FCC RF Test Report

APPLICANT	:	**Motorola Mobility LLC**
EQUIPMENT	:	**Mobile Cellular Phone**
BRAND NAME	:	**Motorola**
MODEL NAME	:	**XT1922-1**
FCC ID	:	**IHDT56XB6**
STANDARD	:	**FCC 47 CFR Part 2, 22(H), 24(E)**
CLASSIFICATION	:	**PCS Licensed Transmitter Held to Ear (PCE)**

The product was received on Dec. 05, 2017 and testing was completed on Jan. 25, 2018. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI/TIA-603-E and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Kunshan) Inc., the test report shall not be reproduced except in full.

James Huang

Approved by: James Huang / Manager

TESTING
NVLAP LAB CODE 600155-0

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APPENDIX B. TEST RESULTS OF RADIATED TEST

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG7D0507-01A	Rev. 01	Initial issue of report	Feb. 01, 2018

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	Reporting Only	PASS	-
	§22.913(a)(2)	Effective Radiated Power	< 7 Watts	PASS	-
3.5	N/A	Peak-to-Average Ratio	< 13 dB	PASS	-
3.6	§2.1049 §22.917(b)	Occupied Bandwidth	Reporting Only	PASS	-
3.7	§2.1051 §22.917(a)	Band Edge Measurement	< 43+10log10(P[Watts])	PASS	-
3.8	§2.1051 §22.917(a)	Conducted Emission	< 43+10log10(P[Watts])	PASS	-
3.9	§2.1055 §22.355	Frequency Stability for Temperature & Voltage	< 2.5 ppm for Part 22H	PASS	-
4.4	§2.1053 §22.917(a)	Field Strength of Spurious Radiation	< 43+10log10(P[Watts])	PASS	Under limit 18.72 dB at 2510.000 MHz

1 General Description

1.1 Applicant

Motorola Mobility LLC
222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

1.2 Manufacturer

Motorola Mobility LLC
222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT1922-1
FCC ID	IHDT56XB6
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/DC-HSDPA/ HSPA+(16QAM Uplink is not supported)/LTE WLAN 2.4GHz 802.11b/g/n HT20 Bluetooth v3.0 + EDR/Bluetooth v4.0 LE/ Bluetooth v4.1 LE/Bluetooth v4.2 LE
IMEI Code	Conducted: 351859090027917/351859090027925 Radiation: 351859090027230/351859090027248
HW Version	DVT1B
SW Version	fastboot_aljeter_oem_userdebug_8.0.0_OPP27.38_1080_in tcfg-test-keys
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. The test results of GSM1900 and WCDMA Band II were consistent with FCC ID: IHDT56XB5, please refer to section 1.7 for the details of data-reuse method. Only GSM850 and WCDMA Band V is full test according to the difference.
3. There are two types of EUT sample 1 and sample 2, the differences between two samples are only for SIM slot, the sample 1 is dual SIM slot, the sample 2 is single SIM slot. According to the difference, we chose sample 1 to evaluate for full test.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	**GSM/GPRS/EDGE:** 850: 824.2 MHz ~ 848.8 MHz 1900: 1850.2 MHz ~ 1909.8MHz **WCDMA:** Band V: 826.4 MHz ~ 846.6 MHz Band II: 1852.4 MHz ~ 1907.6 MHz
Rx Frequency	**GSM/GPRS/EDGE:** 850: 869.2 MHz ~ 893.8 MHz 1900: 1930.2 MHz ~ 1989.8 MHz **WCDMA:** Band V: 871.4 MHz ~ 891.6 MHz Band II: 1932.4 MHz ~ 1987.6 MHz
Maximum Output Power to Antenna	**GSM/GPRS/EDGE:** 850: 32.80 dBm **WCDMA:** Band V: 23.22 dBm
Antenna Type	LDS Antenna
Antenna Gain	Cellular Band: -3.05 dBi
Type of Modulation	GSM: GMSK GPRS: GMSK EDGE: GMSK / 8PSK WCDMA : BPSK (Uplink) HSDPA/DC-HSDPA : QPSK (Uplink) HSUPA : QPSK (Uplink) HSPA+ : 16QAM(Uplink is not supported) DC-HSDPA : 64QAM

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Specification of Accessory

Specification of Accessory				
AC Adapter 1(US)	**Brand Name**	Motorola (Salom)	**Model Name**	SC-22 SPN5970A
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
AC Adapter 1(EU)	**Brand Name**	Motorola (Salom)	**Model Name**	SC-23 SPN5971A
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
AC Adapter 1(UK)	**Brand Name**	Motorola (Salom)	**Model Name**	SC-24 SPN5972A
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
AC Adapter 1(IN)	**Brand Name**	Motorola (Salom)	**Model Name**	SC-25 SPN5973A
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
AC Adapter 1(AU)	**Brand Name**	Motorola (Salom)	**Model Name**	SC-26 SPN5974A
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
AC Adapter 1(AR)	**Brand Name**	Motorola (Salom)	**Model Name**	SC-27 SPN5975A
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
AC Adapter 1(BR)	**Brand Name**	Motorola (Salom)	**Model Name**	SC-28 SPN5976A
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
AC Adapter 1(BR)	**Brand Name**	Motorola (Salom)	**Model Name**	SC-28 SPN5997A
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
AC Adapter 2(US)	**Brand Name**	Motorola (Chenyang)	**Model Name**	SC-22 SPN5993A
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
AC Adapter 2(EU)	**Brand Name**	Motorola (Chenyang)	**Model Name**	SC-23 SPN5989A
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
AC Adapter 2(UK)	**Brand Name**	Motorola (Chenyang)	**Model Name**	SC-24 SPN5990A
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
AC Adapter 2(IN)	**Brand Name**	Motorola (Chenyang)	**Model Name**	SC-25 SPN5991A
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
AC Adapter 2(AU)	**Brand Name**	Motorola (Chenyang)	**Model Name**	SC-26 SPN5988A
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
AC Adapter 2(AR)	**Brand Name**	Motorola (Chenyang)	**Model Name**	SC-27 SPN5992A
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		

Battery	**Brand Name**	Lenovo (SCUD)	**Model Name**	BL270
	Power Rating	3.85/4.4Vdc,4000mAh	Type	Li-ion
Earphone	**Brand Name**	Motorola(NEW LEADER)	**Model Name**	NLD-EM307E-02SF
	Signal Line	1.2 meter, non-shielded cable, without ferrite core		
USB Cable	**Brand Name**	Motorola (Saibao)	**Model Name**	SLQ-A077A
	Signal Line	1.0 meter, shielded cable, without ferrite core		

1.7 Re-use of Measured Data

1.7.1 Introduction Section

This application re-uses data collected on a similar device. The subject device of this application (Model: XT1922-1, FCC ID: IHDT56XB6) is electrically identical to the reference device (Model: XT1922-5, XT1922-4, FCC ID: IHDT56XB5) for the portions of the circuitry corresponding to the data being re-used, as treated by KDB Publication 178919 D01.

1.7.2 Difference Section

For details concerning the similarity with respect to component placement, mechanical/electrical design etc., some difference of population/depopulation to enable support of different cellular bands, please refer to the Product Equality Declaration.

The re-used RF data includes the following bands provided in Appendix D (Sporton RF Report No. FG7D0507A for the reference device Model: XT1922-5, XT1922-4, FCC ID: IHDT56XB5):

1.7.3 Spot Check Verification Data Section

In order to confirm hardware similarity of the subject device with the reference device, spot check measurements were performed on the subject device for radiated spurious emission, Conducted Band-edge and Conducted spurious emission, the test result of GSM 1900/WCDMA Band II were consistent with FCC ID: IHDT56XB5, GSM850 and WCDMA Band V is full test according to the difference.

Assertions concerning the similarity of these devices are based on representations by the applicant. The applicant accepts full responsibility for the validity of the similarity claim, and for the determination that verification test data are sufficient to support it.

1.7.4 Reference detail Section:

Equipment Class	Reference FCC ID	Folder Test/RF Exposure	Report Title/Section
PCE (2G/3G)	IHDT56XB5	Part22H.24E.27L (FG7D0507A)	All sections applicable for GSM 1900/WCDMA Band II

1.8 Maximum ERP Power, Frequency Tolerance, and Emission Designator

FCC Rule	System	Type of Modulation	Maximum ERP (W)	Frequency Tolerance (ppm)	Emission Designator
Part 22H	GSM850 GSM	GMSK	0.5754	0.0299 ppm	242KGXW
Part 22H	GSM850 EDGE class 8	8PSK	0.1384	0.0359 ppm	243KG7W
Part 22H	WCDMA Band V RMC 12.2Kbps	BPSK	0.0634	0.0359 ppm	4M12F9W

1.9 Testing Location

Sporton International (Kunshan) Inc. is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600155-0) and the FCC designation No. is CN5013.

Test Site	Sporton International (Kunshan) Inc.		
Test Site Location	No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335 China TEL: +86-512-57900158 FAX: +86-512-57900958		
Test Site No.	**Sporton Site No.**		**FCC Test Firm Registration No.**
	TH01-KS	03CH03-KS	630927

Note: The test site complies with ANSI C63.4 2014 requirement.

