CE RF Test Report

for mobile stations in the GSM 900 and GSM 1800 bands

Product Name : LTE Module

Model No. : EC25-E, EC25-E MINIPCIE

Prepared for:

Quectel Wireless Solutions Co. Ltd
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Date of Receipt : 03-22-2017

Test Date : 04-16-2017~ 04-23-2017

Issued Date : 04-24-2017

Report No. : UL32220170322CE006-1

Report Version : V1.0

Notes：
The test results only relate to these samples which have been tested.
Partly using this report will not be admitted unless been allowed by Unilab.
Unilab is only responsible for the complete report with the reported stamp of Unilab.

Test Report Certification

Issued Date : 04-24-2017
Report No. : UL32220170322CE006-1

Product Name :	LTE Module
Applicant :	Quectel Wireless Solutions Co. Ltd
Address :	Room 501, Building 13, No.99 Tianzhou Road, Xuhui District, Shanghai,China
Manufacturer :	Quectel Wireless Solutions Co. Ltd
Address :	Room 501, Building 13, No.99 Tianzhou Road, Xuhui District, Shanghai,China
Model No. :	EC25-E, EC25-E MINIPCIE
EUT Voltage:	Low: 3.3V Norminal: 4.0V High: 4.6V
Applicable Standard(s) :	ETSI EN 301 511 V12.5.1 3GPP TS51.010-1 V13.3.0
Test Result :	Complied
Performed Location :	Unilab (Shanghai) Co., Ltd. No. 1350, Lianxi Rd. Pudong New District, Shanghai, China TEL: +86-21-50275125 FAX: +86-21-50277862

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CONTENTS

1. Summary Of Test Result

1.1. Summary Of Standards And Test Results

2. The EUT have been tested according to the applicable standards as referenced below:

ETSI EN 301 511	3GPP TS 51 010-1	Test Description	GSM900	GSM1800
§4.2.1	**§13.1**	**Transmitter-Frequency error and phase error**	**P**	**P**
		Temperature High, Voltage High	P	P
		Temperature High, Voltage Low	P	P
		Temperature Low, Voltage High	P	P
		Temperature Low, Voltage Low	P	P
		Temperature Normal, Voltage Normal	P	P
		Vibration (X axis)	P	P
		Vibration (Y axis)	P	P
		Vibration (Z axis)	P	P
§4.2.2	**§13.2**	**Transmitter-Frequency error under multipath and interference conditions**	**P**	**P**
		Temperature High, Voltage High	P	P
		Temperature High, Voltage Low	P	P
		Temperature Low, Voltage High	P	P
		Temperature Low, Voltage Low	P	P
		Temperature Normal, Voltage Normal	P	P
§4.2.3	**§13.6**	**Transmitter - Frequency error and phase error in HSCSD multislot configuration**	**N/A**	**N/A**
		Temperature High, Voltage High	N/A	N/A
		Temperature High, Voltage Low	N/A	N/A
		Temperature Low, Voltage High	N/A	N/A
		Temperature Low, Voltage Low	N/A	N/A
		Temperature Normal, Voltage Normal	N/A	N/A
		Vibration (X axis)	N/A	N/A
		Vibration (Y axis)	N/A	N/A
		Vibration (Z axis)	N/A	N/A
§4.2.4	**§13.16.1**	**Frequency error and phase error in GPRS multislot configuration**	**P**	**P**
		Temperature High, Voltage High	P	P
		Temperature High, Voltage Low	P	P
		Temperature Low, Voltage High	P	P
		Temperature Low, Voltage Low	P	P
		Temperature Normal, Voltage Normal	P	P
		Vibration (X axis)	P	P
		Vibration (Y axis)	P	P
		Vibration (Z axis)	P	P
§4.2.5	**§13.3**	**Transmitter output power and burst timing**	**P**	**P**
		Temperature High, Voltage High	P	P
		Temperature High, Voltage Low	P	P
		Temperature Low, Voltage High	P	P

		Temperature Low, Voltage Low	P	P
		Temperature Normal, Voltage Normal	P	P
§4.2.6	**§13.4**	**Transmitter-Output RF spectrum**	**P**	**P**
		Temperature High, Voltage High	P	P
		Temperature High, Voltage Low	P	P
		Temperature Low, Voltage High	P	P
		Temperature Low, Voltage Low	P	P
		Temperature Normal, Voltage Normal	P	P
§4.2.7	**§13.7**	**Transmitter output power and burst timing in HSCSD multislot configurations**	**N/A**	**N/A**
		Temperature High, Voltage High	N/A	N/A
		Temperature High, Voltage Low	N/A	N/A
		Temperature Low, Voltage High	N/A	N/A
		Temperature Low, Voltage Low	N/A	N/A
		Temperature Normal, Voltage Normal	N/A	N/A
§4.2.8	**§13.8**	**Transmitter - Output RF spectrum in HSCSD multislot configuration**	**N/A**	**N/A**
		Temperature High, Voltage High	N/A	N/A
		Temperature High, Voltage Low	N/A	N/A
		Temperature Low, Voltage High	N/A	N/A
		Temperature Low, Voltage Low	N/A	N/A
		Temperature Normal, Voltage Normal	N/A	N/A
§4.2.9	**§13.9**	**Transmitter - Output RF spectrum for MS supporting the R-GSM or ER-GSM frequency band**	**N/A**	**N/A**
		Temperature High, Voltage High	N/A	N/A
		Temperature High, Voltage Low	N/A	N/A
		Temperature Low, Voltage High	N/A	N/A
		Temperature Low, Voltage Low	N/A	N/A
		Temperature Normal, Voltage Normal	N/A	N/A
§4.2.10	**§13.16.2**	**Transmitter output power in GPRS multi slot configuration**	**P**	**P**
		Temperature High, Voltage High	P	P
		Temperature High, Voltage Low	P	P
		Temperature Low, Voltage High	P	P
		Temperature Low, Voltage Low	P	P
		Temperature Normal, Voltage Normal	P	P
§4.2.11	**§13.16.3**	**Output RF spectrum in GPRS multi slot configuration**	**P**	**P**
		Temperature High, Voltage High	P	P
		Temperature High, Voltage Low	P	P
		Temperature Low, Voltage High	P	P
		Temperature Low, Voltage Low	P	P
		Temperature Normal, Voltage Normal	P	P
§4.2.12	**§12.1.1**	**Conducted spurious emissions- MS allocated a channel**	**P**	**P**
		Voltage High	P	P
		Voltage Low	P	P

		Voltage Normal	P	P
§4.2.13	**§12.1.2**	**Conducted spurious emissions-MS in idle mode**	**P**	**P**
		Voltage High	P	P
		Voltage Low	P	P
		Voltage Normal	P	P
§4.2.14	**§12.3.1**	**Conducted spurious emissions for MS supporting the R-GSM or ER-GSM frequency band - MS allocated a channel**	**N/A**	**N/A**
		Voltage High	N/A	N/A
		Voltage Low	N/A	N/A
		Voltage Normal	N/A	N/A
§4.2.15	**§12.3.2**	**Conducted spurious emissions for MS supporting the R-GSM or ER-GSM frequency band - MS in idle mode**	**N/A**	**N/A**
		Voltage High	N/A	N/A
		Voltage Low	N/A	N/A
		Voltage Normal	N/A	N/A
§4.2.16	**§12.2.1**	**Radiated spurious emissions-MS allocated a channel**	**P**	**P**
		Voltage Normal	P	P
§4.2.17	**§12.2.2**	**Radiated spurious emissions-MS in idle mode**	**P**	**P**
		Voltage Normal	P	P
§4.2.18	**§12.4.1**	**Radiated spurious emissions for MS supporting the R-GSM or ER-GSM frequency band - MS allocated a channel**	**N/A**	**N/A**
		Voltage Normal	**N/A**	**N/A**
§4.2.19	**§12.4.2**	**Radiated spurious emissions for MS supporting the R-GSM or ER-GSM frequency band - MS in idle mode**	**N/A**	**N/A**
		Voltage Normal	**N/A**	**N/A**
§4.2.20	**§14.7.1**	**Receiver Blocking and spurious response-speech channels**	**P**	**P**
§4.2.21	**§14.7.3**	**Receiver Blocking and spurious response - speech channels for MS supporting the R-GSM or ER-GSM frequency band**	**N/A**	**N/A**
§4.2.22	**3GPP 102933-2 §4.2.1&§4.3.1**	**Improved Receiver Blocking and spurious response - speech channels for 8W MS supporting the R-GSM or ER-GSM frequency band**	**N/A**	**N/A**
§4.2.23	**3GPP 102933-2 §5.2.1&§5.3.1**	**Improved Receiver Blocking and spurious response - speech channels for 2W MS supporting the R-GSM or ER-GSM frequency band**	**N/A**	**N/A**
§4.2.24	**3GPP 102933-2 §4.2.4&§4.3.2**	**Improved Receiver Blocking and spurious response - control channels for 8W MS supporting the R-GSM or ER-GSM frequency band not supporting speech**	**N/A**	**N/A**
§4.2.25	**3GPP 102933-2 §5.2.2&§5.3.2**	**Improved Receiver Blocking and spurious response - control channels for 2W MS supporting the R-GSM or ER-GSM frequency band not supporting speech**	**N/A**	**N/A**
§4.2.26	**§13.17.1**	**Frequency error and Modulation accuracy in EGPRS Configuration**	**P**	**P**

		Temperature High, Voltage High	P	P
		Temperature High, Voltage Low	P	P
		Temperature Low, Voltage High	P	P
		Temperature Low, Voltage Low	P	P
		Temperature Normal, Voltage Normal	P	P
§4.2.27	**§13.17.2**	**Frequency error under multipath and interference conditions in EGPRS Configuration**	**P**	**P**
		Temperature High, Voltage High	P	P
		Temperature High, Voltage Low	P	P
		Temperature Low, Voltage High	P	P
		Temperature Low, Voltage Low	P	P
		Temperature Normal, Voltage Normal	P	P
§4.2.28	**§13.17.3**	**EGPRS Transmitter output power**	**P**	**P**
		Temperature High, Voltage High	P	P
		Temperature High, Voltage Low	P	P
		Temperature Low, Voltage High	P	P
		Temperature Low, Voltage Low	P	P
		Temperature Normal, Voltage Normal	P	P
§4.2.29	**§13.17.4**	**Output RF spectrum in EGPRS Configuration**	**P**	**P**
		Temperature High, Voltage High	P	P
		Temperature High, Voltage Low	P	P
		Temperature Low, Voltage High	P	P
		Temperature Low, Voltage Low	P	P
		Temperature Normal, Voltage Normal	P	P
§4.2.30	**§14.18.5**	**Blocking and spurious response in EGPRS Configuration**	**P**	**P**
§4.2.31	**§14.18.5**	**Blocking and spurious response in DLMC configuration**	**N/A**	**N/A**
§4.2.32	**§14.6.1**	**Intermodulation rejection - speech channels**	**P**	**P**
		Temperature High, Voltage High	P	P
		Temperature High, Voltage Low	P	P
		Temperature Low, Voltage High	P	P
		Temperature Low, Voltage Low	P	P
		Temperature Normal, Voltage Normal	P	P
§4.2.33	**§14.6.2**	**Intermodulation rejection - control channels**	**N/A**	**N/A**
		Temperature High, Voltage High	N/A	N/A
		Temperature High, Voltage Low	N/A	N/A
		Temperature Low, Voltage High	N/A	N/A
		Temperature Low, Voltage Low	N/A	N/A
		Temperature Normal, Voltage Normal	N/A	N/A
§4.2.34	**§14.18.4**	**Intermodulation rejection - EGPRS**	**P**	**P**
		Temperature High, Voltage High	P	P
		Temperature High, Voltage Low	P	P
		Temperature Low, Voltage High	P	P

		Temperature Low, Voltage Low	P	P
		Temperature Normal, Voltage Normal	P	P
§4.2.35	**§14.8.1**	**AM suppression - speech channels**	**P**	**P**
§4.2.36	**§14.8.1**	**AM suppression - control channels**	**N/A**	**N/A**
§4.2.37	**§14.8.3**	**AM suppression - packet channels**	**N/A**	**N/A**
§4.2.38	**§14.5.1.1**	**Adjacent channel rejection - speech channels (TCH/FS)**	**P**	**P**
		Temperature High, Voltage High	P	P
		Temperature High, Voltage Low	P	P
		Temperature Low, Voltage High	P	P
		Temperature Low, Voltage Low	P	P
		Temperature Normal, Voltage Normal	P	P
§4.2.39	**§14.5.2**	**Adjacent channel rejection - control channels**	**N/A**	**N/A**
		Temperature High, Voltage High	N/A	N/A
		Temperature High, Voltage Low	N/A	N/A
		Temperature Low, Voltage High	N/A	N/A
		Temperature Low, Voltage Low	N/A	N/A
		Temperature Normal, Voltage Normal	N/A	N/A
§4.2.40	**§14.18.3**	**Adjacent channel rejection - EGPRS**	**P**	**P**
		Temperature High, Voltage High	P	P
		Temperature High, Voltage Low	P	P
		Temperature Low, Voltage High	P	P
		Temperature Low, Voltage Low	P	P
		Temperature Normal, Voltage Normal	P	P
§4.2.41	**§14.18.3**	**Adjacent channel rejection in DLMC configuration**	**N/A**	**N/A**
		Temperature High, Voltage High	N/A	N/A
		Temperature High, Voltage Low	N/A	N/A
		Temperature Low, Voltage High	N/A	N/A
		Temperature Low, Voltage Low	N/A	N/A
		Temperature Normal, Voltage Normal	N/A	N/A
§4.2.42	**§14.2.1**	**Reference sensitivity - TCH/FS**	**P**	**P**
		Temperature High, Voltage High	P	P
		Temperature High, Voltage Low	P	P
		Temperature Low, Voltage High	P	P
		Temperature Low, Voltage Low	P	P
		Temperature Normal, Voltage Normal	P	P
§4.2.43	**§14.2.3**	**Reference sensitivity - FACCH/F**	**P**	**P**
§4.2.44	**§14.16.1**	**Minimum Input level for Reference Performance - GPRS**	**P**	**P**
		Temperature High, Voltage High	P	P
		Temperature High, Voltage Low	P	P
		Temperature Low, Voltage High	P	P
		Temperature Low, Voltage Low	P	P
		Temperature Normal, Voltage Normal	P	P
§4.2.45	**§14.18.1**	**Minimum Input level for Reference**	**P**	**P**

		Performance - EGPRS		
		Temperature High, Voltage High	P	P
		Temperature High, Voltage Low	P	P
		Temperature Low, Voltage High	P	P
		Temperature Low, Voltage Low	P	P
		Temperature Normal, Voltage Normal	P	P
§4.2.46	**§14.2.9**	**Reference sensitivity - TCH/FS for MS supporting the R-GSM or ER-GSM band**	**N/A**	**N/A**

Note: P means pass,F means failure, N/A means not applicable.

2.1. Test Uncertainty

Where relevant, the following test uncertainty levels have been estimated for tests performed on the apparatus

Parameter	Uncertainty
Radio Frequency	3.5 x10^(-8)
Total RF power, conducted	0.47 dB
Spurious emissions, conducted	2.94 dB
Duty Cycle	5.64 dB
Temperature	0.9 ℃
Humidity	4.5%RH
DC and low frequency voltages	0.45%

3. General Information

3.1. EUT Description

Product Name:	LTE Module
Model Name:	EC25-E, EC25-E MINIPCIE
Hardware Version:	R1.0
Software Version:	EC25EFAR02A04M4G
Support Band:	GSM900/DCS1800
GPRS Class:	12
Tx Frequency Range:	GSM900:880~915MHz DCS1800:1710~1785MHz
Rx Frequency Range:	GSM900:925~960MHz DCS1800:1805 ~1880MHz
Type of modulation:	GMSK for GSM/GPRS 8PSK for EGPRS
Antenna Type:	Connector
Antenna Gain	4dBi

4. Technical Test

4.1. Test Environment

Temperature (℃)	20
Humidity (%RH)	52

4.2. Test Equipment List

Equipment	Manufacturer	Model	Serial No.	Due Date
Receiver	Agilent	N9038A	MY51210142	11/04/2017
Wireless Connectivity Test Set	Agilent	E5515C	MY49080305	11/06/2017
Power Splitter	Agilent	11667C/ 52401	MY53806148	02/25/2018
DC Power Supply	Agilent	E3610A	MY 40010412	01/01/2018
Band Stop Filter	WALNWRIGHT INSTRUMENTS MBHD	WRCT1950-5/40-10SS	SN21	02/25/2018
Band Stop Filter	WALNWRIGHT INSTRUMENTS MBHD	WRCDT 897.6-5/40-8SS	SN9	02/25/2018
Dual Channel EPM Series Power Meter	ROHDE &SCHWARZ	E4419B	MY45100301	09/21/2017
ESG Vector Signal Generator	ROHDE &SCHWARZ	4438C	MY42081708	09/21/2017
Power Sensor	ROHDE &SCHWARZ	8485D	MY41090790	09/21/2017
PSA Spectrum Analyzer	ROHDE &SCHWARZ	E4440A	US41421425	09/21/2017
PSG Signal Generator	ROHDE &SCHWARZ	E8257D	MY45470010	09/21/2017
Signalling Unit 2G	ROHDE &SCHWARZ	E1121	E1121000029	09/21/2017
Fading Simulator	R&S	ABFS	100124	08/15/2017
Bilog Antenna	Schwarzbeck	VULB9160	9160-3316	09/08/2018
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-942	09/08/2018
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-943	09/08/2018
vibration table	STI	DC-1000-13	/	06/24/2017
Cold-heat climate test chamber	Weiss-Voetsch Environmental Testing Instrunments(Taicang) Co., Ltd.	C, 180, -40	54686002620010	12/01/2017

Notes:

Normal: the Temperature is +20 ℃, the humidity is 52%, the voltage is 4.0V;
TL: the Temperature is -10 ℃;
TH: the Temperature is +55℃;
VL: the voltage is 3.3V DC
VH: the voltage is 4.6V DC
There is only show typical and worst test plots in this report.

5. RESULTS

5.1. Transmitter-Frequency error and phase error

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.1

Limits

According to clause 13.1 of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1,13.1.5.

1) Frequency error
   The frequency error shall be less than 0.1ppm, except for GSM 400MS where a value of 0.2ppm shall be used.
2) Phase error
   The RMS phase error shall not exceed 5 degrees.
   The maximum peak deviation during the useful part of each burst shall not exceed 20 degrees.

Test procedure

1) For one transmitted burst, the SS captures the signal as a series of phase samples over the period of the burst. These samples are evenly distributed over the duration of the burst with a minimum sampling rate of 2/T,where T is the modulation symbol period. The received phase trajectory is then represented by this array of at least 294 samples.
2) The SS then calculates, from the known bit pattern and the formal definition of the modulator contained in 3GPP TS 05.04, the expected phase trajectory.
3) .From 1) and 2) the phase trajectory error is calculated, and a linear regression line computed through this phase trajectory error. The slope of this regression line is the frequency error of the mobile transmitter relative to the simulator reference. The difference between the regression line and the individual sample points is the phase error of that point.
4) Step 1)to 3) are repeated for 20 bursts, not necessarily contiguous.
5) The SS instructs the MS to its maximum power control level, all other conditions remaining constant. Step1) to 4) are repeated.
6) The SS instructs the MS to its minimum power control level, all other conditions remaining constant. Step1) to 4) are repeated.
7) The MS is hard mounted on a vibration table and vibrated at the frequency/amplitudes specified in annex 1, TC4(3GPP TS 51 010-1 §Annex1.2.4).During the vibration steps 1) to 6) are repeated.
8) The MS is re-positioned on the vibration table in the two orthogonal planes to the plane used in step7). For each of the orthogonal planes step 7) is repeated.
9) Steps 1) to 6) are repeated under extreme test conditions (see annex 1,TC2.2).

Test Result

PASS

Please refer to following data plots:

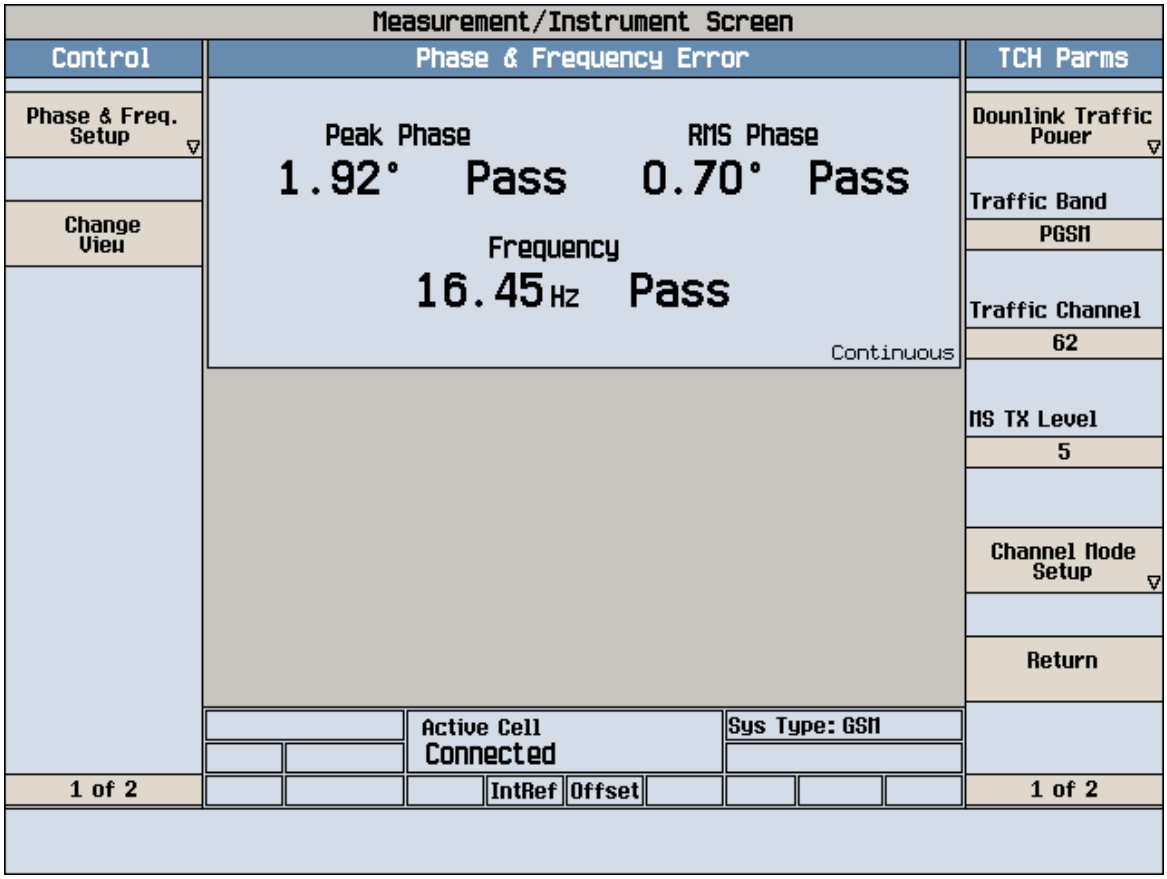
GSM900 Middle Channel

Conditions	Frequency Error (Hz)	Phase Error (°)	
		RMS	Peak
normal	16.45	0.70	1.92
TL/VL	10.65	0.59	1.57
TL /VH	13.04	0.63	1.63
TH/VL	21.56	0.60	1.58
TH/VH	24.80	0.65	1.95
TN/VN/Vibr.axis X	9.50	0.61	1.65
TN/VN/Vibr.axis Y	25.72	0.63	1.66
TN/VN/Vibr.axis Z	23.12	0.68	1.70

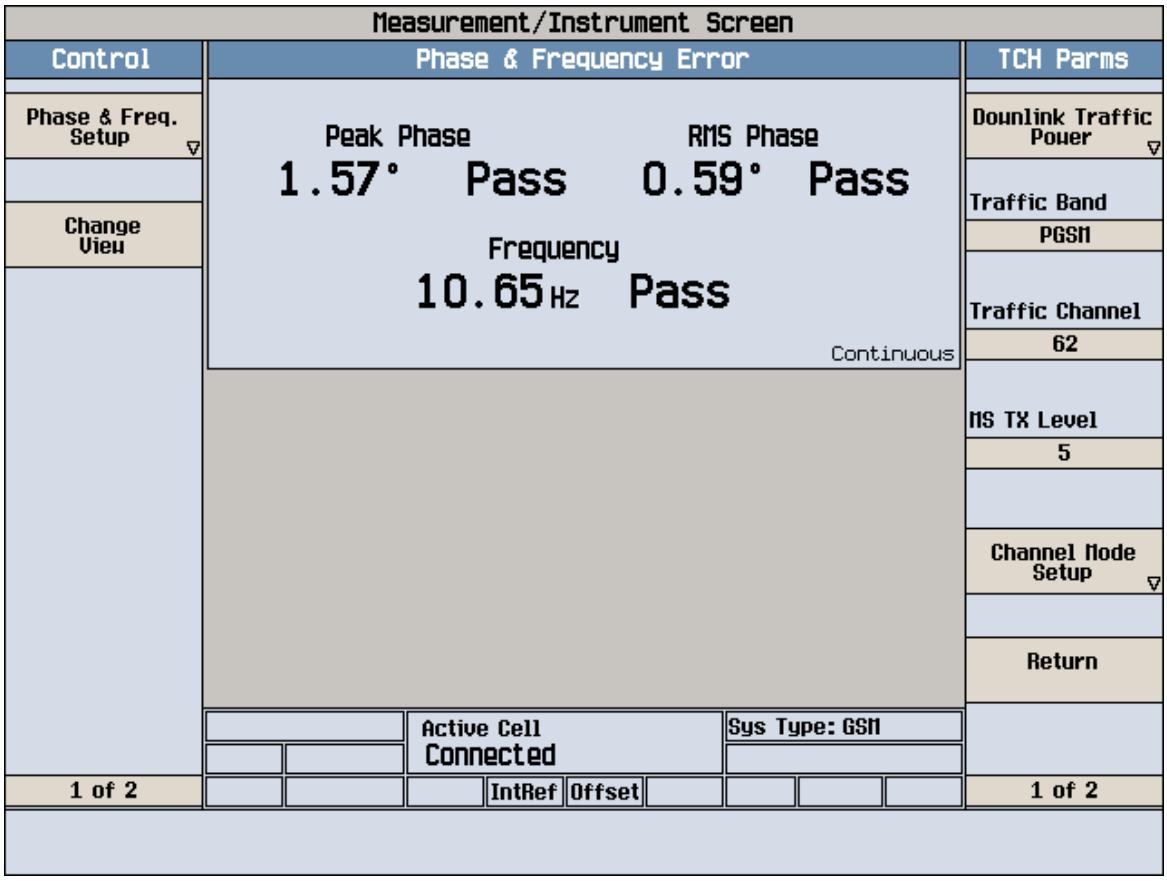
GSM1800 Middle Channel

Conditions	Frequency Error (Hz)	Phase Error(°)	
		RMS	Peak
normal	-9.49	0.62	1.72
TL/VL	-9.36	0.58	1.73
TL /VH	-7.77	0.57	1.63
TH/VL	0.91	0.60	1.94
TH/VH	-7.73	0.60	1.91
TN/VN/Vibr.axis X	-5.90	0.57	1.67
TN/VN/Vibr.axis Y	0.00	0.56	1.67
TN/VN/Vibr.axis Z	7.91	0.54	1.40

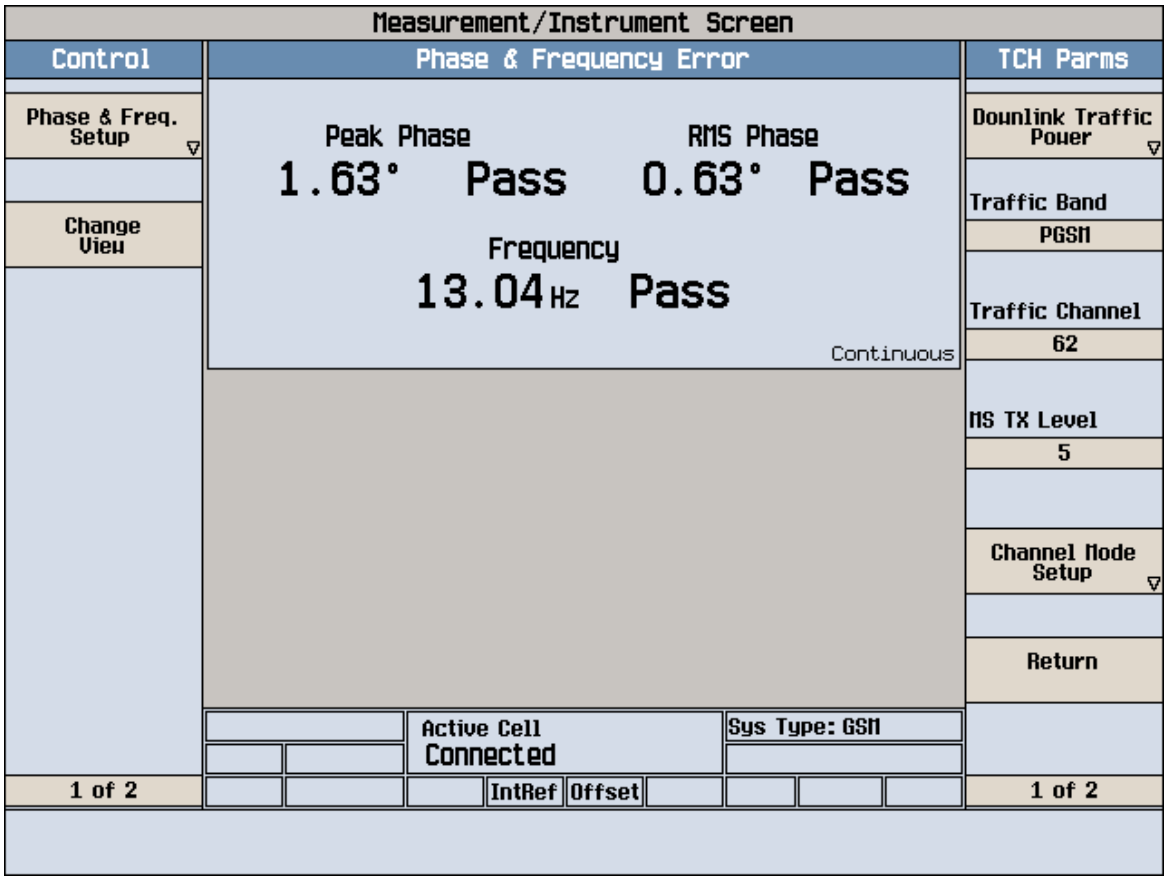
GSM900 Mid Channel normal



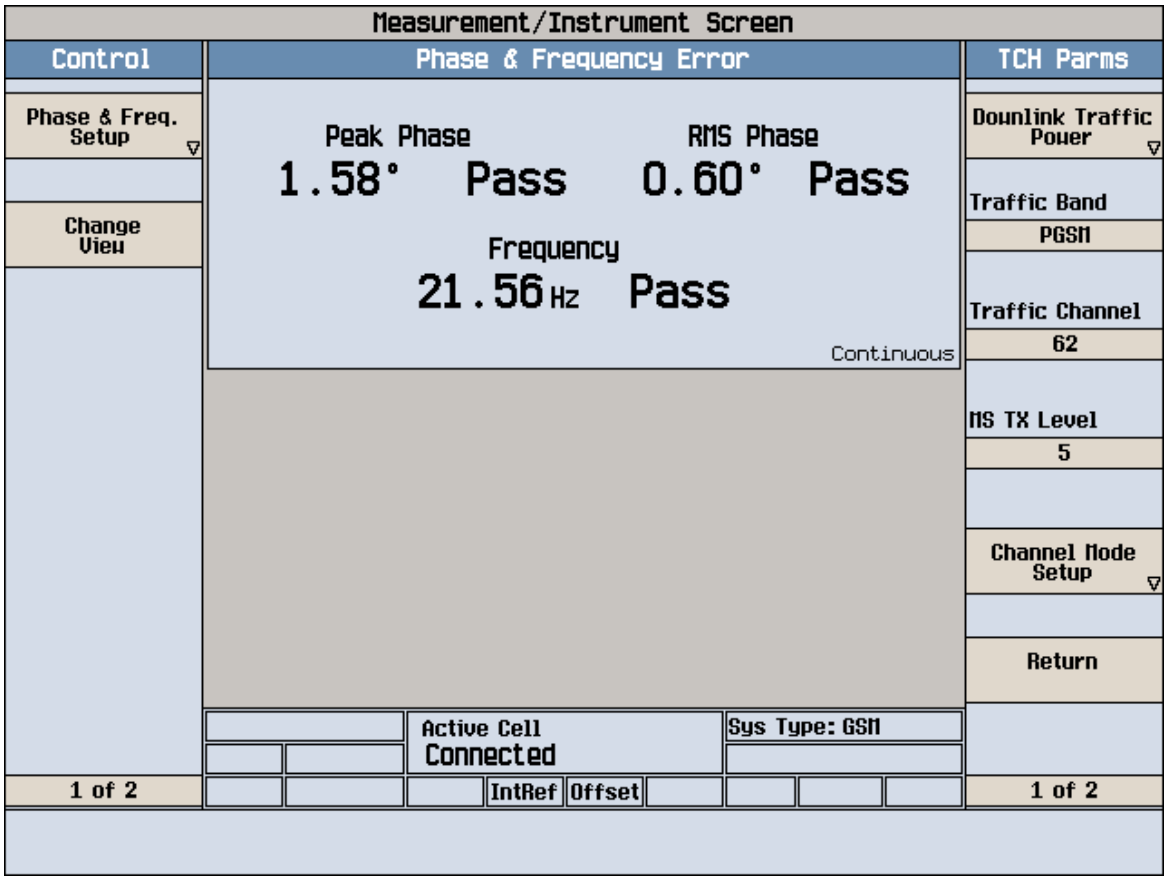
GSM900 Mid Channel TL/VL



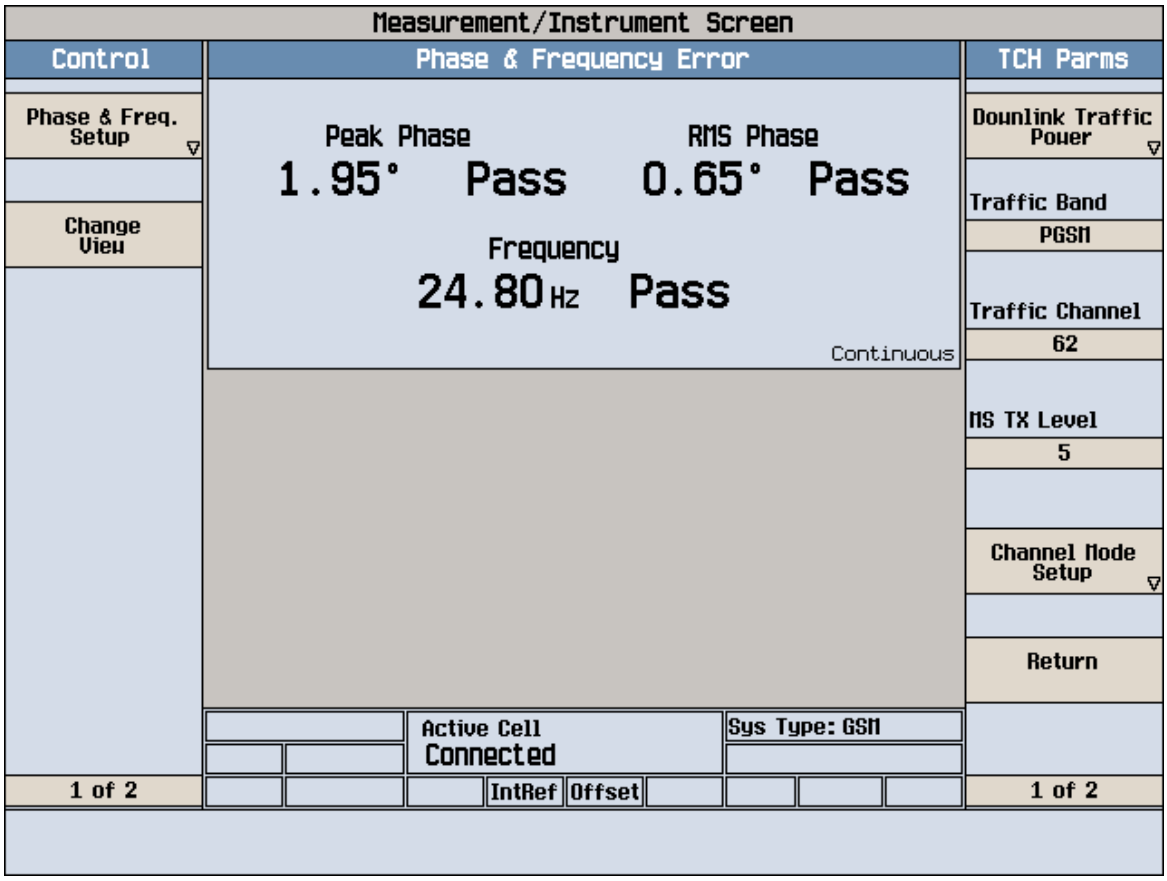
GSM900 Mid Channel TL/VH



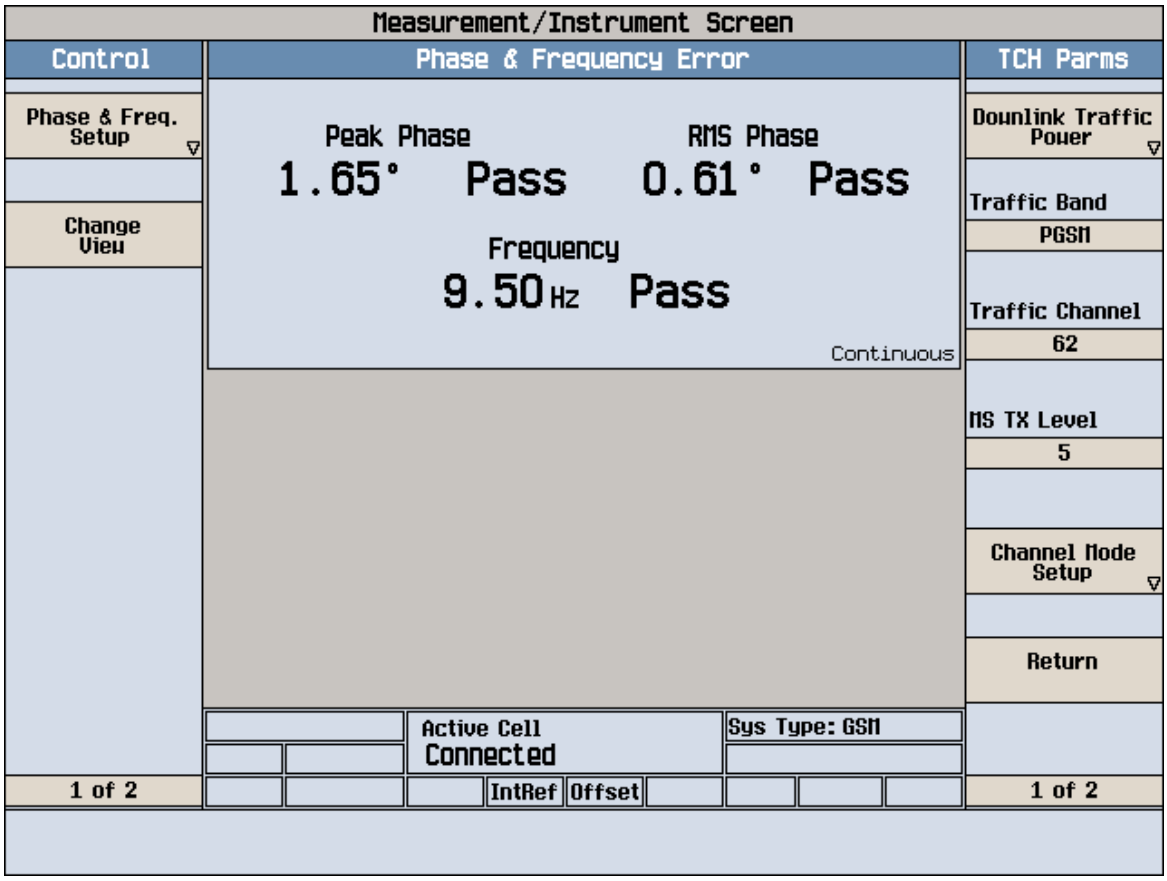
GSM900 Mid Channel TH/VL



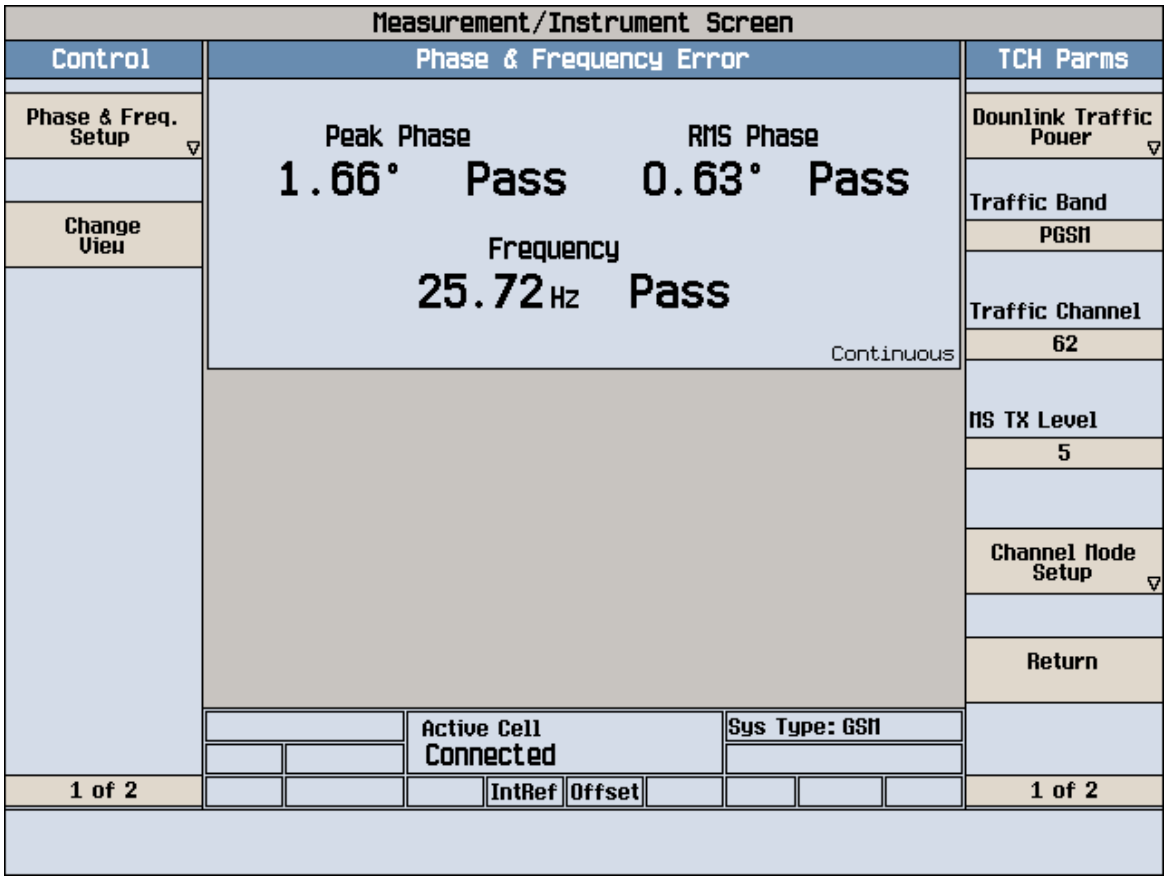
GSM900 Mid Channel TH/VH



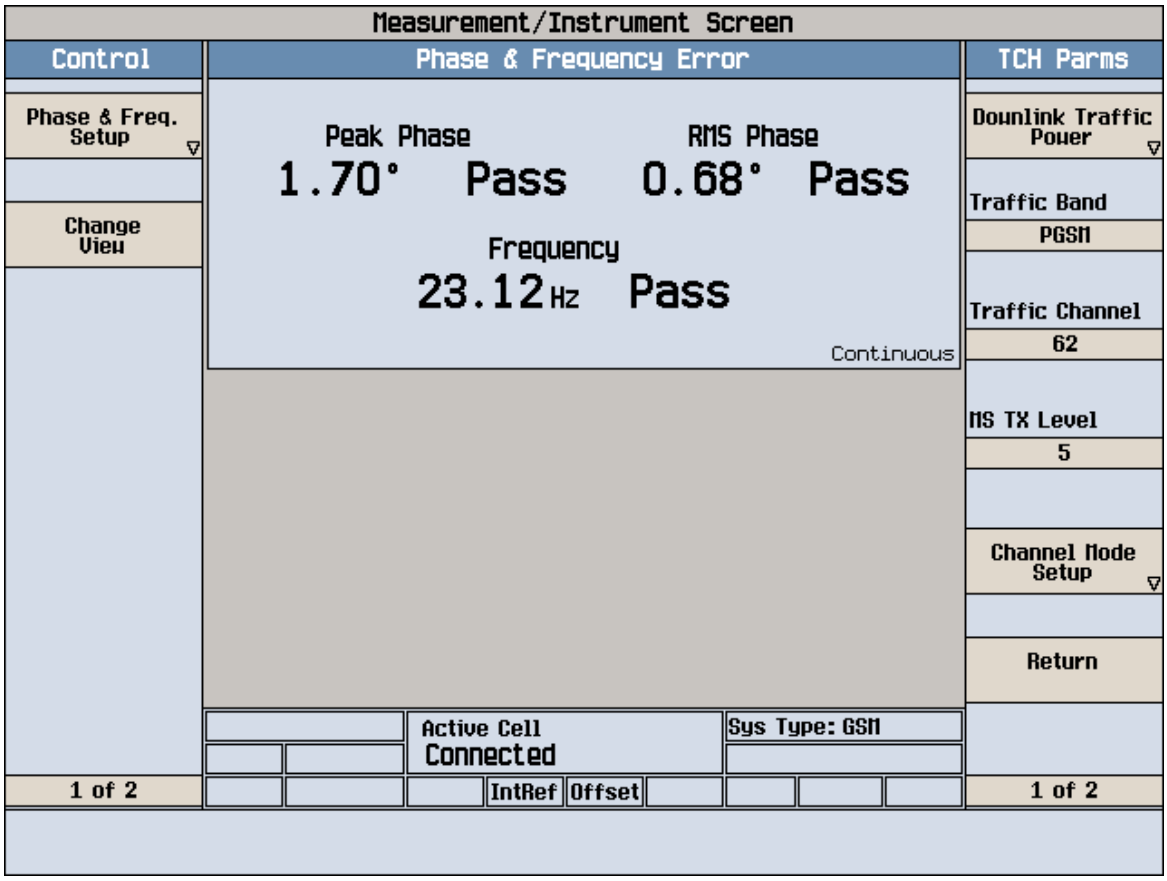
GSM900 Mid Channel normal vibration X axis



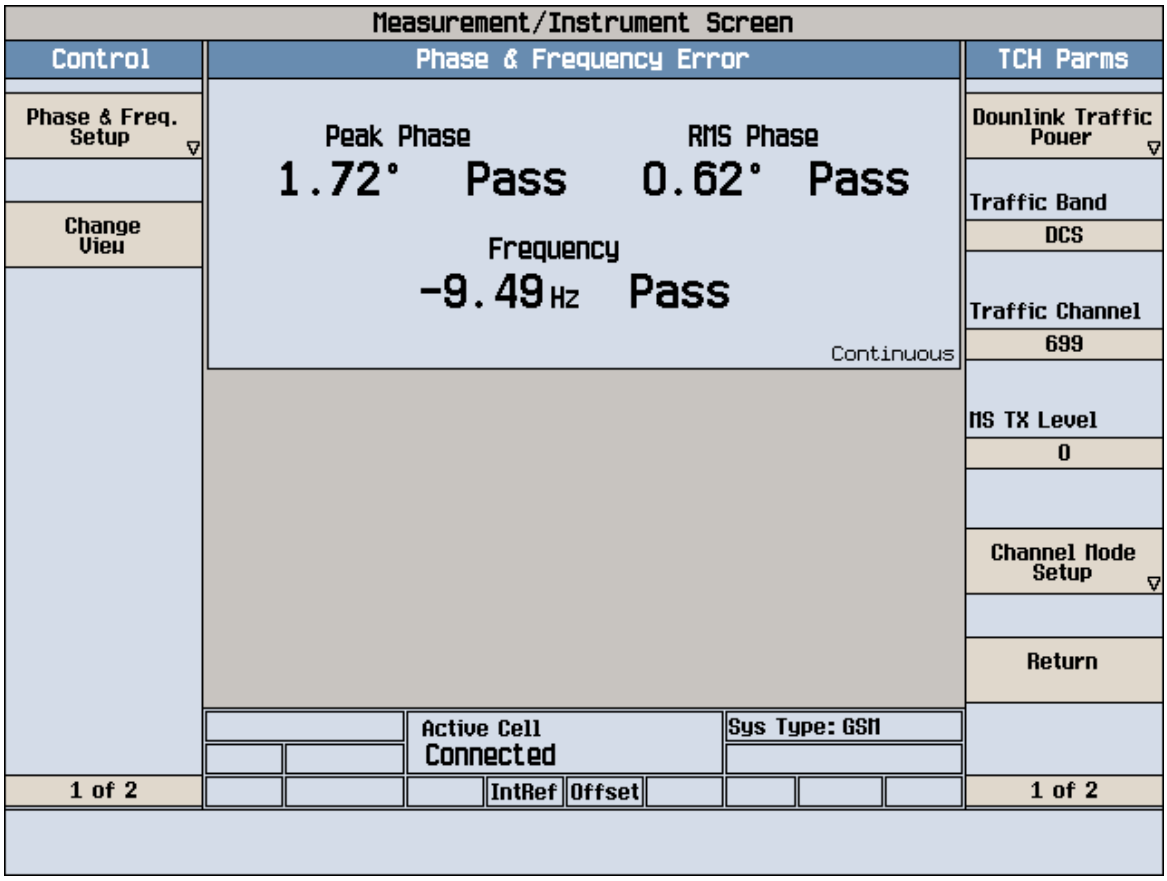
GSM900 Mid Channel normal vibration Y axis



