TEST REPORT

APPLICANT	:	JACS Solutions, Inc.
PRODUCT NAME	:	LTE Indoor CPE
MODEL NAME	:	TD0551
BRAND NAME	:	N/A
FCC ID	:	2AGCDJACSTD0551
STANDARD(S)	:	47 CFR Part 2 47 CFR Part 96
RECEIPT DATE	:	2023-01-30
TEST DATE	:	2023-02-08 to 2023-03-01
ISSUE DATE	:	2023-03-09

Edited by: Zeng Xiaoying (Rapporteur)

Approved by: Shen Junsheng (Supervisor)

MORLAB

Shenzhen Morlab Communications Technology Co., Ltd.
FL.1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555 Fax: 86-755-36698525
Http://www.morlab.cn E-mail: service@morlab.cn

DIRECTORY

Change History		
Version	**Date**	**Reason for change**
1.0	2023-03-09	First edition

1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	JACS Solutions, Inc.
Applicant Address:	809 Pinnacle Drive, Suite R, Linthicum Heights, MD 21090
Manufacturer:	JACS Solutions, Inc.
Manufacturer Address:	809 Pinnacle Drive, Suite R, Linthicum Heights, MD 21090

1.2. Equipment Under Test (EUT) Description

Product Name:	LTE Indoor CPE	
Sample No.:	2#	
Hardware Version:	V1.0	
Software Version:	TD0551_JACS_V1.0.2	
Modulation Type:	QPSK, 16QAM	
Operation Band:	Band 42 / 43 / 48	
Carrier Aggregation:	CA_48C, CA_48D (Only support downlink)	
Frequency Range:	LTE Band 42	Tx: 3550MHz–3600MHz
		Rx: 3550MHz–3600MHz
	LTE Band 43	Tx: 3600MHz–3700MHz
		Rx: 3600MHz–3700MHz
	LTE Band 48	Tx: 3550MHz–3700MHz
		Rx: 3550MHz–3700MHz
Channel Bandwidth	LTE Band 42	5MHz, 10MHz, 15MHz, 20MHz
	LTE Band 43	5MHz, 10MHz, 15MHz, 20MHz
	LTE Band 48	5MHz, 10MHz, 15MHz, 20MHz
Antenna Type:	Fixed Internal Antenna / Fixed External Antenna	
Antenna Gain:	LTE Band 42	-0.3 dBi (Internal Antenna) 0dBi(External Antenna)
	LTE Band 43	-0.2dBi (Internal Antenna) 0dBi(External Antenna)
	LTE Band 48	-0.2dBi (Internal Antenna) 0.0dBi(External Antenna)

Accessory Information:	AC Adapter 1	
	Brand Name:	Shenzhen YWK Electronics Co.,Ltd.
	Model No.:	YWK-AD120100 U
	Serial No.:	N/A
	Rated Output:	12V⎓1A
	Rated Input:	100-240V～50/60Hz, 0.3A
	Manufacturer:	Shenzhen YWK ElectronicsCo.,Ltd
	AC Adapter 2	
	Brand Name:	Huizhou Guoaotong Technology Co.,Ltd
	Model No.:	GA-1201000
	Serial No.:	N/A
	Rated Output:	12V⎓1A
	Rated Input:	100-240V～50/60Hz, 0.3A
	Manufacturer:	Huizhou Guoaotong Technology Co.,Ltd

Note 1: The frequency of LTE band 42 and band 43 can be completely covered by LTE band 48, therefore we only evaluated and tested LTE band 48 by performing full test. Test results for LTE band 48 were recorded in test 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 42	Maximum E.R.P./E.I.R.P. (W)	
BW(MHz)	QPSK	16QAM
20	0.188	0.153
15	0.188	0.153
10	0.188	0.152
5	0.187	0.152
LTE Band 43	**Maximum E.R.P./E.I.R.P. (W)**	
BW(MHz)	QPSK	16QAM
20	0.196	0.162
15	0.195	0.160
10	0.195	0.161
5	0.195	0.158

LTE Band 48	Maximum E.R.P./E.I.R.P. (W)		Emission Designator (99%OBW)	
BW(MHz)	QPSK	16QAM	QPSK	16QAM
20	0.199	0.160	18M0G7D	18M0W7D
15	0.196	0.159	13M5G7D	13M5W7D
10	0.195	0.160	8M99G7D	8M98W7D
5	0.195	0.156	4M50G7D	4M51W7D

1.4. Test Standards and Results

The objective of the report is to perform testing according to Part 2 and Part 96 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 96	CITIZENS BROADBAND RADIO SERVICE

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, 96.41(b)	Transmitter Conducted Output Power and ERP/EIRP	Mar. 01, 2023	Chen Hao Li Huaijie	PASS	No deviation
2.1049	Occupied Bandwidth	Feb. 13, 2023	Li Huaijie	PASS	No deviation
96.41(g)	Peak -Average Ratio	Feb. 13, 2023	Li Huaijie	PASS	No deviation
2.1055	Frequency Stability	Feb. 28, 2023	Li Huaijie	PASS	No deviation
2.1051, 96.41(e)	Conducted Spurious Emissions	Feb. 21, 2023	Li Huaijie	PASS	No deviation
2.1051, 96.41(e)	Band Edge	Feb. 13, 2023	Li Huaijie	PASS	No deviation
2.1051, 96.41(e)	Radiated Spurious Emissions	Feb. 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 96 Requirements

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

2.1.1. Requirement

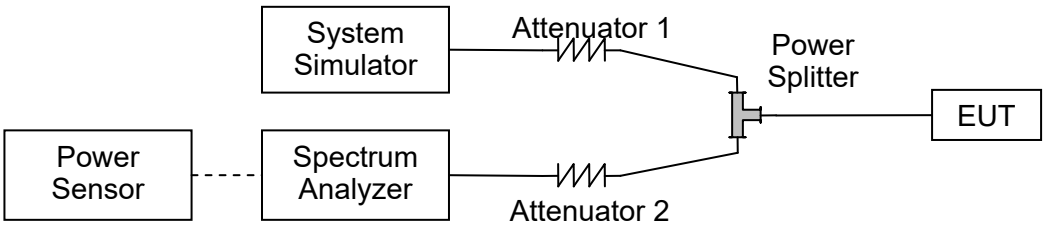
According to FCC section 2.1046(a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current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

The maximum effective isotropic radiated power (EIRP) and maximum Power Spectral Density (PSD) of any CBSD and End User Device must comply with the limits shown in the table as below paragraph.

Device	Maximum EIRP (dBm/10 megahertz)	Maximum PSD (dBm/MHz)
End User Device	23	n/a
Category A CBSD	30	20
Category B CBSD[1]	47	37

Additional requirement, the maximum effective isotropic radiated power (EIRP) limit for 15MHz bandwidth is 24.76dBm, and for 20MHz bandwidth is 26.00dBm.

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 42						
BW [MHz]	Modulation	RB Size	RB Offset	Average Power Low Ch. / Freq.	Average Power Middle Ch. / Freq.	Average Power High Ch. / Freq.
Channel				43190	43340	43490
Frequency (MHz)				3560	3575	3590
20	QPSK	1	0	22.75	22.69	22.71
20	QPSK	1	49	22.58	22.60	22.61
20	QPSK	1	99	22.51	22.58	22.56
20	QPSK	50	0	21.60	21.67	21.63
20	QPSK	50	24	21.66	21.67	21.69
20	QPSK	50	50	21.64	21.60	21.67
20	QPSK	100	0	21.58	21.62	21.60
20	16QAM	1	0	21.80	21.85	21.81
20	16QAM	1	49	21.81	21.79	21.85
20	16QAM	1	99	21.76	21.73	21.78
20	16QAM	50	0	20.70	20.75	20.73
20	16QAM	50	24	20.65	20.65	20.66
20	16QAM	50	50	20.56	20.61	20.61
20	16QAM	100	0	20.69	20.62	20.73

LTE Band 42						
BW [MHz]	Modulation	RB Size	RB Offset	Average Power Low Ch. / Freq.	Average Power Middle Ch. / Freq.	Average Power High Ch. / Freq.
Channel				43165	43340	43515
Frequency (MHz)				3557.5	3575	3592.5
15	QPSK	1	0	22.74	22.64	22.70
15	QPSK	1	37	22.57	22.59	22.60
15	QPSK	1	74	22.46	22.57	22.53
15	QPSK	36	0	21.58	21.64	21.60
15	QPSK	36	20	21.61	21.62	21.67
15	QPSK	36	39	21.59	21.56	21.63
15	QPSK	75	0	21.57	21.61	21.59
15	16QAM	1	0	21.75	21.84	21.76
15	16QAM	1	37	21.79	21.77	21.82
15	16QAM	1	74	21.73	21.69	21.74
15	16QAM	36	0	20.68	20.71	20.69
15	16QAM	36	20	20.64	20.60	20.65
15	16QAM	36	39	20.55	20.60	20.56
15	16QAM	75	0	20.64	20.61	20.70

LTE Band 42						
BW [MHz]	Modulation	RB Size	RB Offset	Average Power Low Ch. / Freq.	Average Power Middle Ch. / Freq.	Average Power High Ch. / Freq.
Channel				43140	43340	43540
Frequency (MHz)				3555	3575	3595
10	QPSK		0	22.74	22.67	22.70
10	QPSK	1	25	22.53	22.57	22.57
10	QPSK	1	49	22.47	22.56	22.53
10	QPSK	25	0	21.56	21.65	21.62
10	QPSK	25	12	21.63	21.66	21.65
10	QPSK	25	25	21.60	21.58	21.62
10	QPSK	50	0	21.53	21.59	21.56
10	16QAM	1	0	21.78	21.80	21.77
10	16QAM	1	25	21.77	21.74	21.82
10	16QAM	1	49	21.74	21.71	21.77
10	16QAM	25	0	20.69	20.73	20.68
10	16QAM	25	12	20.63	20.60	20.61
10	16QAM	25	25	20.54	20.56	20.56
10	16QAM	50	0	20.64	20.58	20.70

LTE Band 42						
BW [MHz]	Modulation	RB Size	RB Offset	Average Power Low Ch. / Freq.	Average Power Middle Ch. / Freq.	Average Power High Ch. / Freq.
Channel				43115	43340	43565
Frequency (MHz)				3552.5	3575	3597.5
5	QPSK	1	0	22.73	22.67	22.70
5	QPSK	1	12	22.54	22.58	22.58
5	QPSK	1	24	22.50	22.53	22.54
5	QPSK	12	0	21.57	21.65	21.61
5	QPSK	12	7	21.61	21.64	21.68
5	QPSK	12	13	21.61	21.58	21.64
5	QPSK	25	0	21.54	21.58	21.59
5	16QAM	1	0	21.79	21.83	21.78
5	16QAM	1	12	21.80	21.78	21.82
5	16QAM	1	24	21.72	21.69	21.76
5	16QAM	12	0	20.68	20.73	20.69
5	16QAM	12	7	20.61	20.64	20.61
5	16QAM	12	13	20.55	20.56	20.58
5	16QAM	25	0	20.67	20.57	20.71

LTE Band 43						
BW [MHz]	Modulation	RB Size	RB Offset	Average Power Low Ch. / Freq.	Average Power Middle Ch. / Freq.	Average Power High Ch. / Freq.
Channel				43690	44090	44490
Frequency (MHz)				3610	3650	3690
20	QPSK	1	0	22.92	22.70	22.68
20	QPSK	1	49	22.79	22.68	22.64
20	QPSK	1	99	22.68	22.49	22.60
20	QPSK	50	0	21.88	21.71	21.72
20	QPSK	50	24	21.85	21.65	21.66
20	QPSK	50	50	21.73	21.53	21.69
20	QPSK	100	0	21.74	21.57	21.67
20	16QAM	1	0	22.09	21.97	21.90
20	16QAM	1	49	22.02	21.89	21.82
20	16QAM	1	99	21.85	21.70	21.75
20	16QAM	50	0	20.92	20.77	20.70
20	16QAM	50	24	20.91	20.78	20.71
20	16QAM	50	50	20.74	20.59	20.71
20	16QAM	100	0	20.80	20.65	20.73

LTE Band 43						
BW [MHz]	Modulation	RB Size	RB Offset	Average Power Low Ch. / Freq.	Average Power Middle Ch. / Freq.	Average Power High Ch. / Freq.
Channel				43665	44090	445151
Frequency (MHz)				3607.5	3650	3692.5
15	QPSK	1	0	22.91	22.68	22.64
15	QPSK	1	37	22.74	22.59	22.62
15	QPSK	1	74	22.59	22.47	22.57
15	QPSK	36	0	21.86	21.68	21.69
15	QPSK	36	20	21.78	21.61	21.62
15	QPSK	36	39	21.72	21.46	21.67
15	QPSK	75	0	21.66	21.49	21.63
15	16QAM	1	0	22.05	21.94	21.85
15	16QAM	1	37	21.93	21.86	21.80
15	16QAM	1	74	21.84	21.65	21.74
15	16QAM	36	0	20.83	20.76	20.68
15	16QAM	36	20	20.90	20.74	20.66
15	16QAM	36	39	20.70	20.54	20.67
15	16QAM	75	0	20.71	20.58	20.68

LTE Band 43						
BW [MHz]	Modulation	RB Size	RB Offset	Average Power Low Ch. / Freq.	Average Power Middle Ch. / Freq.	Average Power High Ch. / Freq.
Channel				43640	44090	44540
Frequency (MHz)				3605	3650	3695
10	QPSK	1	0	22.90	22.63	22.63
10	QPSK	1	25	22.78	22.65	22.60
10	QPSK	1	49	22.62	22.42	22.55
10	QPSK	25	0	21.84	21.70	21.68
10	QPSK	25	12	21.76	21.56	21.62
10	QPSK	25	25	21.72	21.44	21.68
10	QPSK	50	0	21.70	21.48	21.65
10	16QAM	1	0	22.08	21.92	21.89
10	16QAM	1	25	21.96	21.80	21.81
10	16QAM	1	49	21.84	21.64	21.71
10	16QAM	25	0	20.86	20.67	20.65
10	16QAM	25	12	20.85	20.77	20.69
10	16QAM	25	25	20.65	20.55	20.68
10	16QAM	50	0	20.77	20.59	20.72

LTE Band 43						
BW [MHz]	Modulation	RB Size	RB Offset	Average Power Low Ch. / Freq.	Average Power Middle Ch. / Freq.	Average Power High Ch. / Freq.
Channel				43615	44090	44565
Frequency (MHz)				3602.5	3650	3697.5
5	QPSK	1	0	22.91	22.68	22.63
5	QPSK	1	12	22.73	22.59	22.59
5	QPSK	1	24	22.62	22.40	22.57
5	QPSK	12	0	21.81	21.70	21.69
5	QPSK	12	7	21.84	21.55	21.62
5	QPSK	12	13	21.69	21.52	21.67
5	QPSK	25	0	21.73	21.53	21.65
5	16QAM	1	0	21.99	21.88	21.89
5	16QAM	1	12	21.98	21.79	21.77
5	16QAM	1	24	21.78	21.64	21.73
5	16QAM	12	0	20.89	20.67	20.68
5	16QAM	12	7	20.87	20.73	20.66
5	16QAM	12	13	20.70	20.54	20.66
5	16QAM	25	0	20.79	20.59	20.69

LTE Band 48						
BW [MHz]	Modulation	RB Size	RB Offset	Average Power Low Ch. / Freq.	Average Power Middle Ch. / Freq.	Average Power High Ch. / Freq.
Channel				55340	55990	56640
Frequency (MHz)				3560	3625	3690
20	QPSK	1	0	22.83	22.88	22.75
20	QPSK	1	49	22.72	22.73	22.69
20	QPSK	1	99	22.57	22.62	22.61
20	QPSK	50	0	21.66	21.71	21.66
20	QPSK	50	24	21.65	21.70	21.62
20	QPSK	50	50	21.66	21.67	21.65
20	QPSK	100	0	21.63	21.69	21.60
20	16QAM	1	0	21.85	21.94	21.87
20	16QAM	1	49	21.80	21.88	21.81
20	16QAM	1	99	21.72	21.76	21.72
20	16QAM	50	0	20.75	20.78	20.69
20	16QAM	50	24	20.75	20.76	20.75
20	16QAM	50	50	20.61	20.69	20.61
20	16QAM	100	0	20.66	20.74	20.73

LTE Band 48						
BW [MHz]	Modulation	RB Size	RB Offset	Average Power Low Ch. / Freq.	Average Power Middle Ch. / Freq.	Average Power High Ch. / Freq.
Channel				55315	55990	56665
Frequency (MHz)				3557.5	3625	3692.5
15	QPSK	1	0	22.82	22.78	22.68
15	QPSK	1	37	22.71	22.63	22.59
15	QPSK	1	74	22.55	22.61	22.58
15	QPSK	36	0	21.61	21.70	21.58
15	QPSK	36	20	21.57	21.68	21.53
15	QPSK	36	39	21.63	21.63	21.58
15	QPSK	75	0	21.53	21.60	21.59
15	16QAM	1	0	21.75	21.92	21.85
15	16QAM	1	37	21.79	21.85	21.76
15	16QAM	1	74	21.71	21.69	21.65
15	16QAM	36	0	20.68	20.76	20.67
15	16QAM	36	20	20.68	20.69	20.68
15	16QAM	36	39	20.57	20.60	20.57
15	16QAM	75	0	20.62	20.73	20.64

LTE Band 48						
BW [MHz]	Modulation	RB Size	RB Offset	Average Power Low Ch. / Freq.	Average Power Middle Ch. / Freq.	Average Power High Ch. / Freq.
Channel				55290	55990	56690
Frequency (MHz)				3555	3625	3695
10	QPSK		0	22.74	22.80	22.69
10	QPSK	1	25	22.64	22.70	22.61
10	QPSK	1	49	22.49	22.57	22.56
10	QPSK	25	0	21.65	21.70	21.64
10	QPSK	25	12	21.61	21.68	21.58
10	QPSK	25	25	21.56	21.57	21.63
10	QPSK	50	0	21.55	21.67	21.58
10	16QAM	1	0	21.79	21.93	21.77
10	16QAM	1	25	21.74	21.87	21.80
10	16QAM	1	49	21.71	21.71	21.69
10	16QAM	25	0	20.65	20.69	20.61
10	16QAM	25	12	20.74	20.67	20.68
10	16QAM	25	25	20.57	20.68	20.52
10	16QAM	50	0	20.60	20.68	20.66

LTE Band 48						
BW [MHz]	Modulation	RB Size	RB Offset	Average Power Low Ch. / Freq.	Average Power Middle Ch. / Freq.	Average Power High Ch. / Freq.
Channel				55265	55990	56175
Frequency (MHz)				3552.5	3625	3697.5
5	QPSK	1	0	22.80	22.78	22.72
5	QPSK	1	12	22.62	22.64	22.62
5	QPSK	1	24	22.48	22.55	22.60
5	QPSK	12	0	21.64	21.69	21.64
5	QPSK	12	7	21.64	21.61	21.61
5	QPSK	12	13	21.63	21.66	21.59
5	QPSK	25	0	21.53	21.64	21.52
5	16QAM	1	0	21.78	21.84	21.77
5	16QAM	1	12	21.76	21.82	21.74
5	16QAM	1	24	21.70	21.70	21.66
5	16QAM	12	0	20.72	20.74	20.62
5	16QAM	12	7	20.68	20.70	20.65
5	16QAM	12	13	20.52	20.63	20.59
5	16QAM	25	0	20.63	20.64	20.72

Effective Radiated Power and Effective Isotropic Radiated Power:

