47 CFR PART 22 SUBPART H & 24 SUBPART E

TEST REPORT

of

EFT-POS

Model Name:	PS400
Trade Name.:	SAND
Brand Name:	SAND
Report No.:	SH10040042R01
FCC ID:	XLHPS400-1101

prepared for

Shanghai Sand Information Technology System Co., Ltd
Building 22,Germs Park,NO. 487 Tianlin Road, Shanghai China

prepared by

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CTIA Authorized Test Lab
LAB CODE 20081223-00

TABLE OF CONTENT

1. TEST CERTIFICATION

Equipment under Test:	EFT-POS
Brand Name:	SAND
Model Name:	PS400
FCC ID:	XLHPS400-1101
Applicant:	Shanghai Sand Information Technology System Co., Ltd Building 22,Germs Park,NO. 487 Tianlin Road, Shanghai China
Manufacturer:	Shanghai Sand Information Technology System Co., Ltd Building 22,Germs Park,NO. 487 Tianlin Road, Shanghai China
Test Standards:	47 CFR Part 2 47 CFR Part 22 Subpart H 47 CFR Part 24 Subpart E
Test Date(s):	Mar 01, 2011 –Mar 01, 2011
Test Result:	PASS

*** We Hereby Certify That:**

The equipment under test was tested by Shenzhen Electronic Product Quality Testing Center Morlab Laboratory. The test data, data evaluation, test procedures and equipment configurations shown in this report were made in accordance with the requirement of related FCC rules.

The test results of this report only apply for the tested sample equipment identified above. The test report shall be invalid without all the signatures of the test engineer, the reviewer and the approver.

Tested by: Shi Feng Dated: 2011. 3. 11
Shi Feng

Reviewed by: Zhang Jun Dated: 2011. 3. 11
Zhang Jun

Approved by: Wei Bei Dated: 2011. 3. 11
Wei Bei

2. GENERAL INFORMATION

2.1 EUT Description

EUT Type.....: EFT-POS
Model Name .....: PS400
Frequency Range.....: GSM 850MHz:
Tx: 824.20 - 848.80MHz (at intervals of 200kHz);
Rx: 869.20 - 893.80MHz (at intervals of 200kHz)
GSM 1900MHz:
Tx: 1850.20 - 1909.80MHz (at intervals of 200kHz);
Rx: 1930.20 - 1989.80MHz (at intervals of 200kHz)
Modulation Type.....: GMSK;
Power Supply.....: Battery

Brand name:	NARADA
Mode Name.:	NLB465082H-2S
Capacitance:	2000mAh
Rated voltage:	7.4V
Charge limited:	8.4V
Manufacturer:	Narada Power Source Co., Ltd. 9th Floor, Tower A, No. 50,Bauhinia Road, Hangzhou, Zhejiang

Ancillary Equipments.....: AC Adapter (Charger for Battery)

Brand name:	HuntKey
Mode Name.:	ADP036-094B
Rated Input:	AC 100~240V, 1000mA, 50/60Hz
Rated Output:	DC 9V, 4000 mA，30W
Manufacturer:	Shenzhen Huntkey Electronics Co., Ltd. Huntkey Industrial Park, Banxue Road, Ban Tian, Shenzhen

Note 1: The transmitter (Tx) frequency arrangement of the GSM 850MHz band used by the EUT can be represented with the formula F(n)=824.2+0.2*(n-128), 128<=n<=251; the lowest, middle, highest channel numbers (ARFCHs) used and tested in this report are separately 128 (824.2MHz), 190 (836.6MHz) and 251 (848.8MHz).

Note 2: The transmitter (Tx) frequency arrangement of the PCS 1900MHz band used by the EUT can be represented with the formula F(n)=1850.2+0.2*(n-512), 512<=n<=810; the lowest, middle and highest channel numbers (ARFCHs) used and tested in this report are separately 512 (1850.2MHz), 661 (1880.0MHz) and 810 (1909.8MHz).

Note 3: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

2.2 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 2, Part 22 and Part 24 for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 2 (10-1-05 Edition)	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 22 (10-1-05 Edition)	Public Mobile Services
3	47 CFR Part 24 (10-1-05 Edition)	Personal Communications Services
4	ANSI/TIA/EIA-603-C (2004)	Land Mobile FM or PM - Communications Equipment - Measurement and Performance Standards
5	ANSI C63.4-2003	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

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Result
1	2.106 22.905 24.229	Frequencies	PASS
2	2.1046	Conducted RF Output Power	PASS
3	2.1049	26dB Occupied Bandwidth	PASS
4	2.1055 22.355 24.235	Frequency Stability	PASS
5	2.1051 2.1057 22.917 24.238	Conducted Out of Band Emissions	PASS
6	2.1051 2.1057 22.917 24.238	Band Edge	PASS
7	22.913 24.232	Transmitter Radiated Power (EIPR/ERP)	PASS
8	2.1053 2.1057 22.917 24.238	Radiated Out of Band Emissions	PASS

2.3 Facilities and Accreditations

2.3.1 Facilities

Shenzhen Electronic Product Quality Testing Center Morlab Laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L1659.

All measurement facilities used to collect the measurement data are located at Electronic Testing Building, Shahe Road, Xili, Nanshan District, Shenzhen 518055 CHINA. The test site is constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22; the FCC registration number is 741109.

2.3.2 Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (℃):	20 - 25
Relative Humidity (%):	40 - 60
Atmospheric Pressure (kPa):	96

3. 47 CFR PART 2, PART 22H &24E REQUIREMENTS

3.1 Frequencies

3.1.1 Requirement

According to FCC section 22.905, the frequency blocks assignment for the cellular radiotelephone service is listed as below:

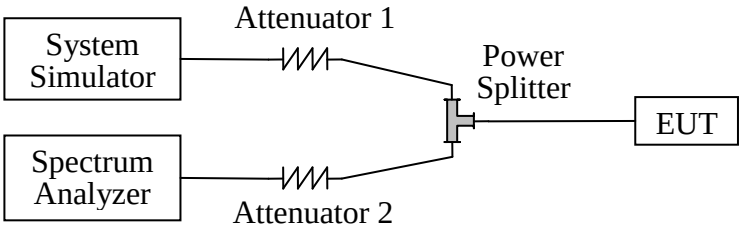
(a) Channel Block A:
Mobile 824 - 835MHz, Base 869 - 880MHz;
Mobile 845 - 846.5MHz, Base 890 - 891.5MHz
(b) Channel Block B:
Mobile 835 - 845 MHz, Base 880 - 890MHz;
Mobile 846.5 - 849 MHz, Base 891.5 - 894MHz

According to FCC section 24.229, the frequencies available in the Broadband PCS services are listed as below, in accordance with the frequency allocations table of FCC section 2.106.

(a) The following frequency blocks are available for assignment on an MTA basis:
Block A: 1850 - 1865MHz paired with 1930 - 1945MHz;
Block B: 1870 - 1885MHz paired with 1950 - 1965MHz.
(b) The following frequency blocks are available for assignment on a BTA basis:
Block C: 1895 - 1910 MHz paired with 1975 - 1990MHz;
Block D: 1865 - 1870 MHz paired with 1945 - 1950MHz;
Block E: 1885 - 1890 MHz paired with 1965 - 1970MHz;
Block F: 1890 - 1895 MHz paired with 1970 - 1975MHz.

3.1.2 Test Description

1. Test Setup:



The EUT, which is powered by the Battery, is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna

terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS.

2. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
SS	Agilent	E5515C	GB46040102	2010.9	1year
Spectrum Analyzer	R&S	FSP30	101020	2010.9	1year
Spectrum Analyzer	Agilent	E4440A	MY46187763	2010.9	1year
Spectrum Analyzer	Rohde Schwarz	FSP13	M-030176	2010.9	1year
Power Splitter	HP	11667B	00164	(n.a.)	(n.a.)
Attenuator 1	Resnet	6dB	(n.a.)	(n.a.)	(n.a.)
Attenuator 2	Resnet	10dB	(n.a.)	(n.a.)	(n.a.)

3.1.3 Test Result

The Tx frequency arrangement of the GSM 850MHz band employed by the EUT should be from 824.2MHz to 848.8MHz (the corresponding frequency block is from 824MHz to 849MHz), and Tx frequency arrangement of the PCS 1900MHz band employed by the EUT should be from 1850.2MHz to 1909.8MHz (the corresponding frequency block is from 1850MHz to 1910MHz).

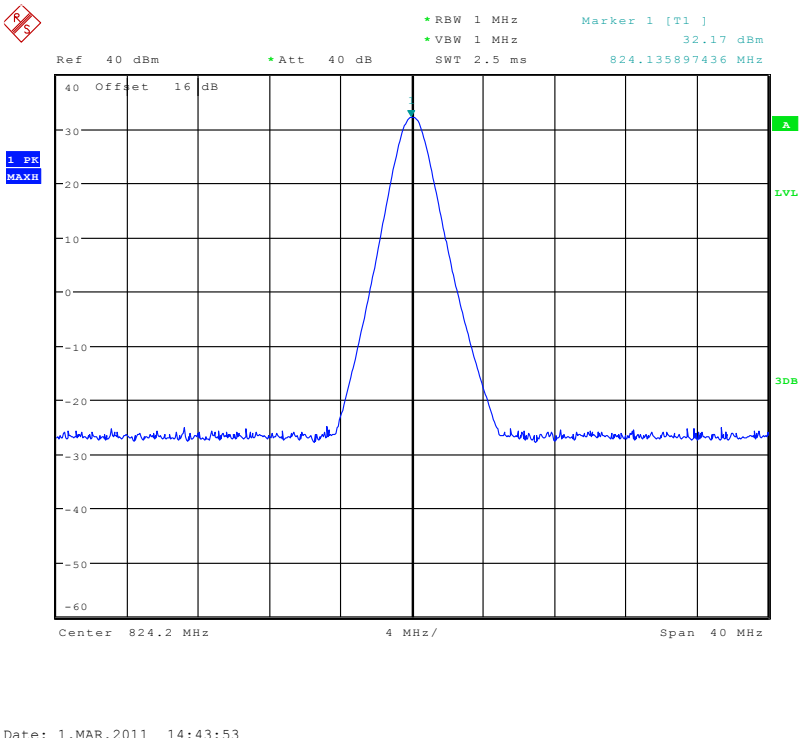
Here the lowest and highest channels are tested to verify the EUT's using the frequency block required.

1. Test Verdict:

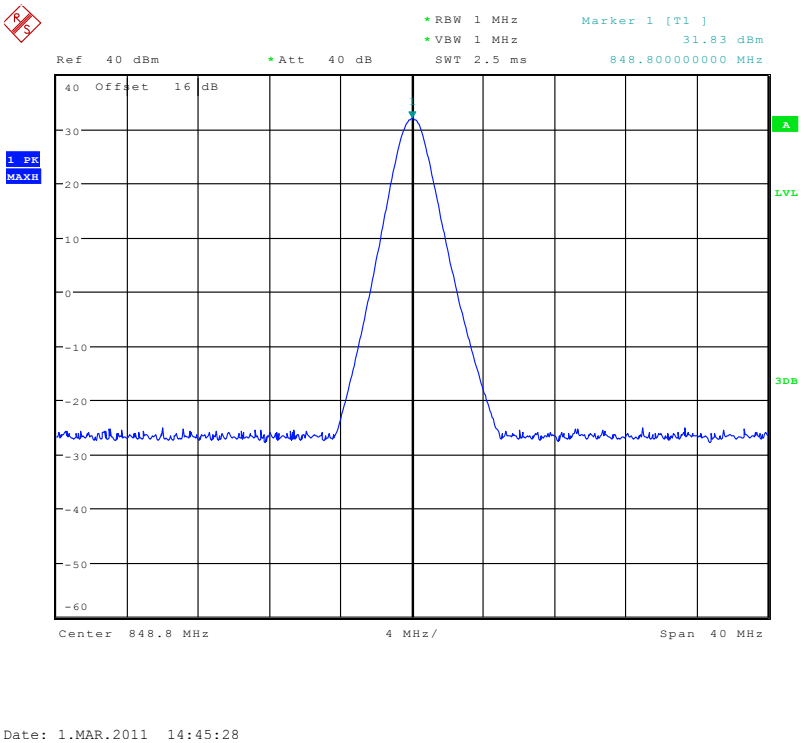
The required frequency block is employed legally, the verdict is PASS.

