

# TEST REPORT

**Reference No.**..... : WTS17S0374081-4E V2  
**FCC ID** ..... : N2GSL513  
**Applicant**..... : DOPPIO MOBILE INTERNATIONAL LIMITED  
**Address**..... : ROOM 1708, 17/f HART AVENUE PLAZA, 5-9 HART AVENUE TISM  
: SHA TSUI, Kowloon, Hongkong  
**Manufacturer** ..... : The same as above  
**Address**..... : The same as above  
**Product Name**..... : Mobile Phone  
**Model No.**..... : SL513  
**Brand**..... : doppio  
: FCC CFR47 Part 22 Subpart H: 2016  
**Standards**..... : FCC CFR47 Part 24 Subpart E: 2016  
: FCC CFR47 Part 2 7 Subpart L:2016  
**Date of Receipt sample** .... : Mar. 20, 2017  
**Date of Test** ..... : Mar. 21 ~ Apr. 06, 2017  
**Date of Issue**..... : Apr. 18, 2017  
**Test Result**..... : **Pass**

**Remarks:**

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

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## 2 Laboratories Introduction

**Waltek Services Test Group Ltd** is a professional third-party testing and certification organization with multi-year product testing and certification experience, established strictly in accordance with ISO/IEC 17025 requirements, and accredited by CNAS (China National Accreditation Service for Conformity Assessment) AQS1Q, CMA and IECEE for CBTL. Meanwhile, Waltek has got recognition as registration and accreditation laboratory from EMSD (Electrical and Mechanical Services Department), and American Energy star, FCC(The Federal Communications Commission), CPSC(Consumer Product Safety Commission), CEC(California energy efficiency), IC(Industry Canada) and ELI(Efficient Lighting Initiative). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as UL, Intertek(ETL-SEMKO), CSA, TÜV Rheinland, TÜV SÜD, etc.



**Waltek Services Test Group Ltd.** is one of the largest and the most comprehensive third party testing organizations in China, our headquarter located in Shenzhen and have branches in Foshan, Dongguan, Zhongshan, Suzhou, Ningbo and Hong Kong, Our test capability covered four large fields: safety test. ElectroMagnetic Compatibility(EMC), reliability and energy performance, Chemical test. As a professional, comprehensive, justice international test organization, we still keep the scientific and rigorous work attitude to help each client satisfy the international standards and assist their product enter into globe market smoothly.

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#### 4 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS17S0374081-4E	Mar. 20, 2017	Mar.21 ~ Apr. 06, 2017	Apr. 07, 2017	original	-	Replaced
WTS17S0374081-4E V1	Mar. 20, 2017	Mar.21 ~ Apr. 06, 2017	Apr. 17, 2017	Version 1	Updated	Replaced
WTS17S0374081-4E V2	Mar. 20, 2017	Mar.21 ~ Apr. 06, 2017	Apr. 18, 2017	Version 2	Updated	Valid

## 5 General Information

### 5.1 General Description of E.U.T.

Product Name:	Mobile Phone
Model No.:	SL513
Model Description:	N/A
GSM Band(s):	GSM 850/900/1800/1900MHz
GPRS/EGPRS Class:	12
WCDMA Band(s):	FDD Band II/V
LTE Band(s):	FDD Band 2/7
Wi-Fi Specification:	2.4G-802.11b/g/n HT20/n HT40
Bluetooth Version:	Bluetooth v4.0 with BLE
GPS:	Support
NFC:	N/A
Hardware Version:	P10A-MB-V2.0
Software Version:	SL513_PE_Claro_V04_20170316
Highest frequency (Exclude Radio):	1.3GHz
Storage Location:	Internal Storage

Note: This EUT has two SIM card slots, and use same one RF module. We found that RF parameters are the same, when we insert the card 1 and card 2. So we usually performed the test under main card slot 1.

### 5.2 Details of E.U.T.

Operation Frequency:	GSM/GPRS/EDGE 850: 824~849MHz PCS/GPRS/EDGE 1900: 1850~1910MHz WCDMA Band II: 1850~1910MHz WCDMA Band V: 824~849MHz LTE Band 2: 1850~1910MHz LTE Band 7: 2500-2570MHz WiFi: 802.11b/g/n HT20: 2412~2462MHz 802.11n HT40: 2422~2452MHz Bluetooth: 2402~2480MHz
Max. RF output power:	GSM 850: 32.84dBm PCS1900: 29.93dBm WCDMA Band II: 22.28dBm WCDMA Band V: 22.48dBm LTE Band 2: 22.78dBm LTE Band 7: 23.74dBm

Type of Modulation:	WiFi(2.4G): 9.41dBm Bluetooth: 0.56dBm GSM,GPRS: GMSK EDGE: GMSK, 8PSK WCDMA: BPSK, 16QAM LTE: QPSK, 16QAM WiFi: CCK, OFDM Bluetooth: GFSK, Pi/4 DQPSK, 8DPSK
Antenna installation:	GSM/WCDMA/LTE: internal permanent antenna WiFi/Bluetooth: internal permanent antenna
Antenna Gain:	GSM 850: -1.0dBi PCS1900: -1.1dBi WCDMA Band II: -1.1dBi WCDMA Band V: -1.0dBi LTE Band 2: -1.1dBi LTE Band 7: -1.2dBi WiFi(2.4G): -1.0dBi Bluetooth: -1.0dBi
Technical Data:	Battery DC 3.8V, 2200mAh DC 5V, 1.0A, charging from adapter (Adapter Input: 100-240V~50/60Hz 0.2A)
Adapter:	Manufacture: Shenzhen Diasinger Digital.,LTD. Model No.: SL513
Type of Emission:	LTE Band 2 1.4MHz: 1M11G7D(QPSK), 1M11W7D(16QAM) LTE Band 2 3MHz: 2M73G7D(QPSK), 2M72W7D(16QAM) LTE Band 2 5MHz: 4M50G7D(QPSK), 4M50W7D(16QAM) LTE Band 2 10 MHz: 8M93G7D(QPSK), 8M92W7D(16QAM) LTE Band 2 15MHz: 13M5G7D(QPSK), 13M5W7D(16QAM) LTE Band 2 20MHz: 17M9G7D(QPSK), 17M9W7D(16QAM) LTE Band 7 5MHz: 4M50G7D(QPSK), 4M50W7D(16QAM) LTE Band 7 10 MHz: 8M92G7D(QPSK), 8M92W7D(16QAM) LTE Band 7 15MHz: 13M5G7D(QPSK), 13M5W7D(16QAM) LTE Band 7 20MHz: 17M9G7D(QPSK), 17M9W7D(16QAM)

### 5.3 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Support Band	Test Mode BW(MHz)	Channel Frequency	Channel Number
LTE Band 2	1.4	1850.7 MHz	18607
		1880.0 MHz	18900
		1909.3 MHz	19193
	3	1851.5 MHz	18615
		1880.0 MHz	18900
		1908.5 MHz	19185
	5	1852.5 MHz	18625
		1880.0 MHz	18900
		1907.5 MHz	19175
	10	1855.0 MHz	18650
		1880.0 MHz	18900
		1905.0 MHz	19150
	15	1857.5 MHz	18675
		1880.0 MHz	18900
		1902.5 MHz	19125
20	1860.0 MHz	18700	
	1880.0 MHz	18900	
	1900.0 MHz	19100	
LTE Band 7	5	2502.5 MHz	20775
		2535 MHz	21100
		2567.5 MHz	21425
	10	2505.0 MHz	20800
		2535 MHz	21100
		2565.0 MHz	21400
	15	2507.5 MHz	20825
		2535 MHz	21100
		2562.5 MHz	21375
	20	2510.0 MHz	20850
		2535 MHz	21100
		2560.0 MHz	21350
Remark: All mode(s) were tested and the worst data was recorded.			

## 5.4 Test Facility

The test facility has a test site registered with the following organizations:

- **IC – Registration No.: 7760A**

Waltek Services(Shenzhen) Co., Ltd. Has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration number 7760A, October 15, 2015.

- **FCC Test Site 1#– Registration No.: 880581**

Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory `has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 880581, April 29, 2014.

- **FCC Test Site 2#– Registration No.: 328995**

Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory `has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 328995, December 3, 2014.

## 6 Test Summary

Test Items	Test Requirement	Result
RF Output Power	2.1046 22.913 (a) 24.232 (c) 27.50(h.2) 27.50(d.4)	PASS
Peak-to-Average Ratio	24.232 (d) 27.50(d)	PASS
Bandwidth	2.1049 22.905 22.917 24.238 27.53(a)	PASS
Spurious Emissions at Antenna Terminal	2.1051 22.917 (a) 24.238 (a) 27.53(h) 27.53(m)(4)	PASS
Field Strength of Spurious Radiation	2.1053 22.917 (a) 24.238 (a) 27.53(h) 27.53(m)(4)	PASS
Out of band emission	22.917 (a) 24.238 (a) 27.53(h) 27.53(m)(4)	PASS
Frequency Stability	2.1055 22.355 24.235 27.5(h) 27.54	PASS
Maximum Permissible Exposure (SAR)	1.1307 2.1093	PASS

## 7 Equipment Used during Test

### 7.1 Equipments List

Conducted Emissions Test Site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	100947	Sep.12,2016	Sep.11,2017
2.	LISN	R&S	ENV216	101215	Sep.12,2016	Sep.11,2017
3.	Cable	Top	TYPE16(3.5M)	-	Sep.12,2016	Sep.11,2017
Conducted Emissions Test Site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	101155	Sep.12,2016	Sep.11,2017
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	Sep.12,2016	Sep.11,2017
3.	Limiter	York	MTS-IMP-136	261115-001-0024	Sep.12,2016	Sep.11,2017
4.	Cable	LARGE	RF300	-	Sep.12,2016	Sep.11,2017
3m Semi-anechoic Chamber for Radiation Emissions Test site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Spectrum Analyzer	R&S	FSP	100091	Apr.29, 2016	Apr.28, 2017
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	Apr.09,2016	Apr.08,2017
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Apr.09,2016	Apr.08,2017
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	Sep.12,2016	Sep.11,2017
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Apr.09,2016	Apr.08,2017
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	Apr.09,2016	Apr.08,2017
7	Broadband Pre-amplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Apr.13,2016	Apr.12,2017
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	Apr.13,2016	Apr.12,2017
9	Signal Generator	R&S	SMR20	100046	Sep.12,2016	Sep.11,2017
10	Smart Antenna	SCHWARZBECK	HA08	-	Apr.09,2016	Apr.08,2017
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No	Last Calibration Date	Calibration Due Date
1	Test Receiver	R&S	ESCI	101296	Apr.13,2016	Apr.12,2017
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	Apr.09,2016	Apr.08,2017

3	Amplifier	Compliance pirection systems inc	PAP-0203	22024	Apr.13,2016	Apr.12,2017
4	Cable	HUBER+SUHNER	CBL2	525178	Apr.13,2016	Apr.12,2017
<b>RF Conducted Testing</b>						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY45114943	Sep.12,2016	Sep.11,2017
2.	Spectrum Analyzer	Agilent	N9020A	MY49100060	Sep.12,2016	Sep.11,2017
3.	Universal Radio Communication Tester	R&S	CMW 500	127818	Apr.13,2016	Apr.12,2017
4	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	Sep.12,2016	Sep.11,2017

## 7.2 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-6}$
RF Power	$\pm 1.0$ dB
RF Power Density	$\pm 2.2$ dB
Radiated Spurious Emissions test	$\pm 5.03$ dB (Bilog antenna 30M~1000MHz)
	$\pm 5.47$ dB (Horn antenna 1000M~25000MHz)
Conducted Spurious Emissions test	$\pm 3.64$ dB (Active Loop antenna 9kHz~30MHz)
Confidence interval: 95%. Confidence factor:k=2	

## 7.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

## 8 RF OUTPUT POWER

Test Requirement:	FCC Part 2.1046, 22.913 (a), 24.232 (c), 27.50(h.2); 27.50(d.4)
Test Method:	TIA/EIA-603-D:2010 KDB971168 D01 v02r02
Test Mode:	TX transmitting

### 8.1 EUT Operation

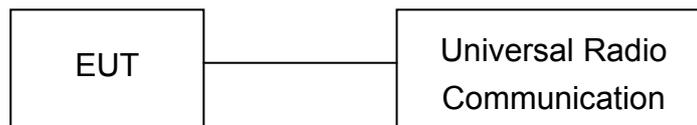
Operating Environment :

Temperature:	22.5 °C
Humidity:	52.1 % RH
Atmospheric Pressure:	101.2kPa

### 8.2 Test Procedure

Conducted method:

The RF output of the transmitter was connected to the wireless test set and the spectrum analyzer through sufficient attenuation.