1.10 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 2, 22(H), 24(E)
- ANSI/TIA-603-E
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01

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.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas. License Digital Systems v03 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:

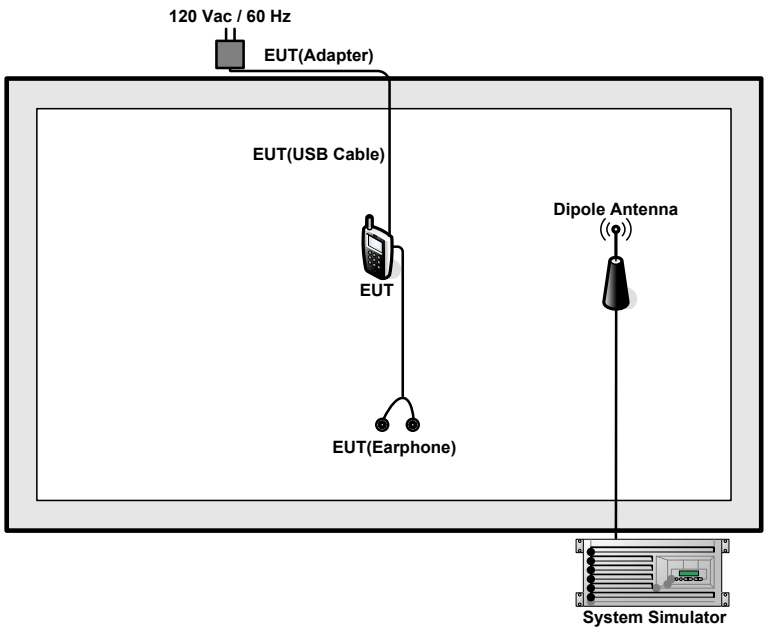
1. 30 MHz to 10th harmonic for GSM850 and WCDMA Band V.

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 ■ EDGE class 8 Link	■ GSM Link ■ EDGE class 8 Link
WCDMA Band V	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	DC Power Supply	GW INSTEK	GPS-3030D	N/A	N/A	Unshielded, 1.8 m

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between RF conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level will be exactly the RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

The following shows an offset computation example with RF cable loss 4.4 dB and a 10dB attenuator.

Example :

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 4.4 + 10 = 14.4 (dB)

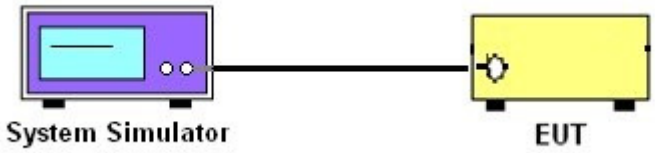
3 Conducted Test Result

3.1 Measuring Instruments

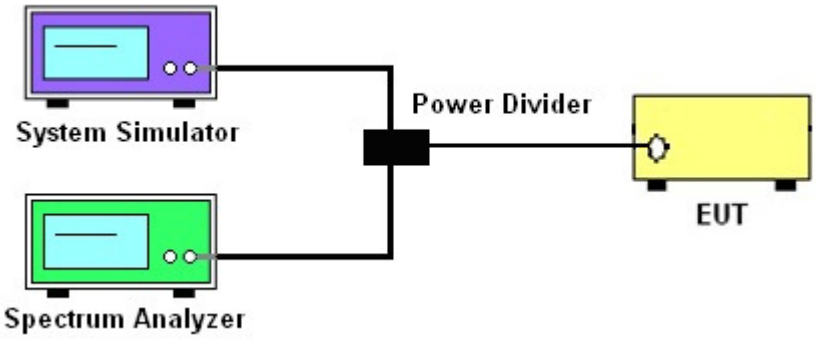
See list of measuring instruments of this test report.

3.2 Test Setup

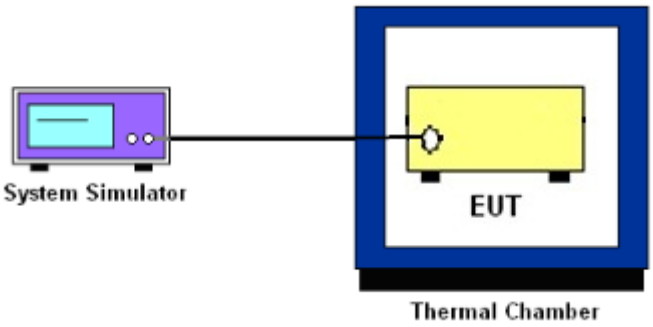
3.2.1 Conducted Output Power



3.2.2 Peak-to-Average Ratio, Occupied Bandwidth, Conducted Band-Edge and Conducted Spurious Emission



3.2.3 Frequency Stability



3.3 Test Result of Conducted Test

Please refer to Appendix A.

3.4 Conducted Output Power and ERP

3.4.1 Description of the Conducted Output Power and ERP

A system simulator was used to establish communication with the EUT. Its parameters were set to enforce EUT transmitting at the maximum power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

The ERP of mobile transmitters must not exceed 7 Watts for GSM850 and WCDMA Band V.

According to KDB 412172 D01 Power Approach,

EIRP = $P_T + G_T – L_C$, ERP = EIRP -2.15, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

3.4.2 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure the maximum burst average power for GSM and maximum average power for other modulation signal.

3.5 Peak-to-Average Ratio

3.5.1 Description of the PAR Measurement

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

3.5.2 Test Procedures

1. The testing follows FCC KDB 971168 D01 v03 Section 5.7.1.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. Set EUT to transmit at maximum output power.
4. When the duty cycle is less than 98%, then signal gating will be implemented on the spectrum analyzer by triggering from the system simulator.
5. Set the CCDF (Complementary Cumulative Distribution Function) option of the spectrum analyzer.

Record the maximum PAPR level associated with a probability of 0.1%.

3.6 99% Occupied Bandwidth and 26dB Bandwidth Measurement

3.6.1 Description of 99% Occupied Bandwidth and 26dB Bandwidth Measurement

The 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 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

3.6.2 Test Procedures

1. The testing follows FCC KDB 971168 v03 Section 4.2.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
4. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
5. Set the detection mode to peak, and the trace mode to max hold.
6. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace. (this is the reference value)
7. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
8. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “–X dB down amplitude” determined in step 6. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
9. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

3.7 Conducted Band Edge

3.7.1 Description of Conducted Band Edge Measurement

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.

3.7.2 Test Procedures

1. The testing follows FCC KDB 971168 D01 v03 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.

3.8 Conducted Spurious Emission

3.8.1 Description of Conducted Spurious Emission Measurement

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.

3.8.2 Test Procedures

1. The testing follows FCC KDB 971168 D01 v03 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.

3.9 Frequency Stability

3.9.1 Description of Frequency Stability Measurement

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.

3.9.2 Test Procedures for Temperature Variation

1. The testing follows FCC KDB 971168 D01 v03 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°C 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°C steps up to 50°C. 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.

3.9.3 Test Procedures for Voltage Variation

1. The testing follows FCC KDB 971168 D01 v03 Section 9.0.
2. The EUT was placed in a temperature chamber at 20±5° C and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
4. The variation in frequency was measured for the worst case.

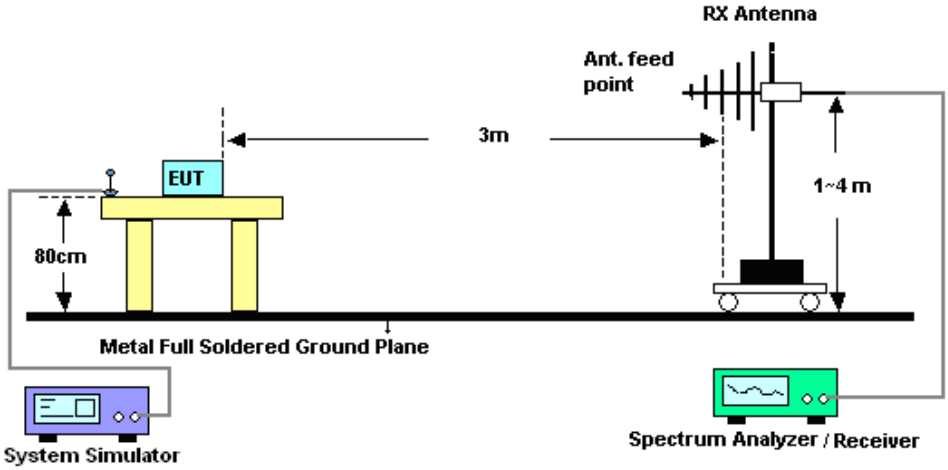
4 Radiated Test Items

4.1 Measuring Instruments

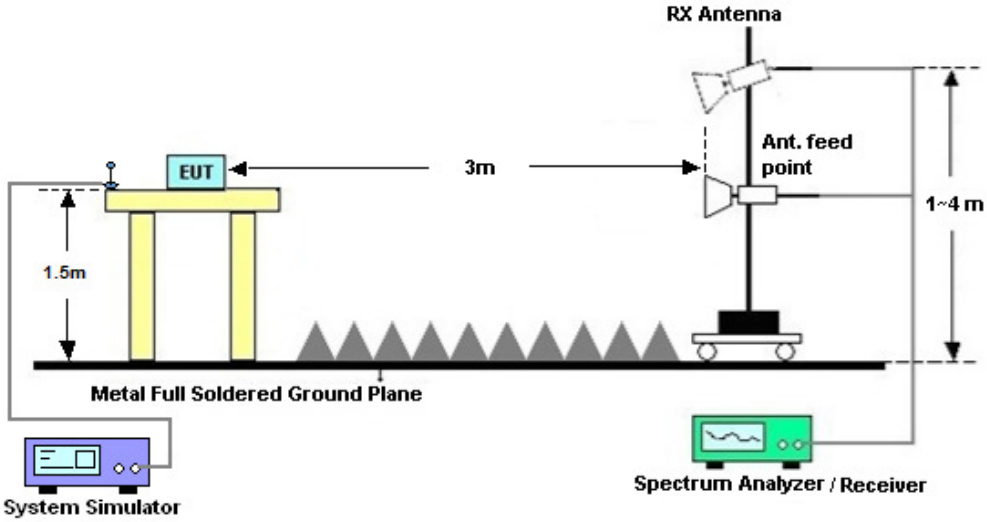
See list of measuring instruments of this test report.

4.2 Test Setup

4.2.1 For radiated test from 30MHz to 1GHz



4.2.2 For radiated test above 1GHz



4.3 Test Result of Radiated Test

Please refer to Appendix B.

4.4 Field Strength of Spurious Radiation Measurement

4.4.1 Description of Field Strength of Spurious Radiated Measurement

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.

