TEST REPORT

APPLICANT	:	Reliance Communications LLC
PRODUCT NAME	:	Orbic Q10
MODEL NAME	:	RC609L
BRAND NAME	:	Orbic
FCC ID	:	2ABGH-RC609LTM
STANDARD(S)	:	47 CFR Part 2 47 CFR Part 90, Subpart S
RECEIPT DATE	:	2022-03-31
TEST DATE	:	2022-04-07 to 2022-04-26
ISSUE DATE	:	2022-06-02

Edited by: Peng Mi (Rapporteur)

Approved by: Shen Junsheng (Supervisor)

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Change History		
Version	**Date**	**Reason for change**
1.0	2022-05-23	First edition
2.0	2022-06-02	Changed product name and replaced the test report version 1.0.

1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Reliance Communications LLC
Applicant Address:	91 Colin Drive, Unit 1, HOLBROOK, New York 11741, United States
Manufacturer:	Unimaxcomm
Manufacturer Address:	35F, HBC HuiLong Center Building-II Minzhi Street, Longhua, Shenzhen, P.R. China 518110

1.2. Equipment Under Test (EUT) Description

Product Name:	Orbic Q10	
Sample No.:	6#	
Hardware Version:	V1.0	
Software Version:	ORB609L_v1.0.2_BTM-ST	
Modulation Type:	QPSK, 16QAM, 64QAM	
Operation Band:	Band 26	
Frequency Range:	LTE Band 26	Tx: 814MHz–824MHz
		Rx: 859MHz–869MHz
Channel Bandwidth	LTE Band 26	1.4MHz, 3MHz, 5MHz, 10MHz
Antenna Type:	Fixed Internal Antenna	
Antenna Gain:	LTE Band 26	-2.14dBi
Accessory Information:	Battery	
	Brand Name:	N/A
	Model No.:	BTE-3402
	Serial No.:	N/A
	Capacity:	3400mAh
	Rated Voltage:	3.8V
	Charge Limit:	4.35V
	Manufacturer:	Phenix New Energy(Hui Zhou)Co.,Ltd.

Accessory Information:	AC Adapter	
	Brand Name:	N/A
	Model No.:	TPA-23A050200UU01
	Serial No.:	N/A
	Rated Output:	5V⎓2000mA
	Rated Input:	100-240V~50/60Hz, 0.3A
	Manufacturer:	Shenzhen Tianyin Electronics Co.,Ltd.

Note 1: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

1.3. Maximum E.R.P./E.I.R.P. and Emission Designator

LTE Band 26	**Maximum E.R.P./E.I.R.P. (W)**			**Emission Designator (99%OBW)**		
BW(MHz)	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
10	0.067	0.059	0.052	9M00G7D	8M95W7D	8M97W7D
5	0.066	0.059	0.052	4M50G7D	4M51W7D	4M52W7D
3	0.067	0.059	0.051	2M70G7D	2M70W7D	2M71W7D
1.4	0.067	0.061	0.052	1M10G7D	1M10W7D	1M10W7D

1.4. Test Standards and Results

The objective of the report is to perform testing according to Part 2 and Part 90 for the EUT FCC ID Certification:

No	Identity	Document Title
1	47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 90	Miscellaneous Wireless Communications Services

Test detailed items/section required by FCC rules and results are as below:

Section	Description	Test Date	Test Engineer	Result	Method Determination /Remark
2.1046, 90.635(b)	Transmitter Conducted Output Power and ERP/EIRP	Apr. 26, 2022	Chen Hao Li Huaijie	PASS	No deviation
90.209	Occupied Bandwidth	Apr. 24, 2022	Li Huaijie	PASS	No deviation
2.1055, 90.213	Frequency Stability	Apr. 26, 2022	Li Huaijie	PASS	No deviation
2.1051, 90.691	Conducted Spurious Emissions	Apr. 24, 2022	Li Huaijie	PASS	No deviation
2.1051, 90.691	Band Edge	Apr. 18, 2022	Li Huaijie	PASS	No deviation
2.1053, 90.691	Radiated Spurious Emissions	Apr. 12, 2022	Li Hanbing	PASS	No deviation

Note 1: The tests were performed according to the method of measurements prescribed in KDB971168 D01 v03 and ANSI/TIA-603-E-2016.

Note 2: The path loss during the RF test is calibrated to correct the results by the offset setting in the test equipments. The ref offset 24.5dB contains two parts that cable loss 14.5dB and Attenuator 10dB.

Note 3: Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.

Note 4: When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% confidence intervals.

1.5. Environmental Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15-35
Relative Humidity (%):	30-60
Atmospheric Pressure (kPa):	86-106

2. 47 CFR Part 2, Part 90S Requirements

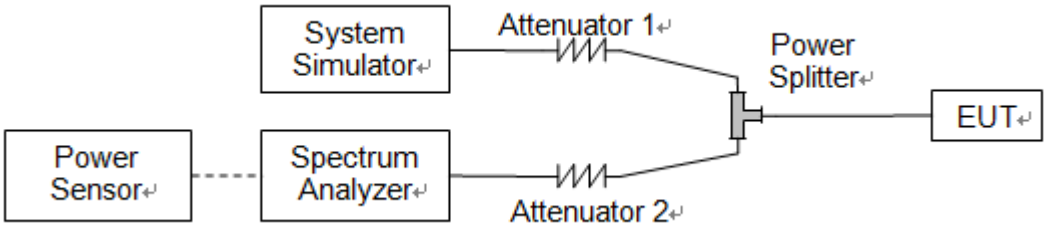
2.1. Transmitter Conducted Output Power and E.R.P./E.I.R.P.

2.1.1. Requirement

According to FCC section 2.1046(a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

According to FCC section 90.635(b) for LTE Band 26, the maximum output power of the transmitter for mobile stations is 100 watts.

2.1.2. Test Description



The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power. A call is established between the EUT and the SS.

2.1.3. Test procedure

KDB 971168 D01v03 Section 5.2 and ANSI/TIA-603-E-2016.

EIRP (dBm) = Conducted Output Power (dBm) + Antenna Gain (dBi)
ERP (dBm) = EIPR (dBm) - 2.15

2.1.4. Result

Conducted Output Power

LTE Band 26						
BW [MHz]	Modulation	RB Size	RB Offset	Average Power Low Ch. / Freq.	Average Power Middle Ch. / Freq.	Average Power High Ch. / Freq.
Channel				/	26740	/
Frequency (MHz)				/	819.0	/
10	QPSK	1	0	/	22.52	/
10	QPSK	1	25	/	22.55	/
10	QPSK	1	49	/	22.41	/
10	QPSK	25	0	/	21.94	/
10	QPSK	25	12	/	21.90	/
10	QPSK	25	25	/	21.89	/
10	QPSK	50	0	/	21.90	/
10	16QAM	1	0	/	21.62	/
10	16QAM	1	25	/	21.71	/
10	16QAM	1	49	/	21.65	/
10	16QAM	25	0	/	21.66	/
10	16QAM	25	12	/	21.67	/
10	16QAM	25	25	/	21.84	/
10	16QAM	50	0	/	22.01	/
10	64QAM	1	0	/	21.30	/
10	64QAM	1	25	/	21.40	/
10	64QAM	1	49	/	21.12	/
10	64QAM	25	0	/	21.47	/
10	64QAM	25	12	/	21.23	/
10	64QAM	25	25	/	21.13	/
10	64QAM	50	0	/	21.43	/

LTE Band 26						
BW [MHz]	Modulation	RB Size	RB Offset	Average Power Low Ch. / Freq.	Average Power Middle Ch. / Freq.	Average Power High Ch. / Freq.
Channel				26715	26740	26765
Frequency (MHz)				816.5	819.0	821.5
5	QPSK	1	0	22.51	22.39	22.43
5	QPSK	1	12	22.46	22.40	22.42
5	QPSK	1	24	22.42	22.39	22.36
5	QPSK	12	0	21.88	21.81	21.76
5	QPSK	12	7	21.98	21.94	21.93
5	QPSK	12	13	21.87	21.85	21.83
5	QPSK	25	0	21.91	21.87	21.83
5	16QAM	1	0	21.62	21.53	21.60
5	16QAM	1	12	21.66	21.56	21.65
5	16QAM	1	24	21.71	21.61	21.69
5	16QAM	12	0	21.99	21.94	21.97
5	16QAM	12	7	21.84	21.83	21.72
5	16QAM	12	13	21.96	21.94	21.89
5	16QAM	25	0	21.51	21.48	21.42
5	64QAM	1	0	21.31	21.28	21.19
5	64QAM	1	12	21.20	21.16	21.17
5	64QAM	1	24	21.14	21.08	21.02
5	64QAM	12	0	21.41	21.31	21.37
5	64QAM	12	7	21.00	20.90	20.90
5	64QAM	12	13	21.40	21.32	21.29
5	64QAM	25	0	21.40	21.39	21.30

LTE Band 26						
BW [MHz]	Modulation	RB Size	RB Offset	Average Power Low Ch. / Freq.	Average Power Middle Ch. / Freq.	Average Power High Ch. / Freq.
Channel				26705	26740	26775
Frequency (MHz)				815.5	819.0	822.5
3	QPSK	1	0	22.55	22.46	22.47
3	QPSK	1	8	22.46	22.42	22.40
3	QPSK	1	14	22.51	22.42	22.43
3	QPSK	8	0	21.78	21.73	21.72
3	QPSK	8	4	21.95	21.88	21.92
3	QPSK	8	7	21.95	21.85	21.92
3	QPSK	15	0	21.80	21.77	21.77
3	16QAM	1	0	21.91	21.88	21.84
3	16QAM	1	8	21.90	21.88	21.88
3	16QAM	1	14	21.88	21.84	21.87
3	16QAM	8	0	21.97	21.94	21.91
3	16QAM	8	4	21.91	21.82	21.85
3	16QAM	8	7	21.67	21.62	21.56
3	16QAM	15	0	21.74	21.66	21.73
3	64QAM	1	0	21.00	20.91	20.90
3	64QAM	1	8	21.30	21.19	21.21
3	64QAM	1	14	21.24	21.15	21.14
3	64QAM	8	0	21.13	21.11	21.06
3	64QAM	8	4	21.13	21.05	21.06
3	64QAM	8	7	21.40	21.34	21.28
3	64QAM	15	0	21.40	21.39	21.32

LTE Band 26						
BW [MHz]	Modulation	RB Size	RB Offset	Average Power Low Ch. / Freq.	Average Power Middle Ch. / Freq.	Average Power High Ch. / Freq.
Channel				26697	26740	26783
Frequency (MHz)				814.7	819.0	823.3
1.4	QPSK	1	0	22.42	22.31	22.30
1.4	QPSK	1	3	22.41	22.32	22.37
1.4	QPSK	1	5	22.41	22.31	22.38
1.4	QPSK	3	0	22.55	22.52	22.47
1.4	QPSK	3	1	22.46	22.38	22.43
1.4	QPSK	3	3	22.46	22.44	22.43
1.4	QPSK	6	0	21.56	21.50	21.50
1.4	16QAM	1	0	21.61	21.60	21.50
1.4	16QAM	1	3	21.68	21.59	21.64
1.4	16QAM	1	5	21.77	21.68	21.65
1.4	16QAM	3	0	21.78	21.67	21.67
1.4	16QAM	3	1	21.78	21.67	21.70
1.4	16QAM	3	3	21.78	21.72	21.68
1.4	16QAM	6	0	22.14	22.04	22.08
1.4	64QAM	1	0	21.34	21.30	21.33
1.4	64QAM	1	3	21.40	21.38	21.36
1.4	64QAM	1	5	21.30	21.24	21.18
1.4	64QAM	3	0	21.39	21.31	21.31
1.4	64QAM	3	1	21.44	21.34	21.39
1.4	64QAM	3	3	21.36	21.25	21.35
1.4	64QAM	6	0	21.43	21.40	21.39

