



# TEST REPORT

**APPLICANT** : Reliance Communications, LLC

**PRODUCT NAME** : 4G-LTE feature phone

**MODEL NAME** : R320L, R320L2

**BRAND NAME** : Orbic

**FCC ID** : 2ABGH-R320L

**STANDARD(S)** : 47 CFR Part 2  
47 CFR Part 90, Subpart S

**RECEIPT DATE** : 2023-02-22

**TEST DATE** : 2023-03-14 to 2023-05-15

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Change History		
Version	Date	Reason for change
1.0	2023-10-12	First edition



# 1. Technical Information

Note: Provide by applicant.

## 1.1. Applicant and Manufacturer Information

<b>Applicant:</b>	Reliance Communications, LLC
<b>Applicant Address:</b>	555 Wireless Blvd. Hauppauge, NY 11788, USA
<b>Manufacturer:</b>	ShenZhen Wellstec Communication Co., Ltd
<b>Manufacturer Address:</b>	1403, Block A, BOTON Science & Technology Park, No. 1044 Chaguang Road, Nanshan District, ShenZhen, China.

## 1.2. Equipment Under Test (EUT) Description

<b>Product Name:</b>	4G-LTE feature phone	
<b>Sample No.:</b>	9#	
<b>Hardware Version:</b>	V1.0	
<b>Software Version:</b>	R320L: R320L_v1.3.1_BVZ R320L2: R320L2_v1.2.7_BVZ	
<b>Modulation Type:</b>	QPSK, 16QAM, 64QAM	
<b>Operation Band:</b>	Band 26	
<b>Frequency Range:</b>	LTE Band 26	Tx: 814MHz–824MHz
		Rx: 859MHz–869MHz
<b>Channel Bandwidth</b>	LTE Band 26	1.4MHz, 3MHz, 5MHz, 10MHz
<b>Antenna Type:</b>	PIFA Antenna	
<b>Antenna Gain:</b>	LTE Band 26	0.35dBi
<b>Accessory Information:</b>	Battery	
	<b>Brand Name:</b>	Orbic
	<b>Model No.:</b>	BP2243
	<b>Serial No.:</b>	N/A
	<b>Capacity:</b>	1850mAh
	<b>Rated Voltage:</b>	3.85V
	<b>Charge Limit:</b>	4.4V
	<b>Manufacturer:</b>	Zhongshan Tianmao Battery Limited Company

<b>Accessory Information:</b>	AC Adapter	
	Brand Name:	Orbic
	Model No.:	A18A-050100U-US2
	Serial No.:	N/A
	Rated Output:	5.0V=1.0A
	Rated Input:	100-240V~50/60Hz, 0.2A
	Manufacturer:	Dongguan Aohai Technology Co., Ltd
	USB Cable	
	Model No.:	R320L
	Manufacturer:	SHENZHEN YONGQUANDA TECHNOLOGY CO.,LTD

**Note 1:** According to the certificate holder, they declared that the models R320L and R320L2 only differ in model name and software version, everything else is the same. The main measuring model is R320L, only the results for R320L were recorded in this report.

**Note 2:** 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
10	0.111	0.086	0.069	9M00G7D	8M95W7D	8M96W7D
5	0.111	0.088	0.067	4M50G7D	4M51W7D	4M51W7D
3	0.113	0.088	0.066	2M70G7D	2M71W7D	2M71W7D
1.4	0.110	0.084	0.069	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	Mar. 16, 2023	Chen Hao Li Huaijie	PASS	No deviation
90.209	Occupied Bandwidth	Mar. 16, 2023	Li Huaijie	PASS	No deviation
2.1055, 90.213	Frequency Stability	Mar. 16, 2023	Li Huaijie	PASS	No deviation
2.1051, 90.691	Conducted Spurious Emissions	Mar. 16, 2023	Li Huaijie	PASS	No deviation
2.1051, 90.691	Band Edge	Mar. 16, 2023	Li Huaijie	PASS	No deviation
2.1053, 90.691	Radiated Spurious Emissions	May 15, 2023	Lin Jiayong	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

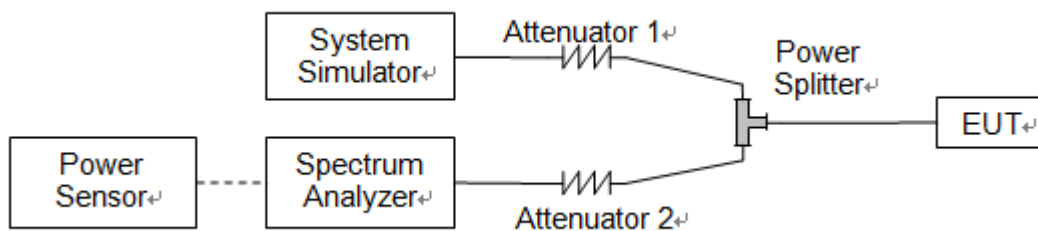
### 2.1. Transmitter Conducted Output Power and E.R.P./E.I.R.P.

#### 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.

$EIRP \text{ (dBm)} = \text{Conducted Output Power (dBm)} + \text{Antenna Gain (dBi)}$

$ERP \text{ (dBm)} = EIPR \text{ (dBm)} - 2.15$

**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	/	22.27	/
10	QPSK	1	25	/	22.12	/
10	QPSK	1	49	/	22.26	/
10	QPSK	25	0	/	21.24	/
10	QPSK	25	12	/	21.18	/
10	QPSK	25	25	/	21.23	/
10	QPSK	50	0	/	20.96	/
10	16QAM	1	0	/	21.13	/
10	16QAM	1	25	/	20.95	/
10	16QAM	1	49	/	20.87	/
10	16QAM	25	0	/	20.13	/
10	16QAM	25	12	/	20.19	/
10	16QAM	25	25	/	20.25	/
10	16QAM	50	0	/	20.09	/
10	64QAM	1	0	/	20.00	/
10	64QAM	1	25	/	19.99	/
10	64QAM	1	49	/	20.16	/
10	64QAM	25	0	/	19.10	/
10	64QAM	25	12	/	19.15	/
10	64QAM	25	25	/	19.08	/
10	64QAM	50	0	/	19.09	/





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	22.24	22.23	22.16
5	QPSK	1	12	21.96	21.91	21.88
5	QPSK	1	24	22.22	22.15	22.18
5	QPSK	12	0	21.19	21.15	21.11
5	QPSK	12	7	21.14	21.12	21.02
5	QPSK	12	13	21.17	21.09	21.09
5	QPSK	25	0	20.88	20.82	20.81
5	16QAM	1	0	21.25	21.17	21.18
5	16QAM	1	12	21.15	21.12	21.10
5	16QAM	1	24	21.05	21.04	21.02
5	16QAM	12	0	20.00	19.89	19.89
5	16QAM	12	7	20.11	20.09	19.99
5	16QAM	12	13	20.28	20.17	20.27
5	16QAM	25	0	19.96	19.94	19.90
5	64QAM	1	0	20.04	19.98	20.00
5	64QAM	1	12	19.99	19.87	19.92
5	64QAM	1	24	19.92	19.86	19.82
5	64QAM	12	0	19.27	19.20	19.15
5	64QAM	12	7	19.14	19.07	19.02
5	64QAM	12	13	19.24	19.22	19.23
5	64QAM	25	0	19.19	19.17	19.18



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	22.33	22.28	22.24
3	QPSK	1	8	22.05	22.00	21.97
3	QPSK	1	14	22.21	22.20	22.17
3	QPSK	8	0	21.12	21.04	21.09
3	QPSK	8	4	21.15	21.14	21.14
3	QPSK	8	7	20.95	20.89	20.83
3	QPSK	15	0	20.94	20.84	20.84
3	16QAM	1	0	21.25	21.18	21.22
3	16QAM	1	8	21.11	21.10	21.04
3	16QAM	1	14	21.09	21.01	21.03
3	16QAM	8	0	20.03	19.99	19.94
3	16QAM	8	4	19.98	19.86	19.91
3	16QAM	8	7	20.25	20.20	20.16
3	16QAM	15	0	20.27	20.17	20.24
3	64QAM	1	0	19.95	19.92	19.92
3	64QAM	1	8	20.00	19.88	19.92
3	64QAM	1	14	19.93	19.85	19.82
3	64QAM	8	0	18.98	18.90	18.94
3	64QAM	8	4	19.02	18.97	19.00
3	64QAM	8	7	19.32	19.31	19.31
3	64QAM	15	0	19.21	19.17	19.10



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	22.10	21.98	22.05
1.4	QPSK	1	3	22.07	21.96	22.05
1.4	QPSK	1	5	22.22	22.15	22.11
1.4	QPSK	3	0	21.00	20.97	20.98
1.4	QPSK	3	1	21.03	20.98	20.98
1.4	QPSK	3	3	21.02	20.97	20.99
1.4	QPSK	6	0	21.16	21.10	21.07
1.4	16QAM	1	0	20.90	20.83	20.87
1.4	16QAM	1	3	20.94	20.89	20.90
1.4	16QAM	1	5	21.06	21.03	21.01
1.4	16QAM	3	0	20.28	20.24	20.17
1.4	16QAM	3	1	20.04	20.03	20.02
1.4	16QAM	3	3	20.09	20.00	20.07
1.4	16QAM	6	0	20.26	20.15	20.23
1.4	64QAM	1	0	20.18	20.11	20.13
1.4	64QAM	1	3	20.11	20.01	20.03
1.4	64QAM	1	5	19.83	19.73	19.82
1.4	64QAM	3	0	19.04	19.00	19.02
1.4	64QAM	3	1	19.26	19.18	19.23
1.4	64QAM	3	3	19.03	18.95	19.02
1.4	64QAM	6	0	19.08	19.02	18.99



**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	/	20.47	0.111	/
10	QPSK	1	25	/	20.32	0.108	/
10	QPSK	1	49	/	20.46	0.111	/
10	QPSK	25	0	/	19.44	0.088	/
10	QPSK	25	12	/	19.38	0.087	/
10	QPSK	25	25	/	19.43	0.088	/
10	QPSK	50	0	/	19.16	0.082	/
10	16QAM	1	0	/	19.33	0.086	/
10	16QAM	1	25	/	19.15	0.082	/
10	16QAM	1	49	/	19.07	0.081	/
10	16QAM	25	0	/	18.33	0.068	/
10	16QAM	25	12	/	18.39	0.069	/
10	16QAM	25	25	/	18.45	0.070	/
10	16QAM	50	0	/	18.29	0.067	/
10	64QAM	1	0	/	18.20	0.066	/
10	64QAM	1	25	/	18.19	0.066	/
10	64QAM	1	49	/	18.36	0.069	/
10	64QAM	25	0	/	17.30	0.054	/
10	64QAM	25	12	/	17.35	0.054	/
10	64QAM	25	25	/	17.28	0.053	/
10	64QAM	50	0	/	17.29	0.054	/



