



REPORT No.: SZ24060210W05

TEST REPORT

APPLICANT : Sonim Technologies, Inc.

PRODUCT NAME : Mobile Hotspot

MODEL NAME : H500V

BRAND NAME : Sonim

FCC ID : WYPH500V

STANDARD(S) : 47 CFR Part 2
47 CFR Part 96

RECEIPT DATE : 2023-11-01

TEST DATE : 2024-08-13 to 2024-09-12

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Change History		
Version	Date	Reason for change
1.0	2024-09-20	First edition



1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Sonim Technologies, Inc.
Applicant Address:	4445 Eastgate Mall, Suite 200, San Diego, CA 92121, USA
Manufacturer:	Sonim Technologies, Inc.
Manufacturer Address:	4445 Eastgate Mall, Suite 200, San Diego, CA 92121, USA

1.2. Equipment Under Test (EUT) Description

Product Name:	Mobile Hotspot	
Sample No.:	12#	
Hardware Version:	V2.0	
Software Version:	H50.0-03-5.4.0-15.32.00	
Modulation Type:	QPSK, 16QAM, 64QAM, 256QAM	
Operation Band:	Band 48	
Carrier Aggregation(UL):	CA_13A-66A, CA_2A-13A, CA_2A-4A, CA_2A-5A, CA_2A-66A, CA_48C, CA_4A-13A, CA_4A-5A, CA_5A-66A, CA_66B, CA_66C	
Frequency Range:	LTE Band 48	Tx: 3550MHz-3700MHz
		Rx: 3550MHz-3700MHz
Channel Bandwidth	LTE Band 48	5MHz, 10MHz, 15MHz, 20MHz
Antenna Type:	PIFA Antenna	
Antenna Gain:	LTE Band 48	ANT 2: -0.14dBi
Accessory Information:	Battery	
	Brand Name:	sonim
	Model No.:	BAT-06000-01S
	Serial No.:	N/A
	Capacity:	6000mAh
	Rated Voltage:	3.85V
	Charge Limit:	4.4V
	Manufacturer:	Guangdong Fenghua New Energy Co.,Ltd.



Accessory Information:	AC Adapter	
	Brand Name:	N/A
	Model No.:	1-CHUSQ302-097
	Serial No.:	N/A
	Rated Output:	5V $\overline{=}$ 3A or 9V $\overline{=}$ 2A or 12V $\overline{=}$ 1.5A
	Rated Input:	100-240V $\sim$ 50/60Hz, 0.5A
	Manufacturer:	HUIZHOU PUAN ELEOTRONICS CO.,LTD

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



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

LTE Band 48	Maximum E.R.P./E.I.R.P. (W)				Emission Designator (99%OBW)			
BW (MHz)	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
20	0.158	0.120	0.092	0.044	18M0G7D	17M9W7D	17M9W7D	17M8W7D
15	0.143	0.121	0.093	0.044	13M4G7D	13M4W7D	13M4W7D	13M4W7D
10	0.143	0.120	0.093	0.044	8M96G7D	8M95W7D	8M99W7D	8M94W7D
5	0.142	0.118	0.092	0.044	4M48G7D	4M48W7D	4M48W7D	4M48W7D



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	Sep. 12, 2024	Yu Xiaoming Gan Jing	PASS	No deviation
2.1049	Occupied Bandwidth	Aug. 20, 2024	Gan Jing	PASS	No deviation
96.41(g)	Peak -Average Ratio	Aug. 20, 2024	Gan Jing	PASS	No deviation
2.1055	Frequency Stability	Sep. 11, 2024	Gan Jing	PASS	No deviation
2.1051, 96.41(e)	Conducted Spurious Emissions	Aug. 20, 2024	Gan Jing	PASS	No deviation
2.1051, 96.41(e)	Band Edge	Aug. 17, 2024	Gan Jing	PASS	No deviation
2.1051, 96.41(e)	Radiated Spurious Emissions	Aug. 31, 2024	Li Hanbin	PASS	No deviation

Note 1: The tests were performed according to the method of measurements prescribed in KDB971168 D01 v03r01 and ANSI/TIA-603-E-2016.

Note 2: 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 3: 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

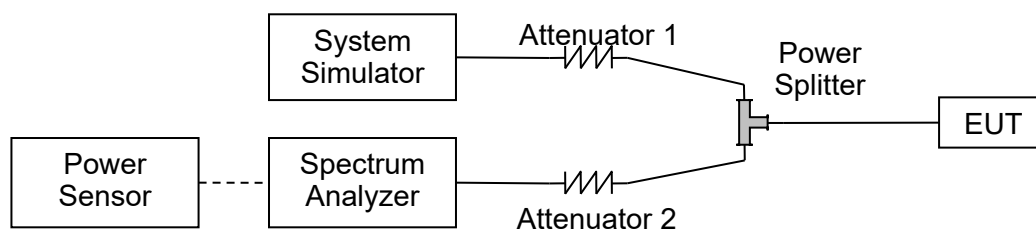
According to FCC section 2.1046(a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current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

