

FCC PART 22H&24E

Measurement and Test Report

For

MONARCH MERCHANT LLC

14521 DICKENS STREET, STE.1, SHERMAN OAKS, CALIFORNIA

FCC ID: YNNTRAV777

Report Concerns: Original Report	Equipment Type: Mobile Phone
Model:	<u>TRAVELER</u>
Report No.:	<u>STR10078118I-1</u>
Test Date:	<u>2010-07-17 to 2010-07-28</u>
Issue Date:	<u>2010-08-12</u>
Test Engineer:	<u>John Zhi</u> 
Reviewed By:	<u>Lahm Peng</u> 
Approved & Authorized By:	<u>Jandy so/PSQ Manager</u> 
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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by SEM.Test Compliance Service Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: MONARCH MERCHANT LLC
Address of applicant: 14521 DICKENS STREET, STE.1, SHERMAN OAKS, CALIFORNIA

Manufacturer: MONARCH MERCHANT LLC
Address of manufacturer: 14521 DICKENS STREET, STE.1, SHERMAN OAKS, CALIFORNIA

General Description of E.U.T

Items	Description
EUT Description:	Mobile Phone
Trade Name:	MONARCH
Model No.:	TRAVELER
Add Model:	MU9700
IMEI:	355501010014281
Rated Voltage:	DC 3.7V
Frequency range:	Tx: 824.2 ~ 848.8 MHz (PCS 850 band) Rx: 864.20 ~ 880.8 MHz (PCS 850 band) Tx: 1850.20 ~ 1909.8 MHz (PCS 1900 band) Rx: 1930.20 ~ 1989.8 MHz (PCS 1900 band)
RF Output Power(Conducted):	GSM850: 32.76dBm, PCS1900: 29.79dBm
RF Output Power(Radiated):	GSM850: 32.48dBm ERP, PCS1900: 29.88dBm EIRP
Cellular Phone Protocol:	GSM 850MHz, GPRS Class12 850MHz PCS 1900MHz, GPRS Class12 1900MHz
Type of Emission:	260KGXW ,/ 260KG7W
Antenna Gain:	-0.23dBi for 850MHz, 0.67dBi for 1900MHz
Type of Antenna:	Integral Antenna
Size:	10.3X5.5X1.4cm

Note: The test data is gathered from a production sample, provided by the manufacture. The others models listed in the report have different appearance only of TRAVELER without circuit and electronic construction changed, declared by the manufacturer.

1.2 Test Standards

The following report is prepared on behalf of the MONARCH MERCHANT LLC 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 Related Submittal(s)/Grant(s)

No Related Submittal(s).

1.4 Test Methodology

All measurements contained in this report were conducted with TIA/EIA 603-C: 2004 and ANSI C63.4-2009, 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.

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted with Low Channel, Middle Channel and High Channel, accordingly in reference to the Operating Instructions.

1.5 Test Facility

- **FCC – Registration No.: 994117**

SEM.Test Compliance Services 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 994117.

- **Industry Canada (IC) Registration No.: 7673A**

The 3m Semi-anechoic chamber of SEM.Test Compliance Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 7673A.

1.6 EUT Exercise Software

The EUT exercise program used during the testing was designed to exercise the system components.

1.7 Accessories Equipment List and Details

Manufacturer	Description	Model	Serial Number
LONGWEI	DC POWER SUPPLY	2410	/

1.8 EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
USB Cable	1.0	Unshielded	Without Core
Earphone	1.1	Unshielded	Without Core

2. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§ 1.1307 § 2.1093	RF Exposure	Compliant
§ 15.207	Conducted Emission	N/A
§ 22.913 (a), § 24.232 (c)	RF Output Power	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 complies with the requirement of the RF exposure, please see the SAR test report.

4. RF OUTPUT POWER

4.1 Standard Applicable

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

According to §24.232 (c), no any case may the peak output power of mobile or portable station transmitter exceed 2 Watt EIRP.

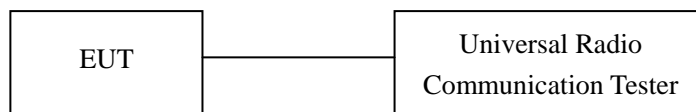
4.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Rohde & Schwarz	FSP	836079/035	2010-04-16	2011-04-15
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2009-07-21	2010-07-20
Horn Antenna	SCHWARZBECK	BBHX9120	9120	2009-07-21	2010-07-20
Horn Antenna	ETS	3117	00086197	2009-07-21	2010-07-20
Signal Generator	R&S	SMR20	100047	2009-08-12	2010-08-11
Amplifier	Agilent	8447F	3113A06717	2009-08-12	2010-08-11
Universal Radio Communication Tester	Rohde & Schwarz	CMU200	112012	2010-04-16	2011-04-15

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

4.3 Test Procedure

Conducted output power test method:



Radiated power test method:

1. The setup of EUT is according with per TIA/EIA Standard 603C 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.

4.4 Environmental Conditions

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

4.5 Summary of Test Results/Plots

ERP for cellular band GSM mode

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Corrected Ampl.	FCC Part 22 Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	dBm	dBm
Low Channel								
824.2	25.62	1.5	0	H	0.8	7.2	32.02	38.45
824.2	25.85	1.5	0	V	0.8	7.2	32.25	38.45
Middle Channel								
836.6	25.71	1.5	0	H	0.8	7.2	32.11	38.45
836.6	25.78	1.5	0	V	0.8	7.2	32.18	38.45
High Channel								
848.8	25.75	1.5	0	H	0.8	7.2	32.15	38.45
848.8	26.08	1.5	0	V	0.8	7.2	32.48	38.45

ERP for cellular band GPRS mode

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Corrected Ampl.	FCC Part 22 Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	dBm	dBm
Low Channel								
824.2	24.65	1.5	0	H	0.8	7.2	31.05	38.45
824.2	24.82	1.5	0	V	0.8	7.2	31.22	38.45
Middle Channel								
836.6	24.49	1.5	0	H	0.8	7.2	30.89	38.45
836.6	24.67	1.5	0	V	0.8	7.2	31.07	38.45
High Channel								
848.8	24.56	1.5	0	H	0.8	7.2	30.96	38.45
848.8	24.72	1.5	0	V	0.8	7.2	31.12	38.45

EIRP for PCS band GSM mode

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Corrected Ampl.	FCC Part 24 Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	dBm	dBm
Low Channel								
1850.2	26.46	1.5	0	H	1.5	4.6	29.56	33
1850.2	26.78	1.5	0	V	1.5	4.6	29.88	33
Middle Channel								
1880.0	26.02	1.5	0	H	1.5	4.6	29.12	33
1880.0	26.25	1.5	0	V	1.5	4.6	29.35	33
High Channel								
1909.8	25.57	1.5	0	H	1.5	4.6	28.67	33
1909.8	25.79	1.5	0	V	1.5	4.6	28.89	33

EIRP for PCS band GPRS mode

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Corrected Ampl.	FCC Part 24 Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	dBm	dBm
Low Channel								
1850.2	26.13	1.5	0	H	1.5	4.6	29.23	33
1850.2	26.58	1.5	0	V	1.5	4.6	29.68	33
Middle Channel								
1880.0	25.82	1.5	0	H	1.5	4.6	28.92	33
1880.0	25.94	1.5	0	V	1.5	4.6	29.04	33
High Channel								
1909.8	25.37	1.5	0	H	1.5	4.6	28.47	33
1909.8	25.62	1.5	0	V	1.5	4.6	28.72	33

Conducted Output Power

For Cellular Band (GSM850)

Test Mode	Channel	Frequency (MHz)	Output Power (dBm)	FCC Part 22.913 Limit (dBm)
GSM	Low Channel	824.2	32.65	38.45
	Middle Channel	836.6	32.73	38.45
	High Channel	848.8	32.76	38.45
GPRS	Low Channel	824.2	31.35	38.45
	Middle Channel	836.6	31.37	38.45
	High Channel	848.8	31.40	38.45

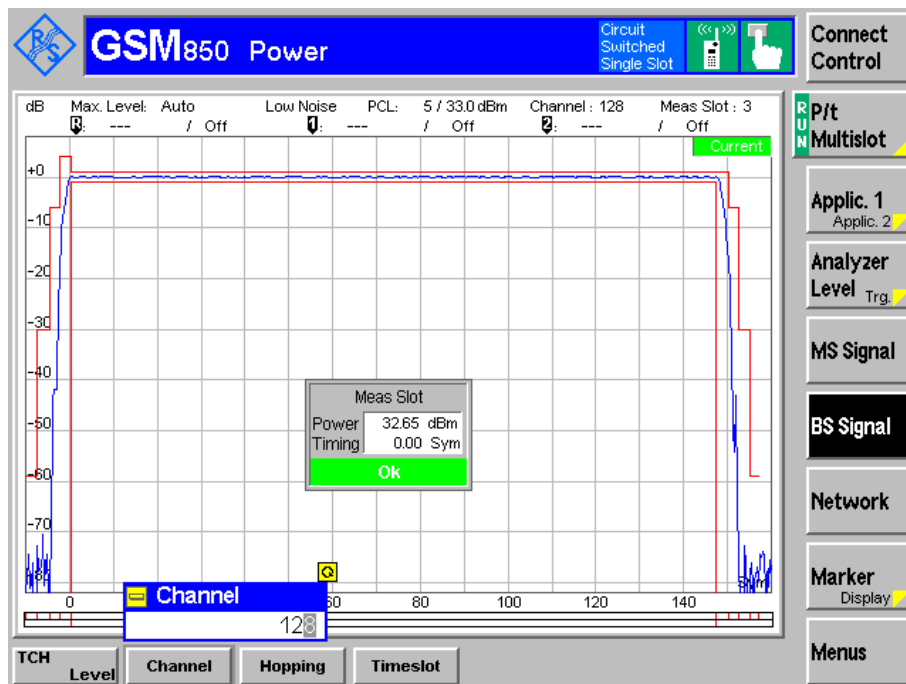
For PCS Band (GSM1900)

Test Mode	Channel	Frequency (MHz)	Output Power (dBm)	FCC Part 24.232 Limit (dBm)
GSM	Low Channel	1850.2	29.79	33
	Middle Channel	1880.0	29.01	33
	High Channel	1909.8	28.44	33
GPRS	Low Channel	1850.2	29.66	33
	Middle Channel	1880.0	28.77	33
	High Channel	1909.8	28.27	33

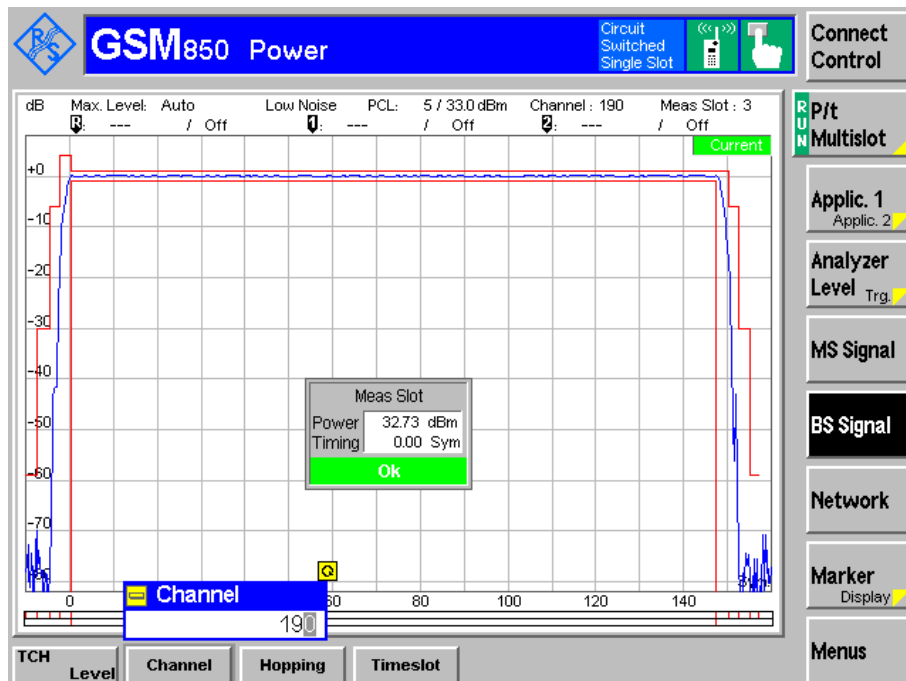
Please refer to the following test plots:

