R&S®FSV
Signal and Spectrum Analyzer
Service Manual Instrument

1307.9331.82 – 08

Test and Measurement

Service Manual Instrument

ROHDE&SCHWARZ

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

- R&S®FSV 3 (1307.9002K03)
- R&S®FSV 7 (1307.9002K07)
- R&S®FSV 13 (1307.9002K13)
- R&S®FSV 30 (1307.9002K30)
- R&S®FSV 40 (1307.9002K39)
- R&S®FSV 40 (1307.9002K40)

The following abbreviations are used throughout this manual:
R&S®FSV is abbreviated as R&S FSV.

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 ±10 % shall apply to the nominal voltage and ±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_{rms} > 30 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.

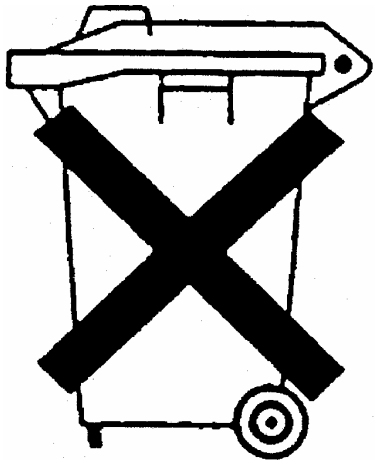
Kundeninformation zur Batterieverordnung (BattV)

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 ménagéres.

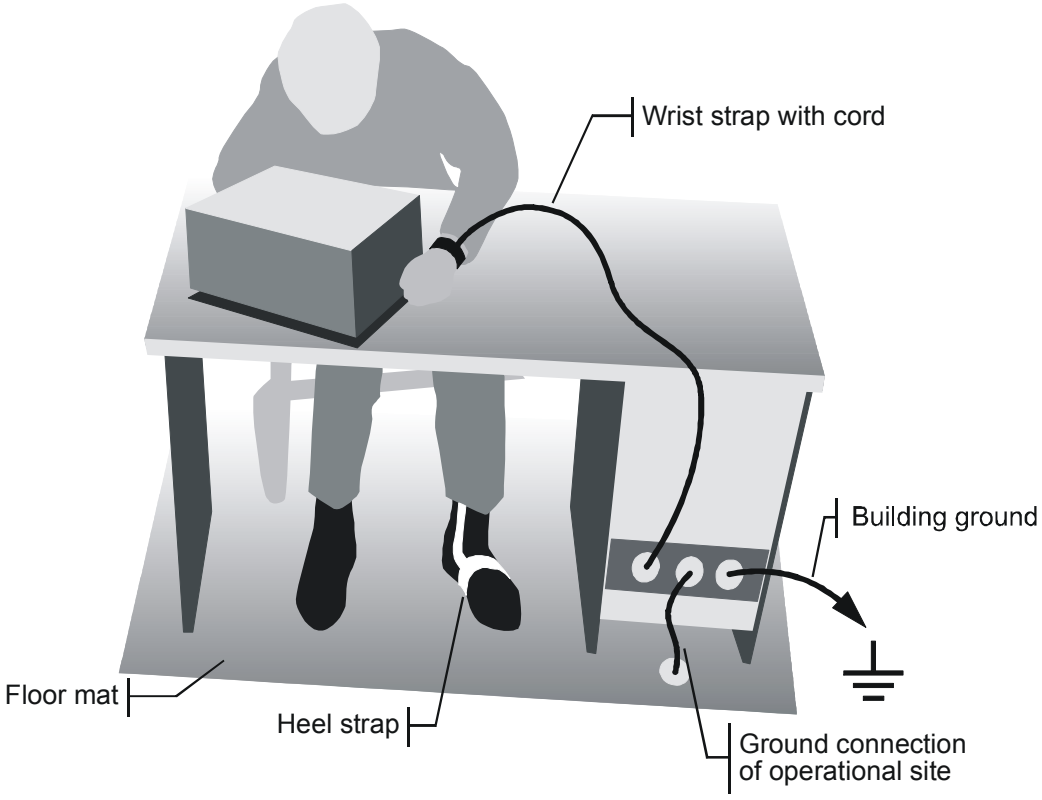
Une pile usagée doit uniquement être éliminée par un centre de service client de Rohde & Schwarz ou peut être collectée pour être traitée spécialement comme déchets dangereux.

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:

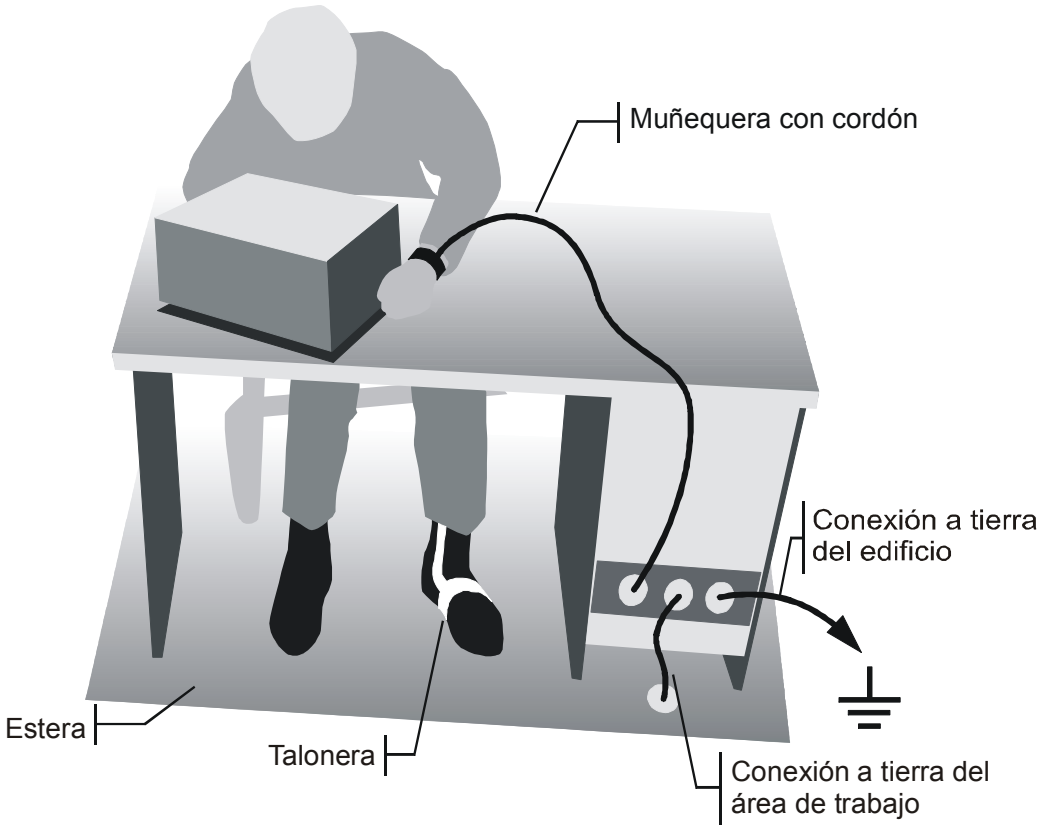
- Wrist strap with cord to ground connection
- Conductive floor mat and heel strap combination

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

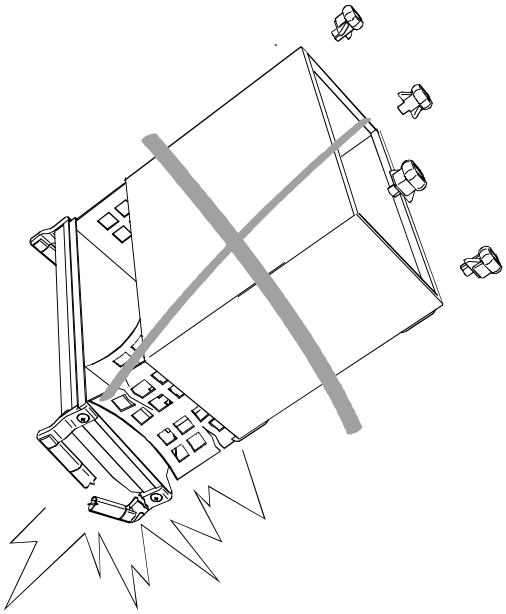
Safety Instructions for Units with Removable Cabinet

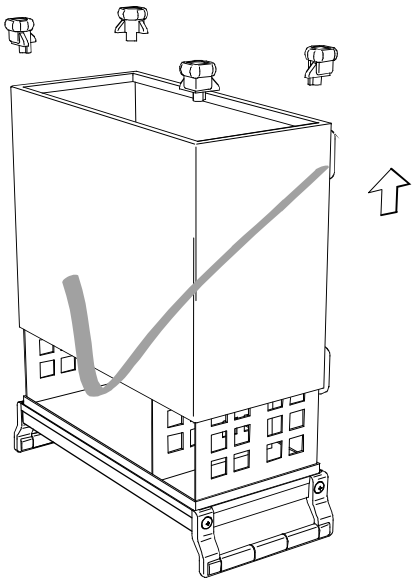
⚠ WARNING

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.

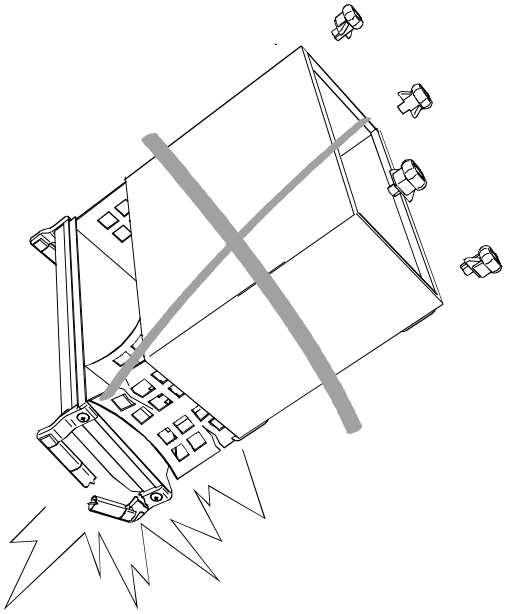
Informaciones de seguridad para aparatos con tubo de quita y pon

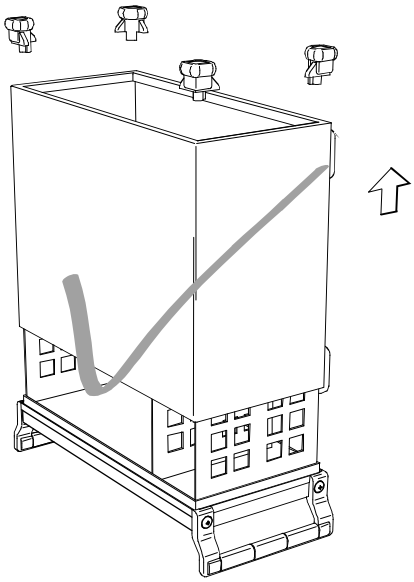
⚠ ADVERTENCIA

Peligro de heridas

Al sacar los piés 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 piés 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 piés de la pared posterior directamente despues de poner la caja. No muevan el aparato nunca sin que los piés de la pared posterior estén atornillados.

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 electro-static 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)

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Documentation Overview

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

- Quick Start Guide
- Operating Manual
- 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 FSV 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 FSV is not included in the option manuals.

For an overview of the available operating manuals, see the R&S FSV 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
- 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

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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 FSV 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 accuracy 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 installinginstrument 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 accuracy IF filter Frequency response Display linearity RF attenuator Phase noise
2	Signal generator (2 units)	FSV 3/7/13: 10 MHz to 15 GHz FSV 30/40: 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	FSV 3/7:10 MHz to 7 GHz FSV 13: 10 MHz to 14 GHz FSV 30: 10 MHz to 30 GHz FSV 40: 10 MHz to 40 GHz level imbalance 3.6 GHz to 8 GHz:≤ 0.3dB 8 GHz to 22 GHz:≤ 0.4dB 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	FSV3/7/13/30: 10 MHz to 30 GHz FSV40: 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.fact unc. % 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 accuracy < 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	FSV 3/7:20 MHz to 7 GHz FSV 13: 20 MHz to 14 GHz FSV30/40: 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 Ω ± 0.1 %	RAD 50	0844.9352.02	B29, frequency response
14	N-cable	Attenuation <0.5 dB up to 7 GHz			B9, frequency response
15	Multimeter	Current 50 mA uncertainty +/- 0.01 mA			B21, bias current

1.2 Performance Test R&S FSV

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.

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 Accuracy

Test equipment: Signal generator (chapter "Measuring Equipment and Accessories", item. 1):
Frequency e.g. 1000 MHz
Level -20 dBm
Frequency accuracy $<1x10^{-9}$
If the frequency accuracy 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 FSV.

Signal generator settings:
- Frequency 1000 MHz
- Level -20 dBm

R&S FSV 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 FSV 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 B4 1 GHz ± 1 kHz (corresponds to 1E-6)

Model with B4 1 GHz ± 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 (Test Equipment, item 2):

Frequency range	R&S FSV 3, 7:	10 MHz to 9 GHz
	R&S FSV 13:	10 MHz to 15 GHz
	R&S FSV 30:	10 MHz to 30 GHz
	R&S FSV 40:	10 MHz to 40 GHz
maximum level	≥ 0 dBm	

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

R&S FSV settings:
- [**PRESET**]
- [**AMPT** : RF ATTEN MANUAL : **0 dB**]
- [**AMPT** : REF LEVEL : **-30 dBm**]
- [**SWEEP** : SWEEPTIME 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} + 2×729.9 MHz
  f_{in} - 2×729.9 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 FSV 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 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 = -10dBm – L_{dis}

1.2.3.2 3rd IF Image Frequency Rejection

Additional signal generator settings:
- Frequency f_{in} + 2×89.9 MHz
- Level: adjust the output level of signal generator for an RF-Input level of -10 dBm

Additional R&S FSV 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 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 = -10dBm – L_{dis}

1.2.3.3 2nd IF Rejection

Additional signal generator settings:
- Frequency 729.9 MHz
- Level: adjust the output level of signal generator for an RF-Input level of -10 dBm

Additional R&S FSV 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 = -10dBm – L_{dis}

1.2.3.4 3rd IF Rejection

Additional signal generator settings:
- Frequency 89.9 MHz
- Level: adjust the output level of signal generator for an RF-Input level of -10 dBm

Additional R&S FSV 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 = -10dBm – L_{dis}

1.2.4 Checking Nonlinearities

1.2.4.1 Third-Order Intercept Point

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

Frequency range:

R&S FSV 3:	10 MHz to 3.6 GHz
R&S FSV 7:	10 MHz to 7 GHz
R&S FSV 13:	10 MHz to 14 GHz
R&S FSV 30:	10 MHz to 30 GHz
R&S FSV 40:	10 MHz to 40 GHz

2 attenuators (Test Equipment, item 10)

Attenuation a_{ATT} = 10 dB

Frequency range:

R&S FSV 3:	10 MHz to 3.6 GHz
R&S FSV 7:	10 MHz to 7 GHz
R&S FSV 13:	10 MHz to 14 GHz
R&S FSV 30:	10 MHz to 30 GHz
R&S FSV 40:	10 MHz to 40 GHz

Power splitter/combiner (Test Equipment, item 4)

Frequency range:

R&S FSV 3:	10 MHz to 3.6 GHz
R&S FSV 7:	10 MHz to 7 GHz
R&S FSV 13:	10 MHz to 14 GHz
R&S FSV 30:	10 MHz to 30 GHz
R&S FSV 40:	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 FSV.

Signal generator settings: (both generators):
- Frequency: generator 1 $f_{g1} = f_{in} - 50$ kHz
  generator 2 $f_{g2} = f_{in} + 50$ kHz
  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 FSV of –15 dBm.
- ➢ Switch off the ALC of the generators to reduce the interference between the generators.

R&S FSV 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 (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 FSV.

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 FSV 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** ⇒ : PEAK]

➢ Set reference to peak of signal
- [**MKR** : REFERENCE FIXED]

Checking the level uncertainty:

R&S FSV settings:
- [**SPAN** : {1 x RBW}] for RBW ≤ 10 MHz or
- [**SPAN** : ZERO] for RBW > 10 MHz not with R&S FSV40, Var.39
- [**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** : SWEEPTIME AUTO]

1.2.6 Checking Spurious Response

Test equipment: 50 Ω termination (Test Equipment, item 5)
Frequency range:

R&S FSV 3:	DC to 3.6 GHz
R&S FSV 7:	DC to 7 GHz
R&S FSV 13:	DC to 13.6 GHz
R&S FSV 30:	DC to 30 GHz
R&S FSV 40:	DC to 40 GHz

Test setup: ➢ Terminate the RF input of the FSV with 50 Ω

R&S FSV 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

1.2.7 Checking Noise Display

Test equipment: 50 Ω termination (Test Equipment, item 5)
Frequency range:

R&S FSV 3:	DC to 3.6 GHz
R&S FSV 7:	DC to 7 GHz
R&S FSV 13:	DC to 13.6 GHz
R&S FSV 30:	DC to 30 GHz
R&S FSV 40:	DC to 40 GHz

➢ Terminate the RF input of the FSV with 50 Ω

R&S FSV 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 .

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

1.2.8 Checking the Level uncertainty and the Frequency Response

Test equipment:

Signal Generator (Test Equipment, item 1)

Frequency range	9 kHz to 3.6 GHz
Maximum level	≥ 0 dBm

Signal Generator (Test Equipment, item 2)

Frequency range:	FSV 7:	10 MHz to 7 GHz
	FSV 13:	10 MHz to 13.6 GHz
	FSV 30:	10 MHz to 30.0 GHz
	FSV 40:	10 MHz to 40.0 GHz
Maximum level:	≥ 0 dBm	

Power meter (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 (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 (Test Equipment, item 8)

Frequency range:		
R&S FSV 7:	DC to 7 GHz	
R&S FSV 13:	DC to 26.5 GHz	
R&S FSV 30:	DC to 30 GHz	
R&S FSV 40:	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 (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 (Test Equipment, item 4)

Frequency range:

R&S FSV 7	DC to 7 GHz
R&S FSV 13	DC to 13.6 GHz
R&S FSV 30	DC to 30 GHz
R&S FSV 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.

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 FSV 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 FSV (level reading of marker 1) reflects the absolute level uncertainty of the R&S FSV. It can be calculated as:

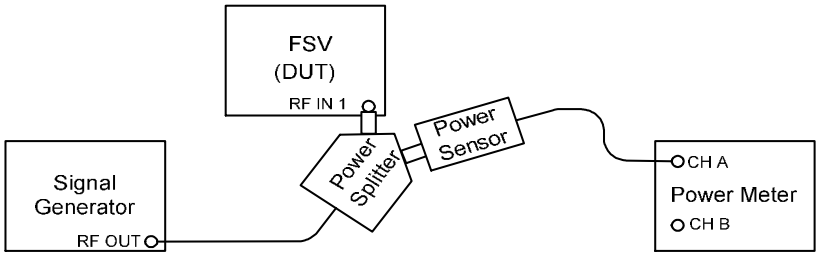
Level uncertainty $_{64MHz}$ = L_{FSV} - $L_{powermeter}$

1.2.8.2 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 FSV RF input.



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 FSV settings:
- [**PRESET**]
- [**AMPT** : RF INPUT {coupling}]
- [**AMPT** : RF ATTEN MANUAL : **{a_{FSV}}**]
- [**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_{FSV} .

Reference measurement:
- ➢ Determine signal level $L_{powermeter}$.
- ➢ Set marker to peak of signal
- [**MKR** ⇒ : PEAK]
- ➢ Read level indication from R&S FSV (reading of marker 1): L_{FSV}

Power Meter:
- ➢ Read level indication from power meter : $L_{powermeter}$

Evaluation:
- ➢ Calculate
  $\Delta Ref / dB = L_{FSV} / dBm - L_{powermeter} / dBm$

  Record $\Delta Ref / dB$

Frequency Response Measurement:
Signal generator settings:
- Frequency f_{fresp}

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

R&S FSV 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 FSV (reading of marker 1): L_{FSV}

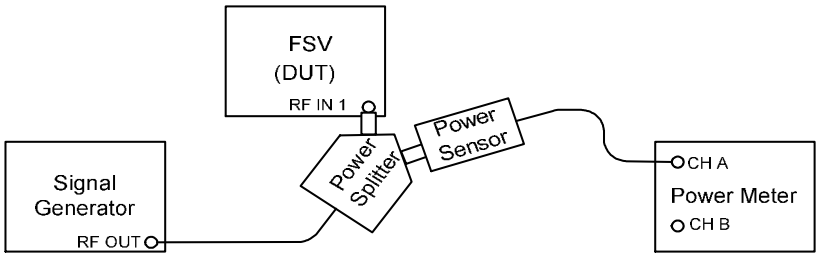
Power Meter: ➢ Read level indication from Power Meter : $L_{powermeter}$

Evaluation: ➢ The frequency response can be calculated as:
Freq. response / dB = $L_{FSV} – L_{powermeter}$ - ΔRef / 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 FSV RF input.



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 FSV settings:
- [**PRESET**]
- [**AMPT** : RF INPUT {coupling}]
- [**AMPT** : RF ATTEN MANUAL : **{a_{FSV}}**]
- [**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_{FSV} .

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

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

Evaluation:
- ➢ Calculate
  ΔRef / dB = L_{FSV} / dBm - $L_{PowerMeter}$ / dBm
- ➢ Record ΔRef / dB

Frequency Response Measurement (span = 100 kHz)

Signal Generator settings: Frequency f_{fresp}

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

R&S FSV settings: - [**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 FSV (reading of marker 1): L_{FSV}

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

Evaluation:
- ➢ The frequency response can be calculated as:
  Freq. response / dB = L_{FSV} - $L_{PowerMeter}$ - ΔRef / dB
- ➢ Take the value of ΔRef as ascertained before.

Frequency Response Measurement (full span)

R&S FSV settings:
- [**PRESET**]
- [**AMPT** : RF INPUT DC]
- [**AMPT** : RF ATTEN MANUAL : **10 dB**]
- [**AMPT** : **0 dBm**]

Signal Generator settings: Frequency f_{fresp}

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

R&S FSV 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 FSV (reading of marker 1): L_{FSV}

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

Evaluation: ➢ The frequency response can be calculated as:
Freq. response / dB = L_{FSV} - $L_{PowerMeter}$ - ΔRef / dB
➢ Take the value of ΔRef as ascertained before.

1.2.9 Checking the Display Nonlinearity

Test equipment: Signal generator (Test Equipment, item 1)
Frequency 128 MHz
Maximum level ≥ 10 dBm
Step attenuator (Test Equipment, item 9)
Frequency 128 MHz
Attenuation 0 to 100 dB in 1 dB steps
Attenuation accuracy < 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 FSV

Signal generator settings: - Frequency 128.1 MHz
- Level +10 dBm

Step attenuator settings: - attenuation 20 dB

R&S FSV 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_{Ref})

Measurement:

Step attenuator settings: - attenuation {a_{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 FSV and the reference L_{Ref} (about 10 dB below the reference level) can be calculated as :

$\Delta L = L_{FSV} - L_{Ref}$

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 50 dB	50 dB to 80 dB
Sweep time	200 ms	600 ms

1.2.10 Checking the RF Attenuator uncertainty

Test equipment: Signal generator (Test Equipment, item 1)
Frequency 128 MHz
Maximum level ≥ 10 dBm
Step attenuator (Test Equipment, item 9)
Frequency 128 MHz
Attenuation 0 to 80 dB in 5 dB steps
Attenuation accuracy < 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 FSV

Signal generator settings: - Frequency 128.1 MHz
- Level 10 dBm

R&S FSV 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** ⇒ : PEAK]

➢ Set reference to peak of signal
- [**MKR** : REFERENCE FIXED]

Measurement

Step attenuator settings: - Attenuation { 80dB - a_{FSV}}

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

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

Evaluation: The difference between the level of the input signal of the R&S FSV 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_{FSV}	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 "Measurement 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 FSV.

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 FSV of 3 dBm.

R&S FSV settings:
- [**PRESET**]
- [**SETUP** : REFERENCE INT]
- [**FREQ** : CENTER : **500 MHz**]
- [**AMPT** : ATTEN MANUAL**: 10 dB**]
- [**AMPT : 0 dBm**]
- [**SPAN** : **1 MHz**]
- [**SWEEP** : SWEEP TIME MANUAL : **1 ms**]
- [**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" 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 a IF overload the level of the signal generator has to be reduced.

Settings for phase noise measurement				
Offset	Span	RBW / Sweeptime / Sweepcount	Reference level	a_{FSV}
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 (Test Equipment, item 11)

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

R&S FSV settings: - [**PRESET**]
- [**AMPT** : RF INPUT {state}]
- [**AMPT** : RF ATTEN MANUAL : {a_{FSV}**}**]

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

Measurement: ➢ Determine the VSWR of the R&S FSV 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 Tracking Generator R&S FSV-B9

1.3.1 Checking absolute level uncertainty

Test equipment: N-cable (Test Equipment, item 14)
Frequency range: 0…7 GHz
Attenuation: < 0.5 dB

Test setup: ➢ Connect RF Output and RF Input.

R&S FSV settings: - [**PRESET**]
- [**AMPT** : RF ATTEN MANUAL : **10 dB**]
- [**SPAN** : 0 Hz]
- [**BW** : RES BW MANUAL : **5 Hz**]
- [**BW** : SWEEP TIME MANUAL : **500 ms**]
- [**AMPT** : **-10 dBm**]
- [**FREQ** : CENTER : **64 MHz**]
- [**MEAS** : Time Dom Power : **Mean**]
- [**OUTPUT** : STATE : On]
- [**SOURCE** : POWER : -10dBm]

Measurement: ➢ Read out the mean marker.

Evaluation: The difference between the signal level measured with the R&S FSV (level reading of marker 1) and the nominal value reflects the absolute level uncertainty of the tracking generator. It can be calculated as:

Level uncertainty $_{64MHz}$ = L_{FSV} + 10 dBm + $a_{Cable(64\ MHz)}$

1.3.2 Checking the Frequency Response

Test equipment: N-cable (Test Equipment, item 14)
Frequency range: 0…7 GHz
Attenuation: < 0.5 dB

Test setup: ➢ Connect RF Output and RF Input.

Reference measurement:

R&S FSV settings:
- [**PRESET**]
- [**AMPT** : RF ATTEN MANUAL : **10 dB**]
- [**SPAN** : 0 Hz]
- [**BW** : RES BW MANUAL : **5 Hz**]
- [**BW** : SWEEP TIME MANUAL : **500 ms**]
- [**AMPT** : **-10 dBm**]
- [**FREQ** : CENTER : **64 MHz**]
- [**MEAS** : Time Dom Power : **Mean**]
- [**OUTPUT** : STATE : On]
- [**SOURCE** : POWER : -10dBm]

Measurement: ➢ Read out the mean marker.

Evaluation: ➢ Calculate:

L_{ref} = L_{FSV} + $a_{Cable(64\ MHz)}$

Checking the frequency response

R&S FSV settings:
- [**PRESET**]
- [**AMPT** : RF ATTEN MANUAL : **10 dB**]
- [**FREQ** : START : **100 kHz**]
- [**BW** : RES BW MANUAL : **50 kHz**]
- [**BW** : SWEEP TIME MANUAL : **10 s**]
- [**AMPT** : **-10 dBm**]
- [**OUTPUT** : STATE : On]
- [**SOURCE** : POWER : -10dBm]

Measurement: ➢ Set marker to peak of signal
- [**MKR** ⇒ : PEAK] (=L_{max} at f_1)

➢ Set marker to minimum value
- [**MKR** ⇒ : MORE : MIN] (=L_{min} at f_2)

Evaluation: The frequency response can be calculated as:
Max. freq. response / dB = L_{max} - L_{ref} + $a_{Cable(f1)}$
Min. freq. response / dB = L_{min} - L_{ref} + $a_{Cable(f2)}$
Take the value of L_{ref} as ascertained before.

1.4 Performance Test Option LO/IF ports for external mixers R&S FSV-B21

1.4.1 Checking LO-level

Test equipment: Power Meter (Test Equipment, item 6)
Power sensor (Test Equipment, item 8)
Frequency range 7.0 MHz to 15.5 GHz
Max. input power P_{max} = +23 dBm
RSS ≤ 2.5% referred to measured power
Impedance Z = 50 Ω
Fixed attenuator with 10 dB (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 FSV settings:
- [**PRESET**]
- [**SENS** : MIX ON

- [**SPAN** : ZERO SPAN]

- [**SETUP** : SERVICE : ENTER PASSWORT **894129**]

Select LO-Power:
- [**SENS** : MIX:LOP {P_{LO}}]
for P_{LO} = 13,0dBm, 15,5dBm and 17,0dBm
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} = ($f_{Center1}$ – 729,9 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} = ($f_{Center1}$ + 729,9 MHz) / 2

Test setup:
➢ Connect power sensor via fixed attenuator to the output ‘LO_{out} / IF_{in}’

Measurement:
➢ Determine level of the LO-signal $L_{LO,meas}$
To achive higher accuracy 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 $L_{LO} = L_{LO,meas} + 10$ dB

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

Test equipment: Signal Generator (Test Equipment, item 1)
Frequency 729.9 MHz
Output power -20 dBm

R&S FSV settings:
- [**PRESET**]
- [**SENS** : MIX ON]
- [**SENS** : MIX:HARM:BAND USER]
- [**SENS** : MIX:HARM 2]
- [**SPAN** : ZERO SPAN]
- [**FREQ** : CENT 16.7299GHz]
- [**SENS** : BAND 2KHz]
- [**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};

Measurement:
- [**MKR->** : PEAK]
➢ Read out the marker

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

Test equipment: Signal Generator (Test Equipment, item 1)
Frequency 729.9 MHz
Output power -20 dBm

R&S FSV settings: - [**PRESET**]
- [**SENS** : MIX ON]
- [**SENS** : MIX:HARM:BAND USER]
- [**SENS** : MIX:HARM 2]
- [**SPAN** : ZERO SPAN]
- [**FREQ** : CENT 16.7299GHz]
- [**SENS** : BAND 2KHz]
- [**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};

Measurement: - [**MKR->** : PEAK]
➢ Read out the marker

1.4.4 Checking the bias supply

Test equipment: Multimeter (Test Equipment, item 15)

R&S FSV 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

1.5 Performance Test Option RF Preamplifier R&S FSV-B22

1.5.1 Checking Noise Display

Test equipment: 50 Ω termination (Test Equipment, item 5)
Frequency range:
R&S FSV 3: DC to 3.6 GHz
R&S FSV 7: DC to 7 GHz

Terminate the RF input of the FSV with 50 Ω

R&S FSV 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	< 1MHz	< 10MHz	> 10kHz
RefLev	-30 dBm	-60 dBm	-60 dBm

1.5.2 Checking the Level uncertainty and the Frequency Response

Test equipment:

- Signal Generator (Test Equipment, item 1)
  Frequency range 9 kHz to 3.6 GHz
  Maximum level ≥ 0 dBm

- Signal Generator (Test Equipment, item 2)
  Frequency range: FSV 7: 10 MHz to 7 GHz
  Maximum level: ≥ 0 dBm

- Power meter (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 (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 (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 (Test Equipment, item 4)
  Frequency range:

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

1.5.2.1 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.

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 FSV 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 FSV (level reading of marker 1) reflects the absolute level uncertainty of the R&S FSV. It can be calculated as:

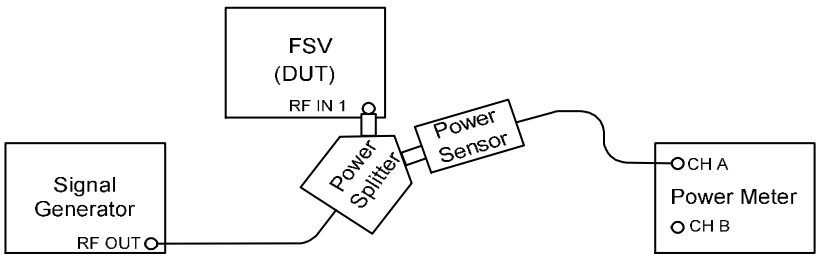
$$\text{Level uncertainty}_{64MHz} = L_{FSV} - L_{powermeter}$$

1.5.2.2 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 FSV RF input.



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 FSV 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 $L_{powermeter}$.
Set marker to peak of signal
- [**MKR** ⇒ : PEAK]

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

Power Meter: ➢ Read level indication from power meter : $L_{PowerMeter}$

Evaluation: ➢ Calculate
$\Delta Ref / dB = L_{FSV} / dBm - L_{PowerMeter} / dBm$

Record $\Delta Ref / dB$

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

R&S FSV 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 FSV (reading of marker 1): L_{FSV}

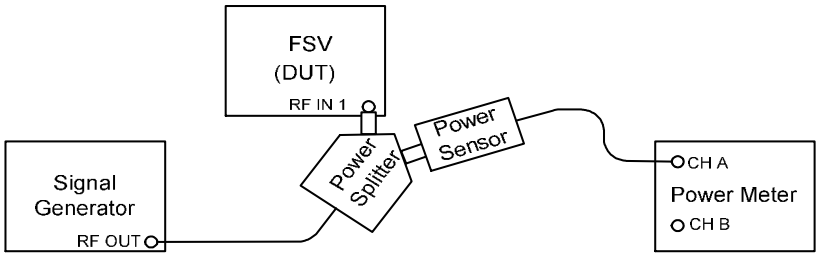
Power Meter: ➢ Read level indication from Power Meter : $L_{PowerMeter}$

Evaluation: ➢ The frequency response can be calculated as:
Freq. response / dB = $L_{FSV} - L_{PowerMeter} - \Delta Ref / dB$

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

1.5.2.3 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 FSV RF input.



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 FSV 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_{FSV} .

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

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

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

Frequency Response Measurement

Signal Generator settings: Frequency f_{fresp}

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

R&S FSV settings: - [**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 FSV (reading of marker 1): L_{FSV}

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

Evaluation:
- ➢ The frequency response can be calculated as:
- ➢ Freq. response / dB = L_{FSV} - $L_{PowerMeter}$ - ΔRef / dB
- ➢ Take the value of ΔRef as ascertained before.

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

1.6.1 Checking Noise Display

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

Frequency range:

R&S FSV 13:	DC to 13.6 GHz
R&S FSV 30:	DC to 30 GHz
R&S FSV 40:	DC to 40 GHz

Terminate the RF input of the FSV with 50 Ω

R&S FSV 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	< 1MHz	< 10MHz	> 10kHz
RefLev	-40 dBm	-60 dBm	-60 dBm

1.6.2 Checking the Level uncertainty and the Frequency Response

Test equipment:

Signal Generator (Test Equipment, item 1)
- Frequency range: 9 kHz to 3.6 GHz
- Maximum level: ≥ 0 dBm

Signal Generator (Test Equipment, item 2)
- Frequency range: FSV 13: 10 MHz to 13.6 GHz; FSV 30: 10 MHz to 30.0 GHz; FSV 40: 10 MHz to 40.0 GHz
- Maximum level: ≥ 0 dBm

Power meter (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 (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 %
- VSWR: 3.6 GHz to 7 GHz <1.15; 1 MHz to 3.6 GHz <1.30; 50 MHz to 128 MHz <1.10

Power Sensor (Test Equipment, item 8)
- Frequency range:
  - R&S FSV 13: DC to 26.5 GHz
  - R&S FSV 30: DC to 30 GHz
  - R&S FSV 40: 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 (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 (Test Equipment, item 4)

Frequency range:

R&S FSV 13	DC to 13.6 GHz
R&S FSV 30	DC to 30 GHz
R&S FSV 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

1.6.2.1 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.

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 FSV 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 FSV (level reading of marker 1) reflects the absolute level uncertainty of the R&S FSV. It can be calculated as:

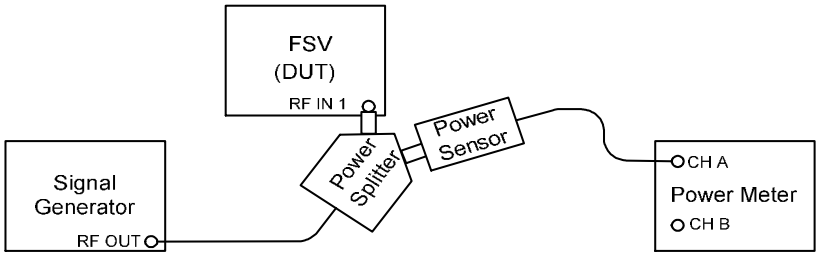
$$\text{Level uncertainty}_{64MHz} = L_{FSV} - L_{powermeter}$$

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 FSV RF input.



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 FSV settings:
- [**PRESET**]
- [**AMPT** : RF INPUT DC]
- [**AMPT** : RF ATTEN 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**]
- [**MKR** ⇒ : MORE : EXCLUDE LO]

Reference measurement: Determine signal level $L_{powermeter}$.
Set marker to peak of signal
- [**MKR** ⇒ : PEAK]
- ➢ Read level indication from R&S FSV (reading of marker 1): L_{FSV}

Power Meter:
- ➢ Read level indication from power meter : $L_{PowerMeter}$

Evaluation:
- ➢ Calculate
  $\Delta Ref / dB = L_{FSV} / dBm - L_{PowerMeter} / dBm$

  Record $\Delta Ref / dB$

Frequency Response Measurement:
Signal generator settings:
- Frequency f_{fresp}

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

R&S FSV 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 FSV (reading of marker 1): L_{FSV}

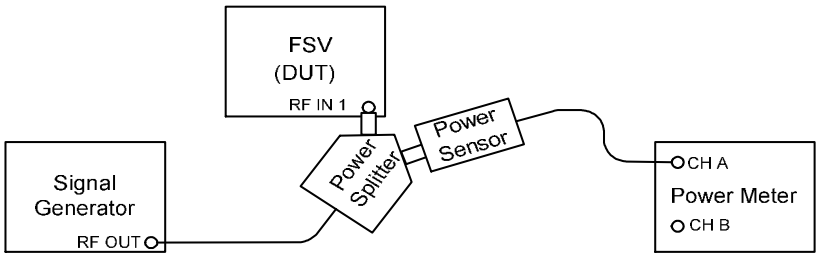
Power Meter: ➢ Read level indication from Power Meter : $L_{PowerMeter}$

Evaluation: ➢ The frequency response can be calculated as:
Freq. response / dB = L_{FSV} - $L_{PowerMeter}$ - ΔRef / 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 FSV RF input.



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 FSV settings:
- [**PRESET**]
- [**AMPT** : RF INPUT DC]
- [**AMPT** : RF ATTEN 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_{FSV} .

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

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

Evaluation:
- ➢ Calculate
  ΔRef / dB = L_{FSV} / dBm - $L_{PowerMeter}$ / dBm
- ➢ Record ΔRef / dB

Frequency Response Measurement

Signal Generator settings: Frequency f_{fresp}

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

R&S FSV settings: - [**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 FSV (reading of marker 1): L_{FSV}

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

Evaluation:
- ➢ The frequency response can be calculated as:
- ➢ Freq. response / dB = L_{FSV} - $L_{PowerMeter}$ - ΔRef / dB
- ➢ Take the value of ΔRef as ascertained before.

1.7 Performance Test Option Electronic Attenuator R&S FSV-B25

1.7.1 Checking the electronic attenuator uncertainty

Test equipment: - Signal generator (Test Equipment, item 1)
Frequency 128 MHz
Maximum level ≥ 10 dBm
- Step attenuator (Test Equipment, item 9)
Frequency 128 MHz
Attenuation 0 to 100 dB in 1 dB steps
Attenuation accuracy < 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 FSV

Signal generator settings: - Frequency 128.1 MHz
- Level 10 dBm

R&S FSV 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** ⇒ : PEAK]
➢ Set reference to peak of signal
- [**MKR** : REFERENCE FIXED]

Measurement Step attenuator settings: - Attenuation { 70dB - a_{El} }

R&S FSV settings:
- [**AMPT** : EL ATTEN MANUAL : { a_{EL}}]
- [**AMPT** : {-35dBm + a_{EL} } **dBm**]
- [**MKR** ⇒ : PEAK]

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

Evaluation: The difference between the level of the input signal of the R&S FSV 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_{FSV}	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

1.7.2 Checking the Level uncertainty and the Frequency Response

Test equipment:

- Signal Generator (Test Equipment, item 1)
  Frequency range 9 kHz to 3.6 GHz
  Maximum level ≥ 0 dBm

- Signal Generator (Test Equipment, item 2)
  Frequency range: FSV 7: 10 MHz to 7 GHz
  Maximum level: ≥ 0 dBm

- Power meter (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 (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 (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 (Test Equipment, item 4)
  Frequency range:

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

1.7.2.1 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.

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 FSV 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 FSV (level reading of marker 1) reflects the absolute level uncertainty of the R&S FSV. It can be calculated as:

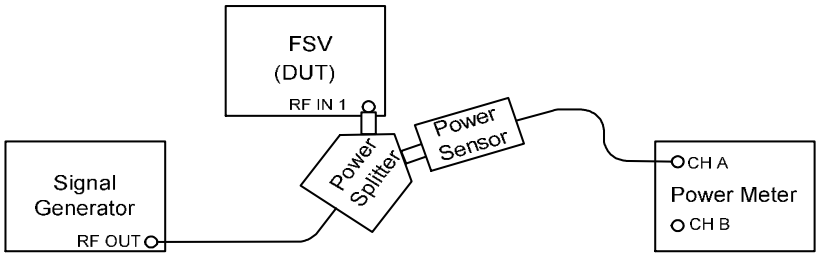
$$\text{Level uncertainty}_{64MHz} = L_{FSV} - L_{powermeter}$$

1.7.2.2 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 FSV RF input.



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 FSV 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 $L_{powermeter}$.
Set marker to peak of signal
- [**MKR** ⇒ : PEAK]

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

Power Meter: ➢ Read level indication from power meter : $L_{PowerMeter}$

Evaluation: ➢ Calculate
$\Delta Ref / dB = L_{FSV} / dBm - L_{PowerMeter} / dBm$

Record $\Delta Ref / dB$

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

R&S FSV 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 FSV (reading of marker 1): L_{FSV}

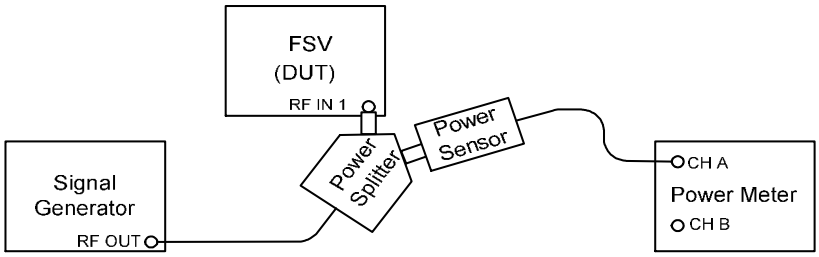
Power Meter: ➢ Read level indication from Power Meter : $L_{PowerMeter}$

Evaluation: ➢ The frequency response can be calculated as:
Freq. response / dB = $L_{FSV} - L_{PowerMeter} - \Delta Ref / dB$

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

1.7.2.3 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 FSV RF input.



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 FSV settings:
- [**PRESET**]
- [**AMPT** : RF INPUT DC]
- [**AMPT** : EL ATTEN MANUAL : $\mathbf{a_{EL}}$**}**]
- [**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 FSV settings:
- ➢ Set marker to peak of signal
- [**MKR** ⇒ : PEAK]
- ➢ Read level indication from R&S FSV (reading of marker 1): L_{FSV}

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

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

Frequency Response Measurement

Frequency f_{fresp}

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

R&S FSV settings: - [**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 FSV (reading of marker 1): L_{FSV}

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

Evaluation:
- ➢ The frequency response can be calculated as:
- ➢ Freq. response / dB = L_{FSV} - $L_{PowerMeter}$ - ΔRef / dB
- ➢ Take the value of ΔRef as ascertained before.

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

1.8.1 Checking Noise Display

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

Frequency range:

R&S FSV 3:	DC to 3.6 GHz
R&S FSV 7:	DC to 7 GHz

Terminate the RF input of the FSV with 50 Ω

R&S FSV settings:
- [**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.

1.8.2 Checking the Frequency Response

Test equipment:
- Signal Generator (Test Equipment, item 1)
  Frequency range 20 Hz to 128 MHz
  Maximum level ≥ 0 dBm

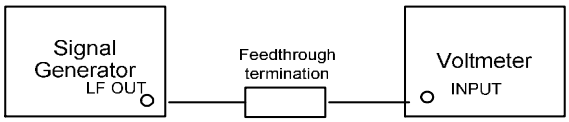
- Voltmeter (Test Equipment, item 10)
  Frequency range 20 Hz to 100 kHz

- 50 Ω feedthrough termination (Test Equipment, item 13)

Reference measurement: See chapter “Frequency response < 3.6 GHz”

Signal generator calibration:

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



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_{Gen} / dBm = 10 × log((V_{Gen}^2 / 50 Ohm) / 1 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_{Gen} / 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 FSV.

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

R&S FSV settings:
- [**PRESET**]
- [**AMPT** : RF INPUT DC]
- [**AMPT** : RF ATTEN MANUAL : **10 dB }**]
- [**AMPT** : **0 dBm**]
- [**SPAN : 10 Hz**]
- [**BW** : RES BW MANUAL : **10 Hz**], for f_{fresp} = 20 Hz: RBW = 3 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 FSV (reading of marker 1): L_{FSV}

Evaluation:
The frequency response can be calculated as:
Freq. response / dB = L_{FSV} - L_{Gen} - ΔRef / dB
Take the value of ΔRef as ascertained before.

