



# FCC RF Test Report

**APPLICANT** : Lenovo Mobile Communication Technology Ltd.  
**EQUIPMENT** : Mobile Cellular Phone  
**BRAND NAME** : Lenovo  
**MODEL NAME** : Lenovo K33a48  
**FCC ID** : YCNK33A48  
**STANDARD** : FCC 47 CFR Part 2, 22(H), 24(E)  
**CLASSIFICATION** : PCS Licensed Transmitter Held to Ear (PCE)

The product was received on Jun. 28, 2016 and testing was completed on Aug. 07, 2016. 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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Prepared by: James Huang / Manager



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Approved by: Jones Tsai / Manager

**SPORTON INTERNATIONAL (KUNSHAN) INC.**  
**No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China**



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## REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG662815A	Rev. 01	Initial issue of report	Sep. 05, 2016

## SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	Reporting Only	PASS	-
3.5	§24.232(d)	Peak-to-Average Ratio	< 13 dB	PASS	-
3.6	§2.1049 §22.917(b) §24.238(b)	Occupied Bandwidth	Reporting Only	PASS	-
3.7	§2.1051 §22.917(a) §24.238(a)	Band Edge Measurement	< 43+10log10(P[Watts])	PASS	-
3.8	§2.1051 §22.917(a) §24.238(a)	Conducted Emission	< 43+10log10(P[Watts])	PASS	-
3.9	§2.1055 §22.355	Frequency Stability for Temperature & Voltage	< 2.5 ppm	PASS	-
	§2.1055 §24.235		Within Authorized Band		
4.4	§22.913(a)(2)	Effective Radiated Power	< 7 Watts	PASS	-
	§24.232(c)	Equivalent Isotropic Radiated Power	< 2 Watts	PASS	-
4.5	§2.1053 §22.917(a) §24.238(a)	Field Strength of Spurious Radiation	< 43+10log10(P[Watts])	PASS	Under limit 42.90 dB at 7520.000 MHz



# 1 General Description

## 1.1 Applicant

**Lenovo Mobile Communication Technology Ltd.**

No.999, Qishan North 2nd Road, Information & Optoelectronics Park, Torch Hi-tech Industry Development Zone, Xiamen, P.R.China

## 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	Lenovo
Model Name	Lenovo K33a48
FCC ID	YCNK33A48
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/HSPA+/DC-HSDPA/LTE/ WLAN2.4GHz 802.11b/g/n HT20/ Bluetooth v3.0+EDR/Bluetooth v4.0 LE/Bluetooth v4.2 LE
IMEI Code	Conducted: 861576030039272/861576030039280 Radiation: 861576030040395/861576030040403 ERP/EIRP: 861576030039496/861576030039504
HW Version	82937_1_13
SW Version	K33_S117_1608021219_ROW
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 is dual SIM slot, sample 2 is single SIM slot. According to the difference, we evaluate is not affect RF performance, so only choose sample 1 to perform RF test.

## 1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
<b>Tx Frequency</b>	<b>GSM/GPRS/EDGE:</b> 850: 824.2 MHz ~ 848.8 MHz 1900: 1850.2 MHz ~ 1909.8MHz <b>WCDMA:</b> Band V: 826.4 MHz ~ 846.6 MHz Band II: 1852.4 MHz ~ 1907.6 MHz
<b>Rx Frequency</b>	<b>GSM/GPRS/EDGE:</b> 850: 869.2 MHz ~ 893.8 MHz 1900: 1930.2 MHz ~ 1989.8 MHz <b>WCDMA:</b> Band V: 871.4 MHz ~ 891.6 MHz Band II: 1932.4 MHz ~ 1987.6 MHz
<b>Maximum Output Power to Antenna</b>	<b>GSM/GPRS/EDGE:</b> 850: 32.60 dBm 1900: 29.68 dBm <b>WCDMA:</b> Band V: 22.93 dBm Band II: 23.34 dBm
<b>Antenna Type</b>	LDS Antenna
<b>Type of Modulation</b>	GSM: GMSK GPRS: GMSK EDGE: GMSK / 8PSK WCDMA: QPSK (Uplink) HSDPA/DC-HSDPA: QPSK (Uplink) HSUPA: QPSK (Uplink) HSPA+: 16QAM (Uplink) DC-HSDPA: 64QAM

## 1.5 Modification of EUT

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

## 1.6 Specification of Accessory

Specification of Accessory				
AC Adapter 1	Brand Name	Lenovo (Acbel)	Model Name	C-P35
	Power Rating	I/P: 100-240 Vac, 300mA, O/P: 5.2Vdc, 2000mA		
AC Adapter 2	Brand Name	Lenovo (Huntkey)	Model Name	C-P35
	Power Rating	I/P: 100-240Vac, 500mA, O/P: 5.2Vdc, 2000mA		
Battery	Brand Name	Lenovo (scud)	Model Name	BL267
	Power Rating	4.4Vdc,3000mAh		
Earphone 1	Brand Name	Lenovo (suicen)	Model Name	SX-H1801A-06
	Signal Line Type	1.1 meter, non-shielded cable, without ferrite core		
Earphone 2	Brand Name	Lenovo (New Leader)	Model Name	NLD-EM127E-96SH-6
	Signal Line Type	1.1 meter, non-shielded cable, without ferrite core		
USB Cable 1	Brand Name	Lenovo(saibao)	Model Name	SWT-A053A
	Signal Line Type	1.0 meter, non-shielded cable, without ferrite core		
USB Cable 2	Brand Name	Lenovo(starw)	Model Name	XJ-007070
	Signal Line Type	1.0 meter, non-shielded cable, without ferrite core		
LCD Panel	Brand Name	tianma	Model Name	Black: TL050VVXP14-00 Golden: TL050VVXP16-00 White: TL050VVXP15-00
Camera	Brand Name	Q Technology	Model Name	Front: FX219BQS Post: FX258BDS
CTP Module	Brand Name	O-FILM	Model Name	Black: MCF-050-2585 Golden: MCF-050-2585-02 White: MCF-050-2585-01

## 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	0.4797	0.0120 ppm	249KGXW
Part 22	GSM850 EDGE class 8	8PSK	0.0883	0.0191 ppm	248KG7W
Part 22	WCDMA Band V RMC 12.2Kbps	QPSK	0.0481	0.0085 ppm	4M15F9W
Part 24	GSM1900 GSM	GMSK	0.4072	0.0144 ppm	245KGXW
Part 24	GSM1900 EDGE class 8	8PSK	0.1462	0.0128 ppm	248KG7W
Part 24	WCDMA Band II RMC 12.2Kbps	QPSK	0.0934	0.0251 ppm	4M14F9W

## 1.8 Testing Location

<b>Test Site</b>	SPORTON INTERNATIONAL INC.	
<b>Test Site Location</b>	No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978	
<b>Test Site No.</b>	<b>Sporton Site No.</b>	
	TH03-HY	

<b>Test Site</b>	SPORTON INTERNATIONAL (KUNSHAN) INC.	
<b>Test Site Location</b>	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958	
<b>Test Site No.</b>	<b>Sporton Site No.</b>	<b>FCC Registration No.</b>
	03CH02-KS	418269

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

## 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)
- ♦ ANSI / TIA / EIA-603-D-2010
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02

### 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.

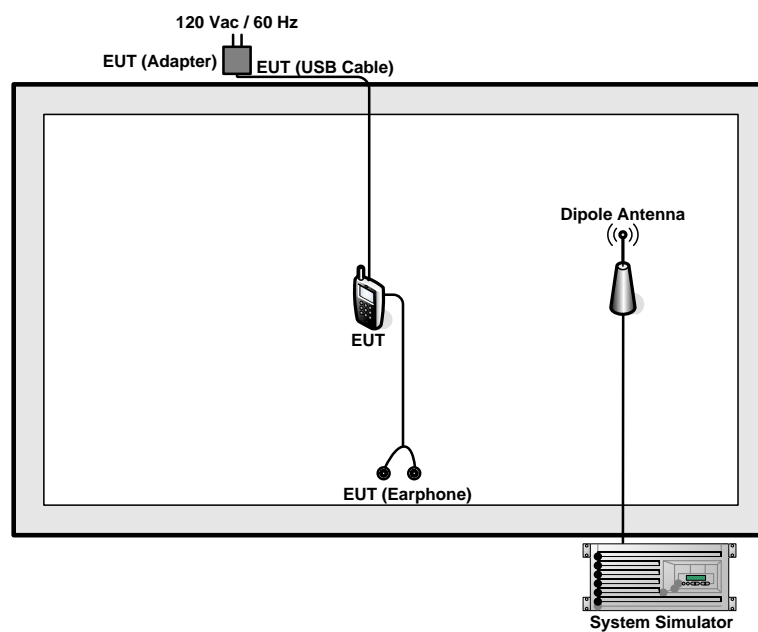
Radiated emissions were investigated from 30 MHz to 10th harmonic.

All modes and data rates and positions were investigated.

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

Test Modes		
Band	Radiated TCs	Conducted TCs
GSM 850	■ GSM Link	■ GSM Link
	■ EDGE class 8 Link	■ EDGE class 8 Link
GSM 1900	■ GSM Link	■ GSM Link
	■ EDGE class 8 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

## 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 6.5 dB and a 10dB attenuator.

Example :

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 6.5 + 10 = 16.5 \text{ (dB)}\end{aligned}$$

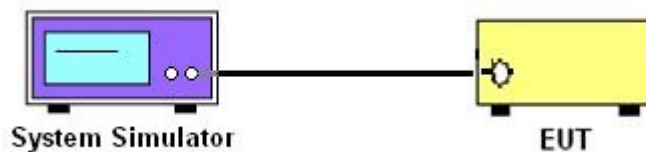
### 3 Conducted Test Result

#### 3.1 Measuring Instruments

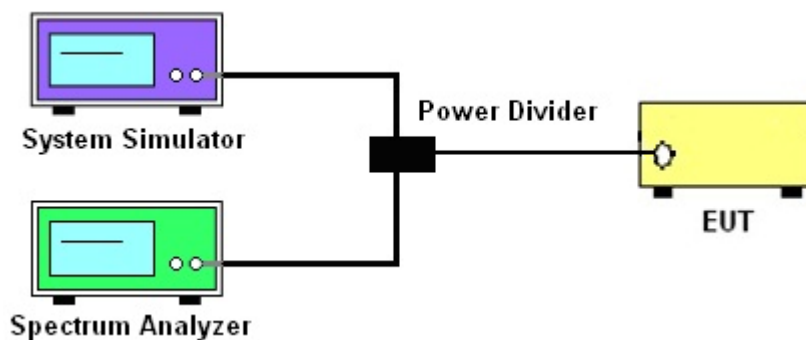
See list of measuring instruments of this test report.

#### 3.2 Test Setup

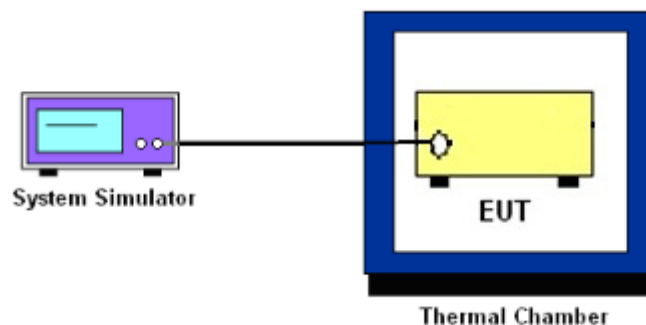
##### 3.2.1 Conducted Output Power



##### 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**

### **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.

### **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  $43 + 10\log(P)$  dB below the transmitter power P(Watts)  
 $= P(W) - [43 + 10\log(P)]$  (dB)  
 $= [30 + 10\log(P)]$  (dBm) -  $[43 + 10\log(P)]$  (dB)  
 $= -13\text{dBm}$ .