For Cellular Band

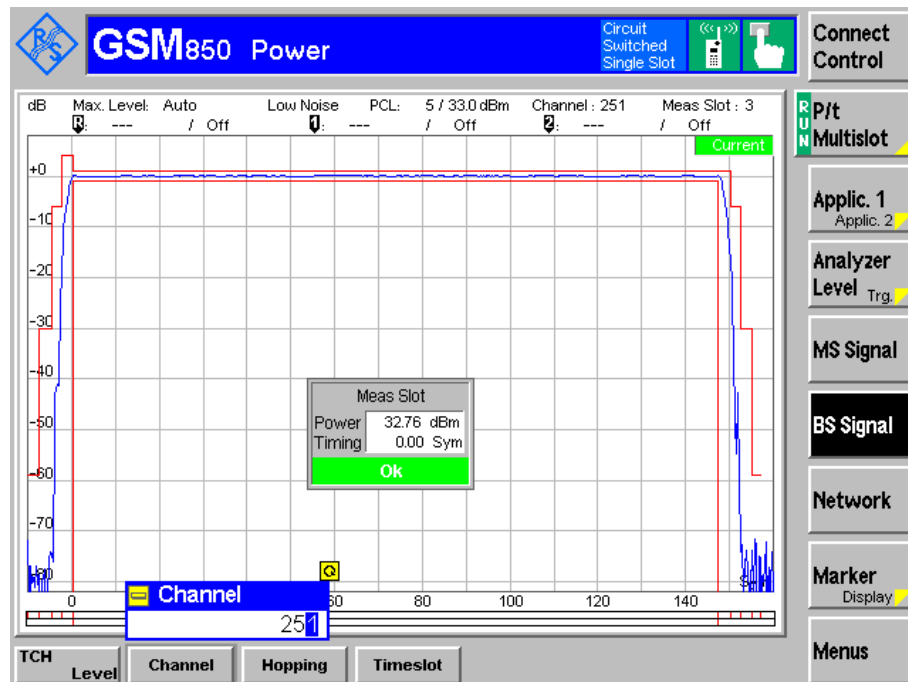
GSM Low Channel



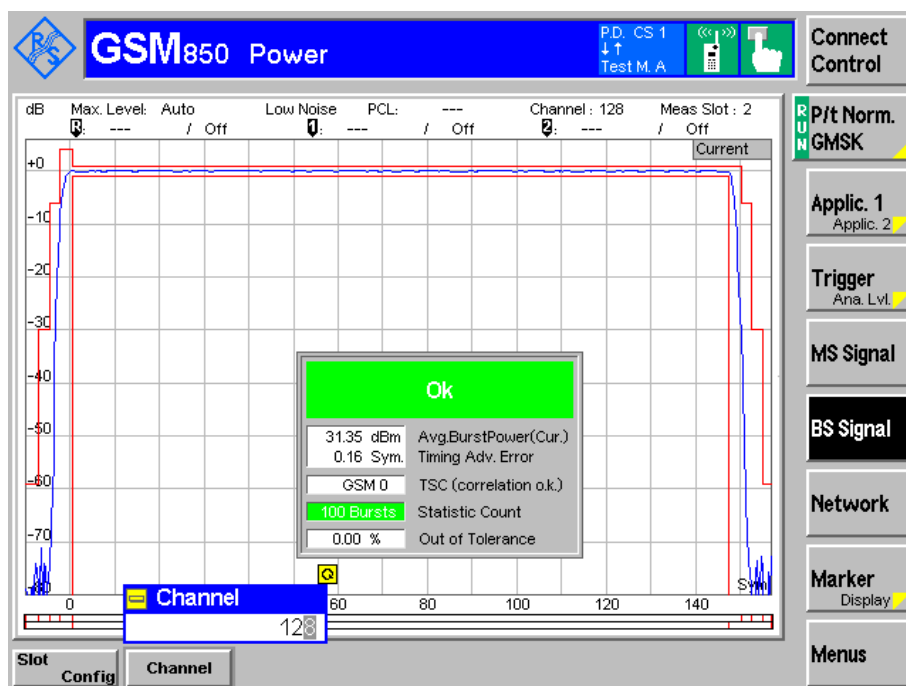
GSM Middle Channel



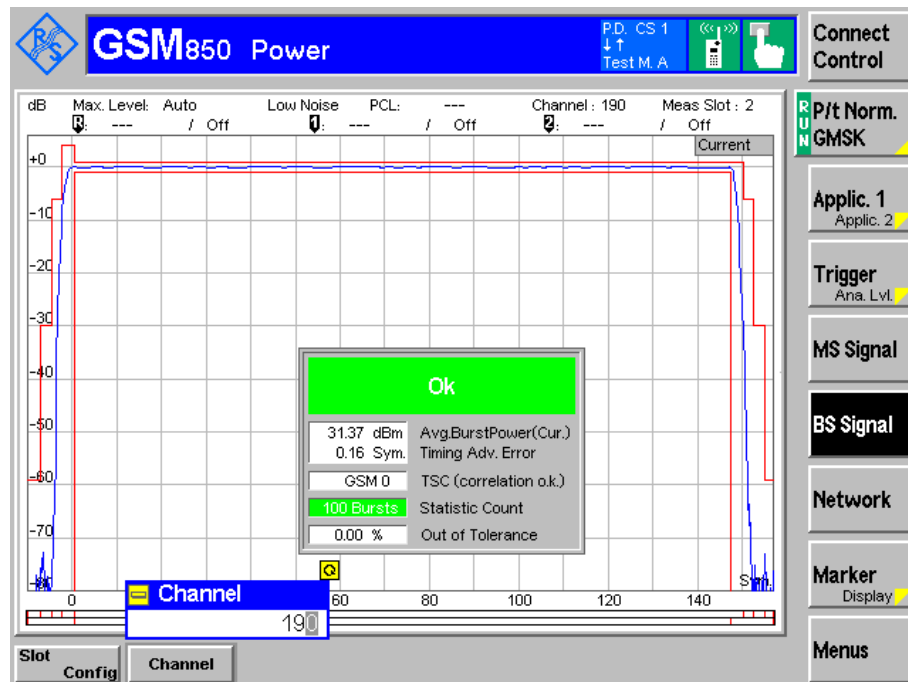
GSM High Channel



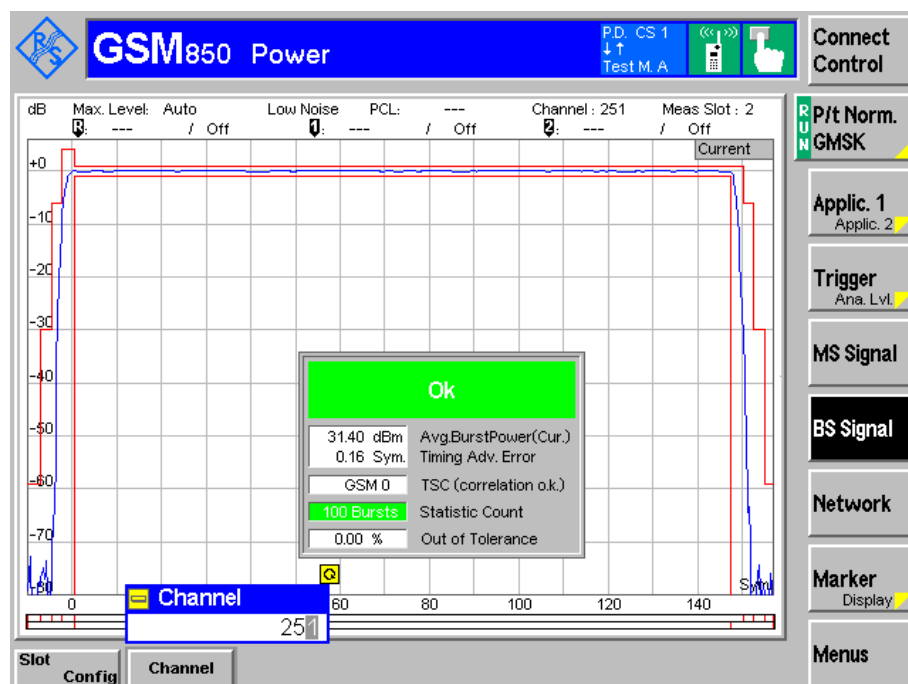
GPRS Low Channel



GPRS Middle Channel

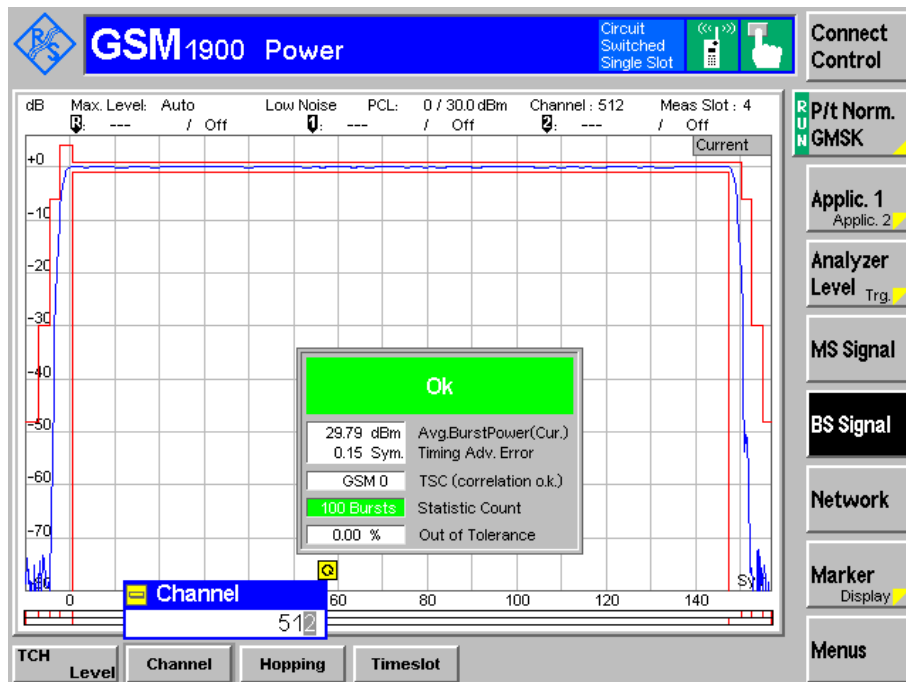


GPRS High Channel

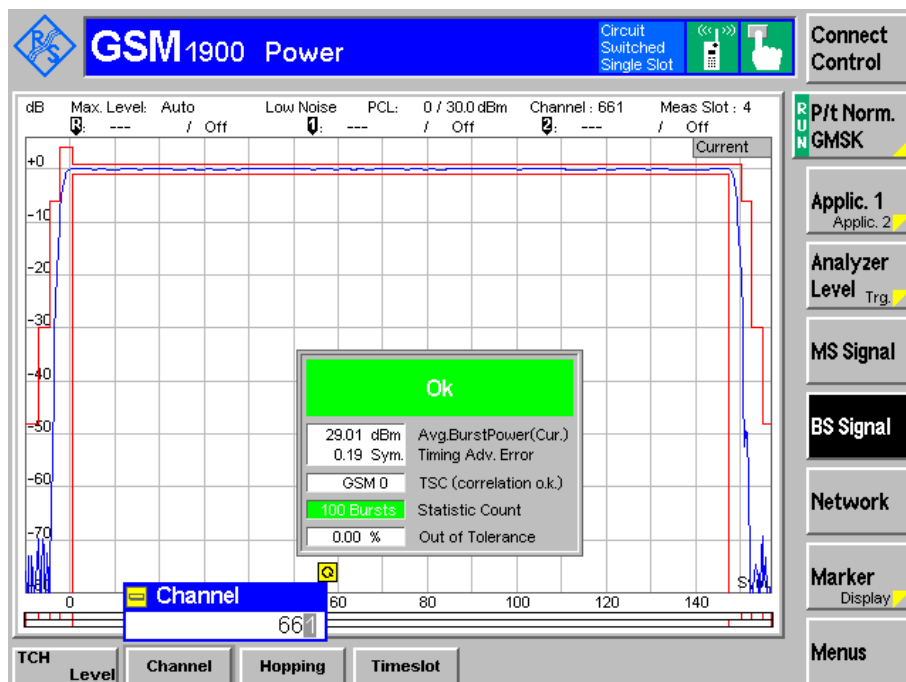


For PCS Band

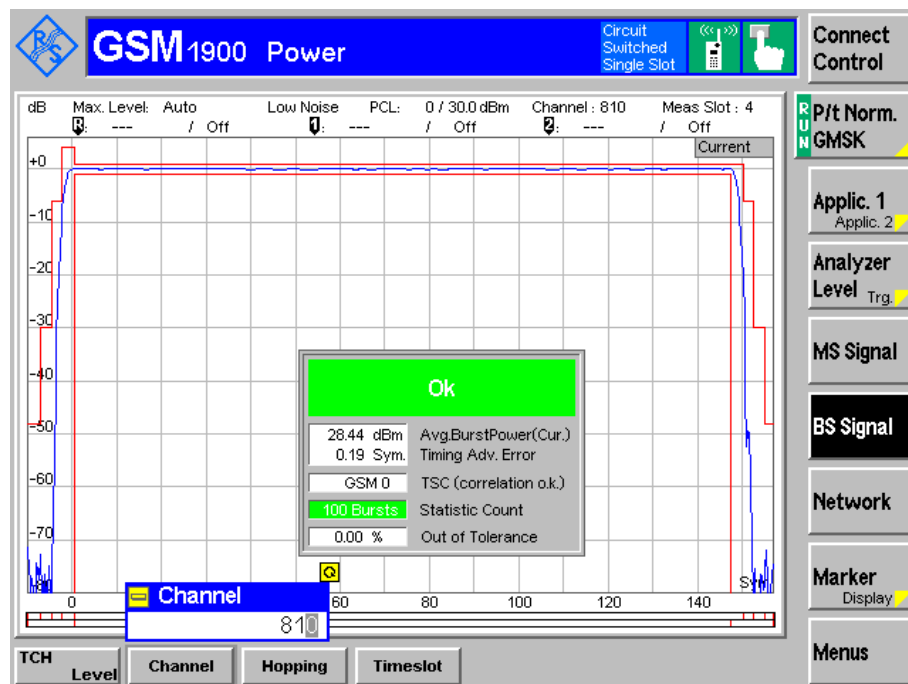
GSM Low Channel



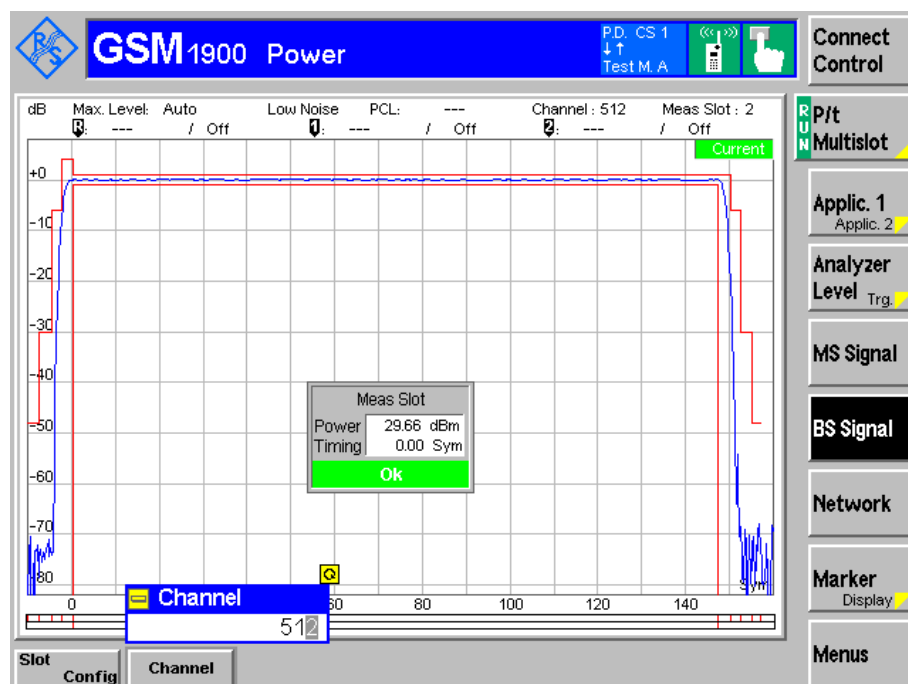
GSM Middle Channel



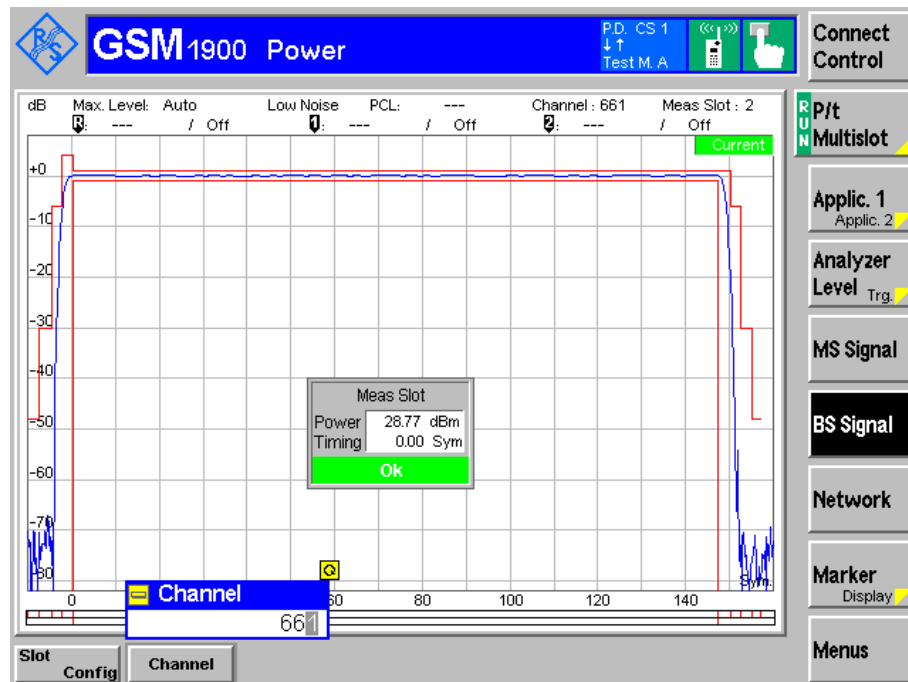
GSM High Channel



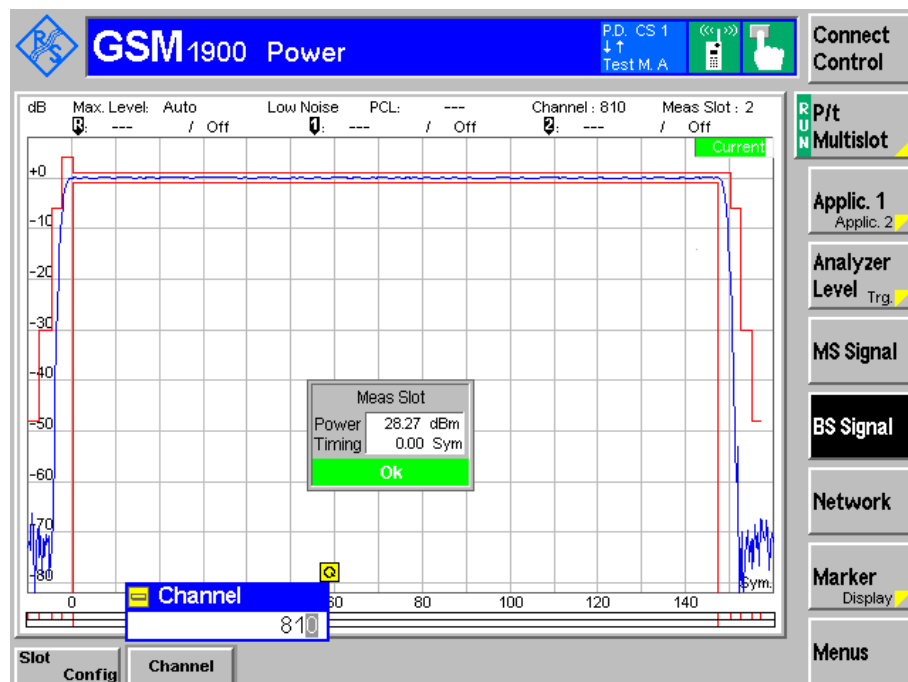
GPRS Low Channel



GPRS Middle Channel



GPRS High Channel



5. EMISSION BANDWIDTH

5.1 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.

5.2 Test Equipment List and Details

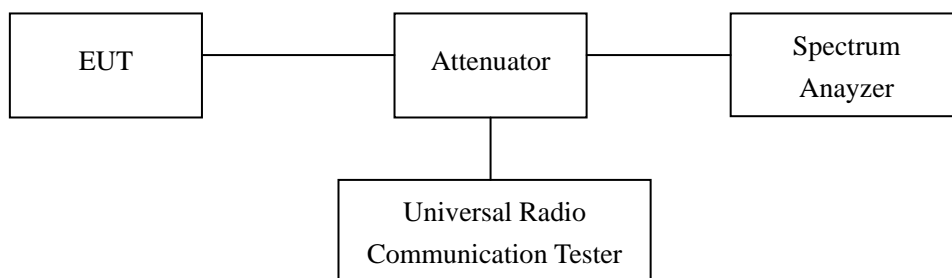
Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Aglient	Spectrum Analyzer	E4402B	US41192821	2009-08-12	2010-08-11
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	112012	2010-04-16	2011-04-15

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

5.3 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:



5.4 Environmental Conditions

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

5.5 Summary of Test Results/Plots

For Cellular Band

For GSM

Channel	Frequency (MHz)	99% Emission Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
128	824.2	261.4303	/
190	836.6	259.5780	/
251	848.8	261.6339	/

For GPRS

Channel	Frequency (MHz)	99% Emission Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
128	824.2	260.4697	/
190	836.6	261.6330	/
251	848.8	268.1651	/

For PCS Band

For GSM

Channel	Frequency (MHz)	99% Emission Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
512	1850.2	266.2842	/
661	1880.0	266.6563	/
810	1909.8	265.7712	/

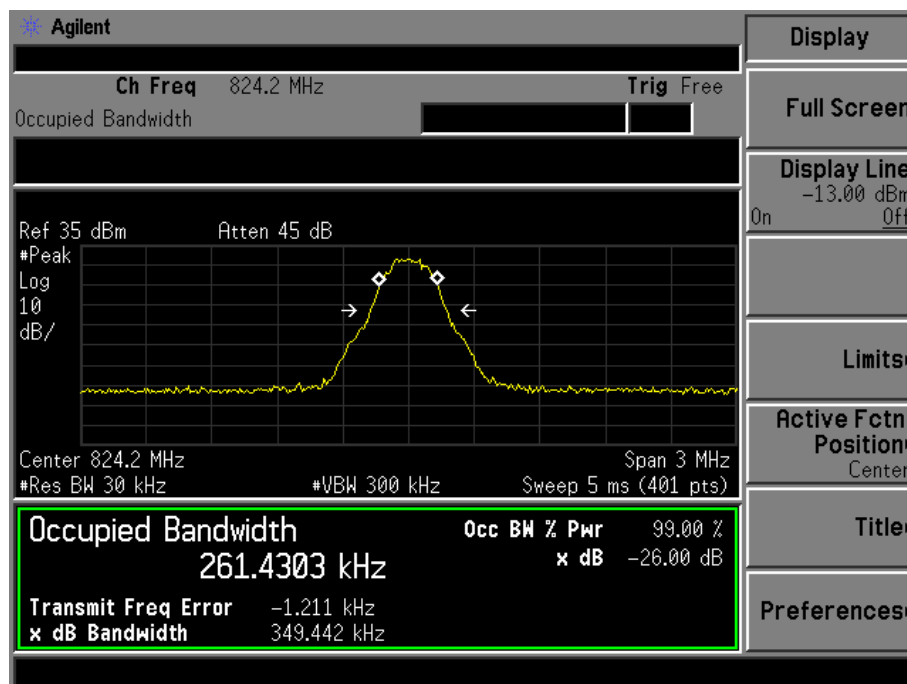
For GPRS

Channel	Frequency (MHz)	99% Emission Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
512	1850.2	263.3377	/
661	1880.0	264.6084	/
810	1909.8	263.7279	/

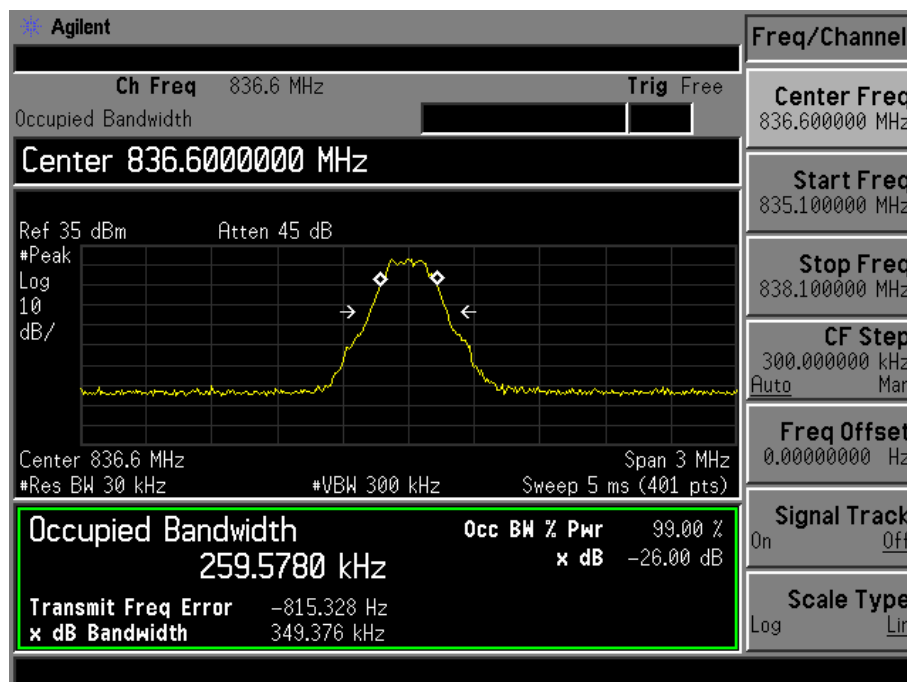
Please refer to the following test plots:

For Cellular Band

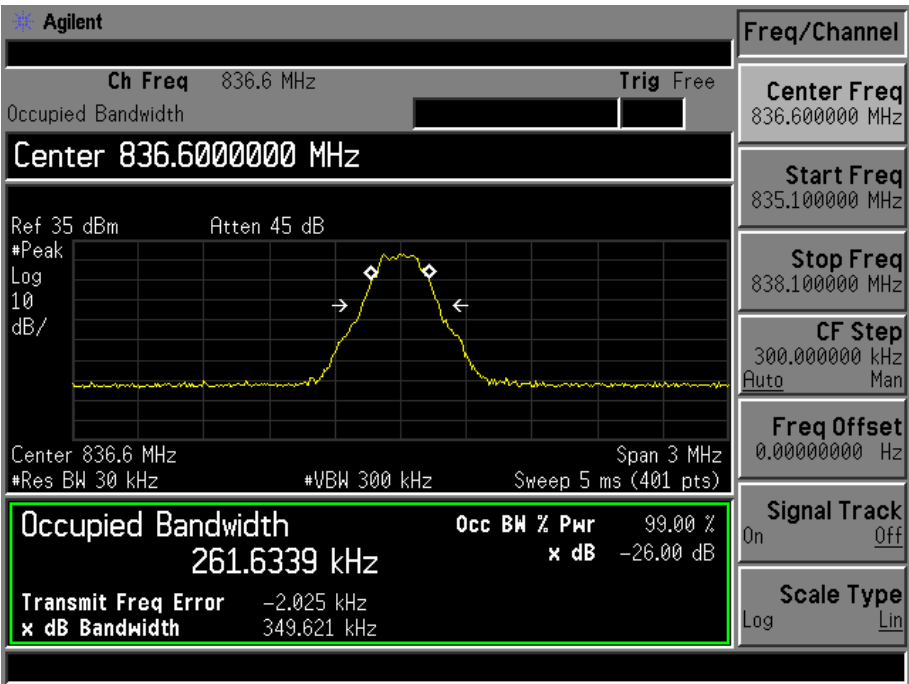
GSM Low Channel



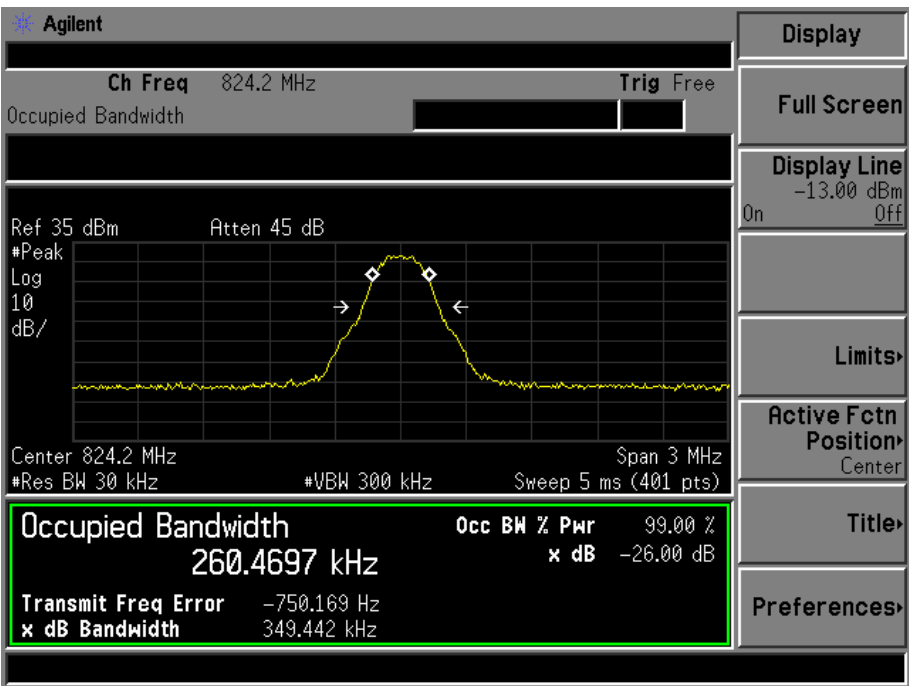
GSM Middle Channel



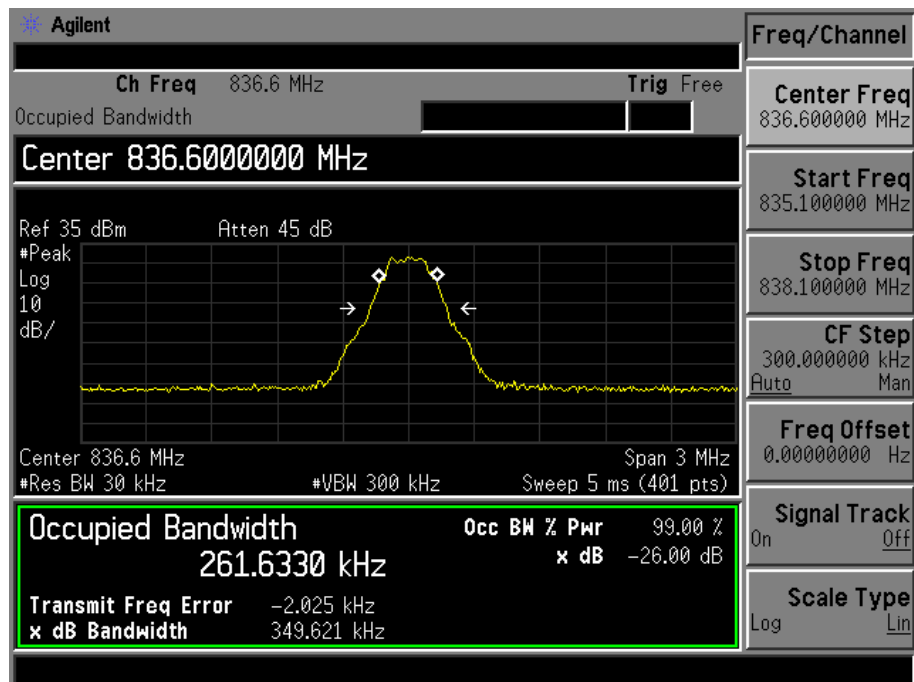
GSM High channel



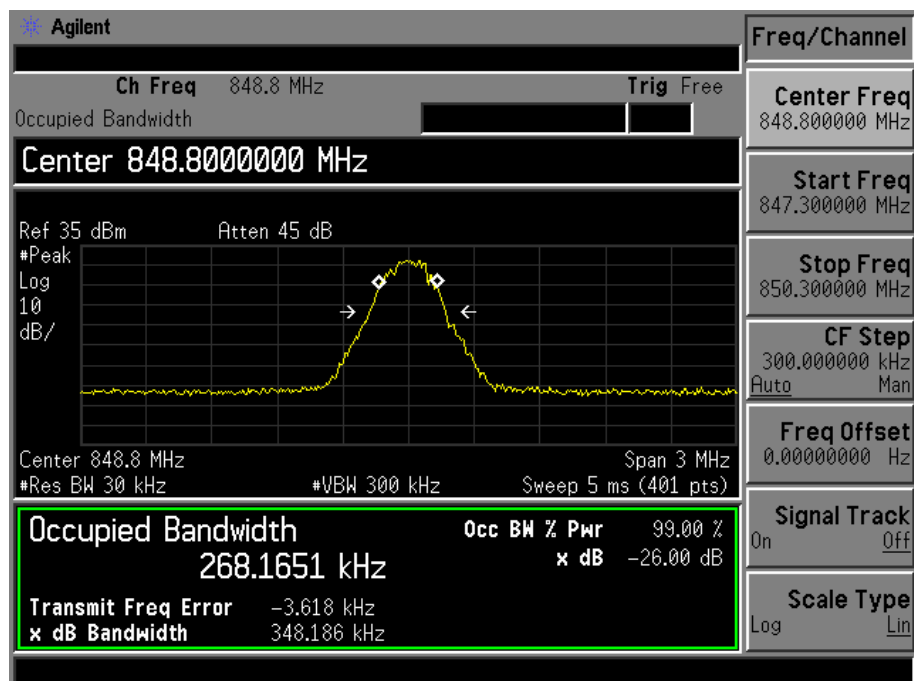
GPRS Low Channel



GPRS Middle Channel

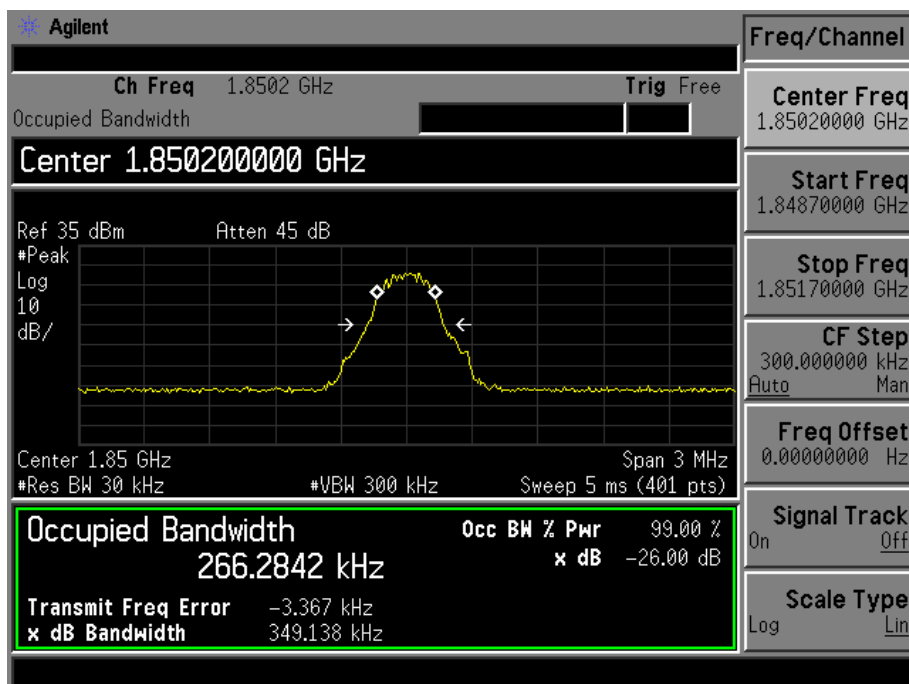


GSM High Channel

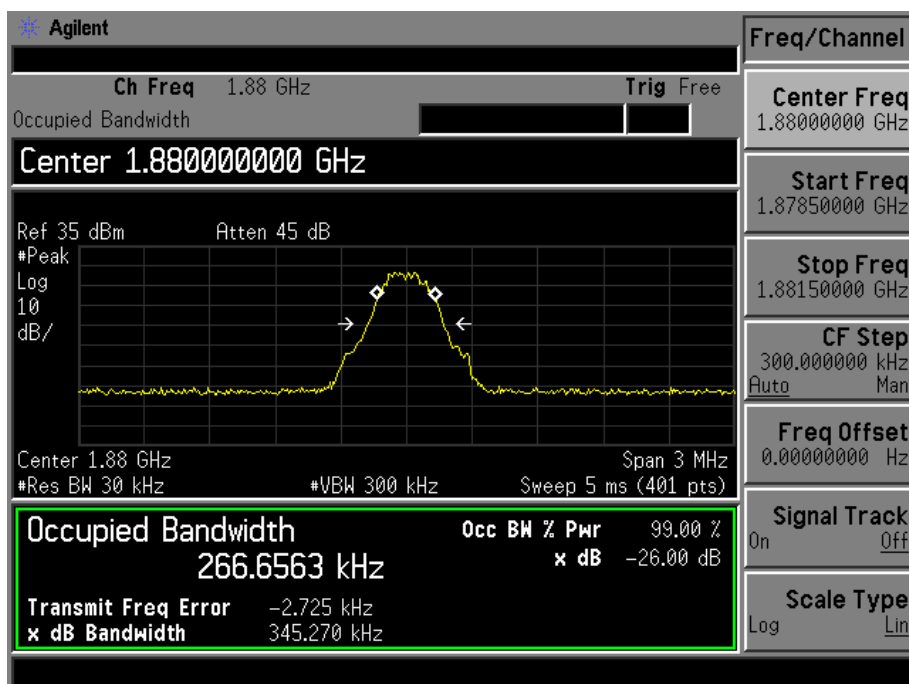


For PCS Band

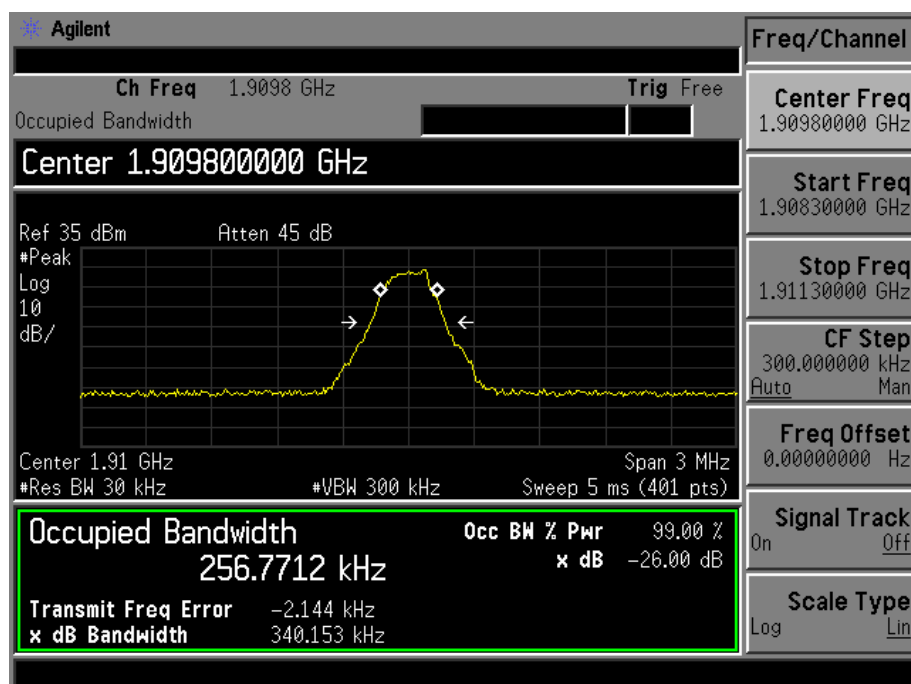
GSM Low Channel



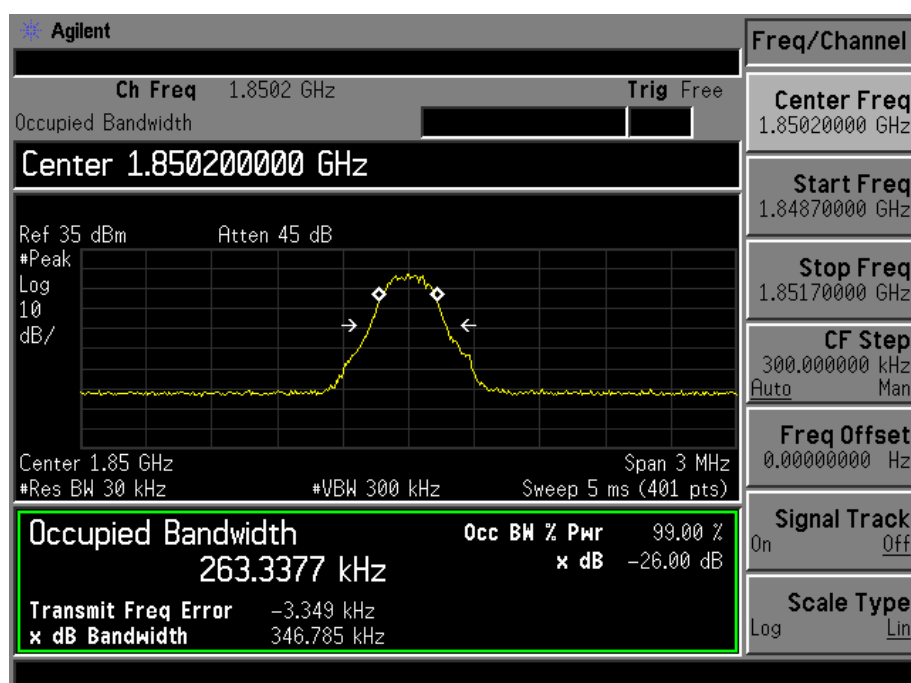
GSM Middle Channel



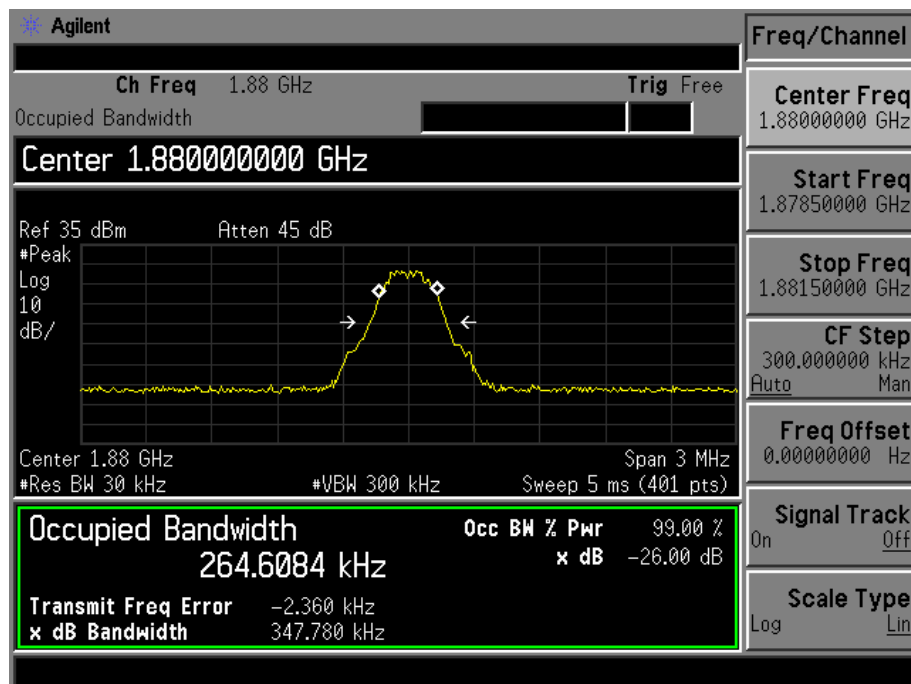
GSM High channel



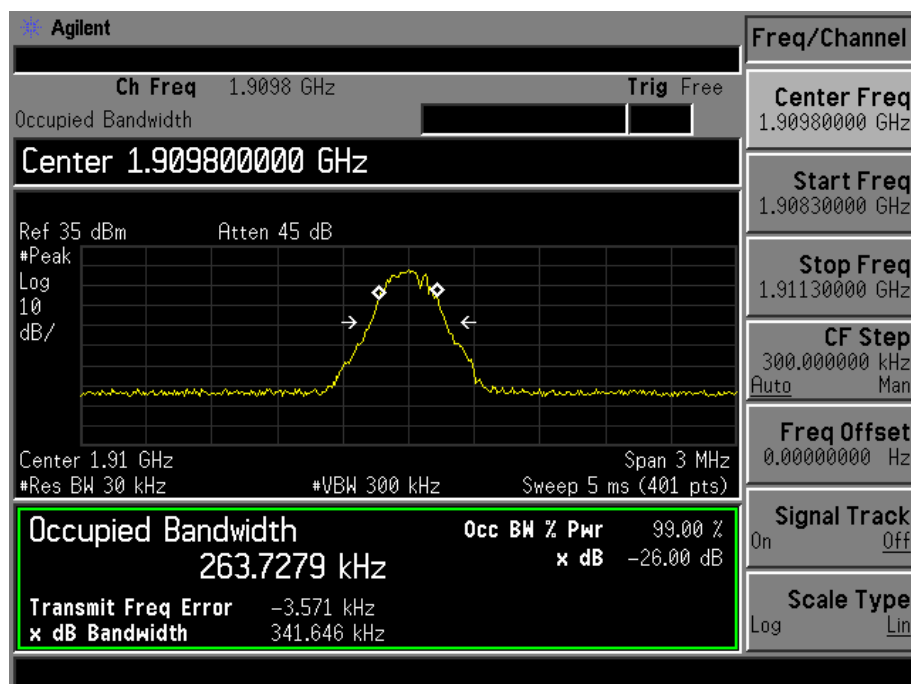
GPRS Low Channel



GPRS Middle Channel



GSM High Channel



6. OUT OF BAND EMISSION AT ANTENNA TERMINAL

6.1 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.