LTE Band 42				Measured E.I.R.P.					
BW [MHz]	Modulation	RB Size	RB Offset	Low Ch. / Freq.		Middle Ch. / Freq.		High Ch. / Freq.	
Channel				43190		43340		43490	
Frequency (MHz)				3560		3575		3590	
				dBm	W	dBm	W	dBm	W
20	QPSK	1	0	22.75	0.188	22.69	0.186	22.71	0.187
20	QPSK	1	49	22.58	0.181	22.60	0.182	22.61	0.182
20	QPSK	1	99	22.51	0.178	22.58	0.181	22.56	0.180
20	QPSK	50	0	21.60	0.145	21.67	0.147	21.63	0.146
20	QPSK	50	24	21.66	0.147	21.67	0.147	21.69	0.148
20	QPSK	50	50	21.64	0.146	21.60	0.145	21.67	0.147
20	QPSK	100	0	21.58	0.144	21.62	0.145	21.60	0.145
20	16QAM	1	0	21.80	0.151	21.85	0.153	21.81	0.152
20	16QAM	1	49	21.81	0.152	21.79	0.151	21.85	0.153
20	16QAM	1	99	21.76	0.150	21.73	0.149	21.78	0.151
20	16QAM	50	0	20.70	0.117	20.75	0.119	20.73	0.118
20	16QAM	50	24	20.65	0.116	20.65	0.116	20.66	0.116
20	16QAM	50	50	20.56	0.114	20.61	0.115	20.61	0.115
20	16QAM	100	0	20.69	0.117	20.62	0.115	20.73	0.118

LTE Band 42				Measured E.I.R.P.					
BW [MHz]	Modulation	RB Size	RB Offset	Low Ch. / Freq.		Middle Ch. / Freq.		High Ch. / Freq.	
Channel				43165		43340		43515	
Frequency (MHz)				3557.5		3575		3592.5	
				dBm	W	dBm	W	dBm	W
15	QPSK	1	0	22.74	0.188	22.64	0.184	22.70	0.186
15	QPSK	1	37	22.57	0.181	22.59	0.182	22.60	0.182
15	QPSK	1	74	22.46	0.176	22.57	0.181	22.53	0.179
15	QPSK	36	0	21.58	0.144	21.64	0.146	21.60	0.145
15	QPSK	36	20	21.61	0.145	21.62	0.145	21.67	0.147
15	QPSK	36	39	21.59	0.144	21.56	0.143	21.63	0.146
15	QPSK	75	0	21.57	0.144	21.61	0.145	21.59	0.144
15	16QAM	1	0	21.75	0.150	21.84	0.153	21.76	0.150
15	16QAM	1	37	21.79	0.151	21.77	0.150	21.82	0.152
15	16QAM	1	74	21.73	0.149	21.69	0.148	21.74	0.149
15	16QAM	36	0	20.68	0.117	20.71	0.118	20.69	0.117
15	16QAM	36	20	20.64	0.116	20.60	0.115	20.65	0.116
15	16QAM	36	39	20.55	0.114	20.60	0.115	20.56	0.114
15	16QAM	75	0	20.64	0.116	20.61	0.115	20.70	0.117

LTE Band 42				Measured E.I.R.P.					
BW [MHz]	Modulation	RB Size	RB Offset	Low Ch. / Freq.		Middle Ch. / Freq.		High Ch. / Freq.	
Channel				43140		43340		43540	
Frequency (MHz)				3555		3575		3595	
				dBm	W	dBm	W	dBm	W
10	QPSK	1	0	22.74	0.188	22.67	0.185	22.70	0.186
10	QPSK	1	25	22.53	0.179	22.57	0.181	22.57	0.181
10	QPSK	1	49	22.47	0.177	22.56	0.180	22.53	0.179
10	QPSK	25	0	21.56	0.143	21.65	0.146	21.62	0.145
10	QPSK	25	12	21.63	0.146	21.66	0.147	21.65	0.146
10	QPSK	25	25	21.60	0.145	21.58	0.144	21.62	0.145
10	QPSK	50	0	21.53	0.142	21.59	0.144	21.56	0.143
10	16QAM	1	0	21.78	0.151	21.80	0.151	21.77	0.150
10	16QAM	1	25	21.77	0.150	21.74	0.149	21.82	0.152
10	16QAM	1	49	21.74	0.149	21.71	0.148	21.77	0.150
10	16QAM	25	0	20.69	0.117	20.73	0.118	20.68	0.117
10	16QAM	25	12	20.63	0.116	20.60	0.115	20.61	0.115
10	16QAM	25	25	20.54	0.113	20.56	0.114	20.56	0.114
10	16QAM	50	0	20.64	0.116	20.58	0.114	20.70	0.117

LTE Band 42				Measured E.I.R.P.					
BW [MHz]	Modulation	RB Size	RB Offset	Low Ch. / Freq.		Middle Ch. / Freq.		High Ch. / Freq.	
Channel				43115		43340		43565	
Frequency (MHz)				3552.5		3575		3597.5	
				dBm	W	dBm	W	dBm	W
5	QPSK	1	0	22.73	0.187	22.67	0.185	22.70	0.186
5	QPSK	1	12	22.54	0.179	22.58	0.181	22.58	0.181
5	QPSK	1	24	22.50	0.178	22.53	0.179	22.54	0.179
5	QPSK	12	0	21.57	0.144	21.65	0.146	21.61	0.145
5	QPSK	12	7	21.61	0.145	21.64	0.146	21.68	0.147
5	QPSK	12	13	21.61	0.145	21.58	0.144	21.64	0.146
5	QPSK	25	0	21.54	0.143	21.58	0.144	21.59	0.144
5	16QAM	1	0	21.79	0.151	21.83	0.152	21.78	0.151
5	16QAM	1	12	21.80	0.151	21.78	0.151	21.82	0.152
5	16QAM	1	24	21.72	0.149	21.69	0.148	21.76	0.150
5	16QAM	12	0	20.68	0.117	20.73	0.118	20.69	0.117
5	16QAM	12	7	20.61	0.115	20.64	0.116	20.61	0.115
5	16QAM	12	13	20.55	0.114	20.56	0.114	20.58	0.114
5	16QAM	25	0	20.67	0.117	20.57	0.114	20.71	0.118

LTE Band 43				Measured E.I.R.P.					
BW [MHz]	Modulation	RB Size	RB Offset	Low Ch. / Freq.		Middle Ch. / Freq.		High Ch. / Freq.	
Channel				43690		44090		44490	
Frequency (MHz)				3610		3650		3690	
				dBm	W	dBm	W	dBm	W
20	QPSK	1	0	22.92	0.196	22.70	0.186	22.68	0.185
20	QPSK	1	49	22.79	0.190	22.68	0.185	22.64	0.184
20	QPSK	1	99	22.68	0.185	22.49	0.177	22.60	0.182
20	QPSK	50	0	21.88	0.154	21.71	0.148	21.72	0.149
20	QPSK	50	24	21.85	0.153	21.65	0.146	21.66	0.147
20	QPSK	50	50	21.73	0.149	21.53	0.142	21.69	0.148
20	QPSK	100	0	21.74	0.149	21.57	0.144	21.67	0.147
20	16QAM	1	0	22.09	0.162	21.97	0.157	21.90	0.155
20	16QAM	1	49	22.02	0.159	21.89	0.155	21.82	0.152
20	16QAM	1	99	21.85	0.153	21.70	0.148	21.75	0.150
20	16QAM	50	0	20.92	0.124	20.77	0.119	20.70	0.117
20	16QAM	50	24	20.91	0.123	20.78	0.120	20.71	0.118
20	16QAM	50	50	20.74	0.119	20.59	0.115	20.71	0.118
20	16QAM	100	0	20.80	0.120	20.65	0.116	20.73	0.118

LTE Band 43				Measured E.I.R.P.					
BW [MHz]	Modulation	RB Size	RB Offset	Low Ch. / Freq.		Middle Ch. / Freq.		High Ch. / Freq.	
Channel				43665		44090		445151	
Frequency (MHz)				3607.5		3650		3692.5	
				dBm	W	dBm	W	dBm	W
15	QPSK	1	0	22.91	0.195	22.68	0.185	22.64	0.184
15	QPSK	1	37	22.74	0.188	22.59	0.182	22.62	0.183
15	QPSK	1	74	22.59	0.182	22.47	0.177	22.57	0.181
15	QPSK	36	0	21.86	0.153	21.68	0.147	21.69	0.148
15	QPSK	36	20	21.78	0.151	21.61	0.145	21.62	0.145
15	QPSK	36	39	21.72	0.149	21.46	0.140	21.67	0.147
15	QPSK	75	0	21.66	0.147	21.49	0.141	21.63	0.146
15	16QAM	1	0	22.05	0.160	21.94	0.156	21.85	0.153
15	16QAM	1	37	21.93	0.156	21.86	0.153	21.80	0.151
15	16QAM	1	74	21.84	0.153	21.65	0.146	21.74	0.149
15	16QAM	36	0	20.83	0.121	20.76	0.119	20.68	0.117
15	16QAM	36	20	20.90	0.123	20.74	0.119	20.66	0.116
15	16QAM	36	39	20.70	0.117	20.54	0.113	20.67	0.117
15	16QAM	75	0	20.71	0.118	20.58	0.114	20.68	0.117

LTE Band 43				Measured E.I.R.P.					
BW [MHz]	Modulation	RB Size	RB Offset	Low Ch. / Freq.		Middle Ch. / Freq.		High Ch. / Freq.	
Channel				43640		44090		44540	
Frequency (MHz)				3605		3650		3695	
				dBm	W	dBm	W	dBm	W
10	QPSK	1	0	22.90	0.195	22.63	0.183	22.63	0.183
10	QPSK	1	25	22.78	0.190	22.65	0.184	22.60	0.182
10	QPSK	1	49	22.62	0.183	22.42	0.175	22.55	0.180
10	QPSK	25	0	21.84	0.153	21.70	0.148	21.68	0.147
10	QPSK	25	12	21.76	0.150	21.56	0.143	21.62	0.145
10	QPSK	25	25	21.72	0.149	21.44	0.139	21.68	0.147
10	QPSK	50	0	21.70	0.148	21.48	0.141	21.65	0.146
10	16QAM	1	0	22.08	0.161	21.92	0.156	21.89	0.155
10	16QAM	1	25	21.96	0.157	21.80	0.151	21.81	0.152
10	16QAM	1	49	21.84	0.153	21.64	0.146	21.71	0.148
10	16QAM	25	0	20.86	0.122	20.67	0.117	20.65	0.116
10	16QAM	25	12	20.85	0.122	20.77	0.119	20.69	0.117
10	16QAM	25	25	20.65	0.116	20.55	0.114	20.68	0.117
10	16QAM	50	0	20.77	0.119	20.59	0.115	20.72	0.118

LTE Band 43				Measured E.I.R.P.					
BW [MHz]	Modulation	RB Size	RB Offset	Low Ch. / Freq.		Middle Ch. / Freq.		High Ch. / Freq.	
Channel				43615		44090		44565	
Frequency (MHz)				3602.5		3650		3697.5	
				dBm	W	dBm	W	dBm	W
5	QPSK	1	0	22.91	0.195	22.68	0.185	22.63	0.183
5	QPSK	1	12	22.73	0.187	22.59	0.182	22.59	0.182
5	QPSK	1	24	22.62	0.183	22.40	0.174	22.57	0.181
5	QPSK	12	0	21.81	0.152	21.70	0.148	21.69	0.148
5	QPSK	12	7	21.84	0.153	21.55	0.143	21.62	0.145
5	QPSK	12	13	21.69	0.148	21.52	0.142	21.67	0.147
5	QPSK	25	0	21.73	0.149	21.53	0.142	21.65	0.146
5	16QAM	1	0	21.99	0.158	21.88	0.154	21.89	0.155
5	16QAM	1	12	21.98	0.158	21.79	0.151	21.77	0.150
5	16QAM	1	24	21.78	0.151	21.64	0.146	21.73	0.149
5	16QAM	12	0	20.89	0.123	20.67	0.117	20.68	0.117
5	16QAM	12	7	20.87	0.122	20.73	0.118	20.66	0.116
5	16QAM	12	13	20.70	0.117	20.54	0.113	20.66	0.116
5	16QAM	25	0	20.79	0.120	20.59	0.115	20.69	0.117

LTE Band 48				Measured E.I.R.P.					
BW [MHz]	Modulation	RB Size	RB Offset	Low Ch. / Freq.		Middle Ch. / Freq.		High Ch. / Freq.	
Channel				55340		55990		56640	
Frequency (MHz)				3560		3625		3690	
				dBm	W	dBm	W	dBm	W
20	QPSK	1	0	22.93	0.196	22.98	0.199	22.85	0.193
20	QPSK	1	49	22.82	0.191	22.83	0.192	22.79	0.190
20	QPSK	1	99	22.67	0.185	22.72	0.187	22.71	0.187
20	QPSK	50	0	21.76	0.150	21.81	0.152	21.76	0.150
20	QPSK	50	24	21.75	0.150	21.80	0.151	21.72	0.149
20	QPSK	50	50	21.76	0.150	21.77	0.150	21.75	0.150
20	QPSK	100	0	21.73	0.149	21.79	0.151	21.70	0.148
20	16QAM	1	0	21.95	0.157	22.04	0.160	21.97	0.157
20	16QAM	1	49	21.90	0.155	21.98	0.158	21.91	0.155
20	16QAM	1	99	21.82	0.152	21.86	0.153	21.82	0.152
20	16QAM	50	0	20.85	0.122	20.88	0.122	20.79	0.120
20	16QAM	50	24	20.85	0.122	20.86	0.122	20.85	0.122
20	16QAM	50	50	20.71	0.118	20.79	0.120	20.71	0.118
20	16QAM	100	0	20.76	0.119	20.84	0.121	20.83	0.121

LTE Band 48				Measured E.I.R.P.					
BW [MHz]	Modulation	RB Size	RB Offset	Low Ch. / Freq.		Middle Ch. / Freq.		High Ch. / Freq.	
Channel				55315		55990		56665	
Frequency (MHz)				3557.5		3625		3692.5	
				dBm	W	dBm	W	dBm	W
15	QPSK	1	0	22.92	0.196	22.88	0.194	22.78	0.190
15	QPSK	1	37	22.81	0.191	22.73	0.187	22.69	0.186
15	QPSK	1	74	22.65	0.184	22.71	0.187	22.68	0.185
15	QPSK	36	0	21.71	0.148	21.80	0.151	21.68	0.147
15	QPSK	36	20	21.67	0.147	21.78	0.151	21.63	0.146
15	QPSK	36	39	21.73	0.149	21.73	0.149	21.68	0.147
15	QPSK	75	0	21.63	0.146	21.70	0.148	21.69	0.148
15	16QAM	1	0	21.85	0.153	22.02	0.159	21.95	0.157
15	16QAM	1	37	21.89	0.155	21.95	0.157	21.86	0.153
15	16QAM	1	74	21.81	0.152	21.79	0.151	21.75	0.150
15	16QAM	36	0	20.78	0.120	20.86	0.122	20.77	0.119
15	16QAM	36	20	20.78	0.120	20.79	0.120	20.78	0.120
15	16QAM	36	39	20.67	0.117	20.70	0.117	20.67	0.117
15	16QAM	75	0	20.72	0.118	20.83	0.121	20.74	0.119

LTE Band 48				Measured E.I.R.P.					
BW [MHz]	Modulation	RB Size	RB Offset	Low Ch. / Freq.		Middle Ch. / Freq.		High Ch. / Freq.	
Channel				55290		55990		56690	
Frequency (MHz)				3555		3625		3695	
				dBm	W	dBm	W	dBm	W
10	QPSK	1	0	22.84	0.192	22.90	0.195	22.79	0.190
10	QPSK	1	25	22.74	0.188	22.80	0.191	22.71	0.187
10	QPSK	1	49	22.59	0.182	22.67	0.185	22.66	0.185
10	QPSK	25	0	21.75	0.150	21.80	0.151	21.74	0.149
10	QPSK	25	12	21.71	0.148	21.78	0.151	21.68	0.147
10	QPSK	25	25	21.66	0.147	21.67	0.147	21.73	0.149
10	QPSK	50	0	21.65	0.146	21.77	0.150	21.68	0.147
10	16QAM	1	0	21.89	0.155	22.03	0.160	21.87	0.154
10	16QAM	1	25	21.84	0.153	21.97	0.157	21.90	0.155
10	16QAM	1	49	21.81	0.152	21.81	0.152	21.79	0.151
10	16QAM	25	0	20.75	0.119	20.79	0.120	20.71	0.118
10	16QAM	25	12	20.84	0.121	20.77	0.119	20.78	0.120
10	16QAM	25	25	20.67	0.117	20.78	0.120	20.62	0.115
10	16QAM	50	0	20.70	0.117	20.78	0.120	20.76	0.119

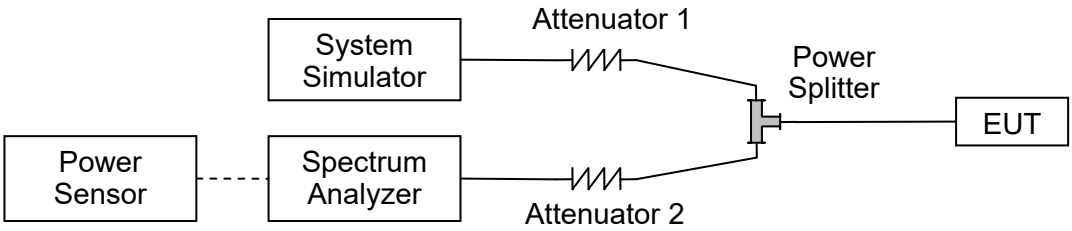
LTE Band 48				Measured E.I.R.P.					
BW [MHz]	Modulation	RB Size	RB Offset	Low Ch. / Freq.		Middle Ch. / Freq.		High Ch. / Freq.	
Channel				55265		55990		56175	
Frequency (MHz)				3552.5		3625		3697.5	
				dBm	W	dBm	W	dBm	W
5	QPSK	1	0	22.90	0.195	22.88	0.194	22.82	0.191
5	QPSK	1	12	22.72	0.187	22.74	0.188	22.72	0.187
5	QPSK	1	24	22.58	0.181	22.65	0.184	22.70	0.186
5	QPSK	12	0	21.74	0.149	21.79	0.151	21.74	0.149
5	QPSK	12	7	21.74	0.149	21.71	0.148	21.71	0.148
5	QPSK	12	13	21.73	0.149	21.76	0.150	21.69	0.148
5	QPSK	25	0	21.63	0.146	21.74	0.149	21.62	0.145
5	16QAM	1	0	21.88	0.154	21.94	0.156	21.87	0.154
5	16QAM	1	12	21.86	0.153	21.92	0.156	21.84	0.153
5	16QAM	1	24	21.80	0.151	21.80	0.151	21.76	0.150
5	16QAM	12	0	20.82	0.121	20.84	0.121	20.72	0.118
5	16QAM	12	7	20.78	0.120	20.80	0.120	20.75	0.119
5	16QAM	12	13	20.62	0.115	20.73	0.118	20.69	0.117
5	16QAM	25	0	20.73	0.118	20.74	0.119	20.82	0.121

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



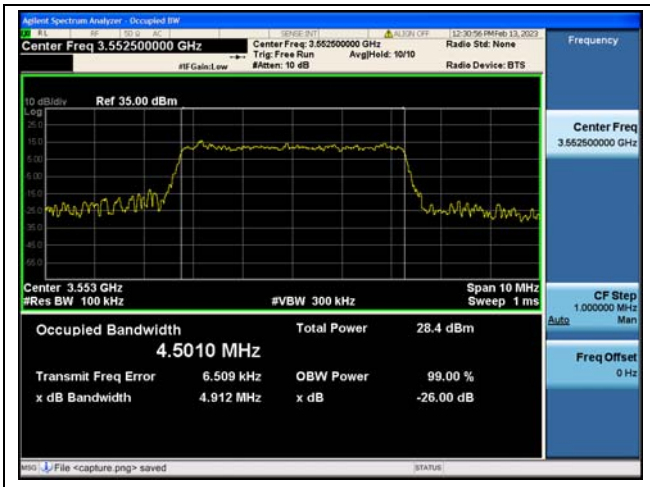
The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum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

2.2.3.Test procedure

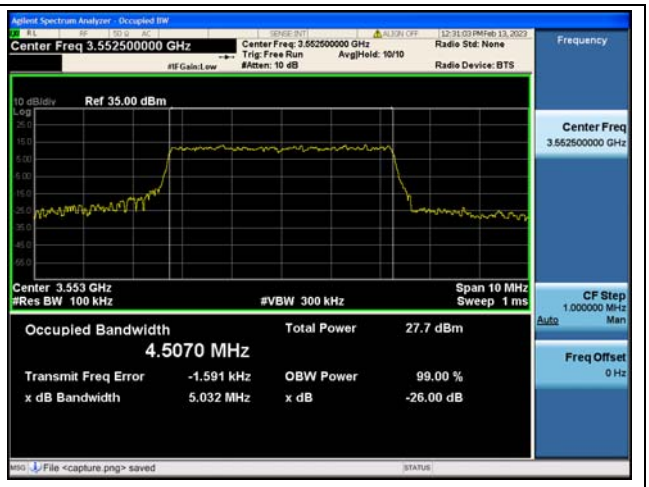
KDB 971168 D01v03 Section 4.1 and ANSI/TIA-603-E-2016.

