LTE RADIO TEST REPORT

Report No: STS1601120F05

Issued for

ITALCOM GROUP

1728Coral Way,Coral Gables,Miami,Florida,United States 33145

Product Name:	SMART PHONE
Brand Name:	NYX
Model No.:	ALTER
Series Model:	N/A
FCC ID:	YPVITALCOMALTER
Test Standard:	FCC Part 22H FCC Part 24E FCC Part 27L/M

Shenzhen STS Test Services Co., Ltd.
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TEST RESULT CERTIFICATION

Applicant's name ..... ITALCOM GROUP

Address..... 1728Coral Way,Coral Gables,Miami,Florida,United States 33145

Manufacture's Name ..... SCOPE Scientific Development co.LTD

Address..... 13/F building C2ipark,No.1001 Xueyuan Rd Nanshan Districe, Shenzhen City .Guangdong Province,China 518055

Product name ..... SMART PHONE

Brand name ..... NYX

Model and/or type reference . ALTER

Standards ..... FCC Part 22H. FCC Part 24E. FCC Part 27L/M

Test procedure..... ANSI / TIA / EIA-603-C-2009

This device described above has been tested by STS and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test.....

Date of performance of tests ..... 21 Jan. 2016 ~ 15 Feb. 2016

Date of Issue..... 16 Feb. 2016

Test Result..... **Pass**

Testing Engineer : (Jin Ming)

Technical Manager : (Tony Liu)

Authorized Signatory : (Bovey Yang)

TABLE OF CONTENTS **Page**

Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	16 Feb. 2016	STS1601120F05	ALL	Initial Issue

1. SUMMARY OF TEST RESULTS

1.1 TEST RESULTS DESCRIPTION AND LABORATORY INFORMATION

Setion	FCC Rule	Description	Limit	Result
	§2.1046	Conducted Output Power	Reporting Only	PASS
	§24.232(d)	Peak-to-Average Ratio	<13 dB	PASS
	§2.1049 §24.238(b) §27.53(h)(3) §27.53(m)(6)	Occupied Bandwidth	Reporting Only	PASS
	§2.1051 §2.917(a) §24.238(a) §27.53(g) §27.53(h)	Conducted Band Edge Measurement (Band 4)	<43+10log10(P[Watts])	PASS
	§27.53(m)(4/6)	(Band 7)	<43+10log10(P[Watts])	N/A
	§2.1051 §2.917(a) §24.238(a) §27.53(g) §27.53(h)	Conducted Spurious Emission (Band 4)	<43+10log10(P[Watts])	PASS
	§27.53(m)(4/6)	Conducted Spurious Emission (Band 7)	< 55+10log10(P[Watts])	N/A
	§2.1055 §24.235 §27.54	Frequency Stability Temperature & Voltage	< 2.5 ppm for Part 22 Within Authorized Band	PASS

	§22.913(a)(2	Effective Radiated Power (Band 5)	ERP < 7 Watt	
	§27.50(c)(10)	Effective Radiated Power (Band 17)	ERP < 3 Watt	N/A
	§24.232(c) §27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 2)((Band 7)	EIRP < 2Watt	N/A
	§27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 4)	EIRP < 1Watt	PASS
	§2.1051 §2 2.917(a) §24.238(a) §27.53(g) §27.53(h)	Radiated Spurious Emission (Band 4)	< 43+10log10(P[Watts])	PASS
	§27.53(m)(4)(6)	Radiated Spurious Emission (Band 7)	< 55+10log10(P[Watts])	N/A

1.1.1 TEST FACTORY

Shenzhen STS Test Services Co., Ltd.
Add. : 1/F., Building B, Zhuoke Science Park, No.190, Chongqing Road,
Fuyong Street, Bao'an District, Shenzhen, Guangdong,China
CNAS Registration No.: L7649;
FCC Registration No.: 842334; IC Registration No.: 12108A-1

1.1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ± **U**，where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95** %。

No.	Item	Uncertainty
1	Conducted Emission (9KHz-150KHz)	±2.88dB
2	Conducted Emission (150KHz-30MHz)	±2.67dB
3	RF power,conducted	±0.70dB
4	Spurious emissions,conducted	±1.19dB
5	All emissions,radiated(<1G) 30MHz-200MHz	±2.83dB
6	All emissions,radiated(<1G) 200MHz-1000MHz	±2.94dB
7	All emissions,radiated(>1G)	±3.03dB
8	Temperature	±0.5℃
9	Humidity	±2%

2. GENERAL INFORMATION

2.1 TECHNICAL SPECIFICATIONS AND REGULATIONS

2.1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	SMART PHONE
Hardware version:	NYX_ALTER_001
Software version:	ALTER_AMXNYX_V001R
FCC ID:	YPVITALCOMALTER
Frequency Bands:	U.S. Bands: ☐LTE FDD Band 2 ☒LTE FDD Band 4 ☐LTE FDD Band 5 ☐LTE FDD Band 7 ☐LTE FDD Band 12 ☐LTE FDD Band 13 ☐LTE FDD Band 17
SIM Card	Support single SIM card.
Antenna:	PIFA Antenna
Antenna gain:	-1 dBi
Power Supply:	DC 3.7V by battery or DC 5.0V supplied by adapter
Battery parameter:	Capacitance: 2000mA, Rated Voltage: 3.7V
Adapter Input:	AC100-240V, 50-60Hz, 0.15A
Adapter Output:	DC 5.0V, 1000mA

2.1.2 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Product Specification Subjective To This Standard	
Tx Frequency	LTE Band 4:1710.7~1754.3MHz
Rx Frequency	LTE Band 4:2110.7~2154.3MHz
Bandwidth	LTE Band 4 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz /20MHz
Maximum Output Power Limit	LTE Band 4 : 22.28 dBm
Type of Modulation	QPSK / 16QAM

2.1.3 EMISSION DESIGNATOR

LTE Band 4 BW(MHz)	Emission Designator (99%OBW)QPSK	Emission Designator (99%OBW)16QAM
1.4	1M11G7D	1M10W7D
3	2M69G7D	2M69W7D
5	4M49G7D	4M49W7D
10	8M96G7D	8M95W7D
15	13M46G7D	13M45W7D
20	17M93G7D	17M92W7D

2.1.4 TEST CONFIGURATION OF EQUIPMENT UNDER TEST

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D02 Power Meas. License Digital Systems v02r02 with maximum output power.Radiated measurements are performed by rotating the EUT in three different orthogonal test planes tofind the maximum emission.

Remark:

1. The mark “v “ means that this configuration is chosen for testing
2. The mark “-“ means that this bandwidth is not supported.
3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated

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	4	v	v	v	v	v	v	v	v	v	v	v	v	v	v
Peak&Avera Ratio	4						v	v	v	v		v	v	v	v
26dB&99% Bandwidth	4	v	v	v	v	v	v	v	v			v	v	v	v
Conducted Band Edge	4	v	v	v	v	v	v	v	v	v		v	v	v	v

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	4	v	v	v	v	v	v	v	v	v			v	v	v
Frequency Stability	4				v			v				v		v	
E.R.P.& E.I.R.P.	4	v	v	v	v	v	v	v	v	v			v	v	v
Radiated Spurious Emission	4	v	v	v	v	v	v	v		v			v	v	v

2.1.5 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for filing to comply with the fcc part 22H&24E&27.

2.1.6 SPECIAL ACCESSORIES

The battery and the charger, earphone supplied by the applicant were used as accessories and being tested with eut intended for fcc grant together.

2.1.7 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.1.8 EUT EXERCISE

The Transmitter was operated in the maximum output power mode through Communication Tester. The TX frequency was fixed which was for the purpose of the measurements.

2.1.9 CONFIGURATION OF EUT SYSTEM

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	SMART PHONE	ALTER	FCC ID: YPVITALCOMALTER	EUT

Note: All the accessories have been used during the test. the following "EUT" in setup diagram means EUT system.

2.1.10 MEASUREMENT INSTRUMENTS

The radiated emission testing was performed according to the procedures of ansi ANSI / TIA / EIA-603-C-2004 and fcc cfr 47 rules of 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057.

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
Spectrum Analyzer	Agilent	E4407B	MY50140340	2015.10.25	2016.10.24
Test Receiver	R&S	ESCI	101427	2015.10.25	2016.10.24
Wideband Radio Communication	Agilent	8960	MY48360751	2015.11.20	2016.11.19
Wideband Radio Communication	R&S	CMU200	112012	2015.10.25	2016.10.24
Wideband Radio Communication	R&S	CMW500	101471	2015.07.07	2016.07.06
Test Receiver	R&S	ESCI	102086	2015.10.25	2016.10.24
Bilog Antenna	TESEQ	CBL6111D	34678	2015.11.25	2016.11.24
Horn Antenna	Schwarzbeck	BBHA 9120D(1201)	9120D-1343	2015.03.06	2016.03.05

2. 1.11 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 factorbetween 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.

3. CONDUCTED OUTPUT POWER

3.1 DESCRIPTION OF THE CONDUCTED OUTPUT POWER MEASUREMENT

3.1.1 MEASUREMENT METHOD

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.
configuration follows KDB 971168 D01.

3.1.2 TEST SETUP

3.1.3 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.

3.1.4 TEST RESULTS

LTE BAND 4

LTE Band 4 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
1.4	1	0	QPSK	20.32	21.65	21.62
1.4	1	2		20.26	21.61	21.62
1.4	1	5		20.46	21.65	21.60
1.4	3	0		20.30	21.71	21.70
1.4	3	1		20.31	21.62	21.61
1.4	3	3		20.36	21.69	21.64
1.4	6	0		20.37	21.61	21.55
1.4	1	0	16-QAM	20.21	21.82	21.77
1.4	1	2		20.18	21.79	21.70
1.4	1	5		20.29	21.83	21.73
1.4	3	0		20.25	21.66	21.59
1.4	3	1		20.26	21.54	21.51
1.4	3	3		20.32	21.59	21.55
1.4	6	0		20.45	21.62	21.61
3	1	0	QPSK	20.36	21.68	21.71
3	1	7		20.23	21.57	21.59
3	1	14		20.64	21.64	21.56
3	8	0		20.40	21.70	21.71
3	8	4		20.50	21.70	21.71
3	8	8		20.60	21.71	21.66
3	15	0		20.47	21.68	21.67
3	1	0	16-QAM	20.50	21.86	21.81
3	1	7		20.46	21.73	21.78
3	1	14		20.76	21.83	21.71
3	8	0		20.50	21.80	21.77
3	8	4		20.58	21.81	21.75
3	8	7		20.72	21.80	21.73
3	15	0		20.47	21.68	21.68

LTE BAND 4

LTE Band 4 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
5	1	0	QPSK	20.31	21.87	21.91
5	1	12		19.97	21.66	21.41
5	1	24		20.74	21.80	21.58
5	12	0		19.98	21.76	21.69
5	12	6		20.02	21.68	21.44
5	12	11		20.20	21.69	21.38
5	25	0		20.08	21.69	21.47
5	1	0	16-QAM	20.42	21.93	21.24
5	1	12		20.13	21.76	21.68
5	1	24		20.87	21.87	21.83
5	12	0		20.01	21.79	21.58
5	12	6		20.80	21.71	21.35
5	12	11		20.25	21.71	21.29
5	25	0		20.16	21.63	21.39
10	1	0	QPSK	20.31	21.92	22.00
10	1	24		20.29	21.65	21.68
10	1	49		20.82	21.88	20.95
10	25	0		20.05	21.75	21.90
10	25	12		20.38	21.69	21.68
10	25	24		20.71	21.75	21.42
10	50	0		20.43	21.76	21.66
10	1	0	16-QAM	20.35	22.11	21.96
10	1	12		20.44	21.82	21.65
10	1	24		20.98	22.06	21.01
10	25	0		20.08	21.77	21.97
10	25	12		20.42	21.71	21.69
10	25	24		20.75	21.75	21.44
10	50	0		20.40	21.71	21.59

LTE BAND 4

LTE Band 4 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
15	1	0	QPSK	20.32	22.00	21.94
15	1	37		20.62	21.61	21.85
15	1	75		21.86	21.92	21.25
15	36	0		20.27	21.90	22.01
15	36	18		20.70	21.79	21.94
15	36	37		21.38	21.90	21.52
15	75	0		20.87	21.91	21.88
15	1	0	16-QAM	20.25	22.18	21.80
15	1	37		20.80	21.78	21.67
15	1	74		21.97	22.09	21.07
15	36	0		20.31	21.88	21.99
15	36	18		20.74	21.77	21.89
15	36	36		21.41	21.85	21.47
15	75	0		20.86	21.88	21.77
20	1	0	QPSK	20.24	21.93	21.91
20	1	50		21.05	21.72	21.97
20	1	99		21.98	22.01	21.14
20	50	0		20.53	21.87	21.91
20	50	24		21.13	21.77	21.93
20	50	49		21.85	21.84	21.68
20	100	0		21.30	21.84	21.89
20	1	0	16-QAM	21.01	22.22	22.39
20	1	49		21.03	22.01	22.38
20	1	99		21.94	22.28	21.56
20	50	0		20.55	21.86	21.85
20	50	24		21.14	21.75	21.89
20	50	49		21.85	21.80	21.60
20	100	0		21.29	21.82	21.89

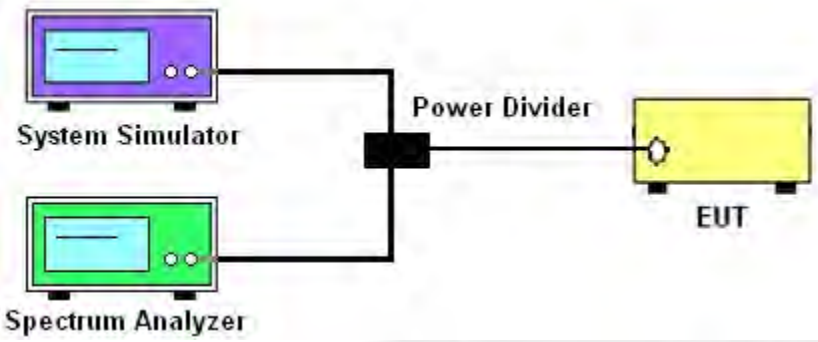
4. PEAK-TO-AVERAGE RATIO

4.1 DESCRIPTION OF THE CONDUCTED OUTPUT POWER MEASUREMENT

4.1.1 MEASUREMENT METHOD

Use one of the procedures presented in 4.1 to measure the total peak power and record as PPk. Use one of the applicable procedures presented 4.2 to measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:
PAPR (dB) = PPk (dBm) - PAvg (dBm).

