



# RADIO TEST REPORT-LTE

## 47 CFR FCC Part 2&27

### Client Information:

Applicant: MPS MAYORISTA DE COLOMBIA S.A.

Applicant add.: Autop Bog Medellin Km2.5 Parque Emp. Tecnologico, Cota, Colombia

Manufacturer: MPS MAYORISTA DE COLOMBIA S.A.

Manufacturer add.: Autop Bog Medellin Km2.5 Parque Emp. Tecnologico, Cota, Colombia

### Product Information:

Product Name: Tablet PC

Model No.: 1200AS, 1200AS+, 1200AS-A, 1200AS-B, 1200AS-C, 1200AS-D

Brand Name: COIN, TOUCH+

FCC ID: 2AHVR-1200AS

Applicable standards: FCC CFR Title 47 Part 2&27

### Prepared By:

#### Dongguan Yaxu (AiT) Technology Limited

No.22, Jinqianling 3rd Street, Jitigang, Huangjiang, Dongguan,  
Guangdong, China

Tel.: +86-769-8202 0499

Fax.: +86-769-8202 0495

Date of Receipt: Mar. 02, 2022

Date of Test: Mar. 02~Mar. 27, 2022

Date of Issue: Mar. 28, 2022

Test Result: Pass

This device described above has been tested by Dongguan Yaxu (AiT) Technology Limited 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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Reviewed by: Simba Huang

Simba Huang

Seal-Chen

Seal.chen

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## 1.SUMMARY OF TEST

### 1.1TEST FACILITY

The test facility is recognized, certified or accredited by the following organizations:

**CNAS- Registration No: L6177**

Dongguan Yaxu (AiT) technology Limited is accredited to ISO/IEC 17025:2017 general Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the competence of testing and calibration laboratories) on Aug.04, 2020

**FCC-Registration No.: 703111 Designation Number: CN1313**

Dongguan Yaxu (AiT) technology Limited has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

**IC —Registration No.: 6819A CAB identifier: CN0122**

The 3m Semi-anechoic chamber of DongguanYaxu (AiT) technology Limited has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 6819A

**A2LA-Lab Cert. No.: 6317.01**

Dongguan Yaxu (AiT) technology Limited has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

### 1.2MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$  , 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 Test	$\pm 1.38\text{dB}$
2	RF power,conducted	$\pm 0.16\text{dB}$
3	Spurious emissions,conducted	$\pm 0.21\text{dB}$
4	All emissions,radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions,radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^\circ\text{C}$
7	Humidity	$\pm 2\%$

## 2.GENERAL INFORMATION

### 2.1GENERAL DESCRIPTION OF EUT

Equipment :	Tablet PC
Trade Mark:	COIN, TOUCH+
Model Name:	1200AS
Serial Model:	1200AS+, 1200AS-A, 1200AS-B, 1200AS-C,1200AS-D
Test sample(s) ID:	22030210-2
Frequency Bands	U.S. Bands: LTE FDD Band 4 LTE FDD Band 7
SIM CARD :	The EUT has one SIM Card sockets
Power Class:	E-UTRA :3
Modulation Mode:	BPSK/QPSK
Antenna	PIFA
Antenna gain	LTEB4:0.7 dBi LTEB7:0.75dBi
Battery parameter	Rated Voltage:3.7V Charge Limit Voltage:4.2V Capacity: 7000mAh
Adapter	Input: 100-240V~50/60Hz 0.6A max Output: DC 5V 2A
Extreme Vol. Limits	DC 3.33V ~ DC 4.07V(Normal: DC 3.7V)
Extreme Temp. Tolerance	-30°C to +50°C
Hardware version number	N/A
Software version number	N/A

## 2.2 LIST OF TEST EQUIPMENTS

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	Spectrum Analyzer	R&S	FSV40	101470	2021.08.30	2022.08.29
2	EMI Measuring Receiver	R&S	ESR	101160	2021.08.30	2022.08.29
3	Low Noise Pre Amplifier	HP	HP8447E	AiT-F01319	2021.08.30	2022.08.29
4	Low Noise Pre Amplifier	Tsj	MLA-0120-A02-34	2648A04738	2021.08.30	2022.08.29
5	Passive Loop	ETS	6512	00165355	2020.09.05	2022.09.04
6	TRILOG Super Broadband test Antenna	SCHWARZBECK	VULB9160	9160-3206	2021.08.28	2022.08.27
7	Broadband Horn Antenna	SCHWARZBECK	BBHA9120D	452	2021.08.28	2022.08.27
8	SHF-EHF Horn Antenna 15-40GHz	SCHWARZBECK	BBHA9170	BBHA9170367d	2020.11.24	2023.11.23
9	EMI Test Receiver	R&S	ESCI	100124	2021.08.30	2022.08.29
10	LISN	Kyoritsu	KNW-242	8-837-4	2021.08.30	2022.08.29
11	LISN	R&S	ESH3-Z2	0357.8810.54-101161-S2	2021.08.30	2022.08.29
12	Pro.Temp&Humi.chamber	MENTEK	MHP-150-1C	MAA08112501	2021.08.30	2022.08.29
13	RF Automatic Test system	MW	MW100-RFCB	21033016	2021.08.30	2022.08.29
14	Wideband Radio communication tester	R&S	CMW500	1201.0002K50	2021.08.30	2022.08.29
15	Signal Analyzer	Agilent	N9020A	9011796	2021.08.30	2022.08.29
16	DC power supply	ZHAOXIN	RXN-305D-2	28070002559	N/A	N/A
17	temporary antenna connector(Note)	NTS	R001	N/A	N/A	N/A

Note: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

### 2.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Product Specification Subjective To This Standard							
Tx Frequency		LTE Band 4:1710~1755MHz LTE Band 7:2500~2570MHz					
Rx Frequency		LTE Band 4:2110~2155MHz LTE Band 7:2620~2690MHz					
Bandwidth		LTE Band 4: 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz /20MHz LTE Band 7: 5MHz / 10MHz / 15MHz /20MHz					
Maximum Output Power		LTE Band 4: 23.41 dBm LTE Band 7: 23.40 dBm					
Type of Modulation		QPSK /16QAM					
RF Function	Band	UE Category UL	Modulation	Power Class	Ant Gain (dBi)	Ant Type	SIM Card
LTE	FDD:4/7	13	UL : QPSK, 16QAM, DL : QPSK, 16QAM	3	0.5	PIFA	2 SIM 1 is used to tested.