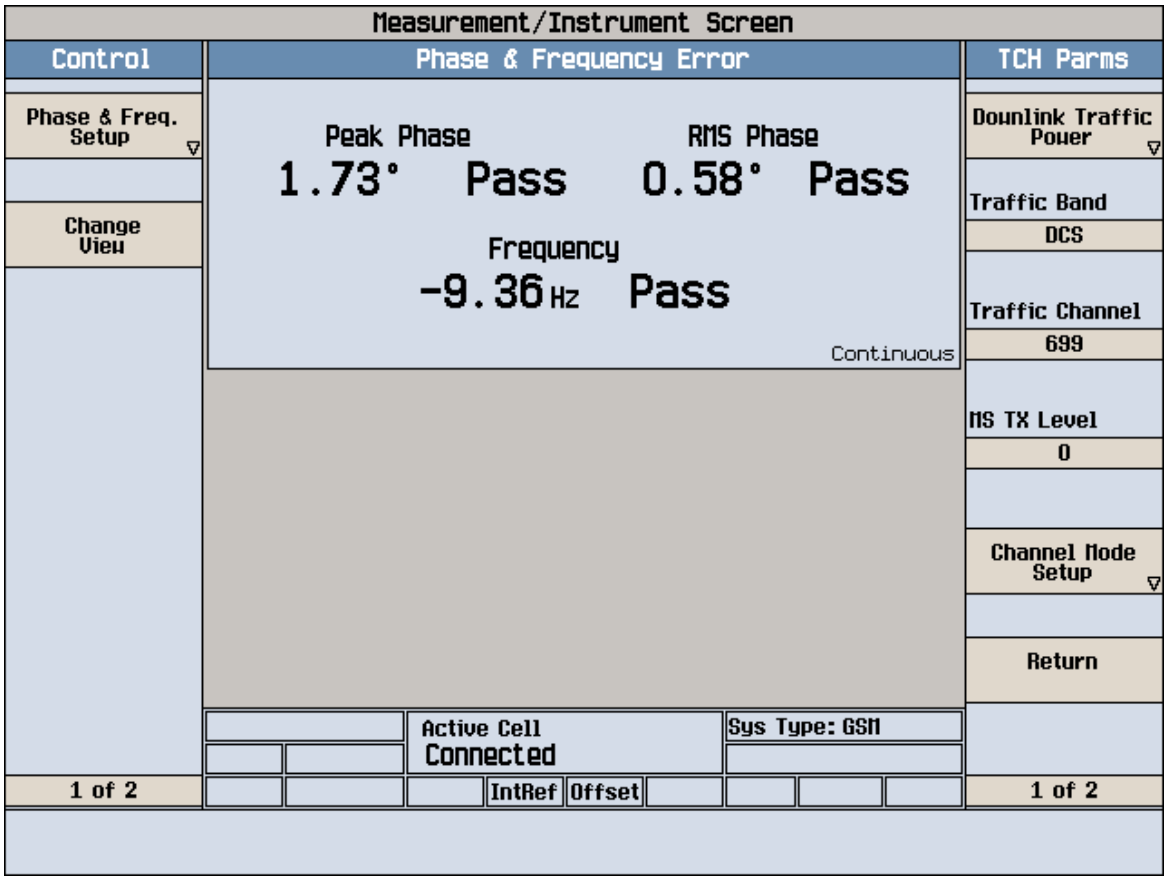
GSM900 Mid Channel normal vibration Z axis



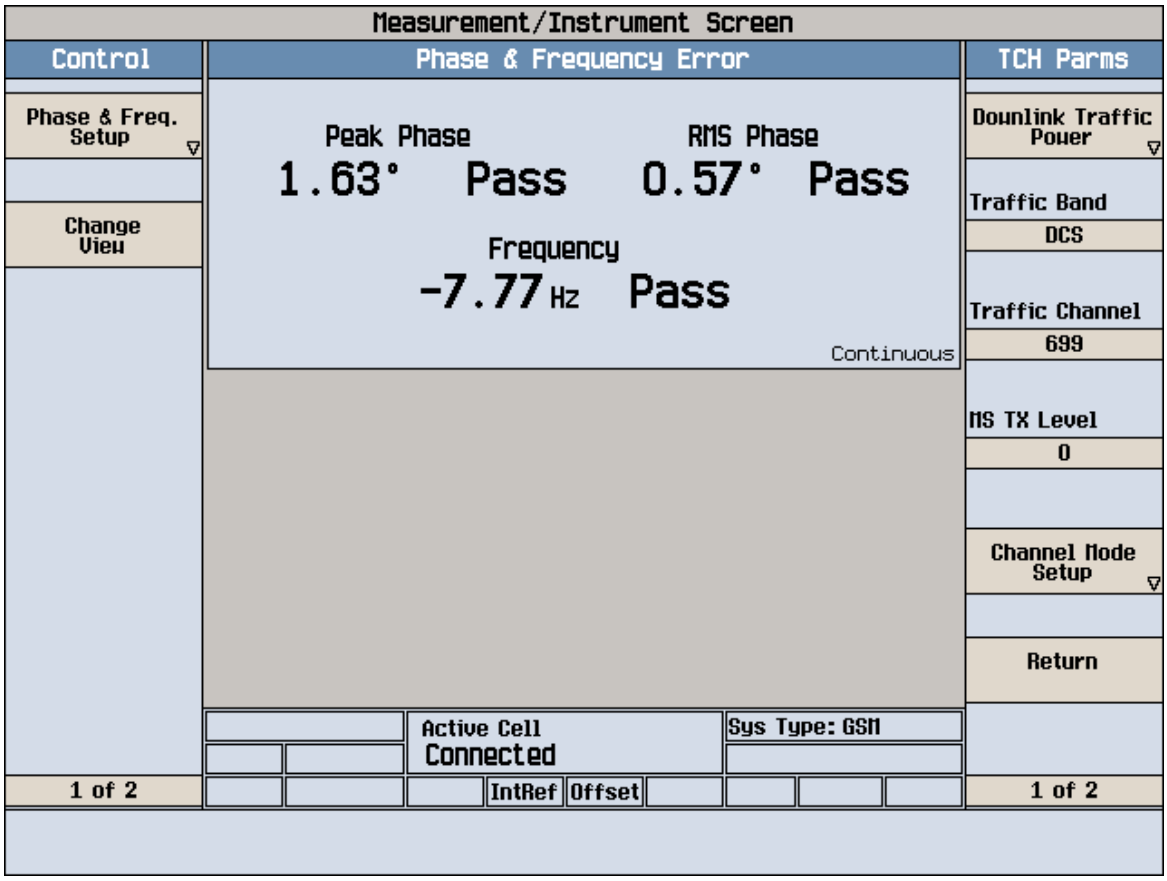
GSM1800 Mid Channel normal



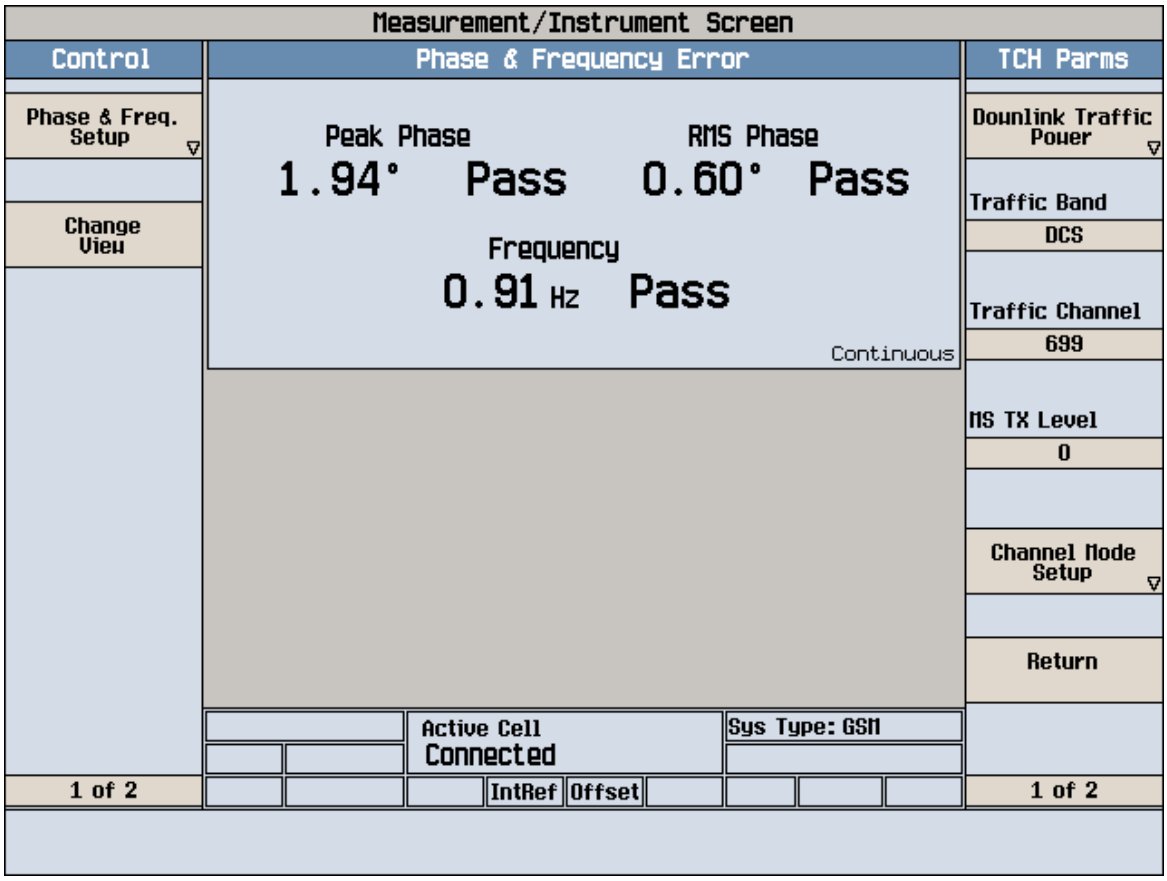
GSM1800 Mid Channel TL/VL



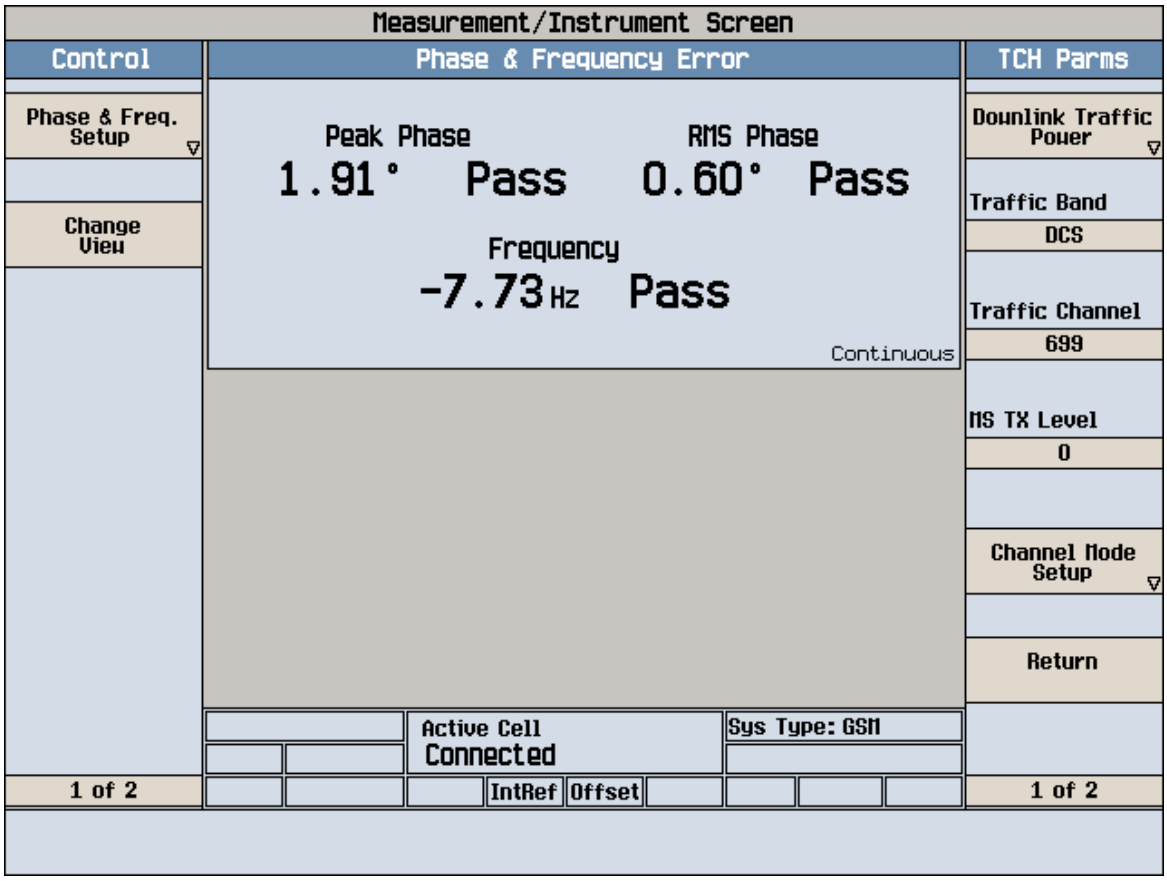
GSM1800 Mid Channel TL/VH



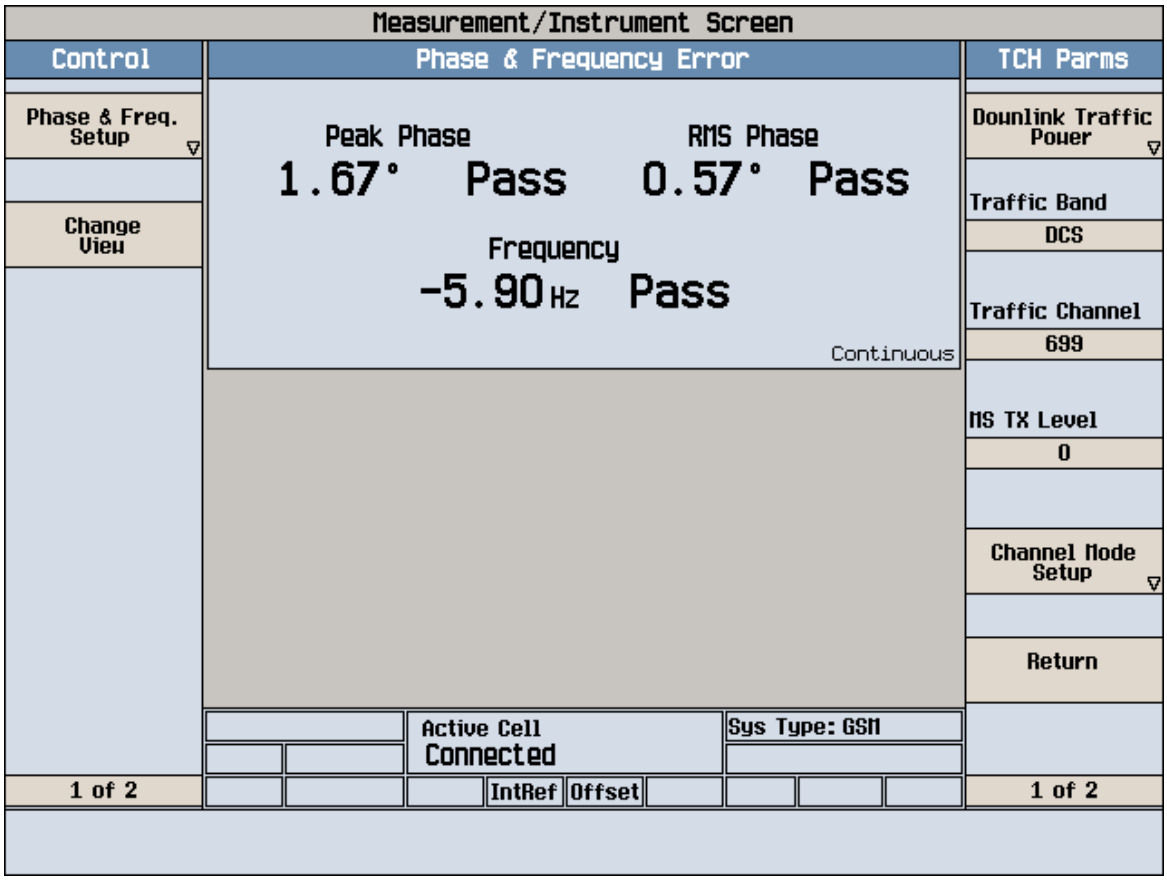
GSM1800 Mid Channel TH/VL



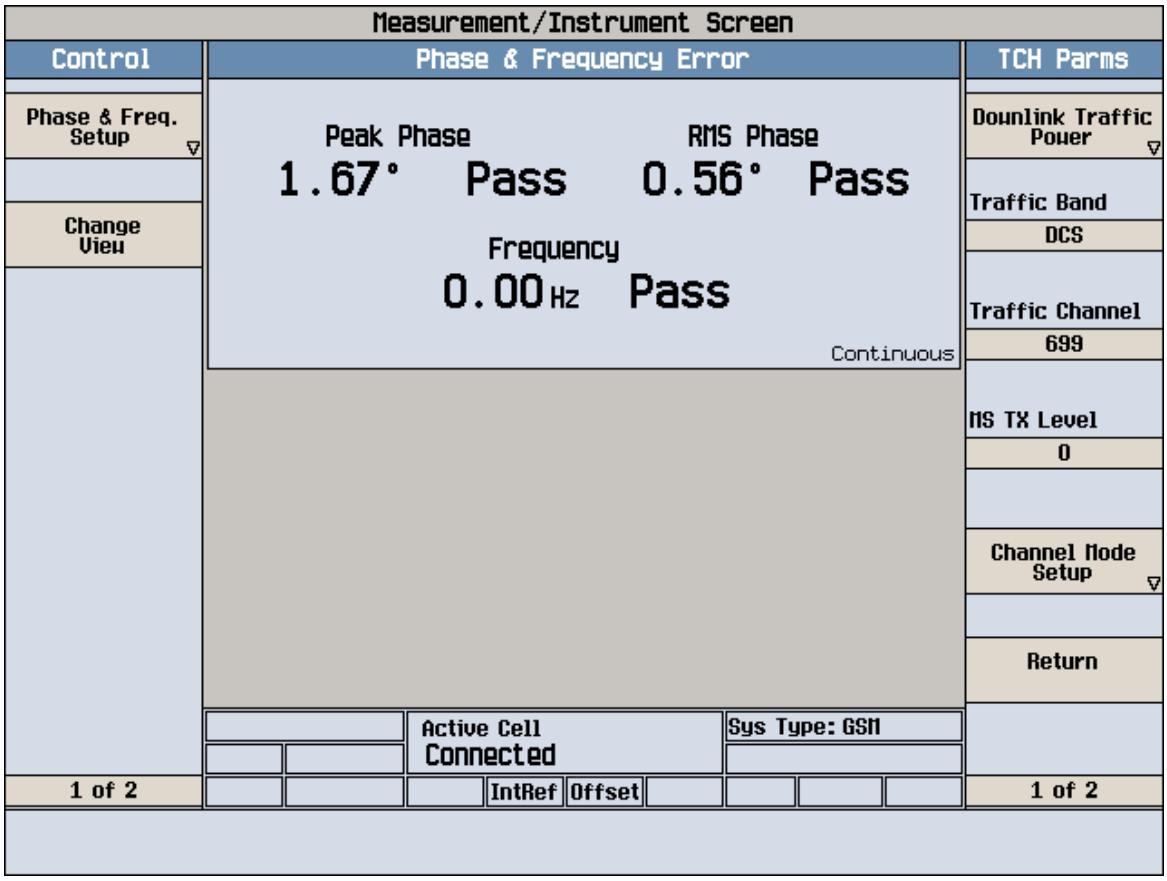
GSM1800 Mid Channel TH/VH



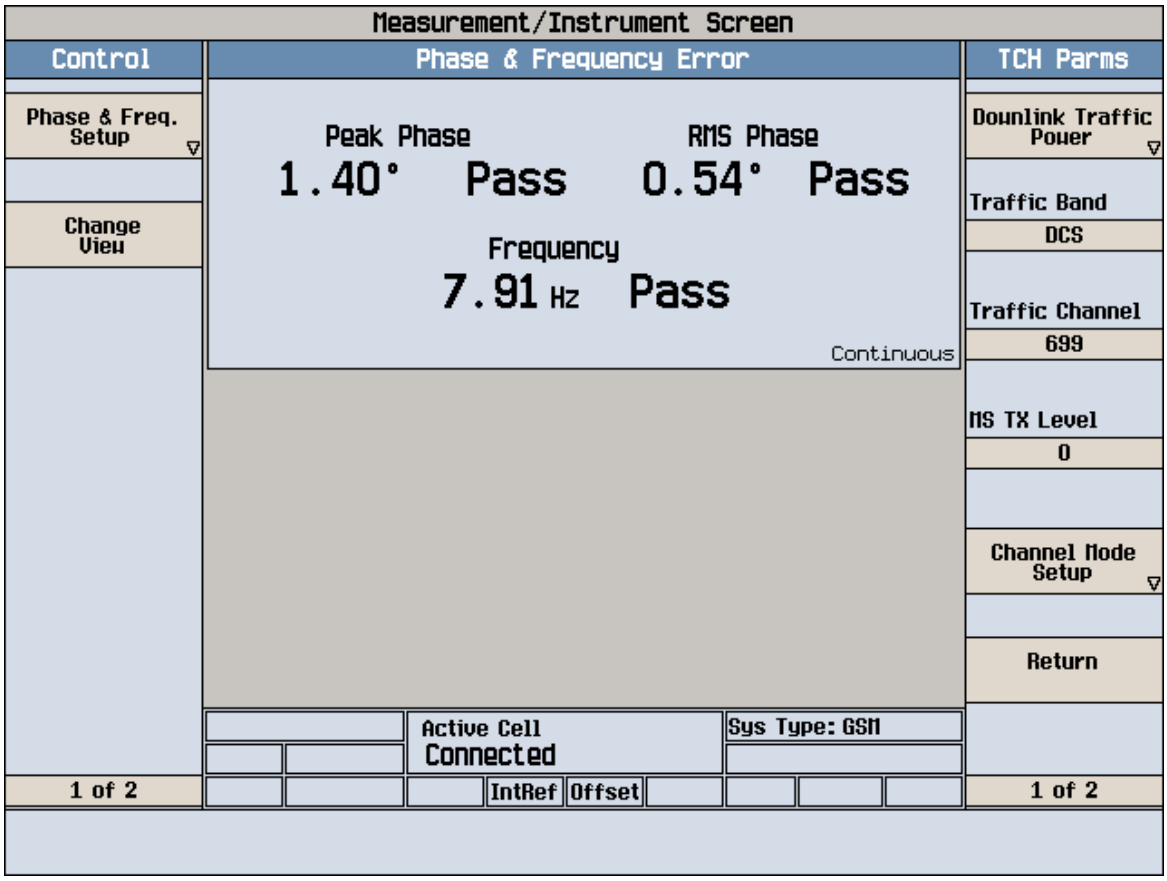
GSM1800 Mid Channel normal vibration X axis



GSM1800 Mid Channel normal vibration Y axis



GSM1800 Mid Channel normal vibration Z axis



5.2. Transmitter-Frequency error under multipath and interference conditions

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.2

Limits

According to clause 13.2 of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1,13.2.5.

1. The MS carrier frequency error for each burst shall be accurate to within 0.1ppm(0.2ppm for GSM 400), or 0.1ppm(0.2ppm for GSM 400) compared to signals received from the BS for signal levels down to 3dB below the reference sensitivity level.
2. The MS carrier frequency error for each burst shall be accurate to within 0.1ppm(0.2ppm for GSM 400), or 0.1ppm(0.2ppm for GSM 400) compared to signals received from the BS for 3dB less carrier to interference ratio than the reference ratios(3GPP TS 05.10, sub-clauses 6 and 6.1).

Table 4-9a: Requirements for frequency error under multipath, Doppler shift and interference conditions

T-GSM 810, GSM 850 and GSM 900		DCS 1 800		PCS 1 900	
Propagation condition	Permitted frequency error	Propagation condition	Permitted frequency error	Propagation condition	Permitted frequency error
RA250	±300 Hz	RA130	±400 Hz	RA130	±420 Hz
HT100	±180 Hz	HT100	±350 Hz	HT100	±370 Hz
TU50	±160 Hz	TU50	±260 Hz	TU50	±280 Hz
TU3	±230 Hz	TU1,5	±320 Hz	TU1,5	±330 Hz

Table 4-9b: Requirements for frequency error under multipath, Doppler shift and interference conditions

GSM 450		GSM 480		GSM 700	
Propagation condition	Permitted frequency error	Propagation condition	Permitted frequency error	Propagation condition	Permitted frequency error
RA500	±300 Hz	RA500	±300 Hz	RA 300	±300 Hz
HT200	±180 Hz	HT200	±180 Hz	HT 120	±180 Hz
TU100	±160 Hz	TU100	±160 Hz	TU 60	±160 Hz
TU6	±230 Hz	TU6	±230 Hz	TU 3.6	±230 Hz

NOTE: The frequency error, with reference to the SS carrier frequency as measured in repeats of step 5), for each measured burst shall be less than the values shown in Table 4-9a and Table 4-9b.

Test procedure

1) The level of the serving cell BCCH is set to 10dB above the reference sensitivity level() and the fading function set to RA. The SS waits 30s for the MS to stabilize to these conditions. The SS is set up to capture the first burst transmitted by the MS during call establishment. A call is initiated by the SS on a channel in mid ARFCN range as described for the generic call set up procedure but to a TCH at level 10dB above the reference sensitivity level() and fading function set to RA.
2) The SS calculates the frequency accuracy of the captured as described in test 13.1.
3) The SS sets the serving cell BCCH and TCH to the reference sensitivity level() applicable to the type of MS, still with fading function set to RA and then waits 30s for the MS to stabilize to these conditions..
4) The SS shall capture subsequent bursts from the traffic channel in the manner described in test 13.1.
5) The SS calculates the frequency accuracy of the captured burst as described in 13.1.
6) Steps 4) and 5) are repeated for 5 traffic channel bursts spaced over a period of not less than 20s.
7) The initial conditions are established again and steps 1) to 6) are repeated but with fading function set to HT100(HT200 for GSM400, HT120 for GSM 700).
8) The initial conditions are established again and steps 1) to 6) are repeated but with fading function set

to TU50(TU100 for GSM400, TU60 for GSM 700).
9) The initial conditions are established again and steps 1) and 2) are repeated but with the following differences:
- the levels of the BCCH and TCH are set to 18dB above reference sensitivity level().
- two further independent interfering signals are sent on the same nominal carrier frequency as the BCCH and TCH and at level 10dB below the level of the TCH and modulated with random data, including the mid-amble.
- the fading function for all channels is set to TU low.
10) The SS waits 100s for the MS to stabilize to these conditions.
11) Repeat steps 4) to 6),except that at step 6) the measurement period must be extended to 200s and number of measurements increased to 20.
12) The initial conditions are established again and steps 1) to 11) are repeated for ARFCN in the Low ARFCN range.
13) The initial conditions are established again and steps 1) to 11) are repeated for ARFCN in the High ARFCN range.
14) Repeat step 8) under extreme test conditions(see annex 1, TC2.2).

Test Result

PASS

5.3. Frequency error and phase error in GPRS multi-slot configuration

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.4

Limits

According to clause 13.16.1 of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1,13.16.1.5.

1 Frequency error
For all measured bursts, the frequency error shall be less than 10E-7.
2 Phase error
For all measured bursts, the RMS phase error shall not exceed 5 degrees.
For all measured bursts, each individual phase error shall not exceed 20 degrees.

Test procedure

1) For one transmitted burst on the last slot of the multi-slot configuration, the SS captures the signal as a series of phase samples over the period of the burst. These samples are evenly distributed over the duration of the burst with a minimum sample rate of 2/T, where T is the modulation symbol period. The received phase trajectory is then represented by this array of at least 294 samples.
2) The SS then calculates, from the known bit pattern and the formal definition of the modulator contained in 3GPP TS 05.04, the expected phase trajectory.
3) From 1) and 2) the phase trajectory error is calculated, and a linear regression line computed through this phase trajectory error. The slope of this regression line is the frequency error of the mobile transmitter relative to the simulator reference. The difference between the regression line and the individual sample points is the phase error of that point.
4) Step 1) to 3) are repeated for 20 bursts, not necessarily contiguous.
5) The SS instructs the MS to its maximum power control level by setting the power control parameter ALPHA to 0 and GAMMA for each timeslot to the desired power level in Packet Uplink Assignment message, all other conditions remaining constant. Step1) to 4) are repeated.
6) The SS instructs the MS to its minimum power control level, all other conditions remaining constant. Step1) to 4) are repeated.
7) The MS is hard mounted on a vibration table and vibrated at the frequency/amplitudes specified in annex 1, TC4(3GPP TS 51 010-1 §Annex1.2.4).During the vibration steps 1) to 6) are repeated.
8) The MS is re-positioned on the vibration table in the two orthogonal planes to the plane used in step7). For each of the orthogonal planes step 7) is repeated.
9) Steps 1) to 6) are repeated under extreme test conditions(see annex 1,TC2.2).

Test Result

PASS

Please refer to following data plots

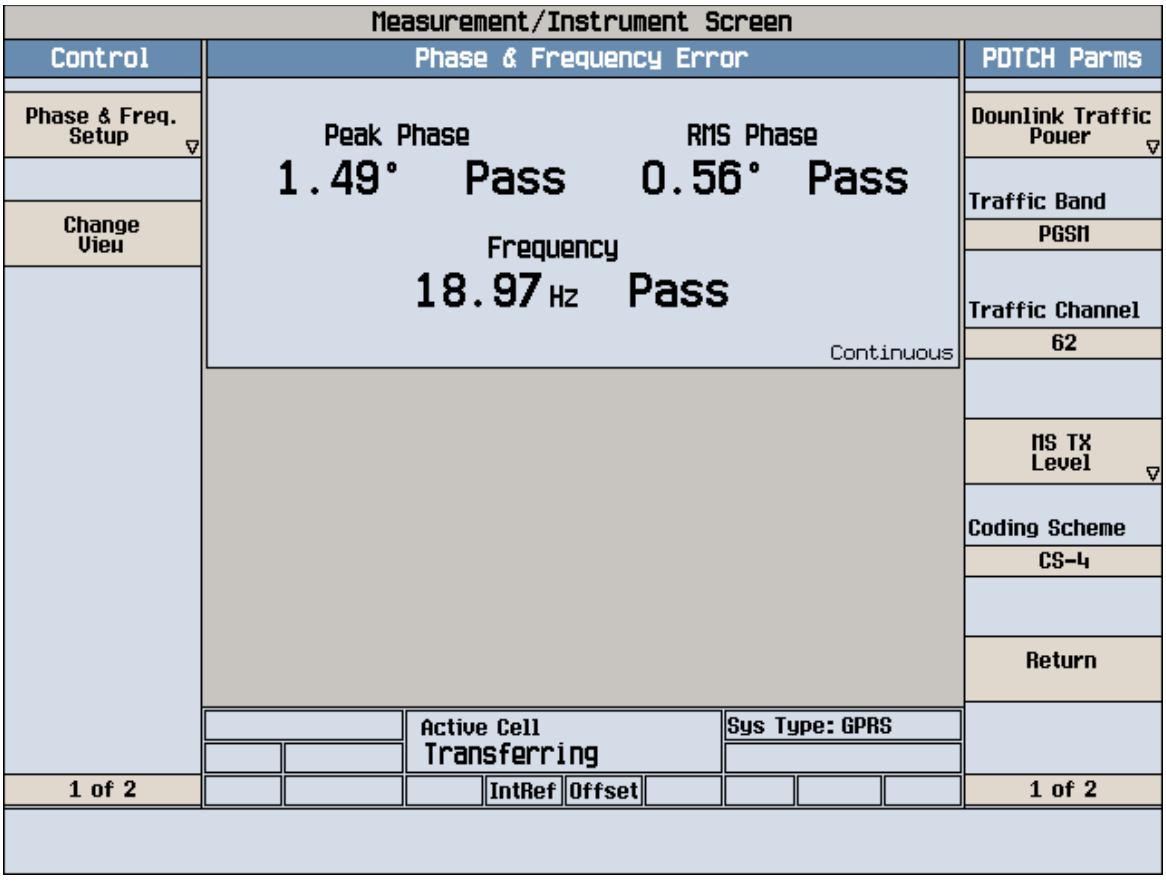
GPRS900 Middle Channel

Conditions	Frequency Error (Hz)	Phase Error (°)	
		RMS	Peak
Normal	18.97	0.56	1.49
TH/VH	12.71	0.58	1.79
TH/VL	18.02	0.59	1.65
TL/VH	17.30	0.57	1.54
TL/VL	18.68	0.58	1.44
TN/VN/Vibr.axis X	16.85	0.63	1.94
TN/VN/Vibr.axis Y	22.95	0.59	1.62
TN/VN/Vibr.axis Z	23.53	0.59	1.42

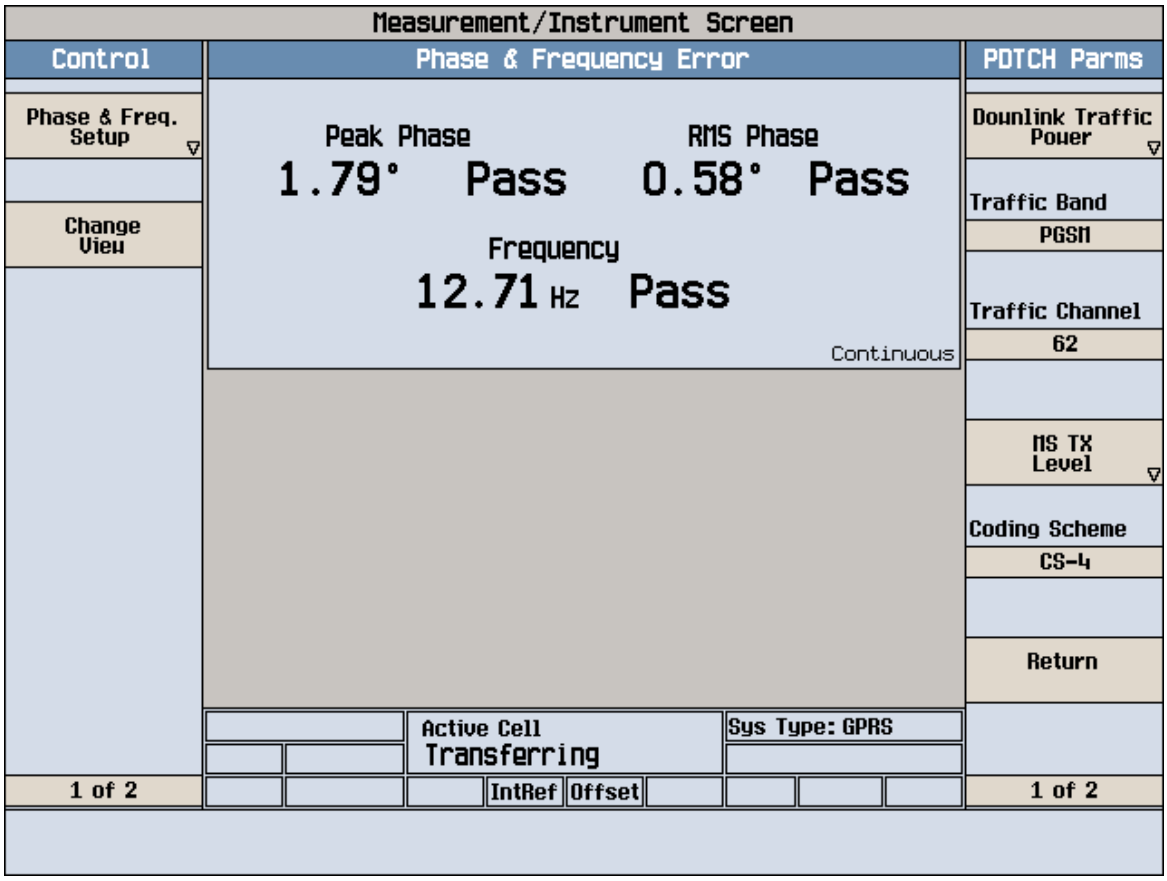
GPRS1800 Middle Channel

Conditions	Frequency Error (Hz)	Phase Error (°)	
		RMS	Peak
Normal	-7.85	0.52	1.49
TH/VH	-7.76	0.54	1.76
TH/VL	0.85	0.50	1.32
TL /VH	-3.59	0.51	1.64
TL/VL	-1.22	0.58	1.55
TN/VN/Vibr.axis X	-0.04	0.51	1.63
TN/VN/Vibr.axis Y	-1.32	0.52	1.60
TN/VN/Vibr.axis Z	0.26	0.58	1.52

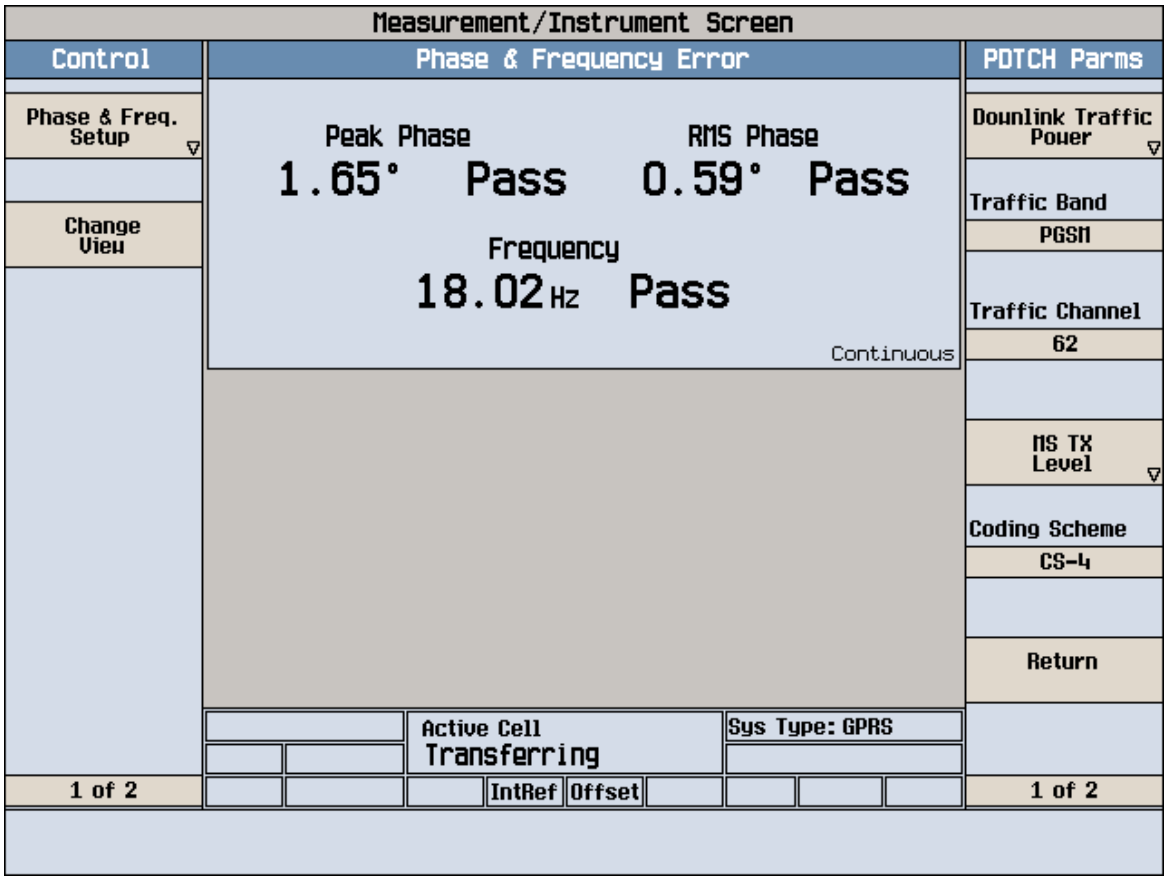
GPRS900 Mid Channel Normal



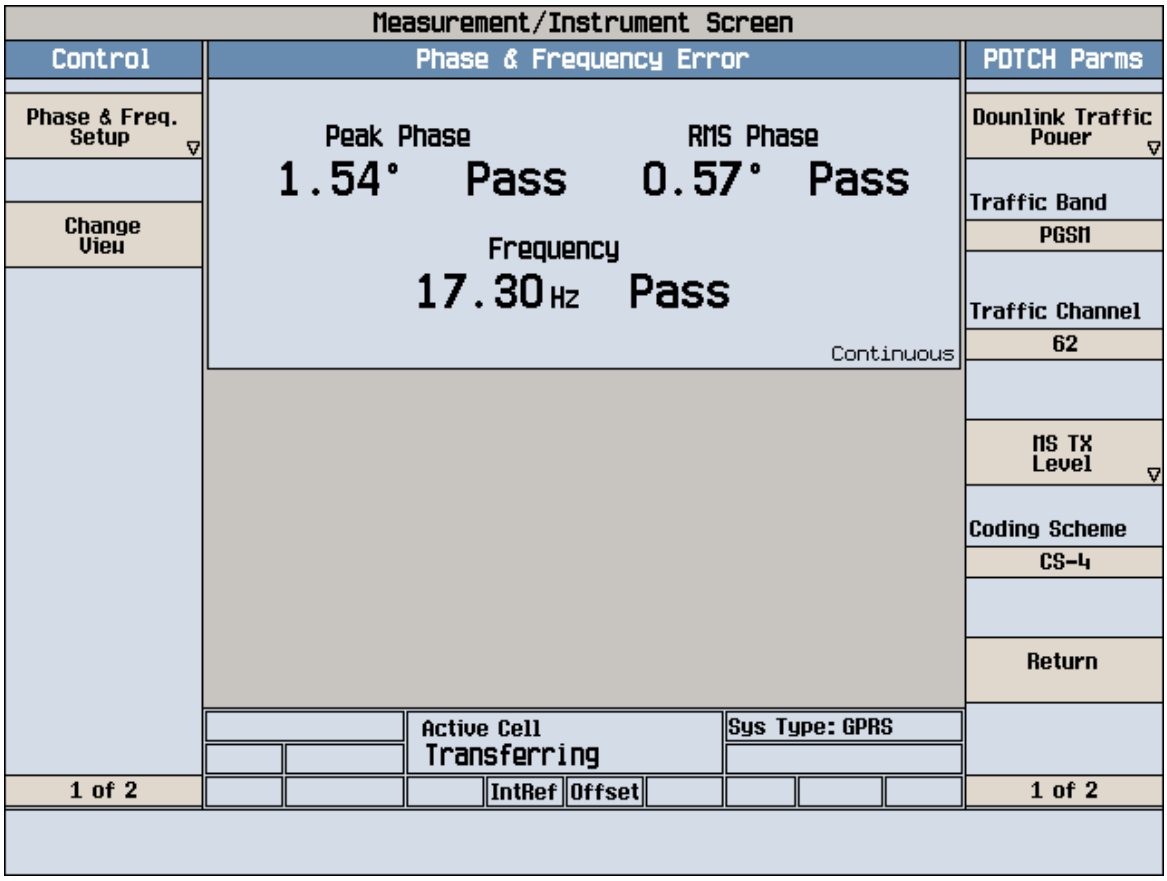
GPRS900 Mid Channel TH/VH



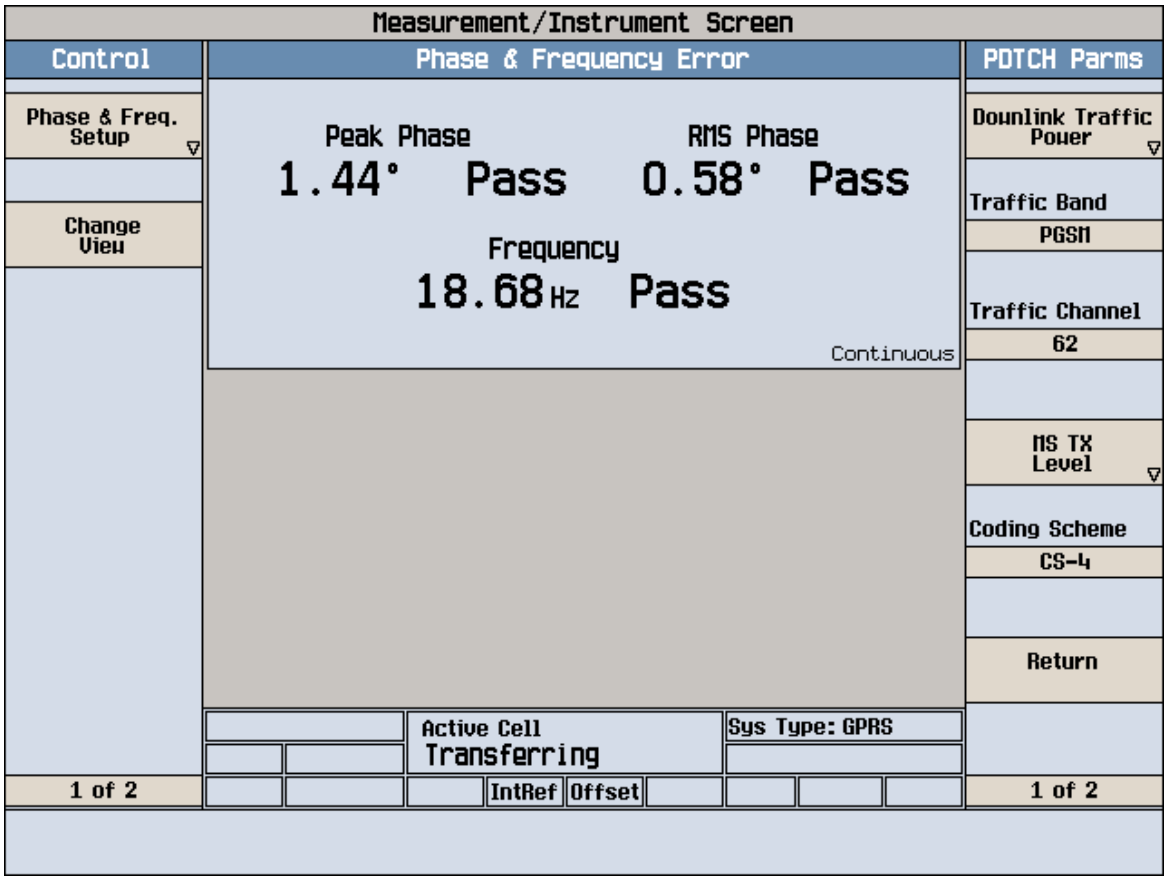
GPRS900 Mid Channel TH/VL



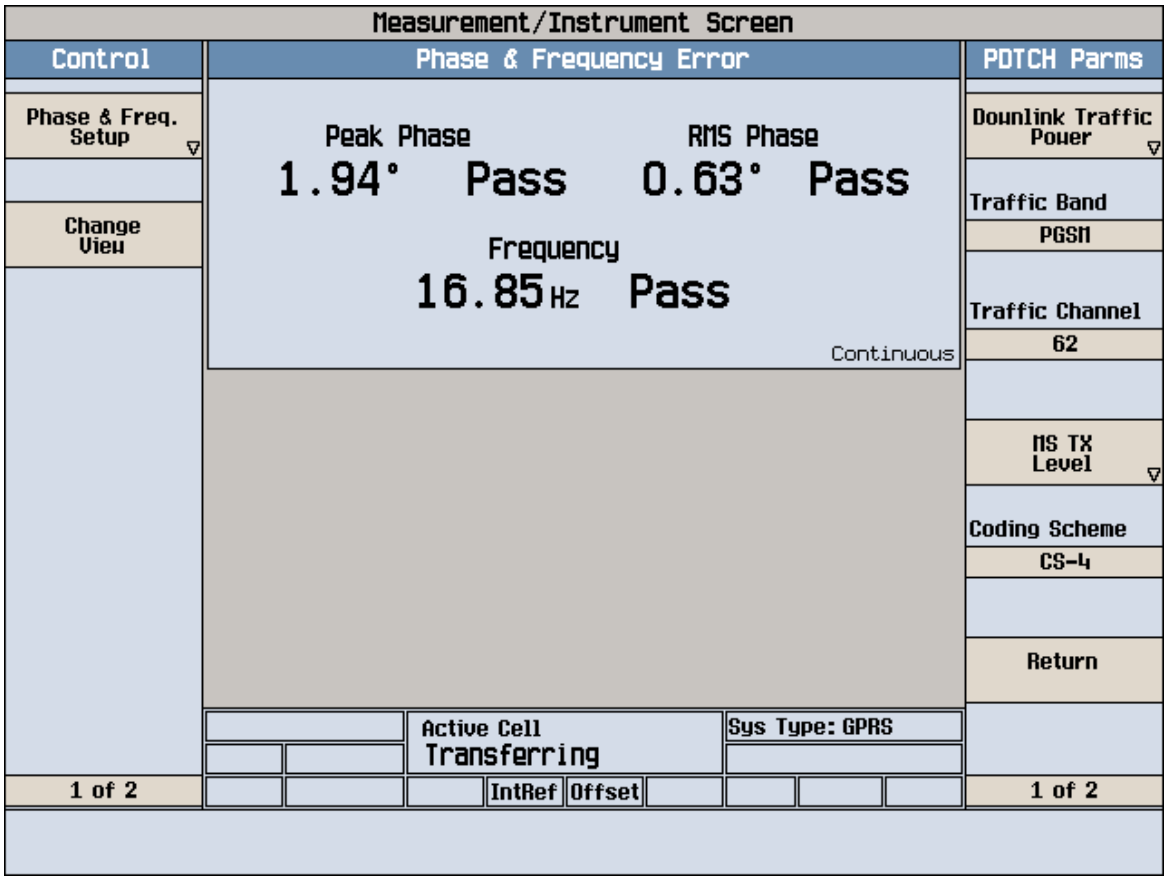
GPRS900 Mid Channel TL/VH



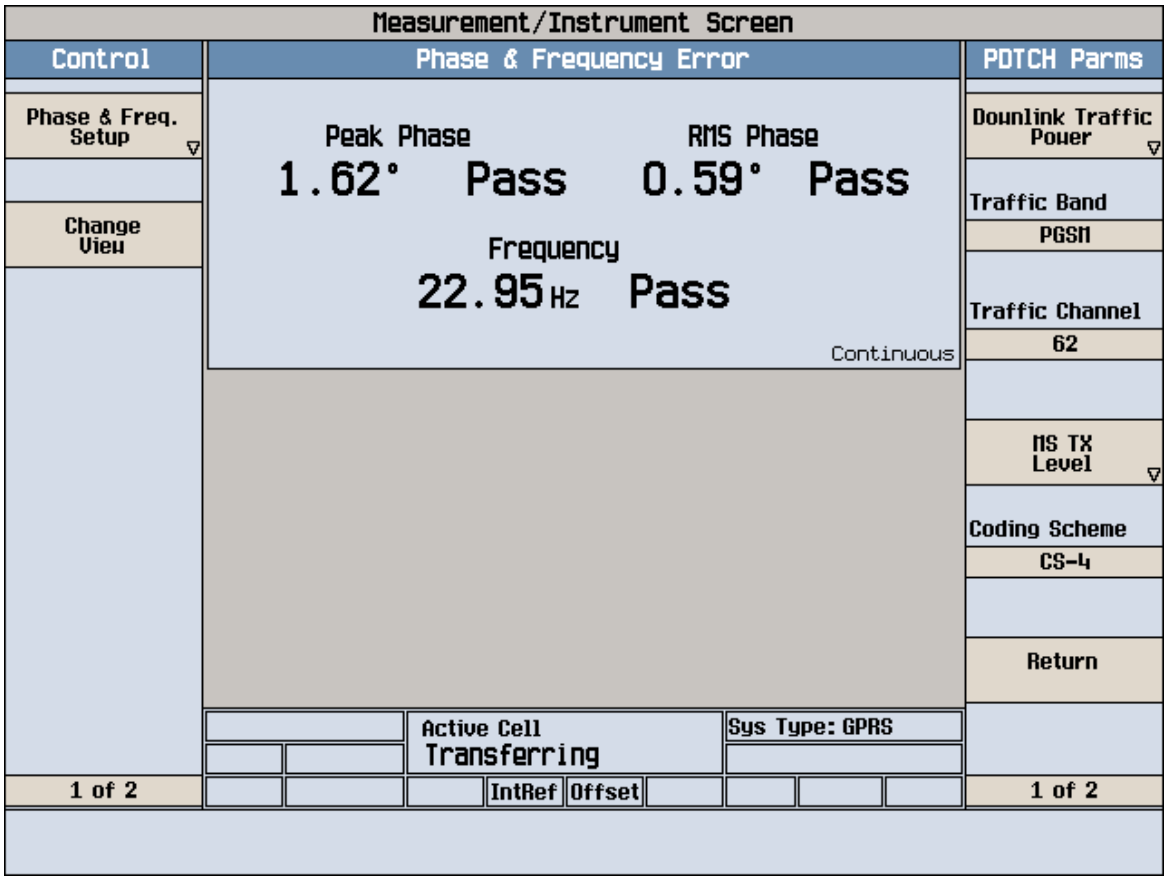
GPRS900 Mid Channel TL/VL



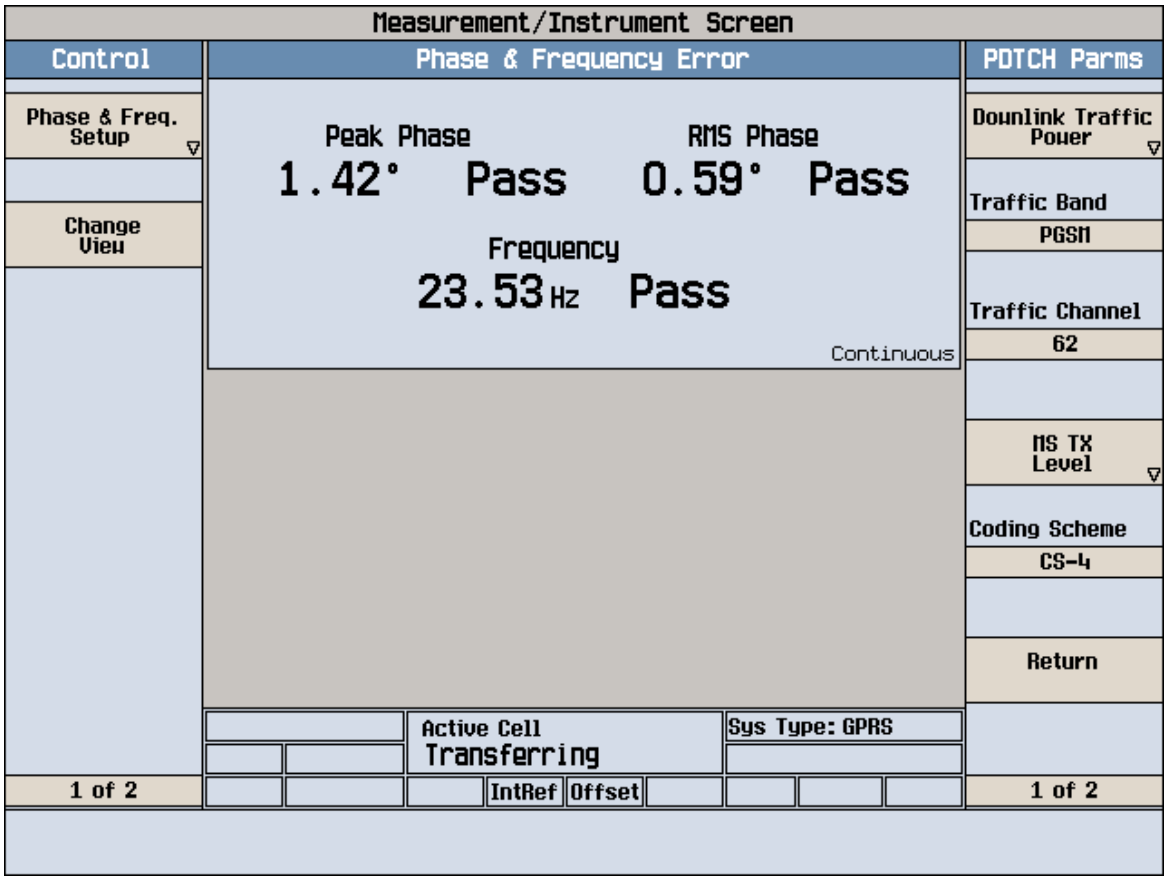
GPRS900 Mid Channel Normal vibration X axis



