RF TEST REPORT

Report No.:	SET2014-12448
Product:	Kid's GPS Tracking Unit
FCC ID:	UFDW4
Model No.:	W4
Applicant:	Cyber Blue (HK) Limited
Address:	Room 703, 7/F, Fook Lee Commercial Centre, Town Place, 33 Lockhart Road, Wanchai,Hong Kong,China
Issued by:	CCIC-SET
Lab Location:	Electronic Testing Building, Shahe Road，Xili, Nanshan District, Shenzh China
	Tel：86 755 26627338 **Fax**：86 755 26627238

Test Report

Product……..……:	Kid's GPS Tracking Unit
Brand Name……...:	N/A.
Trade Name……:	N/A
Applicant……:	Cyber Blue (HK) Limited
Applicant Address…….:	Room 703, 7/F, Fook Lee Commercial Centre, Town Place, 33 Lockhart Road, Wanchai,Hong Kong,China
Manufacturer……:	Cyber Blue (HK) Limited
Manufacturer Address..:	Room 703, 7/F, Fook Lee Commercial Centre, Town Place, 33 Lockhart Road, Wanchai,Hong Kong,China
Test Standards……...:	47 CFR Part 2(10-1-12 Edition) Frequency Allocations and Radio Treaty Matters; General Rules and Regulations 47 CFR Part 22(10-1-12 Edition) Public Mobile Services 47 CFR Part 24(10-1-12 Edition)Personal Communications Services
Test Result……...:	PASS

Tested by ……: 2014.11.19

Haigang He，Test Engineer

Reviewed by……: 2014.11.19

Lu Lei, Senior Engineer

Approved by……...: 2014.11.19

Wu Li'an，Manager

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Change History		
Issue	Date	Reason for change
1.0	2014-11-19	First edition

1. GENERAL INFORMATION

1.1 EUT Description

EUT Type	Kid's GPS Tracking Unit
Serial No.	8C9109007AD8
Hardware Version	W4_V2_0630
Software Version	QIHU60D_11B_PCB01_gprs_MT6260_S00.WATCH361_MT60D_V0_0.bin
EUT supports Radios application	GSM/GPRS Bluetooth v4.0 LE
Frequency Range	GSM 850MHz: Tx: 824.2 - 848.8MHz (at intervals of 200kHz); Rx: 869.2 - 893.8MHz (at intervals of 200kHz) GSM 1900MHz: Tx: 1850.2 - 1909.8MHz (at intervals of 200kHz); Rx: 1930.2 - 1989.8MHz (at intervals of 200kHz)
Multislot Class.....:	GPRS: Multislot Class12
Maximum Output Power to Antenna	GSM850: 31.36dBm GSM1900: 28.92dBm
Antenna Type.....:	FIFA Antenna

1.2 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator

FCC Rule	System	Type of Modulation	Emission Designator	Frequency Tolerance (ppm)	Maximum ERP/EIRP(W)
Part 22	GSM 850	GMSK	246KGXW	0.04	1.54
Part 24	GSM 1900	GMSK	246KGXW	0.03	0.86

1.3 Test Standards and Results

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

1. 47 CFR Part 2, 22(H), 24(E)

2. ANSI / TIA / EIA-603-C-2004

3. FCC KDB 971168 D01 Power Meas. License Digital Systems v02r01

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

No.	Section	Description	Limit	Result	Remark
1	2.1046	Conducted RF Output Power	Reporting Only	PASS	
2	24.232(d)	Peak to Average Radio	＜13dBm	PASS	
3	2.1049, 22.917(b) 24.238(b)	99% Occupied Bandwidth and 26dB Bandwidth	Reporting Only	PASS	
4	2.1055, 22.355 24.235	Frequency Stability	＜2.5ppm	PASS	
5	2.1051 22.917(a) 24.238(a)	Conducted Out of Band Emissions	< 43+10log10(P[Watts])	PASS	
6	2.1051 22.917(a) 24.238(a)	Band Edge	< 43+10log10(P[Watts])	PASS	
7	22.913(a)(2)	Effective Radiated Power	＜7Watts	PASS	
	24.232(c)	Equivalent Isotropic Radiated Power	＜2Watts	PASS	
8	2.1053 22.917(a) 24.238(a)	Field Strength of Spurious Radiation	< 43+10log10(P[Watts])	PASS	

Remark：

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

1.4 Test Configuration of Equipment under Test

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas. License Digital Systems v02r01 with maximum output power.
Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission.
Radiated emissions were investigated as following frequency range:
1. 30 MHz to 9000 MHz for GSM850.

2. 30 MHz to 20000 MHz for GSM1900.
All modes and data rates and positions were investigated.

Test modes are chosen to be reported as the worst case configuration below:

Test Modes		
Band	Radiated TCs	Conducted TCs
GSM 850	GSM Link	GSM Link
GSM 1900	GSM Link	GSM Link

Note: The maximum power levels are chosen to test as the worst case configuration as follows: GSM mode for GMSK modulation, only these modes were used for all tests.

1.5 Facilities and Accreditations

1.5.1 Test Facilities

CNAS-Lab Code: L1659
CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. CCIC is a third party testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L1659. A 12.8*6.8*6.4 (m) fully anechoic chamber was used for the radiated spurious emissions test.
FCC-Registration No.: 406086
CCIC Southern Electronic Product Testing (Shenzhen) 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. Registration 406086, Renewal date Nov. 19, 2011, valid time is until Nov. 18, 2014.

IC-Registration No.: 11185A-1

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A-1 on July. 15, 2013, valid time is until July. 15, 2016.

1.5.2 Test Environment Conditions

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

Temperature (℃):	15℃- 35℃
Relative Humidity (%):	30% -60%
Atmospheric Pressure (kPa):	86KPa-106KPa

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

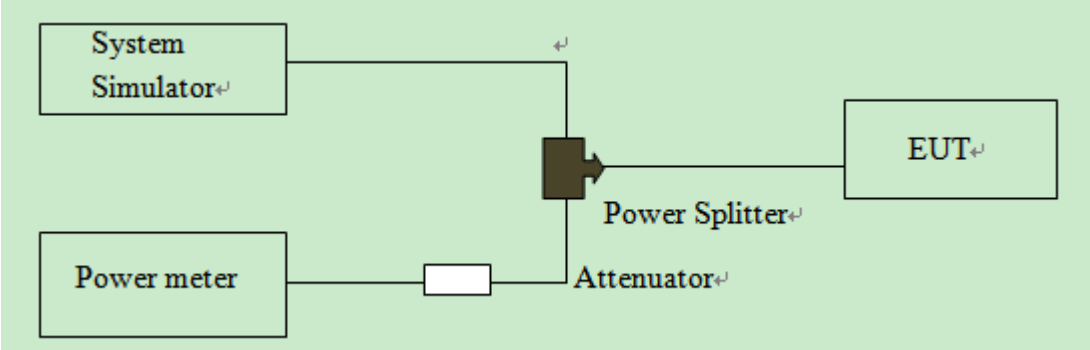
2.1 Conducted RF Output Power

2.1.1 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).

2.1.2 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 Date
System Simulator	Agilent	E5515C	MY47510547	2014.06.11	2015.06.10
Power Meter	R&S	NRV2	1020.1809.02	2014.06.08	2015.06.07
Power Sensor	R&S	NRV-Z4	823.3618.03	2014.06.08	2015.06.07
Attenuator	MCE	10dB	BN3693	2014.06.11	2015.06.10

2.1.3 Test Results

Here the lowest, middle and highest channels are selected to perform testing to verify the conducted RF output power of the EUT.

1. GSM Model Test Verdict:

Band	Channel	Frequency (MHz)	Measured Output Power dBm	Verdict
GSM 850MHz	128	824.2	31.77	PASS
	190	836.6	31.62	PASS
	251	848.8	31.88	PASS
GSM 1900MHz	512	1850.2	28.83	PASS
	661	1880.0	28.60	PASS
	810	1909.8	28.69	PASS
GPRS 850MHz	128	824.2	31.16	PASS
	190	836.6	31.10	PASS
	251	848.8	31.41	PASS
GPRS 1900MHz	512	1850.2	27.93	PASS
	661	1880.0	27.87	PASS
	810	1909.8	27.76	PASS

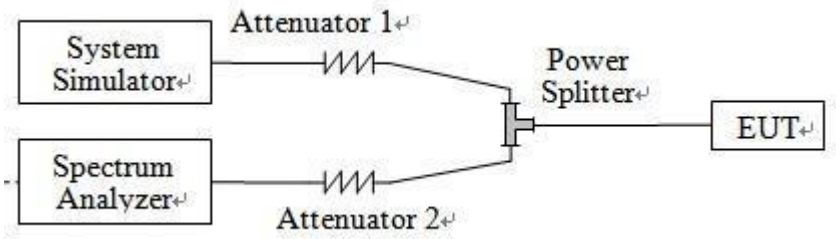
Note 1: For the GPRS model, all the slots were tested and just the worst data was record in this report.

2.2 Peak to Average Radio

2.2.1 Definition

According to FCC section 2.1049 and FCC 24.232(d), the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

2.2.2 Test Description



Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due Date
System Simulator	R&S	CMW500	149333	2014.07.21	2015.07.20
Spectrum Analyzer	R&S	FSP40	100341	2014.07.07	2015.07.06
Attenuator 1	Resent	10dB	(n.a.)	2014.06.11	2015.06.10
Attenuator 2	Resent	3dB	(n.a.)	2014.06.11	2015.06.10

2.2.3 Test Verdict

Here the lowest, middle and highest channels are selected to perform testing to verify the peak-to-average ratio.

Test procedures:

A .For GSM operating mode:

a. Set RBW=1MHz, VBW=3MHz, Peak detector on spectrum analyzer for first trace.

b. Set the RBW = 1MHz, VBW = 3MHz, RMS detector on spectrum analyzer for second trace.

c. The wanted burst signal is triggered by spectrum analyzer, and measured respectively the peak level and Mean level without burst-off time, after system simulator has synchronized with the spectrum analyzer.

B. For UMTS operating mode:

a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.

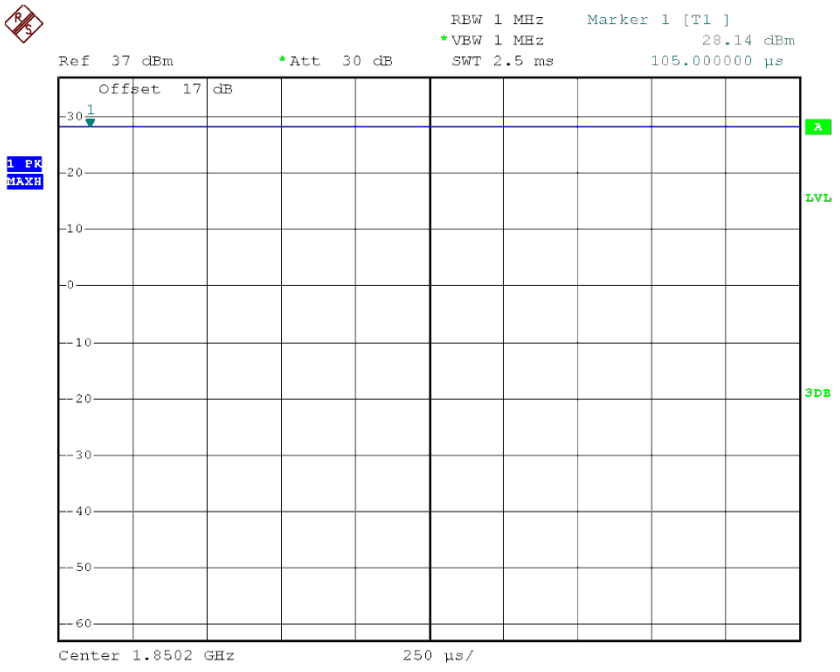
b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1%.

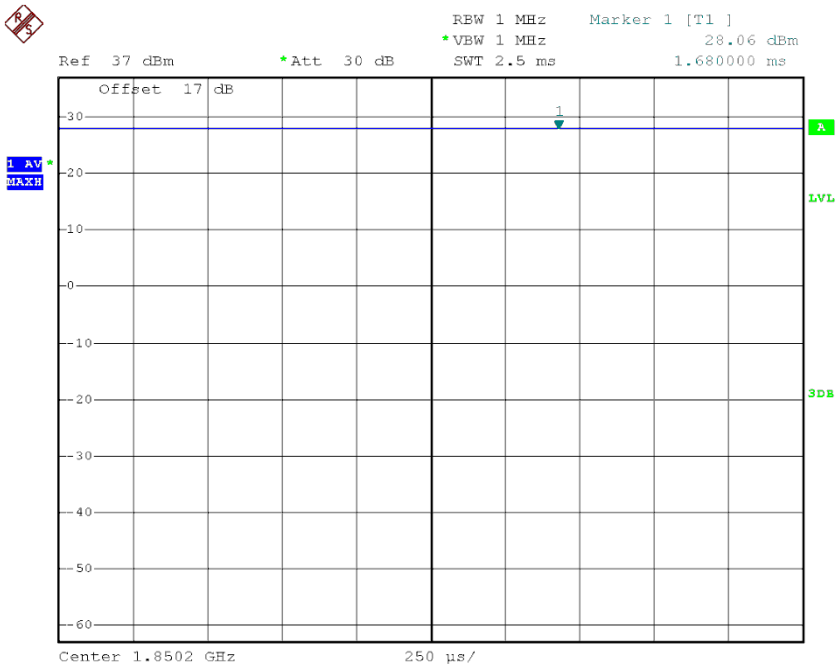
c. Record the deviation as Peak to Average Ratio.