### 2.4 TEST CONFIGURATION OF EQUIPMENT UNDER TEST

Antenna port conducted and radiated test items listed below are performed according to KDB 971168D01 and ANSI C63.262015 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:

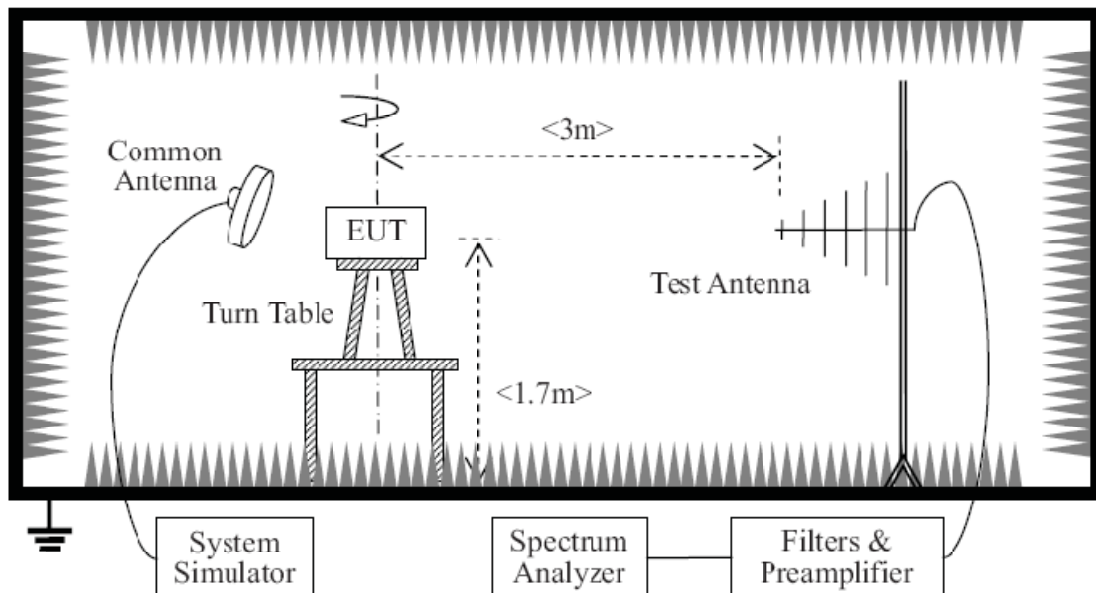
1. The mark 'v' means that this configuration is chosen for testing
2. The mark '-' means that this bandwidth is not supported.
3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated

LTE Band 4	Emission Designator	Emission Designator
BW(MHz)	(99%OBW)QPSK	(99%OBW)16QAM
1.4	1M10G7D	1M10W7D
3	2M69G7D	2M69W7D
5	4M51G7D	4M53W7D
10	8M95G7D	8M94W7D
15	13M5G7D	13M5W7D
20	18M0G7D	18M0W7D
LTE Band 7	Emission Designator	Emission Designator
BW(MHz)	(99%OBW)QPSK	(99%OBW)16QAM
5	4M51G7D	4M53W7D
10	8M95G7D	8M94W7D
15	13M5G7D	13M5W7D
20	18M0G7D	18M0W7D

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
	7			v	v	v	v	v	v	v	v	v	v	v	
Peak&Avera Ratio	4						v	v	v	v		v	v	v	
	7						v	v	v	v		v	v	v	
26dB&99% Bandwidth	4	v	v	v	v	v	v	v	v			v	v	v	
	7			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	
	7			v	v	v	v	v	v	v		v	v	v	
Conducted Spurious Emission	4	v	v	v	v	v	v	v	v	v		v	v	v	
	7			v	v	v	v	v	v	v		v	v	v	
Frequency Stability	4				v			v				v		v	
	7				v			v				v		v	
E.R.P.& E.I.R.P.	4	v	v	v	v	v	v	v	v	v		v	v	v	
	7			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	v	
	7			v	v	v	v	v	v	v		v	v	v	

## 2.5 TEST SETUP

### 1. Radiated Spurious Emission Test Setup



The EUT, which is powered by USB 5V, is located in a 3m Full-Anechoic Chamber; the cable loss, air loss and so on of the site as factors are pre-calibrated using the "Substitution" method, and calculated to correct the reading.

A call is established between the EUT and the SS via a Common Antenna. The EUT is commanded by the SS to operate at the maximum and minimum output power, and only the test result of the maximum output power was recorded.



### 3. CONDUCTED OUTPUT POWER

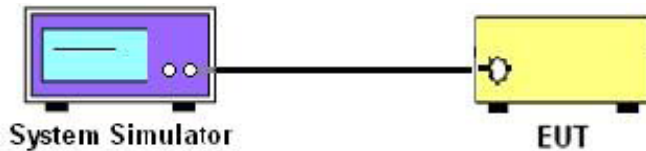
#### 3.1 DESCRIPTION OF THE CONDUCTED OUTPUT POWER MEASUREMENT

##### 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 system simulator.
2. Set EUT at maximum power through the system simulator.
3. Select lowest/middle/highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

Note:  $ERP \text{ or } EIRP = P_{Meas} + G_T$

Where ERP or EIRP: effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as  $P_{Meas}$ , e.g. dBm)

$P_{Meas}$ : measured transmitter output power, in dBm

$G_T$ : gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

3.1.4 TEST RESULTS

LTE Band 4 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
1.4	1	0	QPSK	23.59	23.62	23.55
1.4	1	2		23.30	23.33	23.25
1.4	1	5		23.09	23.05	22.98
1.4	3	0		22.87	22.79	22.74
1.4	3	1		22.63	22.58	22.45
1.4	3	2		22.37	22.37	22.17
1.4	6	0		22.14	22.16	21.87
1.4	1	0	16-QAM	23.36	23.33	23.29
1.4	1	2		23.09	23.04	23.01
1.4	1	5		22.81	22.74	22.73
1.4	3	0		22.54	22.46	22.53
1.4	3	1		22.30	22.18	22.27
1.4	3	2		22.08	21.90	22.03
1.4	6	0		21.82	21.70	21.80
3	1	0	QPSK	23.56	23.61	23.56
3	1	7		23.27	23.40	23.27
3	1	14		22.98	23.11	23.03
3	8	0		22.70	22.88	22.78
3	8	4		22.43	22.59	22.50
3	8	7		22.21	22.32	22.29
3	15	0		21.98	22.10	22.04
3	1	0	16-QAM	23.27	23.35	23.29
3	1	7		23.02	23.12	23.07
3	1	14		22.75	22.84	22.85
3	8	0		22.49	22.61	22.56
3	8	4		22.28	22.36	22.29
3	8	7		22.08	22.07	22.03
3	15	0		21.78	21.78	21.74

LTE Band 4 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
5	1	0	QPSK	23.62	23.66	23.68
5	1	12		23.38	23.42	23.41
5	1	24		23.15	23.17	23.19
5	12	0		22.94	22.92	22.91
5	12	6		22.69	22.65	22.68
5	12	11		22.47	22.42	22.46
5	25	0		22.23	22.12	22.18
5	1	0	16-QAM	23.34	23.46	23.45
5	1	12		23.06	23.23	23.25
5	1	24		22.84	22.99	22.98
5	12	0		22.57	22.74	22.74
5	12	6		22.29	22.49	22.50
5	12	11		22.01	22.27	22.29
5	25	0		21.75	22.05	22.00
10	1	0	QPSK	23.65	23.61	23.72
10	1	24		23.35	23.38	23.52
10	1	49		23.15	23.10	23.26
10	25	0		22.93	22.83	23.04
10	25	12		22.68	22.56	22.75
10	25	24		22.40	22.29	22.55
10	50	0		22.16	22.02	22.30
10	1	0	16-QAM	23.44	23.37	23.45
10	1	24		23.17	23.10	23.22
10	1	49		22.88	22.83	22.97
10	25	0		22.61	22.55	22.76
10	25	12		22.33	22.27	22.47
10	25	24		22.11	21.99	22.24
10	50	0		21.85	21.69	22.02