Band	Channel	Frequency (MHz)	Measured Carrier (dBm)	Refer to Plot
GPRS 850MHz	128	824.14	32.17	Plot A1
	251	848.80	31.83	Plot B1
GPRS 1900MHz	512	1850.20	29.61	Plot C1
	810	1909.86	29.36	Plot D1

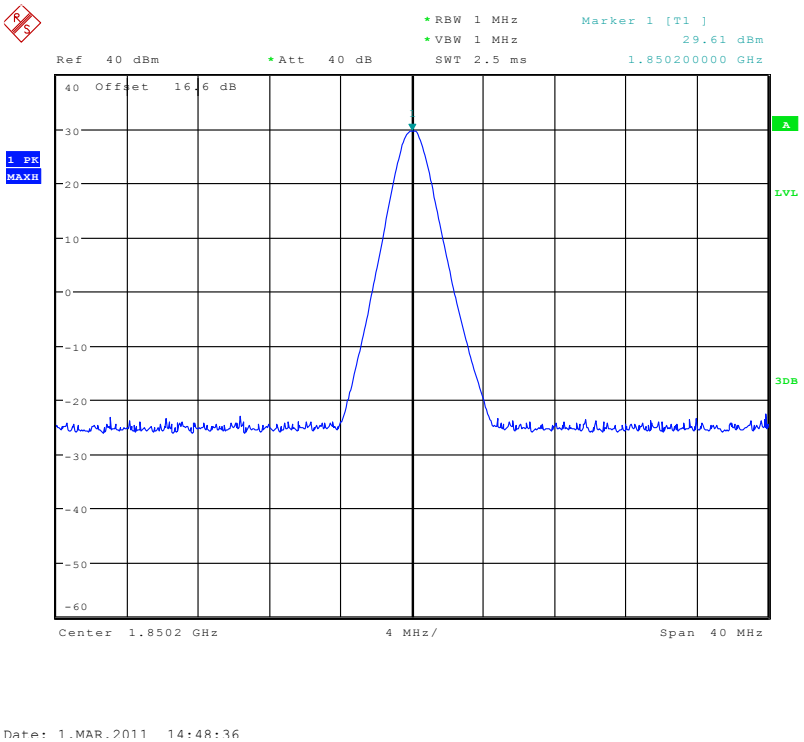
2. Test Plot:



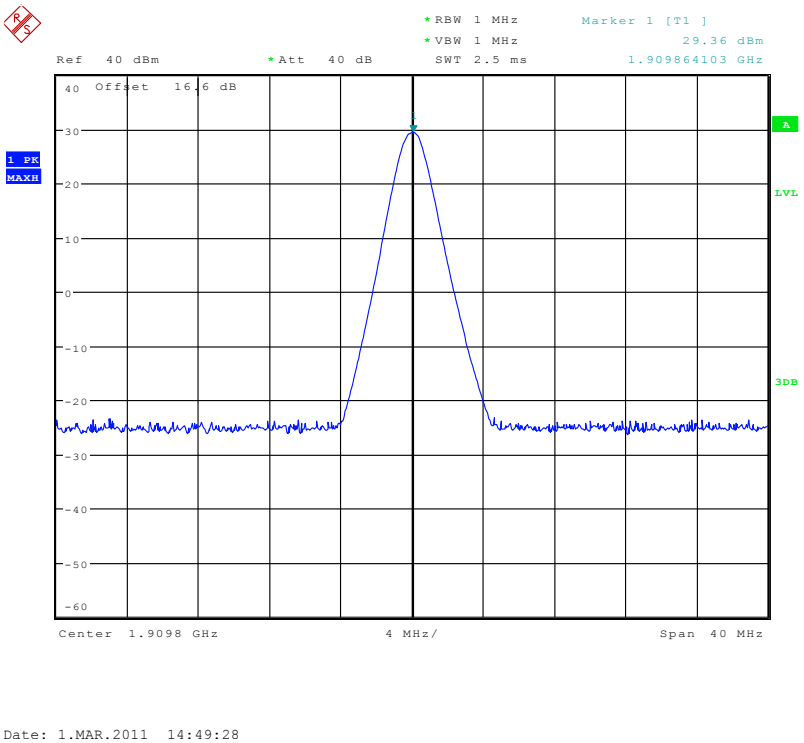
(Plot A1: GPRS 850MHz Channel = 128)



(Plot B1: GPRS 850MHz Channel = 251)



(Plot C1: GPRS 1900MHz Channel = 512



(Plot D1: GPRS 1900MHz Channel = 810)

3.2 Conducted RF Output Power

3.2.1 Requirement

According to FCC section 2.1046(a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

3.2.2 Test Description

See section 3.1.2 of this report.

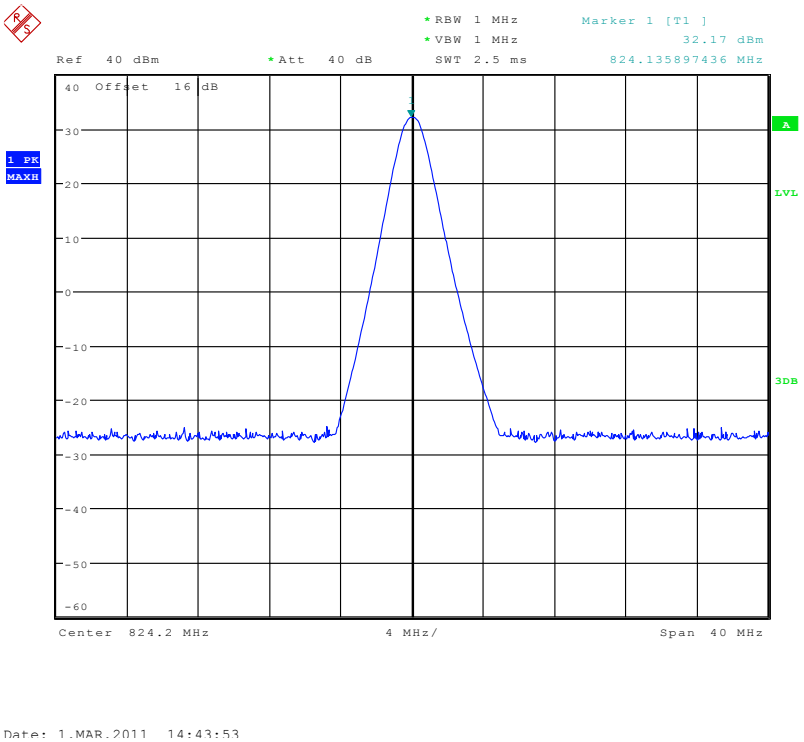
3.2.3 Test Result

Here the lowest, middle and highest channels are selected to perform testing to verify the conducted RF output power of the EUT. For the GSM 850MHz operates at PCL=5 (where Power Class is 4), the rated conducted RF output power is 33dBm within the tolerance of ±3dB, and For the GSM 1900MHz operates at PCL=0 (where Power Class is 1), the rated conducted RF output power is 30dBm within the tolerance of ±3dB.

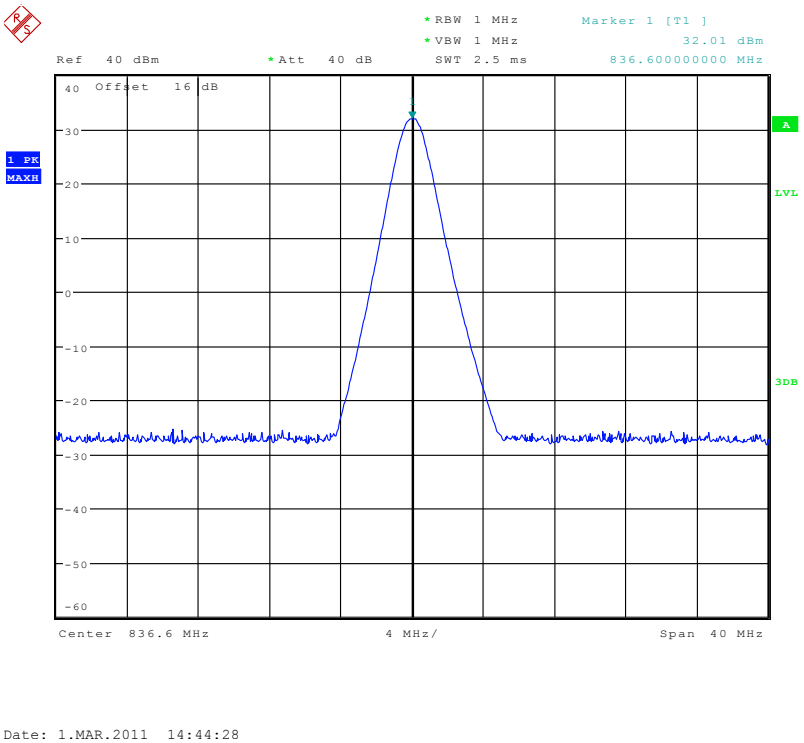
1. Test Verdict:

Band	Channel	Frequency (MHz)	Measured Output Power		Verdict
			dBm	Refer to Plot	
GPRS 850MHz	128	824.14	32.17	Plot A2	PASS
	190	836.60	32.01	Plot B2	PASS
	251	848.80	31.83	Plot C2	PASS
GPRS 1900MHz	512	1850.20	29.61	Plot D2	PASS
	661	1879.94	29.49	Plot E2	PASS
	810	1909.86	29.36	Plot F2	PASS

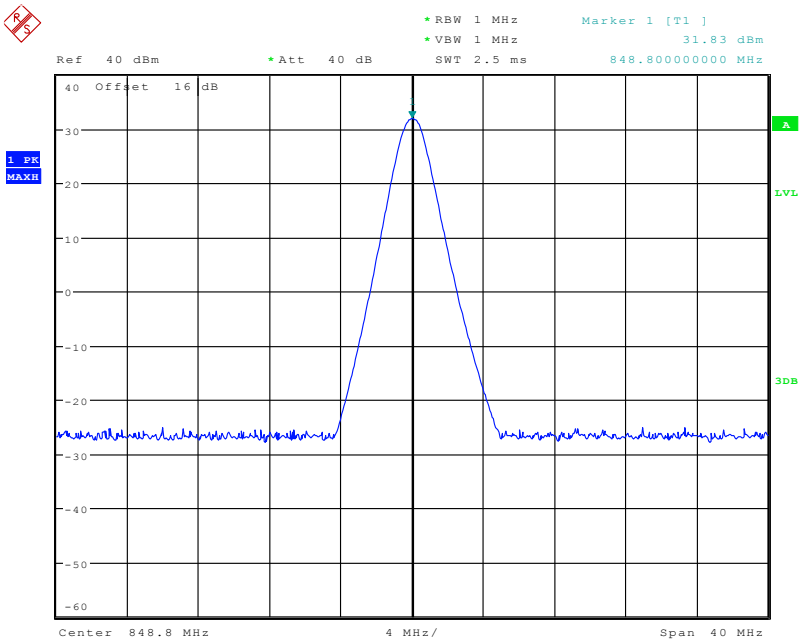
2. Test Plot:



