FCC RF Test Report

APPLICANT	:	Motorola Mobility LLC
EQUIPMENT	:	Mobile Cellular Phone
BRAND NAME	:	Motorola
MODEL NAME	:	10874, 12665
FCC ID	:	IHDT56WK3
STANDARD	:	FCC 47 CFR Part 2, 22(H), 24(E), 27(L)
CLASSIFICATION	:	PCS Licensed Transmitter Held to Ear (PCE)

The product was received on Jun. 17, 2017 and testing was completed on Jul. 12, 2017. 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 / EIA-603-D-2010 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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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG761702-02A	Rev. 01	Initial issue of report	Aug. 09, 2017

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	-
	§24.232(c)	Equivalent Isotropic Radiated Power	< 2 Watts	PASS	-
	§27.50(d)(4)	Equivalent Isotropic Radiated Power	< 1 Watts	PASS	-
3.5	§24.232(d)	Peak-to-Average Ratio	< 13 dB	PASS	-
3.6	§2.1049 §22.917(b) §24.238(b) §27.53(g)	Occupied Bandwidth	Reporting Only	PASS	-
3.7	§2.1051 §22.917(a) §24.238(a) §27.53(h)	Band Edge Measurement	< 43+10log10(P[Watts])	PASS	-
3.8	§2.1051 §22.917(a) §24.238(a) §27.53(h)	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	-
	§2.1055 §24.235 §27.54		Within Authorized Band		
4.4	§2.1053 §22.917(a) §24.238(a) §27.53(h)	Field Strength of Spurious Radiation	< 43+10log10(P[Watts])	PASS	Under limit 38.41 dB at 2512.000 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	10874, 12665
FCC ID	IHDT56WK3
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/DC-HSDPA/HSPA+ (16QAM uplink is not supported)/LTE/NFC WLAN2.4G 802.11b/g/n HT20/HT40/ WLAN5G 802.11a/n HT20/HT40/ WLAN5G 802.11ac VHT20/VHT40/VHT80/ Bluetooth V3.0 + EDR/ Bluetooth V4.0 LE/ Bluetooth v4.1 LE / Bluetooth v4.2 LE / Bluetooth v5.0 LE
IMEI Code	Conducted: 356516080007177/356516080007185 Radiation: 356516080008092/356516080008100
HW Version	DVT2
SW Version	NPW26.75
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. There are two types of EUT, the differences between two samples are only for SIM slot: sample 1(Model name: 12665) is dual SIM slot, sample 2(Model name: 10874) is single SIM slot. We only choose sample 1 to perform full tests.

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 Band IV: 1712.4 MHz ~ 1752.6 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 Band IV: 2112.4 MHz ~ 2152.6 MHz
Maximum Output Power to Antenna	**WCDMA:** Band V: 23.10 dBm Band II: 23.28 dBm Band IV: 23.13 dBm
Antenna Type	Fixed Internal Antenna
Antenna Gain	Cellular Band: -1.60 dBi PCS Band: -1.60 dBi AWS Band: -0.90 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 Specification of Accessory

Specification of Accessory				
AC Adapter 1 (US)	Brand Name	Motorola (Salom)	Model Name	SC-22
	Power Rating	I/P: 100 - 240 Vac, 500 mA, O/P: 5/9/12 Vdc, 3000/1600/1200 mA		
AC Adapter 2 (US)	Brand Name	Motorola (Chenyang)	Model Name	SC-22
	Power Rating	I/P: 100 - 240 Vac, 500 mA, O/P: 5/9/12 Vdc, 3000/1600/1200 mA		
AC Adapter 3 (US)	Brand Name	Motorola (LiteOn)	Model Name	SC-22
	Power Rating	I/P: 100 - 240 Vac, 500 mA, O/P: 5/9/12 Vdc, 3000/1600/1200 mA		
Battery	Brand Name	Motorola (Sunwoda)	Model Name	HX40
	Power Rating	3.8Vdc, 2810mAh	Type	Li-ion
Earphone	Brand Name	Motorola (Cosonic)	Model Name	SH38C16617
	Signal Line Type	1.10 meter, non-shielded cable, without ferrite core		
USB Cable 1	Brand Name	Motorola (Saibao)	Model Name	SKN6473A
	Signal Line Type	1.10 meter, shielded cable, without ferrite core		
USB Cable 2	Brand Name	Motorola (Foxlink)	Model Name	SKN6473A
	Signal Line Type	1.10 meter, shielded cable, without ferrite core		
USB Cable 3	Brand Name	Motorola (Cabletech)	Model Name	SKN6473A
	Signal Line Type	1.10 meter, shielded cable, without ferrite core		

1.6 Modification of EUT

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

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: 10874, 12665, FCC ID: IHDT56WK3) is electrically identical to the reference device (Model: 10647, FCC ID: IHDT56WK1) 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 Operational Description.

The re-used RF data includes the following bands provided in Appendix D (Sporton RF Report No. FG761702-01A for the reference device Model: 10647, FCC ID: IHDT56WK1):

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, the test result were consistent with FCC ID: IHDT56WK1.

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)	IHDT56WK1	Part22H.24E.27L (FG761702-01A)	GSM850, PCS1900
PCE (LTE)	IHDT56WK1	Part22H.24E.27L.27M.27H (FG761702-01B)	LTE band 7

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

FCC Rule	System	Type of Modulation	Maximum ERP/EIRP (W)	Frequency Tolerance (ppm)	Emission Designator
Part 22H	WCDMA Band V RMC 12.2Kbps	BPSK	0.0861	0.0251 ppm	4M14F9W
Part 24E	WCDMA Band II RMC 12.2Kbps	BPSK	0.1472	0.0154 ppm	4M13F9W
Part 27L	WCDMA Band IV RMC 12.2Kbps	BPSK	0.1671	0.0092 ppm	4M13F9W

1.9 Testing Location

Sporton Lab 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), 27(L)
- ANSI / TIA / EIA-603-D-2010
- FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02
- 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 v02r02 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:

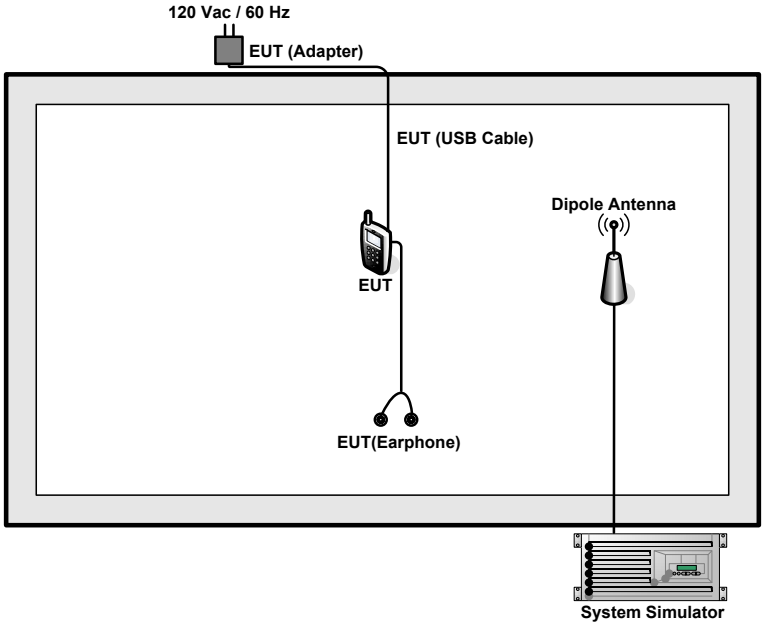
1. 30 MHz to 10th harmonic for WCDMA Band V.
2. 30 MHz to 10th harmonic for WCDMA Band IV.
3. 30 MHz to 10th harmonic for WCDMA Band II.

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**
WCDMA Band V	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link
WCDMA Band II	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link
WCDMA Band IV	■ 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 5.0 dB and a 10dB attenuator.

Example :

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

= 5.0 + 10 = 15.0 (dB)

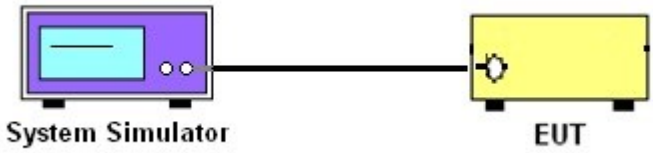
3 Conducted Test Result

3.1 Measuring Instruments

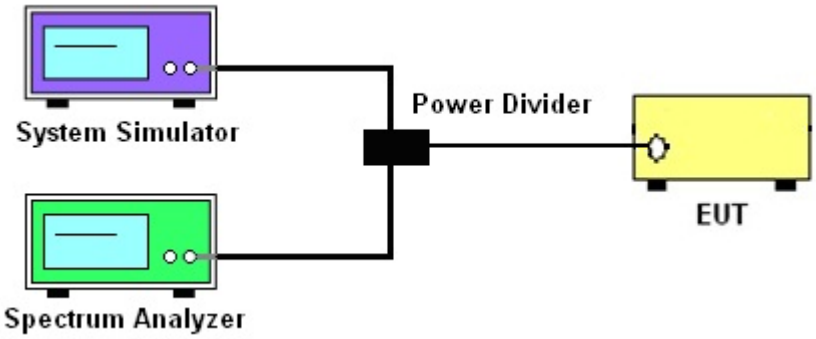
See list of measuring instruments of this test report.