Effective Radiated Power and Effective Isotropic Radiated Power

LTE Band 26				Measured E.R.P.			
BW [MHz]	Modulation	RB Size	RB Offset	Low Ch. / Freq.	Middle Ch. / Freq.		High Ch. / Freq.
Channel				/	26740		/
Frequency (MHz)				/	819		/
				/	dBm	W	/
10	QPSK	1	0	/	18.23	0.067	/
10	QPSK	1	25	/	18.26	0.067	/
10	QPSK	1	49	/	18.12	0.065	/
10	QPSK	25	0	/	17.65	0.058	/
10	QPSK	25	12	/	17.61	0.058	/
10	QPSK	25	25	/	17.60	0.058	/
10	QPSK	50	0	/	17.61	0.058	/
10	16QAM	1	0	/	17.33	0.054	/
10	16QAM	1	25	/	17.42	0.055	/
10	16QAM	1	49	/	17.36	0.054	/
10	16QAM	25	0	/	17.37	0.055	/
10	16QAM	25	12	/	17.38	0.055	/
10	16QAM	25	25	/	17.55	0.057	/
10	16QAM	50	0	/	17.72	0.059	/
10	64QAM	1	0	/	17.01	0.050	/
10	64QAM	1	25	/	17.11	0.051	/
10	64QAM	1	49	/	16.83	0.048	/
10	64QAM	25	0	/	17.18	0.052	/
10	64QAM	25	12	/	16.94	0.049	/
10	64QAM	25	25	/	16.84	0.048	/
10	64QAM	50	0	/	17.14	0.052	/

LTE Band 26				Measured E.R.P.					
BW [MHz]	Modulation	RB Size	RB Offset	Low Ch. / Freq.		Middle Ch. / Freq.		High Ch. / Freq.	
Channel				26715		26740		26765	
Frequency (MHz)				816.5		819.0		821.5	
				dBm	W	dBm	W	dBm	W
5	QPSK	1	0	18.22	0.066	18.10	0.065	18.14	0.065
5	QPSK	1	12	18.17	0.066	18.11	0.065	18.13	0.065
5	QPSK	1	24	18.13	0.065	18.10	0.065	18.07	0.064
5	QPSK	12	0	17.59	0.057	17.52	0.056	17.47	0.056
5	QPSK	12	7	17.69	0.059	17.65	0.058	17.64	0.058
5	QPSK	12	13	17.58	0.057	17.56	0.057	17.54	0.057
5	QPSK	25	0	17.62	0.058	17.58	0.057	17.54	0.057
5	16QAM	1	0	17.33	0.054	17.24	0.053	17.31	0.054
5	16QAM	1	12	17.37	0.055	17.27	0.053	17.36	0.054
5	16QAM	1	24	17.42	0.055	17.32	0.054	17.40	0.055
5	16QAM	12	0	17.70	0.059	17.65	0.058	17.68	0.059
5	16QAM	12	7	17.55	0.057	17.54	0.057	17.43	0.055
5	16QAM	12	13	17.67	0.058	17.65	0.058	17.60	0.058
5	16QAM	25	0	17.22	0.053	17.19	0.052	17.13	0.052
5	64QAM	1	0	17.02	0.050	16.99	0.050	16.90	0.049
5	64QAM	1	12	16.91	0.049	16.87	0.049	16.88	0.049
5	64QAM	1	24	16.85	0.048	16.79	0.048	16.73	0.047
5	64QAM	12	0	17.12	0.052	17.02	0.050	17.08	0.051
5	64QAM	12	7	16.71	0.047	16.61	0.046	16.61	0.046
5	64QAM	12	13	17.11	0.051	17.03	0.050	17.00	0.050
5	64QAM	25	0	17.11	0.051	17.10	0.051	17.01	0.050

LTE Band 26				Measured E.R.P.					
BW [MHz]	Modulation	RB Size	RB Offset	Low Ch. / Freq.		Middle Ch. / Freq.		High Ch. / Freq.	
Channel				26705		26740		26775	
Frequency (MHz)				815.5		819.0		822.5	
				dBm	W	dBm	W	dBm	W
3	QPSK	1	0	18.26	0.067	18.17	0.066	18.18	0.066
3	QPSK	1	8	18.17	0.066	18.13	0.065	18.11	0.065
3	QPSK	1	14	18.22	0.066	18.13	0.065	18.14	0.065
3	QPSK	8	0	17.49	0.056	17.44	0.055	17.43	0.055
3	QPSK	8	4	17.66	0.058	17.59	0.057	17.63	0.058
3	QPSK	8	7	17.66	0.058	17.56	0.057	17.63	0.058
3	QPSK	15	0	17.51	0.056	17.48	0.056	17.48	0.056
3	16QAM	1	0	17.62	0.058	17.59	0.057	17.55	0.057
3	16QAM	1	8	17.61	0.058	17.59	0.057	17.59	0.057
3	16QAM	1	14	17.59	0.057	17.55	0.057	17.58	0.057
3	16QAM	8	0	17.68	0.059	17.65	0.058	17.62	0.058
3	16QAM	8	4	17.62	0.058	17.53	0.057	17.56	0.057
3	16QAM	8	7	17.38	0.055	17.33	0.054	17.27	0.053
3	16QAM	15	0	17.45	0.056	17.37	0.055	17.44	0.055
3	64QAM	1	0	16.71	0.047	16.62	0.046	16.61	0.046
3	64QAM	1	8	17.01	0.050	16.90	0.049	16.92	0.049
3	64QAM	1	14	16.95	0.050	16.86	0.049	16.85	0.048
3	64QAM	8	0	16.84	0.048	16.82	0.048	16.77	0.048
3	64QAM	8	4	16.84	0.048	16.76	0.047	16.77	0.048
3	64QAM	8	7	17.11	0.051	17.05	0.051	16.99	0.050
3	64QAM	15	0	17.11	0.051	17.10	0.051	17.03	0.050

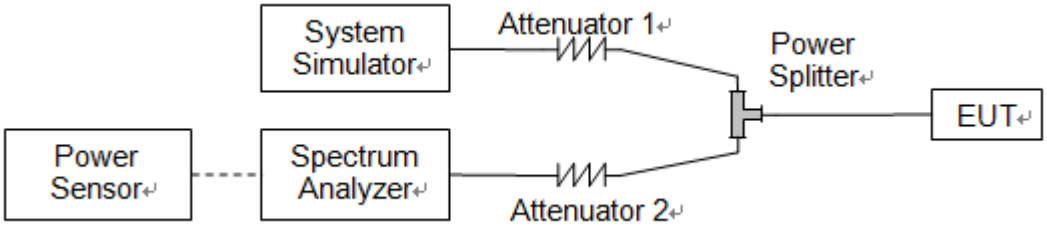
LTE Band 26				Measured E.R.P.					
BW [MHz]	Modulation	RB Size	RB Offset	Low Ch. / Freq.		Middle Ch. / Freq.		High Ch. / Freq.	
Channel				26697		26740		26783	
Frequency (MHz)				814.7		819.0		823.3	
				dBm	W	dBm	W	dBm	W
1.4	QPSK	1	0	18.13	0.065	18.02	0.063	18.01	0.063
1.4	QPSK	1	3	18.12	0.065	18.03	0.064	18.08	0.064
1.4	QPSK	1	5	18.12	0.065	18.02	0.063	18.09	0.064
1.4	QPSK	3	0	18.26	0.067	18.23	0.067	18.18	0.066
1.4	QPSK	3	1	18.17	0.066	18.09	0.064	18.14	0.065
1.4	QPSK	3	3	18.17	0.066	18.15	0.065	18.14	0.065
1.4	QPSK	6	0	17.27	0.053	17.21	0.053	17.21	0.053
1.4	16QAM	1	0	17.32	0.054	17.31	0.054	17.21	0.053
1.4	16QAM	1	3	17.39	0.055	17.30	0.054	17.35	0.054
1.4	16QAM	1	5	17.48	0.056	17.39	0.055	17.36	0.054
1.4	16QAM	3	0	17.49	0.056	17.38	0.055	17.38	0.055
1.4	16QAM	3	1	17.49	0.056	17.38	0.055	17.41	0.055
1.4	16QAM	3	3	17.49	0.056	17.43	0.055	17.39	0.055
1.4	16QAM	6	0	17.85	0.061	17.75	0.060	17.79	0.060
1.4	64QAM	1	0	17.05	0.051	17.01	0.050	17.04	0.051
1.4	64QAM	1	3	17.11	0.051	17.09	0.051	17.07	0.051
1.4	64QAM	1	5	17.01	0.050	16.95	0.050	16.89	0.049
1.4	64QAM	3	0	17.10	0.051	17.02	0.050	17.02	0.050
1.4	64QAM	3	1	17.15	0.052	17.05	0.051	17.10	0.051
1.4	64QAM	3	3	17.07	0.051	16.96	0.050	17.06	0.051
1.4	64QAM	6	0	17.14	0.052	17.11	0.051	17.10	0.051

2.2. Occupied Bandwidth

2.2.1. Requirement

According to FCC section 2.1049, the occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.Occupied bandwidth is also known as the 99% emission bandwidth.

2.2.2. Test Description



The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power. A call is established between the EUT and the SS.

2.2.3. Test procedure

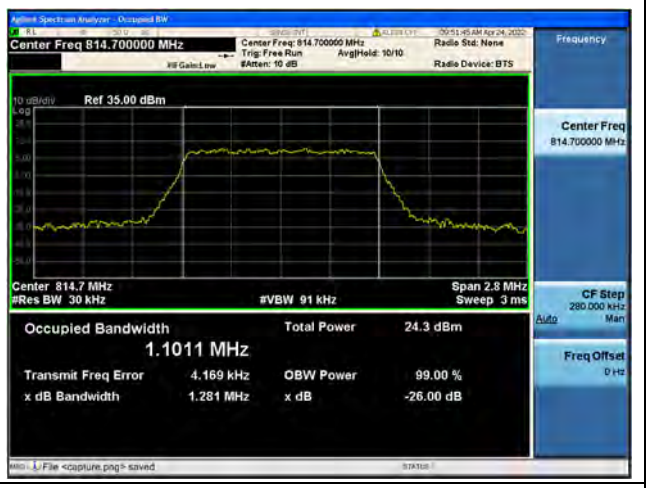
KDB 971168 D01v03 Section 4.1 and ANSI/TIA-603-E-2016.

2.2.4. Test Result

LTE Band 26				
BW(MHz)	Channel Level	Modulation	99% BW(MHz)	26dB BW(MHz)
1.4	Low	QPSK	1.10	1.27
	Low	16QAM	1.10	1.28
	Low	64QAM	1.09	1.30
	Mid	QPSK	1.10	1.28
	Mid	16QAM	1.10	1.29
	Mid	64QAM	1.10	1.28
	High	QPSK	1.09	1.27
	High	16QAM	1.10	1.28
	High	64QAM	1.10	1.29
3	Low	QPSK	2.70	2.99
	Low	16QAM	2.70	2.98
	Low	64QAM	2.70	2.98
	Mid	QPSK	2.66	2.88
	Mid	16QAM	2.70	2.99
	Mid	64QAM	2.64	2.87
	High	QPSK	2.70	2.98
	High	16QAM	2.70	2.99
	High	64QAM	2.71	2.97
5	Low	QPSK	4.50	5.00
	Low	16QAM	4.51	5.01
	Low	64QAM	4.50	4.98
	Mid	QPSK	4.50	4.99
	Mid	16QAM	4.50	4.98
	Mid	64QAM	4.52	5.02
	High	QPSK	4.50	5.03
	High	16QAM	4.50	5.02
	High	64QAM	4.51	5.03
10	Mid	QPSK	9.00	9.87
	Mid	16QAM	8.95	9.80
	Mid	64QAM	8.97	9.86

