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RADIO TEST REPORT

Report No:STS1901136W01

Issued for

Nubia Technology Co.,Ltd

10/F, Tower A, Hans Innovation Mansion, North Ring Rd.,
No.9018, High-Tech Park, Nanshan District, Shenzhen, China

Product Name:	NX619J
Brand Name:	NUOIO
Model Name:	NX619J
Series Model:	N/A
FCC ID:	2AHJO-NX619J
Test Standard:	Part 90 December 20, 2018



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TEST RESULT CERTIFICATION

Applicant's name: Nubia Technology Co.,Ltd
Address: 10/F, Tower A, Hans Innovation Mansion, North Ring Rd., No.9018, High-Tech Park, Nanshan District, Shenzhen, China
Manufacture's Name: Nubia Technology Co.,Ltd
Address: 10/F, Tower A, Hans Innovation Mansion, North Ring Rd., No.9018, High-Tech Park, Nanshan District, Shenzhen, China

Product description

Product Name.....: NX619J
Brand Name: NUOIO
Model Name: NX619J
Series Model.....: N/A

Test Standards.....: Part 90 December 20, 2018
Test procedure.....: KDB 971168 D01 v03r01 , ANSI C63.26 2015

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: 09 Jan. 2019~10 Jan. 2019
Date of Issue.....: 12 Jan. 2019
Test Result.....: Pass

Testing Engineer : [Signature]
(Chris chen)

Technical Manager : [Signature]
(Sunday Hu)

Authorized Signatory : [Signature]
(Vita Li)





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Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	12 Jan. 2019	STS1901136W01	ALL	Initial Issue





1. TEST FACTORY & MEASUREMENT UNCERTAINTY

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

FCC Registration No.: 625569

IC Registration No.: 12108A; A2LA Certificate No.: 4338.01;

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded 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	RF output power,conducted	± 0.71 dB
2	Unwanted Emissions,conducted	± 0.63 dB
3	All emissions,radiated 30-200MHz	± 3.43 dB
4	All emissions,radiated 200MHz-1GHz	± 3.57 dB
5	All emissions,radiated>1G	± 4.13 dB
6	Conducted Emission(9KHz-150KHz)	± 3.18 dB
7	Conducted Emission(150KHz-30MHz)	± 2.70 dB



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 Name:	NX619J
Trade Name	NUOIO
Model Name	NX619J
Series Model	N/A
Model Difference	N/A
Frequency Bands:	U.S. Bands: <input type="checkbox"/> LTE FDD Band 2 <input type="checkbox"/> LTE FDD Band 4 <input type="checkbox"/> LTE FDD Band 5 <input type="checkbox"/> LTE FDD Band 7 <input checked="" type="checkbox"/> LTE FDD Band 18 <input type="checkbox"/> LTE FDD Band 13 <input type="checkbox"/> LTE FDD Band 17 <input type="checkbox"/> LTE TDD Band 25 <input checked="" type="checkbox"/> LTE FDD Band 26 <input type="checkbox"/> LTE TDD Band 41
SIM CARD:	SIM 1 and SIM 2 is a chipset unit and tested as single chipset, SIM 1 is used to tested
Antenna:	PIFA Antenna
Antenna gain:	LTE Band 18: 1.22dBi LTE Band 26: 1.22dBi
Power Supply:	DC 3.85V by battery
Battery parameter:	Capacity: 3800mAh, Rated Voltage: 3.85V Charge Limit: DC 4.4V
Adapter:	Input1: AC1000-240V, 500mA, 50/60Hz Input1: AC1000-240V, 500mA, 50/60Hz Output1: DC12V, 1500mA DC9V, 2000mA; DC5V, 3000mA Output2: DC9-12V, 1500mA DC6-9V,2000mA; DC3.6-6V, 3000mA
Extreme Vol. Limits:	DC 3.5 V to 4.4 V (Nominal DC3.85V)
Extreme Temp. Tolerance:	-30°C to +50°C
Hardware version number:	NX619J_V1AMB
Software version number:	NX619J_ENCommon_V1.03



2.1.2 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Product Specification Subjective To This Standard	
Tx Frequency	LTE Band 18:815~830MHz LTE Band 26:814~824MHz
Rx Frequency	LTE Band 18:860~875MHz LTE Band 26: 859~869MHz
Bandwidth	LTE Band 18 : 5MHz / 10MHz / 15MHz LTE Band 26 : 1.4MHz / 3MHz / 5MHz / 10MHz
Maximum Output Power Limit	LTE Band 18: 22.31 dBm LTE Band 26 : 21.75dBm
Type of Modulation	QPSK / 16QAM/64QAM





2.1.3 EMISSION DESIGNATOR

LTE Band 18 BW(MHz)	Emission Designator (26dBc)QPSK	Emission Designator (26dBc)16QAM	Emission Designator (26dBc)64QAM
5	4M83G7D	4M83W7D	4M80W7D
10	9M37G7D	9M31W7D	9M39W7D
15	13M9G7D	13M7W7D	13M9W7D

LTE Band 26 BW(MHz)	Emission Designator (26dBc)QPSK	Emission Designator (26dBc)16QAM	Emission Designator (26dBc)64QAM
1.4	1M25G7D	1M23W7D	1M23W7D
3	2M94G7D	2M93W7D	2M79W7D
5	4M83G7D	4M79W7D	4M78W7D
10	9M38G7D	9M34W7D	9M36W7D



2.1.4 TEST CONFIGURATION OF EQUIPMENT UNDER TEST

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 v03r01 and ANSI C63.26 2015 Power Meas. License Digital Systems with maximum output power. Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find 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	64QAM	1	Half	Full	L	M	H
Max. Output Power	18			v	v	v		v	v	v	v	v	v	v	v	v
	26	v	v	v	v			v	v	v	v	v	v	v	v	v
26dB&99% Bandwidth	18			v	v			v	v	v			v	v	v	v
	26	v	v	v	v	v		v	v	v			v	v	v	v
Conducted Band Edge	18			v	v	v		v	v	v	v		v	v	v	v
	26	v	v	v	v			v	v	v	v		v	v	v	v
Conducted Spurious Emission	18			v	v	v		v	v	v	v			v	v	v
	26	v	v	v	v			v	v	v	v			v	v	v
Frequency Stability	18				v			v					v		v	
	26				v			v					v		v	
E.R.P.& E.I.R.P.	18			v	v	v		v	v	v	v			v	v	v
	26	v	v	v	v			v	v	v	v			v	v	v
Radiated Spurious Emission	18			v	v	v		v			v			v	v	v
	26	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 Part 90

2.1.6 SPECIAL ACCESSORIES

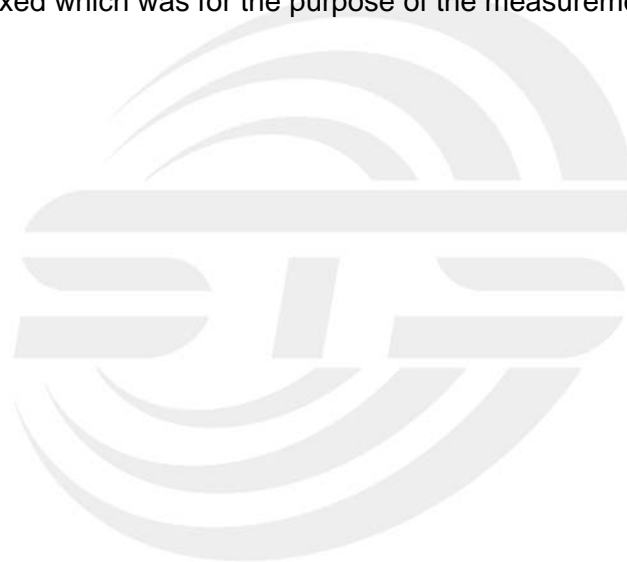
The battery and the charger, earphone supplied by the applicant were used as accessories and being tested with eut intended for fcc grant together.

