

Agilent Technologies 8960
Operational Verification (Manual
Procedure)
Test Equipment Setup

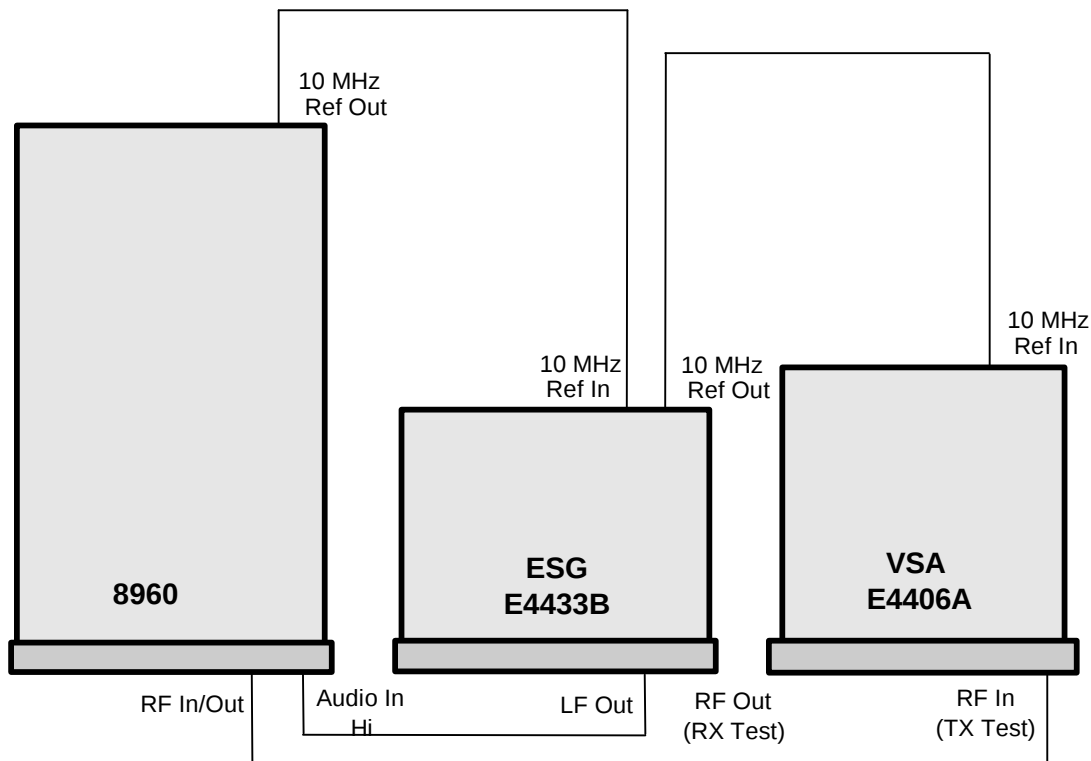
Manual
Verification

Use the following procedure to manually test an 8960 that is running an E1960A GSM Test Application. A test record is included to assist in collecting test data. Make a copy of the test record to use.

The test equipment required for 8960 Operational Verification is:

ESG E4433B Digital Signal Generator

VSA E4406A Transmitter Tester



To perform the 8960 Operational Verification tests requires that the 10 MHz timebases be connected together. Connect the 10 MHz Reference Output of the 8960 to the 10 MHz Ref In of the ESG E4433B. Connect the 10 MHz Ref Out of the ESG E4433B to the 10 MHz Ref In of the VSA E4406A with BNC cables.

The RF In/Out Connector of the 8960 will be alternately connected to either the RF Out of the ESG E4433B (RX Test) or the RF Input of the VSA E4406A (TX Test) with a low loss Type-N cable.

8960 Operational Verification Test Record

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Test Data Record for 8960 with E1960A GSM Test Application

Functional Verification	Expected Limit (Note 1)	Pass	Fail
Analog Generator Level Accy	± 2.0 dB		
Analog Generator Spectral Purity			
Harmonics	≤ -25 dBc		
Sub-Harmonics	≤ -40 dBc		
Analog Audio Generator Accuracy	± 0.03 V		
GSM Generator			
Amplitude Flatness	$\pm .6$ dBm		
Peak Phase Error	(PGSM/EGSM) $< \pm 4$ Deg (DCS/PCS) $< \pm 6$ Deg		
RMS Phase Error	$< \pm 2$ Deg.		
Frequency Error	(18 Hz) $< \pm .04$ ppm		
Analog Audio Analyzer Accuracy	± 0.04 V		
Analog Analyzer RF Power Meter	± 1.6 dBm		
GSM Analyzer Frequency Measurement Accy.	$< \pm 24$ Hz		
GSM Analyzer Residual Phase Error			
RMS Error	$< \pm 2$ Deg		
Peak Error	$< \pm 8$ Deg		
GSM Analyzer PVT Accy	Expected Limit (Note 1)	Pass	Fail
PVT Offset 0usec and 542.8usec	(0 dB) ± 2 dB		
PVT Offset -10usec	≤ 8 dB		
PVT Offset 552.8usec	≤ 8 dB		
GSM Analyzer ORFS Measurement	Expected Limit (Note 1)	Pass	Fail
ORFS Offset ± 100 kHz	≤ -6 dB		
ORFS Offset ± 200 kHz	≤ -33 dB		
ORFS Offset ± 250 kHz	≤ -38 dB		
ORFS Offset ± 400 kHz	≤ -67 dB		
ORFS Offset ± 600 kHz	≤ -76 dB		
ORFS Offset ± 800 kHz	≤ -78 dB		
ORFS Offset ± 1000 kHz	≤ -78 dB		
ORFS Offset ± 1200 kHz	≤ -79 dB		

Note 1 - Expected test limit levels may vary according to test instrument source used. Expected limits listed may require modification.

8960 Operational Verification

Analog Generator Level Accuracy

Analog Generator Level Accuracy is a test to insure that the 8960 can set a basic level and then step in 10 dB increments accurately.

The expected limit is:

RF Generator Output Level, RF In/Out (2 sources) - ± 2.0 dB

The current operating firmware in the 8960 does not allow manual operation of amplitude or frequency using incremental steps for either Signal Generator 1 or 2; a PC with controlling software is required.

Connect the 8960 RF In/Out Connector to the E4406A RF Input.

System Config Screen																																	
Control		Configuration Summary						Utilities																									
Instrument Setup ▾		<table border="1"><thead><tr><th colspan="2">Instrument Information</th></tr></thead><tbody><tr><td>Test Application:</td><td>E1960A GSM Mobile Test</td></tr><tr><td>Codeuare Version:</td><td>A.01.03</td></tr><tr><td>HP-IB Address:</td><td>14</td></tr><tr><td>LAN IP Address:</td><td>15.2.7.102</td></tr><tr><td>Last Calibration:</td><td>23 Feb 1999</td></tr><tr><td>Serial Number:</td><td>US38020107</td></tr></tbody></table> <table border="1"><thead><tr><th colspan="2">Options Installed</th></tr></thead><tbody><tr><td colspan="2"> </td></tr></tbody></table>						Instrument Information		Test Application:	E1960A GSM Mobile Test	Codeuare Version:	A.01.03	HP-IB Address:	14	LAN IP Address:	15.2.7.102	Last Calibration:	23 Feb 1999	Serial Number:	US38020107	Options Installed				Message Log							
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Options Installed																																	
External Trigger Setup ▾																																	
Port Configuration ▾																																	
		<table border="1"><tr><td colspan="2">Active Cell Status :</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Idle</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>						Active Cell Status :								Idle																1 of 2	
Active Cell Status :																																	
Idle																																	

On the 8960 press the 'Local' button and the 'System Configure' button .
The GPIB address must be set to: 14

8960 Operational Verification

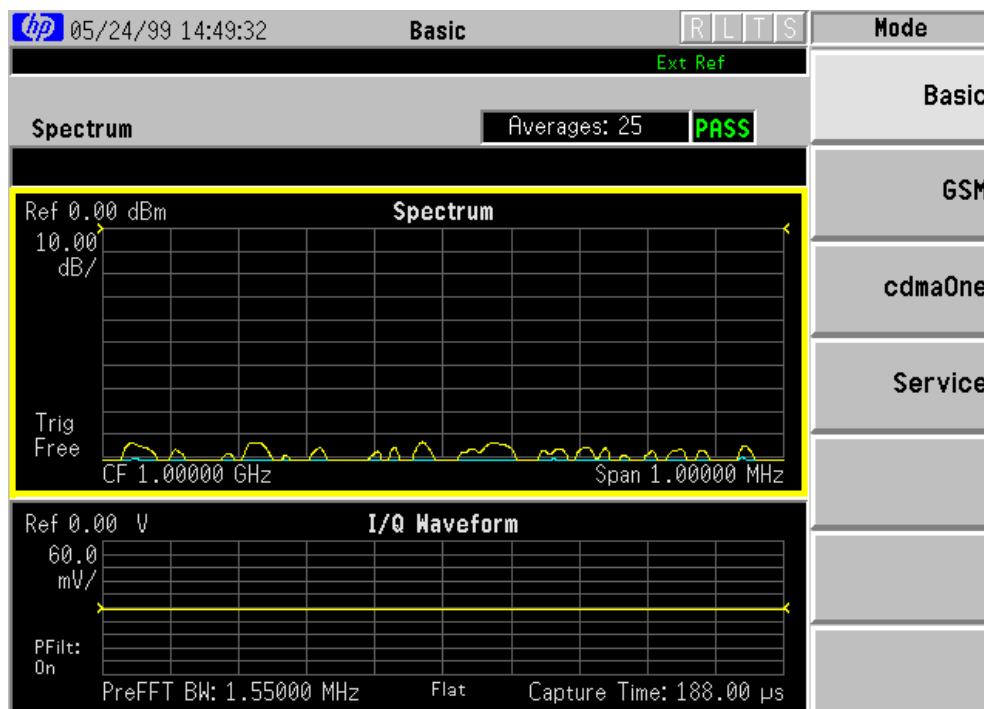
Analog Generator Level Accuracy, cont.

Call Setup Screen									
Call Control		Call Setup					Call Params		
Operating Mode		Mobile Information					RF Gen Power		
Test							RF Gen Power		
Test Function		Operating Mode					RF Gen Band		
							PGSM		
CU		Active Cell					RF Gen Channel		
							20		
Test Function		Burst Timing Error					RF Gen Freq		
							939.00		
CU		CH Reports					Counters		
							Page: 0		
CU		RACH: 0					Missing Burst: 0		
CU		Test Status : CU					1 of 2		

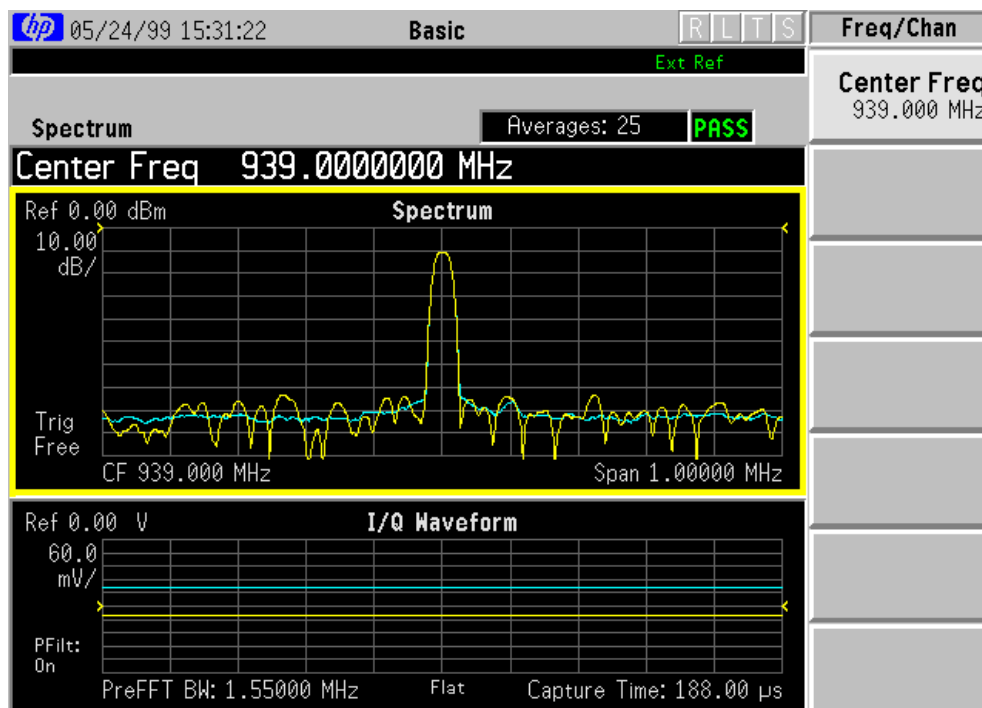
On the 8960 perform the following set up functions:

1. Press the blue **'SHIFT'** button and the **'PRESET'** button (front panel buttons not shown above).
2. Press the display **'Operating Mode'** button and set mode to **Test** using the knob.
3. Press the display **'Test Function'** button and set function to **CW** using the knob.
4. Press the **'RF Gen Freq'** button and set frequency to **939 MHz** using the number keypad and the knob.
5. Press the **'RF Gen Power'** button and set power to **-10 dBm** using the number keypad and the knob.

8960 Operational Verification Analog Generator Level Accuracy, cont.

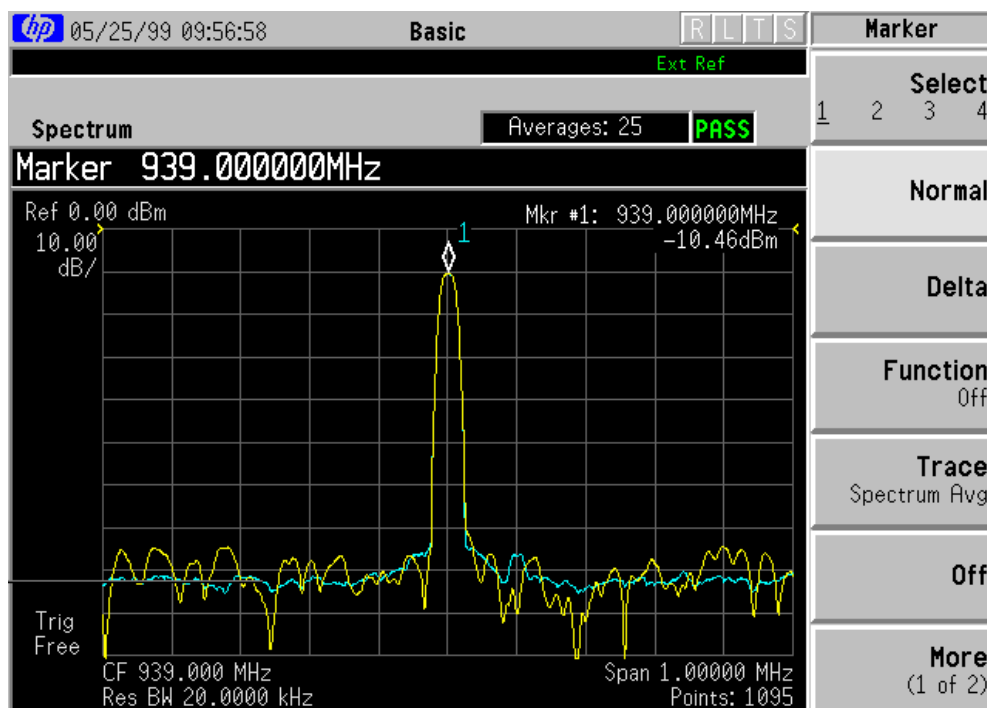


On the E4406A, press the **'Preset'** System button, the **'MODE'** Control button and set to **'Basic'** Mode .