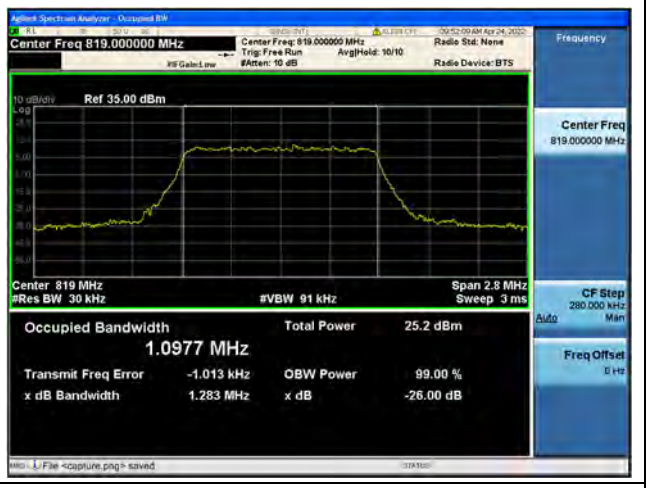
Band26 / 1.4MHz / Low CH / QPSK

Band26 / 1.4MHz / Low CH / 16QAM



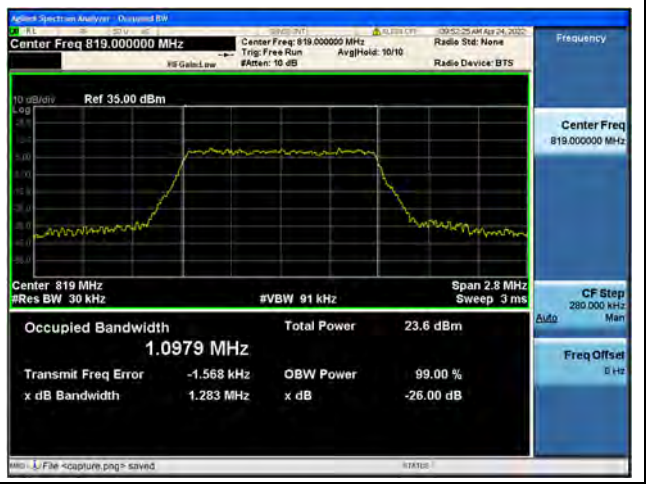
Band26 / 1.4MHz / Low CH / 64QAM

Band26 / 1.4MHz / Mid CH / QPSK



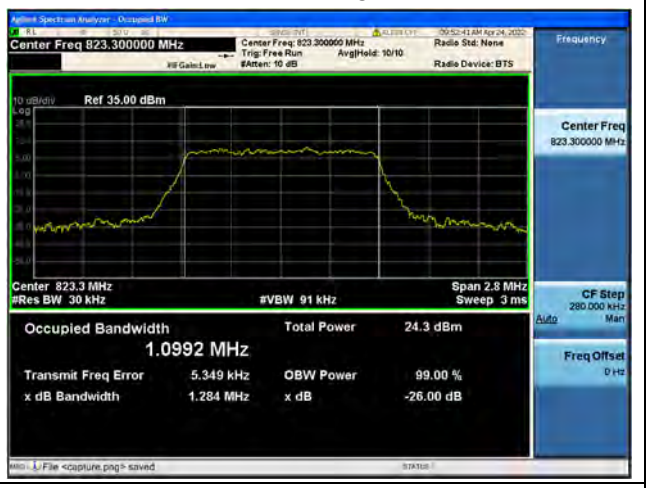
Band26 / 1.4MHz / Mid CH / 16QAM

Band26 / 1.4MHz / Mid CH / 64QAM



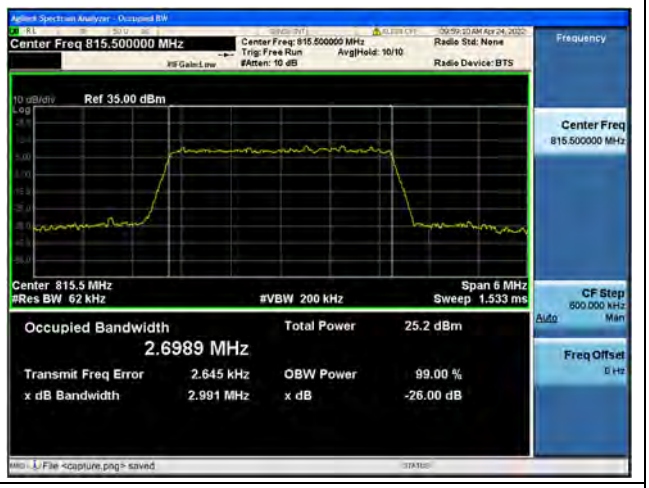
Band26 / 1.4MHz / High CH / QPSK

Band26 / 1.4MHz / High CH / 16QAM



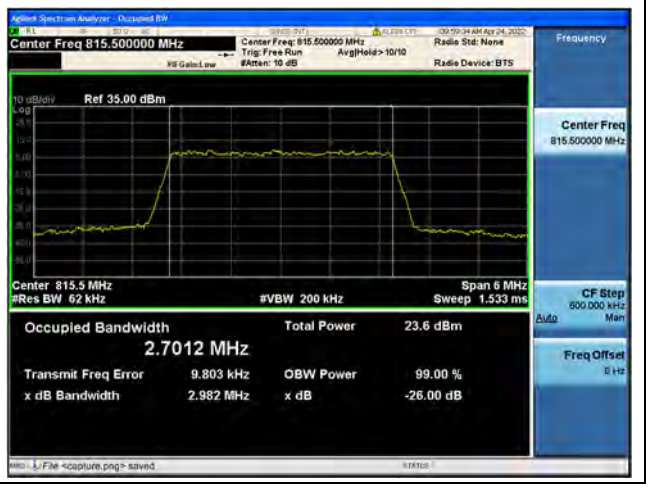
Band26 / 1.4MHz / High CH / 64QAM

Band26 / 3MHz / Low CH / QPSK



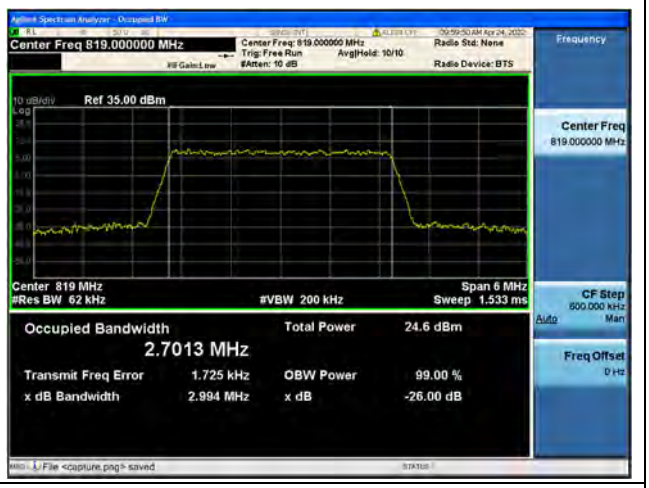
Band26 / 3MHz / Low CH / 16QAM

Band26 / 3MHz / Low CH / 64QAM



Band26 / 3MHz / Mid CH / QPSK

Band26 / 3MHz / Mid CH / 16QAM

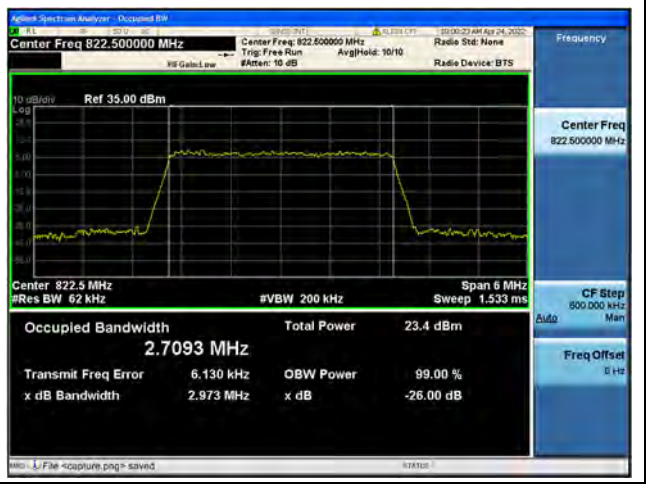


Band26 / 3MHz / Mid CH / 64QAM

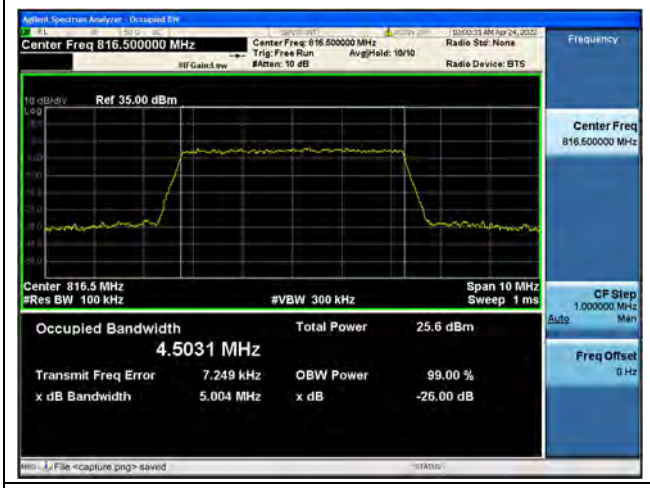
Band26 / 3MHz / High CH / QPSK

Band26 / 3MHz / High CH / 16QAM

Band26 / 3MHz / High CH / 64QAM

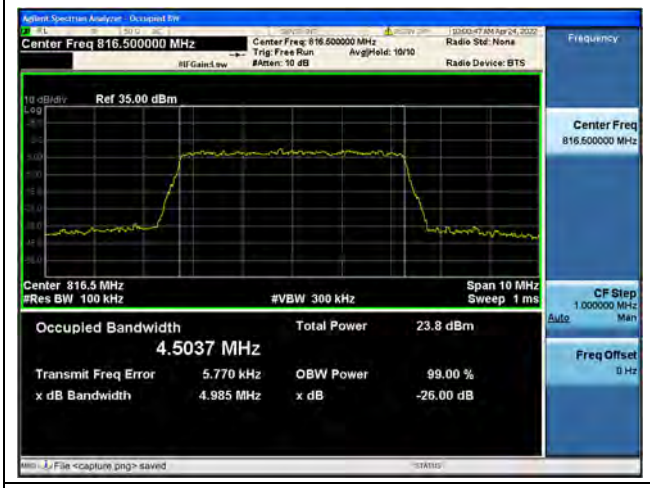


Band26 / 5MHz / Low CH / QPSK

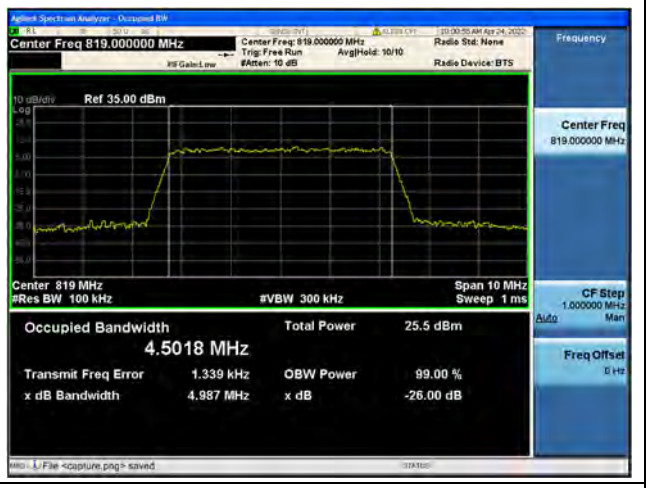


Band26 / 5MHz / Low CH / 16QAM

Band26 / 5MHz / Low CH / 64QAM

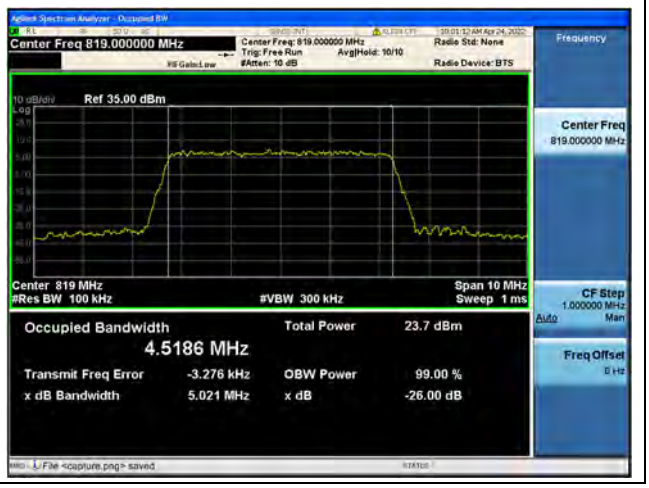


Band26 / 5MHz / Mid CH / QPSK

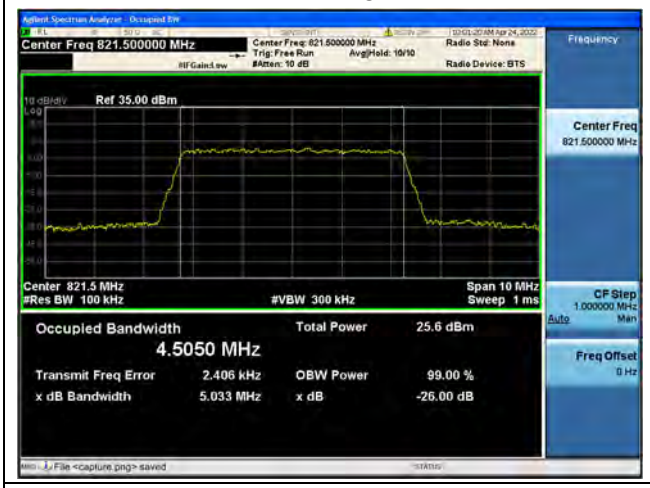


Band26 / 5MHz / Mid CH / 16QAM

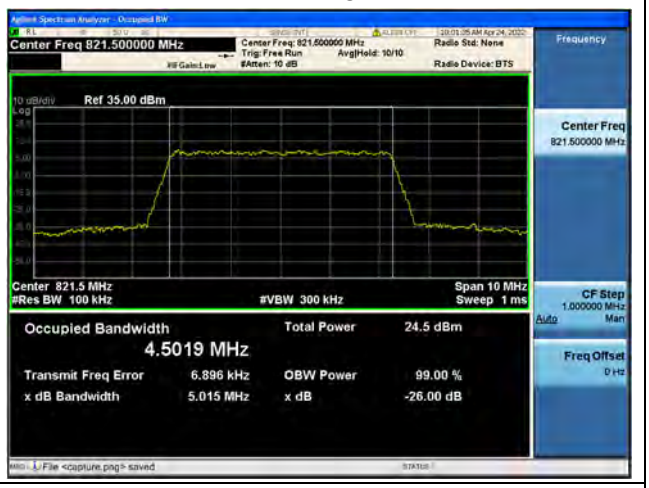
Band26 / 5MHz / Mid CH / 64QAM



Band26 / 5MHz / High CH / QPSK

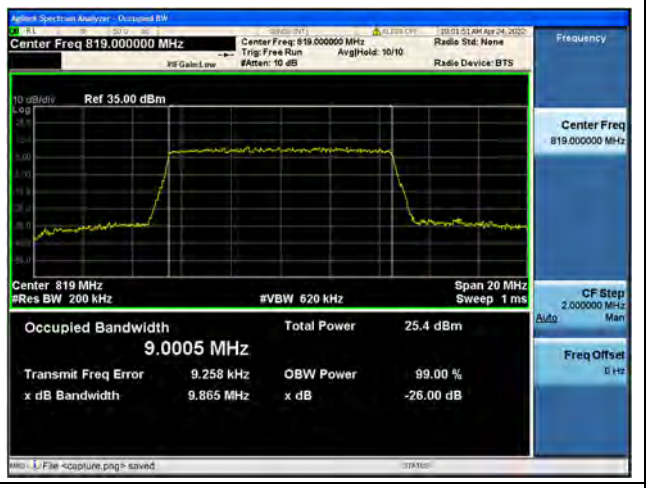


Band26 / 5MHz / High CH / 16QAM



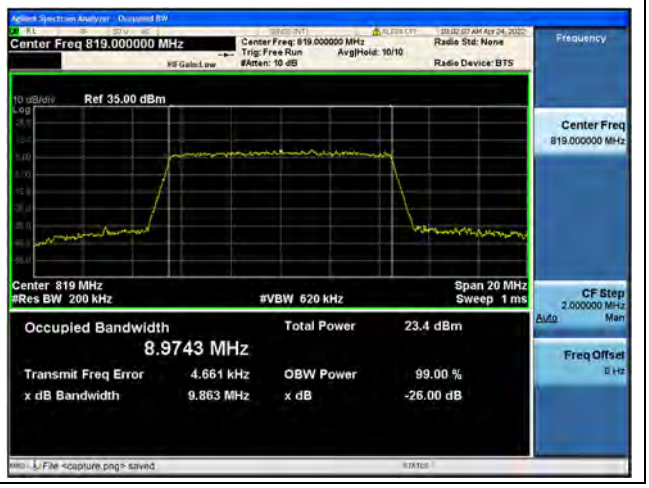
Band26 / 5MHz / High CH / 64QAM

Band26 / 10MHz / Mid CH / QPSK



Band26 / 10MHz / Mid CH / 16QAM

Band26 / 10MHz / Mid CH / 64QAM



2.3. Frequency Stability

2.3.1. Requirement

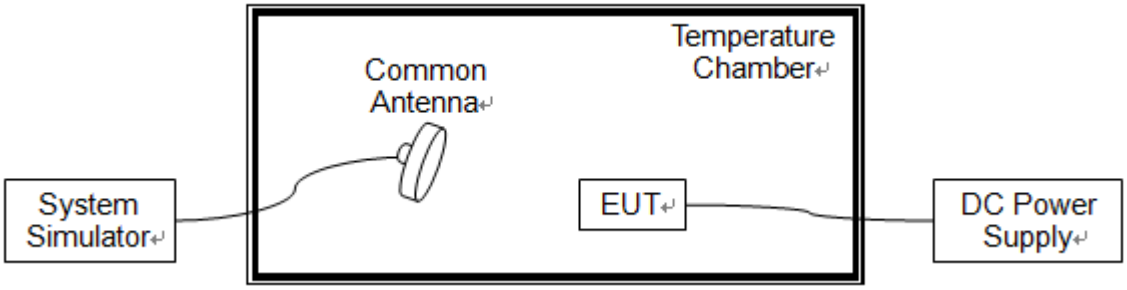