1. Test Verdict:

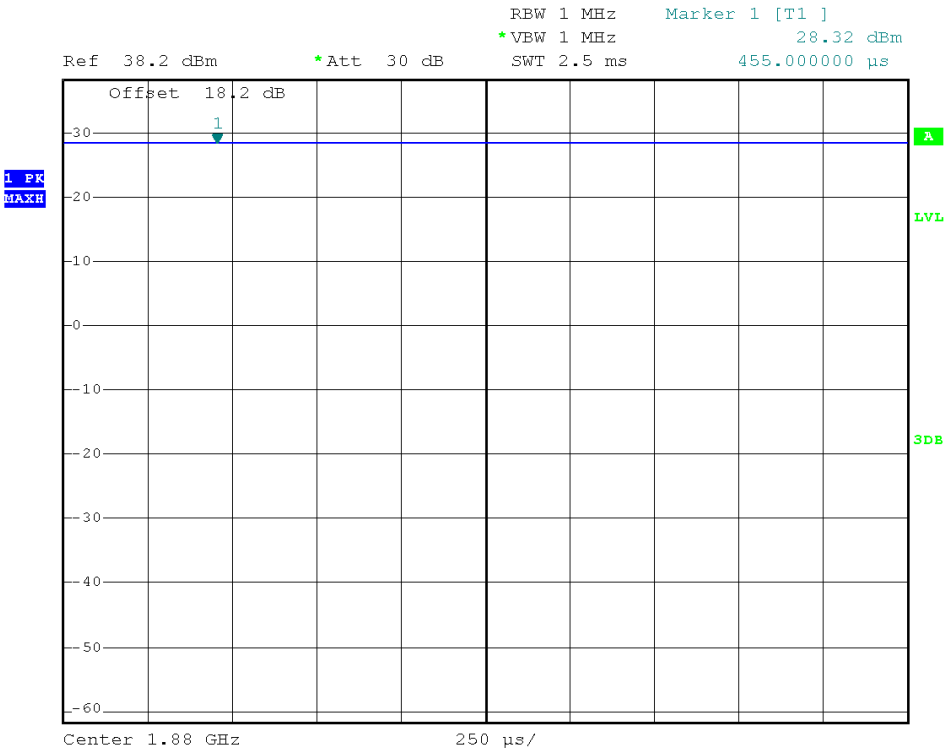
Band	Channel	Frequency (MHz)	Peak to Average radio		Limit	Verdict
			dBm	Refer to Plot	dBm	
GSM 1900MHz	512	1850.2	0.08	Plot A1 to A3	13	PASS
	661	1880.0	0.10			PASS
	810	1909.8	0.06			PASS

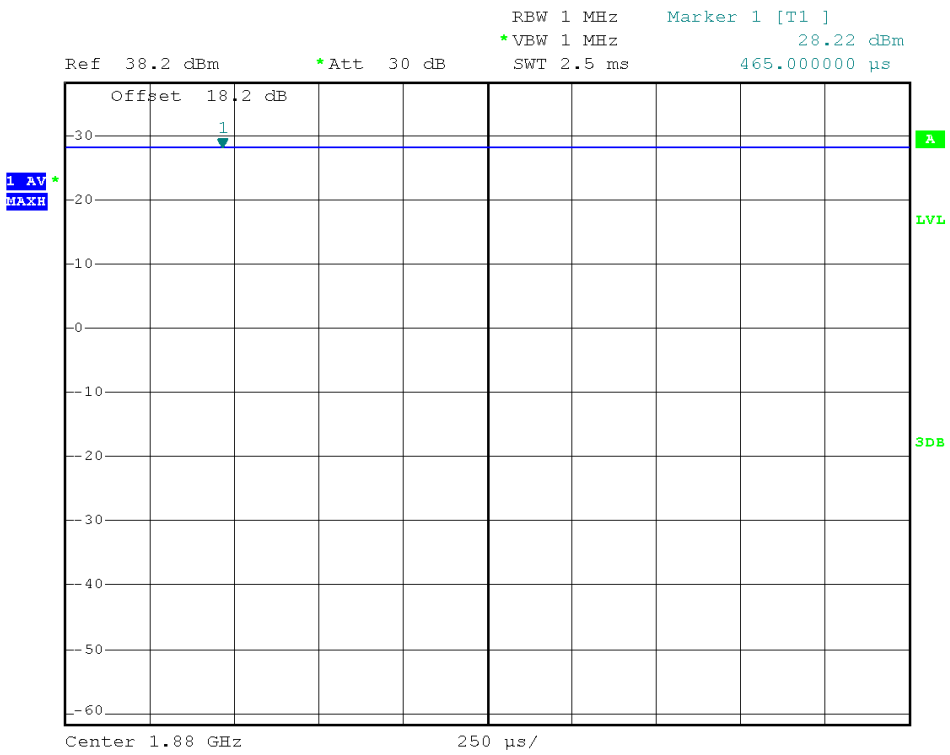
2. GSM Model Test Plots:



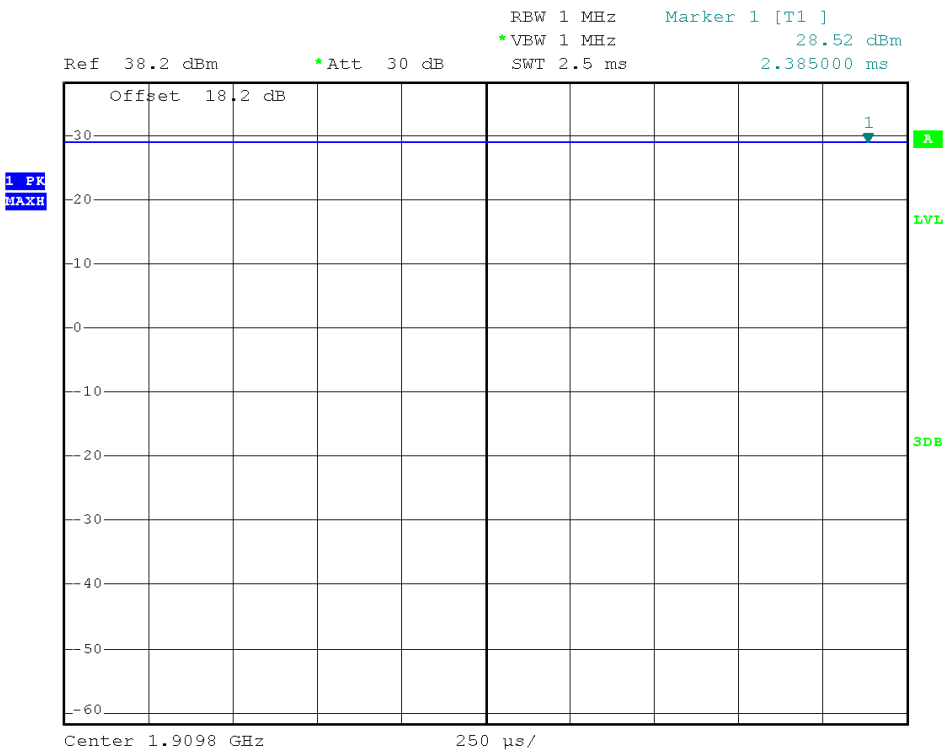


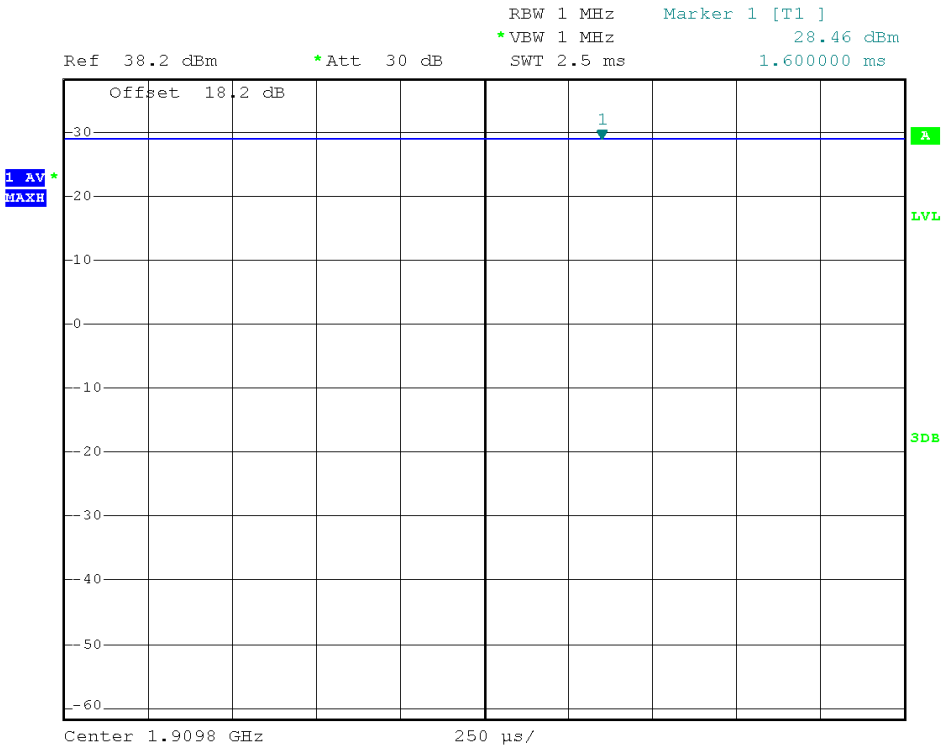
(Plot A1: GSM 1900 MHz Channel = 512)





(Plot A2: GSM 1900 MHz Channel = 661)





(Plot A3: GSM 1900MHz Channel = 810)

2.3 99% Occupied Bandwidth

2.3.1 Definition

The 99% occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.
The emission bandwidth is defined as the width of the signal between two points, located at the 2 sides of the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

2.3.2 Test Description

See section 2.1.2 of this report.

2.3.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r01 Section 4.2.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. The RF output of the EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The 99% occupied bandwidth were measured, set RBW= 1% of span, VBW= 3*RBW, sample detector, trace maximum hold.
5. The 26dB bandwidth were measured, set RBW= 1% of EBW, VBW= 3*RBW, peak detector, trace maximum hold.

2.3.4 Test Verdict

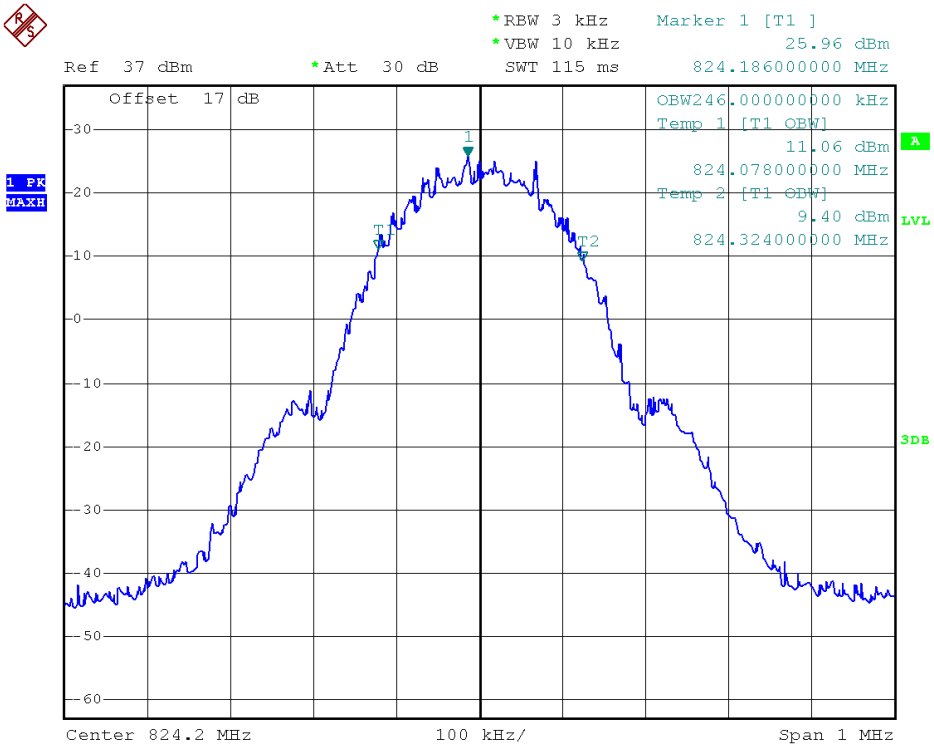
Here the lowest, middle and highest channels are selected to perform testing to verify the 99% occupied bandwidth.