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	20.44	0.111	20.43	0.110	20.36	0.109
5	QPSK	1	12	20.16	0.104	20.11	0.103	20.08	0.102
5	QPSK	1	24	20.42	0.110	20.35	0.108	20.38	0.109
5	QPSK	12	0	19.39	0.087	19.35	0.086	19.31	0.085
5	QPSK	12	7	19.34	0.086	19.32	0.086	19.22	0.084
5	QPSK	12	13	19.37	0.086	19.29	0.085	19.29	0.085
5	QPSK	25	0	19.08	0.081	19.02	0.080	19.01	0.080
5	16QAM	1	0	19.45	0.088	19.37	0.086	19.38	0.087
5	16QAM	1	12	19.35	0.086	19.32	0.086	19.30	0.085
5	16QAM	1	24	19.25	0.084	19.24	0.084	19.22	0.084
5	16QAM	12	0	18.20	0.066	18.09	0.064	18.09	0.064
5	16QAM	12	7	18.31	0.068	18.29	0.067	18.19	0.066
5	16QAM	12	13	18.48	0.070	18.37	0.069	18.47	0.070
5	16QAM	25	0	18.16	0.065	18.14	0.065	18.10	0.065
5	64QAM	1	0	18.24	0.067	18.18	0.066	18.20	0.066
5	64QAM	1	12	18.19	0.066	18.07	0.064	18.12	0.065
5	64QAM	1	24	18.12	0.065	18.06	0.064	18.02	0.063
5	64QAM	12	0	17.47	0.056	17.40	0.055	17.35	0.054
5	64QAM	12	7	17.34	0.054	17.27	0.053	17.22	0.053
5	64QAM	12	13	17.44	0.055	17.42	0.055	17.43	0.055
5	64QAM	25	0	17.39	0.055	17.37	0.055	17.38	0.055



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	20.53	0.113	20.48	0.112	20.44	0.111
3	QPSK	1	8	20.25	0.106	20.20	0.105	20.17	0.104
3	QPSK	1	14	20.41	0.110	20.40	0.110	20.37	0.109
3	QPSK	8	0	19.32	0.086	19.24	0.084	19.29	0.085
3	QPSK	8	4	19.35	0.086	19.34	0.086	19.34	0.086
3	QPSK	8	7	19.15	0.082	19.09	0.081	19.03	0.080
3	QPSK	15	0	19.14	0.082	19.04	0.080	19.04	0.080
3	16QAM	1	0	19.45	0.088	19.38	0.087	19.42	0.087
3	16QAM	1	8	19.31	0.085	19.30	0.085	19.24	0.084
3	16QAM	1	14	19.29	0.085	19.21	0.083	19.23	0.084
3	16QAM	8	0	18.23	0.067	18.19	0.066	18.14	0.065
3	16QAM	8	4	18.18	0.066	18.06	0.064	18.11	0.065
3	16QAM	8	7	18.45	0.070	18.40	0.069	18.36	0.069
3	16QAM	15	0	18.47	0.070	18.37	0.069	18.44	0.070
3	64QAM	1	0	18.15	0.065	18.12	0.065	18.12	0.065
3	64QAM	1	8	18.20	0.066	18.08	0.064	18.12	0.065
3	64QAM	1	14	18.13	0.065	18.05	0.064	18.02	0.063
3	64QAM	8	0	17.18	0.052	17.10	0.051	17.14	0.052
3	64QAM	8	4	17.22	0.053	17.17	0.052	17.20	0.052
3	64QAM	8	7	17.52	0.056	17.51	0.056	17.51	0.056
3	64QAM	15	0	17.41	0.055	17.37	0.055	17.30	0.054



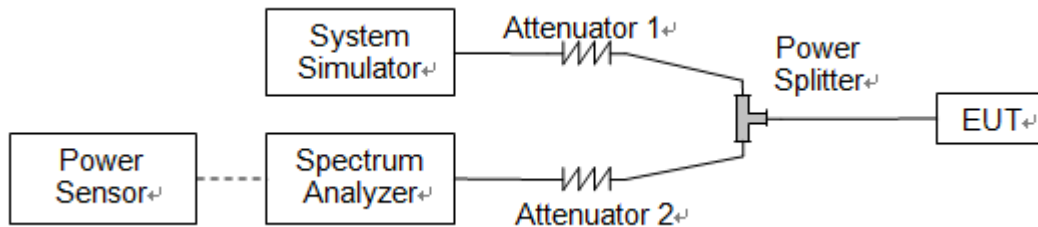
LTE Band 26				Measured E.R.P.					
BW [MHz]	Modulation	RB Size	RB Offset	Low Ch. / Freq.		Middle Ch. / Freq.		High Ch. / Freq.	
Channel				26697		26740		26783	
Frequency (MHz)				814.7		819.0		823.3	
				dBm	W	dBm	W	dBm	W
1.4	QPSK	1	0	20.30	0.107	20.18	0.104	20.25	0.106
1.4	QPSK	1	3	20.27	0.106	20.16	0.104	20.25	0.106
1.4	QPSK	1	5	20.42	0.110	20.35	0.108	20.31	0.107
1.4	QPSK	3	0	19.20	0.083	19.17	0.083	19.18	0.083
1.4	QPSK	3	1	19.23	0.084	19.18	0.083	19.18	0.083
1.4	QPSK	3	3	19.22	0.084	19.17	0.083	19.19	0.083
1.4	QPSK	6	0	19.36	0.086	19.30	0.085	19.27	0.085
1.4	16QAM	1	0	19.10	0.081	19.03	0.080	19.07	0.081
1.4	16QAM	1	3	19.14	0.082	19.09	0.081	19.10	0.081
1.4	16QAM	1	5	19.26	0.084	19.23	0.084	19.21	0.083
1.4	16QAM	3	0	18.48	0.070	18.44	0.070	18.37	0.069
1.4	16QAM	3	1	18.24	0.067	18.23	0.067	18.22	0.066
1.4	16QAM	3	3	18.29	0.067	18.20	0.066	18.27	0.067
1.4	16QAM	6	0	18.46	0.070	18.35	0.068	18.43	0.070
1.4	64QAM	1	0	18.38	0.069	18.31	0.068	18.33	0.068
1.4	64QAM	1	3	18.31	0.068	18.21	0.066	18.23	0.067
1.4	64QAM	1	5	18.03	0.064	17.93	0.062	18.02	0.063
1.4	64QAM	3	0	17.24	0.053	17.20	0.052	17.22	0.053
1.4	64QAM	3	1	17.46	0.056	17.38	0.055	17.43	0.055
1.4	64QAM	3	3	17.23	0.053	17.15	0.052	17.22	0.053
1.4	64QAM	6	0	17.28	0.053	17.22	0.053	17.19	0.052

## 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.



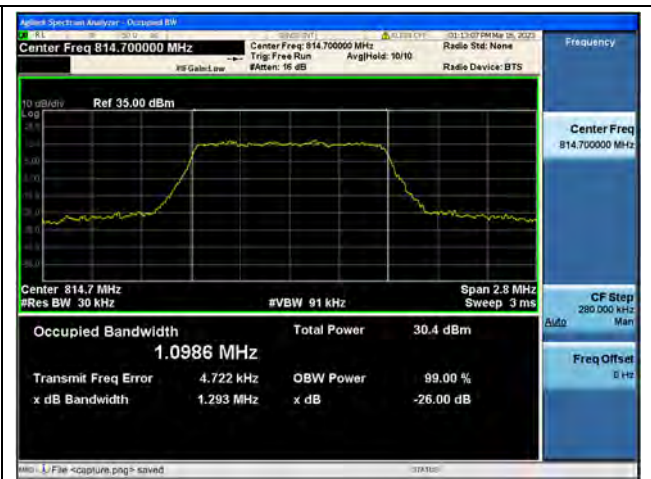


2.2.4. Test Result

LTE Band 26				
BW(MHz)	Channel Level	Modulation	99% BW(MHz)	26dB BW(MHz)
1.4	Low	QPSK	1.09	1.28
	Low	16QAM	1.10	1.29
	Low	64QAM	1.10	1.30
	Mid	QPSK	1.10	1.28
	Mid	16QAM	1.10	1.30
	Mid	64QAM	1.10	1.29
	High	QPSK	1.10	1.29
	High	16QAM	1.10	1.31
	High	64QAM	1.10	1.30
3	Low	QPSK	2.70	2.98
	Low	16QAM	2.71	3.00
	Low	64QAM	2.69	2.96
	Mid	QPSK	2.70	2.98
	Mid	16QAM	2.70	3.00
	Mid	64QAM	2.71	3.00
	High	QPSK	2.70	2.98
	High	16QAM	2.70	2.99
	High	64QAM	2.71	2.99
5	Low	QPSK	4.50	5.04
	Low	16QAM	4.49	4.73
	Low	64QAM	4.51	4.97
	Mid	QPSK	4.49	4.99
	Mid	16QAM	4.50	4.98
	Mid	64QAM	4.50	4.97
	High	QPSK	4.50	5.01
	High	16QAM	4.51	4.99
	High	64QAM	4.50	4.98
10	Mid	QPSK	9.00	9.83
	Mid	16QAM	8.95	9.75
	Mid	64QAM	8.96	9.82



