

R&S®FSVR

Real-Time Spectrum Analyzer

Service Manual Instrument



1311.0687.82 – 02

The Service Manual Instrument describes the following R&S®FSVR models and options:

- R&S FSVR7 (1311.0006K07)
 - R&S FSVR13 (1311.0006K13)
 - R&S FSVR30 (1311.0006K30)
 - R&S FSVR40 (1311.0006K40)
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- R&S FSV-B21 (1310.9597.02)
 - R&S FSV-B22 (1310.9600.02)
 - R&S FSV-B24 (1310.9616.30)
 - R&S FSV-B25 (1310.9622.02)
 - R&S FSV-B29 (already integrated in the R&S FSVR)

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The following abbreviations are used throughout this manual:

R&S®FSVR is abbreviated as R&S FSVR.

Basic Safety Instructions

Always read through and comply with the following safety instructions!

All plants and locations of the Rohde & Schwarz group of companies make every effort to keep the safety standards of our products up to date and to offer our customers the highest possible degree of safety. Our products and the auxiliary equipment they require are designed, built and tested in accordance with the safety standards that apply in each case. Compliance with these standards is continuously monitored by our quality assurance system. The product described here has been designed, built and tested in accordance with the attached EC Certificate of Conformity and has left the manufacturer's plant in a condition fully complying with safety standards. To maintain this condition and to ensure safe operation, you must observe all instructions and warnings provided in this manual. If you have any questions regarding these safety instructions, the Rohde & Schwarz group of companies will be happy to answer them.

Furthermore, it is your responsibility to use the product in an appropriate manner. This product is designed for use solely in industrial and laboratory environments or, if expressly permitted, also in the field and must not be used in any way that may cause personal injury or property damage. You are responsible if the product is used for any intention other than its designated purpose or in disregard of the manufacturer's instructions. The manufacturer shall assume no responsibility for such use of the product.

The product is used for its designated purpose if it is used in accordance with its product documentation and within its performance limits (see data sheet, documentation, the following safety instructions). Using the product requires technical skills and a basic knowledge of English. It is therefore essential that only skilled and specialized staff or thoroughly trained personnel with the required skills be allowed to use the product. If personal safety gear is required for using Rohde & Schwarz products, this will be indicated at the appropriate place in the product documentation. Keep the basic safety instructions and the product documentation in a safe place and pass them on to the subsequent users.

Observing the safety instructions will help prevent personal injury or damage of any kind caused by dangerous situations. Therefore, carefully read through and adhere to the following safety instructions before and when using the product. It is also absolutely essential to observe the additional safety instructions on personal safety, for example, that appear in relevant parts of the product documentation. In these safety instructions, the word "product" refers to all merchandise sold and distributed by the Rohde & Schwarz group of companies, including instruments, systems and all accessories.

Symbols and safety labels

							
Notice, general danger location Observe product documentation	Caution when handling heavy equipment	Danger of electric shock	Warning! Hot surface	PE terminal	Ground	Ground terminal	Be careful when handling electrostatic sensitive devices

					
ON/OFF supply voltage	Standby indication	Direct current (DC)	Alternating current (AC)	Direct/alternating current (DC/AC)	Device fully protected by double (reinforced) insulation

Tags and their meaning

The following signal words are used in the product documentation in order to warn the reader about risks and dangers.



indicates a hazardous situation which, if not avoided, will result in death or serious injury.



indicates a hazardous situation which, if not avoided, could result in death or serious injury.



indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



indicates the possibility of incorrect operation which can result in damage to the product.

In the product documentation, the word ATTENTION is used synonymously.

These tags are in accordance with the standard definition for civil applications in the European Economic Area. Definitions that deviate from the standard definition may also exist in other economic areas or military applications. It is therefore essential to make sure that the tags described here are always used only in connection with the related product documentation and the related product. The use of tags in connection with unrelated products or documentation can result in misinterpretation and in personal injury or material damage.

Operating states and operating positions

The product may be operated only under the operating conditions and in the positions specified by the manufacturer, without the product's ventilation being obstructed. If the manufacturer's specifications are not observed, this can result in electric shock, fire and/or serious personal injury or death. Applicable local or national safety regulations and rules for the prevention of accidents must be observed in all work performed.

1. Unless otherwise specified, the following requirements apply to Rohde & Schwarz products:
predefined operating position is always with the housing floor facing down, IP protection 2X, pollution severity 2, overvoltage category 2, use only indoors, max. operating altitude 2000 m above sea level, max. transport altitude 4500 m above sea level. A tolerance of $\pm 10\%$ shall apply to the nominal voltage and $\pm 5\%$ to the nominal frequency.
2. Do not place the product on surfaces, vehicles, cabinets or tables that for reasons of weight or stability are unsuitable for this purpose. Always follow the manufacturer's installation instructions when installing the product and fastening it to objects or structures (e.g. walls and shelves). An installation that is not carried out as described in the product documentation could result in personal injury or death.
3. Do not place the product on heat-generating devices such as radiators or fan heaters. The ambient temperature must not exceed the maximum temperature specified in the product documentation or in the data sheet. Product overheating can cause electric shock, fire and/or serious personal injury or death.

Electrical safety

If the information on electrical safety is not observed either at all to the extent necessary, electric shock, fire and/or serious personal injury or death may occur.

1. Prior to switching on the product, always ensure that the nominal voltage setting on the product matches the nominal voltage of the AC supply network. If a different voltage is to be set, the power fuse of the product may have to be changed accordingly.
2. In the case of products of safety class I with movable power cord and connector, operation is permitted only on sockets with an earthing contact and protective earth connection.
3. Intentionally breaking the protective earth connection either in the feed line or in the product itself is not permitted. Doing so can result in the danger of an electric shock from the product. If extension cords or connector strips are implemented, they must be checked on a regular basis to ensure that they are safe to use.
4. If the product does not have a power switch for disconnection from the AC supply network, the plug of the connecting cable is regarded as the disconnecting device. In such cases, always ensure that the power plug is easily reachable and accessible at all times (corresponding to the length of connecting cable, approx. 2 m). Functional or electronic switches are not suitable for providing disconnection from the AC supply network. If products without power switches are integrated into racks or systems, a disconnecting device must be provided at the system level.
5. Never use the product if the power cable is damaged. Check the power cable on a regular basis to ensure that it is in proper operating condition. By taking appropriate safety measures and carefully laying the power cable, you can ensure that the cable will not be damaged and that no one can be hurt by, for example, tripping over the cable or suffering an electric shock.
6. The product may be operated only from TN/TT supply networks fused with max. 16 A (higher fuse only after consulting with the Rohde & Schwarz group of companies).
7. Do not insert the plug into sockets that are dusty or dirty. Insert the plug firmly and all the way into the socket. Otherwise, sparks that result in fire and/or injuries may occur.
8. Do not overload any sockets, extension cords or connector strips; doing so can cause fire or electric shocks.
9. For measurements in circuits with voltages $V_{\text{rms}} > 30 \text{ V}$, suitable measures (e.g. appropriate measuring equipment, fusing, current limiting, electrical separation, insulation) should be taken to avoid any hazards.
10. Ensure that the connections with information technology equipment, e.g. PCs or other industrial computers, comply with the IEC60950-1/EN60950-1 or IEC61010-1/EN 61010-1 standards that apply in each case.
11. Unless expressly permitted, never remove the cover or any part of the housing while the product is in operation. Doing so will expose circuits and components and can lead to injuries, fire or damage to the product.
12. If a product is to be permanently installed, the connection between the PE terminal on site and the product's PE conductor must be made first before any other connection is made. The product may be installed and connected only by a licensed electrician.
13. For permanently installed equipment without built-in fuses, circuit breakers or similar protective devices, the supply circuit must be fused in such a way that anyone who has access to the product, as well as the product itself, is adequately protected from injury or damage.

14. Use suitable overvoltage protection to ensure that no overvoltage (such as that caused by a bolt of lightning) can reach the product. Otherwise, the person operating the product will be exposed to the danger of an electric shock.
15. Any object that is not designed to be placed in the openings of the housing must not be used for this purpose. Doing so can cause short circuits inside the product and/or electric shocks, fire or injuries.
16. Unless specified otherwise, products are not liquid-proof (see also section "Operating states and operating positions", item 1. Therefore, the equipment must be protected against penetration by liquids. If the necessary precautions are not taken, the user may suffer electric shock or the product itself may be damaged, which can also lead to personal injury.
17. Never use the product under conditions in which condensation has formed or can form in or on the product, e.g. if the product has been moved from a cold to a warm environment. Penetration by water increases the risk of electric shock.
18. Prior to cleaning the product, disconnect it completely from the power supply (e.g. AC supply network or battery). Use a soft, non-linting cloth to clean the product. Never use chemical cleaning agents such as alcohol, acetone or diluents for cellulose lacquers.

Operation

1. Operating the products requires special training and intense concentration. Make sure that persons who use the products are physically, mentally and emotionally fit enough to do so; otherwise, injuries or material damage may occur. It is the responsibility of the employer/operator to select suitable personnel for operating the products.
2. Before you move or transport the product, read and observe the section titled "Transport".
3. As with all industrially manufactured goods, the use of substances that induce an allergic reaction (allergens) such as nickel cannot be generally excluded. If you develop an allergic reaction (such as a skin rash, frequent sneezing, red eyes or respiratory difficulties) when using a Rohde & Schwarz product, consult a physician immediately to determine the cause and to prevent health problems or stress.
4. Before you start processing the product mechanically and/or thermally, or before you take it apart, be sure to read and pay special attention to the section titled "Waste disposal", item 1.
5. Depending on the function, certain products such as RF radio equipment can produce an elevated level of electromagnetic radiation. Considering that unborn babies require increased protection, pregnant women must be protected by appropriate measures. Persons with pacemakers may also be exposed to risks from electromagnetic radiation. The employer/operator must evaluate workplaces where there is a special risk of exposure to radiation and, if necessary, take measures to avert the potential danger.
6. Should a fire occur, the product may release hazardous substances (gases, fluids, etc.) that can cause health problems. Therefore, suitable measures must be taken, e.g. protective masks and protective clothing must be worn.
7. If a laser product (e.g. a CD/DVD drive) is integrated into a Rohde & Schwarz product, absolutely no other settings or functions may be used as described in the product documentation. The objective is to prevent personal injury (e.g. due to laser beams).

Repair and service

1. The product may be opened only by authorized, specially trained personnel. Before any work is performed on the product or before the product is opened, it must be disconnected from the AC supply network. Otherwise, personnel will be exposed to the risk of an electric shock.
2. Adjustments, replacement of parts, maintenance and repair may be performed only by electrical experts authorized by Rohde & Schwarz. Only original parts may be used for replacing parts relevant to safety (e.g. power switches, power transformers, fuses). A safety test must always be performed after parts relevant to safety have been replaced (visual inspection, PE conductor test, insulation resistance measurement, leakage current measurement, functional test). This helps ensure the continued safety of the product.

Batteries and rechargeable batteries/cells

If the information regarding batteries and rechargeable batteries/cells is not observed either at all or to the extent necessary, product users may be exposed to the risk of explosions, fire and/or serious personal injury, and, in some cases, death. Batteries and rechargeable batteries with alkaline electrolytes (e.g. lithium cells) must be handled in accordance with the EN 62133 standard.

1. Cells must not be taken apart or crushed.
2. Cells or batteries must not be exposed to heat or fire. Storage in direct sunlight must be avoided. Keep cells and batteries clean and dry. Clean soiled connectors using a dry, clean cloth.
3. Cells or batteries must not be short-circuited. Cells or batteries must not be stored in a box or in a drawer where they can short-circuit each other, or where they can be short-circuited by other conductive materials. Cells and batteries must not be removed from their original packaging until they are ready to be used.
4. Keep cells and batteries out of the hands of children. If a cell or a battery has been swallowed, seek medical aid immediately.
5. Cells and batteries must not be exposed to any mechanical shocks that are stronger than permitted.
6. If a cell develops a leak, the fluid must not be allowed to come into contact with the skin or eyes. If contact occurs, wash the affected area with plenty of water and seek medical aid.
7. Improperly replacing or charging cells or batteries that contain alkaline electrolytes (e.g. lithium cells) can cause explosions. Replace cells or batteries only with the matching Rohde & Schwarz type (see parts list) in order to ensure the safety of the product.
8. Cells and batteries must be recycled and kept separate from residual waste. Rechargeable batteries and normal batteries that contain lead, mercury or cadmium are hazardous waste. Observe the national regulations regarding waste disposal and recycling.

Transport

1. The product may be very heavy. Therefore, the product must be handled with care. In some cases, the user may require a suitable means of lifting or moving the product (e.g. with a lift-truck) to avoid back or other physical injuries.

2. Handles on the products are designed exclusively to enable personnel to transport the product. It is therefore not permissible to use handles to fasten the product to or on transport equipment such as cranes, fork lifts, wagons, etc. The user is responsible for securely fastening the products to or on the means of transport or lifting. Observe the safety regulations of the manufacturer of the means of transport or lifting. Noncompliance can result in personal injury or material damage.
3. If you use the product in a vehicle, it is the sole responsibility of the driver to drive the vehicle safely and properly. The manufacturer assumes no responsibility for accidents or collisions. Never use the product in a moving vehicle if doing so could distract the driver of the vehicle. Adequately secure the product in the vehicle to prevent injuries or other damage in the event of an accident.

Waste disposal

1. If products or their components are mechanically and/or thermally processed in a manner that goes beyond their intended use, hazardous substances (heavy-metal dust such as lead, beryllium, nickel) may be released. For this reason, the product may only be disassembled by specially trained personnel. Improper disassembly may be hazardous to your health. National waste disposal regulations must be observed.
2. If handling the product releases hazardous substances or fuels that must be disposed of in a special way, e.g. coolants or engine oils that must be replenished regularly, the safety instructions of the manufacturer of the hazardous substances or fuels and the applicable regional waste disposal regulations must be observed. Also observe the relevant safety instructions in the product documentation. The improper disposal of hazardous substances or fuels can cause health problems and lead to environmental damage.

Informaciones elementales de seguridad

Es imprescindible leer y observar las siguientes instrucciones e informaciones de seguridad!

El principio del grupo de empresas Rohde & Schwarz consiste en tener nuestros productos siempre al día con los estándares de seguridad y de ofrecer a nuestros clientes el máximo grado de seguridad. Nuestros productos y todos los equipos adicionales son siempre fabricados y examinados según las normas de seguridad vigentes. Nuestro sistema de garantía de calidad controla constantemente que sean cumplidas estas normas. El presente producto ha sido fabricado y examinado según el certificado de conformidad adjunto de la UE y ha salido de nuestra planta en estado impecable según los estándares técnicos de seguridad. Para poder preservar este estado y garantizar un funcionamiento libre de peligros, el usuario deberá atenerse a todas las indicaciones, informaciones de seguridad y notas de alerta. El grupo de empresas Rohde & Schwarz está siempre a su disposición en caso de que tengan preguntas referentes a estas informaciones de seguridad.

Además queda en la responsabilidad del usuario utilizar el producto en la forma debida. Este producto está destinado exclusivamente al uso en la industria y el laboratorio o, si ha sido expresamente autorizado, para aplicaciones de campo y de ninguna manera deberá ser utilizado de modo que alguna persona/cosa pueda sufrir daño. El uso del producto fuera de sus fines definidos o sin tener en cuenta las instrucciones del fabricante queda en la responsabilidad del usuario. El fabricante no se hace en ninguna forma responsable de consecuencias a causa del mal uso del producto.

Informaciones elementales de seguridad

Se parte del uso correcto del producto para los fines definidos si el producto es utilizado conforme a las indicaciones de la correspondiente documentación del producto y dentro del margen de rendimiento definido (ver hoja de datos, documentación, informaciones de seguridad que siguen). El uso del producto hace necesarios conocimientos técnicos y ciertos conocimientos del idioma inglés. Por eso se debe tener en cuenta que el producto solo pueda ser operado por personal especializado o personas instruidas en profundidad con las capacidades correspondientes. Si fuera necesaria indumentaria de seguridad para el uso de productos de Rohde & Schwarz, encontraría la información debida en la documentación del producto en el capítulo correspondiente. Guarde bien las informaciones de seguridad elementales, así como la documentación del producto, y entréguelas a usuarios posteriores.

Tener en cuenta las informaciones de seguridad sirve para evitar en lo posible lesiones o daños por peligros de toda clase. Por eso es imprescindible leer detalladamente y comprender por completo las siguientes informaciones de seguridad antes de usar el producto, y respetarlas durante el uso del producto. Deberán tenerse en cuenta todas las demás informaciones de seguridad, como p. ej. las referentes a la protección de personas, que encontrarán en el capítulo correspondiente de la documentación del producto y que también son de obligado cumplimiento. En las presentes informaciones de seguridad se recogen todos los objetos que distribuye el grupo de empresas Rohde & Schwarz bajo la denominación de "producto", entre ellos también aparatos, instalaciones así como toda clase de accesorios.

Símbolos y definiciones de seguridad

							
Aviso: punto de peligro general Observar la documentación del producto	Atención en el manejo de dispositivos de peso elevado	Peligro de choque eléctrico	Advertencia: superficie caliente	Conexión a conductor de protección	Conexión a tierra	Conexión a masa	Aviso: Cuidado en el manejo de dispositivos sensibles a la electrostática (ESD)

					
Tensión de alimentación de PUESTA EN MARCHA / PARADA	Indicación de estado de espera (Standby)	Corriente continua (DC)	Corriente alterna (AC)	Corriente continua / Corriente alterna (DC/AC)	El aparato está protegido en su totalidad por un aislamiento doble (reforzado)

Palabras de señal y su significado

En la documentación del producto se utilizan las siguientes palabras de señal con el fin de advertir contra riesgos y peligros.



PELIGRO identifica un peligro inminente con riesgo elevado que provocará muerte o lesiones graves si no se evita.



ADVERTENCIA identifica un posible peligro con riesgo medio de provocar muerte o lesiones (graves) si no se evita.



ATENCIÓN identifica un peligro con riesgo reducido de provocar lesiones leves o moderadas si no se evita.



AVISO indica la posibilidad de utilizar mal el producto y, como consecuencia, dañarlo.

En la documentación del producto se emplea de forma sinónima el término CUIDADO.

Las palabras de señal corresponden a la definición habitual para aplicaciones civiles en el área económica europea. Pueden existir definiciones diferentes a esta definición en otras áreas económicas o en aplicaciones militares. Por eso se deberá tener en cuenta que las palabras de señal aquí descritas sean utilizadas siempre solamente en combinación con la correspondiente documentación del producto y solamente en combinación con el producto correspondiente. La utilización de las palabras de señal en combinación con productos o documentaciones que no les correspondan puede llevar a interpretaciones equivocadas y tener por consecuencia daños en personas u objetos.

Estados operativos y posiciones de funcionamiento

El producto solamente debe ser utilizado según lo indicado por el fabricante respecto a los estados operativos y posiciones de funcionamiento sin que se obstruya la ventilación. Si no se siguen las indicaciones del fabricante, pueden producirse choques eléctricos, incendios y/o lesiones graves con posible consecuencia de muerte. En todos los trabajos deberán ser tenidas en cuenta las normas nacionales y locales de seguridad del trabajo y de prevención de accidentes.

1. Si no se convino de otra manera, es para los productos Rohde & Schwarz válido lo que sigue: como posición de funcionamiento se define por principio la posición con el suelo de la caja para abajo, modo de protección IP 2X, grado de suciedad 2, categoría de sobrecarga eléctrica 2, uso solamente en estancias interiores, utilización hasta 2000 m sobre el nivel del mar, transporte hasta 4500 m sobre el nivel del mar. Se aplicará una tolerancia de $\pm 10\%$ sobre el voltaje nominal y de $\pm 5\%$ sobre la frecuencia nominal.
2. No sitúe el producto encima de superficies, vehículos, estantes o mesas, que por sus características de peso o de estabilidad no sean aptos para él. Siga siempre las instrucciones de instalación del fabricante cuando instale y asegure el producto en objetos o estructuras (p. ej. paredes y estantes). Si se realiza la instalación de modo distinto al indicado en la documentación del producto, pueden causarse lesiones o incluso la muerte.
3. No ponga el producto sobre aparatos que generen calor (p. ej. radiadores o calefactores). La temperatura ambiente no debe superar la temperatura máxima especificada en la documentación del producto o en la hoja de datos. En caso de sobrecalentamiento del producto, pueden producirse choques eléctricos, incendios y/o lesiones graves con posible consecuencia de muerte.

Seguridad eléctrica

Si no se siguen (o se siguen de modo insuficiente) las indicaciones del fabricante en cuanto a seguridad eléctrica, pueden producirse choques eléctricos, incendios y/o lesiones graves con posible consecuencia de muerte.

1. Antes de la puesta en marcha del producto se deberá comprobar siempre que la tensión preseleccionada en el producto coincida con la de la red de alimentación eléctrica. Si es necesario modificar el ajuste de tensión, también se deberán cambiar en caso dado los fusibles correspondientes del producto.
2. Los productos de la clase de protección I con alimentación móvil y enchufe individual solamente podrán enchufarse a tomas de corriente con contacto de seguridad y con conductor de protección conectado.
3. Queda prohibida la interrupción intencionada del conductor de protección, tanto en la toma de corriente como en el mismo producto. La interrupción puede tener como consecuencia el riesgo de que el producto sea fuente de choques eléctricos. Si se utilizan cables alargadores o regletas de enchufe, deberá garantizarse la realización de un examen regular de los mismos en cuanto a su estado técnico de seguridad.
4. Si el producto no está equipado con un interruptor para desconectarlo de la red, se deberá considerar el enchufe del cable de conexión como interruptor. En estos casos se deberá asegurar que el enchufe siempre sea de fácil acceso (de acuerdo con la longitud del cable de conexión, aproximadamente 2 m). Los interruptores de función o electrónicos no son aptos para el corte de la red eléctrica. Si los productos sin interruptor están integrados en bastidores o instalaciones, se deberá colocar el interruptor en el nivel de la instalación.
5. No utilice nunca el producto si está dañado el cable de conexión a red. Compruebe regularmente el correcto estado de los cables de conexión a red. Asegúrese, mediante las medidas de protección y de instalación adecuadas, de que el cable de conexión a red no pueda ser dañado o de que nadie pueda ser dañado por él, p. ej. al tropezar o por un choque eléctrico.
6. Solamente está permitido el funcionamiento en redes de alimentación TN/TT aseguradas con fusibles de 16 A como máximo (utilización de fusibles de mayor amperaje solo previa consulta con el grupo de empresas Rohde & Schwarz).
7. Nunca conecte el enchufe en tomas de corriente sucias o llenas de polvo. Introduzca el enchufe por completo y fuertemente en la toma de corriente. La no observación de estas medidas puede provocar chispas, fuego y/o lesiones.
8. No sobrecargue las tomas de corriente, los cables alargadores o las regletas de enchufe ya que esto podría causar fuego o choques eléctricos.
9. En las mediciones en circuitos de corriente con una tensión $U_{\text{eff}} > 30 \text{ V}$ se deberán tomar las medidas apropiadas para impedir cualquier peligro (p. ej. medios de medición adecuados, seguros, limitación de tensión, corte protector, aislamiento etc.).
10. Para la conexión con dispositivos informáticos como un PC o un ordenador industrial, debe comprobarse que éstos cumplan los estándares IEC60950-1/EN60950-1 o IEC61010-1/EN 61010-1 válidos en cada caso.
11. A menos que esté permitido expresamente, no retire nunca la tapa ni componentes de la carcasa mientras el producto esté en servicio. Esto pone a descubierto los cables y componentes eléctricos y puede causar lesiones, fuego o daños en el producto.

12. Si un producto se instala en un lugar fijo, se deberá primero conectar el conductor de protección fijo con el conductor de protección del producto antes de hacer cualquier otra conexión. La instalación y la conexión deberán ser efectuadas por un electricista especializado.
13. En el caso de dispositivos fijos que no estén provistos de fusibles, interruptor automático ni otros mecanismos de seguridad similares, el circuito de alimentación debe estar protegido de modo que todas las personas que puedan acceder al producto, así como el producto mismo, estén a salvo de posibles daños.
14. Todo producto debe estar protegido contra sobretensión (debida p. ej. a una caída del rayo) mediante los correspondientes sistemas de protección. Si no, el personal que lo utilice quedará expuesto al peligro de choque eléctrico.
15. No debe introducirse en los orificios de la caja del aparato ningún objeto que no esté destinado a ello. Esto puede producir cortocircuitos en el producto y/o puede causar choques eléctricos, fuego o lesiones.
16. Salvo indicación contraria, los productos no están impermeabilizados (ver también el capítulo "Estados operativos y posiciones de funcionamiento", punto 1). Por eso es necesario tomar las medidas necesarias para evitar la entrada de líquidos. En caso contrario, existe peligro de choque eléctrico para el usuario o de daños en el producto, que también pueden redundar en peligro para las personas.
17. No utilice el producto en condiciones en las que pueda producirse o ya se hayan producido condensaciones sobre el producto o en el interior de éste, como p. ej. al desplazarlo de un lugar frío a otro caliente. La entrada de agua aumenta el riesgo de choque eléctrico.
18. Antes de la limpieza, desconecte por completo el producto de la alimentación de tensión (p. ej. red de alimentación o batería). Realice la limpieza de los aparatos con un paño suave, que no se deshilache. No utilice bajo ningún concepto productos de limpieza químicos como alcohol, acetona o diluyentes para lacas nitrocelulósicas.

Funcionamiento

1. El uso del producto requiere instrucciones especiales y una alta concentración durante el manejo. Debe asegurarse que las personas que manejen el producto estén a la altura de los requerimientos necesarios en cuanto a aptitudes físicas, psíquicas y emocionales, ya que de otra manera no se pueden excluir lesiones o daños de objetos. El empresario u operador es responsable de seleccionar el personal usuario apto para el manejo del producto.
2. Antes de desplazar o transportar el producto, lea y tenga en cuenta el capítulo "Transporte".
3. Como con todo producto de fabricación industrial no puede quedar excluida en general la posibilidad de que se produzcan alergias provocadas por algunos materiales empleados, los llamados alérgenos (p. ej. el níquel). Si durante el manejo de productos Rohde & Schwarz se producen reacciones alérgicas, como p. ej. irritaciones cutáneas, estornudos continuos, enrojecimiento de la conjuntiva o dificultades respiratorias, debe avisarse inmediatamente a un médico para investigar las causas y evitar cualquier molestia o daño a la salud.
4. Antes de la manipulación mecánica y/o térmica o el desmontaje del producto, debe tenerse en cuenta imprescindiblemente el capítulo "Eliminación", punto 1.

5. Ciertos productos, como p. ej. las instalaciones de radiocomunicación RF, pueden a causa de su función natural, emitir una radiación electromagnética aumentada. Deben tomarse todas las medidas necesarias para la protección de las mujeres embarazadas. También las personas con marcapasos pueden correr peligro a causa de la radiación electromagnética. El empresario/operador tiene la obligación de evaluar y señalar las áreas de trabajo en las que exista un riesgo elevado de exposición a radiaciones.
6. Tenga en cuenta que en caso de incendio pueden desprenderse del producto sustancias tóxicas (gases, líquidos etc.) que pueden generar daños a la salud. Por eso, en caso de incendio deben usarse medidas adecuadas, como p. ej. máscaras antigás e indumentaria de protección.
7. En caso de que un producto Rohde & Schwarz contenga un producto láser (p. ej. un lector de CD/DVD), no debe usarse ninguna otra configuración o función aparte de las descritas en la documentación del producto, a fin de evitar lesiones (p. ej. debidas a irradiación láser).

Reparación y mantenimiento

1. El producto solamente debe ser abierto por personal especializado con autorización para ello. Antes de manipular el producto o abrirlo, es obligatorio desconectarlo de la tensión de alimentación, para evitar toda posibilidad de choque eléctrico.
2. El ajuste, el cambio de partes, el mantenimiento y la reparación deberán ser efectuadas solamente por electricistas autorizados por Rohde & Schwarz. Si se reponen partes con importancia para los aspectos de seguridad (p. ej. el enchufe, los transformadores o los fusibles), solamente podrán ser sustituidos por partes originales. Después de cada cambio de partes relevantes para la seguridad deberá realizarse un control de seguridad (control a primera vista, control del conductor de protección, medición de resistencia de aislamiento, medición de la corriente de fuga, control de funcionamiento). Con esto queda garantizada la seguridad del producto.

Baterías y acumuladores o celdas

Si no se siguen (o se siguen de modo insuficiente) las indicaciones en cuanto a las baterías y acumuladores o celdas, pueden producirse explosiones, incendios y/o lesiones graves con posible consecuencia de muerte. El manejo de baterías y acumuladores con electrolitos alcalinos (p. ej. celdas de litio) debe seguir el estándar EN 62133.

1. No deben desmontarse, abrirse ni triturarse las celdas.
2. Las celdas o baterías no deben someterse a calor ni fuego. Debe evitarse el almacenamiento a la luz directa del sol. Las celdas y baterías deben mantenerse limpias y secas. Limpiar las conexiones sucias con un paño seco y limpio.
3. Las celdas o baterías no deben cortocircuitarse. Es peligroso almacenar las celdas o baterías en estuches o cajones en cuyo interior puedan cortocircuitarse por contacto recíproco o por contacto con otros materiales conductores. No deben extraerse las celdas o baterías de sus embalajes originales hasta el momento en que vayan a utilizarse.
4. Mantener baterías y celdas fuera del alcance de los niños. En caso de ingestión de una celda o batería, avisar inmediatamente a un médico.
5. Las celdas o baterías no deben someterse a impactos mecánicos fuertes indebidos.

6. En caso de falta de estanqueidad de una celda, el líquido vertido no debe entrar en contacto con la piel ni los ojos. Si se produce contacto, lavar con agua abundante la zona afectada y avisar a un médico.
7. En caso de cambio o recarga inadecuados, las celdas o baterías que contienen electrolitos alcalinos (p. ej. las celdas de litio) pueden explotar. Para garantizar la seguridad del producto, las celdas o baterías solo deben ser sustituidas por el tipo Rohde & Schwarz correspondiente (ver lista de recambios).
8. Las baterías y celdas deben reciclarse y no deben tirarse a la basura doméstica. Las baterías o acumuladores que contienen plomo, mercurio o cadmio deben tratarse como residuos especiales. Respete en esta relación las normas nacionales de eliminación y reciclaje.

Transporte

1. El producto puede tener un peso elevado. Por eso es necesario desplazarlo o transportarlo con precaución y, si es necesario, usando un sistema de elevación adecuado (p. ej. una carretilla elevadora), a fin de evitar lesiones en la espalda u otros daños personales.
2. Las asas instaladas en los productos sirven solamente de ayuda para el transporte del producto por personas. Por eso no está permitido utilizar las asas para la sujeción en o sobre medios de transporte como p. ej. grúas, carretillas elevadoras de horquilla, carros etc. Es responsabilidad suya fijar los productos de manera segura a los medios de transporte o elevación. Para evitar daños personales o daños en el producto, siga las instrucciones de seguridad del fabricante del medio de transporte o elevación utilizado.
3. Si se utiliza el producto dentro de un vehículo, recae de manera exclusiva en el conductor la responsabilidad de conducir el vehículo de manera segura y adecuada. El fabricante no asumirá ninguna responsabilidad por accidentes o colisiones. No utilice nunca el producto dentro de un vehículo en movimiento si esto pudiera distraer al conductor. Asegure el producto dentro del vehículo debidamente para evitar, en caso de un accidente, lesiones u otra clase de daños.

Eliminación

1. Si se trabaja de manera mecánica y/o térmica cualquier producto o componente más allá del funcionamiento previsto, pueden liberarse sustancias peligrosas (polvos con contenido de metales pesados como p. ej. plomo, berilio o níquel). Por eso el producto solo debe ser desmontado por personal especializado con formación adecuada. Un desmontaje inadecuado puede ocasionar daños para la salud. Se deben tener en cuenta las directivas nacionales referentes a la eliminación de residuos.
2. En caso de que durante el trato del producto se formen sustancias peligrosas o combustibles que deban tratarse como residuos especiales (p. ej. refrigerantes o aceites de motor con intervalos de cambio definidos), deben tenerse en cuenta las indicaciones de seguridad del fabricante de dichas sustancias y las normas regionales de eliminación de residuos. Tenga en cuenta también en caso necesario las indicaciones de seguridad especiales contenidas en la documentación del producto. La eliminación incorrecta de sustancias peligrosas o combustibles puede causar daños a la salud o daños al medio ambiente.

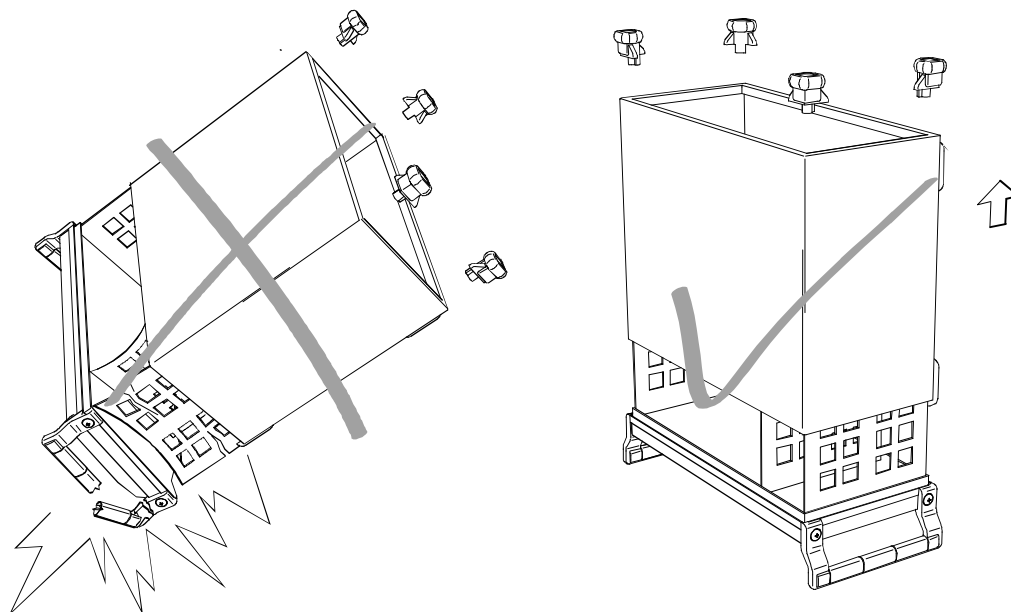
Safety Instructions for Units with Removable Cabinet

WARNING

Danger of injuries

When removing the rear feet, the unit can slip out of the cabinet.

Put the unit onto the front handles, before removing the rear feet and taking off the cabinet. Thus the risk of personal injuries and damages to the unit is avoided.



When mounting the cabinet take care not to pen in the fingers. Also pay attention not to damage or pull off cables. Screw the rear feet back on immediately after mounting the cabinet. Do not move the unit with the rear feet missing.

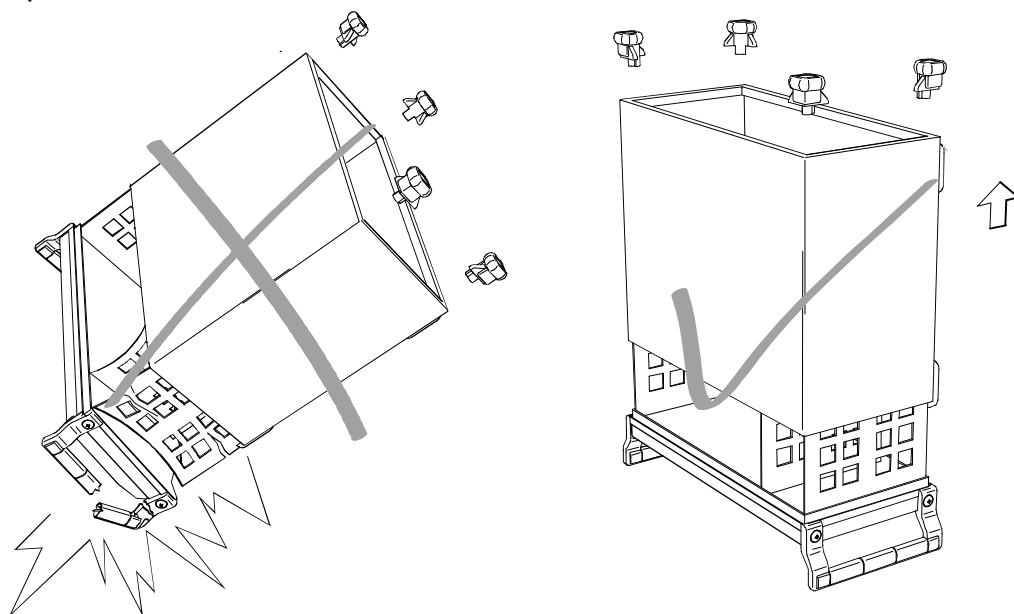
Informaciones de seguridad para aparatos con tubo de quita y pon

ADVERTENCIA

Peligro de heridas

Al sacar los pies de la pared posterior puede deslizarse el aparato fuera de la caja.

Posicionar el aparato de manera segura sobre las asas delanteras, antes de sacar los pies de la pared posterior y entonces sacar la caja. De esta manera evitarán el riesgo de daños en personas y daños en el aparato.



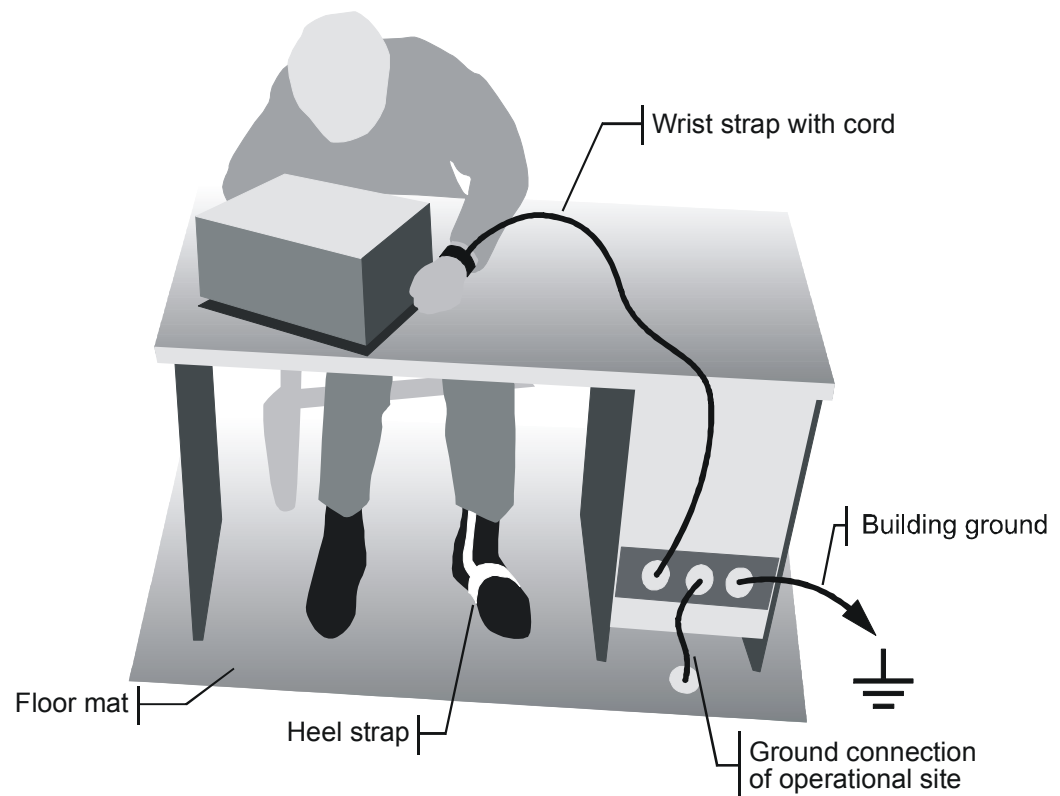
Existe el riesgo de heridas en el momento de poner otra vez la caja, como por ejemplo posiblemente engancharse los dedos. Por favor tengan además en cuenta de que no se enganchen o desconecten cables. Por favor atornillen los pies de la pared posterior directamente despues de poner la caja. No muevan el aparato nunca sin que los pies de la pared posterior estén atornillados.

Instructions for Electrostatic Discharge Protection

NOTICE

Risk of damaging electronic components

To avoid damage of electronic components, the operational site must be protected against electrostatic discharge (ESD).



The following two methods of ESD protection may be used together or separately:

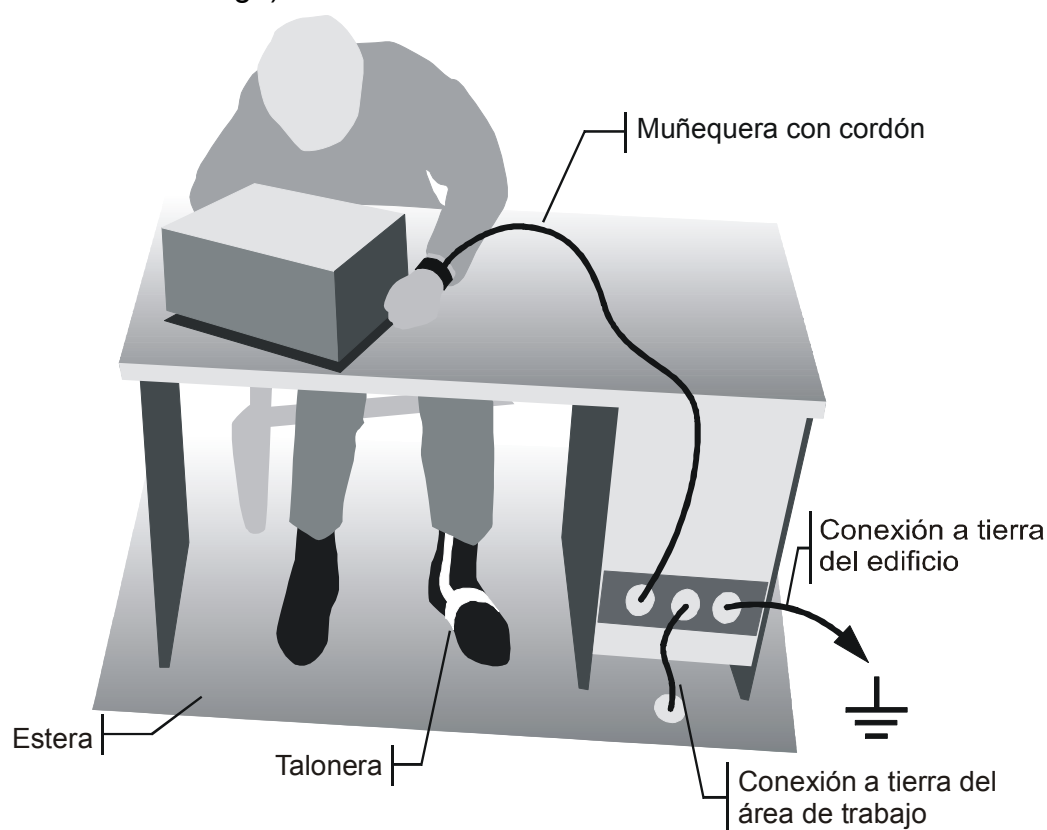
- Wrist strap with cord to ground connection
 - Conductive floor mat and heel strap combination
-

Instrucciones para la protección contra descargas electroestáticas

AVISO

Riesgo de avería de los componentes electrónicos

Para evitar averías en los componentes electrónicos, el área de trabajo tiene que estar protegido contra descargas electroestáticas ESD (electrostatic discharge).



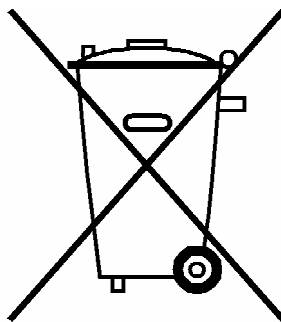
Los siguientes dos métodos de protección ESD pueden ser usados juntos o separados:

- Muñequera con cordón para conexión a tierra
- Combinación de estera antiestática y talonera

Customer Information Regarding Product Disposal

The German Electrical and Electronic Equipment (ElektroG) Act is an implementation of the following EC directives:

- 2002/96/EC on waste electrical and electronic equipment (WEEE) and
- 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS).



Product labeling in accordance with EN 50419

Once the lifetime of a product has ended, this product must not be disposed of in the standard domestic refuse. Even disposal via the municipal collection points for waste electrical and electronic equipment is not permitted.

Rohde & Schwarz GmbH & Co. KG has developed a disposal concept for the environmental-friendly disposal or recycling of waste material and fully assumes its obligation as a producer to take back and dispose of electrical and electronic waste in accordance with the ElektroG Act.

Please contact your local service representative to dispose of the product.



Kundeninformation zur Batterieverordnung (BattV)

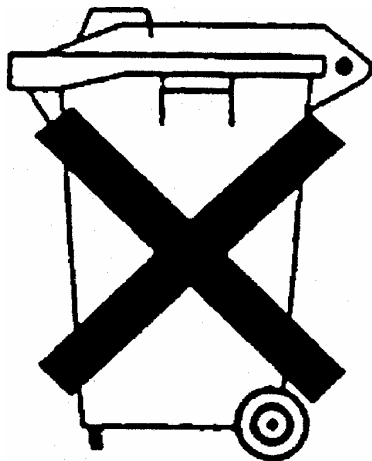
Dieses Gerät enthält eine schadstoffhaltige Batterie. Diese darf nicht mit dem Hausmüll entsorgt werden.

Nach Ende der Lebensdauer darf die Entsorgung nur über eine Rohde&Schwarz-Kundendienststelle oder eine geeignete Sammelstelle erfolgen.

Safety Regulations for Batteries (according to BattV)

This equipment houses a battery containing harmful substances that must not be disposed of as normal household waste.

After its useful life, the battery may only be disposed of at a Rohde & Schwarz service center or at a suitable depot.



Normas de Seguridad para Baterías (Según BattV)

Este equipo lleva una batería que contiene sustancias perjudiciales, que no se debe desechar en los contenedores de basura domésticos.

Después de la vida útil, la batería sólo se podrá eliminar en un centro de servicio de Rohde & Schwarz o en un depósito apropiado.

Consignes de sécurité pour batteries (selon BattV)

Cet appareil est équipé d'une pile comprenant des substances nocives. Ne jamais la jeter dans une poubelle pour ordures ménagères.

Une pile usagée doit uniquement être éliminée par un centre de service client de Rohde & Schwarz ou peut être collectée pour être traitée spécialement comme déchets dangereux.

Procedure in Case of Service and Ordering of Spare Parts

This section contains information on shipping an instrument to your service center and ordering spare parts.

Please contact your local Rohde & Schwarz service center if you need service or repair work of your equipment or to order spare parts. The list of the Rohde & Schwarz representatives is provided at the beginning of this service manual. You can find the current address of your representative on our homepage www.rohde-schwarz.com. Navigate to Service & Support / Service Locations.

Shipping the Instrument

We require the following information in order to answer your inquiry fast and correctly and to determine whether the warranty is still valid for your instrument:

- Instrument model
- Serial number
- Firmware version
- Must the instrument be returned with this firmware?
- Detailed error description in case of repair
- Indication of desired calibration
- Contact person for possible questions

In some countries, an RMA process is available for the return shipment of the instrument. For details, contact your local representative.

When shipping the instrument, be careful to provide for sufficient mechanical and antistatic protection.

- Use the original packaging for transporting or shipping the instrument. The protective caps for the front and rear prevent damage to the operating elements and the connectors.
- If you do not use the original packaging, provide for sufficient padding to prevent the instrument from slipping inside the box. Wrap antistatic packing foil around the instrument to protect it from electrostatic charging.

Rohde & Schwarz offers repair and calibrations of the test systems it produces. The calibration documentation fulfills ISO 17025 requirements.

Shipping Defective Modules

Also when shipping a module, be careful to provide for sufficient mechanical and antistatic protection.

- Ship the module in a sturdy, padded box.
- Wrap the module in antistatic foil.

If the packaging is only antistatic but not conductive, additional conductive packaging is required. The additional packaging is not required if the tightly fitting packaging is conductive.

Exception:

If the module contains a battery, the tightly fitting packaging must always consist of antistatic, non-chargeable material to protect the battery from being discharged.

Ordering Spare Parts

To deliver spare parts promptly and correctly, we need the following information:

- Stock number (see list of spare parts in chapter "Documents")
- Designation
- Component number according to list of spare parts
- Number of pieces
- Instrument type for which the spare part is needed
- Instrument stock number
- Instrument serial number
- Contact person for possible questions

Refurbished Modules

Refurbished modules are an economical alternative to original modules. Bear in mind that refurbished modules are not new, but repaired and fully tested parts. They may have traces from use, but they are electrically and mechanically equivalent to new modules.

Your Rohde & Schwarz representative will be happy to inform you about which modules are available as refurbished modules.

Taking Back Defective Replaced Modules

Defective modules of the replacement program which cannot be repaired are taken back within three months following delivery. A repurchasing value is credited.

Excluded are parts which cannot be repaired, e.g. printed boards that are burnt, broken or damaged by attempts to repair them, incomplete modules, and parts with severe mechanical damage.

Please return the defective replacement modules, together with the accompanying document for returned merchandise, which you received with the spare module. We need the following information:

- Stock number, serial number and designation of the removed part
- Detailed error description
- Stock number, serial number and type of instrument from which the module was removed
- Date of removal
- Name of the engineer/technician who replaced the module
- R&S ordering number
- Service reference number (if available)

Qualitätszertifikat

Certificate of quality

Certificat de qualité

Certified Quality System
ISO 9001

Certified Environmental System
ISO 14001

Sehr geehrter Kunde,

Sie haben sich für den Kauf eines Rohde&Schwarz-Produktes entschieden. Hiermit erhalten Sie ein nach modernsten Fertigungsmethoden hergestelltes Produkt. Es wurde nach den Regeln unseres Qualitätsmanagementsystems entwickelt, gefertigt und geprüft. Das Rohde&Schwarz-Qualitätsmanagementsystem ist u.a. nach ISO 9001 und ISO 14001 zertifiziert.

Der Umwelt verpflichtet

- Energie-effiziente, RoHS-konforme Produkte
- Kontinuierliche Weiterentwicklung nachhaltiger Umweltkonzepte
- ISO 14001-zertifiziertes Umweltmanagementsystem

Dear Customer,

You have decided to buy a Rohde&Schwarz product. You are thus assured of receiving a product that is manufactured using the most modern methods available. This product was developed, manufactured and tested in compliance with our quality management system standards. The Rohde&Schwarz quality management system is certified according to standards such as ISO 9001 and ISO 14001.

Environmental commitment

- Energy-efficient products
- Continuous improvement in environmental sustainability
- ISO 14001-certified environmental management system

Cher client,

Vous avez choisi d'acheter un produit Rohde&Schwarz. Vous disposez donc d'un produit fabriqué d'après les méthodes les plus avancées. Le développement, la fabrication et les tests respectent nos normes de gestion qualité. Le système de gestion qualité de Rohde&Schwarz a été homologué, entre autres, conformément aux normes ISO 9001 et ISO 14001.

Engagement écologique

- Produits à efficience énergétique
- Amélioration continue de la durabilité environnementale
- Système de gestion de l'environnement certifié selon ISO 14001

75 Years of
Driving
Innovation



ROHDE & SCHWARZ

Table of Contents

1	Performance Test	11
1.1	Test Equipment.....	11
1.2	Performance Test R&S FSVR	13
1.2.1	Test Instructions.....	13
1.2.2	Checking the Reference Frequency Uncertainty.....	13
1.2.3	Checking Immunity to Interference.....	14
1.2.4	Checking Nonlinearities	17
1.2.5	Checking IF Filters	18
1.2.6	Checking Spurious Response	19
1.2.7	Checking Noise Display (DANL).....	21
1.2.8	Checking Level Uncertainty and the Frequency Response.....	22
1.2.9	Checking the Display Nonlinearity	29
1.2.10	Checking the RF Attenuator Uncertainty	30
1.2.11	Checking the Phase Noise	32
1.2.12	Checking the VSWR at the RF Input	33
1.3	Performance Test Option LO/IF Ports for External Mixers R&S FSV-B21	34
1.3.1	Checking LO-Level	34
1.3.2	Checking the Input LO_{out} / IF_{in} (2-Port-Mixers).....	35
1.3.3	Checking the Input IF_{in} (3-Port-Mixers).....	36
1.3.4	Checking the Bias Supply	37
1.4	Performance Test for Option RF Preamplifier R&S FSV-B22.....	38
1.4.1	Checking Noise Display.....	38
1.4.2	Checking the Level Uncertainty and the Frequency Response	39
1.5	Performance Test Option RF Preamplifier R&S FSV-B24	45
1.5.1	Checking Noise Display.....	45
1.5.2	Checking the Level Uncertainty and the Frequency Response	46
1.5.3	Absolute Level Uncertainty at 64 MHz	47
1.6	Performance Test for Option Electronic Attenuator R&S FSV-B25.....	52
1.6.1	Checking the Electronic Attenuator Uncertainty	52
1.6.2	Checking the Level Uncertainty and the Frequency Response	53

1.7	Performance Test for Option Frequency Range Extension 10 Hz R&S FSV-B2959	
1.7.1	Checking Noise Display	59
1.7.2	Checking the Frequency Response	60
1.8	Performance Test Report R&S FSVR.....	62
1.9	Performance Test Report for Option R&S FSV-B21	99
1.10	Performance Test Report for Option R&S FSV-B22	101
1.11	Performance Test Report for Option R&S FSV-B24	105
1.12	Performance Test Report for Option R&S FSV-B25	112
1.13	Performance Test Report for Option R&S FSV-B29	115
2	Adjustment	116
2.1	Measuring Equipment	116
2.2	Measuring the Frequency Uncertainty	116
2.3	Troubleshooting.....	117
2.4	Frequency Response Correction	118
3	Repair.....	119
3.1	Functional Description	119
3.1.1	Attenuator	120
3.1.2	Frontend.....	120
3.1.3	Microwave Converter Unit	121
3.1.4	Detector Base Unit.....	122
3.1.5	Detector Extension Unit	122
3.1.6	Motherboard.....	122
3.1.7	Front module controller	122
3.1.8	Front Unit	122
3.1.9	Power Supply.....	122
3.1.10	Options.....	123
3.2	Opening the Instrument	124
3.3	Completing the Instrument	126
3.4	Module Replacement.....	128
3.4.1	Controller A90	128
3.4.2	Lithium Battery on the Controller	130
3.4.3	SATA Hard Drive A91	132
3.4.4	SATA Adaptor A92.....	134

3.4.5	Display with Touch Screen	136
3.4.6	Frontconnector Board A20.....	138
3.4.7	Touch Controller USB Board A60.....	139
3.4.8	Rotary Pulse-Generator A70	141
3.4.9	Push-Button Board Set A80.....	142
3.4.10	Flex Switch Board A81	144
3.4.11	Power Supply Unit	145
3.4.12	Fan	149
3.4.13	Frontend A100	150
3.4.14	Detector Base Unit A120	152
3.4.15	Detector Extension Unit A130.....	154
3.4.16	Attenuator A40	155
3.4.17	Motherboard A10	157
3.4.18	Replacing a blown fuse on the Motherboard A10.....	165
3.4.19	Adapter Board A11	168
3.4.20	MWC Unit A150	169
3.4.21	Diplexer A151	171
3.4.22	Mixer A153.....	172
3.4.23	YIG-Unit (FSVR 13/30/40)	173
3.4.24	Relais-Unit (R&S FSVR13/30/40).....	174
3.4.25	RF Cable W1 (FSVR 7)	175
3.4.26	Adaptor (R&S FSVR13/30/40).....	176
3.4.27	Speaker B1	177
3.4.28	AF Output A71	179
3.4.29	OCXO A250 (R&S FSV-B4)	180
3.4.30	Additional Interface A220 (R&S FSV-B5)	181
3.4.31	RF Cable W18 and RF Cable W19 (only with option R&S FSV-B21)	182
3.4.32	Digital Baseband Interface A240 (R&S FSV-B17).....	183
3.4.33	Preamplifier Unit	185
3.5	Troubleshooting.....	186
3.5.1	Measuring Equipment and Accessories	187
3.5.2	Troubleshooting Start-up Problems	187
3.5.3	Troubleshooting Problems with the Boot Process.....	188

3.5.4	Troubleshooting Problems with the Frontend	191
3.5.5	Troubleshooting Problems with the Microwave Converter Unit.....	191
4	Software Update / Installing Options	195
4.1	Installation of new R&S FSVR Software	195
4.2	Installing Options.....	195
5	Documents	197
5.1	Spare Parts	197
5.2	Available Power Cables	204
5.3	Mechanical Drawings	205

Index

Adapter Board A11		
replacing.....	168	
Additional Interface A220		
replacing.....	181, 182	
adjustment		
equipment.....	116	
frequency accuracy.....	116	
functions.....	116	
AF Output A71		
replacing.....	179	
Attenuator A40		
replacing.....	155	
battery		
replacing (controller).....	130	
boot problems		
troubleshooting.....	188	
Controller A90		
replacing.....	128	
Detector Board A120		
replacing.....	152	
Diplexer A151 (FSVR 30)		
replacing.....	171	
display		
replacing.....	136	
display nonlinearity		
testing.....	29	
documents.....	197	
electronic attenuator		
testing accuracy (option B25).....	52	
error		
fan does not work.....	188	
R&S FSVR cannot be switched on.....	187	
R&S FSVR does not start the measurement application.....	188	
fan		
replacing.....	149	
Flex Switch Board A81		
replacing.....	144	
frequency accuracy		
adjustment.....	116	
checking.....	117	
frequency response		
testing.....	22	
testing (option B22).....	39	
testing (option B25).....	53	
testing (option B29).....	60	
Frontconnector Board A20		
replacing.....	138	
Frontend A100		
replacing.....	150	
IF filters		
testing.....	18	
image frequency rejection.....	15, 16	
interference		
testing.....	14	
level accuracy		
testing.....	22	
testing (option B22).....	39	
testing (option B25).....	53	
measuring equipment.....	116	
troubleshooting.....	187	
Mixer A153 (FSVR 30)		
replacing.....	172	
modules		
replacing.....	119	
Motherboard A10		
replacing.....	157	
MW-Converter Unit A150 (FSVR 13/30)		
replacing.....	169	
noise display		
testing.....	21	
testing (option B22).....	38	
testing (option B29).....	59	
nonlinearities		
testing.....	17	
OCXO A250		
replacing.....	180	
option		
installation.....	195	
option B-22		
performance test.....	38	
Option B-24		
performance test.....	45	
Option B-25		
performance test.....	52	
Option B-29		
performance test.....	59	
performance test.....	11	
equipment.....	11	
frequency accuracy.....	117	
FSVR.....	13	
instructions.....	13	
option B22.....	38	
option B-24.....	45	
option B-25.....	52	
option B-29.....	59	
reference accuracy.....	117	
report (FSVR).....	62	
report (option B-21).....	99	
report (option B-22).....	101	
report (option B-24).....	105	
report (option B-25).....	112	
report (option B29).....	115	
phase noise		
checking.....	32	
power cables		
available.....	204	
Push-Button Board Set A80		
replacing.....	142	
reference frequency		
checking.....	117	
testing accuracy.....	13	
removing		

SATA Adaptor A92	134	software update	195
replacing		spare parts	197
Adapter Board A11	168	Speaker B1	
Additional Interface A220	181, 182	replacing	177
AF Output A71	179	spurious response	
Attenuator A40	155	testing	19
battery (controller)	130	start-up problems	187
controller A90	128	tests	
Detector Board A120	152	display linearity	29
Diplexer A151 (FSVR 30)	171	electronic attenuator accuracy (option B25)	52
display with touch screen	136	frequency response	22
fan	149	frequency response (option B22)	39
Flex Switch Board A81	144	frequency response (option B25)	53
Frontconnector Board A20	138	frequency response (option B29)	60
Frontend A100	150	IF filters	18
Mixer A153 (FSVR 30)	172	immunity to interference	14
modules	119	level accuracy	22
Motherboard A10	157	level accuracy (option B22)	39
MW-Converter Unit A150 (FSVR 13/30)	169	level accuracy (option B25)	53
OCXO A250	180	noise display	21
Push-Button Board Set A80	142	Noise Display (option B22)	38
RF Cable W1	175	Noise Display (option B29)	59
Rotary Pulse-Generator A70	141	nonlinearities	17
SATA Hard Disk A91	132	phase noise	32
Speaker B1	177	reference frequency accuracy	13
Touch Controller USB Board A60	139	RF Attenuator accuracy	30
RF Attenuator		spurious response	19
checking accuracy	30	third-order intercept point	17
RF Cable W1		Touch Controller USB Board A60	
replacing	175	replacing	139
Rotary Pulse-Generator A70		troubleshooting	186
replacing	141	equipment	187
SATA Adaptor A92		problems with boot process	188
removing	134	start-up problems	187
SATA Hard Disk A91		tools	186
replacing	132		

Documentation Overview

The user documentation for the R&S FSVR is divided as follows:

- Quick Start Guide
- Operating Manual
- Service Manual
- Online Help
- Release Notes

Quick Start Guide

This manual is delivered with the instrument in printed form and in PDF format on the CD. It provides the information needed to set up and start working with the instrument. Basic operations and basic measurements are described. Also a brief introduction to remote control is given. The manual includes general information (e.g. Safety Instructions) and the following chapters:

Chapter 1	Front and Rear Panel
Chapter 2	Putting into Operation
Chapter 3	Firmware Update and Installation of Firmware Options
Chapter 4	Basic Operations
Chapter 5	Basic Measurement Examples
Chapter 6	Brief Introduction to Remote Control
Appendix A	Printer Interface
Appendix B	LAN Interface

Operating Manuals

The operating manuals are a supplement to the Quick Start Guide. Operating manuals are provided for the base unit and each additional (software) option.

The operating manual for the base unit provides basic information on operating the R&S FSVR in general, and the "Spectrum" mode in particular. Furthermore, the software options that enhance the basic functionality for various measurement modes are described here. The set of measurement examples in the Quick Start Guide is expanded by more advanced measurement examples. In addition to the brief introduction to remote control in the Quick Start Guide, a description of the basic analyzer commands and programming examples is given. Information on maintenance, instrument interfaces and error messages is also provided.

In the individual option manuals, the specific instrument functions of the option are described in detail. For additional information on default settings and parameters, refer to the data sheets. Basic information on operating the R&S FSVR is not included in the option manuals.

For an overview of the available operating manuals, see the R&S FSVR documentation CD. These manuals are available in PDF format on the CD delivered with the instrument. The printed manuals can be ordered from Rohde & Schwarz GmbH & Co. KG.