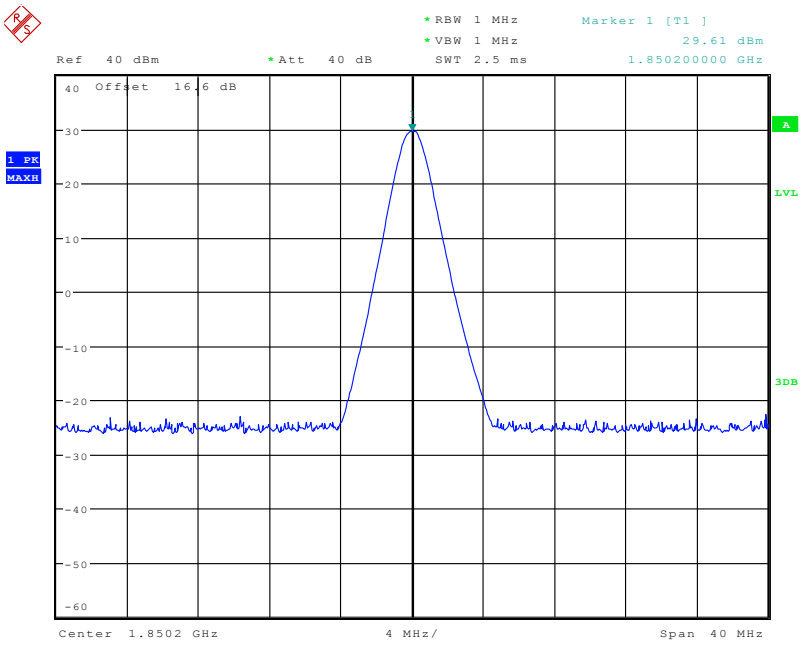
(Plot A2: GPRS 850MHz Channel = 128)



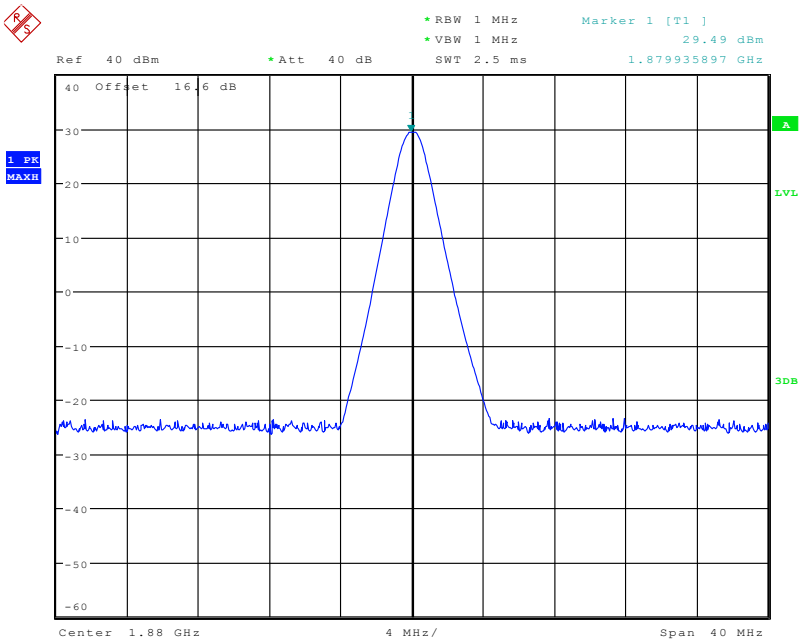
(Plot B2: GPRS 850MHz Channel = 190)



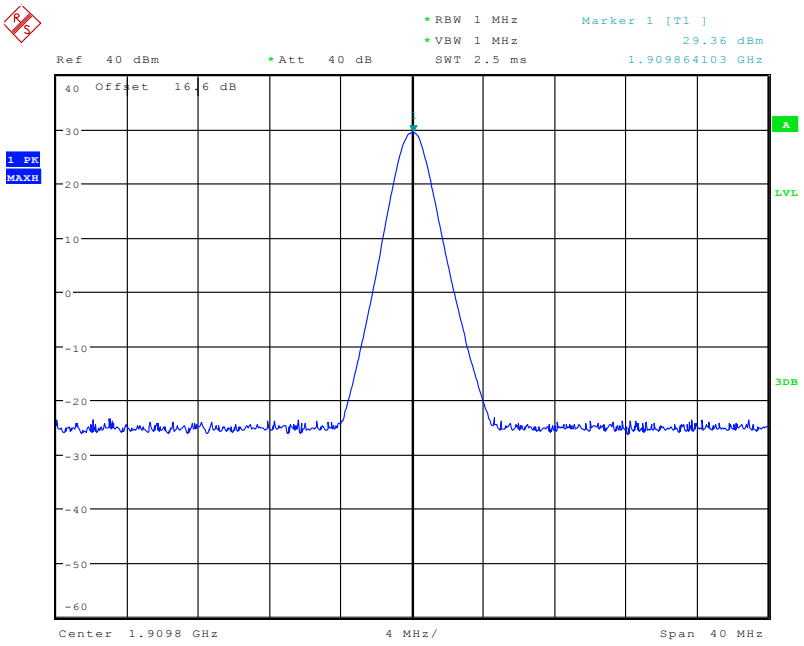
(Plot C2: GPRS 850MHz Channel = 251)



(Plot D2: GPRS 1900MHz Channel = 512)



(Plot E2: GPRS 1900MHz Channel = 661)



(Plot F2: GPRS 1900MHz Channel = 810)

3.3 26dB Occupied Bandwidth

3.3.1 Definition

According to FCC section 2.1049, the occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

Occupied bandwidth is also known as the 99% emission bandwidth, or 26dB bandwidth taking the total RF output power as reference.

3.3.2 Test Description

See section 3.1.2 of this report.

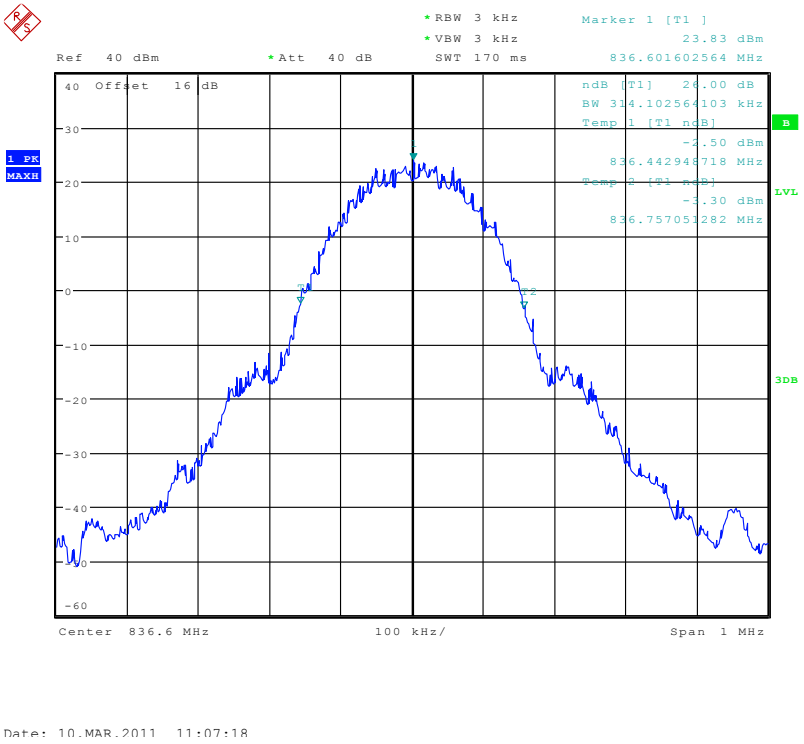
3.3.3 Test Verdict

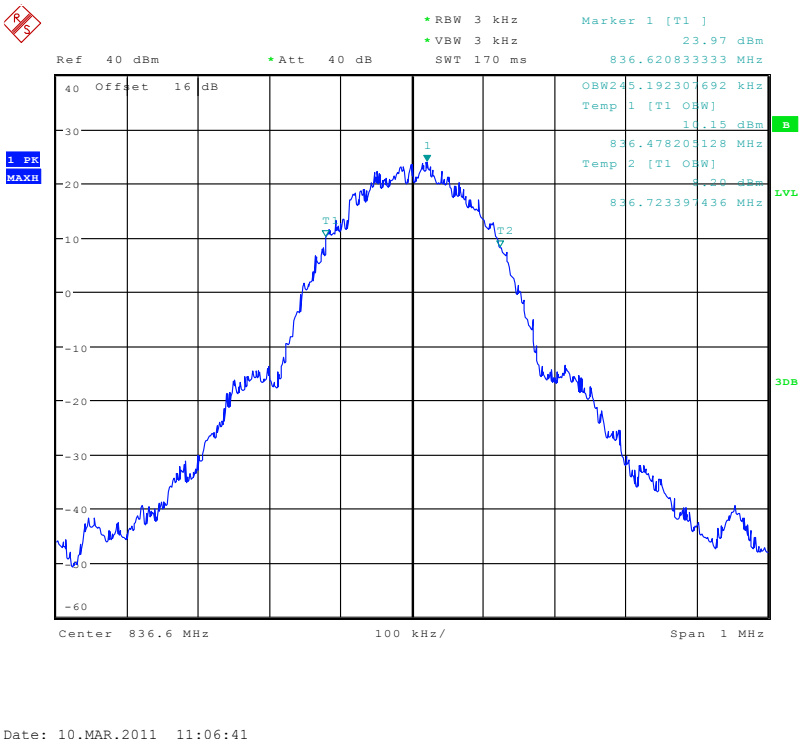
Here the lowest, middle and highest channels are tested to record the 26dB occupied bandwidth, it's about 300kHz. All modes are tested,including (GPRS850 and 1900).

1. Test Verdict:

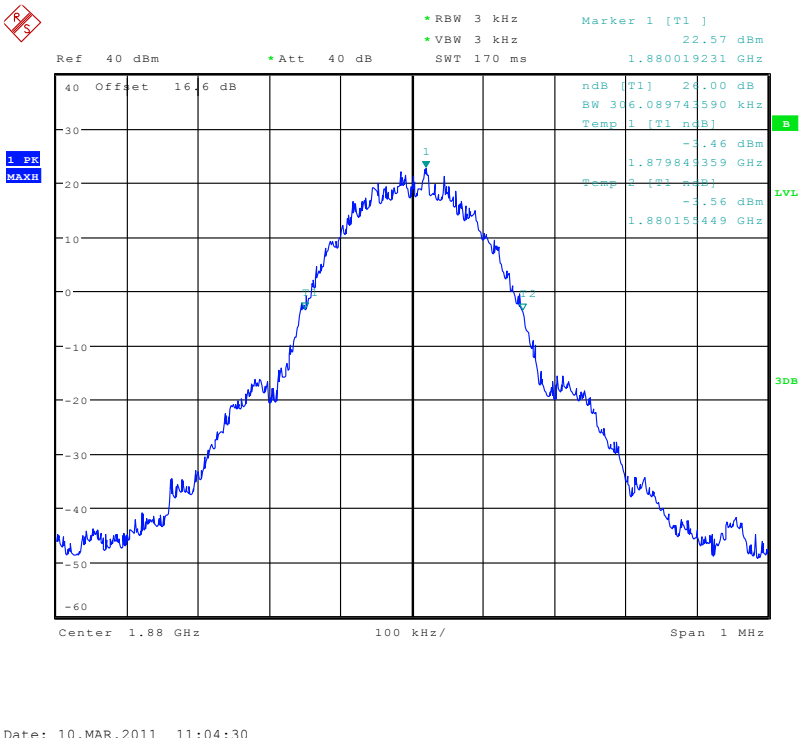
Band	Channel	Measured 26dB Occupied Bandwidth (kHz)	Measured 99% Occupied Bandwidth (kHz)	Refer to Plot
GPRS 850MHz	190	314.10	245.19	Plot A3
GPRS 1900MHz	661	306.09	243.59	Plot B3

