TEST REPORT

REPORT NUMBER: I11GC0114-FCC-RF-1

ON

Type of Equipment: Cellular Radio Module
Type of Designation: TR-900
Manufacturer: iWOW Connections Pte Ltd

ACCORDING TO

FCC CFR Part 2, FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS. Oct, 1, 2010
PART 22, PUBLIC MOBILE SERVICES. Oct 1, 2010
PART 24, PERSONAL COMMUNICATIONS SERVICES, Oct 1, 2010

China Telecommunication Technology Labs.

Month date, year
June 17, 2011

Signature

He Guili
Director

FCC ID:	QPB-TR9000311
Report Date:	2011-06-17

Test Firm Name:	China Telecommunication Technology Labs
Registration Number:	840587

Statement

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported tests were carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Parts 2, 22 and 24. The sample tested was found to comply with the requirements defined in the applied rules.

CONTENTS

1 General Information

1.1 Notes

All reported tests were carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Parts 2, 22 and 24.

The test data of this report are accurate based on the engineering experiences of the person who performed or supervised the tests.

The following deviation from, additions to, or exclusions from the test specifications have been made. See Annex C.

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1.2 Testers

Name: Li Guoqing

Position: Engineer

Department: Department of EMC test

Signature: 李国庆

Name: Lv Ke

Position: Engineer

Department: Department of EMC test

Signature: 吕克

Editor of this test report:

Name: Li Guoqing

Position: Engineer

Department: Department of EMC test

Date: 2011-06-17

Signature: 李国庆

Technical responsibility for area of testing:

Name: Zou Dongyi

Position: Manager

Department: Department of EMC test

Date: 2011-06-17

Signature: 邹东屹

1.3 Testing Laboratory information

1.3.1 Location

Name:	China Telecommunication Technology Labs.
Address:	No. 11, Yue Tan Nan Jie, Xi Cheng District BEIJING P. R. CHINA, 100083
Tel:	+86 10 68094053
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Email:	emc@chinattl.com

1.3.2 Details of accreditation status

Accredited by:	China National Accreditation Service for Conformity Assessment (CNAS)
Registration number:	CNAS Registration No. CNAS L0570
Standard:	ISO/IEC 17025:2005

1.3.3 Test location, where different from section 1.3.1

Name:	------
Street:	------
City:	------
Country:	------
Telephone:	------
Fax:	------
Postcode:	------

1.4 Details of applicant or manufacturer

1.4.1 Applicant

Name:	iWOW Connections Pte Ltd
Address:	1 Lorong 2 Toa Payoh #04-01 Yellow Pages Building
	Singapore 319637
Country:	Singapore
Telephone:	+65 6748 8123
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1.4.2 Manufacturer (if different from applicant in section 1.4.1)

Name:	--
Address:	--

1.4.3 Manufactory (if different from applicant in section 1.4.1)

Name:	--
Address:	--

2 Test Item

2.1 General Information

Manufacturer: iWOW Connections Pte Ltd
Name: Cellular Radio Module
Model Number: TR-900
Serial Number: I4010 D01
Production Status: Product
Receipt date of test item: 2011-03-02

2.2 Outline of EUT

EUT is a cellular Radio Module suporting GSM and GPRS of 850/1900. For GPRS, its multi-slot class is 12 with maximum 4 up slots.

2.3 Modifications Incorporated in EUT

The EUT has not been modified from what is described by the brand name and unique type identification stated above.

2.4 Equipment Configuration

Equipment configuration list:

Item	Generic Description	Manufacturer	Type	Serial No.	Remarks
A	handset	iWOW Connections Pte Ltd	TR-900	I4010 D01	--
B	adapter	--	--	--	--
C	battery	--	--	--	--
D	Earphone	--	--	--	--

Cables:

Item	Cable Type	Manufacturer	Length	Shield	Quantity	Remarks
1	USB	--	--	--	--	--

2.5 Other Information

Version of hardware and software:

HW Version: P1

SW Version: AU001.2.0.0

3 Summary of Test Results

A brief summary of the tests carried out is shown as following.

GSM/GPRS mode:		
Specification Clause	Name of Test	Result
2.1053, 24.238, 22.917	Radiated Spurious Emission	Pass
2.1046,24.232, 22.913(a)	Radiated RF Power Output Effective Radiated Power (ERP)	Pass
2.1049,22.917(b), 24.238(b)	Occupied Bandwidth	*Note 1
2.1055,22.355, 24.235	Frequency Stability over Temperature Variation	Pass
2.1055,22.355, 24.235	Frequency Stability over Voltage Variation	Pass
2.1046,22.913(a), 24.232(c)	Conducted RF Power Output	Pass
2.1051,22.917, 24.238	Conducted spurious emissions	Pass
2.1051,24.238, 2.1053, 22.917	Band Edge	Pass
Note 1: No applicable performance criteria.		

4 Test Results

4.1 Radiated Spurious Emission

Specifications:	2.1053, 24.238, 22.917
Date of Tests	2011-03-07, 2011-05-18
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Operation Mode	TX on, channel 190 and 661 for GSM and GPRS mode 850 and 1900 band respectively.
Test Results:	Pass

Test equipment Used:

Asset Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
7805	EMI Test Receiver	R/S	ESIB26	100211	2012-01-12	Normal
7330	Ultra Broadband Antenna	SCHWARZBECK	VULB 9160	--	2013-11-24	Normal
7330	Double-Ridged Horn Antenna	R/S	HF906	100037	2013-01-24	Normal
713	Fully-Anechoic Chamber	ETS	11.8m×6.5m×6.3m	--	2013-11-16	Normal
111835	Wireless Communications Test Set	R&S	CMU200	1100000802	2011-06-08	Normal

Limit Level Construction:

Part22:

According to Part 22.917(a), i.e., out of band emissions, 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, so the limit level is:

P(dBm) – (43 + 10 log(P)) dB= -13dBm

Part24:

According to Part 24.238(a), i.e., out of band emissions, 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, so the limit level is:

P(dBm) – (43 + 10 log(P)) dB= -13dBm

Limits for Radiated spurious emissions(UE)	
Frequency range	**Limit Level /Resolution Bandwidth**
30 MHz to 1 GHz	-13dBm/100kHz
1 GHz to 20 GHz	-13dBm/1MHz

Test Setup:

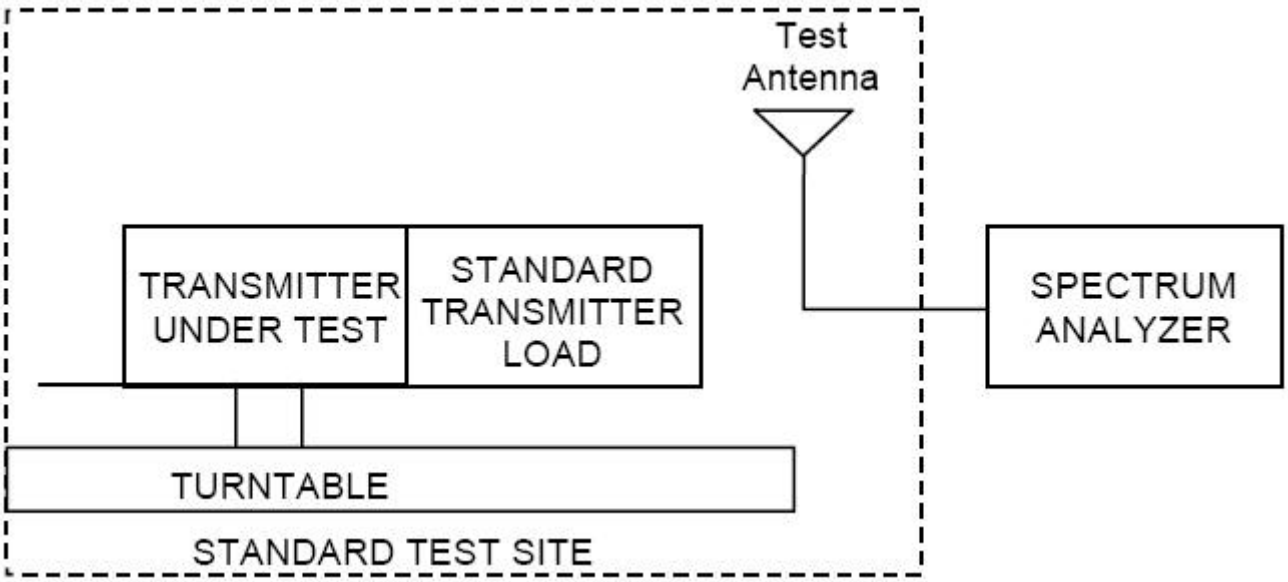
The EUT was placed in an anechoic chamber, see figure SP. The Wireless Communications Test Set was used to set the TX channel and power level and modulate the TX signal with different bit patterns. The test was done using an automated test system, where all test equipments were controlled by a computer.

Figure SP

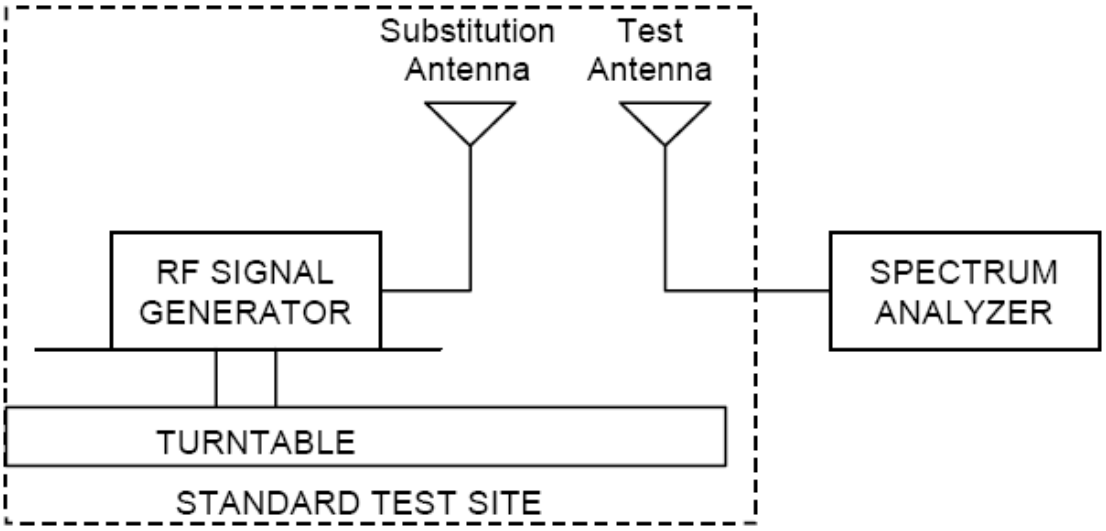
Test Method:

The measurement method is substitution method accordance with section 2.2.12 of ANSI/TIA-603-C: *Land Mobile FM or PM Communications Equipment Measurement and Performance Standards*.

(a) Connect the equipment as illustrated and measure the spurious emissions as the method as above.



(b) Reconnect the equipment as illustrated.



(c) Remove the transmitter and replace it with a substitution antenna. The center of the substitution antenna should be approximately at the same location as the center of the transmitter.

(d) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized, and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.

(e) Repeat step d) with both antennas vertically polarized for each spurious

frequency.

(f) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps d) and e) by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula:

$$P_d\text{(dBm)} = P_g\text{(dBm)} - \textit{cable loss}\ \text{(dB)} + \textit{antenna gain}\ \text{(dB)}$$

where:

P_d is the dipole equivalent power and

P_g is the generator output power into the substitution antenna.

Test Results for GSM850 mode:

EUT Mode	Antenna Polarisation	EUT Position	Test data
Transmitting	Vertical	Face	S190VF for GSM850 mode
Transmitting	Horizontal	Face	S190HF for GSM850 mode
Transmitting	Vertical	Top	S190VT for GSM850 mode
Transmitting	Horizontal	Top	S190HT for GSM850 mode

Test Results for GSM1900 mode:

EUT Mode	Antenna Polarisation	EUT Position	Test data
Transmitting	Vertical	Face	S661VF for GSM1900 mode
Transmitting	Horizontal	Face	S661HF for GSM1900 mode
Transmitting	Vertical	Top	S661VT for GSM1900 mode
Transmitting	Horizontal	Top	S661HT for GSM1900 mode

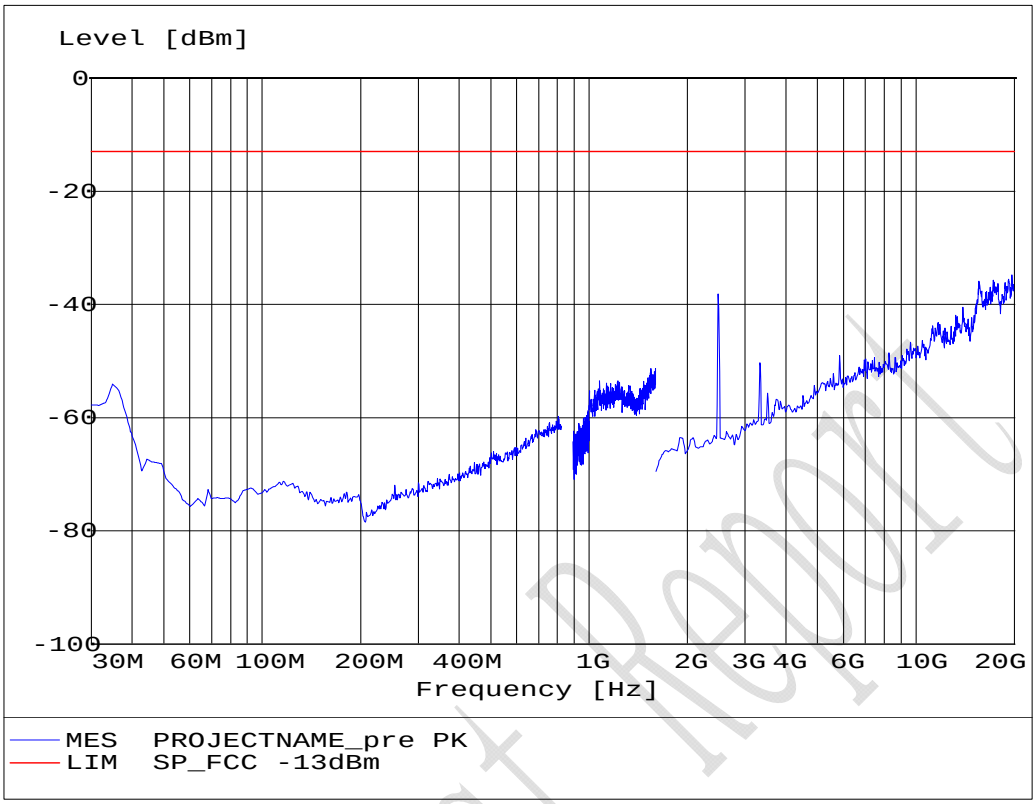
Test Results for GPRS850 mode:

EUT Mode	Antenna Polarisation	EUT Position	Test data
Transmitting	Vertical	Face	S190VFG for GPRS850 mode
Transmitting	Horizontal	Face	S190HFG for GPRS850 mode
Transmitting	Vertical	Top	S190VTG for GPRS850 mode
Transmitting	Horizontal	Top	S190HTG for GPRS850 mode

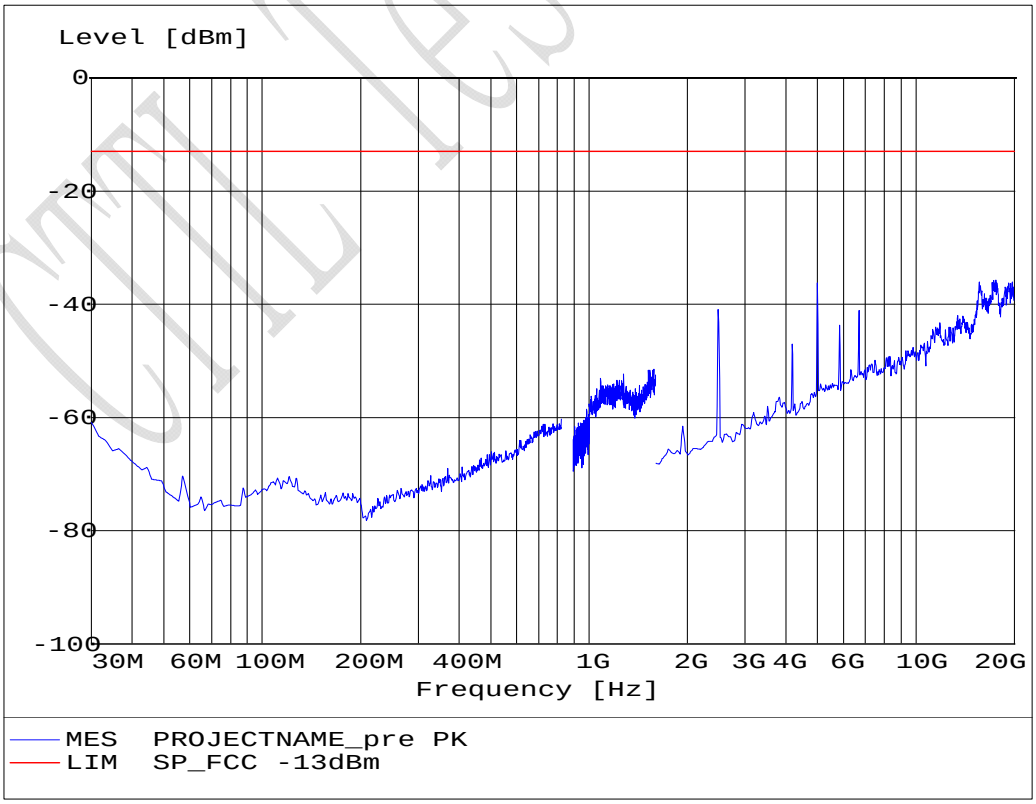
Test Results for GPRS1900 mode:

EUT Mode	Antenna Polarisation	EUT Position	Test data
Transmitting	Vertical	Face	S661VFG for GPRS1900 mode
Transmitting	Horizontal	Face	S661HFG for GPRS1900 mode
Transmitting	Vertical	Top	S661VTG for GPRS1900 mode
Transmitting	Horizontal	Top	S661HTG for GPRS1900 mode