Service Manual

This manual is available in PDF format on the CD delivered with the instrument. It informs on how to check compliance with rated specifications, on instrument function, repair, troubleshooting and fault elimination. It contains all information required for repairing the R&S FSVR by the replacement of modules. The manual includes the following chapters:

Chapter 1 Performance Test

Provides all the information necessary to check for compliance with rated specifications. The required test equipment is included, too.

Chapter 2 Adjustment

Describes the manual adjustment of the calibration source and of the frequency uncertainty as well as the automatic adjustment of individual module data following module replacement.

Chapter 3 Repair

Describes the design as well as simple measures for repair and fault diagnosis, in particular, the replacement of modules.

Chapter 4 Software Update / Installing Options

Contains information on the extension and modification by installing instrument software and retrofitting options.

Chapter 5 Documents

Contains spare parts lists, exploded views and other diagrams and drawings.

Online Help

The Online Help is part of the firmware. It provides quick access to the description of the instrument functions and the remote control commands.

Release Notes

The release notes describe the installation of the firmware, new and modified functions, eliminated problems, and last minute changes to the documentation. The corresponding firmware version is indicated on the title page of the release notes. The current release notes are provided in the Internet.

1 Performance Test

This chapter provides information on executing performance tests. After an overview of the required equipment, the test procedure and the detailed test goals are described. At the end of this chapter, templates for test reports are supplied for your convenience. Fields in the report that the user must fill out before or during the test are indicated by a gray background.

1.1 Test Equipment

Item	Type of equipment	Recommended characteristics or features	Recommended model	R&S Order No.	Application
1	Signal generator	(20 Hz) 9 kHz to 3.6 GHz	R&S SMA100A with options SMA-B106, SMA-B22	1400.0000.02 1405.0809.02 1405.1805.02	Reference frequency uncertainty IF filter Frequency response Display linearity RF attenuator Phase noise
2	Signal generator (2 units)	R&S FSVR7/13: 10 MHz to 15 GHz R&S FSVR30/40: 10 MHz to 40 GHz	R&S SMR20 R&S SMR40	1104.0002.20 1104.0002.40	Immunity to interference Nonlinearities Frequency response
3	Power splitter 2-resistor design	DC to 3.6 GHz equivalent output SWR 10 MHz to 3.6 GHz <1.10 level imbalance ≤ 0.1 dB	Weinschel Model 1870A		Frequency response
4	Power splitter 2-resistor design	R&S FSVR7: 10 MHz to 7 GHz R&S FSVR13: 10 MHz to 14 GHz R&S FSVR30: 10 MHz to 30 GHz R&S FSVR40: 10 MHz to 40 GHz level imbalance 3.6 GHz to 8 GHz: ≤ 0.3 dB 8 GHz to 22 GHz: ≤ 0.4 dB 22 GHz to 40 GHz: ≤ 0.5 dB equivalent output SWR 3.6 GHz to 7 GHz: ≤ 1.3 8 GHz to 22 GHz: ≤ 1.4 22 GHz to 40 GHz: ≤ 1.5	Weinschel Model 1534		Frequency response Third order intercept

5	50-Ohm termination	R&S FSVR7/13/30: 10 MHz to 30 GHz R&S FSVR40: 10 MHz to 40 GHz	Anritsu 28S50 Anritsu 28K50		Noise display
6	Power meter	-30 dBm to +10 dBm Instrumentation uncertainty<0.5%	R&S NRP	1143.8500.02	Frequency response B21, LO output power
7	Power sensor	9 kHz to 7 GHz -30 dBm to 0 dBm	R&S NRP-Z91	1168.8004.02	Frequency response
8	Power sensor	10 MHz to 40 GHz -30 dBm to 0 dBm VSWR cal unc. fact. % 50 to 128 MHz 1.15 1.6 3.6 to 8 GHz 1.15 2 8 to 22 GHz 1.25 2.5 22 to 40 GHz 1.35 3	R&S NRP-Z55	1138.2008.02	Frequency response B21, LO output power
9	Step attenuator	Variable attenuation 0 dB to 100 dB, 1-dB steps attenuation uncertainty < 0.1 dB (f = 128 MHz)	R&S RSG with special calibration	1009.4505.02 0859.4822.00	Display linearity RF attenuator Reference level switching
10	Fixed Attenuator (2 units)	fixed attenuation 10 dB	Anritsu 43KC-10		Nonlinearities B21, LO output power
11	Network analyzer	R&S FSVR7:20 MHz to 7 GHz R&S FSVR13: 20 MHz to 14 GHz R&S FSVR30/40: 20 MHz to 40 GHz	R&S ZVA	1145.1110.10 1145.1110.24 1145.1110.40	VSWR
12	Voltmeter	20 Hz to 9 kHz	R&S URE2	0350.5315.02	B29, frequency response
13	50 Ω termination	BNC, 50 $\Omega \pm 0.1$ %	RAD 50	0844.9352.02	B29, frequency response
14	Multimeter	Current 50 mA uncertainty +/- 0.01 mA			B21, bias current

1.2 Performance Test R&S FSVR

1.2.1 Test Instructions

To ensure that rated specifications are maintained, the following preparations must be made prior to checking the rated characteristics:

- Allow for a minimum warm-up time of 30 minutes at ambient temperature.
- Carry out all internal adjustments.
- The values are specified in the data sheet. Additional uncertainties introduced by the measurement equipment must be taken into account when checking the rated values.
- Unless specified otherwise, all measurements are performed with external reference frequency.
- Unless specified otherwise, all measurements are performed with [YIG ON] for R&S FSVR13 and R&S FSVR30

Inputs for settings during measurements are shown as follows:

- [**<KEY>**] Press a key on the front panel, e.g. [**SPAN**].
- [**<Softkey>**] Press a softkey, e.g. [Peak].
- [**<nn unit>**] Enter a value and terminate by entering the unit, e.g. [**12 kHz**].

Successive entries are separated by [:], e.g. [**BW** : Res BW Manual : **3 kHz**].

1.2.2 Checking the Reference Frequency Uncertainty

Test equipment: Signal generator (chapter "[Test Equipment](#)", item. 1):

Frequency e.g. 1000 MHz

Level -20 dBm

Frequency uncertainty $<1 \times 10^{-9}$

If the frequency uncertainty of the test transmitter is insufficient, the transmitter can be set to the correct frequency with the aid of the frequency counter prior to the measurement.

Test setup:

- ▶ Connect RF output of the signal generator to RF input of the R&S FSVR.
- ▶ Ambient temperature: 20°C to 30°C.

Signal generator settings:

- Frequency 1000 MHz
- Level -20 dBm

- R&S FSVR settings:
- [**PRESET**]
 - [**FREQ** : CENTER : **1 GHz**]
 - [**SPAN** : 1 MHz]
 - [**BW** : RES BW MANUAL : **300 kHz**]
 - [**AMPT** : REF Level : **-8 dBm**]
 - [**SETUP** : REFERENCE INT / EXT]
 - ▶ Switch to an internal reference source (INT)

Note: Before the following measurement, the R&S FSVR must be on for at least ten minutes with an internal reference, so that the reference oscillator is warmed up.

Measurement: ▶ Switch marker frequency count:

- [**MKR** : SIGNAL COUNT]
- ▶ Set the appropriate resolution:
- [**MKR** : **NEXT** : CNT RESOL 1 Hz

Model without R&S FSV-B4 1 GHz $\pm$ 1 kHz (corresponds to 1E-6)

Model with R&S FSV-B4 1 GHz $\pm$ 100 Hz (corresponds 1E-7)

Note: The frequency of the reference oscillator can be adjusted by means of a service function (refer to chapter "Adjustment").

1.2.3 Checking Immunity to Interference

Test equipment: Signal generator (Section "Test Equipment", item 2):

Frequency range	R&S FSVR7: 10 MHz to 9 GHz
	R&S FSVR13: 10 MHz to 15 GHz
	R&S FSVR30: 10 MHz to 30 GHz
	R&S FSVR40: 10 MHz to 40 GHz

maximum level 0 dBm

Test setup: ▶ Connect RF output of the signal generator to RF input.

- R&S FSVR settings:
- [**PRESET**]
 - [**AMPT** : RF ATTEN MANUAL : **0 dB**]
 - [**AMPT** : REF LEVEL : **-30 dBm**]
 - [**SWEEP** : SWEETIME MANUAL : 100 ms]
 - [**SPAN** : **1 kHz**]
 - [**BW** : RES BW MANUAL : **100 Hz**]

1.2.3.1 2nd IF Image Frequency Rejection

Additional signal generator settings:

- Frequency $f_{in} + 2 \times 729.9 \text{ MHz}$
 $f_{in} - 2 \times 729.9 \text{ MHz}$ (see table of performance test report)
- Level: adjust the output level of signal generator for an RF-Input level of -10 dBm

Additional R&S FSVR settings:

- [**FREQ** : CENTER : { f_{in} }]

See table of performance test report for values of f_{in} .

Measurement:

- Set marker to peak of signal
- [**MKR** $\Rightarrow$: PEAK]

Evaluation:

The image frequency rejection is the difference between the output level of the signal generator and the level reading of marker 1 (L_{dis}):

Image frequency rejection = -10 dBm – L_{dis}

1.2.3.2 3rd IF Image Frequency Rejection

Additional signal generator settings:

- Frequency $f_{in} + 2 \times 89.9 \text{ MHz}$
- Level: adjust the output level of signal generator for an RF-Input level of -10 dBm

Additional R&S FSVR settings:

- [**FREQ** : CENTER : { f_{in} }]

See table of performance test report for values of f_{in} .

Measurement:

- Set marker to peak of signal
- [**MKR** $\Rightarrow$: PEAK]

Evaluation:

The image frequency rejection is the difference between the output level of the signal generator and the level reading of marker 1 (L_{dis}):

Image frequency rejection = -10 dBm – L_{dis}

1.2.3.3 2nd IF Rejection

- Additional signal – Frequency 729.9 MHz
- generator settings: – Level: adjust the output level of signal generator for an RF-Input level of -10 dBm
- Additional R&S FSVR settings: – [**FREQ** : CENTER : { f_{in} }]
See table of performance test report for values of f_{in} .
- Measurement: ► Set marker to peak of signal
– [**MKR** ⇒ : PEAK]
- Evaluation: The IF rejection is the difference between the output level of the signal generator and the level reading of marker 1 (L_{dis}):
IF rejection = -10 dBm – L_{dis}

1.2.3.4 3rd IF Rejection

- Additional signal – Frequency 89.9 MHz
- generator settings: – Level: adjust the output level of signal generator for an RF-Input level of -10 dBm
- Additional R&S FSVR settings: – [**FREQ** : CENTER : { f_{in} }]
See table of performance test report for values of f_{in} .
- Measurement: ► Set marker to peak of signal
– [**MKR** ⇒ : PEAK]
- Evaluation: The IF rejection is the difference between the output level of the signal generator and the level reading of marker 1 (L_{dis}):
IF rejection = -10 dBm – L_{dis}

1.2.4 Checking Nonlinearities

1.2.4.1 Third-Order Intercept Point (IP3)

Test equipment: 2 signal generators (Section "Test Equipment", item 2)

Frequency range	R&S FSVR7:	10 MHz to 7 GHz
	R&S FSVR13:	10 MHz to 14 GHz
	R&S FSVR30:	10 MHz to 30 GHz
	R&S FSVR40:	10 MHz to 40 GHz

2 attenuators (Section "Test Equipment", item 10)

Attenuation	$a_{\text{ATT}} = 10 \text{ dB}$		
Frequency range	R&S FSVR7:	10 MHz to 7 GHz	
	R&S FSVR13:	10 MHz to 14 GHz	
	R&S FSVR30:	10 MHz to 30 GHz	
	R&S FSVR40:	10 MHz to 40 GHz	

Power splitter/combiner (Section "Test Equipment", item 4)

Frequency range	R&S FSVR7:	10 MHz to 7 GHz
	R&S FSVR13:	10 MHz to 14 GHz
	R&S FSVR30:	10 MHz to 30 GHz
	R&S FSVR40:	10 MHz to 40 GHz

Test setup:

- ▶ Connect RF outputs of the signal generators via 10 dB attenuators to the inputs of the combiner.
- ▶ Connect output of the combiner to the RF input of the R&S FSVR.

Signal generator – Frequency: generator 1 $f_{g1} = f_{in} - 50 \text{ kHz}$
 settings: generator 2 $f_{g2} = f_{in} + 50 \text{ kHz}$

(both generators): See table of performance test report for values of f_{in}

- ▶ Adjust the output level of the signal generators for an input level at the R&S FSVR of -15 dBm.
- ▶ Switch off the ALC of the generators to reduce the interference between the generators.

R&S FSVR settings:

- [**PRESET**]
- [**AMPT** : RF ATTEN MANUAL : **0 dB**]
- [**AMPT** : **-10 dBm**]
- [**SPAN** : **500 kHz**]
- [**BW** : RES BW MANUAL : **30 Hz**]
- [**FREQ** : CENTER : { f_{in} }]

See table of performance test report for values of f_{in}

Measurement: – [**MKR FCTN** : TOI]

- Evaluation: The third order intercept point (T.O.I) referred to the input signal is displayed in the marker field by the reading [TOI].
- Note: If the input signal is exactly known, the level of the spurious products can alternatively be measured in a span of 20 kHz, for example. The TOI is then calculated from the average of the two spurious signals and the average of the two useful signals.

1.2.5 Checking IF Filters

- Test equipment: Signal generator (Section "Test Equipment", item 1):
- Frequency 64 MHz
 - Level ≥ 0 dBm
- Test setup: ► Connect RF output of the signal generator to the RF input of the R&S FSVR.

1.2.5.1 Checking the Bandwidth Switching Level Uncertainty

Reference measurement (RBW 10 kHz)

- Signal generator settings:
- Frequency: 64 MHz
 - Level: -20 dBm
- R&S FSVR settings:
- [**PRESET**]
 - [**AMPT : -15 dBm**]
 - [**AMPT : RF ATTEN MANUAL : 10 dB**]
 - [**FREQ : CENTER : 64 MHz**]
 - [**BW : COUPLING RATIO : SPAN / RBW MANUAL : 1 : ENTER**]
 - [**SPAN : 10 kHz**]
 - [**SWEEP : SWEEPTIME : 100 ms**]
 - [**TRACE : DETECTOR : RMS**]
- Reference measurement:
- Set marker to peak of signal
 - [**MKR $\Rightarrow$: PEAK**]
 - Set reference to peak of signal
 - [**MKR : REFERENCE FIXED**]

Checking the level Uncertainty

- R&S FSVR settings:
- [**SPAN** : {1 x RBW}] for $RBW \leq 10$ MHz or
 - [**SPAN** : ZERO] for $RBW > 10$ MHz
 - [**BW** : RBW MANUAL : {RBW} : **ENTER**]
- See table of performance test report for values of RBW.
- Measurement:
- Set marker to peak of signal
 - [**MKR** ⇒ : PEAK]
- Evaluation:
- The level difference is displayed in the marker field by the reading 'Delta [T1 FXD] {xxx} dB'.
- Note:
- To check the FFT filter, set the sweep time to auto.
- [**SWEEP** : SWEPTIME AUTO]

1.2.6 Checking Spurious Response

Test equipment: 50 Ω termination (Section "Test Equipment", item 5)

Frequency range	R&S FSVR7: DC to 7 GHz
	R&S FSVR13: DC to 13.6 GHz
	R&S FSVR30: DC to 30 GHz
	R&S FSVR40: DC to 40 GHz

Test setup: ► Terminate the RF input of the FSVR with 50 Ω

- R&S FSVR settings:
- [**PRESET**]
 - [**AMPT** : RF ATTEN MANUAL : **0 dB**]
 - [**AMPT** : **-50 dBm**]
 - [**SPAN** : **10 kHz**]
 - [**BW** : RES BW MANUAL : **1 kHz**]
 - [**FREQ** : CENTER : { f_{spur} }]

Measurement: - [**MKR** ⇒ : PEAK]

f_{spur}	
32 MHz	reference/4
64 MHz	reference/2
128 MHz	reference
256 MHz	reference*2
384 MHz	reference*3

The following test is a function test only:

Test equipment: 50 Ω termination (Section "[Test Equipment](#)", item 5)

Frequency range	R&S FSVR7:	DC to 7 GHz
	R&S FSVR13:	DC to 13.6 GHz
	R&S FSVR30:	DC to 30 GHz
	R&S FSVR40:	DC to 40 GHz

Test setup: ► Terminate the RF input of the FSVR with 50 Ω

R&S FSVR settings:

- [PRESET]
- [**AMPT** : RF ATTEN MANUAL : **0 dB**]
- [**AMPT** : **-30 dBm**]
- [**SWEEP** : SWEEP MODE : FFT]
- [**BW** : RES BW MANUAL : **100 Hz**]
- [TRACE : TRACE 1 : DETECTOR : POSITIVE PEAK]
- [SWEEP : SWEEP POINTS : 32001]

Measurement: ► Read out the trace data.

Evaluation: Check data against limit.

1.2.7 Checking Noise Display (DANL)

Test equipment: 50 Ω termination (Section "Test Equipment", item 5)

Frequency range	R&S FSVR7: DC to 7 GHz
	R&S FSVR13: DC to 13.6 GHz
	R&S FSVR30: DC to 30 GHz
	R&S FSVR40: DC to 40 GHz

► Terminate the RF input of the R&S FSVR with 50 Ω

R&S FSVR
settings:

- [**PRESET**]
- [**AMPT** : RF ATTEN MANUAL : **0 dB**]
- [**SPAN** : 0 Hz]
- [**BW** : RES BW MANUAL : **1 kHz**]
- [**BW** : SWEEP TIME MANUAL : **50 ms**]
- [**TRACE 1** : AVERAGE]
- [**TRACE 1** : SWEEP COUNT : **20 ENTER**]
- [**AMPT** : {RefLev}]
- [**FREQ** : CENTER : { f_n }]
- [**MEAS** : TIME DOMAIN POWER : MEAN]

See table of performance test report for values of f_n .

Measurement: Read out the mean marker and correct the measurement value by -30 dB for the ratio of 1 Hz / 1 kHz.

For R&S FSVR 13/30: Repeat the measurement with [YIG OFF] for $f_n > 7$ GHz with the same limits and values of f_n .

Note: For example the DANL in 1 kHz bandwidth -126 dBm results in a corrected value of -156 dBm in 1 Hz bandwidth.

As both filter designs are digitally and using the same hardware setting, the DANL can be measured also with 1 kHz bandwidth to reduce measurement time.

Frequency	< 10kHz	< 100kHz	< 1MHz	< 10MHz	> 10kHz
RefLev	-10 dBm	-20 dBm	-30 dBm	-60 dBm	-60 dBm

Test selection matrix

The table below gives an overview of the required tests depending on the frequency range of the R&S FSVR and options R&S FSV-B22 and R&S FSV-B24. Test conditions, values for f_N and limits are given in the table of performance test report.

The test DANL8 is mandatory for any R&S FSVR.

	Without options B22 and B24	With option B22 installed and without B24	With option B24 installed and without B22	With option B22 and B24
R&S FSVR7	DANL1	DANL1 and DANL4		
R&S FSVR13/30/40	DANL2	DANL2 DANL5	DANL3 DANL6 / DANL7	DANL3 DANL6 / DANL7

1.2.8 Checking Level Uncertainty and the Frequency Response

Test equipment: Signal Generator (Section "Test Equipment", item 1)

Frequency range 9 kHz to 3.6 GHz

Maximum level ≥ 0 dBm

Signal Generator (Section "Test Equipment", item 2)

Frequency range R&S FSVR7: 10 MHz to 7 GHz
R&S FSVR13: 10 MHz to 13.6 GHz
R&S FSVR30: 10 MHz to 30.0 GHz
R&S FSVR40: 10 MHz to 40.0 GHz

Maximum level: ≥ 0 dBm

Power meter (Section "Test Equipment", item 6)

Power range -30 to 0 dBm

Instrumentation uncertainty $<0.5\%$

Uncertainty of power reference $<1.2\%$

VSWR of power reference <1.10

Power Sensor (Section "Test Equipment", item 7)

Frequency range 9 kHz to 7 GHz

Power range -30 to 0 dBm

Cal factor uncertainty 1 MHz to 3.6 GHz $<1.6\%$

3.6 GHz to 7 GHz $<2\%$

3.6 GHz to 7 GHz <1.15

VSWR 1 MHz to 3.6 GHz <1.30

50 MHz to 128 MHz <1.10

Power Sensor (Section "Test Equipment", item 8)

Frequency range	R&S FSVR7:	DC to 7 GHz
	R&S FSVR13:	DC to 26.5 GHz
	R&S FSVR30:	DC to 30 GHz
	R&S FSVR40:	DC to 40 GHz
Power range		-30 to 0 dBm
Cal factor uncertainty	50 to 128 MHz	<1.6 %
	3.6 to 8 GHz	<2 %
	8 to 22 GHz	<2.5 %
	22 to 40 GHz	<3 %
VSWR	50 to 128 MHz	<1.15
	3.6 to 8 GHz	<1.15
	8 to 22 GHz	<1.25
	22 to 40 GHz	<1.35

6 dB Power Splitter (Section "Test Equipment", item 3)

Frequency range	DC to 3.6 GHz
Level imbalance	10 MHz to 3.6 GHz <0.1 dB
Equivalent output VSWR	10 MHz to 3.6 GHz ≤ 1.1

6 dB Power Splitter (Section "Test Equipment", item 4)

Frequency range:	
R&S FSVR 7	DC to 7 GHz
R&S FSVR 13	DC to 13.6 GHz
R&S FSVR 30	DC to 30 GHz
R&S FSVR 40	DC to 40 GHz
Level imbalance	3.6 to 7 GHz ≤ 0.3 dB
	7 to 22 GHz ≤ 0.4 dB
	22 to 40 GHz ≤ 0.5 dB
Equivalent output VSWR	3.6 to 7 GHz ≤ 1.3
	7 to 22 GHz ≤ 1.4
	22 to 40 GHz ≤ 1.5

1.2.8.1 Absolute Level Uncertainty at 64 MHz

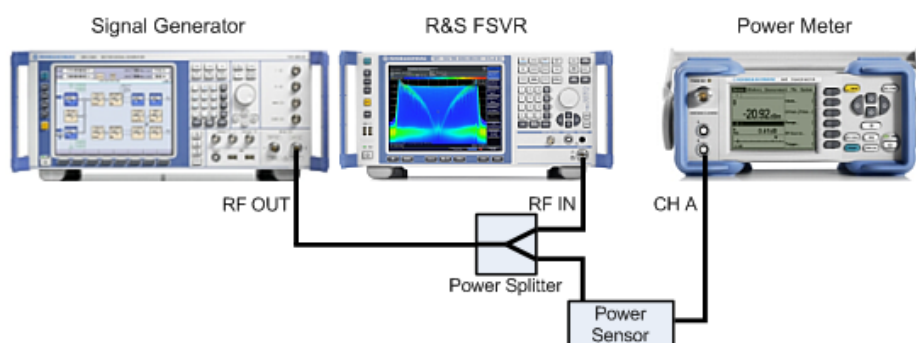
- Test setup:
- ▶ Standardize the Power Meter and Power Sensor (item 6, 7).
 - ▶ Set the Power Meter Cal Factor to the appropriate value for the Power Sensor for 64 MHz.
 - ▶ Connect Power Sensor through a cable to RF output of Signal Generator.
 - ▶ Ambient temperature: 20°C to 30°C
- Signal generator settings:
- Frequency 64 MHz
 - Level -10 dBm
- Measurement:
- ▶ Adjust level to -10 dBm ± 0.1 dB as viewed on the Power Meter.
 - ▶ Record the Power Meter indication.
 - ▶ Disconnect Power Sensor from the cable.
- R&S FSVR settings:
- [**PRESET**]
 - [**AMPT** : RF ATTEN MANUAL : **10 dB**]
 - [**AMPT** : **-10 dBm**]
 - [**SWEEP** : SWEEP TIME : **10 ms**]
 - [**SPAN** : **30 kHz**]
 - [**BW** : RES BW MANUAL : **10 kHz**]
 - [**TRACE** : DETECTOR : RMS]
 - [**FREQ** : CENTER : **64 MHz**]
 - ▶ Set marker to peak of signal
 - [**MKR** ⇒ : PEAK]
- Evaluation:
- The difference between the signal levels measured with the power meter and the R&S FSVR (level reading of marker 1) reflects the absolute level uncertainty of the R&S FSVR. It can be calculated as:

$$\text{Level uncertainty}_{64\text{MHz}} = L_{\text{FSVR}} - L_{\text{powermeter}}$$

1.2.8.2 Frequency Response < 3.6 GHz

Note: If a power splitter with higher level imbalance is used, correction of the measured frequency response is recommended.

- Test setup:
- ▶ Standardize the Power Meter and Power Sensor (item 6, 7).
 - ▶ Use Power Splitter/Combiner (item 3) and connect equipment as shown below.
 - ▶ Connect the power splitter directly to the R&S FSVR RF input.
 - ▶ Ambient temperature: 20°C to 30°C



Important Note

Throughout the remaining steps set the Power Meter Cal Factor as appropriate!

- | | |
|----------------------------|---|
| Signal generator settings: | <ul style="list-style-type: none"> - Level 0 dBm - Frequency 64 MHz |
| R&S FSVR settings: | <ul style="list-style-type: none"> - [PRESET] - [AMPT : RF INPUT {coupling}] - [AMPT : RF ATTEN MANUAL : {a_{FSVR}}] - [AMPT : 0 dBm] (-5 dBm for 5 dB attenuation) - [SPAN : 100 kHz] - [BW : RES BW MANUAL : 10 kHz] - [TRACE : DETECTOR : RMS] - [FREQ : CENTER : 64 MHz] - [MKR ⇒ : MORE : EXCLUDE LO] |

See table of performance test report for values of coupling and a_{FSVR} .

Reference measurement:

- ▶ Determine signal level $L_{\text{powermeter}}$
- ▶ Set marker to peak of signal
- [**MKR** ⇒ : PEAK]
- ▶ Read level indication from R&S FSVR (reading of marker 1): L_{FSVR}

Power Meter: ▶ Read level indication from power meter : $L_{\text{powermeter}}$

Evaluation: Calculate:
 $\Delta\text{Ref} / \text{dB} = L_{\text{FSVR}} / \text{dBm} - L_{\text{powermeter}} / \text{dBm}$
 Record $\Delta\text{Ref} / \text{dB}$

Frequency Response Measurement:

Signal generator settings: – Frequency f_{fresp}
 See table of performance test report for values of f_{fresp}

R&S FSVR settings: – [**SPAN** : {span}]
 – [**FREQ** : CENTER : { f_{fresp} }]
 – [**BW** : RES BW MANUAL : {RBW}]
 See table below for values of span and resolution bandwidth.
 See table of performance test report for values of f_{fresp}

- ▶ Set marker to peak of signal
- [**MKR** ⇒ : PEAK]
- ▶ Read level indication from R&S FSVR (reading of marker 1): L_{FSVR}

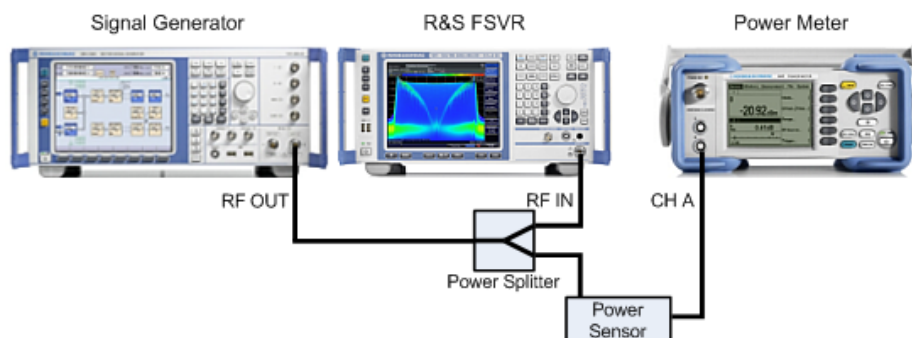
Power Meter: ▶ Read level indication from Power Meter : $L_{\text{powermeter}}$

Evaluation: The frequency response can be calculated as:
 $\text{Freq. response} / \text{dB} = L_{\text{FSVR}} - L_{\text{powermeter}} - \Delta\text{Ref} / \text{dB}$

f_{center}	9 kHz	100.02 kHz	1.005 MHz	≥ 10 MHz
Span	0 Hz	0Hz	0 Hz	100 kHz
RBW	10 Hz	1 kHz	10 kHz	10 kHz

1.2.8.3 Frequency Response > 3.6 GHz

- Test setup:
- ▶ Standardize the Power Meter and Power Sensor (item 6, 8).
 - ▶ Use Power Splitter/Combiner (item 4) and connect equipment as shown below.
 - ▶ Connect the power splitter directly to the R&S FSVR RF input.
 - ▶ Ambient temperature: 20°C to 30°C



Important Note

Throughout the remaining steps set the Power Meter Cal Factor as appropriate!

Reference Measurement

Signal Generator settings:

- Level 0 dBm
- Frequency 64 MHz

R&S FSVR settings:

- [**PRESET**]
- [**AMPT** : RF INPUT {coupling}]
- [**AMPT** : RF ATTEN MANUAL : { a_{FSVR} }]
- [**AMPT** : 0 dBm]
- [**SPAN** : 100 kHz]
- [**BW** : RES BW MANUAL : 10 kHz]
- [**TRACE** : DETECTOR : RMS]
- [**FREQ** : CENTER : 64 MHz]

See table of performance test report for values of coupling and a_{FSVR} .

R&S FSVR settings:

- ▶ Set marker to peak of signal
- [**MKR** ⇒ : PEAK]
- ▶ Read level indication from R&S FSVR (reading of marker 1): L_{FSVR}

Power Meter:

- ▶ Read level indication from Power Meter : $L_{PowerMeter}$

Evaluation:

Calculate:

$$\Delta Ref / dB = L_{FSVR} / dBm - L_{PowerMeter} / dBm$$

Record $\Delta Ref / dB$

Frequency Response Measurement (span = 100 kHz)

- Signal Generator – Frequency f_{fresp}
 settings: See table in performance test report for values of f_{fresp}
- R&S FSVR – [**FREQ** : CENTER : { f_{fresp} }]
 settings: See table in performance test report for values of f_{fresp}
- ▶ Set marker to peak of signal
 - [**MKR** ⇒ : PEAK]
 - ▶ Read level indication from R&S FSVR (reading of marker 1): L_{FSVR}
- Power Meter: ▶ Read level indication from Power Meter : $L_{\text{PowerMeter}}$
- Evaluation: The frequency response can be calculated as:

$$\text{Freq. response / dB} = L_{\text{FSVR}} - L_{\text{PowerMeter}} - \Delta\text{Ref / dB}$$
 Take the value of ΔRef as ascertained before.

Frequency Response Measurement (full span)

- R&S FSVR – [**PRESET**]
 settings: – [**AMPT** : RF INPUT DC]
 – [**AMPT** : RF ATTEN MANUAL : **10 dB**]
 – [**AMPT** : **0 dBm**]
- Signal Generator – Frequency f_{fresp}
 settings: See table in performance test report for values of f_{fresp}
- R&S FSVR – See table in performance test report for values of f_{fresp}
 settings: ▶ Set marker to peak of signal
- [**MKR** ⇒ : PEAK]
 - ▶ Read level indication from R&S FSVR (reading of marker 1): L_{FSVR}
- Power Meter: ▶ Read level indication from Power Meter : $L_{\text{PowerMeter}}$
- Evaluation: The frequency response can be calculated as:

$$\text{Freq. response / dB} = L_{\text{FSVR}} - L_{\text{PowerMeter}} - \Delta\text{Ref / dB}$$
 Take the value of ΔRef as ascertained before.
- For R&S FSVR13/30/40: Repeat the measurement with [YIG OFF] for $f_n > 7$ GHz with the same limits and values of f_n .

1.2.9 Checking the Display Nonlinearity

Test equipment: Signal generator (Section "Test Equipment", item 1)

Frequency 128 MHz

Maximum level ≥ 10 dBm

Step attenuator (Section "Measurement Equipment", item 9)

Frequency 128 MHz

Attenuation 0 to 100 dB in 1 dB steps

Attenuation uncertainty < 0.1 dB

Test setup:

- ▶ Connect RF output of the signal generator to RF input of the step attenuator
- ▶ Connect RF output of the step attenuator to RF input of the R&S FSVR

Signal generator settings:

- Frequency 128.1 MHz
- Level +10 dBm

Step attenuator settings:

- attenuation 20 dB

R&S FSVR settings:

- [**PRESET**]
- [**AMPT** : RF ATTEN MANUAL : **10 dB**]
- [**AMPT** : **0 dBm**]
- [**FREQ** :CENTER : **128.1 MHz**]
- [**SPAN** : **0 Hz**]
- [**TRACE** : DETECTOR : AV]
- [**BW** : RES BW MANUAL : **10 kHz**]
- [**SWEEP** : SWEEP TIME MANUAL : {sweep time}]
- [**MEAS** : TIME DOMAIN POWER : MEAN]

See table below for values of sweep time.

Reference measurement:

- ▶ Read out the mean marker value ($= L_{\text{Ref}}$)

Measurement:

Step attenuator settings:

- attenuation $\{a_{\text{ATT}}\}$

See table of performance test report for values of a_{ATT} .

Evaluation: Read out the mean marker value. The difference between the level of the input signal of the R&S FSVR and the reference L_{Ref} (about 10 dB below the reference level) can be calculated as :

$$\Delta L = L_{\text{FSVR}} - L_{\text{Ref}}$$

Note: A frequency between 5 MHz and 1 GHz may be used. It is recommended to use correction values for the uncertainty of the attenuator.

a_{ATT}	10 dB to 45 dB	50 dB to 80 dB
Sweep time	200 ms	600 ms

1.2.10 Checking the RF Attenuator Uncertainty

Test equipment: Signal generator (Section "Test Equipment", item 1)

Frequency 128 MHz
Maximum level ≥ 10 dBm

Step attenuator (Section "Test Equipment", item 9)

Frequency 128 MHz
Attenuation 0 to 80 dB in 5 dB steps
Attenuation uncertainty < 0.1 dB

Test setup:

- ▶ Connect RF output of the signal generator to RF input of the step attenuator
- ▶ Connect RF output of the step attenuator to RF input of the R&S FSVR

Signal generator settings:

- Frequency 128.1 MHz
- Level 10 dBm

R&S FSVR settings:

- [**PRESET**]
- [**FREQ : CENTER : 128.1 MHz**]
- [**SPAN : 500 Hz**]
- [**BW : RES BW MANUAL : 1 kHz**]
- [**TRACE : DETECTOR : RMS**]
- [**BW : VIDEO BW MANUAL : 100 Hz**]
- [**AMPT : RF ATTEN MANUAL : 10 dB**]
- [**AMPT : -35 dBm**]

Reference measurement:

- ▶ Set marker to peak of signal
- [**MKR $\Rightarrow$: PEAK**]
- ▶ Set reference to peak of signal
- [**MKR : REFERENCE FIXED**]

Measurement

Step attenuator settings: – Attenuation { 80dB - a_{FSVR} }

R&S FSVR settings: – [**AMPT** : RF ATTEN MANUAL : { a_{FSVR} }]
 – [**AMPT** : { -45dBm + a_{FSVR} } dBm]
 – [**MKR** ⇒ : PEAK]

See table below for values of a_{FSVR} , a_{ATT} and reference level.

Evaluation: The difference between the level of the input signal of the R&S FSVR and the reference (at 10 dB RF-Attenuation) is displayed in the marker field by the reading Delta [T1 FXD].

a_{ATT}	70 dB	80 dB	75 dB	65 dB	60 dB	55 dB	50 dB	40dB	30 dB	20 dB	10 dB
a_{FSVR}	10 dB	0 dB	5 dB	15 dB	20 dB	25 dB	30 dB	40dB	50 dB	60 dB	70 dB
reference level	-35 dBm	-45 dBm	-40 dBm	-30 dBm	-25 dBm	-20 dBm	-15 dBm	-5 dBm	5 dBm	+15 dBm	+25 dBm

1.2.11 Checking the Phase Noise

Test equipment: Signal generator (refer to "[Test Equipment](#)", item 1)

Frequency 500 MHz

Level ≥ 0 dBm

Phase noise at 500 MHz:
 < -110 dBc/Hz @ 10 kHz
 < -110 dBc/Hz @ 100 kHz
 < -130 dBc/Hz @ 1 MHz

Test setup: ► Connect RF output of the signal generator to RF input of the R&S FSVR.

Signal generator settings: – Frequency 500 MHz

– Level 3 dBm

► Adjust the output level of the signal generator for an input level at the R&S FSVR of 3 dBm.

R&S FSVR settings:

– [**PRESET**]

– [**SETUP** : REFERENCE INT]

– [**FREQ** : CENTER : **500 MHz**]

– [**AMPT** : ATTEN MANUAL: **10 dB**]

– [**AMPT** : **0 dBm**]

– [**SPAN** : **1 MHz**]

– [**TRACE 1** : DETECTOR RMS]

– [**SWEEP** : SINGLE]

– [**MKR FCTN** : SIGNAL COUNT]

► Set center frequency to counter frequency

– [**MKR FCTN** : PHASE NOISE]

– [**TRACE** : AVERAGE]

– [**SWEEP** : SWEEP COUNT : {sweep count} : **ENTER**

– [**SWEEP** : SWEEP TIME MANUAL : {sweep time} : **ENTER**

– [**SPAN** : {span}]

– [**MKR** : {Offset}]

See table below for values of reference level, sweep time, sweep count and span.

Refer to "[Performance Test Report R&S FSVR](#)" table for values of offset.

Evaluation: The phase noise is displayed in the marker field by the reading 'PHNOISE 2'.

Note: Please make sure not to measure on a spurious signal. In case of an IF overload the level of the signal generator has to be reduced.

Settings for phase noise measurement				
Offset	Span	RBW / Sweptime / Sweepcount	Reference level	a_{FSVR}
100 Hz	200 Hz	5 Hz / 2000 ms / 5	0 dBm	10 dB
1 kHz	2 kHz	100 Hz / 800 ms / 5	0 dBm	10 dB
10 kHz	20 kHz	1 kHz / 500 ms / 5	0 dBm	10 dB
100 kHz	200 kHz	10 kHz / 200 ms / 5	0 dBm	10 dB
1 MHz	2 MHz	10 kHz / 100 ms / 5	0 dBm	10 dB

1.2.12 Checking the VSWR at the RF Input

Test equipment: Network analyzer (Section "[Test Equipment](#)", item 11)

Test setup: ► Connect the test port of the network analyzer to the RF input 1 of the R&S FSVR.

R&S FSVR settings:

- [**PRESET**]
- [**AMPT** : RF INPUT {state}]
- [**AMPT** : RF ATTEN MANUAL : { a_{FSVR} }]

See table of performance test report for values of a_{FSVR} , f_{in} and state .

Measurement: Determine the VSWR of the R&S FSVR at the frequencies shown in the performance test report. See operating manual of the network analyzer for detailed information about VSWR measurement.

1.3 Performance Test Option LO/IF Ports for External Mixers R&S FSV-B21

1.3.1 Checking LO-Level

- Test equipment: Power Meter (Section "Test Equipment", item 6)
 Power sensor (section "Test Equipment", item 8)
- | | |
|------------------|---|
| Frequency range | 7.0 MHz to 15.5 GHz |
| Max. input power | $P_{\max} = +23 \text{ dBm}$ |
| RSS | $\leq 2.5\%$ referred to measured power |
| Impedance | $Z = 50 \Omega$ |
- Fixed attenuator with 10 dB (Section "Test Equipment" item 10)
- Power meter settings:
- ▶ Connect power sensor to the power meter and execute function 'ZERO' when there is no signal applied to the power sensor
- R&S FSVR settings:
- [**PRESET**]
 - [**SENS : MIX ON**]
 - [**SPAN : ZERO SPAN**]
 - [**SETUP : SERVICE : ENTER PASSWORT 894129**]
 - ▶ Select LO-Power:
 - [**SENS : MIX:LOP {P_{LO}}**]
 for $P_{LO} = 13,0\text{dBm}, 15,5\text{dBm}$ and $17,0\text{dBm}$
 - ▶ Bias current set to zero:
 - [**SENS : MIX:BIAS 0.0**]
 - ▶ Select upper sideband with service-function:
 - [**SETUP : SERVICE FUNCTIONS 2.5.2.2.1**]
 - [**FREQ CENTER : {f_{Center1}}**]
 resulting LO-frequency $f_{LO} = (f_{\text{Center1}} - 729,9 \text{ MHz}) / 2$
 - ▶ Select lower sideband with service-function:
 - [**SETUP : SERVICE FUNCTIONS 2.5.2.2.0**]
 - [**FREQ CENTER : {f_{Center2}}**]
 resulting LO-frequency $f_{LO} = (f_{\text{Center1}} + 729,9 \text{ MHz}) / 2$
- Test setup:
- ▶ Connect power sensor via fixed attenuator to the output 'LO_{out} / IF_{in}'
 - ▶ Ambient temperature: 20°C to 30°C

- Measurement: Determine level of the LO-signal $L_{LO,meas}$
To achieve higher uncertainty it is recommended to compensate the frequency response of the power sensor. For compensation frequency use f_{LO}
- Evaluation: The level of the LO-signal can be determined as $L_{LO} = L_{LO,meas} + 10 \text{ dB}$

1.3.2 Checking the Input LO_{out} / IF_{in} (2-Port-Mixers)

- Test equipment: Signal Generator (section "Test Equipment", item 1)
- Frequency 729.9 MHz
 - Output power -20 dBm
- R&S FSVR settings:
- [**PRESET**]
 - [**SENS** : MIX ON]
 - [**SENS** : MIX:HARM:BAND USER]
 - [**SENS** : MIX:HARM 2]
 - [**SPAN** : ZERO SPAN]
 - [**FREQ** : CENT 16.7299 GHz]
 - [**SENS** : BAND 2 kHz]
 - [**DET** : FUNC RMS]
 - [**SETUP** : SERVICE : ENTER PASSWORT **894129**]
 - ▶ Switch off LO with service function:
 - [**SETUP** : SERVICE FUNCTIONS **2.5.2.8.0**]
 - ▶ Bias current set to zero:
 - [**SENS** : MIX:BIAS 0.0]
 - ▶ Select 2-port case:
 - [**SENS** : MIX:PORT 2]
 - ▶ ZF-Attenuation set to 0dB
 - [**SENS** : MIX:LOSS 0.0]
- Signal generator settings:
- Frequency 729.9 MHz
 - Input Level DUT -30 dBm +/- 0,1 dB
- Test setup:
- ▶ Connect the generator to the connector LO_{out} / IF_{in} ;
 - ▶ Ambient temperature: 20°C to 30°C
- Measurement:
- [**MKR->** : PEAK]
 - ▶ Read out the marker

1.3.3 Checking the Input IF_{in} (3-Port-Mixers)

- Test equipment: Signal Generator (section "Test Equipment", item 1)
- Frequency 729.9 MHz
 - Output power -20 dBm
- R&S FSVR settings:
- [**PRESET**]
 - [**SENS** : MIX ON]
 - [**SENS** : MIX:HARM:BAND USER]
 - [**SENS** : MIX:HARM 2]
 - [**SPAN** : ZERO SPAN]
 - [**FREQ** : CENT 16.7299 GHz]
 - [**SENS** : BAND 2 kHz]
 - [**DET** : FUNC RMS]
 - [**SETUP** : SERVICE : ENTER PASSWORT **894129**]
 - ▶ Switch off LO with service function:
 - [**SETUP** : SERVICE FUNCTIONS **2.5.2.8.0**]
 - ▶ Bias current set to zero:
 - [**SENS** : MIX:BIAS 0.0]
 - ▶ Select 3-port case:
 - [**SENS** : MIX:PORT 3]
 - ▶ ZF-Attenuation set to 0dB
 - [**SENS** : MIX:LOSS 0.0]
- Signal generator settings:
- Frequency 729.9 MHz
 - Input Level DUT -30 dBm +/- 0,1 dB
- Test setup:
- ▶ Connect the generator to the connector LO_{out} / IF_{in};
 - ▶ Ambient temperature: 20°C to 30°C
- Measurement:
- [**MKR->** : PEAK]
 - ▶ Read out the marker

1.3.4 Checking the Bias Supply

Test equipment: Multimeter (section "[Test Equipment](#)", item 15)

- R&S FSVR settings:
- [**PRESET**]
 - [**SENS** : MIX ON
 - [**SPAN** : ZERO SPAN]
 - [**SETUP** : SERVICE : ENTER PASSWORT **894129**]
 - ▶ Switch off LO with service function:
 - [**SETUP** : SERVICE FUNCTIONS **2.5.2.8.0**]
 - ▶ Bias current $\{I_{bias}\}$ setting:
 - [**SENS** : MIX:BIAS $\{I_{bias}\}$]
 - ▶ Bias $\{I_{bias}\}$: - 10 mA, 0 mA, + 10 mA)

Test setup: ▶ Connect the DC current meter between cable conductor and ground of LO_{out} / IF_{in}

Measurement: ▶ Read out the current

1.4 Performance Test for Option RF Preamplifier R&S FSV-B22

1.4.1 Checking Noise Display

Test equipment: 50 Ω termination (Section "Test Equipment", item 5)

Frequency range R&S FSVR7: DC to 7 GHz

► Terminate the RF input of the R&S FSVR with 50 Ω

R&S FSVR
settings:

- [**PRESET**]
- [**AMPT** : RF ATTEN MANUAL : **0 dB**]
- [**AMPT** : RF INPUT DC]
- [**AMPT** : PREAMP ON]
- [**SPAN** : 0 Hz]
- [**BW** : RES BW MANUAL : **1 kHz**]
- [**BW** : SWEEP TIME MANUAL : **50 ms**]
- [**TRACE 1** : AVERAGE]
- [**TRACE 1** : SWEEP COUNT : **20 ENTER**]
- [**AMPT** : {RefLev}]
- [**FREQ** : CENTER : { f_n }]
- [**MEAS** : Time Dom Power : **Mean**]

See table of performance test report for values of f_n .

Measurement: ► Read out the mean marker and correct the measurement value by –30 dB for the ratio of 1 Hz / 1 kHz .

Note: For example the DANL in 1 kHz bandwidth –126 dBm results in a corrected value of –156 dBm in 1 Hz bandwidth.

As both filter designs are digitally and using the same hardware setting, the DANL can be measured also with 1 kHz bandwidth to reduce measurement time.

Frequency	< 1 MHz	< 10 MHz	> 10 kHz
RefLev	-30 dBm	-60 dBm	-60 dBm

1.4.2 Checking the Level Uncertainty and the Frequency Response

- Test equipment:
- Signal Generator (Section "[Test Equipment](#)", item 1)

Frequency range	9 kHz to 3.6 GHz
Maximum level	≥ 0 dBm
 - Signal Generator (Section "[Test Equipment](#)", item 2)

Frequency range:	R&S FSVR 7: 10 MHz to 7 GHz
Maximum level:	≥ 0 dBm
 - Power meter (Section "[Test Equipment](#)", item 6)

Power range	-30 to 0 dBm
Instrumentation uncertainty	<0.5%
Uncertainty of power reference	<1.2%
VSWR of power reference	<1.10
 - Power Sensor (Section "[Test Equipment](#)", item 7)

Frequency range	9 kHz to 7 GHz
Power range	-30 to 0 dBm
Cal factor uncertainty	1 MHz to 3.6 GHz <1.6 %
	3.6 GHz to 7 GHz <2 %
	3.6 GHz to 7 GHz <1.15
VSWR	1 MHz to 3.6 GHz <1.30
	50 MHz to 128 MHz <1.10
 - 6 dB Power Splitter (Section "[Test Equipment](#)", item 3)

Frequency range	DC to 3.6 GHz
Level imbalance	10 MHz to 3.6 GHz <0.1 dB
Equivalent output VSWR	10 MHz to 3.6 GHz ≤ 1.1
 - 6 dB Power Splitter (Section "[Test Equipment](#)", item 4)

Frequency range	R&S FSVR7: DC to 7 GHz
Level imbalance	3.6 to 7 GHz ≤ 0.3 dB
Equivalent output VSWR	3.6 to 7 GHz ≤ 1.3

1.4.2.1 Absolute Level Uncertainty at 64 MHz

- Test setup:
- ▶ Standardize the Power Meter and Power Sensor (item 6, 7).
 - ▶ Set the Power Meter Cal Factor to the appropriate value for the Power Sensor for 64 MHz.
 - ▶ Connect Power Sensor through a cable to RF output of Signal Generator.
 - ▶ Ambient temperature: 20°C to 30°C
- Signal generator settings:
- Frequency 64 MHz
 - Level -10 dBm
- Measurement:
- ▶ Adjust level to -10 dBm ± 0.1 dB as viewed on the Power Meter.
 - ▶ Record the Power Meter indication.
 - ▶ Disconnect Power Sensor from the cable.
- R&S FSVR settings:
- [**PRESET**]
 - [**AMPT** : RF ATTEN MANUAL : **30 dB**]
 - [**AMPT** : RF INPUT DC]
 - [**AMPT** : PREAMP ON]
 - [**AMPT** : **-10 dBm**]
 - [**SWEEP** : SWEEP TIME : **10 ms**]
 - [**SPAN** : **30 kHz**]
 - [**BW** : RES BW MANUAL : **10 kHz**]
 - [**TRACE** : DETECTOR : RMS]
 - [**FREQ** : CENTER : **64 MHz**]
 - ▶ Set marker to peak of signal
 - [**MKR** ⇒ : PEAK]
- Evaluation:
- The difference between the signal levels measured with the power meter and the R&S FSVR (level reading of marker 1) reflects the absolute level uncertainty of the R&S FSVR. It can be calculated as:

$$\text{Level uncertainty}_{64\text{MHz}} = L_{\text{FSVR}} - L_{\text{powermeter}}$$

1.4.2.2 Frequency Response at < 3.6 GHz

Checking the frequency response

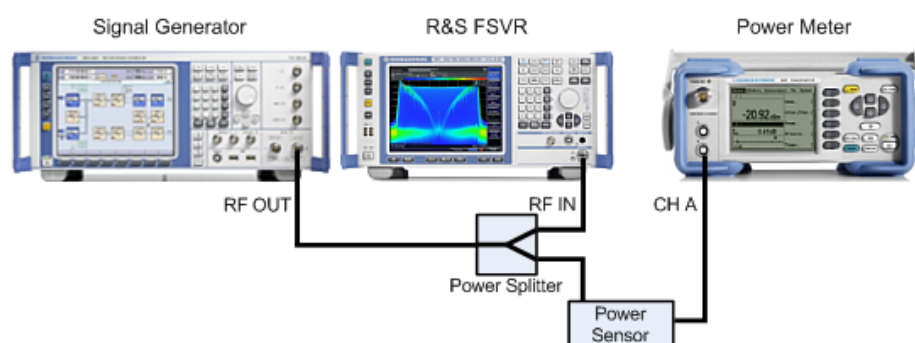


Power splitter with higher level imbalance

If a power splitter with higher level imbalance is used, correction of the measured frequency response is recommended.

Test setup:

- ▶ Standardize the Power Meter and Power Sensor (item 6, 7).
- ▶ Use Power Splitter/Combiner (item 3) and connect equipment as shown below.
- ▶ Connect the power splitter directly to the R&S FSVR RF input.
- ▶ Ambient temperature: 20°C to 30°C



Important Note

Throughout the remaining steps set the Power Meter Cal Factor as appropriate!

Signal generator settings:

- Level 0 dBm
- Frequency 64 MHz

R&S FSVR settings:

- [**PRESET**]
- [**AMPT** : RF INPUT DC]
- [**AMPT** : RF ATTEN MANUAL : **30 dB**]
- [**AMPT** : PREAMP ON]
- [**AMPT** : **0 dBm**]
- [**SPAN** : **100 kHz**]
- [**BW** : RES BW MANUAL : **10 kHz**]
- [**TRACE** : DETECTOR : RMS]
- [**FREQ** : CENTER : **64 MHz**]
- [**MKR** ⇒ : MORE : EXCLUDE LO]

- Reference measurement:
- ▶ Determine signal level $L_{\text{powermeter}}$
 - ▶ Set marker to peak of signal
 - [**MKR** ⇒ : PEAK]
- Read level indication from R&S FSVR (reading of marker 1): L_{FSVR}
- Power Meter:
- ▶ Read level indication from power meter : $L_{\text{PowerMeter}}$
- Evaluation:
- Calculate
- $$\Delta\text{Ref} / \text{dB} = L_{\text{FSVR}} / \text{dBm} - L_{\text{PowerMeter}} / \text{dBm}$$
- Record $\Delta\text{Ref} / \text{dB}$

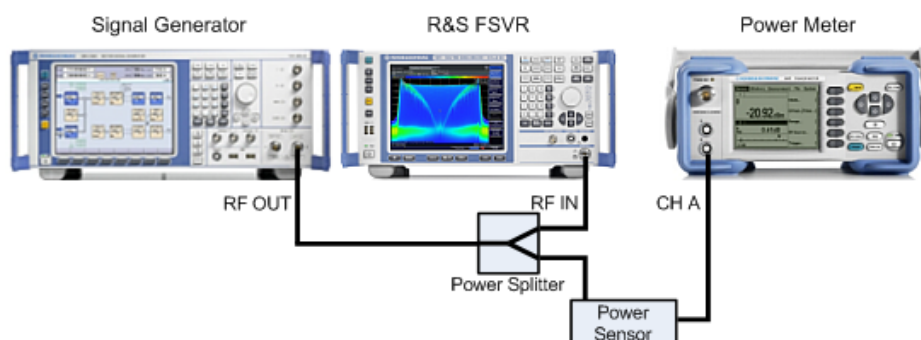
Frequency Response Measurement:

- Signal generator settings:
- Frequency f_{fresp}
- See table of performance test report for values of f_{fresp}
- R&S FSVR settings:
- [**SPAN** : {span}]
 - [**FREQ** : CENTER : { f_{fresp} }]
 - [**BW** : RES BW MANUAL : {**RBW**}]
- See table below for values of span and resolution bandwidth.
- See table of performance test report for values of f_{fresp}
- ▶ Set marker to peak of signal
 - [**MKR** ⇒ : PEAK]
 - ▶ Read level indication from R&S FSVR (reading of marker 1): L_{FSVR}
- Power Meter:
- ▶ Read level indication from Power Meter : $L_{\text{PowerMeter}}$
- Evaluation:
- The frequency response can be calculated as:
- $$\text{Freq. response} / \text{dB} = L_{\text{FSVR}} - L_{\text{PowerMeter}} - \Delta\text{Ref} / \text{dB}$$

f_{center}	9 kHz	100.02 kHz	1,005 MHz	≥ 10 MHz
Span	0 Hz	0 Hz	0 Hz	100 kHz
RBW	10 Hz	1 kHz	10 kHz	10 kHz

1.4.2.3 Frequency Response > 3.6 GHz

- Test setup:
- ▶ Standardize the Power Meter and Power Sensor (item 6, 8).
 - ▶ Use Power Splitter/Combiner (item 4) and connect equipment as shown below.
 - ▶ Connect the power splitter directly to the R&S FSVR RF input.
 - ▶ Ambient temperature: 20°C to 30°C



Important Note

Throughout the remaining steps set the Power Meter Cal Factor as appropriate!

Reference Measurement:

Signal Generator – Level 0 dBm
settings:

- Frequency 64 MHz

R&S FSVR
settings:

- [**PRESET**]
- [**AMPT** : RF INPUT DC]
- [**AMPT** : RF ATTEN MANUAL : **30 dB**]
- [**AMPT** : PREAMP ON]
- [**AMPT** : **0 dBm**]
- [**SPAN** : **100 kHz**]
- [**BW** : RES BW MANUAL : **10 kHz**]
- [**TRACE** : DETECTOR : RMS]
- [**FREQ** : CENTER : **64 MHz**]

See table of performance test report for values of coupling and a_{FSVR} .

R&S FSVR
settings:

- ▶ Set marker to peak of signal
- [**MKR** ⇒ : PEAK]
- ▶ Read level indication from R&S FSVR (reading of marker 1): L_{FSVR}

Power Meter:

- ▶ Read level indication from Power Meter : $L_{\text{PowerMeter}}$

Evaluation: Calculate
 $\Delta\text{Ref} / \text{dB} = L_{\text{FSVR}} / \text{dBm} - L_{\text{PowerMeter}} / \text{dBm}$
 Record $\Delta\text{Ref} / \text{dB}$

Frequency Response Measurement

Signal Generator – Frequency f_{resp}
 settings: See table in performance test report for values of f_{resp}

R&S FSVR – [**FREQ** : CENTER : { f_{resp} }]
 settings: See table in performance test report for values of f_{resp}

- ▶ Set marker to peak of signal
- [**MKR** $\Rightarrow$: PEAK]
- ▶ Read level indication from R&S FSVR (reading of marker 1): L_{FSVR}

Power Meter: ▶ Read level indication from Power Meter : $L_{\text{PowerMeter}}$

Evaluation: The frequency response can be calculated as:
 $\text{Freq. response} / \text{dB} = L_{\text{FSVR}} - L_{\text{PowerMeter}} - \Delta\text{Ref} / \text{dB}$
 Take the value of ΔRef as ascertained before.

1.5 Performance Test Option RF Preamplifier R&S FSV-B24

1.5.1 Checking Noise Display

Test equipment: 50 Ω termination (Section "Test Equipment", item 5)

Frequency range R&S FSVR13: DC to 13.6 GHz
 R&S FSVR30: DC to 30 GHz
 R&S FSVR40: DC to 40 GHz

R&S FSVR
settings:

► Terminate the RF input of the R&S FSVR with 50 Ω

- [**PRESET**]
- [**AMPT** : RF ATTEN MANUAL : **0 dB**]
- [**AMPT** : RF INPUT DC]
- [**AMPT** : PREAMP ON]
- [**SPAN** : 0 Hz]
- [**BW** : RES BW MANUAL : **1 kHz**]
- [**BW** : SWEEP TIME MANUAL : **50 ms**]
- [**TRACE 1** : AVERAGE]
- [**TRACE 1** : SWEEP COUNT : **20 ENTER**]
- [**AMPT** : {RefLev}]
- [**FREQ** : CENTER : { f_n }]
- [**MEAS** : Time Dom Power : **Mean**]

See table of performance test report for values of f_n .

Measurement: ► Read out the mean marker and correct the measurement value by –30 dB for the ratio of 1 Hz / 1 kHz.

Note: For example the DANL in 1 kHz bandwidth –126 dBm results in a corrected value of –156 dBm in 1 Hz bandwidth.

As both filter designs are digitally and using the same hardware setting, the DANL can be measured also with 1 kHz bandwidth to reduce measurement time.

Frequency	< 1MHz	< 10 MHz	> 10 kHz
RefLev	-40 dBm	-60 dBm	-60 dBm

1.5.2 Checking the Level Uncertainty and the Frequency Response

Test equipment: Signal Generator (Section "Test Equipment", item 1)

Frequency range 9 kHz to 3.6 GHz

Maximum level ≥ 0 dBm

Signal Generator (Section "Test Equipment", item 2)

Frequency range: R&S FSVR13: 10 MHz to 13.6 GHz

R&S FSVR30: 10 MHz to 30.0 GHz

R&S FSVR40: 10 MHz to 40.0 GHz

Maximum level: ≥ 0 dBm

Power meter (Section "Test Equipment", item 6)

Power range -30 to 0 dBm

Instrumentation uncertainty $<0.5\%$

Uncertainty of power reference $<1.2\%$

VSWR of power reference <1.10

Power Sensor (Section "Test Equipment", item 7)

Frequency range 9 kHz to 7 GHz

Power range -30 to 0 dBm

Cal factor uncertainty 1 MHz to 3.6 GHz $<1.6\%$

3.6 GHz to 7 GHz $<2\%$

3.6 GHz to 7 GHz <1.15

VSWR 1 MHz to 3.6 GHz <1.30

50 MHz to 128 MHz <1.10

Power Sensor (Section "Test Equipment", item 8)

Frequency range: R&S FSVR13: DC to 26.5 GHz

R&S FSVR30: DC to 30 GHz

R&S FSVR40: DC to 40 GHz

Power range -30 to 0 dBm

Cal factor uncertainty 50 to 128 MHz $<1.6\%$

3.6 to 8 GHz $<2\%$

8 to 22 GHz $<2.5\%$

22 to 40 GHz $<3\%$

VSWR 50 to 128 MHz <1.15

3.6 to 8 GHz <1.15

8 to 22 GHz <1.25

22 to 40 GHz <1.35

6 dB Power Splitter (Section "Test Equipment", item 3)

Frequency range DC to 3.6 GHz

Level imbalance 10 MHz to 3.6 GHz <0.1 dB

Equivalent output VSWR 10 MHz to 3.6 GHz ≤ 1.1

6 dB Power Splitter (Section "Test Equipment", item 4)

Frequency range	R&S FSVR13: DC to 13.6 GHz	
	R&S FSVR30: DC to 30 GHz	
	R&S FSVR40: DC to 40 GHz	
Level imbalance	3.6 to 7 GHz	≤ 0.3 dB
	7 to 22 GHz	≤ 0.4 dB
	22 to 40 GHz	≤ 0.5 dB
Equivalent output VSWR	3.6 to 7 GHz	≤ 1.3
	7 to 22 GHz	≤ 1.4
	22 to 40 GHz	≤ 1.5

1.5.3 Absolute Level Uncertainty at 64 MHz

- Test setup:
- ▶ Standardize the Power Meter and Power Sensor (item 6, 7).
 - ▶ Set the Power Meter Cal Factor to the appropriate value for the Power Sensor for 64 MHz.
 - ▶ Connect Power Sensor through a cable to RF output of Signal Generator.
 - ▶ Ambient temperature: 20°C to 30°C
- Signal generator settings:
- Frequency 64 MHz
 - Level -10 dBm
- Measurement:
- ▶ Adjust level to -10 dBm ± 0.1 dB as viewed on the Power Meter.
 - ▶ Record the Power Meter indication.
 - ▶ Disconnect Power Sensor from the cable.
- R&S FSVR settings:
- [**PRESET**]
 - [**AMPT** : RF ATTEN MANUAL : **30 dB**]
 - [**AMPT** : RF INPUT DC]
 - [**AMPT** : PREAMP ON]
 - [**AMPT** : **-10 dBm**]
 - [**SWEEP** : SWEEP TIME : **10 ms**]
 - [**SPAN** : **30 kHz**]
 - [**BW** : RES BW MANUAL : **10 kHz**]
 - [**TRACE** : DETECTOR : RMS]
 - [**FREQ** : CENTER : **64 MHz**]
 - ▶ Set marker to peak of signal
 - [**MKR** ⇒ : PEAK]

Evaluation: The difference between the signal levels measured with the power meter and the R&S FSVR (level reading of marker 1) reflects the absolute level uncertainty of the R&S FSVR. It can be calculated as:

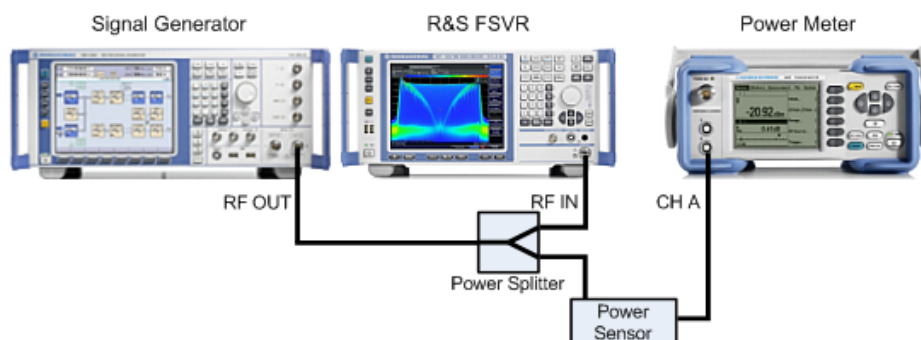
$$\text{Level uncertainty}_{64\text{MHz}} = L_{\text{FSVR}} - L_{\text{powermeter}}$$

1.5.3.1 Frequency Response < 3.6 GHz

Checking the frequency response

Note: If a power splitter with higher level imbalance is used, correction of the measured frequency response is recommended.

