



# FCC RF Test Report

**APPLICANT** : Bullitt Group  
**EQUIPMENT** : Rugged Smart Phone  
**BRAND NAME** : CAT  
**MODEL NAME** : S30  
**MARKETING NAME** : S30  
**FCC ID** : ZL5S30  
**STANDARD** : 47 CFR Part 2, 24(E), 27  
**CLASSIFICATION** : PCS Licensed Transmitter Held to Ear (PCE)

The product was received on Jul. 01, 2015 and completely tested on Jul. 23, 2015. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA / EIA-603-C-2004 and the testing has shown the tested sample to be 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 INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager



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FCC ID : ZL5S30

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### REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG570160B	Rev. 01	Initial issue of report	Aug. 11, 2015



**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	Occupied Bandwidth	Reporting Only	PASS	-
3.7	§2.1051 §24.238(a) §27.53(g) §27.53(m)(4)	Conducted Band Edge Measurement (Band 2) (Band 4) (Band 17) (Band 7)	< 43+10log <sub>10</sub> (P[Watts])	PASS	-
3.8	§2.1051 §24.238(a) §27.53(g)	Conducted Spurious Emission (Band 2) (Band 4) (Band 17)	< 43+10log <sub>10</sub> (P[Watts])	PASS	-
	§2.1051 §27.53(m)(4)	Conducted Spurious Emission (Band 7)	< 55+10log <sub>10</sub> (P[Watts])		
3.9	§2.1055 §24.235 §27.54	Frequency Stability Temperature & Voltage	< 2.5 ppm for Part 22 Within Authorized Band	PASS	-
4.4	§27.50(c)(10)	Effective Radiated Power (Band 17)	ERP < 3 Watt	PASS	-
	§24.232(c) §27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 2) (Band 7)	EIRP < 2Watt		
	§27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 4)	EIRP < 1Watt		
4.5	§2.1053 §24.238(a) §27.53(g) §27.53(h)	Radiated Spurious Emission (Band 2) (Band 4) (Band 17)	< 43+10log <sub>10</sub> (P[Watts])	PASS	Under limit 7.26 dB at 10008.000 MHz
	§2.1053 §27.53(m)(4)	Radiated Spurious Emission (Band 7)	< 55+10log <sub>10</sub> (P[Watts])		



# 1 General Description

## 1.1 Applicant

**Bullitt Group**

One Valpy, Valpy Street, Reading, Berkshire, RG1 1AR United Kingdom

## 1.2 Manufacturer

**Compal Electronics, INC.**

No. 385, Yangguang St. Neihu District, Taipei City 11491, Taiwan, R.O.C

## 1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Rugged Smart Phone
Brand Name	CAT
Model Name	S30
Marketing Name	S30
FCC ID	ZL5S30
EUT supports Radios application	GSM/EGPRS/WCDMA/HSPA/LTE WLAN 11b/g/n HT20 Bluetooth v4.1 EDR/LE
EUT Stage	Identical Prototype

### <Sample Information>

S30 has 2 different Variant	
Sample 1	Dual SIM
Sample 2	Single SIM
The HW difference is SIM holder	



### 1.4 Product Specification subjective to this standard

Product Specification subjective to this standard	
<b>Tx Frequency</b>	LTE Band 2 : 1850.7 MHz ~ 1909.3 MHz LTE Band 4 : 1710.7 MHz ~ 1754.3 MHz LTE Band 7 : 2502.5 MHz ~ 2567.5 MHz LTE Band 17 : 706.5 MHz ~ 713.5 MHz
<b>Rx Frequency</b>	LTE Band 2 : 1930.7 MHz ~ 1989.3 MHz LTE Band 4 : 2110.7 MHz ~ 2154.3 MHz LTE Band 7 : 2622.5MHz ~ 2687.5 MHz LTE Band 17 : 736.5 MHz ~ 743.5 MHz
<b>Bandwidth</b>	LTE Band 2 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 4 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 7 : 5MHz/ 10MHz / 15MHz / 20MHz LTE Band 17 : 5MHz / 10MHz
<b>Maximum Output Power to Antenna</b>	LTE Band 2 : 23.97 dBm LTE Band 4 : 23.72 dBm LTE Band 7 : 22.93 dBm LTE Band 17 : 23.88 dBm
<b>Type of Modulation</b>	QPSK / 16QAM

### 1.5 Modification of EUT

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



### 1.6 Emission Designator

LTE Band 2		QPSK			16QAM		
BW(MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	
1.4	1M09G7D	-	0.2118	1M10W7D	-	0.1807	
3	2M73G7D	-	0.2244	2M72W7D	-	0.1837	
5	4M51G7D	-	0.2249	4M50W7D	-	0.1905	
10	9M01G7D	0.0089	0.2333	9M05W7D	-	0.1941	
15	13M6G7D	-	0.2296	13M5W7D	-	0.1762	
20	18M4G7D	-	0.2399	18M6W7D	-	0.1972	
LTE Band 4		QPSK			16QAM		
BW(MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	
1.4	1M09G7D	-	0.1730	1M09W7D	-	0.1660	
3	2M73G7D	-	0.1932	2M73W7D	-	0.1671	
5	4M50G7D	-	0.1671	4M52W7D	-	0.1452	
10	9M11G7D	0.0081	0.1445	9M05W7D	-	0.1197	
15	13M5G7D	-	0.1445	13M5W7D	-	0.1274	
20	18M7G7D	-	0.1403	18M3W7D	-	0.1274	
LTE Band 7		QPSK			16QAM		
BW(MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	
5	4M51G7D	-	0.2472	4M51W7D	-	0.2089	
10	9M03G7D	0.0024	0.2541	9M03W7D	-	0.2051	
15	13M5G7D	-	0.2742	13M5W7D	-	0.2360	
20	18M5G7D	-	0.2786	18M5W7D	-	0.2296	
LTE Band 17		QPSK			16QAM		
BW(MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum ERP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum ERP(W)	
5	4M50G7D	-	0.0318	4M51W7D	-	0.0298	
10	9M03G7D	0.0115	0.0350	9M03W7D	-	0.0283	



## 1.7 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1022 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

<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>
	TH02-HY

<b>Test Site</b>	SPORTON INTERNATIONAL INC.
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<b>Test Site No.</b>	<b>Sporton Site No.</b>
	03CH10-HY

## 1.8 Applicable Standards

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

- ♦ 47 CFR Part 2, 24(E), 27
- ♦ ANSI / TIA / EIA-603-C-2004
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02
- ♦ FCC KDB 412172 D01 Determining ERP and EIRP v01

**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 listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v02r02 with maximum output power.

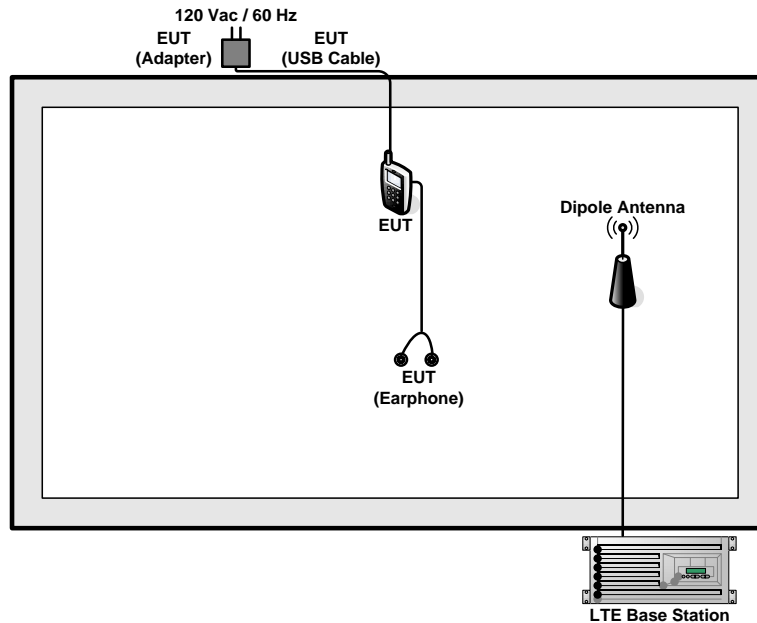
Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission.

Test Items	Band	Bandwidth (MHz)						Modulation		RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
Max. Output Power	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	7	-	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	17	-	-	Y	Y	-	-	Y	Y	Y	Y	Y	Y	Y	Y
Peak-to-Average Ratio	2						Y	Y	Y	Y		Y	Y	Y	Y
	4						Y	Y	Y	Y		Y	Y	Y	Y
	7	-	-				Y	Y	Y	Y		Y	Y	Y	Y
	17	-	-		Y	-	-	Y	Y	Y		Y	Y	Y	Y
26dB and 99% Bandwidth	2	Y	Y	Y	Y	Y	Y	Y	Y			Y	Y	Y	Y
	4	Y	Y	Y	Y	Y	Y	Y	Y			Y	Y	Y	Y
	7	-	-	Y	Y	Y	Y	Y	Y			Y	Y	Y	Y
	17	-	-	Y	Y	-	-	Y	Y			Y	Y	Y	Y
Conducted Band Edge	2	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y		Y
	4	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y		Y
	7	-	-	Y	Y	Y	Y	Y	Y	Y		Y	Y		Y
	17	-	-	Y	Y	-	-	Y	Y	Y		Y	Y		Y



Test Items	Band	Bandwidth (MHz)						Modulation		RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
Conducted Spurious Emission	2	√	√	√	√	√	√	√	√	√			√	√	√
	4	√	√	√	√	√	√	√	√	√			√	√	√
	7	-	-	√	√	√	√	√	√	√			√	√	√
	17	-	-	√	√	-	-	√	√	√			√	√	√
Frequency Stability	2				√			√				√		√	
	4				√			√				√		√	
	7	-	-		√			√				√		√	
	17	-	-		√	-	-	√				√		√	
E.R.P/ E.I.R.P.	2	√	√	√	√	√	√	√	√	√			√	√	√
	4	√	√	√	√	√	√	√	√	√			√	√	√
	7	-	-	√	√	√	√	√	√	√			√	√	√
	17	-	-	√	√	-	-	√	√	√			√	√	√
Radiated Spurious Emission	2	√	√	√	√	√	√	√		√	√	√	√	√	√
	4	√	√	√	√	√	√	√		√	√	√	√	√	√
	7	-	-	√	√	√	√	√		√	√	√	√	√	√
	17	-	-	√	√	-	-	√		√	√	√	√	√	√
Note	<ol style="list-style-type: none"> <li>The mark “√” means that this configuration is chosen for testing</li> <li>The mark “-” means that this bandwidth is not supported.</li> <li>For E.R.P/E.I.R.P. measurement, the widest bandwidth of each band is chosen for testing due to highest conducted power. Besides, the lowest bandwidth of each band is also measured for reporting only.</li> <li>The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.</li> <li>All test items are performed on sample 1.</li> </ol>														