1. Test Verdict:

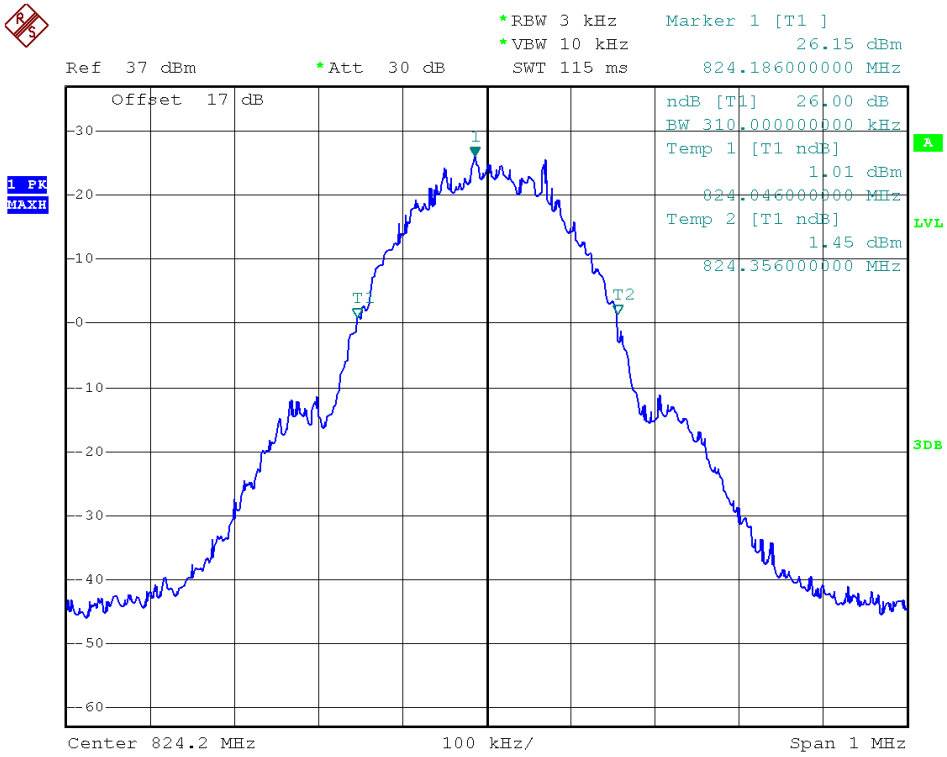
Band	Channel	Frequency (MHz)	26dB bandwidth	99% Occupied Bandwidth	Refer to Plot
GSM 850MHz	128	824.2	310	246	Plot A1-A2
	190	836.6	312	244	Plot A3-A4
	251	848.8	314	244	Plot A5-A6

Band	Channel	Frequency (MHz)	26dB bandwidth	99% Occupied Bandwidth	Refer to Plot
GSM 1900MHz	512	1850.2	314	244	Plot B1-B2
	661	1880.0	312	242	Plot B3-B4
	810	1909.8	314	246	Plot B5-B6

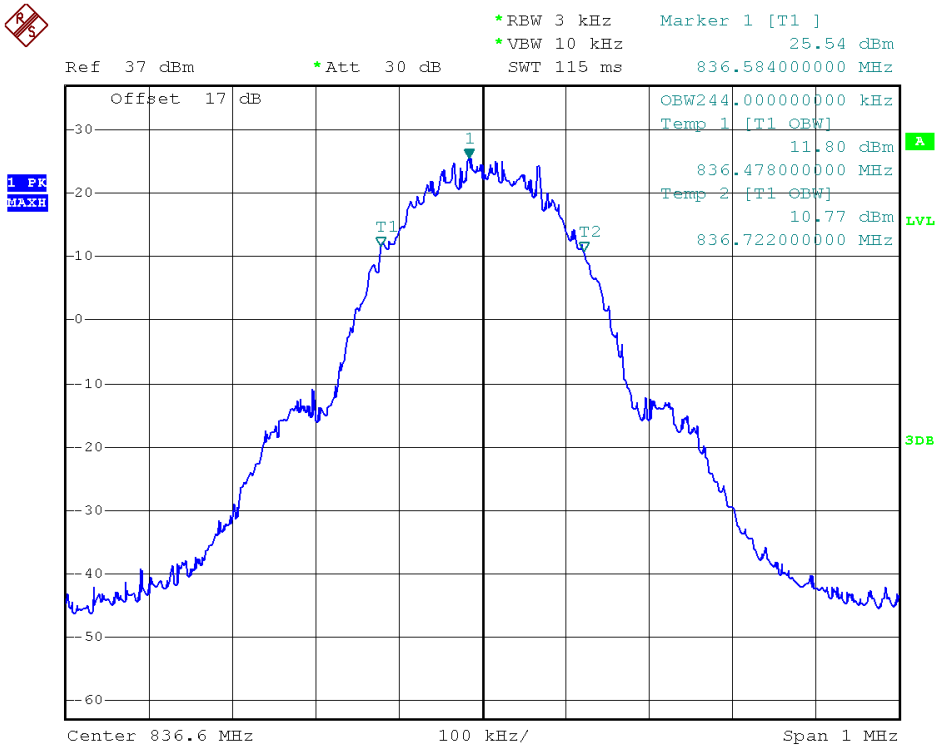
2. Test Plots:



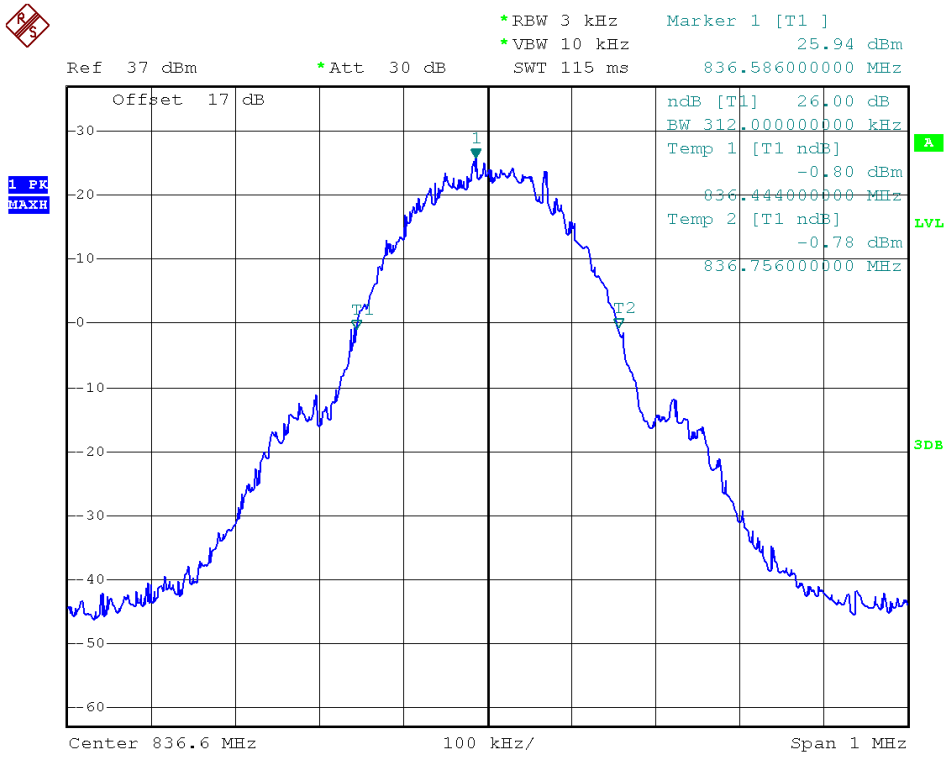
(Plot A1: GSM 850MHz Channel = 128)



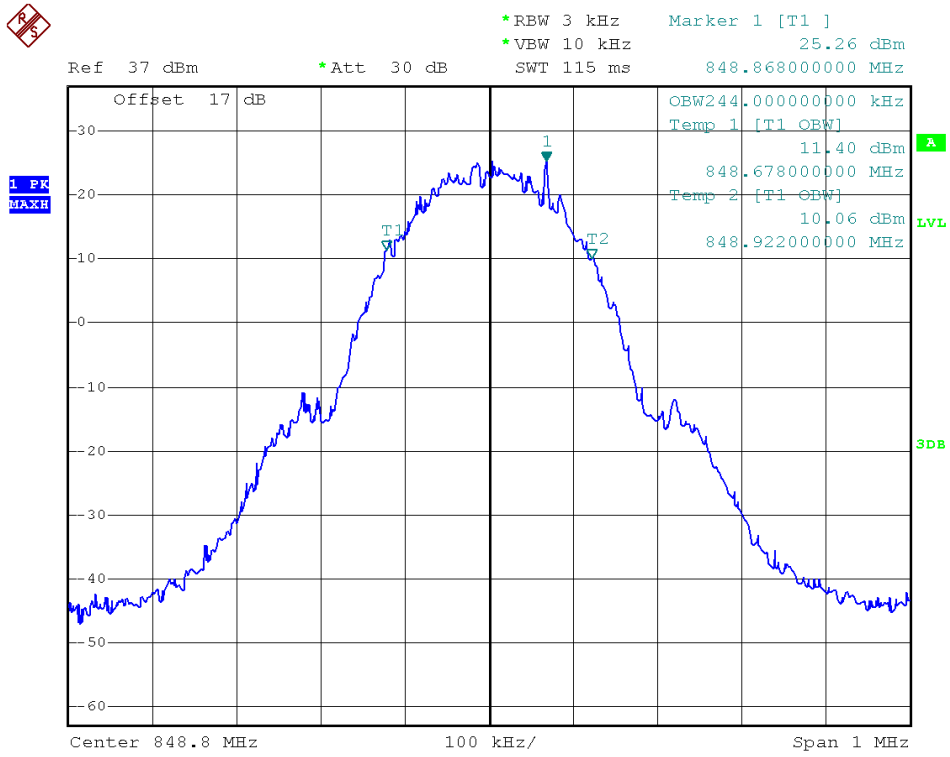
(Plot A2: GSM 850MHz Channel = 128)



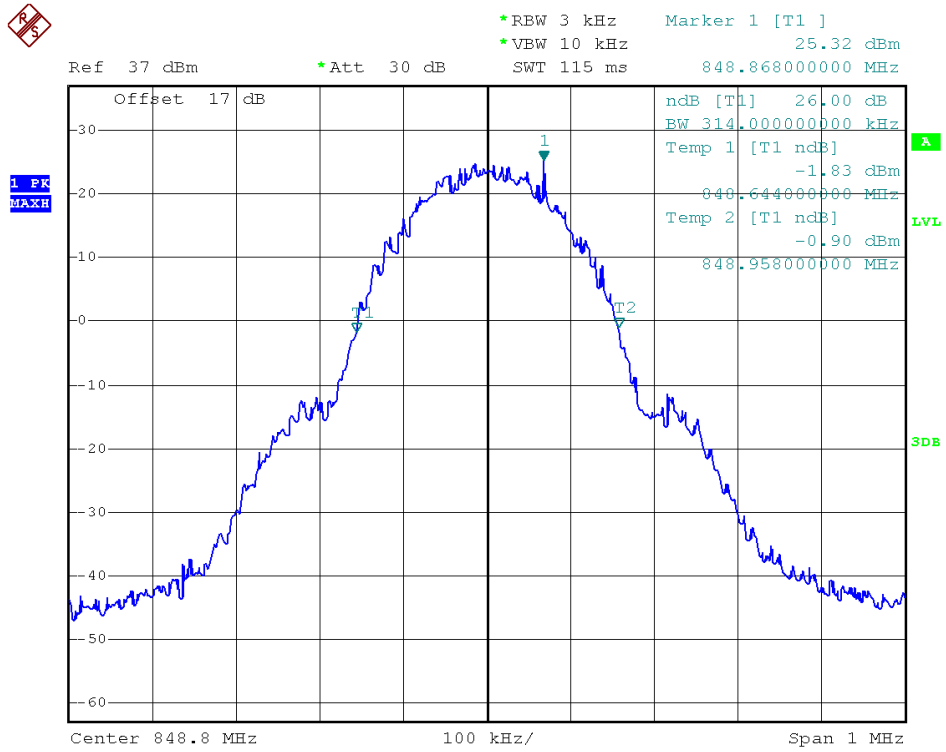
(Plot A3: GSM 850MHz Channel = 190)



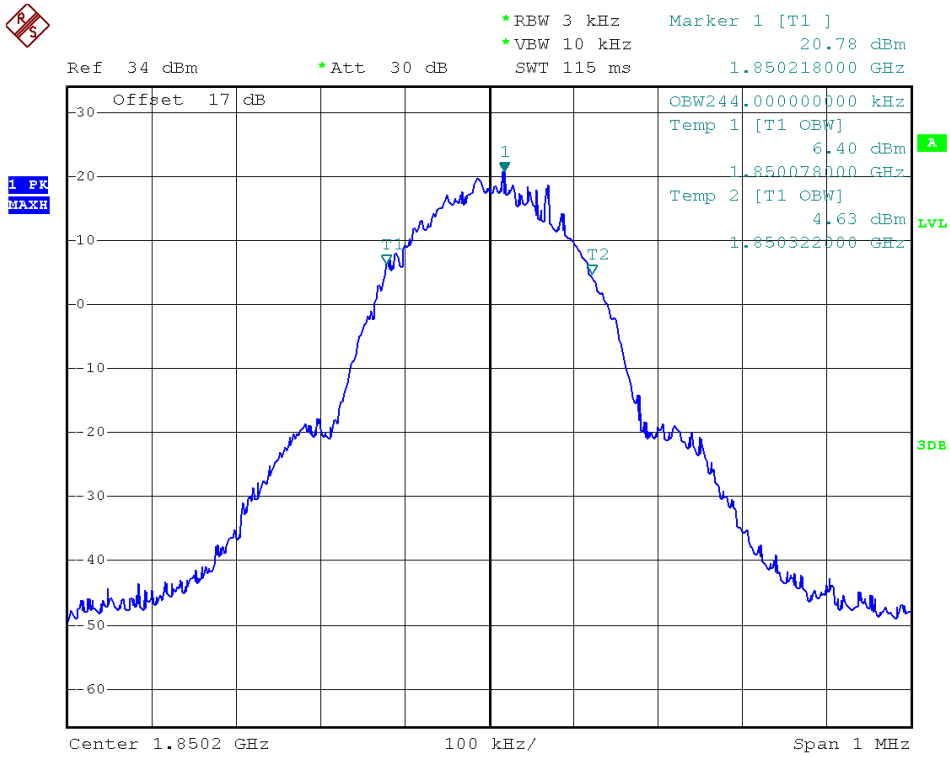
(Plot A4: GSM 850MHz Channel = 190)