Radiated method:

1. The setup of EUT is according with per TIA/EIA Standard 603D:2010.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

## 8.3 Test Result

## Conducted Power

## LTE Band 2:

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
1.4MHz	18607	1850.7	QPSK	1	0	22.59	22.0±1	/
				1	2	22.56	22.0±1	/
				1	5	22.61	22.0±1	/
				3	0	21.64	21.0±1	/
				3	1	21.63	21.0±1	/
				3	2	21.61	21.0±1	/
			6	0	21.62	21.0±1	1.0	
			16QAM	1	0	21.64	21.0±1	1.0
				1	2	21.62	21.0±1	1.0
				1	5	21.64	21.0±1	1.0
				3	0	21.65	21.0±1	1.0
				3	1	21.63	21.0±1	1.0
				3	2	21.39	21.0±1	1.0
			6	0	20.61	21.0±1	1.0	
	18900	1880	QPSK	1	0	22.35	22.0±1	/
				1	2	22.26	22.0±1	/
				1	5	22.34	22.0±1	/
				3	0	21.39	21.0±1	/
				3	1	21.36	21.0±1	/
				3	2	21.38	21.0±1	/
			6	0	21.36	21.0±1	1.0	
			16QAM	1	0	21.69	21.0±1	1.0
				1	2	21.66	21.0±1	1.0
				1	5	21.68	21.0±1	1.0
				3	0	21.58	21.0±1	1.0
				3	1	21.53	21.0±1	1.0
				3	2	21.55	21.0±1	1.0
			6	0	20.21	21.0±1	1.0	
	19193	1909.3	QPSK	1	0	22.36	22.0±1	/
				1	2	22.42	22.0±1	/
1				5	22.44	22.0±1	/	
3				0	21.52	21.0±1	/	
3				1	21.56	21.0±1	/	
3				2	21.54	21.0±1	/	
6			0	21.51	21.0±1	1.0		
16QAM			1	0	21.43	21.0±1	1.0	
			1	2	21.44	21.0±1	1.0	
			1	5	21.49	21.0±1	1.0	
			3	0	21.68	21.0±1	1.0	
			3	1	21.69	21.0±1	1.0	
			3	2	21.68	21.0±1	1.0	
6			0	20.57	21.0±1	1.0		

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
3MHz	18615	1851.5	QPSK	1	0	22.74	22.0±1	/
				1	8	22.78	22.0±1	/
				1	14	22.69	22.0±1	/
				6	0	21.8	21.0±1	1.0
				6	4	21.78	21.0±1	1.0
				6	9	21.77	21.0±1	1.0
			16QAM	15	0	21.75	21.0±1	1.0
				1	0	21.54	21.0±1	1.0
				1	8	21.56	21.0±1	1.0
				1	14	21.48	21.0±1	1.0
				6	0	20.81	21.0±1	1.0
				6	4	20.77	21.0±1	1.0
				6	9	20.76	21.0±1	1.0
				15	0	20.68	21.0±1	1.0
	18900	1880	QPSK	1	0	22.37	22.0±1	/
				1	8	22.39	22.0±1	/
				1	14	22.33	22.0±1	/
				6	0	21.45	21.0±1	1.0
				6	4	21.42	21.0±1	1.0
				6	9	21.41	21.0±1	1.0
			16QAM	15	0	21.39	21.0±1	1.0
				1	0	21.68	21.0±1	1.0
				1	8	21.71	21.0±1	1.0
				1	14	21.67	21.0±1	1.0
				6	0	20.48	21.0±1	1.0
				6	4	20.47	21.0±1	1.0
				6	9	20.42	21.0±1	1.0
				15	0	20.38	21.0±1	1.0
	19185	1908.5	QPSK	1	0	22.38	22.0±1	/
				1	8	22.45	22.0±1	/
				1	14	22.5	22.0±1	/
				6	0	21.55	21.0±1	1.0
				6	4	21.58	21.0±1	1.0
				6	9	21.6	21.0±1	1.0
			16QAM	15	0	21.53	21.0±1	1.0
				1	0	21.4	21.0±1	1.0
1				8	21.55	21.0±1	1.0	
1				14	21.34	21.0±1	1.0	
6				0	20.5	21.0±1	1.0	
6				4	20.67	21.0±1	1.0	
6				9	20.46	21.0±1	1.0	
15				0	20.51	21.0±1	1.0	

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
5MHz	18625	1852.5	QPSK	1	0	22.61	22.0±1	/
				1	12	22.78	22.0±1	/
				1	24	22.73	22.0±1	/
				12	0	21.82	21.0±1	1.0
				12	6	21.77	21.0±1	1.0
				12	11	21.86	21.0±1	1.0
				25	0	21.78	21.0±1	1.0
			16QAM	1	0	21.73	21.0±1	1.0
				1	12	21.72	21.0±1	1.0
				1	24	21.6	21.0±1	1.0
				12	0	20.52	21.0±1	1.0
				12	6	20.87	21.0±1	1.0
				12	11	20.71	21.0±1	1.0
				25	0	20.68	21.0±1	1.0
	18900	1880	QPSK	1	0	22.48	22.0±1	/
				1	12	22.44	22.0±1	/
				1	24	22.35	22.0±1	/
				12	0	21.44	21.0±1	1.0
				12	6	21.43	21.0±1	1.0
				12	11	21.37	21.0±1	1.0
				25	0	21.33	21.0±1	1.0
			16QAM	1	0	21.77	21.0±1	1.0
				1	12	21.6	21.0±1	1.0
				1	24	21.48	21.0±1	1.0
				12	0	20.49	21.0±1	1.0
				12	6	20.45	21.0±1	1.0
				12	11	20.44	21.0±1	1.0
				25	0	20.34	21.0±1	1.0
	19175	1907.5	QPSK	1	0	22.46	22.0±1	/
				1	12	22.64	22.0±1	/
				1	24	22.58	22.0±1	/
				12	0	21.52	21.0±1	1.0
				12	6	21.55	21.0±1	1.0
				12	11	21.61	21.0±1	1.0
				25	0	21.51	21.0±1	1.0
			16QAM	1	0	21.08	21.0±1	1.0
1				12	21.18	21.0±1	1.0	
1				24	21.2	21.0±1	1.0	
12				0	20.48	21.0±1	1.0	
12				6	20.5	21.0±1	1.0	
12				11	20.55	21.0±1	1.0	
25				0	20.36	21.0±1	1.0	

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
10MHz	18650	1855	QPSK	1	0	22.6	22.0±1	/
				1	24	22.71	22.0±1	/
				1	49	22.78	22.0±1	/
				25	0	21.78	21.0±1	1.0
				25	12	21.71	21.0±1	1.0
				25	24	21.67	21.0±1	1.0
			16QAM	50	0	21.73	21.0±1	1.0
				1	0	21.67	21.0±1	1.0
				1	24	21.54	21.0±1	1.0
				1	49	21.49	21.0±1	1.0
				25	0	20.72	21.0±1	1.0
				25	12	20.66	21.0±1	1.0
				25	24	20.61	21.0±1	1.0
				50	0	20.62	21.0±1	1.0
	18900	1880	QPSK	1	0	22.48	22.0±1	/
				1	24	22.4	22.0±1	/
				1	49	22.3	22.0±1	/
				25	0	21.46	21.0±1	1.0
				25	12	21.39	21.0±1	1.0
				25	24	21.36	21.0±1	1.0
			16QAM	50	0	21.42	21.0±1	1.0
				1	0	21.83	21.0±1	1.0
				1	24	21.69	21.0±1	1.0
				1	49	21.63	21.0±1	1.0
				25	0	20.43	21.0±1	1.0
				25	12	20.37	21.0±1	1.0
				25	24	20.34	21.0±1	1.0
				50	0	20.38	21.0±1	1.0
	19150	1905	QPSK	1	0	22.36	22.0±1	/
				1	24	22.43	22.0±1	/
1				49	22.59	22.0±1	/	
25				0	21.38	21.0±1	1.0	
25				12	21.45	21.0±1	1.0	
25				24	21.5	21.0±1	1.0	
16QAM			50	0	21.44	21.0±1	1.0	
			1	0	21.23	21.0±1	1.0	
			1	24	21.35	21.0±1	1.0	
			1	49	21.51	21.0±1	1.0	
			25	0	20.38	21.0±1	1.0	
			25	12	20.46	21.0±1	1.0	
			25	24	20.51	21.0±1	1.0	
			50	0	20.4	21.0±1	1.0	

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
15MHz	18675	1857.5	QPSK	1	0	22.73	22.0±1	/
				1	37	22.72	22.0±1	/
				1	74	22.69	22.0±1	/
				36	0	21.91	21.0±1	1.0
				36	16	21.84	21.0±1	1.0
				36	35	21.82	21.0±1	1.0
				75	0	21.89	21.0±1	1.0
			16QAM	1	0	21.75	21.0±1	1.0
				1	37	21.58	21.0±1	1.0
				1	74	21.48	21.0±1	1.0
				36	0	20.77	21.0±1	1.0
				36	16	20.7	21.0±1	1.0
				36	35	20.66	21.0±1	1.0
				75	0	20.75	21.0±1	1.0
	18900	1880	QPSK	1	0	22.63	22.0±1	/
				1	37	22.46	22.0±1	/
				1	74	22.31	22.0±1	/
				36	0	21.61	21.0±1	1.0
				36	16	21.49	21.0±1	1.0
				36	35	21.46	21.0±1	1.0
				75	0	21.55	21.0±1	1.0
			16QAM	1	0	21.9	21.0±1	1.0
				1	37	21.78	21.0±1	1.0
				1	74	21.64	21.0±1	1.0
				36	0	20.55	21.0±1	1.0
				36	16	20.46	21.0±1	1.0
				36	35	20.4	21.0±1	1.0
				75	0	20.45	21.0±1	1.0
	19125	1902.5	QPSK	1	0	22.43	22.0±1	/
				1	37	22.56	22.0±1	/
				1	74	22.72	22.0±1	/
				36	0	21.51	21.0±1	1.0
				36	16	21.59	21.0±1	1.0
				36	35	21.64	21.0±1	1.0
				75	0	21.56	21.0±1	1.0
			16QAM	1	0	21.52	21.0±1	1.0
1				37	21.61	21.0±1	1.0	
1				74	21.89	21.0±1	1.0	
36				0	20.32	21.0±1	1.0	
36				16	20.4	21.0±1	1.0	
36				35	20.47	21.0±1	1.0	
75				0	20.4	21.0±1	1.0	

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
20MHz	18700	1860	QPSK	1	0	22.6	22.0±1	/
				1	49	22.66	22.0±1	/
				1	99	22.6	22.0±1	/
				50	0	21.8	21.0±1	1.0
				50	24	21.7	21.0±1	1.0
				50	49	21.63	21.0±1	1.0
				100	0	21.72	21.0±1	1.0
			16QAM	1	0	21.37	21.0±1	1.0
				1	49	21.06	21.0±1	1.0
				1	99	21.05	21.0±1	1.0
				50	0	21.74	21.0±1	1.0
				50	24	21.64	21.0±1	1.0
				50	49	21.57	21.0±1	1.0
				100	0	20.66	21.0±1	1.0
	18900	1880	QPSK	1	0	22.69	22.0±1	/
				1	49	22.68	22.0±1	/
				1	99	22.29	22.0±1	/
				50	0	21.58	21.0±1	1.0
				50	24	21.47	21.0±1	1.0
				50	49	21.41	21.0±1	1.0
				100	0	21.5	21.0±1	1.0
			16QAM	1	0	21.12	21.0±1	1.0
				1	49	21.82	21.0±1	1.0
				1	99	21.67	21.0±1	1.0
				50	0	20.52	21.0±1	1.0
				50	24	20.42	21.0±1	1.0
				50	49	20.36	21.0±1	1.0
				100	0	20.43	21.0±1	1.0
	19100	1900	QPSK	1	0	22.36	22.0±1	/
				1	49	22.39	22.0±1	/
				1	99	22.7	22.0±1	/
				50	0	21.32	21.0±1	1.0
				50	24	21.34	21.0±1	1.0
				50	49	21.46	21.0±1	1.0
				100	0	21.39	21.0±1	1.0
			16QAM	1	0	21.62	21.0±1	1.0
1				49	21.51	21.0±1	1.0	
1				99	21.96	21.0±1	1.0	
50				0	20.23	21.0±1	1.0	
50				24	20.24	21.0±1	1.0	
50				49	20.35	21.0±1	1.0	
100				0	20.29	21.0±1	1.0	

**LTE Band 7:**

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
5MHz	20775	2502.5	QPSK	1	0	23.63	23.0±1	/
				1	49	23.53	23.0±1	/
				1	99	23.51	23.0±1	/
				12	0	22.68	22.0±1	1.0
				12	24	22.64	22.0±1	1.0
				12	49	22.64	22.0±1	1.0
				25	0	22.61	22.0±1	1.0
			16QAM	1	0	22.7	22.0±1	1.0
				1	49	22.57	22.0±1	1.0
				1	99	22.65	22.0±1	1.0
				12	0	21.81	21.0±1	2.0
				12	24	21.75	21.0±1	2.0
				12	49	21.74	21.0±1	2.0
				25	0	21.81	21.0±1	2.0
	21100	2535	QPSK	1	0	23.29	23.0±1	/
				1	49	23.33	23.0±1	/
				1	99	23.33	23.0±1	/
				12	0	22.39	22.0±1	1.0
				12	24	22.39	22.0±1	1.0
				12	49	22.4	22.0±1	1.0
				25	0	22.35	22.0±1	1.0
			16QAM	1	0	22.59	22.0±1	1.0
				1	49	22.62	22.0±1	1.0
				1	99	22.62	22.0±1	1.0
				12	0	21.57	21.0±1	2.0
				12	24	21.57	21.0±1	2.0
				12	49	21.58	21.0±1	2.0
				25	0	21.45	21.0±1	2.0
	21425	2567.5	QPSK	1	0	23.48	23.0±1	/
				1	49	23.42	23.0±1	/
1				99	23.36	23.0±1	/	
12				0	22.53	22.0±1	1.0	
12				24	22.48	22.0±1	1.0	
12				49	22.47	22.0±1	1.0	
25				0	22.43	22.0±1	1.0	
16QAM			1	0	22.21	22.0±1	1.0	
			1	49	22.13	22.0±1	1.0	
			1	99	22.07	22.0±1	1.0	
			12	0	21.63	21.0±1	2.0	
			12	24	21.57	21.0±1	2.0	
			12	49	21.56	21.0±1	2.0	
			25	0	21.44	21.0±1	2.0	