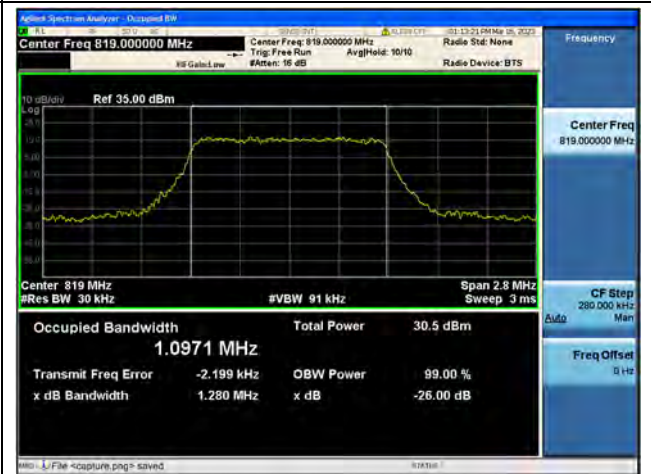
Band26 Part90 / 1.4MHz / QPSK/ Low CH



Band26 Part90 / 1.4MHz / 16QAM/ Low CH



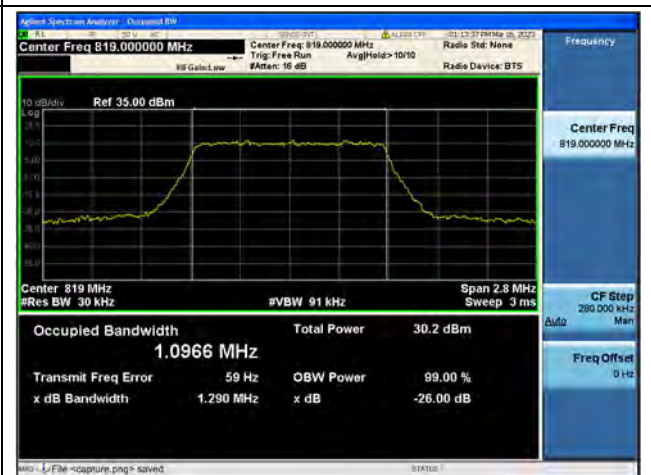
Band26 Part90 / 1.4MHz / 64QAM/ Low CH



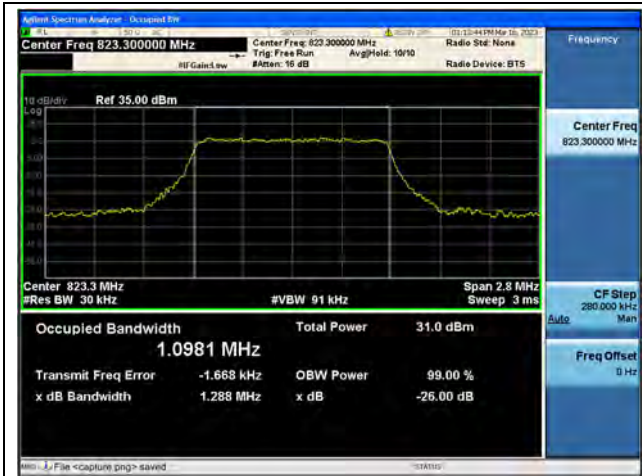
Band26 Part90 / 1.4MHz / QPSK/ Mid CH



Band26 Part90 / 1.4MHz / 16QAM/ Mid CH



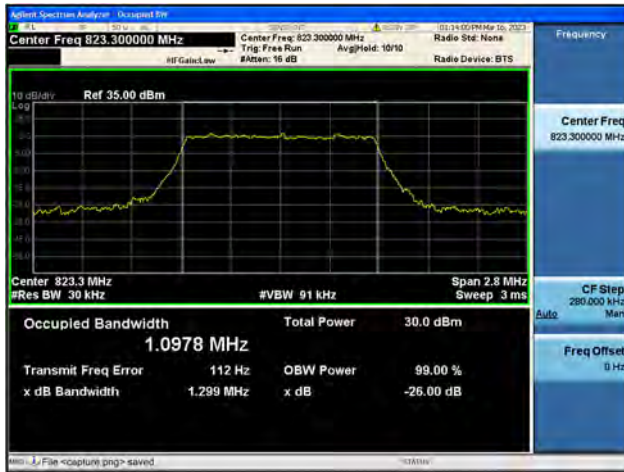
Band26 Part90 / 1.4MHz / 64QAM/ Mid CH



Band26 Part90 / 1.4MHz / QPSK/ High CH



Band26 Part90 / 1.4MHz / 16QAM/ High CH



Band26 Part90 / 1.4MHz / 64QAM/ High CH



Band26 Part90 / 3MHz / QPSK/ Low CH



Band26 Part90 / 3MHz / 16QAM/ Low CH



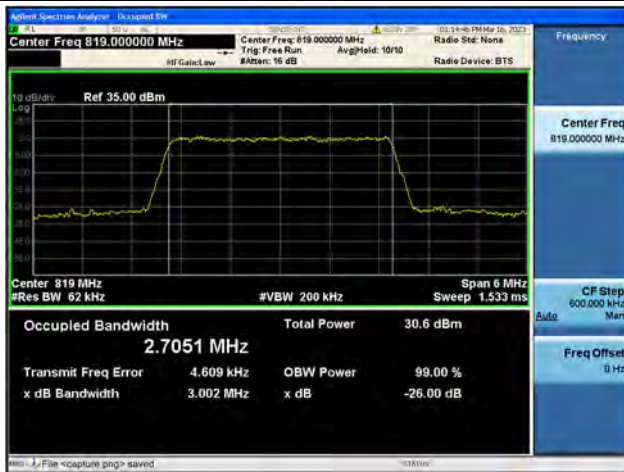
Band26 Part90 / 3MHz / 64QAM/ Low CH



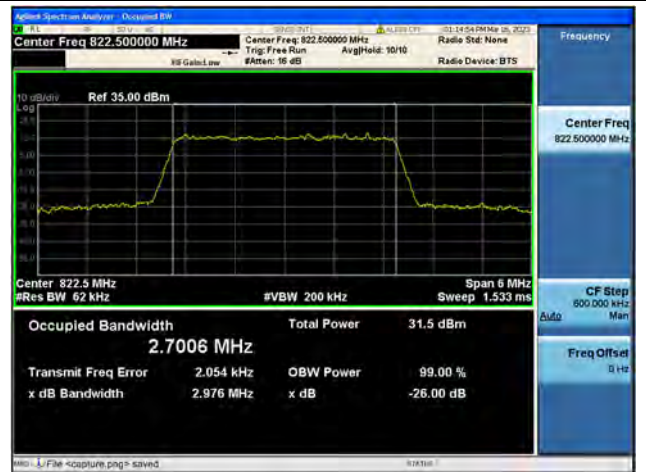
Band26 Part90 / 3MHz / QPSK/ Mid CH



Band26 Part90 / 3MHz / 16QAM/ Mid CH



Band26 Part90 / 3MHz / 64QAM/ Mid CH



Band26 Part90 / 3MHz / QPSK/ High CH



Band26 Part90 / 3MHz / 16QAM/ High CH



Band26 Part90 / 3MHz / 64QAM/ High CH



Band26 Part90 / 5MHz / QPSK/ Low CH



Band26 Part90 / 5MHz / 16QAM/ Low CH



Band26 Part90 / 5MHz / 64QAM/ Low CH



Band26 Part90 / 5MHz / QPSK/ Mid CH



Band26 Part90 / 5MHz / 16QAM/ Mid CH



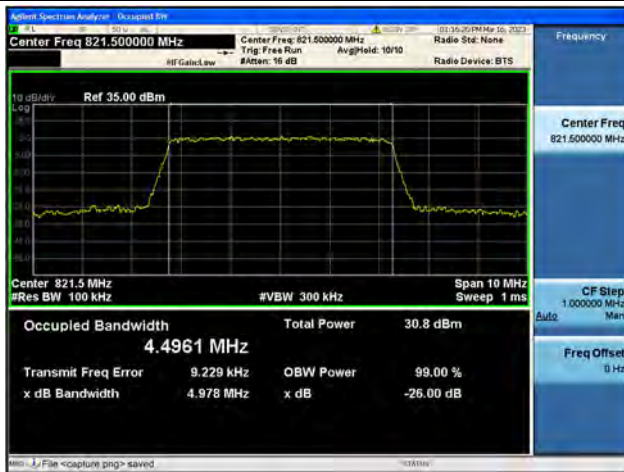
Band26 Part90 / 5MHz / 64QAM/ Mid CH



Band26 Part90 / 5MHz / QPSK/ High CH



Band26 Part90 / 5MHz / 16QAM/ High CH



Band26 Part90 / 5MHz / 64QAM/ High CH



Band26 Part90 / 10MHz / QPSK/ Mid CH



Band26 Part90 / 10MHz / 16QAM/ Mid CH



Band26 Part90 / 10MHz / 64QAM/ Mid CH

## 2.3. Frequency Stability

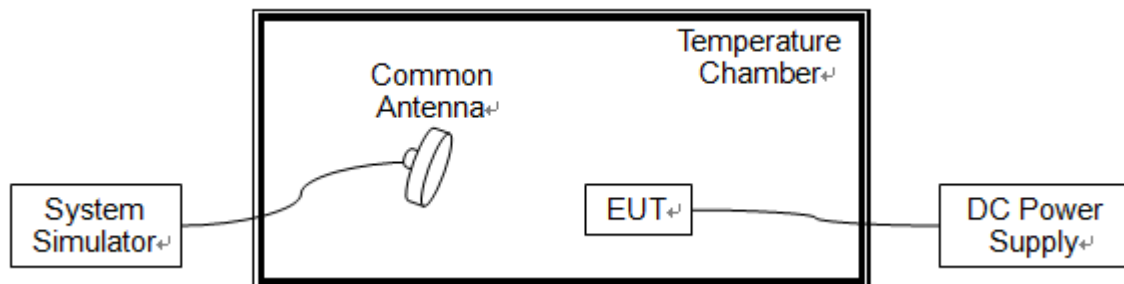
### 2.3.1. Requirement

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  $-30^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$  at intervals of not more than  $10^{\circ}\text{C}$ .
- (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  $0^{\circ}\text{C}$  to  $45^{\circ}\text{C}$ , 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 3.85V, 4.40V and 3.60V, which are specified by the applicant; the normal temperature here used is 20°C.

LTE Band 26, 64QAM, Channel 26740, Frequency 819MHz Limit =±2.5ppm					
Voltage (%)	Power (VDC)	Temp(°C)	Fre. Dev.(Hz)	Deviation (ppm)	Result
Normal	3.85	+20(Ref)	17	0.021	PASS
Normal		0	0	0.000	
Normal		+10	13	0.016	
Normal		+20	14	0.017	
Normal		+30	20	<b>0.024</b>	
Normal		+40	17	0.021	
Normal		+45	1	0.001	
High		4.40	+20	17	
BATT.ENDPOINT	3.60	+20	-12	-0.015	

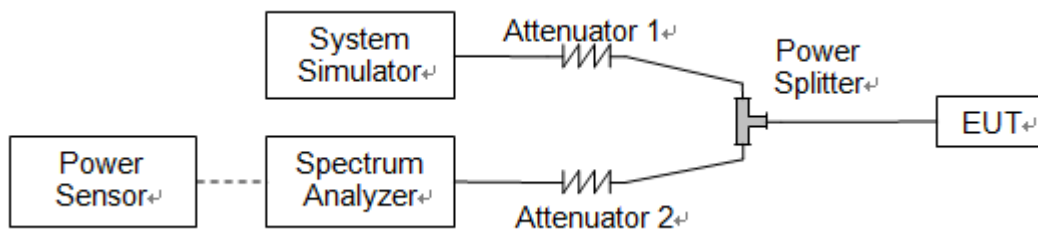


## 2.4. Conducted Spurious Emissions

### 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



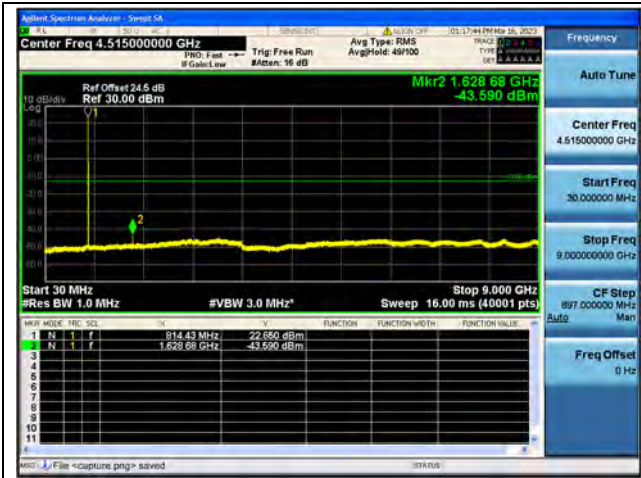
The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum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

### 2.4.3. Test procedure

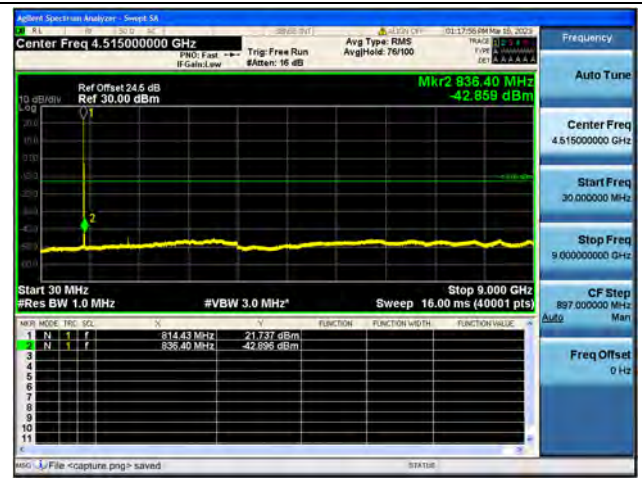
KDB 971168 D01v03 Section 6.0 and ANSI/TIA-603-E-2016.