## 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 10<sup>th</sup> 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  $43 + 10\log(P)$  dB below the transmitter power P(Watts)  
$$= P(W) - [43 + 10\log(P)] \text{ (dB)}$$
$$= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$$
$$= -13\text{dBm}.$$

### 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  $\pm 0.00025\%$  ( $\pm 2.5\text{ppm}$ ) 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  $-30^{\circ}\text{C}$  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  $10^{\circ}\text{C}$  steps up to  $50^{\circ}\text{C}$ . 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  $20\pm 5^{\circ}\text{C}$  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

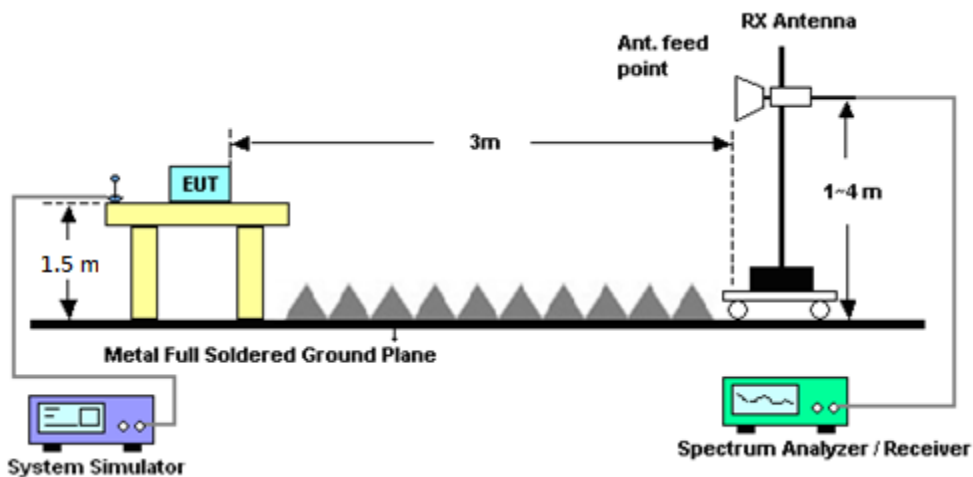
See list of measuring instruments of this test report.

### 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 Effective Radiated Power and Effective Isotropic Radiated Power Measurement

### 4.4.1 Description of the ERP/EIRP Measurement

The substitution method, in ANSI / TIA / EIA-603-D-2010, was used for ERP/EIRP measurement, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02r02. The ERP of mobile transmitters must not exceed 7 Watts (Cellular Band) and the EIRP of mobile transmitters are limited to 2 Watts (PCS Band).

### 4.4.2 Test Procedures

1. The testing follows FCC KDB 971168 D01 v02r02 Section 5.2.1. (for CDMA/WCDMA), Section 5.2.2.2 (for GSM/GPRS/EDGE) and ANSI / TIA-603-D-2010 Section 2.2.17.
2. The EUT was placed on a non-conductive rotating platform (0.8 meters for frequency below 1GHz and 1.5 meter for frequency above 1GHz) in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with RMS detector per section 5. of KDB 971168 D01.
3. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power. The maximum emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
4. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-D. The EUT was replaced by the substitution antenna at same location, and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain - Analyzer reading. Then the EUT's EIRP was calculated with the correction factor,  $EIRP = LVL + \text{Correction factor}$  and  $ERP = EIRP - 2.15$ . Take the record of the output power at substitution antenna.



	GSM/GPRS/EDGE	WCDMA/HSPA
SPAN	500kHz	10MHz
RBW	10kHz	100kHz
VBW	30kHz	300kHz
Detector	RMS	RMS
Trace	Average	Average
Average Type	Power	Power
Sweep Count	100	100

## 4.5 Field Strength of Spurious Radiation Measurement

### 4.5.1 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.

### 4.5.2 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.  $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
12.  $ERP \text{ (dBm)} = EIRP - 2.15$
13. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
14. The limit line is derived from  $43 + 10\log(P)$  dB below the transmitter power P(Watts)  
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$   
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$   
 $= -13\text{dBm}.$



## 5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	Rohde & Schwarz	FSP30	101329	9kHz~30GHz	Jun. 27, 2016	Aug. 01, 2016	Jun. 26, 2017	Conducted (TH03-HY)
Hygrometer	Testo	608-H1	34893241	N/A	May 03, 2016	Aug. 01, 2016	May 02, 2017	Conducted (TH03-HY)
Temperature Chamber	ESPEC	SU-641	92013721	-30℃ ~70℃	Nov. 20, 2015	Aug. 01, 2016	Nov. 19, 2016	Conducted (TH03-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL883644	Voltage:0~20V; Current:0~5A	Nov. 26, 2015	Aug. 01, 2016	Nov. 25, 2016	Conducted (TH03-HY)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Sep. 10, 2015	Aug. 07, 2016	Sep. 09, 2016	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150208	10Hz~44GHz, Max 30dB	Apr. 22, 2016	Aug. 07, 2016	Apr. 21, 2017	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6112D	37879	30MHz~2GHz	Sep. 12, 2015	Aug. 07, 2016	Sep. 11, 2016	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Nov. 07, 2015	Aug. 07, 2016	Nov. 06, 2016	Radiation (03CH02-KS)
SHF-EHF Horn	com-power	AH-840	101070	18GHz~40GHz	Oct. 10, 2015	Aug. 07, 2016	Oct. 09, 2016	Radiation (03CH02-KS)
Amplifier	com-power	PA-103A	161069	1kHz~1000MHz / 32 dB	Apr. 22, 2016	Aug. 07, 2016	Apr. 21, 2017	Radiation (03CH02-KS)
High Gain Amplifier	MITEQ	AMF-7D-00 101800-30-1 00	1865802	1GHz~18GHz	Jan. 20, 2016	Aug. 07, 2016	Jan. 19, 2017	Radiation (03CH02-KS)
Amplifier	Agilent	8449B	3008A02384	1~26.5GHz Gain 30dB	Oct. 24, 2015	Aug. 07, 2016	Oct. 23, 2016	Radiation (03CH02-KS)
Amplifier	MITEQ	TTA1840-35 -HG	1887435	18GHz~40GHz	Jan. 20, 2016	Aug. 07, 2016	Jan. 19, 2017	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Aug. 07, 2016	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Aug. 07, 2016	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Aug. 07, 2016	NCR	Radiation (03CH02-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% ( $U = 2Uc(y)$ )	5.1dB
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### Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	4.5dB
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### Uncertainty of Radiated Emission Measurement (18GHz ~ 40GHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.1dB
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## 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	32.20	32.58	32.60	29.40	29.35	29.68
GPRS class 8	32.17	32.57	32.58	29.37	29.33	29.67
GPRS class 10	30.97	30.98	31.40	28.91	28.94	29.01
GPRS class 11	29.91	29.96	29.98	27.66	27.63	27.70
GPRS class 12	28.46	28.55	28.58	26.36	26.34	26.38
EGPRS class 8	24.55	24.49	24.48	24.76	24.72	24.68
EGPRS class 10	23.46	23.35	23.45	23.36	23.53	23.45
EGPRS class 11	22.38	22.26	22.37	22.46	22.33	22.24
EGPRS class 12	21.37	21.18	21.24	21.22	21.19	21.08

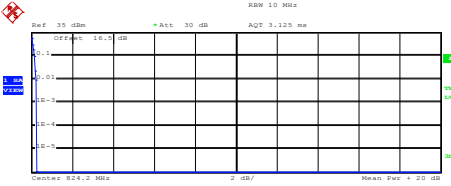
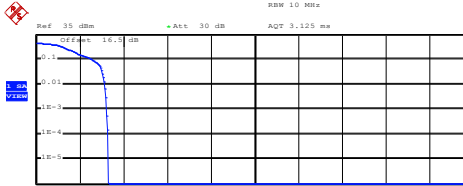
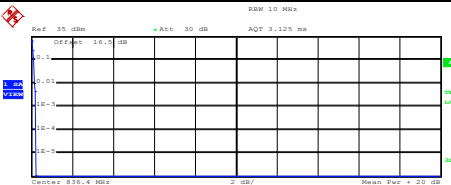
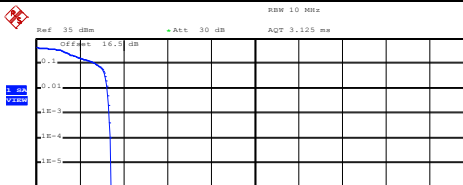
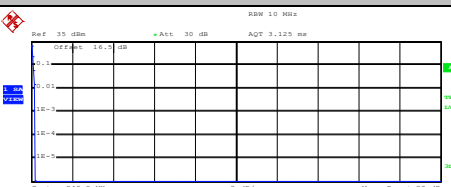
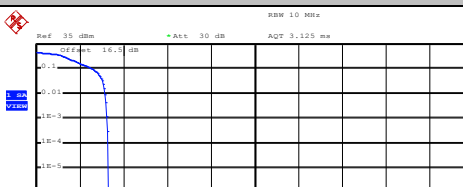
Conducted Power (*Unit: dBm)						
Band	WCDMA Band V			WCDMA Band II		
Channel	4132	4182	4233	9262	9400	9538
Frequency	826.4	836.4	846.6	1852.4	1880	1907.6
AMR 12.2Kbps	22.87	22.91	22.83	23.26	23.21	23.32
RMC 12.2Kbps	22.90	22.93	22.84	23.28	23.22	23.34
HSDPA Subtest-1	21.65	21.69	21.65	22.04	21.99	21.95
HSDPA Subtest-2	21.80	21.81	21.73	22.12	22.08	22.01
HSDPA Subtest-3	21.32	21.31	21.24	21.63	21.60	21.54
HSDPA Subtest-4	21.33	21.33	21.25	21.62	21.59	21.54
DC-HSDPA Subtest-1	21.62	21.67	21.59	22.02	21.78	21.99
DC-HSDPA Subtest-2	21.71	21.77	21.67	22.01	22.01	21.89
DC-HSDPA Subtest-3	21.32	21.34	21.24	21.52	21.60	21.47
DC-HSDPA Subtest-4	21.31	21.37	21.21	21.56	21.53	21.61
HSUPA Subtest-1	21.04	21.26	21.31	21.51	21.98	22.03
HSUPA Subtest-2	20.79	20.71	20.32	21.13	20.63	20.97
HSUPA Subtest-3	19.95	19.98	19.79	20.72	20.71	20.14
HSUPA Subtest-4	21.37	21.29	20.92	21.18	21.57	21.18
HSUPA Subtest-5	21.70	21.60	21.60	22.20	22.00	21.90
HSPA+ (16QAM) Subtest-1	21.03	20.88	21.00	21.77	21.45	21.82

