FCC Part 22H & 24E
Measurement and Test Report

For

JXJ Technologies Corporation

1 Meca Way, Norcross, GA 30024

FCC ID: 2AGOEJXJ-HM041

FCC Rules:	FCC Part 22H, FCC Part 24E
Product Description:	Wireless Data Terminal
Tested Model:	JXJ-HM041
Report No.:	STR15118191I-1
Tested Date:	2015-11-12 to 2015-11-23
Issued Date:	2015-11-24
Tested By:	Silin Chen / EMC Manager
Reviewed By:	Suan Su / Engineer
Approved & Authorized By:	Jandy So / PSQ Manager

Prepared By:

Shenzhen SEM.Test Technology Co., Ltd.
1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road,
Bao'an District, Shenzhen, P.R.C.（518101）
Tel.: +86-755-33663308 Fax.: +86-755-33663309 Website: www.semtest.com.cn

TABLE OF CONTENTS

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	JXJ Technologies Corporation
Address of applicant:	1 Meca Way, Norcross, GA 30024
Manufacturer:	Shenzhen Baode rui kang Technology Co., Ltd.
Address of manufacturer:	Room.705-70, Building B of Huachuangda, Xin'an Street, Baoan Avenue, Bao'an District, ShenZhen, China

General Description of EUT	
Product Name:	Wireless Data Terminal
Trade Name:	jWotch
Model No.:	JXJ-HM041
Adding Model(s):	JXJ-HM031, JXJ-HM032, JXJ-HM042, JXJ-HM051,
Hardware Version:	in907_MB_V0.1
Software Version:	JWOTCH_HSPA_1.0.10
IMEI:	864765020133479
Rated Voltage:	Battery: DC 3.7V
Note: The test data is gathered from a production sample provided by the manufacturer. The appearance of others models listed in the report is different from main-test model JXJ-HM041, but the circuit and the electronic construction do not change, declared by the manufacturer.	

Technical Characteristics of EUT	
2G	
Support Networks:	GSM, GPRS, EDGE
Support Band:	GSM850/PCS1900
Uplink Frequency:	GSM/GPRS/EDGE 850: 824~849MHz GSM/GPRS/EDGE 1900: 1850~1910MHz
Downlink Frequency:	GSM/GPRS/EDGE 850: 869~894MHz GSM/GPRS/EDGE 1900: 1930~1990MHz
Max Conducted Output Power:	GSM850: 32.11dBm, GSM1900: 28.80dBm EDGE850: 25.43dBm, EDGE1900: 24.96dBm
Type of Modulation:	GMSK, 8PSK
Type of Emission:	GSM850: 261KGXW, GSM1900: 261KGXW EDGE850: 263KG7W, EDGE1900: 264KG7W
Type of Antenna:	Integral Antenna
Antenna Gain:	2.0dBi
GPRS Class:	Class 12
3G	
Support Networks:	WCDMA, HSDPA, HSUPA
Support Band:	WCDMA Band V
Uplink Frequency:	WCDMA Band V: 824~849MHz
Downlink Frequency:	WCDMA Band V: 869~894MHz
Max Conducted Output Power:	WCDMA Band V: 22.09dBm
Type of Modulation:	BPSK
Type of Emission:	WCDMA Band V: 4M19F9W
Type of Antenna:	Integral Antenna
Antenna Gain:	2.0dBi

1.2 Test Standards

The following report is prepared on behalf of the JXJ Technologies Corporation in accordance with FCC Part 2 subpart J, FCC Part 22 subpart H and FCC Part 24 subpart E of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 2 subpart J, FCC Part 22 subpart H and FCC Part 24 subpart E of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI/TIA-603-D: 2010 and ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

1.4 Test Facility

- **FCC – Registration No.: 934118**
  Shenzhen SEM.Test Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 934118.

- **Industry Canada (IC) Registration No.: 11464A**
  The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

- **CNAS Registration No.: L4062**
  Shenzhen SEM.Test Technology Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C (518101)

1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	GSM 850	Low, Middle, High Channels
TM2	GPRS 850	Low, Middle, High Channels
TM3	EDGE 850	Low, Middle, High Channels
TM4	GSM 1900	Low, Middle, High Channels
TM5	GPRS 1900	Low, Middle, High Channels
TM6	EDGE 1900	Low, Middle, High Channels
TM7	WCDMA Band Ⅴ	Low, Middle, High Channels
TM8	HSDPA Band Ⅴ	Low, Middle, High Channels
TM9	HSUPA Band Ⅴ	Low, Middle, High Channels

Testing Configure			
Support Band	Support Standard	Channel Frequency	Channel Number
GSM 850	GSM/GPRS/EDGE	824.2 MHz	128
		836.6 MHz	190
		848.8 MHz	251
PCS 1900	GSM/GPRS/EDGE	1850.2 MHz	512
		1880.0 MHz	661
		1909.8 MHz	810
WCDMA Band V	WCDMA/HSDPA/HSUPA	826.4 MHz	4132
		836.6 MHz	4183
		846.6 MHz	4233
Note: the transmitter has been tested on the communications mode of GSM, GPRS, EDGE, WCDMA, HSDPA, HSUPA compliance test and record the worst case.			

EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
Earphone Cable	1.25	Unshielded	Without Core
USB Cable	1.0	Shielded	Without Core

Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
Notebook	Lenovo	E10	LR-63C8R

Special Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
/	/	/	/

1.6 Test Equipment List and Details

Kind of Equipment	Manufacturer	Type	S/N	Cal Date	Due Date
Equipment list of < Shenzhen SEM.Test Technology Co., Ltd.>					
Test SIM card	-		-	N/A	
GSM Tester	Rohde & Schwarz	CMU200	104036	2015-06-17	2016-06-16
Spectrum Analyzer	Agilent	E4407B	MY41440400	2015-06-17	2016-06-16
Spectrum Analyzer	Agilent	N9020A	US47140102	2015-06-17	2016-06-16
Signal Generator	Agilent	83752A	3610A01453	2015-06-17	2016-06-16
Vector Signal Generator	Agilent	N5182A	MY47070202	2015-06-17	2016-06-16
Power Divider	Weinschel	1506A	PM204	2015-06-17	2016-06-16
Power Divider	RF-Lambda	RFLT4W5M18G	14110400027	2015-06-17	2016-06-16
Spectrum Analyzer	Rohde & Schwarz	FSP	836079/035	2015-06-17	2016-06-16
EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2015-06-17	2016-06-16
Amplifier	Agilent	8447F	3113A06717	2015-06-17	2016-06-16
Amplifier	C&D	PAP-1G18	2002	2015-06-17	2016-06-16
Broadband Antenna	Schwarz beck	VULB9163	9163-333	2015-06-17	2016-06-16
Horn Antenna	ETS	3117	00086197	2015-06-17	2016-06-16
Horn Antenna	ETS	3116B	00088203	2015-06-17	2016-06-16

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 1.1307, § 2.1093	RF Exposure	Compliant
§ 22.913 (a), § 24.232 (c)	RF Output Power	Compliant
§ 24.51	Peak-to-average Radio (PAR) of Transmitter	Compliant
§ 22.917 (b), § 24.238 (b)	Emission Bandwidth	Compliant
§ 22.917 (a), § 24.238 (a)	Spurious Emissions at Antenna Terminal	Compliant
§ 22.917 (a), § 24.238 (a)	Spurious Radiation Emissions	Compliant
§ 22.917 (a), § 24.238 (a)	Out of Band Emissions	Compliant
§ 22.355, § 24.235	Frequency Stability	Compliant

3. RF Exposure

3.1 Standard Applicable

According to § 1.1307 and § 2.1093, the portable transmitter must comply the RF exposure requirements.

3.2 Test Result

This product complied with the requirement of the RF exposure, please see the SAR report.

4. RF Output Power

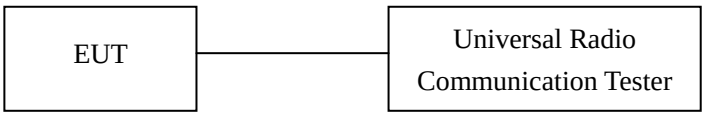
4.1 Standard Applicable

According to §22.913(a)(2), The ERP of mobile and portable stations transmitters and auxiliary test transmitters must not exceed 7 Watts.

According to §24.232 (c), Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

4.2 Test Procedure

Conducted output power test method:



Radiated power test method:

1.The setup of EUT is according with per ANSI/TIA-603-D: 2010 and ANSI C63.4-2014 measurement procedure.

2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.

4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

4.3 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

4.4 Summary of Test Results/Plots

Radiated Power

ERP For GSM Mode GSM850

Frequency	Substitude SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	dBm	dBm
Low Channel								
824.2	28.38	1.5	0	H	1.5	0	26.88	38.45
824.2	30.02	1.5	0	V	1.5	0	28.52	38.45
Middle Channel								
836.6	28.31	1.5	0	H	1.5	0	26.81	38.45
836.6	30.14	1.5	0	V	1.5	0	28.64	38.45
High Channel								
848.8	28.23	1.5	0	H	1.5	0	26.73	38.45
848.8	30.09	1.5	0	V	1.5	0	28.59	38.45

EIRP For GSM Mode PCS1900

Frequency	Substitude SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 24E Limit
MHz	DBm	Meter	Degree	H / V	dB	dB	DBm	dBm
Low Channel								
1850.2	18.84	1.5	0	H	1.9	7.7	24.64	33
1850.2	20.17	1.5	0	V	1.9	7.7	25.97	33
Middle Channel								
1880.0	18.13	1.5	0	H	1.9	7.7	23.93	33
1880.0	19.94	1.5	0	V	1.9	7.7	25.74	33
High Channel								
1909.8	18.54	1.5	0	H	1.9	7.7	24.34	33
1909.8	20.06	1.5	0	V	1.9	7.7	25.86	33

ERP For GPRS Mode GSM850

Frequency	Substitude SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	dBm	dBm
Low Channel								
824.2	27.84	1.5	0	H	1.5	0	26.34	38.45
824.2	30.45	1.5	0	V	1.5	0	28.95	38.45
Middle Channel								
836.6	27.43	1.5	0	H	1.5	0	25.93	38.45
836.6	29.81	1.5	0	V	1.5	0	28.31	38.45
High Channel								
848.8	26.84	1.5	0	H	1.5	0	25.34	38.45
848.8	30.24	1.5	0	V	1.5	0	28.74	38.45

EIRP For GPRS Mode PCS1900

Frequency	Substitude SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 24E Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	DBm	dBm
Low Channel								
1850.2	17.15	1.5	0	H	1.9	7.7	22.95	33
1850.2	19.43	1.5	0	V	1.9	7.7	25.23	33
Middle Channel								
1880.0	16.84	1.5	0	H	1.9	7.7	22.64	33
1880.0	19.16	1.5	0	V	1.9	7.7	24.96	33
High Channel								
1909.8	16.73	1.5	0	H	1.9	7.7	22.53	33
1909.8	19.64	1.5	0	V	1.9	7.7	25.44	33

ERP For EDGE Mode GSM850

Frequency	Substitude SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	dBm	dBm
Low Channel								
824.2	23.82	1.5	0	H	1.5	0	22.32	38.45
824.2	25.62	1.5	0	V	1.5	0	24.12	38.45
Middle Channel								
836.6	24.53	1.5	0	H	1.5	0	23.03	38.45
836.6	26.55	1.5	0	V	1.5	0	25.05	38.45
High Channel								
848.8	24.63	1.5	0	H	1.5	0	23.13	38.45
848.8	26.93	1.5	0	V	1.5	0	25.43	38.45

EIRP For EDGE Mode PCS1900

Frequency	Substitude SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 24E Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	DBm	dBm
Low Channel								
1850.2	15.64	1.5	0	H	1.9	7.7	21.44	33.00
1850.2	17.43	1.5	0	V	1.9	7.7	23.23	33.00
Middle Channel								
1880.0	15.52	1.5	0	H	1.9	7.7	21.32	33.00
1880.0	17.32	1.5	0	V	1.9	7.7	23.12	33.00
High Channel								
1909.8	15.75	1.5	0	H	1.9	7.7	21.55	33.00
1909.8	17.53	1.5	0	V	1.9	7.7	23.33	33.00

ERP For WCDMA Mode Band V

Frequency	Substitude SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dBd	dBm	dBm
Low Channel								
826.4	20.63	1.5	0	H	1.5	0	19.13	38.45
826.4	22.14	1.5	0	V	1.5	0	20.64	38.45
Middle Channel								
836.6	20.83	1.5	0	H	1.5	0	19.33	38.45
836.6	21.83	1.5	0	V	1.5	0	20.33	38.45
High Channel								
846.6	21.14	1.5	0	H	1.5	0	19.64	38.45
846.6	21.92	1.5	0	V	1.5	0	20.42	38.45

ERP For HSDPA Mode Band V

Frequency	Substitude SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dBd	dBm	dBm
Low Channel								
826.4	20.84	1.5	0	H	1.5	0	19.34	38.45
826.4	22.04	1.5	0	V	1.5	0	20.54	38.45
Middle Channel								
836.6	20.55	1.5	0	H	1.5	0	19.05	38.45
836.6	22.03	1.5	0	V	1.5	0	20.53	38.45
High Channel								
846.6	20.82	1.5	0	H	1.5	0	19.32	38.45
846.6	21.95	1.5	0	V	1.5	0	20.45	38.45

ERP For HSUPA Mode Band V

Frequency	Substitude SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dBd	dBm	dBm
Low Channel								
826.4	21.25	1.5	0	H	1.5	0	19.75	38.45
826.4	22.05	1.5	0	V	1.5	0	20.55	38.45
Middle Channel								
836.6	21.14	1.5	0	H	1.5	0	19.64	38.45
836.6	22.44	1.5	0	V	1.5	0	20.94	38.45
High Channel								
846.6	20.92	1.5	0	H	1.5	0	19.42	38.45
846.6	22.04	1.5	0	V	1.5	0	20.54	38.45

Note: Result = Substitude - Cable loss + Antenna Gain

Max. Conducted Output Power

For Cellular Band (GSM850)

Test Mode	Channel	Frequency (MHz)	Average Power (dBm)	FCC Part 22.913 Limit (dBm)
GSM	Low Channel	824.2	32.06	38.45
	Middle Channel	836.6	32.11	38.45
	High Channel	848.8	32.10	38.45
GPRS(1 Slot)	Low Channel	824.2	32.08	38.45
	Middle Channel	836.6	32.04	38.45
	High Channel	848.8	32.04	38.45
EDGE(1 Slot)	Low Channel	824.2	25.43	38.45
	Middle Channel	836.6	25.26	38.45
	High Channel	848.8	25.08	38.45

For PCS Band (PCS1900)

Test Mode	Channel	Frequency (MHz)	Average Power (dBm)	FCC Part 24.232 Limit (dBm)
GSM	Low Channel	1850.2	28.64	33.0
	Middle Channel	1880.0	28.56	33.0
	High Channel	1909.8	28.38	33.0
GPRS(1 Slot)	Low Channel	1850.2	28.80	33.0
	Middle Channel	1880.0	28.68	33.0
	High Channel	1909.8	28.52	33.0
EDGE(1 Slot)	Low Channel	1850.2	24.96	33.0
	Middle Channel	1880.0	24.55	33.0
	High Channel	1909.8	24.34	33.0

For WCDMA Band V

Test Mode	Channel	Frequency (MHz)	Average Power (dBm)	FCC Part 22.913 Limit (dBm)
WCDMA	Low Channel	826.4	22.09	38.45
	Middle Channel	836.6	21.96	38.45
	High Channel	846.6	21.89	38.45
HSDPA	Low Channel	826.4	21.22	38.45
	Middle Channel	836.6	20.95	38.45
	High Channel	846.6	20.87	38.45
HSUPA	Low Channel	826.4	21.14	38.45
	Middle Channel	836.6	20.99	38.45
	High Channel	846.6	20.96	38.45

5. Peak-to-average Radio (PAR) of Transmitter

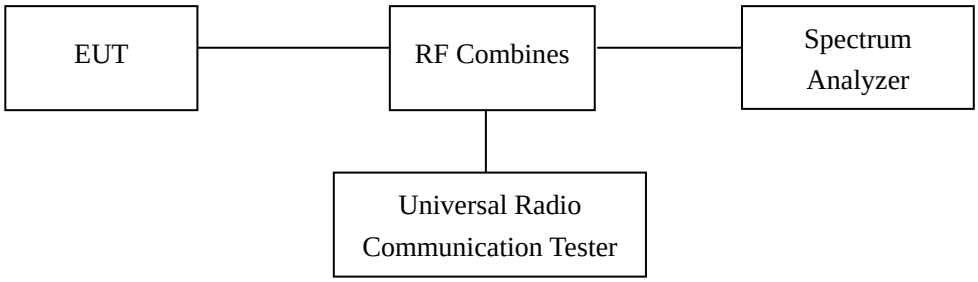
5.1 Standard Applicable

According to §24.232(d), Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

5.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 30kHz and the peak-to-average ratio (PAR) of the transmission was recorded.

Test Configuration for the emission bandwidth testing:



5.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

5.4 Summary of Test Results

For PCS1900 Band

Test Mode	Channel	Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)	PAR (dB)	Limit (dB)
GSM	512	1850.2	30.05	28.64	1.41	13
	661	1880.0	30.12	28.56	1.56	13
	810	1909.8	30.02	28.38	1.64	13
GPRS (1 Slot)	512	1850.2	30.41	28.80	1.61	13
	661	1880.0	30.21	28.68	1.53	13
	810	1909.8	30.56	28.52	2.04	13
EDGE (1 Slot)	512	1850.2	27.52	24.96	2.56	13
	661	1880.0	27.23	24.55	2.68	13
	810	1909.8	27.43	24.34	3.09	13

6. Emission Bandwidth

6.1 Standard Applicable

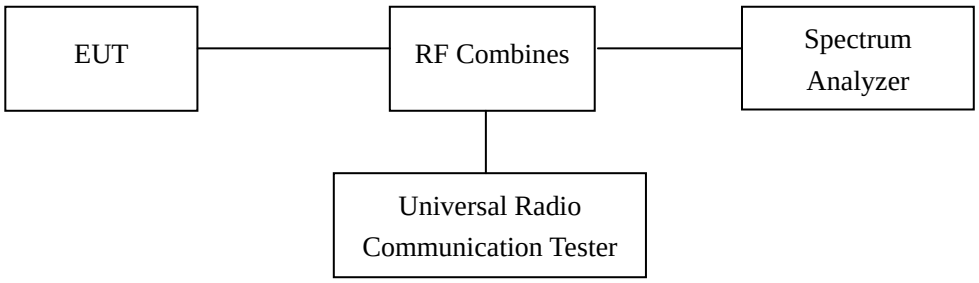
According to §22.917(b), The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

According to §24.238(b), The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

6.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 30kHz and the 26dB bandwidth was recorded.

Test Configuration for the emission bandwidth testing:



6.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

6.4 Summary of Test Results/Plots

For Cellular Band

Test Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM	128	824.2	253.8687	338.559
	190	836.6	260.8876	339.514
	251	848.8	260.5671	340.037
GPRS	128	824.2	252.7209	335.974
	190	836.6	255.9632	341.513
	251	848.8	259.3899	337.683
EDGE	128	824.2	257.9434	323.290
	190	836.6	262.8508	329.129
	251	848.8	256.0763	325.586

For PCS Band

Test Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM	512	1850.2	258.9154	339.894
	661	1880.0	256.3492	344.063
	810	1909.8	261.1625	338.795
GPRS	512	1850.2	254.8564	340.934
	661	1880.0	253.7101	339.207
	810	1909.8	255.5096	338.410
EDGE	512	1850.2	262.4195	332.977
	661	1880.0	261.4530	325.615
	810	1909.8	263.9776	336.907

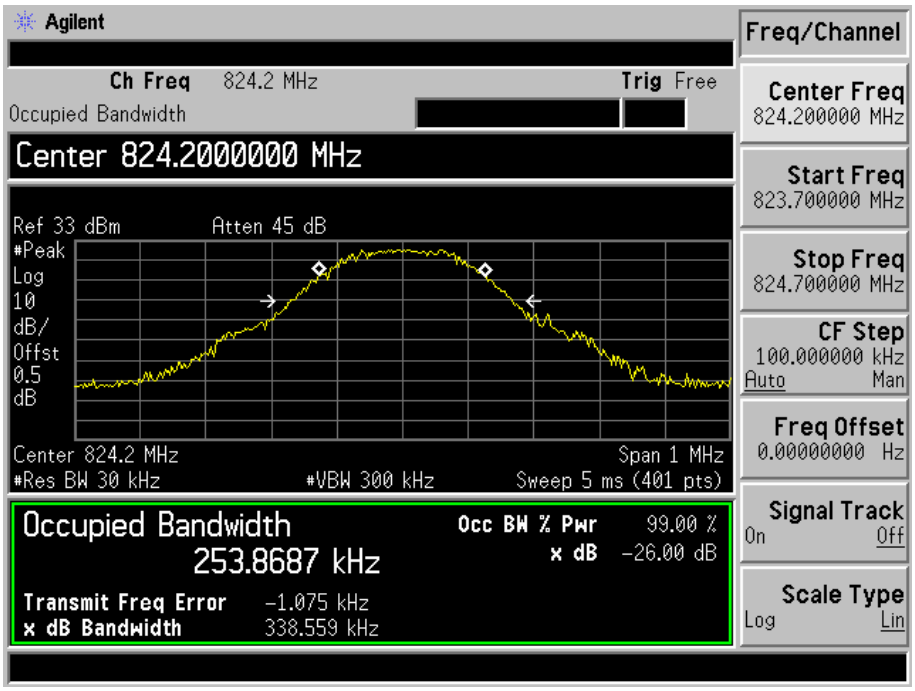
For WCDMA Band V

Test Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
WCDMA	4132	826.4	4.1595	4.721
	4183	836.6	4.1410	4.702
	4233	846.6	4.1551	4.729
HSDPA	4132	826.4	4.1466	4.688
	4183	836.6	4.1860	4.674
	4233	846.6	4.1440	4.684
HSUPA	4132	826.4	4.0962	4.679
	4183	836.6	4.0931	4.706
	4233	846.6	4.0896	4.673

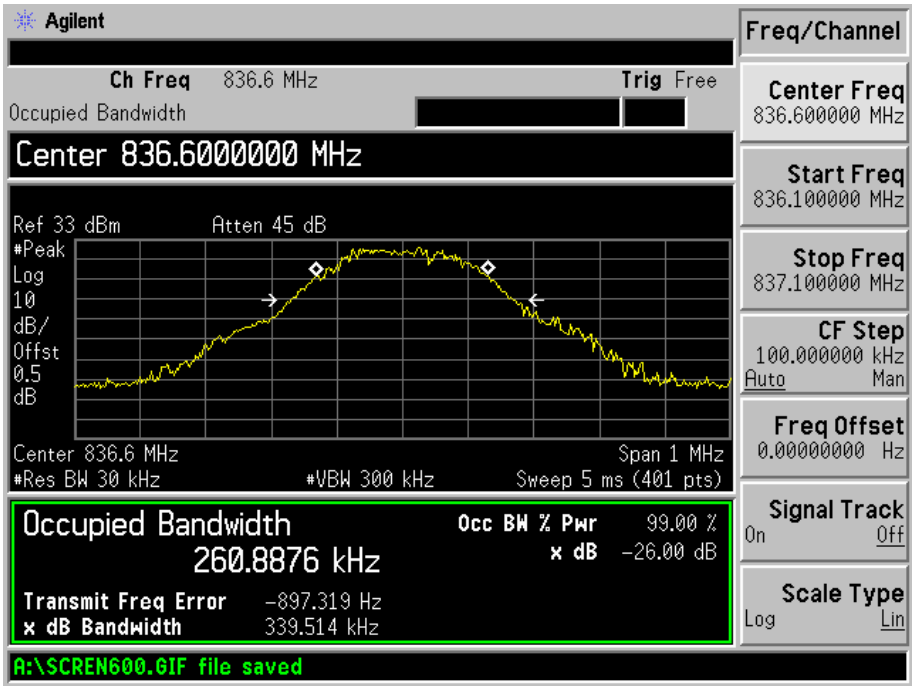
Please refer to the following test plots:

For Cellular Band

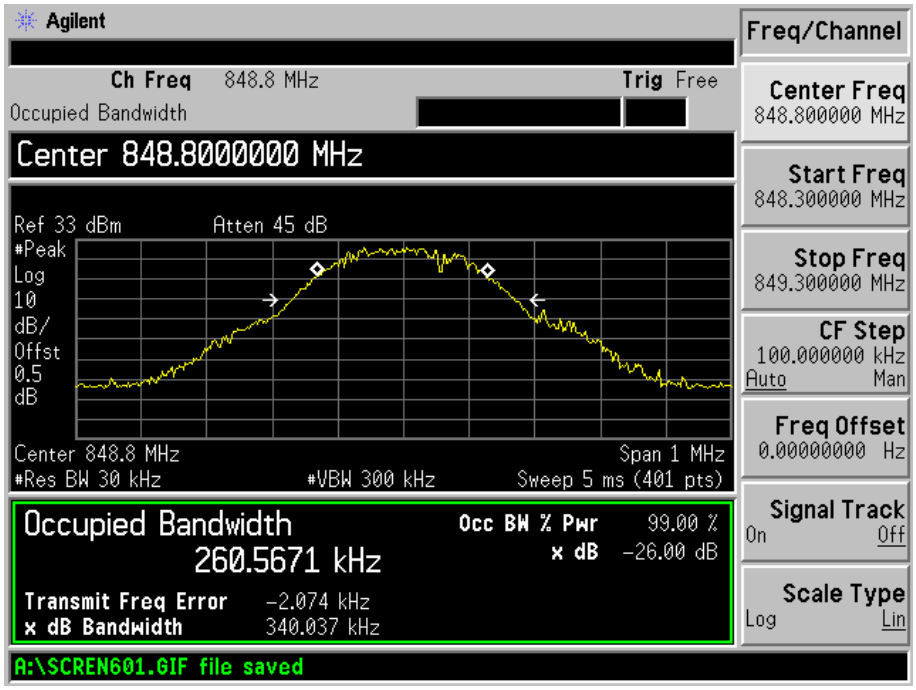
GSM Low Channel



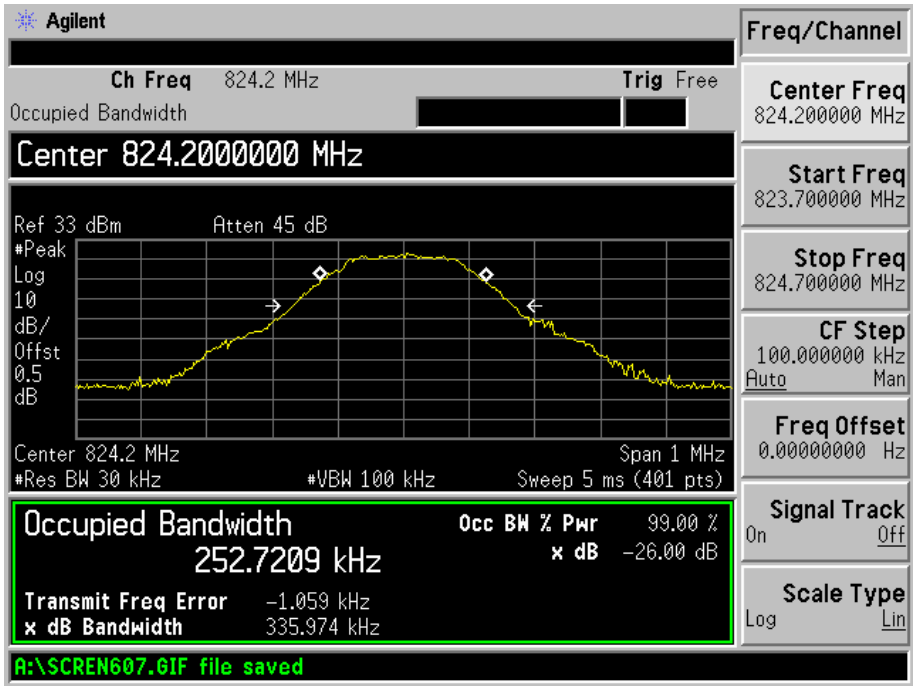
GSM Middle Channel



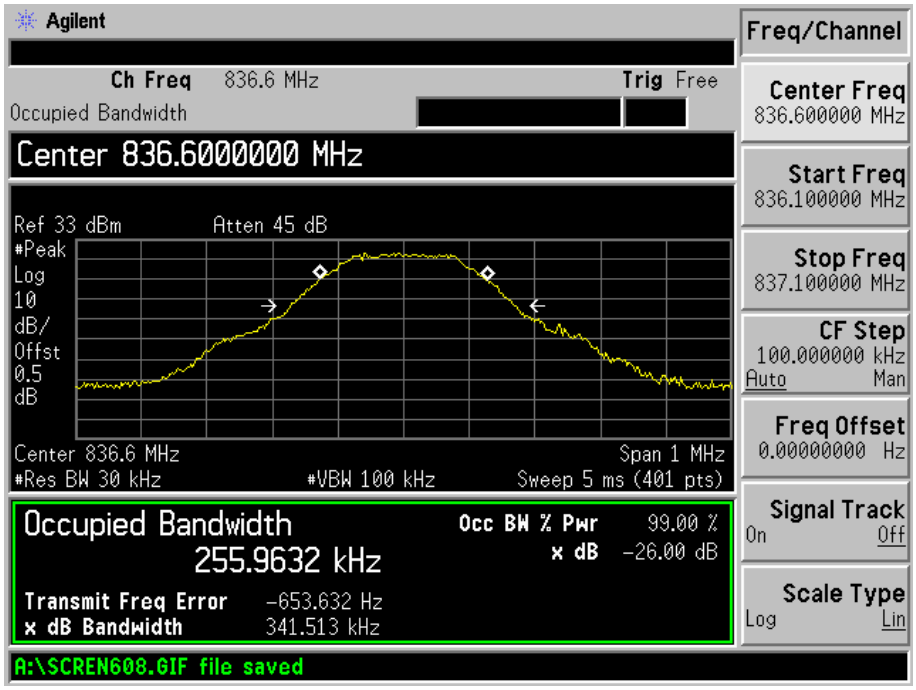
GSM High channel



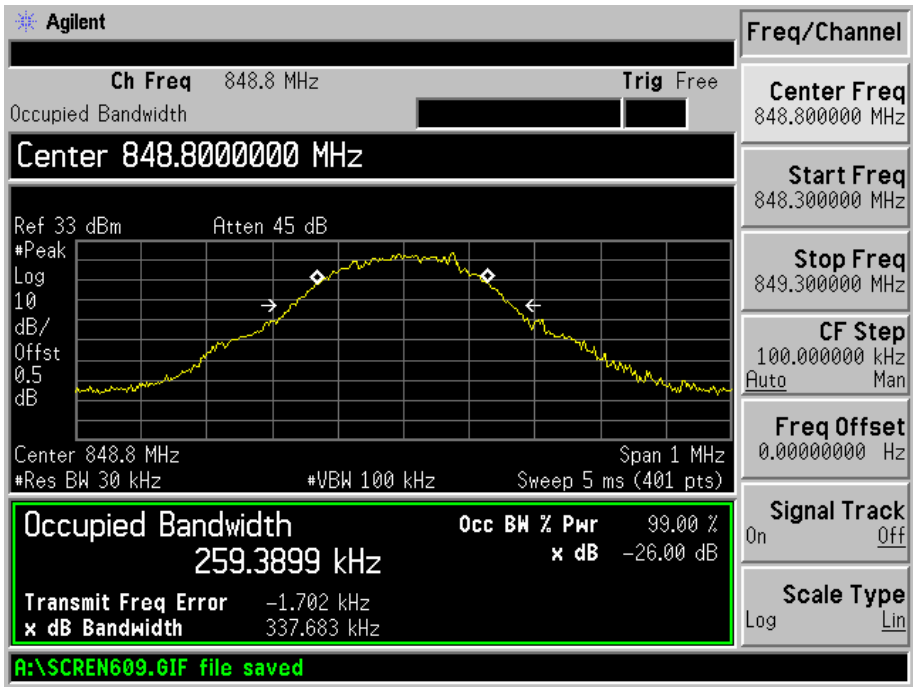
GPRS Low Channel



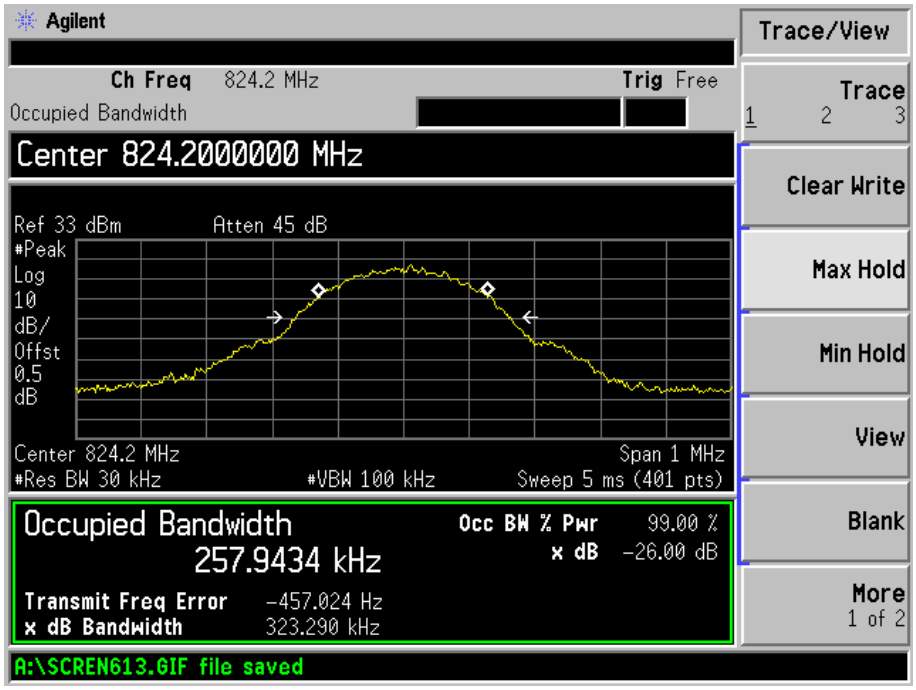
GPRS Middle Channel



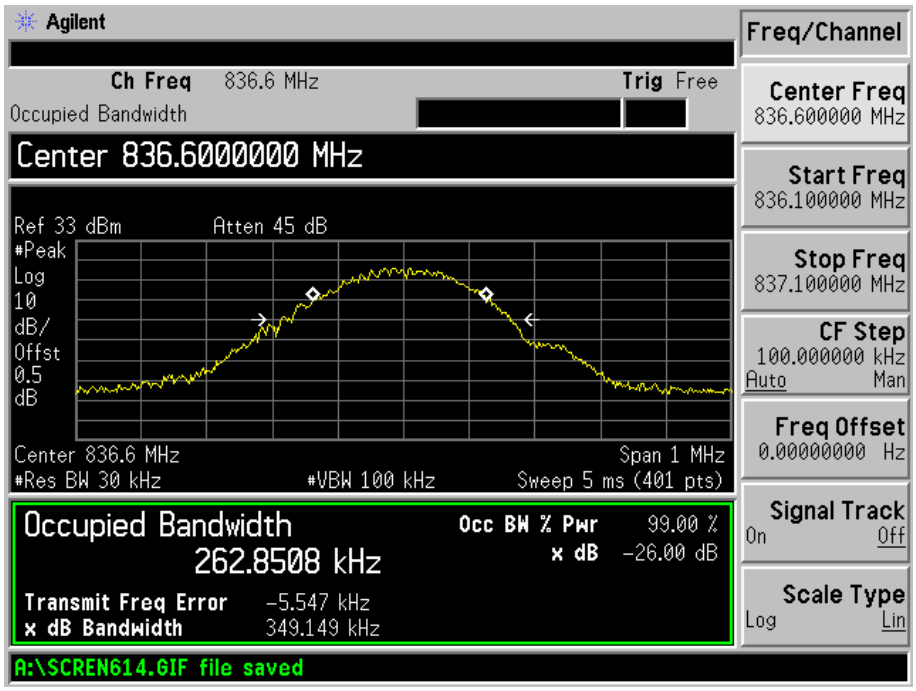
GPRS High Channel



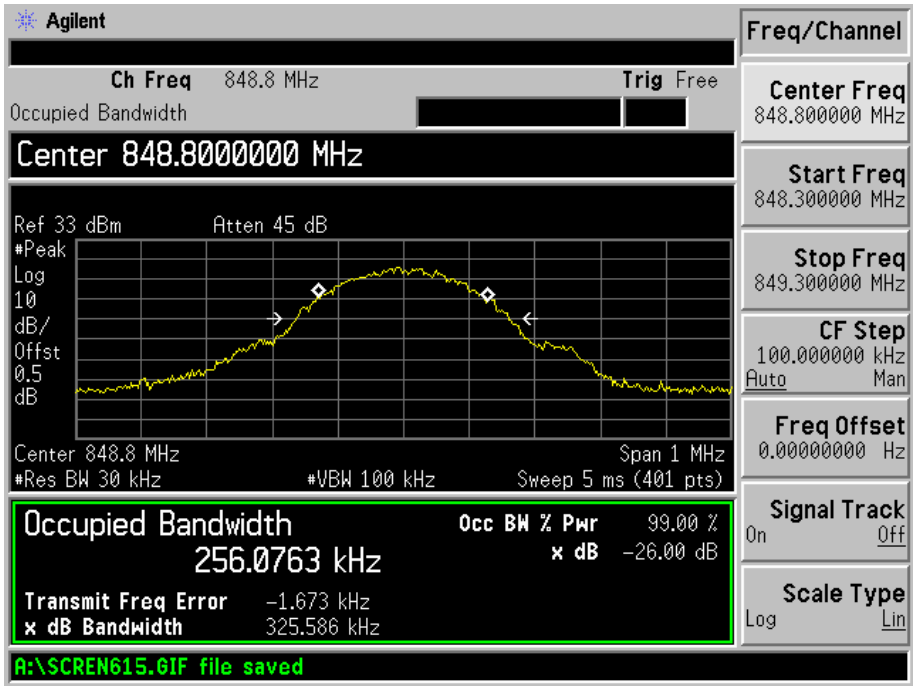
EDGE Low Channel



EDGE Middle Channel

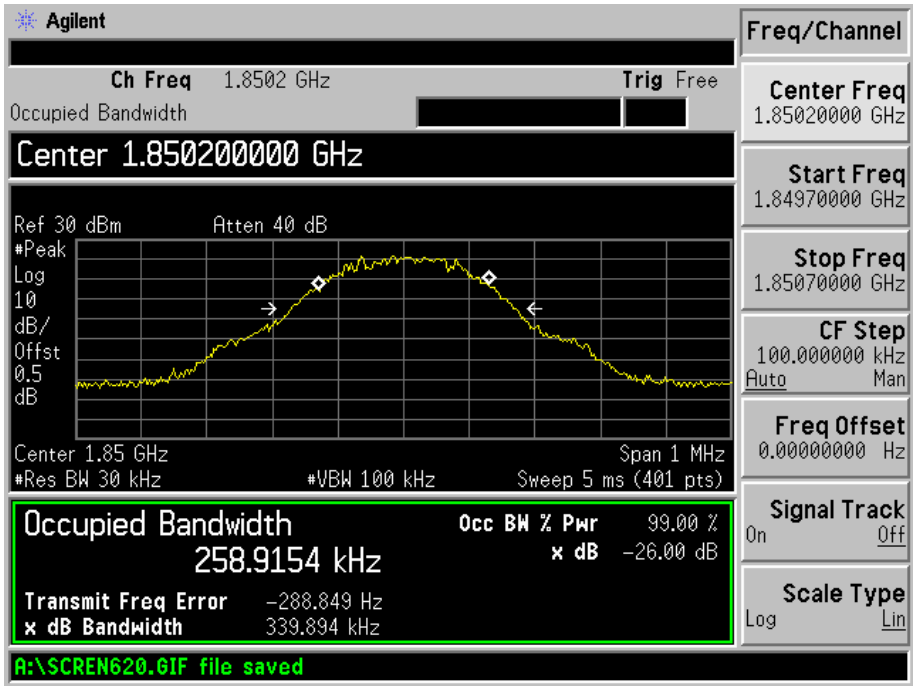


EDGE High Channel

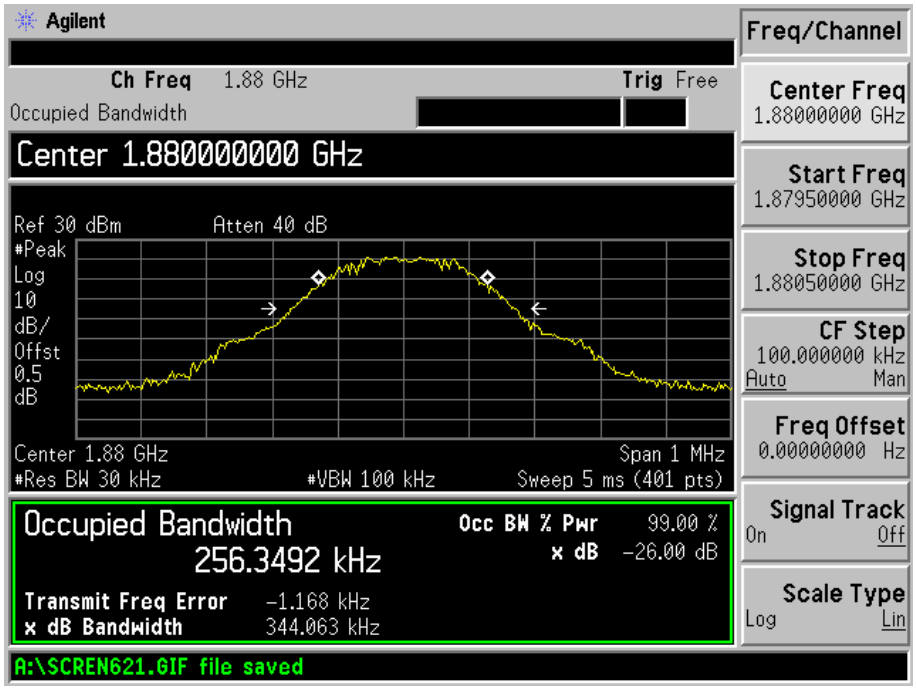


For PCS Band

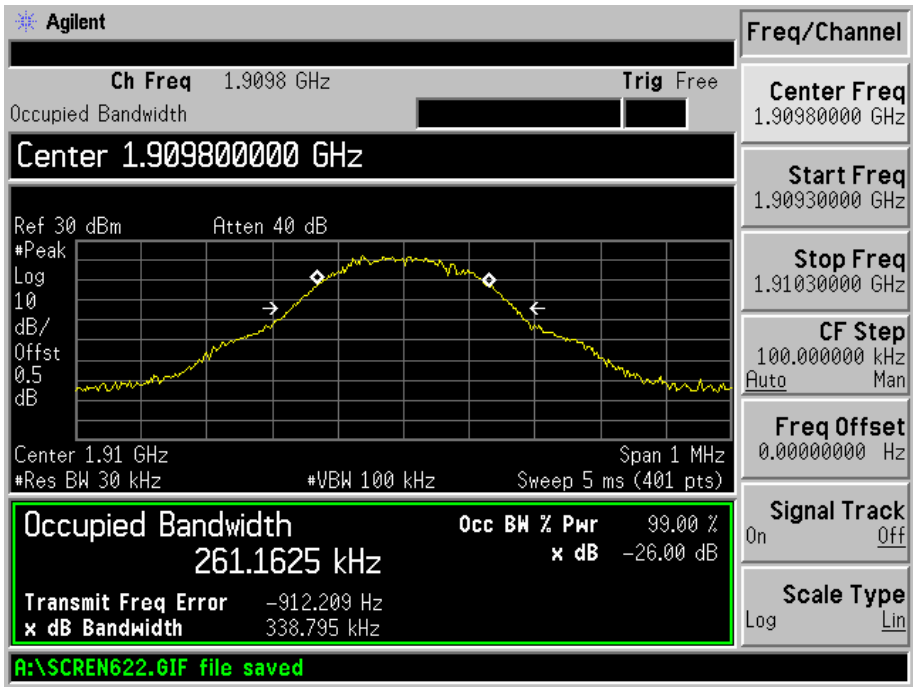
GSM Low Channel



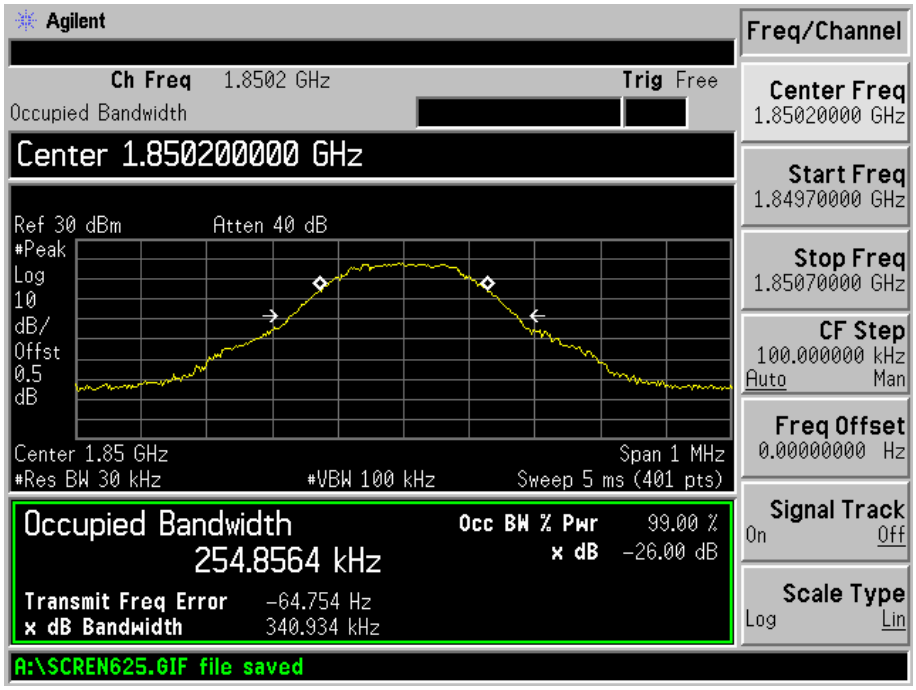
GSM Middle Channel



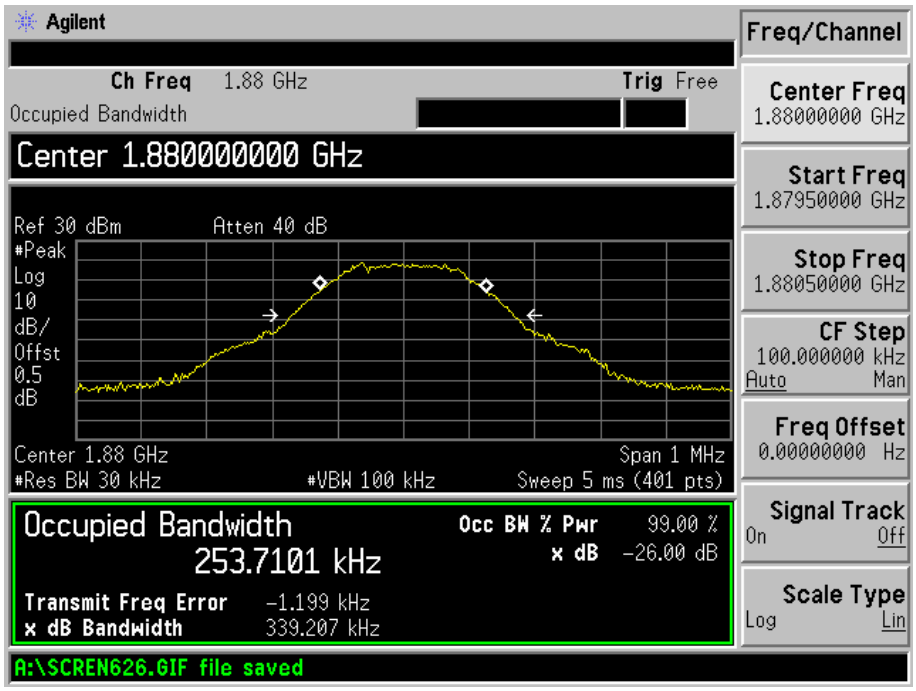
GSM High channel



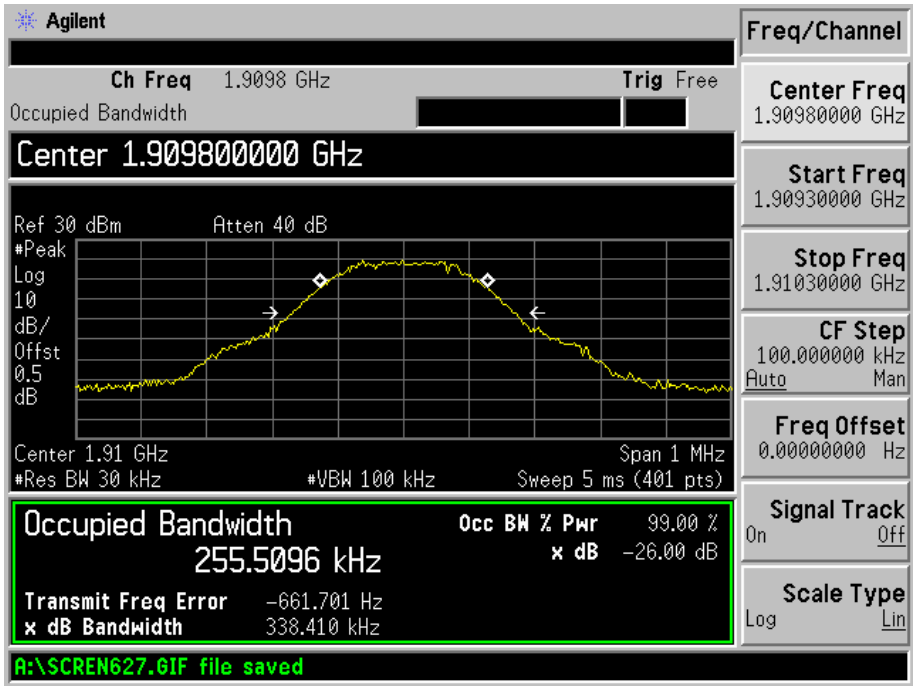
GPRS Low Channel



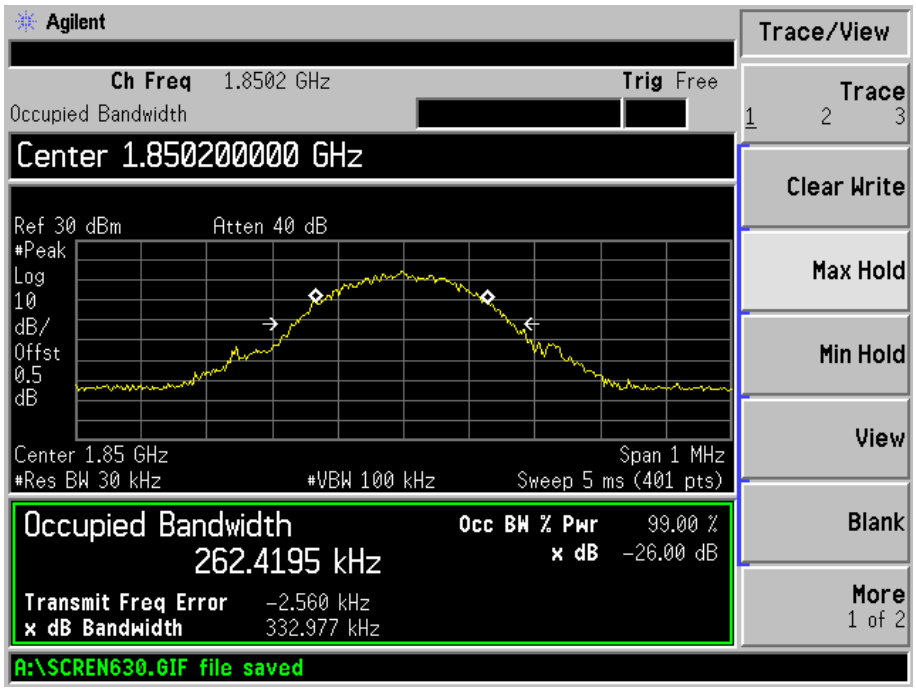
GPRS Middle Channel



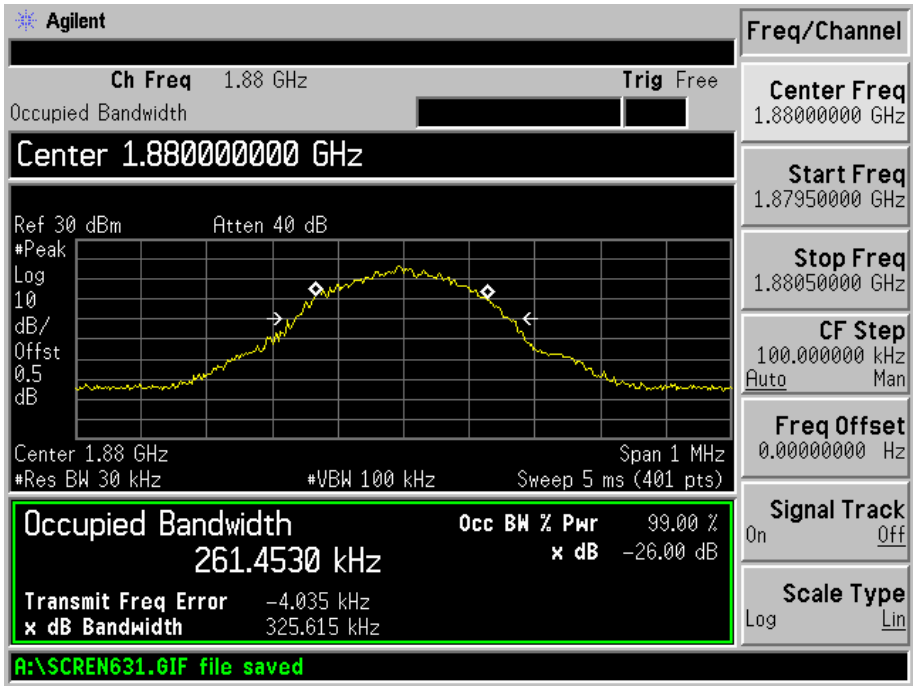
GPRS High Channel



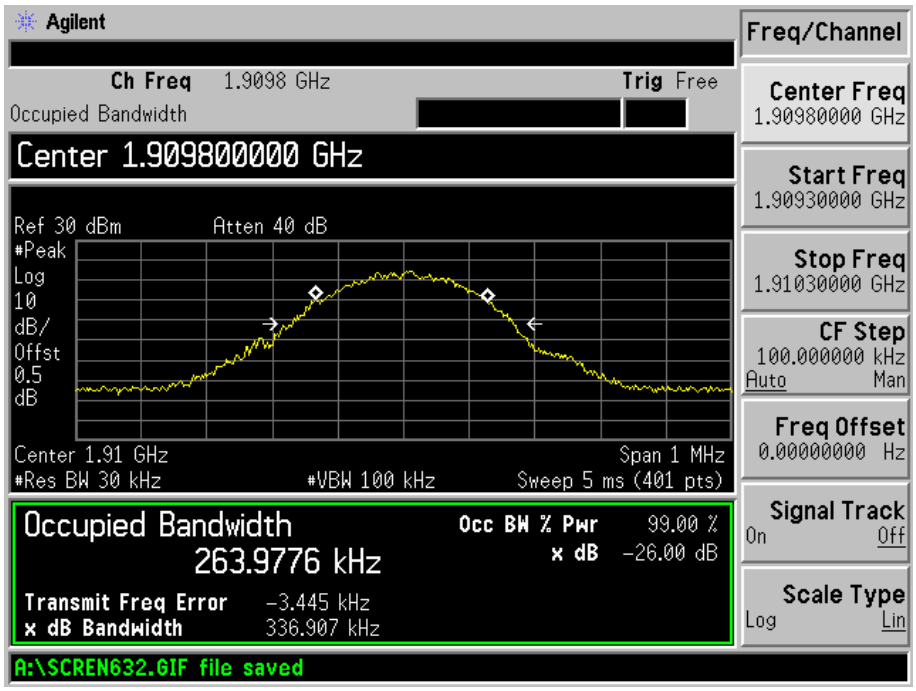
EDGE Low Channel



EDGE Middle Channel

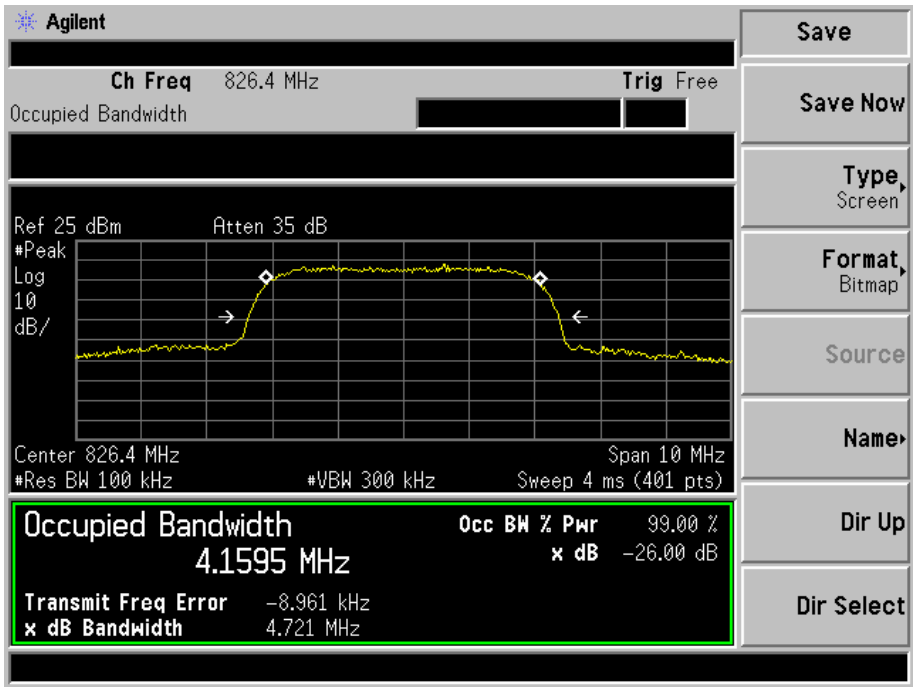


EDGE High Channel

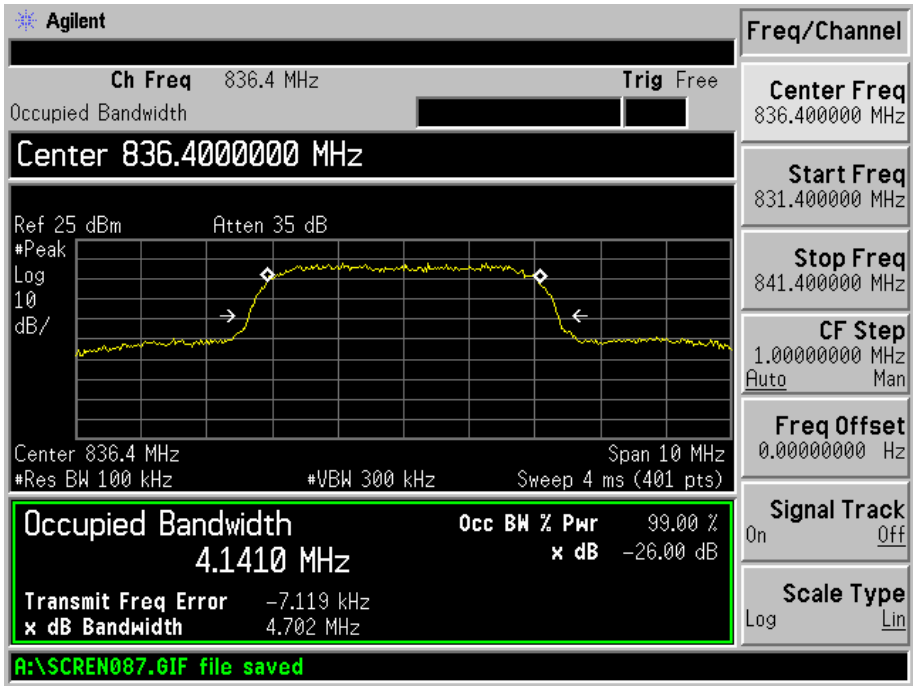


For Band V

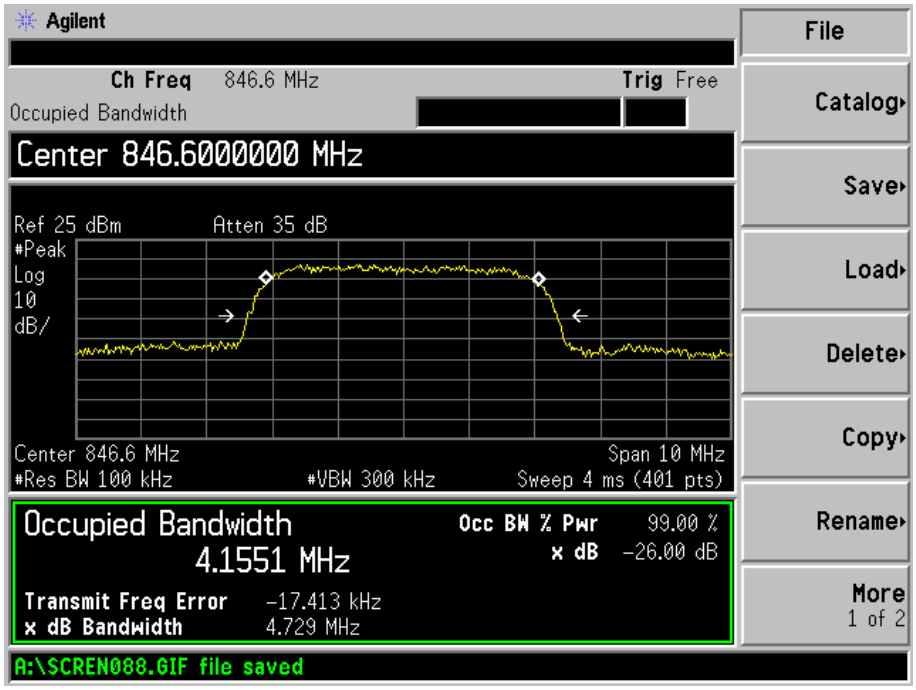
WCDMA Low Channel