3.2 Test Setup

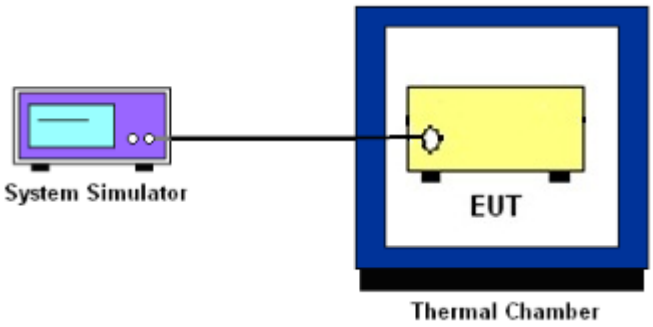
3.2.1 Conducted Output Power



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/EIRP

3.4.1 Description of the Conducted Output Power and ERP/EIRP

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 WCDMA Band V.

The EIRP of mobile transmitters must not exceed 2 Watts for WCDMA Band II.

The EIRP of mobile transmitters must not exceed 1 Watts for WCDMA Band IV.

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 v02r02 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 v02r02 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 v02r02 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 v02r02 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 v02r02 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 v02r02 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.

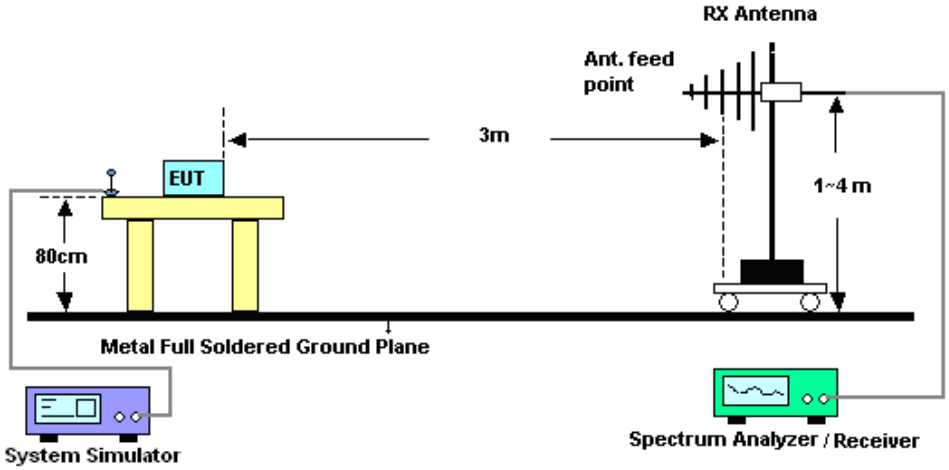
4 Radiated Test Items

4.1 Measuring Instruments

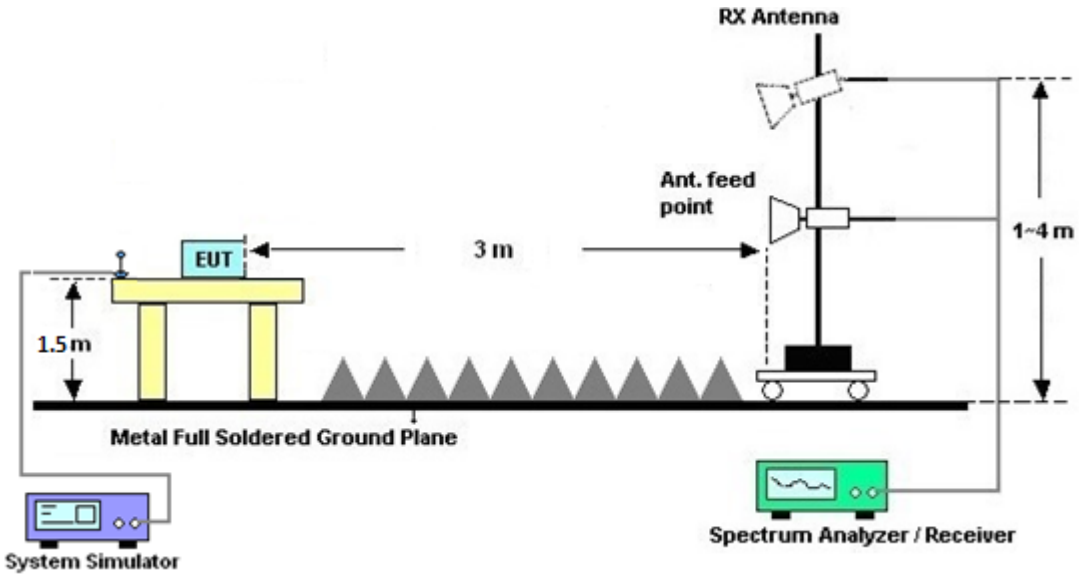
See list of measuring instruments of this test report.

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 v02r02 Section 5.8 and ANSI / TIA-603-D-2010 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. 09, 2016	Jul. 01, 2017	Aug. 08, 2017	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Oct. 13, 2016	Jul. 01, 2017	Oct. 12, 2017	Conducted (TH01-KS)
Radio communication analyzer	Anritsu	MT8820C	6201300652	2G/3G/LTE Band	Aug. 08, 2016	Jul. 01, 2017	Aug. 07, 2017	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz-44GHz	Apr. 18, 2017	Jul. 12, 2017	Apr. 17, 2018	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	35406	25MHz-2GHz	Apr. 22, 2017	Jul. 12, 2017	Apr. 21, 2018	Radiation (03CH03-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1356	1GHz~18GHz	Apr. 22, 2017	Jul. 12, 2017	Apr. 21, 2018	Radiation (03CH03-KS)
SHF-EHF Horn	com-power	AH-840	101070	18GHz ~40GHz	Oct. 19, 2016	Jul. 12, 2017	Oct. 18, 2017	Radiation (03CH03-KS)
Amplifier	SONOMA	310N	187289	9kHz~1GHz	Aug. 09, 2016	Jul. 12, 2017	Aug. 08, 2017	Radiation (03CH03-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Oct. 13, 2016	Jul. 12, 2017	Oct. 12, 2017	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Jul. 12, 2017	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Jul. 12, 2017	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Jul. 12, 2017	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	WCDMA Band V			WCDMA Band II			WCDMA Band IV		
Channel	4132	4182	4233	9262	9400	9538	1312	1413	1513
Frequency	826.4	836.4	846.6	1852.4	1880	1907.6	1712.4	1732.6	1752.6
AMR 12.2Kbps	23.03	23.08	23.01	23.00	23.26	23.18	22.89	23.02	23.11
RMC 12.2Kbps	23.05	23.10	23.02	23.01	23.28	23.20	22.90	23.04	23.13
HSDPA Subtest-1	21.94	22.05	21.82	21.87	22.14	21.99	20.43	20.50	20.92
HSDPA Subtest-2	21.63	22.03	21.88	21.61	22.16	22.00	20.44	20.53	20.52
HSDPA Subtest-3	21.03	22.07	21.35	21.45	21.70	21.54	19.55	20.05	20.06
HSDPA Subtest-4	21.37	21.99	21.30	21.44	21.70	21.54	19.93	20.04	20.05
DC-HSDPA Subtest-1	20.69	20.77	20.69	20.29	20.59	20.47	20.15	20.29	20.41
DC-HSDPA Subtest-2	20.70	20.75	20.68	20.29	20.57	20.46	20.14	20.31	20.40
DC-HSDPA Subtest-3	20.68	20.74	20.61	20.30	20.55	20.44	20.15	20.29	20.45
DC-HSDPA Subtest-4	20.66	20.73	20.63	20.28	20.55	20.40	20.17	20.28	20.44
HSUPA Subtest-1	22.11	22.05	21.99	21.96	22.23	22.14	21.41	21.51	21.69
HSUPA Subtest-2	20.01	19.77	19.89	20.06	20.29	20.06	19.77	20.37	20.07
HSUPA Subtest-3	21.05	20.90	20.84	21.07	21.22	21.08	20.59	20.74	20.86
HSUPA Subtest-4	20.06	20.00	19.88	19.93	20.25	20.12	19.78	19.88	20.09
HSUPA Subtest-5	22.02	21.93	21.90	22.05	22.35	22.02	21.79	21.94	22.10