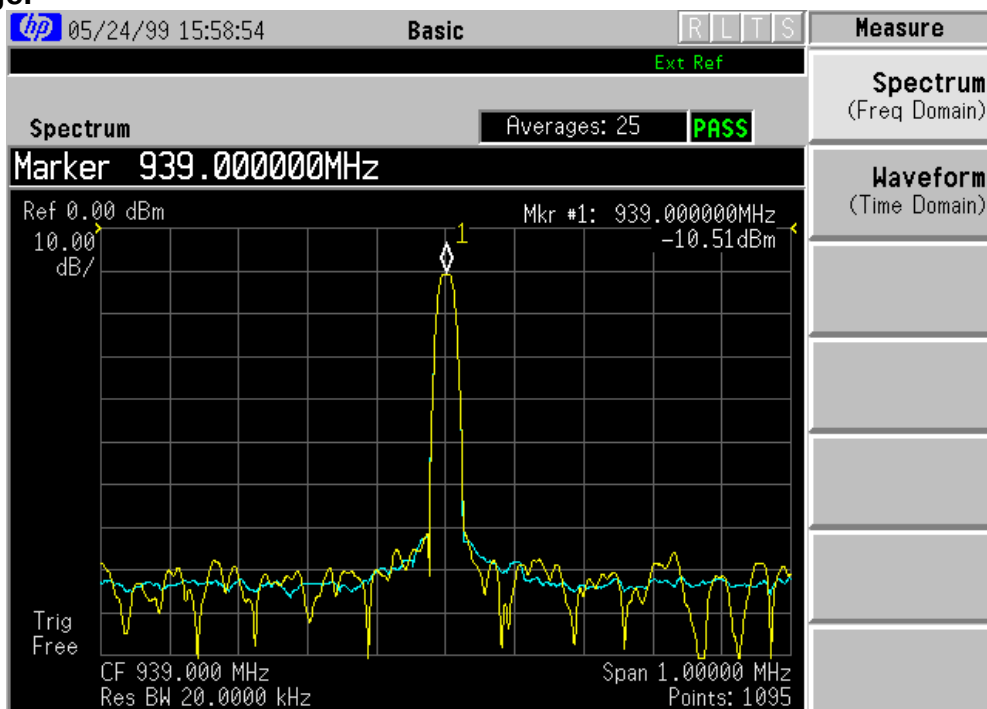


On the E4406A, press the **'FREQUENCY'** Control button and set the Center Frequency to 939 MHz.

8960 Operational Verification Analog Generator Level Accuracy, cont.

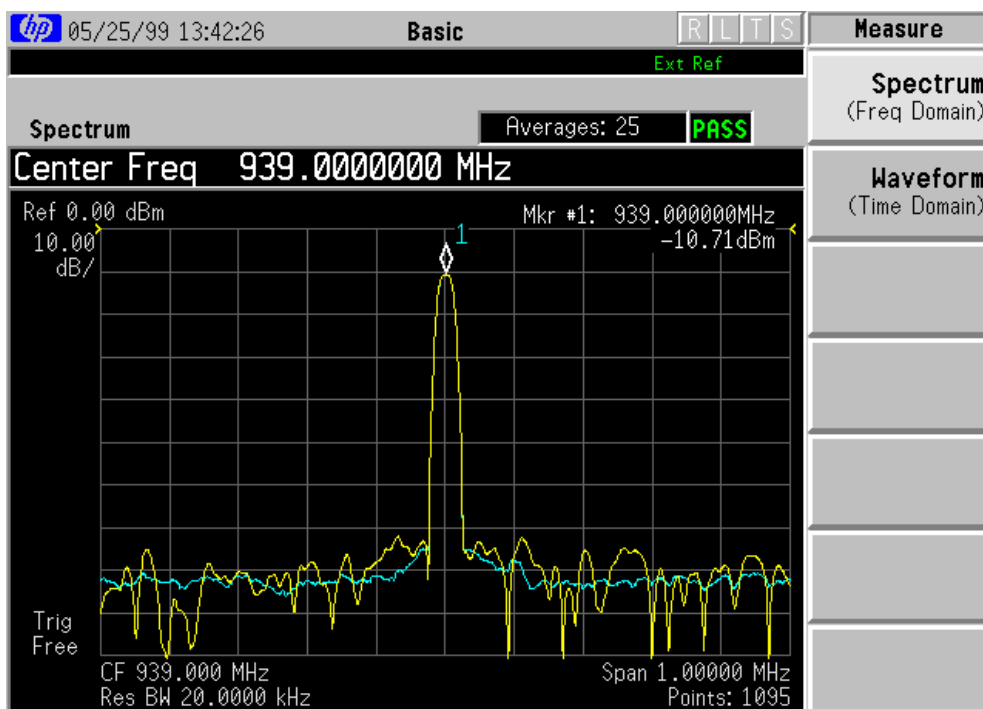


On the E4406A, press the 'ZOOM' button, the 'Marker' button, and the 'Search' button. Select the 'TRACE' screen button and set the trace to Spectrum Average.



On the E4406A, press the 'MEASURE' Control button.

8960 Operational Verification Analog Generator Level Accuracy, cont.



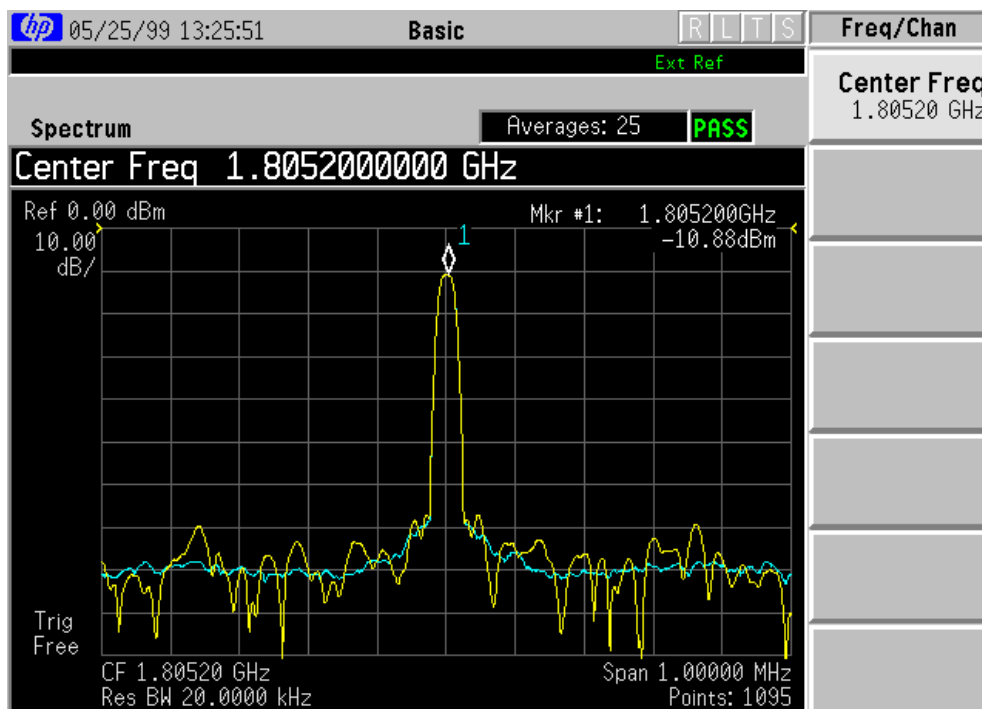
Step the 8960 down in amplitude in 10 dB increments to -80 dBm. Insure that each level step is accurate within ± 2 dB.

Call Setup Screen			
Call Control	Call Setup		Call Params
Operating Mode			RF Gen Power
Test	Mobile Information		-10.00
	INSI: INEI: Revision Level: Supported Band: Power Class: ---- Called Number:		RF Gen Band
Test Function			PGSM
CU	Last Location MCC NNC LAC ---- ---- ----		RF Gen Channel
	Burst Timing Error ---- T		20
	SACCH Reports Timing Adv: ---- Tx Level: ---- Rx Level: ---- Rx Qual: ----		RF Gen Freq
Cell Info	Counters Page: 0 RACH: 0 Missing Burst: 0 Corrupt Burst: 0 Decode Error: 0		1805.20 MHz
	Test Status : CU		1 of 2

On the 8960 perform the following set up functions:

1. Press the 'RF Gen Freq' button and set frequency to **1805.2 MHz**.
2. Press the 'RF Gen Power' button and set power to **-10 dBm**.

8960 Operational Verification Analog Generator Level Accuracy, cont.



On the E4406A set Center Frequency to 1.8052 GHz. Step the 8960 down in amplitude in 10 dB increments to -80 dBm. Insure that each level step is accurate within ± 2 dB.

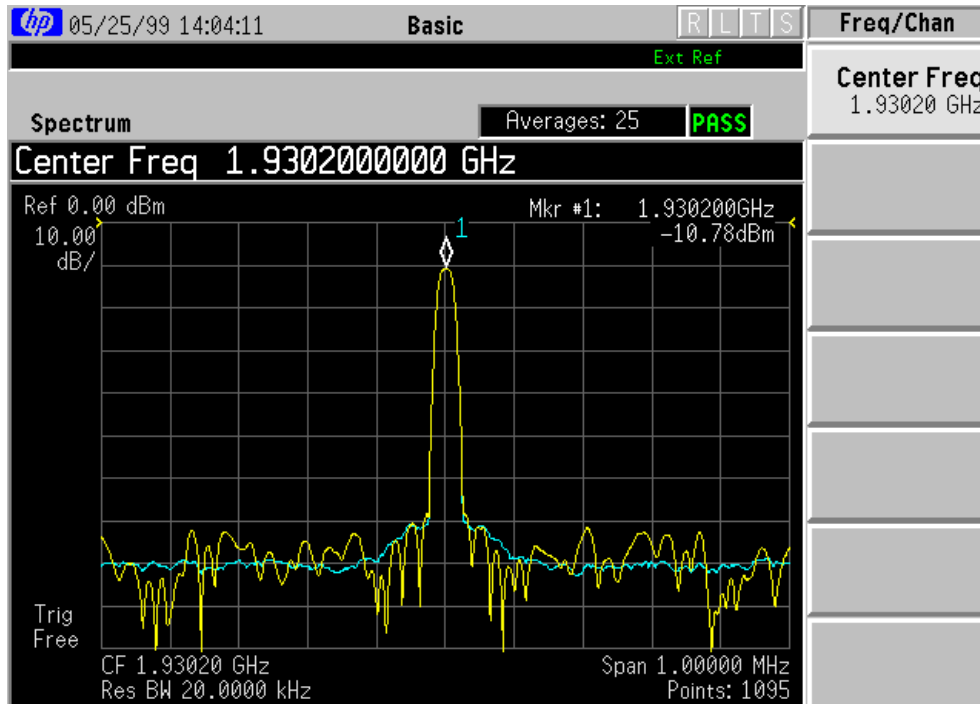
Call Setup Screen															
Call Control		Call Setup						Call Params							
Operating Mode		Mobile Information IMSI: IMEI: Revision Level: Supported Band: Power Class: ---- Called Number: Last Location <table border="1"> <tr> <td>NCC</td> <td>NMC</td> <td>LAC</td> </tr> <tr> <td>----</td> <td>----</td> <td>----</td> </tr> </table> Burst Timing Error ---- T SACCH Reports Timing Adv: ---- Tx Level: ---- Rx Level: ---- Rx Qual: ---- Counters Page: 0 RACH: 0 Missing Burst: 0 Corrupt Burst: 0 Decode Error: 0						NCC	NMC	LAC	----	----	----	RF Gen Power	
NCC	NMC							LAC							
----	----							----							
Test								-10.00							
Test Function		RF Gen Band													
CU		PGSM													
Cell Info		RF Gen Channel						20							
		RF Gen Freq						1930.20 MHz							
		Test Status : CU						1 of 2							

On the 8960 perform the following set up functions:

1. Press the 'RF Gen Freq' button and set frequency to 1930.2 MHz.
2. Press the 'RF Gen Power' button and set power to -10 dBm.

8960 Operational Verification Analog Generator Level Accuracy, cont.

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On the E4406Aset Center Frequency to 1.9302 GHz. Step the 8960 down in amplitude in 10 dB increments to -80 dBm. Insure that each level step is accurate within ± 2 dB.

Important Note:

The 8960 contains 2 complete signal generator sources (these are very similar to the E4432/33B Signal Generator).

The operating firmware of the 8960 only provides for operation of 1 source using the manual user interface (front panel) in the analog mode. It is not possible to test the second source in a analog mode using any manual method.

However....the second source can be tested manually in a GSM transmit mode. See the test titled "GSM Generator Amplitude Flatness. Peak Phase Error, RMS Phase Error, and Frequency Error --- Source 2" in this section.

Testing source 2 in an analog mode requires using the Verification Automated Software.

