FCC RF Test Report

APPLICANT	:	Motorola Mobility LLC
EQUIPMENT	:	Mobile Cellular Phone
BRAND NAME	:	Motorola
MODEL NAME	:	9889, 9890
FCC ID	:	IHDT56WE3
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 Jan. 19, 2017 and testing was completed on Mar. 01, 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.

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APPENDIX A. TEST RESULTS OF CONDUCTED TEST

APPENDIX B. TEST RESULTS OF RADIATED TEST

APPENDIX C. TEST SETUP PHOTOGRAPHS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG711902A	Rev. 01	Initial issue of report	Mar. 30, 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 22	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 28.26 dB at 2508.000 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	9889, 9890
FCC ID	IHDT56WE3
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/DC-HSDPA/HSPA+/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: 355647080006454/355647080006462 Radiation: 355647080005316/355647080005324
HW Version	WKHMA1B2-2
SW Version	NRD90M.05 for Single SIM mobile NRD90M.04 for Dual SIM mobile
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 sample 1 and sample 2, the differences between two samples are only for SIM slot, sample 1(model name: 9889) is dual SIM slot, sample 2(model name: 9890) is single SIM slot. According to the difference, the Sample 1 to perform 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 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	**GSM/GPRS/EDGE:** 850: 33.39 dBm 1900: 29.96 dBm **WCDMA:** Band V: 23.42 dBm Band II: 22.70 dBm Band IV: 22.88 dBm
Antenna Type	PIFA Antenna
Antenna Gain	Cellular Band: -0.36 dBi PCS Band: 1.95 dBi AWS Band: 1.50 dBi
Type of Modulation	GSM: GMSK GPRS: GMSK EDGE: GMSK / 8PSK WCDMA : BPSK (Uplink) HSDPA/DC-HSDPA : QPSK (Uplink) HSUPA : QPSK (Uplink) HSPA+ : 16QAM 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 IN	**Brand Name**	Motorola (AcBel)	**Model Name**	C-P49 SPN5946A
	Power Rating	I/P: 100-240 Vac, 300mA, O/P: 5.2 Vdc, 2000mA		
AC Adapter US	**Brand Name**	Motorola (AcBel)	**Model Name**	C-P35 SPN5945A
	Power Rating	I/P: 100-240 Vac, 300mA, O/P: 5.2 Vdc, 2000mA		
AC Adapter EU	**Brand Name**	Motorola (AcBel)	**Model Name**	C-P36 SPN5944A
	Power Rating	I/P: 100-240 Vac, 300mA, O/P: 5.2 Vdc, 2000mA		
AC Adapter UK	**Brand Name**	Motorola (AcBel)	**Model Name**	C-P37 SPN5940A
	Power Rating	I/P: 100-240 Vac, 300mA, O/P: 5.2 Vdc, 2000mA		
AC Adapter AR	**Brand Name**	Motorola (AcBel)	**Model Name**	C-P47 SPN5942A
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5.2 Vdc, 2000mA		
Battery	**Brand Name**	Motorola (Sunwoda)	**Model Name**	HC60
	Power Rating	3.8Vdc,3780/4000mAh (Min/Typ)	**Type**	Li-ion
Earphone	**Brand Name**	Motorola (hetong)	**Model Name**	PY-13A1602-01KC39
	Signal Line Type	1.3 meter, non-shielded cable, without ferrite core		
USB Cable	**Brand Name**	Motorola (Sai Bao)	**Model Name**	SYD-A017A
	Signal Line Type	1.0 meter, shielded cable, without ferrite core		

1.7 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 22	GSM850 GSM	GMSK	1.2246	0.0395 ppm	245KGXW
Part 22	GSM850 EDGE class 8	8PSK	0.3097	0.0239 ppm	250KG7W
Part 22	WCDMA Band V RMC 12.2Kbps	BPSK	0.1233	0.0407 ppm	4M21F9W
Part 24	GSM1900 GSM	GMSK	1.5524	0.0176 ppm	246KGXW
Part 24	GSM1900 EDGE class 8	8PSK	0.5821	0.0133 ppm	246KG7W
Part 24	WCDMA Band II RMC 12.2Kbps	BPSK	0.2917	0.0186 ppm	4M22F9W
Part 27	WCDMA Band IV RMC 12.2Kbps	BPSK	0.2742	0.0219 ppm	4M20F9W

1.8 Testing Location

Test Site	Sporton International (KunShan) INC.		
Test Site Location	No.3-2, Pingxiang Road, Kunshan Development Zone, Jiangsu, China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958		
Test Site No.	**Sporton Site No.**		**FCC Registration No.**
	TH01-KS	03CH02-KS	418269
		03CH03-KS	306251

1.9 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 GSM850 and WCDMA Band V.
2. 30 MHz to 10th harmonic for WCDMA Band IV.
3. 30 MHz to 10th harmonic for GSM1900 and WCDMA Band II.

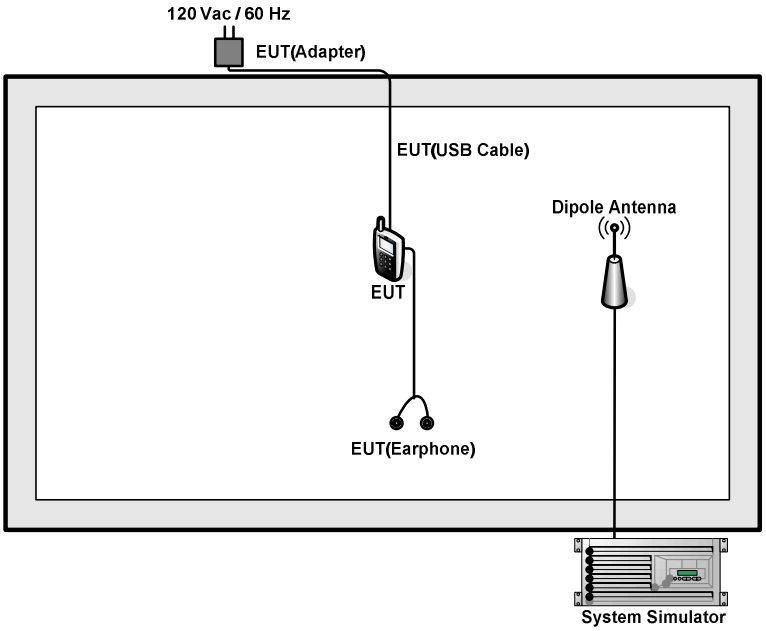
All modes and data rates and positions were investigated.

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

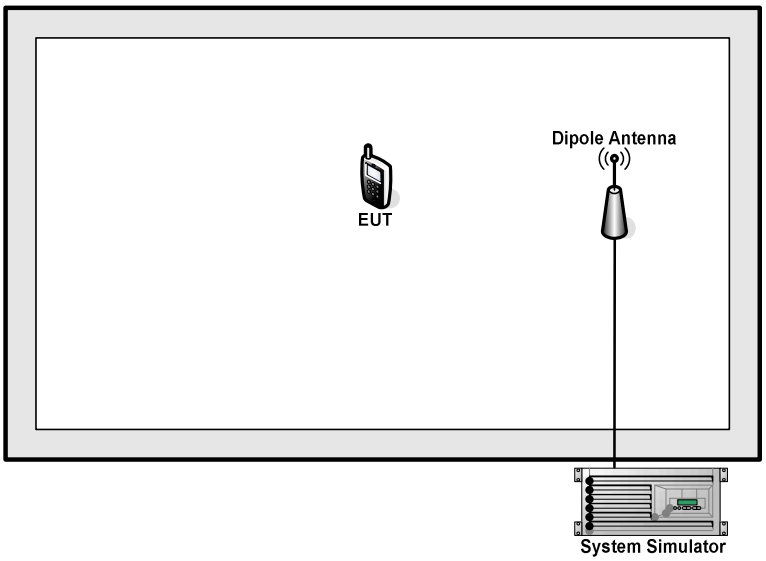
Test Modes		
Band	**Radiated TCs**	**Conducted TCs**
GSM 850	■ GSM Link ■ EDGE class 8 Link	■ GSM Link ■ EDGE class 8 Link
GSM 1900	■ GSM Link ■ EDGE class 8 Link	■ GSM Link ■ EDGE class 8 Link
WCDMA Band V	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link
WCDMA Band II	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link
WCDMA Band IV	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link

2.2 Connection Diagram of Test System

For 22H



For 24E/27L



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 4.7 dB and a 10dB attenuator.

Example :

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

= 4.7 + 10 = 14.7 (dB)

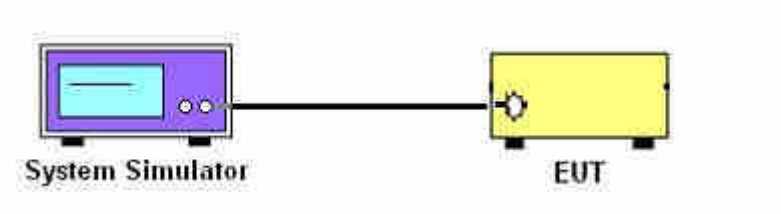
3 Conducted Test Result

3.1 Measuring Instruments

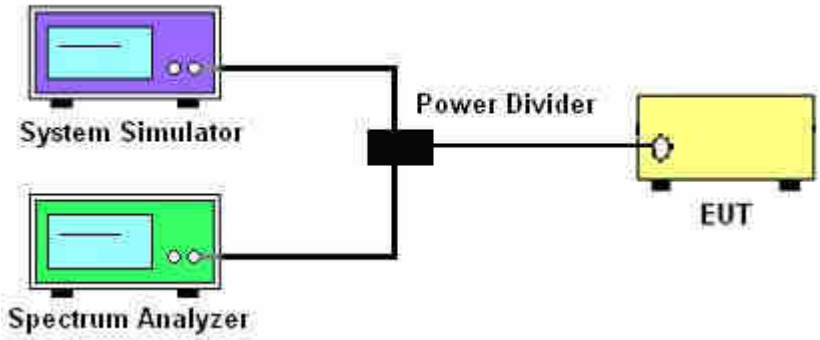
See list of measuring instruments of this test report.

3.2 Test Setup

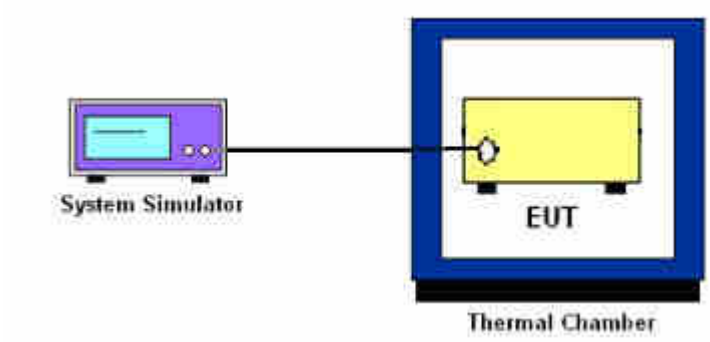
3.2.1 Conducted Output Power



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 GSM850 and WCDMA Band V.

The EIRP of mobile transmitters must not exceed 2 Watts for GSM1900 and 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.

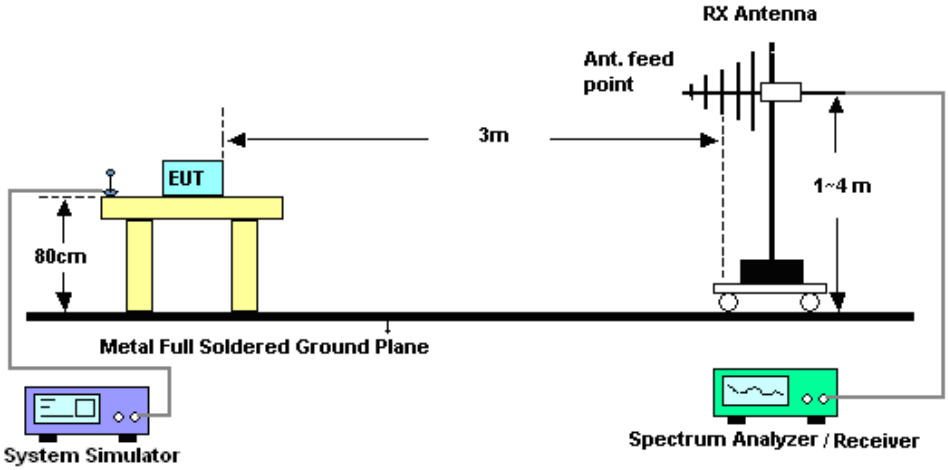
4 Radiated Test Items

4.1 Measuring Instruments

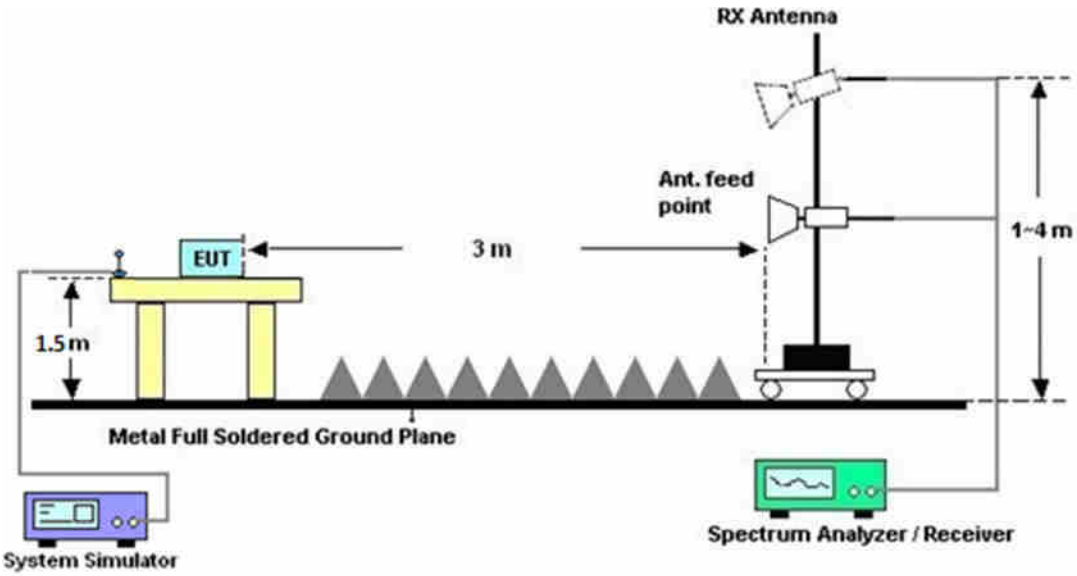
See list of measuring instruments of this test report.

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	Feb. 18, 2017~ Mar. 01, 2017	Aug. 08, 2017	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Oct. 13, 2016	Feb. 18, 2017~ Mar. 01, 2017	Oct. 12, 2017	Conducted (TH01-KS)
Radio communication analyzer	Anritsu	MT8820C	6201300652	2G/3G/LTE Band	Aug. 08, 2016	Feb. 18, 2017~ Mar. 01, 2017	Aug. 07, 2017	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Aug. 09, 2016	Feb. 16, 2017	Aug. 08, 2017	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150208	10Hz~44GHz, MAX 30dB	Apr. 22, 2016	Feb. 16, 2017	Apr. 21, 2017	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6112D	37879	30MHz~2GHz	Aug. 20, 2016	Feb. 16, 2017	Aug. 19, 2017	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Oct. 22, 2016	Feb. 16, 2017	Oct. 21, 2017	Radiation (03CH02-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Feb. 15, 2017	Feb. 16, 2017	Feb. 14, 2018	Radiation (03CH02-KS)
Amplifier	com-power	PA-103A	161069	1kHz~1000MHz / 32 dB	Apr. 22, 2016	Feb. 16, 2017	Apr. 21, 2017	Radiation (03CH02-KS)
Amplifier	Agilent	8449B	3008A02384	1~26.5GHz Gain 30dB	Oct. 13, 2016	Feb. 16, 2017	Oct. 12, 2017	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Feb. 16, 2017	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Feb. 16, 2017	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Feb. 16, 2017	NCR	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz~44GHz	Apr. 22, 2016	Feb. 16, 2017	Apr. 21, 2017	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	35406	25MHz~2GHz	Apr. 16, 2016	Feb. 16, 2017	Apr. 15, 2017	Radiation (03CH03-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1356	1GHz~18GHz	Apr. 16, 2016	Feb. 16, 2017	Apr. 15, 2017	Radiation (03CH03-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Mar. 03, 2016	Feb. 16, 2017	Mar. 02, 2017	Radiation (03CH03-KS)
Amplifier	SONOMA	310N	187289	9kHz~1GHz	Aug. 09, 2016	Feb. 16, 2017	Aug. 08, 2017	Radiation (03CH03-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Oct. 13, 2016	Feb. 16, 2017	Oct. 12, 2017	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Feb. 16, 2017	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Feb. 16, 2017	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Feb. 16, 2017	NCR	Radiation (03CH03-KS)

NCR: No Calibration Required

6 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz) for 03CH02-KS

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.2dB

Uncertainty of Radiated Emission Measurement (1GHz ~ 18 GHz) for 03CH02-KS

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.7dB

Uncertainty of Radiated Emission Measurement (18GHz ~ 40GHz) for 03CH02-KS

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.3dB

Uncertainty of Radiated Emission Measurement (25 MHz ~ 1000 MHz) for 03CH03-KS

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

Uncertainty of Radiated Emission Measurement (1GHz ~ 40 GHz) for 03CH03-KS

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			GSM1900		
Channel	128	189	251	512	661	810
Frequency	824.2	836.4	848.8	1850.2	1880.0	1909.8
GSM	33.39	33.20	33.18	29.91	29.87	29.96
GPRS class 8	33.37	33.19	33.19	29.90	29.89	29.94
GPRS class 10	32.73	32.52	32.49	29.18	29.18	29.24
GPRS class 11	31.02	30.70	30.66	27.52	27.51	27.56
GPRS class 12	29.91	29.62	29.58	26.45	26.44	26.50
EGPRS class 8	27.42	27.32	27.32	25.29	25.70	25.64
EGPRS class 10	26.35	26.25	26.27	24.70	24.58	24.61
EGPRS class 11	24.36	24.26	24.27	22.59	22.48	22.47
EGPRS class 12	23.02	23.04	23.07	21.36	21.25	21.24