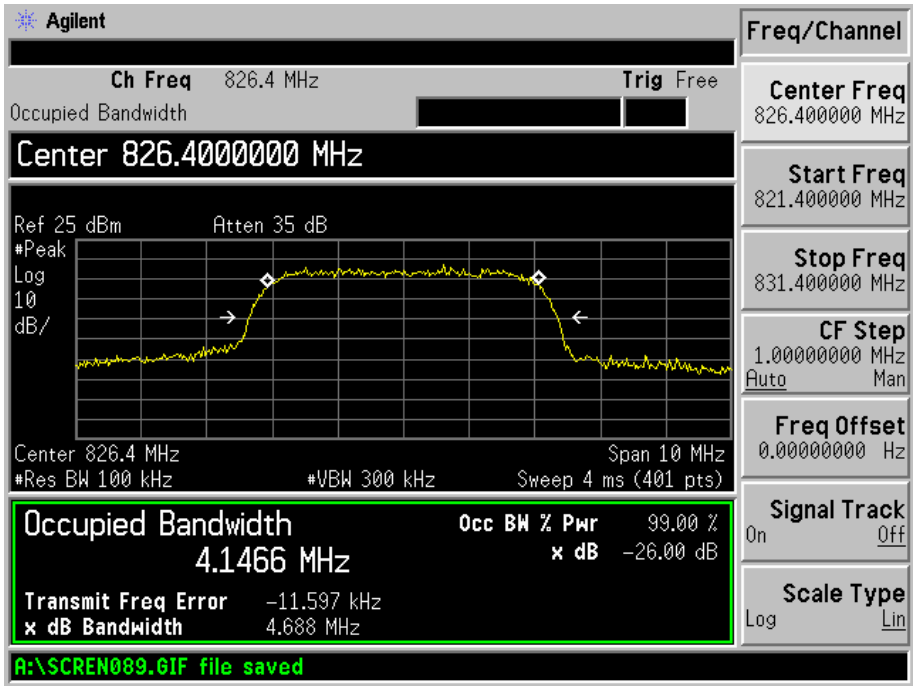
WCDMA Middle Channel



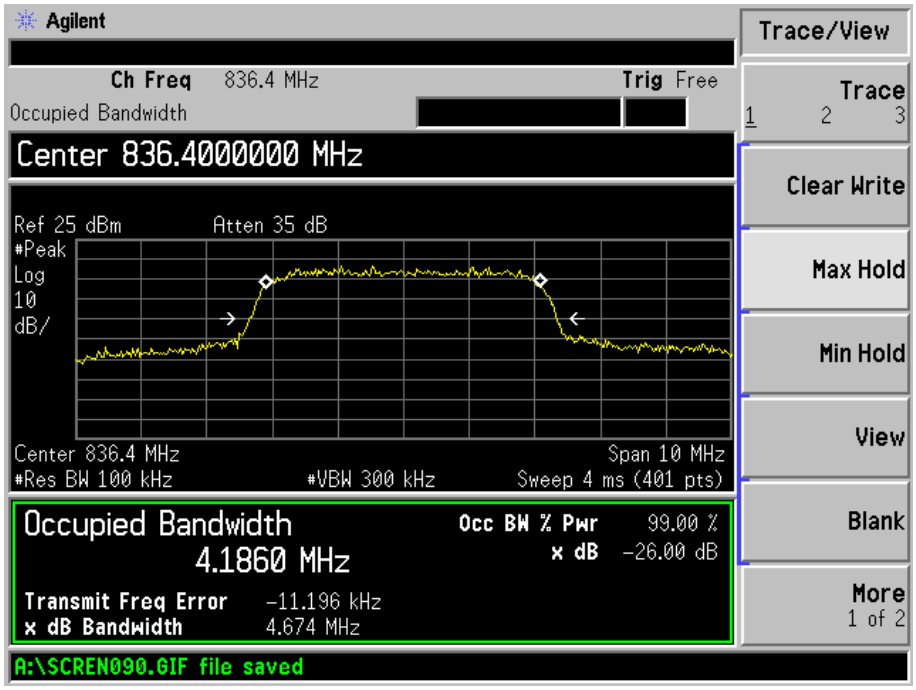
WCDMA High Channel



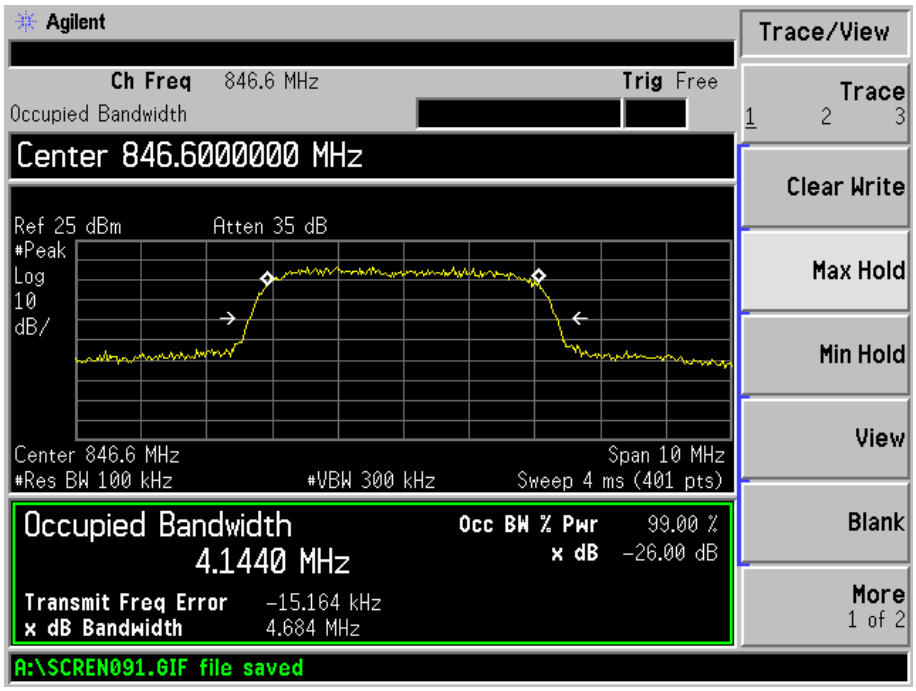
HSDPA Low Channel



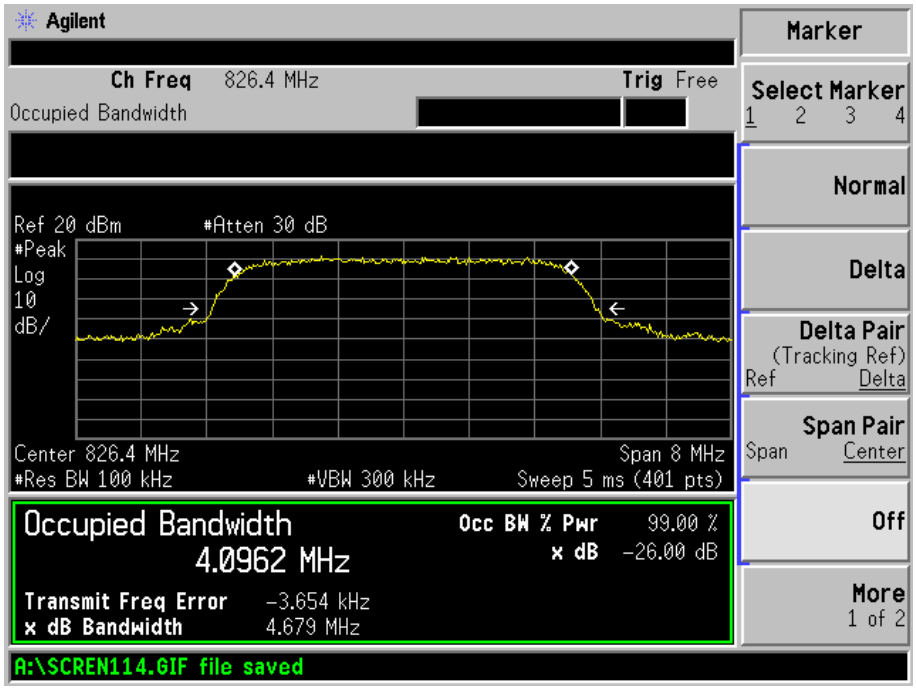
HSDPA Middle Channel



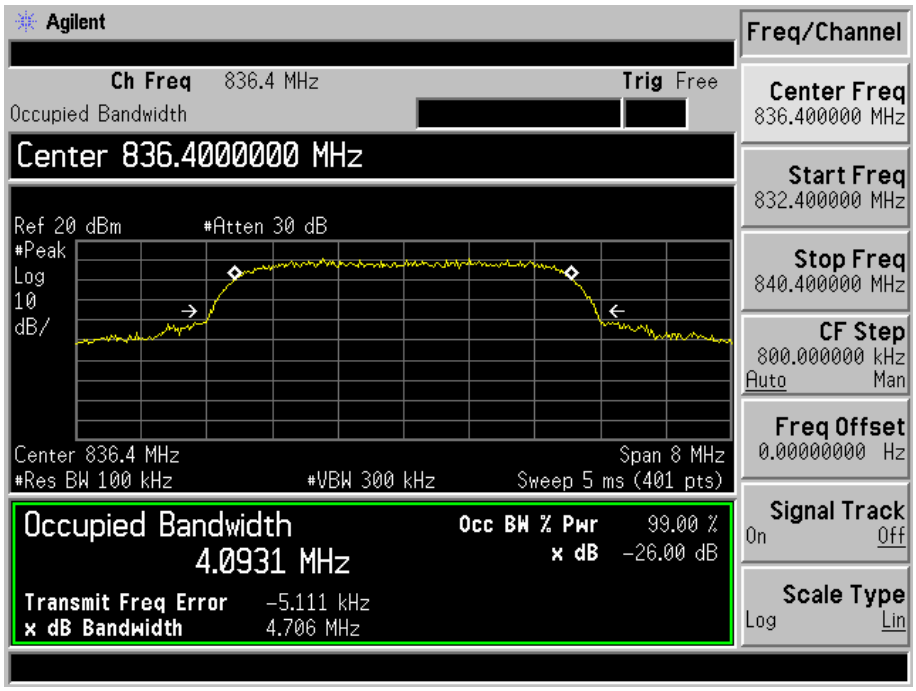
HSDPA High Channel



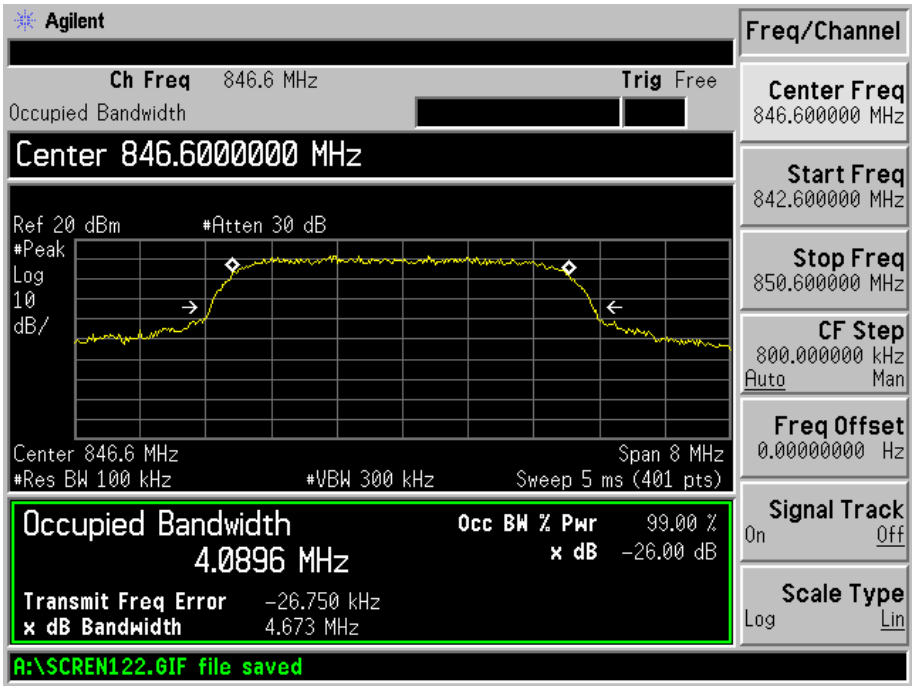
HSUPA Low Channel



HSUPA Middle Channel



HSUPA High Channel



7. Out of Band Emissions at Antenna Terminal

7.1 Standard Applicable

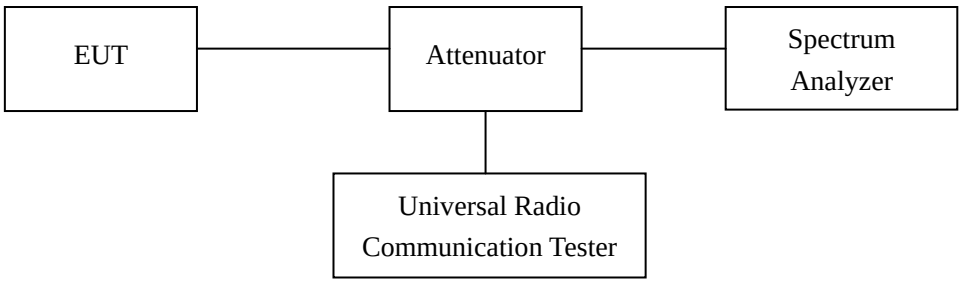
According to §22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

7.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 100kHz and 1MHz for the scan frequency from 30MHz to 1GHz and the scan frequency from 1GHz to up to 10^{th} harmonic.

Test Configuration for the out of band emissions testing:



7.3 Environmental Conditions

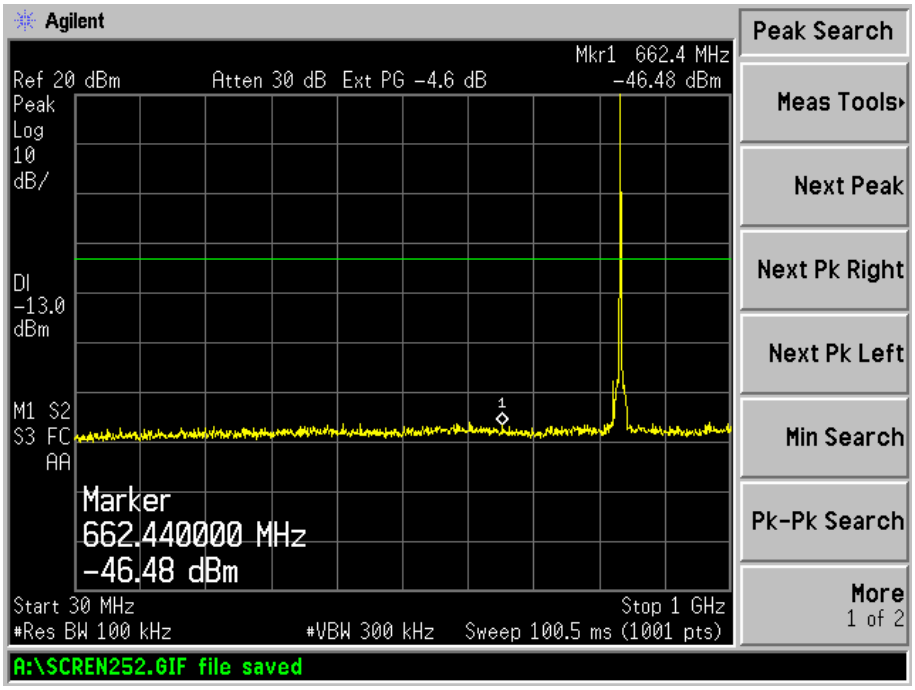
Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

7.4 Summary of Test Results/Plots

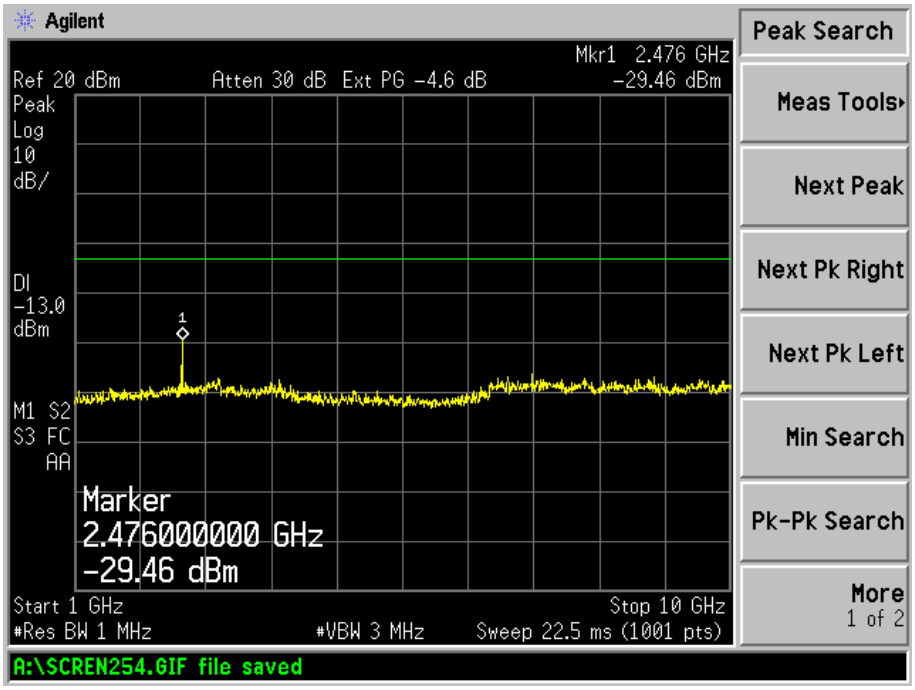
Please refer to the following test plots, please refer to the following test plots; Emission from 9kHz to 30MHz is attenuated more than 20dB below the permissible limits, so the data is not display.