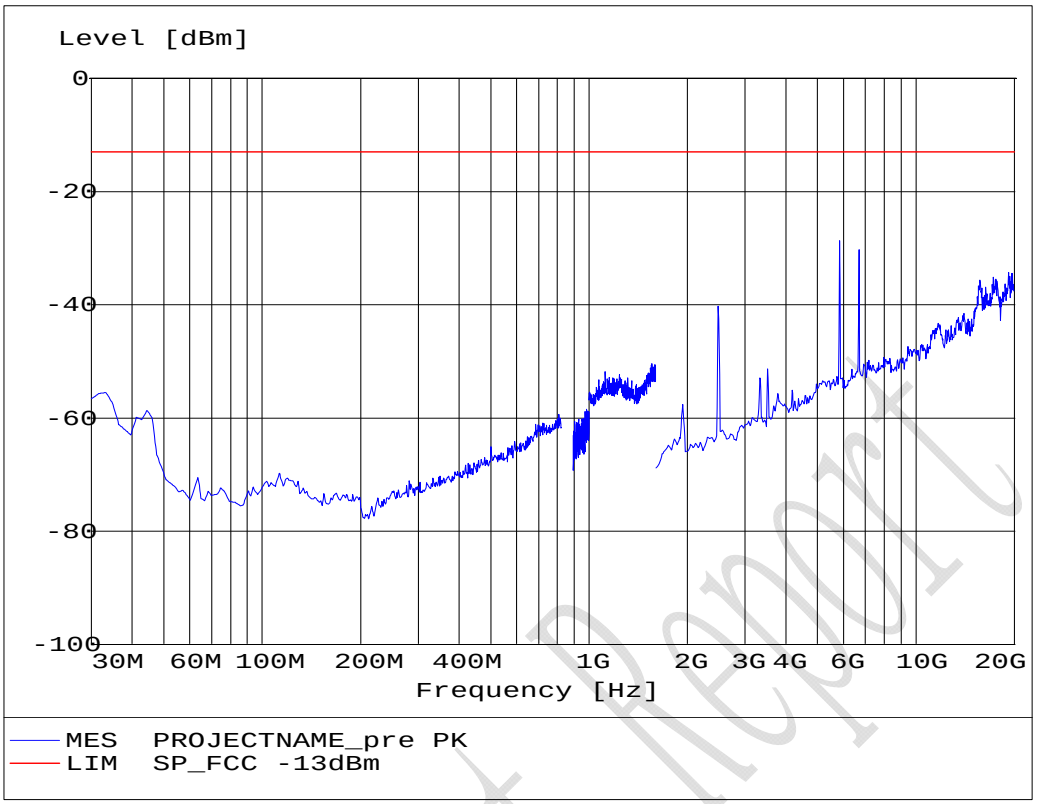
Graphical Results for GSM mode:



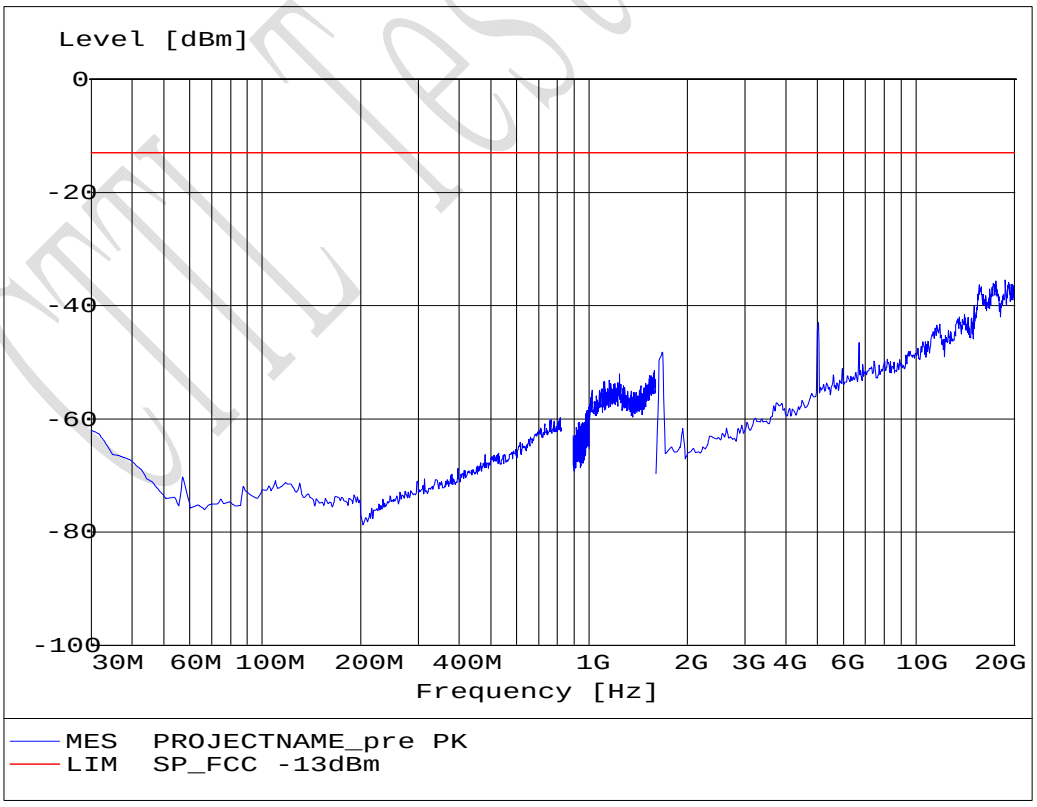
S190VF for GSM850 mode



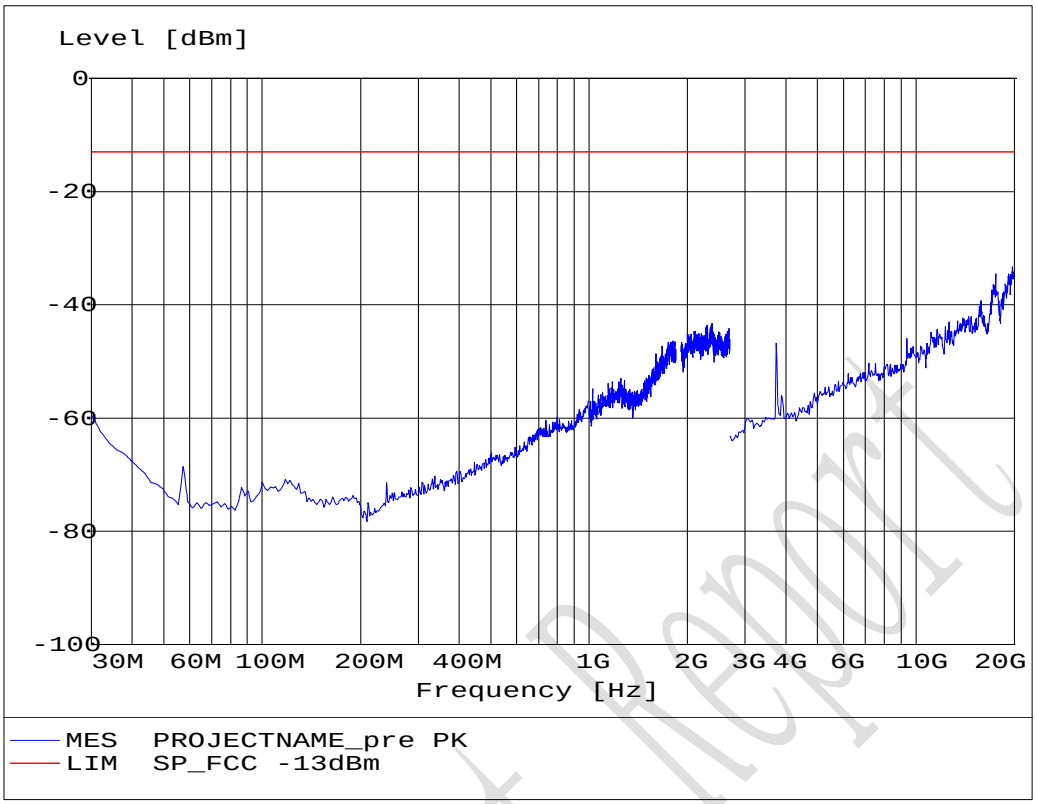
S190HF for GSM850 mode



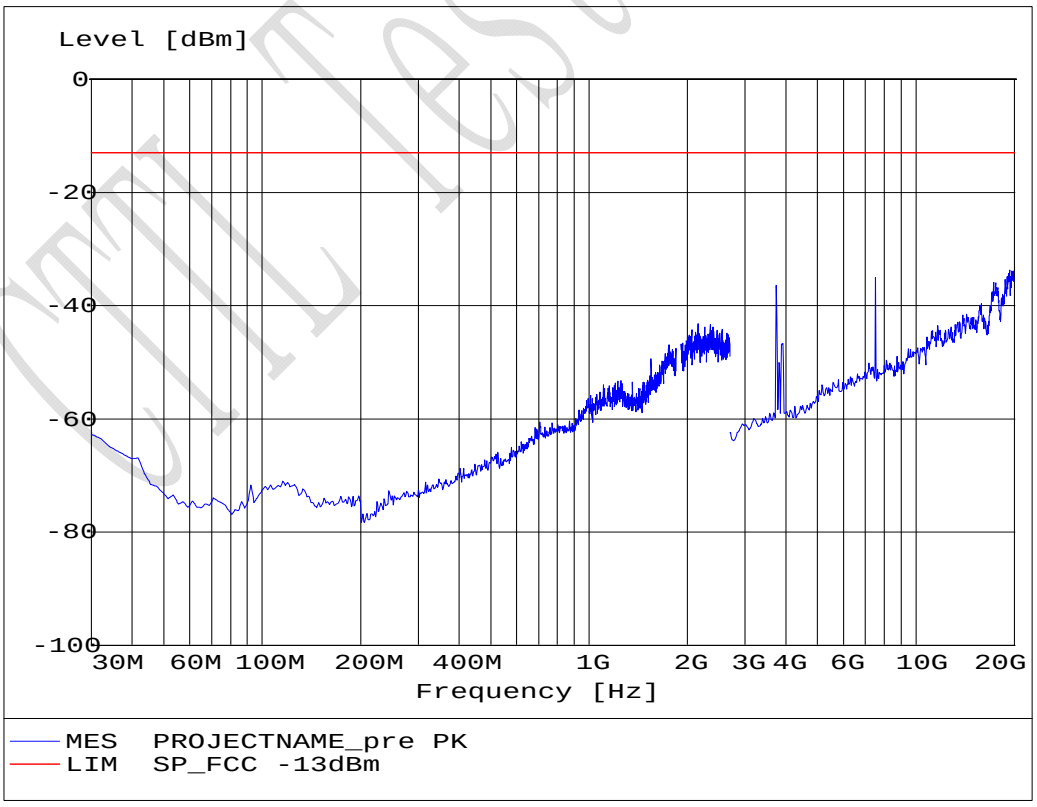
S190VT for GSM850 mode



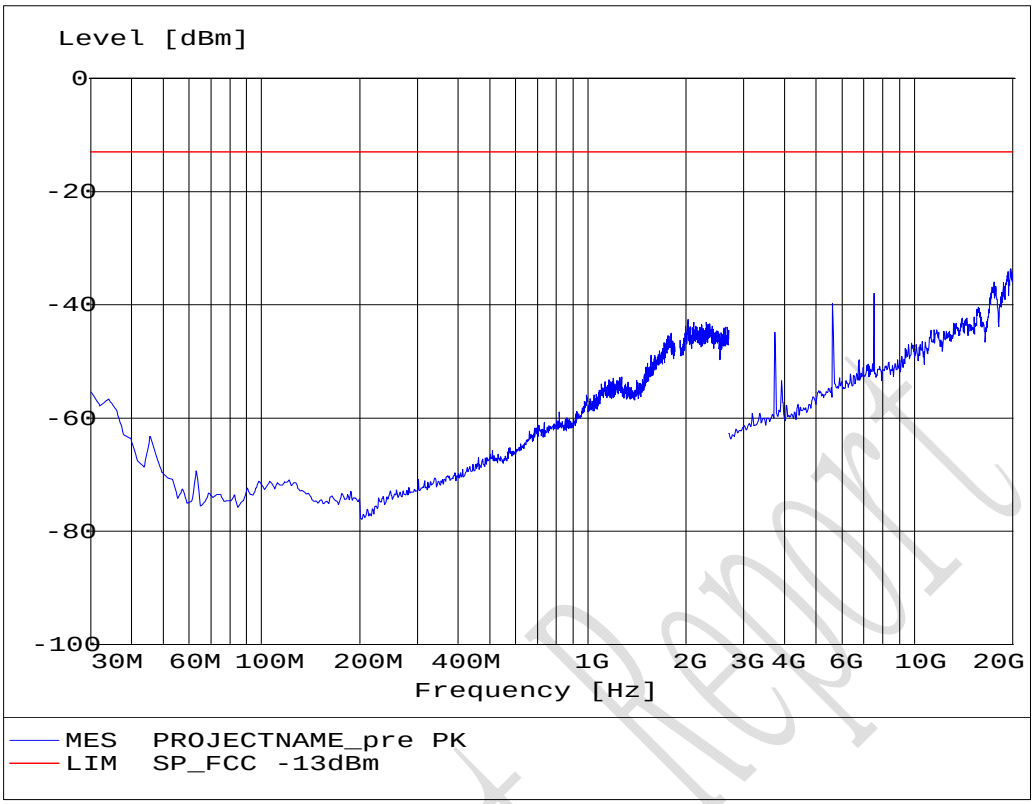
S190HT for GSM850 mode



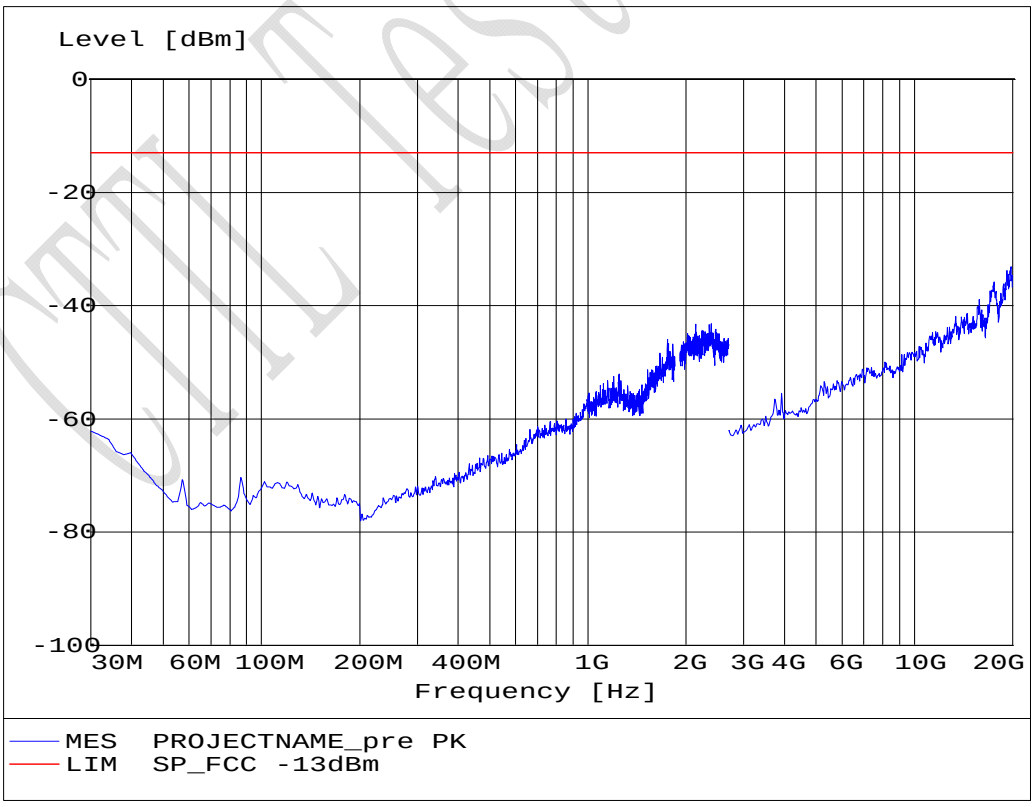
S661VF for GSM1900 mode



S661HF for GSM1900 mode

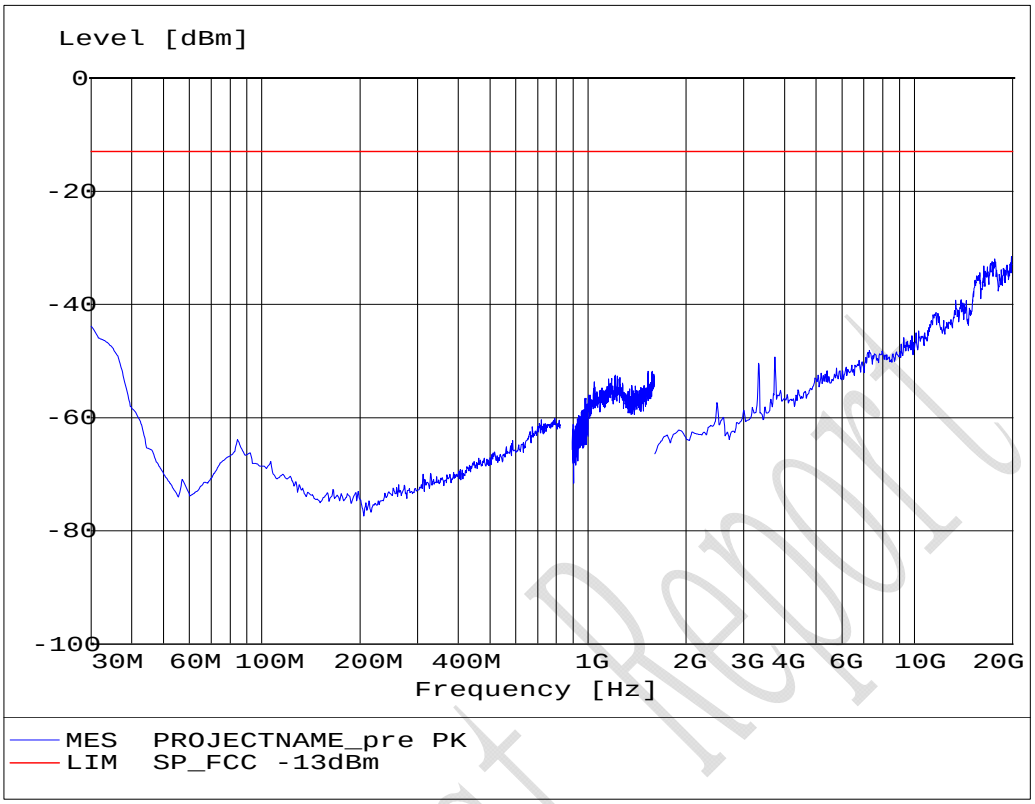


S661VT for GSM1900 mode

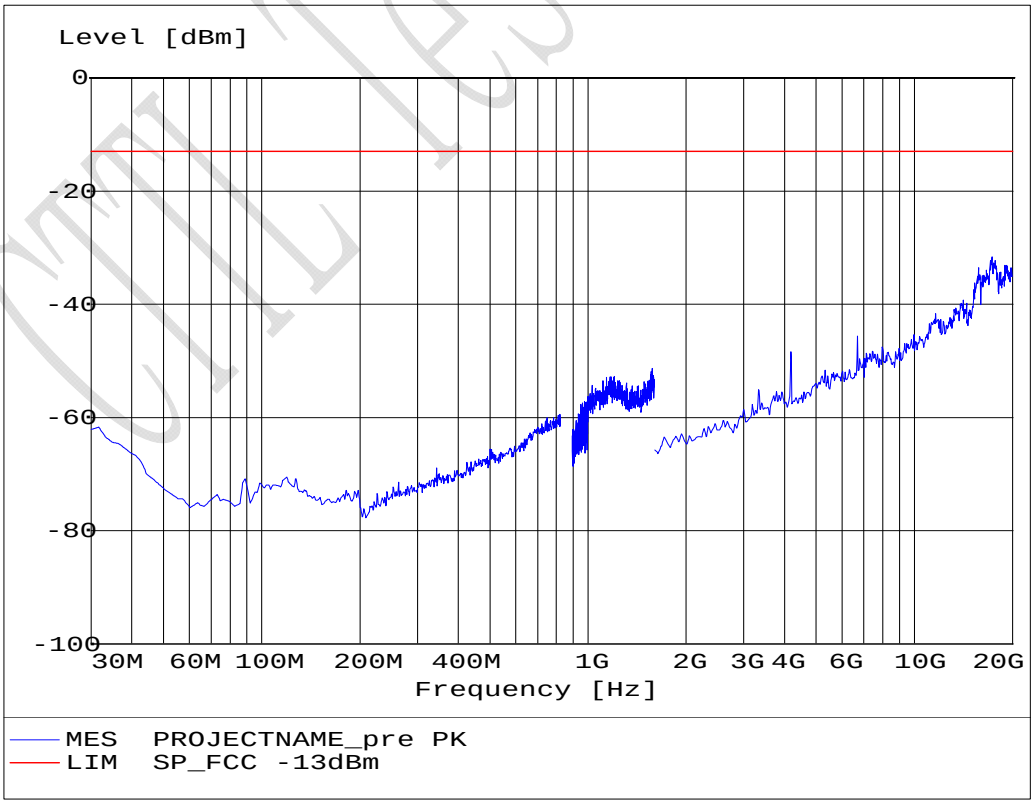


S661HT for GSM1900 mode

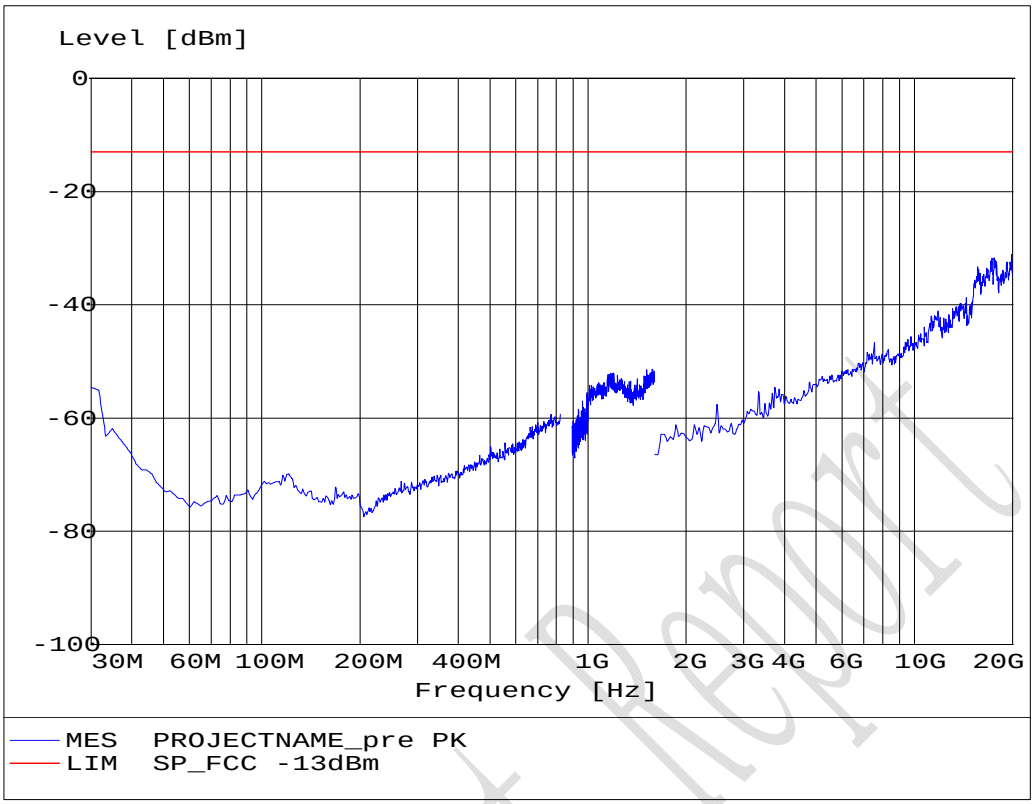
Graphical Results for GPRS mode:



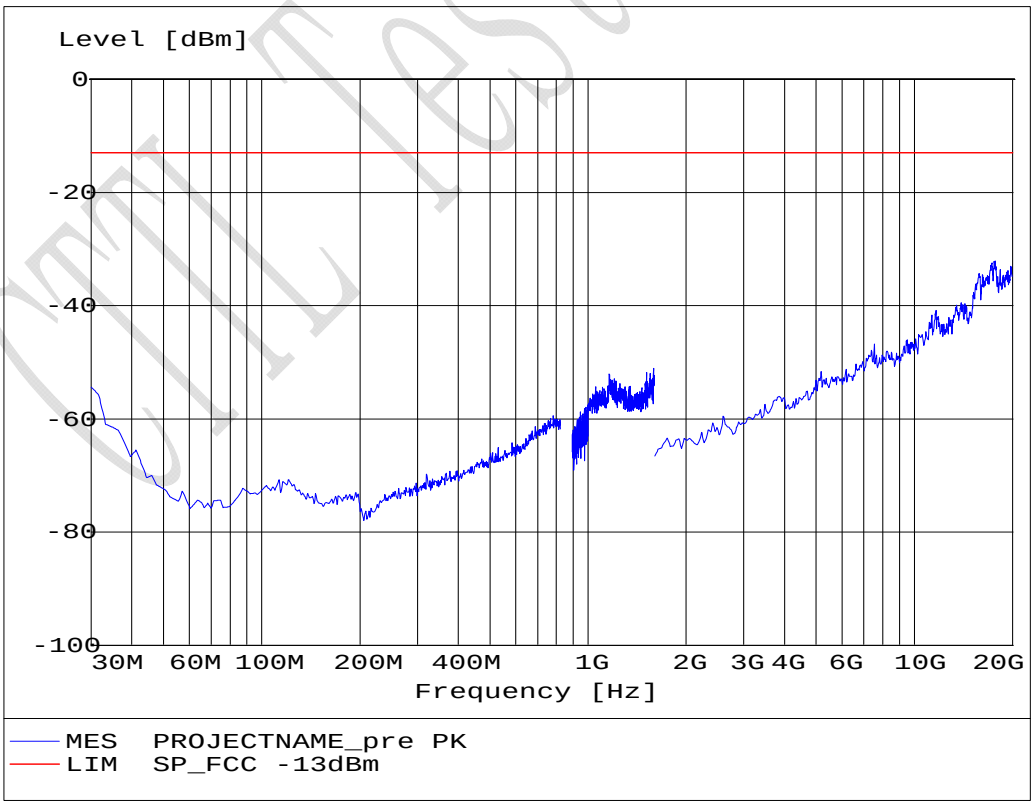
S190VFG for GPRS850 mode



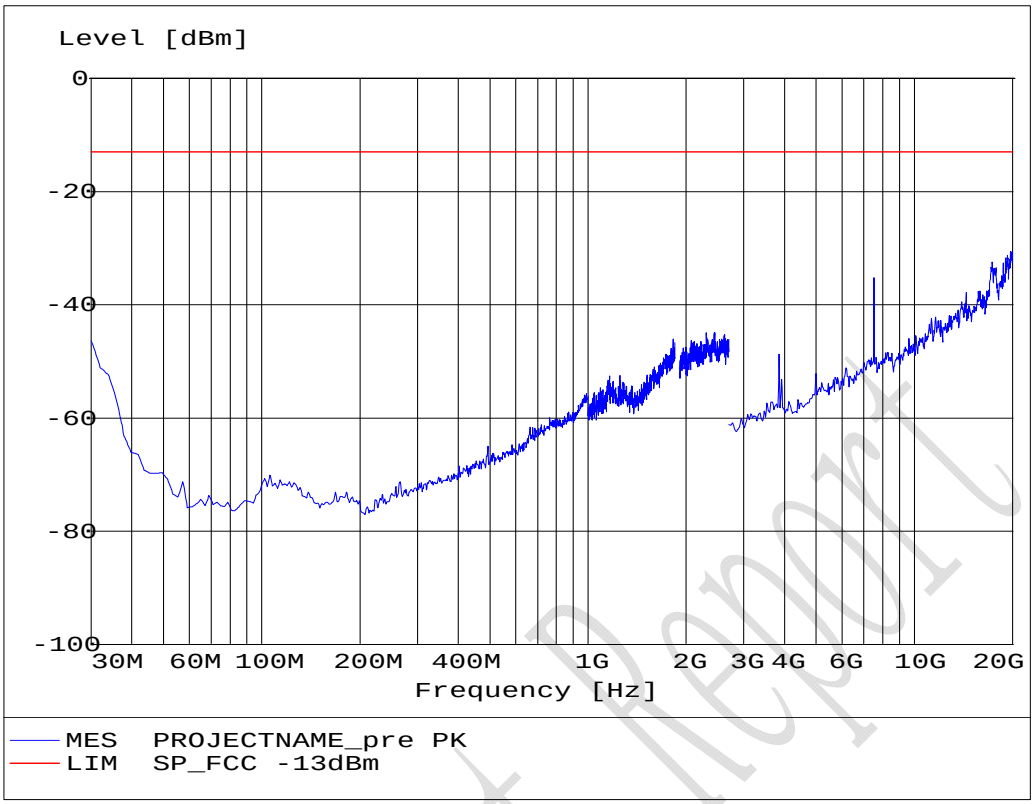
S190HFG for GPRS850 mode



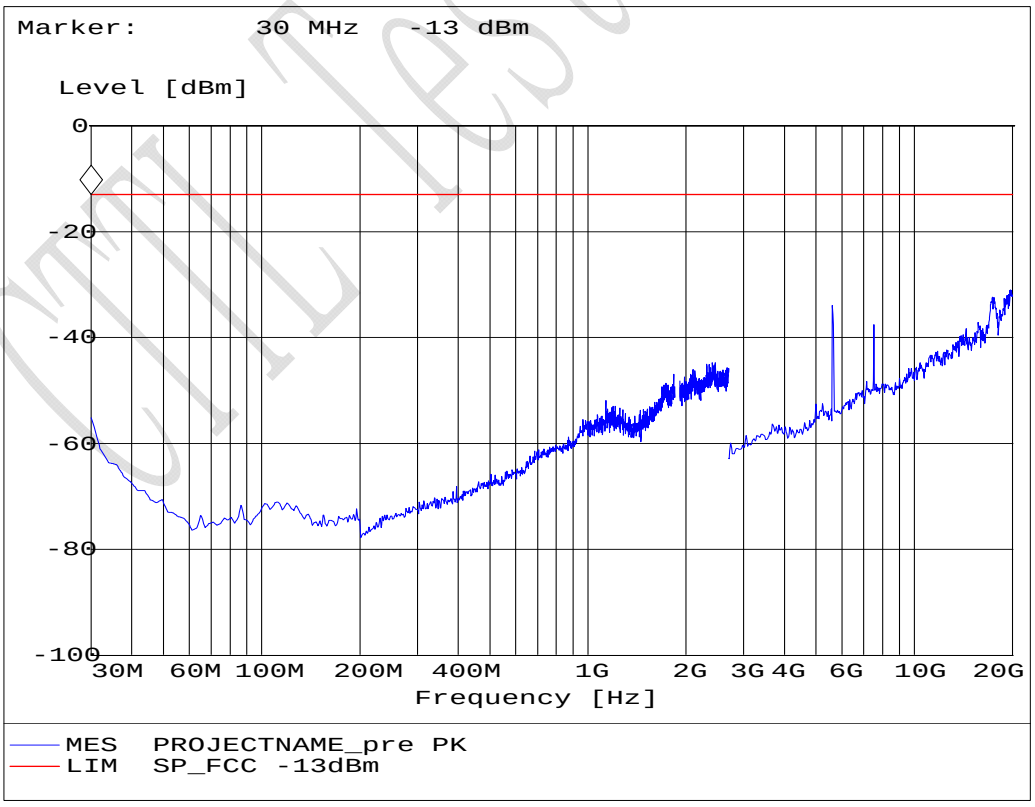
S190VTG for GPRS850 mode



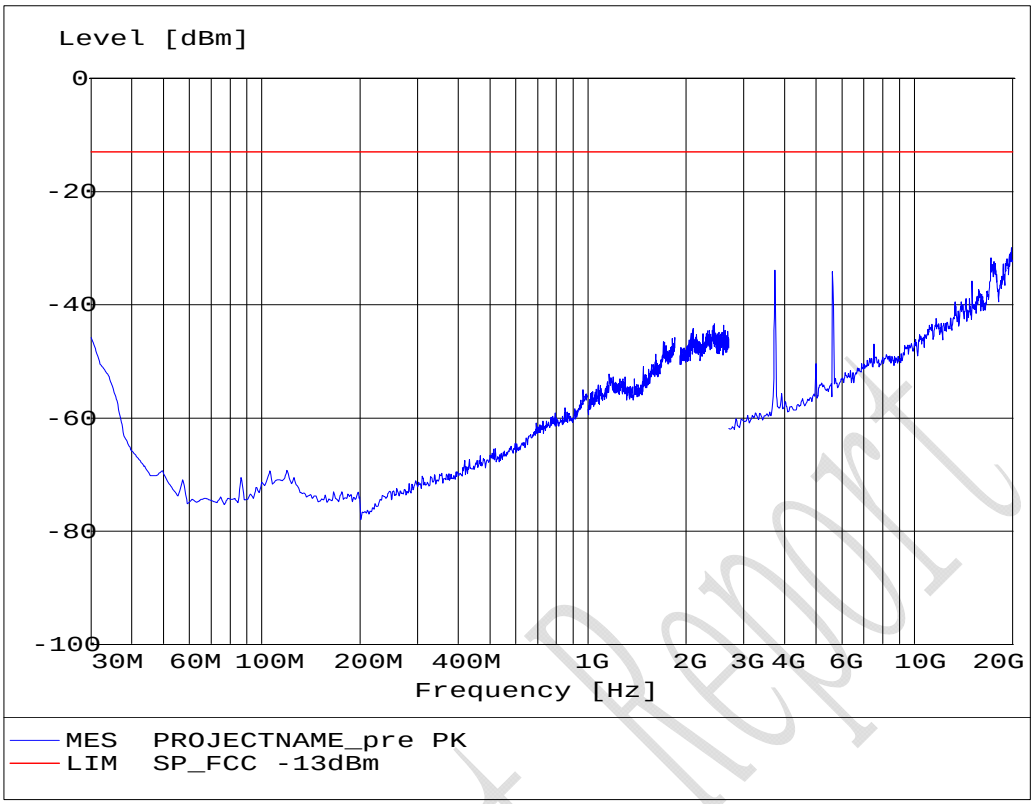
S190HTG for GPRS850 mode



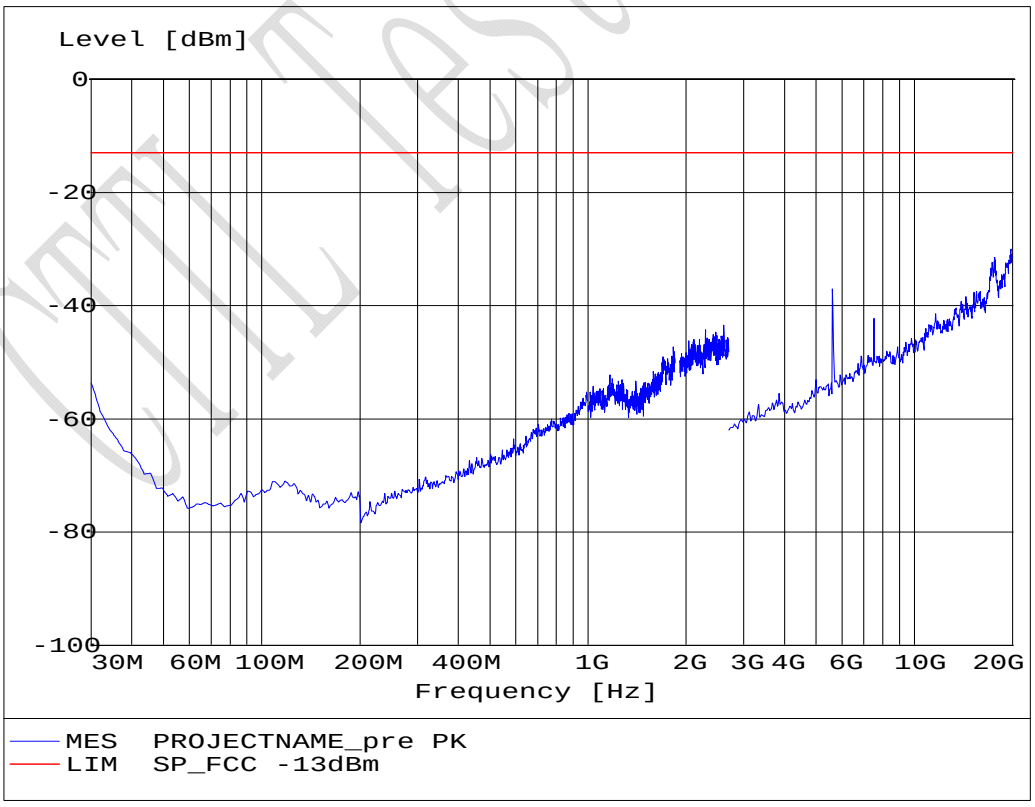
S661VFG for GPRS1900 mode



S661HFG for GPRS1900 mode



S661VTG for GPRS1900 mode



S661HTG for GPRS1900 mode

4.2 Radiated RF Power Output and ERP

Specifications:	2.1046,24.232,22.913(a)
Date of Tests	2011-03-07, 2011-05-19
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Operation Mode	TX on, channel 128, 190, 251, 512, 661 and 810 for GSM and GPRS mode 850 and 1900 band respectively.
Test Results:	Pass

Test equipment Used:

Asset Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
7805	EMI Test Receiver	R/S	ESIB26	100211	2012-01-12	Normal
7330	Ultra Broadband Antenna	SCHWARZBECK	VULB 9160	--	2013-11-24	Normal
713	Fully-Anechoic Chamber	ETS	11.8m×6.5m×6.3m	--	2013-11-16	Normal
111835	Wireless Communications Test Set	R&S	CMU200	1100000802	2011-06-08	Normal

Limit Level Construction:

(a) Radiated RF Power Output

According to Part 24.232(b), i.e., Mobile/portable stations are limited to 2 watts EIRP peak power and the equipment must employ means to limit the power to the minimum necessary for successful communication, so the limit level is 2 W or 33 dBm.