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

$ERP\ (dBm) = EIPR\ (dBm) - 2.15$

**2.1.4.Result****Conducted Output Power:**

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	22.06	22.12	21.99
20	QPSK	1	49	21.56	21.58	21.60
20	QPSK	1	99	21.62	21.62	21.56
20	QPSK	50	0	21.16	21.19	20.92
20	QPSK	50	24	20.61	20.66	20.59
20	QPSK	50	50	20.61	20.74	20.39
20	QPSK	100	0	20.63	20.63	20.37
20	16QAM	1	0	20.89	20.94	20.74
20	16QAM	1	49	20.79	20.76	20.60
20	16QAM	1	99	20.77	20.82	20.63
20	16QAM	50	0	19.55	19.63	19.57
20	16QAM	50	24	19.57	19.66	19.38
20	16QAM	50	50	19.55	19.68	19.32
20	16QAM	100	0	19.58	19.62	19.42
20	64QAM	1	0	19.75	19.80	19.66
20	64QAM	1	49	19.75	19.71	19.58
20	64QAM	1	99	19.56	19.72	19.44
20	64QAM	50	0	19.55	19.69	19.41
20	64QAM	50	24	19.44	19.56	19.45
20	64QAM	50	50	19.60	19.55	19.36
20	64QAM	100	0	19.55	19.63	19.31
20	256QAM	1	0	16.56	16.57	16.29
20	256QAM	1	49	16.44	16.46	16.50
20	256QAM	1	99	16.44	16.26	16.34
20	256QAM	50	0	15.29	15.62	15.34
20	256QAM	50	24	15.35	15.52	15.47
20	256QAM	50	50	15.34	15.33	15.31
20	256QAM	100	0	15.34	15.54	15.19



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	56665.15
Frequency (MHz)				3557.5	3625	3692.65
15	QPSK	1	0	21.60	21.68	21.62
15	QPSK	1	37	21.54	21.57	21.60
15	QPSK	1	74	21.56	21.62	21.52
15	QPSK	36	0	20.66	20.72	20.66
15	QPSK	36	20	20.68	20.70	20.72
15	QPSK	36	39	20.69	20.72	20.58
15	QPSK	75	0	20.59	20.67	20.71
15	16QAM	1	0	20.95	20.91	20.93
15	16QAM	1	37	20.89	20.76	20.78
15	16QAM	1	74	20.77	20.80	20.66
15	16QAM	36	0	19.53	19.70	19.61
15	16QAM	36	20	19.50	19.61	19.55
15	16QAM	36	39	19.47	19.57	19.57
15	16QAM	75	0	19.49	19.53	19.61
15	64QAM	1	0	19.70	19.72	19.82
15	64QAM	1	37	19.71	19.64	19.68
15	64QAM	1	74	19.67	19.54	19.60
15	64QAM	36	0	19.47	19.56	19.66
15	64QAM	36	20	19.53	19.41	19.52
15	64QAM	36	39	19.47	19.63	19.55
15	64QAM	75	0	19.44	19.44	19.40
15	256QAM	1	0	16.56	16.52	16.26
15	256QAM	1	37	16.29	16.43	16.62
15	256QAM	1	74	16.53	16.34	16.28
15	256QAM	36	0	15.31	15.59	15.38
15	256QAM	36	20	15.44	15.54	15.50
15	256QAM	36	39	15.35	15.34	15.24
15	256QAM	75	0	15.35	15.46	15.27



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	21.58	21.67	21.51
10	QPSK	1	25	21.62	21.68	21.34
10	QPSK	1	49	21.53	21.65	21.49
10	QPSK	25	0	20.75	20.84	20.54
10	QPSK	25	12	20.71	20.64	20.61
10	QPSK	25	25	20.59	20.62	20.55
10	QPSK	50	0	20.60	20.76	20.51
10	16QAM	1	0	20.93	20.83	20.68
10	16QAM	1	25	20.73	20.75	20.67
10	16QAM	1	49	20.83	20.78	20.65
10	16QAM	25	0	19.54	19.66	19.61
10	16QAM	25	12	19.55	19.74	19.36
10	16QAM	25	25	19.47	19.52	19.41
10	16QAM	50	0	19.48	19.67	19.50
10	64QAM		0	19.74	19.72	19.63
10	64QAM	1	25	19.63	19.81	19.47
10	64QAM	1	49	19.52	19.71	19.45
10	64QAM	25	0	19.64	19.70	19.54
10	64QAM	25	12	19.45	19.53	19.49
10	64QAM	25	25	19.53	19.52	19.38
10	64QAM	50	0	19.40	19.61	19.30
10	256QAM	1	0	16.53	16.50	16.33
10	256QAM	1	25	16.27	16.48	16.52
10	256QAM	1	49	16.51	16.24	16.26
10	256QAM	25	0	15.38	15.63	15.47
10	256QAM	25	12	15.42	15.53	15.52
10	256QAM	25	25	15.52	15.41	15.23
10	256QAM	50	0	15.30	15.60	15.27



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	21.63	21.65	21.51
5	QPSK	1	12	21.54	21.59	21.42
5	QPSK	1	24	21.52	21.53	21.42
5	QPSK	12	0	20.82	20.73	20.69
5	QPSK	12	7	20.73	20.82	20.42
5	QPSK	12	13	20.54	20.72	20.39
5	QPSK	25	0	20.62	20.59	20.39
5	16QAM	1	0	20.85	20.84	20.76
5	16QAM	1	12	20.77	20.80	20.58
5	16QAM	1	24	20.81	20.83	20.53
5	16QAM	12	0	19.64	19.68	19.59
5	16QAM	12	7	19.59	19.61	19.44
5	16QAM	12	13	19.45	19.69	19.40
5	16QAM	25	0	19.60	19.59	19.46
5	64QAM	1	0	19.79	19.74	19.61
5	64QAM	1	12	19.65	19.69	19.46
5	64QAM	1	24	19.60	19.67	19.53
5	64QAM	12	0	19.56	19.62	19.39
5	64QAM	12	7	19.41	19.44	19.56
5	64QAM	12	13	19.63	19.49	19.46
5	64QAM	25	0	19.55	19.44	19.37
5	256QAM	1	0	16.59	16.52	16.40
5	256QAM	1	12	16.36	16.43	16.59
5	256QAM	1	24	16.47	16.40	16.20
5	256QAM	12	0	15.41	15.54	15.50
5	256QAM	12	7	15.37	15.55	15.61
5	256QAM	12	13	15.33	15.33	15.29
5	256QAM	25	0	15.30	15.56	15.32