For Cellular Band

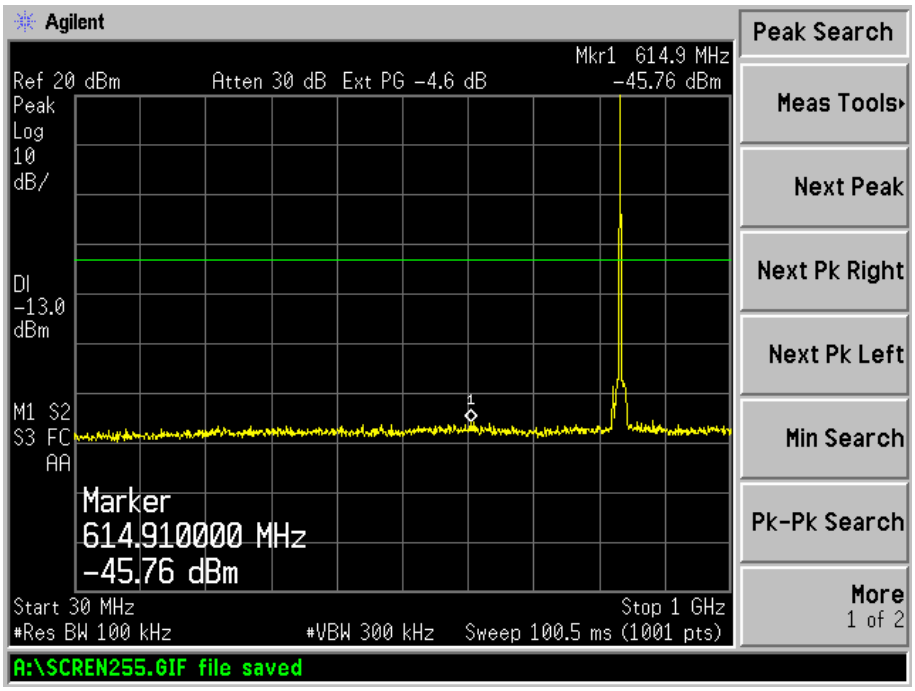
GSM Low Channel 30MHz to 1GHz



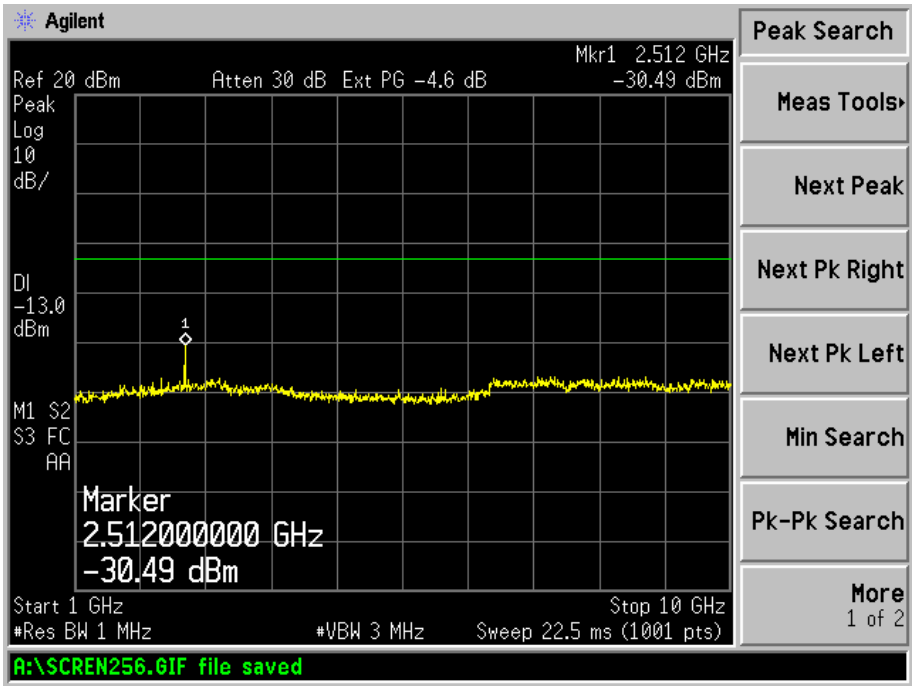
Above 1GHz



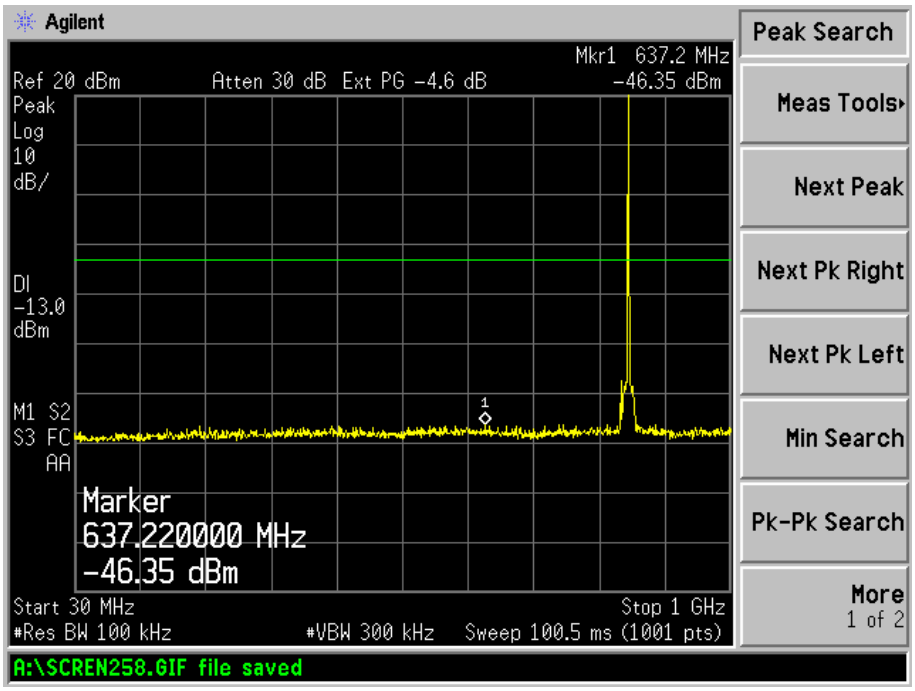
GSM Middle Channel
30MHz to 1GHz



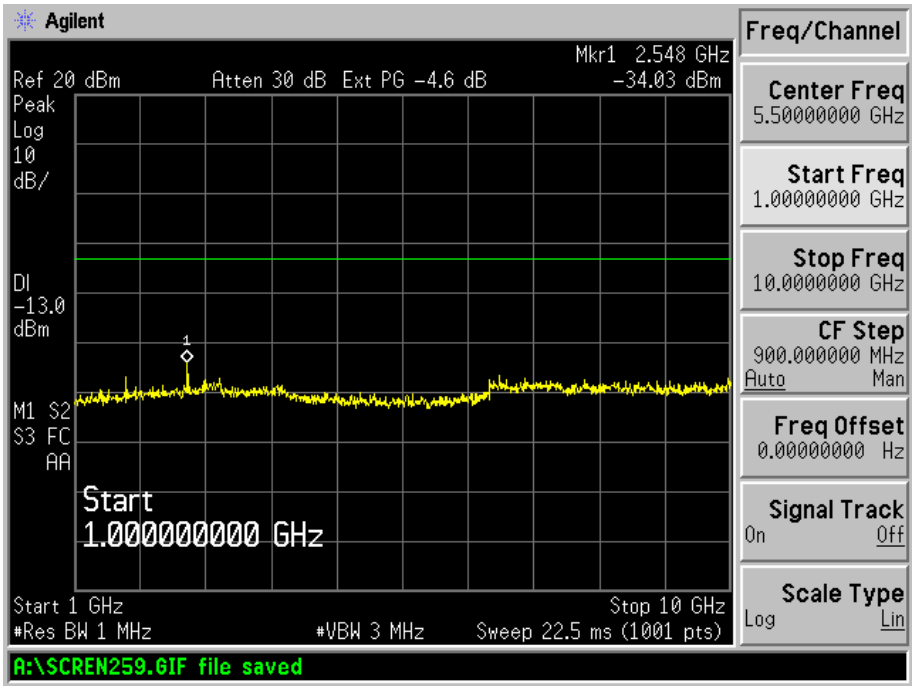
Above 1GHz



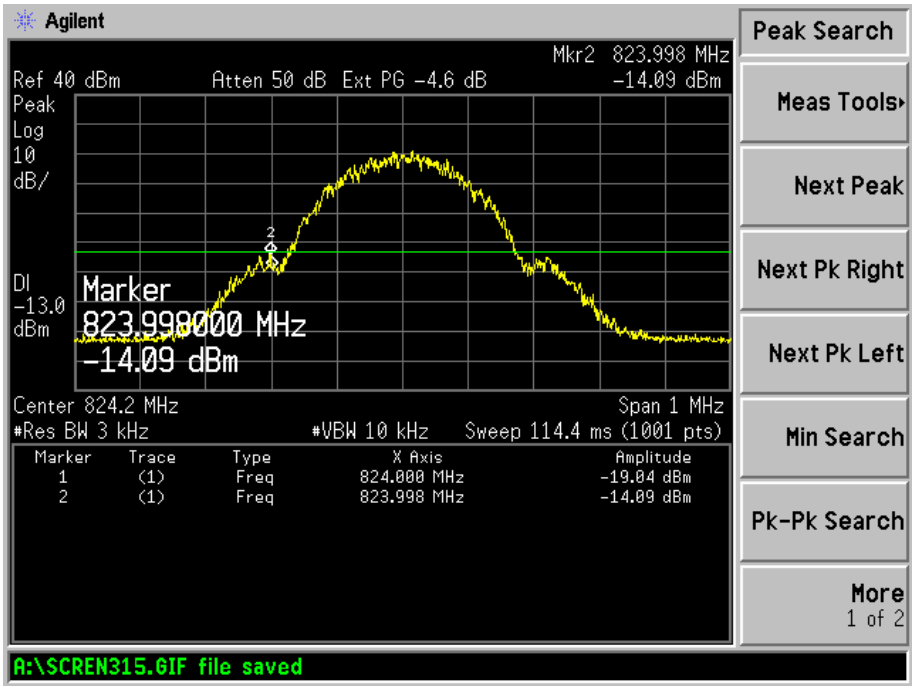
GSM High Channel
30MHz to 1GHz



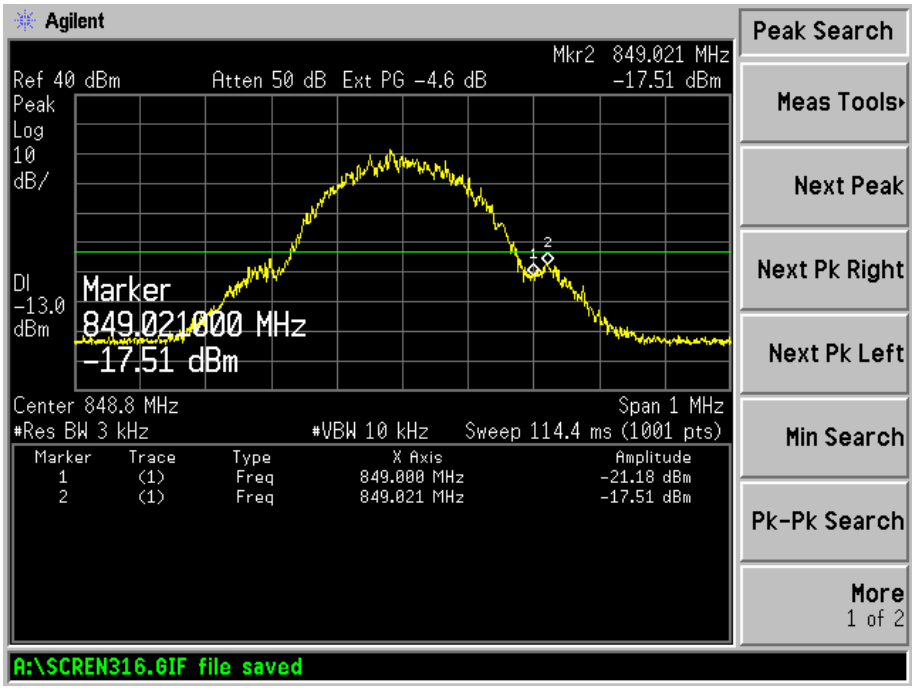
Above 1GHz



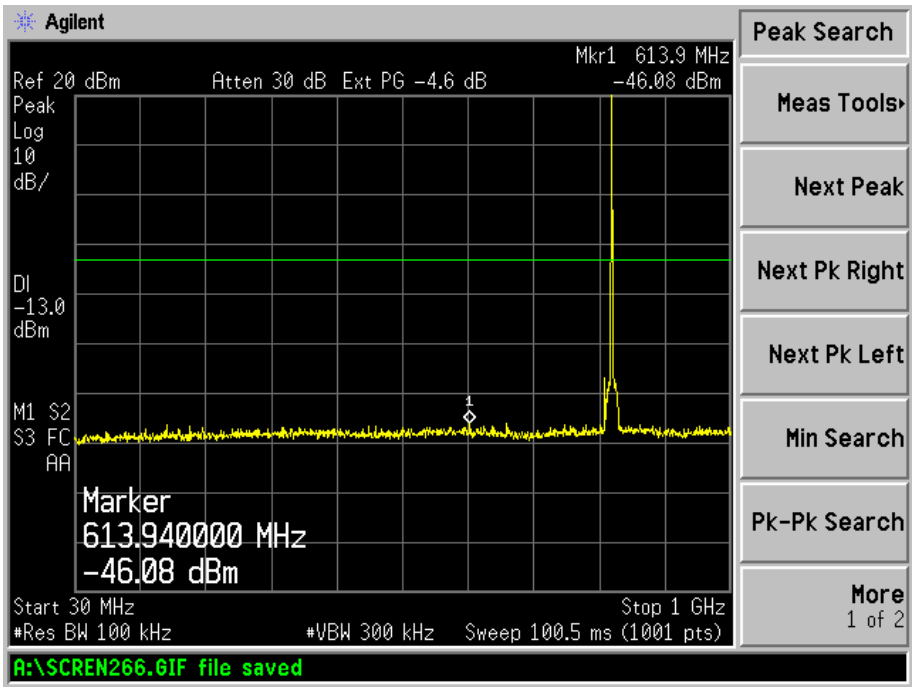
GSM Low Band Emission



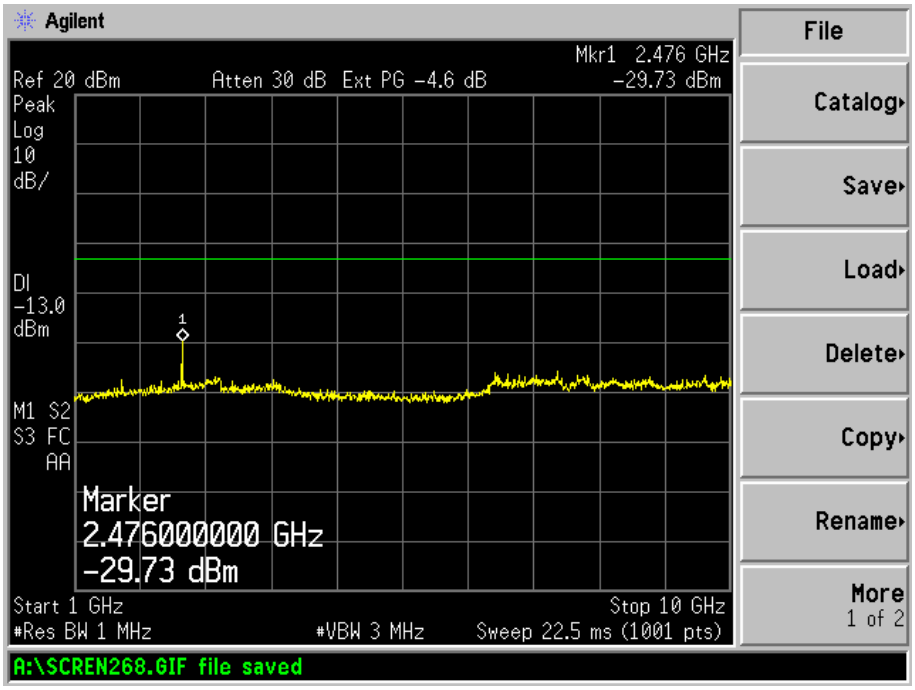
GSM High Band Emission



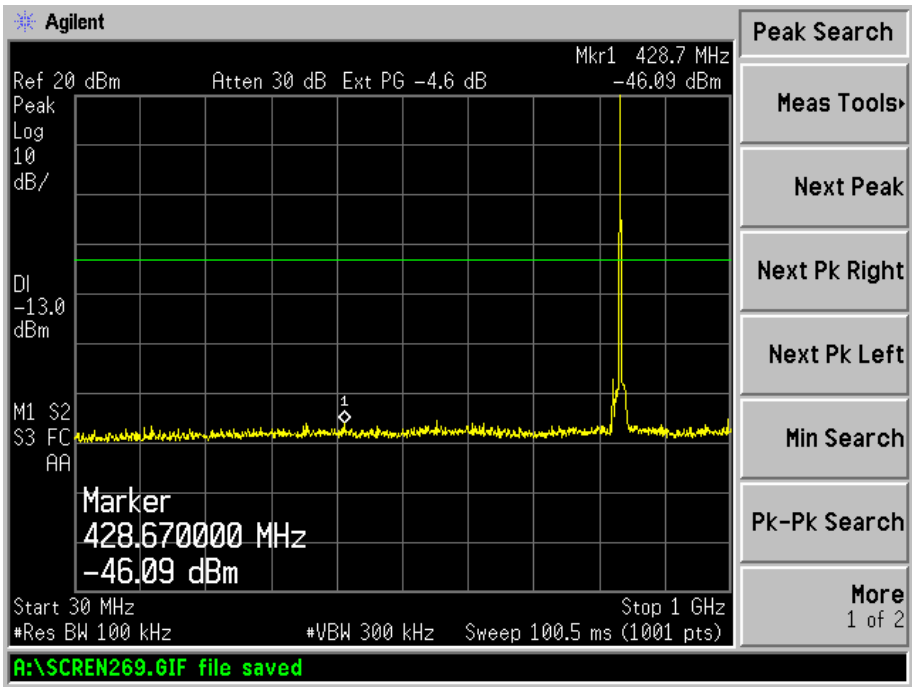
GPRS Low Channel
30MHz to 1GHz



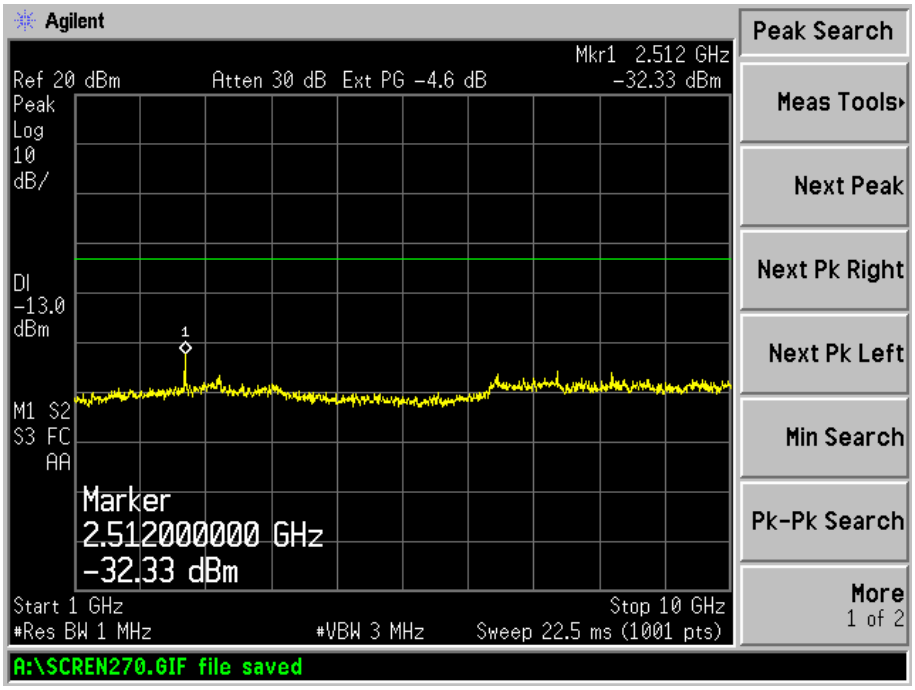
Above 1GHz



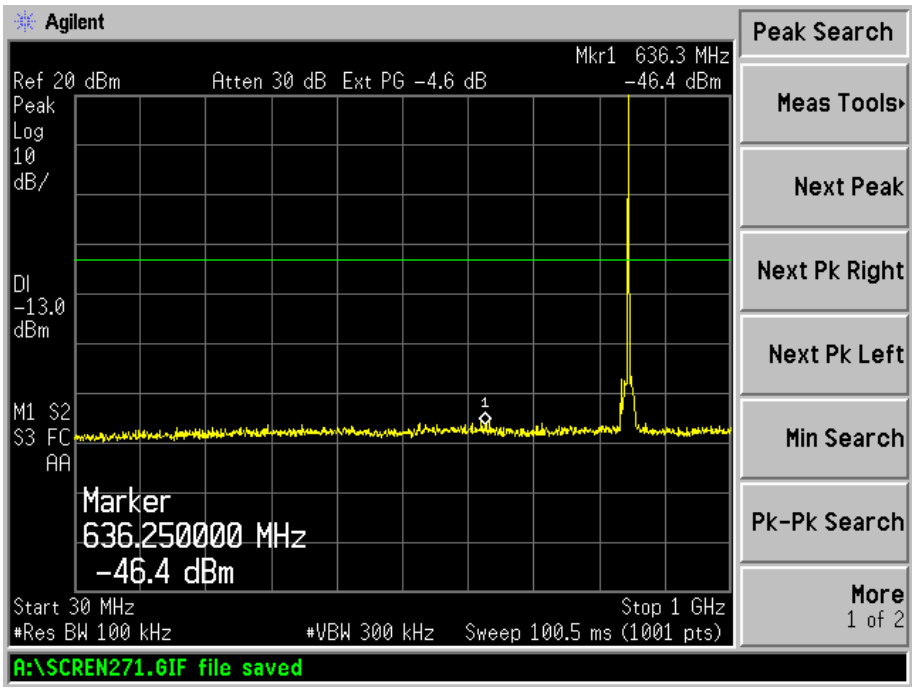
GPRS Middle Channel
30MHz to 1GHz



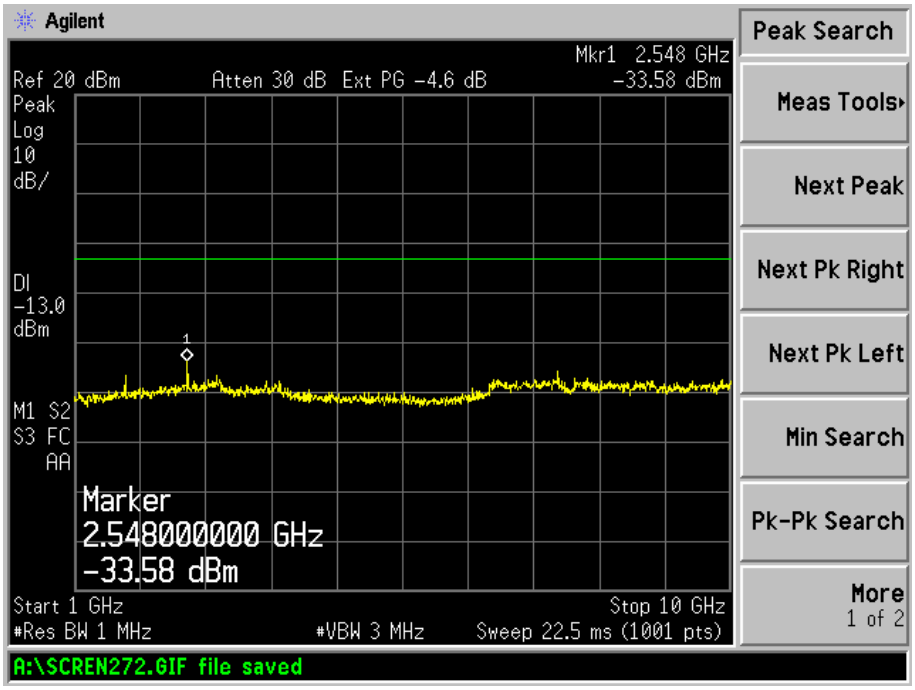
Above 1GHz



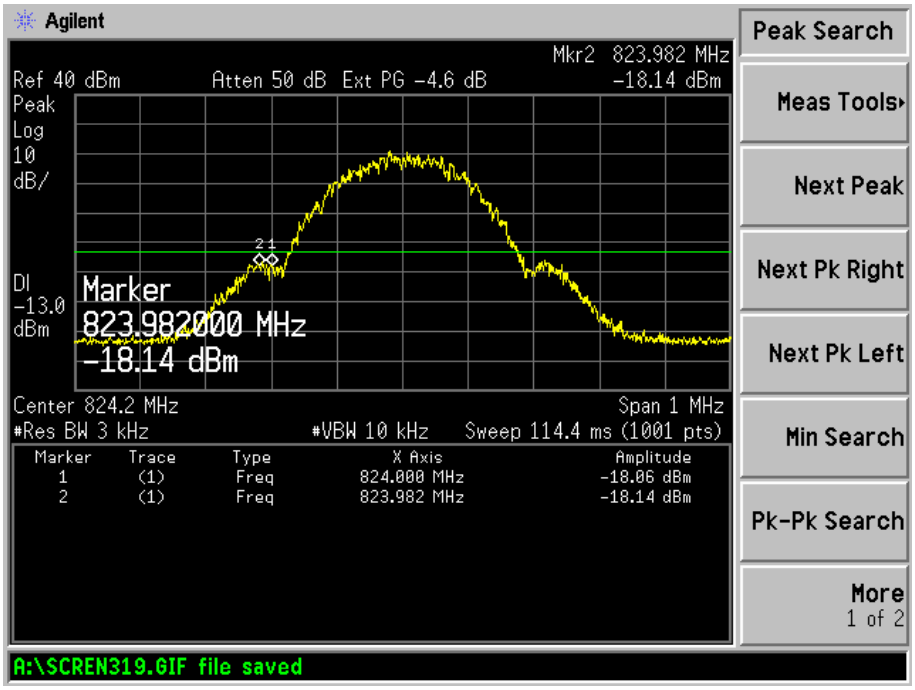
GPRS High Channel
30MHz to 1GHz



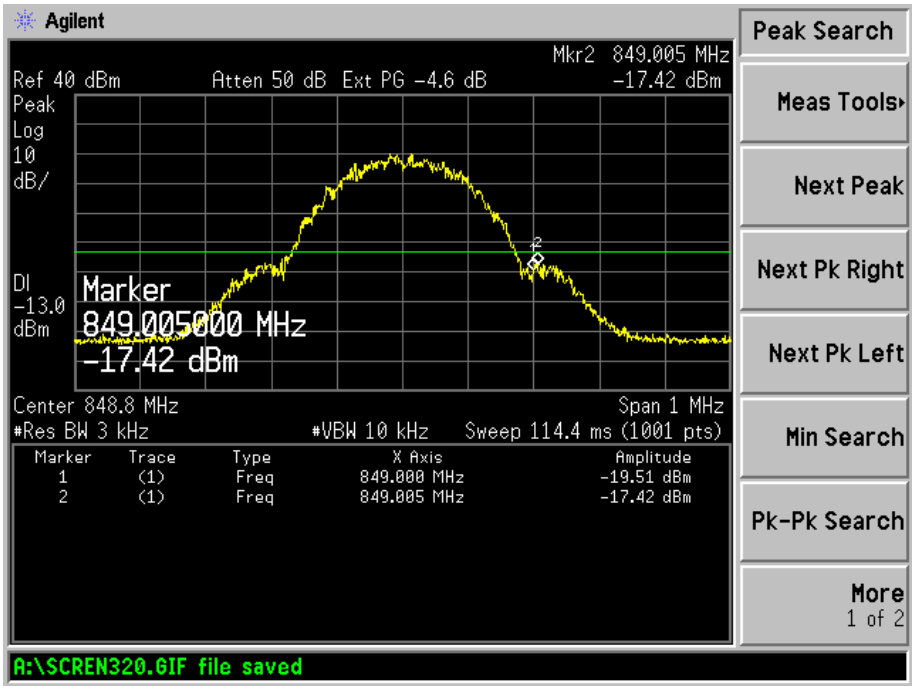
Above 1GHz



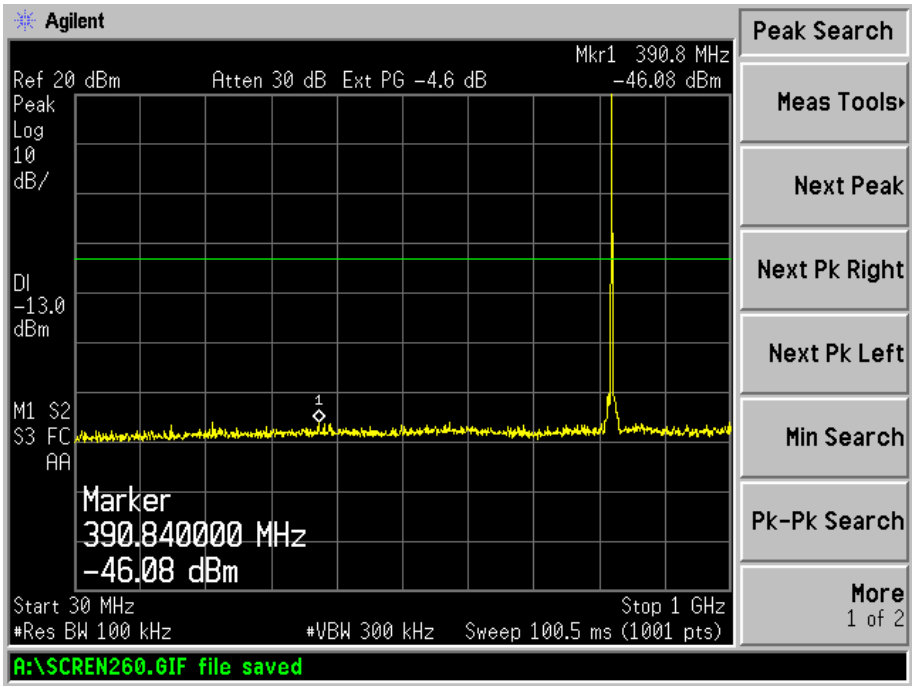
GPRS Low Band Emission



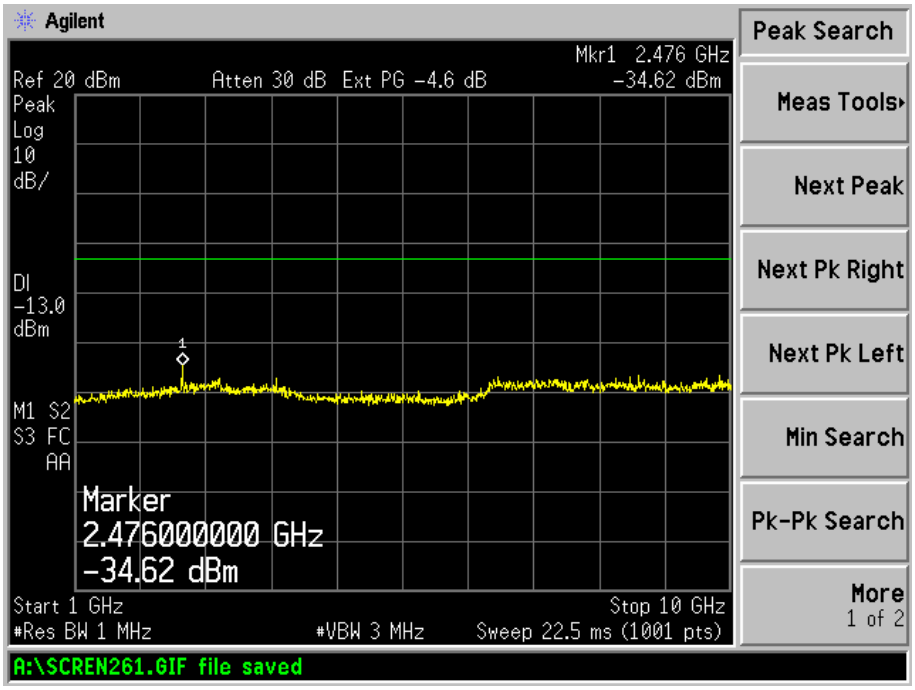
GPRS High Band Emission



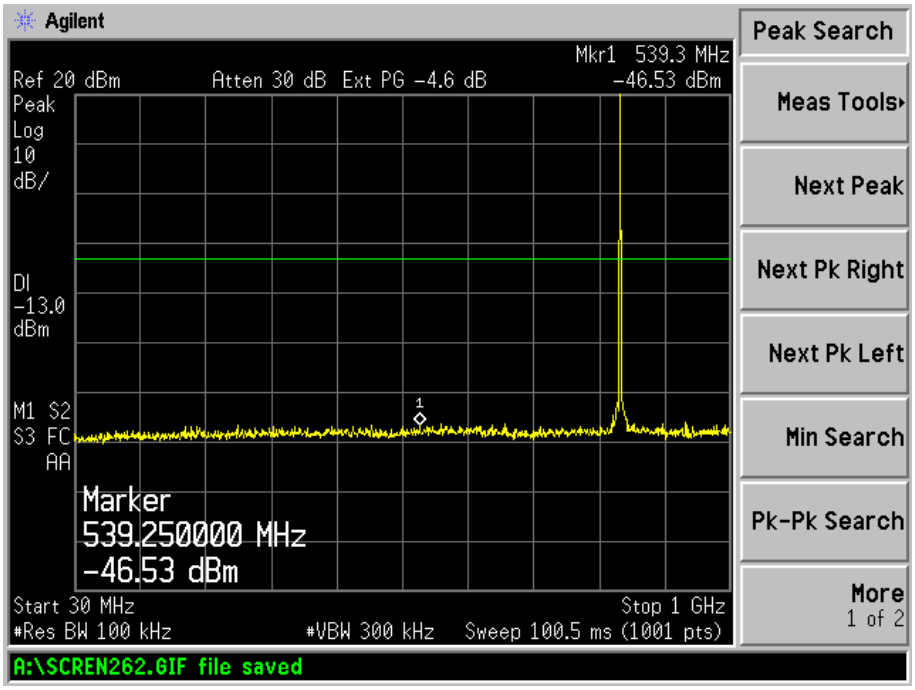
EDGE Low Channel



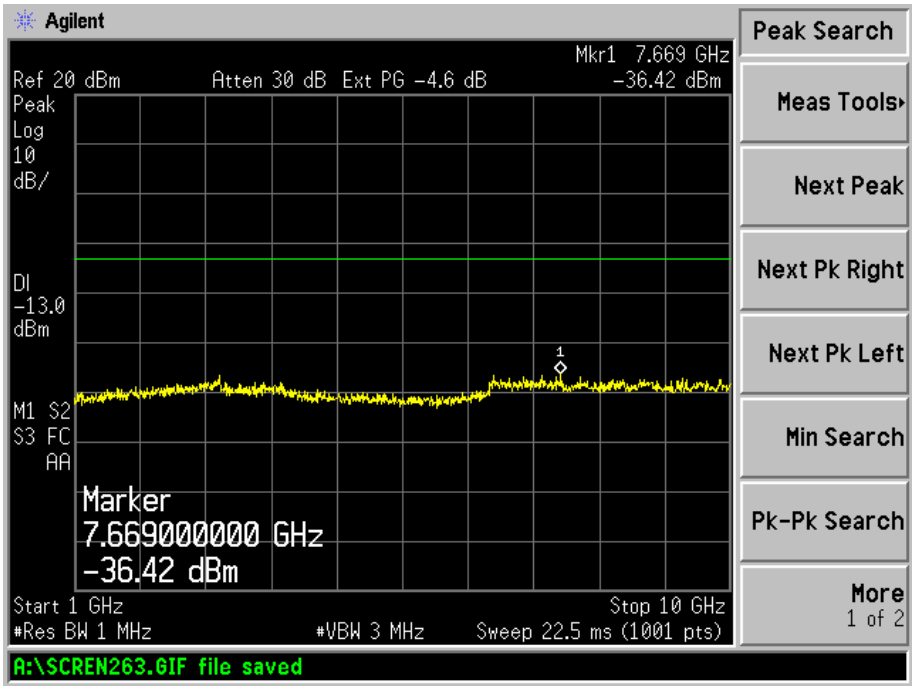
Above 1GHz



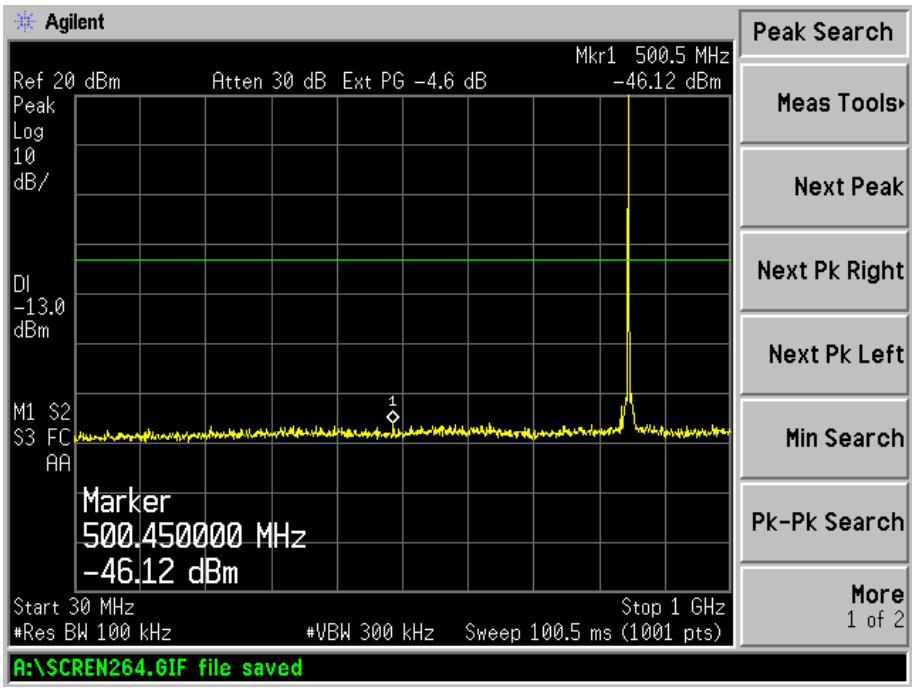
EDGE Middle Channel



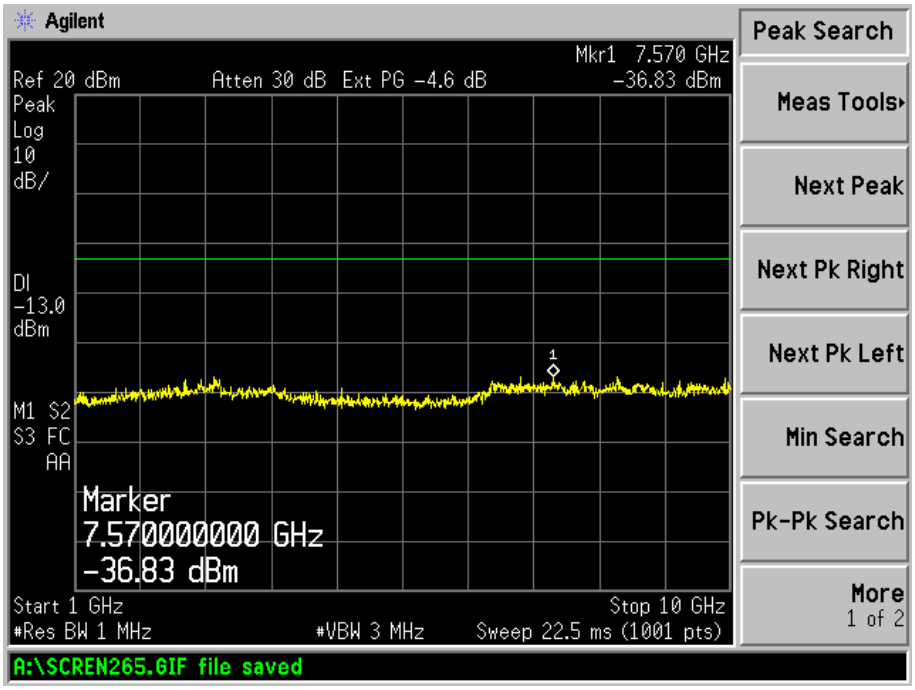
Above 1GHz



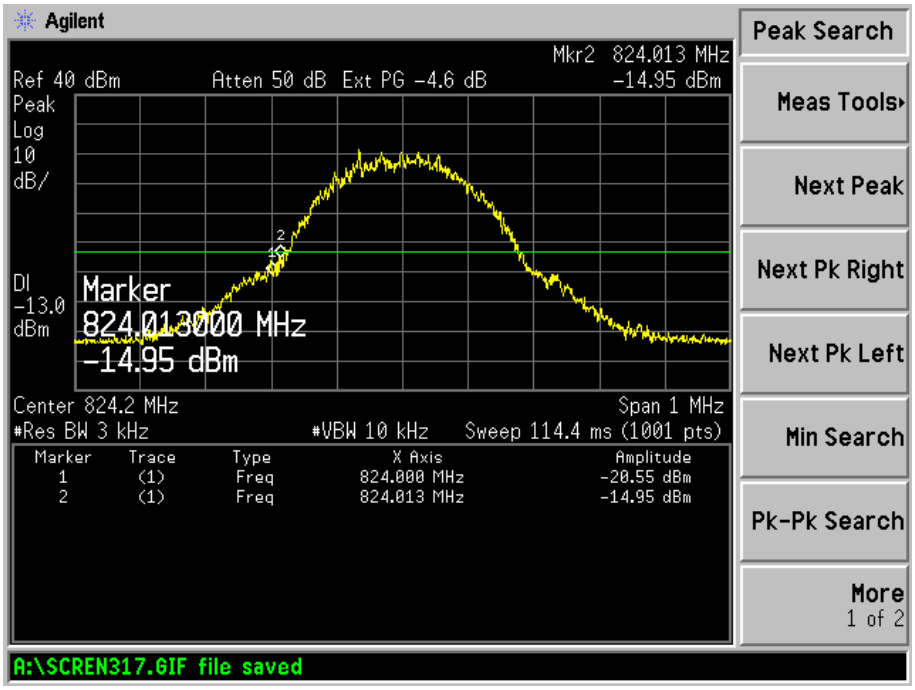
EDGE High Channel



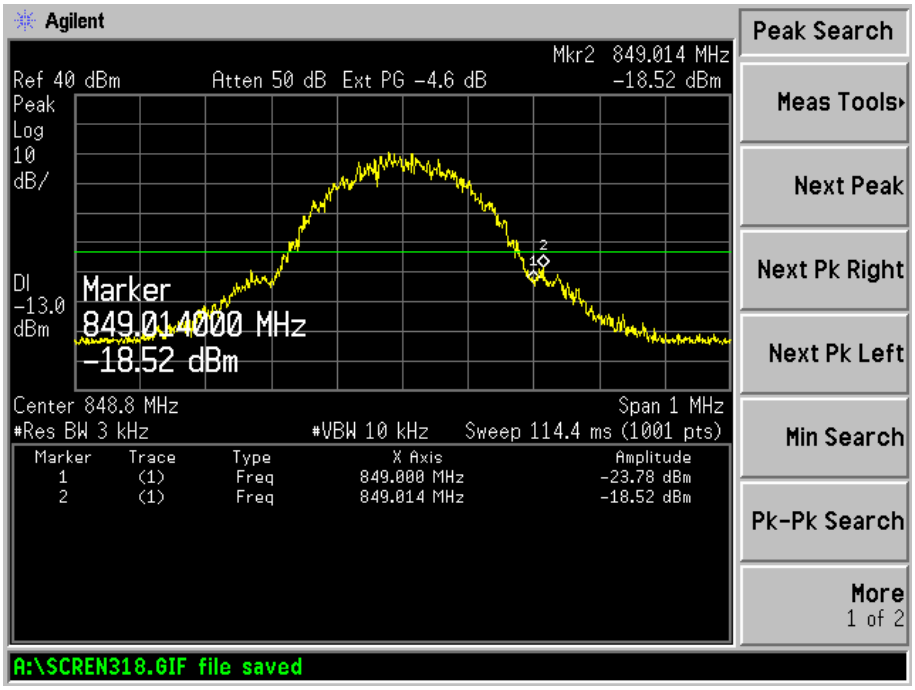
Above 1GHz



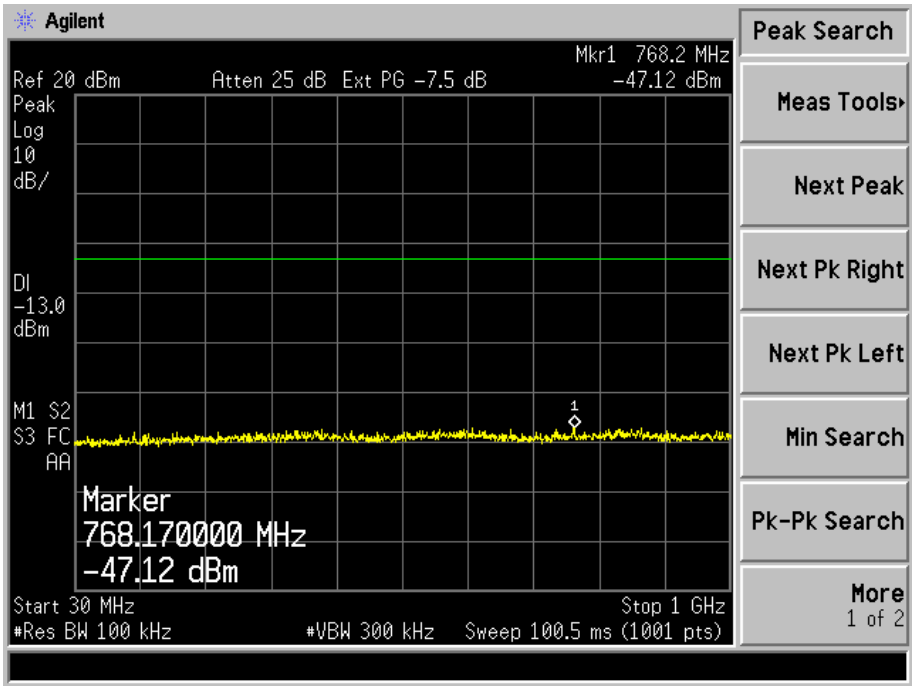
EDGE Low Band Emission



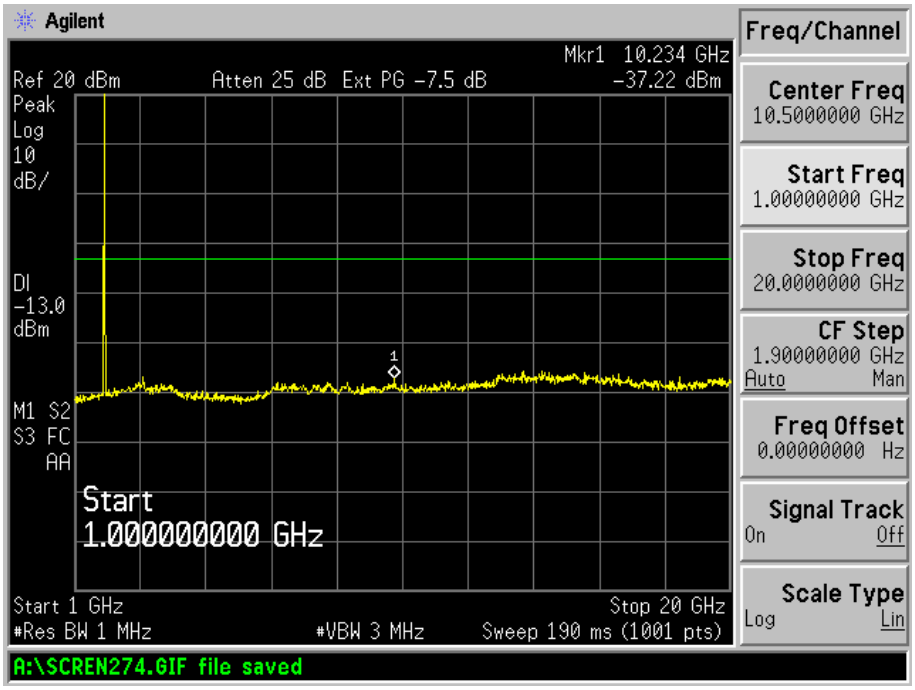
EDGE High Band Emission



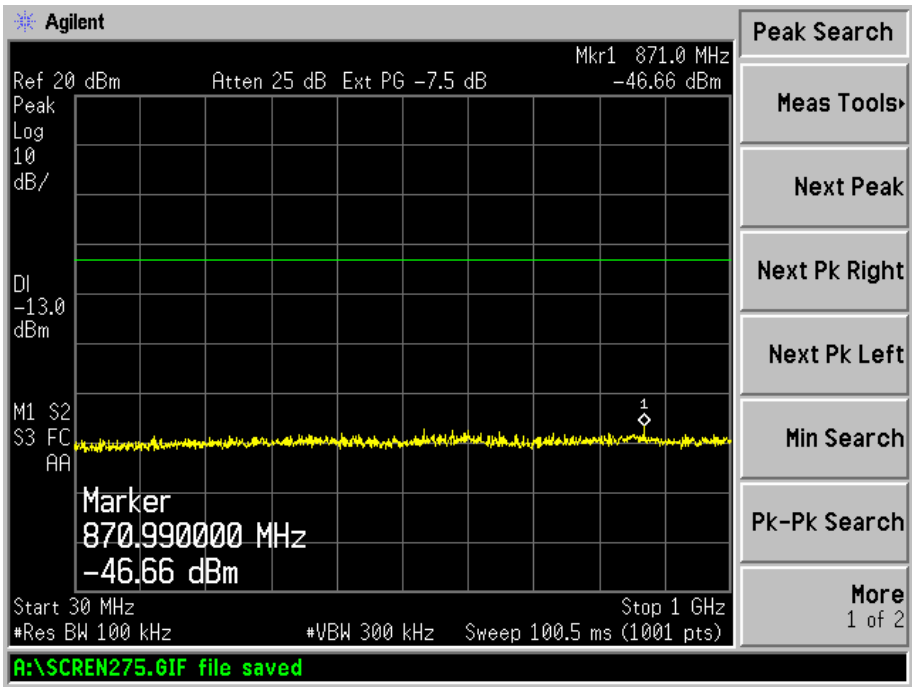
For PCS Band
GSM Low Channel
30MHz to 1GHz