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
10MHz	20800	2505	QPSK	1	0	23.64	23.0±1	/
				1	49	23.54	23.0±1	/
				1	99	23.43	23.0±1	/
				25	0	22.75	22.0±1	1.0
				25	24	22.64	22.0±1	1.0
				25	49	22.62	22.0±1	1.0
				50	0	22.69	22.0±1	1.0
			16QAM	1	0	22.64	22.0±1	1.0
				1	49	22.54	22.0±1	1.0
				1	99	22.44	22.0±1	1.0
				25	0	21.78	21.0±1	2.0
				25	24	21.7	21.0±1	2.0
				25	49	21.66	21.0±1	2.0
				50	0	21.7	21.0±1	2.0
	21100	2535	QPSK	1	0	23.32	23.0±1	/
				1	49	23.33	23.0±1	/
				1	99	23.39	23.0±1	/
				25	0	22.36	22.0±1	1.0
				25	24	22.37	22.0±1	1.0
				25	49	22.43	22.0±1	1.0
				50	0	22.41	22.0±1	1.0
			16QAM	1	0	22.65	22.0±1	1.0
				1	49	22.7	22.0±1	1.0
				1	99	22.78	22.0±1	1.0
				25	0	21.48	21.0±1	2.0
				25	24	21.5	21.0±1	2.0
				25	49	21.51	21.0±1	2.0
				50	0	21.51	21.0±1	2.0
	21400	2565	QPSK	1	0	23.52	23.0±1	/
				1	49	23.48	23.0±1	/
1				99	23.36	23.0±1	/	
25				0	22.53	22.0±1	1.0	
25				24	22.48	22.0±1	1.0	
25				49	22.46	22.0±1	1.0	
50				0	22.51	22.0±1	1.0	
16QAM			1	0	22.61	22.0±1	1.0	
			1	49	22.47	22.0±1	1.0	
			1	99	22.4	22.0±1	1.0	
			25	0	21.7	21.0±1	2.0	
			25	24	21.66	21.0±1	2.0	
			25	49	21.62	21.0±1	2.0	
			50	0	21.6	21.0±1	2.0	

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
15MHz	20825	2507.5	QPSK	1	0	23.66	23.0±1	/
				1	49	23.47	23.0±1	/
				1	99	23.34	23.0±1	/
				36	0	22.77	22.0±1	1.0
				36	24	22.69	22.0±1	1.0
				36	49	22.5	22.0±1	1.0
				75	0	22.67	22.0±1	1.0
			16QAM	1	0	22.65	22.0±1	1.0
				1	49	22.44	22.0±1	1.0
				1	99	22.31	22.0±1	1.0
				36	0	21.73	21.0±1	2.0
				36	24	21.66	21.0±1	2.0
				36	49	21.56	21.0±1	2.0
				75	0	21.65	21.0±1	2.0
	21100	2535	QPSK	1	0	23.26	23.0±1	/
				1	49	23.37	23.0±1	/
				1	99	23.42	23.0±1	/
				36	0	22.43	22.0±1	1.0
				36	24	22.45	22.0±1	1.0
				36	49	22.51	22.0±1	1.0
				75	0	22.46	22.0±1	1.0
			16QAM	1	0	22.66	22.0±1	1.0
				1	49	22.72	22.0±1	1.0
				1	99	22.84	22.0±1	1.0
				36	0	21.51	21.0±1	2.0
				36	24	21.53	21.0±1	2.0
				36	49	21.54	21.0±1	2.0
				75	0	21.5	21.0±1	2.0
	21375	2562.5	QPSK	1	0	23.59	23.0±1	/
				1	49	23.57	23.0±1	/
1				99	23.42	23.0±1	/	
36				0	22.64	22.0±1	1.0	
36				24	22.63	22.0±1	1.0	
36				49	22.56	22.0±1	1.0	
75				0	22.61	22.0±1	1.0	
16QAM			1	0	22.94	22.0±1	1.0	
			1	49	22.86	22.0±1	1.0	
			1	99	22.73	22.0±1	1.0	
			36	0	21.63	21.0±1	2.0	
			36	24	21.62	21.0±1	2.0	
			36	49	21.54	21.0±1	2.0	
			75	0	21.6	21.0±1	2.0	

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
20MHz	20850	2510	QPSK	1	0	23.74	23.0±1	/
				1	49	23.48	23.0±1	/
				1	99	23.3	23.0±1	/
				50	0	22.75	22.0±1	1.0
				50	24	22.62	22.0±1	1.0
				50	49	22.45	22.0±1	1.0
			16QAM	100	0	22.54	22.0±1	1.0
				1	0	22.32	22.0±1	1.0
				1	49	22.02	22.0±1	1.0
				1	99	22.03	22.0±1	1.0
				50	0	21.82	21.0±1	2.0
				50	24	21.69	21.0±1	2.0
				50	49	21.57	21.0±1	2.0
				100	0	21.67	21.0±1	2.0
	21100	2535	QPSK	1	0	23.28	23.0±1	/
				1	49	23.33	23.0±1	/
				1	99	23.39	23.0±1	/
				50	0	22.42	22.0±1	1.0
				50	24	22.44	22.0±1	1.0
				50	49	22.52	22.0±1	1.0
			16QAM	100	0	22.47	22.0±1	1.0
				1	0	22.74	22.0±1	1.0
				1	49	22.78	22.0±1	1.0
				1	99	22.92	22.0±1	1.0
				50	0	21.52	21.0±1	2.0
				50	24	21.54	21.0±1	2.0
				50	49	21.56	21.0±1	2.0
				100	0	21.5	21.0±1	2.0
	21350	2560	QPSK	1	0	23.55	23.0±1	/
				1	49	23.58	23.0±1	/
1				99	23.46	23.0±1	/	
50				0	22.7	22.0±1	1.0	
50				24	22.61	22.0±1	1.0	
50				49	22.65	22.0±1	1.0	
16QAM			100	0	22.64	22.0±1	1.0	
			1	0	23.02	22.0±1	1.0	
			1	49	22.9	22.0±1	1.0	
			1	99	22.8	22.0±1	1.0	
			50	0	21.69	21.0±1	2.0	
			50	24	21.64	21.0±1	2.0	
			50	49	21.62	21.0±1	2.0	
			100	0	21.65	21.0±1	2.0	

**ERP and EIRP****LTE Band 2**

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	RX Antenna		Substituted			Absolute Level (dBm)	Part 24E	
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
LTE Band 2 Channel 18607 – 1.4MHz – QPSK										
1850.70	79.27	192	1.8	H	5.30	0.31	10.40	15.39	33	-17.61
1850.70	84.79	318	1.6	V	11.51	0.31	10.40	21.60	33	-11.40
LTE Band 2 Channel 18900 – 1.4MHz – QPSK										
1880.00	79.06	82	2.3	H	5.21	0.31	10.40	15.30	33	-17.70
1880.00	84.88	175	1.3	V	11.76	0.31	10.40	21.85	33	-11.15
LTE Band 2 Channel 19193 – 1.4MHz – QPSK										
1909.30	78.72	137	1.2	H	4.99	0.32	10.40	15.07	33	-17.93
1909.30	84.92	106	2.1	V	11.96	0.32	10.40	22.04	33	-10.96
LTE Band 2 Channel 18607 – 1.4MHz – 16QAM										
1850.70	79.88	152	1.3	H	5.91	0.31	10.40	16.00	33	-17.00
1850.70	84.41	20	1.0	V	11.13	0.31	10.40	21.22	33	-11.78
LTE Band 2 Channel 18900 – 1.4MHz – 16QAM										
1880.00	76.55	84	1.7	H	2.70	0.31	10.40	12.79	33	-20.21
1880.00	84.28	274	2.1	V	11.16	0.31	10.40	21.25	33	-11.75
LTE Band 2 Channel 19193 – 1.4MHz – 16QAM										
1909.30	77.03	2	2.0	H	3.30	0.32	10.40	13.38	33	-19.62
1909.30	84.80	347	1.9	V	11.84	0.32	10.40	21.92	33	-11.08
LTE Band 2 Channel 18615 – 3MHz – QPSK										
1851.50	76.27	317	2.0	H	2.30	0.31	10.40	12.39	33	-20.61
1851.50	84.61	190	2.1	V	11.33	0.31	10.40	21.42	33	-11.58
LTE Band 2 Channel 18900 – 3MHz – QPSK										
1880.00	79.72	105	1.5	H	5.87	0.31	10.40	15.96	33	-17.04
1880.00	84.68	345	2.2	V	11.56	0.31	10.40	21.65	33	-11.35
LTE Band 2 Channel 19185 – 3MHz – QPSK										
1908.50	79.67	318	1.9	H	5.94	0.32	10.40	16.02	33	-16.98
1908.50	84.62	350	2.4	V	11.66	0.32	10.40	21.74	33	-11.26
LTE Band 2 Channel 18615 – 3MHz – 16QAM										
1851.50	77.84	83	2.5	H	3.87	0.31	10.40	13.96	33	-19.04
1851.50	84.32	226	1.9	V	11.04	0.31	10.40	21.13	33	-11.87
LTE Band 2 Channel 18900 – 3MHz – 16QAM										
1880.00	78.12	312	2.4	H	4.27	0.31	10.40	14.36	33	-18.64
1880.00	84.72	174	2.1	V	11.60	0.31	10.40	21.69	33	-11.31
LTE Band 2 Channel 19185 – 3MHz – 16QAM										
1908.50	79.82	194	1.7	H	6.09	0.32	10.40	16.17	33	-16.83
1908.50	84.66	309	2.2	V	11.70	0.32	10.40	21.78	33	-11.22
LTE Band 2 Channel 18625 – 5MHz – QPSK										
1852.50	77.26	13	1.2	H	3.29	0.31	10.40	13.38	33	-19.62
1852.50	84.42	55	1.5	V	11.14	0.31	10.40	21.23	33	-11.77
LTE Band 2 Channel 18900 – 5MHz – QPSK										

1880.00	76.19	304	1.6	H	2.34	0.31	10.40	12.43	33	-20.57
1880.00	84.68	197	1.4	V	11.56	0.31	10.40	21.65	33	-11.35
LTE Band 2 Channel 19175 – 5MHz – QPSK										
1907.50	76.68	81	1.8	H	2.95	0.32	10.40	13.03	33	-19.97
1907.50	84.61	120	2.2	V	11.65	0.32	10.40	21.73	33	-11.27
LTE Band 2 Channel 18625 – 5MHz – 16QAM										
1852.50	78.85	8	1.1	H	4.88	0.31	10.40	14.97	33	-18.03
1852.50	84.08	247	1.7	V	10.80	0.31	10.40	20.89	33	-12.11
LTE Band 2 Channel 18900 – 5MHz – 16QAM										
1880.00	79.24	165	2.0	H	5.39	0.31	10.40	15.48	33	-17.52
1880.00	84.60	105	1.5	V	11.48	0.31	10.40	21.57	33	-11.43
LTE Band 2 Channel 19175 – 5MHz – 16QAM										
1907.50	78.99	114	2.3	H	5.26	0.32	10.40	15.34	33	-17.66
1907.50	84.16	246	2.1	V	11.20	0.32	10.40	21.28	33	-11.72
LTE Band 2 Channel 18650 – 10MHz – QPSK										
1855.00	79.28	60	2.5	H	5.31	0.31	10.40	15.40	33	-17.60
1855.00	84.70	154	1.9	V	11.42	0.31	10.40	21.51	33	-11.49
LTE Band 2 Channel 18900 – 10MHz – QPSK										
1880.00	76.48	225	1.4	H	2.63	0.31	10.40	12.72	33	-20.28
1880.00	84.87	322	1.2	V	11.75	0.31	10.40	21.84	33	-11.16
LTE Band 2 Channel 19150 – 10MHz – QPSK										
1905.00	78.83	167	2.4	H	5.10	0.32	10.40	15.18	33	-17.82
1905.00	84.88	26	1.3	V	11.92	0.32	10.40	22.00	33	-11.00
LTE Band 2 Channel 18650 – 10MHz – 16QAM										
1855.00	79.53	187	2.0	H	5.56	0.31	10.40	15.65	33	-17.35
1855.00	84.53	88	1.1	V	11.25	0.31	10.40	21.34	33	-11.66
LTE Band 2 Channel 18900 – 10MHz – 16QAM										
1880.00	78.48	257	2.0	H	4.63	0.31	10.40	14.72	33	-18.28
1880.00	84.47	250	1.5	V	11.35	0.31	10.40	21.44	33	-11.56
LTE Band 2 Channel 19150 – 10MHz – 16QAM										
1905.00	76.65	203	1.6	H	2.92	0.32	10.40	13.00	33	-20.00
1905.00	84.26	263	1.9	V	11.30	0.32	10.40	21.38	33	-11.62
LTE Band 2 Channel 18675 – 15MHz – QPSK										
1857.50	77.35	190	2.4	H	3.38	0.31	10.40	13.47	33	-19.53
1857.50	84.02	183	2.0	V	10.74	0.31	10.40	20.83	33	-12.17
LTE Band 2 Channel 18900 – 15MHz – QPSK										
1880.00	78.38	318	2.3	H	4.53	0.31	10.40	14.62	33	-18.38
1880.00	84.68	204	2.2	V	11.56	0.31	10.40	21.65	33	-11.35
LTE Band 2 Channel 19125 – 15MHz – QPSK										
1902.50	78.95	91	1.0	H	5.22	0.32	10.40	15.30	33	-17.70
1902.50	84.85	237	2.4	V	11.89	0.32	10.40	21.97	33	-11.03
LTE Band 2 Channel 18675 – 15MHz – 16QAM										
1857.50	76.90	321	1.1	H	2.93	0.31	10.40	13.02	33	-19.98
1857.50	84.71	159	1.8	V	11.43	0.31	10.40	21.52	33	-11.48
LTE Band 2 Channel 18900 – 15MHz – 16QAM										
1880.00	78.12	291	1.7	H	4.27	0.31	10.40	14.36	33	-18.64
1880.00	84.92	218	2.4	V	11.80	0.31	10.40	21.89	33	-11.11