**Effective Radiated Power and Effective Isotropic Radiated Power:**

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	21.92	0.156	21.98	0.158	21.85	0.153
20	QPSK	1	49	21.42	0.139	21.44	0.139	21.46	0.140
20	QPSK	1	99	21.48	0.141	21.48	0.141	21.42	0.139
20	QPSK	50	0	21.02	0.126	21.05	0.127	20.78	0.120
20	QPSK	50	24	20.47	0.111	20.52	0.113	20.45	0.111
20	QPSK	50	50	20.47	0.111	20.60	0.115	20.25	0.106
20	QPSK	100	0	20.49	0.112	20.49	0.112	20.23	0.105
20	16QAM	1	0	20.75	0.119	20.80	0.120	20.60	0.115
20	16QAM	1	49	20.65	0.116	20.62	0.115	20.46	0.111
20	16QAM	1	99	20.63	0.116	20.68	0.117	20.49	0.112
20	16QAM	50	0	19.41	0.087	19.49	0.089	19.43	0.088
20	16QAM	50	24	19.43	0.088	19.52	0.090	19.24	0.084
20	16QAM	50	50	19.41	0.087	19.54	0.090	19.18	0.083
20	16QAM	100	0	19.44	0.088	19.48	0.089	19.28	0.085
20	64QAM	1	0	19.61	0.091	19.66	0.092	19.52	0.090
20	64QAM	1	49	19.61	0.091	19.57	0.091	19.44	0.088
20	64QAM	1	99	19.42	0.087	19.58	0.091	19.30	0.085
20	64QAM	50	0	19.41	0.087	19.55	0.090	19.27	0.085
20	64QAM	50	24	19.30	0.085	19.42	0.087	19.31	0.085
20	64QAM	50	50	19.46	0.088	19.41	0.087	19.22	0.084
20	64QAM	100	0	19.41	0.087	19.49	0.089	19.17	0.083
20	256QAM	1	0	16.42	0.044	16.43	0.044	16.15	0.041
20	256QAM	1	49	16.30	0.043	16.32	0.043	16.36	0.043
20	256QAM	1	99	16.30	0.043	16.12	0.041	16.20	0.042
20	256QAM	50	0	15.15	0.033	15.48	0.035	15.20	0.033
20	256QAM	50	24	15.21	0.033	15.38	0.035	15.33	0.034
20	256QAM	50	50	15.20	0.033	15.19	0.033	15.17	0.033
20	256QAM	100	0	15.20	0.033	15.40	0.035	15.05	0.032



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	21.46	0.140	21.54	0.143	21.48	0.141
15	QPSK	1	37	21.40	0.138	21.43	0.139	21.46	0.140
15	QPSK	1	74	21.42	0.139	21.48	0.141	21.38	0.137
15	QPSK	36	0	20.52	0.113	20.58	0.114	20.52	0.113
15	QPSK	36	20	20.54	0.113	20.56	0.114	20.58	0.114
15	QPSK	36	39	20.55	0.114	20.58	0.114	20.44	0.111
15	QPSK	75	0	20.45	0.111	20.53	0.113	20.57	0.114
15	16QAM	1	0	20.81	0.121	20.77	0.119	20.79	0.120
15	16QAM	1	37	20.75	0.119	20.62	0.115	20.64	0.116
15	16QAM	1	74	20.63	0.116	20.66	0.116	20.52	0.113
15	16QAM	36	0	19.39	0.087	19.56	0.090	19.47	0.089
15	16QAM	36	20	19.36	0.086	19.47	0.089	19.41	0.087
15	16QAM	36	39	19.33	0.086	19.43	0.088	19.43	0.088
15	16QAM	75	0	19.35	0.086	19.39	0.087	19.47	0.089
15	64QAM	1	0	19.56	0.090	19.58	0.091	19.68	0.093
15	64QAM	1	37	19.57	0.091	19.50	0.089	19.54	0.090
15	64QAM	1	74	19.53	0.090	19.40	0.087	19.46	0.088
15	64QAM	36	0	19.33	0.086	19.42	0.087	19.52	0.090
15	64QAM	36	20	19.39	0.087	19.27	0.085	19.38	0.087
15	64QAM	36	39	19.33	0.086	19.49	0.089	19.41	0.087
15	64QAM	75	0	19.30	0.085	19.30	0.085	19.26	0.084
15	256QAM	1	0	16.42	0.044	16.38	0.043	16.12	0.041
15	256QAM	1	37	16.15	0.041	16.29	0.043	16.48	0.044
15	256QAM	1	74	16.39	0.044	16.20	0.042	16.14	0.041
15	256QAM	36	0	15.17	0.033	15.45	0.035	15.24	0.033
15	256QAM	36	20	15.30	0.034	15.40	0.035	15.36	0.034
15	256QAM	36	39	15.21	0.033	15.20	0.033	15.10	0.032
15	256QAM	75	0	15.21	0.033	15.32	0.034	15.13	0.033