4.4.2 Test Procedures

1. The testing follows FCC KDB 971168 D01 v03 Section 5.8 and ANSI/TIA-603-E Section 2.2.12.
2. The EUT was placed on a rotatable wooden table 0.8 meters for frequency below 1GHz and 1.5 meter for frequency above 1GHz above the ground.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical polarizations.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
9. Taking the record of output power at antenna port.
10. Repeat step 7 to step 8 for another polarization.
11. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
12. ERP (dBm) = EIRP - 2.15
13. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
14. 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.

5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Aug. 08, 2017	Dec. 25, 2017~ Jan. 03, 2018	Aug. 07, 2018	Conducted (TH01-KS)
Radio communication analyzer	Anritsu	MT8820C	6201300652	2G/3G/LTE_ full band	Aug. 08, 2017	Dec. 25, 2017~ Jan. 03, 2018	Aug. 07, 2018	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Oct. 12, 2017	Dec. 25, 2017~ Jan. 03, 2018	Oct. 11, 2018	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz~44GHz	Apr. 18, 2017	Jan. 25, 2018	Apr. 17, 2018	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	35406	25MHz~2GHz	Apr. 22, 2017	Jan. 25, 2018	Apr. 21, 2018	Radiation (03CH03-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1356	1GHz~18GHz	Apr. 22, 2017	Jan. 25, 2018	Apr. 21, 2018	Radiation (03CH03-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Feb. 15, 2017	Jan. 25, 2018	Feb. 14, 2018	Radiation (03CH03-KS)
Amplifier	com-power	PA-103A	161069	1MHz~1000MHz / 32 dB	Apr. 18, 2017	Jan. 25, 2018	Apr. 17, 2018	Radiation (03CH03-KS)
high gain Amplifier	MITEQ	AMF-7D-00 101800-30-1 0P	2025788	1GHz~18GHz	Apr. 18, 2017	Jan. 25, 2018	Apr. 17, 2018	Radiation (03CH03-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Oct. 12, 2017	Jan. 25, 2018	Oct. 11, 2018	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Jan. 25, 2018	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Jan. 25, 2018	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Jan. 25, 2018	NCR	Radiation (03CH03-KS)

NCR: No Calibration Required

6 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.8dB

Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.3dB

Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)

Conducted Power (*Unit: dBm)			
Band	GSM850		
Channel	128	189	251
Frequency	824.2	836.4	848.8
GSM	32.80	32.78	32.67
GPRS class 8	32.78	32.77	32.65
GPRS class 10	29.31	29.37	29.21
GPRS class 11	27.31	27.32	27.40
GPRS class 12	25.96	25.92	25.78
EGPRS class 8	26.61	26.51	26.37
EGPRS class 10	26.47	26.37	26.26
EGPRS class 11	25.10	24.91	24.76
EGPRS class 12	23.57	23.42	23.16

Conducted Power (*Unit: dBm)			
Band	WCDMA Band V		
Channel	4132	4182	4233
Frequency	826.4	836.4	846.6
AMR 12.2Kbps	23.10	23.20	23.02
RMC 12.2Kbps	23.11	23.22	23.04
HSDPA Subtest-1	21.71	21.76	21.62
HSDPA Subtest-2	21.81	21.91	21.73
HSDPA Subtest-3	21.29	21.40	21.23
HSDPA Subtest-4	21.28	21.40	21.12
DC-HSDPA Subtest-1	21.67	21.71	21.59
DC-HSDPA Subtest-2	21.66	21.76	21.58
DC-HSDPA Subtest-3	21.61	21.36	21.52
DC-HSDPA Subtest-4	21.29	21.35	21.59
HSUPA Subtest-1	21.78	21.40	21.50
HSUPA Subtest-2	20.33	20.76	20.28
HSUPA Subtest-3	20.54	20.87	20.48
HSUPA Subtest-4	20.62	20.74	20.47
HSUPA Subtest-5	21.70	21.80	21.60

ERP

GSM850 (GT - LC= -3.05 dBi)			
Channel	128	189	251
	(Low)	(Mid)	(High)
Frequency (MHz)	824.2	836.4	848.8
Conducted Power (dBm)	32.80	32.78	32.67
Conducted Power (Watts)	1.9055	1.8967	1.8493
ERP(dBm)	27.60	27.58	27.47
ERP(Watts)	0.5754	0.5728	0.5585

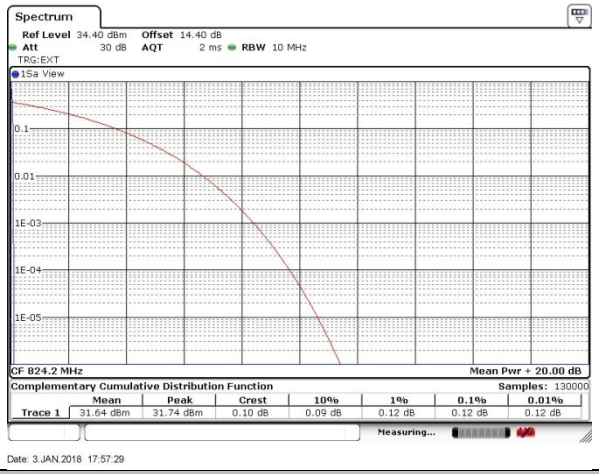
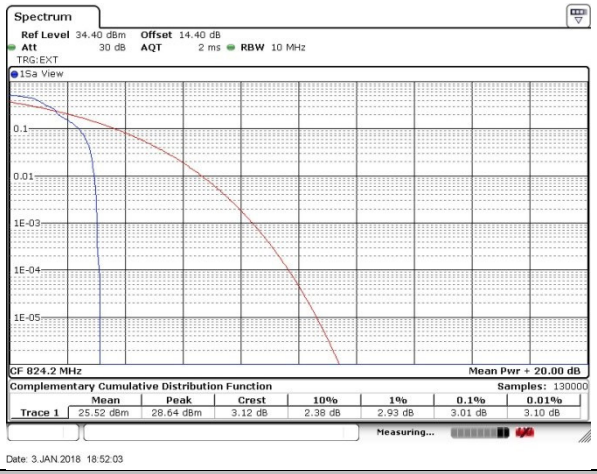
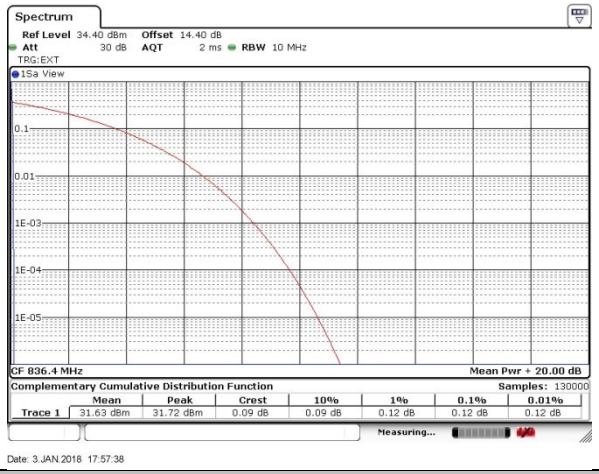
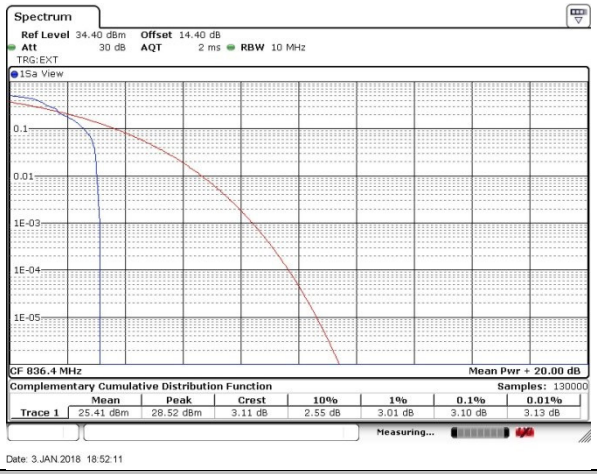
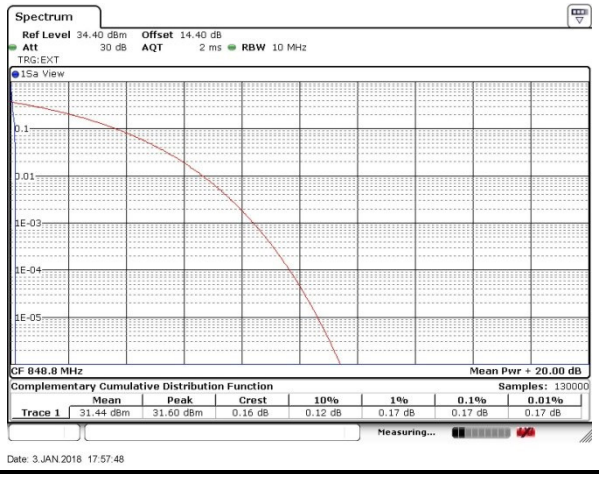
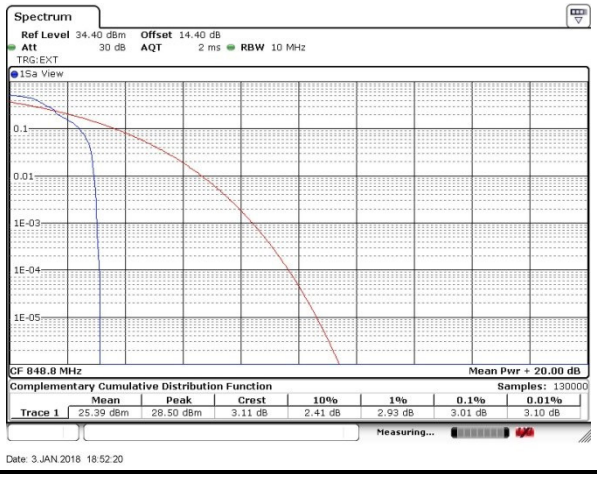
EDGE850 (G_T - L_C=-3.05dBi)			
Channel	128	189	251
	(Low)	(Mid)	(High)
Frequency (MHz)	824.2	836.4	848.8
Conducted Power (dBm)	26.61	26.51	26.37
Conducted Power (Watts)	0.4581	0.4477	0.4335
ERP(dBm)	21.41	21.31	21.17
ERP(Watts)	0.1384	0.1352	0.1309