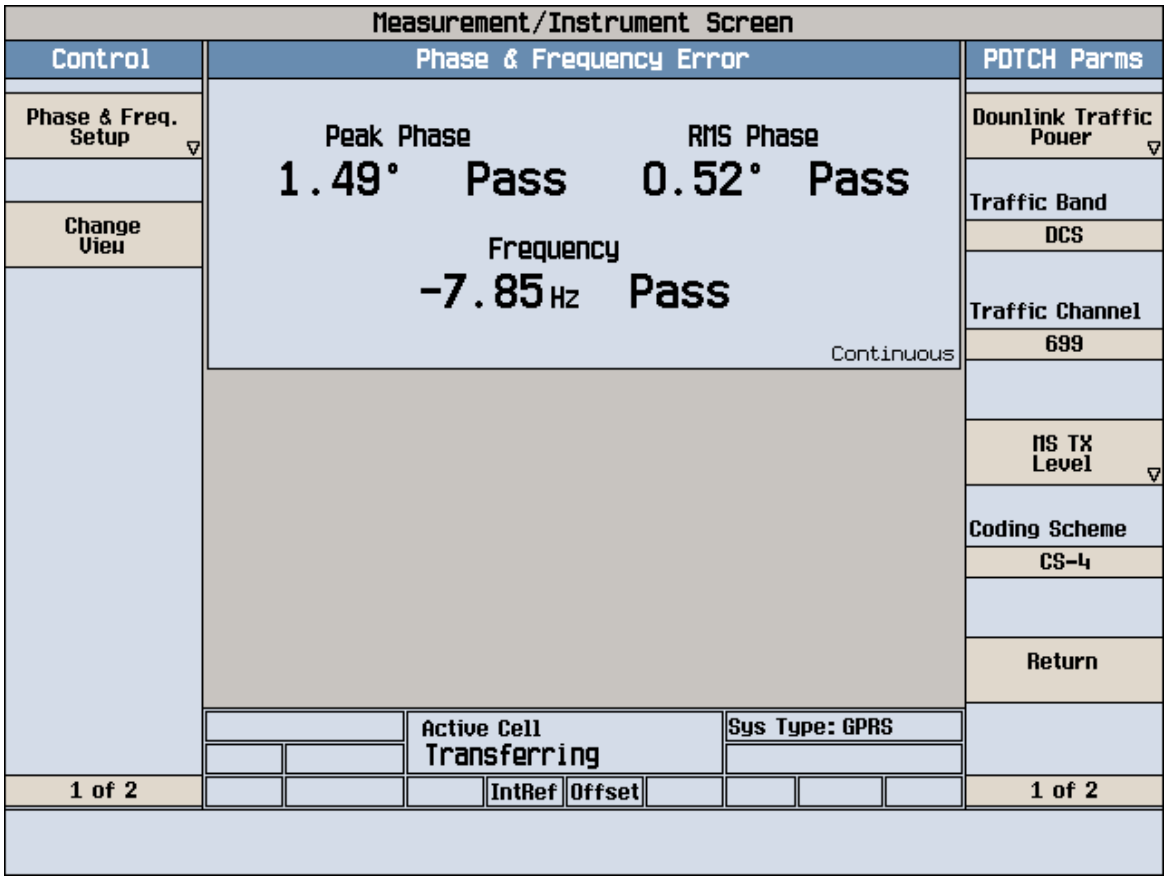
GPRS900 Mid Channel Normal vibration Y axis



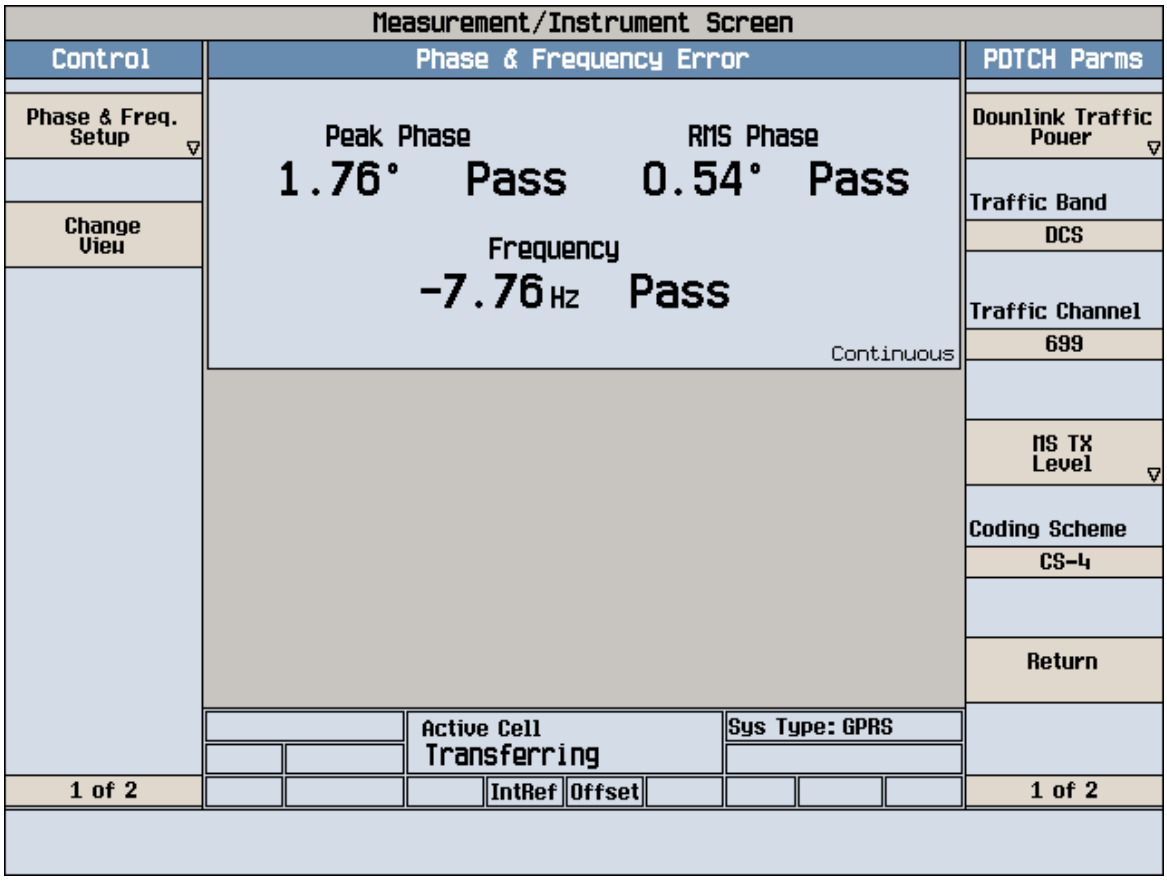
GPRS900 Mid Channel Normal vibration Z axis



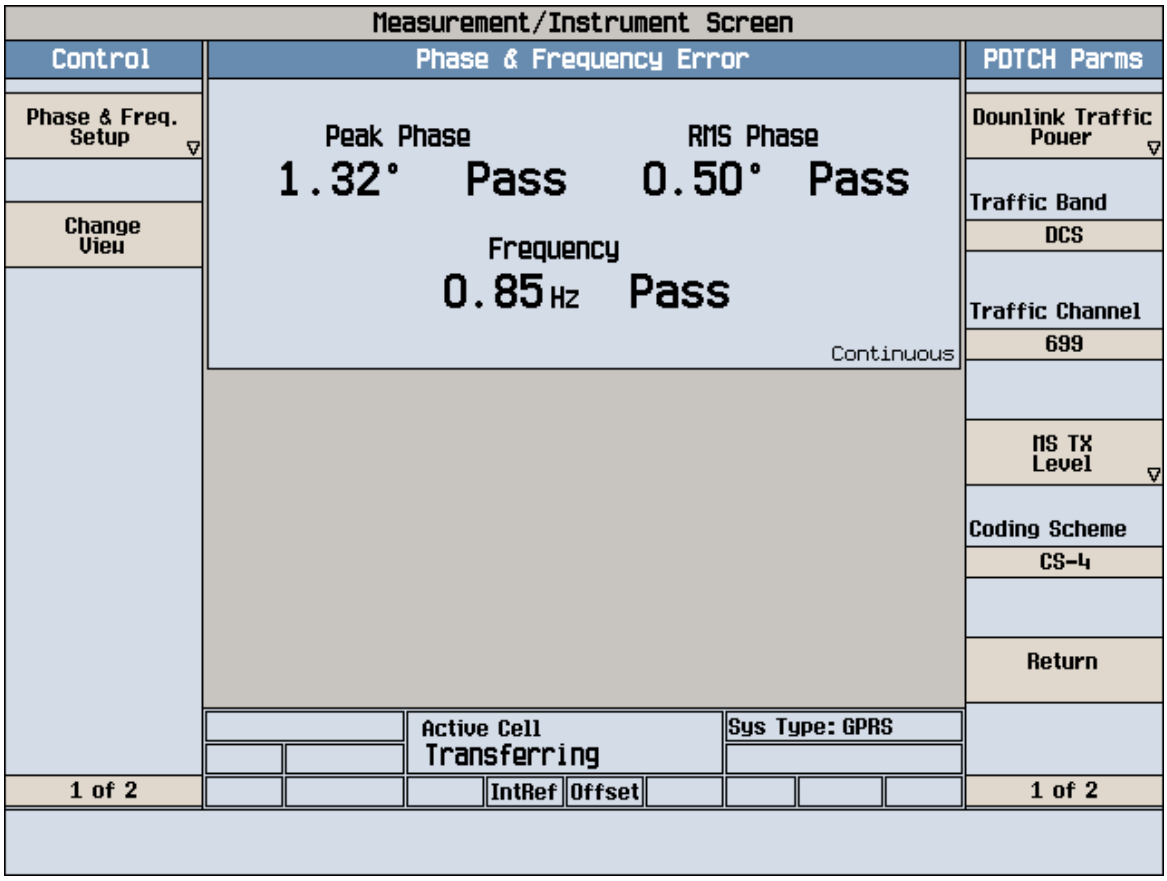
GPRS1800 Mid Channel Normal



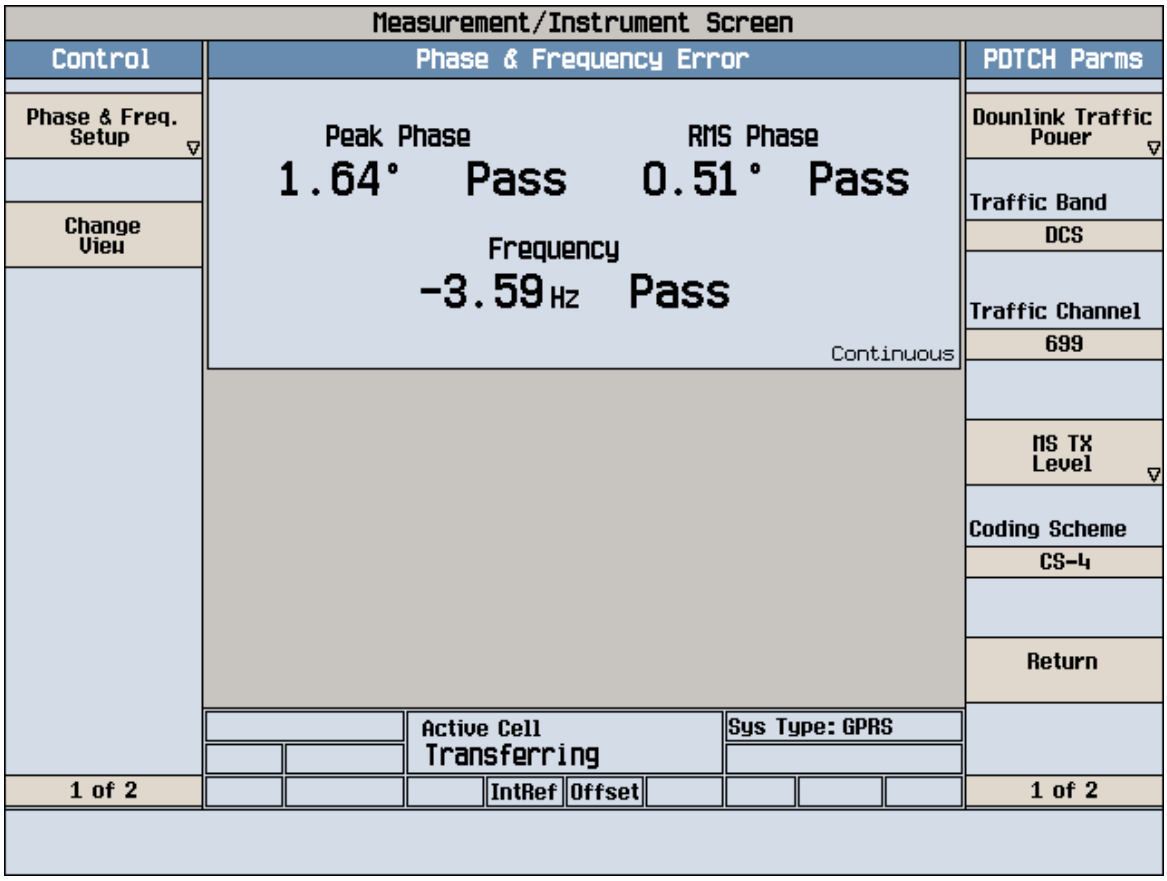
GPRS1800 Mid Channel TH/VH



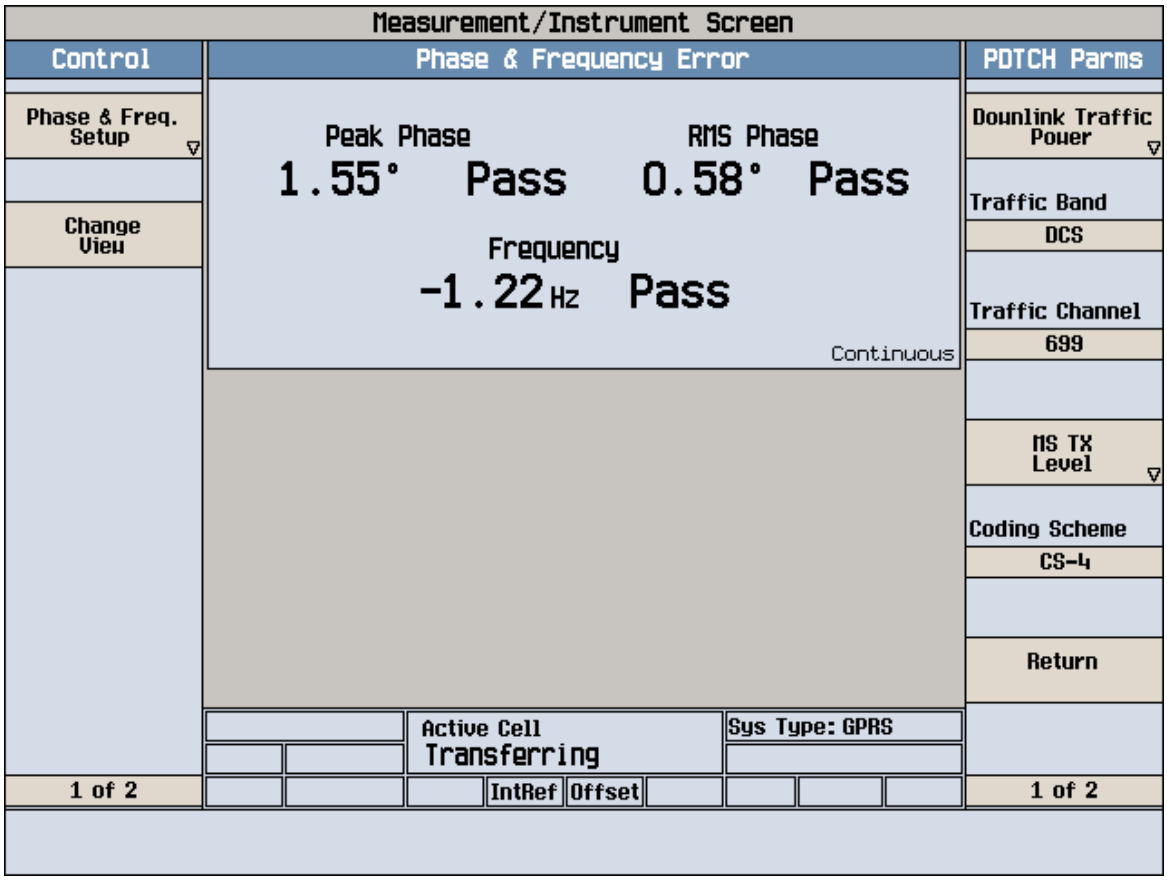
GPRS1800 Mid Channel TH/VL



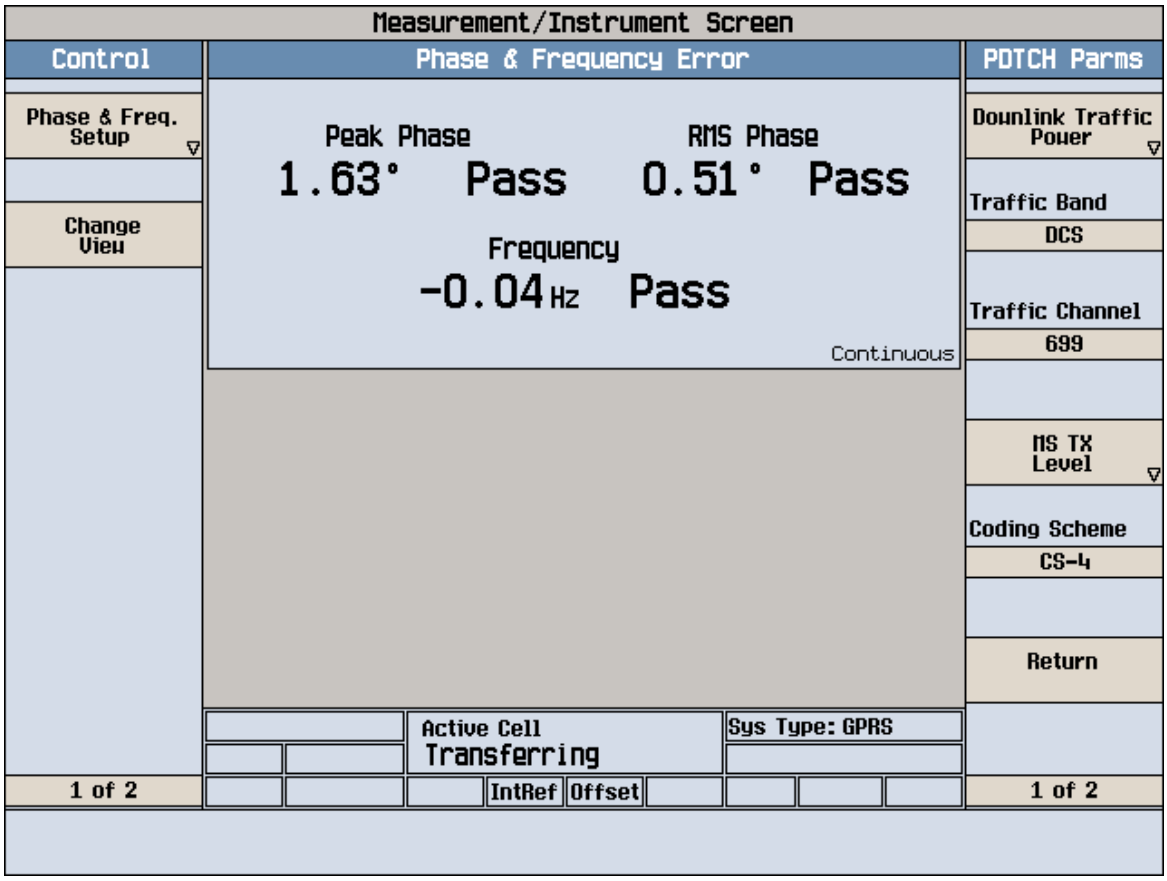
GPRS1800 Mid Channel TL/VH



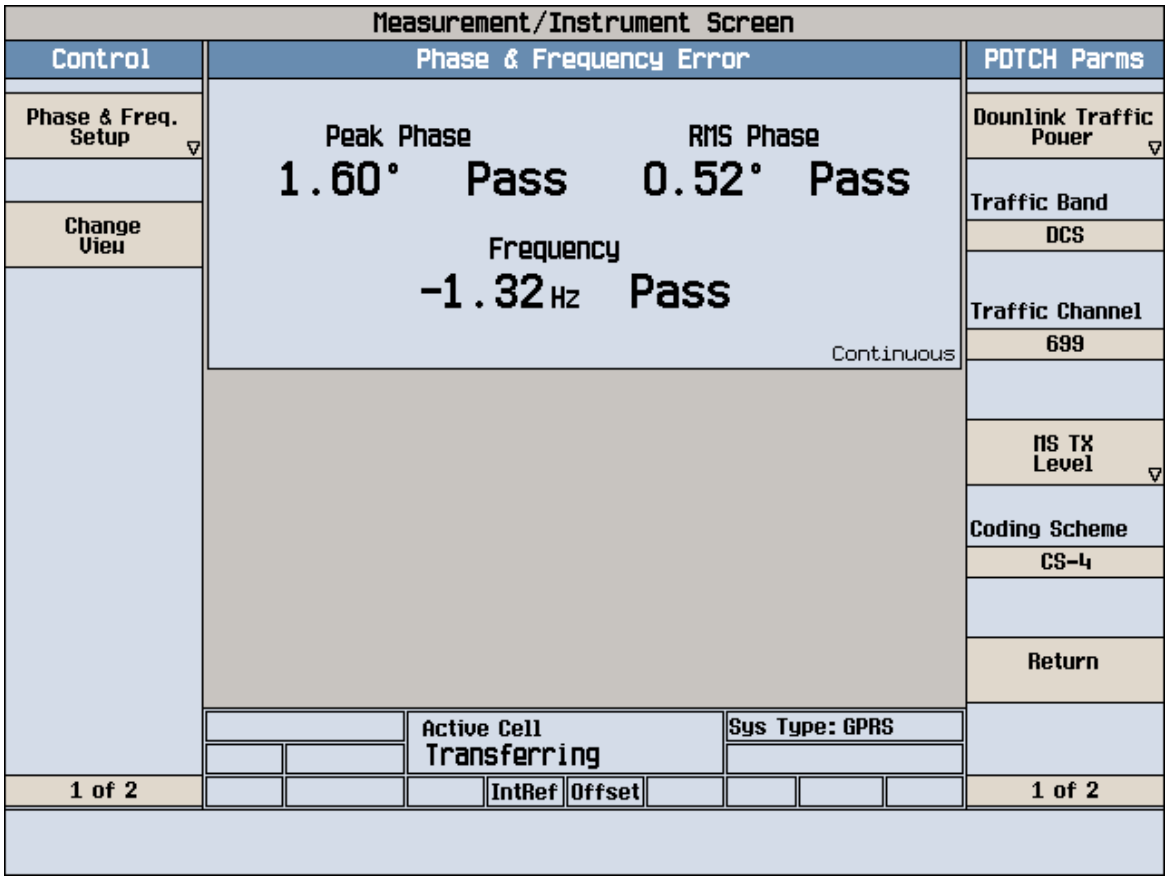
GPRS1800 Mid Channel TL/VL



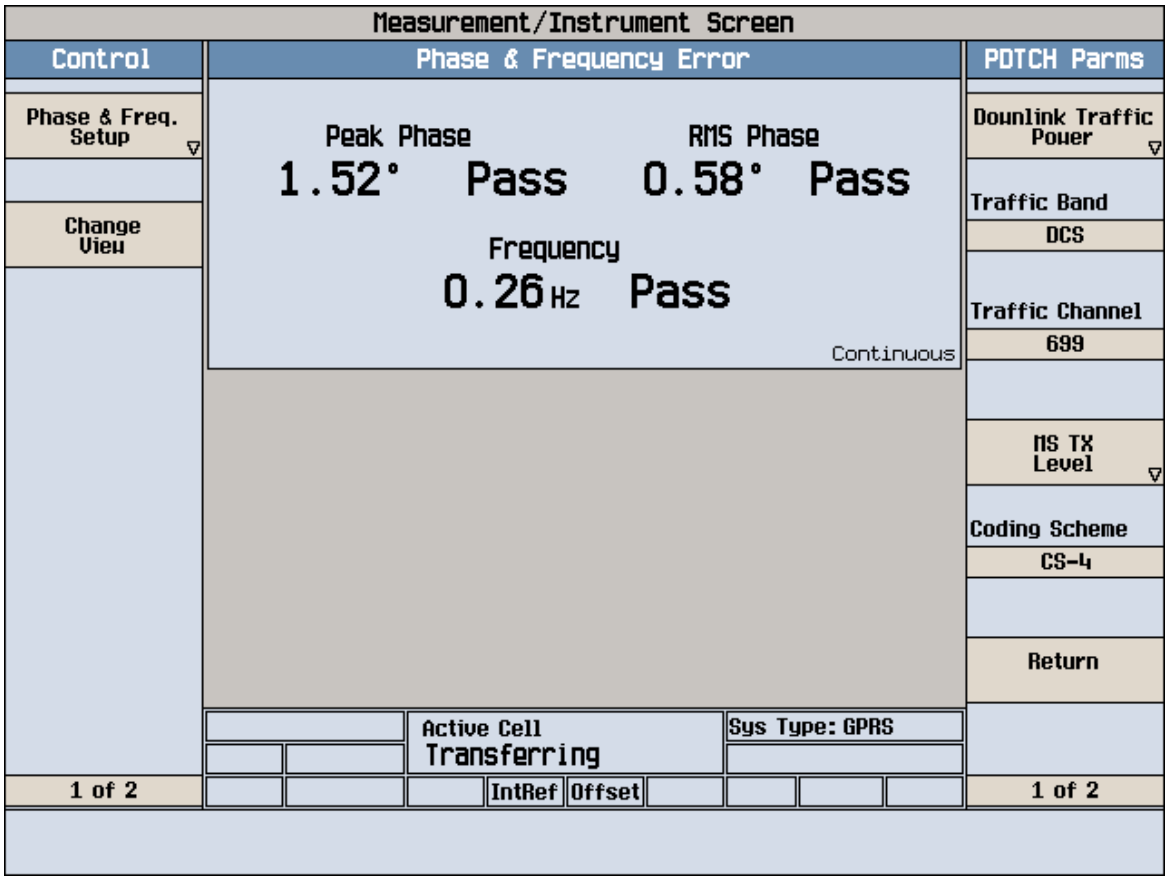
GPRS1800 Mid Channel Normal vibration X axis



GPRS1800 Mid Channel Normal vibration Y axis



GPRS1800 Mid Channel Normal vibration Z axis



5.4. Transmitter output power and burst timing

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.5

Limits

According to clause 13.3 of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1,13.3.5.

Table 4-10: Bands other than DCS 1800 and PCS 1900 transmitter output power for different power classes

Power class				Power control level (note2)	Transmitter output power	Tolerances	
2	3	4	5		dBm	normal	extreme
·				2	39	±2 dB	±2,5 dB
·	·			3	37	±3 dB (note1)	±4 dB (note1)
·	·			4	35	±3 dB	±4 dB
·	·	·		5	33	±3 dB (note1)	±4 dB (note1)
·	·	·		6	31	±3 dB	±4 dB
·	·	·	·	7	29	±3 dB (note1)	±4 dB (note1)
·	·	·	·	8	27	±3 dB	±4 dB
·	·	·	·	9	25	±3 dB	±4 dB
·	·	·	·	10	23	±3 dB	±4 dB
·	·	·	·	11	21	±3 dB	±4 dB
·	·	·	·	12	19	±3 dB	±4 dB
·	·	·	·	13	17	±3 dB	±4 dB
·	·	·	·	14	15	±3 dB	±4 dB
·	·	·	·	15	13	±3 dB	±4 dB
·	·	·	·	16	11	±5 dB	±6 dB
·	·	·	·	17	9	±5 dB	±6 dB
·	·	·	·	18	7	±5 dB	±6 dB
·	·	·	·	19	5	±5 dB	±6 dB

NOTE1: When the power control level corresponds to the power class of the MS, then the tolerances shall be 2,0 dB under normal test conditions and 2,5 dB under extreme test conditions.
NOTE2: There is no requirement to test power control levels 20-31

Table 4-11: DCS 1800 transmitter output power for different power classes

Power class			Power control level (note2)	Transmitter output power	Tolerances	
1	2	3		dBm	normal	extreme
		·	29	36	±2,0 dB	±2,5 dB
		·	30	34	±3,0 dB	±4,0 dB
		·	31	32	±3,0 dB	±4,0 dB
·		·	0	30	±3,0 dB (note1)	±4 dB (note1)
·		·	1	28	±3 dB	±4 dB
·		·	2	26	±3 dB	±4 dB
·	·	·	3	24	±3 dB (note1)	±4 dB (note1)
·	·	·	4	22	±3 dB	±4 dB
·	·	·	5	20	±3 dB	±4 dB
·	·	·	6	18	±3 dB	±4 dB
·	·	·	7	16	±3 dB	±4 dB
·	·	·	8	14	±3 dB	±4 dB
·	·	·	9	12	±4 dB	±5 dB
·	·	·	10	10	±4 dB	±5 dB
·	·	·	11	8	±4 dB	±5 dB
·	·	·	12	6	±4 dB	±5 dB
·	·	·	13	4	±4 dB	±5 dB
·	·	·	14	2	±5 dB	±6 dB
·	·	·	15	0	±5 dB	±6 dB

NOTE1: When the power control level corresponds to the power class of the MS, then the tolerances shall be 2,0 dB under normal test conditions and 2,5 dB under extreme test conditions.
NOTE2: There is no requirement to test power control levels 16-28

Table 4-12: PCS 1900 transmitter output power for different power classes

Power class			Power control level (note2)	Transmitter output power	Tolerances	
1	2	3		dBm	Normal	Extreme
		·	30	33	±2,0 dB	±2,5 dB
		·	31	32	±2,0 dB	±2,5 dB
·		·	0	30	±3,0 dB (note1)	±4 dB (note1)
·		·	1	28	±3 dB	±4 dB
·		·	2	26	±3 dB	±4 dB
·	·	·	3	24	±3 dB (note1)	±4 dB (note1)
·	·	·	4	22	±3 dB	±4 dB
·	·	·	5	20	±3 dB	±4 dB
·	·	·	6	18	±3 dB	±4 dB
·	·	·	7	16	±3 dB	±4 dB
·	·	·	8	14	±3 dB	±4 dB
·	·	·	9	12	±4 dB	±5 dB
·	·	·	10	10	±4 dB	±5 dB
·	·	·	11	8	±4 dB	±5 dB
·	·	·	12	6	±4 dB	±5 dB
·	·	·	13	4	±4 dB	±5 dB
·	·	·	14	2	±5 dB	±6 dB
·	·	·	15	0	±5 dB	±6 dB

NOTE1: When the power control level corresponds to the power class of the MS, then the tolerances shall be 2,0 dB under normal test conditions and 2,5 dB under extreme test conditions.
NOTE2: There is no requirement to test power control levels 16-29

Table 4-13: Lowest measurement limit for power/time template

	lowest limit
Bands other than DCS 1800 and PCS 1900	-59 dBc or -54 dBm whichever is the highest, except for the timeslot preceding the active slot, for which the allowed level is equal to -59 dBc or -36 dBm, whichever is the highest
DCS 1 800, PCS 1 900	-48 dBc or -48 dBm whichever is the highest

Test procedure

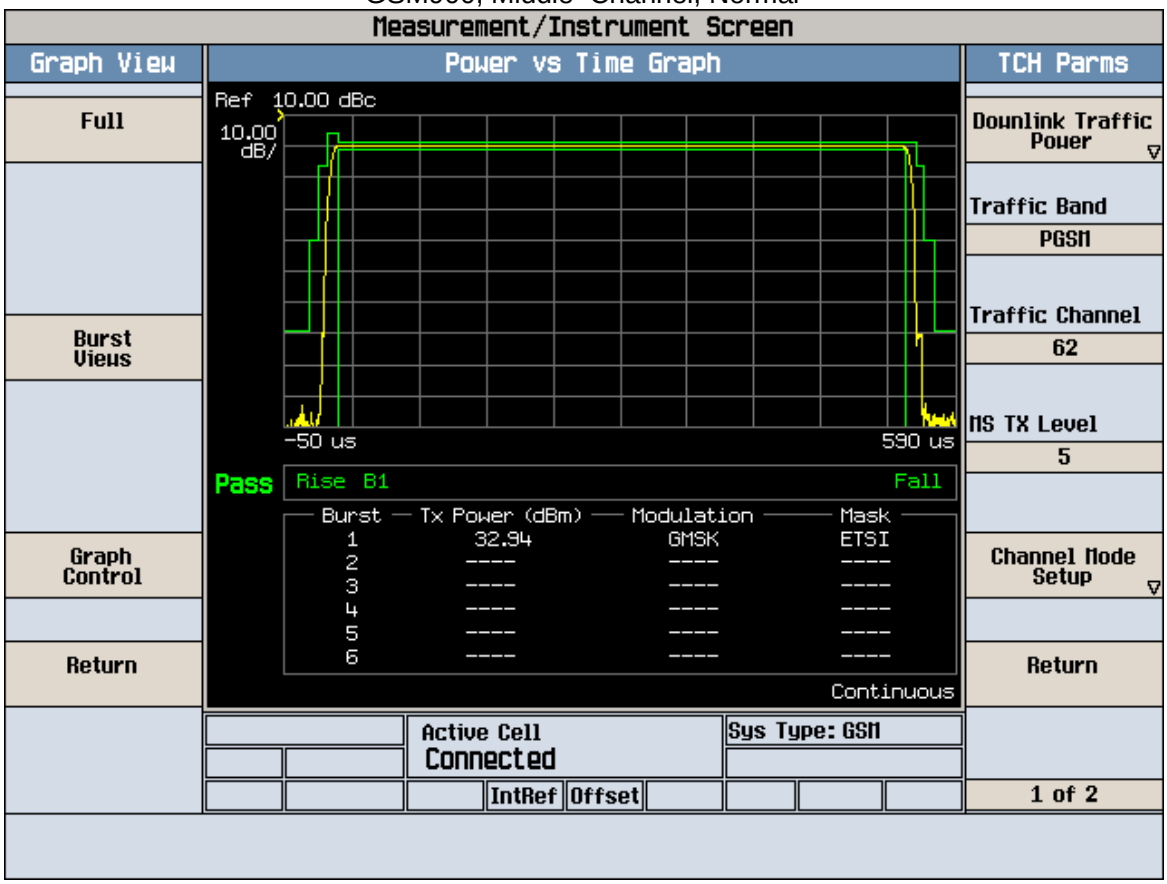
1) Measurement of normal burst transmitter output power(see §13.3.4.1.2).
2) Measurement of normal burst timing delay..
3) Measurement of normal burst power/time relationship.
4) Step 1)to 3) are repeated with the MS commanded to operate on each of the nominal output power levels supported by the MS,(see table 4-10,4-11and 4-12) and in step 1) on one nominal output level higher than supported by the MS.
5) The SS commands the MS to the maximum power control level supported by the MS and step 1) to 3) are repeated for ARFCN in the Low and High ranges.
6) Measurement of access burst transmitter output power.
7) Measurement of access burst timing delay.
8) Measurement of access burst power/time relationship.