ERP/EIRP

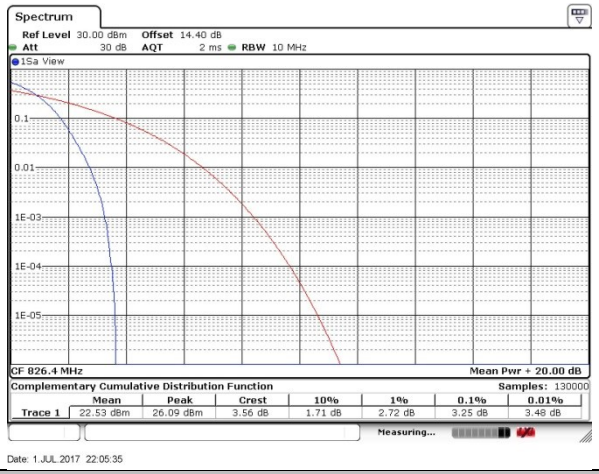
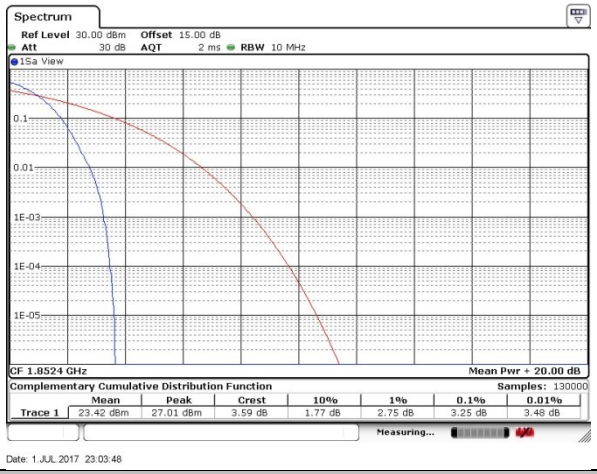
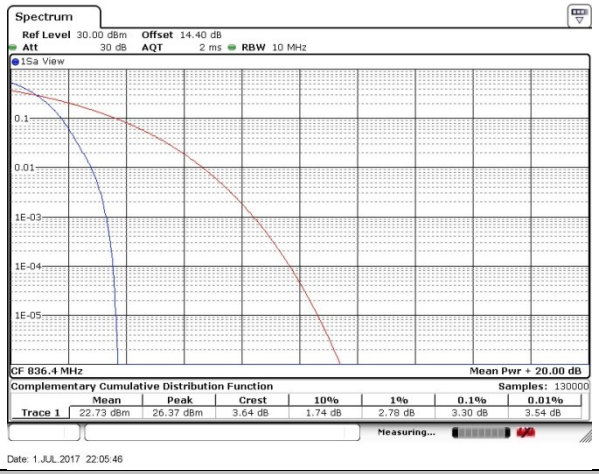
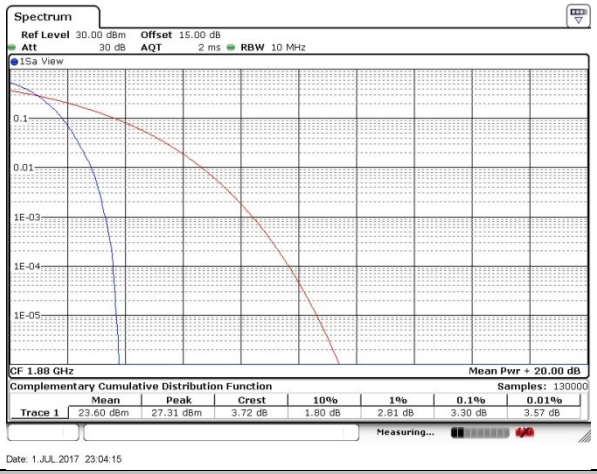
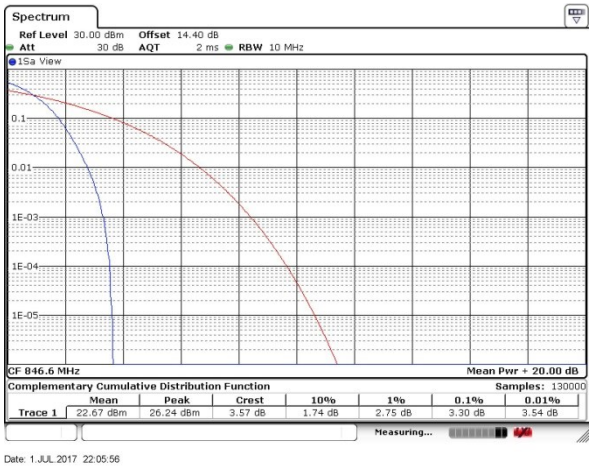
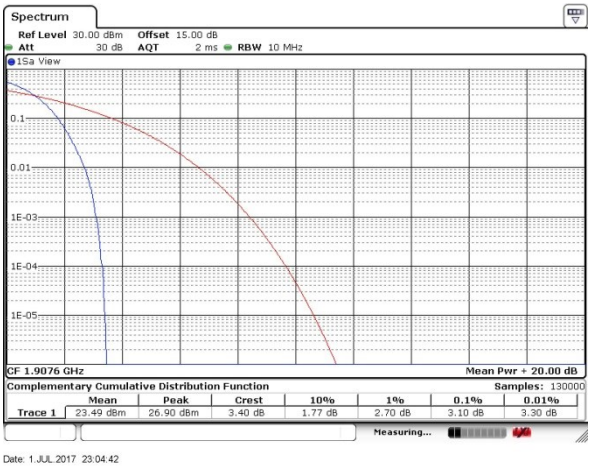
WCDMA Band V (G_T - $L_{C=}$ -1.60dBi)			
Channel	4132	4182	4233
	(Low)	(Mid)	(High)
Frequency (MHz)	826.4	836.4	846.6
Conducted Power (dBm)	23.05	23.10	23.02
Conducted Power (Watts)	0.2018	0.2042	0.2004
ERP(dBm)	19.30	19.35	19.27
ERP(Watts)	0.0851	0.0861	0.0845

WCDMA Band II (G_T - $L_{C=}$ -1.60dBi)			
Channel	9262	9400	9538
	(Low)	(Mid)	(High)
Frequency (MHz)	1852.4	1880	1907.6
Conducted Power (dBm)	23.01	23.28	23.20
Conducted Power (Watts)	0.2000	0.2128	0.2089
EIRP(dBm)	21.41	21.68	21.60
EIRP(Watts)	0.1384	0.1472	0.1445

WCDMA Band IV (G_T - $L_{C=}$ -0.90dBi)			
Channel	1312	1413	1513
	(Low)	(Mid)	(High)
Frequency (MHz)	1712.4	1732.6	1752.6
Conducted Power (dBm)	22.90	23.04	23.13
Conducted Power (Watts)	0.1950	0.2014	0.2056
EIRP(dBm)	22.00	22.14	22.23
EIRP(Watts)	0.1585	0.1637	0.1671

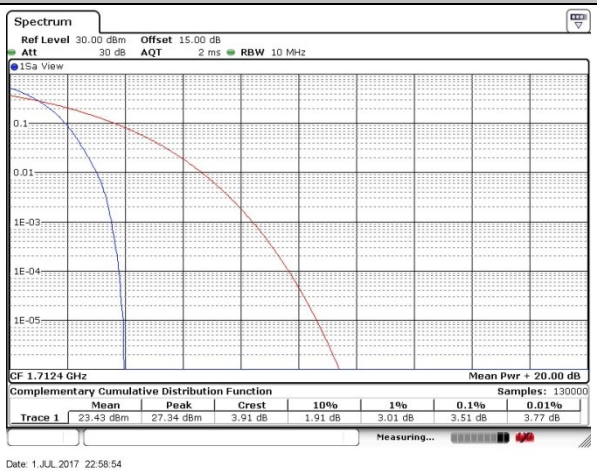
Peak-to-Average Ratio

Mode	WCDMA Band V	WCDMA Band II	WCDMA Band IV	Limit: 13dB
Mod.	RMC 12.2Kbps	RMC 12.2Kbps	RMC 12.2Kbps	Result
Lowest CH	3.25	3.25	3.51	PASS
Middle CH	3.30	3.30	3.30	
Highest CH	3.30	3.10	3.33	

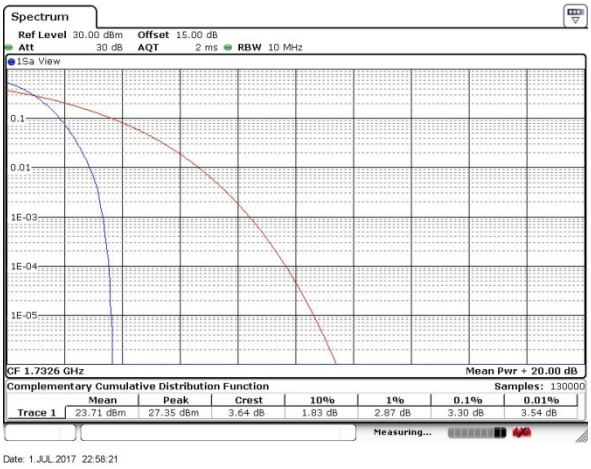
WCDMA Band V (RMC 12.2Kbps)	WCDMA Band II (RMC 12.2Kbps)
Lowest Channel	**Lowest Channel**
	
Middle Channel	**Middle Channel**
	
Highest Channel	**Highest Channel**
	

WCDMA Band IV (RMC 12.2Kbps)