LTE Band 4 Maximum Average Power [dBm]							
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	
15	1	0	QPSK	24.22	24.12	24.23	
15	1	37		23.95	23.88	24.00	
15	1	74		23.74	23.67	23.79	
15	36	0		23.51	23.46	23.54	
15	36	18		23.25	23.17	23.30	
15	36	39		22.97	22.93	23.08	
15	75	0		22.67	22.65	22.82	
15	1	0		24.01	23.87	24.01	
15	1	38	16-QAM	23.80	23.57	23.77	
15	1	75		23.60	23.28	23.56	
15	36	0		23.39	23.06	23.27	
15	36	18		23.14	22.81	23.07	
15	36	39		22.91	22.61	22.83	
15	75	0		22.68	22.32	22.63	
20	1	0		24.62	24.59	24.61	
20	1	49	QPSK	24.36	24.36	24.36	
20	1	99		24.11	24.16	24.11	
20	50	0		23.89	23.89	23.87	
20	50	24		23.69	23.61	23.58	
20	50	49		23.40	23.37	23.31	
20	100	0		23.14	23.08	23.05	
20	1	0		16-QAM	24.35	24.35	24.34
20	1	49			24.13	24.10	24.06
20	1	99	23.93		23.87	23.78	
20	50	0	23.70		23.59	23.51	
20	50	24	23.42		23.30	23.25	
20	50	49	23.14		23.01	23.04	
20	100	0	22.89		22.72	22.78	

LTE Band 7 Maximum Average Power [dBm]							
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	
5	1	0	QPSK	23.12	23.23	23.26	
5	1	12		22.89	23.00	23.01	
5	1	24		22.59	22.72	22.74	
5	12	0		22.34	22.50	22.51	
5	12	6		22.11	22.28	22.26	
5	12	11		21.81	22.05	21.97	
5	25	0		21.59	21.79	21.69	
5	1	0		22.86	22.95	22.97	
5	1	12	16-QAM	22.59	22.69	22.72	
5	1	24		22.32	22.45	22.48	
5	12	0		22.08	22.25	22.27	
5	12	6		21.86	21.98	22.04	
5	12	11		21.59	21.75	21.74	
5	25	0		21.30	21.47	21.51	
10	1	0		QPSK	23.15	23.19	23.22
10	1	24			22.89	22.92	22.96
10	1	49	22.64		22.67	22.76	
10	25	0	22.37		22.45	22.46	
10	25	12	22.08		22.24	22.24	
10	25	24	21.84		22.04	21.96	
10	50	0	21.55		21.81	21.66	
10	1	0	16-QAM		22.89	22.91	22.97
10	1	24		22.62	22.62	22.70	
10	1	49		22.37	22.41	22.46	
10	25	0		22.08	22.19	22.26	
10	25	12		21.85	21.90	21.99	
10	25	24		21.61	21.62	21.75	
10	50	0		21.34	21.35	21.52	

LTE Band 7 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
15	1	0	QPSK	23.56	23.62	23.68
15	1	37		23.35	23.41	23.41
15	1	74		23.14	23.19	23.11
15	36	0		22.85	22.98	22.84
15	36	18		22.61	22.75	22.62
15	36	39		22.32	22.45	22.42
15	75	0		22.08	22.19	22.21
15	1	0	16-QAM	23.33	23.37	23.48
15	1	38		23.12	23.13	23.23
15	1	75		22.87	22.87	22.93
15	36	0		22.64	22.60	22.72
15	36	18		22.42	22.31	22.45
15	36	39		22.16	22.05	22.17
15	75	0		21.87	21.80	21.88
20	1	0	QPSK	24.35	24.23	24.62
20	1	49		24.06	23.94	24.39
20	1	99		23.81	23.67	24.14
20	50	0		23.53	23.40	23.89
20	50	24		23.27	23.16	23.68
20	50	49		23.05	22.94	23.41
20	100	0		22.79	22.72	23.11
20	1	0	16-QAM	24.13	24.01	24.37
20	1	49		23.85	23.79	24.11
20	1	99		23.58	23.53	23.91
20	50	0		23.31	23.29	23.70
20	50	24		23.10	23.05	23.49
20	50	49		22.84	22.76	23.27
20	100	0		22.61	22.46	23.06

LTE Band 4 Maximum EIRP [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
1.4	1	0	QPSK	24.29	24.32	24.25
1.4	1	2		24.00	24.03	23.95
1.4	1	5		23.79	23.75	23.68
1.4	3	0		23.57	23.49	23.44
1.4	3	1		23.33	23.28	23.15
1.4	3	2		23.07	23.07	22.87
1.4	6	0		22.84	22.86	22.57
1.4	1	0	16-QAM	24.06	24.03	23.99
1.4	1	2		23.79	23.74	23.71
1.4	1	5		23.51	23.44	23.43
1.4	3	0		23.24	23.16	23.23
1.4	3	1		23.00	22.88	22.97
1.4	3	2		22.78	22.60	22.73
1.4	6	0		22.52	22.40	22.50
3	1	0	QPSK	24.26	24.31	24.26
3	1	7		23.97	24.10	23.97
3	1	14		23.68	23.81	23.73
3	8	0		23.40	23.58	23.48
3	8	4		23.13	23.29	23.20
3	8	7		22.91	23.02	22.99
3	15	0		22.68	22.80	22.74
3	1	0	16-QAM	23.97	24.05	23.99
3	1	7		23.72	23.82	23.77
3	1	14		23.45	23.54	23.55
3	8	0		23.19	23.31	23.26
3	8	4		22.98	23.06	22.99
3	8	7		22.78	22.77	22.73
3	15	0		22.48	22.48	22.44

LTE Band 4 Maximum EIRP [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
5	1	0	QPSK	24.32	24.36	24.38
5	1	12		24.08	24.12	24.11
5	1	24		23.85	23.87	23.89
5	12	0		23.64	23.62	23.61
5	12	6		23.39	23.35	23.38
5	12	11		23.17	23.12	23.16
5	25	0		22.93	22.82	22.88
5	1	0	16-QAM	24.04	24.16	24.15
5	1	12		23.76	23.93	23.95
5	1	24		23.54	23.69	23.68
5	12	0		23.27	23.44	23.44
5	12	6		22.99	23.19	23.20
5	12	11		22.71	22.97	22.99
5	25	0		22.45	22.75	22.70
10	1	0	QPSK	24.35	24.31	24.42
10	1	24		24.05	24.08	24.22
10	1	49		23.85	23.80	23.96
10	25	0		23.63	23.53	23.74
10	25	12		23.38	23.26	23.45
10	25	24		23.10	22.99	23.25
10	50	0		22.86	22.72	23.00
10	1	0	16-QAM	24.14	24.07	24.15
10	1	24		23.87	23.80	23.92
10	1	49		23.58	23.53	23.67
10	25	0		23.31	23.25	23.46
10	25	12		23.03	22.97	23.17
10	25	24		22.81	22.69	22.94
10	50	0		22.55	22.39	22.72