## 2.2 Connection Diagram of Test System



## 2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	LTE Base Station	Anritsu	MT8820C	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 EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

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

*Offset = RF cable loss + attenuator factor.*

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Example :

$$\begin{aligned} \text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)}. \\ &= 4.2 + 10 = 14.2 \text{ (dB)} \end{aligned}$$

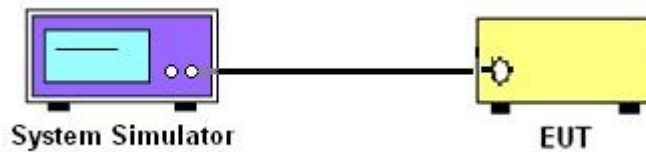
### 3 Conducted Test Items

#### 3.1 Measuring Instruments

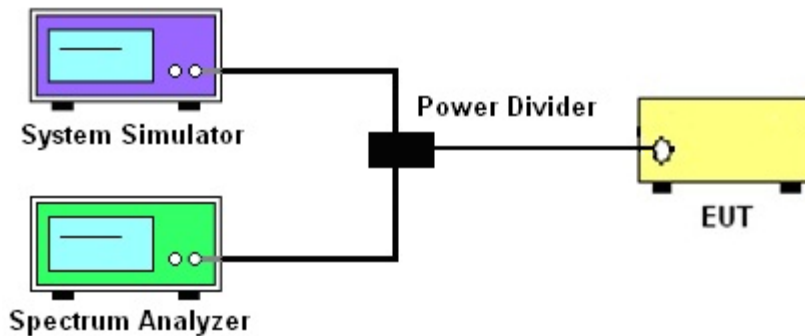
See list of measuring instruments of this test report.

#### 3.2 Test Setup

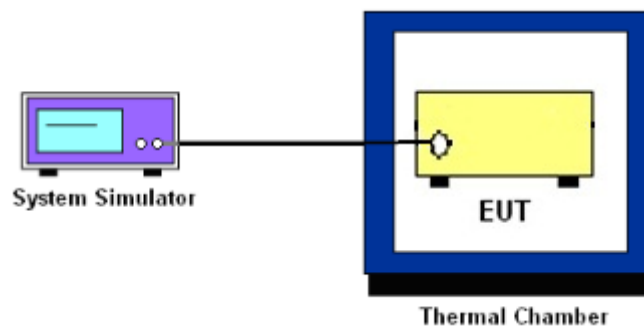
##### 3.2.1 Conducted Output Power



##### 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 Measurement and ERP/EIRP Measurement**

A system simulator was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output 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 the system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.



## **3.5 Peak-to-Average Ratio**

### **3.5.1 Description of the PAR Measurement**

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, 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 v02r02 Section 5.7.1.
2. The EUT was connected to spectrum and system simulator via a power divider.
3. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
4. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
5. Record the deviation as Peak to Average Ratio.



## **3.6 Occupied Bandwidth**

### **3.6.1 Description of Occupied 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.



### **3.7 Conducted Band Edge**

#### **3.7.1 Description of Conducted Band Edge Measurement**

24.238 (a) and RSS – 133 for Band 2

For operations in the 1850-1910 and 1930-1990 MHz band, the FCC limit is  $43 + 10\log_{10}(P[\text{Watts}])$  dB below the transmitter power  $P(\text{Watts})$  in a 1MHz bandwidth. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

27.53 (g) and RSS – 130 for Band 17

For operations in the 698 -746 MHz band, the FCC limit is  $43 + 10\log_{10}(P[\text{Watts}])$  dB below the transmitter power  $P(\text{Watts})$  in a 100 kHz bandwidth. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

27.53 (h) and RSS – 139 for Band 4

For operations in the 1710 – 1755 MHz band, the FCC limit is  $43 + 10\log_{10}(P[\text{Watts}])$  dB below the transmitter power  $P(\text{Watts})$  in a 1 MHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

27.53(m)(4) and RSS-199 for Band 7

For mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that  $43 + 10 \log (P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log (P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.





### 3.7.2 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 6.0.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The band edges of low and high channels for the highest RF powers were measured. Set RBW  $\geq 1\%$  EBW in the 1MHz band immediately outside and adjacent to the band edge.
4. Set spectrum analyzer with RMS detector.
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)  
 $= -13$ 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.

For Band 7:

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  $55 + 10 \log (P)$  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 v02r02 Section 6.0.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by 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. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
7. Set spectrum analyzer with RMS detector.
8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
9. Taking the record of maximum spurious emission.
10. The limit line is derived from  $43 + 10\log(P)$ dB below the transmitter power P(Watts)  
= P(W)- [43 + 10log(P)] (dB)  
= [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)  
= -13dBm.
11. For Band 7  
The limit line is derived from  $55 + 10\log(P)$ dB below the transmitter power P(Watts)



### 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 EUT was set up in the thermal chamber and connected with the system simulator.
2. 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.
3. With power OFF, the temperature was raised in  $10^{\circ}\text{C}$  step 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 v02r02 Section 9.0.
2. The EUT was placed in a temperature chamber at  $25\pm 5^{\circ}\text{C}$  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.

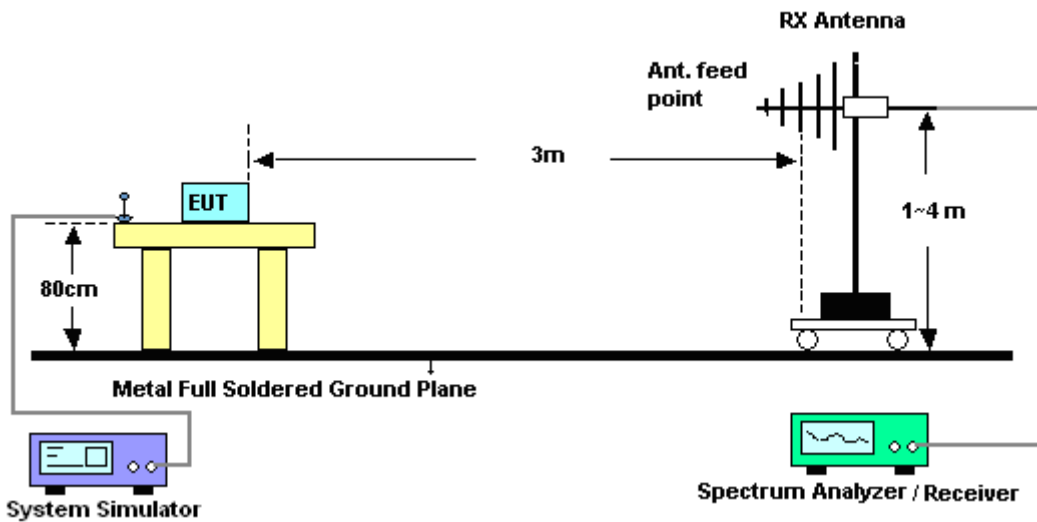
## 4 Radiated Test Items

### 4.1 Measuring Instruments

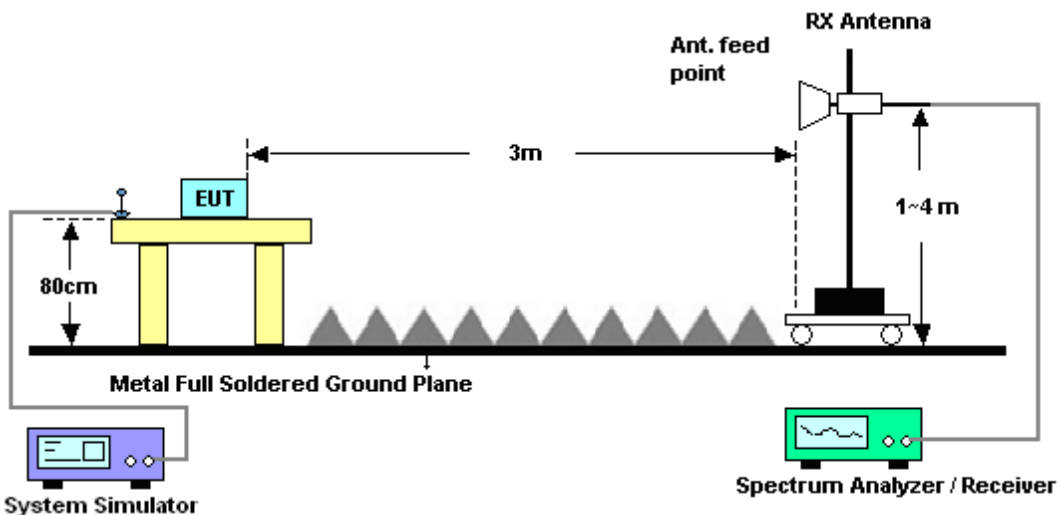
See list of measuring instruments of this test report.

### 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

### 4.4.1 Description of the ERP/EIRP Measurement

Effective radiated power output measurements by substitution method according to ANSI / TIA / EIA-603-C-2004, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02r02. Mobile and portable (hand-held) stations operating are limited to average ERP of 3 watts with LTE band 17.

Equivalent isotropic radiated power output measurements by substitution method according to ANSI / TIA / EIA-603-C-2004, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02r02. Mobile and portable (hand-held) stations operating are limited to average EIRP of 2 watts with LTE band 2 / 7 and 1 watt with LTE band 4.

### 4.4.2 Test Procedures

1. The EUT was placed on a non-conductive rotating platform 0.8 meters high 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.
2. 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.
3. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-C. 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.