Test Result

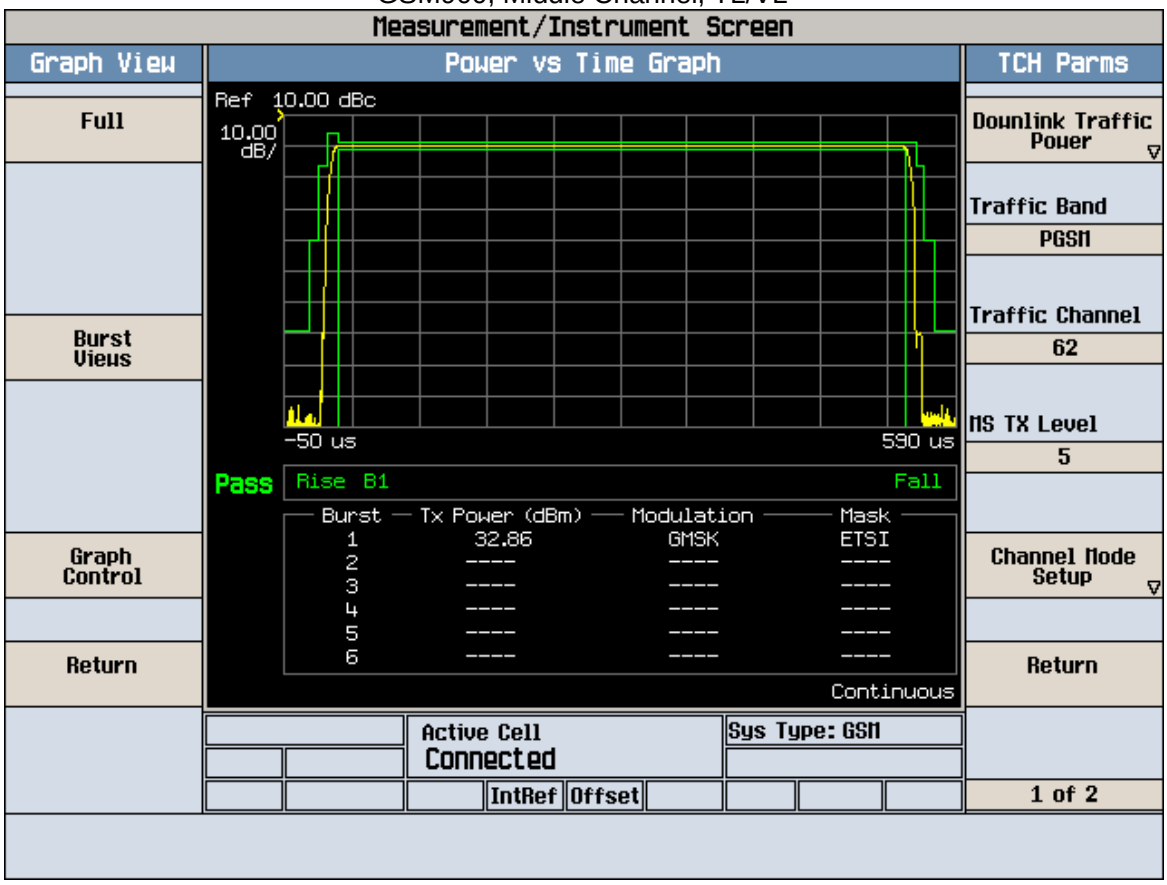
PASS

Please refer to following data plots

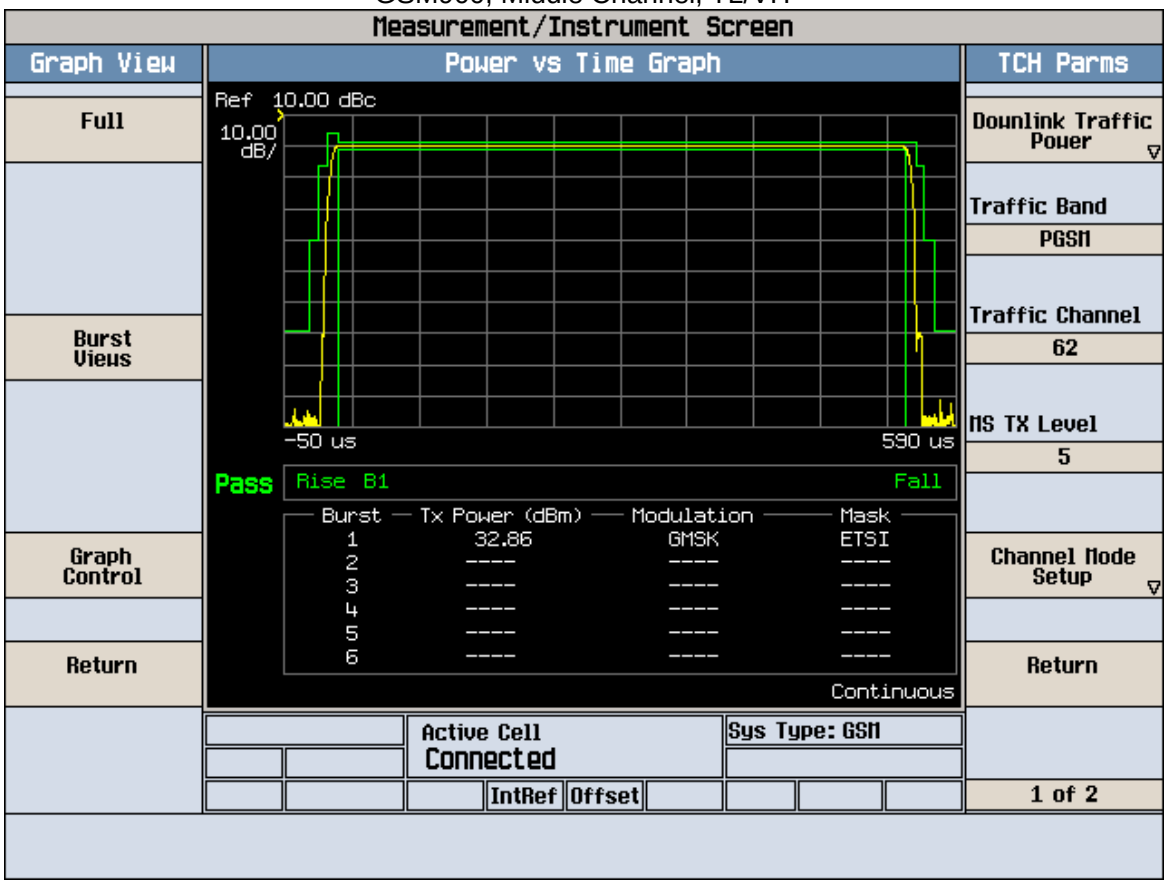
GSM900, Middle Channel, Normal



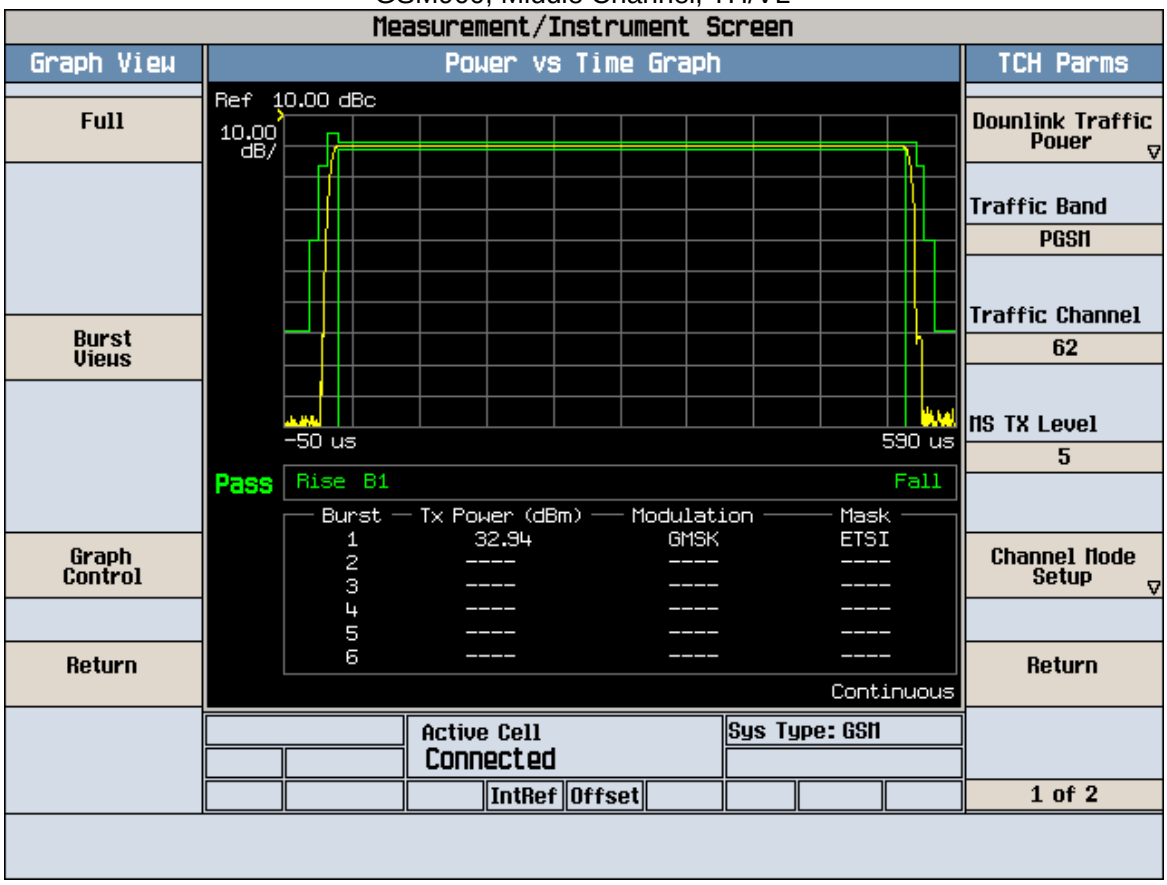
GSM900, Middle Channel, TL/VL



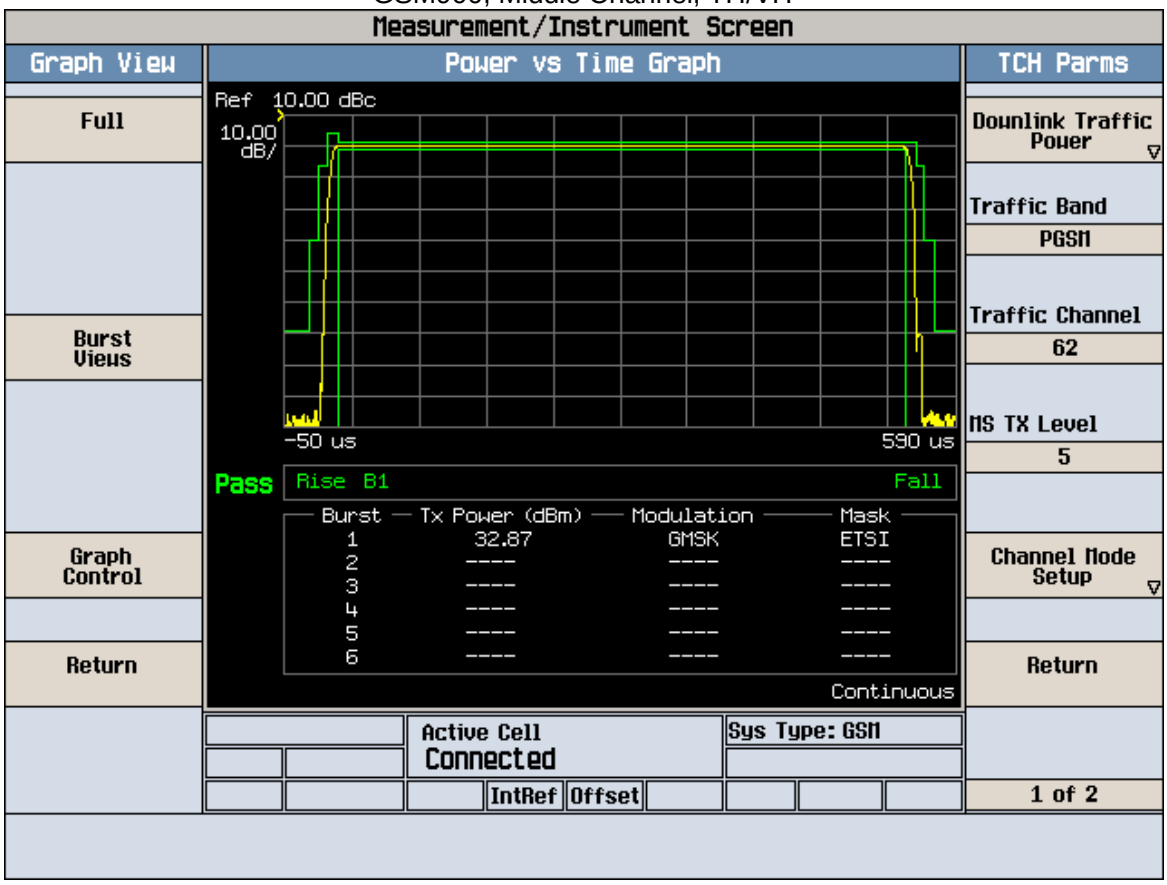
GSM900, Middle Channel, TL/VH



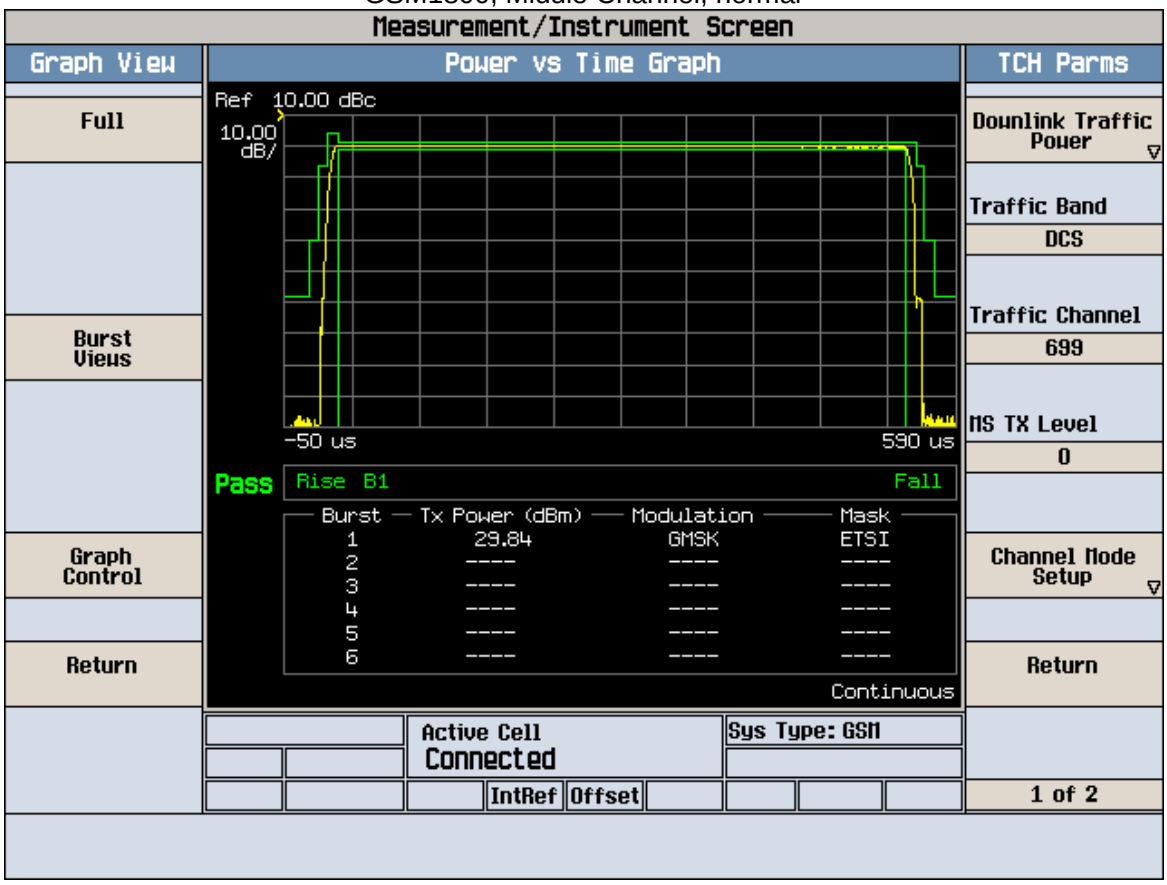
GSM900, Middle Channel, TH/VL



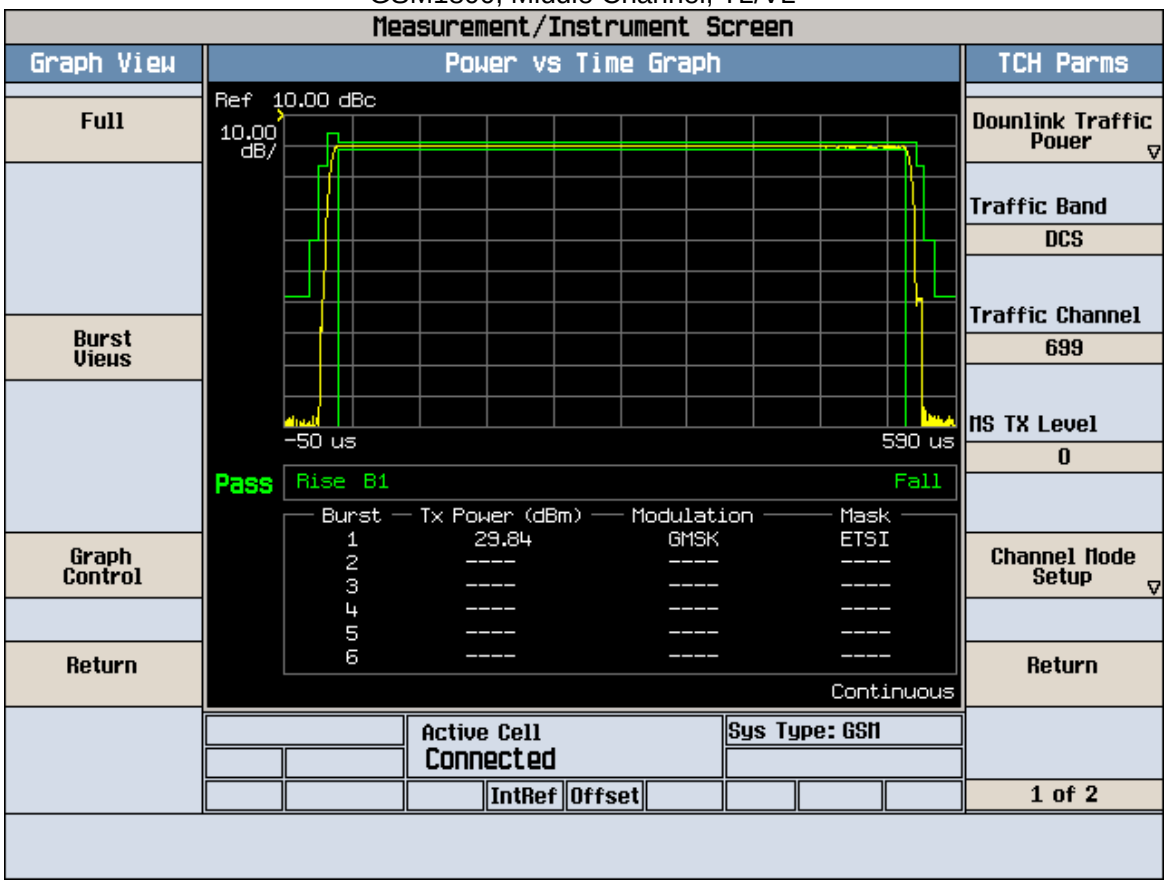
GSM900, Middle Channel, TH/VH



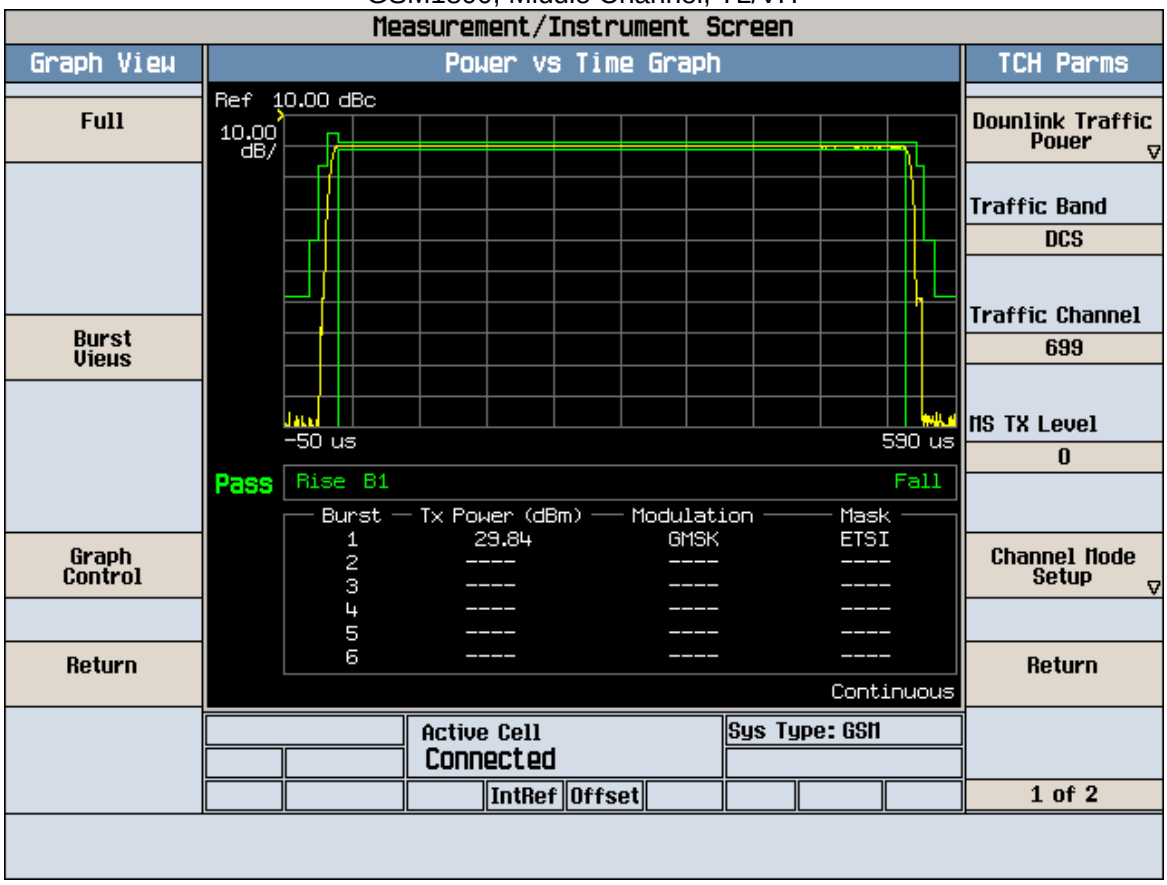
GSM1800, Middle Channel, normal



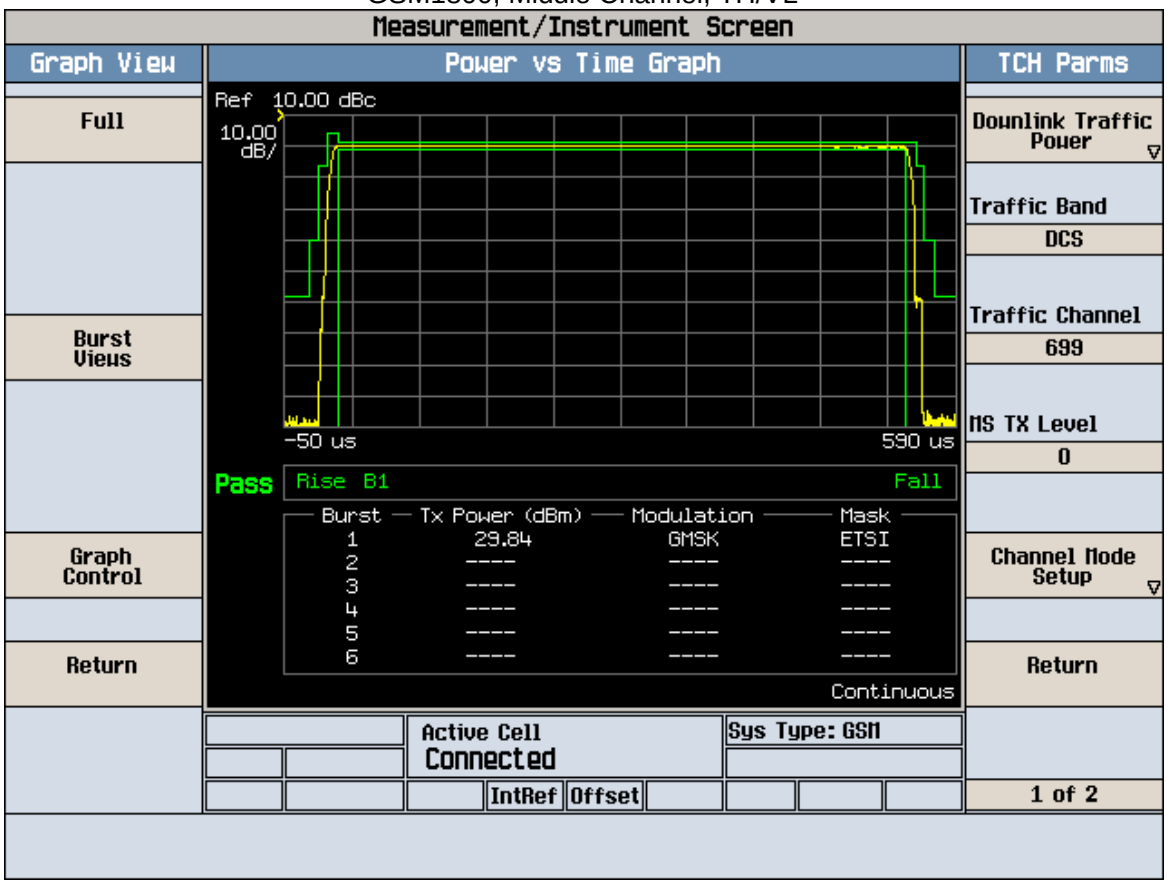
GSM1800, Middle Channel, TL/VL



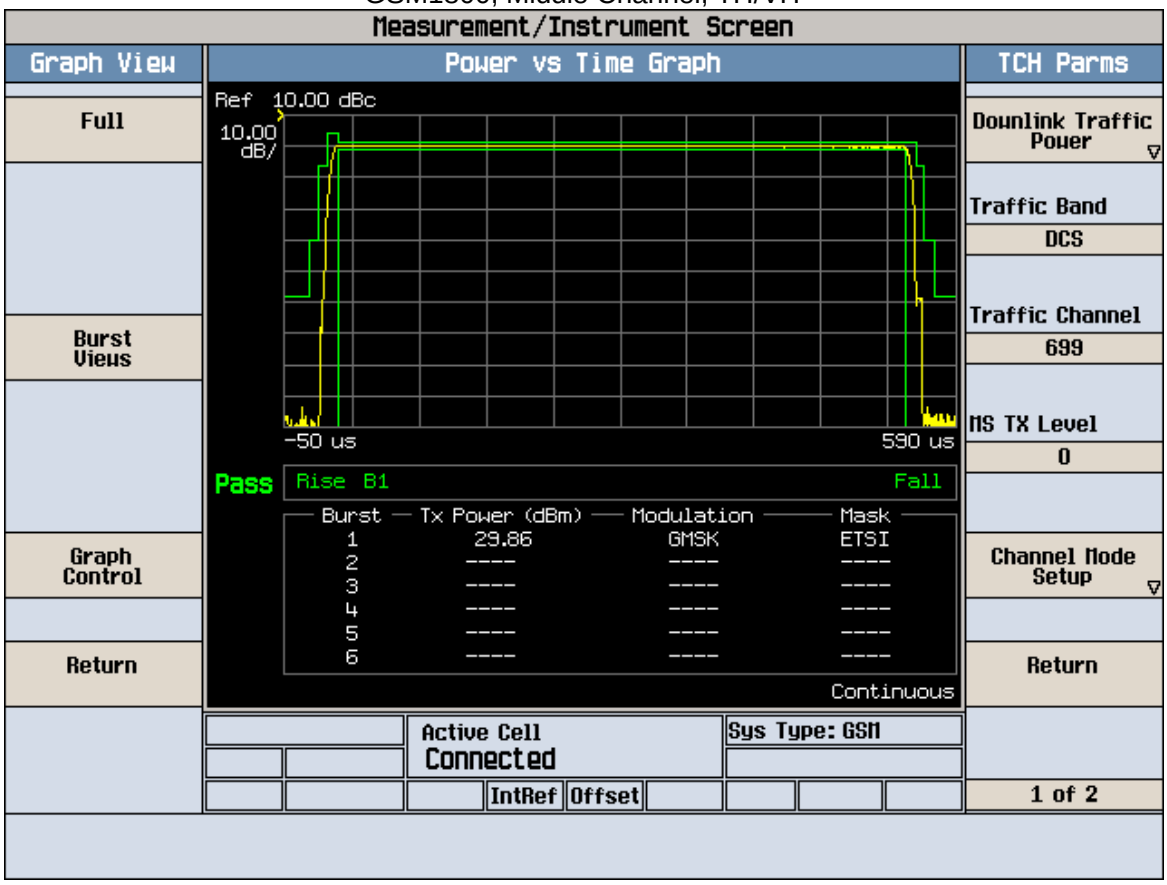
GSM1800, Middle Channel, TL/VH



GSM1800, Middle Channel, TH/VL



GSM1800, Middle Channel, TH/VH



5.5. Transmitter-Output RF spectrum

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.6

Limits

According to clause 13.4of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1,13.4.5.

Table 4-14:GSM 400,GSM 700,T-GSM 850 and GSM 900 spectrum due to modulation out to less than 1800kHz offset

	power levels in dB relative to the measurement at FT				
Power level	Frequency offset (kHz)				
(dBm)	0-100	200	250	400	600 to <1800
39	+0,5	-30	-33	-60	-66
37	+0,5	-30	-33	-60	-64
35	+0,5	-30	-33	-60	-62
<= 33	+0,5	-30	-33	-60	-60
The values above are subject to the minimum absolute levels (dBm) below.					
	-36	-36	-36	-36	-51

Table 4-15: **DCS 1800 Spectrum due to modulation out to less than 1800kHz offset**

	power levels in dB relative to the measurement at FT				
Power level	Frequency offset (kHz)				
(dBm)	0-100	200	250	400	600 to <1800
<= 36	+0,5	-30	-33	-60	-60
The values above are subject to the minimum absolute levels (dBm) below.					
	-36	-36	-36	-36	-56

Table 4-16:Spectrum due to modulation from 1800kHz offset to the edge of the transmit band(wideband noise)

power levels in dB relative to the measurement at FT									
GSM 400, GSM 700, T-GSM 810, GSM 850 and GSM 900				DCS 1 800			PCS 1 900		
Power	Frequency offset			Power	Frequency offset		Power	Frequency offset	
Level	kHz			level	KHz		level	kHz	
(dBm)	1 800 to	3 000 to	>= 6 000	(dBm)	1 800 to	>= 6 000	(dBm)	1 800 to	>= 6 000
	< 3 000	< 6 000			< 6 000			< 6 000	
39	-69	-71	-77	36	-71	-79	33	-68	-76
37	-67	-69	-75	34	-69	-77	32	-67	-75
35	-65	-67	-73	32	-67	-75	30	-65	-73
<= 33	-63	-65	-71	30	-65	-73	28	-63	-71
				28	-63	-71	26	-61	-69
				26	-61	-69	<= 24	-59	-67
				<= 24	-59	-67			
The values above are subject to the minimum absolute levels (dBm) below.									
	-46	-46	-46		-51	-51		-51	-51

Test procedure

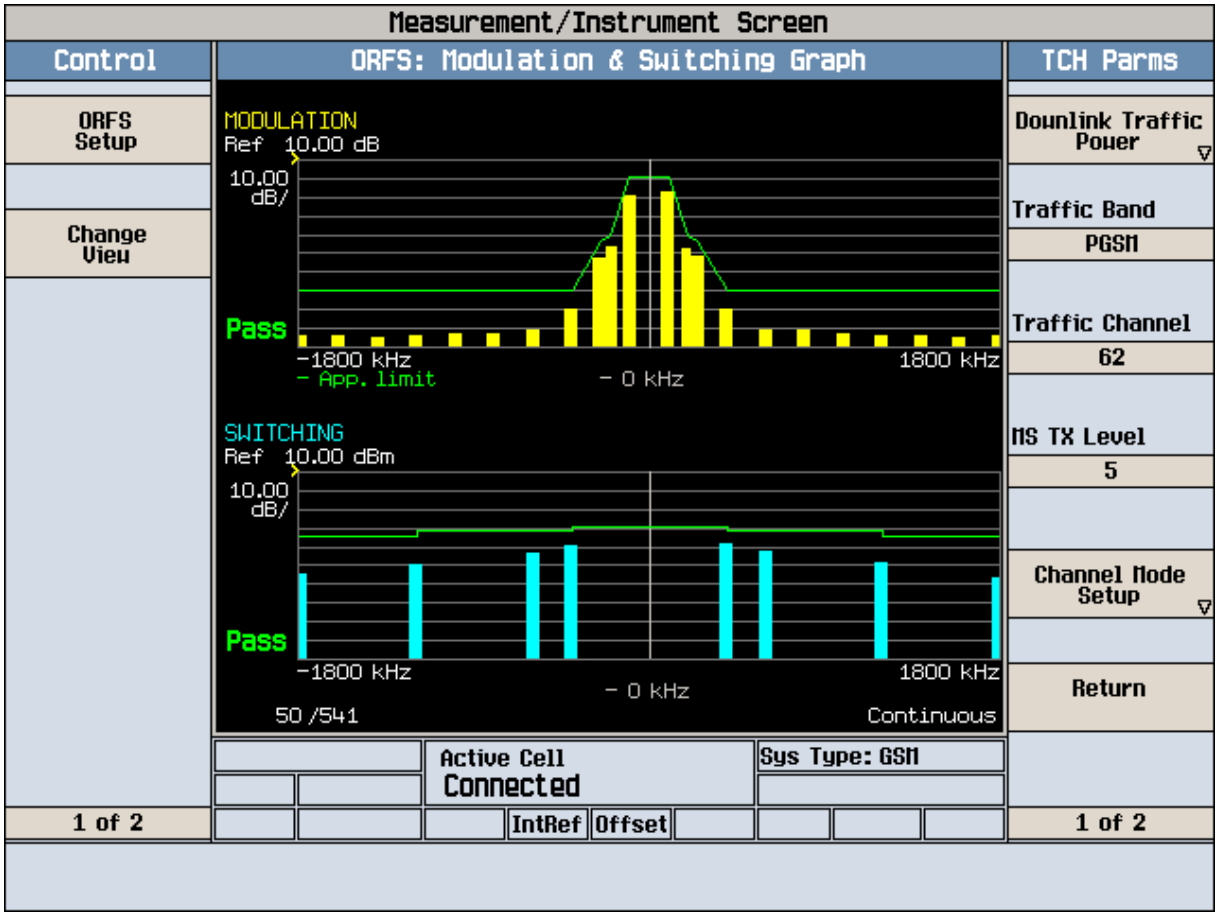
The following operating conditions were made in accordance with the ETSI 301 511 Clause 4.2.6.

Test Result

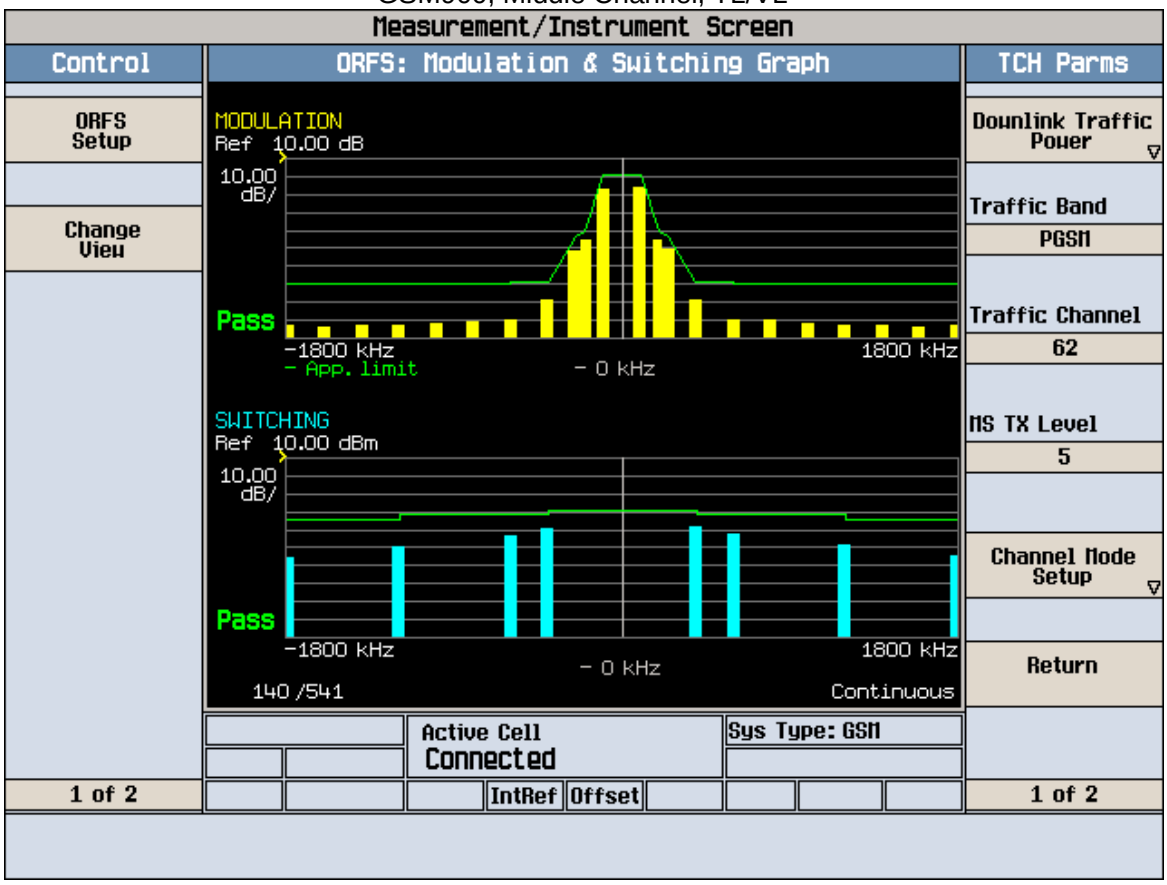
PASS

Please refer to following data plots

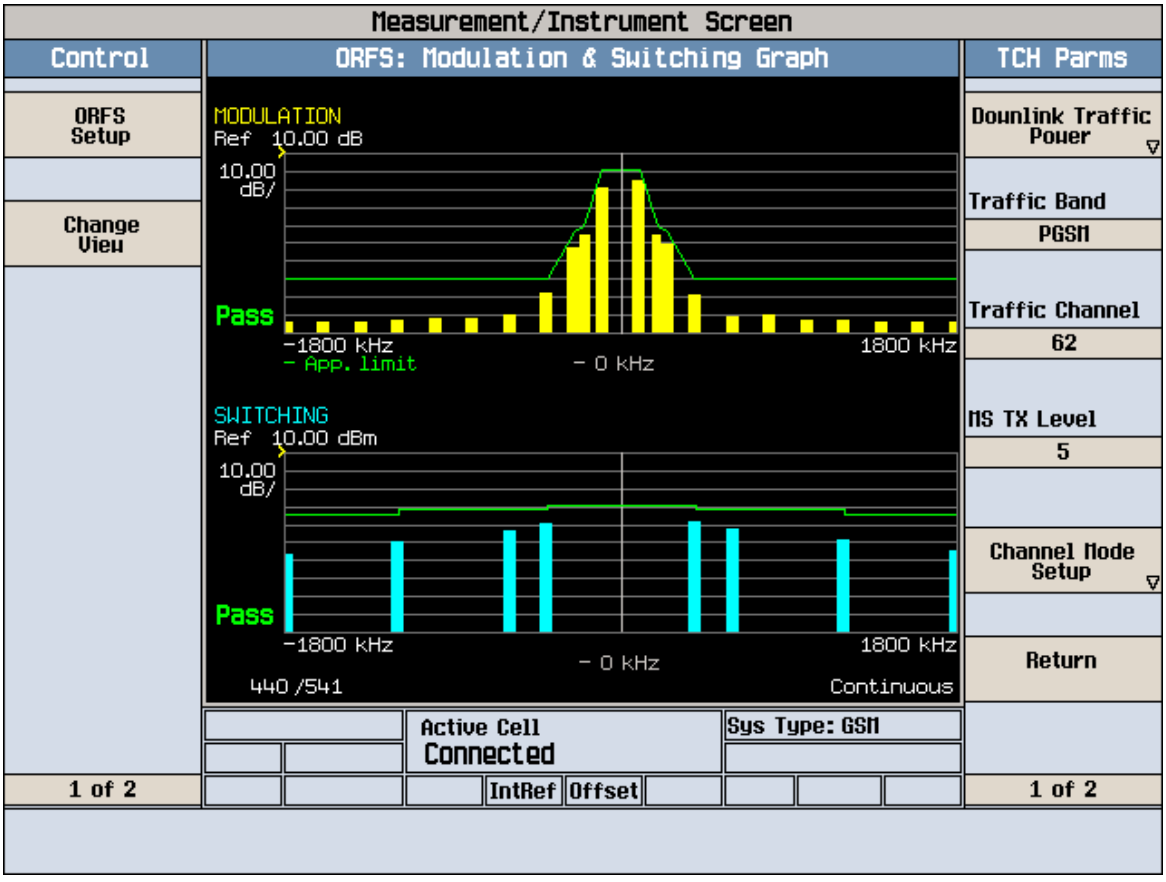
GSM900, Middle Channel, Normal



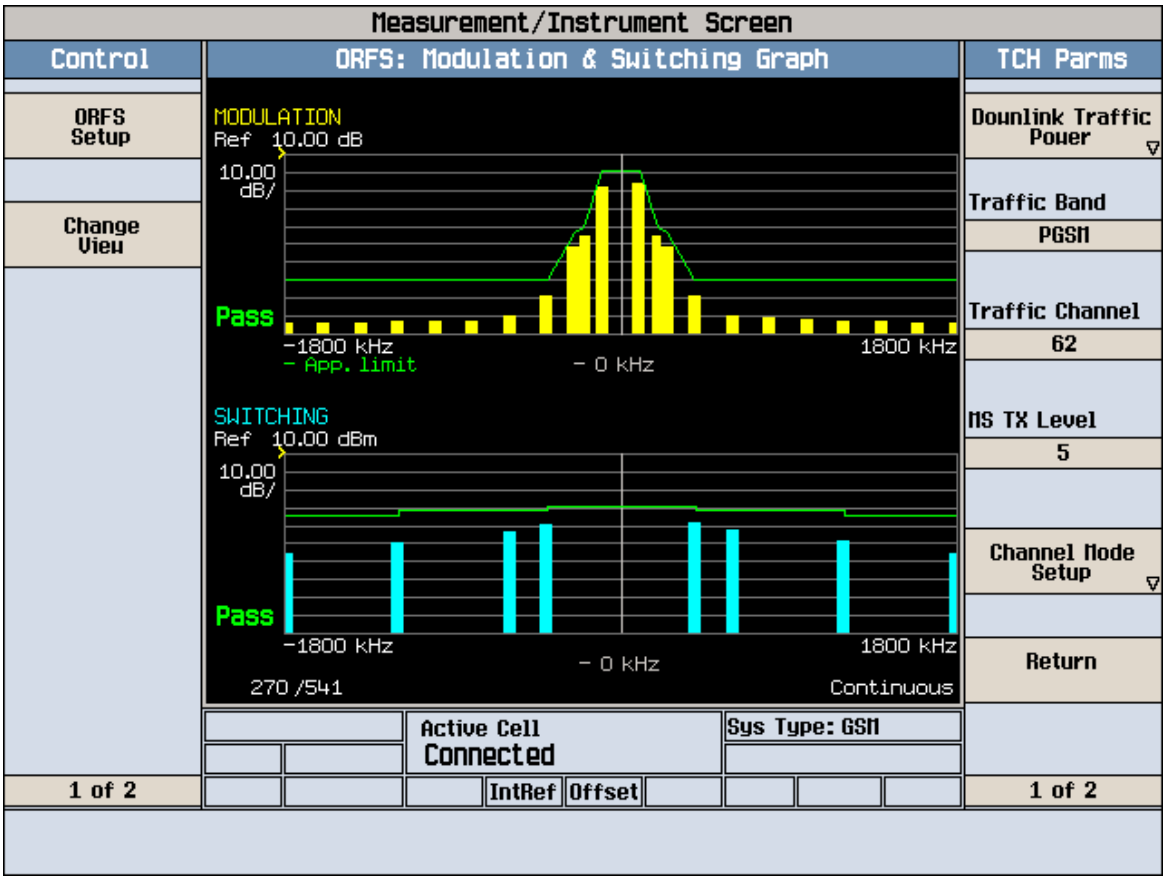
GSM900, Middle Channel, TL/VL



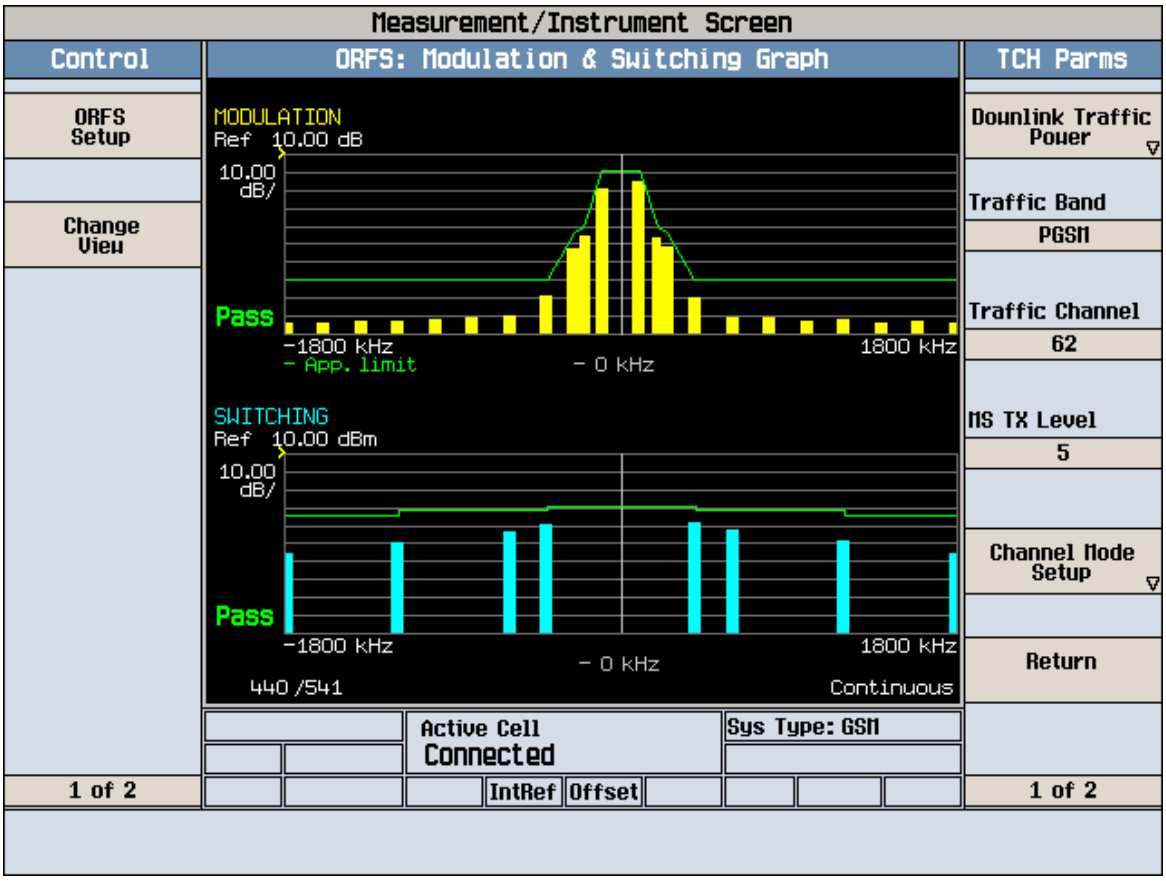
GSM900, Middle Channel, TL/VH



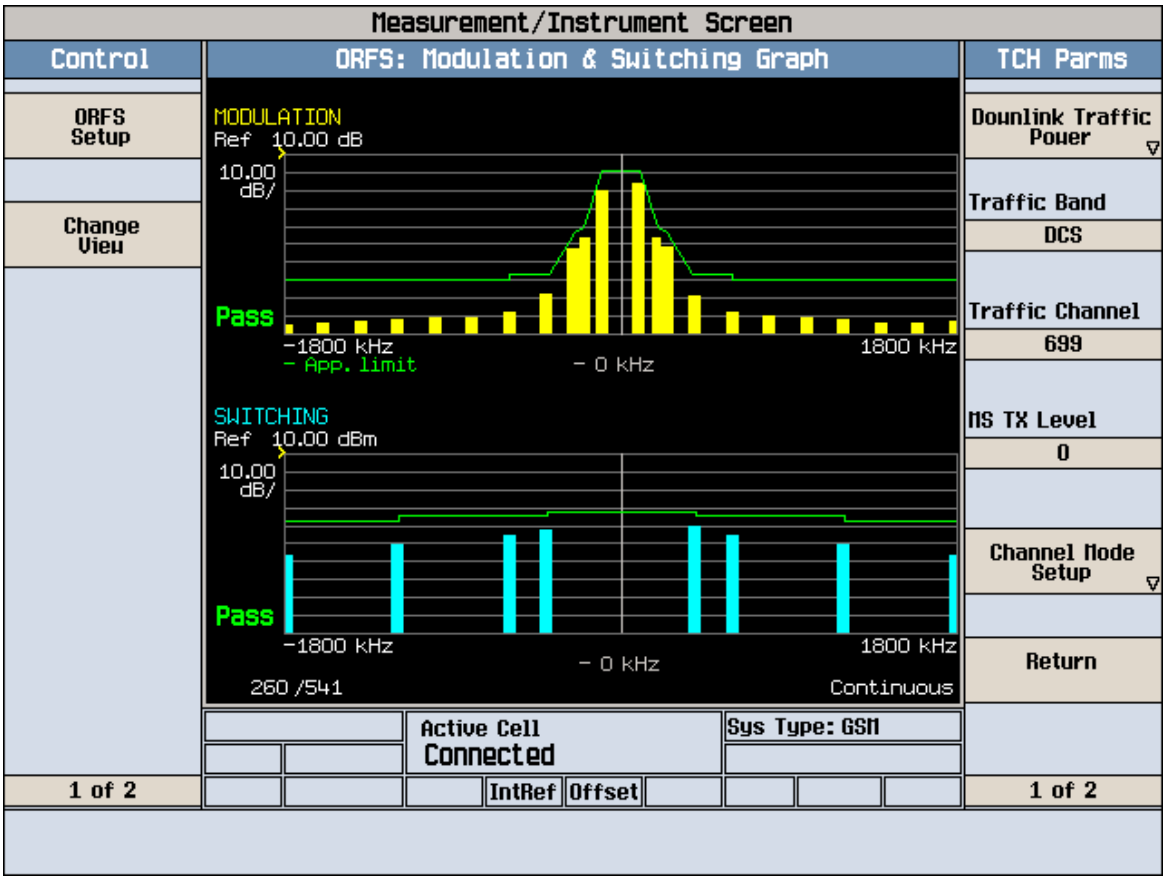
GSM900, Middle Channel, TH/VL



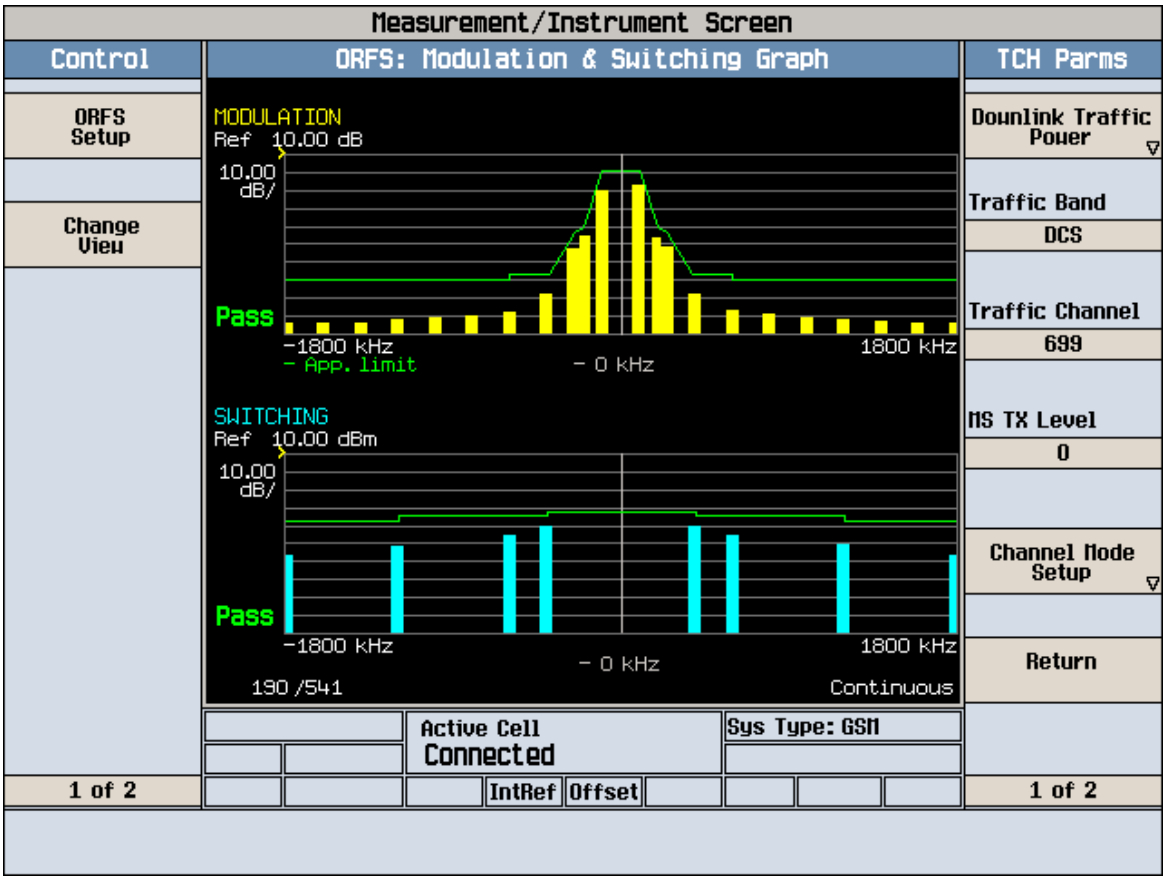
GSM900, Middle Channel, TH/VH



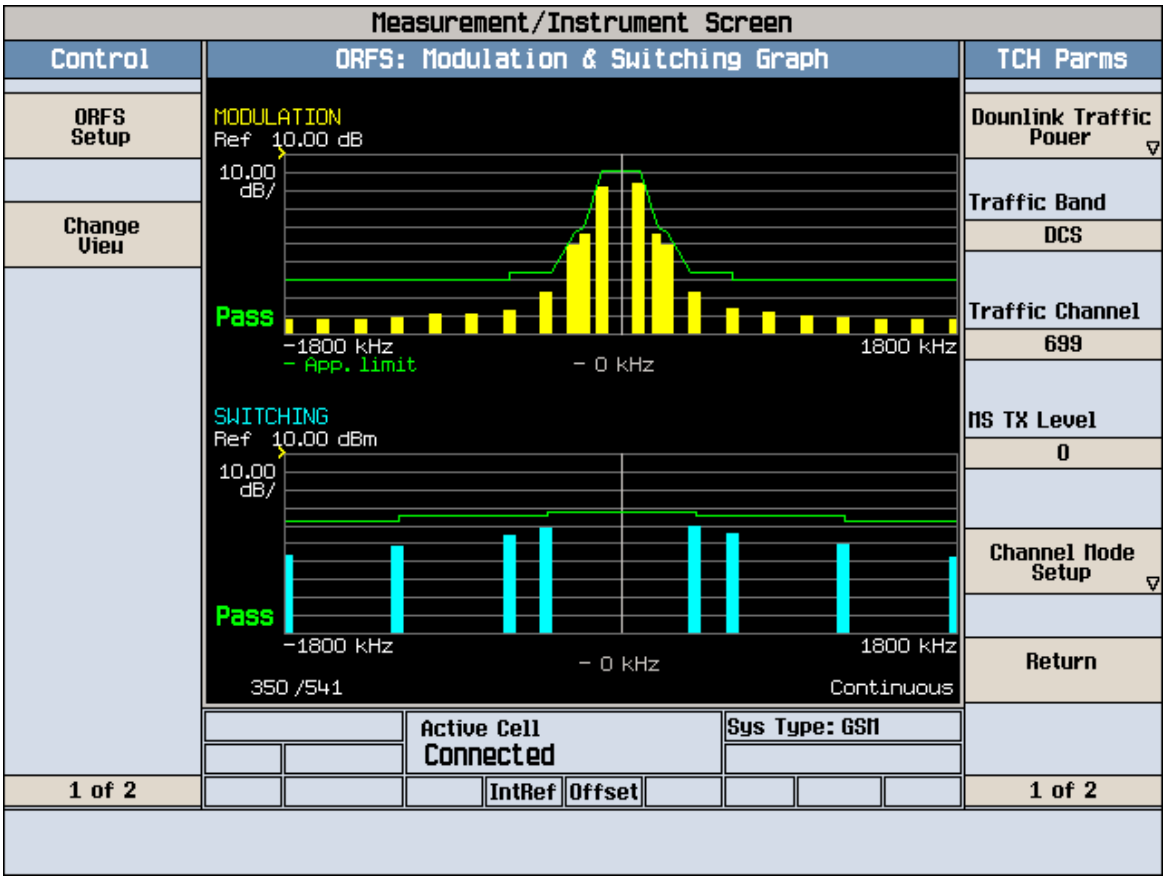
GSM1800, Middle Channel, normal



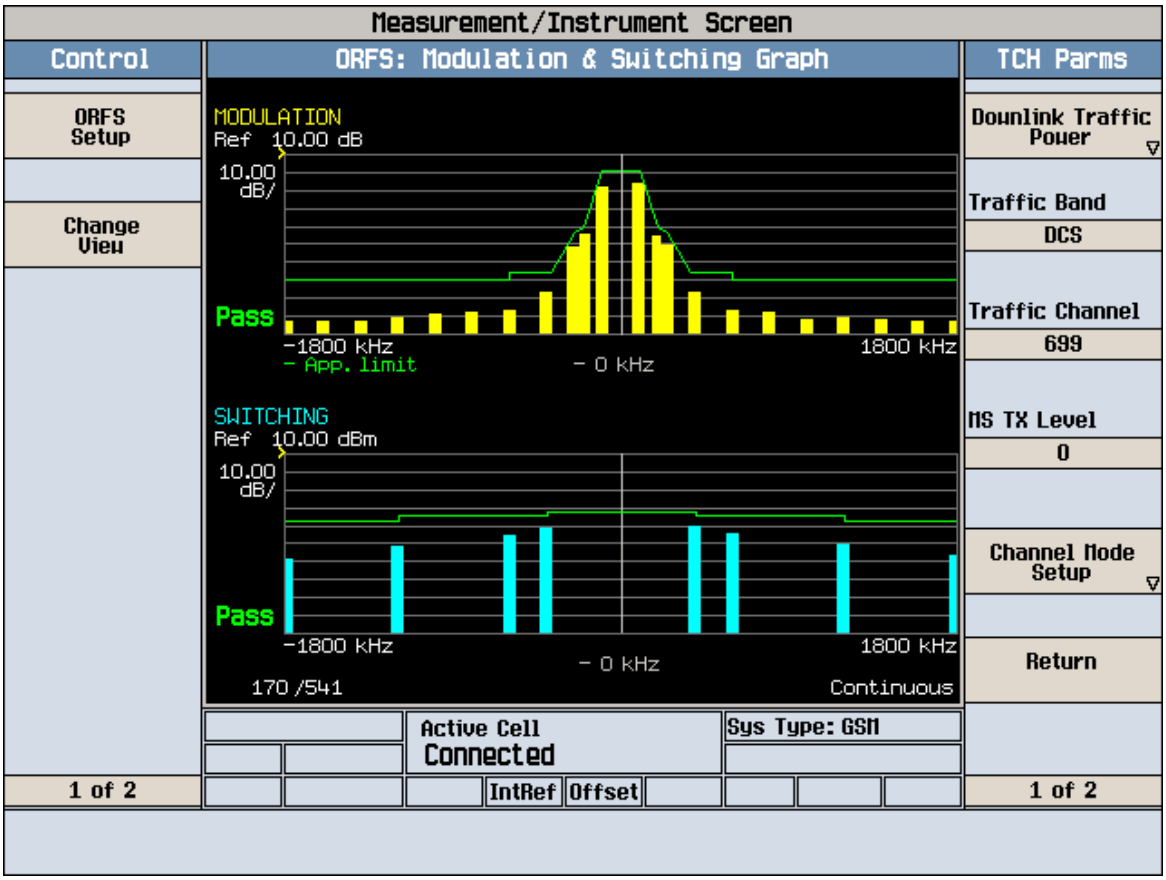
GSM1800, Middle Channel, TL/VL



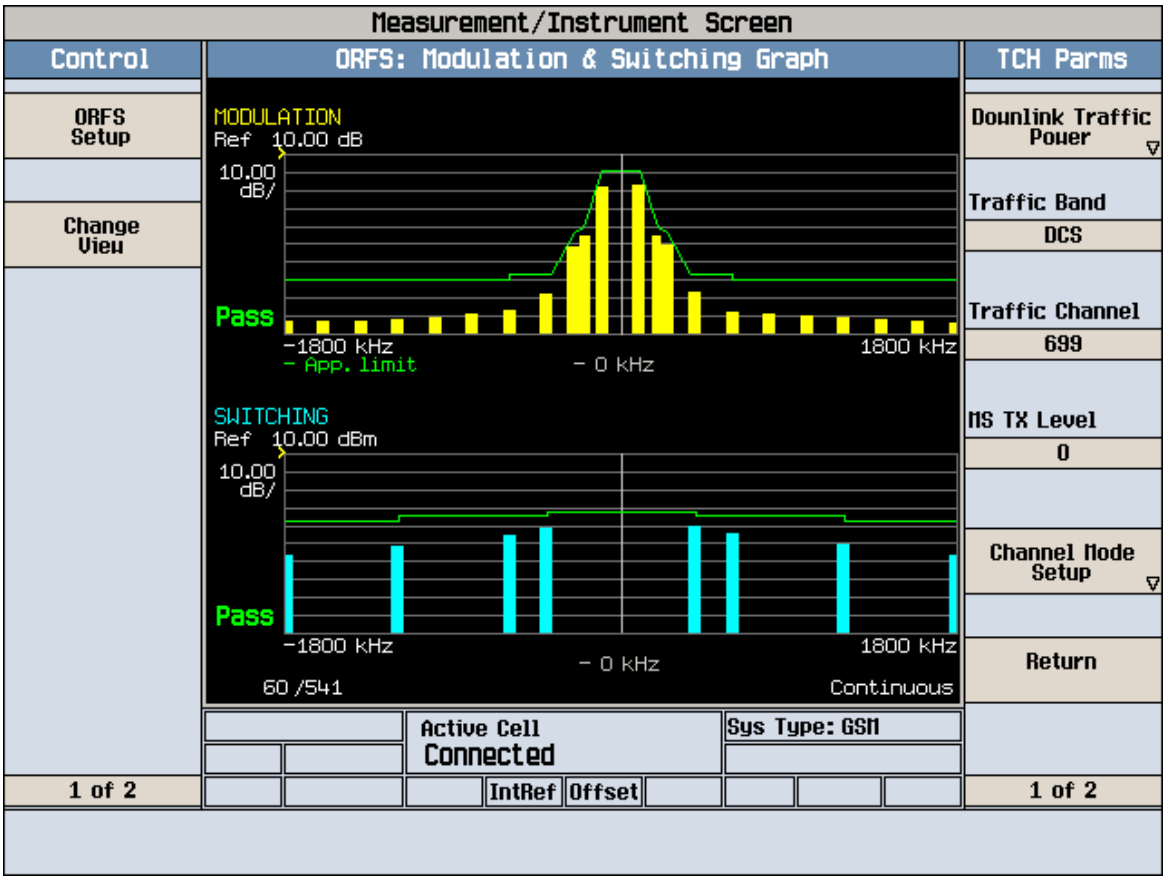
GSM1800, Middle Channel, TL/VH



GSM1800, Middle Channel, TH/VL



GSM1800, Middle Channel, TH/VH



5.6. Transmitter output power in GPRS multi slot configuration

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.10

Limits

According to clause 13.16.2 of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1,13.16.2.5.