LTE Band 2 Channel 19125 – 15MHz – 16QAM										
1902.50	76.53	123	1.7	H	2.80	0.32	10.40	12.88	33	-20.12
1902.50	84.47	134	2.5	V	11.51	0.32	10.40	21.59	33	-11.41
LTE Band 2 Channel 18700 – 20MHz – QPSK										
1860.00	78.80	46	2.0	H	4.83	0.31	10.40	14.92	33	-18.08
1860.00	84.66	128	1.6	V	11.38	0.31	10.40	21.47	33	-11.53
LTE Band 2 Channel 18900 – 20MHz – QPSK										
1880.00	79.99	188	1.4	H	6.14	0.31	10.40	16.23	33	-16.77
1880.00	84.29	16	1.6	V	11.17	0.31	10.40	21.26	33	-11.74
LTE Band 2 Channel 19100 – 20MHz – QPSK										
1900.00	77.19	127	1.7	H	3.46	0.32	10.40	13.54	33	-19.46
1900.00	84.48	312	2.4	V	11.52	0.32	10.40	21.60	33	-11.40
LTE Band 2 Channel 18670 – 20MHz – 16QAM										
1860.00	76.81	46	1.2	H	2.84	0.31	10.40	12.93	33	-20.07
1860.00	84.46	63	1.7	V	11.18	0.31	10.40	21.27	33	-11.73
LTE Band 2 Channel 18900 – 20MHz – 16QAM										
1880.00	79.62	339	2.2	H	5.77	0.31	10.40	15.86	33	-17.14
1880.00	84.25	15	1.3	V	11.13	0.31	10.40	21.22	33	-11.78
LTE Band 2 Channel 19100 – 20MHz – 16QAM										
1900.00	77.65	82	1.4	H	3.92	0.32	10.40	14.00	33	-19.00
1900.00	84.39	282	2.3	V	11.43	0.32	10.40	21.51	33	-11.49

## LTE Band 7

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Part 27	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
LTE Band 7 Channel 20775 – 5MHz – QPSK										
2502.50	77.05	270	1.4	H	3.05	0.43	10.60	13.22	33	-16.78
2502.50	81.60	273	1.4	V	11.32	0.43	10.60	21.49	33	-8.51
LTE Band 7 Channel 21100 – 5MHz – QPSK										
2535.00	77.12	216	2.3	H	3.12	0.43	10.60	13.29	33	-16.71
2535.00	81.13	309	1.1	V	10.85	0.43	10.60	21.02	33	-8.98
LTE Band 7 Channel 21425 – 5MHz – QPSK										
2567.50	77.50	142	2.2	H	3.39	0.43	10.60	13.56	33	-16.44
2567.50	81.41	162	2.1	V	11.22	0.43	10.60	21.39	33	-8.61
LTE Band 7 Channel 20775 – 5MHz – 16QAM										
2502.50	76.29	110	1.8	H	2.29	0.31	10.40	12.38	33	-17.62
2502.50	81.55	353	1.6	V	11.27	0.31	10.40	21.36	33	-8.64
LTE Band 7 Channel 21100 – 5MHz – 16QAM										
2535.00	76.61	26	1.6	H	2.61	0.31	10.40	12.70	33	-17.30
2535.00	81.64	72	2.4	V	11.36	0.31	10.40	21.45	33	-8.55
LTE Band 7 Channel 21425 – 5MHz – 16QAM										
2567.50	77.57	280	1.3	H	3.46	0.32	10.40	13.54	33	-16.46
2567.50	81.46	296	2.4	V	11.27	0.32	10.40	21.35	33	-8.65
LTE Band 7 Channel 20800 – 10MHz – QPSK										
2505.00	76.40	116	1.3	H	2.40	0.31	10.40	12.49	33	-17.51
2505.00	81.54	303	1.3	V	11.26	0.31	10.40	21.35	33	-8.65
LTE Band 7 Channel 21100 – 10MHz – QPSK										
2535.00	76.71	118	1.6	H	2.71	0.31	10.40	12.80	33	-17.20
2535.00	81.68	107	2.3	V	11.40	0.31	10.40	21.49	33	-8.51
LTE Band 7 Channel 21400 – 10MHz – QPSK										
2565.00	79.11	73	1.3	H	5.00	0.32	10.40	15.08	33	-14.92
2565.00	81.14	54	2.3	V	10.95	0.32	10.40	21.03	33	-8.97
LTE Band 7 Channel 20800 – 10MHz – 16QAM										
2505.00	78.80	289	1.7	H	4.80	0.31	10.40	14.89	33	-15.11
2505.00	81.02	192	1.5	V	10.74	0.31	10.40	20.83	33	-9.17
LTE Band 7 Channel 21100 – 10MHz – 16QAM										
2535.00	76.89	92	1.2	H	2.89	0.31	10.40	12.98	33	-17.02
2535.00	81.02	35	1.2	V	10.74	0.31	10.40	20.83	33	-9.17
LTE Band 7 Channel 21400 – 10MHz – 16QAM										
2565.00	78.89	86	1.3	H	4.78	0.32	10.40	14.86	33	-15.14
2565.00	81.36	168	1.7	V	11.17	0.32	10.40	21.25	33	-8.75
LTE Band 7 Channel 20825 – 15MHz – QPSK										
2507.50	77.48	201	1.4	H	3.48	0.31	10.40	13.57	33	-16.43
2507.50	81.11	141	2.3	V	10.83	0.31	10.40	20.92	33	-9.08
LTE Band 7 Channel 21100 – 15MHz – QPSK										
2535.00	78.50	128	2.0	H	4.50	0.31	10.40	14.59	33	-15.41
2535.00	81.83	5	2.3	V	11.55	0.31	10.40	21.64	33	-8.36

LTE Band 7 Channel 21375 – 15MHz – QPSK										
2562.50	77.09	229	2.5	H	2.98	0.32	10.40	13.06	33	-16.94
2562.50	81.18	148	2.3	V	10.99	0.32	10.40	21.07	33	-8.93
LTE Band 7 Channel 20825 – 15MHz – 16QAM										
2507.50	78.88	209	1.2	H	4.88	0.31	10.40	14.97	33	-15.03
2507.50	81.04	56	1.9	V	10.76	0.31	10.40	20.85	33	-9.15
LTE Band 7 Channel 21100 – 15MHz – 16QAM										
2535.00	78.68	196	1.7	H	4.68	0.31	10.40	14.77	33	-15.23
2535.00	81.43	355	1.6	V	11.15	0.31	10.40	21.24	33	-8.76
LTE Band 7 Channel 21375 – 15MHz – 16QAM										
2562.50	76.54	277	1.9	H	2.43	0.32	10.40	12.51	33	-17.49
2562.50	81.42	177	1.6	V	11.23	0.32	10.40	21.31	33	-8.69
LTE Band 7 Channel 20850 – 20MHz – QPSK										
2510.00	79.83	190	2.0	H	5.83	0.31	10.40	15.92	33	-14.08
2510.00	81.90	39	1.5	V	11.62	0.31	10.40	21.71	33	-8.29
LTE Band 7 Channel 21100 – 20MHz – QPSK										
2535.00	79.67	142	1.2	H	5.67	0.31	10.40	15.76	33	-14.24
2535.00	81.37	196	1.2	V	11.09	0.31	10.40	21.18	33	-8.82
LTE Band 7 Channel 21350 – 20MHz – QPSK										
2560.00	78.16	67	2.4	H	4.05	0.32	10.40	14.13	33	-15.87
2560.00	81.93	331	2.2	V	11.74	0.32	10.40	21.82	33	-8.18
LTE Band 7 Channel 20850 – 20MHz – 16QAM										
2502.50	78.98	239	1.1	H	4.98	0.43	10.60	15.15	33	-14.85
2502.50	81.08	297	2.0	V	10.80	0.43	10.60	20.97	33	-9.03
LTE Band 7 Channel 21100 – 20MHz – 16QAM										
2535.00	76.40	40	1.8	H	2.40	0.43	10.60	12.57	33	-17.43
2535.00	81.76	229	1.3	V	11.48	0.43	10.60	21.65	33	-8.35
LTE Band 7 Channel 21350 – 20MHz – 16QAM										
2567.50	77.72	82	2.0	H	3.61	0.43	10.60	13.78	33	-16.22
2567.50	81.41	270	1.4	V	11.22	0.43	10.60	21.39	33	-8.61

## 9 Peak-to-Average Ratio

Test Requirement:	24.232 (d), 27.50(d)
Test Method:	N/A
Test Mode:	TX transmitting

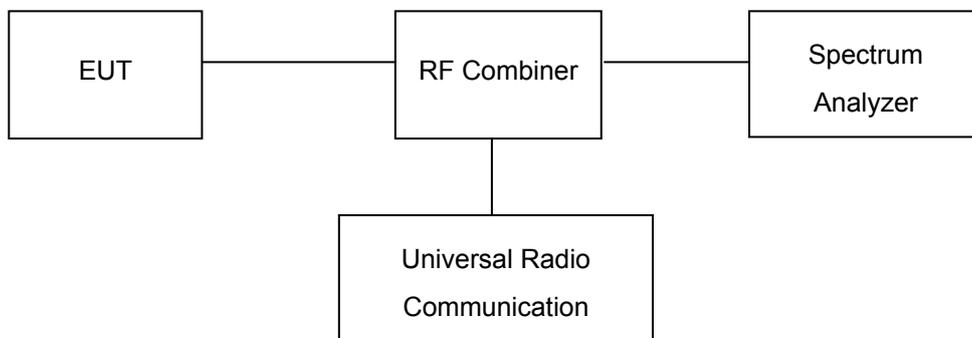
### 9.1 EUT Operation

Operating Environment :

Temperature:	22.5 °C
Humidity:	52.3% RH
Atmospheric Pressure:	101.2kPa

### 9.2 Test Procedure

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. Set EUT to transmit at maximum output power.
3. When the duty cycle is less than 98%, then signal gating will be implemented on the spectrum analyzer by triggering from the system simulator.
4. Set the CCDF (Complementary Cumulative Distribution Function) option of the spectrum analyzer. Record the maximum PAPR level associated with a probability of 0.1%.



### 9.3 Test Result

PASS

#### LTE Band

Please refer to the Appendix Band 2/7 LTE Peak to Average Ratio.

## 10 BANDWIDTH

Test Requirement:	FCC Part 2.1049, 22.917, 22.905, 24.238, 27.53(a)
Test Method:	TIA/EIA-603-D:2010 KDB971168 D01 v02r02
Test Mode:	TX transmitting

### 10.1 EUT Operation

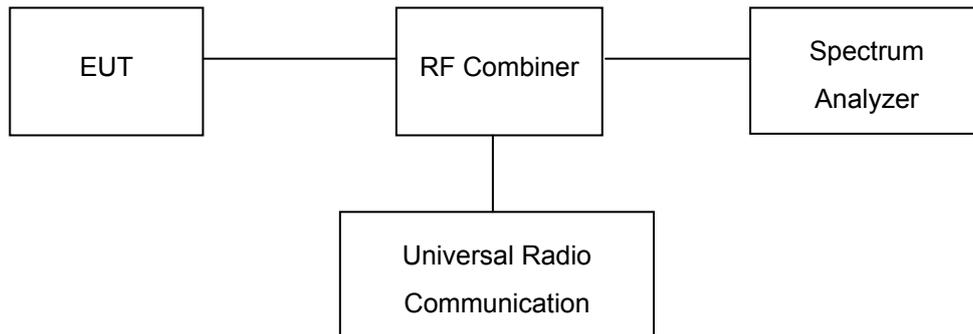
Operating Environment :

Temperature:	22.5 °C
Humidity:	52.3% RH
Atmospheric Pressure:	101.2kPa

### 10.2 Test Procedure

The RF output of the transmitter was connected to the wireless test set and the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set in the range of 1 to 5 % of the anticipated OBW and the 26 dB & 99%bandwidth was recorded.



### 10.3 Test Result

#### LTE Band 2 (Part 24E):

BW(MHz)	Channel	Frequency (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
1.4	18607	1850.7	QPSK	1.09	1.24
			16QAM	1.09	1.25
1.4	18900	1880	QPSK	1.09	1.24
			16QAM	1.09	1.24
1.4	19193	1909.3	QPSK	1.09	1.25
			16QAM	1.09	1.25
3	18615	1851.5	QPSK	2.72	2.97
			16QAM	2.72	2.96
3	18900	1880	QPSK	2.73	2.96
			16QAM	2.72	2.96
3	19185	1908.5	QPSK	2.73	2.97
			16QAM	2.72	2.97
5	18625	1852.5	QPSK	4.5	4.87
			16QAM	4.5	4.85
5	18900	1880	QPSK	4.5	4.85
			16QAM	4.49	4.86
5	19175	1907.5	QPSK	4.5	4.84
			16QAM	4.49	4.83
10	18650	1855	QPSK	8.93	9.42
			16QAM	8.92	9.43
10	18900	1880	QPSK	8.92	9.36
			16QAM	8.92	9.35
10	19150	1905	QPSK	8.92	9.42
			16QAM	8.91	9.38
15	18675	1857.5	QPSK	13.47	14.33
			16QAM	13.46	14.27
15	18900	1880	QPSK	13.46	14.24
			16QAM	13.44	14.25

15	19125	1902.5	QPSK	13.45	14.51
			16QAM	13.44	14.28
20	18700	1860	QPSK	17.89	18.79
			16QAM	17.89	18.78
20	18900	1880	QPSK	17.89	18.76
			16QAM	17.88	18.76
20	19100	1900	QPSK	17.85	18.82
			16QAM	17.86	18.78

**LTE Band 7 (Part 27):**

BW(MHz)	Channel	Frequency (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
5	20775	2502.5	QPSK	4.5	4.84
			16QAM	4.5	4.83
5	21100	2535	QPSK	4.5	4.85
			16QAM	4.49	4.84
5	21425	2567.5	QPSK	4.5	4.83
			16QAM	4.49	4.82
10	20850	2510	QPSK	8.92	9.36
			16QAM	8.92	9.39
10	21100	2535	QPSK	8.92	9.37
			16QAM	8.91	9.37
10	21400	2565	QPSK	8.92	9.34
			16QAM	8.92	9.38
15	20800	2505	QPSK	13.46	14.25
			16QAM	13.46	14.25
15	21100	2535	QPSK	13.47	14.24
			16QAM	13.46	14.25
15	21375	2562.5	QPSK	13.44	14.25
			16QAM	13.45	14.25
20	20825	2507.5	QPSK	17.89	18.74