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	23.32	23.16	23.41	22.66	22.69	22.48	22.76	22.86	22.58
RMC 12.2Kbps	23.33	23.16	23.42	22.68	22.70	22.50	22.77	22.88	22.60
HSDPA Subtest-1	22.06	21.93	22.25	21.46	21.60	21.29	21.67	21.71	21.45
HSDPA Subtest-2	22.06	21.95	22.25	21.44	21.58	21.34	21.70	21.72	21.44
HSDPA Subtest-3	21.61	21.50	21.71	21.02	21.13	20.87	21.21	21.27	20.99
HSDPA Subtest-4	21.57	21.47	21.76	21.01	21.09	20.84	21.18	21.27	20.96
DC-HSDPA Subtest-1	21.99	21.74	22.11	21.30	21.21	21.18	21.41	21.36	21.28
DC-HSDPA Subtest-2	21.93	21.69	22.09	21.25	21.18	21.16	21.36	21.34	21.25
DC-HSDPA Subtest-3	21.41	21.21	21.50	20.69	20.65	20.59	20.80	20.83	20.67
DC-HSDPA Subtest-4	21.41	21.17	21.55	20.70	20.66	20.57	20.80	20.82	20.68
HSUPA Subtest-1	20.03	19.98	20.22	19.57	19.66	19.33	19.66	19.74	19.44
HSUPA Subtest-2	20.03	19.93	20.24	19.51	19.62	19.34	19.70	19.78	19.47
HSUPA Subtest-3	21.04	20.93	21.23	20.48	20.59	20.35	20.67	20.77	20.44
HSUPA Subtest-4	19.52	19.37	19.71	19.08	19.14	18.84	19.18	19.26	18.92
HSUPA Subtest-5	22.10	21.90	22.20	21.50	21.60	21.30	21.70	21.70	21.40
HSPA+ (16QAM) Subtest-1	19.88	19.65	20.01	19.19	19.17	19.20	19.25	19.29	19.16

ERP/EIRP

GSM850 (G_T - L_C= -0.36dB)			
Channel	128	189	251
	(Low)	(Mid)	(High)
Frequency (MHz)	824.2	836.4	848.8
Conducted Power (dBm)	33.39	33.20	33.18
Conducted Power (Watts)	2.1827	2.0893	2.0797
ERP(dBm)	30.88	30.69	30.67
ERP(Watts)	1.2246	1.1722	1.1668

EDGE850 (G_T - L_C= -0.36dB)			
Channel	128	189	251
	(Low)	(Mid)	(High)
Frequency (MHz)	824.2	836.4	848.8
Conducted Power (dBm)	27.42	27.32	27.32
Conducted Power (Watts)	0.5521	0.5395	0.5395
ERP(dBm)	24.91	24.81	24.81
ERP(Watts)	0.3097	0.3027	0.3027

GSM1900 (G_T - L_C= 1.95dB)			
Channel	512	661	810
	(Low)	(Mid)	(High)
Frequency (MHz)	1850.2	1880	1909.8
Conducted Power (dBm)	29.91	29.87	29.96
Conducted Power (Watts)	0.9795	0.9705	0.9908
EIRP(dBm)	31.86	31.82	31.91
EIRP(Watts)	1.5346	1.5205	1.5524

EDGE1900 (G_T - L_C= 1.95dB)			
Channel	512	661	810
	(Low)	(Mid)	(High)
Frequency (MHz)	1850.2	1880	1909.8
Conducted Power (dBm)	25.29	25.70	25.64
Conducted Power (Watts)	0.3381	0.3715	0.3664
EIRP(dBm)	27.24	27.65	27.59
EIRP(Watts)	0.5297	0.5821	0.5741

WCDMA Band V (G_T - $L_{C=}$ -0.36dB)			
Channel	4132	4182	4233
	(Low)	(Mid)	(High)
Frequency (MHz)	826.4	836.4	846.6
Conducted Power (dBm)	23.33	23.16	23.42
Conducted Power (Watts)	0.2153	0.2070	0.2198
ERP(dBm)	20.82	20.65	20.91
ERP(Watts)	0.1208	0.1161	0.1233

WCDMA Band II (G_T - $L_{C=}$ 1.95dB)			
Channel	9262	9400	9538
	(Low)	(Mid)	(High)
Frequency (MHz)	1852.4	1880	1907.6
Conducted Power (dBm)	22.68	22.70	22.50
Conducted Power (Watts)	0.1854	0.1862	0.1778
EIRP(dBm)	24.63	24.65	24.45
EIRP(Watts)	0.2904	0.2917	0.2786

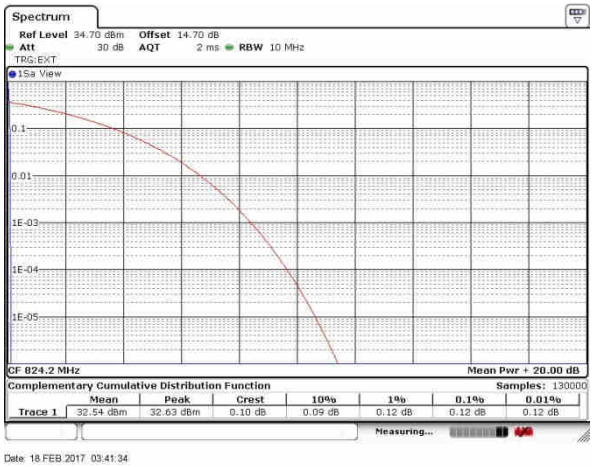
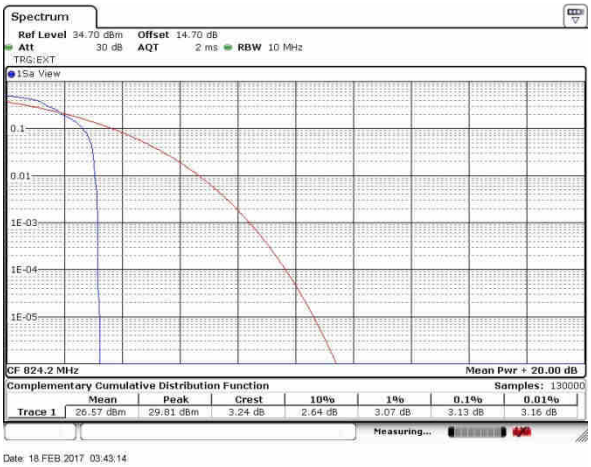
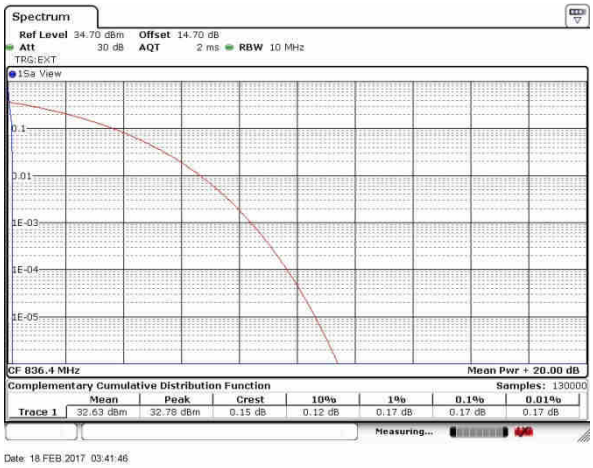
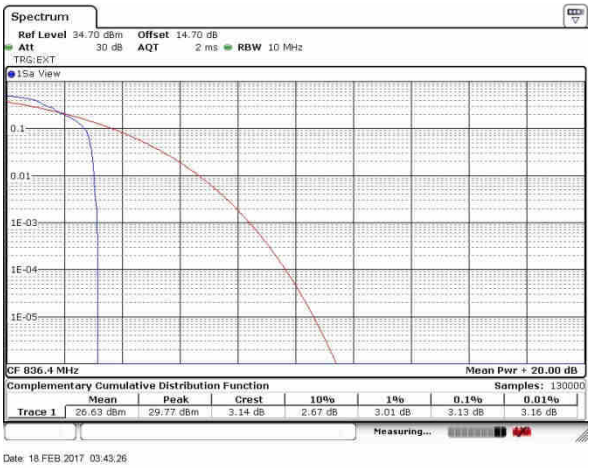
WCDMA Band IV (G_T - $L_{C=}$ 1.50dB)			
Channel	1312	1413	1513
	(Low)	(Mid)	(High)
Frequency (MHz)	1712.4	1732.6	1752.6
Conducted Power (dBm)	22.77	22.88	22.60
Conducted Power (Watts)	0.1892	0.1941	0.1820
EIRP(dBm)	24.27	24.38	24.10
EIRP(Watts)	0.2673	0.2742	0.2570

Peak-to-Average Ratio

Mode	GSM850		Limit: 13dB
Mod.	GSM	EDGE class 8	Result
Lowest CH	0.12	3.13	PASS
Middle CH	0.17	3.13	
Highest CH	0.12	3.13	

Mode	GSM1900		Limit: 13dB
Mod.	GSM	EDGE class 8	Result
Lowest CH	0.12	3.36	PASS
Middle CH	0.14	3.13	
Highest CH	0.12	3.10	

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	2.72	2.38	2.61	PASS
Middle CH	3.01	2.67	2.78	
Highest CH	2.70	2.32	2.75	

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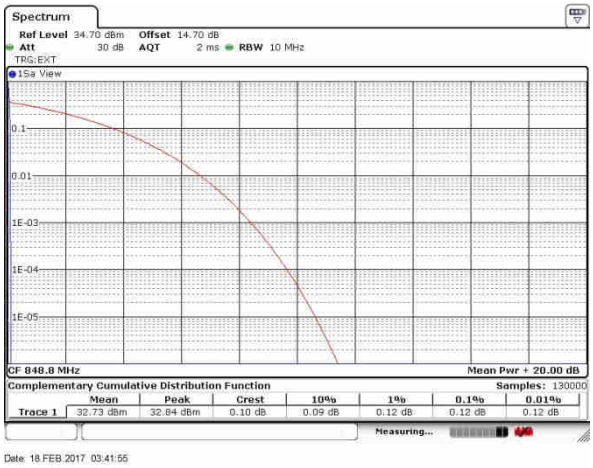
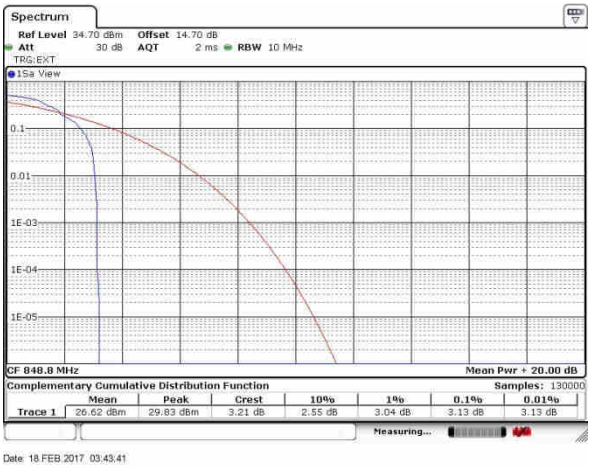
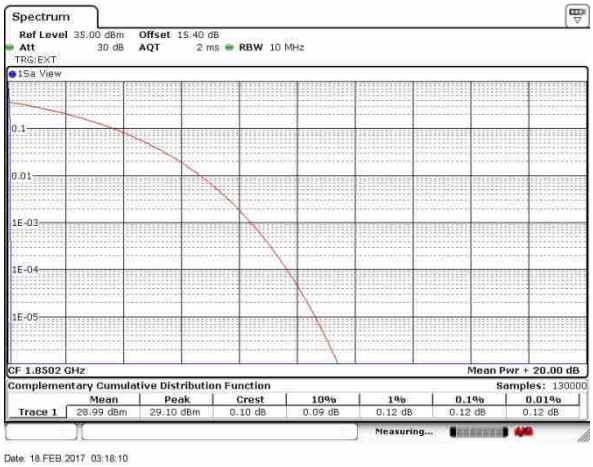
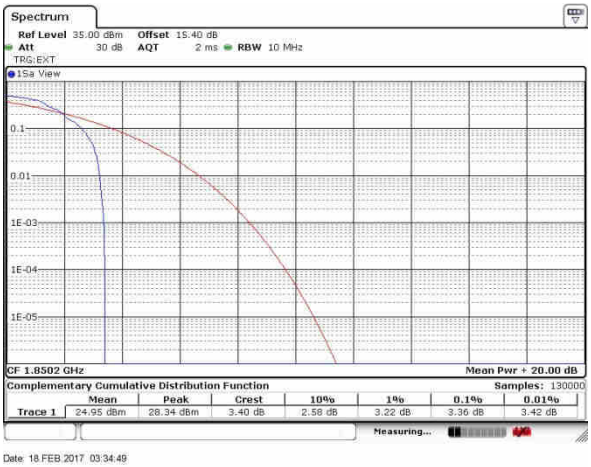
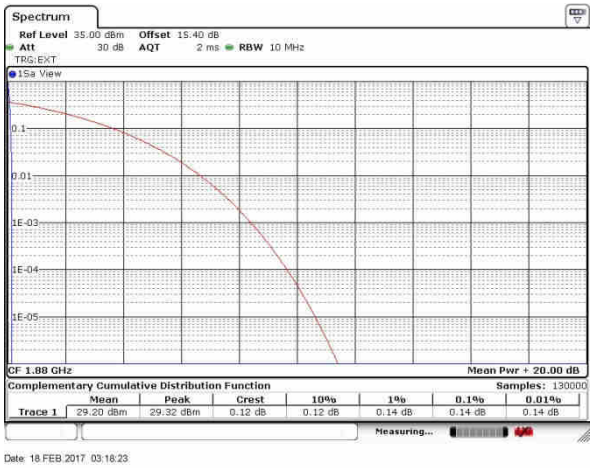
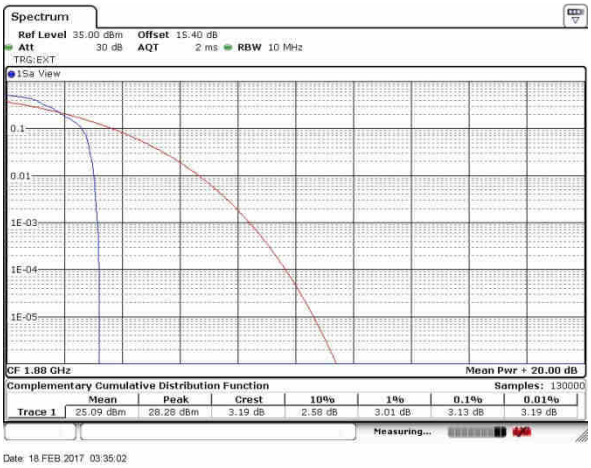
	