According to FCC section 2.1055 & 90.213, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

(a) The temperature is varied from -30°C to +50°C at intervals of not more than 10°C.

(b) For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

Note: The operating temperature of EUT is from 0°C to 55°C, which are specified by the applicant.

2.3.2. Test Description



The EUT which is powered by the DC Power Supply directly, is located in the Temperature Chamber. The EUT is commanded by the System Simulator (SS) to operate at the maximum output power. A call is established between the EUT and the SS via a Common Antenna.

2.3.3. Test procedure

KDB 971168 D01v03 Section 9.0 and ANSI/TIA-603-E-2016.

2.3.4. Test Result

The nominal, highest and lowest extreme voltages are separately 3.80V, 4.35V and 3.62V, which are specified by the applicant; the normal temperature here used is 20°C.

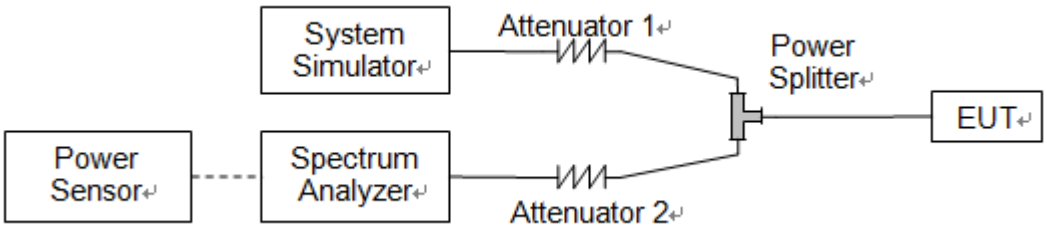
LTE Band 26, QPSK, Channel 26740, Frequency 819MHz Limit =±2.5ppm					
Voltage (%)	**Power (VDC)**	**Temp(°C)**	**Fre. Dev.(Hz)**	**Deviation (ppm)**	**Result**
Normal	3.80	+20(Ref)	23	0.028	PASS
Normal		0	39	0.048	
Normal		+10	41	0.050	
Normal		+20	-34	-0.042	
Normal		+30	-36	-0.044	
Normal		+40	37	0.045	
Normal		+50	14	0.017	
Normal		+55	21	0.026	
High	4.35	+20	30	0.037	
BATT.ENDPOINT	3.65	+20	20	0.024	

2.4. Conducted Spurious Emissions

2.4.1. Requirement

According to FCC section 2.1051, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43+10*log(P)dB. This calculated to be -13dBm.

2.4.2. Test Description



The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power. A call is established between the EUT and the SS.

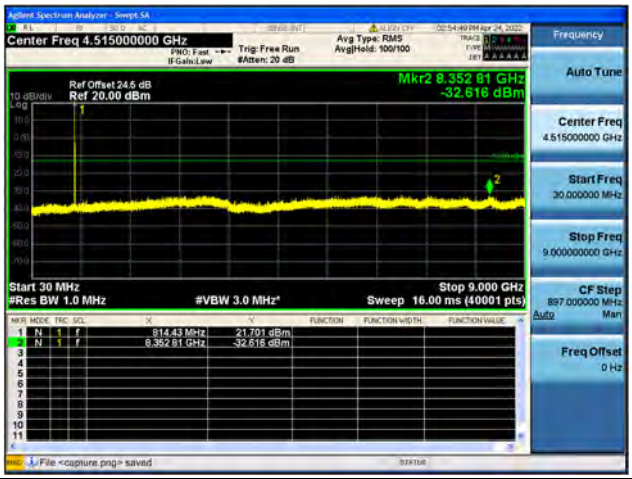
2.4.3. Test procedure

KDB 971168 D01v03 Section 6.0 and ANSI/TIA-603-E-2016.