1.9 Performance Test Report R&S FSV

ROHDE&SCHWARZ	Signal and Spectrum Analyzer R&S FSV	1307.9002.03 / 07
Serial number:	_____	
Date:	_____	
Person responsible:	_____	
Signature:	_____	

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

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	General Tests					
Page 15	Reference Frequency Accuracy					
	Basic unit	999.999	_____	1000.001	MHz	
	with option R&S FSV-B4	999.9999	_____	1000.0001	MHz	
Page 16	2nd IF Image Frequency Rejection f_{in}					
	FSV 3/7/13/30/40:					
	101 MHz	80	_____	-	dB	
	1799 MHz	80	_____	-	dB	
	3599 MHz	80	_____	-	dB	
	FSV 7/13/30/40:					
	5299 MHz	80	_____	-	dB	
	6999 MHz	80	_____	-	dB	
	FSV 13/30/40:					
	9999 MHz	80	_____	-	dB	
	FSV 30/40:					
	17999 MHz	80	_____	-	dB	
	25999 MHz *)	80	_____	-	dB	
	FSV 40:					
	33999 MHz	70	_____	-	dB	
	38539 MHz	70	_____	-	dB	
	*) f_{in} – 2×729.9 MHz					
Page 16	3rd IF Image Frequency Rejection f_{in}					

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	FSV 3/7/13/30/40:					
	101 MHz	80	_____	-	dB	
	3599 MHz	80	_____	-	dB	
	FSV 7/13/30/40:					
	6999 MHz	80	_____	-	dB	
	FSV 13/30/40:					
	9999 MHz	80	_____	-	dB	
	FSV 30/40:					
	21999 MHz	80	_____	-	dB	
	FSV 40:					
	32999 MHz	80	_____	-	dB	
	36999 MHz	80	_____	-	dB	
Page 17	2nd IF Rejection f_{in}					
	FSV 3/7/13/30/40:					
	101 MHz	80	_____	-	dB	
	3599 MHz	80	_____	-		
	FSV 7/13/30/40:					
	5299 MHz	80	_____	-		
	6999 MHz	80	_____	-		
	FSV 13/30/40:					
	9999 MHz	80	_____	-	dB	
	FSV 30/40:					
	21999 MHz	80	_____	-	dB	
	FSV 40:					
	32999 MHz	80	_____	-	dB	
	36999 MHz	80	_____	-	dB	
Page 17	3rd IF Rejection f_{in}					
	1001 MHz	80	_____	-	dB	
Page 18	Third-Order Intercept Point f_{in}					
	FSV 3/7/13/30/40:					
	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	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	3599.2 MHz	13	_____	-	dBm	
	FSV 7/13/30/40:					
	3601.2 MHz	15	_____	-	dBm	
	4101.2 MHz	15	_____	-	dBm	
	4601.2 MHz	15	_____	-	dBm	
	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	
	FSV 13/30/40:					
	7999 MHz	15	_____		dBm	
	8999 MHz	15	_____		dBm	
	9999 MHz	15	_____		dBm	
	10999 MHz	15	_____		dBm	
	11999 MHz	15	_____		dBm	
	12999 MHz	15	_____		dBm	
	FSV 30/40:					
	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	
	FSV 40:					
	32999 MHz	15	_____		dBm	
	34999 MHz	15	_____		dBm	
	36999 MHz	15	_____		dBm	
	38999 MHz	15	_____		dBm	
	39999 MHz	15	_____		dBm	
Page 19	Bandwidth switching level uncertainty sweep mode RBW					
	40 MHz (with option FSV-B70 only)	-0.1	_____	0.1	dB	
	28 MHz (not with R&S FSV40, Var.39)	-0.1	_____	0.1	dB	
	20 MHz (not with R&S FSV40, Var.39)	-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	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	2 MHz	-0.1	_____	0.1	dB	
	1 MHz	-0.1	_____	0.1	dB	
	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	
Page 19	Bandwidth switching level uncertainty FFT mode RBW					
	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	
Page 20	Spurious Response f_{spur}					
	16 MHz	-	_____	-103	dBm	
	32 MHz	-	_____	-103	dBm	
	64 MHz	-	_____	-103	dBm	
	128 MHz	-	_____	-103	dBm	
Page 20	Noise Display normalized to 1 Hz Preamplifier = OFF f_n					
	FSV 3/7:					
	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	
	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	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	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	
	FSV 7:					
	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	
Page 20	Noise Display normalized to 1 Hz Preamplifier = OFF, without option FSV-B24 f_n					
	FSV 13/30/40:					
	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	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	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	
	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	
	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	
	FSV 13/30:					
	7499.9 MHz	-	_____	-148	dBm	
	7999.9 MHz	-	_____	-148	dBm	
	8499.9 MHz	-	_____	-148	dBm	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	8999.9 MHz	-	_____	-148	dBm	
	9499.9 MHz	-	_____	-148	dBm	
	9999.9 MHz	-	_____	-148	dBm	
	10499.9 MHz	-	_____	-148	dBm	
	10999.9 MHz	-	_____	-148	dBm	
	11499.9 MHz	-	_____	-148	dBm	
	11999.9 MHz	-	_____	-148	dBm	
	12499.9 MHz	-	_____	-148	dBm	
	12999.9 MHz	-	_____	-148	dBm	
	13499.9 MHz	-	_____	-148	dBm	
	FSV 30:					
	13999.9 MHz	-	_____	-148	dBm	
	14999.9 MHz	-	_____	-148	dBm	
	15999.9 MHz	-	_____	-144	dBm	
	16999.9 MHz	-	_____	-144	dBm	
	17999.9 MHz	-	_____	-144	dBm	
	18999.9 MHz	-	_____	-144	dBm	
	19999.9 MHz	-	_____	-144	dBm	
	20999.9 MHz	-	_____	-144	dBm	
	21999.9 MHz	-	_____	-144	dBm	
	22999.9 MHz	-	_____	-144	dBm	
	23999.9 MHz	-	_____	-144	dBm	
	24999.9 MHz	-	_____	-144	dBm	
	25999.9 MHz	-	_____	-144	dBm	
	26999.9 MHz	-	_____	-144	dBm	
	27999.9 MHz	-	_____	-144	dBm	
	28999.9 MHz	-	_____	-144	dBm	
	29999.9 MHz	-	_____	-144	dBm	
	FSV 40:					
	7499.9 MHz	-	_____	-145	dBm	
	7999.9 MHz	-	_____	-145	dBm	
	8499.9 MHz	-	_____	-145	dBm	
	8999.9 MHz	-	_____	-145	dBm	
	9499.9 MHz	-	_____	-145	dBm	
	9999.9 MHz	-	_____	-145	dBm	
	10499.9 MHz	-	_____	-145	dBm	
	10999.9 MHz	-	_____	-145	dBm	
	11499.9 MHz	-	_____	-145	dBm	
	11999.9 MHz	-	_____	-145	dBm	
	12499.9 MHz	-	_____	-145	dBm	
	12999.9 MHz	-	_____	-145	dBm	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	13499.9 MHz	-	_____	-145	dBm	
	13999.9 MHz	-	_____	-145	dBm	
	14999.9 MHz	-	_____	-145	dBm	
	15999.9 MHz	-	_____	-142	dBm	
	16999.9 MHz	-	_____	-142	dBm	
	17999.9 MHz	-	_____	-142	dBm	
	18999.9 MHz	-	_____	-142	dBm	
	19999.9 MHz	-	_____	-142	dBm	
	20999.9 MHz	-	_____	-142	dBm	
	21999.9 MHz	-	_____	-142	dBm	
	22999.9 MHz	-	_____	-142	dBm	
	23999.9 MHz	-	_____	-142	dBm	
	24999.9 MHz	-	_____	-142	dBm	
	25999.9 MHz	-	_____	-142	dBm	
	26999.9 MHz	-	_____	-142	dBm	
	27999.9 MHz	-	_____	-142	dBm	
	28999.9 MHz	-	_____	-142	dBm	
	29999.9 MHz	-	_____	-142	dBm	
	31999.9 MHz	-	_____	-142	dBm	
	32999.9 MHz	-	_____	-142	dBm	
	33999.9 MHz	-	_____	-142	dBm	
	34999.9 MHz	-	_____	-136	dBm	
	35999.9 MHz	-	_____	-136	dBm	
	36999.9 MHz	-	_____	-136	dBm	
	37999.9 MHz	-	_____	-136	dBm	
	38999.9 MHz	-	_____	-136	dBm	
	39999.9 MHz	-	_____	-136	dBm	
Page 20	Noise Display normalized to 1 Hz Preamplifier = OFF, with option FSV-B24 f_n					
	FSV 13/30/40:					
	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	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	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	
	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	
	7499.9 MHz	-	_____	-145	dBm	
	7999.9 MHz	-	_____	-145	dBm	
	8499.9 MHz	-	_____	-145	dBm	
	8999.9 MHz	-	_____	-145	dBm	
	9499.9 MHz	-	_____	-145	dBm	
	9999.9 MHz	-	_____	-145	dBm	
	10499.9 MHz	-	_____	-145	dBm	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	10999.9 MHz	-	_____	-145	dBm	
	11499.9 MHz	-	_____	-145	dBm	
	11999.9 MHz	-	_____	-145	dBm	
	12499.9 MHz	-	_____	-145	dBm	
	12999.9 MHz	-	_____	-145	dBm	
	13499.9 MHz	-	_____	-145	dBm	
	FSV 30:					
	13999.9 MHz	-	_____	-143	dBm	
	14999.9 MHz	-	_____	-143	dBm	
	15999.9 MHz	-	_____	-141	dBm	
	16999.9 MHz	-	_____	-141	dBm	
	17999.9 MHz	-	_____	-141	dBm	
	18999.9 MHz	-	_____	-141	dBm	
	19999.9 MHz	-	_____	-141	dBm	
	20999.9 MHz	-	_____	-141	dBm	
	21999.9 MHz	-	_____	-141	dBm	
	22999.9 MHz	-	_____	-141	dBm	
	23999.9 MHz	-	_____	-141	dBm	
	24999.9 MHz	-	_____	-141	dBm	
	25999.9 MHz	-	_____	-141	dBm	
	26999.9 MHz	-	_____	-141	dBm	
	27999.9 MHz	-	_____	-141	dBm	
	28999.9 MHz	-	_____	-141	dBm	
	29999.9 MHz	-	_____	-141	dBm	
	FSV 40:					
	7499.9 MHz	-	_____	-143	dBm	
	7999.9 MHz	-	_____	-143	dBm	
	8499.9 MHz	-	_____	-143	dBm	
	8999.9 MHz	-	_____	-143	dBm	
	9499.9 MHz	-	_____	-143	dBm	
	9999.9 MHz	-	_____	-143	dBm	
	10499.9 MHz	-	_____	-143	dBm	
	10999.9 MHz	-	_____	-143	dBm	
	11499.9 MHz	-	_____	-143	dBm	
	11999.9 MHz	-	_____	-143	dBm	
	12499.9 MHz	-	_____	-143	dBm	
	12999.9 MHz	-	_____	-143	dBm	
	13499.9 MHz	-	_____	-143	dBm	
	13999.9 MHz	-	_____	-141	dBm	
	14999.9 MHz	-	_____	-141	dBm	
	15999.9 MHz	-	_____	-139	dBm	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	16999.9 MHz	-	_____	-139	dBm	
	17999.9 MHz	-	_____	-139	dBm	
	18999.9 MHz	-	_____	-139	dBm	
	19999.9 MHz	-	_____	-139	dBm	
	20999.9 MHz	-	_____	-139	dBm	
	21999.9 MHz	-	_____	-139	dBm	
	22999.9 MHz	-	_____	-139	dBm	
	23999.9 MHz	-	_____	-139	dBm	
	24999.9 MHz	-	_____	-139	dBm	
	25999.9 MHz	-	_____	-139	dBm	
	26999.9 MHz	-	_____	-139	dBm	
	27999.9 MHz	-	_____	-139	dBm	
	28999.9 MHz	-	_____	-139	dBm	
	29999.9 MHz	-	_____	-139	dBm	
	31999.9 MHz	-	_____	-139	dBm	
	32999.9 MHz	-	_____	-139	dBm	
	33999.9 MHz	-	_____	-139	dBm	
	34999.9 MHz	-	_____	-132	dBm	
	35999.9 MHz	-	_____	-132	dBm	
	36999.9 MHz	-	_____	-132	dBm	
	37999.9 MHz	-	_____	-132	dBm	
	38999.9 MHz	-	_____	-132	dBm	
	39999.9 MHz	-	_____	-132	dBm	
Page 23	Absolute level uncertainty at 64 MHz	-0.2	_____	0.2	dB	
Page 23	Frequency response < 3.6 GHz, RF attenuation 5 dB, DC coupled f_{fresp}					
	FSV 3/7/13/30/40:					
	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	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	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	
Page 25	**FSV7/13/30/40:** Frequency response > 3.6 GHz, RF attenuation = 5 dB, DC coupled f_{fresp}					
	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	
Page 25	**FSV 13/30/40:** Frequency response > 3.6 GHz, RF attenuation = 5 dB, DC coupled f_{fresp}					
	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	
Page 25	**FSV 30/40:** Frequency response > 3.6 GHz, RF attenuation = 5 dB, DC coupled f_{fresp}					
	14001 MHz	-3	_____	3	dB	
	15001 MHz	-3	_____	3	dB	
	16001 MHz	-3	_____	3	dB	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	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	
	28001 MHz	-3	_____	3	dB	
	29001 MHz	-3	_____	3	dB	
	29999 MHz	-3	_____	3	dB	
Page 25	**FSV 40:** Frequency response > 3.6 GHz, RF attenuation = 5 dB, DC coupled f_{fresp}					
	30001 MHz	-3.5	_____	3.5	dB	
	31001 MHz	-3.5	_____	3.5	dB	
	32001 MHz	-3.5	_____	3.5	dB	
	33001 MHz	-3.5	_____	3.5	dB	
	34001 MHz	-3.5	_____	3.5	dB	
	35001 MHz	-3.5	_____	3.5	dB	
	36001 MHz	-3.5	_____	3.5	dB	
	37001 MHz	-3.5	_____	3.5	dB	
	38001 MHz	-3.5	_____	3.5	dB	
	39001 MHz	-3.5	_____	3.5	dB	
	39999 MHz	-3.5	_____	3.5	dB	
Page 23	Frequency response < 3.6 GHz, RF attenuation 10 dB, DC coupled f_{fresp}					
	FSV 3/7/13/30/40:					
	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	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	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	
Page 25	**FSV7/13/30/40:** Frequency response > 3.6 GHz, RF attenuation = 10 dB, DC coupled f_{fresp}					
	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	
Page 25	**FSV 13/30/40:** Frequency response > 3.6 GHz, RF attenuation = 10 dB, DC coupled f_{fresp}					
	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	
Page 25	**FSV 30/40:** Frequency response > 3.6 GHz, RF attenuation = 10 dB, DC coupled					

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	f_{fresp}					
	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	
Page 25	**FSV 40:** Frequency response > 3.6 GHz, RF attenuation = 10 dB, DC coupled f_{fresp}					
	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	
Page 23	Frequency response < 3.6 GHz, RF attenuation 20 dB, DC coupled f_{fresp}					
	FSV 3/7/13/30/40:					
	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			

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	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	
Page 25	**FSV7/13/30/40:** Frequency response > 3.6 GHz, RF attenuation = 20 dB, DC coupled f_{fresp}					
	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	
Page 25	**FSV 13/30/40:** Frequency response > 3.6 GHz, RF attenuation = 20 dB, DC coupled f_{fresp}					
	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	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	13501 MHz	-1.5	_____	1.5	dB	
	13599 MHz	-1.5	_____	1.5	dB	
Page 25	**FSV 30/40:** Frequency response > 3.6 GHz, RF attenuation = 20 dB, DC coupled f_{fresp}					
	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	
Page 25	**FSV 40:** Frequency response > 3.6 GHz, RF attenuation = 20 dB, DC coupled f_{fresp}					
	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	
Page 23	Frequency response < 3.6 GHz, RF attenuation 30 dB, DC coupled f_{fresp}					
	FSV 3/7/13/30/40:					
	9 kHz	-0.5	_____	0.5	dB	
	100.02 kHz	-0.5	_____	0.5	dB	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	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	
Page 25	**FSV7/13/30/40:** Frequency response > 3.6 GHz, RF attenuation = 30 dB, DC coupled f_{fresp}				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	
Page 25	**FSV 13/30/40:** Frequency response > 3.6 GHz, RF attenuation = 30 dB, DC coupled f_{fresp}					
	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	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	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	
Page 25	**FSV 30/40:** Frequency response > 3.6 GHz, RF attenuation = 30 dB, DC coupled f_{fresp}					
	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	
Page 25	**FSV 40:** Frequency response > 3.6 GHz, RF attenuation = 30 dB, DC coupled f_{fresp}					
	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	
Page 23	Frequency response < 3.6 GHz, RF attenuation 40 dB, DC coupled					

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	f_{fresp}					
	FSV 3/7/13/30/40:					
	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	
	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	
Page 25	**FSV7/13/30/40:** Frequency response > 3.6 GHz, RF attenuation = 40 dB, DC coupled f_{fresp}					
	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	
Page 25	**FSV 13/30/40:** Frequency response > 3.6 GHz, RF attenuation = 40 dB, DC coupled f_{fresp}					
	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	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	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	
Page 25	**FSV 30/40:** Frequency response > 3.6 GHz, RF attenuation = 40 dB, DC coupled f_{fresp}					
	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	
Page 25	**FSV 40:** Frequency response > 3.6 GHz, RF attenuation = 40 dB, DC coupled f_{fresp}					
	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	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	38001 MHz	-2.5	_____	2.5	dB	
	39001 MHz	-2.5	_____	2.5	dB	
	39999 MHz	-2.5	_____	2.5	dB	
Page 23	Frequency response < 3.6 GHz, RF attenuation 10 dB, AC coupled f_{fresp}					
	FSV 3/7:					
	1.005 MHz	-1	_____	1	dB	
	FSV 3/7/13/30/40:					
	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	
Page 25	**FSV7/13/30/40:** Frequency response > 3.6 GHz, RF attenuation = 10 dB, AC coupled f_{fresp}					
	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	
Page 25	**FSV 13/30/40:** Frequency response > 3.6 GHz, RF attenuation = 10 dB, AC coupled f_{fresp}					
	7001 MHz	-2.5	_____	2.5	dB	
	7501 MHz	-2.5	_____	2.5	dB	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	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	
Page 25	**FSV 30/40:** Frequency response > 3.6 GHz, RF attenuation = 10 dB, AC coupled f_{fresp}					
	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	
	28001 MHz	-3	_____	3	dB	
	29001 MHz	-3	_____	3	dB	
	29999 MHz	-3	_____	3	dB	
Page 25	**FSV 40:** Frequency response > 3.6 GHz, RF attenuation = 10 dB, AC coupled f_{fresp}					
	30001 MHz	-3.5	_____	3.5	dB	
	31001 MHz	-3.5	_____	3.5	dB	
	32001 MHz	-3.5	_____	3.5	dB	
	33001 MHz	-3.5	_____	3.5	dB	
	34001 MHz	-3.5	_____	3.5	dB	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	35001 MHz	-3.5	_____	3.5	dB	
	36001 MHz	-3.5	_____	3.5	dB	
	37001 MHz	-3.5	_____	3.5	dB	
	38001 MHz	-3.5	_____	3.5	dB	
	39001 MHz	-3.5	_____	3.5	dB	
	39999 MHz	-3.5	_____	3.5	dB	
Page 25	**FSV 13/30/40:** Frequency response > 3.6 GHz, RF attenuation = 10 dB, DC coupled, full span f_{fresp}					
	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	
Page 25	**FSV 30/40:** Frequency response > 3.6 GHz, RF attenuation = 10 dB, DC coupled, full span f_{fresp}					
	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	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	27001 MHz	-3	_____	3	dB	
	28001 MHz	-3	_____	3	dB	
	29001 MHz	-3	_____	3	dB	
	29999 MHz	-3	_____	3	dB	
Page 25	**FSV 40:** Frequency response > 3.6 GHz, RF attenuation = 10 dB, DC coupled, full span f_{fresp}					
	30001 MHz	-3.5	_____	3.5	dB	
	31001 MHz	-3.5	_____	3.5	dB	
	32001 MHz	-3.5	_____	3.5	dB	
	33001 MHz	-3.5	_____	3.5	dB	
	34001 MHz	-3.5	_____	3.5	dB	
	35001 MHz	-3.5	_____	3.5	dB	
	36001 MHz	-3.5	_____	3.5	dB	
	37001 MHz	-3.5	_____	3.5	dB	
	38001 MHz	-3.5	_____	3.5	dB	
	39001 MHz	-3.5	_____	3.5	dB	
	39999 MHz	-3.5	_____	3.5	dB	
Page 26	Display Nonlinearity a_{att}					
	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	
	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	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	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	-45.1	_____	-44.9	dB	
	70 dB	-50.1	_____	-49.9	dB	
	75 dB	-55.1	_____	-54.9	dB	
	80 dB	-60.1	_____	-59.9	dB	
Page 28	RF Attenuator uncertainty a_{FSV}					
	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	
Page 29	Phase Noise Offset					
	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)	
Page 30	VSWR					
	10 dB, DC coupled f_{in}					
	FSV 3/7/13/30/40:					
	10 MHz	-	_____	1.5		
	250 MHz	-	_____	1.5		
	500 MHz	-	_____	1.5		
	750 MHz	-	_____	1.5		
	1000 MHz	-	_____	1.5		
	1250 MHz	-	_____	1.5		

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	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		
	FSV 7/13/30/40:					
	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		
	FSV 13/30/40:					
	8000 MHz	-	_____	2		
	9000 MHz	-	_____	2		
	10000 MHz	-	_____	2		
	11000 MHz	-	_____	2		
	12000 MHz	-	_____	2		
	13000 MHz	-	_____	2		
	FSV 30/40:					
	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		

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	FSV 40:					
	31000 MHz	-	_____	2.5		
	33000 MHz	-	_____	2.5		
	35000 MHz	-	_____	2.5		
	37000 MHz	-	_____	2.5		
	39000 MHz	-	_____	2.5		
	39999 MHz	-	_____	2.5		
Page 30	VSWR					
	20 dB, DC coupled f_{in}					
	FSV 3/7/13/30/40:					
	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		
	FSV 7/13/30/40:					
	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		

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	FSV 13/30/40:					
	8000 MHz	-	_____	2		
	9000 MHz	-	_____	2		
	10000 MHz	-	_____	2		
	11000 MHz	-	_____	2		
	12000 MHz	-	_____	2		
	13000 MHz	-	_____	2		
	FSV 30/40:					
	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		
	FSV 40:					
	31000 MHz	-	_____	2.5		
	33000 MHz	-	_____	2.5		
	35000 MHz	-	_____	2.5		
	37000 MHz	-	_____	2.5		
	39000 MHz	-	_____	2.5		
	39999 MHz	-	_____	2.5		
Page 30	VSWR					
	40 dB, DC coupled f_{in}					
	FSV 3/7/13/30/40:					
	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		

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	3250 MHz	-	_____	1.5		
	3500 MHz	-	_____	1.5		
	FSV 7/13/30/40:					
	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		
	FSV 13/30/40:					
	8000 MHz	-	_____	2		
	9000 MHz	-	_____	2		
	10000 MHz	-	_____	2		
	11000 MHz	-	_____	2		
	12000 MHz	-	_____	2		
	13000 MHz	-	_____	2		
	FSV 30/40:					
	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		
	FSV 40:					
	31000 MHz	-	_____	2.5		
	33000 MHz	-	_____	2.5		
	35000 MHz	-	_____	2.5		
	37000 MHz	-	_____	2.5		
	39000 MHz	-	_____	2.5		
	39999 MHz	-	_____	2.5		

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
Page 30	VSWR					
	10 dB, AC coupled f_{in}					
	FSV 3/7/13/30/40:					
	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		
	FSV 7/13/30/40:					
	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		
	FSV 13/30/40:					
	8000 MHz	-	_____	2		
	9000 MHz	-	_____	2		
	10000 MHz	-	_____	2		
	11000 MHz	-	_____	2		
	12000 MHz	-	_____	2		
	13000 MHz	-	_____	2		

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	FSV 30/40:					
	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		
Page 30	VSWR					
	20 dB, AC coupled f_{in}					
	FSV 3/7/13/30/40:					
	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		
	FSV 7/13/30/40:					
	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		

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	6750 MHz	-	_____	2		
	7000 MHz	-	_____	2		
	FSV 13/30/40:					
	8000 MHz	-	_____	2		
	9000 MHz	-	_____	2		
	10000 MHz	-	_____	2		
	11000 MHz	-	_____	2		
	12000 MHz	-	_____	2		
	13000 MHz	-	_____	2		
	FSV 30/40:					
	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		
Page 30	VSWR 40 dB, AC coupled f_{in}					
	FSV 3/7/13/30/40:					
	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		
	FSV 7/13/30/40:					
	3750 MHz	-	_____	2		
	4000 MHz	-	_____	2		
	4250 MHz	-	_____	2		

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	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		
	FSV 13/30/40:					
	8000 MHz	-	_____	2		
	9000 MHz	-	_____	2		
	10000 MHz	-	_____	2		
	11000 MHz	-	_____	2		
	12000 MHz	-	_____	2		
	13000 MHz	-	_____	2		
	FSV 30/40:					
	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		

1.10 Performance Test Report for Option R&S FSV-B9

ROHDE&SCHWARZ	Option Tracking Generator R&S FSV-B9	1310.9639.02
Serial number: Date: Person responsible: Signature:	_____ _____ _____ _____	

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

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
Page 30	Absolute level uncertainty at 64 MHz, output level -10 dBm	-1	_____	+1	dB	
Page 31	Frequency response					
	FSV 3:					
	100 kHz to 3.6 GHz, min. value	-3	_____	+3	dB	
	100 kHz to 3.6 GHz, max. value	-3	_____	+3		
	FSV 7/13/30/40:					
	100 kHz to 7 GHz, min. value	-3	_____	+3	dB	
	100 kHz to 7 GHz, max. value	-3	_____	+3	dB	

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

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

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

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
Page 32	LO level $f_{Center1}$					
	16,1899 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	16,5899 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	16,9899 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	17,3899 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	17,7899 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	18,1899 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	18,5899 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	18,9899 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	19,3899 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	19,7899 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	20,1899 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	20,5899 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	20,9899 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	21,3899 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	21,7899 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	22,1899 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	22,5899 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	22,9899 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	23,3899 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	23,7899 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	24,1899 GHz	P_{LO} - 1		P_{LO} + 1	dBm	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
Page 32	LO level $f_{Center2}$					
	23,1301 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	23,5301 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	23,9301 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	24,3301 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	24,7301 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	25,1301 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	25,5301 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	25,9301 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	26,3301 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	26,7301 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	27,1301 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	27,5301 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	27,9301 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	28,3301 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	28,7301 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	29,1301 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	29,5301 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
	29,7301 GHz	P_{LO} - 1		P_{LO} + 1	dBm	
Page 33	level display 2-port-mixer	-31		-29	dBm	
Page 33	level display 3-port-mixer	-31		-29	dBm	
Page 34	Bias current I_{bias}					
	-10 mA	-12.0		-8.0	mA	
	0 mA	-1.0		+1.0	mA	
	+10 mA	+8.0		+12.0	mA	

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

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

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

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
Page 35	Noise Display normalized to 1 Hz Preamplifier = ON f_n					
	FSV 3/7:					
	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	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	2799.9 MHz	-		-160	dBm	
	2999.9 MHz	-		-160	dBm	
	3199.9 MHz	-		-160	dBm	
	3399.9 MHz	-		-160	dBm	
	3599.9 MHz	-		-160	dBm	
	FSV 7:					
	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	
Page 35	Noise Display normalized to 1 Hz Preamplifier = ON f_n					
	FSV 13/30/40:					
	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	
	1199.9 MHz	-		-159	dBm	
	1399.9 MHz	-		-159	dBm	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	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	
	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	
Page 36	Absolute level uncertainty at 64 MHz	-0.2		0.2	dB	
Page 37	Frequency response < 3.6 GHz, RF attenuation 30 dB, DC coupled Preamplifier = ON f_{fresp}					
	FSV 3/7/13/30/40:					
	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	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	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	
Page 38	**FSV7/13/30/40:** Frequency response > 3.6 GHz, RF attenuation = 30 dB, DC coupled Preamplifier = ON f_{fresp}					
	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-B24

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

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

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
Page 40	Noise Display normalized to 1 Hz Preamplifier = ON f_n					
	FSV 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	
	2599.9 MHz	-	_____	-157	dBm	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	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	
	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	
	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	
	FSV 30:					
	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	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	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	
	FSV 40:					
	31999.9 MHz	-	_____	-159	dBm	
	32999.9 MHz	-	_____	-159	dBm	
	33999.9 MHz	-	_____	-159	dBm	
	34999.9 MHz	-	_____	-154	dBm	
	35999.9 MHz	-	_____	-154	dBm	
	36999.9 MHz	-	_____	-154	dBm	
	37999.9 MHz	-	_____	-154	dBm	
	38999.9 MHz	-	_____	-154	dBm	
	39999.9 MHz	-	_____	-154	dBm	
Page 42	Absolute level uncertainty at 64 MHz	-0.2		0.2	dB	
Page 42	Frequency response < 3.6 GHz, RF attenuation 40 dB, DC coupled Preamplifier = ON f_{fresp}					
	FSV 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	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	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	
Page 44	**FSV13/30/40:** Frequency response > 3.6 GHz, RF attenuation = 40 dB, DC coupled Preamplifier = ON f_{fresp}					
	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	
Page 44	**FSV 13/30/40:** Frequency response > 3.6 GHz, RF attenuation = 40 dB, DC coupled Preamplifier = ON f_{fresp}					
	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	
Page 44	**FSV 30/40:** Frequency response > 3.6 GHz, RF attenuation = 40 dB, DC coupled Preamplifier = ON f_{fresp}					
	14001 MHz	-3.5	_____	3.5	dB	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	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	
Page 44	**FSV 40:** Frequency response > 3.6 GHz, RF attenuation = 40 dB, DC coupled Preamplifier = ON f_{fresp}					
	30001 MHz	-4	_____	4	dB	
	31001 MHz	-4	_____	4	dB	
	32001 MHz	-4	_____	4	dB	
	33001 MHz	-4	_____	4	dB	
	34001 MHz	-4	_____	4	dB	
	35001 MHz	-4	_____	4	dB	
	36001 MHz	-4	_____	4	dB	
	37001 MHz	-4	_____	4	dB	
	38001 MHz	-4	_____	4	dB	
	39001 MHz	-4	_____	4	dB	
	39999 MHz	-4	_____	4	dB	

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

ROHDE&SCHWARZ	Option Electronic Attenuator R&S FSV-B25	1310.9616.02
Serial number: Date: Person responsible: Signature:	_____ _____ _____ _____	

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

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
Page 46	Electronic attenuator uncertainty a_{EL}					
	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	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
	22 dB	-22.2		-21.8	dB	
	23 dB	-23.2		-22.8	dB	
	24 dB	-24.2		-23.8	dB	
	25 dB	-25.2		-24.8	dB	
Page 47	Absolute level uncertainty at 64 MHz	-0.2		0.2	dB	
Page 48	Frequency response < 3.6 GHz, electronic attenuation 15 dB, DC coupled f_{fresp}					
	FSV 3/7/13/30/40:					
	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	
Page 49	**FSV7/13/30/40:** Frequency response > 3.6 GHz, electronic attenuation 15 dB, DC coupled f_{fresp}					
	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	

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
Page 48	Frequency response < 3.6 GHz, electronic attenuation 25 dB, DC coupled f_{fresp}					
	FSV 3/7/13/30/40:					
	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	
Page 49	**FSV7/13/30/40:** Frequency response > 3.6 GHz, electronic attenuation 25 dB, DC coupled f_{fresp}					
	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	

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

ROHDE&SCHWARZ	**Freq. Range Extension 20 Hz** R&S FSV-B29	**1310.9639.02**
Serial number: Date: Person responsible: Signature:	_____ _____ _____ _____	

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

Ref.	Measurand	Specified min. value	Measured value	Specified max. value	Unit	MU
Page 51	Noise Display normalized to 1 Hz Preamplifier = OFF f_n					
	20 Hz	-		-100	dBm	
	80 Hz	-		-110	dBm	
	1010 Hz	-		-120	dBm	
Page 52	Frequency response < 9 kHz, RF attenuation 10 dB DC coupled f_{fresp}					
	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 accuracy.

2.1 Measuring Equipment

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

Item	Type of equipment	Recommended Specifications	Recommende dEquipment	R&S Order No.	Use
1	Signal generator	Frequency: 1 GHz Output level: >-20 dBm Uncertainty of frequency: $1x10^{-9}$	R&S SMA100A		Frequency Accuracy of Reference Oscillator

2.2 Measuring the Frequency Accuracy

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 accuracy: $<1x10^{-9}$

If the frequency accuracy 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 FSV.

R&S FSV settings:

- [**SETUP:** MORE: SERVICE: PASSWORD: **894129**]

Warming up the reference oscillator

Before the following measurement, the R&S FSV 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 ± 1 kHz
- Model with OCXO (option R&S FSV-B4): 1.0 GHz ± 100 Hz

For verification proceed as follows:

R&S FSV settings:

- [SETUP : REFERENCE : INT]

Toggle to internal reference.

Signal generator settings:

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

R&S FSV 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 to 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.

2.5 Tracking Generator

Adjustment of the tracking generator (FSV-B9) output level.

1. Press the “Windows” button at the instrument. Open “My Computer”.
2. Open the file:
   “`C:\R_S\Instr\eeprom\trackinggenerator\SglValues.dat`” with a text editor while the firmware is running.
3. Edit the values in the `[ATT_ERROR]` section of the file:

   ```
   ABSOLUTE_ERROR_ALC_ON=0.0
   ABSOLUTE_ERROR_ALC_OFF=0.0
   ```
4. Overwrite the existing file by saving the edited file.
5. Change to analyzer firmware and enter the service password:

   [SETUP : MORE : SERVICE : PASSWORD : 30473035]
6. Load the edited file:

   [SETUP : MORE : SERVICE : SERVICE FUNCTION : 2.0.25.0.track]
7. Measure the level accuracy according to the performance test at 64MHz as described in chapter “**Error! Reference source not found. Error! Reference source not found.**”

8. Calculate values to write in the "SglValues.dat" file: measured value +10dBm. (the correction value is <0 if the output power is below -10dBm).
9. Edit the values in the [ATT_ERROR] section of the "SglValues.dat" file:

   ABSOLUTE_ERROR_ALC_ON=[calculated Value]

   ABSOLUTE_ERROR_ALC_OFF=0.0
10. Keep the "SglValues.dat" file opened and continue as follows:

    [SETUP : MORE : SERVICE : SERVICE FUNCTION : 2.8.0.1.2]
11. Repeat steps 7 and 8.
12. Edit the values in the [ATT_ERROR] section of the file “SglValues.dat”:

    ABSOLUTE_ERROR_ALC_ON=[do not edit!]

    ABSOLUTE_ERROR_ALC_OFF=[calculated Value]
13. Save the file by overwriting the old one.
14. Load the edited file:

    [SETUP : MORE : SERVICE : SERVICE FUNCTION : 2.0.25.0.track]
15. Repeat step 7. Deviation to nominal output level (-10dBm) must be < 1,5dB.
16. Continue as follows:

    [SETUP : MORE : SERVICE : SERVICE FUNCTION : 2.8.0.0]
17. Repeat step 7. Deviation to nominal output level (-10dBm) must be < 1dB.
18. Save the file in the EEPROM:

    [SETUP : MORE : SERVICE : SERVICE FUNCTION : 3.8.6.1]
19. Check the frequency response by doing the performance test as described in chapter “**Error! Reference source not found. Error! Reference source not found.**”.

3 Repair

The following chapter describes how to replace modules in the FSV. 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

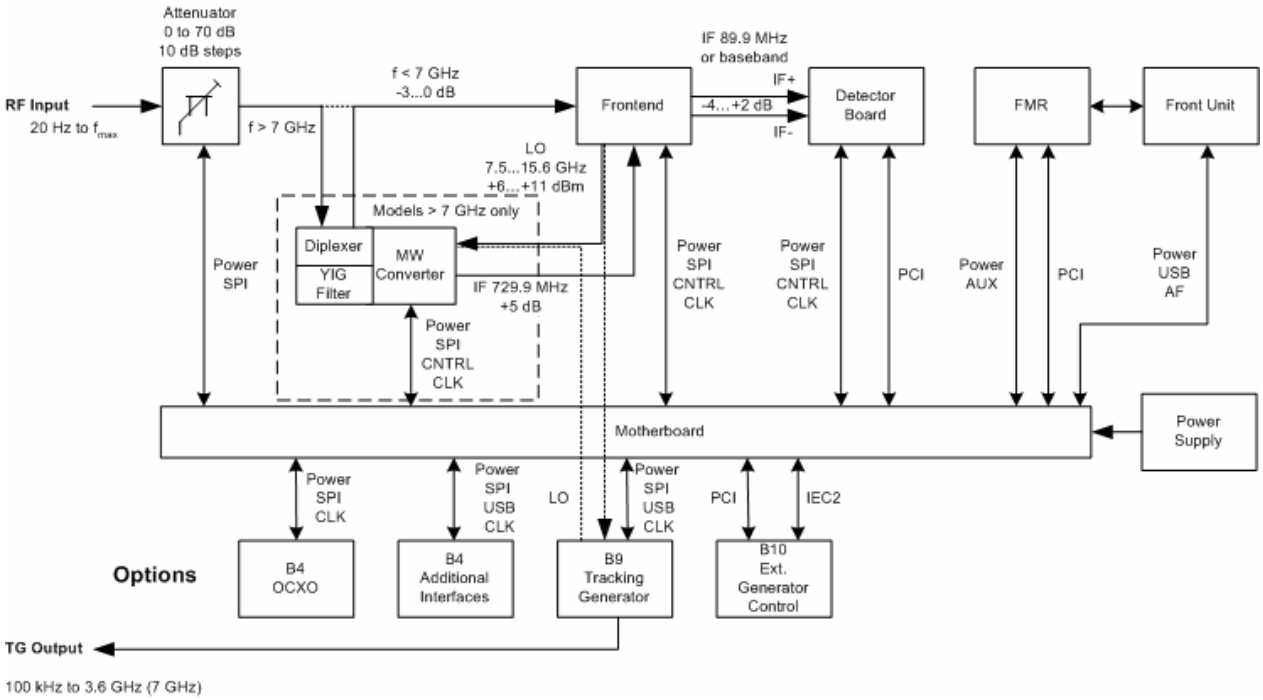
Shock hazard

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 FSV.



The R&S FSV is a triple-conversion (double conversion for frequencies > 7 GHz) heterodyne receiver for the frequency range from 20 Hz to 3.6 GHz, 7 GHz , 13 GHz, 30 GHz or 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 board where the digital filtering is provided. The remaining data are transferred to the host processor via a PCI interface. The hardware settings are controlled via a serial interface on the motherboard that is set from the host via the PCI interface.

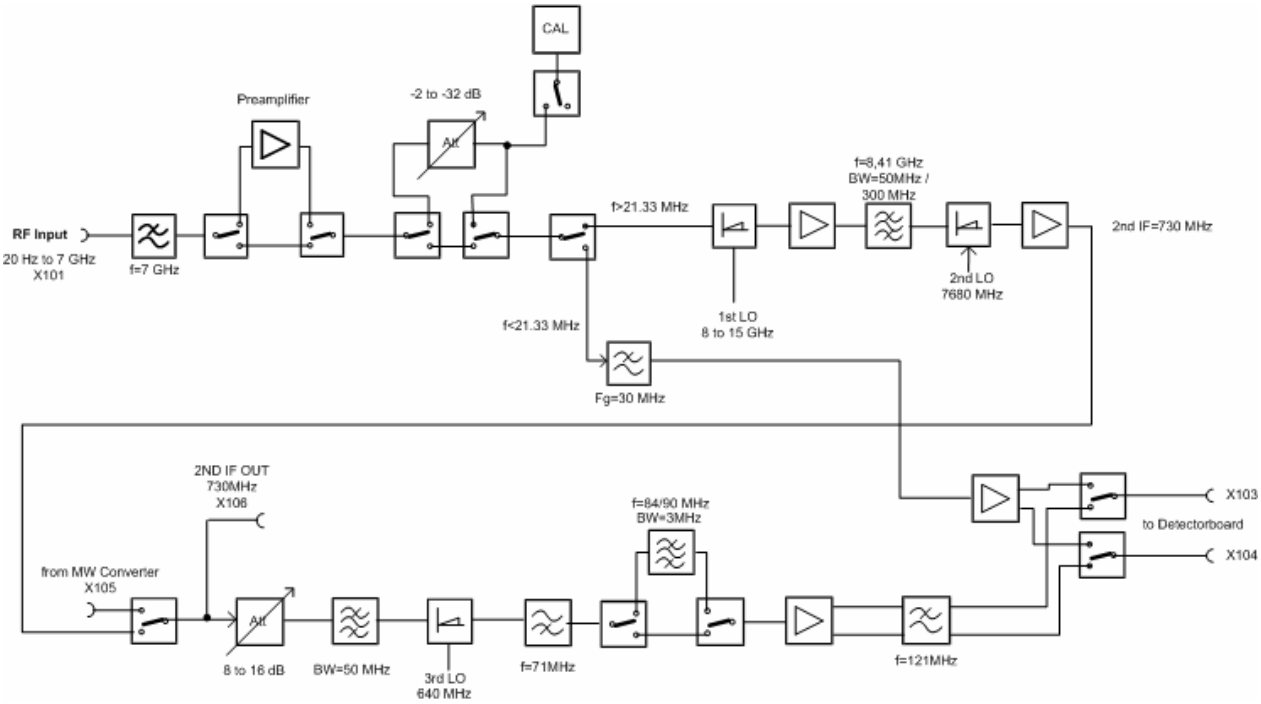
3.1.1 Attenuator

The attenuator switch in steps of 10 dB and have maximum total attenuation of 70 dB and contain 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.

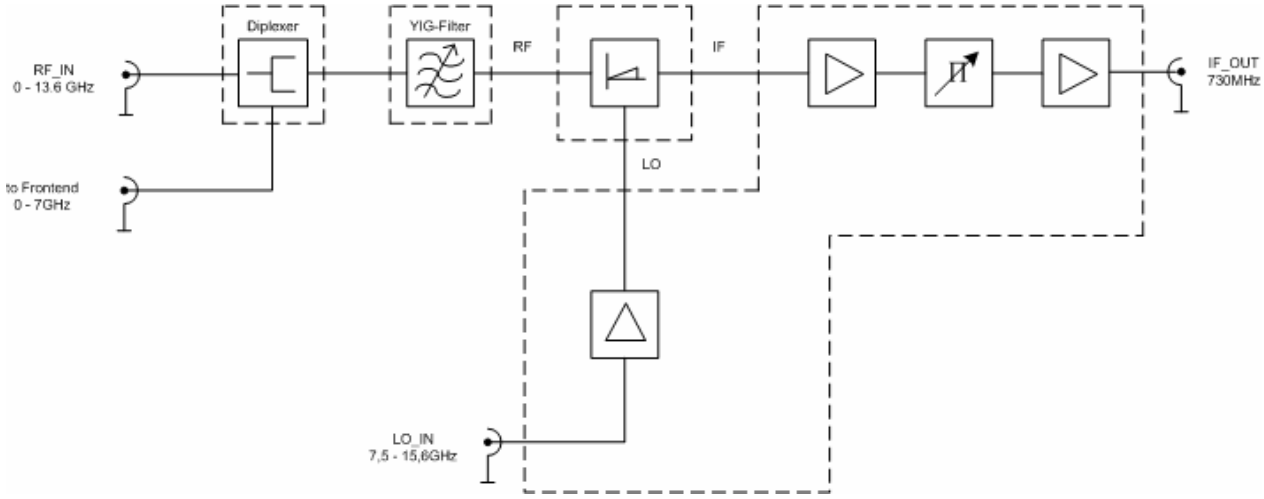
The following figure shows a block diagram of the R&S FSV frontend:



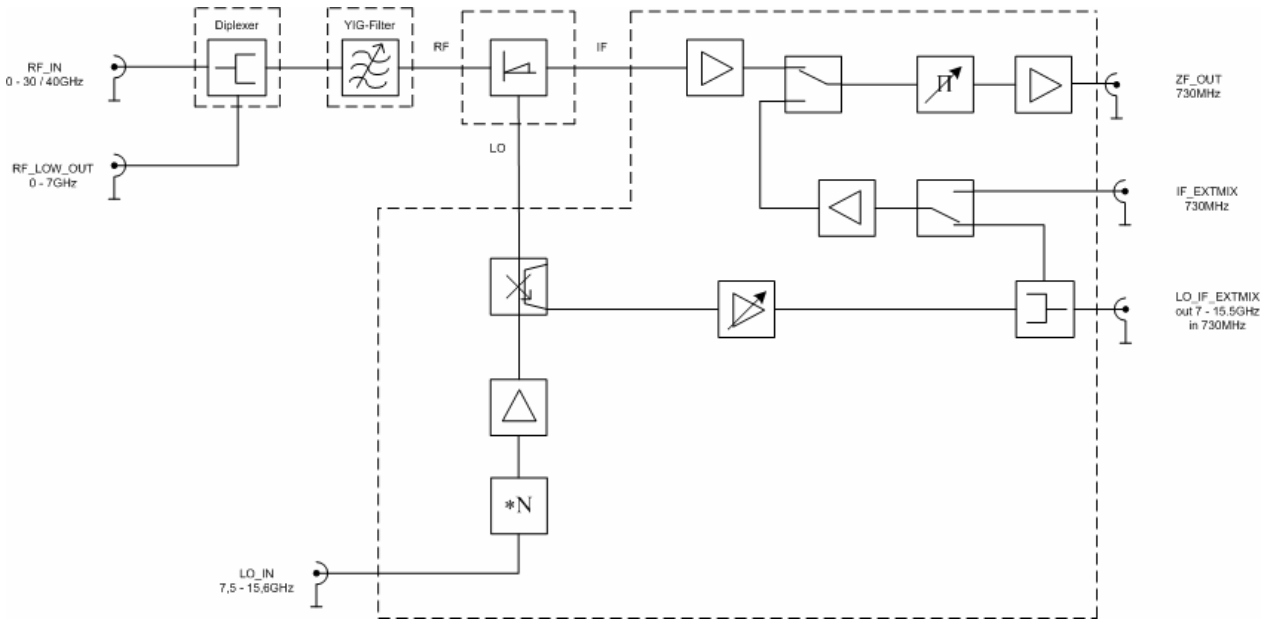
3.1.3 Microwave Converter Unit

The high frequency models of the R&S FSV (frequency range > 7 GHz) also 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 following figure shows a block diagram of the microwave converter unit for R&S FSV 13:



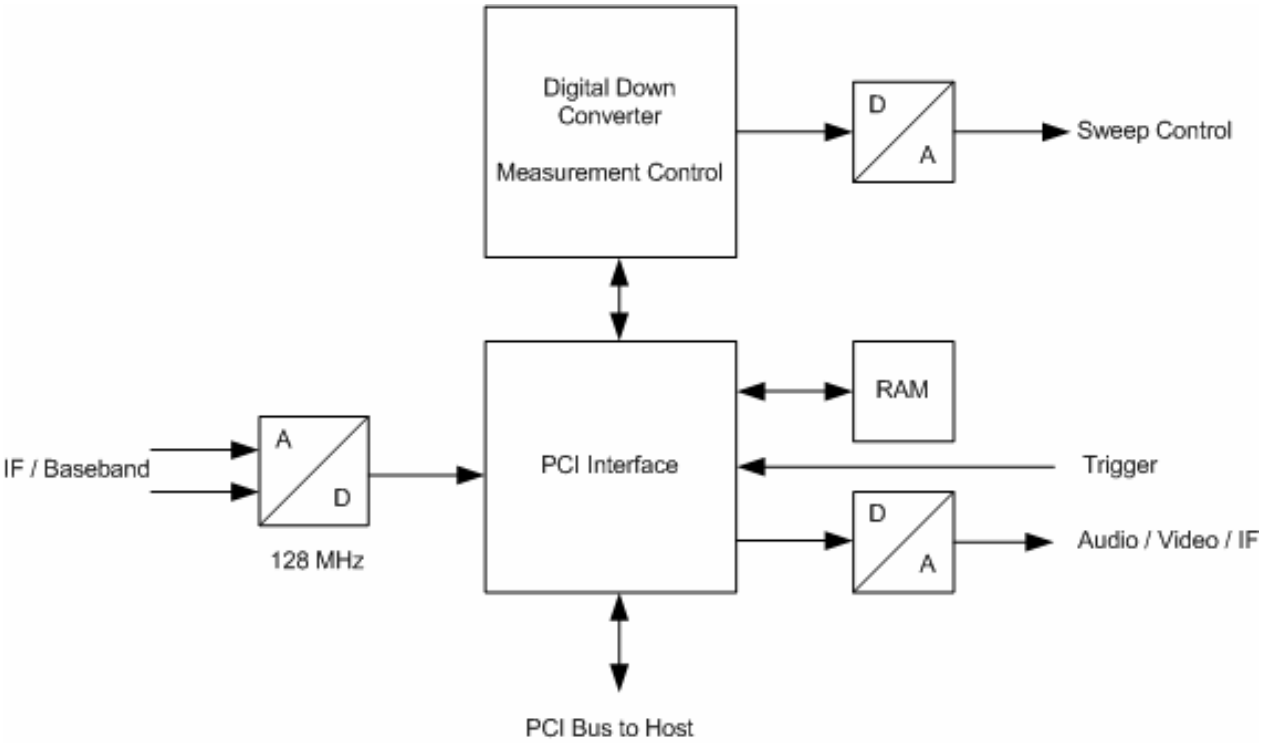
The following figure shows a block diagram of the microwave converter unit for R&S FSV 30/40:



3.1.4 Detector Board

The detector board digitizes the IF or baseband signal of the front end. The module contains the digital signal processing and the sequence control of the analyzer. The detector board is connected to the front module controller via PCI bus.