GSM1900 (GSM)	GSM1900 (EDGE class 8)
Lowest Channel	**Lowest Channel**
	
Middle Channel	**Middle Channel**
	
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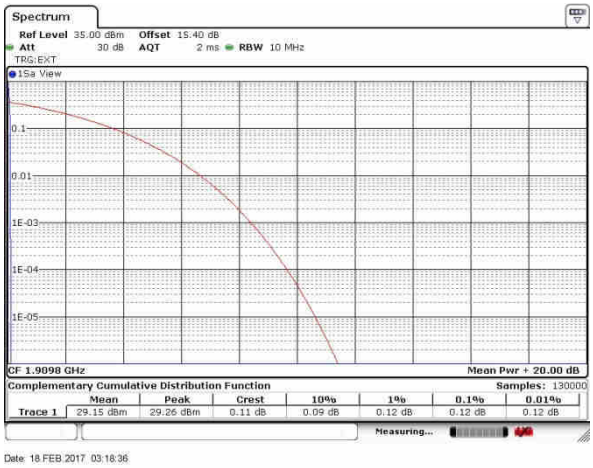
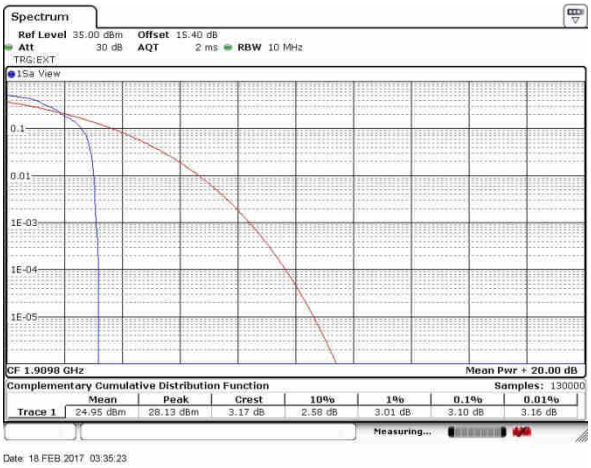
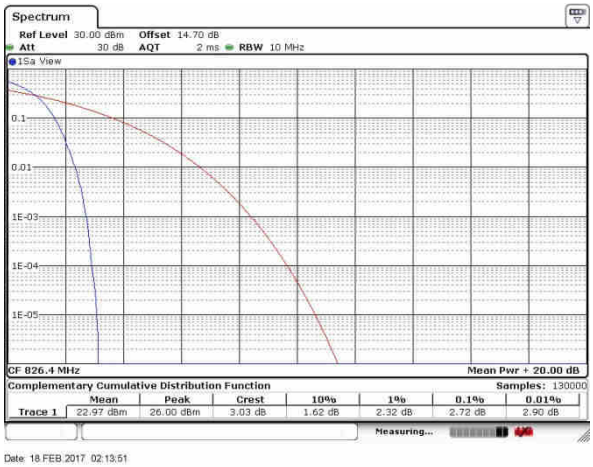
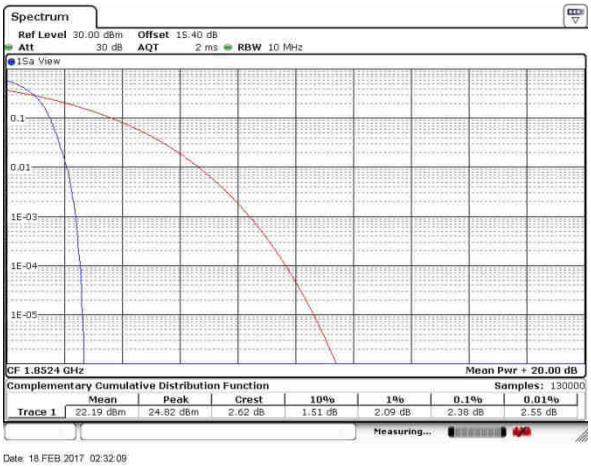
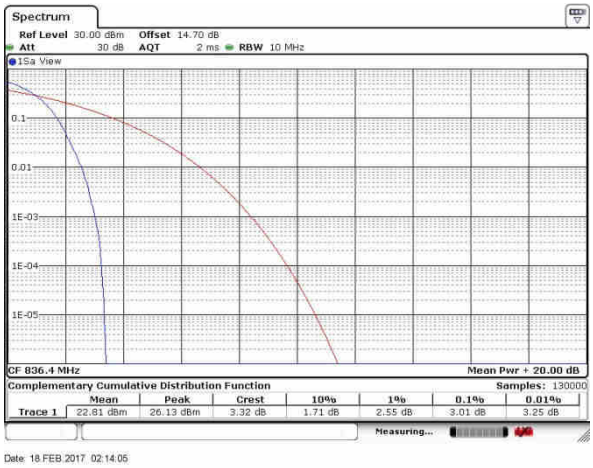
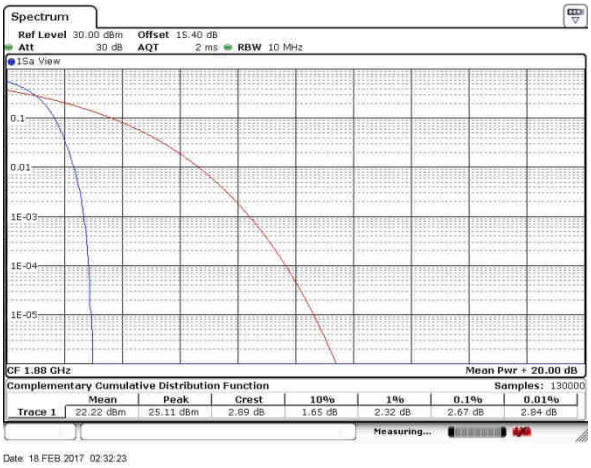
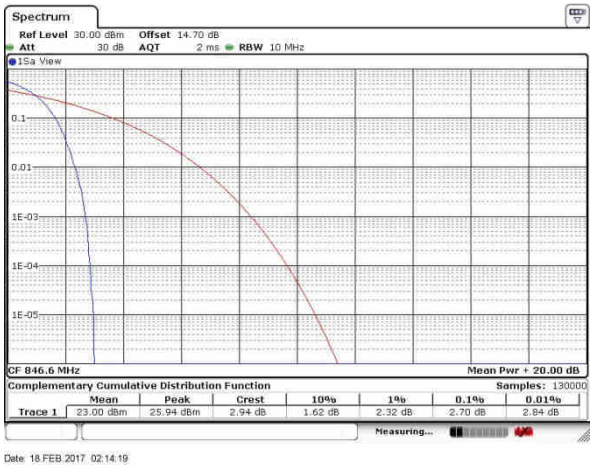
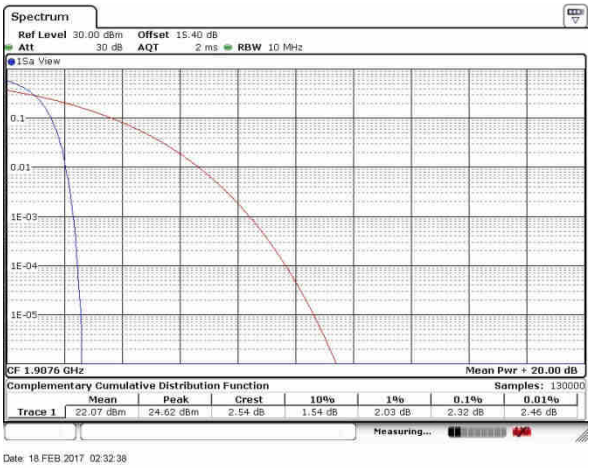
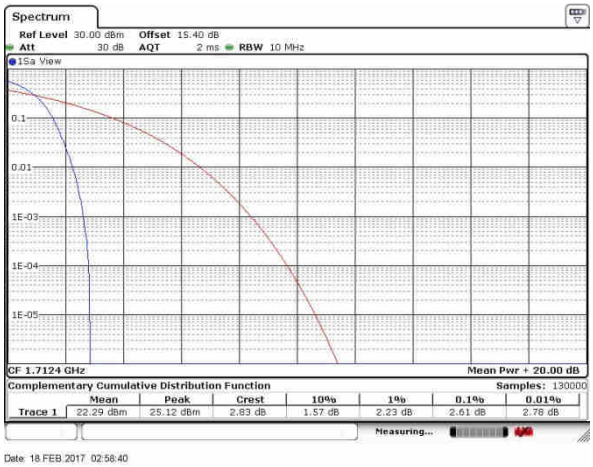
	

WCDMA Band V (RMC 12.2Kbps)	WCDMA Band II (RMC 12.2Kbps)
Lowest Channel	**Lowest Channel**
	
Middle Channel	**Middle Channel**
	
Highest Channel	**Highest Channel**
	

WCDMA Band IV (RMC 12.2Kbps)	
Lowest Channel	
	
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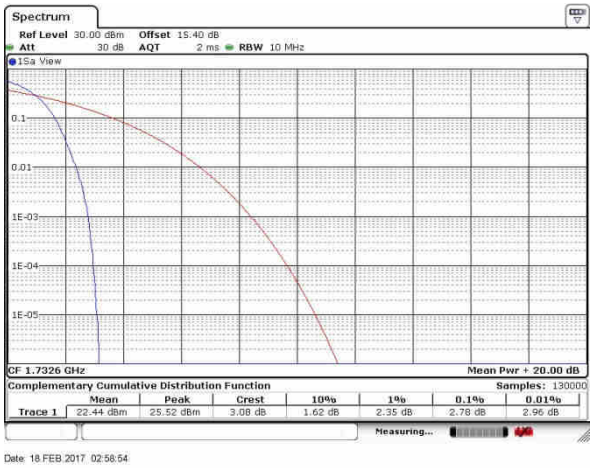	
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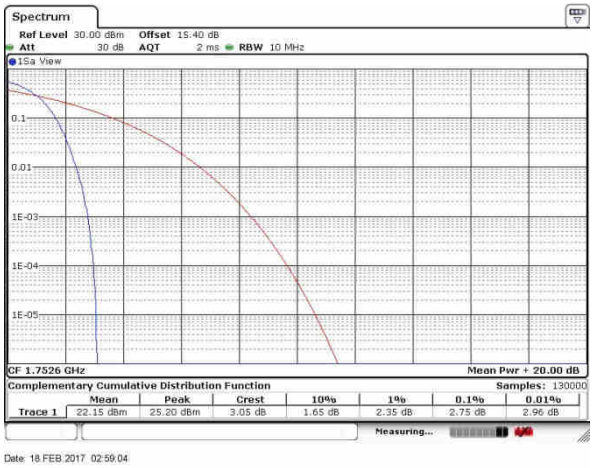
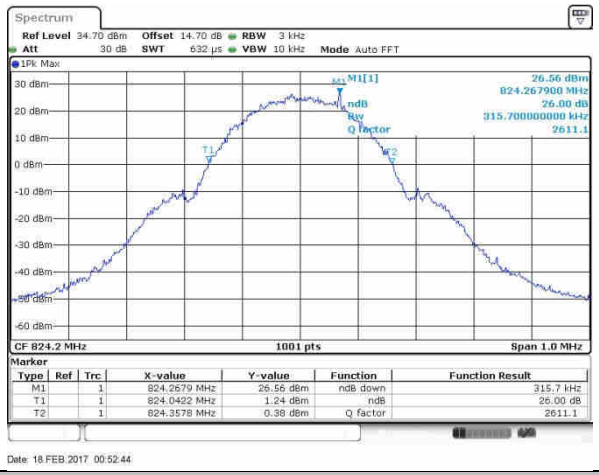
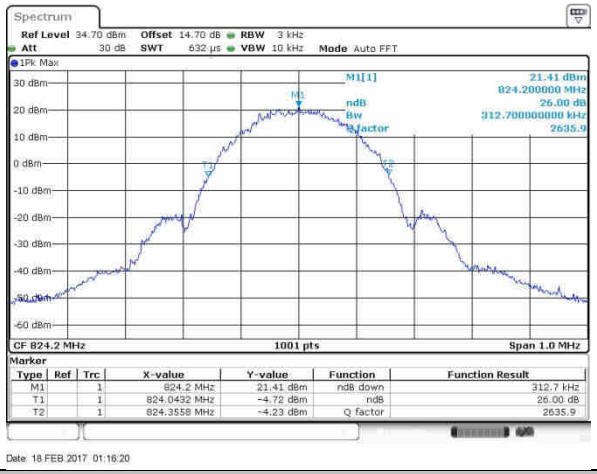
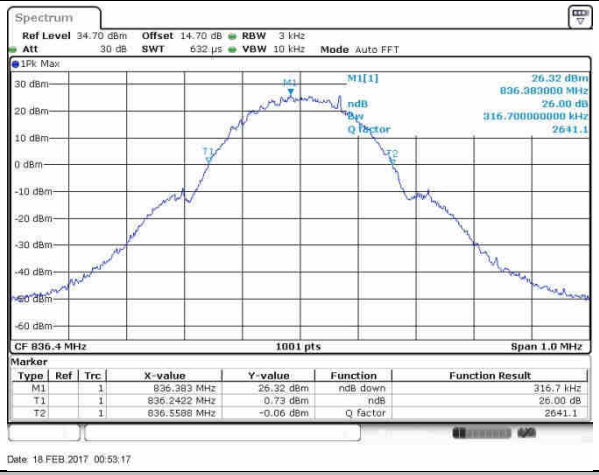
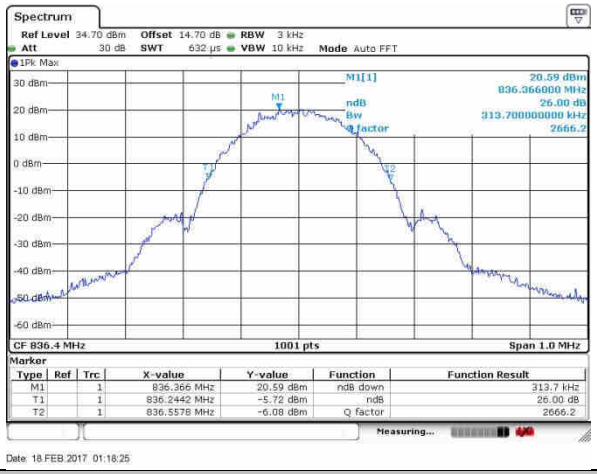
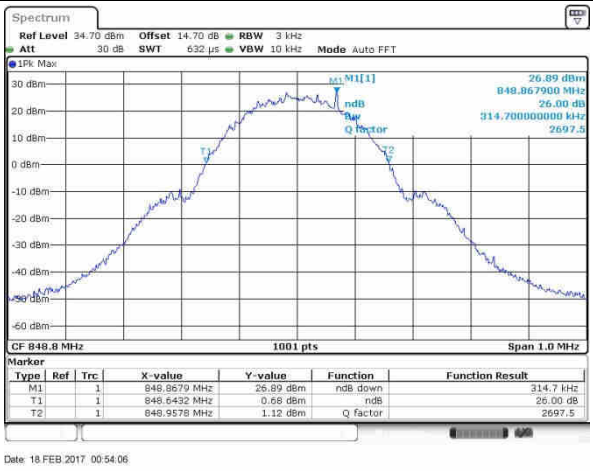
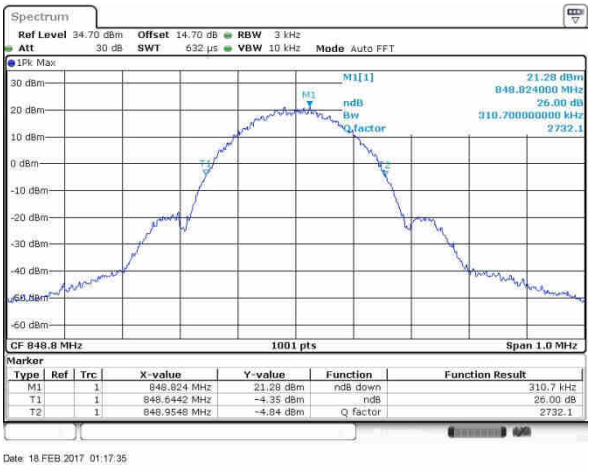
	

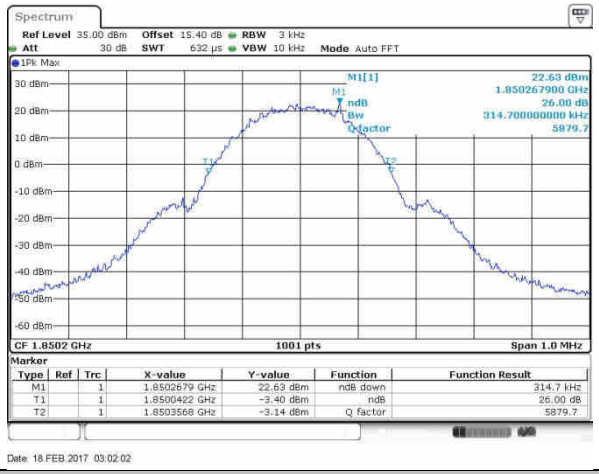
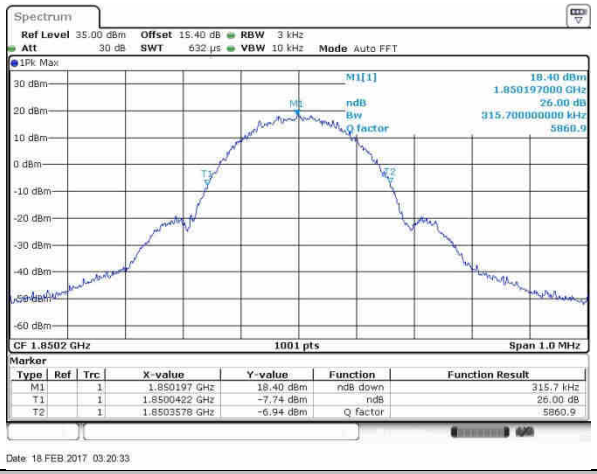
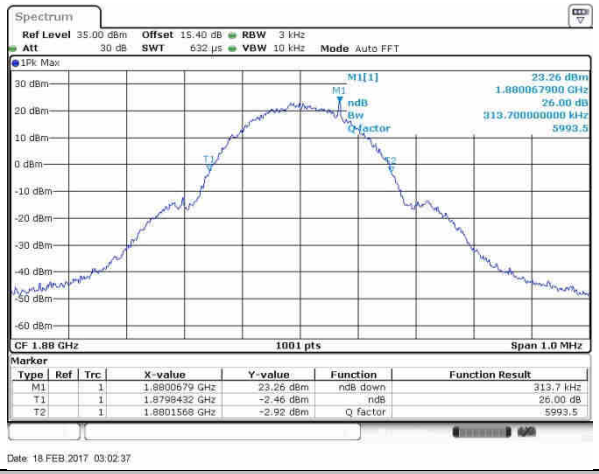
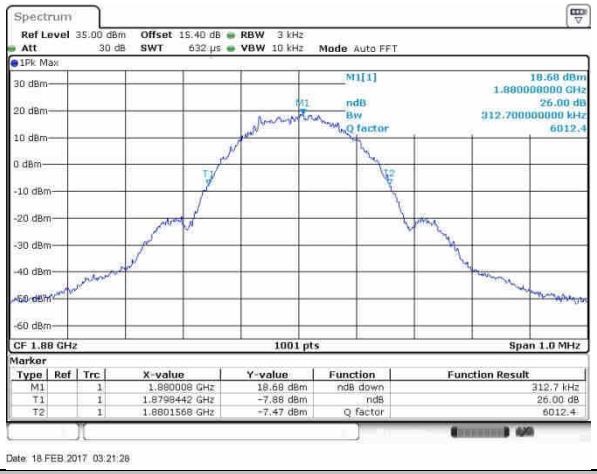
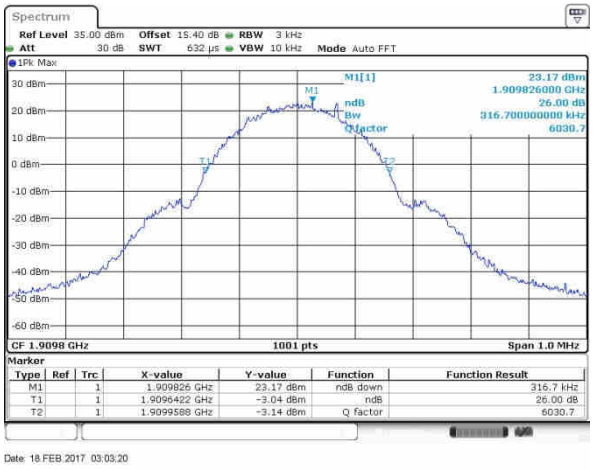
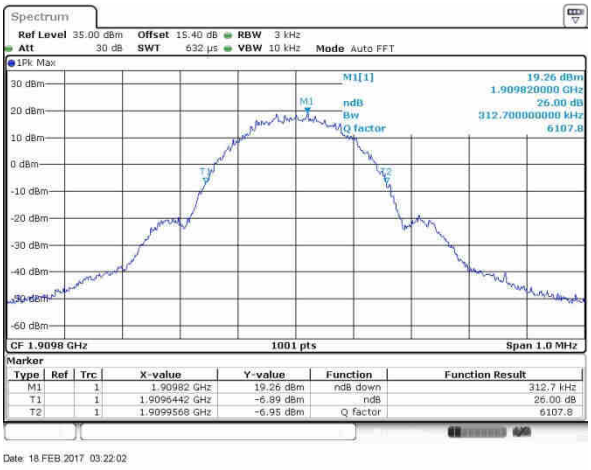
26dB Bandwidth