4.1.2 TEST SETUP



4.1.3 TEST PROCEDURES

1. The testing follows FCC KDB 971168 v02r02 Section 5.7.2..

2. The EUT was connected to spectrum and system simulator via a power divider

3. Select lowest, middle, and highest channels for each band and different modulation.

4. Set the test probe and measure the peak and average power of the spectrum analyzer

5. Record the deviation as Peak to Average Ratio.

	LTE					
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	1000kHz	1000kHz	1000kHz
Detector	PK/RMS	PK/RMS	PK/RMS	PK/RMS	PK/RMS	PK/RMS
Peak Trace	Max	Max	Max	Max	Max	Max
AVG Trace	Trace average at least 100 traces in power averaging (i.e., RMS) mode.					
Sweep Count	Auto	Auto	Auto	Auto	Auto	Auto

4.1.4 TEST RESULTS

LTE BAND 4

LTE Band 4 PAR [dBm]										
BW [MHz]	RB Size	Mod	Lowest			Middle			Highest		
			PEAK	AVG	P-A	PEAK	AVG	P-A	PEAK	AVG	P-A
20	1	QPSK	25.16	21.98	3.18	25.24	22.01	3.23	25.41	21.97	3.44
20	100		24.67	21.30	3.37	24.44	21.84	2.60	25.15	21.89	3.26
20	1	16-QAM	25.34	21.94	3.40	25.62	22.28	3.34	25.39	22.39	3.00
20	100		24.15	21.29	2.86	25.01	21.82	3.19	24.60	21.89	2.71
Limit			≤13dBm								

5. RADIATED POWER AND EFFECTIVE ISOTROPIC RADIATED POWER

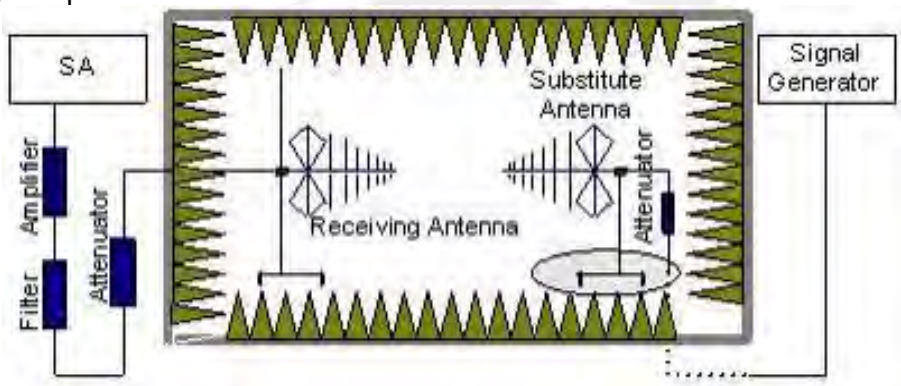
5.1 DESCRIPTION OF THE ERP/EIRP MEASUREMENT

5.1.1 MEASUREMENT METHOD

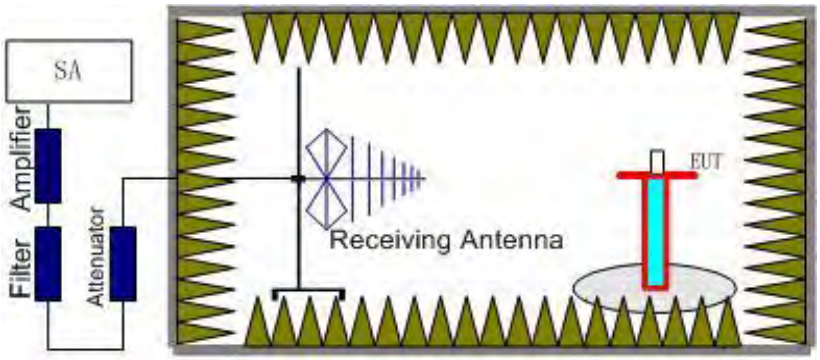
Effective radiated power output measurements by substitution method according to ANSI / TIA / EIA-603-C, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02r02.
Equivalent isotropic radiated power output measurements by substitution method according to ANSI /TIA / EIA-603-C, 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 1 watt with LTE band 4.

5.1.2 TEST SETUP

The procedure of radiated spurious emissions is as follows:
a) Pre-calibration With pre-calibration method, the Radiated Spurious Emissions(RSE) is calculated as, RSE=Rx(dBuV)+CL(dB)+SA(dB)+Gain(dBi)-107(dBuV to dBm)The SA is calibrated using following setup.



b) EUT was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the test item for emission measurements. The height of receiving antenna is 0.8m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the test item and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1MHz bandwidth.



Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of any band into any of the other blocks.

The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established and the ARpl is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss and the air loss. The measurement results are obtained as described below: Power=PMea+ARpl

5.1.3 TEST PROCEDURES

1. The testing follows FCC KDB 971168 v02r02 Section 5.6. and ANSI / TIA-603-C-2009 Section 2.2.17.
2. 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 Peak detector.
3. During the measurement, the system simulator parameters were set to force the EUTtransmitting at maximum output power. The maximum emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
4. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to-TIA/EIA-603-C. The EUT was replaced by dipole antenna (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 +Correction factor and ERP = EIRP – 2.15.

5.RB Set greater than bandwidth,Vb Set spectrum analyzer Maximum support.

5.1.4 TEST RESULTS

LTE Band 4

LTE Band 4 / 1.4MHz					
Channel	Modulation	RB		Horizontal	Vertical
		Size	Offset	EIRP(dBm)	EIRP(dBm)
Lowest	QPSK	1	0	20.27	20.67
Middle		1	0	20.12	20.52
Highest		1	0	20.26	20.53
Lowest	16QAM	1	0	20.15	20.64
Middle		1	0	20.72	20.75
Highest		1	0	20.27	20.67
Limit	EIRP<1W=30dBm			Result	PASS

LTE Band 4 / 3MHz					
Channel	Modulation	RB		Horizontal	Vertical
		Size	Offset	EIRP(dBm)	EIRP(dBm)
Lowest	QPSK	1	0	20.75	20.67
Middle		1	0	20.68	20.60
Highest		1	0	20.72	20.61
Lowest	16QAM	1	0	20.80	20.80
Middle		1	0	20.36	20.33
Highest		1	0	20.63	20.42
Limit	EIRP<1W=30dBm			Result	PASS

LTE Band 4 / 5MHz					
Channel	Modulation	RB		Horizontal	Vertical
		Size	Offset	EIRP(dBm)	EIRP(dBm)
Lowest	QPSK	1	0	20.16	20.66
Middle		1	0	19.87	20.82
Highest		1	0	20.83	20.69
Lowest	16QAM	1	0	20.20	20.10
Middle		1	0	20.07	20.70
Highest		1	0	20.02	20.03
Limit	EIRP<1W=30dBm			Result	PASS

LTE Band 4 / 10MHz					
Channel	Modulation	RB		Horizontal	Vertical
		Size	Offset	EIRP(dBm)	EIRP(dBm)
Lowest	QPSK	1	0	20.32	20.31
Middle		1	0	20.48	20.39
Highest		1	0	20.82	20.65
Lowest	16QAM	1	0	20.02	20.84
Middle		1	0	20.29	20.50
Highest		1	0	20.39	20.49
Limit	EIRP<1W=30dBm			Result	PASS

LTE Band 4 / 15MHz					
Channel	Modulation	RB		Horizontal	Vertical
		Size	Offset	EIRP(dBm)	EIRP(dBm)
Lowest	QPSK	1	0	20.11	20.99
Middle		1	0	20.07	20.00
Highest		1	0	20.29	20.21
Lowest	16QAM	1	0	20.23	20.22
Middle		1	0	20.18	20.17
Highest		1	0	20.22	20.10
Limit	EIRP<1W=30dBm			Result	PASS

LTE Band 4 / 20MHz					
Channel	Modulation	RB		Horizontal	Vertical
		Size	Offset	EIRP(dBm)	EIRP(dBm)
Lowest	QPSK	1	0	21.25	21.38
Middle		1	0	20.54	21.45
Highest		1	0	20.67	21.27
Lowest	16QAM	1	0	20.78	21.56
Middle		1	0	20.52	21.27
Highest		1	0	20.33	21.85
Limit	EIRP<1W=30dBm			Result	PASS

6. OCCUPIED BANDWIDTH

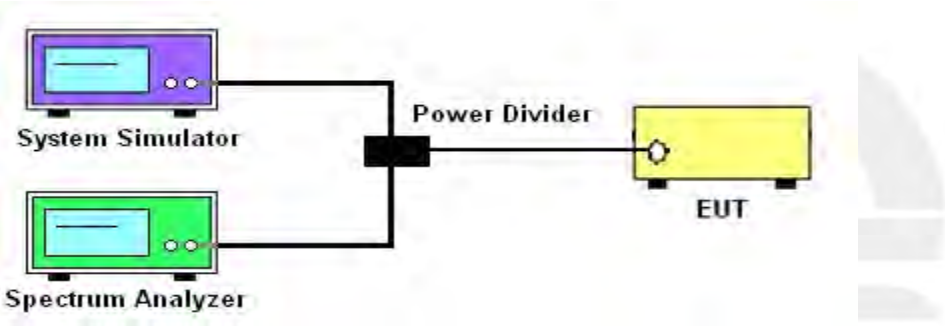
6.1 DESCRIPTION OF OCCUPIED BANDWIDTH MEASUREMENT

6.1.1 MEASUREMENT METHOD

1.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.

2.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.

6.1.2 TEST SETUP



6.1.3 TEST PROCEDURES

1. The testing follows FCC KDB 971168 v02r02 Section 4.1.and 4.2

2. The EUT was connected to spectrum and system simulator via a power divider

3. Select lowest, middle, and highest channels for each band and different modulation.

4. Set the test probe and measure the Occupied Bandwidth of the spectrum analyzer

5. Measure and record the Occupied Bandwidth from the Spectrum Analyzer.

	LTE					
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	1000kHz	1000kHz	1000kHz
Detector	PK	PK	PK	PK	PK	PK
Trace	Max	Max	Max	Max	Max	Max
Sweep Count	Auto	Auto	Auto	Auto	Auto	Auto

6.1.4 MEASUREMENT RESULT

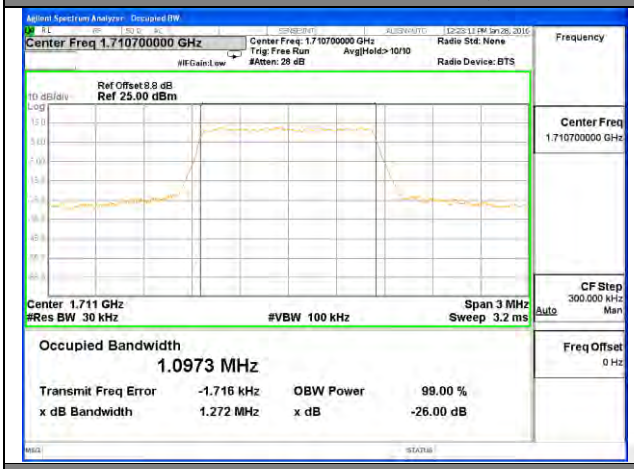
LTE BAND 4

LTE Band 4 Bandwidth [MHz]							
BW [MHz]	Mod	Lowest		Middle		Highest	
		26dB BW	99% BW	26dB BW	99% BW	26dB BW	99% BW
1.4	QPSK	1.272	1.0973	1.286	1.1016	1.270	1.1062
1.4	16-QAM	1.288	1.1032	1.266	1.0966	1.278	1.0995
3	QPSK	2.912	2.6844	2.904	2.6930	2.911	2.6858
3	16-QAM	2.929	2.6832	2.932	2.6877	2.928	2.6834
5	QPSK	4.964	4.4910	4.991	4.4888	4.925	4.4864
5	16-QAM	4.980	4.4827	4.987	4.4855	4.926	4.4842
10	QPSK	9.792	8.9537	9.659	8.9404	9.752	8.9565
10	16-QAM	9.624	8.9530	9.664	8.9481	9.783	8.9541
15	QPSK	14.62	13.450	14.51	13.400	14.68	13.461
15	16-QAM	14.51	13.426	14.53	13.412	14.47	13.449
20	QPSK	19.15	17.904	19.09	17.842	19.44	17.928
20	16-QAM	19.19	17.909	19.27	17.883	19.32	17.920

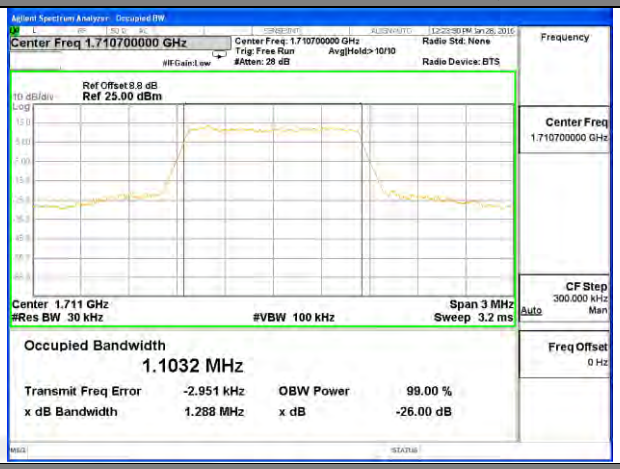
LTE band 4

LTE band 4 (99% and -26 Bandwidth)