6.2 Test Equipment List and Details

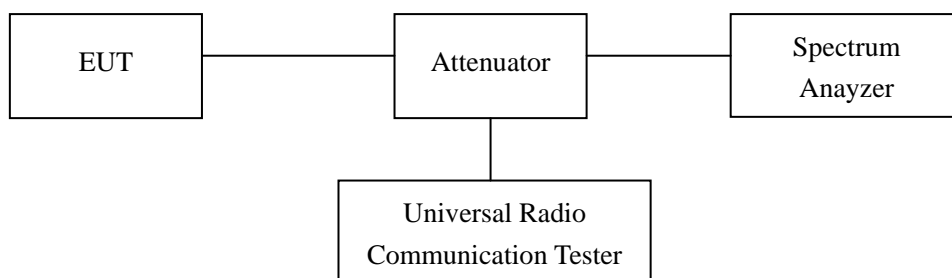
Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Aglient	Spectrum Analyzer	E4402B	US41192821	2009-08-12	2010-08-11
Rohde & Schwarz	Spectrum Analyzer	FSP	836079/035	2010-04-16	2011-04-15
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	112012	2010-04-16	2011-04-15

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

6.3 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 10th harmonic.

Test Configuration for the out of band emissions testing:



6.4 Environmental Conditions

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

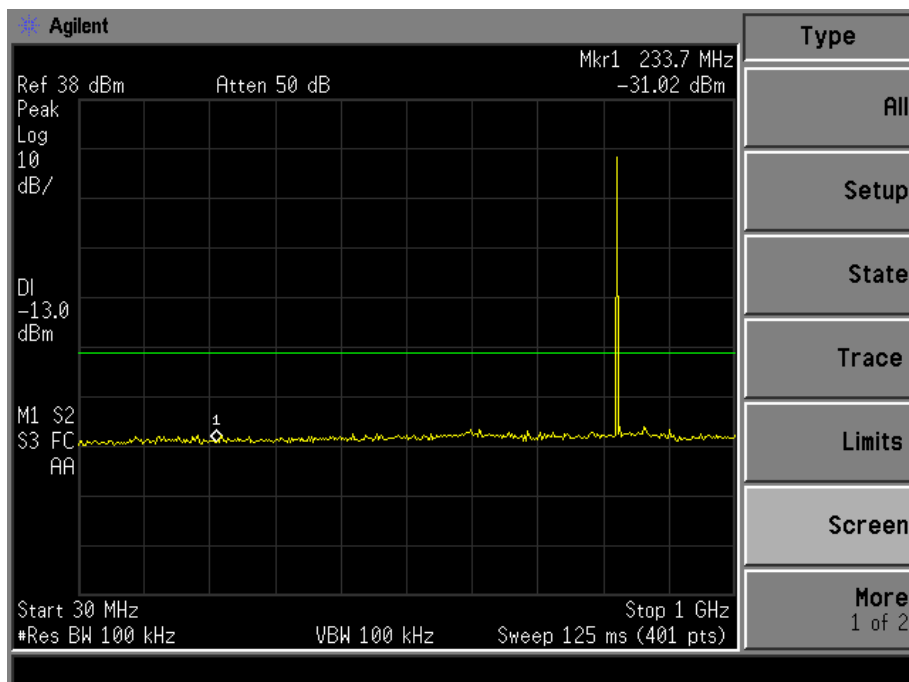
6.5 Summary of Test Results/Plots

Please refer to the following test plots

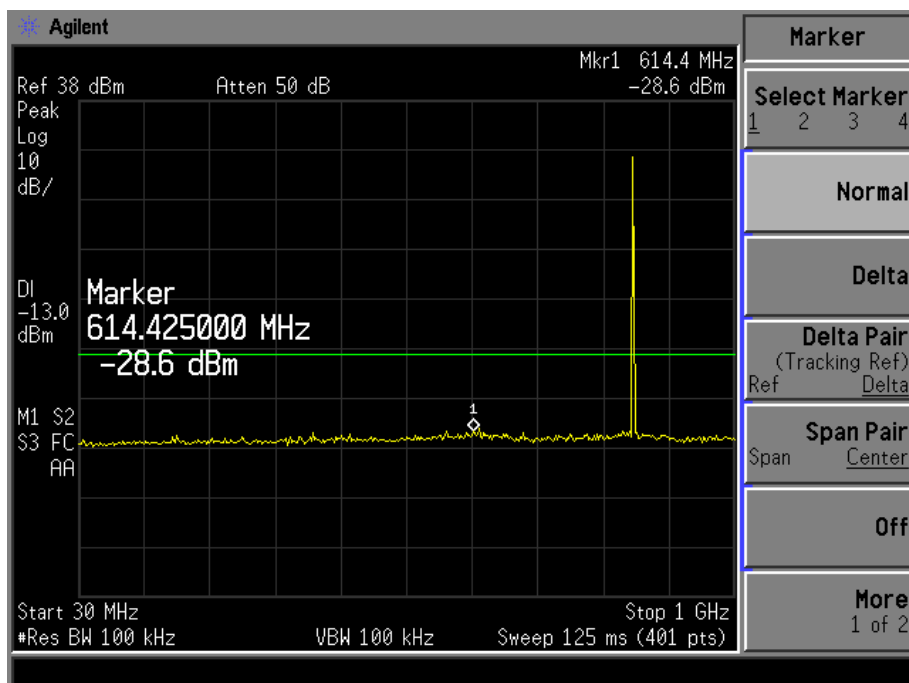
For Cellular Band GSM Mode

From 30MHz to 1GHz

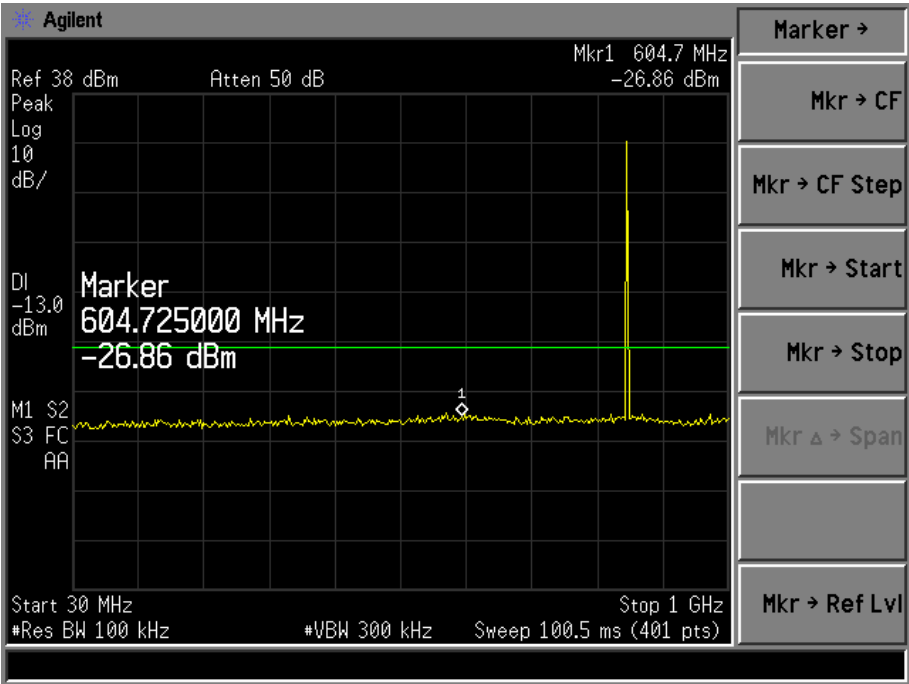
Low Channel



Middle Channel

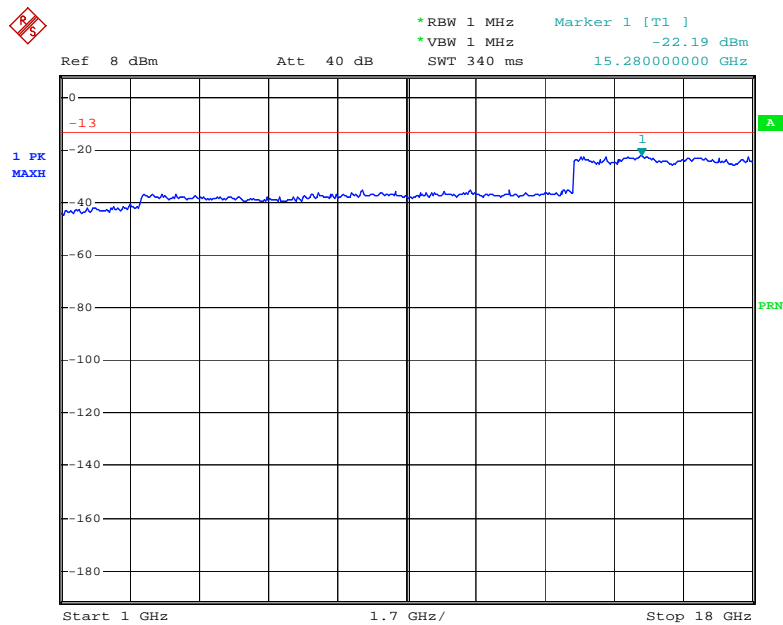