			16QAM	17.89	18.75
20	21100	2535	QPSK	17.89	18.75
			16QAM	17.89	18.76
20	21350	2560	QPSK	17.87	18.77
			16QAM	17.87	18.77

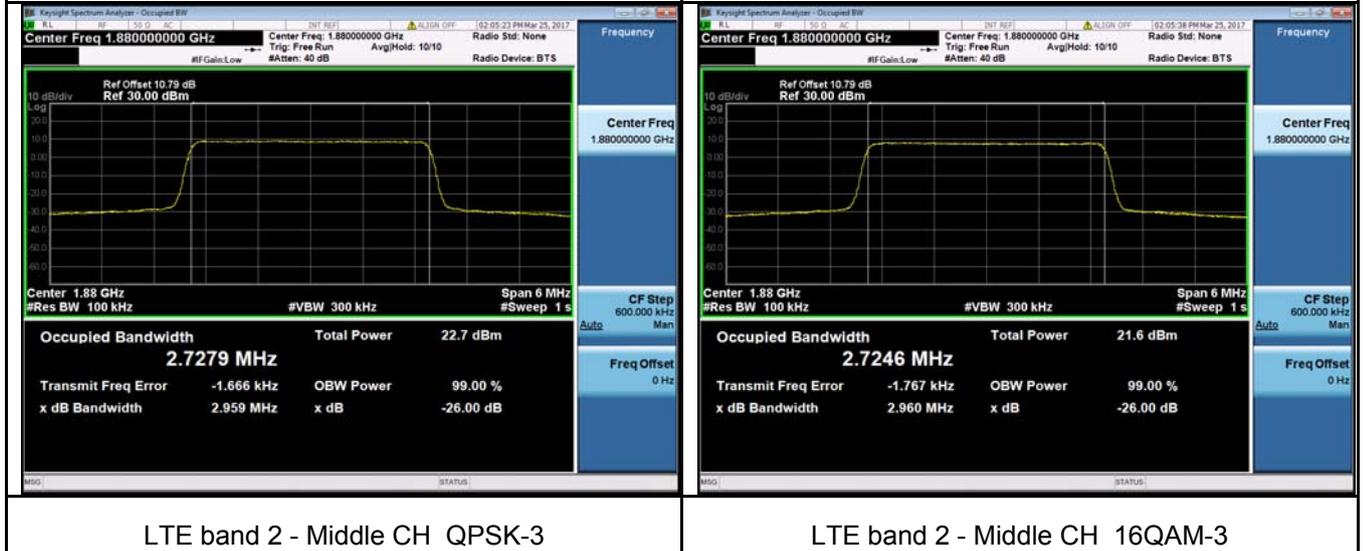
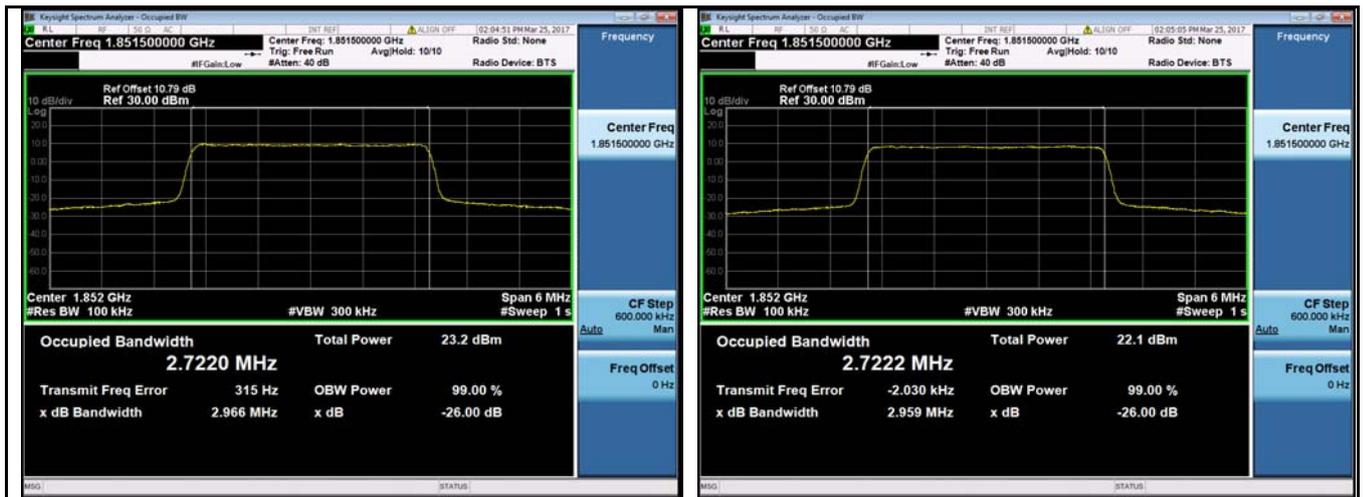
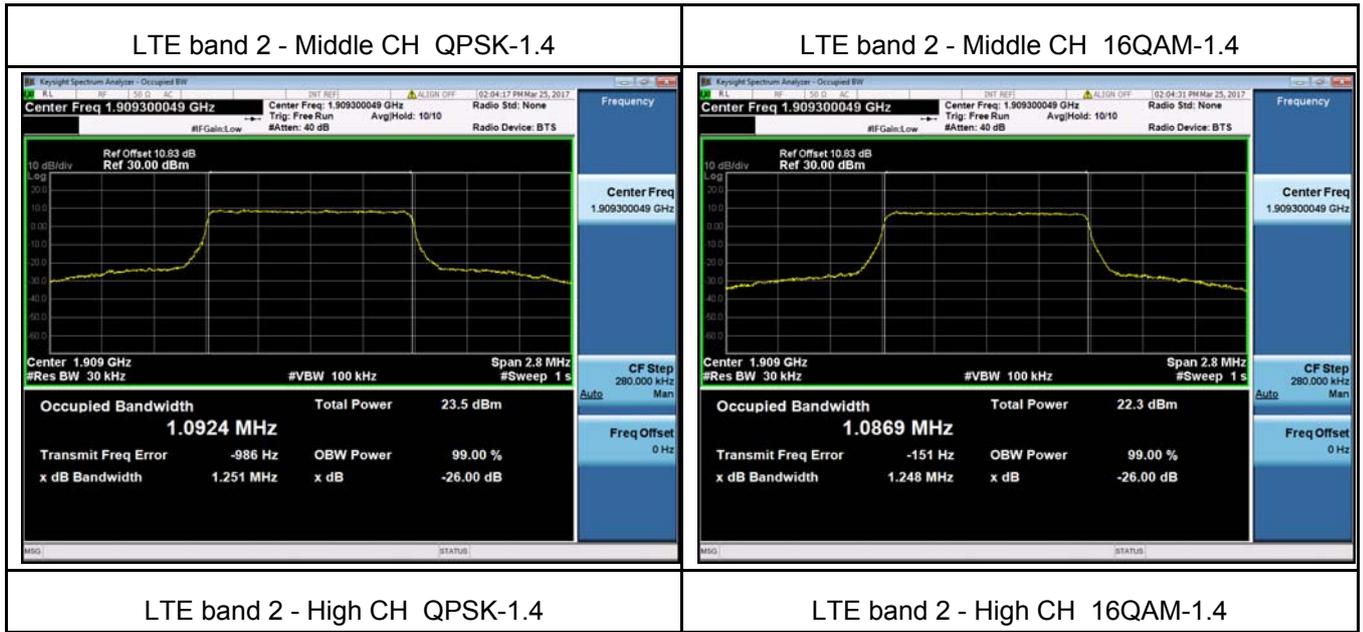
**Test Plots  
LTE Band 2 (Part 24E)**