2.2.4.Test Result

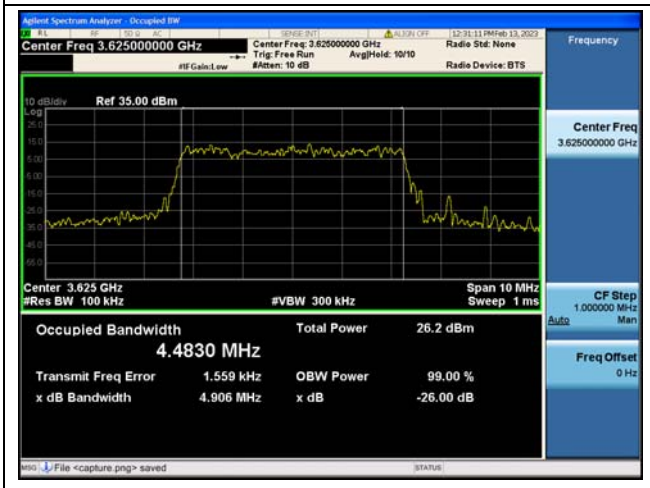
LTE Band 48				
BW(MHz)	Channel Level	Modulation	99% BW(MHz)	26dB BW(MHz)
5	Low	QPSK	4.50	4.91
	Low	16QAM	4.51	5.03
	Mid	QPSK	4.48	4.91
	Mid	16QAM	4.50	4.93
	High	QPSK	4.50	4.92
	High	16QAM	4.49	4.90
10	Low	QPSK	8.99	9.77
	Low	16QAM	8.98	9.76
	Mid	QPSK	8.97	9.61
	Mid	16QAM	8.91	9.68
	High	QPSK	8.97	9.57
	High	16QAM	8.96	9.73
15	Low	QPSK	13.47	14.64
	Low	16QAM	13.46	14.81
	Mid	QPSK	13.48	14.48
	Mid	16QAM	13.48	14.44
	High	QPSK	13.42	14.35
	High	16QAM	13.44	14.33
20	Low	QPSK	17.97	19.07
	Low	16QAM	17.95	19.41
	Mid	QPSK	17.95	19.06
	Mid	16QAM	17.94	19.26
	High	QPSK	17.93	19.02
	High	16QAM	17.85	19.26



Band48 / 5MHz / QPSK/ Low CH



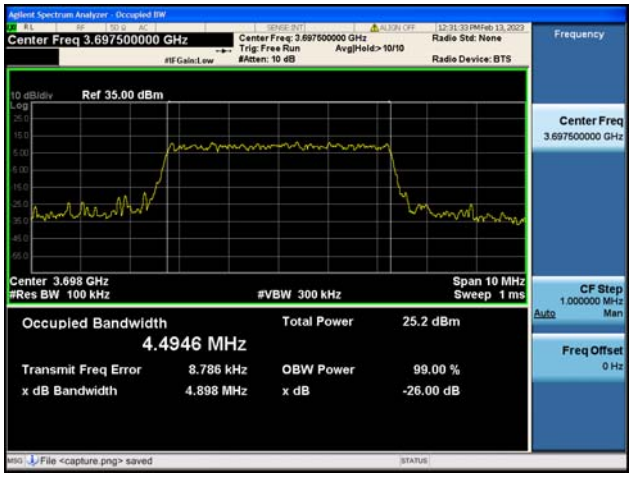
Band48 / 5MHz / 16QAM/ Low CH



Band48 / 5MHz / QPSK/ Mid CH

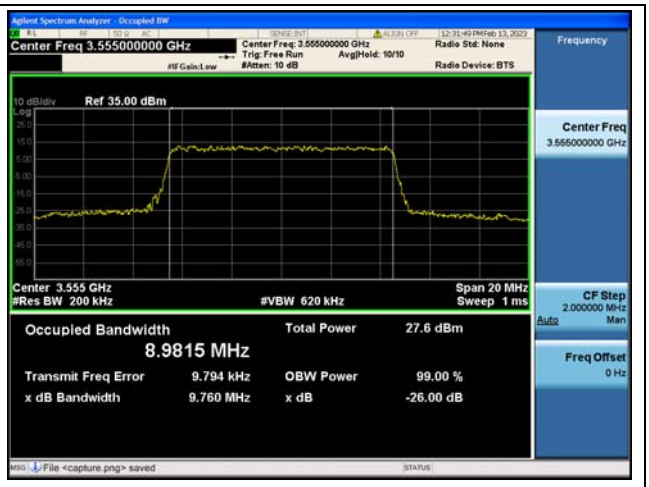
Band48 / 5MHz / 16QAM/ Mid CH

Band48 / 5MHz / QPSK/ High CH

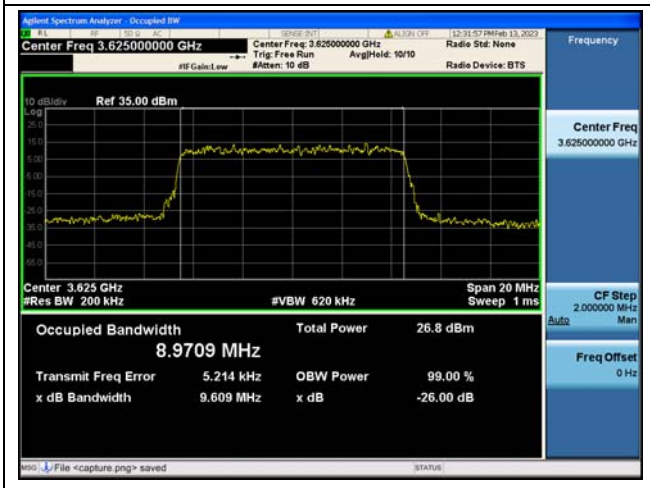


Band48 / 5MHz / 16QAM/ High CH

Band48 / 10MHz / QPSK/ Low CH

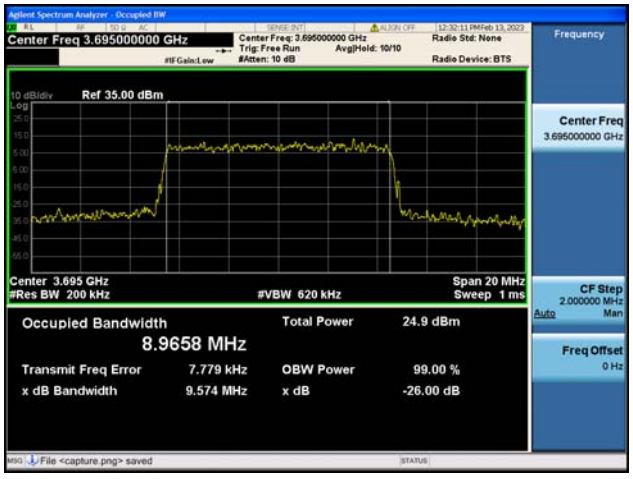


Band48 / 10MHz / 16QAM/ Low CH

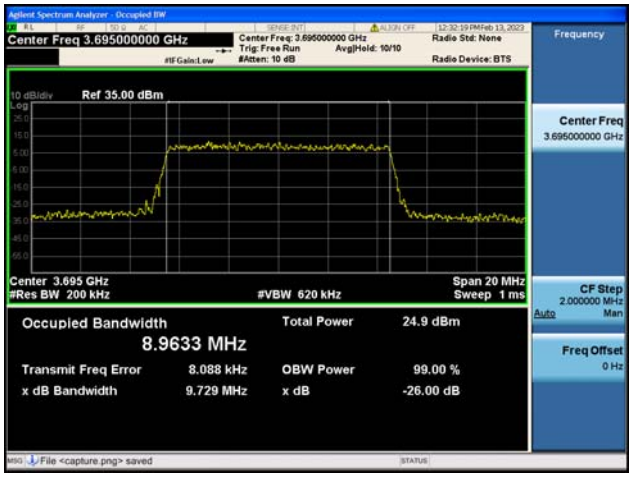


Band48 / 10MHz / QPSK/ Mid CH

Band48 / 10MHz / 16QAM/ Mid CH



Band48 / 10MHz / QPSK/ High CH



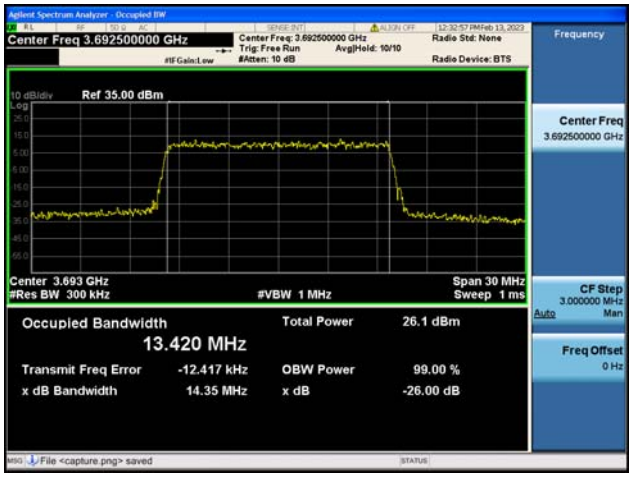
Band48 / 10MHz / 16QAM/ High CH

Band48 / 15MHz / QPSK/ Low CH

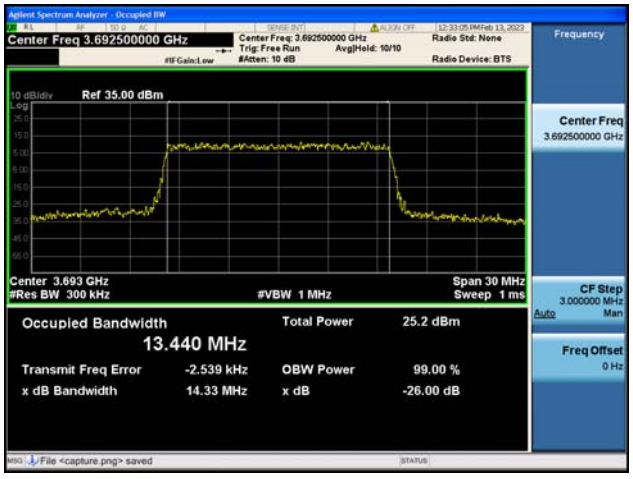
Band48 / 15MHz / 16QAM/ Low CH

Band48 / 15MHz / QPSK/ Mid CH

Band48 / 15MHz / 16QAM/ Mid CH

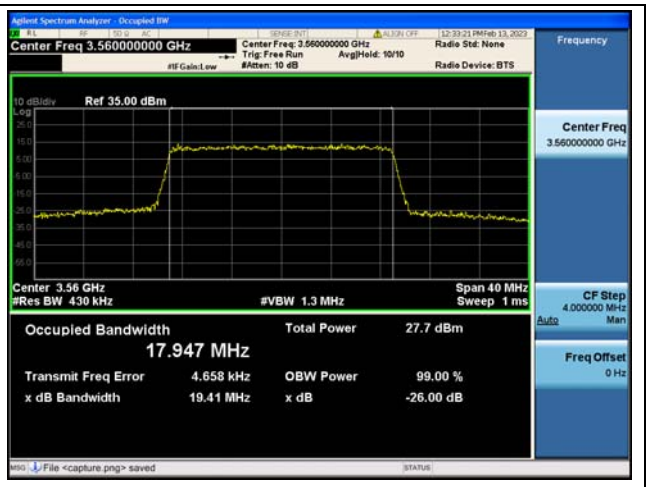


Band48 / 15MHz / QPSK/ High CH

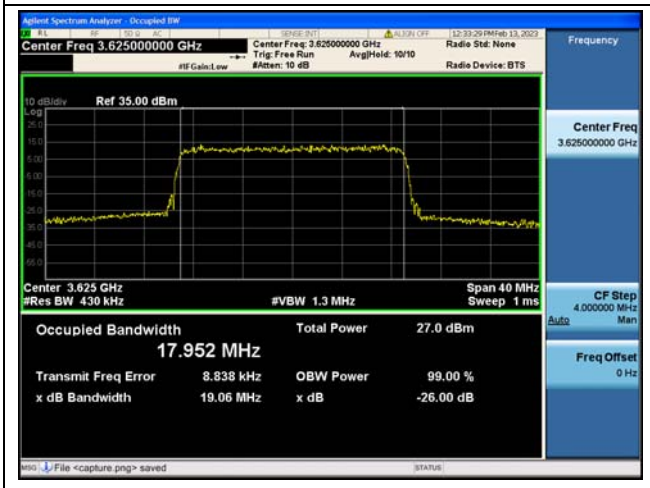


Band48 / 15MHz / 16QAM/ High CH

Band48 / 20MHz / QPSK/ Low CH

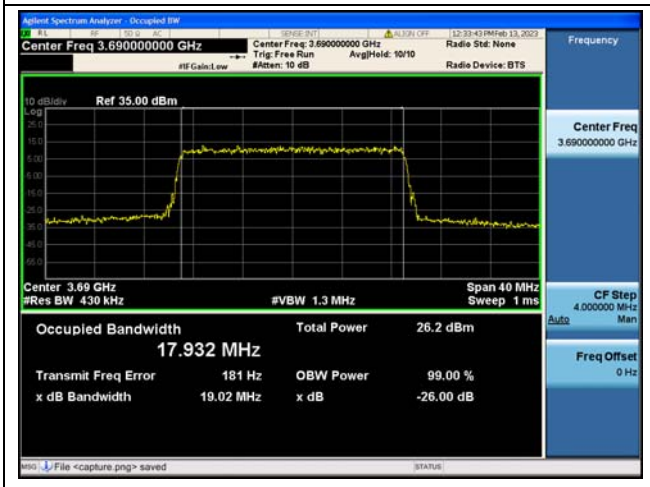


Band48 / 20MHz / 16QAM/ Low CH



Band48 / 20MHz / QPSK/ Mid CH

Band48 / 20MHz / 16QAM/ Mid CH



Band48 / 20MHz / QPSK/ High CH

Band48 / 20MHz / 16QAM/ High CH

2.3. Frequency Stability

2.3.1.Requirement

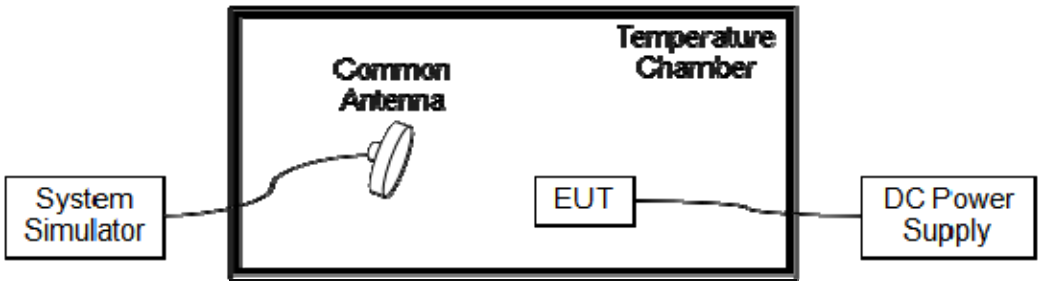
According to FCC section 2.1055 & 90.213, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

(a) The temperature is varied from -30°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 -10°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 12V, 13V and 9V, which are specified by the applicant; the normal temperature here used is 20°C.

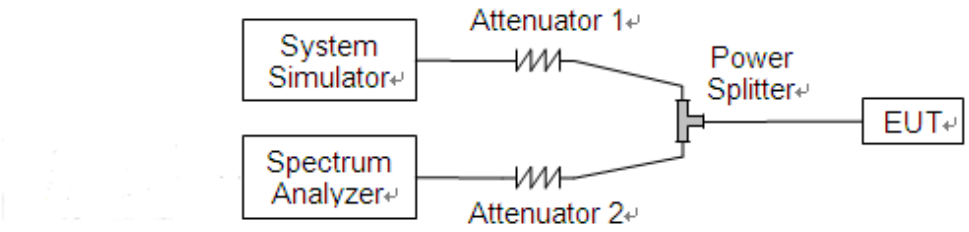
LTE Band 48, QPSK, Channel 55990, Frequency 3625.0MHz Limit =Within Authorized Band					
Voltage (%)	**Power (VDC)**	**Temp(°C)**	**Fre. Dev.(Hz)**	**Deviation (ppm)**	**Result**
Normal	12.00	+20(Ref)	-16	-0.004	PASS
Normal		-10	19	0.005	
Normal		0	17	0.005	
Normal		+10	-13	-0.004	
Normal		+20	19	0.005	
Normal		+30	-16	-0.004	
Normal		+40	-20	-0.006	
Normal		+50	42	0.012	
Normal		+55	18	0.005	
High	13.00	+20	20	0.006	
BATT.ENDPOINT	9.00	+20	45	0.012	

2.4. Peak to Average Radio

2.4.1.Requirement

According to FCC 96.41(g), the peak-to-average power ratio (PAPR) of any CBSD transmitter output power must not exceed 13 dB.