- Test setup:
- ▶ Standardize the Power Meter and Power Sensor (item 6, 7).
 - ▶ Use Power Splitter/Combiner (item 3) and connect equipment as shown below.
 - ▶ Connect the power splitter directly to the R&S FSVR RF input.
 - ▶ Ambient temperature: 20°C to 30°C



Important Note

Throughout the remaining steps set the Power Meter Cal Factor as appropriate!

- | | |
|----------------------------|--|
| Signal generator settings: | <ul style="list-style-type: none"> - Level 0 dBm - Frequency 64 MHz |
| R&S FSVR settings: | <ul style="list-style-type: none"> - [PRESET] - [AMPT : RF INPUT DC] - [AMPT : RF ATTEN MANUAL : 40 dB] - [AMPT : PREAMP ON] - [AMPT : 0 dBm] - [SPAN : 100 kHz] |
| R&S FSVR settings: | <ul style="list-style-type: none"> - [BW : RES BW MANUAL : 10 kHz] - [TRACE : DETECTOR : RMS] - [FREQ : CENTER : 64 MHz] - [MKR ⇒ : MORE : EXCLUDE LO] |

- Reference measurement:
- ▶ Determine signal level $L_{\text{powermeter}}$.
 - ▶ Set marker to peak of signal
 - [**MKR** ⇒ : PEAK]
 - ▶ Read level indication from R&S FSVR (reading of marker 1): L_{FSVR}
- Power Meter:
- ▶ Read level indication from power meter : $L_{\text{PowerMeter}}$
- Evaluation:
- Calculate
- $$\Delta \text{Ref} / \text{dB} = L_{\text{FSVR}} / \text{dBm} - L_{\text{PowerMeter}} / \text{dBm}$$
- Record $\Delta \text{Ref} / \text{dB}$

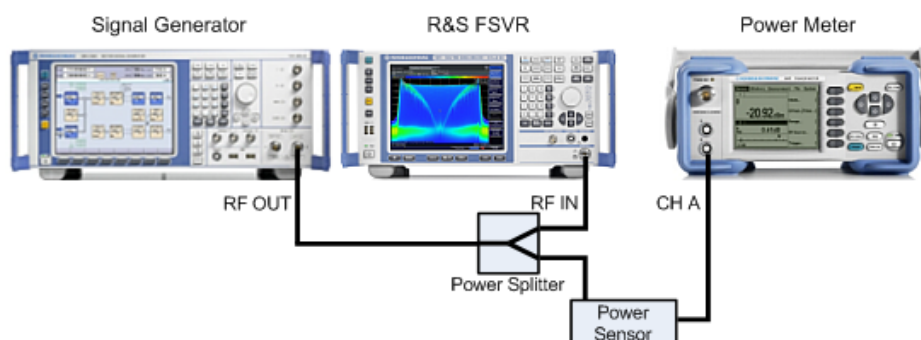
Frequency Response Measurement:

- Signal generator settings:
- Frequency f_{fresp}
 - See table of performance test report for values of f_{fresp}
- R&S FSVR settings:
- [**SPAN** : {span}]
 - [**FREQ** : CENTER : { f_{fresp} }]
 - [**BW** : RES BW MANUAL : {**RBW**}]
 - See table below for values of span and resolution bandwidth.
 - See table of performance test report for values of f_{fresp}
 - ▶ Set marker to peak of signal
 - [**MKR** ⇒ : PEAK]
 - ▶ Read level indication from R&S FSVR (reading of marker 1): L_{FSVR}
- Power Meter:
- ▶ Read level indication from Power Meter : $L_{\text{PowerMeter}}$
- Evaluation:
- The frequency response can be calculated as:
- $$\text{Freq. response} / \text{dB} = L_{\text{FSVR}} - L_{\text{PowerMeter}} - \Delta \text{Ref} / \text{dB}$$

f_{center}	9 kHz	100.02 kHz	1.005 MHz	≥ 10 MHz
Span	0 Hz	0Hz	0 Hz	100 kHz
RBW	10 Hz	1 kHz	10 kHz	10 kHz

1.5.3.2 Frequency Response > 3.6 GHz

- Test setup:
- ▶ Standardize the Power Meter and Power Sensor (item 6, 8).
 - ▶ Use Power Splitter/Combiner (item 4) and connect equipment as shown below.
 - ▶ Connect the power splitter directly to the R&S FSVR RF input.
 - ▶ Ambient temperature: 20°C to 30°C



Important Note

Throughout the remaining steps set the Power Meter Cal Factor as appropriate!

Reference Measurement:

Signal Generator settings:

- Level 0 dBm
- Frequency 64 MHz

R&S FSVR settings:

- [**PRESET**]
- [**AMPT** : RF INPUT DC]
- [**AMPT** : RF ATTN MANUAL : **40 dB**]
- [**AMPT** : PREAMP ON]
- [**AMPT** : **0 dBm**]
- [**SPAN** : **100 kHz**]
- [**BW** : RES BW MANUAL : **10 kHz**]
- [**TRACE** : DETECTOR : RMS]
- [**FREQ** : CENTER : **64 MHz**]

See table of performance test report for values of coupling and a_{FSVR} .

R&S FSVR settings:

- ▶ Set marker to peak of signal
- [**MKR** ⇒ : PEAK]
- ▶ Read level indication from R&S FSVR (reading of marker 1): L_{FSVR}

Power Meter:

- ▶ Read level indication from Power Meter : $L_{\text{PowerMeter}}$

Evaluation: Calculate
 $\Delta\text{Ref} / \text{dB} = L_{\text{FSVR}} / \text{dBm} - L_{\text{PowerMeter}} / \text{dBm}$
 Record $\Delta\text{Ref} / \text{dB}$

Frequency Response Measurement

Signal Generator – Frequency f_{fresp}
 settings: See table in performance test report for values of f_{fresp}

R&S FSVR – [**FREQ** : CENTER : { f_{fresp} }]
 settings: See table in performance test report for values of f_{fresp}

- ▶ Set marker to peak of signal
- [**MKR** ⇒ : PEAK]
- ▶ Read level indication from R&S FSVR (reading of marker 1): L_{FSVR}

Power Meter: ▶ Read level indication from Power Meter : $L_{\text{PowerMeter}}$

Evaluation: The frequency response can be calculated as:

$$\text{Freq. response} / \text{dB} = L_{\text{FSVR}} - L_{\text{PowerMeter}} - \Delta\text{Ref} / \text{dB}$$

Take the value of ΔRef as ascertained before.

For R&S FSVR13/30/40: Repeat the measurement with [YIG OFF] for $f_n > 7 \text{ GHz}$ with the same limits and values of f_n .

1.6 Performance Test for Option Electronic Attenuator R&S FSV-B25

1.6.1 Checking the Electronic Attenuator Uncertainty

- Test equipment:
- Signal generator (Section "[Test Equipment](#)", item 1)
 - Frequency 128 MHz
 - Maximum level ≥ 10 dBm
 - Step attenuator (Section "[Test Equipment](#)", item 9)
 - Frequency 128 MHz
 - Attenuation 0 to 100 dB in 1 dB steps
 - Attenuation Uncertainty < 0.1 dB
- Test setup:
- Connect RF output of the signal generator to RF input of the step attenuator
 - Connect RF output of the step attenuator to RF input of the R&S FSVR
- Signal generator settings:
- Frequency 128.1 MHz
 - Level 10 dBm
- R&S FSVR settings:
- [**PRESET**]
 - [**FREQ : CENTER : 128.1 MHz**]
 - [**SPAN : 500 Hz**]
 - [**BW : RES BW MANUAL : 1 kHz**]
 - [**TRACE : DETECTOR : RMS**]
 - [**BW : VIDEO BW MANUAL : 100 Hz**]
 - [**AMPT : EL ATTEN MANUAL : 0 dB**]
 - [**AMPT : MECH ATT MANUAL : 10 dB**]
 - [**AMPT : -35 dBm**]
- Reference measurement:
- Set marker to peak of signal
 - [**MKR $\Rightarrow$: PEAK**]
 - Set reference to peak of signal
 - [**MKR : REFERENCE FIXED**]
- Measurement
- Step attenuator settings:
- Attenuation { 70dB - a_{EI} }

- R&S FSVR settings:
- [**AMPT** : EL ATTEN MANUAL : { a_{EL} }]
 - [**AMPT** : { -35dBm + a_{EL} } **dBm**]
 - [**MKR** $\Rightarrow$: PEAK]

See table below for values of a_{FSVR} , a_{ATT} and reference level.

Evaluation: The difference between the level of the input signal of the R&S FSVR and the reference (at 10 dB RF-Attenuation) is displayed in the marker field by the reading Delta [T1 FXD].

a_{ATT}	70 dB	69 dB	68 dB	67 dB	...	48 dB	47 dB	46dB	45 dB
a_{FSVR}	0 dB	1 dB	2 dB	3 dB	...	22 dB	23 dB	24 dB	25 dB
reference level	-35 dBm	-34 dBm	-35 dBm	-34 dBm	...	-13 dBm	-12 dBm	-11 dBm	-10 dBm

1.6.2 Checking the Level Uncertainty and the Frequency Response

- Test equipment:
- Signal Generator (Section "[Test Equipment](#)", item 1)
 - Frequency range 9 kHz to 3.6 GHz
 - Maximum level ≥ 0 dBm
 - Signal Generator (Section "[Test Equipment](#)", item 2)
 - Frequency range: R&S FSVR 7: 10 MHz to 7 GHz
 - Maximum level: ≥ 0 dBm
 - Power meter (Section "[Test Equipment](#)", item 6)
 - Power range -30 to 0 dBm
 - Instrumentation uncertainty <0.5%
 - Uncertainty of power reference <1.2%
 - VSWR of power reference <1.10
 - Power Sensor (Section "[Test Equipment](#)", item 7)
 - Frequency range 9 kHz to 7 GHz
 - Power range -30 to 0 dBm
 - Cal factor uncertainty 1 MHz to 3.6 GHz <1.6 %
 - 3.6 GHz to 7 GHz <2 %
 - 3.6 GHz to 7 GHz <1.15
 - VSWR 1 MHz to 3.6 GHz <1.30
 - 50 MHz to 128 MHz <1.10
 - 6 dB Power Splitter (Section "[Test Equipment](#)", item 3)
 - Frequency range DC to 3.6 GHz
 - Level imbalance 10 MHz to 3.6 GHz <0.1 dB
 - Equivalent output VSWR 10 MHz to 3.6 GHz ≤ 1.1

- 6 dB Power Splitter (Section "Test Equipment", item 4)

Frequency range:

R&S FSVR7	DC to 7 GHz	
Level imbalance	3.6 to 7 GHz	≤ 0.3 dB
Equivalent output VSWR	3.6 to 7 GHz	≤ 1.3

1.6.2.1 Absolute Level Uncertainty at 64 MHz

- Test setup:
- ▶ Standardize the Power Meter and Power Sensor (item 6, 7).
 - ▶ Set the Power Meter Cal Factor to the appropriate value for the Power Sensor for 64 MHz.
 - ▶ Connect Power Sensor through a cable to RF output of Signal Generator.
 - ▶ Ambient temperature: 20°C to 30°C
- Signal generator settings:
- Frequency 64 MHz
 - Level -10 dBm
- Measurement:
- ▶ Adjust level to -10 dBm ± 0.1 dB as viewed on the Power Meter.
 - ▶ Record the Power Meter indication.
 - ▶ Disconnect Power Sensor from the cable.
- R&S FSVR settings:
- [**PRESET**]
 - [**AMPT** : EL ATTEN MANUAL : **0 dB**]
 - [**AMPT** : MECH ATT MANUAL : **10 dB**]
 - [**AMPT** : **-10 dBm**]
 - [**SWEEP** : SWEEP TIME : **10 ms**]
 - [**SPAN** : **30 kHz**]
 - [**BW** : RES BW MANUAL : **10 kHz**]
 - [**TRACE** : DETECTOR : **RMS**]
 - [**FREQ** : CENTER : **64 MHz**]
 - ▶ Set marker to peak of signal
 - [**MKR** ⇒ : **PEAK**]
- Evaluation:
- The difference between the signal levels measured with the power meter and the R&S FSVR (level reading of marker 1) reflects the absolute level uncertainty of the R&S FSVR. It can be calculated as:

$$\text{Level uncertainty}_{64\text{MHz}} = L_{\text{FSVR}} - L_{\text{powermeter}}$$

1.6.2.2 Frequency Response < 3.6 GHz

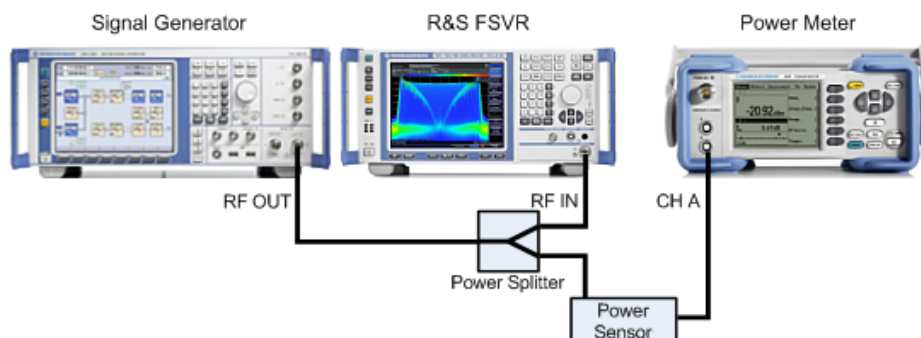
Checking the frequency response

Note:

If a power splitter with higher level imbalance is used, correction of the measured frequency response is recommended.

Test setup:

- ▶ Standardize the Power Meter and Power Sensor (item 6, 7).
- ▶ Use Power Splitter/Combiner (item 3) and connect equipment as shown below.
- ▶ Connect the power splitter directly to the R&S FSVR RF input.
- ▶ Ambient temperature: 20°C to 30°C



Important Note

Throughout the remaining steps set the Power Meter Cal Factor as appropriate!

Signal generator settings:

- Level 0 dBm
- Frequency 64 MHz

R&S FSVR settings:

- [**PRESET**]
- [**AMPT** : RF INPUT DC]
- [**AMPT** : EL ATTEN MANUAL : a_{EL}]
- [**AMPT** : MECH ATT MANUAL : **10 dB**]
- [**AMPT** : **0 dBm**]
- [**SPAN** : **100 kHz**]
- [**BW** : RES BW MANUAL : **10 kHz**]
- [**TRACE** : DETECTOR : RMS]
- [**FREQ** : CENTER : **64 MHz**]
- [**MKR** ⇒ : MORE : EXCLUDE LO]

See table of performance test report for values of a_{EL} .

- Reference measurement:
- ▶ Determine signal level $L_{\text{powermeter}}$.
 - ▶ Set marker to peak of signal
 - [**MKR** ⇒ : PEAK]
 - ▶ Read level indication from R&S FSVR (reading of marker 1): L_{FSVR}
- Power Meter:
- ▶ Read level indication from power meter : $L_{\text{PowerMeter}}$
- Evaluation:
- Calculate
- $$\Delta\text{Ref} / \text{dB} = L_{\text{FSVR}} / \text{dBm} - L_{\text{PowerMeter}} / \text{dBm}$$
- Record $\Delta\text{Ref} / \text{dB}$

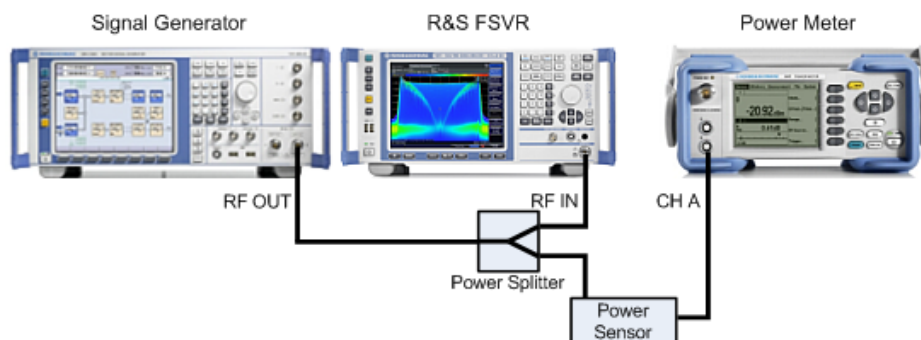
Frequency Response Measurement:

- Signal generator settings:
- Frequency f_{fresp}
 - See table of performance test report for values of f_{fresp}
- R&S FSVR settings:
- [**SPAN** : {span}]
 - [**FREQ** : CENTER : { f_{fresp} }]
 - [**BW** : RES BW MANUAL : {RBW}]
 - See table below for values of span and resolution bandwidth.
 - See table of performance test report for values of f_{fresp}
 - ▶ Set marker to peak of signal
 - [**MKR** ⇒ : PEAK]
 - Read level indication from R&S FSVR (reading of marker 1): L_{FSVR}
- Power Meter:
- ▶ Read level indication from Power Meter : $L_{\text{PowerMeter}}$
- Evaluation:
- The frequency response can be calculated as:
- $$\text{Freq. response} / \text{dB} = L_{\text{FSVR}} - L_{\text{PowerMeter}} - \Delta\text{Ref} / \text{dB}$$

f_{center}	9 kHz	100.02 kHz	1,005 MHz	≥ 10 MHz
Span	0 Hz	0Hz	0 Hz	100 kHz
RBW	10 Hz	1 kHz	10 kHz	10 kHz

1.6.2.3 Frequency Response > 3.6 GHz

- Test setup:
- ▶ Standardize the Power Meter and Power Sensor (item 6, 8).
 - ▶ Use Power Splitter/Combiner (item 4) and connect equipment as shown below.
 - ▶ Connect the power splitter directly to the R&S FSVR RF input.
 - ▶ Ambient temperature: 20°C to 30°C



Important Note

Throughout the remaining steps set the Power Meter Cal Factor as appropriate!

Reference Measurement:

Signal Generator – Level 0 dBm
settings:

- Frequency 64 MHz

R&S FSVR
settings:

- [**PRESET**]
- [**AMPT** : RF INPUT DC]
- [**AMPT** : EL ATTEN MANUAL : a_{EL}]
- [**AMPT** : MECH ATT MANUAL : 10 dB]
- [**AMPT** : 0 dBm]
- [**SPAN** : 100 kHz]
- [**BW** : RES BW MANUAL : 10 kHz]
- [**TRACE** : DETECTOR : RMS]
- [**FREQ** : CENTER : 64 MHz]

See table of performance test report for values of a_{EL} .

R&S FSVR
settings:

- ▶ Set marker to peak of signal
- [**MKR** ⇒ : PEAK]
- ▶ Read level indication from R&S FSVR (reading of marker 1): L_{FSVR}

Power Meter:

- ▶ Read level indication from Power Meter : $L_{PowerMeter}$

Evaluation: Calculate
 $\Delta\text{Ref} / \text{dB} = L_{\text{FSVR}} / \text{dBm} - L_{\text{PowerMeter}} / \text{dBm}$
 Record $\Delta\text{Ref} / \text{dB}$

Frequency Response Measurement

Frequency f_{fresp}

See table in performance test report for values of f_{fresp}

R&S FSVR
 settings:

– [**FREQ** : CENTER : { f_{fresp} }]

See table in performance test report for values of f_{fresp}

► Set marker to peak of signal

– [**MKR** $\Rightarrow$: PEAK]

► Read level indication from R&S FSVR (reading of marker 1): L_{FSVR}

Power Meter:

► Read level indication from Power Meter : $L_{\text{PowerMeter}}$

Evaluation: The frequency response can be calculated as:

Freq. response / dB = $L_{\text{FSVR}} - L_{\text{PowerMeter}} - \Delta\text{Ref} / \text{dB}$

Take the value of ΔRef as ascertained before.

1.7 Performance Test for Option Frequency Range Extension 10 Hz R&S FSV-B29

The option R&S FSV-B29 is built in per default in the R&S FSVR.

1.7.1 Checking Noise Display

Test equipment: 50 Ω termination (Section "Test Equipment", item 5)

Frequency range R&S FSVR7/13/30/40: DC to 7 GHz

R&S FSVR
settings:

- Terminate the RF input of the R&S FSVR with 50 Ω
- [**PRESET**]
- [**AMPT** : RF ATTEN MANUAL : **0 dB**]
- [**SPAN** : **0 Hz**]
- [**BW** : RES BW MANUAL : **5 Hz**]
- [**BW** : SWEEP TIME MANUAL : **500 ms**]
- [**TRACE 1** : AVERAGE]
- [**TRACE 1** : SWEEP COUNT : **20 ENTER**]
- [**AMPT** : **-10 dBm**]
- [**FREQ** : CENTER : { f_n }]
- [**MEAS** : Time Dom Power : **Mean**]

See table of performance test report for values of f_n .

Measurement: ► Read out the mean marker and correct the measurement value by -7 dB for the ratio of 1 Hz / 5 Hz .

Note: For example the DANL in 5 Hz bandwidth -120 dBm results in a corrected value of -127 dBm in 1 Hz bandwidth.

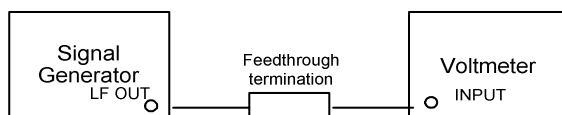
As both filter designs are digitally and using the same hardware setting, the DANL can be measured also with 5 Hz bandwidth to reduce measurement time.

1.7.2 Checking the Frequency Response

- Test equipment:
- Signal Generator (Section "Test Equipment", item 1)
 - Frequency range 20 Hz to 128 MHz
 - Maximum level ≥ 0 dBm
 - Voltmeter (Section "Test Equipment", item 10)
 - Frequency range 20 Hz to 100 kHz
 - 50 Ω feedthrough termination (Section "Test Equipment", item 13)
- Reference measurement: See chapter "Checking Level Uncertainty and the Frequency Response"

Signal generator calibration:

- Test setup:
- Connect the LF output of the signal generator via the feedthrough termination with the input of the voltmeter.



- Ambient temperature: 20°C to 30°C

- Signal generator settings:
- Level 141 mV

- Measurement:
- Set the Signal Generator frequency to the first value listed in the table below.
 - Read the voltage at the voltmeter. Calculate the level / dBm as follows:

$$L_{\text{Gen}} / \text{dBm} = 10 \times \log((V_{\text{Gen}}^2 / 50 \text{ Ohm}) / 1 \text{ mW})$$
 - Record the measured values in the table below.
 - Repeat the steps for the remaining frequencies listed in the table below.

Applied frequency (f_{fresp})	$L_{\text{Gen}} / \text{dBm}$
20 Hz	_____
110 Hz	_____
1010 Hz	_____
2010 Hz	_____
3010 Hz	_____
5010 Hz	_____
7010 Hz	_____
8990 Hz	_____

Checking the frequency response

Test setup: ► Connect the LF output of the signal generator with the input of the R&S FSVR.

Signal Generator settings: – Frequency f_{fresp}
See table of performance test report for values of f_{fresp}

R&S FSVR settings: – [**PRESET**]
– [**AMPT** : RF INPUT DC]
– [**AMPT** : RF ATTEN MANUAL : **10 dB**]
– [**AMPT** : **0 dBm**]
– [**SPAN** : **10 Hz**]
– [**BW** : RES BW MANUAL : **10 Hz**]
– [**TRACE** : DETECTOR : RMS]

Measurement: – [**FREQ** : CENTER : { f_{fresp} }]
See table in performance test report for values of f_{fresp}
► Set marker to peak of signal
– [**MKR** ⇒ : PEAK]
► Read level indication from R&S FSVR (reading of marker 1): L_{FSVR}

Evaluation: The frequency response can be calculated as:
$$\text{Freq. response / dB} = L_{\text{FSVR}} - L_{\text{Gen}} - \Delta\text{Ref / dB}$$

Take the value of ΔRef as ascertained before.

1.8 Performance Test Report R&S FSVR

ROHDE&SCHWARZ	Realtime Spectrum Analyzer R&S FSVR	1311.0006.07/13/30/40
Serial number:		
Date:		
Person responsible:		
Signature:		

For nominal data and limit values refer to the data sheet supplied with the instrument.

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
General Tests					
Reference Frequency Uncertainty	Page 13				
Basic unit		999.999	_____	1000.001	MHz
with option R&S FSV-B4		999.9999	_____	1000.0001	MHz
2nd IF Image Frequency Rejection f_{in}	Page 15				
R&S FSVR7/13/30/40:					
101 MHz		80	_____	-	dB
1799 MHz		80	_____	-	dB
3599 MHz		80	_____	-	dB
5299 MHz		80	_____	-	dB
6999 MHz		80	_____	-	dB
R&S FSVR13/30/40:					
9999 MHz		80	_____	-	dB
R&S FSVR30/40:					
17999 MHz		80	_____	-	dB
25999 MHz *)		80	_____	-	dB
R&S FSVR40:					
33999 MHz		70	_____	-	dB
38539 MHz		70	_____	-	dB
*) $f_{in} - 2 \times 729.9$ MHz					
3rd IF Image Frequency Rejection f_{in}	Page 15				
R&S FSVR7/13/30/40:					
101 MHz		80	_____	-	dB
3599 MHz		80	_____	-	dB
6999 MHz		80	_____	-	dB

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
R&S FSVR13/30/40:					
9999 MHz		80	_____	-	dB
R&S FSVR30/40:					
21999 MHz		80	_____	-	dB
R&S FSVR40:					
32999 MHz		80	_____	-	dB
36999 MHz		80	_____	-	dB
2nd IF Rejection f_{in}	Page 16				
R&S FSVR7/13/30/40:					
101 MHz		80	_____	-	dB
3599 MHz		80	_____	-	
5299 MHz		80	_____	-	
6999 MHz		80	_____	-	
R&S FSVR13/30/40:					
9999 MHz		80	_____	-	dB
R&S FSVR30/40:					
21999 MHz		80	_____	-	dB
R&S FSVR40:					
32999 MHz		80	_____	-	dB
36999 MHz		80	_____	-	dB
3rd IF Rejection f_{in}	Page 16				
1001 MHz		80	_____	-	dB
Third-Order Intercept Point f_{in}	Page 17				
R&S FSVR7/13/30/40:					
10.2 MHz		12	_____	-	dBm
50.2 MHz		12	_____	-	dBm
100.2 MHz		13	_____	-	dBm
600.2 MHz		13	_____	-	dBm
1100.2 MHz		13	_____	-	dBm
1600.2 MHz		13	_____	-	dBm
2100.2 MHz		13	_____	-	dBm
2600.2 MHz		13	_____	-	dBm
3100.2 MHz		13	_____	-	dBm
3599.2 MHz		13	_____	-	dBm
3601.2 MHz		15	_____	-	dBm
4101.2 MHz		15	_____	-	dBm
4601.2 MHz		15	_____	-	dBm

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
5101.2 MHz		15	_____	-	dBm
5601.2 MHz		15	_____	-	dBm
6101.2 MHz		15	_____	-	dBm
6601.2 MHz		15	_____	-	dBm
6999.2 MHz		15	_____	-	dBm
R&S FSVR13/30/40:					
7999 MHz		15	_____		dBm
8999 MHz		15	_____		dBm
9999 MHz		15	_____		dBm
10999 MHz		15	_____		dBm
11999 MHz		15	_____		dBm
12999 MHz		15	_____		dBm
R&S FSVR30/40:					
13999 MHz		15	_____		dBm
15999 MHz		15	_____		dBm
17999 MHz		15	_____		dBm
19999 MHz		15	_____		dBm
21999 MHz		15	_____		dBm
23999 MHz		15	_____		dBm
25999 MHz		15	_____		dBm
27999 MHz		15	_____		dBm
29999 MHz		15	_____		dBm
R&S FSVR40:					
32999 MHz		15	_____		dBm
34999 MHz		15	_____		dBm
36999 MHz		15	_____		dBm
38999 MHz		15	_____		dBm
39999 MHz		15	_____		dBm
Bandwidth switching level uncertainty sweep mode RBW	Page 18				
40 MHz		-0.1	_____	0.1	dB
28 MHz		-0.1	_____	0.1	dB
20 MHz		-0.1	_____	0.1	dB
10 MHz		-0.1	_____	0.1	dB
5 MHz		-0.1	_____	0.1	dB
3 MHz		-0.1	_____	0.1	dB
2 MHz		-0.1	_____	0.1	dB
1 MHz		-0.1	_____	0.1	dB

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
500 kHz		-0.1	_____	0.1	dB
300 kHz		-0.1	_____	0.1	dB
200 kHz		-0.1	_____	0.1	dB
100 kHz		-0.1	_____	0.1	dB
10 kHz			Reference		
1 kHz		-0.1	_____	0.1	dB
100 Hz		-0.1	_____	0.1	dB
Bandwidth switching level uncertainty FFT mode RBW	Page 18				
300 kHz		-0.2	_____	0.2	dB
200 kHz		-0.2	_____	0.2	dB
100 kHz		-0.2	_____	0.2	dB
10 kHz		-0.2	_____	0.2	dB
1 kHz		-0.2	_____	0.2	dB
100 Hz		-0.2	_____	0.2	dB
Spurious Response f_{spur}	Page 19				
16 MHz		-	_____	-103	dBm
32 MHz		-	_____	-103	dBm
64 MHz		-	_____	-103	dBm
128 MHz		-	_____	-103	dBm
256 MHz		-	_____	-103	dBm
384 MHz		-	_____	-103	dBm
Spurious response (full span)					
20 MHz to 40 GHz		-	_____	-103	dBm
20 MHz to 34 GHz		-	_____	-110	dBm
34 GHz to 40 GHz		-	_____	-105	dBm
Noise Display normalized to 1 Hz Preamplifier = OFF (DANL1) f_n	Page 21				
R&S FSVR7:					
9 kHz		-	_____	-130	dBm
99 kHz		-	_____	-130	dBm
999 kHz		-	_____	-145	dBm
10.1 MHz		-	_____	-152	dBm
19.99 MHz		-	_____	-152	dBm
49.99 MHz		-	_____	-152	dBm
99.99 MHz		-	_____	-152	dBm
199.9 MHz		-	_____	-152	dBm

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
499.9 MHz		-	_____	-152	dBm
599.9 MHz		-	_____	-152	dBm
699.9 MHz		-	_____	-152	dBm
799.9 MHz		-	_____	-152	dBm
899.9 MHz		-	_____	-152	dBm
999.9 MHz		-	_____	-152	dBm
1199.9 MHz		-	_____	-150	dBm
1399.9 MHz		-	_____	-150	dBm
1599.9 MHz		-	_____	-150	dBm
1799.9 MHz		-	_____	-150	dBm
1999.9 MHz		-	_____	-150	dBm
2199.9 MHz		-	_____	-150	dBm
2399.9 MHz		-	_____	-150	dBm
2599.9 MHz		-	_____	-150	dBm
2799.9 MHz		-	_____	-150	dBm
2999.9 MHz		-	_____	-150	dBm
3199.9 MHz		-	_____	-150	dBm
3399.9 MHz		-	_____	-150	dBm
3599.9 MHz		-	_____	-150	dBm
3601.0 MHz		-	_____	-148	dBm
3799.9 MHz		-	_____	-148	dBm
3999.9 MHz		-	_____	-148	dBm
4199.9 MHz		-	_____	-148	dBm
4399.9 MHz		-	_____	-148	dBm
4599.9 MHz		-	_____	-148	dBm
4799.9 MHz		-	_____	-148	dBm
4999.9 MHz		-	_____	-148	dBm
5199.9 MHz		-	_____	-148	dBm
5399.9 MHz		-	_____	-148	dBm
5599.9 MHz		-	_____	-148	dBm
5799.9 MHz		-	_____	-148	dBm
5999.9 MHz		-	_____	-148	dBm
6199.9 MHz		-	_____	-146	dBm
6399.9 MHz		-	_____	-146	dBm
6599.9 MHz		-	_____	-146	dBm
6799.9 MHz		-	_____	-146	dBm
6999.9 MHz		-	_____	-146	dBm

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
Noise Display normalized to 1 Hz Preamplifier = OFF, without option FSV-B24 (DANL2) f_n	Page 21				
R&S FSVR13/30/40:					
9 kHz		-	_____	-130	dBm
99 kHz		-	_____	-130	dBm
999 kHz		-	_____	-145	dBm
10.1 MHz		-	_____	-151	dBm
19.99 MHz		-	_____	-151	dBm
49.99 MHz		-	_____	-151	dBm
99.99 MHz		-	_____	-151	dBm
199.9 MHz		-	_____	-151	dBm
499.9 MHz		-	_____	-151	dBm
599.9 MHz		-	_____	-151	dBm
699.9 MHz		-	_____	-151	dBm
799.9 MHz		-	_____	-151	dBm
899.9 MHz		-	_____	-151	dBm
999.9 MHz		-	_____	-151	dBm
1199.9 MHz		-	_____	-149	dBm
1399.9 MHz		-	_____	-149	dBm
1599.9 MHz		-	_____	-149	dBm
1799.9 MHz		-	_____	-149	dBm
1999.9 MHz		-	_____	-149	dBm
2199.9 MHz		-	_____	-149	dBm
2399.9 MHz		-	_____	-149	dBm
2599.9 MHz		-	_____	-149	dBm
2799.9 MHz		-	_____	-149	dBm
2999.9 MHz		-	_____	-149	dBm
3199.9 MHz		-	_____	-149	dBm
3399.9 MHz		-	_____	-149	dBm
3599.9 MHz		-	_____	-149	dBm
3601.0 MHz		-	_____	-146	dBm
3799.9 MHz		-	_____	-146	dBm
3999.9 MHz		-	_____	-146	dBm
4199.9 MHz		-	_____	-146	dBm
4399.9 MHz		-	_____	-146	dBm
4599.9 MHz		-	_____	-146	dBm
4799.9 MHz		-	_____	-146	dBm
4999.9 MHz		-	_____	-146	dBm

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
5199.9 MHz		-	_____	-146	dBm
5399.9 MHz		-	_____	-146	dBm
5599.9 MHz		-	_____	-146	dBm
5799.9 MHz		-	_____	-146	dBm
5999.9 MHz		-	_____	-146	dBm
6199.9 MHz		-	_____	-144	dBm
6399.9 MHz		-	_____	-144	dBm
6599.9 MHz		-	_____	-144	dBm
6799.9 MHz		-	_____	-144	dBm
6999.9 MHz		-	_____	-144	dBm
R&S FSVR13/30:					
7000.1 MHz		_____	_____	-144	dBm
7499.9 MHz		_____	_____	-148+1	dBm
7999.9 MHz		_____	_____	-148+1	dBm
8499.9 MHz		_____	_____	-148+1	dBm
8999.9 MHz		_____	_____	-148+1	dBm
9499.9 MHz		_____	_____	-148+1	dBm
9999.9 MHz		_____	_____	-148+1	dBm
10499.9 MHz		_____	_____	-148+1	dBm
10999.9 MHz		_____	_____	-148+1	dBm
11499.9 MHz		_____	_____	-148+1	dBm
11999.9 MHz		_____	_____	-148+1	dBm
12499.9 MHz		_____	_____	-148+1	dBm
12999.9 MHz		_____	_____	-148+1	dBm
13499.9 MHz		_____	_____	-148+1	dBm
R&S FSVR30:					
13999.9 MHz		_____	_____	-148+1	dBm
14999.9 MHz		_____	_____	-148+1	dBm
15999.9 MHz		_____	_____	-144+2	dBm
16999.9 MHz		_____	_____	-144+2	dBm
17999.9 MHz		_____	_____	-144+2	dBm
18999.9 MHz		_____	_____	-144+2	dBm
19999.9 MHz		_____	_____	-144+2	dBm
20999.9 MHz		_____	_____	-144+2	dBm
21999.9 MHz		_____	_____	-144+2	dBm
22999.9 MHz		_____	_____	-144+2	dBm
23999.9 MHz		_____	_____	-144+2	dBm
24999.9 MHz		_____	_____	-144+2	dBm

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
25999.9 MHz		_____	_____	-144+2	dBm
26999.9 MHz		_____	_____	-144+2	dBm
27999.9 MHz		_____	_____	-144+2	dBm
28999.9 MHz		_____	_____	-144+2	dBm
29999.9 MHz		_____	_____	-144+2	dBm
R&S FSVR40:					
7499.9 MHz		-	_____	-144	dBm
7999.9 MHz		-	_____	-145+2	dBm
8499.9 MHz		-	_____	-145+2	dBm
8999.9 MHz		-	_____	-145+2	dBm
9499.9 MHz		-	_____	-145+2	dBm
9999.9 MHz		-	_____	-145+2	dBm
10499.9 MHz		-	_____	-145+2	dBm
10999.9 MHz		-	_____	-145+2	dBm
11499.9 MHz		-	_____	-145+2	dBm
11999.9 MHz		-	_____	-145+2	dBm
12499.9 MHz		-	_____	-145+2	dBm
12999.9 MHz		-	_____	-145+2	dBm
13499.9 MHz		-	_____	-145+2	dBm
13999.9 MHz		-	_____	-145+2	dBm
14999.9 MHz		-	_____	-145+2	dBm
15999.9 MHz		-	_____	-142+2	dBm
16999.9 MHz		-	_____	-142+2	dBm
17999.9 MHz		-	_____	-142+2	dBm
18999.9 MHz		-	_____	-142+2	dBm
19999.9 MHz		-	_____	-142+2	dBm
20999.9 MHz		-	_____	-142+2	dBm
21999.9 MHz		-	_____	-142+2	dBm
22999.9 MHz		-	_____	-142+2	dBm
23999.9 MHz		-	_____	-142+2	dBm
24999.9 MHz		-	_____	-142+2	dBm
25999.9 MHz		-	_____	-142+2	dBm
26999.9 MHz		-	_____	-142+2	dBm
27999.9 MHz		-	_____	-142+2	dBm
28999.9 MHz		-	_____	-142+2	dBm
29999.9 MHz		-	_____	-142+2	dBm
31999.9 MHz		-	_____	-142+2	dBm
32999.9 MHz		-	_____	-142+2	dBm

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
33999.9 MHz		-	_____	-142+2	dBm
34999.9 MHz		-	_____	-136+3	dBm
35999.9 MHz		-	_____	-136+3	dBm
36999.9 MHz		-	_____	-136+3	dBm
37999.9 MHz		-	_____	-136+3	dBm
38999.9 MHz		-	_____	-136+3	dBm
39999.9 MHz		-	_____	-136+3	dBm
Noise Display normalized to 1 Hz Preamplifier = OFF, with option FSV-B24 (DANL3) f_n	Page 21				
R&S FSVR13/30/40:					
9 kHz		-	_____	-130	dBm
99 kHz		-	_____	-130	dBm
999 kHz		-	_____	-145	dBm
10.1 MHz		-	_____	-150	dBm
19.99 MHz		-	_____	-150	dBm
49.99 MHz		-	_____	-150	dBm
99.99 MHz		-	_____	-150	dBm
199.9 MHz		-	_____	-150	dBm
499.9 MHz		-	_____	-150	dBm
599.9 MHz		-	_____	-150	dBm
699.9 MHz		-	_____	-150	dBm
799.9 MHz		-	_____	-150	dBm
899.9 MHz		-	_____	-150	dBm
999.9 MHz		-	_____	-150	dBm
1199.9 MHz		-	_____	-147	dBm
1399.9 MHz		-	_____	-147	dBm
1599.9 MHz		-	_____	-147	dBm
1799.9 MHz		-	_____	-147	dBm
1999.9 MHz		-	_____	-147	dBm
2199.9 MHz		-	_____	-147	dBm
2399.9 MHz		-	_____	-147	dBm
2599.9 MHz		-	_____	-147	dBm
2799.9 MHz		-	_____	-147	dBm
2999.9 MHz		-	_____	-147	dBm
3199.9 MHz		-	_____	-147	dBm
3399.9 MHz		-	_____	-147	dBm
3599.9 MHz		-	_____	-147	dBm
3601.0 MHz		-	_____	-144	dBm

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
3799.9 MHz		-	_____	-144	dBm
3999.9 MHz		-	_____	-144	dBm
4199.9 MHz		-	_____	-144	dBm
4399.9 MHz		-	_____	-144	dBm
4599.9 MHz		-	_____	-144	dBm
4799.9 MHz		-	_____	-144	dBm
4999.9 MHz		-	_____	-144	dBm
5199.9 MHz		-	_____	-144	dBm
5399.9 MHz		-	_____	-144	dBm
5599.9 MHz		-	_____	-144	dBm
5799.9 MHz		-	_____	-144	dBm
5999.9 MHz		-	_____	-144	dBm
6199.9 MHz		-	_____	-141	dBm
6399.9 MHz		-	_____	-141	dBm
6599.9 MHz		-	_____	-141	dBm
6799.9 MHz		-	_____	-141	dBm
6999.9 MHz		-	_____	-141	dBm
R&S FSVR13/30					
7.000.1 MHz		_____	_____	-141	dBm
7499.9 MHz		_____	_____	-145+1	dBm
7999.9 MHz		_____	_____	-145+1	dBm
8499.9 MHz		_____	_____	-145+1	dBm
8999.9 MHz		_____	_____	-145+1	dBm
9499.9 MHz		_____	_____	-145+1	dBm
9999.9 MHz		_____	_____	-145+1	dBm
10499.9 MHz		_____	_____	-145+1	dBm
10999.9 MHz		_____	_____	-145+1	dBm
11499.9 MHz		_____	_____	-145+1	dBm
11999.9 MHz		_____	_____	-145+1	dBm
12499.9 MHz		_____	_____	-145+1	dBm
12999.9 MHz		_____	_____	-145+1	dBm
13499.9 MHz		_____	_____	-145+1	dBm
R&S FSVR30:					
13999.9 MHz		_____	_____	-143+1	dBm
14999.9 MHz		_____	_____	-143+1	dBm
15999.9 MHz		_____	_____	-141+2	dBm
16999.9 MHz		_____	_____	-141+2	dBm
17999.9 MHz		_____	_____	-141+2	dBm

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
18999.9 MHz		_____	_____	-141+2	dBm
19999.9 MHz		_____	_____	-141+2	dBm
20999.9 MHz		_____	_____	-141+2	dBm
21999.9 MHz		_____	_____	-141+2	dBm
22999.9 MHz		_____	_____	-141+2	dBm
23999.9 MHz		_____	_____	-141+2	dBm
24999.9 MHz		_____	_____	-141+2	dBm
25999.9 MHz		_____	_____	-141+2	dBm
26999.9 MHz		_____	_____	-141+2	dBm
27999.9 MHz		_____	_____	-141+2	dBm
28999.9 MHz		_____	_____	-141+2	dBm
29999.9 MHz		_____	_____	-141+2	dBm
R&S FSVR40:					
7499.9 MHz		-	_____	-143+2	dBm
7999.9 MHz		-	_____	-143+2	dBm
8499.9 MHz		-	_____	-143+2	dBm
8999.9 MHz		-	_____	-143+2	dBm
9499.9 MHz		-	_____	-143+2	dBm
9999.9 MHz		-	_____	-143+2	dBm
10499.9 MHz		-	_____	-143+2	dBm
10999.9 MHz		-	_____	-143+2	dBm
11499.9 MHz		-	_____	-143+2	dBm
11999.9 MHz		-	_____	-143+2	dBm
12499.9 MHz		-	_____	-143+2	dBm
12999.9 MHz		-	_____	-143+2	dBm
13499.9 MHz		-	_____	-143+2	dBm
13999.9 MHz		-	_____	-141+2	dBm
14999.9 MHz		-	_____	-141+2	dBm
15999.9 MHz		-	_____	-139+2	dBm
16999.9 MHz		-	_____	-139+2	dBm
17999.9 MHz		-	_____	-139+2	dBm
18999.9 MHz		-	_____	-139+2	dBm
19999.9 MHz		-	_____	-139+2	dBm
20999.9 MHz		-	_____	-139+2	dBm
21999.9 MHz		-	_____	-139+2	dBm
22999.9 MHz		-	_____	-139+2	dBm
23999.9 MHz		-	_____	-139+2	dBm
24999.9 MHz		-	_____	-139+2	dBm

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
25999.9 MHz		-	_____	-139+2	dBm
26999.9 MHz		-	_____	-139+2	dBm
27999.9 MHz		-	_____	-139+2	dBm
28999.9 MHz		-	_____	-139+2	dBm
29999.9 MHz		-	_____	-139+2	dBm
31999.9 MHz		-	_____	-139+2	dBm
32999.9 MHz		-	_____	-139+2	dBm
33999.9 MHz		-	_____	-139+2	dBm
34999.9 MHz		-	_____	-132+3	dBm
35999.9 MHz		-	_____	-132+3	dBm
36999.9 MHz		-	_____	-132+3	dBm
37999.9 MHz		-	_____	-132+3	dBm
38999.9 MHz		-	_____	-132+3	dBm
39999.9 MHz		-	_____	-132+3	dBm

Measurand	Ref.	Specified min. value	Measured value YIG OFF	Measured value YIG ON	Specified max. value	Unit
Absolute level uncertainty at 64 MHz	Page 24	-0.2	-	_____	0.2	dB
Frequency response < 3.6 GHz, RF attenuation 5 dB, DC coupled f_{resp}	Page 25					
R&S FSVR7/13/30/40:						
9 kHz		-1	-	_____	1	dB
100.02 kHz		-1	-	_____	1	dB
1.005 MHz		-1	-	_____	1	dB
10.15 MHz		-1	-	_____	1	dB
51 MHz		-1	-	_____	1	dB
64 MHz				Reference		
101 MHz		-1	-	_____	1	dB
201 MHz		-1	-	_____	1	dB
301 MHz		-1	-	_____	1	dB
401 MHz		-1	-	_____	1	dB
501 MHz		-1	-	_____	1	dB
601 MHz		-1	-	_____	1	dB
701 MHz		-1	-	_____	1	dB
801 MHz		-1	-	_____	1	dB
901 MHz		-1	-	_____	1	dB
1001 MHz		-1	-	_____	1	dB
1501 MHz		-1	-	_____	1	dB

Measurand	Ref.	Specified min. value	Measured value YIG OFF	Measured value YIG ON	Specified max. value	Unit
2001 MHz		-1	-	_____	1	dB
2501 MHz		-1	-	_____	1	dB
3001 MHz		-1	-	_____	1	dB
3599 MHz		-1	-	_____	1	dB
R&S FSVR7/13/30/40: Frequency response > 3.6 GHz, RF attenuation = 5 dB, DC coupled f_{fresp}	Page 27					
4001 MHz		-1.5	-	_____	1.5	dB
4501 MHz		-1.5	-	_____	1.5	dB
5001 MHz		-1.5	-	_____	1.5	dB
5501 MHz		-1.5	-	_____	1.5	dB
6001 MHz		-1.5	-	_____	1.5	dB
6501 MHz		-1.5	-	_____	1.5	dB
6999 MHz		-1.5	-	_____	1.5	dB
R&S FSVR13/30/40: Frequency response > 3.6 GHz, RF attenuation = 5 dB, DC coupled f_{fresp}	Page 27					
7001 MHz		-2.5	_____	_____	2.5	dB
7501 MHz		-2.5	_____	_____	2.5	dB
8001 MHz		-2.5	_____	_____	2.5	dB
8501 MHz		-2.5	_____	_____	2.5	dB
9001 MHz		-2.5	_____	_____	2.5	dB
9501 MHz		-2.5	_____	_____	2.5	dB
10001 MHz		-2.5	_____	_____	2.5	dB
10501 MHz		-2.5	_____	_____	2.5	dB
11001 MHz		-2.5	_____	_____	2.5	dB
11501 MHz		-2.5	_____	_____	2.5	dB
12001 MHz		-2.5	_____	_____	2.5	dB
12501 MHz		-2.5	_____	_____	2.5	dB
13001 MHz		-2.5	_____	_____	2.5	dB
13501 MHz		-2.5	_____	_____	2.5	dB
13599 MHz		-2.5	_____	_____	2.5	dB
R&S FSVR30/40: Frequency response > 3.6 GHz, RF attenuation = 5 dB, DC coupled f_{fresp}	Page 27					
14001 MHz		-3	_____	_____	3	dB
15001 MHz		-3	_____	_____	3	dB
16001 MHz		-3	_____	_____	3	dB
17001 MHz		-3	_____	_____	3	dB

Measurand	Ref.	Specified min. value	Measured value YIG OFF	Measured value YIG ON	Specified max. value	Unit
18001 MHz		-3	_____	_____	3	dB
19001 MHz		-3	_____	_____	3	dB
20001 MHz		-3	_____	_____	3	dB
21001 MHz		-3	_____	_____	3	dB
22001 MHz		-3	_____	_____	3	dB
23001 MHz		-3	_____	_____	3	dB
24001 MHz		-3	_____	_____	3	dB
25001 MHz		-3	_____	_____	3	dB
26001 MHz		-3	_____	_____	3	dB
27001 MHz		-3.5	_____	_____	3.5	dB
28001 MHz		-3.5	_____	_____	3.5	dB
29001 MHz		-3.5	_____	_____	3.5	dB
29999 MHz		-3.5	_____	_____	3.5	dB
R&S FSVR40: Frequency response > 3.6 GHz, RF attenuation = 5 dB, DC coupled f_{fresp}	Page 27					
30001 MHz		-4.0		_____	4.0	dB
31001 MHz		-4.0		_____	4.0	dB
32001 MHz		-4.0		_____	4.0	dB
33001 MHz		-4.0		_____	4.0	dB
34001 MHz		-4.0		_____	4.0	dB
35001 MHz		-4.0		_____	4.0	dB
36001 MHz		-4.0		_____	4.0	dB
37001 MHz		-4.0		_____	4.0	dB
38001 MHz		-4.0		_____	4.0	dB
39001 MHz		-4.0		_____	4.0	dB
39999 MHz		-4.0		_____	4.0	dB
Frequency response < 3.6 GHz, RF attenuation 10 dB, DC coupled f_{fresp}	Page 25					
R&S FSVR7/13/30/40:						
9 kHz		-0.5	-	_____	0.5	dB
100.02 kHz		-0.5	-	_____	0.5	dB
1.005 MHz		-0.5	-	_____	0.5	dB
10.15 MHz		-0.3	-	_____	0.3	dB
51 MHz		-0.3	-	_____	0.3	dB
64 MHz				Reference		
101 MHz		-0.3	-	_____	0.3	dB
201 MHz		-0.3	-	_____	0.3	dB

Measurand	Ref.	Specified min. value	Measured value YIG OFF	Measured value YIG ON	Specified max. value	Unit
301 MHz		-0.3	-	_____	0.3	dB
401 MHz		-0.3	-	_____	0.3	dB
501 MHz		-0.3	-	_____	0.3	dB
601 MHz		-0.3	-	_____	0.3	dB
701 MHz		-0.3	-	_____	0.3	dB
801 MHz		-0.3	-	_____	0.3	dB
901 MHz		-0.3	-	_____	0.3	dB
1001 MHz		-0.3	-	_____	0.3	dB
1501 MHz		-0.3	-	_____	0.3	dB
2001 MHz		-0.3	-	_____	0.3	dB
2501 MHz		-0.3	-	_____	0.3	dB
3001 MHz		-0.3	-	_____	0.3	dB
3599 MHz		-0.3	-	_____	0.3	dB
R&S FSVR7/13/30/40: Frequency response > 3.6 GHz, RF attenuation = 10 dB, DC coupled f_{fresp}	Page 27					
4001 MHz		-0.5	-	_____	0.5	dB
4501 MHz		-0.5	-	_____	0.5	dB
5001 MHz		-0.5	-	_____	0.5	dB
5501 MHz		-0.5	-	_____	0.5	dB
6001 MHz		-0.5	-	_____	0.5	dB
6501 MHz		-0.5	-	_____	0.5	dB
6999 MHz		-0.5	-	_____	0.5	dB
R&S FSVR13/30/40: Frequency response > 3.6 GHz, RF attenuation = 10 dB, DC coupled f_{fresp}	Page 27					
7001 MHz		-1.5	_____	_____	1.5	dB
7501 MHz		-1.5	_____	_____	1.5	dB
8001 MHz		-1.5	_____	_____	1.5	dB
8501 MHz		-1.5	_____	_____	1.5	dB
9001 MHz		-1.5	_____	_____	1.5	dB
9501 MHz		-1.5	_____	_____	1.5	dB
10001 MHz		-1.5	_____	_____	1.5	dB
10501 MHz		-1.5	_____	_____	1.5	dB
11001 MHz		-1.5	_____	_____	1.5	dB
11501 MHz		-1.5	_____	_____	1.5	dB
12001 MHz		-1.5	_____	_____	1.5	dB
12501 MHz		-1.5	_____	_____	1.5	dB
13001 MHz		-1.5	_____	_____	1.5	dB

Measurand	Ref.	Specified min. value	Measured value YIG OFF	Measured value YIG ON	Specified max. value	Unit
13501 MHz		-1.5	_____	_____	1.5	dB
13599 MHz		-1.5	_____	_____	1.5	dB
R&S FSVR30/40: Frequency response > 3.6 GHz, RF attenuation = 10 dB, DC coupled f_{fresp}	Page 27					
14001 MHz		-2	_____	_____	2	dB
15001 MHz		-2	_____	_____	2	dB
16001 MHz		-2	_____	_____	2	dB
17001 MHz		-2	_____	_____	2	dB
18001 MHz		-2	_____	_____	2	dB
19001 MHz		-2	_____	_____	2	dB
20001 MHz		-2	_____	_____	2	dB
21001 MHz		-2	_____	_____	2	dB
22001 MHz		-2	_____	_____	2	dB
23001 MHz		-2	_____	_____	2	dB
24001 MHz		-2	_____	_____	2	dB
25001 MHz		-2	_____	_____	2	dB
26001 MHz		-2	_____	_____	2	dB
27001 MHz		-2	_____	_____	2	dB
28001 MHz		-2	_____	_____	2	dB
29001 MHz		-2	_____	_____	2	dB
29999 MHz		-2	_____	_____	2	dB
R&S FSVR40: Frequency response > 3.6 GHz, RF attenuation = 10 dB, DC coupled f_{fresp}	Page 27					
30001 MHz		-2.5		_____	2.5	dB
31001 MHz		-2.5		_____	2.5	dB
32001 MHz		-2.5		_____	2.5	dB
33001 MHz		-2.5		_____	2.5	dB
34001 MHz		-2.5		_____	2.5	dB
35001 MHz		-2.5		_____	2.5	dB
36001 MHz		-2.5		_____	2.5	dB
37001 MHz		-2.5		_____	2.5	dB
38001 MHz		-2.5		_____	2.5	dB
39001 MHz		-2.5		_____	2.5	dB
39999 MHz		-2.5		_____	2.5	dB

Measurand	Ref.	Specified min. value	Measured value YIG OFF	Measured value YIG ON	Specified max. value	Unit
Frequency response < 3.6 GHz, RF attenuation 20 dB, DC coupled f_{fresp}	Page 25					
R&S FSVR7/13/30/40:						
9 kHz		-0.5	-	_____	0.5	dB
100.02 kHz		-0.5	-	_____	0.5	dB
1.005 MHz		-0.5	-	_____	0.5	dB
10.15 MHz		-0.3	-	_____	0.3	dB
51 MHz		-0.3	-	_____	0.3	dB
64 MHz				Reference		
101 MHz		-0.3	-	_____	0.3	dB
201 MHz		-0.3	-	_____	0.3	dB
301 MHz		-0.3	-	_____	0.3	dB
401 MHz		-0.3	-	_____	0.3	dB
501 MHz		-0.3	-	_____	0.3	dB
601 MHz		-0.3	-	_____	0.3	dB
701 MHz		-0.3	-	_____	0.3	dB
801 MHz		-0.3	-	_____	0.3	dB
901 MHz		-0.3	-	_____	0.3	dB
1001 MHz		-0.3	-	_____	0.3	dB
1501 MHz		-0.3	-	_____	0.3	dB
2001 MHz		-0.3	-	_____	0.3	dB
2501 MHz		-0.3	-	_____	0.3	dB
3001 MHz		-0.3	-	_____	0.3	dB
3599 MHz		-0.3	-	_____	0.3	dB
R&S FSVR7/13/30/40: Frequency response > 3.6 GHz, RF attenuation = 20 dB, DC coupled f_{fresp}	Page 27					
4001 MHz		-0.5	-	_____	0.5	dB
4501 MHz		-0.5	-	_____	0.5	dB
5001 MHz		-0.5	-	_____	0.5	dB
5501 MHz		-0.5	-	_____	0.5	dB
6001 MHz		-0.5	-	_____	0.5	dB
6501 MHz		-0.5	-	_____	0.5	dB
6999 MHz		-0.5	-	_____	0.5	dB
R&S FSVR13/30/40: Frequency response > 3.6 GHz, RF attenuation = 20 dB, DC coupled f_{fresp}	Page 27					
7001 MHz		-1.5	_____	_____	1.5	dB
7501 MHz		-1.5	_____	_____	1.5	dB

Measurand	Ref.	Specified min. value	Measured value YIG OFF	Measured value YIG ON	Specified max. value	Unit
8001 MHz		-1.5	_____	_____	1.5	dB
8501 MHz		-1.5	_____	_____	1.5	dB
9001 MHz		-1.5	_____	_____	1.5	dB
9501 MHz		-1.5	_____	_____	1.5	dB
10001 MHz		-1.5	_____	_____	1.5	dB
10501 MHz		-1.5	_____	_____	1.5	dB
11001 MHz		-1.5	_____	_____	1.5	dB
11501 MHz		-1.5	_____	_____	1.5	dB
12001 MHz		-1.5	_____	_____	1.5	dB
12501 MHz		-1.5	_____	_____	1.5	dB
13001 MHz		-1.5	_____	_____	1.5	dB
13501 MHz		-1.5	_____	_____	1.5	dB
13599 MHz		-1.5	_____	_____	1.5	dB
R&S FSVR30/40: Frequency response > 3.6 GHz, RF attenuation = 20 dB, DC coupled f_{fresp}	Page 27					
14001 MHz		-2	_____	_____	2	dB
15001 MHz		-2	_____	_____	2	dB
16001 MHz		-2	_____	_____	2	dB
17001 MHz		-2	_____	_____	2	dB
18001 MHz		-2	_____	_____	2	dB
19001 MHz		-2	_____	_____	2	dB
20001 MHz		-2	_____	_____	2	dB
21001 MHz		-2	_____	_____	2	dB
22001 MHz		-2	_____	_____	2	dB
23001 MHz		-2	_____	_____	2	dB
24001 MHz		-2	_____	_____	2	dB
25001 MHz		-2	_____	_____	2	dB
26001 MHz		-2	_____	_____	2	dB
27001 MHz		-2	_____	_____	2	dB
28001 MHz		-2	_____	_____	2	dB
29001 MHz		-2	_____	_____	2	dB
29999 MHz		-2	_____	_____	2	dB

Measurand	Ref.	Specified min. value	Measured value YIG OFF	Measured value YIG ON	Specified max. value	Unit
R&S FSVR40: Frequency response > 3.6 GHz, RF attenuation = 20 dB, DC coupled f_{fresp}	Page 27					
30001 MHz		-2.5		_____	2.5	dB
31001 MHz		-2.5		_____	2.5	dB
32001 MHz		-2.5		_____	2.5	dB
33001 MHz		-2.5		_____	2.5	dB
34001 MHz		-2.5		_____	2.5	dB
35001 MHz		-2.5		_____	2.5	dB
36001 MHz		-2.5		_____	2.5	dB
37001 MHz		-2.5		_____	2.5	dB
38001 MHz		-2.5		_____	2.5	dB
39001 MHz		-2.5		_____	2.5	dB
39999 MHz		-2.5		_____	2.5	dB
Frequency response < 3.6 GHz, RF attenuation 30 dB, DC coupled f_{fresp}	Page 25					
R&S FSVR7/13/30/40:						
9 kHz		-0.5	-	_____	0.5	dB
100.02 kHz		-0.5	-	_____	0.5	dB
1.005 MHz		-0.5	-	_____	0.5	dB
10.15 MHz		-0.3	-	_____	0.3	dB
51 MHz		-0.3	-	_____	0.3	dB
64 MHz				Reference		
101 MHz		-0.3	-	_____	0.3	dB
201 MHz		-0.3	-	_____	0.3	dB
301 MHz		-0.3	-	_____	0.3	dB
401 MHz		-0.3	-	_____	0.3	dB
501 MHz		-0.3	-	_____	0.3	dB
601 MHz		-0.3	-	_____	0.3	dB
701 MHz		-0.3	-	_____	0.3	dB
801 MHz		-0.3	-	_____	0.3	dB
901 MHz		-0.3	-	_____	0.3	dB
1001 MHz		-0.3	-	_____	0.3	dB
1501 MHz		-0.3	-	_____	0.3	dB
2001 MHz		-0.3	-	_____	0.3	dB
2501 MHz		-0.3	-	_____	0.3	dB
3001 MHz		-0.3	-	_____	0.3	dB
3599 MHz		-0.3	-	_____	0.3	dB