The following figure shows a block diagram of the R&S FSV detector board:



3.1.5 Motherboard

The motherboard provides slots for the modules. It contains signal connections and the power and reference signal distribution.

3.1.6 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 (PCI 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.

3.1.7 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.

3.1.8 Power Supply

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

The power supply module is a primary clocked switching power supply. On the secondary side, it generates the following DC voltages: +3.3 V, +5.2 V, +12 V, -12 V 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 13.5V-standby voltage for the crystal oscillator and the LED STANDBY on the front panel.

3.1.9 Options

3.1.9.1 OCXO

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.

3.1.9.2 Additional Interfaces

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

3.1.9.3 Tracking Generator

In normal operation (no frequency offset), the tracking generator generates a signal exactly at the input frequency of the R&S FSV in the frequency range up to 3 GHz (7 GHz for models > 3 GHz).

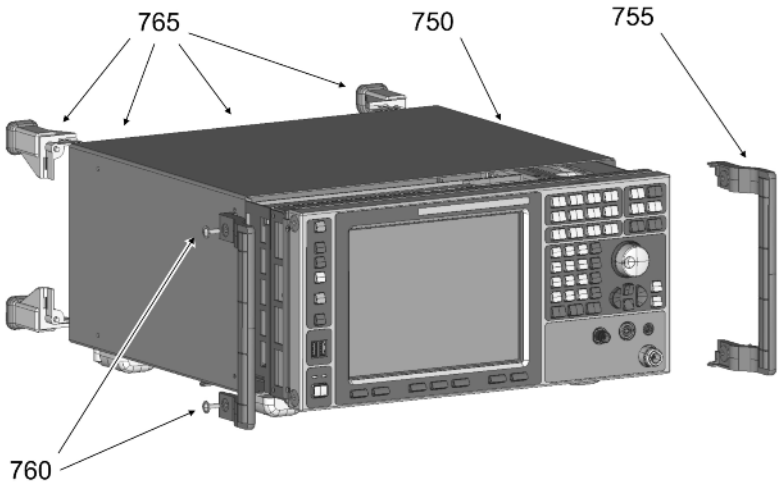
To support frequency-converting measurements, a constant frequency offset of ±1 GHz between the input frequency of the R&S FSV and the output signal of the tracking generator can be set. In addition, I/Q modulation or AM or FM of the output signal can be performed using two analog input signals.

The output level is controlled and can be adjusted between -60 dBm and 0 dBm in 0.1 dB steps.

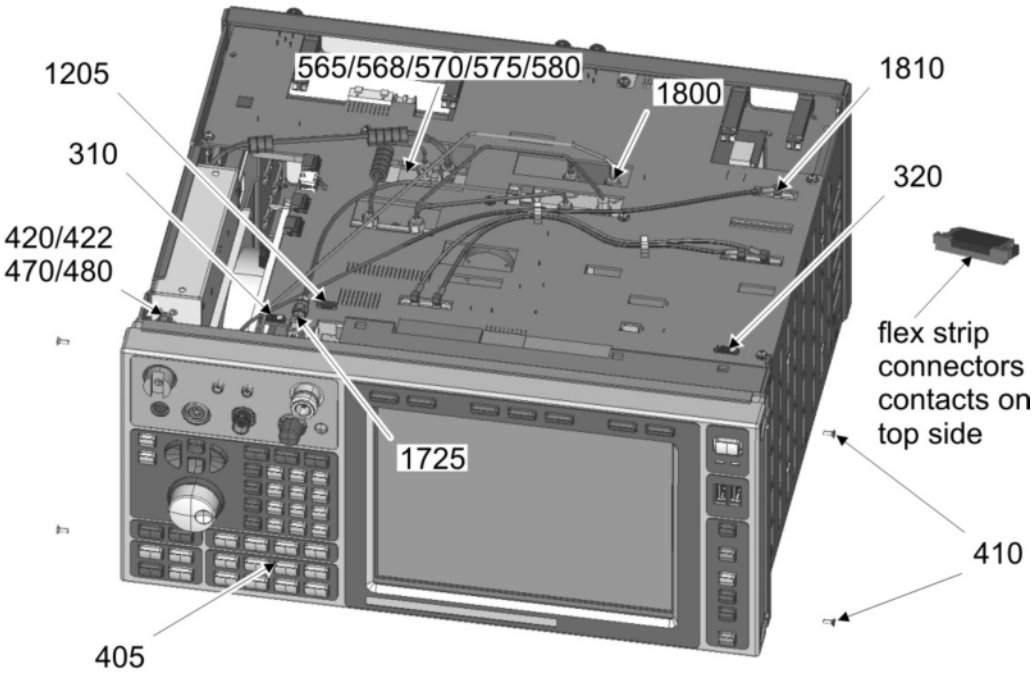
3.1.9.4 External Generator Control

The external generator control option permits a number of commercially available generators to be operated as tracking generators on the R&S FSV. The generator is controlled via the – optional – second IEC bus interface of the R&S FSV (= IEC2, supplied together with the option); with some Rohde & Schwarz generators, it can also be controlled via the TTL synchronization interface included in the AUX Control interface of the R&S FSV.

3.2 Opening the Instrument



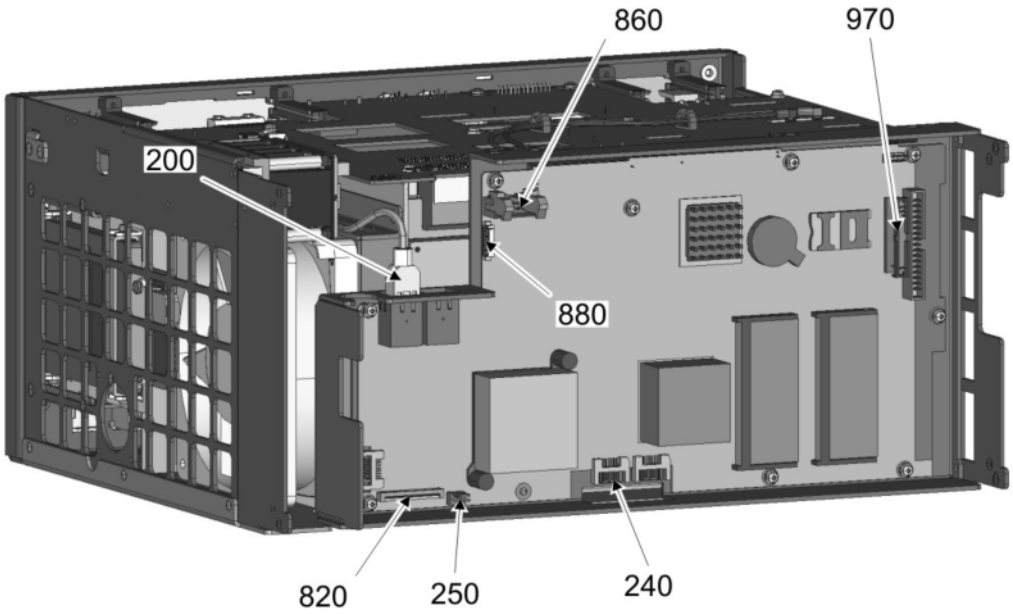
1. Switch off the instrument and disconnect the power plug.
2. Unscrew four screws in the rear wall feet (765) and remove them.
3. Remove the housing. (750)
4. Unscrew the four screws (760) of the front handles (755) on both sides and remove them.



5. Disconnect the cable flex strip (310) and (320).
6. For instruments with Option R&S FSV-B3: Disconnect the cable flex strip (1205).

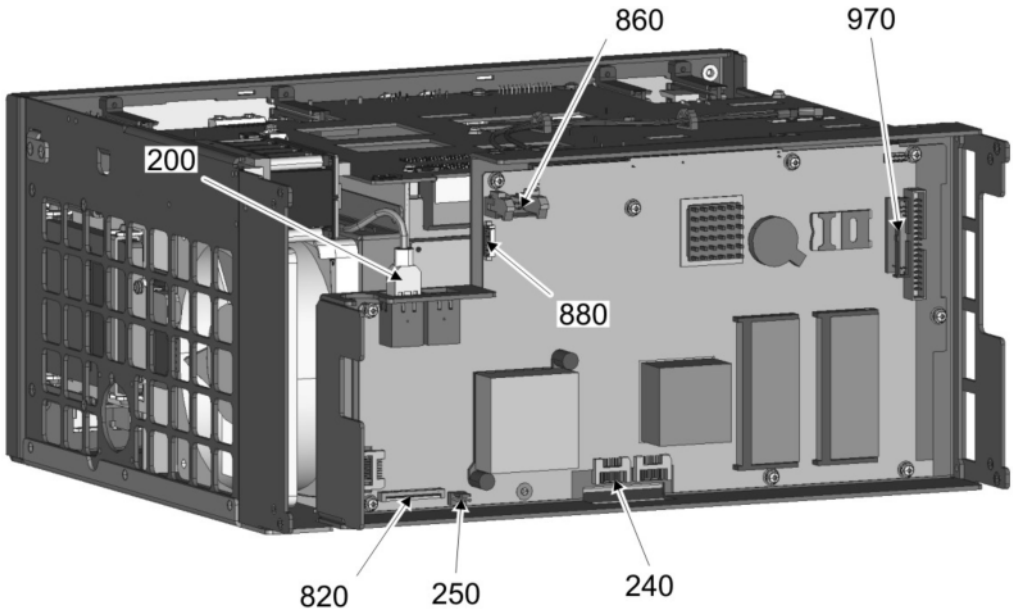
7. For instruments with Option R&S FSV-B9: Disconnect RF cable W13-2 (1725) from the front unit side (405).
8. For instruments with Option R&S FSV-B21: Disconnect RF cable W18 (1800) and RF cable W19 (1810) from the MW Converter Unit (565/570/575/580).
9. Unscrew four screws (410) in the front unit.

   NOTICE! Risk of damage to the instrument. Cables are still connected to the controller.
10. Disconnect RF cable W1 (420/422/470/480).
11. Move the front unit (405) carefully a few millimeters to the front side to disconnect the controller cables.



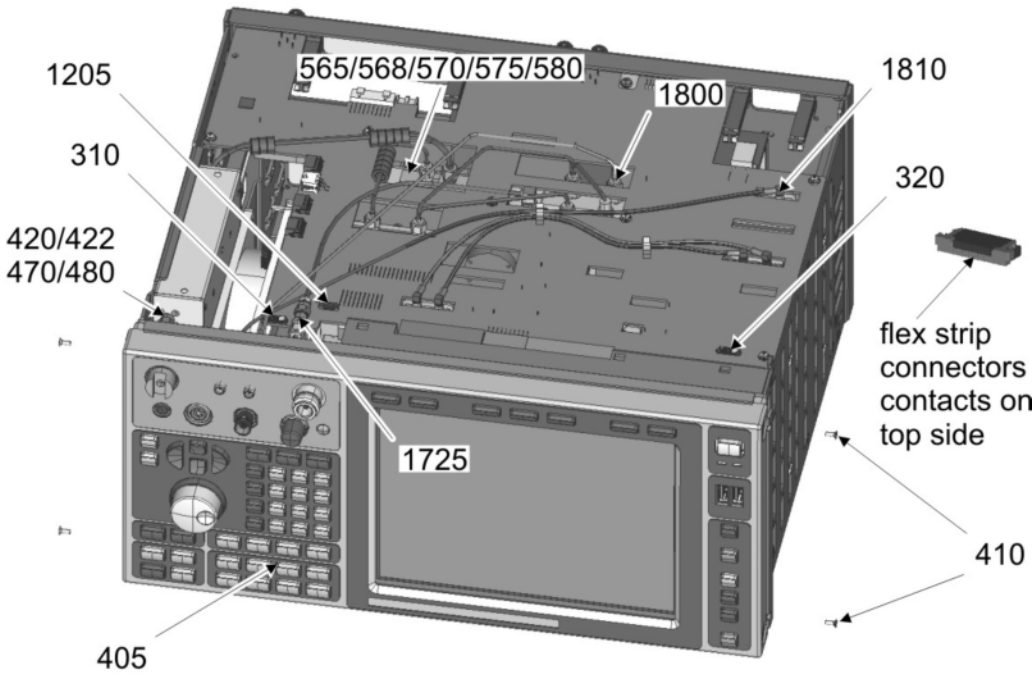
12. Disconnect cable flex switch board fsv (820), cable rotary puls-generator (860), cable W31 LST board FMR (970), cable touch-controller-usb-board (880), patchcable (200), SATA datacable (240) and SATA powercable (250) from the controller.
13. Remove the front unit (405) completely.

3.3 Completing the Instrument



1. Connect cable flex switch board fsv (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).

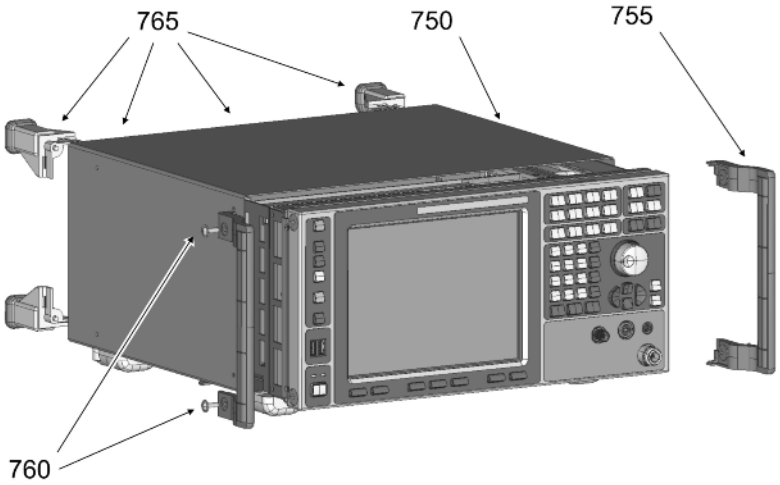
   NOTICE! Risk of damage to the instrument. Make sure you route the cables properly.



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-B9: Connect RF cable W13-2 (1725).
6. For instruments with Option R&S FSV-B21: Connect RF cable W18 (1800) and RF cable W19 (1810) to the MW Converter Unit (565/570/575/580).
7. Fasten the four screws (410) to screw the front unit (405) together with the unit frame (22/24).
8. Mount the front handles (755) on both sides by using the four screws (760).



9. Mount the housing (750) and adjust it properly to the front unit (405).
10. 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

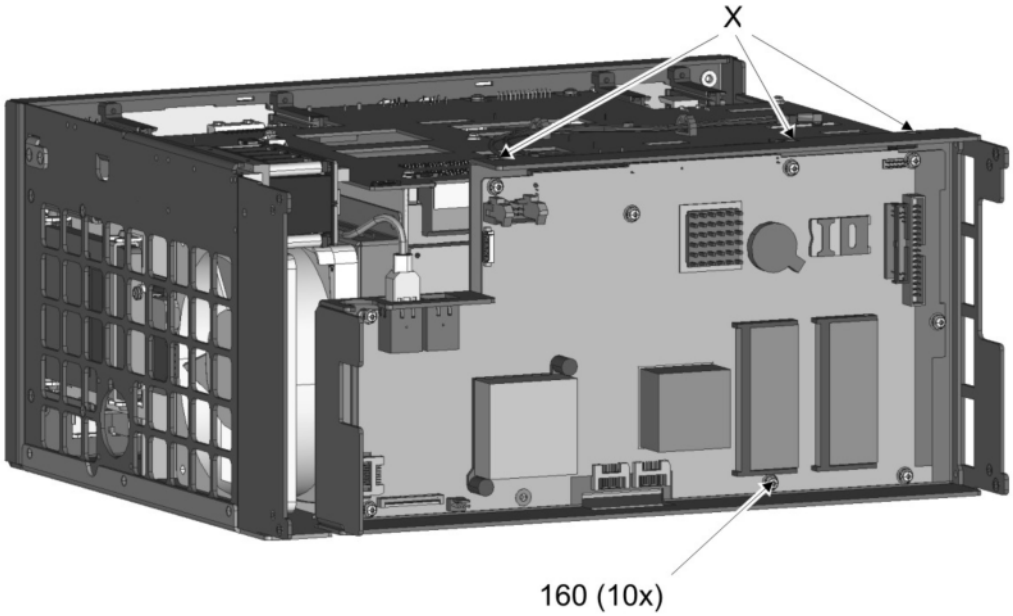
Risk of electrostatic discharge

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 5.1 Spare Parts, item 155, and explosion drawings 1307.9002.01 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 (155) 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 "FSV".
3. Follow the instructions in the PDF file on how to create the boot CD-ROM.

Creating a BIOS Update CD-ROM:

1. Use a burning program and burn an ISO image CD with the following file:
2. FSV-5-1-22-2-MeasurementBIOS.iso (This files contains the Bios Update CD-ROM).

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:
17. [**SETUP** : SERVICE : SELFTEST] then[SELFTEST RESULTS]
18. Start a total calibration and check the result:
19. [**SETUP** : ALIGNMENT] then[SHOW ALIGN RESULTS]
20. Perform a frequency response correction using the correction software. Further information can be found in chapter "2 Adjustment".
21. Adjust the instrument as described in chapter "2 Adjustment".

3.4.2 Lithium Battery on the Controller

See 5.1 Spare Parts, item 159, and explosion drawings 1307.9002.01 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]
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".

3.4.3 SATA Hard Drive A91

See chapter 5.1 Spare Parts, item 276, and explosion drawings 1307.9002.01 sheet 1.

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

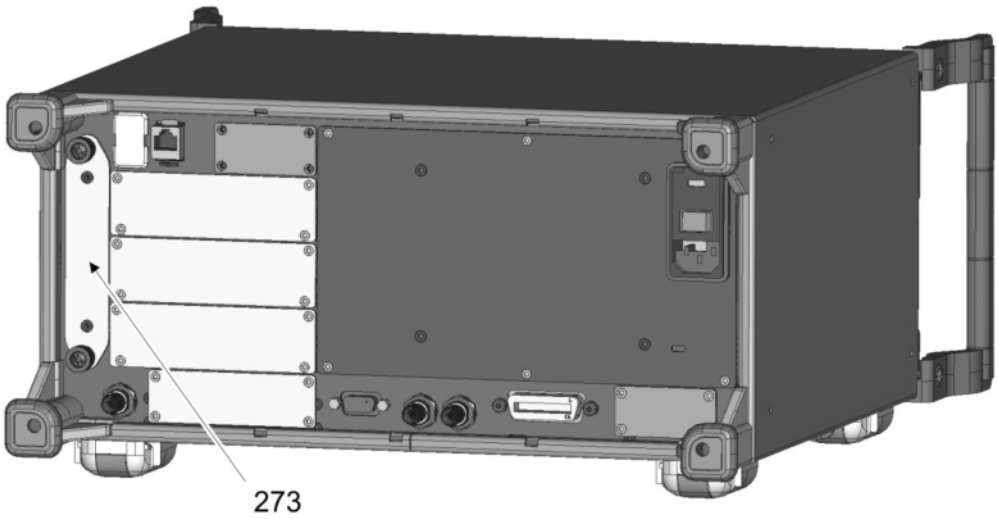
NOTICE

Risk of losing important information

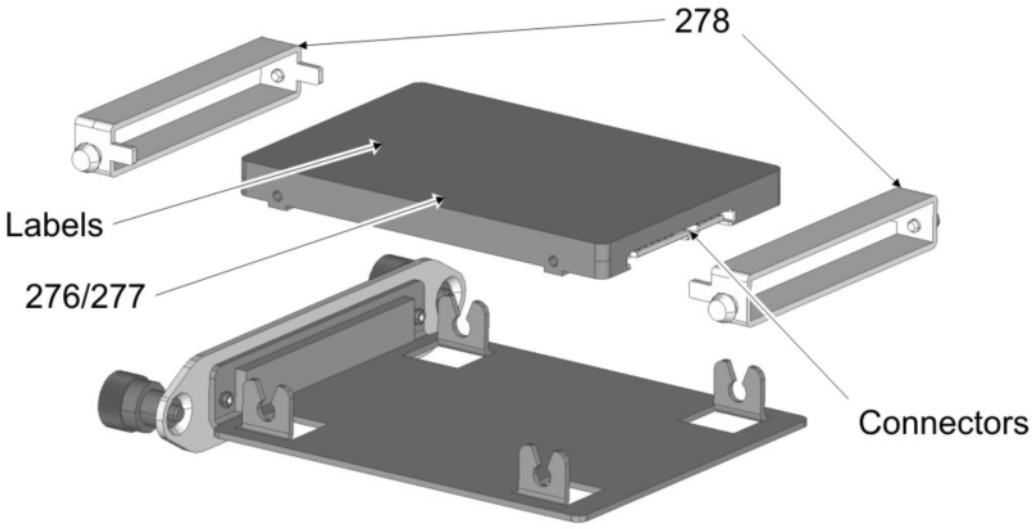
Important information about the type of instrument, installed hardware, options, etc., is stored both on the motherboard and on the hard drive. This information is required in order to restore the instrument in case of errors. Thus, do not replace the motherboard and the hard drive at the same time, 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 (273) to the rear.



3. Carefully remove the hard drive (276/277) together with the two holders (278) from the sheet-metal part.
4. Remove the two holders (278) from the hard drive (276/277).



3.4.3.2 Installing the New Hard Drive

1. Attach the two holders (278) to the new hard drive (276/277).
2. Push the new hard drive (276/277) 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 and the labels above.
3. Insert the Hard Drive (273/274) 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

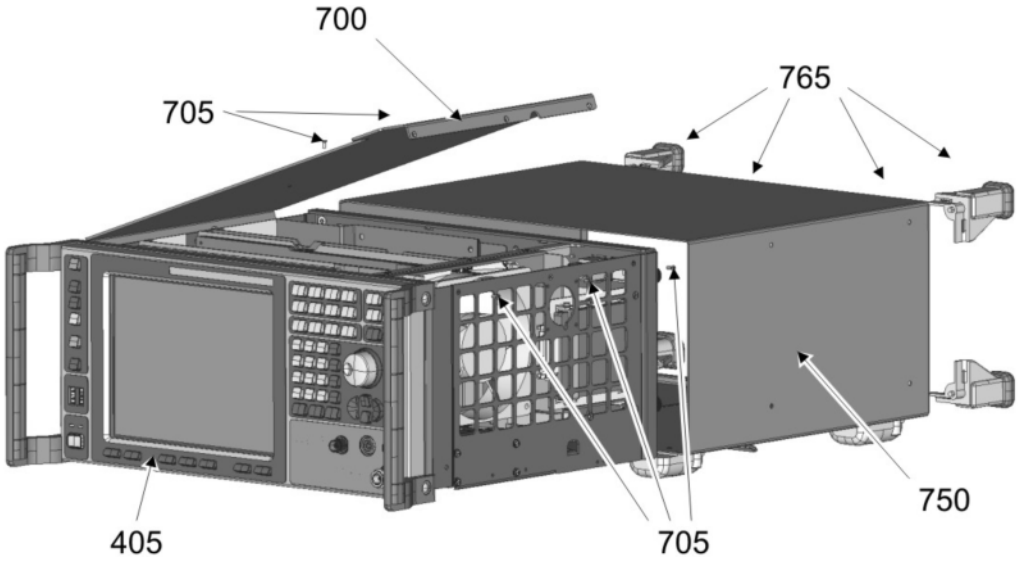
If a blue screen appears after starting the instrument, make sure that the knurled screws are fixed properly and the hard drive has a contact to the SATA adaptor.

3.4.4 SATA Adaptor A92

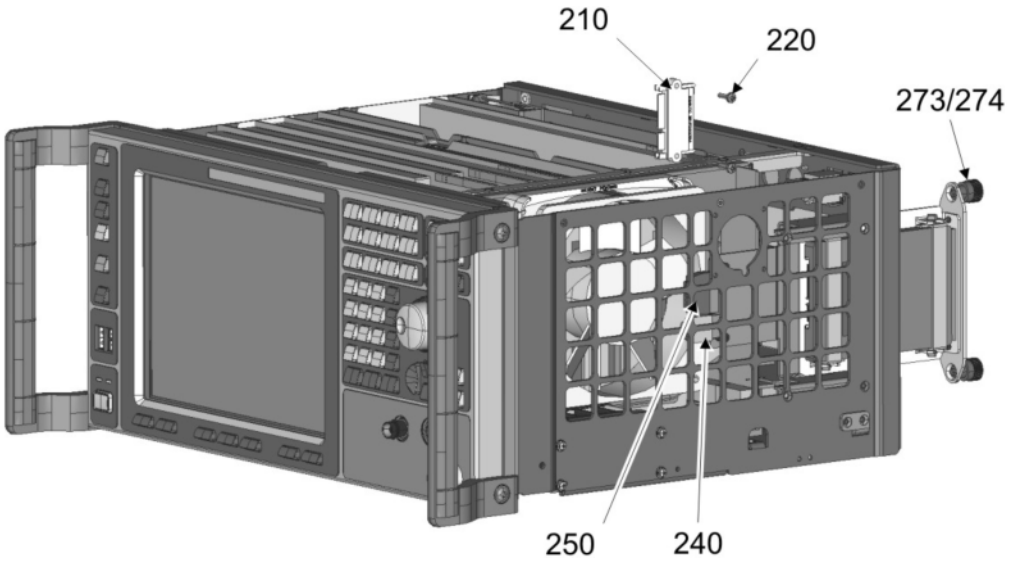
See chapter "5.1 Spare Parts", item 210, and explosion drawing 1307.9002.01 sheet 1.

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

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 five screws (705) in the top cover (700) and remove the cover.
5. If your FSV has an audio-option FSV B3 remove the speaker as described in chapter “3.4.34.1 Removing the Speaker”.



6. Unscrew the two knurled screws and remove the hard drive (273/274) to the rear.
7. Disconnect the SATA data cable (240) and the SATA power cable (250).
8. 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 (273/274) at the rear and fix it with the two knurled screws.
4. If your FSV has an audio option FSV B3 assemble the speaker as described in chapter “3.4.34.2 Installing the New Speaker”.
5. Mount the top cover (700) on the instrument with five screws (705).
6. Mount the housing (750) and adjust it properly to the front unit (405).
7. Mount the rear wall feet (765).
8. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
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]

NOTICE

Blue screen after replacing a hard drive

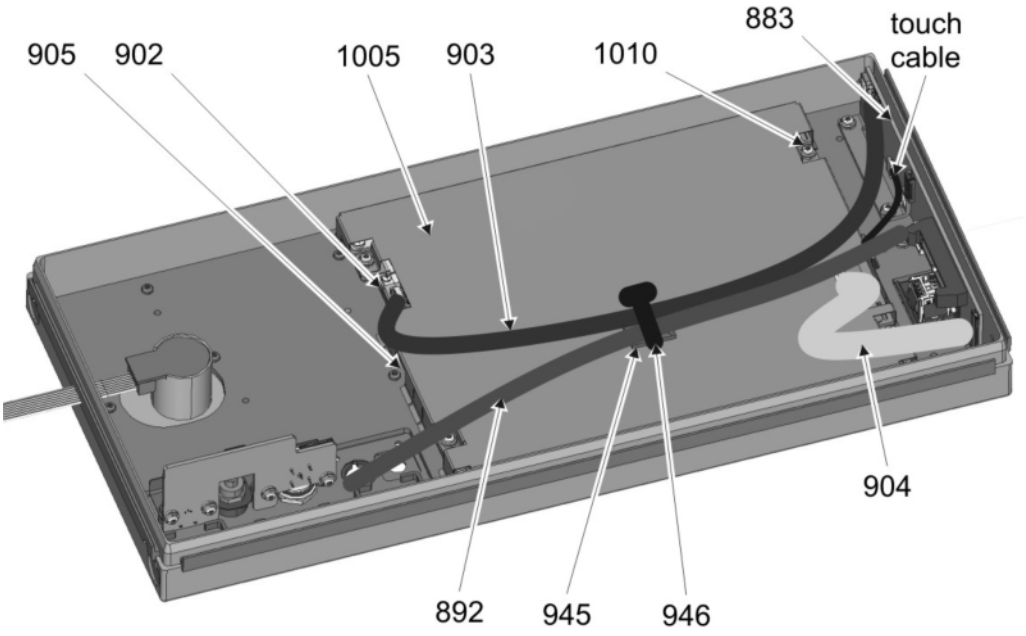
If a blue screen appears after starting the instrument, make sure that the knurled screws are fixed properly and the hard drive has a contact to the SATA adaptor.

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

The display with touch screen (902) can only be replaced with the same part number. Otherwise you need to change the keyboard holder (845) and the display shielding (1005) as well.



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 (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 (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 (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 (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:

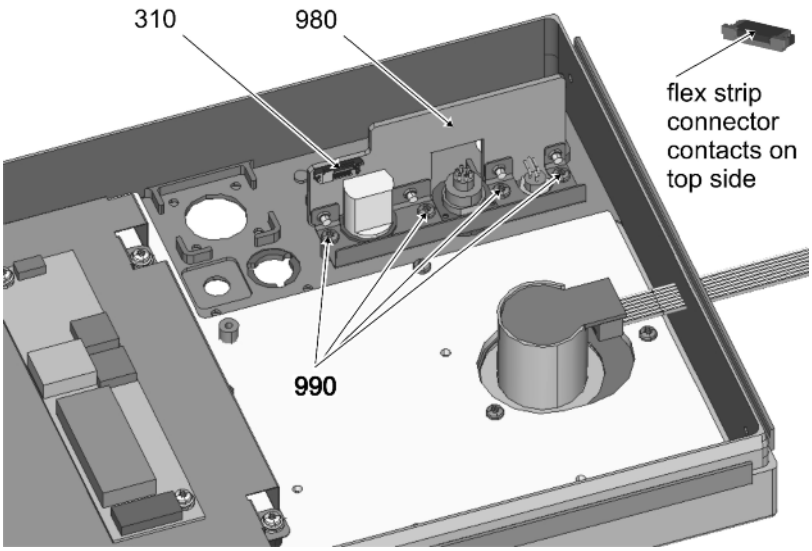
   [SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
4. Start alignment and check the result:

   [SETUP : ALIGNMENT : SELF ALIGNMENT], then[SHOW ALIGN RESULTS]
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 Front Connector Board A20

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

3.4.6.1 Removing the Front Connector Board



1. Open the instrument as described in "3.2 Opening the Instrument".
2. Unplug the flex strip cable (310) from the front connector board (980).
3. Unscrew four screws (990) from the front connector 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:

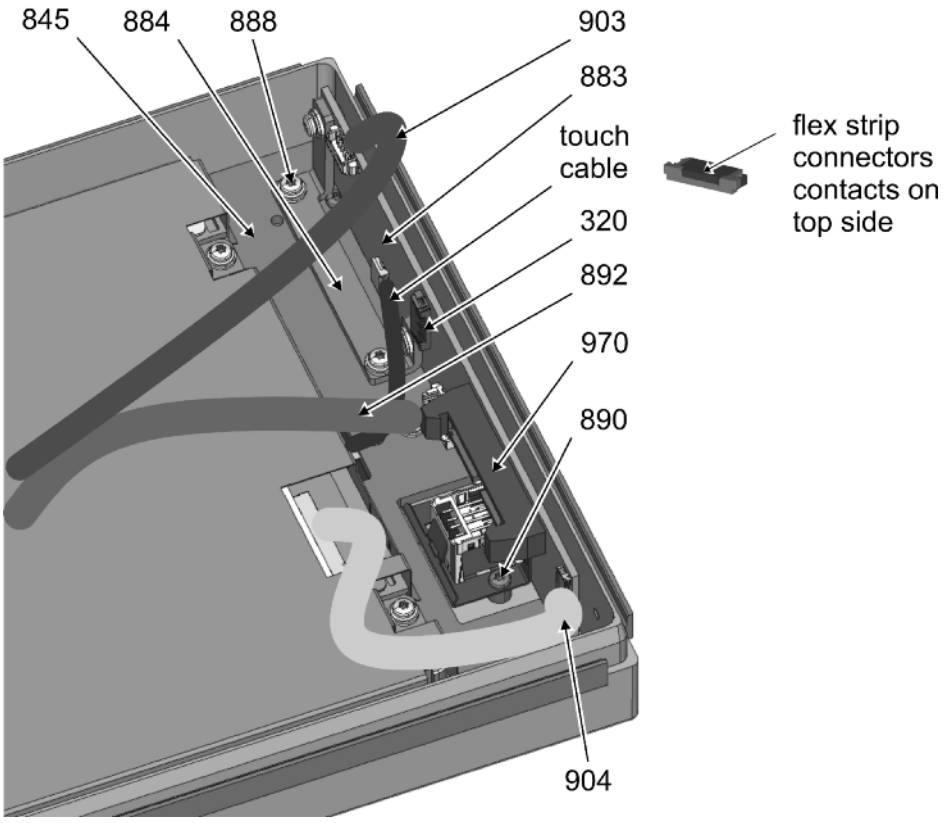
   [SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
3. Start alignment and check the result:

   [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".

3.4.7 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 (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 (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. Start selftest and check results:

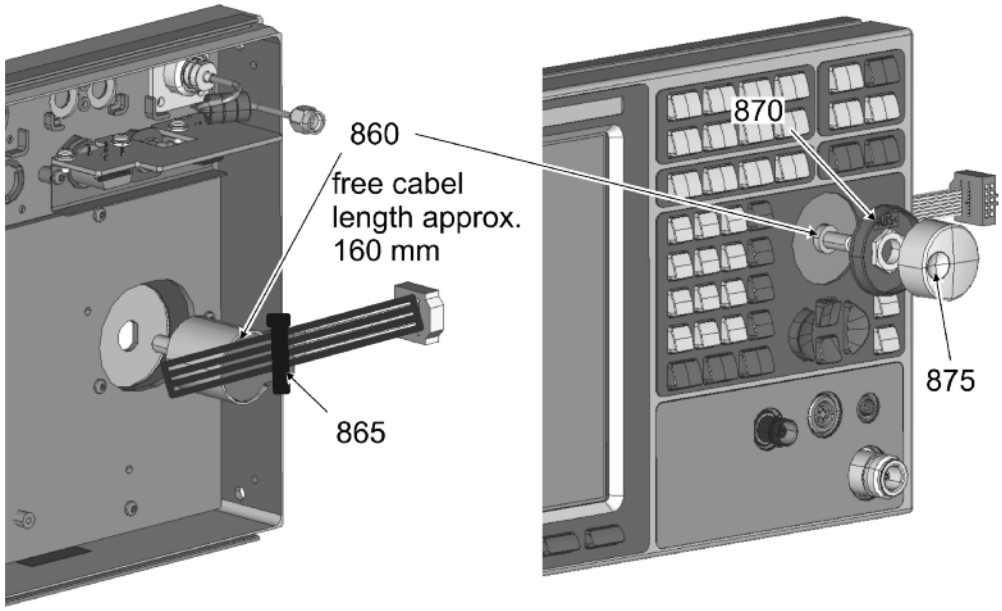
   [SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
3. Start alignment and check the result:

   [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".

3.4.8 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:

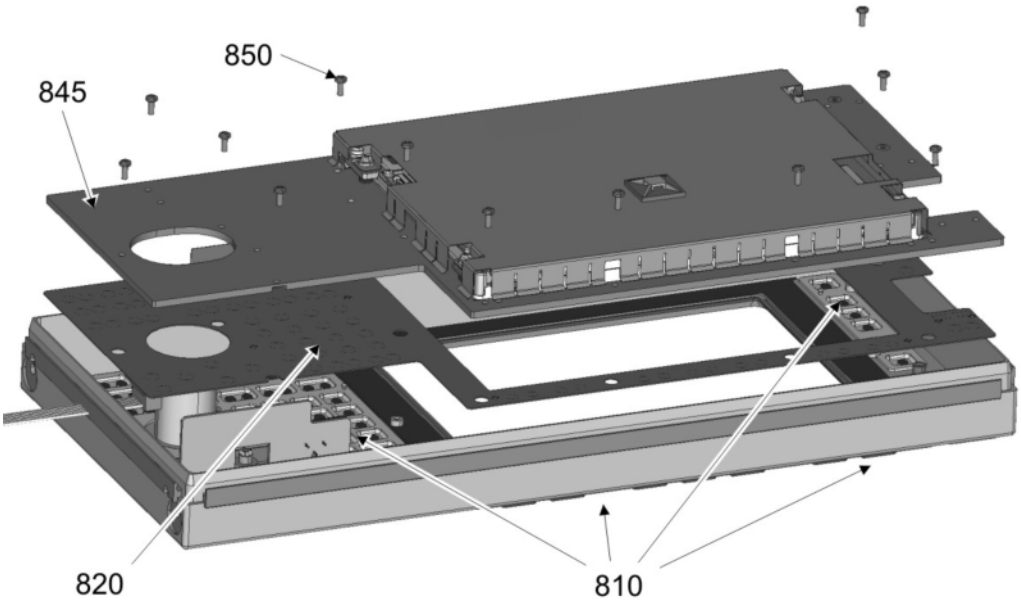
   [SETUP : ALIGNMENT : SELF ALIGNMENT], then[SHOW ALIGN RESULTS]
4. Perform a frequency response correction using the correction software. Further information can be found in chapter "2 Adjustment".
5. Adjust the instrument as described in chapter "2 Adjustment".

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 : SERVIE 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 changes its color and the unknown key code is displayed in the dialog status line.

6. To verify that all keys works 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]
9. Start alignment and check the result:

   [SETUP : ALIGNMENT : SELF ALIGNMENT], then[SHOW ALIGN RESULTS]
10. Perform a frequency response correction using the correction software. Further information can be found in chapter "2 Adjustment".
11. 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 “**Error! Reference source not found. Error! Reference source not found.**” for FSV 3,7,13,30 or “3.4.9 Push-Button Board Set A80” for FSV40.

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

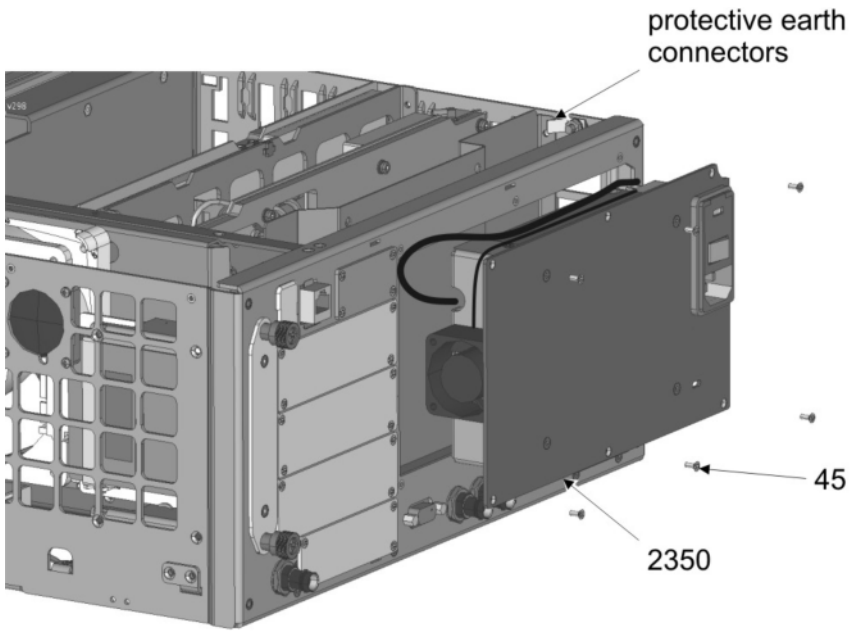
Finally the key test described in section “**Error! Reference source not found. Error! Reference source not found.**” must also be performed using the tool.

3.4.11 Power Supply (FSV 3/7)

See chapter "5.1 Spare Parts", item 2300, explosion drawing 1307.9002.01 sheet 2, and drawing 1164.5423.01.

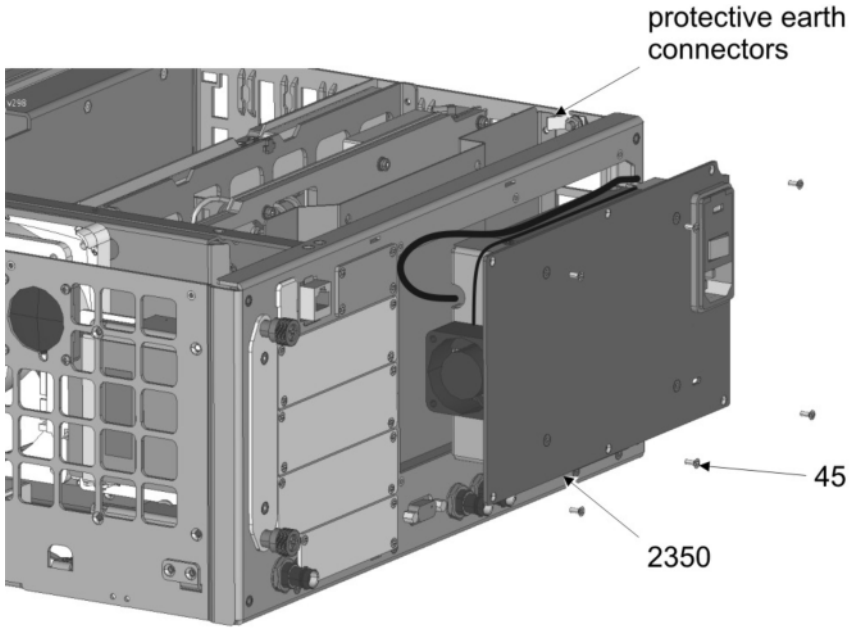
The power supply is fitted at the rear of the instrument frame of the R&S FSV.

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 five screws (705) in the top cover (700) and remove it.