	LTE Average					
LTE BW	1.4M	3M	5M	10M	15M	20M
Span	3MHz	6MHz	10MHz	20MHz	30MHz	40MHz
RBW	30kHz	100kHz	100kHz	300kHz	300kHz	300kHz
VBW	100kHz	300kHz	300kHz	1MHz	1MHz	1MHz
Detector	RMS	RMS	RMS	RMS	RMS	RMS
Trace	Average	Average	Average	Average	Average	Average
Average Type	Power	Power	Power	Power	Power	Power
Sweep Count	100	100	100	100	100	100

	LTE Peak					
LTE BW	1.4M	3M	5M	10M	15M	20M
Span	3MHz	6MHz	10MHz	20MHz	30MHz	40MHz
RBW	30kHz	100kHz	100kHz	300kHz	300kHz	300kHz
VBW	100kHz	300kHz	300kHz	1MHz	1MHz	1MHz
Detector	Peak	Peak	Peak	Peak	Peak	Peak
Trace	Max Hold	Max Hold	Max Hold	Max Hold	Max Hold	Max Hold
Power	Channel	Channel	Channel	Channel	Channel	Channel



## 4.5 Radiated Spurious Emission

### 4.5.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI / TIA / EIA-603-C-2004. 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.

For Band 7

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  $55 + 10 \log (P)$  dB.

For LTE Band 17

For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to  $-70$  dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and  $-80$  dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

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 v02r02 Section 5.8 and ANSI / TIA-603-C-2004 Section 2.2.12.
2. The EUT was placed on a rotatable wooden table with 0.8 meter above 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 the maximum spurious emission for both horizontal and vertical polarizations.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the 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. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

The limit line is derived from  $43 + 10\log(P)$ dB below the transmitter power P(Watts)

$$= P(W) - [43 + 10\log(P)] \text{ (dB)}$$

$$= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$$

$$= -13\text{dBm.}$$

For Band 7:

The limit line is derived from  $55 + 10\log(P)$ dB below the transmitter power P(Watts)

$$12. \text{ EIRP (dBm)} = \text{S.G. Power} - \text{Tx Cable Loss} + \text{Tx Antenna Gain}$$

$$13. \text{ ERP (dBm)} = \text{EIRP} - 2.15$$



## 5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
LTE Base Station	Anritsu	MT8820C	6201432821	GSM/GPRS /WCDMA/LTE	Oct. 27, 2014	Jul. 18, 2015 ~ Jul. 23, 2015	Oct. 26, 2015	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV40	101397	10Hz~40GHz	Sep. 17, 2014	Jul. 18, 2015 ~ Jul. 23, 2015	Sep. 16 2015	Conducted (TH05-HY)
Temperature Chamber	ESPEC	SH-641	92013720	-30°C~70°C	Dec. 04, 2014	Jul. 18, 2015 ~ Jul. 23, 2015	Dec. 03, 2015	Conducted (TH05-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	18GHz- 40GHz	Oct. 02, 2014	Jul. 17, 2015 ~ Jul. 18, 2015	Oct. 01, 2015	Radiation (03CH10-HY)
Amplifier	SONOMA	310N	187311	9kHz~1GHz	Nov. 24, 2014	Jul. 17, 2015 ~ Jul. 18, 2015	Nov. 23, 2015	Radiation (03CH10-HY)
Bilog Antenna	TESEQ	CBL 6111D	35413	30MHz~1GHz	Oct. 24, 2014	Jul. 17, 2015 ~ Jul. 18, 2015	Oct. 23, 2015	Radiation (03CH10-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1325	1GHz ~ 18GHz	Oct. 03, 2014	Jul. 17, 2015 ~ Jul. 18, 2015	Oct. 02, 2015	Radiation (03CH10-HY)
Preamplifier	Keysight	83017A	MY53270078	1GHz~26.5GHz	Nov. 20, 2014	Jul. 17, 2015 ~ Jul. 18, 2015	Nov. 19, 2015	Radiation (03CH10-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200485	10Hz ~ 44GHZ	Oct. 14, 2014	Jul. 17, 2015 ~ Jul. 18, 2015	Oct. 13, 2015	Radiation (03CH10-HY)
Antenna Mast	EMEC	AM-BS-450 0-B	N/A	1~4m	N/A	Jul. 17, 2015 ~ Jul. 18, 2015	N/A	Radiation (03CH10-HY)
Turn Table	EMEC	TT 2200	N/A	0-360 degree	N/A	Jul. 17, 2015 ~ Jul. 18, 2015	N/A	Radiation (03CH10-HY)





## 6 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.54
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### Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.50
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## Appendix A. Test Results of Conducted Test

### Conducted Output Power(Average power)



LTE Band 2 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
1.4	1	0	QPSK	23.40	23.64	23.40
1.4	1	2		23.33	23.57	23.34
1.4	1	5		23.38	23.56	23.30
1.4	3	0		23.33	23.50	23.36
1.4	3	1		23.39	23.60	23.30
1.4	3	2		23.33	23.54	23.30
1.4	6	0		22.58	22.54	22.39
1.4	1	0	16-QAM	22.92	22.88	22.72
1.4	1	2		22.84	22.86	22.67
1.4	1	5		22.77	22.82	22.61
1.4	3	0		22.86	22.81	22.63
1.4	3	1		22.72	22.68	22.68
1.4	3	2		22.84	22.67	22.58
1.4	6	0		21.44	21.21	21.38
3	1	0	QPSK	23.76	23.68	23.56
3	1	7		23.71	23.61	23.25
3	1	14		23.60	23.51	23.16
3	8	0		22.59	22.61	22.37
3	8	4		22.65	22.62	22.39
3	8	7		22.70	22.64	22.36
3	15	0		22.61	22.70	22.37
3	1	0	16-QAM	22.99	22.95	22.86
3	1	7		22.90	22.86	22.75
3	1	14		22.85	22.57	22.82
3	8	0		21.58	21.80	21.63
3	8	4		21.72	21.86	21.61
3	8	7		21.52	21.89	21.61
3	15	0		21.34	21.72	21.59



LTE Band 2 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
5	1	0	QPSK	23.71	23.67	23.52
5	1	12		23.64	23.66	23.32
5	1	24		23.61	23.16	23.28
5	12	0		22.54	22.61	22.40
5	12	6		22.55	22.56	22.39
5	12	11		22.46	22.48	22.39
5	25	0		22.60	22.61	22.30
5	1	0	16-QAM	22.87	22.79	22.71
5	1	12		22.86	22.75	22.70
5	1	24		22.80	22.74	22.55
5	12	0		21.54	21.63	21.35
5	12	6		21.56	21.67	21.29
5	12	11		21.59	21.50	21.27
5	25	0		21.61	21.74	21.37
10	1	0	QPSK	23.93	23.65	23.50
10	1	24		23.68	23.60	23.39
10	1	49		23.65	23.49	23.36
10	25	0		22.64	22.58	22.50
10	25	12		22.54	22.59	22.44
10	25	24		22.59	22.49	22.39
10	50	0		22.63	22.51	22.40
10	1	0	16-QAM	22.95	22.87	22.90
10	1	24		22.84	22.73	22.71
10	1	49		22.79	22.64	22.74
10	25	0		21.72	21.69	21.56
10	25	12		21.66	21.61	21.64
10	25	24		21.71	21.52	21.56
10	50	0		21.63	21.54	21.40



LTE Band 2 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
15	1	0	QPSK	23.65	23.79	23.41
15	1	37		23.64	23.69	23.27
15	1	74		23.37	23.42	23.02
15	36	0		22.61	22.64	22.53
15	36	18		22.61	22.56	22.33
15	36	37		22.43	22.45	22.27
15	75	0		22.61	22.52	22.34
15	1	0	16-QAM	22.87	22.74	22.74
15	1	37		22.77	22.73	22.68
15	1	74		22.67	22.49	22.43
15	36	0		21.50	21.72	21.55
15	36	18		21.60	21.66	21.42
15	36	37		21.51	21.45	21.36
15	75	0		21.47	21.54	21.42
20	1	0	QPSK	23.97	23.67	23.78
20	1	49		23.70	23.51	23.66
20	1	99		23.59	23.39	23.53
20	50	0		22.76	22.74	22.70
20	50	24		22.59	22.66	22.66
20	50	49		22.56	22.57	22.47
20	100	0		22.55	22.62	22.60
20	1	0	16-QAM	22.96	22.97	22.84
20	1	49		22.78	22.77	22.83
20	1	99		22.64	22.67	22.43
20	50	0		21.75	21.85	21.61
20	50	24		21.64	21.57	21.61
20	50	49		21.49	21.56	21.54
20	100	0		21.64	21.62	21.53



LTE Band 4 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
1.4	1	0	QPSK	23.55	23.53	23.40
1.4	1	2		23.45	23.44	23.30
1.4	1	5		23.30	23.31	23.29
1.4	3	0		23.42	23.23	23.38
1.4	3	1		23.40	23.30	23.38
1.4	3	2		23.40	23.40	23.36
1.4	6	0		22.39	22.34	22.43
1.4	1	0	16-QAM	22.72	22.72	22.89
1.4	1	2		22.71	22.63	22.84
1.4	1	5		22.59	22.51	22.65
1.4	3	0		22.56	22.68	22.78
1.4	3	1		22.55	22.70	22.80
1.4	3	2		22.54	22.66	22.78
1.4	6	0		21.24	21.25	21.52
3	1	0	QPSK	23.60	23.67	23.62
3	1	7		23.57	23.62	23.60
3	1	14		23.49	23.56	23.52
3	8	0		22.63	22.55	22.63
3	8	4		22.58	22.61	22.63
3	8	7		22.55	22.49	22.61
3	15	0		22.54	22.46	22.63
3	1	0	16-QAM	22.80	22.82	22.98
3	1	7		22.75	22.74	22.86
3	1	14		22.74	22.60	22.80
3	8	0		21.86	21.61	21.58
3	8	4		21.86	21.43	21.58
3	8	7		21.73	21.43	21.78
3	15	0		21.63	21.37	21.45