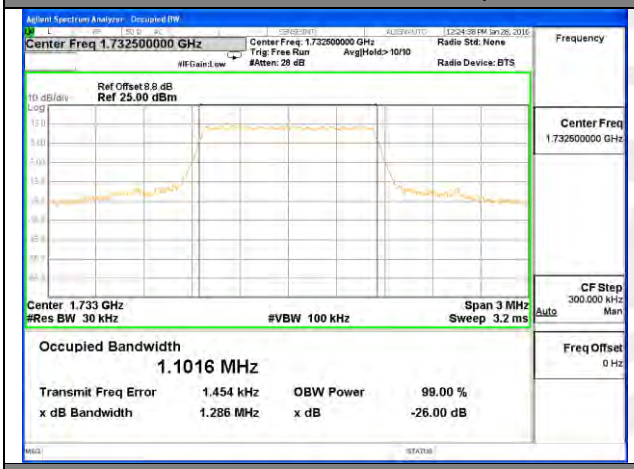
Lowest Channel / 1.4MHz / QPSK



Lowest Channel / 1.4MHz / 16QAM

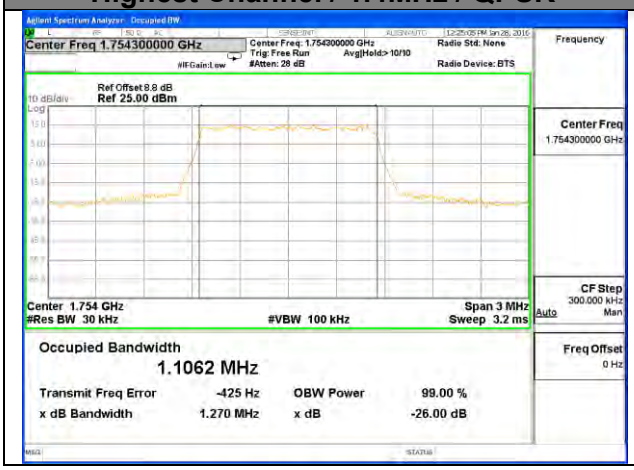


Middle Channel / 1.4MHz / QPSK

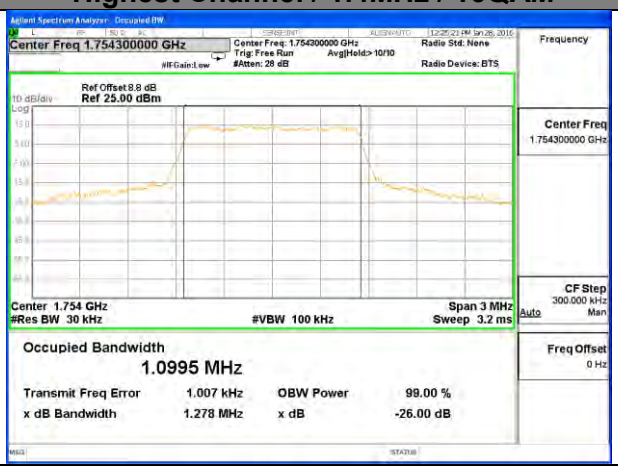


Middle Channel / 1.4MHz / 16QAM

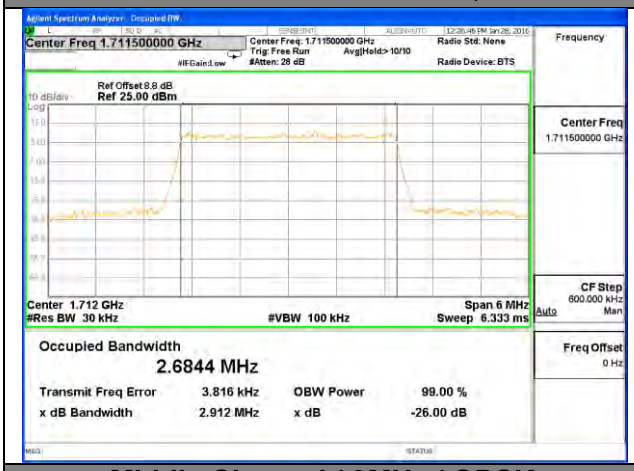
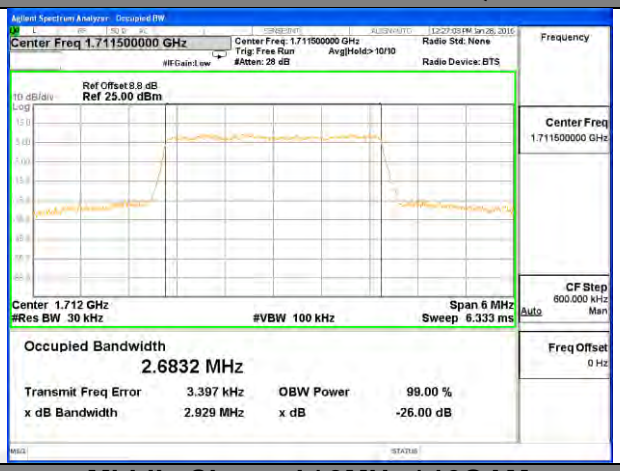
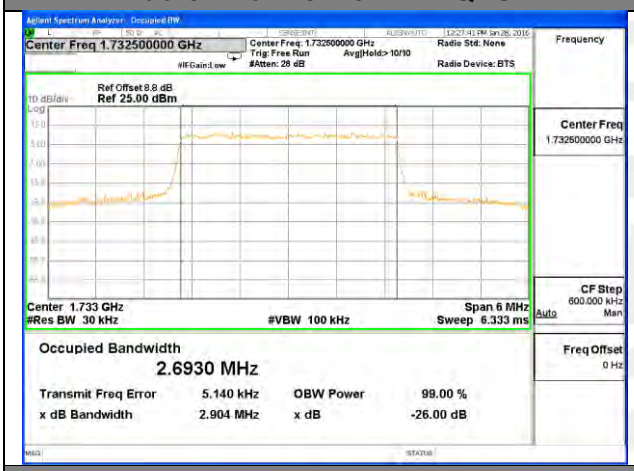
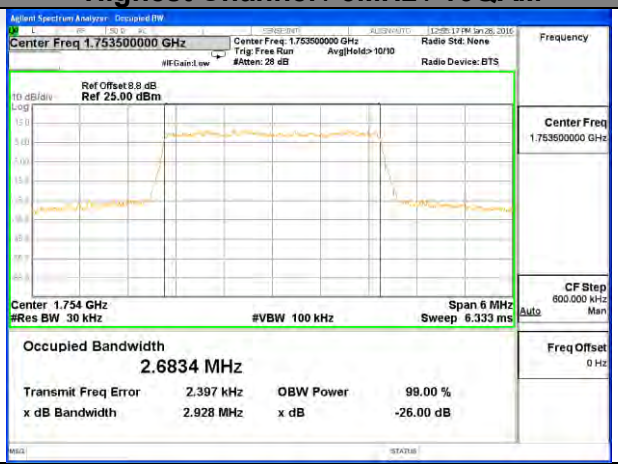
Highest Channel / 1.4MHz / QPSK



Highest Channel / 1.4MHz / 16QAM



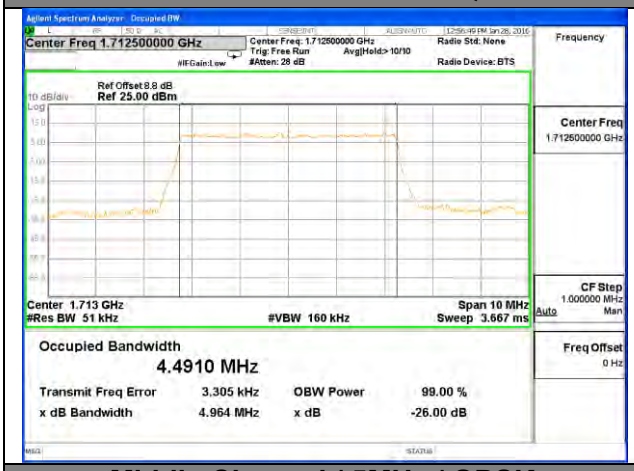
LTE band 4

LTE band 4 (99% and -26 Bandwidth)	
Lowest Channel / 3MHz / QPSK	Lowest Channel / 3MHz / 16QAM
	
Middle Channel / 3MHz / QPSK	Middle Channel / 3MHz / 16QAM
	
Highest Channel / 3MHz / QPSK	Highest Channel / 3MHz / 16QAM
	

LTE band 4

LTE band 4 (99% and -26 Bandwidth)

Lowest Channel / 5MHz / QPSK



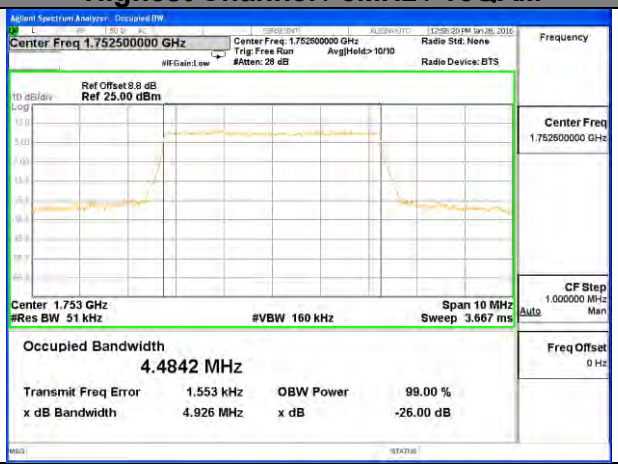
Lowest Channel / 5MHz / 16QAM

Middle Channel / 5MHz / QPSK

Middle Channel / 5MHz / 16QAM

Highest Channel / 5MHz / QPSK

Highest Channel / 5MHz / 16QAM



LTE band 4

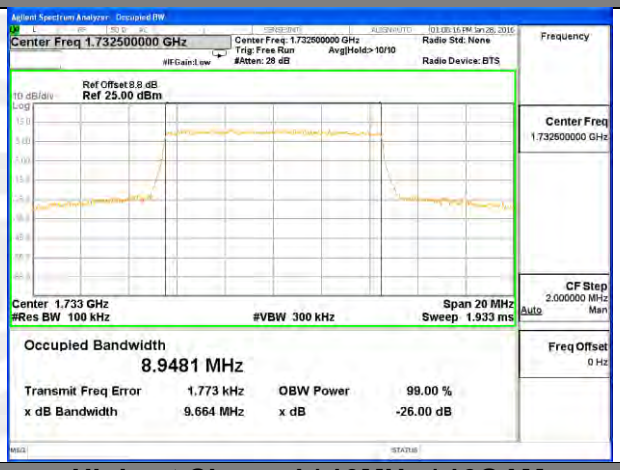
LTE band 4 (99% and -26 Bandwidth)

Lowest Channel / 10MHz / QPSK

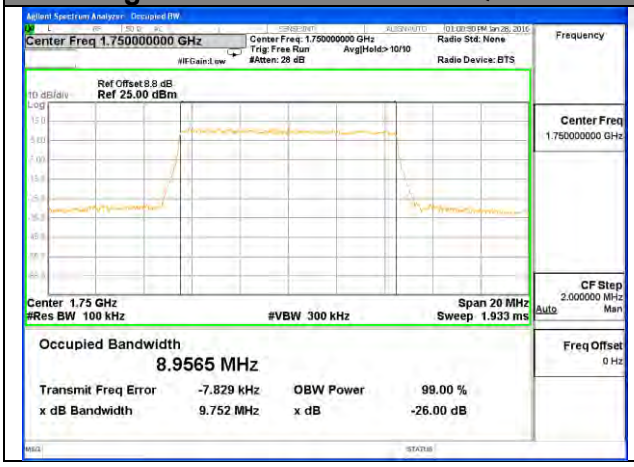
Lowest Channel / 10MHz / 16QAM

Middle Channel / 10MHz / QPSK

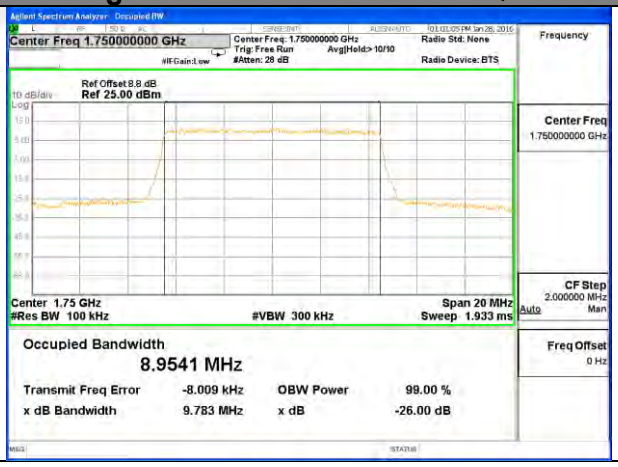
Middle Channel / 10MHz / 16QAM



Highest Channel / 10MHz / QPSK



Highest Channel / 10MHz / 16QAM



LTE band 4

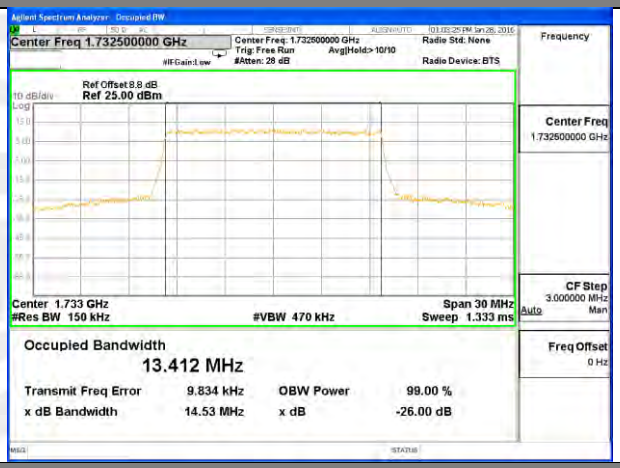
LTE band 4 (99% and -26 Bandwidth)

Lowest Channel / 15MHz / QPSK

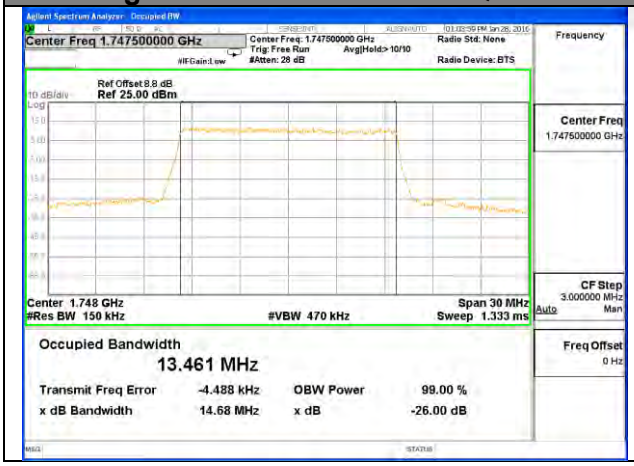
Lowest Channel / 15MHz / 16QAM

Middle Channel / 15MHz / QPSK

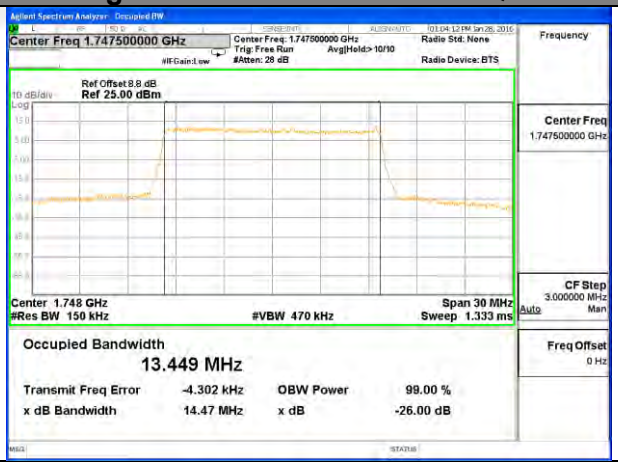
Middle Channel / 15MHz / 16QAM



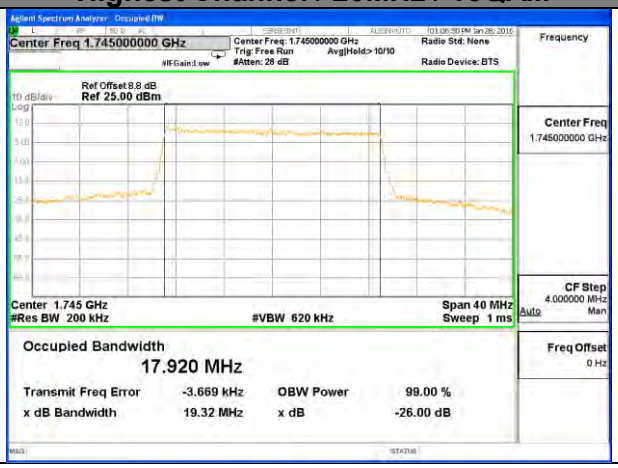
Highest Channel / 15MHz / QPSK



Highest Channel / 15MHz / 16QAM



LTE band 4

LTE band 4 (99% and -26 Bandwidth)	
Lowest Channel / 20MHz / QPSK	Lowest Channel / 20MHz / 16QAM
	
Middle Channel / 20MHz / QPSK	Middle Channel / 20MHz / 16QAM
	
Highest Channel / 20MHz / QPSK	Highest Channel / 20MHz / 16QAM
	

7. CONDUCTED BAND EDGE

7.1 DESCRIPTION OF CONDUCTED BAND EDGE MEASUREMENT

7.1.1 MEASUREMENT METHOD

1. §22.917(a)
For operations in the 824 – 849 MHz band, the FCC limit is 43 + 10log10(P[Watts]) dB below the transmitter power P(Watts) in a 100kHz 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.

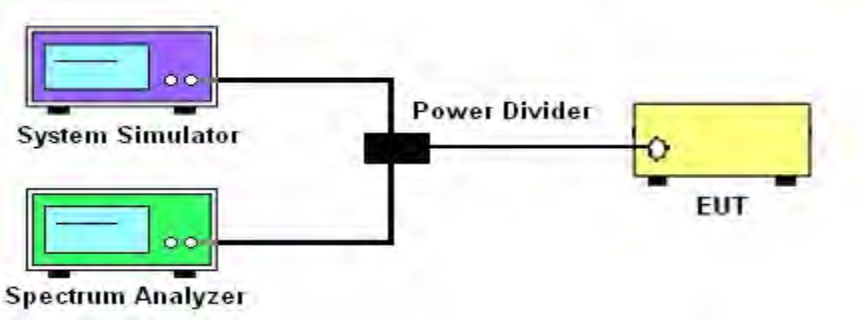
2. §24.238 (a)
For operations in the 1850-1910 and 1930-1990 MHz band, the FCC limit is 43 + 10log10(P[Watts]) dB below the transmitter power P(Watts) in a 1MHz bandwidth. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed

3. §27.53 (h)
For operations in the 1710 – 1755 MHz band, the FCC limit is 43 + 10log10(P[Watts]) dB below the transmitter power P(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.