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	21.44	0.139	21.53	0.142	21.37	0.137
10	QPSK	1	25	21.48	0.141	21.54	0.143	21.20	0.132
10	QPSK	1	49	21.39	0.138	21.51	0.142	21.35	0.136
10	QPSK	25	0	20.61	0.115	20.70	0.117	20.40	0.110
10	QPSK	25	12	20.57	0.114	20.50	0.112	20.47	0.111
10	QPSK	25	25	20.45	0.111	20.48	0.112	20.41	0.110
10	QPSK	50	0	20.46	0.111	20.62	0.115	20.37	0.109
10	16QAM	1	0	20.79	0.120	20.69	0.117	20.54	0.113
10	16QAM	1	25	20.59	0.115	20.61	0.115	20.53	0.113
10	16QAM	1	49	20.69	0.117	20.64	0.116	20.51	0.112
10	16QAM	25	0	19.40	0.087	19.52	0.090	19.47	0.089
10	16QAM	25	12	19.41	0.087	19.60	0.091	19.22	0.084
10	16QAM	25	25	19.33	0.086	19.38	0.087	19.27	0.085
10	16QAM	50	0	19.34	0.086	19.53	0.090	19.36	0.086
10	64QAM	1	0	19.60	0.091	19.58	0.091	19.49	0.089
10	64QAM	1	25	19.49	0.089	19.67	0.093	19.33	0.086
10	64QAM	1	49	19.38	0.087	19.57	0.091	19.31	0.085
10	64QAM	25	0	19.50	0.089	19.56	0.090	19.40	0.087
10	64QAM	25	12	19.31	0.085	19.39	0.087	19.35	0.086
10	64QAM	25	25	19.39	0.087	19.38	0.087	19.24	0.084
10	64QAM	50	0	19.26	0.084	19.47	0.089	19.16	0.082
10	256QAM	1	0	16.39	0.044	16.36	0.043	16.19	0.042
10	256QAM	1	25	16.13	0.041	16.34	0.043	16.38	0.043
10	256QAM	1	49	16.37	0.043	16.10	0.041	16.12	0.041
10	256QAM	25	0	15.24	0.033	15.49	0.035	15.33	0.034
10	256QAM	25	12	15.28	0.034	15.39	0.035	15.38	0.035
10	256QAM	25	25	15.38	0.035	15.27	0.034	15.09	0.032
10	256QAM	50	0	15.16	0.033	15.46	0.035	15.13	0.033



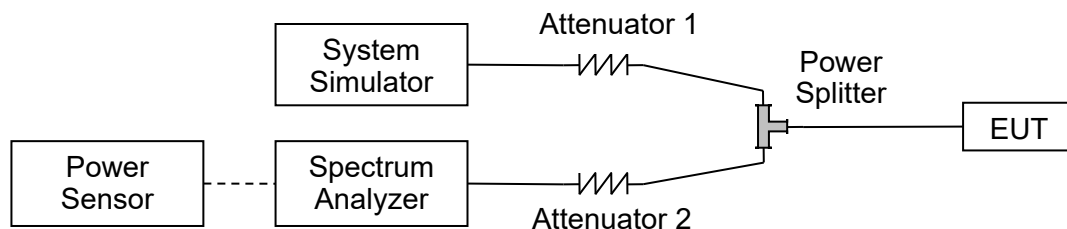
LTE Band 48				Measured E.I.R.P.					
BW [MHz]	Modulation	RB Size	RB Offset	Low Ch. / Freq.		Middle Ch. / Freq.		High Ch. / Freq.	
Channel				55265		55990		56175	
Frequency (MHz)				3552.5		3625		3697.5	
				dBm	W	dBm	W	dBm	W
5	QPSK	1	0	21.49	0.141	21.51	0.142	21.37	0.137
5	QPSK	1	12	21.40	0.138	21.45	0.140	21.28	0.134
5	QPSK	1	24	21.38	0.137	21.39	0.138	21.28	0.134
5	QPSK	12	0	20.68	0.117	20.59	0.115	20.55	0.114
5	QPSK	12	7	20.59	0.115	20.68	0.117	20.28	0.107
5	QPSK	12	13	20.40	0.110	20.58	0.114	20.25	0.106
5	QPSK	25	0	20.48	0.112	20.45	0.111	20.25	0.106
5	16QAM	1	0	20.71	0.118	20.70	0.117	20.62	0.115
5	16QAM	1	12	20.63	0.116	20.66	0.116	20.44	0.111
5	16QAM	1	24	20.67	0.117	20.69	0.117	20.39	0.109
5	16QAM	12	0	19.50	0.089	19.54	0.090	19.45	0.088
5	16QAM	12	7	19.45	0.088	19.47	0.089	19.30	0.085
5	16QAM	12	13	19.31	0.085	19.55	0.090	19.26	0.084
5	16QAM	25	0	19.46	0.088	19.45	0.088	19.32	0.086
5	64QAM	1	0	19.65	0.092	19.60	0.091	19.47	0.089
5	64QAM	1	12	19.51	0.089	19.55	0.090	19.32	0.086
5	64QAM	1	24	19.46	0.088	19.53	0.090	19.39	0.087
5	64QAM	12	0	19.42	0.087	19.48	0.089	19.25	0.084
5	64QAM	12	7	19.27	0.085	19.30	0.085	19.42	0.087
5	64QAM	12	13	19.49	0.089	19.35	0.086	19.32	0.086
5	64QAM	25	0	19.41	0.087	19.30	0.085	19.23	0.084
5	256QAM	1	0	16.45	0.044	16.38	0.043	16.26	0.042
5	256QAM	1	12	16.22	0.042	16.29	0.043	16.45	0.044
5	256QAM	1	24	16.33	0.043	16.26	0.042	16.06	0.040
5	256QAM	12	0	15.27	0.034	15.40	0.035	15.36	0.034
5	256QAM	12	7	15.23	0.033	15.41	0.035	15.47	0.035
5	256QAM	12	13	15.19	0.033	15.19	0.033	15.15	0.033
5	256QAM	25	0	15.16	0.033	15.42	0.035	15.18	0.033