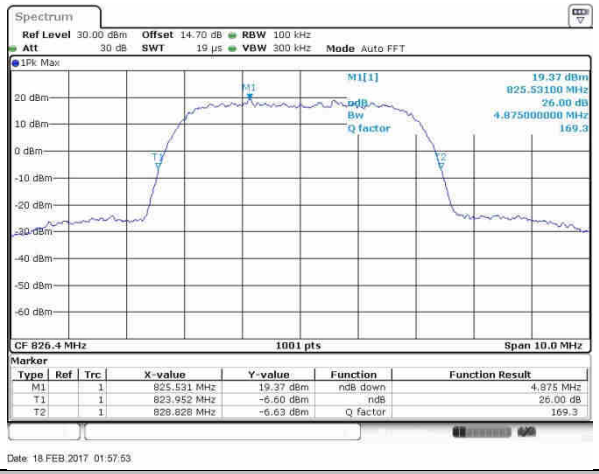
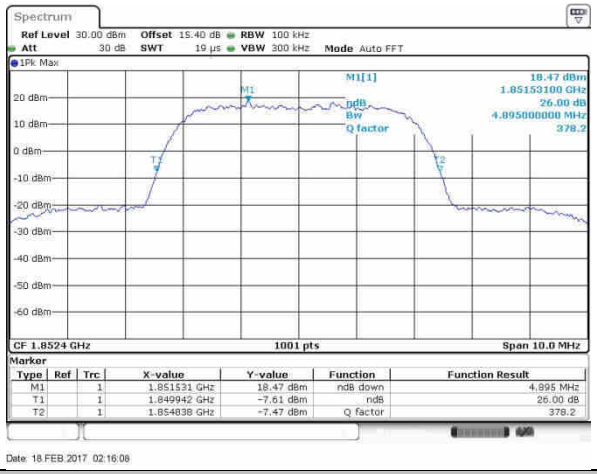
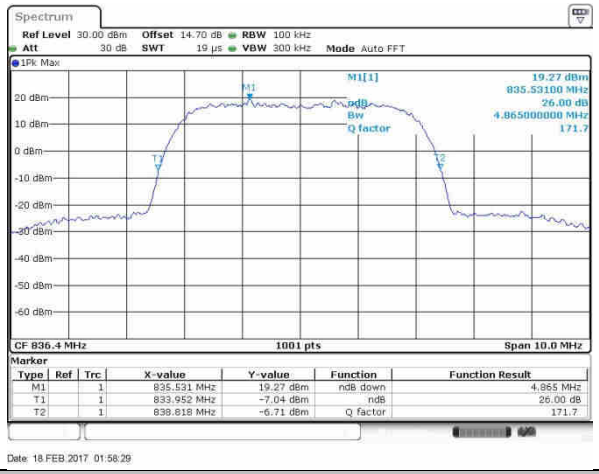
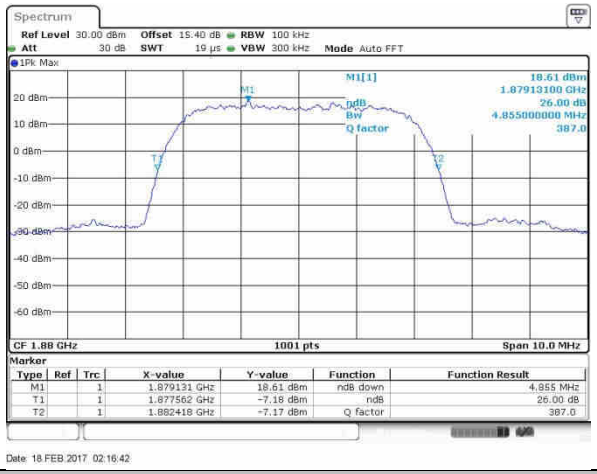
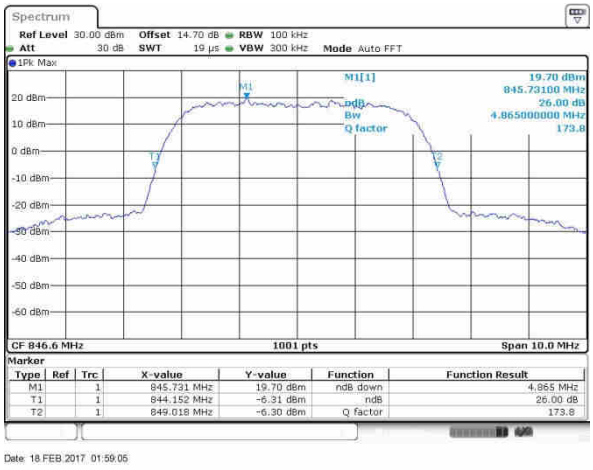
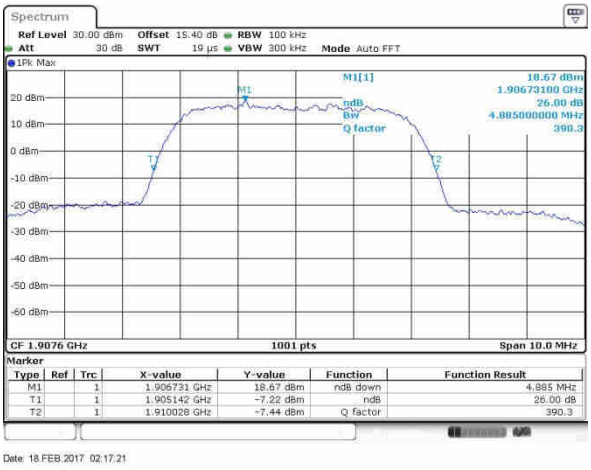
Mode	GSM850	
Mod.	GSM	EDGE class 8
Lowest CH	0.316	0.313
Middle CH	0.317	0.314
Highest CH	0.315	0.311

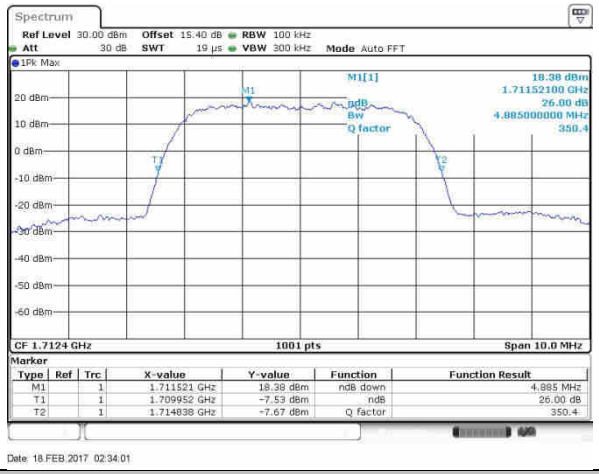
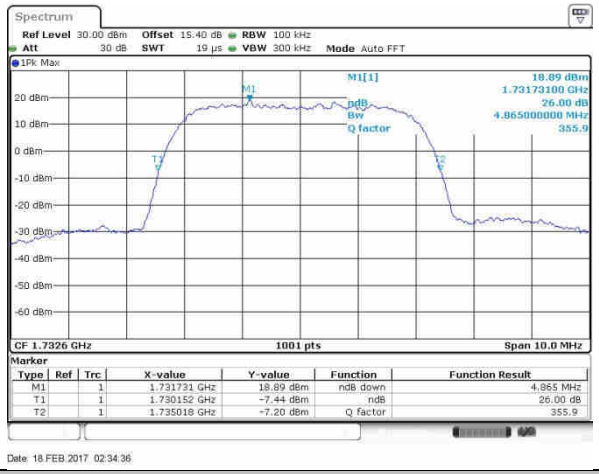
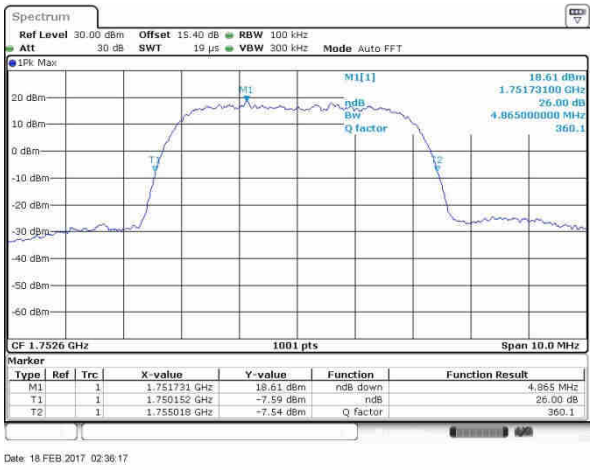
Mode	GSM1900	
Mod.	GSM	EDGE class 8
Lowest CH	0.315	0.316
Middle CH	0.314	0.313
Highest CH	0.317	0.313

Mode	WCDMA Band V	WCDMA Band II	WCDMA Band IV
Mod.	RMC 12.2Kbps	RMC 12.2Kbps	RMC 12.2Kbps
Lowest CH	4.88	4.90	4.89
Middle CH	4.87	4.86	4.87
Highest CH	4.87	4.89	4.87

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

GSM1900 (GSM)	GSM1900 (EDGE class 8)
Lowest Channel	**Lowest Channel**
	
Middle Channel	**Middle Channel**
	
Highest Channel	**Highest Channel**
	

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

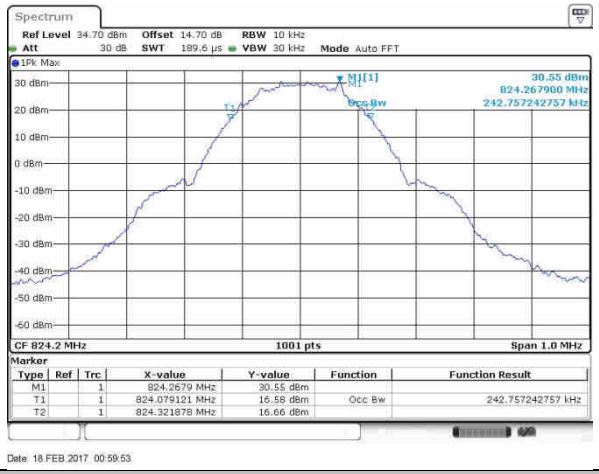
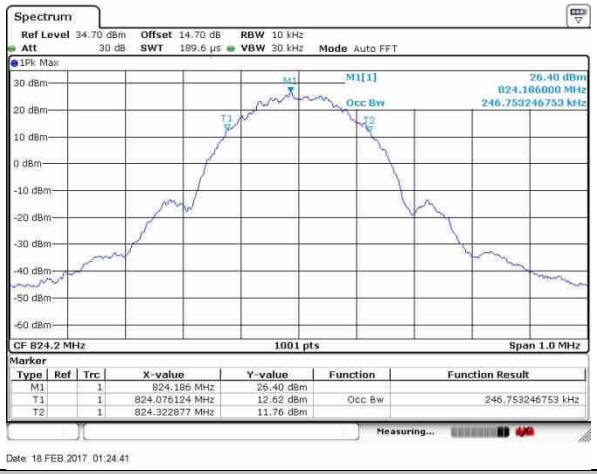
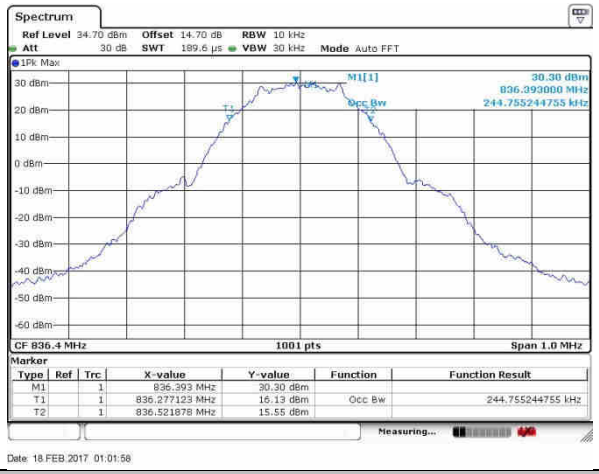
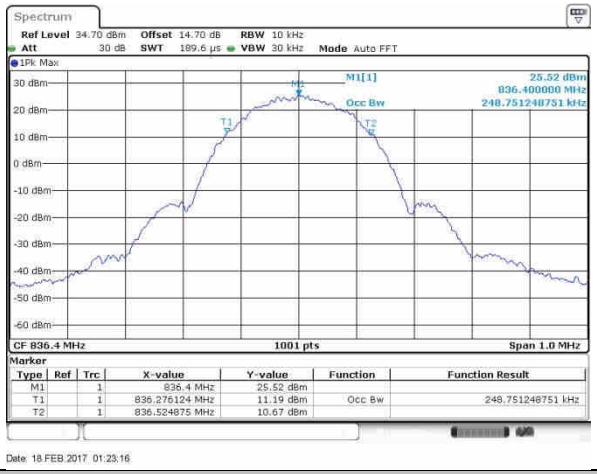
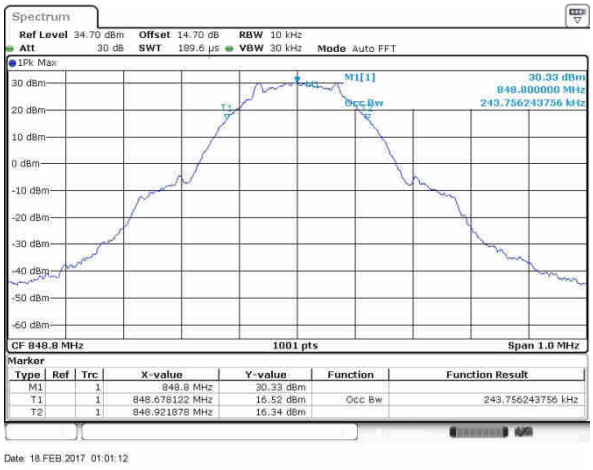
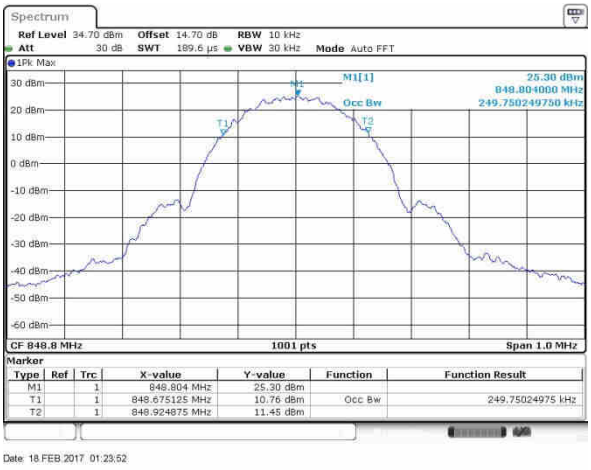
WCDMA Band IV (RMC 12.2Kbps)	
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