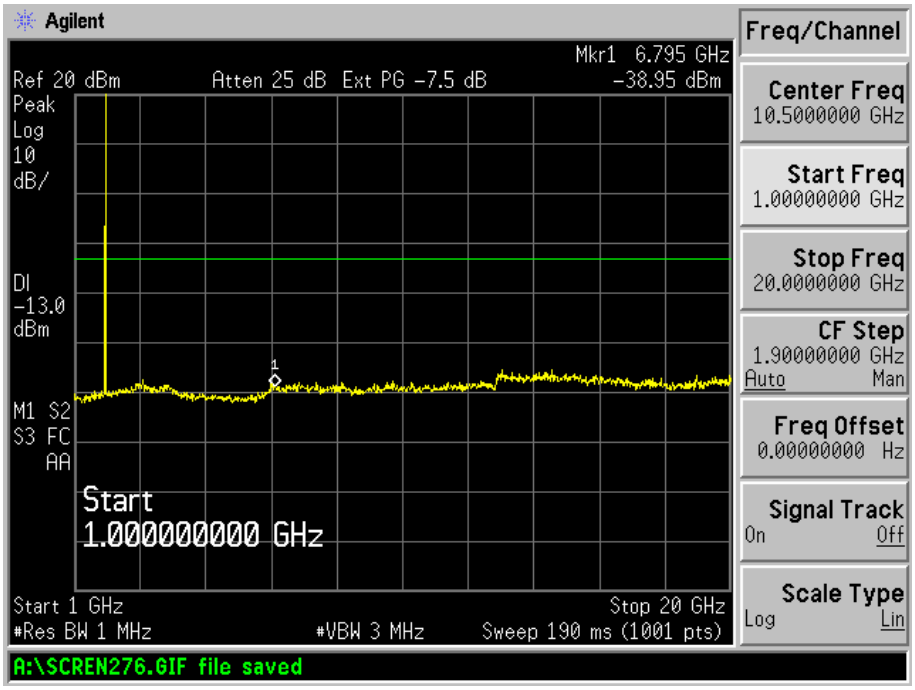
Above 1GHz



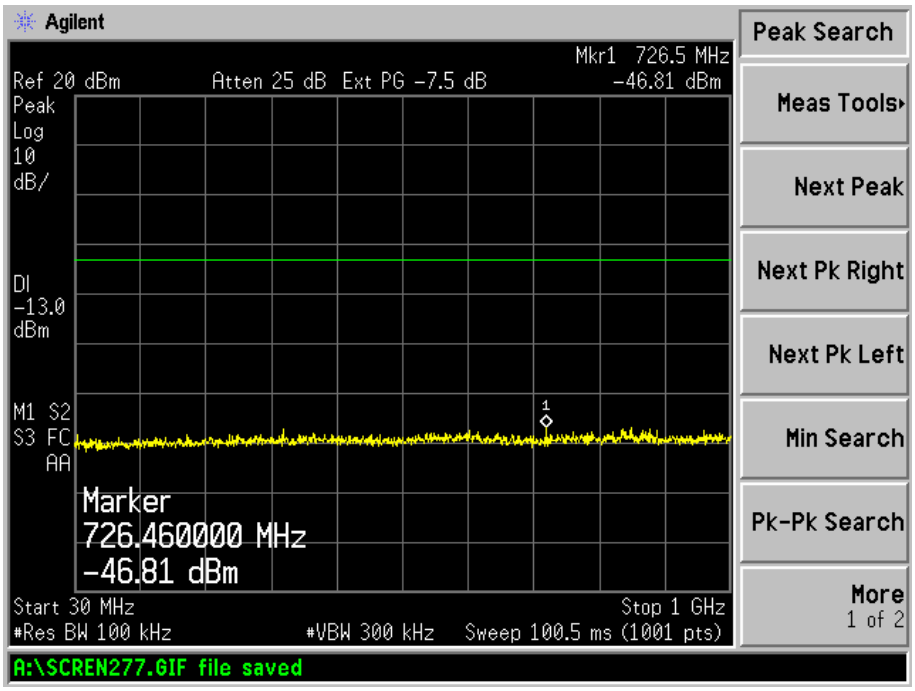
GSM Middle Channel
30MHz to 1GHz



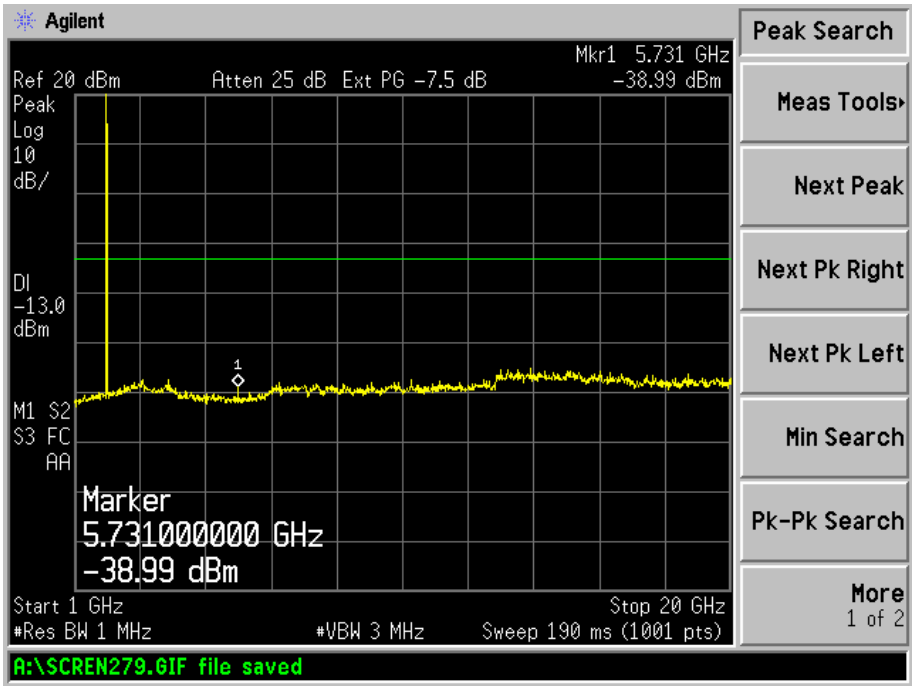
Above 1GHz



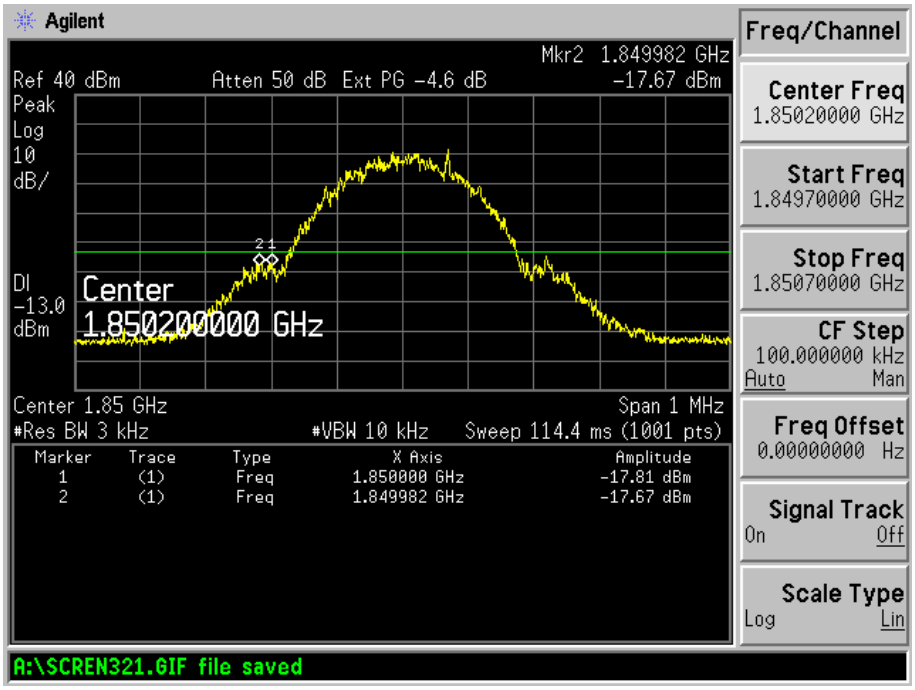
GSM High Channel
30MHz to 1GHz



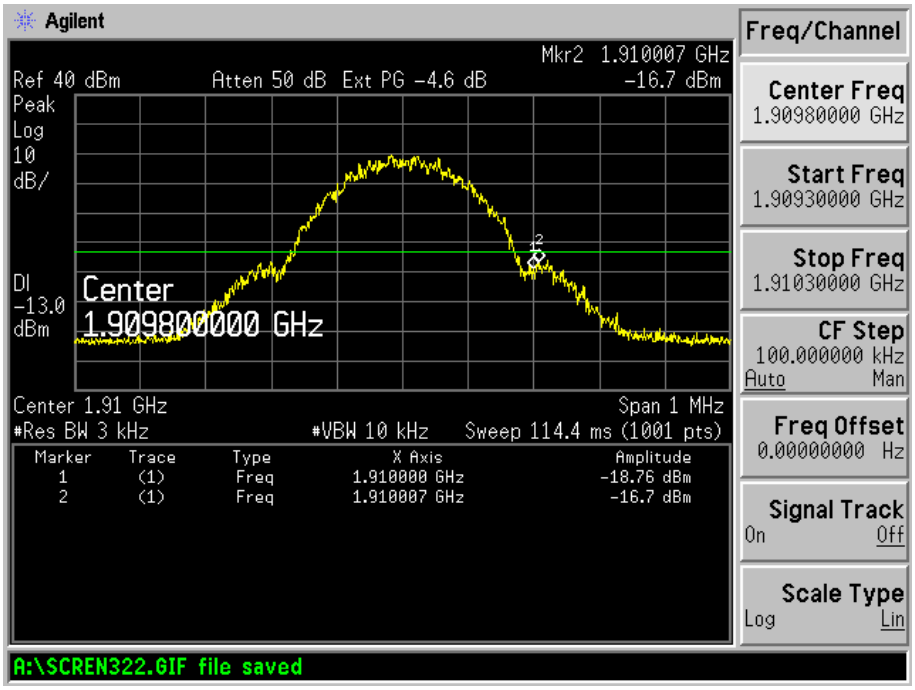
Above 1GHz



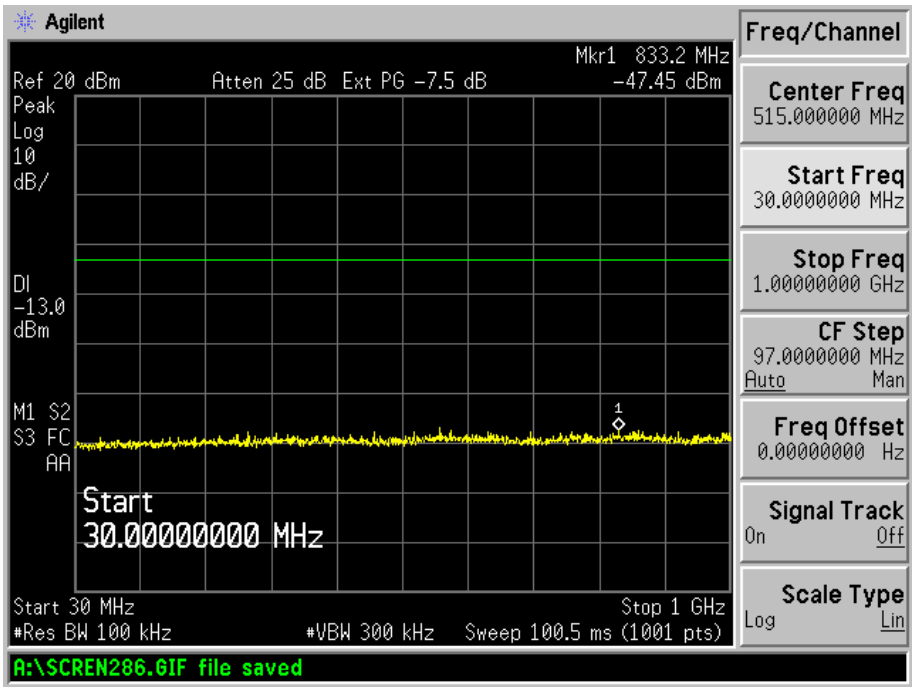
GSM Low Band Emission



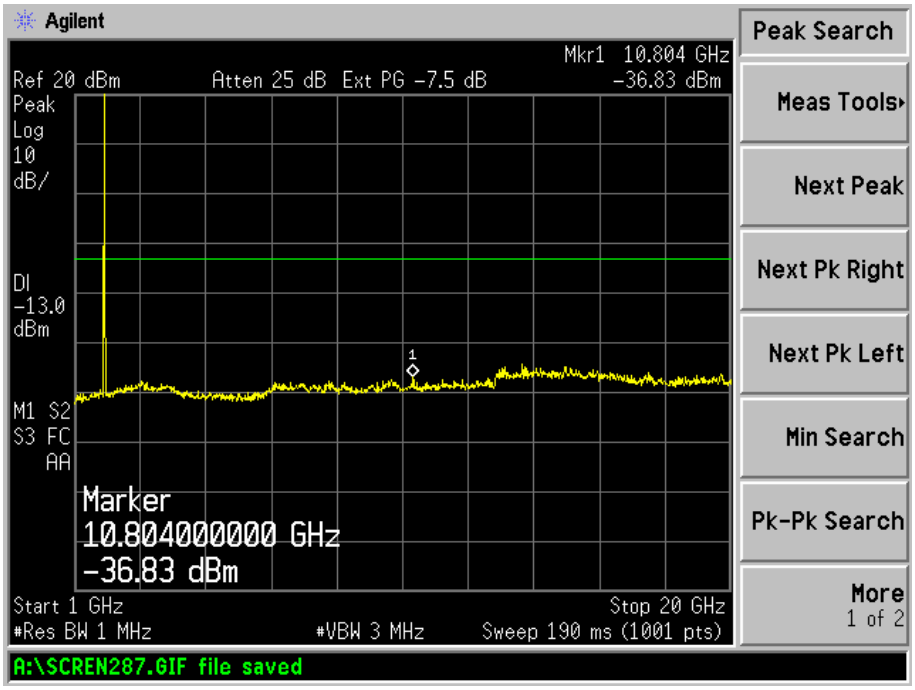
GSM High Band Emission



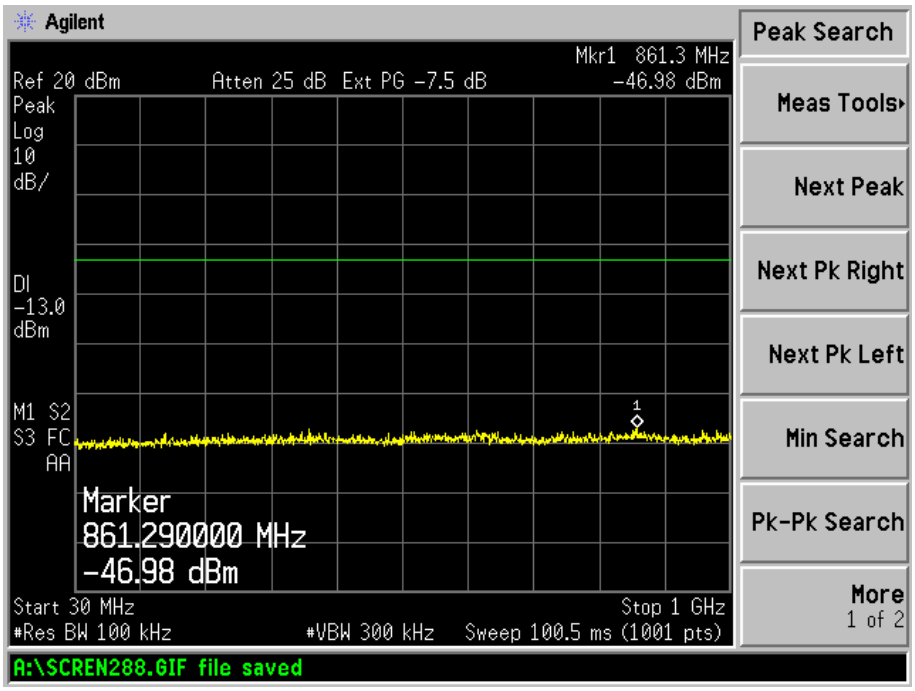
GPRS Low Channel
30MHz to 1GHz



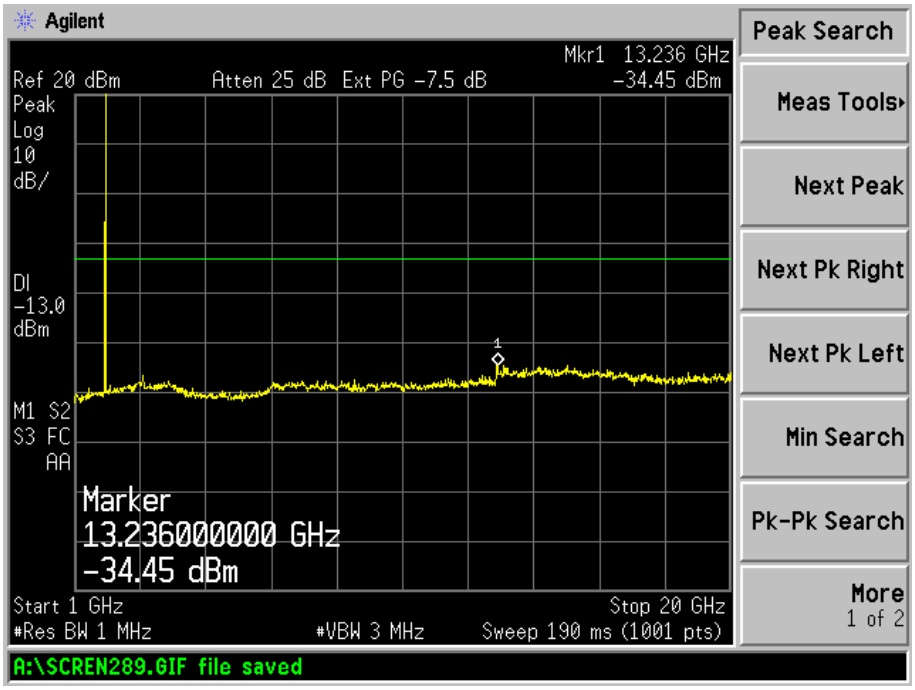
Above 1GHz



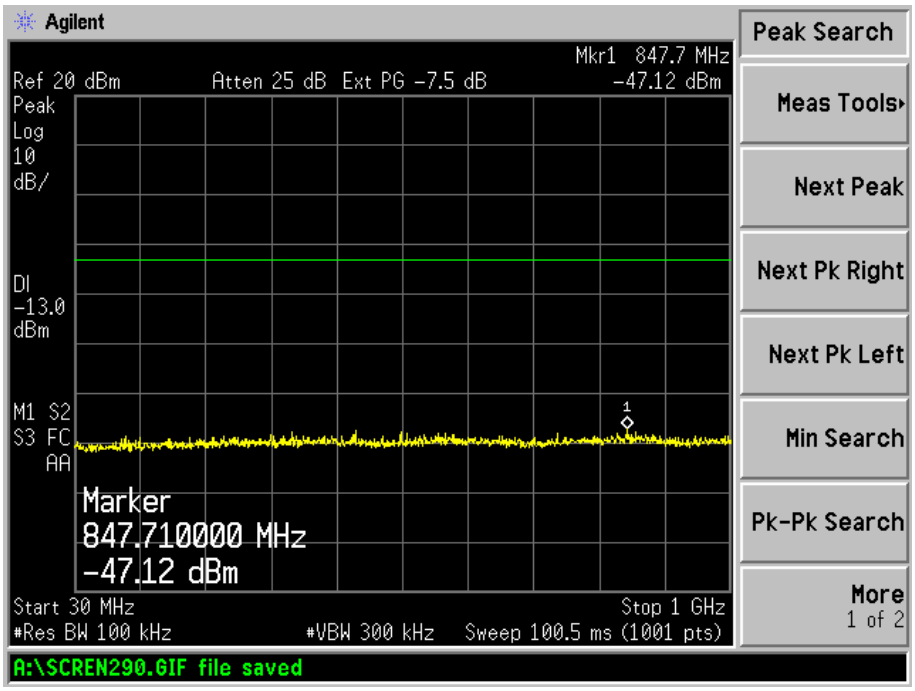
GPRS Middle Channel
30MHz to 1GHz



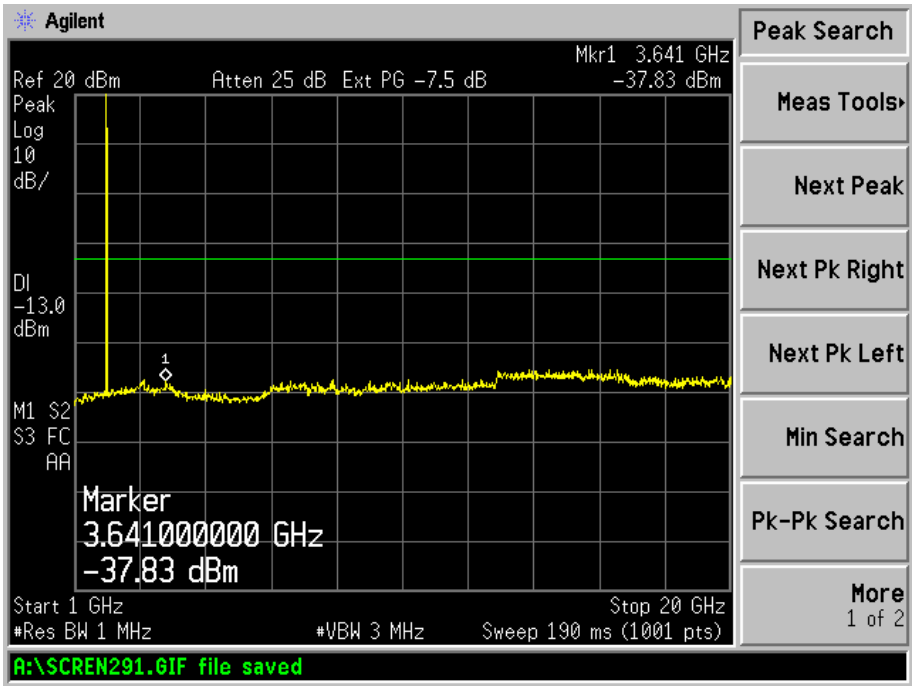
Above 1GHz



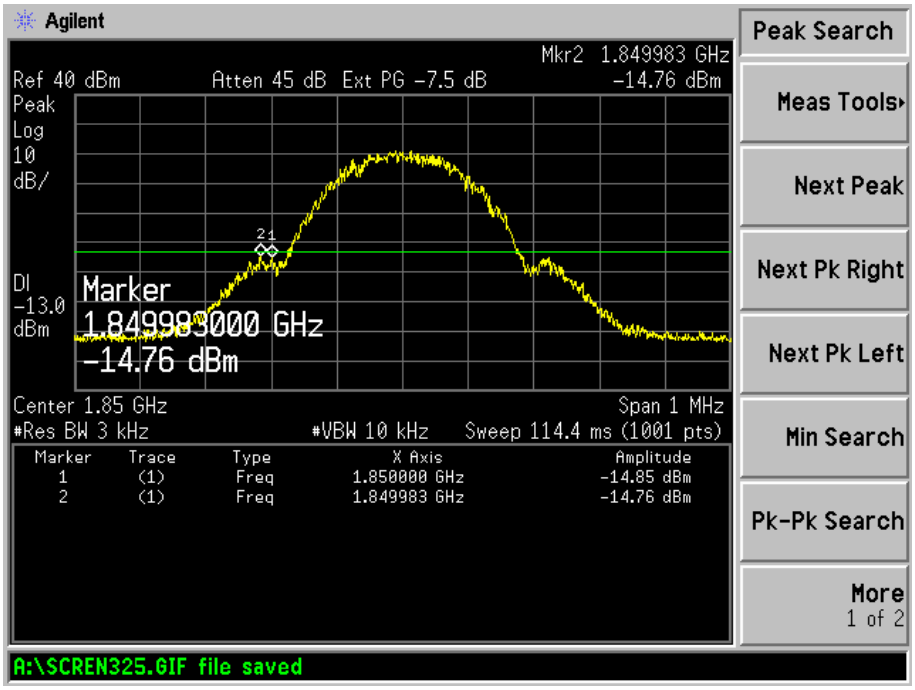
GPRS High Channel
30MHz to 1GHz



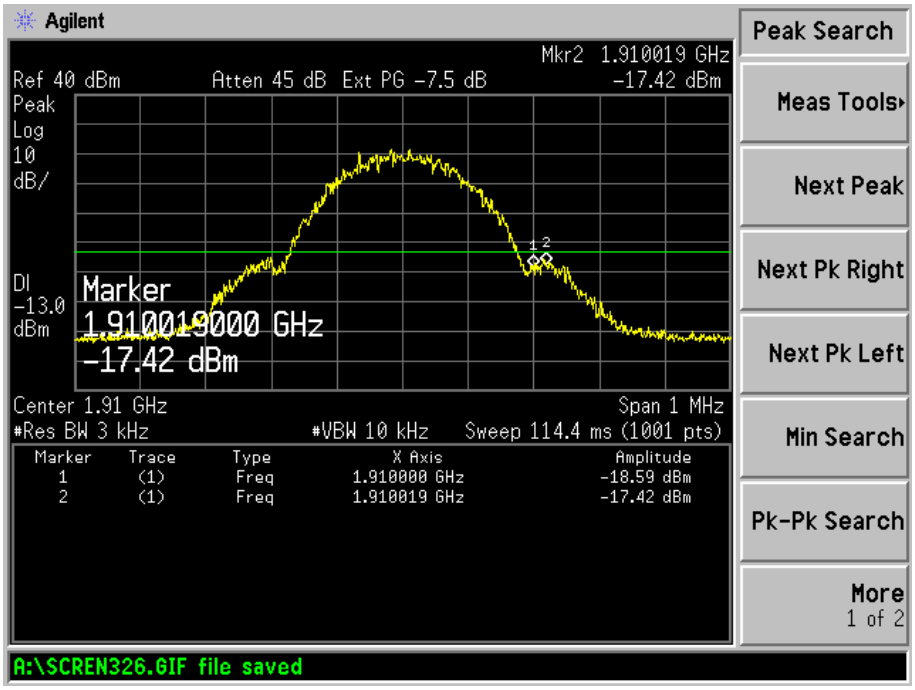
Above 1GHz



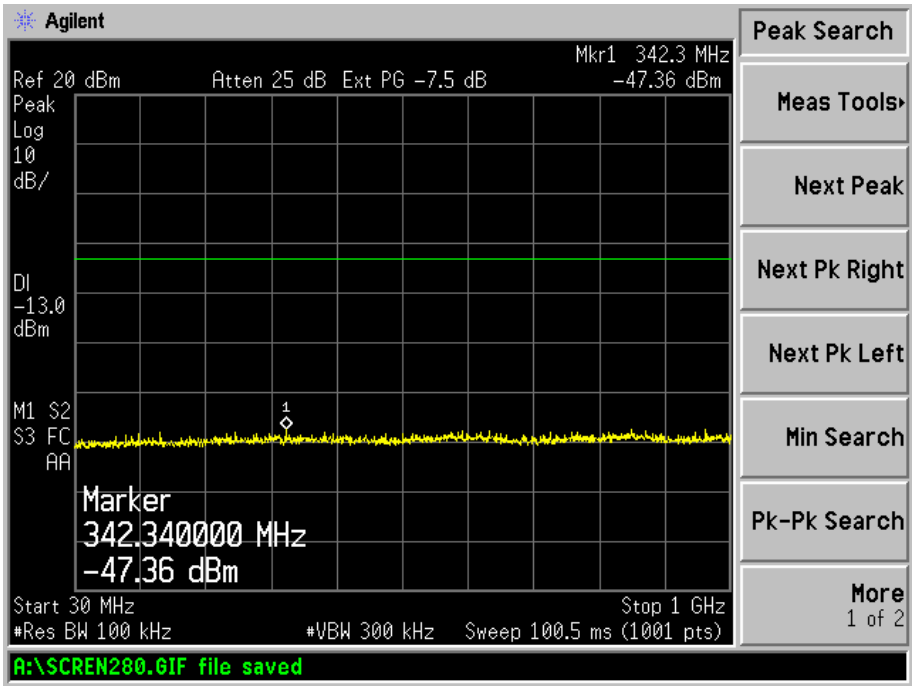
GPRS Low Band Emission



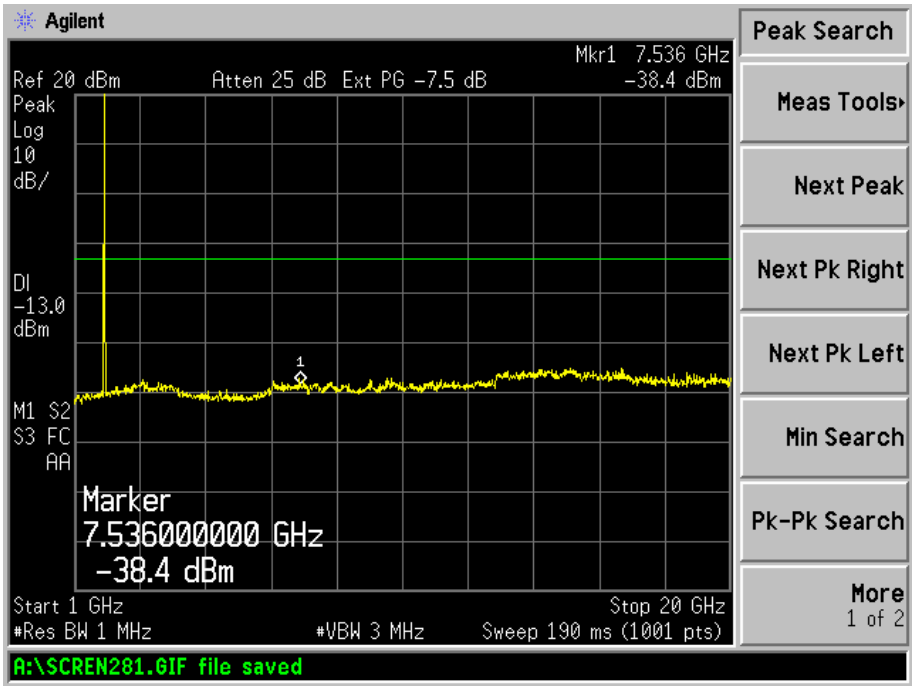
GPRS High Band Emission



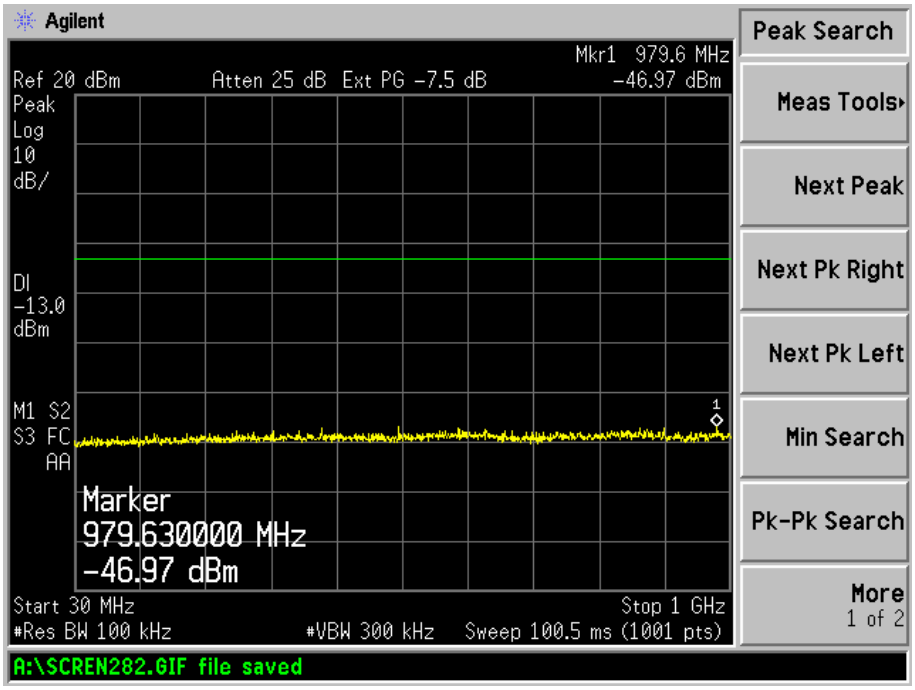
EDGE Low Channel



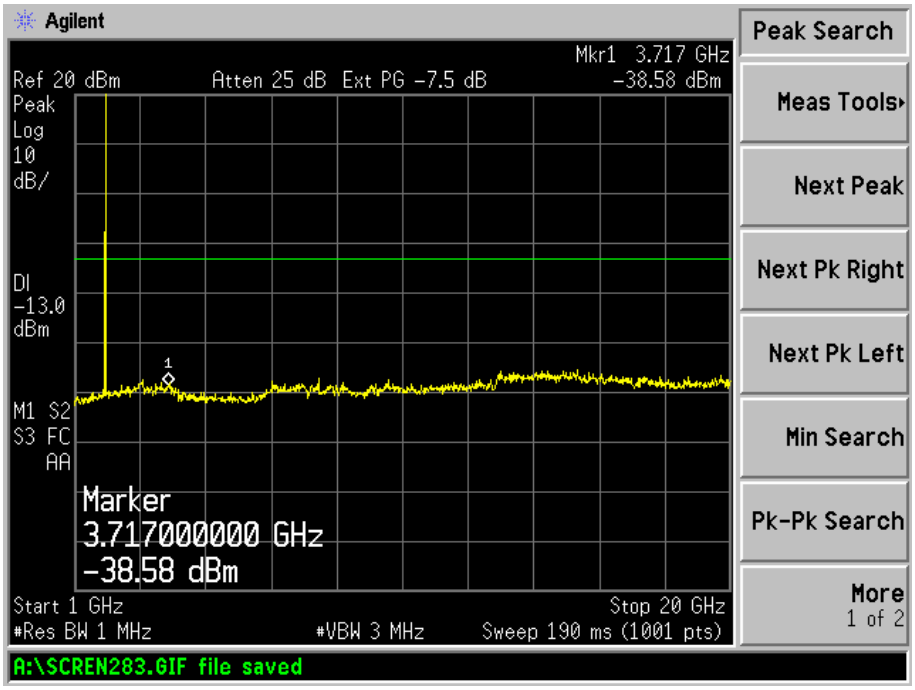
Above 1GHz



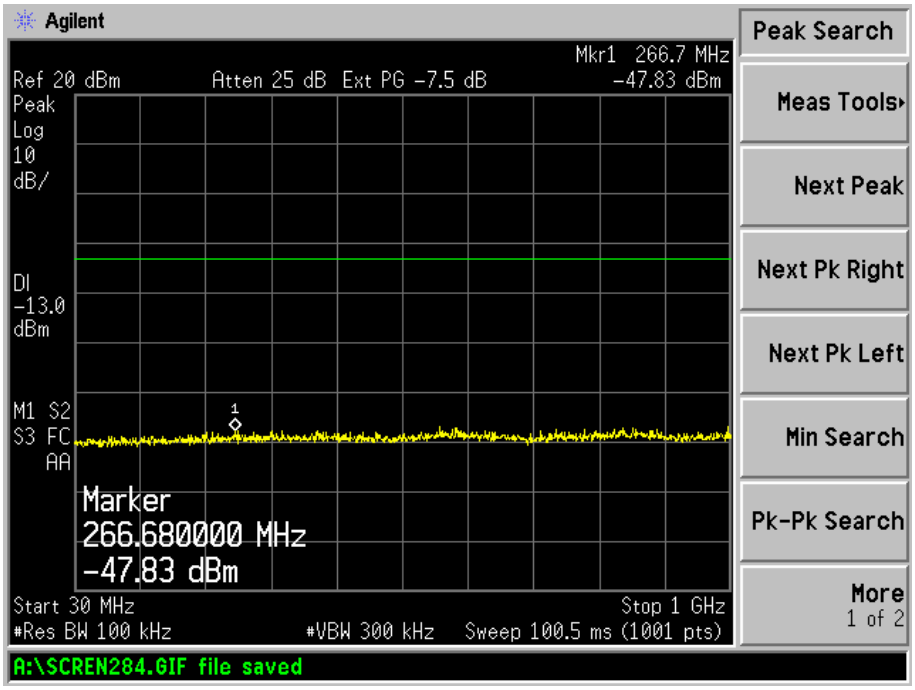
EDGE Middle Channel



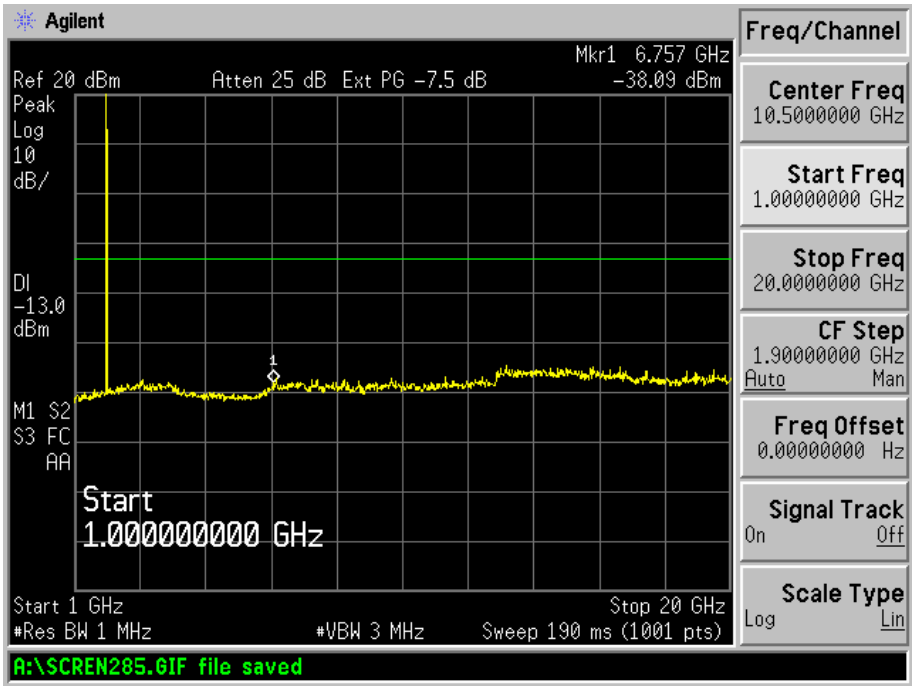
Above 1GHz



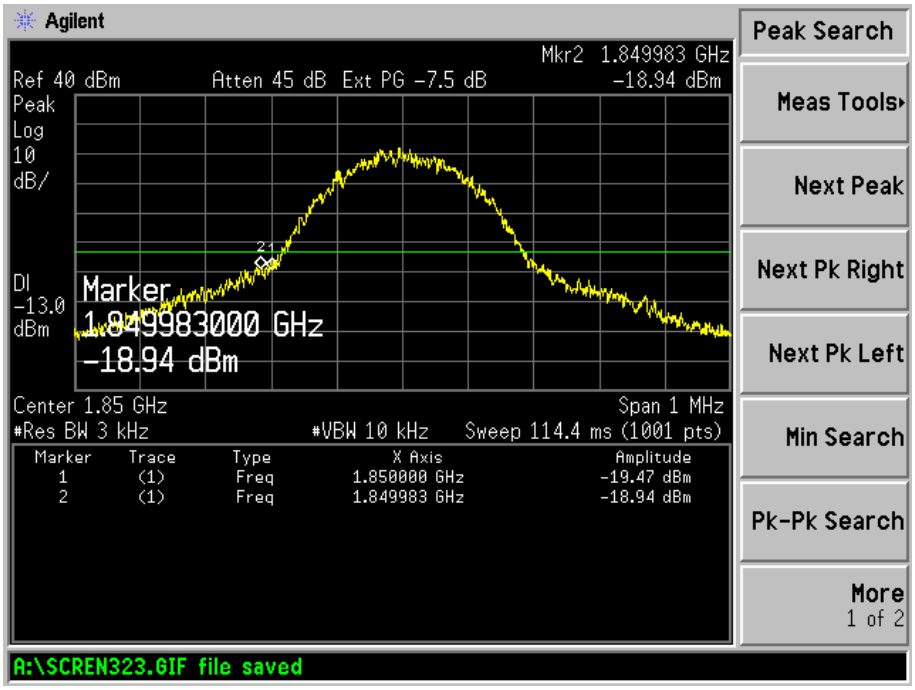
EDGE High Channel



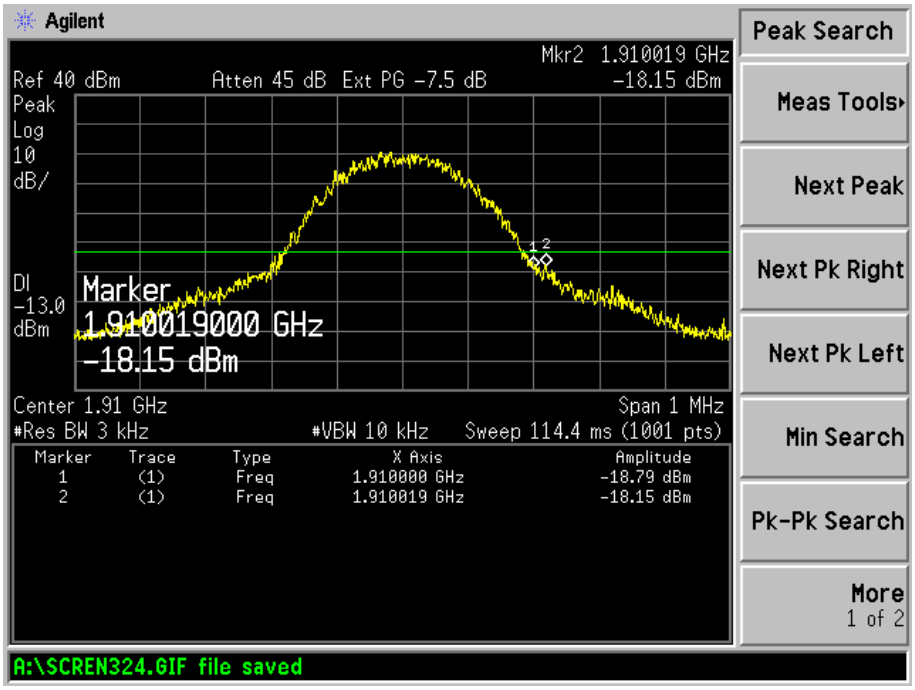