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

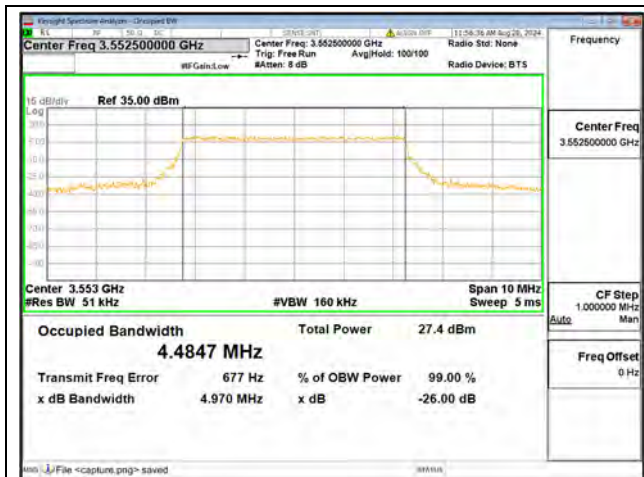
KDB 971168 D01v03 Section 4.1 and ANSI/TIA-603-E-2016.

**2.2.4. Test Result**

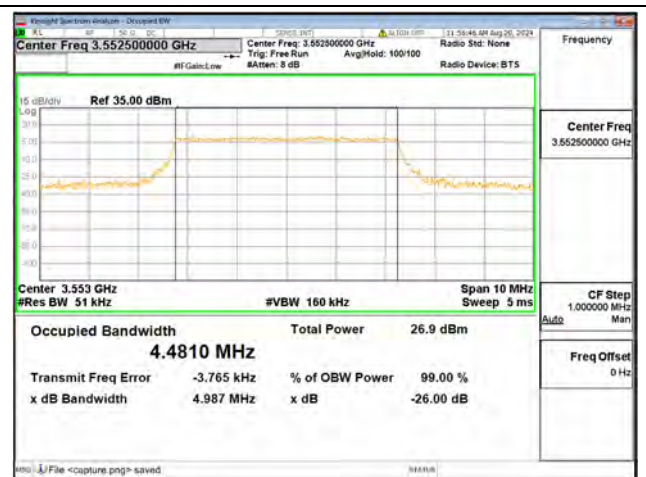
LTE Band	BW(MHz)	Channel Level	Channel	Frequency (MHz)	Modulation	99% BW (MHz)	26dB BW (MHz)	Verdict
B48	5	Low	55265	3552.5	QPSK	4.4847	4.9695	PASS
B48	5	Low	55265	3552.5	16QAM	4.4810	4.9869	PASS
B48	5	Low	55265	3552.5	64QAM	4.4791	4.9303	PASS
B48	5	Low	55265	3552.5	256QAM	4.4836	4.9843	PASS
B48	5	Mid	55990	3625	QPSK	4.4822	4.9079	PASS
B48	5	Mid	55990	3625	16QAM	4.4636	4.9595	PASS
B48	5	Mid	55990	3625	64QAM	4.4793	4.8954	PASS
B48	5	Mid	55990	3625	256QAM	4.4835	4.9667	PASS
B48	5	High	56715	3697.5	QPSK	4.4592	5.0768	PASS
B48	5	High	56715	3697.5	16QAM	4.4728	4.9555	PASS
B48	5	High	56715	3697.5	64QAM	4.4667	4.9008	PASS
B48	5	High	56715	3697.5	256QAM	4.4580	4.9386	PASS
B48	10	Low	55290	3555	QPSK	8.9397	9.7984	PASS
B48	10	Low	55290	3555	16QAM	8.9417	9.8231	PASS
B48	10	Low	55290	3555	64QAM	8.9515	9.7774	PASS
B48	10	Low	55290	3555	256QAM	8.9429	9.6349	PASS
B48	10	Mid	55990	3625	QPSK	8.9628	9.4820	PASS
B48	10	Mid	55990	3625	16QAM	8.9235	9.5583	PASS
B48	10	Mid	55990	3625	64QAM	8.9856	9.6866	PASS
B48	10	Mid	55990	3625	256QAM	8.6742	8.9815	PASS
B48	10	High	56690	3695	QPSK	8.9447	9.7678	PASS
B48	10	High	56690	3695	16QAM	8.9495	9.7074	PASS
B48	10	High	56690	3695	64QAM	8.9416	9.6919	PASS
B48	10	High	56690	3695	256QAM	8.3111	8.7114	PASS
B48	15	Low	55315	3557.5	QPSK	13.430	14.438	PASS
B48	15	Low	55315	3557.5	16QAM	13.425	14.535	PASS
B48	15	Low	55315	3557.5	64QAM	13.419	14.484	PASS
B48	15	Low	55315	3557.5	256QAM	13.231	13.732	PASS
B48	15	Mid	55990	3625	QPSK	13.353	14.424	PASS
B48	15	Mid	55990	3625	16QAM	13.395	14.385	PASS
B48	15	Mid	55990	3625	64QAM	13.415	14.418	PASS
B48	15	Mid	55990	3625	256QAM	13.230	14.058	PASS
B48	15	High	56665	3692.5	QPSK	13.410	14.362	PASS