2.4.2.Test Description



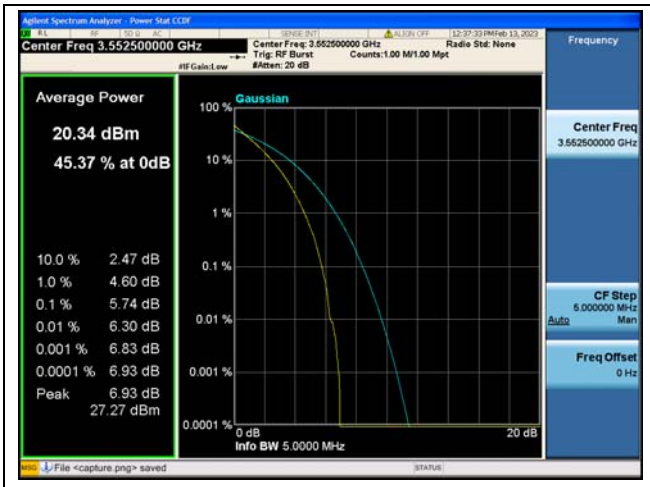
The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum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

2.4.3.Test procedure

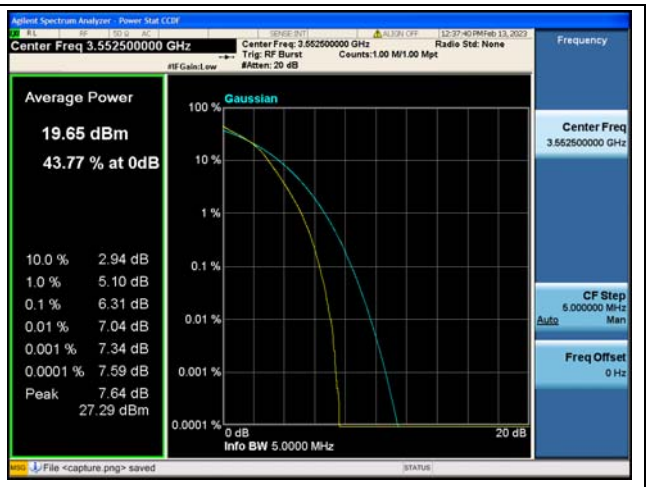
KDB 971168 D01v03 Section 5.7 and ANSI/TIA-603-E-2016.

2.4.4.Test Result

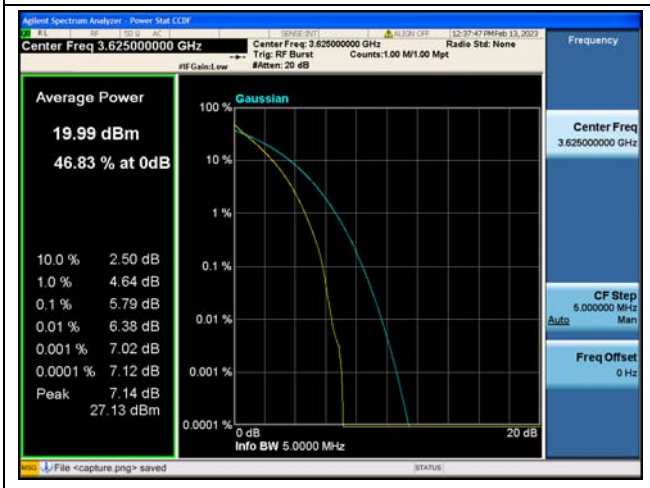
LTE Band 48					
BW(MHz)	**Channel Level**	**Modulation**	**PAR Radio(dB)**	**Limit(dB)**	**Verdict**
5	Low	QPSK	5.74	<=13	PASS
	Low	16QAM	6.31	<=13	PASS
	Mid	QPSK	5.79	<=13	PASS
	Mid	16QAM	6.23	<=13	PASS
	High	QPSK	5.85	<=13	PASS
	High	16QAM	6.20	<=13	PASS
10	Low	QPSK	5.69	<=13	PASS
	Low	16QAM	6.35	<=13	PASS
	Mid	QPSK	5.55	<=13	PASS
	Mid	16QAM	6.22	<=13	PASS
	High	QPSK	5.50	<=13	PASS
	High	16QAM	6.25	<=13	PASS
15	Low	QPSK	5.52	<=13	PASS
	Low	16QAM	6.29	<=13	PASS
	Mid	QPSK	5.62	<=13	PASS
	Mid	16QAM	6.17	<=13	PASS
	High	QPSK	5.38	<=13	PASS
	High	16QAM	6.13	<=13	PASS
20	Low	QPSK	5.66	<=13	PASS
	Low	16QAM	6.39	<=13	PASS
	Mid	QPSK	5.51	<=13	PASS
	Mid	16QAM	6.32	<=13	PASS
	High	QPSK	5.52	<=13	PASS
	High	16QAM	6.24	<=13	PASS



Band48 / 5MHz / Low CH / QPSK



Band48 / 5MHz / Low CH / 16QAM

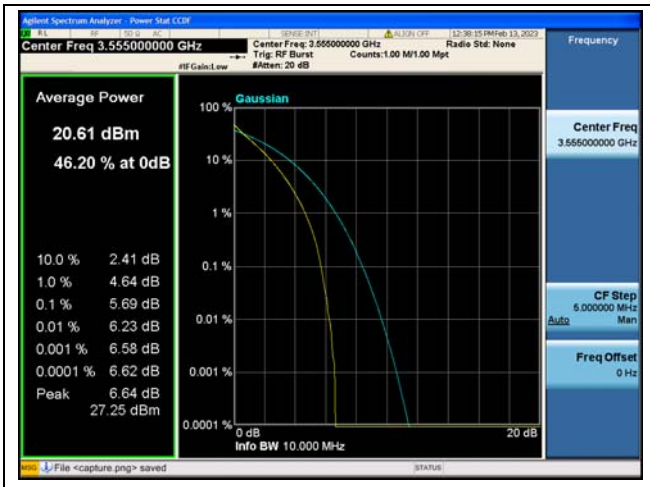


Band48 / 5MHz / Mid CH / QPSK

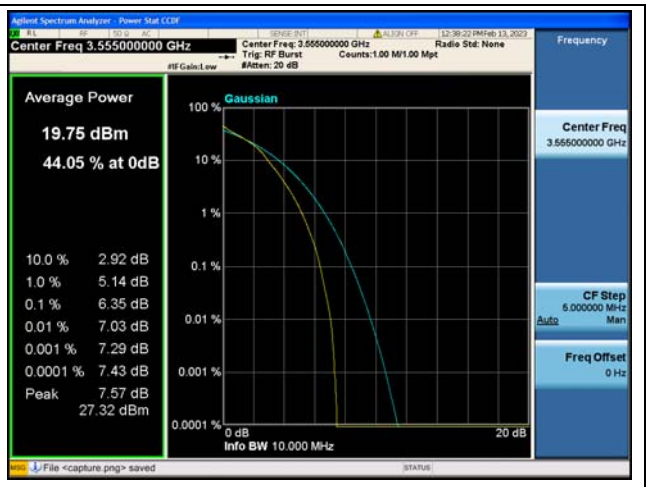
Band48 / 5MHz / Mid CH / 16QAM

Band48 / 5MHz / High CH / QPSK

Band48 / 5MHz / High CH / 16QAM



Band48 / 10MHz / Low CH / QPSK



Band48 / 10MHz / Low CH / 16QAM

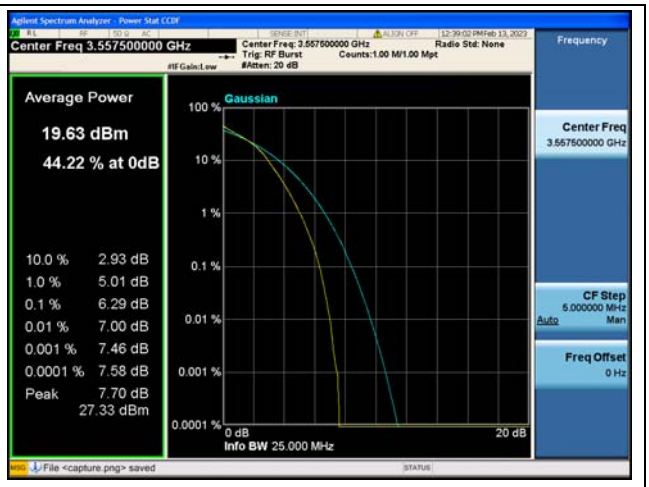
Band48 / 10MHz / Mid CH / QPSK

Band48 / 10MHz / Mid CH / 16QAM

Band48 / 10MHz / High CH / QPSK

Band48 / 10MHz / High CH / 16QAM

Band48 / 15MHz / Low CH / QPSK



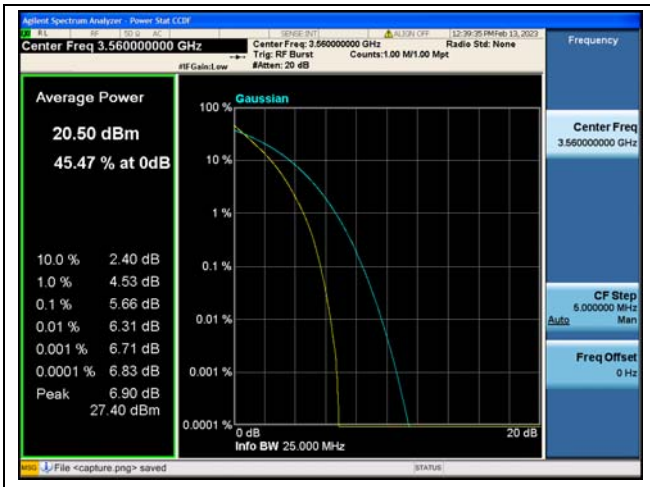
Band48 / 15MHz / Low CH / 16QAM

Band48 / 15MHz / Mid CH / QPSK

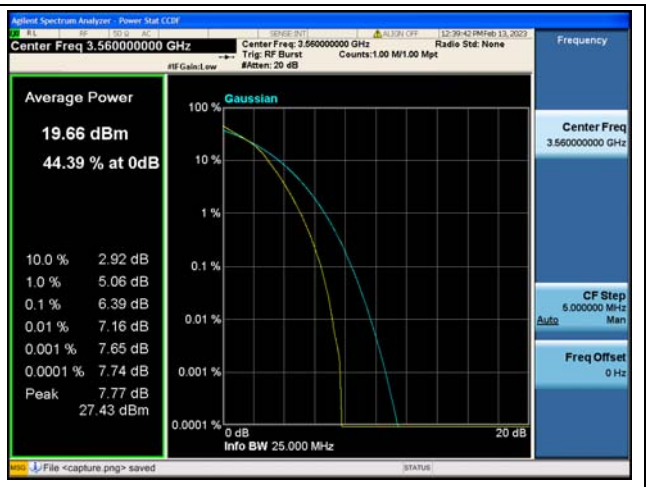
Band48 / 15MHz / Mid CH / 16QAM

Band48 / 15MHz / High CH / QPSK

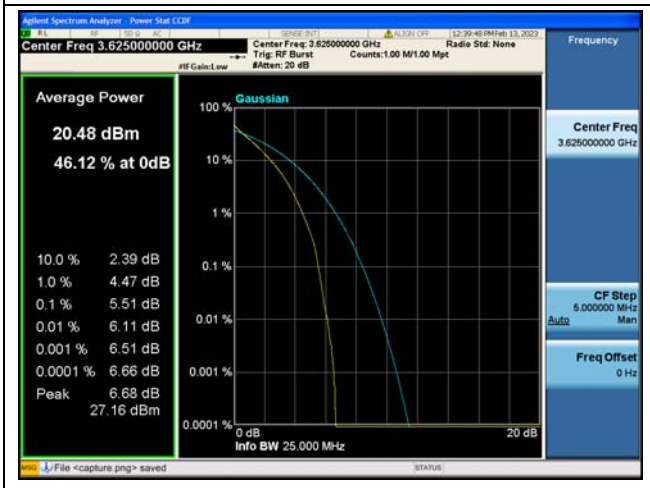
Band48 / 15MHz / High CH / 16QAM



Band48 / 20MHz / Low CH / QPSK



Band48 / 20MHz / Low CH / 16QAM



Band48 / 20MHz / Mid CH / QPSK

Band48 / 20MHz / Mid CH / 16QAM

Band48 / 20MHz / High CH / QPSK

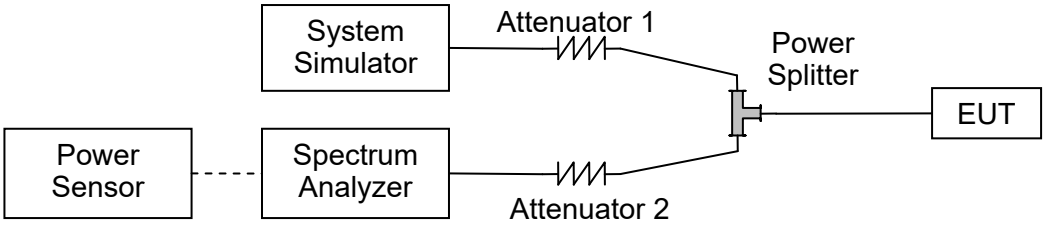
Band48 / 20MHz / High CH / 16QAM

2.5. Conducted Spurious Emissions

2.5.1.Requirement

According to FCC section 96.41(e), the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz.

2.5.2.Test Description

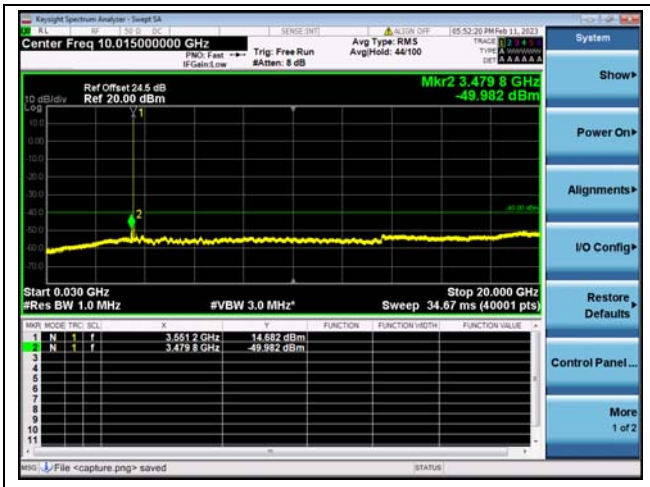


The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum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

2.5.1.Test procedure

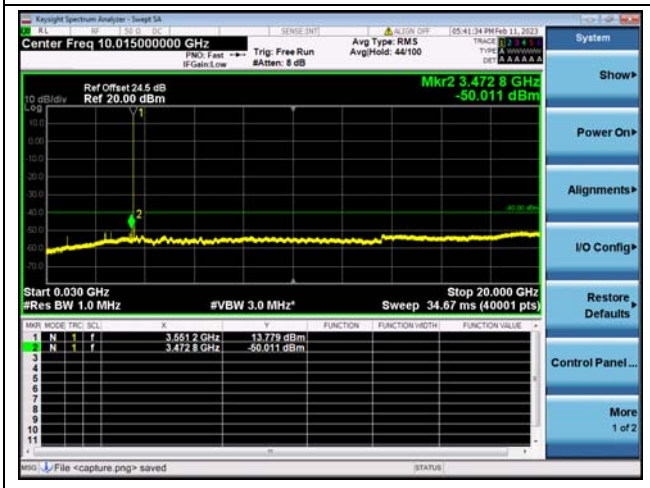
KDB 971168 D01v03 Section 6.0 and ANSI/TIA-603-E-2016.