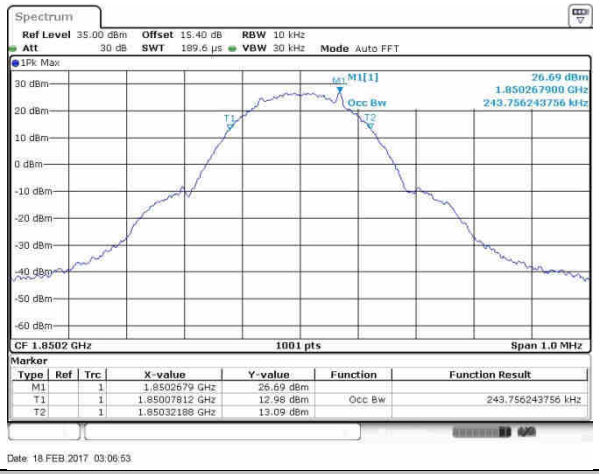
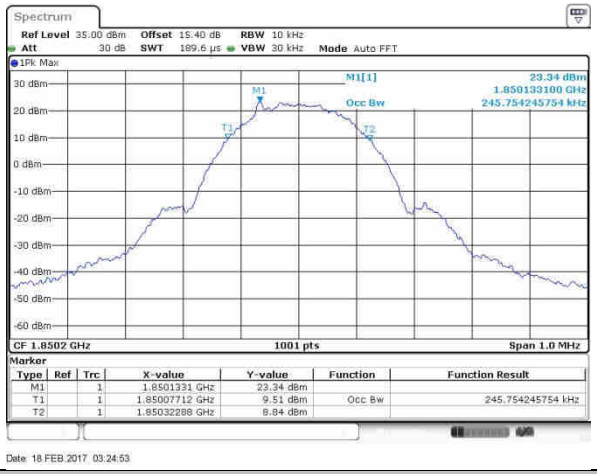
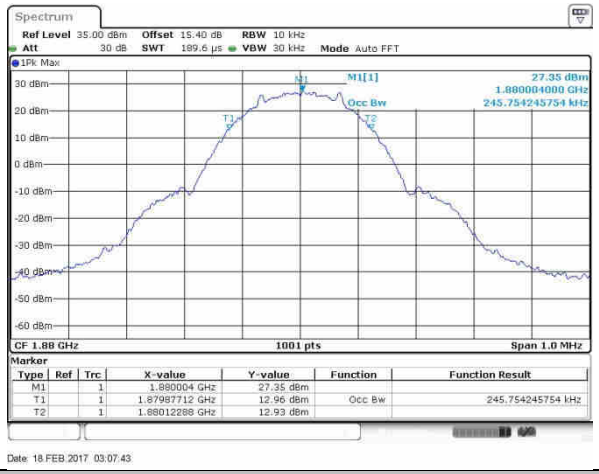
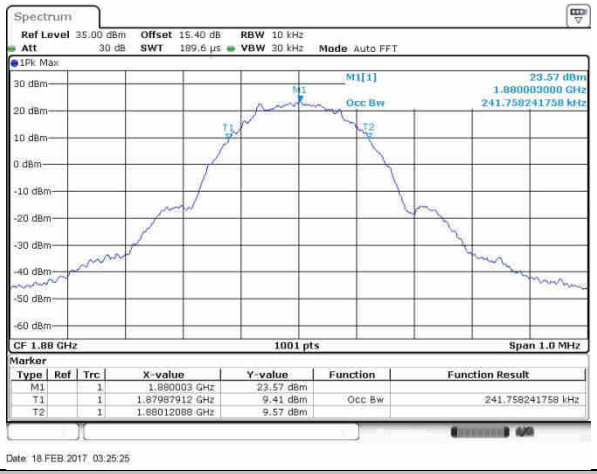
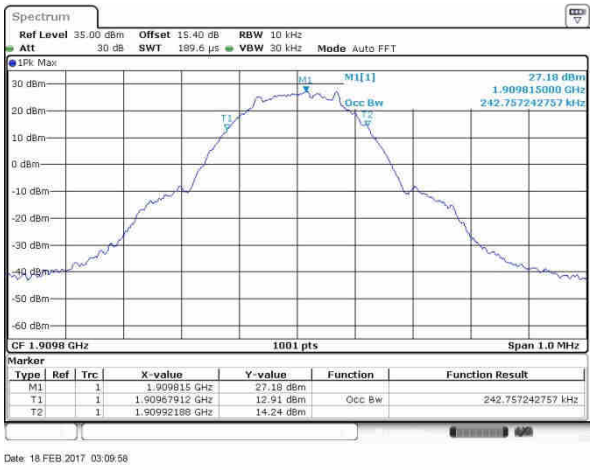
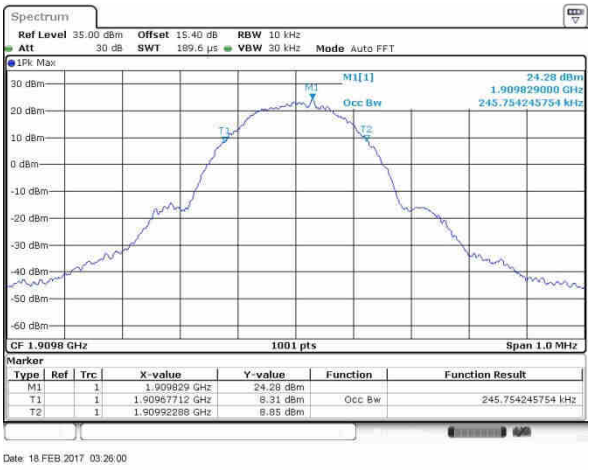
Occupied Bandwidth

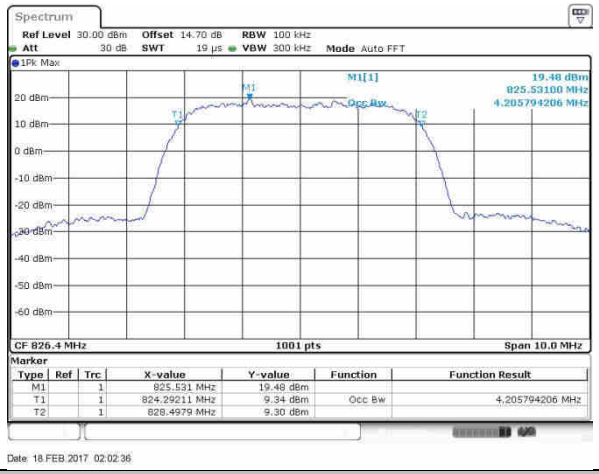
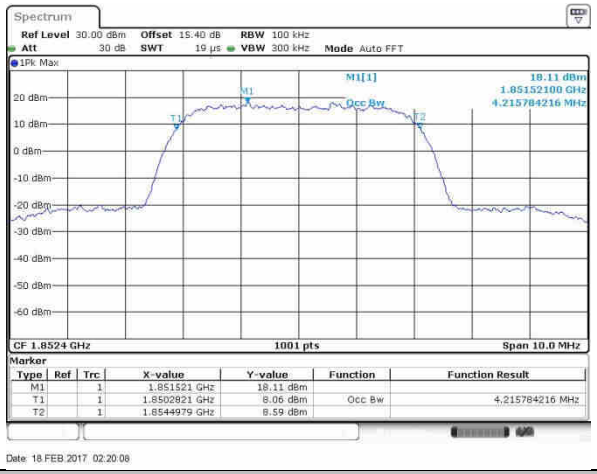
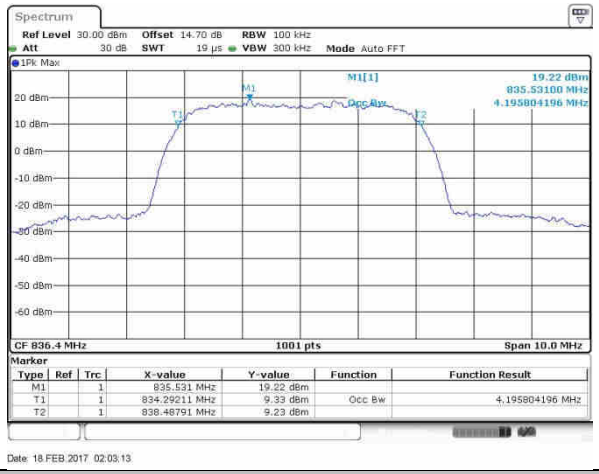
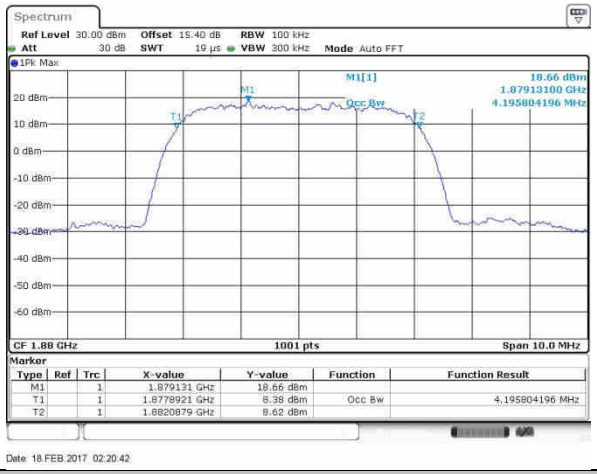
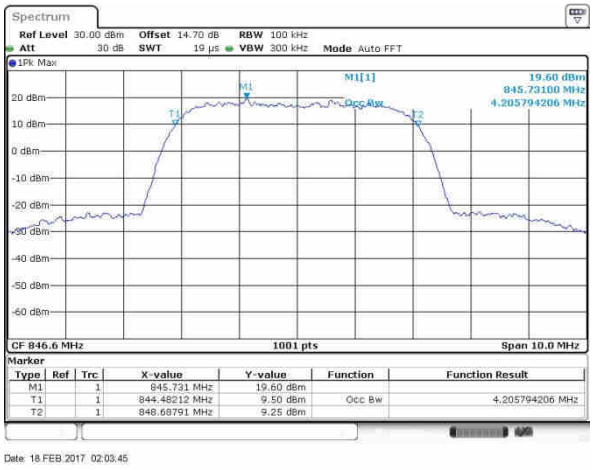
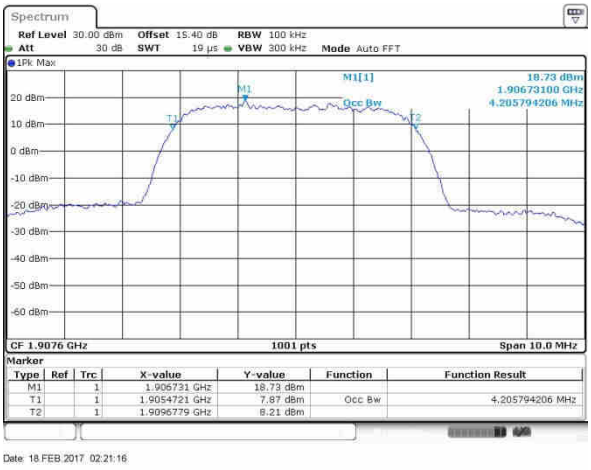
Mode	GSM850	
Mod.	GSM	EDGE class 8
Lowest CH	0.243	0.247
Middle CH	0.245	0.249
Highest CH	0.244	0.250

Mode	GSM1900	
Mod.	GSM	EDGE class 8
Lowest CH	0.244	0.246
Middle CH	0.246	0.242
Highest CH	0.243	0.246

Mode	WCDMA Band V	WCDMA Band II	WCDMA Band IV
Mod.	RMC 12.2Kbps	RMC 12.2Kbps	RMC 12.2Kbps
Lowest CH	4.21	4.22	4.20
Middle CH	4.20	4.20	4.20
Highest CH	4.21	4.21	4.20

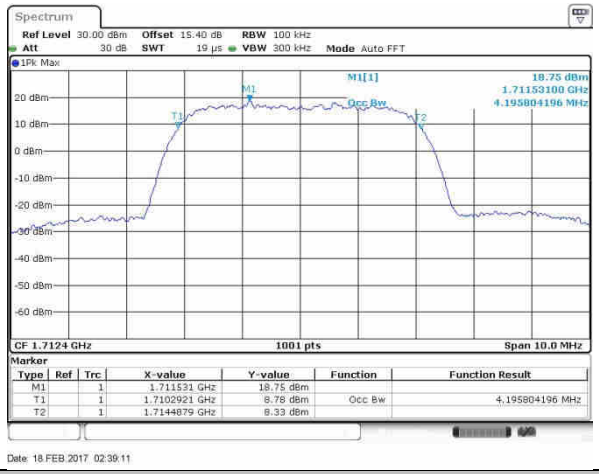
GSM850 (GSM)	GSM850 (EDGE class 8)
Lowest Channel	**Lowest Channel**
	
Middle Channel	**Middle Channel**
	
Highest Channel	**Highest Channel**
	

GSM1900 (GSM)	GSM1900 (EDGE class 8)
Lowest Channel	**Lowest Channel**
	
Middle Channel	**Middle Channel**
	
Highest Channel	**Highest Channel**
	

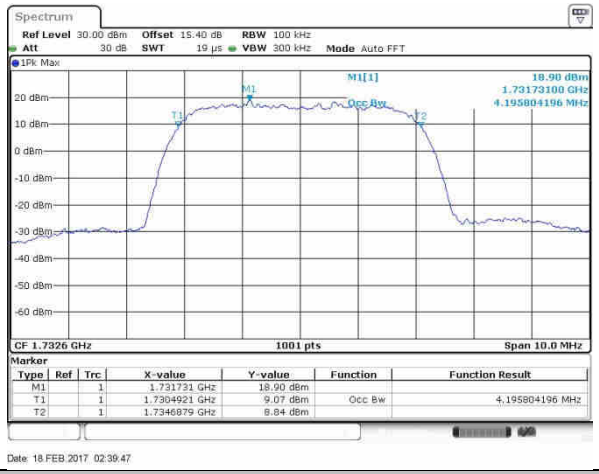
WCDMA Band V (RMC 12.2Kbps)	WCDMA Band II (RMC 12.2Kbps)
Lowest Channel	**Lowest Channel**
	
Middle Channel	**Middle Channel**
	
Highest Channel	**Highest Channel**
	

WCDMA Band IV (RMC 12.2Kbps)

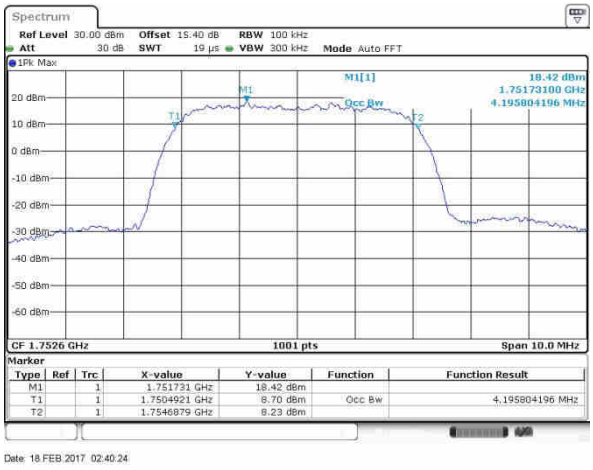
Lowest Channel



Middle Channel



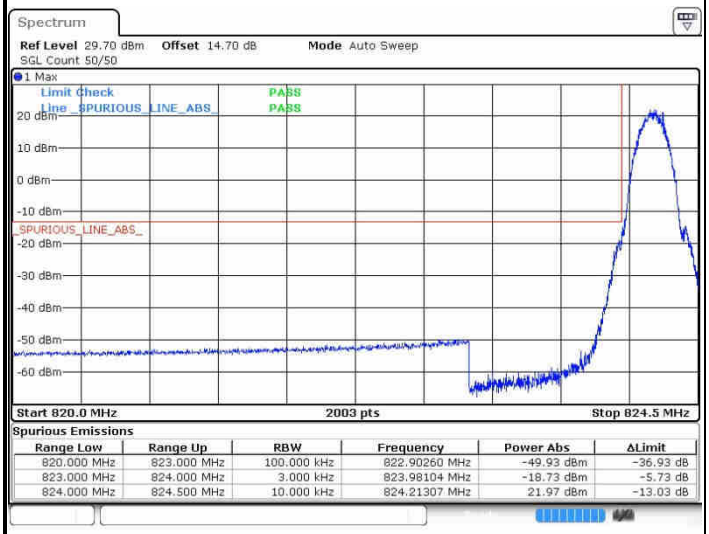
Highest Channel



Conducted Band Edge

GSM850 (GSM)

Lowest Band Edge

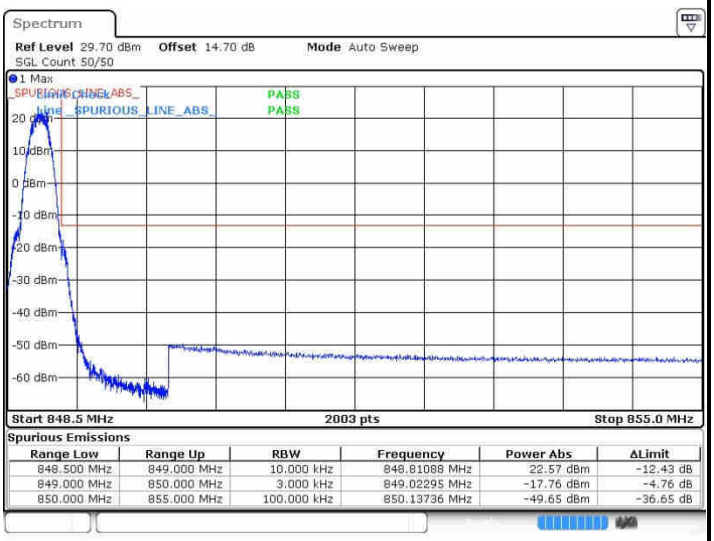


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
820.000 MHz	823.000 MHz	100.000 kHz	822.90260 MHz	-49.93 dBm	-36.93 dB
823.000 MHz	824.000 MHz	3.000 kHz	823.98104 MHz	-18.73 dBm	-5.73 dB
824.000 MHz	824.500 MHz	10.000 kHz	824.21307 MHz	21.97 dBm	-13.03 dB

Date: 18.FEB.2017 01:04:40

Highest Band Edge



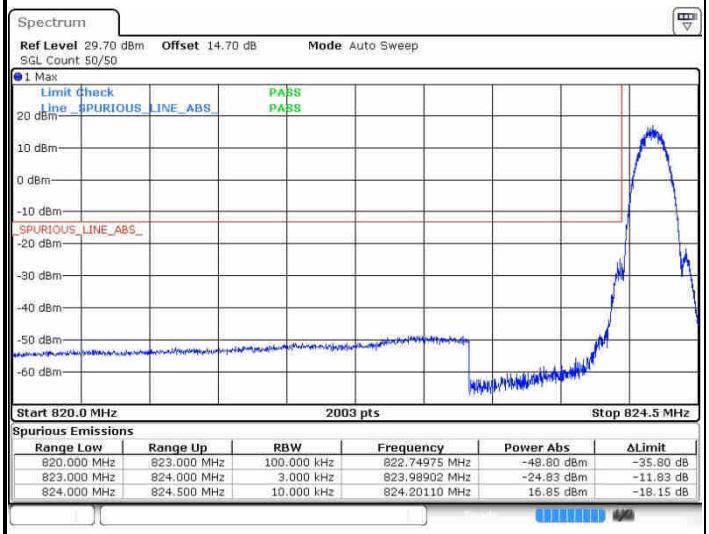
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
848.500 MHz	849.000 MHz	10.000 kHz	848.81088 MHz	22.57 dBm	-12.43 dB
849.000 MHz	850.000 MHz	3.000 kHz	849.02295 MHz	-17.76 dBm	-4.76 dB
850.000 MHz	855.000 MHz	100.000 kHz	850.13736 MHz	-49.65 dBm	-36.65 dB

Date: 18.FEB.2017 01:06:13

GSM850 (EDGE class 8)