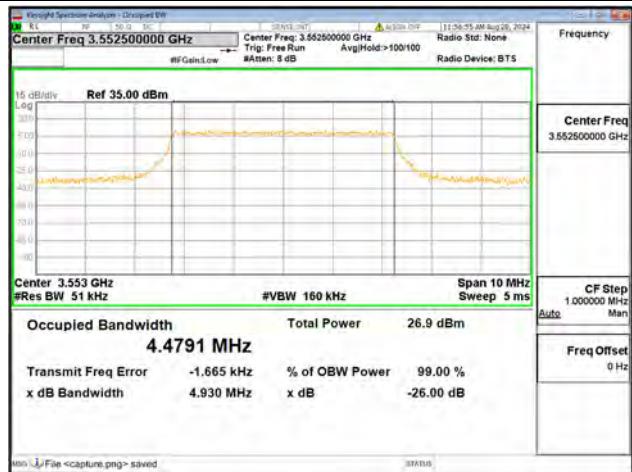
B48	15	High	56665	3692.5	16QAM	13.444	14.227	PASS
B48	15	High	56665	3692.5	64QAM	13.365	14.196	PASS
B48	15	High	56665	3692.5	256QAM	13.418	13.895	PASS
B48	20	Low	55340	3560	QPSK	17.873	19.390	PASS
B48	20	Low	55340	3560	16QAM	17.874	19.383	PASS
B48	20	Low	55340	3560	64QAM	17.854	19.242	PASS
B48	20	Low	55340	3560	256QAM	17.758	18.576	PASS
B48	20	Mid	55990	3625	QPSK	17.955	19.020	PASS
B48	20	Mid	55990	3625	16QAM	17.807	18.723	PASS
B48	20	Mid	55990	3625	64QAM	17.810	19.050	PASS
B48	20	Mid	55990	3625	256QAM	17.762	18.498	PASS
B48	20	High	56640	3690	QPSK	17.912	18.956	PASS
B48	20	High	56640	3690	16QAM	17.839	19.004	PASS
B48	20	High	56640	3690	64QAM	17.846	18.609	PASS
B48	20	High	56640	3690	256QAM	17.769	18.672	PASS