4. §27.53(m)(4/6)
For operations in the 2502.5 MHz ~ 2567.5 MHz band this section, 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 MHzand 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licenseesoperating on frequencies below 2495 MHz may also submit a documented interference complaintagainst BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

5. §27.53 (g)
For operations in the 698 -746 MHz band, the FCC limit is 43 + 10log10(P[Watts]) dB below the transmitter power P(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.

7.1.2 TEST SETUP



7.1.3 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 >= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.

4. Set spectrum analyzer with RMS/AVG detector

5. The RF fundamental frequency should be excluded against the limit line in the operating frquency band.

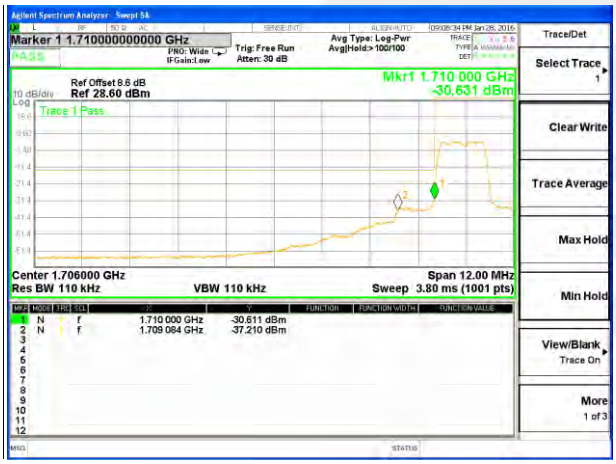
6.The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
= P(W)- [43 + 10log(P)] (dB)
= [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
= -13dBm.

Band 7:
= P(W)- [55 + 10log(P)] (dB)
= [30 + 10log(P)] (dBm) - [55 + 10log(P)] (dB)
= -25dBm.

	LTE					
LTE BW	1.4M	3M	5M	10M	15M	20M
Span	12MHz	13MHz	15MHz	20MHz	25MHz	30MHz
RBW	30kHz	100kHz	100kHz	300kHz	300kHz	300kHz
VBW	100kHz	300kHz	300kHz	1000kHz	1000kHz	1000kHz
Detector	AVG	AVG	AVG	AVG	AVG	AVG
Trace	Max	Max	Max	Max	Max	Max
Sweep Count	Auto	Auto	Auto	Auto	Auto	Auto

7.1.4 MEASUREMENT RESULT

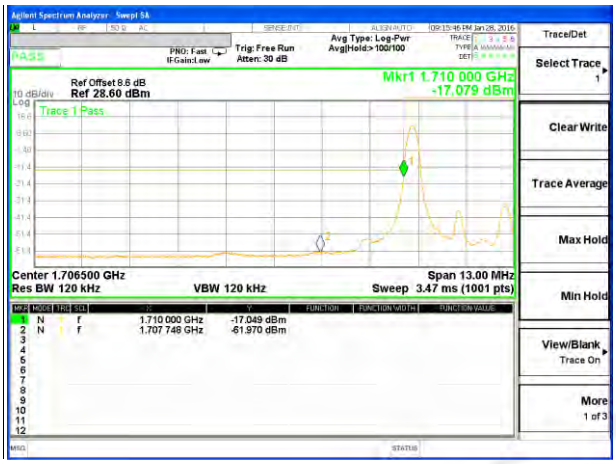
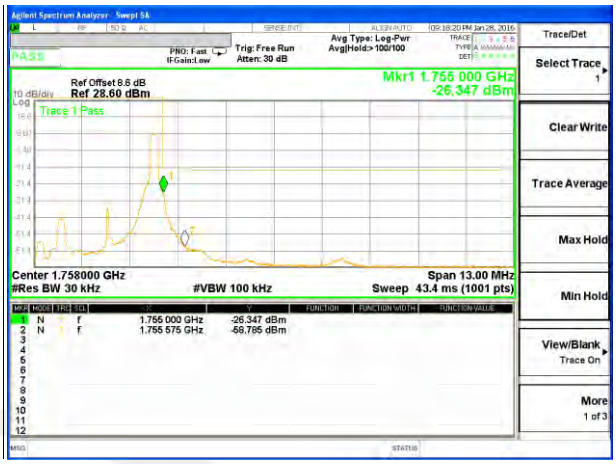
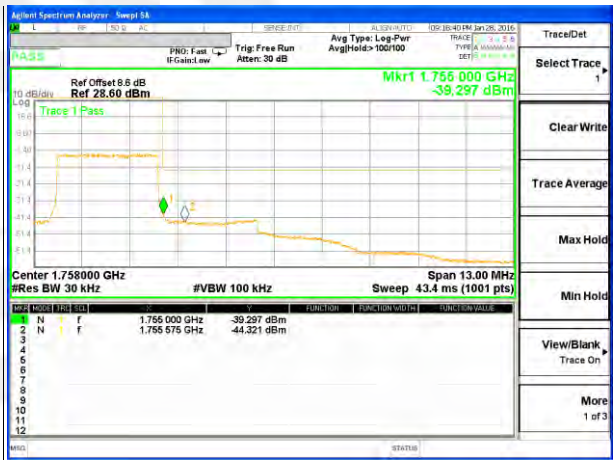
LTE band 4

LTE Band 4 / 1.4MHz /QPSK	
Lowest Band Edge / 1 RB	**Highest Band Edge / 1 RB**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

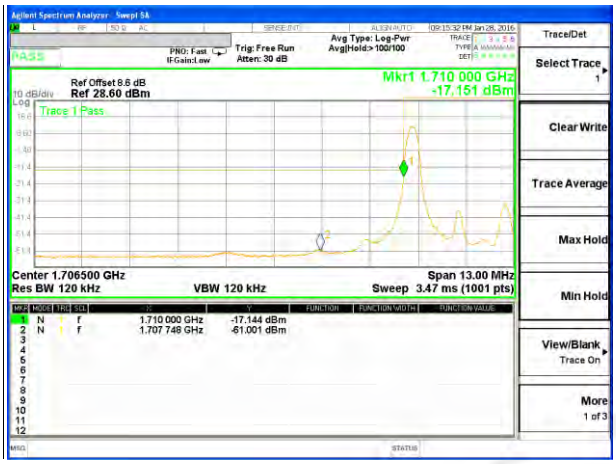
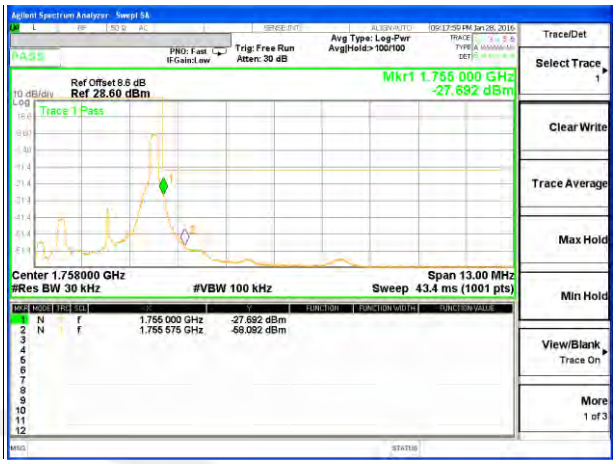
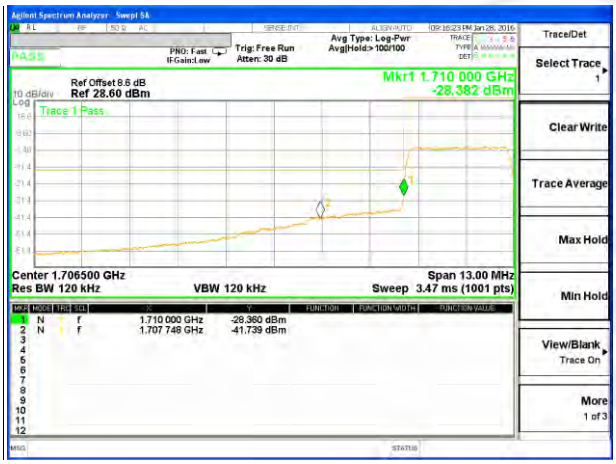
LTE band 4

LTE Band 4 / 1.4MHz /16QAM	
Lowest Band Edge / 1 RB	**Highest Band Edge / 1 RB**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

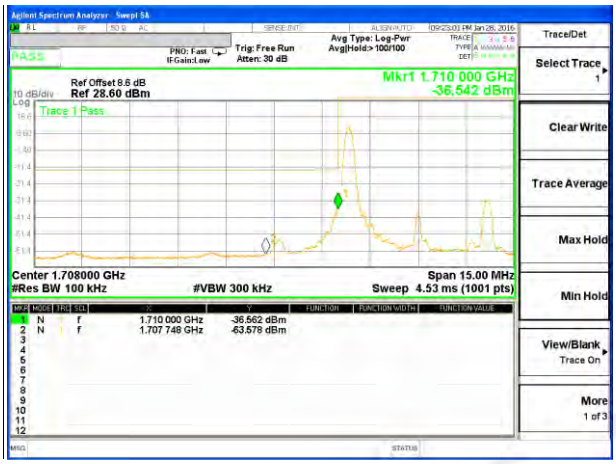
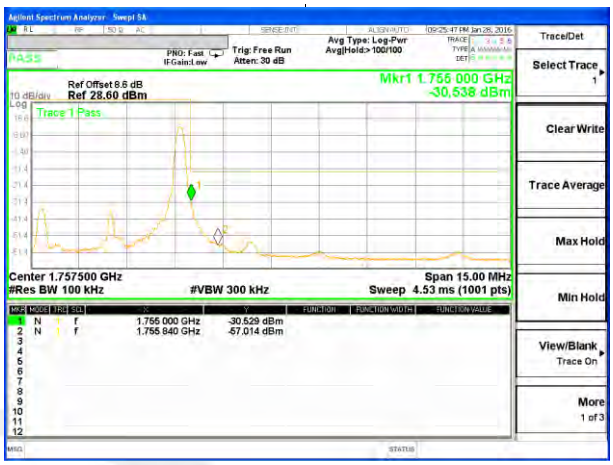
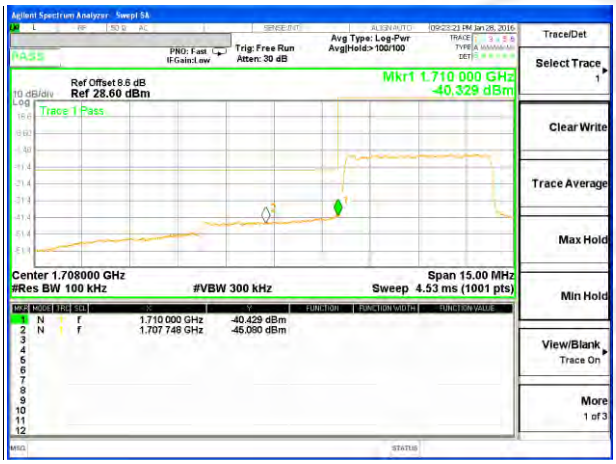
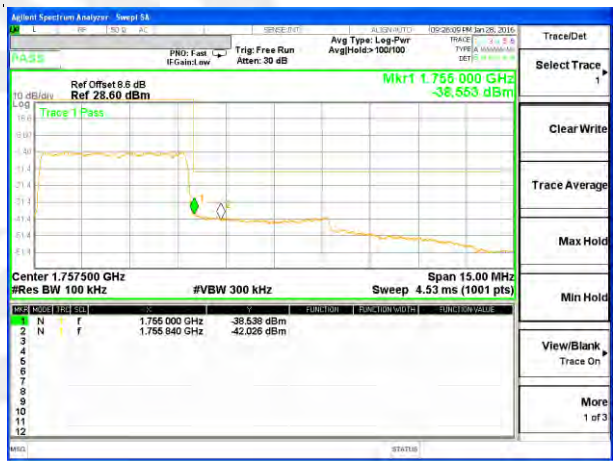
LTE band 4

LTE Band 4 / 3MHz /QPSK	
Lowest Band Edge / 1 RB	**Highest Band Edge / 1 RB**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

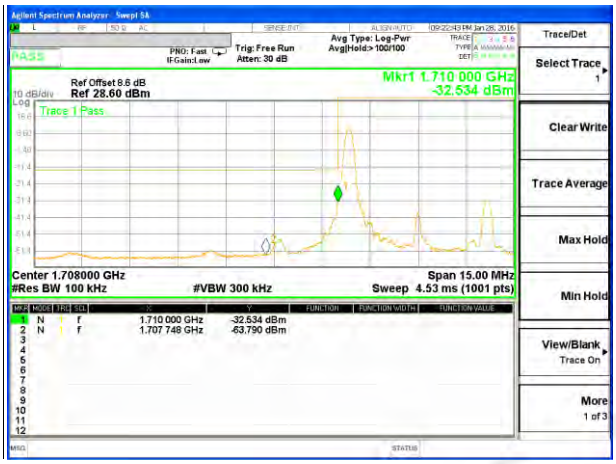
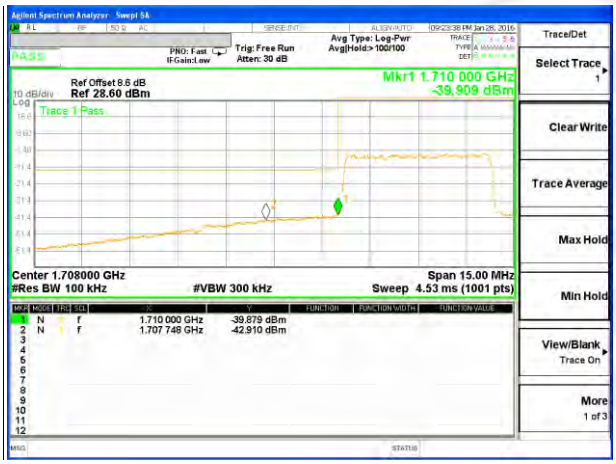
LTE band 4

LTE Band 4 / 3MHz /16QAM	
Lowest Band Edge / 1 RB	**Highest Band Edge / 1 RB**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