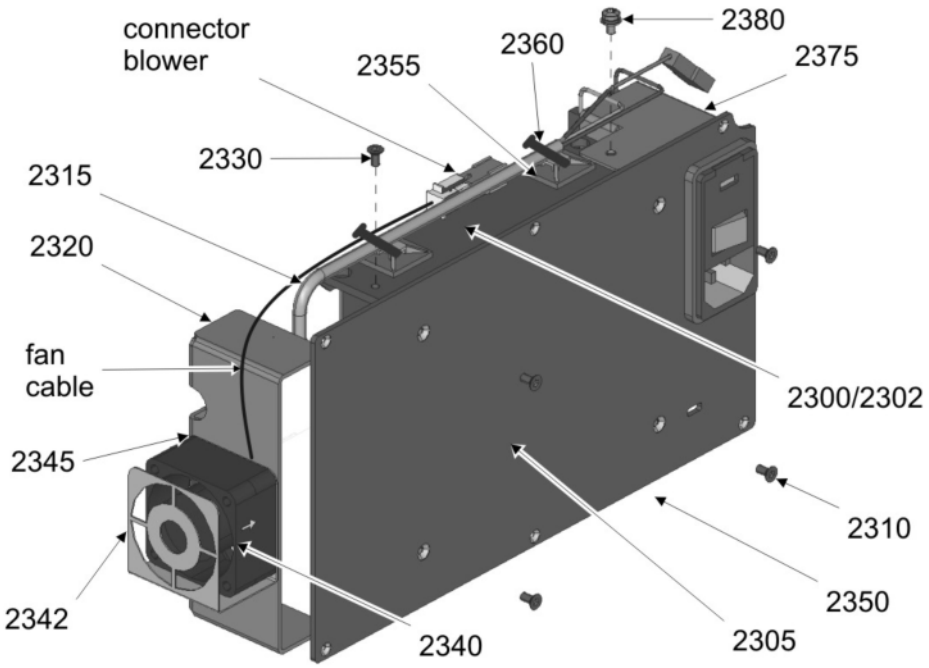
3.4.11.2 Removing the Power Supply Unit



1. Remove both protective earth conductors from their connector.

2. Unscrew six screws (45).
3. Carefully take the rear plate approx. 40 mm out of the instrument.
4. Disconnect the cable power supply motherboard (2350) from the motherboard.
5. Remove the unit completely.

3.4.11.3 Removing the Power Supply



1. Remove both cable ties (2360).
2. Disconnect the cable power supply motherboard (2350) from the power supply (2300/2302).
3. Unscrew two screws (2330) and remove the bracket fan (2320) approx. 20 mm from the power supply.
4. Disconnect the cable power input (2315) from the power supply.
5. Unscrew four screws (2310) and remove the power supply.
6. Remove the touch protection (2375) with the screw (2380).

3.4.11.4 Installing the New Power Supply

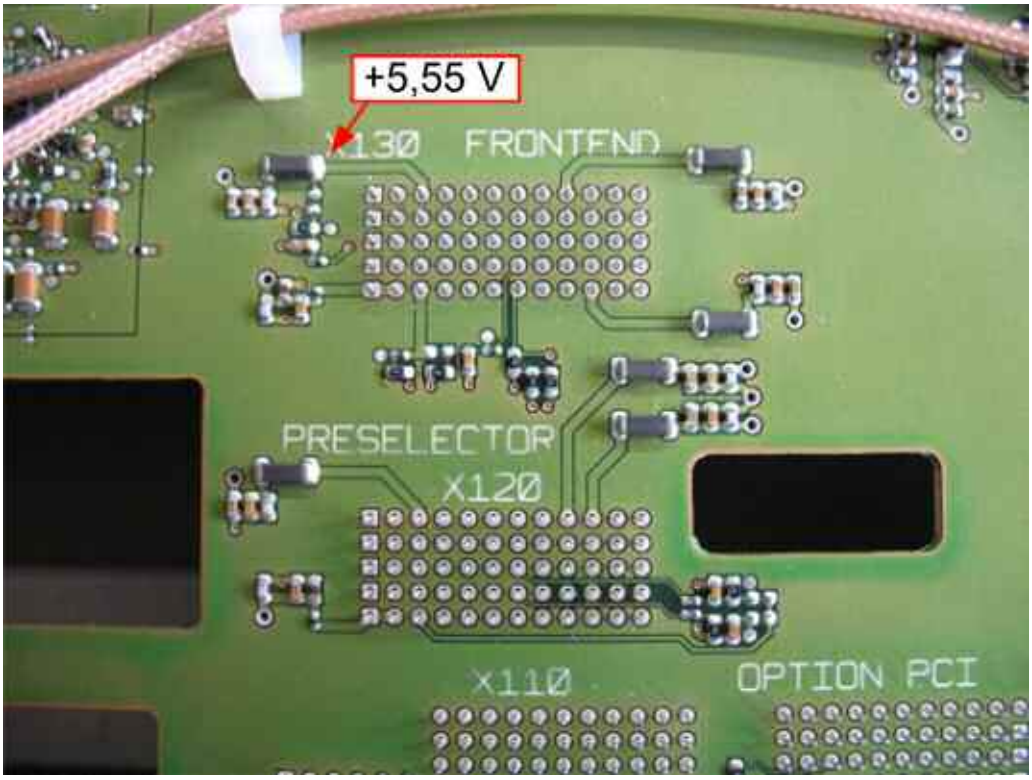
1. Mount the power supply (2300/2302) with four screws (2310) to the rear plate (2305).
2. Mount the bracket fan (2320) with two screws (2330).
3. Fix the touch protection (2375) with a screw (2380).

4. Connect the cable power input (2315) and the cable power supply motherboard (2350) to the power supply (2300/2302).
5. Connect the cable power supply motherboard (2350) to the motherboard.
6. Place the power supply outside of the instrument.

7. 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.

8. Adjust the +5 V voltage to +5.55 V ± 10 mV, measured at the motherboard (frontend connector).



9. Switch the instrument off.
10. Tie the cable power input (2315) and the fan cable together with both cable ties (2360) and the holders (2355).
11. Carefully insert the power supply (2300/2302) into the instrument.

    NOTICE! Risk of damage to the instrument. Make sure you route the cables properly.
12. Mount the rear plate to the instrument with six screws (45).
13. Connect two protective earth conductors to their connectors.
14. Fix the top cover (700) with five screws (705).
15. Mount the housing (750) and adjust it properly to the front unit (405).
16. Mount the rear wall feet (765).
17. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
18. Start selftest and check results:

    [SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
19. Start alignment and check the result:

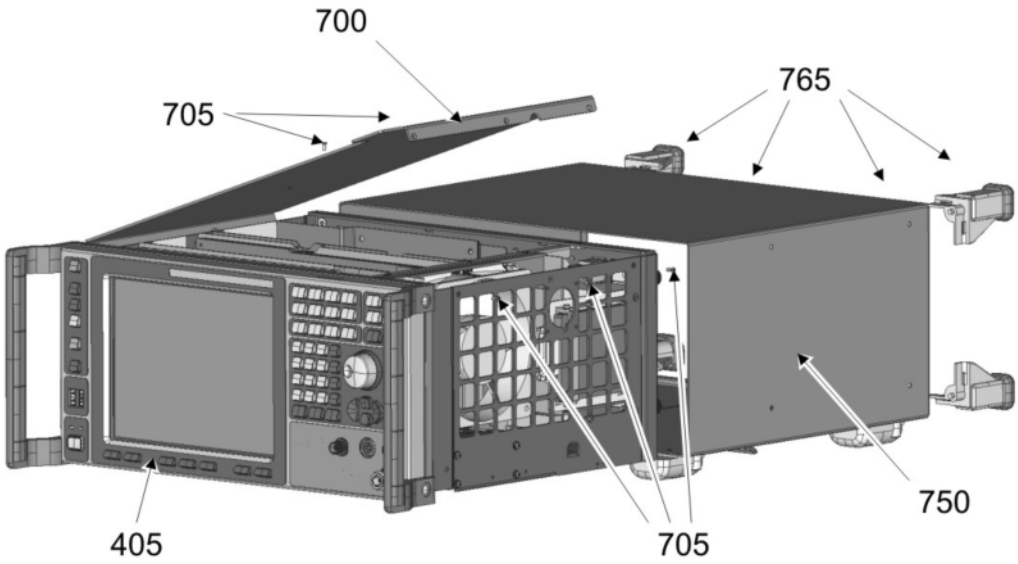
    [SETUP : ALIGNMENT : SELF ALIGNMENT], then[SHOW ALIGN RESULTS]

3.4.12 Power Supply (FSV 13/30/40)

See chapter "5.1 Spare Parts", item 30, and explosion drawing 1307.9002.01 sheet 2.

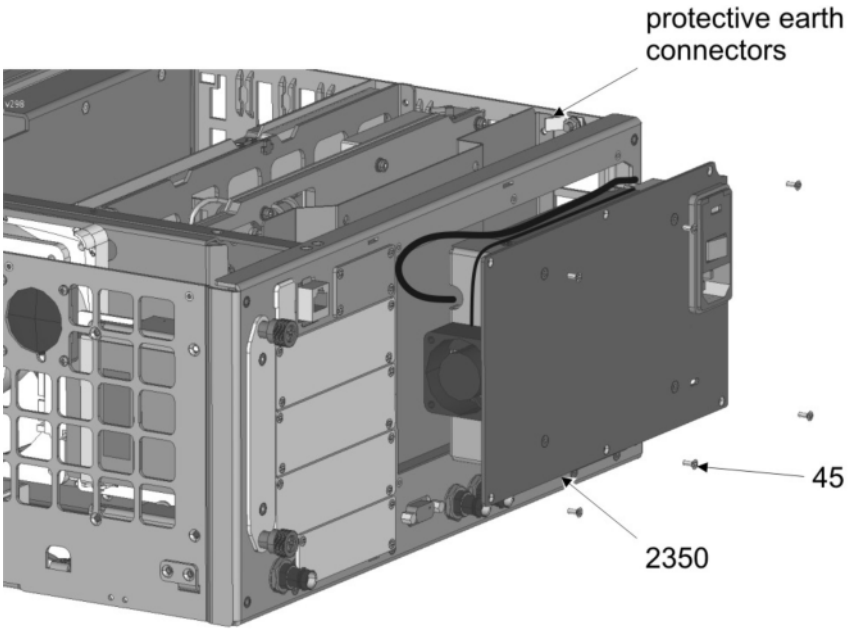
The power supply is fitted at the rear of the instrument frame of the R&S FSV.

3.4.12.1 Removing the top cover



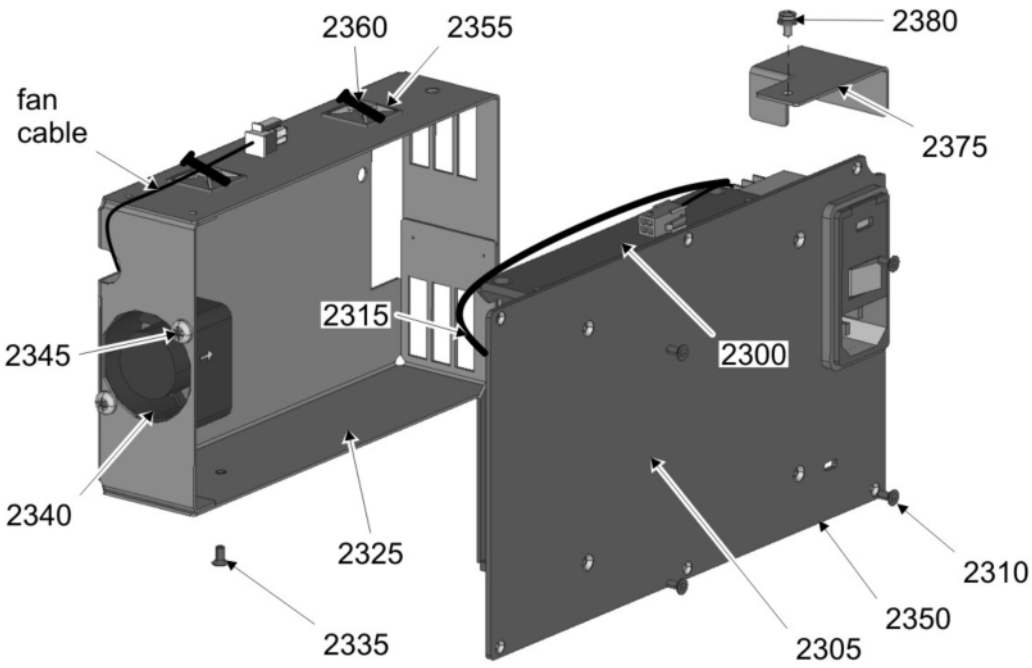
1. Switch off the instrument and disconnect the power plug.
2. Unscrew four screws in the rear wall feet (765) and remove them.
3. Remove the housing (750).
4. Unscrew five screws (705) in the top cover (700) and remove it.

3.4.12.2 Removing the Power Supply Unit



1. Remove both protective earth conductors from their connector.
2. Unscrew six screws (45).
3. Carefully take the rear plate approx. 40 mm out of the instrument.
4. Disconnect the cable power supply motherboard (2350) from the motherboard.
5. Remove the unit completely.

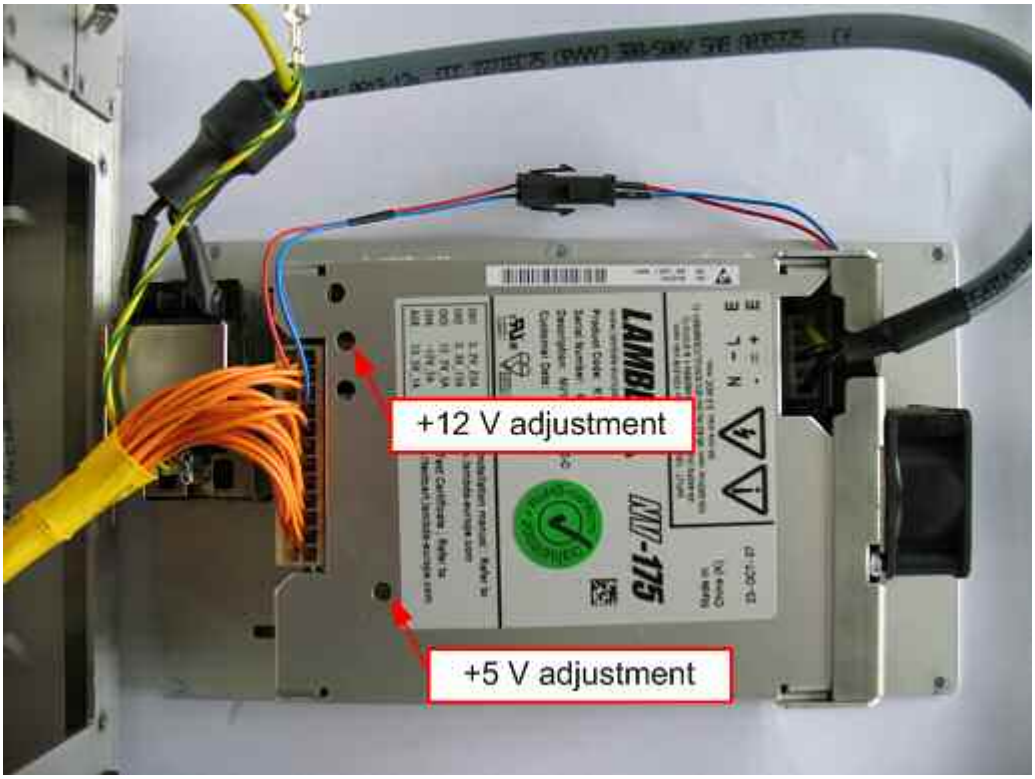
3.4.12.3 Removing the Power Supply



1. Remove both cable ties (2360).
2. Disconnect the fan (2340).
3. Disconnect the cable power supply motherboard (62) from the power supply (2300).
4. Disconnect the cable power supply motherboard (2350) and the cable power input (2315) from the power supply (2300).
5. Unscrew two screws (2335/2380), remove the shielding (2325) and the touch-protection (2375) from the power supply (2300).
6. Unscrew four screws (2310) and remove the power supply (2300).

3.4.12.4 Installing the New Power Supply

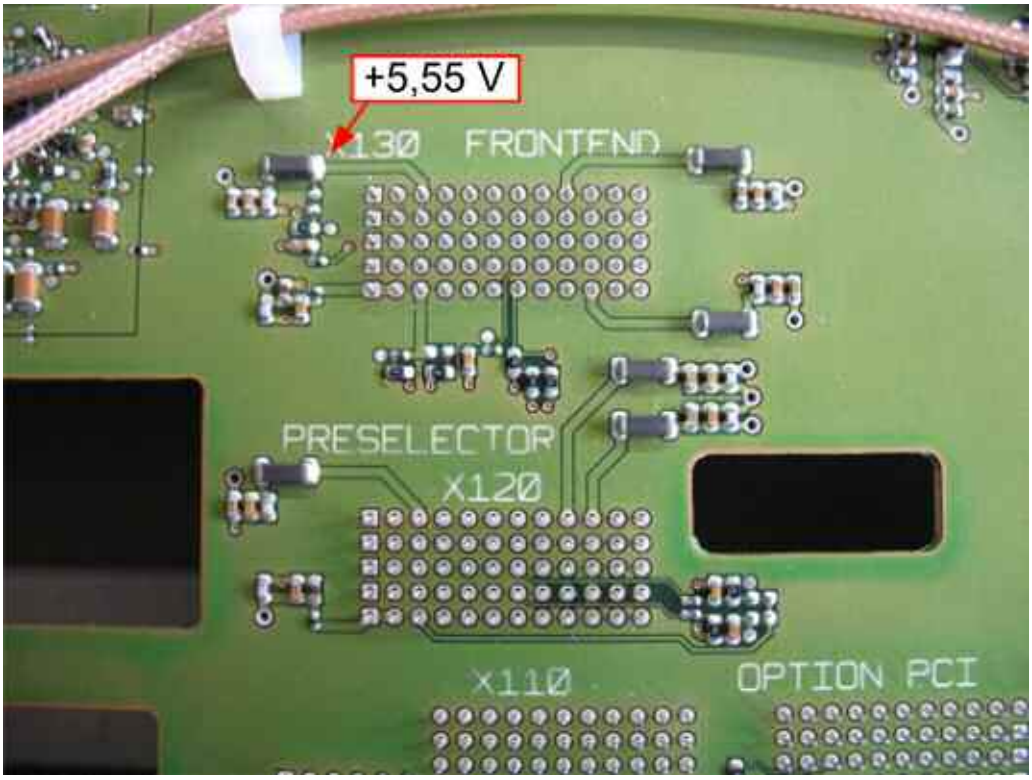
1. Mount the power supply (2300) with four screws (2310) to the rear plate (2305).
2. Mount the shielding (2320) with one screw (2335).
3. Fix the touch protection (2375) with a screw (2380).
4. Connect the cable power input (2315) and the cable power supply motherboard (2350) to the power supply (2300).
5. Connect the fan (2340).
6. Connect the cable power supply motherboard (2350) to the motherboard.
7. Place the power supply outside of the instrument.



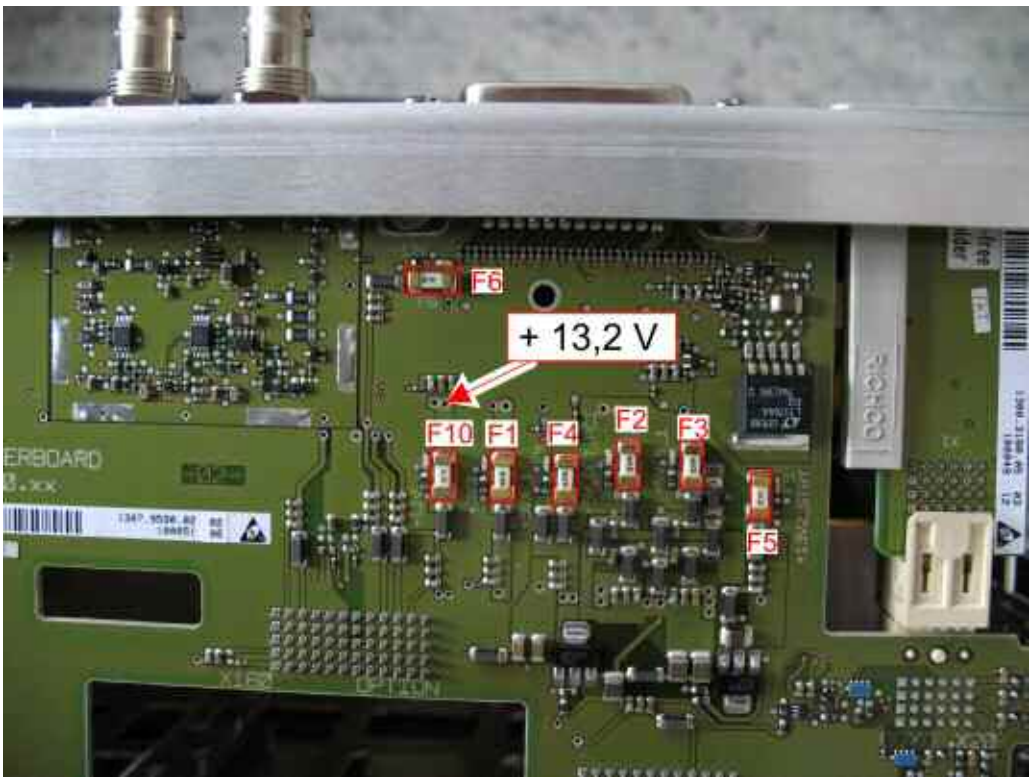
8. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.

   NOTICE! Mains voltage is applied to the power supply.

9. Adjust the +5 V voltage to +5.55 V ± 10 mV, measured at the motherboard (frontend connector).



10. **FSV40:** Adjust the +12 V voltage to +13.2 V ± 10 mV, measured at the motherboard (Fuse F10).



11. Switch the instrument off.
12. Tie the cable power input (2315) and the fan cable together with both cable ties (2360) and the holders (2355).
13. Carefully put the power supply (2300) into the instrument.

    NOTICE! Risk of damage to the instrument. Make sure you route the cables properly.
14. Mount the rear plate with six screws (45) to the instrument.
15. Connect the two protective earth conductors to their connector.
16. Mount the top cover (700) on the instrument with five screws (705).
17. Mount the housing (750) and adjust it properly to the front unit (405).
18. Mount the rear wall feet (765).
19. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
20. Start selftest and check results:

    [SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
21. Start alignment and check the result:

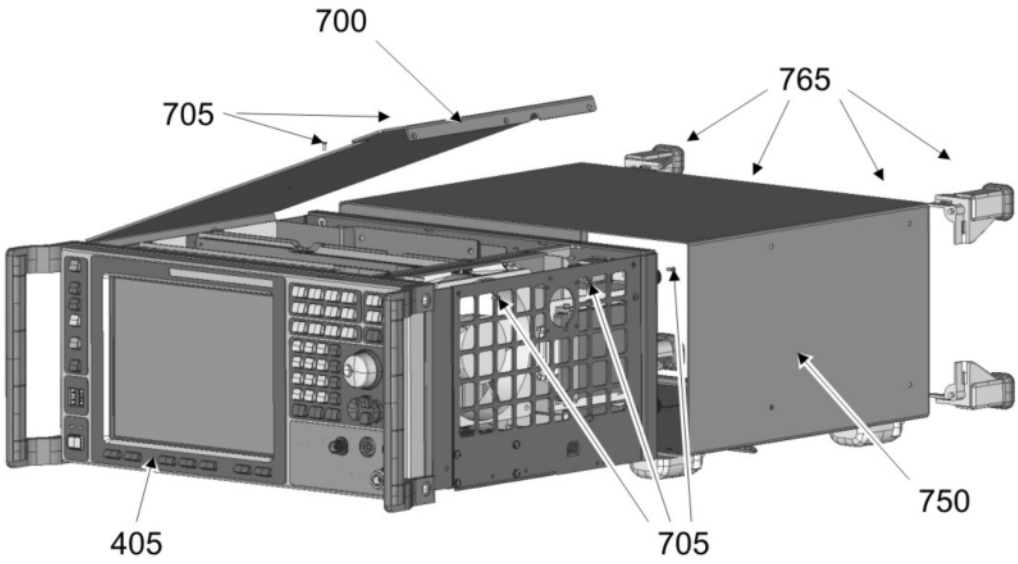
    [SETUP : ALIGNMENT : SELF ALIGNMENT], then[SHOW ALIGN RESULTS]

3.4.13 Power Supply Fan

See chapter "5.1 Spare Parts", item 58, and explosion drawing 1307.9002.01 sheet 2.

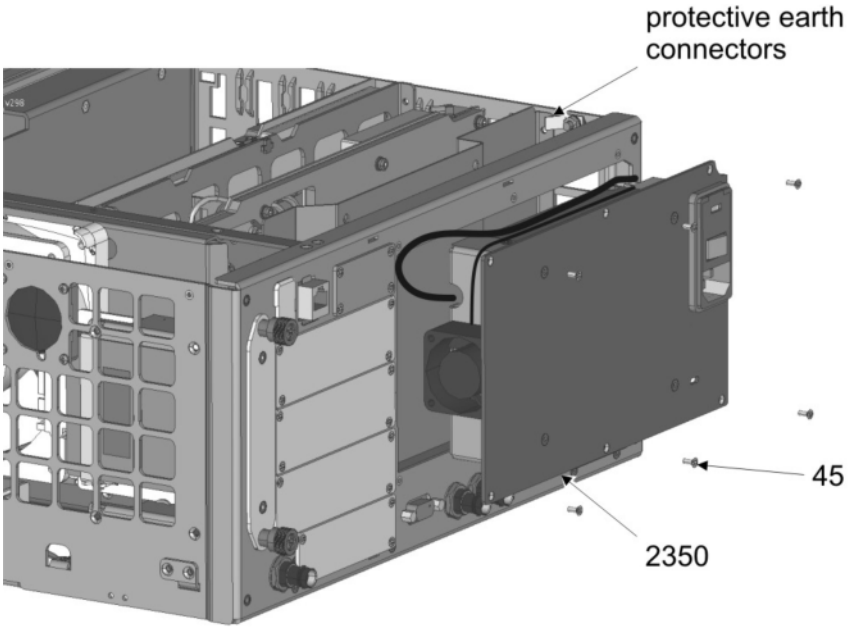
The fan is fitted at the rear of the instrument frame of the R&S FSV.

3.4.13.1 Removing the top cover



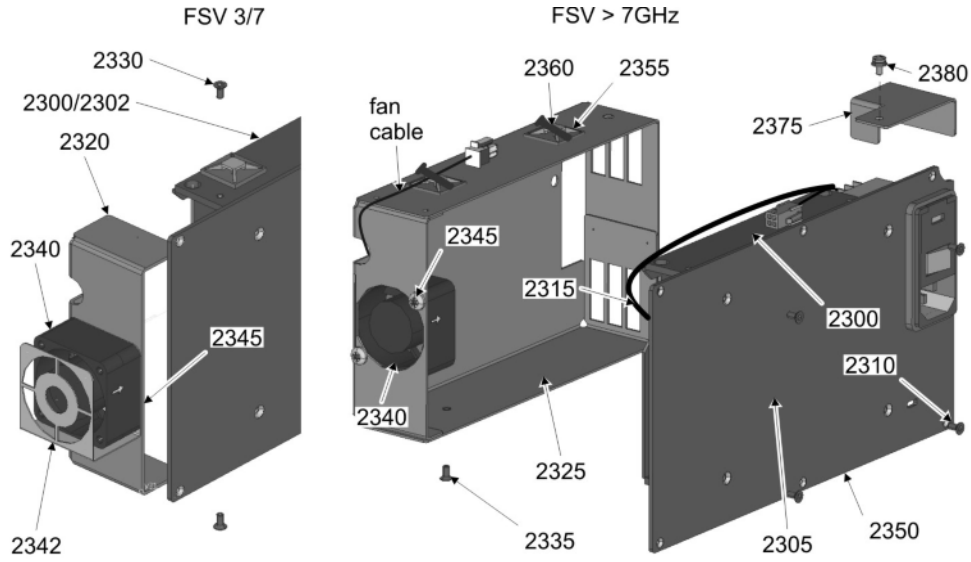
1. Switch off the instrument and disconnect the power plug.
2. Unscrew four screws in the rear wall feet (765) and remove them.
3. Remove the housing (750).
4. Unscrew five screws (705) in the top cover (700) and remove it.

3.4.13.2 Removing the Power Supply Unit



1. Remove both protective earth conductors from the connector.
2. Unscrew six screws (45).
3. Carefully take the rear plate approx. 40 mm out of the instrument.
4. Disconnect the cable power supply motherboard (2350) from the motherboard.
5. Remove the unit completely.

3.4.13.3 Removing the Fan



1. Remove both cable ties (2360).
2. Disconnect the fan (2340).
3. FSV 3/7: Unscrew two screws (2330) and remove the bracket (2320) with the fan (2340) and the shielding (2342) completely.
4. FSV > 7GHz: Disconnect and remove the cable power supply motherboard (2350) and the cable power input (2315).
5. FSV > 7GHz: Unscrew two screws (2335/2380) and remove the touch-protection (2375) and the shielding (2325).
6. Unscrew two screws (2345) and remove the fan (2340).

3.4.13.4 Installing the New Fan

1. Mount the fan (2340) with two screws (2345).
2. FSV 3/7: The shielding (2342) is mounted between the fan and the fan bracket (2320). Mount the bracket with two screws (2330) to the power supply (2300/2302).
3. FSV > 7GHz: Mount the shielding (2325) and the touch-protection (2375) with two screws (2335/2380).
4. FSV > 7GHz: Connect the cable power supply motherboard (2350) and the cable power input (2315) to the power supply (2300).
5. Connect the fan (2340) to the cable power supply motherboard (2350).
6. Fix the cable power input (2315) and the fan cable together with two cable ties (2360) and the holder (2355).
7. Connect the cable power supply motherboard (2350) to the motherboard.

8. Carefully put the power supply (32/34/35/36) into the instrument.

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

9. Mount the rear plate with six screws (45) to the instrument.
10. Connect the two protective earth conductors to their connector.
11. Fix the top cover (700) with five screws (705).
12. Mount the housing (750) and adjust it properly to the front unit(405).
13. Mount the rear wall feet (765).
14. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
15. Start selftest and check results:

    [SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]

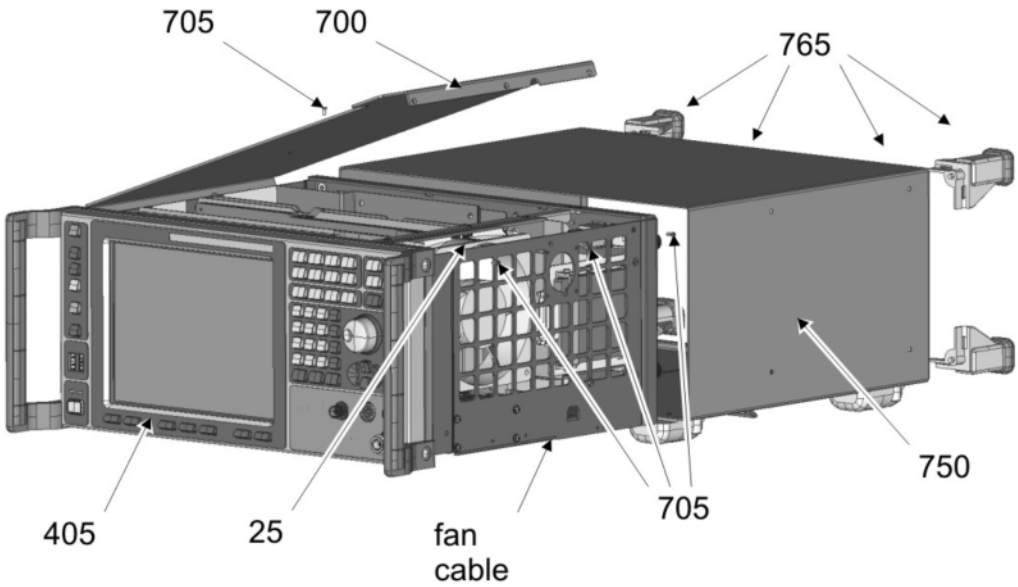
16. Start alignment and check the result:

    [SETUP : ALIGNMENT : SELF ALIGNMENT], then[SHOW ALIGN RESULTS]

3.4.14 Fan

See chapter "5.1 Spare Parts", item 25, and explosion drawings 1307.9002.01 sheet 1.

3.4.14.1 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 five screws (705) in the top cover (700) and remove it.
5. Unplug the fan cable from the motherboard X83 (FAN).
6. Remove the fan (25) from the rubber sleeve.

3.4.14.2 Installing the New Fan

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

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

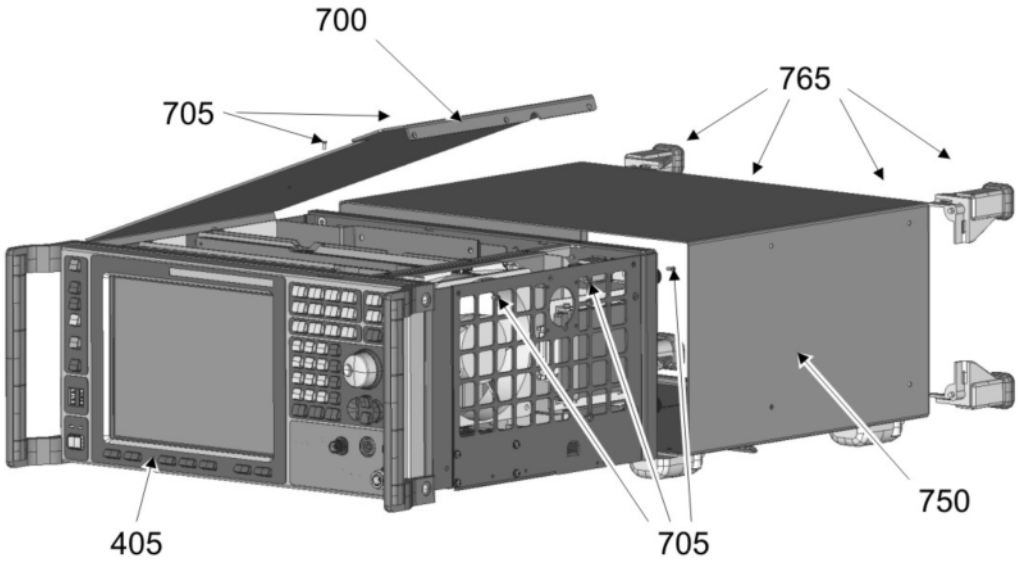
   Make sure you route the cables with enough distance to the fan.
3. Mount the top cover (700) on the instrument with five screws (705).
4. Mount the housing (750) and adjust it properly to the front unit(405).
5. Mount the rear wall feet (765).
6. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.

3.4.15 Frontend A100

See chapter "5.1 Spare Parts", item 550 and explosion drawing 1307.9002.01 sheet 1.

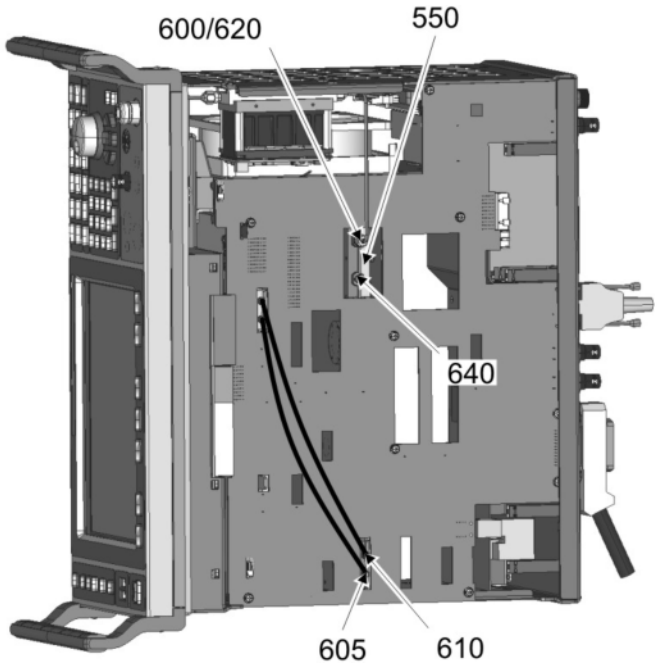
The frontend is installed in the middle of the instrument.

3.4.15.1 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 five screws (705) in the top cover (700) and remove it.
5. Place the instrument on the left side frame.



6. Disconnect RF cable W2 (600), RF cable W3 (605), RF cable W4 (610) and if available RF cable W5 (620), W7 (640) and W6 (630) (on top side, not displayed) from the frontend (550).
7. 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.

3.4.15.2 Installing the New Frontend

1. Plug the new frontend into the instrument and reconnect W2 (600), RF cable W3 (605), RF cable W4 (610) and if available RF cable W5 (620), W7 (640) and W6 (630) (on top side, not displayed) to the board.

   Note: Refer to the cable wiring drawing on the motherboard.
2. Mount the top cover (700) on the instrument with five 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. After starting the 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]

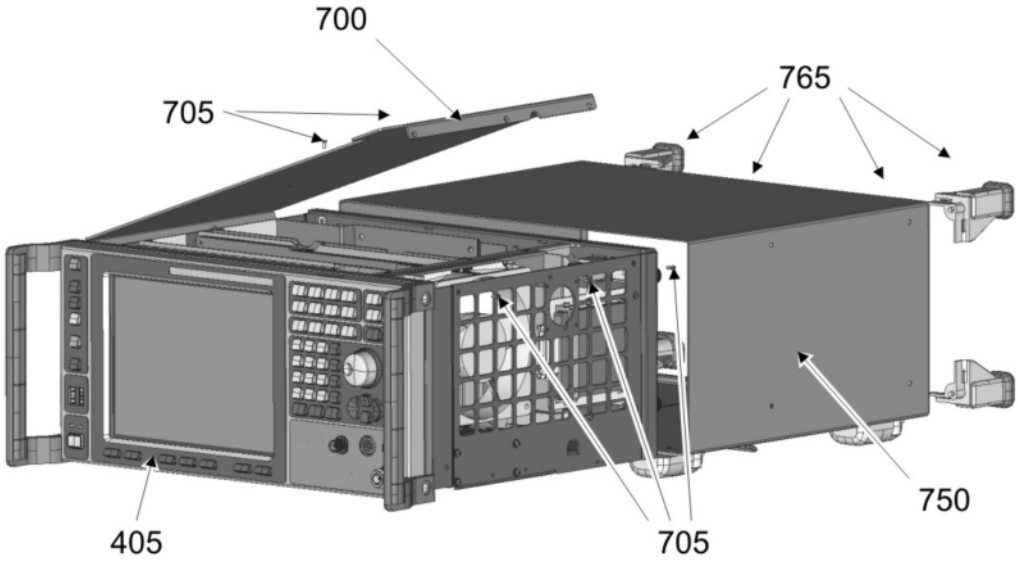
9. Perform a frequency response correction using the correction software. Further information can be found in chapter "2 Adjustment".

10. Adjust the instrument as described in chapter "2 Adjustment".

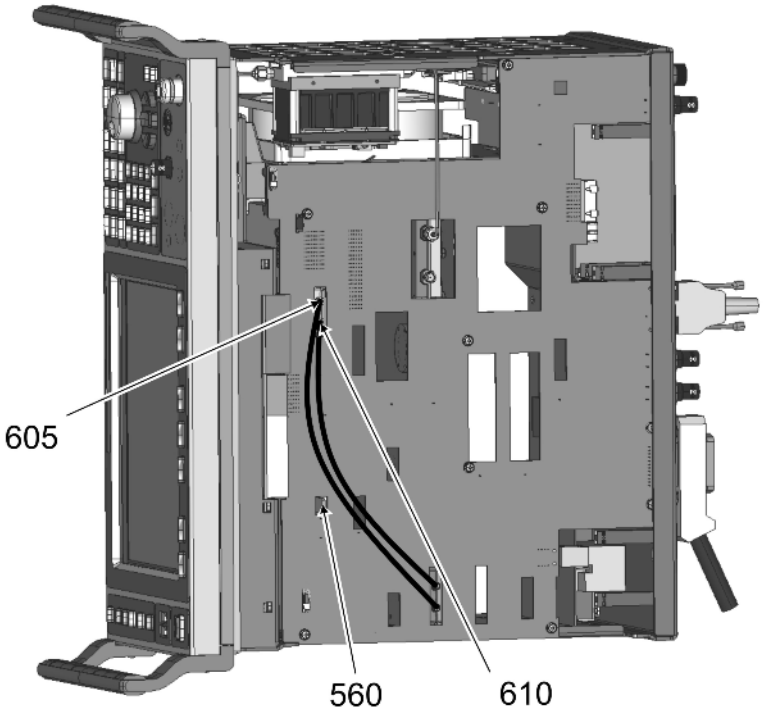
3.4.16 Detector Board A120

See chapter "5.1 Spare Parts", item 560 and explosion drawing 1307.9002.01 sheet 1.

3.4.16.1 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 five 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 (605) and W4 (610) from the detector board (560).
7. Push out the detector board (560) 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.

3.4.16.2 Installing the New Detector Board

1. Plug the new detector board into the instrument and reconnect RF cables W3 (605) and W4 (610) to the board.

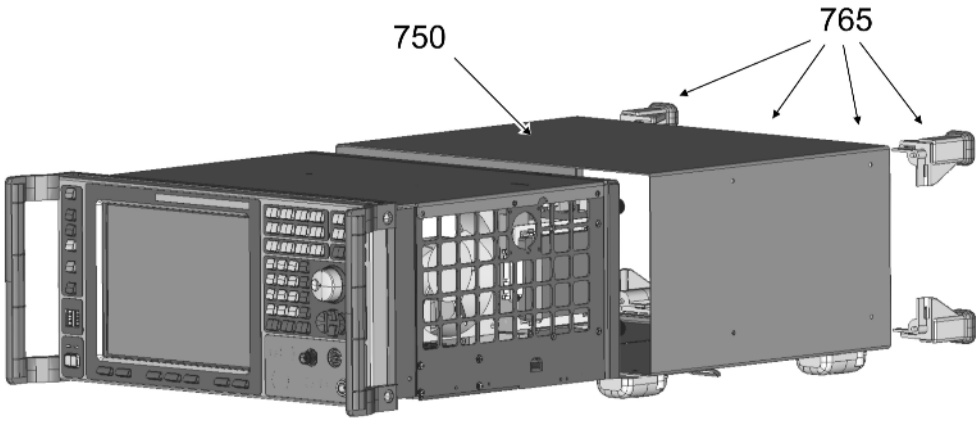
   Note: Refer to the cable wiring drawing on the motherboard.
2. Mount the top cover (700) on the instrument with five screws (705).
3. Mount the housing (750) and adjust it properly to the front unit (405).
4. Mount the rear wall feet (765).
5. Connect the instrument to the mains, switch on the instrument 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]

3.4.17 Attenuator A40 (FSV 3/7)

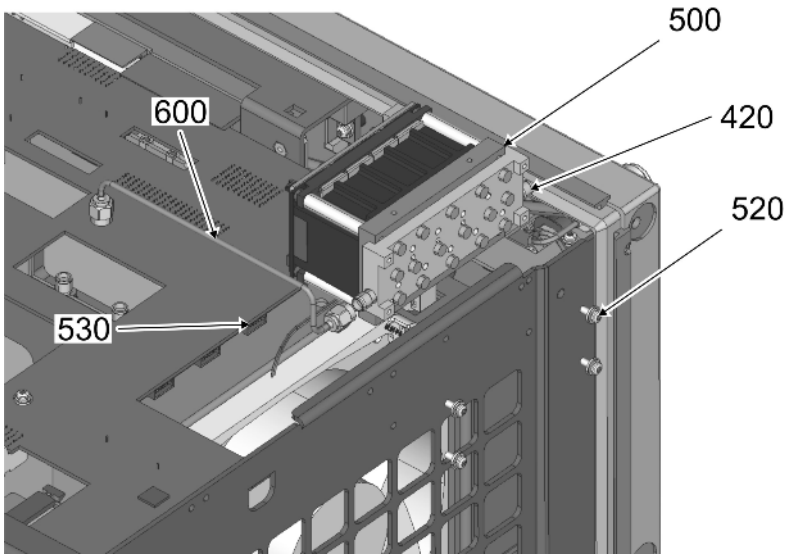
See chapter "5.1 Spare Parts", item 500 and explosion drawing 1307.9002.01 sheet 1.

3.4.17.1 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).



4. Place the instrument on the back side.



5. Remove RF cable W2 (600) completely from the instrument.
6. Disconnect the RF cable W1 (420) from the attenuator (500) and attenuator cable (530) from the motherboard.
7. Unscrew four screws (520) and remove the attenuator (500).
8. Disconnect attenuator cable (530) from the attenuator (500).

3.4.17.2 Installing the New Attenuator

1. Connect the attenuator cable (530) to the attenuator (500).
2. Mount the new attenuator (500) with four screws (520).
3. Connect the RF cable W1 (420) and the attenuator cable (530) to the Motherboard X81 and the RF cable W2 (600) to the attenuator (500) and the frontend (550).
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:

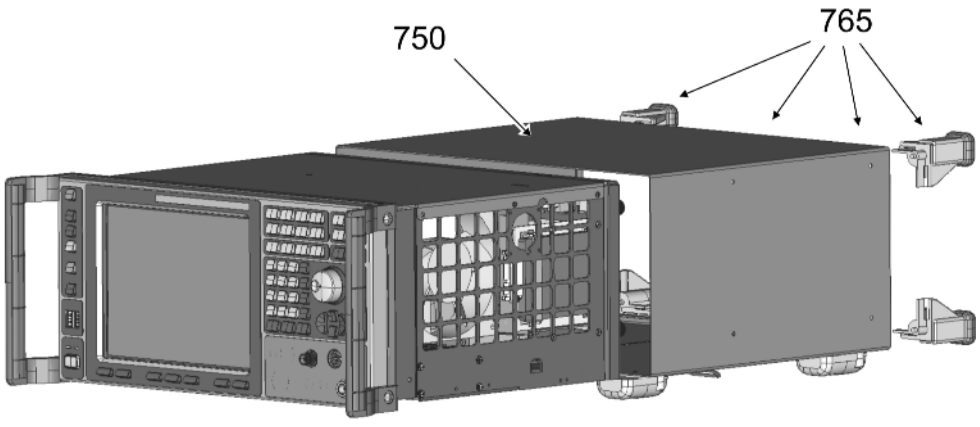
   [SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
8. Start alignment and check the result:

   [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".