8960 Operational Verification Analog Generator Spectral Purity

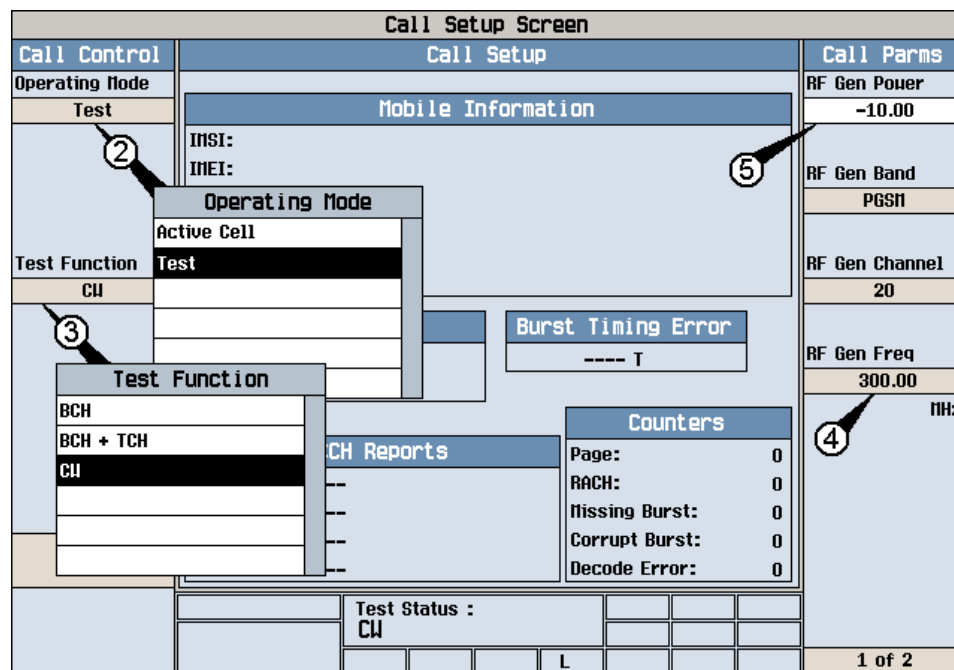
Manual
Verification

Analog Generator Spectral Purity is a test to insure that the 8960 has harmonics and spurious signals within specification. The test is run by setting the 8960 to a carrier frequency of 300 MHz and power level of -10 dBm. Harmonics and spurious are checked at 450 MHz, 600 MHz, 750 MHz, and 900 MHz. The expected limits are:

Spectral Purity Harmonics	-	≤ -25 dBc
Sub-Harmonics	-	≤ -40 dBc
Non-Harmonics	-	≤ -55 dBc <1500 kHz
	-	≤ -68 dBc >1500 kHz

The current operating firmware in the 8960 does not allow manual operation of amplitude or frequency using incremental steps for either Signal Generator 1 or 2, a PC with controlling software is required.

Connect the 8960 RF In/Out Connector to the E4406A RF Input.

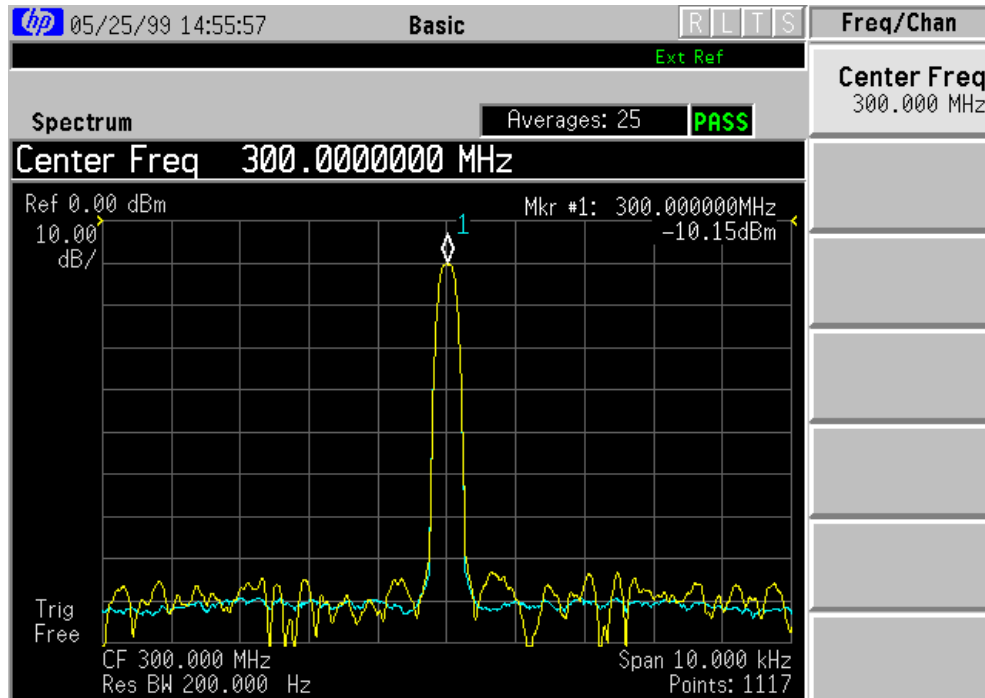


On the 8960 perform the following set up functions:

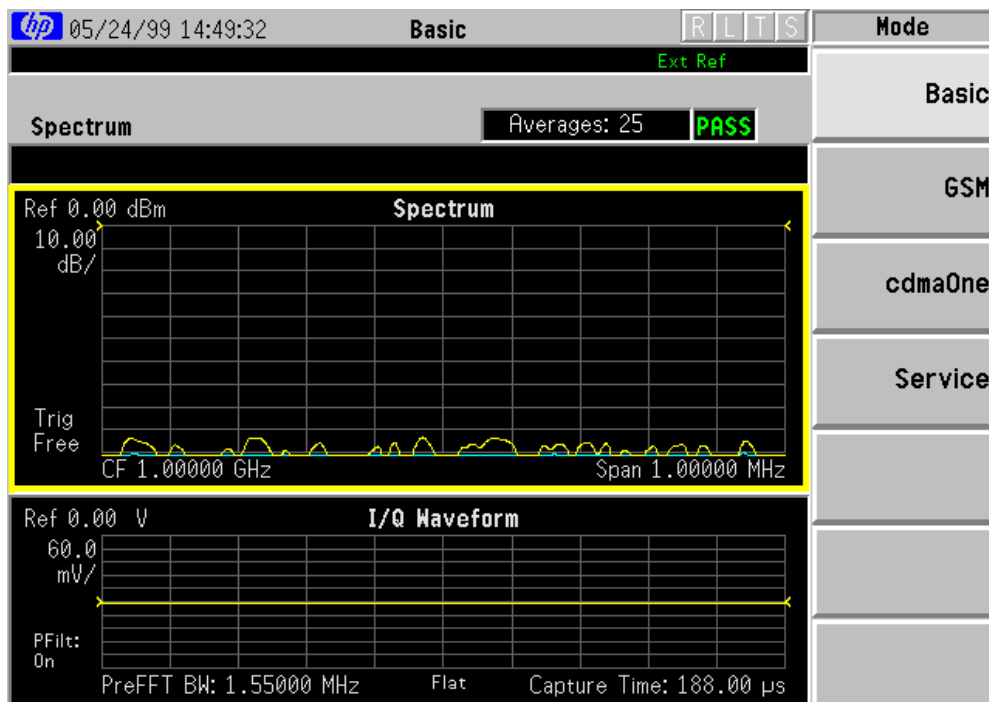
1. Press the blue '**SHIFT**' button and the '**PRESET**' button (front panel buttons not shown above).
2. Press the display '**Operating Mode**' button and set mode to **Test** using the knob.
3. Press the display '**Test Function**' button and set function to **CW** using the knob.
4. Press the '**RF Gen Freq**' button and set frequency to **300 MHz** using the number keypad and the knob.
5. Press the '**RF Gen Power**' button and set power to **-10 dBm** using the number keypad and the knob.

8960 Operational Verification Analog Generator Spectral Purity

Manual
Verification



On the E4406A, press the '**Preset**' System button, press the '**Mode**' Control button and set to '**Basic**' Mode.

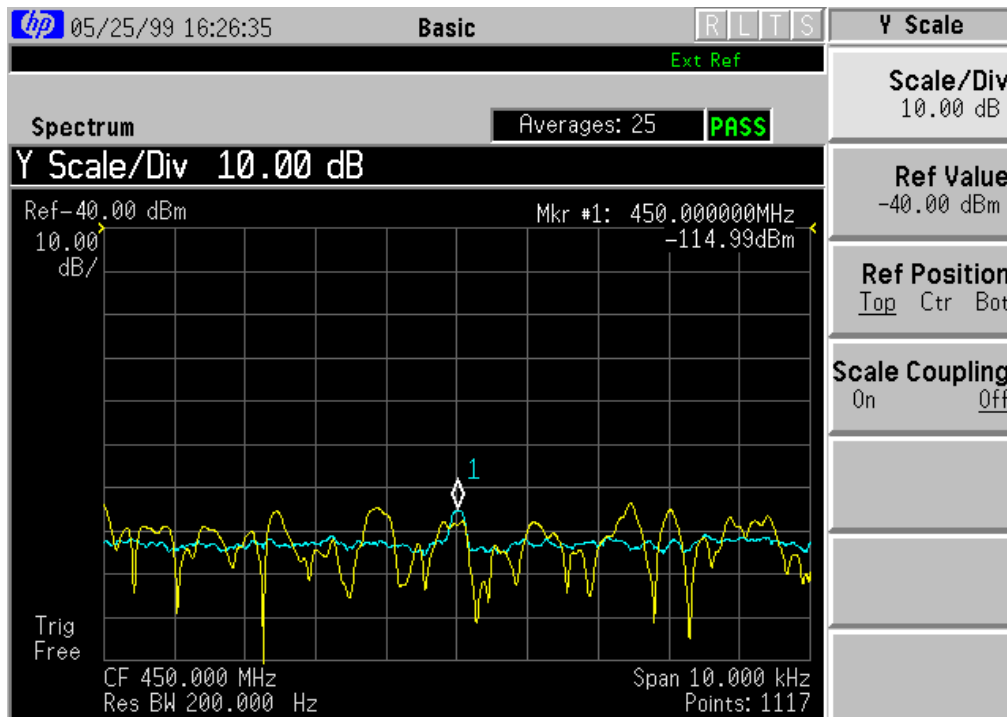


ON the E4406A make the following settings: Center Freq: 300 MHz Span: 10 kHz

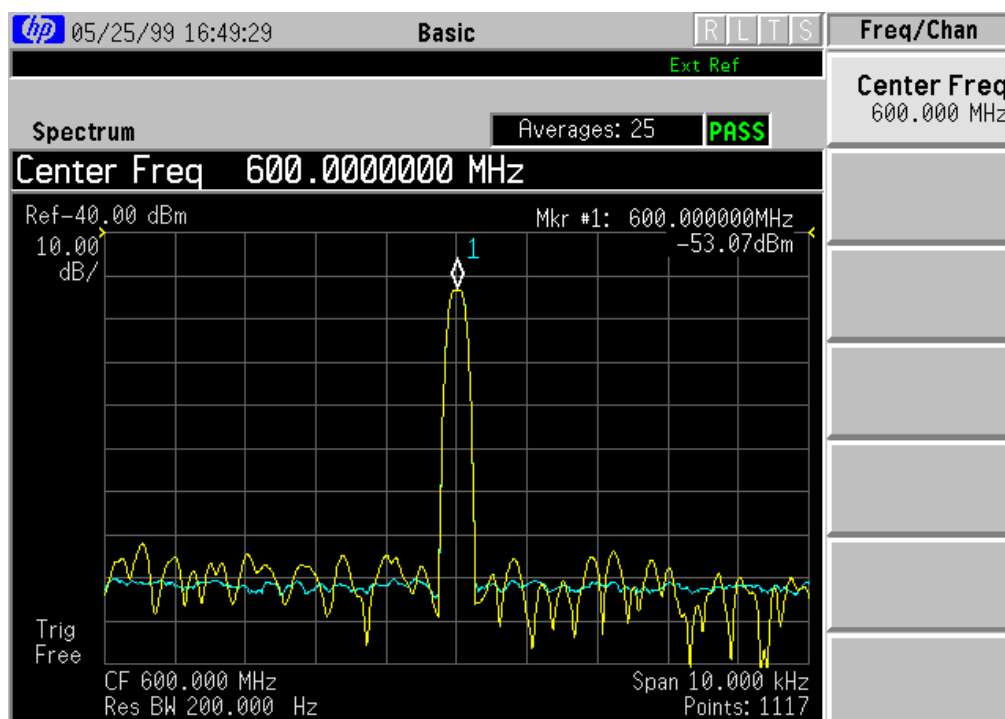
Press the '**ZOOM**' button, the '**Marker**' button, and the '**Search**' button. Select the '**TRACE**' screen button and set the trace to Spectrum Average. The 8960 amplitude should equal -10 dBm $\pm$ 2 dB.

8960 Operational Verification Analog Generator Spectral Purity

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Verification



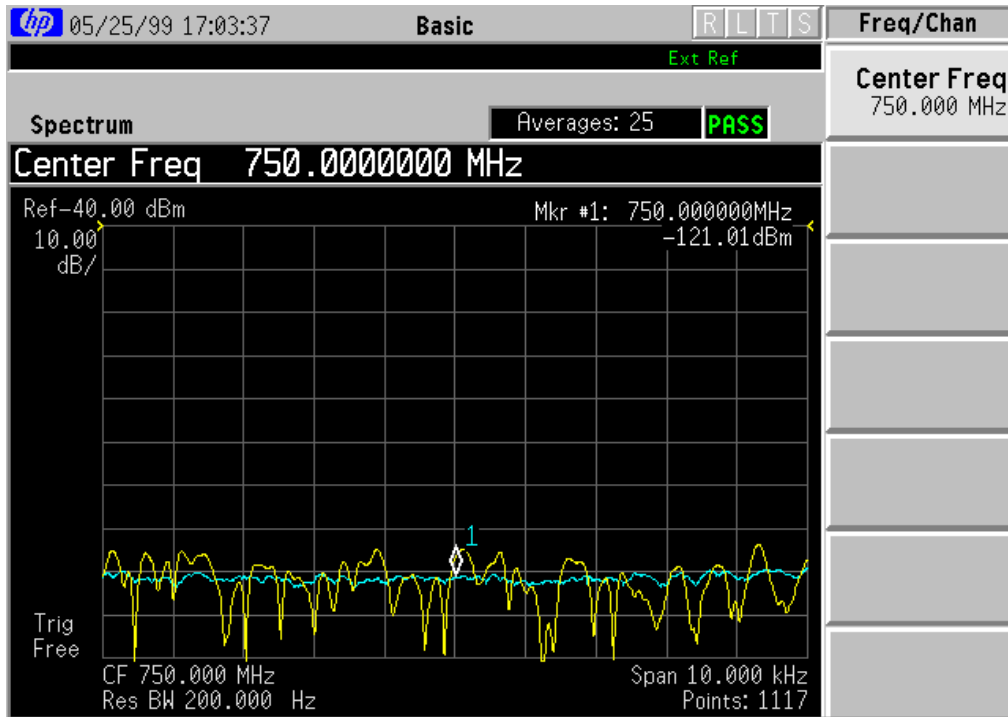
On the E4406A set the center frequency to 450 MHz. Press the 'AMPLITUDE' button and set Ref Value to -50 dBm. The Sub-Harmonic expected limit is: ≤ -50 dBm.