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.

E-1
EUT

Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	Serial No.	Note
N/A	N/A	N/A	N/A	N/A

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.



2.1.10 MEASUREMENT INSTRUMENTS

The radiated emission testing was performed according to the procedures of ANSI C63.26 2015 and FCC Part 90

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2018.10.13	2019.10.12
Signal Analyzer	Agilent	N9020A	MY51110105	2018.03.08	2019.03.07
Wireless Communications Test Set	R&S	CMW 500	133884	2018.03.11	2019.03.10
Bilog Antenna	TESEQ	CBL6111D	34678	2017.11.02	2020.11.1
Horn Antenna	Schwarzbeck	BBHA 9120D(1201)	9120D-1343	2017.10.27	2020.10.26
SHF-EHF Horn Antenna (15G-40GHz)	A-INFO	LB-180400-KF	J211020657	2018.03.11	2019.03.10
Pre-mpifier (0.1M-3GHz)	EM	EM330	060665	2018.03.09	2019.03.08
PreAmplifier (1G-18GHz)	SKET	LNPA-01018G-45	SK2018080901	2018.10.13	2019.10.12
turn table	EM	SC100_1	60531	N/A	N/A
Antenna mast	EM	SC100	N/A	N/A	N/A
Temperature & Humidity	HH660	Mieo	N/A	2018.10.11	2019.10.10

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Universal Radio communication tester	R&S	CMU200	11764	2018.10.13	2019.10.12
Wireless Communications Test Set	R&S	CMW 500	133884	2018.03.11	2019.03.10
Signal Analyzer	Agilent	N9020A	MY49100060	2018.10.13	2019.10.12
Temperature & Humidity	HH660	Mieo	N/A	2018.10.11	2019.10.10



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 factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

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

Offset = RF Cable Loss + Attenuator Factor.



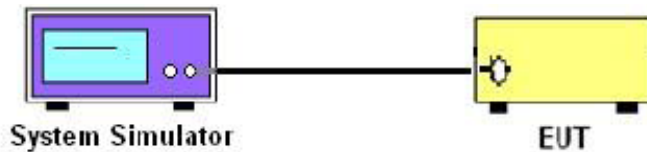
3. CONDUCTED OUTPUT POWER

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 v03r01.

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 18

LTE Band 18 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
5	1	0	QPSK	22.18	22.15	22.26
5	1	12		21.96	21.92	22.01
5	1	24		21.69	21.64	21.72
5	12	0		21.43	21.4	21.46
5	12	6		21.14	21.18	21.16
5	12	11		20.93	20.96	20.87
5	25	0		20.69	20.75	20.57
5	1	0	16-QAM	21.95	21.86	21.96
5	1	12		21.73	21.66	21.69
5	1	24		21.48	21.39	21.4
5	12	0		21.22	21.1	21.19
5	12	6		20.99	20.82	20.92
5	12	11		20.74	20.62	20.71
5	25	0		20.46	20.37	20.42
5	1	0	64-QAM	20.62	20.79	20.68
5	1	12		20.64	20.81	20.63
5	1	24		20.72	20.78	20.97
5	12	0		19.73	19.72	19.60
5	12	6		19.90	19.82	19.60
5	12	11		19.81	19.76	19.68
5	25	0		19.75	19.72	19.57
10	1	0	QPSK	22.2	22.19	22.31
10	1	24		21.94	21.92	22.11
10	1	49		21.69	21.63	21.91
10	25	0		21.49	21.36	21.64
10	25	12		21.25	21.14	21.36
10	25	24		21.02	20.91	21.07
10	50	0		20.76	20.65	20.86
10	1	0	16-QAM	22	21.91	22.06
10	1	24		21.79	21.67	21.84
10	1	49		21.53	21.42	21.63
10	25	0		21.3	21.17	21.36
10	25	12		21.06	20.97	21.13



10	25	24	64-QAM	20.82	20.69	20.89
10	50	0		20.56	20.4	20.69
10	1	0		20.75	21.32	21.11
10	1	24		21.01	21.10	20.77
10	1	49		21.33	21.15	21.01
10	25	0		19.93	20.00	19.95
10	25	12		19.98	20.05	20.03
10	25	24		19.96	20.01	19.99
10	50	0		19.95	20.05	20.02





LTE BAND 18

LTE Band 18 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
15	1	0	QPSK	/	22.23	/
15	1	37		/	21.95	/
15	1	74		/	21.71	/
15	36	0		/	21.42	/
15	36	18		/	21.15	/
15	36	39		/	20.86	/
15	75	0		/	20.59	/
15	1	0	16-QAM	/	21.93	/
15	1	38		/	21.65	/
15	1	75		/	21.39	/
15	36	0		/	21.11	/
15	36	18		/	20.91	/
15	36	39		/	20.68	/
15	75	0		/	20.4	/
15	1	0	64-QAM	/	21.34	/
15	1	38		/	21.13	/
15	1	75		/	19.93	/
15	36	0		/	19.99	/
15	36	18		/	20.05	/
15	36	39		/	20.08	/
15	75	0		/	20.12	/



LTE BAND 26

LTE Band 26 Maximum Average Power [dBm]				
BW [MHz]	RB Size	RB Offset	Mod	Lowest
1.4	1	0	QPSK	21.64
1.4	1	2		21.39
1.4	1	5		21.14
1.4	3	0		20.9
1.4	3	1		20.7
1.4	3	2		20.45
1.4	6	0		20.16
1.4	1	0		16-QAM
1.4	1	2	21.12	
1.4	1	5	20.89	
1.4	3	0	20.68	
1.4	3	1	20.42	
1.4	3	2	20.14	
1.4	6	0	19.93	
1.4	1	0	64-QAM	
1.4	1	2		20.28
1.4	1	5		20.55
1.4	3	0		20.59
1.4	3	1		20.47
1.4	3	2		20.56
1.4	6	0		19.53
3	1	0		QPSK
3	1	7	21.47	
3	1	14	21.24	
3	8	0	20.95	
3	8	4	20.69	
3	8	7	20.43	
3	15	0	20.17	
3	1	0	16-QAM	
3	1	7		21.19
3	1	14		20.89
3	8	0		20.6
3	8	4		20.4
3	8	7		20.13
3	15	0		19.88



3	1	0	64-QAM	20.54
3	1	7		20.97
3	1	14		20.95
3	8	0		19.54
3	8	4		19.55
3	8	7		19.62
3	15	0		19.58





LTE BAND 26

LTE Band 26 Maximum Average Power [dBm]				
BW [MHz]	RB Size	RB Offset	Mod	Lowest
5	1	0	QPSK	21.73
5	1	12		21.5
5	1	24		21.24
5	12	0		21.02
5	12	6		20.78
5	12	11		20.49
5	25	0		20.26
5	1	0	16-QAM	21.49
5	1	12		21.22
5	1	24		21.01
5	12	0		20.71
5	12	6		20.42
5	12	11		20.2
5	25	0		19.96
5	1	0	64-QAM	21.28
5	1	12		21.14
5	1	24		21.20
5	12	0		20.10
5	12	6		20.04
5	12	11		20.17
5	25	0		20.24
10	1	0	QPSK	21.75
10	1	24		21.46
10	1	49		21.23
10	25	0		21.01
10	25	12		20.81
10	25	24		20.57
10	50	0		20.29
10	1	0	16-QAM	21.47
10	1	24		21.24
10	1	49		21
10	25	0		20.71
10	25	12		20.46
10	25	24		20.22
10	50	0		19.95