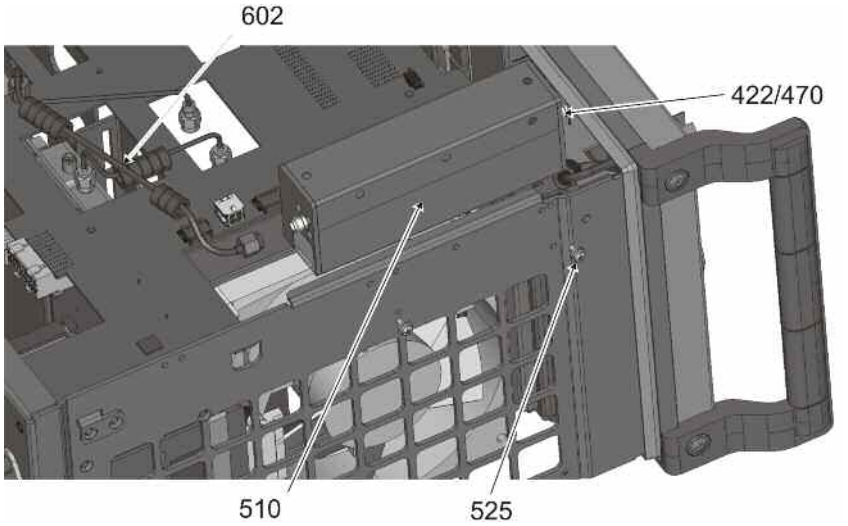
3.4.18 Attenuator A40 (FSV 13/30/40)

See chapter "5.1 Spare Parts", item 510 and explosion drawing 1307.9002.01 sheet 1.

3.4.18.1 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).
4. Place the instrument on the back side.



5. Remove RF cable W2 (602) completely from the instrument.
6. Disconnect the RF cable W1 (422/470) from the attenuator (510) and attenuator cable (530) from the motherboard.
7. Unscrew two screws (525) and remove the attenuator (510).
8. Disconnect attenuator cable (530) from the attenuator (510).

3.4.18.2 Installing the New Attenuator

1. Connect the attenuator cable (530) to the attenuator (510).
2. Mount the new attenuator (510) with two screws (525).
3. Connect the RF cable W1 (422/470) and the attenuator cable (530) to the Motherboard X81 and the RF cable W2 (602) to the attenuator (510) and the frontend (550).
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".

3.4.19 Motherboard A10

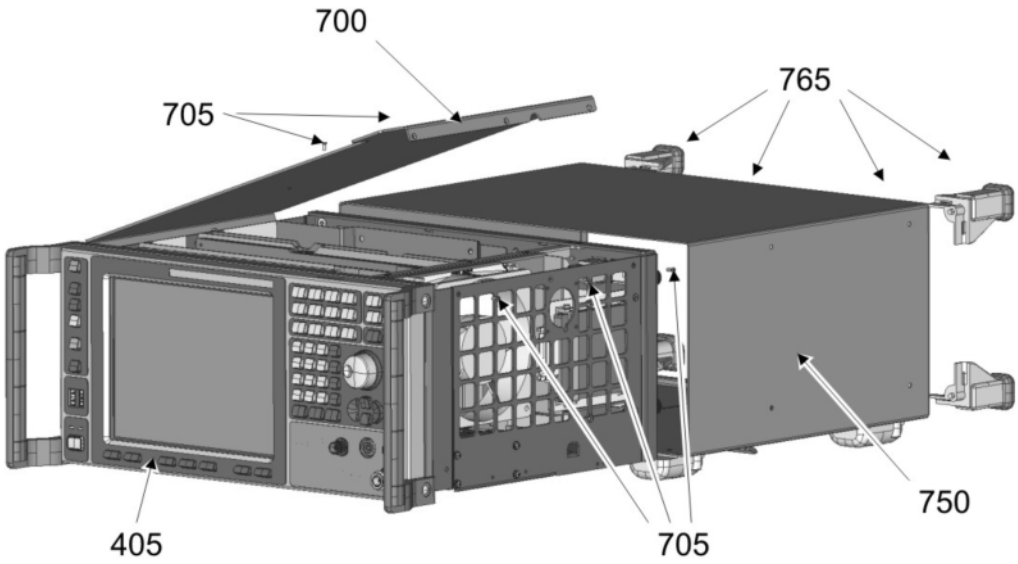
See chapter "5.1 Spare Parts", item 120/122, and explosion drawings 1307.9002.01 sheet 1.

NOTICE

Risk of losing important information

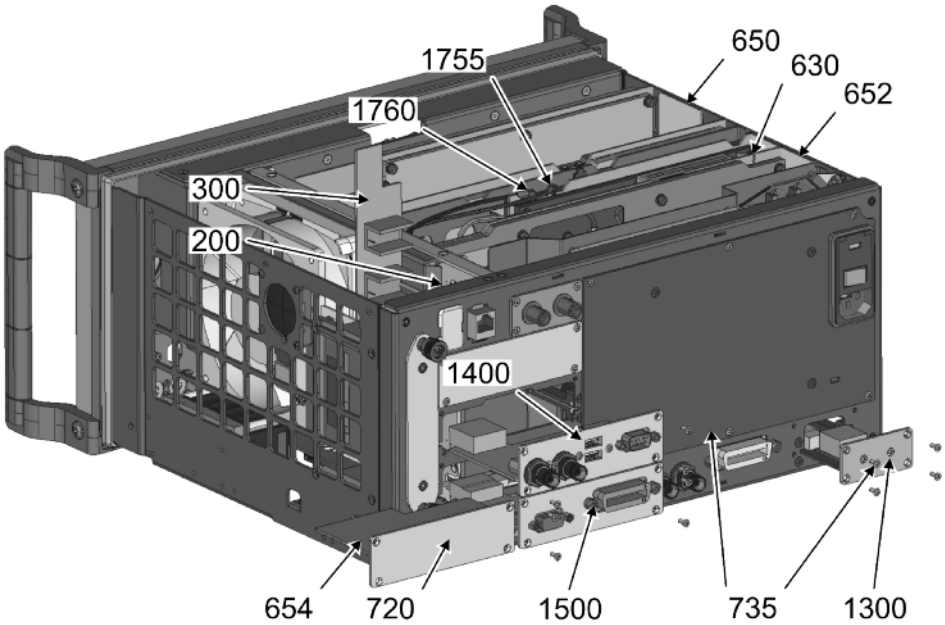
Important information about the type of instrument, installed hardware, options, etc., is stored both on the motherboard and on the hard drive. This information is required in order to restore the instrument in case of errors. Thus, do not replace the motherboard and the hard drive at the same time, 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.

3.4.19.1 Opening the Instrument



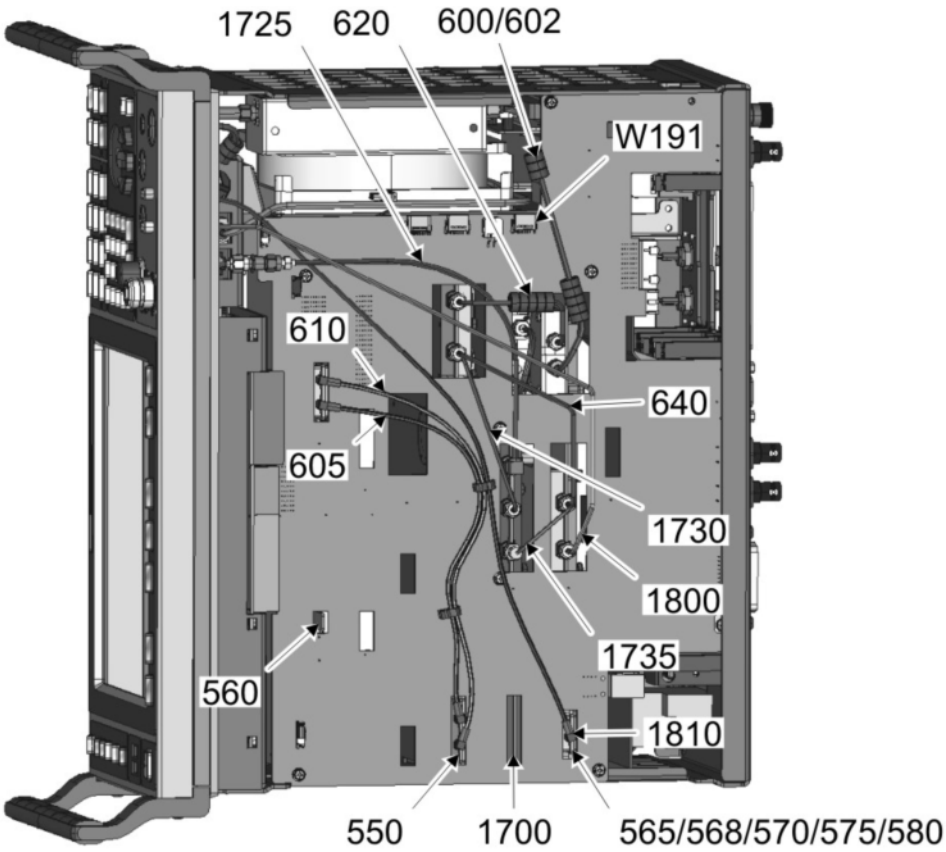
1. Switch off the instrument and disconnect the power plug.
2. Unscrew four screws in the rear wall feet (765) and remove them.
3. Remove the housing (750).
4. Unscrew five screws (705) in the top cover (700) and remove it.

3.4.19.2 Removing the Hardware Options



1. Unscrew four screws (735) at option OCXO (1300), additional interfaces (1400) and external generator control (1500), if present and remove them to the rear of the instrument.
2. If the instrument has no external generator control (1500), remove the rear plate option (720) and the baffle plate (654) to the rear of the instrument.
3. Disconnect the patch cable (200).
4. Carefully remove the adapterboard FSV (300).
5. Disconnect and remove RF cable W6 (630) completely (FSV13,30,40).
6. For instruments with Option R&S FSV-B9: Disconnect RF cable W16 (1755) and RF cable W17 (1760).
7. If available, remove baffle plates (650) and (652) (FSV3,7).

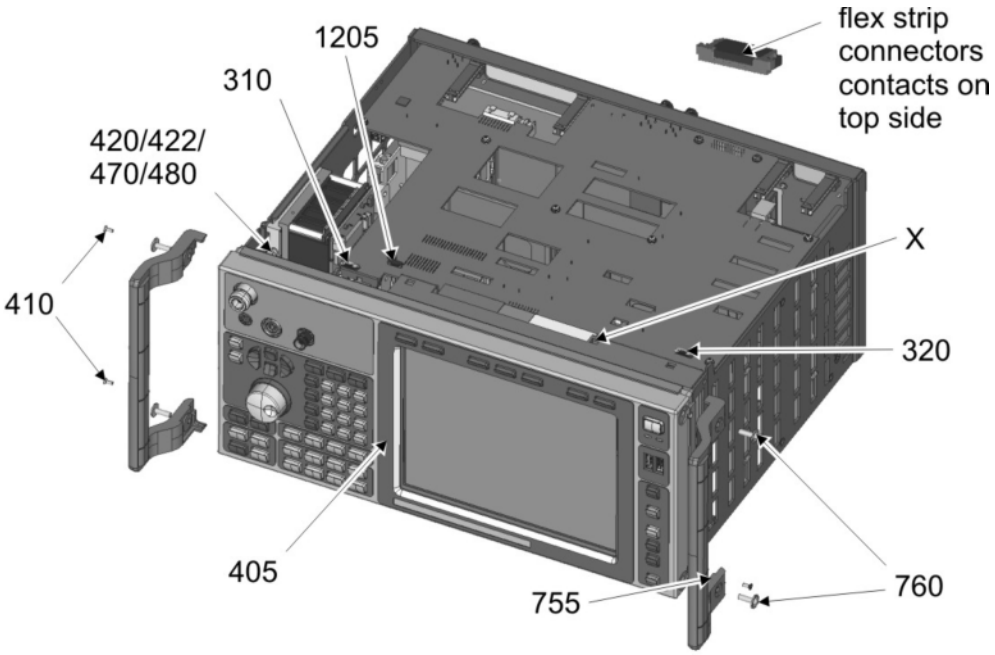
3.4.19.3 Removing the Frontend Board, the Detector Board, the MW Converter Unit (FSV13,30,40) and the Tracking Generator (FSV-B9)



1. Remove RF cable W2 (600/602), RF cable W3 (605),RF cable W4 (610), RF cable W5 (620) (FSV13,30,40), RF cable W7 (640) (FSV13,30,40) completely from the instrument.
2. For instruments with Option R&S FSV-B9: Remove RF cable W13-2 (1725), RF cable W14 (1730), RF cable W15 (1735) (FSV13,30,40) completely and push out tracking generator (1700).
3. For instruments with Option R&S FSV-B21: Disconnect RF cable W18 (1800) and RF cable W19 (1810) from the MW Converter Unit (565/570/575/580).
4. For instruments with Option R&S FSV-B24: Disconnect cable W191.
5. Push out detector board (550), frontend (560) and MW Converter Unit (565/568/570/575/580) (FSV13,30,40) to the top side of the instrument.

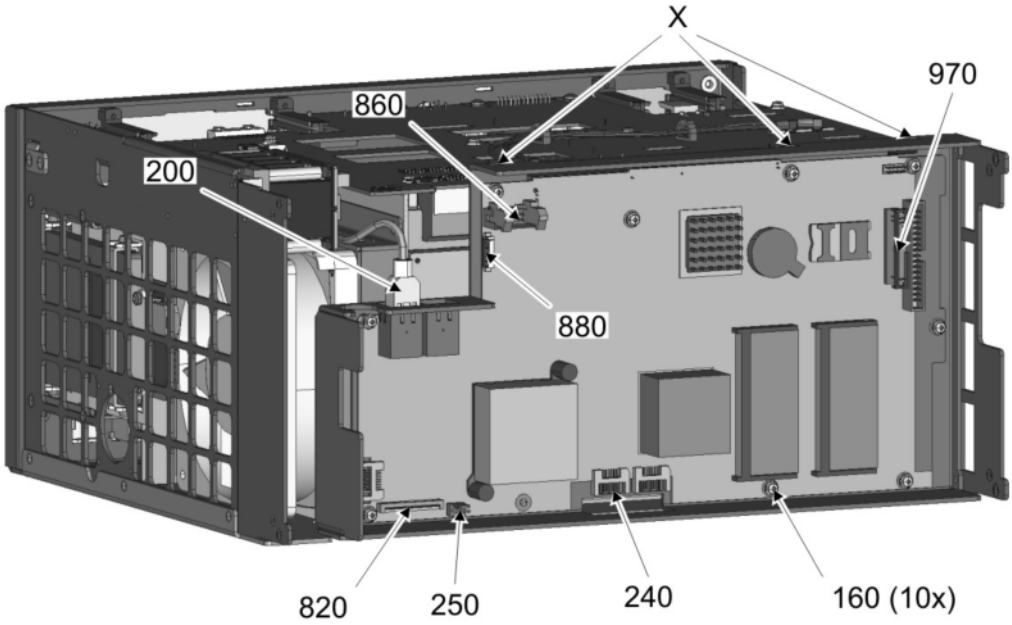
   Tip: The boards can be moved up by pressing carefully from the bottom through the connector holes in the motherboard against the board.

3.4.19.4 Removing the Controller



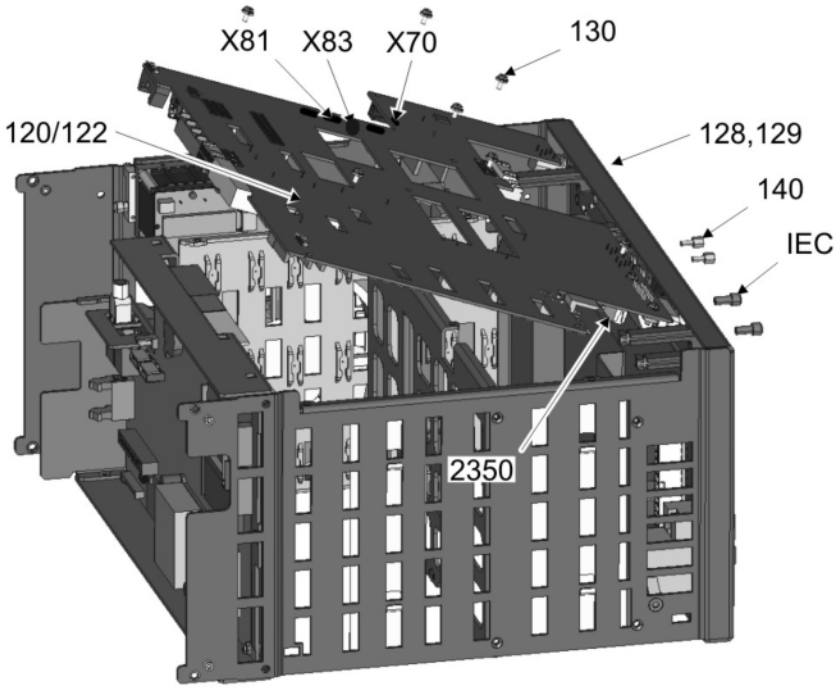
1. Unscrew the four screws (760) of the front handles (755) on both sides and remove them.
2. Disconnect cable flex strip (310) and (320).
3. For instruments with Option R&S FSV-B3: Disconnect cable flex strip (1205).
4. Unscrew four screws (410) in the front unit.

   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 fsv (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.

3.4.19.5 Removing the Motherboard



1. Disconnect the fan cable from the motherboard connector X83 (FAN) and the attenuator cable from connector X81.
2. For instruments with Option R&S FSV-B3: Disconnect the speaker cable from the motherboard connector X70 (SPEAKER).
3. Remove two screws (140), three nuts (129), three washers (128) and two bolts (IEC) with washers at the rear.
4. Unscrew and remove seven screws (130).

   Notice! The power supply is still connected to the motherboard.
5. Carefully take the motherboard (120/122) out of the frame as shown in the picture below. Disconnect the cable power supply-motherboard (2350) from the motherboard (120/122) before removing it completely.

3.4.19.6 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. Connect the cable power supply-motherboard 2350 to the motherboard (120/122) and put the board in completely.
3. Fix two screws (140), three washers (128) with nuts (129) and two bolts (IEC) with washers at the rear.

4. Mount the motherboard with seven screws (130).
5. Connect the fan cable to the motherboard connector X83 (FAN) and the attenuator cable to connector X81.
6. For instruments with Option R&S FSV-B3: Connect the speaker cable to the motherboard connector X70 (SPEAKER).
7. Carefully place down the controller (150) and fasten it with ten screws (160).
8. Connect cable flex switch board fsv (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.
9. Assemble the front unit (405) carefully and connect RF cable W1 (420/422/470/480).
10. Connect cable flex strip (310) and (320).
11. For instruments with Option R&S FSV-B3: Connect cable flex strip (1205).

    Note: The flex strip connector contacts are on the top of the device.
12. Fasten the four screws (410) to screw the front unit (405) together with the unit frame (22/24).
13. Mount front handles (755) on both sides by using four screws (760).
14. Plug the detector board (560), the frontend (550) and the MW Converter Unit (565/568/570/575/580) (FSV13/30/40) into the instrument and connect RF cable W2 (600/602), RF cable W3 (605), RF cable W4 (610), RF cable W5 (620) (FSV13/30/40) and RF cable W7 (640) (FSV13/30/40).

    Note: Refer to the cable wiring drawing on the motherboard.
15. For instruments with Option R&S FSV-B9: Plug the tracking generator (1700) into the instrument an connect RF cable W13-2 (1725), RF cable W14 (1730) and RF cable W15 (1735) (FSV13/30/40).
16. For instruments with Option R&S FSV-B21: Connect RF cable W18 (1800) and RF cable W19 (1810) to the MW Converter Unit (565/570/575/580).
17. For instruments with Option R&S FSV-B24: Connect cable W191.
18. If available, insert the baffle plates (650) and (652) (FSV3,7).
19. For instruments with Option R&S FSV-9: Connect RF cable W16 (1755) and RF cable W17 (1760).
20. Connect RF cable W6 (630) (FSV13,30,40).
21. Plug in the adapterboard FSV (300).
22. Connect the patch cable (200).
23. If available, mount the options OCXO (1300), additional interfaces (1400) and external generator control (1500) at the rear of the instrument with four screws (735) each.

24. If the instrument has no external generator control (1500), insert the baffle plate (654) on the rear of the instrument and mount the rear plate option (720) with four screws (735).
25. Mount the top cover (700) on the instrument with five screws (705).
26. Mount the housing (750) and adjust it properly to the front unit (405).
27. Mount the rear wall feet (765).

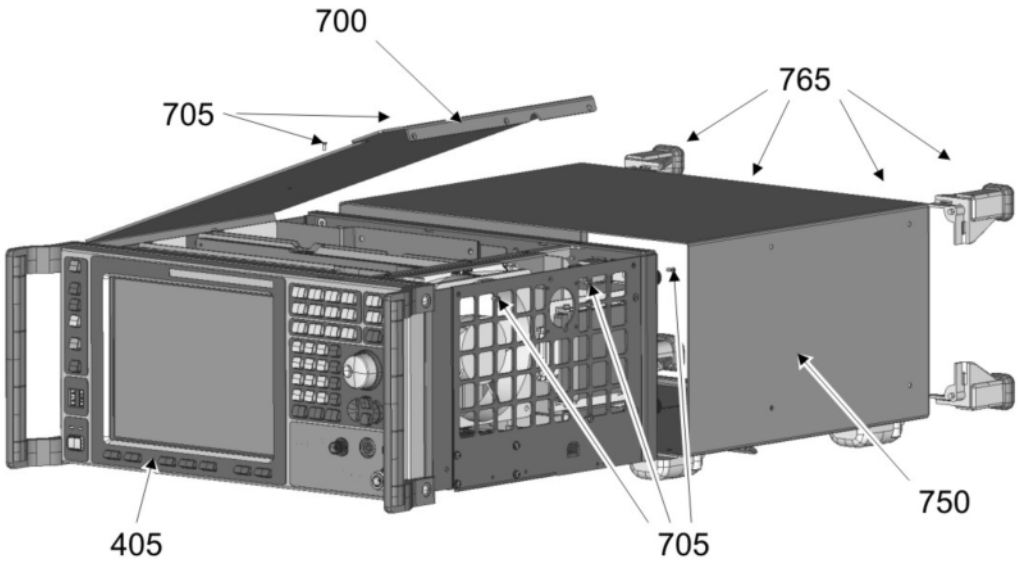
3.4.19.7 Putting into Operation

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

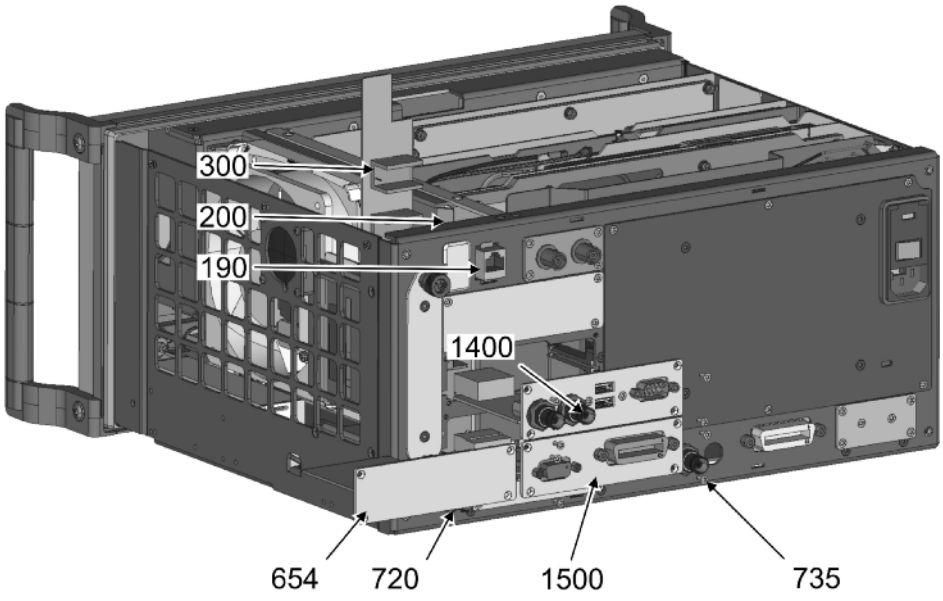
3.4.20 Adapter Board A11

See chapter "5.1 Spare Parts", item 300 and explosion drawing 1307.9002.01 sheet 2.

3.4.20.1 Removing the Adapter 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 five screws (705) in the top cover (700) and remove it.
5. Unplug the patch cable (200) from the coupler (190) and put it to the left.



6. Unscrew four screws (735) at option OCXO (1300), additional interfaces (1400) and external generator control (1500), if present and remove them to the rear of the instrument.
7. If the instrument has no external generator control (1500), remove the rear plate option (720) and the baffle plate (654) to the rear of the instrument.

8. Carefully remove the adapter board (300) from the motherboard.

3.4.20.2 Installing the New Adapter Board

1. Pull the new adapter board (300) carefully into the motherboard.
2. Connect the patch cable (200) with the coupler (190).
3. If available, mount the options OCXO (1300), additional interfaces (1400) and external generator control (1500) at the rear of the instrument with four screws (735) each.
4. If the instrument has no external generator control (1500), insert the baffle plate (654) on the rear of the instrument and mount the rear plate option (720) with four screws (735).
5. Mount the top cover (700) on the instrument with five screws (705).
6. Mount the housing (750) and adjust it properly to the front unit(405).
7. Mount the rear wall feet (765).
8. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
9. Start selftest and check results:

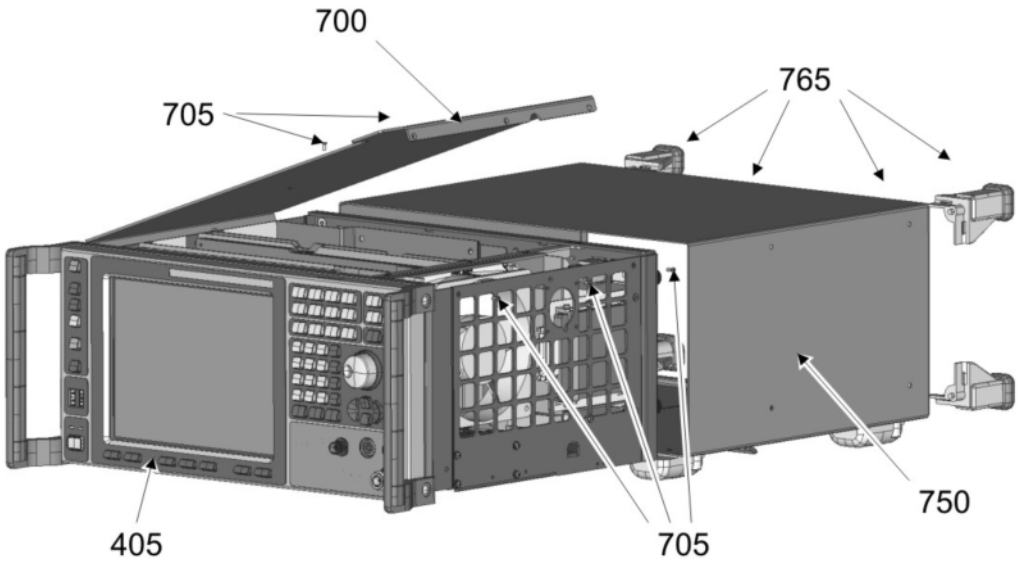
   [SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
10. Start alignment and check the result:

    [SETUP : ALIGNMENT : SELF ALIGNMENT], then[SHOW ALIGN RESULTS]

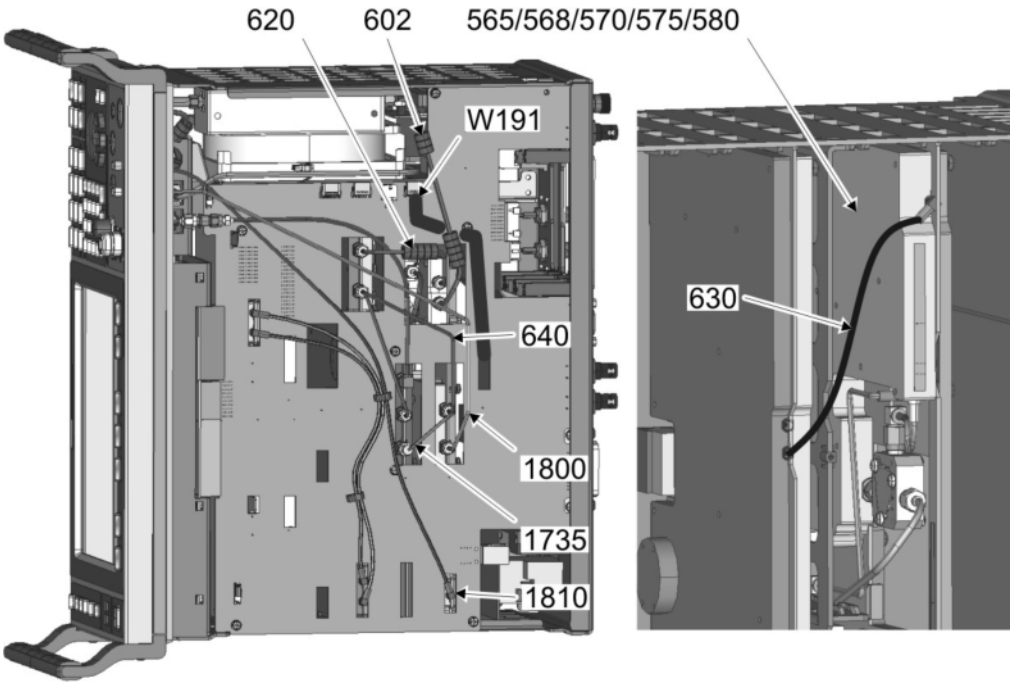
3.4.21 MWC Unit A150 (FSV 13/30/40)

See chapter "5.1 Spare Parts", item 565/568/570/575/580 and explosion drawing 1307.9002.01 sheet 1.

3.4.21.1 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 five screws (705) in the top cover (700) and remove it.
5. Place the instrument on the right side frame.



6. Disconnect RF cable W6 (630) from the MW converter unit (565/568/570/575/580).
7. Disconnect RF cable W2 (602), RF cable W5 (620) and RF cable W7 (640) (if available) completely.

8. For instruments with Option R&S FSV-B9: Remove RF cable W15 (1735).
9. For instruments with Option R&S FSV-B21: Disconnect RF cable W18 (1800) and RF cable W19 (1810) from the MW Converter Unit (565/570/575/580).
10. For instruments with Option R&S FSV-B24: Disconnect the preamplifier cable W191.
11. Push out the MW converter unit (565/568/570/575/580) 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.

3.4.21.2 Installing the New MW Converter Unit

1. Plug the new MW converter unit (565/568/570/575/580) into the instrument and reconnect RF cable W2 (602), RF cable W5 (620), RF cable W7 (640) and RF cable W6 (630), if available.

   Note: Refer to the cable wiring drawing on the motherboard.
2. For instruments with Option R&S FSV-B9: Connect RF cable W15 (1735).
3. For instruments with Option R&S FSV-B21: Connect RF cable W18 (1800) and RF cable W19 (1810) to the MW Converter Unit (565/570/575/580).
4. For instruments with Option R&S FSV-B24: Connect the preamplifier cable W191 to the motherboard.
5. Mount the top cover (700) on the instrument with five screws (705).
6. Mount the housing (750) and adjust it properly to the front unit(405).
7. Mount the rear wall feet (765).
8. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
9. Start selftest and check results:

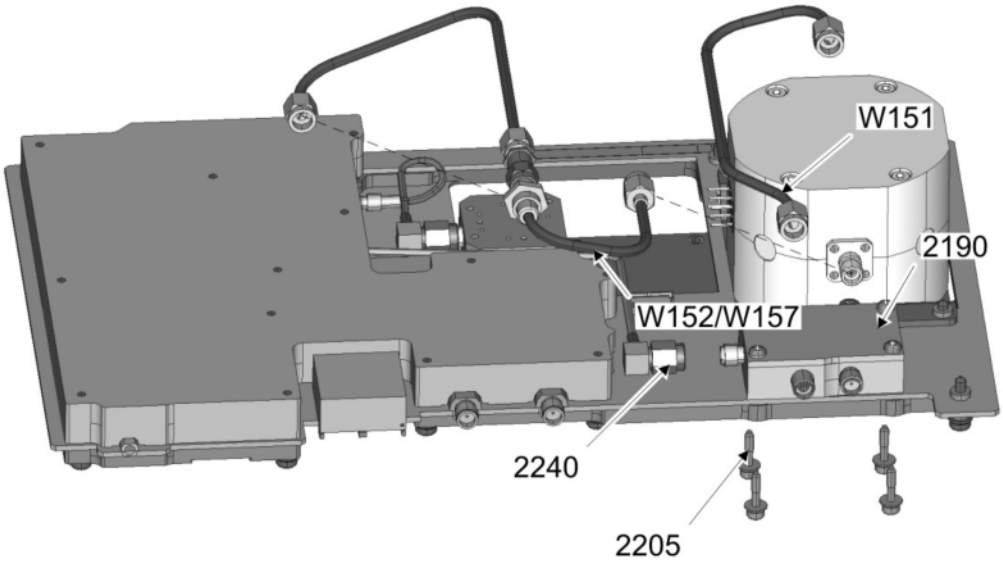
   [SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
10. Start alignment and check the result:

    [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".

3.4.22 Diplexer A151 (FSV 30/40)

See chapter "5.1 Spare Parts", item 2190 and explosion drawing 1307.9748.01, sheet 1.

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



1. Remove the MW converter unit as described in “3.4.21.1 Removing the Board”.
2. Disconnect RF cable W152/W157, W151 completely and RF cable W168 (2240) from the diplexer (2190).
3. Unscrew all screws from the cover (2210) and remove it.
4. Unscrew the two screws (2200) and remove the diplexer (2190).

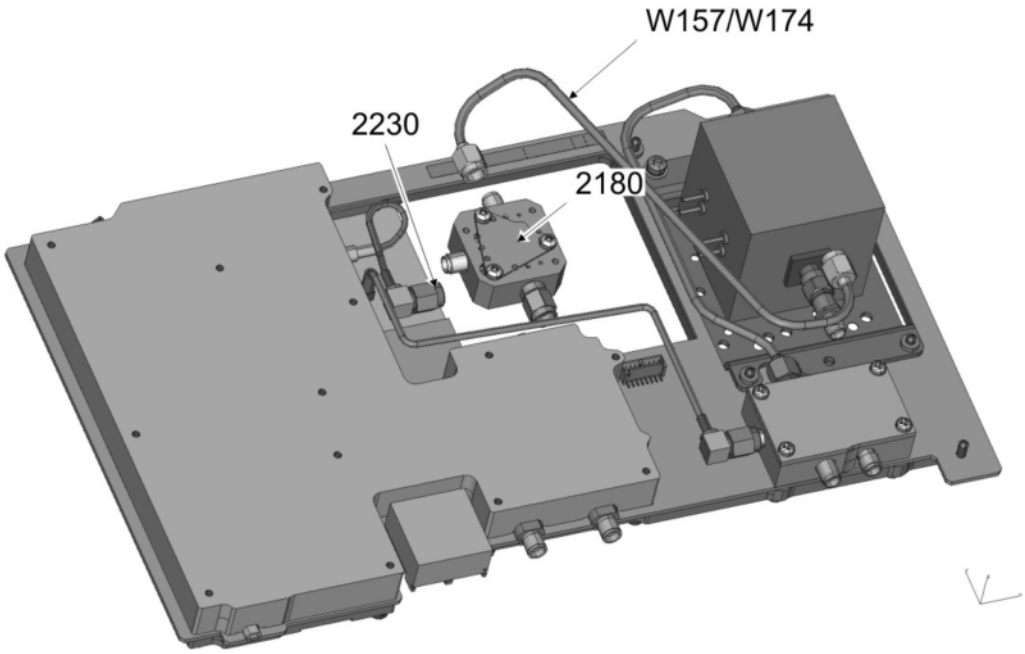
3.4.22.2 Installing the New Diplexer

1. Mount the new diplexer (2190) with two screws (2200).
2. Mount the cover (2210) and fix it with all screws.
3. Reconnect RF cable W15), W152/W157 and RF cable W168 (2240) with the diplexer (2190).
4. Continue with the procedure described in “3.4.21.2 Installing the New MW Converter Unit”.

3.4.23 Mixer A153 (FSV 30/40)

See chapter "5.1 Spare Parts", item 2180 and explosion drawing 1307.9748.01, sheet 1.

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



1. Remove the MW converter unit as described in “3.4.21.1 Removing the Board.
2. Disconnect RF cable W174/W157 completely and RF cable W167 (2230) from the mixer (2180).
3. Unscrew and remove the mixer (2180) from the unit.

3.4.23.2 Installing the New Mixer

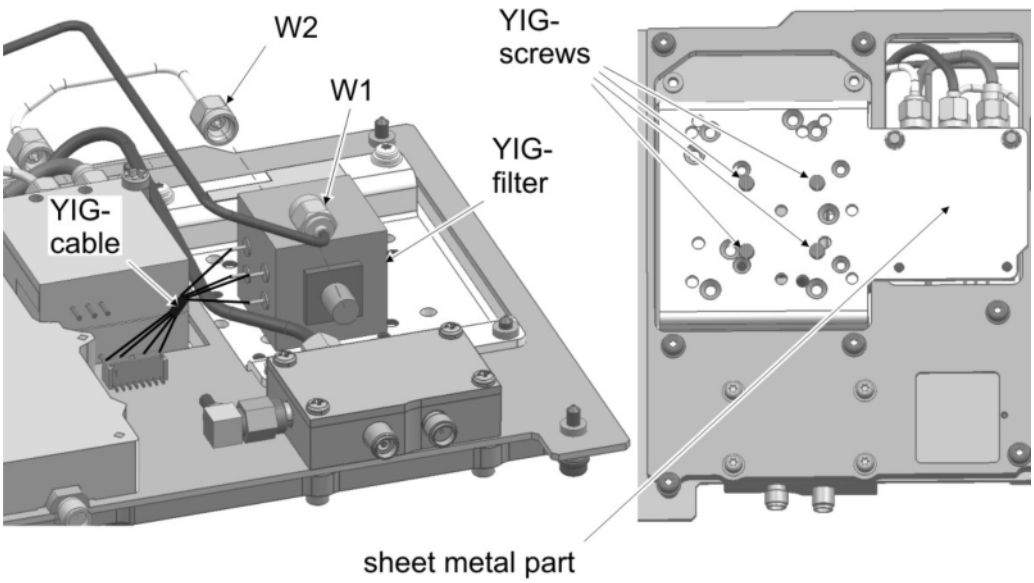
1. Mount the new mixer (2180).
2. Reconnect RF cable W174/W157 and RF cable W167 (2230) with the mixer (2180).
3. Continue with the procedure described in “3.4.21.2 Installing the New MW Converter Unit”.

3.4.24 YIG-Unit

See chapter "5.1 Spare Parts", item 2110/2115/2120/2125/2140/2145 and explosion drawing 1307.9748.01, sheet 1 and 2 for FSV30/40 and item 2010/2015/2020/2025 and explosion drawing 1308.1192.01, sheet 1 and 2 for FSV13.

The YIG Unit includes a sheet metal part on which the YIG filter is mounted. It is not necessary to replace it. How to position and mount the new filter can be seen from the provided unit.

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



1. Remove the MW converter unit as described in “3.4.21.1 Removing the Board.
2. Remove both RF cables (W1/W2) from the filter completely.
3. Unplug the cable W1 from the connector.
4. Unscrew four YIG screws and remove the filter.

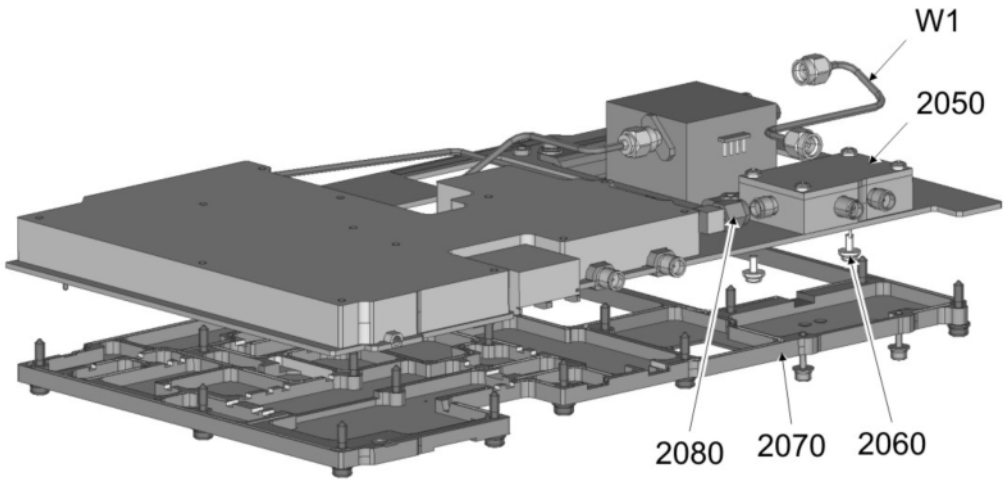
3.4.24.2 Installing the New YIG-Unit

1. Mount the new filter to the sheet metal part. Depending on which filter is provided with your unit use the appropriate screw holes to mount it.
2. Connect the RF cables (W1/W2) to the unit.
3. Connect the YIG cable to the connector.
4. Continue with the procedure described in “3.4.21.2 Installing the New MW Converter Unit”.

3.4.25 Diplexer A151 (FSV 13)

See chapter "5.1 Spare Parts", item 2050 and explosion drawing 1308.1192.01.

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



1. Remove the MW converter unit as described in “3.4.21.1 Removing the Board".
2. Disconnect RF cable W1 completely and RF cable W168 (2280) from the diplexer (2050).
3. Unscrew all screws from the cover (2070) and remove it.
4. Unscrew the two screws (2060) and remove the diplexer (2050).

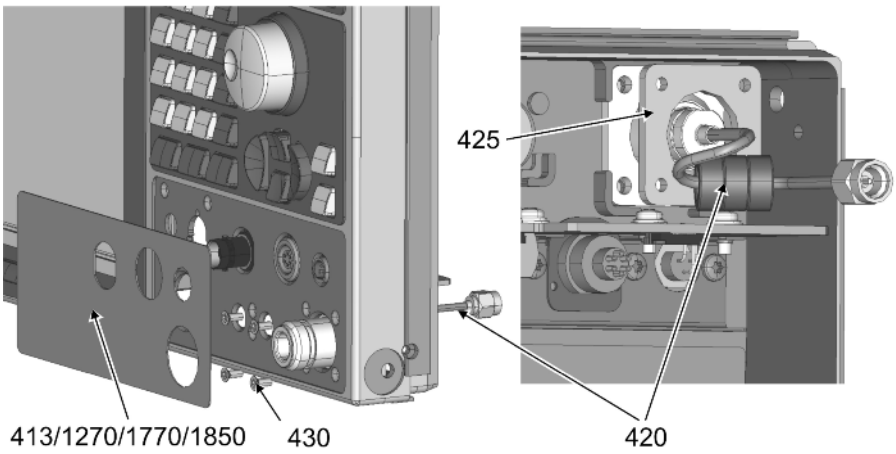
3.4.25.2 Installing the New Diplexer

1. Mount the new diplexer (2050) with two screws (2060).
2. Mount the cover (2070) and fix it with all screws.
3. Reconnect RF cable W1 and RF cable W168 (2280) with the diplexer (2050).
4. Continue with the procedure described in “3.4.21.2 Installing the New MW Converter Unit”.

3.4.26 RF Cable W1 (FSV 3/7)

See chapter "5.1 Spare Parts", item 420 and explosion drawing 1307.9002.01 sheet 1.

3.4.26.1 Removing the RF Cable



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

3.4.26.2 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.
2. Place the label FSV connector (413/1270/1770/1850) on the front unit.
3. Complete the instrument as described in "3.3 Completing the Instrument".
4. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
5. Start selftest and check results:

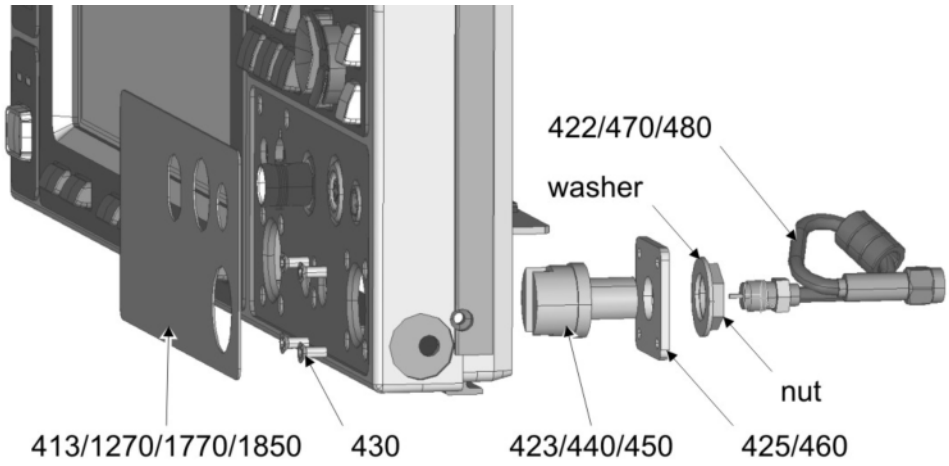
   [SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
6. Start alignment and check the result:

   [SETUP : ALIGNMENT : SELF ALIGNMENT], then[SHOW ALIGN RESULTS]
7. Perform a frequency response correction using the correction software. Further information can be found in chapter "2 Adjustment".
8. Adjust the instrument as described in chapter "2 Adjustment".