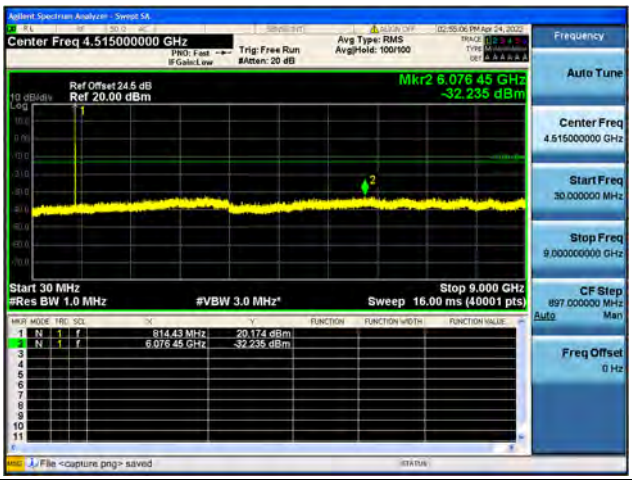
2.4.4. Test Result

Band26 / 1.4MHz / Low CH / QPSK

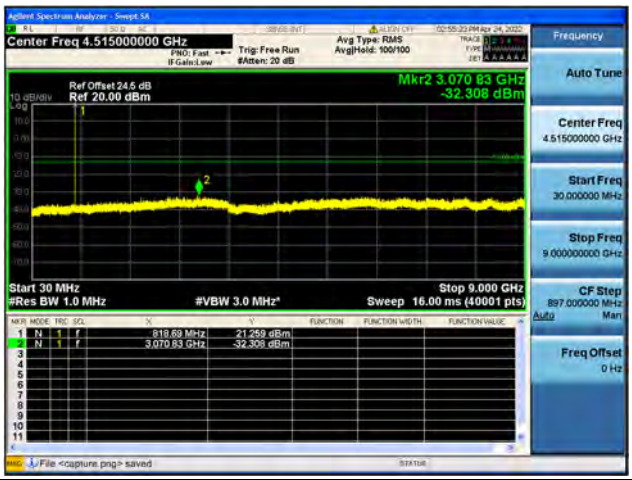
Band26 / 1.4MHz / Low CH / 16QAM



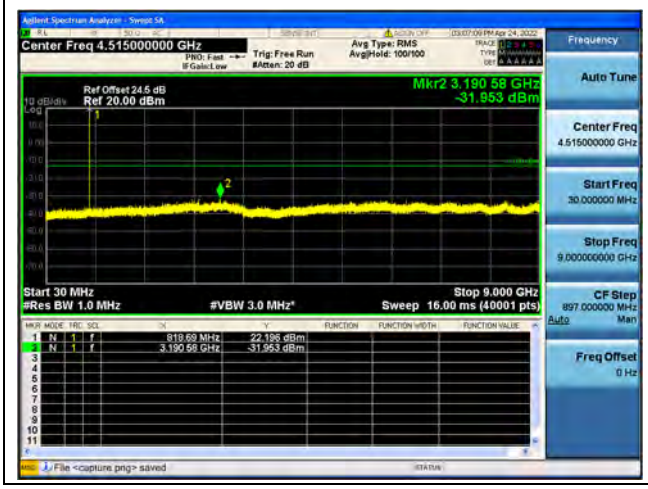
Band26 / 1.4MHz / Low CH / 64QAM



Band26 / 1.4MHz / Mid CH / QPSK



Band26 / 1.4MHz / Mid CH / 16QAM

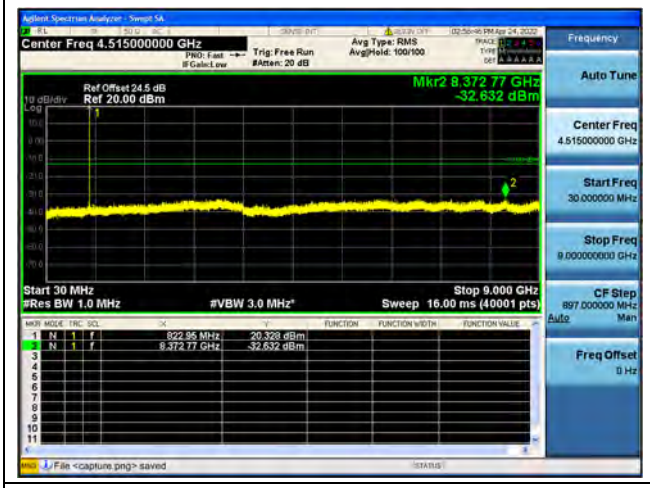


Band26 / 1.4MHz / Mid CH / 64QAM

Band26 / 1.4MHz / High CH / QPSK

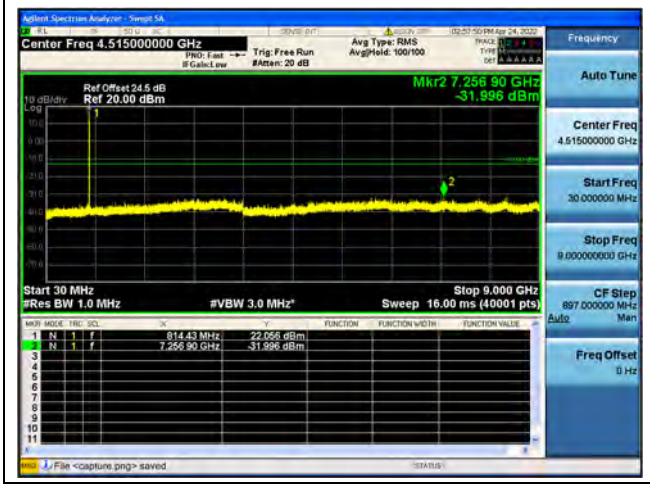
Band26 / 1.4MHz / High CH / 16QAM

Band26 / 1.4MHz / High CH / 64QAM



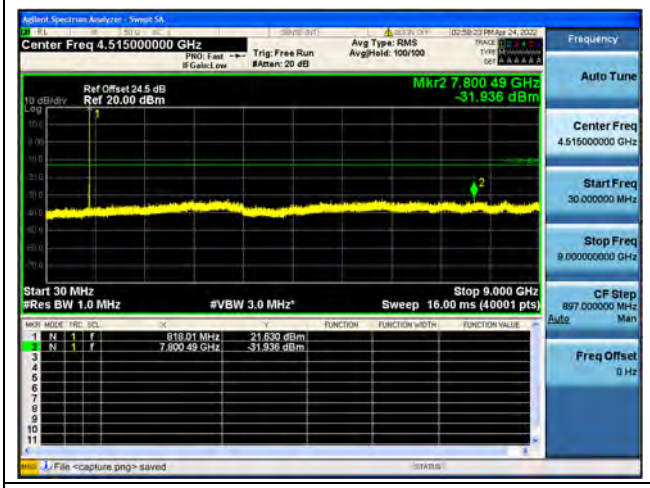
Band26 / 3MHz / Low CH / QPSK

Band26 / 3MHz / Low CH / 16QAM



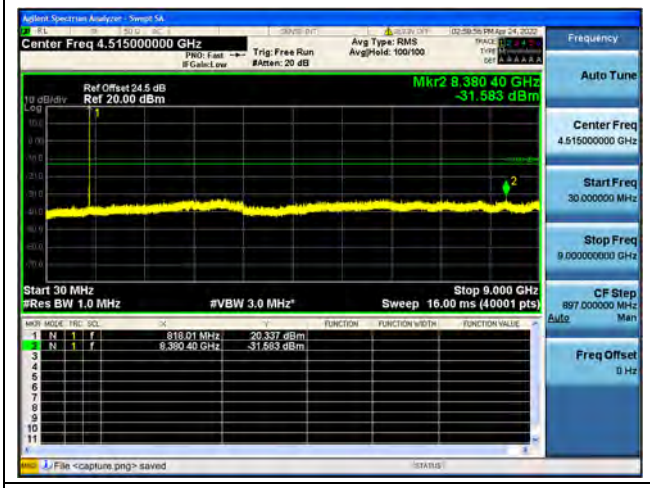
Band26 / 3MHz / Low CH / 64QAM

Band26 / 3MHz / Mid CH / QPSK



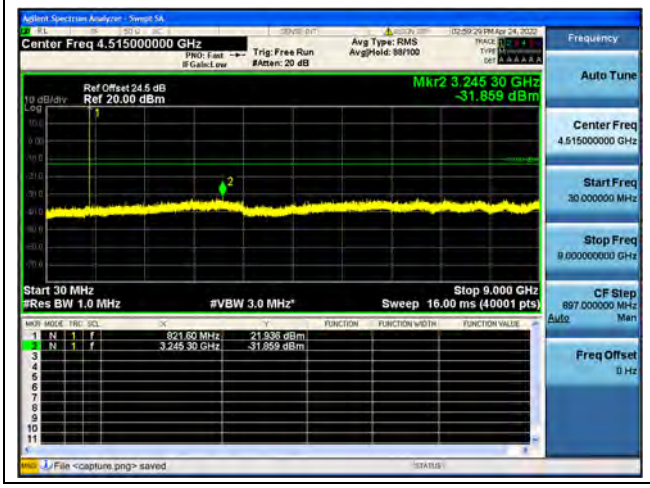
Band26 / 3MHz / Mid CH / 16QAM

Band26 / 3MHz / Mid CH / 64QAM



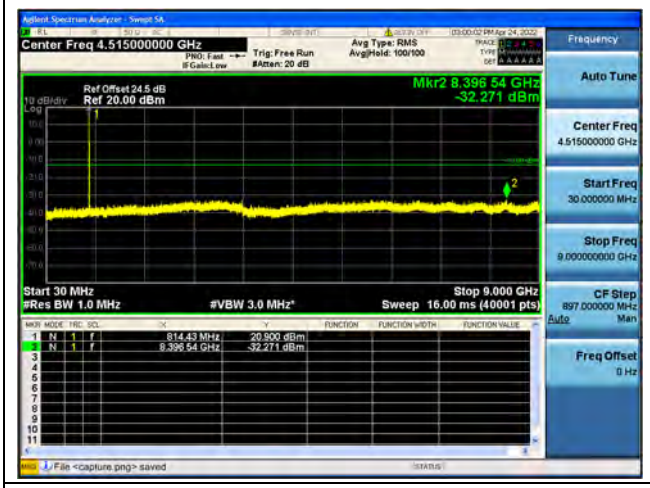
Band26 / 3MHz / High CH / QPSK

Band26 / 3MHz / High CH / 16QAM



Band26 / 3MHz / High CH / 64QAM

Band26 / 5MHz / Low CH / QPSK



Band26 / 5MHz / Low CH / 16QAM

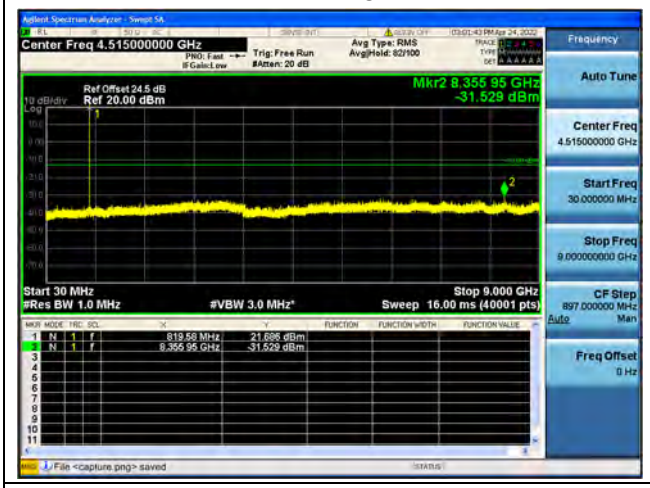
Band26 / 5MHz / Low CH / 64QAM

Band26 / 5MHz / Mid CH / QPSK

Band26 / 5MHz / Mid CH / 16QAM

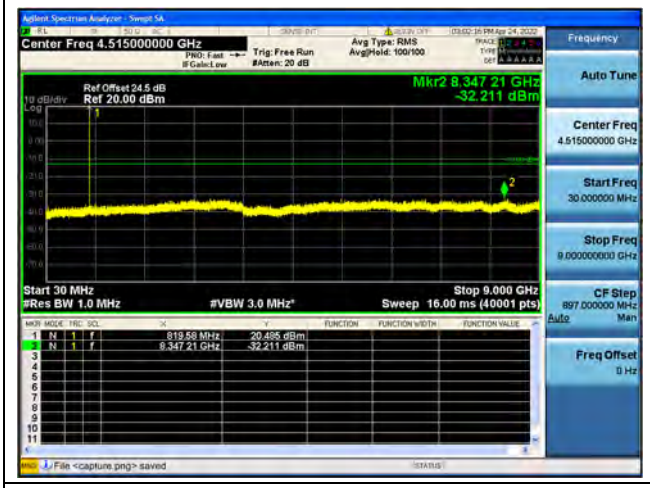
Band26 / 5MHz / Mid CH / 64QAM

Band26 / 5MHz / High CH / QPSK



Band26 / 5MHz / High CH / 16QAM

Band26 / 5MHz / High CH / 64QAM



Band26 / 10MHz / Mid CH / QPSK

Band26 / 10MHz / Mid CH / 16QAM

Band26 / 10MHz / Mid CH / 64QAM

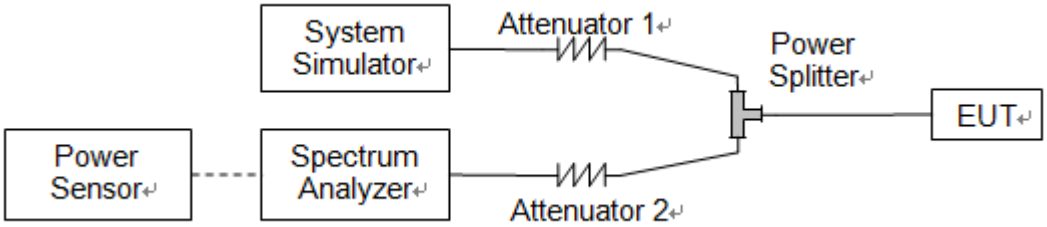
2.5. Band Edge

2.5.1. Requirement

Band26

According to FCC section 90.961(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

2.5.2. Test Description



The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power. A call is established between the EUT and the SS.