10	1	0	64-QAM	20.55
10	1	24		21.11
10	1	49		20.93
10	25	0		19.66
10	25	12		19.78
10	25	24		19.82
10	50	0		19.66



4. RADIATED POWER AND EFFECTIVE ISOTROPIC RADIATED POWER

4.1 DESCRIPTION OF THE ERP/EIRP MEASUREMENT

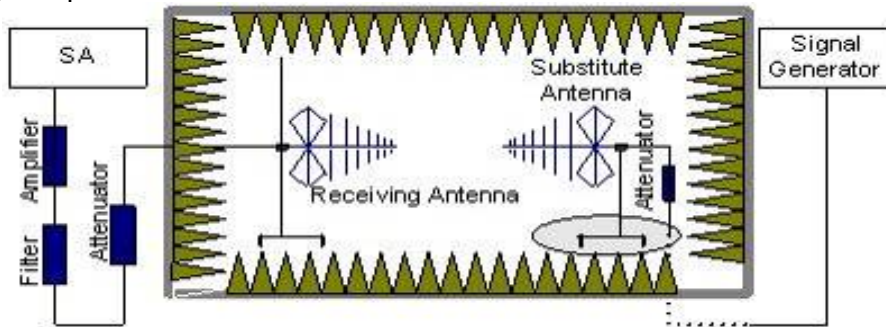
4.1.1 MEASUREMENT METHOD

Effective radiated power output measurements by substitution method according to ANSI C63.26 2015, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems. Mobile and portable (hand-held) stations operating are limited to average ERP, Equivalent isotropic radiated power output measurements by substitution method according to ANSI C63.26 2015, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas, Mobile and portable (hand-held) stations operating are limited to average EIRP.

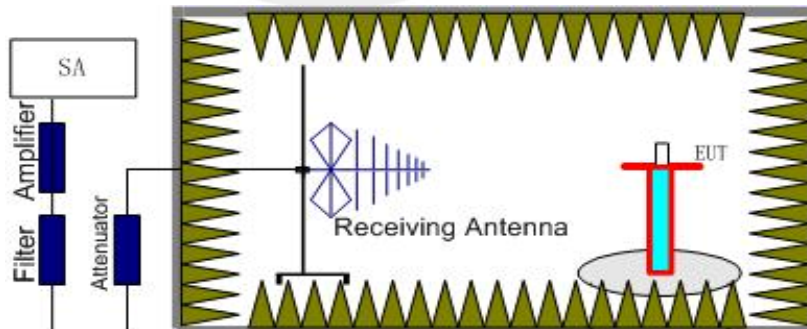
4.1.2 TEST SETUP

The procedure of radiated spurious emissions is as follows:

a) Pre-calibration With pre-calibration method, the Radiated Spurious Emissions(RSE) is calculated as, $RSE = R_x(\text{dBuV}) + CL(\text{dB}) + SA(\text{dB}) + Gain(\text{dBi}) - 107(\text{dBuV to dBm})$ The SA is calibrated using following setup.



b) EUT was placed on a 1.5 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: $Power = P_{Mea} + AR_{pl}$



4.1.3 TEST PROCEDURES

1. The testing follows FCC KDB 971168 D01v03r01 Section 5.6. and ANSI C63.26 2015 Section 5.2.
2. The EUT was placed on a non-conductive rotating platform 1.5 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 EUT transmitting at maximum output power. The maximum emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
4. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to ANSI C63.26 2015. 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, $EIRP/ERP = LVL + \text{Correction factor}$
5. RB Set greater than bandwidth, Vb Set spectrum analyzer Maximum support.





4.1.4 TEST RESULTS

Note:Test is divided into three directions, X/Y/Z. X pattern for the worst.

LTE Band 18:Top Antenna

Radiated Power (ERP) for LTE Band 18 / 5M									
Modulation	RB		Channel	Result					Conclusion
	Size	Offset		S G.Level (dBm)	Cable loss	Gain (dBi)	PMeas E.R.P(dBm)	Polarization	
								Of Max. ERP	
QPSK	1	0	Lowest	11.79	2.35	10.13	19.57	Horizontal	Pass
	1	0	Middle	11.63	2.36	10.16	19.43	Horizontal	Pass
	1	0	Highest	11.73	2.37	10.22	19.58	Horizontal	Pass
	1	0	Lowest	13.24	2.35	10.13	21.02	Vertical	Pass
	1	0	Middle	13.08	2.36	10.16	20.88	Vertical	Pass
	1	0	Highest	13.13	2.37	10.22	20.98	Vertical	Pass
16QAM	1	0	Lowest	11.60	2.35	10.13	19.38	Horizontal	Pass
	1	0	Middle	11.35	2.36	10.16	19.15	Horizontal	Pass
	1	0	Highest	11.33	2.37	10.22	19.18	Horizontal	Pass
	1	0	Lowest	12.97	2.35	10.13	20.75	Vertical	Pass
	1	0	Middle	12.82	2.36	10.16	20.62	Vertical	Pass
	1	0	Highest	12.83	2.37	10.22	20.68	Vertical	Pass
64QAM	1	0	Lowest	11.47	2.35	10.13	19.25	Horizontal	Pass
	1	0	Middle	11.19	2.36	10.16	18.99	Horizontal	Pass
	1	0	Highest	11.21	2.37	10.22	19.06	Horizontal	Pass
	1	0	Lowest	12.86	2.35	10.13	20.64	Vertical	Pass
	1	0	Middle	12.68	2.36	10.16	20.48	Vertical	Pass
	1	0	Highest	12.65	2.37	10.22	20.50	Vertical	Pass
Limit	ERP<100W=50dBm								



Radiated Power (ERP) for LTE Band 18 / 10M

Modulation	RB		Channel	Result					Conclusion
	Size	Offset		S G.Level (dBm)	Cable loss	Gain (dBi)	PMeas E.R.P.(dBm)	Polarization	
								Of Max. ERP	
QPSK	1	0	Lowest	11.78	2.35	10.13	19.56	Horizontal	Pass
	1	0	Middle	11.89	2.36	10.16	19.69	Horizontal	Pass
	1	0	Highest	11.9	2.37	10.22	19.75	Horizontal	Pass
	1	0	Lowest	13.19	2.35	10.13	20.97	Vertical	Pass
	1	0	Middle	13.24	2.36	10.16	21.04	Vertical	Pass
	1	0	Highest	13.32	2.37	10.22	21.17	Vertical	Pass
16QAM	1	0	Lowest	11.66	2.35	10.13	19.44	Horizontal	Pass
	1	0	Middle	11.62	2.36	10.16	19.42	Horizontal	Pass
	1	0	Highest	11.71	2.37	10.22	19.56	Horizontal	Pass
	1	0	Lowest	13.12	2.35	10.13	20.9	Vertical	Pass
	1	0	Middle	13.01	2.36	10.16	20.81	Vertical	Pass
	1	0	Highest	13.02	2.37	10.22	20.87	Vertical	Pass
64QAM	1	0	Lowest	11.55	2.35	10.13	19.33	Horizontal	Pass
	1	0	Middle	11.48	2.36	10.16	19.28	Horizontal	Pass
	1	0	Highest	11.53	2.37	10.22	19.38	Horizontal	Pass
	1	0	Lowest	12.99	2.35	10.13	20.77	Vertical	Pass
	1	0	Middle	12.85	2.36	10.16	20.65	Vertical	Pass
	1	0	Highest	12.9	2.37	10.22	20.75	Vertical	Pass
Limit	ERP<100W=50dBm								

Radiated Power (ERP) for LTE Band 18 / 15M

Modulation	RB		Channel	Result					Conclusion
	Size	Offset		S G.Level (dBm)	Cable loss	Gain (dBi)	PMeas E.R.P.(dBm)	Polarization	
								Of Max. ERP	
QPSK	1	0	Middle	12.02	2.36	10.16	19.82	Horizontal	Pass
	1	0	Middle	13.34	2.36	10.16	21.14	Vertical	Pass
16QAM	1	0	Middle	11.66	2.36	10.16	19.46	Horizontal	Pass
	1	0	Middle	12.98	2.36	10.16	20.78	Vertical	Pass
64QAM	1	0	Middle	11.44	2.36	10.16	19.24	Horizontal	Pass
	1	0	Middle	12.85	2.36	10.16	20.65	Vertical	Pass
Limit	ERP<100W=50dBm								