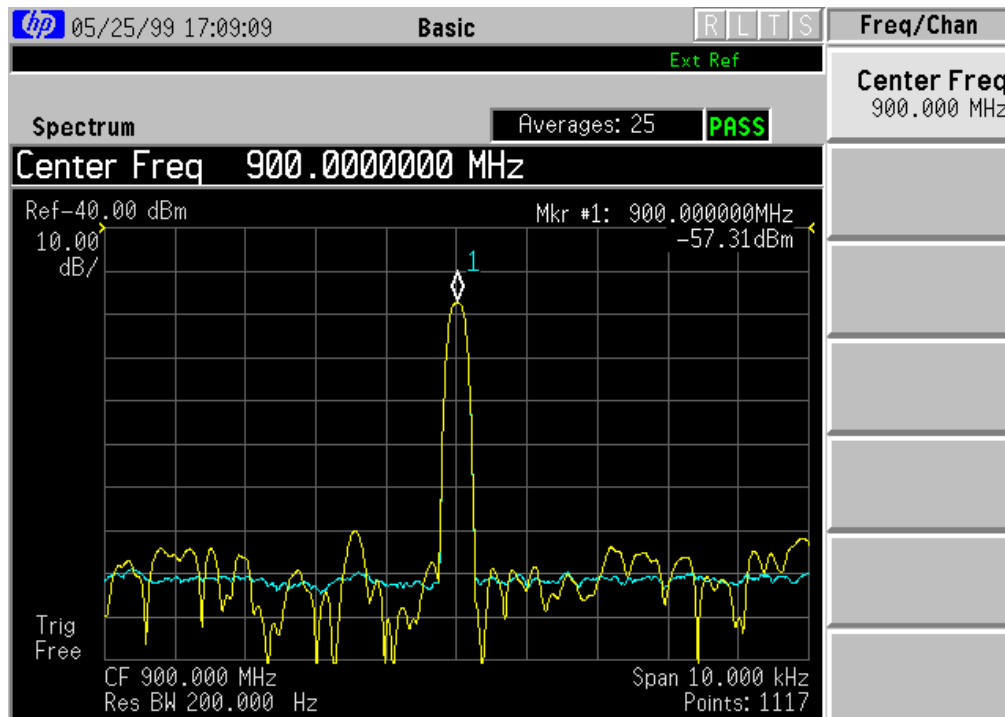
On the E4406A set Center Frequency to 600 MHz. The Harmonic expected limit is: ≤ -35 dBm

8960 Operational Verification Analog Generator Spectral Purity

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On the E4406A set the Center Frequency to 750 MHz. The Sub-Harmonic expected limit is: ≤ -50 dBm



On the E4406A set the Center Frequency to 900 MHz. The Harmonic expected limit is: ≤ -35 dBm .

8960 Operational Verification Audio Generator Accuracy

The Audio Generator test checks to insure that the 8960 has an audio source signal with reasonable performance of accuracy.

The test is run by setting the 8960 in the audio generator mode and looping an audio signal from the Audio Out BNC connector to the Audio In Hi BNC connector to measure level accuracy of the audio output. The audio generator expected limits are:

Level Accuracy - $\pm$ 0.03V

Connect the 8960 Audio Out Connector to the Audio In Hi Connector with a BNC cable.

Call Setup Screen									
Call Control		Call Setup					Call Params		
Operating Mode							Cell Power		
Active Cell							-85.00		
		Mobile Information					Cell Band		
		IMSI: IMEI: Revision Level: Supported Band: Power Class: ---- Called Number:					PGSM		
Originate Call							Broadcast Chan		
							20		
Paging IMSI		Last Location			Burst Timing Error				
001012345678901		MCC MNC LAC ---- ---- ----			---- T				
		SACCH Reports			Counters				
		Timing Adv: ---- Tx Level: ---- Rx Level: ---- Rx Qual: ----			Page: 0 RACH: 0 Missing Burst: 0 Corrupt Burst: 0 Decode Error: 0				
Cell Info							Mobile Loopback		
		Active Cell Status :							
		Idle							
		L							
1 of 3									

Begin the test procedure by pressing the blue 'SHIFT' button and RESET.

Press the Instrument Select button. Press the knob and activate the Audio Generator screen

Set audio amplitude to 1.414 V. Set audio frequency to 1 kHz.

8960 Operational Verification Audio Generator Accuracy,cont.

Call Setup Screen									
Control		Audio Generator					Call Parm's		
Operating Mode		Amplitude 1.41 v Pulsed: Off State: On Frequency 1000.00 Hz					Cell Power		
Active Cell							-85.00		
Originate Call							Cell Band		
							PGSM		
Close Menu		Loc Measurement Selection Transmit Power Power vs Time Phase & Frequency Error Fast Bit Error Bit Error Analog Audio Decoded Audio Output RF Spectrum					Broadcast Chan		
							20		
							Mobile Loopback		
		Active Cell Status : Idle					1 of 3		

Press the 'Measurement Selection' button. Use the knob and select Analog Audio, push the knob to start selection.

Measurement Screen									
Control		Analog Audio					Call Parm's		
Analog Audio Setup		Audio In Level 1.00 v Continuous					Cell Power		
							-85.00		
							Cell Band		
							PGSM		
		Audio Generator Amplitude 1.41 v Pulsed: Off State: On Frequency 1000.00 Hz					Broadcast Chan		
							20		
							Mobile Loopback		
		Active Cell Status : Idle					1 of 3		
1 of 2									

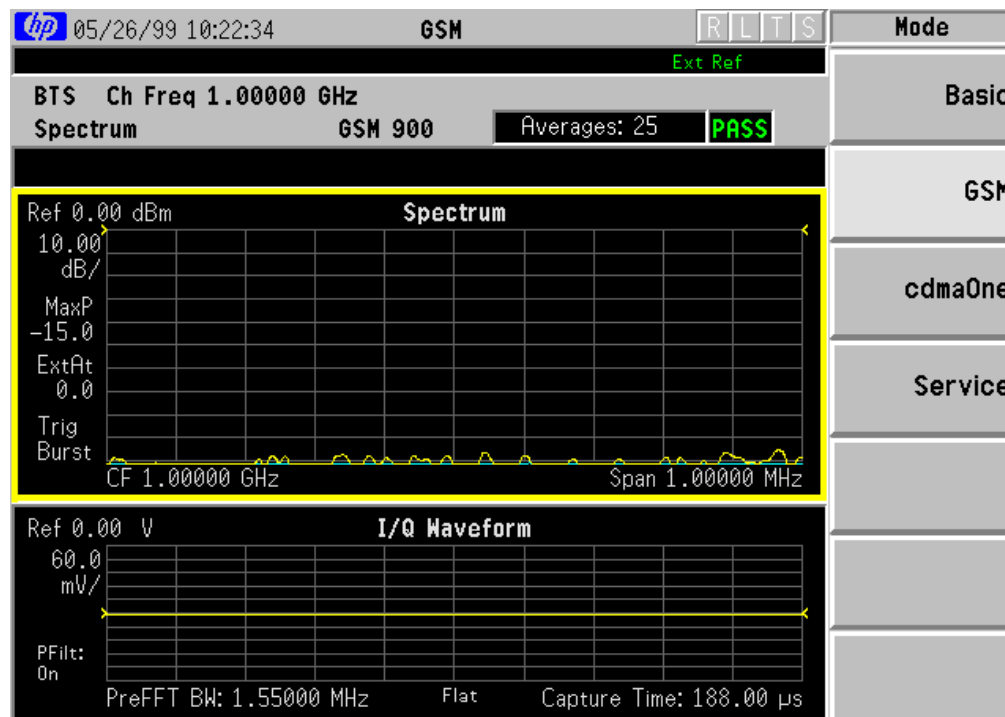
The Analog Audio measurement screen should appear. The expected limits are: Level Accuracy: $\pm 0.03V$

Go to Screen 2 of 3. Set the Traffic Channel to 124.

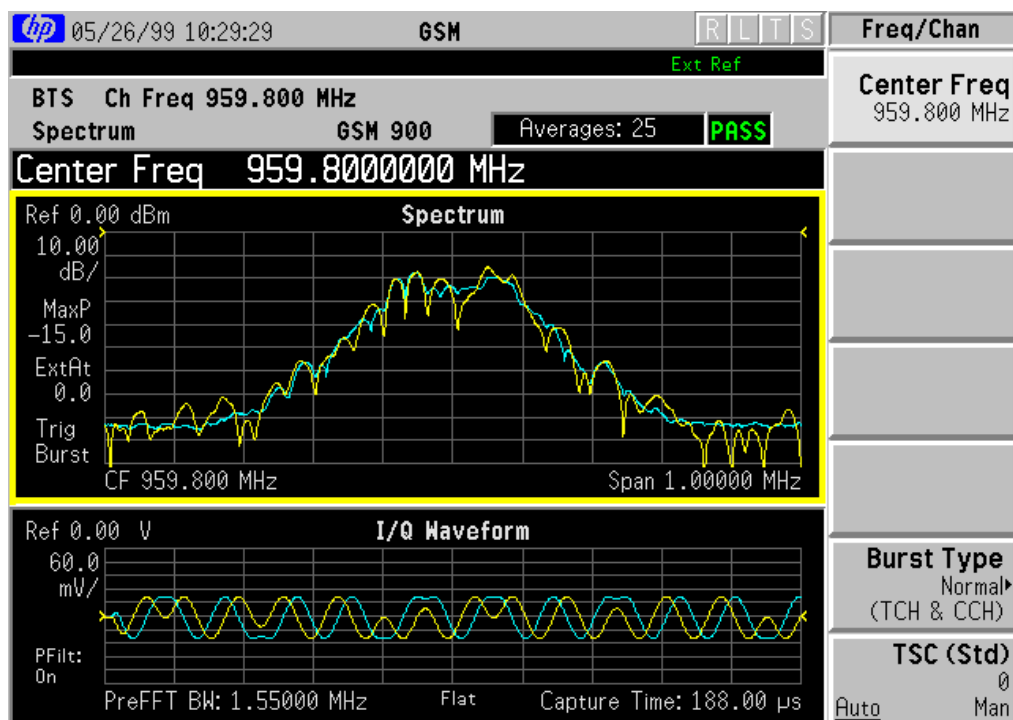
Go to Screen 3 of 3. Set the expected burst to TSC0.

8960 Operational Verification **GSM Generator Amplitude Flatness, Peak Phase Error,** **RMS Phase Error, and Frequency Error, Source 1 cont.**

Manual
Verification



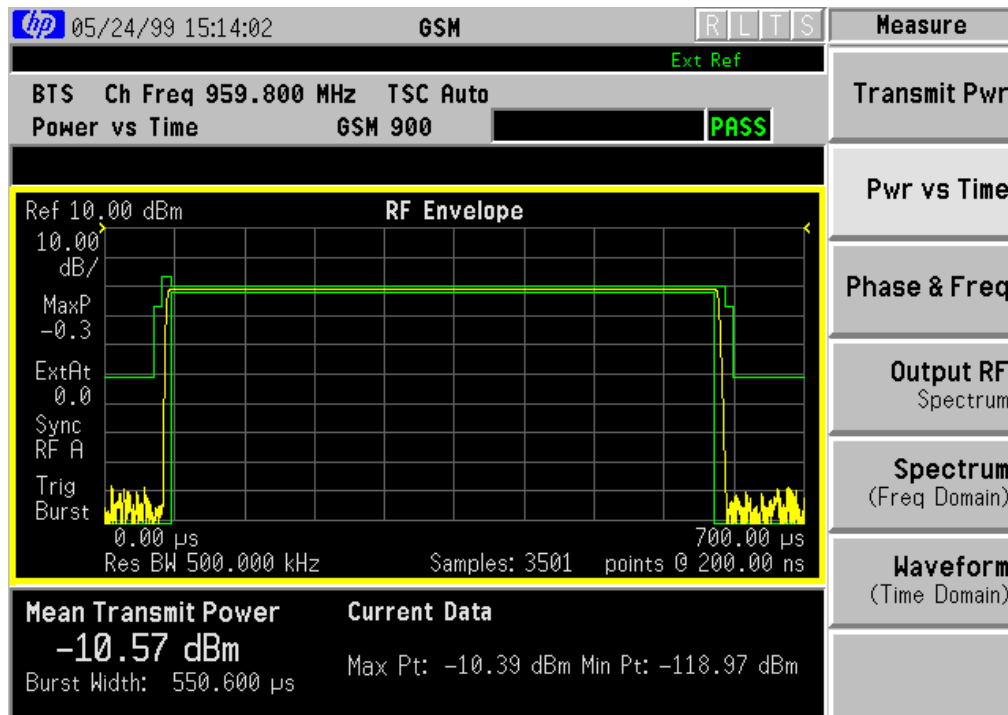
On the E4406A, press the 'MODE' Control button and set Mode field to GSM.



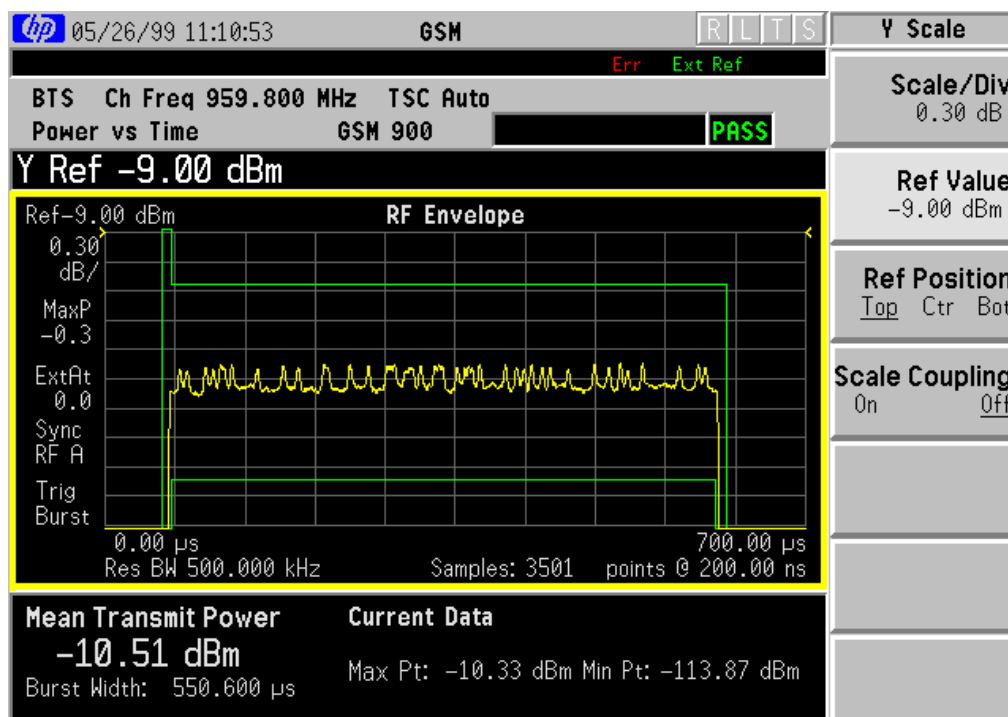
On the E4406A set the Center Frequency to 959.8 MHz (channel 124). The Burst RF Spectrum should appear.