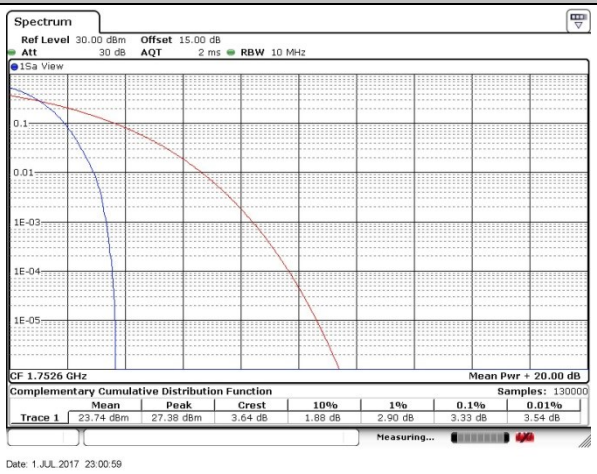
Lowest Channel



Middle Channel



Highest Channel

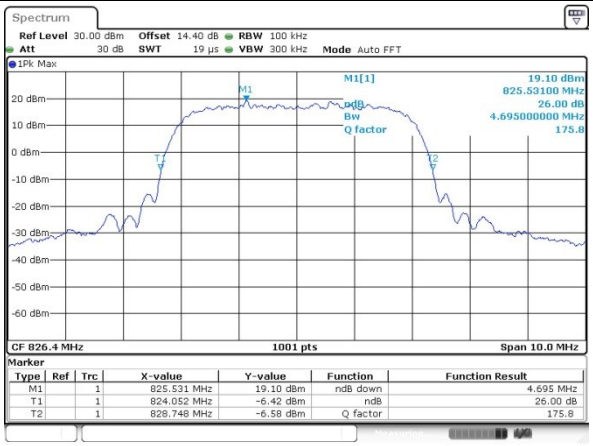


26dB Bandwidth

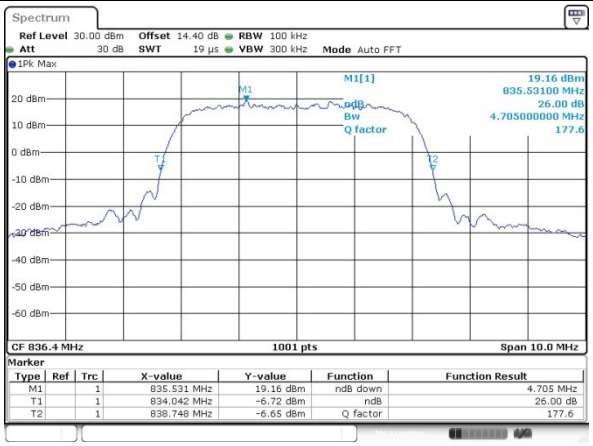
Mode	WCDMA Band V	WCDMA Band II	WCDMA Band IV
Mod.	RMC 12.2Kbps	RMC 12.2Kbps	RMC 12.2Kbps
Lowest CH	4.70	4.70	4.70
Middle CH	4.71	4.70	4.69
Highest CH	4.70	4.71	4.70

WCDMA Band V (RMC 12.2Kbps)

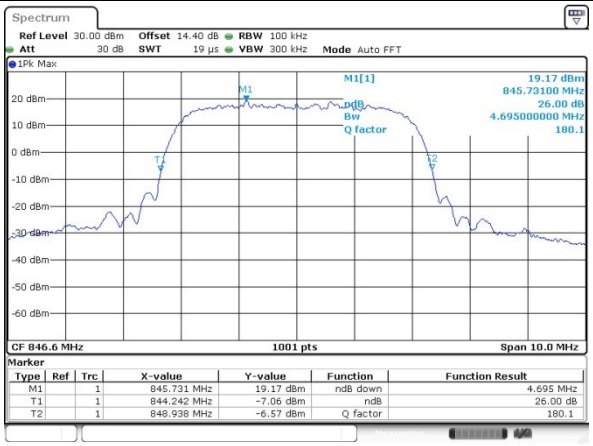
Lowest Channel



Middle Channel

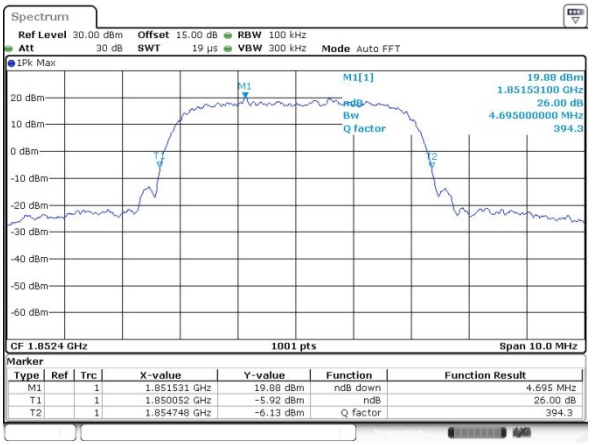


Highest Channel

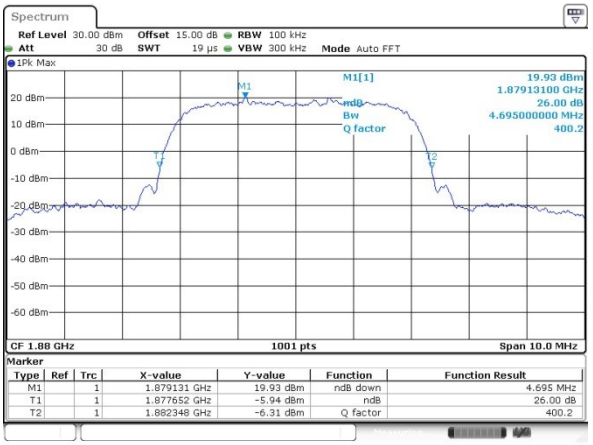


WCDMA Band II (RMC 12.2Kbps)

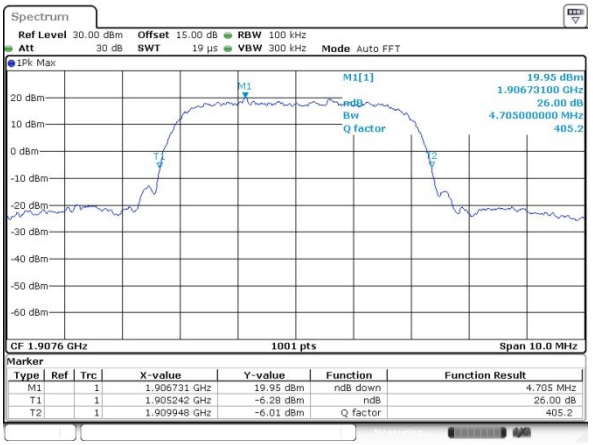
Lowest Channel



Middle Channel

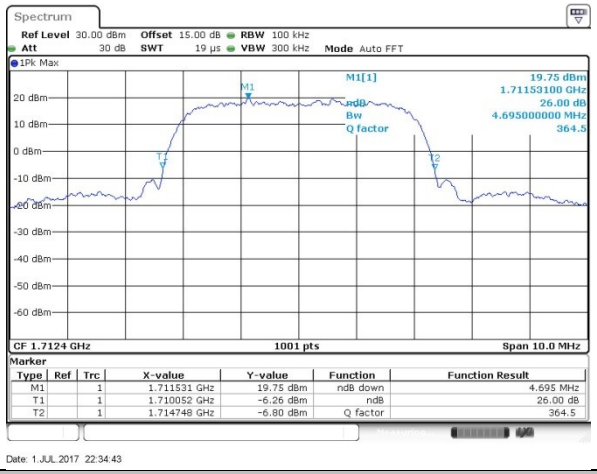


Highest Channel

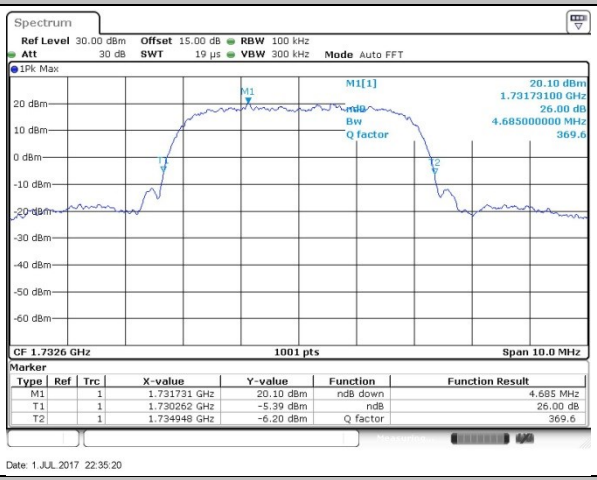


WCDMA Band IV (RMC 12.2Kbps)