## Peak-to-Average Ratio

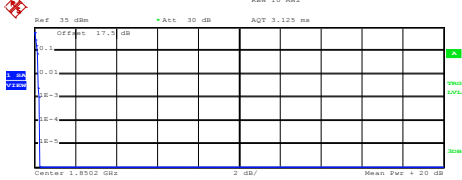
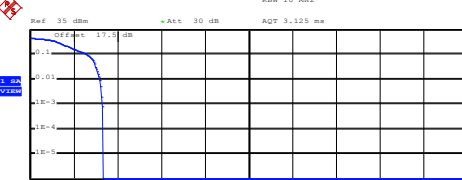
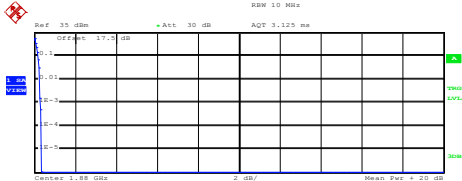
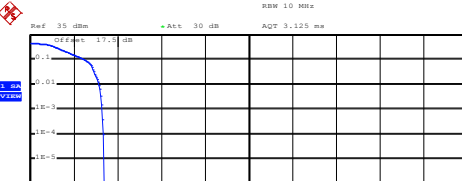
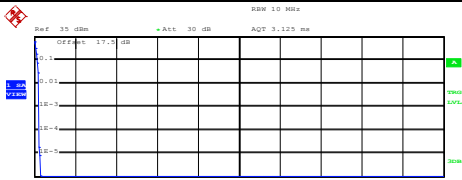
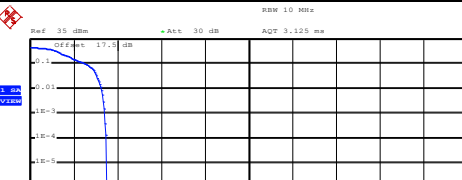
Mode	GSM850(dB)		Limit: 13dB
Mod.	GSM	EDGE class 8	Result
Lowest CH	0.28	3.24	<b>PASS</b>
Middle CH	0.24	3.36	
Highest CH	0.20	3.24	

Mode	GSM1900(dB)		Limit: 13dB
Mod.	GSM	EDGE class 8	Result
Lowest CH	0.24	3.32	<b>PASS</b>
Middle CH	0.32	3.32	
Highest CH	0.24	3.40	

Mode	WCDMA Band V(dB)	WCDMA Band II(dB)	Limit: 13dB
Mod.	RMC 12.2Kbps	RMC 12.2Kbps	Result
Lowest CH	3.32	3.28	<b>PASS</b>
Middle CH	3.20	2.92	
Highest CH	3.04	2.96	

GSM850 (GSM)	GSM850 (EDGE class 8)																												
Lowest Channel	Lowest Channel																												
 <p>Ref: 35 dBm    *Att: 30 dB    AQT: 3.125 ms</p> <p>Center: 824.2 MHz    2 dB/    Mean Pwr: +20 dB</p> <p>Complementary Cumulative Distribution Function (100000 samples)</p> <p>Trace 1</p> <table border="1"> <tr><td>Mean</td><td>32.52 dBm</td></tr> <tr><td>Peak</td><td>32.79 dBm</td></tr> <tr><td>Crest</td><td>0.27 dB</td></tr> </table> <table border="1"> <tr><td>10 %</td><td>0.16 dB</td></tr> <tr><td>1 %</td><td>0.24 dB</td></tr> <tr><td>.1 %</td><td>0.28 dB</td></tr> <tr><td>.01 %</td><td>0.28 dB</td></tr> </table> <p>Date: 1.AUG.2016 10:50:31</p>	Mean	32.52 dBm	Peak	32.79 dBm	Crest	0.27 dB	10 %	0.16 dB	1 %	0.24 dB	.1 %	0.28 dB	.01 %	0.28 dB	 <p>Ref: 35 dBm    *Att: 30 dB    AQT: 3.125 ms</p> <p>Center: 824.2 MHz    2 dB/    Mean Pwr: +20 dB</p> <p>Complementary Cumulative Distribution Function (100000 samples)</p> <p>Trace 1</p> <table border="1"> <tr><td>Mean</td><td>24.98 dBm</td></tr> <tr><td>Peak</td><td>28.27 dBm</td></tr> <tr><td>Crest</td><td>3.29 dB</td></tr> </table> <table border="1"> <tr><td>10 %</td><td>2.60 dB</td></tr> <tr><td>1 %</td><td>3.16 dB</td></tr> <tr><td>.1 %</td><td>3.24 dB</td></tr> <tr><td>.01 %</td><td>3.28 dB</td></tr> </table> <p>Date: 1.AUG.2016 11:25:53</p>	Mean	24.98 dBm	Peak	28.27 dBm	Crest	3.29 dB	10 %	2.60 dB	1 %	3.16 dB	.1 %	3.24 dB	.01 %	3.28 dB
Mean	32.52 dBm																												
Peak	32.79 dBm																												
Crest	0.27 dB																												
10 %	0.16 dB																												
1 %	0.24 dB																												
.1 %	0.28 dB																												
.01 %	0.28 dB																												
Mean	24.98 dBm																												
Peak	28.27 dBm																												
Crest	3.29 dB																												
10 %	2.60 dB																												
1 %	3.16 dB																												
.1 %	3.24 dB																												
.01 %	3.28 dB																												
Middle Channel	Middle Channel																												
 <p>Ref: 35 dBm    *Att: 30 dB    AQT: 3.125 ms</p> <p>Center: 836.4 MHz    2 dB/    Mean Pwr: +20 dB</p> <p>Complementary Cumulative Distribution Function (100000 samples)</p> <p>Trace 1</p> <table border="1"> <tr><td>Mean</td><td>32.63 dBm</td></tr> <tr><td>Peak</td><td>32.86 dBm</td></tr> <tr><td>Crest</td><td>0.23 dB</td></tr> </table> <table border="1"> <tr><td>10 %</td><td>0.12 dB</td></tr> <tr><td>1 %</td><td>0.16 dB</td></tr> <tr><td>.1 %</td><td>0.24 dB</td></tr> <tr><td>.01 %</td><td>0.24 dB</td></tr> </table> <p>Date: 1.AUG.2016 10:51:28</p>	Mean	32.63 dBm	Peak	32.86 dBm	Crest	0.23 dB	10 %	0.12 dB	1 %	0.16 dB	.1 %	0.24 dB	.01 %	0.24 dB	 <p>Ref: 35 dBm    *Att: 30 dB    AQT: 3.125 ms</p> <p>Center: 836.4 MHz    2 dB/    Mean Pwr: +20 dB</p> <p>Complementary Cumulative Distribution Function (100000 samples)</p> <p>Trace 1</p> <table border="1"> <tr><td>Mean</td><td>25.15 dBm</td></tr> <tr><td>Peak</td><td>28.55 dBm</td></tr> <tr><td>Crest</td><td>3.41 dB</td></tr> </table> <table border="1"> <tr><td>10 %</td><td>2.76 dB</td></tr> <tr><td>1 %</td><td>3.24 dB</td></tr> <tr><td>.1 %</td><td>3.36 dB</td></tr> <tr><td>.01 %</td><td>3.40 dB</td></tr> </table> <p>Date: 1.AUG.2016 11:26:25</p>	Mean	25.15 dBm	Peak	28.55 dBm	Crest	3.41 dB	10 %	2.76 dB	1 %	3.24 dB	.1 %	3.36 dB	.01 %	3.40 dB
Mean	32.63 dBm																												
Peak	32.86 dBm																												
Crest	0.23 dB																												
10 %	0.12 dB																												
1 %	0.16 dB																												
.1 %	0.24 dB																												
.01 %	0.24 dB																												
Mean	25.15 dBm																												
Peak	28.55 dBm																												
Crest	3.41 dB																												
10 %	2.76 dB																												
1 %	3.24 dB																												
.1 %	3.36 dB																												
.01 %	3.40 dB																												
Highest Channel	Highest Channel																												
 <p>Ref: 35 dBm    *Att: 30 dB    AQT: 3.125 ms</p> <p>Center: 848.8 MHz    2 dB/    Mean Pwr: +20 dB</p> <p>Complementary Cumulative Distribution Function (100000 samples)</p> <p>Trace 1</p> <table border="1"> <tr><td>Mean</td><td>32.47 dBm</td></tr> <tr><td>Peak</td><td>32.64 dBm</td></tr> <tr><td>Crest</td><td>0.17 dB</td></tr> </table> <table border="1"> <tr><td>10 %</td><td>0.12 dB</td></tr> <tr><td>1 %</td><td>0.16 dB</td></tr> <tr><td>.1 %</td><td>0.20 dB</td></tr> <tr><td>.01 %</td><td>0.20 dB</td></tr> </table> <p>Date: 1.AUG.2016 10:52:29</p>	Mean	32.47 dBm	Peak	32.64 dBm	Crest	0.17 dB	10 %	0.12 dB	1 %	0.16 dB	.1 %	0.20 dB	.01 %	0.20 dB	 <p>Ref: 35 dBm    *Att: 30 dB    AQT: 3.125 ms</p> <p>Center: 848.8 MHz    2 dB/    Mean Pwr: +20 dB</p> <p>Complementary Cumulative Distribution Function (100000 samples)</p> <p>Trace 1</p> <table border="1"> <tr><td>Mean</td><td>25.59 dBm</td></tr> <tr><td>Peak</td><td>28.90 dBm</td></tr> <tr><td>Crest</td><td>3.31 dB</td></tr> </table> <table border="1"> <tr><td>10 %</td><td>2.60 dB</td></tr> <tr><td>1 %</td><td>3.16 dB</td></tr> <tr><td>.1 %</td><td>3.24 dB</td></tr> <tr><td>.01 %</td><td>3.32 dB</td></tr> </table> <p>Date: 1.AUG.2016 11:26:55</p>	Mean	25.59 dBm	Peak	28.90 dBm	Crest	3.31 dB	10 %	2.60 dB	1 %	3.16 dB	.1 %	3.24 dB	.01 %	3.32 dB
Mean	32.47 dBm																												
Peak	32.64 dBm																												
Crest	0.17 dB																												
10 %	0.12 dB																												
1 %	0.16 dB																												
.1 %	0.20 dB																												
.01 %	0.20 dB																												
Mean	25.59 dBm																												
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Crest	3.31 dB																												
10 %	2.60 dB																												
1 %	3.16 dB																												
.1 %	3.24 dB																												
.01 %	3.32 dB																												