Table 4-17: Bands other than DCS 1800 and PCS transmitter output power for different power classes

Power class				Power control level (note 4)	GAMMA_TN (Γ_{CH})	Transmitter output power (note 2,3)	Tolerances	
2	3	4	5			dBm	normal	extreme
·				2	0	39	±2 dB	±2,5 dB
·	·			3	1	37	±3 dB (note 1)	±4 dB (note 1)
·	·			4	2	35	±3 dB	±4 dB
·	·	·		5	3	33	±3 dB (note 1)	±4 dB (note 1)
·	·	·		6	4	31	±3 dB	±4 dB
·	·	·	·	7	5	29	±3 dB (note 1)	±4 dB (note 1)
·	·	·	·	8	6	27	±3 dB	±4 dB
·	·	·	·	9	7	25	±3 dB	±4 dB
·	·	·	·	10	8	23	±3 dB	±4 dB
·	·	·	·	11	9	21	±3 dB	±4 dB
·	·	·	·	12	10	19	±3 dB	±4 dB
·	·	·	·	13	11	17	±3 dB	±4 dB
·	·	·	·	14	12	15	±3 dB	±4 dB
·	·	·	·	15	13	13	±3 dB	±4 dB
·	·	·	·	16	14	11	±5 dB	±6 dB
·	·	·	·	17	15	9	±5 dB	±6 dB
·	·	·	·	18	16	7	±5 dB	±6 dB
·	·	·	·	19	17	5	±5 dB	±6 dB

NOTE1: When the power control level corresponds to the power class of the MS, then the tolerances shall be 2,0 dB under normal test conditions and 2,5 dB under extreme test conditions.
NOTE 2: For R99 and Rel-4, the maximum output power in a multislot configuration must be lower within the limits defined in table 13.16.2-1a. From Rel-5 onwards, the maximum output power in a multislot configuration may be lower within the limits defined in table 13.16.2-1b.
NOTE 3: For a MS using reduced interslot dynamic range in multislot configurations, the MS may restrict the interslot output power control range to a 10 dB window, on a TDMA frame basis. On those timeslots where the ordered power level is more than 10 dB lower than the applied power level of the highest power timeslot, the MS shall transmit at a lowest possible power level within 10 dB range from the highest applied power level, if not transmitting at the actual ordered power level.
NOTE 4: There is no requirement to test power control levels 20-31.

Table 4-18: DCS 1800 transmitter output power for different power classes

Power class			Power control level (note 4)	GAMMA_TN (Γ_{CH}	Transmitter output power (note 2,3)	Tolerances	
1	2	3			dBm	normal	extreme
		·	29	0	36	±2,0 dB	±2,5 dB
		·	30	1	34	±3,0 dB	±4,0 dB
		·	31	2	32	±3,0 dB	±4,0 dB
·		·	0	3	30	±3,0 dB (note_1)	±4 dB (note_1)
·		·	1	4	28	±3 dB	±4 dB
·		·	2	5	26	±3 dB	±4 dB
·	·	·	3	6	24	±3 dB (note_1)	±4 dB (note_1)
·	·	·	4	7	22	±3 dB	±4 dB
·	·	·	5	8	20	±3 dB	±4 dB
·	·	·	6	9	18	±3 dB	±4 dB
·	·	·	7	10	16	±3 dB	±4 dB
·	·	·	8	11	14	±3 dB	±4 dB
·	·	·	9	12	12	±4 dB	±5 dB
·	·	·	10	13	10	±4 dB	±5 dB
·	·	·	11	14	8	±4 dB	±5 dB
·	·	·	12	15	6	±4 dB	±5 dB
·	·	·	13	16	4	±4 dB	±5 dB
·	·	·	14	17	2	±5 dB	±6 dB
·	·	·	15	18	0	±5 dB	±6 dB

NOTE1: When the power control level corresponds to the power class of the MS, then the tolerances shall be 2,0 dB under normal test conditions and 2,5 dB under extreme test conditions.

NOTE 2: For R99 and Rel-4, the maximum output power in a multislot configuration must be lower within the limits defined in table 13.16.2-2a. From Rel-5 onwards, the maximum output power in a multislot configuration may be lower within the limits defined in table 13.16.2-2b.

NOTE 3: For a MS using reduced interslot dynamic range in multislot configurations, the MS may restrict the interslot output power control range to a 10 dB window, on a TDMA frame basis. On those timeslots where the ordered power level is more than 10 dB lower than the applied power level of the highest power timeslot, the MS shall transmit at a lowest possible power level within 10 dB range from the highest applied power level, if not transmitting at the actual ordered power level.

NOTE 4: There is no requirement to test power control levels 16-28.

Test procedure

1) The MS is placed in the anechoic shielded chamber or on the outdoor test site, on an isolated support, in the position for normal use, at a distance of at least 3 meters from a test antenna, connected to the SS.
2) With the initial conditions set according to sub clause 13.16.2.4.2.1 the test procedure are done at maximum power for ARFCN in the low, mid, high range, the measurement is made eight times with the MS rotated by n*45 degrees for all values of n in the range 0 to 7.
3) Assessment of test site loss for scaling of received output power measurements.
4) Temporary antenna connector calibration factors (transmit).
5) Measurements at extreme test conditions.

Test Result

PASS

5.7. Output RF spectrum in GPRS multi slot configuration

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.11

Limits

According to clause 13.16.3 of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1,13.16.3.5.

Table 4-19: GSM 400, GSM700, GSM850 and GSM900 Spectrum
Due to modulation out less than 1800 kHz offset

	power levels in dB relative to the measurement at FT				
Power level	Frequency offset (kHz)				
(dBm)	0-100	200	250	400	600 to < 1 800
39	+0,5	-30	-33	-60	-66
37	+0,5	-30	-33	-60	-64
35	+0,5	-30	-33	-60	-62
<= 33	+0,5	-30	-33	-60	-60
The values above are subject to the minimum absolute levels (dBm) below.					
	-36	-36	-36	-36	-51

Table 4-20: DCS 1800 Spectrum Due to modulation
out less than 1800 kHz offset

	power levels in dB relative to the measurement at FT				
Power level	Frequency offset (kHz)				
(dBm)	0-100	200	250	400	600 to < 1 800
<= 36	+0,5	-30	-33	-60	-60
The values above are subject to the minimum absolute levels (dBm) below.					
	-36	-36	-36	-36	-56

Table 4-21: Spurious emissions in the MS receive bands

Band (MHz)	Spurious emissions level (dBm)	
	GSM 400, GSM 900 and DCS 1 800	GSM 700 GSM 850 PCS 1 900
925 to 935	-67	
935 to 960	-79	
1805 to 1880	-71	
728 to 736		-73
736 to 746		-79
747 to 757		-79
757 to763		-73
869 to 894		-79
1930 to 1990		-71

Test procedure

1) The test shall be run under the default GPRS with power control parameter ALPHA(a) set to 0.
2) The MS shall be operated with its highest number of uplink slots.
3) In the step 4) to 9) the FT is equal to the hop pattern ARFCN in the Mid ARFCN range.
4) The other settings of the spectrum analyser are set as follows:
-Zero frequency scan;

-Resolution bandwidth: 30kHz
-Video bandwidth: 30kHz
5) By tuning the spectrum analyser centre frequency to the measurement frequencies the power level is measured over 50 bursts at all multiples of 30kHz offset from FT To <1800kHz.
6) The resolution and video bandwidth on the spectrum analyser are adjusted to 100kHz and the measurements are made at the following frequencies:
For DCS 1800:
on every ARFCN from 1800 kHz offset from the carrier to the edge of the relevant transmit band for each measurement over 50 bursts.
at 200 kHz intervals over the band 925 MHz to 960 MHz for each measurement over 50 bursts.

7) The MS is commanded to its minimum power control level. The spectrum analyzer is set again as in 4)
8) By tuning the spectrum analyzer centre frequency to the measurement frequencies the power level is measured over 200 bursts at the following frequencies:
FT;
FT+100kHz FT-100 kHz;
FT+200kHz FT-200 kHz;
FT+250kHz FT-250kHz;
FT+200kHz*N FT-200 kHz*N;
N=2,3,4,5,6,7,8;
And FT =RF channel nominal centre frequency.
9) Steps 1) to 8) is repeated except that in step 1) the spectrum analyzer is gated so that the burst of the next active time slot is measured.

Test Result

PASS

5.8. Conducted spurious emissions-MS allocated a channel

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.12.

Limits

According to clause 12.1.1 of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1,12.1.1.5.

Table 4-5

Frequency range	Power level in dBm		
	GSM 400, GSM 700, T-GSM 810 GSM 850, GSM 900	DCS 1 800	PCS 1 900
9 kHz to 1 GHz	-36	-36	-36
1 GHz to 12,75 GHz	-30		-30
1 GHz to 1 710 MHz		-30	
1 710 MHz to 1 785 MHz		-36	
1 785 MHz to 12,75 GHz		-30	

Test procedure

1) Measurements are made in the frequency range 100kHz to 12,75GHz. Spurious emissions are measured at the connector of the transceiver, as the power level of any discrete signal, higher than requirement in table 4-5 minus 6dB, delivered into a 50Ω load.
2) The measurement bandwidth based on a 5 pole synchronously tuned filter is according to table 4-6.The power indication is the peak power detected by the measuring system.
3) The measurement on any frequency shall be performed for at least one TDMA frame period with the exception of the idle frame.

Table 4-6

Frequency range	Frequency offset	Filter bandwidth	Approx video bandwidth
100 kHz to 50 MHz	-	10 kHz	30 kHz
50 MHz to 500 MHz excl. relevant TX band: GSM 450: 450,4 MHz to 457,6 MHz; GSM 480: 478,8 MHz to 486 MHz, and the RX bands: For GSM 400 MS: 460,4 MHz to 467,6 MHz; 488,8 MHz to 496 MHz.	-	100 kHz	300 kHz
500 MHz to 12,75 GHz, excl. relevant TX band: GSM 710: 698 MHz to 716 MHz GSM 750: 777 MHz to 793 MHz T-GSM 810: 806 MHz to 821 MHz; GSM 850: 824 MHz to 849 MHz; P-GSM: 890 MHz to 915 MHz; E-GSM: 880 MHz to 915 MHz; DCS: 1 710 MHz to 1 785 MHz, PCS 1 900: 1 850 MHz to 1 910 MHz; and the RX bands: For GSM 400 MS, GSM 900 MS and DCS 1 800 MS: 925 MHz to 960 MHz; 1 805 MHz to 1 880 MHz. For GSM 710, GSM 750, T-GSM 810, GSM 850 MS and PCS 1 900 MS: 728 MHz to 746 MHz; 747 MHz to 763 MHz; 851 MHz to 866 MHz 869 MHz to 894 MHz; 1 930 MHz to 1 990 MHz	0 to 10 MHz >= 10 MHz >= 20 MHz >= 30 MHz (offset from edge of relevant TX band)	100 kHz 300 kHz 1 MHz 3 MHz	300 kHz 1 MHz 3 MHz 3 MHz
relevant TX band: GSM 450: 450,4 MHz to 457,6 MHz GSM 480: 478,8 MHz to 486 MHz GSM 710: 698 MHz to 716 MHz GSM 750: 777 MHz to 793 MHz T-GSM 810: 806 MHz to 821 MHz; GSM 850: 824 MHz to 849 MHz P-GSM: 890 MHz to 915 MHz E-GSM: 880 MHz to 915 MHz DCS: 1 710 MHz to 1 785 MHz PCS 1 900: 1 850 MHz to 1 910 MHz	1,8 to 6,0 MHz > 6,0 MHz (offset from carrier)	30 kHz 100 kHz	100 kHz 300 kHz

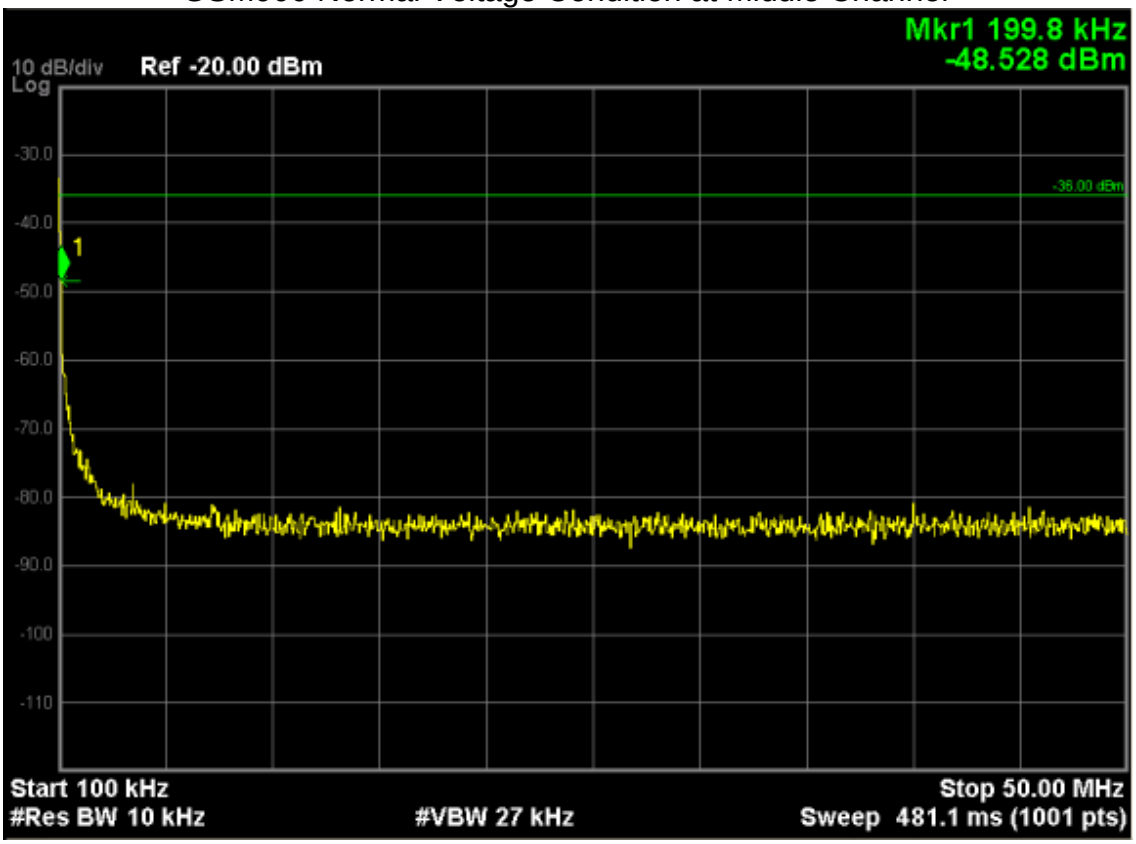
NOTE 1: The excluded RX bands are tested in subclause 13.4.
NOTE 2: The filter and video bandwidths, and frequency offsets are only correct for measurements on an MS transmitting on a channel in the Mid ARFCN range.
NOTE 3: Due to practical implementation, the video bandwidth is restricted to a maximum of 3 MHz.

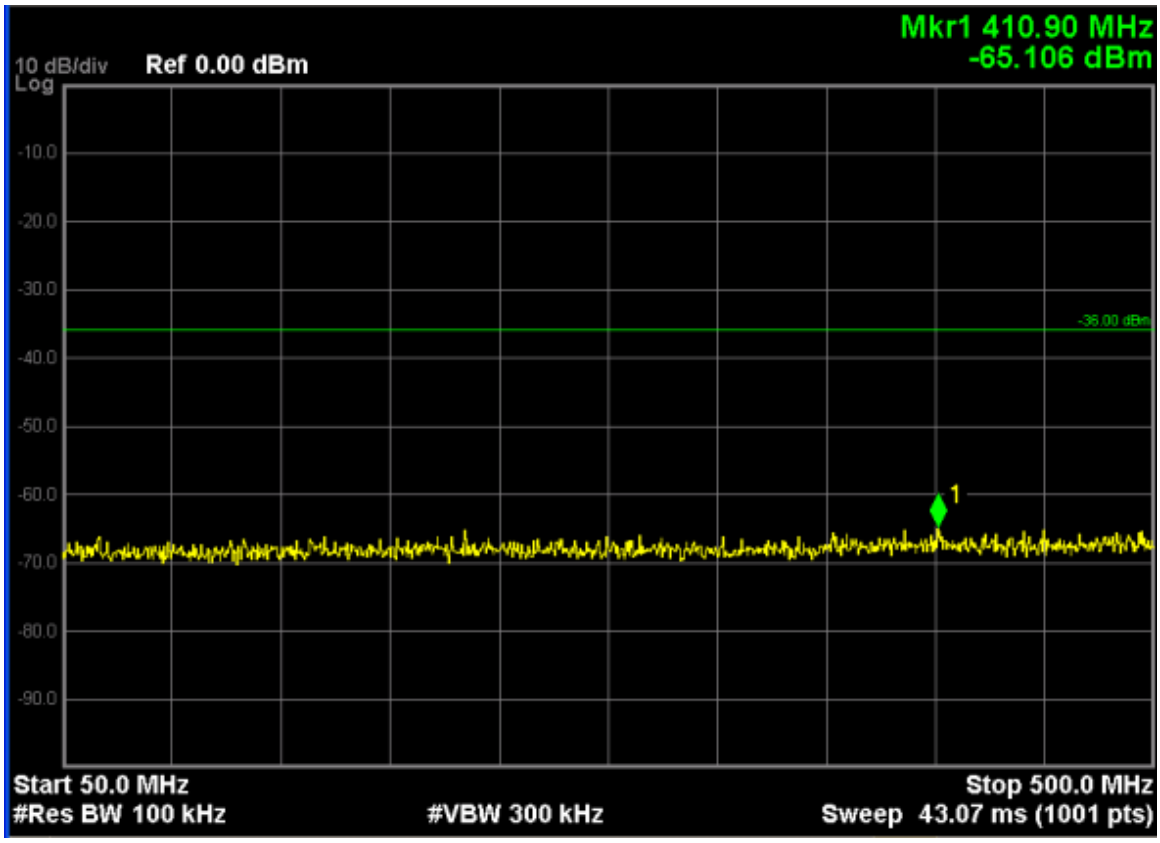
Test Result

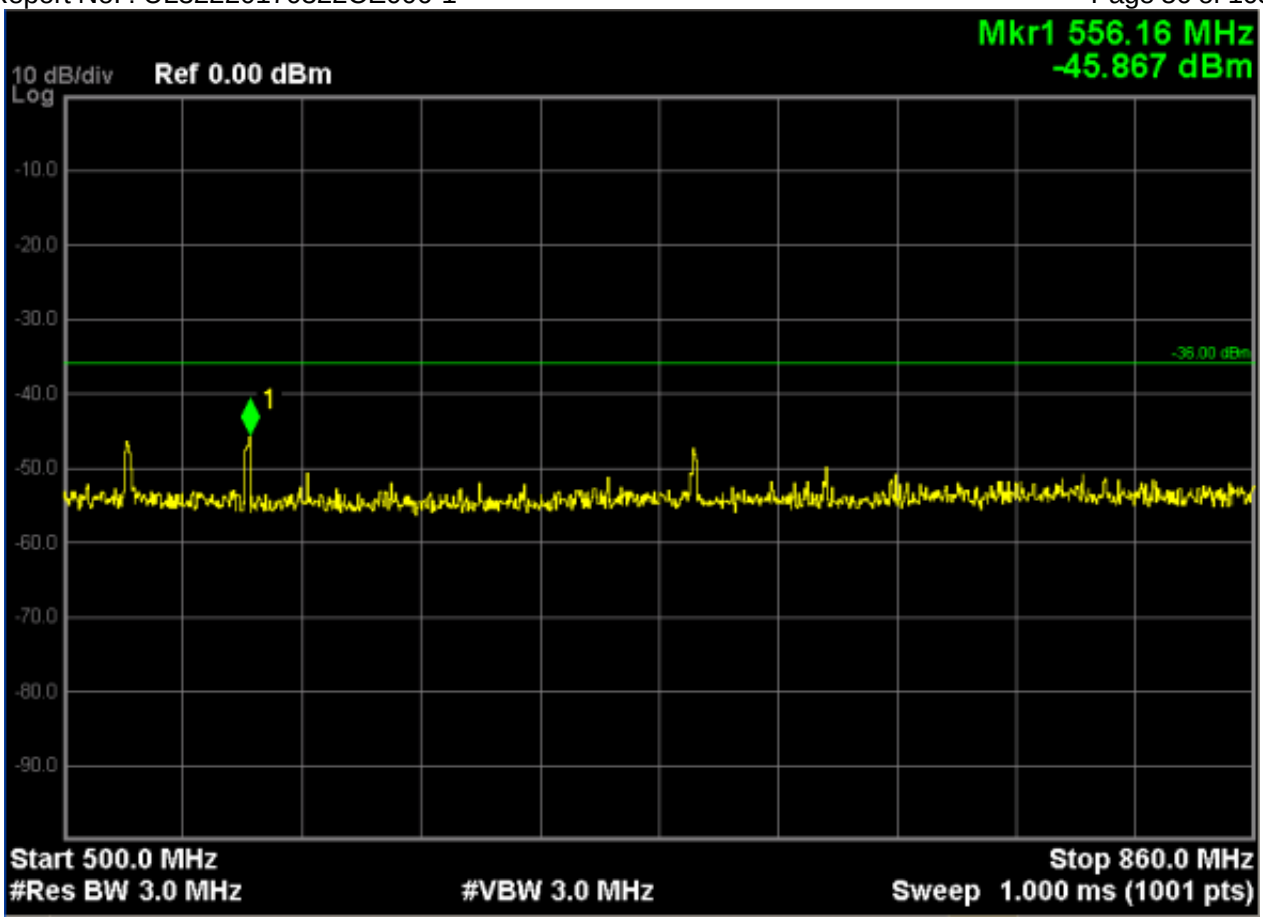
PASS

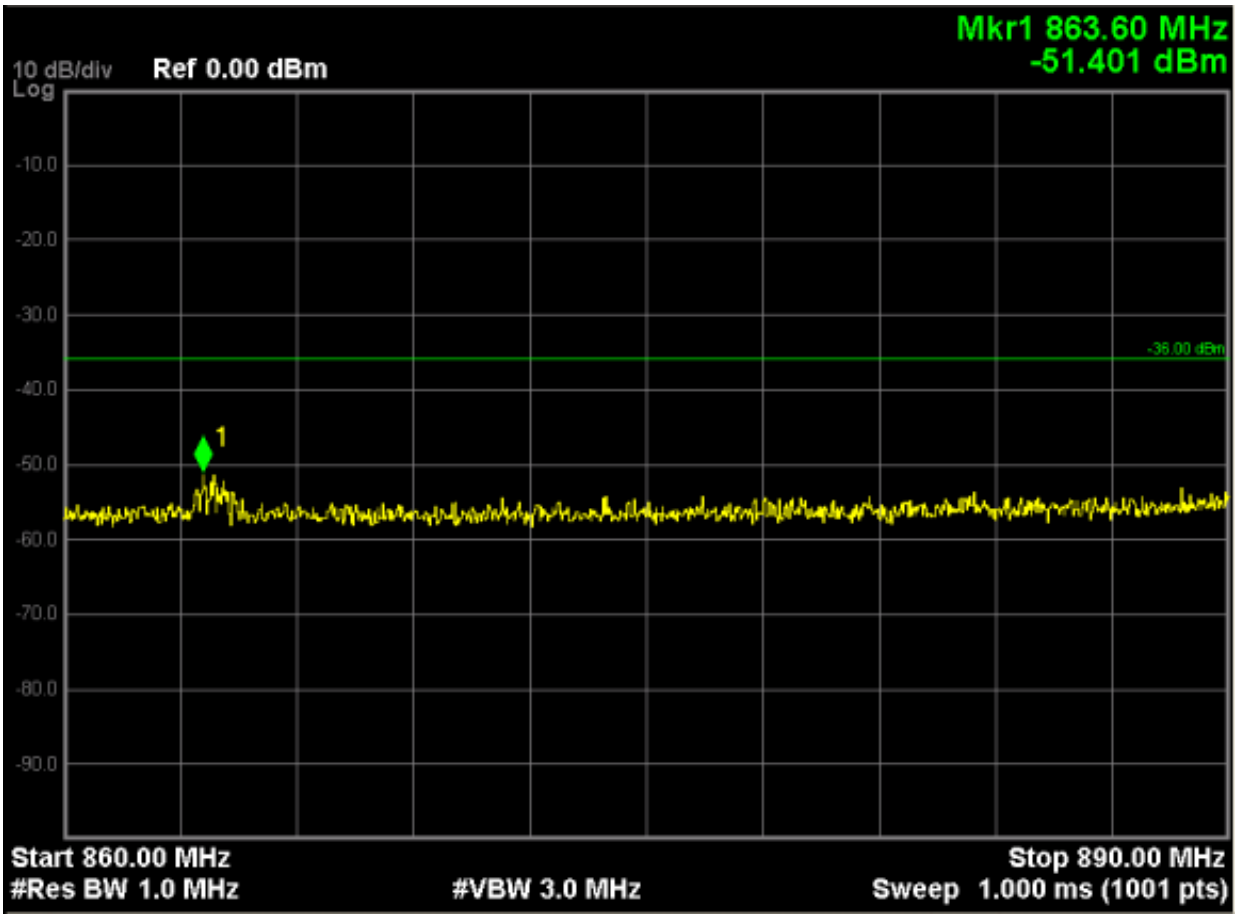
Please refer to following worst case data plots.

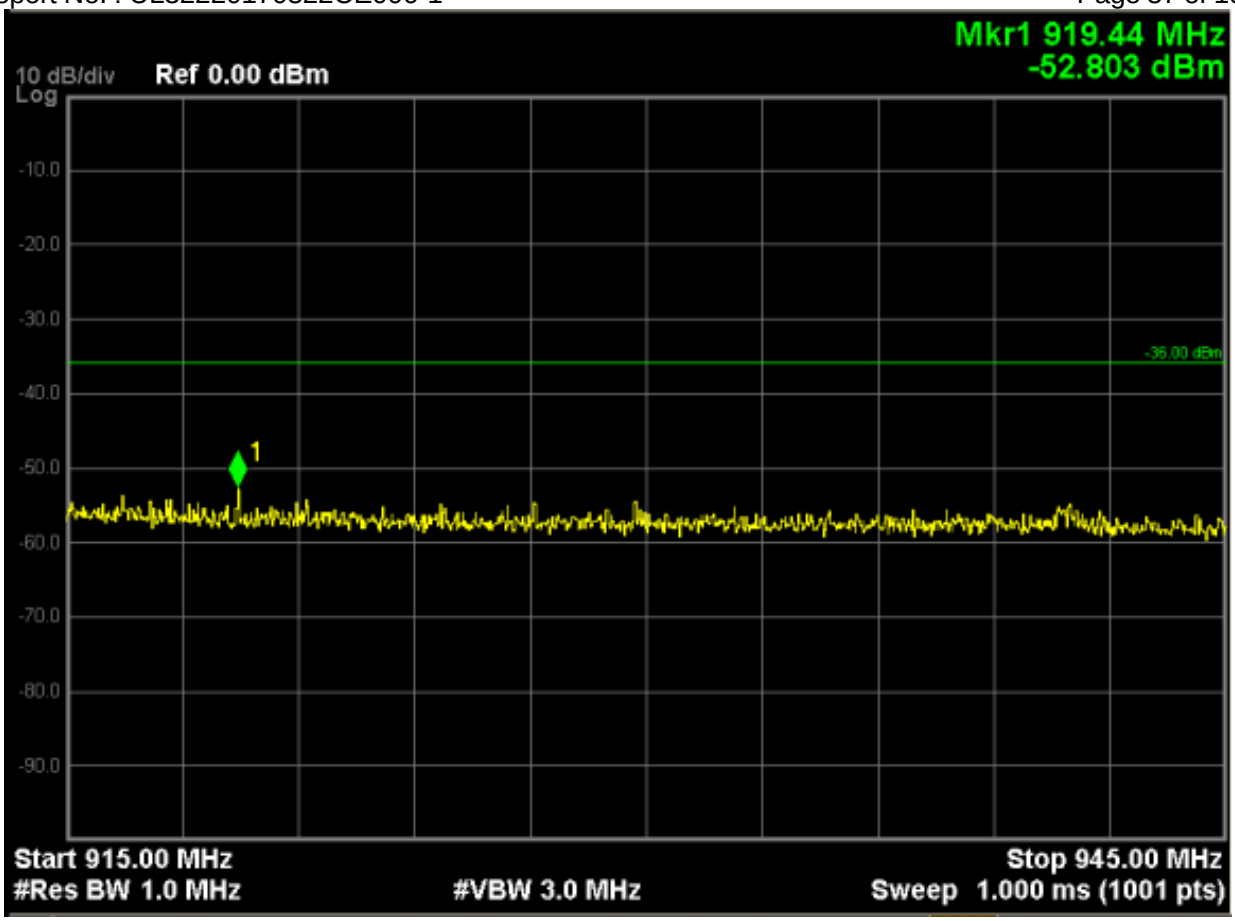
GSM900 Normal Voltage Condition at Middle Channel

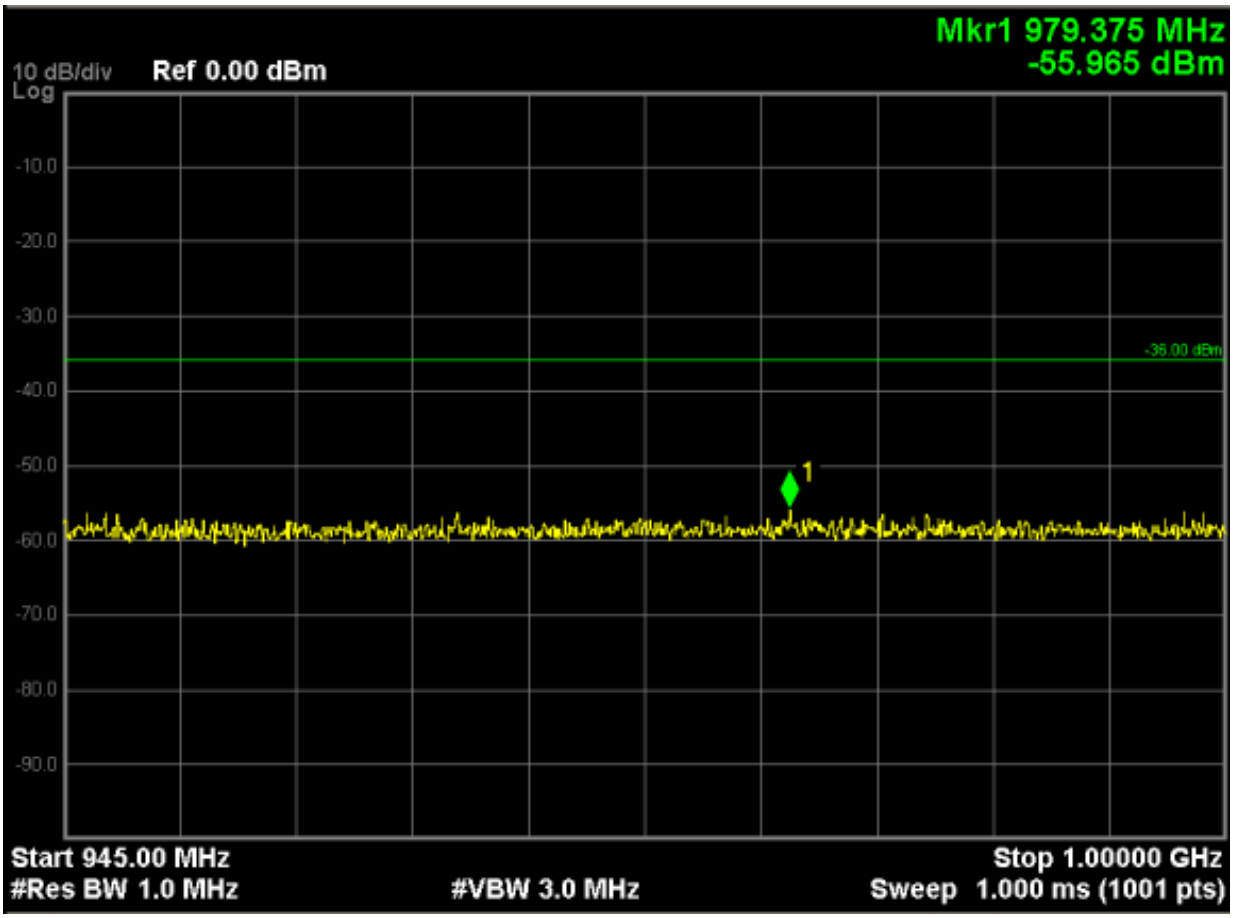


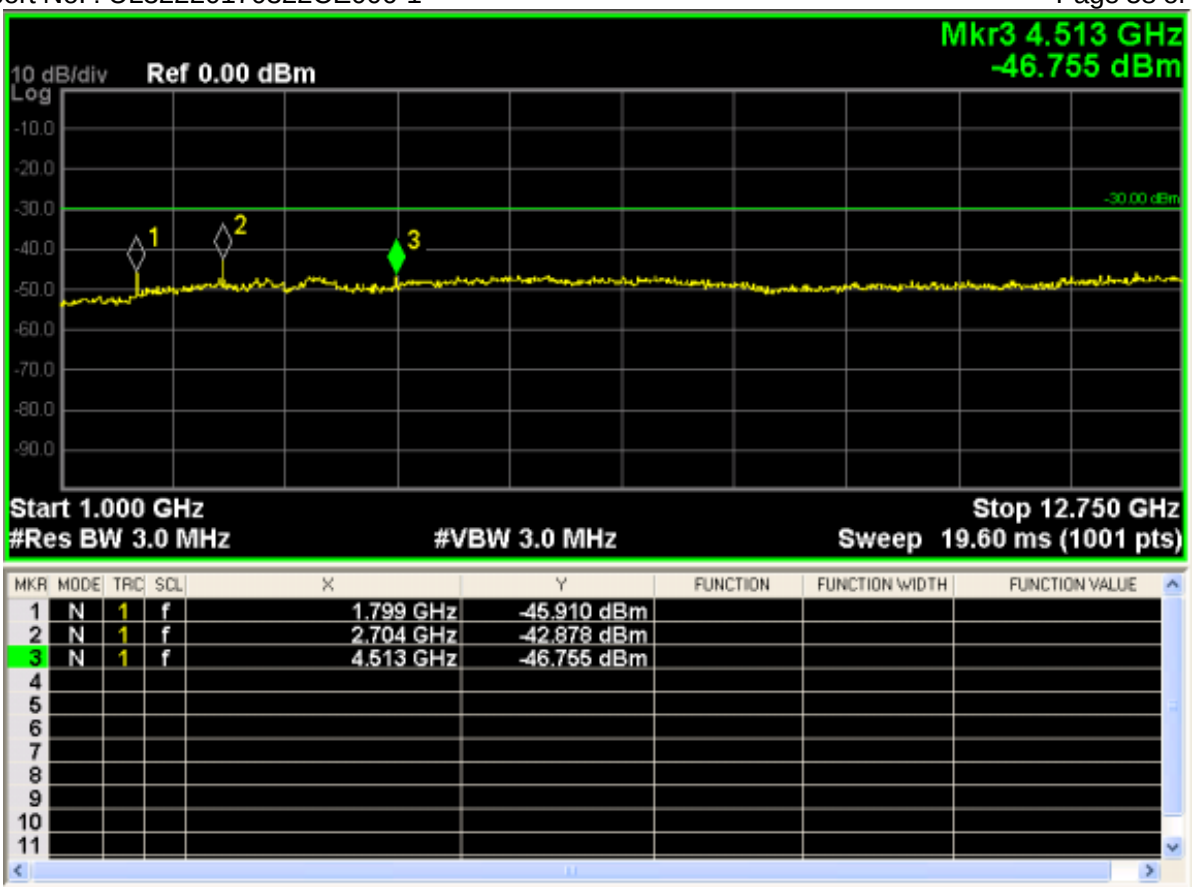



Mkr1 556.16 MHz
-45.867 dBm
10 dB/div
Log
Ref 0.00 dBm
-10.0
-20.0
-30.0
-36.00 dBm
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
1
Start 500.0 MHz
#Res BW 3.0 MHz
#VBW 3.0 MHz
Stop 860.0 MHz
Sweep 1.000 ms (1001 pts)

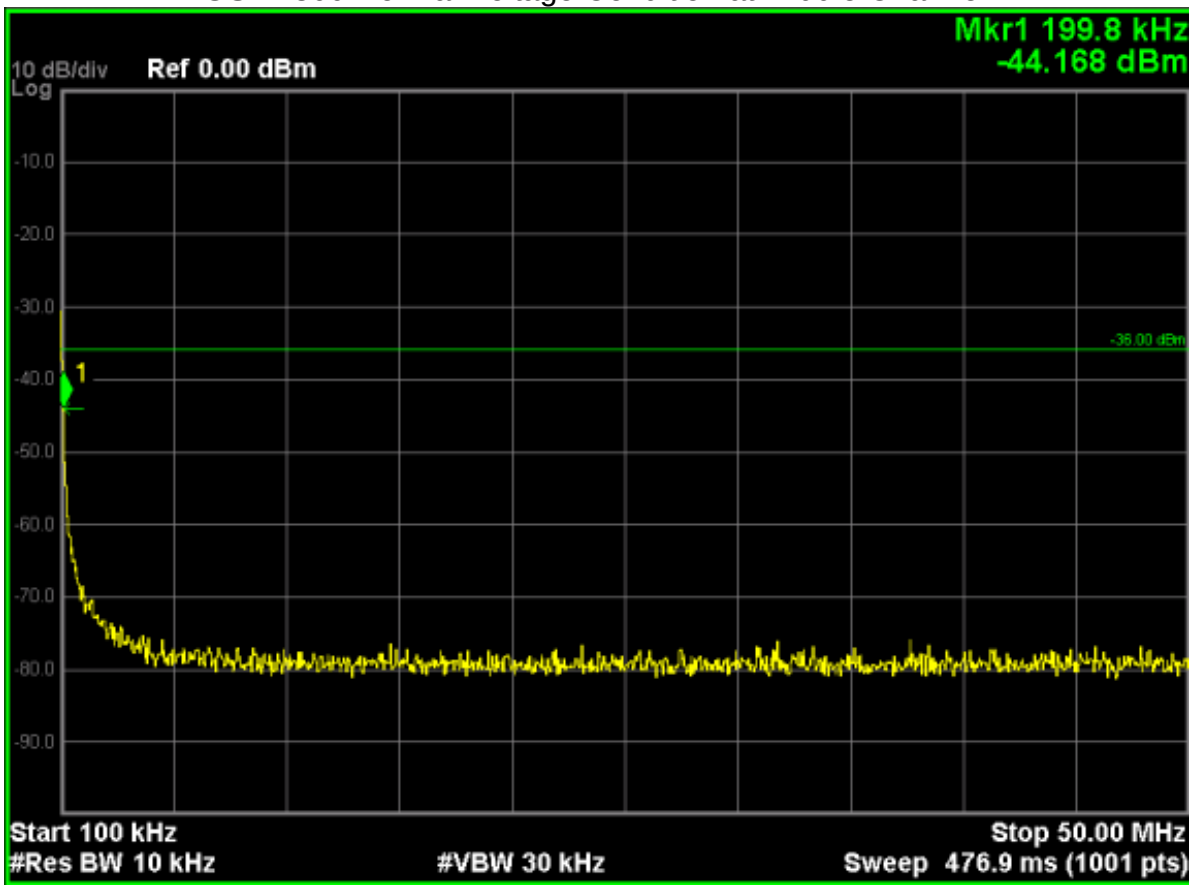

Mkr1 863.60 MHz
-51.401 dBm
10 dB/div
Log
Ref 0.00 dBm
-10.0
-20.0
-30.0
-36.00 dBm
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
1
Start 860.00 MHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 890.00 MHz
Sweep 1.000 ms (1001 pts)

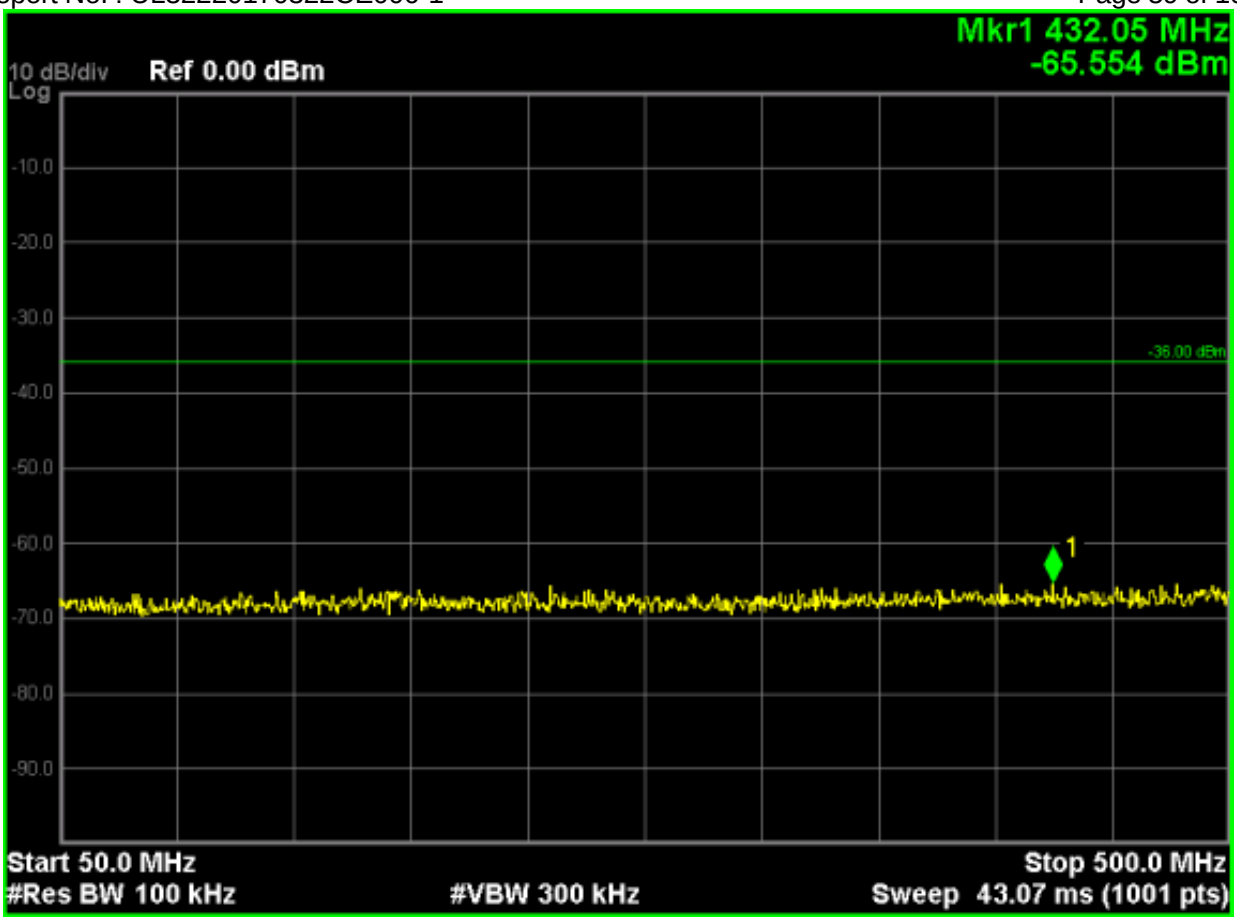

Mkr1 919.44 MHz
-52.803 dBm
10 dB/div
Log
Ref 0.00 dBm
-10.0
-20.0
-30.0
-36.00 dBm
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
1
Start 915.00 MHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 945.00 MHz
Sweep 1.000 ms (1001 pts)

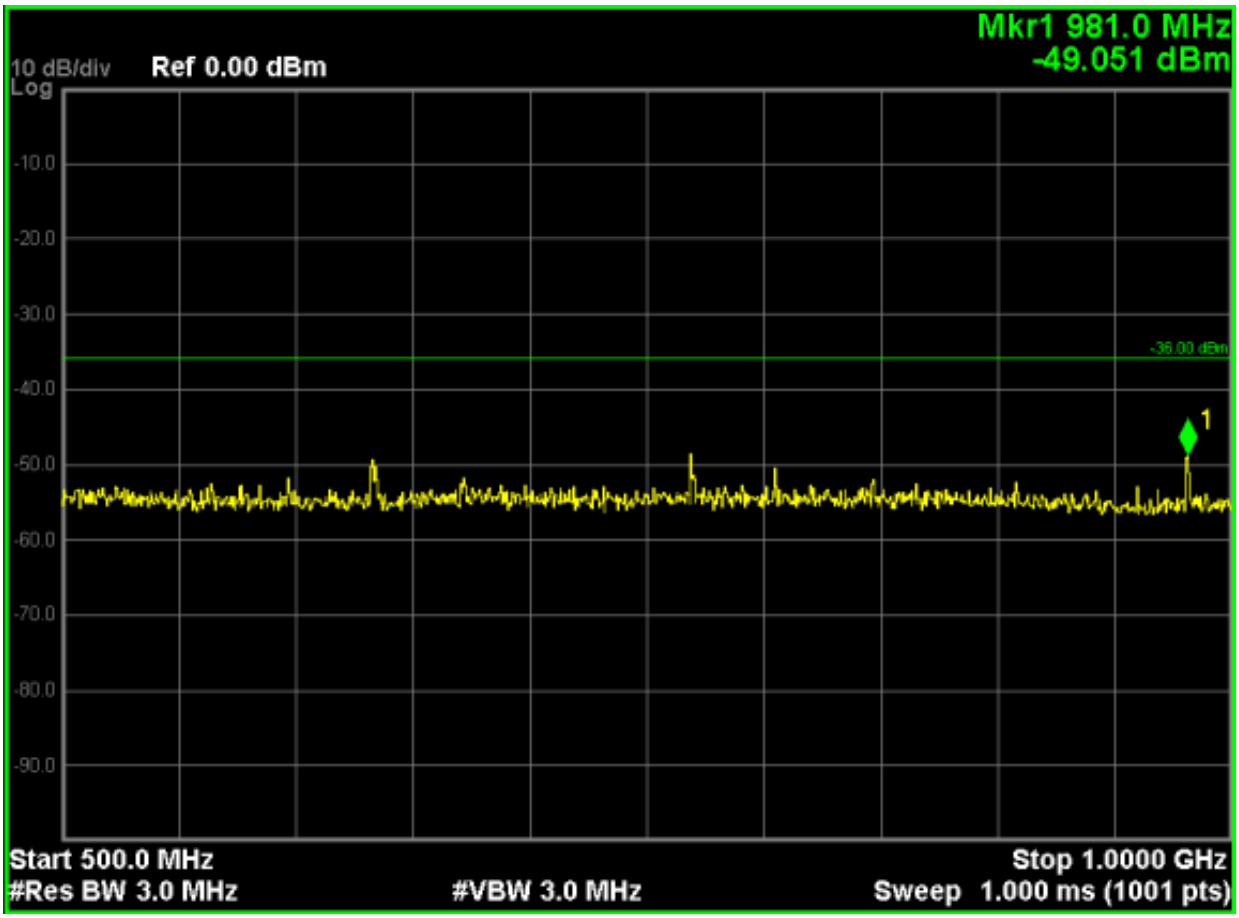

Mkr1 979.375 MHz
-55.965 dBm
10 dB/div
Log
Ref 0.00 dBm
-10.0
-20.0
-30.0
-36.00 dBm
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
1
Start 945.00 MHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 1.00000 GHz
Sweep 1.000 ms (1001 pts)