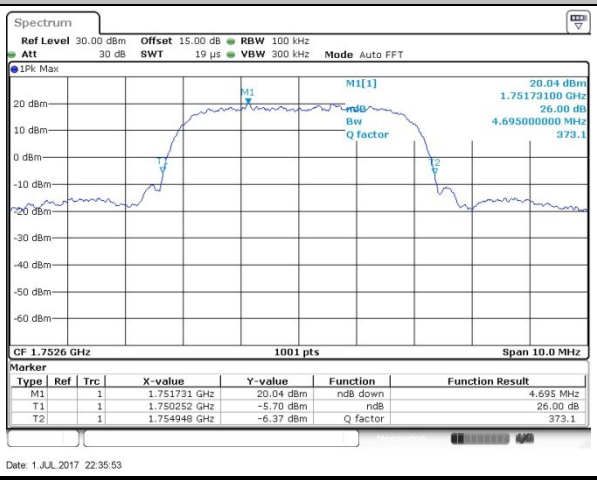
Lowest Channel



Middle Channel



Highest Channel

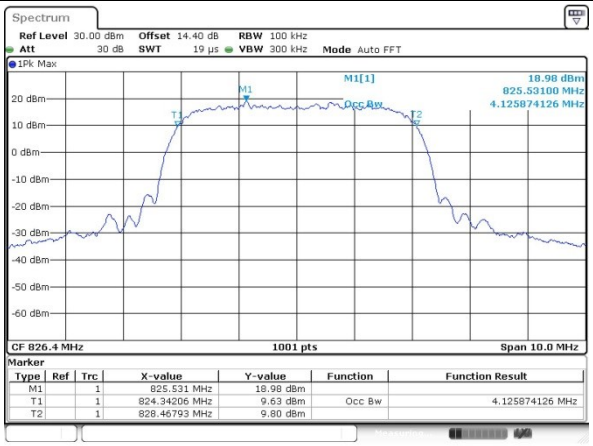


Occupied Bandwidth

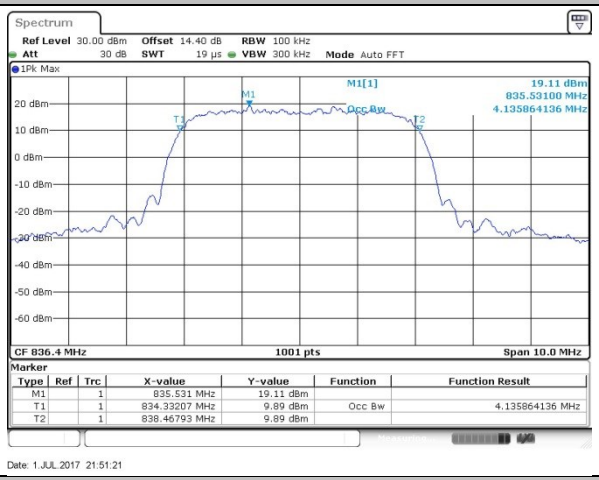
Mode	WCDMA Band V	WCDMA Band II	WCDMA Band IV
Mod.	RMC 12.2Kbps	RMC 12.2Kbps	RMC 12.2Kbps
Lowest CH	4.13	4.13	4.13
Middle CH	4.14	4.13	4.12
Highest CH	4.13	4.13	4.13

WCDMA Band V (RMC 12.2Kbps)

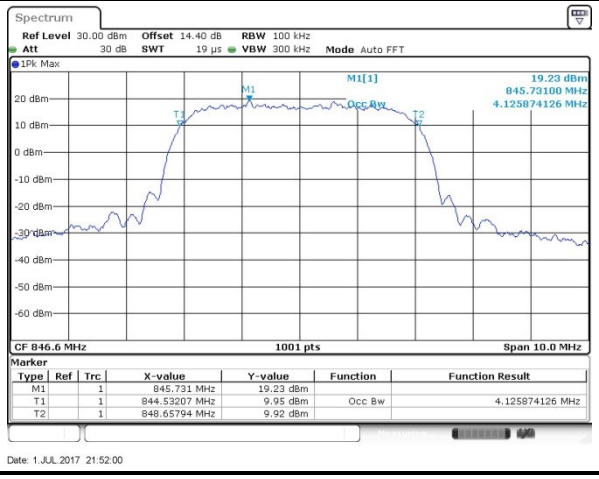
Lowest Channel



Middle Channel

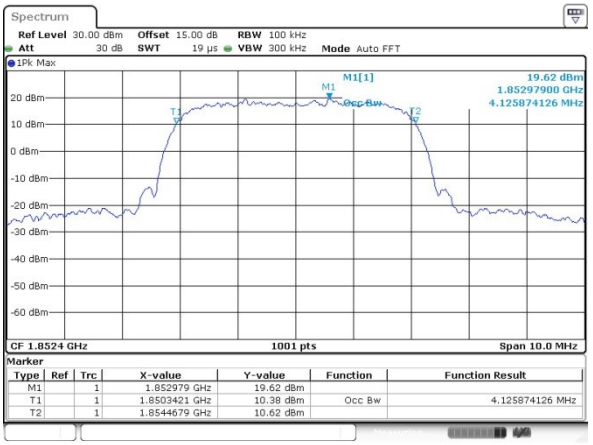


Highest Channel

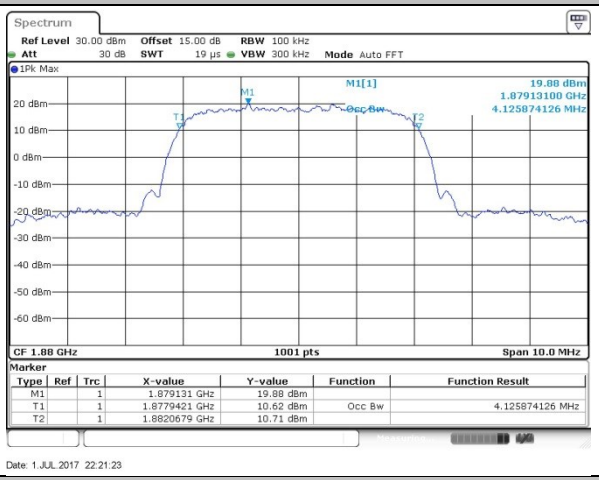


WCDMA Band II (RMC 12.2Kbps)

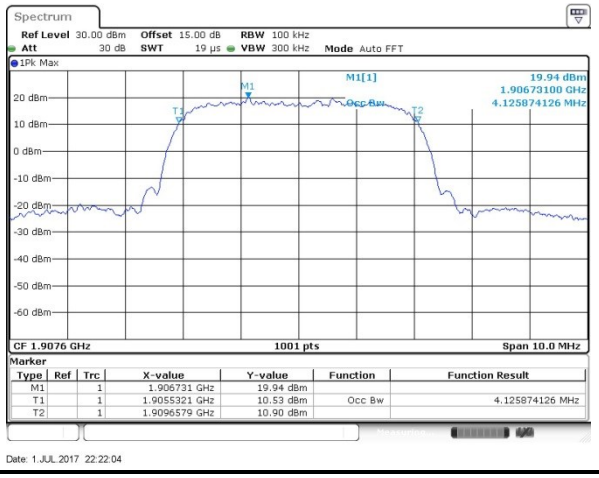
Lowest Channel



Middle Channel

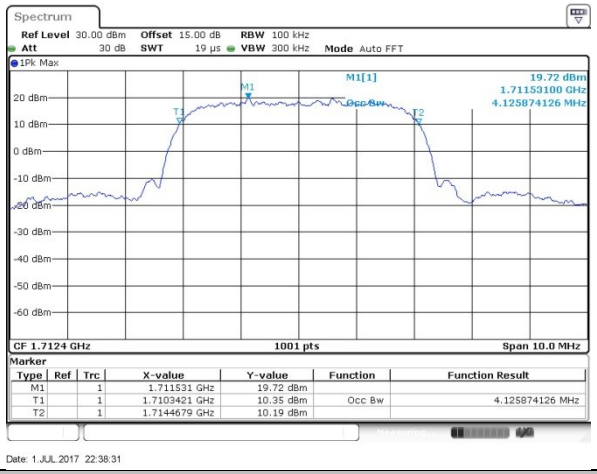


Highest Channel

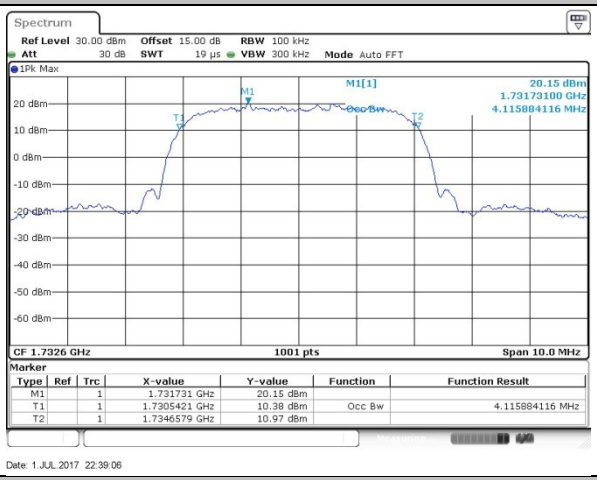


WCDMA Band IV (RMC 12.2Kbps)