GSM1900 (GSM)		GSM1900 (EDGE class 8)	
Lowest Channel		Lowest Channel	
 <p>Ref: 35 dBm    +Att: 30 dB    AQT: 3.125 ms Center: 1.8502 GHz    2 dB/    Mean Pwr: +20 dB</p> <p>Complementary Cumulative Distribution Function (100000 samples)</p> <p>Trace 1</p> <p>Mean: 29.27 dBm Peak: 29.54 dBm Crest: 0.27 dB</p> <p>10 %: 0.16 dB 1 %: 0.20 dB .1 %: 0.24 dB .01 %: 0.28 dB</p> <p>Date: 1.AUG.2016 11:41:48</p>		 <p>Ref: 35 dBm    +Att: 30 dB    AQT: 3.125 ms Center: 1.8502 GHz    2 dB/    Mean Pwr: +20 dB</p> <p>Complementary Cumulative Distribution Function (100000 samples)</p> <p>Trace 1</p> <p>Mean: 25.42 dBm Peak: 28.76 dBm Crest: 3.35 dB</p> <p>10 %: 2.64 dB 1 %: 3.20 dB .1 %: 3.32 dB .01 %: 3.36 dB</p> <p>Date: 1.AUG.2016 13:47:32</p>	
Middle Channel		Middle Channel	
 <p>Ref: 35 dBm    +Att: 30 dB    AQT: 3.125 ms Center: 1.85 GHz    2 dB/    Mean Pwr: +20 dB</p> <p>Complementary Cumulative Distribution Function (100000 samples)</p> <p>Trace 1</p> <p>Mean: 29.62 dBm Peak: 29.96 dBm Crest: 0.34 dB</p> <p>10 %: 0.20 dB 1 %: 0.28 dB .1 %: 0.32 dB .01 %: 0.36 dB</p> <p>Date: 1.AUG.2016 11:42:38</p>		 <p>Ref: 35 dBm    +Att: 30 dB    AQT: 3.125 ms Center: 1.85 GHz    2 dB/    Mean Pwr: +20 dB</p> <p>Complementary Cumulative Distribution Function (100000 samples)</p> <p>Trace 1</p> <p>Mean: 25.33 dBm Peak: 28.69 dBm Crest: 3.37 dB</p> <p>10 %: 2.52 dB 1 %: 3.16 dB .1 %: 3.32 dB .01 %: 3.36 dB</p> <p>Date: 1.AUG.2016 13:48:17</p>	
Highest Channel		Highest Channel	
 <p>Ref: 35 dBm    +Att: 30 dB    AQT: 3.125 ms Center: 1.9098 GHz    2 dB/    Mean Pwr: +20 dB</p> <p>Complementary Cumulative Distribution Function (100000 samples)</p> <p>Trace 1</p> <p>Mean: 29.44 dBm Peak: 29.75 dBm Crest: 0.31 dB</p> <p>10 %: 0.16 dB 1 %: 0.24 dB .1 %: 0.24 dB .01 %: 0.24 dB</p> <p>Date: 1.AUG.2016 11:43:26</p>		 <p>Ref: 35 dBm    +Att: 30 dB    AQT: 3.125 ms Center: 1.9098 GHz    2 dB/    Mean Pwr: +20 dB</p> <p>Complementary Cumulative Distribution Function (100000 samples)</p> <p>Trace 1</p> <p>Mean: 25.06 dBm Peak: 28.55 dBm Crest: 3.50 dB</p> <p>10 %: 2.56 dB 1 %: 3.28 dB .1 %: 3.40 dB .01 %: 3.48 dB</p> <p>Date: 1.AUG.2016 13:48:51</p>	



WCDMA Band V (RMC 12.2Kbps)		WCDMA Band II (RMC 12.2Kbps)	
Lowest Channel		Lowest Channel	
<div><div><div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><di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**26dB Bandwidth**

Mode	GSM850(MHz)	
Mod.	GSM	EDGE class 8
Lowest CH	0.302	0.284
Middle CH	0.314	0.281
Highest CH	0.314	0.270

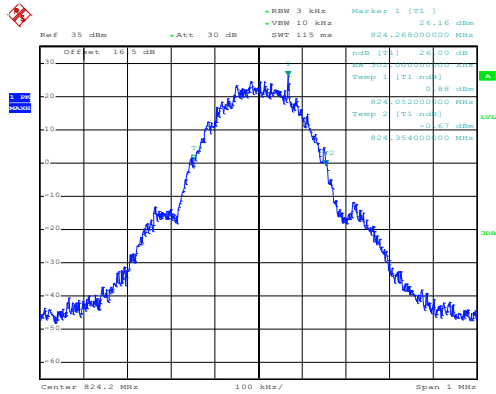
Mode	GSM1900(MHz)	
Mod.	GSM	EDGE class 8
Lowest CH	0.293	0.298
Middle CH	0.312	0.282
Highest CH	0.314	0.291

Mode	WCDMA Band V(MHz)	WCDMA Band II(MHz)
Mod.	RMC 12.2Kbps	RMC 12.2Kbps
Lowest CH	4.69	4.70
Middle CH	4.70	4.72
Highest CH	4.68	4.70



## GSM850 (GSM)

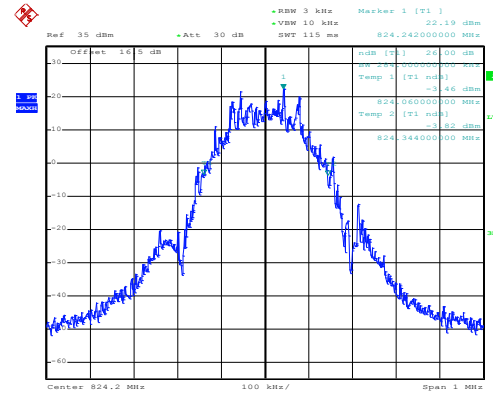
## Lowest Channel



Date: 1.AUG.2016 10:40:09

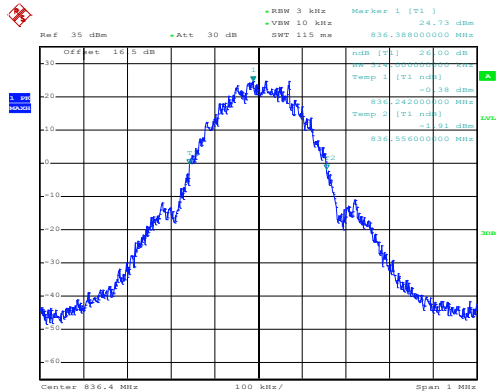
## GSM850 (EDGE class 8)

## Lowest Channel



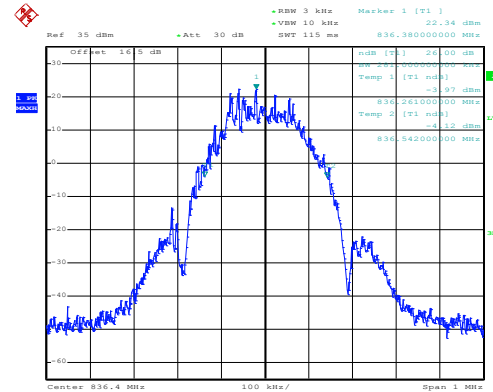
Date: 1.AUG.2016 11:16:21

## Middle Channel



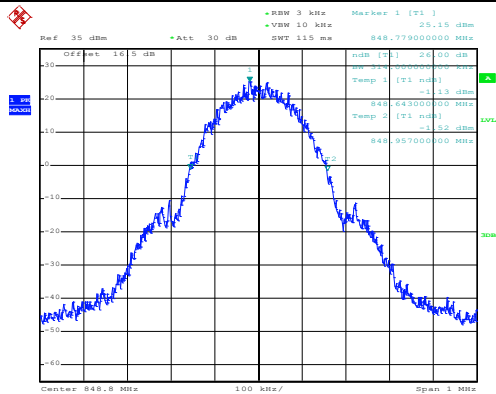
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## Middle Channel