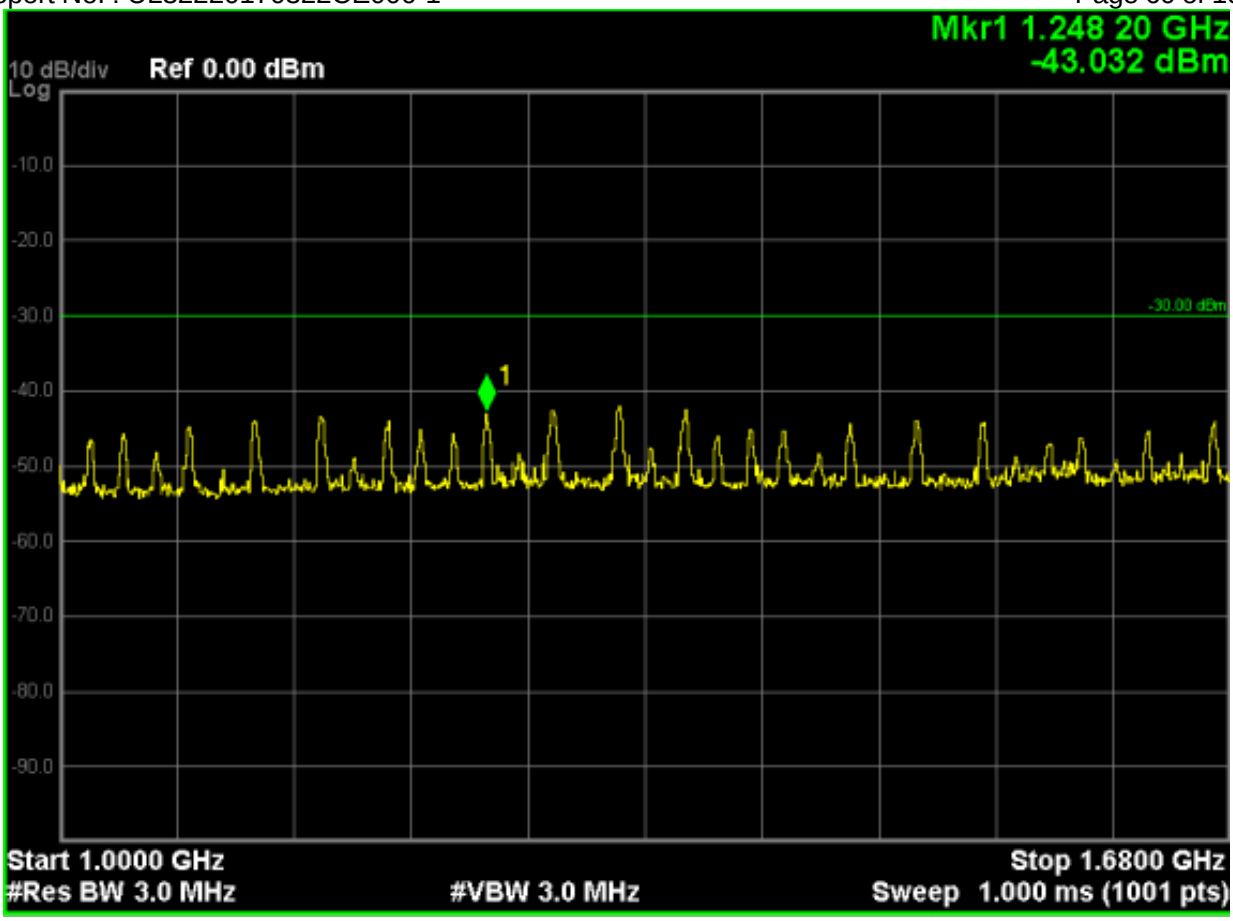


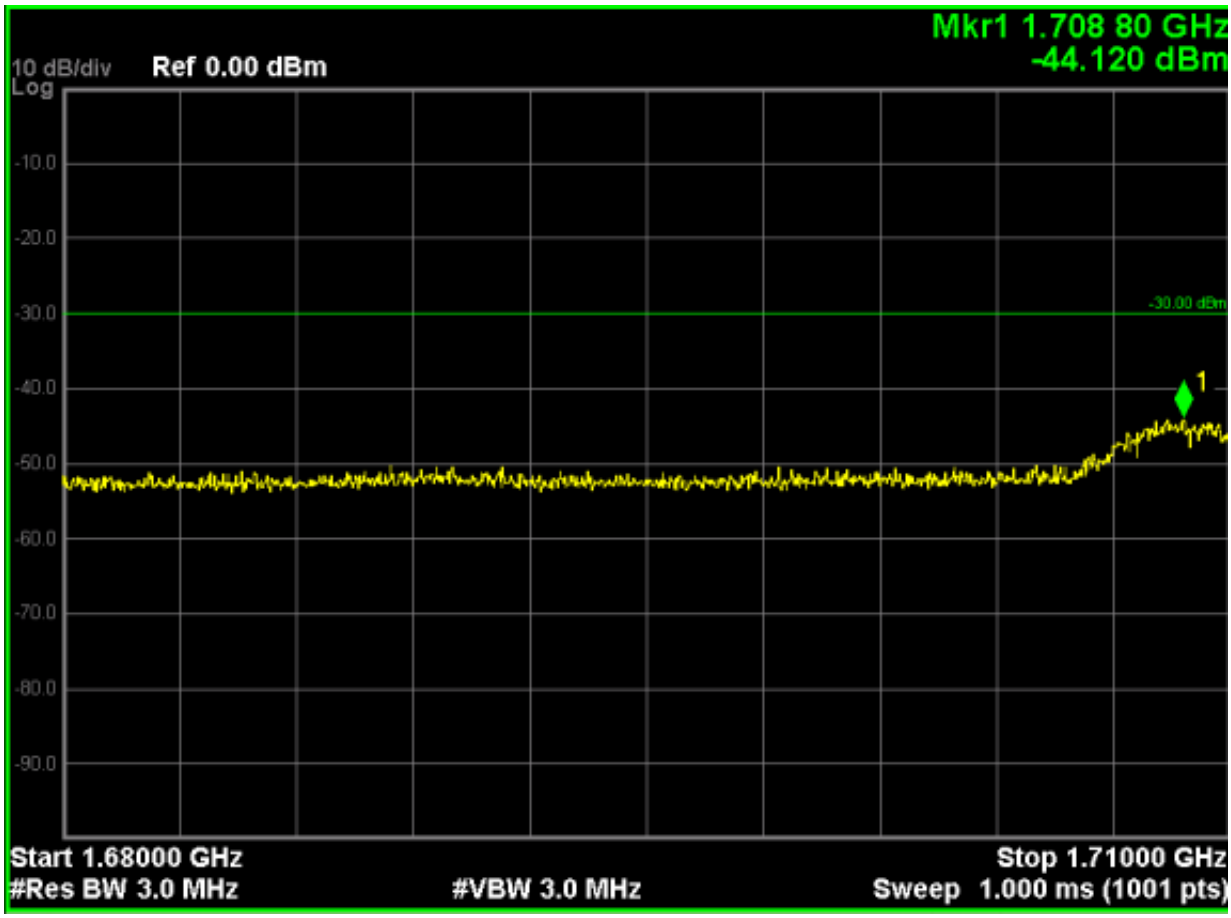
GSM1800 Normal Voltage Condition at Middle Channel

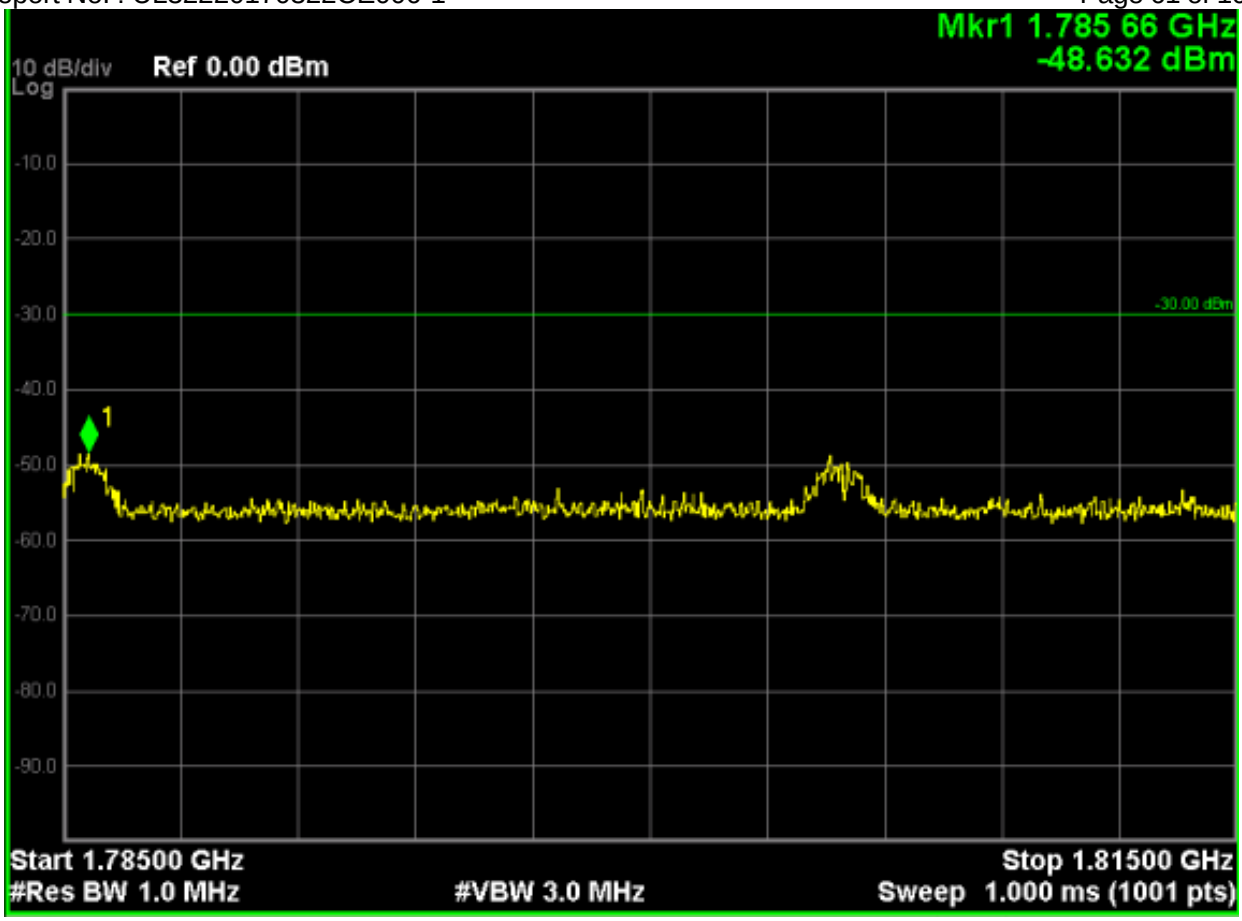


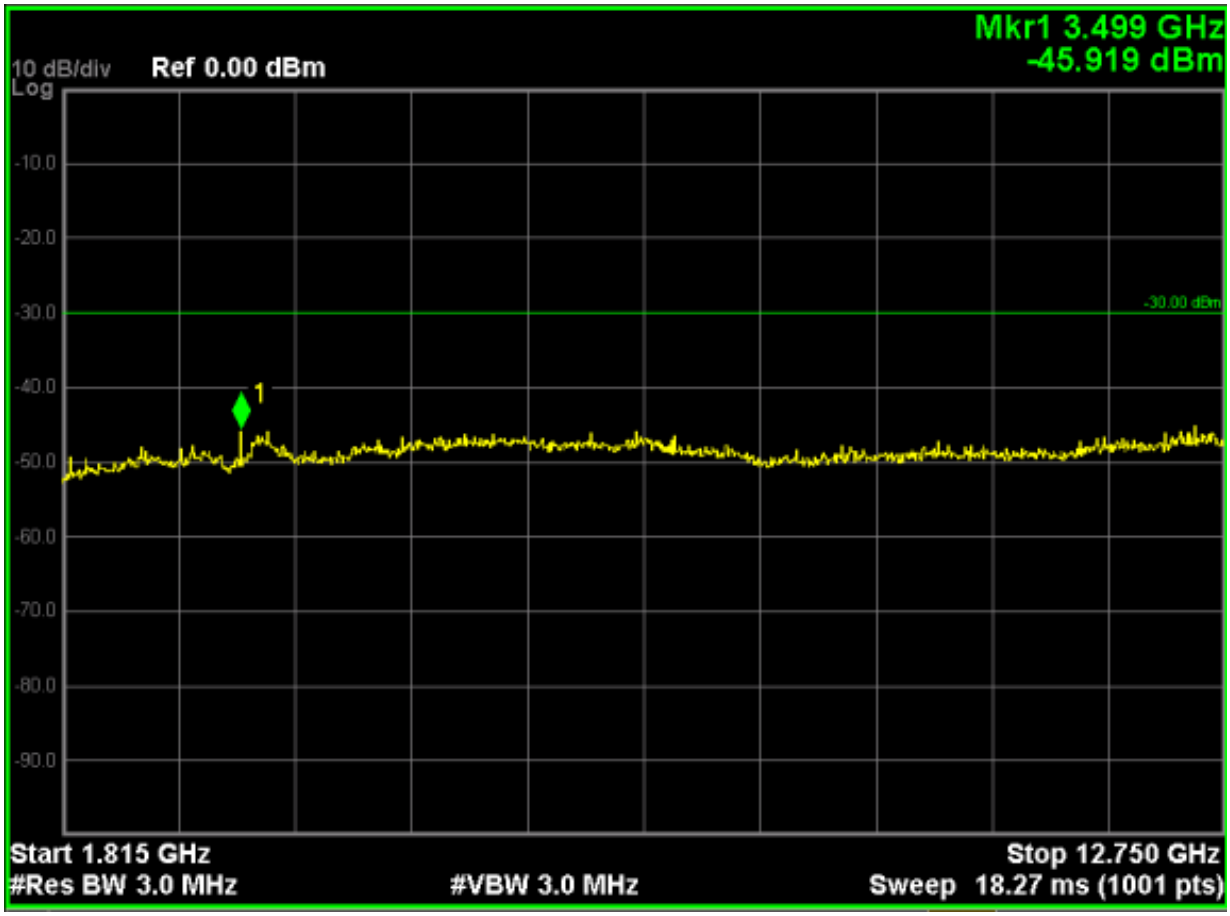

Mkr1 432.05 MHz
-65.554 dBm
10 dB/div
Log
Ref 0.00 dBm
-10.0
-20.0
-30.0
-36.00 dBm
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
1
Start 50.0 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 500.0 MHz
Sweep 43.07 ms (1001 pts)


Mkr1 981.0 MHz
-49.051 dBm
10 dB/div
Log
Ref 0.00 dBm
-10.0
-20.0
-30.0
-36.00 dBm
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
1
Start 500.0 MHz
#Res BW 3.0 MHz
#VBW 3.0 MHz
Stop 1.0000 GHz
Sweep 1.000 ms (1001 pts)


Mkr1 1.248 20 GHz
-43.032 dBm
10 dB/div
Log
Ref 0.00 dBm
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
-30.00 dBm
1
Start 1.0000 GHz
#Res BW 3.0 MHz
#VBW 3.0 MHz
Stop 1.6800 GHz
Sweep 1.000 ms (1001 pts)


Mkr1 1.708 80 GHz
-44.120 dBm
10 dB/div
Log
Ref 0.00 dBm
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
-30.00 dBm
1
Start 1.68000 GHz
#Res BW 3.0 MHz
#VBW 3.0 MHz
Stop 1.71000 GHz
Sweep 1.000 ms (1001 pts)


Mkr1 1.785 66 GHz
-48.632 dBm
10 dB/div
Log
Ref 0.00 dBm
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
-30.00 dBm
1
Start 1.78500 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 1.81500 GHz
Sweep 1.000 ms (1001 pts)


Mkr1 3.499 GHz
-45.919 dBm
10 dB/div
Log
Ref 0.00 dBm
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
-30.00 dBm
1
Start 1.815 GHz
#Res BW 3.0 MHz
#VBW 3.0 MHz
Stop 12.750 GHz
Sweep 18.27 ms (1001 pts)

5.9. Conducted spurious emissions-MS in idle mode

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.13

Limits

According to clause 12.1.2 of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1,12.1.2.5.

Table 4-7

Frequency range		Power level in dBm	
		GSM 400, T-GSM 810 GSM 900, DCS 1 800	GSM 700, GSM 850, PCS 1 900
9 kHz to	880 MHz	-57	-57
880 MHz to	915 MHz	-59	-57
915 MHz to	1000 MHz	-57	-57
1 GHz to	1 710 MHz	-47	
1 710 MHz to	1 785 MHz	-53	
1 785 MHz to	12,75 GHz	-47	
1 GHz to	1 850 MHz		-47
1 850 MHz to	1 910 MHz		-53
1 910 MHz to	12,75 GHz		-47

Test procedure

1) Measurements are made in the frequency range 100 kHz to 12,75GHz. Spurious emissions are measured as the power level of any discrete signal, higher than requirement in table 4-7 minus 6dB, delivered into a 50Ω load.
2) The measurement bandwidth based on a 5 pole synchronously tuned filter is according to table 4-8.The power indication is the peak power detected by the measuring system.
3) The measurement time on any frequency shall be such that it includes the time during which the MS receives a TDMA frame containing the paging channel.

table 4-8

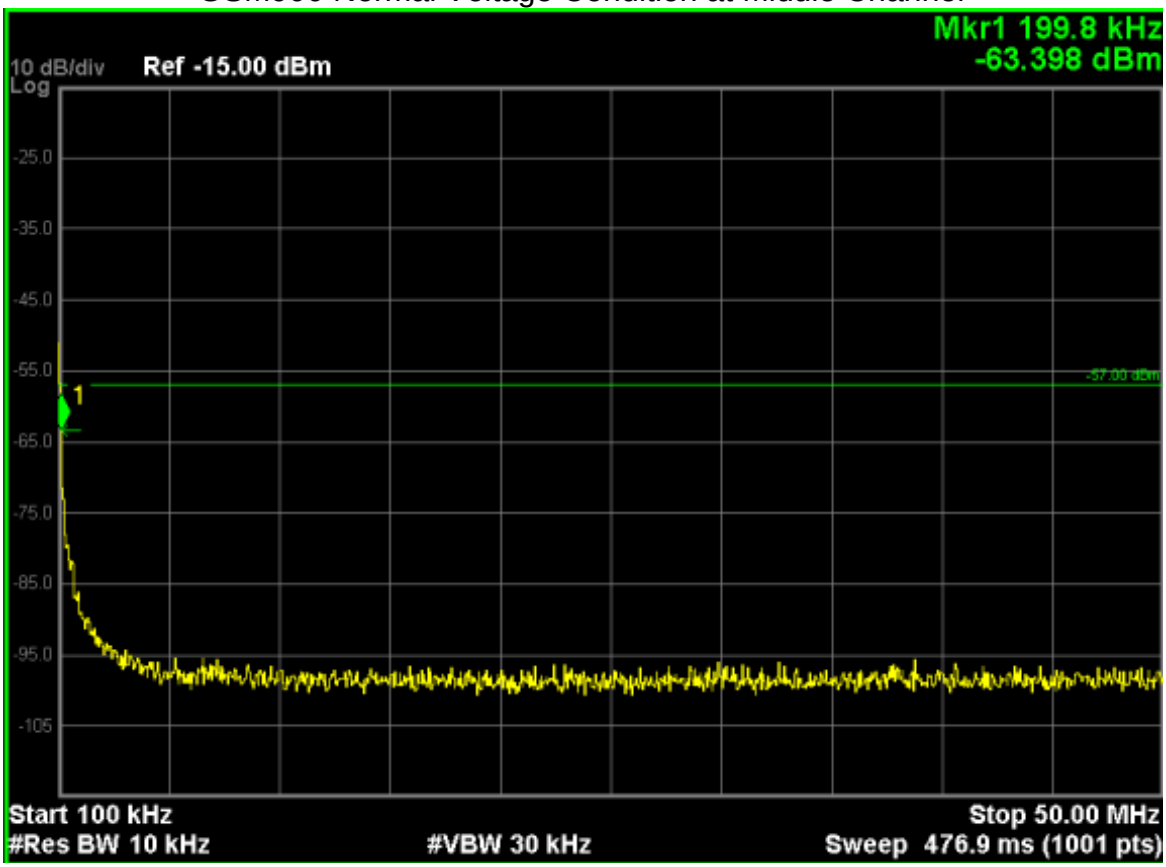
Frequency range	Filter bandwidth	Video bandwidth
100 kHz to 50 MHz	10 kHz	30 kHz
50 MHz to 12,75 GHz	100 kHz	300 kHz

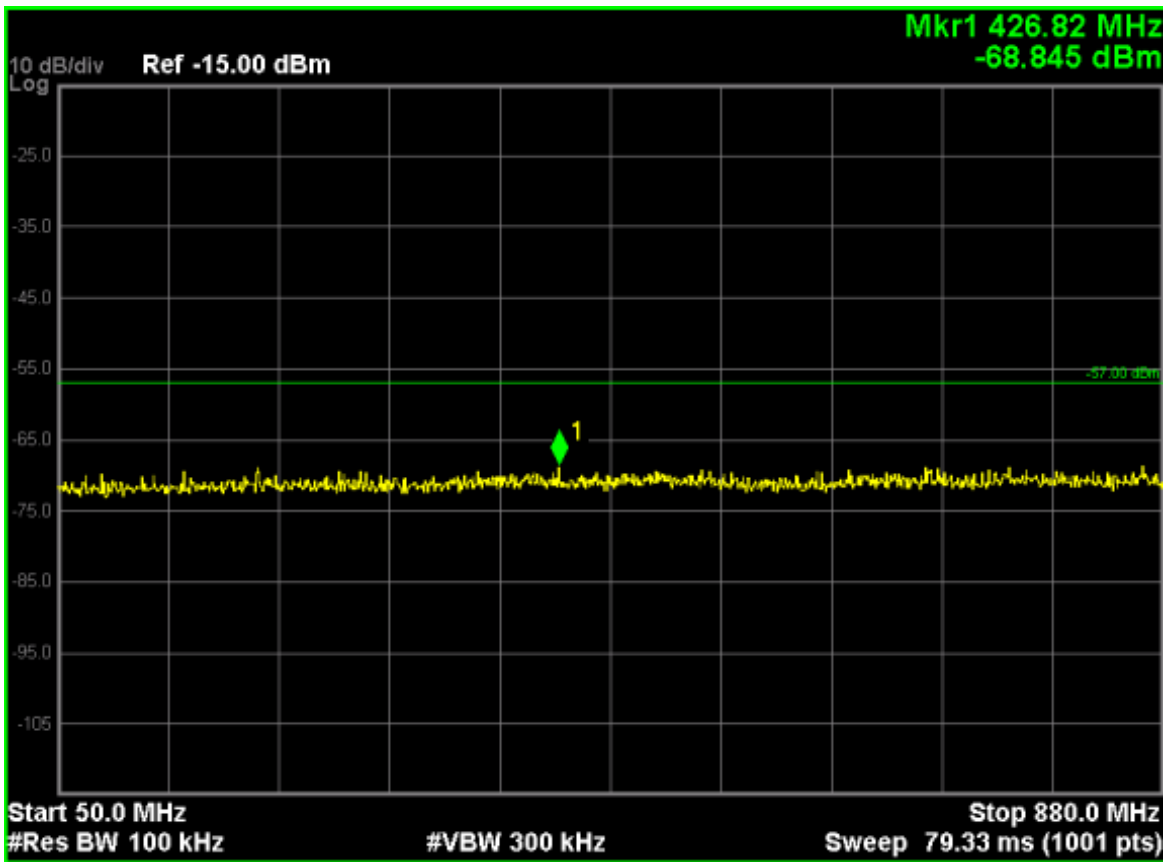
Test Result

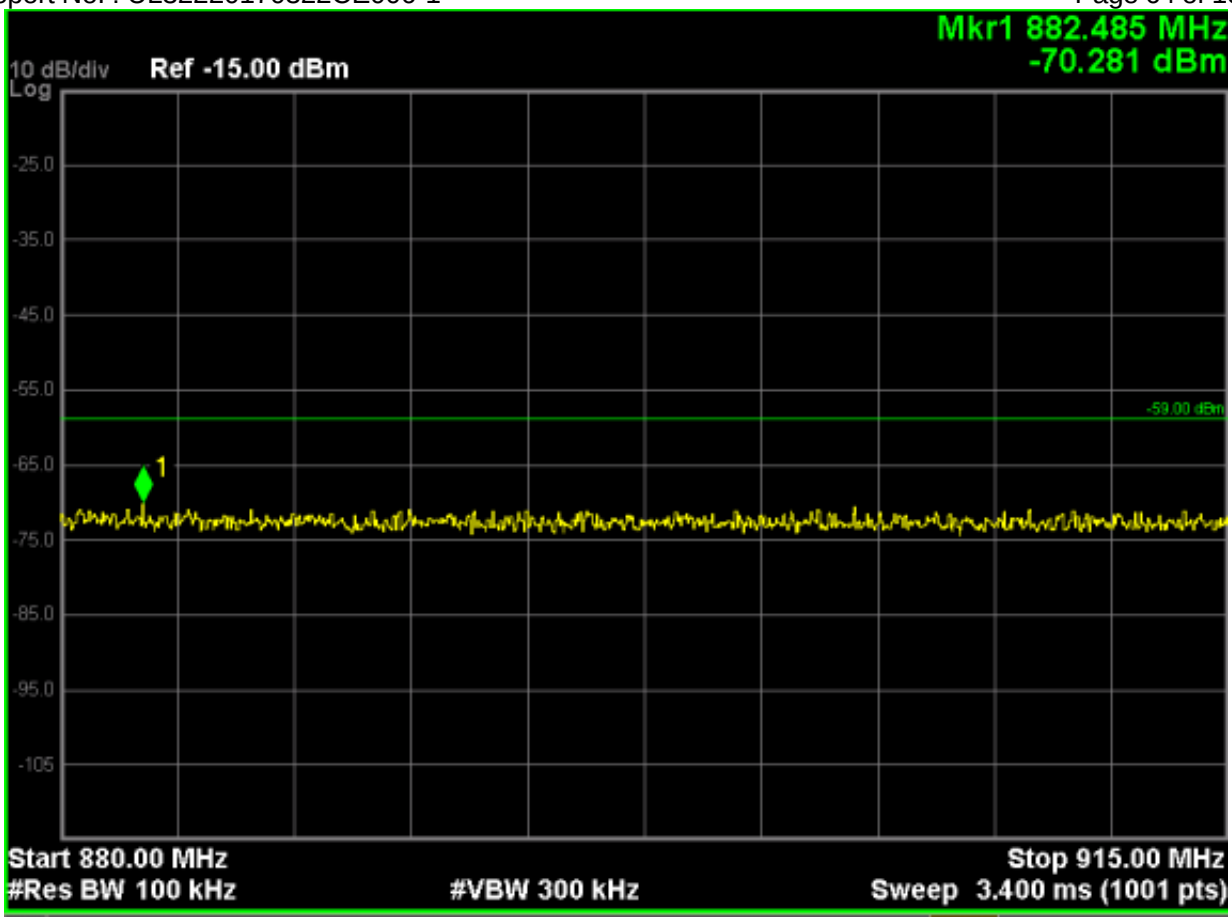
PASS

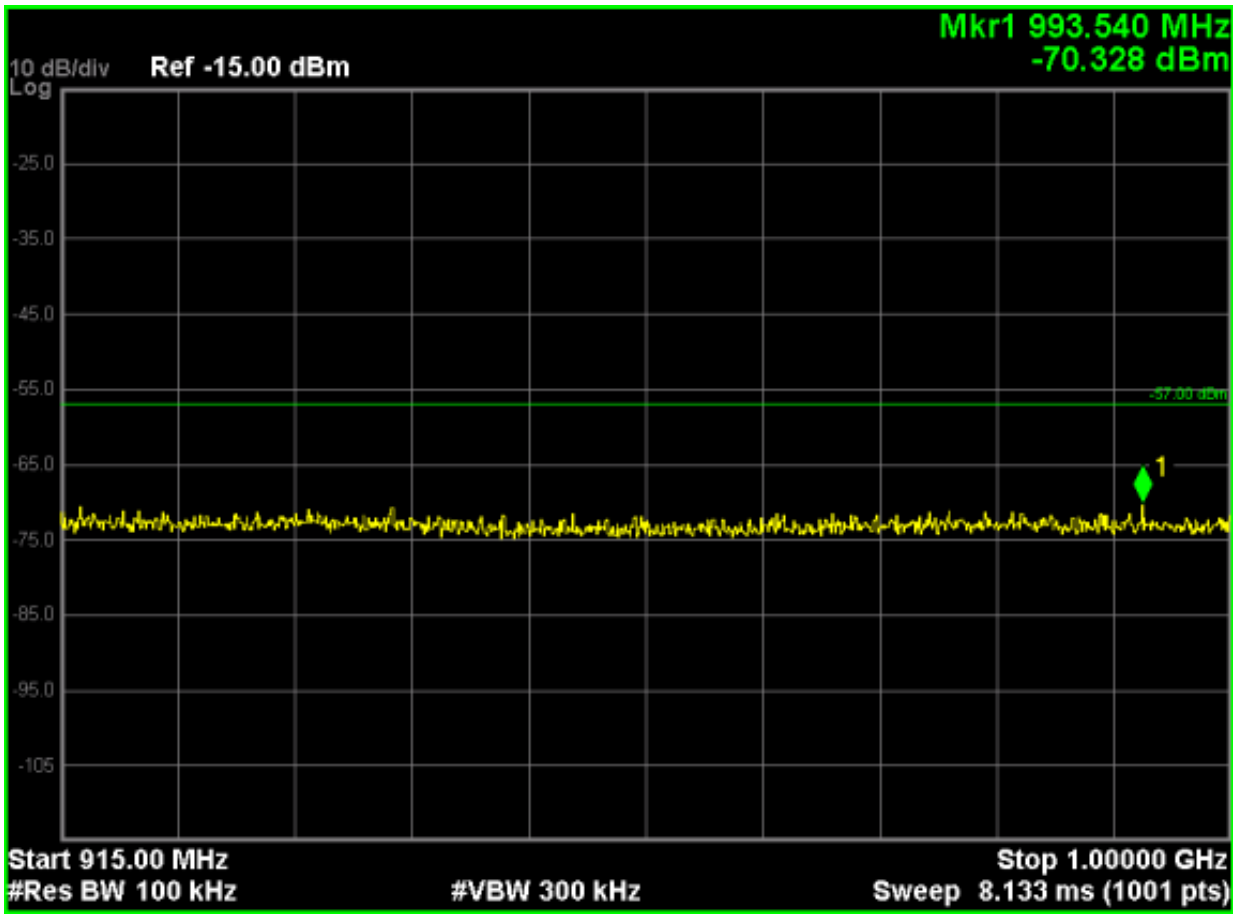
Please refer to following worst case data plots

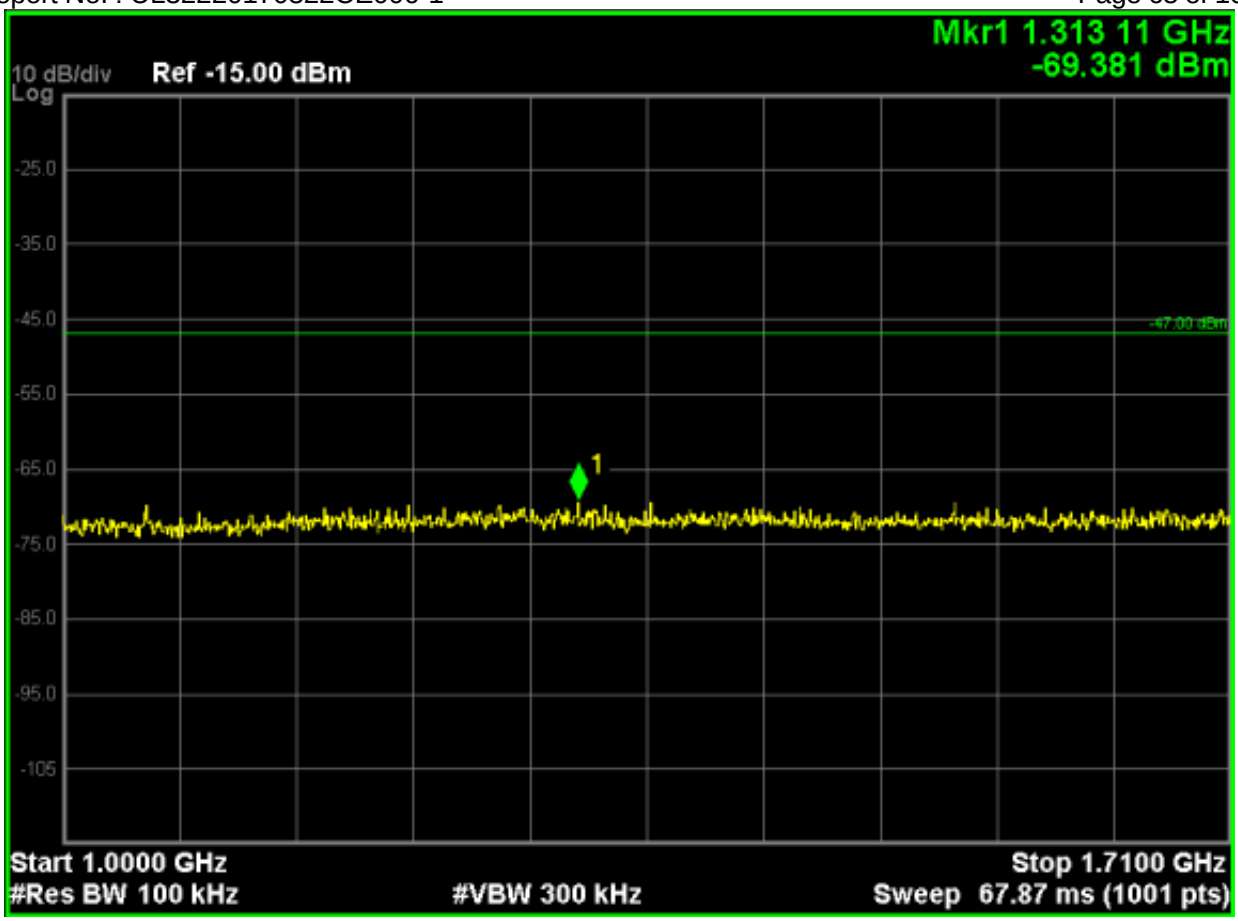
GSM900 Normal Voltage Condition at Middle Channel

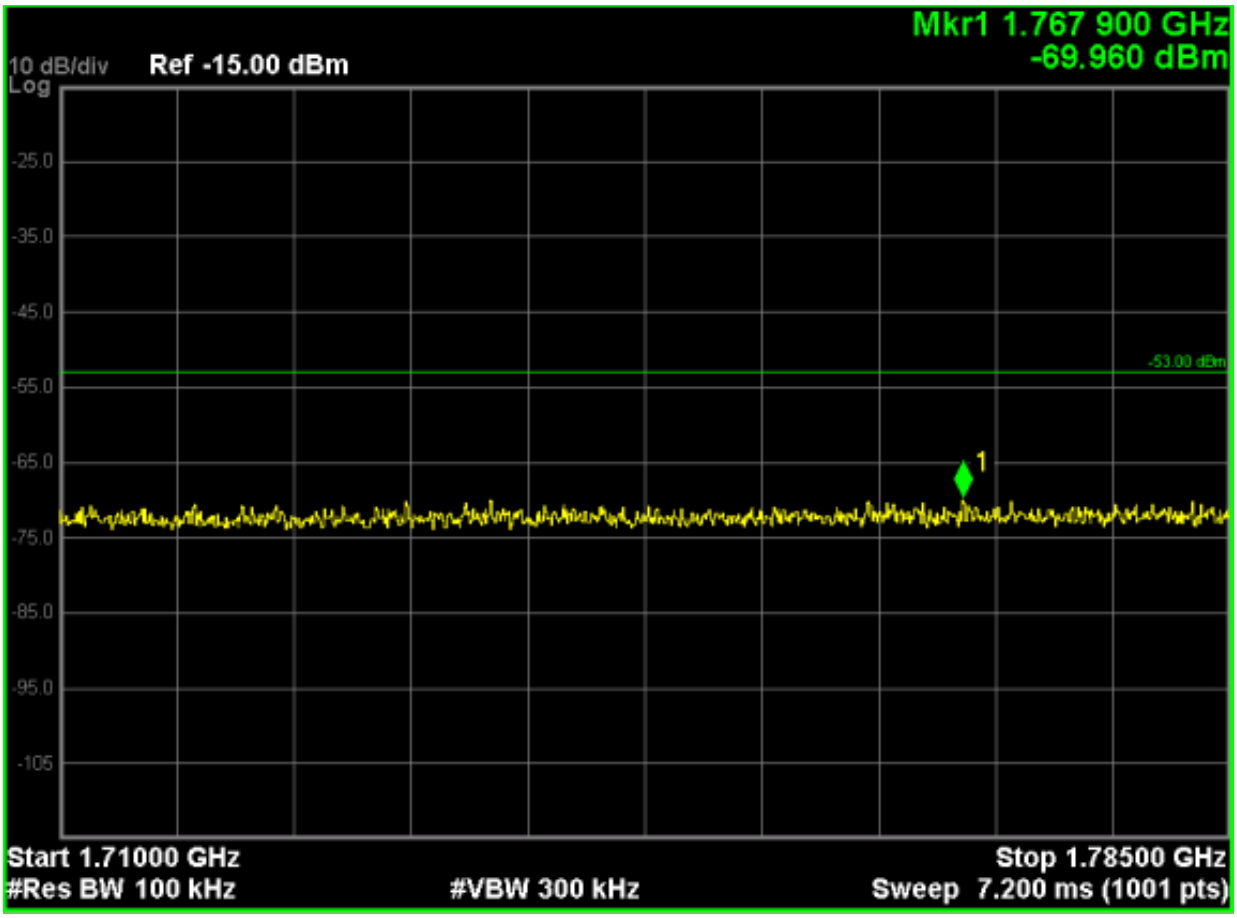


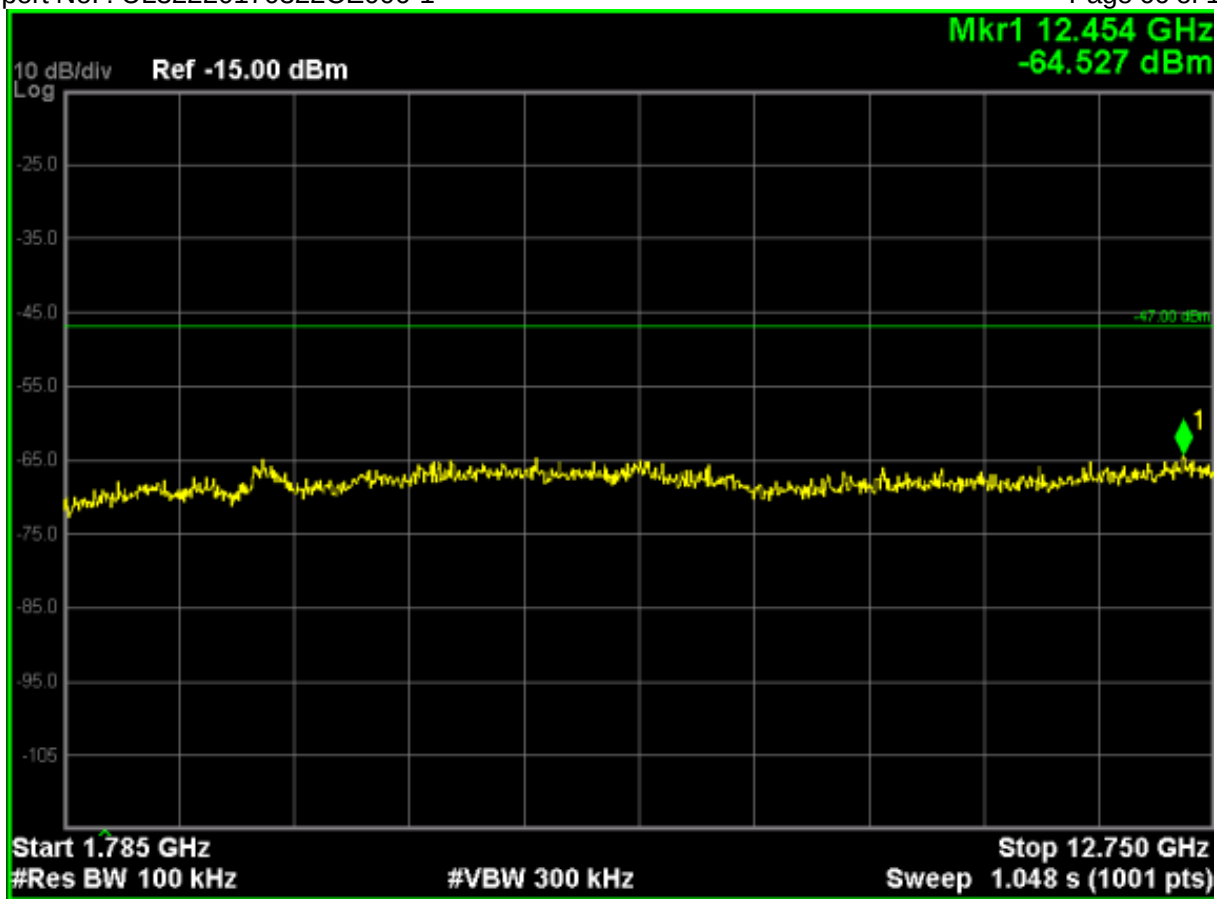



Mkr1 882.485 MHz
-70.281 dBm
10 dB/div
Log
Ref -15.00 dBm
-25.0
-35.0
-45.0
-55.0
-65.0
-75.0
-85.0
-95.0
-105
-59.00 dBm
1
Start 880.00 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 915.00 MHz
Sweep 3.400 ms (1001 pts)

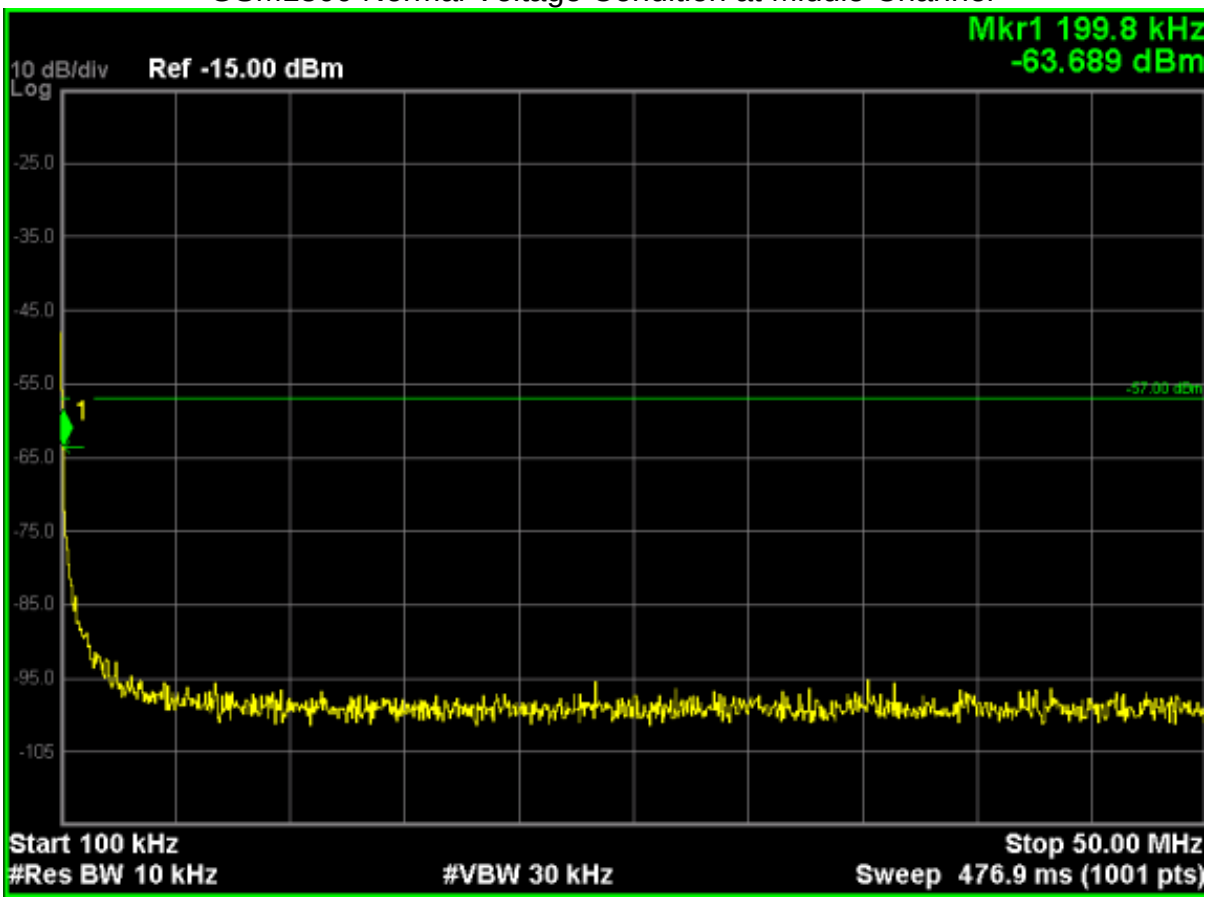

Mkr1 993.540 MHz
-70.328 dBm
10 dB/div
Log
Ref -15.00 dBm
-25.0
-35.0
-45.0
-55.0
-65.0
-75.0
-85.0
-95.0
-105
-57.00 dBm
1
Start 915.00 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.00000 GHz
Sweep 8.133 ms (1001 pts)

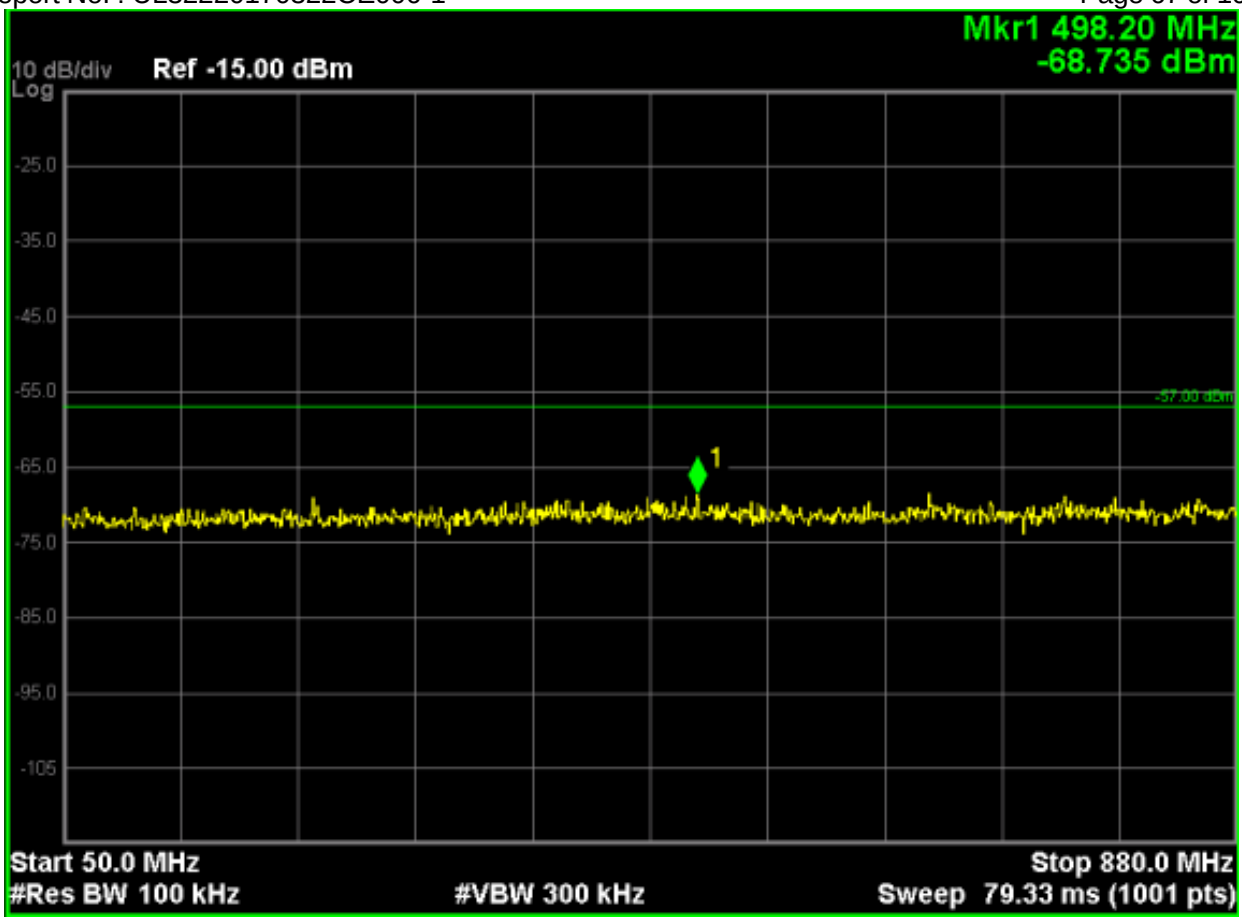

Mkr1 1.313 11 GHz
-69.381 dBm
10 dB/div
Log
Ref -15.00 dBm
-25.0
-35.0
-45.0
-47.00 dBm
-55.0
-65.0
-75.0
-85.0
-95.0
-105
1
Start 1.0000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.7100 GHz
Sweep 67.87 ms (1001 pts)

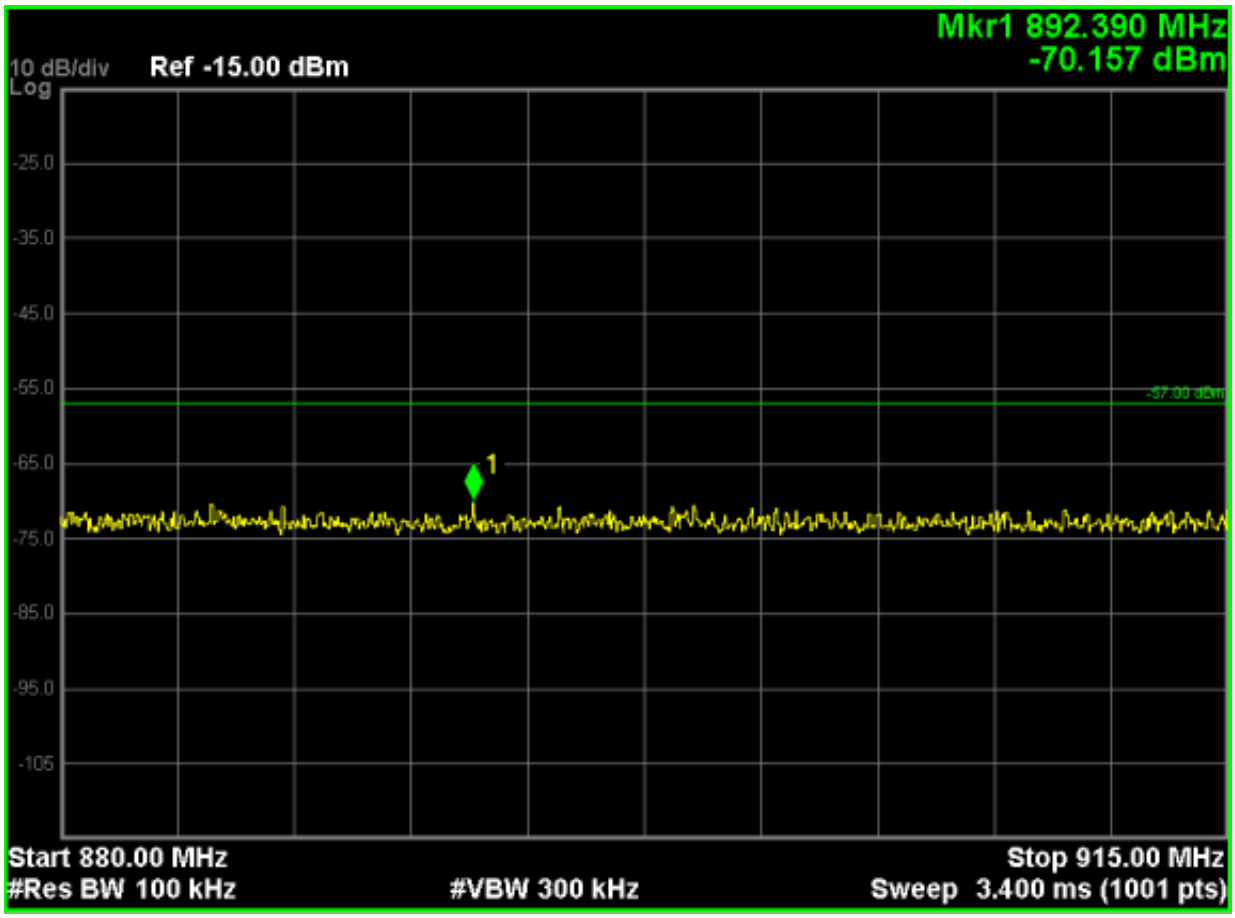

Mkr1 1.767 900 GHz
-69.960 dBm
10 dB/div
Log
Ref -15.00 dBm
-25.0
-35.0
-45.0
-53.00 dBm
-55.0
-65.0
-75.0
-85.0
-95.0
-105
1
Start 1.71000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.78500 GHz
Sweep 7.200 ms (1001 pts)