LTE Band 4 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
5	1	0	QPSK	23.58	23.55	23.62
5	1	12		23.52	23.39	23.60
5	1	24		23.41	23.26	23.33
5	12	0		22.51	22.39	22.48
5	12	6		22.46	22.36	22.51
5	12	11		22.29	22.34	22.45
5	25	0		22.46	22.31	22.50
5	1	0	16-QAM	22.74	22.73	22.81
5	1	12		22.63	22.61	22.80
5	1	24		22.59	22.67	22.80
5	12	0		21.23	21.33	21.49
5	12	6		21.32	21.31	21.54
5	12	11		21.25	21.32	21.48
5	25	0		21.39	21.36	21.52
10	1	0	QPSK	23.57	23.69	23.65
10	1	24		23.39	23.63	23.54
10	1	49		23.13	23.40	23.44
10	25	0		22.40	22.49	22.58
10	25	12		22.34	22.36	22.59
10	25	24		22.23	22.45	22.56
10	50	0		22.26	22.39	22.54
10	1	0	16-QAM	22.82	22.81	22.82
10	1	24		22.77	22.72	22.81
10	1	49		22.52	22.62	22.65
10	25	0		21.44	21.43	21.65
10	25	12		21.33	21.41	21.71
10	25	24		21.31	21.41	21.49
10	50	0		21.25	21.45	21.65



LTE Band 4 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
15	1	0	QPSK	23.50	23.39	23.64
15	1	37		23.26	23.25	23.54
15	1	74		23.02	23.34	23.48
15	36	0		22.41	22.50	22.56
15	36	18		22.24	22.39	22.52
15	36	37		22.20	22.41	22.53
15	75	0		22.28	22.43	22.54
15	1	0	16-QAM	22.88	22.74	22.96
15	1	37		22.57	22.66	22.93
15	1	74		22.47	22.60	22.81
15	36	0		21.30	21.34	21.57
15	36	18		21.33	21.45	21.47
15	36	37		21.31	21.37	21.53
15	75	0		21.28	21.39	21.57
20	1	0	QPSK	23.62	23.60	23.72
20	1	49		23.37	23.43	23.53
20	1	99		23.22	23.29	23.37
20	50	0		22.46	22.47	22.44
20	50	24		22.32	22.43	22.36
20	50	49		22.33	22.34	22.33
20	100	0		22.25	22.38	22.39
20	1	0	16-QAM	22.86	22.79	22.81
20	1	49		22.55	22.61	22.77
20	1	99		22.45	22.60	22.64
20	50	0		21.25	21.45	21.47
20	50	24		21.21	21.47	21.39
20	50	49		21.14	21.39	21.33
20	100	0		21.23	21.41	21.41





LTE Band 7 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
5	1	0	QPSK	22.68	22.80	22.68
5	1	12		22.63	22.77	22.58
5	1	24		22.48	22.71	22.38
5	12	0		21.83	21.81	21.54
5	12	6		21.97	21.74	21.64
5	12	11		21.84	21.75	21.77
5	25	0		21.87	21.78	21.66
5	1	0	16-QAM	21.96	21.92	21.94
5	1	12		21.87	21.91	21.87
5	1	24		21.70	21.90	21.77
5	12	0		20.76	20.60	20.41
5	12	6		20.78	20.75	20.57
5	12	11		20.75	20.53	20.60
5	25	0		20.88	20.66	20.60
10	1	0	QPSK	22.77	22.70	22.82
10	1	24		22.60	22.65	22.72
10	1	49		22.51	22.58	22.71
10	25	0		21.90	21.97	21.88
10	25	12		21.92	21.83	21.84
10	25	24		21.78	21.82	21.61
10	50	0		21.87	21.82	21.75
10	1	0	16-QAM	21.97	21.96	21.96
10	1	24		21.87	21.93	21.91
10	1	49		21.67	21.84	21.78
10	25	0		20.93	20.90	20.99
10	25	12		20.91	20.81	20.94
10	25	24		20.90	20.99	20.77
10	50	0		20.80	20.79	20.84



LTE Band 7 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
15	1	0	QPSK	22.72	22.78	22.81
15	1	37		22.63	22.67	22.73
15	1	74		22.56	22.57	22.67
15	36	0		21.92	21.93	21.99
15	36	18		21.78	21.81	21.93
15	36	37		21.85	21.81	21.75
15	75	0		21.84	21.89	21.70
15	1	0	16-QAM	21.71	21.82	21.80
15	1	37		21.61	21.62	21.75
15	1	74		21.54	21.50	21.70
15	36	0		20.92	20.98	20.99
15	36	18		20.93	20.89	20.86
15	36	37		20.95	20.85	20.70
15	75	0		20.90	20.94	20.93
20	1	0	QPSK	22.77	22.79	22.93
20	1	49		22.53	22.67	22.73
20	1	99		22.42	22.56	22.59
20	50	0		21.59	21.61	21.92
20	50	24		21.43	21.50	21.75
20	50	49		21.51	21.46	21.50
20	100	0		21.47	21.56	21.68
20	1	0	16-QAM	21.80	21.86	21.97
20	1	49		21.71	21.63	21.70
20	1	99		21.33	21.80	21.61
20	50	0		20.64	20.58	20.88
20	50	24		20.54	20.48	20.70
20	50	49		20.51	20.41	20.42
20	100	0		20.44	20.63	20.60



LTE Band 17 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
5	1	0	QPSK	23.59	23.47	23.52
5	1	12		23.51	23.30	23.38
5	1	24		23.44	23.28	23.34
5	12	0		22.40	22.32	22.33
5	12	6		22.31	22.35	22.42
5	12	11		22.33	22.28	22.35
5	25	0		22.28	22.27	22.30
5	1	0	16-QAM	22.59	22.63	22.69
5	1	12		22.54	22.60	22.64
5	1	24		22.41	22.53	22.50
5	12	0		21.46	21.22	21.09
5	12	6		21.37	21.25	21.28
5	12	11		21.16	21.21	21.34
5	25	0		21.15	21.26	21.32
10	1	0	QPSK	23.83	23.88	23.58
10	1	24		23.73	23.85	23.37
10	1	49		23.70	23.80	23.31
10	25	0		22.72	22.75	22.22
10	25	12		22.71	22.68	22.22
10	25	24		22.71	22.72	22.34
10	50	0		22.81	22.72	22.39
10	1	0	16-QAM	22.81	22.79	22.62
10	1	24		22.73	22.74	22.61
10	1	49		22.71	22.75	22.57
10	25	0		21.86	21.65	21.48
10	25	12		21.55	21.75	21.46
10	25	24		21.79	21.82	21.37
10	50	0		21.78	21.78	21.36



## **Appendix B. Test Results of Radiated Test**

**ERP/EIRP**



LTE Band 2 / 1.4MHz (Average)							
Channel	Modulation	RB		Horizontal		Vertical	
		Size	Offset	EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	QPSK	1	0	23.26	0.2118	22.13	0.1633
Middle		1	0	23.26	0.2118	22.11	0.1626
Highest		1	0	22.60	0.1820	21.43	0.1390
Lowest	16QAM	1	0	22.03	0.1596	21.00	0.1259
Middle		1	0	22.57	0.1807	21.41	0.1384
Highest		1	0	22.12	0.1629	21.16	0.1306
Limit	EIRP < 2W			Result		PASS	

LTE Band 2 / 3MHz (Average)							
Channel	Modulation	RB		Horizontal		Vertical	
		Size	Offset	EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	QPSK	1	0	23.30	0.2138	22.36	0.1722
Middle		1	0	23.51	0.2244	22.35	0.1718
Highest		1	0	22.76	0.1888	21.66	0.1466
Lowest	16QAM	1	0	22.46	0.1762	21.47	0.1403
Middle		1	0	22.64	0.1837	21.51	0.1416
Highest		1	0	22.21	0.1663	21.42	0.1387
Limit	EIRP < 2W			Result		PASS	

LTE Band 2 / 5MHz (Average)							
Channel	Modulation	RB		Horizontal		Vertical	
		Size	Offset	EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	QPSK	1	0	23.26	0.2118	22.26	0.1683
Middle		1	0	23.52	0.2249	22.35	0.1718
Highest		1	0	22.62	0.1828	21.46	0.1400
Lowest	16QAM	1	0	22.31	0.1702	21.40	0.1380
Middle		1	0	22.80	0.1905	21.68	0.1472
Highest		1	0	21.54	0.1426	20.54	0.1132
Limit	EIRP < 2W			Result		PASS	



LTE Band 2 / 10MHz (Average)							
Channel	Modulation	RB		Horizontal		Vertical	
		Size	Offset	EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	QPSK	1	0	23.68	0.2333	22.62	0.1828
Middle		1	0	23.63	0.2307	22.41	0.1742
Highest		1	0	22.98	0.1986	21.76	0.1500
Lowest	16QAM	1	0	22.54	0.1795	21.41	0.1384
Middle		1	0	22.88	0.1941	21.68	0.1472
Highest		1	0	22.44	0.1754	21.27	0.1340
Limit	EIRP < 2W			Result		PASS	

LTE Band 2 / 15MHz (Average)							
Channel	Modulation	RB		Horizontal		Vertical	
		Size	Offset	EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	QPSK	1	0	23.55	0.2265	22.53	0.1791
Middle		1	0	23.61	0.2296	22.33	0.1710
Highest		1	0	23.35	0.2163	22.08	0.1614
Lowest	16QAM	1	0	22.40	0.1738	21.20	0.1318
Middle		1	0	22.46	0.1762	21.09	0.1285
Highest		1	0	22.16	0.1644	20.94	0.1242
Limit	EIRP < 2W			Result		PASS	

LTE Band 2 / 20MHz (Average)							
Channel	Modulation	RB		Horizontal		Vertical	
		Size	Offset	EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	QPSK	1	0	23.62	0.2301	22.58	0.1811
Middle		1	0	23.80	0.2399	22.48	0.1770
Highest		1	0	23.31	0.2143	22.19	0.1656
Lowest	16QAM	1	0	22.76	0.1888	21.66	0.1466
Middle		1	0	22.95	0.1972	21.64	0.1459
Highest		1	0	22.10	0.1622	20.92	0.1236
Limit	EIRP < 2W			Result		PASS	



LTE Band 4 / 1.4MHz (Average)							
Channel	Modulation	RB		Horizontal		Vertical	
		Size	Offset	EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	QPSK	1	0	20.06	0.1014	18.35	0.0684
Middle		1	0	21.64	0.1459	19.84	0.0964
Highest		1	0	22.38	0.1730	21.06	0.1276
Lowest	16QAM	1	0	19.38	0.0867	17.66	0.0583
Middle		1	0	20.91	0.1233	19.12	0.0817
Highest		1	0	22.20	0.1660	20.29	0.1069
Limit	EIRP < 1W			Result		PASS	