Measurand	Ref.	Specified min. value	Measured value YIG OFF	Measured value YIG ON	Specified max. value	Unit
R&S FSVR7/13/30/40: Frequency response > 3.6 GHz, RF attenuation = 30 dB, DC coupled f_{fresp}	Page 27					dB
4001 MHz		-0.5	-	_____	0.5	dB
4501 MHz		-0.5	-	_____	0.5	dB
5001 MHz		-0.5	-	_____	0.5	dB
5501 MHz		-0.5	-	_____	0.5	dB
6001 MHz		-0.5	-	_____	0.5	dB
6501 MHz		-0.5	-	_____	0.5	dB
6999 MHz		-0.5	-	_____	0.5	dB
R&S FSVR13/30/40: Frequency response > 3.6 GHz, RF attenuation = 30 dB, DC coupled f_{fresp}	Page 27					
7001 MHz		-1.5	_____	_____	1.5	dB
7501 MHz		-1.5	_____	_____	1.5	dB
8001 MHz		-1.5	_____	_____	1.5	dB
8501 MHz		-1.5	_____	_____	1.5	dB
9001 MHz		-1.5	_____	_____	1.5	dB
9501 MHz		-1.5	_____	_____	1.5	dB
10001 MHz		-1.5	_____	_____	1.5	dB
10501 MHz		-1.5	_____	_____	1.5	dB
11001 MHz		-1.5	_____	_____	1.5	dB
11501 MHz		-1.5	_____	_____	1.5	dB
12001 MHz		-1.5	_____	_____	1.5	dB
12501 MHz		-1.5	_____	_____	1.5	dB
13001 MHz		-1.5	_____	_____	1.5	dB
13501 MHz		-1.5	_____	_____	1.5	dB
13599 MHz		-1.5	_____	_____	1.5	dB
R&S FSVR30/40: Frequency response > 3.6 GHz, RF attenuation = 30 dB, DC coupled f_{fresp}	Page 27					
14001 MHz		-2	_____	_____	2	dB
15001 MHz		-2	_____	_____	2	dB
16001 MHz		-2	_____	_____	2	dB
17001 MHz		-2	_____	_____	2	dB
18001 MHz		-2	_____	_____	2	dB
19001 MHz		-2	_____	_____	2	dB
20001 MHz		-2	_____	_____	2	dB
21001 MHz		-2	_____	_____	2	dB

Measurand	Ref.	Specified min. value	Measured value YIG OFF	Measured value YIG ON	Specified max. value	Unit
22001 MHz		-2	_____	_____	2	dB
23001 MHz		-2	_____	_____	2	dB
24001 MHz		-2	_____	_____	2	dB
25001 MHz		-2	_____	_____	2	dB
26001 MHz		-2	_____	_____	2	dB
27001 MHz		-2	_____	_____	2	dB
28001 MHz		-2	_____	_____	2	dB
29001 MHz		-2	_____	_____	2	dB
29999 MHz		-2	_____	_____	2	dB
R&S FSVR40: Frequency response > 3.6 GHz, RF attenuation = 30 dB, DC coupled f_{fresp}	Page 27					
30001 MHz		-2.5		_____	2.5	dB
31001 MHz		-2.5		_____	2.5	dB
32001 MHz		-2.5		_____	2.5	dB
33001 MHz		-2.5		_____	2.5	dB
34001 MHz		-2.5		_____	2.5	dB
35001 MHz		-2.5		_____	2.5	dB
36001 MHz		-2.5		_____	2.5	dB
37001 MHz		-2.5		_____	2.5	dB
38001 MHz		-2.5		_____	2.5	dB
39001 MHz		-2.5		_____	2.5	dB
39999 MHz		-2.5		_____	2.5	dB
Frequency response < 3.6 GHz, RF attenuation 40 dB, DC coupled f_{fresp}	Page 25					
FSVR 7/13/30/40:						
9 kHz		-0.5	-	_____	0.5	dB
100.02 kHz		-0.5	-	_____	0.5	dB
1.005 MHz		-0.5	-	_____	0.5	dB
10.15 MHz		-0.3	-	_____	0.3	dB
51 MHz		-0.3	-	_____	0.3	dB
64 MHz				Reference		
101 MHz		-0.3	-	_____	0.3	dB
201 MHz		-0.3	-	_____	0.3	dB
301 MHz		-0.3	-	_____	0.3	dB
401 MHz		-0.3	-	_____	0.3	dB
501 MHz		-0.3	-	_____	0.3	dB
601 MHz		-0.3	-	_____	0.3	dB

Measurand	Ref.	Specified min. value	Measured value YIG OFF	Measured value YIG ON	Specified max. value	Unit
701 MHz		-0.3	-	_____	0.3	dB
801 MHz		-0.3	-	_____	0.3	dB
901 MHz		-0.3	-	_____	0.3	dB
1001 MHz		-0.3	-	_____	0.3	dB
1501 MHz		-0.3	-	_____	0.3	dB
2001 MHz		-0.3	-	_____	0.3	dB
2501 MHz		-0.3	-	_____	0.3	dB
3001 MHz		-0.3	-	_____	0.3	dB
3599 MHz		-0.3	-	_____	0.3	dB
R&S FSVR7/13/30/40: Frequency response > 3.6 GHz, RF attenuation = 40 dB, DC coupled f_{fresp}	Page 27					
4001 MHz		-0.5	-	_____	0.5	dB
4501 MHz		-0.5	-	_____	0.5	dB
5001 MHz		-0.5	-	_____	0.5	dB
5501 MHz		-0.5	-	_____	0.5	dB
6001 MHz		-0.5	-	_____	0.5	dB
6501 MHz		-0.5	-	_____	0.5	dB
6999 MHz		-0.5	-	_____	0.5	dB
R&S FSVR13/30/40: Frequency response > 3.6 GHz, RF attenuation = 40 dB, DC coupled f_{fresp}	Page 27					
7001 MHz		-1.5	_____	_____	1.5	dB
7501 MHz		-1.5	_____	_____	1.5	dB
8001 MHz		-1.5	_____	_____	1.5	dB
8501 MHz		-1.5	_____	_____	1.5	dB
9001 MHz		-1.5	_____	_____	1.5	dB
9501 MHz		-1.5	_____	_____	1.5	dB
10001 MHz		-1.5	_____	_____	1.5	dB
10501 MHz		-1.5	_____	_____	1.5	dB
11001 MHz		-1.5	_____	_____	1.5	dB
11501 MHz		-1.5	_____	_____	1.5	dB
12001 MHz		-1.5	_____	_____	1.5	dB
12501 MHz		-1.5	_____	_____	1.5	dB
13001 MHz		-1.5	_____	_____	1.5	dB
13501 MHz		-1.5	_____	_____	1.5	dB
13599 MHz		-1.5	_____	_____	1.5	dB

Measurand	Ref.	Specified min. value	Measured value YIG OFF	Measured value YIG ON	Specified max. value	Unit
R&S FSVR30/40: Frequency response > 3.6 GHz, RF attenuation = 40 dB, DC coupled f_{fresp}	Page 27					
14001 MHz		-2	_____	_____	2	dB
15001 MHz		-2	_____	_____	2	dB
16001 MHz		-2	_____	_____	2	dB
17001 MHz		-2	_____	_____	2	dB
18001 MHz		-2	_____	_____	2	dB
19001 MHz		-2	_____	_____	2	dB
20001 MHz		-2	_____	_____	2	dB
21001 MHz		-2	_____	_____	2	dB
22001 MHz		-2	_____	_____	2	dB
23001 MHz		-2	_____	_____	2	dB
24001 MHz		-2	_____	_____	2	dB
25001 MHz		-2	_____	_____	2	dB
26001 MHz		-2	_____	_____	2	dB
27001 MHz		-2	_____	_____	2	dB
28001 MHz		-2	_____	_____	2	dB
29001 MHz		-2	_____	_____	2	dB
29999 MHz		-2	_____	_____	2	dB
R&S FSVR40: Frequency response > 3.6 GHz, RF attenuation = 40 dB, DC coupled f_{fresp}	Page 27					
30001 MHz		-2.5		_____	2.5	dB
31001 MHz		-2.5		_____	2.5	dB
32001 MHz		-2.5		_____	2.5	dB
33001 MHz		-2.5		_____	2.5	dB
34001 MHz		-2.5		_____	2.5	dB
35001 MHz		-2.5		_____	2.5	dB
36001 MHz		-2.5		_____	2.5	dB
37001 MHz		-2.5		_____	2.5	dB
38001 MHz		-2.5		_____	2.5	dB
39001 MHz		-2.5		_____	2.5	dB
39999 MHz		-2.5		_____	2.5	dB
Frequency response < 3.6 GHz, RF attenuation 10 dB, AC coupled f_{fresp}	Page 25					
R&S FSVR7:						
1.005 MHz		-1	-	_____	1	dB

Measurand	Ref.	Specified min. value	Measured value YIG OFF	Measured value YIG ON	Specified max. value	Unit
R&S FSVR7/13/30/40:						
10.15 MHz		-1	-	_____	1	dB
51 MHz		-1	-	_____	1	dB
64 MHz				Reference		
101 MHz		-1	-	_____	1	dB
201 MHz		-1	-	_____	1	dB
301 MHz		-1	-	_____	1	dB
401 MHz		-1	-	_____	1	dB
501 MHz		-1	-	_____	1	dB
601 MHz		-1	-	_____	1	dB
701 MHz		-1	-	_____	1	dB
801 MHz		-1	-	_____	1	dB
901 MHz		-1	-	_____	1	dB
1001 MHz		-1	-	_____	1	dB
1501 MHz		-1	-	_____	1	dB
2001 MHz		-1	-	_____	1	dB
2501 MHz		-1	-	_____	1	dB
3001 MHz		-1	-	_____	1	dB
3599 MHz		-1	-	_____	1	dB
R&S FSVR7/13/30/40: Frequency response > 3.6 GHz, RF attenuation = 10 dB, AC coupled f_{fresp}	Page 27					
4001 MHz		-1.5	-	_____	1.5	dB
4501 MHz		-1.5	-	_____	1.5	dB
5001 MHz		-1.5	-	_____	1.5	dB
5501 MHz		-1.5	-	_____	1.5	dB
6001 MHz		-1.5	-	_____	1.5	dB
6501 MHz		-1.5	-	_____	1.5	dB
6999 MHz		-1.5	-	_____	1.5	dB
R&S FSVR13/30/40: Frequency response > 3.6 GHz, RF attenuation = 10 dB, AC coupled f_{fresp}	Page 27					
7001 MHz		-2.5	_____	_____	2.5	dB
7501 MHz		-2.5	_____	_____	2.5	dB
8001 MHz		-2.5	_____	_____	2.5	dB
8501 MHz		-2.5	_____	_____	2.5	dB
9001 MHz		-2.5	_____	_____	2.5	dB
9501 MHz		-2.5	_____	_____	2.5	dB
10001 MHz		-2.5	_____	_____	2.5	dB

Measurand	Ref.	Specified min. value	Measured value YIG OFF	Measured value YIG ON	Specified max. value	Unit
10501 MHz		-2.5	_____	_____	2.5	dB
11001 MHz		-2.5	_____	_____	2.5	dB
11501 MHz		-2.5	_____	_____	2.5	dB
12001 MHz		-2.5	_____	_____	2.5	dB
12501 MHz		-2.5	_____	_____	2.5	dB
13001 MHz		-2.5	_____	_____	2.5	dB
13501 MHz		-2.5	_____	_____	2.5	dB
13599 MHz		-2.5	_____	_____	2.5	dB
R&S FSVR30/40: Frequency response > 3.6 GHz, RF attenuation = 10 dB, AC coupled f_{fresp}	Page 27					
14001 MHz		-3	_____	_____	3	dB
15001 MHz		-3	_____	_____	3	dB
16001 MHz		-3	_____	_____	3	dB
17001 MHz		-3	_____	_____	3	dB
18001 MHz		-3	_____	_____	3	dB
19001 MHz		-3	_____	_____	3	dB
20001 MHz		-3	_____	_____	3	dB
21001 MHz		-3	_____	_____	3	dB
22001 MHz		-3	_____	_____	3	dB
23001 MHz		-3	_____	_____	3	dB
24001 MHz		-3	_____	_____	3	dB
25001 MHz		-3	_____	_____	3	dB
26001 MHz		-3	_____	_____	3	dB
27001 MHz		-3.5	_____	_____	3.5	dB
28001 MHz		-3.5	_____	_____	3.5	dB
29001 MHz		-3.5	_____	_____	3.5	dB
29999 MHz		-3.5	_____	_____	3.5	dB
R&S FSVR40: Frequency response > 3.6 GHz, RF attenuation = 10 dB, AC coupled f_{fresp}	Page 27					
30001 MHz		-4.0		_____	4.0	dB
31001 MHz		-4.0		_____	4.0	dB
32001 MHz		-4.0		_____	4.0	dB
33001 MHz		-4.0		_____	4.0	dB
34001 MHz		-4.0		_____	4.0	dB
35001 MHz		-4.0		_____	4.0	dB
36001 MHz		-4.0		_____	4.0	dB
37001 MHz		-4.0		_____	4.0	dB

Measurand	Ref.	Specified min. value	Measured value YIG OFF	Measured value YIG ON	Specified max. value	Unit
38001 MHz		-4.0		_____	4.0	dB
39001 MHz		-4.0		_____	4.0	dB
39999 MHz		-4.0		_____	4.0	dB
R&S FSVR13/30/40: Frequency response > 3.6 GHz, RF attenuation = 10 dB, DC coupled, full span f_{fresp}	Page 27					
7001 MHz		-2.5	_____	_____	2.5	dB
7501 MHz		-2.5	_____	_____	2.5	dB
8001 MHz		-2.5	_____	_____	2.5	dB
8501 MHz		-2.5	_____	_____	2.5	dB
9001 MHz		-2.5	_____	_____	2.5	dB
9501 MHz		-2.5	_____	_____	2.5	dB
10001 MHz		-2.5	_____	_____	2.5	dB
10501 MHz		-2.5	_____	_____	2.5	dB
11001 MHz		-2.5	_____	_____	2.5	dB
11501 MHz		-2.5	_____	_____	2.5	dB
12001 MHz		-2.5	_____	_____	2.5	dB
12501 MHz		-2.5	_____	_____	2.5	dB
13001 MHz		-2.5	_____	_____	2.5	dB
13501 MHz		-2.5	_____	_____	2.5	dB
13599 MHz		-2.5	_____	_____	2.5	dB
R&S FSVR30/40: Frequency response > 3.6 GHz, RF attenuation = 10 dB, DC coupled, full span f_{fresp}	Page 27					
14001 MHz		-3	_____	_____	3	dB
15001 MHz		-3	_____	_____	3	dB
16001 MHz		-3	_____	_____	3	dB
17001 MHz		-3	_____	_____	3	dB
18001 MHz		-3	_____	_____	3	dB
19001 MHz		-3	_____	_____	3	dB
20001 MHz		-3	_____	_____	3	dB
21001 MHz		-3	_____	_____	3	dB
22001 MHz		-3	_____	_____	3	dB
23001 MHz		-3	_____	_____	3	dB
24001 MHz		-3	_____	_____	3	dB
25001 MHz		-3	_____	_____	3	dB
26001 MHz		-3	_____	_____	3	dB
27001 MHz		-3	_____	_____	3	dB

Measurand	Ref.	Specified min. value	Measured value YIG OFF	Measured value YIG ON	Specified max. value	Unit
28001 MHz		-3	_____	_____	3	dB
29001 MHz		-3	_____	_____	3	dB
29999 MHz		-3	_____	_____	3	dB
R&S FSVR40: Frequency response > 3.6 GHz, RF attenuation = 10 dB, DC coupled, full span f_{resp}	Page 27					
30001 MHz		-4.0		_____	4.0	dB
31001 MHz		-4.0		_____	4.0	dB
32001 MHz		-4.0		_____	4.0	dB
33001 MHz		-4.0		_____	4.0	dB
34001 MHz		-4.0		_____	4.0	dB
35001 MHz		-4.0		_____	4.0	dB
36001 MHz		-4.0		_____	4.0	dB
37001 MHz		-4.0		_____	4.0	dB
38001 MHz		-4.0		_____	4.0	dB
39001 MHz		-4.0		_____	4.0	dB
39999 MHz		-4.0		_____	4.0	dB

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
Display Nonlinearity a_{att}	Page 29				
10 dB		9.9	_____	10.1	dB
12 dB		7.9	_____	8.1	dB
14 dB		5.9	_____	6.1	dB
16 dB		3.9	_____	4.1	dB
18 dB		1.9	_____	2.1	dB
20 dB		-	Reference	-	
22 dB		-2.1	_____	-1.9	dB
24 dB		-4.1	_____	-3.9	dB
26 dB		-6.1	_____	-5.9	dB
28 dB		-8.1	_____	-7.9	dB
30 dB		-10.1	_____	-9.9	dB
32 dB		-12.1	_____	-11.9	dB
34 dB		-14.1	_____	-13.9	dB
36 dB		-16.1	_____	-15.9	dB
38 dB		-18.1	_____	-17.9	dB
40 dB		-20.1	_____	-19.9	dB
42 dB		-22.1	_____	-21.9	dB

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
44 dB		-24.1	_____	-23.9	dB
46 dB		-26.1	_____	-25.9	dB
48 dB		-28.1	_____	-27.9	dB
50 dB		-30.1	_____	-29.9	dB
52 dB		-32.1	_____	-31.9	dB
54 dB		-34.1	_____	-33.9	dB
56 dB		-36.1	_____	-35.9	dB
58 dB		-38.1	_____	-37.9	dB
60 dB		-40.1	_____	-39.9	dB
65 dB		-45.15	_____	-44.85	dB
70 dB		-50.15	_____	-49.85	dB
75 dB		-55.2	_____	-54.8	dB
80 dB		-60.2	_____	-59.8	dB
RF Attenuator uncertainty a_{FSVR}	Page 30				
0 dB		9.8	_____	10.2	dB
5 dB		4.8	_____	5.2	dB
10 dB			Reference		
15 dB		-5.2	_____	-4.8	dB
20 dB		-10.2	_____	-9.8	dB
25 dB		-15.2	_____	-14.8	dB
30 dB		-20.2	_____	-19.8	dB
40 dB		-30.2	_____	-29.8	dB
50 dB		-40.2	_____	-39.8	dB
60 dB		-50.2	_____	-49.8	dB
70 dB		-60.2	_____	-59.8	dB
Phase Noise Offset	Page 32				
100 Hz		-	_____	-84	dBc (1Hz)
1 kHz		-	_____	-101	dBc (1Hz)
10 kHz		-	_____	-106	dBc (1Hz)
100 kHz		-	_____	-115	dBc (1Hz)
1 MHz		-	_____	-134	dBc (1Hz)
Return Loss					
VSWR	Page 33				
10 dB, DC coupled f_{in}					
R&S FSVR7/13/30/40:					
10 MHz		-	_____	1.5	
250 MHz		-	_____	1.5	

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
500 MHz		-	_____	1.5	
750 MHz		-	_____	1.5	
1000 MHz		-	_____	1.5	
1250 MHz		-	_____	1.5	
1500 MHz		-	_____	1.5	
1750 MHz		-	_____	1.5	
2000 MHz		-	_____	1.5	
2250 MHz		-	_____	1.5	
2500 MHz		-	_____	1.5	
2750 MHz		-	_____	1.5	
3000 MHz		-	_____	1.5	
3250 MHz		-	_____	1.5	
3500 MHz		-	_____	1.5	
R&S FSVR7/13/30/40:					
3750 MHz		-	_____	2	
4000 MHz		-	_____	2	
4250 MHz		-	_____	2	
4500 MHz		-	_____	2	
4750 MHz		-	_____	2	
5000 MHz		-	_____	2	
5250 MHz		-	_____	2	
5500 MHz		-	_____	2	
5750 MHz		-	_____	2	
6000 MHz		-	_____	2	
6250 MHz		-	_____	2	
6500 MHz		-	_____	2	
6750 MHz		-	_____	2	
7000 MHz		-	_____	2	
R&S FSVR13/30/40:					
8000 MHz		-	_____	2	
9000 MHz		-	_____	2	
10000 MHz		-	_____	2	
11000 MHz		-	_____	2	
12000 MHz		-	_____	2	
13000 MHz		-	_____	2	
R&S FSVR30/40:					
14000 MHz		-	_____	2	
16000 MHz		-	_____	2	
18000 MHz		-	_____	2	

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
20000 MHz		-	_____	2.2	
22000 MHz		-	_____	2.2	
24000 MHz		-	_____	2.2	
26000 MHz		-	_____	2.2	
28000 MHz		-	_____	2.2	
29999 MHz		-	_____	2.2	
R&S FSVR40:				2.5	
31000 MHz		-	_____	2.5	
33000 MHz		-	_____	2.5	
35000 MHz		-	_____	2.5	
37000 MHz		-	_____	2.5	
39000 MHz		-	_____	2.5	
39999 MHz		-	_____	2.5	
VSWR	Page 33				
20 dB, DC coupled f_{in}					
R&S FSVR7/13/30/40:					
10 MHz		-	_____	1.5	
250 MHz		-	_____	1.5	
500 MHz		-	_____	1.5	
750 MHz		-	_____	1.5	
1000 MHz		-	_____	1.5	
1250 MHz		-	_____	1.5	
1500 MHz		-	_____	1.5	
1750 MHz		-	_____	1.5	
2000 MHz		-	_____	1.5	
2250 MHz		-	_____	1.5	
2500 MHz		-	_____	1.5	
2750 MHz		-	_____	1.5	
3000 MHz		-	_____	1.5	
3250 MHz		-	_____	1.5	
3500 MHz		-	_____	1.5	
R&S FSVR7/13/30/40:					
3750 MHz		-	_____	2	
4000 MHz		-	_____	2	
4250 MHz		-	_____	2	
4500 MHz		-	_____	2	
4750 MHz		-	_____	2	
5000 MHz		-	_____	2	

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
5250 MHz		-	_____	2	
5500 MHz		-	_____	2	
5750 MHz		-	_____	2	
6000 MHz		-	_____	2	
6250 MHz		-	_____	2	
6500 MHz		-	_____	2	
6750 MHz		-	_____	2	
7000 MHz		-	_____	2	
R&S FSVR13/30/40:					
8000 MHz		-	_____	2	
9000 MHz		-	_____	2	
10000 MHz		-	_____	2	
11000 MHz		-	_____	2	
12000 MHz		-	_____	2	
13000 MHz		-	_____	2	
R&S FSVR30/40:					
14000 MHz		-	_____	2	
16000 MHz		-	_____	2	
18000 MHz		-	_____	2	
20000 MHz		-	_____	2.2	
22000 MHz		-	_____	2.2	
24000 MHz		-	_____	2.2	
26000 MHz		-	_____	2.2	
28000 MHz		-	_____	2.2	
29999 MHz		-	_____	2.2	
R&S FSVR40:					
31000 MHz		-	_____	2.5	
33000 MHz		-	_____	2.5	
35000 MHz		-	_____	2.5	
37000 MHz		-	_____	2.5	
39000 MHz		-	_____	2.5	
39999 MHz		-	_____	2.5	
VSWR	Page 33				
40 dB, DC coupled					
f_{in}					
R&S FSVR7/13/30/40:					
10 MHz		-	_____	1.5	
250 MHz		-	_____	1.5	
500 MHz		-	_____	1.5	

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
750 MHz		-	_____	1.5	
1000 MHz		-	_____	1.5	
1250 MHz		-	_____	1.5	
1500 MHz		-	_____	1.5	
1750 MHz		-	_____	1.5	
2000 MHz		-	_____	1.5	
2250 MHz		-	_____	1.5	
2500 MHz		-	_____	1.5	
2750 MHz		-	_____	1.5	
3000 MHz		-	_____	1.5	
3250 MHz		-	_____	1.5	
3500 MHz		-	_____	1.5	
R&S FSVR7/13/30/40:					
3750 MHz		-	_____	2	
4000 MHz		-	_____	2	
4250 MHz		-	_____	2	
4500 MHz		-	_____	2	
4750 MHz		-	_____	2	
5000 MHz		-	_____	2	
5250 MHz		-	_____	2	
5500 MHz		-	_____	2	
5750 MHz		-	_____	2	
6000 MHz		-	_____	2	
6250 MHz		-	_____	2	
6500 MHz		-	_____	2	
6750 MHz		-	_____	2	
7000 MHz		-	_____	2	
R&S FSVR13/30/40:					
8000 MHz		-	_____	2	
9000 MHz		-	_____	2	
10000 MHz		-	_____	2	
11000 MHz		-	_____	2	
12000 MHz		-	_____	2	
13000 MHz		-	_____	2	
R&S FSVR30/40:					
14000 MHz		-	_____	2	
16000 MHz		-	_____	2	
18000 MHz		-	_____	2	
20000 MHz		-	_____	2.2	

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
22000 MHz		-	_____	2.2	
24000 MHz		-	_____	2.2	
26000 MHz		-	_____	2.2	
28000 MHz		-	_____	2.2	
29999 MHz		-	_____	2.2	
R&S FSVR40:					
31000 MHz		-	_____	2.5	
33000 MHz		-	_____	2.5	
35000 MHz		-	_____	2.5	
37000 MHz		-	_____	2.5	
39000 MHz		-	_____	2.5	
39999 MHz		-	_____	2.5	
VSWR	Page 33				
10 dB, AC coupled					
f_{in}					
R&S FSVR7/13/30/40:					
10 MHz		-	_____	1.5	
250 MHz		-	_____	1.5	
500 MHz		-	_____	1.5	
750 MHz		-	_____	1.5	
1000 MHz		-	_____	1.5	
1250 MHz		-	_____	1.5	
1500 MHz		-	_____	1.5	
1750 MHz		-	_____	1.5	
2000 MHz		-	_____	1.5	
2250 MHz		-	_____	1.5	
2500 MHz		-	_____	1.5	
2750 MHz		-	_____	1.5	
3000 MHz		-	_____	1.5	
3250 MHz		-	_____	1.5	
3500 MHz		-	_____	1.5	
R&S FSVR7/13/30/40:					
3750 MHz		-	_____	2	
4000 MHz		-	_____	2	
4250 MHz		-	_____	2	
4500 MHz		-	_____	2	
4750 MHz		-	_____	2	
5000 MHz		-	_____	2	
5250 MHz		-	_____	2	

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
5500 MHz		-	_____	2	
5750 MHz		-	_____	2	
6000 MHz		-	_____	2	
6250 MHz		-	_____	2	
6500 MHz		-	_____	2	
6750 MHz		-	_____	2	
7000 MHz		-	_____	2	
R&S FSVR13/30/40:					
8000 MHz		-	_____	2	
9000 MHz		-	_____	2	
10000 MHz		-	_____	2	
11000 MHz		-	_____	2	
12000 MHz		-	_____	2	
13000 MHz		-	_____	2	
R&S FSVR30/40:					
14000 MHz		-	_____	2	
16000 MHz		-	_____	2	
18000 MHz		-	_____	2	
20000 MHz		-	_____	2.2	
22000 MHz		-	_____	2.2	
24000 MHz		-	_____	2.2	
26000 MHz		-	_____	2.2	
26999 MHz		-	_____	2.2	
VSWR	Page 33				
20 dB, AC coupled					
f_{in}					
R&S FSVR7/13/30/40:					
10 MHz		-	_____	1.5	
250 MHz		-	_____	1.5	
500 MHz		-	_____	1.5	
750 MHz		-	_____	1.5	
1000 MHz		-	_____	1.5	
1250 MHz		-	_____	1.5	
1500 MHz		-	_____	1.5	
1750 MHz		-	_____	1.5	
2000 MHz		-	_____	1.5	
2250 MHz		-	_____	1.5	
2500 MHz		-	_____	1.5	
2750 MHz		-	_____	1.5	

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
3000 MHz		-	_____	1.5	
3250 MHz		-	_____	1.5	
3500 MHz		-	_____	1.5	
R&S FSVR7/13/30/40:					
3750 MHz		-	_____	2	
4000 MHz		-	_____	2	
4250 MHz		-	_____	2	
4500 MHz		-	_____	2	
4750 MHz		-	_____	2	
5000 MHz		-	_____	2	
5250 MHz		-	_____	2	
5500 MHz		-	_____	2	
5750 MHz		-	_____	2	
6000 MHz		-	_____	2	
6250 MHz		-	_____	2	
6500 MHz		-	_____	2	
6750 MHz		-	_____	2	
7000 MHz		-	_____	2	
R&S FSVR13/30/40:					
8000 MHz		-	_____	2	
9000 MHz		-	_____	2	
10000 MHz		-	_____	2	
11000 MHz		-	_____	2	
12000 MHz		-	_____	2	
13000 MHz		-	_____	2	
R&S FSVR30/40:					
14000 MHz		-	_____	2	
16000 MHz		-	_____	2	
18000 MHz		-	_____	2	
20000 MHz		-	_____	2.2	
22000 MHz		-	_____	2.2	
24000 MHz		-	_____	2.2	
26000 MHz		-	_____	2.2	
26999 MHz		-	_____	2.2	

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
VSWR	Page 33				
40 dB, AC coupled f_{in}					
R&S FSVR7/13/30/40:					
10 MHz		-	_____	1.5	
250 MHz		-	_____	1.5	
500 MHz		-	_____	1.5	
750 MHz		-	_____	1.5	
1000 MHz		-	_____	1.5	
1250 MHz		-	_____	1.5	
1500 MHz		-	_____	1.5	
1750 MHz		-	_____	1.5	
2000 MHz		-	_____	1.5	
2250 MHz		-	_____	1.5	
2500 MHz		-	_____	1.5	
2750 MHz		-	_____	1.5	
3000 MHz		-	_____	1.5	
3250 MHz		-	_____	1.5	
3500 MHz		-	_____	1.5	
R&S FSVR7/13/30/40:					
3750 MHz		-	_____	2	
4000 MHz		-	_____	2	
4250 MHz		-	_____	2	
4500 MHz		-	_____	2	
4750 MHz		-	_____	2	
5000 MHz		-	_____	2	
5250 MHz		-	_____	2	
5500 MHz		-	_____	2	
5750 MHz		-	_____	2	
6000 MHz		-	_____	2	
6250 MHz		-	_____	2	
6500 MHz		-	_____	2	
6750 MHz		-	_____	2	
7000 MHz		-	_____	2	
R&S FSVR13/30/40:					
8000 MHz		-	_____	2	
9000 MHz		-	_____	2	
10000 MHz		-	_____	2	
11000 MHz		-	_____	2	

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
12000 MHz		-	_____	2	
13000 MHz		-	_____	2	
R&S FSVR30/40:					
14000 MHz		-	_____	2	
16000 MHz		-	_____	2	
18000 MHz		-	_____	2	
20000 MHz		-	_____	2.2	
22000 MHz		-	_____	2.2	
24000 MHz		-	_____	2.2	
26000 MHz		-	_____	2.2	
26999 MHz		-	_____	2.2	

1.9 Performance Test Report for Option R&S FSV-B21

ROHDE&SCHWARZ		Option LO/IF ports for external mixers	1310.9597.02
		R&S FSV-B21	
Serial number:			
Date:			
Person responsible:			
Signature:			

For nominal data and limit values refer to the data sheet supplied with the instrument.

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
LO level f_{Center1}	Page 34				
16,1899 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
16,5899 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
16,9899 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
17,3899 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
17,7899 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
18,1899 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
18,5899 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
18,9899 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
19,3899 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
19,7899 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
20,1899 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
20,5899 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
20,9899 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
21,3899 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
21,7899 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
22,1899 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
22,5899 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
22,9899 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
23,3899 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
23,7899 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
24,1899 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
LO level f_{Center2}	Page 34				
23,1301 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
23,5301 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
23,9301 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
24,3301 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
24,7301 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
25,1301 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
25,5301 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
25,9301 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
26,3301 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
26,7301 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
27,1301 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
27,5301 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
27,9301 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
28,3301 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
28,7301 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
29,1301 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
29,5301 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
29,7301 GHz		$P_{\text{LO}} - 1$		$P_{\text{LO}} + 1$	dBm
level display 2-port-mixer	Page 35	-31		-29	dBm
level display 3-port-mixer	Page 36	-31		-29	dBm
Bias current I_{bias}	Page 37				
-10 mA		-12.0		-8.0	mA
0 mA		-1.0		+1.0	mA
+10 mA		+8.0		+12.0	mA

1.10 Performance Test Report for Option R&S FSV-B22

ROHDE&SCHWARZ	Option RF Preamplifier	1310.9600.02
R&S FSV-B22		
Serial number:	_____	
Date:	_____	
Person responsible:	_____	
Signature:	_____	

For nominal data and limit values refer to the data sheet supplied with the instrument.

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
Noise Display normalized to 1 Hz DANL4 B22 Preamplifier = ON f_n	Page 38				
R&S FSVR7:					
101 kHz		-	_____	-150	dBm
999 kHz		-	_____	-150	dBm
10.1 MHz		-	_____	-162	dBm
19.99 MHz		-	_____	-162	dBm
49.99 MHz		-	_____	-162	dBm
99.99 MHz		-	_____	-162	dBm
199.9 MHz		-	_____	-162	dBm
499.9 MHz		-	_____	-162	dBm
599.9 MHz		-	_____	-162	dBm
699.9 MHz		-	_____	-162	dBm
799.9 MHz		-	_____	-162	dBm
899.9 MHz		-	_____	-162	dBm
999.9 MHz		-	_____	-162	dBm
1199.9 MHz		-	_____	-160	dBm
1399.9 MHz		-	_____	-160	dBm
1599.9 MHz		-	_____	-160	dBm
1799.9 MHz		-	_____	-160	dBm
1999.9 MHz		-	_____	-160	dBm
2199.9 MHz		-	_____	-160	dBm
2399.9 MHz		-	_____	-160	dBm
2599.9 MHz		-	_____	-160	dBm
2799.9 MHz		-	_____	-160	dBm

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
2999.9 MHz		-	_____	-160	dBm
3199.9 MHz		-	_____	-160	dBm
3399.9 MHz		-	_____	-160	dBm
3599.9 MHz		-	_____	-160	dBm
3601.0 MHz		-	_____	-158	dBm
3799.9 MHz		-	_____	-158	dBm
3999.9 MHz		-	_____	-158	dBm
4199.9 MHz		-	_____	-158	dBm
4399.9 MHz		-	_____	-158	dBm
4599.9 MHz		-	_____	-158	dBm
4799.9 MHz		-	_____	-158	dBm
4999.9 MHz		-	_____	-158	dBm
5199.9 MHz		-	_____	-158	dBm
5399.9 MHz		-	_____	-158	dBm
5599.9 MHz		-	_____	-158	dBm
5799.9 MHz		-	_____	-158	dBm
5999.9 MHz		-	_____	-158	dBm
6199.9 MHz		-	_____	-156	dBm
6399.9 MHz		-	_____	-156	dBm
6599.9 MHz		-	_____	-156	dBm
6799.9 MHz		-	_____	-156	dBm
6999.9 MHz		-	_____	-156	dBm
Noise Display normalized to 1 Hz DANL5 B22 Preamplifier = ON f_n	Page 38				
R&S FSVR13/30/40:					
101 kHz		-	_____	-145	dBm
999 kHz		-	_____	-145	dBm
10.1 MHz		-	_____	-155	dBm
19.99 MHz		-	_____	-155	dBm
49.99 MHz		-	_____	-161	dBm
99.99 MHz		-	_____	-161	dBm
199.9 MHz		-	_____	-161	dBm
499.9 MHz		-	_____	-161	dBm
599.9 MHz		-	_____	-161	dBm
699.9 MHz		-	_____	-161	dBm
799.9 MHz		-	_____	-161	dBm
899.9 MHz		-	_____	-161	dBm
999.9 MHz		-	_____	-161	dBm

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
1199.9 MHz		-	_____	-159	dBm
1399.9 MHz		-	_____	-159	dBm
1599.9 MHz		-	_____	-159	dBm
1799.9 MHz		-	_____	-159	dBm
1999.9 MHz		-	_____	-159	dBm
2199.9 MHz		-	_____	-159	dBm
2399.9 MHz		-	_____	-159	dBm
2599.9 MHz		-	_____	-159	dBm
2799.9 MHz		-	_____	-159	dBm
2999.9 MHz		-	_____	-159	dBm
3199.9 MHz		-	_____	-159	dBm
3399.9 MHz		-	_____	-159	dBm
3599.9 MHz		-	_____	-159	dBm
3601.0 MHz		-	_____	-156	dBm
3799.9 MHz		-	_____	-156	dBm
3999.9 MHz		-	_____	-156	dBm
4199.9 MHz		-	_____	-156	dBm
4399.9 MHz		-	_____	-156	dBm
4599.9 MHz		-	_____	-156	dBm
4799.9 MHz		-	_____	-156	dBm
4999.9 MHz		-	_____	-156	dBm
5199.9 MHz		-	_____	-156	dBm
5399.9 MHz		-	_____	-156	dBm
5599.9 MHz		-	_____	-156	dBm
5799.9 MHz		-	_____	-156	dBm
5999.9 MHz		-	_____	-156	dBm
6199.9 MHz		-	_____	-154	dBm
6399.9 MHz		-	_____	-154	dBm
6599.9 MHz		-	_____	-154	dBm
6799.9 MHz		-	_____	-154	dBm
6999.9 MHz		-	_____	-154	dBm
Absolute level uncertainty at 64 MHz	Page 40	-0.2		0.2	dB
Frequency response < 3.6 GHz, RF attenuation 30 dB, DC coupled Preamplifier = ON f_{fresp}	Page 41				
R&S FSVR7/13/30/40:					
9 kHz		-1	_____	1	dB
100.02 kHz		-1	_____	1	dB
1.005 MHz		-1	_____	1	dB

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
10.15 MHz		-1	_____	1	dB
51 MHz		-1	_____	1	dB
64 MHz			Reference		
101 MHz		-1	_____	1	dB
201 MHz		-1	_____	1	dB
301 MHz		-1	_____	1	dB
401 MHz		-1	_____	1	dB
501 MHz		-1	_____	1	dB
601 MHz		-1	_____	1	dB
701 MHz		-1	_____	1	dB
801 MHz		-1	_____	1	dB
901 MHz		-1	_____	1	dB
1001 MHz		-1	_____	1	dB
1501 MHz		-1	_____	1	dB
2001 MHz		-1	_____	1	dB
2501 MHz		-1	_____	1	dB
3001 MHz		-1	_____	1	dB
3599 MHz		-1	_____	1	dB
R&S FSVR7/13/30/40: Frequency response > 3.6 GHz, RF attenuation = 30 dB, DC coupled Preamplifier = ON f_{fresp}	Page 43				
4001 MHz		-1.5	_____	1.5	dB
4501 MHz		-1.5	_____	1.5	dB
5001 MHz		-1.5	_____	1.5	dB
5501 MHz		-1.5	_____	1.5	dB
6001 MHz		-1.5	_____	1.5	dB
6501 MHz		-1.5	_____	1.5	dB
6999 MHz		-1.5	_____	1.5	dB

1.11 Performance Test Report for Option R&S FSV-B24

ROHDE&SCHWARZ	Option Preamplifier	1310.9616.13/30
	R&S FSV-B24	
Serial number:	_____	
Date:	_____	
Person responsible:	_____	
Signature:	_____	

For nominal data and limit values refer to the data sheet supplied with the instrument.

Measurand	Ref.	Specified min. value	Measured value YIG ON	Specified max. value	Unit
Noise Display normalized to 1 Hz DANL6 B24 Preamplifier = ON YIG filter = ON f_n	Page 45				
FSVR 13/30/40:					
101 kHz			_____	-145	dBm
999 kHz			_____	-155	dBm
10.1 MHz			_____	-155	dBm
19.99 MHz			_____	-155	dBm
49.99 MHz			_____	-160	dBm
99.99 MHz			_____	-160	dBm
199.9 MHz			_____	-160	dBm
499.9 MHz			_____	-160	dBm
599.9 MHz			_____	-160	dBm
699.9 MHz			_____	-160	dBm
799.9 MHz			_____	-160	dBm
899.9 MHz			_____	-160	dBm
999.9 MHz			_____	-160	dBm
1199.9 MHz			_____	-157	dBm
1399.9 MHz			_____	-157	dBm
1599.9 MHz			_____	-157	dBm
1799.9 MHz			_____	-157	dBm
1999.9 MHz			_____	-157	dBm
2199.9 MHz			_____	-157	dBm
2399.9 MHz			_____	-157	dBm

Measurand	Ref.	Specified min. value	Measured value YIG ON	Specified max. value	Unit
2599.9 MHz			_____	-157	dBm
2799.9 MHz			_____	-157	dBm
2999.9 MHz			_____	-157	dBm
3199.9 MHz			_____	-157	dBm
3399.9 MHz			_____	-157	dBm
3599.9 MHz			_____	-157	dBm
3601.0 MHz			_____	-153	dBm
3799.9 MHz			_____	-153	dBm
3999.9 MHz			_____	-153	dBm
4199.9 MHz			_____	-153	dBm
4399.9 MHz			_____	-153	dBm
4599.9 MHz			_____	-153	dBm
4799.9 MHz			_____	-153	dBm
4999.9 MHz			_____	-153	dBm
5199.9 MHz			_____	-153	dBm
5399.9 MHz			_____	-153	dBm
5599.9 MHz			_____	-153	dBm
5799.9 MHz			_____	-153	dBm
5999.9 MHz			_____	-153	dBm
6199.9 MHz			_____	-150	dBm
6399.9 MHz			_____	-150	dBm
6599.9 MHz			_____	-150	dBm
6799.9 MHz			_____	-150	dBm
6999.9 MHz			_____	-150	dBm
7000.1 MHz			_____	-150	dBm
7499.9 MHz			_____	-164	dBm
7999.9 MHz			_____	-164	dBm
8499.9 MHz			_____	-164	dBm
8999.9 MHz			_____	-164	dBm
9499.9 MHz			_____	-164	dBm
9999.9 MHz			_____	-164	dBm
10499.9 MHz			_____	-164	dBm
10999.9 MHz			_____	-164	dBm
11499.9 MHz			_____	-164	dBm
11999.9 MHz			_____	-164	dBm
12499.9 MHz			_____	-164	dBm
12999.9 MHz			_____	-164	dBm
13499.9 MHz			_____	-164	dBm

Measurand	Ref.	Specified min. value	Measured value YIG ON	Specified max. value	Unit
R&S FSVR30/40:					
13999.9 MHz			_____	-164	dBm
14999.9 MHz			_____	-164	dBm
15999.9 MHz			_____	-159	dBm
16999.9 MHz			_____	-159	dBm
17999.9 MHz			_____	-159	dBm
18999.9 MHz			_____	-159	dBm
19999.9 MHz			_____	-159	dBm
20999.9 MHz			_____	-159	dBm
21999.9 MHz			_____	-159	dBm
22999.9 MHz			_____	-159	dBm
23999.9 MHz			_____	-159	dBm
24999.9 MHz			_____	-159	dBm
25999.9 MHz			_____	-159	dBm
26999.9 MHz			_____	-159	dBm
27999.9 MHz			_____	-159	dBm
28999.9 MHz			_____	-159	dBm
29999.9 MHz			_____	-159	dBm
R&S FSVR40:					
31999.9 MHz			_____	-159	dBm
32999.9 MHz			_____	-159	dBm
33999.9 MHz			_____	-159	dBm
34999.9 MHz			_____	-154+1	dBm
35999.9 MHz			_____	-154+1	dBm
36999.9 MHz			_____	-154+1	dBm
37999.9 MHz			_____	-154+1	dBm
38999.9 MHz			_____	-154+1	dBm
39999.9 MHz			_____	-154+1	dBm
Noise Display normalized to 1 Hz DANL7 B24 Preamplicifier = ON YIG filter off f_n	Page 45				
R&S FSVR13/30/40:					
7000.1 MHz		_____		-150	dBm
7499.9 MHz		_____		-164+4	dBm
7999.9 MHz		_____		-164+4	dBm
8499.9 MHz		_____		-164+4	dBm
8999.9 MHz		_____		-164+4	dBm
9499.9 MHz		_____		-164+4	dBm

Measurand	Ref.	Specified min. value	Measured value YIG ON	Specified max. value	Unit
9999.9 MHz		_____		-164+4	dBm
10499.9 MHz		_____		-164+4	dBm
10999.9 MHz		_____		-164+4	dBm
11499.9 MHz		_____		-164+4	dBm
11999.9 MHz		_____		-164+4	dBm
12499.9 MHz		_____		-164+4	dBm
12999.9 MHz		_____		-164+4	dBm
13499.9 MHz		_____		-164+4	dBm
R&S FSVR30:					
13999.9 MHz		_____		-164+4	dBm
14999.9 MHz		_____		-164+4	dBm
15999.9 MHz		_____		-159+4	dBm
16999.9 MHz		_____		-159+4	dBm
17999.9 MHz		_____		-159+4	dBm
18999.9 MHz		_____		-159+4	dBm
19999.9 MHz		_____		-159+4	dBm
20999.9 MHz		_____		-159+4	dBm
21999.9 MHz		_____		-159+4	dBm
22999.9 MHz		_____		-159+4	dBm
23999.9 MHz		_____		-159+4	dBm
24999.9 MHz		_____		-159+4	dBm
25999.9 MHz		_____		-159+4	dBm
26999.9 MHz		_____		-159+4	dBm
27999.9 MHz		_____		-159+4	dBm
28999.9 MHz		_____		-159+4	dBm
29999.9 MHz		_____		-159+4	dBm
R&S FSVR40:					
31999.9 MHz		-		-159+4	dBm
32999.9 MHz		-		-159+4	dBm
33999.9 MHz		-		-159+4	dBm
34999.9 MHz		-		-154+5	dBm
35999.9 MHz		-		-154+5	dBm
36999.9 MHz		-		-154+5	dBm
37999.9 MHz		-		-154+5	dBm
38999.9 MHz		-		-154+5	dBm
39999.9 MHz		-		-154+5	dBm

Measurand	Ref.	Specified min. value	Measured value YIG OFF	Measured value YIG ON	Specified max. value	Unit
Absolute level uncertainty at 64 MHz	Page 47	-0.2	-	_____	0.2	dB
Frequency response < 3.6 GHz, RF attenuation 40 dB, DC coupled Preamplifier = ON f_{fresp}	Page 48					
R&S FSVR13/30/40:						
9 kHz		-1	-	_____	1	dB
100.02 kHz		-1	-	_____	1	dB
1.005 MHz		-1	-	_____	1	dB
10.15 MHz		-1	-	_____	1	dB
51 MHz		-1	-	_____	1	dB
64 MHz				Reference		
101 MHz		-1	-	_____	1	dB
201 MHz		-1	-	_____	1	dB
301 MHz		-1	-	_____	1	dB
401 MHz		-1	-	_____	1	dB
501 MHz		-1	-	_____	1	dB
601 MHz		-1	-	_____	1	dB
701 MHz		-1	-	_____	1	dB
801 MHz		-1	-	_____	1	dB
901 MHz		-1	-	_____	1	dB
1001 MHz		-1	-	_____	1	dB
1501 MHz		-1	-	_____	1	dB
2001 MHz		-1	-	_____	1	dB
2501 MHz		-1	-	_____	1	dB
3001 MHz		-1	-	_____	1	dB
3599 MHz		-1	-	_____	1	dB
R&S FSVR13/30/40: Frequency response > 3.6 GHz, RF attenuation = 40 dB, DC coupled Preamplifier = ON f_{fresp}	Page 50					
4001 MHz		-1.5	-	_____	1.5	dB
4501 MHz		-1.5	-	_____	1.5	dB
5001 MHz		-1.5	-	_____	1.5	dB
5501 MHz		-1.5	-	_____	1.5	dB
6001 MHz		-1.5	-	_____	1.5	dB
6501 MHz		-1.5	-	_____	1.5	dB
6999 MHz		-1.5	-	_____	1.5	dB

Measurand	Ref.	Specified min. value	Measured value YIG OFF	Measured value YIG ON	Specified max. value	Unit
R&S FSVR13/30/40: Frequency response > 3.6 GHz, RF attenuation = 40 dB, DC coupled Preamplifier = ON f_{fresp}	Page 50					
7001 MHz		-3	_____	_____	3	dB
7501 MHz		-3	_____	_____	3	dB
8001 MHz		-3	_____	_____	3	dB
8501 MHz		-3	_____	_____	3	dB
9001 MHz		-3	_____	_____	3	dB
9501 MHz		-3	_____	_____	3	dB
10001 MHz		-3	_____	_____	3	dB
10501 MHz		-3	_____	_____	3	dB
11001 MHz		-3	_____	_____	3	dB
11501 MHz		-3	_____	_____	3	dB
12001 MHz		-3	_____	_____	3	dB
12501 MHz		-3	_____	_____	3	dB
13001 MHz		-3	_____	_____	3	dB
13501 MHz		-3	_____	_____	3	dB
13599 MHz		-3	_____	_____	3	dB
R&S FSVR30/40: Frequency response > 3.6 GHz, RF attenuation = 40 dB, DC coupled Preamplifier = ON f_{fresp}	Page 50					
14001 MHz		-3.5	_____	_____	3.5	dB
15001 MHz		-3.5	_____	_____	3.5	dB
16001 MHz		-3.5	_____	_____	3.5	dB
17001 MHz		-3.5	_____	_____	3.5	dB
18001 MHz		-3.5	_____	_____	3.5	dB
19001 MHz		-3.5	_____	_____	3.5	dB
20001 MHz		-3.5	_____	_____	3.5	dB
21001 MHz		-3.5	_____	_____	3.5	dB
22001 MHz		-3.5	_____	_____	3.5	dB
23001 MHz		-3.5	_____	_____	3.5	dB
24001 MHz		-3.5	_____	_____	3.5	dB
25001 MHz		-3.5	_____	_____	3.5	dB
26001 MHz		-3.5	_____	_____	3.5	dB
27001 MHz		-3.5	_____	_____	3.5	dB
28001 MHz		-3.5	_____	_____	3.5	dB
29001 MHz		-3.5	_____	_____	3.5	dB
29999 MHz		-3.5	_____	_____	3.5	dB

Measurand	Ref.	Specified min. value	Measured value YIG OFF	Measured value YIG ON	Specified max. value	Unit
R&S FSVR40: Frequency response > 3.6 GHz, RF attenuation = 40 dB, DC coupled Preamplifier = ON f_{resp}	Page 50					
30001 MHz		-4.5		_____	4.5	dB
31001 MHz		-4.5		_____	4.5	dB
32001 MHz		-4.5		_____	4.5	dB
33001 MHz		-4.5		_____	4.5	dB
34001 MHz		-4.5		_____	4.5	dB
35001 MHz		-4.5		_____	4.5	dB
36001 MHz		-4.5		_____	4.5	dB
37001 MHz		-4.5		_____	4.5	dB
38001 MHz		-4.5		_____	4.5	dB
39001 MHz		-4.5		_____	4.5	dB
39999 MHz		-4.5		_____	4.5	dB

1.12 Performance Test Report for Option R&S FSV-B25

ROHDE&SCHWARZ	Option Electronic Attenuator	1310.9622.02
R&S FSV-B25		
Serial number:		
Date:		
Person responsible:		
Signature:		

For nominal data and limit values refer to the data sheet supplied with the instrument.

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
Electronic attenuator uncertainty a_{EL}	Page 52				
0 dB			Reference		
1 dB		-1.2	_____	-0.8	dB
2 dB		-2.2	_____	-1.8	
3 dB		-3.2	_____	-2.8	dB
4 dB		-4.2	_____	-3.8	dB
5 dB		-5.2	_____	-4.8	dB
6 dB		-6.2	_____	-5.8	dB
7 dB		-7.2	_____	-6.8	dB
8 dB		-8.2	_____	-7.8	dB
9 dB		-9.2	_____	-8.8	dB
10 dB		-10.2	_____	-9.8	dB
11 dB		-11.2	_____	-10.8	dB
12 dB		-12.2	_____	-11.8	dB
13 dB		-13.2	_____	-12.8	dB
14 dB		-14.2	_____	-13.8	dB
15 dB		-15.2	_____	-14.8	dB
16 dB		-16.2	_____	-15.8	dB
17 dB		-17.2	_____	-16.8	dB
18 dB		-18.2	_____	-17.8	dB
19 dB		-19.2	_____	-18.8	dB
20 dB		-20.2	_____	-19.8	dB
21 dB		-21.2	_____	-20.8	dB
22 dB		-22.2	_____	-21.8	dB
23 dB		-23.2	_____	-22.8	dB

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
24 dB		-24.2	_____	-23.8	dB
25 dB		-25.2	_____	-24.8	dB
Absolute level uncertainty at 64 MHz	Page 54	-0.2	_____	0.2	dB
Frequency response < 3.6 GHz, electronic attenuation 15 dB, DC coupled f_{fresp}	Page 55				
R&S FSVR7/13/30/40:					
9 kHz		-1	_____	1	dB
100.02 kHz		-1	_____	1	dB
1.005 MHz		-1	_____	1	dB
10.15 MHz		-1	_____	1	dB
51 MHz		-1	_____	1	dB
64 MHz			Reference		
101 MHz		-1	_____	1	dB
201 MHz		-1	_____	1	dB
301 MHz		-1	_____	1	dB
401 MHz		-1	_____	1	dB
501 MHz		-1	_____	1	dB
601 MHz		-1	_____	1	dB
701 MHz		-1	_____	1	dB
801 MHz		-1	_____	1	dB
901 MHz		-1	_____	1	dB
1001 MHz		-1	_____	1	dB
1501 MHz		-1	_____	1	dB
2001 MHz		-1	_____	1	dB
2501 MHz		-1	_____	1	dB
3001 MHz		-1	_____	1	dB
3599 MHz		-1	_____	1	dB
R&S FSVR7/13/30/40: Frequency response > 3.6 GHz, electronic attenuation 15 dB, DC coupled f_{fresp}	Page 57				
4001 MHz		-1.5	_____	1.5	dB
4501 MHz		-1.5	_____	1.5	dB
5001 MHz		-1.5	_____	1.5	dB
5501 MHz		-1.5	_____	1.5	dB
6001 MHz		-1.5	_____	1.5	dB
6501 MHz		-1.5	_____	1.5	dB
6999 MHz		-1.5	_____	1.5	dB

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
Frequency response < 3.6 GHz, electronic attenuation 25 dB, DC coupled f_{fresp}	Page 55				
R&S FSVR7/13/30/40:					
9 kHz		-1	_____	1	dB
100.02 kHz		-1	_____	1	dB
1.005 MHz		-1	_____	1	dB
10.15 MHz		-1	_____	1	dB
51 MHz		-1	_____	1	dB
64 MHz			Reference		
101 MHz		-1	_____	1	dB
201 MHz		-1	_____	1	dB
301 MHz		-1	_____	1	dB
401 MHz		-1	_____	1	dB
501 MHz		-1	_____	1	dB
601 MHz		-1	_____	1	dB
701 MHz		-1	_____	1	dB
801 MHz		-1	_____	1	dB
901 MHz		-1	_____	1	dB
1001 MHz		-1	_____	1	dB
1501 MHz		-1	_____	1	dB
2001 MHz		-1	_____	1	dB
2501 MHz		-1	_____	1	dB
3001 MHz		-1	_____	1	dB
3599 MHz		-1	_____	1	dB
R&S FSVR7/13/30/40: Frequency response > 3.6 GHz, electronic attenuation 25 dB, DC coupled f_{fresp}	Page 57				
4001 MHz		-1.5	_____	1.5	dB
4501 MHz		-1.5	_____	1.5	dB
5001 MHz		-1.5	_____	1.5	dB
5501 MHz		-1.5	_____	1.5	dB
6001 MHz		-1.5	_____	1.5	dB
6501 MHz		-1.5	_____	1.5	dB
6999 MHz		-1.5	_____	1.5	dB

1.13 Performance Test Report for Option R&S FSV-B29

ROHDE&SCHWARZ	Freq. Range Extension 10 Hz	1310.9639.02
R&S FSV-B29		
Serial number:	_____	
Date:	_____	
Person responsible:	_____	
Signature:	_____	

For nominal data and limit values refer to the data sheet supplied with the instrument.

Measurand	Ref.	Specified min. value	Measured value	Specified max. value	Unit
Noise Display normalized to 1 Hz DANL8 (B29) Preamplifier = OFF f_n	Page 59				
20 Hz		-	_____	-100	dBm
80 Hz		-	_____	-110	dBm
1010 Hz		-	_____	-120	dBm
Frequency response < 9 kHz, RF attenuation 10 dB DC coupled f_{fresp}	Page 60				
20 Hz		-1	_____	+1	dB
110 Hz		-1	_____	+1	dB
1010 Hz		-1	_____	+1	dB
2010 Hz		-1	_____	+1	dB
3010 Hz		-1	_____	+1	dB
5010 Hz		-1	_____	+1	dB
7010 Hz		-1	_____	+1	dB
8990 Hz		-1	_____	+1	dB

2 Adjustment

NOTICE

Risk of erroneous measurement results

Adjustment must be carried out exclusively by qualified personnel since any change can considerably affect the instrument's measurement uncertainty.

2.1 Measuring Equipment

Table 2-1: Measuring Equipment and Accessories for Manual Adjustment of the R&S FSVR Reference Oscillator

Item	Type of equipment	Recommended Specifications	Recommended Equipment	R&S Order No.	Use
1	Signal generator	Frequency: 1 GHz Output level: >-20 dBm Uncertainty of frequency: 1×10^{-9}	R&S SMA100A		Frequency Uncertainty of Reference Oscillator

2.2 Measuring the Frequency Uncertainty

Automatic adjustment of the reference oscillator without adjustment software: (Instruments with and without option R&S FSV-B4) .

Test equipment: Signal generator (chapter "[Measuring Equipment and Accessories](#)", item. 1):

- Frequency: e.g. 1000 MHz
- Level: -15 dBm
- Frequency uncertainty: $<1 \times 10^{-9}$

If the frequency uncertainty of the test transmitter is insufficient, the transmitter can be set to the correct frequency with the aid of the frequency counter prior to the measurement.

Test setup: ► Connect RF output of the signal generator to RF input of the R&S FSVR.

R&S FSVR settings: - [**SETUP: MORE: SERVICE: PASSWORD: 894129**]



Warming up the reference oscillator

Before the following measurement, the R&S FSVR must be on for at least ten minutes with an internal reference, so that the reference oscillator is warmed up.

Measurement:

► Start automatic adjustment by entering the service function:

– [**SETUP** : MORE : SERVICE : SERVICE FUNCTION : **2.3.12**]

The instrument performs the automatic adjustment. The new tuning values are stored in the EEPROM automatically.

2.3 Troubleshooting

Checking the input signal:

The automatic adjustment routine checks the power level of the input signal. The adjustment is aborted if the input level is not within the range from -10 dBm to -20 dBm.

The automatic adjustment is also aborted if the input signal is not within the nominal frequency range:

- Model without OCXO (option R&S FSV-B4): 1.0 GHz $\pm$ 1 kHz
- Model with OCXO (option R&S FSV-B4): 1.0 GHz $\pm$ 100 Hz

For verification proceed as follows:

R&S FSVR
settings:

– [**SETUP** : REFERENCE : INT]

► Toggle to internal reference.

Signal generator
settings:

Frequency: as above (e.g. 1000 MHz)

R&S FSVR
settings:

– [**PRESET**]

– [**FREQ** : 1 GHz]

– [**SPAN** : 100 kHz]

– [**BW** : RES BW MANUAL: 10 kHz]

– [**MKR FUNC** : SIGNAL COUNT]

- Measurement:
- ▶ Read out the power level of the marker and check whether the input level is within the range from -10 dBm to -20 dBm.
 - ▶ Read out the frequency value (Count:) of the marker and check whether the input signal frequency is in the nominal frequency range as shown above.

Checking appropriate warm-up of the instrument:

The automatic adjustment routine checks the drift of the internal reference oscillator. If there is too much drift (warming up is not completed) the adjustment is aborted.

Checking the R&S FSV-B4 option

Disconnect the instrument from all power supplies, remove option R&S FSV-B4, connect the power again and perform the automatic adjustment as described above. If this works correctly, most likely the R&S FSV-B4 option is defective.

2.4 Frequency Response Correction

With some boards (see chapter 3, section "[Repair](#)"), a frequency response correction is necessary. This correction can be performed by R&S service representations.

3 Repair

The following chapter describes how to replace modules in the R&S FSVR. The general procedures to open and complete the instrument are described in the introduction. For all descriptions, the numbers in parenthesis refer to the elements indicated in the inserted graphics.

WARNING

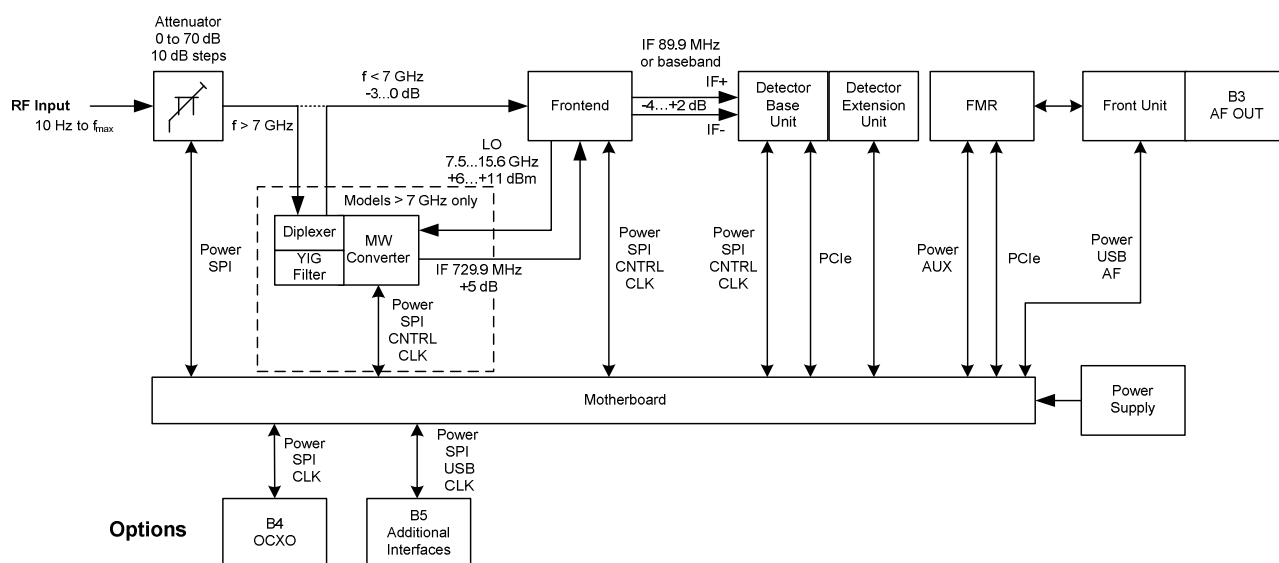
Shock hazard

Before opening the casing, make sure that the instrument is switched off and disconnected from all power supplies.