LTE band 2 - Low CH QPSK-1.4

LTE band 2 - Low CH 16QAM-1.4







LTE band 2 - High CH QPSK-3



LTE band 2 - High CH 16QAM-3



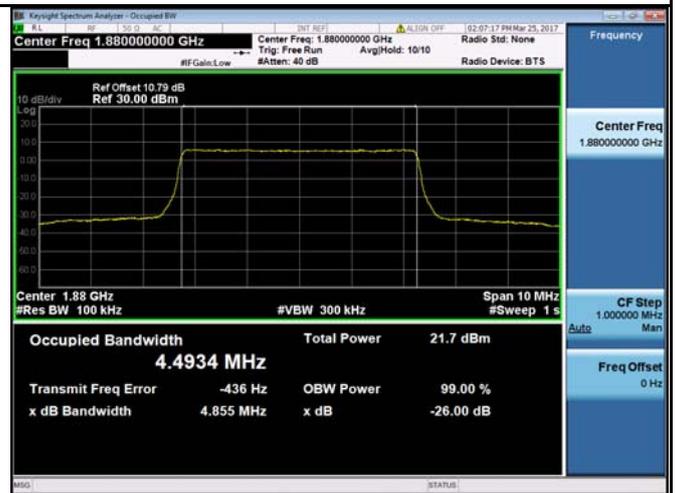
LTE band 2 - Low CH QPSK-5



LTE band 2 - Low CH 16QAM-5



LTE band 2 - Middle CH QPSK-5



LTE band 2 - Middle CH 16QAM-5





LTE band 2 - High CH QPSK-10



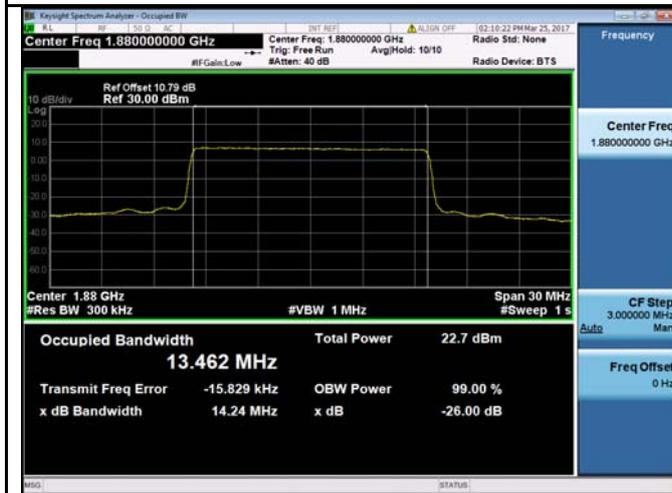
LTE band 2 - High CH 16QAM-10



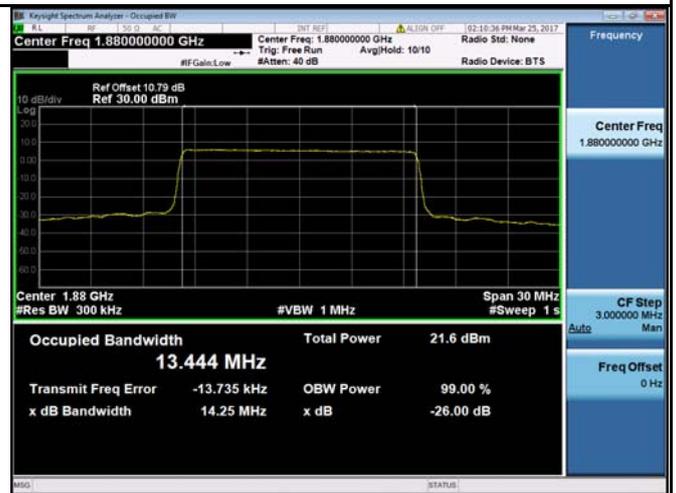
LTE band 2 - Low CH QPSK-15



LTE band 2 - Low CH 16QAM-15



LTE band 2 - Middle CH QPSK-15



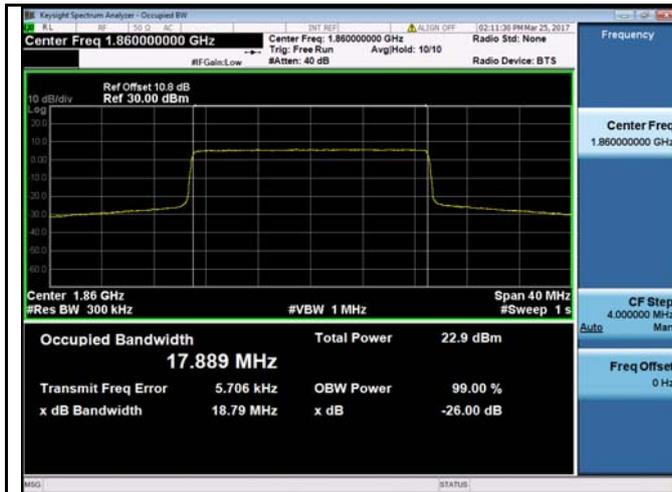
LTE band 2 - Middle CH 16QAM-15



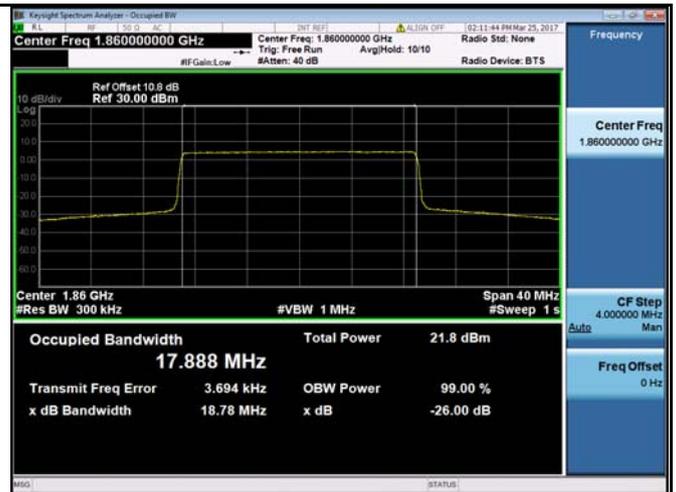
LTE band 2 - High CH QPSK-15



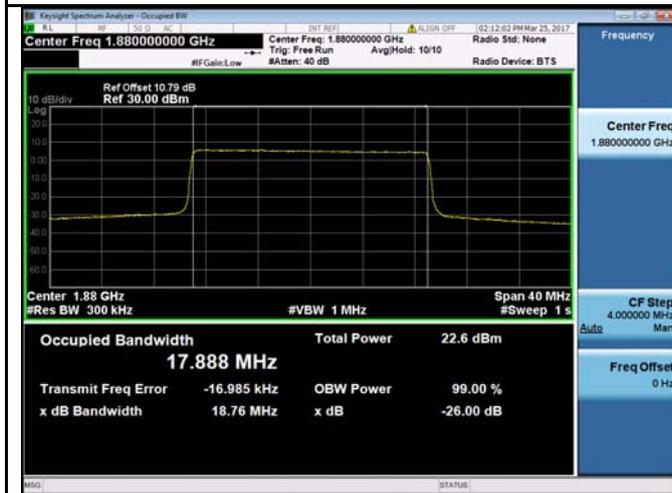
LTE band 2 - High CH 16QAM-15



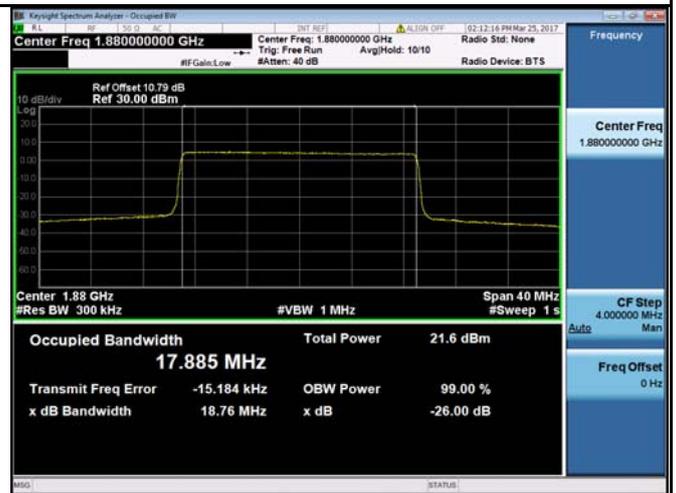
LTE band 2 - Low CH QPSK-20



LTE band 2 - Low CH 16QAM-20



LTE band 2 - Middle CH QPSK-20



LTE band 2 - Middle CH 16QAM-20



LTE band 2 - High CH QPSK-20



LTE band 2 - High CH 16QAM-20

LTE Band 7 (Part 27)



LTE band 7 - Low CH QPSK-5



LTE band 7 - Low CH 16QAM-5



LTE band 7 - Middle CH QPSK-5



LTE band 7 - Middle CH 16QAM-5



LTE band 7 - High CH QPSK-5



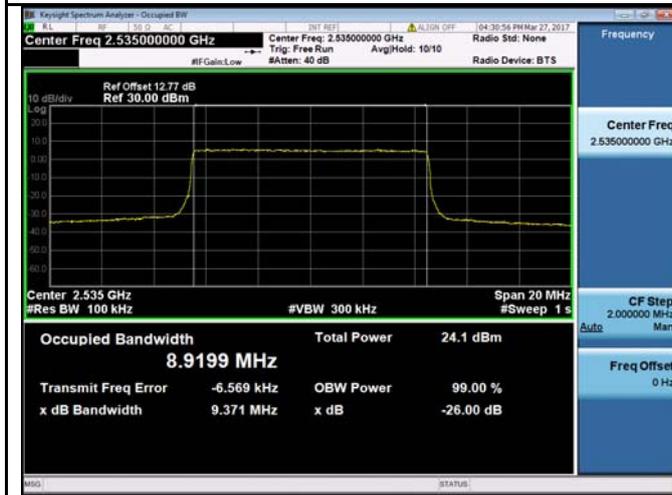
LTE band 7 - High CH 16QAM-5



LTE band 7 - Low CH QPSK-10



LTE band 7 - Low CH 16QAM-10



LTE band 7 - Middle CH QPSK-10



LTE band 7 - Middle CH 16QAM-10



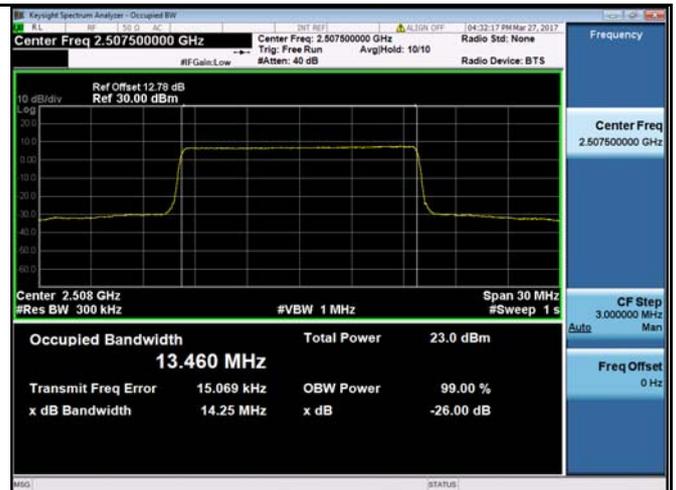
LTE band 7 - High CH QPSK-10



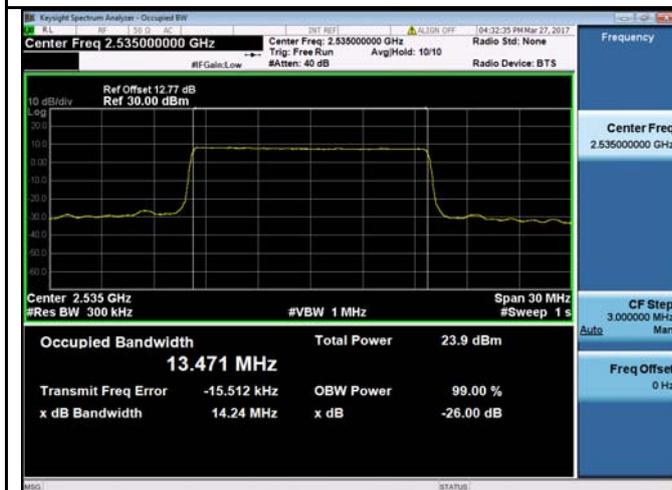
LTE band 7 - High CH 16QAM-10



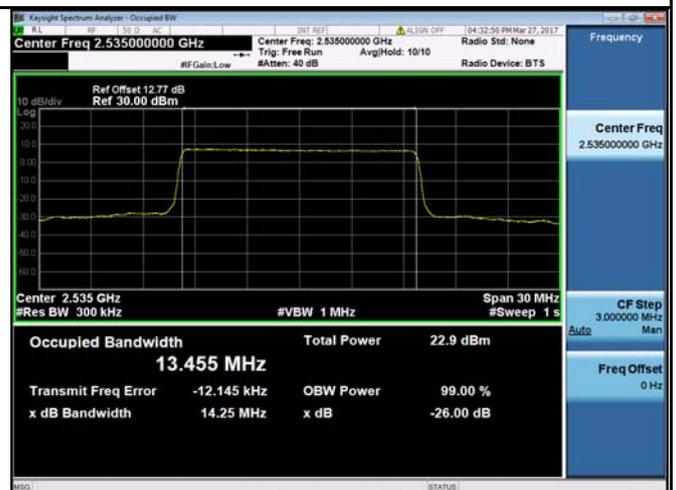
LTE band 7 - Low CH QPSK-15



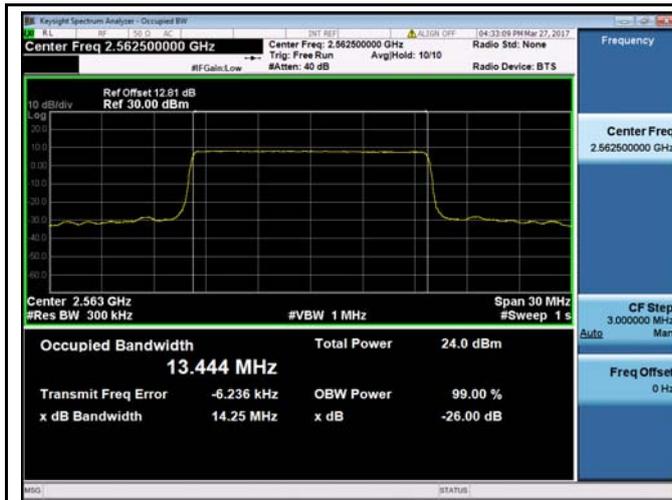
LTE band 7 - Low CH 16QAM-15



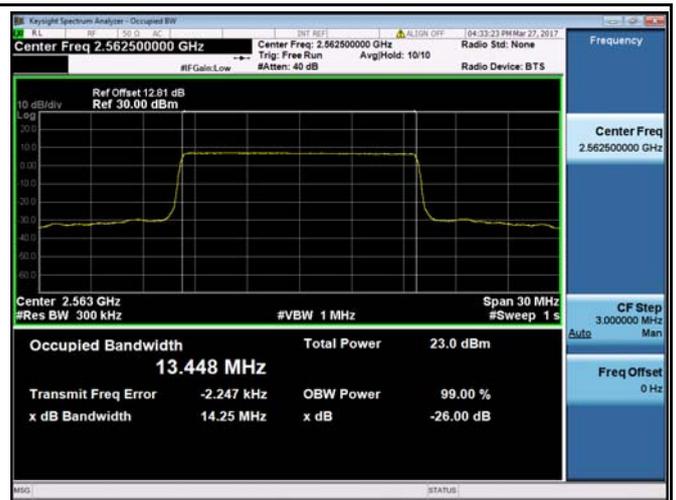
LTE band 7 - Middle CH QPSK-15



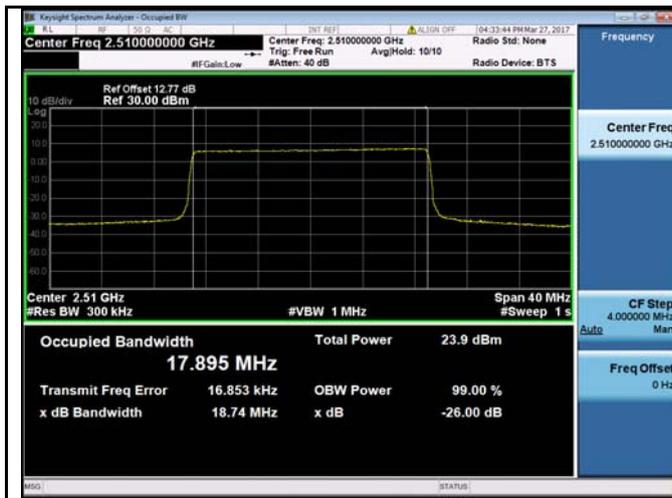
LTE band 7 - Middle CH 16QAM-15



LTE band 7 - High CH QPSK-15



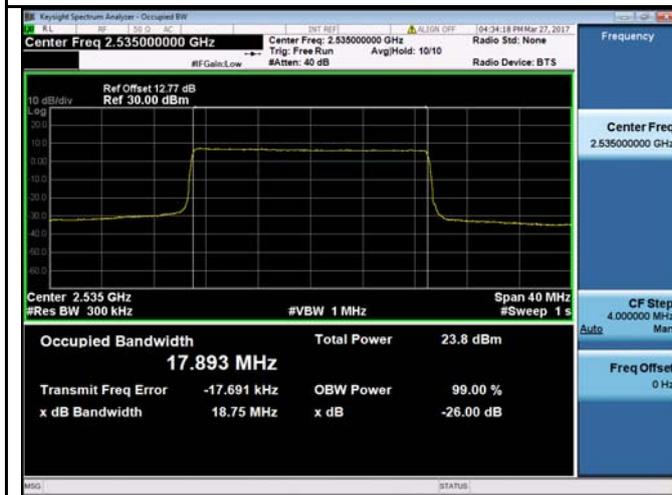
LTE band 7 - High CH 16QAM-15



LTE band 7 - Low CH QPSK-20



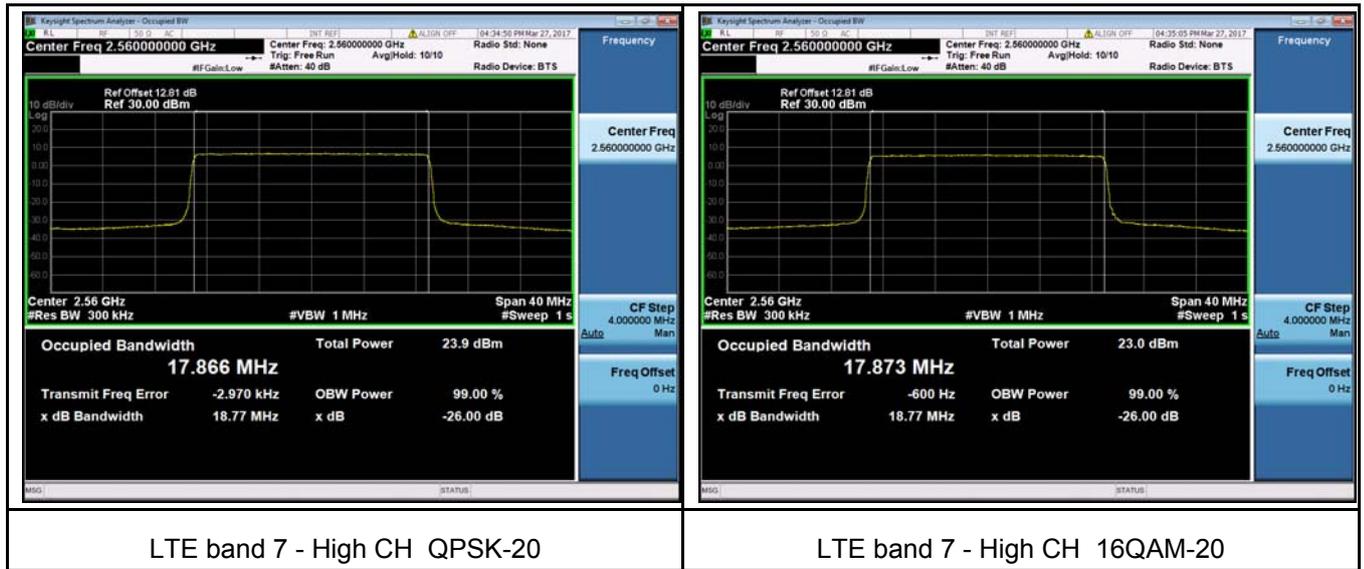
LTE band 7 - Low CH 16QAM-20



LTE band 7 - Middle CH QPSK-20



LTE band 7 - Middle CH 16QAM-20



## 11 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Test Requirement:	FCC Part 2.1051, 22.917(a), 24.238(a), 27.53(h), 27.53(m)(4)
Test Method:	TIA/EIA-603-D:2010 KDB971168 D01 v02r02
Test Mode:	TX transmitting