WCDMA Band V (G_T - L_C= -3.05dBi)			
Channel	4132	4182	4233
	(Low)	(Mid)	(High)
Frequency (MHz)	826.4	836.4	846.6
Conducted Power (dBm)	23.11	23.22	23.04
Conducted Power (Watts)	0.2046	0.2099	0.2014
ERP(dBm)	17.91	18.02	17.84
ERP(Watts)	0.0618	0.0634	0.0608

Peak-to-Average Ratio

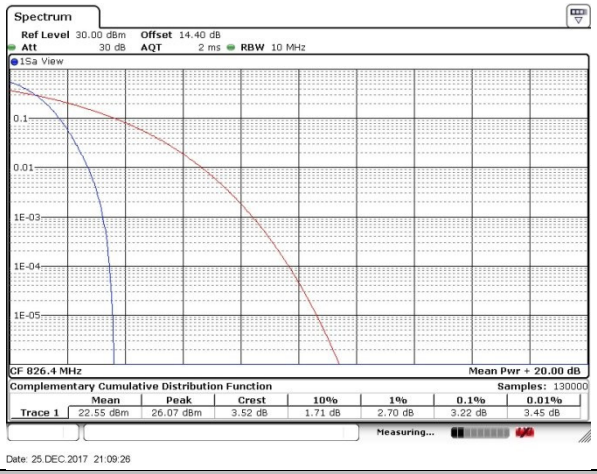
Mode	GSM850(dB)		Limit: 13dB
Mod.	GSM	EDGE class 8	Result
Lowest CH	0.12	3.01	PASS
Middle CH	0.12	3.10	
Highest CH	0.17	3.01	

Mode	WCDMA Band V(dB)	Limit: 13dB
Mod.	RMC 12.2Kbps	Result
Lowest CH	3.22	PASS
Middle CH	3.16	
Highest CH	3.16	

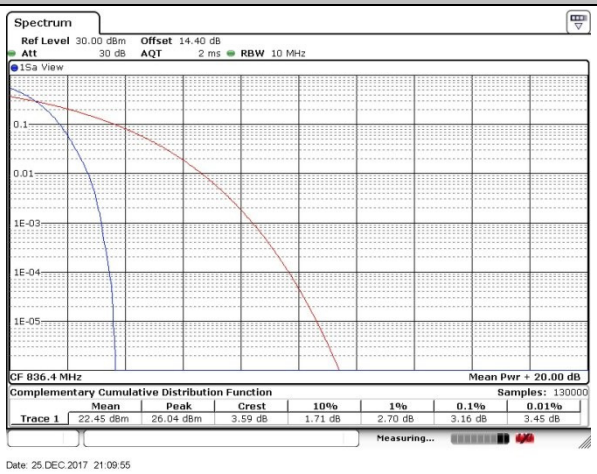
GSM850 (GSM)	GSM850 (EDGE class 8)
Lowest Channel	**Lowest Channel**
	
Middle Channel	**Middle Channel**
	
Highest Channel	**Highest Channel**
	

WCDMA Band V (RMC 12.2Kbps)

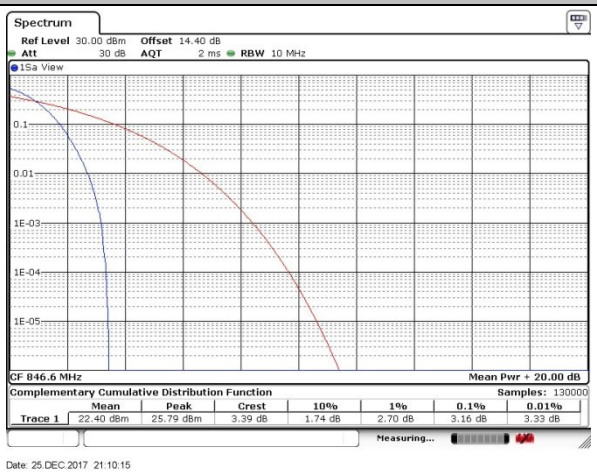
Lowest Channel



Middle Channel



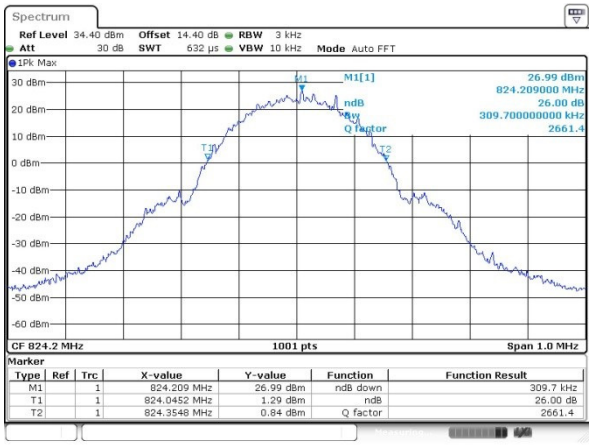
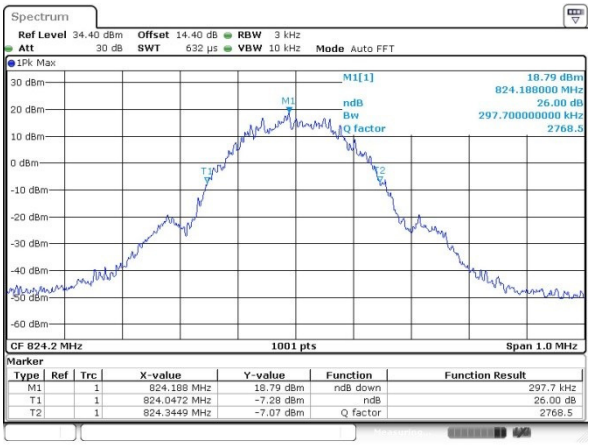
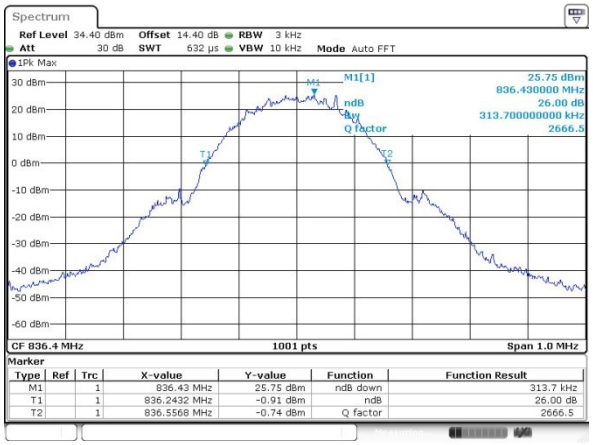
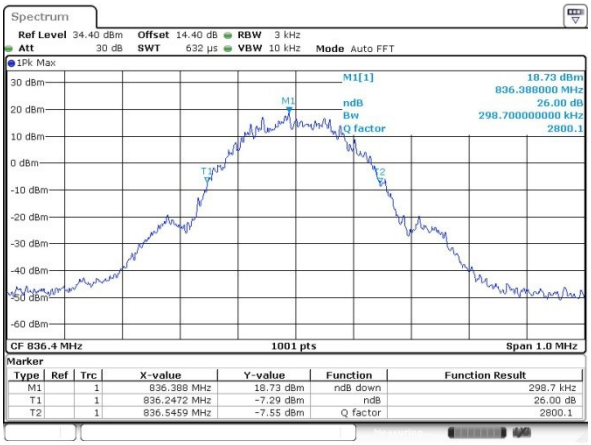
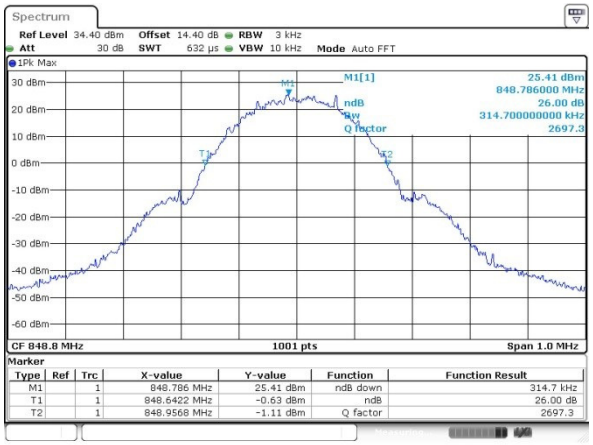
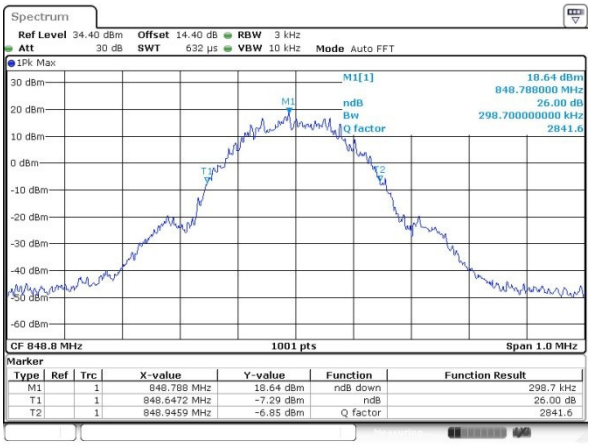
Highest Channel