High Channel

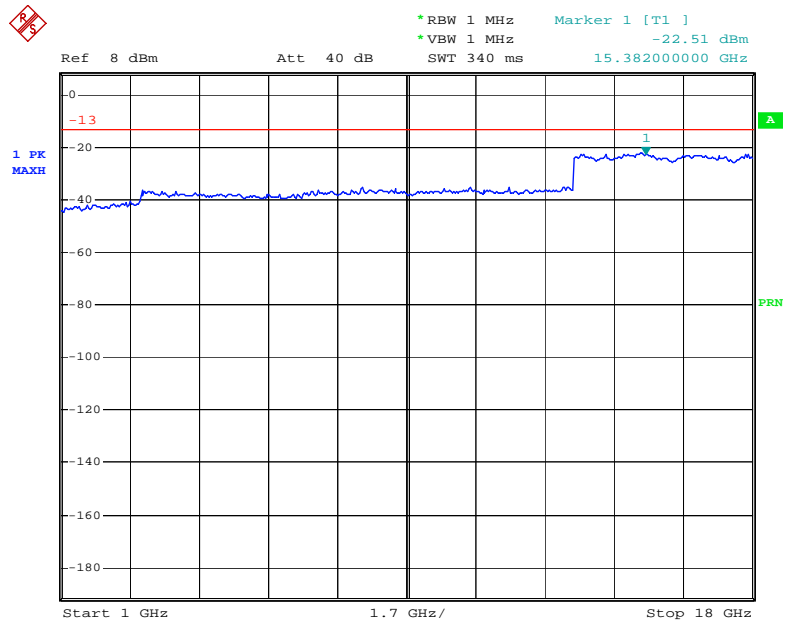


Above 1GHz

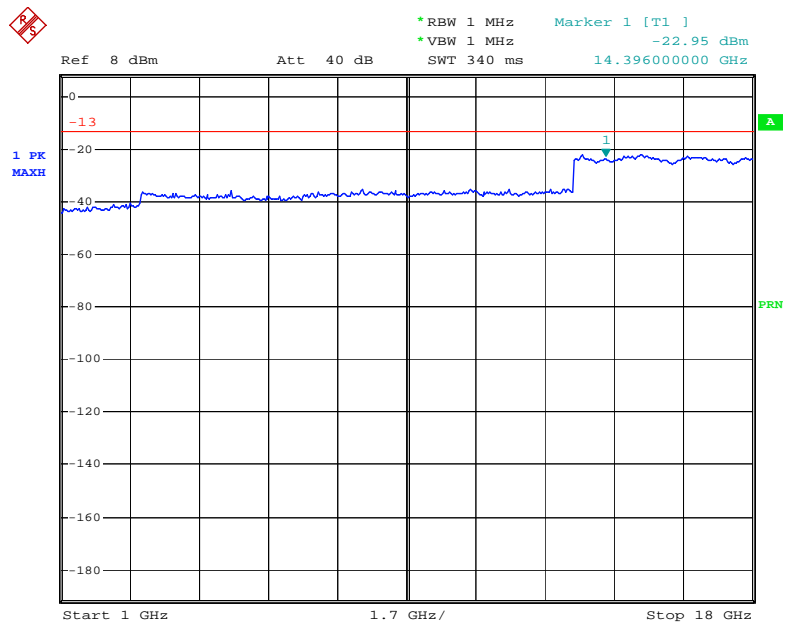
Low Channel



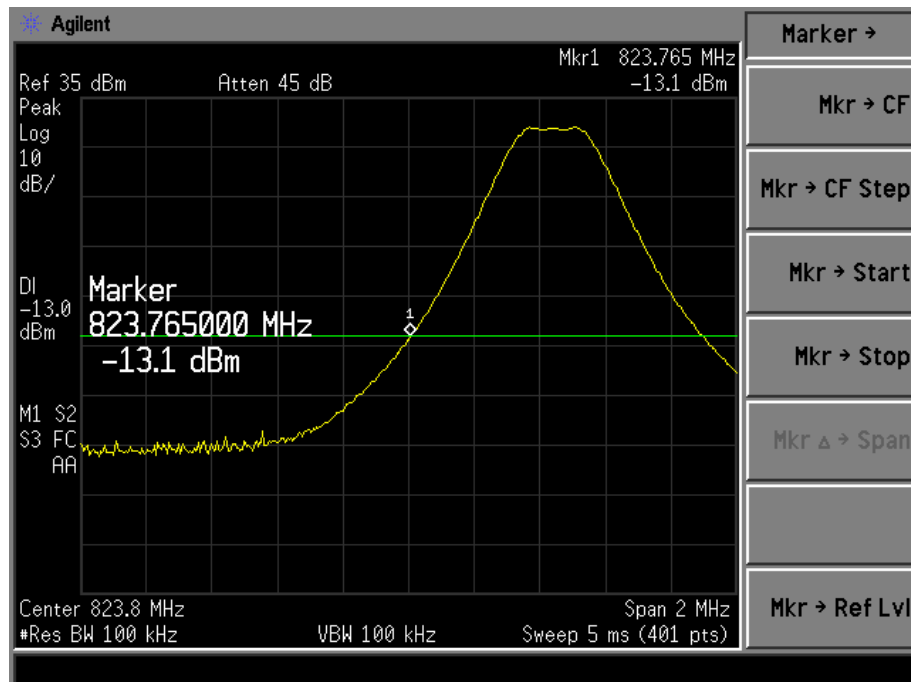
Middle Channel



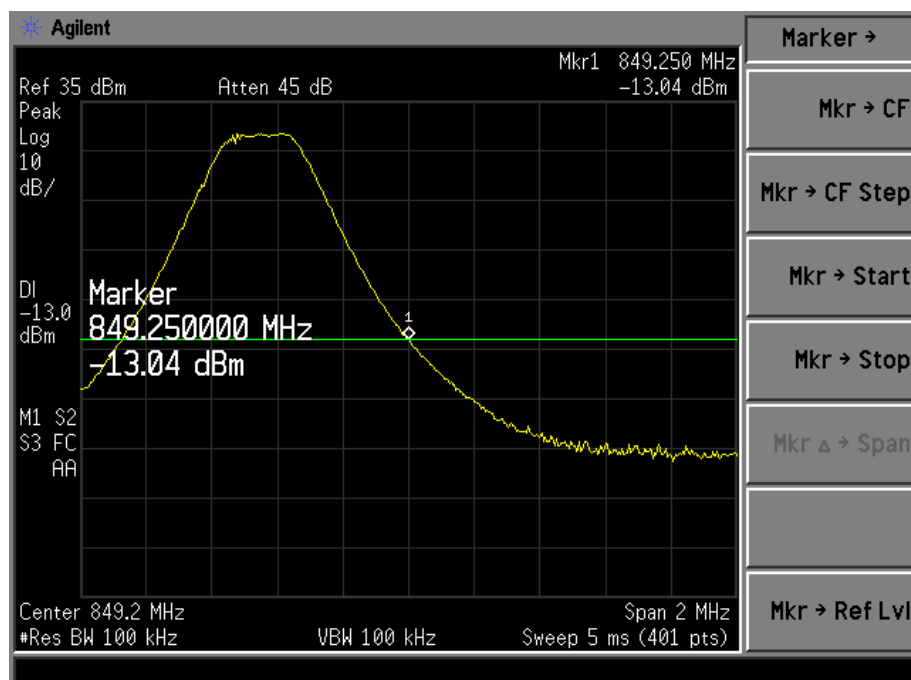
High Channel



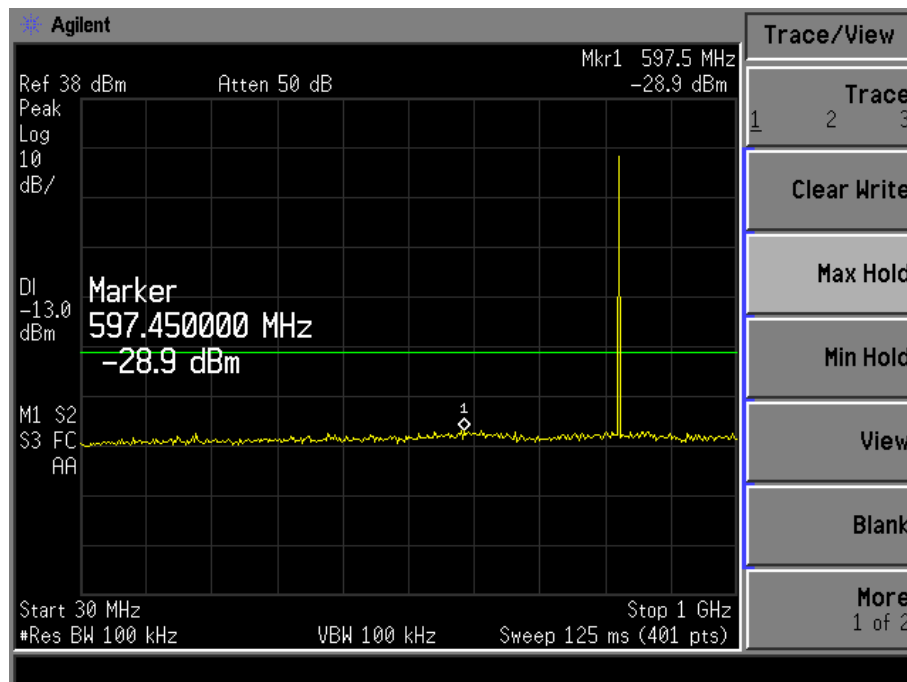
GSM Low band Emission



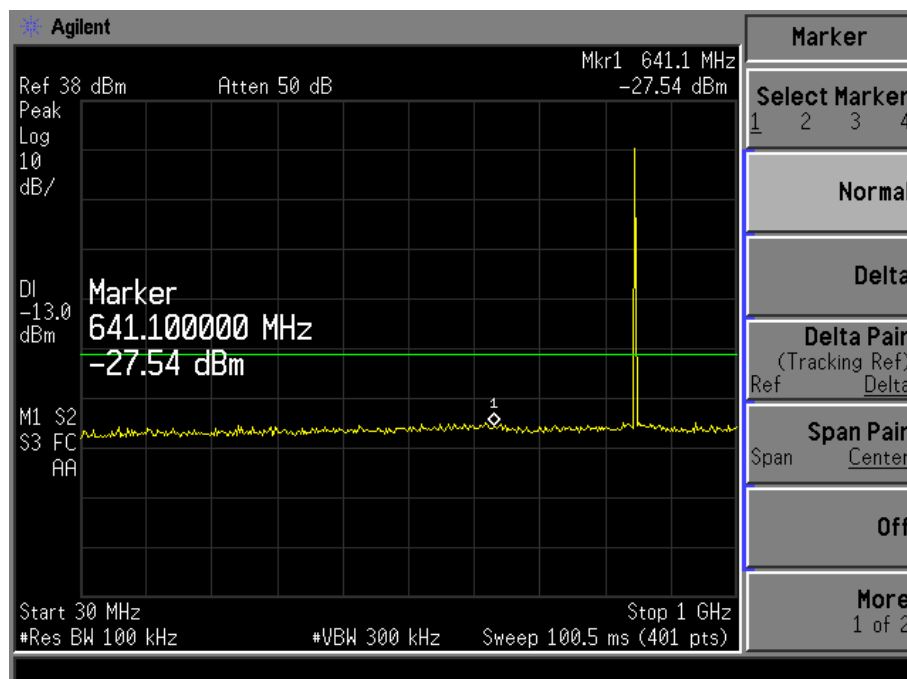
GSM High band Emission



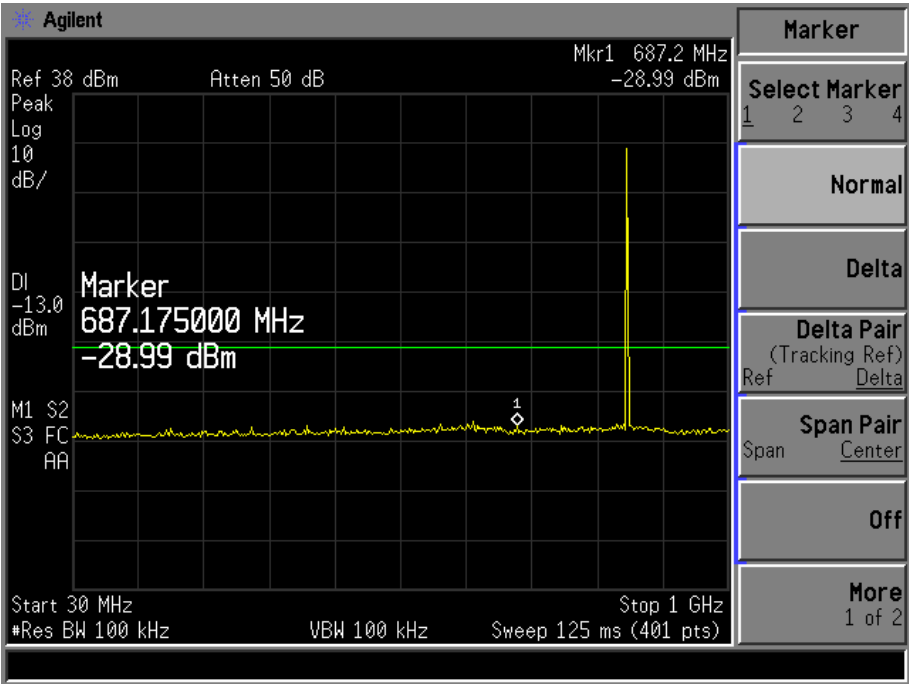
For Cellular Band GPRS Mode
From 30MHz to 1GHz
Low Channel



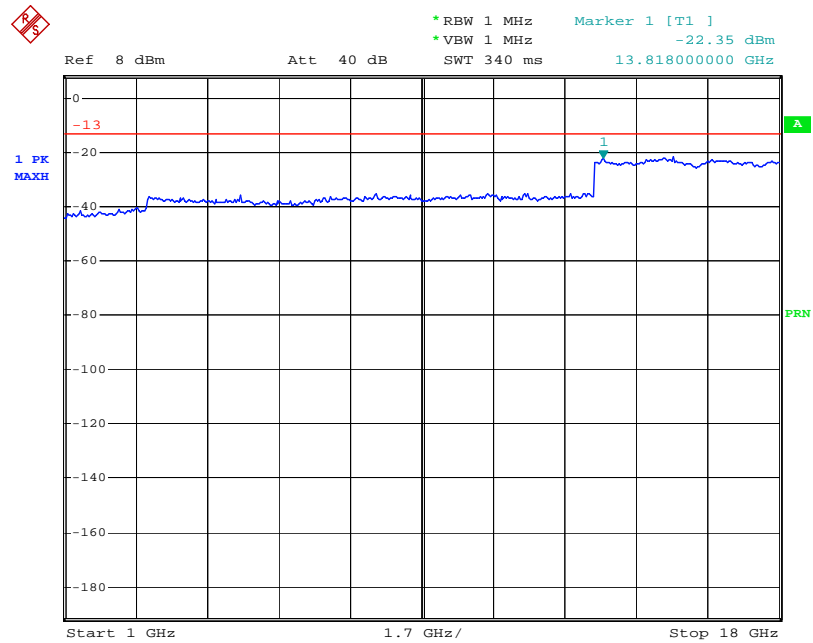
Middle Channel



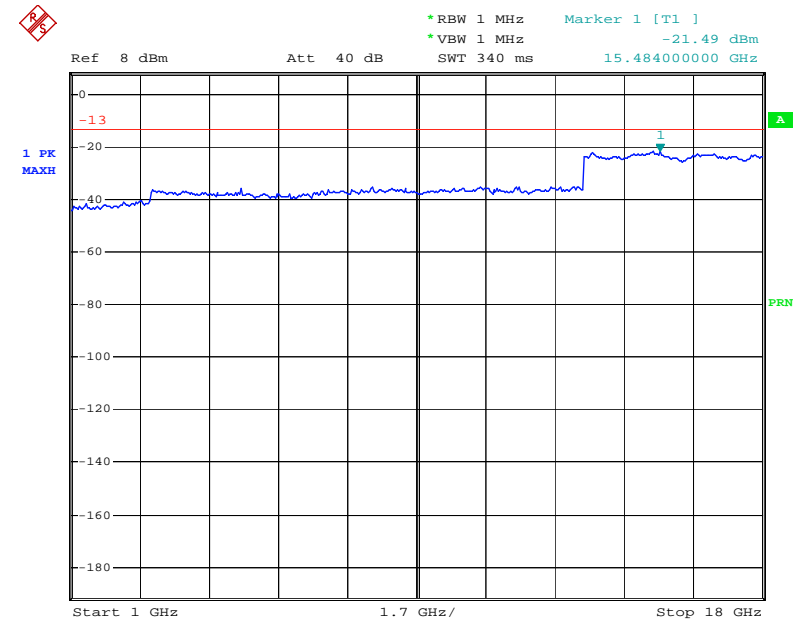
High Channel



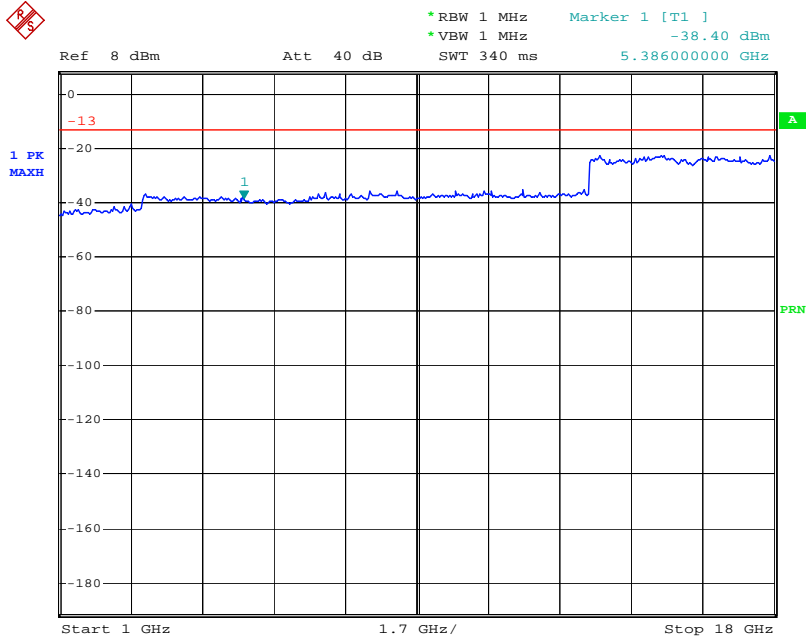
Above 1GHz
Low Channel



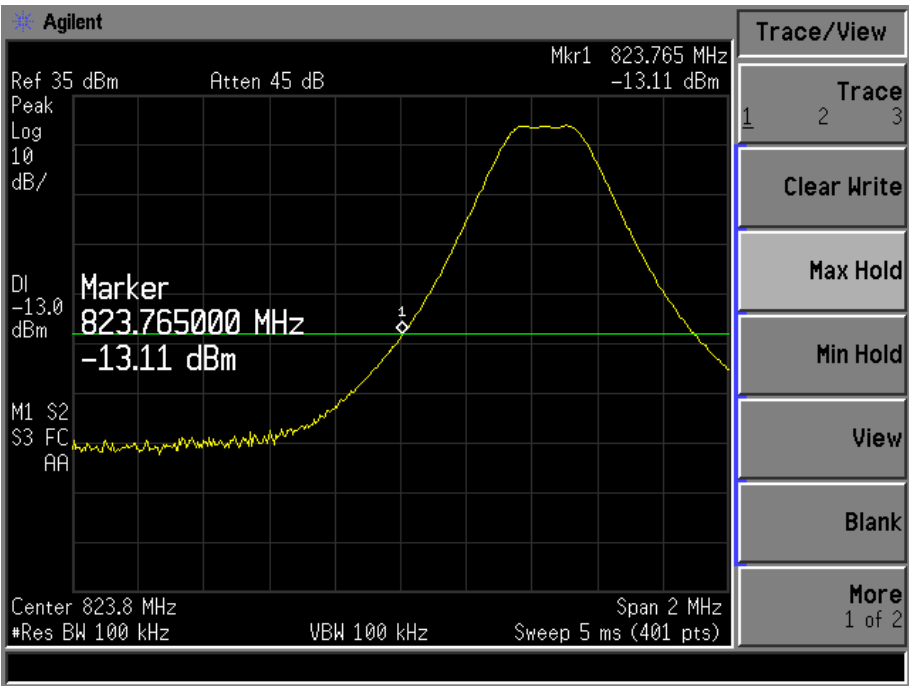
Middle Channel



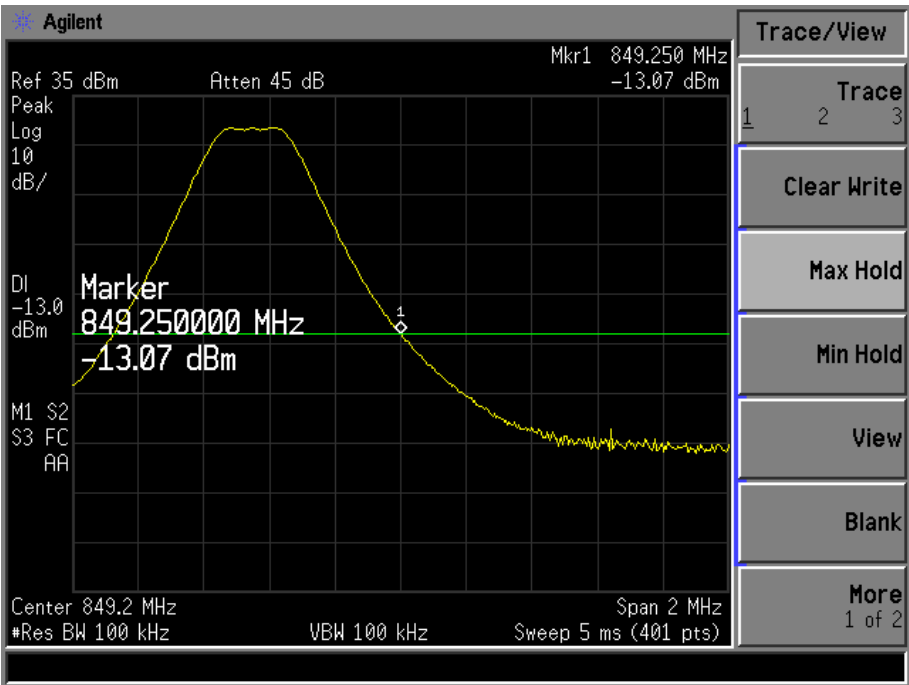
High Channel



GPRS Low band Emission



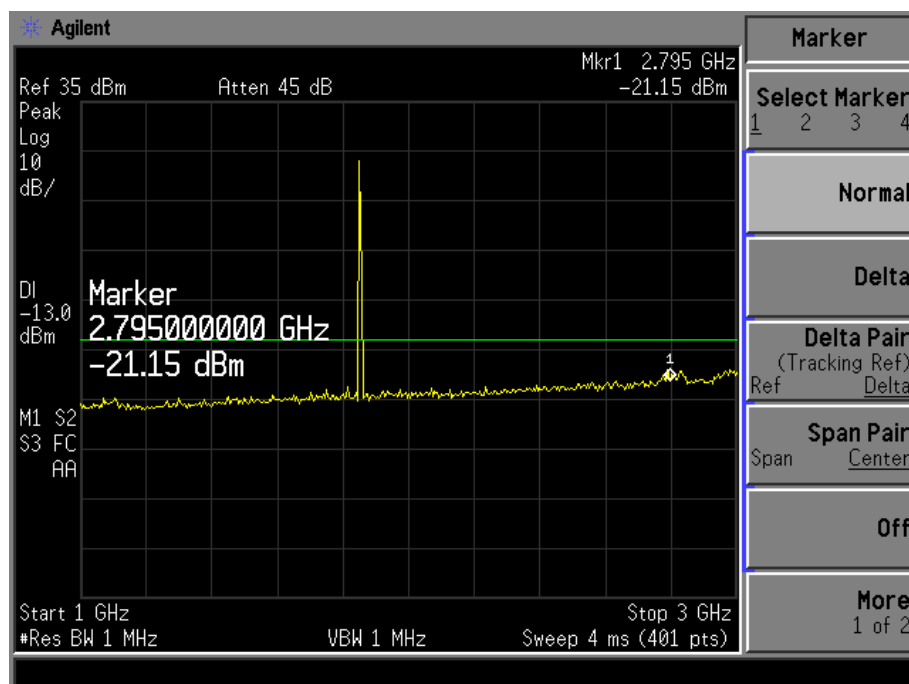
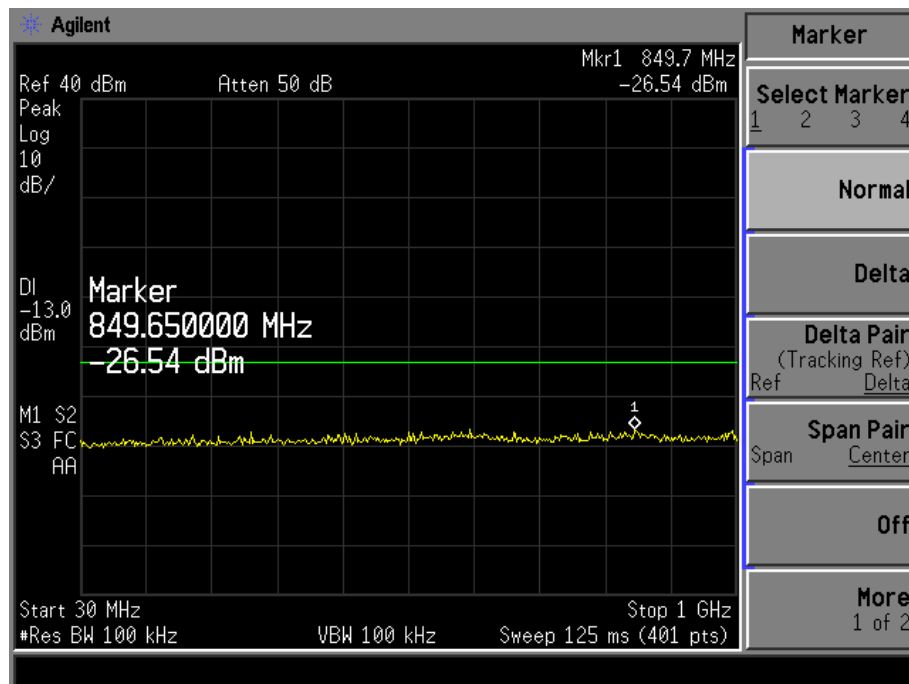
GPRS High band Emission