LTE Band 4 Maximum EIRP [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
15	1	0	QPSK	24.92	24.82	24.93
15	1	37		24.65	24.58	24.70
15	1	74		24.44	24.37	24.49
15	36	0		24.21	24.16	24.24
15	36	18		23.95	23.87	24.00
15	36	39		23.67	23.63	23.78
15	75	0		23.37	23.35	23.52
15	1	0	16-QAM	24.71	24.57	24.71
15	1	38		24.50	24.27	24.47
15	1	75		24.30	23.98	24.26
15	36	0		24.09	23.76	23.97
15	36	18		23.84	23.51	23.77
15	36	39		23.61	23.31	23.53
15	75	0		23.38	23.02	23.33
20	1	0	QPSK	25.32	25.29	25.31
20	1	49		25.06	25.06	25.06
20	1	99		24.81	24.86	24.81
20	50	0		24.59	24.59	24.57
20	50	24		24.39	24.31	24.28
20	50	49		24.10	24.07	24.01
20	100	0		23.84	23.78	23.75
20	1	0	16-QAM	25.05	25.05	25.04
20	1	49		24.83	24.80	24.76
20	1	99		24.63	24.57	24.48
20	50	0		24.40	24.29	24.21
20	50	24		24.12	24.00	23.95
20	50	49		23.84	23.71	23.74
20	100	0		23.59	23.42	23.48

LTE Band 7 Maximum EIRP [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
5	1	0	QPSK	23.87	23.98	24.01
5	1	12		23.64	23.75	23.76
5	1	24		23.34	23.47	23.49
5	12	0		23.09	23.25	23.26
5	12	6		22.86	23.03	23.01
5	12	11		22.56	22.80	22.72
5	25	0		22.34	22.54	22.44
5	1	0	16-QAM	23.61	23.70	23.72
5	1	12		23.34	23.44	23.47
5	1	24		23.07	23.20	23.23
5	12	0		22.83	23.00	23.02
5	12	6		22.61	22.73	22.79
5	12	11		22.34	22.50	22.49
5	25	0		22.05	22.22	22.26
10	1	0	QPSK	23.90	23.94	23.97
10	1	24		23.64	23.67	23.71
10	1	49		23.39	23.42	23.51
10	25	0		23.12	23.20	23.21
10	25	12		22.83	22.99	22.99
10	25	24		22.59	22.79	22.71
10	50	0		22.30	22.56	22.41
10	1	0	16-QAM	23.64	23.66	23.72
10	1	24		23.37	23.37	23.45
10	1	49		23.12	23.16	23.21
10	25	0		22.83	22.94	23.01
10	25	12		22.60	22.65	22.74
10	25	24		22.36	22.37	22.50
10	50	0		22.09	22.10	22.27

LTE Band 7 Maximum EIRP [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
15	1	0	QPSK	24.31	24.37	24.43
15	1	37		24.10	24.16	24.16
15	1	74		23.89	23.94	23.86
15	36	0		23.60	23.73	23.59
15	36	18		23.36	23.50	23.37
15	36	39		23.07	23.20	23.17
15	75	0		22.83	22.94	22.96
15	1	0	16-QAM	24.08	24.12	24.23
15	1	38		23.87	23.88	23.98
15	1	75		23.62	23.62	23.68
15	36	0		23.39	23.35	23.47
15	36	18		23.17	23.06	23.20
15	36	39		22.91	22.80	22.92
15	75	0		22.62	22.55	22.63
20	1	0	QPSK	25.10	24.98	25.37
20	1	49		24.81	24.69	25.14
20	1	99		24.56	24.42	24.89
20	50	0		24.28	24.15	24.64
20	50	24		24.02	23.91	24.43
20	50	49		23.80	23.69	24.16
20	100	0		23.54	23.47	23.86
20	1	0	16-QAM	24.88	24.76	25.12
20	1	49		24.60	24.54	24.86
20	1	99		24.33	24.28	24.66
20	50	0		24.06	24.04	24.45
20	50	24		23.85	23.80	24.24
20	50	49		23.59	23.51	24.02
20	100	0		23.36	23.21	23.81

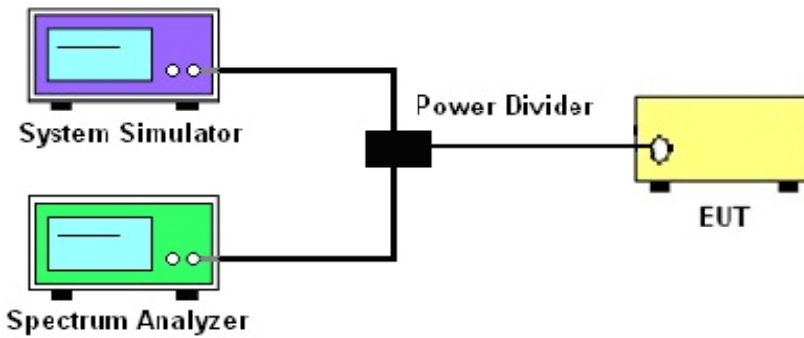
#### 4. PEAK-TO-AVERAGE RATIO

##### 4.1 DESCRIPTION OF THE CONDUCTED OUTPUT POWER MEASUREMENT

###### 4.1.1 MEASUREMENT METHOD

Use one of the procedures presented in 4.1.3 to measure the total peak power and record as PPK. Use one of the applicable procedures presented 4.1.3 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 D01 v03r01 Section 5.7 and ANSI C63.262015Section 5.2.6
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 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/AVG	PK/AVG	PK/AVG	PK/AVG	PK/AVG	PK/AVG
Trace	Max	Max	Max	Max	Max	Max
Sweep Count	Auto	Auto	Auto	Auto	Auto	Auto

4.1.4 TEST RESULTS

LTE Band 4 PAR [dBm]					
BW [MHz]	RB Size	Modulation	Lowest	Middle	Highest
			P-A	P-A	P-A
20	1	QPSK	5.02	4.74	4.41
20	100		5.57	5.55	5.35
20	1	16-QAM	6.17	4.92	5.14
20	100		6.26	6.44	6.18
Limit			≤13dB		

LTE Band 7 PAR [dBm]					
BW [MHz]	RB Size	Modulation	Lowest	Middle	Highest
			P-A	P-A	P-A
20	1	QPSK	4.97	4.32	4.58
20	100		5.23	5.43	5.32
20	1	16-QAM	5.82	5.48	5.2
20	100		5.79	6.13	6.06
Limit			≤13dB		

Note: Test chart See Appendix 4

## 5. OCCUPIED BANDWIDTH

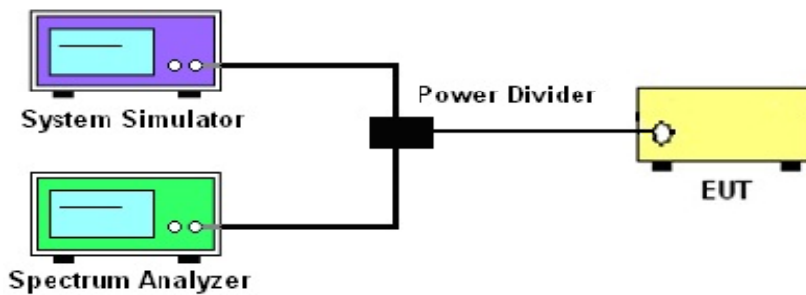
### 5.1 DESCRIPTION OF OCCUPIED BANDWIDTH MEASUREMENT

#### 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 4.2 and 4.3.
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.