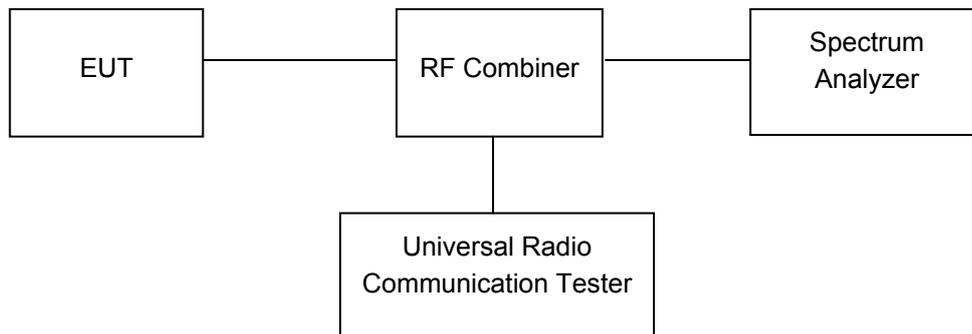
### 11.1 EUT Operation

Operating Environment :

Temperature:	23.5 °C
Humidity:	52.1 % RH
Atmospheric Pressure:	101.3kPa

### 11.2 Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonics.



### 11.3 Test Result

PASS

#### LTE Band

Please refer to the Appendix Band 2/7 LTE Transmitter Spurious Emissions.

## 12 SPURIOUS RADIATED EMISSIONS

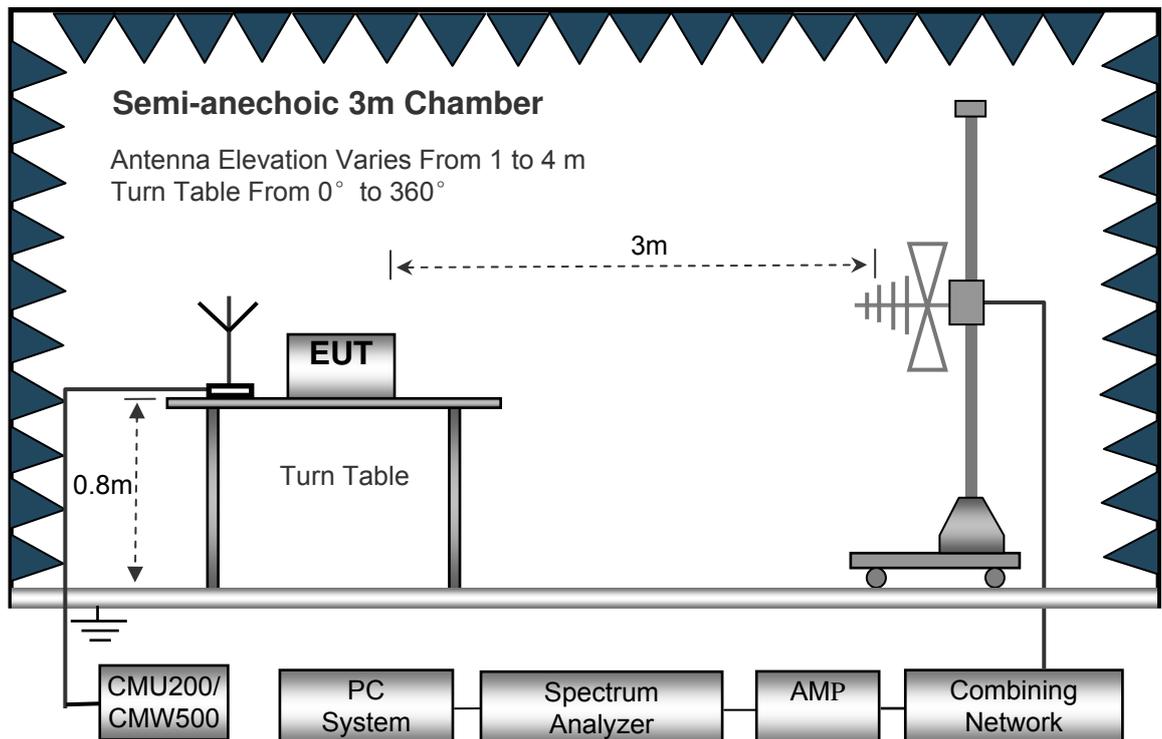
Test Requirement:	FCC Part 2.1053, 22.917, 24.238, 27.53(h), 27.53(m)(4)
Test Method:	TIA/EIA-603-D:2010 KDB971168 D01 v02r02
Test Mode:	TX transmitting

### 12.1 EUT Operation

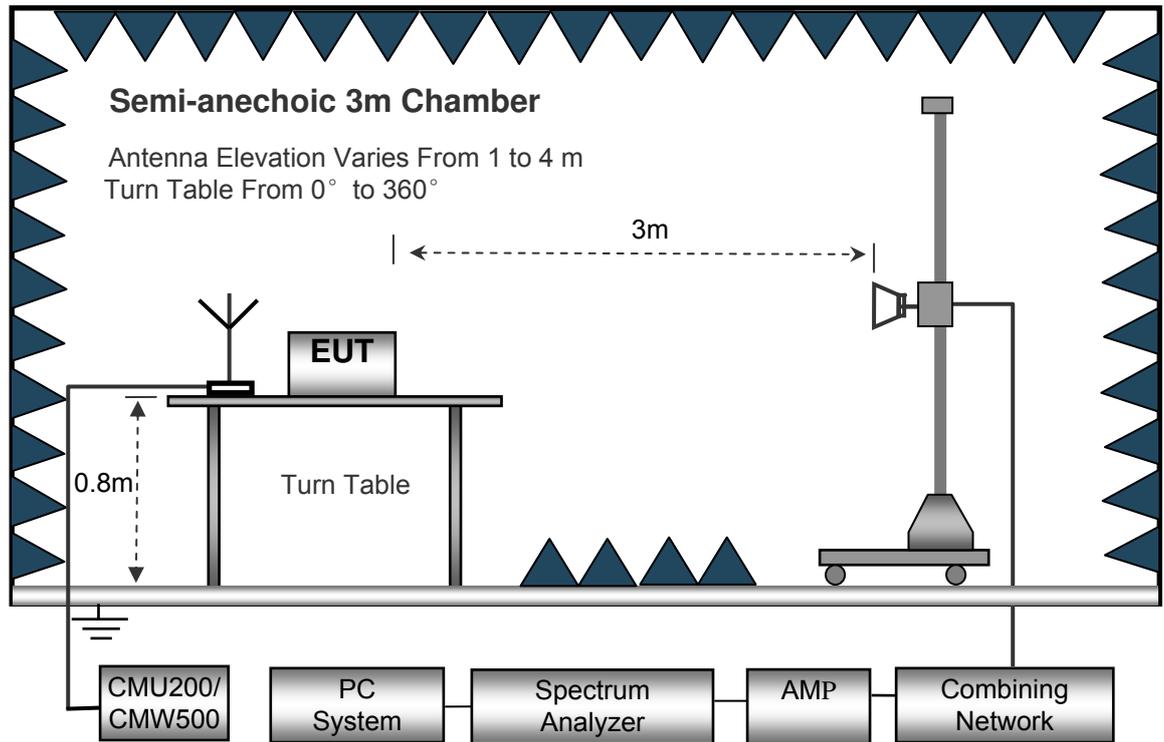
Operating Environment :	
Temperature:	23.5 °C
Humidity:	52.1 % RH
Atmospheric Pressure:	101.2kPa

### 12.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site. The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



### 12.3 Spectrum Analyzer Setup

30MHz ~ 1GHz

Sweep Speed ..... Auto  
 Detector ..... PK  
 Resolution Bandwidth..... 100kHz  
 Video Bandwidth..... 300kHz

Above 1GHz

Sweep Speed ..... Auto  
 Detector ..... PK  
 Resolution Bandwidth..... 1MHz  
 Video Bandwidth..... 3MHz  
 Detector ..... Ave.  
 Resolution Bandwidth..... 1MHz  
 Video Bandwidth..... 10Hz

## 12.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. The spectrum was investigated from 30MHz up to the tenth harmonic of the highest fundamental frequency.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the Z position. So the data shown was the Z position only.
7. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.  
Spurious emissions in dB =  $10 \lg(\text{TXpwr in Watts}/0.001)$  – the absolute level  
Spurious attenuation limit in dB =  $43 + 10 \text{Log}_{10}(\text{power out in Watts})$
8. Repeat above procedures until the measurements for all frequencies are completed.

## 12.5 Summary of Test Results

Remark: Test performed from 30MHz to 10<sup>th</sup> harmonics with low/middle/high channels, only the worst data were recorded.

### LTE Band 2

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Result	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
LTE BAND 2 Channel 18607										
216.37	46.97	177	1.7	H	-63.54	0.15	0.00	-63.69	-13.00	-50.69
216.37	37.84	296	1.1	V	-69.75	0.15	0.00	-69.90	-13.00	-56.90
3701.40	65.95	58	1.7	H	-45.59	2.37	12.50	-35.46	-13.00	-22.46
3701.40	59.98	144	1.5	V	-49.83	2.37	12.50	-39.70	-13.00	-26.70
5552.10	53.58	172	1.1	H	-56.03	2.86	12.90	-45.99	-13.00	-32.99
5552.10	44.73	360	1.5	V	-64.15	2.86	12.90	-54.11	-13.00	-41.11
LTE BAND 2 Channel 18900										
216.37	47.10	105	1.9	H	-63.41	0.15	0.00	-63.56	-13.00	-50.56
216.37	38.55	344	1.8	V	-69.04	0.15	0.00	-69.19	-13.00	-56.19
3760.00	58.53	182	1.3	H	-53.01	2.37	12.50	-42.88	-13.00	-29.88
3760.00	53.43	300	1.2	V	-56.38	2.37	12.50	-46.25	-13.00	-33.25
5640.00	46.10	7	2.0	H	-63.51	2.86	12.90	-53.47	-13.00	-40.47
5640.00	37.40	33	1.6	V	-71.48	2.86	12.90	-61.44	-13.00	-48.44
LTE BAND 2 Channel 19193										
216.37	46.55	115	1.4	H	-63.96	0.15	0.00	-64.11	-13.00	-51.11
216.37	37.74	247	1.8	V	-69.85	0.15	0.00	-70.00	-13.00	-57.00
3818.60	51.58	141	1.8	H	-59.27	2.37	12.60	-49.04	-13.00	-36.04
3818.60	47.15	28	2.0	V	-62.16	2.37	12.60	-51.93	-13.00	-38.93
5727.90	38.80	343	1.9	H	-70.55	2.86	12.90	-60.51	-13.00	-47.51
5727.90	29.87	87	1.6	V	-78.63	2.86	12.90	-68.59	-13.00	-55.59

## LTE Band 7

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Result	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
LTE BAND 7 Channel 20775										
216.37	40.42	262	2.0	H	-70.09	0.15	0.00	-70.24	-25.00	-57.24
216.37	29.70	122	1.1	V	-77.89	0.15	0.00	-78.04	-25.00	-65.04
5005.00	65.95	160	1.2	H	-43.29	2.79	12.70	-33.38	-25.00	-20.38
5005.00	59.98	165	2.1	V	-48.79	2.79	12.70	-38.88	-25.00	-25.88
7507.50	53.58	194	1.1	H	-52.96	3.12	11.50	-44.58	-25.00	-31.58
7507.50	44.73	154	1.6	V	-60.70	3.12	11.50	-52.32	-25.00	-39.32
LTE BAND 7 Channel 21100										
216.37	40.31	100	1.7	H	-70.20	0.15	0.00	-70.35	-25.00	-57.35
216.37	30.36	168	1.2	V	-77.23	0.15	0.00	-77.38	-25.00	-64.38
5070.00	58.54	34	2.1	H	-50.70	2.37	12.50	-40.57	-25.00	-27.57
5070.00	53.53	4	2.0	V	-55.24	2.37	12.50	-45.11	-25.00	-32.11
7605.00	46.17	171	1.6	H	-60.37	3.12	11.50	-51.99	-25.00	-38.99
7605.00	37.55	148	1.1	V	-67.88	3.12	11.50	-59.50	-25.00	-46.50
LTE BAND 7 Channel 21425										
216.37	40.62	249	1.5	H	-69.89	0.15	0.00	-70.04	-25.00	-57.04
216.37	31.13	344	1.9	V	-76.46	0.15	0.00	-76.61	-25.00	-63.61
5135.00	50.59	88	1.1	H	-58.82	2.37	12.50	-48.69	-25.00	-35.69
5135.00	46.72	232	2.1	V	-62.05	2.37	12.50	-51.92	-25.00	-38.92
7702.50	38.26	257	1.1	H	-66.97	3.12	11.50	-58.59	-25.00	-45.59
7702.50	29.94	272	1.6	V	-74.95	3.12	11.50	-66.57	-25.00	-53.57