Read all safety instructions at the beginning of this manual carefully!

3.1 Functional Description

The following figure shows a block diagram of the R&S FSVR.



The R&S FSVR is a triple-conversion (double conversion for frequencies > 7 GHz) heterodyne receiver for the frequency range from 10 Hz to 7 GHz, 13 GHz, 30 GHz, 40 GHz depending on the instrument model. After signals are received, they are processed by the frontend to a digital IF of approx. 90 MHz. This IF is fed to the detector base unit where the digital filtering is provided. The remaining data are transferred to the host processor via a PCI express (PCIe) interface. The hardware settings are controlled via a serial interface on the motherboard that is set from the host via the PCIe interface.

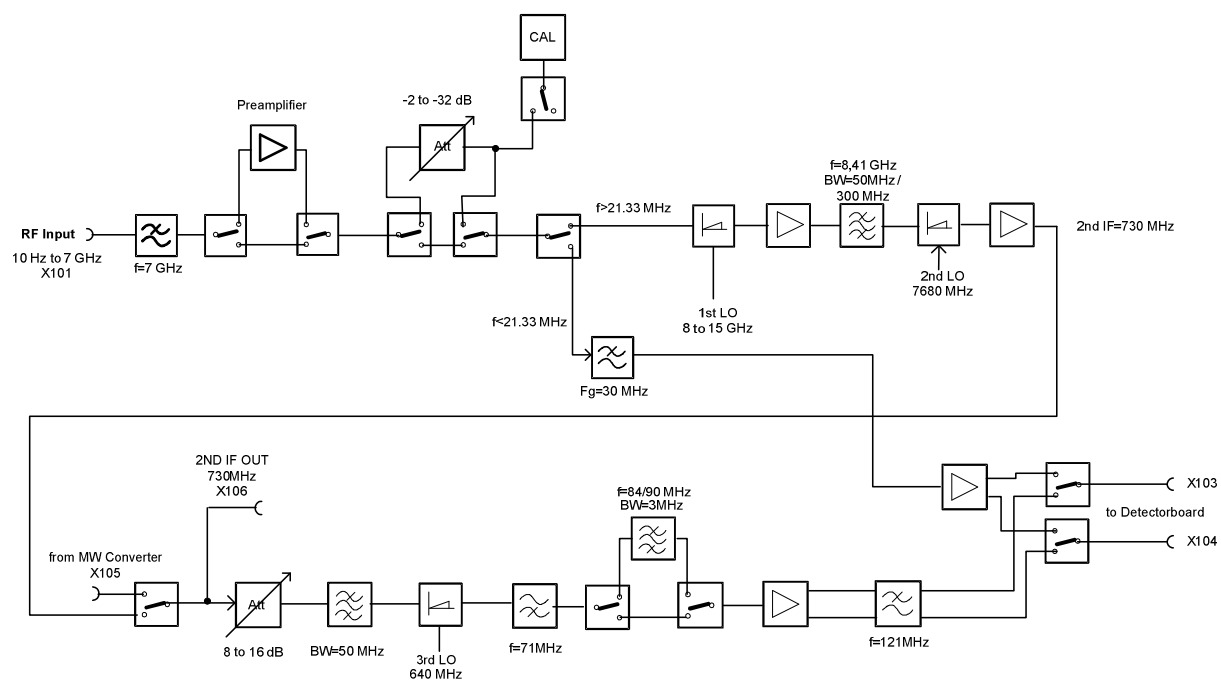
3.1.1 Attenuator

The attenuator switches in 10 dB steps and has a maximum total attenuation of 70 dB and contains an AC coupling that can be bypassed.

3.1.2 Frontend

The frontend converts the receive frequency in the range from 20 Hz to 7 GHz to an IF of approx. 90 MHz. The module also includes the required local oscillators and associated frequency processing circuits.

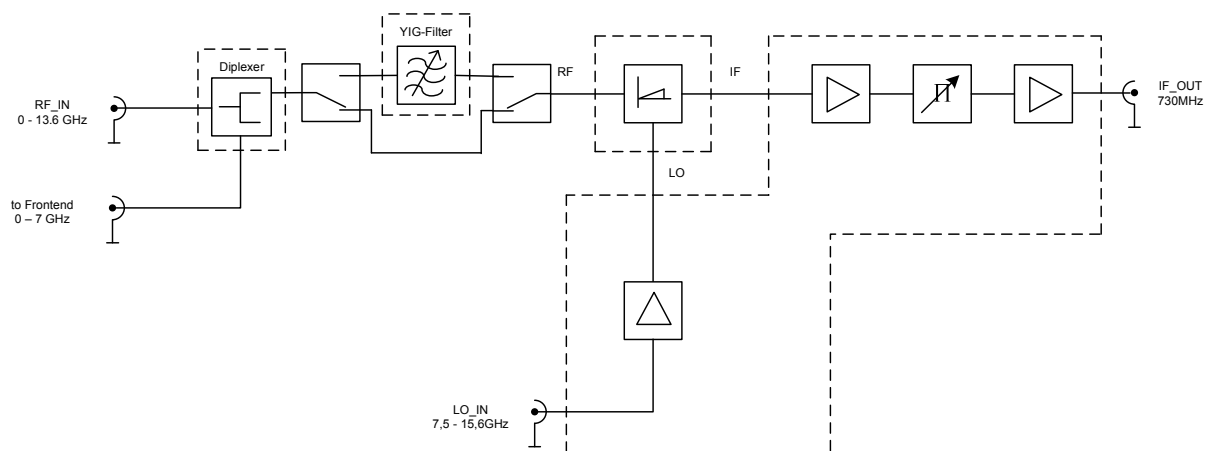
The following figure shows a block diagram of the R&S FSVR frontend:



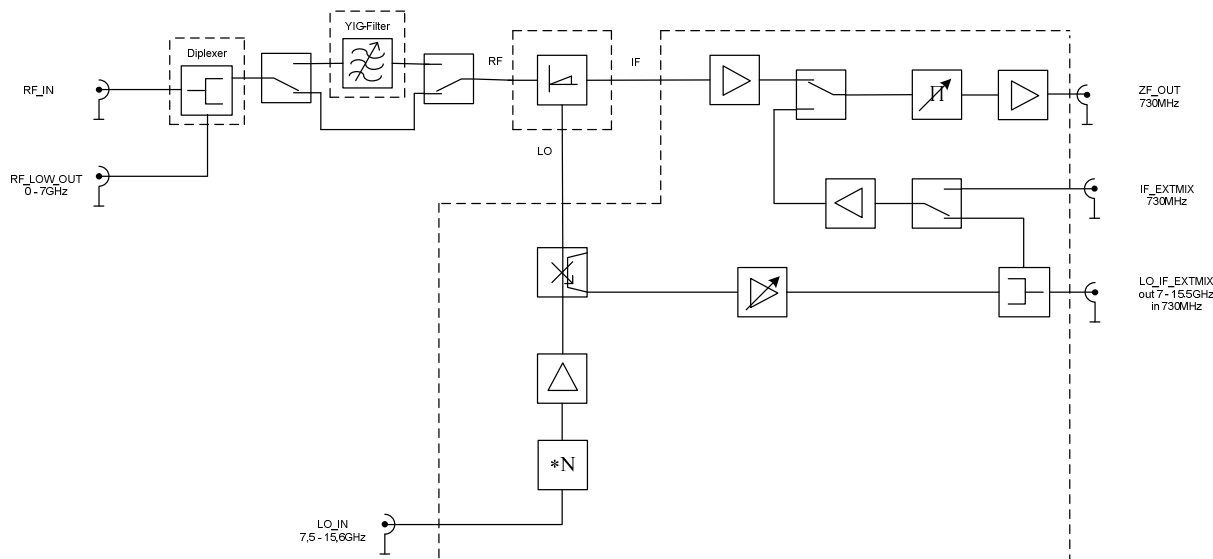
3.1.3 Microwave Converter Unit

The high frequency models of the R&S FSVR (frequency range > 7 GHz) comprise a microwave converter board. This module converts the input signals in the range above 7 GHz to the second IF of approx. 730 MHz. After the attenuator, the input signals are split within the diplexer into the two signal paths < 7 GHz and > 7 GHz. Signals above 7 GHz are forwarded to the mixer via the YIG filter. The YIG filter can be bypassed by relay switches.

The following figure shows a block diagram of the microwave converter unit for R&S FSVR13:



The following figure shows a block diagram of the microwave converter unit for R&S FSVR30/40:



3.1.4 Detector Base Unit

The detector base unit digitizes the IF or baseband signal of the frontend. The module contains the digital signal processing and the sequence control for the spectrum mode. The detector base unit is connected to the front module controller via PCIe bus.

3.1.5 Detector Extension Unit

The detector extension unit contains the signal processing for the real time modes. The data, digitized by the detector base unit, is sent to the detector extension unit via a proprietary highspeed LVDS link. This data is processed on the detector extension unit and sent back to the detector base unit also by a highspeed LVDS link. The detector base unit sends the processed data to the front module controller via the PCIe bus.

3.1.6 Motherboard

The motherboard provides the slots for the modules. It contains signal connections and the power and reference signal distribution. A FPGA that contains the board EEPROM controls the two main fans.

3.1.7 Front module controller

The front module controller (FMR) contains all the necessary components on a board, including the processor, memory chips (SIMM modules), I/O devices (PCIe bus), lithium battery, IEC/IEEE bus controller, LCD graphics controller, external VGA monitor graphics interface (monitor), controller for SATA hard drive and an USB interfaces.

3.1.8 Front Unit

The front unit consists of an aluminium case panel and a mounting plate which accommodates the LCD with touch screen, the touch screen controller, the backlight inverter, the keyboard mat with the membrane, the rotary knob and the front connector board.

3.1.9 Power Supply

The power supply unit provides all currents necessary for the operation of the R&S FSVR. It can be switched off by means of the power switch on the rear panel.

The power supply unit is a primary clocked switching power supply. On the secondary side, it generates the following DC voltages: +5.5 V, +12.2 V, -12.2 V (FSVR 40: 13,0V) and +13.5 V standby.

A control signal controlled by the front module controller (depending on the STANDBY/ON key on the front of the instrument frame) activates the power supply. In standby operation, it only supplies the 13.5 V-standby voltage for heating the OCXO (R&S FSV-B4), the LED STANDBY on the front panel and the power up control logic on the front module controller.

3.1.10 Options

3.1.10.1 Audio Demodulator R&S FSV-B3

The option R&S FSV-B3 provides the headphone jack at the front of the instrument, the volume regulator on the front of the instrument and the internal speaker. The option did not contain an EEPROM so the serial number can only be read on the board itself.

3.1.10.2 Digital Baseband Interface R&S FSV-B17

The option R&S FSV-B17 provides a proprietary LVDS digital baseband input and output at the rear of the instrument. Other R&S instrument with LVDS interface can communicate with the instrument through the input and output.

3.1.10.3 LO/IF Ports for External Mixers, R&S FSV-B21

The Option R&S FSV-B21 provides the interface for an external mixer to extend the frequency range of the instrument to up to 110 GHz. Only available for R&S FSVR13 and R&S FSVR30.

3.1.10.4 Preamplifier R&S FSV-B24

The option R&S FSV-B24 provides an internal Preamp which covers the whole frequency range of the instrument. Only available for R&S FSVR13 and R&S FSVR30.

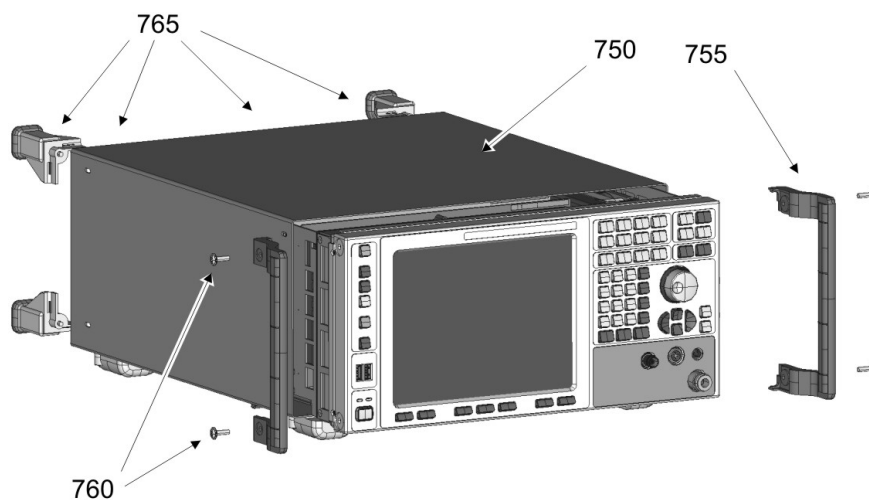
3.1.10.5 OCXO R&S FSV-B4

The R&S FSV-B4 option contains an oven-controlled crystal oscillator (OCXO). This OCXO generates a 10 MHz signal, which is routed to the frontend and used as a reference signal.

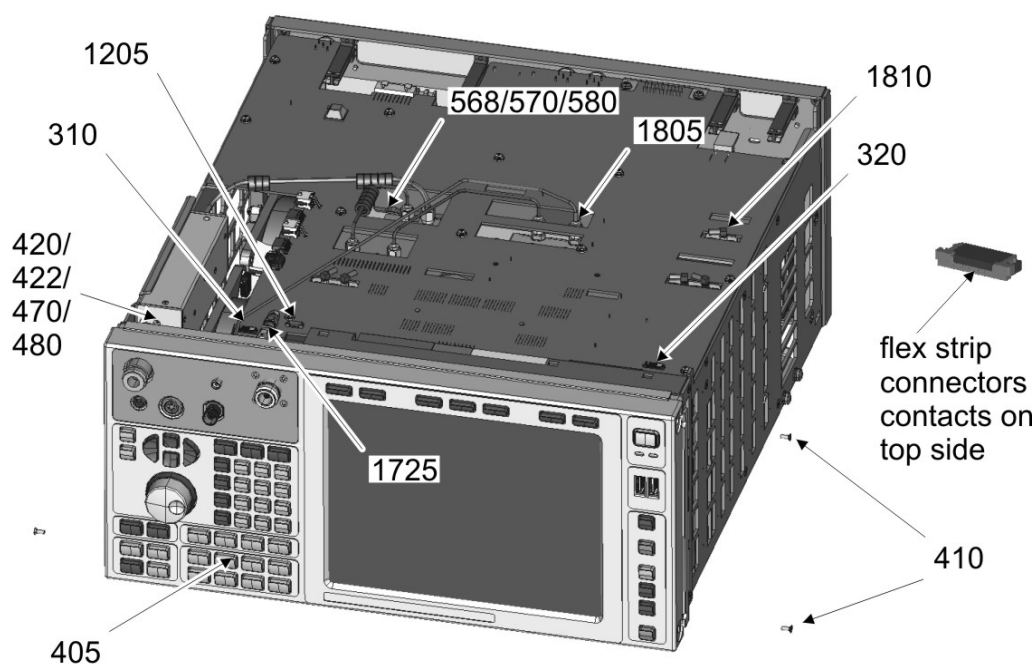
3.1.10.6 Additional Interfaces R&S FSV-B5

The R&S FSV-B5 option contains the interfaces IF/Video output, trigger output, aux port and two USB ports.

3.2 Opening the Instrument



1. Switch off the instrument and disconnect the power plug.
2. Unscrew four screws in the rear wall feet (765) and remove them.
3. Remove the housing (750).
4. Unscrew the four screws (760) of the front handles (755) on both sides and remove them.

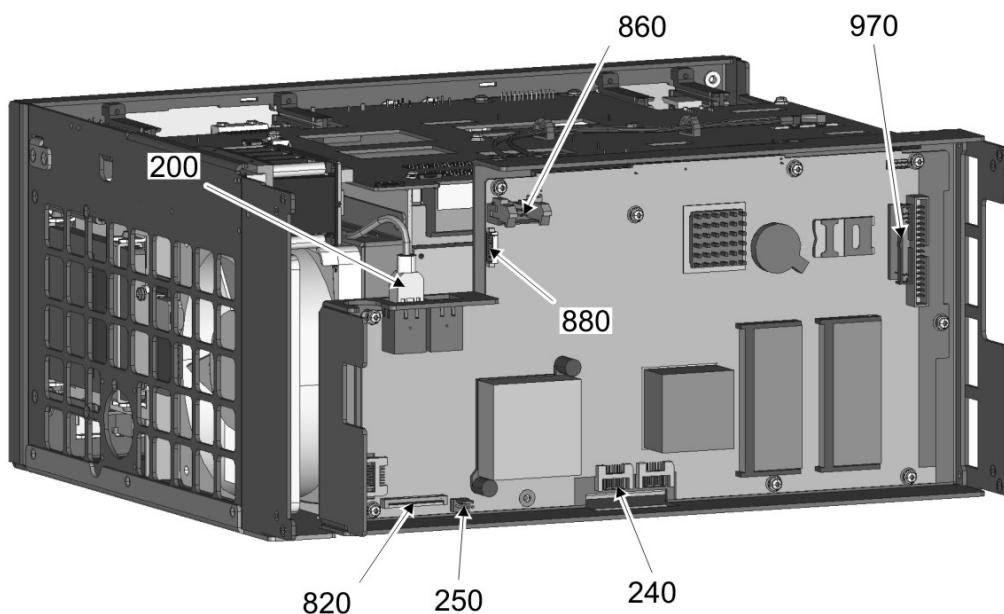


5. Disconnect the cable flex strip (310) and (320).
6. For instruments with Option R&S FSV-B3: Disconnect the cable flex strip (1205).
7. For instruments with Option R&S FSV-B21: Disconnect RF cable W18 (1805) and RF cable W19 (1810) from the MW converter unit (570/580).

8. Unscrew four screws (410) in the front unit (405).

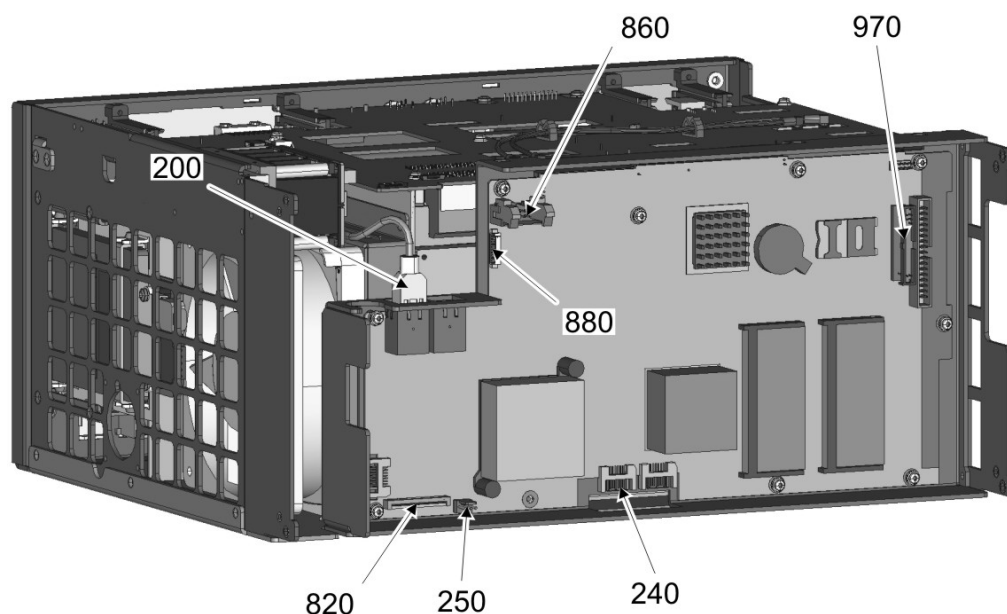
NOTICE! Risk of damage to the instrument. Cables are still connected to the controller.

9. Disconnect RF cable W1 (420/422/470/480).
10. Move the front unit (405) carefully a few millimeters to the front side to disconnect the controller cables.



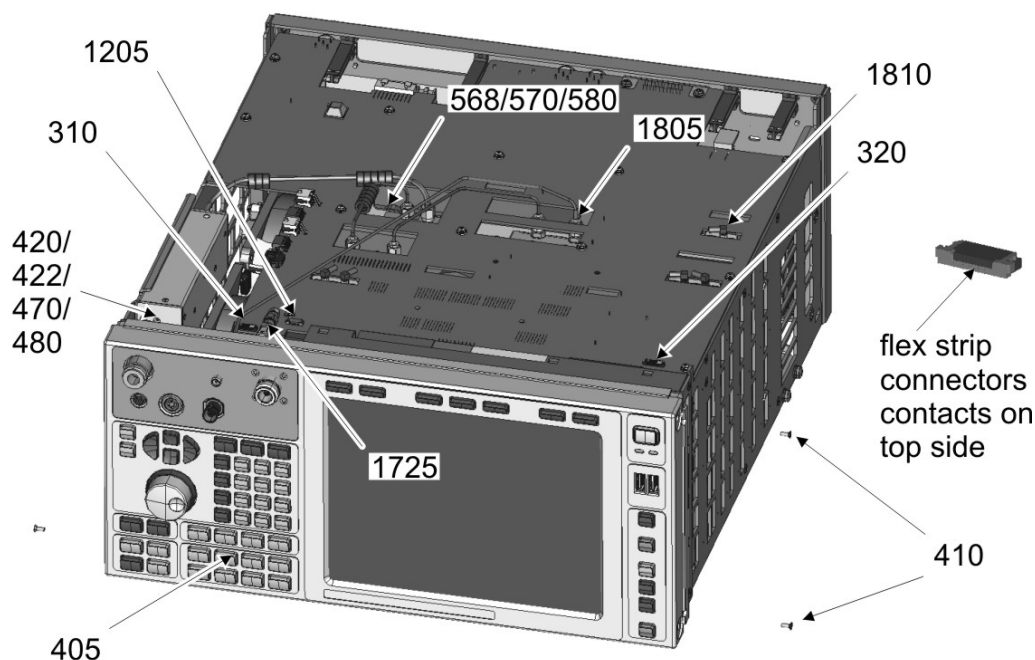
11. Disconnect cable flex switch board FSVR (820), cable rotary puls-generator (860), cable W31 LST board FMR (970), cable touch-controller-usb-board (880), patchcable (200), SATA datacable (240) and SATA powercable (250) from the controller.
12. Remove the front unit (405) completely.

3.3 Completing the Instrument



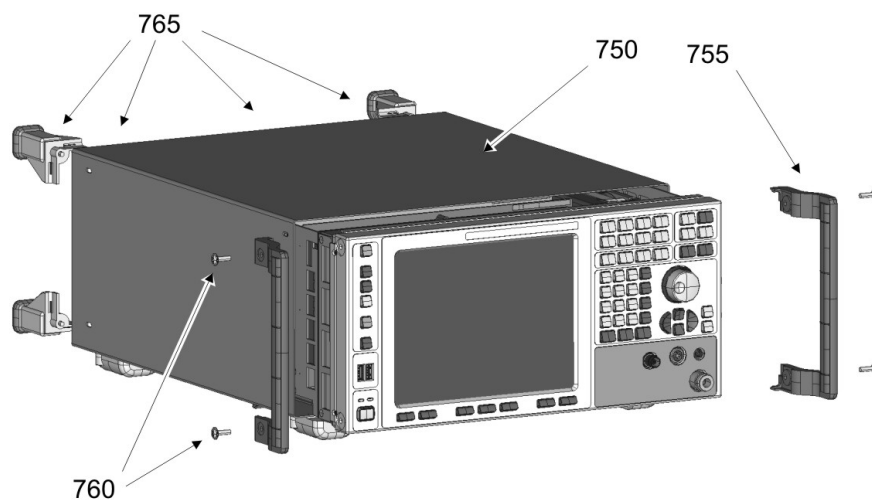
1. Connect cable flex switch board R&S FSVR (820), cable rotary puls-generator (860), cable W31 LST board FMR (970), cable touch-controller-usb-board (880), patchcable (200), SATA datacable (240) and SATA powercable (250).

NOTICE! Risk of damage to the instrument. Make sure you route the cables properly.



2. Assemble the front unit (405) carefully and connect RF cable W1 (420/422/470/480).

3. Connect cable flex strip (310) and (320).
4. Connect the cable flex strip (1205), if available (only Option R&S FSV-B3).
Note: The flex strip connector contacts are on the top of the device.
5. For instruments with Option R&S FSV-B21: Connect RF cable W18 (1805) and RF cable W19 (1810) to the MW converter unit (570/580).
6. Fasten the four screws (410) to screw the front unit (405) together with the unit frame.
7. Mount the front handles (755) on both sides by using the four screws (760).



8. Mount the housing (750) and adjust it properly to the front unit (405).
9. Mount the rear wall feet (765).

3.4 Module Replacement

⚠ WARNING

Danger of injury during module replacement

Any adjustments, replacement of parts, maintenance or repair must be carried out exclusively by technical personnel authorized by Rohde & Schwarz.

Observe the safety instructions for units with a removable casing.

Follow the step-by-step instructions for module replacement carefully to avoid injury and to help ensure safe operation.

NOTICE

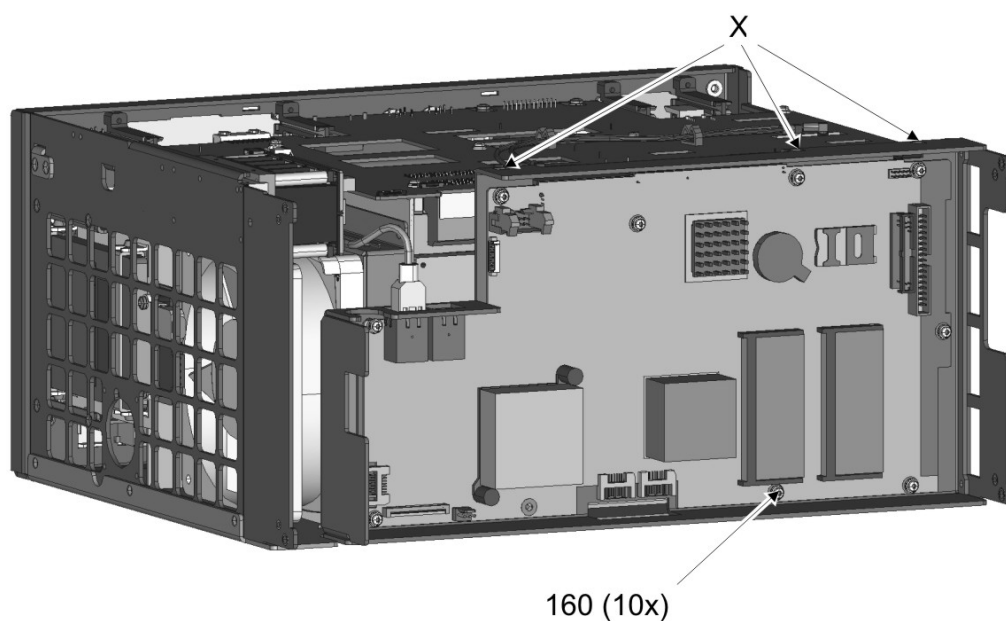
Risk of electrostatic discharge

Protect the work area against electrostatic discharge to avoid damage to electronic components in the modules. For details, refer to the safety instructions at the beginning of this manual.

3.4.1 Controller A90

See chapter 5.1 Spare Parts, item 150, and explosion drawings 1311.0006.01 sheet 1.

3.4.1.1 Removing the Controller



1. Open the instrument as described in "[3.2 Opening the Instrument](#)".
2. Unscrew ten screws (160).
3. Remove the controller using a screwdriver, if necessary. Put the screwdriver into each of the three holes (indicated by an X in the graphic), to press the controller out.

3.4.1.2 Installing the New Controller

1. Carefully insert the new controller (150) and fasten it using ten screws (160).
2. Complete the instrument as described in "[3.3 Completing the Instrument](#)".

3.4.1.3 Putting into Operation

In case a trial key was installed or should be installed in the future, also the time control key must be entered. Request the code via the service support database.

- Connect the instrument to the mains and switch on the instrument power switch. The instrument is now in standby mode.

BIOS Update:

1. You can download the BIOS image from Gloris, section "Firmware/Software".
2. Select "FW by type" and choose "FSVR".
3. Follow the instructions in the PDF file on how to create the boot CD-ROM.

Creating a BIOS Update CD-ROM:

Download the latest ISO file from Gloris, section "Firmware/Software" and burn it on an CD. This CD contains the bios update file.

Executing the Update:

NOTICE

Risk of causing instrument unusability

During the BIOS update, do not switch off the instrument.

If you terminate the update procedure before it is completed, the instrument will likely not boot again. In this case, contact your Rohde & Schwarz service center.

1. To perform the BIOS update you need a USB CD-ROM drive (or DVD ROM drive) and a USB keyboard.
2. Switch the device off at the rear panel.
3. Insert BIOS Update CD-ROM in USB CD drive.
4. Connect USB CD drive to the device front panel USB connector.
5. Connect USB keyboard to the device front panel USB connector.

6. Switch on the power switch at the rear panel of the device.
7. Press 'DEL' key on the keyboard to enter the BIOS SETUP.
8. Choose with page up / down keys the 'Advanced Bios Features'. Press 'ENTER'.
9. Select "Boot Configuration" and press 'ENTER'.
10. Choose "First Boot Device" and change from "Hard Drive" to "USB-CDROM".
11. Press key 'F10' and confirm with key 'Y'.
12. The unit reboots from the CD-ROM automatically (if the CD is not recognized either the CD-ROM is not working or the CD is not burned as an ISO CD image. Change CD-ROM or burn the ISO image again).
13. Bios update starts automatically.
NOTICE! Do not switch off the unit before the program tells you to. Otherwise the CPU board has to be replaced!
14. Unplug the USB cable of the CD-ROM.
15. Reboot the instrument.
16. Start self test and check results:
[**SETUP** : SERVICE : SELFTEST] then [SELFTEST RESULTS]
17. Start a total calibration and check the result:
[**SETUP** : ALIGNMENT] then [SHOW ALIGN RESULTS].
18. Perform a frequency response correction using the correction software. Further information can be found in chapter "[2 Adjustment](#)".
19. Adjust the instrument as described in chapter "[2 Adjustment](#)".

3.4.2 Lithium Battery on the Controller

See chapter 5.1 Spare Parts, item 159, and explosion drawings 1311.0006.01 sheet 1.

The lithium battery is located on the controller.

WARNING

Risk of intoxication and explosion

Observe the safety regulations for batteries in the Grouped Safety Messages at the beginning of the manual.

3.4.2.1 Removing the Lithium Battery

1. Open the instrument as described in "[3.2 Opening the Instrument](#)".
2. Carefully push the contact springs of the battery holder up and remove the battery (159).

3.4.2.2 Installing the New Battery

1. Carefully push the contact springs of the battery holder up and insert battery into the holder beneath the springs.

Note: The plus pole (+) of the battery points upwards.

NOTICE! Risk of damage to the instrument. Do not short-circuit the battery!

2. Complete the instrument as described in "[3.3 Completing the Instrument](#)".

3.4.2.3 Putting into Operation

1. Connect the instrument to the mains and switch on its power switch. The instrument is now in standby mode.
2. After starting the instrument, check hardware info:
[SETUP : MORE : SYSTEM INFO : HARDWARE INFO]
3. Start selftest and check results:
[SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
4. Start alignment and check the result:
[SETUP : ALIGNMENT : SELF ALIGNMENT], then [SHOW ALIGN RESULTS]
Perform a frequency response correction using the correction software. Further information can be found in chapter "[2 Adjustment](#)".
Adjust the instrument as described in chapter "[2 Adjustment](#)".

3.4.3 SATA Hard Drive A91

See chapter [5.1 Spare Parts](#), item 275, and explosion drawings 1311.0006.01 sheet 1.

The spare part is already formatted for the R&S FSVR and contains the complete software.

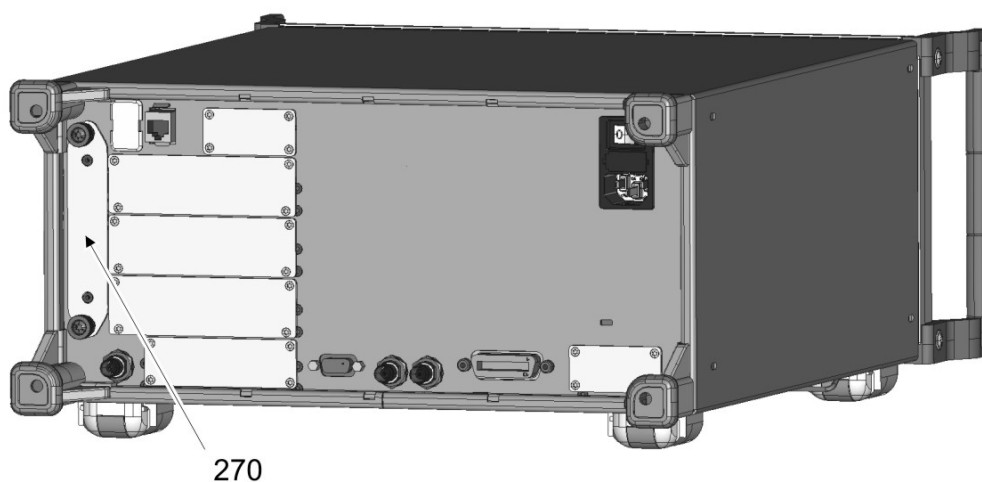
NOTICE

Risk of losing important information

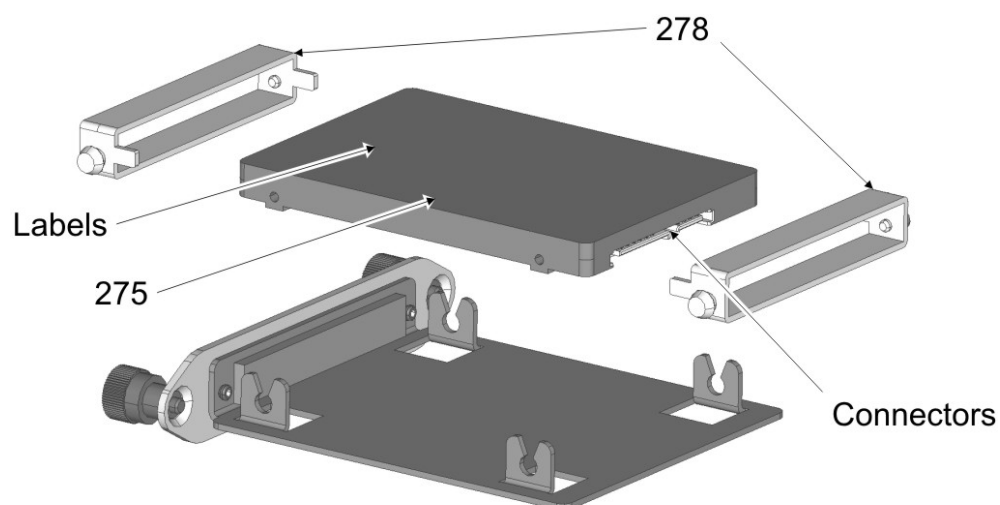
Important information about the type of instrument, installed hardware, options, etc., is stored both on the motherboard and on the hard drive. This information is required in order to restore the instrument in case of errors. Thus, do not replace the motherboard and the hard drive at the same time, as doing so will cause this information to be lost. If the instrument does not function after the hard drive has been replaced, do not replace the motherboard. Instead, re-install the old hard drive and then replace the motherboard.

3.4.3.1 Removing the SATA Hard Drive

1. Switch off the instrument and disconnect the power plug.
2. Unscrew the two knurled screws and remove the Hard Drive (270) to the rear.



1. Carefully remove the hard drive (275) together with the two holders (278) from the sheet-metal part.
2. Remove the two holders (278) from the hard drive (275).



3.4.3.2 Installing the New Hard Drive

1. Attach the two holders (278) to the new hard drive (275).
2. Push the new hard drive (275) together with the two holders (278) into the holes of the sheet-metal part.

Note: Make sure that all parts are orientated as shown in the picture above and that they lock in place. The connectors have to be on the rear of the hard drive (270) and the labels above.

3. Insert the Hard Drive (270) and fasten the two knurled screws.
4. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.

NOTICE

Blue screen after replacing a hard drive

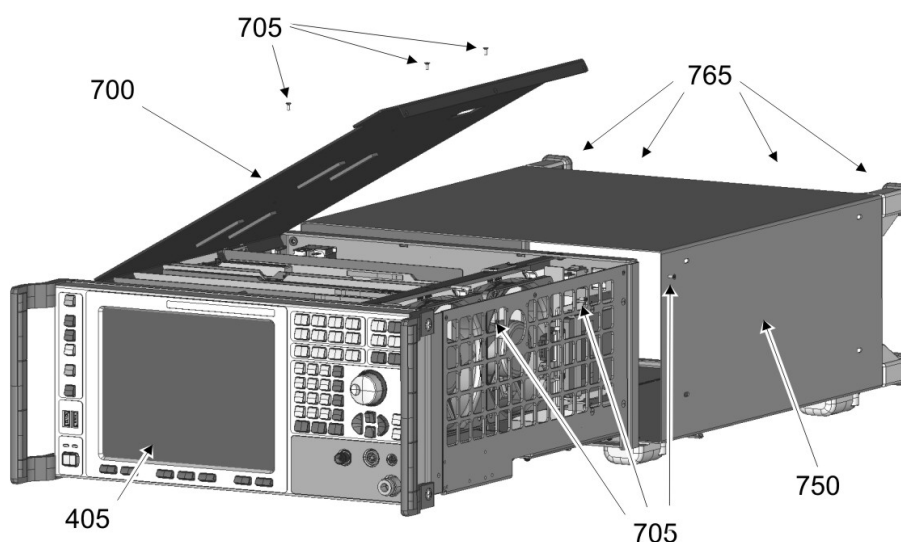
If a blue screen appears after starting the instrument, make sure that the knurled screws are fixed properly and the hard drive has a contact to the SATA adaptor.

3.4.4 SATA Adaptor A92

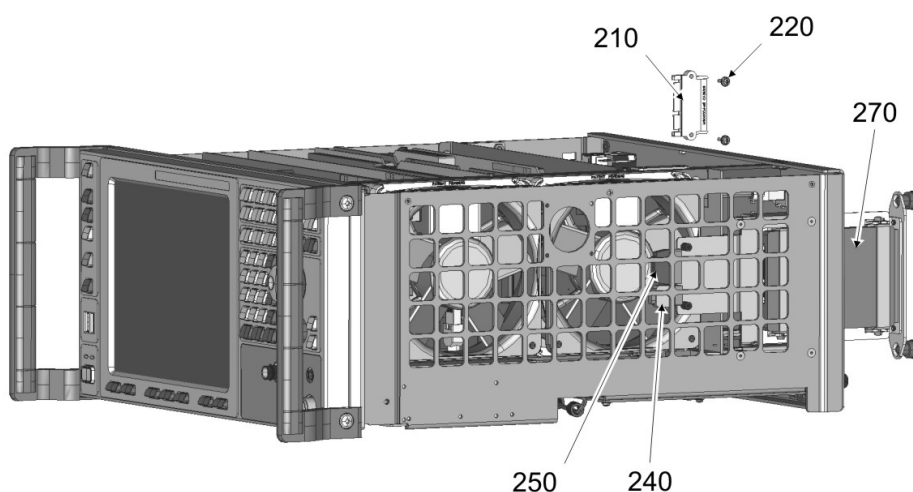
See chapter "5.1 Spare Parts", item 210, and explosion drawing 1311.0006.01 sheet 1.

The SATA Adaptor is fitted at the right side of the instrument frame of the R&S FSVR.

3.4.4.1 Removing the SATA Adaptor



1. Switch off the instrument and disconnect the power plug.
2. Unscrew four screws in the rear wall feet (765) and remove them.
3. Remove the housing (750).
4. Unscrew six screws (705) in the top cover (700) and remove the cover.



1. Unscrew the two knurled screws and remove the hard drive (270) to the rear.
2. Disconnect the SATA data cable (240) and the SATA power cable (250).
3. Unscrew two screws (220) and remove them together with the SATA adaptor (210).

3.4.4.2 Installing the New SATA Adaptor

1. Mount the new SATA adaptor (210) with two screws (220).
2. Reconnect the SATA data cable (240) and the SATA power cable (250).
3. Insert the hard drive (270) at the rear and fix it with the two knurled screws.
4. Mount the top cover (700) on the instrument with six screws (705).
5. Mount the housing (750) and adjust it properly to the front unit (405).
6. Mount the rear wall feet (765).
7. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
8. Start selftest and check results:
[SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
9. Start alignment and check the result:
[SETUP : ALIGNMENT : SELF ALIGNMENT], then [SHOW ALIGN RESULTS]

NOTICE

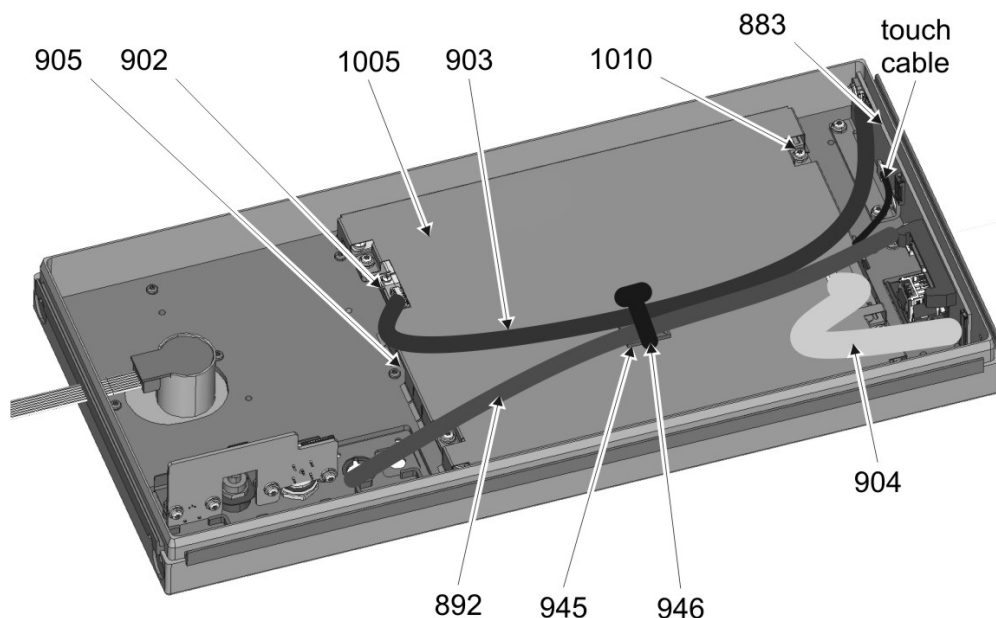
Blue screen after replacing a hard drive

If a blue screen appears after starting the instrument, make sure that the knurled screws are fixed properly and the hard drive has a contact to the SATA adaptor.

3.4.5 Display with Touch Screen

See chapter "5.1 Spare Parts", item 902, and explosion drawing 1307.9025.01 sheet 1.

3.4.5.1 Removing the Touch Screen



1. Open the instrument as described in "3.2 Opening the Instrument".
2. Remove the cable tie (946).
3. Put the cable (892) to the right, without plugging off.
4. Unplug the display cable Toshiba (904) on the display side.
5. Unplug the LED backlight cable (903) from the display (902) and put it to the right.
6. Remove the touch cable from the touch controller board (883).
7. Unscrew four screws (1010) in the display shielding (1005).
8. Remove the display shielding (1005) carefully.
9. Remove the display with touch screen (902).
10. Make sure that the rubber seal 2,0 mm black (905) remains in the groove of the front unit.

3.4.5.2 Installing the New Touch Screen

1. Make sure that the rubber seal 2,0mm black (905) is properly located in the groove of the front unit.
2. Carefully put in the new touch screen (902).
3. Mount the display shielding (1005) with four screws (1010).

4. Connect the touch cable to the touch controller board (883).
5. Connect the LED backlight cable (903) to the display (902).
6. Connect the display cable Toshiba (904) to the display (902).
7. Tie the LED backlight cable (903) and the cable (892) together with a cable tie (946) and the holder (945).
8. Complete the instrument as described in "[3.3 Completing the Instrument](#)".

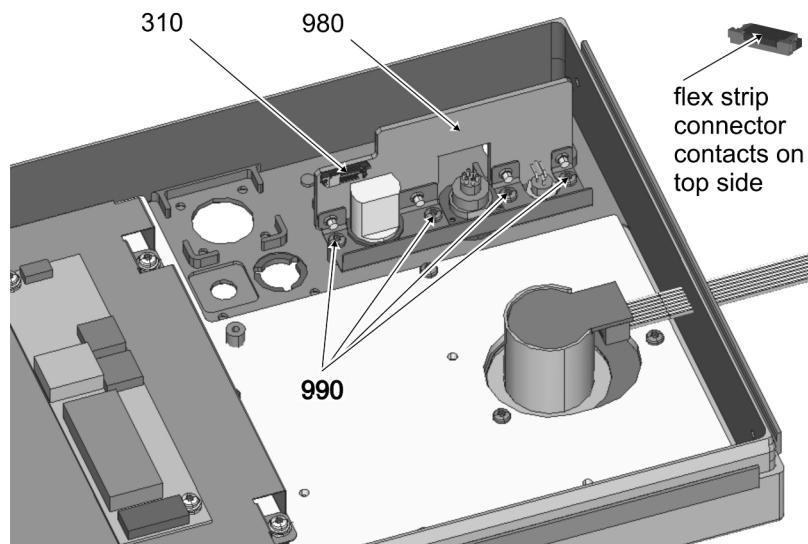
3.4.5.3 Putting into Operation

1. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
2. Calibrating the touch screen: to calibrate the touch screen you need a USB mouse or a USB keyboard with a touch ball.
[SETUP : ALIGNMENT : TOUCH SCREEN ALIGNMENT], follow the instructions on the screen.
3. Start selftest and check results:
[SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
4. Start alignment and check the result:
[SETUP : ALIGNMENT : SELF ALIGNMENT], then [SHOW ALIGN RESULTS]
robert
5. Perform a frequency response correction using the correction software. Further information can be found in chapter "[2 Adjustment](#)".
6. Adjust the instrument as described in chapter "[2 Adjustment](#)".

3.4.6 Frontconnector Board A20

See chapter "5.1 Spare Parts", item 980, and explosion drawing 1307.9025.01 sheet 1.

3.4.6.1 Removing the Frontconnector Board



1. Open the instrument as described in "3.2 Opening the Instrument".
2. Unplug the flex strip cable (310) from the Frontconnector Board (980).
3. Unscrew four screws (990) from the Frontconnector Board (980).
4. Remove the Front Connector Board (980) carefully.

3.4.6.2 Installing the New Front Connector Board

1. Mount the new front connector board (980) carefully with four screws (990).
2. Connect the flex strip cable (310) to the front connector board (980).
Note: The flex strip connector contacts are on the top of the device.
3. Complete the instrument as described in "3.3 Completing the Instrument".

3.4.6.3 Putting into Operation

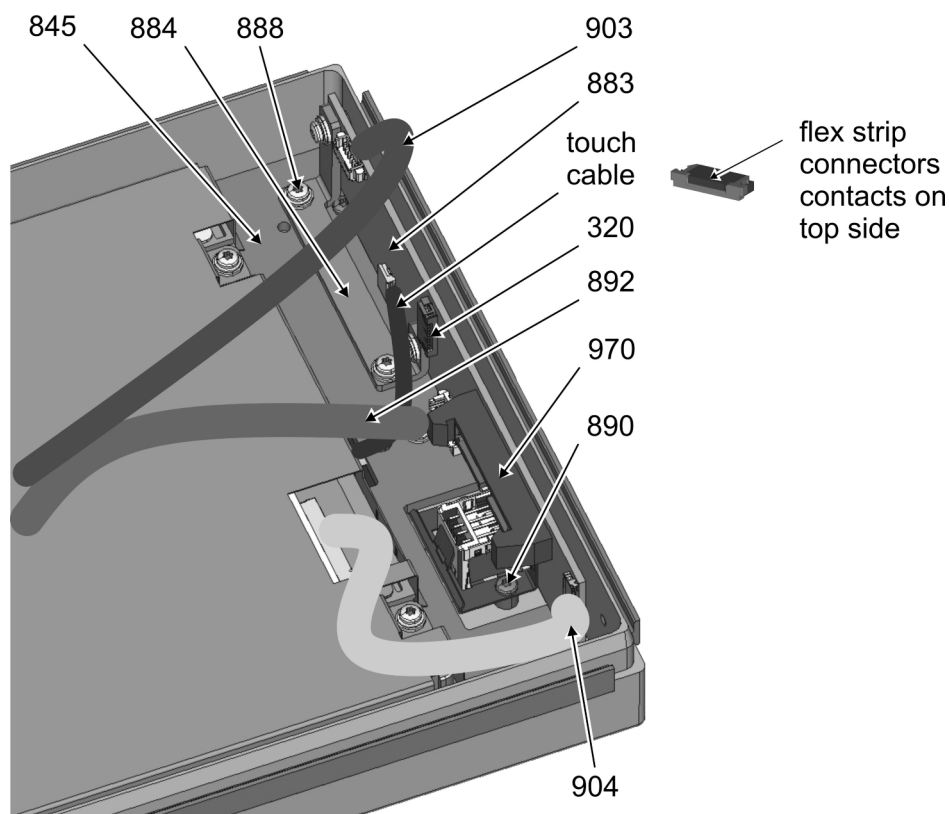
1. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
2. Start selftest and check results:
[SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
Start alignment and check the result:
[SETUP : ALIGNMENT : SELF ALIGNMENT], then [SHOW ALIGN RESULTS]

3. Perform a frequency response correction using the correction software. Further information can be found in chapter "2 Adjustment".
4. Adjust the instrument as described in chapter "2 Adjustment".

3.4.7 Touch Controller USB Board A60

See chapter "5.1 Spare Parts", item 883, and explosion drawing 1307.9025.01 sheet 1.

3.4.7.1 Removing the Touch Controller USB Board



1. Open the instrument as described in "3.2 Opening the Instrument".
2. Unplug the cable (892), the touch cable, the LED backlight cable (903) and the display cable Toshiba (904) from the touch-controller-USB-board (883).
3. Unscrew two screws (888) from the keyboard holder (845) and two screws (890).
4. Carefully remove the USB-touch-controller-board (883).
5. Unscrew two screws (888) from the touch-controller-USB-board (883) and remove the holder touch controller (884), the cable W31 LST board FMR (970) and the flex strip cable (320) completely.

3.4.7.2 Installing the New Touch Controller USB Board

1. Mount the holder touch controller (884) with two screws (888) to the new touch-controller-USB-board (883).
2. Mount the new touch-controller-USB-board (883) carefully with two screws (890) and two screws (888) to the front unit.
3. Connect the cable (892), the touch cable, the LED backlight cable (903) and the display cable Toshiba (904) with the touch-controller-USB-board (883).
4. Connect the cable W31 LST board FMR (970) and the flex strip cable (320) to the touch-controller-USB-board (883).
5. Complete the instrument as described in "[3.3 Completing the Instrument](#)".

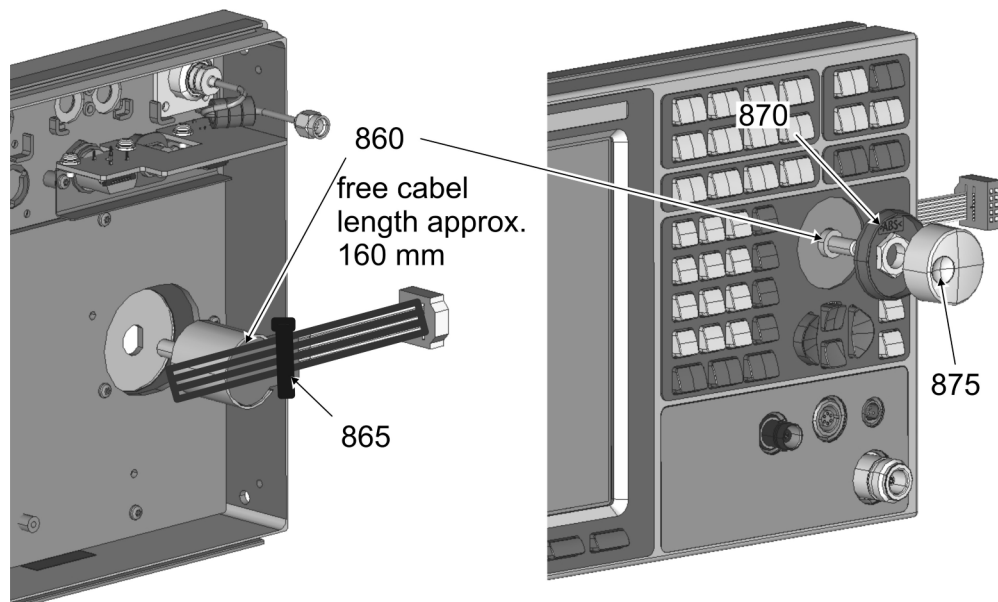
3.4.7.3 Putting into Operation

1. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
2. Calibrating the touch screen: to calibrate the touch screen you need a USB mouse or a USB keyboard with a touch ball.
[SETUP : ALIGNMENT : TOUCH SCREEN ALIGNMENT], follow the instructions on the screen
3. Start selftest and check results:
[SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
4. Start alignment and check the result:
[SETUP : ALIGNMENT : SELF ALIGNMENT], then [SHOW ALIGN RESULTS]
5. Perform a frequency response correction using the correction software. Further information can be found in chapter "[2 Adjustment](#)".
6. Adjust the instrument as described in chapter "[2 Adjustment](#)".

3.4.8 Rotary Pulse-Generator A70

See chapter "5.1 Spare Parts", item 860, and explosion drawing 1307.9025.01 sheet 1.

3.4.8.1 Removing the Rotary Pulse-Generator



1. Open the instrument as described in "3.2 Opening the Instrument".
2. Remove the knob (875) carefully from the rotary pulse generator (860).
3. Unscrew the collar with nut (875).
4. Remove the rotary pulse generator from the frame unit.

3.4.8.2 Installing the New Rotary Pulse-Generator

1. Mount the new rotary pulse-generator (860) carefully with the collar with nut (870) to the front unit.
2. Assemble the knob (875).
3. Shorten the free length of the cable (860) carefully to approx. 160mm by using a cable tie (865).
4. Complete the instrument as described in "3.3 Completing the Instrument".

3.4.8.3 Putting into Operation

1. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
2. Start selftest and check results:
[SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]

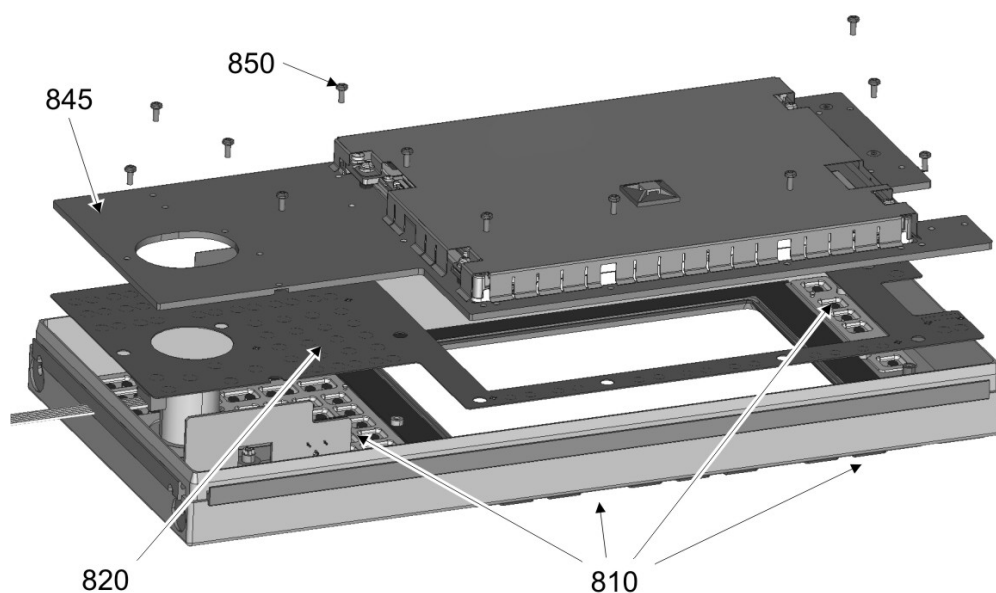
3. Start alignment and check the result:
[SETUP : ALIGNMENT : SELF ALIGNMENT], then [SHOW ALIGN RESULTS]
4. Perform a frequency response correction using the correction software. Further information can be found in chapter "2 Adjustment".
5. Adjust the instrument as described in chapter "2 Adjustment".

3.4.9 Push-Button Board Set A80

See chapter "5.1 Spare Parts", item 810, and explosion drawing 1307.9025.01 sheet 1.

NOTE: For quality reasons, it is strictly recommended that you change the Push-Button Board Set (810) together with the flex switch board (820)!

3.4.9.1 Removing the Push-Button Board Set



1. Open the instrument as described in "3.2 Opening the Instrument".
2. Remove the USB-touch-controller-board (883) as described in "3.4.11.1 Removing the Touch Controller USB Board".
3. Unscrew twelve screws (850) from the keyboard holder (845) and remove the holder together with the display carefully.
4. Remove the flex switch board (820).
5. Remove the four pieces of the push-button board set (810).

3.4.9.2 Installing the New Push-Button Board Set

1. Insert four pieces of the new push-button board set (810) into the front cover.
2. Place in the flex switch board (820). Make sure that all nipples of the push-button board set (810) pass through the holes of the flex switch board (820).
3. Assemble the keyboard holder (845) with twelve screws (850).
4. Assemble the touch-controller-USB-board (883) as described in "3.4.11.2 Installing the New Touch-Controller-USB-Board".
5. Complete the instrument as described in "3.3 Completing the Instrument".

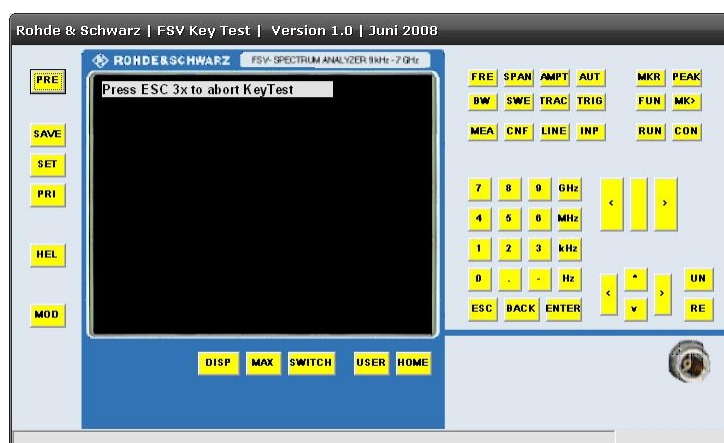
3.4.9.3 Checking the Push-Button Board Set and Putting into Operation

1. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.

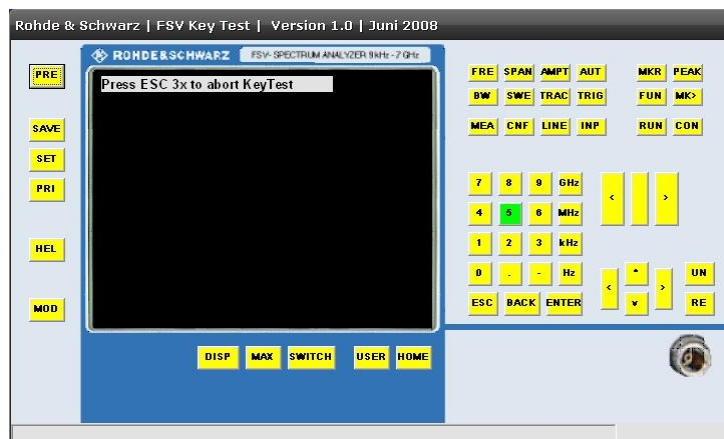
2. Starting the key test tool:

[SETUP : MORE : SERVICE : ENTER PASSWORD : 894129 ENTER]

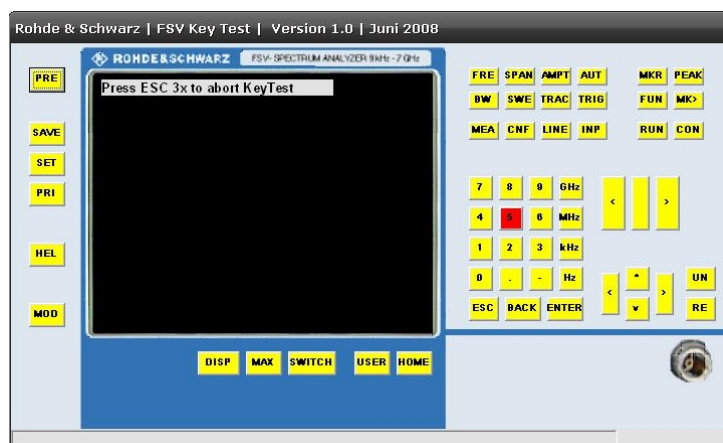
[SETUP : MORE : SERVICE : SERVICE FUNCTION : 2.0.14.0]



3. After the first pressing of a key the corresponding button changes its color from yellow to green:



4. If the key is pressed a second time, the corresponding button changes its color from green to red.
5. If a key does not match the given key code, the corresponding button does not change its color and the unknown key code is displayed in the dialog status line.



6. To verify that all keys work properly, all keys should be pressed twice and finally all displayed buttons should have a red color. Otherwise the keyboard does not work properly.
7. Press the ESC key three times to abort the key test tool during the test.
8. Start selftest and check results:
[SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
Start alignment and check the result:
[SETUP : ALIGNMENT : SELF ALIGNMENT], then [SHOW ALIGN RESULTS]
9. Perform a frequency response correction using the correction software. Further information can be found in chapter "[2 Adjustment](#)".
10. Adjust the instrument as described in chapter "[2 Adjustment](#)".

3.4.10 Flex Switch Board A81

See chapter "[5.1 Spare Parts](#)", item 820, and explosion drawing 1307.9025.01 sheet 1 and sheet 2.

NOTE: For quality reasons, it is strictly recommended that you change the Push-Button Board Set (810) together with the flex switch board (820)!