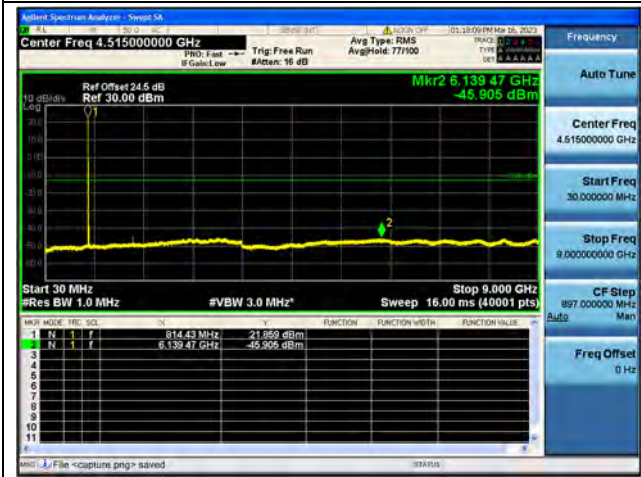
2.4.4. Test Result



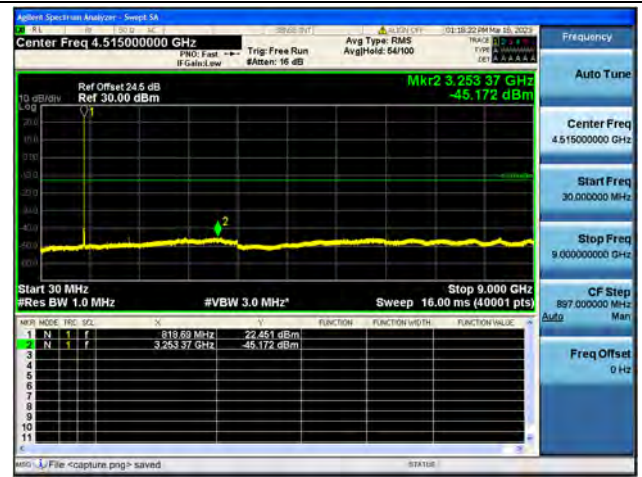
Band26 Part90 / 1.4MHz / Low CH / QPSK



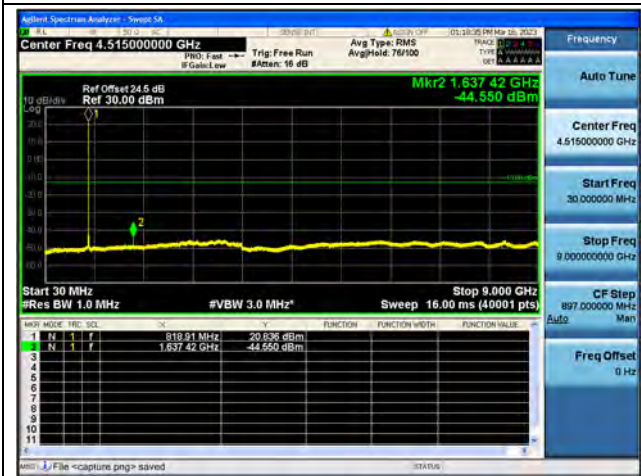
Band26 Part90 / 1.4MHz / Low CH / 16QAM



Band26 Part90 / 1.4MHz / Low CH / 64QAM



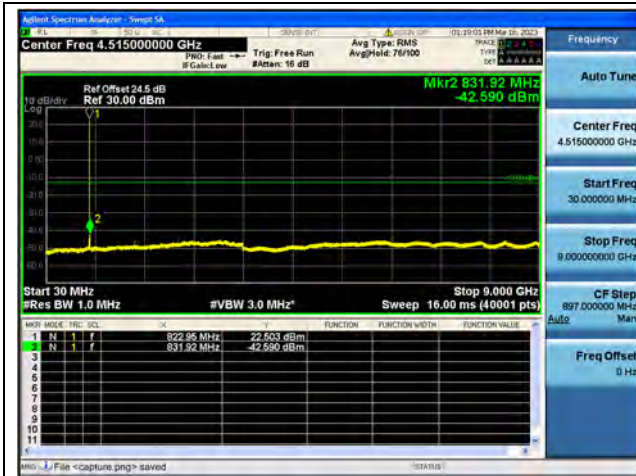
Band26 Part90 / 1.4MHz / Mid CH / QPSK



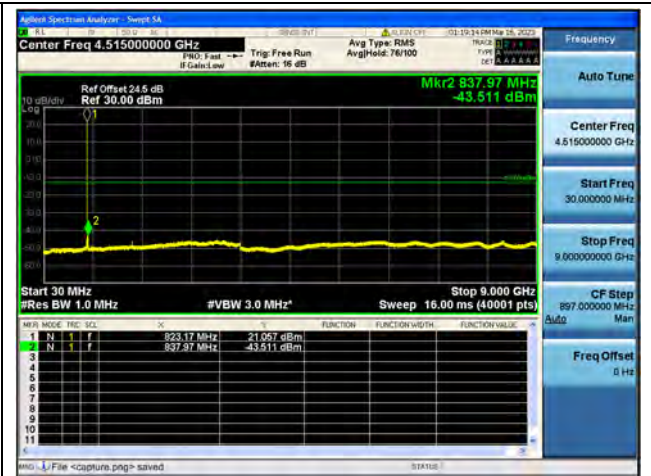
Band26 Part90 / 1.4MHz / Mid CH / 16QAM



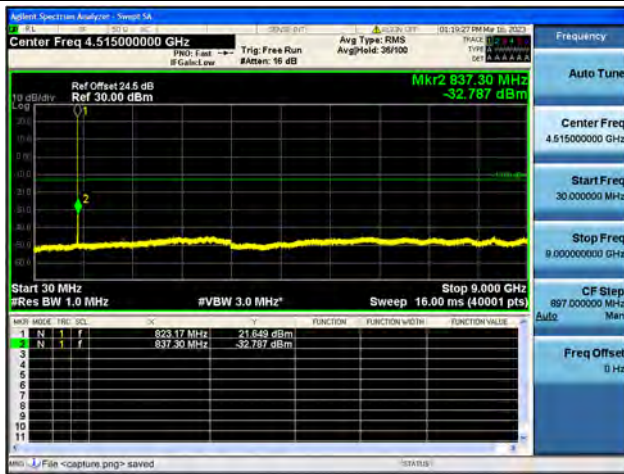
Band26 Part90 / 1.4MHz / Mid CH / 64QAM



Band26 Part90 / 1.4MHz / High CH / QPSK



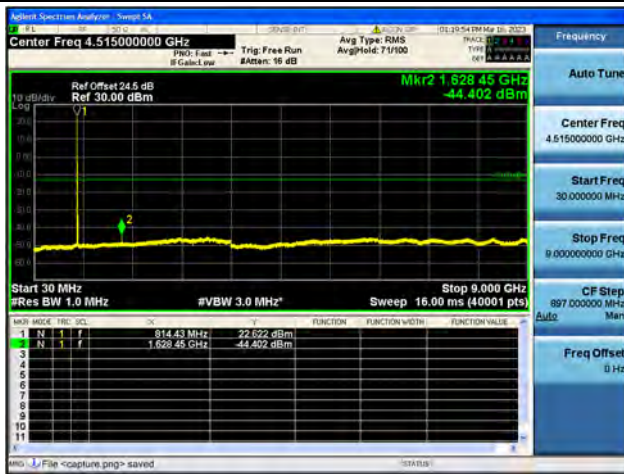
Band26 Part90 / 1.4MHz / High CH / 16QAM