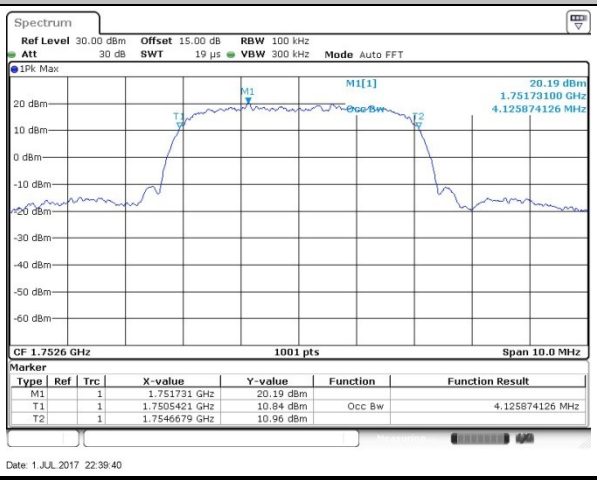
Lowest Channel



Middle Channel

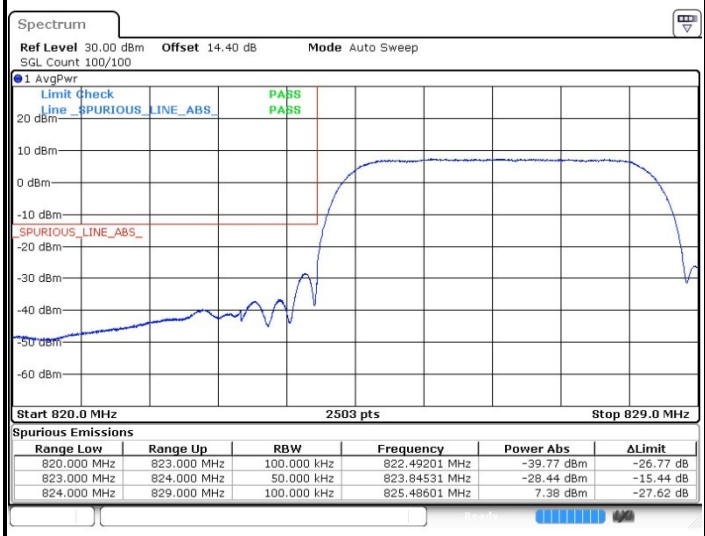


Highest Channel



Conducted Band Edge

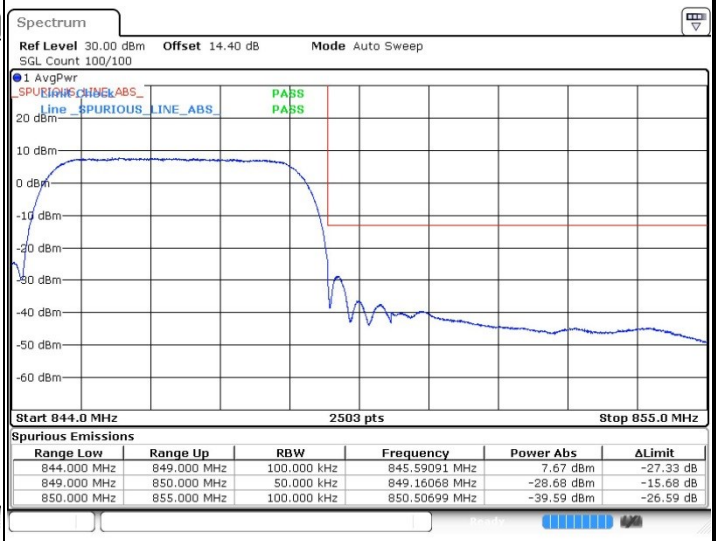
WCDMA Band V (RMC 12.2Kbps)	
Lowest Band Edge	**Highest Band Edge**



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
820.000 MHz	823.000 MHz	100.000 kHz	822.49201 MHz	-39.77 dBm	-26.77 dB
823.000 MHz	824.000 MHz	50.000 kHz	823.84531 MHz	-28.44 dBm	-15.44 dB
824.000 MHz	829.000 MHz	100.000 kHz	825.48601 MHz	7.38 dBm	-27.62 dB

Date: 1.JUL.2017 22:09:36



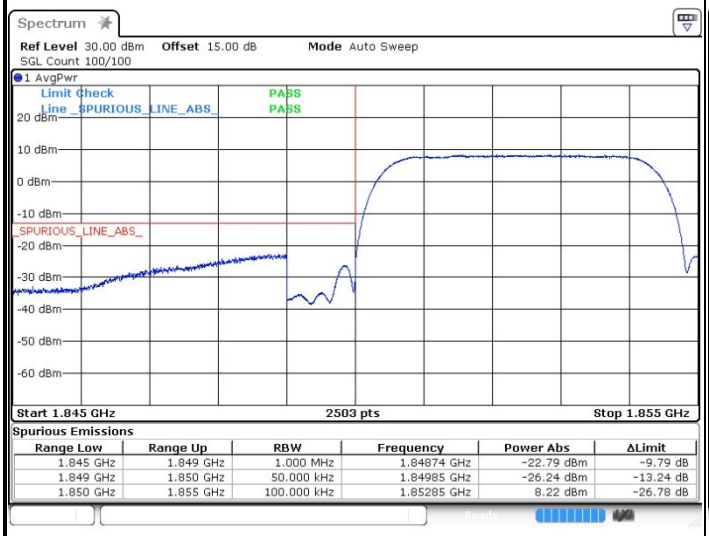
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
844.000 MHz	849.000 MHz	100.000 kHz	845.59091 MHz	7.67 dBm	-27.33 dB
849.000 MHz	850.000 MHz	50.000 kHz	849.16068 MHz	-28.68 dBm	-15.68 dB
850.000 MHz	855.000 MHz	100.000 kHz	850.50699 MHz	-39.59 dBm	-26.59 dB

Date: 1.JUL.2017 22:12:31

WCDMA Band II (RMC 12.2Kbps)

Lowest Band Edge

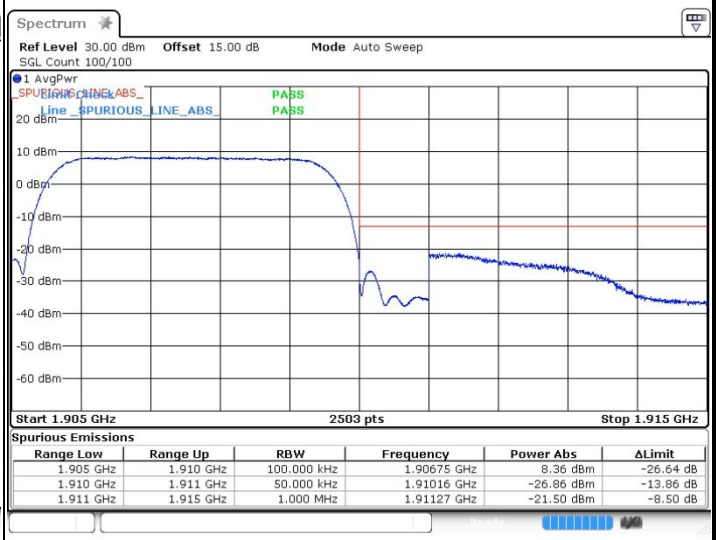


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.845 GHz	1.849 GHz	1.000 MHz	1.84874 GHz	-22.79 dBm	-9.79 dB
1.849 GHz	1.850 GHz	50.000 kHz	1.84985 GHz	-26.24 dBm	-13.24 dB
1.850 GHz	1.855 GHz	100.000 kHz	1.85285 GHz	8.22 dBm	-26.78 dB

Date: 1.JUL.2017 22:25:02

Highest Band Edge



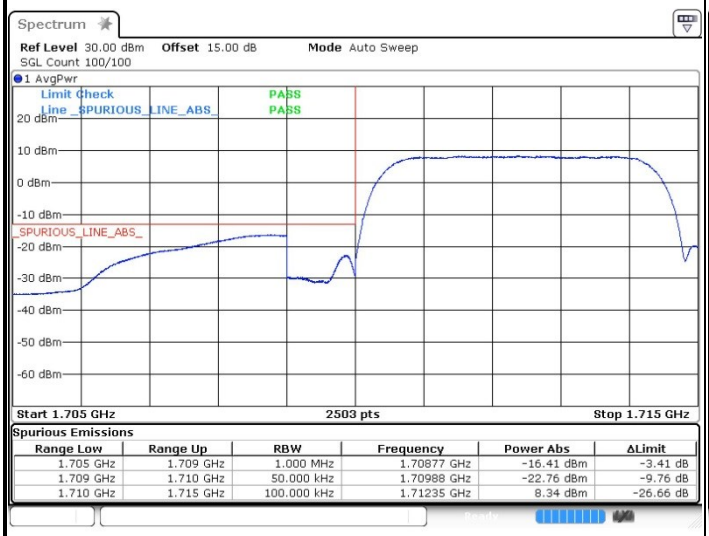
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.905 GHz	1.910 GHz	100.000 kHz	1.90675 GHz	8.36 dBm	-26.64 dB
1.910 GHz	1.911 GHz	50.000 kHz	1.91016 GHz	-26.86 dBm	-13.86 dB
1.911 GHz	1.915 GHz	1.000 MHz	1.91127 GHz	-21.50 dBm	-8.50 dB

Date: 1.JUL.2017 22:28:05

WCDMA Band IV (RMC 12.2Kbps)

Lowest Band Edge

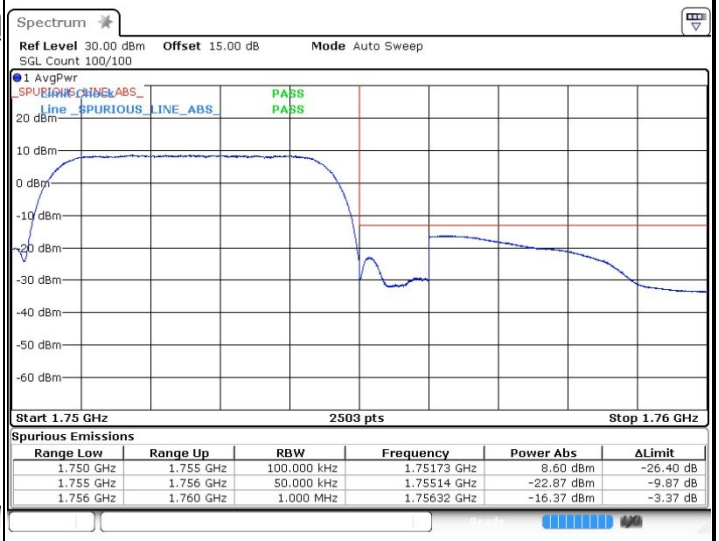


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.705 GHz	1.709 GHz	1.000 MHz	1.70877 GHz	-16.41 dBm	-3.41 dB
1.709 GHz	1.710 GHz	50.000 kHz	1.70988 GHz	-22.76 dBm	-9.76 dB
1.710 GHz	1.715 GHz	100.000 kHz	1.71235 GHz	8.34 dBm	-26.66 dB