26dB Bandwidth

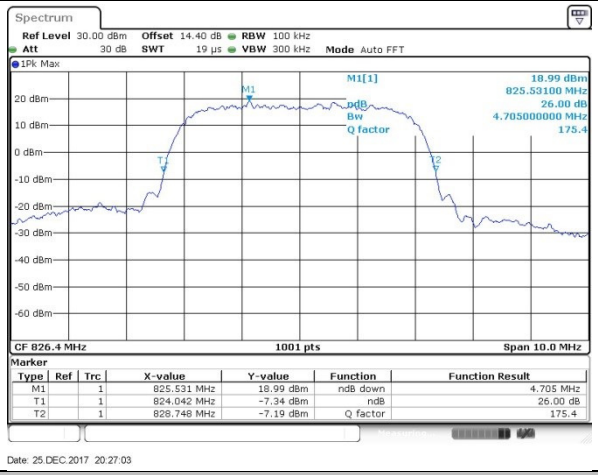
Mode	GSM850(MHz)	
Mod.	GSM	EDGE class 8
Lowest CH	0.310	0.298
Middle CH	0.314	0.299
Highest CH	0.315	0.299

Mode	WCDMA Band V(MHz)
Mod.	RMC 12.2Kbps
Lowest CH	4.705
Middle CH	4.695
Highest CH	4.695

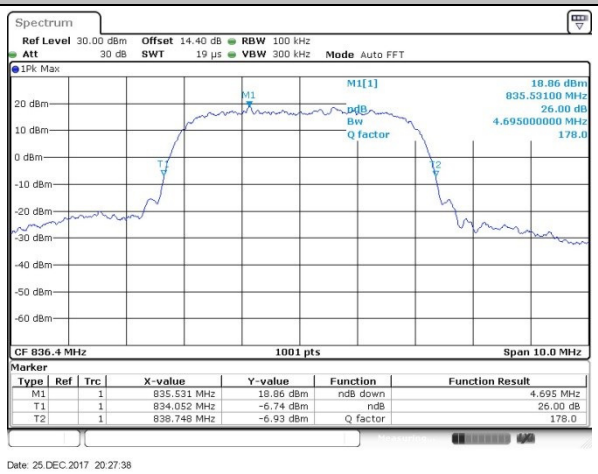
GSM850 (GSM)	GSM850 (EDGE class 8)
Lowest Channel	**Lowest Channel**
	
Middle Channel	**Middle Channel**
	
Highest Channel	**Highest Channel**
	

WCDMA Band V (RMC 12.2Kbps)

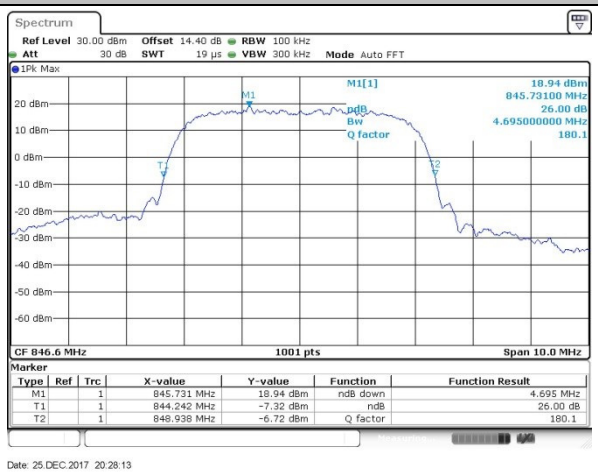
Lowest Channel



Middle Channel



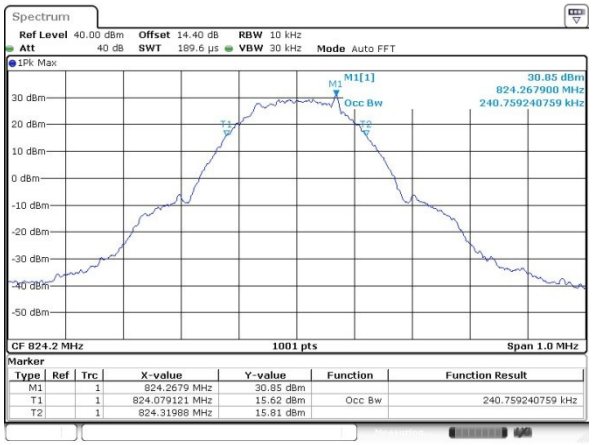
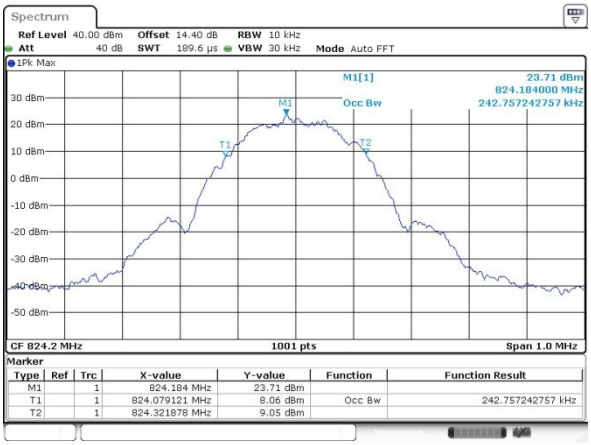
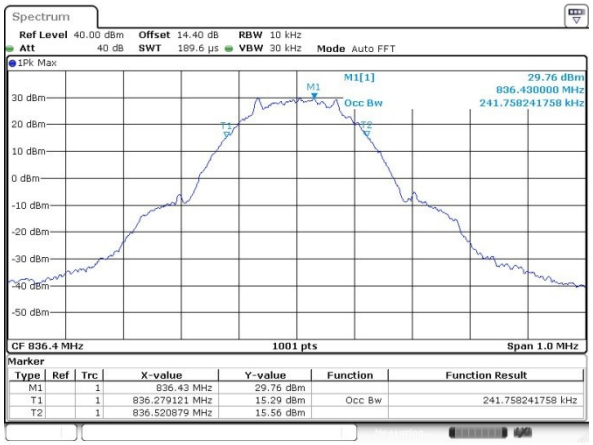
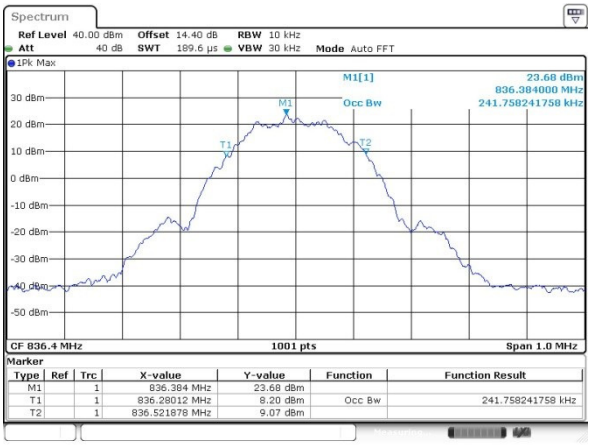
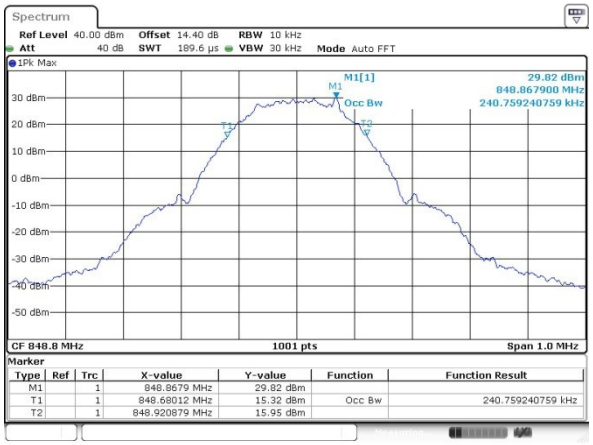
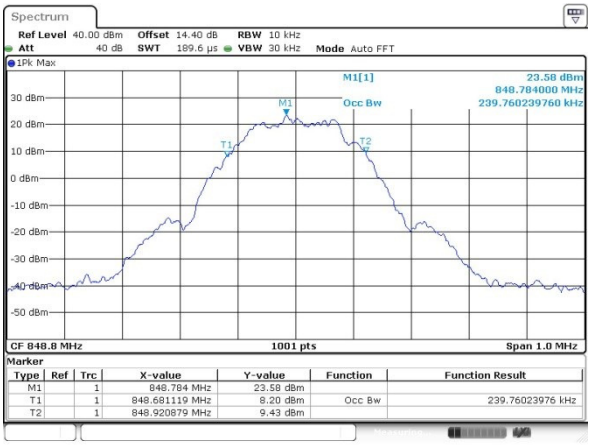
Highest Channel



Occupied Bandwidth

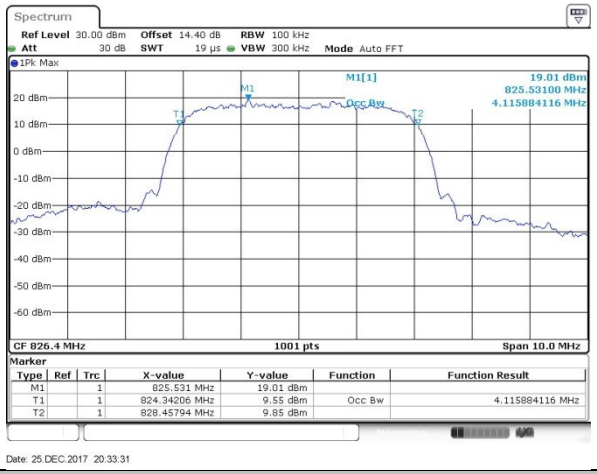
Mode	GSM850(MHz)	
Mod.	GSM	EDGE class 8
Lowest CH	0.241	0.243
Middle CH	0.242	0.242
Highest CH	0.241	0.240

Mode	WCDMA Band V(MHz)
Mod.	RMC 12.2Kbps
Lowest CH	4.12
Middle CH	4.12
Highest CH	4.11