Band26 Part90 / 1.4MHz / High CH / 64QAM



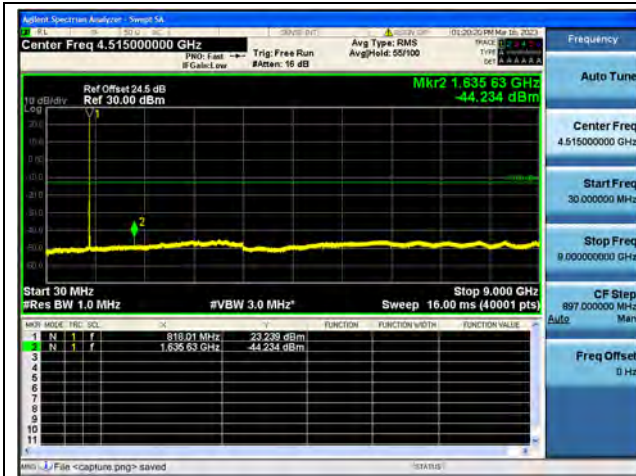
Band26 Part90 / 3MHz / Low CH / QPSK



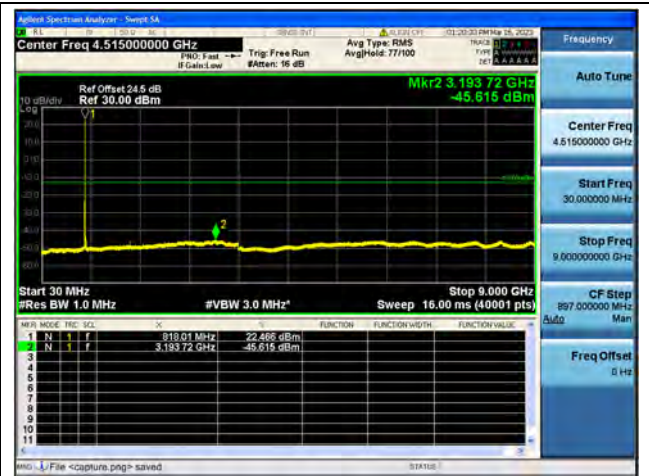
Band26 Part90 / 3MHz / Low CH / 16QAM



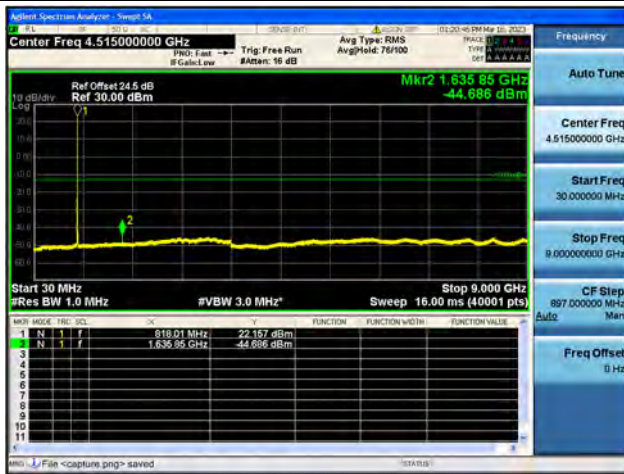
Band26 Part90 / 3MHz / Low CH / 64QAM



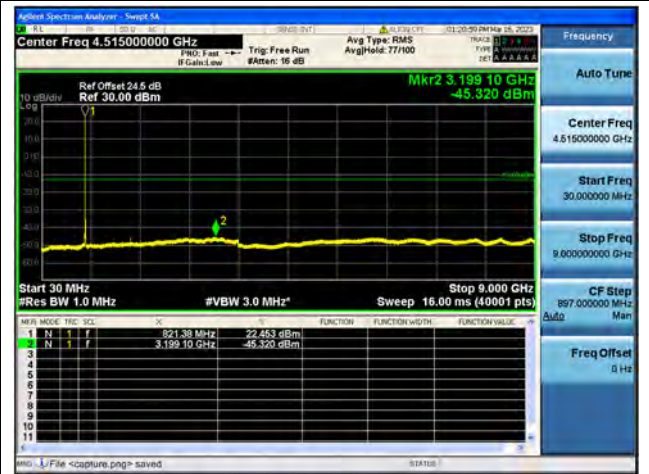
Band26 Part90 / 3MHz / Mid CH / QPSK



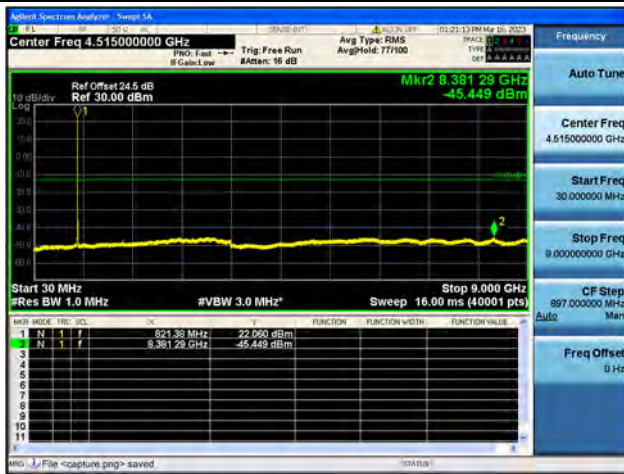
Band26 Part90 / 3MHz / Mid CH / 16QAM



Band26 Part90 / 3MHz / Mid CH / 64QAM



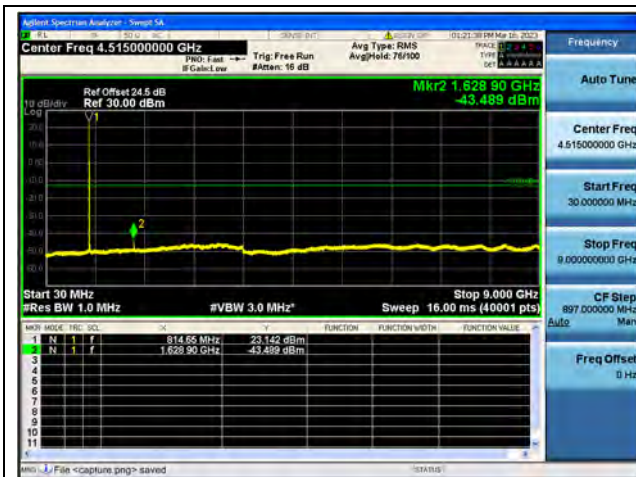
Band26 Part90 / 3MHz / High CH / QPSK



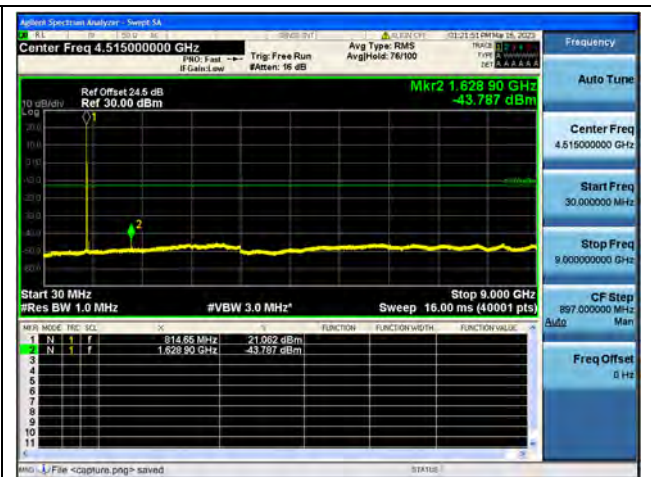
Band26 Part90 / 3MHz / High CH / 16QAM



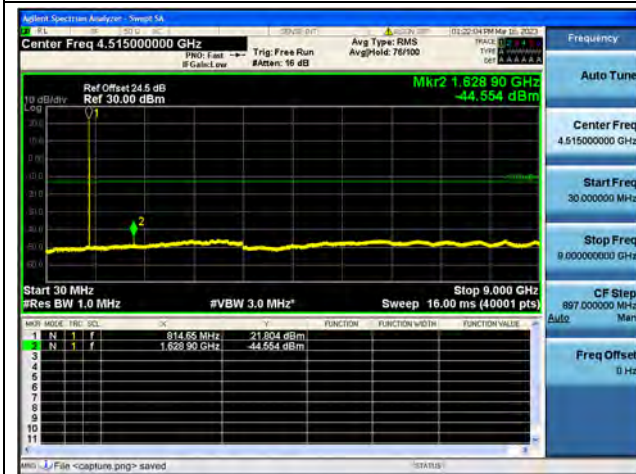
Band26 Part90 / 3MHz / High CH / 64QAM



Band26 Part90 / 5MHz / Low CH / QPSK



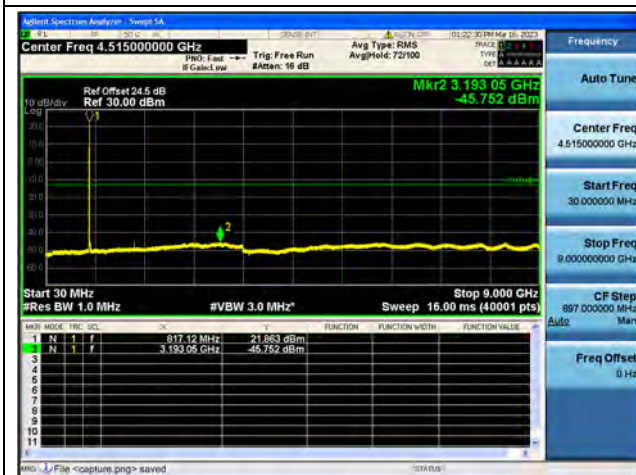
Band26 Part90 / 5MHz / Low CH / 16QAM



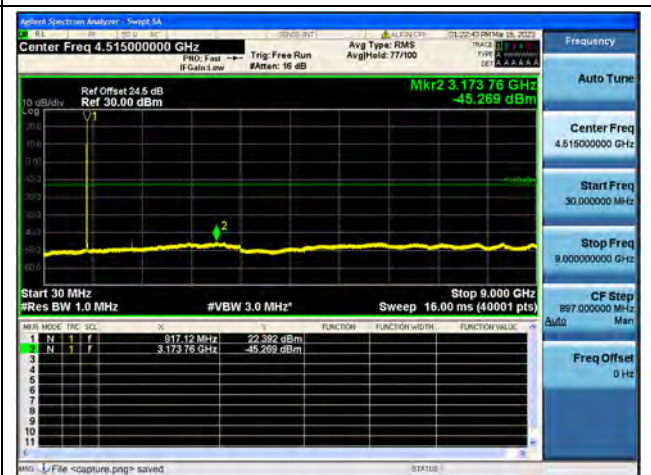
Band26 Part90 / 5MHz / Low CH / 64QAM



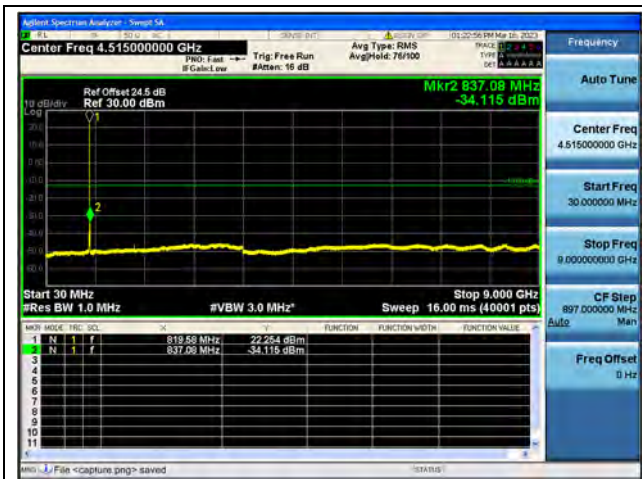
Band26 Part90 / 5MHz / Mid CH / QPSK



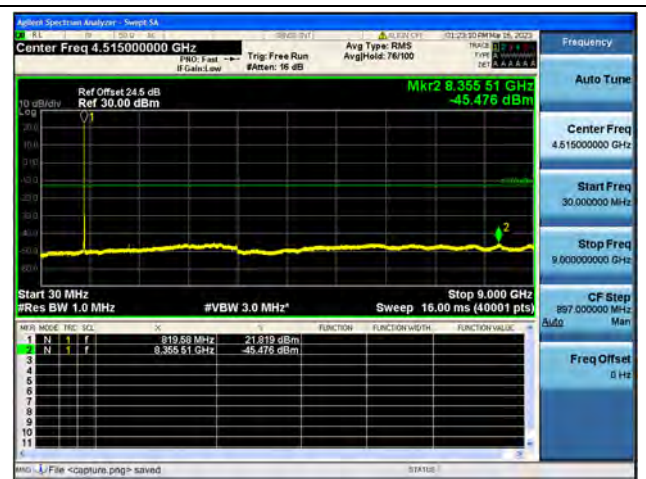
Band26 Part90 / 5MHz / Mid CH / 16QAM



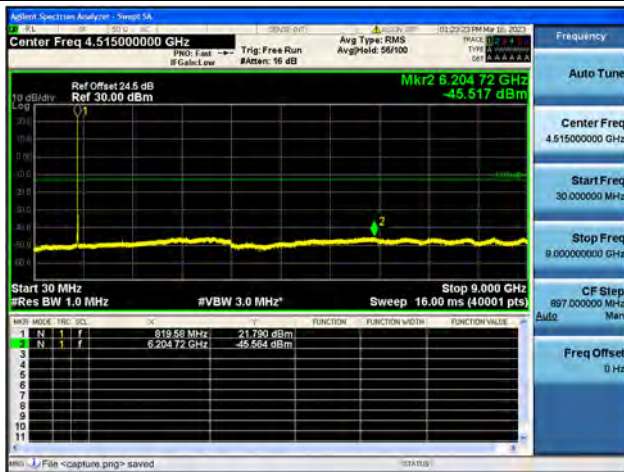
Band26 Part90 / 5MHz / Mid CH / 64QAM



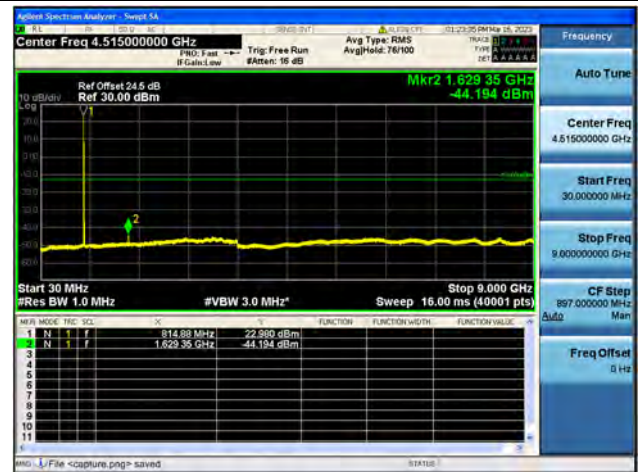
Band26 Part90 / 5MHz / High CH / QPSK



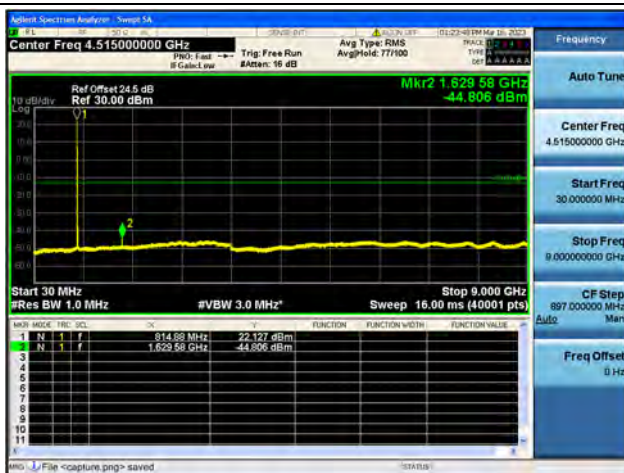
Band26 Part90 / 5MHz / High CH / 16QAM



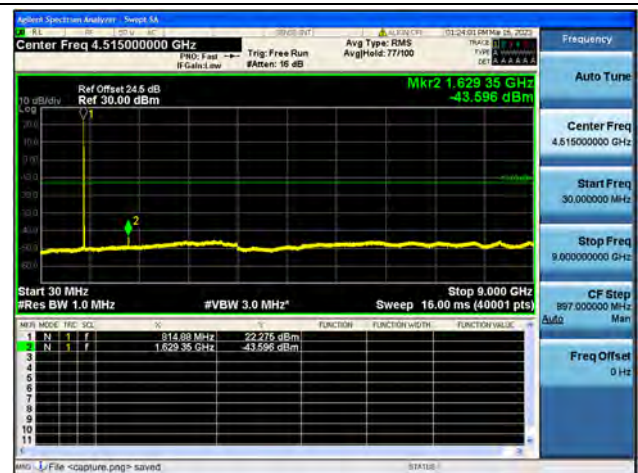
Band26 Part90 / 5MHz / High CH / 64QAM



Band26 Part90 / 10MHz / Mid CH / QPSK



Band26 Part90 / 10MHz / Mid CH / 16QAM



Band26 Part90 / 10MHz / Mid CH / 64QAM

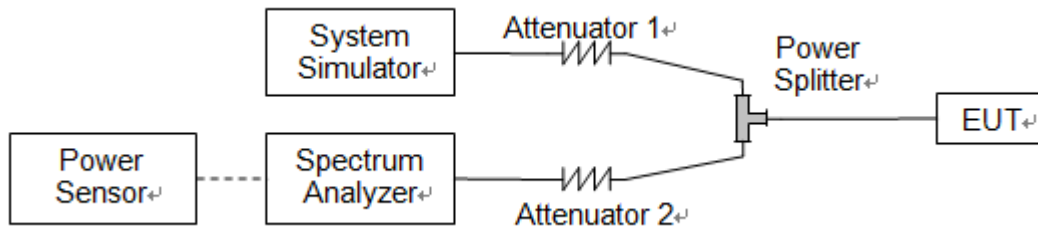