Date: 1.JUL.2017 22:42:33

Highest Band Edge



Spurious Emissions

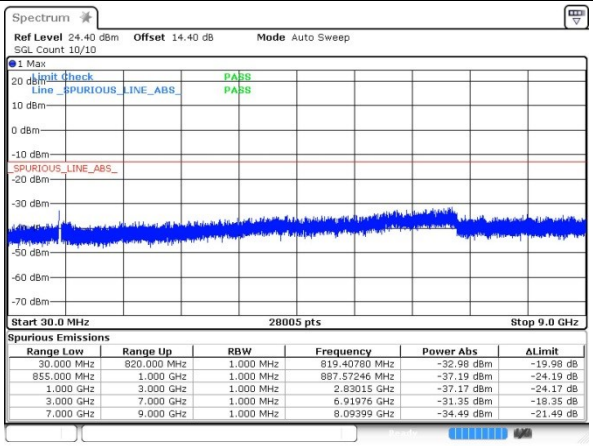
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.750 GHz	1.755 GHz	100.000 kHz	1.75173 GHz	8.60 dBm	-26.40 dB
1.755 GHz	1.756 GHz	50.000 kHz	1.75514 GHz	-22.87 dBm	-9.87 dB
1.756 GHz	1.760 GHz	1.000 MHz	1.75632 GHz	-16.37 dBm	-3.37 dB

Date: 1.JUL.2017 22:45:20

Conducted Spurious Emission

WCDMA Band V (RMC 12.2Kbps)

Lowest Channel

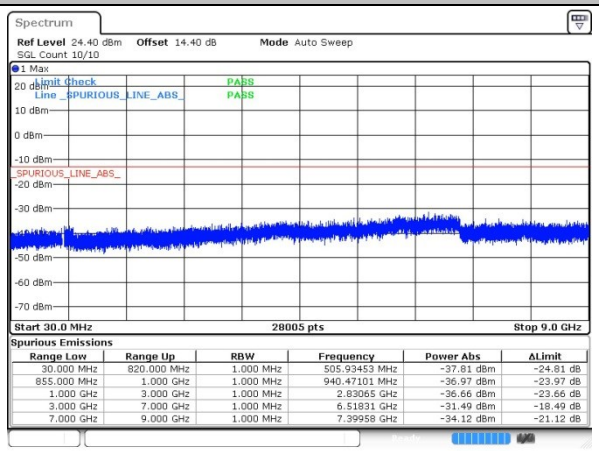


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	820.000 MHz	1.000 MHz	819.40780 MHz	-32.98 dBm	-19.98 dB
855.000 MHz	1.000 GHz	1.000 MHz	887.57246 MHz	-37.19 dBm	-24.19 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.83015 GHz	-37.17 dBm	-24.17 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.91976 GHz	-31.35 dBm	-18.35 dB
7.000 GHz	9.000 GHz	1.000 MHz	8.09399 GHz	-34.49 dBm	-21.49 dB

Date: 1.JUL.2017 22:01:23

Middle Channel

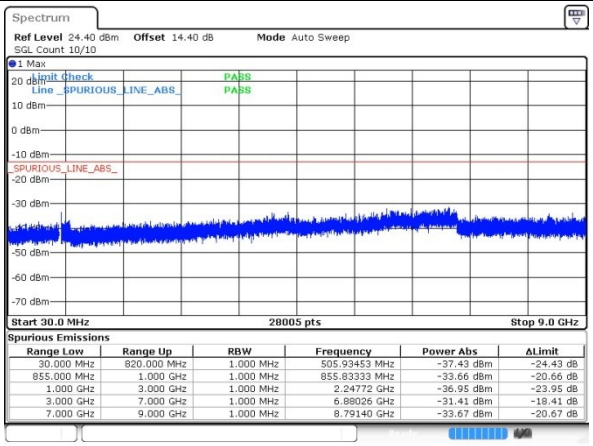


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	820.000 MHz	1.000 MHz	505.93453 MHz	-37.81 dBm	-24.81 dB
855.000 MHz	1.000 GHz	1.000 MHz	940.47101 MHz	-36.97 dBm	-23.97 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.83065 GHz	-36.66 dBm	-23.66 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.51831 GHz	-31.49 dBm	-18.49 dB
7.000 GHz	9.000 GHz	1.000 MHz	7.39958 GHz	-34.12 dBm	-21.12 dB

Date: 1.JUL.2017 22:02:47

Highest Channel



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	820.000 MHz	1.000 MHz	505.93453 MHz	-37.43 dBm	-24.43 dB
855.000 MHz	1.000 GHz	1.000 MHz	855.83333 MHz	-33.66 dBm	-20.66 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.24772 GHz	-36.95 dBm	-23.95 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.88026 GHz	-31.41 dBm	-18.41 dB
7.000 GHz	9.000 GHz	1.000 MHz	8.79140 GHz	-33.67 dBm	-20.67 dB

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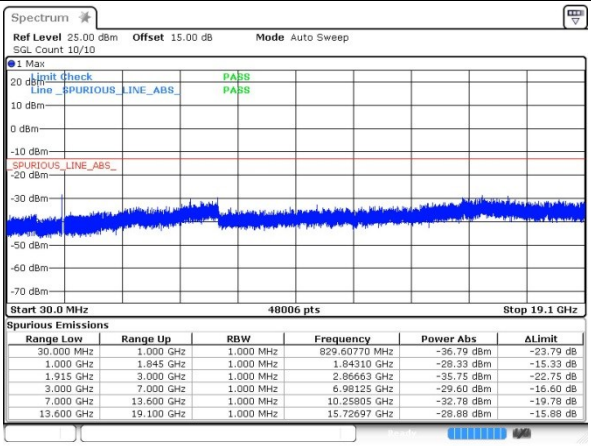
WCDMA Band II (RMC 12.2Kbps)

Lowest Channel

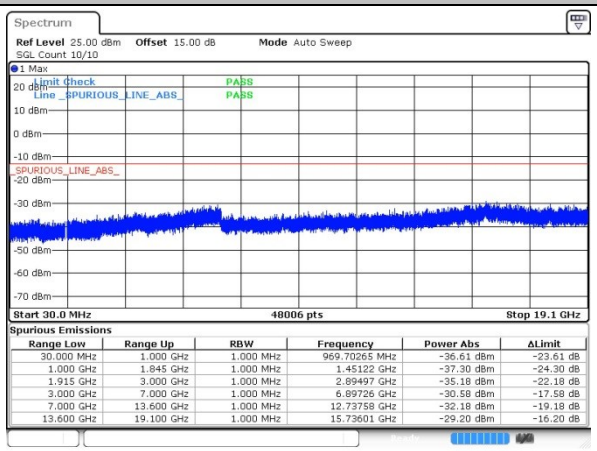


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	829.60770 MHz	-36.79 dBm	-23.79 dB
1.000 GHz	1.845 GHz	1.000 MHz	1.84310 GHz	-28.33 dBm	-15.33 dB
1.915 GHz	3.000 GHz	1.000 MHz	2.86663 GHz	-35.75 dBm	-22.75 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.98125 GHz	-29.60 dBm	-16.60 dB
7.000 GHz	13.600 GHz	1.000 MHz	10.25805 GHz	-32.78 dBm	-19.78 dB
13.600 GHz	19.100 GHz	1.000 MHz	15.72697 GHz	-28.88 dBm	-15.88 dB

Date: 1.JUL.2017 22:29:34

Middle Channel



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	969.70265 MHz	-36.61 dBm	-23.61 dB
1.000 GHz	1.845 GHz	1.000 MHz	1.45122 GHz	-37.30 dBm	-24.30 dB
1.915 GHz	3.000 GHz	1.000 MHz	2.89497 GHz	-35.18 dBm	-22.18 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.89726 GHz	-30.58 dBm	-17.58 dB
7.000 GHz	13.600 GHz	1.000 MHz	12.73758 GHz	-32.18 dBm	-19.18 dB
13.600 GHz	19.100 GHz	1.000 MHz	15.73601 GHz	-29.20 dBm	-16.20 dB

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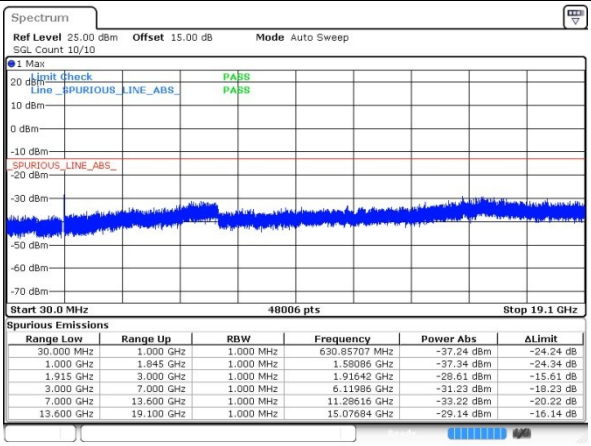
Highest Channel



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	630.85707 MHz	-37.24 dBm	-24.24 dB
1.000 GHz	1.845 GHz	1.000 MHz	1.58086 GHz	-37.34 dBm	-24.34 dB
1.915 GHz	3.000 GHz	1.000 MHz	1.91642 GHz	-28.61 dBm	-15.61 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.11986 GHz	-31.23 dBm	-18.23 dB
7.000 GHz	13.600 GHz	1.000 MHz	11.28616 GHz	-33.22 dBm	-20.22 dB
13.600 GHz	19.100 GHz	1.000 MHz	15.07684 GHz	-29.14 dBm	-16.14 dB