8960 Operational Verification **GSM Generator Amplitude Flatness, Peak Phase Error,** **RMS Phase Error, and Frequency Error, Source 1 cont.**

Manual
Verification



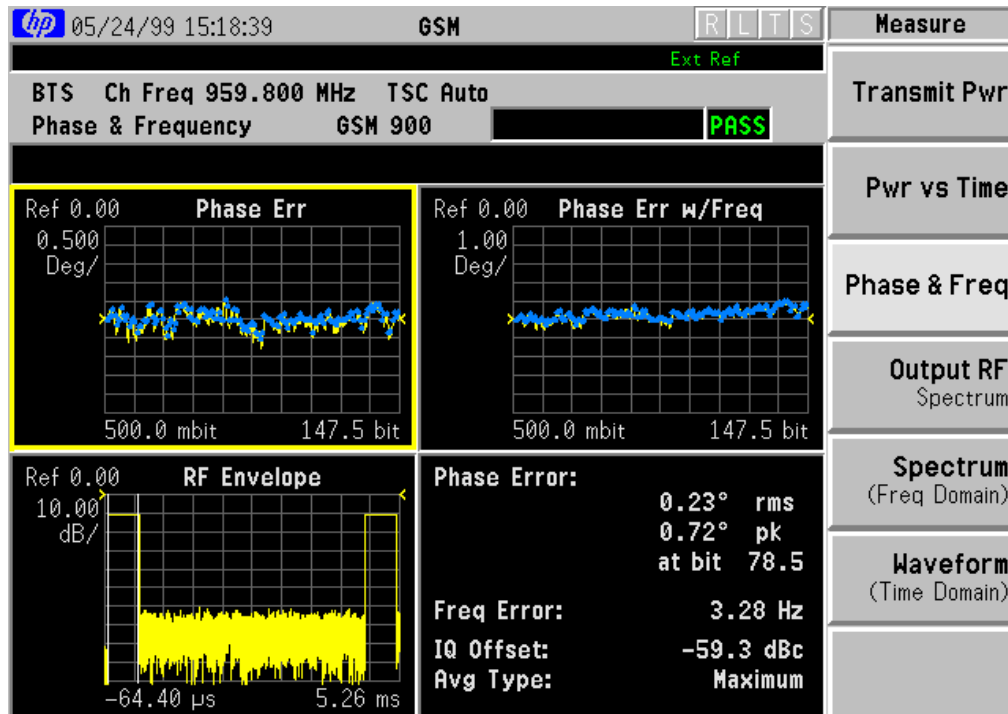
On the E4406A, press the PVTbutton.



On the E4406A, press the 'AMPLITUDE' Control button. Set 'Scale/Div' field to be .3 dB and the 'Ref Value' field to be -9 dBm. The display shown above should appear. The expected PVT limits are: $\leq \pm .6$ dB flatness

8960 Operational Verification
GSM Generator Amplitude Flatness, Peak Phase Error,
RMS Phase Error, and Frequency Error, Source 1 cont.

Manual
Verification



On the E4406A, press the 'Phase & Freq' button. The display shown above should appear. The expected limits for Phase & Frequency are:

- Peak Phase Error - $<\pm 4$ Degrees in PGSM & EGSM Bands
 $<\pm 6$ Degrees in DCS and PCS Bands
- RMS Phase Error - $<\pm 2$ Degrees in PGSM & EGSM Bands
- Frequency Error - $<\pm .04$ ppm (18 Hz)

8960 Operational Verification

GSM Generator Amplitude Flatness, Peak Phase Error, RMS Phase Error, and Frequency Error

Source 2

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Verification

GSM Generator tests check to insure that the 8960 has a GSM Digital signal within a reasonable specification. The test is run by setting the 8960 to a traffic channel of 30 and power level of -10 dBm. The E4406A is then set in a digital measurement mode and checks the 8960 GSM signal for Amplitude Flatness (PVT), Peak Phase Error, RMS Phase Error, and Frequency Error. The expected limits are:

- Amplitude Flatness - $< \pm .6$ dBm
- Peak Phase Error - $< \pm 8$ degrees in PGSM & EGSM Bands
 $< \pm 12$ degrees in DCS and PCS Bands
- RMS Phase Error - $< \pm 2$ degree in PGSM and EGSM Bands
- Frequency Error - $< \pm .04$ ppm + TB

Call Setup Screen	
Call Control	Call Setup
Operating Mode	Mobile Information
Test	Operating Mode
	Active Cell
Test Function	Test
BCH + TCH	Cell Band
	PGSM
	EGSM
	DCS
	PCS
Test Function	CH Reports
BCH	RACH:
BCH + TCH	Missing Burst:
CW	Corrupt Burst:
	Decode Error:
	Test Status :
	CW
	L
	1 of 3

On the 8960 perform the following set up functions:

1. Press the blue '**SHIFT**' button and the '**PRESET**' button (front panel buttons not shown above).
2. Press the display '**Operating Mode**' button and set mode to **Test** using the knob.
3. Press the display '**Test Function**' button and set function to **BCH+TCH** using the knob.
4. Press the '**Cell Power**' button and set power to **-10 dBm** using the number keypad and the knob.
5. Press the '**Cell Band**' button and set the cell band type to **DCS** using the knob.
6. Press the '**Broadcast Chan**' button and set the channel to **512** using the number keypad and the knob.

8960 Operational Verification **GSM Generator Amplitude Flatness, Peak Phase Error,** **RMS Phase Error, and Frequency Error, Source 2 cont.**

Manual
Verification

Call Setup Screen										
Call Control		Call Setup					Call Params			
Operating Mode		Mobile Information IMSI: IMEI: Revision Level: Supported Band: Power Class: ---- Called Number:					Traffic Band			
Test							PGSM			
Test Function							Traffic Channel			
							124			
BCH + TCH		Timeslot			4					
Cell Info		Last Location MCC MNC LAC ---- ---- ----			Burst Timing Error ---- T			Timing Advance		
		SACCH Reports Timing Adv: ---- Tx Level: ---- Rx Level: ---- Rx Qual: ----			Counters Page: 0 RACH: 0 Missing Burst: 0 Corrupt Burst: 0 Decode Error: 0			MS TX Level		
								Speech		
								Echo		
		Test Status : Sending BCH + TCH					2 of 3			

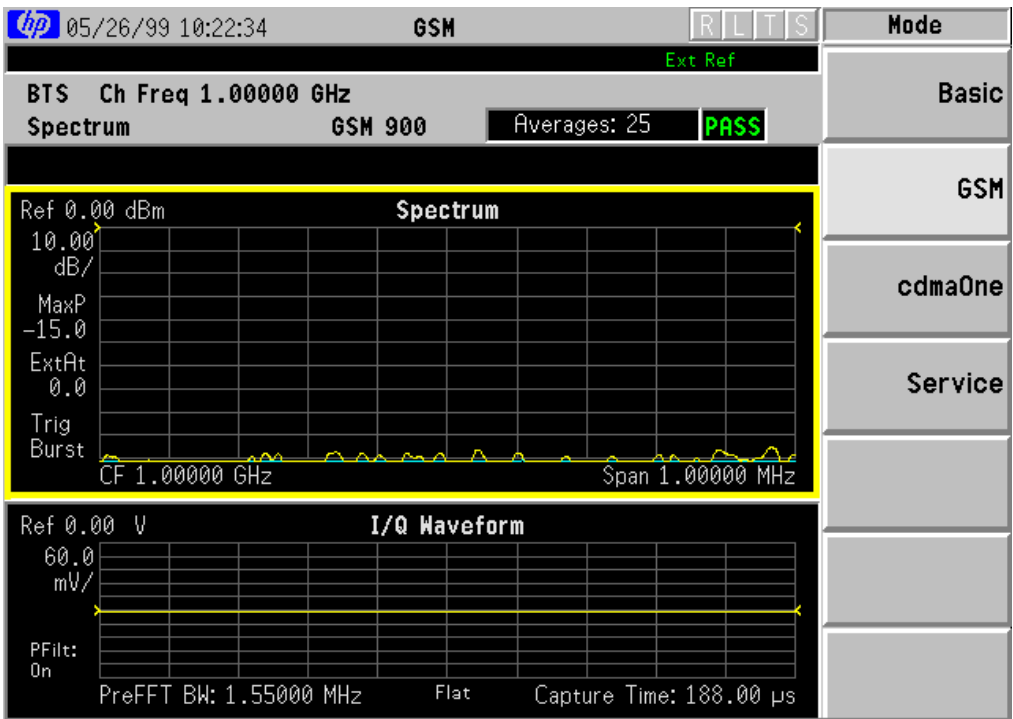
Go to Screen 2 of 3. Set the Traffic Band to PGSM and the Traffic Channel to 124.

Call Setup Screen										
Call Control		Call Setup					Call Params			
Operating Mode		Mobile Information IMSI: IMEI: Revision Level: Supported Band: Power Class: ---- Called Number:					Receiver Control			
Test							Auto			
Test Function										
BCH + TCH		Last Location MCC MNC LAC ---- ---- ----			Burst Timing Error ---- T			Expected Power		
Cell Info		SACCH Reports Timing Adv: ---- Tx Level: ---- Rx Level: ---- Rx Qual: ----			Counters Page: 0 RACH: 0 Missing Burst: 0 Corrupt Burst: 0 Decode Error: 0			Expected Burst		
								TSC0		
		Test Status : Sending BCH + TCH					3 of 3			

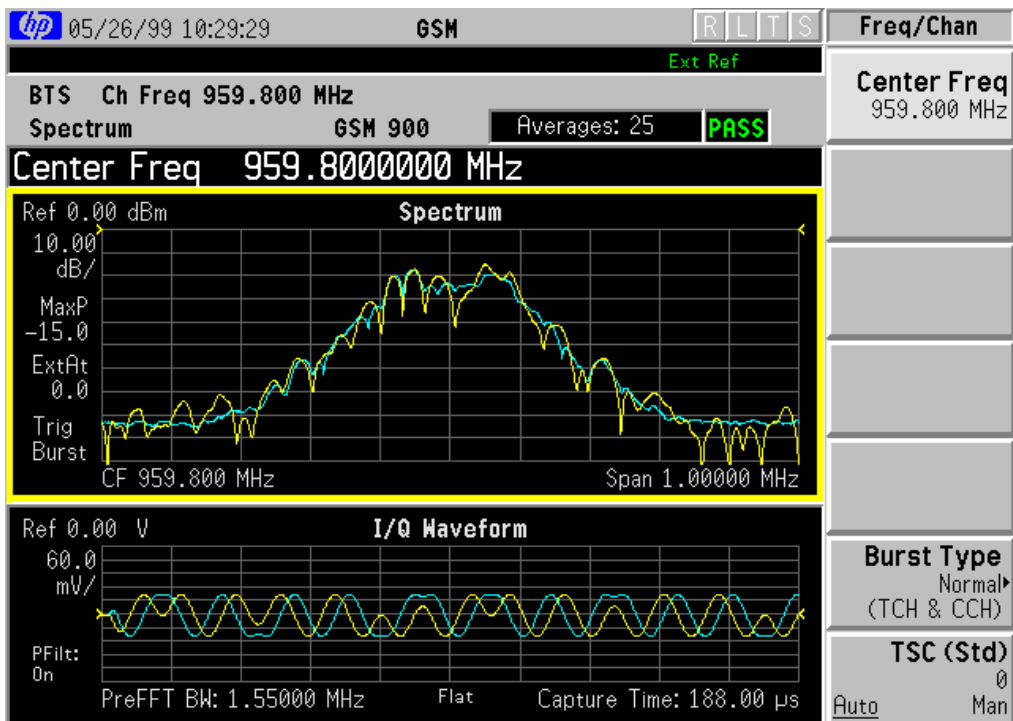
Go to Screen 3 of 3. Set the expected burst to TSC0.

8960 Operational Verification
GSM Generator Amplitude Flatness, Peak Phase Error,
RMS Phase Error, and Frequency Error, Source 2 cont.

Manual
Verification



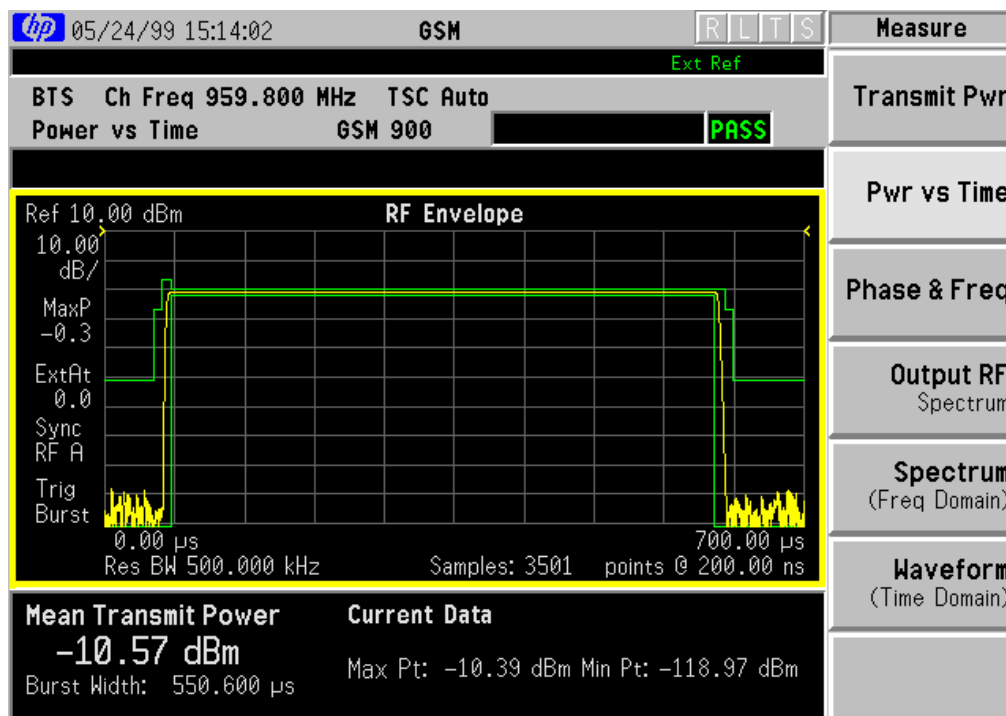
On the E4406A, press the 'MODE' Control button and set Mode field to GSM.