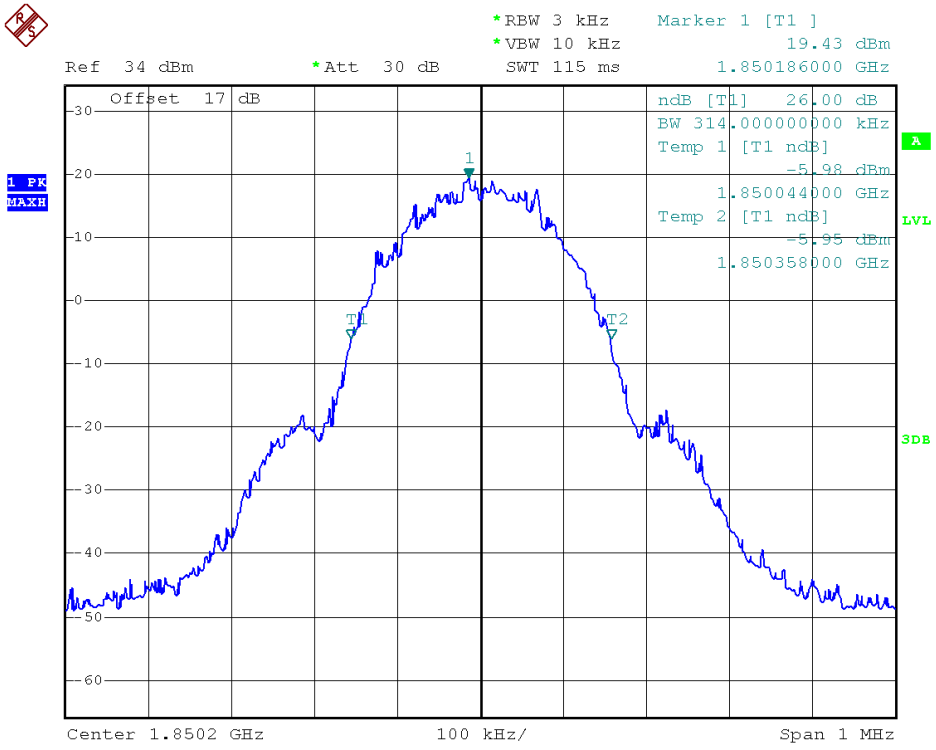
(Plot A5: GSM 850MHz Channel = 251)



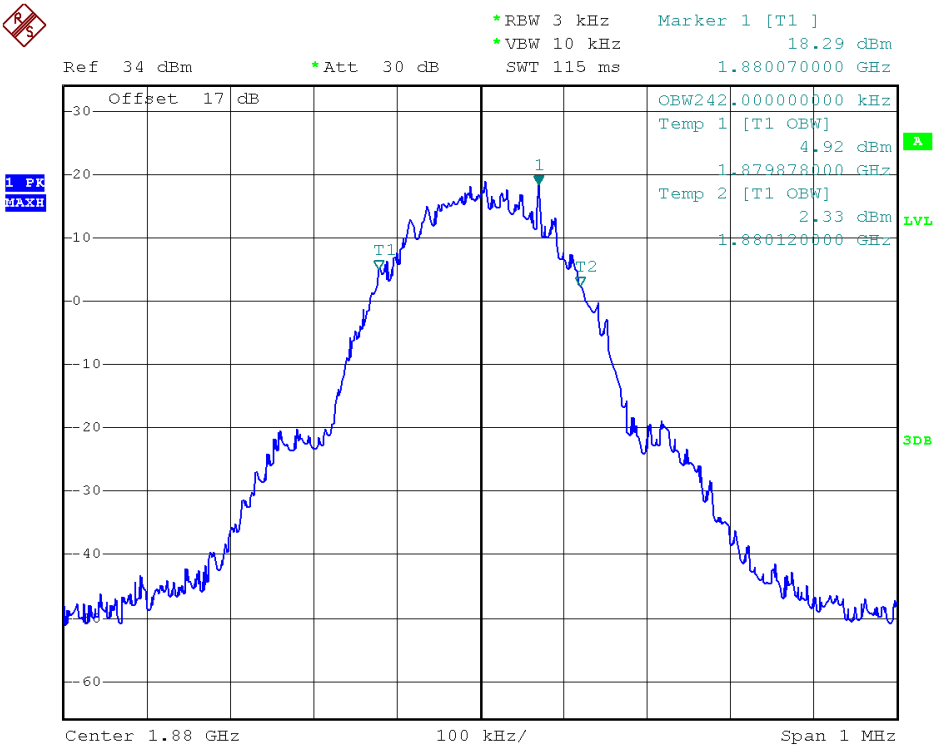
(Plot A6: GSM 850MHz Channel = 251)



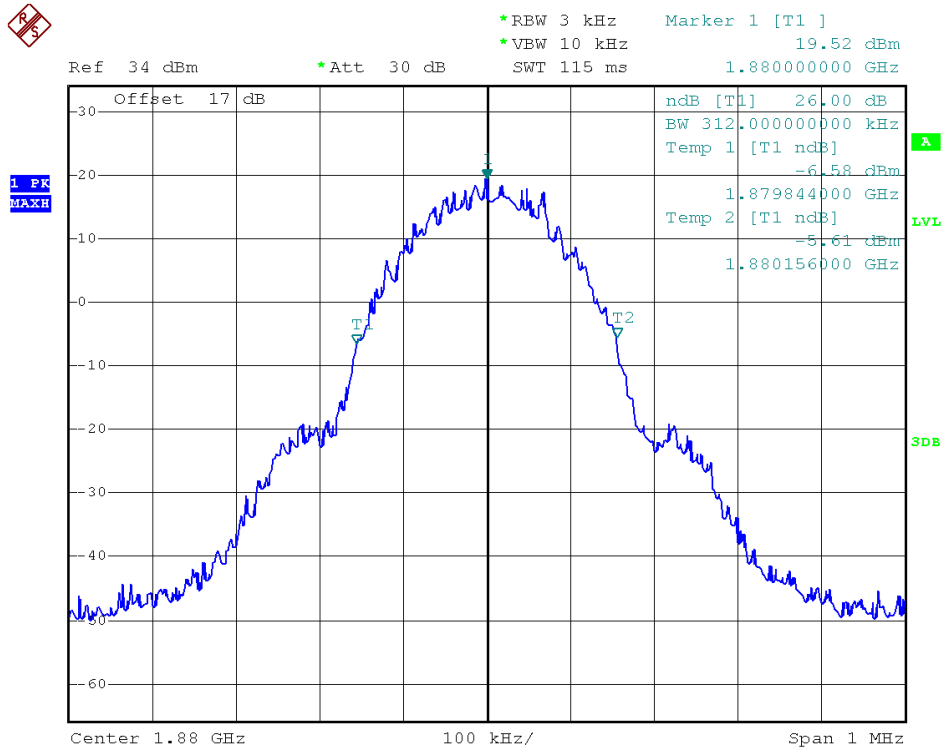
(Plot B1: GSM 1900MHz Channel = 512)



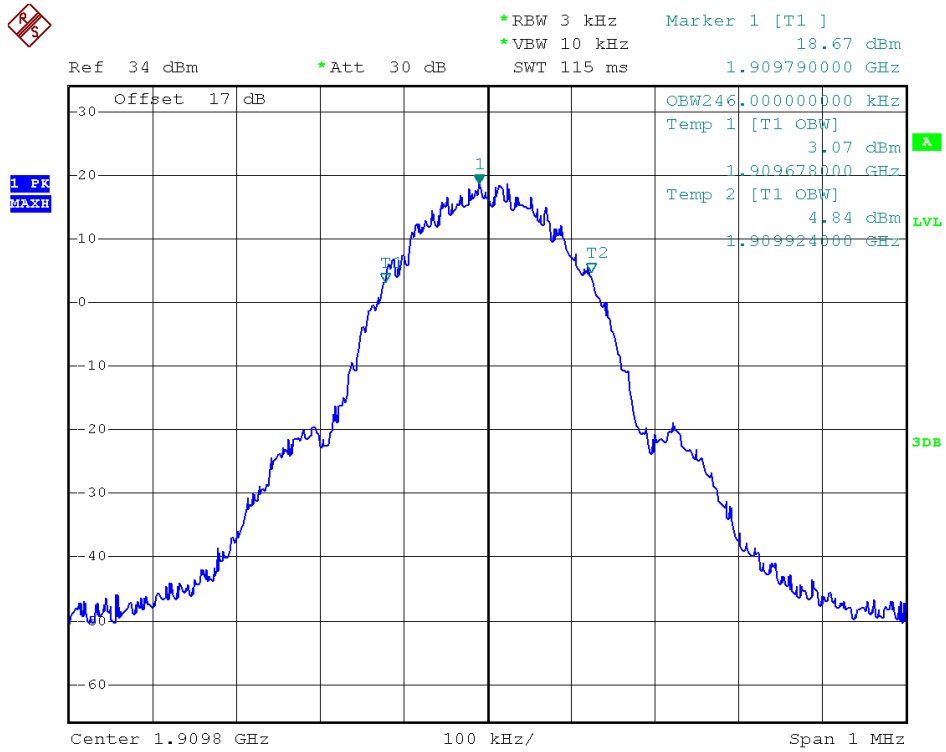
(Plot B2: GSM 1900MHz Channel = 512)



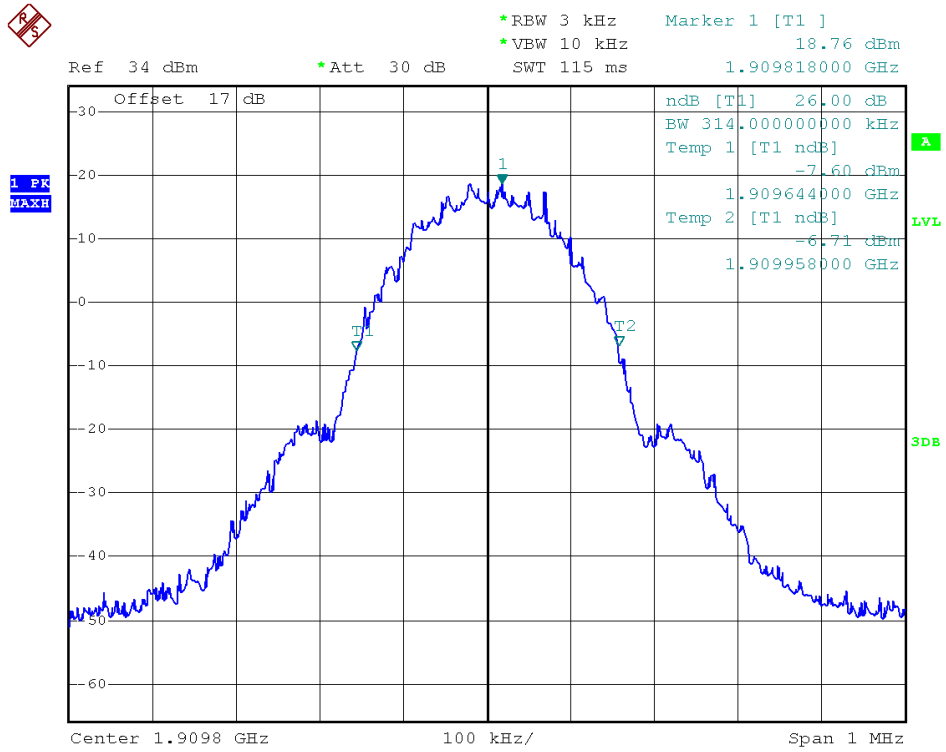
(Plot B3: GSM 1900MHz Channel = 661)



(Plot B4: GSM 1900MHz Channel = 661)



(Plot B5: GSM 1900MHz Channel = 810)



(Plot B6: GSM 1900MHz Channel = 810)

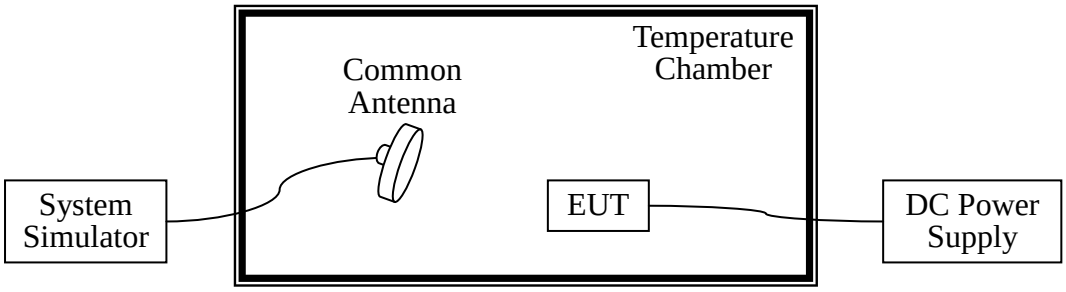
2.4 Frequency Stability

2.4.1 Requirement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency.

2.4.2 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. Data	Cal. Due Data
System Simulator	Agilent	E5515C	GB43130131	2014.06.11	2015.06.10
DC Power Supply	Good Will	GPS-3030DD	EF920938	2014.06.11	2015.06.10
Temperature Chamber	YinHe Experimental Equip.	HL4003T	(n.a.)	2014.06.11	2015.06.10
Cable	SUNHNER	SUCOFLEX 100	/	2014.06.05	2015.06.04

2.4.3 Test Procedures for Temperature Variation

1. The testing follows FCC KDB 971168 v02r01 Section 9.0.
2. The EUT was set up in the thermal chamber and connected with the system simulator.

3. With power OFF, the temperature was decreased to -30 ℃ and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in 10 ℃ steps up to 50 ℃. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

2.4.4 Test Procedures for Voltage Variation

1. The testing follows FCC KDB 971168 v02r01 Section 9.0.
2. The EUT was placed in a temperature chamber at 25±5 °C and connected with the system simulator.
3. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
4. The variation in frequency was measured for the worst case.

2.4.5 Test Verdict

The nominal, highest and lowest extreme voltages are separately 3.8VDC, 4.2VDC and 3.6VDC, which are specified by the applicant; the normal temperature here used is 25 ℃.