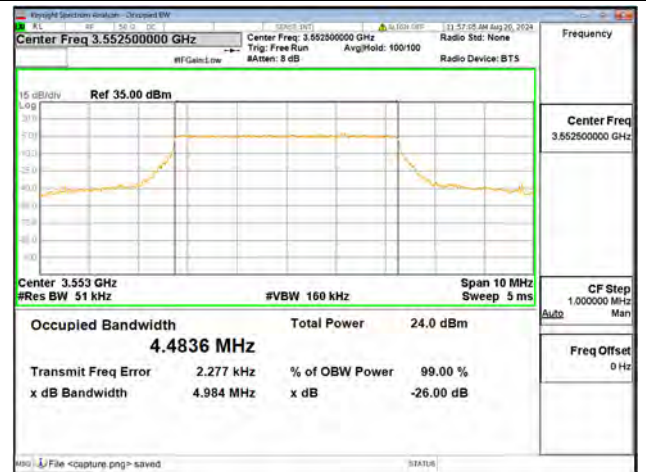
B48 / 5MHz / QPSK/ Low CH



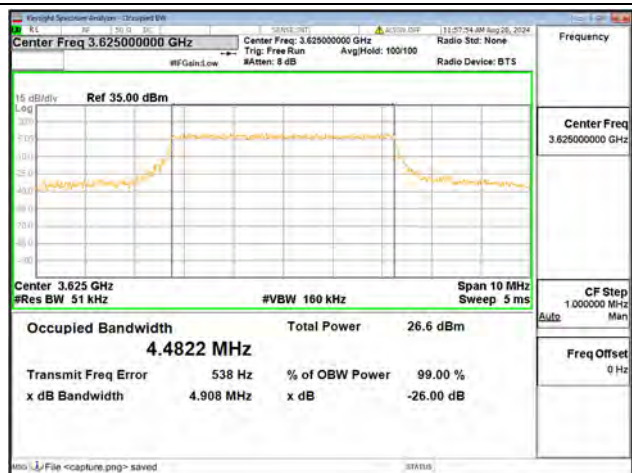
B48 / 5MHz / 16QAM/ Low CH



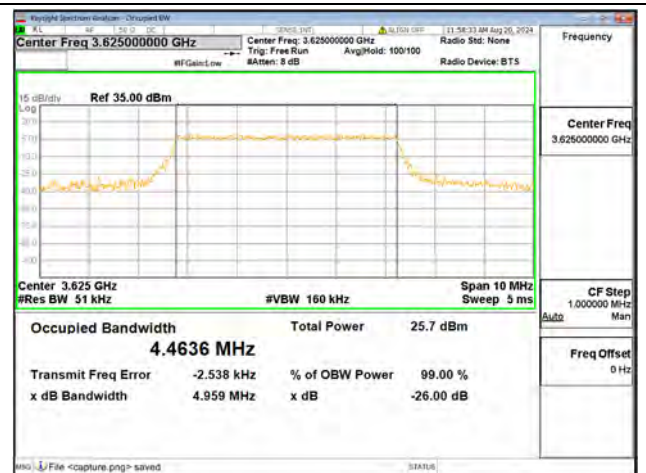
B48 / 5MHz / 64QAM/ Low CH



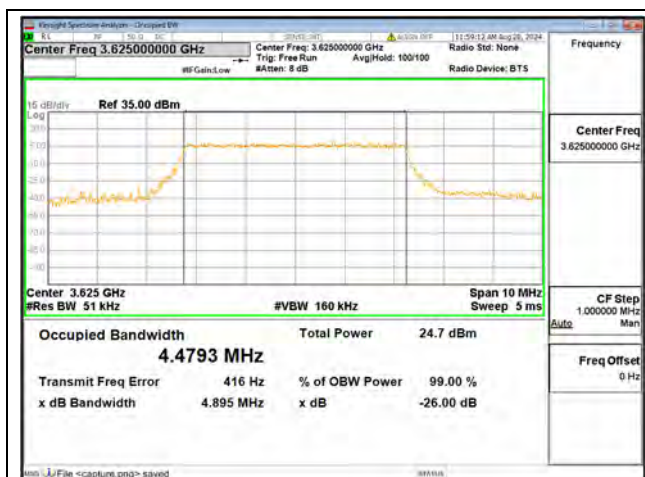
B48 / 5MHz / 256QAM/ Low CH



B48 / 5MHz / QPSK/ Mid CH



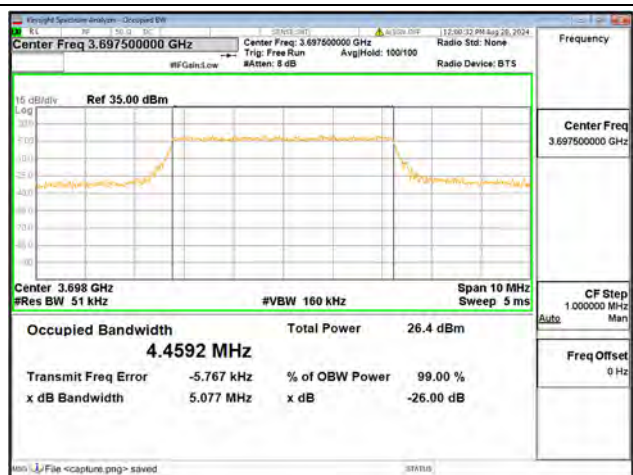
B48 / 5MHz / 16QAM/ Mid CH



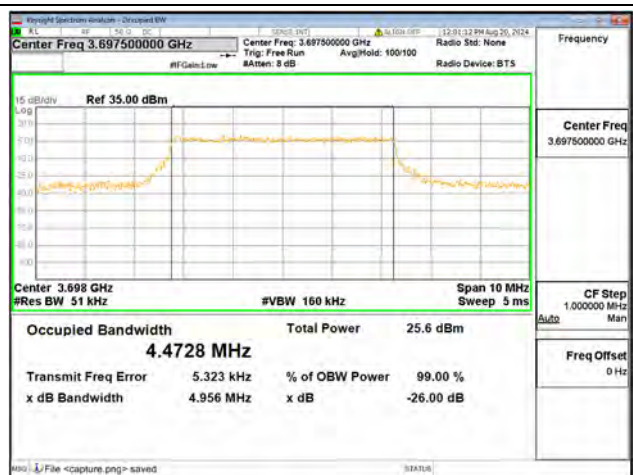
B48 / 5MHz / 64QAM/ Mid CH



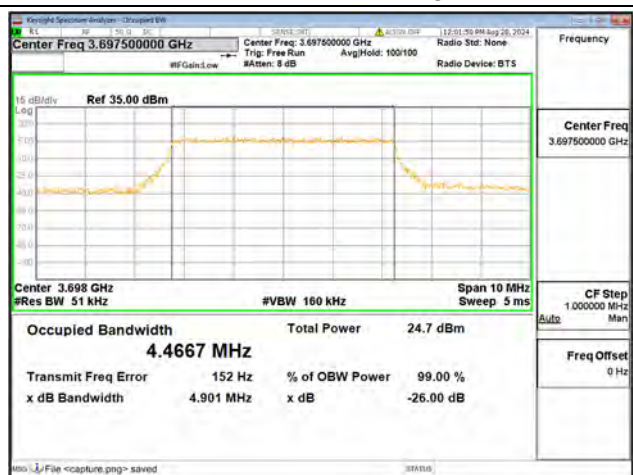