	1.4M	3M	5M	10M	15M	20M
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 4 Bandwidth [MHz]							
BW [MHz]	Mode	Lowest		Middle		Highest	
		99% BW	26dB BW	99% BW	26dB BW	99% BW	26dB BW
1.4	QPSK	1.094	1.246	1.0964	1.249	1.101	1.249
1.4	16-QAM	1.097	1.248	1.1026	1.251	1.093	1.245
3	QPSK	2.6919	2.999	2.6856	2.983	2.684	2.967
3	16-QAM	2.685	2.973	2.683	2.986	2.6875	3.002
5	QPSK	4.5	4.957	4.513	4.971	4.51	4.995
5	16-QAM	4.527	5.009	4.534	4.998	4.513	4.977
10	QPSK	8.932	9.671	8.948	9.73	8.947	9.694
10	16-QAM	8.934	9.7	8.944	9.743	8.937	9.767
15	QPSK	13.438	14.84	13.491	14.92	13.466	14.84
15	16-QAM	13.486	14.84	13.501	15	13.468	14.87
20	QPSK	17.924	19.52	17.965	19.64	17.894	19.38
20	16-QAM	17.981	19.57	17.953	19.54	17.893	19.51

LTE Band 7 Bandwidth [MHz]							
BW [MHz]	Mode	Lowest		Middle		Highest	
		99% BW	26dB BW	99% BW	26dB BW	99% BW	26dB BW
5	QPSK	4.513	4.985	4.506	4.998	4.502	4.993
5	16-QAM	4.526	5.015	4.508	4.992	4.5301	5.002
10	QPSK	8.933	9.713	8.946	9.732	8.948	9.729
10	16-QAM	8.937	9.677	8.943	9.755	8.934	9.782
15	QPSK	13.482	14.99	13.492	14.96	13.44	14.9
15	16-QAM	13.497	14.97	13.486	14.93	13.486	14.84
20	QPSK	17.894	19.46	17.952	19.67	17.944	19.43
20	16-QAM	17.954	19.56	17.954	19.65	17.914	19.6

Note: Test chart See Appendix 1

## 6. CONDUCTED BAND EDGE

### 6.1 DESCRIPTION OF CONDUCTED BAND EDGE MEASUREMENT

#### 6.1.1 MEASUREMENT METHOD

1. §22.917(a) For operations in the 824 – 849 MHz band, the FCC limit is  $43 + 10\log_{10}(P[\text{Watts}])$  dB below the transmitter power  $P(\text{Watts})$  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  $43 + 10\log_{10}(P[\text{Watts}])$  dB below the transmitter power  $P(\text{Watts})$  in a 1MHz bandwidth. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed

#### 3. §27.53 (h)

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

#### 4. §27.53(m)(4)

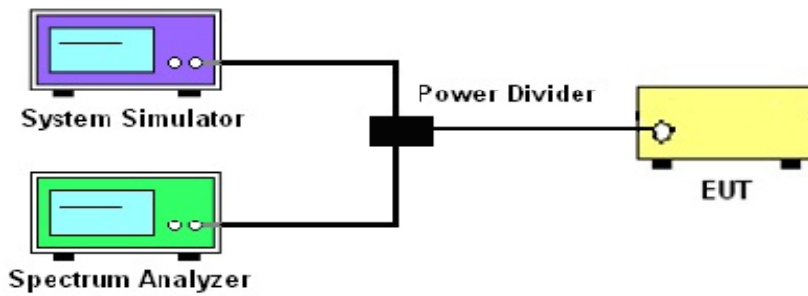
For operations in the 2500 MHz ~ 2570 MHz band this section, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the 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 than  $43 + 10 \log (P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log (P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

#### 5. §27.53 (g)

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



### 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					
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 2

## 7. CONDUCTED SPURIOUS EMISSION

### 7.1 DESCRIPTION OF CONDUCTED SPURIOUS EMISSION MEASUREMENT

#### 7.1.1 MEASUREMENT METHOD

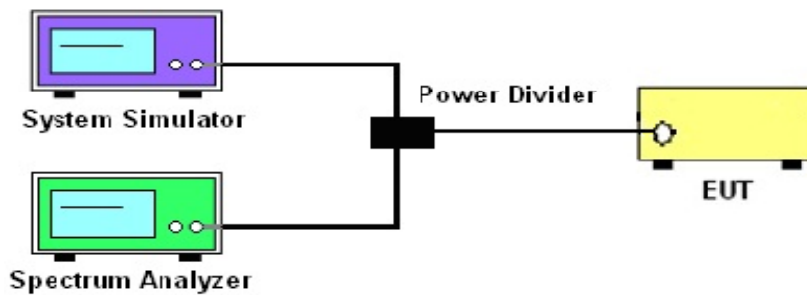
The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

For Band 7:

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least  $55 + 10 \log (P)$  dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

#### 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 3

## 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. 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. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

#### 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,  $RSE = Rx \text{ (dBuV)} + CL \text{ (dB)} + SA \text{ (dB)} + Gain \text{ (dBi)} - 107 \text{ (dBuV to dBm)}$  The SA is calibrated using following setup.

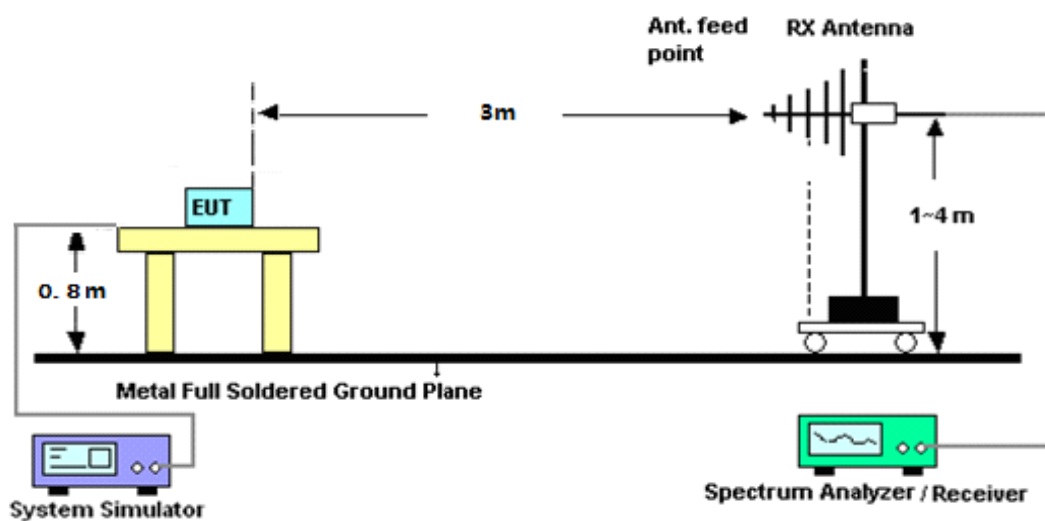
b) EUT was placed on 1.5 m non-conductive stand at a 3 m test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 m from the test item for emission measurements. The height of receiving antenna is 0.8m. The test setup refers to figure below. Detected emissions were 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 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.