Lowest Band Edge

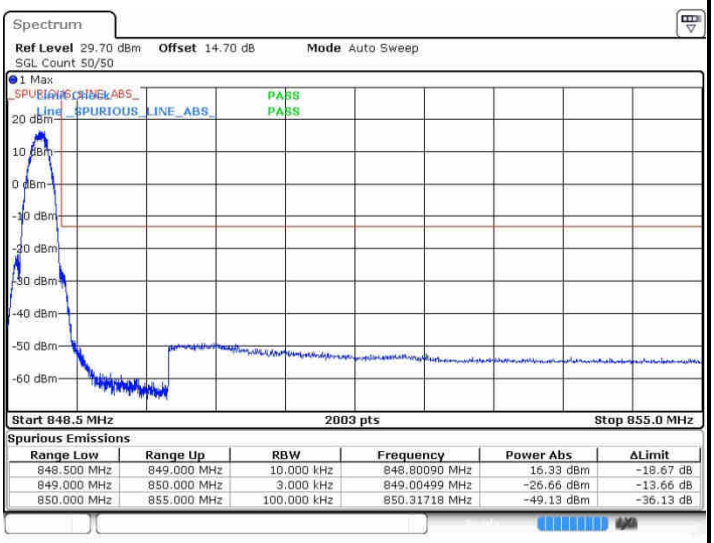


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
820.000 MHz	823.000 MHz	100.000 kHz	822.74975 MHz	-48.80 dBm	-35.80 dB
823.000 MHz	824.000 MHz	3.000 kHz	823.98902 MHz	-24.83 dBm	-11.83 dB
824.000 MHz	824.500 MHz	10.000 kHz	824.20110 MHz	16.85 dBm	-18.15 dB

Date: 18.FEB.2017 01:26:47

Highest Band Edge



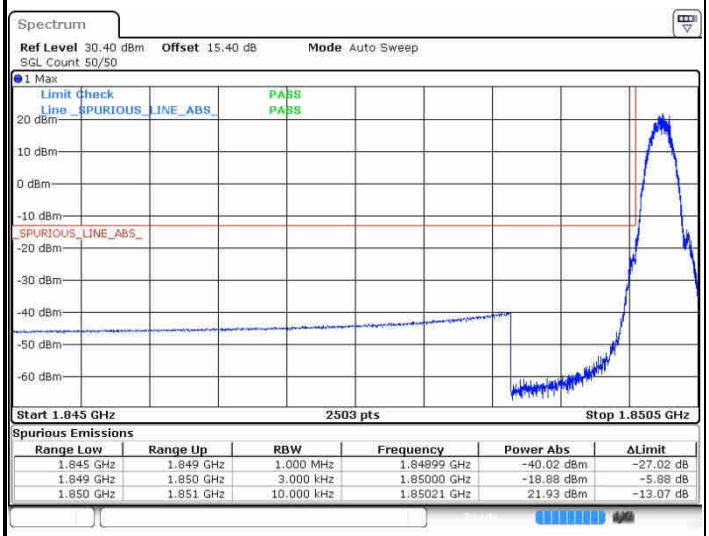
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
848.500 MHz	849.000 MHz	10.000 kHz	848.80090 MHz	16.33 dBm	-18.67 dB
849.000 MHz	850.000 MHz	3.000 kHz	849.00499 MHz	-26.66 dBm	-13.66 dB
850.000 MHz	855.000 MHz	100.000 kHz	850.31718 MHz	-49.13 dBm	-36.13 dB

Date: 18.FEB.2017 01:28:43

GSM1900 (GSM)

Lowest Band Edge

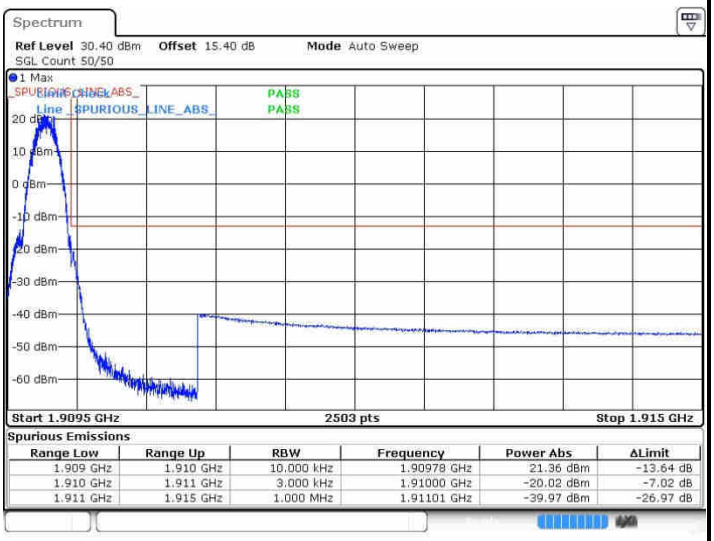


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.845 GHz	1.849 GHz	1.000 MHz	1.84899 GHz	-40.02 dBm	-27.02 dB
1.849 GHz	1.850 GHz	3.000 kHz	1.85000 GHz	-18.88 dBm	-5.88 dB
1.850 GHz	1.851 GHz	10.000 kHz	1.85021 GHz	21.93 dBm	-13.07 dB

Date: 18.FEB.2017 03:11:42

Highest Band Edge



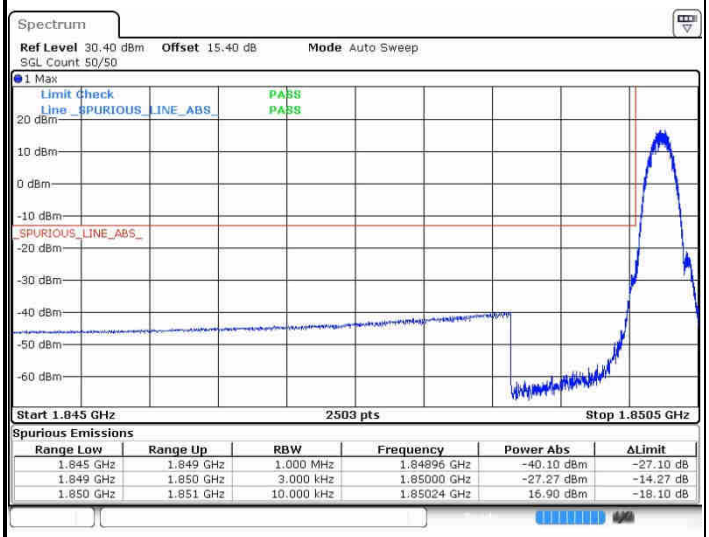
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.909 GHz	1.910 GHz	10.000 kHz	1.90978 GHz	21.36 dBm	-13.64 dB
1.910 GHz	1.911 GHz	3.000 kHz	1.91000 GHz	-20.02 dBm	-7.02 dB
1.911 GHz	1.915 GHz	1.000 MHz	1.91101 GHz	-39.97 dBm	-26.97 dB

Date: 18.FEB.2017 03:13:14

GSM1900 (EDGE class 8)

Lowest Band Edge

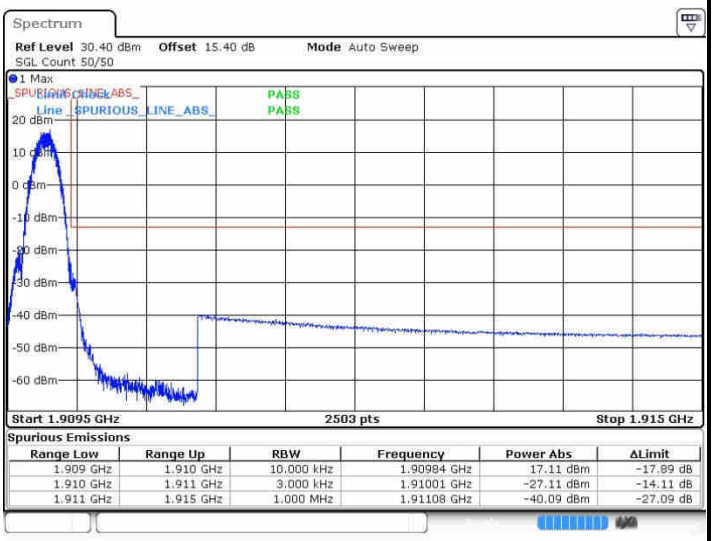


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.845 GHz	1.849 GHz	1.000 MHz	1.84896 GHz	-40.10 dBm	-27.10 dB
1.849 GHz	1.850 GHz	3.000 kHz	1.85000 GHz	-27.27 dBm	-14.27 dB
1.850 GHz	1.851 GHz	10.000 kHz	1.85024 GHz	16.90 dBm	-18.10 dB

Date: 18.FEB.2017 03:27:40

Highest Band Edge



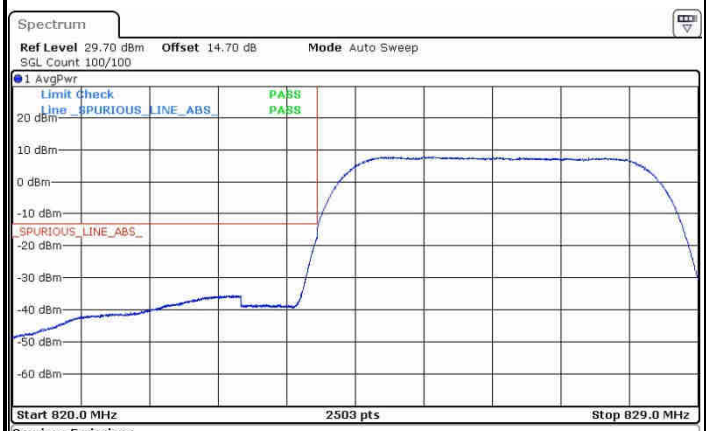
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.909 GHz	1.910 GHz	10.000 kHz	1.90984 GHz	17.11 dBm	-17.89 dB
1.910 GHz	1.911 GHz	3.000 kHz	1.91001 GHz	-27.11 dBm	-14.11 dB
1.911 GHz	1.915 GHz	1.000 MHz	1.91108 GHz	-40.09 dBm	-27.09 dB

Date: 18.FEB.2017 03:29:38

WCDMA Band V (RMC 12.2Kbps)

Lowest Band Edge

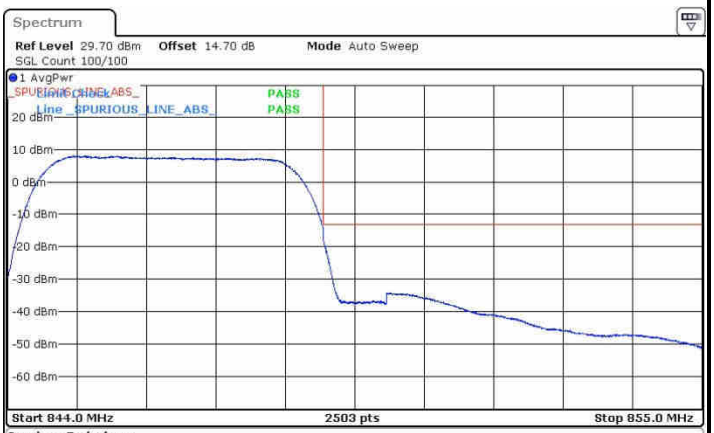


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
820.000 MHz	823.000 MHz	100.000 kHz	822.89361 MHz	-35.46 dBm	-22.46 dB
823.000 MHz	824.000 MHz	50.000 kHz	823.99900 MHz	-17.15 dBm	-4.15 dB
824.000 MHz	829.000 MHz	100.000 kHz	825.10140 MHz	7.82 dBm	-27.18 dB

Date: 18.FEB.2017 02:06:35

Highest Band Edge



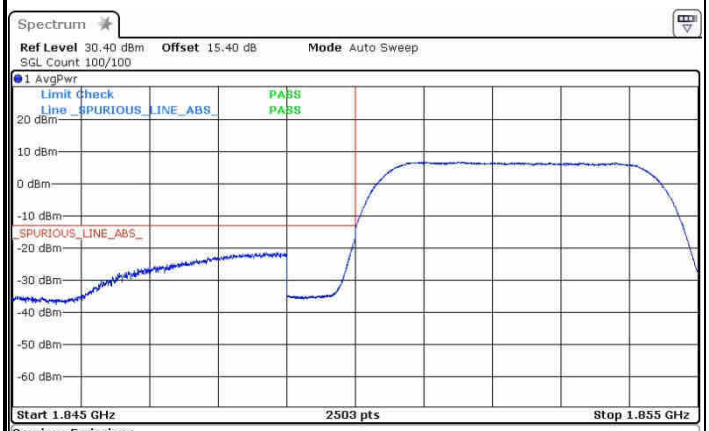
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
844.000 MHz	849.000 MHz	100.000 kHz	845.20629 MHz	8.04 dBm	-26.96 dB
849.000 MHz	850.000 MHz	50.000 kHz	849.00100 MHz	-18.03 dBm	-5.03 dB
850.000 MHz	855.000 MHz	100.000 kHz	850.01748 MHz	-34.21 dBm	-21.21 dB

Date: 18.FEB.2017 02:09:22

WCDMA Band II (RMC 12.2Kbps)

Lowest Band Edge

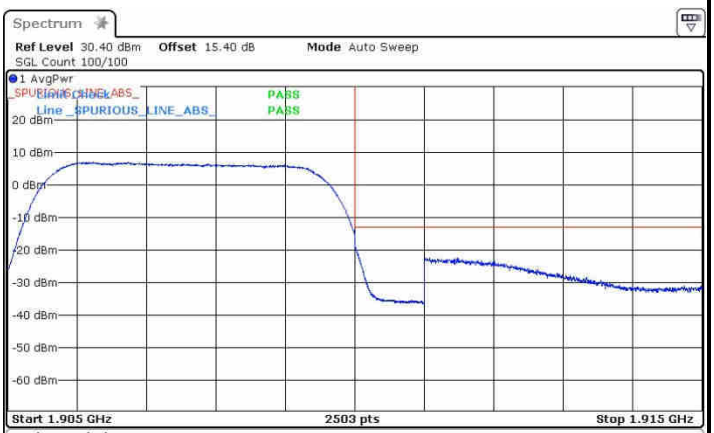


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.845 GHz	1.849 GHz	1.000 MHz	1.84869 GHz	-21.33 dBm	-8.33 dB
1.849 GHz	1.850 GHz	50.000 kHz	1.85000 GHz	-17.05 dBm	-4.05 dB
1.850 GHz	1.855 GHz	100.000 kHz	1.85104 GHz	6.93 dBm	-28.07 dB

Date: 18.FEB.2017 02:24:12

Highest Band Edge

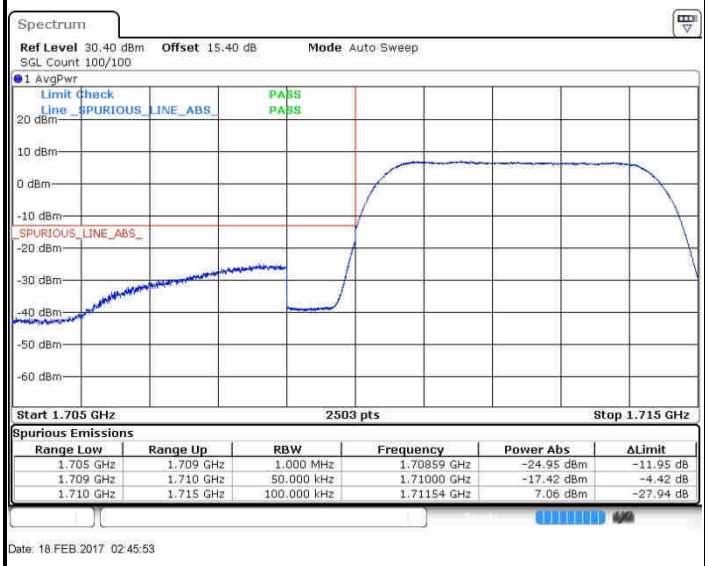


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.905 GHz	1.910 GHz	100.000 kHz	1.90613 GHz	7.05 dBm	-27.95 dB
1.910 GHz	1.911 GHz	50.000 kHz	1.91000 GHz	-18.80 dBm	-5.80 dB
1.911 GHz	1.915 GHz	1.000 MHz	1.91101 GHz	-22.33 dBm	-9.33 dB

Date: 18.FEB.2017 02:27:01

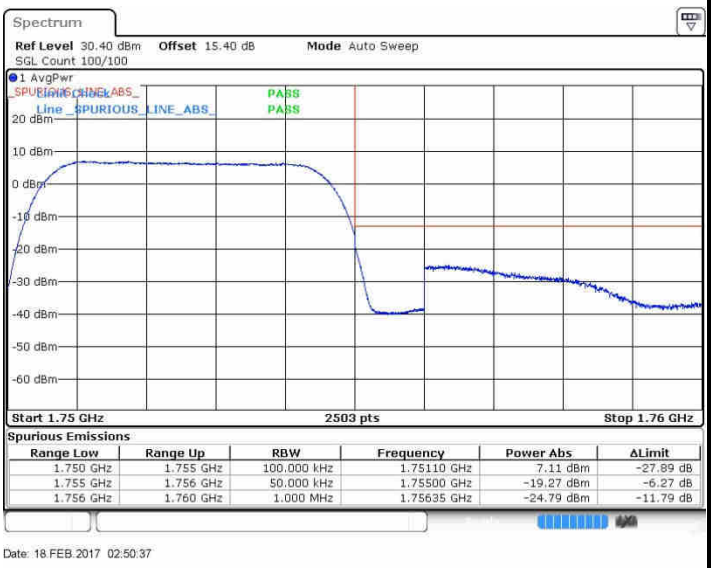
WCDMA Band IV (RMC 12.2Kbps)	
Lowest Band Edge	**Highest Band Edge**



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.705 GHz	1.709 GHz	1.000 MHz	1.70859 GHz	-24.95 dBm	-11.95 dB
1.709 GHz	1.710 GHz	50.000 kHz	1.71000 GHz	-17.42 dBm	-4.42 dB
1.710 GHz	1.715 GHz	100.000 kHz	1.71154 GHz	7.06 dBm	-27.94 dB

Date: 18.FEB.2017 02:45:53



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
1.750 GHz	1.755 GHz	100.000 kHz	1.75110 GHz	7.11 dBm	-27.89 dB
1.755 GHz	1.756 GHz	50.000 kHz	1.75500 GHz	-19.27 dBm	-6.27 dB
1.756 GHz	1.760 GHz	1.000 MHz	1.75635 GHz	-24.79 dBm	-11.79 dB

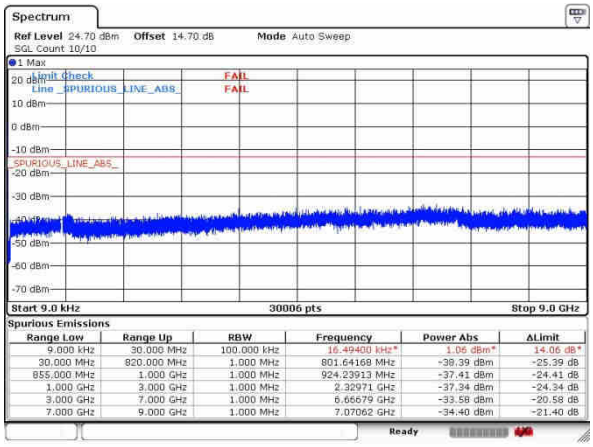
Date: 18.FEB.2017 02:50:37

Conducted Spurious Emission

*Note: The fail points below 1MHz are signals from spectrum analyzer which can be ignored.