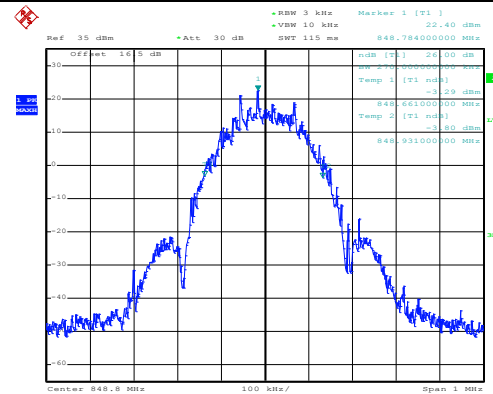
Date: 1.AUG.2016 11:16:50

## Highest Channel

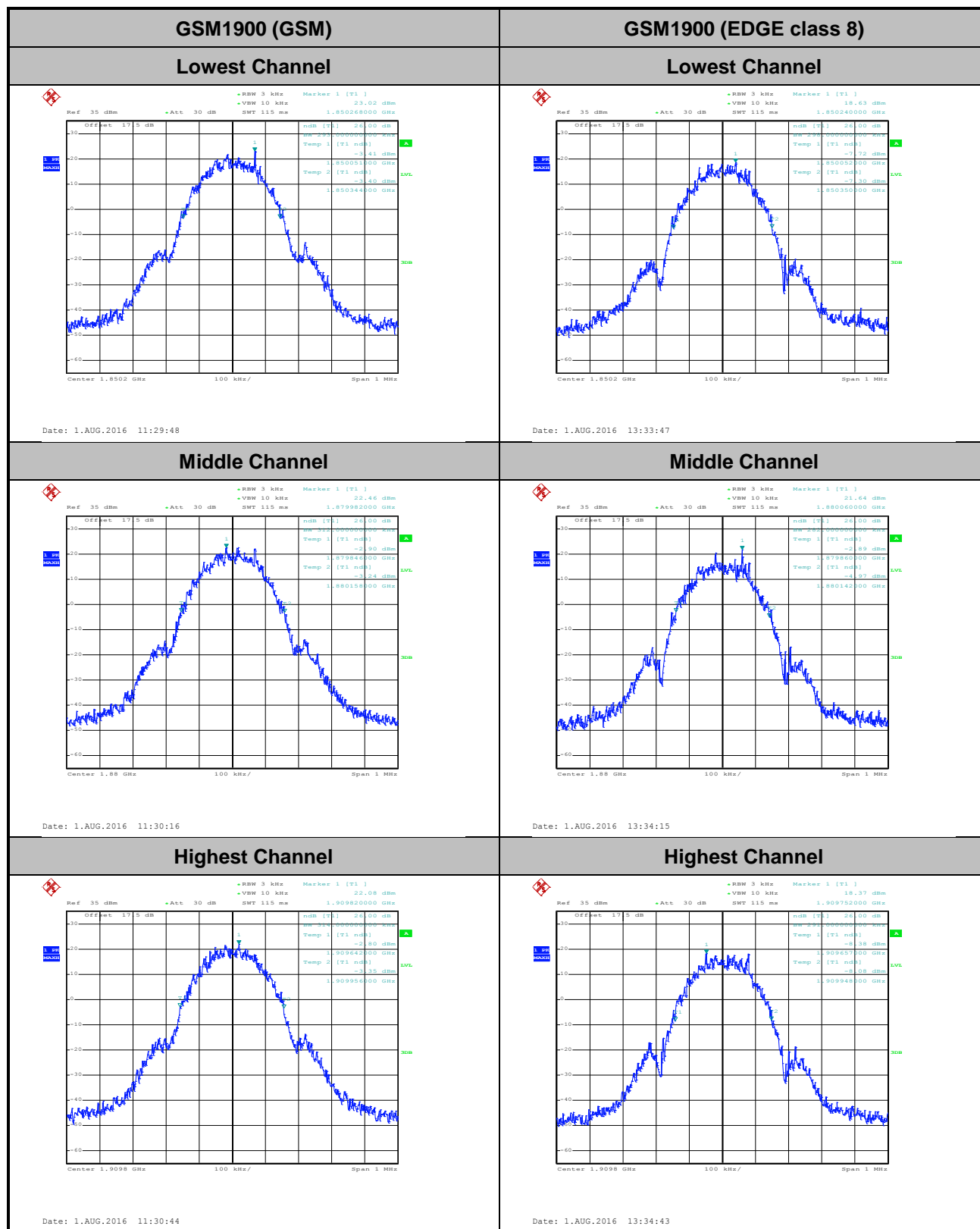


Date: 1.AUG.2016 10:41:05

## Highest Channel



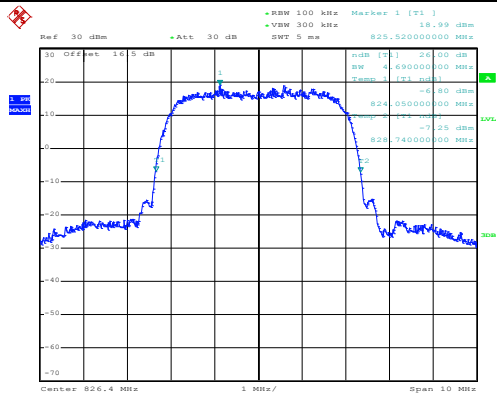
Date: 1.AUG.2016 11:17:18





### WCDMA Band V (RMC 12.2Kbps)

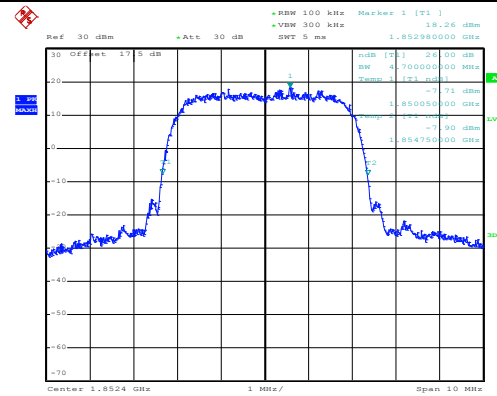
## Lowest Channel



Date: 1.AUG.2016 13:55:03

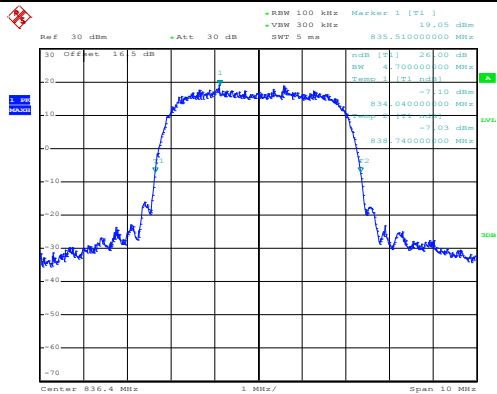
### WCDMA Band II (RMC 12.2Kbps)

### Lowest Channel



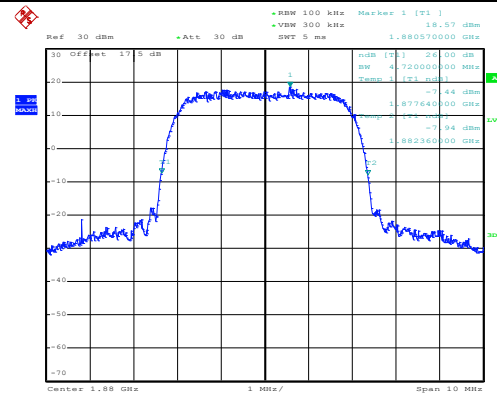
Date: 1.AUG.2016 09:42:25

## Middle Channel



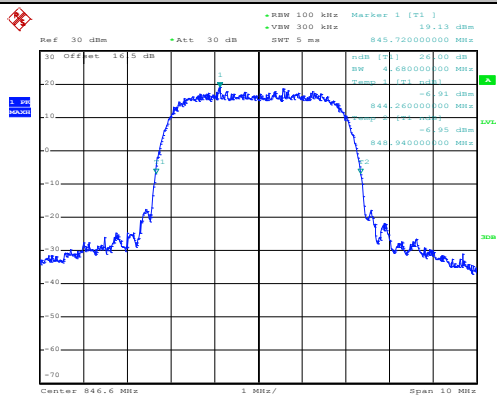
Date: 1.AUG.2016 13:55:31

### Middle Channel



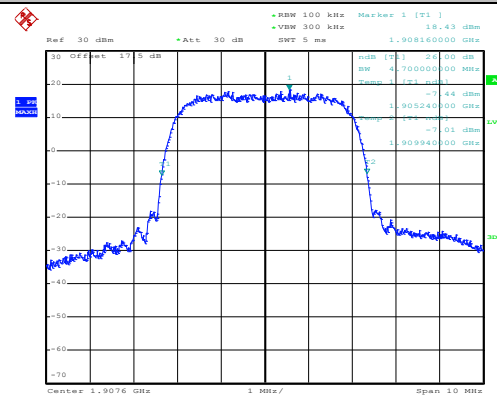
Date: 1.AUG.2016 09:42:53

## Highest Channel



Date: 1.AUG.2016 13:55:59

### Highest Channel



Date: 1.AUG.2016 09:43:21

**Occupied Bandwidth**

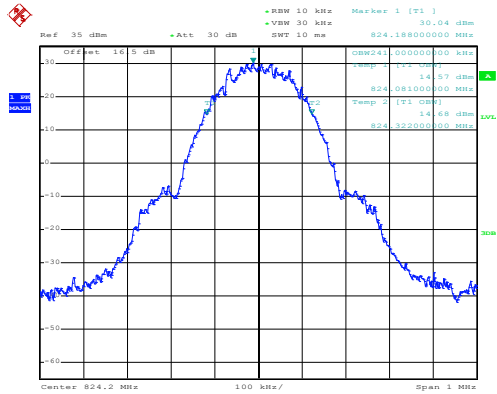
Mode	GSM850(MHz)	
Mod.	GSM	EDGE class 8
Lowest CH	0.241	0.248
Middle CH	0.242	0.248
Highest CH	0.249	0.241

Mode	GSM1900(MHz)	
Mod.	GSM	EDGE class 8
Lowest CH	0.245	0.244
Middle CH	0.242	0.248
Highest CH	0.244	0.241

Mode	WCDMA Band V(MHz)	WCDMA Band II(MHz)
Mod.	RMC 12.2Kbps	RMC 12.2Kbps
Lowest CH	4.14	4.12
Middle CH	4.15	4.14
Highest CH	4.13	4.13

## GSM850 (GSM)

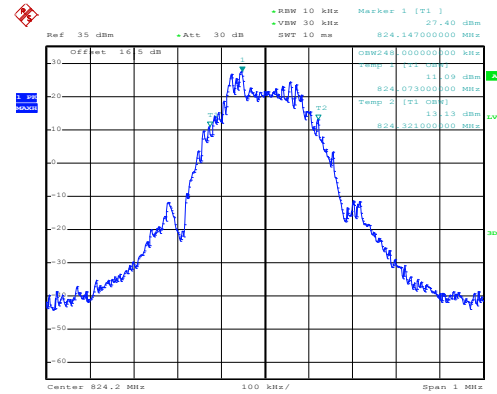
## Lowest Channel



Date: 1.AUG.2016 10:41:39

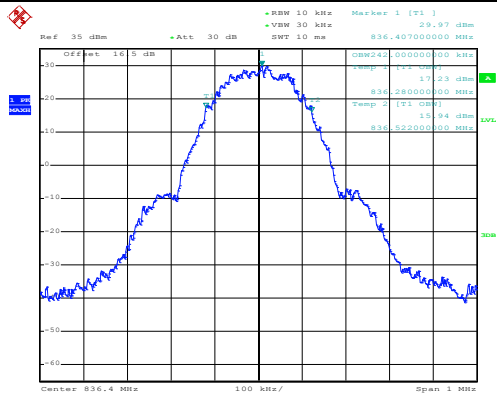
**GSM850 (EDGE class 8)**

### Lowest Channel



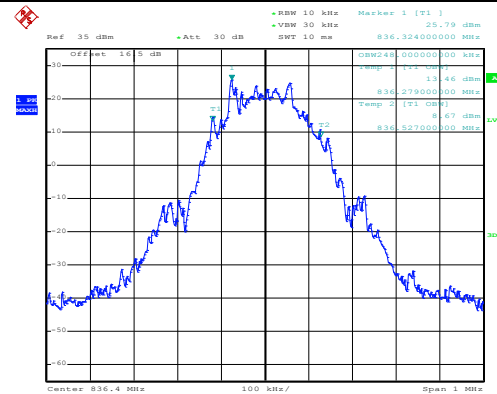
Date: 1.AUG.2016 11:18:08

## Middle Channel



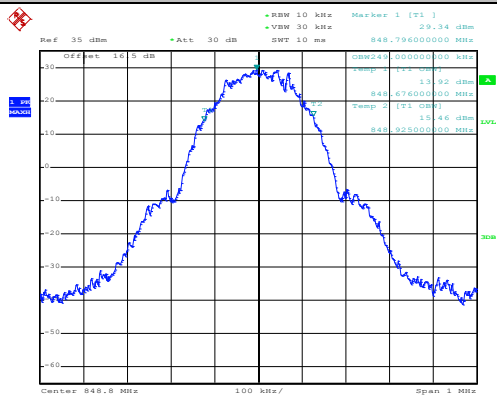
Date: 1.AUG.2016 10:42:07

## Middle Channel



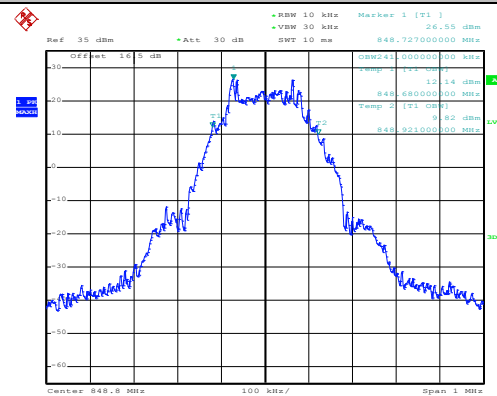
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### Highest Channel