## 2.5. Band Edge

### 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 Part90 / 1.4MHz / Low CH / QPSK / 1 RB



Band26 Part90 / 1.4MHz / Low CH / QPSK / FULL RB



Band26 Part90 / 1.4MHz / High CH / QPSK / 1 RB



Band26 Part90 / 1.4MHz / High CH / QPSK / FULL RB





Band26 Part90 / 3MHz / Low CH / QPSK / 1 RB



Band26 Part90 / 3MHz / Low CH / QPSK / FULL RB



Band26 Part90 / 3MHz / High CH / QPSK / 1 RB



Band26 Part90 / 3MHz / High CH / QPSK / FULL RB



Band26 Part90 / 5MHz / Low CH / QPSK / 1 RB



Band26 Part90 / 5MHz / Low CH / QPSK / FULL RB



Band26 Part90 / 5MHz / High CH / QPSK / 1 RB



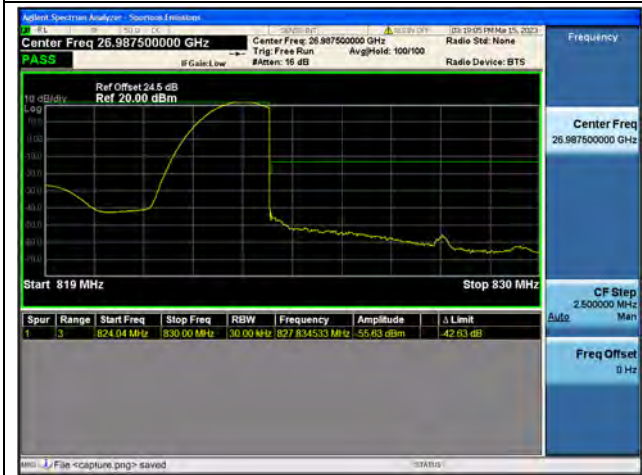
Band26 Part90 / 5MHz / High CH / QPSK / FULL RB



Band26 Part90 / 10MHz / Low CH / QPSK / 1 RB



Band26 Part90 / 10MHz / Low CH / QPSK / FULL RB



Band26 Part90 / 10MHz / High CH / QPSK / 1 RB



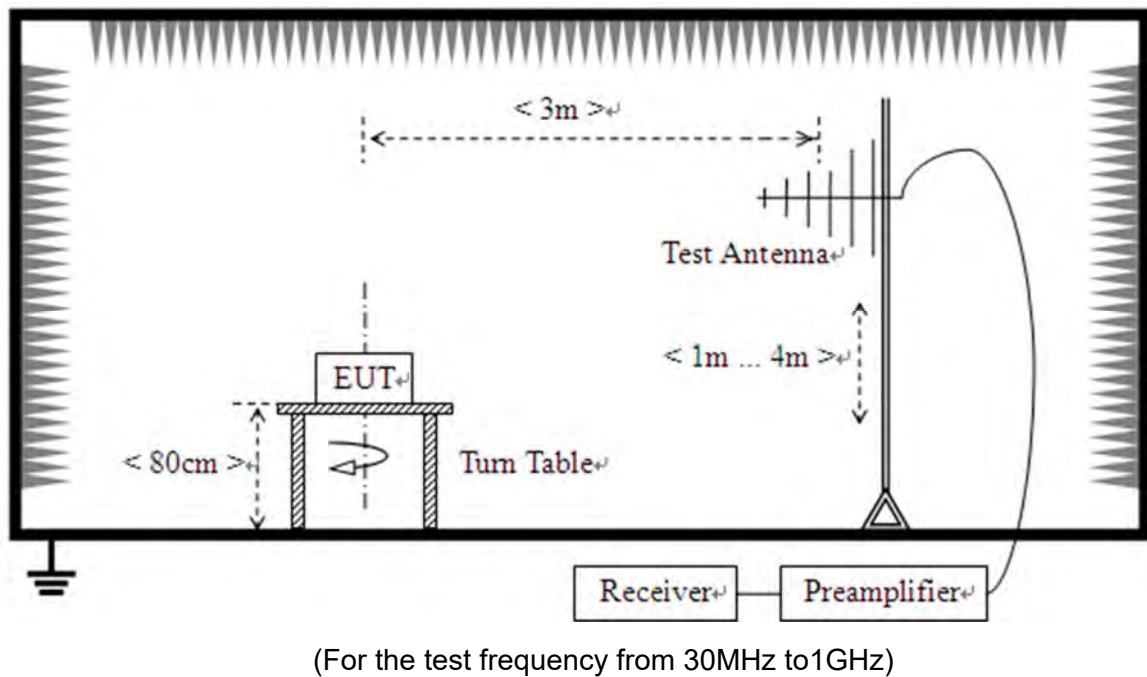
Band26 Part90 / 10MHz / High CH / QPSK / FULL RB

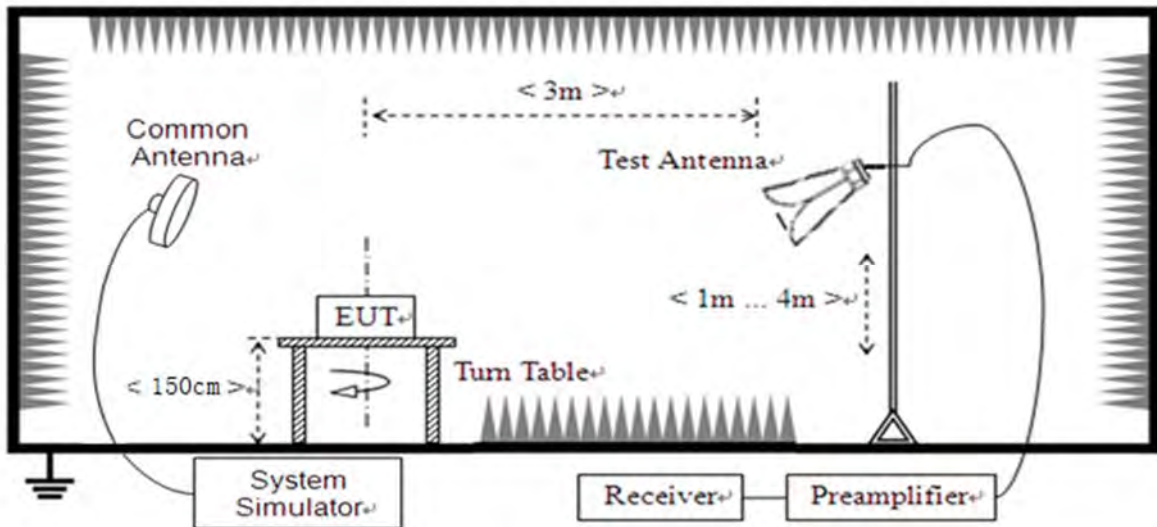
## 2.6. Radiated Spurious Emissions

### 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 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:

$$A_{\text{SUBST}} = P_{\text{SUBST\_TX}} - P_{\text{SUBST\_RX}} - L_{\text{SUBST\_CABLES}} + G_{\text{SUBST\_TX\_ANT}}$$

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

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

$P_{\text{SUBST\_TX}}$  is signal generator level,

$P_{\text{SUBST\_RX}}$  is receiver level,

$L_{\text{SUBST\_CABLES}}$  is cable losses including TX cable,

$G_{\text{SUBST\_TX\_ANT}}$  is substitution antenna gain.