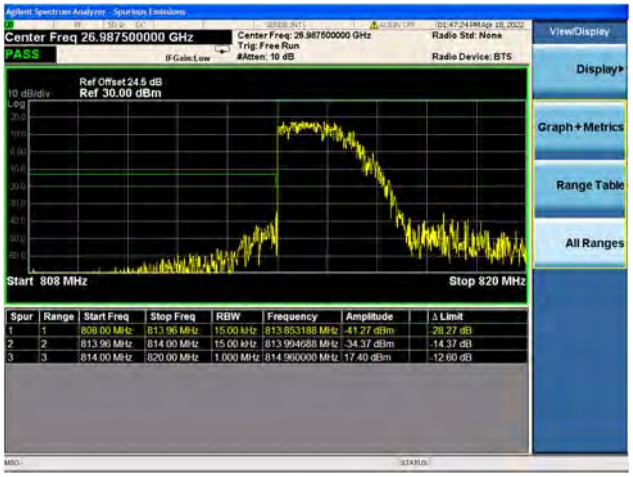
2.5.3. Test procedure

KDB 971168 D01v03 Section 6.0 and ANSI/TIA-603-E-2016.

2.5.4. Test Result

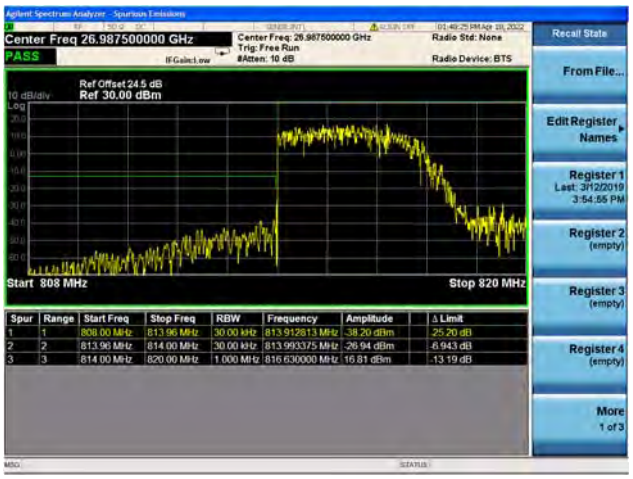
Band26 / 1.4MHz / Low CH / QPSK / 1 RB

Band26 / 1.4MHz / Low CH / QPSK / FULL RB



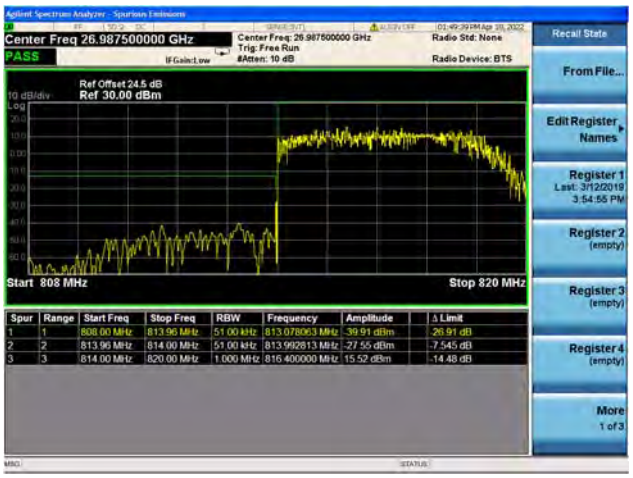
Band26 / 3MHz / Low CH / QPSK / 1 RB

Band26 / 3MHz / Low CH / QPSK / FULL RB

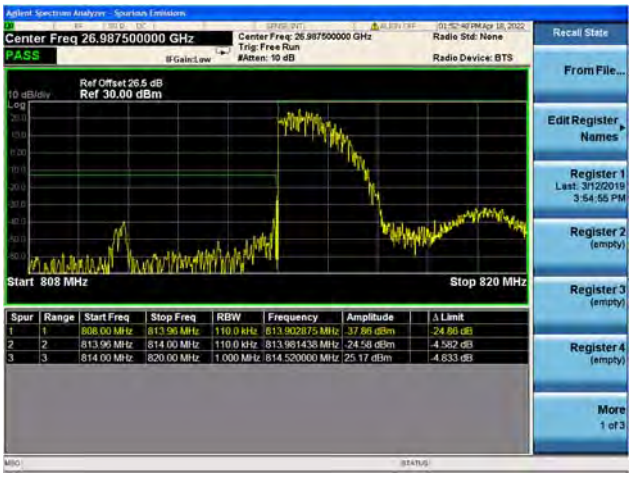


Band26 / 5MHz / Low CH / QPSK / 1 RB

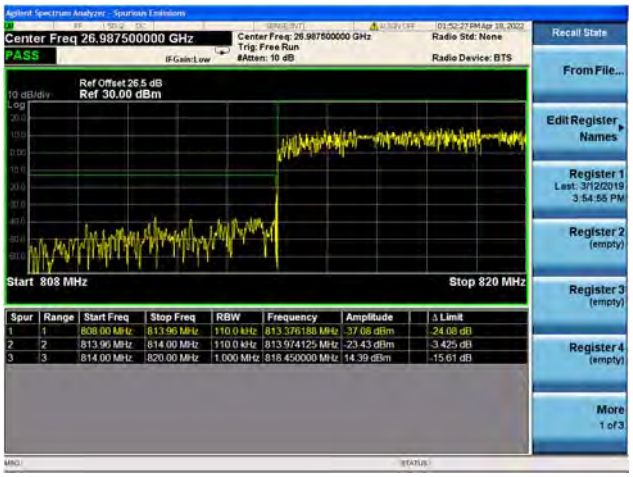
Band26 / 5MHz / Low CH / QPSK / FULL RB



Band26 / 10MHz / Low CH / QPSK / 1 RB



Band26 / 10MHz / Low CH / QPSK / FULL RB

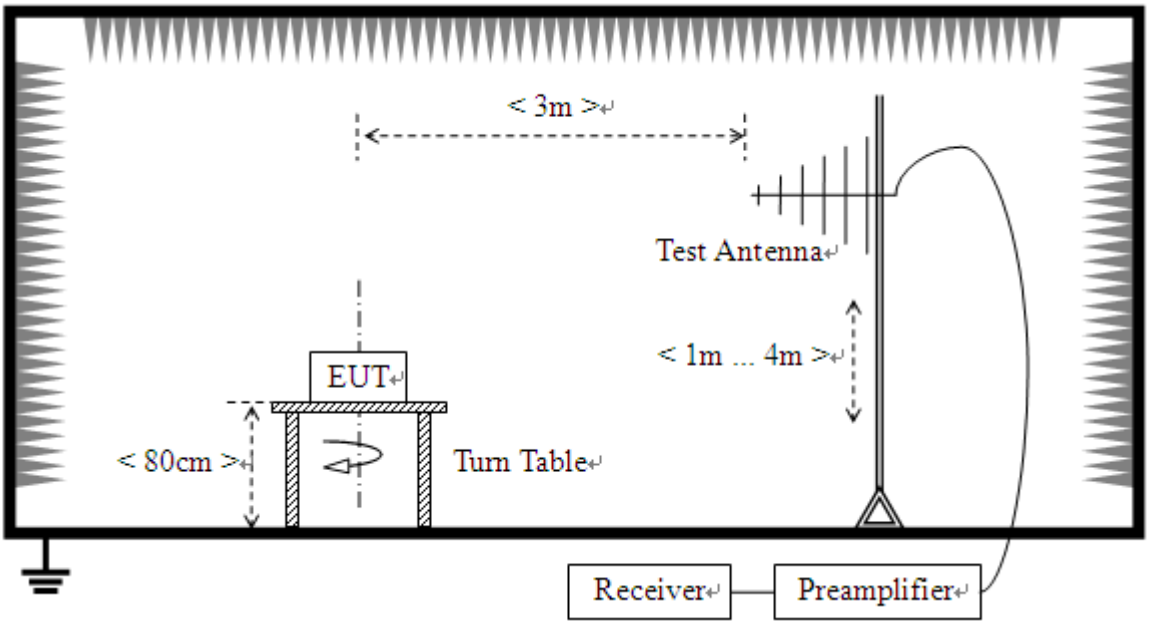


2.6. Radiated Spurious Emissions

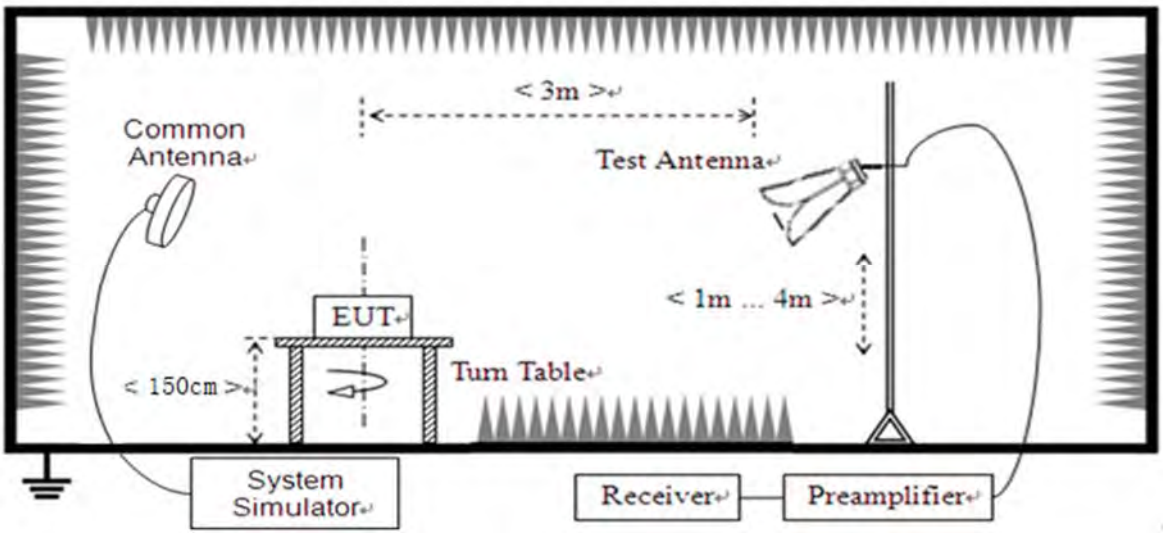
2.6.1. Requirement

According to FCC section 2.1051, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43+10*log(P)dB. This calculated to be -13dBm.

2.6.2. Test Description



(For the test frequency from 30MHz to1GHz)



(For the test frequency above 1GHz)

The EUT 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.
In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground and the Turn Table is actuated to turn from 0° to 360°to determine the maximum value of the radiated power. The emission levels at both horizontal and vertical polarizations should be tested. The Filters consists of Notch Filters and High Pass Filter.

Note: when doing measurements above 1GHz, the EUT has been within the 3dB cone width of the horn antenna during horizontal antenna.

2.6.3. Test procedure

KDB 971168 D01v03 Section 5.8 and ANSI/TIA-603-E-2016.

For measurements below 1GHz the resolution bandwidth is set to 100kHz for peak detection measurements.

For measurements above 1GHz the resolution bandwidth is set to 1MHz, the video band width is set to 3MHz for peak measurements.

2.6.4. Test Result

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. The lowest, middle and highest channels are tested to verify the out of band emissions.

The substitution corrections are obtained as described below:

$A_{SUBST} = P_{SUBST_TX} - P_{SUBST_RX} - L_{SUBST_CABLES} + G_{SUBST_TX_ANT}$

$A_{TOT} = L_{CABLES} + A_{SUBST}$

Where A_{SUBST} is the final substitution correction including receive antenna gain.