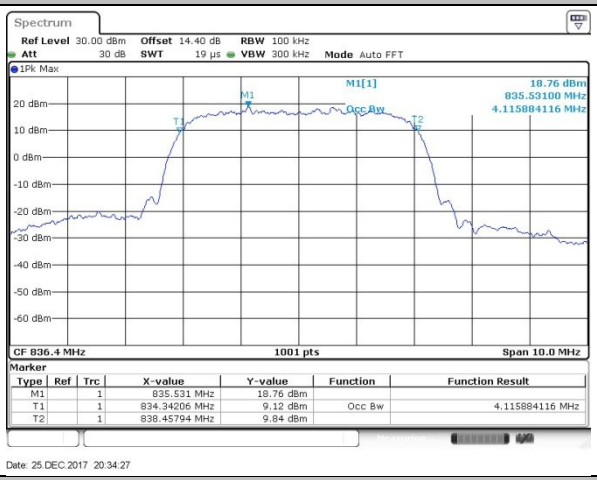
GSM850 (GSM)	GSM850 (EDGE class 8)
Lowest Channel	**Lowest Channel**
	
Middle Channel	**Middle Channel**
	
Highest Channel	**Highest Channel**
	

WCDMA Band V (RMC 12.2Kbps)

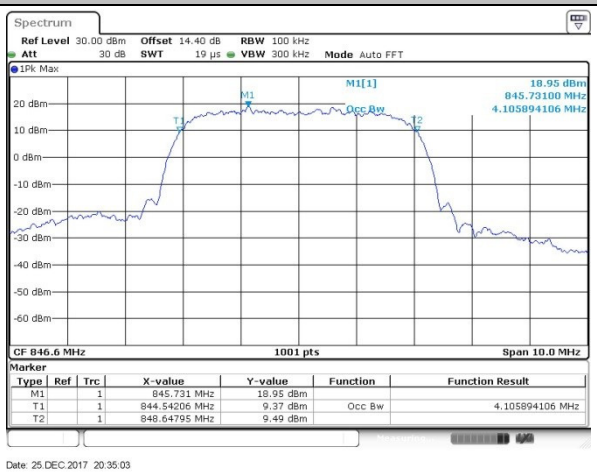
Lowest Channel



Middle Channel



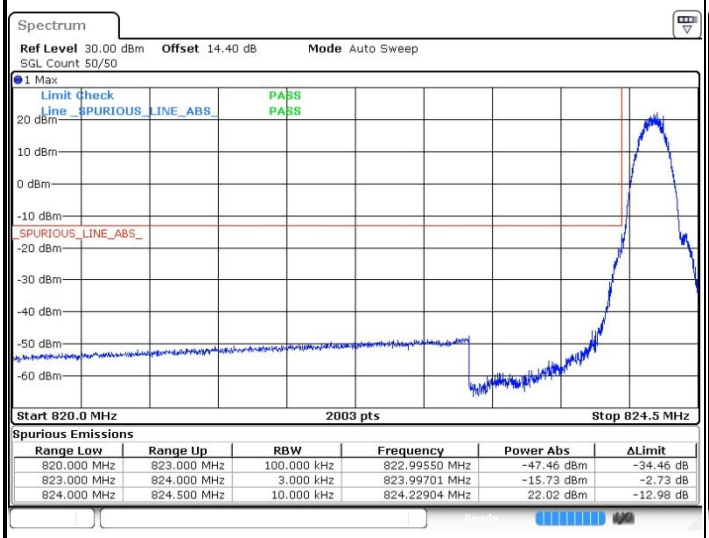
Highest Channel



Conducted Band Edge

GSM850 (GSM)

Lowest Band Edge

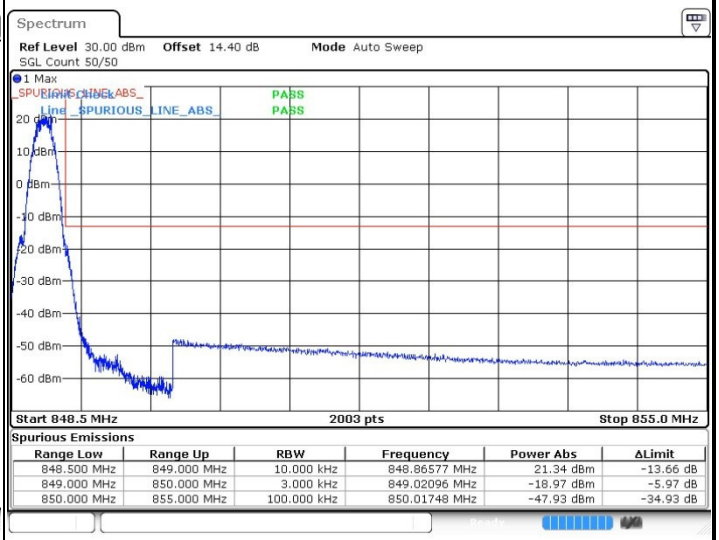


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
820.000 MHz	823.000 MHz	100.000 kHz	822.99550 MHz	-47.46 dBm	-34.46 dB
823.000 MHz	824.000 MHz	3.000 kHz	823.99701 MHz	-15.73 dBm	-2.73 dB
824.000 MHz	824.500 MHz	10.000 kHz	824.22904 MHz	22.02 dBm	-12.98 dB

Date: 3.JAN.2018 17:59:24

Highest Band Edge



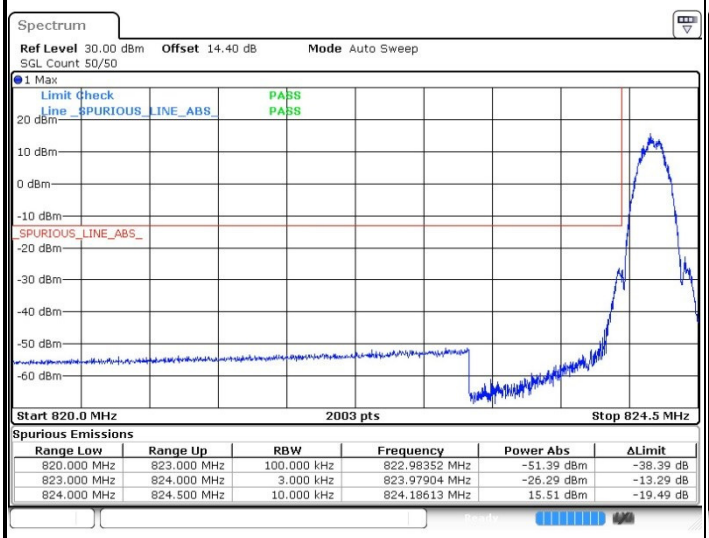
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
848.500 MHz	849.000 MHz	10.000 kHz	848.86577 MHz	21.34 dBm	-13.66 dB
849.000 MHz	850.000 MHz	3.000 kHz	849.02096 MHz	-18.97 dBm	-5.97 dB
850.000 MHz	855.000 MHz	100.000 kHz	850.01748 MHz	-47.93 dBm	-34.93 dB

Date: 3.JAN.2018 18:00:51

GSM850 (EDGE class 8)

Lowest Band Edge

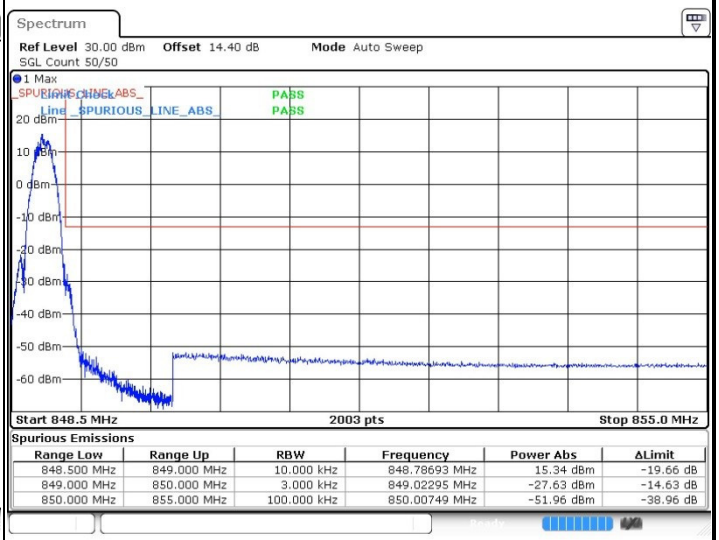


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
820.000 MHz	823.000 MHz	100.000 kHz	822.98352 MHz	-51.39 dBm	-38.39 dB
823.000 MHz	824.000 MHz	3.000 kHz	823.97904 MHz	-26.29 dBm	-13.29 dB
824.000 MHz	824.500 MHz	10.000 kHz	824.18613 MHz	15.51 dBm	-19.49 dB

Date: 3.JAN.2018 18:39:40

Highest Band Edge

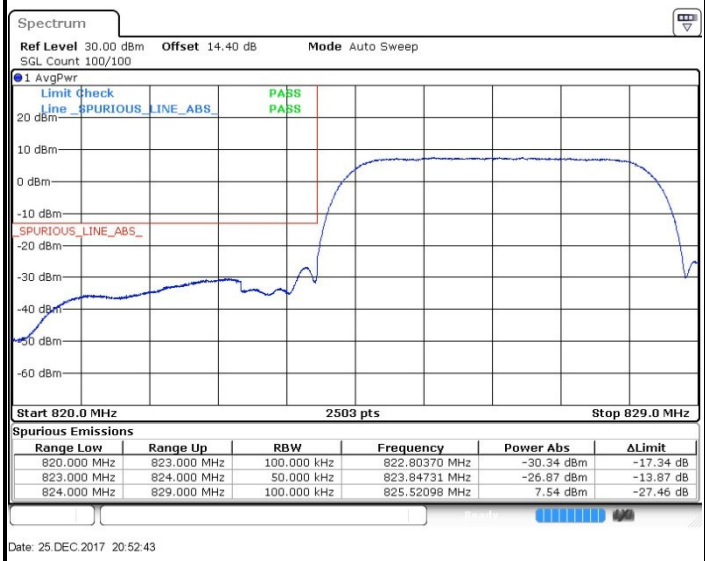


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
848.500 MHz	849.000 MHz	10.000 kHz	848.78693 MHz	15.34 dBm	-19.66 dB
849.000 MHz	850.000 MHz	3.000 kHz	849.02295 MHz	-27.63 dBm	-14.63 dB
850.000 MHz	855.000 MHz	100.000 kHz	850.00749 MHz	-51.96 dBm	-38.96 dB