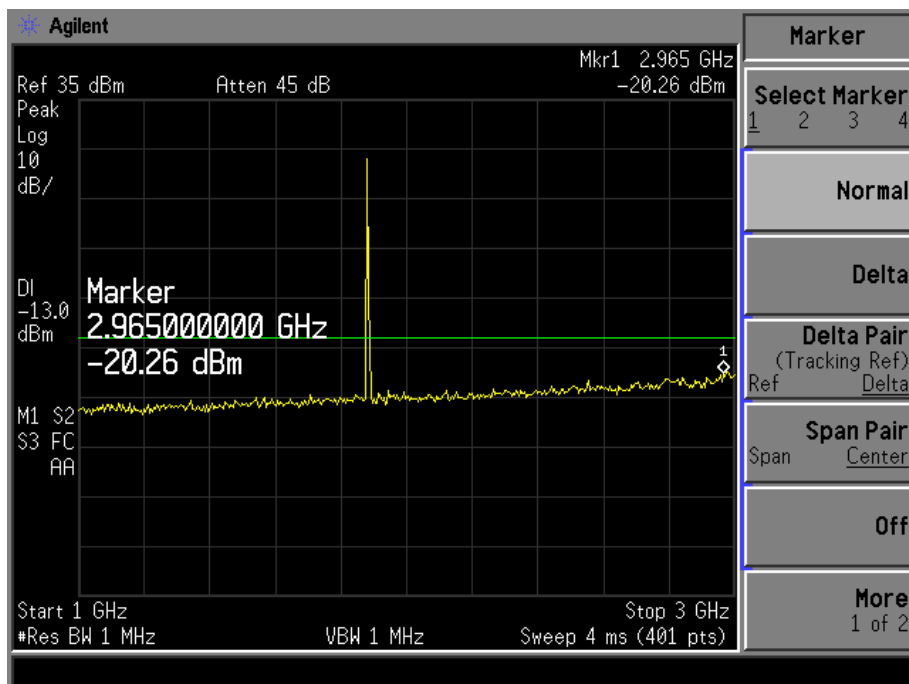
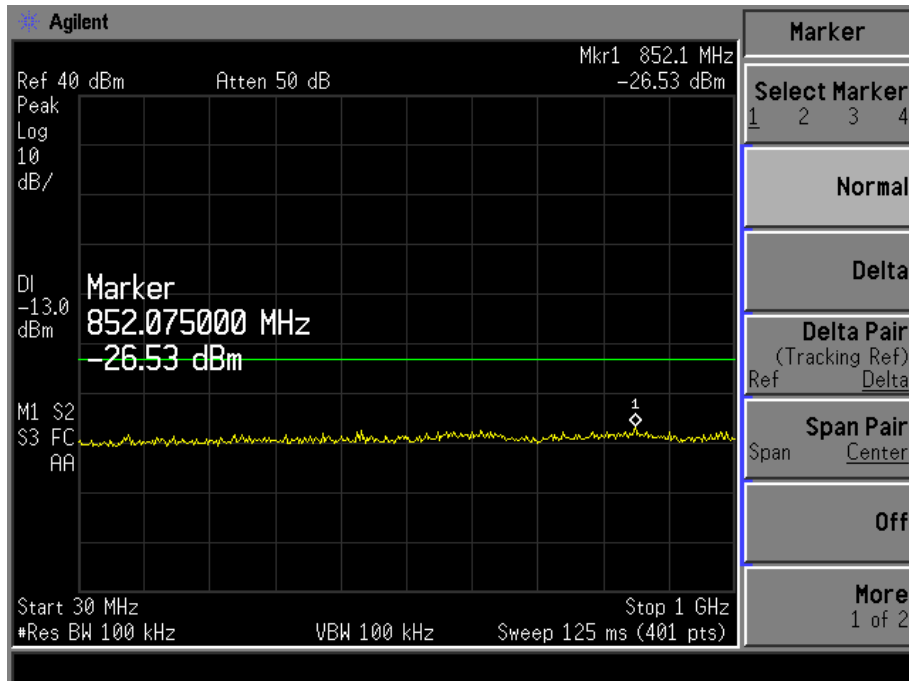
For PCS band GSM Mode

From 30MHz to 3GHz

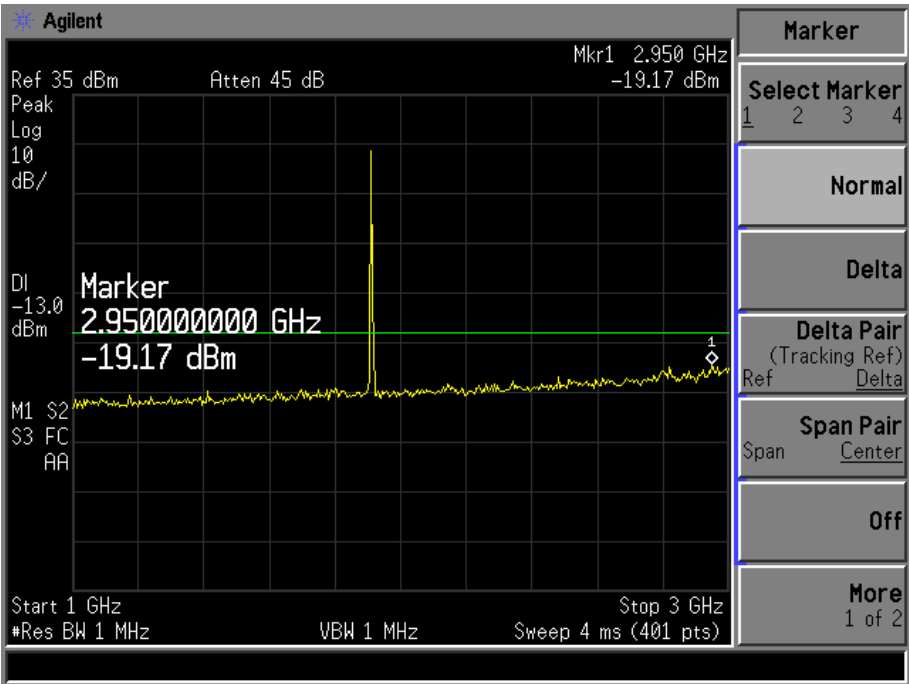
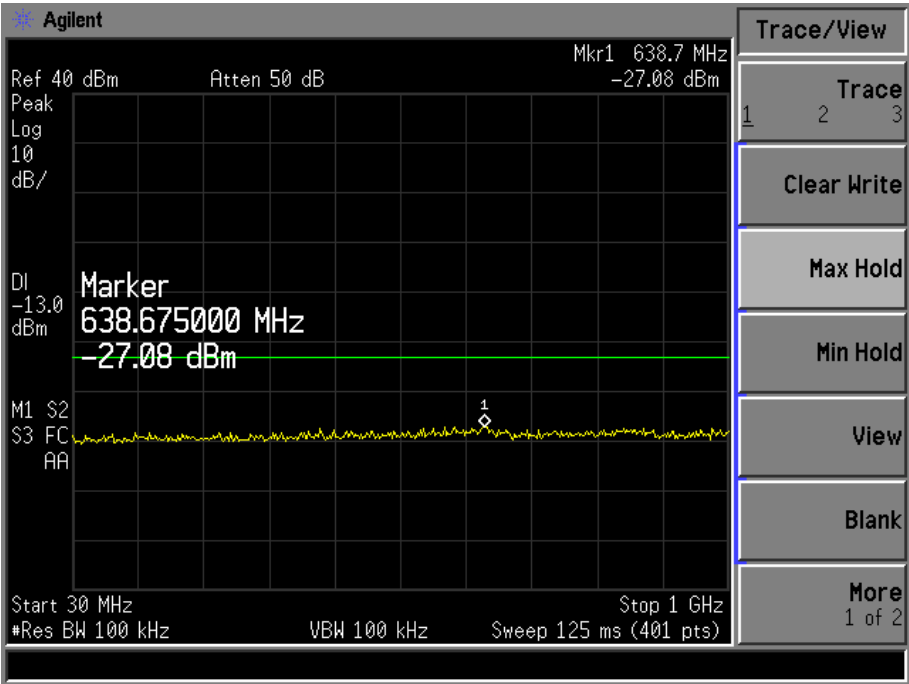
Low Channel



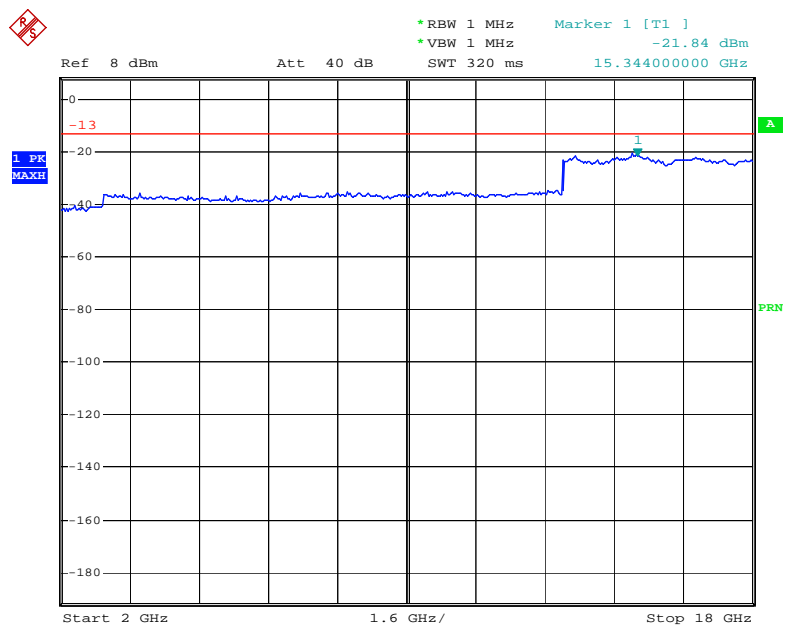
Middle Channel



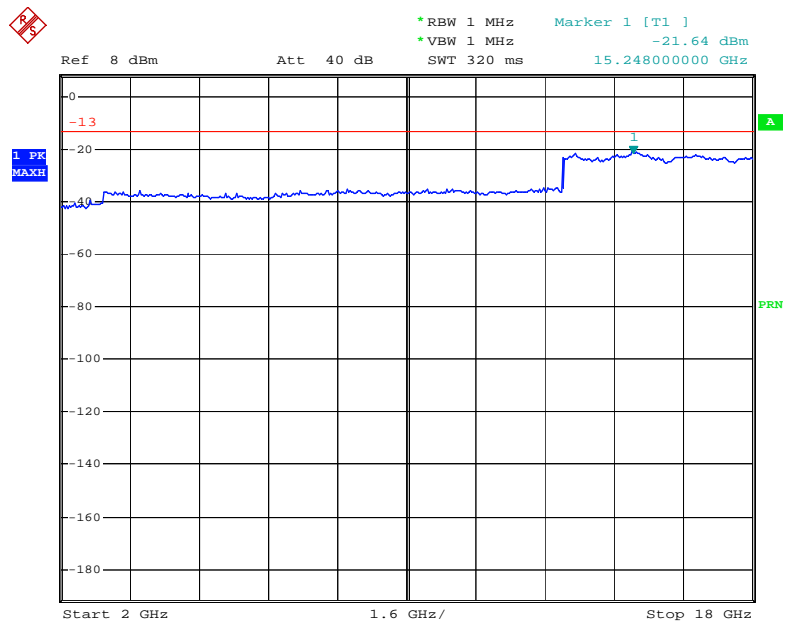
High Channel



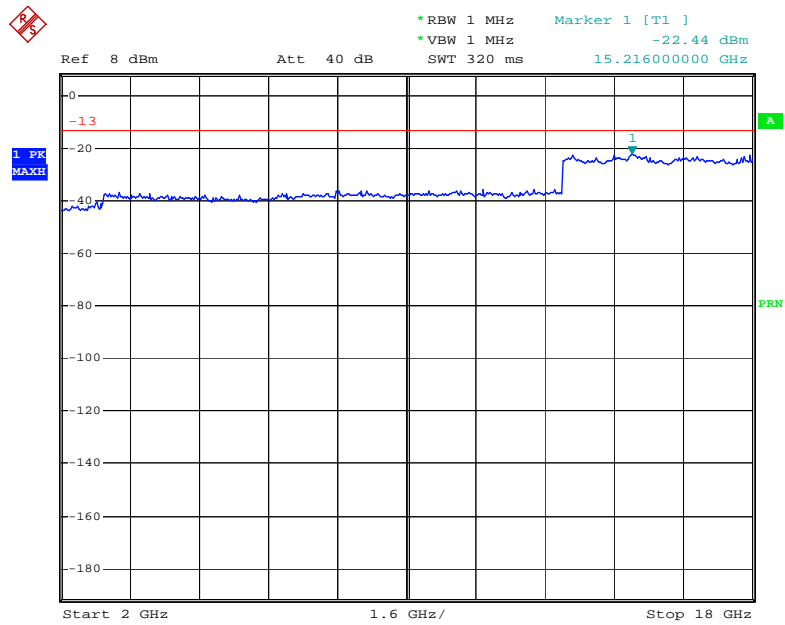
Above 3GHz
Low Channel



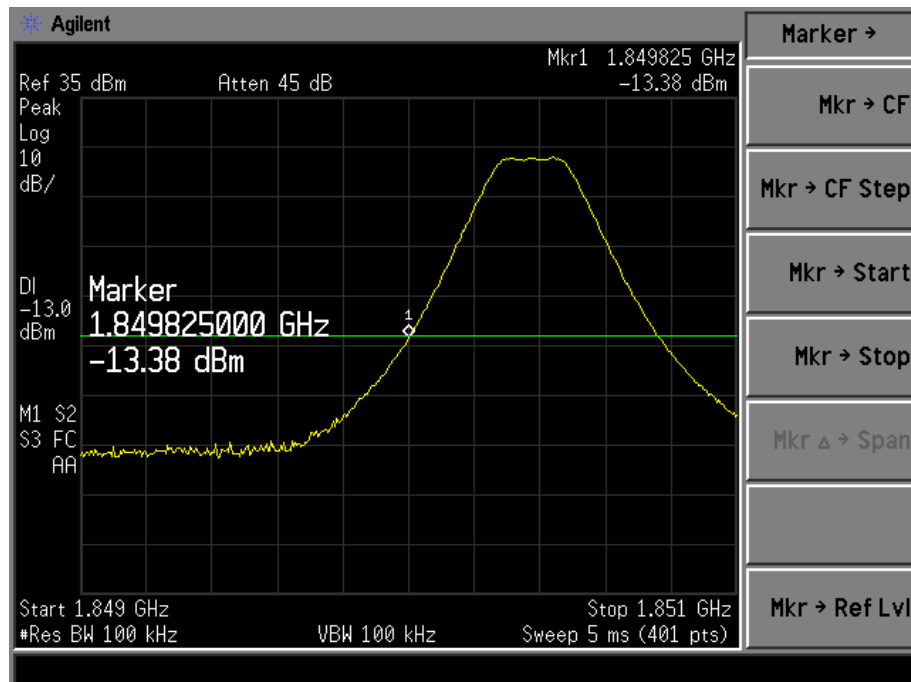
Middle Channel



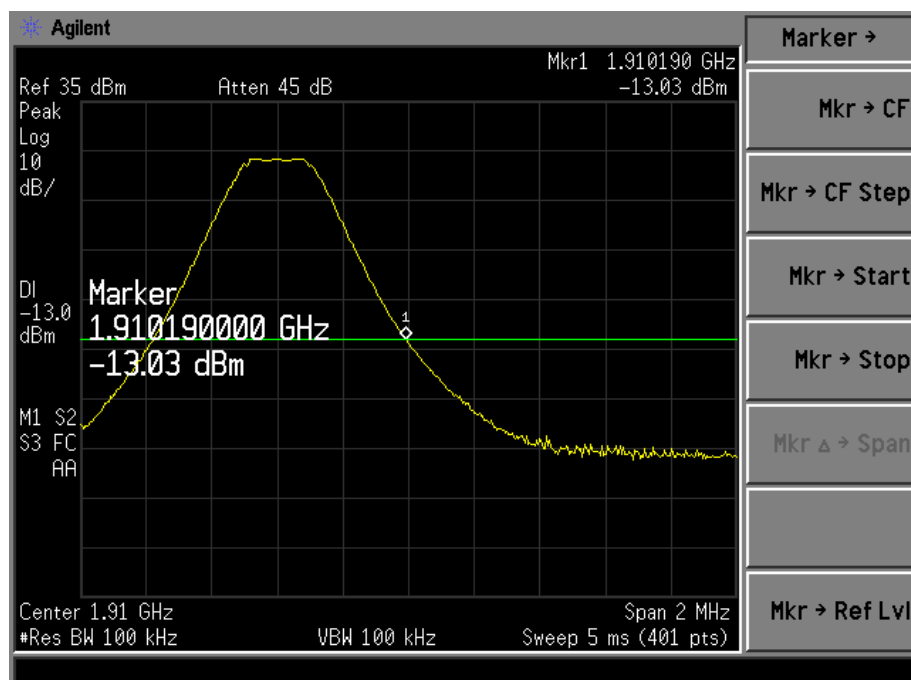
High Channel



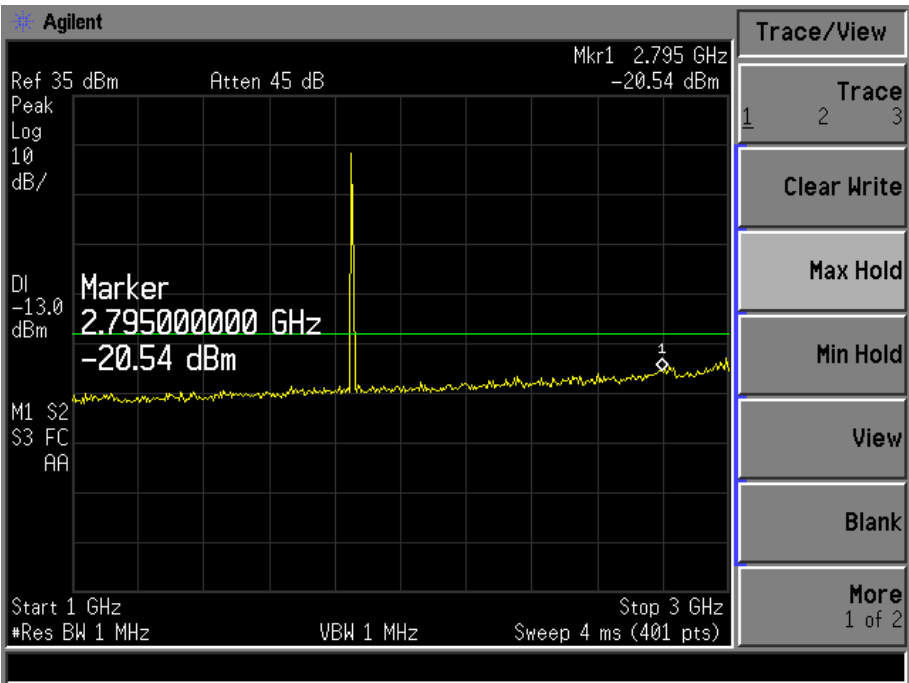
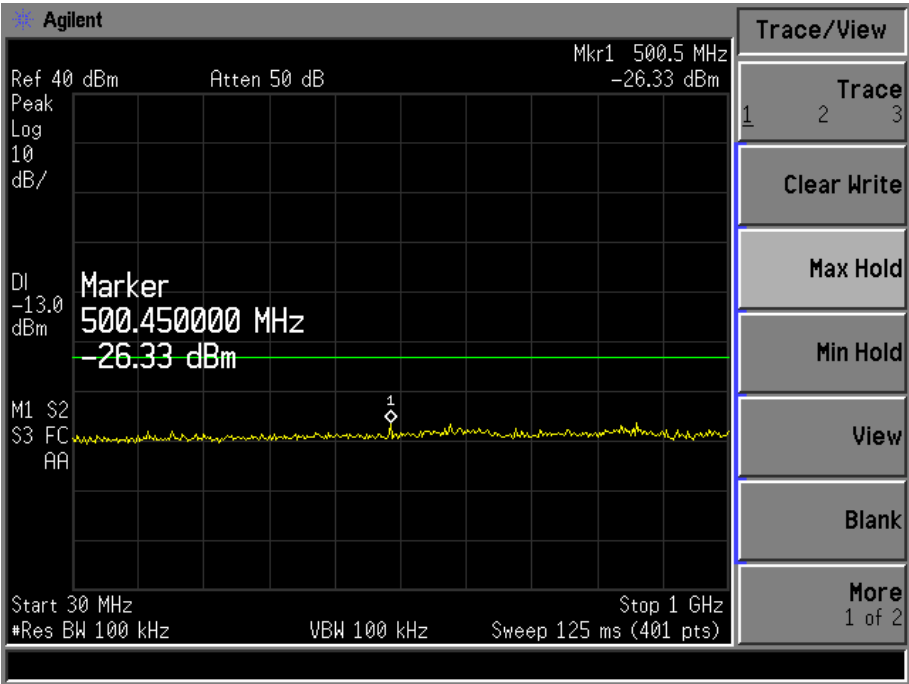
GSM Low band Emission