LTE Band 4 / 3MHz (Average)							
Channel	Modulation	RB		Horizontal		Vertical	
		Size	Offset	EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	QPSK	1	0	20.57	0.1140	19.03	0.0800
Middle		1	0	22.11	0.1626	20.58	0.1143
Highest		1	0	22.86	0.1932	21.82	0.1521
Lowest	16QAM	1	0	19.70	0.0933	18.11	0.0647
Middle		1	0	21.07	0.1279	18.64	0.0731
Highest		1	0	22.23	0.1671	20.66	0.1164
Limit	EIRP < 1W			Result		PASS	

LTE Band 4 / 5MHz (Average)							
Channel	Modulation	RB		Horizontal		Vertical	
		Size	Offset	EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	QPSK	1	0	20.47	0.1114	19.22	0.0836
Middle		1	0	21.32	0.1355	19.59	0.0910
Highest		1	0	22.23	0.1671	20.91	0.1233
Lowest	16QAM	1	0	19.43	0.0877	17.99	0.0630
Middle		1	0	20.68	0.1169	18.95	0.0785
Highest		1	0	21.62	0.1452	20.08	0.1019
Limit	EIRP < 1W			Result		PASS	



LTE Band 4/ 10MHz (Average)							
Channel	Modulation	RB		Horizontal		Vertical	
		Size	Offset	EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	QPSK	1	0	19.67	0.0927	18.17	0.0656
Middle		1	0	21.60	0.1445	20.06	0.1014
Highest		1	0	20.93	0.1239	19.11	0.0815
Lowest	16QAM	1	0	18.86	0.0769	17.21	0.0526
Middle		1	0	20.75	0.1189	19.18	0.0828
Highest		1	0	20.78	0.1197	19.25	0.0841
Limit	EIRP < 1W			Result		PASS	

LTE Band 4 / 15MHz (Average)							
Channel	Modulation	RB		Horizontal		Vertical	
		Size	Offset	EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	QPSK	1	0	20.93	0.1239	19.08	0.0809
Middle		1	0	21.60	0.1445	19.69	0.0931
Highest		1	0	21.58	0.1439	20.54	0.1132
Lowest	16QAM	1	0	19.82	0.0959	17.79	0.0601
Middle		1	0	20.00	0.1000	18.38	0.0689
Highest		1	0	21.05	0.1274	19.22	0.0836
Limit	EIRP < 1W			Result		PASS	

LTE Band 4 / 20MHz (Average)							
Channel	Modulation	RB		Horizontal		Vertical	
		Size	Offset	EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	QPSK	1	0	19.98	0.0995	18.03	0.0635
Middle		1	0	21.14	0.1300	19.58	0.0908
Highest		1	0	21.47	0.1403	20.10	0.1023
Lowest	16QAM	1	0	19.21	0.0834	17.25	0.0531
Middle		1	0	20.47	0.1114	18.89	0.0774
Highest		1	0	21.05	0.1274	19.47	0.0885
Limit	EIRP < 1W			Result		PASS	





LTE Band 7 / 5MHz (Average)							
Channel	Modulation	RB		Horizontal		Vertical	
		Size	Offset	EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	QPSK	1	0	23.86	0.2432	23.72	0.2355
Middle		1	0	23.12	0.2051	23.61	0.2296
Highest		1	0	23.93	0.2472	22.34	0.1714
Lowest	16QAM	1	0	23.20	0.2089	22.99	0.1991
Middle		1	0	22.50	0.1778	22.98	0.1986
Highest		1	0	23.12	0.2051	21.55	0.1429
Limit	EIRP < 2W			Result		PASS	

LTE Band 7 / 10MHz (Average)							
Channel	Modulation	RB		Horizontal		Vertical	
		Size	Offset	EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	QPSK	1	0	23.96	0.2489	23.93	0.2472
Middle		1	0	23.20	0.2089	23.23	0.2104
Highest		1	0	24.05	0.2541	22.41	0.1742
Lowest	16QAM	1	0	22.95	0.1972	22.96	0.1977
Middle		1	0	22.47	0.1766	22.61	0.1824
Highest		1	0	23.12	0.2051	21.50	0.1413
Limit	EIRP < 2W			Result		PASS	



LTE Band 7 / 15MHz (Average)							
Channel	Modulation	RB		Horizontal		Vertical	
		Size	Offset	EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	QPSK	1	0	24.38	0.2742	24.23	0.2649
Middle		1	0	23.37	0.2173	23.71	0.2350
Highest		1	0	23.96	0.2489	22.56	0.1803
Lowest	16QAM	1	0	23.73	0.2360	23.60	0.2291
Middle		1	0	22.84	0.1923	22.45	0.1758
Highest		1	0	22.80	0.1905	21.32	0.1355
Limit	EIRP < 2W			Result		PASS	

LTE Band 7 / 20MHz (Average)							
Channel	Modulation	RB		Horizontal		Vertical	
		Size	Offset	EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	QPSK	1	0	24.45	0.2786	24.10	0.2570
Middle		1	0	23.35	0.2163	23.58	0.2280
Highest		1	0	23.93	0.2472	22.32	0.1706
Lowest	16QAM	1	0	23.61	0.2296	22.82	0.1914
Middle		1	0	22.05	0.1603	22.40	0.1738
Highest		1	0	22.73	0.1875	21.58	0.1439
Limit	EIRP < 2W			Result		PASS	



LTE Band 17 / 5MHz (Average)							
Channel	Modulation	RB		Horizontal		Vertical	
		Size	Offset	ERP(dBm)	ERP(W)	ERP(dBm)	ERP(W)
Lowest	QPSK	1	0	15.02	0.0318	-0.78	0.0008
Middle		1	0	14.78	0.0301	0.25	0.0011
Highest		1	0	14.68	0.0294	0.54	0.0011
Lowest	16QAM	1	0	13.89	0.0245	-1.61	0.0007
Middle		1	0	14.74	0.0298	-0.30	0.0009
Highest		1	0	14.29	0.0269	-0.26	0.0009
Limit	ERP < 3W			Result		PASS	

LTE Band 17 / 10MHz (Average)							
Channel	Modulation	RB		Horizontal		Vertical	
		Size	Offset	ERP(dBm)	ERP(W)	ERP(dBm)	ERP(W)
Lowest	QPSK	1	0	15.44	0.0350	-0.07	0.0010
Middle		1	0	15.23	0.0333	0.03	0.0010
Highest		1	0	15.19	0.0330	0.44	0.0011
Lowest	16QAM	1	0	14.24	0.0265	-1.68	0.0007
Middle		1	0	14.46	0.0279	-0.69	0.0009
Highest		1	0	14.52	0.0283	1.13	0.0013
Limit	ERP < 3W			Result		PASS	



## **Radiated Spurious Emission**



LTE Band 2 / 1.4MHz / QPSK / RB Size 1 Offset 0									
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)
Lowest	3700	-36.45	-13	-23.45	-55.31	-43.02	1.67	8.24	H
	5548	-39.17	-13	-26.17	-62.84	-46.24	2.65	9.72	H
	7403	-37.84	-13	-24.84	-66.69	-46.99	2.46	11.61	H
									H
									H
									H
	3700	-36.95	-13	-23.95	-55.27	-43.52	1.67	8.24	V
	5548	-41.65	-13	-28.65	-63.63	-48.72	2.65	9.72	V
	7403	-39.54	-13	-26.54	-67.63	-48.69	2.46	11.61	V
									V
Middle	3763	-31.88	-13	-18.88	-50.86	-38.51	1.69	8.32	H
	5639	-37.18	-13	-24.18	-60.96	-44.23	2.71	9.76	H
	7522	-35.65	-13	-22.65	-64.02	-45.04	2.42	11.81	H
									H
									H
									H
	3763	-33.06	-13	-20.06	-51.68	-39.69	1.69	8.32	V
	5639	-39.19	-13	-26.19	-61.53	-46.24	2.71	9.76	V
	7522	-37.13	-13	-24.13	-65.6	-46.52	2.42	11.81	V
									V
Highest	3819	-31.01	-13	-18.01	-50.37	-35.54	1.70	8.38	H
	5730	-36.07	-13	-23.07	-60.29	-40.95	2.76	9.79	H
	7634	-38.37	-13	-25.37	-66.8	-45.71	2.39	11.88	H
									H
									H
									H
	3819	-34.29	-13	-21.29	-52.49	-38.82	1.70	8.38	V
	5730	-37.26	-13	-24.26	-60.5	-42.14	2.76	9.79	V
	7634	-40.67	-13	-27.67	-68.44	-48.01	2.39	11.88	V
									V

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



LTE Band 2 / 3MHz / QPSK / RB Size 1 Offset 0									
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)
Lowest	3700	-37.25	-13	-24.25	-55.87	-43.82	1.67	8.24	H
	5548	-39.94	-13	-26.94	-63.61	-47.01	2.65	9.72	H
	7403	-37.19	-13	-24.19	-66.04	-46.34	2.46	11.61	H
									H
									H
									H
	3700	-36.77	-13	-23.77	-55.6	-43.34	1.67	8.24	V
	5548	-41.98	-13	-28.98	-64.29	-49.05	2.65	9.72	V
	7403	-39.27	-13	-26.27	-67.25	-48.42	2.46	11.61	V
									V
Middle	3756	-30.38	-13	-17.38	-49.51	-37	1.68	8.31	H
	5639	-36.19	-13	-23.19	-59.96	-43.24	2.71	9.76	H
	7515	-33.91	-13	-20.91	-62.99	-43.29	2.42	11.81	H
									H
									H
									H
	3756	-31.62	-13	-18.62	-50.43	-38.24	1.68	8.31	V
	5639	-38.19	-13	-25.19	-60.6	-45.24	2.71	9.76	V
	7515	-35.92	-13	-22.92	-64.18	-45.3	2.42	11.81	V
									V
Highest	3812	-29.72	-13	-16.72	-49.48	-34.24	1.70	8.37	H
	5723	-37.29	-13	-24.29	-61.3	-42.18	2.75	9.79	H
	7627	-36.26	-13	-23.26	-64.5	-43.6	2.39	11.88	H
									H
									H
									H
	3812	-31.37	-13	-18.37	-49.98	-35.89	1.70	8.37	V
	5723	-38.35	-13	-25.35	-61.28	-43.24	2.75	9.79	V
	7627	-38.96	-13	-25.96	-66.71	-46.3	2.39	11.88	V
									V