(b) ERP

According to Part 22.913(a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts, or 38.5 dBm.

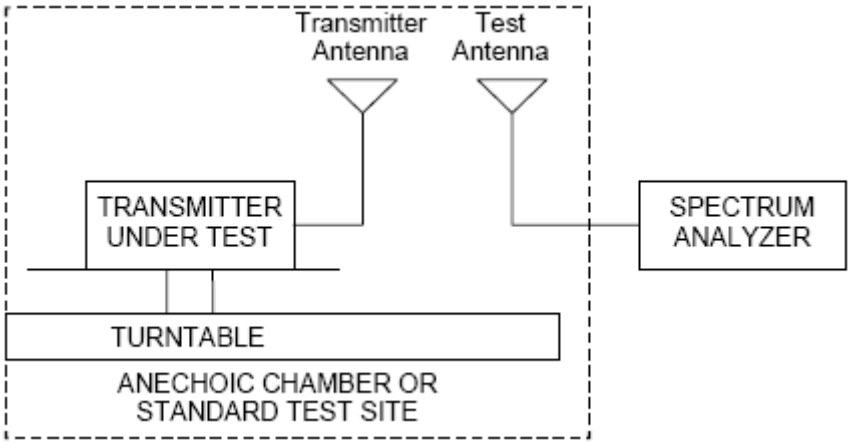
Test Setup:

The EUT was set in an anechoic chamber, which is connected to the Wireless Communications Test Set located outside the chamber. The test was done using an automated test system, where all test equipments were controlled by a computer. The test distance separation from the receive antenna is 3 meters.

Test Method

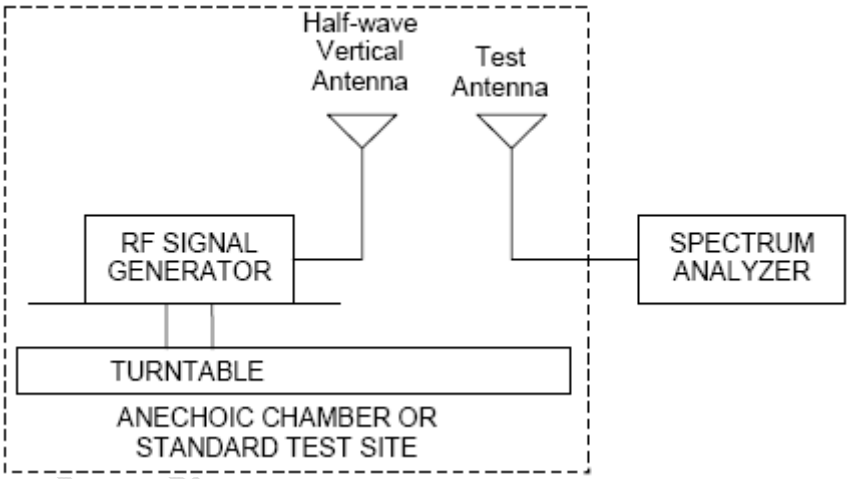
The measurement was performed accordance with section 2.2.17 of ANSI/TIA-603-C: *Land Mobile FM or PM Communications Equipment Measurement and Performance Standards*.

a) Connect the equipment as illustrated. Mount the equipment in a vertical orientation on a multi-axis plastic holder in a RF anechoic chamber.



b) Key the transmitter on, then rotate the EUT 360 degree azimuthally and record spectrum analyzer power level (LVL) measurements at angular increments that are sufficiently small to permit resolution of all peaks.

c) Replace the transmitter under test with a vertically polarized half-wave dipole, or an antenna whose gain is known relative to an ideal half-wave dipole, illustrated as following. The center of the antenna should be at the same location as the center of the antenna under test.



d) Connect the antenna to a signal generator with a known output power and record the path loss (in dB) as LOSS.

LOSS = Generator Output Power (dBm) – Analyzer reading (dBm)

e) Determine the effective radiated output power at each angular position from the readings in steps b) and d) using the following equation:

ERP (dBm) = LVL (dBm) + LOSS (dB)

f) The maximum ERP is the maximum value determined in the preceding step.

Method of Calculation

ERP can then be calculated as follows:

P_d (dBm) = P_g (dBm) - Losses (dB) + Antenna Gain (dBd)

where:

dBd refers to gain relative to an ideal dipole.

EIRP can then be calculated as follows:
P_i (dBm) = P_g (dBm) - Losses (dB) + Antenna Gain (dBi)
where:
dBi refers to gain relative to an ideal source.
0 dBi = 2.15 dBd

Test Data:

GSM 850 band mode:

Channel	Output power (Pg) [dBm]	Loss [dB]	Antenna Gain [dBd]	ERP (P_d) [dBm]
128 (824.2MHz)	14.22	0.3	2.73	16.65
190 (836.6MHz)	23.23	0.5	2.80	25.53
251 (848.8MHz)	20.76	0.5	2.87	23.13

GSM 1900 band mode:

Channel	Output power (Pg) [dBm]	Loss [dB]	Antenna Gain [dBi]	EIRP (P_i) [dBm]
512 (1850.2MHz)	17.45	0.3	4.88	22.03
661 (1880.0MHz)	17.62	0.5	4.95	22.07
810 (1909.8MHz)	14.71	0.5	5.02	19.23

GPRS 850 band mode:

Channel	Output power (Pg) [dBm]	Loss [dB]	Antenna Gain [dBd]	ERP (P_d) [dBm]
128(4TS) (824.2MHz)	25.69	0.3	2.73	28.12
190(4TS) (836.6MHz)	24.67	0.5	2.80	26.97
251(4TS) (848.8MHz)	21.50	0.5	2.87	26.02

GPRS 1900 band mode:

Channel	Output power (Pg) [dBm]	Loss [dB]	Antenna Gain [dBi]	EIRP (P_i) [dBm]
512(4TS) (1850.2MHz)	17.11	0.3	4.88	21.69
661(4TS) (1880.0MHz)	19.15	0.5	4.95	23.60
810(4TS) (1909.8MHz)	20.17	0.5	5.02	24.69

4.3 Occupied bandwidth

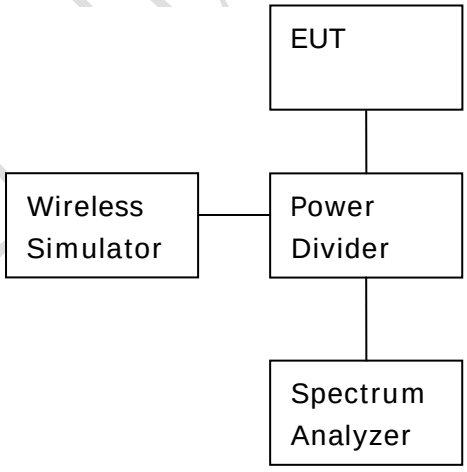
Specifications:	2.1049,22.917(b),24.238(b)
Date of Test	2011-03-14, 2011-05-18
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Operation Mode	TX on, channel 128, 190, 251, 512, 661 and 810 for GSM and GPRS mode 850 and 1900 band respectively.
Test Results:	--

Test equipment Used:

Asset Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
7330	EMC Analyzer	Agilent	E7405A	US41160321	2011-08-22	Normal
---	Power spliter	Jie sai	---	1000132	2012-01-04	Normal
111835	Wireless Communications Test Set	R&S	CMU200	1100000802	2011-06-08	Normal

Test Setup

During the test, the EUT was controlled via the Wireless Communications Test Set to ensure max power transmission and proper modulation and measured by spectrum analyzer.



Test Method

The 99% occupied bandwidth was calculated form the spectrum analyzer.
First the emission spectrums are captured via the spectrum analyzer;
Second through the GPIB card and Agilent readout software, all frequencies points and corresponded power values are recorded on the excel table;
Third the calculation based the definition of 99% occupied bandwidth are

performed to determine the lowest and the highest frequency points of the occupied bandwidth.
Finally, the occupied bandwidths can be got by subtract the lowest frequency from the highest frequency.

Note:

None

Test Data:

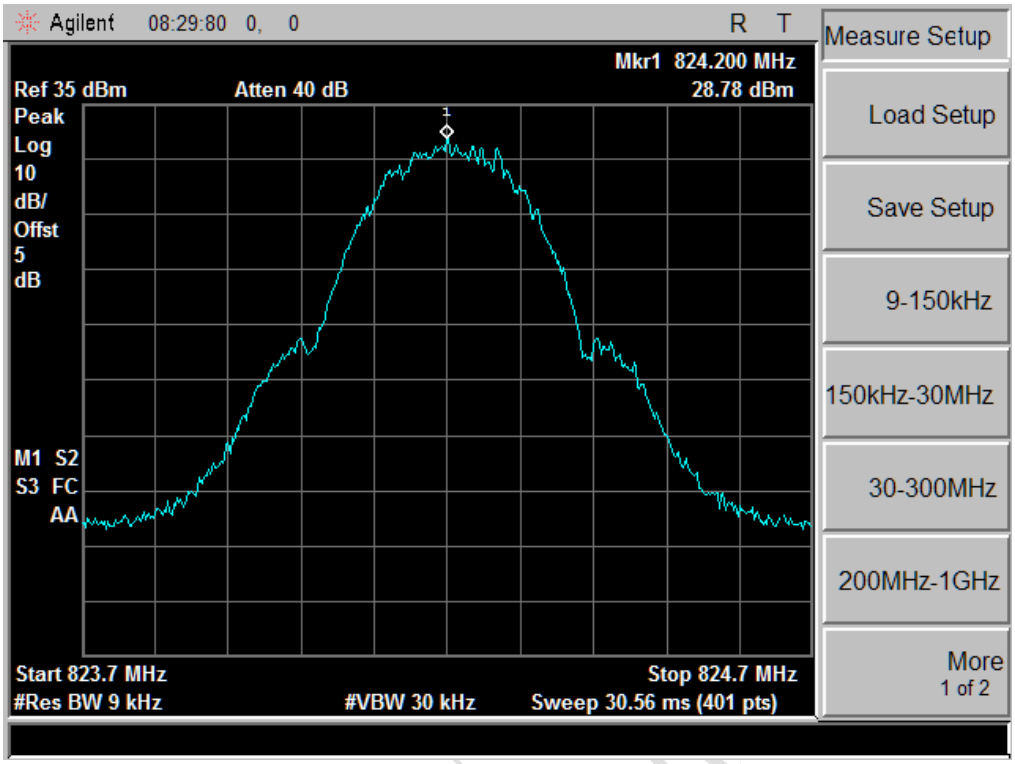
GSM 850 band mode

EUT channel no.	99% occupied bandwidth [kHz]
128 (824.2MHz)	245.0
190 (836.6MHz)	245.0
251 (848.8MHz)	245.0

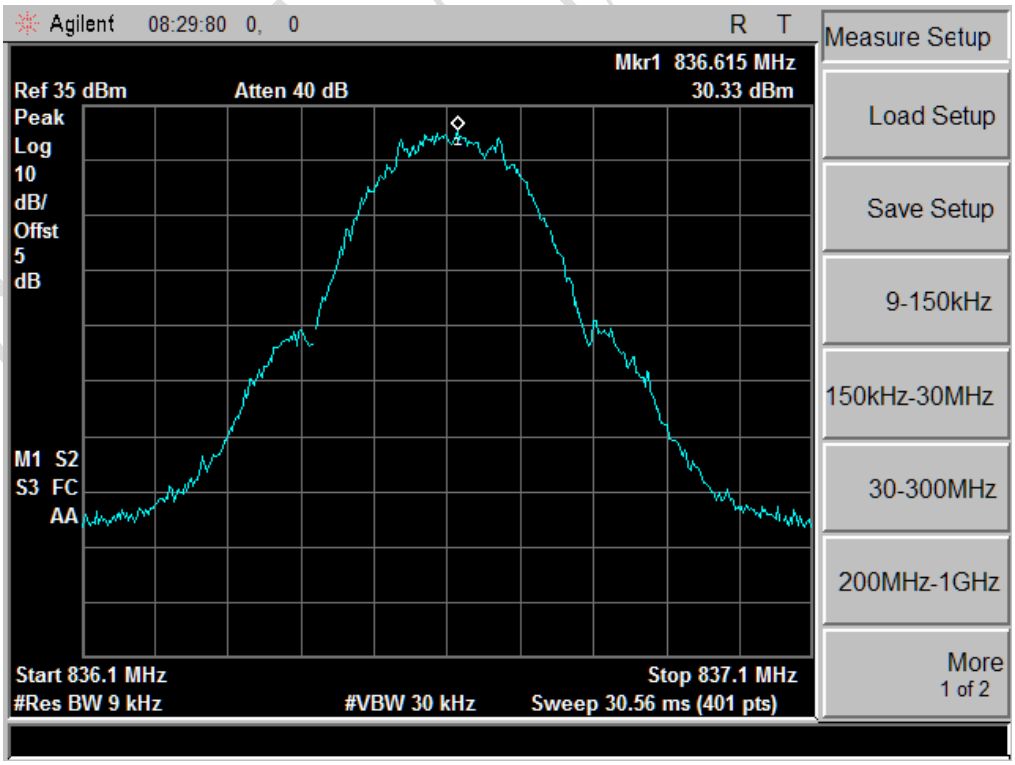
GSM 1900 band mode

EUT channel no.	99% occupied bandwidth [kHz]
512 (1850.2MHz)	247.5
661 (1880.0MHz)	245.0
810 (1909.8MHz)	247.5

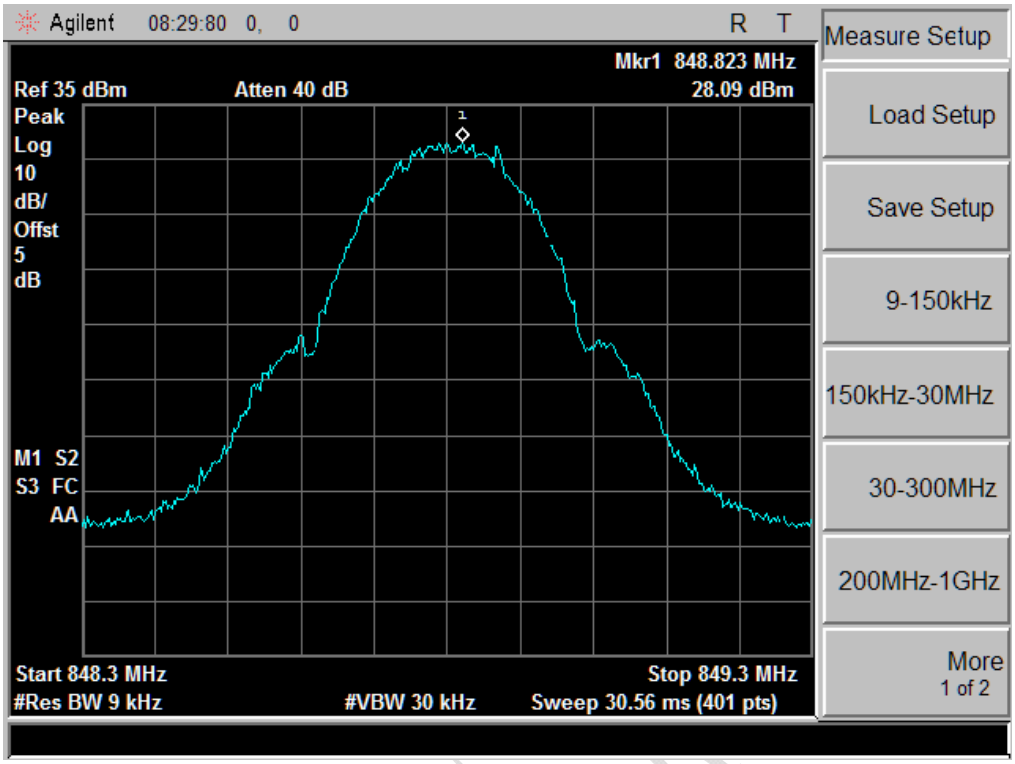
Graphical results for GSM mode:



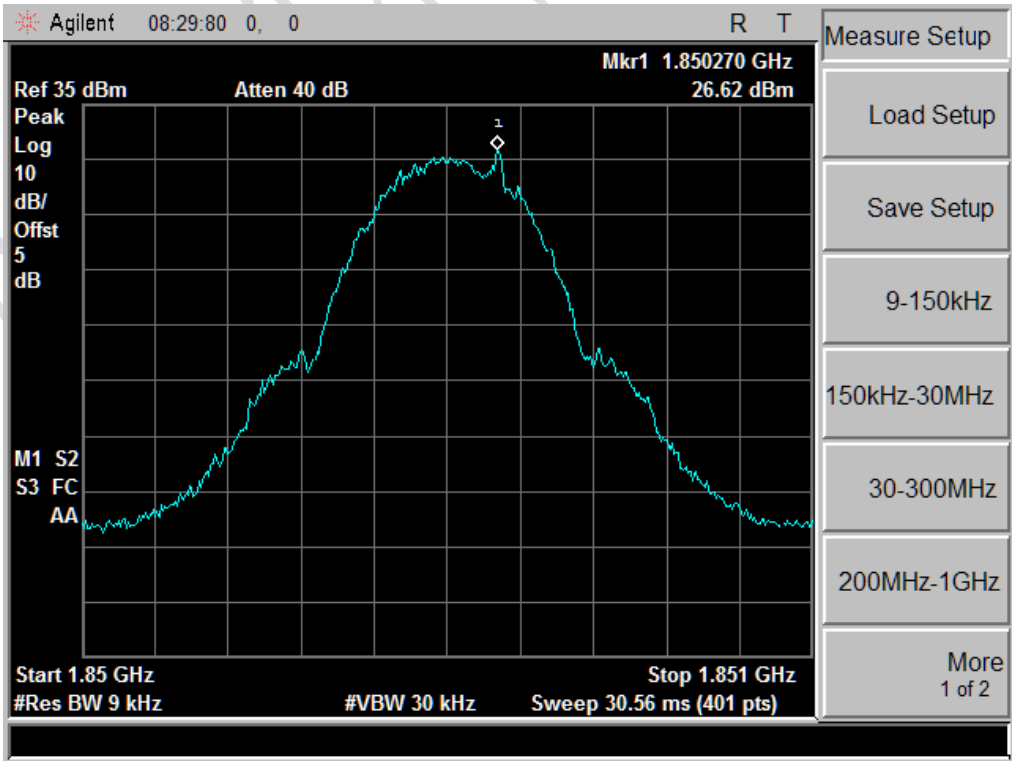
GSM850 Channel 128



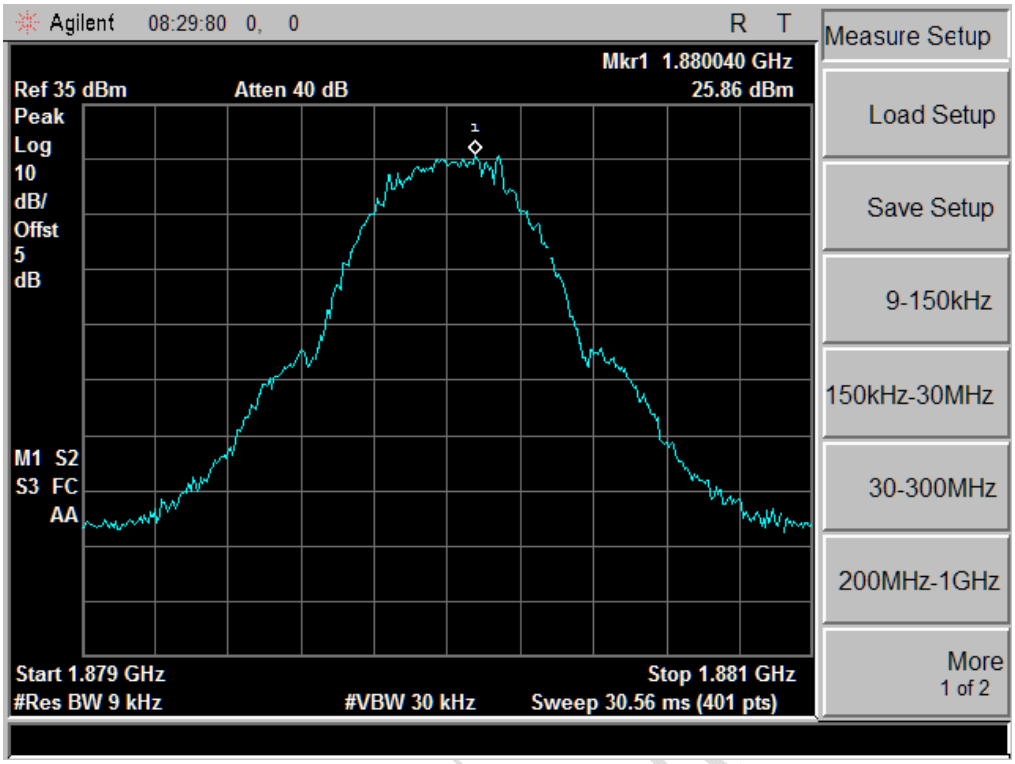
GSM850 Channel 190



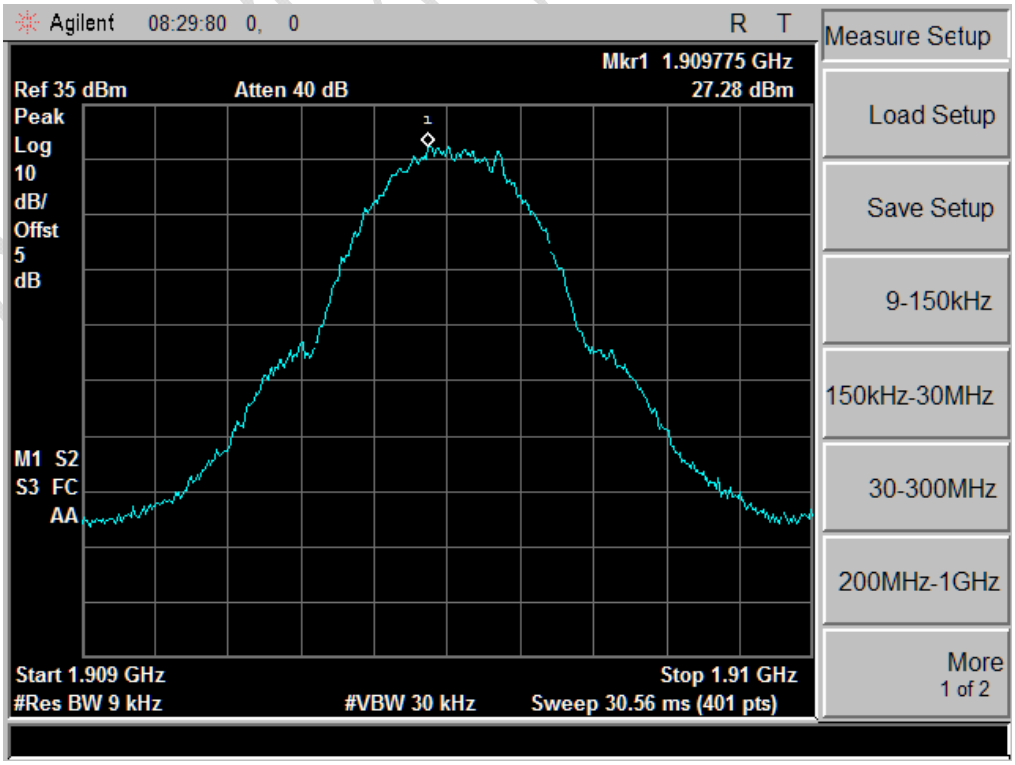
GSM850 Channel 251



GSM1900 Channel 512



GSM1900 Channel 661



GSM1900 Channel 810

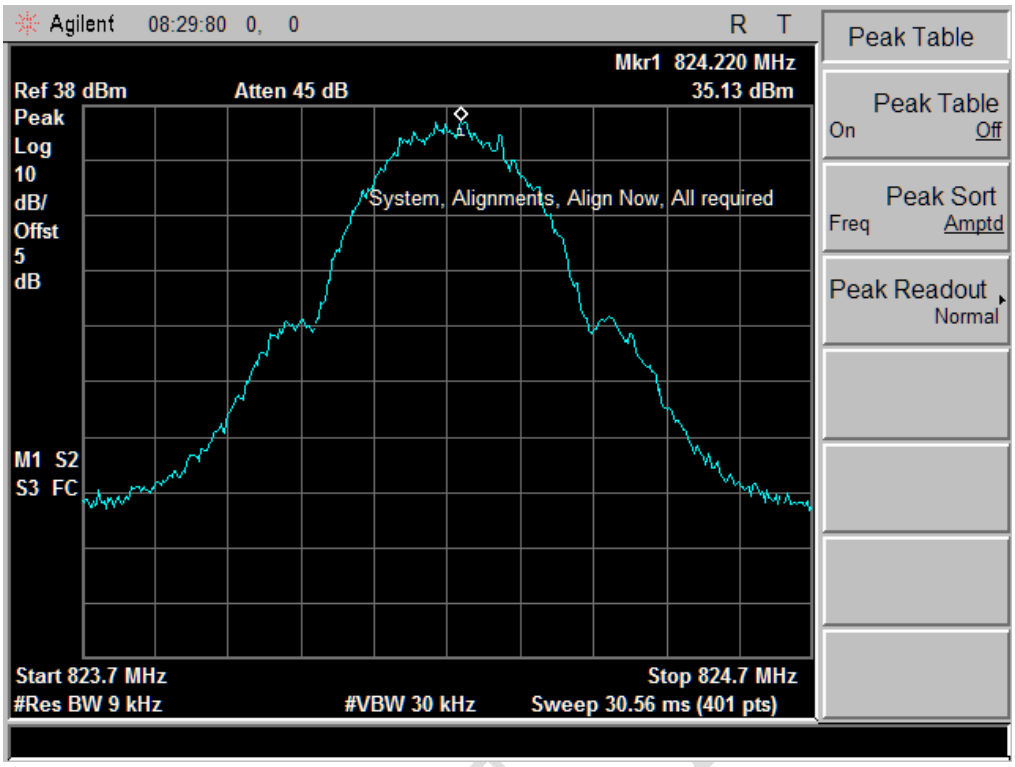
GPRS 850 band mode

EUT channel no.	99% occupied bandwidth [kHz]
128 (824.2MHz)	252.5
190 (836.6MHz)	250.0
251 (848.8MHz)	252.5

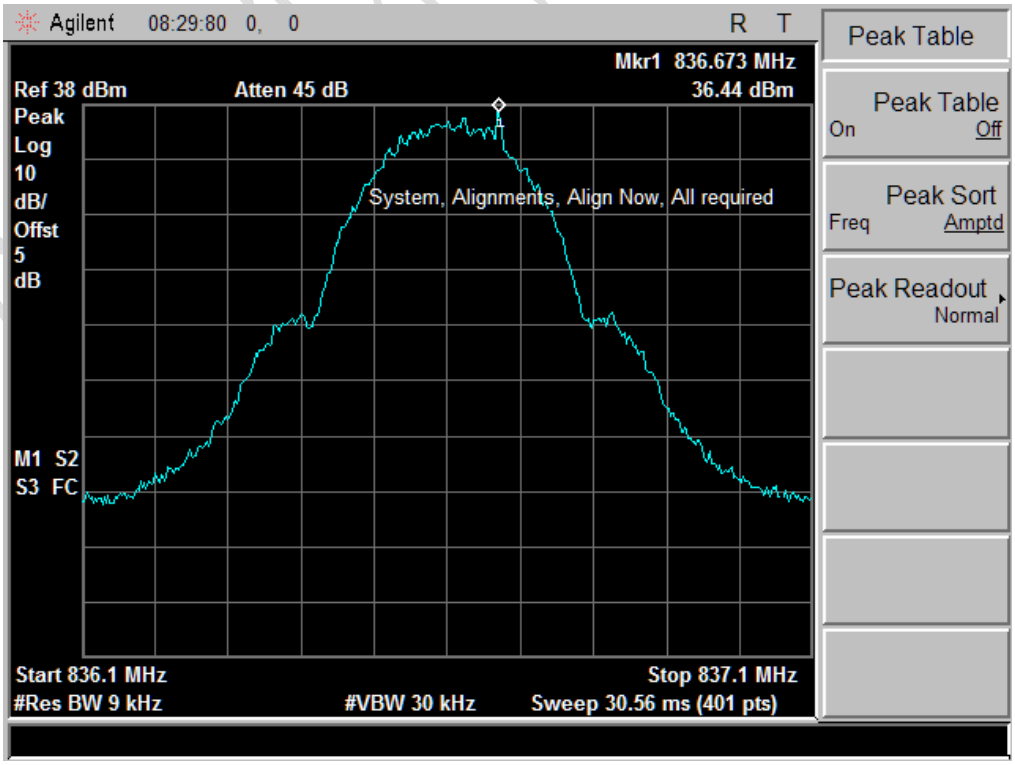
GPRS 1900 band mode

EUT channel no.	99% occupied bandwidth [kHz]
512 (1850.2MHz)	250.0
661 (1880.0MHz)	250.0
810 (1909.8MHz)	250.0

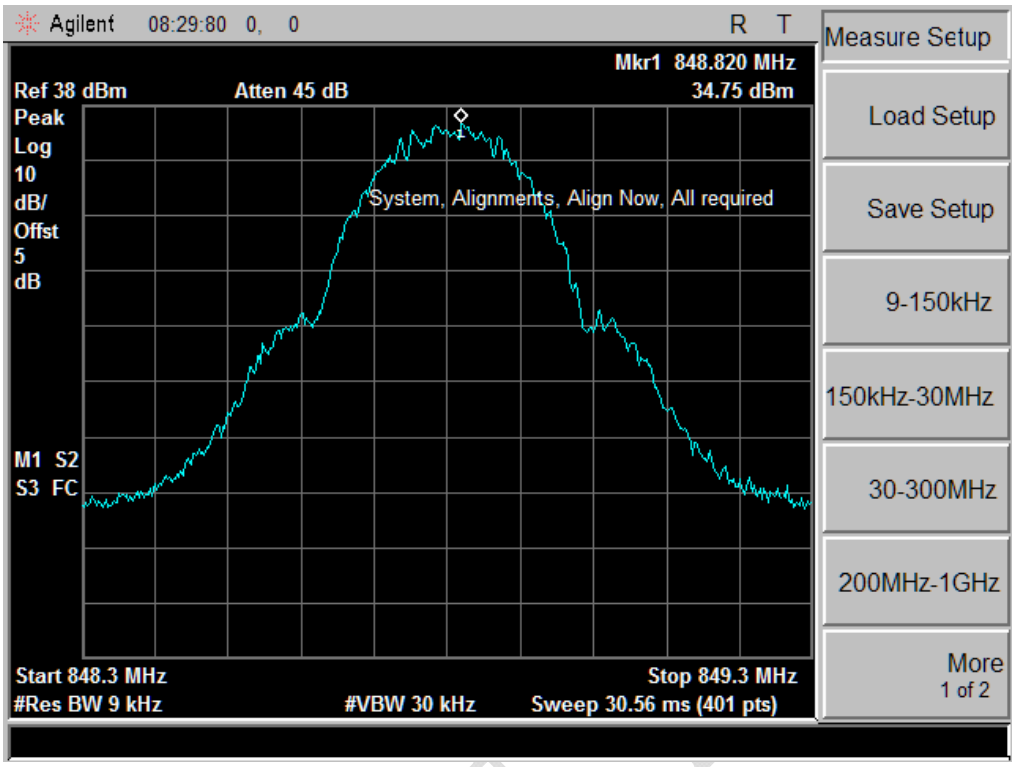
Graphical results for GPRS mode:



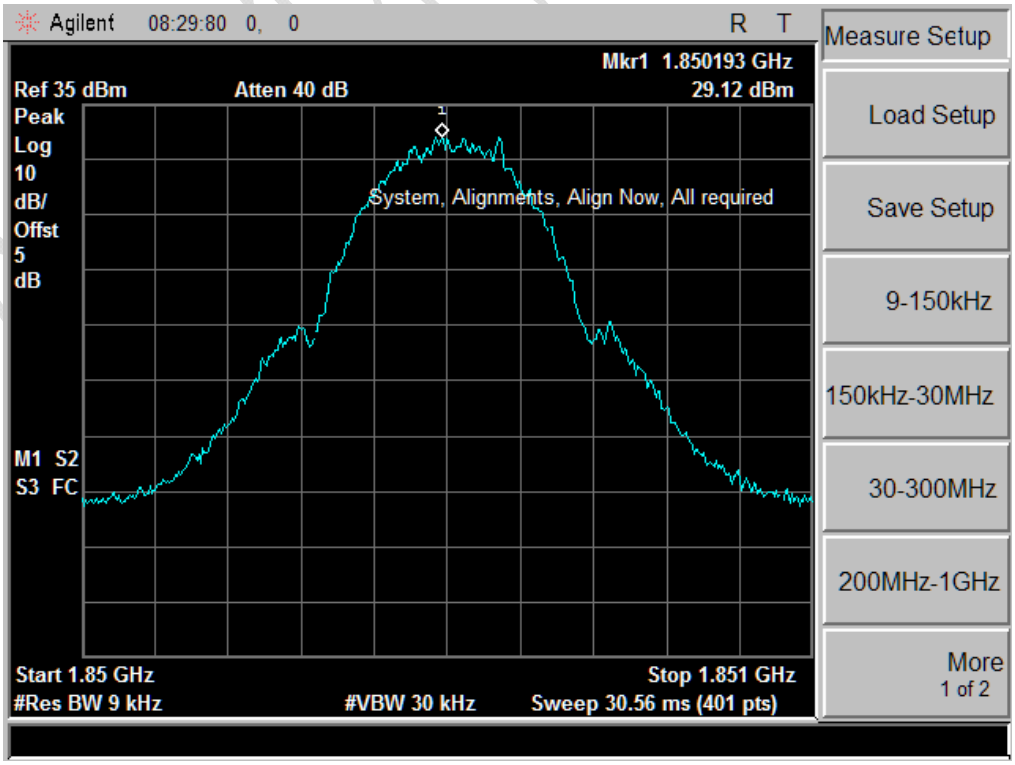
GPRS850 Channel 128



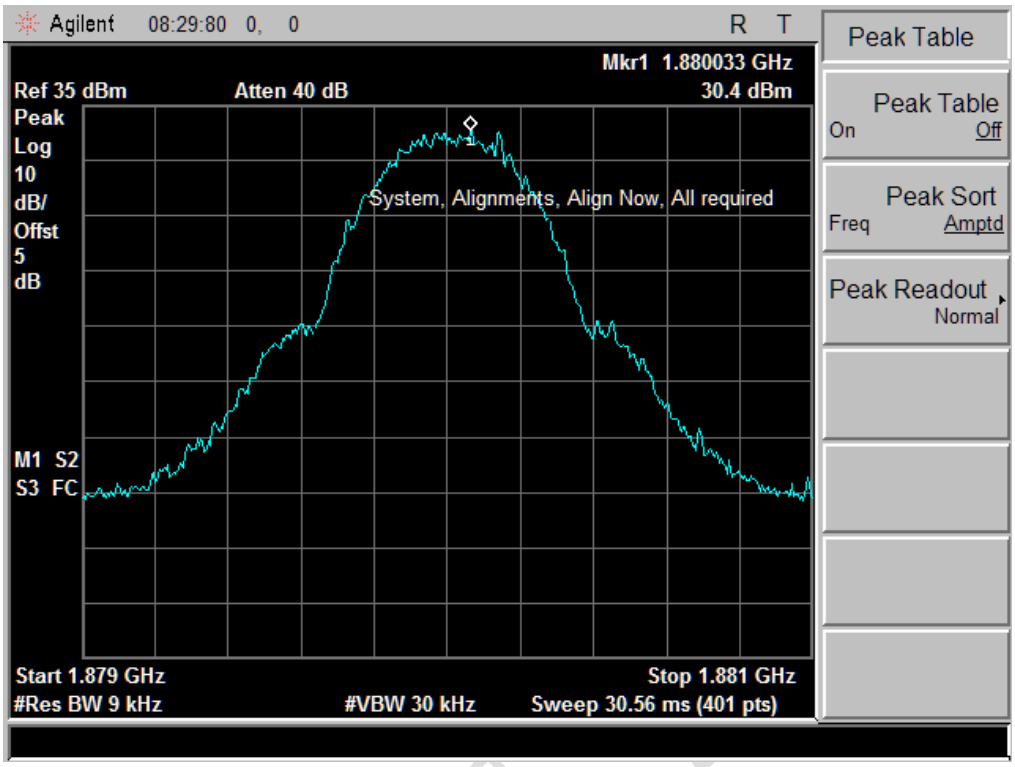
GPRS850 Channel 190



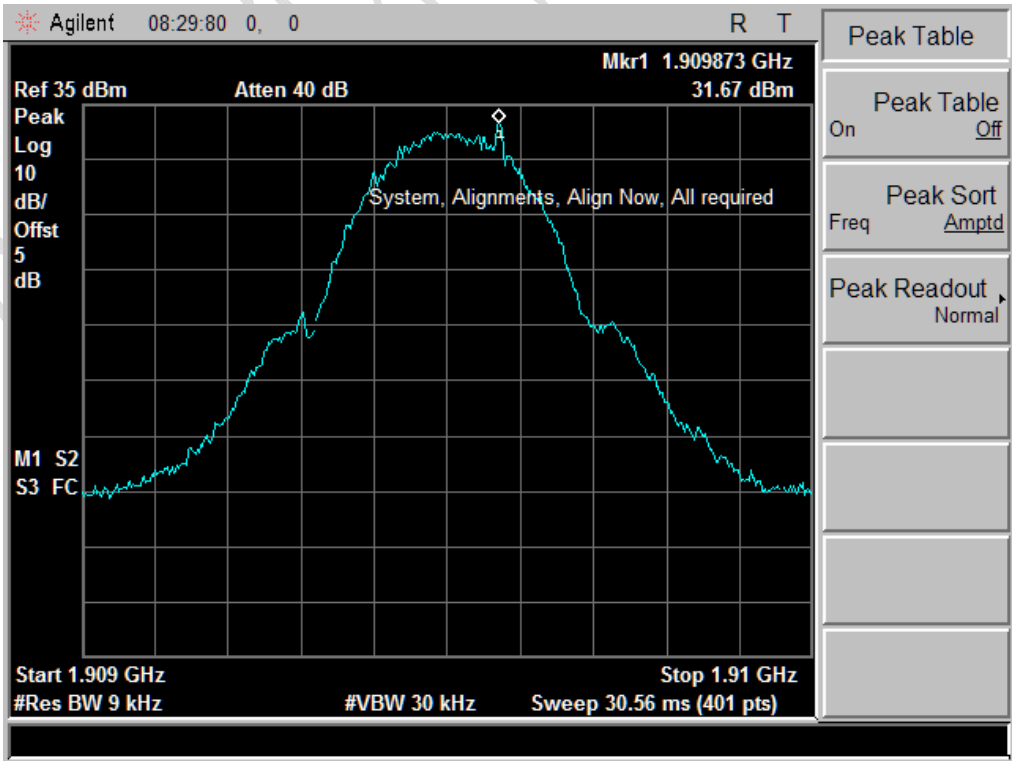
GPRS850 Channel 251



GPRS1900 Channel 512



GPRS1900 Channel 661



GPRS1900 Channel 810

4.4 Frequency Stability over Temperature Variation

Specifications:	2.1055,22.355,24.235
Date of Test	2011-03-28, 2011-05-18
Test conditions:	Ambient Temperature:-30℃-50℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Operation Mode	TX on, channel 190 and 661 for GSM and GPRS mode 850 and 1900 band respectively.
Test Results:	Pass

Test equipment Used:

Asset Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
111835	Wireless Communications Test Set	R&S	CMU200	1100000802	2011-06-08	Normal
561	Temperature Chamber	Terchy Environmental Technology LTD.	MHU-800SR	84121202	2013-01-06	Normal

Limit	
Frequency deviation [ppm]	±2.5

Test Setup

The EUT was placed in a temperature chamber, demonstrated as figure T. The Wireless Telecommunications Test Set was used to set the Tx channel and power level, modulate the TX signal with different bit patterns and measure the frequency of Tx.