2. Test Plot:

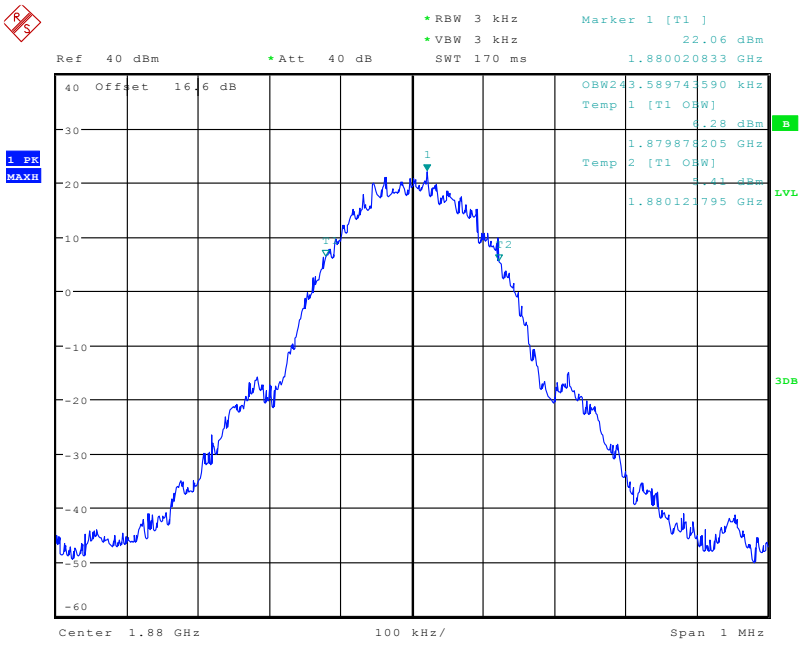




(Plot A3: GPRS 850MHz Channel = 190)



Date: 10.MAR.2011 11:04:30



Date: 10.MAR.2011 11:05:01

(Plot B3: GPRS 1900MHz Channel = 661)

3.4 Frequency Stability

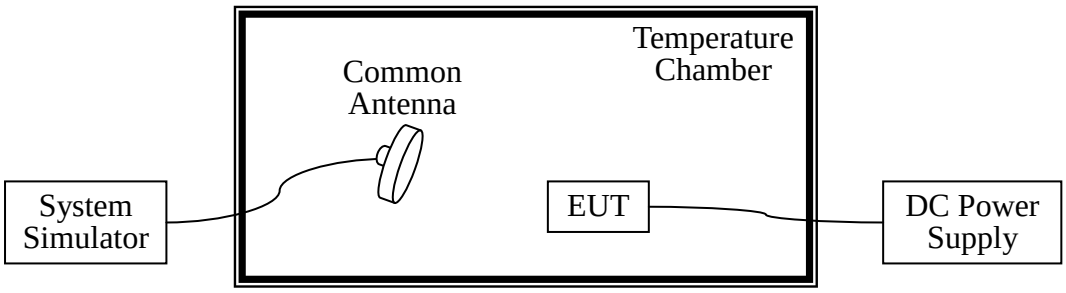
3.4.1 Requirement

According to FCC section 22.355 and FCC section 24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

(a) The temperature is varied from -30 ℃ to +50 ℃ at intervals of not more than 10 ℃.
(b) For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

3.4.2 Test Description

1. Test Setup:



The EUT, which is powered by the DC Power Supply directly, is located in the Temperature Chamber. The EUT is commanded by the System Simulator (SS) to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS via a Common Antenna.

2. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
System Simulator	Rohde&Schwarz	CMU200	105571	2010.9	1year
System Simulator	Agilent	E5515C	GB46040102	2010.9	1year
DC Power Supply	Good Will	GPS-3030DD	EF920938	2009.10	2year
Temperature Chamber	YinHe Experimental Equip.	HL4003T	(n.a.)	2010.9	1year

3.4.3 Test Verdict

The nominal, highest and lowest extreme voltages are separately 7.4VDC, 10VDC and 6.5VDC,

which are specified by the applicant; the normal temperature here used is 25℃. The frequency deviation limit is ±2.5ppm. All modes are tested,including (GPRS850 and 1900).

Band	Test Conditions		Frequency Deviation						Verdict
	Power (VDC)	Temperature (℃)	Low Channel		Middle Channel		High Channel		Limit ±2.5ppm (ppm)
			Dev. Freq. Hz	Deviation (ppm)	Dev. Freq. Hz	Deviation (ppm)	Dev. Freq. Hz	Deviation (ppm)	
GSM 850MHz	7.4	-30	-	-	-	-	-	-	PASS
		-20	-	-	-	-	-	-	
		-10	-	-	-	-	-	-	
		5	-5	0	-3	0	-3	0	
		+10	5	0	4	0	4	0	
		+20	-1	0	4	0	5	0	
		+30	9	0	-5	0	-8	0	
		+40	-5	0	7	0	6	0	
		+50	-	-	-	-	-	-	
	10	+25	-7	0	-7	0	-5	0	
	6.5	+25	-2	0	-4	0	4	0	
GSM 1900MHz	7.4	-30	-	-	-	-	-	-	PASS
		-20	-	-	-	-	-	-	
		-10	-	-	-	-	-	-	
		5	7	0	-4	0	-6	0	
		+10	-4	0	-4	0	4	0	
		+20	6	0	3	0	2	0	
		+30	3	0	5	0	-4	0	
		+40	-5	0	-7	0	-5	0	
		+50	-	-	-	-	-	-	
	10	+25	4	0	6	0	8	0	
	6.5	+25	-6	0	-4	0	-7	0	

Note:

1. The EUT stops transmitting at temperatures 0 ℃,-10 ℃, -20 ℃, -30 ℃ and -50 ℃.

2. The manufacturer declared that the EUT could work properly between temperatures 5 ℃~40 ℃.

3.5 Conducted Out of Band Emissions

3.5.1 Requirement

According to FCC section 22.917(a) and FCC section 24.238(a), the power of any emission 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. This calculated to be -13dBm.

3.5.2 Test Description

See section 3.1.2 of this report.

3.5.3 Test Result

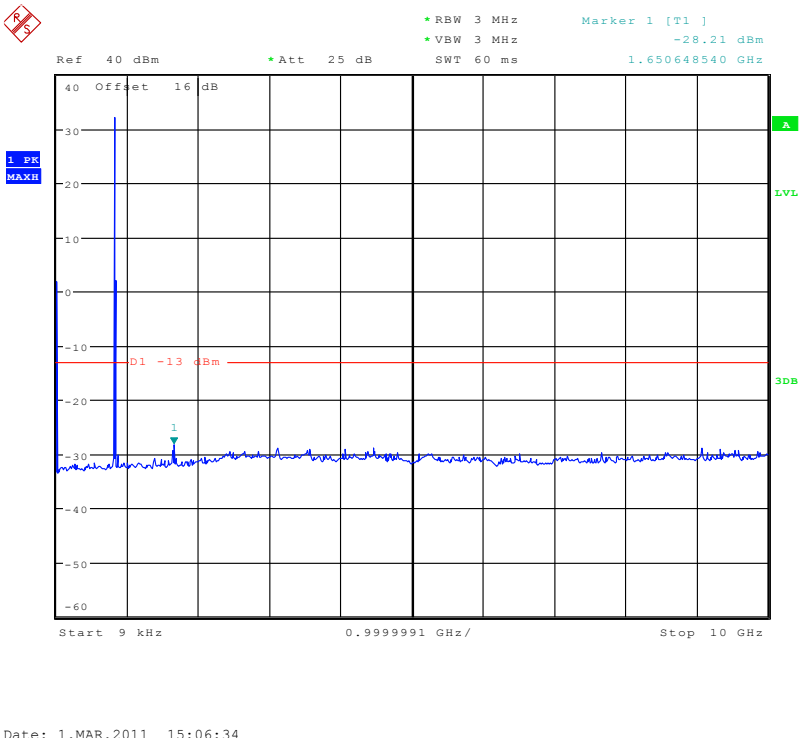
The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions. All modes are tested,including (GPRS850 and 1900).

Test Verdict:

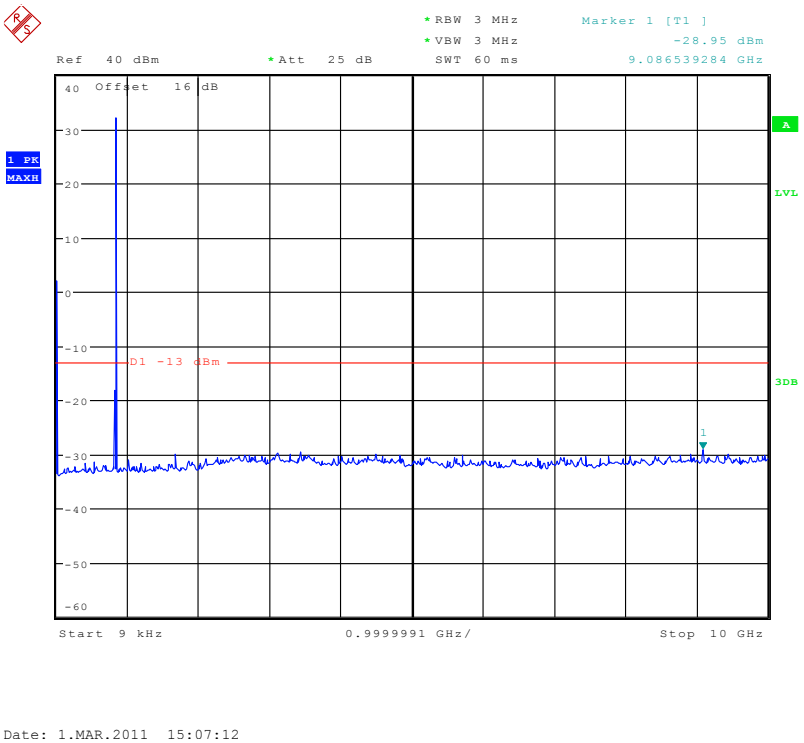
Band	Channel	Frequency (GHz)	Measured Max. Spurious Emission (dBm)	Refer to Plot	Limit (dBm)	Verdict
GPRS 850MHz	128	1.65	-28.21	Plot A4	-13	PASS
	190	9.09	-28.95	Plot B4		PASS
	251	5.10	-29.03	Plot C4		PASS
GPRS 1900MHz	512	17.92	-27.98	Plot D4	-13	PASS
	661	17.34	-27.71	Plot E4		PASS
	810	4.39	-28.41	Plot F4		PASS

3. Test Plot for the Whole Measurement Frequency Range:

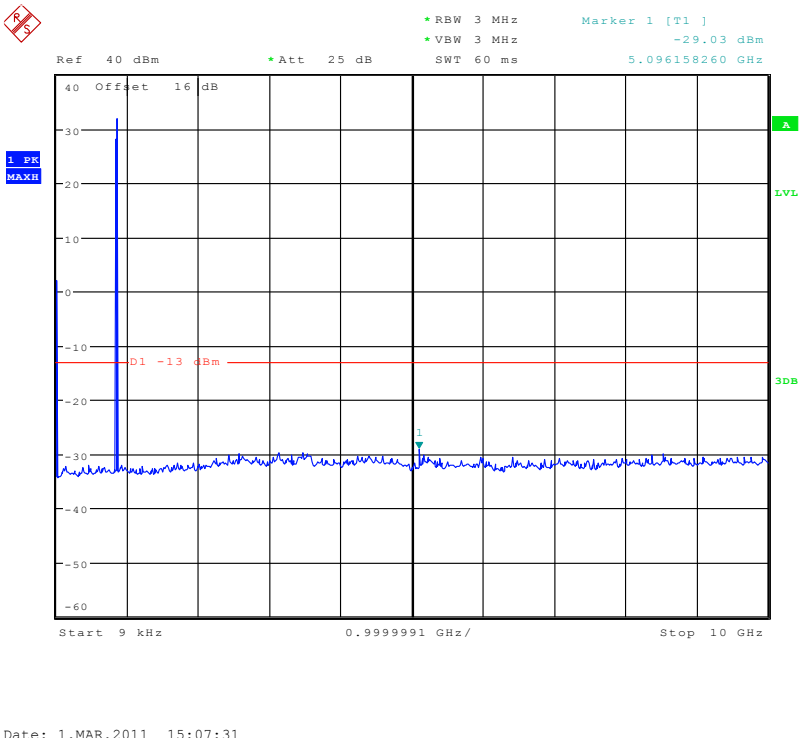
Note: the power of the EUT transmitting frequency should be ignored.