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



LTE Band 2 / 5MHz / QPSK / RB Size 1 Offset 0									
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)
Lowest	3704	-40.94	-13	-27.94	-59.35	-47.52	1.67	8.24	H
	5556	-44.23	-13	-31.23	-67.77	-51.3	2.66	9.72	H
	7404	-41.46	-13	-28.46	-70.35	-50.61	2.46	11.61	H
									H
									H
									H
	3704	-41.04	-13	-28.04	-59.5	-47.62	1.67	8.24	V
	5556	-46.68	-13	-33.68	-68.7	-53.75	2.66	9.72	V
	7404	-42.99	-13	-29.99	-71.15	-52.14	2.46	11.61	V
									V
Middle	3760	-35.68	-13	-22.68	-54.86	-42.31	1.69	8.31	H
	5636	-42.48	-13	-29.48	-65.83	-49.53	2.70	9.75	H
	7516	-39.05	-13	-26.05	-67.64	-48.44	2.42	11.81	H
									H
									H
									H
	3760	-36.32	-13	-23.32	-55.33	-42.95	1.69	8.31	V
	5636	-44.07	-13	-31.07	-66.52	-51.12	2.70	9.75	V
	7516	-39.89	-13	-26.89	-68.41	-49.28	2.42	11.81	V
									V
Highest	3812	-31.59	-13	-18.59	-50.97	-36.11	1.70	8.37	H
	5716	-41.81	-13	-28.81	-60.78	-46.7	2.75	9.79	H
	7620	-35.90	-13	-22.90	-64.46	-43.23	2.39	11.87	H
									H
									H
									H
	3812	-32.99	-13	-19.99	-51.36	-37.51	1.70	8.37	V
	5716	-39.25	-13	-26.25	-61.99	-44.14	2.75	9.79	V
	7620	-38.69	-13	-25.69	-66.95	-46.02	2.39	11.87	V
									V

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



LTE Band 2 / 10MHz / QPSK / RB Size 1 Offset 0									
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)
Lowest	3700	-36.24	-13	-23.24	-55.32	-42.81	1.67	8.24	H
	5555	-39.96	-13	-26.96	-63.69	-47.03	2.66	9.72	H
	7403	-36.75	-13	-23.75	-65.23	-45.9	2.46	11.61	H
									H
									H
									H
	3700	-36.12	-13	-23.12	-55.03	-42.69	1.67	8.24	V
	5555	-42.74	-13	-29.74	-64.47	-49.81	2.66	9.72	V
	7403	-38.62	-13	-25.62	-66.68	-47.77	2.46	11.61	V
									V
Middle	3756	-34.89	-13	-21.89	-53.81	-41.51	1.68	8.31	H
	5632	-40.36	-13	-27.36	-64.04	-47.41	2.70	9.75	H
	7508	-38.14	-13	-25.14	-66.78	-47.52	2.43	11.80	H
									H
									H
									H
	3756	-36.99	-13	-23.99	-55.63	-43.61	1.68	8.31	V
	5632	-44.36	-13	-31.36	-66.31	-51.41	2.70	9.75	V
	7508	-40.68	-13	-27.68	-69.11	-50.06	2.43	11.80	V
									V
Highest	3805	-31.69	-13	-18.69	-51.04	-36.21	1.70	8.37	H
	5702	-37.49	-13	-24.49	-61.45	-42.38	2.74	9.78	H
	7606	-37.28	-13	-24.28	-65.76	-44.6	2.40	11.86	H
									H
									H
									H
	3805	-33.63	-13	-20.63	-52.14	-38.15	1.70	8.37	V
	5702	-41.65	-13	-28.65	-64.43	-46.54	2.74	9.78	V
	7606	-38.71	-13	-25.71	-66.94	-46.03	2.40	11.86	V
									V

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





LTE Band 2 / 15MHz / QPSK / RB Size 1 Offset 0									
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)
Lowest	3700	-35.43	-13	-22.43	-53.84	-42	1.67	8.24	H
	5555	-39.24	-13	-26.24	-62.81	-46.31	2.66	9.72	H
	7403	-37.54	-13	-24.54	-66.36	-46.69	2.46	11.61	H
									H
									H
									H
	3700	-36.23	-13	-23.23	-54.81	-42.8	1.67	8.24	V
	5555	-41.56	-13	-28.56	-63.55	-48.63	2.66	9.72	V
	7403	-38.01	-13	-25.01	-66.29	-47.16	2.46	11.61	V
									V
Middle	3749	-31.62	-13	-18.62	-50.6	-38.24	1.68	8.30	H
	5618	-37.16	-13	-24.16	-60.59	-44.21	2.69	9.75	H
	7494	-34.03	-13	-21.03	-63.08	-43.39	2.43	11.79	H
									H
									H
									H
	3749	-33.19	-13	-20.19	-51.77	-39.81	1.68	8.30	V
	5618	-39.30	-13	-26.30	-61.52	-46.35	2.69	9.75	V
	7494	-35.56	-13	-22.56	-63.66	-44.92	2.43	11.79	V
									V
Highest	3791	-33.66	-13	-20.66	-52.97	-38.16	1.70	8.35	H
	5688	-41.59	-13	-28.59	-65.36	-46.48	2.73	9.78	H
	7585	-37.80	-13	-24.80	-66.16	-45.1	2.40	11.85	H
									H
									H
									H
	3791	-36.19	-13	-23.19	-54.72	-40.69	1.70	8.35	V
	5688	-36.91	-13	-23.91	-64.49	-41.8	2.73	9.78	V
	7585	-41.11	-13	-28.11	-69.06	-48.41	2.40	11.85	V
									V

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



LTE Band 2 / 20MHz / QPSK / RB Size 1 Offset 0									
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)
Lowest	3700	-36.54	-13	-23.54	-55.13	-43.11	1.67	8.24	H
	5555	-38.51	-13	-25.51	-62.17	-45.58	2.66	9.72	H
	7403	-38.06	-13	-25.06	-66.99	-47.21	2.46	11.61	H
									H
									H
									H
	3700	-37.23	-13	-24.23	-55.79	-43.8	1.67	8.24	V
	5555	-42.18	-13	-29.18	-64.24	-49.25	2.66	9.72	V
	7403	-39.77	-13	-26.77	-67.8	-48.92	2.46	11.61	V
									V
Middle	3742	-31.93	-13	-18.93	-51.01	-38.54	1.68	8.29	H
	5611	-38.55	-13	-25.55	-62.14	-45.61	2.69	9.74	H
	7487	-33.17	-13	-20.17	-62.04	-42.51	2.43	11.77	H
									H
									H
									H
	3742	-32.63	-13	-19.63	-51.54	-39.24	1.68	8.29	V
	5611	-40.09	-13	-27.09	-62.08	-47.15	2.69	9.74	V
	7487	-35.26	-13	-22.26	-63.58	-44.6	2.43	11.77	V
									V
Highest	3784	-34.39	-13	-21.39	-53.63	-38.89	1.69	8.34	H
	5674	-39.42	-13	-26.42	-63.27	-44.31	2.73	9.77	H
	7564	-39.24	-13	-26.24	-67.94	-46.52	2.41	11.84	H
									H
									H
									H
	3784	-34.71	-13	-21.71	-53.49	-39.21	1.69	8.34	V
	5674	-39.34	-13	-26.34	-61.89	-44.23	2.73	9.77	V
	7564	-41.64	-13	-28.64	-69.58	-48.92	2.41	11.84	V
									V

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



LTE Band 4 / 1.4MHz / QPSK / RB Size 1 Offset 0									
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)
Lowest	3420	-44.93	-13	-31.93	-61.49	-51	1.58	7.65	H
	5128	-45.20	-13	-32.20	-67.96	-52.49	2.41	9.70	H
	6843	-32.08	-13	-19.08	-58.88	-40.05	2.64	10.61	H
									H
									H
									H
	3420	-46.61	-13	-33.61	-62.86	-52.68	1.58	7.65	V
	5128	-44.41	-13	-31.41	-66.55	-51.7	2.41	9.70	V
	6743	-35.01	-13	-22.01	-61.36	-42.83	2.67	10.49	V
									V
Middle	3462	-43.27	-13	-30.27	-60.18	-49.51	1.59	7.83	H
	5198	-45.57	-13	-32.57	-68.44	-52.82	2.45	9.70	H
	6927	-32.03	-13	-19.03	-59.04	-40.13	2.61	10.71	H
									H
									H
									H
	3462	-45.12	-13	-32.12	-62.06	-51.36	1.59	7.83	V
	5198	-41.41	-13	-28.41	-63.54	-48.66	2.45	9.70	V
	6927	-34.63	-13	-21.63	-61.72	-42.73	2.61	10.71	V
									V
Highest	3511	-43.20	-13	-30.20	-60.35	-49.61	1.61	8.01	H
	5261	-45.16	-13	-32.16	-67.97	-52.37	2.49	9.70	H
	7018	-35.74	-13	-22.74	-62.47	-43.99	2.58	10.84	H
									H
									H
									H
	3511	-46.10	-13	-33.10	-63.58	-52.51	1.61	8.01	V
	5261	-41.82	-13	-28.82	-64.81	-49.03	2.49	9.70	V
	7018	-36.91	-13	-23.91	-64.32	-45.16	2.58	10.84	V
									V

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



LTE Band 4 / 3MHz / QPSK / RB Size 1 Offset 0									
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)
Lowest	3424	-48.22	-13	-35.22	-64.98	-54.31	1.58	7.67	H
	5136	-49.20	-13	-36.20	-71.91	-56.48	2.42	9.70	H
	6844	-36.09	-13	-23.09	-63.19	-44.06	2.64	10.61	H
									H
									H
									H
	3424	-50.52	-13	-37.52	-66.81	-56.61	1.58	7.67	V
	5136	-48.94	-13	-35.94	-70.88	-56.22	2.42	9.70	V
	6844	-39.18	-13	-26.18	-65.59	-47.15	2.64	10.61	V
									V
Middle	3468	-47.53	-13	-34.53	-64.27	-53.79	1.59	7.86	H
	5196	-48.87	-13	-35.87	-71.47	-56.12	2.45	9.70	H
	6928	-35.95	-13	-22.95	-63.09	-44.05	2.61	10.71	H
									H
									H
									H
	3468	-49.43	-13	-36.43	-66.54	-55.69	1.59	7.86	V
	5196	-47.62	-13	-34.62	-69.81	-54.87	2.45	9.70	V
	6928	-38.58	-13	-25.58	-65.36	-46.68	2.61	10.71	V
									V
Highest	3508	-47.66	-13	-34.66	-65.07	-54.06	1.61	8.01	H
	5260	-48.40	-13	-35.40	-71.08	-55.61	2.49	9.70	H
	7012	-38.02	-13	-25.02	-65.77	-46.26	2.59	10.82	H
									H
									H
									H
	3508	-49.71	-13	-36.71	-67.64	-56.11	1.61	8.01	V
	5260	-44.81	-13	-31.81	-67.66	-52.02	2.49	9.70	V
	7012	-39.58	-13	-26.58	-67.2	-47.82	2.59	10.82	V
									V