2.5.2.Test Result



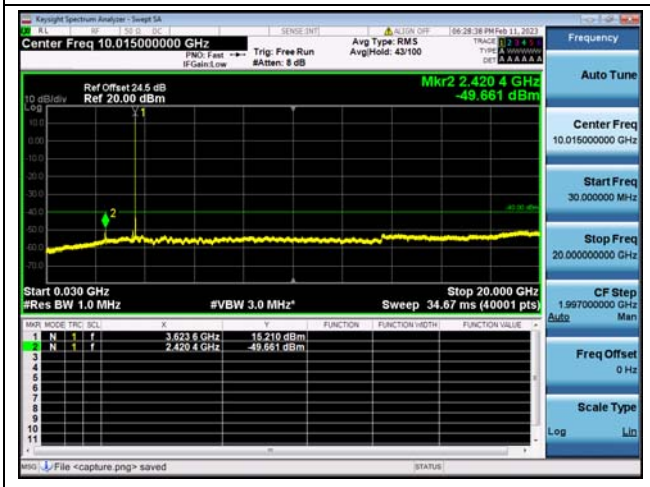
Band48-30M-20G / 5MHz / Low CH / QPSK

Band48-20G-37G / 5MHz / Low CH / QPSK



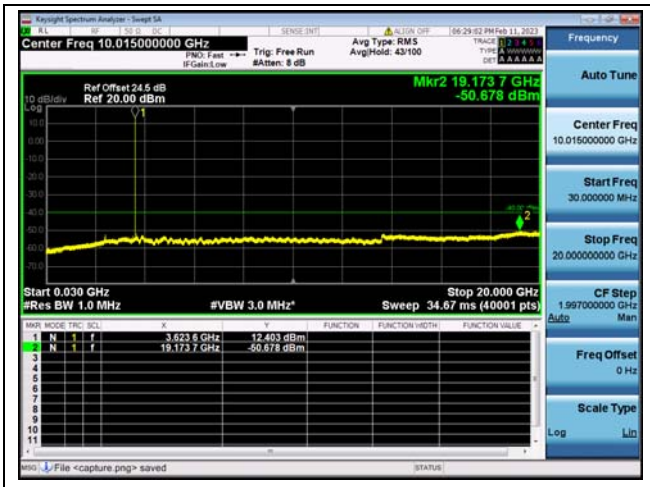
Band48-30M-20G / 5MHz / Low CH / 16QAM

Band48-20G-37G / 5MHz / Low CH / 16QAM



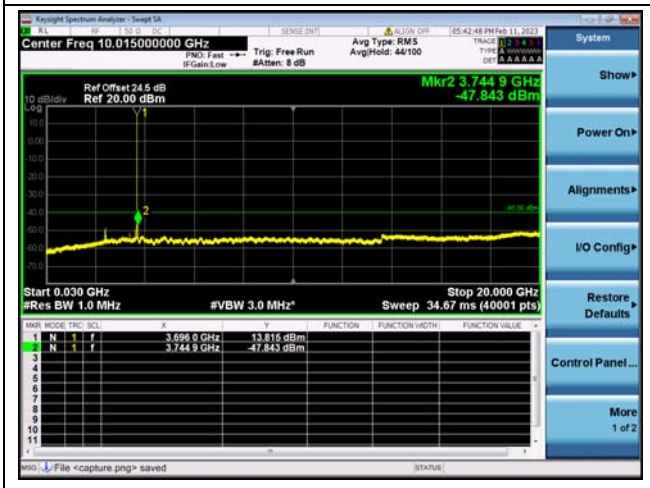
Band48-30M-20G / 5MHz / Mid CH / QPSK

Band48-20G-37G / 5MHz / Mid CH / QPSK



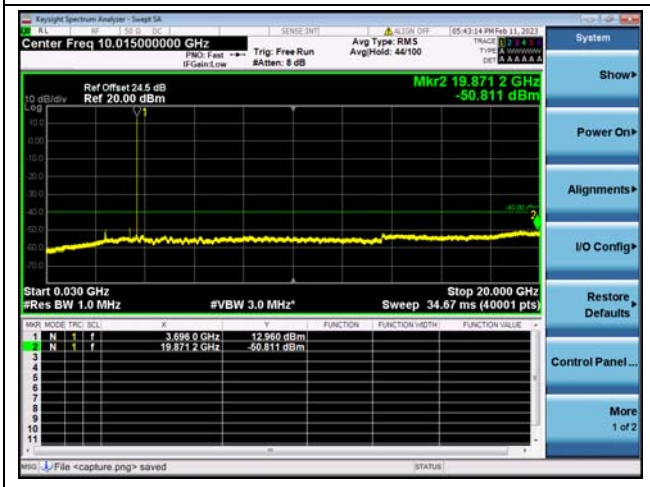
Band48-30M-20G / 5MHz / Mid CH / 16QAM

Band48-20G-37G / 5MHz / Mid CH / 16QAM



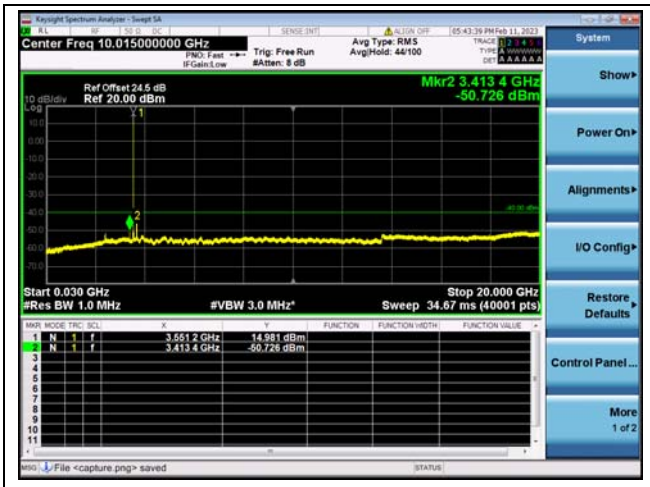
Band48-30M-20G / 5MHz / High CH / QPSK

Band48-20G-37G / 5MHz / High CH / QPSK



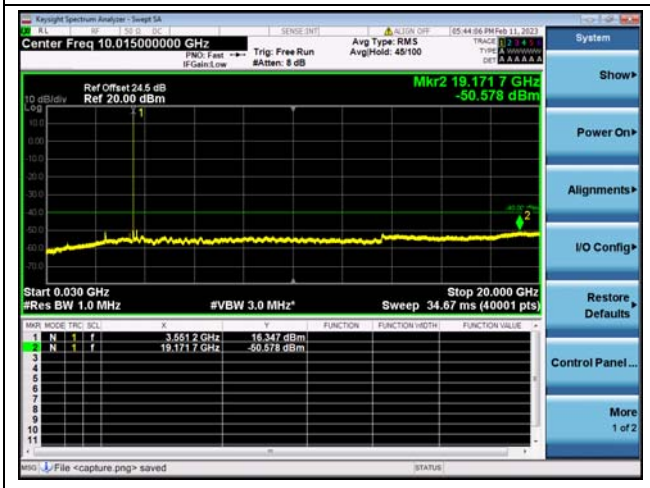
Band48-30M-20G / 5MHz / High CH / 16QAM

Band48-20G-37G / 5MHz / High CH / 16QAM



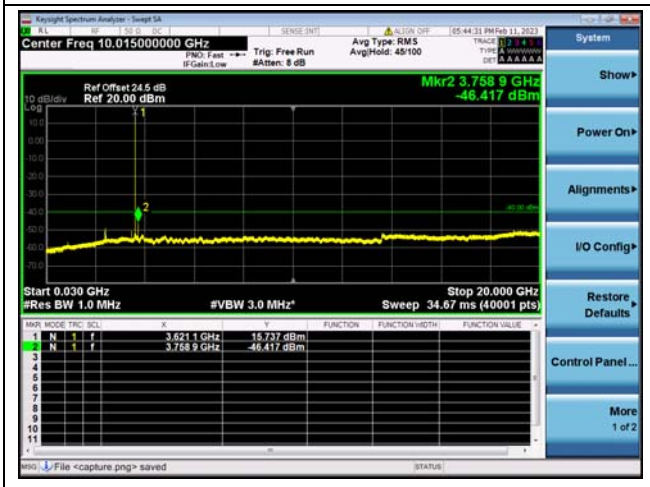
Band48-30M-20G / 10MHz / Low CH / QPSK

Band48-20G-37G / 10MHz / Low CH / QPSK



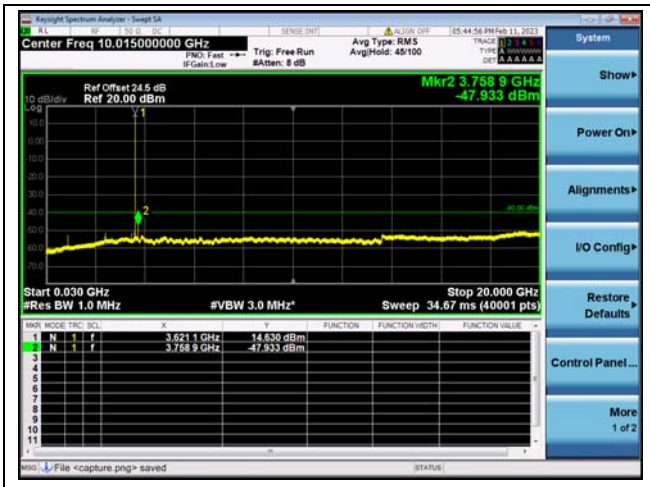
Band48-30M-20G / 10MHz / Low CH / 16QAM

Band48-20G-37G / 10MHz / Low CH / 16QAM



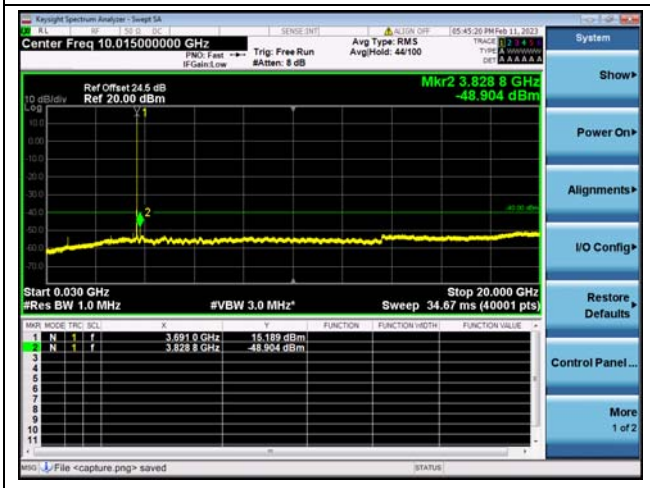
Band48-30M-20G / 10MHz / Mid CH / QPSK

Band48-20G-37G / 10MHz / Mid CH / QPSK



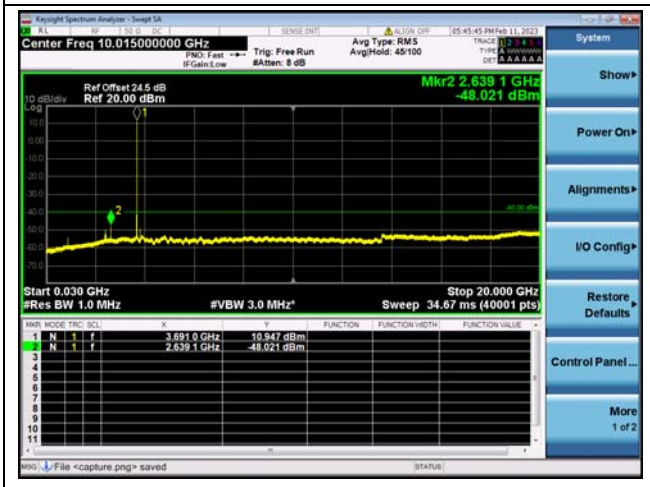
Band48-30M-20G / 10MHz / Mid CH / 16QAM

Band48-20G-37G / 10MHz / Mid CH / 16QAM



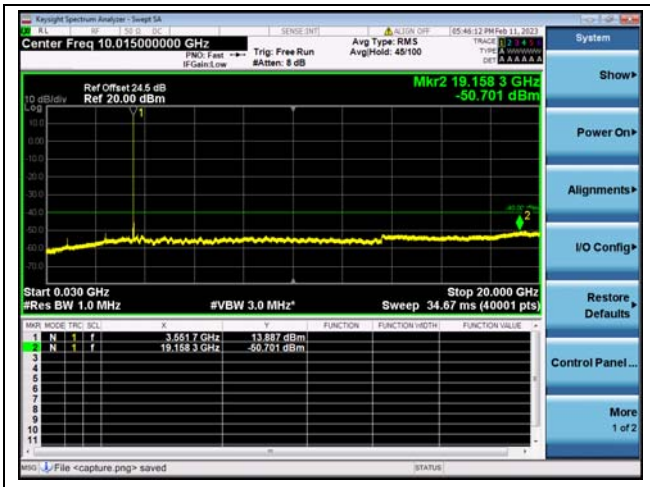
Band48-30M-20G / 10MHz / High CH / QPSK

Band48-20G-37G / 10MHz / High CH / QPSK



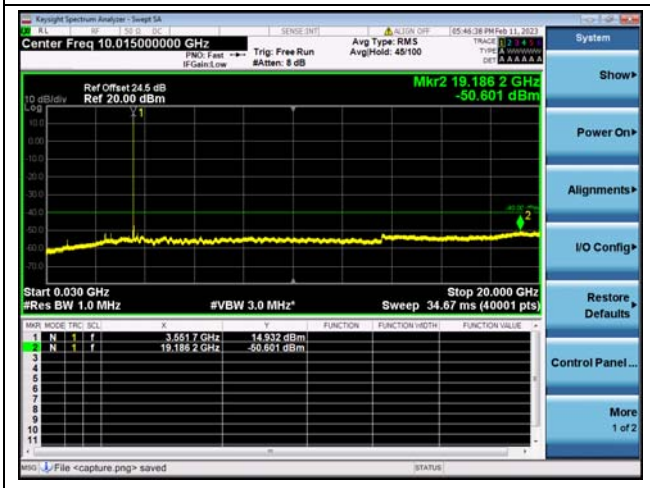
Band48-30M-20G / 10MHz / High CH / 16QAM

Band48-20G-37G / 10MHz / High CH / 16QAM



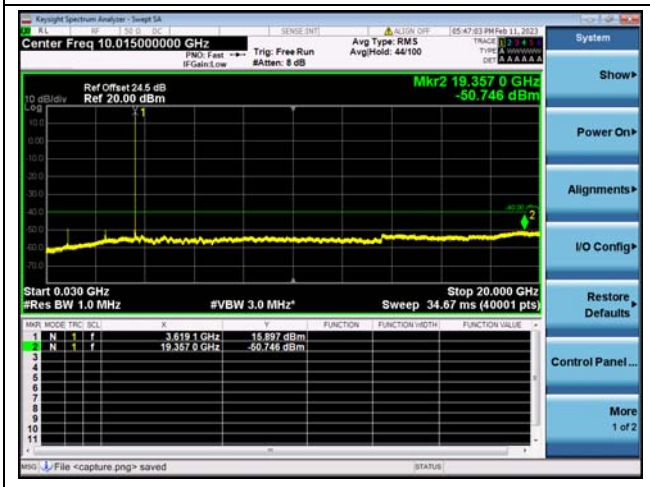
Band48-30M-20G / 15MHz / Low CH / QPSK

Band48-20G-37G / 15MHz / Low CH / QPSK



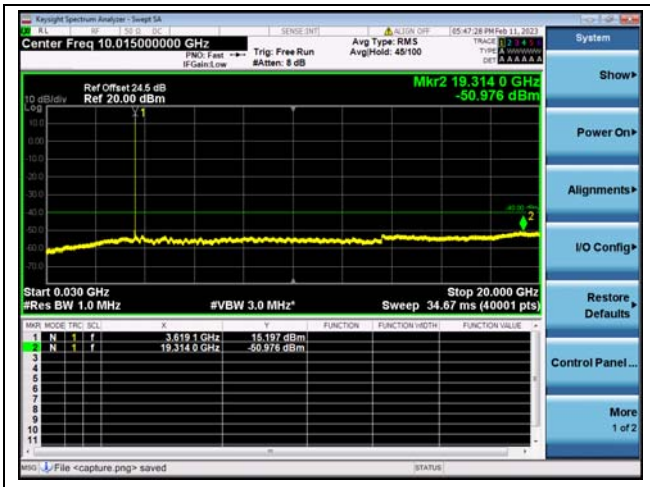
Band48-30M-20G / 15MHz / Low CH / 16QAM

Band48-20G-37G / 15MHz / Low CH / 16QAM



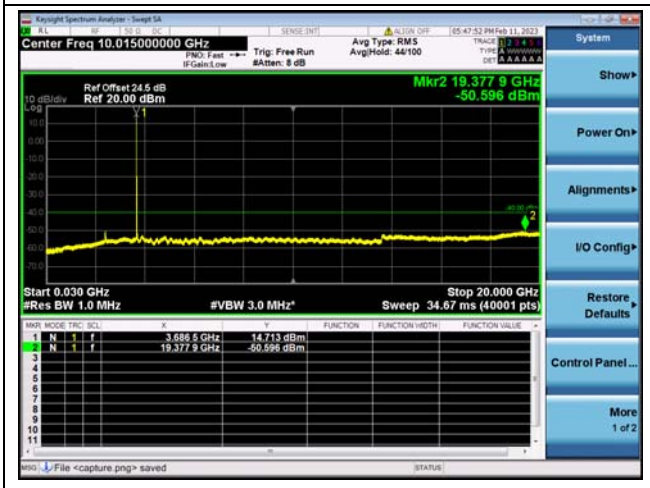
Band48-30M-20G / 15MHz / Mid CH / QPSK

Band48-20G-37G / 15MHz / Mid CH / QPSK



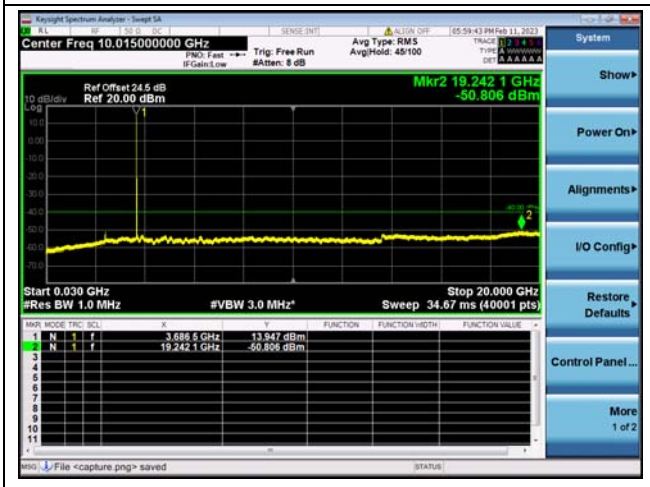
Band48-30M-20G / 15MHz / Mid CH / 16QAM

Band48-20G-37G / 15MHz / Mid CH / 16QAM



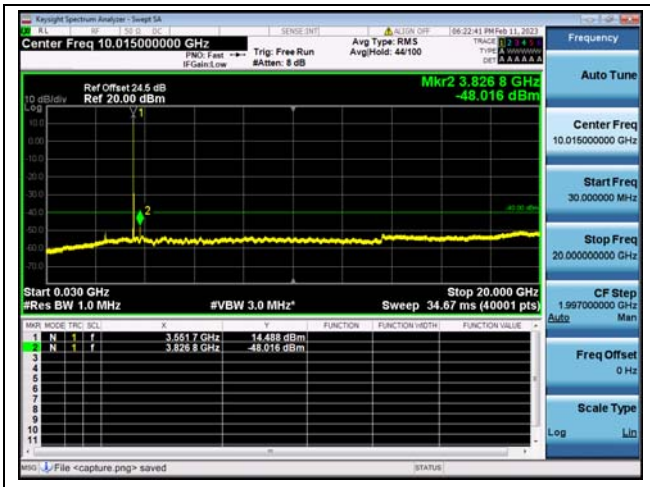
Band48-30M-20G / 15MHz / High CH / QPSK

Band48-20G-37G / 15MHz / High CH / QPSK



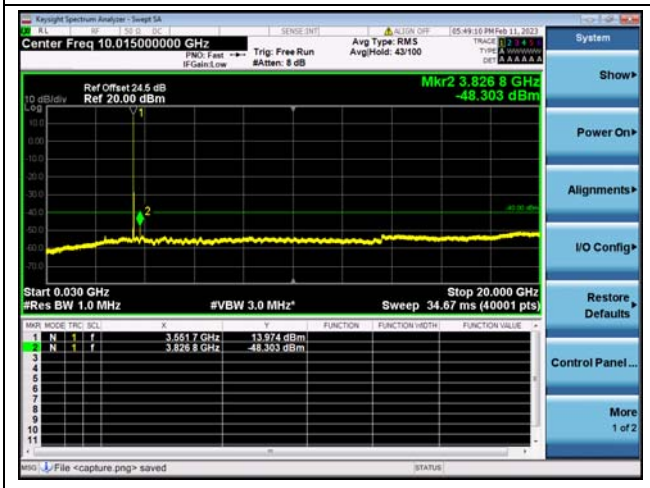
Band48-30M-20G / 15MHz / High CH / 16QAM

Band48-20G-37G / 15MHz / High CH / 16QAM



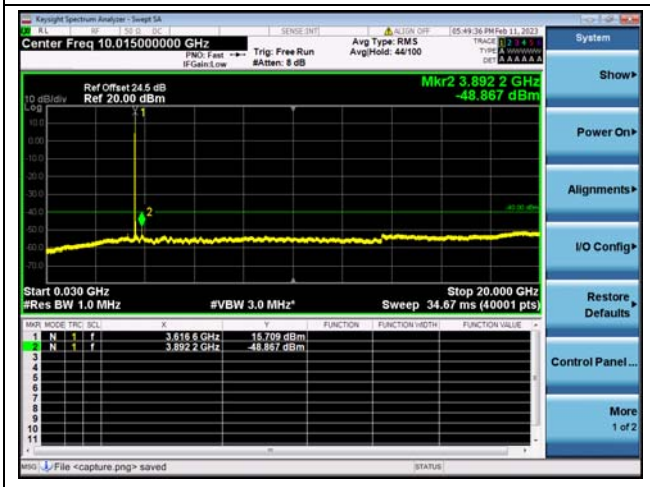
Band48-30M-20G / 20MHz / Low CH / QPSK

Band48-20G-37G / 20MHz / Low CH / QPSK



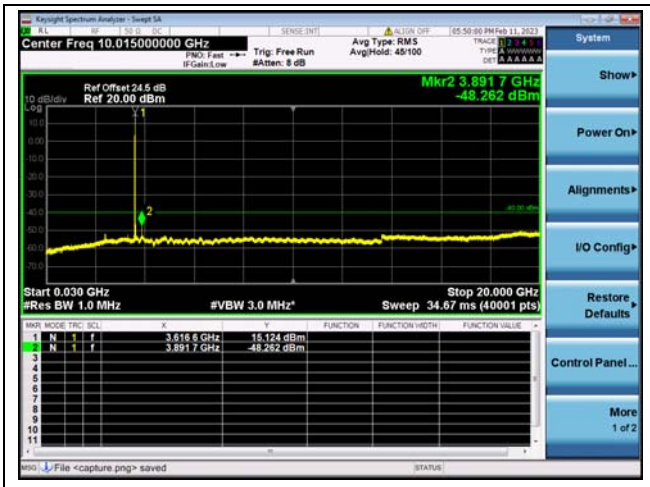
Band48-30M-20G / 20MHz / Low CH / 16QAM

Band48-20G-37G / 20MHz / Low CH / 16QAM



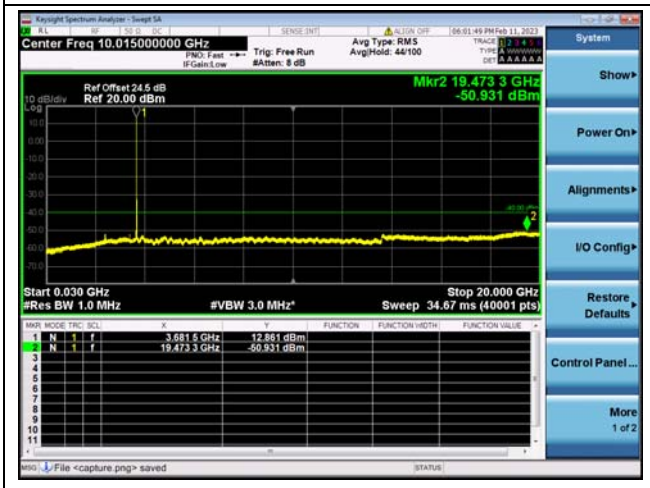
Band48-30M-20G / 20MHz / Mid CH / QPSK

Band48-20G-37G / 20MHz / Mid CH / QPSK



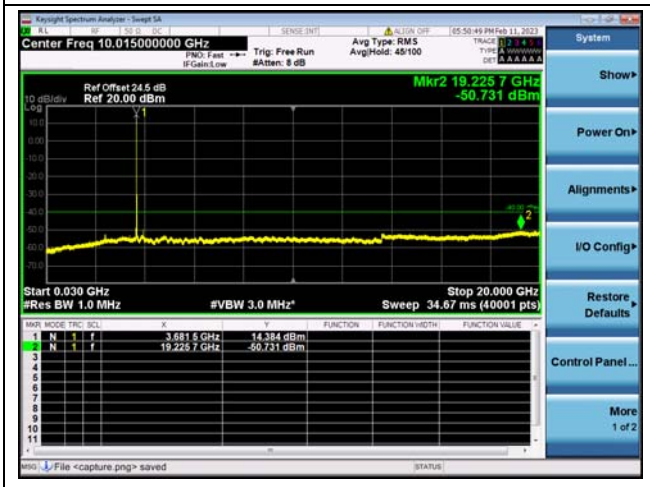
Band48-30M-20G / 20MHz / Mid CH / 16QAM

Band48-20G-37G / 20MHz / Mid CH / 16QAM



Band48-30M-20G / 20MHz / High CH / QPSK

Band48-20G-37G / 20MHz / High CH / QPSK



Band48-30M-20G / 20MHz / High CH / 16QAM

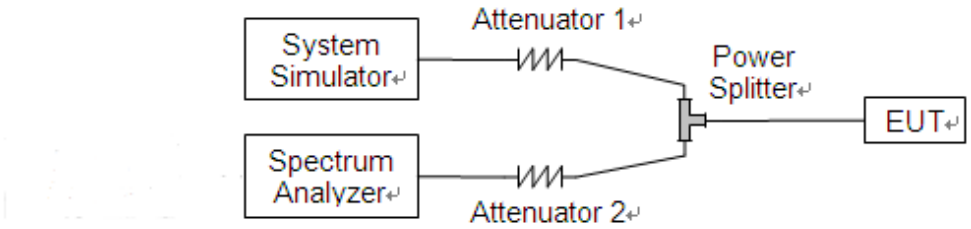
Band48-20G-37G / 20MHz / High CH / 16QAM