3.4.27 Adaptor (FSV 13/30/40)

See chapter "5.1 Spare Parts", item 423/440/450 and explosion drawing 1307.9002.01 sheet 1.

3.4.27.1 Removing the Adaptor



1. Open the instrument as described in "3.2 Opening the Instrument".
2. Remove the label FSV connector (413/1270/1770/1850).
3. Unscrew four screws (430).
4. Remove the adaptor (423/450/460) together with the mounting plate (425/460) and the RF cable W1 (422/470/480).
5. Disassemble the RF cable W1 (422/470/480) from the adaptor (423/450/460).
6. Unscrew the nut and disassemble the washer and the mounting plate (425/460) from the adaptor (423/450/460).

3.4.27.2 Installing the New Adaptor and Putting into Operation

1. Assemble the new adaptor (423/450/460) together with the mounting plate (425/460), the washer, nut and the RF cable W1 (422/470/480).
2. Mount the adaptor (423/450/460) with four screws (430) to the front unit.
3. Place the label FSV connector (413/1270/1770/1850) on the front unit.
4. Complete the instrument as described in "3.3 Completing the Instrument".
5. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
6. Start selftest and check results:

   [SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
7. Start alignment and check the result:

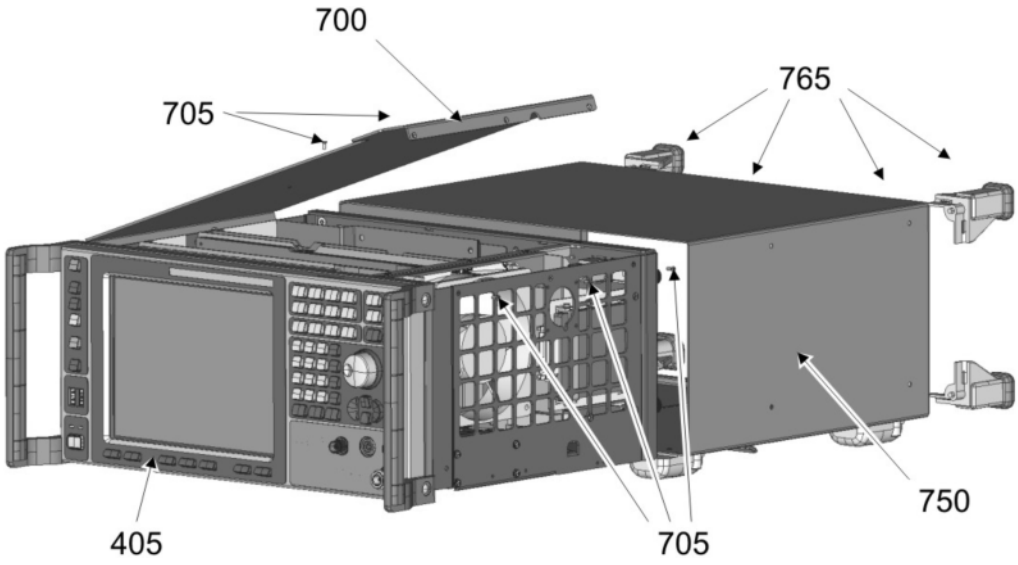
   [SETUP : ALIGNMENT : SELF ALIGNMENT], then[SHOW ALIGN RESULTS]
8. Perform a frequency response correction using the correction software. Further information can be found in chapter "2 Adjustment".
9. Adjust the instrument as described in chapter "2 Adjustment".

3.4.28 Speaker B1

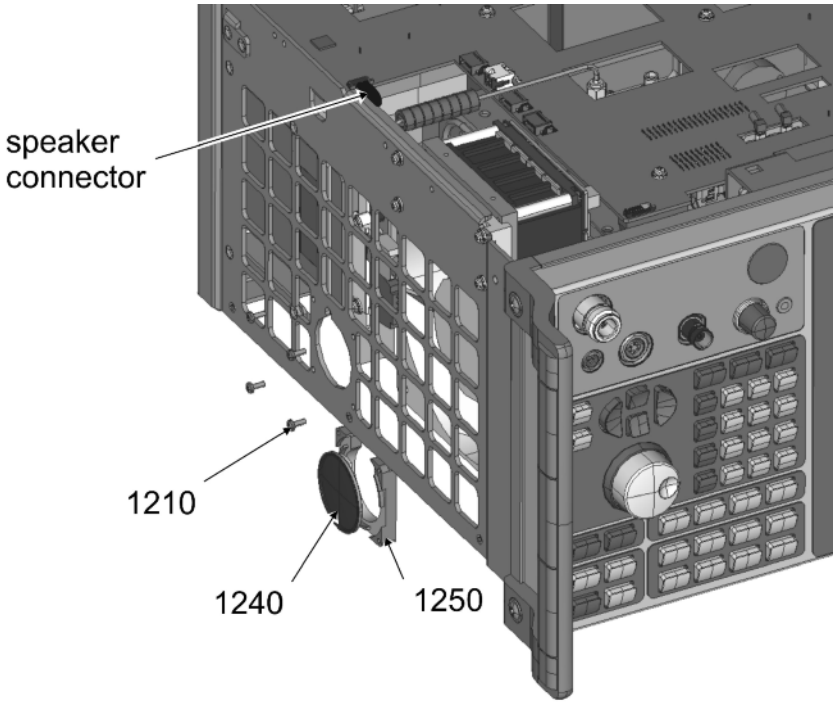
See chapter "5.1 Spare Parts", item 1240 and explosion drawing 1310.9700.00 sheet 1.

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

3.4.28.1 Removing the Speaker



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 five screws (705) in the top cover (700) and remove it.
5. Unplug the speaker connector from motherboard.



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

3.4.28.2 Installing the New Speaker

1. Pull the new speaker (1240) carefully into the holder (1250).
2. Mount the holder (1250) with four screws (1210) on the frame.
3. Connect the speaker with the motherboard.

   Note: Refer to the cable wiring drawing on the motherboard.
4. Mount the top cover (700) on the instrument with five 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:

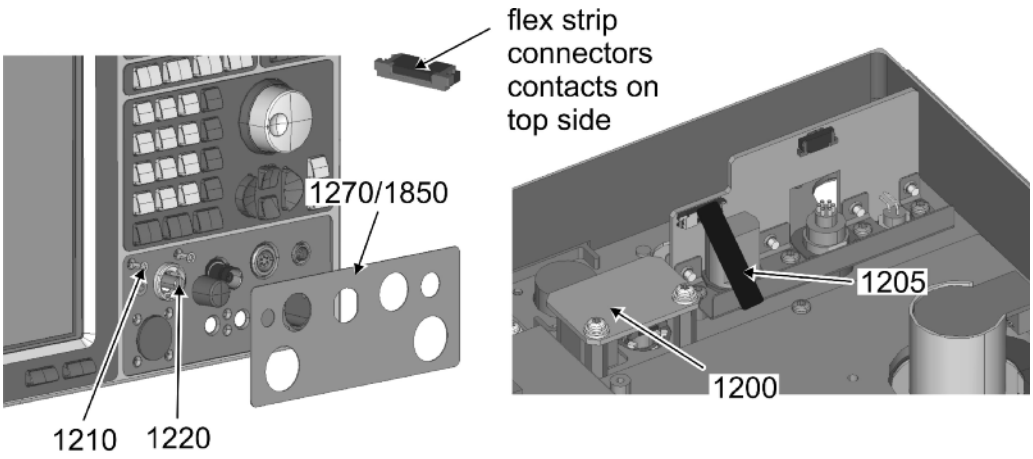
   [SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
9. Start alignment and check the result:

   [SETUP : ALIGNMENT : SELF ALIGNMENT], then[SHOW ALIGN RESULTS]

3.4.29 AF Output A71

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

3.4.29.1 Removing the AF Output



1. Open the instrument as described in "3.2 Opening the Instrument".
2. Remove the label FSV connector (1270/1850).
3. Remove the knob (1220).
4. Unscrew two screws (1210).
5. Remove the AF output (1200) carefully.
6. Disconnect flex-strip (1205) from the AF output (1200).

3.4.29.2 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.
2. Mount the new AF output (1200) with two screws (1210) to the front unit.
3. Place the label fsv connector (1270/1850) on the front unit.
4. Assemble the knob (1220).
5. Complete the instrument as described in "3.3 Completing the Instrument".

3.4.29.3 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]

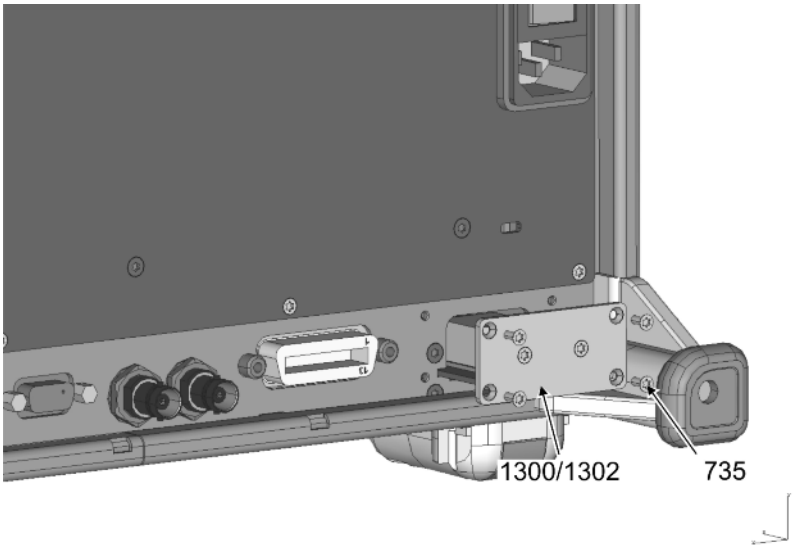
4. Perform a frequency response correction using the correction software. Further information can be found in chapter "2 Adjustment".

5. Adjust the instrument as described in chapter "2 Adjustment".

3.4.30 OCXO A250

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

3.4.30.1 Removing the OCXO



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

3.4.30.2 Installing the New OCXO and Putting into Operation

1. Insert the new OCXO (1300/1302) carefully and mount it with four screws (735).
2. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
3. Start selftest and check results:

   [SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]

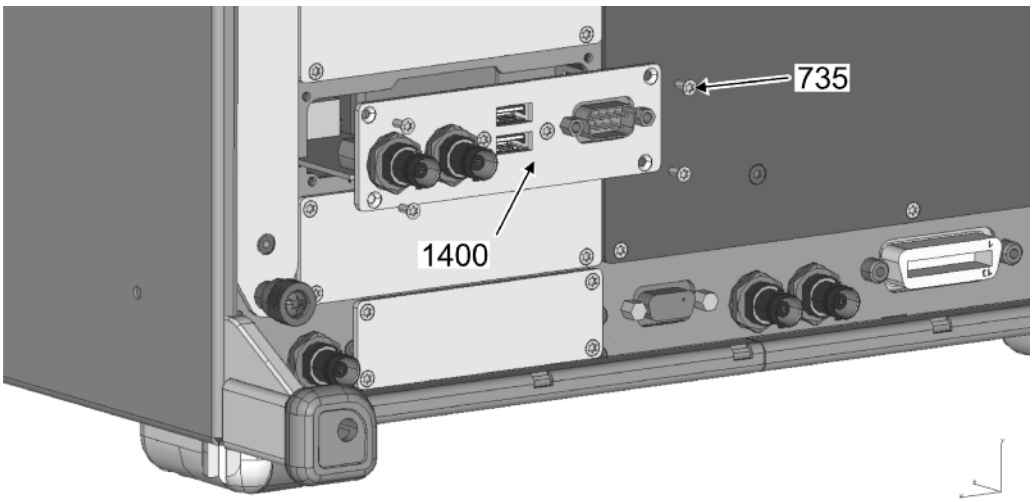
4. Start alignment and check the result:

   [SETUP : ALIGNMENT : SELF ALIGNMENT], then[SHOW ALIGN RESULTS]

3.4.31 Additional Interface A220

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

3.4.31.1 Removing the Additional Interface



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

3.4.31.2 Installing the New Additional Interface and Putting into Operation

1. Insert the new additional interface (1400) carefully and mount it with four screws (735).
2. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
3. Start selftest and check results:

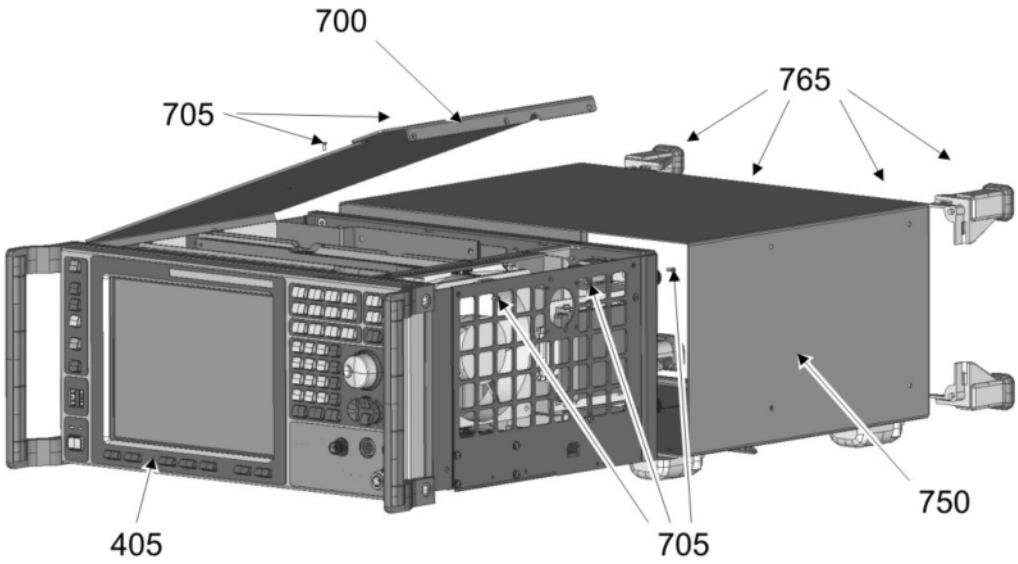
   [SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
4. Start alignment and check the result:

   [SETUP : ALIGNMENT : SELF ALIGNMENT], then[SHOW ALIGN RESULTS]

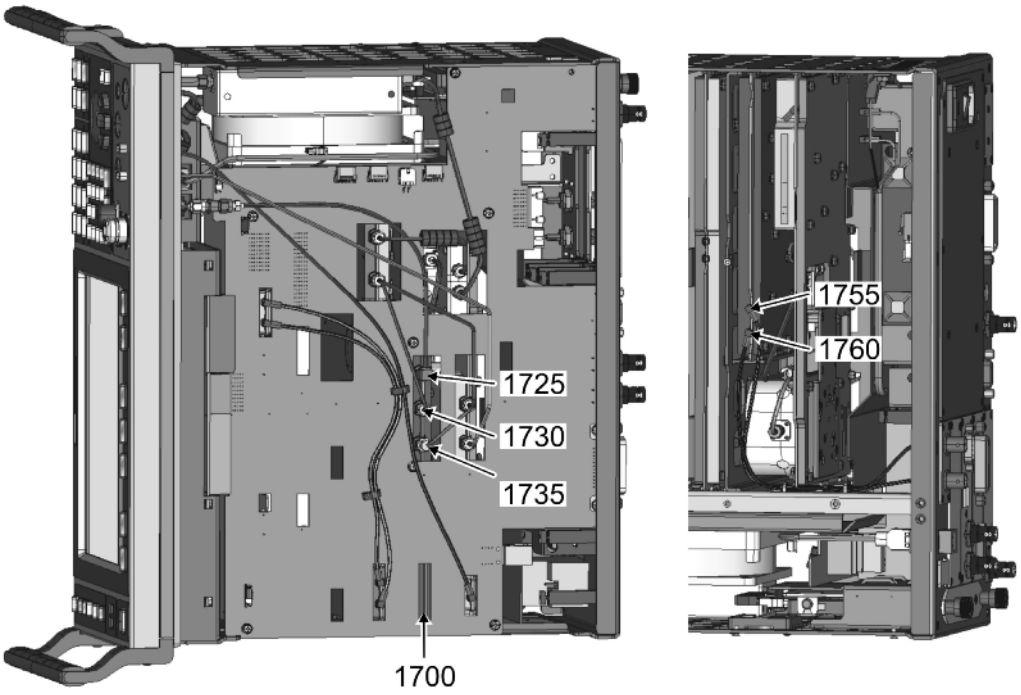
3.4.32 Tracking Generator A140

See chapter "5.1 Spare Parts", item 1700, and explosion drawing 1310.9774.00.

3.4.32.1 Removing the Tracking Generator



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 five screws (705) in the top cover (700) and remove it.



5. Disconnect RF cable W13-2 (1725), RF cable W14 (1730), RF cable W16 (1755), RF cable W17 (1760) and if available RF cable W15 (1735) from the tracking generator (1700).
6. Carefully push out the tracking generator (1700).

3.4.32.2 Installing the New Tracking Generator and Putting into Operation

1. Insert the new tracking generator (1700) carefully.
2. Connect RF cable W13-2 (1725), RF cable W14 (1730), RF cable W16 (1755), RF cable W17 (1760) and if available RF cable W15 (1735) to the tracking generator (1700).
3. Mount the top cover (700) on the instrument with five 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. Start selftest and check results:

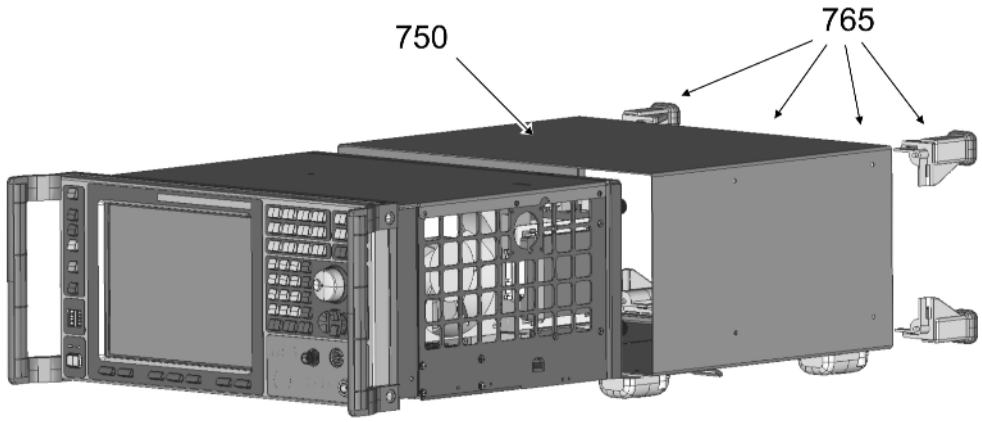
   [SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
8. Start alignment and check the result:

   [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”.

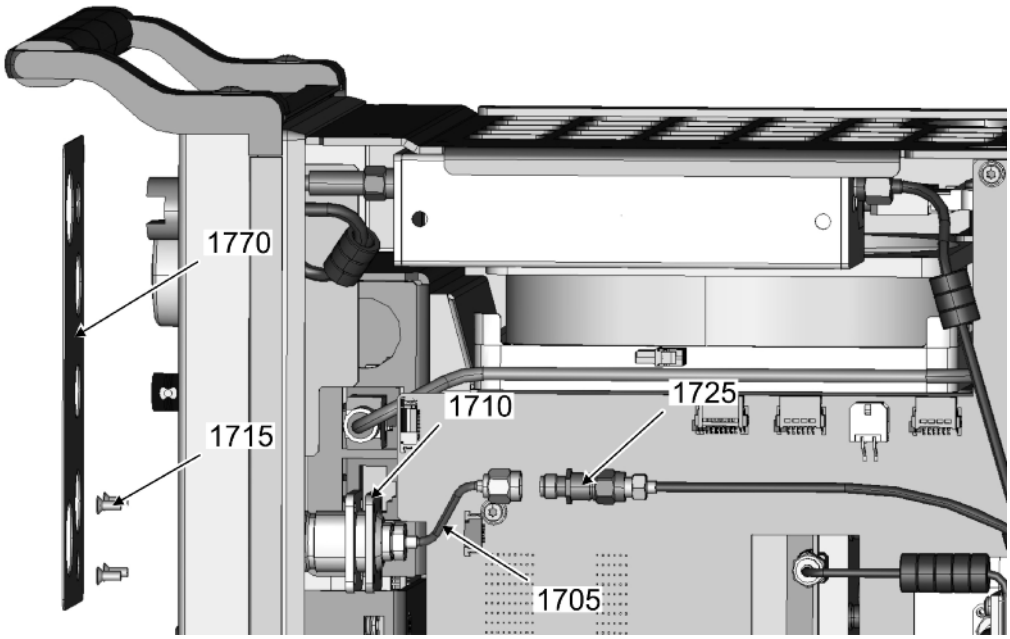
3.4.33 RF Cable W13

See chapter "5.1 Spare Parts", item 1705, and explosion drawing 1310.9774.00.

3.4.33.1 Removing the RF Cable W13



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. Carefully remove the label FSV connector (1770).
5. Disconnect RF cable W13-2 (1725) from RF cable W13 (1705).
6. Unscrew and remove four screws (1715).
7. Remove the RF cable W13 (1705) and disassemble the mounting plate (1710).

3.4.33.2 Installing the New RF Cable W13 and Putting into Operation

1. Insert the new RF cable W13 (1705) together with the mounting plate (1710).
2. Mount the RF cable W13 (1705) with four screws (1715).
3. Carefully connect RF cable W13-2 (1725) to RF cable W13 (1705).
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:

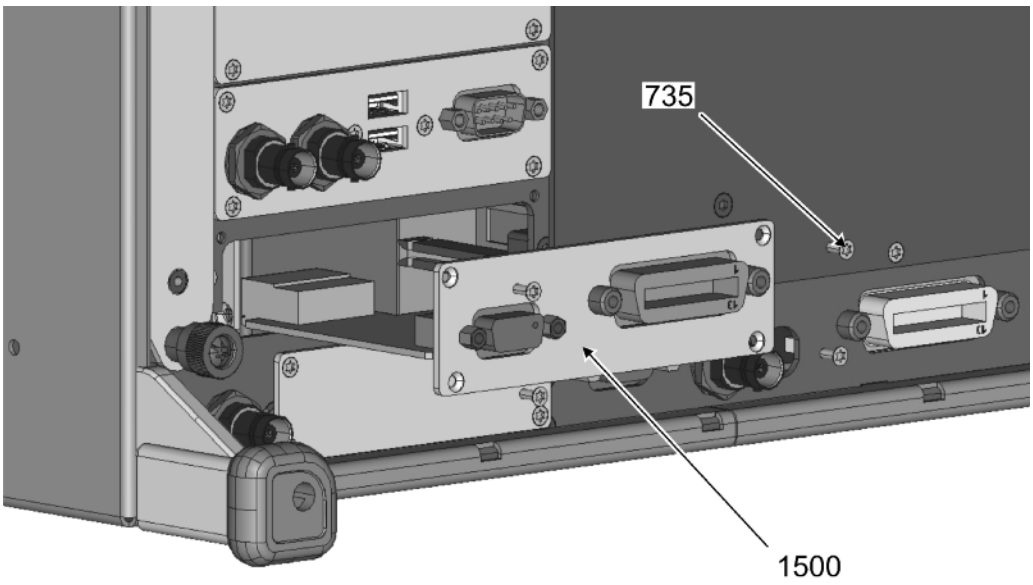
   [SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
8. Start alignment and check the result:

   [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”.

3.4.34 Ext. Generator Control A230

See chapter "5.1 Spare Parts", item 1500, and explosion drawing 1310.9716.00.

3.4.34.1 Removing the Ext. Generator Control



1. Unscrew four screws (735).
2. Carefully remove the ext. generator control (1500).

3.4.34.2 Installing the New Ext. Generator Control and Putting into Operation

1. Insert the new ext. generator control (1500) carefully and mount it with four screws (735).
2. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
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]

3.4.34.3 Functional Check

1. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
2. Connect a generator, e.g. R&S SMU200A, with the FSV via IEC/IEEE-bus cable (IEC2 interface) and a TTL cable (AUX CONTROL interface). Connect the generator output with the RF input.

3. Analyzer settings:

   [PRESET]

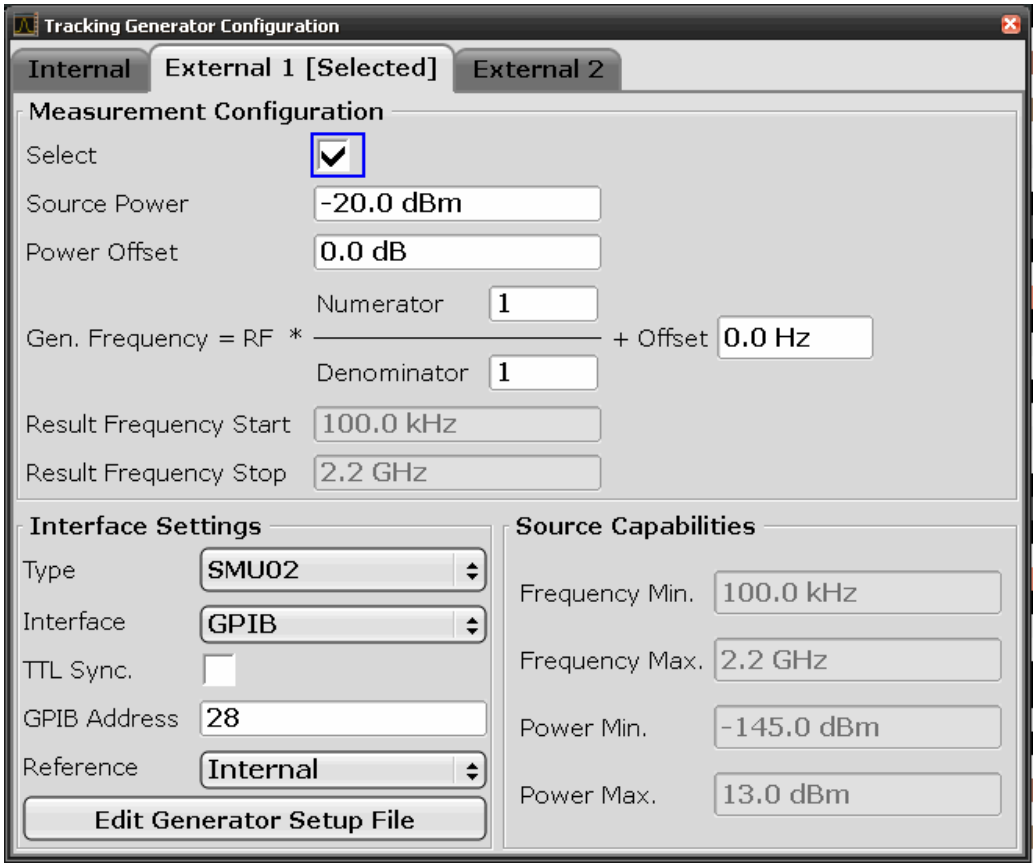
   [FREQ : CENTER : 100 MHz]

   [FREQ : SPAN : 10 MHz]

4. Configure the generator:

   [INPUT/OUTPUT : TRACKING GENERATOR : SOURCE CONFIG]

   Enter the source power, select the generator type and interface, and activate TTL sync.



5. Activate the generator:

   [INPUT/OUTPUT : TRACKING GENERATOR : SOURCE RF ON]

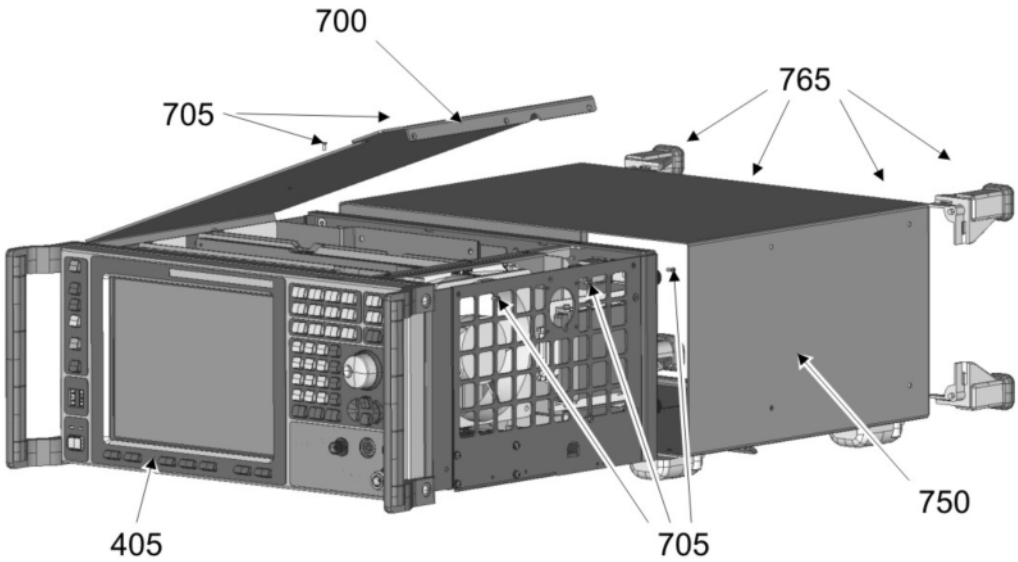
6. Check the displayed level:

   The resulting trace is displayed as a horizontal line at -20 dBm.

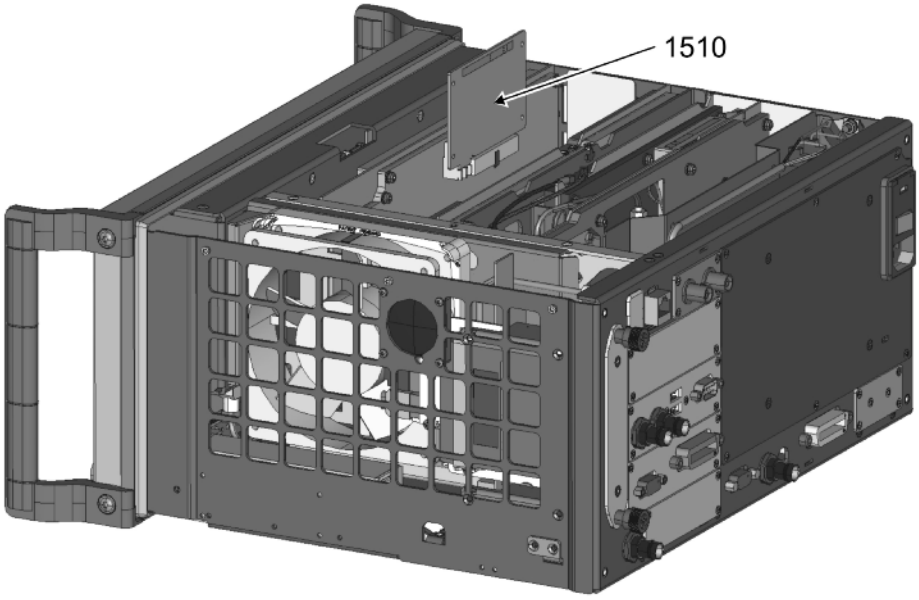
3.4.35 IEC-Bus Control A210

See chapter "5.1 Spare Parts", item 1510, and explosion drawing 1310.9716.00.

3.4.35.1 Removing the IEC-Bus Control



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 five screws (705) in the top cover (700) and remove it.



5. Remove the IEC-bus control (1510) from the instrument.

3.4.35.2 Installing the New IEC-Bus Control and Putting into Operation

1. Insert the new IEC-bus control (1510) carefully.
2. Mount the top cover (700) on the instrument with five 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. Start selftest and check results:

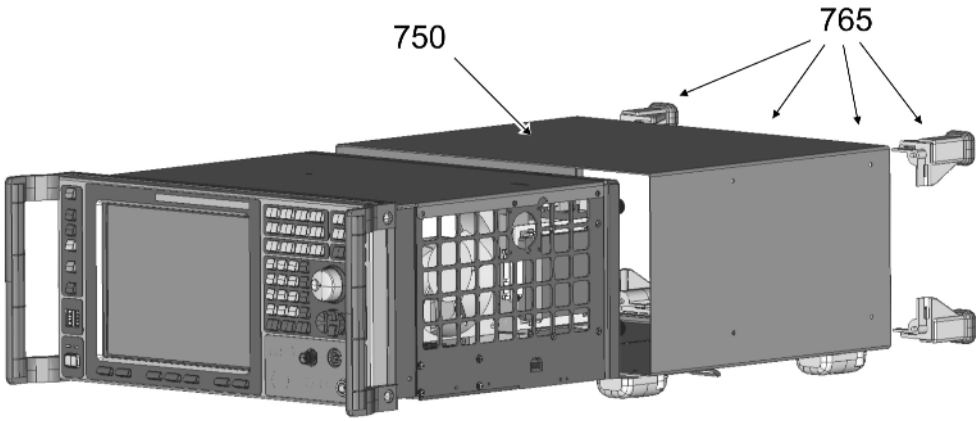
   [SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]
7. Start alignment and check the result:

   [SETUP : ALIGNMENT : SELF ALIGNMENT], then[SHOW ALIGN RESULTS]

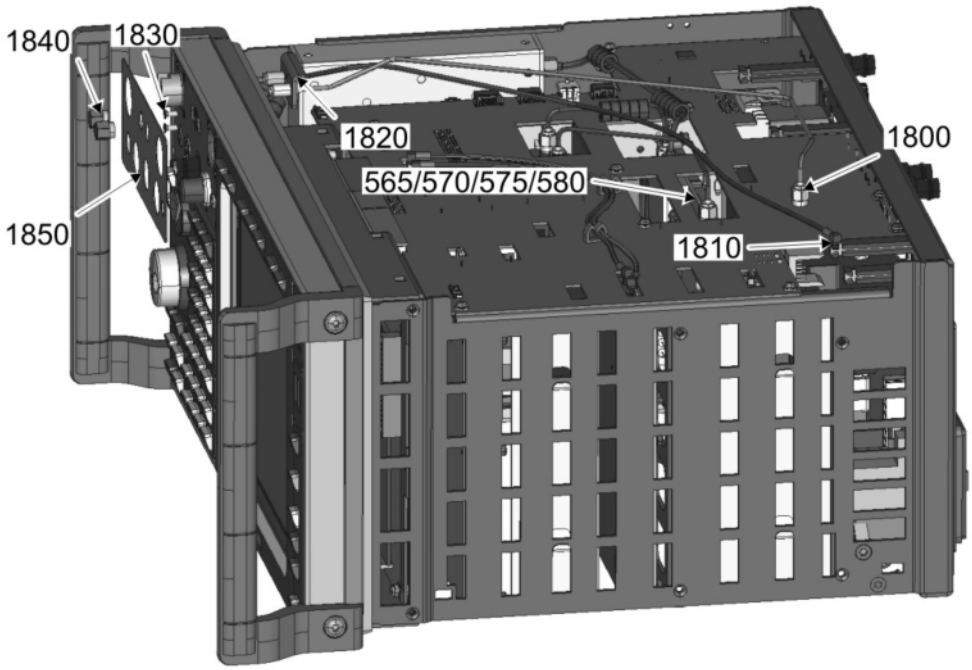
3.4.36 RF Cable W18 and RF Cable W19

See chapter "5.1 Spare Parts", item 1800/1810 and explosion drawing 1308.1963.00.

3.4.36.1 Removing the RF Cable W18/19



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. Disconnect RF cable W18 (1800) and W19 (1810) from the MW converter unit (565/570/575/580).
5. Remove two protection caps (1840).
6. Remove the label FSV connector (1850).
7. Unscrew and remove two screws (1830).
8. Carefully remove RF cable W18 (1800) and RF cable W19 (1810) together with the holder (1820) from the instrument.
9. Disassemble RF cable W18 (1800) or RF cable W19 (1810) from the holder (1820).

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

1. Mount the new RF cable W18 (1800) or RF cable W19 (1810) on the holder (1820).
2. Carefully put both cables with the holder into the instrument and fix it with two screws (1830).
3. Connect the RF cables to the MW converter unit (565/570/575/580).
4. Assemble the label FSV connector (1850) and two protection caps (1840).
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]

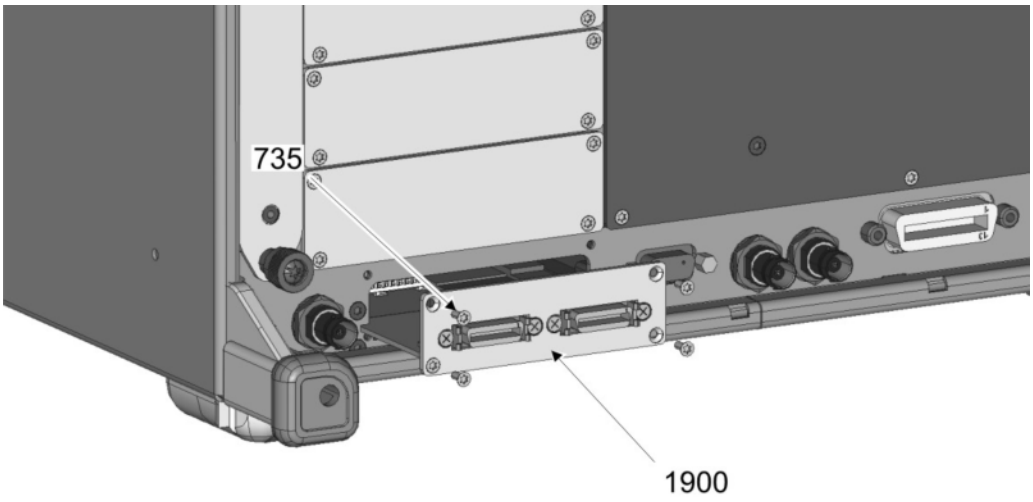
10. Perform a frequency response correction using the correction software. Further information can be found in chapter "2 Adjustment".

11. Adjust the instrument as described in chapter "2 Adjustment".

3.4.37 Digital I/Q LVDS A240

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

3.4.37.1 Removing the Digital I/Q LVDS



1. Unscrew four screws (735).
2. Carefully remove the additional interface (1900).

3.4.37.2 Installing the New Digital I/Q LVDS and Putting into Operation

1. Insert the new digital I/Q LVDS (1900) carefully and mount it with four screws (735).
2. Connect the instrument to the mains, switch on the instrument power switch and switch on the instrument with the ON/OFF key.
3. Connect the digital baseband output with the digtal baseband input via LVDS cable R&S®SMU-Z6 (stock number 1415.0201.02).
4. Activate the B17 selftest:

   [SETUP : MORE : SERVICE : PASSWORD : 894129]

[SETUP : MORE : SERVICE : SERVICE FUNKTION 2.13.0.1]

5. Start selftest and check results:

   [SETUP : MORE : SERVICE : SELFTEST], then [SELFTEST RESULTS]

6. Start alignment and check the result:

   [SETUP : ALIGNMENT : SELF ALIGNMENT], then[SHOW ALIGN RESULTS]

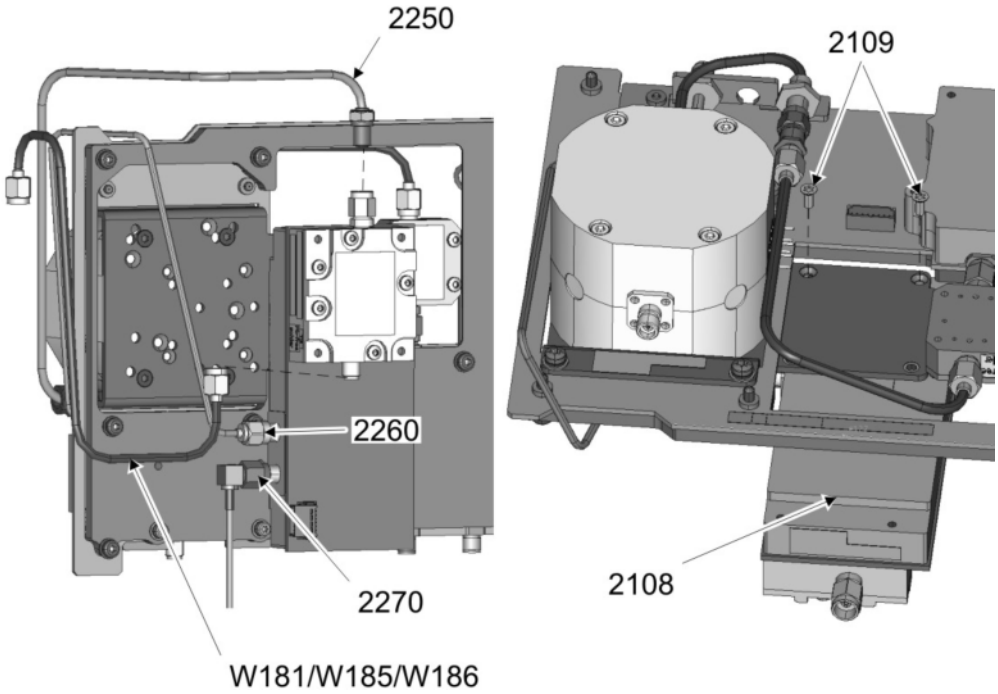
7. Deactivate the B17 selftest:

   [SETUP : MORE : SERVICE : SERVICE FUNKTION 2.13.0.0]

3.4.38 Preamplifier Unit (FSV 13/30/40)

See chapter "5.1 Spare Parts", item 2108 and explosion drawing 1307.9748.01 sheet 2.

3.4.38.1 Removing the Board and the Preamplifier Unit



1. Remove the MW converter unit as described in "3.4.21.1Removing the Board".
2. Remove RF cable W181/W185/W186 and RF cable W180 (2250) completely from the board.
3. Disconnect RF cable W190 (2270) and RF cable W184 (2260) from the preamplifier unit (2108).
4. Unscrew and remove two screws (2109).
5. Remove the preamplifier unit (2108) from the board.

3.4.38.2 Installing the New Preamplifier Unit

1. Mount the new preamplifier unit (2108) with two screws (2109).
2. Assemble RF cable W181/W185/W186 and RF cable W180 (2250).
3. Connect RF cable W190 (2270) and RF cable W184 (2260).
4. Continue with the procedure described in "3.4.21.2 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 FSV 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.

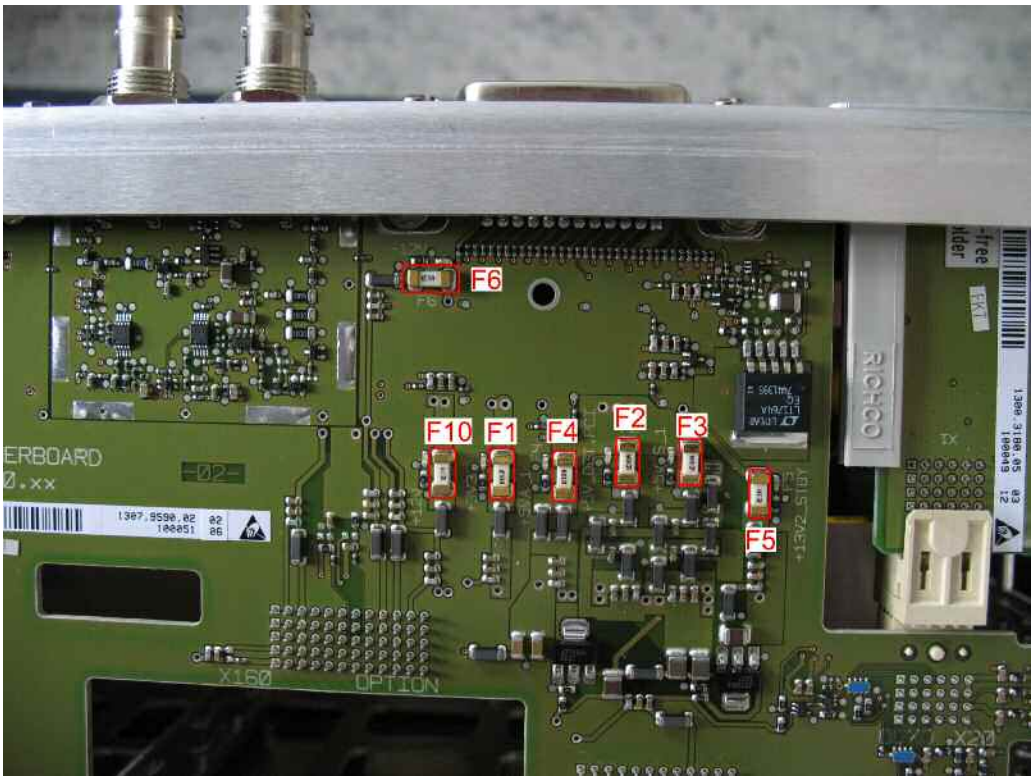
3.5.1 Measuring Equipment and Accessories

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

Error: R&S FSV cannot be switched on

- Check power-on switch at the rear.
- If the power switch is OFF: Switch on power supply.
- Measure voltages on the motherbaord, if the power supply starts, but the screen remains dark:



F1 nominal value: +3.3 V

F2 nominal value: +5.55 V

F3 nominal value: +5.55 V

F4 nominal value: +5.55 V

F5 rated value: 13.5 V

F6 rated value: -12 V

F10 rated value:

FSV3/7/13/30: +12.2 V

FSV 40: +13.2 V

If a fuse is blown, the corresponding red LED lights up.

Error: Fan does not work

- Check voltage at connector:
- X83 pins 1+ 2 : rated value 6 V to 12 V
- voltage o.k.: fan is defective
- voltage too low: fan is blocked or power consumption too high

3.5.3 Troubleshooting Problems with the Boot Process

Error: R&S FSV does not start the measurement application

.Following switch-on, the R&S FSV first boots the computer BIOS. After successful initialization of the computer, the Windows XP operating system starts up. Subsequently, the test 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 the keyboard socket.

Starting the device

► Start R&S FSV

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

```
Phoenix - AwardBIOS v6.00PG, An Energy Star Ally
Copyright (C) 1984-2003, Phoenix Technologies, LTD.
R&S ANALYZER BIOS V5.1-22-3
Main Processor : Intel (R) Celeron (R) 1.50GHz (100x15.0)
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) 1984-2003, Phoenix Technologies, LTD.
R&S ANALYZER BIOS V5.1-22-3
Main Processor : Intel (R) Celeron (R) 1.50GHz (100x15.0)
Memory Testing : 1015808K OK + 32M shared memory
Memory Frequency : DDR333
```

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. The basic version of the R&S FSV provides 1 Gbyte.