1. GSM 850MHz Band

Test Conditions		Frequency Deviation Middle Channel 836.6MHz		
Power (VDC)	Temperature (℃)	Frequency Error	Frequency Error	Limit
		Hz	ppm	ppm
3.8	-30	20.32	0.02	2.5
	-20	16.31	0.02	
	-10	-17.56	0.02	
	0	32.11	0.04	
	+10	-25.03	0.03	
	+20	-17.19	0.02	
	+30	19.36	0.02	
	+40	19.64	0.02	
	+50	22.27	0.03	
4.2	+25	28.95	0.03	
3.6	+25	31.09	0.04	

2. GSM 1900MHz Band

Test Conditions		Frequency Deviation Middle Channel 1880MHz		
Power (VDC)	Temperature (℃)	Frequency Error	Frequency Error	Limit
		Hz	ppm	ppm
3.8	-30	17.29	0.01	2.5
	-20	-47.32	0.03	
	-10	-13.40	0.01	
	0	16.47	0.01	
	+10	30.18	0.02	
	+20	37.07	0.02	
	+30	-22.98	0.01	
	+40	26.21	0.01	
	+50	21.10	0.01	
4.2	+25	-49.18	0.03	
3.6	+25	29.89	0.02	

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (℃)	Channel = 512 (1850.2MHz)		Channel = 661 (1880.0MHz)		Channel = 810 (1909.8MHz)		
		Hz	Limits	Hz	Limits	Hz	Limits	
3.8	-30	17.29	±1850.2	11.87	±1880.0	-1.20	±1909.8	PASS
	-20	-7.32		-0.59		-19.38		
	-10	-3.40		21.45		7.57		
	0	16.47		13.45		4.22		
	+10	30.18		1.31		-17.39		
	+20	37.07		-12.52		11.90		
	+30	-7.98		30.62		6.63		
	+40	26.21		13.45		28.93		
	+50	11.10		-12.52		19.66		
4.2	+25	-6.18		50.62		22.19		

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (℃)	Channel = 512 (1850.2MHz)		Channel = 661 (1880.0MHz)		Channel = 810 (1909.8MHz)		
		Hz	Limits	Hz	Limits	Hz	Limits	
3.6	+25	18.66		-18.00		-18.70		

2.5 Conducted Out of Band Emissions

2.5.1 Requirement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.
It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

2.5.2 Test Description

See section 2.1.2 of this report.

2.5.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r01 Section 6.0.

2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)
   = P(W) - [43 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
   = -13dBm.

2.5.4 Test Result

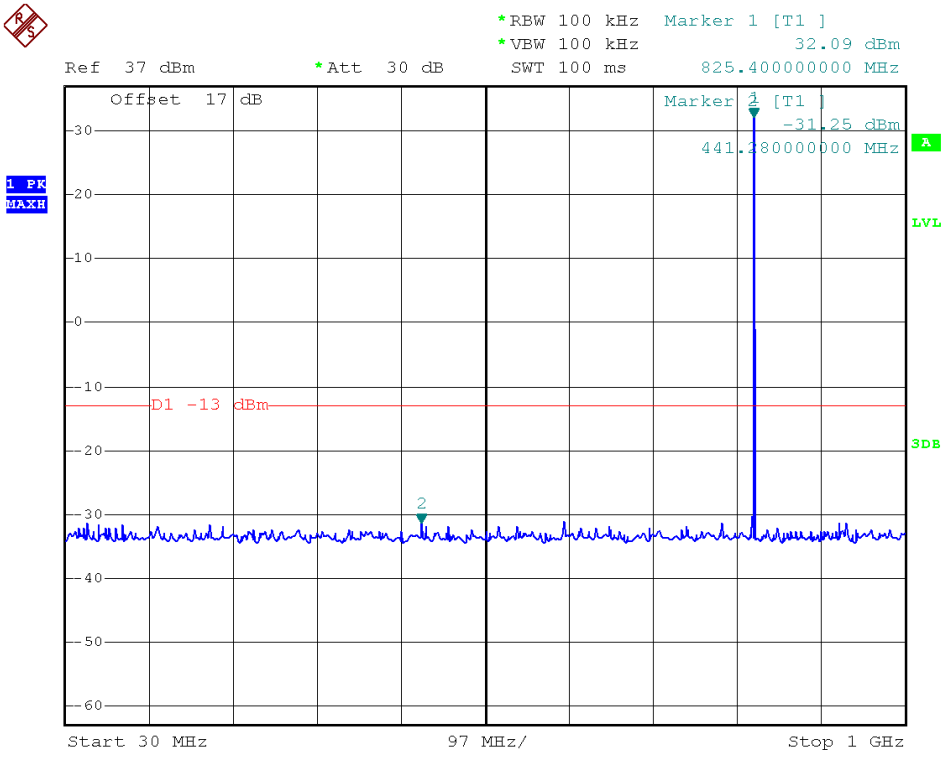
The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions.

1. Test Verdict:

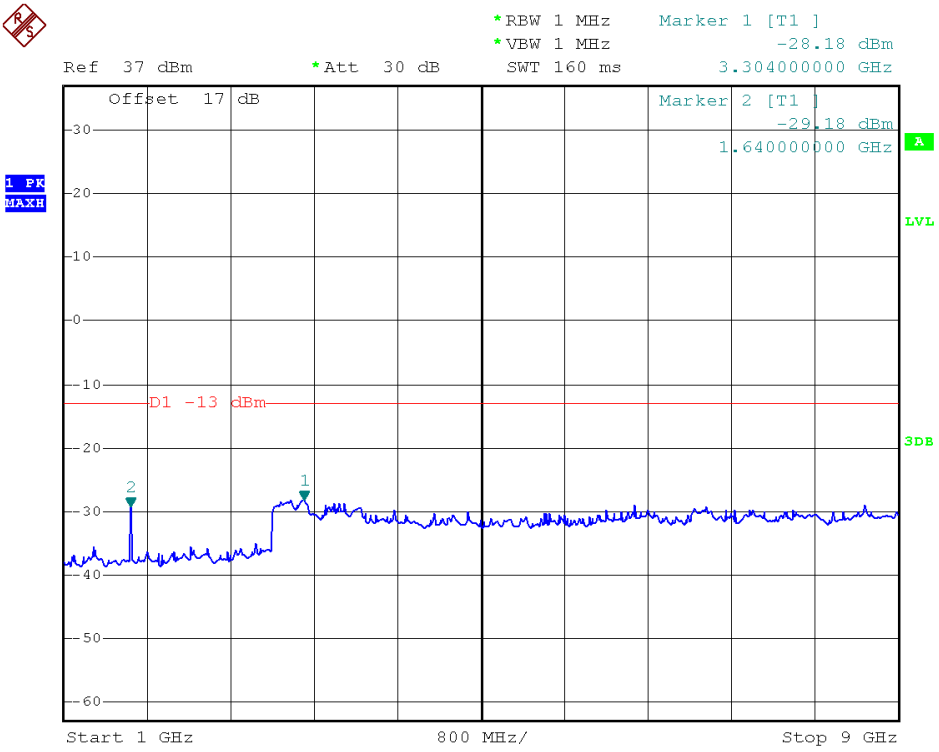
Band	Channel	Frequency (MHz)	Measured Max. Spurious Emission (dBm)	Refer to Plot	Limit (dBm)	Verdict
GSM 850MHz	128	824.2	-28.18	Plot A1toA1.1	-13	PASS
	190	836.6	-28.21	Plot A2toA2.1		PASS
	251	848.8	-26.01	Plot A3toA3.1		PASS
GSM 1900MHz	512	1850.2	-20.55	Plot B1toB1.1	-13	PASS
	661	1880.0	-20.27	Plot B2toB2.1		PASS
	810	1909.8	-20.99	Plot B3toB3.1		PASS

2. Test Plots for the Whole Measurement Frequency Range:

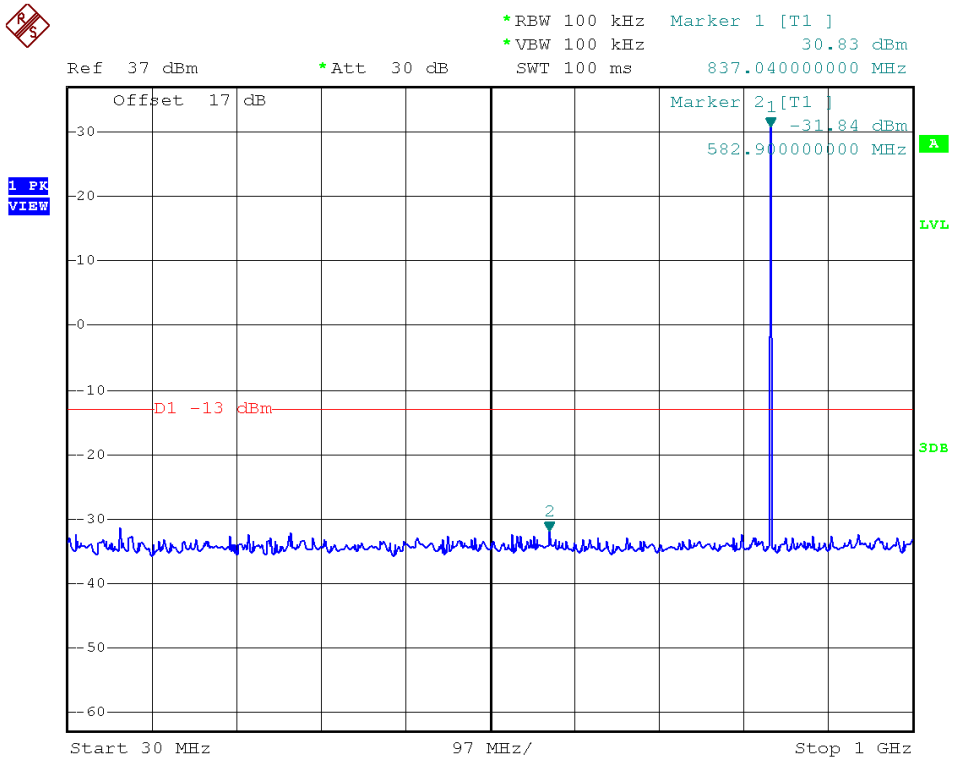
Note: the power of the EUT transmitting frequency should be ignored.



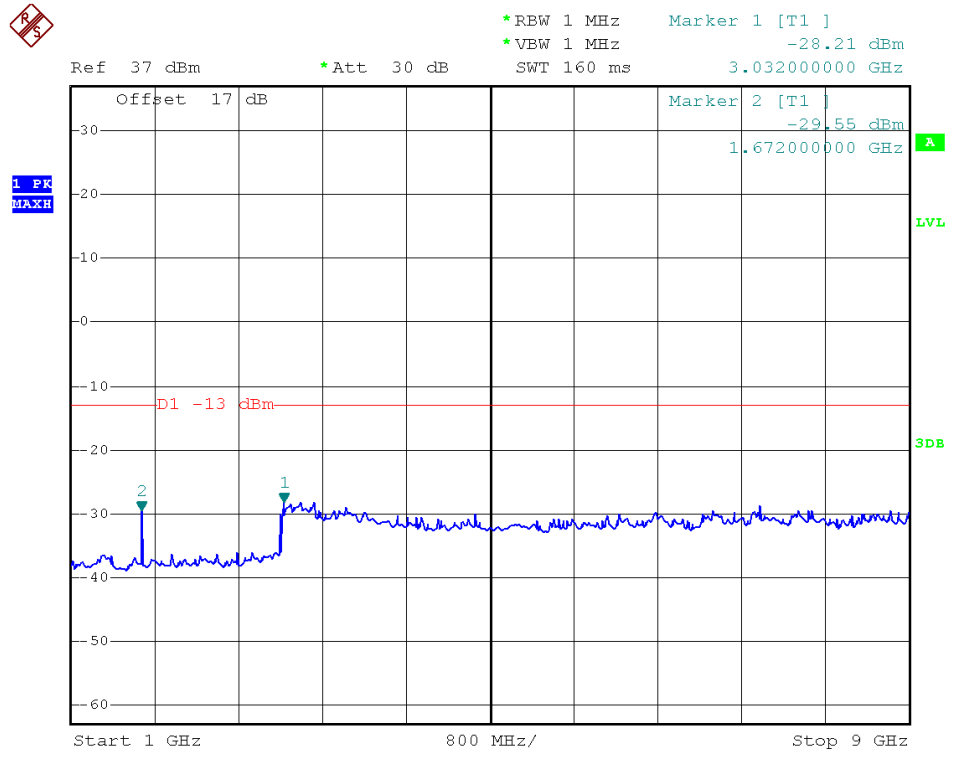
(Plot A1: GSM 850MHz Channel = 128, 30MHz to 1GHz)



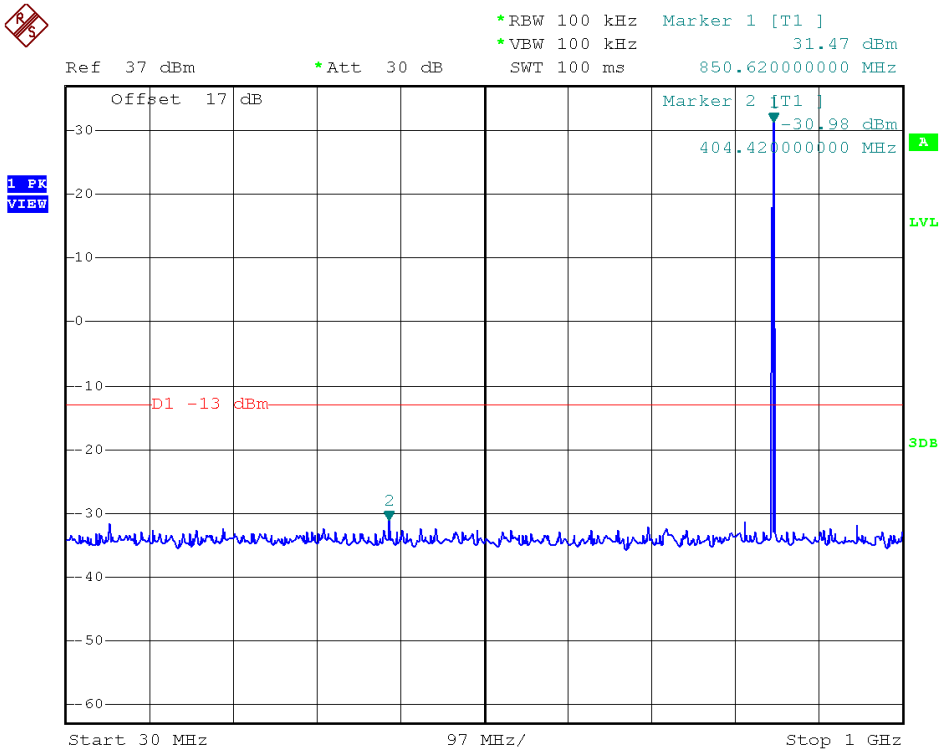
(Plot A1.1: GSM 850MHz Channel = 128, 1GHz to 9GHz)