2.6. Band Edge

2.6.1.Requirement

Part 96.41(e)(1)(i)
For channel and frequency assignments made by the SAS to CBSDs, the conducted power of any CBSD emission outside the fundamental emission bandwidth as specified in paragraph (e)(3) of this section (whether the emission is inside or outside of the authorized band) shall not exceed −13 dBm/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any CBSD emission shall not exceed −25 dBm/MHz.
Part 96.41(e)(1)(ii)
For channel and frequency assignments made by a CBSD to End User Devices, the conducted power of any End User Device emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed −13 dBm/MHz within 0 to B megahertz (where B is the bandwidth in megahertz of the assigned channel or multiple contiguous channels of the End User Device) above the upper CBSD-assigned channel edge and within 0 to B megahertz below the lower CBSD-assigned channel edge. At all frequencies greater than B megahertz above the upper CBSD assigned channel edge and less than B megahertz below the lower CBSD-assigned channel edge, the conducted power of any End User Device emission shall not exceed −25 dBm/MHz.
Part 96.41(e)(2)
For CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed −25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz.

2.6.2.Test Description

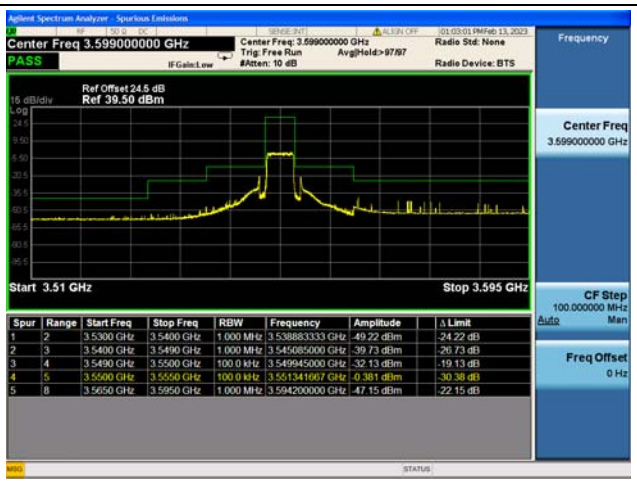


The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum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

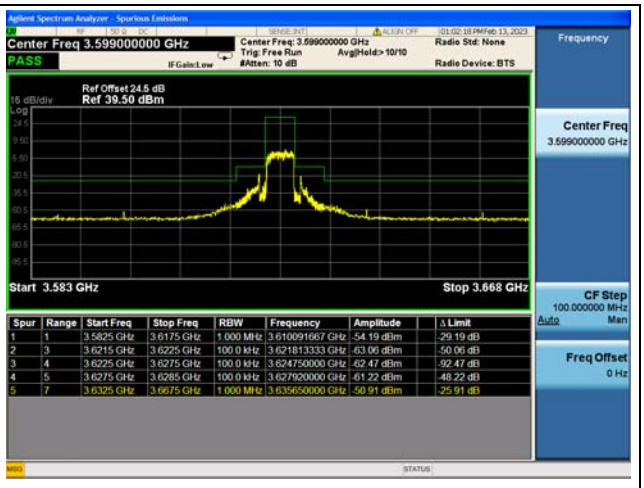
2.6.3.Test procedure

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

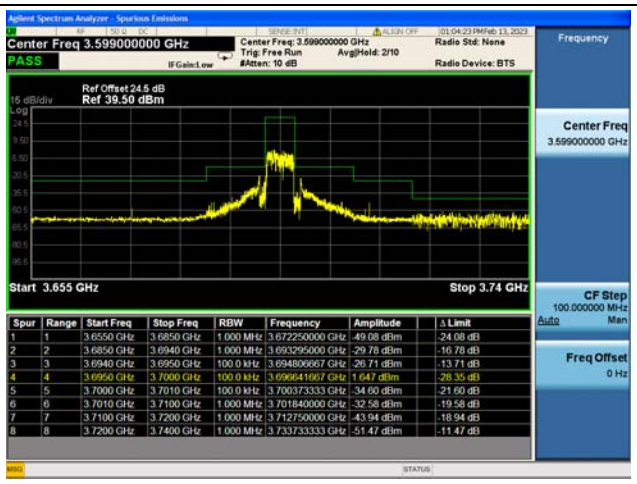
2.6.4.Test Result



Band48 / 5MHz / Low CH / QPSK / FULL RB

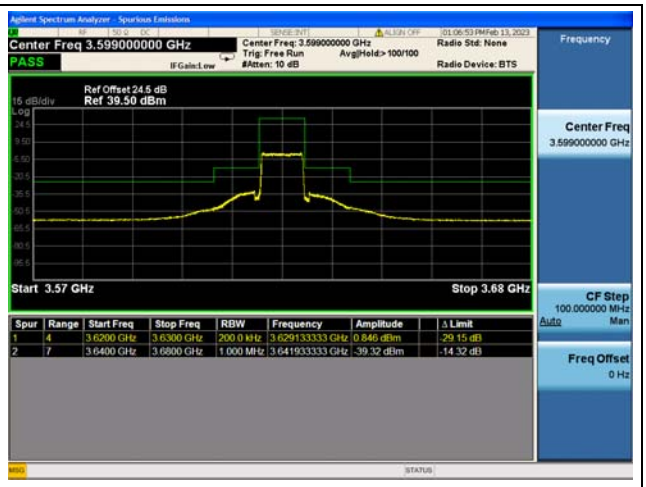


Band48 / 5MHz / Mid CH / QPSK / FULL RB

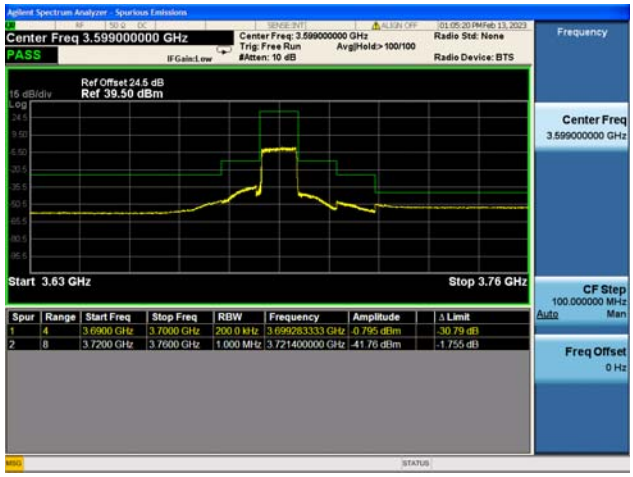


Band48 / 5MHz / High CH / QPSK / FULL RB

Band48 / 10MHz / Low CH / QPSK / FULL RB

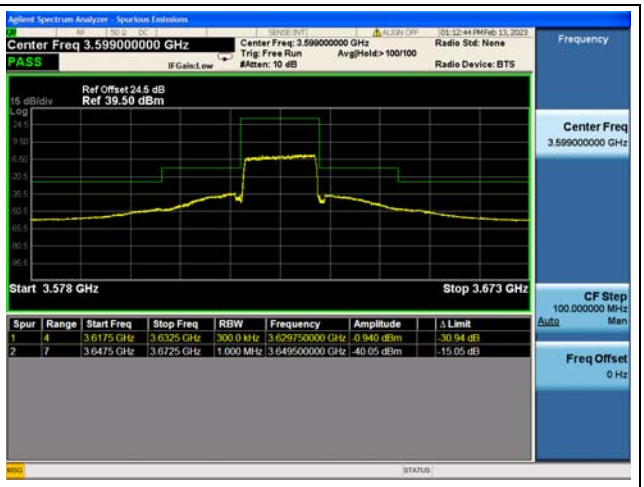


Band48 / 10MHz / Mid CH / QPSK / FULL RB

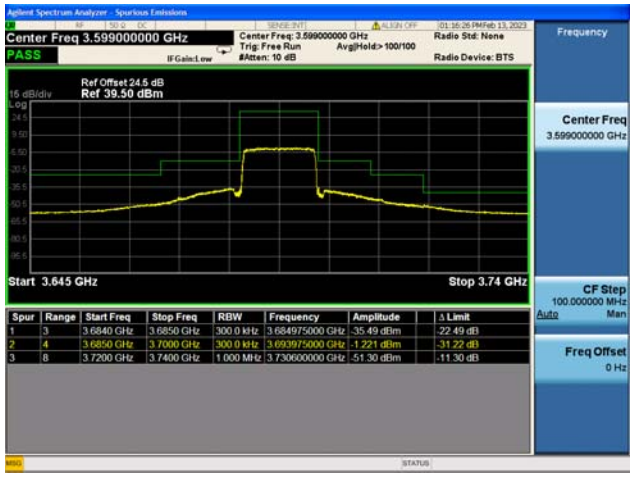


Band48 / 10MHz / High CH / QPSK / FULL RB

Band48 / 15MHz / Low CH / QPSK / FULL RB

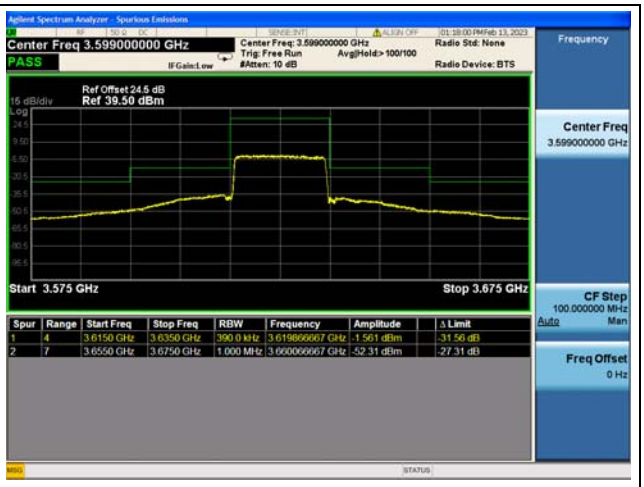


Band48 / 15MHz / Mid CH / QPSK / FULL RB



Band48 / 15MHz / High CH / QPSK / FULL RB

Band48 / 20MHz / Low CH / QPSK / FULL RB



Band48 / 20MHz / Mid CH / QPSK / FULL RB

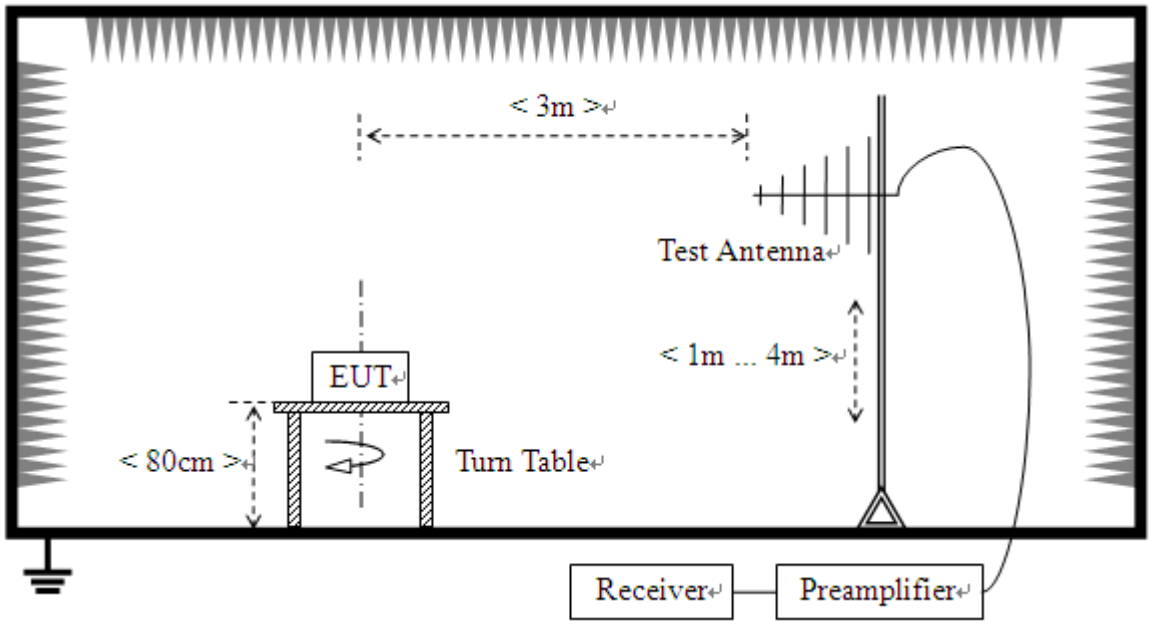
Band48 / 20MHz / High CH / QPSK / FULL RB

2.7. Radiated Spurious Emissions

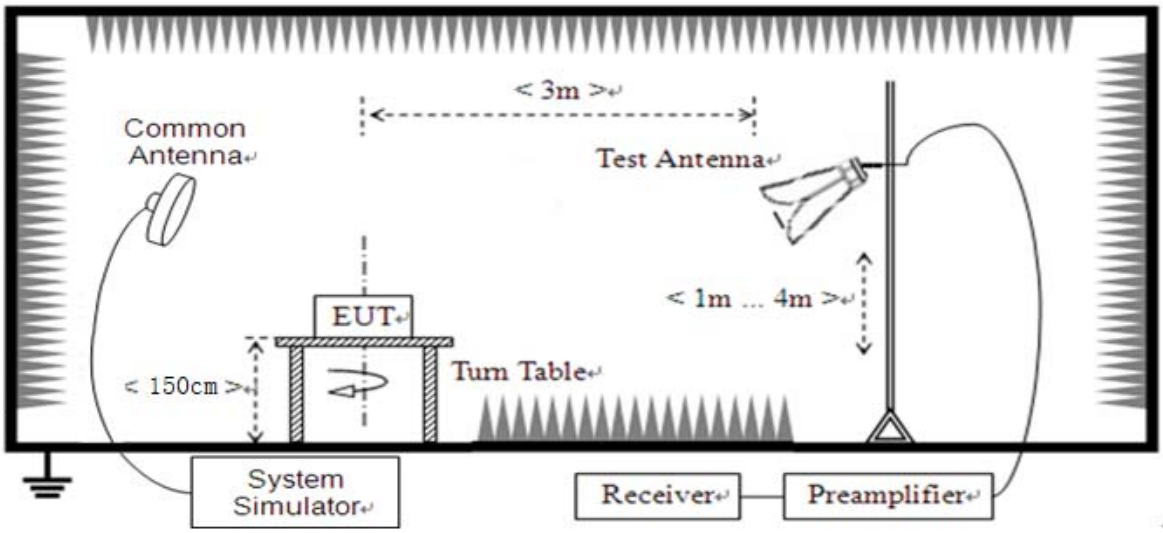
2.7.1.Requirement

The power of any emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz.

2.7.2.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.

2.7.3.Test procedure

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

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

2.7.4.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.

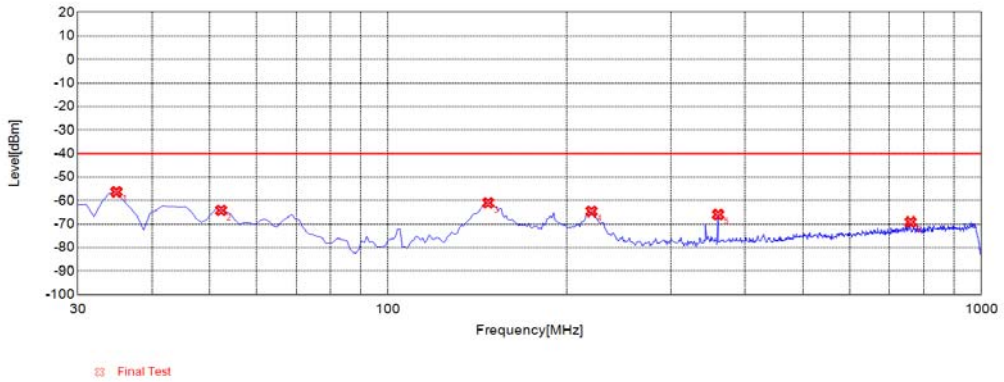
Note2: All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

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.

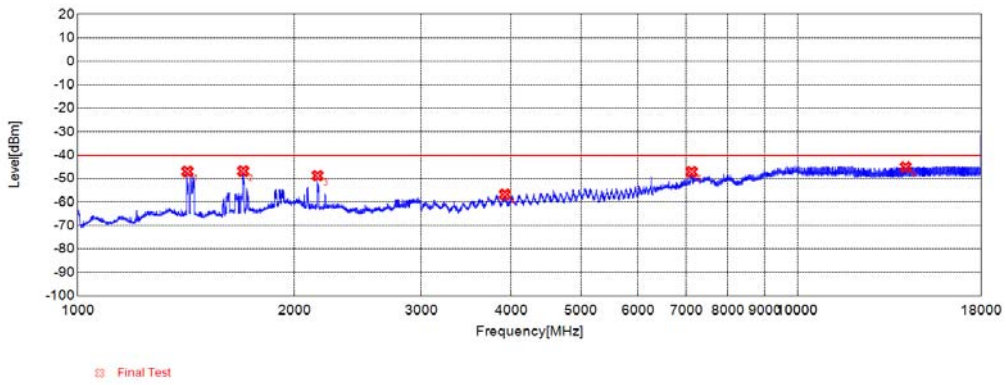
Note4: N/A means the frequency is the basic frequency or the base station frequency, they are no need to verdict.