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

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

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

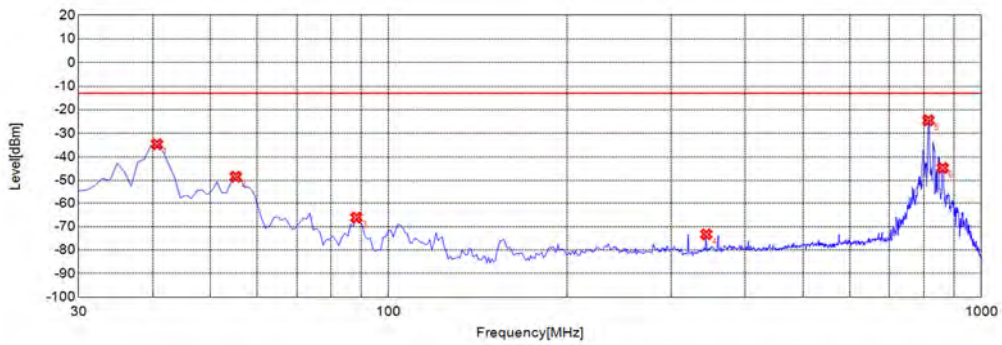
**Note2:** All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

**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.

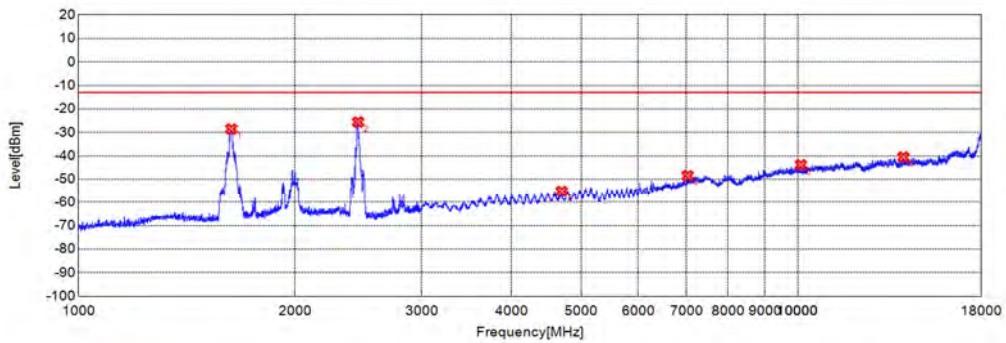
**Note 5:** The amplitude of emissions (18GHz to 10th harmonics) which are attenuated more than 20 dB below the limit are not be reported.

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



Final Test

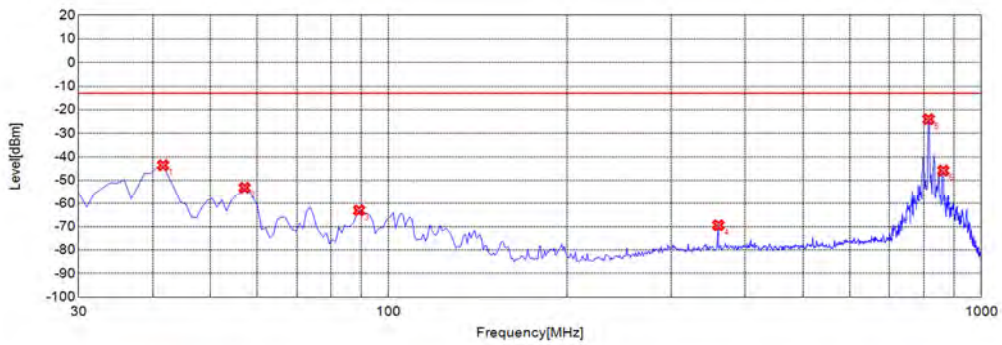
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	40.6810	-34.62	-13.00	Horizontal	PASS
2	55.2450	-48.38	-13.00	Horizontal	PASS
3	88.2580	-66.15	-13.00	Horizontal	PASS
4	343.6240	-73.29	-13.00	Horizontal	PASS
5	814.5450	-24.46	-13.00	Horizontal	N/A
6	861.1510	-44.65	-13.00	Horizontal	N/A



Final Test

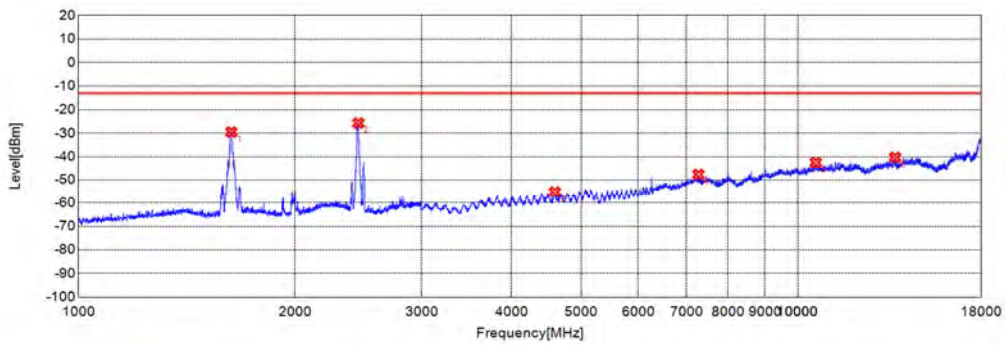
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1630.8770	-28.56	-13.00	Horizontal	PASS
2	2447.8160	-25.59	-13.00	Horizontal	PASS
3	4697.7830	-55.2	-13.00	Horizontal	PASS
4	7030.6720	-48.47	-13.00	Horizontal	PASS
5	10106.1840	-43.82	-13.00	Horizontal	PASS
6	14026.8380	-40.48	-13.00	Horizontal	PASS

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



Final Test

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

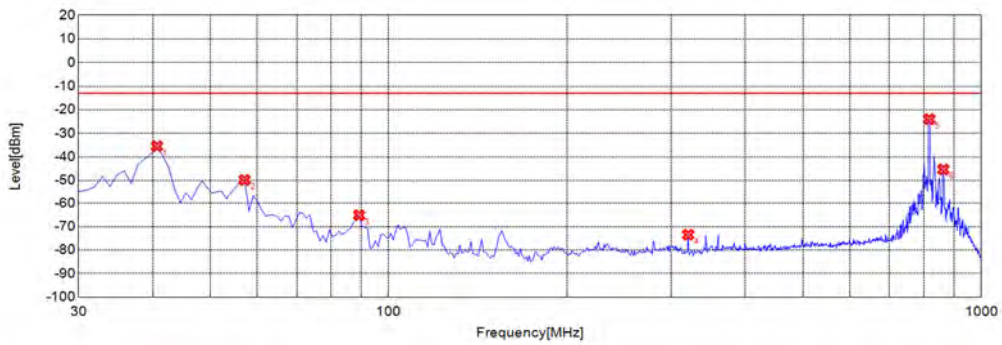


Final Test

No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1630.8770	-29.48	-13.00	Vertical	PASS
2	2449.8170	-25.63	-13.00	Vertical	PASS
3	4595.2660	-55.19	-13.00	Vertical	PASS
4	7278.2130	-47.61	-13.00	Vertical	PASS
5	10598.7660	-42.48	-13.00	Vertical	PASS
6	13659.2770	-40.29	-13.00	Vertical	PASS

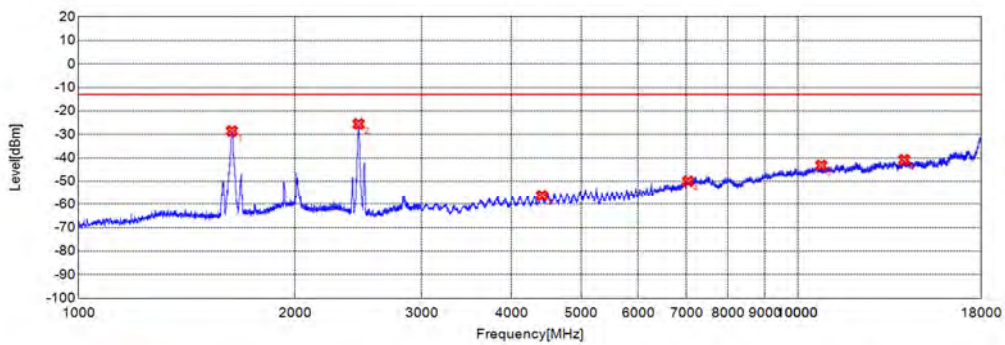


LTE Band 26, 5MHz BW, Mid Channel, QPSK



Final Test

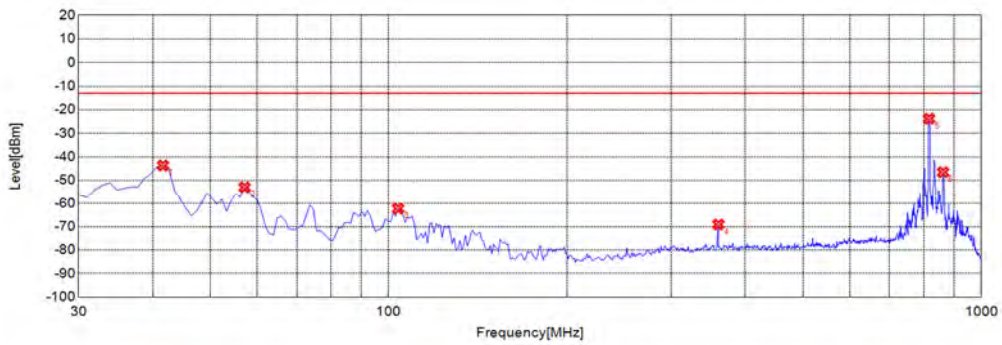
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	40.6810	-35.45	-13.00	Horizontal	PASS
2	57.1870	-49.76	-13.00	Horizontal	PASS
3	89.2290	-65.15	-13.00	Horizontal	PASS
4	320.3200	-73.45	-13.00	Horizontal	PASS
5	817.4570	-24	-13.00	Horizontal	N/A
6	863.0930	-45.28	-13.00	Horizontal	N/A