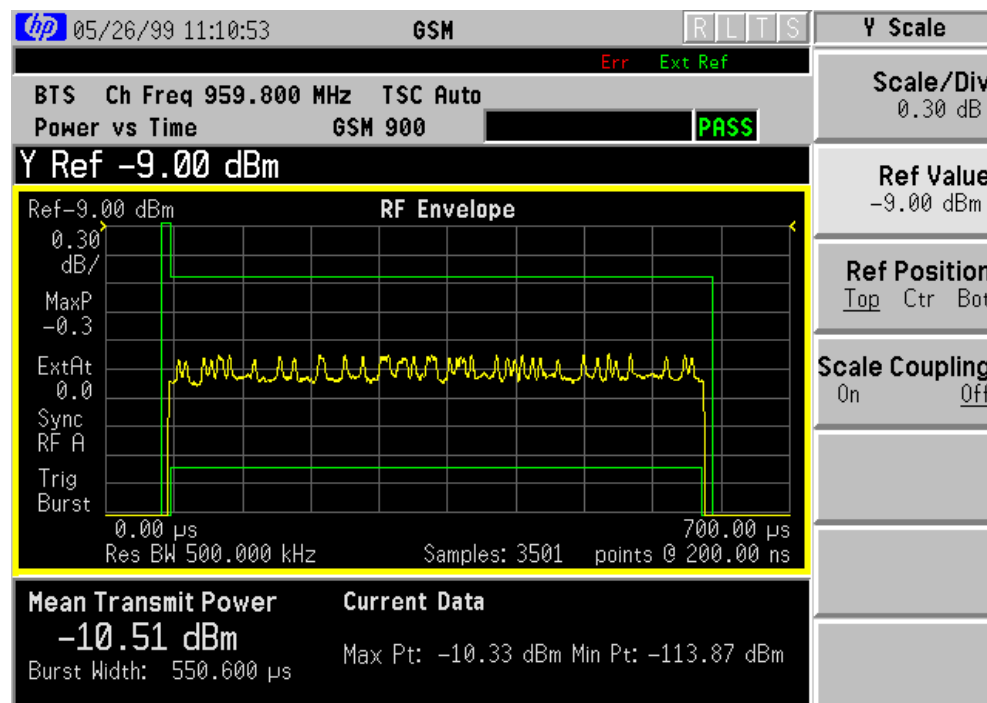
On the E4406A set the Center Frequency to 959.8 MHz (channel 124). The Burst RF Spectrum should appear.

8960 Operational Verification **GSM Generator Amplitude Flatness, Peak Phase Error,** **RMS Phase Error, and Frequency Error, Source 2 cont.**

Manual
Verification



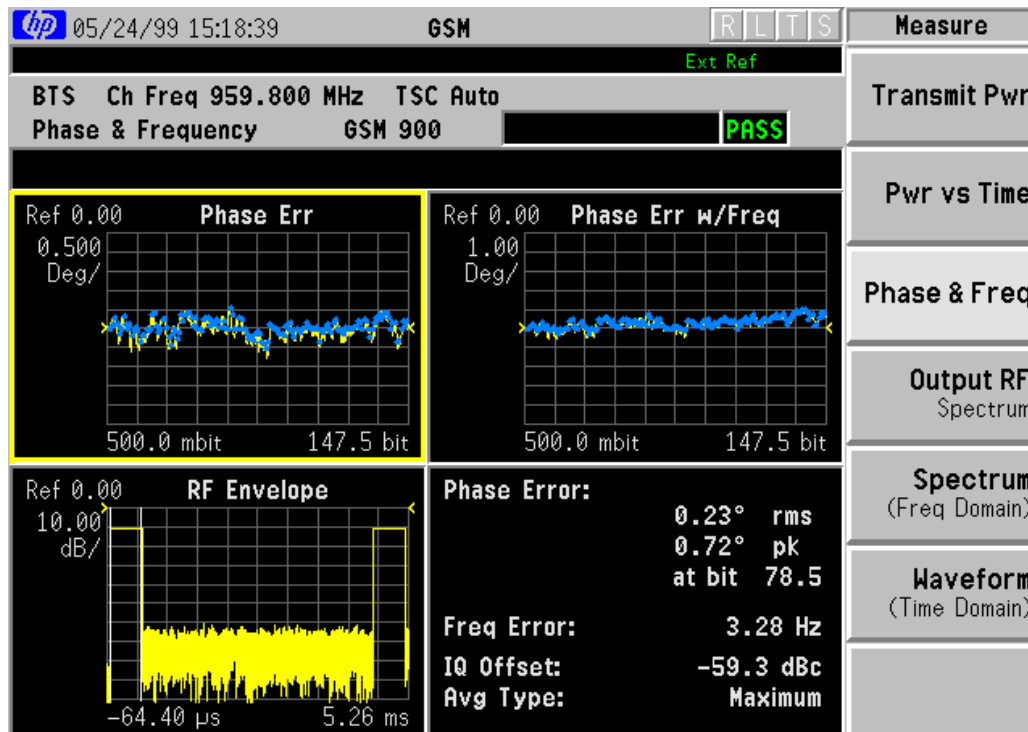
On the E4406A, press the PVTbutton.



On the E4406A, press the 'AMPLITUDE' Control button. Set 'Scale/Div' field to be .3 dB and the 'Ref Value' field to be -9 dBm. The display shown above should appear. The expected PVT limits are: $<\pm .6$ dB flatness

8960 Operational Verification
GSM Generator Amplitude Flatness, Peak Phase Error,
RMS Phase Error, and Frequency Error, Source 2 cont.

Manual
Verification



On the E4406A, press the 'Phase & Freq' button. The display shown above should appear. The expected limits for Phase & Frequency are:

- Peak Phase Error - $<\pm 4$ Degrees in PGSM & EGSM Bands
 $<\pm 6$ Degrees in DCS and PCS Bands
- RMS Phase Error - $<\pm 2$ Degrees in PGSM & EGSM Bands
- Frequency Error - $<\pm .04$ ppm (18 Hz)

8960 Operational Verification Analog Audio Analyzer

The Analog Audio Analyzer is tested to insure that the 8960 can accurately measure an audio signal within a reasonable limit.

The test is run by setting the 8960 into the Audio Analyzer measurement mode. The E4433B is then set to output an Audio signal on the LF Out connector at 1.414 Vp at a frequency of 1 kHz. The Analog Audio Measurement Accuracy expected limit is:

Levels 10mv to 20V Peak - $\pm 0.04V$
Frequency 200 Hz to 8 kHz

Connect a BNC cable between the E4433B LF Out connector and the 8960 Audio In Hi connector.

Call Setup Screen									
Call Control	Call Setup						Call Params		
Operating Mode							Cell Power		
Active Cell	Mobile Information						-85.00		
	INSI: INEI: Revision Level: Supported Band: Power Class: ---- Called Number:						Cell Band		
							PGSM		
Originate Call							Broadcast Chan		
							20		
Paging INSI	Last Location			Burst Timing Error					
001012345678901	MCC MNC LAC ---- ---- ----			---- T					
	SACCH Reports			Counters					
	Timing Adv: ---- Tx Level: ---- Rx Level: ---- Rx Qual: ----			Page: 0 RACH: 0 Missing Burst: 0 Corrupt Burst: 0 Decode Error: 0					
Cell Info							Mobile Loopback		
	Active Cell Status : Idle								
				L					
							1 of 3		

Begin the test procedure by pressing the blue **'SHIFT'** button and RESET.

8960 Operational Verification Analog Audio Analyzer, cont.

Call Setup Screen						
Control	Call Setup				Call Params	
Operating Mode	Mobile Information				Cell Power	
Active Cell					-85.00	
					Cell Band	
					PGSM	
					Broadcast Chan	
Originate Call	INST: IMEI: Revision Level: Supported Band: Power Class: ---- Called Number:				20	
	Loc	Measurement Selection				
		Transmit Power				
		Power vs Time				
		Phase & Frequency Error				
		Fast Bit Error				
		Bit Error				
		Analog Audio				
		Decoded Audio				
Close Menu		Output RF Spectrum				Mobile Loopback
			Active Cell Status :			
			Idle			
				L		
						1 of 3

Press the 'Measurement Selection' button. Use the knob and select Analog Audio, push the knob to start selection.

FREQUENCY		AMPLITUDE		LF Out Off On	
4.000 000 000 00 GHz		-135.0 dBm		LF Out Amplitude 1.414V	
EXT REF		RF Off MOD ON		LF Out Source (Func Gen) ▶	
Modulation Status Information					
MOD	STATE	DEPTH/DEV	SOURCE	RATE	WAVEFORM
LF Out	On	1.414 Vp	FuncGen	1.0000 kHz	Sine
LF Out Freq 1.0000 kHz					
LF Out Period (N/A)					
LF Out Width (N/A)					

On the E4433B press the LF Out button. Set LF Out to **On**. Set LF Amplitude to 1.414Vp. Set the LF Out Frequency to be 1.0000 kHz.

8960 Operational Verification Analog Audio Analyzer, cont.

Measurement Screen									
Control	Analog Audio							Call Parns	
Analog Audio Setup ▾	Audio In Level 0.99 v Continuous							Cell Power	-85.00
								Cell Band	PGSM
								Broadcast Chan	20
								Mobile Loopback	
	Active Cell Status : Idle								
1 of 2				L				1 of 3	

The 8960 Analog Audio screen should display a voltage level measurement of the audio signal from the E4433B .

The Analog Audio measurement expected limit is $\pm 0.04V$

8960 Operational Verification Analog Analyzer RF Power Meter

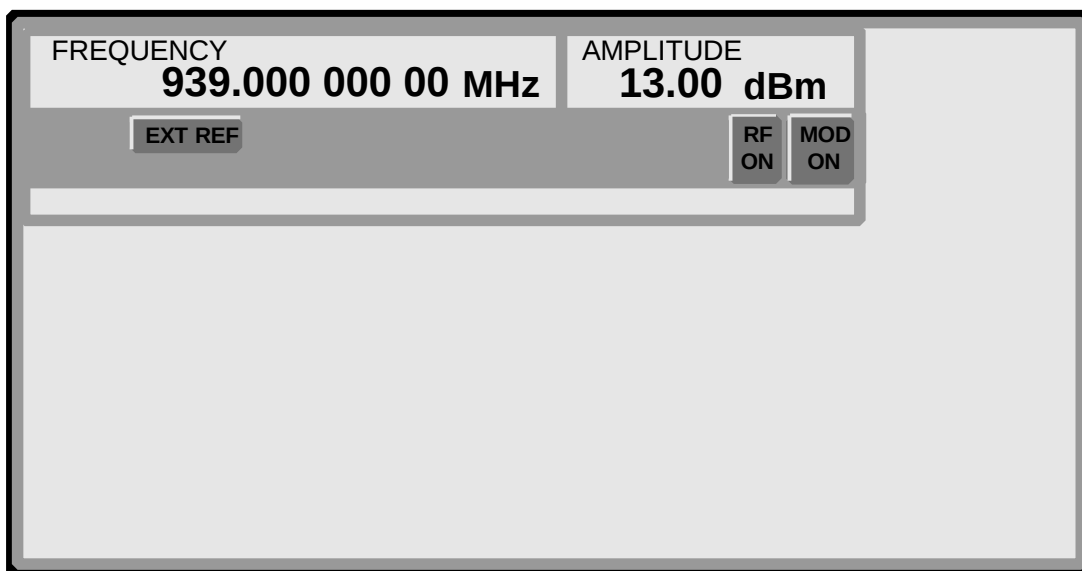
The Analog Analyzer RF Power Meter is tested to insure that the 8960 can accurately measure an RF signal within a reasonable limit.

The test is run by setting the 8960 into a manual measurement mode. The E4433B is then set to output a CW RF signal at various levels and frequencies. The Analog RF Power Meter Accuracy expected limits are:

Levels ≥ -20 to $+43$ dBm - $< \pm 1.60$ dB

Frequency 810 to 960 MHz

Begin by connecting a cable between the RF Out port of the E4433B and the RF In/Out port of the 8960.



Set the E4433B to output a signal at a frequency of 939 MHz, amplitude +13 dBm

8960 Operational Verification Analog Analyzer RF Power Meter, cont.

Manual
Verification

Call Setup Screen									
Call Control		Call Setup					Call Params		
Operating Mode		Mobile Information INSI: IMEI:					Cell Power		
Test							-85.00		
Test Function		Operating Mode Active Cell Test 					Cell Band		
							PGSM		
CU		Burst Timing Error ----- T					Broadcast Chan		
CU							20		
Test Function BCH BCH + TCH CU 		CH Reports 					Counters Page: 0 RACH: 0 Missing Burst: 0 Corrupt Burst: 0 Decode Error: 0		
Test Status :		CU					1 of 3		

On the 8960 perform the following set up functions:

1. Press the blue **'SHIFT'** button and the **'PRESET'** button (front panel buttons not shown above).
2. Press the display **'Operating Mode'** button and set mode to **Test** using the knob.
3. Press the display **'Measurement Selection'** button and select **'Transmit Power'** as the Operating Mode.

Call Setup Screen									
Control		Call Setup					Call Params		
Operating Mode		Mobile Information INSI: IMEI: Revision Level: Supported Band: Power Class: ---- Called Number:					RF Gen Power		
Test							-85.00		
Test Function		Measurement Selection Loc Transmit Power Power vs Time Phase & Frequency Error Fast Bit Error Bit Error Analog Audio Decoded Audio Output RF Spectrum					RF Gen Band		
							PGSM		
CU		Close Measurement					RF Gen Channel		
CU							20		
Close Menu		Close Menu					RF Gen Freq		
							939.00 MHz		
Background		Test Status : CU					1 of 2		

Press **'Measurement Selection'** button and select **'Transmit Power'** as the Operating Mode.