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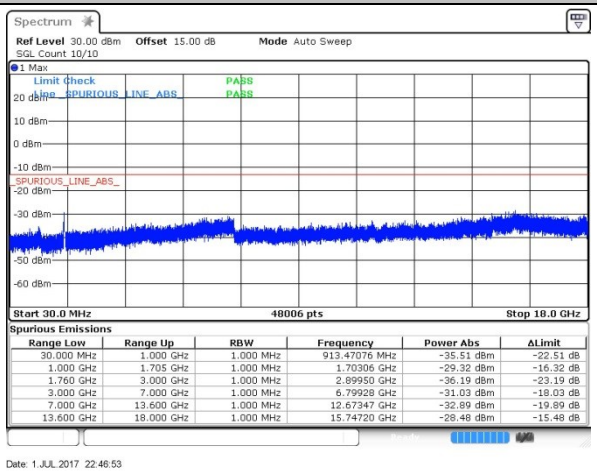
WCDMA Band IV (RMC 12.2Kbps)

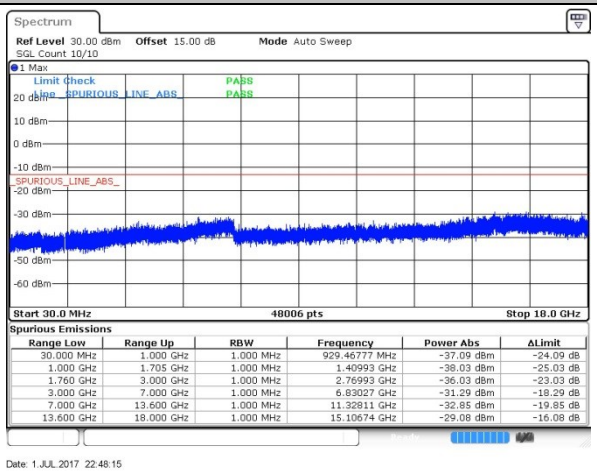
Lowest Channel



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	913.47076 MHz	-35.51 dBm	-22.51 dB
1.000 GHz	1.705 GHz	1.000 MHz	1.70306 GHz	-29.32 dBm	-16.32 dB
1.760 GHz	3.000 GHz	1.000 MHz	2.89950 GHz	-36.19 dBm	-23.19 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.79928 GHz	-31.03 dBm	-18.03 dB
7.000 GHz	13.600 GHz	1.000 MHz	12.67347 GHz	-32.89 dBm	-19.89 dB
13.600 GHz	18.000 GHz	1.000 MHz	15.74720 GHz	-28.48 dBm	-15.48 dB

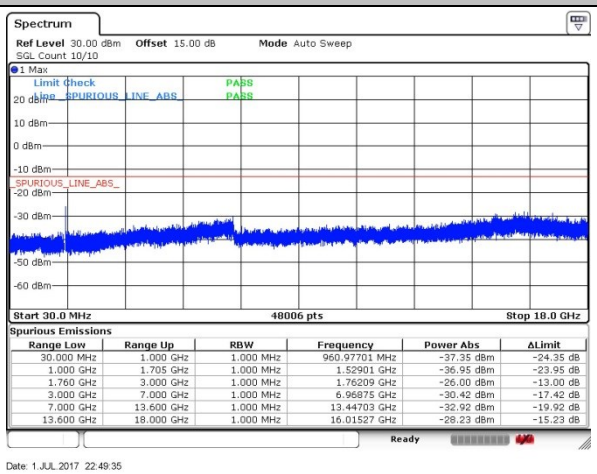
Middle Channel



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	929.46777 MHz	-37.09 dBm	-24.09 dB
1.000 GHz	1.705 GHz	1.000 MHz	1.40993 GHz	-38.03 dBm	-25.03 dB
1.760 GHz	3.000 GHz	1.000 MHz	2.76993 GHz	-36.03 dBm	-23.03 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.83027 GHz	-31.29 dBm	-18.29 dB
7.000 GHz	13.600 GHz	1.000 MHz	11.32811 GHz	-32.85 dBm	-19.85 dB
13.600 GHz	18.000 GHz	1.000 MHz	15.10674 GHz	-29.08 dBm	-16.08 dB

Highest Channel



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	960.97701 MHz	-37.35 dBm	-24.35 dB
1.000 GHz	1.705 GHz	1.000 MHz	1.52901 GHz	-36.95 dBm	-23.95 dB
1.760 GHz	3.000 GHz	1.000 MHz	1.76209 GHz	-26.00 dBm	-13.00 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.96875 GHz	-30.42 dBm	-17.42 dB
7.000 GHz	13.600 GHz	1.000 MHz	13.44703 GHz	-32.92 dBm	-19.92 dB
13.600 GHz	18.000 GHz	1.000 MHz	16.01527 GHz	-28.23 dBm	-15.23 dB

Frequency Stability

Test Conditions	Middle Channel	WCDMA Band V (RMC 12.2Kbps)	Limit 2.5ppm
Temperature (°C)	Voltage (Volt)	Deviation (ppm)	Result
50	Normal Voltage	0.0179	PASS
40	Normal Voltage	0.0143	
30	Normal Voltage	0.0048	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0012	
0	Normal Voltage	0.0024	
-10	Normal Voltage	0.0203	
-20	Normal Voltage	0.0251	
-30	Normal Voltage	0.0096	
20	Maximum Voltage	0.0227	
20	Normal Voltage	0.0024	
20	Battery End Point	0.0191	

Note:

1. Normal Voltage = 3.82V. ；Battery End Point (BEP) =3.65V.；Maximum Voltage =4.4 V
2. The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.

Test Conditions	Middle Channel	WCDMA Band II (RMC 12.2Kbps)	Limit Note 2.
Temperature (°C)	Voltage (Volt)	Deviation (ppm)	Result
50	Normal Voltage	0.0064	PASS
40	Normal Voltage	0.0043	
30	Normal Voltage	0.0032	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0027	
0	Normal Voltage	0.0005	
-10	Normal Voltage	0.0122	
-20	Normal Voltage	0.0138	
-30	Normal Voltage	0.0011	
20	Maximum Voltage	0.0154	
20	Normal Voltage	0.0117	
20	Battery End Point	0.0112	

Note:

3. Normal Voltage = 3.82V. ；Battery End Point (BEP) =3.65V.；Maximum Voltage =4.4 V

4. The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.

Test Conditions	Middle Channel	WCDMA Band IV (RMC 12.2Kbps)	Limit Note 2.
Temperature (°C)	Voltage (Volt)	Deviation (ppm)	Result
50	Normal Voltage	0.0052	PASS
40	Normal Voltage	0.0012	
30	Normal Voltage	0.0040	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0023	
0	Normal Voltage	0.0029	
-10	Normal Voltage	0.0063	
-20	Normal Voltage	0.0075	
-30	Normal Voltage	0.0092	
20	Maximum Voltage	0.0035	
20	Normal Voltage	0.0017	
20	Battery End Point	0.0087	

Note:

1. Normal Voltage = 3.82V. ；Battery End Point (BEP) = 3.65V.；Maximum Voltage =4.4V
2. The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.

Appendix B. Test Results of Radiated Test

Radiated Spurious Emission

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	-68.05	-13	-55.05	-70.65	-70.37	1.33	5.80	H
	2512	-51.41	-13	-38.41	-60.98	-54.58	1.58	6.90	H
	3345	-66.67	-13	-53.67	-75.88	-70.17	1.85	7.50	H
	1672	-69.18	-13	-56.18	-71.05	-71.50	1.33	5.80	V
	2510	-59.13	-13	-46.13	-67.10	-62.30	1.58	6.90	V
	3345	-66.75	-13	-53.75	-75.77	-70.25	1.85	7.50	V

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

WCDMA Band II(RMC 12.2Kbps)									
Channel	Frequency (MHz)	EIRP (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	3762	-56.75	-13	-43.75	-70.99	-58.46	5.08	6.80	H
	5640	-58.73	-13	-45.73	-75.53	-60.40	8.03	9.70	H
	7521	-55.20	-13	-42.20	-76.50	-57.58	9.43	11.81	H
	3762	-59.46	-13	-46.46	-71.89	-61.17	5.08	6.80	V
	5640	-58.52	-13	-45.52	-75.61	-60.19	8.03	9.70	V
	7521	-54.36	-13	-41.36	-75.5	-56.74	9.43	11.81	V

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

WCDMA Band IV(RMC 12.2Kbps)									
Channel	Frequency (MHz)	EIRP (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	3465	-65.51	-13	-52.51	-74.41	-69.48	4.87	8.84	H
	5199	-65.48	-13	-52.48	-76.41	-66.92	7.70	9.14	H
	6930	-57.26	-13	-44.26	-75.73	-58.94	8.98	10.66	H
	3465	-62.42	-13	-49.42	-74.04	-66.39	4.87	8.84	V
	5197.8	-62.03	-13	-49.03	-76.08	-63.47	7.70	9.14	V
	6930	-58.02	-13	-45.02	-76.04	-59.70	8.98	10.66	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 FG761702-01A which is issued separately.