Above 1GHz



EDGE Low Band Emission



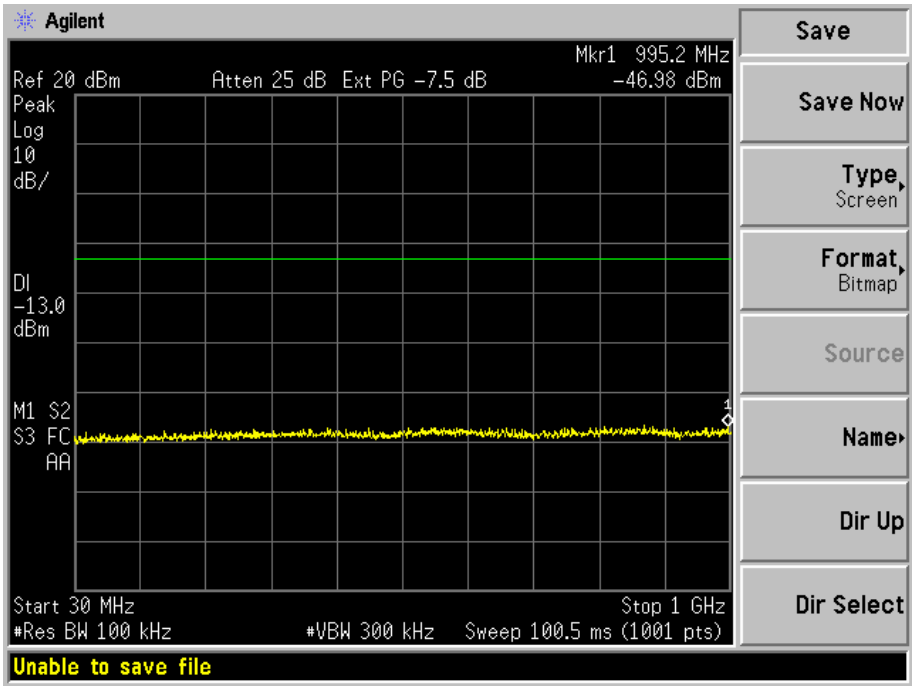
EDGE High Band Emission



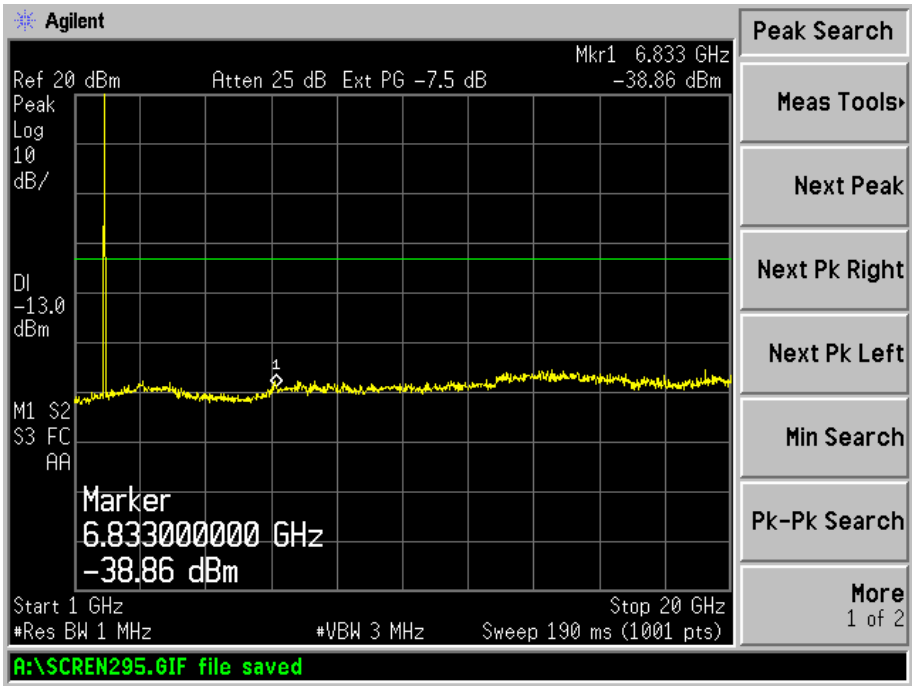
For Band V

WCDMA Low Channel

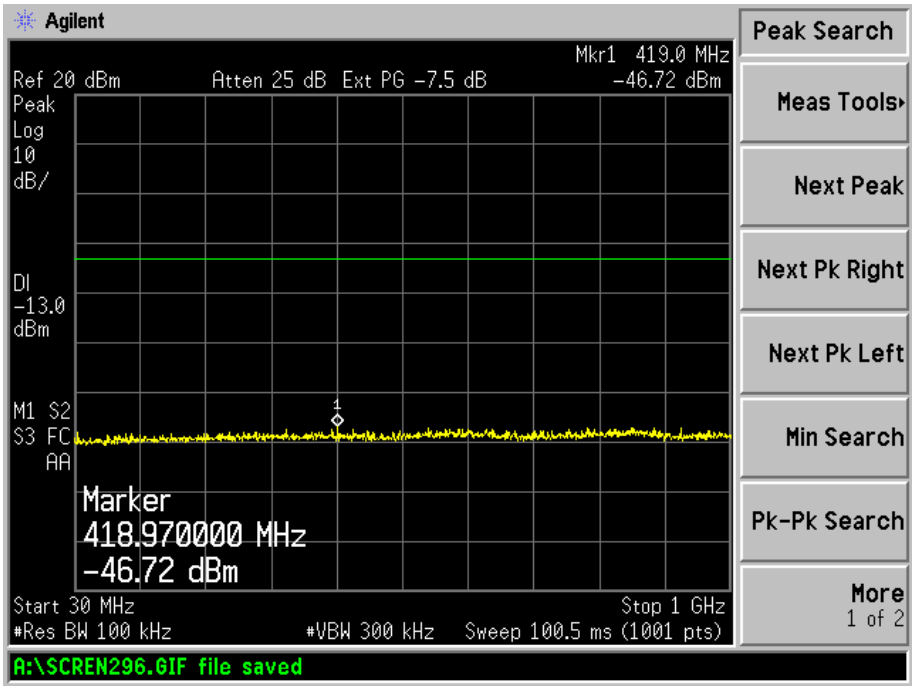
30MHz to 1GHz



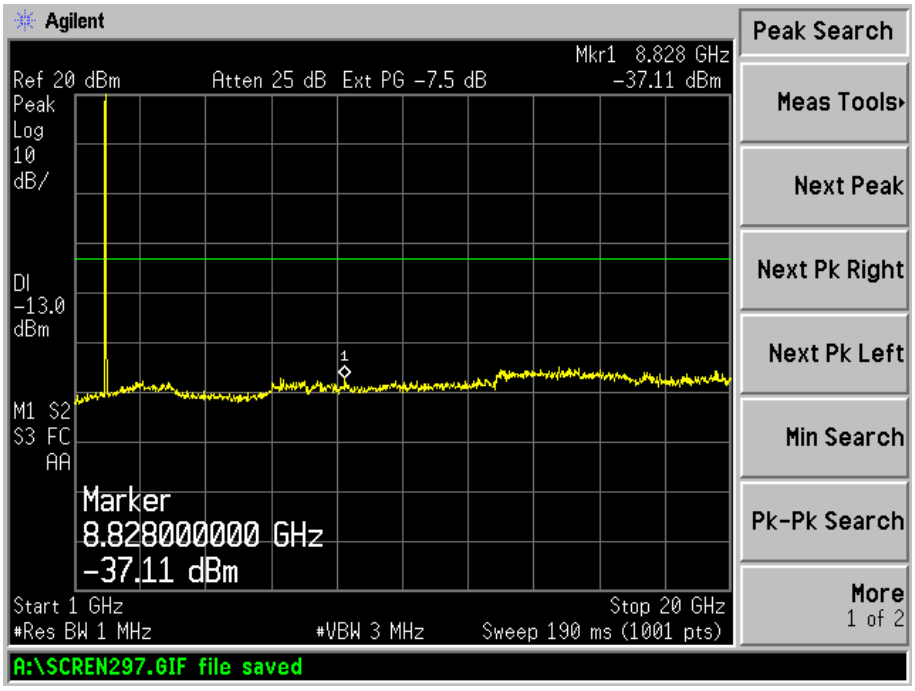
Above 1GHz



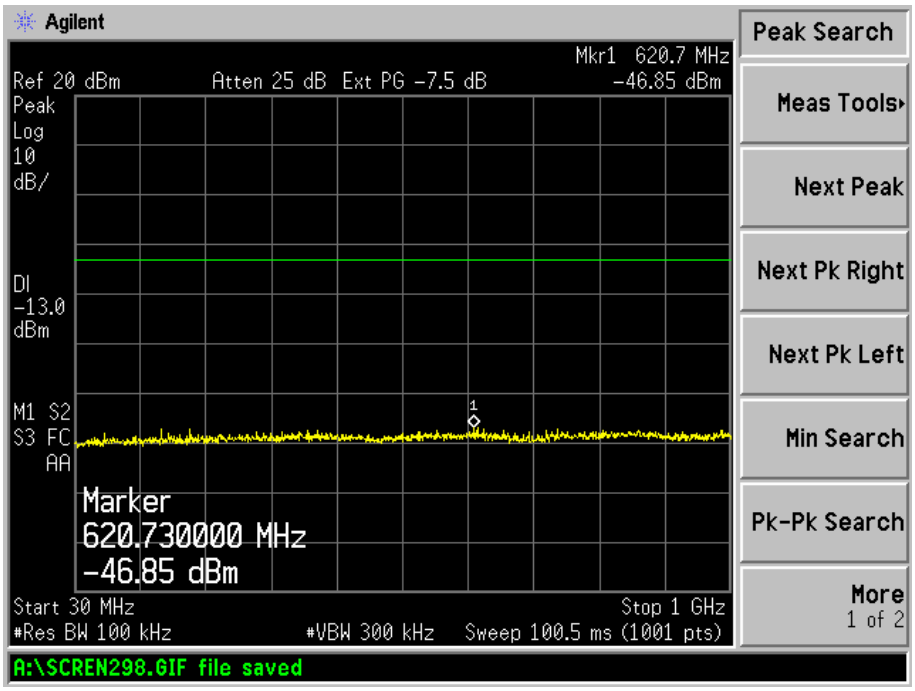
WCDMA Middle Channel
30MHz to 1GHz



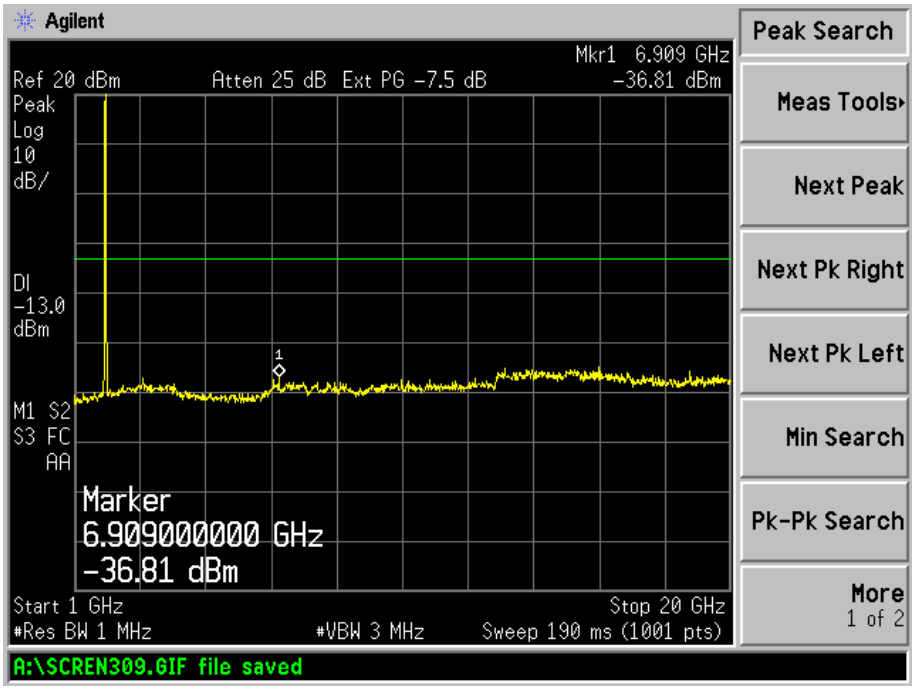
Above 1GHz



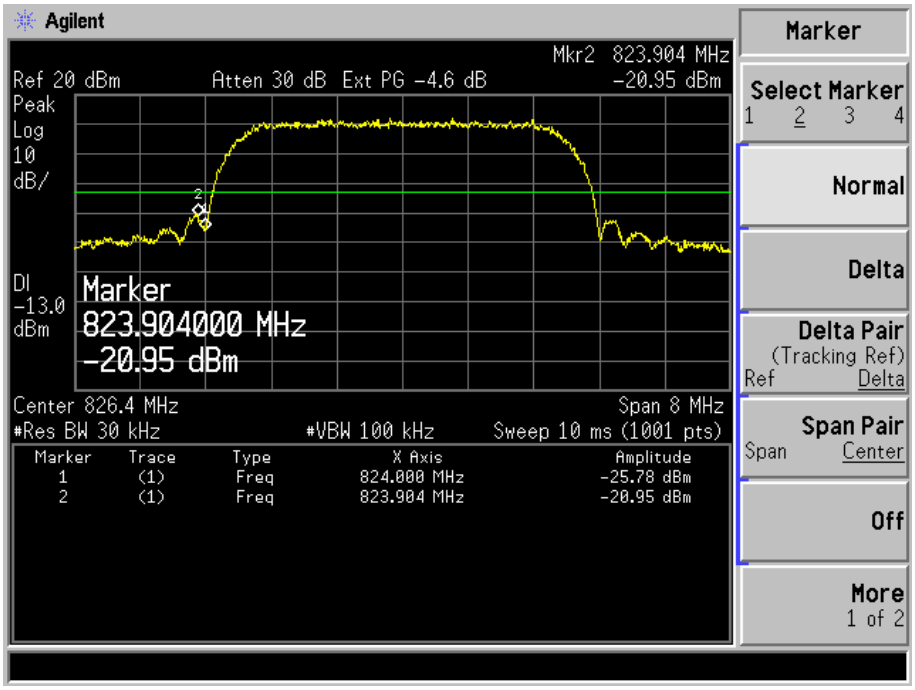
WCDMA High Channel
30MHz to 1GHz



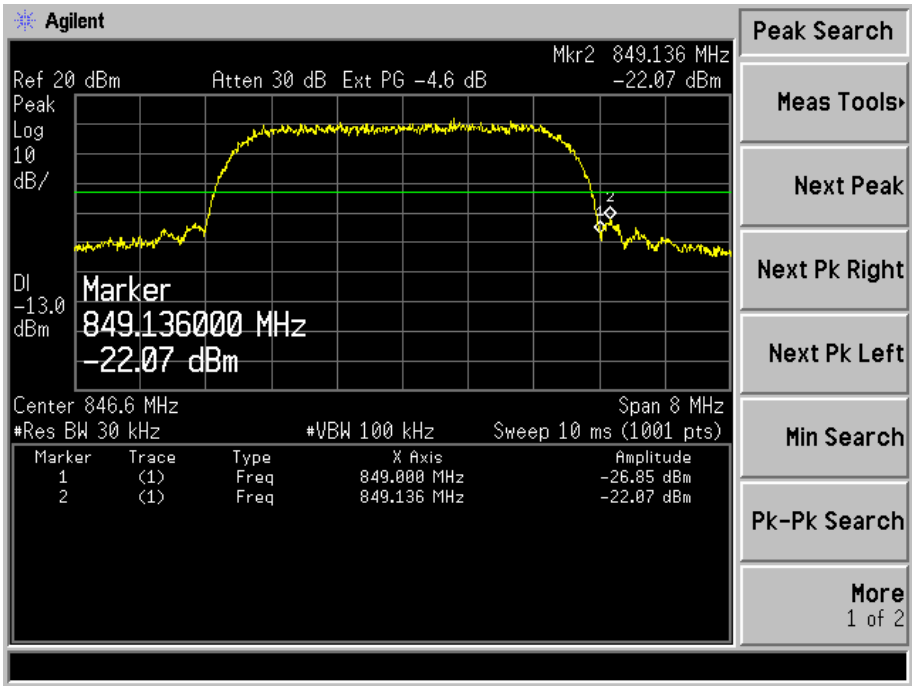
Above 1GHz



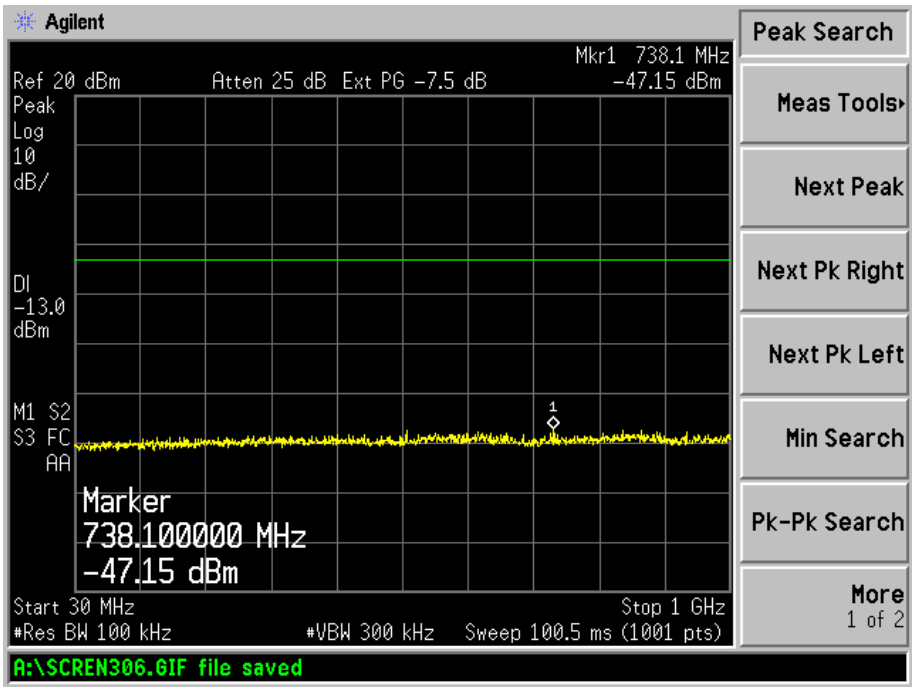
WCDMA Low Band Spurious Emission



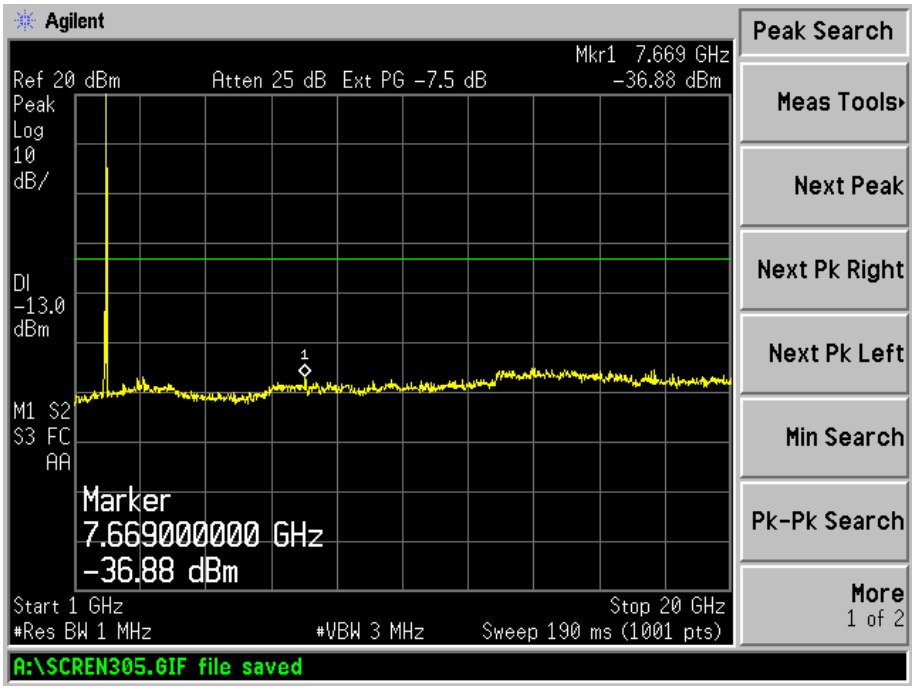
WCDMA High Band Spurious Emission



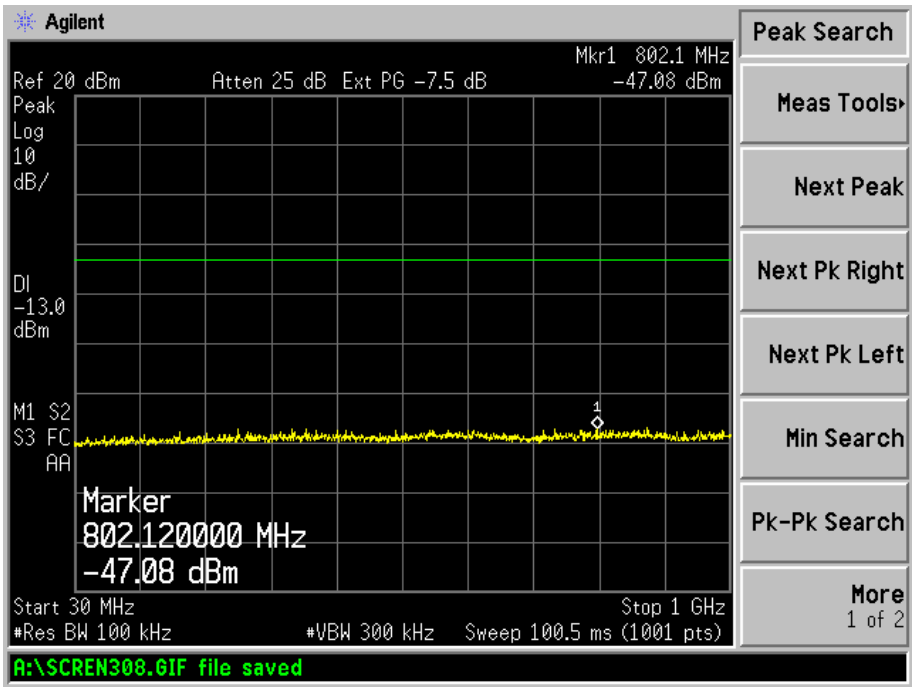
HSDPA Low Channel
30MHz to 1GHz



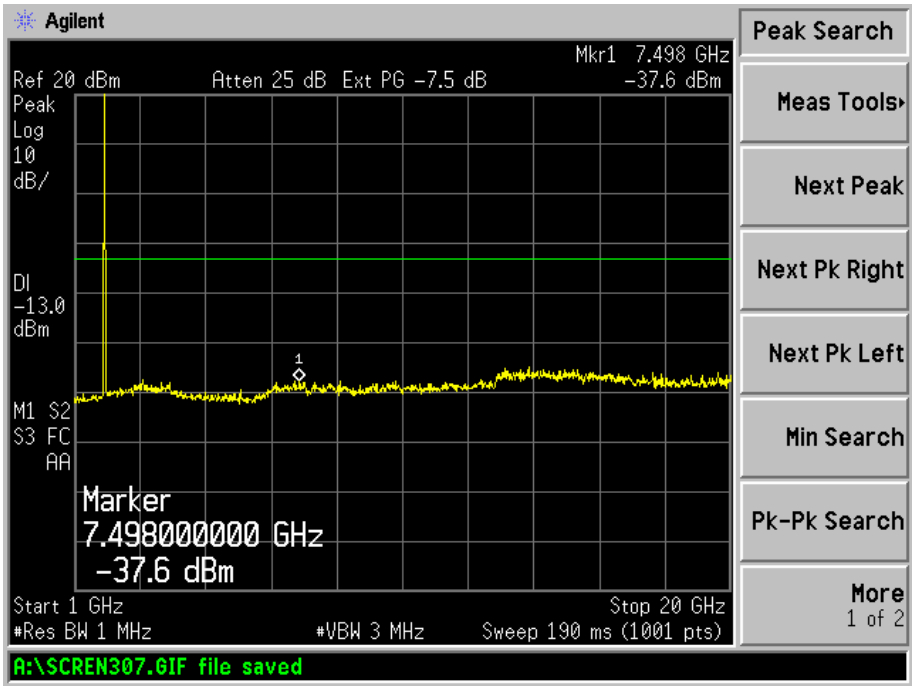
Above 1GHz



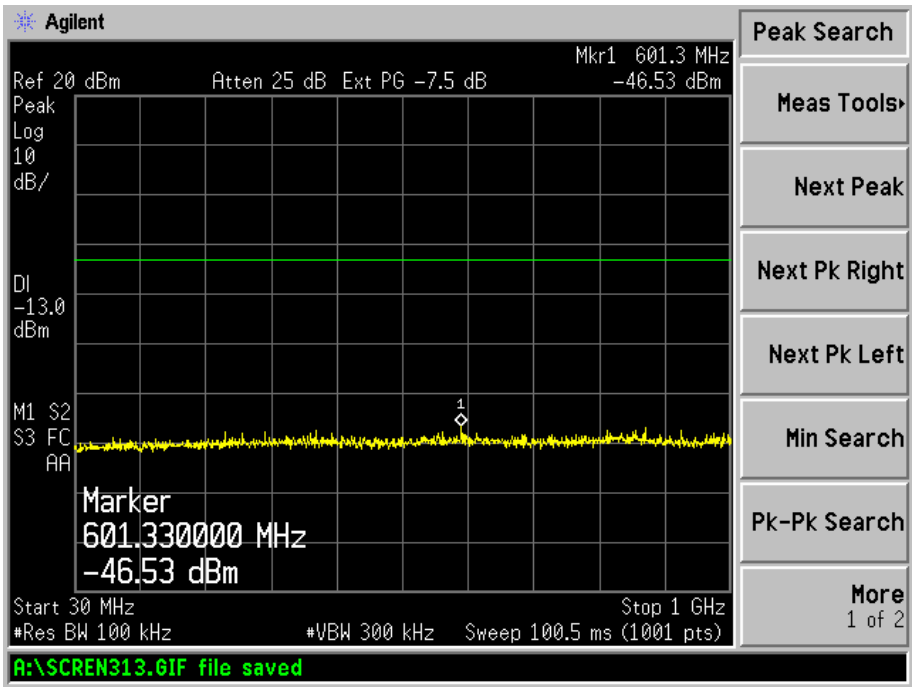
HSDPA Middle Channel
30MHz to 1GHz



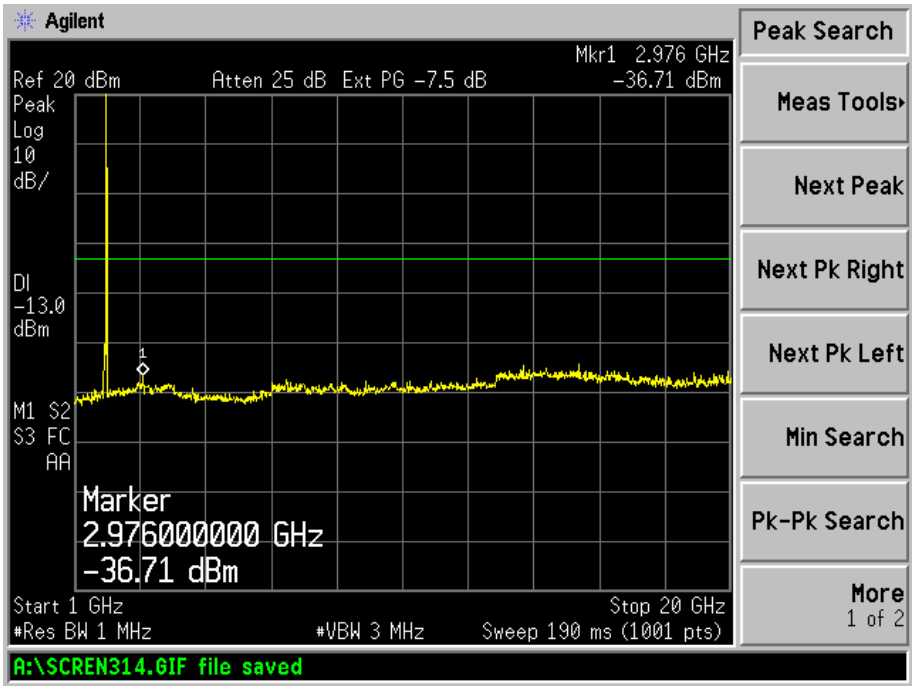
Above 1GHz



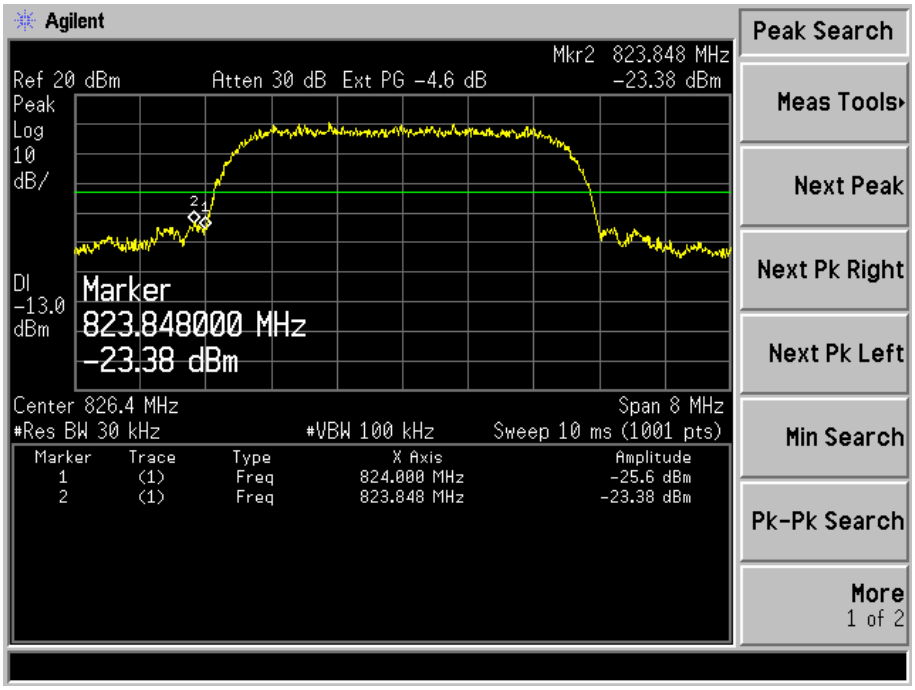
HSDPA High Channel
30MHz to 1GHz



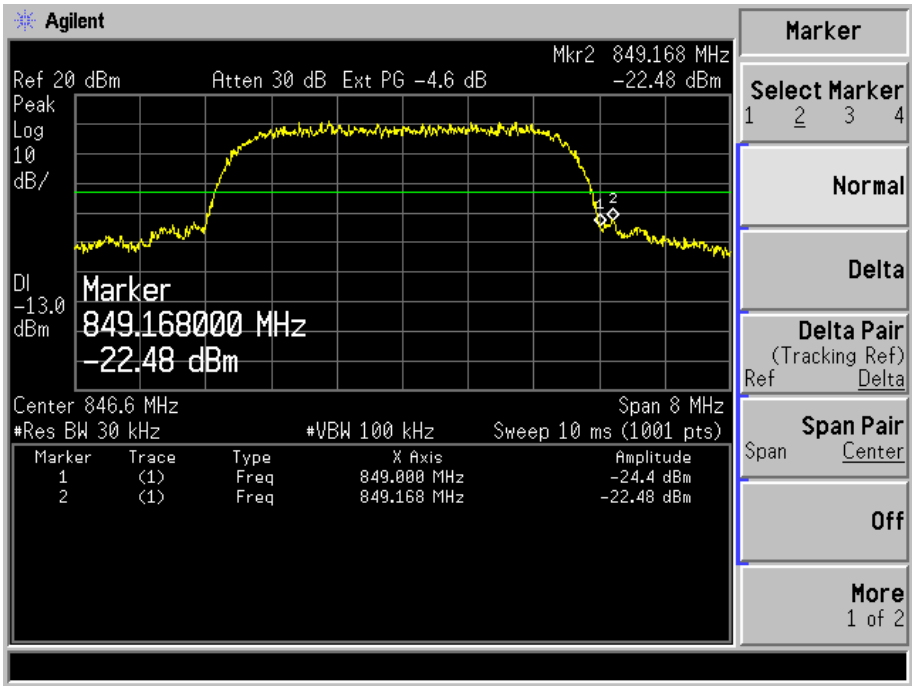
Above 1GHz



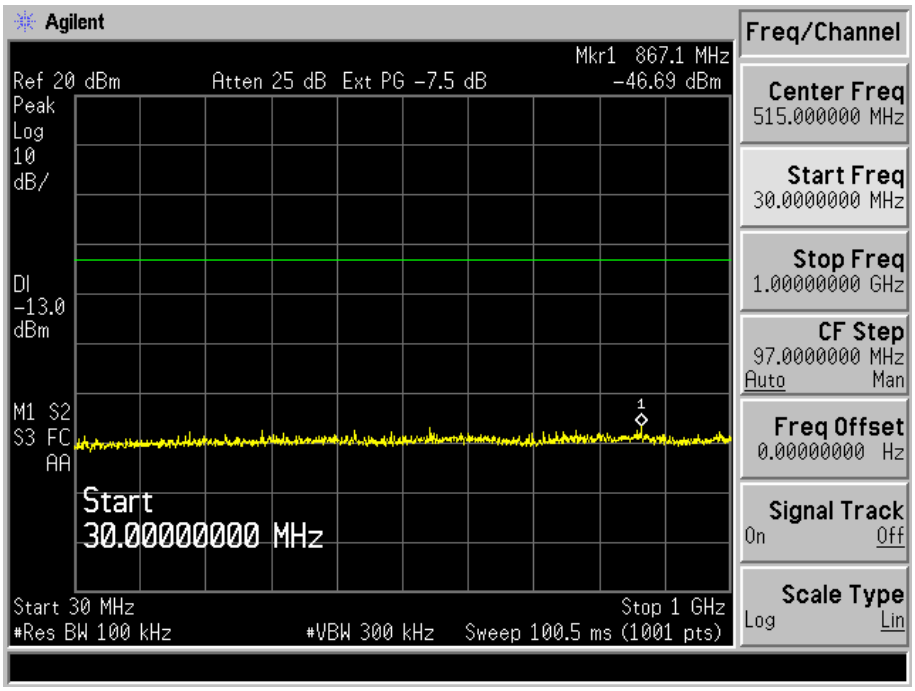
HSDPA Low Band Spurious Emission



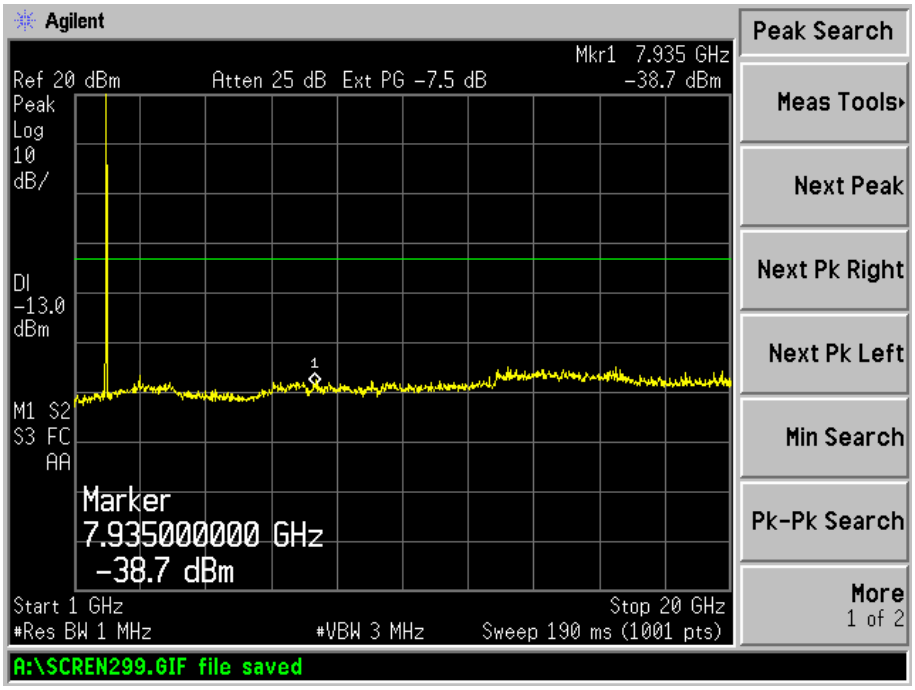
HSDPA High Band Spurious Emission



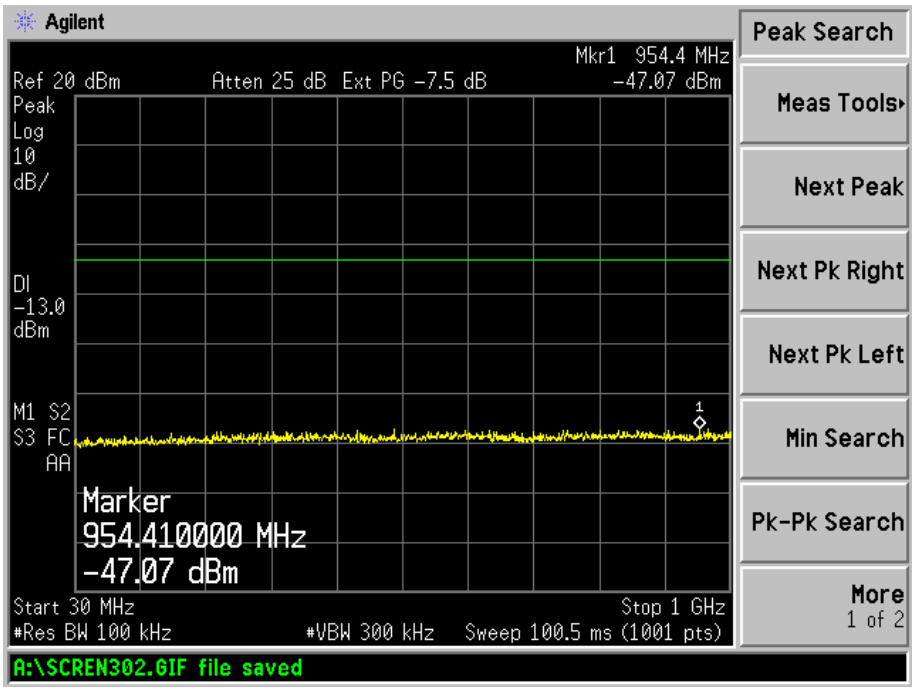