Date: 3.JAN.2018 18:45:27

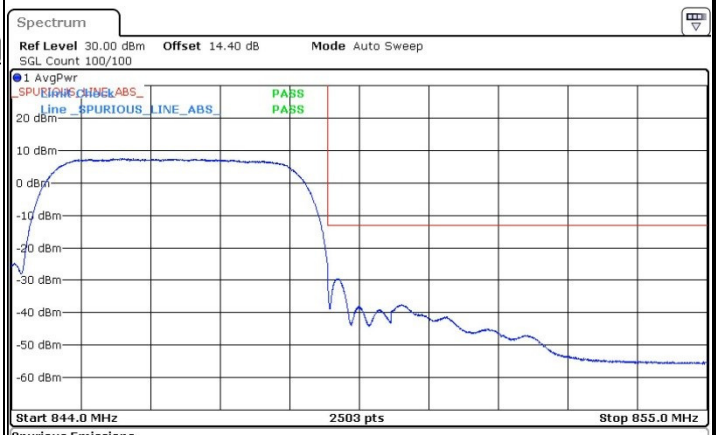
WCDMA Band V (RMC 12.2Kbps)	
Lowest Band Edge	**Highest Band Edge**



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
820.000 MHz	823.000 MHz	100.000 kHz	822.80370 MHz	-30.34 dBm	-17.34 dB
823.000 MHz	824.000 MHz	50.000 kHz	823.84731 MHz	-26.87 dBm	-13.87 dB
824.000 MHz	829.000 MHz	100.000 kHz	825.52098 MHz	7.54 dBm	-27.46 dB

Date: 25.DEC.2017 20:52:43



Spurious Emissions

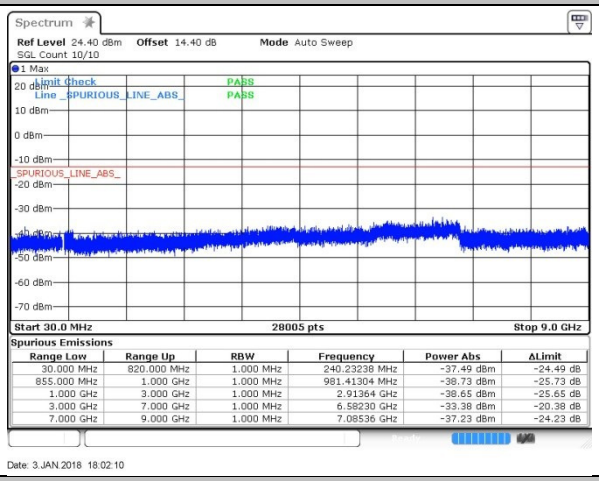
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
844.000 MHz	849.000 MHz	100.000 kHz	845.71578 MHz	7.59 dBm	-27.41 dB
849.000 MHz	850.000 MHz	50.000 kHz	849.17066 MHz	-29.53 dBm	-16.53 dB
850.000 MHz	855.000 MHz	100.000 kHz	850.16234 MHz	-37.59 dBm	-24.59 dB

Date: 25.DEC.2017 20:55:29

Conducted Spurious Emission

GSM850 (GSM)

Lowest Channel

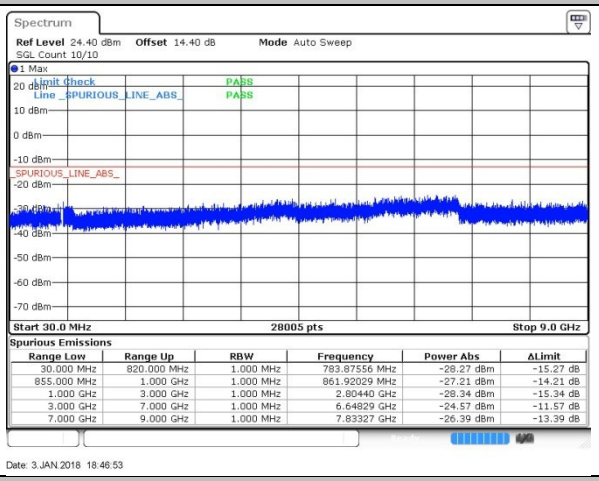


Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	820.000 MHz	1.000 MHz	240.23238 MHz	-37.49 dBm	-24.49 dB
855.000 MHz	1.000 GHz	1.000 MHz	981.41304 MHz	-38.73 dBm	-25.73 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.91364 GHz	-38.65 dBm	-25.65 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.58230 GHz	-33.38 dBm	-20.38 dB
7.000 GHz	9.000 GHz	1.000 MHz	7.08536 GHz	-37.23 dBm	-24.23 dB

Date: 3.JAN.2018 18:02:10

GSM850 (EDGE class 8)

Lowest Channel



Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	820.000 MHz	1.000 MHz	783.87556 MHz	-28.27 dBm	-15.27 dB
855.000 MHz	1.000 GHz	1.000 MHz	861.92029 MHz	-27.21 dBm	-14.21 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.80440 GHz	-28.34 dBm	-15.34 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.64829 GHz	-24.57 dBm	-11.57 dB
7.000 GHz	9.000 GHz	1.000 MHz	7.83327 GHz	-26.39 dBm	-13.39 dB

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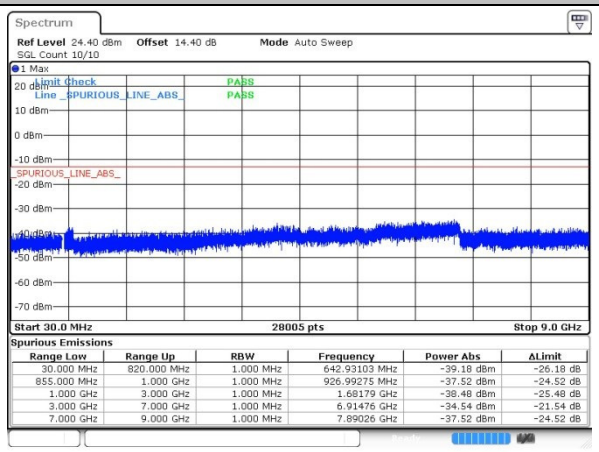
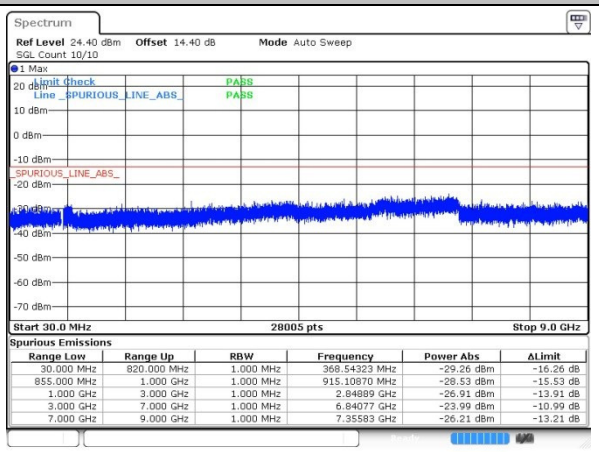
Middle Channel



Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	820.000 MHz	1.000 MHz	642.93103 MHz	-39.18 dBm	-26.18 dB
855.000 MHz	1.000 GHz	1.000 MHz	926.99275 MHz	-37.52 dBm	-24.52 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.68179 GHz	-38.48 dBm	-25.48 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.91476 GHz	-34.54 dBm	-21.54 dB
7.000 GHz	9.000 GHz	1.000 MHz	7.89026 GHz	-37.52 dBm	-24.52 dB

Date: 3.JAN.2018 18:03:25

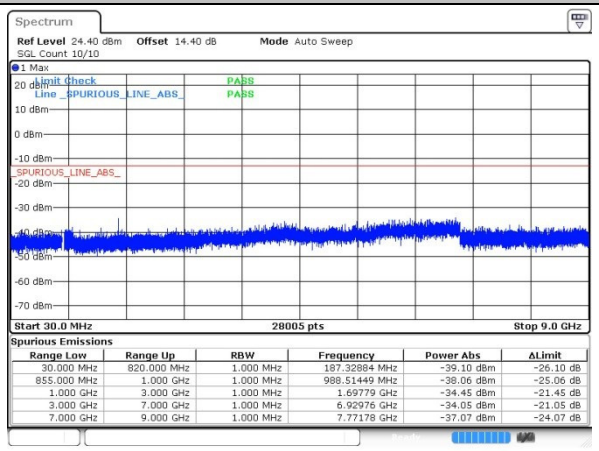
Middle Channel



Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	820.000 MHz	1.000 MHz	368.54323 MHz	-29.26 dBm	-16.26 dB
855.000 MHz	1.000 GHz	1.000 MHz	915.10870 MHz	-28.53 dBm	-15.53 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.84889 GHz	-26.91 dBm	-13.91 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.84077 GHz	-23.99 dBm	-10.99 dB
7.000 GHz	9.000 GHz	1.000 MHz	7.35583 GHz	-26.21 dBm	-13.21 dB