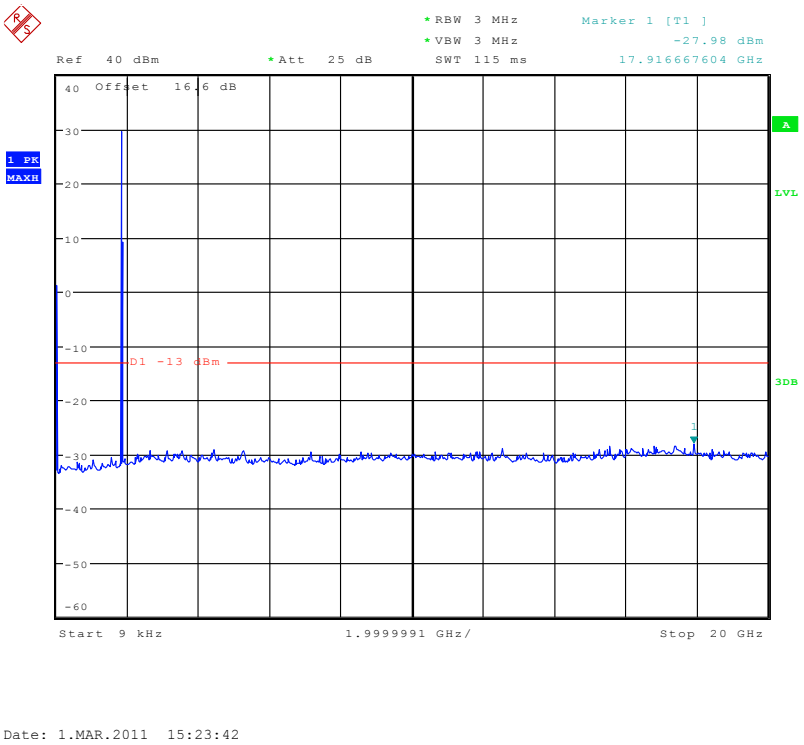
(Plot A4: GPRS 850MHz Channel = 128, 9KHz to 10GHz)



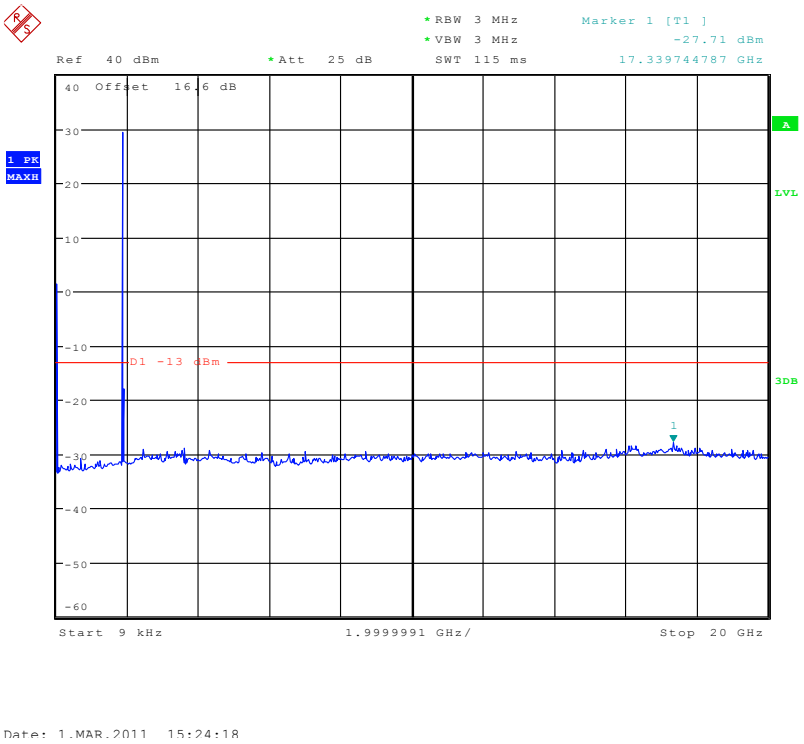
(Plot B4: GPRS 850MHz Channel = 190, 9KHz to 10GHz)



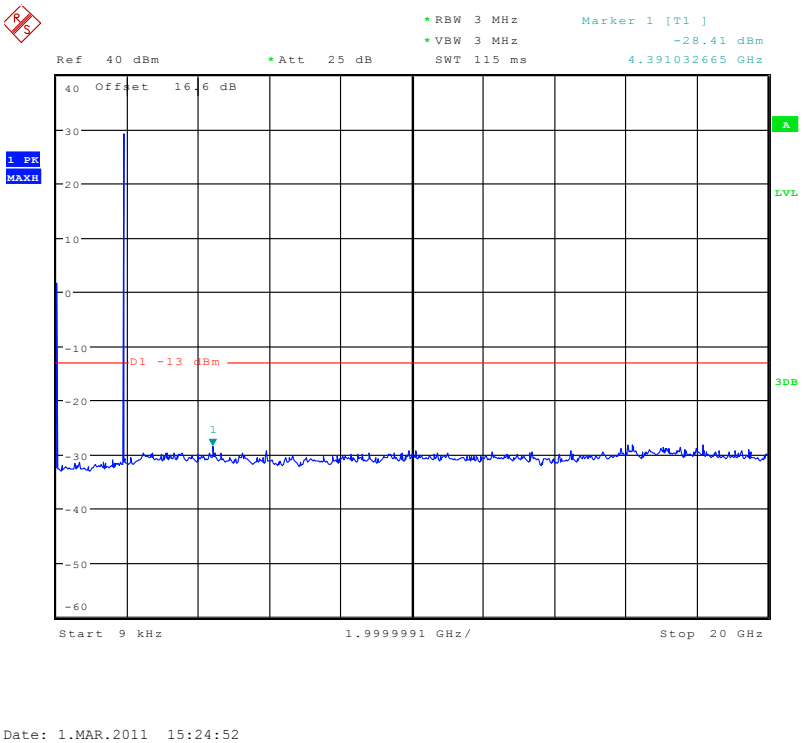
(Plot C4: GPRS 850MHz Channel = 251, 9KHz to 10GHz)



(Plot D4: GPRS 1900MHz Channel = 512, 9KHz to 20GHz)



(Plot E4: GPRS 1900MHz Channel = 661, 9KHz to 20GHz)



(Plot F4: GPRS 1900MHz Channel = 810, 9KHz to 20GHz)

3.6 Band Edge

3.6.1 Requirement

According to FCC section 22.917(b) and FCC section 24.238(b), in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth (26dB emission bandwidth) of the fundamental emission of the transmitter may be employed.

3.6.2 Test Description

See section 3.1.2 of this report.

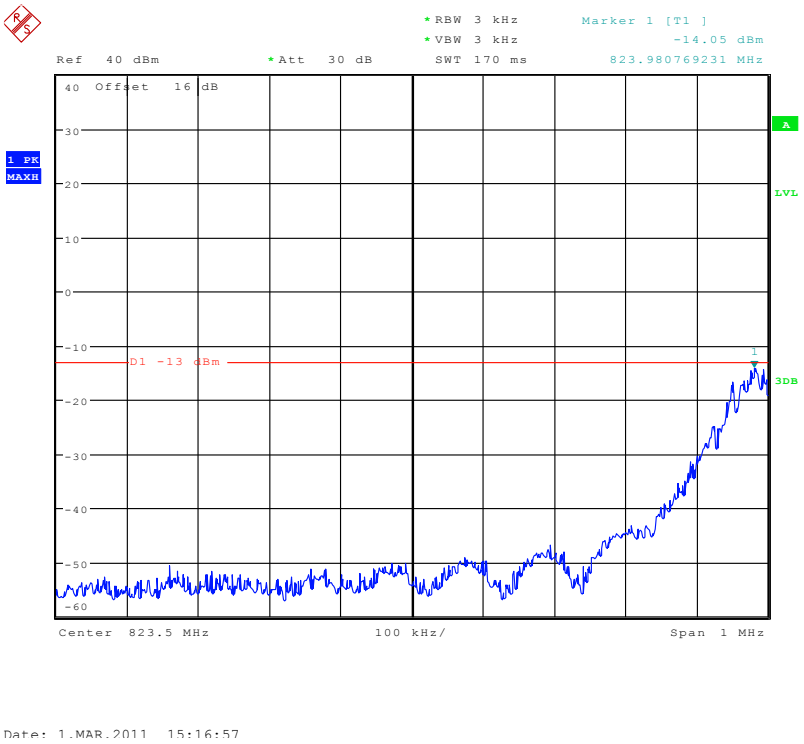
3.6.3 Test Result

The lowest and highest channels are tested to verify the band edge emissions. All modes are tested, including (GPRS850 and 1900).

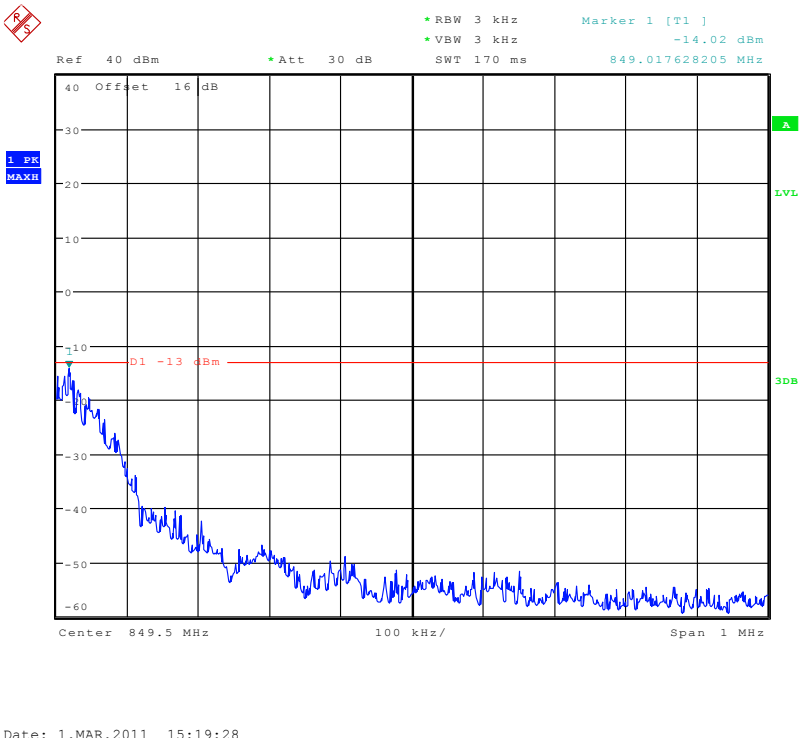
Test Verdict:

Band	Channel	Frequency (MHz)	Measured Max. Band Edge Emission (dBm)	Refer to Plot	Limit (dBm)	Verdict
GPRS 850MHz	128	823.98	-14.05	Plat A5	-13	PASS
	251	849.02	-14.02	Plot B5		PASS
GPRS 1900MHz	512	1849.98	-16.04	Plat C5		PASS
	810	1910.02	-15.24	Plot D5		PASS