HSUPA Low Channel
30MHz to 1GHz



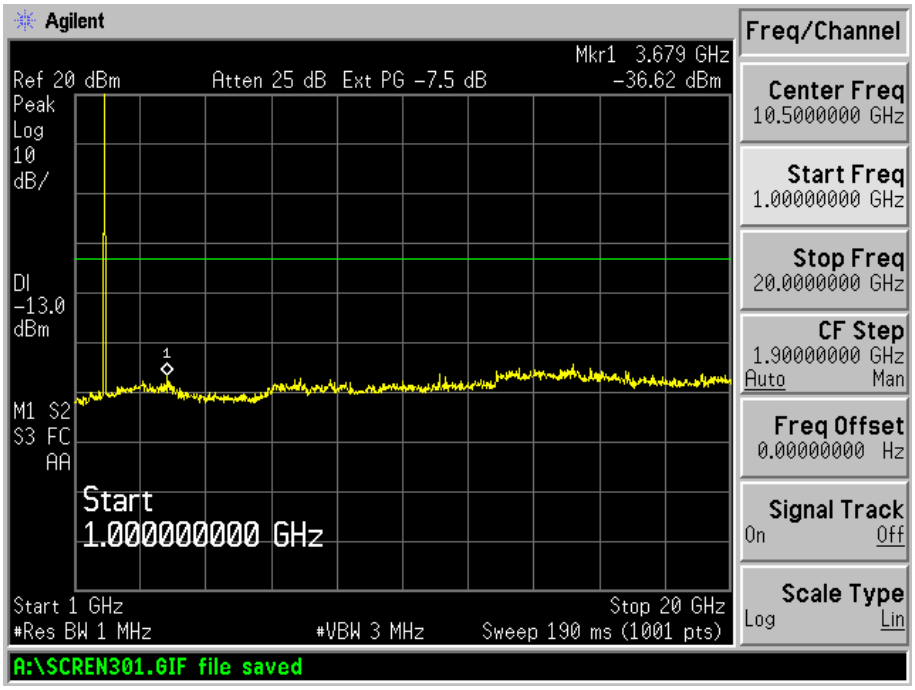
Above 1GHz



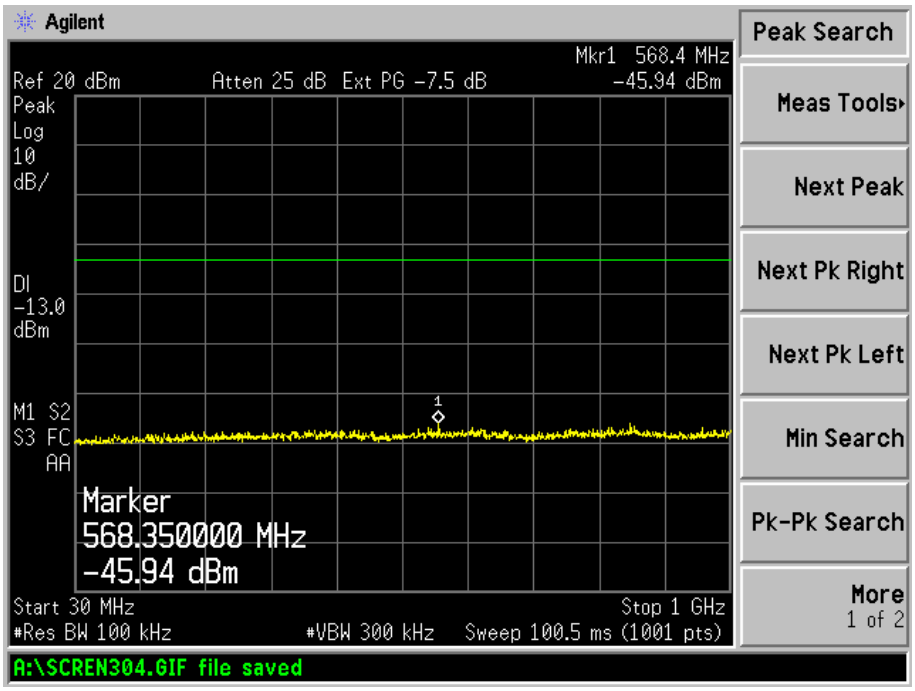
HSUPA Middle Channel
30MHz to 1GHz



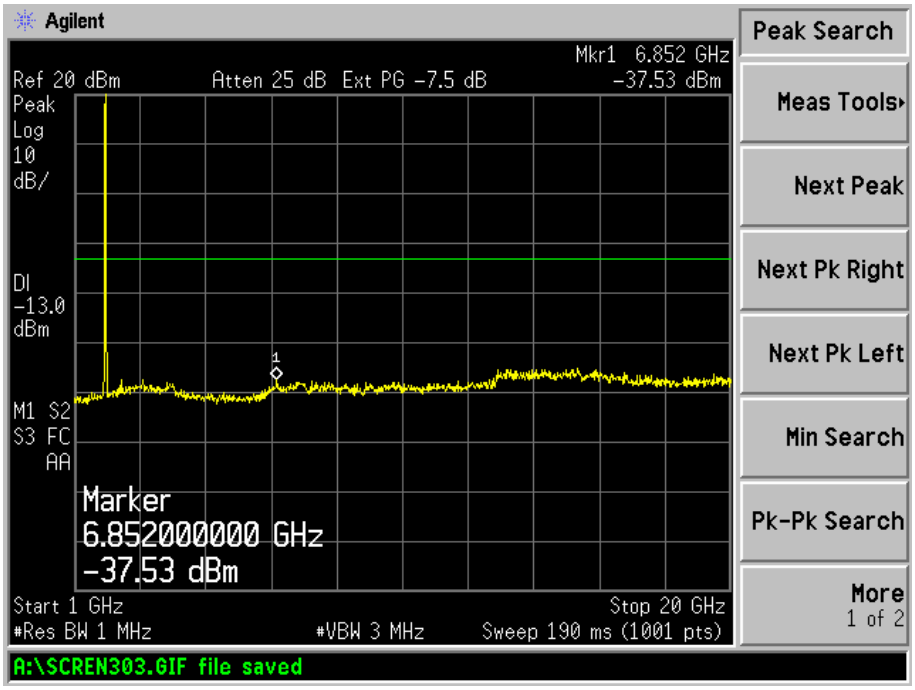
Above 1GHz



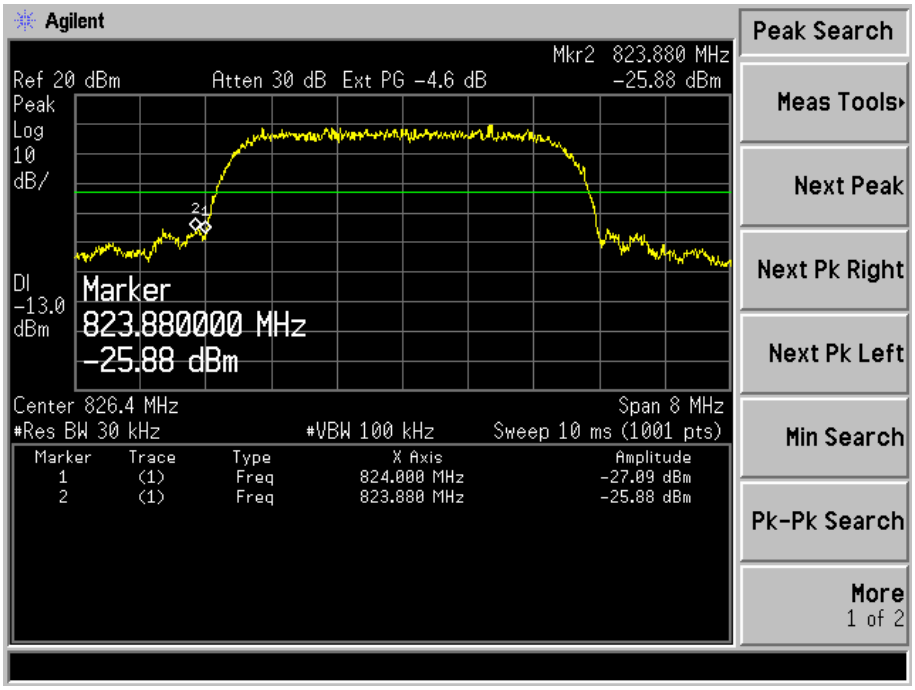
HSUPA High Channel
30MHz to 1GHz



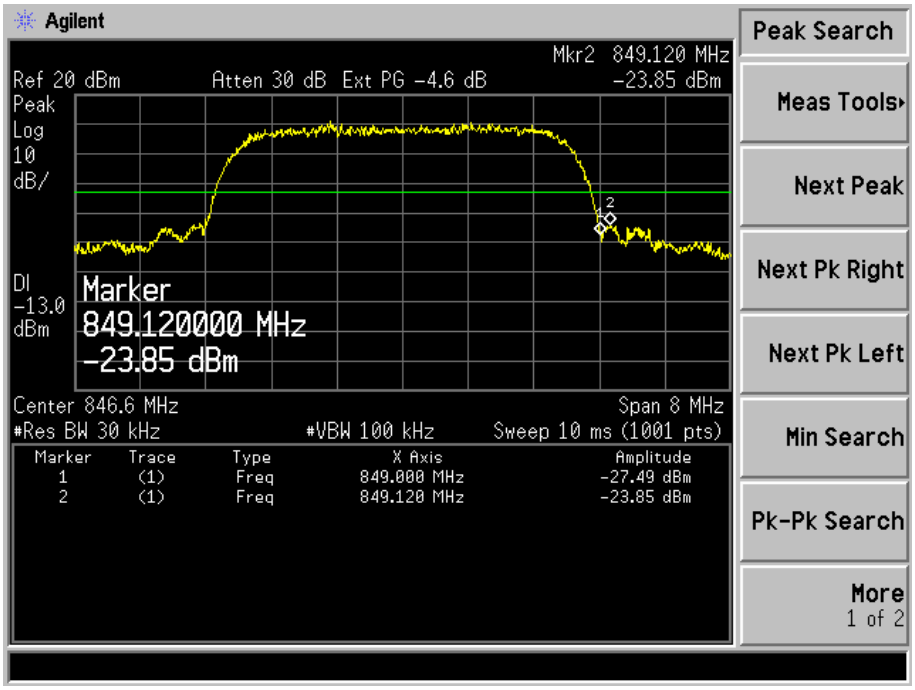
Above 1GHz



HSUPA Low Band Spurious Emission



HSUPA High Band Spurious Emission



8. Spurious Radiated Emissions

8.1 Measurement Uncertainty

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is ±5.20 dB.

8.2 Standard Applicable

According to §22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

8.3 Test Procedure

1. The setup of EUT is according with per ANSI/TIA-603-D: 2010 and ANSI C63.4-2009 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious attenuation limit in dB =43+10 Log_{10} (power out in Watts)

8.4 Environmental Conditions

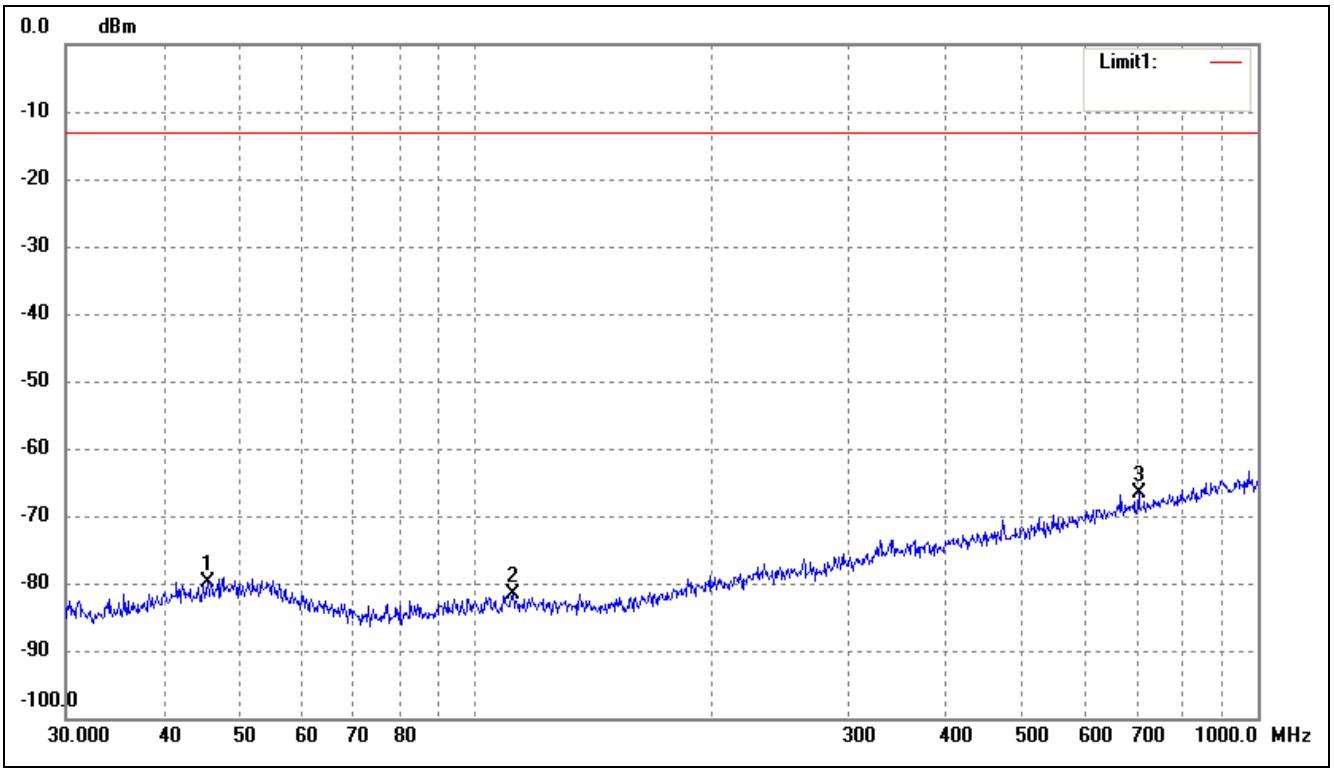
Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

8.5 Summary of Test Results/Plots

According to the data below, the FCC Part 22.917 and 24.238 standards, and had the worst margin of:

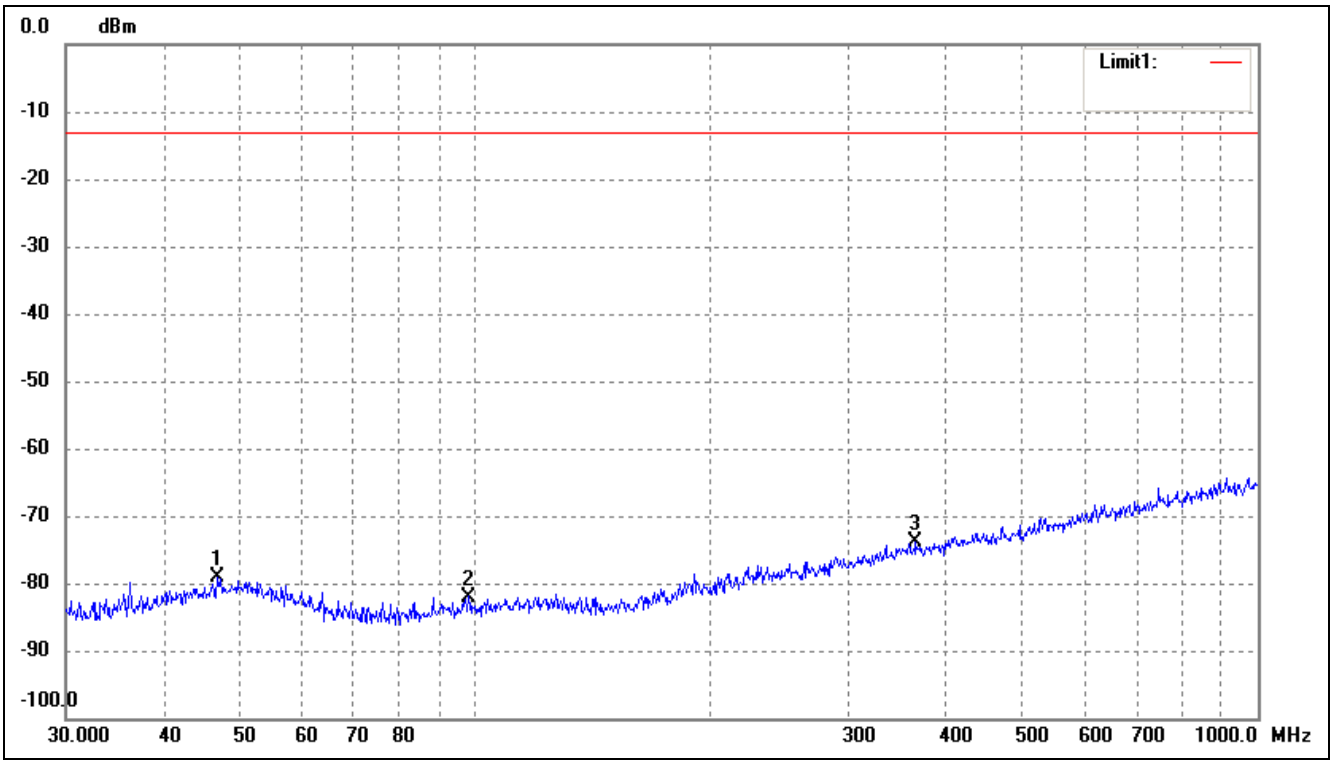
Note: this EUT was tested in 3 orthogonal positions and the worst case position (Vertical) data was reported.