Fixed Internal Antenna

LTE Band 48, 20MHz BW, Low Channel, QPSK

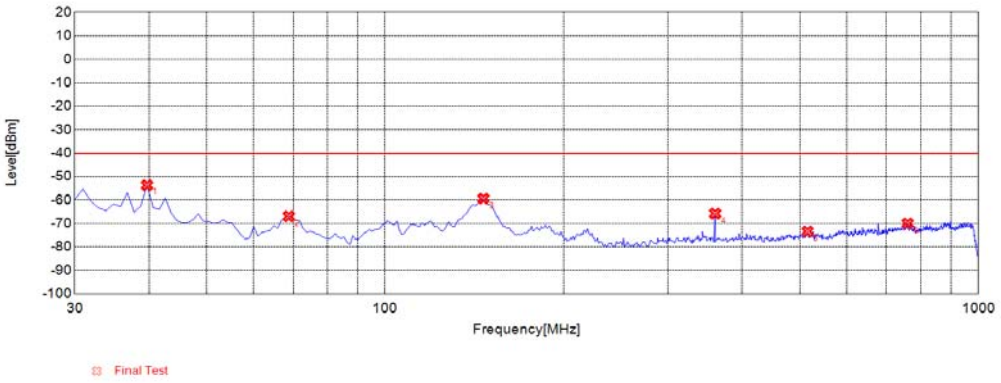


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	34.8550	-56.34	-40.00	Horizontal	PASS
2	52.3320	-64.19	-40.00	Horizontal	PASS
3	147.4870	-60.97	-40.00	Horizontal	PASS
4	220.3100	-64.62	-40.00	Horizontal	PASS
5	360.1300	-65.97	-40.00	Horizontal	PASS
6	760.1700	-69.11	-40.00	Horizontal	PASS

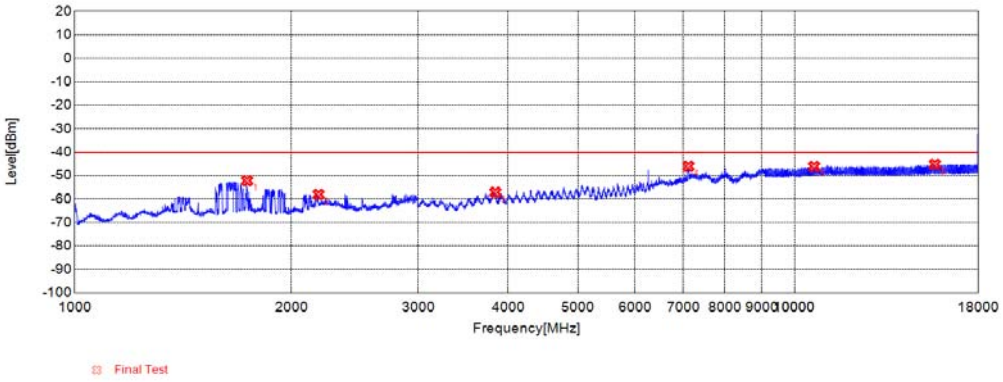


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1420.1400	-46.96	-40.00	Horizontal	PASS
2	1697.5660	-46.8	-40.00	Horizontal	PASS
3	2153.7180	-48.78	-40.00	Horizontal	PASS
4	3921.7690	-56.79	-40.00	Horizontal	PASS
5	7125.4580	-47.14	-40.00	Horizontal	PASS
6	14132.9040	-45.08	-40.00	Horizontal	PASS

LTE Band 48, 20MHz BW, Low Channel, QPSK

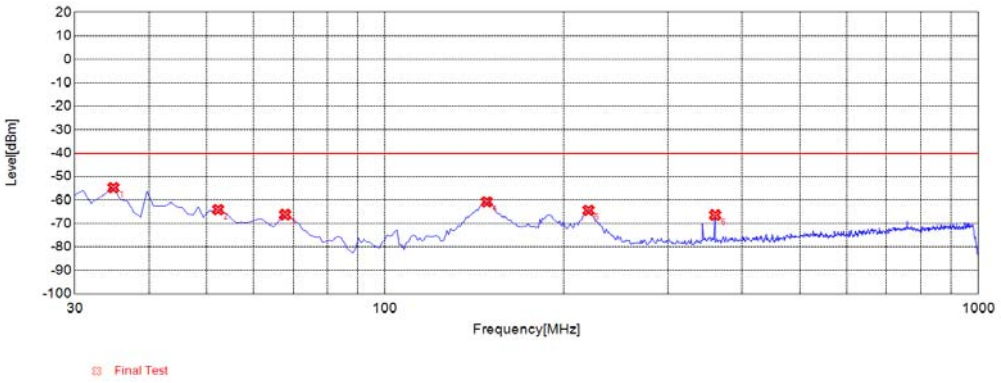


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	39.7100	-53.68	-40.00	Vertical	PASS
2	68.8390	-66.93	-40.00	Vertical	PASS
3	146.5170	-59.4	-40.00	Vertical	PASS
4	360.1300	-65.77	-40.00	Vertical	PASS
5	515.4850	-73.35	-40.00	Vertical	PASS
6	760.1700	-69.92	-40.00	Vertical	PASS

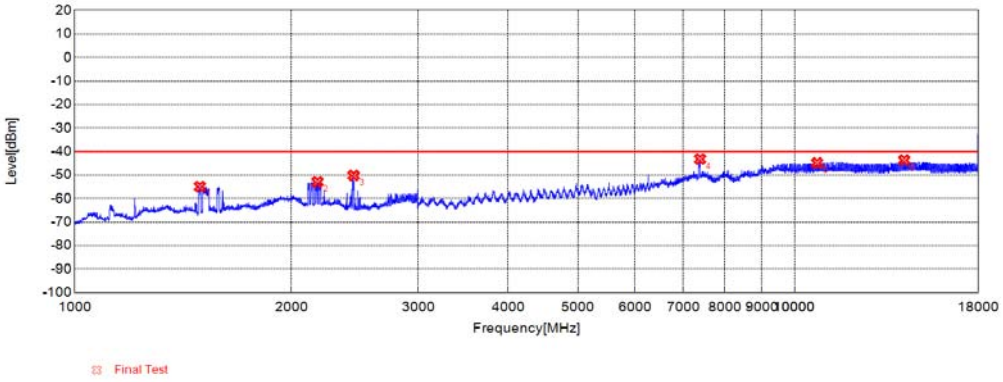


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1735.5790	-52.21	-40.00	Vertical	PASS
2	2181.0600	-58.06	-40.00	Vertical	PASS
3	3840.0930	-57.16	-40.00	Vertical	PASS
4	7120.4580	-46.07	-40.00	Vertical	PASS
5	10644.1830	-46.19	-40.00	Vertical	PASS
6	15666.4070	-45.21	-40.00	Vertical	PASS

LTE Band 48, 20MHz BW, Mid Channel, QPSK

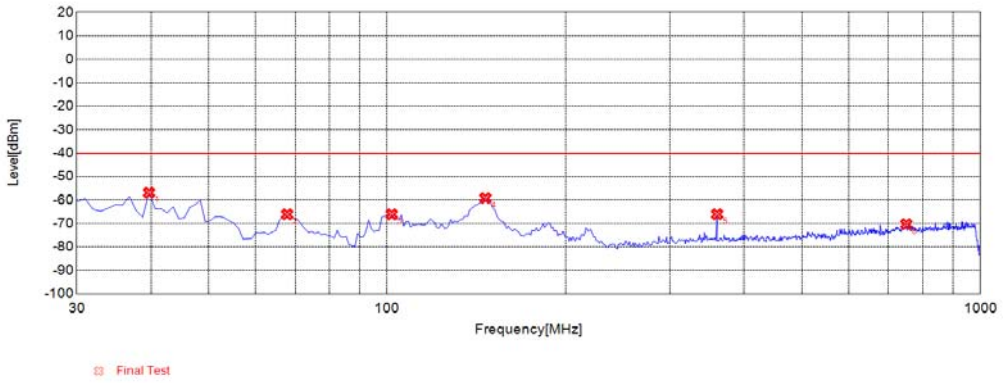


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	34.8550	-54.71	-40.00	Horizontal	PASS
2	52.3320	-64.07	-40.00	Horizontal	PASS
3	67.8680	-66.25	-40.00	Horizontal	PASS
4	148.4580	-60.78	-40.00	Horizontal	PASS
5	220.3100	-64.41	-40.00	Horizontal	PASS
6	360.1300	-66.42	-40.00	Horizontal	PASS

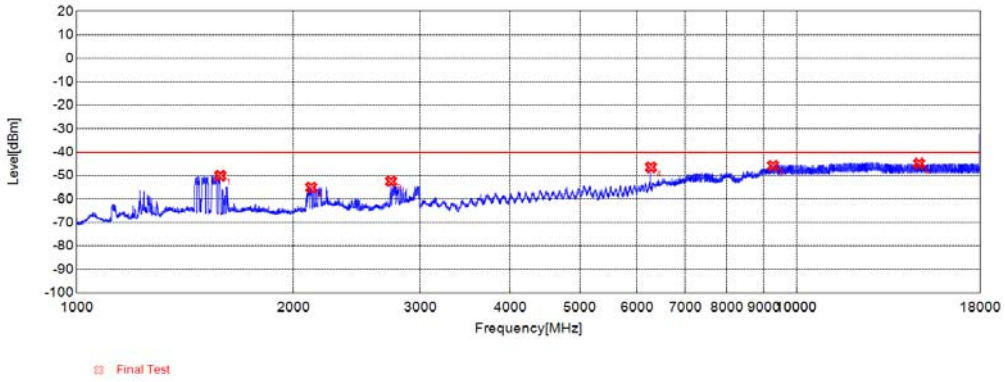


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1492.1640	-54.91	-40.00	Horizontal	PASS
2	2173.7250	-52.94	-40.00	Horizontal	PASS
3	2439.8130	-50.18	-40.00	Horizontal	PASS
4	7392.1550	-43.24	-40.00	Horizontal	PASS
5	10749.1940	-44.84	-40.00	Horizontal	PASS
6	14202.9110	-43.66	-40.00	Horizontal	PASS

LTE Band 48, 20MHz BW, Mid Channel, QPSK

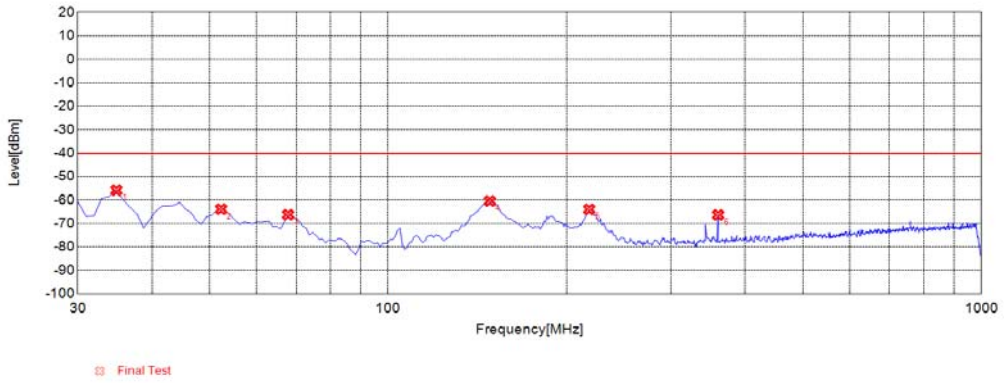


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	39.7100	-56.89	-40.00	Vertical	PASS
2	67.8680	-66.1	-40.00	Vertical	PASS
3	101.8520	-66.1	-40.00	Vertical	PASS
4	146.5170	-59.19	-40.00	Vertical	PASS
5	360.1300	-66.06	-40.00	Vertical	PASS
6	750.4600	-70.22	-40.00	Vertical	PASS

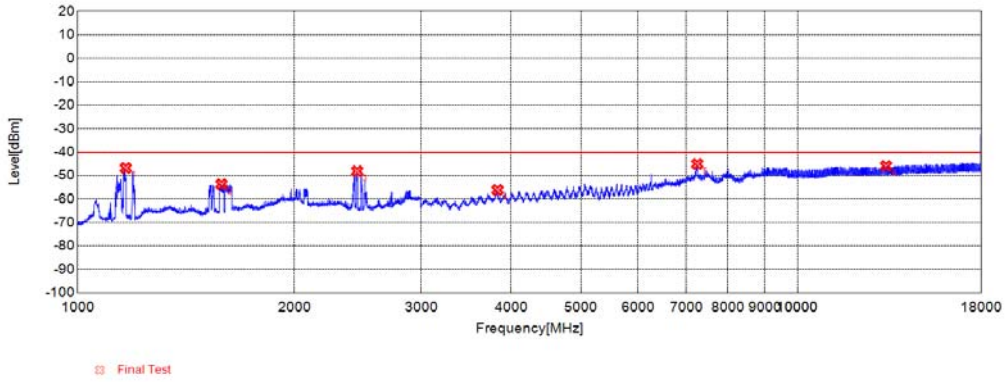


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1582.8610	-50.07	-40.00	Vertical	PASS
2	2117.0390	-55.05	-40.00	Vertical	PASS
3	2733.2440	-52.47	-40.00	Vertical	PASS
4	6275.3640	-46.47	-40.00	Vertical	PASS
5	9275.6970	-45.83	-40.00	Vertical	PASS
6	14799.6440	-44.88	-40.00	Vertical	PASS

LTE Band 48, 20MHz BW, High Channel, QPSK

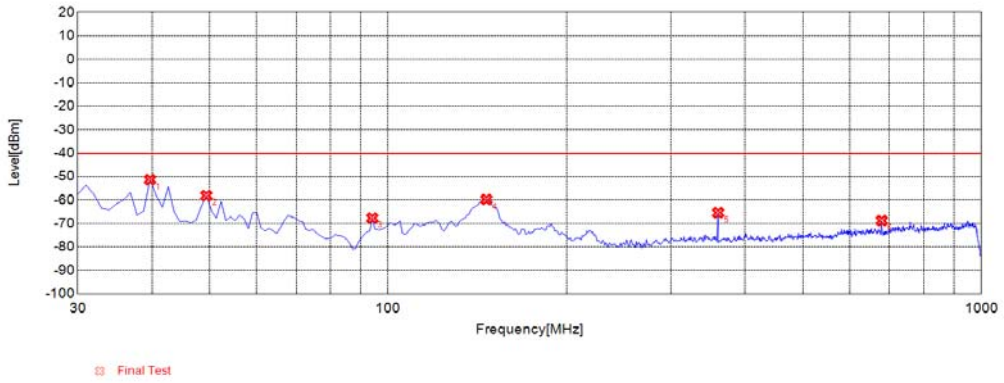


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	34.8550	-55.84	-40.00	Horizontal	PASS
2	52.3320	-63.9	-40.00	Horizontal	PASS
3	67.8680	-66.26	-40.00	Horizontal	PASS
4	148.4580	-60.42	-40.00	Horizontal	PASS
5	218.3680	-63.98	-40.00	Horizontal	PASS
6	360.1300	-66.35	-40.00	Horizontal	PASS

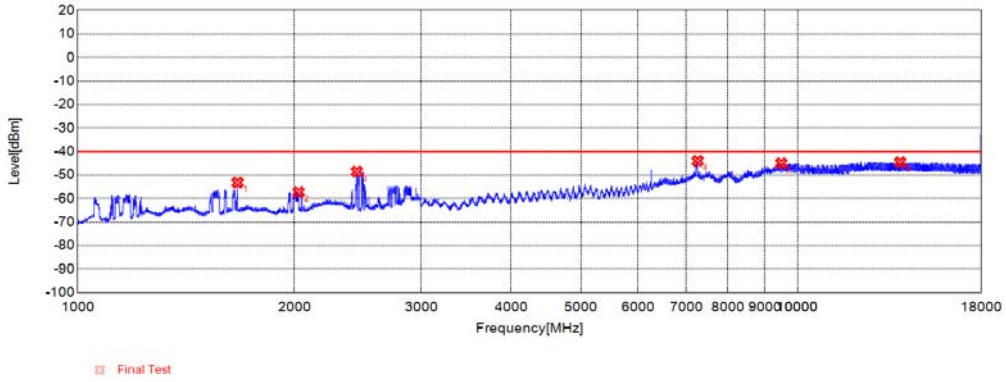


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1166.0550	-46.78	-40.00	Horizontal	PASS
2	1583.5280	-53.69	-40.00	Horizontal	PASS
3	2444.4810	-48.14	-40.00	Horizontal	PASS
4	3830.0920	-56.14	-40.00	Horizontal	PASS
5	7255.4730	-45.07	-40.00	Horizontal	PASS
6	13274.4750	-45.93	-40.00	Horizontal	PASS

LTE Band 48, 20MHz BW, High Channel, QPSK



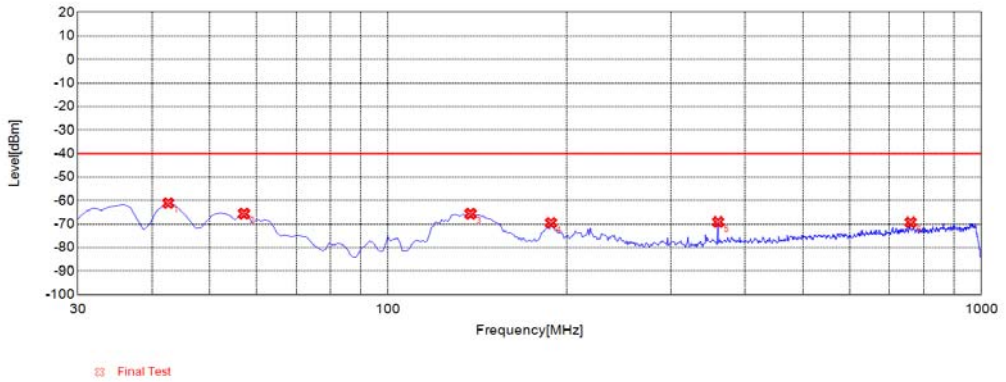
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	39.7100	-51.29	-40.00	Vertical	PASS
2	49.4190	-58.14	-40.00	Vertical	PASS
3	94.0840	-67.71	-40.00	Vertical	PASS
4	146.5170	-59.75	-40.00	Vertical	PASS
5	360.1300	-65.4	-40.00	Vertical	PASS
6	679.5800	-68.76	-40.00	Vertical	PASS