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) 1984-2003, Phoenix Technologies, LTD.
R&S ANALYZER BIOS V5.1-22-3
Main Processor : Intel (R) Celeron (R) 1.50GHz (100x15.0)
Memory Testing : 1015808K OK + 32M shared memory
Memory Frequency : DDR333
Detecting IDE drives…
IDE Channel 2 Master : FUJITSU MHV2040H (depending on the hard drive installed)
IDE Channel 3 Master: NONE
```

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

Operating system start

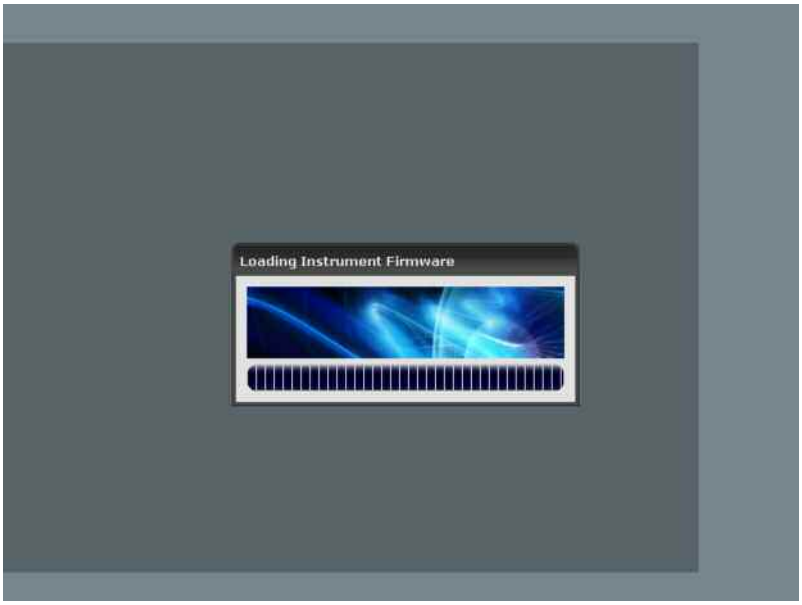
After this test, the BIOS has been loaded and the operating system is started.

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 and 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. 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 FSV 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.



3.5.4 Troubleshooting Problems with the Frontend

Error:

No level is displayed or the level is too small.

Test equipment:

Generator, spectrum analyzer

R&S FSV setting:

Frequency: 10MHz, Span: 0Hz

Input:

Generator: 10MHz , -20dBm at X101

Output:

90MHz, X103: Spectrum analyzer

Check level:

>-16dBm at X103

Repeat measurement with output at X104

Check level on several frequencies:

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

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

3.5.5 Troubleshooting Problems with the Microwave Converter Unit

Error:

No level is displayed or the level is too small (f > 7 GHz).

Test equipment:

Generator, spectrum analyzer

R&S FSV setting:

Frequency: 7001MHz, 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

3.5.5.1 Level conditions at the diplexer

Test equipment:

Generator, spectrum analyzer

f>7 GHz:

R&S FSV setting:

Frequency: 7001MHz, 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 FSV 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

3.5.5.2 Level conditions at the YIG filter unit

Test equipment:

Generator, spectrum analyzer

R&S FSV setting:

Frequency: 7001MHz, 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

3.5.5.3 Level conditions at the mixer (only models >13 GHz)

Test equipment:

Generator, spectrum analyzer

R&S FSV setting:

Frequency: 7001MHz, 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

3.5.5.4 Level conditions at the IF signal path (only models >13 GHz)

Test equipment:

Generator, spectrum analyzer

R&S FSV 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

4 Software Update / Installing Options

This chapter contains information on updating software, restoring the operating-system installation and installing options to the R&S FSV. 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 FSV 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 the 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:

1. Switch off the instrument and disconnect the power supply cables.
2. Unscrew that part of the rear-panel where the option has to be inserted.
3. Plug in the option and fix it using the screws you previously removed.

4. Switch on the R&S FSV.
5. Install additional software, if supplied, according to the instructions enclosed with the option.
6. 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 FSV 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. desig.	Rec. spare parts
Drawing 1307.9002.01 (R&S FSV Signal and Spectrum Analyzer)					
22	UNIT FRAME FSV (FSV 3/7)	1164.4940.02	1		
24	UNIT FRAME FSV (FSV 13/30/40)	1164.4940.03	1		
25	FAN 119X119X32	1307.9431.00	1		X
32	POWER SUPPLY UNIT (FSV 3/7)	1164.5423.02	1		
34	POWER SUPPLY UNIT (FSV 13/30)	1164.5423.03	1		
35	POWER SUPPLY UNIT (FSV 3, MOD21)	1164.5423.05	1		
36	POWER SUPPLY UNIT (FSV 40)	1164.5423.04	1		
45	SCREW	1148.3288.00	6		
120	MOTHERBOARD FSV (FSV 3/7/13/30)	1307.9590.02	1	A10	X
122	MOTHERBOARD FSV (FSV 40)	1307.9590.03	1	A10	X
128	SERRATED LOCK WASHER	3583.1578.00	3		
129	NUT	3583.1561.00	3		
130	SCREW	1148.3059.00	8		
140	LOCKING SCREW	1093.9180.00	2		
155	FRONTMODUL CONTR. 9/6	1206.0198.00	1	A90	X
159	3.0V 230MAH LI-MNO2 CR2032	0858.2049.00	1		X
160	SCREW	1148.3059.00	9		

Pos.	Designation	Stock No.	No.	Electr. desig.	Rec. spare parts
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 420	1091.3456.00	1	W91	
250	SATA POWERCABLE 440	1091.3433.00	1	W92	
260	GROMMET 14X24X7	0099.1440.00	1		
273	REMOVABLE HARD DRIVE FSV	1307.9248.03	1		
274	SOLID STATE DRIVE FSV	1307.9248.05	1		
276	SATA HARD DRIVE WITH SOFTWARE FSV	1307.9448.03	1	A91	X
277	SSD WITH SOFTWARE FSV (FSV3, MOD21)	1307.9448.05	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 FSV	1307.9025.03	1		
410	SCREW	1148.3288.00	4		
411	LABEL FSV 9KHZ … 3.6GHZ (FSV 3)	1308.0715.00	1		
412	LABEL FSV 9KHZ ... 7GHZ (FSV 7)	1308.0638.00	1		
413	LABEL FSV CONNECTOR STANDARD	1308.0296.00	1		X
414	LABEL FSV 9KHZ ... 13GHZ (FSV 13)	1308.0350.00	1		
415	LABEL FSV 9KHZ ... 30GHZ (FSV 30)	1308.0367.00	1		
416	LABEL FSV 9KHZ ... 40GHZ (FSV 40)	1308.0373.00	1		
418	LABEL FSV CONNECTOR OPT. (FSV3, MOD21)	1308.0315.00	1		
420	RF CABLE W1 (FSV 3/7)	1308.0321.00	1	W1	X
422	RF CABLE W1 (13GHZ) (FSV 13)	1308.0880.00	1	W1	
423	ADAPTOR (FSV 13)	0343.0257.00	1		X
425	MOUNTING PLATE (FSV 3/7/13)	1093.4750.00	1		

Pos.	Designation	Stock No.	No.	Electr. desig.	Rec. spare parts
430	SCREW	1148.3288.00	4		
440	ADAPTOR (FSV 30)	1021.0493.00	1		X
450	TESTPORT-ADAPTOR (FSV 40)	1036.4702.00	1		X
460	MOUNTING PLATE (FSV 30/40)	1093.4772.00	1		
470	RF CABLE W1 (30 GHZ) (FSV 30)	1308.0838.00	1	W1	
480	RF CABLE W1 (40 GHZ) (FSV 40)	1308.0896.00	1	W1	
500	ATTENUATOR 7GHZ (FSV 3/7)	1137.1408.02	1	A40	X
510	ATTENUATOR (FSV 13/30/40)	1046.5101.05	1	A40	X
520	SCREW (FSV 3/7)	1148.3059.00	4		
525	SCREW (FSV 13/30/40)	1148.3059.00	2		
530	ATTENUATOR CABLE	1308.0815.00	1	W40	
550	FRONTEND	1311.0512.02	1	A100	X
560	DETECTOR BOARD	1307.9554.02	1	A120	X
565	FSV3-B21 LO/IF PORTS (FSV3, MOD21)	1311.0870.00	1	A150	X
568	MW CONVERTER UNIT 13.6GHZ (FSV 13)	see Table 5-1	1	A150	X
570	MW CONVERTER UNIT 30 GHZ (FSV 30)	see Table 5-1	1	A150	X
575	MWC UNIT 40 GHZ (FSV 40, MOD39)	see Table 5 1	1	A150	X
580	MW CONVERTER UNIT 40 GHZ (FSV 40)	see Table 5-1	1	A150	X
600	RF CABLE W2 (FSV 3/7)	1308.0538.00	1	W2	
602	RF CABLE W2 (FSV 13/30/40)	1308.0844.00	1	W2	
605	RF CABLE W3/4	1164.6271.00	1	W3	
610	RF CABLE W3/4	1164.6271.00	1	W4	
620	RF CABLE W5 (FSV 13/30/40)	1308.0850.00	1	W5	
630	RF CABLE W6 (FSV 13/30/40)	1308.0867.00	1	W6	
640	RF CABLE W7 (FSV 13/30/40)	1308.0873.00	1	W7	
650	BAFFLE PLATE	1308.1363.00	1		
652	BAFFLE PLATE (FSV 3/7)	1308.1370.00	1		
700	TOP COVER	1308.0567.00	1		
705	SCREW	1148.3288.00	5		
710	COVER	0852.0467.00	1		
720	REAR PLATE OPTION	1307.9519.00	3		
725	REAR PLATE LVDS	1307.9525.00	1		

Pos.	Designation	Stock No.	No.	Electr. desig.	Rec. spare parts
730	REAR PLATE OCXO	1307.9531.00	2		
735	SCREW	1148.3288.00	24		
750	HOUSING FSV	1308.1340.00	1		
755	FRONT HANDLE	1096.1480.00	2		
760	SCREW	1096.4896.00	4		
765	REAR WALL FOOT	1096.2493.00	4		
770	BW2 LABEL F. REAR PANEL FOOT	1096.2435.00	1		
780	ACCESSORIES FSV 3/7/13 (FSV 3/7/13)	1307.9483.00	1		
782	ACCESSORIES FSV 3 MOD21	1311.0887.00	1		
785	ACCESSORIES FSV 30 (FSV 30)	1307.9490.00	1		
790	ACCESSORIES FSV 40 (FSV 40)	1307.9502.00	1		
Drawing 1307.9025.01 (Frontpanel FSV)					
800	FRONT COVER FSV	1308.2476.00	1		
805	SEALING	0396.1035.00	1		
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 TOUCHCONTROLLER	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	DISPLAY CABLE 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		

Pos.	Designation	Stock No.	No.	Electr. desig.	Rec. spare parts
970	CABLE W31 LST BOA–D - FMR	1307.9425.00	1	W31	
980	FRONTCONNECTOR BOARD	1307.9890.02	1	A20	X
990	SCREW	1300.4457.00	4		
1005	DISPLAY SHIELDING	1311.0770.00	1		
1010	SCREW	1148.3059.00	4		
Drawing 1308.1192.01 (MWC Unit 13 GHz) (FSV 13)					
2000	MW CONVERTER13	1308.1157.02	1	A150	
2005	PREAMPLIFIER UNIT	1164.5481.02	1		
2006	SCREW	1148.2769.00	2		
2010	YIG UNIT 13.6 GHZ (MICRO LAMBDA)	1308.1205.13	1	A152	X
2015	YIG UNIT 13.6 GHZ (MICRO LAMBDA)	1308.1205.15	1	A152	X
2020	YIG UNIT 13.6 GHZ (TELEDYNE)	1308.1205.14	1	A152	X
2025	YIG UNIT 13.6 GHZ (TELEDYNE)	1308.1205.16	1	A152	X
2030	SCREW	1148.3059.00	3		
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 MWC13 (BOTTOM)	1313.0090.00	1		
2075	B SIDE COVER MWC13 (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		
2090	RF CABLE W190	1308.2424.00	1		
2099	BAR CODE LABEL	0071.7714.00	1		
Drawing 1307.9748.01 (MWC Unit) (FSV 30/40)					
2100	MW CONVERTER2	1308.0721.02	1	A150	
2102	MW CONVERTER2	1308.0721.04	1	A150	
2104	MW CONVERTER2	1308.0721.06	1	A150	
2105	MW CONVERTER2	1308.0721.03	1	A150	
2106	MW CONVERTER2	1308.0721.07	1	A150	
2107	MW CONVERTER2	1308.0721.05	1	A150	
2108	PREAMPLIFIER UNIT	1164.5481.02	1		X
2109	SCREW	1148.2769.00	2		

Pos.	Designation	Stock No.	No.	Electr. desig.	Rec. spare parts
2110	YIG UNIT 30GHZ (R&S)	1308.1292.30	1		X
2115	YIG UNIT 30GHZ + PREAMP (R&S)	1308.1292.33	1		X
2120	YIG UNIT 30GHZ (MICRO LAMBDA)	1308.1292.31	1		X
2125	YIG UNIT 30GHZ + PREAMP (MICRO LAMBDA)	1308.1292.34	1		X
2140	YIG UNIT 40GHZ (R&S)	1308.1292.40	1		X
2145	YIG UNIT 40GHZ + PREAMP (R&S)	1308.1305.43	1		X
2164	HOLDING PLATE	1308.1970.00	1		
2167	VELCRO-STRIP ONE-WRAP 16MM	5500.8537.00	0.04M		
2170	SCREW	1148.3059.00	3		
2180	MIXER M1	1307.1501.02	1	A153	X
2185	TERMINATION 50OHM	0249.7823.00	1		
2190	DIPLEXER 46	1162.1120.05	1	A151	X
2192	HOLDING PLATE	1308.2299.00	1		
2205	SCREW	1096.5205.00	4		
2207	SCREW	1096.5205.00	2		
2210	A SIDE COVER MWC	1313.0084.00	1		
2220	B SIDE COVER MWC	1308.1186.00	1		
2230	RF CABLE W167	1308.1328.00	1		
2233	TERMINATION SMP	0048.6767.00	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		
2270	RF CABLE W190	1308.2424.00	1		
2290	BAR CODE LABEL	0071.7714.00	1		
Drawing 1164.5423.01 (Power Supply Unit)					
2300	AC/DC POWER SUPPLY (FSV 3/7/30/40)	1400.1307.00	1	A50	X
2302	AC/DC POWER SUPPLY (FSV 3, MOD21)	1400.1113.00	1	A50	X
2305	REAR PLATE POWER SUPPLY 2 PRINTED	1308.1592.00	1		
2310	CABLE POWER INPUT	1308.0744.00	1	W10	
2320	BRACKET FAN (FSV 3/7)	1308.1663.00	1		
2325	POWER SUPPLY SHIELDING (FSV 13/30/40)	1308.2482.00	1		
2330	SCREW (FSV 3/7)	1148.2781.00	2		

Pos.	Designation	Stock No.	No.	Electr. desig.	Rec. spare parts
2335	SCREW (FSV 13/30/40)	1148.2781.00	1		
2340	FAN	1308.1711.00	1		X
2342	FAN SHEET	1313.0032.00	1		
2345	SCREW	1096.4838.00	2		
2350	CABLE POWER SUPPLY TO MOTHERBOARD	1308.1728.00	1	W11	
2355	HOLDER	0794.5214.00	2		
2360	CABLE TIE	0015.9038.00	2		
2365	CONNECTOR	2100.3610.00	1	A51	X
2370	TIME LAG FUSE	0099.6729.00	2		
2375	TOUCH-PROTECTION	1308.2124.00	1		
2380	SCREW	0041.1682.00	1		
2385	PROTECTIVE EARTH CONDUCTOR	1308.1734.00	1		
2390	LABEL POWER SUPPLY UNIT	1164.5446.00	1		
2395	BAR CODE LABEL	0071.7714.00	1		
Option FSV-B1 1310.9500.02					
1110	SHOCK MOUNT.FR.LE.4HU	1096.6553.00	1		X
1120	SHOCK MOUNT.FR.RI.4HU	1096.6560.00	1		X
1130	SHOCK MOUNT.REAR 4HU	1096.6576.00	2		X
1140	PROTEC. COVER 4HU 7/8	1096.6582.00	1		X
1150	CARRY HANDLE	1096.6118.00	1		X
1160	HOUSING FSV	1308.1357.00	1		X
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 FSV CONNECTOR (OPTION)	1308.0309.00	1		
Drawing 1310.9716.00 (Option FSV-B4 1310.9522.02)					
1300	OCXO	1300.3180.05	1	A250	X

Pos.	Designation	Stock No.	No.	Electr. desig.	Rec. spare parts
1302	OCXO HIGH PERFORMANCE	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 1310.9774.00 (Option FSV-B9 1310.9545.02)					