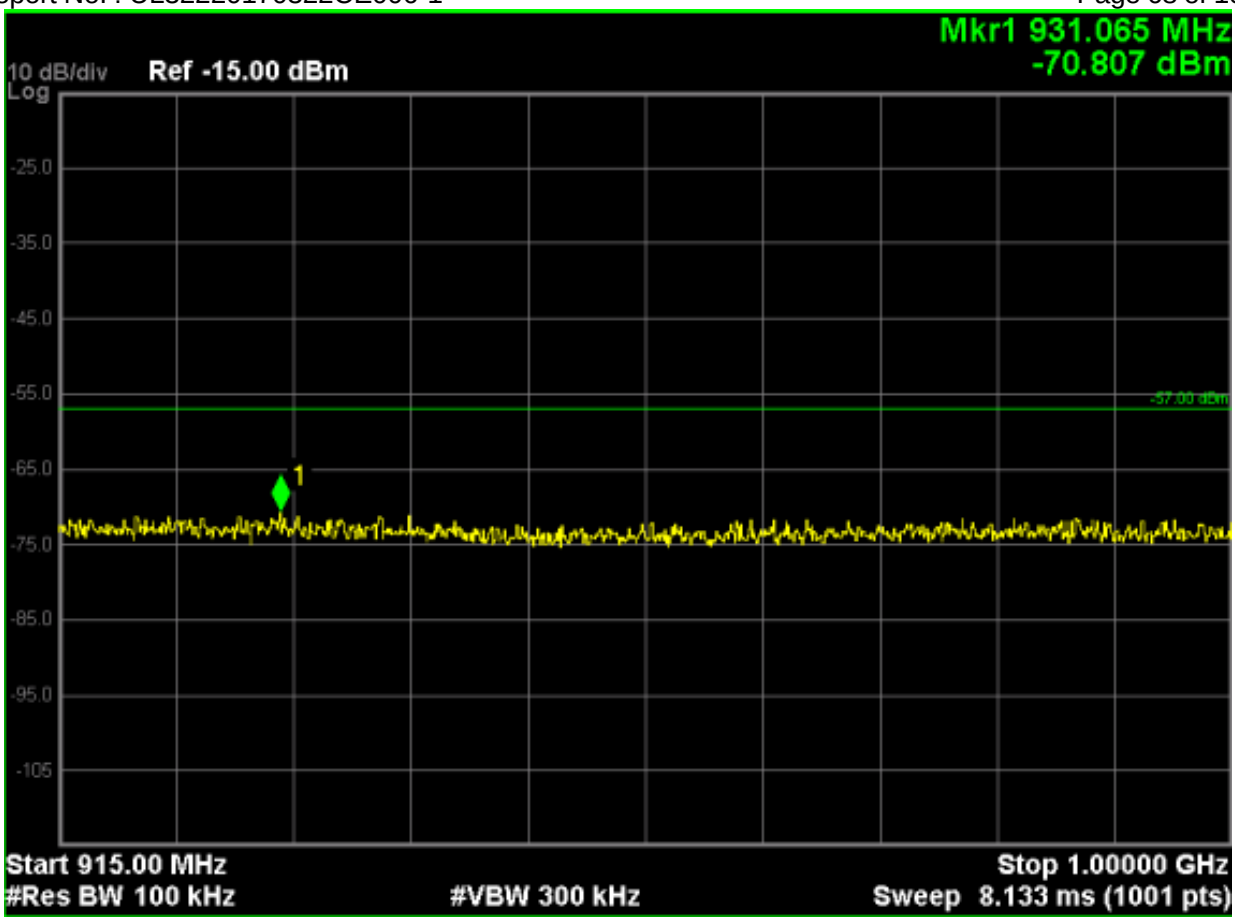


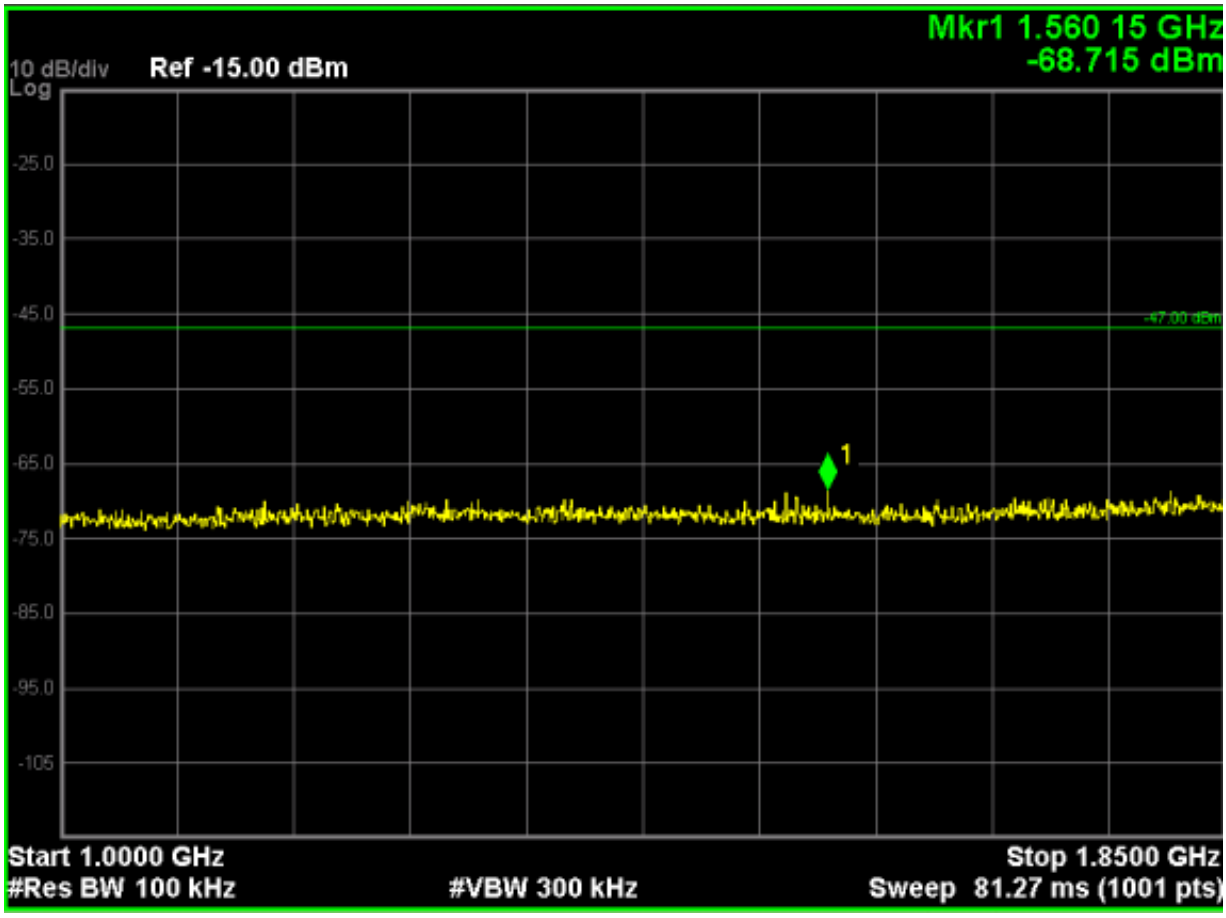
GSM1800 Normal Voltage Condition at Middle Channel

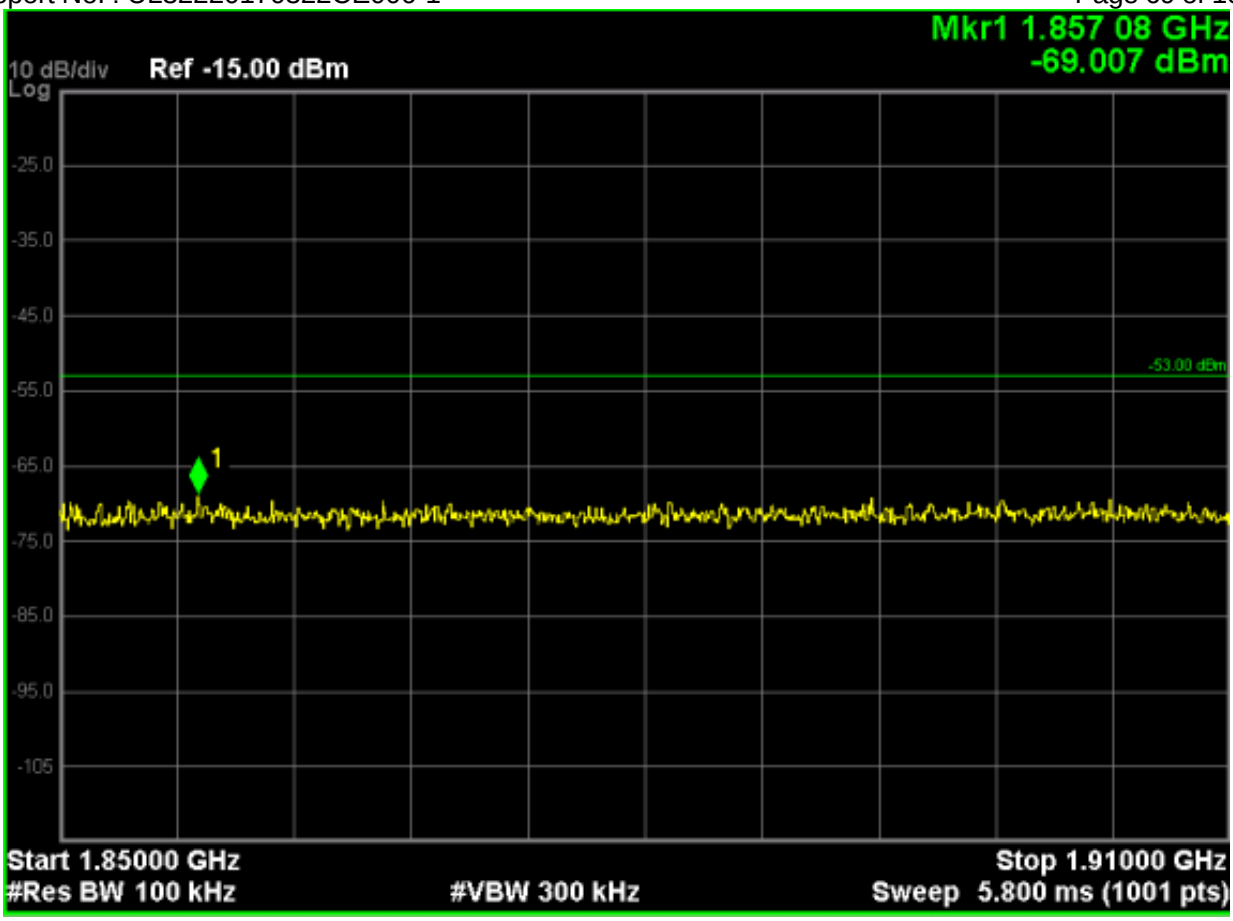


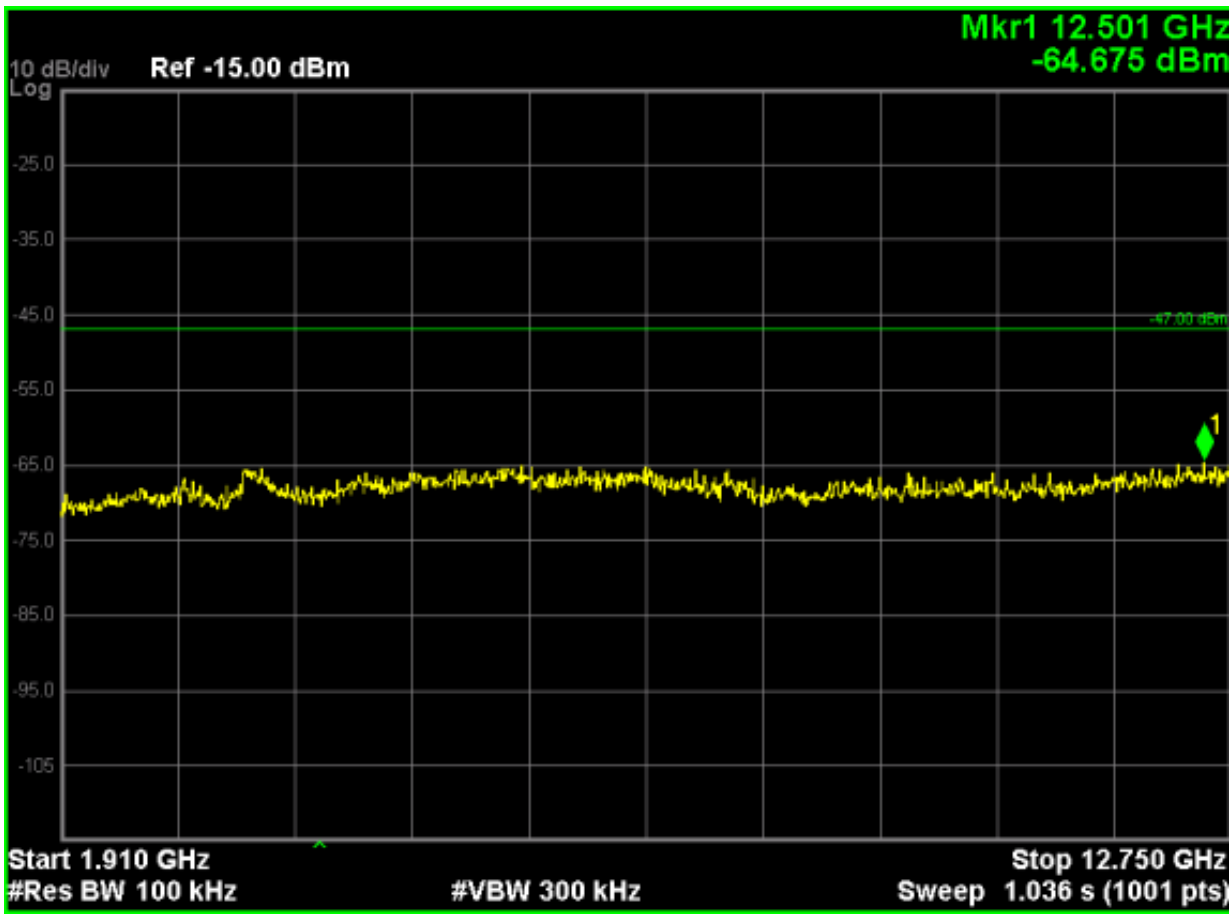

Mkr1 498.20 MHz
-68.735 dBm
10 dB/div
Log
Ref -15.00 dBm
-25.0
-35.0
-45.0
-55.0
-65.0
-75.0
-85.0
-95.0
-105
-57.00 dBm
1
Start 50.0 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 880.0 MHz
Sweep 79.33 ms (1001 pts)


Mkr1 892.390 MHz
-70.157 dBm
10 dB/div
Log
Ref -15.00 dBm
-25.0
-35.0
-45.0
-55.0
-65.0
-75.0
-85.0
-95.0
-105
-57.00 dBm
1
Start 880.00 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 915.00 MHz
Sweep 3.400 ms (1001 pts)


Mkr1 931.065 MHz
-70.807 dBm
10 dB/div
Log
Ref -15.00 dBm
-25.0
-35.0
-45.0
-55.0
-65.0
-75.0
-85.0
-95.0
-105
-57.00 dBm
1
Start 915.00 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.00000 GHz
Sweep 8.133 ms (1001 pts)


Mkr1 1.560 15 GHz
-68.715 dBm
10 dB/div
Log
Ref -15.00 dBm
-25.0
-35.0
-45.0
-55.0
-65.0
-75.0
-85.0
-95.0
-105
-47.00 dBm
1
Start 1.0000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.8500 GHz
Sweep 81.27 ms (1001 pts)


Mkr1 1.857 08 GHz
-69.007 dBm
10 dB/div
Log
Ref -15.00 dBm
-25.0
-35.0
-45.0
-53.00 dBm
-55.0
-65.0
-75.0
-85.0
-95.0
-105
1
Start 1.85000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.91000 GHz
Sweep 5.800 ms (1001 pts)


Mkr1 12.501 GHz
-64.675 dBm
10 dB/div
Log
Ref -15.00 dBm
-25.0
-35.0
-45.0
-47.00 dBm
-55.0
-65.0
-75.0
-85.0
-95.0
-105
1
Start 1.910 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 12.750 GHz
Sweep 1.036 s (1001 pts)

5.10. Radiated spurious emissions-MS allocated a channel

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.16

Limits

According to clause 12.2.1 of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1,12.2.1.5.

Table 4-1

Frequency range		Power level in dBm		
		GSM 400, GSM 700, T-GSM 810, GSM 850, GSM 900	DCS 1 800	PCS 1 900
30 MHz to	1 GHz	-36	-36	-36
1 GHz to	4 GHz	-30		-30
1 GHz to	1 710 MHz		-30	
1 710 MHz to	1 785 MHz		-36	
1 785 MHz to	4 GHz		-30	

Test procedure

1) Initially the test antenna is closely coupled to the MS and any spurious emission radiated by the MS is detected by the test antenna and receiver in the range 30MHz to 4GHz.
2) The test antenna separation is set to the appropriate measurement distance and at each frequency which an emission has been detected, the MS shall be rotated to obtain maximum response and the effective radiated power of the mission determined by a substitution measurement. In case of an anechoic shielded chamber pre-calibration may be used instead of a substitution measurement.
3) The measurement bandwidth, based on a 5 pole synchronously tuned filter, is set according to table 4.2.The power indication is the peak power detected by the measuring system.
4) The measurements are repeated with the test antenna in the orthogonal polarization plane.

Table 4-2

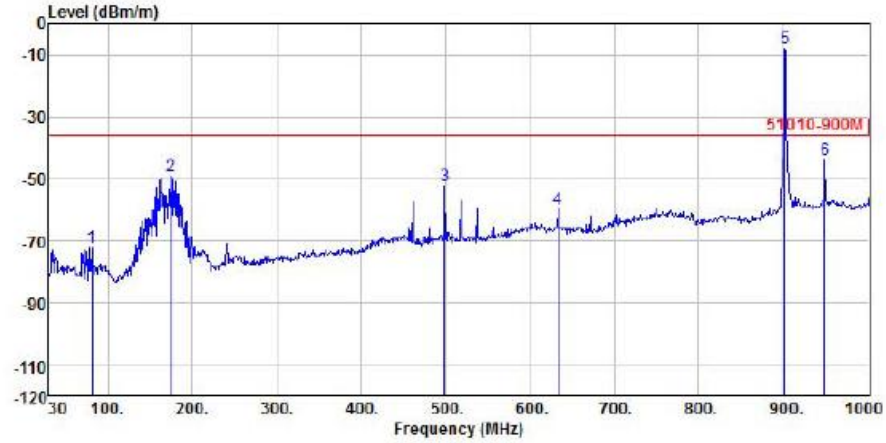
Frequency range	Frequency offset	Filter bandwidth	Approx video bandwidth
30 MHz to 50 MHz	-	10 kHz	30 kHz
50 MHz to 500 MHz excl. relevant TX band: GSM 450: 450,4 MHz to 457,6 MHz; GSM 480: 478,8 MHz to 486 MHz	-	100 kHz	300 kHz
500 MHz to 4 GHz, Excl. relevant TX band: GSM 710: 698 MHz to 716 MHz GSM 750: 777 MHz to 793 MHz T-GSM 810: 806MHz to 821 MHz GSM 850: 824 MHz to 849 MHz P-GSM: 890 MHz to 915 MHz; E-GSM: 880 MHz to 915 MHz; DCS: 1 710 MHz to 1 785 MHz. PCS 1 900: 1 850 MHz to 1 910 MHz	0 to 10 MHz >= 10 MHz >= 20 MHz >= 30 MHz (offset from edge of relevant TX band)	100 kHz 300 kHz 1 MHz 3 MHz	300 kHz 1 MHz 3 MHz 3 MHz
Relevant TX band: GSM 450: 450,4 MHz to 457,6 MHz GSM 480: 478,8 MHz to 486 MHz GSM 710: 698 MHz to 716 MHz GSM 750: 777 MHz to 793 MHz T-GSM 810: 806MHz to 821 MHz GSM 850: 824 MHz to 849 MHz P-GSM: 890 MHz to 915 MHz E-GSM: 880 MHz to 915 MHz DCS: 1 710 MHz to 1 785 MHz PCS 1 900: 1 850 MHz to 1 910 MHz	1,8 MHz to 6,0 MHz > 6,0 MHz (offset from carrier)	30 kHz 100 kHz	100 kHz 300 kHz
NOTE 1: The filter and video bandwidths, and frequency offsets are only correct for measurements on an MS transmitting on a channel in the Mid ARFCN range. NOTE 2: Due to practical implementation of a SS, the video bandwidth is restricted to a maximum of 3 MHz.			

Test Result

PASS

Please refer to following worst case data plots.

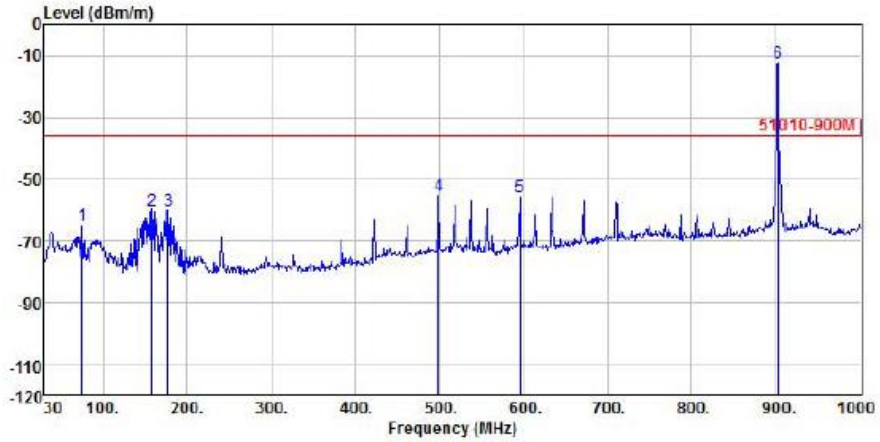
GSM900 Normal Voltage Condition at Middle Channel



Site : chamber
Condition : 51010-900M 3m VULB9160(RSE-H) HORIZONTAL
EUT :
Model Name : EC25-E
Temp/Humi : 24 ℃ /61 %
Power Rating: DC 5V
Mode : GSM 900
Memo :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Limit Level	Over Line	Limit	Remark
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	80.44	-90.72	17.60	1.08	0.00	-72.04	-35.99	-36.05	Peak
2	174.53	-78.59	27.69	1.87	0.00	-49.03	-35.99	-13.04	Peak
3	499.48	-87.69	32.43	3.03	0.00	-52.23	-35.99	-16.24	Peak
4	633.34	-98.72	35.41	3.49	0.00	-59.82	-35.99	-23.83	Peak
5	pp 902.03	-53.40	41.56	4.06	0.00	-7.78	-35.99	28.21	Peak
6	947.62	-90.86	43.05	4.14	0.00	-43.67	-35.99	-7.68	Peak

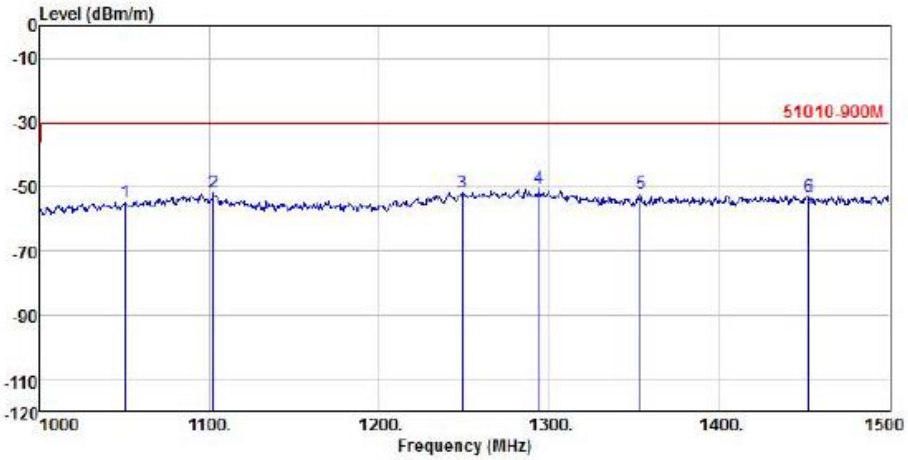
Note: the mark 5 is carrier.



Site : chamber
Condition : 51010-900M 3m VULB9160(RSE-V) VERTICAL
EUT :
Model Name : EC25-E
Temp/Humi : 24 ℃ /61 %
Power Rating: DC 5V
Mode : GSM 900
Memo :

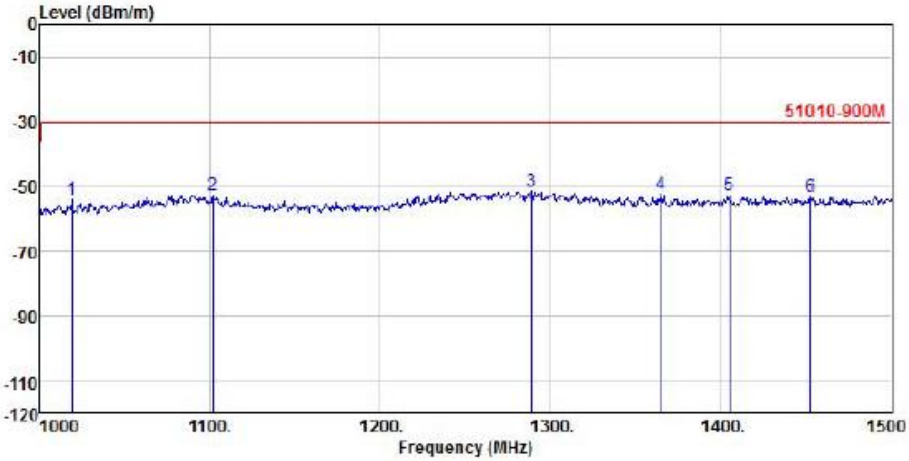
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Limit Level	Over Line	Limit	Remark
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	74.62	-89.91	23.91	1.11	0.00	-64.89	-35.99	-28.90	Peak
2	158.04	-84.64	22.96	1.68	0.00	-60.00	-35.99	-24.01	Peak
3	177.44	-84.32	22.30	1.87	0.00	-60.15	-35.99	-24.16	Peak
4	499.48	-87.38	28.79	3.03	0.00	-55.56	-35.99	-19.57	Peak
5	595.51	-88.69	29.67	3.34	0.00	-55.68	-35.99	-19.69	Peak
6	pp 903.00	-51.16	34.58	4.07	0.00	-12.51	-35.99	23.48	Peak

Note: the mark 6 is carrier.



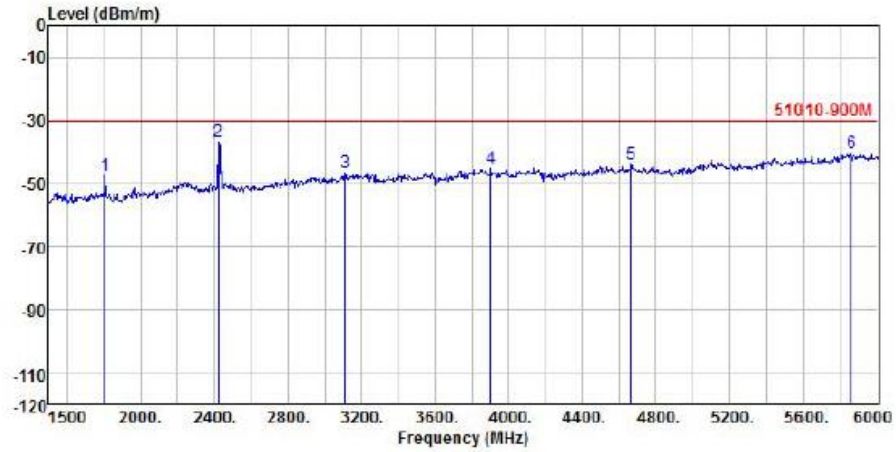
Site : chamber
Condition : 51010-900M 3m BBHA9120D(RSE-H) HORIZONTAL
EUT :
Model Name : EC25-E
Temp/Humi : 24 ℃ /61 %
Power Rating: DC 5V
Mode : GSM 900
Memo :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	1050.00	-57.84	36.89	4.55	38.41	-54.81	-29.99	-24.82	Peak
2	1102.00	-57.88	39.62	4.80	38.41	-51.87	-29.99	-21.88	Peak
3	1249.00	-57.89	39.31	5.09	38.43	-51.92	-29.99	-21.93	Peak
4	pp 1294.00	-56.46	39.34	5.20	38.43	-50.35	-29.99	-20.36	Peak
5	1354.00	-56.34	37.29	5.35	38.44	-52.14	-29.99	-22.15	Peak
6	1453.00	-57.22	37.20	5.55	38.45	-52.92	-29.99	-22.93	Peak



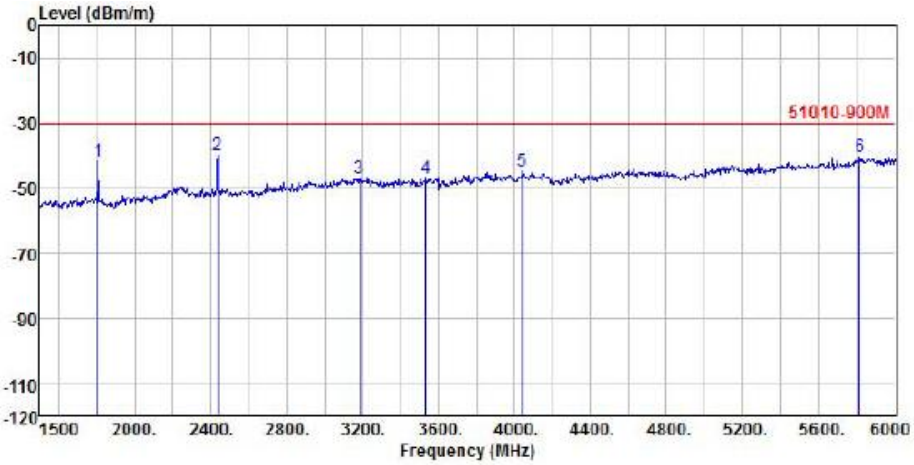
Site : chamber
Condition : 51010-900M 3m BBHA9120D(RSE-V) VERTICAL
EUT :
Model Name : EC25-E
Temp/Humi : 24 ℃ /61 %
Power Rating: DC 5V
Mode : GSM 900
Memo :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	1018.50	-55.85	35.04	4.98	38.40	-54.23	-29.99	-24.24	Peak
2	1101.50	-58.53	39.62	4.80	38.41	-52.52	-29.99	-22.53	Peak
3	pp 1289.00	-57.53	39.34	5.20	38.43	-51.42	-29.99	-21.43	Peak
4	1365.00	-56.63	37.29	5.35	38.44	-52.43	-29.99	-22.44	Peak
5	1405.50	-56.99	37.26	5.33	38.44	-52.84	-29.99	-22.85	Peak
6	1453.00	-57.31	37.20	5.55	38.45	-53.01	-29.99	-23.02	Peak



Site : chamber
Condition : 51010-900M 3m BBHA9120D(RSE-H) HORIZONTAL
EUT :
Model Name : EC25-E
Temp/Humi : 24 ℃ /61 %
Power Rating: DC 5V
Mode : GSM 900
Memo :

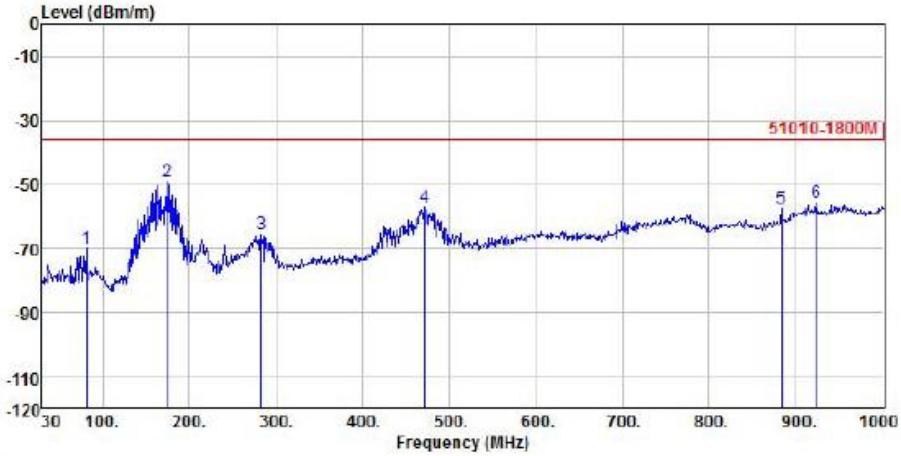
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Limit Level	Over Line	Limit	Remark
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	1806.00	-52.37	37.11	6.20	38.48	-47.54	-29.99	-17.55	Peak
2	pp 2422.50	-43.93	38.07	7.29	38.33	-36.90	-29.99	-6.91	Peak
3	3111.00	-56.88	40.27	8.12	38.04	-46.53	-29.99	-16.54	Peak
4	3903.00	-57.72	40.92	9.18	37.55	-45.17	-29.99	-15.18	Peak
5	4663.50	-58.55	41.93	10.13	37.23	-43.72	-29.99	-13.73	Peak
6	5856.00	-58.31	43.19	11.66	36.84	-40.30	-29.99	-10.31	Peak



Site : chamber
Condition : 51010-900M 3m BBHA9120D(RSE-V) VERTICAL
EUT :
Model Name : EC25-E
Temp/Humi : 24 ℃ /61 %
Power Rating: DC 5V
Mode : GSM 900
Memo :

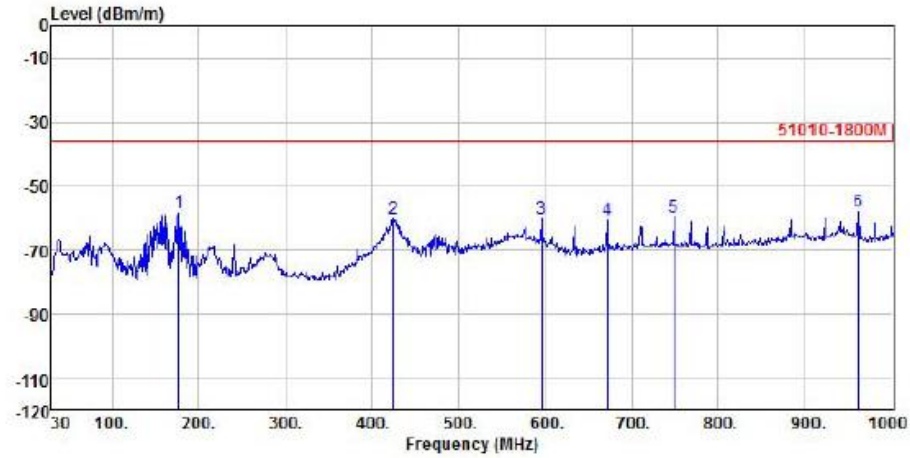
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Limit Level	Over Line	Limit	Remark
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	1806.00	-46.53	37.11	6.20	38.48	-41.70	-29.99	-11.71	Peak
2	pp 2436.00	-47.09	38.07	7.29	38.33	-40.06	-29.99	-10.07	Peak
3	3183.00	-58.03	40.75	8.22	38.00	-47.06	-29.99	-17.07	Peak
4	3534.00	-58.38	40.40	8.79	37.78	-46.97	-29.99	-16.98	Peak
5	4042.50	-57.49	40.90	9.31	37.48	-44.76	-29.99	-14.77	Peak
6	5811.00	-58.51	43.39	11.58	36.86	-40.40	-29.99	-10.41	Peak

DCS1800 Normal Voltage Condition at Middle Channel



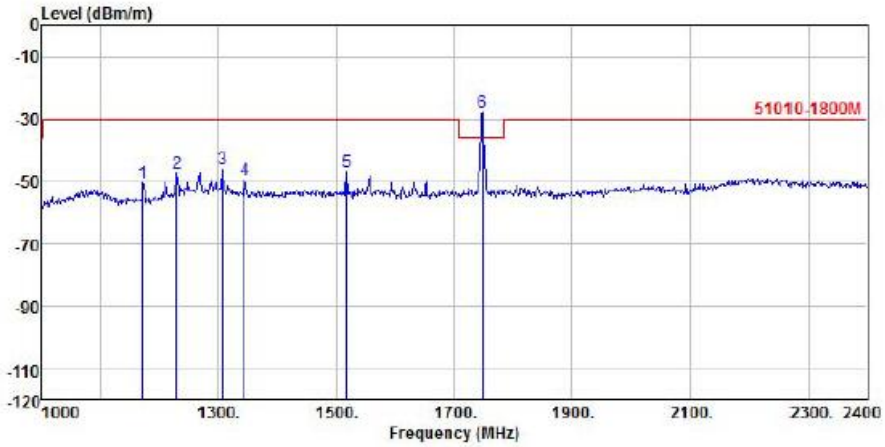
Site : chamber
Condition : 51010-1800M 3m VULB9160(RSE-V) VERTICAL
EUT :
Model Name : EC25-E
Temp/Humi : 24 ℃ /61 %
Power Rating: DC 5V
Mode : GSM 1800
Memo :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Limit Level	Over Line	Limit	Remark
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	80.44	-88.56	17.60	1.08	0.00	-69.88	-35.99	-33.89	Peak
2 pp	174.53	-78.82	27.69	1.87	0.00	-49.26	-35.99	-13.27	Peak
3	283.17	-94.63	26.92	2.22	0.00	-65.49	-35.99	-29.50	Peak
4	471.35	-91.87	31.85	2.93	0.00	-57.09	-35.99	-21.10	Peak
5	883.60	-101.24	39.68	3.97	0.00	-57.59	-35.99	-21.60	Peak
6	921.43	-102.67	42.65	4.09	0.00	-55.93	-35.99	-19.94	Peak



Site : chamber
Condition : 51010-1800M 3m VULB9160(RSE-V) VERTICAL
EUT :
Model Name : EC25-E
Temp/Humi : 24 ℃ /61 %
Power Rating: DC 5V
Mode : GSM 1800
Memo :

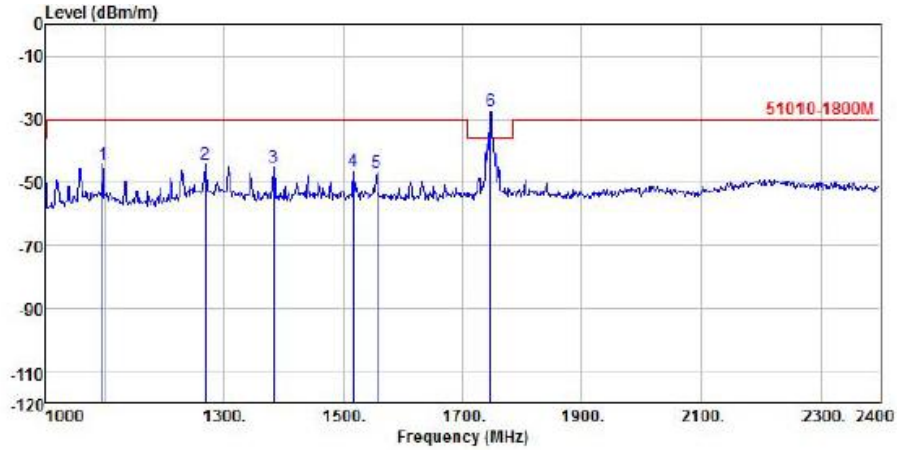
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Limit Level	Over Line	Limit	Remark
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	177.44	-82.59	22.30	1.87	0.00	-58.42	-35.99	-22.43	Peak
2	424.79	-90.45	27.27	2.81	0.00	-60.37	-35.99	-24.38	Peak
3	595.51	-93.01	29.67	3.34	0.00	-60.00	-35.99	-24.01	Peak
4	672.14	-96.09	31.81	3.55	0.00	-60.73	-35.99	-24.74	Peak
5	748.77	-96.51	32.97	3.80	0.00	-59.74	-35.99	-23.75	Peak
6 pp	960.23	-96.45	34.29	4.20	0.00	-57.96	-35.99	-21.97	Peak



Site : chamber
Condition : 51010-1800M 3m BBHA9120D(RSE-H) HORIZONTAL
EUT :
Model Name : EC25-E
Temp/Humi : 24 ℃ /61 %
Power Rating: DC 5V
Mode : GSM 1800
Memo :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	1170.80	-53.72	36.58	4.89	38.42	-50.67	-29.99	-20.68	Peak
2	1229.60	-52.17	38.25	5.07	38.42	-47.27	-29.99	-17.28	Peak
3	1306.60	-52.37	39.36	5.26	38.43	-46.18	-29.99	-16.19	Peak
4	1344.40	-53.57	37.25	5.32	38.43	-49.43	-29.99	-19.44	Peak
5	1518.00	-51.10	36.75	5.69	38.45	-47.11	-29.99	-17.12	Peak
6	pp 1749.00	-32.48	36.83	6.03	38.47	-28.09	-35.99	7.90	Peak

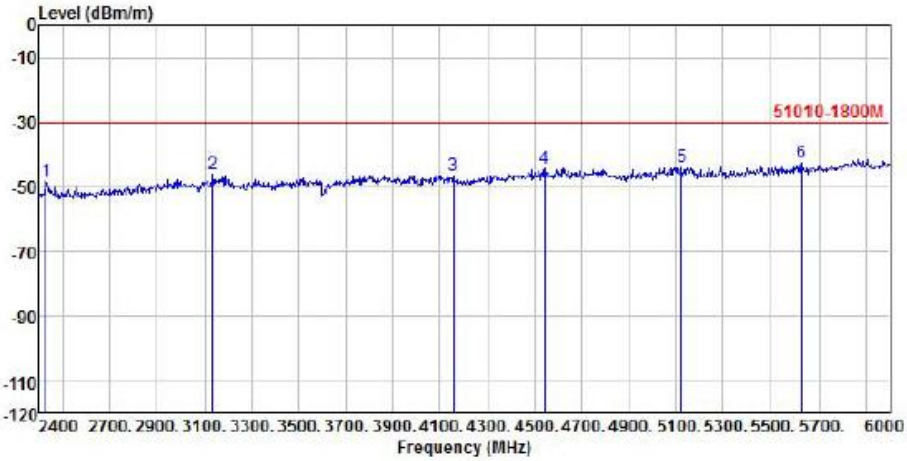
Note: the mark 6 is carrier.



Site : chamber
Condition : 51010-1800M 3m BBHA9120D(RSE-V) VERTICAL
EUT :
Model Name : EC25-E
Temp/Humi : 24 ℃ /61 %
Power Rating: DC 5V
Mode : GSM 1800
Memo :

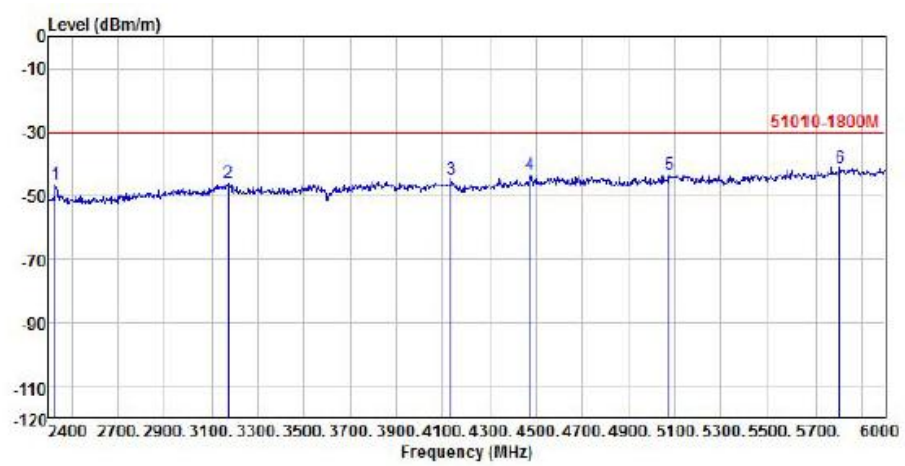
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	1095.20	-50.47	39.62	4.80	38.41	-44.46	-29.99	-14.47	Peak
2	1267.40	-50.52	39.33	5.14	38.43	-44.48	-29.99	-14.49	Peak
3	1382.20	-49.26	37.30	5.34	38.44	-45.06	-29.99	-15.07	Peak
4	1516.60	-50.43	36.75	5.69	38.45	-46.44	-29.99	-16.45	Peak
5	1555.80	-51.36	37.12	5.76	38.46	-46.94	-29.99	-16.95	Peak
6	pp 1747.60	-31.84	36.83	6.03	38.47	-27.45	-35.99	8.54	Peak

Note: the mark 6 is carrier.



Site : chamber
Condition : 51010-1800M 3m BBHA9120D(RSE-H) HORIZONTAL
EUT :
Model Name : EC25-E
Temp/Humi : 24 ℃ /61 %
Power Rating: DC 5V
Mode : GSM 1800
Memo :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Limit Level	Over Line	Limit	Remark
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	2428.80	-55.43	38.07	7.29	38.33	-48.40	-29.99	-18.41	Peak
2	3134.40	-57.33	41.13	8.06	38.02	-46.16	-29.99	-16.17	Peak
3	4156.80	-59.81	41.41	9.54	37.43	-46.29	-29.99	-16.30	Peak
4	4542.00	-58.42	41.68	9.95	37.28	-44.07	-29.99	-14.08	Peak
5	5125.20	-60.80	43.30	10.61	37.06	-43.95	-29.99	-13.96	Peak
6	pp 5632.80	-59.46	42.70	11.11	36.91	-42.56	-29.99	-12.57	Peak



Site : chamber
Condition : 51010-1800M 3m BBHA9120D(RSE-V) VERTICAL
EUT :
Model Name : EC25-E
Temp/Humi : 24 ℃ /61 %
Power Rating: DC 5V
Mode : GSM 1800
Memo :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Limit Level	Over Line	Limit	Remark
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	2428.80	-53.58	38.07	7.29	38.33	-46.55	-29.99	-16.56	Peak
2	3174.00	-57.01	40.75	8.22	38.00	-46.04	-29.99	-16.05	Peak
3	4135.20	-58.35	41.56	9.53	37.45	-44.71	-29.99	-14.72	Peak
4	4473.60	-57.28	41.19	9.84	37.31	-43.56	-29.99	-13.57	Peak
5	5074.80	-60.19	43.14	10.52	37.07	-43.60	-29.99	-13.61	Peak
6	pp 5805.60	-59.41	43.39	11.58	36.86	-41.30	-29.99	-11.31	Peak

5.11. Radiated spurious emission Ms in idle mode

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.17

Limits

According to clause 12.2.2 of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1,12.2.2.5.

Table 4-3

Frequency range		Power level in dBm	
		GSM 400, T-GSM 810, GSM 900, DCS 1 800	GSM 700, GSM 850, PCS 1 900
30 MHz to	880 MHz	-57	-57
880 MHz to	915 MHz	-59	-57
915 MHz to	1 000 MHz	-57	-57
1 GHz to	1 710 MHz	-47	
1 710 MHz to	1 785 MHz	-53	
1 785 MHz to	4GHz	-47	
1 GHz to	1 850 MHz		-47
1 850 MHz to	1 910 MHz		-53
1 910 MHz to	4GHz		-47

Test procedure

1) Initially the test antenna is closely coupled to the MS and any spurious emission radiated by the MS is detected by the test antenna and receiver in the range 30MHz to4GHz.
2) The test antenna separation is set to the appropriate measurement distance and at each frequency at which a spurious emission has been detected the MS is rotated to obtain a maximum response. The effective radiated power of the emission is determined by a substitution measurement. In case of an anechoic shielded chamber pre-calibration may be used instead of a substitution measurement.
3) The measurement bandwidth based on a 5 pole synchronously tuned filter shall be according to table 4.4.The power indication is the peak power detected by the measuring system.
4) .The measurements are repeated with the test antenna in the orthogonal polarization plane.