The procedure is the same as the one described in section "[Push-Button Board Set A80](#)" for R&S FSVR7,13,30 or "[Push-Button Board Set A80](#)" for R&S FSVR40.

The flex switch board (820) is placed above the push-button board set (810).

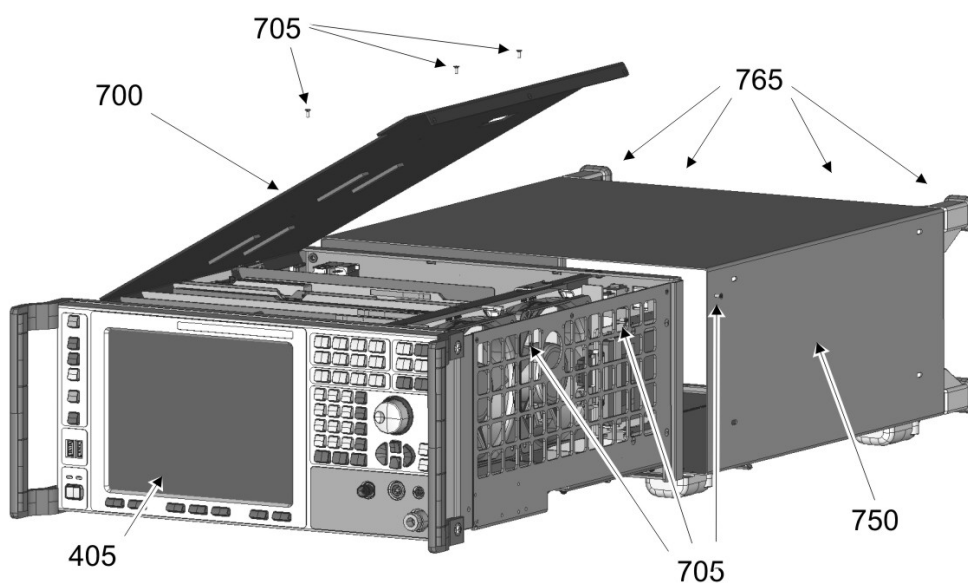
Finally the key test described in section "[Checking the Push-Button Board Set and Putting into Operation](#)" must also be performed using the tool.

3.4.11 Power Supply Unit

See chapter "[5.1 Spare Parts](#)", item 30/35, explosion drawing 1311.0006.01 sheet 2.

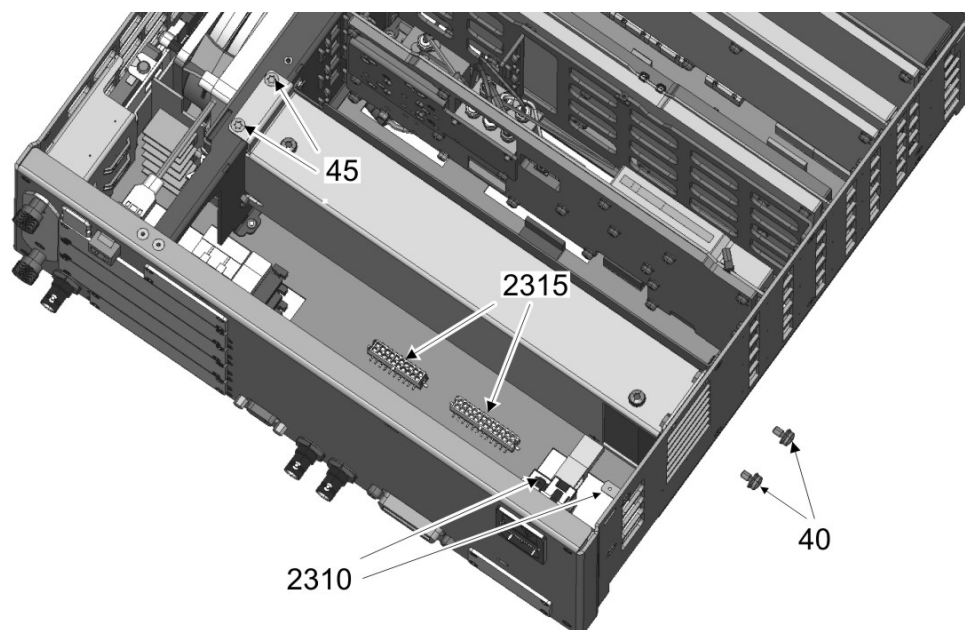
The power supply is fitted at the rear of the instrument frame of the R&S FSVR.

3.4.11.1 Removing the top cover



1. Switch off the instrument and disconnect the power plug.
2. Unscrew four screws in the rear wall feet (765) and remove them.
3. Remove the housing (750).
4. Unscrew six screws (705) in the top cover (700) and remove it.

3.4.11.2 Removing the Power Supply Unit



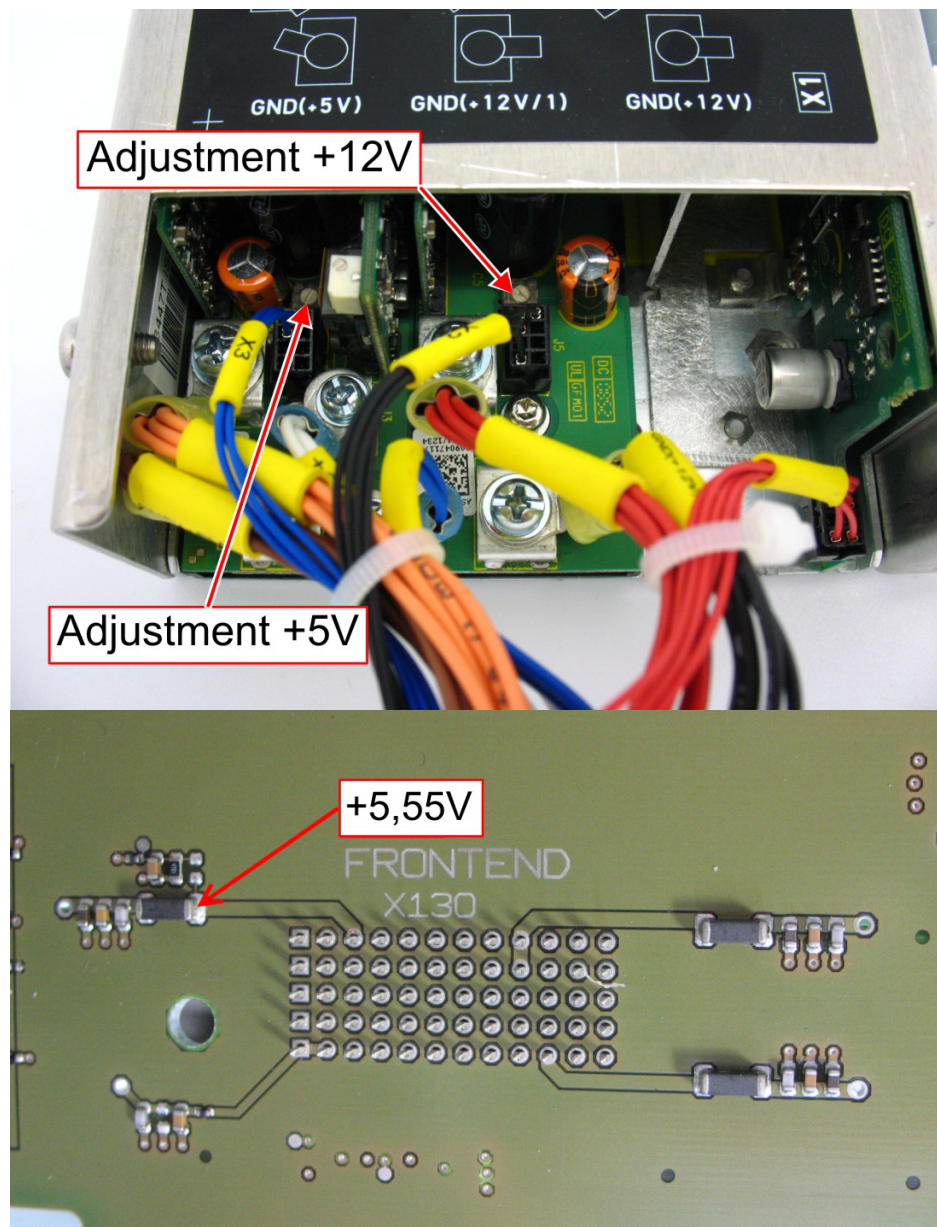
1. Remove the power input cable (2310) from the connectors.
2. Disconnect the cable power supply-motherboard (2315) from the motherboard.
3. Unscrew four screws (40/45).
4. Take out the unit completely.

3.4.11.3 Installing the New Power Supply Unit

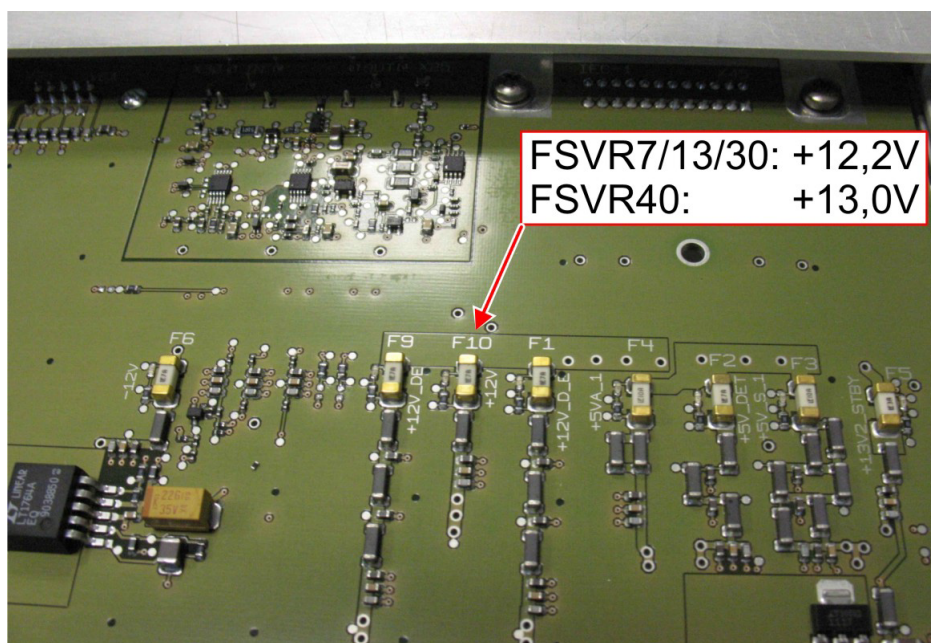
1. Connect cable power supply-motherboard (2315) and the power input cable (2310) to the connectors.
2. Place the power supply outside of the instrument. Take care not to shortcircuit the mains input or the current output of the power supply.
3. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.

NOTICE! Mains voltage is applied to the power supply.

4. Adjust the +5 V voltage to $+5.55 \text{ V} \pm 10 \text{ mV}$, measured at the motherboard (frontend connector X130, see picture below).



5. R&S FSVR7/13/30: Adjust the +12 V voltage to $+12,2 \text{ V} \pm 10 \text{ mV}$, measured at the motherboard (fuse F10, see picture below).
6. R&S FSVR40: Adjust the +12 V voltage to $+13,0 \text{ V} \pm 10 \text{ mV}$, measured at the motherboard (fuse F10, see picture below).

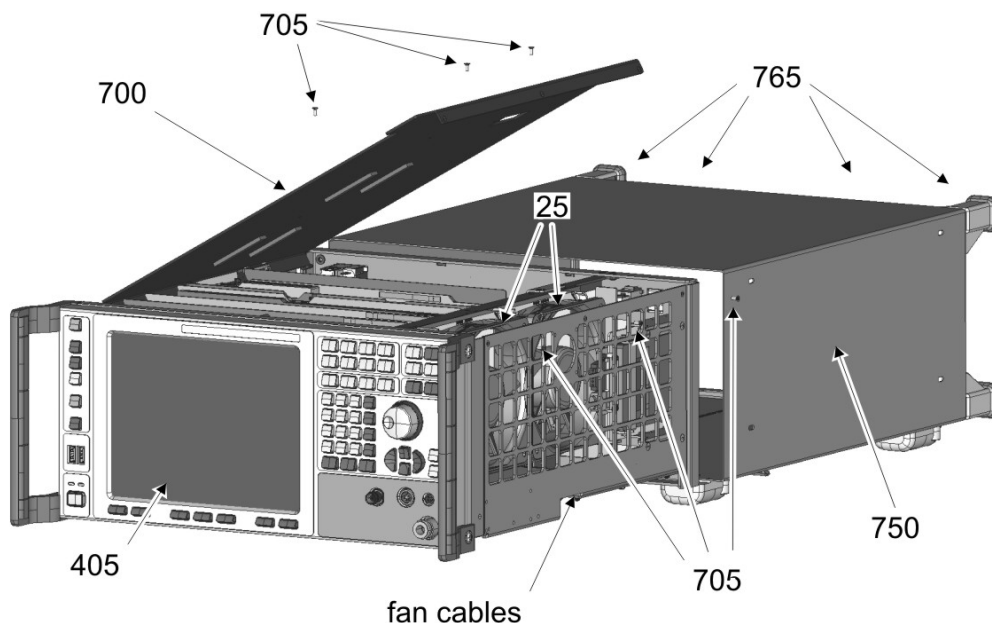


7. Switch the instrument off.
8. Tie the cable power input (2315) and both cable ties (2360) to holders (2355).
9. Carefully insert the power supply (2300) into the instrument.
NOTICE! Risk of damage to the instrument. Make sure you route the cables properly.
10. Assemble the power supply unit with four screws (40/45) to the instrument.
11. Connect two protective earth conductors to their connectors.
12. Tie the cable power input to the holder on the power supply unit near the power inlet by use of a cable tie.
13. Fix the top cover (700) with six screws (705).
14. Mount the housing (750) and adjust it properly to the front unit (405).
15. Mount the rear wall feet (765).
16. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
17. Start selftest and check results:
 [SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
18. Start alignment and check the result:
 [SETUP : ALIGNMENT : SELF ALIGNMENT], then [SHOW ALIGN RESULTS]

3.4.12 Fan

See chapter "5.1 Spare Parts", item 25, and explosion drawings 1311.0006.01 sheet 1.

3.4.12.1 Removing the Fan



1. Switch off the instrument and disconnect the power plug.
2. Unscrew four screws in the rear wall feet (765) and remove them.
3. Remove the housing (750).
4. Unscrew six screws (705) in the top cover (700) and remove it.
5. Unplug the two fan cables from the motherboard X83, X84 (FAN).
6. Remove the fan (25) from the rubber sleeve.

3.4.12.2 Installing the New Fan

1. Insert the new fan (25) and mount it to the frame with the rubber sleeve.
2. Connect the fan cables to the motherboard connector X83, X84 (FAN).

Note: Note the direction of the airflow printed on the fan. The fan must blow the air into the instrument.

Make sure you route all cables with enough distance to the fan.

3. Mount the top cover (700) on the instrument with six screws (705).
4. Mount the housing (750) and adjust it properly to the front unit (405).
5. Mount the rear wall feet (765).

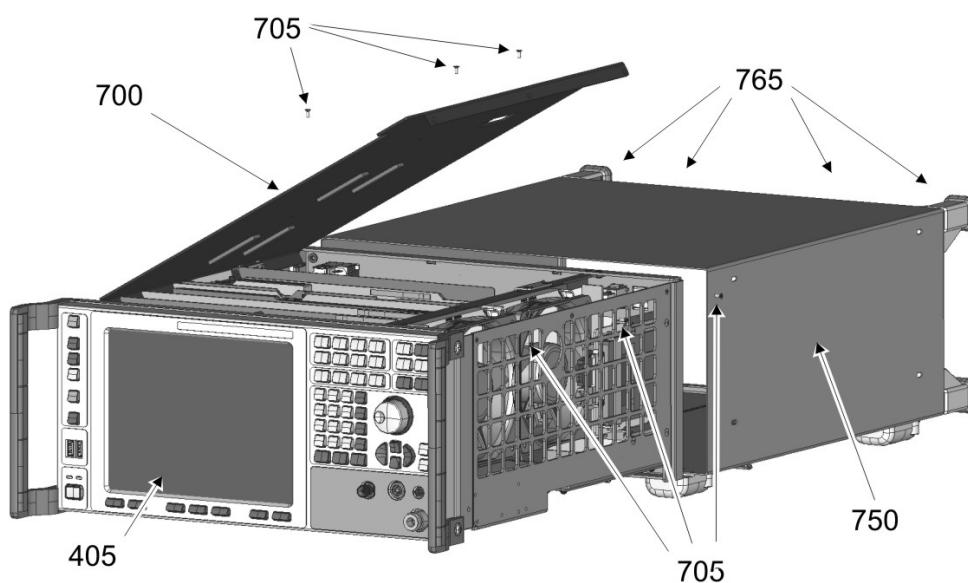
6. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
7. Watch the fans: they have to spin up at power on of the instrument and slow down after a short time.

3.4.13 Frontend A100

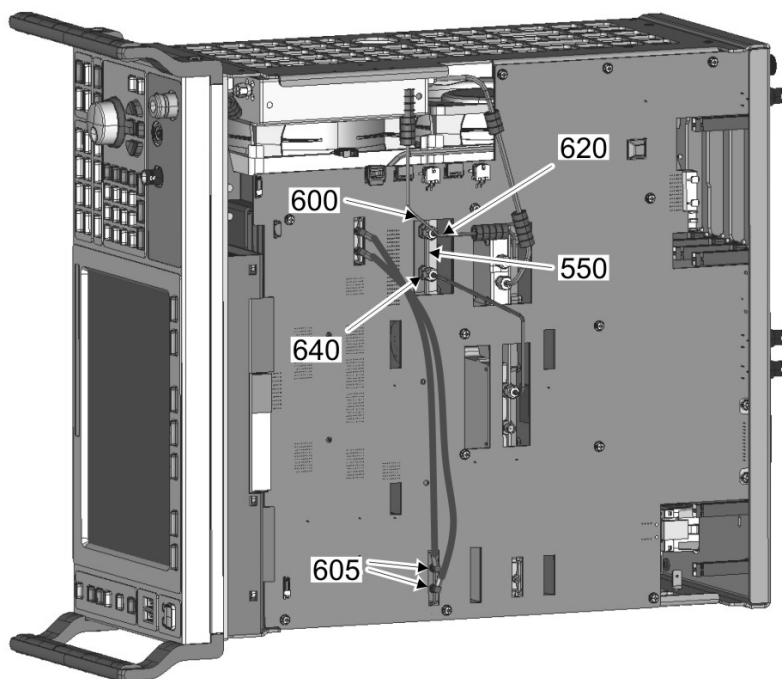
See chapter "[5.1 Spare Parts](#)", item 550 and explosion drawing 1311.0006.01 sheet 1.

The frontend is installed in the middle of the instrument.

3.4.13.1 Removing the Board



1. Switch off the instrument and disconnect the power plug.
2. Unscrew four screws in the rear wall feet (765) and remove them.
3. Remove the housing (750).
4. Unscrew six screws (705) in the top cover (700) and remove it.
5. Place the instrument on the left side frame.



1. FSVR 7: Disconnect RF cable W2 (600) and both RF cables W3/W4 (605) from the frontend (550).
2. FSVR 13/30/40: Disconnect both RF cables W3/W4 (605), RF cable W5 (620), W7 (640) and W6 (630) (on top side, not pictured) from the frontend (550).
3. Push out the frontend (550) to the top side of the instrument.

Tip: The board can be moved up by pressing carefully from the bottom through the connector holes in the motherboard against the board.

3.4.13.2 Installing the New Frontend

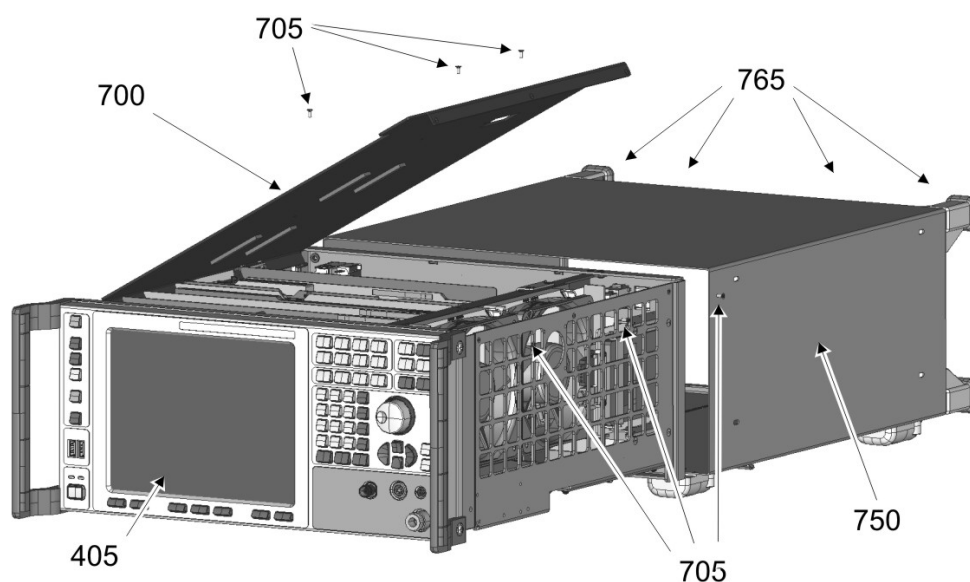
1. Plug the new frontend into the instrument.
2. R&S FSVR7: Connect RF cable W2 (600) and both RF cables W3/W4 (605) to the board (550).
3. R&S FSVR13/30/40: Connect both RF cables W3/W4 (605), RF cable W5 (620), W7 (640) and W6 (630) (on top side, not shown in the picture) to the frontend (550).
4. Mount the top cover (700) on the instrument with six screws (705).
5. Mount the housing (750) and adjust it properly to the front unit (405).
6. Mount the rear wall feet (765).
7. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
8. After starting the instrument check:
[SETUP : MORE : SYSTEM INFO : HARDWARE INFO]

9. Start selftest and check results:
[SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
10. Start alignment and check the result:
[SETUP : ALIGNMENT : SELF ALIGNMENT], then [SHOW ALIGN RESULTS]
11. Perform a frequency response correction using the correction software. Further information can be found in chapter "2 Adjustment".
12. Adjust the instrument as described in chapter "2 Adjustment".

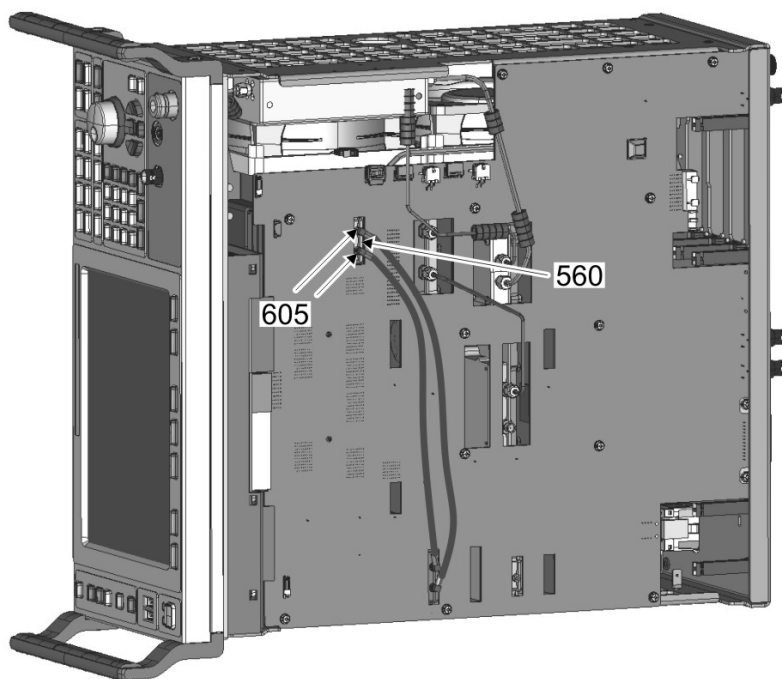
3.4.14 Detector Base Unit A120

See chapter "5.1 Spare Parts", item 560 and explosion drawing 1311.0006.01 sheet 1.

3.4.14.1 Removing the Unit



1. Switch off the instrument and disconnect the power plug.
2. Unscrew four screws in the rear wall feet (765) and remove them.
3. Remove the housing (750).
4. Unscrew six screws (705) in the top cover (700) and remove it.
5. Place the instrument on the left side frame.



6. Disconnect the RF cables W3/W4 (605) from the detector unit (560).
7. Push out the detector unit (560) to the top side of the instrument.

Tip: The unit can be moved up by pressing carefully from the bottom through the connector holes in the motherboard against the board.

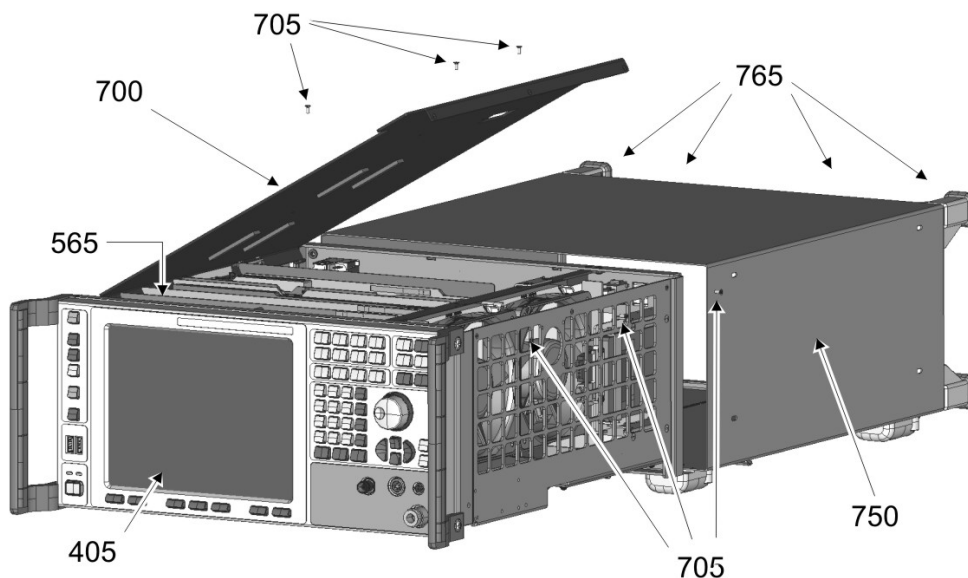
3.4.14.2 Installing the New Detector Base Unit

1. Plug the new detector base unit into the instrument and reconnect RF cables W3/W4 (605) to the board.
2. Mount the top cover (700) on the instrument with six screws (705).
3. Mount the housing (750) and adjust it properly to the front unit (405).
4. Mount the rear wall feet (765).
5. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
6. Perform an instrument check:
[SETUP : MORE : SYSTEM INFO : HARDWARE INFO]
7. Start selftest and check results:
[SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
8. Start alignment and check the result:
[SETUP : ALIGNMENT : SELF ALIGNMENT], then [SHOW ALIGN RESULTS]
9. Perform a frequency response correction using the correction software. Further information can be found in chapter "2 Adjustment".
10. Adjust the instrument as described in chapter "2 Adjustment".

3.4.15 Detector Extension Unit A130

See chapter "5.1 Spare Parts", item 565 and explosion drawing 1311.0006.01 sheet 1.

3.4.15.1 Removing the Unit



1. Switch off the instrument and disconnect the power plug.
2. Unscrew four screws in the rear wall feet (765) and remove them.
3. Remove the housing (750).
4. Unscrew six screws (705) in the top cover (700) and remove it.
5. Push out the extension unit (565) to the top side of the instrument. It is the first board behind the front unit (405).

3.4.15.2 Installing the New Extension Unit

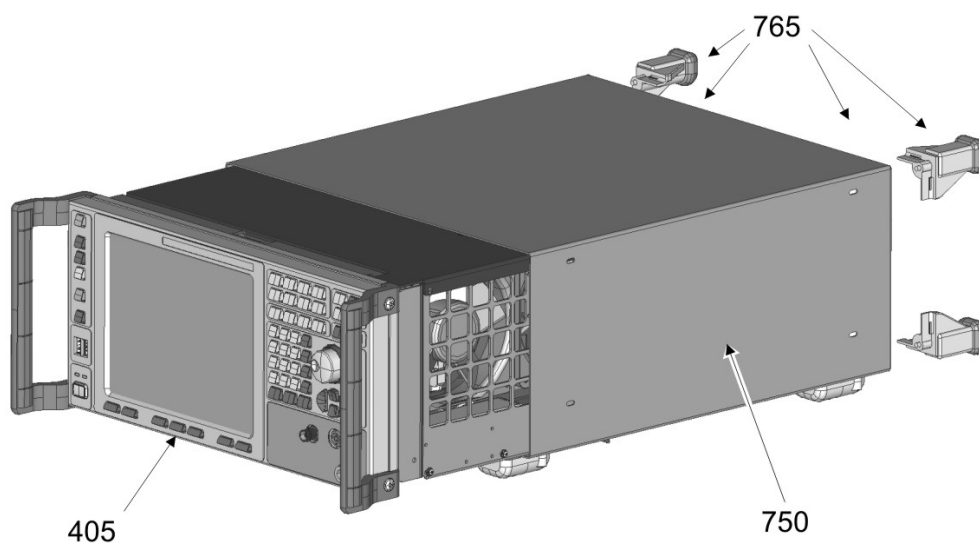
1. Plug the new extension unit (565) into the instrument.
2. Mount the top cover (700) on the instrument with six screws (705).
3. Mount the housing (750) and adjust it properly to the front unit (405).
4. Mount the rear wall feet (765).
5. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
6. Perform an instrument check:
[SETUP : MORE : SYSTEM INFO : HARDWARE INFO]
7. Start selftest and check results:
[SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
8. Start alignment and check the result:
[SETUP : ALIGNMENT : SELF ALIGNMENT], then [SHOW ALIGN RESULTS]

3.4.16 Attenuator A40

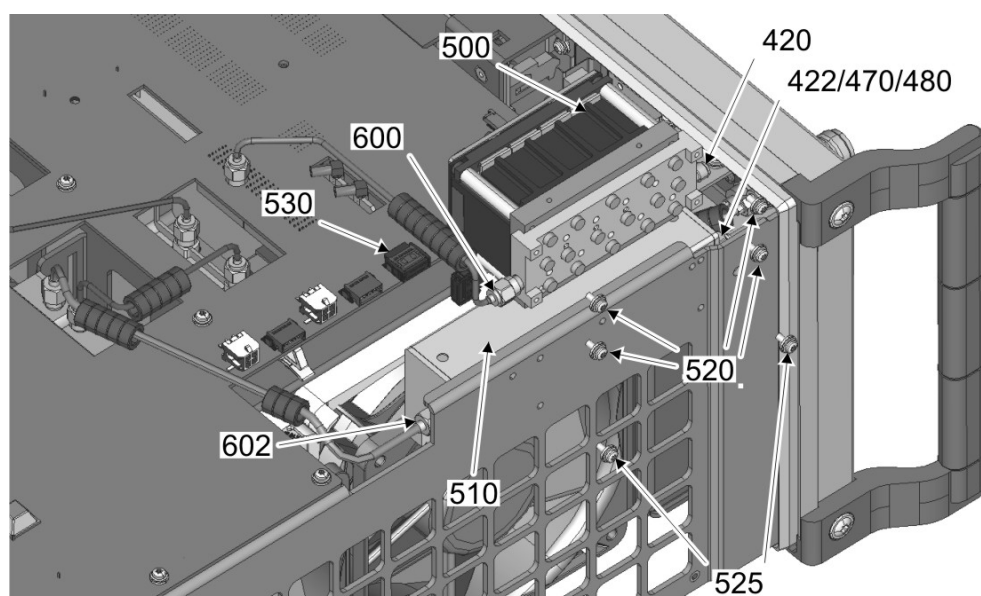
See chapter "5.1 Spare Parts", item 500/510 and explosion drawing 1311.0006.01 sheet 1.

3.4.16.1 Removing the Attenuator

1. Switch off the instrument and disconnect the power plug.
2. Unscrew four screws in the rear wall feet (765) and remove them.
3. Remove the housing (750).



1. Place the instrument on the back side.



2. Remove RF cable W2 (600/602) completely from the instrument.

3. Disconnect the RF cable W1 (420/422/470/480) from the attenuator (500/510) and attenuator cable (530) from the motherboard.
4. R&S FSVR7: Unscrew four screws (520) and remove the attenuator (500).
R&S FSVR13/30/40: Unscrew two screws (525) and remove the attenuator (510).
5. Disconnect attenuator cable (530) from the attenuator (500/510).

3.4.16.2 Installing the New Attenuator

1. Connect the attenuator cable (530) to the attenuator (500/510).
2. Mount the new attenuator (510/500) with two/four screws (525/520).
3. Connect the RF cable W1 (420/422/470/480) and the attenuator cable (530) to the Motherboard X81 and the RF cable W2 (600/602) to the attenuator (500/510) and the frontend or the MWC.
4. Mount the housing (750) and adjust it properly to the front unit (405).
5. Mount the rear wall feet (765).
6. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
7. Start selftest and check results:
[SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
8. Start alignment and check the result:
[SETUP : ALIGNMENT : SELF ALIGNMENT], then [SHOW ALIGN RESULTS]
9. Perform a frequency response correction using the correction software. Further information can be found in chapter "[2 Adjustment](#)".
10. Adjust the instrument as described in chapter "[2 Adjustment](#)".

3.4.17 Motherboard A10

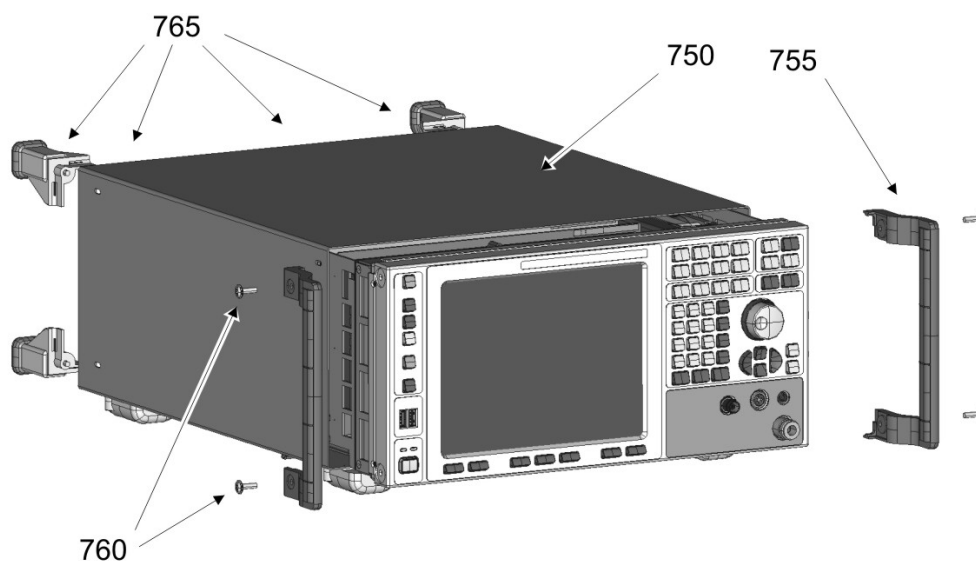
See chapter "5.1 Spare Parts", item 120, and explosion drawings 1311.0006.01 sheet 3. In case of a blown fuse it is possible to change only the fuse instead of the whole Motherboard. Please see chapter Replacing a blown fuse on the Motherboard A10 for further informations.

NOTICE

Risk of losing important information

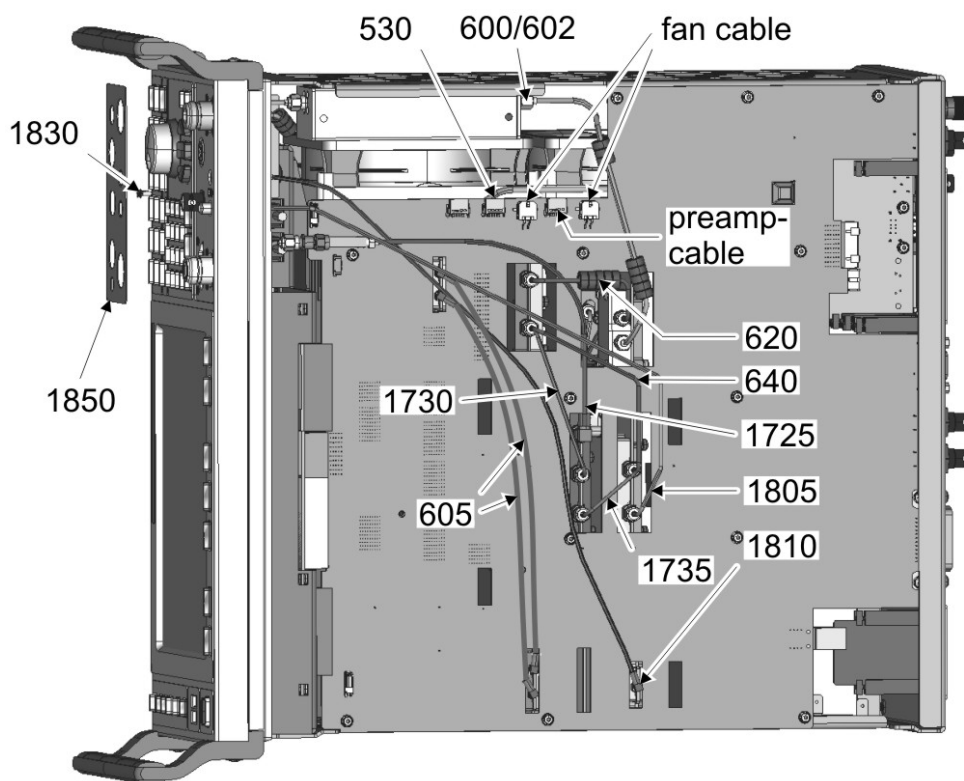
Important information about the type of instrument, installed hardware, options, etc., is stored both on the motherboard and on the hard drive. This information is required in order to restore the instrument in case of errors. Thus, do not replace the motherboard and the hard drive at the same time, as doing so will cause this information to be lost. If the instrument does not function after the hard drive has been replaced, do not replace the motherboard. Instead, re-install the old hard drive and then replace the motherboard.

3.4.17.1 Opening the Instrument



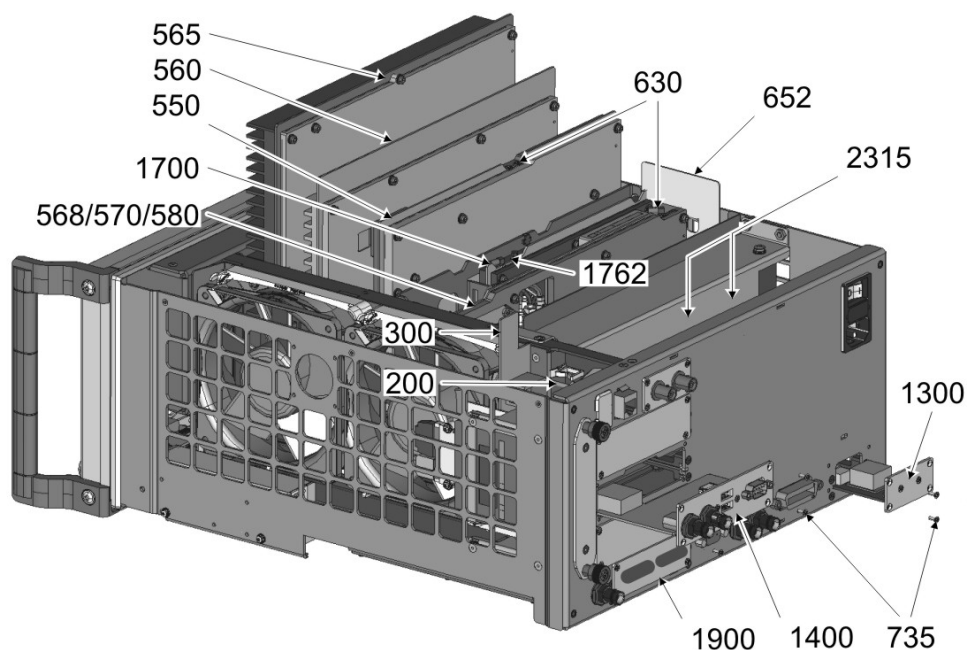
1. Switch off the instrument and disconnect the power plug.
2. Unscrew four screws in the rear wall feet (765) and remove them.
3. Remove the housing (750).
4. Unscrew six screws (705) in the top cover (700) and remove it.

3.4.17.2 Removing the Frontend, the Detector Base Unit, the Detector Extension Unit, the MW Converter Unit (R&S FSVR13/30/40)



1. Remove RF cable W2 (600/602), RF cables W3/W4 (605), completely from the instrument.
2. Disconnect both fan cables X83, X84 and the attenuator cable (530).
3. R&S FSVR13/30/40: Remove RF cable W5 (620), RF cable W7 (640) completely from the instrument.
4. For instruments with option R&S FSV-B21: Disconnect RF cable W18 (1805) and RF cable W19 (1810) from the MW converter unit (570/580). Remove the label (1850) from the front unit (405), unscrew two screws (1830) and remove the RF cables (1805/1810) together with the metal sheet from the instrument.
5. For instruments with option R&S FSV-B24: Disconnect the preamp cable from the motherboard.

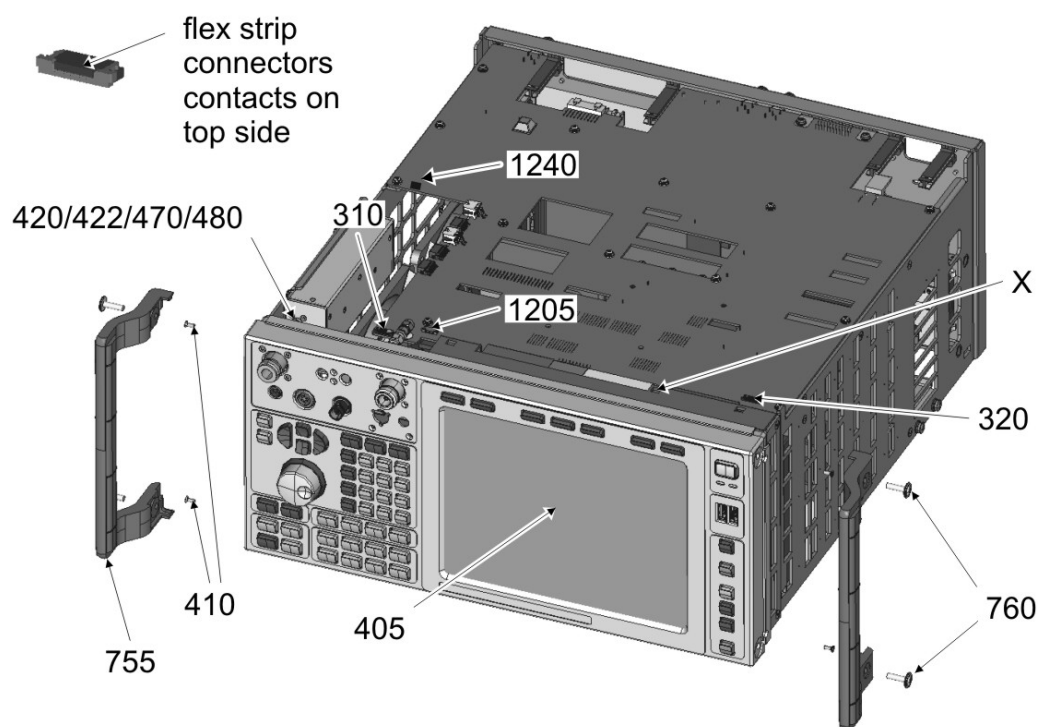
3.4.17.3 Removing the Boards



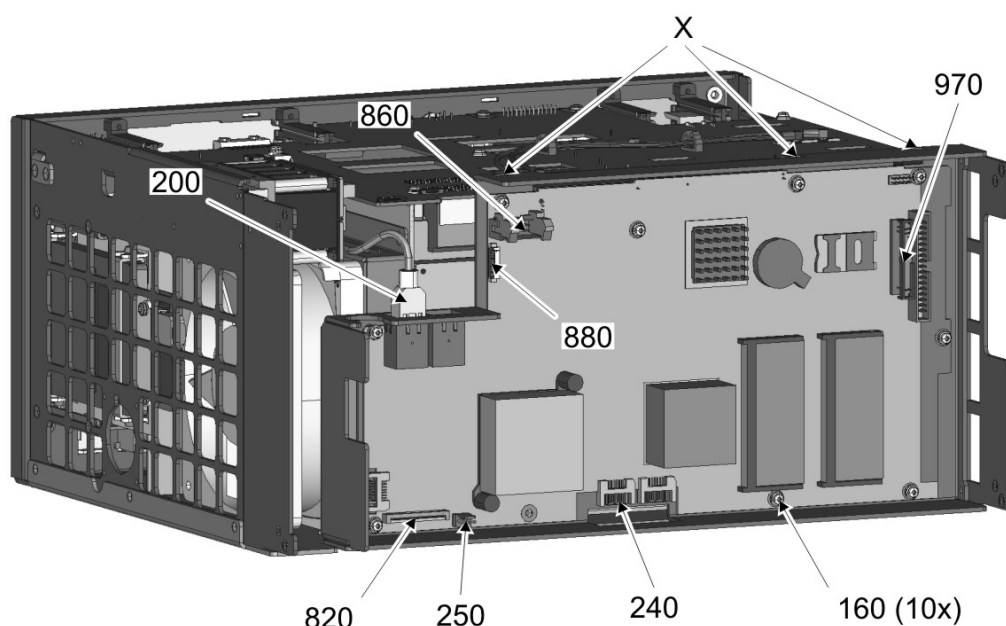
1. For instruments with R&S FSV-B4: Unscrew four screws (735) at option OCXO (1300) and remove it.
2. For instruments with R&S FSV-B5: Unscrew four screws (735) at option additional interfaces (1400) and remove it.
3. For instruments with R&S FSV-B17: Unscrew four screws (735) at option I/Q online input/output (1900) and remove it.
4. For R&S FSVR7: Remove the baffle plate (652).
5. Disconnect the patch cable (200) and both connectors of the cable power supply-motherboard (2315).
6. Carefully remove the adapterboard (300).
7. Disconnect and remove RF cable W6 (630) completely (FSVR 13,30,40).
8. Push out the detector extension unit (565), detector base unit (560), frontend (550) and MW converter unit (568/570/580) (R&S FSVR13/30/40) to the top side of the instrument.

Tip: The boards can be moved up by pressing carefully from the bottom through the connector holes in the motherboard against the board.

3.4.17.4 Removing the Controller

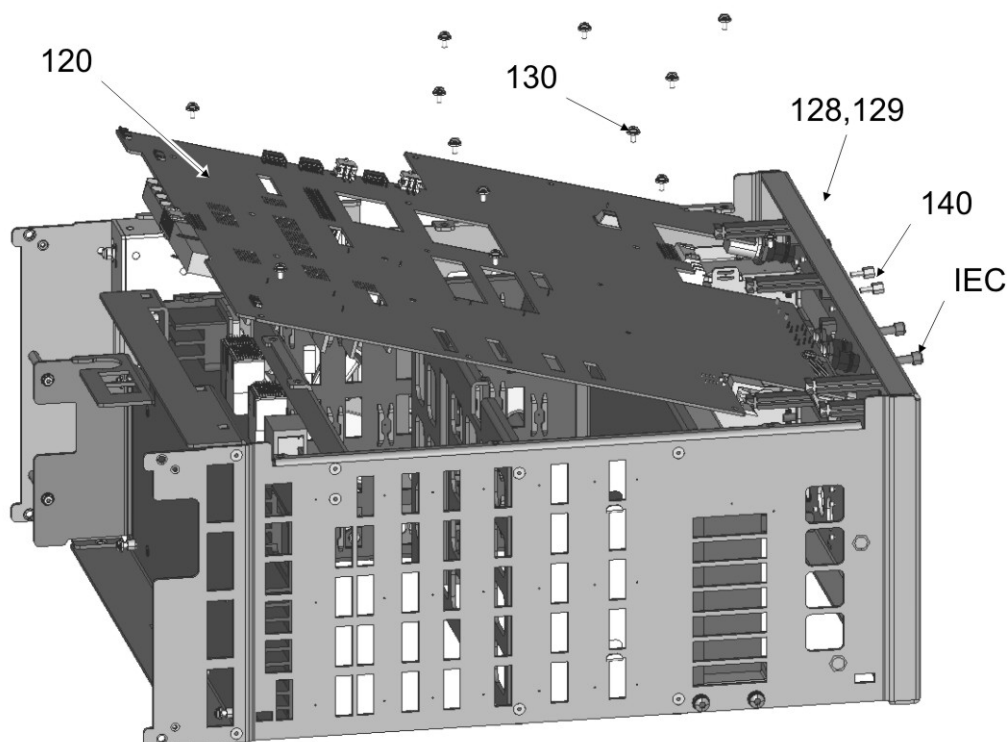


1. Unscrew the four screws (760) of the front handles (755) on both sides and remove them.
2. Disconnect cable flex strip (310) and (320).
3. For instruments with option R&S FSV-B3: Disconnect cable flex strip (1205) and the speaker cable (1240).
4. Unscrew four screws (410) in the front unit.
NOTICE! Risk of damage to the instrument. Cables are still connected to the controller.
5. Disconnect RF cable W1 (420/422/470/480).
6. Move the front unit (405) carefully a few millimeters to the front side to disconnect the controller cables.



7. Disconnect cable flex switch board FSVR (820), cable rotary puls-generator (860), cable W31 LST board FMR (970), cable touch-controller-usb-board (880), patchcable (200), SATA datacable (240) and SATA powercable (250) from the controller.
8. Remove the front unit (405) completely.
9. Unscrew ten screws (160).
10. Remove the controller. If necessary, use a screwdriver to take it off. Push the screwdriver alternately into one of the three holes (singned with a X on the picture above) to press the controller out.

3.4.17.5 Removing the Motherboard



11. Remove two screws (140), three nuts (129), three washers (128) and two bolts (IEC) with washers at the rear.
12. Unscrew and remove thirteen screws (130).
13. Carefully take the motherboard (120) out of the frame as shown in the picture above.

3.4.17.6 Installing the New Motherboard

1. Insert the motherboard into the instrument in reverse order.
Note: Move the motherboard carefully to the rear panel without causing damage to the parts on the board.
2. Fix two screws (140), three washers (128) with nuts (129) and two bolts (IEC) with washers at the rear.
3. Mount the motherboard with thirteen screws (130).
4. Connect the fan cables to the motherboard connector X83 and X84 (FAN) and the attenuator cable (530) to connector X81.
5. Carefully place down the controller (150) and fasten it with ten screws (160).
6. Connect cable flex switch board FSVR (820), cable rotary puls-generator (860), cable W31 LST board FMR (970), cable touch-controller-usb-board (880), patchcable (200), SATA datacable (240) and SATA powercable (250).

NOTICE! Risk of damage to the instrument. Make sure you route the cables properly.

7. Assemble the front unit (405) carefully and connect RF cable W1 (420/422/470/480).
 8. Connect cable flex strip (310) and (320).
 9. For instruments with option R&S FSV-B3: Connect cable flex strip (1205) and the speaker cable (1240) to the motherboard..
- Note:** The flex strip connector contacts are on the top of the device.
10. Fasten the four screws (410) to screw the front unit (405) together with the unit frame.
 11. Mount front handles (755) on both sides by using four screws (760).
 12. Plug the detector base unit (560), the detector extension unit (565) and the frontend (550) into the instrument.
 13. R&S FSVR13/30/40: Plug the MW converter unit (568/570/580) into the instrument, connect the RF cable W5 (620), RF cable W7 (640) and RF cable W6 (630).
 14. Connect RF cable W3/W4 (605) and RF cable W2 (600/602).
 15. Plug in the adapterboard FSVR (300) and connect the patch cable (200).
 16. Connect both connectors of the cable power supply-motherboard (2315).
 17. R&S FSVR7: Insert the baffle plate (652).
 18. For instruments with option R&S FSV-B21: Mount the two RF cables W18/W19 (1805/1810) together with the metal sheet and two screws (1830) to the instrument and connect them with the MW converter unit (570/580). Affix the label (1850) on the front unit (405).
 19. For instruments with option R&S FSV-B4: Mount the option OCXO (1300) with four screws (735).
 20. For instruments with option R&S FSV-B5: Mount the option additional interfaces (1400) with four screws (735).
 21. For instruments with R&S FSV-B17: Mount the option I/Q online input/output (1900) with four screws (735).
 22. For instruments with option R&S FSV-B24: Connect the preamp cable to the motherboard.
 23. Mount the top cover (700) on the instrument with six screws (705).
 24. Mount the housing (750) and adjust it properly to the front unit (405).
 25. Mount the rear wall feet (765).

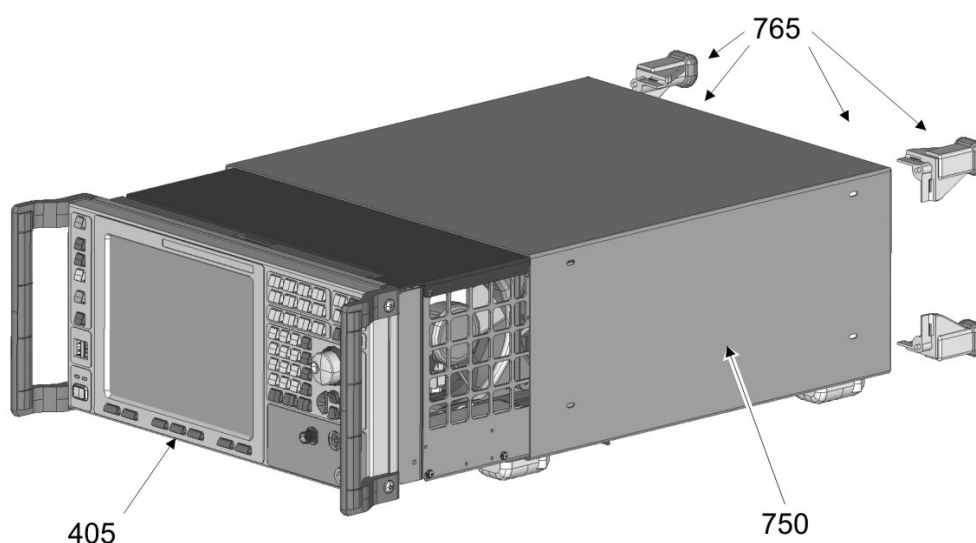
3.4.17.7 Putting into Operation

1. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
2. Watch the fans: The fans must speed up at power on of the instrument and slow down after a short time.
3. A backup of the EEPROM files must be made with the aid of a service function.
4. [SETUP : MORE : SERVICE : ENTER PASSWORD : 20122004 ENTER]
5. [SETUP : MORE : SERVICE : SERVICE FUNCTION : 10.0.3 ENTER]
6. After starting the instrument, check hardware info:
[SETUP : MORE : SYSTEM INFO : HARDWARE INFO]
7. Start selftest and check results:
[SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
8. Start alignment and check the result:
[SETUP : ALIGNMENT : SELF ALIGNMENT], then [SHOW ALIGN RESULTS]
9. Perform a frequency response correction using the correction software. Further information can be found in chapter "[2 Adjustment](#)".
10. Adjust the instrument as described in chapter "[2 Adjustment](#)".

3.4.18 Replacing a blown fuse on the Motherboard A10

In case of a blown Fuse on the Motherboard it is possible to replace the corresponding fuse only. A blown fuse is indicated by the red light near the fuse lighting up.

3.4.18.1 Removing the defective fuse



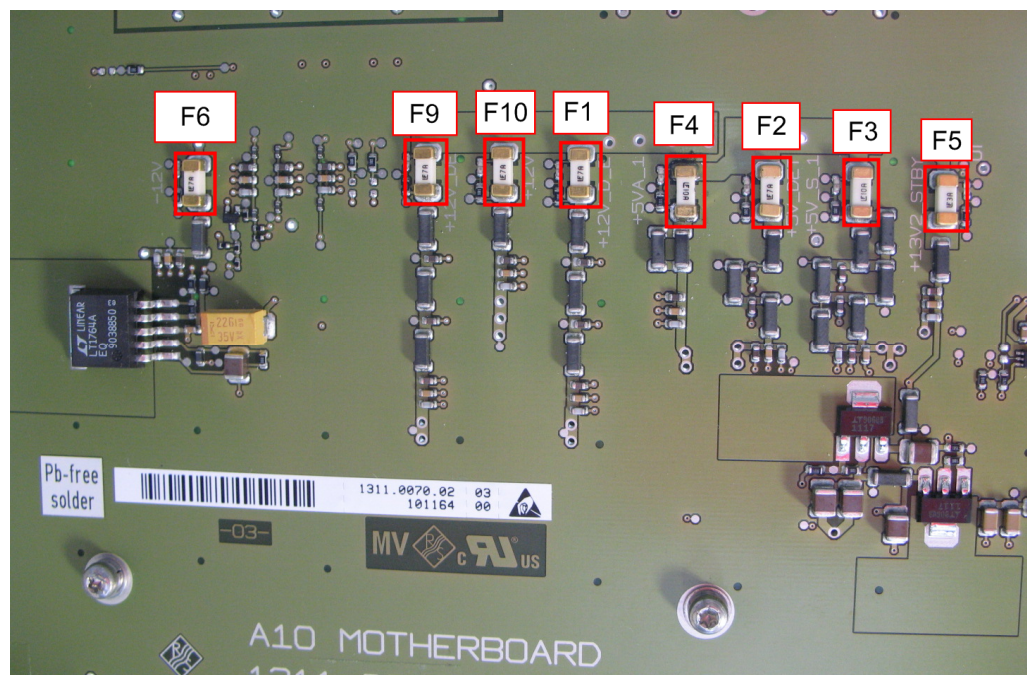
1. Switch off the instrument and disconnect the power plug.
2. Unscrew four screws in the rear wall feet (765) and remove them.
3. Remove the housing (750).
4. The fuses are on the bottom of the Motherboard. Carefully desolder the defective fuse. Be careful not to damage the board! A good practice is to use two solder irons, one on the left side of the fuse and the other one on the right side of the fuse, to desolder the fuse.
5. Clean the pads on the board carefully by use of a desolder wick.

3.4.18.2 Installing the new fuse

1. Replace the defective fuse only by an original spare part! Otherwise you will lose the safety approval of the instrument! The fuses and its spare parts are listed in the following table:

F1	2079.5994.00	7A FF	Power supply rail for detector base unit
F2	6104.9199.00	10A FF	Power supply rail for detector base unit
F3	6104.9199.00	10A FF	Power supply rail for front module controller

F4	6104.9199.00	10A FF	Power supply rail for analog modules
F5	6100.7862.00	3A FF	Standby supply rail
F6	2079.5994.00	7A FF	Negative voltage supply rail
F9	2079.5994.00	7A FF	Power supply rail for detector extension unit
F10	2079.5994.00	7A FF	Supply rail for analog modules



2. Solder carefully the fuse to the corresponding pads on the motherboard by use of a Pb free solder tin. Be careful not to overheat the fuse. This may result in a defective fuse!
3. Be sure there is no shortcircuit on the board!

3.4.18.3 Putting into Operation

1. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
2. **NOTICE!** Mains voltage is applied to the power supply.
3. Control the power rail with the replaced Fuse by measuring the corresponding voltage. If the fuse is blown again check the boards supplied by this power rail. Please see the chapter 3.5 for further details.

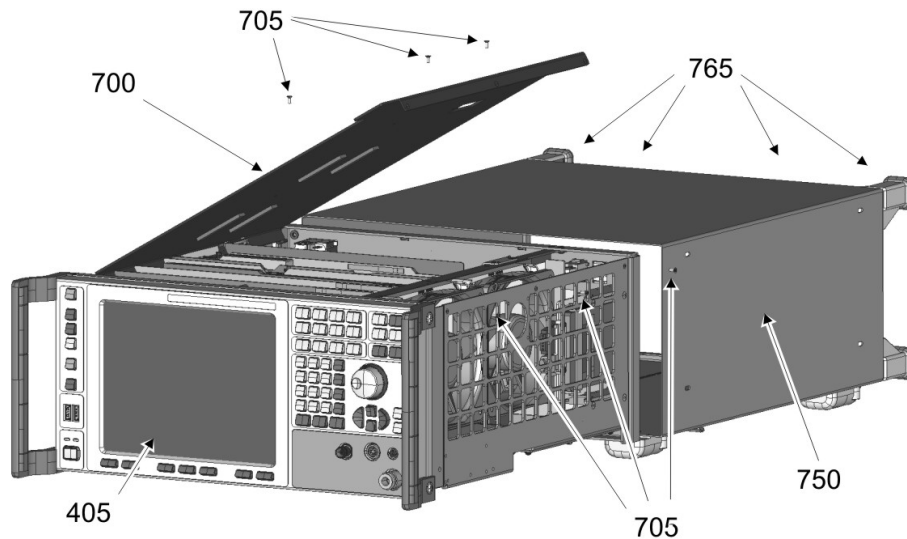
F1	nominal value: +12,2V R&S FSVR40: +13,0 V	Power supply rail for detector base unit
F2	nominal value: +5,5V	Power supply rail for detector base unit
F3	nominal value: +5,5V	Power supply rail for front module controller
F4	nominal value: +5,5V	Power supply rail for analog modules
F5	nominal value: +13,5 V	Standby supply rail
F6	nominal value: -12,2 V	Negative voltage supply rail
F9	nominal value: +12,2V R&S FSVR40: +13,0 V	Power supply rail for detector extension unit
F10	nominal value: +12,2V R&S FSVR40: +13,0 V	Supply rail for analog modules

4. Switch off the instrument and disconnect the power plug.
5. Mount the housing (750) and adjust it properly to the front unit (405).
6. Mount the rear wall feet (765).
7. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
8. Start selftest and check results: [SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
9. Start alignment and check the result: [SETUP : ALIGNMENT : SELF ALIGNMENT], then [SHOW ALIGN RESULTS]

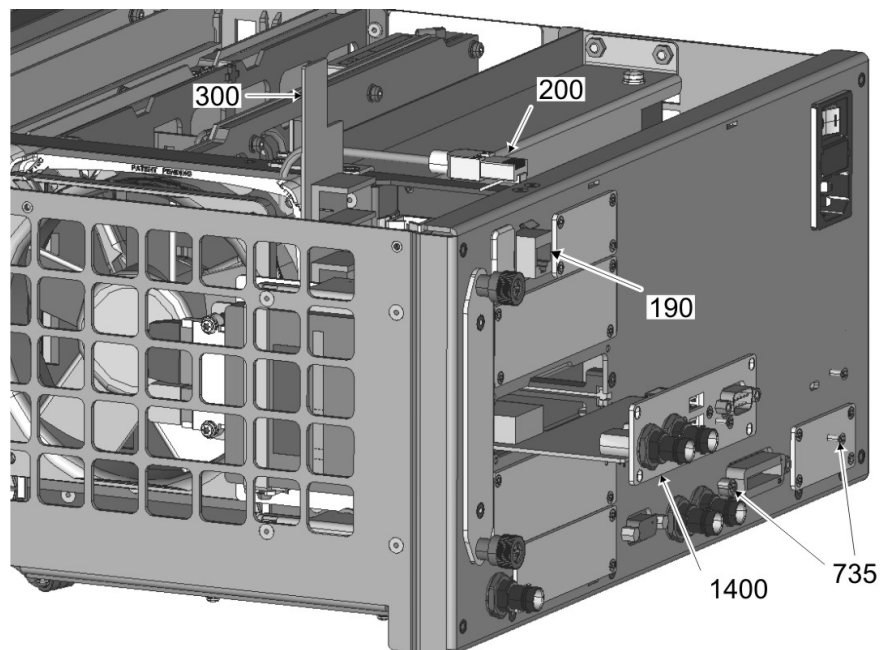
3.4.19 Adapter Board A11

See chapter "5.1 Spare Parts", item 300 and explosion drawing 1311.0006.01 sheet 2.