8960 Operational Verification Analog Analyzer RF Power Meter, cont.

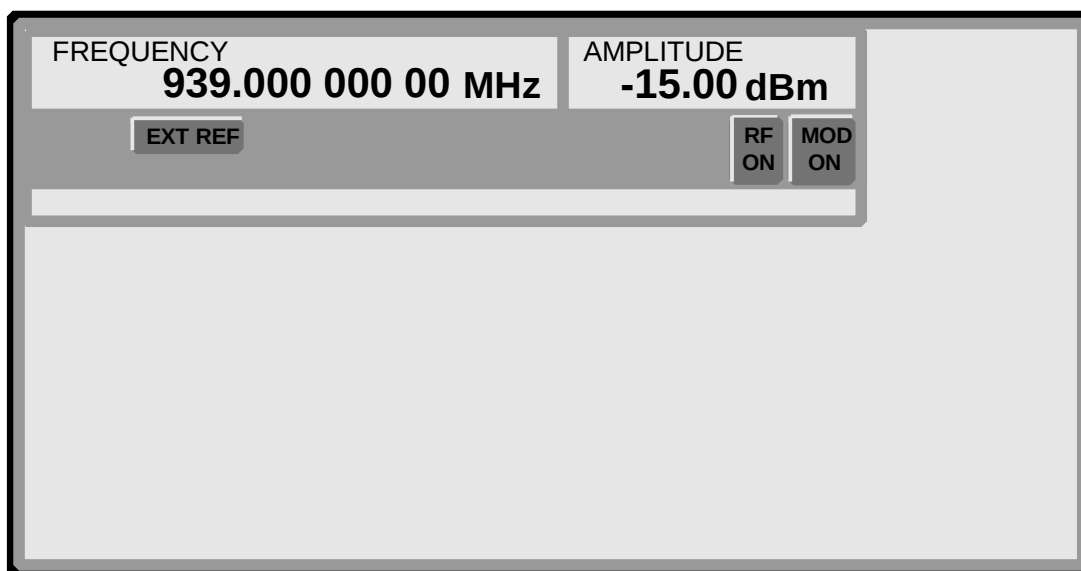
Measurement Screen									
Control		Transmit Power					Call Params		
Transmit Power Setup ▾		Transmit Power 14.63 dBm Continuous					RF Gen Power		
							-85.00		
							RF Gen Band		
							PGSH		
							RF Gen Channel		
							20		
							RF Gen Freq		
							939.00		
							MHz		
Close Menu									
		Test Status : CW							
1 of 2							1 of 2		

Press 'Transmit Power Setup' button and set Trigger Source to 'Immediate'.

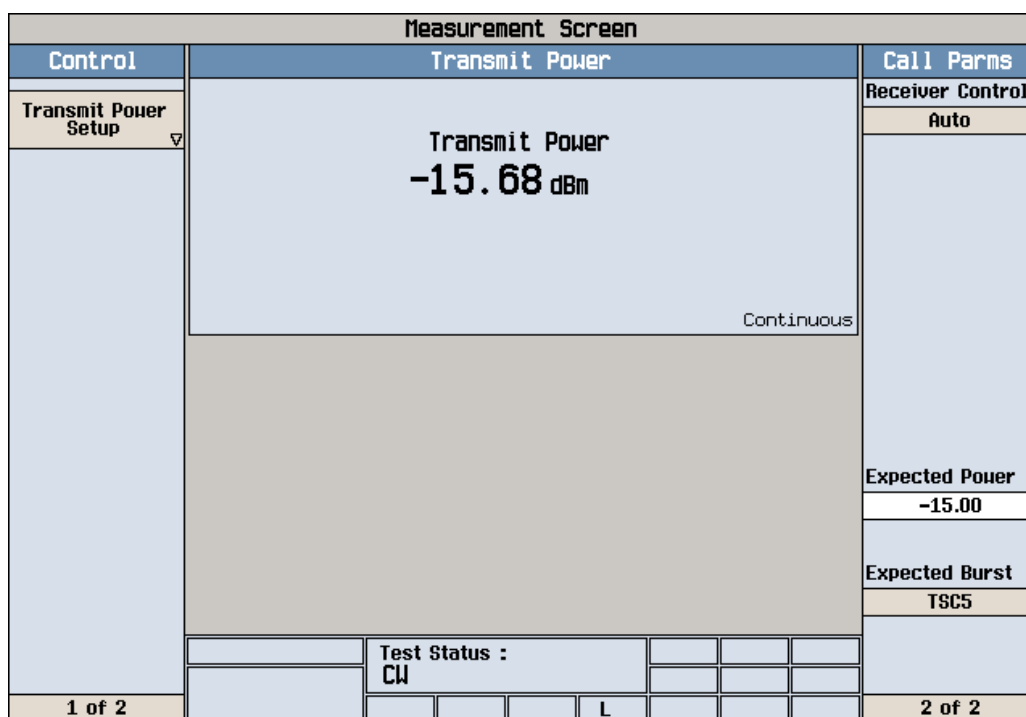
Measurement Screen									
Control		Transmit Power					Call Params		
Transmit Power Setup ▾		Transmit Power 13.01 dBm Continuous					Receiver Control		
							Auto		
							Expected Power		
							13.00		
							Expected Burst		
							TSC0		
Close Menu									
		Test Status : CW							
1 of 2							2 of 2		

On screen 2 of 2 set Expected Power to +13.00 dBm. RF Power measurement Specification is $< \pm 1.63$ dB.

8960 Operational Verification Analog Analyzer RF Power Meter, cont.



On the E4433B set the Amplitude to -15 dBm.



On the 8960 set Expected Power to -15.00 dBm.
RF Power measurement expected limit is $< \pm 1.60$ dB.

8960 Operational Verification
Analog Analyzer RF Power Meter, cont.

Manual
Verification



Change the E4433B amplitude to +13 dBm and frequency to 1.85 GHz .

Measurement Screen									
Control	Transmit Power						Call Params		
Operating Mode	Transmit Power 13.01 dBm						Receiver Control		
Test							Auto		
Test Function									
CW									
Close Measurement							Expected Power		
							13.00		
Close Menu							Expected Burst		
							TSC0		
		Test Status :					2 of 2		
		CW							
					L				

On screen 2 of 2 of the 8960 set expected power to +13.00 dBm.
RF Power measurement expected limit is < ± 1.60 dB.

8960 Operational Verification GSM Analyzer

The GSM Analyzer is tested to insure that the 8960 can accurately measure a GSM burst signal within a reasonable limit.

The test is run by setting the 8960 into GSM Analyzer manual measurement mode. The ESG E4433B is then set to output a GSM burst signal at +15 dBm amplitude. The GSM Analyzer Measurement Accuracy expected limits are:

Frequency Error

Measurement Accy. - $< \pm 24 \text{ Hz} + \text{Time Base}$

Residual Phase Error

Measurement Accy RMS - $< \pm 2 \text{ Degree}$

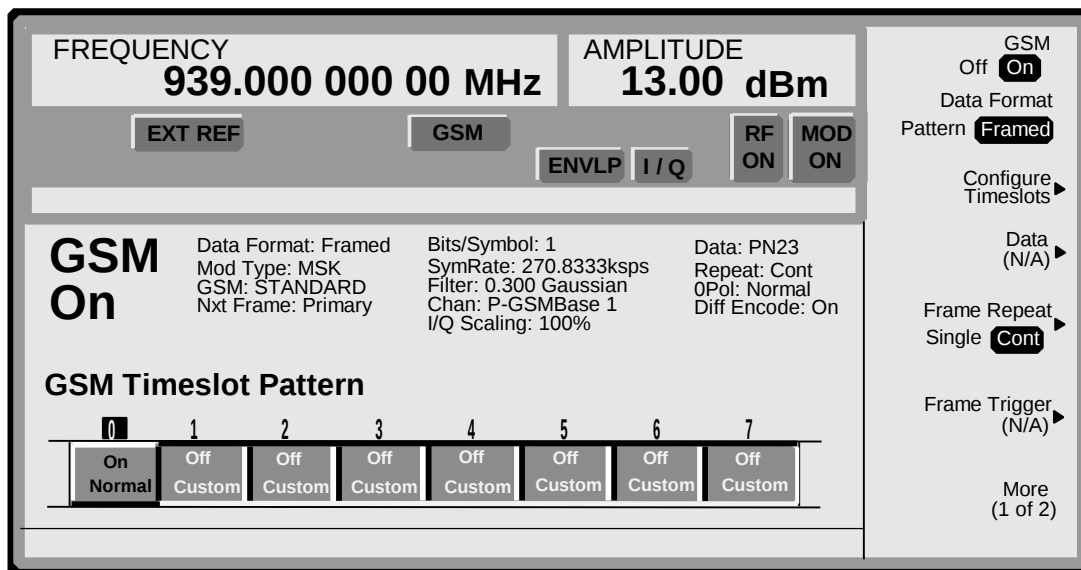
Measurement Accy. Peak - $< \pm 8 \text{ Degrees}$

Power versus Time

Rel. Measurement Accy at Time Offset - $\pm 2 \text{ dB}$

ORFS

Rel. Measurement Accy Freq. Offset - $\pm 3 \text{ dB}$



Begin by connecting a cable between the RF Out port of the E4433B and the RF In/Out port of the 8960. Set the E4433B to output a signal at a frequency of 939 MHz, GSM On, Burst On or Framed Data, and amplitude +13 dBm

8960 Operational Verification GSM Analyzer

Manual
Verification

Call Setup Screen									
Call Control	Call Setup						Call Params		
Operating Mode	Mobile Information INSI: IMEI: Operating Mode Active Cell Test						Cell Power		
Test							-85.00		
Originate Call							Cell Band		
							PGSN		
Paging INSI	Burst Timing Error ---- T						Broadcast Chan		
0010123456789							20		
Cell Info	SACCH Reports Timing Adv: ---- Tx Level: ---- Rx Level: ---- Rx Qual: ----						Counters Page: 0 RACH: 0 Missing Burst: 0 Corrupt Burst: 0 Decode Error: 0		
							Test Status : CW		
	L						1 of 3		

On the 8960 perform the following set up functions:

1. Press the blue **'SHIFT'** button and the **'PRESET'** button (front panel buttons not shown above).
2. Press the display **'Operating Mode'** button and set mode to **Test** using the

Call Setup Screen															
Call Control	Call Setup						Call Params								
Operating Mode	Mobile Information INSI: IMEI: Revision Level: Supported Band: Power Class: ---- Called Number: Last Location MCC MNC LAC						Receiver Control								
Test							Manual								
Test Function							Burst Timing Error ---- T						Manual Band		
													PGSN		
BCH	SACCH Reports Timing Adv: ---- Tx Level: ---- Rx Level: ---- Rx Qual: ----						Manual Channel								
							30								
Cell Info	Counters Page: 0 RACH: 0 Missing Burst: 0 Corrupt Burst: 0 Decode Error: 0						Manual Freq								
							939.00 MHz								
	Test Status : Sending BCH						Expected Power								
							13.00								
	L						Expected Burst								
							TSC0								
	L						3 of 3								

Select screen 3 of 3. Set 'Receiver Control' field to Manual. Set 'Manual Freq' to 939 MHz. Set 'Expected Power' to +13 dBm. Set 'Expected burst' to TSC0.

8960 Operational Verification GSM Analyzer, cont.

Manual
Verification

Measurement Screen											
Control		Transmit Power							Call Params		
Operating Mode		Transmit Power 13.01 dBm							Receiver Control		
Test									Manual		
									Manual Band		
									PGSM		
Test Function		Continuous							Manual Channel		
BCH									30		
		Loc	Measurement Selection							Manual Freq	
Close Measurement			Transmit Power								
		Power vs Time							939.00		
		Phase & Frequency Error							MHz		
		Fast Bit Error							Expected Power		
		Bit Error							13.00		
		Analog Audio							Expected Burst		
		Decoded Audio									
Close Menu		Output RF Spectrum							TSC0		
					Test Status :						3 of 3
					Sending BCH						
					L						

Press 'Measurement Selection' button and select 'Transmit Power' as the Operating Mode. Transmit Power window should display a reading of approximately +13 dBm

Measurement Screen																																												
Control	Phase & Frequency Error							Call Params																																				
Phase & Freq. Setup	<table><tr><td></td><td colspan="2">Peak Phase °</td><td colspan="2">RMS Phase °</td><td colspan="2">Frequency Hz</td></tr><tr><td>Minimum</td><td colspan="2">0.12</td><td colspan="2">0.12</td><td colspan="2">1.22</td></tr><tr><td>Maximum</td><td colspan="2">0.97</td><td colspan="2">0.19</td><td colspan="2">4.64</td></tr><tr><td>Average</td><td colspan="2">0.41</td><td colspan="2">0.14</td><td colspan="2">2.18</td></tr><tr><td colspan="7"></td></tr></table>								Peak Phase °		RMS Phase °		Frequency Hz		Minimum	0.12		0.12		1.22		Maximum	0.97		0.19		4.64		Average	0.41		0.14		2.18									Receiver Control	
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	Manual																																											
	Manual Band																																											
	PGSM																																											
	Manual Channel																																											
30																																												
50 / 100							Continuous																																					
Phase & Freq Setup					Value																																							
Multi-Measurement Count					10		Manual Freq																																					
Trigger Arm					Continuous		939.00																																					
Trigger Source					Auto		MHz																																					
Trigger Delay					0.000 s		Expected Power																																					
Trigger Qualification					On		13.00																																					
Swap Window Positions	Burst Synchronization					Midamble		Expected Burst																																				
	Measurement Timeout					Off		TSC0																																				
	Test Status :																																											
	Sending BCH																																											
1 of 2				L			3 of 3																																					

Press 'Measurement Selection' button and select 'Phase & Frequency Error' as the Operating Mode. Press 'Phase & Frequency Setup' button. Select Multi-Measurement Count value to be 10. Close Menu to turn off the Setup window.

8960 Operational Verification GSM Analyzer, cont.

Manual
Verification

Measurement Screen																									
Control	Phase & Frequency Error							Call Params																	
Phase & Freq. Setup ▾	<table><tr><td></td><td>Peak Phase °</td><td>RMS Phase °</td><td>Frequency Hz</td></tr><tr><td>Minimum</td><td>0.12</td><td>0.12</td><td>1.22</td></tr><tr><td>Maximum</td><td>0.97</td><td>0.19</td><td>4.64</td></tr><tr><td>Average</td><td>0.41</td><td>0.14</td><td>2.18</td></tr></table>								Peak Phase °	RMS Phase °	Frequency Hz	Minimum	0.12	0.12	1.22	Maximum	0.97	0.19	4.64	Average	0.41	0.14	2.18	Receiver Control	
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								Minimum	0.12	0.12	1.22														
								Maximum	0.97	0.19	4.64														
								Average	0.41	0.14	2.18														
Manual																									
Manual Band																									
PGSM																									
Continuous							Manual Channel																		
							30																		
							Manual Freq																		
							939.00																		
							NR																		
Transmit Power							Expected Power																		
							13.00																		
							Expected Burst																		
							TSC0																		
Swap Window Positions	Transmit Power 13.01 dBm							Expected Power																	
13.00																									
Expected Burst																									
TSC0																									
	Continuous							Expected Power																	
								13.00																	
								Expected Burst																	
								TSC0																	
		Test Status : Sending BCH																							
					L																				
1 of 2								3 of 3																	

The Phase and Frequency Error window should appear and display average readings of Peak and RMS phase error and Frequency error.