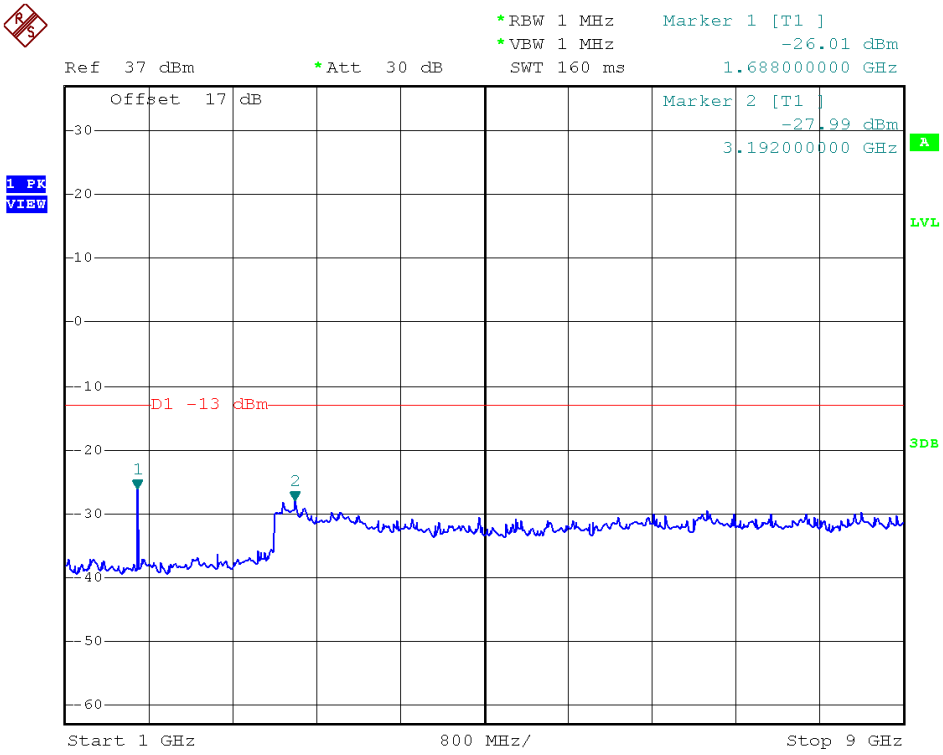
(Plot A2: GSM 850MHz Channel = 190, 30MHz to 1GHz)



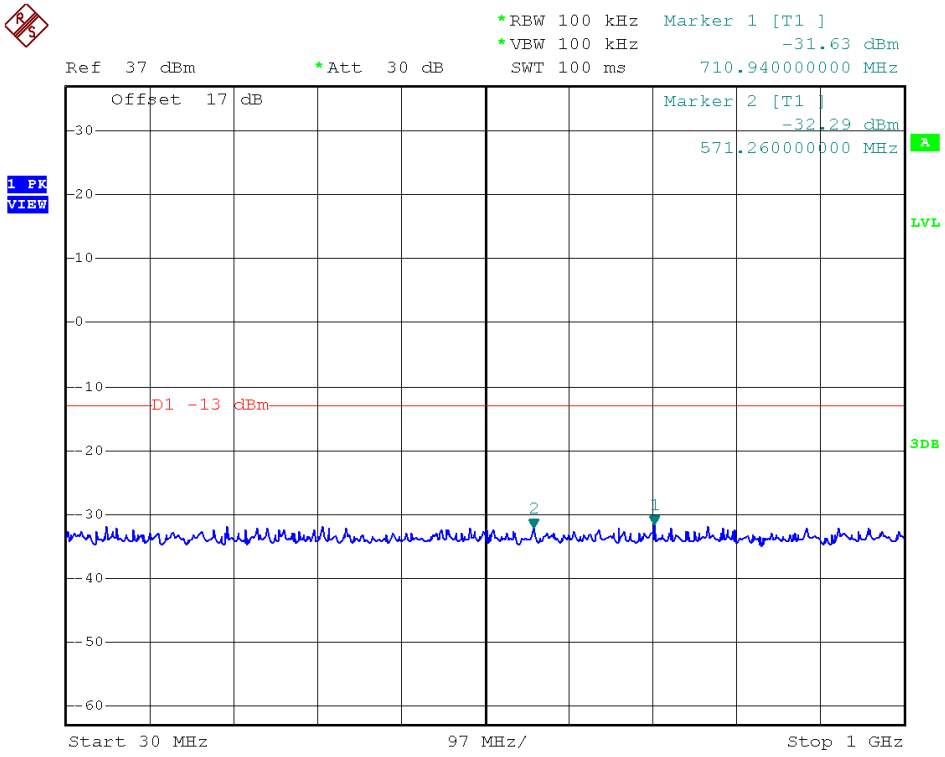
(Plot A2.1: GSM 850MHz Channel = 190, 1GHz to 9GHz)



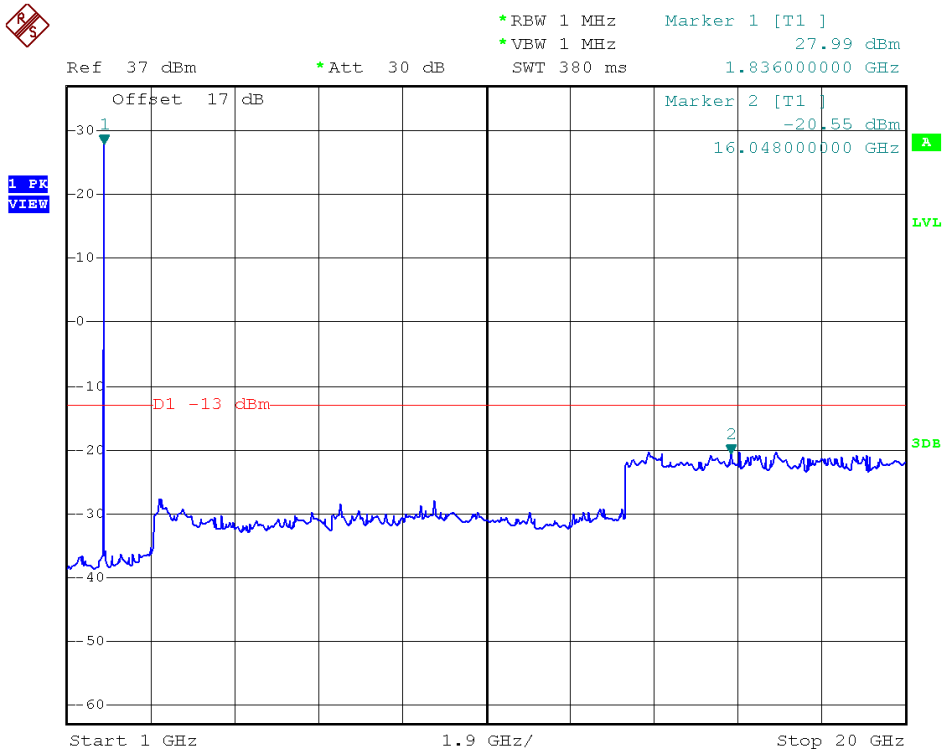
(Plot A3: GSM 850MHz Channel = 251, 30MHz to 1GHz)



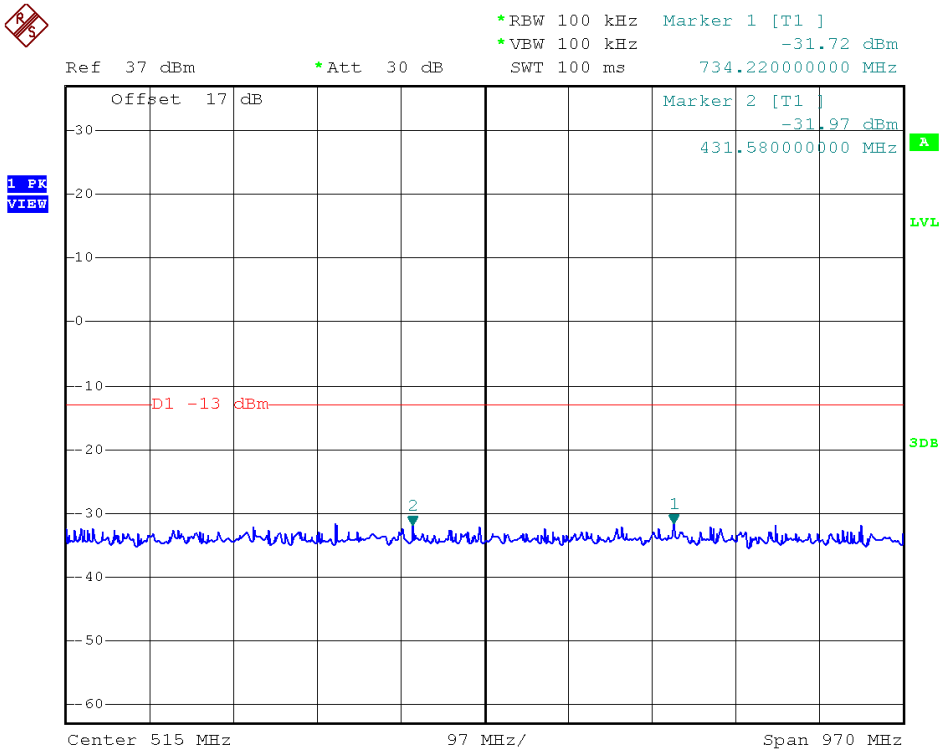
(Plot A3.1: GSM 850MHz Channel = 251, 1GHz to 9GHz)



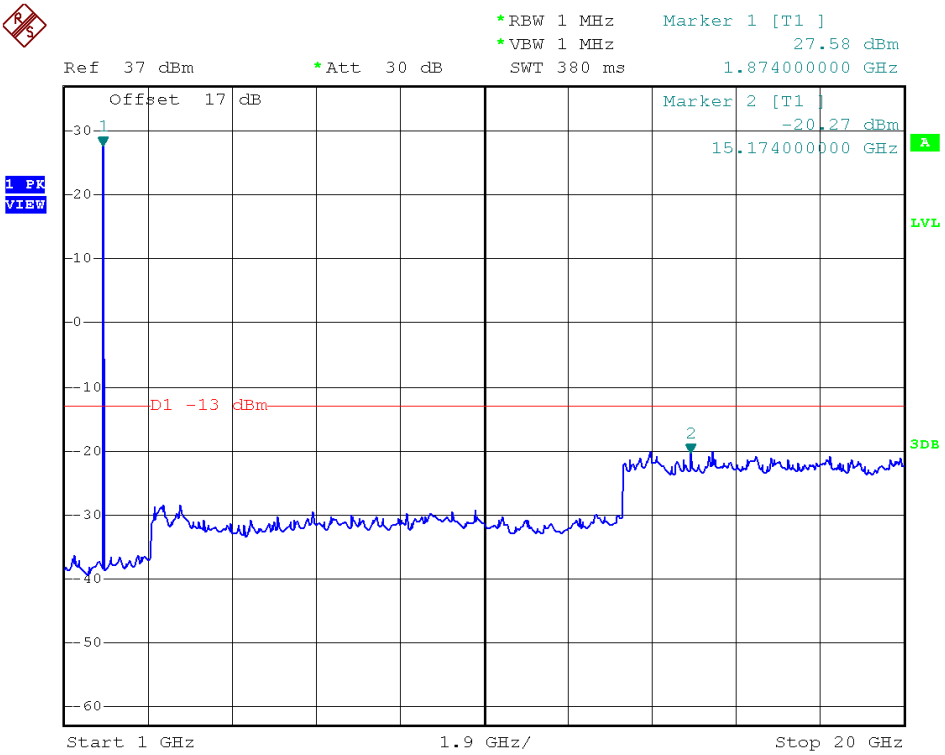
(Plot B1: GSM 1900MHz Channel = 512, 30MHz to 1GHz)



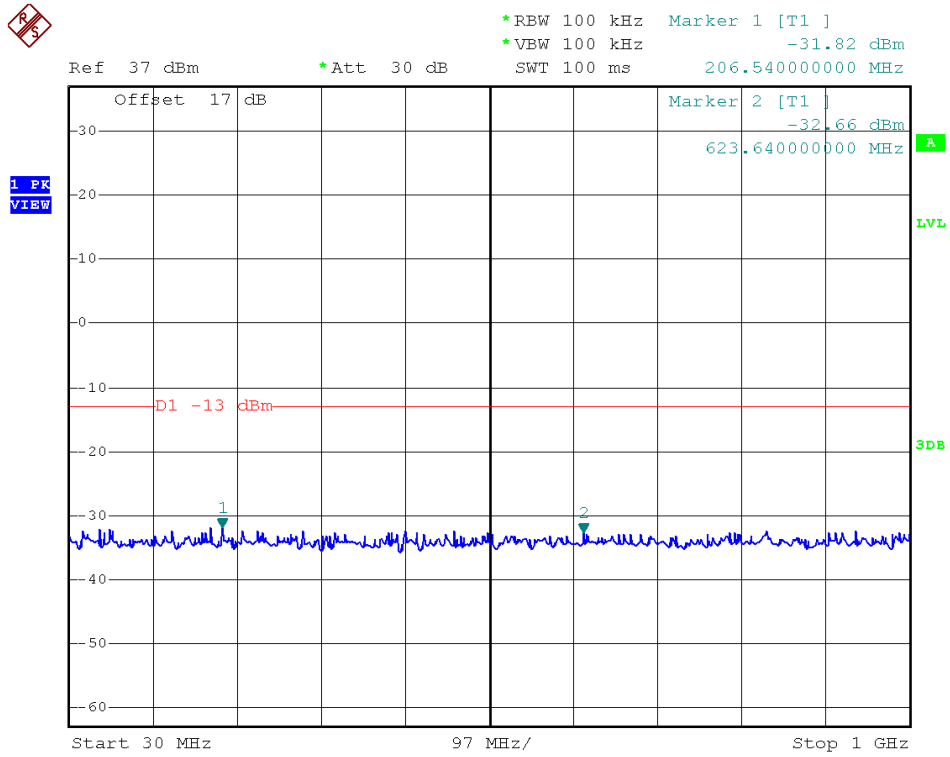
(Plot B1.1: GSM 1900MHz Channel = 512, 1GHz to 20GHz)