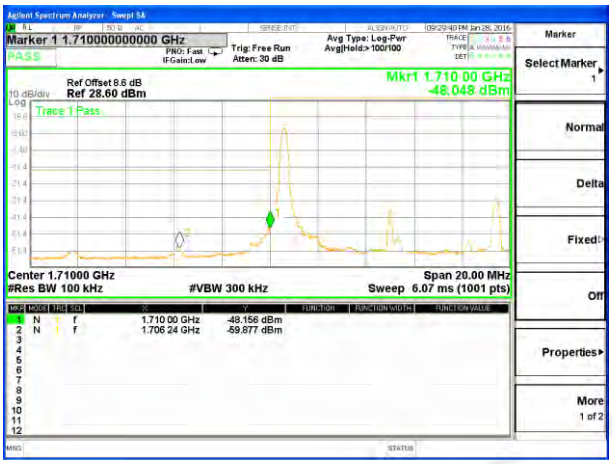
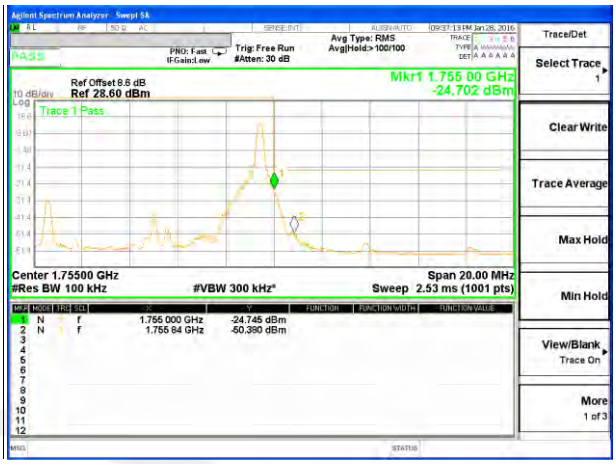
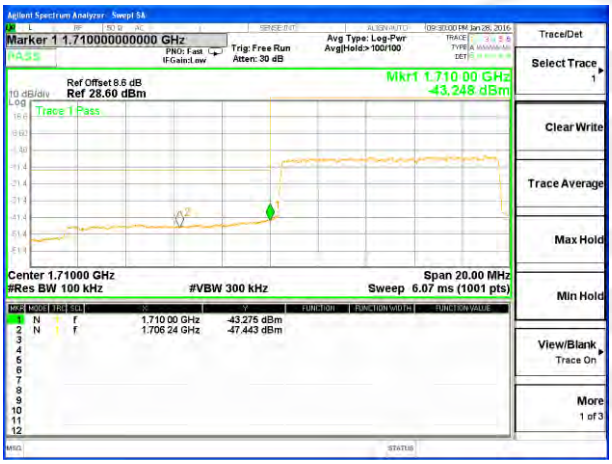
LTE band 4

LTE Band 4 / 5MHz /QPSK	
Lowest Band Edge / 1 RB	**Highest Band Edge / 1 RB**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

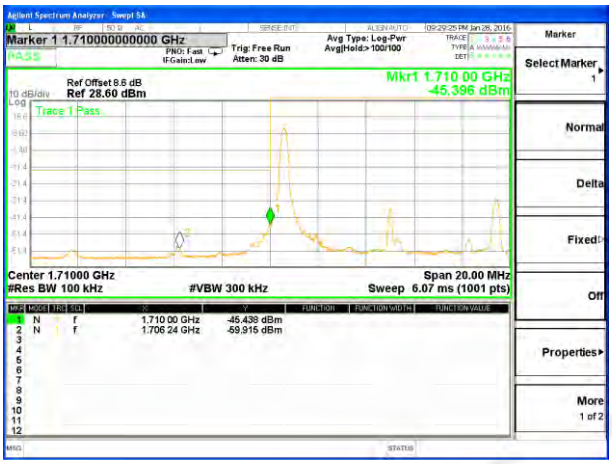
LTE band 4

LTE Band 4 / 5MHz /16QAM	
Lowest Band Edge / 1 RB	**Highest Band Edge / 1 RB**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

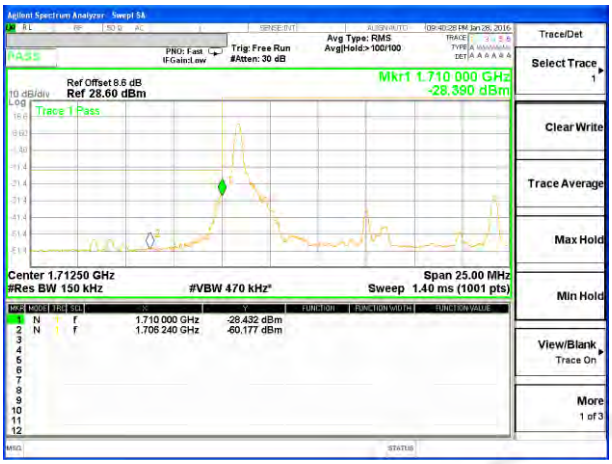
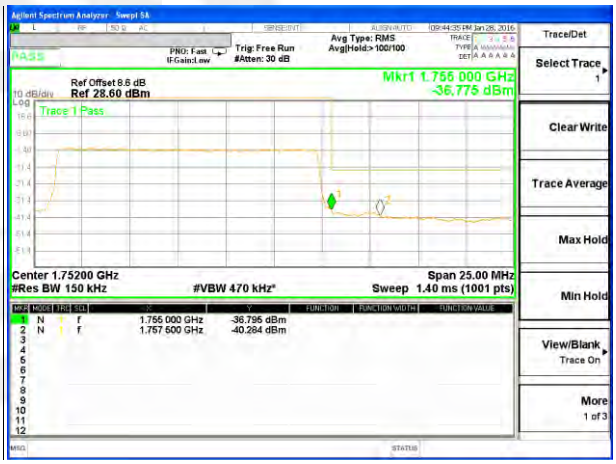
LTE band 4

LTE Band 4 / 10MHz /QPSK	
Lowest Band Edge / 1 RB	**Highest Band Edge / 1 RB**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

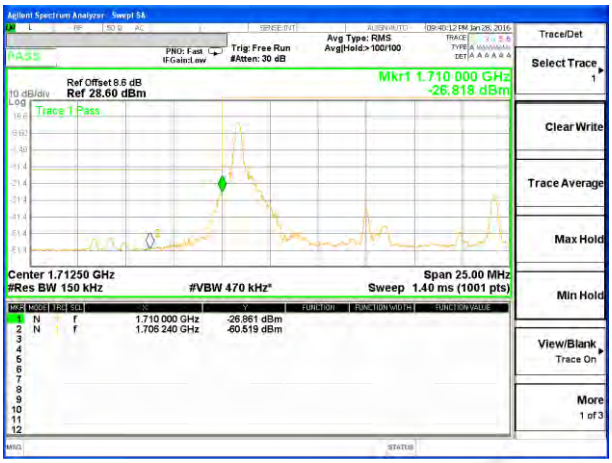
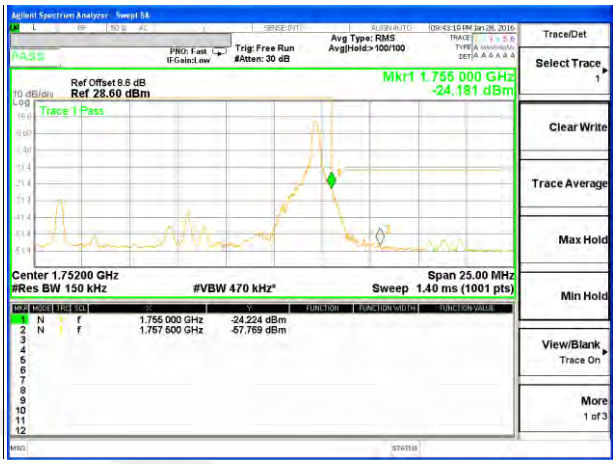
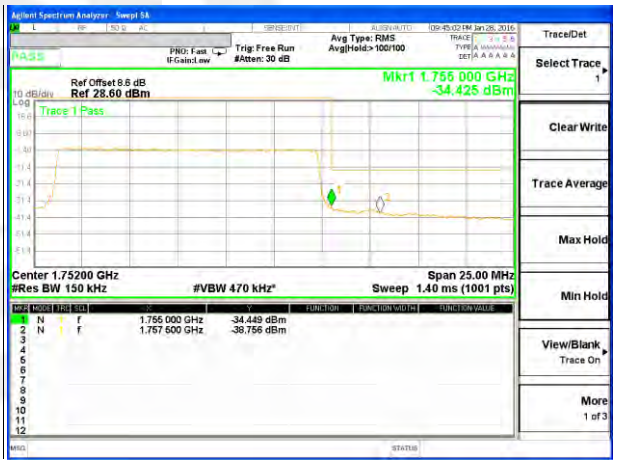
LTE band 4

LTE Band 4 / 10MHz /16QAM	
Lowest Band Edge / 1 RB	**Highest Band Edge / 1 RB**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

LTE band 4

LTE Band 4 / 15MHz /QPSK	
Lowest Band Edge / 1 RB	**Highest Band Edge / 1 RB**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

LTE band 4

LTE Band 4 / 15MHz /16QAM	
Lowest Band Edge / 1 RB	**Highest Band Edge / 1 RB**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

LTE band 4

LTE Band 4 / 20MHz /QPSK	
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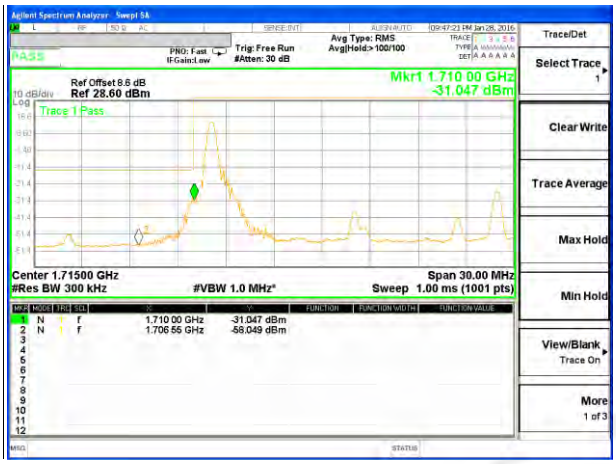
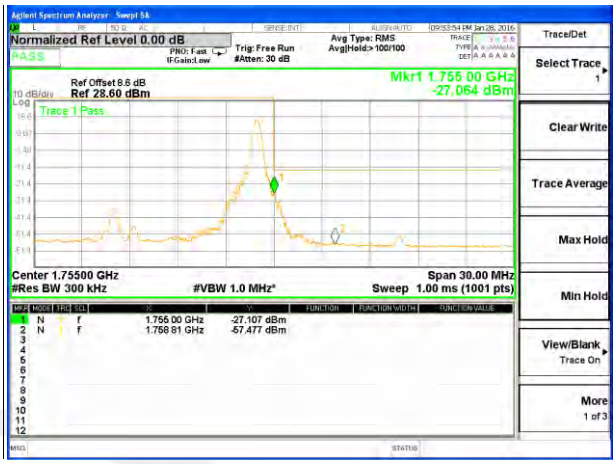
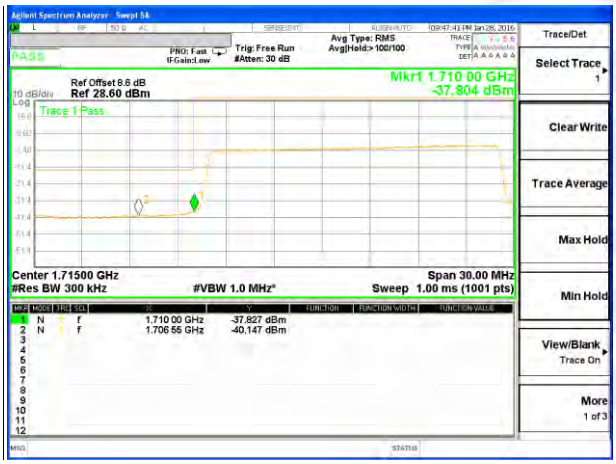
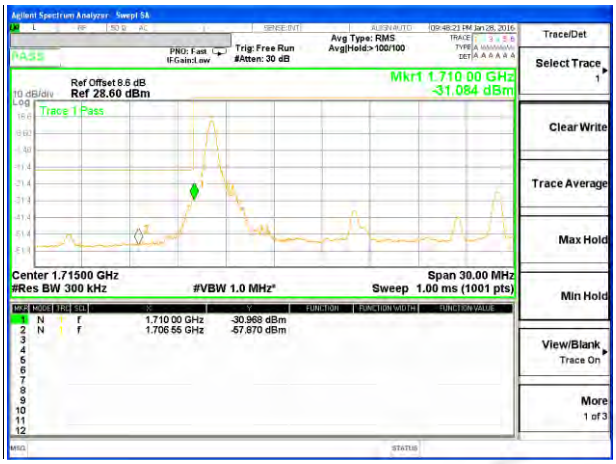
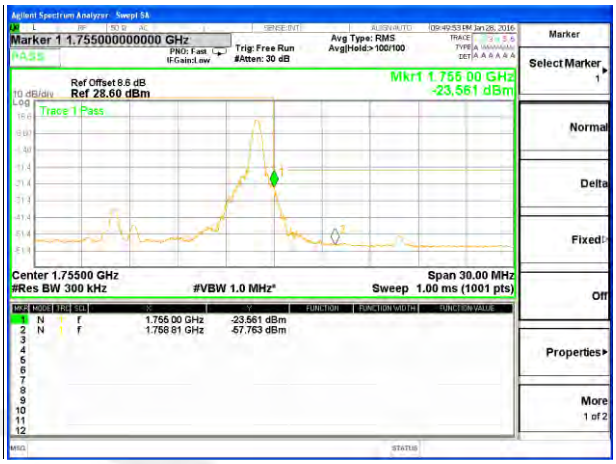
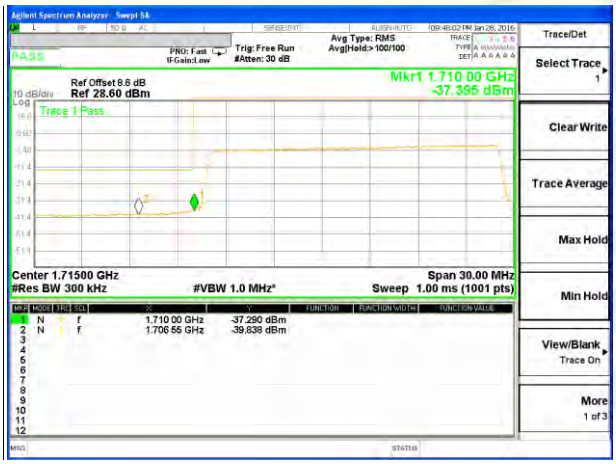
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

LTE band 4

LTE Band 4 / 20MHz /16QAM	
Lowest Band Edge / 1 RB	**Highest Band Edge / 1 RB**
	
Lowest Band Edge / Full RB	**Highest Band Edge / Full RB**
	

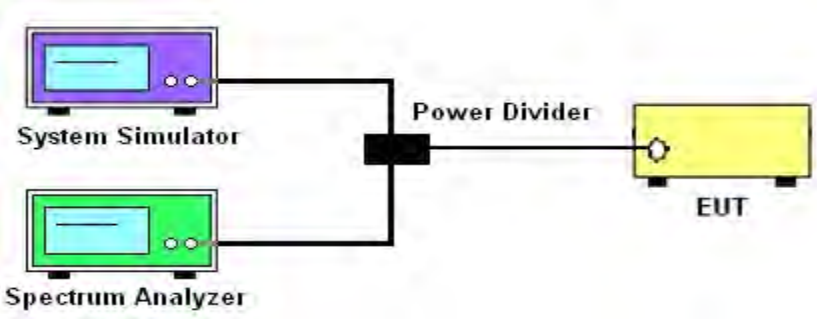
8. CONDUCTED SPURIOUS EMISSION

8.1 DESCRIPTION OF CONDUCTED SPURIOUS EMISSION MEASUREMENT

8.1.1 MEASUREMENT METHOD

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.

8.1.2 TEST SETUP



8.1.3 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. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.