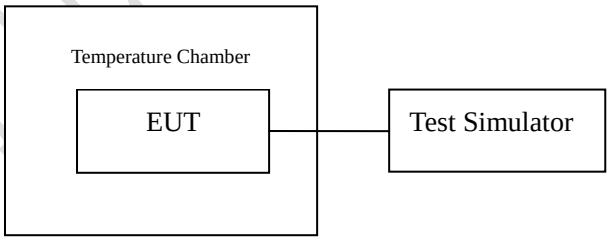


Figure T: setup for measurement of frequency stability over temperature variation

Test Method

1. The EUT was turned off and placed in the temperature chamber.
2. The temperature of the chamber was set to -30℃ and allowed to stabilize.
3. The EUT temperature was allowed to stabilize for 45 minutes.
4. The EUT was turned on and set to transmit with Wireless

Telecommunications Test Set.

5. The maximum transmit frequency deviation during one minute period was measured by Wireless Communications Test Set.
6. The steps 3-5 were repeated for -20℃, -10℃, 0℃, 10℃, 20℃, 30℃, 40℃ and 50℃.

Test data:

GSM 850 band mode

Compliance windows: ±2091.5Hz

Temperature[℃]	Deviation[Hz]	Remarks
-30	-17	Pass
-20	-16	Pass
-10	-16	Pass
0	-19	Pass
10	-20	Pass
20	-22	Pass
30	-21	Pass
40	-24	Pass
50	-22	Pass

GSM 1900 band mode

Compliance windows: ±4700.0Hz

Temperature[℃]	Deviation[Hz]	Remarks
-30	-33	Pass
-20	-31	Pass
-10	-39	Pass
0	-37	Pass
10	-39	Pass
20	-45	Pass
30	-46	Pass
40	-48	Pass
50	-44	Pass

GPRS 850 band mode

Compliance windows: ±2091.5Hz

Temperature[℃]	Deviation[Hz]	Remarks
-30	-29	Pass
-20	-25	Pass
-10	-27	Pass
0	-33	Pass
10	-30	Pass
20	-34	Pass
30	-33	Pass
40	-32	Pass
50	-29	Pass

GPRS 1900 band mode

Compliance windows: ±4700.0Hz

Temperature[℃]	Deviation[Hz]	Remarks
-30	-56	Pass
-20	-52	Pass
-10	-58	Pass
0	-65	Pass
10	-64	Pass
20	-66	Pass
30	-61	Pass
40	-75	Pass
50	-62	Pass

4.5 Frequency Stability over Voltage Variation

Specifications:	2.1055,22.355,24.235
Date of Test	2011-03-29, 2011-05-18
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Operation Mode	TX on, channel 190 and 661 for GSM and GPRS mode 850 and 1900 band respectively.
Test Results:	Pass

Test equipment Used:

Asset Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
111835	Wireless Communications Test Set	R&S	CMU200	1100000802	2011-06-08	Normal
7982	DC Power Source	4NIC	DH1715A-3	004224	--	Normal

Limit

Frequency deviation [ppm]	±2.5

Test Setup

The EUT was placed in a shielding chamber and powered by an adjustable power supply, demonstrated as figure V. A Wireless Telecommunications Test Set was used to set the TX channel and power level, modulate the TX signal with different bit patterns and measure the frequency of TX.

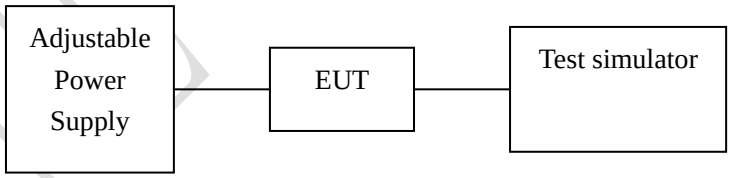


Figure V: test setup for measurement of frequency stability over voltage variation

Test Method

The EUT was powered by the adjustable power supply. The frequency stability is measured by the Wireless Telecommunications Test Set.

Test data:

GSM 850 band mode

Compliance windows: ±2091.5Hz

Level	Voltage[V]	Deviation[Hz]	Remarks
Nominal	3.8	-37	Pass
Cut-off Point	3.4	-29	Pass

GSM 1900 band mode

Compliance windows: ±4700.0Hz

Level	Voltage[V]	Deviation[Hz]	Remarks
Nominal	3.8	-58	Pass
Cut-off Point	3.4	-50	Pass

GPRS 850 band mode

Compliance windows: ±2091.5Hz

Level	Voltage[V]	Deviation[Hz]	Remarks
Nominal	3.8	-41	Pass
Cut-off Point	3.4	-36	Pass

GPRS 1900 band mode

Compliance windows: ±4700.0Hz

Level	Voltage[V]	Deviation[Hz]	Remarks
Nominal	3.8	-66	Pass
Cut-off Point	3.4	-60	Pass

4.6 Conducted RF Power Output

Specifications:	2.1046,22.913(a),24.232(c)
Date of Tests	2011-03-14~2011-03-24, 2011-05-16
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Operation Mode	TX on, channel 128, 190, 251, 512, 661 and 810 for GSM and GPRS mode 850 and 1900 band respectively.
Test Results:	Pass

Test equipment Used:

Asset Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
7330	EMC Analyzer	Agilent	E7405A	US41160321	2011-08-22	Normal
7805	EMI Test Receiver	R/S	ESIB26	100211	2012-01-12	Normal
---	Power spliter	Jie sai	---	1000132	2012-01-04	Normal
111835	Wireless Communications Test Set	R&S	CMU200	1100000802	2011-06-08	Normal

Limit Level Construction:

(a) Radiated RF Power Output

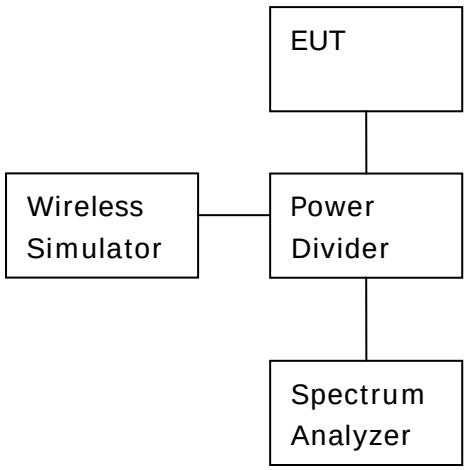
According to Part 24.232(b), i.e., Mobile/portable stations are limited to 2 watts EIRP peak power and the equipment must employ means to limit the power to the minimum necessary for successful communication, so the limit level is 2 W or 33 dBm.

(b) ERP

According to Part 22.913(a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts, or 38.5 dBm.

Test Setup:

During the test, the EUT was controlled via the Wireless Communications Test Set to ensure max power transmission and proper modulation and measured by spectrum analyzer.



Test Method

1) The EUT was coupled to the spectrum analyzer and the base station simulator through a power divider. The lost of the cables the test system is calibrated to correct the readings.
2) The spectrum analyzer was set to Maxpeak Detector function and Maximum hold mode.
3) The resolution bandwidth of the spectrum analyzer was comparable to the emission bandwidth.

Note:

None

Test Results:

GSM 850 band mode

Channel No.	Peak output power [dBm]
128 (824.2MHz)	30.45
190 (836.6MHz)	32.83
251 (848.8MHz)	30.81

GSM 1900 band mode

Channel No.	Peak output power [dBm]
512 (1850.2MHz)	28.09
661 (1880.0MHz)	28.32
810 (1909.8MHz)	29.48

GPRS 850 band mode

Channel No.	Peak output power [dBm]
128 (824.2MHz)	26.44
190 (836.6MHz)	30.30
251 (848.8MHz)	26.82

GPRS 1900 band mode

Channel No.	Peak output power [dBm]
512 (1850.2MHz)	28.06
661 (1880.0MHz)	29.52
810 (1909.8MHz)	29.43

4.7 Conducted Spurious Emission

Specifications:	2.1051,22.917,24.238
Date of Tests	2011-03-24, 2011-05-18
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Operation Mode	TX on, channel 190 and 661 for GPRS mode 850 and 1900 band respectively.
Test Results:	Pass

Test equipment Used:

Asset Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
7805	EMI Test Receiver	R/S	ESIB26	100211	2012-01-12	Normal
7330	EMC Analyzer	Agilent	E7405A	US41160321	2011-08-22	Normal
---	Power spliter	Jie sai	---	1000132	2012-01-04	Normal
111835	Wireless Communications Test Set	R&S	CMU200	1100000802	2011-06-08	Normal

Limit Level Construction:

Part22:

According to Part 22.917(a), i.e., out of band emissions, 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, so the limit level is:

P(dBm) – (43 + 10 log(P)) dB= -13dBm

Part24:

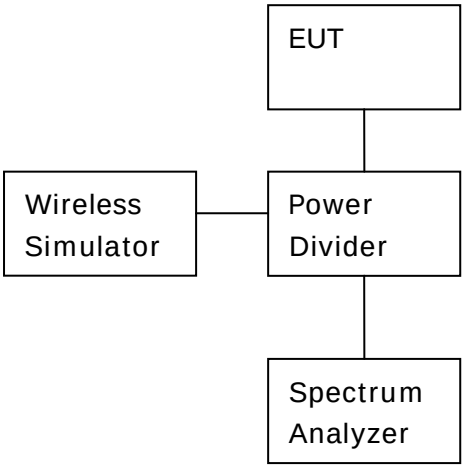
According to Part 24.238(a), i.e., out of band emissions, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB, so the limit level is:

P(dBm) – (43 + 10 log(P)) dB= -13dBm

Limits for Conducted spurious emissions(UE)	
Frequency range	**Limit Level /Resolution Bandwidth**
30 MHz to 20000 MHz	-13dBm/1MHz

Test Setup:

During the test, the EUT was controlled via the Wireless Communications Test Set to ensure max power transmission and proper modulation and measured by spectrum analyzer.



Test Method

The measurement was performed accordance with section 2.2.13 of ANSI/TIA-603-B-2002: *Land Mobile FM or PM Communications Equipment Measurement and Performance Standards*.

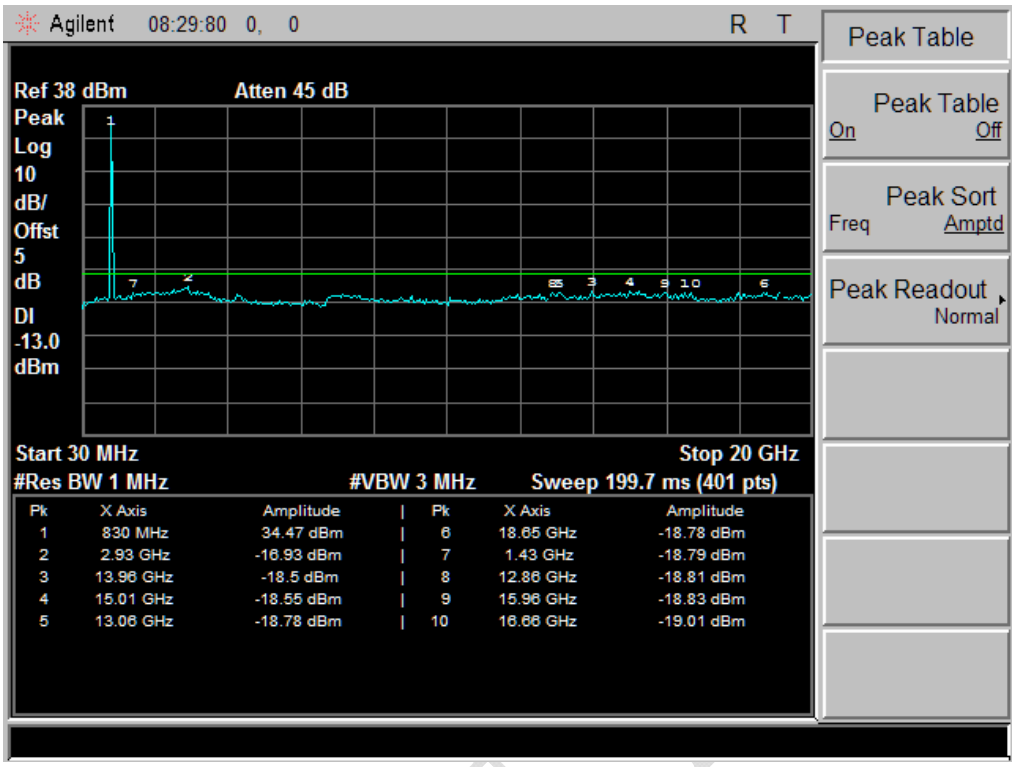
The following steps outline the procedure used to measure the conducted emissions from the EUT.

1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency.

Note:

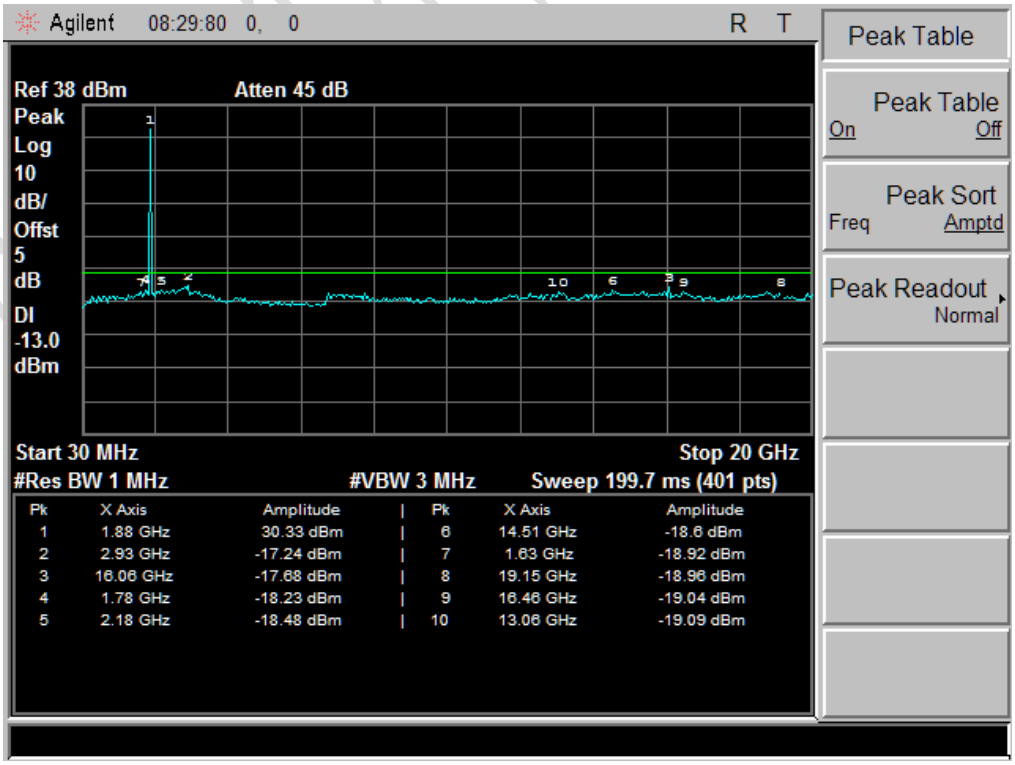
None

Graphical results for GSM mode:



GSM850 Channel 190

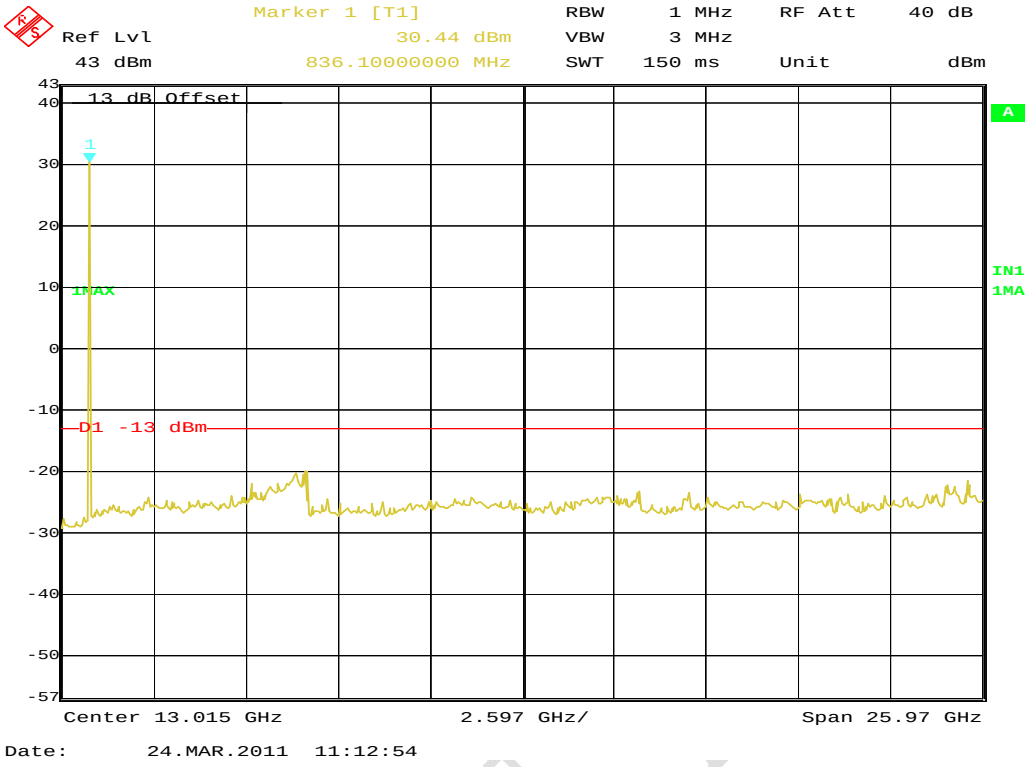
Note: 830 MHz is the EUT's operating frequency point.