3.4.19.1 Removing the Adapter Board



1. Switch off the instrument and disconnect the power plug.
 - Unscrew four screws in the rear wall feet (765) and remove them.
 - Remove the housing (750).
 - Unscrew six screws (705) in the top cover (700) and remove it.
 - Unplug the patch cable (200) from the coupler (190).



- For instruments with option R&S FSV-B5: Unscrew four screws (735) and remove the option additional interfaces (1400).
- Carefully remove the adapter board (300) from the motherboard.

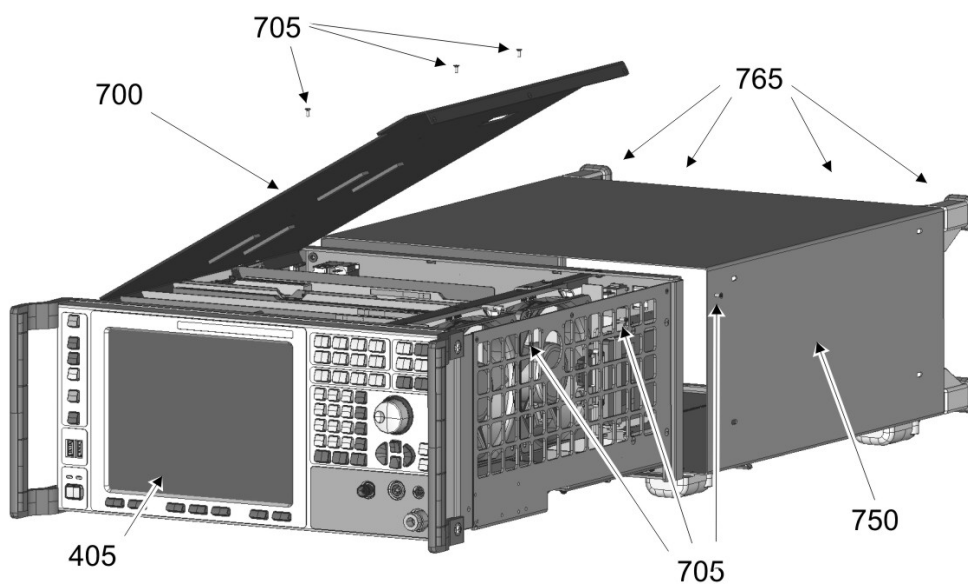
3.4.19.2 Installing the New Adapter Board

1. Pull the new adapter board (300) carefully into the motherboard.
 - Connect the patch cable (200) to the coupler (190).
 - For instruments with option R&S FSV-B5: Mount the option additional interfaces (1400) with four screws (735).
 - Mount the top cover (700) on the instrument with six screws (705).
 - Mount the housing (750) and adjust it properly to the front unit (405).
 - Mount the rear wall feet (765).
 - Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
 - Start selftest and check results:
[SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
 - Start alignment and check the result:
[SETUP : ALIGNMENT : SELF ALIGNMENT], then [SHOW ALIGN RESULTS]

3.4.20 MWC Unit A150

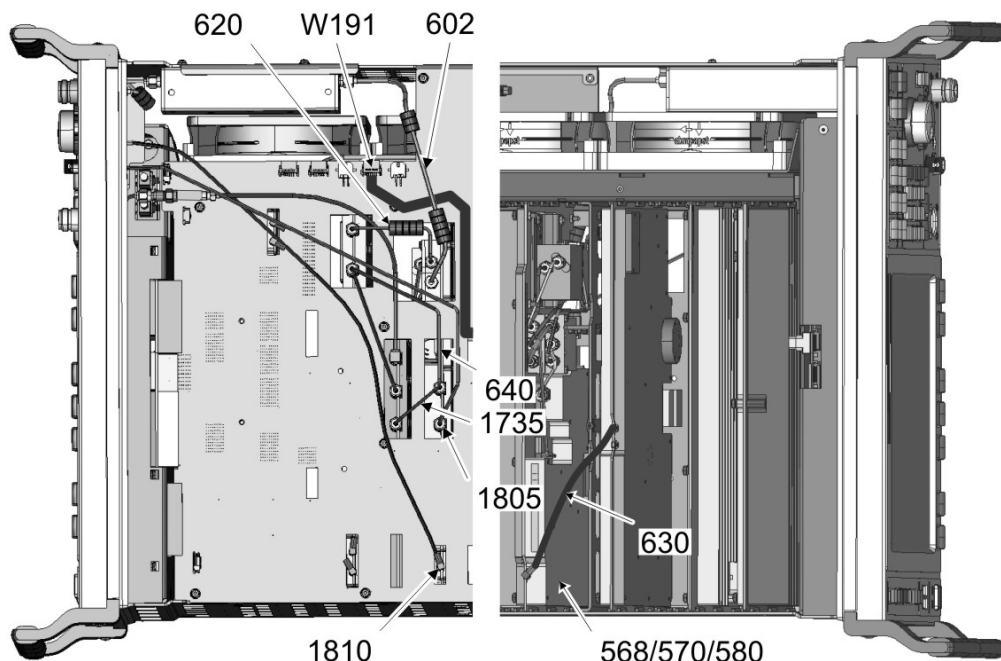
See chapter "5.1 Spare Parts", item 568/570/580 and explosion drawing 1311.0006.01 sheet 1.

3.4.20.1 Removing the Board



1. Switch off the instrument and disconnect the power plug.

- Unscrew four screws in the rear wall feet (765) and remove them.
- Remove the housing (750).
- Unscrew six screws (705) in the top cover (700) and remove it.
- Place the instrument on the right side frame.



- Disconnect RF cable W6 (630) from the MW converter unit (568/570/580).
- Disconnect RF cable W2 (602), RF cable W5 (620) and RF cable W7 (640) completely. Remove RF cable W15 (1735).
- For instruments with option R&S FSV-B21: Disconnect RF cable W18 (1805) and RF cable W19 (1810) from the MW converter unit (570/580).
- For instruments with option R&S FSV-B24: Disconnect the preamplifier cable W191.
- Push out the MW converter unit (568/570/580) to the top side of the instrument.

Tip: The board can be moved up by pressing carefully from the bottom through the connector holes in the motherboard against the board.

3.4.20.2 Installing the New MW Converter Unit

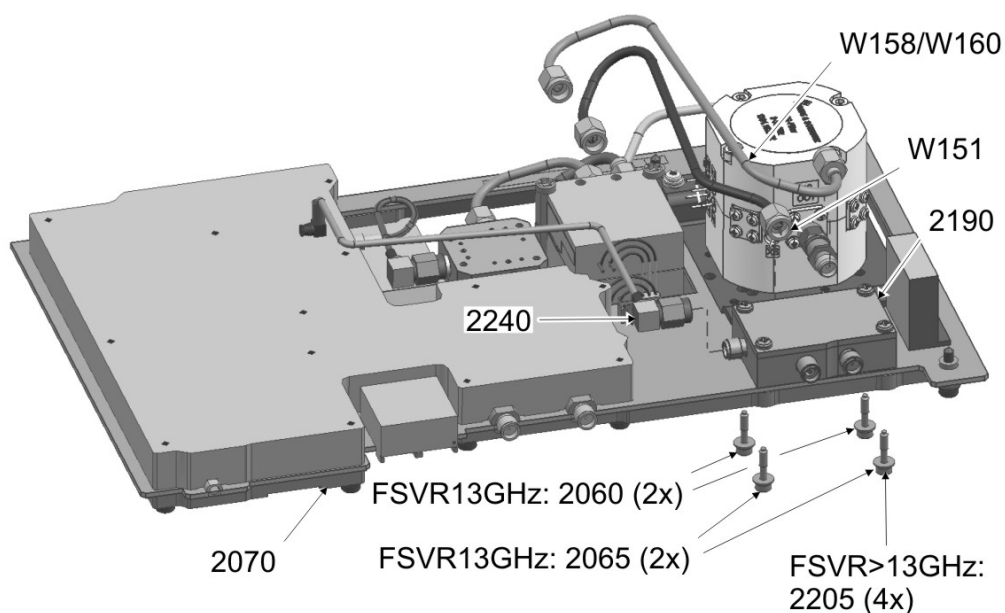
1. Plug the new MW converter unit (568/570/580) into the instrument and connect RF cable W2 (602), RF cable W5 (620), RF cable W6 (630) and RF cable W7 (640).
- For instruments with option R&S FSV-B21: Connect RF cable W18 (1805) and RF cable W19 (1810) to the MW converter unit (570/580).
 - For instruments with option R&S FSV-B24: Connect the preamplifier cable W191 to the motherboard.
 - Mount the top cover (700) on the instrument with six screws (705).
 - Mount the housing (750) and adjust it properly to the front unit (405).
 - Mount the rear wall feet (765).
 - Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.

- Start selftest and check results:
[SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
- Start alignment and check the result:
[SETUP : ALIGNMENT : SELF ALIGNMENT], then [SHOW ALIGN RESULTS]
- Perform a frequency response correction using the correction software. Further information can be found in chapter "2 Adjustment".
- Adjust the instrument as described in chapter "2 Adjustment".

3.4.21 Diplexer A151

See chapter "5.1 Spare Parts", FSVR13: item 2050 and explosion drawing 1308.1192.01, sheet 3, R&S FSVR30/40: item 2190 and explosion drawing 1307.9748.01, sheet 3.

3.4.21.1 Opening the Instrument, Removing the Board and Removing the Diplexer



1. Remove the MW converter unit as described in "Removing the Board".
 - R&S FSVR30/40: Disconnect RF cable W158/W160 and remove it.
 - Disconnect RF cable W151 completely and RF cable W168 (2240) from the diplexer (2190).
 - R&S FSVR30/40: Unscrew four screws (2205) and remove the diplexer (2190).
- R&S FSVR13: Unscrew two screws (2065), unscrew all screws of the cover (2070) and remove it. Unscrew two screws (2060) and remove the diplexer (2190).

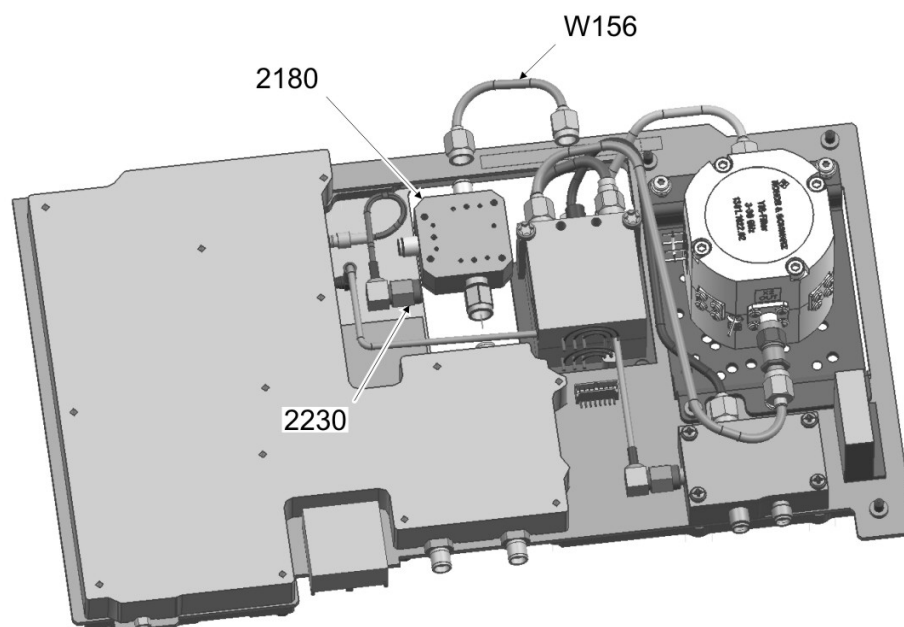
3.4.21.2 Installing the New Diplexer

1. R&S FSVR30/40: Mount the new diplexer (2190) with four screws (2205).
R&S FSVR13: Mount the new diplexer (2190) with two screws (2060). Mount the cover (2070) and fix two screws (2065).
 - Connect RF cable W151 and RF cable W168 (2240) to the diplexer (2190).
 - Connect RF cable W158/W160.
 - Continue with the procedure described in [“Installing the New MW Converter Unit”](#).

3.4.22 Mixer A153

See chapter [“5.1 Spare Parts”](#), item 2180 and explosion drawing 1307.9748.01, sheet 3 and sheet 4.

3.4.22.1 Opening the Instrument, Removing the Board and Removing the Mixer



1. Remove the MW converter unit as described in [“Removing the Board”](#).
 - Disconnect and remove RF cable W156 and disconnect RF cable W167 (2230) from the mixer (2180).
 - Unscrew and remove the mixer (2180) from the unit.

3.4.22.2 Installing the New Mixer

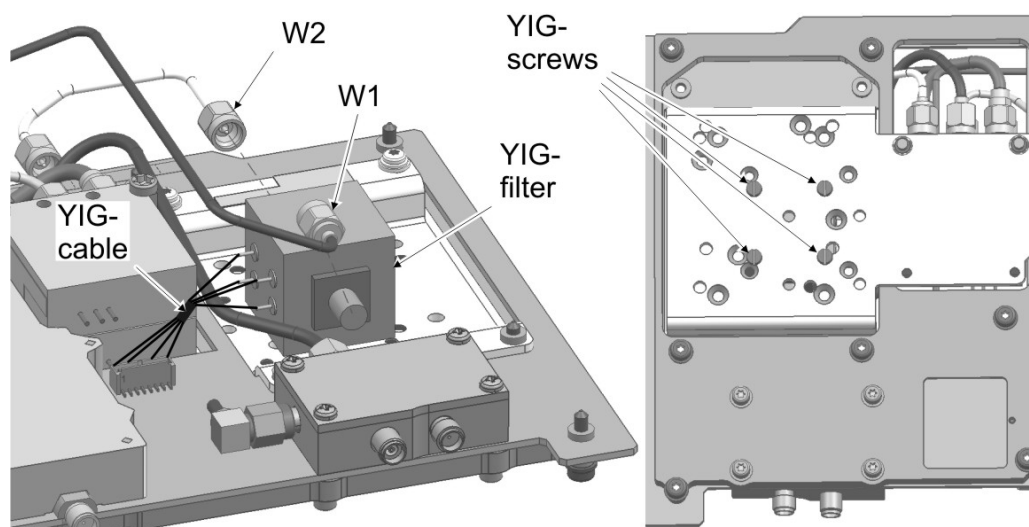
1. Mount the new mixer (2180).
 - Connect RF cable W156 and RF cable W167 (2230) to the mixer (2180).
 - Continue with the procedure described in [“Installing the New MW Converter Unit”](#).

3.4.23 YIG-Unit (FSVR 13/30/40)

See chapter "[5.1 Spare Parts](#)", R&S FSVR30/40: item 2112/2122/2162 and explosion drawing 1307.9748.01, sheet 3 and 4, R&S FSVR13: item 2012/2022 and explosion drawing 1308.1192.01 sheet 3 and 4.

The YIG-Unit contains a sheet metal part. It is not necessary to change it.

3.4.23.1 Opening the Instrument, Removing the Board and Removing the YIG-Unit



1. Remove the MW converter unit as described in "[Removing the Board](#)".
 - Remove both RF cables (W1,W2) completely from the unit.
 - Unplug the YIG-cable from the connector.
 - Unscrew four YIG-screws and remove the YIG-filter.

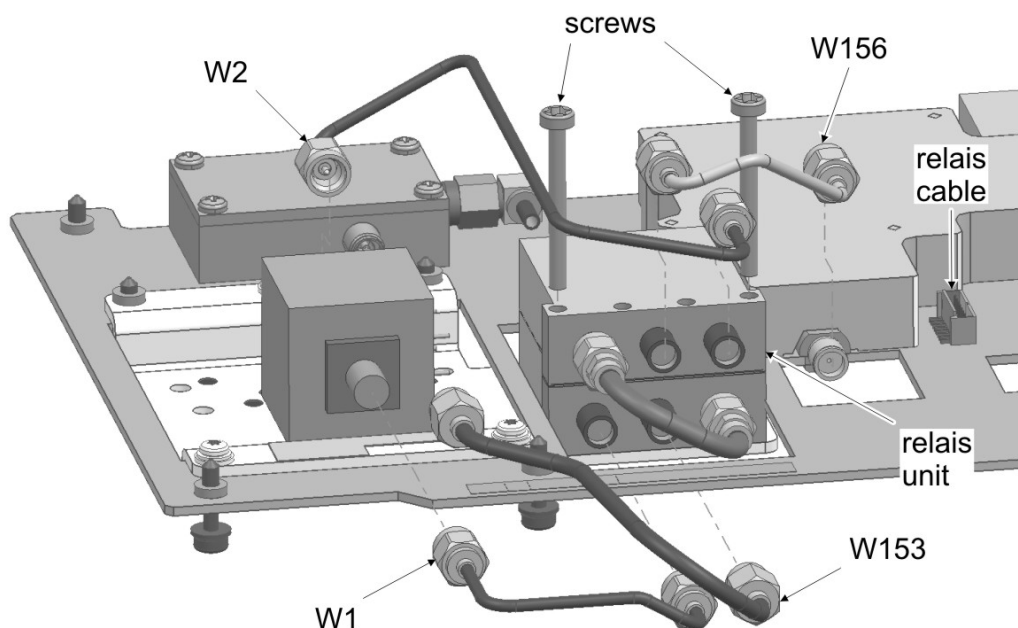
3.4.23.2 Installing the New YIG-Unit

1. Mount the new filter to the sheet metal. Depending on the filter use the appropriate screw holes to mount the filter.
 - Connect both RF cables (W1/W2) to the unit.
 - Connect the YIG-cable to the connector.
 - Continue with the procedure described in "[3.4.20.2 Installing the New MW Converter Unit](#)".

3.4.24 Relais-Unit (R&S FSVR13/30/40)

See chapter "5.1 Spare Parts", R&S FSVR30/40: item 2165 and explosion drawing 1307.9748.01, sheet 3 and 4, R&S FSVR13: item 2040 and explosion drawing 1308.1192.01 sheet 3 and 4.

3.4.24.1 Opening the Instrument, Removing the Board and Removing the Relais-Unit



1. Remove the MW converter unit as described in "3.4.20.1 Removing the Board".
 - Remove RF cable W1, RF cable W2, RF cable W153 and RF cable W156 completely.
 - Unplug the relais-cable from the connector.
 - Unscrew two screws and remove the relais-unit.

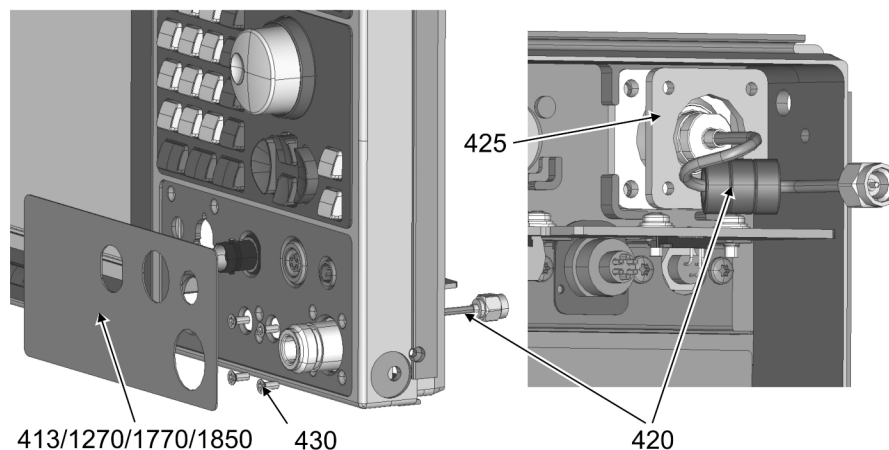
3.4.24.2 Installing the New Relais-Unit

1. Mount the new relais-unit with two screws to the sheet metal.
 - Connect RF cable W1, RF cable W2, RF cable W153 and RF cable W156.
 - Connect the relais-cable to the connector.
 - Continue with the procedure described in "3.4.20.2 Installing the New MW Converter Unit".

3.4.25 RF Cable W1 (FSVR 7)

See chapter "5.1 Spare Parts", item 420 and explosion drawing 1311.0006.01 sheet 1.

3.4.25.1 Removing the RF Cable



1. Open the instrument as described in "3.2 Opening the Instrument".
 - Remove the label FSVR connector (413/1270/1770/1850).
 - Unscrew four screws (430).
 - Remove the RF cable W1 (420) carefully.
 - Disassemble the mounting plate (425) from the RF cable W1 (420).

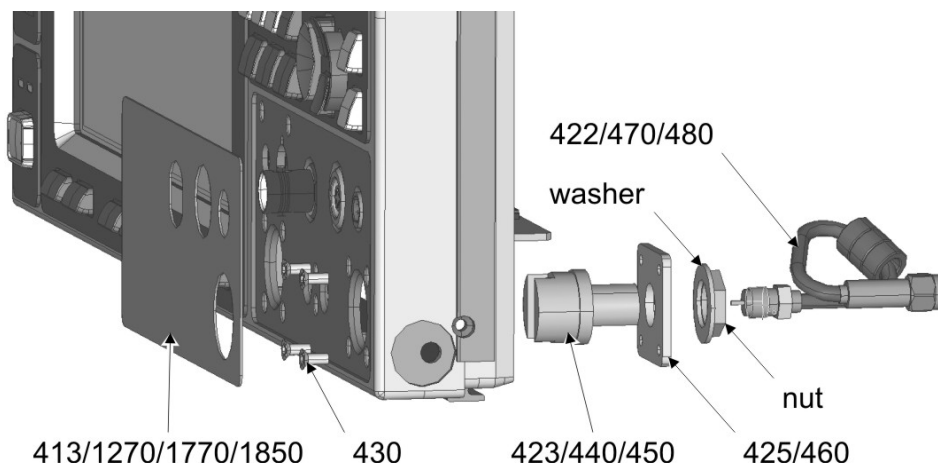
3.4.25.2 Installing the New RF Cable W1 and Putting into Operation

1. Mount the new RF cable W1 (420) and the mounting plate (425) with four screws (430) to the front unit.
 - Place the label R&S FSVR connector (413/1270/1770/1850) on the front unit.
 - Complete the instrument as described in "3.3 Completing the Instrument".
2. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
 - Start selftest and check results:
[SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
 - Start alignment and check the result:
[SETUP : ALIGNMENT : SELF ALIGNMENT], then [SHOW ALIGN RESULTS]
 - Perform a frequency response correction using the correction software. Further information can be found in chapter "2 Adjustment".
 - Adjust the instrument as described in chapter "2 Adjustment".

3.4.26 Adaptor (R&S FSVR13/30/40)

See chapter "5.1 Spare Parts", item 423/440/450 and explosion drawing 1311.0006.01 sheet 1.

3.4.26.1 Removing the Adaptor



1. Open the instrument as described in "3.2 Opening the Instrument".
 - Remove the label R&S FSVR connector (413/1270/1770/1850).
 - Unscrew four screws (430).
 - Remove the adaptor (423/440/450) together with the mounting plate (425/460) and the RF cable W1 (422/470/480).
 - Disassemble the RF cable W1 (422/470/480) from the adaptor (423/440).
 - Unscrew the nut and disassemble the washer and the mounting plate (425/460) from the adaptor (423/440/450).

3.4.26.2 Installing the New Adaptor and Putting into Operation

1. Assemble the new adaptor (423/440/450) together with the mounting plate (425/460), the washer, nut and the RF cable W1 (422/470/480).
2. Mount the adaptor (423/440/450) with four screws (430) to the front unit.
 - Place the label R&S FSVR connector (413/1270/1770/1850) on the front unit.
 - Complete the instrument as described in "3.3 Completing the Instrument".
3. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
 - Start selftest and check results:
[SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
 - Start alignment and check the result:
[SETUP : ALIGNMENT : SELF ALIGNMENT], then [SHOW ALIGN RESULTS]

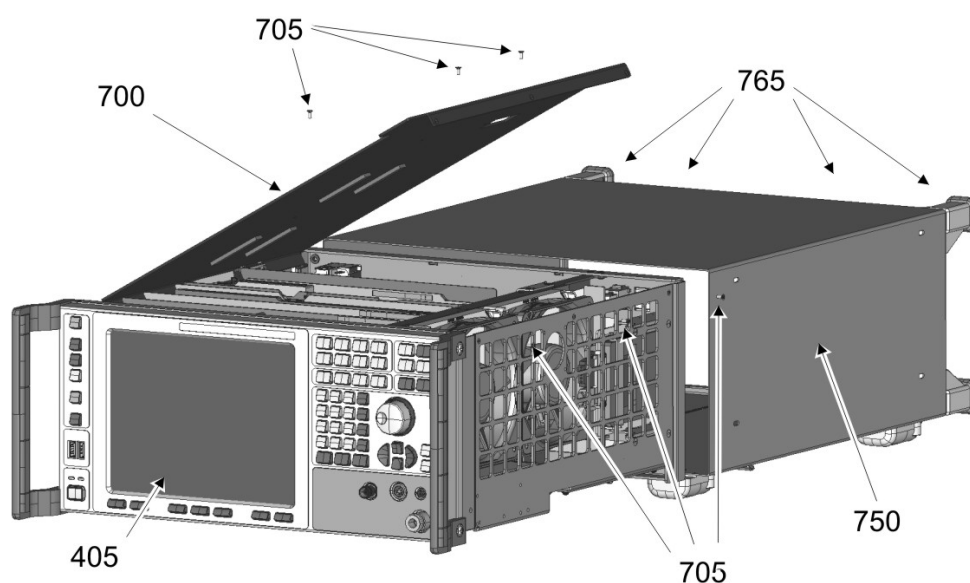
- Perform a frequency response correction using the correction software. Further information can be found in chapter "2 Adjustment".
- Adjust the instrument as described in chapter "2 Adjustment".

3.4.27 Speaker B1

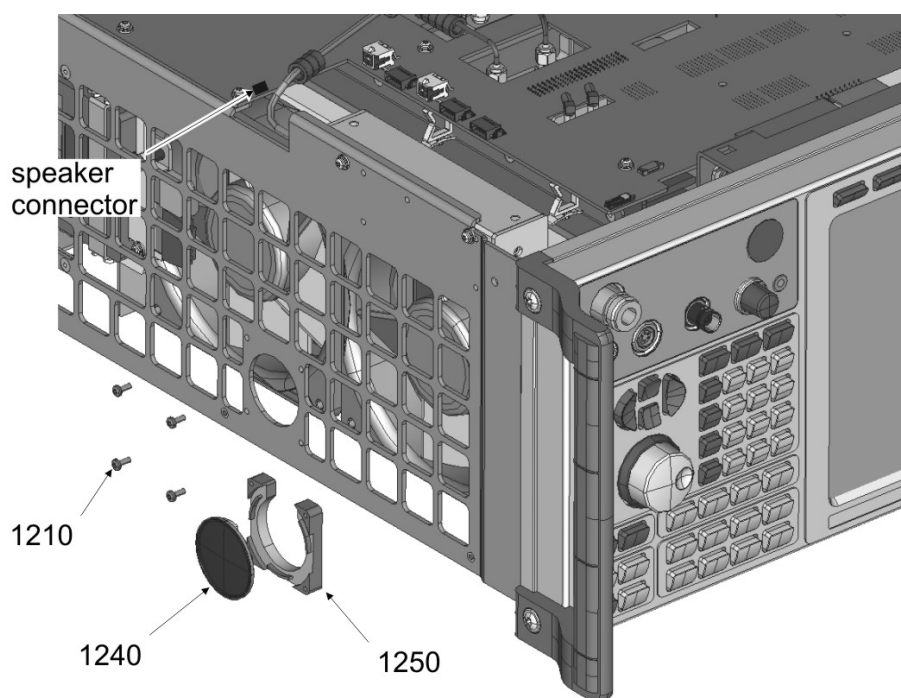
See chapter "5.1 Spare Parts", item 1240 and explosion drawing 1310.9700.00 sheet 1.

The speaker is installed on the right side of the instrument.

3.4.27.1 Removing the Speaker



1. Switch off the instrument and disconnect the power plug.
 - Unscrew four screws in the rear wall feet (765) and remove them.
 - Remove the housing (750).
 - Unscrew six screws (705) in the top cover (700) and remove it.
 - Unplug the speaker connector X70 from motherboard.



- Unscrew the four screws (1210).
- Remove the holder (1250) together with the speaker (1240).
- Pull the speaker (1240) out of the holder (1250)

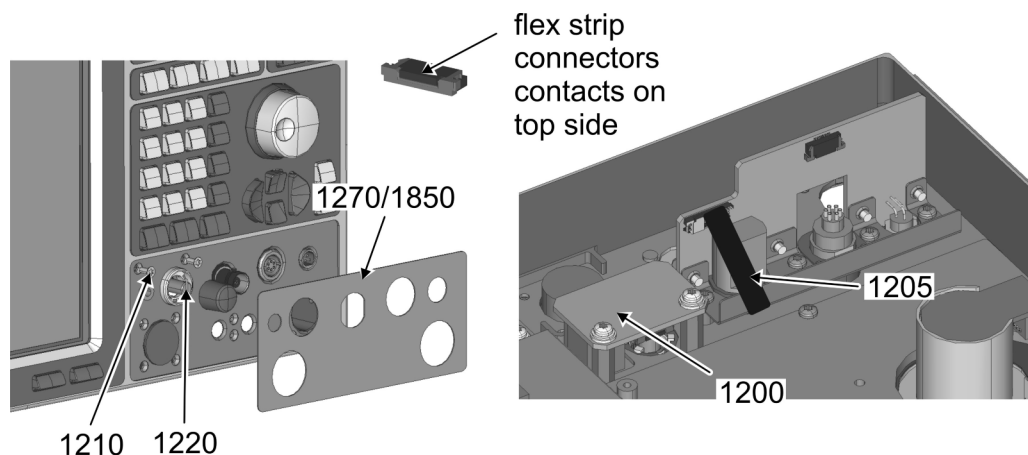
3.4.27.2 Installing the New Speaker

1. Pull the new speaker (1240) carefully into the holder (1250).
 - Mount the holder (1250) with four screws (1210) on the frame.
 - Connect the speaker with the connector X70 on the motherboard.
 - Mount the top cover (700) on the instrument with six screws (705).
 - Mount the housing (750) and adjust it properly to the front unit (405).
 - Mount the rear wall feet (765).
 - Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
 - Start selftest and check results:
[SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
 - Start alignment and check the result:
[SETUP : ALIGNMENT : SELF ALIGNMENT], then [SHOW ALIGN RESULTS]

3.4.28 AF Output A71

See chapter "5.1 Spare Parts", item 1200, and explosion drawing 1310.9700.00.

3.4.28.1 Removing the AF Output



1. Open the instrument as described in "3.2 Opening the Instrument".
 - Remove the label R&S FSVR connector (1270/1850).
 - Remove the knob (1220).
 - Unscrew two screws (1210).
 - Remove the AF output (1200) carefully.
 - Disconnect flex-strip (1205) from the AF output (1200).

3.4.28.2 Installing the New AF Output

1. Connect the flex-strip (1205) to the new AF output (1200).

Note: The flex strip connector contacts are on the top of the device.

 - Mount the new AF output (1200) with two screws (1210) to the front unit.
 - Place the label FSVR connector (1270/1850) on the front unit.
 - Assemble the knob (1220).
 - Complete the instrument as described in "3.3 Completing the Instrument".

3.4.28.3 Putting into Operation

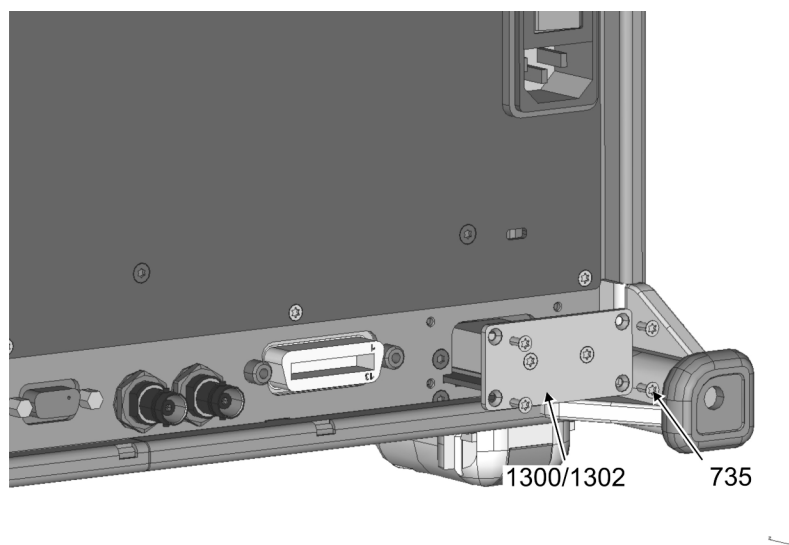
1. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
 - Start selftest and check results:
[SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
 - Start alignment and check the result:
[SETUP : ALIGNMENT : SELF ALIGNMENT], then [SHOW ALIGN RESULTS]

- Perform a frequency response correction using the correction software. Further information can be found in chapter "2 Adjustment".
- Adjust the instrument as described in chapter "2 Adjustment".

3.4.29 OCXO A250 (R&S FSV-B4)

See chapter "5.1 Spare Parts", item 1300/1302, and explosion drawing 1310.9716.00.

3.4.29.1 Removing the OCXO



1. Unscrew four screws (735).
- Carefully remove the OCXO (1300/1302).

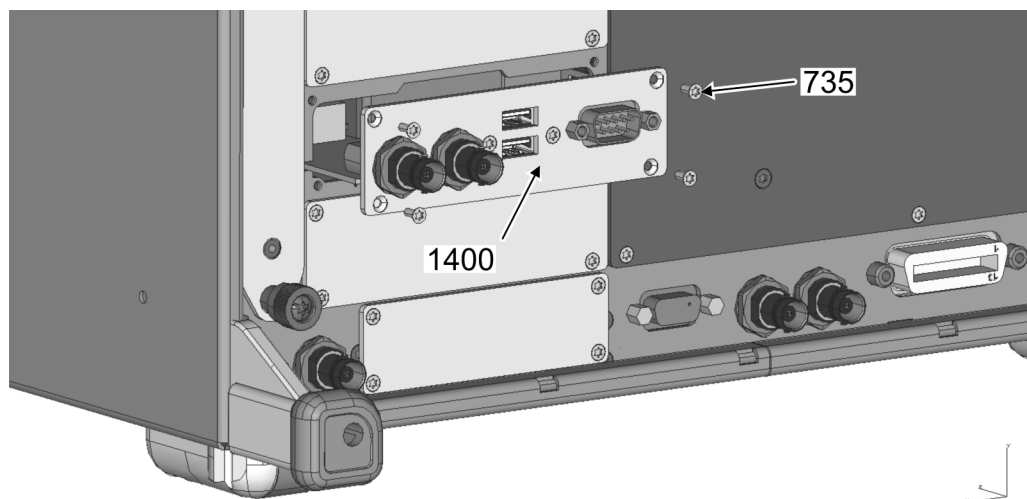
3.4.29.2 Installing the New OCXO and Putting into Operation

1. Insert the new OCXO (1300/1302) carefully and mount it with four screws (735).
- Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
- Start selftest and check results:
[SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
- Start alignment and check the result:
[SETUP : ALIGNMENT : SELF ALIGNMENT], then [SHOW ALIGN RESULTS]

3.4.30 Additional Interface A220 (R&S FSV-B5)

See chapter "5.1 Spare Parts", item 1400, and explosion drawing 1310.9716.00.

3.4.30.1 Removing the Additional Interface



1. Unscrew four screws (735).
 - Carefully remove the additional interface (1400).

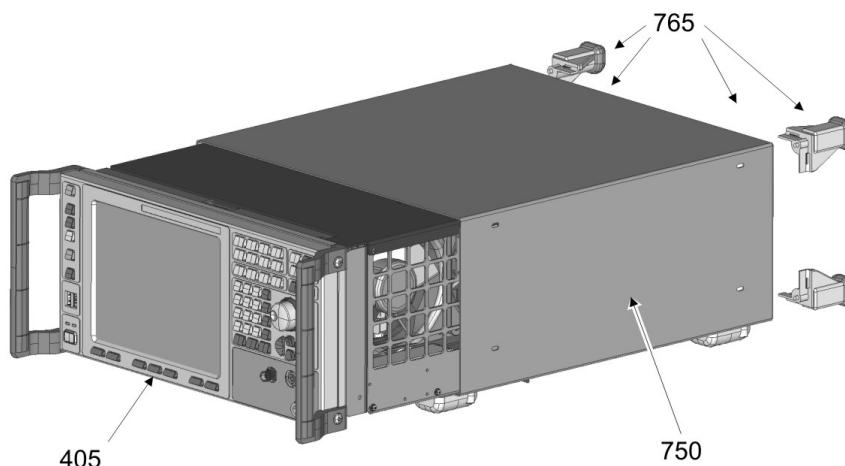
3.4.30.2 Installing the New Additional Interface and Putting into Operation

1. Insert the new additional interface (1400) carefully and mount it with four screws (735).
 - Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
 - Start selftest and check results:
[SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
 - Start alignment and check the result:
[SETUP : ALIGNMENT : SELF ALIGNMENT], then [SHOW ALIGN RESULTS]

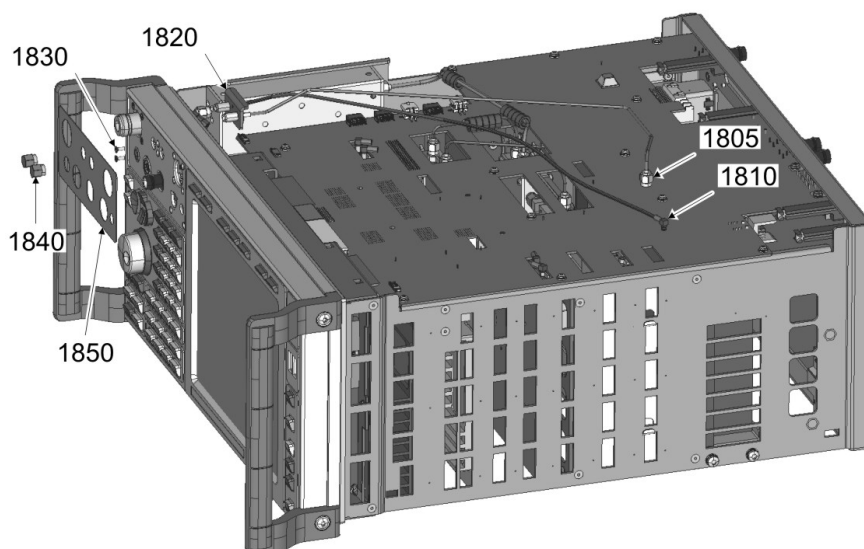
3.4.31 RF Cable W18 and RF Cable W19 (only with option R&S FSV-B21)

See chapter "5.1 Spare Parts", item 1805/1810 and explosion drawing 1308.1963.00.

3.4.31.1 Removing the RF Cable W18/19



1. Switch off the instrument and disconnect the power plug.
 - Unscrew four screws in the rear wall feet (765) and remove them.
 - Remove the housing (750).



- Disconnect RF cable W18 (1805) and W19 (1810) from the MWC (570/580).
- Remove two protection caps (1840).
- Remove the label R&S FSVR connector (1850).
- Unscrew and remove two screws (1830).
- Carefully remove RF cable W18 (1805) and RF cable W19 (1810) together with the holder (1820) from the instrument.
- Disassemble RF cable W18 (1805) or RF cable W19 (1810) from the holder (1820).

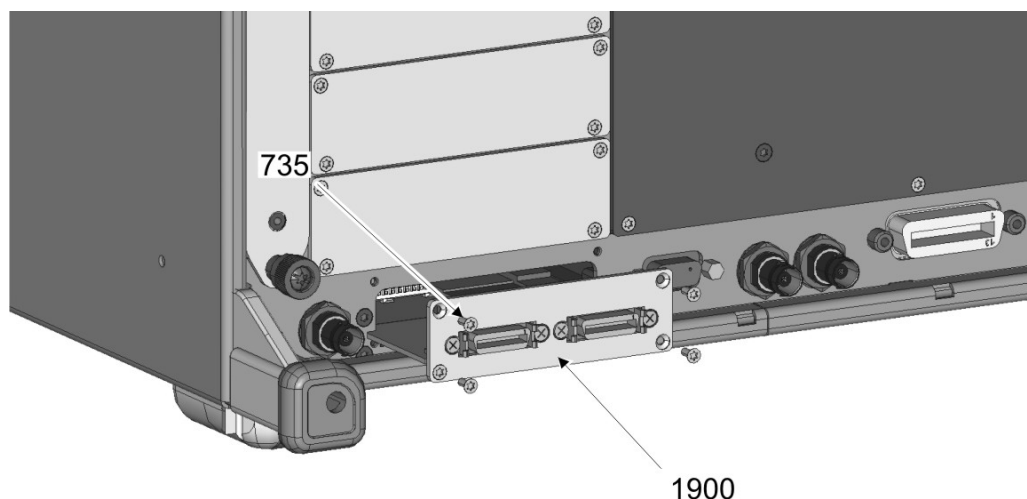
3.4.31.2 Installing the New RF Cable W18/W19 and Putting into Operation

1. Mount the new RF cable W18 (1805) or RF cable W19 (1810) on the holder (1820).
 - Carefully put both cables with the holder into the instrument and fix it with two screws (1830).
 - Connect the RF cables to the MWC (570/580).
 - Assemble the label FSVR connector (1850) and two protection caps (1840).
 - Mount the housing (750) and adjust it properly to the front unit (405).
2. Mount the rear wall feet (765).
 - Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
 - Start selftest and check results:
[SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
 - Start alignment and check the result:
[SETUP : ALIGNMENT : SELF ALIGNMENT], then [SHOW ALIGN RESULTS]
 - Perform a frequency response correction using the correction software. Further information can be found in chapter "2 Adjustment".
 - Adjust the instrument as described in chapter "2 Adjustment".

3.4.32 Digital Baseband Interface A240 (R&S FSV-B17)

See chapter "5.1 Spare Parts", item 1900, and explosion drawing 1310.9716.00.

3.4.32.1 Removing the Digital Baseband Interface



3. Unscrew four screws (735).
4. Carefully remove the additional interface (1900).

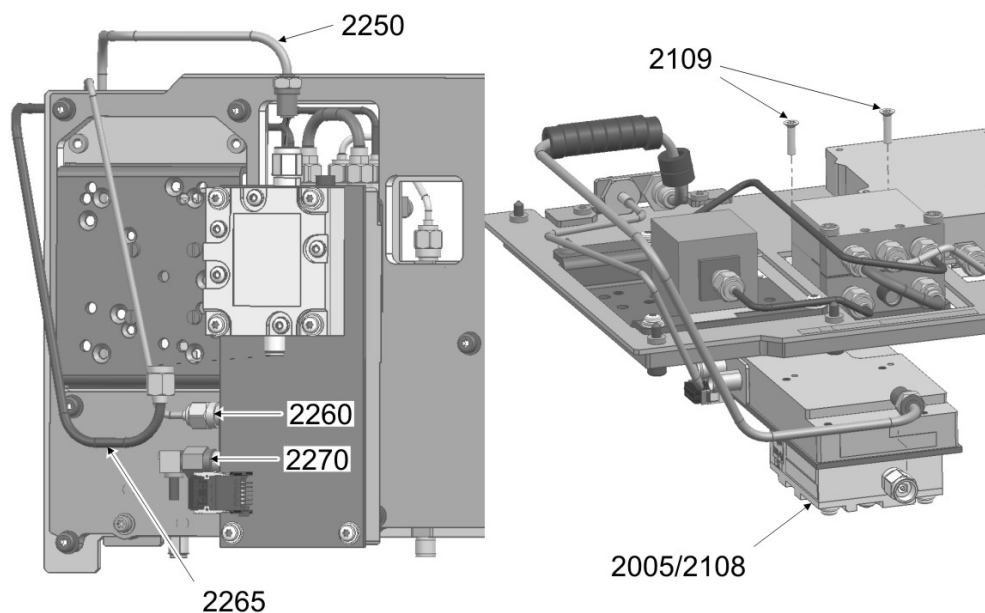
3.4.32.2 Installing the New Digital Baseband Interface and Putting into Operation

5. Insert the new digital I/Q LVDS (1900) carefully and mount it with four screws (735).
6. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
7. Connect the digital baseband output with the digital baseband input via LVDS cable R&S®SMU-Z6 (stock number 1415.0201.02).
8. Activate the R&S FSV-B17 selftest:
[SETUP : MORE : SERVICE : PASSWORD : 894129]
[SETUP : MORE : SERVICE : SERVICE FUNKTION 2.13.0.1]
9. Start selftest and check results:
[SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
10. Deactivate the R&S FSV-B17 selftest:
[SETUP : MORE : SERVICE : SERVICE FUNKTION 2.13.0.0]
11. Remove the LVDS cable and the password: [SETUP : MORE : SERVICE : PASSWORD :]
12. Start alignment and check the result:
[SETUP : ALIGNMENT : SELF ALIGNMENT], then[SHOW ALIGN RESULTS]

3.4.33 Preamplifier Unit

See chapter "5.1 Spare Parts", R&S FSVR30/40: item 2108 and explosion drawing 1307.9748.01 sheet 4, R&S FSVR13: item 2005 and explosion drawing 1308.1192.01 sheet 4.

3.4.33.1 Removing the Board and the Preamplifier Unit



1. Remove the MWC unit as described in "3.4.20.1 Removing the Board".
2. Remove RF cable W187 (2265) completely from the board.
3. Disconnect RF cable W180 (2250), RF cable W190 (2270) and RF cable W184 (2260) from the preamplifier unit (2005/2108).
4. Unscrew and remove two screws (2109).
 - Remove the preamplifier unit (2005/2108) from the board.

3.4.33.2 Installing the New Preamplifier Unit

1. Mount the new preamplifier unit (2005/2108) with two screws (2109).
2. Connect RF cable W180 (2250), RF cable W184 (2260), RF cable W187 (2265) and RF cable W190 (2270) to the unit.
 - Continue with the procedure described in "3.4.20.2 Installing the New MW Converter Unit".

3.5 Troubleshooting

Malfunctions may have simple causes but also may be caused by faulty components.

These troubleshooting instructions enable you to locate error causes down to board level and make the instrument ready for use again by means of board replacement.

We recommend that the instrument be shipped to our experts in the service centers (see address list) for module replacement and further error elimination.

WARNING

Shock hazard

Before opening the casing, make sure that the instrument is switched off and disconnected from all power supplies.

Read all safety instructions at the beginning of this manual carefully!

NOTICE

Risk of damage to the boards

Be careful not to cause short circuits when measuring voltages at pins placed close together!

Utilities provided in the R&S FSVR for diagnostic purposes:

- Permanent monitoring of levels and frequencies in the instrument
 - Self test
 - System error correction
-



Frequent cause of problems: connections

When problems occur, first check whether any cables, plug-in connections of boards, etc are damaged and whether they are connected properly.

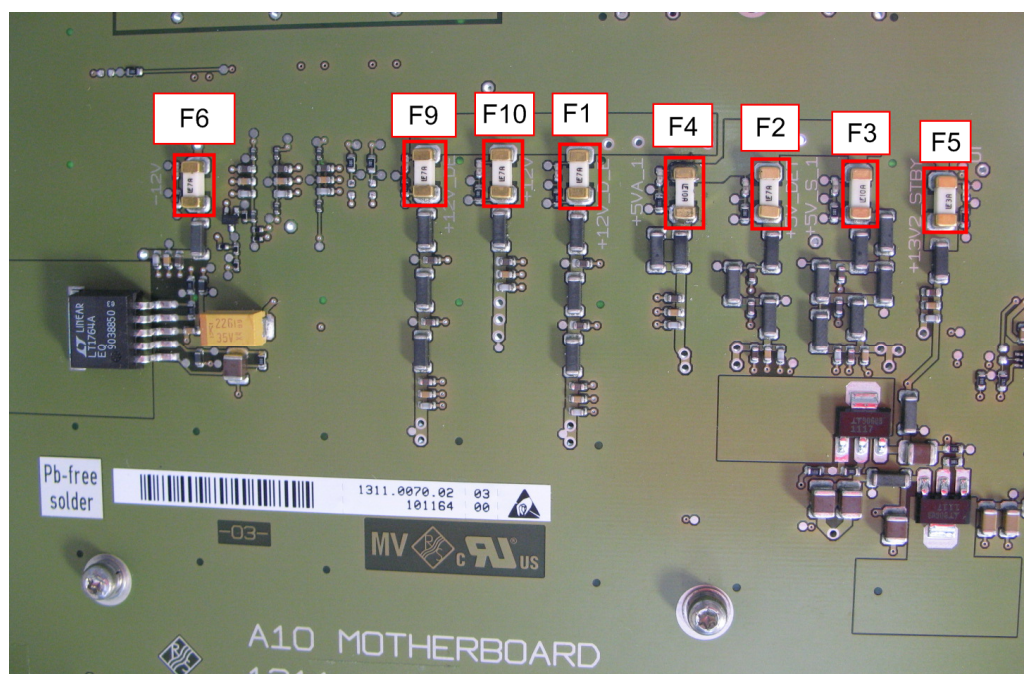
3.5.1 Measuring Equipment and Accessories

Item	Type of equipment	Specifications recommended	Equipment recommended	R&S-Order No.	Use
1	DC meter		R&S URE	0350.5315.02	Troubleshooting Start Up
2	Spectrum Analyzer		R&S FSP	1164.4391.07	Troubleshooting Frontend
3	Signal Generator		R&S SMR20	1104.0002.20	Troubleshooting Frontend

3.5.2 Troubleshooting Start-up Problems

3.5.2.1 Error: R&S FSVR cannot be switched on

- Check power-on switch at the rear.
- If the power switch is OFF: Switch on power supply.
- Check the cabling of the power supply unit. All connectors must fit to its sockets.
- If the power supply starts, but the screen remains dark, check the fuses at the bottom of the Motherboard. A blown fuse is indicated by a red light near the fuse. If a fuse is blown refer to chapter 3.4.18 for replacing it.
- If there is no defective fuse measure the voltages of the power rails on the motherboard:



F1	nominal value: +12,2V R&S FSVR40: +13,0 V	Power supply rail for detector base unit
F2	nominal value: +5,5V	Power supply rail for detector base unit
F3	nominal value: +5,5V	Power supply rail for front module controller
F4	nominal value: +5,5V	Power supply rail for analog modules
F5	nominal value: 13,5 V	Standby supply rail
F6	nominal value: -12,2 V	Negative voltage supply rail
F9	nominal value: +12,2V R&S FSVR40: +13,0 V	Power supply rail for detector extension unit
F10	nominal value: +12,2V R&S FSVR40: +13,0 V	Supply rail for analog modules

3.5.2.2 Error: Fan does not work

- Check voltage at connector: X83 or X84 pins 1+ 2 : rated value +12,2 V
- voltage o.k.: check green LED on Motherboard near the fuses. If there is no green light check voltages at fuse F4 according to 3.5.2.1.
 - fuse and voltage o.k.: The FPGA on the motherboard cannot load its configuration; the motherboard might be defective.
- green light o.k.: fan is blocked or fan is defective

3.5.2.3 Error: Fan speeds up and did not slow down after a while at room temperature or below

- check green LED on Motherboard near the fuses. If there is no green light, the motherboard might be defective.
- check if the instrument is working properly:
 - if the measurement application is not starting up check the frontend
 - If the instrument is working properly replace the fan

3.5.3 Troubleshooting Problems with the Boot Process

3.5.3.1 Error: R&S FSVR does not start the measurement application

Following switch-on, the R&S FSVR first boots the computer BIOS. After successful initialization of the computer, the Windows XP operating system starts up. Subsequently, the measurement application is loaded as start-up program. Simultaneously, self tests are performed at various locations and error messages, if any, are output. For troubleshooting, it is advisable to connect a keyboard to one of the USB sockets.

Starting the device

► Start R&S FSVR

Subsequent to switching on the R&S FSVR, the following BIOS message is displayed:

```
Phoenix - AwardBIOS v6.00PG, An Energy Star Ally
Copyright (C) 1984-2007, Phoenix Technologies, LTD.
R&S ANALYZER BIOS V7.0-4-62-1
Main Processor : Intel (R) Core(TM)2 Duo 2.28GHz (200x11.0)
Memory Testing :
```

Hardware test

The computer starts the hardware test. The test results are displayed on the screen. If errors occur during the boot procedure, these messages may indicate defects.

```
Phoenix - AwardBIOS v6.00PG, An Energy Star Ally
Copyright (C) 1984-2007, Phoenix Technologies, LTD.
R&S ANALYZER BIOS V7.0-4-62-1
Main Processor : Intel (R) Core(TM)2 Duo 2.28GHz (200x11.0)
Memory Testing : 4185024K OK + 8M shared memory
```

Note:

If no result of the memory test is indicated, the memory is defective.

Memory test

The memory test issues the memory capacity of the controller.

Hardware check

Subsequently, BIOS starts the hardware check and displays all PC boards found.

This procedure can be interrupted using the ESC key on the connected external keyboard; any other key continues the boot process.

```
Phoenix - AwardBIOS v6.00PG, An Energy Star Ally
Copyright (C) 1984-2007, Phoenix Technologies, LTD.
R&S ANALYZER BIOS V7.0-4-62-1
Main Processor : Intel (R) Core (TM)2 Duo 2.28GHz (200x11.0)
Memory Testing : 4185024K OK + 8M shared memory
CPU Brand Name : Intel (C) Core™2 Duo CPU      T7500 @ 2.28GHz
C1E Bios Supported
EM64T

Memory Frequency For DDR2 667 (Dual Channel Mode)
IDE Channel 0 Master : None
IDE Channel 0 Slave : None
IDE Channel 1 master : Fujitsu MHZ22080BH (depending on the installed hard
drive)
```

Note:

If this hard drive entry is missing, the hard drive may be faulty.

Operating system start

After this test, the BIOS has been loaded and the operating system is started.

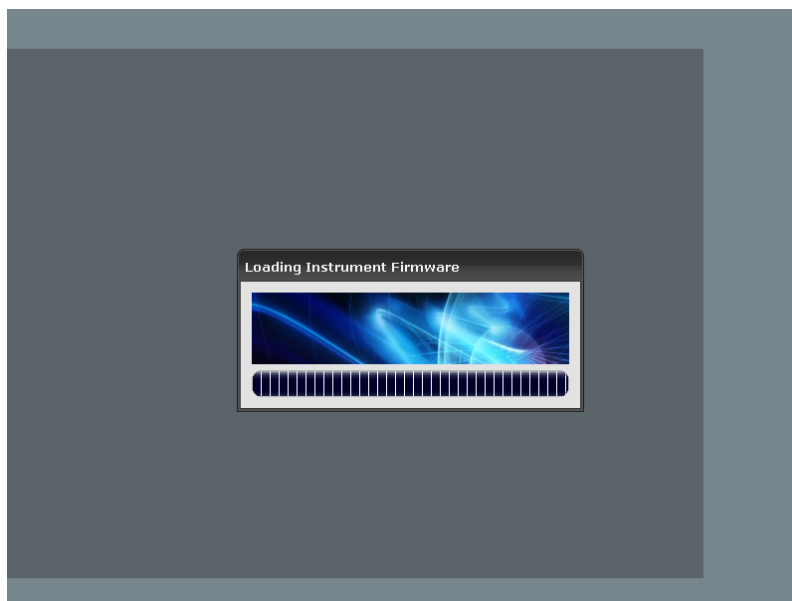


If the message "No System Disk or Disk error ..." is displayed at this point, the contents of the hard drive are not correct. Replace the hard drive.

If the operating system on the hard drive has been destroyed or cannot be loaded correctly, Windows XP reacts by displaying a "blue screen". This blue screen contains all essential information on the internal states of the computer. Be sure to have properly installed the harddrive to the instrument. (see chapter: 3.4.3) If harddrive is installed properly Windows XP and the instrument firmware must be updated. Contact the service to perform the update.

Application start

Subsequent to starting the operation system, the application for the R&S FSVR is loaded in a start-up program. The program start is initiated automatically and generates a window that displays information on the start-up procedure.



While starting the application reads the hardware information and sets up the measurement hardware. If the hardware information of the motherboard, the frontend, the step attenuator, the detector extension unit or the detector base unit can not be read the application denies starting by displaying an error message. In this case the module mentioned in the error message must be checked if the hardware information in the EEPROM on the module is correct and can be read properly. If there is no fault check the serial bus on the motherboard.

3.5.4 Troubleshooting Problems with the Frontend

3.5.4.1 Error: No level is displayed or the level is too small.

Test equipment:

Generator, spectrum analyzer

R&S FSVR setting:

Frequency: 10 MHz, Span: 0 Hz

Input:

Generator: 10 MHz, -20 dBm at X101

Output:

90 MHz, X103: Spectrum analyzer

Check level:

>-16 dBm at X103

Repeat measurement with output at X104

Check level on several frequencies:

Frequency	100 MHz	1000 MHz	3000 MHz	7000 MHz
Output level	> -18 dBm	>-18 dBm	>-20 dBm	>-24 dBm

If the level is ok, check the attenuator or the input cable.

3.5.5 Troubleshooting Problems with the Microwave Converter Unit

3.5.5.1 Error: No level is displayed or the level is too small ($f > 7$ GHz).

Test equipment:

Generator, spectrum analyzer

R&S FSVR setting:

Frequency: 7001 MHz, Span: 0 Hz

Input:

Generator: 7001 MHz, -20 dBm at X168 (Diplexer)

Output:

729.9 MHz, X159: Spectrum analyzer

Check level:

>-15 dBm at X159

Check level on several frequencies:

Frequency	10 GHz	13.5 GHz	22 GHz *)	29 GHz *)	39 GHz **)
Output level	> -15 dBm	>-15 dBm	>-15 dBm	>-15 dBm	>-15 dBm

If the level is ok, check the attenuator, input cable or frontend.

*) only models >13 GHz

**) only models >30 GHz

3.5.5.2 Level conditions at the diplexer**Test equipment:**

Generator, spectrum analyzer

f > 7 GHz:**R&S FSVR setting:**

Frequency: 7001 MHz, Span: 0 Hz

Input:

Generator: 7001 MHz, -20 dBm at X168

Output:

7001 MHz, X7: Spectrum analyzer

Check level:

>-23 dBm at X7

Check level on several frequencies:

Frequency	10 GHz	13.5 GHz	22 GHz *)	29 GHz *)	39 GHz **)
Output level	> -23 dBm	>-23 dBm	>-23 dBm	>-23 dBm	>-24 dBm

*) only models >13 GHz

**) only models >30 GHz

f < 7 GHz:**R&S FSVR setting:**

Frequency: 6999 MHz, Span: 0 Hz

Input:

Generator: 6999 MHz, -20 dBm at X168

Output:

6999 MHz, X169: Spectrum analyzer

Check level:

>-23 dBm at X169

3.5.5.3 Level conditions at the YIG filter unit**Test equipment:**

Generator, spectrum analyzer

R&S FSVR setting:

Frequency: 7001 MHz, Span: 0 Hz

Input:

Generator: 7001 MHz, -20 dBm at IN (YIG filter)

Output:

7001 MHz, OUT (YIG filter): Spectrum analyzer

Check level:

>-30 dBm at X2

Check level on several frequencies:

Frequency	10 GHz	13.5 GHz	22 GHz *)	29 GHz *)	39 GHz **)
Output level	> -30 dBm	>-30 dBm	>-30 dBm	>-30 dBm	>-30 dBm

*) only models >13 GHz

**) only models >30 GHz

3.5.5.4 Level conditions at the mixer (only models >13 GHz)**Test equipment:**

Generator, spectrum analyzer

R&S FSVR setting:

Frequency: 7001 MHz, Span: 0 Hz

Input:

Generator: 7001 MHz, -20 dBm at RF (mixer)

Output:

729.9 MHz, IF (mixer): Spectrum analyzer

Check level:

>-30 dBm at IF

LO > 11 dBm at X1501

Check level on several frequencies:

Frequency	10 GHz	13.5 GHz	22 GHz	29 GHz	39 GHz *)
Output level	>-30 dBm	>-30 dBm	>-30 dBm	>-30 dBm	>-35 dBm

LO level at X1501

Frequency	10 GHz	13.4 GHz	22 GHz	29 GHz	39 GHz *)
LO frequency	10.7299 GHz	14.1299 GHz	22.7299 GHz	28.2701 GHz	38.2701 GHz
LO level	> 11 dBm	>11 dBm	>6 dBm	>8 dBm	>0 dBm

*) only models >30 GHz

3.5.5.5 Level conditions at the IF signal path (only models >13 GHz)**Test equipment:**

Generator, spectrum analyzer

R&S FSVR setting:

Frequency: 7001 MHz, Span: 0 Hz

Input:

Generator: 729.9 MHz, -30 dBm at X1508

Output:

729.9 MHz, X159: Spectrum analyzer

Check level:

>-15 dBm at X159

Check level on several frequencies:

Frequency	10 GHz	13.5 GHz	22 GHz	29 GHz	39 GHz *)
Output level	> -15 dBm	>-15 dBm	>-15 dBm	>-15 dBm	>-15 dBm

*) only models >30 GHz

4 Software Update / Installing Options

This chapter contains information on updating software, restoring the operating-system installation and installing options to the R&S FSVR. Additional manuals obtained together with a software/firmware update or with subsequently acquired options can be filed here.