P_{SUBST_TX} is signal generator level,

P_{SUBST_RX} is receiver level,

L_{SUBST_CABLES} is cable losses including TX cable,

$G_{SUBST_TX_ANT}$ is substitution antenna gain.

A_{TOT} is total correction factor including cable loss and substitution correction

During the test, the data of A_{TOT} was added in the test spectrum analyze, so spectrum analyze reading is the final values which contain the data of A_{TOT}.

Note1: The power of the EUT transmitting frequency should be ignored.

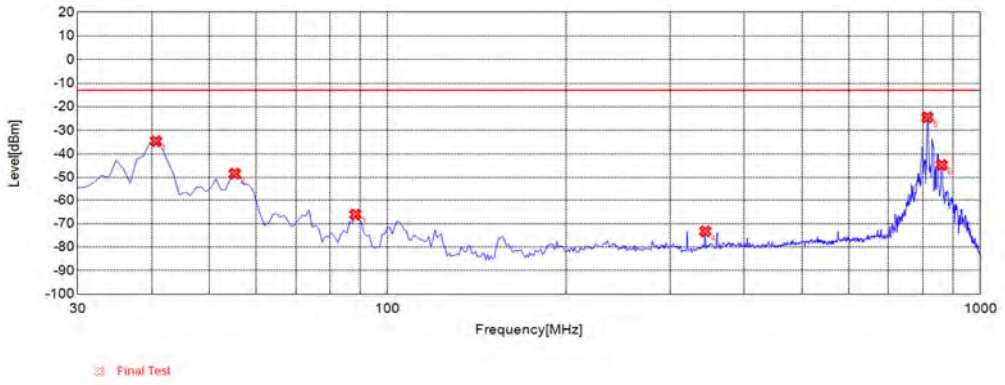
Note2: All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Note3: All bandwidth and modulation were considered and evaluated respectively by performing full test for each band, only the worst cases (Max Bandwidth and QPSK mode) were recorded in this test report.

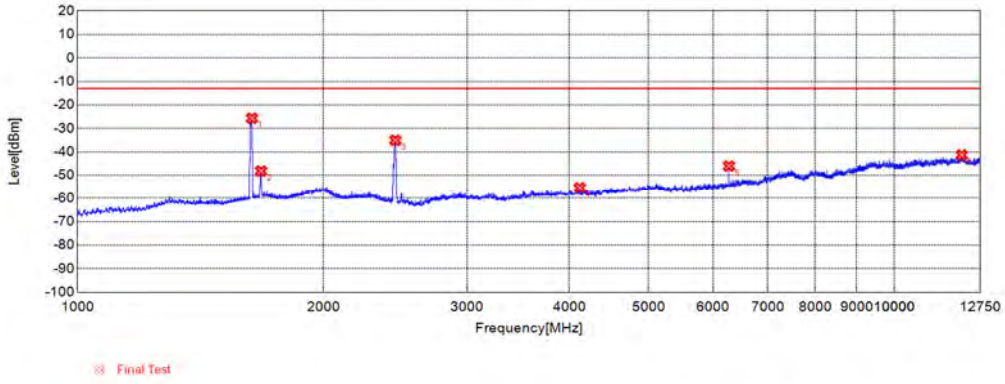
Note 4: N/A means the frequency is the basic frequency or the base station frequency, they are no need to verdict.

Note 5: The amplitude of emissions (18GHz to 10th harmonics) which are attenuated more than 20 dB below the limit are not be reported.

LTE Band 26, 5MHz BW, Low Channel, QPSK

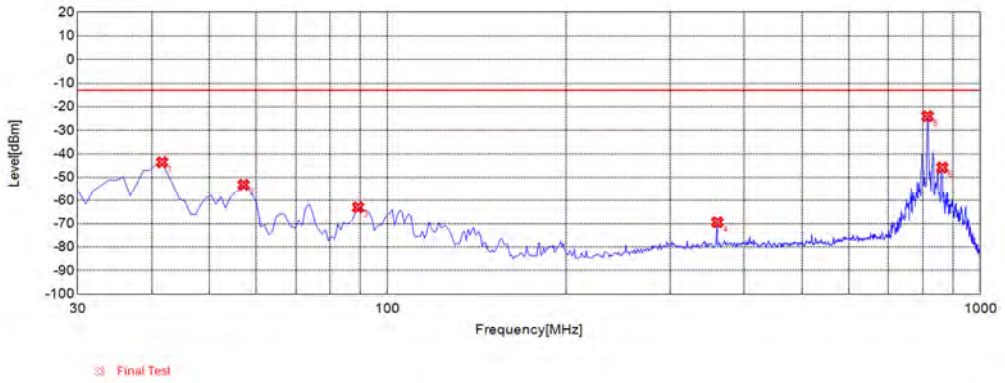


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	40.6810	-34.62	-13.00	Horizontal	PASS
2	55.2450	-48.38	-13.00	Horizontal	PASS
3	88.2580	-66.15	-13.00	Horizontal	PASS
4	343.6240	-73.29	-13.00	Horizontal	PASS
5	814.5450	-24.46	-13.00	Horizontal	N/A
6	861.1510	-44.65	-13.00	Horizontal	N/A

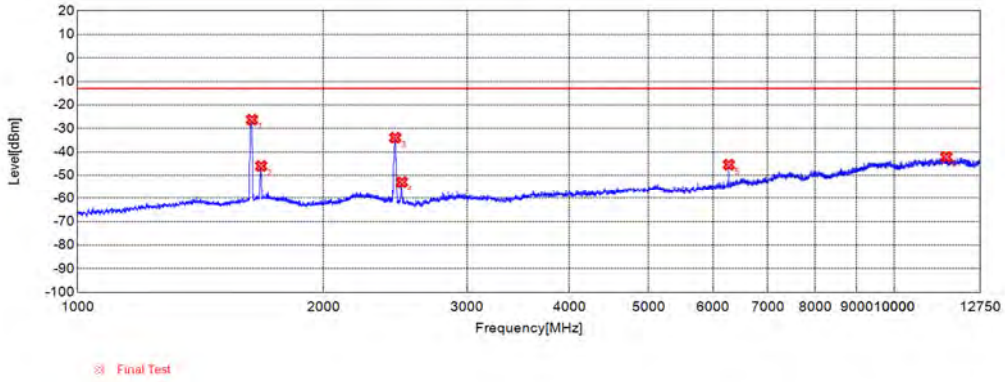


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1635.5450	-25.69	-13.00	Horizontal	PASS
2	1677.5590	-48.17	-13.00	Horizontal	PASS
3	2450.4830	-35.05	-13.00	Horizontal	PASS
4	4121.4370	-55.36	-13.00	Horizontal	PASS
5	6276.5460	-46.03	-13.00	Horizontal	PASS
6	12099.8920	-41.3	-13.00	Horizontal	PASS

LTE Band 26, 5MHz BW, Low Channel, QPSK

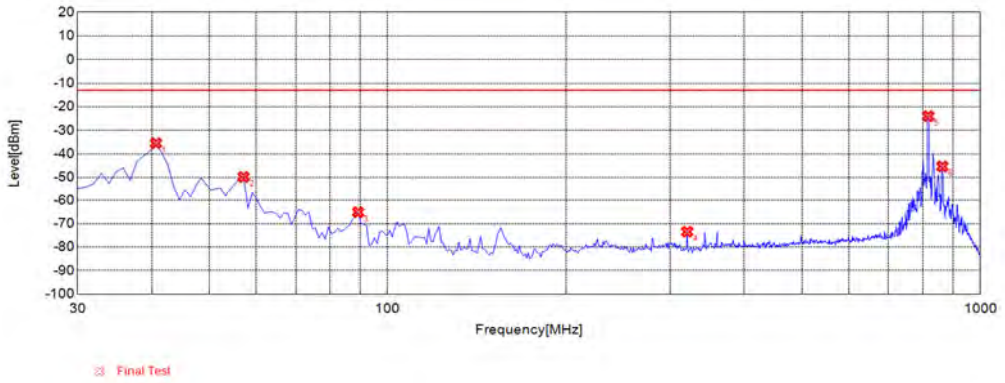


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	41.6520	-43.54	-13.00	Vertical	PASS
2	57.1870	-53.12	-13.00	Vertical	PASS
3	89.2290	-63.07	-13.00	Vertical	PASS
4	360.1300	-69.42	-13.00	Vertical	PASS
5	814.5450	-24.01	-13.00	Vertical	N/A
6	863.0930	-45.79	-13.00	Vertical	N/A

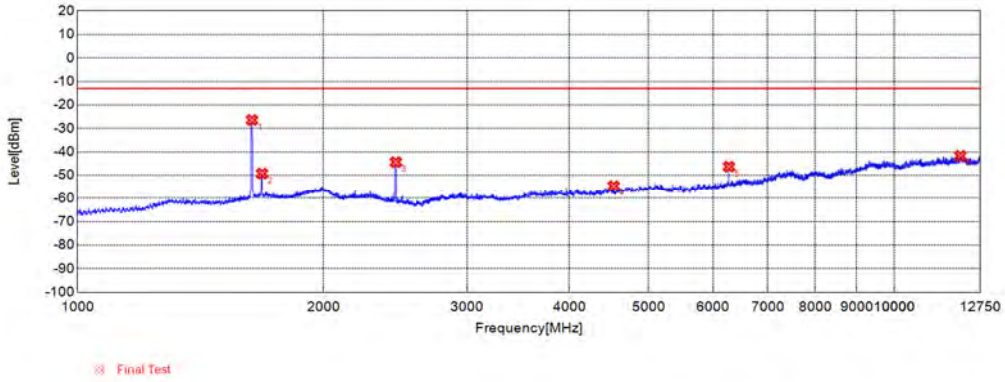


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1635.5450	-26.29	-13.00	Vertical	PASS
2	1678.2260	-46	-13.00	Vertical	PASS
3	2449.8170	-33.96	-13.00	Vertical	PASS
4	2495.8320	-52.87	-13.00	Vertical	PASS
5	6274.9210	-45.45	-13.00	Vertical	PASS
6	11587.9310	-42.17	-13.00	Vertical	PASS

LTE Band 26, 5MHz BW, Mid Channel, QPSK

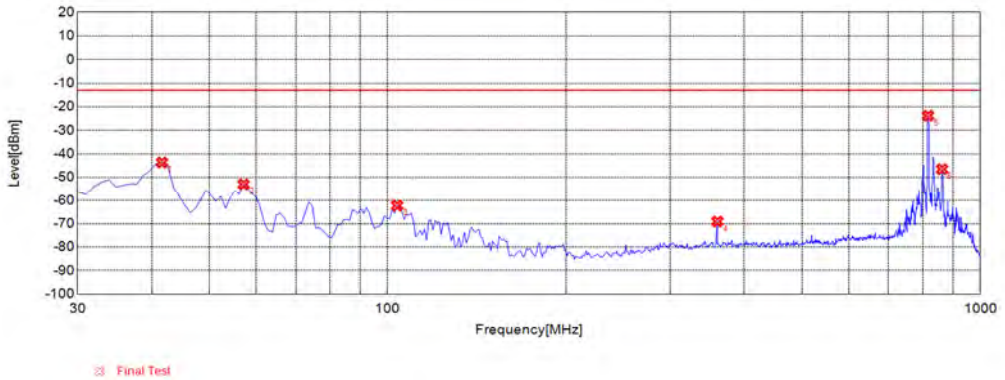


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	40.6810	-35.45	-13.00	Horizontal	PASS
2	57.1870	-49.76	-13.00	Horizontal	PASS
3	89.2290	-65.15	-13.00	Horizontal	PASS
4	320.3200	-73.45	-13.00	Horizontal	PASS
5	817.4570	-24	-13.00	Horizontal	N/A
6	863.0930	-45.28	-13.00	Horizontal	N/A