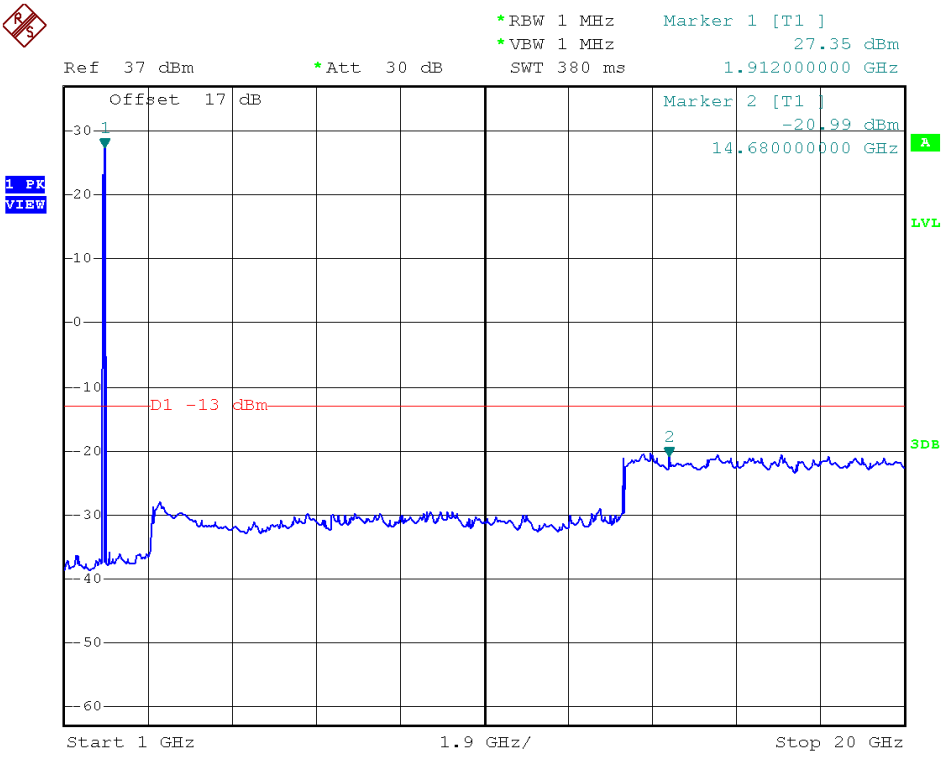
(Plot B2: GSM 1900MHz Channel = 661, 30MHz to 1GHz)



(Plot B2.1: GSM 1900MHz Channel = 661, 1GHz to 20GHz)



(Plot B3: GSM 1900MHz Channel = 810, 30MHz to 1GHz)



(Plot B3.1: GSM 1900MHz Channel = 810, 1GHz to 20GHz)

2.6 Band Edge

2.6.1 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.

2.6.2 Test Description

See section 2.1.2 of this report.

2.6.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r01 Section 6.0.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator The path loss was compensated to the results for each measurement.
4. The band edges of low and high channels for the highest RF powers were measured.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)
   = P(W) - [43 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
   = -13dBm.

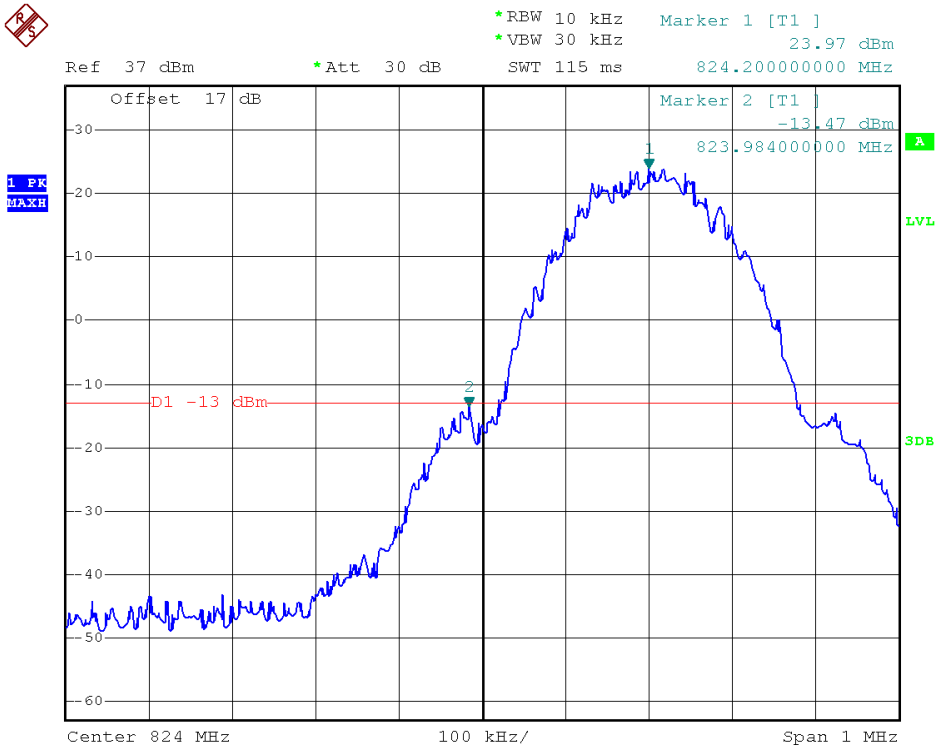
2.6.4 Test Result

The lowest and highest channels are tested to verify the band edge emissions.

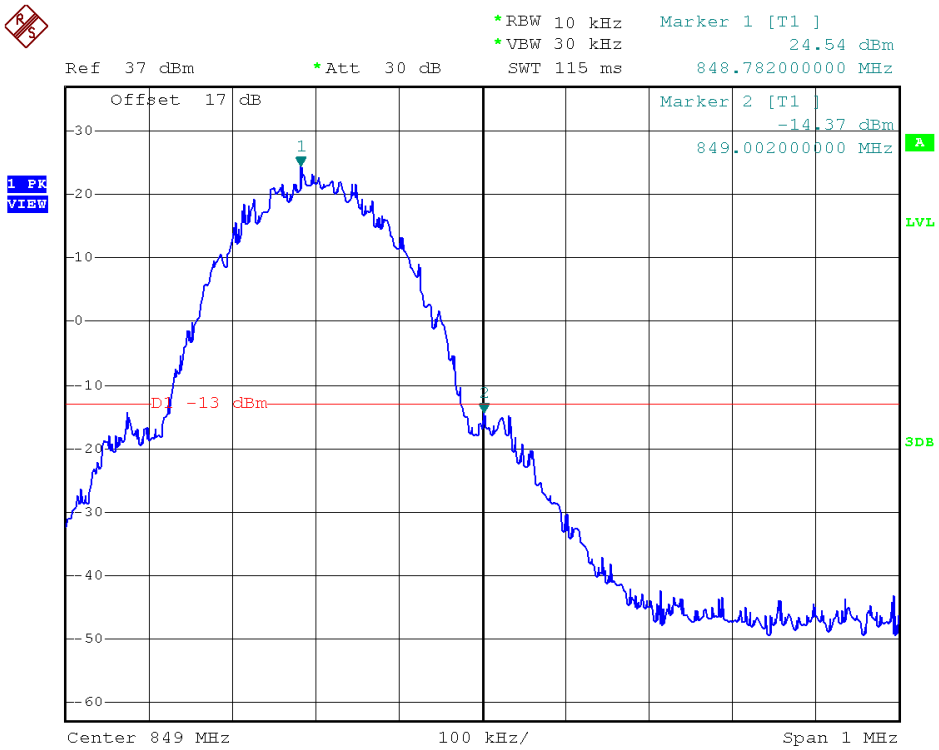
1. Test Verdict:

Band	Channel	Frequency (MHz)	Measured Max. Band Edge Emission (dBm)	Refer to Plot	Limit (dBm)	Verdict
GSM 850MHz	128	824.2	-13.47	Plat A	-13	PASS
	251	848.8	-14.37	Plot B		PASS
GSM 1900MHz	512	1850.2	-16.98	Plat C	-13	PASS
	810	1909.8	-17.30	Plot D		PASS

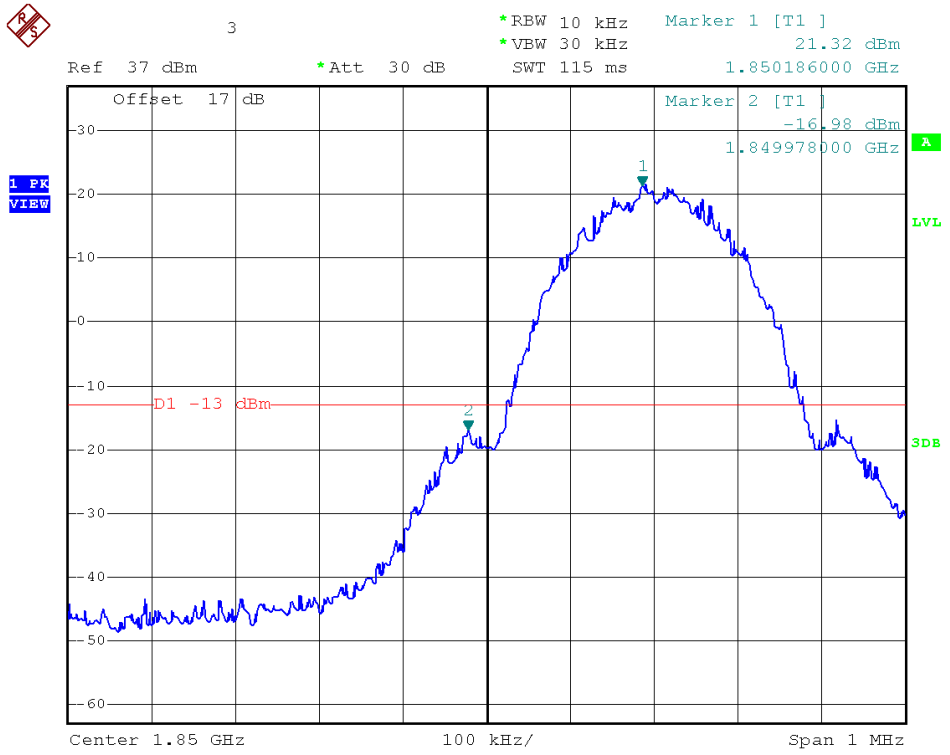
2. Test Plots:



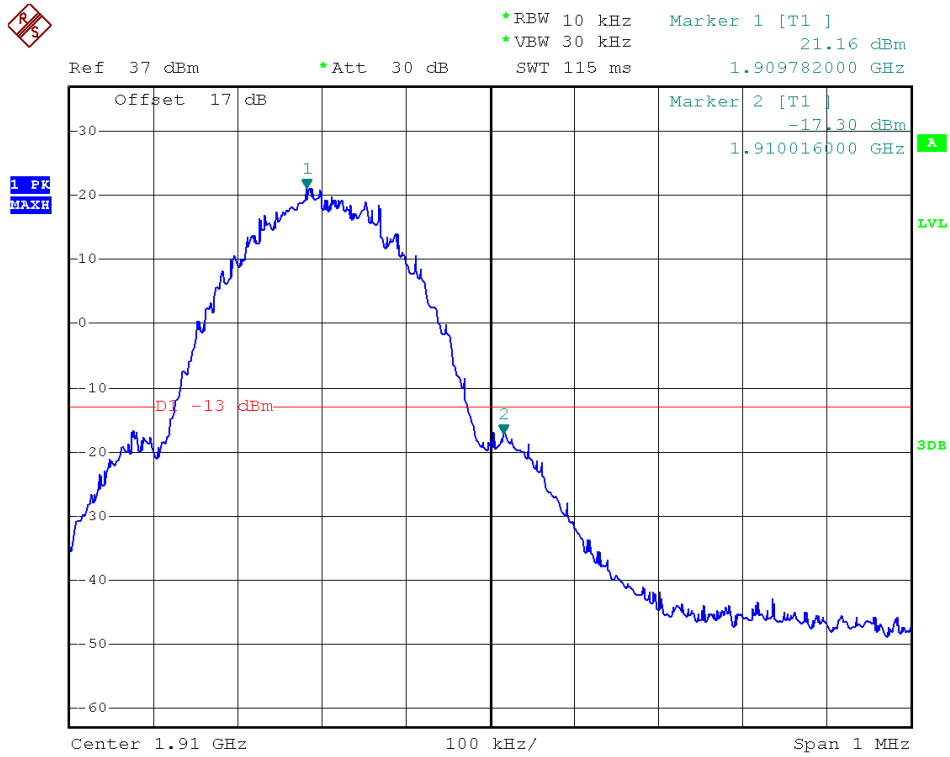
(Plot A: GSM 850 Channel = 128)