Final Test

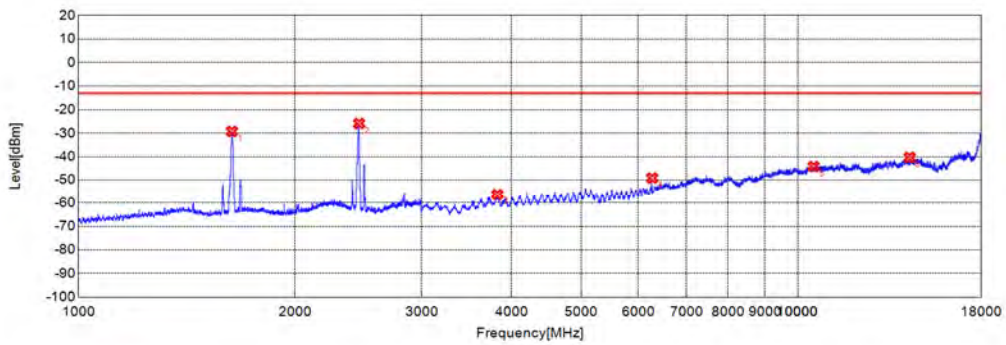
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1634.2110	-28.59	-13.00	Horizontal	PASS
2	2451.1500	-25.57	-13.00	Horizontal	PASS
3	4410.2350	-56.18	-13.00	Horizontal	PASS
4	7040.6730	-49.97	-13.00	Horizontal	PASS
5	10786.2980	-43.22	-13.00	Horizontal	PASS
6	14071.8450	-40.8	-13.00	Horizontal	PASS

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



Final Test

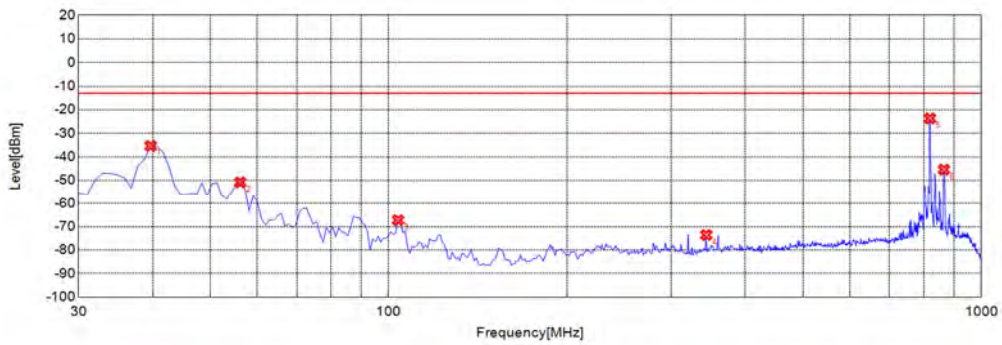
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	41.6520	-43.6	-13.00	Vertical	PASS
2	57.1870	-52.91	-13.00	Vertical	PASS
3	103.7940	-62.3	-13.00	Vertical	PASS
4	360.1300	-69.07	-13.00	Vertical	PASS
5	816.4860	-23.78	-13.00	Vertical	N/A
6	862.1220	-46.49	-13.00	Vertical	N/A



Final Test

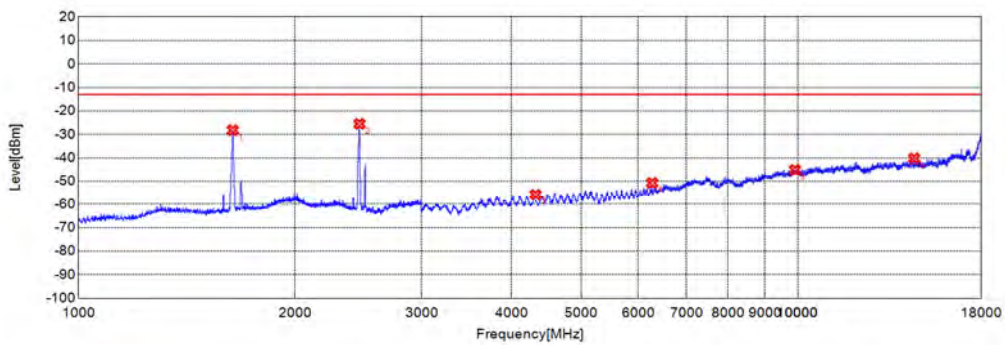
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1634.2110	-29.19	-13.00	Vertical	PASS
2	2455.8190	-25.81	-13.00	Vertical	PASS
3	3822.6370	-56.34	-13.00	Vertical	PASS
4	6275.5460	-49.16	-13.00	Vertical	PASS
5	10523.7540	-44.21	-13.00	Vertical	PASS
6	14311.8850	-40.26	-13.00	Vertical	PASS

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



Final Test

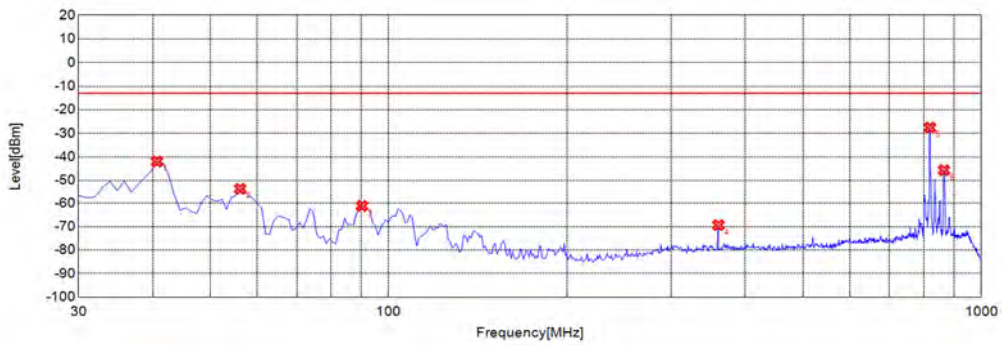
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	39.7100	-35.33	-13.00	Horizontal	PASS
2	56.2160	-50.77	-13.00	Horizontal	PASS
3	103.7940	-67.21	-13.00	Horizontal	PASS
4	343.6240	-73.56	-13.00	Horizontal	PASS
5	819.3990	-23.66	-13.00	Horizontal	N/A
6	865.0350	-45.38	-13.00	Horizontal	N/A



Final Test

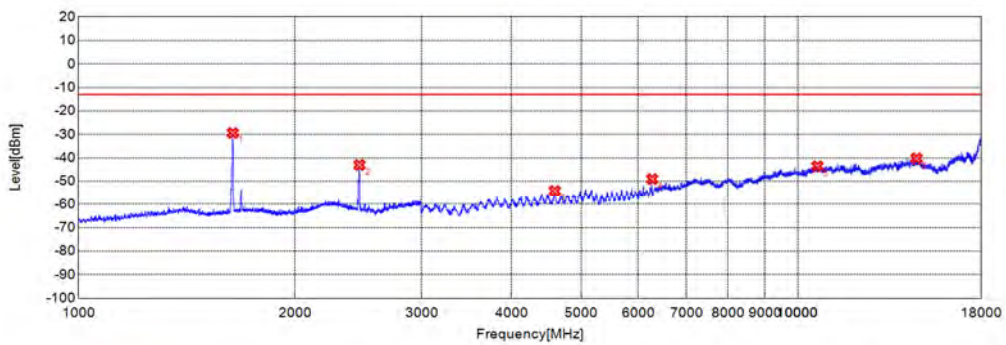
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1638.8800	-28.21	-13.00	Horizontal	PASS
2	2458.4860	-25.52	-13.00	Horizontal	PASS
3	4320.2200	-55.77	-13.00	Horizontal	PASS
4	6275.5460	-50.68	-13.00	Horizontal	PASS
5	9916.1530	-45.09	-13.00	Horizontal	PASS
6	14521.9200	-40.2	-13.00	Horizontal	PASS

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



Final Test

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



Final Test

No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1638.8800	-29.4	-13.00	Vertical	PASS
2	2458.4860	-43.01	-13.00	Vertical	PASS
3	4595.2660	-54.14	-13.00	Vertical	PASS
4	6275.5460	-49.03	-13.00	Vertical	PASS
5	10653.7760	-43.56	-13.00	Vertical	PASS
6	14634.4390	-40.21	-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	$\pm 2.22$ dB
Bandwidth	$\pm 5\%$
Conducted Spurious Emission	$\pm 2.77$ dB
Band Edge	$\pm 2.77$ dB
Equivalent Isotropic Radiated Power	$\pm 2.22$ dB
Radiated Spurious Emissions	$\pm 6$ 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

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

### 2. Identification of the Responsible Testing Location

<b>Name:</b>	Shenzhen Morlab Communications Technology Co., Ltd.
<b>Address:</b>	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 C63.10-2013 and 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	2022.07.04	2023.07.03
Communication Test Station	6200995016	MT8820C	Anritsu	2022.10.11	2023.10.10
Temperature Chamber	20171112102	HZ-2019	Dongguan Lixian Instrument Technology Co., Ltd	2022.10.10	2023.10.09

##### 4.2 List of Software Used

Description	Manufacturer	Software Version
Morlab FCC LTE Test System	MORLAB	V4.4
TS+ -[JS36-RSE]	Tonscend	V2.0.1.3

**4.3 Radiated Test Equipments**

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Due Date
System Simulator	152038	CMW500	R&S	2022.10.11	2023.10.10
Receiver	MY54130016	N9038A	Agilent	2022.07.07	2023.07.06
Test Antenna - Bi-Log	9163-519	VULB 9163	Schwarzbeck	2022.05.25	2025.05.24
Test Antenna - Horn	9120D-963	BBHA 9120D	Schwarzbeck	2022.05.23	2025.05.24
RF Coaxial Cable (DC-18GHz)	MRE001	PE330	Pasternack	2022.07.08	2023.07.07
RF Coaxial Cable (DC-18GHz)	MRE002	CLU18	Pasternack	2022.07.08	2023.07.07
RF Coaxial Cable (DC-18GHz)	MRE003	CLU18	Pasternack	2022.07.08	2023.07.07
RF Coaxial Cable (DC-40GHz)	22290045	QA360-40-K K-0.5	Qualwave	2022.07.08	2023.07.07
RF Coaxial Cable (DC-40GHz)	22290046	QA360-40-K KF-2	Qualwave	2022.07.08	2023.07.07
Preamplifier (10MHz-6GHz)	46732	S10M100L38 02	LUCIX CORP.	2022.07.08	2023.07.07
Preamplifier (2GHz-18GHz)	61171/61172	S020180L32 03	LUCIX CORP.	2022.07.08	2023.07.07
Preamplifier (18GHz-40GHz)	DS77209	DCLNA0118-40C-S	Decentest	2022.07.23	2023.07.22
Notch Filter	N/A	WRCGV -LTE B18	Wainwright	2022.07.08	2023.07.07
Notch Filter	N/A	WRCGV -LTE B26	Wainwright	2022.07.08	2023.07.07
Anechoic Chamber	N/A	9m*6m*6m	CRT	2022.05.10	2025.05.09

END OF REPORT