The expected measurement limits are:

Peak error is $\leq \pm 8$ Deg, RMS error is $\leq \pm 2$ Deg, Frequency error is $\leq \pm 24$

Hz.

Measurement Screen																									
PvT Setup		Power vs Time: Numeric Screen 1						Call Params																	
Measurement Setup ▾		<table><tr><th>Offset (us)</th><th>Level (dBc)</th><th>Offset (us)</th><th>Level (dBc)</th></tr><tr><td>-28.00</td><td>-84.99</td><td>0.00</td><td>-0.03</td></tr><tr><td>-18.00</td><td>-82.83</td><td>321.20</td><td>0.03</td></tr><tr><td>-10.00</td><td>-8.31</td><td>331.20</td><td>0.00</td></tr></table>						Offset (us)	Level (dBc)	Offset (us)	Level (dBc)	-28.00	-84.99	0.00	-0.03	-18.00	-82.83	321.20	0.03	-10.00	-8.31	331.20	0.00	Receiver Control	
Offset (us)	Level (dBc)							Offset (us)	Level (dBc)																
-28.00	-84.99							0.00	-0.03																
-18.00	-82.83							321.20	0.03																
-10.00	-8.31	331.20	0.00																						
Measurement Offsets ▾		Manual																							
		Continuous						Manual Band																	
								PGSM																	
								Manual Channel																	
								30																	
		Power vs Time Measurement Setup						Value																	
		Multi-Measurement Count						10																	
Trigger Arm						Continuous																			
Trigger Source						Auto																			
Trigger Delay						0.000 s																			
Burst Synchronization						Midamble																			
Measurement Timeout						Off																			
Close Menu								Expected Power																	
								13.00																	
								Expected Burst																	
								TSC0																	
		Test Status : Sending BCH																							
		L						3 of 3																	

Press 'Measurement Selection' button and select 'Power vs. Time' as the Operating Mode. Press the 'Power vs. Time Setup' button and then the 'Measurement Setup' button, set the Multi-Measurement Count value to be 10. Close menu to turn off measurement setup window.

8960 Operational Verification GSM Analyzer, cont.

Manual
Verification

Measurement Screen																									
PvT Setup	Power vs Time: Numeric Screen 1						Call Params																		
Measurement Setup ▾	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Offset (us)</th> <th style="width: 25%;">Level (dBc)</th> <th style="width: 25%;">Offset (us)</th> <th style="width: 25%;">Level (dBc)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">-28.00</td> <td style="text-align: center;">-84.99</td> <td style="text-align: center;">0.00</td> <td style="text-align: center;">-0.03</td> </tr> <tr> <td style="text-align: center;">-18.00</td> <td style="text-align: center;">-82.83</td> <td style="text-align: center;">321.20</td> <td style="text-align: center;">0.03</td> </tr> <tr> <td style="text-align: center;">-10.00</td> <td style="text-align: center;">-8.31</td> <td style="text-align: center;">331.20</td> <td style="text-align: center;">0.00</td> </tr> </tbody> </table> 10 / 10 Continuous						Offset (us)	Level (dBc)	Offset (us)	Level (dBc)	-28.00	-84.99	0.00	-0.03	-18.00	-82.83	321.20	0.03	-10.00	-8.31	331.20	0.00	Receiver Control		
Offset (us)							Level (dBc)	Offset (us)	Level (dBc)																
-28.00							-84.99	0.00	-0.03																
-18.00	-82.83	321.20	0.03																						
-10.00	-8.31	331.20	0.00																						
Measurement Offsets ▾	Manual																								
Return to PvT Control	Phase & Frequency Error Peak Phase 0.42° RMS Phase 0.15° Frequency 0.45 Hz Continuous						Manual Band																		
							PGSM																		
	Background Test Status : Sending BCH L						Manual Channel																		
							30																		
							Manual Freq																		
							939.00																		
							Expected Power																		
							13.00																		
							Expected Burst																		
							TSC0																		
							3 of 3																		

Press 'Return to PvT Control' button then press the 'Change View' button.

Measurement Screen																									
Change View	Power vs Time: Numeric Screen 1						Call Params																		
Summary	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Offset (us)</th> <th style="width: 25%;">Level (dBc)</th> <th style="width: 25%;">Offset (us)</th> <th style="width: 25%;">Level (dBc)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">-28.00</td> <td style="text-align: center;">-84.99</td> <td style="text-align: center;">0.00</td> <td style="text-align: center;">-0.03</td> </tr> <tr> <td style="text-align: center;">-18.00</td> <td style="text-align: center;">-82.83</td> <td style="text-align: center;">321.20</td> <td style="text-align: center;">0.03</td> </tr> <tr> <td style="text-align: center;">-10.00</td> <td style="text-align: center;">-8.31</td> <td style="text-align: center;">331.20</td> <td style="text-align: center;">0.00</td> </tr> </tbody> </table> 10 / 10 Continuous						Offset (us)	Level (dBc)	Offset (us)	Level (dBc)	-28.00	-84.99	0.00	-0.03	-18.00	-82.83	321.20	0.03	-10.00	-8.31	331.20	0.00	Receiver Control		
Offset (us)							Level (dBc)	Offset (us)	Level (dBc)																
-28.00							-84.99	0.00	-0.03																
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Numeric 1 of 2	Manual																								
Numeric 2 of 2	Phase & Frequency Error Peak Phase 0.42° RMS Phase 0.15° Frequency 0.45 Hz Continuous						Manual Band																		
Return to PvT Control							PGSM																		
	Background Test Status : Sending BCH L						Manual Channel																		
							30																		
							Manual Freq																		
							939.00																		
							Expected Power																		
							13.00																		
							Expected Burst																		
							TSC0																		
							3 of 3																		

Press the 'Numeric 1 of 2' button. The Power vs Time Numeric Screen 1 should appear. The expected limits are:

0 usec - 0dBc ±2dBc -10 usec - ≤ 8dBc

8960 Operational Verification

Manual
Verification

Measurement Screen																									
Change View		Power vs Time: Numeric Screen 2						Call Params																	
Summary		<table><tr><th>Offset (us)</th><th>Level (dBc)</th><th>Offset (us)</th><th>Level (dBc)</th></tr><tr><td>339.20</td><td>0.09</td><td>552.80</td><td>-14.31</td></tr><tr><td>349.20</td><td>0.06</td><td>560.80</td><td>-84.99</td></tr><tr><td>542.80</td><td>0.07</td><td>570.80</td><td>-82.83</td></tr></table> 10 / 10 Continuous						Offset (us)	Level (dBc)	Offset (us)	Level (dBc)	339.20	0.09	552.80	-14.31	349.20	0.06	560.80	-84.99	542.80	0.07	570.80	-82.83	Receiver Control	
Offset (us)	Level (dBc)							Offset (us)	Level (dBc)																
339.20	0.09							552.80	-14.31																
349.20	0.06							560.80	-84.99																
542.80	0.07	570.80	-82.83																						
		Manual																							
Numeric 1 of 2		Manual Band																							
		PGSM																							
Numeric 2 of 2		Manual Channel																							
		30																							
Return to PoT Control		Phase & Frequency Error						Manual Freq																	
		Peak Phase0.42° RMS Phase0.15° Frequency0.45 Hz Continuous						939.00																	
								MHz																	
								Expected Power																	
								13.00																	
								Expected Burst																	
								TSC0																	
		Background		Test Status : Sending BCH																					
					L																				
								3 of 3																	

Press the 'Numeric 2 of 2' button. The Power vs Time Numeric Screen 2 should appear. The expected limits are: 542.8usec - 0dBc ±2dBc 552.8usec - ≤ 8 dBc

Note on measured values: Power versus Time measurements are depend on the accuracy of the source being measured. In the example above the E4433B had performance of -14 dBc at a 552.8 usec offset on the burst. Variation in burst timing can vary the offset in dBc greatly. This measurement is meant to show consistency between 8960 units using the same identical source for each unit tested.

Measurement Screen						
ORFS Setup	ORFS: Modulation Screen 1					Call Params
Measurement Setup	Offset (kHz)	Level (dB)	Offset (kHz)	Level (dB)		Cell Power
	400.00	-71.13	----	----		-85.00
	600.00	-80.61	----	----		
Modulation Frequencies	----	----	----	----		Cell Band
	----	----	----	----		PGSM
Switching Frequencies	TX Power: 14.88 dBm 30 kHz BU Power: 4.31 dBm					Broadcast Chan
	Continuous					20
	Measurement Setup		Value			
	Multi-Measurement Count		20			
	Multi-Measurement Count (Switching)		10			
	Trigger Arm		Continuous			
	Trigger Source		Auto			
	Trigger Delay		0.000 s			
	Measurement Timeout		Off			
Close Menu						Mobile Loopback
	Background	Active Cell Status : Connected				
			L			
						1 of 3

Press 'Measurement Selection' button and select 'Output RF Spectrum' as the Operating Mode. Press the 'ORFS Setup' and then the 'Measurement Setup' button. Set Multi-Measurement Count value to 20. Close menu to turn off window.

8960 Operational Verification GSM Analyzer, cont.

Measurement Screen											
ORFS Setup		ORFS: Modulation Screen 1						Call Parm			
Measurement Setup ▾		Offset (kHz)		Level (dB)		Offset (kHz)		Level (dB)		Receiver Control	
		400.00		-70.10		-200.00		-34.69		Manual	
		600.00		-79.91		200.00		-35.92		Manual Band PGSM	
Modulation Frequencies ▾		-100.00		-9.63		-250.00		-41.78			
		100.00		-4.21		250.00		-38.79			
Switching Frequencies ▾		TX Power: 14.88 dBm				30 kHz BU Power: 7.47 dBm				Manual Channel	
		Continuous								30	
Close Menu		Modulation Frequencies				Value				Manual Freq	
		Modulation Offset 1				400.0 kHz				939.00	
		Modulation Offset 2				600.0 kHz				MHz	
		Modulation Offset 3				-100.0 kHz				Expected Power	
		Modulation Offset 4				100.0 kHz				13.00	
		Modulation Offset 5				-200.0 kHz				Expected Burst	
		Modulation Offset 6				200.0 kHz				TSC0	
		Modulation Offset 7				-250.0 kHz					
		Modulation Offset 8				250.0 kHz					
		Background		Test Status : Sending BCH						3 of 3	

The ORFS measurement screen must be configured for offset frequency values to make a measurement. Press the 'Modulation Frequencies' button. Load the default frequencies into each offset by rotating the knob to each offset and pressing the 'ON' button. Load frequencies 100 kHz to 1200 kHz. Close the menu.

Measurement Screen										
Change View	ORFS: Modulation Screen 2								Call Parm	
Modulation Numeric 1 of 3	Offset (kHz)		Level (dB)		Offset (kHz)		Level (dB)		Receiver Control	
	-400.00	-73.74			-1000.00	-85.34			Manual	
	-600.00	-81.78			1000.00	-84.68				
Modulation Numeric 2 of 3	-800.00	-85.25			-1200.00	-87.24			Manual Band	
	800.00	-85.46			1200.00	-85.19			PGSM	
	TX Power: 14.87 dBm		30 kHz BU Power: 9.16 dBm							Manual Channel
Modulation Numeric 3 of 3									30	
	Power vs Time: Numeric Screen 1								Manual Freq	
Switching Numeric	Offset (us)		Level (dBc)		Offset (us)		Level (dBc)		939.00	
	-28.00	-84.63			0.00	-0.03			MHz	
	-18.00	-86.43			321.20	0.03			Expected Power	
	-10.00	-1.64			331.20	0.01			13.00	
Return to ORFS Control									Expected Burst	
									TSC0	
	Background		Test Status : Sending BCH							
					L				3 of 3	

Press 'Return to ORFS Control' button. Press 'Change View' button and select which modulation numeric screens to view by pressing either the 'Modulation Numeric 1 of 3' or the 'Modulation Numeric 2 of 3' buttons..

8960 Operational Verification GSM Analyzer, cont.

Measurement Screen									
Change View	ORFS: Modulation Screen 2							Call Params	
Modulation Numeric 1 of 3	Offset (kHz)		Level (dB)		Offset (kHz)		Level (dB)		Receiver Control
	-400.00		-73.74		-1000.00		-85.34		Manual
	-600.00		-81.78		1000.00		-84.68		
Modulation Numeric 2 of 3	-800.00		-85.25		-1200.00		-87.24		Manual Band
	800.00		-85.46		1200.00		-85.19		PGSM
	TX Power: 14.87 dBm		30 kHz BU Power: 9.16 dBm						
Modulation Numeric 3 of 3								Continuous	
	Power vs Time: Numeric Screen 1								
Switching Numeric	Offset (us)		Level (dBc)		Offset (us)		Level (dBc)		Manual Freq
	-28.00		-84.63		0.00		-0.03		939.00
	-18.00		-86.43		321.20		0.03		MHz
	-10.00		-1.64		331.20		0.01		Expected Power
								13.00	
Return to ORFS Control								Expected Burst	
								TSC0	
	Background		Test Status : Sending BCH						
					L				3 of 3

The expected ORFS measurement limits are: (example)

ORFS Offsets	± 100 kHz	-	≤ -6 dB
ORFS Offsets	± 200 kHz	-	≤ -33 dB
ORFS Offsets	± 250 kHz	-	≤ -38 dB
ORFS Offsets	± 400 kHz	-	≤ -67 dB
ORFS Offsets	± 600 kHz	-	≤ -76 dB
ORFS Offsets	± 800 kHz	-	≤ -78 dB
ORFS Offsets	± 1000 kHz	-	≤ -78 dB
ORFS Offsets	± 1200 kHz	-	≤ -79 dB
ORFS Offsets	> 1200 kHz	-	≤ -80 dB

Note: A measured value (example: -79 dB at 600 kHz) is dependent on the performance of the source being measured. In this example a typical E4433B may have ORFS performance of -79 dB at 600 kHz from the carrier. The values may change however according to the source. The measured accuracy of a source should be consistent for every 8960 unit. The measurement done for this test is meant to show test consistency between 8960 units using the same identical source for each unit tested.