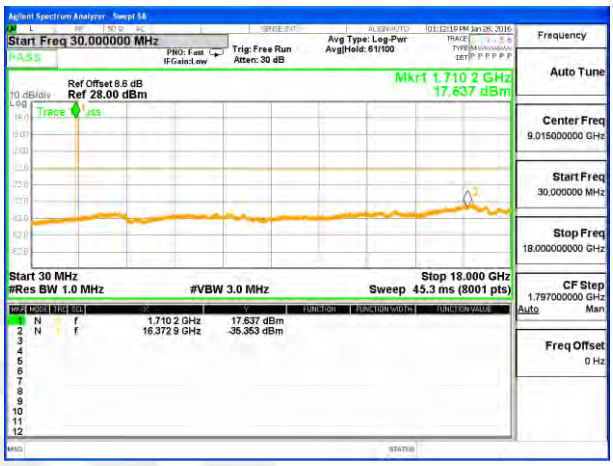
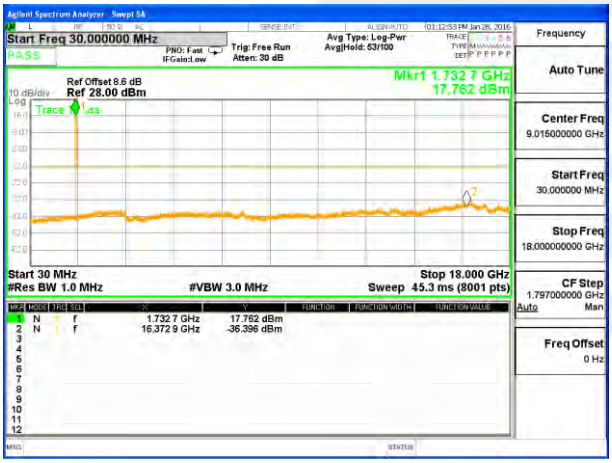
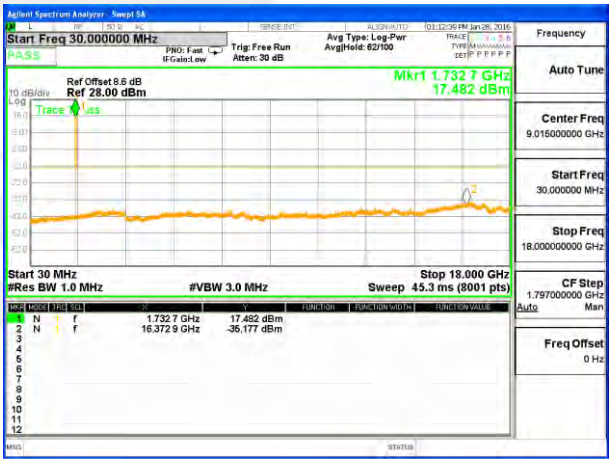
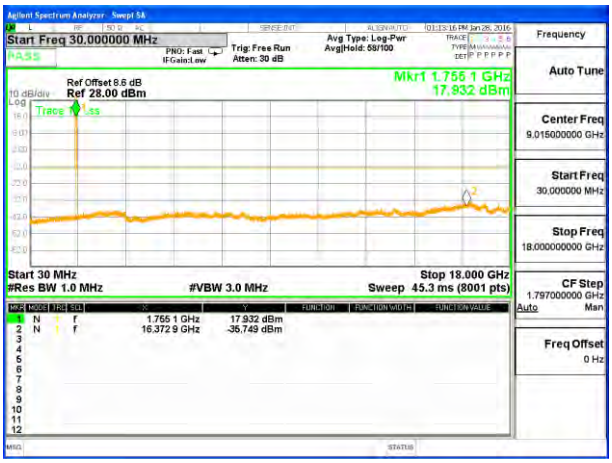
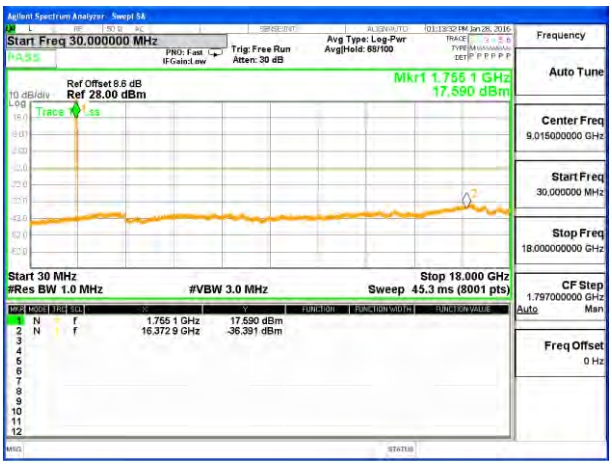
5. The RF fundamental frequency should be excluded against the limit line in the operating frquency band.

6.The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
= P(W)- [43 + 10log(P)] (dB) = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
= -13dBm.

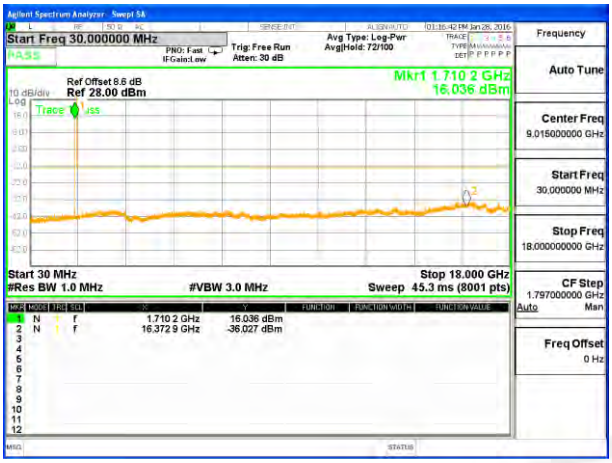
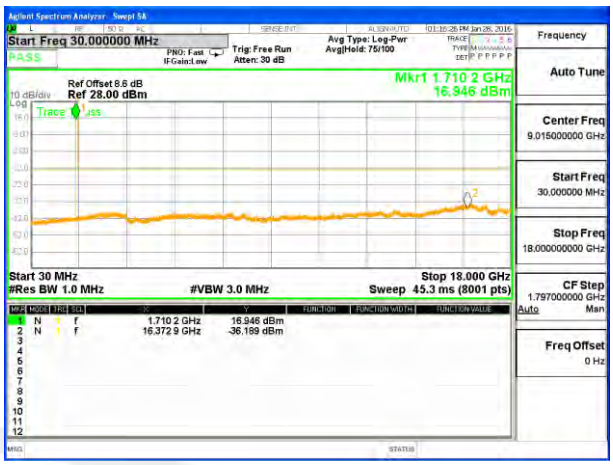
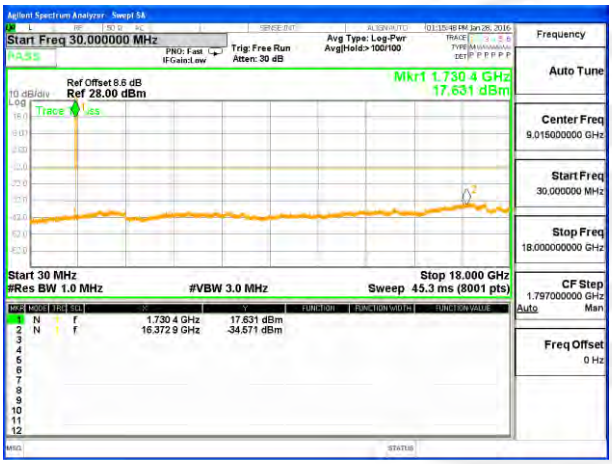
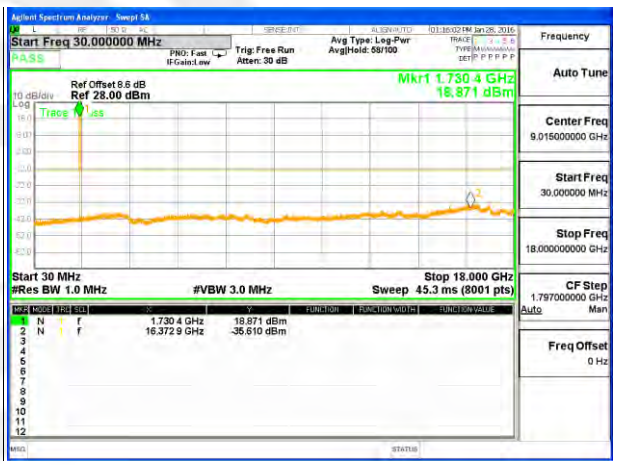
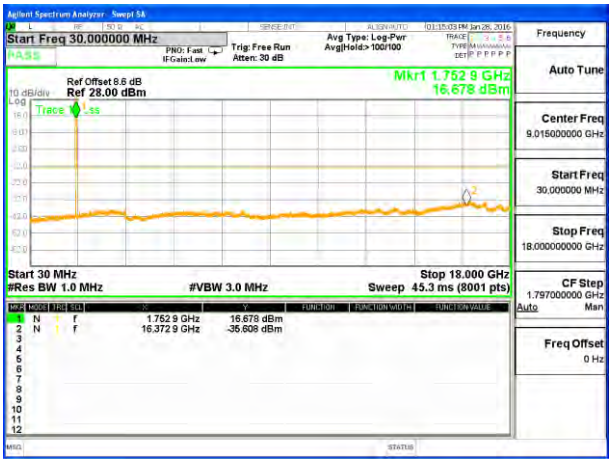
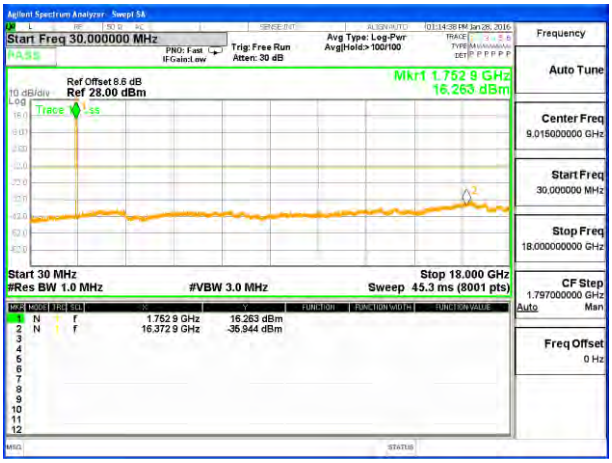
	LTE					
LTE BW	1.4M	3M	5M	10M	15M	20M
Span	Auto	Auto	Auto	Auto	Auto	Auto
RBW	1000kHz	1000kHz	1000kHz	1000kHz	1000kHz	1000kHz
VBW	3000kHz	3000kHz	3000kHz	3000kHz	3000kHz	3000kHz
Detector	PK	PK	PK	PK	PK	PK
Trace	Max	Max	Max	Max	Max	Max

8.1.4 TEST RESULTS

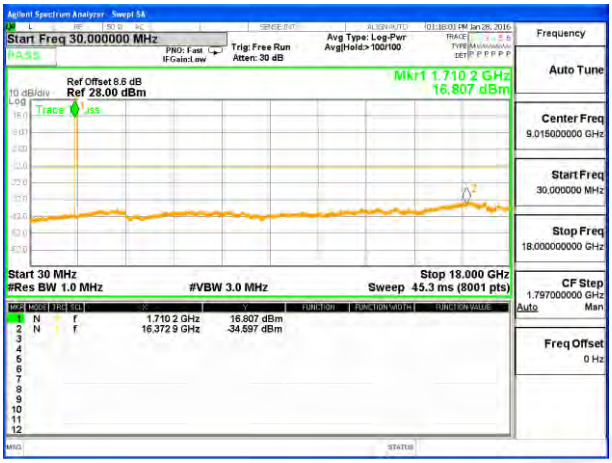
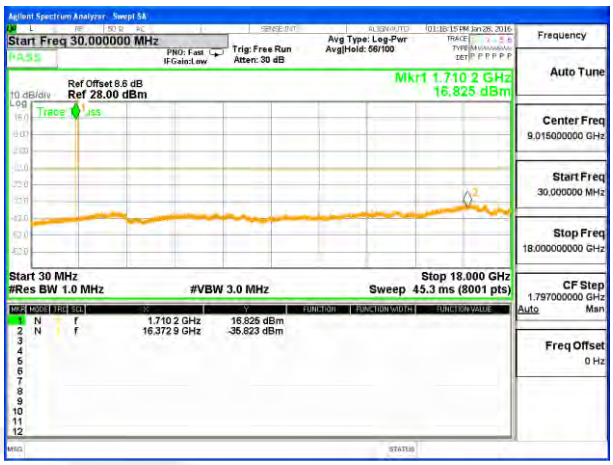
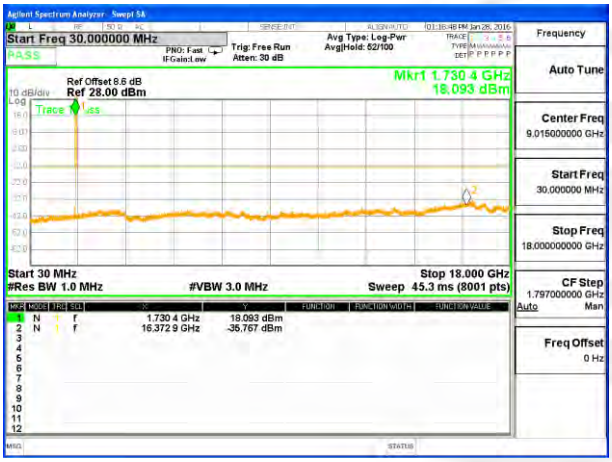
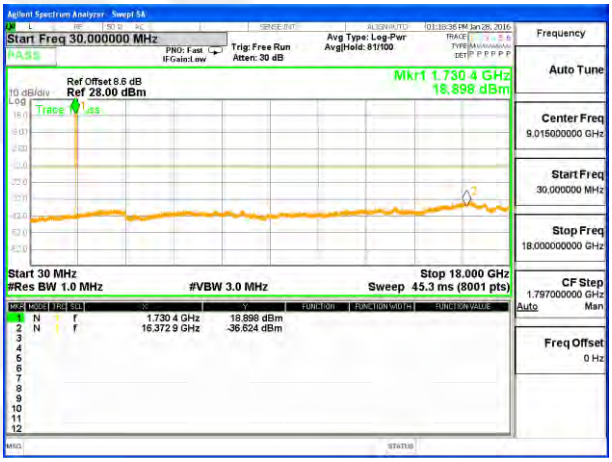
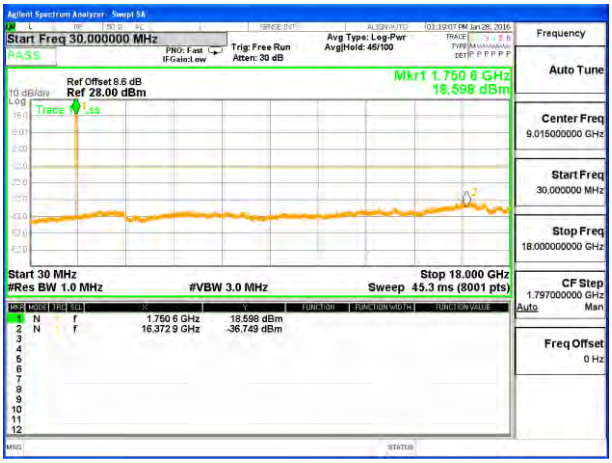
LTE BAND 4