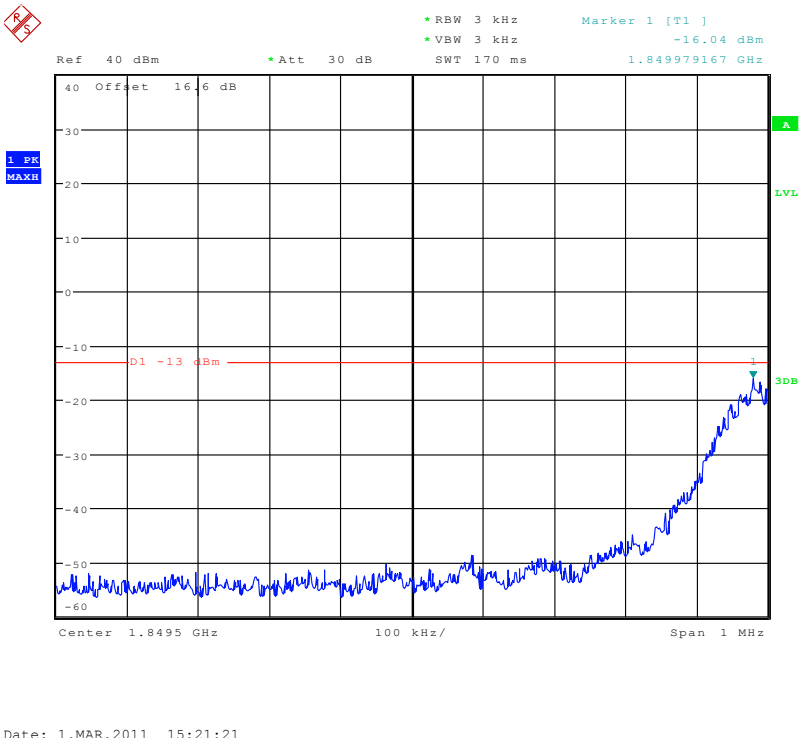
4. Test Plot:



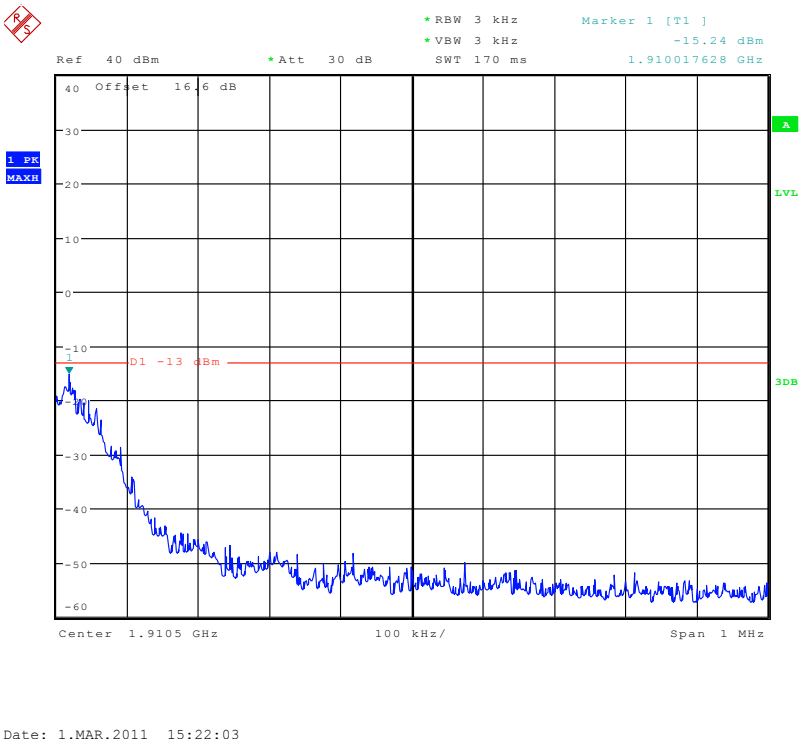
(Plot A5: GPRS 850MHz Channel = 128)



(Plot B5: GPRS 850MHz Channel = 251)



(Plot C5: GPRS 1900MHz Channel = 512)



(Plot D5: GPRS 1900MHz Channel = 810)

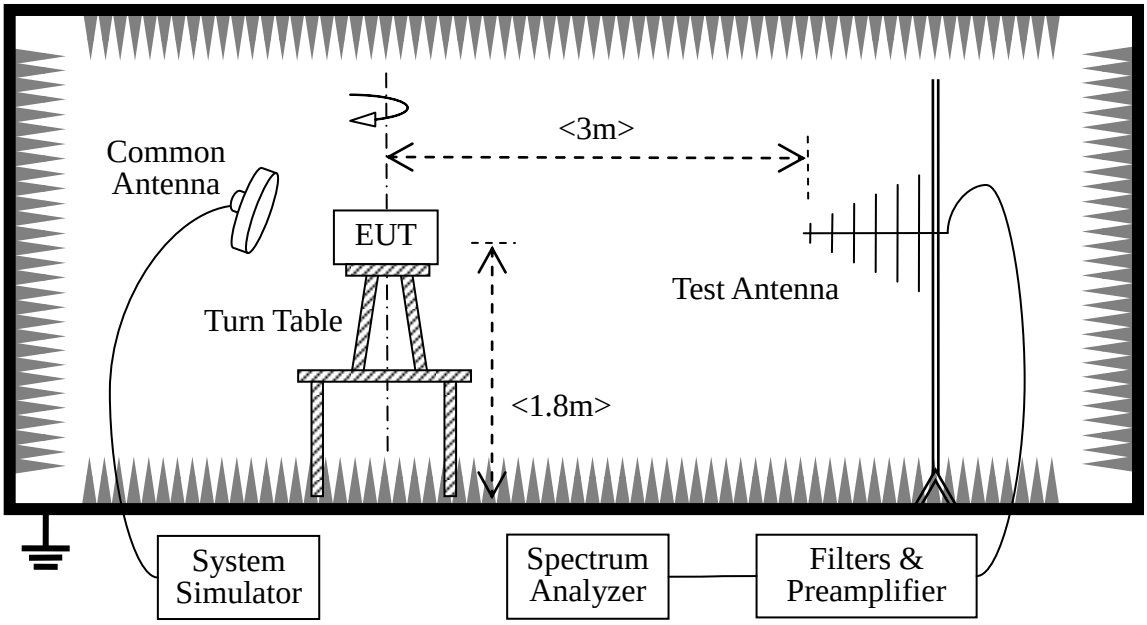
3.7 Transmitter Radiated Power (EIRP/ERP)

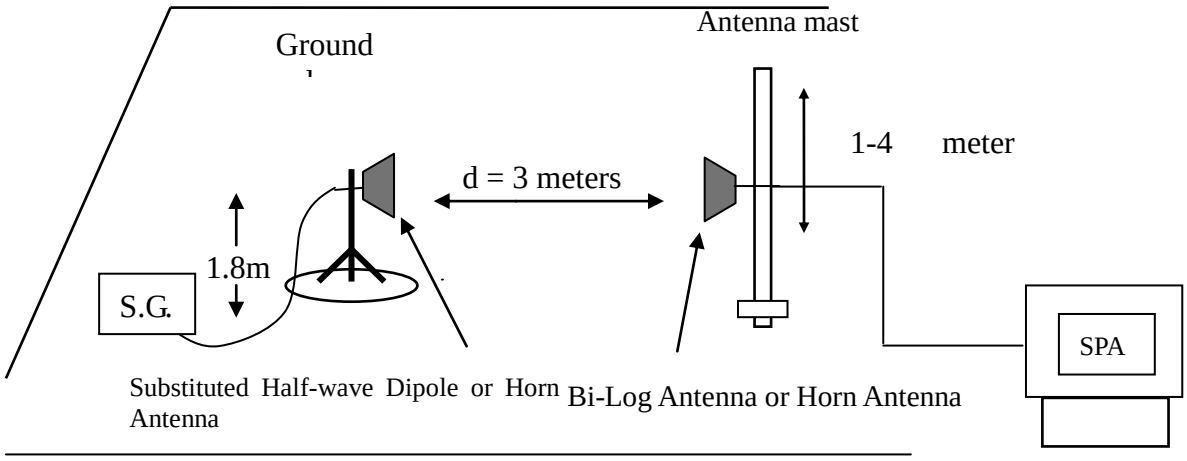
3.7.1 Requirement

According to FCC section 22.913, the Effective Radiated Power (ERP) of mobile transmitters and auxiliary test transmitters must not exceed 7Watts, and FCC section 24.232, the broadband PCS mobile station is limited to 2Watts e.i.r.p. peak power.

3.7.2 Test Description

1. Test Setup:





Substituted Method Test Set-up

The EUT, which is powered by the Battery charged with the AC Adapter, is located in a 3m Full-Anechoic Chamber; the cable loss, air loss and so on of the site as factors are pre-calibrated using the "Substitution" method, and calculated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power i.e. GSM850MHz band Power Control Level (PCL) = 5 and Power Class = 4 and GSM1900MHz band Power Control Level (PCL) = 0 and Power Class = 1. A call is established between the EUT and the SS via a Common Antenna.

The Test Antenna is a Bi-Log one (used for 30MHz to 1GHz) or a Horn one (used for above 3GHz), and it's located at the same height as the EUT. The Filters consists of Notch Filters and High Pass Filter.

According to FCC §22.913, the ERP of Cellular mobile transmitters must not exceed 7 Watts (38.5dBm).

The measurements procedures in TIA-603C-2004 are used.

1. EUT was placed on a 1.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.8m. Detected emissions were maximized at each frequency by rotating the EUT through 360 °and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (P_r).
3. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
4. The cable loss (P_{cl}) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain (Ga) should be recorded after test. The measurement results are obtained as described below:
   Power(EIRP)= $P_{Mea} + P_{cl} + G_a$
5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.

2. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
SS	Agilent	E5515C	GB46040102	2010.9	1year
Spectrum Analyzer	Agilent	E4440A	MY46187763	2010.9	1year
Spectrum Analyzer	R&S	FSP30	101020	2010.9	1year
Full-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2009.10	2year
Test Antenna - Bi-Log	Rohde&Schwarz	HL562	100385	2010.9	1year
Test Antenna - Horn	Rohde&Schwarz	HF906	100565	2010.9	1year

3.7.3 Test Result

The Turn Table is actuated to turn from 0 ° to 360 °, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. The lowest, middle and highest channels are tested. All modes are tested,including (GPRS 850 and 1900).

Test Verdict:

Limits:

	Burst Peak ERP (dBm)
GPRS850	≤38.5dBm (7W)

Measurement result

Channel	Peak ERP (dBm)	P_{cl} Cable Loss (dB)	G_a Antenna Gain(dB)	Correction (dBm)	P_{Mea} (dBm)	Polarization
128	27.26	10.01	5.05	2.15	14.35	Horizontal
190	27.15	10.03	5.07	2.15	14.20	Horizontal
251	27.09	10.05	5.11	2.15	14.08	Horizontal
128	26.11	10.01	5.05	2.15	13.20	Vertical
190	25.94	10.03	5.07	2.15	12.99	Vertical
251	25.88	10.05	5.11	2.15	12.87	Vertical

Remark:

$ERP(dBm)= P_{Mea}+ P_{cl}+G_a-2.15$

Limits:

	Burst Peak EIRP (dBm)
GPRS1900	≤33dBm (2W)

Measurement result

Channel	Peak ERP (dBm)	P_{cl} Cable Loss (dB)	G_a Antenna Gain(dB)	P_{Mea}(dBm)	Polarization
512	24.13	12.05	5.52	6.56	Horizontal
661	24.24	12.08	5.64	6.52	Horizontal
810	24.05	12.11	5.61	6.33	Horizontal
512	23.85	12.05	5.52	6.28	Vertical
661	23.94	12.08	5.64	6.22	Vertical
810	23.79	12.11	5.61	6.07	Vertical

Remark:

$EIRP(dBm)= P_{Mea}+ P_{cl}+G_a$

3.8 Radiated Out of Band Emissions

3.8.1 Requirement

According to FCC section 22.917(a) and section 24.238(a), the power of any emission 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. This calculated to be -13dBm.

3.8.2 Test Description

See section 3.7.2 of this report.