1700	TRACKING GENERATOR	1308.0196.02	1	A140	X
1705	RF CABLE W13	1308.1892.00	1	W13	X
1710	MOUNTING PLATE	1093.4750.00	1		
1715	SCREW	1148.3288.00	4		
1725	RF CABLE W13-2	1308.1928.00	1	W13-2	
1730	RF CABLE W14	1308.1740.00	1	W14	
1735	RF CABLE W15	1308.1757.00	1	W15	
1740	TERMINATION 50 OHM	0249.7823.00	1		
1745	REAR PLATE TRACKING GENERATOR	1308.1934.00	1		
1750	SCREW	1148.3288.00	4		
1755	RF CABLE W16	1308.1905.00	1	W16	
1760	RF CABLE W17	1308.1911.00	1	W17	
1765	CABLE HOLDER	1093.9045.00	2		
1770	LABEL FSV CONNECTOR	1308.0309.00	1		X
1775	COVER	0009.9181.00	1		
1780	COVER	3585.4545.00	1		
Drawing 1310.9716.00 (Option FSV-B10 1310.9551.02)					
1500	EXT. GEN. CONTROL	1307.9854.02	1	A230	X
1510	IEC-BUS CONTR.	1164.5200.02	1	A210	X
1570	ACCESSORIES FSV-B10	1310.9780.00	1		
Drawing 1310.9716.00 (Option FSV-B17 1310.9568.02)					
1900	DIGITAL I/O LVDS	1307.9877.02	1	A240	X
Drawing 1310.9716.00 (Option FSV-B18 1310.9697.03)					
2510	SSD WITH SOFTWARE	1308.9448.03	1		X
2530	HOLDER	1201.8161.00	2		X
2540	HOLDER HARD DRIVE	1307.9460.00	1		
Drawing 1310.9716.00 (Option FSV-B19 1310.9574.03)					
1605	SATA HARD DRIVE WITH SOFTWARE	1308.9448.03	1		X
1607	HOLDER	1201.8161.00	2		X
1609	HOLDER HARD DRIVE	1307.9460.00	1		

Pos.	Designation	Stock No.	No.	Electr. desig.	Rec. spare parts
Drawing 1308.1963.00 (Option FSV-B21 1310.9597.02)					
1800	RF CABLE W18	1308.1940.00	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 FSV CONNECTOR	1308.0315.00	1		X
1860	COVER	0009.9200.00	1		
1870	COVER	0009.9181.00	1		
1880	COVER	3585.4545.00	1		
Drawing 1307.9748.01, sheet 2 (Option FSV-B24 1310.9616.13/30/40)					
	MW CONVERTER UNIT 13.6/30/40 GHZ	see Table 5-1		A150	X

MWC Unit Overview

Depending on if your R&S FSV has the option B21, B24, both or none of them, you will need a certain MWC Unit as shown in the table below.

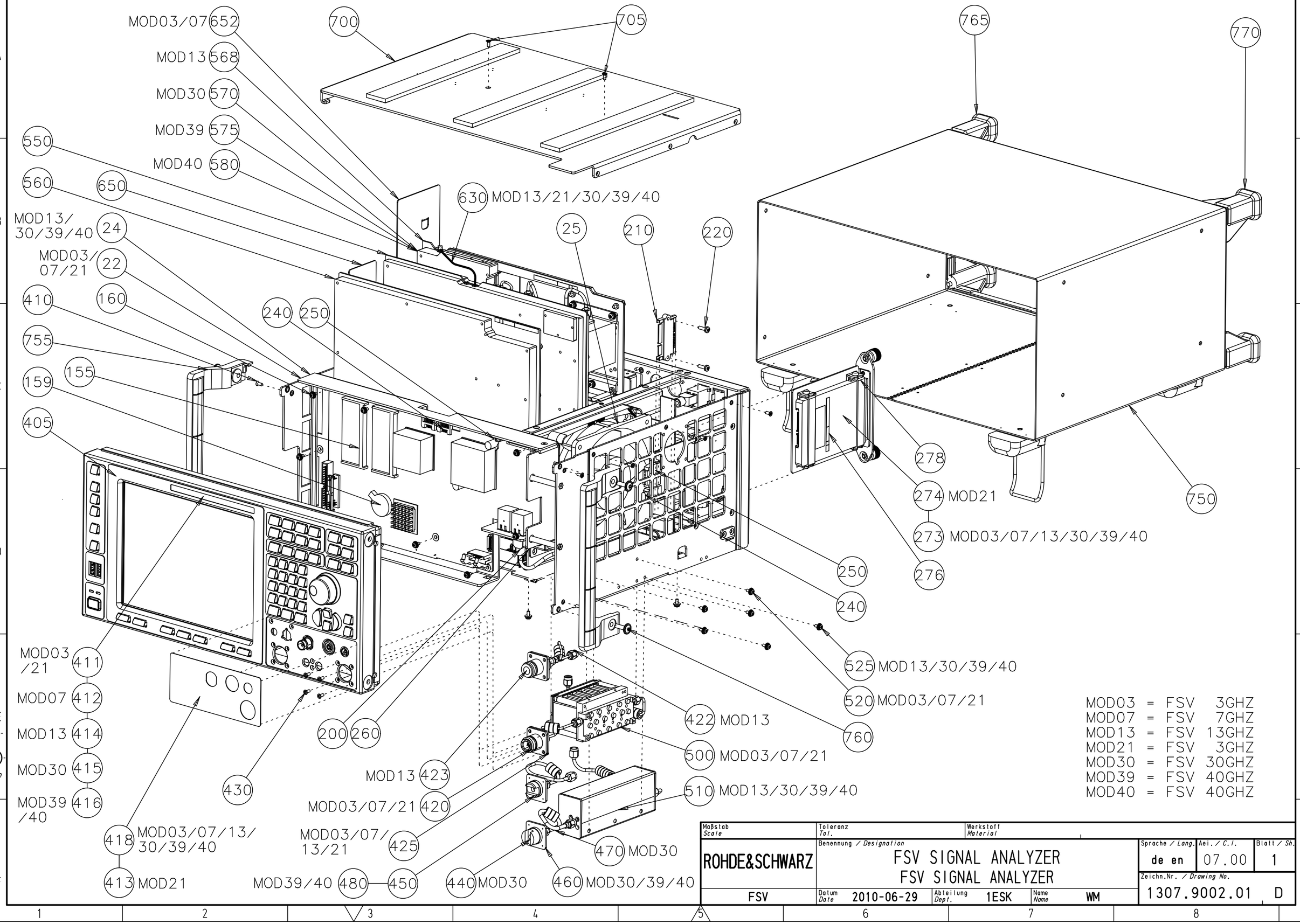
FSV Model	Option FSV-B21	Option FSV-B24	Stock No.	No.	Elect.desig.	Rec. spare parts
FSV 3	X		1307.9748.21	1	A150	X
FSV 13			1308.1192.13	1	A150	X
FSV 13		X	1308.1192.14	1	A150	X
FSV 30			1307.9748.34	1	A150	X
FSV 30	X		1307.9748.30	1	A150	X
FSV 30		X	1307.9748.35	1	A150	X
FSV 30	X	X	1307.9748.31	1	A150	X
FSV 40			1307.9748.44	1	A150	X
FSV 40	X		1307.9748.40	1	A150	X
FSV 40		X	1307.9748.45	1	A150	X
FSV 40	X	X	1307.9748.41	1	A150	X
FSV 40, K39			1307.9748.54	1	A150	X
FSV 40, K39	X		1307.9748.50	1	A150	X
FSV 40, K39		X	1307.9748.55	1	A150	X
FSV 40, K39	X	X	1307.9748.51	1	A150	X

Table 5-1: MWC Unit Overwiew

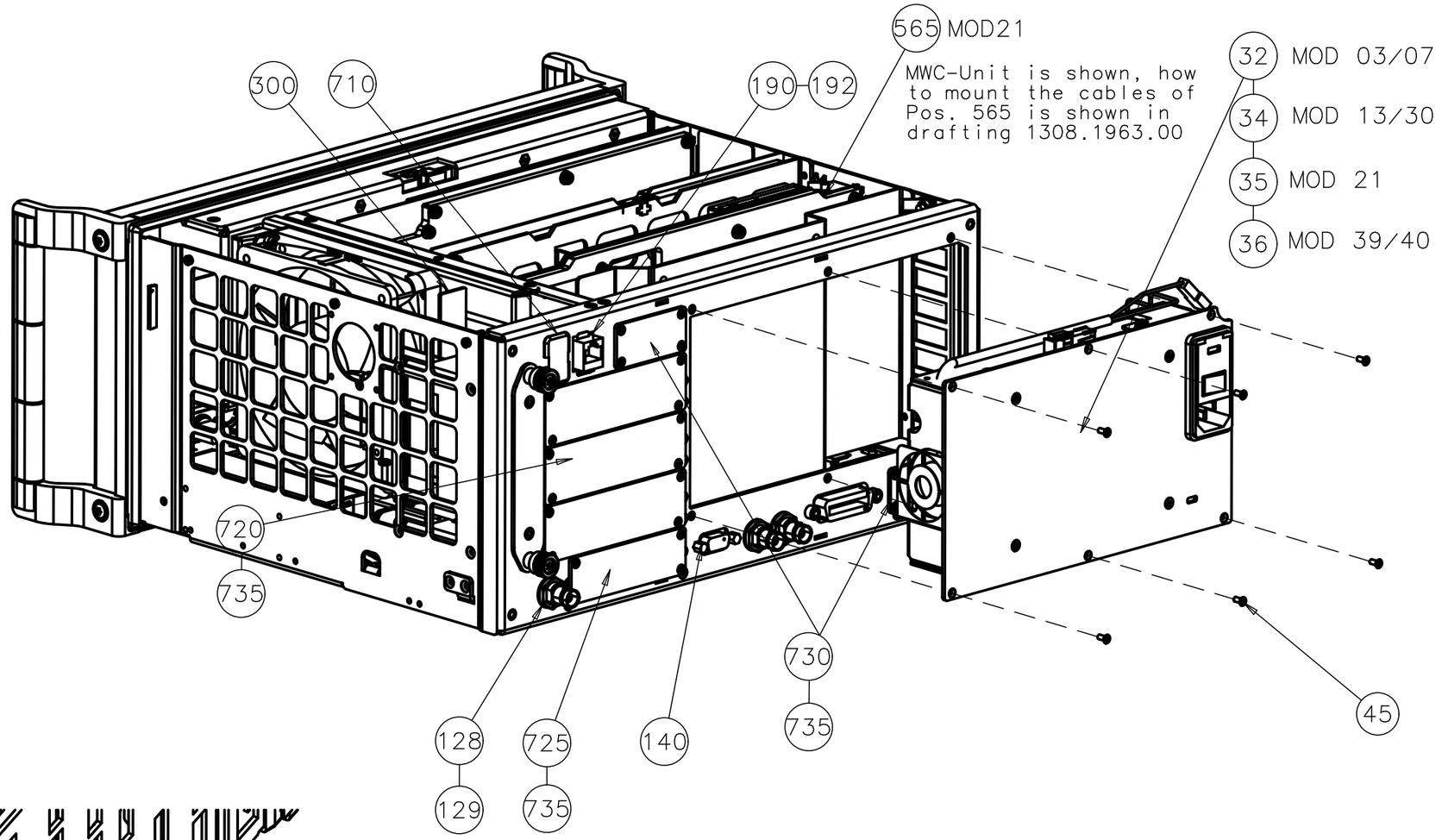
5.2 Available Power Cables

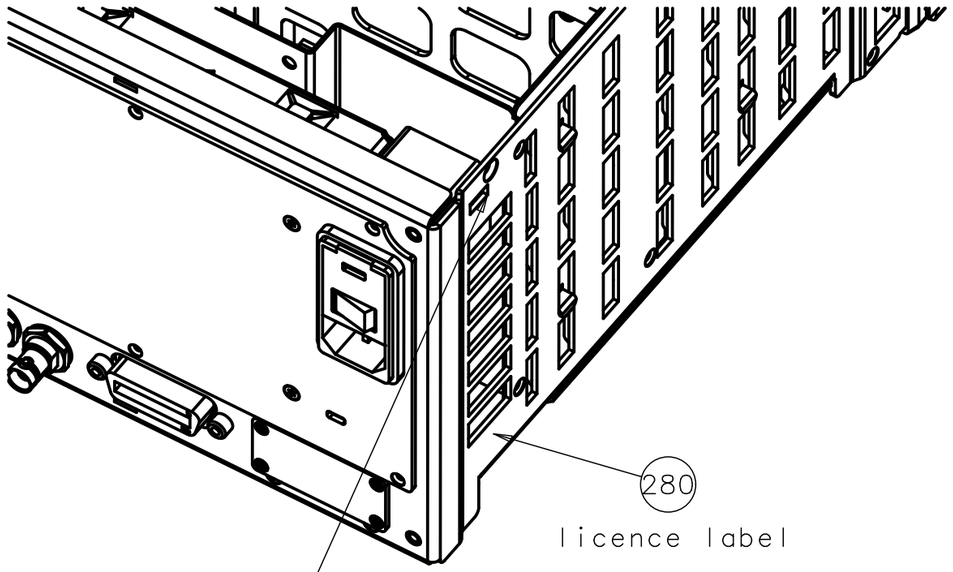
Stock No.	Earthed-contact connector	Preferably used in
DS 0006.7013.00	BS1363: 1967' 10 A, 250 V complying with IEC 83: 1975 standard B2	Great Britain
DS 0006.7020.00	Type 12, 10 A, 250 V complying with SEV-regulation 1011.1059, standard sheet S 24 507	Switzerland
DS 0006.7036.00	Type 498/13, 10 A, 250 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



Maßstab *Scale*	Toleranz *Tol.*	Werkstoff *Material*				
ROHDE&SCHWARZ	Benennung / *Designation* FSV SIGNAL ANALYZER FSV SIGNAL ANALYZER				Sprache / *Long.* de en	Aei. / *C.I.* 07.00	Blatt / *Sh.* 1
FSV	Datum *Date* 2010-06-29	Abteilung *Dept.* 1ESK	Name *Name* WM		Zeichn.Nr. / *Drawing No.* 1307.9002.01		D

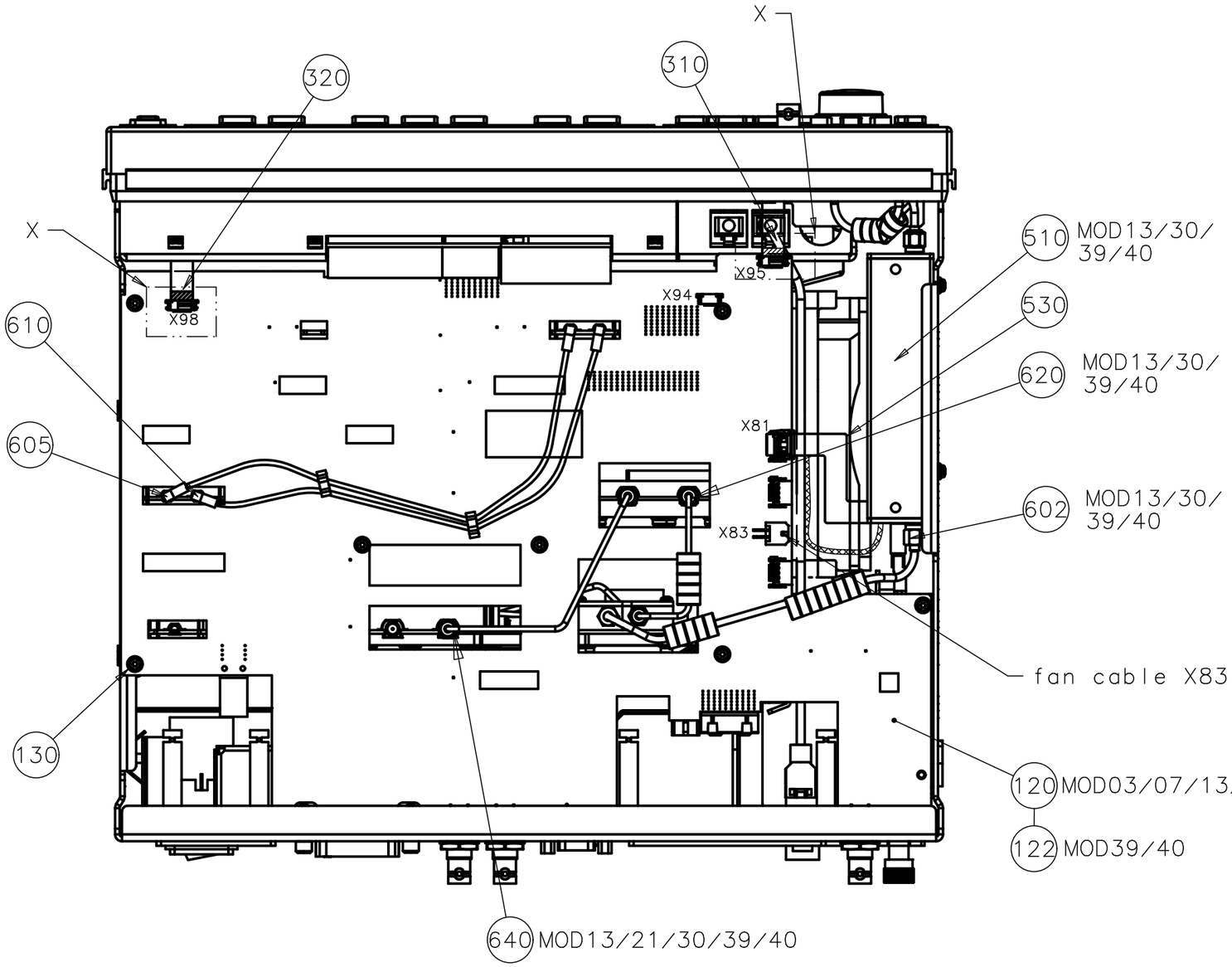


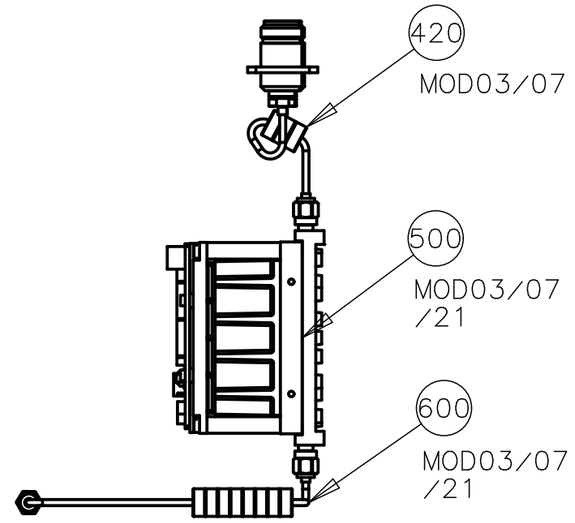


Projektions-methode
Projection Method

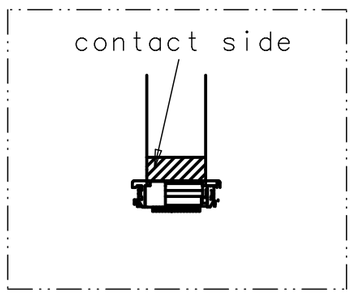
MOD03 = FSV 3GHZ
MOD07 = FSV 7GHZ
MOD13 = FSV 13GHZ
MOD21 = FSV 3GHZ
MOD30 = FSV 30GHZ
MOD39 = FSV 40GHZ
MOD40 = FSV 40GHZ

Maßstab *Scale*	Toleranz *Tol.*	Werkstoff *Material*	
ROHDE&SCHWARZ	Benennung / *Designation* FSV SIGNAL ANALYZER FSV SIGNAL ANALYZER	Sprache / *Lang.* de en	Aei. / *C.I.* 09.00 / Blatt / *Sh.* 2
FSV	Datum *Date* 2010-06-29 / Abteilung *Dept.* 1ESK / Name *Name* WM	Zeichn.Nr. / *Drawing No.* 1307.9002.01	D





Detail X



Projektions-methode
Projection Method

MOD03 = FSV 3GHZ
MOD07 = FSV 7GHZ
MOD13 = FSV 13GHZ
MOD21 = FSV 3GHZ
MOD30 = FSV 30GHZ
MOD39 = FSV 40GHZ
MOD40 = FSV 40GHZ

Maßstab / *Scale*	Toleranz / *Tol.*	Werkstoff / *Material*			
ROHDE&SCHWARZ	Benennung / *Designation* FSV SIGNAL ANALYZER FSV SIGNAL ANALYZER			Sprache / *Lang.* de en	Aei. / *C.I.* 05.00	Blatt / *Sh.* 3
FSV	Datum / *Date* 2010-06-29	Abteilung / *Dept.* 1ESK	Name / *Name* WM	Zeichn.Nr. / *Drawing No.* 1307.9002.01		D

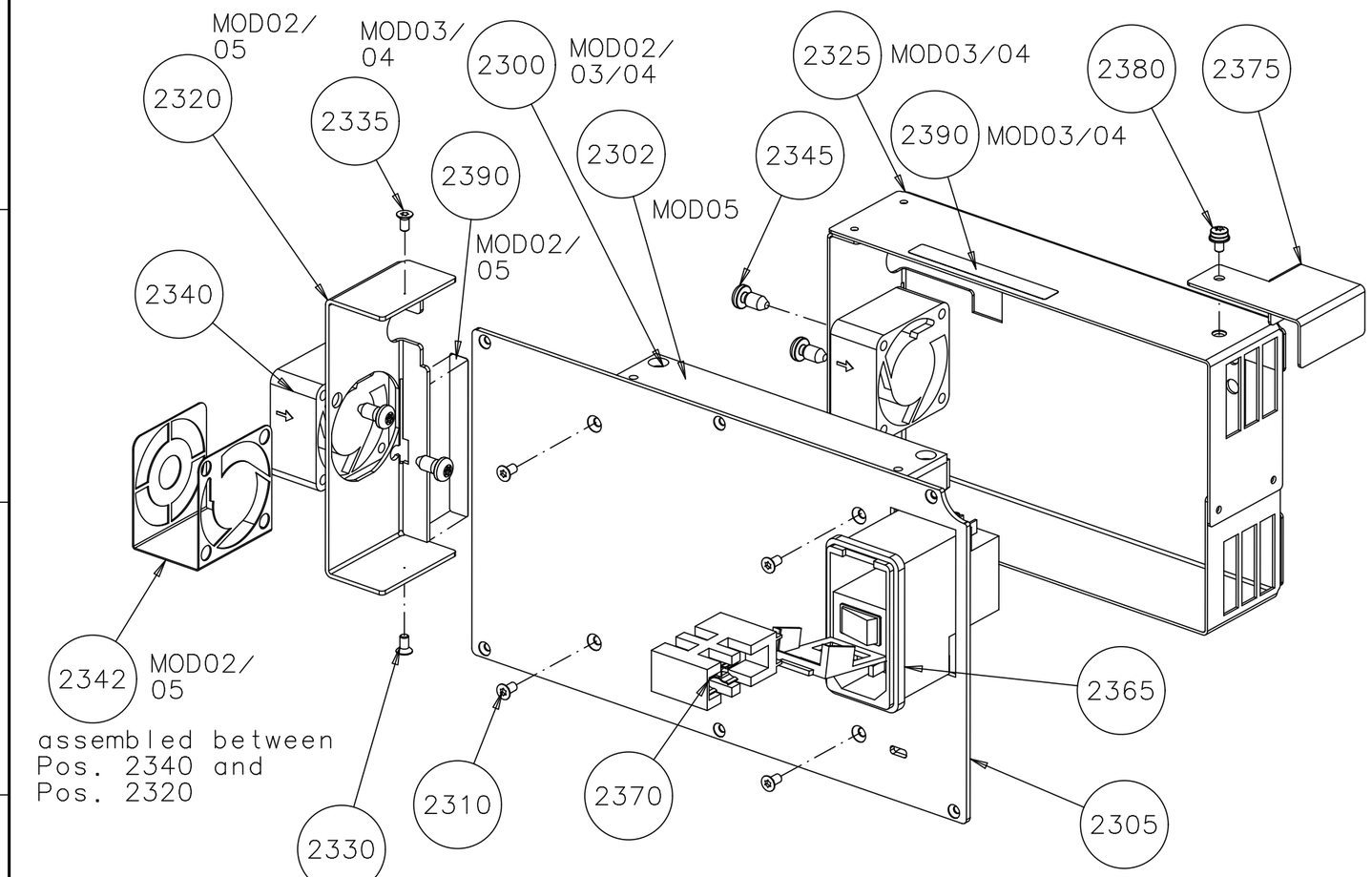
X2:1

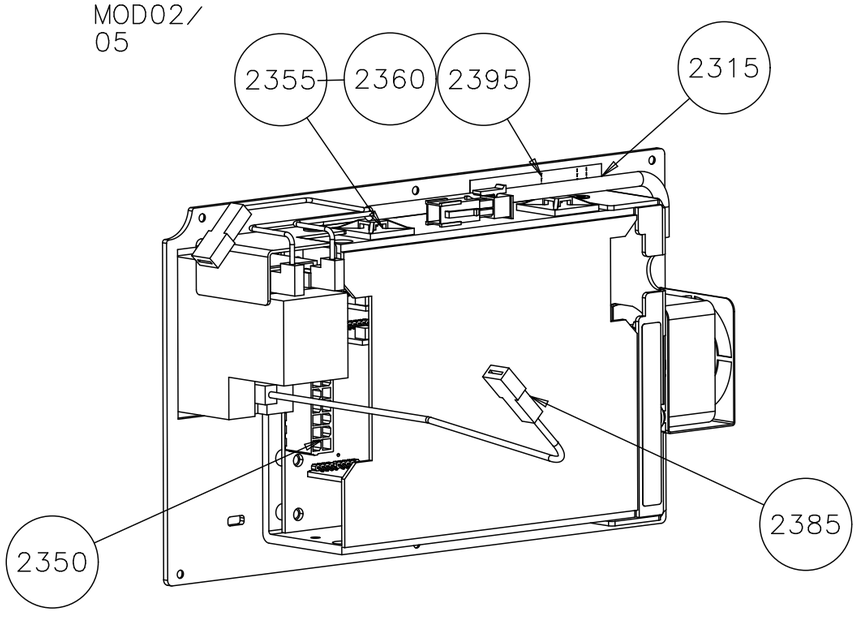
890
883
970
not pictured
884
888
1005
1010
904
not pictured
903
not pictured
945
946
to fix Pos.892 and cable Pos.903
892
this end connect with controller, the other with Pos.883
902
990
980
865
to store the overlength of the cable; fix it carefully, don't damage the cable
860
850
845
820
all nopes of Pos.810 have to pass through Pos.820
810
870
875
830
805
800 MOD03
802 MOD04
905

Versions:
MOD03 = FSV with LED backlight display
MOD04 = FSVR

Projektions-methode
Projection Method

Maßstab *Scale*	Toleranz *Tol.*	Werkstoff *Material*					
ROHDE&SCHWARZ	Benennung / *Designation*	FRONTEINHEIT FSV FRONT UNIT FSV			Sprache / *Lang.* de en	Aei. / *C.I.* 06.00	Blatt / *Sh.* 1
FSV	Datum *Date* 2010-06-01	Abteilung *Dept.* 1ESK	Name *Name* WM		Zeichn.Nr. / *Drawing No.* 1307.9025.01		D

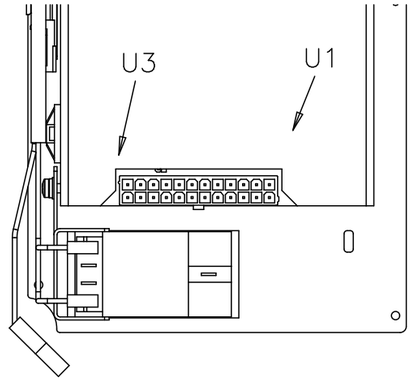




adjust the voltages:

MOD 02/03/04/05 U1 = +5,55V +/- 10mV

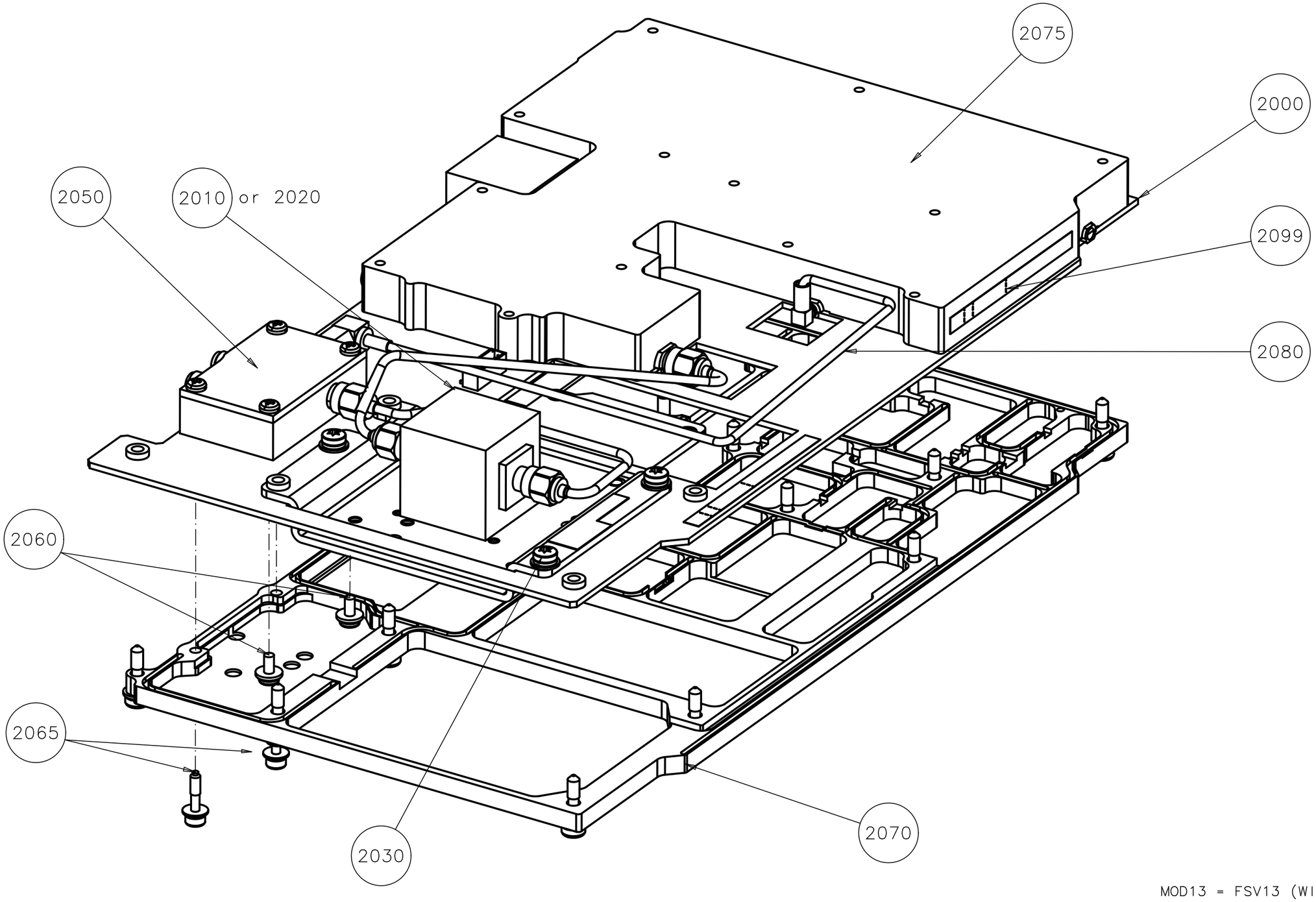
MOD 02/03/05: U3 = +12,2V +/- 10mV
MOD 04: U3 = +13,2V +/- 10mV



MOD 02 = FSV 3/7 U3=12,2V
MOD 03 = FSV 13/30 U3=12,2V
MOD 04 = FSV 40 U3=13,2V
MOD 05 = FSV 3 MOD21 U3=12,2V

Projektions-methode
Projection Method

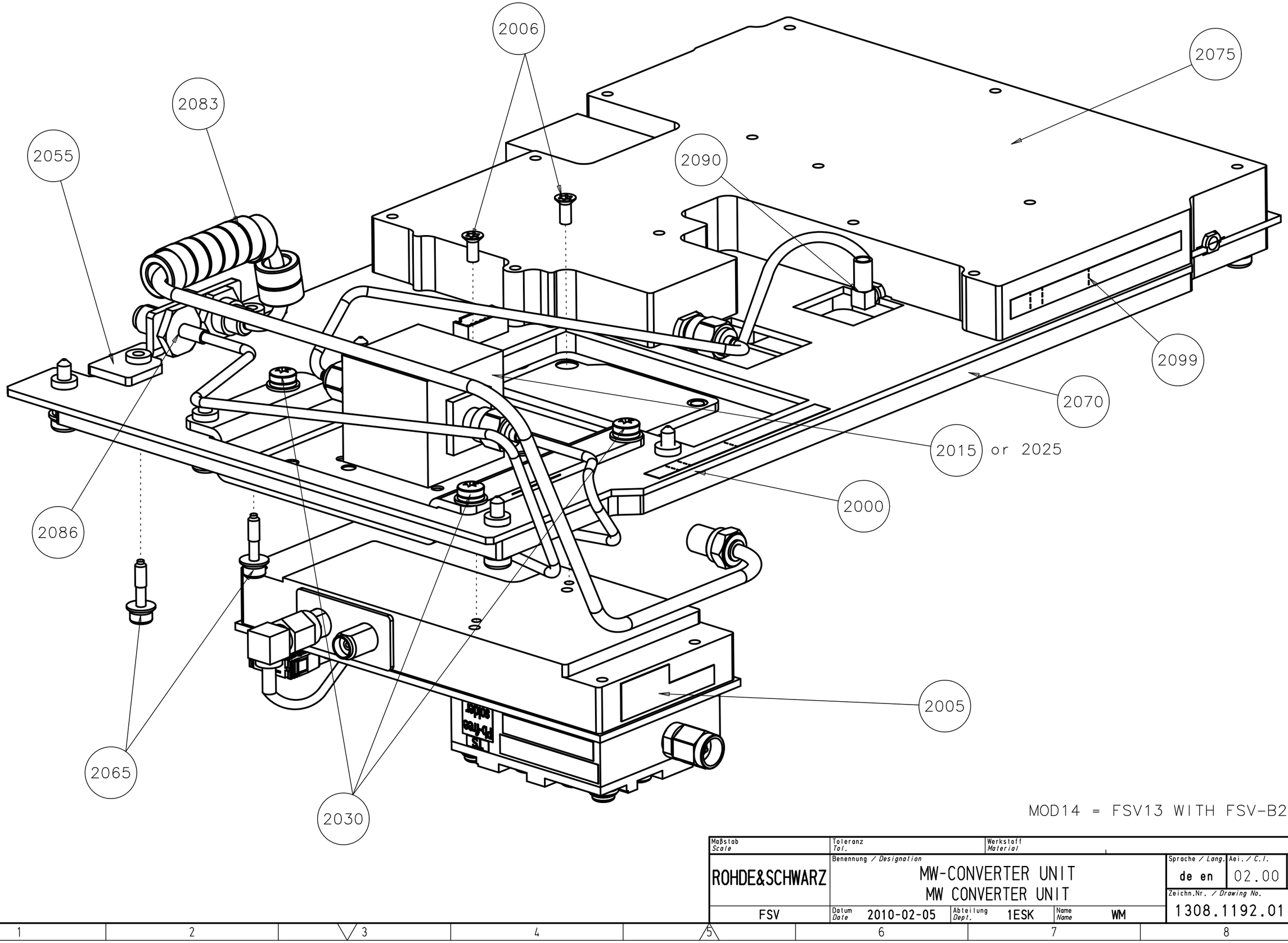
Maßstab *Scale* 1:2	Toleranz *Tol.*	Werkstoff *Material*			
ROHDE&SCHWARZ	Benennung / *Designation* NETZTEIL UNIT POWER SUPPLY UNIT			Sprache / *Lang.* de en	Aei. / *C.I.* 06.00	Blatt / *Sh.* 1
				Zeichn.Nr. / *Drawing No.* 1164.5423.01		D
FSV	Datum *Date* 2010-06-08	Abteilung *Dept.* 1ESK	Name *Name* Welz			



MOD13 = FSV13 (WITHOUT OPTION)

Projektions-methode
Projection Method

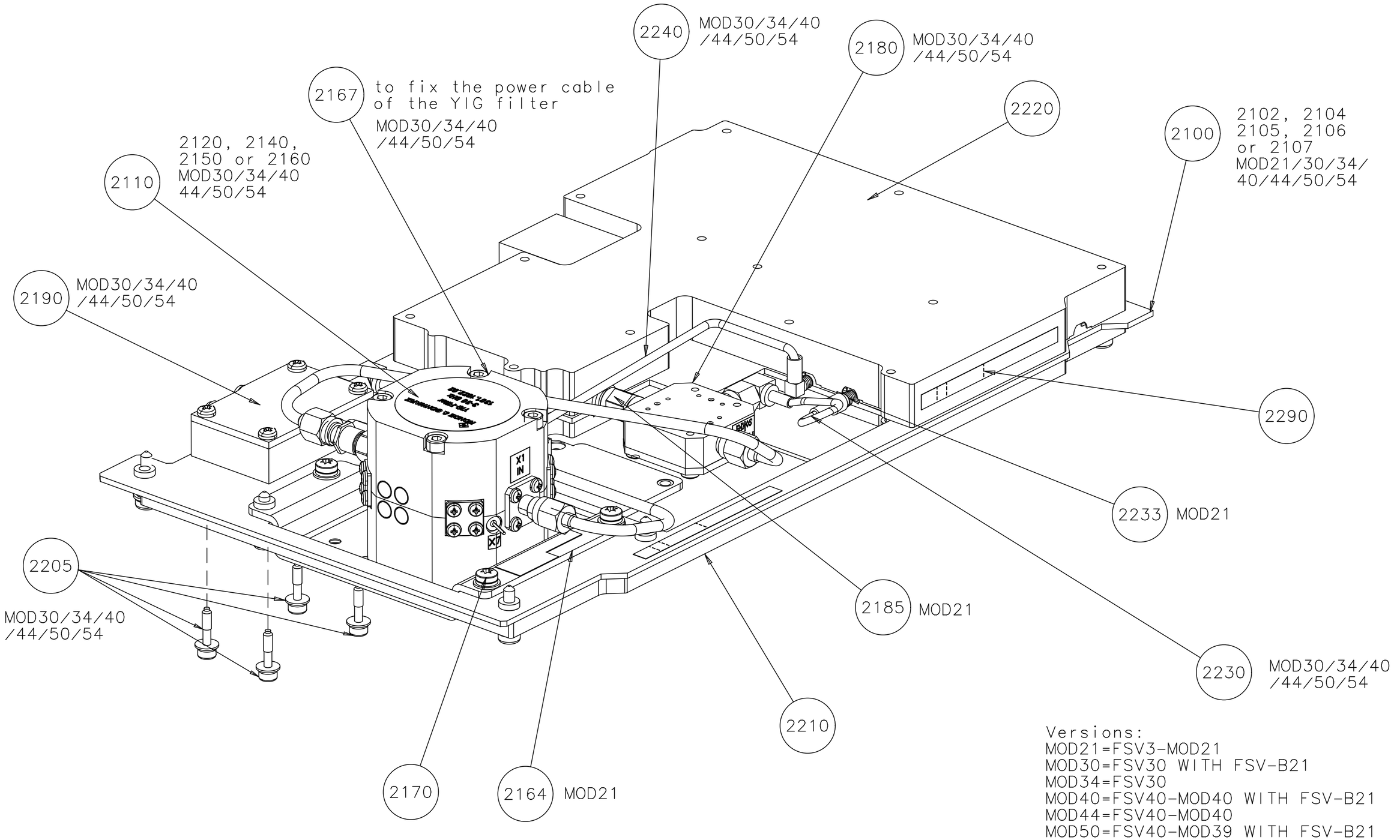
Maßstab *Scale* 1:1	Toleranz *Tol.*	Werkstoff *Material*			
ROHDE&SCHWARZ	Benennung / *Designation* MW-CONVERTER UNIT MW CONVERTER UNIT			Sprache / *Lang.* de en	Aei. / *C.I.* 04.00	Blatt / *Sh.* 1
FSV	Datum *Date* 2010-02-05	Abteilung *Dept.* 1ESK	Name *Name* WM	Zeichn.Nr. / *Drawing No.* 1308.1192.01		D



MOD14 = FSV13 WITH FSV-B24

Projektions-methode
Projection Method

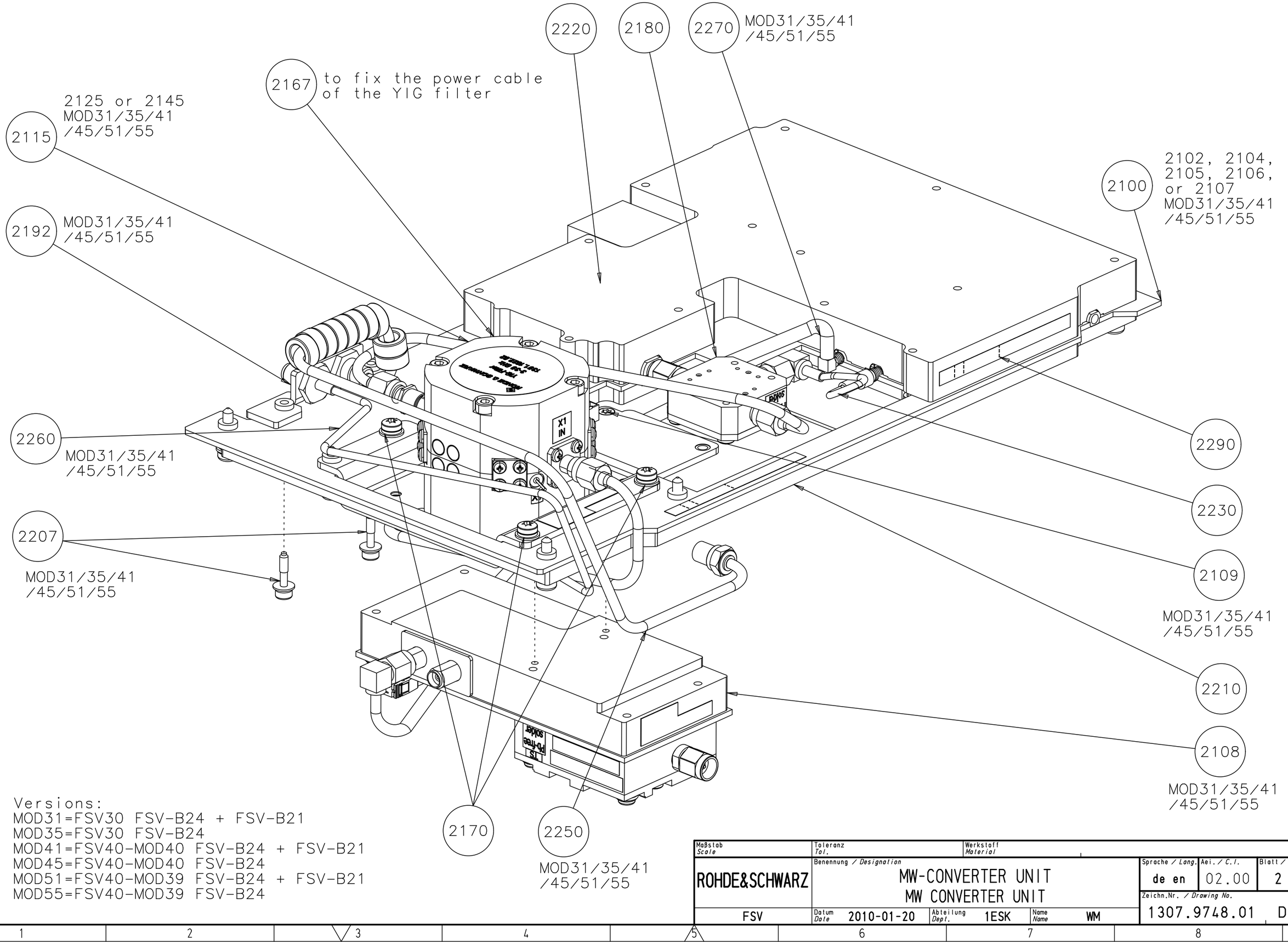
Maßstab *Scale*	Toleranz *Tol.*	Werkstoff *Material*			
ROHDE&SCHWARZ	Benennung / *Designation* MW-CONVERTER UNIT MW CONVERTER UNIT			Sprache / *Lang.* de en	Aei. / *C.I.* 02.00	Blatt / *Sh.* 2
				Zeichn.Nr. / *Drawing No.* 1308.1192.01		D
FSV	Datum *Date* 2010-02-05	Abteilung *Dept.* 1ESK	Name *Name* WM			



Versions:
MOD21=FSV3-MOD21
MOD30=FSV30 WITH FSV-B21
MOD34=FSV30
MOD40=FSV40-MOD40 WITH FSV-B21
MOD44=FSV40-MOD40
MOD50=FSV40-MOD39 WITH FSV-B21
MOD54=FSV40-MOD39

Projektions-methode
Projection Method

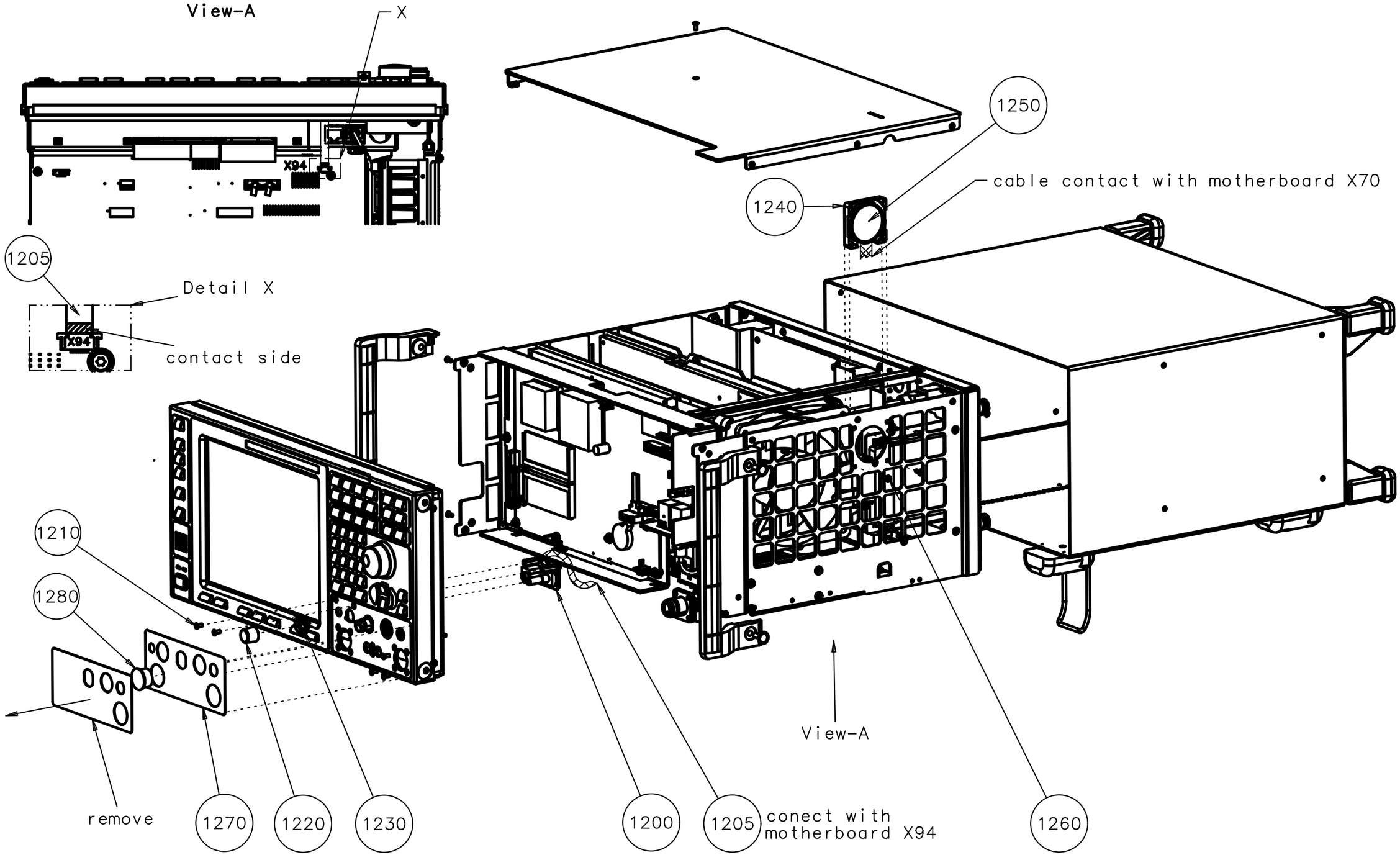
Maßstab *Scale*	Toleranz *Tol.*	Werkstoff *Material*					
ROHDE&SCHWARZ	Benennung / *Designation* MW-CONVERTER UNIT MW CONVERTER UNIT				Sprache / *Lang.* de en	Aei. / *C.I.* 06.00	Blatt / *Sh.* 1
					Zeichn.Nr. / *Drawing No.* 1307.9748.01		D
FSV	Datum *Date* 2010-05-04	Abteilung *Dept.* 1ESK	Name *Name* WM				



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

Projektions-methode
Projection Method

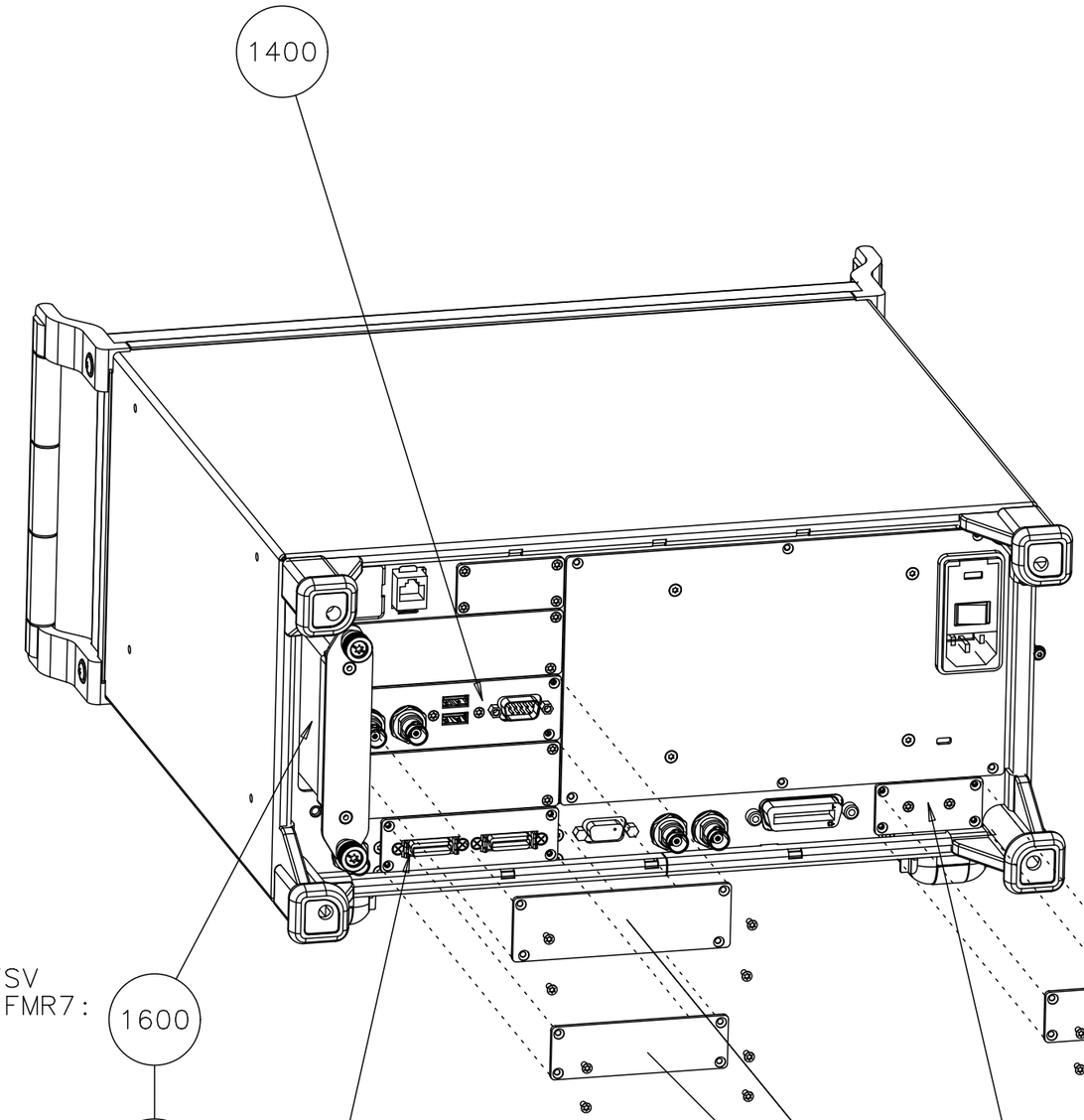
Maßstab *Scale*	Toleranz *Tol.*	Werkstoff *Material*			
ROHDE&SCHWARZ	Benennung / *Designation* MW-CONVERTER UNIT MW CONVERTER UNIT			Sprache / *Lang.* de en	Aei. / *C.I.* 02.00	Blatt / *Sh.* 2
FSV	Datum *Date* 2010-01-20	Abteilung *Dept.* 1ESK	Name *Name* WM	Zeichn.Nr. / *Drawing No.* 1307.9748.01		D

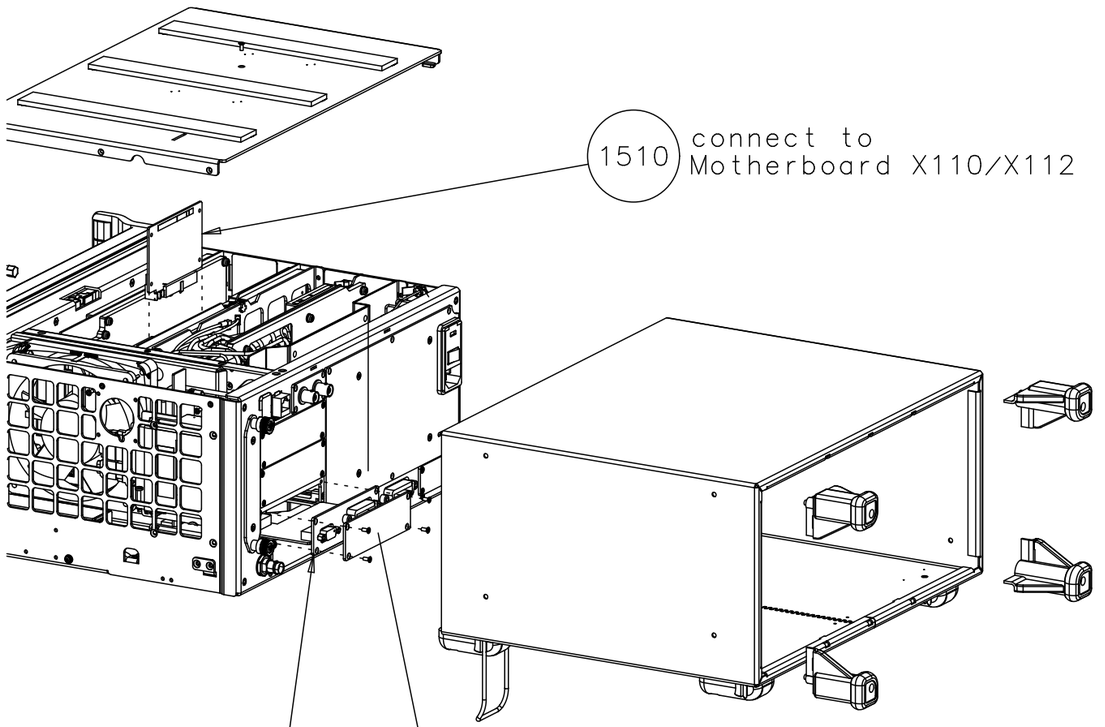


Assembly instruction FSV for
B3

Maßstab *Scale*	Toleranz *Tol.*	Werkstoff *Material*			
ROHDE&SCHWARZ	Benennung / *Designation* EINBAUANWEISUNG FSV-B3 ASSEMBLY INSTRUCTION FSV-B3			Sprache / *Lang.* de en	Aei. / *C.I.* 01.00	Blatt / *Sh.* 1
FSV-B3	Datum *Date* 2008-05-16	Abteilung *Dept.* 1ESK	Name *Name* PA/WM	Zeichn.Nr. / *Drawing No.* 1310.9700.00		D

Projektionsmethode
Projection Method





for FSV with FMR7: 1600

for FSV with FMR9: 1605

2510

FSVR: 1606

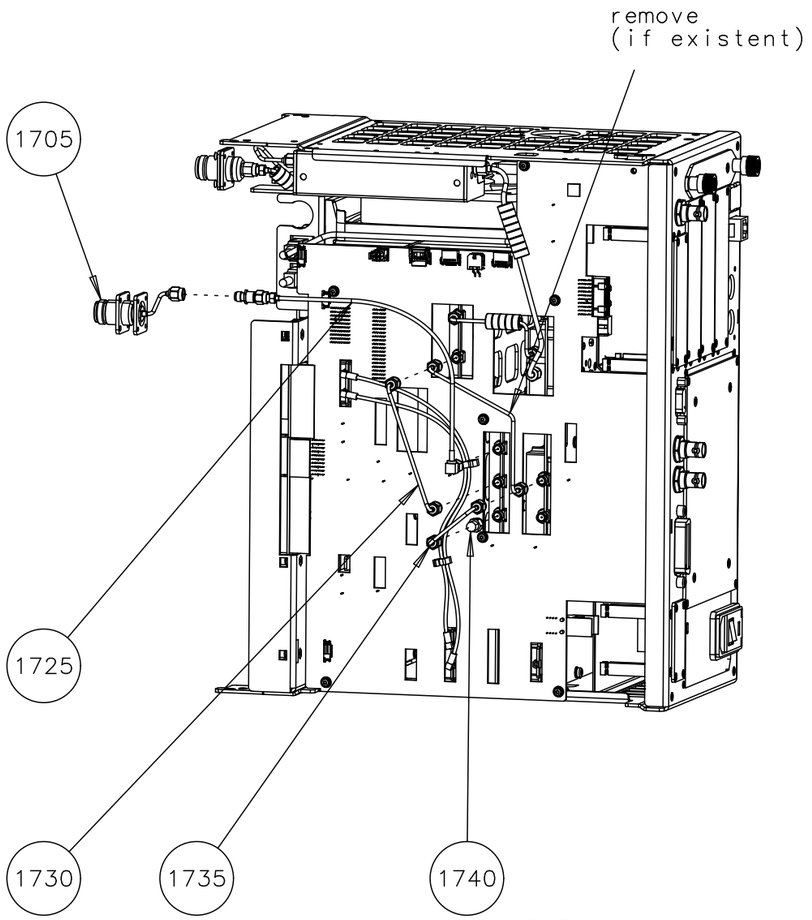
1300 VAR 02

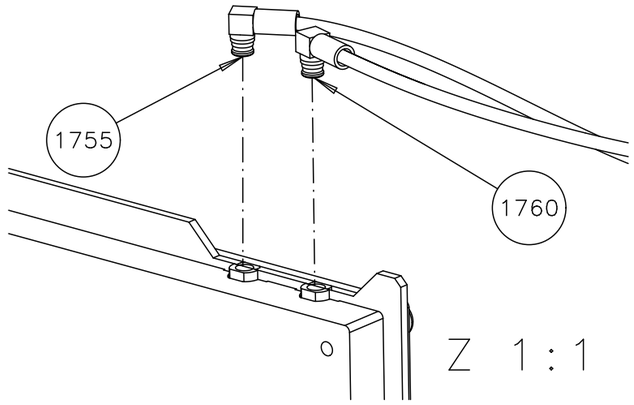
1302 VAR 03

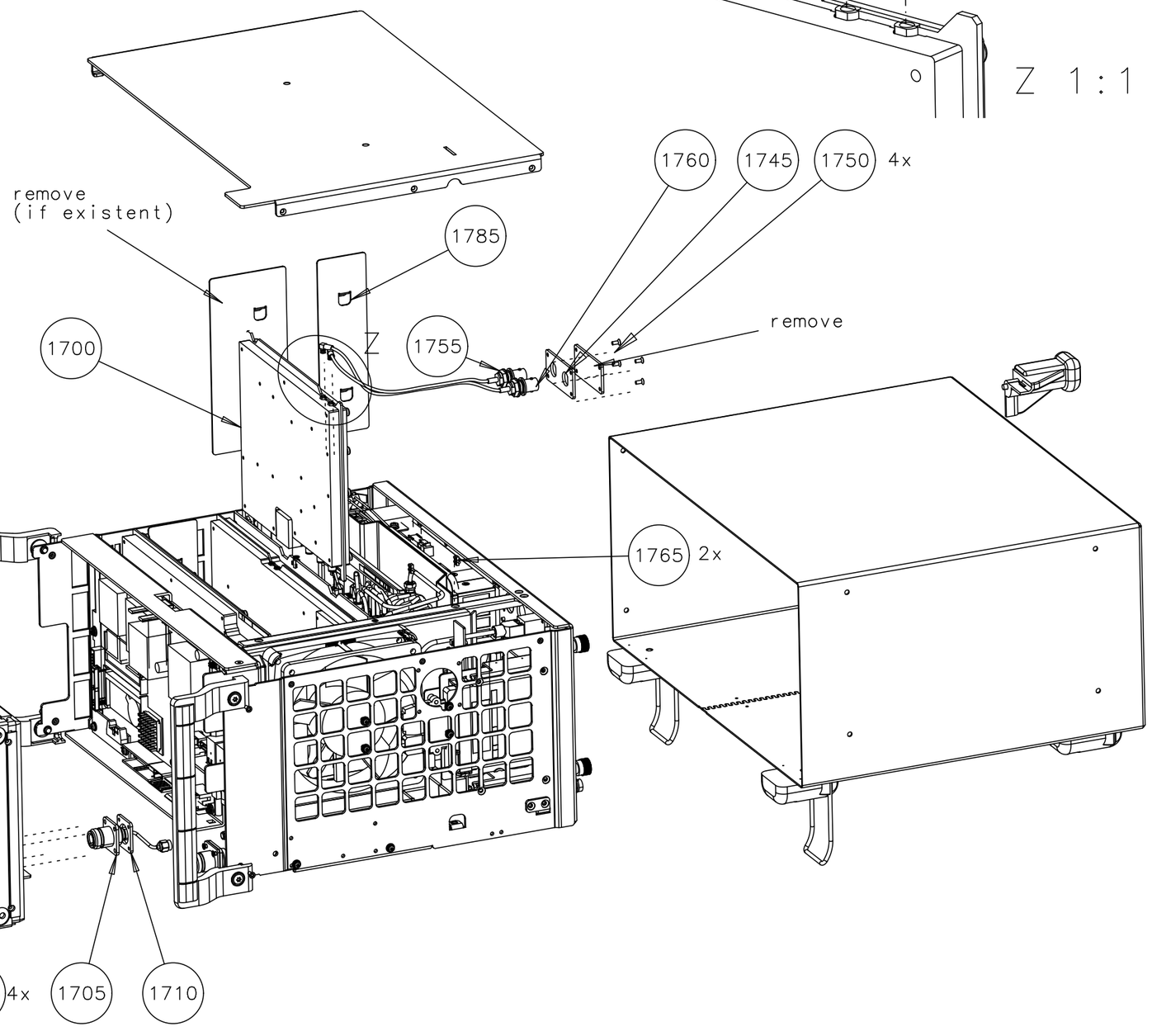
Assembly instruction for
FSV- B4 (1300/1302)
FSV- B5 (1400)
FSV-B10 (1500/1510)
FSV-B17 (1900)
FSV-B18 (2510)
FSV-B19 (1600/1605)
FSVR-B19 (1606)

Projektions-methode
Projection Method

Maßstab *Scale*	Toleranz *Tol.*	Werkstoff *Material*			
ROHDE&SCHWARZ	Benennung / *Designation*: EINBAUANWEISUNG FSV / ASSEMBLY INSTRUCTION FSV			Sprache / *Lang.*: de en	Aei. / *C.I.*: 05.00	Blatt / *Sh.*: 1
FSV	Datum *Date*: 2010-06-14	Abteilung *Dept.*: 1ESK	Name *Name*: WM	Zeichn.Nr. / *Drawing No.*: 1310.9716.00		D





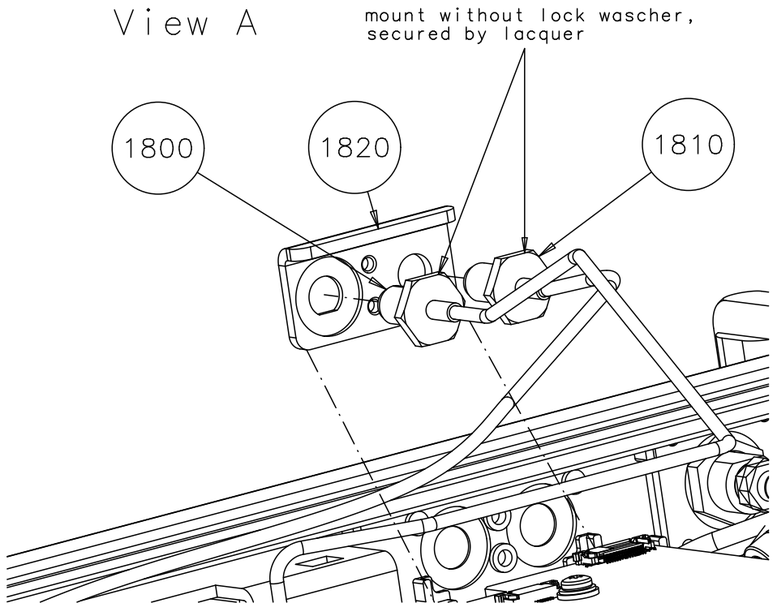


Projektions-methode

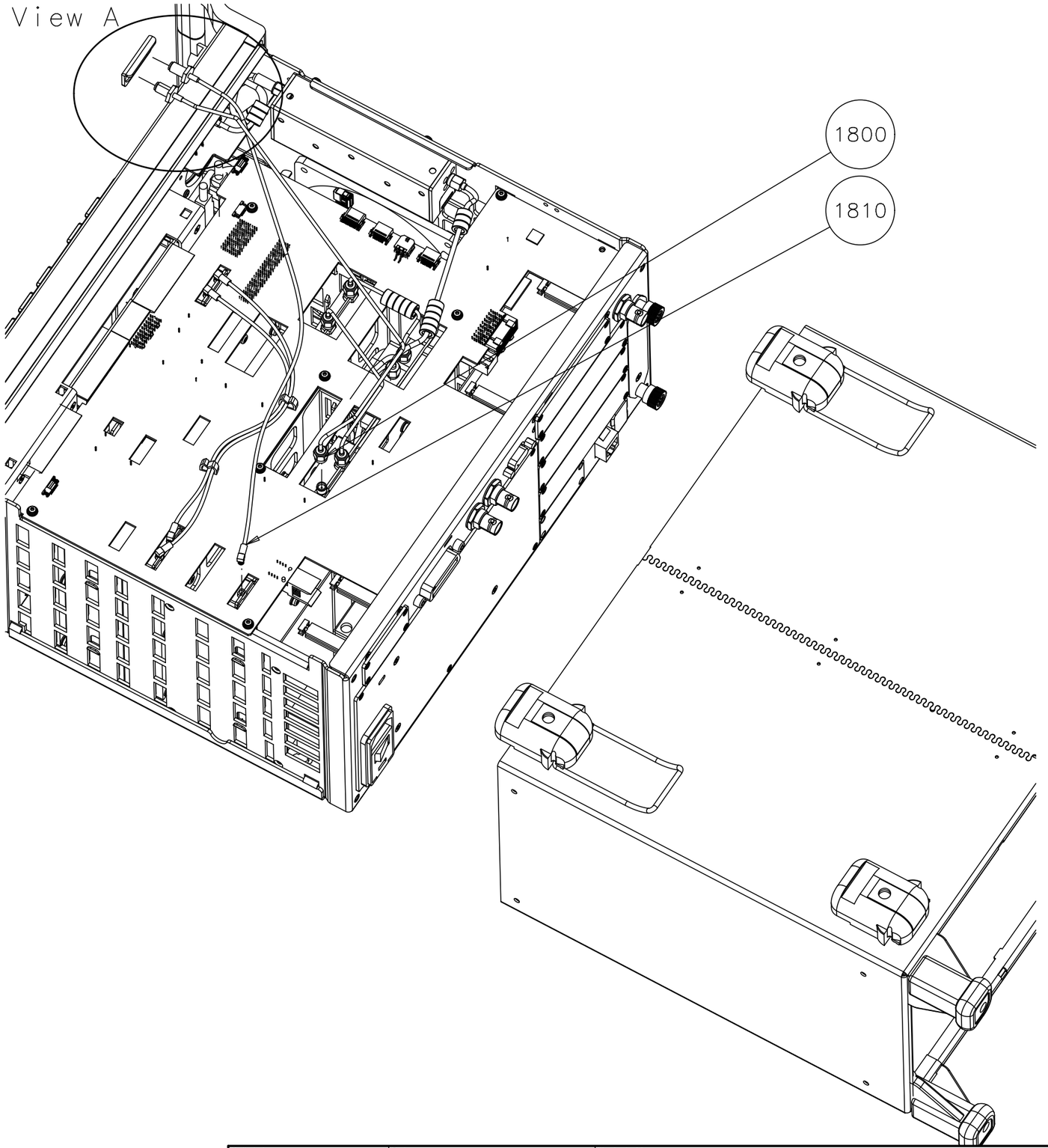
Projection Method

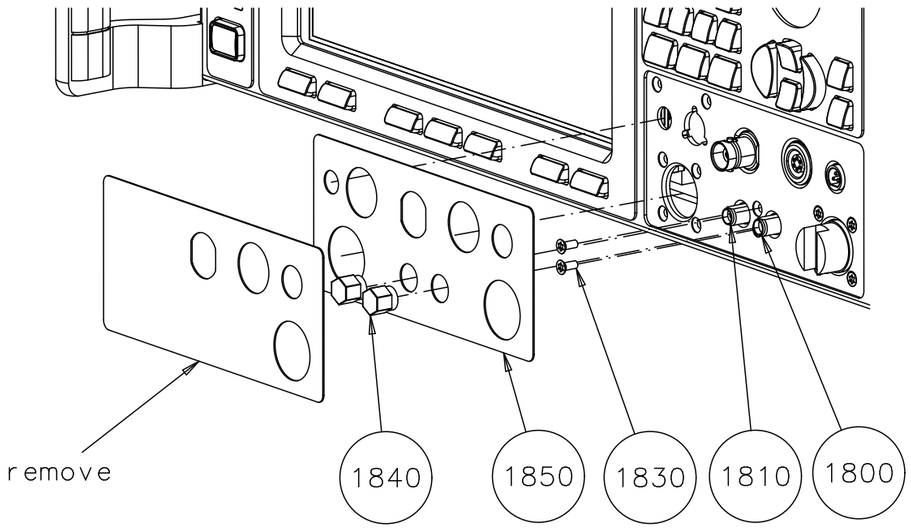
Maßstab *Scale* 1:5(1:1)	Toleranz *Tol.*	Werkstoff *Material*			
ROHDE&SCHWARZ	Benennung / *Designation* EINBAUANWEISUNG FSV-B9 ASSEMBLY INSTRUCTION FSV-B9			Sprache / *Lang.* de en	Aei. / *C.I.* 05.00	Blatt / *Sh.* 1
FSV-B9	Datum *Date* 2009-05-14	Abteilung *Dept.* 1ESK	Name *Name* WM	Zeichn.Nr. / *Drawing No.* 1310.9774.00		D

View A



View A





Projektions-methode
Projection Method

Maßstab *Scale*	Toleranz *Tol.*	Werkstoff *Material*		
ROHDE&SCHWARZ	Benennung / *Designation* EINBAUANWEISUNG FSV-B21 ASSEMBLY INSTRUCTION FSV-B21		Sprache / *Lang.*: de en	Aei. / *C.I.*: 01.00 — Blatt / *Sh.*: 1
FSV-B21	Datum *Date*: 2009-02-12 — Abteilung *Dept.*: 1ESK — Name *Name*: VL/WM		Zeichn.Nr. / *Drawing No.*: 1308.1963.00	D

A60 USB / Touch

A30 Display

(A40) Inverter

A50 LST Adapt. Bd

A92 Controller (FMR)

A80 / A81 Keyboard

A70

A92 SATA Adapter

A91 Harddisk

X90 LAN

TG I (FSV-B9)

TG Q (FSV-B9)

A11 Adapter Board

A220 Additional Interface FSV-B5
- Noise Source Control
- IF/Video /Demod Output
- 2xUSB
- Aux Port

A230 Ext. Gen. Control FSV- B10
- SCPI IEC 625
- Aux Control

A120 Detector

A245 Bridge LVDS FSV-B17

A210 Ext. Gen. FSV-B10

A100 Frontend

A150 MW Converter

A140 Tracking Gen. FSV-B9

A10 Motherboard

A240 I/Q Data FSV-B17
- Digital Baseband Input
- Digital Baseband Output

A250 OCXO FSV-B4

A50 Power Supply

A51 Power Filter
- Power Line

Chassis GND

A20 Front Connector Board
- Noise Source
- Power Sensor
- Probe Power

A71 VOL / Phones FSV-B3
- Phone
- Volume

A40 RF Attenuator
- RF In
- TG Out

VGA IEC-1

IN OUT REF

Trigger

Option FSV-B3

B1

FAN1

M

Bindende Angaben ueber Varianten, Trimmwerte, Bauteile und nicht bestueckte Bauteile siehe ST.

For binding information on models, trimming and components values and nonfitted components see parts list.

ACHTUNG: ESD!
Elektrostatisch gefaehrdete Bauelemente erfordern eine besondere Handhabung.

ATTENTION: ESD!
Electrostatic sensitiv devices require a special handling.

ROHDE&SCHWARZ	Benennung / Designat.: FSV SIGNAL ANALYZER FSV SIGNAL ANALYZER			Spr.:/Lang.: de	Aei:/C.I.: 28.00	Blatt:/Sh.: 1 -
FSV	Datum: Date: 2009-03-26	Abteilung: Dept.: 1ESK	Name: Name: schwinge	Zeichn.Nr.:/Drawing No.: 1307.9002.01 S		