Note: 1) Absolute Level = SG Level - Cable loss + Antenna Gain

2) Margin = Absolute Level - Limit

## 13 Band Edge Measurement

Test Requirement:	FCC Part 2.1051, 22.917(a), 24.238(a), 27.53(h), 27.53(m)(4)
Test Method:	TIA/EIA-603-D:2010 KDB971168 D01 v02r02
Test Mode:	TX transmitting

### 13.1 EUT Operation

Operating Environment :

Temperature:	23.5 °C
Humidity:	52.3 % RH
Atmospheric Pressure:	101.3kPa

### 13.2 Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

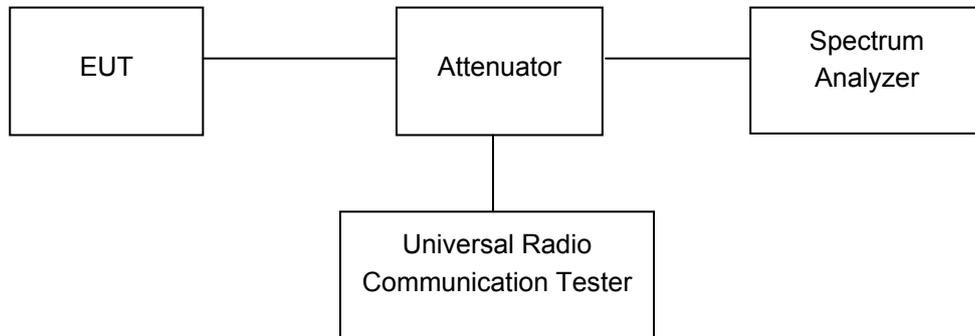
According to FCC Part 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the TX transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

According to FCC Part 24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the TX transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

According to FCC Part 27.53(h), Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10}(P)$  dB.

According to FCC Part 27.53(m)(4), 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 than  $43 + 10 \log(P)$  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.

The center of the spectrum analyzer was set to block edge frequency



### 13.3 Test Result

PASS

#### LTE Band

Please refer to the Appendix Band 2/7 LTE Band Edge.

## 14 FREQUENCY STABILITY

Test Requirement:	FCC Part 2.1055, 22.355, 24.235, 27.5(h),27.54
Test Method:	TIA/EIA-603-D:2010 KDB971168 D01 v02r02
Test Mode:	TX transmitting

### 14.1 EUT Operation

Operating Environment :

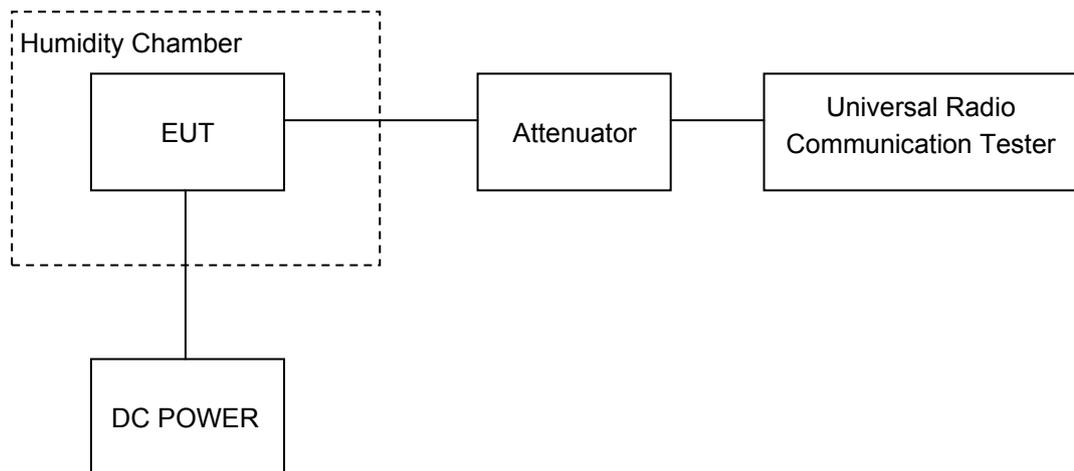
Temperature:	22.9 °C
Humidity:	52.0 % RH
Atmospheric Pressure:	101.3kPa

### 14.2 Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: For hand carried, battery powered equipment; reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



### 14.3 Test Result

LTE Band 2

Test Frequency:1880.0MHz QPSK 1.4MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.8	5	0.0027	2.5
40		6	0.0032	2.5
30		15	0.0080	2.5
20		6	0.0032	2.5
10		11	0.0059	2.5
0		-1	-0.0005	2.5
-10		15	0.0080	2.5
-20		7	0.0037	2.5
-30		13	0.0069	2.5
20		3.3	15	0.0080
20	4.2	11	0.0059	2.5

T Test Frequency:1880.0MHz 16QAM 1.4MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.8	3	0.0016	2.5
40		11	0.0059	2.5
30		3	0.0016	2.5
20		7	0.0037	2.5
10		5	0.0027	2.5
0		8	0.0043	2.5
-10		3	0.0016	2.5
-20		11	0.0059	2.5
-30		14	0.0074	2.5
20		3.3	0	0.0000
20	4.2	0	0.0000	2.5

## LTE Band 2

Test Frequency:1880.0MHz QPSK 3MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.8	1	0.0005	2.5
40		-1	-0.0005	2.5
30		0	0.0000	2.5
20		-4	-0.0021	2.5
10		-1	-0.0005	2.5
0		-10	-0.0053	2.5
-10		-11	-0.0059	2.5
-20		-13	-0.0069	2.5
-30		3	0.0016	2.5
20	3.3	1	0.0005	2.5
20	4.2	-7	-0.0037	2.5

Test Frequency:1880.0MHz 16QAM 3MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.8	10	0.0053	2.5
40		-4	-0.0021	2.5
30		5	0.0027	2.5
20		2	0.0011	2.5
10		4	0.0021	2.5
0		11	0.0059	2.5
-10		10	0.0053	2.5
-20		1	0.0005	2.5
-30		2	0.0011	2.5
20	3.3	9	0.0048	2.5
20	4.2	2	0.0011	2.5

## LTE Band 2

Test Frequency:1880.0MHz QPSK 5MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.8	5	0.0027	2.5
40		9	0.0048	2.5
30		9	0.0048	2.5
20		8	0.0037	2.5
10		10	0.0053	2.5
0		1	0.0005	2.5
-10		-2	-0.0011	2.5
-20		2	0.0011	2.5
-30		14	0.0074	2.5
20	3.3	-1	-0.0005	2.5
20	4.2	1	0.0005	2.5

Test Frequency:1880.0MHz 16QAM 5MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.8	3	0.0016	2.5
40		-4	-0.0021	2.5
30		-1	-0.0005	2.5
20		-3	-0.0021	2.5
10		1	0.0005	2.5
0		-4	-0.0021	2.5
-10		-6	-0.0032	2.5
-20		4	0.0021	2.5
-30		1	0.0005	2.5
20	3.3	-12	-0.0064	2.5
20	4.2	5	0.0027	2.5

## LTE Band 2

Test Frequency:1880.0MHz QPSK 10MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.8	4	0.0021	2.5
40		-6	-0.0032	2.5
30		0	0.0000	2.5
20		4	0.0011	2.5
10		10	0.0053	2.5
0		-4	-0.0021	2.5
-10		5	0.0027	2.5
-20		2	0.0011	2.5
-30		8	0.0043	2.5
20	3.3	-4	-0.0021	2.5
20	4.2	4	0.0021	2.5

Test Frequency:1880.0MHz 16QAM 10MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.8	15	0.0080	2.5
40		9	0.0048	2.5
30		3	0.0016	2.5
20		7	0.0037	2.5
10		-1	-0.0005	2.5
0		-2	-0.0011	2.5
-10		4	0.0021	2.5
-20		10	0.0053	2.5
-30		0	0.0000	2.5
20	3.3	0	0.0000	2.5
20	4.2	6	0.0032	2.5

## LTE Band 2

Test Frequency:1880.0MHz QPSK 15MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.8	9	0.0048	2.5
40		-2	-0.0011	2.5
30		3	0.0016	2.5
20		2	0.0011	2.5
10		-3	-0.0016	2.5
0		10	0.0053	2.5
-10		2	0.0011	2.5
-20		4	0.0021	2.5
-30		5	0.0027	2.5
20	3.3	4	0.0021	2.5
20	4.2	-4	-0.0021	2.5

Test Frequency:1880.0MHz 16QAM 15MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.8	-7	-0.0037	2.5
40		-1	-0.0005	2.5
30		-4	-0.0021	2.5
20		1	0.0005	2.5
10		-3	-0.0016	2.5
0		3	0.0016	2.5
-10		0	0.0000	2.5
-20		-6	-0.0032	2.5
-30		-3	-0.0016	2.5
20	3.3	6	0.0032	2.5
20	4.2	-8	-0.0043	2.5

## LTE Band 2

Test Frequency:1880.0MHz QPSK 20MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.8	0	0.0000	2.5
40		-2	-0.0011	2.5
30		-6	-0.0032	2.5
20		1	0.0005	2.5
10		3	0.0016	2.5
0		-4	-0.0021	2.5
-10		7	0.0037	2.5
-20		-1	-0.0005	2.5
-30		1	0.0005	2.5
20	3.3	2	0.0011	2.5
20	4.2	9	0.0048	2.5

Test Frequency:1880.0MHz 16QAM 20MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.8	7	0.0037	2.5
40		-3	-0.0016	2.5
30		7	0.0037	2.5
20		0	0.0000	2.5
10		5	0.0027	2.5
0		-4	-0.0021	2.5
-10		-3	-0.0016	2.5
-20		8	0.0043	2.5
-30		1	0.0005	2.5
20	3.3	8	0.0043	2.5
20	4.2	5	0.0027	2.5

## LTE Band 7

Test Frequency:2535MHz QPSK 5MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.8	4	0.0016	2.5
40		4	0.0016	2.5
30		12	0.0047	2.5
20		5	0.0020	2.5
10		7	0.0028	2.5
0		10	0.0039	2.5
-10		11	0.0043	2.5
-20		3	0.0012	2.5
-30		13	0.0051	2.5
20	3.3	1	0.0004	2.5
20	4.2	-2	-0.0008	2.5

Test Frequency:2535MHz 16QAM 5MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.8	6	0.0024	2.5
40		4	0.0016	2.5
30		-6	-0.0024	2.5
20		3	0.0012	2.5
10		11	0.0043	2.5
0		-3	-0.0012	2.5
-10		-5	-0.0020	2.5
-20		4	0.0016	2.5
-30		8	0.0032	2.5
20	3.3	-1	-0.0004	2.5
20	4.2	-5	-0.0020	2.5

## LTE Band 7

Test Frequency:2535MHz QPSK 10MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.8	1	0.0004	2.5
40		7	0.0028	2.5
30		10	0.0039	2.5
20		1	0.0004	2.5
10		7	0.0028	2.5
0		7	0.0028	2.5
-10		5	0.0020	2.5
-20		-8	-0.0032	2.5
-30		-4	-0.0016	2.5
20	3.3	7	0.0028	2.5
20	4.2	-4	-0.0016	2.5

Test Frequency:2535MHz 16QAM 10MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.8	4	0.0016	2.5
40		0	0.0000	2.5
30		-5	-0.0020	2.5
20		3	0.0012	2.5
10		11	0.0043	2.5
0		-5	-0.0020	2.5
-10		4	0.0016	2.5
-20		-4	-0.0016	2.5
-30		11	0.0043	2.5
20	3.3	-5	-0.0020	2.5
20	4.2	9	0.0036	2.5

## LTE Band 7

Test Frequency:2535MHz QPSK 15MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.8	4	0.0016	2.5
40		4	0.0016	2.5
30		0	0.0000	2.5
20		3	0.0012	2.5
10		4	0.0016	2.5
0		6	0.0024	2.5
-10		7	0.0028	2.5
-20		1	0.0004	2.5
-30		6	0.0024	2.5
20	3.3	-5	-0.0020	2.5
20	4.2	9	0.0036	2.5

Test Frequency:2535MHz 16QAM 15MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.8	3	0.0012	2.5
40		8	0.0032	2.5
30		5	0.0020	2.5
20		6	0.0024	2.5
10		-1	-0.0004	2.5
0		13	0.0051	2.5
-10		6	0.0024	2.5
-20		-1	-0.0004	2.5
-30		12	0.0047	2.5
20	3.3	5	0.0020	2.5
20	4.2	14	0.0055	2.5

## LTE Band 7

Test Frequency:2535MHz QPSK 20MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.8	10	0.0039	2.5
40		-6	-0.0024	2.5
30		11	0.0043	2.5
20		3	0.0012	2.5
10		6	0.0024	2.5
0		-2	-0.0008	2.5
-10		12	0.0047	2.5
-20		9	0.0036	2.5
-30		4	0.0016	2.5
20	3.3	-5	-0.0020	2.5
20	4.2	10	0.0039	2.5

Test Frequency:2535MHz 16QAM 20MHz				
Temperature (°C)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.8	6	0.0024	2.5
40		-5	-0.0020	2.5
30		-7	-0.0028	2.5
20		-2	-0.0008	2.5
10		0	0.0000	2.5
0		-1	-0.0004	2.5
-10		-3	-0.0012	2.5
-20		0	0.0000	2.5
-30		0	0.0000	2.5
20	3.3	-10	-0.0039	2.5
20	4.2	-1	-0.0004	2.5

## **15 RF Exposure**

Remark: refer to SAR test report: WTS17S0374082E.