3.8.3 Test Procedure

1. Perform test system setup as section 2.4.2
2. Make a limit line whose value is -13dBm on the Spectrum Analyzer, and set the RBW of the Spectrum Analyzer to 1MHz.
3. The lowest and the highest channel were selected to perform tests respectively.
4. Employ the bi-log Test Antenna as the test system receiving antenna and set the frequency range of the Spectrum Analyzer from 30MHz to 3GHz.
5. The measurement is performed with the Test Antenna at both horizontal and vertical polarization respectively. Set the polarization of the Test Antenna to be horizontal.
6. Actuate the Turn Table to turn from 0 degrees to 360 degrees to find the maximum reading via the Spectrum Analyzer, mark the fundamental frequency and the harmonics thereof, after then record the harmonics and the plot.
7. Set the polarization of the Test Antenna to be vertical, then repeat step 6.
8. Employ the horn Test Antenna as the test system receiving antenna and set the frequency range of the Spectrum Analyzer from 3GHz to 10^{th} harmonic of the fundamental frequency (here used 10GHz), then repeat step 5 to 7.
9. Set the frequency range of the Spectrum Analyzer suitably to capture the waveform; search peak and mark it; finally record the peak and the plot.

3.8.4 Test Result

Table for the Harmonics

NOTE: "---" in the table following means that the emission power was too small to be measured and was at least 12dB below the limit. All modes are tested,including (GPRS 850 and 1900).

I GPRS 850MHz

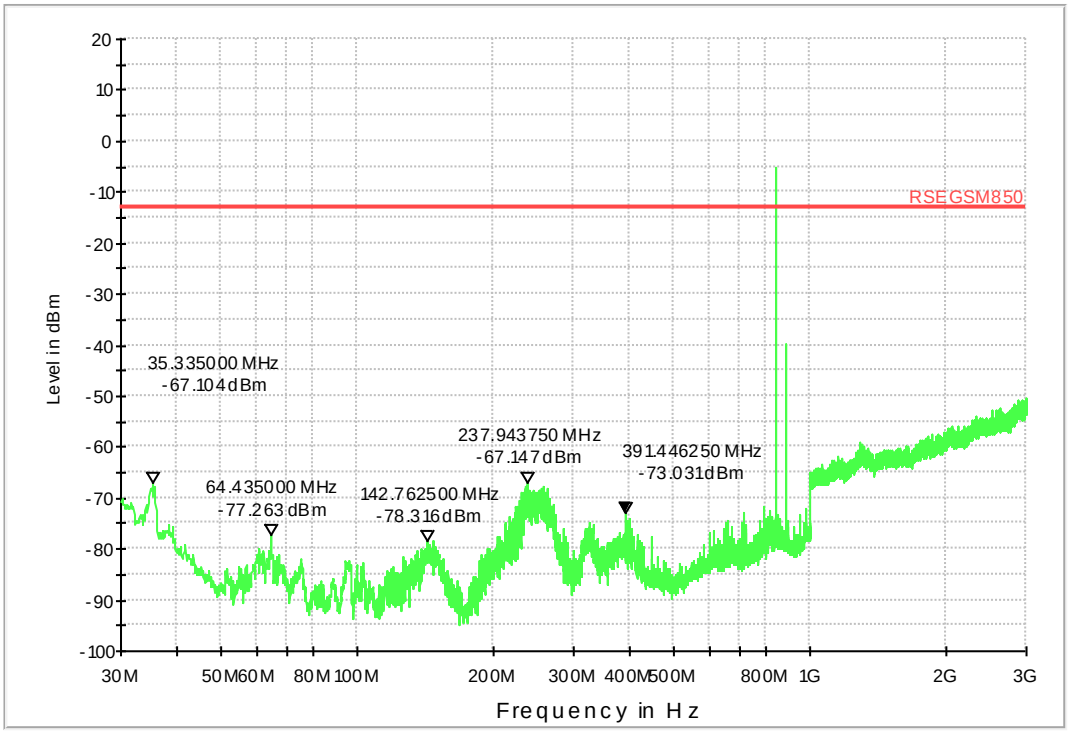
No.	Frequency (MHz)	Emission Power (dBm)		Limit (dBm)
		Test Antenna Vertical	Test Antenna Horizontal	
TCH number set to 190 (836.6MHz)				
1	35.335	-76.076	-67.104	-13
2	51.0975	-78.820	---	-13
3	64.435	---	-77.263	-13
4	107.47875	-67.125	---	-13
5	194.9	-76.998	---	-13
6	237.94375	---	-67.147	-13
7	391.4465	---	-73.031	-13
8	588.35625	-72.683	---	-13
9	3872.375	---	-54.792	-13

II GPRS 1900MHz

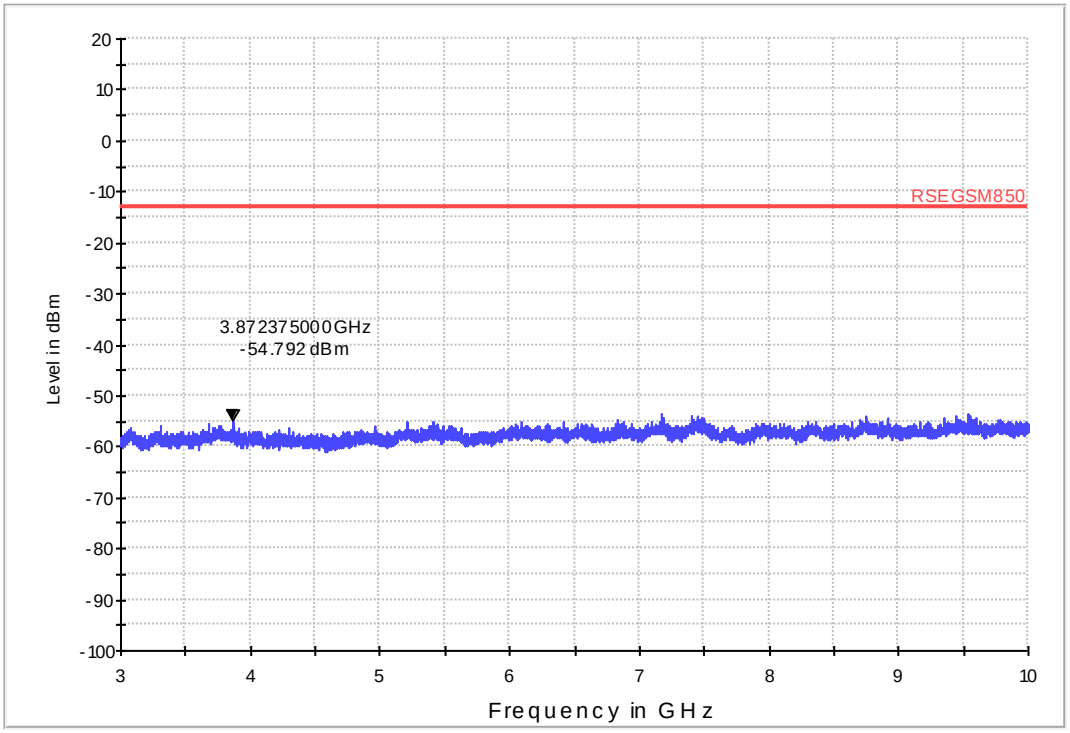
No.	Frequency (MHz)	Emission Power (dBm)		Limit (dBm)
		Test Antenna Vertical	Test Antenna Horizontal	
TCH number set to 661 (1880.2MHz)				
1	35.21375	---	-70.339	-13
2	81.28875	-77.181	---	-13
3	108.57	-75.583	---	-13
4	140.8225	---	-77.282	-13
5	257.7075	---	-60.793	-13
6	271.16625	---	-56.867	-13
7	395.32625	-77.981	---	-13
8	420.30375	---	-68.152	-13
9	587.75	-74.499	---	-13