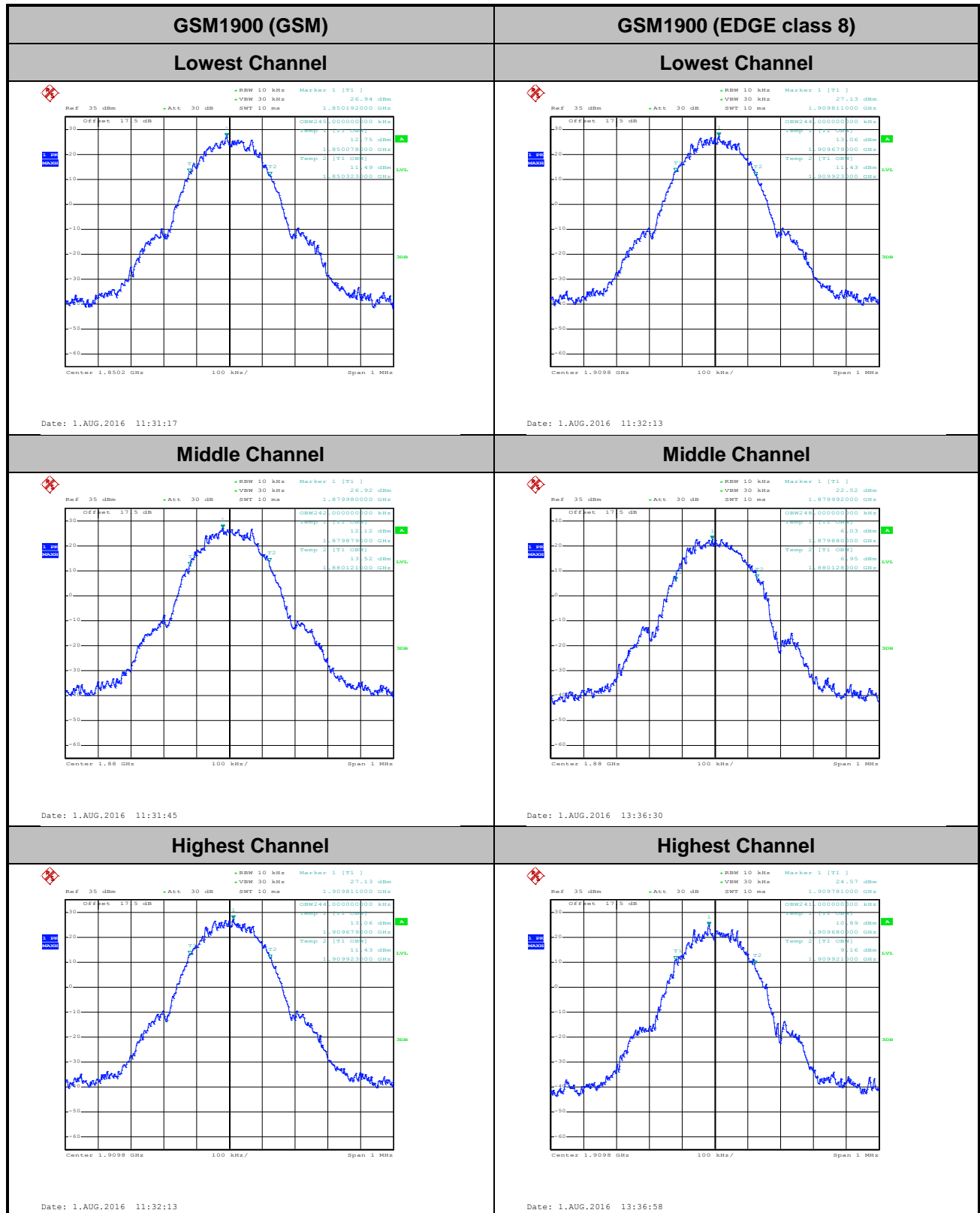


Date: 1.AUG.2016 10:42:35

### Highest Channel

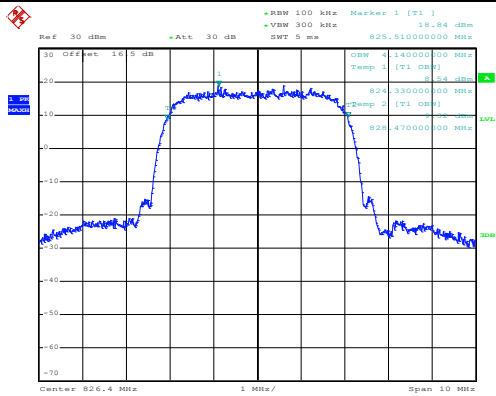


Date: 1.AUG.2016 11:19:04



### WCDMA Band V (RMC 12.2Kbps)

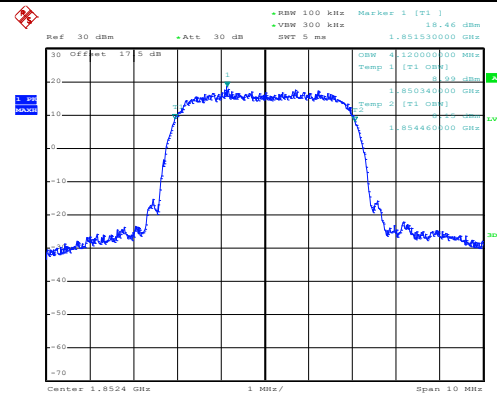
## Lowest Channel



Date: 1.AUG.2016 13:57:11

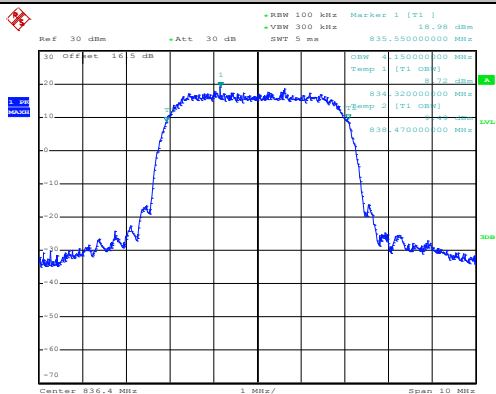
### WCDMA Band II (RMC 12.2Kbps)

### Lowest Channel



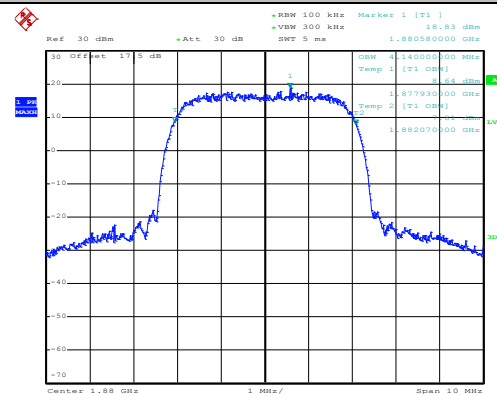
Date: 1.AUG.2016 09:44:00

## Middle Channel



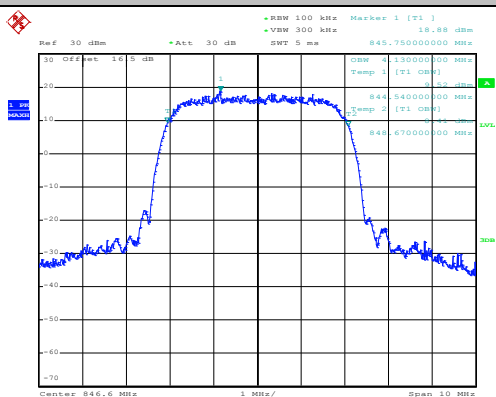
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### Middle Channel



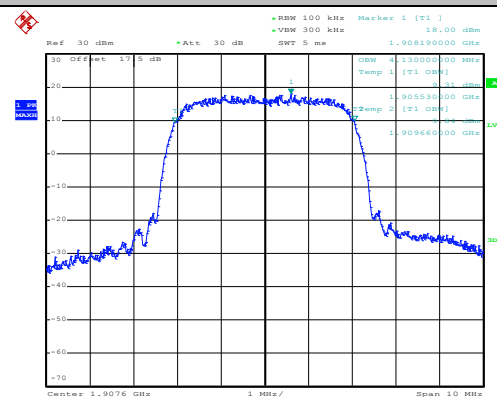
Date: 1.AUG.2016 09:44:28

### Highest Channel



Date: 1.AUG.2016 13:58:07

### Highest Channel



Date: 1.AUG.2016 09:44:56

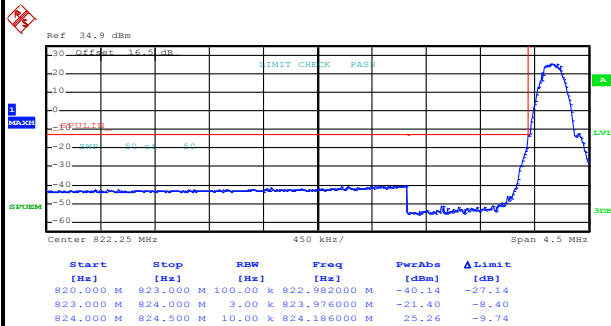


## **Conducted Band Edge**



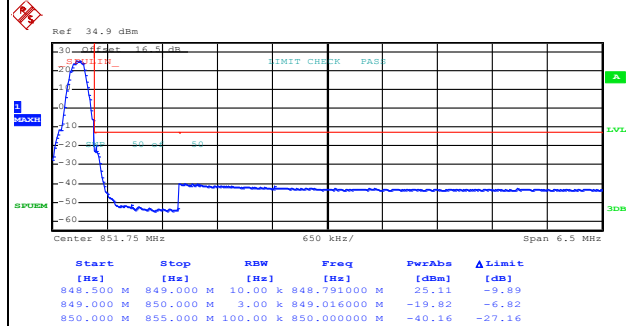
## GSM850 (GSM)

## Lowest Band Edge



Date: 1.AUG.2016 10:44:23

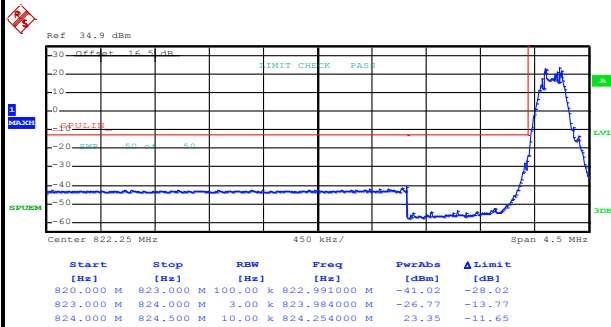
## Highest Band Edge



Date: 1.AUG.2016 10:45:51

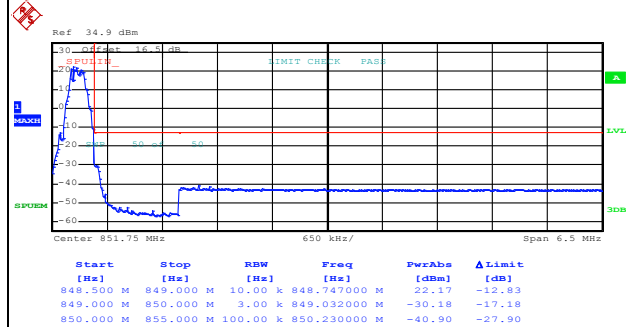
## GSM850 (EDGE class 8)

## Lowest Band Edge



Date: 1.AUG.2016 11:23:18

## Highest Band Edge

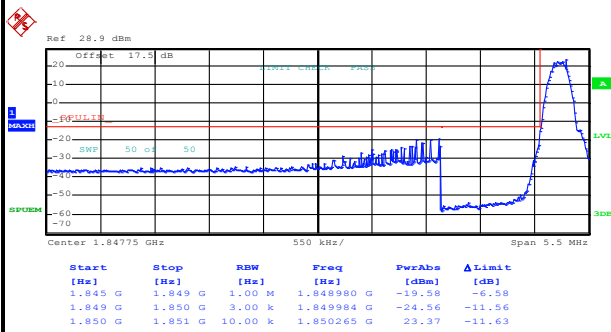


Date: 1.AUG.2016 11:24:45



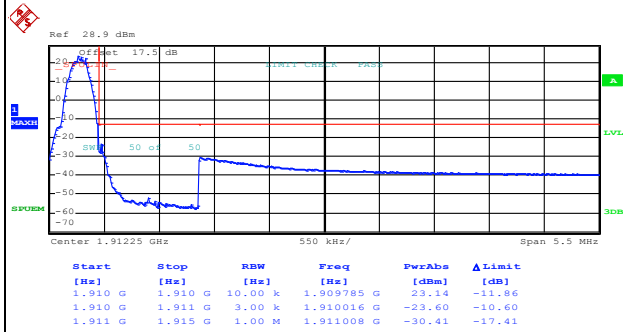
## GSM1900 (GSM)