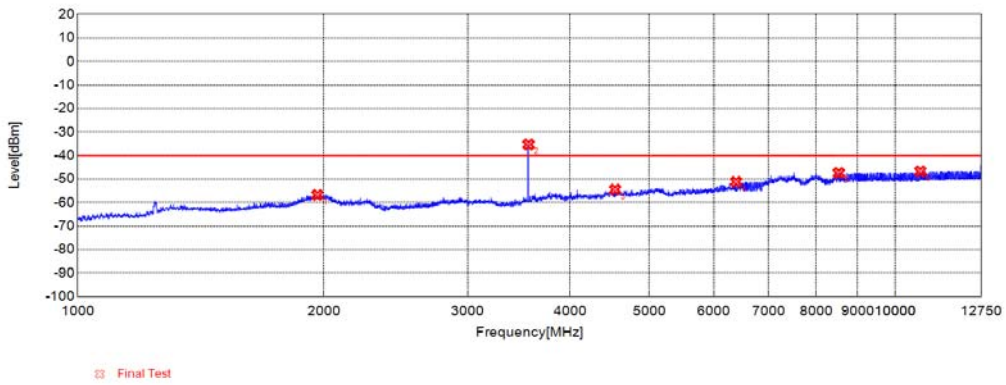
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1667.5560	-53.18	-40.00	Vertical	PASS
2	2026.3420	-57.28	-40.00	Vertical	PASS
3	2442.4810	-48.55	-40.00	Vertical	PASS
4	7263.8070	-44.02	-40.00	Vertical	PASS
5	9492.3880	-44.99	-40.00	Vertical	PASS
6	13887.8760	-44.56	-40.00	Vertical	PASS

Fixed External Antenna

LTE Band 48, 20MHz BW, Low Channel, QPSK

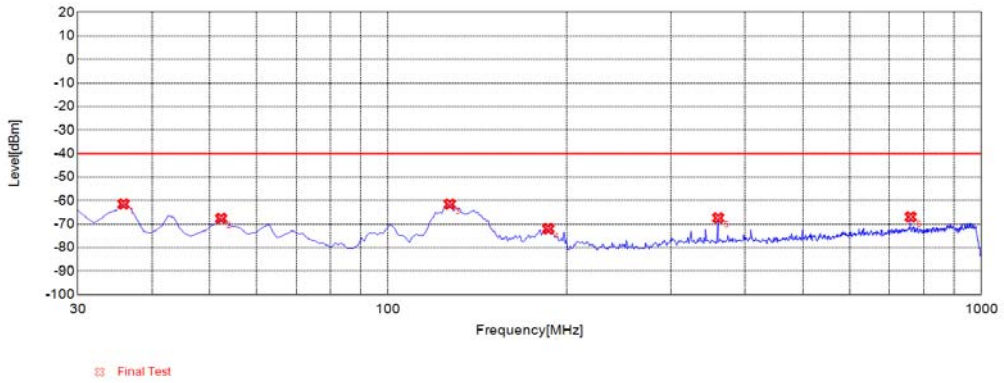


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	42.6230	-61.12	-40.00	Horizontal	PASS
2	57.1870	-65.6	-40.00	Horizontal	PASS
3	137.7780	-65.63	-40.00	Horizontal	PASS
4	188.2680	-69.46	-40.00	Horizontal	PASS
5	360.1300	-69.1	-40.00	Horizontal	PASS
6	760.1700	-69.27	-40.00	Horizontal	PASS

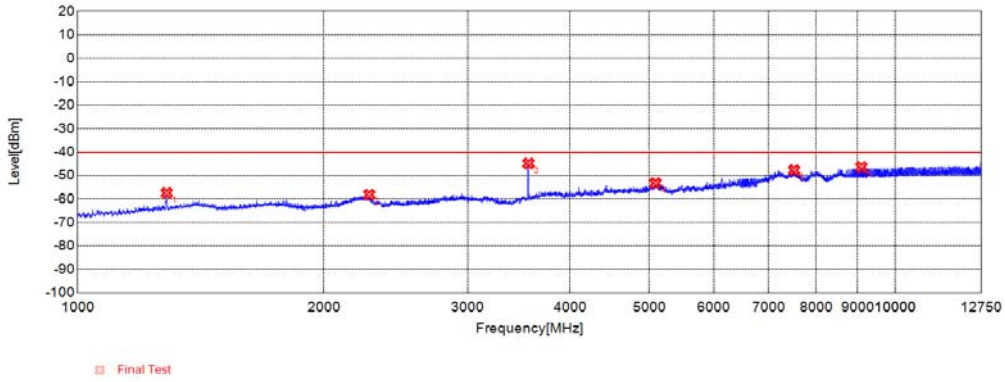


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1964.3210	-56.76	-40.00	Horizontal	PASS
2	3560.7180	-35.31	-40.00	Horizontal	N/A
3	4544.0070	-54.46	-40.00	Horizontal	PASS
4	6390.3150	-51.19	-40.00	Horizontal	PASS
5	8534.0470	-47.44	-40.00	Horizontal	PASS
6	10739.5400	-46.76	-40.00	Horizontal	PASS

LTE Band 48, 20MHz BW, Low Channel, QPSK

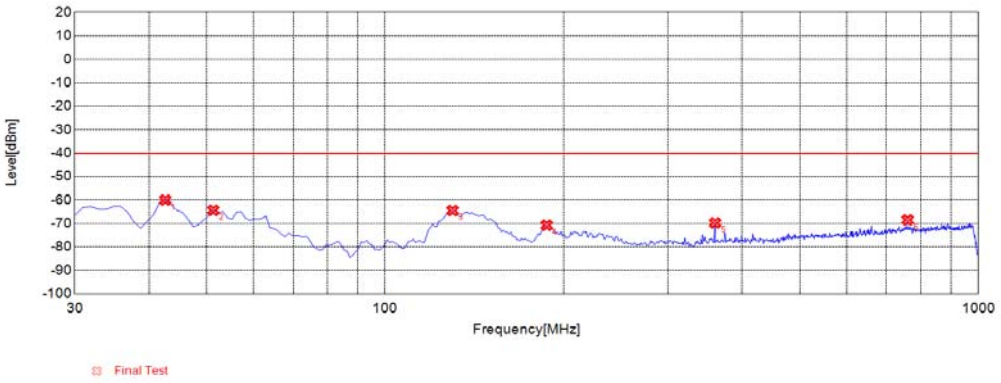


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	35.8260	-61.5	-40.00	Vertical	PASS
2	52.3320	-67.6	-40.00	Vertical	PASS
3	127.0970	-61.56	-40.00	Vertical	PASS
4	186.3260	-72.05	-40.00	Vertical	PASS
5	360.1300	-67.42	-40.00	Vertical	PASS
6	760.1700	-66.96	-40.00	Vertical	PASS

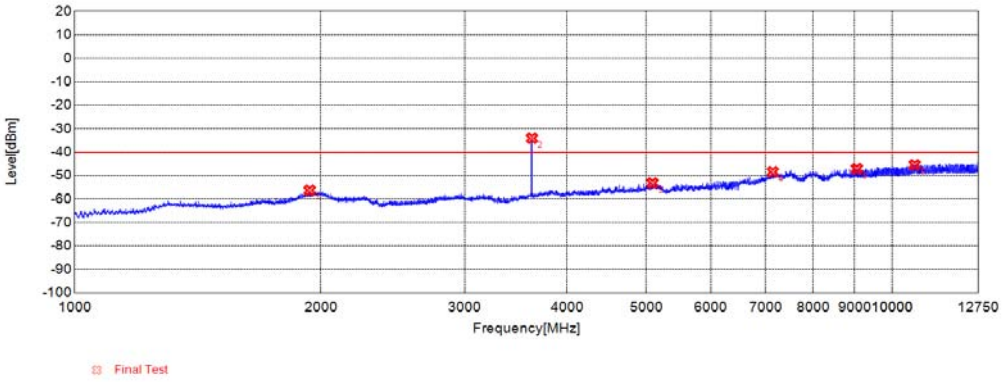


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1284.7620	-57.42	-40.00	Vertical	PASS
2	2273.0910	-58.13	-40.00	Vertical	PASS
3	3560.7180	-44.82	-40.00	Vertical	N/A
4	5091.7240	-53.23	-40.00	Vertical	PASS
5	7524.7540	-47.7	-40.00	Vertical	PASS
6	9094.7660	-46.4	-40.00	Vertical	PASS

LTE Band 48, 20MHz BW, Mid Channel, QPSK

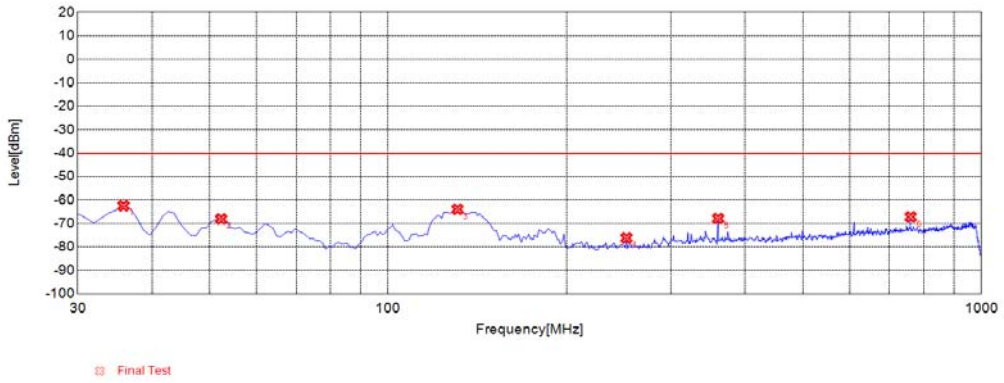


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	42.6230	-59.99	-40.00	Horizontal	PASS
2	51.3610	-64.38	-40.00	Horizontal	PASS
3	130.0100	-64.48	-40.00	Horizontal	PASS
4	187.2970	-70.75	-40.00	Horizontal	PASS
5	360.1300	-69.76	-40.00	Horizontal	PASS
6	760.1700	-68.48	-40.00	Horizontal	PASS

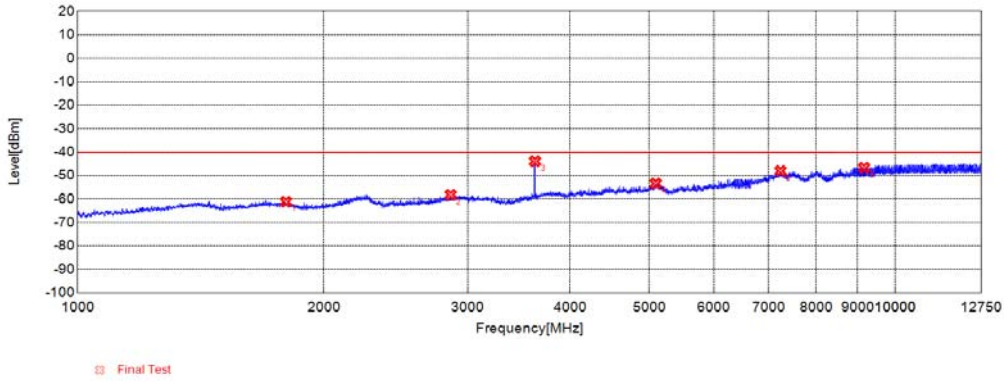


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1938.3130	-56.3	-40.00	Horizontal	PASS
2	3625.7290	-34.1	-40.00	Horizontal	N/A
3	5091.7240	-53.17	-40.00	Horizontal	PASS
4	7146.0660	-48.41	-40.00	Horizontal	PASS
5	9055.7590	-47.14	-40.00	Horizontal	PASS
6	10658.2760	-45.44	-40.00	Horizontal	PASS

LTE Band 48, 20MHz BW, Mid Channel, QPSK

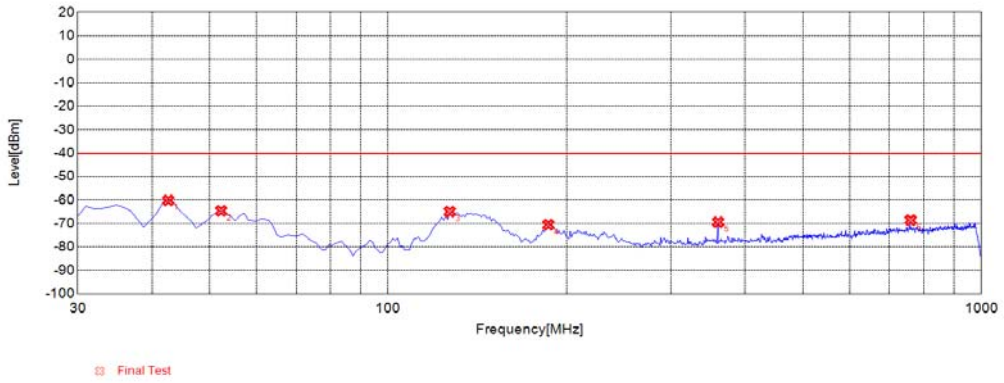


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	35.8260	-62.5	-40.00	Vertical	PASS
2	52.3320	-68.06	-40.00	Vertical	PASS
3	130.9810	-63.94	-40.00	Vertical	PASS
4	252.3520	-76.17	-40.00	Vertical	PASS
5	360.1300	-67.88	-40.00	Vertical	PASS
6	760.1700	-67.19	-40.00	Vertical	PASS

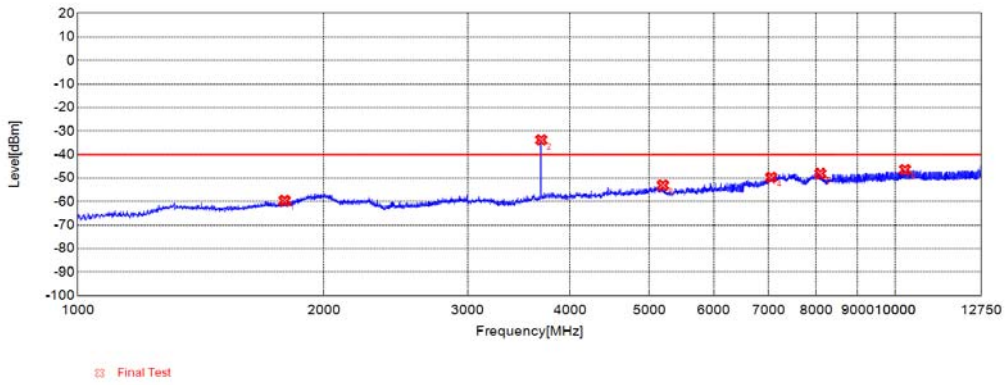


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1797.5990	-61.16	-40.00	Vertical	PASS
2	2859.2860	-58.21	-40.00	Vertical	PASS
3	3625.7290	-43.93	-40.00	Vertical	N/A
4	5094.9740	-53.36	-40.00	Vertical	PASS
5	7241.9570	-48.03	-40.00	Vertical	PASS
6	9164.6520	-46.67	-40.00	Vertical	PASS

LTE Band 48, 20MHz BW, High Channel, QPSK

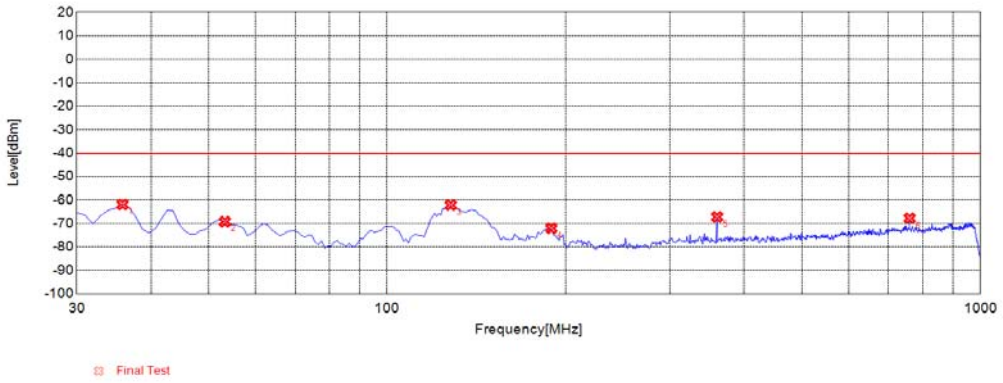


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	42.6230	-60.14	-40.00	Horizontal	PASS
2	52.3320	-64.62	-40.00	Horizontal	PASS
3	127.0970	-64.97	-40.00	Horizontal	PASS
4	186.3260	-70.52	-40.00	Horizontal	PASS
5	360.1300	-69.42	-40.00	Horizontal	PASS
6	760.1700	-68.58	-40.00	Horizontal	PASS

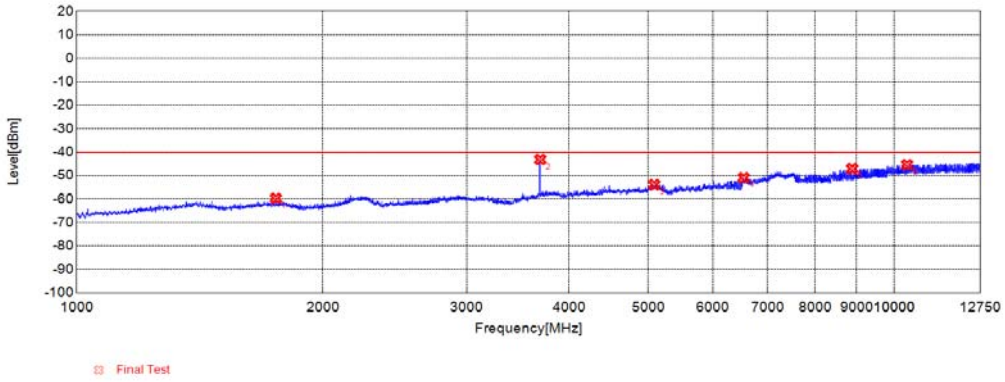


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1790.9300	-59.64	-40.00	Horizontal	PASS
2	3690.7400	-33.78	-40.00	Horizontal	N/A
3	5198.9910	-53.08	-40.00	Horizontal	PASS
4	7055.0510	-49.78	-40.00	Horizontal	PASS
5	8103.3510	-48.14	-40.00	Horizontal	PASS
6	10284.4640	-46.48	-40.00	Horizontal	PASS

LTE Band 48, 20MHz BW, High Channel, QPSK



No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	35.8260	-61.93	-40.00	Vertical	PASS
2	53.3030	-69.23	-40.00	Vertical	PASS
3	128.0680	-62.15	-40.00	Vertical	PASS
4	189.2390	-72.07	-40.00	Vertical	PASS
5	360.1300	-67.19	-40.00	Vertical	PASS
6	760.1700	-67.78	-40.00	Vertical	PASS



No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1752.2510	-59.7	-40.00	Vertical	PASS
2	3690.7400	-43.2	-40.00	Vertical	N/A
3	5088.4730	-53.86	-40.00	Vertical	PASS
4	6546.3410	-50.95	-40.00	Vertical	PASS
5	8886.7310	-47.09	-40.00	Vertical	PASS
6	10373.8540	-45.39	-40.00	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	MY54170556	N9030A	Agilent	2022.10.10	2023.10.09
Communication Test Station	6261830572	MT8821C	Anritsu	2022.02.14	2023.02.13
Temperature Chamber	S022177101 00089002	KMT-36LF 1A0	KOMEG	2022.11.18	2023.11.17

4.2 List of Software Used

Description	Manufacturer	Software Version
Morlab FCC Test System	MORLAB	V3.1
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
System Simulator	MY48364176	8960-E5515C	Agilent	2022.03.01	2023.02.28
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-KK-0.5	Qualwave	2022.07.08	2023.07.07
RF Coaxial Cable (DC-40GHz)	22290046	QA360-40-KK F-2	Qualwave	2022.07.08	2023.07.07
Preamplifier (10MHz-6GHz)	46732	S10M100L3802	LUCIX CORP.	2022.07.08	2023.07.07
Preamplifier (2GHz-18GHz)	61171/61172	S020180L3203	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 B48	Wainwright	2022.07.08	2023.07.07
Anechoic Chamber	N/A	9m*6m*6m	CRT	2022.05.10	2025.05.09

END OF REPORT