GSM850 (GSM)

Lowest Channel

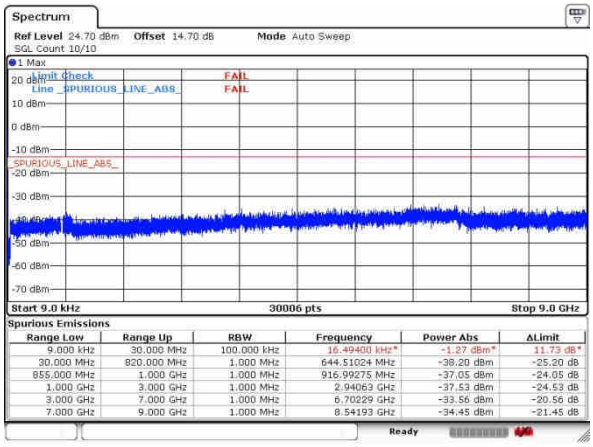


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	30.000 MHz	100.000 kHz	16.49400 kHz*	1.06 dBm*	14.06 dB*
30.000 MHz	820.000 MHz	1.000 MHz	801.64168 MHz	-38.39 dBm	-25.39 dB
855.000 MHz	1.000 GHz	1.000 MHz	924.23913 MHz	-37.41 dBm	-24.41 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.32971 GHz	-37.34 dBm	-24.34 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.66679 GHz	-33.58 dBm	-20.58 dB
7.000 GHz	9.000 GHz	1.000 MHz	7.07062 GHz	-34.40 dBm	-21.40 dB

Date: 1.MAR.2017 19:01:57

Middle Channel

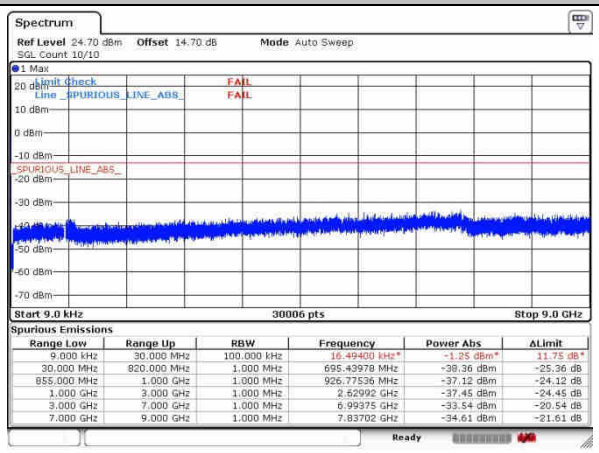


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	30.000 MHz	100.000 kHz	16.49400 kHz*	-1.27 dBm*	11.73 dB*
30.000 MHz	820.000 MHz	1.000 MHz	644.51024 MHz	-38.20 dBm	-25.20 dB
855.000 MHz	1.000 GHz	1.000 MHz	916.99275 MHz	-37.05 dBm	-24.05 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.94063 GHz	-37.53 dBm	-24.53 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.70229 GHz	-33.56 dBm	-20.56 dB
7.000 GHz	9.000 GHz	1.000 MHz	8.54193 GHz	-34.45 dBm	-21.45 dB

Date: 1.MAR.2017 19:02:48

Highest Channel



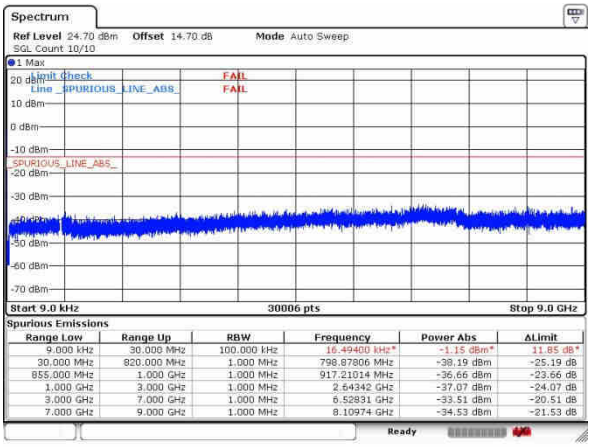
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	30.000 MHz	100.000 kHz	16.49400 kHz*	-1.25 dBm*	11.75 dB*
30.000 MHz	820.000 MHz	1.000 MHz	695.43978 MHz	-38.36 dBm	-25.36 dB
855.000 MHz	1.000 GHz	1.000 MHz	926.77536 MHz	-37.12 dBm	-24.12 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.62992 GHz	-37.45 dBm	-24.45 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.99375 GHz	-33.54 dBm	-20.54 dB
7.000 GHz	9.000 GHz	1.000 MHz	7.83702 GHz	-34.61 dBm	-21.61 dB

Date: 1.MAR.2017 19:03:05

GSM850 (EDGE class 8)

Lowest Channel

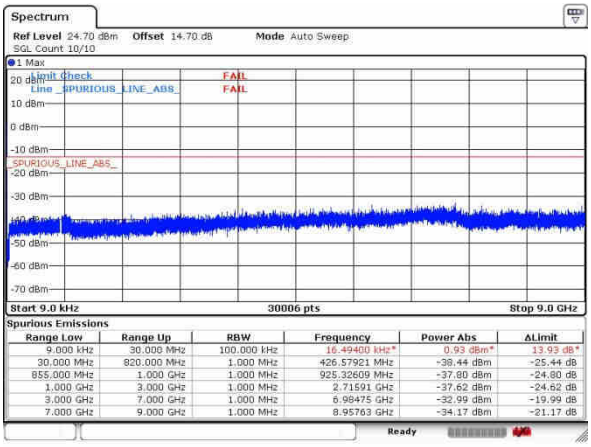


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	30.000 MHz	100.000 kHz	16.49400 kHz*	-1.15 dBm*	11.85 dB*
30.000 MHz	820.000 MHz	1.000 MHz	798.87806 MHz	-38.19 dBm	-25.19 dB
855.000 MHz	1.000 GHz	1.000 MHz	917.21014 MHz	-36.66 dBm	-23.66 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.64342 GHz	-37.07 dBm	-24.07 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.52831 GHz	-33.51 dBm	-20.51 dB
7.000 GHz	9.000 GHz	1.000 MHz	8.10974 GHz	-34.53 dBm	-21.53 dB

Date: 1.MAR.2017 19:08:58

Middle Channel

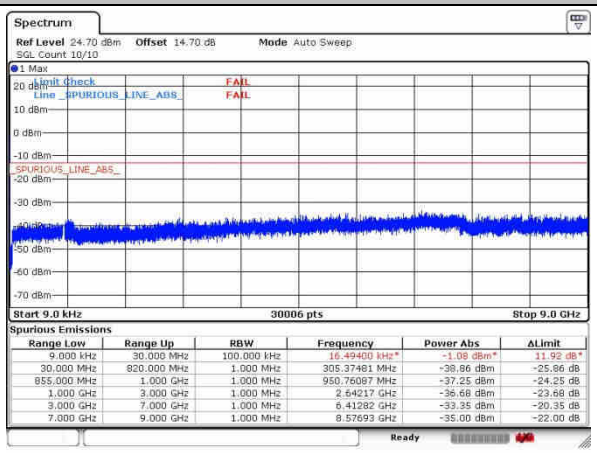


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	30.000 MHz	100.000 kHz	16.49400 kHz*	0.93 dBm*	13.93 dB*
30.000 MHz	820.000 MHz	1.000 MHz	426.57921 MHz	-38.44 dBm	-25.44 dB
855.000 MHz	1.000 GHz	1.000 MHz	925.32609 MHz	-37.80 dBm	-24.80 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.71591 GHz	-37.62 dBm	-24.62 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.98475 GHz	-32.99 dBm	-19.99 dB
7.000 GHz	9.000 GHz	1.000 MHz	8.95763 GHz	-34.17 dBm	-21.17 dB

Date: 1.MAR.2017 19:09:26

Highest Channel



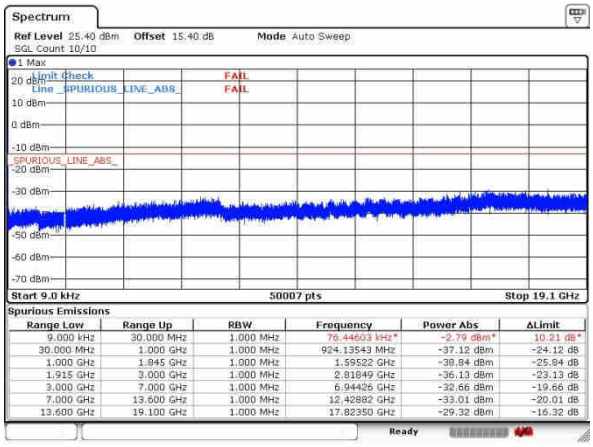
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	30.000 MHz	100.000 kHz	16.49400 kHz*	-1.08 dBm*	11.92 dB*
30.000 MHz	820.000 MHz	1.000 MHz	305.37481 MHz	-38.86 dBm	-25.86 dB
855.000 MHz	1.000 GHz	1.000 MHz	950.76087 MHz	-37.25 dBm	-24.25 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.64217 GHz	-36.68 dBm	-23.68 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.41282 GHz	-33.35 dBm	-20.35 dB
7.000 GHz	9.000 GHz	1.000 MHz	8.57693 GHz	-35.00 dBm	-22.00 dB

Date: 1.MAR.2017 19:09:42

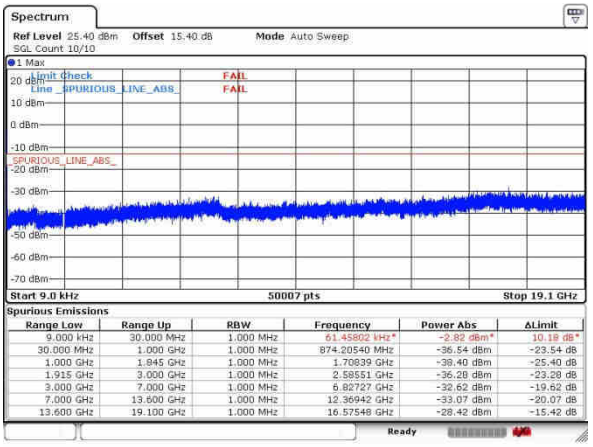
GSM1900 (GSM)

Lowest Channel

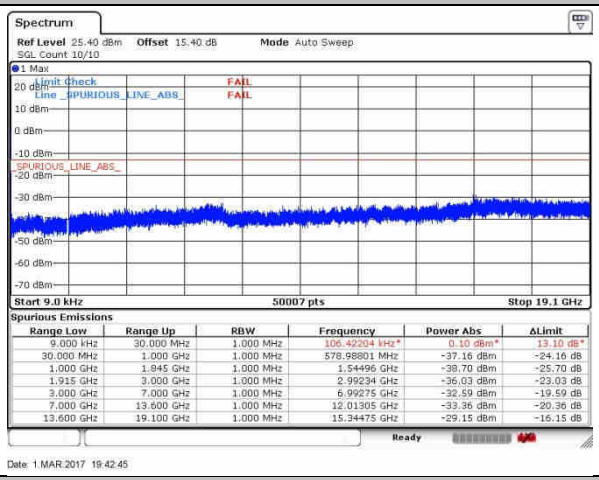


GSM1900 (EDGE class 8)

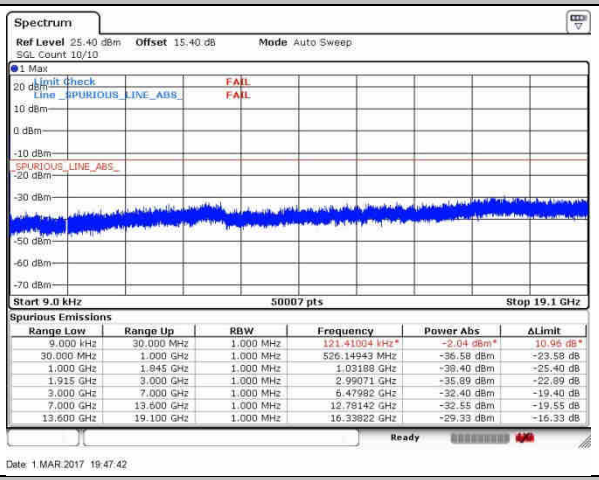
Lowest Channel



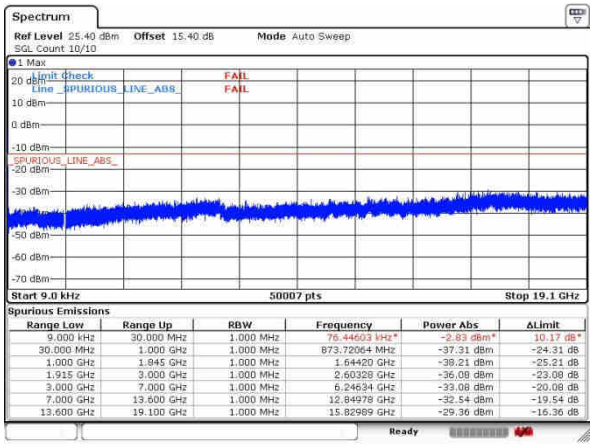
Middle Channel



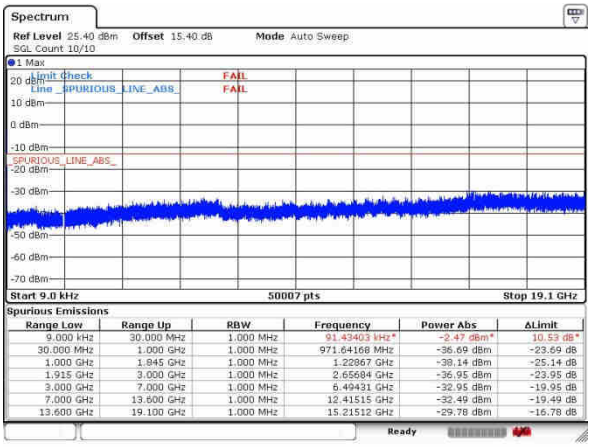
Middle Channel



Highest Channel

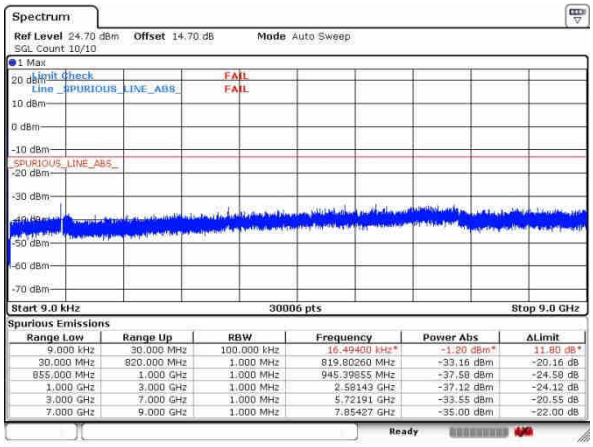


Highest Channel



WCDMA Band V (RMC 12.2Kbps)

Lowest Channel

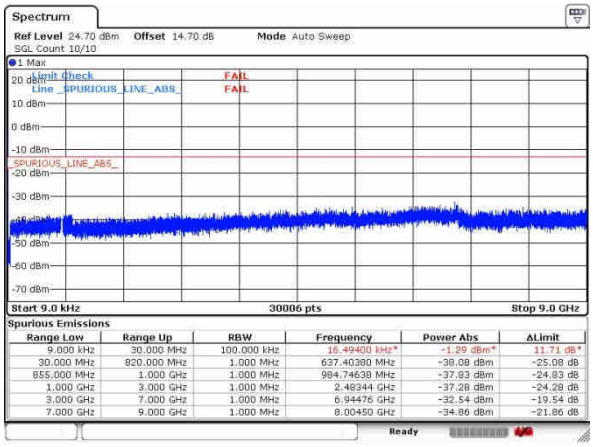


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	30.000 MHz	100.000 kHz	16.49400 kHz*	-1.20 dBm*	11.80 dB*
30.000 MHz	820.000 MHz	1.000 MHz	819.80260 MHz	-33.16 dBm	-20.16 dB
855.000 MHz	1.000 GHz	1.000 MHz	945.39855 MHz	-37.58 dBm	-24.58 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.58143 GHz	-37.12 dBm	-24.12 dB
3.000 GHz	7.000 GHz	1.000 MHz	5.72191 GHz	-33.55 dBm	-20.55 dB
7.000 GHz	9.000 GHz	1.000 MHz	7.85427 GHz	-35.00 dBm	-22.00 dB