LTE Band 18:Bottom Antenna

Radiated Power (ERP) for LTE Band 18 / 5M									
Modulation	RB		Channel	Result					Conclusion
	Size	Offset		S G.Level (dBm)	Cable loss	Gain (dBi)	PMeas E.R.P(dBm)	Polarization	
								Of Max. ERP	
QPSK	1	0	Lowest	11.67	2.35	10.13	19.45	Horizontal	Pass
	1	0	Middle	11.51	2.36	10.16	19.31	Horizontal	Pass
	1	0	Highest	11.61	2.37	10.22	19.46	Horizontal	Pass
	1	0	Lowest	13.12	2.35	10.13	20.90	Vertical	Pass
	1	0	Middle	12.96	2.36	10.16	20.76	Vertical	Pass
	1	0	Highest	13.01	2.37	10.22	20.86	Vertical	Pass
16QAM	1	0	Lowest	11.48	2.35	10.13	19.26	Horizontal	Pass
	1	0	Middle	11.23	2.36	10.16	19.03	Horizontal	Pass
	1	0	Highest	11.21	2.37	10.22	19.06	Horizontal	Pass
	1	0	Lowest	12.85	2.35	10.13	20.63	Vertical	Pass
	1	0	Middle	12.7	2.36	10.16	20.50	Vertical	Pass
	1	0	Highest	12.71	2.37	10.22	20.56	Vertical	Pass
64QAM	1	0	Lowest	11.35	2.35	10.13	19.13	Horizontal	Pass
	1	0	Middle	11.07	2.36	10.16	18.87	Horizontal	Pass
	1	0	Highest	11.09	2.37	10.22	18.94	Horizontal	Pass
	1	0	Lowest	12.74	2.35	10.13	20.52	Vertical	Pass
	1	0	Middle	12.56	2.36	10.16	20.36	Vertical	Pass
	1	0	Highest	12.53	2.37	10.22	20.38	Vertical	Pass
Limit	ERP<100W=50dBm								



Radiated Power (ERP) for LTE Band 18 / 10M

Modulation	RB		Channel	Result					Conclusion
	Size	Offset		S G.Level (dBm)	Cable loss	Gain (dBi)	PMeas E.R.P.(dBm)	Polarization	
								Of Max. ERP	
QPSK	1	0	Lowest	11.66	2.35	10.13	19.44	Horizontal	Pass
	1	0	Middle	11.77	2.36	10.16	19.57	Horizontal	Pass
	1	0	Highest	11.78	2.37	10.22	19.63	Horizontal	Pass
	1	0	Lowest	13.07	2.35	10.13	20.85	Vertical	Pass
	1	0	Middle	13.12	2.36	10.16	20.92	Vertical	Pass
	1	0	Highest	13.2	2.37	10.22	21.05	Vertical	Pass
16QAM	1	0	Lowest	11.54	2.35	10.13	19.32	Horizontal	Pass
	1	0	Middle	11.5	2.36	10.16	19.30	Horizontal	Pass
	1	0	Highest	11.59	2.37	10.22	19.44	Horizontal	Pass
	1	0	Lowest	13	2.35	10.13	20.78	Vertical	Pass
	1	0	Middle	12.89	2.36	10.16	20.69	Vertical	Pass
	1	0	Highest	12.9	2.37	10.22	20.75	Vertical	Pass
64QAM	1	0	Lowest	11.43	2.35	10.13	19.21	Horizontal	Pass
	1	0	Middle	11.36	2.36	10.16	19.16	Horizontal	Pass
	1	0	Highest	11.41	2.37	10.22	19.26	Horizontal	Pass
	1	0	Lowest	12.87	2.35	10.13	20.65	Vertical	Pass
	1	0	Middle	12.73	2.36	10.16	20.53	Vertical	Pass
	1	0	Highest	12.78	2.37	10.22	20.63	Vertical	Pass
Limit	ERP<100W=50dBm								

Radiated Power (ERP) for LTE Band 18 / 15M

Modulation	RB		Channel	Result					Conclusion
	Size	Offset		S G.Level (dBm)	Cable loss	Gain (dBi)	PMeas E.R.P.(dBm)	Polarization	
								Of Max. ERP	
QPSK	1	0	Middle	11.9	2.36	10.16	19.70	Horizontal	Pass
	1	0	Middle	13.22	2.36	10.16	21.02	Vertical	Pass
16QAM	1	0	Middle	11.54	2.36	10.16	19.34	Horizontal	Pass
	1	0	Middle	12.86	2.36	10.16	20.66	Vertical	Pass
64QAM	1	0	Middle	11.32	2.36	10.16	19.12	Horizontal	Pass
	1	0	Middle	12.73	2.36	10.16	20.53	Vertical	Pass
Limit	ERP<100W=50dBm								



LTE Band 26:Top Antenna

Radiated Power (ERP) for LTE Band 26 / 1.4M									
Modulation	RB		Channel	Result					Conclusion
	Size	Offset		S G.Level (dBm)	Cable loss	Gain (dBi)	PMeas E.R.P(dBm)	Polarization	
								Of Max. ERP	
QPSK	1	0	Middle	11.25	2.36	10.16	19.05	Horizontal	Pass
	1	0	Middle	12.57	2.36	10.16	20.37	Vertical	Pass
16QAM	1	0	Middle	10.99	2.36	10.16	18.79	Horizontal	Pass
	1	0	Middle	12.3	2.36	10.16	20.10	Vertical	Pass
64QAM	1	0	Middle	10.85	2.36	10.16	18.65	Horizontal	Pass
	1	0	Middle	12.06	2.36	10.16	19.86	Vertical	Pass
Limit	ERP<100W=50dBm								

Radiated Power (ERP) for LTE Band 26 / 3M									
Modulation	RB		Channel	Result					Conclusion
	Size	Offset		S G.Level (dBm)	Cable loss	Gain (dBi)	PMeas E.R.P(dBm)	Polarization	
								Of Max. ERP	
QPSK	1	0	Middle	11.22	2.36	10.16	19.02	Horizontal	Pass
	1	0	Middle	12.64	2.36	10.16	20.44	Vertical	Pass
16QAM	1	0	Middle	10.88	2.36	10.16	18.68	Horizontal	Pass
	1	0	Middle	12.35	2.36	10.16	20.15	Vertical	Pass
64QAM	1	0	Middle	10.62	2.36	10.16	18.42	Horizontal	Pass
	1	0	Middle	12.18	2.36	10.16	19.98	Vertical	Pass
Limit	ERP<100W=50dBm								



Radiated Power (ERP) for LTE Band 26 / 5M									
Modulation	RB		Channel	Result					Conclusion
	Size	Offset		S G.Level (dBm)	Cable loss	Gain (dBi)	PMeas E.R.P(dBm)	Polarization	
								Of Max. ERP	
QPSK	1	0	Middle	11.14	2.36	10.16	18.94	Horizontal	Pass
	1	0	Middle	12.54	2.36	10.16	20.34	Vertical	Pass
16QAM	1	0	Middle	11.08	2.36	10.16	18.88	Horizontal	Pass
	1	0	Middle	12.46	2.36	10.16	20.26	Vertical	Pass
64QAM	1	0	Middle	11.01	2.36	10.16	18.81	Horizontal	Pass
	1	0	Middle	12.23	2.36	10.16	20.03	Vertical	Pass
Limit	ERP<100W=50dBm								