LTE Band 4 / 1.4MHz /Emission	
Lowest Channel / QPSK	**Lowest Channel / 16QAM**
	
Middle Channel / QPSK	**Middle Channel / 16QAM**
	
Highest Channel / QPSK	**Highest Channel / 16QAM**
	

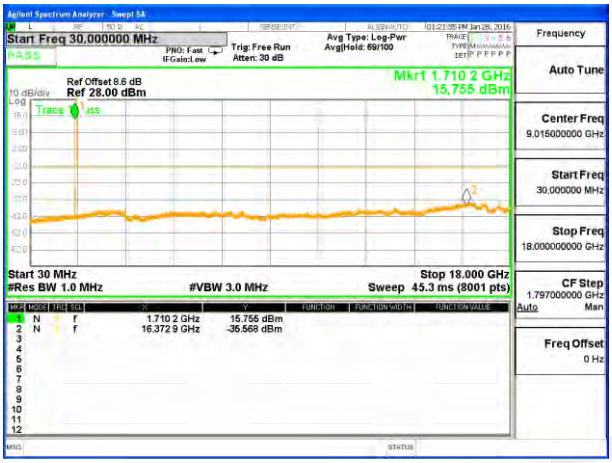
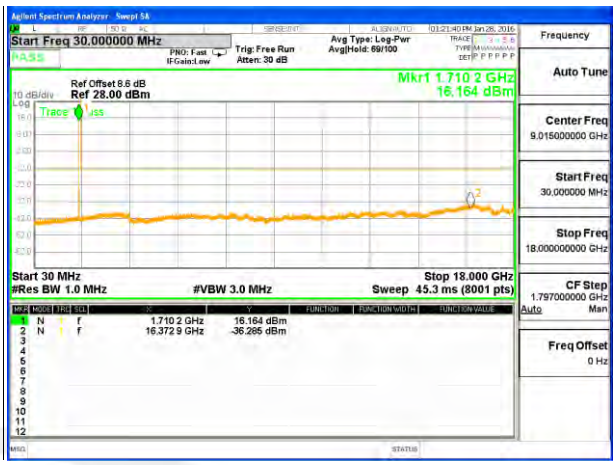
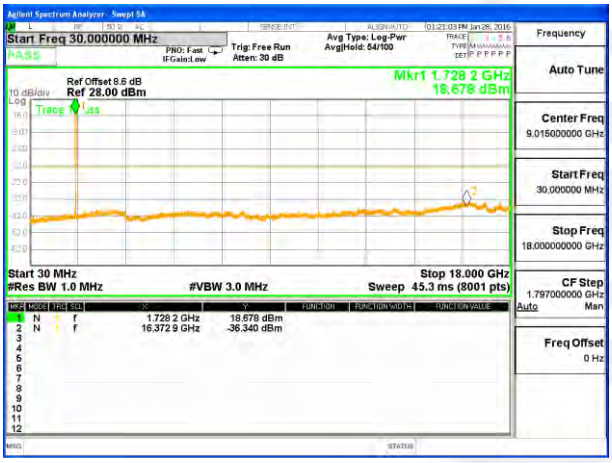
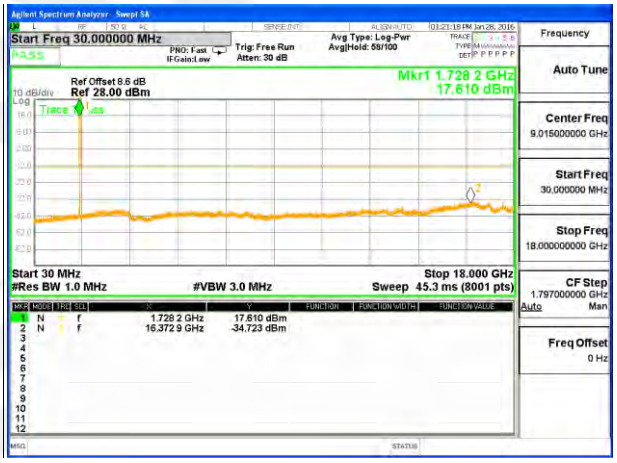
LTE BAND 4

LTE Band 4 / 3MHz /Emission	
Lowest Channel / QPSK	Lowest Channel / 16QAM
	
Middle Channel / QPSK	Middle Channel / 16QAM
	
Highest Channel / QPSK	Highest Channel / 16QAM
	

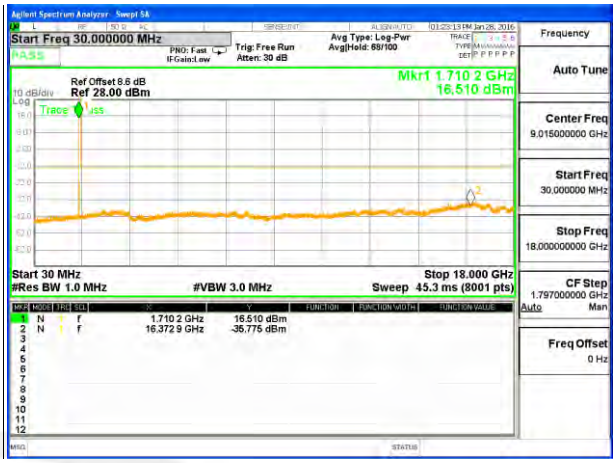
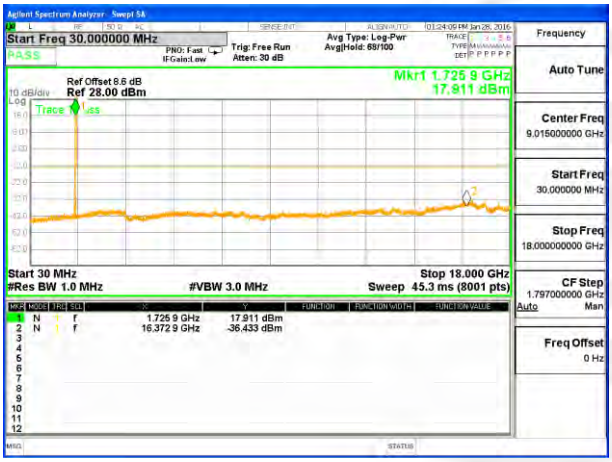
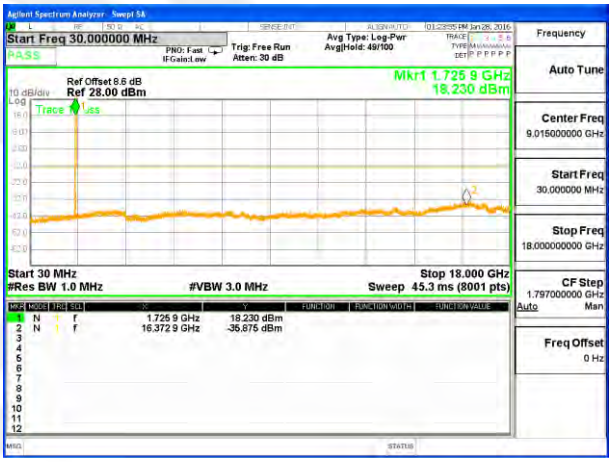
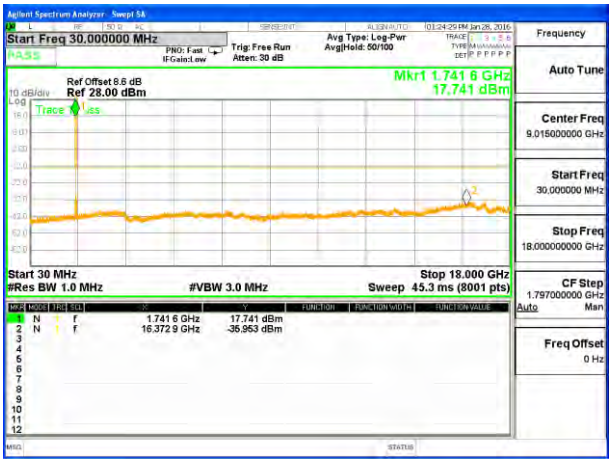
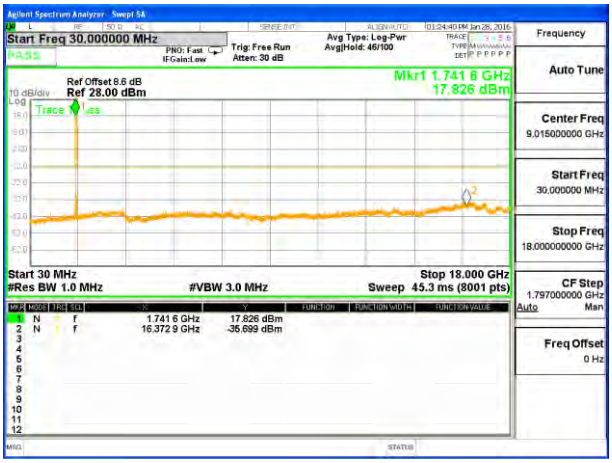
LTE BAND 4

LTE Band 4 / 5MHz /Emission	
Lowest Channel / QPSK	Lowest Channel / 16QAM
	
Middle Channel / QPSK	Middle Channel / 16QAM
	
Highest Channel / QPSK	Highest Channel / 16QAM
	

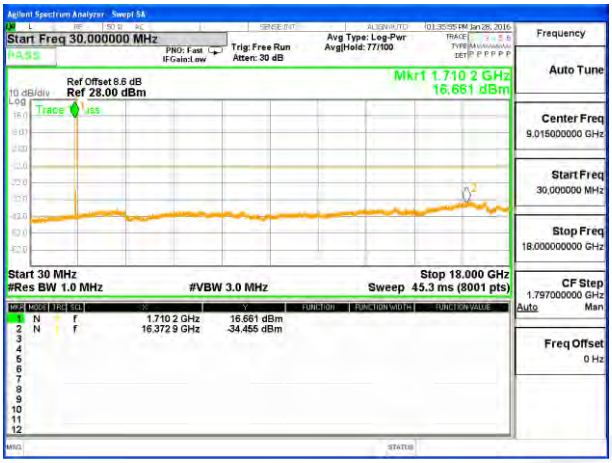
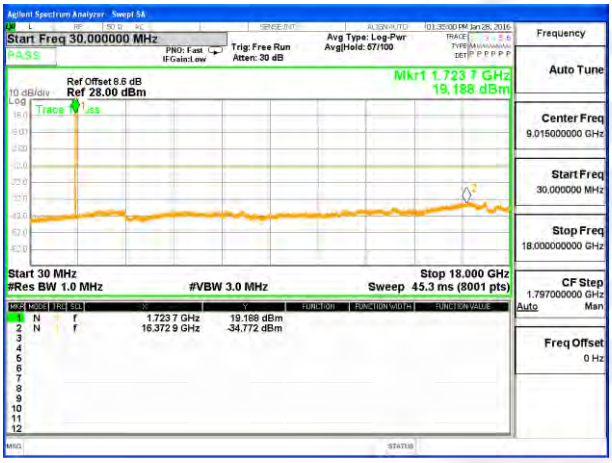
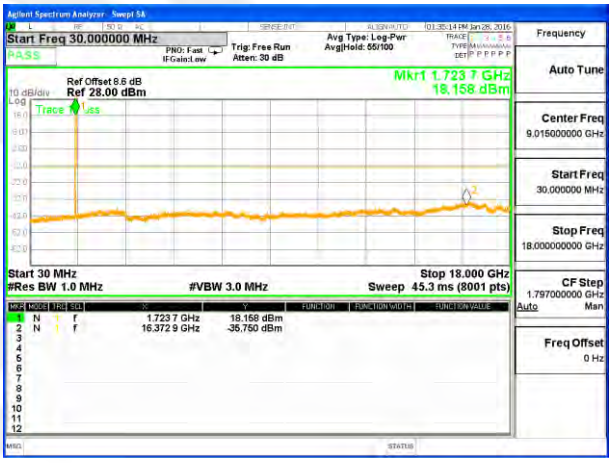
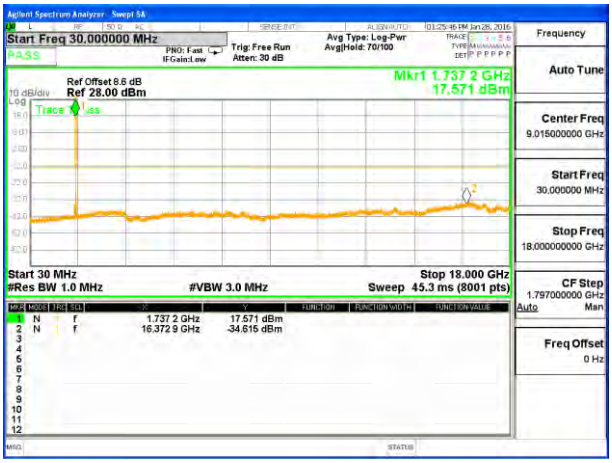
LTE BAND 4

LTE Band 4 / 10MHz /Emission	
Lowest Channel / QPSK	**Lowest Channel / 16QAM**
	
Middle Channel / QPSK	**Middle Channel / 16QAM**
	
Highest Channel / QPSK	**Highest Channel / 16QAM**
	

LTE BAND 4

LTE Band 4 / 15MHz /Emission	
Lowest Channel / QPSK	**Lowest Channel / 16QAM**
	
Middle Channel / QPSK	**Middle Channel / 16QAM**
	
Highest Channel / QPSK	**Highest Channel / 16QAM**
	

LTE BAND 4

LTE Band 4 / 20MHz /Emission	
Lowest Channel / QPSK	**Lowest Channel / 16QAM**
	
Middle Channel / QPSK	**Middle Channel / 16QAM**
	
Highest Channel / QPSK	**Highest Channel / 16QAM**
	

9. RADIATED SPURIOUS EMISSION

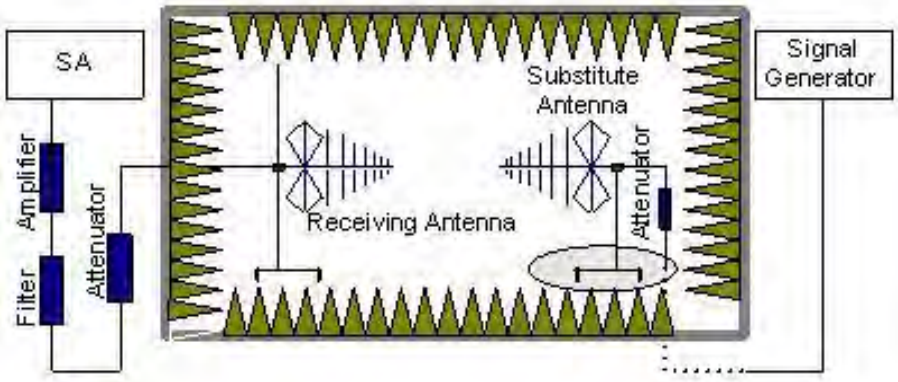
9.1 DESCRIPTION OF RADIATED SPURIOUS EMISSION

9.1.1 MEASUREMENT METHOD

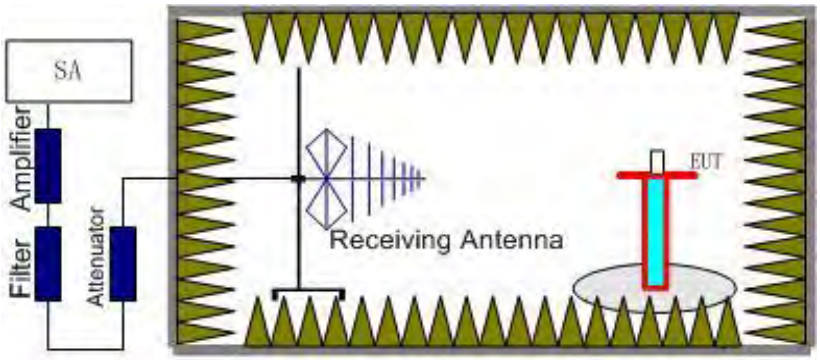
The radiated spurious emission was measured by substitution method according to ANSI / TIA / EIA-603-C-2004. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.
For Band 7 The power 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 Band.The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

5.1.2 Test Setup

The procedure of radiated spurious emissions is as follows:
a) Pre-calibration With pre-calibration method, the Radiated Spurious Emissions(RSE) is calculated as, RSE=Rx（dBuV）+CL（dB）+SA（dB）+Gain（dBi）-107（dBuV to dBm）The SA is calibrated using following setup.



b) EUT was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the test item for emission measurements. The height of receiving antenna is 0.8m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the test item and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1MHz bandwidth.



Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of any band into any of the other blocks.

The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established and the ARpl is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss and the air loss. The measurement results are obtained as described below: Power=PMea+ARpl

9.1.3 TEST PROCEDURES

1. The testing follows FCC KDB 971168 v02r02 Section 5.8 and ANSI / TIA-603-C-2009 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 + 10log(P)dB below the transmitter power P(Watts)
= P(W)- [43 + 10log(P)] (dB)
= [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
= -13dBm
.
For Band 7:
The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)
= [30 + 10log(P)] (dBm) - [55 + 10log(P)] (dB)
= -25dBm
EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
ERP (dBm) = EIRP - 2.15

9.1.4 TEST RESULTS

LTE BAND 4

LTE Band 4 / 1.4MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Margin	Polarity
3420.392	-31.45	0.31	-31.14	-13	-18.14	Horizontal
5130.600	-33.85	3.98	-29.87	-13	-16.87	Horizontal
6843.810	-41.53	10.50	-31.03	-13	-18.03	Horizontal
3420.398	-35.56	0.30	-35.26	-13	-22.26	Vertical
5130.593	-34.64	3.98	-30.66	-13	-17.66	Vertical
6843.812	-42.64	10.50	-32.14	-13	-19.14	Vertical
LTE Band 4 / 1.4MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Margin	Polarity
3462.110	-36.43	0.31	-36.12	-13	-23.12	Horizontal
5198.214	-32.21	3.98	-28.23	-13	-15.23	Horizontal
6927.200	-42.86	10.50	-32.36	-13	-19.36	Horizontal
3462.106	-31.67	0.30	-31.37	-13	-18.37	Vertical
5198.217	-36.46	3.98	-32.48	-13	-19.48	Vertical
6927.200	-37.74	10.50	-27.24	-13	-14.24	Vertical
LTE Band 4 / 1.4MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Margin	Polarity
3511.401	-32.86	0.31	-32.55	-13	-19.55	Horizontal
5261.398	-35.53	3.98	-31.55	-13	-18.55	Horizontal
7018.200	-37.45	10.50	-26.95	-13	-13.95	Horizontal
3511.396	-32.56	0.30	-32.26	-13	-19.26	Vertical
5261.403	-41.46	3.98	-37.48	-13	-24.48	Vertical
7018.204	-38.35	10.50	-27.85	-13	-14.85	Vertical

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

LTE BAND 4

LTE Band 4 / 3MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Margin	Polarity
3420.395	-31.68	0.31	-31.37	-13	-18.37	Horizontal
5128.596	-33.97	3.98	-29.99	-13	-16.99	Horizontal
6843.808	-41.46	10.50	-30.96	-13	-17.96	Horizontal
3420.397	-35.86	0.30	-35.56	-13	-22.56	Vertical
5128.593	-34.57	3.98	-30.59	-13	-17.59	Vertical
6843.811	-42.36	10.50	-31.86	-13	-18.86	Vertical
LTE Band 4 / 3MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Margin	Polarity
3462.111	-36.76	0.31	-36.45	-13	-23.45	Horizontal
5191.212	-32.46	3.98	-28.48	-13	-15.48	Horizontal
6927.195	-42.78	10.50	-32.28	-13	-19.28	Horizontal
3462.105	-31.45	0.30	-31.15	-13	-18.15	Vertical
5191.219	-36.83	3.98	-32.85	-13	-19.85	Vertical
6927.197	-37.57	10.50	-27.07	-13	-14.07	Vertical
LTE Band 4 / 3MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Margin	Polarity
3504.606	-32.89	0.31	-32.58	-13	-19.58	Horizontal
5254.403	-35.96	3.98	-31.98	-13	-18.98	Horizontal
7011.202	-37.12	10.50	-26.62	-13	-13.62	Horizontal
3504.606	-32.38	0.30	-32.08	-13	-19.08	Vertical
5254.406	-41.23	3.98	-37.25	-13	-24.25	Vertical
7011.204	-38.28	10.50	-27.78	-13	-14.78	Vertical

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

LTE BAND 4

LTE Band 4 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Margin	Polarity
3420.397	-31.47	0.31	-31.16	-13	-18.16	Horizontal
5128.599	-33.89	3.98	-29.91	-13	-16.91	Horizontal
6843.804	-41.66	10.50	-31.16	-13	-18.16	Horizontal
3420.391	-35.39	0.30	-35.09	-13	-22.09	Vertical
5128.597	-34.53	3.98	-30.55	-13	-17.55	Vertical
6843.805	-42.06	10.50	-31.56	-13	-18.56	Vertical
LTE Band 4 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Margin	Polarity
3464.104	-36.94	0.31	-36.63	-13	-23.63	Horizontal
5190.220	-32.55	3.98	-28.57	-13	-15.57	Horizontal
6928.195	-42.45	10.50	-31.95	-13	-18.95	Horizontal
3464.104	-31.94	0.30	-31.64	-13	-18.64	Vertical
5190.216	-36.53	3.98	-32.55	-13	-19.55	Vertical
6928.195	-37.65	10.50	-27.15	-13	-14.15	Vertical
LTE Band 4 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Margin	Polarity
3462.603	-32.65	0.31	-32.34	-13	-19.34	Horizontal
5191.401	-35.52	3.98	-31.54	-13	-18.54	Horizontal
6920.205	-37.61	10.50	-27.11	-13	-14.11	Horizontal
3462.604	-32.47	0.30	-32.17	-13	-19.17	Vertical
5191.400	-41.8	3.98	-37.82	-13	-24.82	Vertical
6920.207	-38.67	10.50	-28.17	-13	-15.17	Vertical

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

LTE BAND 4

LTE Band 4 / 10MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Margin	Polarity
3420.394	-31.72	0.31	-31.41	-13	-18.41	Horizontal
5132.599	-33.51	3.98	-29.53	-13	-16.53	Horizontal
6843.804	-41.77	10.50	-31.27	-13	-18.27	Horizontal
3420.394	-35.94	0.30	-35.64	-13	-22.64	Vertical
5132.595	-34.54	3.98	-30.56	-13	-17.56	Vertical
6843.801	-42.32	10.50	-31.82	-13	-18.82	Vertical
LTE Band 4 / 10MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Margin	Polarity
3455.106	-36.45	0.31	-36.14	-13	-23.14	Horizontal
5184.212	-32.48	3.98	-28.5	-13	-15.5	Horizontal
6928.199	-42.68	10.50	-32.18	-13	-19.18	Horizontal
3455.104	-31.59	0.30	-31.29	-13	-18.29	Vertical
5184.213	-36.35	3.98	-32.37	-13	-19.37	Vertical
6913.197	-37.48	10.50	-26.98	-13	-13.98	Vertical
LTE Band 4 / 10MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Margin	Polarity
3490.608	-32.48	0.31	-32.17	-13	-19.17	Horizontal
5240.401	-35.34	3.98	-31.36	-13	-18.36	Horizontal
6983.206	-37.52	10.50	-27.02	-13	-14.02	Horizontal
3490.613	-32.56	0.30	-32.26	-13	-19.26	Vertical
5240.404	-41.43	3.98	-37.45	-13	-24.45	Vertical
6983.200	-38.25	10.50	-27.75	-13	-14.75	Vertical

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

LTE BAND 4

LTE Band 4 / 15MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Margin	Polarity
3420.398	-31.63	0.31	-31.32	-13	-18.32	Horizontal
5135.599	-33.61	3.98	-29.63	-13	-16.63	Horizontal
6843.812	-41.47	10.50	-30.97	-13	-17.97	Horizontal
3420.396	-35.73	0.30	-35.43	-13	-22.43	Vertical
5135.596	-34.63	3.98	-30.65	-13	-17.65	Vertical
6843.805	-42.77	10.50	-32.27	-13	-19.27	Vertical
LTE Band 4 / 15MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Margin	Polarity
3455.108	-36.58	0.31	-36.27	-13	-23.27	Horizontal
5177.215	-32.87	3.98	-28.89	-13	-15.89	Horizontal
6906.197	-42.55	10.50	-32.05	-13	-19.05	Horizontal
3455.110	-31.68	0.30	-31.38	-13	-18.38	Vertical
5177.214	-36.62	3.98	-32.64	-13	-19.64	Vertical
6906.200	-37.58	10.50	-27.08	-13	-14.08	Vertical
LTE Band 4 / 15MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Margin	Polarity
3483.611	-32.62	0.31	-32.31	-13	-19.31	Horizontal
5226.397	-35.63	3.98	-31.65	-13	-18.65	Horizontal
6962.200	-37.51	10.50	-27.01	-13	-14.01	Horizontal
3508.604	-32.73	0.30	-32.43	-13	-19.43	Vertical
5226.403	-41.56	3.98	-37.58	-13	-24.58	Vertical
6962.208	-38.57	10.50	-28.07	-13	-15.07	Vertical

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

LTE BAND 4

LTE Band 4 / 20MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Margin	Polarity
3420.391	-31.63	0.31	-31.32	-13	-18.32	Horizontal
5135.593	-33.71	3.98	-29.73	-13	-16.73	Horizontal
6843.808	-41.57	10.50	-31.07	-13	-18.07	Horizontal
3420.398	-35.48	0.30	-35.18	-13	-22.18	Vertical
5135.599	-34.52	3.98	-30.54	-13	-17.54	Vertical
6843.808	-42.88	10.50	-32.38	-13	-19.38	Vertical
LTE Band 4 / 20MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Margin	Polarity
3448.106	-36.88	0.31	-36.57	-13	-23.57	Horizontal
5170.218	-32.62	3.98	-28.64	-13	-15.64	Horizontal
6892.194	-42.51	10.50	-32.01	-13	-19.01	Horizontal
3448.109	-31.56	0.30	-31.26	-13	-18.26	Vertical
5170.218	-36.46	3.98	-32.48	-13	-19.48	Vertical
6892.197	-37.25	10.50	-26.75	-13	-13.75	Vertical
LTE Band 4 / 20MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Margin	Polarity
3476.606	-32.06	0.31	-31.75	-13	-18.75	Horizontal
5212.401	-35.63	3.98	-31.65	-13	-18.65	Horizontal
6948.207	-37.51	10.50	-27.01	-13	-14.01	Horizontal
3476.608	-32.45	0.30	-32.15	-13	-19.15	Vertical
5212.401	-41.57	3.98	-37.59	-13	-24.59	Vertical
6948.204	-38.12	10.50	-27.62	-13	-14.62	Vertical

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

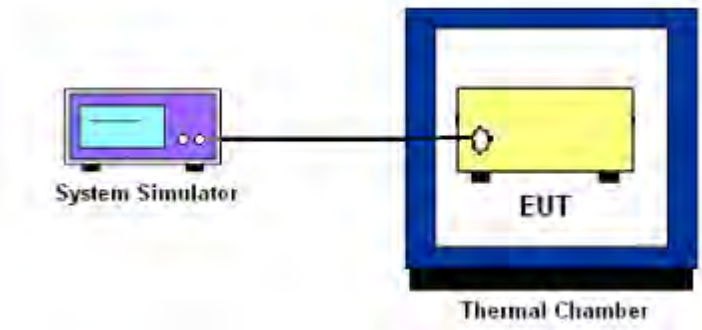
10. FREQUENCY STABILITY

10.1 DESCRIPTION OF FREQUENCY STABILITY MEASUREMENT

10.1.1 MEASUREMENT METHOD

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency.

10.1.2 Test Setup



10.1.3 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°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°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

10.1.4 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±5° C and connected with the system simlator.

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.

10.1.4 MEASUREMENT RESULT

LTE BAND 4

Test Conditions		LTE Band 4 (QPSK) / Middle Channel 1732.5MHz		Limit
Temperature (°C)	Voltage (Volt)	BW 10MHz		Note 2.
		Deviation (Hz)	Deviation (ppm)	Result
50°C	Normal Votage	25	0.014	PASS
30°C	Normal Votage	29	0.017	
20°C	Normal Votage	22	0.013	
10°C	Normal Votage	-24	-0.014	
0°C	Normal Votage	-35	-0.020	
-10°C	Normal Votage	23	0.013	
-20°C	Normal Votage	18	0.010	
-30°C	Normal Votage	21	0.012	
20°C	Maximum Votage	-22	-0.013	
20°C	Normal Votage	-21	-0.012	
20°C	Battery End Point	27	0.016	

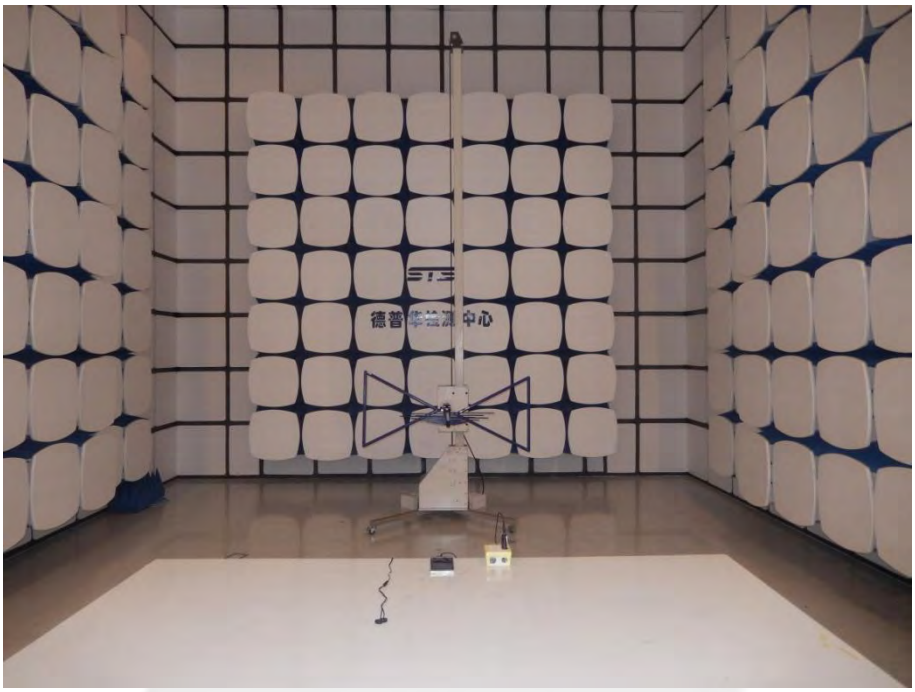
Note:

1. Normal Voltage = 3.7V. ； Battery End Point (BEP) = 3.5 V.； Maximum Voltage = 4.2 V

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

PHOTOS OF TEST SETUP

RADIATED SPURIOUS EMISSION



※※※※※END OF THE REPORT※※※※※