Date: 1.MAR.2017 19:14:07

Middle Channel

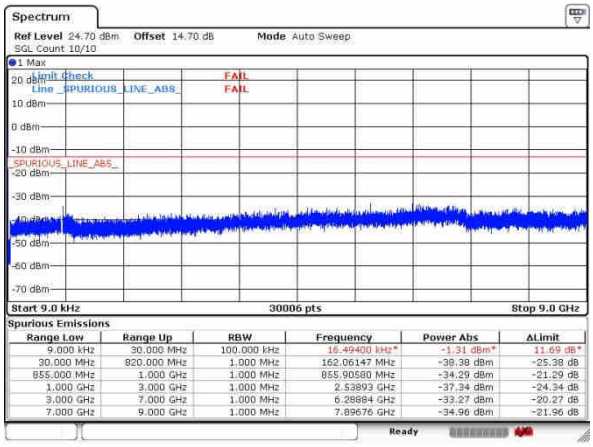


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	30.000 MHz	100.000 kHz	16.49400 kHz*	-1.29 dBm*	11.71 dB*
30.000 MHz	820.000 MHz	1.000 MHz	637.40380 MHz	-38.08 dBm	-25.08 dB
855.000 MHz	1.000 GHz	1.000 MHz	984.74638 MHz	-37.83 dBm	-24.83 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.48344 GHz	-37.28 dBm	-24.28 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.94476 GHz	-32.54 dBm	-19.54 dB
7.000 GHz	9.000 GHz	1.000 MHz	8.00450 GHz	-34.86 dBm	-21.86 dB

Date: 1.MAR.2017 19:15:54

Highest Channel



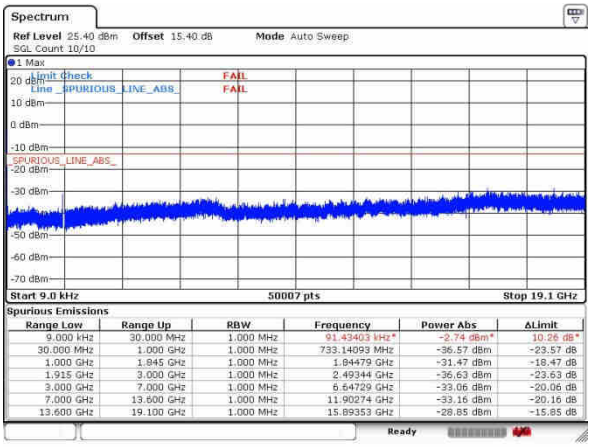
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	30.000 MHz	100.000 kHz	16.49400 kHz*	-1.31 dBm*	11.69 dB*
30.000 MHz	820.000 MHz	1.000 MHz	162.06147 MHz	-38.38 dBm	-25.38 dB
855.000 MHz	1.000 GHz	1.000 MHz	855.90580 MHz	-34.29 dBm	-21.29 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.53893 GHz	-37.34 dBm	-24.34 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.28884 GHz	-33.27 dBm	-20.27 dB
7.000 GHz	9.000 GHz	1.000 MHz	7.89676 GHz	-34.96 dBm	-21.96 dB

Date: 1.MAR.2017 19:16:22

WCDMA Band II (RMC 12.2Kbps)

Lowest Channel

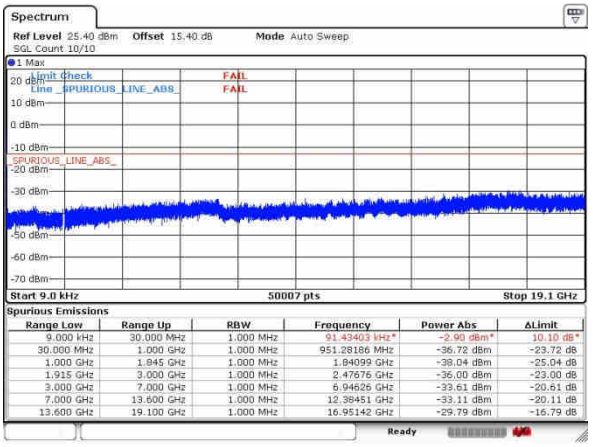


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	30.000 MHz	1.000 MHz	91.43403 kHz*	-2.74 dBm*	10.26 dB*
30.000 MHz	1.000 GHz	1.000 MHz	733.14093 MHz	-36.57 dBm	-23.57 dB
1.000 GHz	1.845 GHz	1.000 MHz	1.84479 GHz	-31.47 dBm	-18.47 dB
1.915 GHz	3.000 GHz	1.000 MHz	2.49344 GHz	-36.63 dBm	-23.63 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.64729 GHz	-33.06 dBm	-20.06 dB
7.000 GHz	13.600 GHz	1.000 MHz	11.90274 GHz	-33.16 dBm	-20.16 dB
13.600 GHz	19.100 GHz	1.000 MHz	15.89353 GHz	-28.85 dBm	-15.85 dB

Date: 1.MAR.2017 19:27:26

Middle Channel

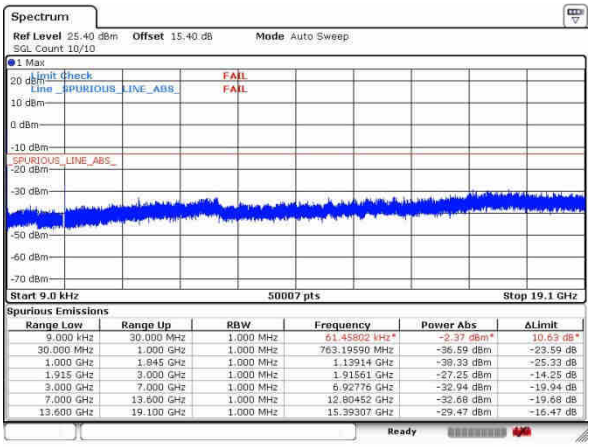


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	30.000 MHz	1.000 MHz	91.43403 kHz*	-2.90 dBm*	10.10 dB*
30.000 MHz	1.000 GHz	1.000 MHz	951.28186 MHz	-36.72 dBm	-23.72 dB
1.000 GHz	1.845 GHz	1.000 MHz	1.84099 GHz	-39.04 dBm	-25.04 dB
1.915 GHz	3.000 GHz	1.000 MHz	2.47676 GHz	-36.00 dBm	-23.00 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.94626 GHz	-33.61 dBm	-20.61 dB
7.000 GHz	13.600 GHz	1.000 MHz	12.38451 GHz	-33.11 dBm	-20.11 dB
13.600 GHz	19.100 GHz	1.000 MHz	16.95142 GHz	-29.79 dBm	-16.79 dB

Date: 1.MAR.2017 19:28:06

Highest Channel



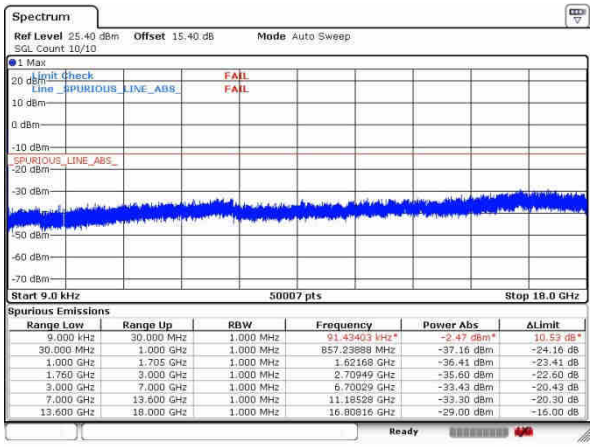
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	30.000 MHz	1.000 MHz	61.45802 kHz*	-2.37 dBm*	10.63 dB*
30.000 MHz	1.000 GHz	1.000 MHz	763.19590 MHz	-36.59 dBm	-23.59 dB
1.000 GHz	1.845 GHz	1.000 MHz	1.13914 GHz	-38.33 dBm	-25.33 dB
1.915 GHz	3.000 GHz	1.000 MHz	1.91561 GHz	-27.25 dBm	-14.25 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.92776 GHz	-32.94 dBm	-19.94 dB
7.000 GHz	13.600 GHz	1.000 MHz	12.80452 GHz	-32.68 dBm	-19.68 dB
13.600 GHz	19.100 GHz	1.000 MHz	15.39307 GHz	-29.47 dBm	-16.47 dB

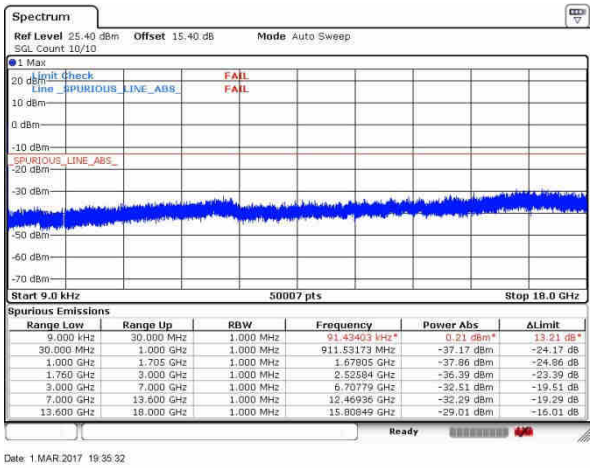
Date: 1.MAR.2017 19:28:35

WCDMA Band IV (RMC 12.2Kbps)

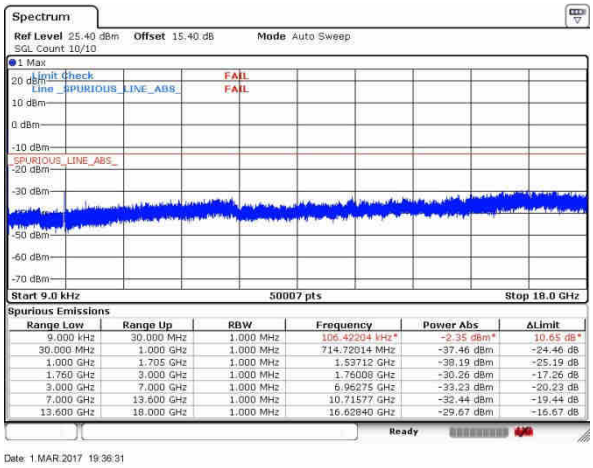
Lowest Channel



Middle Channel



Highest Channel



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	0.0072	0.0191	PASS
40	Normal Voltage	0.0012	0.0167	
30	Normal Voltage	0.0395	0.0132	
20(Ref.)	Normal Voltage	0.0000	0.0000	
10	Normal Voltage	0.0084	0.0132	
0	Normal Voltage	0.0036	0.0239	
-10	Normal Voltage	0.0323	0.0036	
-20	Normal Voltage	0.0072	0.0227	
-30	Normal Voltage	0.0215	0.0096	
20	Maximum Voltage	0.0383	0.0120	
20	Normal Voltage	0.0036	0.0203	
20	Battery End Point	0.0203	0.0096	

Note: Normal Voltage = 3.8 V. ；Battery End Point (BEP) = 3.5 V.；Maximum Voltage =4.4 V

Test Conditions	Middle Channel	GSM1900 (GSM)	GSM1900 (EDGE class 8)	Limit Note 2.
Temperature (°C)	Voltage (Volt)	Deviation (ppm)		Result
50	Normal Voltage	0.0016	0.0112	PASS
40	Normal Voltage	0.0037	0.0043	
30	Normal Voltage	0.0138	0.0133	
20(Ref.)	Normal Voltage	0.0000	0.0000	
10	Normal Voltage	0.0154	0.0048	
0	Normal Voltage	0.0048	0.0090	
-10	Normal Voltage	0.0128	0.0069	
-20	Normal Voltage	0.0005	0.0096	
-30	Normal Voltage	0.0112	0.0101	
20	Maximum Voltage	0.0016	0.0021	
20	Normal Voltage	0.0117	0.0128	
20	Battery End Point	0.0176	0.0011	

Note:

1. Normal Voltage = 3.8 V. ；Battery End Point (BEP) = 3.5 V.；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 V (RMC 12.2Kbps)	Limit 2.5ppm
Temperature (°C)	Voltage (Volt)	Deviation (ppm)	Result
50	Normal Voltage	0.0191	PASS
40	Normal Voltage	0.0036	
30	Normal Voltage	0.0239	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0287	
0	Normal Voltage	0.0275	
-10	Normal Voltage	0.0060	
-20	Normal Voltage	0.0024	
-30	Normal Voltage	0.0407	
20	Maximum Voltage	0.0024	
20	Normal Voltage	0.0084	
20	Battery End Point	0.0215	

Note: Normal Voltage = 3.8 V. ；Battery End Point (BEP) = 3.5 V.；Maximum Voltage =4.4 V

Test Conditions	Middle Channel	WCDMA Band II (RMC 12.2Kbps)	Limit Note 2.
Temperature (°C)	Voltage (Volt)	Deviation (ppm)	Result
50	Normal Voltage	0.0186	PASS
40	Normal Voltage	0.0005	
30	Normal Voltage	0.0144	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0032	
0	Normal Voltage	0.0181	
-10	Normal Voltage	0.0011	
-20	Normal Voltage	0.0122	
-30	Normal Voltage	0.0016	
20	Maximum Voltage	0.0133	
20	Normal Voltage	0.0005	
20	Battery End Point	0.0117	

Note:

1. Normal Voltage = 3.8V. ；Battery End Point (BEP) = 3.5 V.；Maximum Voltage =4.4V
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 IV (RMC 12.2Kbps)	Limit Note 2.
Temperature (°C)	Voltage (Volt)	Deviation (ppm)	Result
50	Normal Voltage	0.0219	PASS
40	Normal Voltage	0.0190	
30	Normal Voltage	0.0023	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0150	
0	Normal Voltage	0.0035	
-10	Normal Voltage	0.0196	
-20	Normal Voltage	0.0040	
-30	Normal Voltage	0.0162	
20	Maximum Voltage	0.0029	
20	Normal Voltage	0.0144	
20	Battery End Point	0.0121	

Note:

1. Normal Voltage = 3.8 V. ；Battery End Point (BEP) = 3.5 V.；Maximum Voltage =4.4V
2. The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.

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	-49.94	-13	-36.94	-50.65	-51.80	1.19	5.20	H
	2508	-41.26	-13	-28.26	-47.11	-43.48	1.53	5.90	H
	3345	-59.22	-13	-46.22	-63.17	-62.01	1.76	6.70	H
	4182	-54.34	-13	-41.34	-58.97	-57.49	1.90	7.20	H
	5018.4	-67.12	-13	-54.12	-73.35	-71.70	2.17	8.90	H
	5853	-57.20	-13	-44.20	-69.86	-62.44	2.41	9.80	H
	1672	-55.90	-13	-42.90	-53.85	-57.76	1.19	5.20	V
	2508	-47.51	-13	-34.51	-51.55	-49.73	1.53	5.90	V
	3345	-64.46	-13	-51.46	-67.78	-67.25	1.76	6.70	V
	4182	-58.12	-13	-45.12	-64.23	-61.27	1.90	7.20	V
	5018.4	-63.75	-13	-50.75	-72.3	-68.33	2.17	8.90	V
	5853	-51.68	-13	-38.68	-66.53	-56.92	2.41	9.80	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	-51.19	-13	-38.19	-51.28	-53.05	1.19	5.20	H
	2508	-48.17	-13	-35.17	-52.62	-50.39	1.53	5.90	H
	3345	-55.30	-13	-42.30	-59.25	-58.09	1.76	6.70	H
	1672	-55.19	-13	-42.19	-53	-57.05	1.19	5.20	V
	2508	-57.46	-13	-44.46	-59.44	-59.68	1.53	5.90	V
	3345	-64.73	-13	-51.73	-68.05	-67.52	1.76	6.70	V

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

GSM1900 (GSM)									
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	3759	-59.75	-13	-46.75	-73.99	-61.46	5.08	6.80	H
	5640	-49.63	-13	-36.63	-66.43	-51.30	8.03	9.70	H
	7521	-53.72	-13	-40.72	-75.02	-56.10	9.43	11.81	H
	3759	-60.56	-13	-47.56	-72.99	-62.27	5.08	6.80	V
	5640	-53.58	-13	-40.58	-70.67	-55.25	8.03	9.70	V
	7521	-55.14	-13	-42.14	-76.28	-57.52	9.43	11.81	V

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

GSM1900 (EDGE class 8)									
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	3759	-60.02	-13	-47.02	-74.26	-61.73	5.08	6.80	H
	5640	-58.60	-13	-45.60	-75.40	-60.27	8.03	9.70	H
	7521	-55.18	-13	-42.18	-76.48	-57.56	9.43	11.81	H
	3759	-60.86	-13	-47.86	-73.29	-62.57	5.08	6.80	V
	5640	-59.27	-13	-46.27	-76.36	-60.94	8.03	9.70	V
	7521	-55.41	-13	-42.41	-76.55	-57.79	9.43	11.81	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	1672.8	-66.66	-13	-53.66	-65.29	-68.52	1.19	5.20	H
	2512	-56.74	-13	-43.74	-59.73	-58.96	1.53	5.90	H
	3345	-67.18	-13	-54.18	-71.13	-69.97	1.76	6.70	H
	1672	-68.97	-13	-55.97	-66.93	-70.83	1.19	5.20	V
	2509.2	-65.65	-13	-52.65	-67.63	-67.87	1.53	5.90	V
	3345	-67.36	-13	-54.36	-70.68	-70.15	1.76	6.70	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	3759	-57.47	-13	-44.47	-71.71	-59.18	5.08	6.80	H
	5643	-52.03	-13	-39.03	-68.83	-53.70	8.03	9.70	H
	7521	-55.36	-13	-42.36	-76.66	-57.74	9.43	11.81	H
	3760	-60.63	-13	-47.63	-73.06	-62.34	5.08	6.80	V
	5637	-52.52	-13	-39.52	-69.61	-54.19	8.03	9.70	V
	7521	-55.39	-13	-42.39	-76.53	-57.77	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	3468	-65.33	-13	-52.33	-72.12	-70.22	1.81	6.70	H
	5197.8	-61.39	-13	-48.39	-74.07	-68.29	2.23	9.13	H
	6930.4	-60.87	-13	-47.87	-76.05	-68.93	2.60	10.66	H
	3468	-66.91	-13	-53.91	-72.11	-71.80	1.81	6.70	V
	5197.8	-57.12	-13	-44.12	-70.67	-64.02	2.23	9.13	V
	6930.4	-61.05	-13	-48.05	-76.1	-69.11	2.6	10.66	V

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