Radiated Power (ERP) for LTE Band 26 / 10M									
Modulation	RB		Channel	Result					Conclusion
	Size	Offset		S G.Level (dBm)	Cable loss	Gain (dBi)	PMeas E.R.P(dBm)	Polarization	
								Of Max. ERP	
QPSK	1	0	Middle	11.24	2.36	10.16	19.04	Horizontal	Pass
	1	0	Middle	12.66	2.36	10.16	20.46	Vertical	Pass
16QAM	1	0	Middle	10.96	2.36	10.16	18.76	Horizontal	Pass
	1	0	Middle	12.35	2.36	10.16	20.15	Vertical	Pass
64QAM	1	0	Middle	10.81	2.36	10.16	18.61	Horizontal	Pass
	1	0	Middle	12.25	2.36	10.16	20.05	Vertical	Pass
Limit	ERP<100W=50dBm								

LTE Band 26:Bottom Antenna

Radiated Power (ERP) for LTE Band 26 / 1.4M									
Modulation	RB		Channel	Result					Conclusion
	Size	Offset		S G.Level (dBm)	Cable loss	Gain (dBi)	PMeas E.R.P(dBm)	Polarization	
								Of Max. ERP	
QPSK	1	0	Middle	11.13	2.36	10.16	18.93	Horizontal	Pass
	1	0	Middle	12.45	2.36	10.16	20.25	Vertical	Pass
16QAM	1	0	Middle	10.87	2.36	10.16	18.67	Horizontal	Pass
	1	0	Middle	12.18	2.36	10.16	19.98	Vertical	Pass
64QAM	1	0	Middle	10.73	2.36	10.16	18.53	Horizontal	Pass



	1	0	Middle	11.94	2.36	10.16	19.74	Vertical	Pass
Limit	ERP<100W=50dBm								

Radiated Power (ERP) for LTE Band 26 / 3M

Modulation	RB		Channel	Result					Conclusion
	Size	Offset		S G.Level (dBm)	Cable loss	Gain (dBi)	PMeas E.R.P(dBm)	Polarization	
								Of Max. ERP	
QPSK	1	0	Middle	11.34	2.36	10.16	19.14	Horizontal	Pass
	1	0	Middle	12.76	2.36	10.16	20.56	Vertical	Pass
16QAM	1	0	Middle	11.05	2.36	10.16	18.85	Horizontal	Pass
	1	0	Middle	12.47	2.36	10.16	20.27	Vertical	Pass
64QAM	1	0	Middle	10.74	2.36	10.16	18.54	Horizontal	Pass
	1	0	Middle	12.32	2.36	10.16	20.12	Vertical	Pass
Limit	ERP<100W=50dBm								

Radiated Power (ERP) for LTE Band 26 / 5M

Modulation	RB		Channel	Result					Conclusion
	Size	Offset		S G.Level (dBm)	Cable loss	Gain (dBi)	PMeas E.R.P(dBm)	Polarization	
								Of Max. ERP	
QPSK	1	0	Middle	11.26	2.36	10.16	19.06	Horizontal	Pass
	1	0	Middle	12.66	2.36	10.16	20.46	Vertical	Pass
16QAM	1	0	Middle	11.21	2.36	10.16	19.01	Horizontal	Pass
	1	0	Middle	12.58	2.36	10.16	20.38	Vertical	Pass
64QAM	1	0	Middle	11.13	2.36	10.16	18.93	Horizontal	Pass
	1	0	Middle	12.35	2.36	10.16	20.15	Vertical	Pass
Limit	ERP<100W=50dBm								

Radiated Power (ERP) for LTE Band 26 / 10M

Modulation	RB		Channel	Result					Conclusion
	Size	Offset		S G.Level (dBm)	Cable loss	Gain (dBi)	PMeas E.R.P(dBm)	Polarization	
								Of Max. ERP	
QPSK	1	0	Middle	11.36	2.36	10.16	19.16	Horizontal	Pass
	1	0	Middle	12.78	2.36	10.16	20.58	Vertical	Pass



16QAM	1	0	Middle	11.08	2.36	10.16	18.88	Horizontal	Pass
	1	0	Middle	12.47	2.36	10.16	20.27	Vertical	Pass
64QAM	1	0	Middle	10.93	2.36	10.16	18.73	Horizontal	Pass
	1	0	Middle	12.35	2.36	10.16	20.15	Vertical	Pass
Limit	ERP<100W=50dBm								



5. OCCUPIED BANDWIDTH

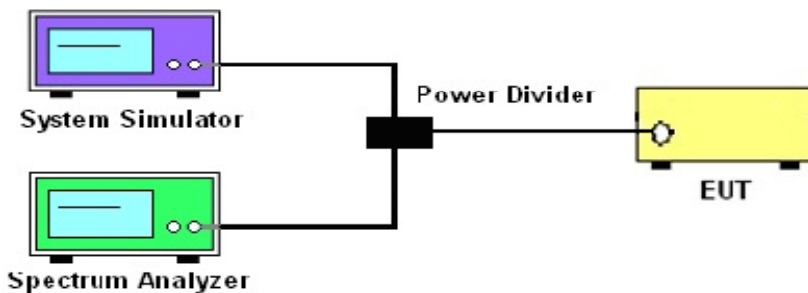
5.1 DESCRIPTION OF OCCUPIED BANDWIDTH MEASUREMENT

5.1.1 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.

5.1.2 TEST SETUP



5.1.3 TEST PROCEDURES

1. The testing follows FCC KDB 971168 D01 v03r01 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	30kHz	100kHz	100kHz	300kHz	300kHz
VBW	100kHz	100kHz	300kHz	300kHz	1000kHz	1000kHz
Detector	PK	PK	PK	PK	PK	PK
Trace	Max	Max	Max	Max	Max	Max
Sweep Count	Auto	Auto	Auto	Auto	Auto	Auto



5.1.4 MEASUREMENT RESULT

LTE BAND 18

LTE Band 41 Bandwidth [MHz]							
BW [MHz]	Mod	Lowest		Middle		Highest	
		26dB BW	99% BW	26dB BW	99% BW	26dB BW	99% BW
5	QPSK	4.811	4.4704	4.776	4.4570	4.833	4.4653
5	16-QAM	4.832	4.4611	4.808	4.4603	4.788	4.4648
10	QPSK	9.232	8.8658	9.362	8.9042	9.368	8.9192
10	16-QAM	9.246	8.8734	9.307	8.8955	9.307	8.9158
15	QPSK	-	-	13.91	13.318	-	-
15	16-QAM	-	-	13.74	13.301	-	-

LTE BAND 26

LTE Band 26 Bandwidth [MHz]							
BW [MHz]	Mod	Lowest		Middle		Highest	
		26dB BW	99% BW	26dB BW	99% BW	26dB BW	99% BW
1.4	QPSK	1.249	1.0926	-	-	-	-
1.4	16-QAM	1.229	1.0906	-	-	-	-
3	QPSK	2.937	2.6879	-	-	-	-
3	16-QAM	2.928	2.6823	-	-	-	-
5	QPSK	4.828	4.4661	-	-	-	-
5	16-QAM	4.791	4.4630	-	-	-	-
10	QPSK	9.382	8.9242	-	-	-	-
10	16-QAM	9.343	8.9221	-	-	-	-

NOTE: Test chart See Appendix A

6. CONDUCTED BAND EDGE

6.1 DESCRIPTION OF CONDUCTED BAND EDGE MEASUREMENT

6.1.1 MEASUREMENT METHOD

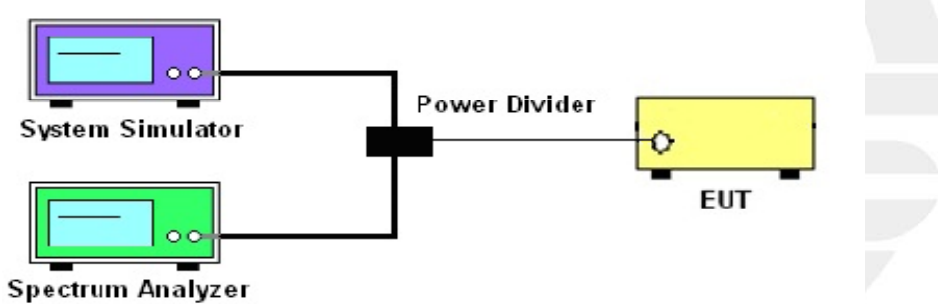
1. §90.691

Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116 \text{ Log}_{10}(f/6.1)$ decibels or $50 + 10 \text{ Log}_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \text{ Log}_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