Table 4-4

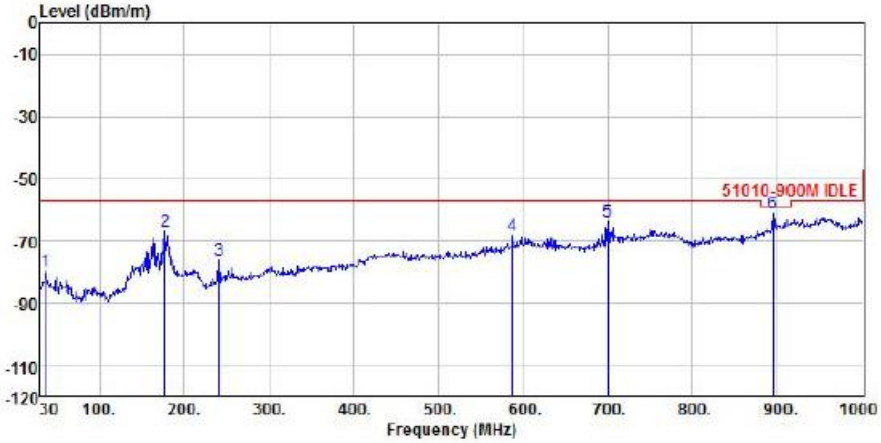
Frequency range	Filter bandwidth	Video bandwidth
30 MHz to 50 MHz	10 kHz	30 kHz
50 MHz to 4 GHz	100 kHz	300 kHz

Test Result

PASS

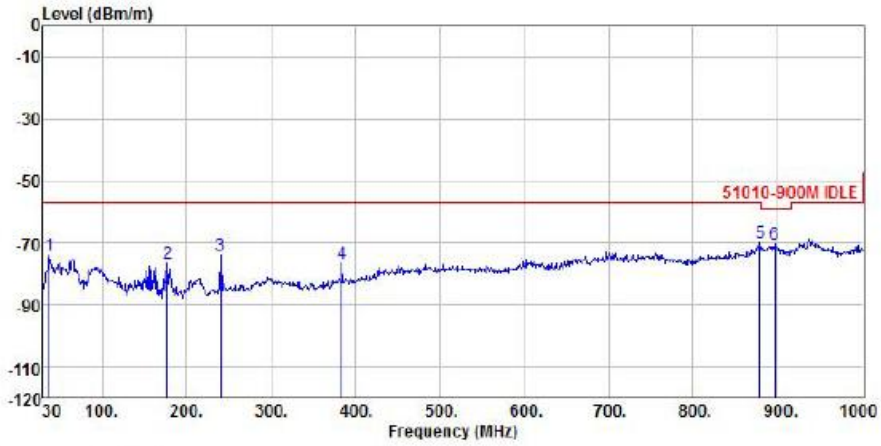
Please refer to following data plots

GSM900 Normal Voltage Condition at Middle Channel（idle）



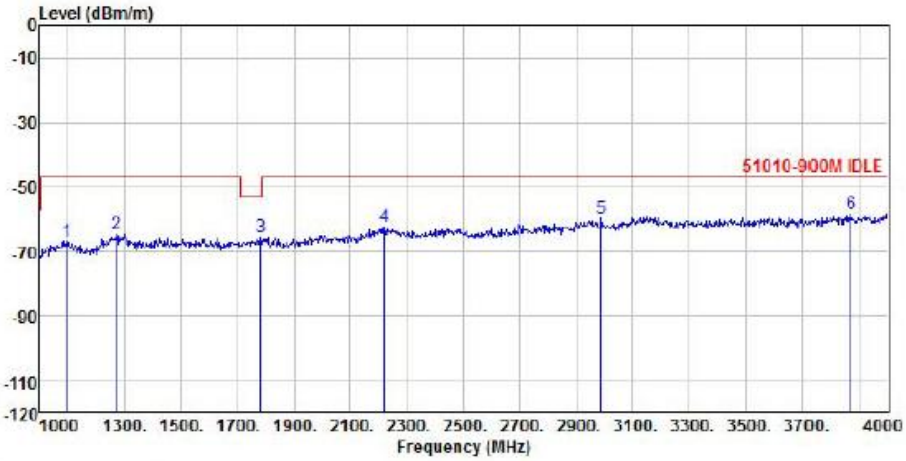
Site : chamber
Condition : 51010-900M IDLE 3m VULB9160(RSE-H) HORIZONTAL
EUT :
Model Name : EC25-E
Temp/Humi : 24 ℃ /61 %
Power Rating: DC 5V
Mode : GSM 900 IDLE
Memo :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	35.82	-71.98	24.50	-32.23	0.00	-79.71	-56.99	-22.72	Peak
2	177.44	-63.22	27.80	-31.59	0.00	-67.01	-56.99	-10.02	Peak
3	240.49	-71.10	25.82	-31.08	0.00	-76.36	-56.99	-19.37	Peak
4	586.78	-74.77	35.45	-29.00	0.00	-68.32	-56.99	-11.33	Peak
5	700.27	-71.50	36.91	-29.33	0.00	-63.92	-56.99	-6.93	Peak
6	pp 895.24	-73.84	40.86	-28.23	0.00	-61.21	-58.99	-2.22	Peak



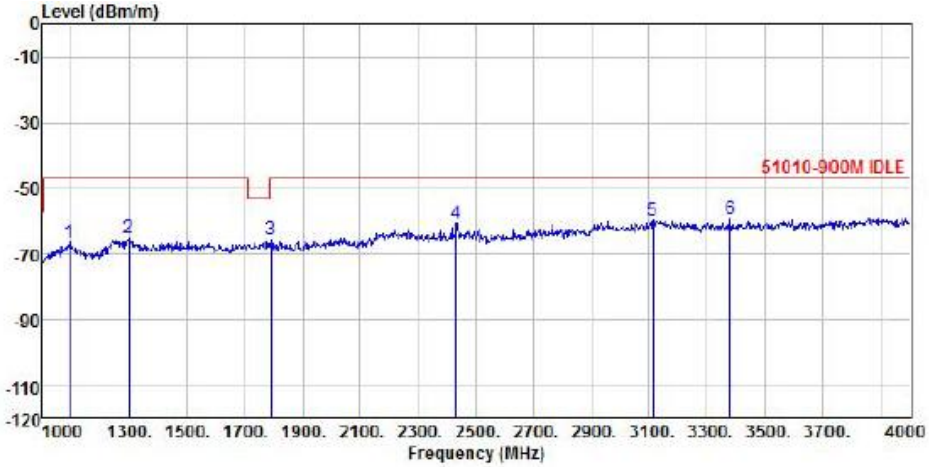
Site : chamber
Condition : 51010-900M IDLE 3m VULB9160(RSE-V) VERTICAL
EUT :
Model Name : EC25-E
Temp/Humi : 24 ℃ /61 %
Power Rating: DC 5V
Mode : GSM 900 IDLE
Memo :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	37.76	-60.55	18.58	-32.20	0.00	-74.17	-56.99	-17.18	Peak
2	177.44	-67.20	22.30	-31.59	0.00	-76.49	-56.99	-19.50	Peak
3	239.52	-66.77	23.85	-31.09	0.00	-74.01	-56.99	-17.02	Peak
4	384.05	-72.49	25.62	-29.87	0.00	-76.74	-56.99	-19.75	Peak
5	879.72	-76.32	35.06	-28.50	0.00	-69.76	-56.99	-12.77	Peak
6	pp 896.21	-77.26	35.17	-28.21	0.00	-70.30	-58.99	-11.31	Peak



Site : chamber
Condition : 51010-900M IDLE 3m BBHA9120D(RSE-H) HORIZONTAL
EUT :
Model Name : HC25-E
Temp/Humi : 24 ℃ /61 %
Power Rating: DC 5V
Mode : GSM 900 IDLE
Memo :

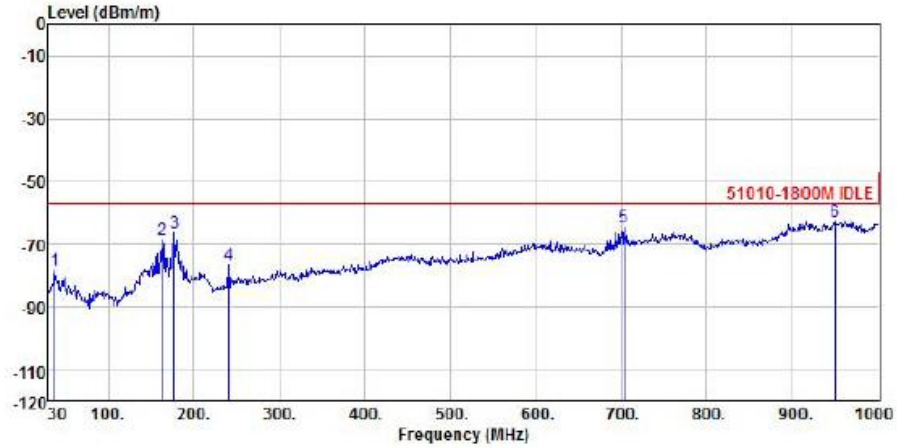
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Limit Level	Over Line	Limit	Remark
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	1093.00	-71.71	38.71	4.72	38.41	-66.69	-46.99	-19.70	Peak
2	1273.00	-70.56	39.33	5.14	38.43	-64.52	-46.99	-17.53	Peak
3	1783.00	-70.32	37.01	6.14	38.48	-65.65	-52.99	-12.66	Peak
4	2221.00	-70.75	39.75	6.81	38.41	-62.60	-46.99	-15.61	Peak
5	2989.00	-69.94	40.05	8.06	38.11	-59.94	-46.99	-12.95	Peak
6	pp 3868.00	-70.94	41.06	9.07	37.57	-58.38	-46.99	-11.39	Peak



Site : chamber
Condition : 51010-900M IDLE 3m BBHA9120D(RSE-V) VERTICAL
EUT :
Model Name : HC25-E
Temp/Humi : 24 ℃ /61 %
Power Rating: DC 5V
Mode : GSM 900 IDLE
Memo :

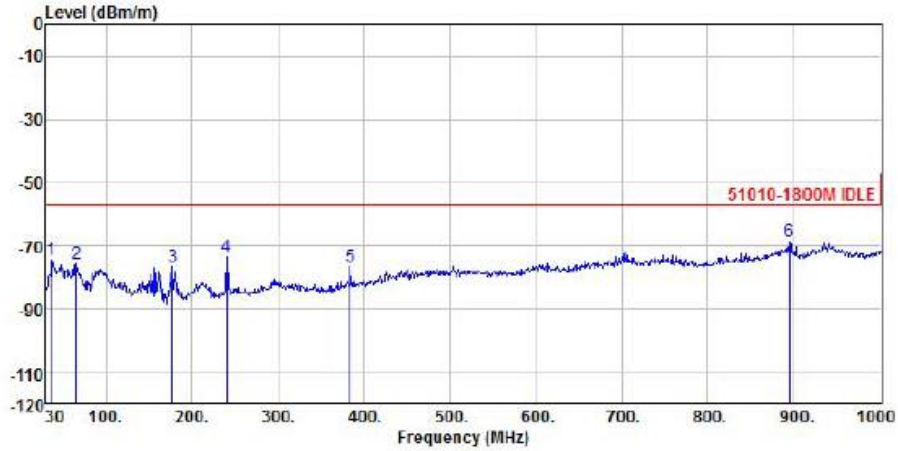
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Limit Level	Over Line	Limit	Remark
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	1090.00	-71.28	38.71	4.72	38.41	-66.26	-46.99	-19.27	Peak
2	1297.00	-71.24	39.34	5.20	38.43	-65.13	-46.99	-18.14	Peak
3	1789.00	-70.31	37.01	6.14	38.48	-65.64	-46.99	-18.65	Peak
4	2431.00	-67.62	38.07	7.29	38.33	-60.59	-46.99	-13.60	Peak
5	3112.00	-70.34	40.27	8.12	38.04	-59.99	-46.99	-13.00	Peak
6	pp 3382.00	-70.08	39.86	8.54	37.87	-59.55	-46.99	-12.56	Peak

GSM1800 Normal Voltage Condition at Middle Channel（idle）



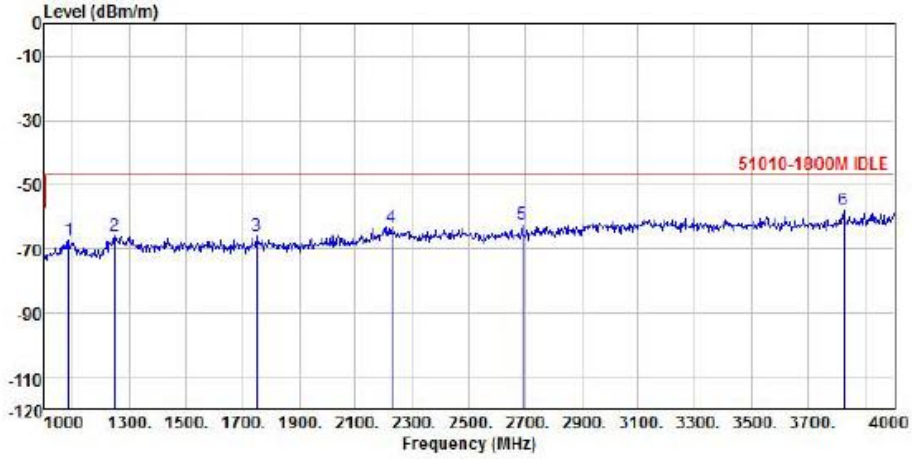
Site : chamber
Condition : 51010-1800M IDLE 3m VULB9160(RSE-H) HORIZONTAL
EUT :
Model Name : EC25-E
Temp/Humi : 24 ℃ /61 %
Power Rating: DC 5V
Mode : GSM 1800 IDLE
Memo :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	37.76	-70.23	24.10	-32.20	0.00	-78.33	-56.99	-21.34	Peak
2	162.89	-64.32	27.16	-31.55	0.00	-68.71	-56.99	-11.72	Peak
3	177.44	-62.63	27.80	-31.59	0.00	-66.42	-56.99	-9.43	Peak
4	240.49	-71.56	25.82	-31.08	0.00	-76.82	-56.99	-19.83	Peak
5	703.18	-72.68	37.20	-29.35	0.00	-64.83	-56.99	-7.84	Peak
6	pp 948.59	-77.95	43.17	-27.90	0.00	-62.68	-56.99	-5.69	Peak



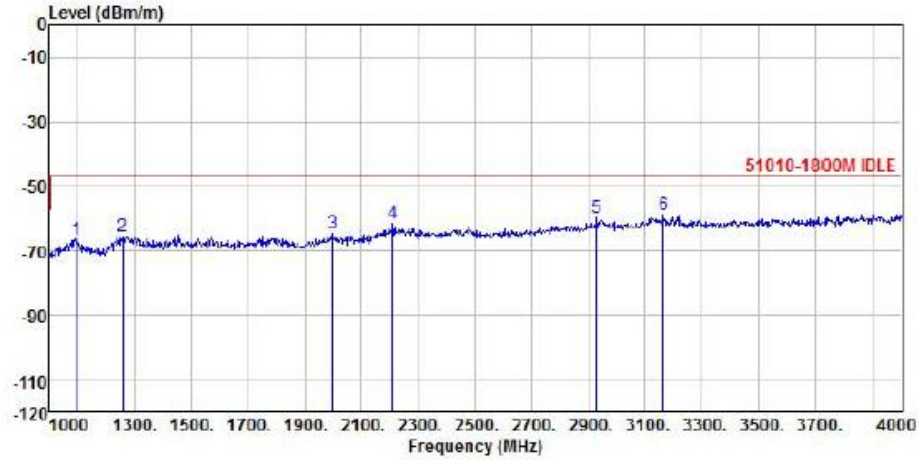
Site : chamber
Condition : 51010-1800M IDLE 3m VULB9160(RSE-V) VERTICAL
EUT :
Model Name : EC25-E
Temp/Humi : 24 ℃ /61 %
Power Rating: DC 5V
Mode : GSM 1800 IDLE
Memo :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	36.79	-60.67	18.58	-32.21	0.00	-74.30	-56.99	-17.31	Peak
2	64.92	-69.48	25.45	-31.84	0.00	-75.87	-56.99	-18.88	Peak
3	177.44	-67.32	22.30	-31.59	0.00	-76.61	-56.99	-19.62	Peak
4	239.52	-66.30	23.85	-31.09	0.00	-73.54	-56.99	-16.55	Peak
5	384.05	-72.34	25.62	-29.87	0.00	-76.59	-56.99	-19.60	Peak
6	pp 895.24	-75.52	35.26	-28.23	0.00	-68.49	-56.99	-11.50	Peak



Site : chamber
Condition : 51010-1800M IDLE 3m BBHA9120D(RSE-H) HORIZONTAL
EUT :
Model Name : EC25-E
Temp/Humi : 24 ℃ /61 %
Power Rating: DC 5V
Mode : GSM 1800 IDLE
Memo :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Limit Level	Over Line	Limit	Remark
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	1084.00	-72.54	38.71	4.72	38.41	-67.52	-46.99	-20.53	Peak
2	1246.00	-71.03	38.25	5.07	38.42	-66.13	-46.99	-19.14	Peak
3	1750.00	-70.58	36.83	6.03	38.47	-66.19	-46.99	-19.20	Peak
4	2227.00	-71.33	39.75	6.81	38.41	-63.18	-46.99	-16.19	Peak
5	2689.00	-70.08	38.40	7.56	38.23	-62.35	-46.99	-15.36	Peak
6	pp 3820.00	-70.58	40.97	9.01	37.60	-58.20	-46.99	-11.21	Peak



Site : chamber
Condition : 51010-1800M IDLE 3m BBHA9120D(RSE-V) VERTICAL
EUT :
Model Name : EC25-E
Temp/Humi : 24 ℃ /61 %
Power Rating: DC 5V
Mode : GSM 1800 IDLE
Memo :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Limit Level	Over Line	Limit	Remark
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	1096.00	-72.34	39.62	4.80	38.41	-66.33	-46.99	-19.34	Peak
2	1258.00	-71.31	39.31	5.09	38.43	-65.34	-46.99	-18.35	Peak
3	1999.00	-70.38	37.73	6.50	38.50	-64.65	-46.99	-17.66	Peak
4	2209.00	-69.86	39.82	6.79	38.42	-61.67	-46.99	-14.68	Peak
5	2929.00	-69.82	40.09	7.95	38.13	-59.91	-46.99	-12.92	Peak
6	pp 3166.00	-70.13	40.94	8.14	38.01	-59.06	-46.99	-12.07	Peak

5.12. Receiver Blocking and spurious response- speech channels

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.20

Limits

According to clause 14.7.1 of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1, 14.7.1.5.

Table 4-29a: Statistical test limits for blocking performance

Channel	bits per s	Orig. RBER requirement	Derived test limit	Target number of samples	Target test time (s)	Target test time (hh:mm:ss)
TCH/FS Class II	3900	0,020000	0,025020	16107	4	00:00:04

Table 4-29c: Limits for blocking

Channel	Type of measurement	Test limit error rate %	Minimum number of samples
TCH/FS Class II	RBER	2,439	8 200

Test procedure

1. A call is set up according to the generic call set up except the BCCH frequency list shall be empty, on a TCH with an arbitrary ARFCN in the range supported by the MS.
2. The power control level is set to maximum power.
3. The ARFN of the BCCH shall be the same- or at an offset of +/-2 channels, than that of the ARFCN for the TCH.
4. The SS transmits Standard Test signal C1 on the traffic channel.
5. The SS commands the MS to create traffic channel loop back signaling erased frames.

Test Result

PASS

5.13. Frequency error and Modulation accuracy in EGPRS Configuration

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.26

Limits

According to clause 13.17.1 of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1, 13.17.1.5.

1. For all measured bursts, the frequency error, derived in step c.4), shall be less than 10E-7.
2. For all measured bursts, the RMS EVM, derived in step c.3) shall not exceed 9.0 % under normal conditions and 10.0% under extreme conditions.
3. The (averaged) value of peak EVM derived in step g) shall not exceed 30 %.
4. The 95:th percentile value derived in step i) shall not exceed 15 %.
5. The origin offset suppression derived in subclause 13.17.1.4.2 step h) shall exceed 30 dB for MS.

Test procedure

Please reference to 3GPP TS 51 010-1, 13.17.1.4.2.

Test Result

PASS

5.14. Frequency error under multipath and interference conditions in EGPRS Configuration

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.27

Limits

According to clause 13.17.2 of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1, 13.17.2.5.

Table 13.17-1: Requirements for frequency error under multipath, Doppler shift and interference conditions

GSM 400		T-GSM 810, GSM 850 and GSM 900		DCS 1 800 and PCS 1 900	
Propagation condition	Permitted frequency error	Propagation condition	Permitted frequency error	Propagation condition	Permitted frequency error
RA500	±300 Hz	RA250	±300 Hz	RA130	±400 Hz
HT200	±180 Hz	HT100	±180 Hz	HT100	±350 Hz
TU100	±160 Hz	TU50	±160 Hz	TU50	±260 Hz
TU6	±230 Hz	TU3	±230 Hz	TU1,5	±320 Hz

GSM 700	
Propagation condition	Permitted frequency error
RA 300	±300 Hz
HT 120	±180 Hz
TU 60	±160 Hz
TU 3.6	±230 Hz

Test procedure

1) The SS transmits packets under static conditions, using MCS-5 coding. The SS is set up to capture the first burst transmitted by the MS during the uplink TBF. EGPRS Switched Radio Block Loop Back Mode is initiated by the SS according to the procedure defined in 3GPP TS 04.14; 5.5.1 on a PDTCH/MCS-5 channel in the mid ARFCN range. The PDTCH level is set to 10 dB above the input signal level at reference sensitivity performance for PDTCH/MCS-5 applicable to the type of MS and the fading function is set to RA. 8PSK modulated downlink transmission shall be utilised.
2) The SS calculates the frequency accuracy of the captured burst as described in test 13.16.1 for MS capable of only GMSK modulated transmission in the uplink. For MS capable of both GMSK and 8PSK modulated transmission in the uplink the frequency accuracy of the captured burst shall be calculated as described in the test 13.17.1.
3) The SS sets the serving cell BCCH and PDTCH to the PDTCH input signal level at reference sensitivity performance for PDTCH/MCS-5 applicable to the type of MS, still with the fading function set to RA and then waits 30 s for the MS to stabilize to these conditions.
4) The SS shall capture subsequent bursts from the traffic channel in the manner described in test 13.16.1 or test 13.17.1.

NOTE: Due to the very low signal level at the MS receiver input the MS receiver is liable to error. The "looped back" bits are therefore also liable to error, and hence the SS does not know the expected bit sequence. The SS will have to demodulate the received signal to derive (error free) the transmitter burst bit pattern. Using this bit pattern the SS can calculate the expected phase trajectory according to the definition within 3GPP TS 05.04.

5) The SS calculates the frequency accuracy of the captured burst as described in test 13.16.1 or test 13.17.1.
6) Steps 4) and 5) are repeated for 5 traffic channel bursts spaced over a period of not less than 20 s.
7) Both downlink and uplink TBFs are terminated. The initial conditions are established again and steps 1) to 6) are repeated but with the fading function set to HT200 for GSM 400, HT120 for GSM700 and

HT100 for all other bands.

8) The initial conditions are established again and steps 1) to 6) are repeated but with the fading function set to TU100 for GSM 400, TU60 for GSM700 and TU50 for all other bands.
9) The initial conditions are established again and steps 1) and 2) are repeated but with the following differences:
   - the levels of the BCCH and PDTCH are set to – 72,5 dBm + Corr. Corr = the correction factor for reference performance according to Spec 45.005 subclause 6.2.
   - two further independent 8-PSK modulated interfering signals are sent on the same nominal carrier frequency as the BCCH and PDTCH and at a level 20,5 dB below the level of the PDTCH and modulated with random data, including the midamble.
   - the fading function for all channels including the interfering signals is set to TUlow.
   - the SS waits 100 s for the MS to stabilize to these conditions.
10) Repeat steps 4) to 6), except that at step f) the measurement period must be extended to 200 s and the number of measurements increased to 20.
11) The initial conditions are established again and steps 1) to 10) are repeated for ARFCN in the Low ARFCN range.
12) The initial conditions are established again and steps 1) to 10) are repeated for ARFCN in the High ARFCN range.
13) Repeat step 8) under extreme test conditions (see annex 1, TC2.2).

Test Result

PASS

5.15. EGPRS Transmitter output power

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.28

Limits

According to clause 13.17.3 of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1, 13.17.3.5.

Table 13.17.3-1: Bands other than DCS 1800 and PCS 1900 transmitter output power for different power classes 8PSK Modulated Signals

Power class			Power control level (note 3)	GAMMA_TN (Γ_{CH})	Transmitter output power (note 1,2)	Tolerances	
E1	E2	E3					
·			2-5	0-3	33	±2 dB	±2.5dB
			6	4	31	±3 dB	±4 dB
			7	5	29	±3 dB	±4 dB
	·		8	6	27	±3 dB	±4 dB
	·		9	7	25	±3 dB	±4 dB
	·	·	10	8	23	±3 dB	±4 dB
	·	·	11	9	21	±3 dB	±4 dB
	·	·	12	10	19	±3 dB	±4 dB
	·	·	13	11	17	±3 dB	±4 dB
	·	·	14	12	15	±3 dB	±4 dB
	·	·	15	13	13	±3 dB	±4 dB
	·	·	16	14	11	±5 dB	±6 dB
	·	·	17	15	9	±5 dB	±6 dB
	·	·	18	16	7	±5 dB	±6 dB
	·	·	19	17	5	±5 dB	±6 dB

NOTE 1: For R99 and Rel-4, the maximum output power in a multislot configuration must be lower within the limits defined in table 13.17.3-1a. From Rel-5 onwards, the maximum output power in a multislot configuration may be lower within the limits defined in table 13.17.3-1b.
NOTE 2: For a MS using reduced interslot dynamic range in multislot configurations, the MS may restrict the interslot output power control range to a 10 dB window, on a TDMA frame basis. On those timeslots where the ordered power level is more than 10 dB lower than the applied power level of the highest power timeslot, the MS shall transmit at a lowest possible power level within 10 dB range from the highest applied power level, if not transmitting at the actual ordered power level.
NOTE 3: There is no requirement to test power control levels 20-31.

Table 13.17.3-1a: R99 and Rel-4: Bands other than DCS 1800 and PCS 1900 allowed maximum output power reduction in a multislot configuration

Number of timeslots in uplink assignment	Permissible nominal reduction of maximum output power, (dB)
1	0
2	0 to 3,0
3	1,8 to 4,8
4	3,0 to 6,0

Table 13.17.3-1b: From Rel-5 onwards: Bands other than DCS 1800 and PCS 1900 allowed maximum output power reduction in a multislot configuration

Number of timeslots in uplink assignment	Permissible nominal reduction of maximum output power, (dB)
1	0
2	3,0
3	4,8
4	6,0
5	7,0
6	7,8
7	8,5
8	9,0

Table 13.17.3-2: DCS 1 800 and PCS 1 900 transmitter output power for different power classes 8-PSK Modulated Signals

Power class			Power control level (note 3)	GAMMA_TN (Γ_{CH})	Transmitter output power (note 1,2)	Tolerances	
E1	E2	E3				NORMAL	EXTREME
-			29,0 *)	0-3 **)	30	±3 dB(note 4)	±4dB(note 4)
			1	4	28	±3 dB	±4 dB
	-		2	5	26	±3 dB(note 4)	±4 dB(note 4)
	-		3	6	24	±3 dB	±4 dB
	-	-	4	7	22	±3 dB	±4 dB
	-	-	5	8	20	±3 dB	±4 dB
	-	-	6	9	18	±3 dB	±4 dB
	-	-	7	10	16	±3 dB	±4 dB
	-	-	8	11	14	±4 dB	±4 dB
	-	-	9	12	12	±4 dB	±5 dB
	-	-	10	13	10	±4 dB	±5 dB
	-	-	11	14	8	±4 dB	±5 dB
	-	-	12	15	6	±4 dB	±5 dB
	-	-	13	16	4	±5 dB	±5 dB
	-	-	14	17	2	±5 dB	±6 dB
	-	-	15	18	0	±5 dB	±6 dB

*) 30-0 for PCS 1900 **) 1-3 for PCS 1900

NOTE 1: For R99 and Rel-4, the maximum output power in a multislot configuration must be lower within the limits defined in table 13.17.3-2a. From Rel-5 onwards, the maximum output power in a multislot configuration may be lower within the limits defined in table 13.17.3-2b.

NOTE 2: For a MS using reduced interslot dynamic range in multislot configurations, the MS may restrict the interslot output power control range to a 10 dB window, on a TDMA frame basis. On those timeslots where the ordered power level is more than 10 dB lower than the applied power level of the highest power timeslot, the MS shall transmit at a lowest possible power level within 10 dB range from the highest applied power level, if not transmitting at the actual ordered power level.

NOTE 3: There is no requirement to test power control levels 16-28.

NOTE 4: When the power control level corresponds to the power class of the MS, then the tolerances shall be ±2,0 dB under normal test conditions and ±2,5 dB under extreme test conditions for a class E1 mobile. For a class E2 mobile the tolerances shall be -4/+3 under normal test conditions and -4,5/+4 dB under extreme test conditions.

Table 13.17.3-2a: R99 and Rel-4: DCS 1 800 and PCS 1 900 allowed maximum output power reduction in a multislot configuration

Number of timeslots in uplink assignment	Permissible nominal reduction of maximum output power, (dB)
1	0
2	0 to 3,0
3	1,8 to 4,8
4	3,0 to 6,0

Table 13.17.3-2b: From Rel-5 onwards: DCS 1 800 and PCS 1 900 allowed maximum output power reduction in a multislot configuration

Number of timeslots in uplink assignment	Permissible nominal reduction of maximum output power, (dB)
1	0
2	3,0
3	4,8
4	6,0
5	7,0
6	7,8
7	8,5
8	9,0

Table 13.17.3-3: Lowest measurement limit for power / time template

(*)	For bands other than DCS 1800 and PCS 1900 MS	:	59 dBc or -54 dBm whichever is the highest, except for the timeslot preceding the active slot, for which the allowed level is -59 dBc or -36 dBm, whichever is the highest
	For DCS 1 800 MS and PCS 1 900 MS	:	-48 dBc or -48 dBm, whichever is the higher.
		:	no requirement below -30 dBc (see subclause 4.5.1).
(***)	For bands other than DCS 1800 and PCS 1900 MS	:	-4 dBc for power control level 16;
			-2 dBc for power level 17;
			-1 dBc for power level controls levels 18 and 19.
	For DCS 1 800 and PCS 1900 MS		-4dBc for power control level 11,
			-2dBc for power level 12,
			-1dBc for power control levels 13,14 and 15
(**)	For bands other than DCS 1800 and PCS 1900 MS	:	-30 dBc or -17 dBm, whichever is the higher.
	For DCS 1 800 and PCS 1900 MS		-30dBc or -20dBm, whichever is the higher.

Test procedure

Please reference to 3GPP TS 51 010-1, 13.17.3.4.2.2.

Test Result

PASS

5.16. Output RF spectrum in EGPRS configuration

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.29

Limits

According to clause 13.17.4 of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1, 14.17.4.5.

Table 13.17.4-1: GSM 400, GSM 700, GSM 850 and GSM 900 Spectrum due to modulation out to less than 1 800 kHz offset

	power levels in dB relative to the measurement at FT				
Power level	Frequency offset (kHz)				
(dBm)	0-100	200	250	400	600 to < 1 800
39	+0,5	-30	-33	-60	-66
37	+0,5	-30	-33	-60	-64
35	+0,5	-30	-33	-60	-62
<= 33	+0,5	-30	-33	-60 (note)	-60
The values above are subject to the minimum absolute levels (dBm) below.					
	-36	-36	-36	-36	-51
NOTE: For equipment supporting 8PSK, the requirement for 8-PSK modulation is –54dB.					

Table 13.17.4-2: DCS 1 800/PCS 1 900 Spectrum due to modulation out to less than 1 800 kHz offset

	power levels in dB relative to the measurement at FT				
Power level	Frequency offset (kHz)				
(dBm)	0-100	200	250	400	600 to < 1 800
<= 36	+0,5	-30	-33	-60	-60
34	+0.5	-30	-33	-60	-60
32	+0.5	-30	-33	-60	-60
30	+0.5	-30	-33	-60 (note)	-60
The values above are subject to the minimum absolute levels (dBm) below.					
	-36	-36	-36	-36	-56
NOTE: For equipment supporting 8-PSK, the requirement for 8-PSK modulation is –54dB.					

Table 13.17.4-3: Spectrum due to modulation from 1 800 kHz offset to the edge of the transmit band (wideband noise)

power levels in dB relative to the measurement at FT						
GSM 400, GSM 700, GSM 850 and GSM 900				DCS 1 800 and PCS 1 900		
Power level (dBm)	Frequency offset kHz			Power level (dBm)	Frequency offset kHz	
	1 800 to < 3 000	3 000 to < 6 000	≥ 6 000		1 800 to < 6 000	≥ 6 000
39 37 35 <= *33*	-69 -67 -65 ***-63***	-71 -69 -67 ***-65***	-77 -75 -73 ***-71***	36 34 32 30 28 26 <= 24	-71 -69 -67 -65 -63 -61 -59	-79 -77 -75 *-73* *-71* *-69* *-67*
The values above are subject to the minimum absolute levels (dBm) below.						
	-46	-46	-46		-51	-51

Table 13.17.4-4: Spurious emissions in the MS receive bands

Band (MHz)	Spurious emissions level for GSM 400, GSM 900 and DCS 1800 (dBm)	Spurious emissions level for GSM 700, GSM 850 and PCS 1 900 (dBm)
460 to 496	-67 Applicable only for GSM 400 mobiles	
925 to 935 935 to 960 1 805 to 1 880	-67 -79 -71	
728 to 736		-73
736 to 746		-79
747 to 757		-79
757 to763		-73
869 to 894		-79
1 930 to 1 990		-71
1 850 to 1 910		Comply with FCC rules for wideband PCS services (see 3GPP TS 05.05, subclause 4.3, applicable only for PCS)

Table 13.17.4-5: GSM700, GSM 850 and GSM 900 Spectrum due to switching transients

Power level	Maximum level for various offsets from carrier frequency			
	400 kHz	600 kHz	1 200 kHz	1 800 kHz
39 dBm	-13 dBm	-21 dBm	-21 dBm	-24 dBm
37 dBm	-15 dBm	-21 dBm	-21 dBm	-24 dBm
35 dBm	-17 dBm	-21 dBm	-21 dBm	-24 dBm
33 dBm	-19 dBm	-21 dBm	-21 dBm	-24 dBm
31 dBm	-21 dBm	-23 dBm	-23 dBm	-26 dBm
29 dBm	-23 dBm	-25 dBm	-25 dBm	-28 dBm
27 dBm	-23 dBm	-26 dBm	-27 dBm	-30 dBm
25 dBm	-23 dBm	-26 dBm	-29 dBm	-32 dBm
23 dBm	-23 dBm	-26 dBm	-31 dBm	-34 dBm
<= +21 dBm	-23 dBm	-26 dBm	-32 dBm	-36 dBm

Table 13.17.4-6: DCS 1 800/PCS 1 900 Spectrum due to switching transients

Power level	Maximum level for various offsets from carrier frequency			
	400 kHz	600 kHz	1 200 kHz	1 800 kHz
36 dBm	-16 dBm	-21 dBm	-21 dBm	-24 dBm
34 dBm	-18 dBm	-21 dBm	-21 dBm	-24 dBm
32 dBm	-20 dBm	-22 dBm	-22 dBm	-25 dBm
30 dBm	-22 dBm	-24 dBm	-24 dBm	-27 dBm
28 dBm	-23 dBm	-25 dBm	-26 dBm	-29 dBm
26 dBm	-23 dBm	-26 dBm	-28 dBm	-31 dBm
24 dBm	-23 dBm	-26 dBm	-30 dBm	-33 dBm
22 dBm	-23 dBm	-26 dBm	-31 dBm	-35 dBm
<= +20 dBm	-23 dBm	-26 dBm	-32 dBm	-36 dBm

Test procedure

1. In steps 2) to 8) the FT is equal to the hop pattern ARFCN in the Mid ARFCN range.
2. The other settings of the spectrum analyser are set as follows:
   - Zero frequency scan;
   - Resolution bandwidth: 30 kHz;
   - Video bandwidth: 30 kHz;
   - Video averaging: may be used, depending on the implementation of the test.

   The video signal of the spectrum analyser is "gated" such that the spectrum generated by at least 40 of the symbols 87 to 132 of the burst in one of the active time slots is the only spectrum measured.This gating may be analogue or numerical, dependent upon the design of the spectrum analyser. Only measurements during transmitted bursts on the nominal carrier of the measurement are included. The spectrum analyser averages over the gated period and over 200 or 50 such bursts, using numerical and/or video averaging.

   The MS is commanded to its maximum power control level in every transmitted time slot.
3. By tuning the spectrum analyser centre frequency to the measurement frequencies the power level is measured over 50 bursts at all multiples of 30 kHz offset from FT to < 1 800 kHz.
4. The resolution and video bandwidth on the spectrum analyser are adjusted to 100 kHz and the measurements are made at the following frequencies:

   on every ARFCN from 1 800 kHz offset from the carrier to the edge of the relevant transmit band for each measurement over 50 bursts.

   at 200 kHz intervals over the 2 MHz either side of the relevant transmit band for each measurement over 50 bursts.

   For GSM 400 and DCS 1 800:

   at 200 kHz intervals over the band 450 MHz to 496 MHz for each measurement over 50 bursts.
   at 200 kHz intervals over the band 925 MHz to 960 MHz for each measurement over 50 bursts.
   at 200 kHz intervals over the band 1 805 MHz to 1 880 MHz for each measurement over 50 bursts.

   For GSM 900

   at 200 kHz intervals over the band 925 MHz to 960MHz for each measurement over 50 bursts;
   at 200 kHz intervals over the band 1805 MHz to 1880 MHz for each measurement over 50 bursts.

   For GSM 700, GSM 850 and DCS 1 900:

   at 200 kHz intervals over the band 728MHz to 746 MHz for each measurement over 50 bursts.
   at 200 kHz intervals over the band 747 MHz to 763 MHz for each measurement over 50 bursts.
   at 200 kHz intervals over the band 869 MHz to 894 MHz for each measurement over 50 bursts.
   at 200 kHz intervals over the band 1 930 MHz to 1 990 MHz for each measurement over 50 bursts.
5. The MS is commanded to its minimum power control level. The spectrum analyser is set again as in b).
6. By tuning the spectrum analyser centre frequency to the measurement frequencies the power level is measured over 200 bursts at the following frequencies:

   FT;
   FT + 100 kHz FT - 100 kHz;
   FT + 200 kHz FT - 200 kHz;
   FT + 250 kHz FT - 250 kHz;
   FT + 200 kHz * N FT - 200 kHz * N;
   where N = 2, 3, 4, 5, 6, 7, and 8;

and FT = RF channel nominal centre frequency.

7. Steps 1) to 6) is repeated except that in step 1) the spectrum analyzer is gated so that the burst of the next active time slot is measured.
8. The spectrum analyser settings are adjusted to:
   - Zero frequency scan;
   - Resolution bandwidth: 30 kHz;
   - Video bandwidth: 100 kHz;
   - Peak hold.

   The spectrum analyser gating of the signal is switched off.
   The MS is commanded to its maximum power control level in every transmitted time slot.
9. By tuning the spectrum analyser centre frequency to the measurement frequencies the power level is measured atthe following frequencies:
   FT + 400 kHz FT - 400 kHz;
   FT + 600 kHz FT - 600 kHz;
   FT + 1,2 MHz FT - 1,2 MHz;
   FT + 1,8 MHz FT - 1,8 MHz;
   where FT = RF channel nominal centre frequency.

   The duration of each measurement (at each frequency) will be such as to cover at least 10 burst transmissions at FT.
10. Step9) is repeated for power control levels 7 and 11.
11. Steps 2), 6), 8) and9) are repeated with FT equal to the hop pattern ARFCN in the Low ARFCN range except that in step 8) the MS is commanded to power control level 11 rather than maximum power.
12. Steps 2), 6), 8) and 9) are repeated with FT equal to the hop pattern ARFCN in the High ARFCN range except that in step 8) the MS is commanded to power control level 11 rather than maximum power.
13. Steps 1) 2) 6) 8), and 9) are repeated under extreme test conditions (annex 1, TC2.2). except that at step h) the MS is commanded to power control level 11.

Test Result

PASS

5.17. Blocking and spurious response in EGPRS configuration

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.30

Limits

According to clause 14.18.5 of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1, 14.18.5.5.

Table 14.18.5-1: Statistical test limits for blocking performance of EGPRS mobiles

Blocking and spurious response for EGPRS mobiles						
		Orig. BLER	Derived	Target number	Target test	Target test time
	blocks per s	requirement	test limit	of samples	time (s)	(hh:mm:ss)
One time slot:						
PDTCH/MCS-4	50	0,100000	0,125100	3221	64	00:01:04
USF/MCS-4	50	0,010000	0,012510	32214	644	00:10:44
PDTCH/MCS-9	50	0,100000	0,125100	3221	64	00:01:04
USF/MCS-9	50	0,010000	0,012510	32214	644	00:10:44
Two time slots:						
PDTCH/MCS-4	100	0,100000	0,125100	3221	32	00:00:32
USF/MCS-4	100	0,010000	0,012510	32214	322	00:05:22
PDTCH/MCS-9	100	0,100000	0,125100	3221	32	00:00:32
USF/MCS-9	100	0,010000	0,012510	32214	322	00:05:22
Three time slots						
PDTCH/MCS-4	150	0,100000	0,125100	3221	21	00:00:21
USF/MCS-4	150	0,010000	0,012510	32214	215	00:03:35
PDTCH/MCS-9	150	0,100000	0,125100	3221	21	00:00:21
USF/MCS-9	150	0,010000	0,012510	32214	215	00:03:35
Four time slots						
PDTCH/MCS-4	200	0,100000	0,125100	3221	16	00:00:16
USF/MCS-4	200	0,010000	0,012510	32214	161	00:02:41
PDTCH/MCS-9	200	0,100000	0,125100	3221	16	00:00:16
USF/MCS-9	200	0,010000	0,012510	32214	161	00:02:41

Test procedure

Please reference to 3GPP TS 51 010-1, 14.18.5.4.

Test Result

PASS

5.18. Intermodulation rejection - speech channels

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.32

Limits

According to clause 14.6.1 of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1, 14.6.1

Table 14-25: Limits for intermodulation rejection

Channel	Propagation conditions	Type of measurement	Test limit error rate %	Minimum No. of samples
TCH/FS Class II	Static	RBER	2,439	8 200

Test procedure

1. The amplitude of the wanted signal is set to 4 dB above the reference sensitivity level (see table 14-24).
2. The SS commands the MS to create the loop back facility signalling erased frames.
3. The SS produces a static wanted signal, and two static interfering (unwanted) signals at the same time. There is no correlation in the modulation between the signals.
   The first interfering signal is on a frequency equal to the centre frequency of an ARFCN four above that of the receiver. This signal is static and unmodulated.
   The second interfering signal is on an ARFCN eight above that of the receiver. This signal is static, continuous and modulated by random data.
4. The amplitude of both the interfering signals is set according to table 14-24.
   The SS compares the data of the signal that it sends to the MS with the signal which is looped back from the receiver after demodulation and decoding, and checks the frame erasure indication.
5. The SS tests the RBER compliance of class II bits by examining at least the minimum number of samples of consecutive bits. Bits only taken from those frames which do not signal frame erasure. The number of error events is recorded.
6. The measurement of step 4) is repeated with the two unwanted signals having frequencies corresponding to ARFCN four and eight below the ARFCN of the wanted signal.
7. Steps 2) to 5), are repeated but with the receiver operating on an ARFCN in the Low ARFCN range.
8. Steps 5) to 5), are repeated but with the receiver operating on an ARFCN in the High ARFCN range.
9. Steps 1) to 7) are repeated under extreme test conditions.

Test Result

PASS

5.19. Intermodulation rejection - EGPRS

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.34

Limits

According to clause 14.18.4 of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1, 14.18.4.5.

1. The block error rate (BLER) performance for PDTCH/MCS1 to 4 shall not exceed 10 % and for PDTCH/MCS5 to 9 shall not exceed 10 % or 30 % depending on Coding Schemes; 3GPP TS 05.05, subclause 6.2.
2. The block error rate (BLER) performance for USF/MSC-1 to 9 shall not exceed 1 %; 3GPP TS 05.05, subclause 6.2.
3. The BLER shall not exceed the conformance requirements given in 1. - 2. under extreme conditions; 3GPP TS 05.05, subclause 6.2 and annex D subclauses D.2.1 and D.2.2.

Test procedure

Please reference to 3GPP TS 51 010-1, 14.18.4.4.

Test Result

PASS

5.20. AM suppression - speech channels

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.35

Limits

According to clause 14.8.1 of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1, 14.8.1

Table 14-33: Limits for AM suppression

Channel	Propagation conditions	Type of measurement	Test limit error rate %	Minimum No. of samples
TCH/FS Class II	Static	RBER	2,439	8 200

Test procedure

1. The SS produces a static wanted signal with an amplitude 4 dB above reference sensitivity level.
2. The SS produces an interfering signal as described below:
   - static fading profile;
   - at an in band frequency greater than 6 MHz separated from FR and separated by at least two ARFCNs from any spurious responses.
3. The SS compares the data of the signal that it sends to the MS with the signal which is looped back from the receiver after demodulation and decoding, and checks the frame erasure indication.
4. The SS tests the RBER compliance of class II bits by examining at least the minimum number of samples of consecutive bits. Bits only taken from those frames which do not signal frame erasure. The number of error events is recorded.

Test Result

PASS

5.21. Adjacent channel rejection - speech channels (TCH/FS)

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.38

Limits

According to clause 14.5.1.1 of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1, 14.5.1.1

Table 14-22: Limits for adjacent channel electivity

			GSM 400, GSM 700, T-GSM 810, GSM 850 and GSM 900		DCS 1 800 and PCS 1 900	
Interference at	Channel	Type of measurement	Test limit error rate %	Minimum No. of samples	Test limit error rate %	Minimum No. of samples
200 kHz	TCH/FS	FER	6,742*α	8 900	3,371*α	17 800
	class Ib	RBER	0,420/α	1 000 000	0,270/α	2 000 000
	class II	RBER	8,333	600 000	8,333	1 200 000
400 kHz	TCH/FS	FER	6,742*α	8 900	3,371*α	17 800
Interferer	class Ib	RBER	0,420/α	1 000 000	0,270/α	2 000 000
TUhight	class II	RBER	8,333	600 000	8,333	1 200 000
400 kHz	TCH/FS	FER	11,461*α	8 900	5,714*α	10 500
Interferer	class Ib	RBER	0,756/α	1 000 000	0,483/α	1 200 000
Static	class II	RBER	9,167	600 000	9,167	720 000

Test procedure

1. In addition to the wanted signal, the SS transmits an independent, uncorrelated interfering signal, Standard Test Signal I1 (unwanted signal). The SS produces an interfering signal as described below:
   The unwanted signal is continuous and has no fixed relationship with the bit transitions of the wanted signal.
   The fading characteristic of the wanted and the unwanted signal is set to TUhigh.
   The unwanted signal is transmitted at a nominal frequency 200 kHz above the nominal frequency of the wanted signal.
2. The SS compares the data of the signal that it sends to the MS with the signal which is looped back from the receiver after demodulation and decoding, and checks the frame erasure indication.
3. The SS tests the frame erasure compliance for the TCH/FS by examining at least the minimum number of samples of consecutive frames. The number of frame erasure events is recorded.
4. The SS determines the number of residual bit error events for the bits of the class Ib and class II, by examining sequences of at least the minimum number of samples of consecutive bits of class Ib and class II, Bits are only taken from those frames for which no bad frame indication was given.
5. The measurement of steps 3) and 4) is repeated with the unwanted signal on a frequency at the same displacement from, but below, the frequency of the wanted signal.
6. The measurement of steps 3) to 5) shall be repeated for a displacement of the unwanted signal of 400 kHz, and with the amplitude of the unwanted signal 41 dB above the level of the wanted input signal, The fading characteristic of the wanted and the unwanted signal is set to TUhigh. If a system simulator does not support the faded interferer, a static adjacent interferer may be used.
7. Steps 3) to 6) are repeated for class II BER under extreme test conditions.

Test Result

PASS

5.22. Adjacent channel rejection - EGPRS

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.40

Limits

According to clause 14.18.3 of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1, 14.18.3.5.

Table 14.18-7a: Adjacent channel interference ratio for MS at reference performance for 8-PSK modulation

GSM 400, GSM 700, GSM 850 and GSM 900						
Type of channel		Propagation conditions				
		TUlow (no FH)	TUlow (ideal FH)	TUhigh (no FH)	TUhigh (ideal FH)	RA (no FH)
PDTCH/MCS-5	dB	2,5	-2	-1	-2	1
PDTCH/MCS-6	dB	5,5	0,5	2	1	6,5
PDTCH/MCS-7	dB	10,5	8	10	9	(note 1)
PDTCH/MCS-8	dB	15,5	9 (note 2)	11 (note 2)	10,5 (note 2)	(note 1)
PDTCH/MCS-9	dB	10 (note 2)	12,5 (note 2)	17 (note 2)	15,5 (note 2)	(note 1)
USF/MCS-5 to 9	dB	-1	-8,5	-8	-9,5	-9
DCS 1 800 and PCS 1 900						
Type of channel		Propagation conditions				
		TUlow (no FH)	TUlow (ideal FH)	TUhigh (no FH)	TUhigh (ideal FH)	RA (no FH)
PDTCH/MCS-5	dB	2,5	-2	-2	-1,5	1
PDTCH/MCS-6	dB	5,5	0,5	1,5	1,5	6,5
PDTCH/MCS-7	dB	10,5	8	12,5	12	(note 1)
PDTCH/MCS-8	dB	15,5	9 (note 2)	16 (note 2)	15,5 (note 2)	(note 1)
PDTCH/MCS-9	dB	10 (note 2)	12,5 (note 2)	(note 1)	(note 1)	(note 1)
USF/MCS-5 to 9	dB	-1	-8,5	-9	-9,5	-9
NOTE1: PDTCH for MCS-x can not meet the reference performance for some propagation conditions. NOTE 2: Performance is specified at 30% BLER for some cases.						

Test procedure

Please reference to 3GPP TS 51 010-1, 14.18.3.4.

Test Result

PASS

5.23. Reference sensitivity - TCH/FS

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.42

Limits

According to clause 14.2.1 of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1, 14.2.1

Table 14-5: Limits for GSM 400, GSM 700, T-GSM 810, GSM 850 and GSM 900 sensitivity

Channels	Propagation conditions TUhigh		Propagation conditions RA		Propagation conditions HT		Static conditions	
	Test limit error rate %	Minimum No. of samples	Test limit error rate %	Minimum No. of samples	Test limit error rate %	Minimum No. of samples	Test limit error rate %	Minimum No. of samples
TCH/FS								
FER	6,742*α	8 900					0,122*α	164 000
class Ib(RBER)	0,42/α	1 000 000					0,41/α	20 000 000
class II(RBER)	8,333	120 000	7,5	24 000	9,333	60 000	2,439	8 200

Table 14-6: Limits for DCS 1 800 and PCS 1 900 sensitivity

Channels	Propagation conditions TUhigh		Propagation conditions RA		Propagation conditions HT		Static conditions	
	Test limit error rate %	Minimum No. of samples	Test limit error rate %	Minimum No. of samples	Test limit error rate %	Minimum No. of samples	Test limit error rate %	Minimum No. of samples
TCH/FS								
FER	4,478*α	13 400					0,122*α	164 000
class Ib(RBER)	0,32/α	1 500 000					0,41/α	20 000 000
class II(RBER)	8,333	60 000	7,5	24 000	9,333	30 000	2,439	8 200

Test procedure

1. The fading function is set to TUhigh.
2. The SS sets the amplitude of the wanted signal to reference sensitivity level ( ).
3. The SS compares the data of the signal that it sends to the MS with the signal which is looped back from the receiver after demodulation and decoding, and checks the frame erasure indication.
4. The SS determines the number of residual bit error events for the bits of class II, by examining sequences of at least the minimum number of samples of consecutive bits of class II. Bits are taken only from those frames not signalled as erased.
5. The SS determines the number of residual bit error events for the bits of the class Ib, by examining sequences of at least the minimum number of samples of consecutive bits of class Ib. Bits are only taken from those frames not signalled as erased.
6. The SS also determines the frame erasure events by examining sequences of at least the minimum number of samples of consecutive frames and assuming a frame is received successfully, if it is not signalled as erased.
7. Steps 1) to 4) are repeated under extreme test conditions.
8. Steps 1) to 7) are repeated for TCH/FS with ARFCNs in the Low ARFCN range for GSM 400, GSM 700, TGSM 810, GSM 850, DCS 1800 and PCS 1 900 and ARFCN 5 for GSM 900 and the High ARFCN range.
9. Steps 2) to 4) are repeated with the SS fading function set in turn to RA and HT.
10. Steps 2) to 7) are repeated, with the SS fading function set to static and the MS is commanded by the

SS into hopping mode using the hopping sequence defined in clause 6.

11. The amplitude of the wanted signal is set according to step 2). All the other time slots, except the active ones, are set to 20 dB above reference sensitivity level( ). This implicitly tests adjacent time slot rejection.

Test Result

PASS

5.24. Reference sensitivity – FACCH/F

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.43

Limits

According to clause 14.2.3 of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1, 14.2.3

Table 14-9: Limits for FACCH/F sensitivity

			GSM 400, GSM 700, T-GSM 810, GSM 850 and GSM 900		DCS 1 800 and PCS 1 900	
Channels	Type of measurements	Propagation	Test limit error rate %	Minimum No of samples	Test limit error rate %	Minimum No of samples
FACCH/F	FER	TUhigh	8,961	6696	4,368	13736

Test procedure

1. The fading function is set to TUhigh.
2. The SS sets the amplitude of the wanted signal to reference sensitivity level ( ).
3. The SS sends a Layer 3 message which does not require a Layer 3 response from the MS. Due to the low signal level the MS may not be able to acknowledge the Layer 2 frame with an RR frame and the SS will repeat the Layer 2 frame. Each repeated L2 frame will be counted and will indicate a frame erasure event.
4. The SS determines the frame erasure events during at least the minimum number of samples of FACCH/F frames. The SS also determines the frame erasure events by examining sequences of at least the minimum number of samples of consecutive frames and assuming a frame is received successfully, if it is not signalled as erased.

Test Result

PASS

5.25. Minimum Input level for Reference Performance – GPRS

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.44

Limits

According to clause 14.16.1 of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1, 14.16.1.5

Test procedure

The following operating conditions were made in accordance with the ETSI EN 301 511 Clause 4.2.44.

Test Result

PASS

5.26. Minimum Input level for Reference Performance – EGPRS

Standard Applicable

According to ETSI EN 301 511 V12.5.1 §4.2.45

Limits

According to clause 14.18.1 of TS 151 010-1[2]
Reference to 3GPP TS 51 010-1, 14.18.1.5

Test procedure

Please reference to 3GPP TS 51 010-1, 14.18.1.5

Test Result

PASS

APPENDIX A. Test SetUp Photographs

Please refer to the file named “RF Test Setup Photos”.

APPENDIX B. EUT Photographs

Please refer to the file named “EUT Photos”.

----End of the report----