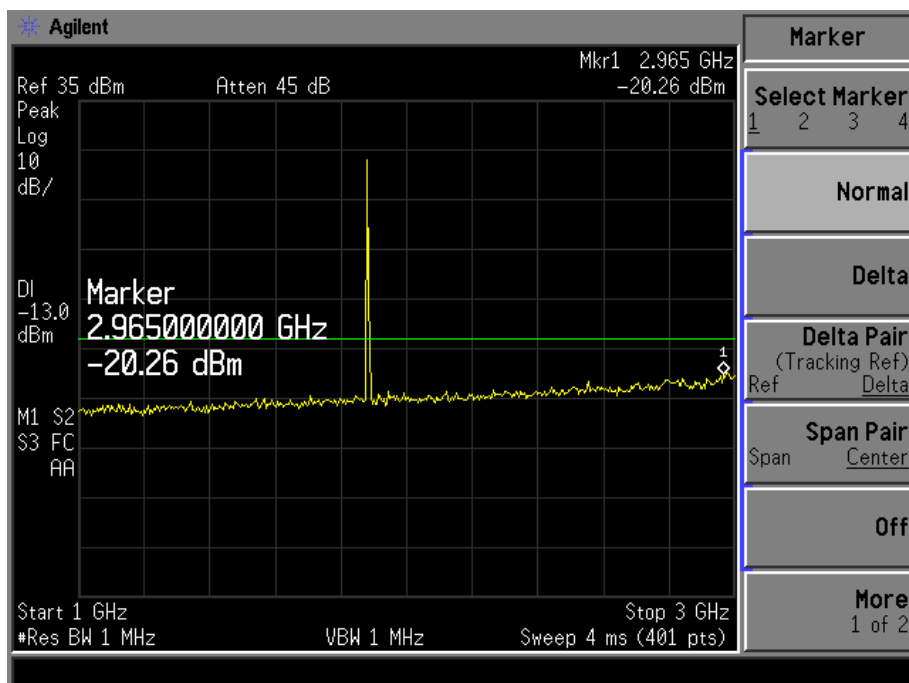
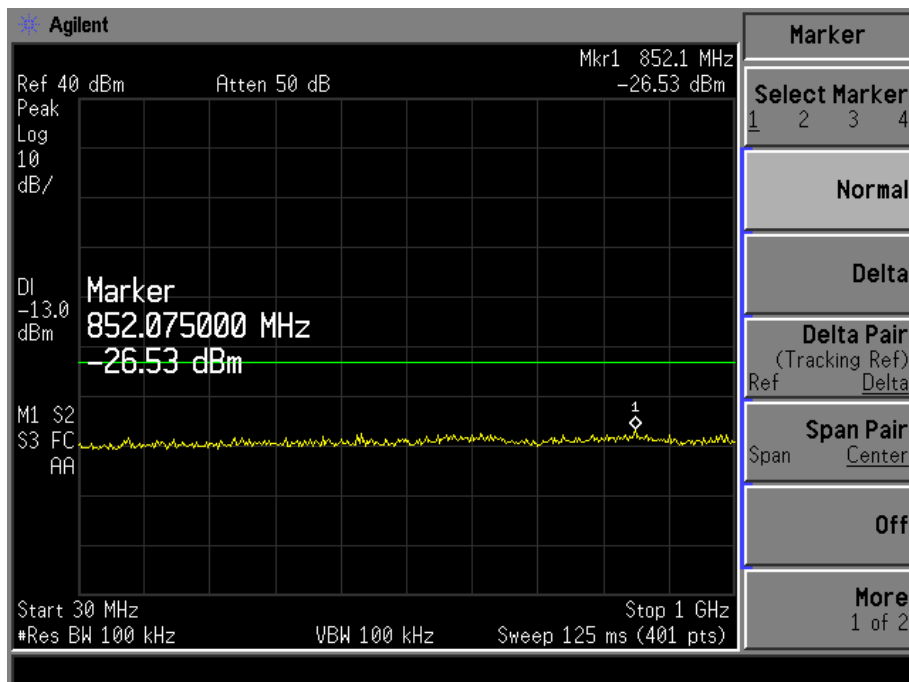
GSM High band Emission



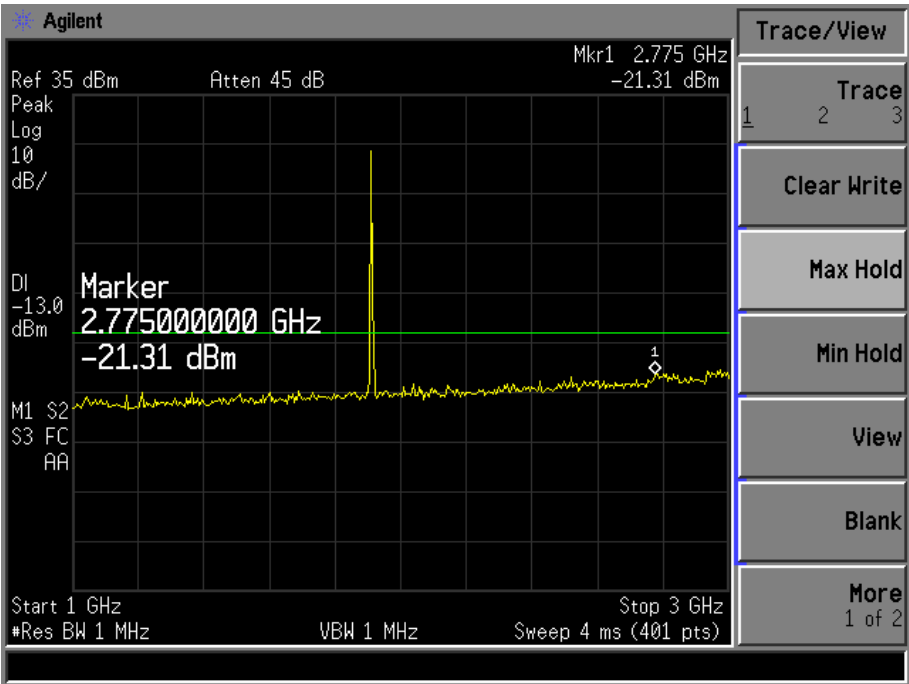
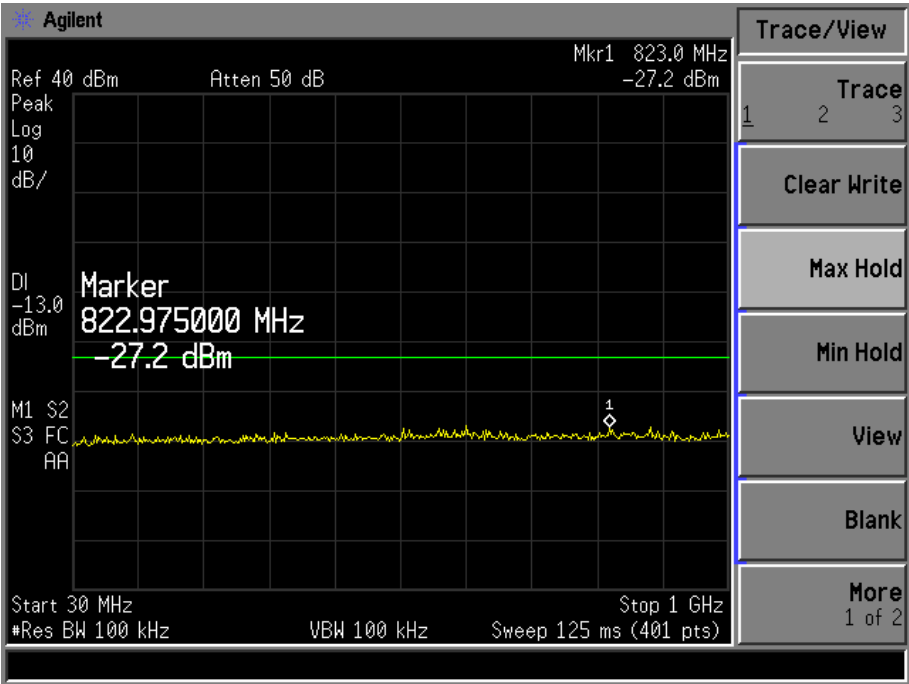
For PCS Band GPRS Mode
From 30MHz to 3GHz
Low Channel



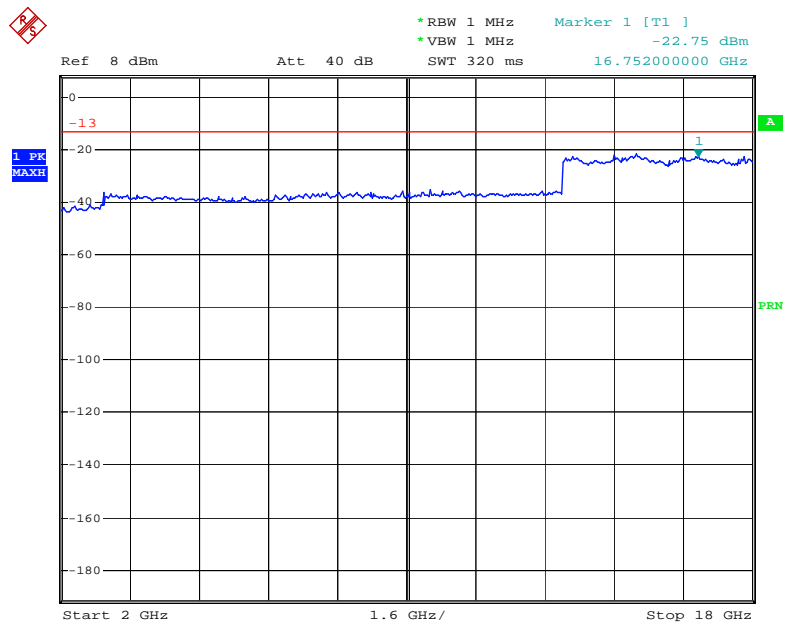
Middle Channel



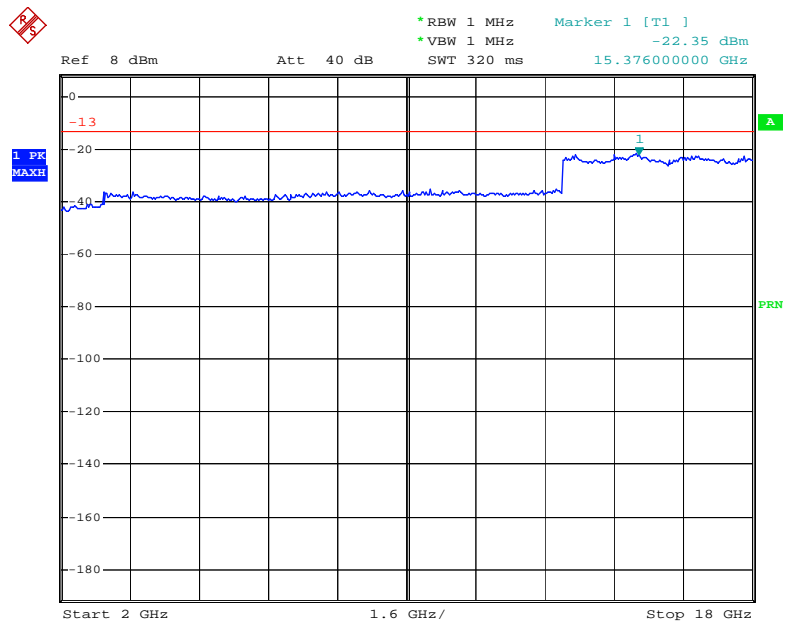
High Channel



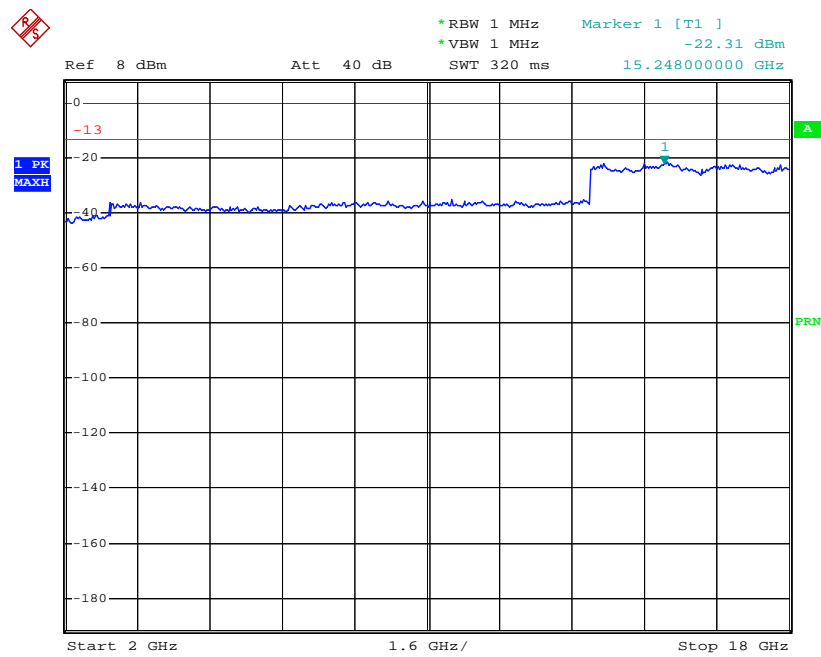
Above 3GHz
Low Channel



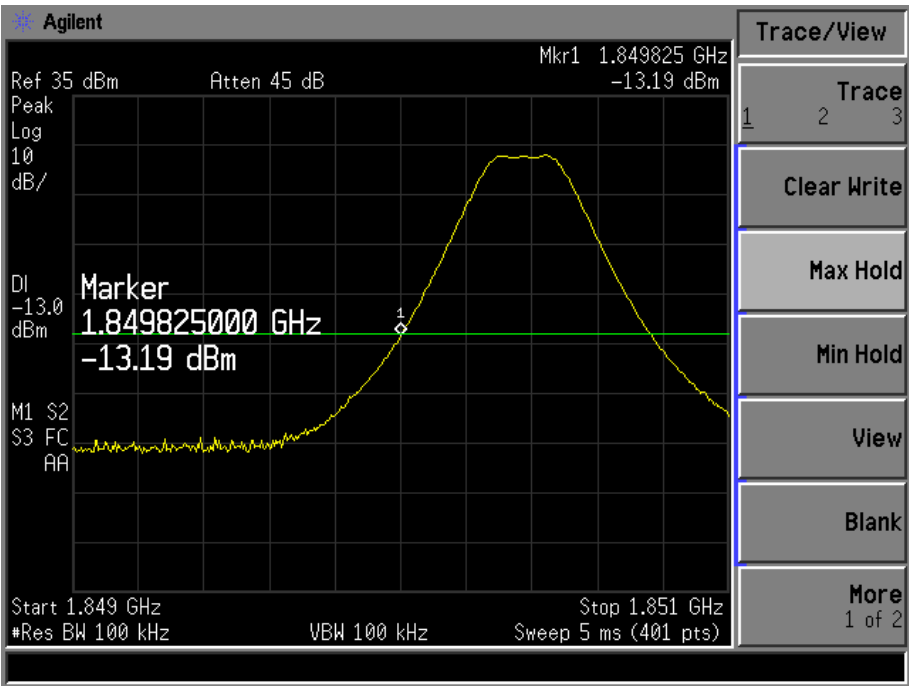
Middle Channel



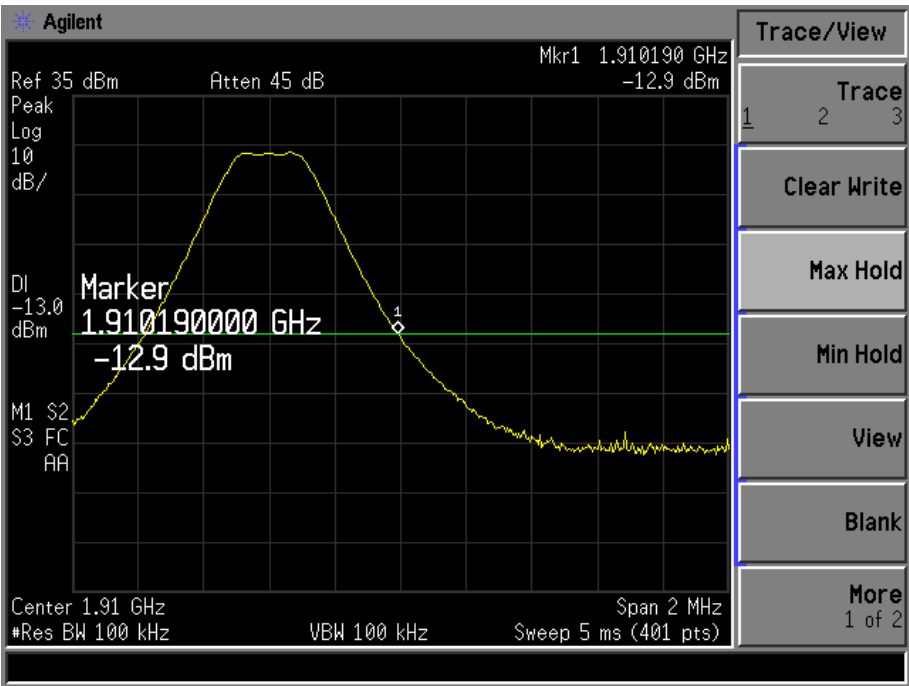
High Channel



GPRS Low band Emission



GPRS High band Emission



7. SPURIOUS RADIATION EMISSIONS

7.1 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.

7.2 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.