## Lowest Band Edge



Date: 1.AUG.2016 11:36:03

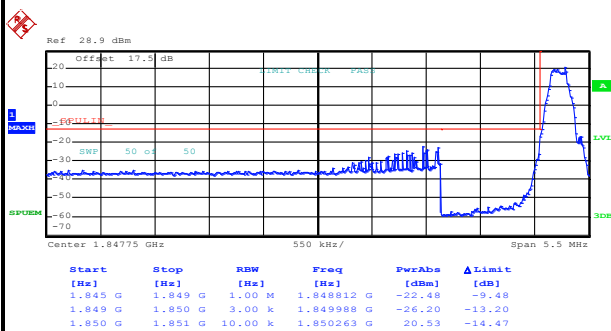
## Highest Band Edge



Date: 1.AUG.2016 11:37:35

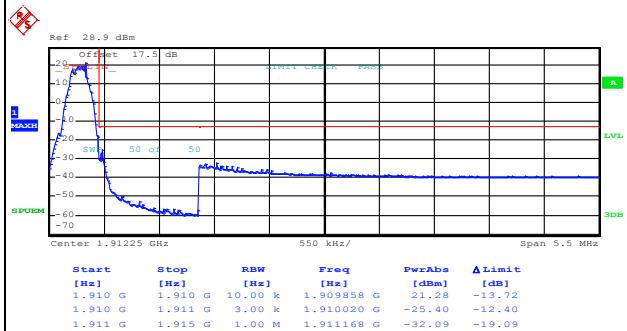
## GSM1900 (EDGE class 8)

## Lowest Band Edge



Date: 1.AUG.2016 13:45:17

## Highest Band Edge



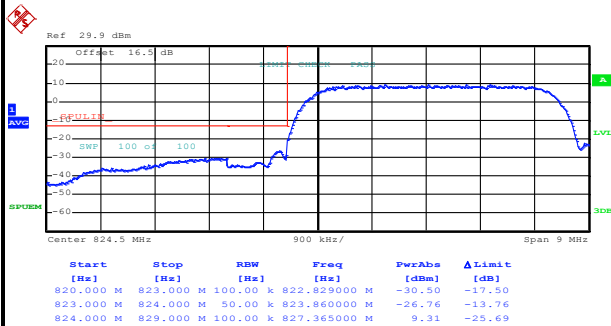
Date: 1.AUG.2016 13:46:44





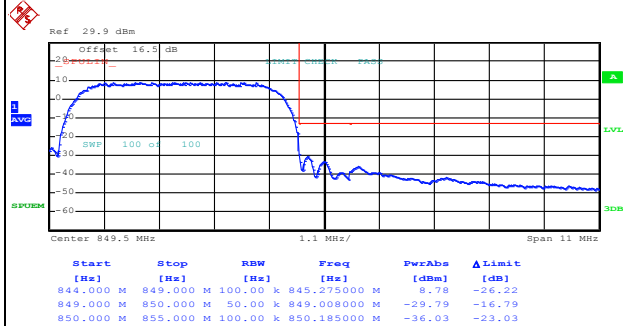
## WCDMA Band V (RMC 12.2Kbps)

## Lowest Band Edge



Date: 1.AUG.2016 14:03:41

## Highest Band Edge

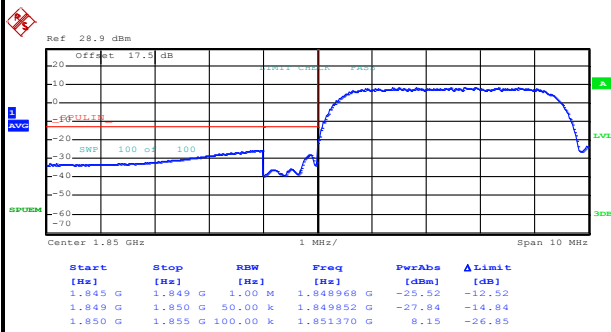


Date: 1.AUG.2016 14:06:24



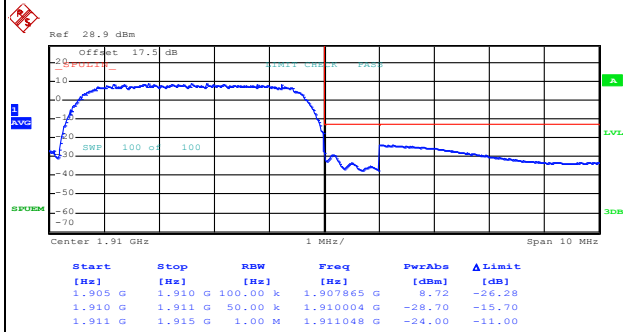
## WCDMA Band II (RMC 12.2Kbps)

## Lowest Band Edge



Date: 1.AUG.2016 09:39:05

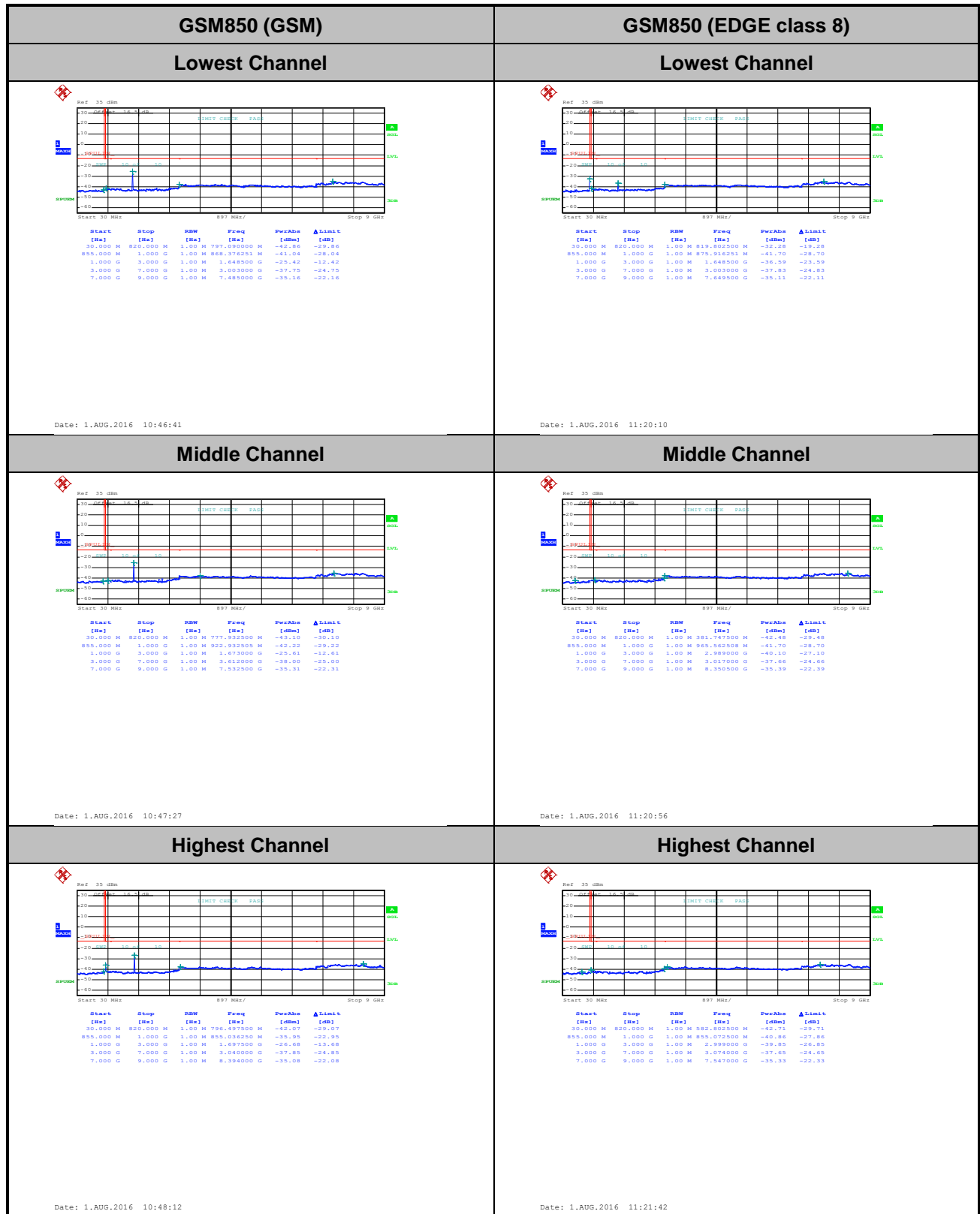
## Highest Band Edge



Date: 1.AUG.2016 09:41:48



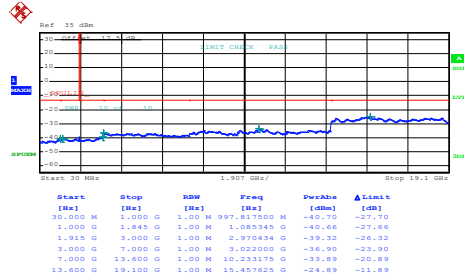
## **Conducted Spurious Emission**





## GSM1900 (GSM)

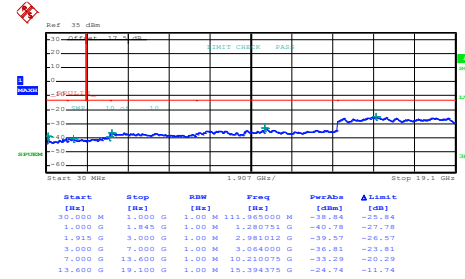
## Lowest Channel



Date: 1.AUG.2016 11:38:27

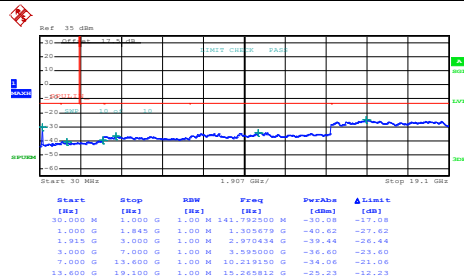
## GSM1900 (EDGE class 8)