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



LTE Band 4 / 5MHz / QPSK / RB Size 1 Offset 0									
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)
Lowest	3420	-43.44	-13	-30.44	-60	-49.51	1.58	7.65	H
	5128	-45.69	-13	-32.69	-68.54	-52.98	2.41	9.70	H
	6843	-31.69	-13	-18.69	-58.51	-39.66	2.64	10.61	H
	8551	-43.41	-13	-30.41	-73.71	-53.54	2.39	12.52	H
									H
									H
	3420	-46.08	-13	-33.08	-62.33	-52.15	1.58	7.65	V
	5128	-44.80	-13	-31.80	-66.46	-52.09	2.41	9.70	V
	6843	-35.83	-13	-22.83	-62.24	-43.8	2.64	10.61	V
	8551	-43.48	-13	-30.48	-73.04	-53.61	2.39	12.52	V
								V	
								V	
Middle	3462	-43.27	-13	-30.27	-60.08	-49.51	1.59	7.83	H
	5191	-44.93	-13	-31.93	-67.67	-52.18	2.45	9.70	H
	6820	-33.18	-13	-20.18	-60.18	-41.12	2.65	10.58	H
									H
									H
	3462	-45.81	-13	-32.81	-62.87	-52.05	1.59	7.83	V
	5191	-41.98	-13	-28.98	-64	-49.23	2.45	9.70	V
	6820	-35.17	-13	-22.17	-61.87	-43.11	2.65	10.58	V
									V
									V
								V	
Highest	3504	-42.39	-13	-29.39	-59.76	-48.79	1.61	8.00	H
	5254	-44.94	-13	-31.94	-67.56	-52.16	2.48	9.70	H
	7004	-33.02	-13	-20.02	-60.22	-41.24	2.59	10.81	H
									H
									H
	3504	-44.48	-13	-31.48	-62.09	-50.88	1.61	8.00	V
	5254	-40.47	-13	-27.47	-63.43	-47.69	2.48	9.70	V
	7004	-34.49	-13	-21.49	-61.92	-42.71	2.59	10.81	V
									V
									V

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



LTE Band 4 / 10MHz / QPSK / RB Size 1 Offset 0									
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)
Lowest	3420	-43.05	-13	-30.05	-60.19	-49.12	1.58	7.65	H
	5135	-45.35	-13	-32.35	-68.38	-52.64	2.41	9.70	H
	6843	-31.57	-13	-18.57	-58.82	-39.54	2.64	10.61	H
	8551	-43.70	-13	-30.70	-74.1	-53.83	2.39	12.52	H
									H
									H
	3420	-47.54	-13	-34.54	-63.87	-53.61	1.58	7.65	V
	5135	-43.80	-13	-30.80	-65.75	-51.09	2.41	9.70	V
	6843	-35.98	-13	-22.98	-62.52	-43.95	2.64	10.61	V
	8551	-43.60	-13	-30.60	-73.29	-53.73	2.39	12.52	V
								V	
								V	
Middle	3460	-49.31	-13	-36.31	-66.59	-55.54	1.59	7.82	H
	5188	-47.11	-13	-34.11	-70.29	-54.36	2.45	9.70	H
	6916	-37.59	-13	-24.59	-64.63	-45.67	2.62	10.70	H
									H
									H
	3460	-50.01	-13	-37.01	-67.06	-56.24	1.59	7.82	V
	5188	-46.87	-13	-33.87	-69.11	-54.12	2.45	9.70	V
	6916	-41.17	-13	-28.17	-68	-49.25	2.62	10.70	V
									V
									V
								V	
Highest	3490	-42.33	-13	-29.33	-59.79	-48.68	1.60	7.96	H
	5240	-45.74	-13	-32.74	-68.44	-52.96	2.48	9.70	H
	6983	-32.37	-13	-19.37	-59.53	-40.55	2.60	10.78	H
									H
									H
	3490	-44.42	-13	-31.42	-62.15	-50.77	1.60	7.96	V
	5240	-41.90	-13	-28.90	-64.56	-49.12	2.48	9.70	V
	6983	-34.18	-13	-21.18	-61.58	-42.36	2.60	10.78	V
									V
									V

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



LTE Band 4 / 15MHz / QPSK / RB Size 1 Offset 0									
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)
Lowest	3420	-45.92	-13	-32.92	-62.39	-51.99	1.58	7.65	H
	5135	-44.77	-13	-31.77	-67.49	-52.06	2.41	9.70	H
	6843	-32.23	-13	-19.23	-59.08	-40.2	2.64	10.61	H
									H
									H
									H
	3420	-45.95	-13	-32.95	-62.01	-52.02	1.58	7.65	V
	5135	-44.32	-13	-31.32	-66.06	-51.61	2.41	9.70	V
	6843	-36.88	-13	-23.88	-63.32	-44.85	2.64	10.61	V
									V
Middle	3455	-48.62	-13	-35.62	-65.36	-54.83	1.59	7.80	H
	5177	-47.65	-13	-34.65	-70.28	-54.91	2.44	9.70	H
	6906	-33.98	-13	-20.98	-60.87	-42.05	2.62	10.69	H
									H
									H
									H
	3455	-47.38	-13	-34.38	-64.01	-53.59	1.59	7.80	V
	5177	-45.42	-13	-32.42	-67.41	-52.68	2.44	9.70	V
	6906	-39.04	-13	-26.04	-65.78	-47.11	2.62	10.69	V
									V
Highest	3483	-43.93	-13	-30.93	-60.85	-50.26	1.60	7.93	H
	5226	-44.65	-13	-31.65	-67.34	-51.88	2.47	9.70	H
	6962	-31.44	-13	-18.44	-58.65	-39.59	2.60	10.75	H
									H
									H
									H
	3483	-46.38	-13	-33.38	-63.32	-52.71	1.60	7.93	V
	5226	-40.79	-13	-27.79	-63.45	-48.02	2.47	9.70	V
	6962	-34.10	-13	-21.10	-61.38	-42.25	2.60	10.75	V
									V

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



LTE Band 4 / 20MHz / QPSK / RB Size 1 Offset 0									
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)
Lowest	3420	-47.01	-13	-34.01	-63.56	-53.08	1.58	7.65	H
	5135	-46.32	-13	-33.32	-68.92	-53.61	2.41	9.70	H
	6843	-32.13	-13	-19.13	-59.05	-40.1	2.64	10.61	H
									H
									H
									H
	3420	-47.35	-13	-34.35	-63.72	-53.42	1.58	7.65	V
	5135	-43.40	-13	-30.40	-65.55	-50.69	2.41	9.70	V
	6843	-36.19	-13	-23.19	-62.66	-44.16	2.64	10.61	V
									V
Middle	3448	-45.36	-13	-32.36	-62.01	-51.54	1.59	7.77	H
	5170	-49.22	-13	-36.22	-71.83	-56.49	2.43	9.70	H
	6892	-34.76	-13	-21.76	-62.16	-42.81	2.63	10.67	H
									H
									H
									H
	3448	-47.23	-13	-34.23	-63.91	-53.41	1.59	7.77	V
	5170	-45.53	-13	-32.53	-68.74	-52.8	2.43	9.70	V
	6892	-38.88	-13	-25.88	-65.53	-46.93	2.63	10.67	V
									V
Highest	3476	-42.85	-13	-29.85	-60.14	-49.15	1.60	7.89	H
	5212	-45.82	-13	-32.82	-68.57	-53.06	2.46	9.70	H
	6948	-30.11	-13	-17.11	-57.77	-38.24	2.61	10.74	H
									H
									H
									H
	3476	-45.11	-13	-32.11	-62.47	-51.41	1.60	7.89	V
	5212	-41.08	-13	-28.08	-63.42	-48.32	2.46	9.70	V
	6948	-34.23	-13	-21.23	-61.26	-42.36	2.61	10.74	V
									V

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





LTE Band 7 / 5MHz / QPSK / RB Size 1 Offset 0									
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)
Lowest	5004	-43.52	-25	-18.52	-66.19	-50.88	2.34	9.70	H
	7500	-38.32	-25	-13.32	-67.13	-47.69	2.43	11.80	H
	10008	-33.06	-25	-8.06	-64.67	-42.57	2.70	12.20	H
									H
									H
									H
	5004	-45.49	-25	-20.49	-66.95	-52.85	2.34	9.70	V
	7500	-44.26	-25	-19.26	-72.54	-53.63	2.43	11.80	V
	10008	-38.43	-25	-13.43	-68.24	-47.94	2.70	12.20	V
									V
Middle	5064	-44.48	-25	-19.48	-67.19	-51.81	2.37	9.70	H
	7596	-38.51	-25	-13.51	-66.88	-47.97	2.40	11.86	H
	10128	-35.50	-25	-10.50	-67.18	-45.06	2.70	12.25	H
									H
									H
									H
	5064	-47.34	-25	-22.34	-68.93	-54.67	2.37	9.70	V
	7596	-45.57	-25	-20.57	-73.54	-55.03	2.40	11.86	V
	10128	-41.28	-25	-16.28	-71.37	-50.84	2.70	12.25	V
									V
Highest	5136	-45.44	-25	-20.44	-68.22	-52.72	2.42	9.70	H
	7692	-38.04	-25	-13.04	-66.44	-47.59	2.37	11.92	H
	10260	-34.78	-25	-9.78	-66.32	-44.39	2.69	12.30	H
									H
									H
									H
	5136	-49.10	-25	-24.10	-70.94	-56.38	2.42	9.70	V
	7692	-43.91	-25	-18.91	-71.79	-53.46	2.37	11.92	V
	10260	-41.64	-25	-16.64	-72.1	-51.25	2.69	12.30	V
									V