6.1.2 TEST SETUP



6.1.3 TEST PROCEDURES

1. The testing FCC KDB 971168 D01 v03r01 Section 6.0. and ANSI C63.26 2015 Section 5.7.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The band edges of low and high channels for the highest RF powers were measured. Set RBW $\geq 1\%$ EBW in the 1MHz band immediately outside and adjacent to the band edge.
4. Set spectrum analyzer with RMS/AVG detector
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. The limit line is derived from $43 + 10 \log(P)$ dB below the transmitter power P(Watts)

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

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

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

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





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

6.1.4 MEASUREMENT RESULT

NOTE:Test chart See Appendix B



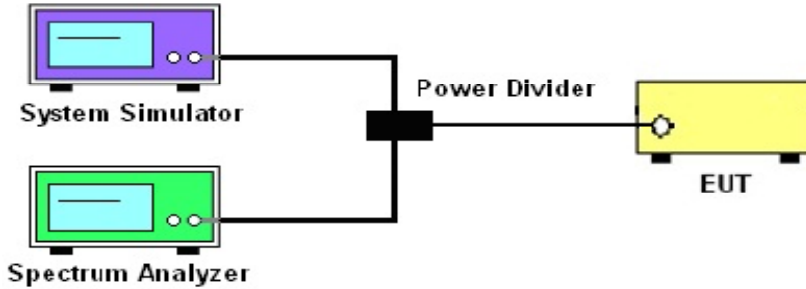
7. CONDUCTED SPURIOUS EMISSION

7.1 DESCRIPTION OF CONDUCTED SPURIOUS EMISSION MEASUREMENT

7.1.1 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.

7.1.2 TEST SETUP



7.1.3 TEST PROCEDURES

- 1.The testing FCC KDB 971168 D01 v03r01 Section 6.0. and ANSI C63.26 2015 Section 5.7.
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 frequency band.
- 6.The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)] \text{ (dB)} = [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$
 $= -13\text{dBm}.$
 For Band 7: $P(W) - [43 + 10\log(P)] \text{ (dB)} = -25\text{dBm}$

	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

7.1.4 TEST RESULTS

NOTE:Test chart See Appendix C

8. RADIATED SPURIOUS EMISSION

8.1 DESCRIPTION OF RADIATED SPURIOUS EMISSION

8.1.1 MEASUREMENT METHOD

The radiated spurious emission was measured by substitution method according to ANSI C63.26 2015 . 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.

8.1.2 Test Setup

The procedure of radiated spurious emissions is as follows:

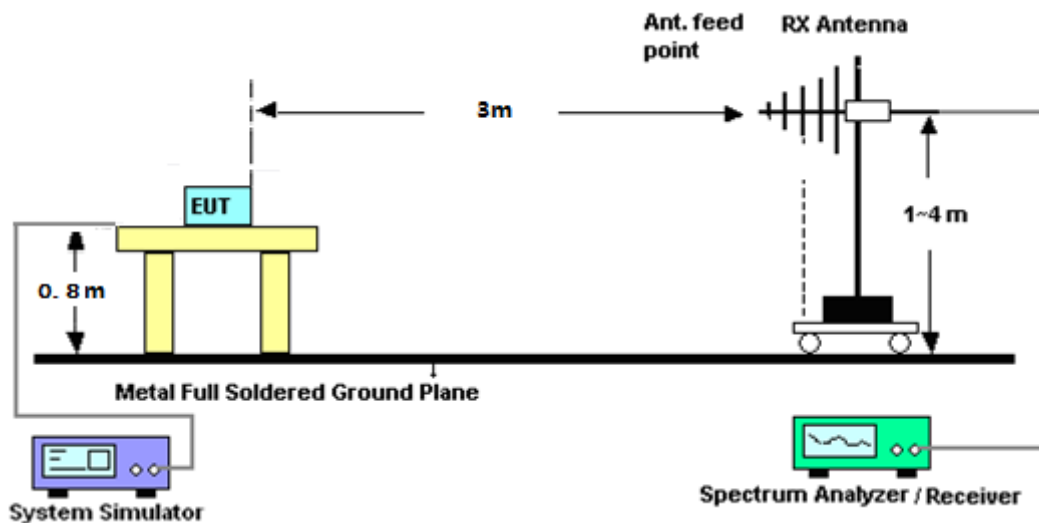
a) Pre-calibration With pre-calibration method, the Radiated Spurious Emissions(RSE) is calculated as, $RSE = Rx (dBuV) + CL (dB) + SA (dB) + Gain (dBi) - 107 (dBuV \text{ to } dBm)$ The SA is calibrated using following setup.

b) EUT was placed on a 1.5 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.

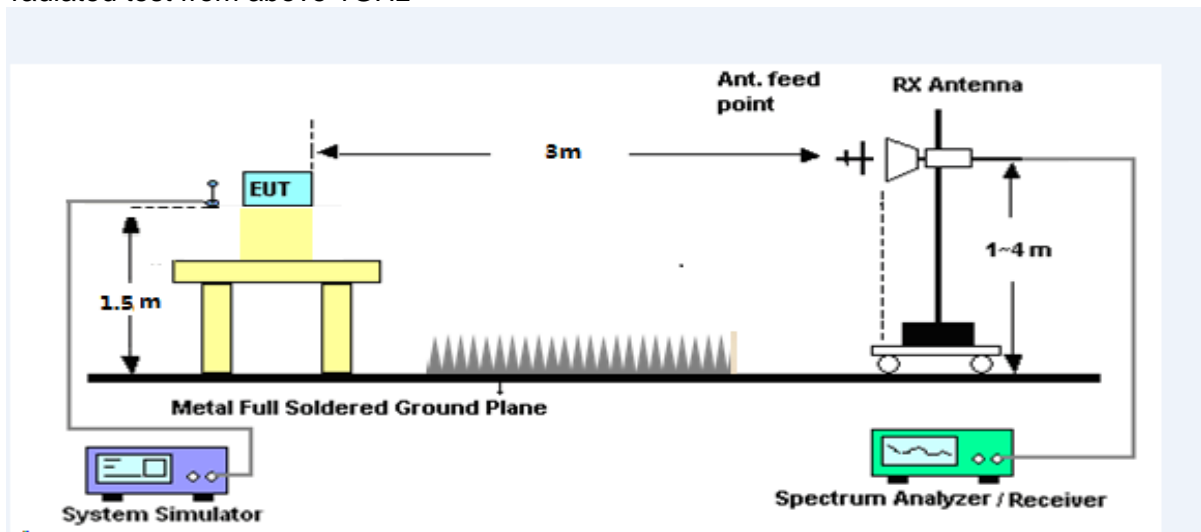
Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside 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: $Power = P_{Mea} + AR_{pl}$

For radiated test from 30MHz to 1GHz



For radiated test from above 1GHz



8.1.3 TEST PROCEDURES

1. The testing FCC KDB 971168 D01 Section 5.8 and ANSI C63.26 2015 Section 5.5.
2. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
9. Taking the record of output power at antenna port.
10. Repeat step 7 to step 8 for another polarization.
11. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

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

For Band 7:

The limit line is derived from $55 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= [30 + 10\log(P)]$ (dBm) - $[55 + 10\log(P)]$ (dB)
 $= -25$ dBm

EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain

ERP (dBm) = EIRP - 2.15



8.1.4 TEST RESULTS

LTE BAND 18:Top Antenna

LTE Band18 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
1635.49	-33.68	12.90	12.56	-33.34	-13.00	-20.34	H
2452.51	-34.51	13.10	12.46	-33.87	-13.00	-20.87	H
3270.62	-32.85	12.33	21.13	-41.65	-13.00	-28.65	H
1635.49	-35.87	12.90	12.76	-35.73	-13.00	-22.73	V
2452.51	-34.40	13.10	16.32	-37.62	-13.00	-24.62	V
3270.62	-32.33	12.33	21.13	-41.13	-13.00	-28.13	V
LTE Band 18 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
1645.13	-33.76	12.80	12.56	-33.52	-13.00	-20.52	H
2466.81	-34.57	13.10	12.46	-33.93	-13.00	-20.93	H
3289.89	-33.38	12.33	21.13	-42.18	-13.00	-29.18	H
1645.13	-34.98	12.80	12.76	-34.94	-13.00	-21.94	V
2466.81	-34.76	13.10	16.32	-37.98	-13.00	-24.98	V
3289.89	-31.99	12.33	21.13	-40.79	-13.00	-27.79	V
LTE Band18 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
1655.47	-33.60	12.61	12.56	-33.55	-13.00	-20.55	H
2482.48	-35.23	13.12	12.46	-34.57	-13.00	-21.57	H
3309.96	-32.58	12.32	21.13	-41.39	-13.00	-28.39	H
1655.47	-35.08	12.61	12.76	-35.23	-13.00	-22.23	V
2482.48	-34.41	13.12	16.32	-37.61	-13.00	-24.61	V
3309.96	-31.88	12.32	21.13	-40.69	-13.00	-27.69	V



LTE Band 18 / 10MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dBm)	
1640.44	-33.56	12.90	12.56	-33.22	-13.00	-20.22	H
2460.59	-35.30	13.10	12.46	-34.66	-13.00	-21.66	H
3280.63	-32.84	12.33	21.13	-41.64	-13.00	-28.64	H
1640.44	-34.79	12.90	12.76	-34.65	-13.00	-21.65	V
2460.59	-33.83	13.10	16.32	-37.05	-13.00	-24.05	V
3280.63	-32.54	12.33	21.13	-41.34	-13.00	-28.34	V
LTE Band 18 / 10MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dBm)	
1645.06	-33.57	12.80	12.56	-33.33	-13.00	-20.33	H
2467.24	-34.76	13.10	12.46	-34.12	-13.00	-21.12	H
3289.90	-32.70	12.33	21.13	-41.50	-13.00	-28.50	H
1645.06	-35.35	12.80	12.76	-35.31	-13.00	-22.31	V
2467.24	-35.25	13.10	16.32	-38.47	-13.00	-25.47	V
3289.90	-31.94	12.33	21.13	-40.74	-13.00	-27.74	V
LTE Band 18 / 10MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dBm)	
1650.58	-33.99	12.61	12.56	-33.94	-13.00	-20.94	H
2475.34	-34.95	13.12	12.46	-34.29	-13.00	-21.29	H
3300.12	-32.54	12.32	21.13	-41.35	-13.00	-28.35	H
1650.58	-34.58	12.61	12.76	-34.73	-13.00	-21.73	V
2475.34	-34.10	13.12	16.32	-37.30	-13.00	-24.30	V
3300.12	-31.75	12.32	21.13	-40.56	-13.00	-27.56	V



LTE Band18 / 15MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
1644.87	-33.70	12.80	12.56	-33.46	-13.00	-20.46	H
2467.12	-34.61	13.10	12.46	-33.97	-13.00	-20.97	H
3290.00	-32.80	12.33	21.13	-41.60	-13.00	-28.60	H
1644.87	-35.69	12.80	12.76	-35.65	-13.00	-22.65	V
2467.12	-33.97	13.10	16.32	-37.19	-13.00	-24.19	V
3290.00	-32.33	12.33	21.13	-41.13	-13.00	-28.13	V

LTE BAND 18:Bottom Antenna

LTE Band18 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
1633.92	-33.62	12.90	12.56	-33.28	-13.00	-20.28	H
2471.11	-34.79	13.10	12.46	-34.15	-13.00	-21.15	H
3274.62	-33.12	12.33	21.13	-41.92	-13.00	-28.92	H
1646.16	-35.24	12.90	12.76	-35.10	-13.00	-22.1	V
2444.22	-34.72	13.10	16.32	-37.94	-13.00	-24.94	V
3273.52	-32.82	12.33	21.13	-41.62	-13.00	-28.62	V

LTE Band 18 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
1646.52	-33.27	12.90	12.56	-32.93	-13.00	-19.93	H
2478.53	-34.77	13.10	12.46	-34.13	-13.00	-21.13	H
3259.52	-33.82	12.33	21.13	-42.62	-13.00	-29.62	H
1655.13	-34.42	12.90	12.76	-34.28	-13.00	-21.28	V
2475.63	-34.67	13.10	16.32	-37.89	-13.00	-24.89	V
3268.96	-32.23	12.33	21.13	-41.03	-13.00	-28.03	V

LTE Band18 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
1647.23	-33.43	12.90	12.56	-33.09	-13.00	-20.09	H
2477.28	-35.37	13.10	12.46	-34.73	-13.00	-21.73	H
3326.97	-32.39	12.33	21.13	-41.19	-13.00	-28.19	H
1671.32	-34.69	12.90	12.76	-34.55	-13.00	-21.55	V
2483.72	-34.88	13.10	16.32	-38.10	-13.00	-25.1	V
3323.72	-31.46	12.33	21.13	-40.26	-13.00	-27.26	V



LTE Band 18 / 10MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dBm)	
1648.39	-33.34	12.90	12.56	-33.00	-13.00	-20.00	H
2476.82	-35.21	13.10	12.46	-34.57	-13.00	-21.57	H
3263.96	-32.83	12.33	21.13	-41.63	-13.00	-28.63	H
1647.86	-33.12	12.90	12.76	-32.98	-13.00	-19.98	V
2477.56	-34.23	13.10	16.32	-37.45	-13.00	-24.45	V
3267.23	-32.19	12.33	21.13	-40.99	-13.00	-27.99	V
LTE Band 18 / 10MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dBm)	
1649.15	-33.30	12.80	12.56	-33.06	-13.00	-20.06	H
2443.62	-34.88	13.10	12.46	-34.24	-13.00	-21.24	H
3256.54	-33.34	12.33	21.13	-42.14	-13.00	-29.14	H
1671.82	-36.99	12.80	12.76	-36.95	-13.00	-23.95	V
2447.32	-34.72	13.10	16.32	-37.94	-13.00	-24.94	V
3283.33	-32.59	12.33	21.13	-41.39	-13.00	-28.39	V
LTE Band 18 / 10MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dBm)	
1671.83	-34.83	12.61	12.56	-34.78	-13.00	-21.78	H
2475.52	-33.66	13.12	12.46	-33.00	-13.00	-20.00	H
3316.37	-33.49	12.32	21.13	-42.3	-13.00	-29.3	H
1656.83	-34.28	12.61	12.76	-34.43	-13.00	-21.43	V
2477.38	-35.84	13.12	16.32	-39.04	-13.00	-26.04	V
3325.13	-31.49	12.32	21.13	-40.3	-13.00	-27.3	V



LTE Band18 / 15MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
1647.14	-32.66	12.80	12.56	-32.42	-13.00	-19.42	H
2466.19	-34.63	13.10	12.46	-33.99	-13.00	-20.99	H
3284.43	-31.79	12.33	21.13	-40.59	-13.00	-27.59	H
1647.04	-33.88	12.80	12.76	-33.84	-13.00	-20.84	V
2466.49	-33.09	13.10	16.32	-36.31	-13.00	-23.31	V
3288.73	-31.96	12.33	21.13	-40.76	-13.00	-27.76	V

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

Test is divided into three directions, X/Y/Z. X pattern for the worst.