(Plot B: GSM 850 Channel = 251)



(Plot C: GSM 1900 Channel = 512)



(Plot D: GSM 1900 Channel = 810)

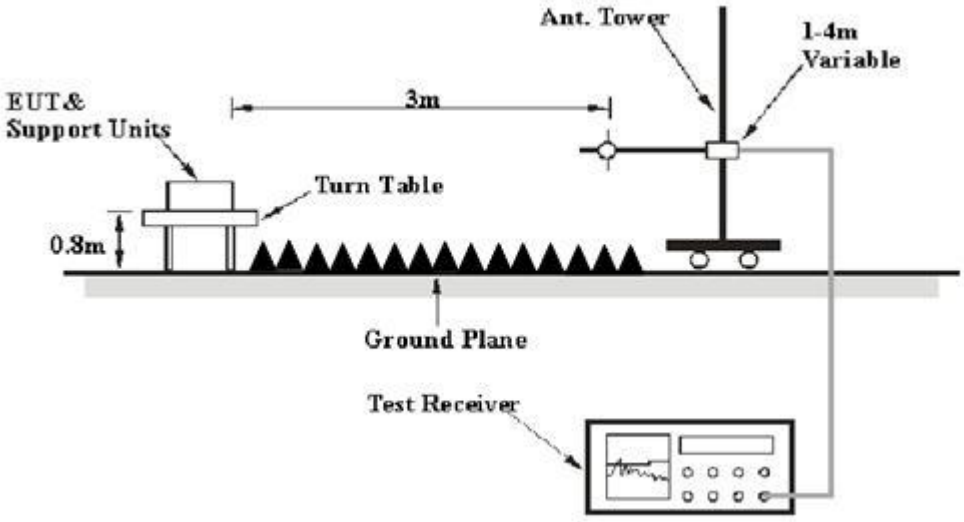
2.7 Transmitter Radiated Power (EIRP/ERP)

2.7.1 Requirement

The substitution method, in ANSI / TIA / EIA-603-C-2004, was used for ERP/EIRP measurement, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02r01. The ERP of mobile transmitters must not exceed 7 Watts (Cellular Band) and the EIRP of mobile transmitters are limited to 2 Watts (PCS Band) and 1 Watts (AWS Band).

2.7.2 Test Description

1. Test Setup:



The EUT, which is powered by the DC 3.8V Power Supply directly, 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.

A call is established between the EUT and the SS via a Common Antenna. The EUT is commanded by the SS to operate at the maximum and minimum output power, and only the test result of the maximum output power was recorded.

2. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	R&S	FSP40	1164.4391.40	2014.07.07	2015.07.06
EMI Test Receiver	R&S	ESIB26	100130	2014.07.07	2015.07.06
Full-Anechoic Chamber	Albatross～ Projects	12.8m*6.8m*6.4m	A0412372	2014.01.05	2015.01.04

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due Date
Double ridge horn antenna	R&S	HF906	A0304225	2014.06.11	2015.06.10
Ultra-wideband antenna	R&S	HL562	A0304224	2014.06.11	2015.06.10
Loop antenna	R&S	HFH2-Z2	A0304226	2014.06.11	2015.06.10
Cable	SUNHNER	SUCOFLEX 100	/	2014.06.05	2015.06.04
Cable	SUNHNER	SUCOFLEX 104	/	2014.06.05	2015.06.04

2.7.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r01 Section 5.2.1. (for CDMA/WCDMA), Section 5.2.2.2 (for GSM/GPRS/EDGE) and ANSI / TIA-603-C-2004 Section 2.2.17.

2. The EUT was placed on a turntable 1.5 meters high in a fully anechoic chamber.

3. The EUT was placed 3 meters from the receiving antenna, which was mounted on the antenna tower.

4. GSM operating modes: Set RBW= 1MHz, VBW= 3MHz, RMS detector over burst;

UMTS operating modes: Set RBW= 100 kHz, VBW= 300 kHz, RMS detector over frame, and use channel power option with bandwidth=5MHz, per KDB 971168 D01.

5. The table was rotated 360 degrees to determine the position of the highest radiated power.

6. The height of the receiving antenna is adjusted to look for the maximum ERP/EIRP.

7. Taking the record of maximum ERP/EIRP.

8. A dipole antenna was substituted in place of the EUT and was driven by a signal generator.

9. The conducted power at the terminal of the dipole antenna is measured.

10. Repeat step 3 to step 5 to get the maximum ERP/EIRP of the substitution antenna.

11. ERP/EIRP = Ps + Et – Es + Gs = Ps + Rt – Rs + Gs

Ps (dBm)：Input power to substitution antenna.

Gs (dBi or dBd)：Substitution antenna Gain.

Et = Rt + AF Es = Rs + AF

AF (dB/m)：Receive antenna factor

Rt：The highest received signal in spectrum analyzer for EUT.

Rs：The highest received signal in spectrum analyzer for substitution antenna.

2.7.4 Test Result

Test Notes:

1. This device employs GMSK technology with GSM and GPRS capabilities. All configurations were investigated and the worst case emissions were found in GSM mode.

2. This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, HSUPA and HSPA+ capabilities. All configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2Kbps.

3. This unit was tested with its standard battery.

4. The worst case test configuration was found in the vertical positioning where the EUT is laying on its side. The data reported in the tables below were measured in this test setup.

Band	Channel	Frequency (MHz)	Antenna Pol (H/V)	PCL	Measured ERP dBm	Limit dBm	Verdict
GSM 850MHz	128	824.20	V	5	31.87	38.5	PASS
	190	836.60	V	5	31.79		PASS
	251	848.80	V	5	31.75		PASS

Band	Channel	Frequency (MHz)	Antenna Pol (H/V)	PCL	Measured ERP dBm	Limit dBm	Verdict
GSM 850MHz	128	824.20	H	5	31.67	38.5	PASS
	190	836.60	H	5	31.72		PASS
	251	848.80	H	5	31.58		PASS

Band	Channel	Frequency (MHz)	Antenna Pol (H/V)	PCL	Measured EIRP dBm	Limit dBm	Verdict
GSM 1900MHz	512	1850.2	V	0	29.14	33	PASS
	661	1880.0	V	0	29.27		PASS
	810	1909.8	V	0	29.32		PASS

Band	Channel	Frequency (MHz)	Antenna Pol (H/V)	PCL	Measured EIRP dBm	Limit dBm	Verdict
GSM 1900MHz	512	1850.2	H	0	29.11	33	PASS
	661	1880.0	H	0	29.15		PASS
	810	1909.8	H	0	29.03		PASS

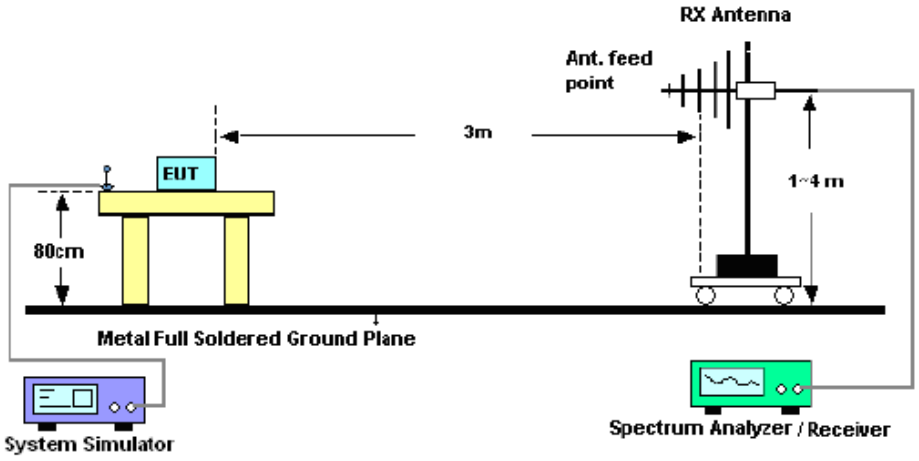
2.8 Radiated Out of Band Emissions

2.8.1 Requirement

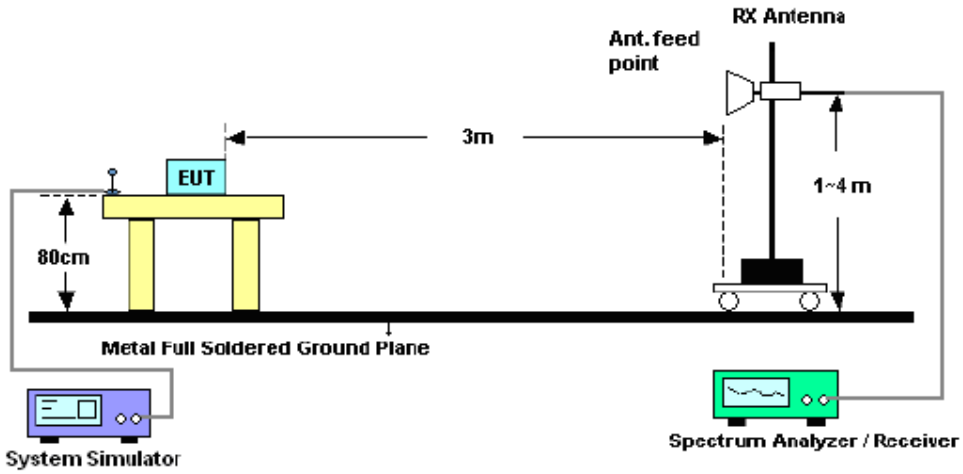
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

2.8.2 Test Description

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



Equipment List：

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal.Due Date
System Simulator	R&S	CMW500	149333	2014.07.21	2015.07.20
EMI Test Receiver	R&S	ESIB26	100130	2014.07.07	2015.07.06
Full-Anechoic Chamber	Albatross～ Projects	12.8m*6.8m*6.4m	A0412372	2014.01.05	2015.01.04
Double ridge horn antenna(1GHz~18GHz)	R&S	HF906	100150	2014.06.11	2015.06.10
Broadband antenna (30MHz~1GHz)	R&S	HL562	101341	2014.06.11	2015.06.10
Horn antenna (18GHz~26.5GHz)	R&S	HM118	101286	2014.06.11	2015.06.10
Cable	SUNHNER	SUCOFLEX 100	/	2014.06.05	2015.06.04
Cable	SUNHNER	SUCOFLEX 104	/	2014.06.05	2015.06.04

2.8.3 Test Procedures

1. All possible modes of operation were investigated. Only the 6 worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.

2. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.

3. Radiated Emissions Measurement Uncertainty

   All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 1GHz – 40GH is ±6.0dB (for EUTs < 0.5m X 0.5m X 0.5m).

4. Environmental Conditions Temperature 23℃

   Relative Humidity 49%

   Atmospheric Pressure 1010mbar

5. The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

6. 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.

7. 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.

8. Sample Calculation:

EUT Field Strength (dBm) = Reading (Signal generator) + Antenna Gain (substitution antenna) - Cable loss (From Signal Generator to substitution antenna)

9. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

= P(W) - [43 + 10log(P)] (dB)

= [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)

= -13dBm.

2.8.4 Test Result

GSM 850 (Low Channel)							
Frequency (MHz)	Substituted level(dBm)	Polarity (H/V)	Antenna Gain(dBi)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Result
1648.4	-39.54	H	5.51	1.12	-35.15	-13	Pass
1648.4	-40.08	V	5.51	1.12	-35.69	-13	Pass
318.0	-55.04	H	3.13	0.52	-52.43	-13	Pass
540.4	-54.33	V	3.51	0.62	-51.44	-13	Pass

GSM 850 (Middle Channel)							
Frequency (MHz)	Substituted level(dBm)	Polarity (H/V)	Antenna Gain(dBi)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Result
1673.2	-39.42	H	5.51	1.12	-35.03	-13	Pass
1673.2	-38.56	V	5.51	1.12	-34.17	-13	Pass
317.2	-53.51	H	3.13	0.52	-50.90	-13	Pass
540.6	-54.47	V	3.51	0.62	-51.58	-13	Pass

GSM 850 (High Channel)							
Frequency (MHz)	Substituted level(dBm)	Polarity (H/V)	Antenna Gain(dBi)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Result
1697.6	-38.14	H	5.51	1.12	-33.75	-13	Pass
1697.6	-38.65	V	5.51	1.12	-34.26	-13	Pass
317.6	-54.24	H	3.13	0.52	-51.63	-13	Pass
540.1	-53.40	V	3.51	0.62	-50.51	-13	Pass

GSM 1900 (Low Channel)							
Frequency (MHz)	Substituted level(dBm)	Polarity (H/V)	Antenna Gain(dBi)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Result
3700.4	-39.75	H	8.65	2.45	-33.55	-13	Pass
3700.4	-37.12	V	8.65	2.45	-30.92	-13	Pass
318.2	-52.25	H	3.13	0.52	-49.64	-13	Pass
540.4	-54.31	V	3.51	0.62	-51.42	-13	Pass

GSM 1900 (Middle Channel)							
Frequency (MHz)	Substituted level(dBm)	Polarity (H/V)	Antenna Gain(dBi)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Result
3760	-37.61	H	8.65	2.45	-31.41	-13	Pass
3760	-38.81	V	8.65	2.45	-32.61	-13	Pass
317.9	-55.82	H	3.13	0.52	-53.21	-13	Pass
539.1	-54.55	V	3.51	0.62	-51.66	-13	Pass

GSM 1900 (High Channel)							
Frequency (MHz)	Substituted level(dBm)	Polarity (H/V)	Antenna Gain(dBi)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Result
3819.6	-37.47	H	8.65	2.45	-31.27	-13	Pass
3819.6	-36.59	V	8.65	2.45	-30.39	-13	Pass
316.7	-54.63	H	3.13	0.52	-52.02	-13	Pass
538.8	-55.51	V	3.51	0.62	-52.62	-13	Pass

** END OF REPORT **