7.3 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Signal Generator	R&S	SMR20	100047	2009-08-12	2010-08-11
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2009-07-21	2010-07-20
Horn Antenna	SCHWARZBECK	BBHX9120	9120	2009-07-21	2010-07-20
Horn Antenna	ETS	3117	00086197	2009-07-21	2010-07-20
Pre-amplifier	CD	PAP-0118	24002	2009-08-12	2010-08-11
Amplifier	Agilent	8447F	3113A06717	2009-08-12	2010-08-11
Coaxial Cable	SCHWARZBECK	AK9513	9513-10	2009-08-12	2010-08-11
Spectrum Analyzer	Rohde & Schwarz	FSP	836079/035	2010-04-16	2011-04-15
Universal Radio Communication Tester	Rohde & Schwarz	CMU200	112012	2010-04-16	2011-04-15

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

7.4 Test Procedure

1. The setup of EUT is according with per TIA/EIA Standard 603C and ANSI C63.4-2003 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 $= 43 + 10 \log_{10}(\text{power out in Watts})$

7.5 Environmental Conditions

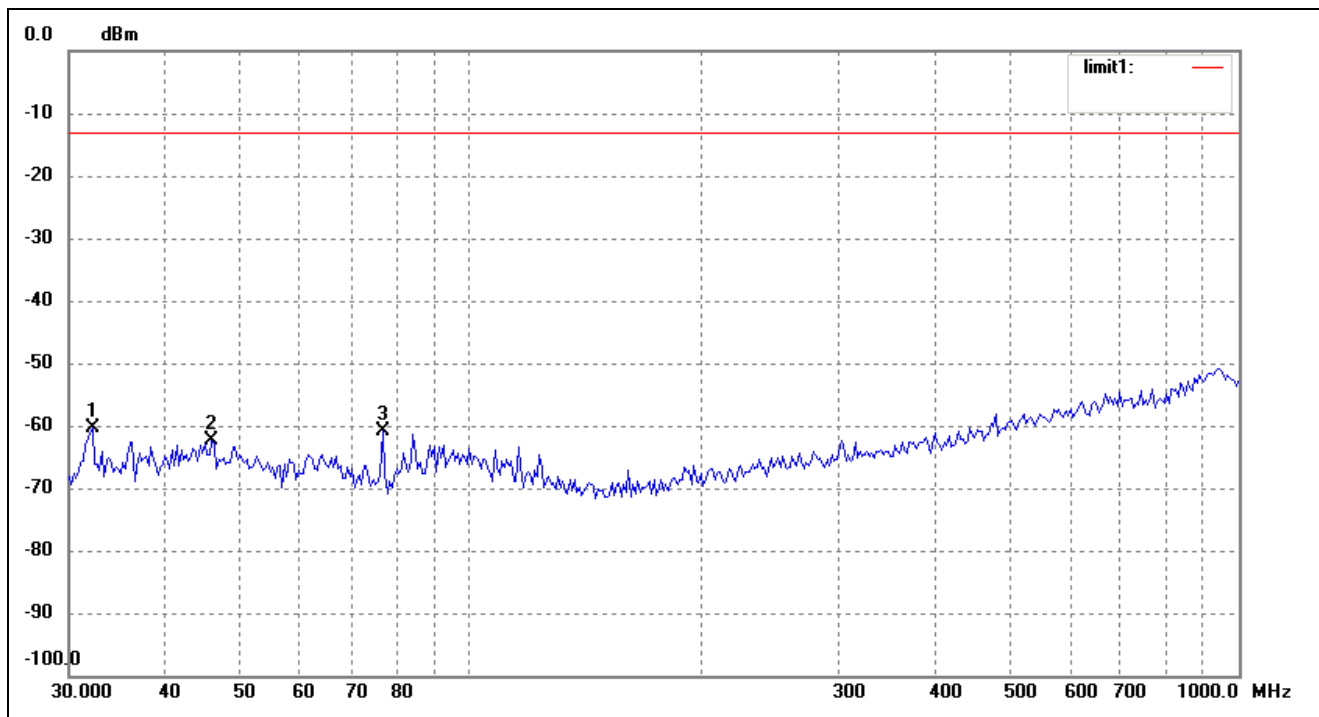
Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

7.6 Summary of Test Results/Plots

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

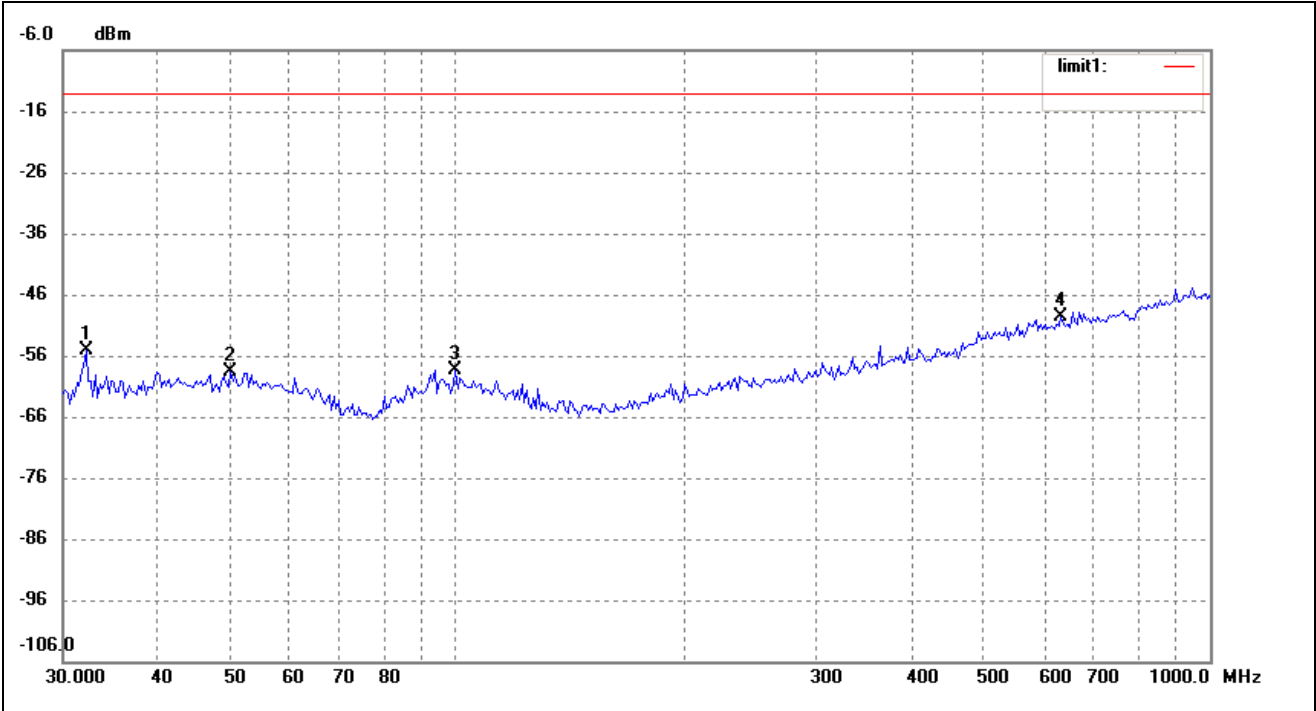
-13.6 dBm at 1673.2 MHz in the Vertical polarization for GSM Band, 30 MHz to 1 GHz.

For Cellular Band Horizontal below 1000MHz



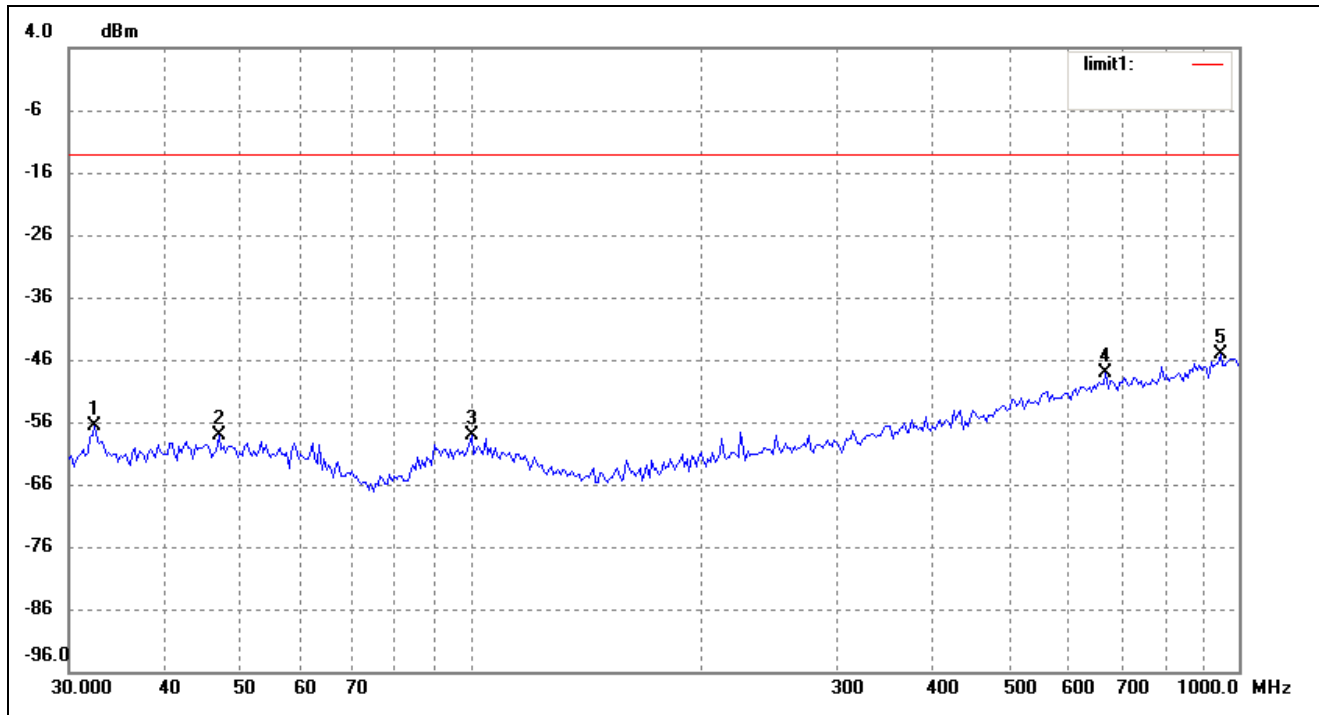
No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	32.1795	-85.54	25.22	-60.32	-13.00	-47.32	ERP
2	46.0164	-88.72	26.38	-62.34	-13.00	-49.34	ERP
3	76.7808	-81.79	20.96	-60.83	-13.00	-47.83	ERP

Vertical below 1000MHz



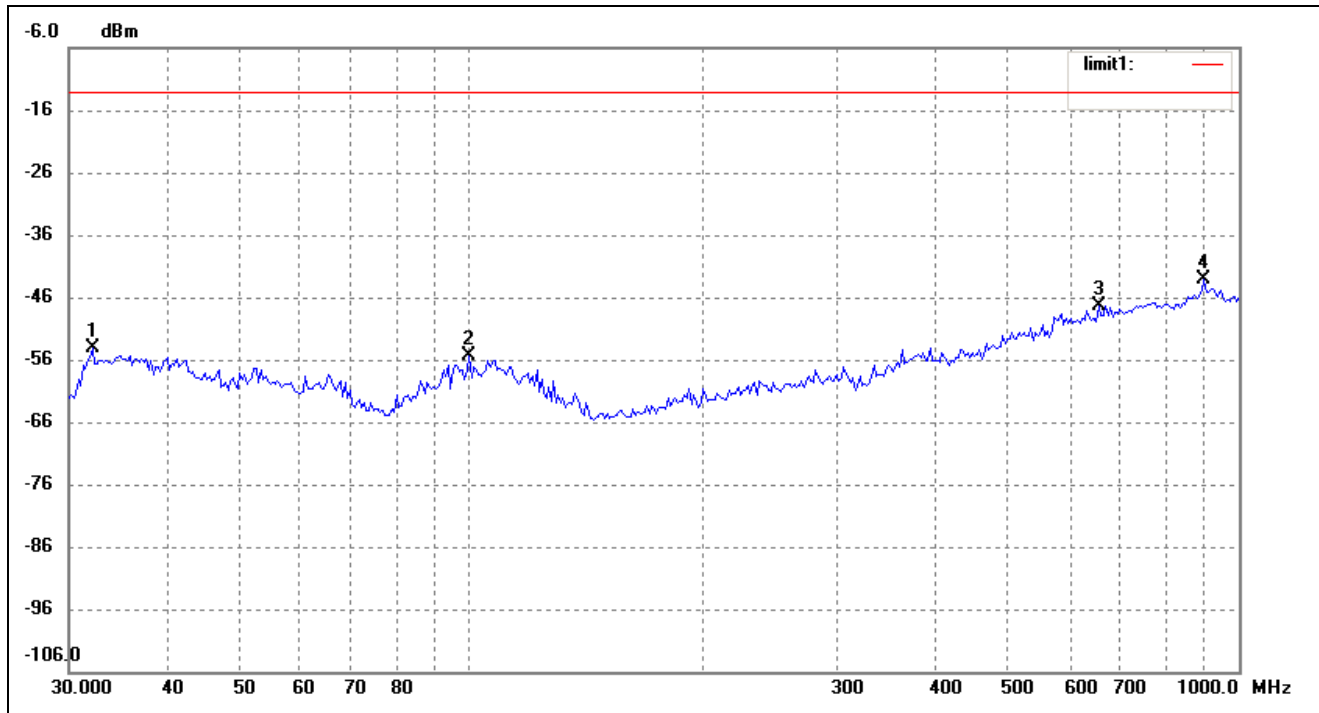
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	Factor(dB)	(dBm)	(dBm)	(dB)	
1	32.1795	-80.44	25.22	-55.22	-13.00	-42.22	ERP
2	50.0566	-84.79	26.14	-58.65	-13.00	-45.65	ERP
3	99.5281	-84.30	26.03	-58.27	-13.00	-45.27	ERP
4	633.9073	-83.09	33.45	-49.64	-13.00	-36.64	ERP

For PCS Band Horizontal below 1000MHz



No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	32.4059	-81.75	25.22	-56.53	-13.00	-43.53	ERP
2	46.9948	-84.48	26.32	-58.16	-13.00	-45.16	ERP
3	100.2286	-84.16	26.04	-58.12	-13.00	-45.12	ERP
4	670.4893	-81.76	33.64	-48.12	-13.00	-35.12	ERP
5	945.4399	-81.92	36.76	-45.16	-13.00	-32.16	ERP

Vertical below 1000MHz



No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	32.1795	-79.44	25.22	-54.22	-13.00	-41.22	ERP
2	99.5281	-81.30	26.03	-55.27	-13.00	-42.27	ERP
3	656.5300	-80.85	33.57	-47.28	-13.00	-34.28	ERP
4	900.1474	-79.45	36.40	-43.05	-13.00	-30.05	ERP

Above 1000MHz

For GSM850 Band

Frequency	SG Reading	Height	Polar	Cable loss	Antenna Gain	Corrected Ampl.	EN300440 Limit	EN300440 Margin
MHz	dBm	Meter	H / V	dB	dB	dBm	dBm	dB
Middle Channel , 1-20GHz								
1673.2	-34.0	1.5	H	1.9	7.6	-28.3	-13	-15.3
1673.2	-32.3	1.5	V	1.9	7.6	-26.6	-13	-13.6
2509.8	-37.4	1.5	H	2.2	7.9	-31.7	-13	-18.7
2509.8	-34.2	1.5	V	2.2	7.9	-28.5	-13	-15.5
3346.4	-39.3	1.5	H	3.3	7.3	-35.3	-13	-22.3
3346.4	-34.7	1.5	V	3.3	7.3	-30.7	-13	-17.7
4183	-41.5	1.5	H	4.9	8.1	-38.3	-13	-25.3
4183	-38.0	1.5	V	4.9	8.1	-34.8	-13	-21.8
5019.6	-43.1	1.5	H	5.1	8.5	-39.7	-13	-26.7
5019.6	-39.0	1.5	V	5.1	8.5	-35.6	-13	-22.6

For GSM1900 Band

Frequency	SG Reading	Height	Polar	Cable loss	Antenna Gain	Corrected Ampl.	EN300440 Limit	EN300440 Margin
MHz	dBm	Meter	H / V	dB	dB	dBm	dBm	dB
Middle Channel , 1-20GHz								
3760	-34.8	1.5	H	4.8	7.5	-32.1	-13	-19.1
3760	-30.9	1.5	V	4.8	7.5	-28.2	-13	-15.2
5640	-41.2	1.5	H	5.2	8.9	-37.5	-13	-24.5
5640	-34.9	1.5	V	5.2	8.9	-31.2	-13	-18.2
7520	-42.7	1.5	H	6.3	9.3	-39.7	-13	-26.7
7520	-37.7	1.5	V	6.3	9.3	-34.7	-13	-21.7
9400	-46.1	1.5	H	6.9	9.7	-43.3	-13	-30.3
9400	-42.7	1.5	V	6.9	9.7	-39.9	-13	-26.9
11280	-37.2	1.5	H	7.5	10.5	-34.2	-13	-21.2
11280	-45.1	1.5	V	7.5	10.5	-42.1	-13	-29.1

Note: Testing is carried out with frequency rang 30MHz to the tenth harmonics, which above 7th Harmonics is close to the noise base even antenna close up to 1meter distance according the measurement of ANSI C63.4.

8. FREQUENCY STABILITY

8.1 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.

8.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Aglient	Spectrum Analyzer	E4402B-ESA	US41192821	2009-08-12	2010-08-11
Rohde & Schwarz	Universal Radio Communication	CMU200	112012	2010-04-16	2011-04-15
GONGWEN	Moisture Test Chamber	GDS-150	SEMT-0013	2010-07-16	2011-07-15
LW	DC Power Supply	APR-3003	N/A	2010-07-16	2011-07-15

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

8.3 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	85-115% of declared nominal voltage
-30°C to +50°C	Normal

8.4 Environmental Conditions

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

8.5 Summary of Test Results/Plots

For Cellular Band

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	-33	-0.03945
40	3.7	-37	-0.04423
30	3.7	-40	-0.04781
20	3.7	-41	-0.04901
10	3.7	-44	-0.05259
0	3.7	-40	-0.04781
-10	3.7	-27	-0.03227
-20	3.7	-38	-0.04542
-30	3.7	-43	-0.0514

For PCS Band

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	-34	-0.01809
40	3.7	-38	-0.02021
30	3.7	-41	-0.02181
20	3.7	-42	-0.02234
10	3.7	-45	-0.02394
0	3.7	-41	-0.02181
-10	3.7	-28	-0.01489
-20	3.7	-39	-0.02074
-30	3.7	-44	-0.0234

So, Frequency Stability Versus Input Voltage is:

Reference Frequency(Middle Channel): 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3V	-41	-0.04901
	3.7V	-44	-0.05259
	2.9V Endpoint	-40	-0.04781
Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3V	-42	-0.02234
	3.7V	-45	-0.02394
	2.9V Endpoint	-42	-0.02234

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