Test Plot

MORLAB-RSE-FCC-GSM850 30M-3G

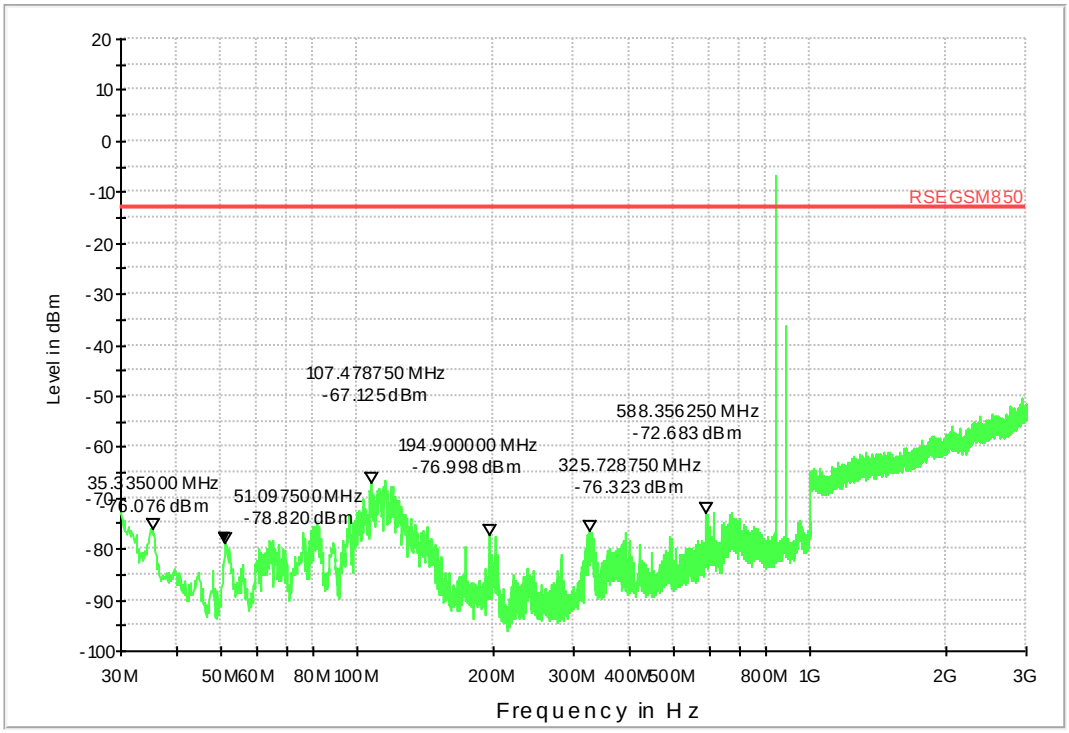


MORLAB-RSE-FCC-GSM850 3G-10G

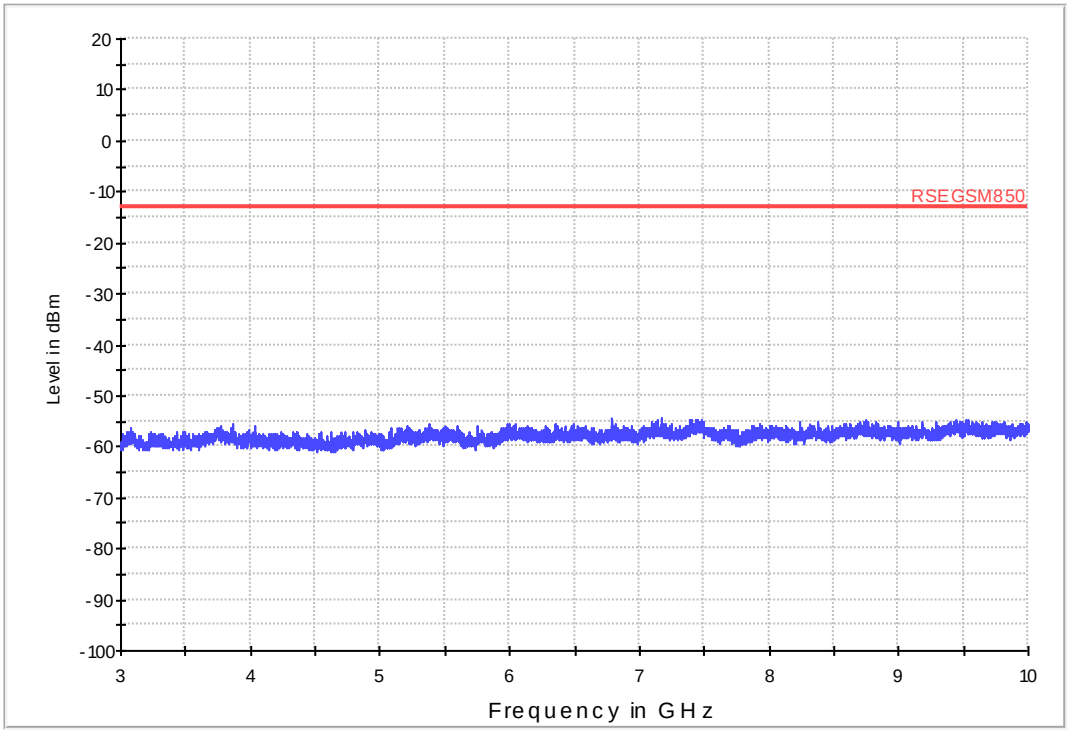


GPRS 850 CH190-H 30M-10G

MORLAB-RSE-FCC-GSM850 30M-3G

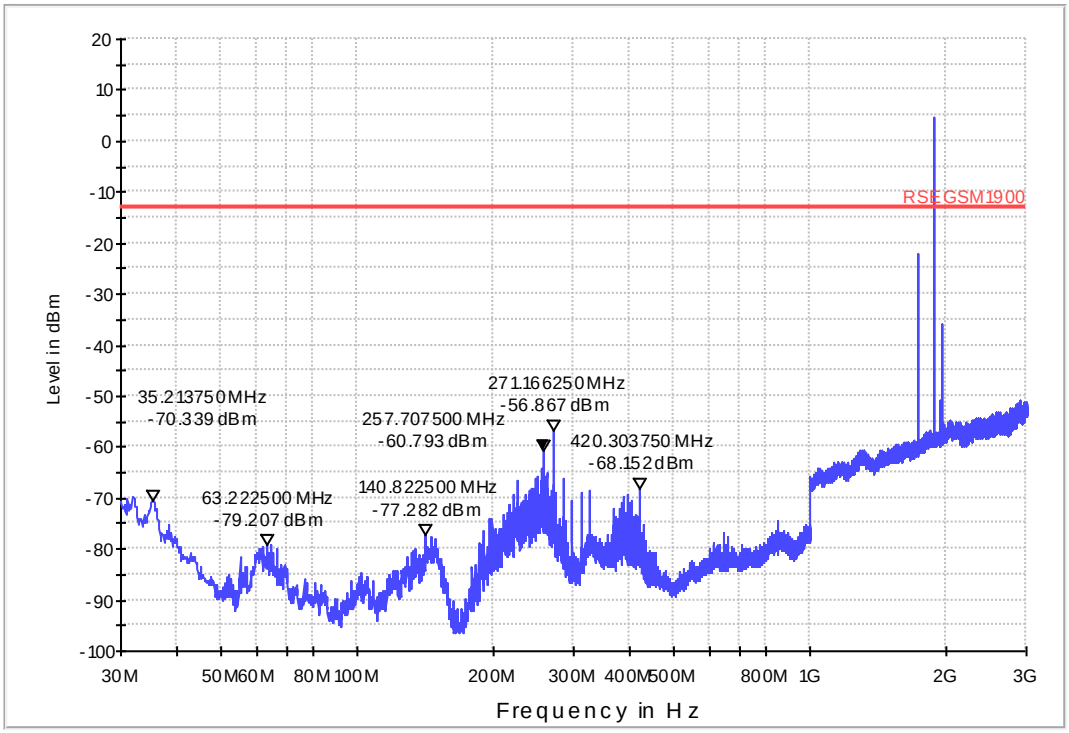


MORLAB-RSE-FCC-GSM850 3G-10G

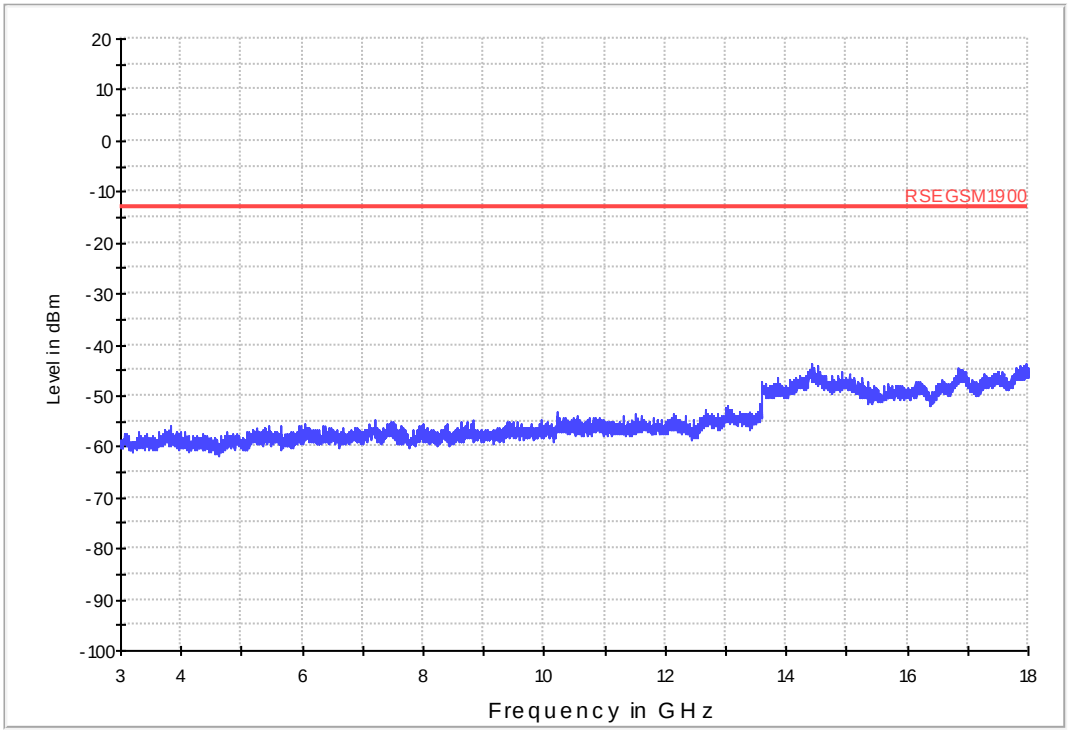


GPRS 850 CH190-V 30M-10G

MORLAB-RSE-FCC-GSM1900 30M-3G

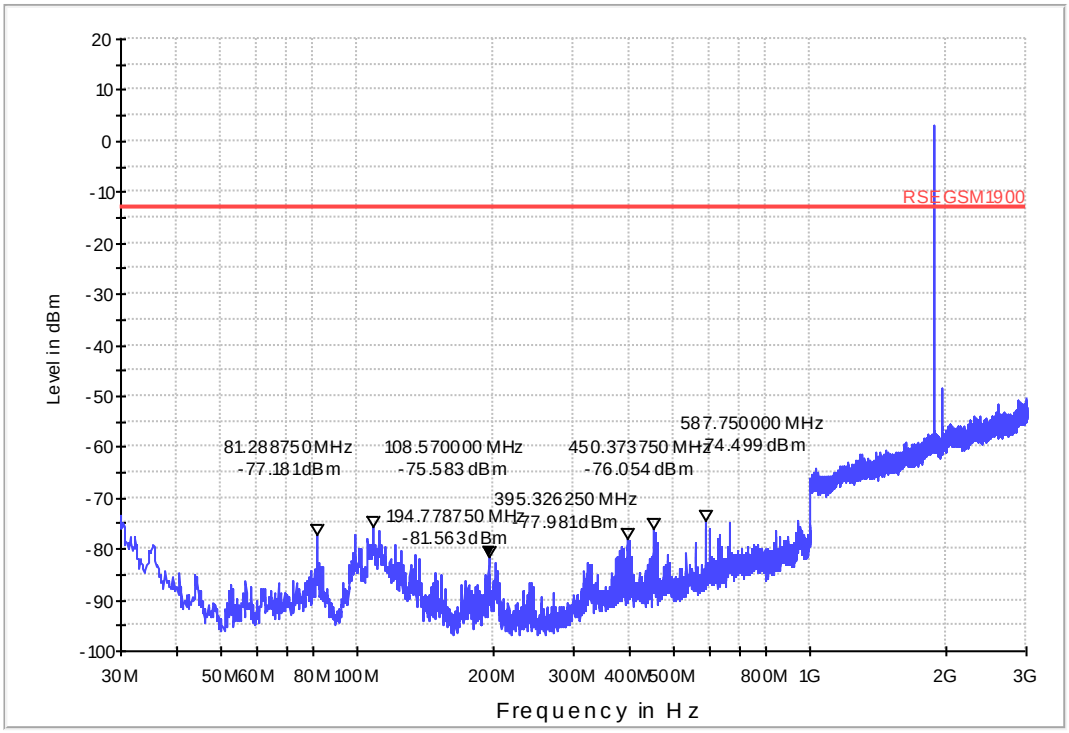


MORLAB-RSE-FCC-GSM1900 3G-20G

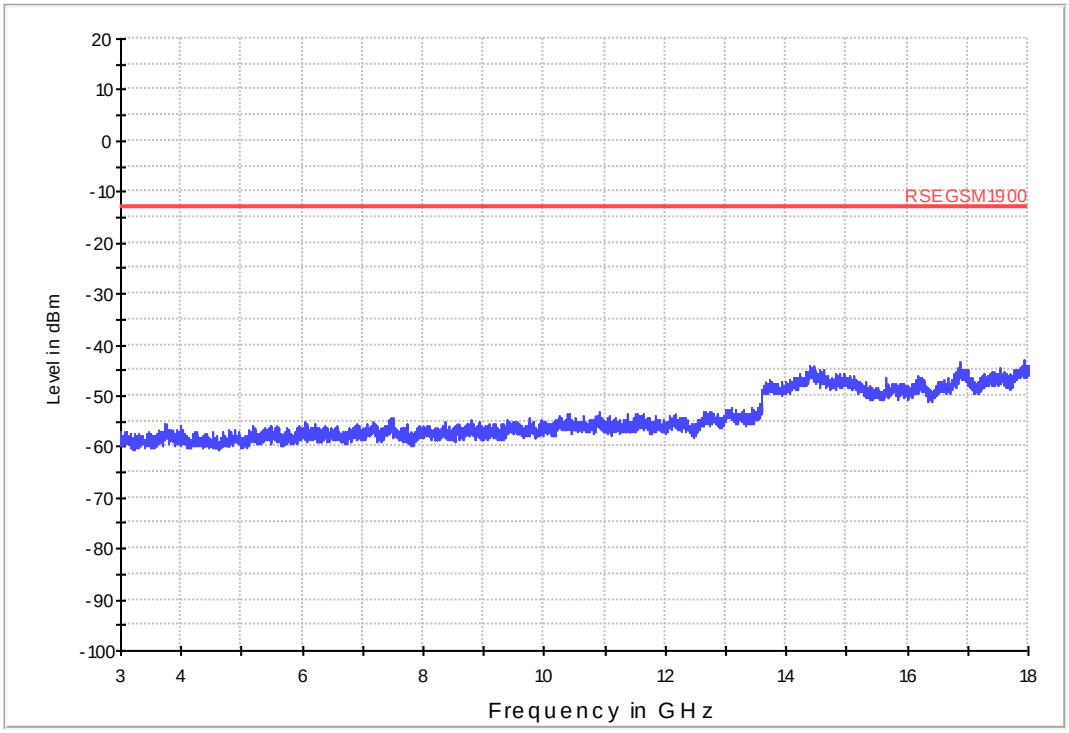


GPRS 1900 CH661-H 30M-18G

MORLAB-RSE-FCC-GSM1900 30M-3G



MORLAB-RSE-FCC-GSM1900 3G-20G



GPRS 1900 CH661-V 3G-18G