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



LTE Band 7 / 10MHz / QPSK / RB Size 1 Offset 0									
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)
Lowest	5004	-43.64	-25	-18.64	-66.49	-51	2.34	9.70	H
	7500	-37.26	-25	-12.26	-66.09	-46.63	2.43	11.80	H
	10008	-34.07	-25	-9.07	-65.6	-43.58	2.70	12.20	H
									H
									H
									H
	5004	-45.51	-25	-20.51	-66.9	-52.87	2.34	9.70	V
	7500	-43.37	-25	-18.37	-71.96	-52.74	2.43	11.80	V
	10008	-37.41	-25	-12.41	-67.34	-46.92	2.70	12.20	V
									V
Middle	5064	-44.80	-25	-19.80	-67.7	-52.13	2.37	9.70	H
	7596	-38.55	-25	-13.55	-66.89	-48.01	2.40	11.86	H
	10128	-33.54	-25	-8.54	-65.15	-43.1	2.70	12.25	H
									H
									H
									H
	5064	-46.85	-25	-21.85	-68.51	-54.18	2.37	9.70	V
	7596	-44.39	-25	-19.39	-72.38	-53.85	2.40	11.86	V
	10128	-40.52	-25	-15.52	-70.71	-50.08	2.70	12.25	V
									V
Highest	5124	-43.94	-25	-18.94	-66.69	-51.23	2.41	9.70	H
	7680	-37.50	-25	-12.50	-65.93	-47.04	2.37	11.91	H
	10248	-35.41	-25	-10.41	-67.04	-45.01	2.69	12.30	H
									H
									H
									H
	5124	-47.40	-25	-22.40	-69.57	-54.69	2.41	9.70	V
	7680	-43.35	-25	-18.35	-71.3	-52.89	2.37	11.91	V
	10248	-41.42	-25	-16.42	-71.88	-51.02	2.69	12.30	V
									V

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



LTE Band 7 / 15MHz / QPSK / RB Size 1 Offset 0									
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)
Lowest	5004	-45.18	-25	-20.18	-68.02	-52.54	2.34	9.70	H
	7500	-37.26	-25	-12.26	-66.13	-46.63	2.43	11.80	H
	10008	-32.26	-25	-7.26	-63.88	-41.77	2.70	12.20	H
									H
									H
									H
	5004	-47.86	-25	-22.86	-69.23	-55.22	2.34	9.70	V
	7500	-43.12	-25	-18.12	-71.52	-52.49	2.43	11.80	V
	10008	-38.51	-25	-13.51	-68.46	-48.02	2.70	12.20	V
									V
Middle	5052	-44.34	-25	-19.34	-67.17	-51.67	2.37	9.70	H
	7584	-38.30	-25	-13.30	-66.75	-47.75	2.40	11.85	H
	10116	-34.86	-25	-9.86	-66.47	-44.41	2.70	12.25	H
									H
									H
									H
	5052	-47.41	-25	-22.41	-68.9	-54.74	2.37	9.70	V
	7584	-44.11	-25	-19.11	-72.09	-53.56	2.40	11.85	V
	10116	-40.82	-25	-15.82	-71.01	-50.37	2.70	12.25	V
									V
Highest	5112	-44.97	-25	-19.97	-67.75	-52.27	2.40	9.70	H
	7668	-39.47	-25	-14.47	-67.87	-49	2.38	11.90	H
	10224	-35.57	-25	-10.57	-67.29	-45.16	2.69	12.29	H
									H
									H
									H
	5112	-49.02	-25	-24.02	-70.97	-56.32	2.40	9.70	V
	7668	-44.94	-25	-19.94	-72.86	-54.47	2.38	11.90	V
	10224	-42.40	-25	-17.40	-72.8	-51.99	2.69	12.29	V
									V

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



LTE Band 7 / 20MHz / QPSK / RB Size 1 Offset 0									
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)
Lowest	5004	-43.28	-25	-18.28	-66.1	-50.64	2.34	9.70	H
	7500	-37.16	-25	-12.16	-66.22	-46.53	2.43	11.80	H
	10008	-35.07	-25	-10.07	-66.61	-44.58	2.70	12.20	H
									H
									H
									H
	5004	-45.52	-25	-20.52	-66.9	-52.88	2.34	9.70	V
	7500	-43.63	-25	-18.63	-71.93	-53	2.43	11.80	V
	10008	-39.70	-25	-14.70	-69.58	-49.21	2.70	12.20	V
									V
Middle	5052	-44.43	-25	-19.43	-67.31	-51.76	2.37	9.70	H
	7584	-37.72	-25	-12.72	-66.13	-47.17	2.40	11.85	H
	10104	-34.56	-25	-9.56	-66.19	-44.11	2.70	12.24	H
									H
									H
									H
	5052	-48.04	-25	-23.04	-69.61	-55.37	2.37	9.70	V
	7584	-44.56	-25	-19.56	-72.58	-54.01	2.40	11.85	V
	10104	-40.64	-25	-15.64	-70.78	-50.19	2.70	12.24	V
									V
Highest	5100	-46.33	-25	-21.33	-69.16	-53.64	2.39	9.70	H
	7656	-38.47	-25	-13.47	-66.87	-47.98	2.38	11.89	H
	10200	-33.55	-25	-8.55	-65.25	-43.13	2.70	12.28	H
									H
									H
									H
	5100	-49.69	-25	-24.69	-71.44	-57	2.39	9.70	V
	7656	-44.61	-25	-19.61	-72.51	-54.12	2.38	11.89	V
	10200	-39.84	-25	-14.84	-70.25	-49.42	2.70	12.28	V
									V

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



LTE Band 17 / 5MHz / QPSK / RB Size 1 Offset 0									
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)
Lowest	1408	-49.39	-13	-36.39	-59.71	-51.10	0.87	4.73	H
	2112	-41.52	-13	-28.52	-54.16	-42.44	1.17	4.24	H
	2816	-39.78	-13	-26.78	-55.28	-41.89	1.39	5.65	H
	3520	-52.97	-13	-39.97	-70.32	-57.23	1.61	8.02	H
									H
									H
	1408	-52.84	-13	-39.84	-62.28	-54.55	0.87	4.73	V
	2112	-45.11	-13	-32.11	-58.51	-46.03	1.17	4.24	V
	2816	-47.22	-13	-34.22	-63.49	-49.33	1.39	5.65	V
	3520	-55.48	-13	-42.48	-72.97	-59.74	1.61	8.02	V
								V	
								V	
Middle	1416	-55.07	-13	-42.07	-65.45	-56.82	0.87	4.78	H
	2128	-46.36	-13	-33.36	-59.23	-47.32	1.17	4.28	H
	2832	-43.49	-13	-30.49	-59.14	-45.61	1.39	5.67	H
	3536	-56.18	-13	-43.18	-73.57	-60.46	1.62	8.04	H
									H
									H
	1416	-58.21	-13	-45.21	-67.65	-59.96	0.87	4.78	V
	2120	-49.55	-13	-36.55	-63.24	-50.49	1.17	4.26	V
	2832	-52.16	-13	-39.16	-68.34	-54.28	1.39	5.67	V
	3536	-56.83	-13	-43.83	-74.72	-61.11	1.62	8.04	V
								V	
								V	
Highest	1424	-52.07	-13	-39.07	-62.36	-53.87	0.88	4.83	H
	2136	-47.07	-13	-34.07	-60.22	-48.05	1.18	4.31	H
	2848	-42.14	-13	-29.14	-58.12	-44.27	1.40	5.68	H
	3560	-57.48	-13	-44.48	-75.18	-61.78	1.62	8.07	H
									H
									H
	1424	-54.38	-13	-41.38	-63.48	-56.18	0.88	4.83	V
	2136	-49.91	-13	-36.91	-64.08	-50.89	1.18	4.31	V
	2848	-50.63	-13	-37.63	-66.82	-52.76	1.40	5.68	V
	3560	-57.76	-13	-44.76	-75.83	-62.06	1.62	8.07	V
								V	
								V	

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



LTE Band 17 / 10MHz / QPSK / RB Size 1 Offset 0									
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)
Lowest	1408	-48.63	-13	-35.63	-58.98	-50.34	0.87	4.73	H
	2112	-39.95	-13	-26.95	-52.69	-40.87	1.17	4.24	H
	2816	-37.55	-13	-24.55	-52.91	-39.66	1.39	5.65	H
	3520	-51.94	-13	-38.94	-69.31	-56.20	1.61	8.02	H
									H
									H
	1408	-52.18	-13	-39.18	-61.68	-53.89	0.87	4.73	V
	2112	-43.29	-13	-30.29	-56.64	-44.21	1.17	4.24	V
	2816	-45.20	-13	-32.20	-61.51	-47.31	1.39	5.65	V
	3520	-53.51	-13	-40.51	-71.00	-57.77	1.61	8.02	V
								V	
								V	
Middle	1408	-50.17	-13	-37.17	-60.43	-51.88	0.87	4.73	H
	2120	-40.71	-13	-27.71	-53.69	-41.65	1.17	4.26	H
	2824	-38.11	-13	-25.11	-53.58	-40.23	1.39	5.66	H
	3528	-52.46	-13	-39.46	-69.89	-56.73	1.61	8.03	H
									H
									H
	1408	-53.31	-13	-40.31	-62.80	-55.02	0.87	4.73	V
	2120	-44.22	-13	-31.22	-57.90	-45.16	1.17	4.26	V
	2824	-45.70	-13	-32.70	-61.99	-47.82	1.39	5.66	V
	3528	-54.36	-13	-41.36	-72.14	-58.63	1.61	8.03	V
								V	
								V	
Highest	1416	-51.10	-13	-38.10	-61.41	-52.85	0.87	4.78	H
	2120	-42.09	-13	-29.09	-54.96	-43.03	1.17	4.26	H
	2824	-40.50	-13	-27.50	-55.90	-42.62	1.39	5.66	H
	3536	-52.87	-13	-39.87	-70.45	-57.15	1.62	8.04	H
									H
									H
	1416	-54.73	-13	-41.73	-64.19	-56.48	0.87	4.78	V
	2120	-45.96	-13	-32.96	-59.68	-46.90	1.17	4.26	V
	2824	-46.52	-13	-33.52	-63.02	-48.64	1.39	5.66	V
	3536	-54.74	-13	-41.74	-72.46	-59.02	1.62	8.04	V
								V	
								V	

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