Spurious Emission From 30MHz to 1GHz
For Cellular Band_ GSM850 Mode
Horizontal:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	45.5348	-82.57	2.78	-79.79	-13.00	-66.79	ERP
2	111.7380	-82.97	1.31	-81.66	-13.00	-68.66	ERP
3	704.2261	-81.40	14.71	-66.69	-13.00	-53.69	ERP

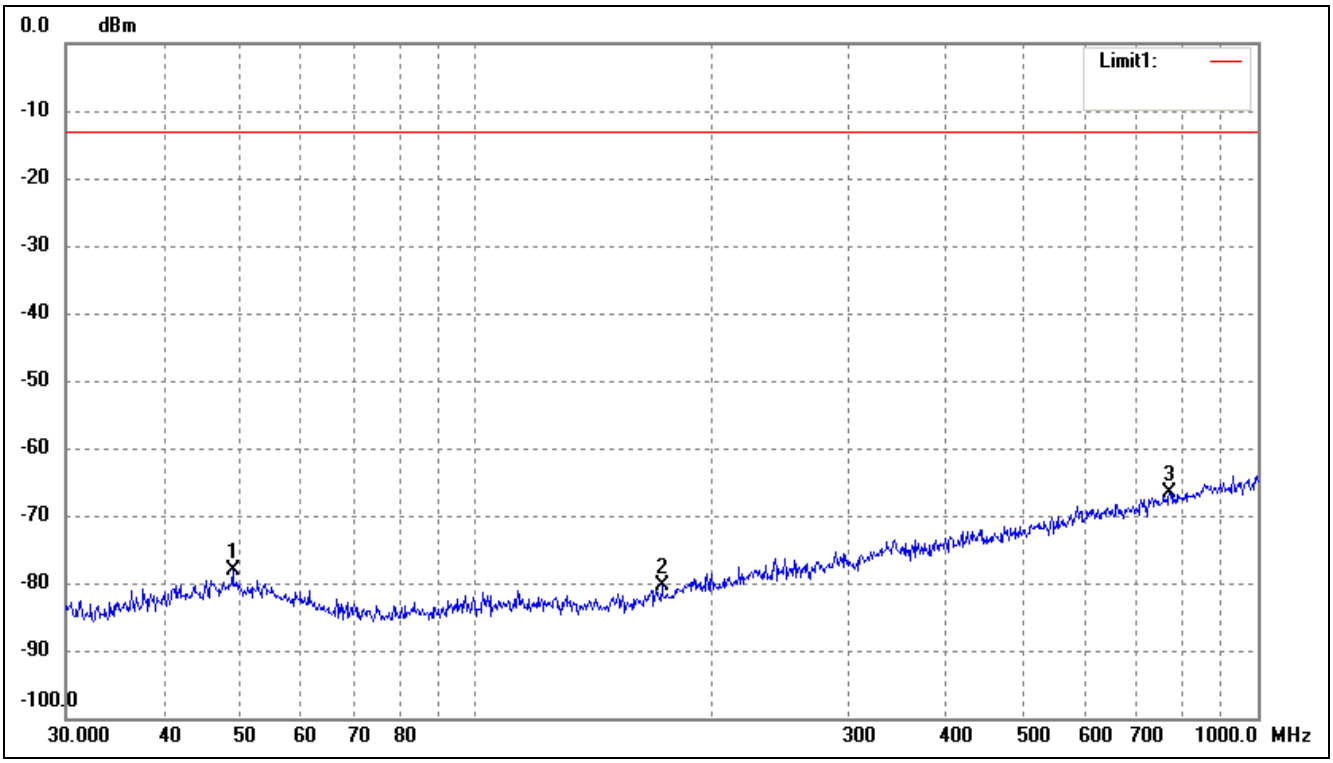
Vertical:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	46.8303	-82.00	2.98	-79.02	-13.00	-66.02	ERP
2	98.1419	-82.44	0.44	-82.00	-13.00	-69.00	ERP
3	365.5391	-82.56	8.63	-73.93	-13.00	-60.93	ERP

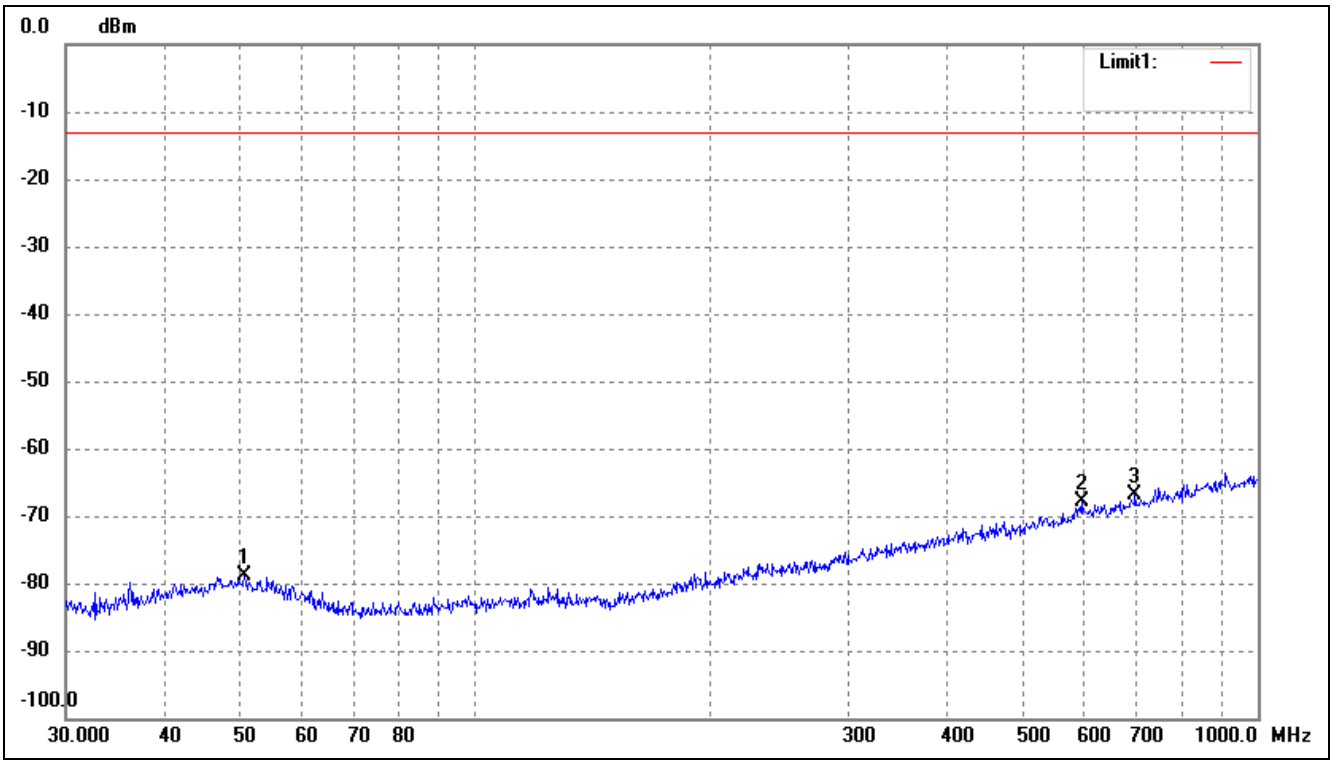
For Cellular Band_ GSM1900 Mode

Horizontal:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	49.0145	-81.47	3.30	-78.17	-13.00	-65.17	ERP
2	173.2051	-82.31	1.98	-80.33	-13.00	-67.33	ERP
3	771.4486	-82.56	15.86	-66.70	-13.00	-53.70	ERP

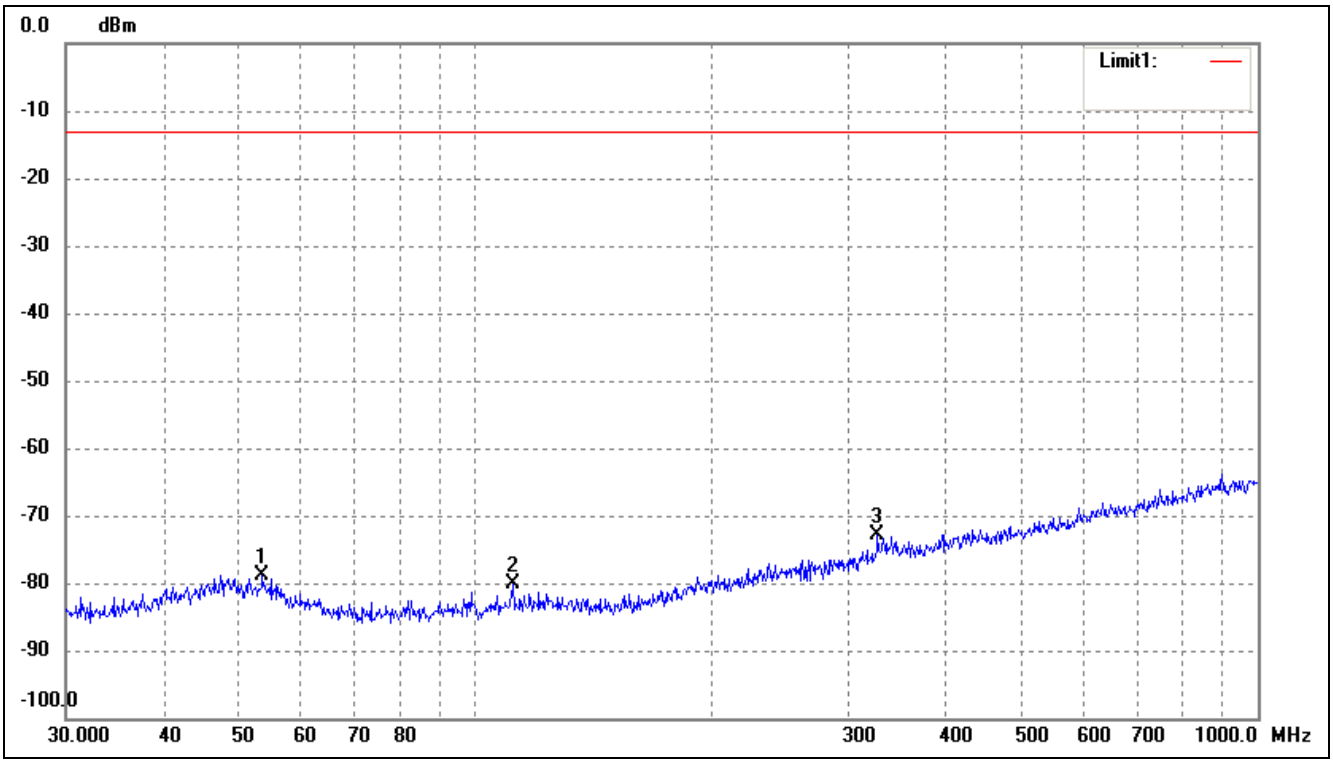
Vertical:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	50.7637	-82.08	3.30	-78.78	-13.00	-65.78	ERP
2	595.1329	-81.23	13.38	-67.85	-13.00	-54.85	ERP
3	696.8567	-81.44	14.59	-66.85	-13.00	-53.85	ERP

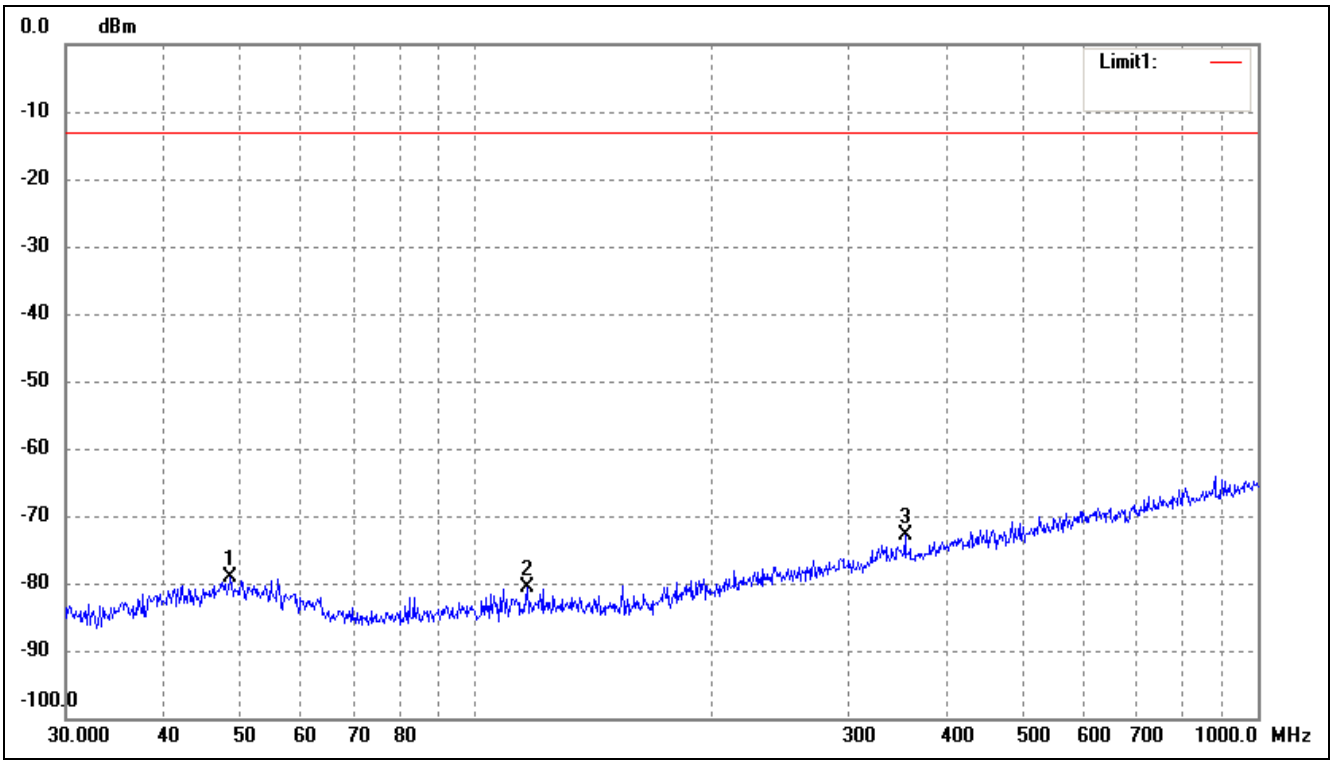
For Cellular Band_ EDGE850 Mode

Horizontal:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	53.5052	-81.54	2.71	-78.83	-13.00	-65.83	ERP
2	111.7380	-81.36	1.31	-80.05	-13.00	-67.05	ERP
3	326.7395	-80.47	7.64	-72.83	-13.00	-59.83	ERP

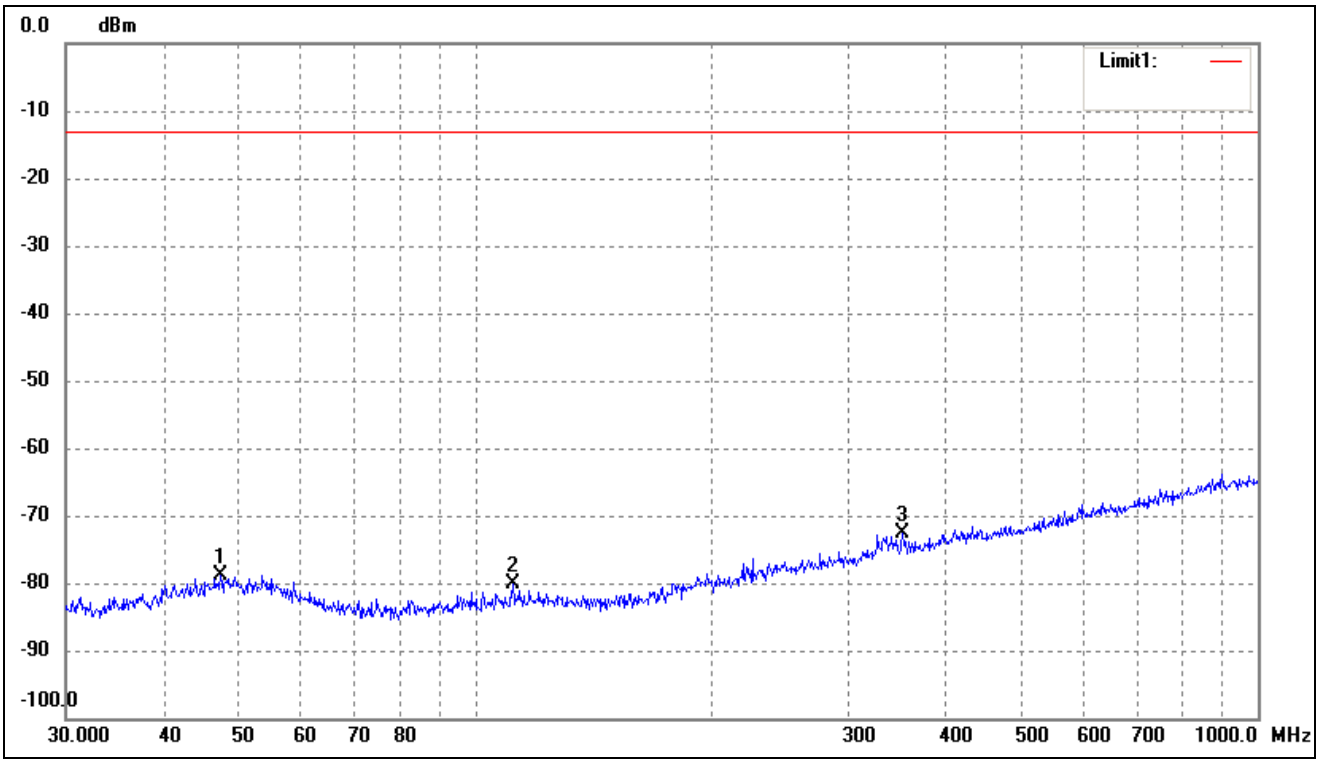
Vertical:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	48.6719	-82.30	3.25	-79.05	-13.00	-66.05	ERP
2	116.5401	-81.90	1.25	-80.65	-13.00	-67.65	ERP
3	354.1831	-81.52	8.67	-72.85	-13.00	-59.85	ERP

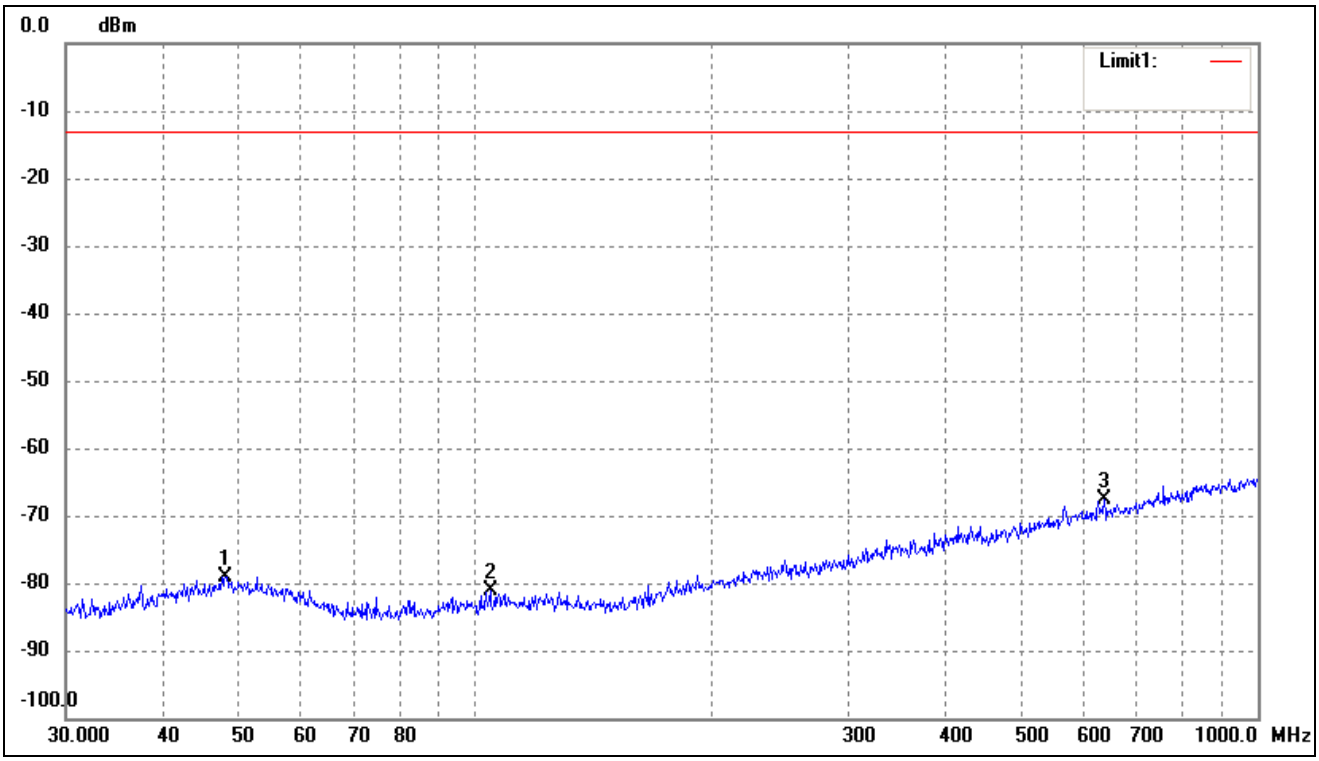
For Cellular Band_ EDGE1900 Mode

Horizontal:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	47.3255	-81.90	3.06	-78.84	-13.00	-65.84	ERP
2	111.7380	-81.36	1.31	-80.05	-13.00	-67.05	ERP
3	351.7079	-81.34	8.69	-72.65	-13.00	-59.65	ERP

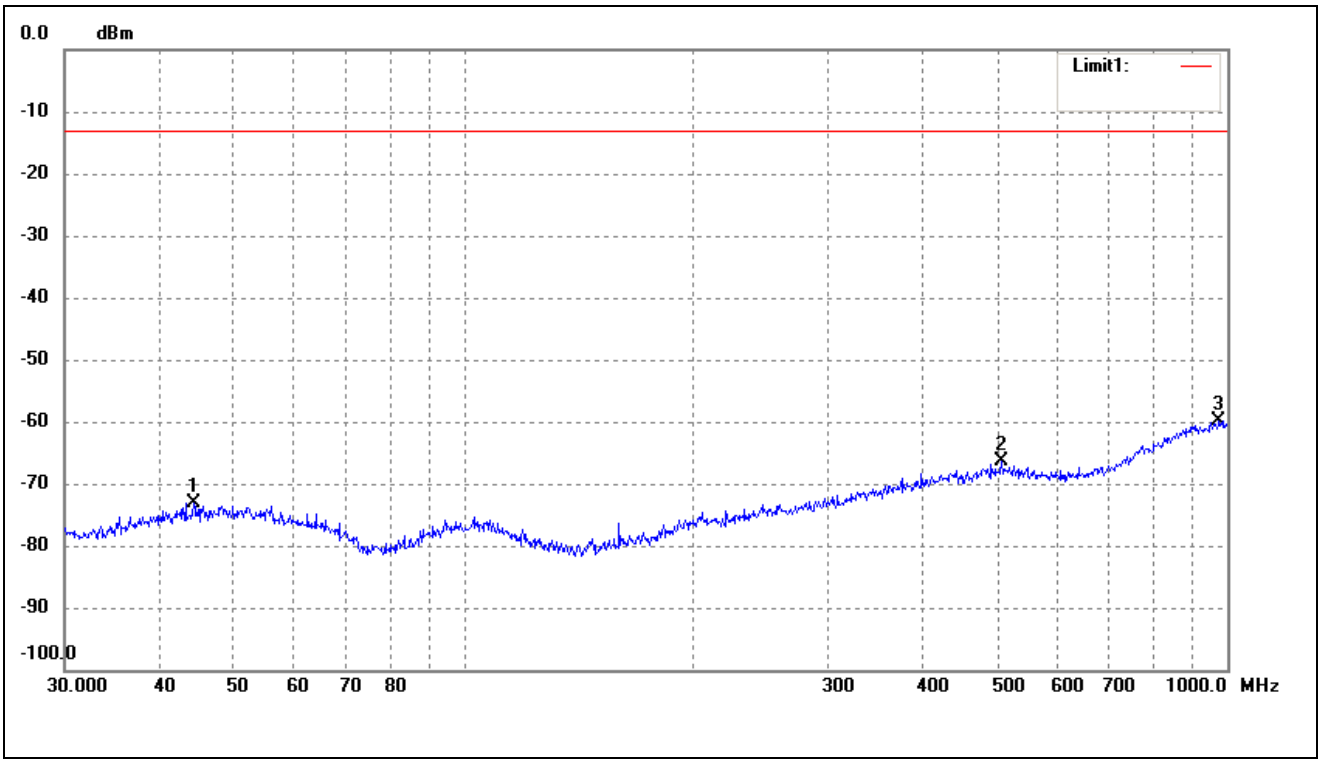
Vertical:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	47.9940	-82.21	3.14	-79.07	-13.00	-66.07	ERP
2	104.5361	-82.10	0.93	-81.17	-13.00	-68.17	ERP
3	636.1340	-81.38	13.84	-67.54	-13.00	-54.54	ERP

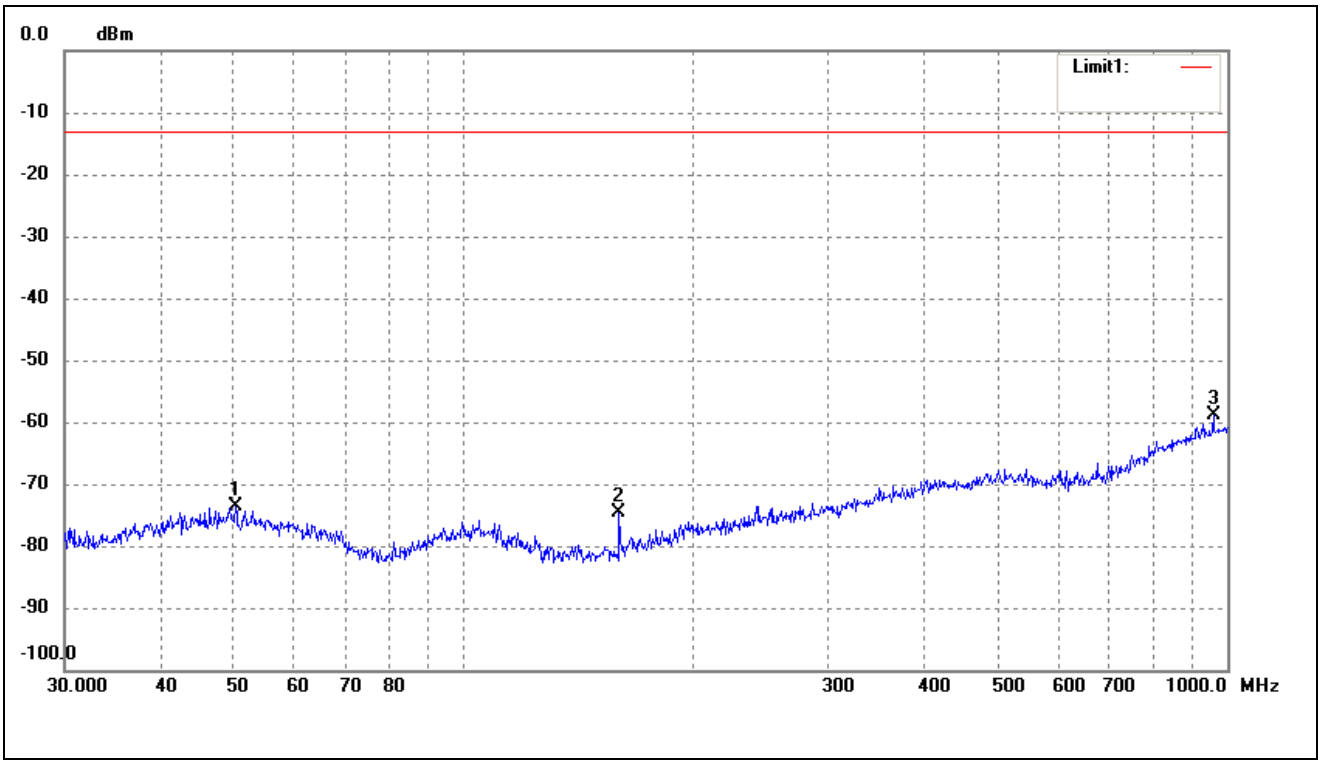
For band V Mode

Horizontal:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	44.2752	-77.36	4.19	-73.17	-13.00	-60.17	ERP
2	506.4791	-77.01	10.64	-66.37	-13.00	-53.37	ERP
3	975.7529	-77.91	18.12	-59.79	-13.00	-46.79	ERP

Vertical:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	50.2325	-78.06	4.33	-73.73	-13.00	-60.73	ERP
2	159.7844	-74.09	-0.55	-74.64	-13.00	-61.64	ERP
3	958.7943	-76.62	17.86	-58.76	-13.00	-45.76	ERP

Note: Margin= (Reading+ Correct)- Limit

Spurious Emissions Above 1GHz

For Cellular Band_GSM850 Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (824.2MHz)						
1648.4	-55.35	4.94	-50.44	-13	-37.44	H
2472.6	-54.21	8.46	-45.77	-13	-32.77	H
1648.4	-54.71	4.94	-49.79	-13	-36.79	V
2472.6	-53.35	8.46	-44.93	-13	-31.93	V
Middle Channel (836.6MHz)						
1673.2	-54.91	5.11	-49.88	-13	-36.88	H
2509.8	-54.44	8.54	-45.86	-13	-32.86	H
1673.2	-54.93	5.11	-49.84	-13	-36.84	V
2509.8	-55.07	8.54	-46.52	-13	-33.52	V
High Channel (848.8MHz)						
1697.6	-51.60	5.29	-46.33	-13	-33.33	H
2546.4	-53.87	8.59	-45.23	-13	-32.23	H
1697.6	-51.65	5.29	-46.31	-13	-33.31	V
2546.4	-53.73	8.59	-45.15	-13	-32.15	V

For PCS Band_GSM1900 Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (1850.2MHz)						
3700.4	-46.71	10.54	-36.23	-13	-23.23	H
5550.6	-57.22	13.37	-43.84	-13	-30.84	H
3700.4	-46.16	10.54	-35.58	-13	-22.58	V
5550.6	-59.41	13.37	-46.06	-13	-33.06	V
Middle Channel (1880MHz)						
3760.0	-46.32	10.64	-35.74	-13	-22.74	H
5640.0	-57.86	13.54	-44.34	-13	-31.34	H
3760.0	-46.01	10.64	-35.39	-13	-22.39	V
5640.0	-58.08	13.54	-44.52	-13	-31.52	V
High Channel (1909.8MHz)						
3819.6	-47.25	10.74	-36.51	-13	-23.51	H
5729.4	-59.51	13.71	-45.8	-13	-32.80	H
3819.6	-46.82	10.74	-36.07	-13	-23.07	V
5729.4	-59.16	13.71	-45.44	-13	-32.44	V

For Band V Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (826.4MHz)						
1652.8	-59.45	14.98	-44.47	-13.00	-31.47	H
2479.2	-59.97	17.02	-42.95	-13.00	-29.95	H
1652.8	-58.42	14.98	-43.44	-13.00	-30.44	V
2479.2	-59.65	17.02	-42.63	-13.00	-29.63	V
Middle Channel (836.6MHz)						
1673.2	-58.68	6.86	-51.82	-13.00	-38.82	H
2509.8	-59.17	14.62	-44.55	-13.00	-31.55	H
1673.2	-59.63	6.86	-52.77	-13.00	-39.77	V
2509.8	-60.66	14.62	-46.04	-13.00	-33.04	V
High Channel (846.6MHz)						
1693.2	-57.79	6.86	-50.93	-13.00	-37.93	H
2539.8	-60.81	15.03	-45.78	-13.00	-32.78	H
1693.2	-58.29	6.86	-51.43	-13.00	-38.43	V
2539.8	-59.73	15.03	-44.70	-13.00	-31.70	V

Note: Result=Reading+ Correct, Margin= Result- Limit

Testing is carried out with frequency rang 9kHz to 20GHz, which above 3th Harmonics and below 30MHz are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured, so the data is not display.

9. Frequency Stability

9.1 Standard Applicable

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Cellular Band

Frequency range (MHz)	Base, fixed (ppm)	Mobile ≤3 watts (ppm)	Mobile ≤3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929	5.0	N/A	N/A
929 to 960	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

9.2 Test Procedure

According to §2.1055, the following test procedure was performed.
The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm is calculated from the measured peak to peak value.
The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode

Temperature:	Supply Voltage
20°C	DC 3.3-4.2V of nominal voltage declared by manufacturer
-30°C to +50°C	Normal

9.3 Environmental Conditions

Temperature:	20°C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

9.4 Summary of Test Results/Plots

For Cellular Band GSM Mode

Reference Frequency(Middle Channel): 836.6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	65	0.0777
40	3.7	75	0.0896
30	3.7	65	0.0777
20	3.7	69	0.0825
10	3.7	71	0.0849
0	3.7	79	0.0944
-10	3.7	63	0.0753
-20	3.7	69	0.0825
-30	3.7	64	0.0765

For PCS Band GSM Mode

Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	59	0.0314
40	3.7	48	0.0255
30	3.7	46	0.0245
20	3.7	56	0.0298
10	3.7	55	0.0293
0	3.7	61	0.0324
-10	3.7	47	0.0250
-20	3.7	60	0.0319
-30	3.7	57	0.0303

For Cellular Band GPRS Mode

Reference Frequency(Middle Channel): 836.6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	78	0.0932
40	3.7	79	0.0944
30	3.7	64	0.0765
20	3.7	89	0.1064
10	3.7	97	0.1159
0	3.7	64	0.0765
-10	3.7	79	0.0944
-20	3.7	81	0.0968
-30	3.7	69	0.0825

For PCS Band GPRS Mode

Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	59	0.0314
40	3.7	57	0.0303
30	3.7	55	0.0293
20	3.7	66	0.0351
10	3.7	51	0.0271
0	3.7	65	0.0346
-10	3.7	58	0.0309
-20	3.7	59	0.0314
-30	3.7	64	0.0340

For Cellular Band EDGE Mode

Reference Frequency(Middle Channel): 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	48	0.0574
40	3.7	39	0.0466
30	3.7	44	0.0526
20	3.7	49	0.0586
10	3.7	37	0.0442
0	3.7	39	0.0466
-10	3.7	46	0.0550
-20	3.7	41	0.0490
-30	3.7	43	0.0514

For PCS Band EDGE Mode

Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	77	0.0410
40	3.7	89	0.0473
30	3.7	71	0.0378
20	3.7	76	0.0404
10	3.7	84	0.0447
0	3.7	75	0.0399
-10	3.7	75	0.0399
-20	3.7	85	0.0452
-30	3.7	76	0.0404

For WCDMA Band V Mode

Reference Frequency(Middle Channel): 836.6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	-46	-0.0550
40	3.7	-39	-0.0466
30	3.7	-36	-0.0430
20	3.7	-50	-0.0598
10	3.7	-31	-0.0371
0	3.7	-26	-0.0311
-10	3.7	-37	-0.0442
-20	3.7	-41	-0.0490
-30	3.7	-20	-0.0239

For HSUPA Band V Mode

Reference Frequency(Middle Channel): 836.6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	-54	-0.0646
40	3.7	-47	-0.0562
30	3.7	-44	-0.0526
20	3.7	-58	-0.0693
10	3.7	-39	-0.0466
0	3.7	-34	-0.0407
-10	3.7	-45	-0.0538
-20	3.7	-49	-0.0586
-30	3.7	-28	-0.0335

For HSDPA Band V Mode

Reference Frequency(Middle Channel): 836.6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	-68	-0.0813
40	3.7	-61	-0.0729
30	3.7	-58	-0.0693
20	3.7	-72	-0.0861
10	3.7	-53	-0.0634
0	3.7	-48	-0.0574
-10	3.7	-59	-0.0705
-20	3.7	-63	-0.0753
-30	3.7	-42	-0.0502

So, Frequency Stability Versus Input Voltage is:

Reference Frequency(Middle Channel): GSM 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.3	66	0.0789
	3.7	69	0.0825
	4.2	64	0.0765
Reference Frequency(Middle Channel): GSM 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.3	58	0.0309
	3.7	56	0.0298
	4.2	59	0.0314

Reference Frequency(Middle Channel): GPRS 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.3	74	0.0885
	3.7	89	0.1064
	4.2	81	0.0968
Reference Frequency(Middle Channel): GPRS 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.3	62	0.0330
	3.7	66	0.0351
	4.2	74	0.0394
Reference Frequency(Middle Channel): EDGE 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.3	52	0.0622
	3.7	49	0.0586
	4.2	53	0.0634
Reference Frequency(Middle Channel): EDGE 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.3	73	0.0388
	3.7	76	0.0404
	4.2	71	0.0378

Reference Frequency(Middle Channel): WCDMA 836.6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.3	57	0.0303
	3.7	-50	-0.0598
	4.2	61	0.0324
Reference Frequency(Middle Channel): HSDPA 836.6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.3	53	0.0282
	3.7	-72	-0.0861
	4.2	48	0.0255
Reference Frequency(Middle Channel): HSUPA 836.6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.3	64	0.0340
	3.7	-58	-0.0693
	4.2	65	0.0346

******* END OF REPORT *******