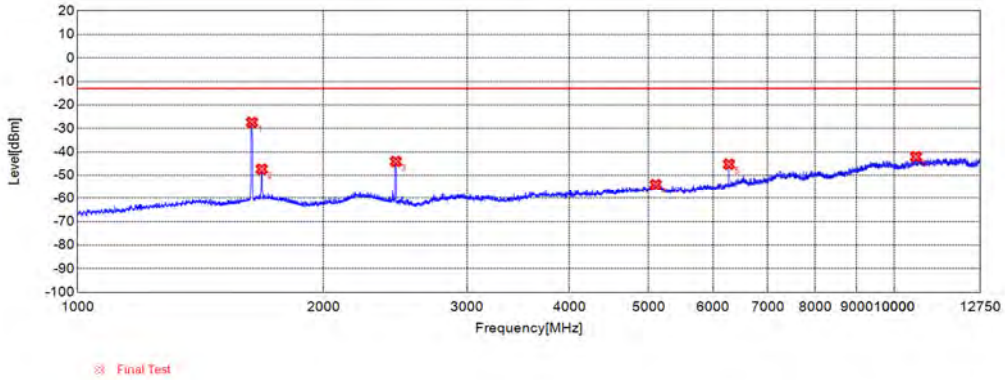


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1635.5450	-26.42	-13.00	Horizontal	PASS
2	1682.8940	-49.26	-13.00	Horizontal	PASS
3	2453.8180	-44.36	-13.00	Horizontal	PASS
4	4535.8810	-54.67	-13.00	Horizontal	PASS
5	6276.5460	-46.31	-13.00	Horizontal	PASS
6	12052.7590	-41.67	-13.00	Horizontal	PASS

LTE Band 26, 5MHz BW, Mid Channel, QPSK

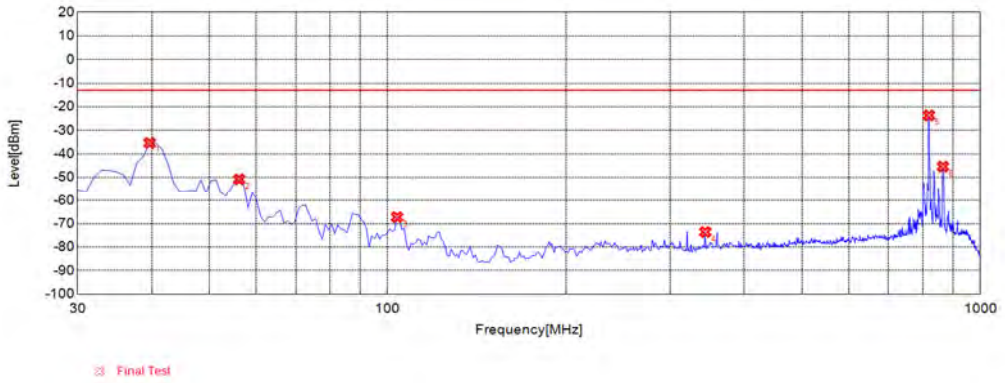


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	41.6520	-43.6	-13.00	Vertical	PASS
2	57.1870	-52.91	-13.00	Vertical	PASS
3	103.7940	-62.3	-13.00	Vertical	PASS
4	360.1300	-69.07	-13.00	Vertical	PASS
5	816.4860	-23.78	-13.00	Vertical	N/A
6	862.1220	-46.49	-13.00	Vertical	N/A

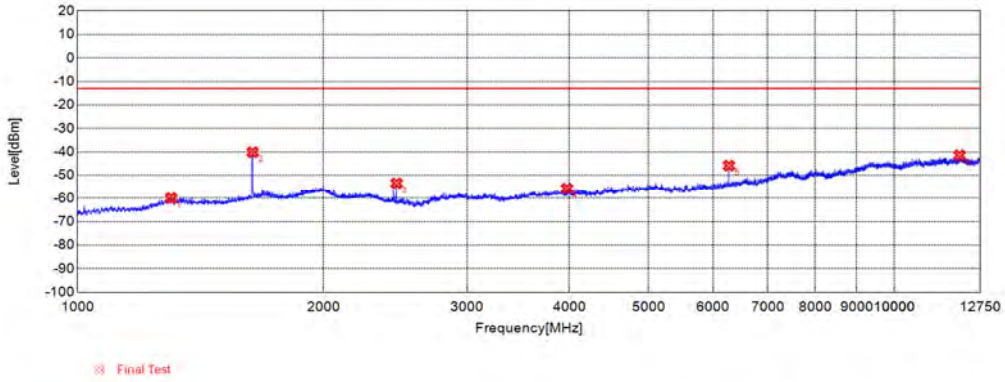


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1635.5450	-27.42	-13.00	Vertical	PASS
2	1680.8940	-47.35	-13.00	Vertical	PASS
3	2453.8180	-44.05	-13.00	Vertical	PASS
4	5104.7260	-53.98	-13.00	Vertical	PASS
5	6276.5460	-45.24	-13.00	Vertical	PASS
6	10638.7730	-42.07	-13.00	Vertical	PASS

LTE Band 26, 5MHz BW, High Channel, QPSK

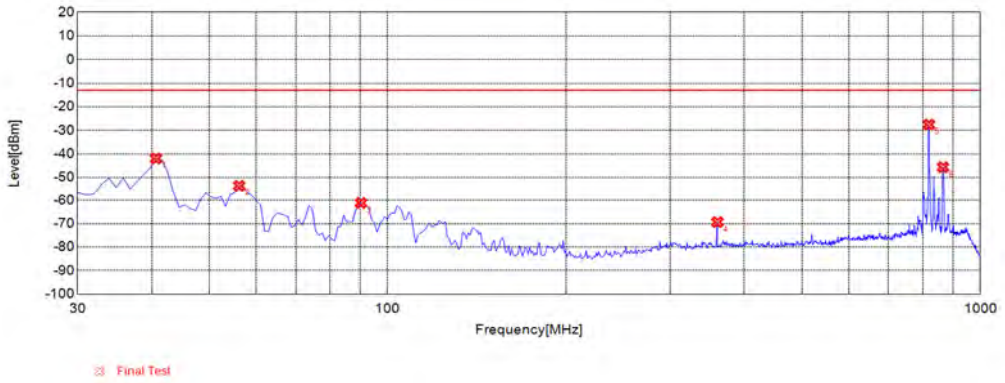


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	39.7100	-35.33	-13.00	Horizontal	PASS
2	56.2160	-50.77	-13.00	Horizontal	PASS
3	103.7940	-67.21	-13.00	Horizontal	PASS
4	343.6240	-73.56	-13.00	Horizontal	PASS
5	819.3990	-23.66	-13.00	Horizontal	N/A
6	865.0350	-45.38	-13.00	Horizontal	N/A

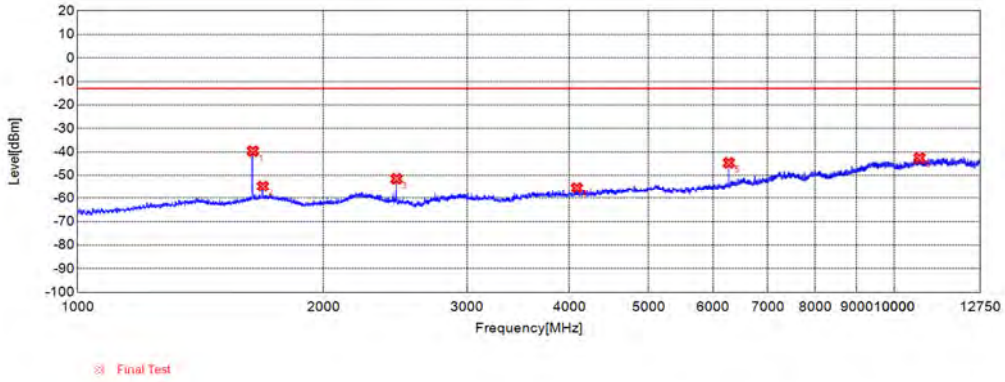


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1302.1010	-59.99	-13.00	Horizontal	PASS
2	1638.8800	-40.14	-13.00	Horizontal	PASS
3	2459.1530	-53.42	-13.00	Horizontal	PASS
4	3976.7880	-55.74	-13.00	Horizontal	PASS
5	6276.5460	-45.87	-13.00	Horizontal	PASS
6	12026.7540	-41.46	-13.00	Horizontal	PASS

LTE Band 26, 5MHz BW, High Channel, QPSK



No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	40.6810	-41.93	-13.00	Vertical	PASS
2	56.2160	-53.53	-13.00	Vertical	PASS
3	90.2000	-61.19	-13.00	Vertical	PASS
4	360.1300	-69.34	-13.00	Vertical	PASS
5	819.3990	-27.58	-13.00	Vertical	N/A
6	865.0350	-45.61	-13.00	Vertical	N/A



No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1639.5470	-39.68	-13.00	Vertical	PASS
2	1686.2290	-54.76	-13.00	Vertical	PASS
3	2458.4860	-51.45	-13.00	Vertical	PASS
4	4087.3060	-55.44	-13.00	Vertical	PASS
5	6274.9210	-44.66	-13.00	Vertical	PASS
6	10742.7900	-42.59	-13.00	Vertical	PASS

Annex A Test Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for test performed on the EUT as specified in CISPR 16-1-2:

Test items	Uncertainty
Output Power	±2.22 dB
Bandwidth	±5%
Conducted Spurious Emission	±2.77 dB
Band Edge	±2.77 dB
Equivalent Isotropic Radiated Power	±2.22 dB
Radiated Spurious Emissions	±6 dB

This uncertainty represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Annex B Testing Laboratory Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Laboratory Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

3. Facilities and Accreditations

All measurement facilities used to collect the measurement data are located at FL.3, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10-2013and CISPR Publication 22; the FCC designation number is CN1192, the test firm registration number is 226174.

4. Test Equipments Utilized

4.1 Conducted Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Due Date
EXA Signal Analyzer	MY51511149	N9020A	Agilent	2021.07.26	2022.07.25
EXA Signal Analyzer	MY54170556	N9030A	Agilent	2021.10.20	2022.10.19
System Simulator	6200995016	MT8820C	Anritsu	2021.10.21	2022.10.20
System Simulator	6261830572	MT8821C	Anritsu	2022.02.14	2023.02.13
Temperature Chamber	20171112102	HZ-2019	Dongguan Lixian Instrument Technology Co., Ltd	2021.10.20	2022.10.19

4.2 List of Software Used

Description	Manufacturer	Software Version
Morlab FCC Test System	MORLAB	V3.0
MORLAB EMCR V1.2	MORLAB	V1.0

4.3 Radiated Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Due Date
System Simulator	152038	CMW500	R&S	2021.10.21	2022.10.20
System Simulator	6200995016	MT8820C	Anritsu	2021.10.21	2022.10.20
Receiver	MY54130016	N9038A	Agilent	2021.07.16	2022.07.15
Test Antenna - Bi-Log	9163-519	VULB 9163	Schwarzbeck	2019.05.24	2022.05.23
Test Antenna - Horn	9170C-531	BBHA9170	Schwarzbeck	2019.07.26	2022.07.25
Test Antenna - Horn	01774	BBHA 9120D	Schwarzbeck	2019.07.26	2022.07.25
Coaxial cable (N male) (9KHz-30MHz)	CB04	EMC04	Morlab	N/A	N/A
Coaxial cable (N male) (30MHz-26GHz)	CB02	EMC02	Morlab	N/A	N/A
Coaxial cable (N male) (30MHz-26GHz)	CB03	EMC03	Morlab	N/A	N/A
Coaxial cable (N male) (30MHz-40GHz)	CB05	EMC05	Morlab	N/A	N/A
1-18GHz pre-Amplifier	61171/61172	S020180L3203	Tonscend	2021.07.16	2022.07.15
18-26.5GHz pre-Amplifier	46732	S10M100L3802	Tonscend	2021.07.16	2022.07.15
26-40GHz pre-Amplifier	56774	S40M400L4002	Tonscend	2021.07.16	2022.07.15
Notch Filter	N/A	WRCGV -LTE 26	Wainwright	2021.07.16	2022.07.15
Anechoic Chamber	N/A	9m*6m*6m	CRT	2019.07.13	2022.07.12

END OF REPORT