LTE BAND 26:Top Antenna

LTE Band 26 / 1.4MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dBm)	
1637.01	-33.56	12.90	12.56	-33.22	-13.00	-20.22	H
2456.37	-35.40	13.10	12.46	-34.76	-13.00	-21.76	H
3275.86	-33.29	12.33	21.13	-42.09	-13.00	-29.09	H
1637.01	-35.56	12.90	12.76	-35.42	-13.00	-22.42	V
2456.37	-34.83	13.10	16.32	-38.05	-13.00	-25.05	V
3275.86	-31.91	12.33	21.13	-40.71	-13.00	-27.71	V
LTE Band 26 / 3MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dBm)	
1637.47	-34.13	12.90	12.56	-33.79	-13.00	-20.79	H
2455.60	-35.33	13.10	12.46	-34.69	-13.00	-21.69	H
3274.58	-32.64	12.33	21.13	-41.44	-13.00	-28.44	H
1637.47	-35.72	12.90	12.76	-35.58	-13.00	-22.58	V
2455.60	-34.38	13.10	16.32	-37.60	-13.00	-24.60	V
3274.58	-32.43	12.33	21.13	-41.23	-13.00	-28.23	V
LTE Band 26 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dBm)	
1638.25	-34.43	12.90	12.56	-34.09	-13.00	-21.09	H
2457.50	-35.13	13.10	12.46	-34.49	-13.00	-21.49	H
3276.92	-33.51	12.33	21.13	-42.31	-13.00	-29.31	H
1638.25	-35.79	12.90	12.76	-35.65	-13.00	-22.65	V
2457.50	-35.05	13.10	16.32	-38.27	-13.00	-25.27	V
3276.92	-33.20	12.33	21.13	-42.00	-13.00	-29.00	V



LTE Band 26 / 10MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dBm)	
1638.48	-34.83	12.90	12.56	-34.49	-13.00	-21.49	H
2457.44	-34.28	13.10	12.46	-33.64	-13.00	-20.64	H
3276.90	-32.98	12.33	21.13	-41.78	-13.00	-28.78	H
1638.48	-35.81	12.90	12.76	-35.67	-13.00	-22.67	V
2457.44	-34.15	13.10	16.32	-37.37	-13.00	-24.37	V
3276.90	-32.14	12.33	21.13	-40.94	-13.00	-27.94	V

LTE BAND 26:Bottom Antenna

LTE Band 26 / 1.4MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dBm)	
1640.97	-32.41	12.90	12.56	-32.07	-13.00	-19.07	H
2466.96	-33.76	13.10	12.46	-33.12	-13.00	-20.12	H
3270.46	-32.82	12.33	21.13	-41.62	-13.00	-28.62	H
1632.31	-34.52	12.90	12.76	-34.38	-13.00	-21.38	V
2453.76	-33.85	13.10	16.32	-37.07	-13.00	-24.07	V
3281.16	-30.93	12.33	21.13	-39.73	-13.00	-26.73	V

LTE Band 26 / 3MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dBm)	
1648.67	-33.44	12.90	12.56	-33.10	-13.00	-20.10	H
2459.72	-34.24	13.10	12.46	-33.60	-13.00	-20.60	H
3261.82	-31.70	12.33	21.13	-40.50	-13.00	-27.50	H
1638.06	-35.05	12.90	12.76	-34.91	-13.00	-21.91	V
2454.18	-33.52	13.10	16.32	-36.74	-13.00	-23.74	V
3273.41	-31.52	12.33	21.13	-40.32	-13.00	-27.32	V

LTE Band 26 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dBm)	
1643.27	-33.57	12.90	12.56	-33.23	-13.00	-20.23	H
2456.12	-34.83	13.10	12.46	-34.19	-13.00	-21.19	H
3272.58	-32.34	12.33	21.13	-41.14	-13.00	-28.14	H
1645.41	-35.05	12.90	12.76	-34.91	-13.00	-21.91	V
2453.47	-34.14	13.10	16.32	-37.36	-13.00	-24.36	V
3274.52	-33.22	12.33	21.13	-42.02	-13.00	-29.02	V



LTE Band 26 / 10MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dBm)	
1626.11	-33.35	12.90	12.56	-33.01	-13.00	-20.01	H
2422.02	-33.34	13.10	12.46	-32.7	-13.00	-19.70	H
3277.01	-32.11	12.33	21.13	-40.91	-13.00	-27.91	H
1666.22	-35.05	12.90	12.76	-34.91	-13.00	-21.91	V
2460.52	-33.56	13.10	16.32	-36.78	-13.00	-23.78	V
3258.12	-32.31	12.33	21.13	-41.11	-13.00	-28.11	V

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

Test is divided into three directions, X/Y/Z. X pattern for the worst.



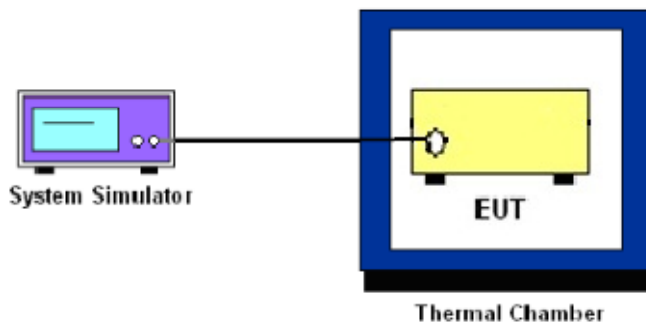
9. FREQUENCY STABILITY

9.1 DESCRIPTION OF FREQUENCY STABILITY MEASUREMENT

9.1.1 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 $\pm 0.00025\%$ ($\pm 2.5\text{ppm}$) of the center frequency.

9.1.2 Test Setup



9.1.3 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.

9.1.4 TEST PROCEDURES FOR VOLTAGE VARIATION

1. The testing follows FCC KDB 971168 D01v01r03 Section 9.0.
2. The EUT was placed in a temperature chamber at $25\pm 5^{\circ}\text{C}$ and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
4. The variation in frequency was measured for the worst case.



9.1.5 MEASUREMENT RESULT

LTE BAND18

LTE Band 18 (QPSK) / 822.5MHz / BW10M					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	19.07	0.011	2.5ppm	PASS
40		14.43	0.008		
30		35.06	0.020		
20		20.31	0.012		
10		36.42	0.021		
0		25.87	0.015		
-10		33.53	0.019		
-20		12.84	0.007		
-30		31.51	0.018		
25		Maximum Voltage	15.02		
25	BEP	31.91	0.018		

LTE Band 18 (QPSK) / 822.5MHz / BW20M					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	32.27	0.019	2.5ppm	PASS
40		15.73	0.009		
30		28.28	0.016		
20		17.58	0.010		
10		24.88	0.014		
0		28.02	0.016		
-10		16.17	0.009		
-20		17.48	0.010		
-30		24.46	0.014		
25		Maximum Voltage	14.52		
25	BEP	31.91	0.018		

Note: 1. Normal Voltage = 3.85V. ; Battery End Point (BEP) = 3.5V.; Maximum Voltage = 4.4 V

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





LTE BAND 26

LTE Band 26 (QPSK) / 819MHz / BW10M					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	15.73	0.009	2.5ppm	PASS
40		28.81	0.017		
30		13.76	0.008		
20		21.09	0.012		
10		36.33	0.021		
0		15.88	0.009		
-10		25.37	0.015		
-20		35.15	0.020		
-30		28.15	0.016		
25	Maximum Voltage	12.02	0.007		
25	BEP	36.22	0.021		

LTE Band 26 (QPSK) / 819MHz / BW20M					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	26.04	0.015	2.5ppm	PASS
40		36.02	0.021		
30		15.61	0.009		
20		35.84	0.021		
10		15.92	0.009		
0		15.86	0.009		
-10		20.78	0.012		
-20		30.98	0.018		
-30		24.90	0.014		
25		Maximum Voltage	18.70		
25	BEP	27.37	0.016		

Note: 1. Normal Voltage = 3.85V. ; Battery End Point (BEP) = 3.5V.; Maximum Voltage = 4.4 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

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*****END OF THE REPORT*****