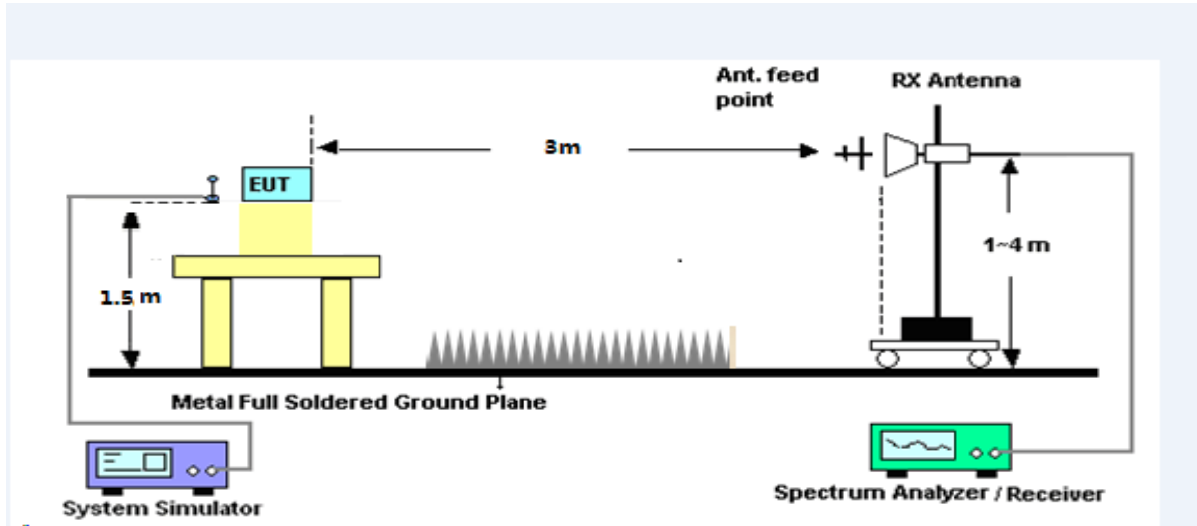
The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established and the ARpl is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable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

$$\text{Power} = \text{PMea} + \text{ARpl}$$

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 7 and ANSI C63.26 2015 Section 5.5.
2. The EUT was placed on a rotatable wooden table with 1.5 meter above ground.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antennatower.
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

8.1.4 TEST RESULTS

LTE Band 4 / 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)	
3420.96	-33.57	12.90	12.56	-33.23	-13.00	-20.23	H
5132.12	-34.28	13.10	16.32	-37.50	-13.00	-24.50	H
6842.40	-33.50	12.33	21.13	-42.30	-13.00	-29.30	H
3420.96	-34.87	12.90	12.56	-34.53	-13.00	-21.53	V
5132.12	-33.83	13.10	16.32	-37.05	-13.00	-24.05	V
6842.40	-32.69	12.33	21.13	-41.49	-13.00	-28.49	V
LTE Band 4 / 1.4MHz / 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)	
3464.99	-33.70	12.90	12.56	-33.36	-13.00	-20.36	H
5196.55	-34.52	13.10	16.32	-37.74	-13.00	-24.74	H
6929.87	-33.32	12.33	21.13	-42.12	-13.00	-29.12	H
3464.99	-34.93	12.90	12.56	-34.59	-13.00	-21.59	V
5196.55	-33.95	13.10	16.32	-37.17	-13.00	-24.17	V
6929.87	-32.75	12.33	21.13	-41.55	-13.00	-28.55	V
LTE Band 4 / 1.4MHz / 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)	
3508.18	-33.95	12.90	12.56	-33.61	-13.00	-20.61	H
5262.15	-35.20	13.10	16.32	-38.42	-13.00	-25.42	H
7015.80	-32.44	12.33	21.13	-41.24	-13.00	-28.24	H
3508.18	-35.50	12.90	12.56	-35.16	-13.00	-22.16	V
5262.15	-33.93	13.10	16.32	-37.15	-13.00	-24.15	V
7015.80	-32.48	12.33	21.13	-41.28	-13.00	-28.28	V

LTE Band 4 / 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)	
3423.84	-34.21	12.90	12.56	-33.87	-13.00	-20.87	H
5135.96	-34.97	13.10	16.32	-38.19	-13.00	-25.19	H
6848.61	-32.19	12.33	21.13	-40.99	-13.00	-27.99	H
3423.84	-34.77	12.90	12.56	-34.43	-13.00	-21.43	V
5135.96	-34.36	13.10	16.32	-37.58	-13.00	-24.58	V
6848.61	-31.91	12.33	21.13	-40.71	-13.00	-27.71	V
LTE Band 4 / 3MHz / 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)	
3464.90	-33.54	12.90	12.56	-33.20	-13.00	-20.20	H
5196.96	-34.58	13.10	16.32	-37.80	-13.00	-24.80	H
6929.75	-32.31	12.33	21.13	-41.11	-13.00	-28.11	H
3464.90	-34.73	12.90	12.56	-34.39	-13.00	-21.39	V
5196.96	-34.11	13.10	16.32	-37.33	-13.00	-24.33	V
6929.75	-32.98	12.33	21.13	-41.78	-13.00	-28.78	V
LTE Band 4 / 3MHz / 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)	
3506.13	-33.89	12.90	12.56	-33.55	-13.00	-20.55	H
5261.86	-34.68	13.10	16.32	-37.90	-13.00	-24.90	H
7012.57	-32.39	12.33	21.13	-41.19	-13.00	-28.19	H
3506.13	-35.16	12.90	12.56	-34.82	-13.00	-21.82	V
5261.86	-34.57	13.10	16.32	-37.79	-13.00	-24.79	V
7012.57	-33.20	12.33	21.13	-42.00	-13.00	-29.00	V

LTE Band 4 / 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)	
3424.84	-34.60	12.90	12.56	-34.26	-13.00	-21.26	H
5137.12	-34.10	13.10	16.32	-37.32	-13.00	-24.32	H
6849.91	-32.28	12.33	21.13	-41.08	-13.00	-28.08	H
3424.84	-35.28	12.90	12.56	-34.94	-13.00	-21.94	V
5137.12	-33.88	13.10	16.32	-37.10	-13.00	-24.10	V
6849.91	-32.73	12.33	21.13	-41.53	-13.00	-28.53	V
LTE Band 4 / 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)	(dBm)	
3464.74	-33.65	12.90	12.56	-33.31	-13.00	-20.31	H
5196.60	-35.39	13.10	16.32	-38.61	-13.00	-25.61	H
6929.57	-33.14	12.33	21.13	-41.94	-13.00	-28.94	H
3464.74	-35.05	12.90	12.56	-34.71	-13.00	-21.71	V
5196.60	-34.15	13.10	16.32	-37.37	-13.00	-24.37	V
6929.57	-31.76	12.33	21.13	-40.56	-13.00	-27.56	V
LTE Band 4 / 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)	(dBm)	
3505.18	-34.64	12.90	12.56	-34.30	-13.00	-21.30	H
5256.82	-34.78	13.10	16.32	-38.00	-13.00	-25.00	H
7009.83	-32.49	12.33	21.13	-41.29	-13.00	-28.29	H
3505.18	-35.86	12.90	12.56	-35.52	-13.00	-22.52	V
5256.82	-35.21	13.10	16.32	-38.43	-13.00	-25.43	V
7009.83	-32.78	12.33	21.13	-41.58	-13.00	-28.58	V