Date: 3.JAN.2018 18:48:16

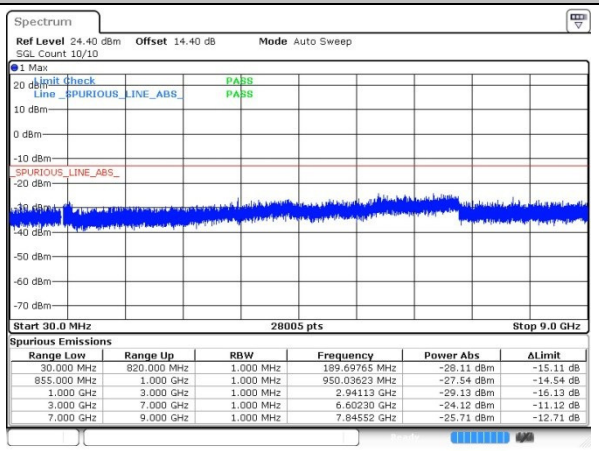
Highest Channel



Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	820.000 MHz	1.000 MHz	187.32884 MHz	-39.10 dBm	-26.10 dB
855.000 MHz	1.000 GHz	1.000 MHz	988.51449 MHz	-38.06 dBm	-25.06 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.69779 GHz	-34.45 dBm	-21.45 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.92976 GHz	-34.05 dBm	-21.05 dB
7.000 GHz	9.000 GHz	1.000 MHz	7.77178 GHz	-37.07 dBm	-24.07 dB

Date: 3.JAN.2018 18:04:40

Highest Channel



Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	820.000 MHz	1.000 MHz	189.69765 MHz	-28.11 dBm	-15.11 dB
855.000 MHz	1.000 GHz	1.000 MHz	950.03623 MHz	-27.54 dBm	-14.54 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.94113 GHz	-29.13 dBm	-16.13 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.60230 GHz	-24.12 dBm	-11.12 dB
7.000 GHz	9.000 GHz	1.000 MHz	7.84552 GHz	-25.71 dBm	-12.71 dB

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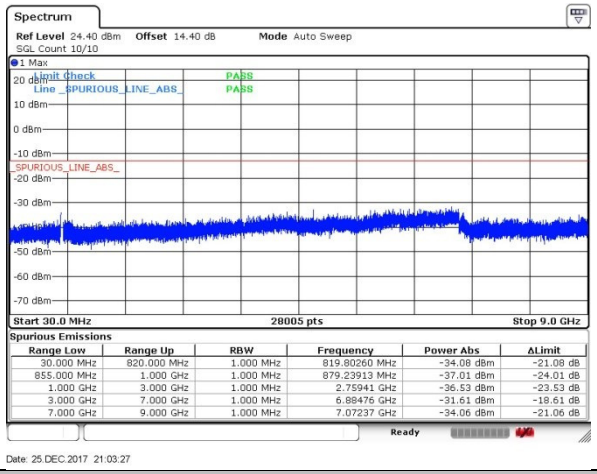
WCDMA Band V (RMC 12.2Kbps)

Lowest Channel

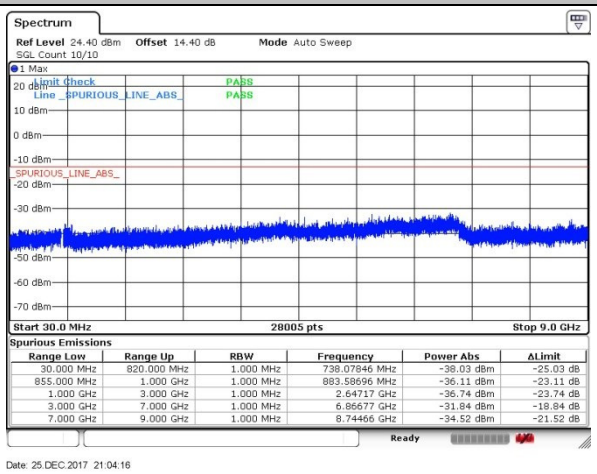


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	820.000 MHz	1.000 MHz	819.80260 MHz	-34.08 dBm	-21.08 dB
855.000 MHz	1.000 GHz	1.000 MHz	879.23913 MHz	-37.01 dBm	-24.01 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.75941 GHz	-36.53 dBm	-23.53 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.88476 GHz	-31.61 dBm	-18.61 dB
7.000 GHz	9.000 GHz	1.000 MHz	7.07237 GHz	-34.06 dBm	-21.06 dB

Date: 25.DEC.2017 21:03:27

Middle Channel

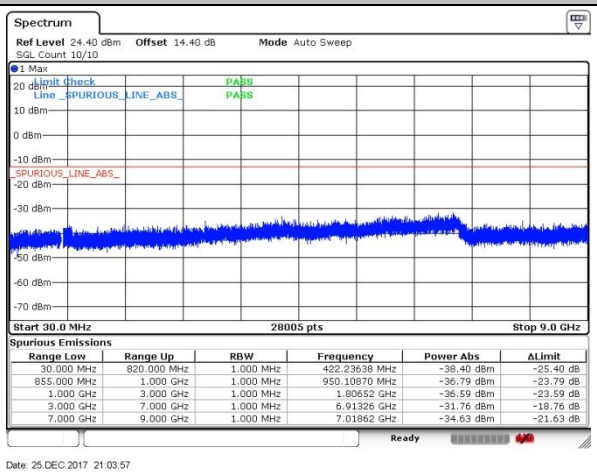


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	820.000 MHz	1.000 MHz	738.07846 MHz	-38.03 dBm	-25.03 dB
855.000 MHz	1.000 GHz	1.000 MHz	883.58696 MHz	-36.11 dBm	-23.11 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.64717 GHz	-36.74 dBm	-23.74 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.86677 GHz	-31.84 dBm	-18.84 dB
7.000 GHz	9.000 GHz	1.000 MHz	8.74466 GHz	-34.52 dBm	-21.52 dB

Date: 25.DEC.2017 21:04:16

Highest Channel



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	820.000 MHz	1.000 MHz	422.23638 MHz	-38.40 dBm	-25.40 dB
855.000 MHz	1.000 GHz	1.000 MHz	950.10870 MHz	-36.79 dBm	-23.79 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.80652 GHz	-36.59 dBm	-23.59 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.91326 GHz	-31.76 dBm	-18.76 dB
7.000 GHz	9.000 GHz	1.000 MHz	7.01862 GHz	-34.63 dBm	-21.63 dB

Date: 25.DEC.2017 21:03:57

Frequency Stability

Test Conditions	Middle Channel	GSM850 (GSM)	GSM850 (EDGE class 8)	Limit 2.5ppm
Temperature (°C)	Voltage (Volt)	Deviation (ppm)		Result
50	Normal Voltage	0.0275	0.0347	PASS
40	Normal Voltage	0.0167	0.0048	
30	Normal Voltage	0.0072	0.0060	
20(Ref.)	Normal Voltage	0.0000	0.0000	
10	Normal Voltage	0.0299	0.0108	
0	Normal Voltage	0.0024	0.0143	
-10	Normal Voltage	0.0108	0.0359	
-20	Normal Voltage	0.0215	0.0036	
-30	Normal Voltage	0.0048	0.0132	
20	Maximum Voltage	0.0060	0.0000	
20	Normal Voltage	0.0024	0.0251	
20	Battery End Point	0.0096	0.0012	

Note: Normal Voltage = 3.8 V.；Battery End Point (BEP) =3.6 V.；Maximum Voltage =4.4 V.

Test Conditions	Middle Channel	WCDMA Band V (RMC 12.2Kbps)	Limit 2.5ppm
Temperature (°C)	Voltage (Volt)	Deviation (ppm)	Result
50	Normal Voltage	0.0084	PASS
40	Normal Voltage	0.0287	
30	Normal Voltage	0.0024	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0359	
0	Normal Voltage	0.0251	
-10	Normal Voltage	0.0060	
-20	Normal Voltage	0.0299	
-30	Normal Voltage	0.0036	
20	Maximum Voltage	0.0012	
20	Normal Voltage	0.0239	
20	Battery End Point	0.0263	

Note: Normal Voltage = 3.8 V.；Battery End Point (BEP) =3.6 V.；Maximum Voltage =4.4 V.

Appendix B. Test Results of Radiated Test

Radiated Spurious Emission

GSM850 (GSM)									
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1672	-49.06	-13	-36.06	-51.10	-50.97	1.14	5.20	H
	2510	-38.26	-13	-25.26	-45.57	-40.89	1.12	5.90	H
	3345	-61.73	-13	-48.73	-65.85	-64.94	1.34	6.70	H
	1672	-49.41	-13	-36.41	-50.01	-51.32	1.14	5.20	V
	2510	-31.72	-13	-18.72	-40.07	-34.35	1.12	5.90	V
	3345	-62.09	-13	-49.09	-67.23	-65.30	1.34	6.70	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

GSM850 (EDGE class 8)									
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1672	-52.72	-13	-39.72	-53.38	-54.63	1.14	5.20	H
	2510	-56.05	-13	-43.05	-60.35	-58.68	1.12	5.90	H
	3345	-62.37	-13	-49.37	-66.49	-65.58	1.34	6.70	H
	1672	-63.07	-13	-50.07	-62.17	-64.98	1.14	5.20	V
	2510	-54.28	-13	-41.28	-57.35	-56.91	1.12	5.90	V
	3345	-60.17	-13	-47.17	-65.31	-63.38	1.34	6.70	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

WCDMA Band V(RMC 12.2Kbps)									
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1672	-61.67	-13	-48.67	-61.99	-63.58	1.14	5.20	H
	2510	-59.41	-13	-46.41	-63.71	-62.04	1.12	5.90	H
	3345	-61.71	-13	-48.71	-65.83	-64.92	1.34	6.70	H
	1672	-62.02	-13	-49.02	-61.12	-63.93	1.14	5.20	V
	2510	-60.31	-13	-47.31	-63.38	-62.94	1.12	5.90	V
	3345	-61.22	-13	-48.22	-66.36	-64.43	1.34	6.70	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

Appendix D. Reference Report

Please refer to Sporton report number FG7D0507A which is issued separately.