4.1 Installation of new R&S FSVR Software

For information on updating software refer to the release notes. The most recent version is provided on our Internet site at www.rohde-schwarz.com. You can also follow the link on the CD supplied with the instrument.

4.2 Installing Options

A list of all available hardware and software options is provided on our Internet site at www.rohde-schwarz.com. You can also follow the link on the CD supplied with the instrument.

For retrofitting, note the mounting instructions enclosed with the options.



WARNING

Shock hazard

Before opening the housing, ensure that the instrument is switched off and disconnected from the power supply by removing the plug from the AC and DC power connector.

Read all safety instructions at the beginning of this manual carefully!

NOTICE

Risk of electrostatic discharge

Protect the operational site against electrostatic discharge to avoid damage to electronic components of the modules. For details refer to the safety instructions at the beginning of this manual.

When installing hardware options, note the following:

- ▶ Switch off the instrument and disconnect the power supply cables.
 - Unscrew that part of the rear-panel where the option has to be inserted.
 - Plug in the option and fix it using the screws you previously removed.
 - Switch on the R&S FSVR.
 - Install additional software, if supplied, according to the instructions enclosed with the option.
 - If an adjustment is required for this option, the appropriate notes can be found in the installation instructions for the option.

5 Documents

This chapter provides information on the ordering of spare parts and contains the spare part list and the documents for the complete R&S FSVR unit.

5.1 Spare Parts

The stock numbers necessary for ordering replacement parts and modules can be found in the spare part list further down.

NOTICE

Risk of damaging a module

When shipping a module, observe the instructions provided in the section titled "Procedure in Case of Service and Ordering of Spare Parts" at the beginning of this document.

Pos.	Designation	Stock No.	No.	Electr. design.	Rec. spare parts
Drawing 1311.0006.01 sheet 1, 2, 3 (R&S FSVR Real-Time Spectrum Analyzer)					
20	UNIT FRAME FSVR	1311.0112.00	1		
25	FAN 119X119X38	1304.7021.00	1		X
30	POWER SUPPLY UNIT (FSVR 7/13/30)	1311.0506.02	1		X
35	POWER SUPPLY UNIT (FSVR 40)	1311.0506.03	1		X
40	SCREW	0794.7130.00	2		
45	SCREW	1148.2817.00	2		
50	HOLDER	0794.5214.00	1		
60	CABLE TIE	0015.9038.00	1		
70	POWER ENTRY MODUL	1160.2988.00	1	A51	X
80	FUSE DRAWER EXTRA SAVE	1160.2994.00	1		
90	TIME LAG FUSE T6.3H	0020.7630.00	2		
100	GROUND WIRE	1300.2731.00	1		
120	MOTHERBOARD FSVR	1311.0070.02	1	A10	X
128	SERRATED LOCK WASHER	3583.1578.00	3		
129	NUT	3583.1561.00	3		
130	SCREW	1148.3059.00	13		
140	LOCKING SCREW	1093.9180.00	2		

Pos.	Designation	Stock No.	No.	Electr. design.	Rec. spare parts
150	FRONTMODUL CONTR. 9/6	1206.0198.00	1	A90	X
159	3.0 V 230MAH LI-MNO2 CR2032	0858.2049.00	1		X
160	SCREW	1148.3059.00	9		
175	BIOS FOR FMR9	1308.2324.00	1		
190	2XRJ45 COUPLER JACK STRAIGHT	1093.9122.00	1	X90	X
192	SILICONE CORD RD4X8MM	1130.0164.00	1		
200	PATCHCABLE CAT.6. 0.5M	0041.9283.00	1	W90	
210	SATA ADAPTOR	1308.0280.00	1	A92	X
220	SCREW	1304.9199.00	2		
240	SATA DATACABLE 500	3585.8234.00	1	W91	
250	SATA POWERCABLE 440	1091.3433.00	1	W92	
260	GROMMET 14X24X7	0099.1440.00	1		
270	REMOVEABLE HARD DRIVE FSVR	1307.9248.04	1		
275	SATA HARD DRIVE WITH SOFTWARE FSVR	1307.9448.04	1	A91	X
278	HOLDER	1201.8161.00	2		X
280	OPERATING SYSTEM	1099.8570.00	1		
290	IMAGE SOFTWARE	0048.7540.00	1		
300	ADAPTERBOARD	1307.9919.02	1	A11	X
310	FLEX-STRIP.16P. R=0.5 L=75	1308.1034.00	1	W20	
320	FLEX-STRIP.16P. R=0.5 L=150	1308.1040.00	1	W61	
405	FRONT UNIT FSVR	1307.9025.04	1		
410	SCREW	1148.3288.00	4		
412	LABEL FSVR 10HZ ... 7GHZ (FSVR 7)	1311.0470.00	1		
413	LABEL CONNECTOR STANDARD	1308.0296.00	1		X
414	LABEL FSVR 10HZ ... 13GHZ (FSVR 13)	1311.0487.00	1		
415	LABEL FSVR 10HZ ... 30GHZ (FSVR 30)	1311.0493.00	1		
416	LABEL FSVR 10HZ ... 40GHZ (FSVR 40)	1311.0970.00	1		
420	RF CABLE W1 (FSVR 7)	1308.0321.00	1	W1	X
422	RF CABLE W1 (FSVR 13)	1308.0880.00	1	W1	
423	ADAPTOR (FSVR 13)	0343.0257.00	1		X
425	MOUNTING PLATE (FSVR 7/13)	1093.4750.00	1		
430	SCREW	1148.3288.00	4		
440	ADAPTOR (FSVR 30)	1021.0493.00	1		X
450	TESTPORT-ADAPTOR (FSVR 40)	1036.4702.00	1		X

Pos.	Designation	Stock No.	No.	Electr. design.	Rec. spare parts
460	MOUNTING PLATE (FSVR 30/40)	1093.4772.00	1		
470	RF CABLE W1 (FSVR 30)	1308.0838.00	1	W1	
480	RF CABLE W1 (FSVR 40)	1308.0896.00	1	W1	
500	ATTENUATOR 7GHZ (FSVR 7)	1137.1408.02	1	A40	X
510	ATTENUATOR (FSVR 13/30/40)	1046.5101.05	1	A40	X
520	SCREW (FSVR 7)	1148.3059.00	4		
525	SCREW (FSVR 13/30)	1148.3059.00	2		
530	ATTENUATOR CABLE	1308.0815.00	1	W40	
550	FRONTEND	1311.0512.02	1	A100	X
560	DETECTOR BASE UNIT	1311.0012.02	1	A120	X
565	DETECTOR EXTENSION UNIT	1311.0035.02	1	A130	X
568	MW CONVERTER UNIT 13.6GHZ (FSVR 13)	see Table 5-1	1	A150	X
570	MW CONVERTER UNIT 30 GHZ (FSVR 30)	see Table 5-1	1	A150	X
580	MW CONVERTER UNIT 40 GHZ (FSVR 40)	see Table 5-1	1	A150	X
600	RF CABLE W2 (FSVR 7)	1311.0335.00	1	W2	
602	RF CABLE W2 (FSVR 13/30/40)	1311.0341.00	1	W2	
605	RF CABLE W3/4	1164.6271.00	2	W3	
620	RF CABLE W5 (FSVR 13/30/40)	1308.0850.00	1	W5	
630	RF CABLE W6 (FSVR 13/30/40)	1308.0867.00	1	W6	
640	RF CABLE W7 (FSVR 13/30/40)	1308.0873.00	1	W7	
652	BAFFLE PLATE (FSVR 7)	1308.1370.00	1		
700	TOP COVER	1311.0258.00	1		
705	SCREW	1148.3288.00	6		
710	COVER	0852.0467.00	1		
720	REAR PLATE OPTION	1307.9519.00	3		
725	REAR PLATE LVDS	1307.9525.00	1		
730	REAR PLATE OCXO	1307.9531.00	2		
735	SCREW	1148.3288.00	24		
750	CASE FSVR 4HU 7/8 D450	1311.0293.00	1		
755	FRONT HANDLE	1096.1480.00	2		
760	SCREW	1096.4896.00	4		
765	REAR WALL FOOT	1096.2493.00	4		
770	LABEL F. REAR PANEL FOOT	1096.2435.00	1		
780	ACCESSORIES (FSVR 7/13)	1311.0364.00	1		

Pos.	Designation	Stock No.	No.	Electr. design.	Rec. spare parts
785	ACCESSORIES (FSVR 30)	1311.0370.00	1		
790	ACCESSORIES (FSVR 40)	1311.1148.00	1		
Drawing 1307.9025.01 (Frontpanel R&S FSVR)					
800	FRONT COVER FSVR	1311.0464.00	1		
805	SEALING	0396.1035.00	1.1 M		
810	PUSH-BUTTON BOARD SET	1307.9083.00	1	A80	X
820	FLEX. SWITCH BOARD	1307.9090.00	1	A81	X
830	SHROUD	0852.1234.00	1		
845	KEYBOARD HOLDER	1311.0764.00	1		
850	SCREW	1300.4457.00	12		
860	ROTARY PULS-GENERATOR	0852.2799.00	1	A70	X
865	CABLE TIE	0015.9038.00	1		
870	COLLER WITH NUT	0852.2699.00	1		
875	KNOB	0852.1128.00	1		
883	TOUCH-CONTROLLER-USB-BOARD-2	1308.1492.02	1	A60	X
884	HOLDER TOUCH CONTROLLER	1308.1628.00	1		
888	SCREW	1148.3059.00	4		
890	SCREW	1300.4457.00	2		
892	CABLE	2085.4350.00	1	W60	
902	DISPLAY WITH TOUCHSCREEN	1311.0787.00	1	A30	X
903	LED BACKLIGHT CABLE	1308.2201.00	1		
904	DISPLAYCABLE TOSHIBA 100MM	1308.1657.00	1		
905	RUBBER SEAL 2.0MM. BLACK	1308.1011.00	0,7 M		
945	HOLDER	0794.5214.00	1		
946	CABLE TIE	0015.9038.00	1		
970	CABLE W31 LST BOARD - FMR	1307.9425.00	1	W31	
980	FRONTCONNECTOR BOARD	1307.9890.02	1	A20	X
990	DIE CAST SCREW 2.5X6	1300.4457.00	4		
1005	DISPLAY SHIELDING	1311.0770.00	1		
1010	SCREW	1148.3059.00	4		
Drawing 1308.1192.01 sheet 3,4 (MW Converter Unit 13 GHz) (R&S FSVR 13)					
2000	MW CONVERTER13	1308.1157.02	1	A150	
2005	PREAMPLIFIER UNIT	1164.5481.02	1		X
2006	SCREW	1148.2769.00	2		

Pos.	Designation	Stock No.	No.	Electr. design.	Rec. spare parts
2012	YIG-UNIT 13.6 GHZ (MICRO LAMBDA)	1308.1205.17	1	A152	X
2022	YIG-UNIT 13.6 GHZ (TELEDYNE)	1308.1205.18	1	A152	X
2030	SCREW	1148.3059.00	3		
2040	RELAIS UNIT 13GHZ	1164.6113.13	1		X
2050	DIPLEXER 46	1162.1120.05	1	A151	X
2055	HOLDING PLATE	1308.2299.00	1		
2060	SCREW	1148.3059.00	2		
2065	SCREW	1096.5205.00	2		
2070	A SIDE COVER MWC (BOTTOM)	1313.0090.00	1		
2075	B SIDE COVER MWC (TOP)	1308.1228.00	1		
2080	RF CABLE W168	1308.1334.00	1		
2083	RF CABLE W180	1308.2218.00	1		
2086	RF CABLE W184	1308.2253.00	1		
2088	RF CABLE W187	1308.2282.00	1		
2090	RF CABLE W190	1308.2424.00	1		
2092	RF CABLE W153	1308.0938.00	1		
2094	RF CABLE W173	1308.2060.00	1		
2099	BAR CODE LABEL	0071.7714.00	1		
Drawing 1307.9748.01 sheet 3, 4 (MW Converter Unit) (R&S FSVR 30/40)					
2100	MW CONVERTER	1308.0721.02	1	A150	
2102	MW CONVERTER	1308.0721.04	1	A150	
2105	MW CONVERTER	1308.0721.03	1	A150	
2107	MW CONVERTER	1308.0721.05	1	A150	
2108	PREAMPLIFIER UNIT	1164.5481.02	1		X
2109	SCREW	1148.2769.00	2		
2112	YIG-UNIT 30GHZ (R&S)	1308.1292.36	1		X
2122	YIG-UNIT 30GHZ (MICRO LAMBDA)	1308.1292.37	1		X
2162	YIG-UNIT 40GHZ (R&S)	1308.1292.46	1		X
2165	RELAIS UNIT 40GHZ	1164.6113.40	1		X
2167	VELCRO-STRIP ONE-WRAP 16 MM	5500.8537.00	0.04M		
2170	SCREW	1148.3059.00	3		
2180	MIXER M1	1307.1501.02	1	A153	X
2190	DIPLEXER 46	1162.1120.05	1	A151	X
2192	HOLDING PLATE	1308.2299.00	1		

Pos.	Designation	Stock No.	No.	Electr. desig.	Rec. spare parts
2205	SCREW	1096.5205.00	4		
2207	SCREW	1096.5205.00	2		
2210	A SIDE COVER MWC	1308.1170.00	1		
2220	B SIDE COVER MWC	1308.1186.00	1		
2225	RF CABLE W153	1308.0938.00	1		
2230	RF CABLE W167	1308.1328.00	1		
2235	RF CABLE W156	1308.0967.00	1		
2240	RF CABLE W168	1308.1334.00	1		
2250	RF CABLE W180	1308.2218.00	1		
2260	RF CABLE W184	1308.2253.00	1		
2265	RF CABLE W187	1308.2282.00	1		
2270	RF CABLE W190	1308.2424.00	1		
2290	BAR CODE LABEL	0071.7714.00	1		
Drawing 1310.9700.00 (Option FSV-B3 1310.9516.02)					
1200	AF OUTPUT	1308.0144.02	1	A71	X
1205	FLEX-STRIP 10P. R=0.5 L=150	3584.6696.00	1	W71	
1210	SCREW	1148.3288.00	2		
1220	KNOB	4066.1169.00	1		
1230	SHROUD	0852.1228.00	1		
1240	SPEAKER	1308.0809.00	1	B1	X
1250	SPEAKER BRACKET	1308.0580.00	1		
1260	SCREW	1300.4457.00	4		
1270	LABEL CONNECTOR (OPTION)	1308.0309.00	1		
Drawing 1310.9716.00 (Option FSV-B4 1310.9522.02/03)					
1300	OCXO (VAR02)	1300.3180.05	1	A250	X
1302	OCXO HIGH PERFORMANCE (VAR03)	1300.3180.07	1	A250	X
Drawing 1310.9716.00 (Option FSV-B5 1310.9539.02)					
1400	ADDITIONAL INTERFACE	1307.9831.02	1	A220	X
Drawing 1310.9845.00 (Option FSV-B17 1310.9568.02)					
1900	DIGITAL BASEBAND INTERFACE	1307.9877.02	1	A240	X
Drawing 1310.9716.00 (Option FSVR-B18 1310.9697.04)					
2520	SSD WITH SOFTWARE	1307.9448.06	1		X
2530	HOLDER	1201.8161.00	2		X
2540	HOLDER HARD DRIVE	1307.9460.00	1		

Pos.	Designation	Stock No.	No.	Electr. design.	Rec. spare parts
Drawing 1310.9716.00 (Option FSVR-B19 1310.9574.04)					
1606	SATA HARD DRIVE WITH SOFTWARE	1307.9448.04	1		X
1607	HOLDER	1201.8161.00	2		X
1609	HOLDER HARD DRIVE	1307.9460.00	1		
Drawing 1308.1963.00 (Option FSV-B21 1310.9597.02)					
1805	RF CABLE W18	1311.0429.00	1	W18	X
1810	RF CABLE W19	1308.1957.00	1	W19	X
1820	HOLDER EXT. MIXER	1157.1103.00	1		
1830	SCREW	1148.3288.00	2		
1840	PROTECTION CAP	1066.2095.00	2		
1850	LABEL CONNECTOR	1308.0315.00	1		X
1860	COVER	0009.9200.00	1		
1870	COVER	0009.9181.00	1		
1880	COVER	3585.4545.00	1		
1895	ACCESSORIES	1164.6307.00	1		
Drawing 1307.9748.01, sheet 2 (Option FSV-B24 1310.9616.13/30/40)					
	MW CONVERTER UNIT 13.6/30 GHZ	see Table 5-1		A150	X

MWC Unit Overview

Depending on if your R&S FSVR has the option R&S FSV-B21, R&S FSV-B24, both or none of them, you will need a certain MWC Unit as shown in the table below.

FSVR Model	Option R&S FSV-B21	Option FSV-B24	Stock No.	No.	Electr. design.	Rec. spare parts
R&S FSVR13			1308.1192.15	1	A150	X
R&S FSVR13		X	1308.1192.16	1	A150	X
R&S FSVR30			1307.9748.36	1	A150	X
R&S FSVR30	X		1307.9748.32	1	A150	X
R&S FSVR30		X	1307.9748.37	1	A150	X
R&S FSVR30	X	X	1307.9748.33	1	A150	X
R&S FSVR40			1307.9748.46	1	A150	X
R&S FSVR40	X		1307.9748.42	1	A150	X
R&S FSVR40		X	1307.9748.47	1	A150	X
R&S FSVR40	X	X	1307.9748.43	1	A150	X

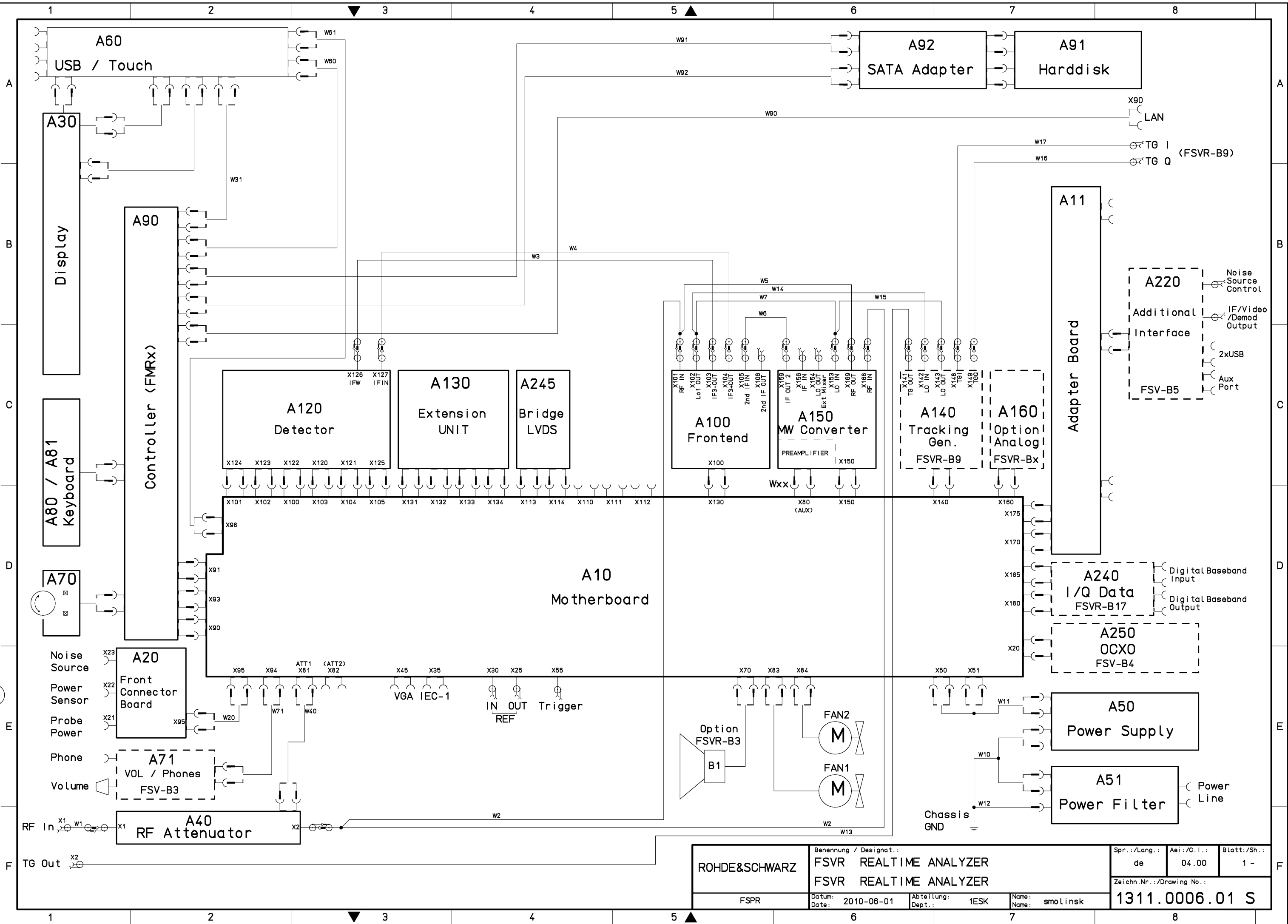
Table 5-1: MWC Unit Overview

5.2 Available Power Cables

Stock No.	Earthed-contact connector	Preferably used in
DS 0006.7013.00	BS1363: 1967' 10 A, 250 V complying with IEC 83: 1975 standard B2	Great Britain
DS 0006.7020.00	Type 12, 10 A, 250 V complying with SEV-regulation 1011.1059, standard sheet S 24 507	Switzerland
DS 0006.7036.00	Type 498/13, 10 A, 250 V complying with US-regulation UL 498, or with IEC 83	USA/Canada
DS 0041.4752.00	GB2099, GB1002, 10 A, 250 V approvals CCC	China
DS 0041.6232.00	JIS C 8303, 7A, 125 V AC approvals PSE (JET)	Japan
DS 0006.7107.00	Type SAA3, 10 A, 250 V, complying with AS C112-1964 Ap.	Australia
DS 0025.2365.00 DS 0099.1456.00	DIN 49 441, 10 A, 250 V, angular DIN 49 441, 10 A, 250 V, straight approvals VDE, ÖVE, CEBEC, KEMA, S, D, N, FI, LCIE, IMQ, UCIEE	Europe (except Switzerland)

5.3 Mechanical Drawings

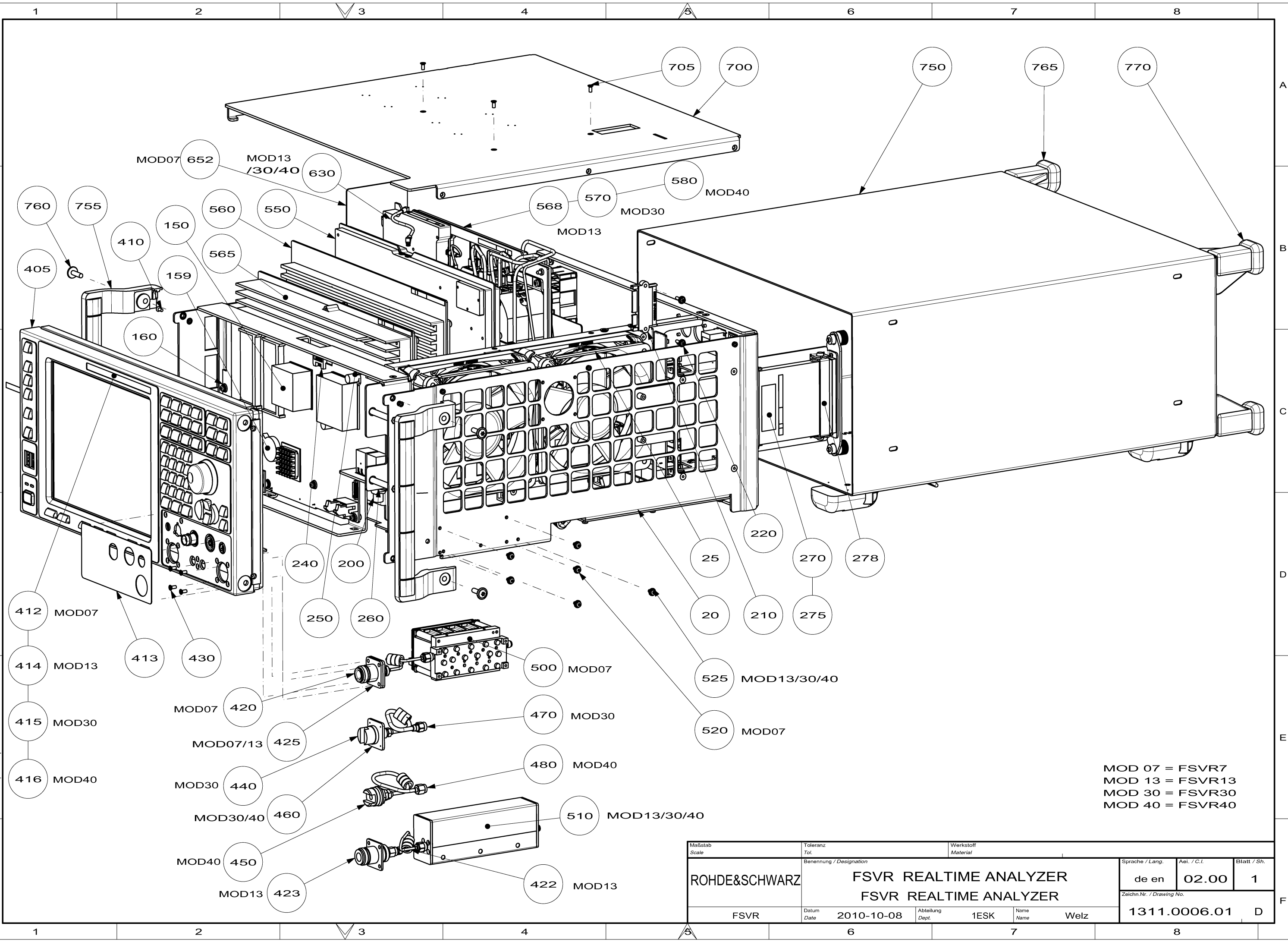
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ROHDE&SCHWARZ	Benennung / Designat.: FSVR REALTIME ANALYZER FSVR REALTIME ANALYZER			Spr.:/Lang.: de	Aei:/C.I.: 04.00	Blatt:/Sh.: 1 -
	FSPR	Datum: Date: 2010-06-01	Abteilung: Dept.: 1ESK	Name: Name: smolinsk	Zeichn.Nr./Drawing No.: 1311.0006.01 S	

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Projektions-
methode
Projection
Method



MOD 07 = FSVR7
MOD 13 = FSVR13
MOD 30 = FSVR30
MOD 40 = FSVR40

Maßstab Scale	Toleranz Tol.	Werkstoff Material										
ROHDE&SCHWARZ	Benennung / Designation					Sprache / Lang.		Ael. / C.I.		Blatt / Sh.		
	FSVR REALTIME ANALYZER FSVR REALTIME ANALYZER					de en		02.00		1		
						Zeichn.Nr. / Drawing No.						
FSVR	Datum Date	2010-10-08	Abteilung Dept.	1ESK	Name Name	Welz		1311.0006.01				D

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view A

PE
(protective earth)

connect with power
input cable from
power supply unit

connect with cable
powersupply-motherboard
from power supply unit

licence label

Projektions-
methode
Projection
Method

MOD 07 = FSVR7
MOD 13 = FSVR13
MOD 30 = FSVR30
MOD 40 = FSVR40

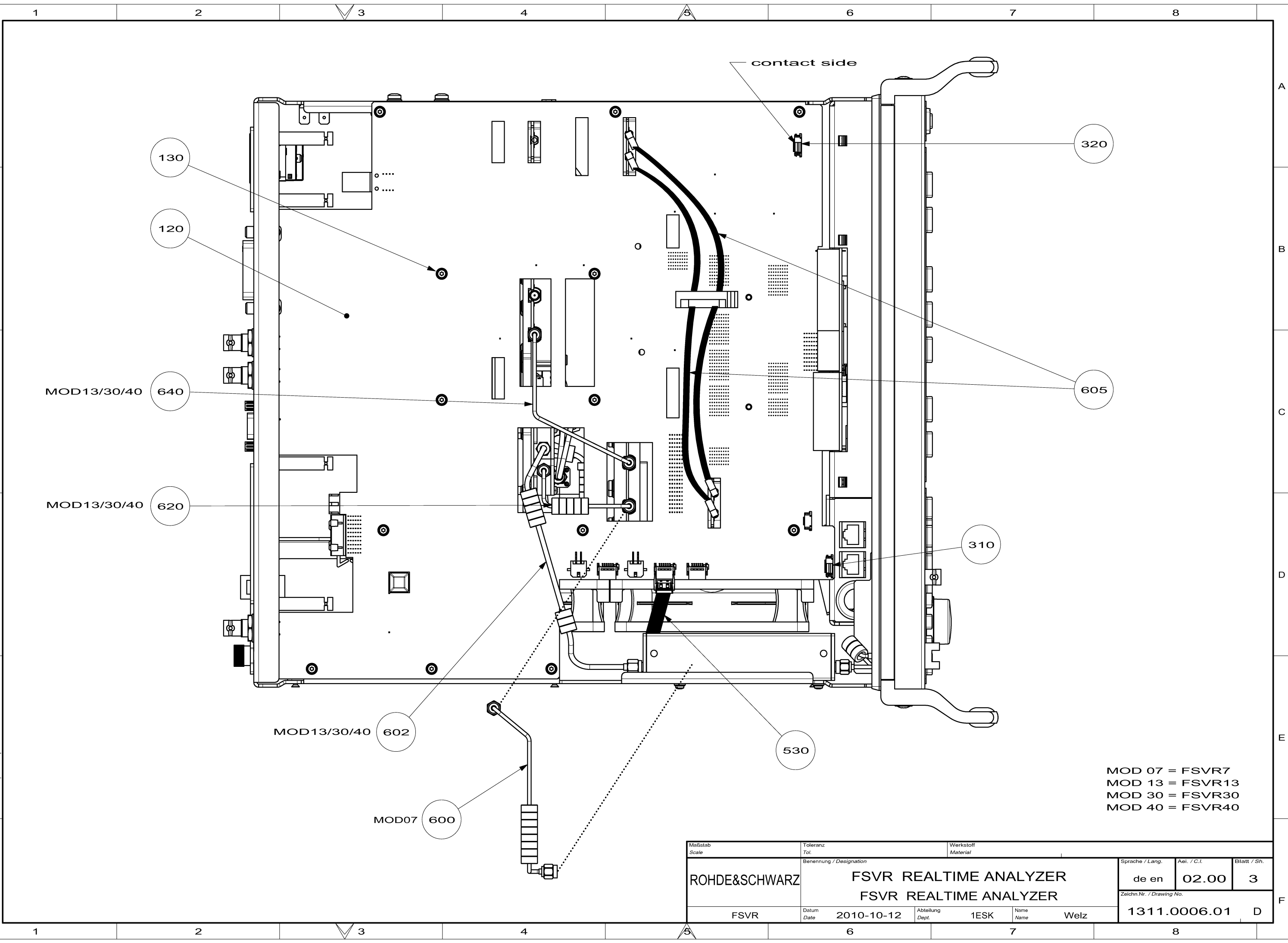
Maßstab Scale	Toleranz Tol.	Werkstoff Material			
Benennung / Designation			Sprache / Lang.	Ärl. / C.I.	Blatt / Sh.
ROHDE&SCHWARZ			de en	03.00	2
FSVR			Zeichn.Nr. / Drawing No.		
Datum Date			Abteilung Dept.	Name Name	Welz
2010-10-12			1ESK	Welz	
			1311.0006.01		

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Projektions-
methode
Projection
Method



A
B
C
D
E
F



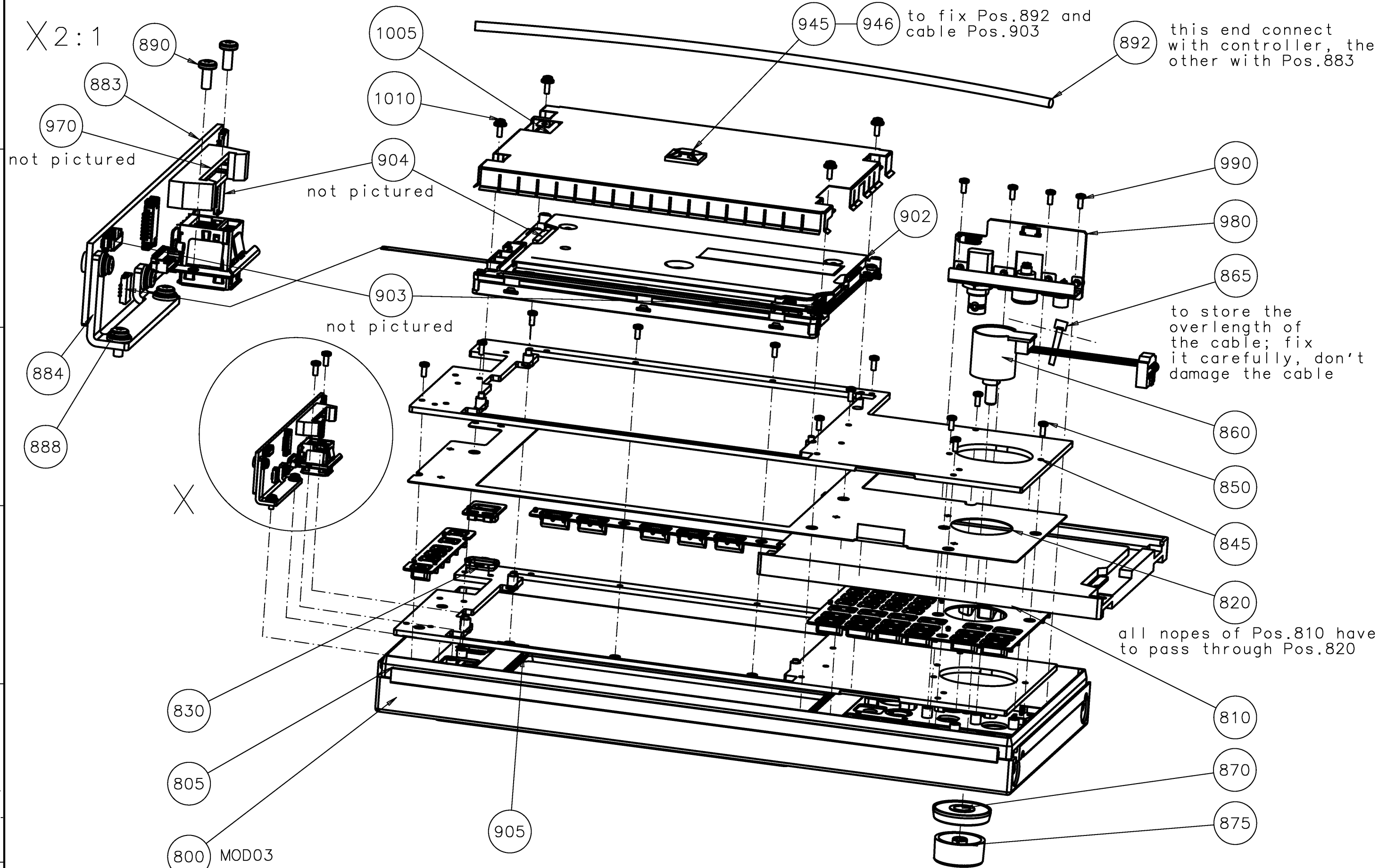
MOD 07 = FSVR7
MOD 13 = FSVR13
MOD 30 = FSVR30
MOD 40 = FSVR40

Maßstab Scale	Toleranz Tol.	Werkstoff Material			
Benennung / Designation			Sprache / Lang.	Ävl. / C.I.	Blatt / Sh.
ROHDE&SCHWARZ			de en	02.00	3
FSVR			Zeichn.Nr. / Drawing No.		
Datum Date			Abteilung Dept.	Name Name	
2010-10-12			1ESK	Welz	
			1311.0006.01		
			D		

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Projektions-
methode
Projection
Method

X 2:1



Versions:
MOD03 = FSV with LED backlight display
MOD04 = FSVR

Maßstab Scale	Toleranz Tol.	Werkstoff Material	Sprache / Lang. Ael. / C.I.		Blatt / Sh.
ROHDE&SCHWARZ	Benennung / Designation	FRONTEINHEIT FSV FRONT UNIT FSV	de en	06.00	1
FSV	Datum Date	2010-06-01	Abteilung Dept.	1ESK	Name Name WM
			Zeichn.Nr. / Drawing No. 1307.9025.01 D		

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Projektions-
methode
Projection
Method

2115 2125 or 2145
MOD31/35/41
/45/51/55

2192 MOD31/35/41
/45/51/55

2260 MOD31/35/41
/45/51/55

2207 MOD31/35/41
/45/51/55

2167 to fix the power cable
of the YIG filter

2220

2180

2270

MOD31/35/41
/45/51/55

2100

2102, 2104,
2105, 2106,
or 2107
MOD31/35/41
/45/51/55

2290

2230

2109

MOD31/35/41
/45/51/55

2210

2108

MOD31/35/41
/45/51/55

2170

2250

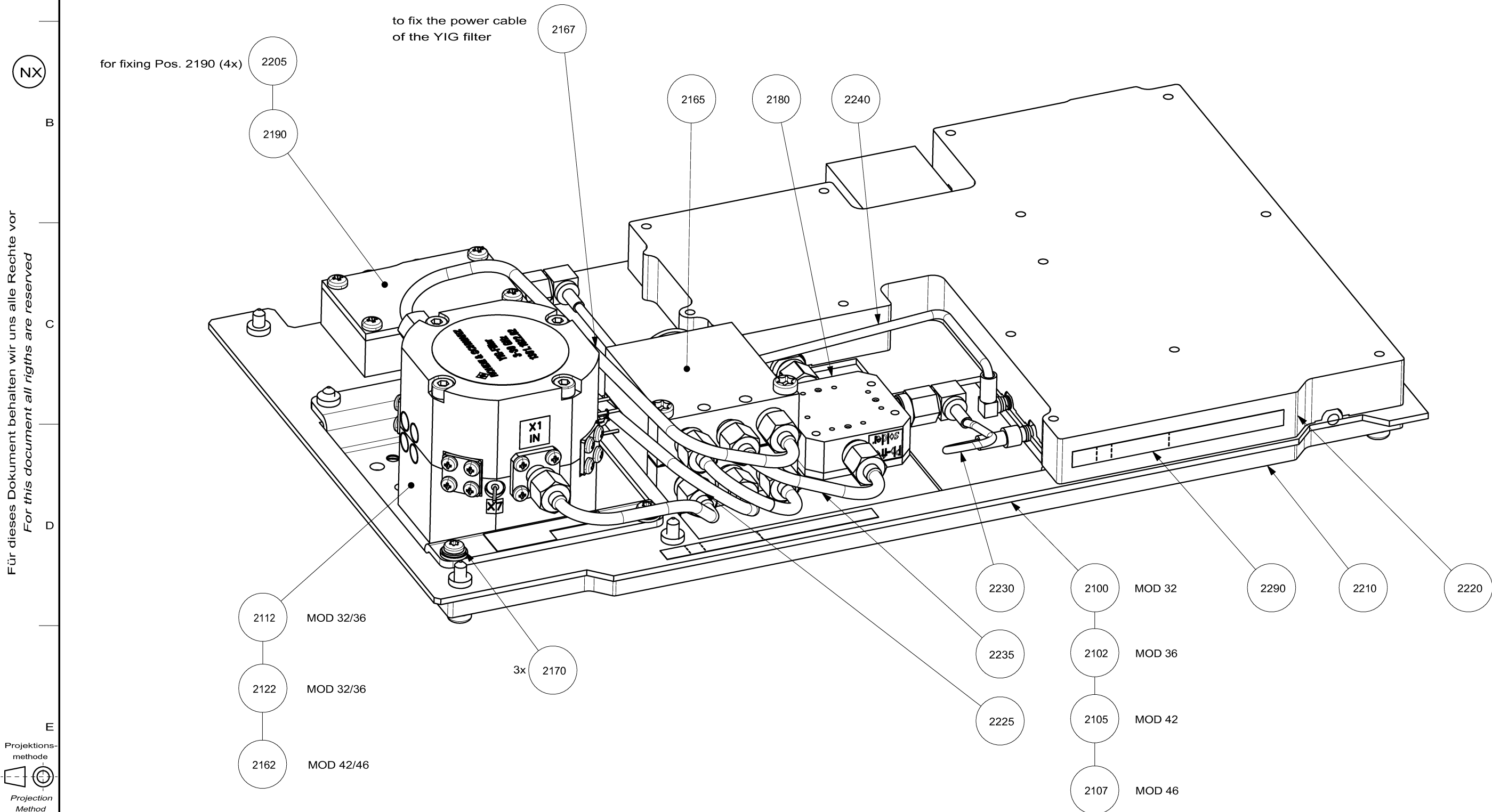
MOD31/35/41
/45/51/55

Versions:
MOD31=FSV30 FSV-B24 + FSV-B21
MOD35=FSV30 FSV-B24
MOD41=FSV40-MOD40 FSV-B24 + FSV-B21
MOD45=FSV40-MOD40 FSV-B24
MOD51=FSV40-MOD39 FSV-B24 + FSV-B21
MOD55=FSV40-MOD39 FSV-B24

Maßstab Scale	Toleranz Tol.	Werkstoff Material	Sprache / Lang. Ael. / C.I.	Blatt / Sh.
ROHDE&SCHWARZ	Benennung / Designation	MW-CONVERTER UNIT MW CONVERTER UNIT	de en 02.00	2
FSV	Datum Date 2010-01-20	Abteilung Dept. 1ESK	Name Name WM	Zeichn.Nr. / Drawing No. 1307.9748.01 D

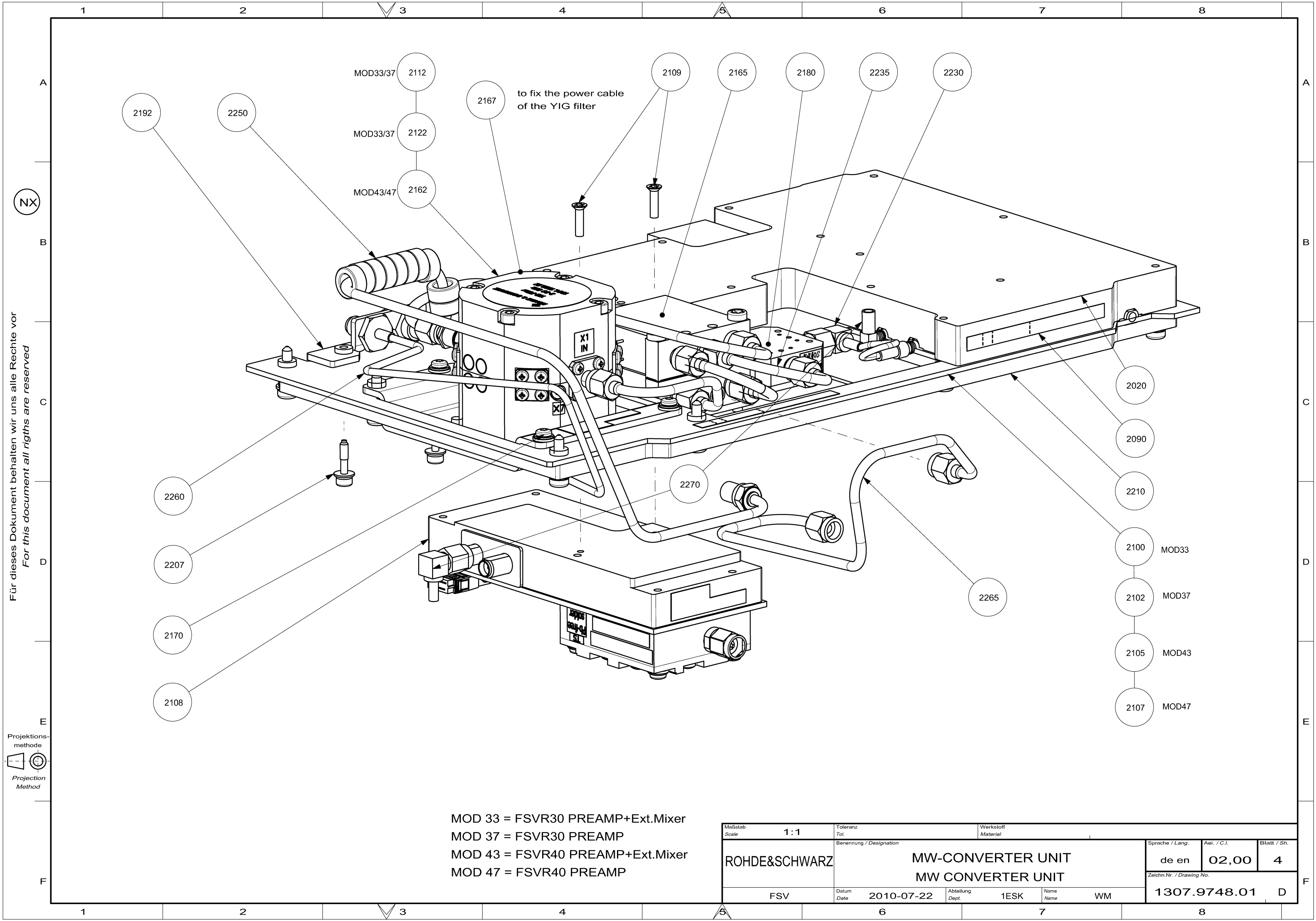
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Projektions-
methode
Projection
Method



Versions:
MOD 32 = FSVR30 Ext.Mixer+RL
MOD 36 = FSVR30 RL
MOD 42 = FSVR40 Ext.Mixer+RL
MOD 46 = FSVR40 RL

Maßstab Scale	1:1	Toleranz Tol.	Werkstoff Material	Sprache / Lang.			Ael. / C.I.	Blatt / Sh.
ROHDE&SCHWARZ		Benennung / Designation			de en	02,00	3	
FSV		Datum Date	2010-07-21	Abteilung Dept.	1ESK	Name Name	Welz	Zeichn.Nr. / Drawing No.
		MW-CONVERTER UNIT MW CONVERTER UNIT			1307.9748.01			D



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Projektions-
methode
Projection
Method

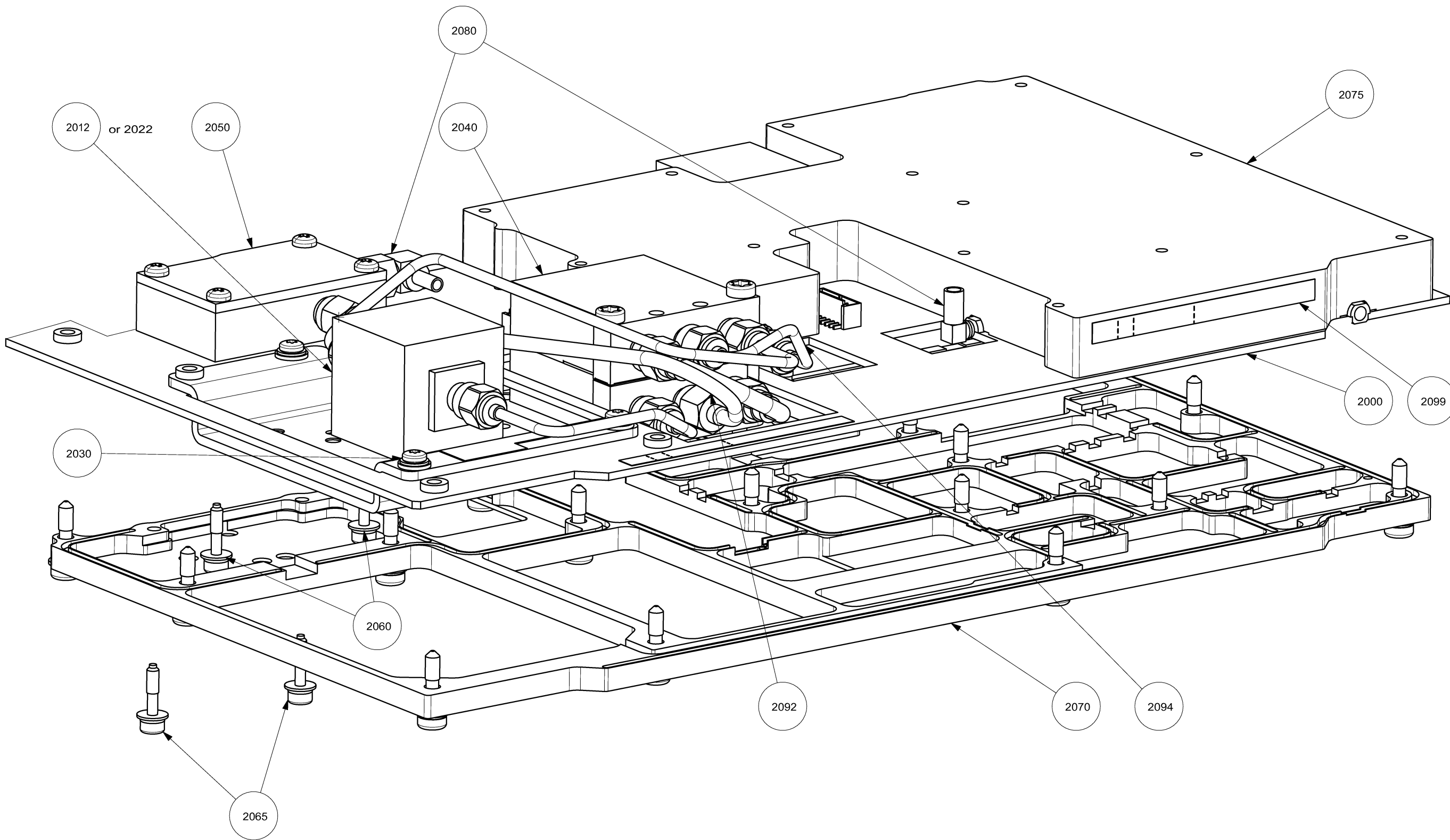
MOD 33 = FSVR30 PREAMP+Ext.Mixer
MOD 37 = FSVR30 PREAMP
MOD 43 = FSVR40 PREAMP+Ext.Mixer
MOD 47 = FSVR40 PREAMP

Maßstab Scale	1:1	Toleranz Tol.		Werkstoff Material								
ROHDE&SCHWARZ		Benennung / Designation MW-CONVERTER UNIT MW CONVERTER UNIT				Sprache / Lang.		Ael. / C.I.		Blatt / Sh.		
						de en		02,00		4		
						Zeichn.Nr. / Drawing No.						
FSV		Datum Date	2010-07-22	Abteilung Dept.	1ESK	Name Name		WM		1307.9748.01		D

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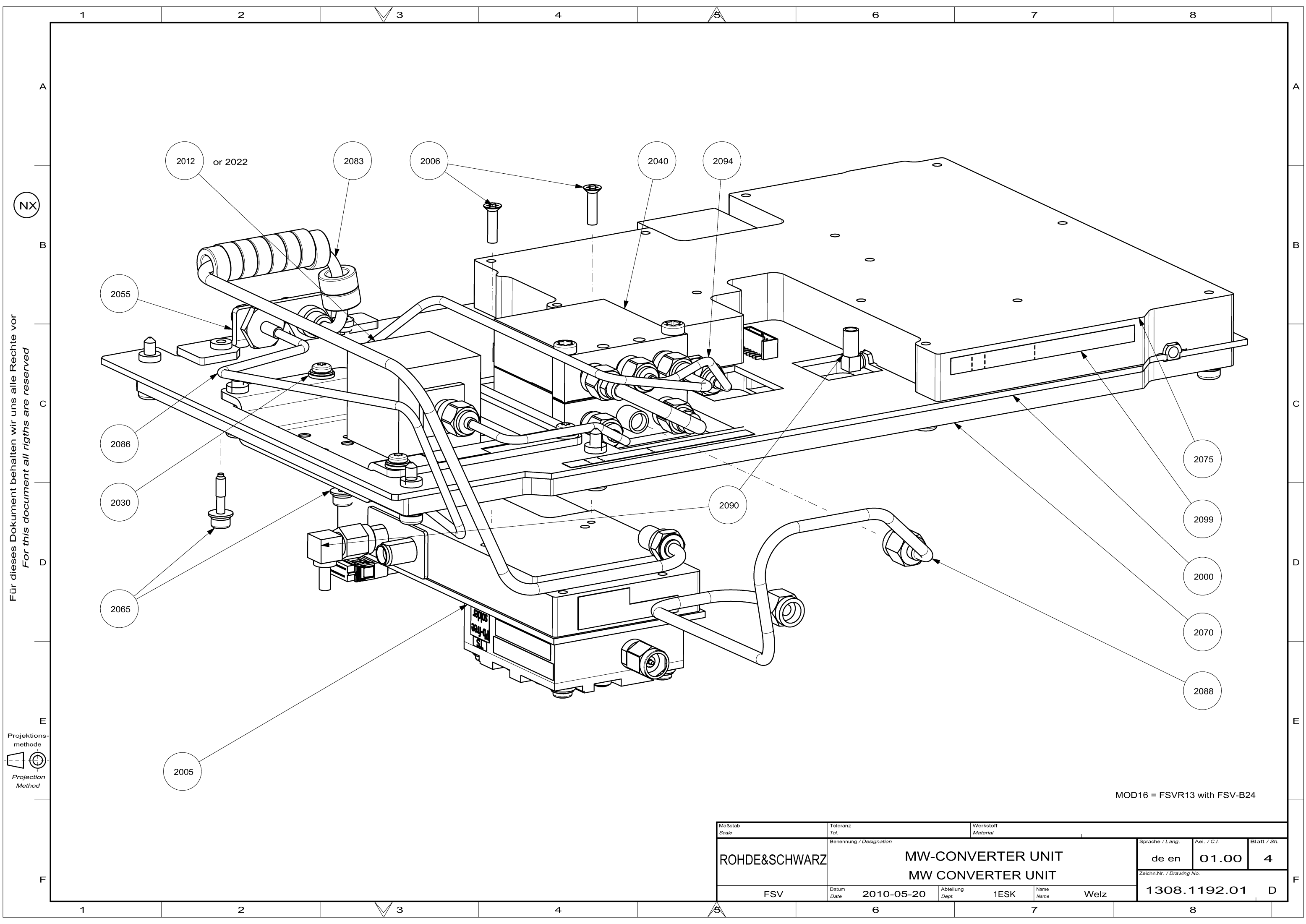
NX

Projektions-
methode
Projection
Method



MOD15 = FSVR13

Maßstab Scale	Toleranz Tol.		Werkstoff Material		Sprache / Lang.		Ael. / C.I.	Blatt / Sh.
ROHDE&SCHWARZ	Benennung / Designation		MW-CONVERTER UNIT MW CONVERTER UNIT		de en	01.00	3	
FSV	Datum Date	2010-05-20	Abteilung Dept.	1ESK	Name Name	Welz	Zeichn.Nr. / Drawing No. 1308.1192.01	



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Projektions-
methode

Projection
Method

MOD16 = FSVR13 with FSV-B24

Maßstab Scale		Toleranz Tol.		Werkstoff Material						
ROHDE&SCHWARZ		Benennung / Designation MW-CONVERTER UNIT MW CONVERTER UNIT			Sprache / Lang.		Ael. / C.I.	Blatt / Sh.		
					de en		01.00	4		
		FSV		Datum Date	2010-05-20	Abteilung Dept.	1ESK	Name Name	Welz	Zeichn.Nr. / Drawing No. 1308.1192.01

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Projektions-
methode
Projection
Method

View A

mount without lock washer,
secured by lacquer

1800

1820

1810

View A

1805 for FSVR

1800 for FSV

1810

remove

1840

1850

1830

1810

1800

Maßstab Scale	Toleranz Tol.	Werkstoff Material	Sprache / Lang. Ael. / C.I.	Blatt / Sh.
ROHDE&SCHWARZ	Benennung / Designation		de en	02.00
	EINBAUANWEISUNG FSV-B21 ASSEMBLY INSTRUCTION FSV-B21		Zeichn.Nr. / Drawing No.	1
FSV-B21	Datum Date	2010-07-27	Abteilung Dept.	1ESK
	Name Name	Welz		1308.1963.00
				D

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Projektions-
methode
Projection
Method

View-A

X

X94

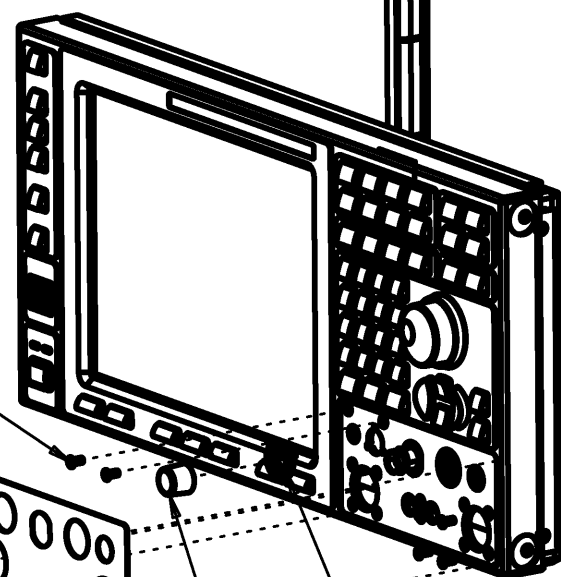
1250

1240

cable contact with motherboard X70

Detail X

contact side



View-A

1200 1205 connect with motherboard X94

1260

remove

1270

1220

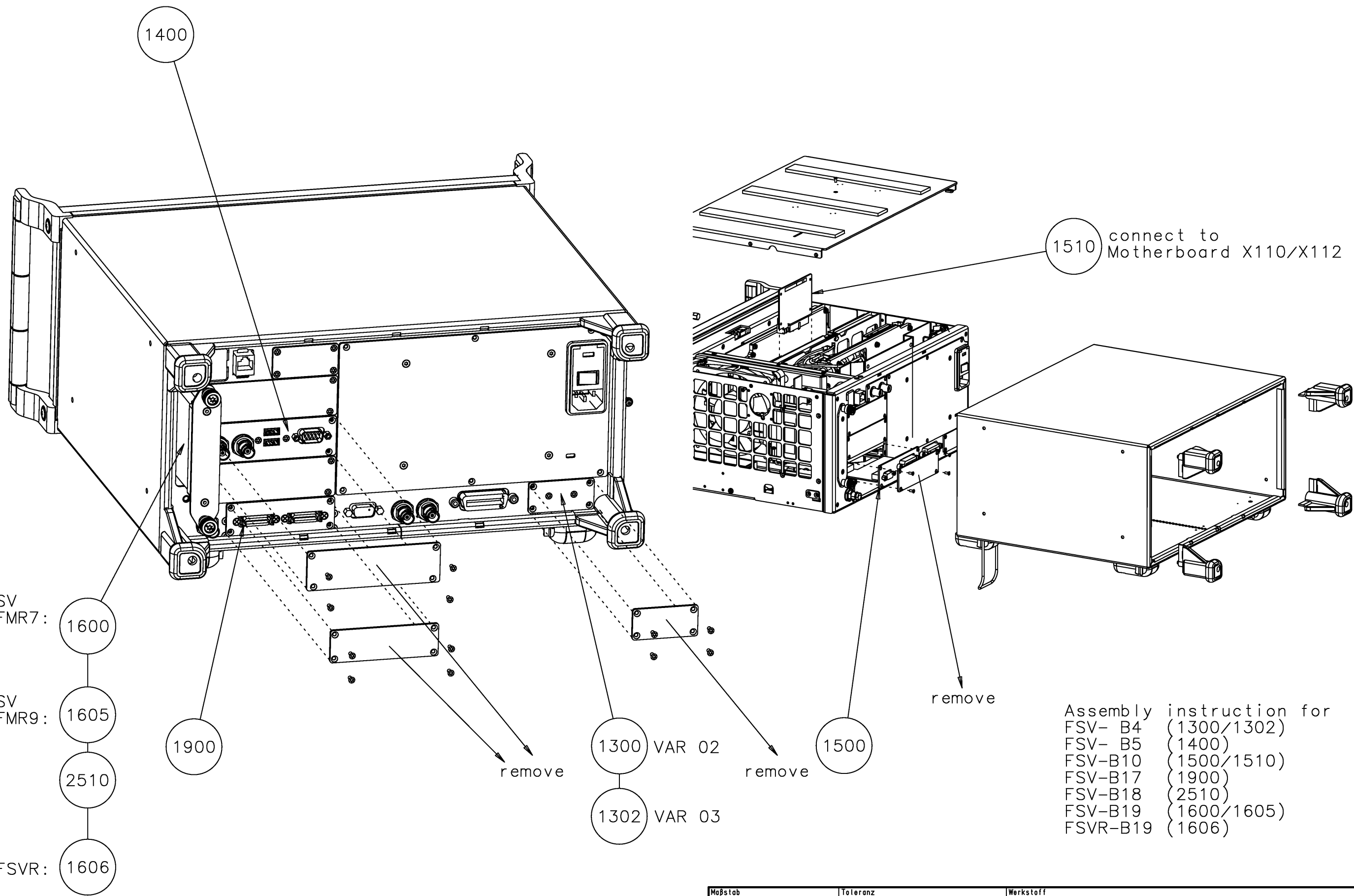
1230

Assembly instruction FSV for
B3

Maßstab Scale	Toleranz Tol.		Werkstoff Material		Sprache / Lang. Ael. / C.I.		Blatt / Sh.
ROHDE&SCHWARZ	Benennung / Designation		EINBAUANWEISUNG FSV-B3 ASSEMBLY INSTRUCTION FSV-B3		de en	01.00	1
FSV-B3	Datum Date	2008-05-16	Abteilung Dept.	1ESK	Name Name	PA/MM	Zeichn.Nr. / Drawing No. 1310.9700.00
							D

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Projektions-
methode
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Method



Assembly instruction for
FSV- B4 (1300/1302)
FSV- B5 (1400)
FSV-B10 (1500/1510)
FSV-B17 (1900)
FSV-B18 (2510)
FSV-B19 (1600/1605)
FSVR-B19 (1606)

Maßstab Scale	Toleranz Tol.		Werkstoff Material		Sprache / Lang. Ael. / C.I.		Blatt / Sh.
ROHDE&SCHWARZ	Benennung / Designation		EINBAUANWEISUNG FSV ASSEMBLY INSTRUCTION FSV		de en	05.00	1
FSV	Datum Date	2010-06-14	Abteilung Dept.	1ESK	Name Name	WM	Zeichn.Nr. / Drawing No. 1310.9716.00
							D