LTE Band 4 / 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)	
3429.96	-34.75	12.90	12.56	-34.41	-13.00	-21.41	H
5145.03	-34.58	13.10	16.32	-37.80	-13.00	-24.80	H
6860.56	-32.15	12.33	21.13	-40.95	-13.00	-27.95	H
3429.96	-34.57	12.90	12.56	-34.23	-13.00	-21.23	V
5145.03	-34.37	13.10	16.32	-37.59	-13.00	-24.59	V
6860.56	-32.74	12.33	21.13	-41.54	-13.00	-28.54	V
LTE Band 4 / 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)	
3464.50	-34.16	12.90	12.56	-33.82	-13.00	-20.82	H
5196.62	-34.62	13.10	16.32	-37.84	-13.00	-24.84	H
6929.57	-32.55	12.33	21.13	-41.35	-13.00	-28.35	H
3464.50	-35.20	12.90	12.56	-34.86	-13.00	-21.86	V
5196.62	-34.27	13.10	16.32	-37.49	-13.00	-24.49	V
6929.57	-32.85	12.33	21.13	-41.65	-13.00	-28.65	V
LTE Band 4 / 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)	
3500.20	-33.44	12.90	12.56	-33.10	-13.00	-20.10	H
5250.31	-34.98	13.10	16.32	-38.20	-13.00	-25.20	H
7000.02	-32.30	12.33	21.13	-41.10	-13.00	-28.10	H
3500.20	-35.96	12.90	12.56	-35.62	-13.00	-22.62	V
5250.31	-34.05	13.10	16.32	-37.27	-13.00	-24.27	V
7000.02	-32.55	12.33	21.13	-41.35	-13.00	-28.35	V



LTE Band 4 / 15MHz / 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)	
3434.74	-34.93	12.90	12.56	-34.59	-13.00	-21.59	H
5152.31	-34.38	13.10	16.32	-37.60	-13.00	-24.60	H
6870.47	-32.83	12.33	21.13	-41.63	-13.00	-28.63	H
3434.74	-34.68	12.90	12.56	-34.34	-13.00	-21.34	V
5152.31	-34.11	13.10	16.32	-37.33	-13.00	-24.33	V
6870.47	-32.01	12.33	21.13	-40.81	-13.00	-27.81	V
LTE Band 4 / 15MHz / 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)	
3464.83	-33.53	12.90	12.56	-33.19	-13.00	-20.19	H
5196.78	-34.24	13.10	16.32	-37.46	-13.00	-24.46	H
6929.69	-33.22	12.33	21.13	-42.02	-13.00	-29.02	H
3464.83	-34.95	12.90	12.56	-34.61	-13.00	-21.61	V
5196.78	-34.39	13.10	16.32	-37.61	-13.00	-24.61	V
6929.69	-32.76	12.33	21.13	-41.56	-13.00	-28.56	V
LTE Band 4 / 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)	(dBm)	
3495.37	-34.61	12.90	12.56	-34.27	-13.00	-21.27	H
5242.20	-34.73	13.10	16.32	-37.95	-13.00	-24.95	H
6989.92	-32.78	12.33	21.13	-41.58	-13.00	-28.58	H
3495.37	-35.10	12.90	12.56	-34.76	-13.00	-21.76	V
5242.20	-33.99	13.10	16.32	-37.21	-13.00	-24.21	V
6989.92	-32.18	12.33	21.13	-40.98	-13.00	-27.98	V

LTE Band 4 / 20MHz / 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)	
3439.91	-34.82	12.90	12.56	-34.48	-13.00	-21.48	H
5160.33	-34.52	13.10	16.32	-37.74	-13.00	-24.74	H
6880.84	-32.58	12.33	21.13	-41.38	-13.00	-28.38	H
3439.91	-34.86	12.90	12.56	-34.52	-13.00	-21.52	V
5160.33	-34.60	13.10	16.32	-37.82	-13.00	-24.82	V
6880.84	-32.87	12.33	21.13	-41.67	-13.00	-28.67	V
LTE Band 4 / 20MHz / 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)	
3464.64	-34.50	12.90	12.56	-34.16	-13.00	-21.16	H
5196.43	-35.38	13.10	16.32	-38.60	-13.00	-25.60	H
6929.93	-33.21	12.33	21.13	-42.01	-13.00	-29.01	H
3464.64	-35.68	12.90	12.56	-35.34	-13.00	-22.34	V
5196.43	-34.30	13.10	16.32	-37.52	-13.00	-24.52	V
6929.93	-32.91	12.33	21.13	-41.71	-13.00	-28.71	V
LTE Band 4 / 20MHz / 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)	
3490.59	-34.45	12.90	12.56	-34.11	-13.00	-21.11	H
5235.29	-34.72	13.10	16.32	-37.94	-13.00	-24.94	H
6979.37	-32.20	12.33	21.13	-41.00	-13.00	-28.00	H
3490.59	-35.84	12.90	12.56	-35.50	-13.00	-22.50	V
5235.29	-33.86	13.10	16.32	-37.08	-13.00	-24.08	V
6979.37	-32.11	12.33	21.13	-40.91	-13.00	-27.91	V

LTE Band 7 / 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)	
5004.98	-33.97	12.66	15.86	-37.17	-25.00	-12.17	H
7507.47	-35.44	11.46	19.28	-43.26	-25.00	-18.26	H
10010.53	-32.70	12.79	23.19	-43.10	-25.00	-18.10	H
5004.98	-35.61	12.66	15.86	-38.81	-25.00	-13.81	V
7507.47	-34.22	11.46	19.28	-42.04	-25.00	-17.04	V
10010.53	-33.14	12.79	23.19	-43.54	-25.00	-18.54	V
LTE Band 7 / 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)	(dBm)	
5069.99	-33.96	12.72	15.86	-37.10	-25.00	-12.10	H
7604.96	-35.16	11.46	19.28	-42.98	-25.00	-17.98	H
10139.99	-32.83	12.09	23.19	-43.93	-25.00	-18.93	H
5069.99	-35.20	12.72	15.86	-38.34	-25.00	-13.34	V
7604.96	-35.11	11.46	19.28	-42.93	-25.00	-17.93	V
10139.99	-32.50	12.09	23.19	-43.60	-25.00	-18.60	V
LTE Band 7 / 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)	(dBm)	
5133.81	-33.56	12.76	15.86	-36.66	-25.00	-11.66	H
7701.42	-34.75	11.45	19.28	-42.58	-25.00	-17.58	H
10268.12	-33.34	12.28	23.19	-44.25	-25.00	-19.25	H
5133.81	-34.67	12.76	15.86	-37.77	-25.00	-12.77	V
7701.42	-34.59	11.45	19.28	-42.42	-25.00	-17.42	V
10268.12	-32.73	12.28	23.19	-43.64	-25.00	-18.64	V