GSM1900 Channel 661

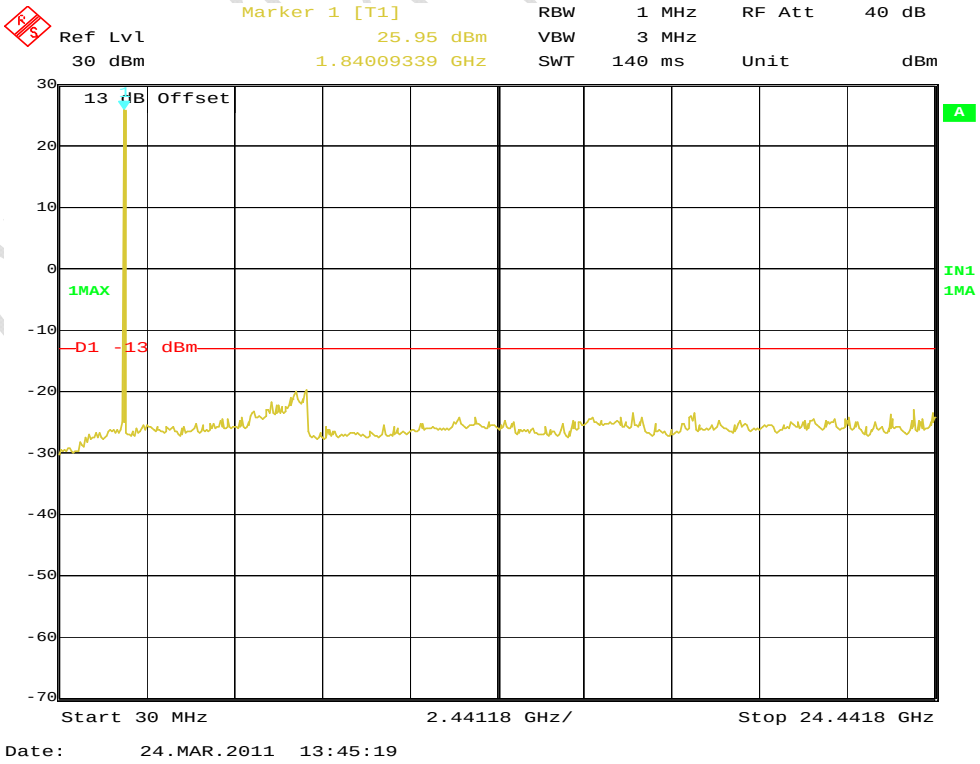
Note: 1880 MHz is the EUT's operating frequency point.

Graphical results for GPRS mode:



GPRS850 Channel 190

Note: 836.1 MHz is the EUT's operating frequency point.



GPRS1900 Channel 661

Note: 1840 MHz is the EUT's operating frequency point.

4.8 Band Edge

Specifications:	2.1051, 24.238, 2.1053, 22.917
Date of Tests	2011-03-24~2011-3-29, 2011-05-16
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Operation Mode	TX on, channel 128, 251, 512, and 810 for GSM and GPRS mode 850 and 1900 band respectively.
Test Results:	Pass

Test equipment Used:

Asset Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
7805	EMI Test Receiver	R/S	ESIB26	100211	2012-01-12	Normal
---	Power spliter	Jie sai	---	1000132	2012-01-04	Normal
111835	Wireless Communications Test Set	R&S	CMU200	1100000802	2011-06-08	Normal

Limit Level Construction:

Part22:

According to Part 22.917(a), i.e., out of band emissions, 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, so the limit level is:

P(dBm) – (43 + 10 log(P)) dB= -13dBm

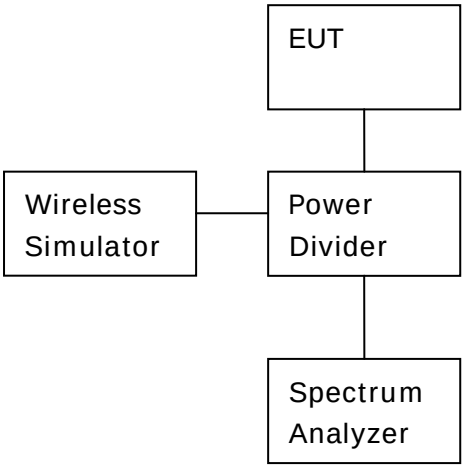
Part24:

According to Part 24.238(a), i.e., out of band emissions, 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, so the limit level is:

P(dBm) – (43 + 10 log(P)) dB= -13dBm

Test Setup:

During the test, the EUT was controlled via the Wireless Communications Test Set to ensure max power transmission and proper modulation and measured by spectrum analyzer.



Test Method

1) The EUT was coupled to the EMI test receiver analyzer mode and the base station simulator through a power divider. The lost of the cables the test system is calibrated to correct the readings.
2) The spectrum analyzer was set to Maxpeak Detector function and Maximum hold mode.
3) The resolution bandwidth of the spectrum analyzer was a little greater than 1% of the 26dB emission bandwidth.

Note: --

Test Results:

GSM 850 band mode:

Band-edge emission		
EUT Channel	Frequency [MHz]	Level [dBm]
128 left band edge (824.2MHz)	823.998	-14.04
251 right band edge (848.8MHz)	849.018	-13.73

GSM 1900 band mode:

Band-edge emission		
EUT Channel	Frequency [MHz]	Level [dBm]
512 left band edge (1850.2MHz)	1849.997	-13.54
810 right band edge (1909.8MHz)	1910.022	-14.92

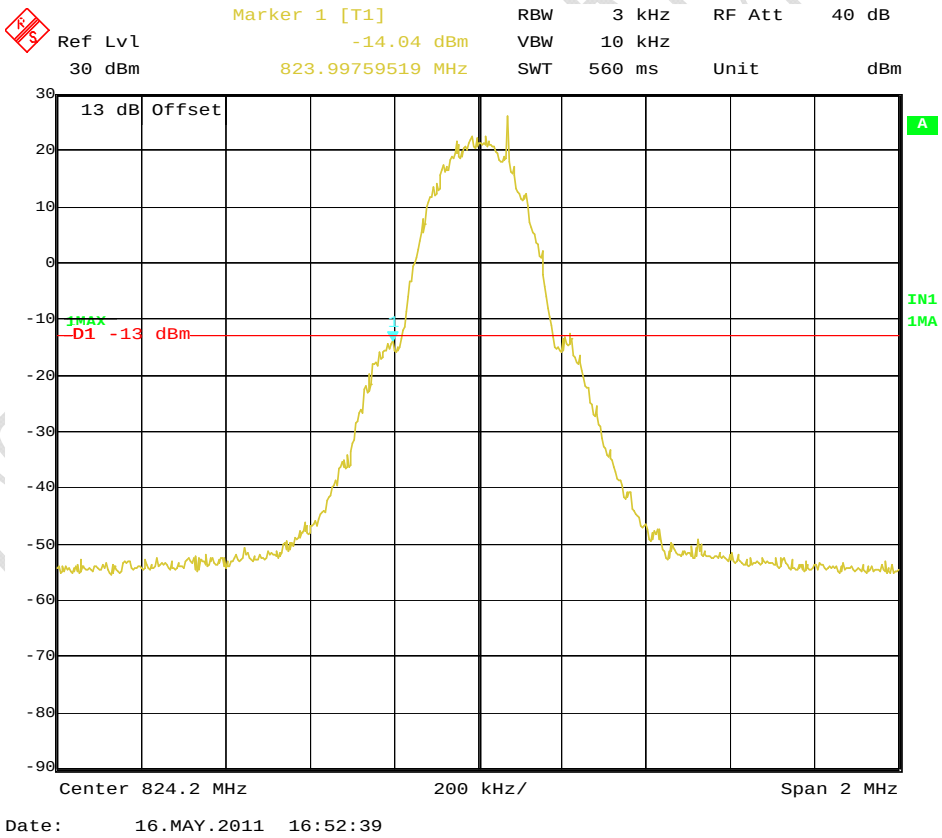
GPRS 850 band mode

Band-edge emission		
EUT Channel	Frequency [MHz]	Level [dBm]
128 left band edge (824.2MHz)	823.996	-17.54
251 right band edge (848.8MHz)	849.021	-14.80

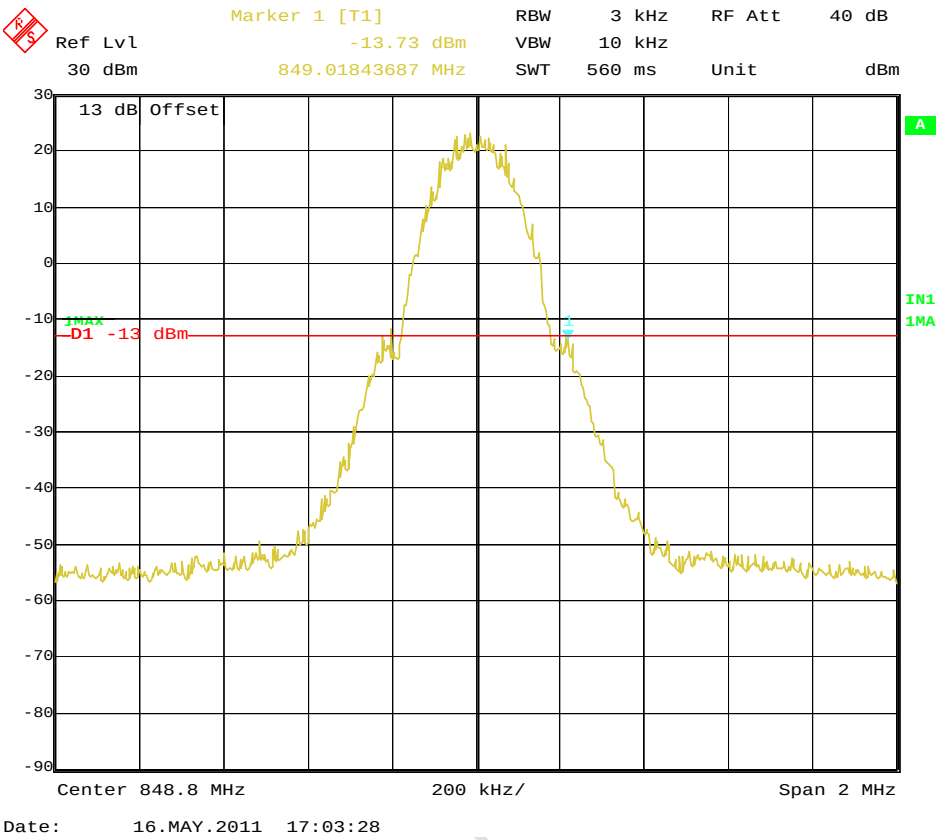
GPRS 1900 band mode

Band-edge emission		
EUT Channel	Frequency [MHz]	Level [dBm]
512 left band edge (1850.2MHz)	1849.999	-14.20
810 right band edge (1909.8MHz)	1910.021	-14.81

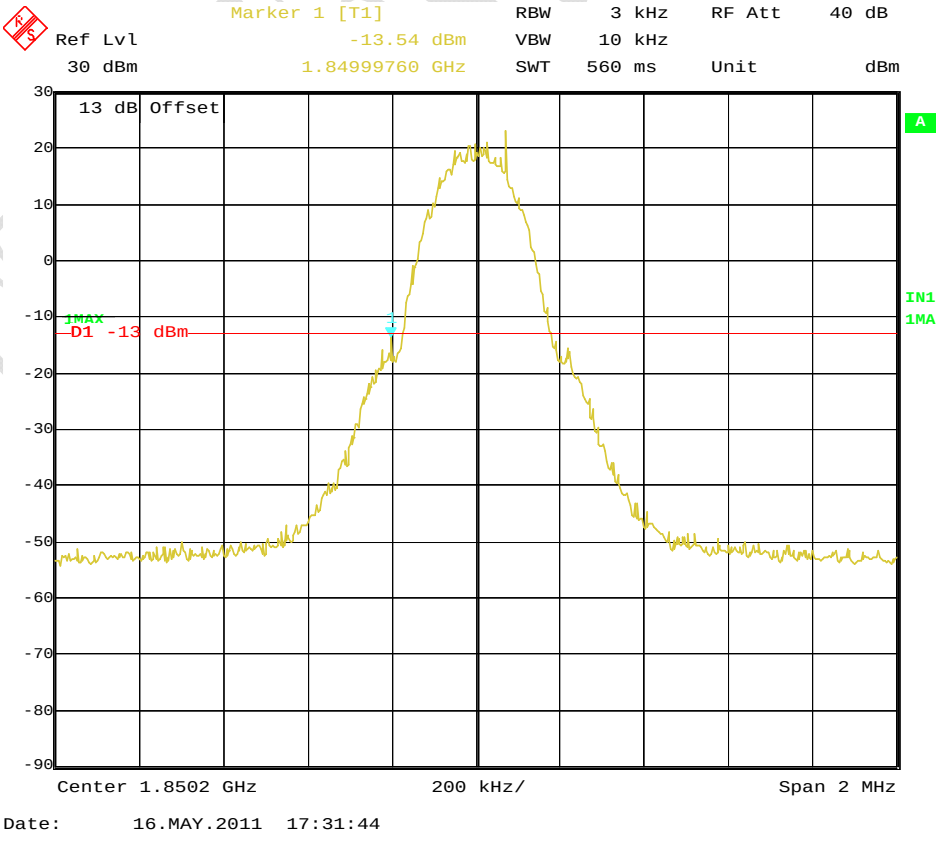
Graphical results for GSM mode:



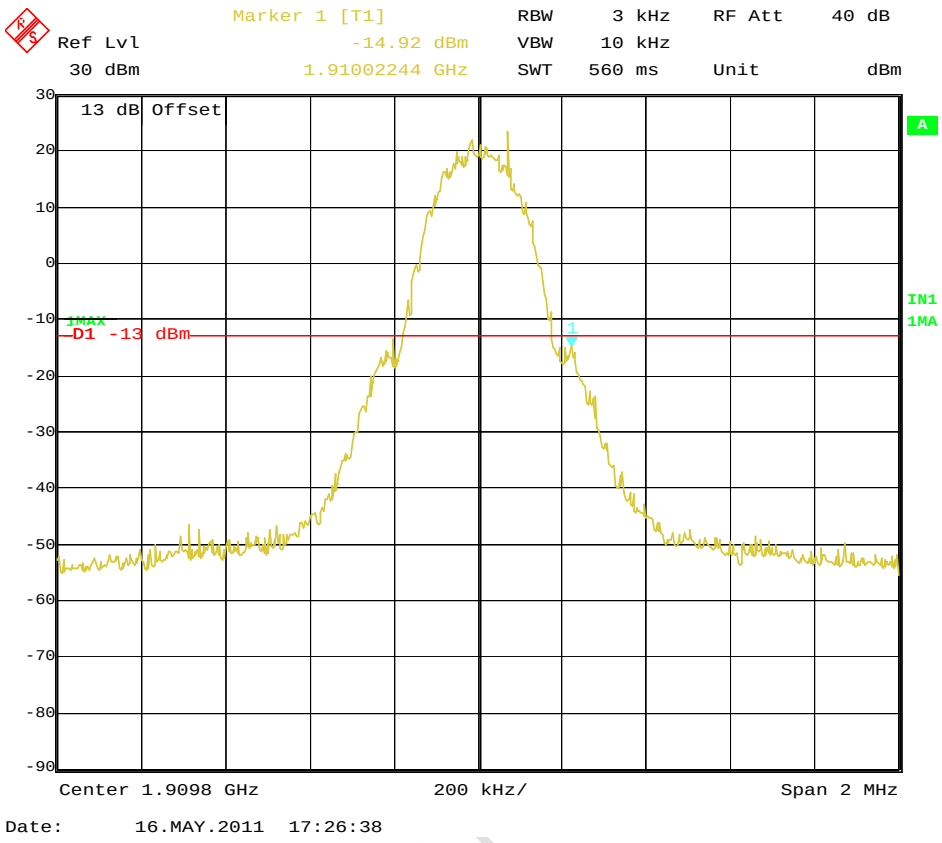
GSM850 Channel 128 Left band edge



GSM850 Channel 251 Right band edge

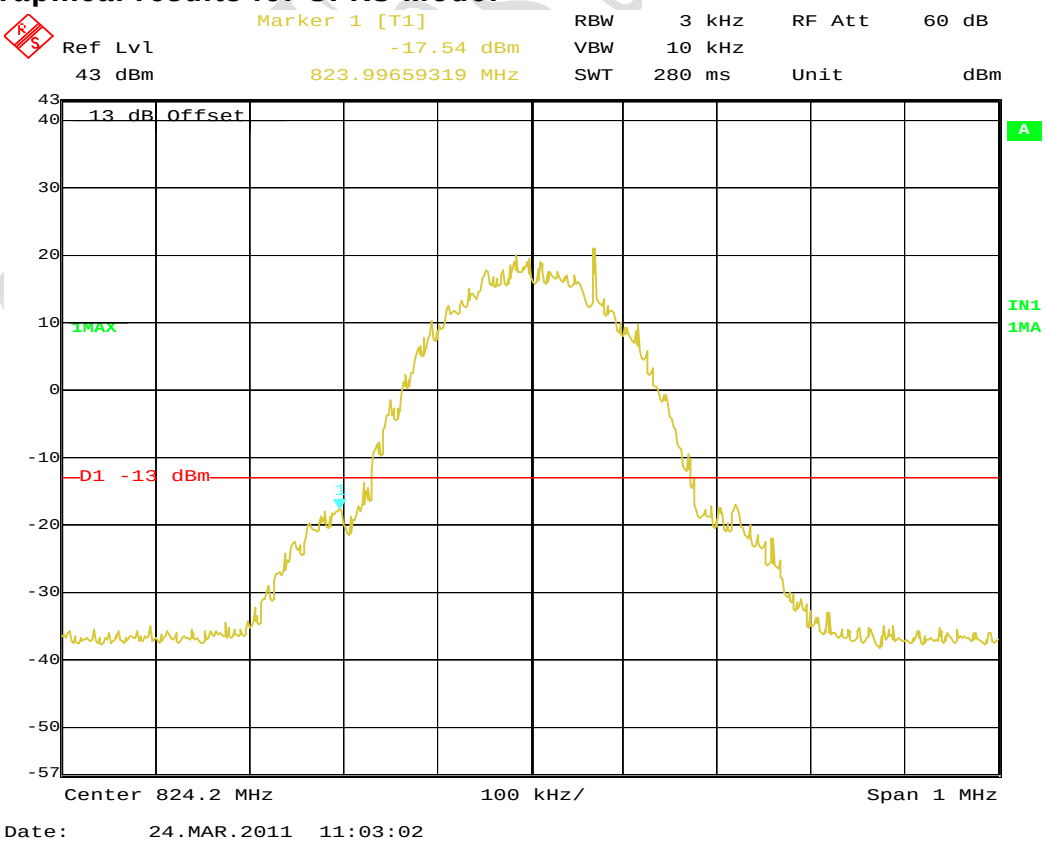


GSM1900 Channel 512 Left band edge

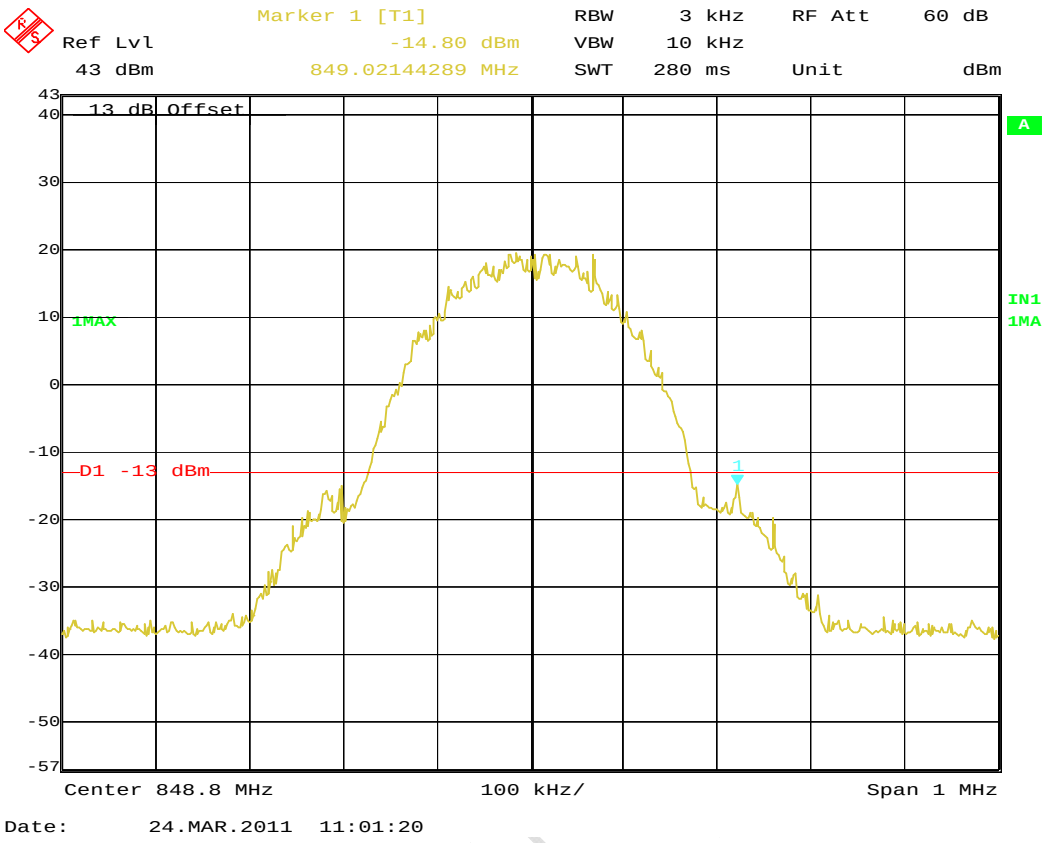


GSM1900 Channel 810 Right band edge

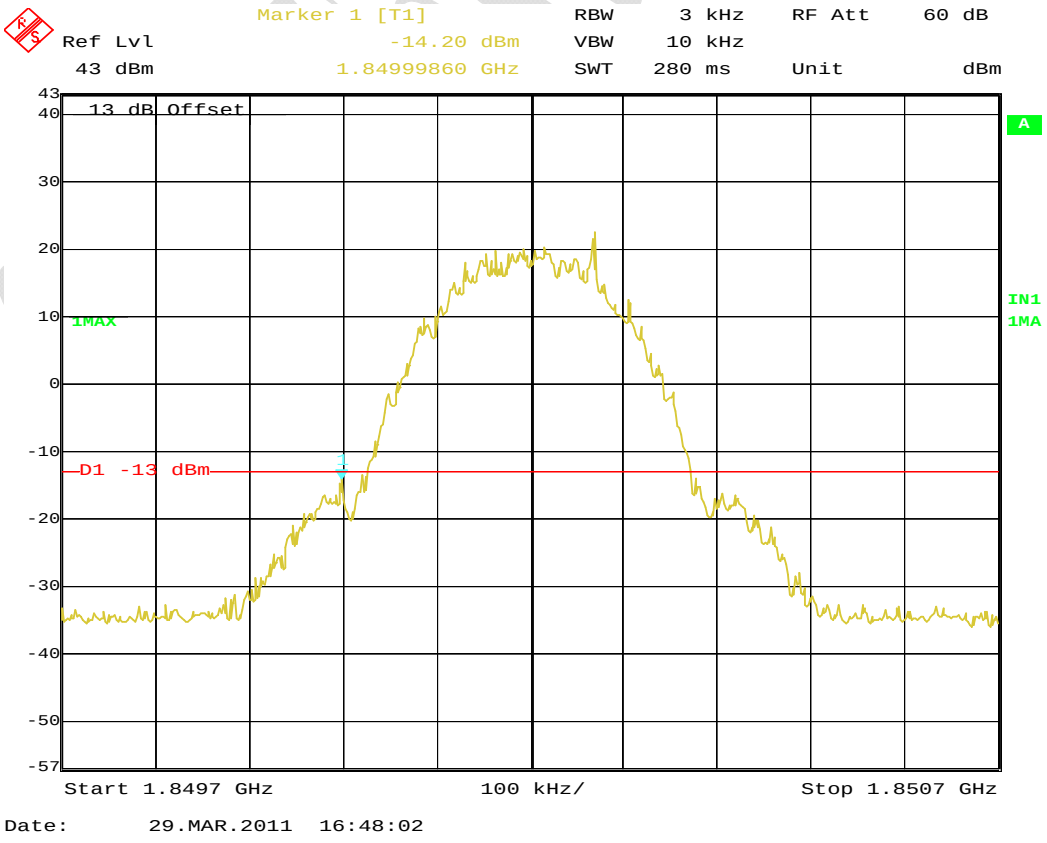
Graphical results for GPRS mode:



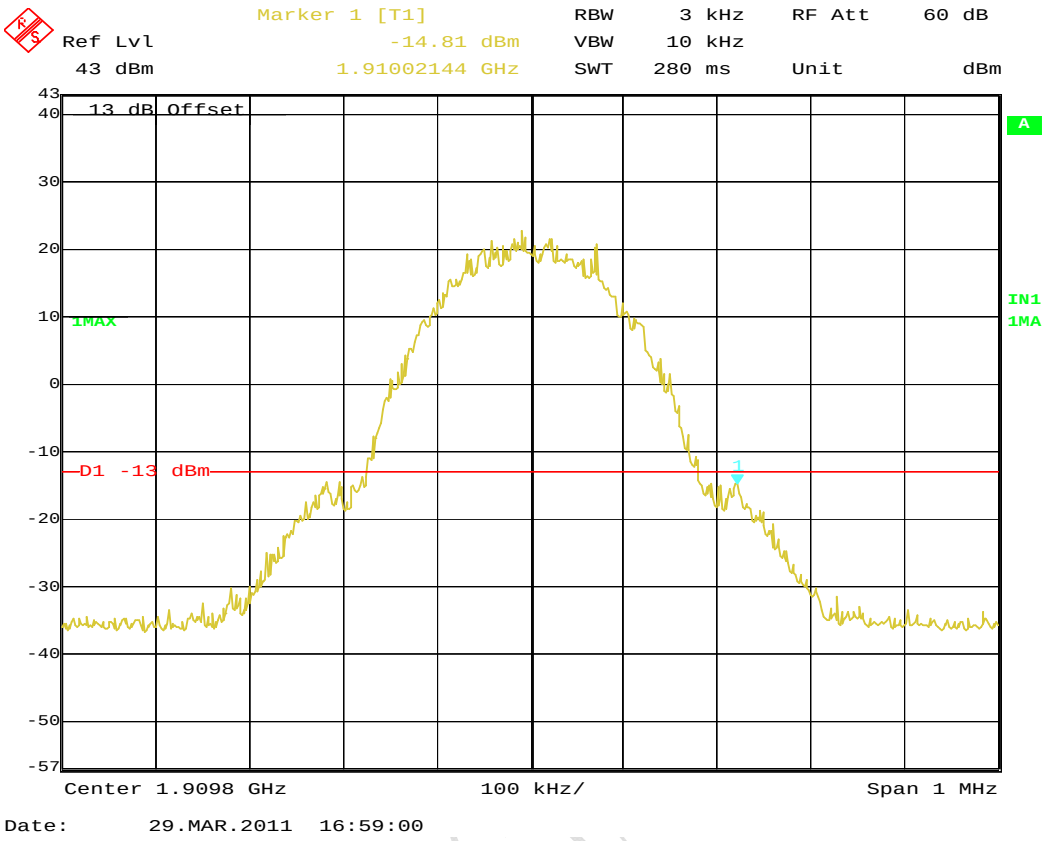
GPRS850 Channel 128 Left band edge



GPRS850 Channel 251 Right band edge



GPRS1900 Channel 512 Left band edge

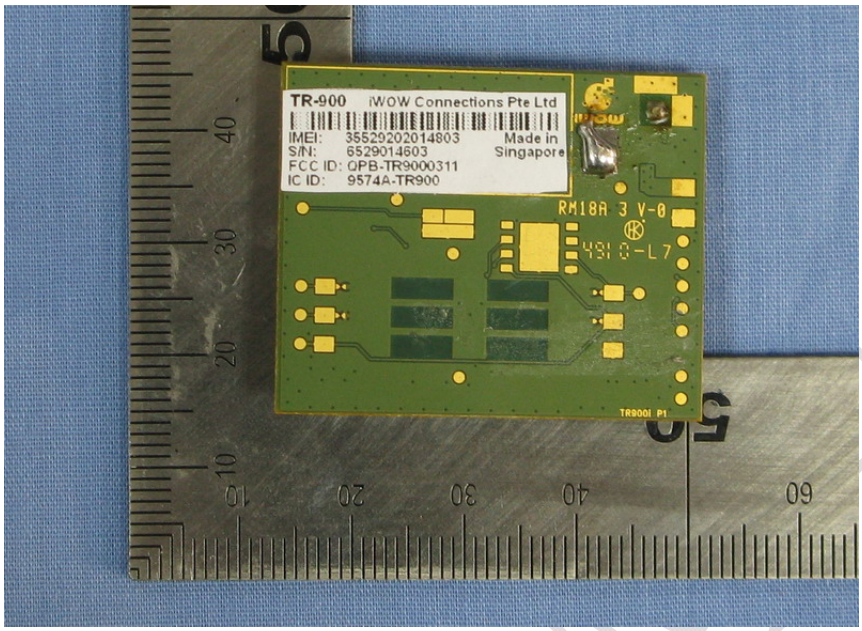


GPRS1900 Channel 810 Right band edge

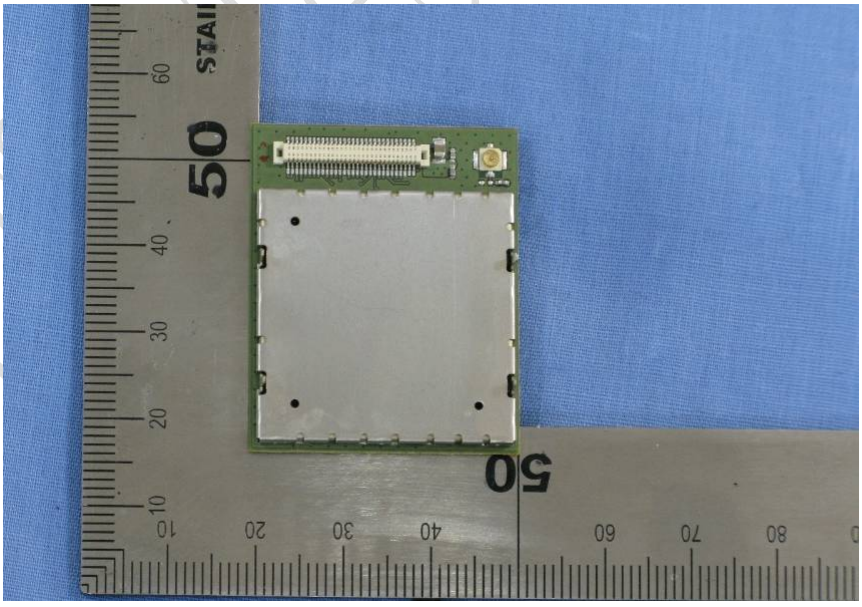
Annex A External Photos

NA

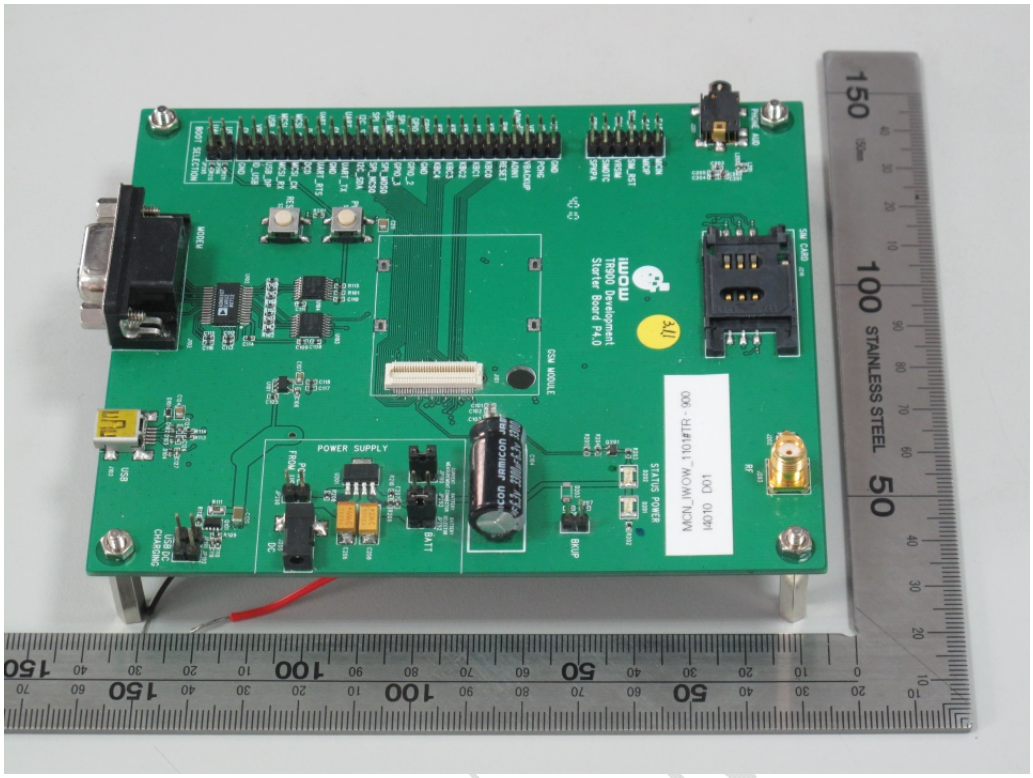
Annex B Internal Photos



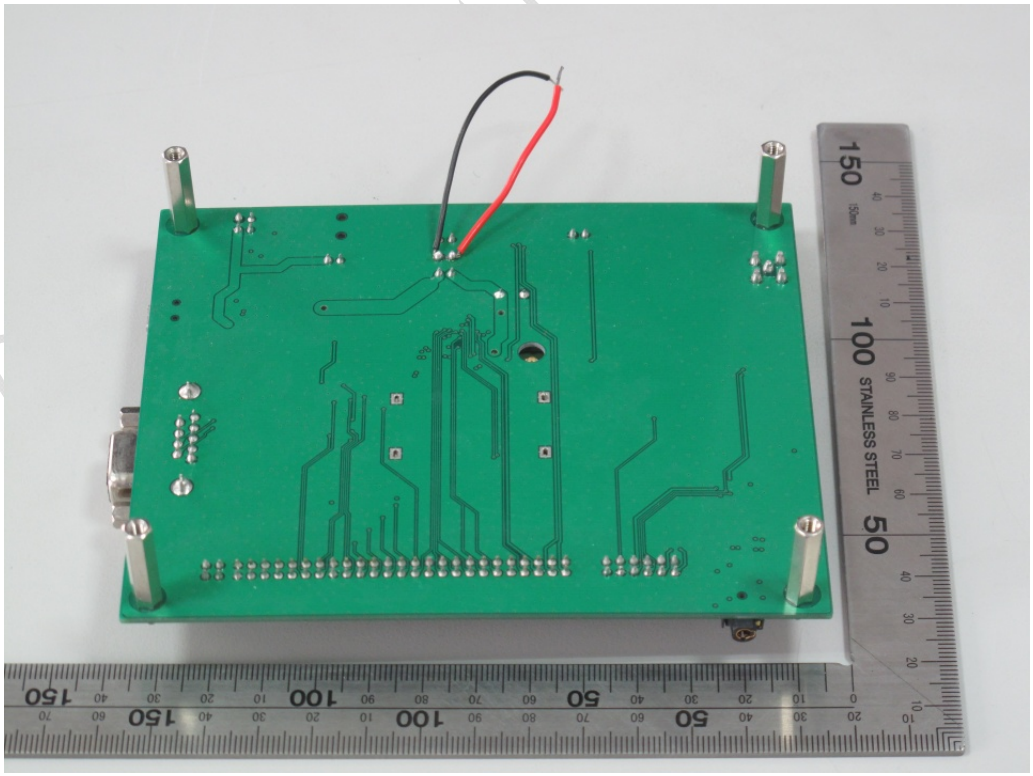
RF Module (face)



RF Module (back)



Main board (face)



Main board (back)

ANNEX C Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

The End of this Report