## Lowest Channel



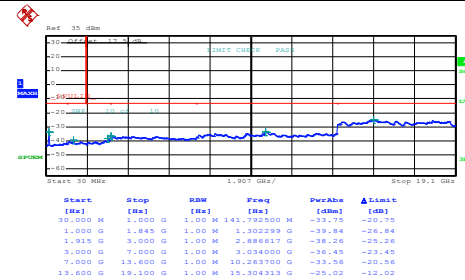
Date: 1.AUG.2016 13:41:08

## Middle Channel



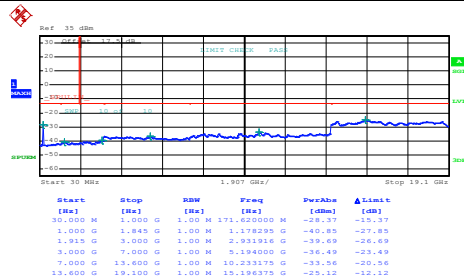
Date: 1.AUG.2016 11:39:13

## Middle Channel



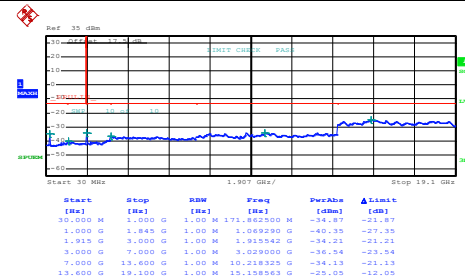
Date: 1.AUG.2016 13:41:54

## Highest Channel

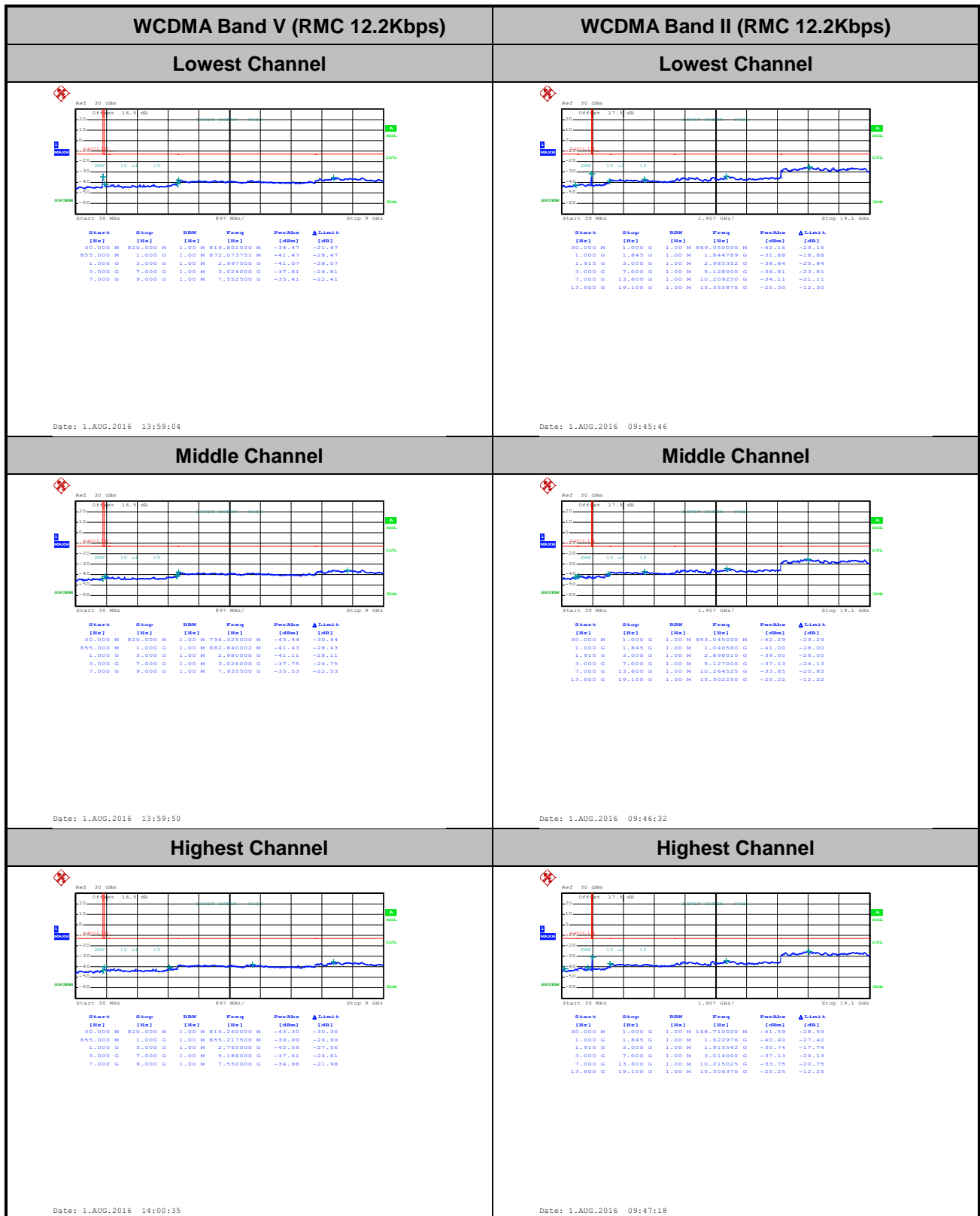


Date: 1.AUG.2016 11:39:59

## Highest Channel



Date: 1.AUG.2016 13:42:40



**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	0.0012	0.0155	PASS
40	Normal Voltage	0.0036	0.0191	
30	Normal Voltage	0.0048	0.0120	
20(Ref.)	Normal Voltage	0.0000	0.0000	
10	Normal Voltage	0.0048	0.0048	
0	Normal Voltage	0.0060	0.0036	
-10	Normal Voltage	0.0084	0.0036	
-20	Normal Voltage	0.0024	0.0012	
-30	Normal Voltage	0.0120	0.0024	
20	Maximum Voltage	0.0084	0.0036	
20	Normal Voltage	0.0084	0.0024	
20	Battery End Point	0.0036	0.0024	

**Note:** Normal Voltage = 3.85V. ; Battery End Point (BEP) = 3.5 V. ; Maximum Voltage =4.35 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	0.0027	PASS
40	Normal Voltage	0.0011	0.0011	
30	Normal Voltage	0.0005	0.0000	
20(Ref.)	Normal Voltage	0.0000	0.0000	
10	Normal Voltage	0.0011	0.0005	
0	Normal Voltage	0.0011	0.0005	
-10	Normal Voltage	0.0021	0.0005	
-20	Normal Voltage	0.0027	0.0021	
-30	Normal Voltage	0.0011	0.0021	
20	Maximum Voltage	0.0027	0.0117	
20	Normal Voltage	0.0144	0.0128	
20	Battery End Point	0.0005	0.0000	

**Note:**

1. Normal Voltage = 3.85V. ; Battery End Point (BEP) = 3.5 V. ; Maximum Voltage =4.35 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
Temperature (°C)	Voltage (Volt)	Deviation (ppm)	2.5ppm
50	Normal Voltage	0.0021	PASS
40	Normal Voltage	0.0011	
30	Normal Voltage	0.0016	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0000	
0	Normal Voltage	0.0021	
-10	Normal Voltage	0.0011	
-20	Normal Voltage	0.0085	
-30	Normal Voltage	0.0080	
20	Maximum Voltage	0.0043	
20	Normal Voltage	0.0048	
20	Battery End Point	0.0048	

**Note:** Normal Voltage = 3.85V. ; Battery End Point (BEP) = 3.5 V. ; Maximum Voltage =4.35 V



Test Conditions	Middle Channel	WCDMA Band II (RMC 12.2Kbps)	Limit Note 2.
Temperature (°C)	Voltage (Volt)	Deviation (ppm)	Result
50	Normal Voltage	0.0036	PASS
40	Normal Voltage	0.0012	
30	Normal Voltage	0.0012	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0060	
0	Normal Voltage	0.0108	
-10	Normal Voltage	0.0179	
-20	Normal Voltage	0.0143	
-30	Normal Voltage	0.0143	
20	Maximum Voltage	0.0132	
20	Normal Voltage	0.0155	
20	Battery End Point	0.0251	

**Note:**

1. Normal Voltage = 3.85V. ; Battery End Point (BEP) = 3.5 V. ; Maximum Voltage =4.35 V
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

### ERP/EIRP

Channel	Mode	Horizontal		Vertical	
		ERP(dBm)	ERP(W)	ERP(dBm)	ERP(W)
Lowest	GSM850 GSM	26.70	0.4677	15.43	0.0349
Middle		26.23	0.4199	15.53	0.0357
Highest		26.81	0.4797	16.7	0.0468
Lowest	GSM850 EDGE class 8	18.18	0.0658	7.2	0.0052
Middle		18.91	0.0778	8.23	0.0067
Highest		19.46	0.0883	9.42	0.0087
Lowest	WCDMA Band V RMC 12.2Kbps	16.55	0.0452	5.55	0.0036
Middle		16.77	0.0476	6.44	0.0044
Highest		16.82	0.0481	6.59	0.0046
Limit	ERP < 7W	Result		PASS	

Channel	Mode	Horizontal		Vertical	
		EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	GSM1900 GSM	25.58	0.3614	25.07	0.3214
Middle		26.10	0.4072	25.62	0.3650
Highest		25.80	0.3802	25.71	0.3724
Lowest	GSM1900 EDGE class 8	20.82	0.1209	20.24	0.1057
Middle		21.46	0.1398	20.99	0.1258
Highest		21.07	0.1279	21.65	0.1462
Lowest	WCDMA Band II RMC 12.2Kbps	19.03	0.0800	18.61	0.0726
Middle		19.70	0.0934	18.91	0.0778
Highest		19.69	0.0931	19.09	0.0811
Limit	EIRP < 2W	Result		PASS	



**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	-59.24	-13	-46.24	-57.44	-61.06	1.23	5.20	H
	2512	-63.76	-13	-50.76	-68.61	-65.99	1.52	5.90	H
	3345.6	-66.34	-13	-53.34	-73.90	-69.12	1.77	6.70	H
	1672	-58.88	-13	-45.88	-56.83	-60.70	1.23	5.20	V
	2509.2	-61.66	-13	-48.66	-69.96	-63.89	1.52	5.90	V
	3345.6	-63.36	-13	-50.36	-74.46	-66.14	1.77	6.70	V

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

GSM850 (EDGE class 8)									
Channel	Frequency ( MHz )	ERP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading (dBm)	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1672	-69.10	-13	-56.10	-67.30	-70.92	1.23	5.20	H
	2509.2	-66.03	-13	-53.03	-70.88	-68.26	1.52	5.90	H
	3345.6	-67.03	-13	-54.03	-74.59	-69.81	1.77	6.70	H
	1672	-68.83	-13	-55.83	-66.78	-70.65	1.23	5.20	V
	2509.2	-64.33	-13	-51.33	-72.63	-66.56	1.52	5.90	V
	3345.6	-63.89	-13	-50.89	-74.99	-66.67	1.77	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	3762	-65.31	-13	-52.31	-74.32	-70.17	1.93	6.80	H
	5640	-60.98	-13	-47.98	-70.02	-68.28	2.40	9.70	H
	7520	-56.91	-13	-43.91	-71.95	-65.96	2.76	11.81	H
	3762	-65.07	-13	-52.07	-74.38	-69.94	1.93	6.80	V
	5640	-61.75	-13	-48.75	-69.7	-69.05	2.40	9.70	V
	7520	-59.51	-13	-46.51	-72	-68.56	2.76	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	3762	-64.30	-13	-51.30	-73.31	-69.16	1.93	6.80	H
	5640	-60.43	-13	-47.43	-69.47	-67.73	2.40	9.70	H
	7520	-55.90	-13	-42.90	-70.94	-64.95	2.76	11.81	H
	3762	-64.62	-13	-51.62	-73.93	-69.49	1.93	6.80	V
	5640	-62.38	-13	-49.38	-70.33	-69.68	2.40	9.70	V
	7520	-59.37	-13	-46.37	-71.86	-68.42	2.76	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	-68.64	-13	-55.64	-66.84	-70.46	1.23	5.20	H
	2509.2	-66.58	-13	-53.58	-71.43	-68.81	1.52	5.90	H
	3345.6	-66.47	-13	-53.47	-74.03	-69.25	1.77	6.70	H
	1672	-68.92	-13	-55.92	-66.87	-70.74	1.23	5.20	V
	2509.2	-63.63	-13	-50.63	-71.93	-65.86	1.52	5.90	V
	3345.6	-63.12	-13	-50.12	-74.22	-65.90	1.77	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	3762	-65.32	-13	-52.32	-74.33	-70.18	1.93	6.80	H
	5640	-60.94	-13	-47.94	-69.98	-68.24	2.40	9.70	H
	7520	-57.05	-13	-44.05	-72.09	-66.10	2.76	11.81	H
	3762	-64.83	-13	-51.83	-74.14	-69.70	1.93	6.80	V
	5640	-61.86	-13	-48.86	-69.81	-69.16	2.40	9.70	V
	7520	-59.10	-13	-46.10	-71.59	-68.15	2.76	11.81	V

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