LTE Band 7 / 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)	
5010.11	-34.08	12.66	15.86	-37.28	-25.00	-12.28	H
7515.57	-34.93	11.46	19.28	-42.75	-25.00	-17.75	H
10020.64	-33.63	12.79	23.19	-44.03	-25.00	-19.03	H
5010.11	-35.55	12.66	15.86	-38.75	-25.00	-13.75	V
7515.57	-34.61	11.46	19.28	-42.43	-25.00	-17.43	V
10020.64	-32.76	12.79	23.19	-43.16	-25.00	-18.16	V
LTE Band 7 / 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)	
5069.79	-33.58	12.72	15.86	-36.72	-25.00	-11.72	H
7604.67	-34.55	11.46	19.28	-42.37	-25.00	-17.37	H
10139.55	-32.36	12.09	23.19	-43.46	-25.00	-18.46	H
5069.79	-36.00	12.72	15.86	-39.14	-25.00	-14.14	V
7604.67	-34.01	11.46	19.28	-41.83	-25.00	-16.83	V
10139.55	-31.74	12.09	23.19	-42.84	-25.00	-17.84	V
LTE Band 7 / 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)	
5129.13	-33.54	12.76	15.86	-36.64	-25.00	-11.64	H
7694.05	-34.38	11.45	19.28	-42.21	-25.00	-17.21	H
10258.69	-32.72	12.28	23.19	-43.63	-25.00	-18.63	H
5129.13	-35.85	12.76	15.86	-38.95	-25.00	-13.95	V
7694.05	-34.00	11.45	19.28	-41.83	-25.00	-16.83	V
10258.69	-33.11	12.28	23.19	-44.02	-25.00	-19.02	V

LTE Band 7 / 15MHz / 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)	
5015.66	-34.64	12.66	15.86	-37.84	-25.00	-12.84	H
7524.09	-35.49	11.46	19.28	-43.31	-25.00	-18.31	H
10031.69	-33.48	12.79	23.19	-43.88	-25.00	-18.88	H
5015.66	-34.89	12.66	15.86	-38.09	-25.00	-13.09	V
7524.09	-34.26	11.46	19.28	-42.08	-25.00	-17.08	V
10031.69	-32.47	12.79	23.19	-42.87	-25.00	-17.87	V
LTE Band 7 / 15MHz / 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)	
5069.63	-33.81	12.72	15.86	-36.95	-25.00	-11.95	H
7605.03	-34.50	11.46	19.28	-42.32	-25.00	-17.32	H
10139.90	-32.52	12.09	23.19	-43.62	-25.00	-18.62	H
5069.63	-35.08	12.72	15.86	-38.22	-25.00	-13.22	V
7605.03	-33.89	11.46	19.28	-41.71	-25.00	-16.71	V
10139.90	-32.89	12.09	23.19	-43.99	-25.00	-18.99	V
LTE Band 7 / 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)	(dBm)	
5123.47	-34.86	12.76	15.86	-37.96	-25.00	-12.96	H
7523.66	-35.03	11.45	19.28	-42.86	-25.00	-17.86	H
10031.88	-32.28	12.28	23.19	-43.19	-25.00	-18.19	H
5123.47	-35.69	12.76	15.86	-38.79	-25.00	-13.79	V
7523.66	-34.98	11.45	19.28	-42.81	-25.00	-17.81	V
10031.88	-32.41	12.28	23.19	-43.32	-25.00	-18.32	V

LTE Band 7 / 20MHz / 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)	
5020.87	-34.36	12.66	15.86	-37.56	-25.00	-12.56	H
7530.96	-34.02	11.46	19.28	-41.84	-25.00	-16.84	H
10258.89	-33.01	12.79	23.19	-43.41	-25.00	-18.41	H
5020.87	-35.48	12.66	15.86	-38.68	-25.00	-13.68	V
7530.96	-34.91	11.46	19.28	-42.73	-25.00	-17.73	V
10258.89	-32.60	12.79	23.19	-43.00	-25.00	-18.00	V
LTE Band 7 / 20MHz / 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)	
5069.94	-34.60	12.72	15.86	-37.74	-25.00	-12.74	H
7605.13	-35.31	11.46	19.28	-43.13	-25.00	-18.13	H
10139.64	-32.18	12.09	23.19	-43.28	-25.00	-18.28	H
5069.94	-34.65	12.72	15.86	-37.79	-25.00	-12.79	V
7605.13	-34.14	11.46	19.28	-41.96	-25.00	-16.96	V
10139.64	-31.73	12.09	23.19	-42.83	-25.00	-17.83	V
LTE Band 7 / 20MHz / 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)	
5118.90	-34.63	12.76	15.86	-37.73	-25.00	-12.73	H
7678.00	-34.66	11.45	19.28	-42.49	-25.00	-17.49	H
10237.83	-32.81	12.28	23.19	-43.72	-25.00	-18.72	H
5118.90	-35.27	12.76	15.86	-38.37	-25.00	-13.37	V
7678.00	-34.76	11.45	19.28	-42.59	-25.00	-17.59	V
10237.83	-33.10	12.28	23.19	-44.01	-25.00	-19.01	V

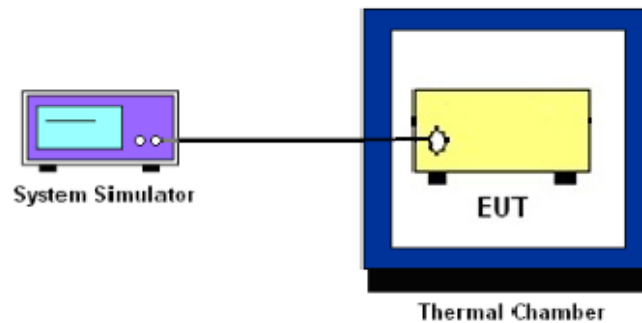
## 9. FREQUENCY STABILITY

### 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  $-30^{\circ}\text{C}$  and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in  $10^{\circ}\text{C}$  step up to  $50^{\circ}\text{C}$ . The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

#### 9.1.4 TEST PROCEDURES FOR VOLTAGE VARIATION

1. The testing follows FCC KDB 971168 D01v01r03 Section 9.
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 TEST RESULTS

LTE Band 4 (QPSK) / 1733MHz / BW10M					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	11.98	0.007	2.5ppm	PASS
40		32.70	0.019		
30		21.54	0.012		
20		22.28	0.013		
10		35.08	0.020		
0		31.81	0.018		
-10		11.59	0.007		
-20		22.89	0.013		
-30		14.07	0.008		
20		Maximum Voltage	33.58		
20	BEP	19.87	0.011		

LTE Band 4 (QPSK) / 1733MHz / BW20M					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	30.35	0.018	2.5ppm	PASS
40		32.90	0.019		
30		33.42	0.019		
20		25.26	0.015		
10		18.66	0.011		
0		23.94	0.014		
-10		22.05	0.013		
-20		35.88	0.021		
-30		30.15	0.017		
20		Maximum Voltage	33.57		
20	BEP	23.14	0.013		



LTE Band 7 (QPSK) / 2535MHz / BW10M					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	27.41	0.011	2.5ppm	PASS
40		33.43	0.013		
30		30.63	0.012		
20		15.23	0.006		
10		28.65	0.011		
0		30.95	0.012		
-10		24.72	0.010		
-20		23.52	0.009		
-30		16.98	0.007		
20		Maximum Voltage	28.33		
20	BEP	25.06	0.010		

LTE Band 7 (QPSK) / 2535MHz / BW20M					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	26.94	0.011	2.5ppm	PASS
40		21.20	0.008		
30		33.95	0.013		
20		32.29	0.013		
10		19.25	0.008		
0		21.32	0.008		
-10		15.70	0.006		
-20		32.75	0.013		
-30		34.07	0.013		
20		Maximum Voltage	35.48		
20	BEP	29.82	0.012		

## APPENDIX — PHOTOS OF TEST SETUP

**SPURIOUS EMISSION TEST SETUP (BELOW 1GHZ)**



**SPURIOUS EMISSION TEST SETUP (ABOVE 1GHZ)**



**\*\*End of report\*\***