B48 / 5MHz / 256QAM/ Mid CH



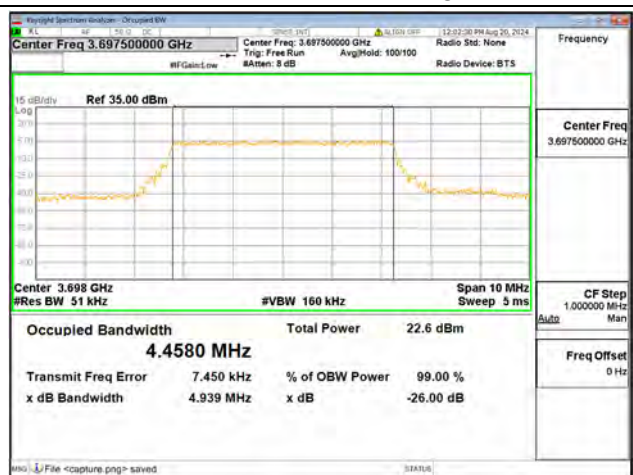
B48 / 5MHz / QPSK/ High CH



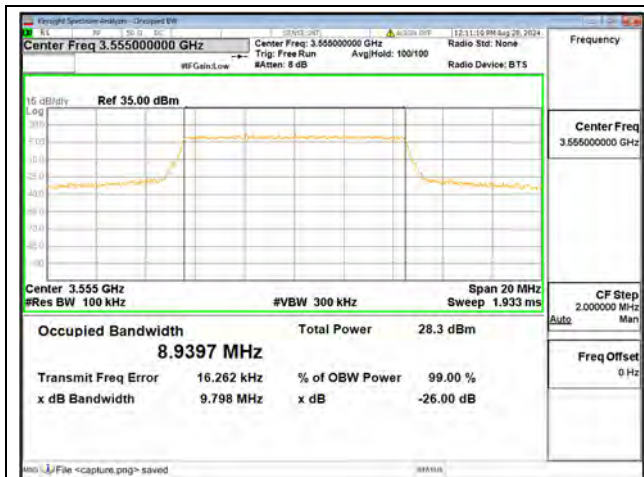
B48 / 5MHz / 16QAM/ High CH



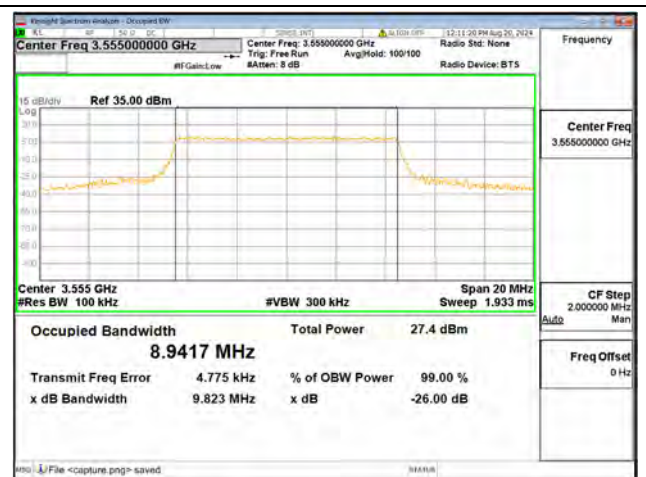
B48 / 5MHz / 64QAM/ High CH



B48 / 5MHz / 256QAM/ High CH



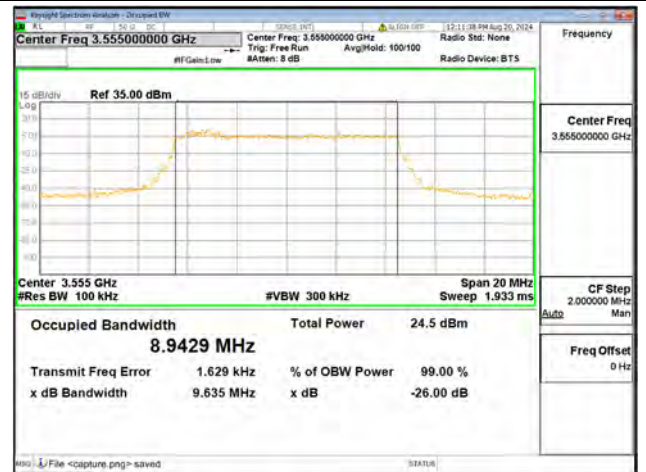
B48 / 10MHz / QPSK/ Low CH



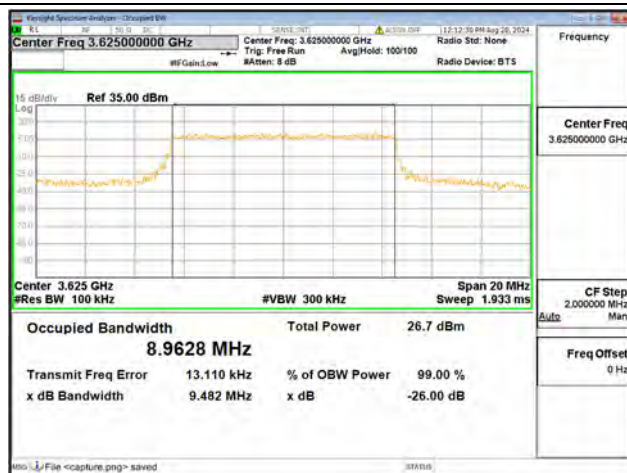
B48 / 10MHz / 16QAM/ Low CH



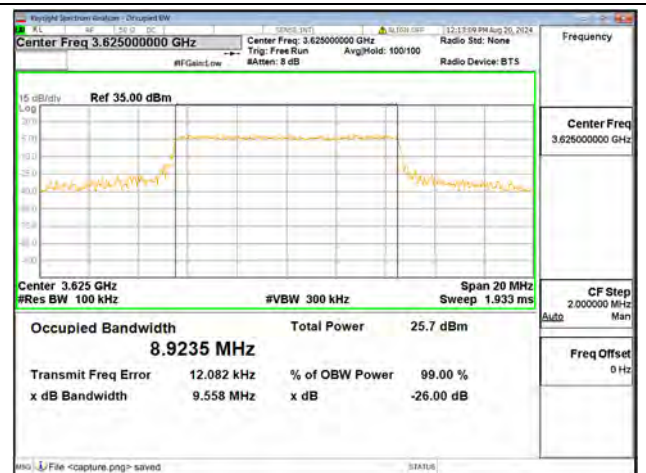
B48 / 10MHz / 64QAM/ Low CH



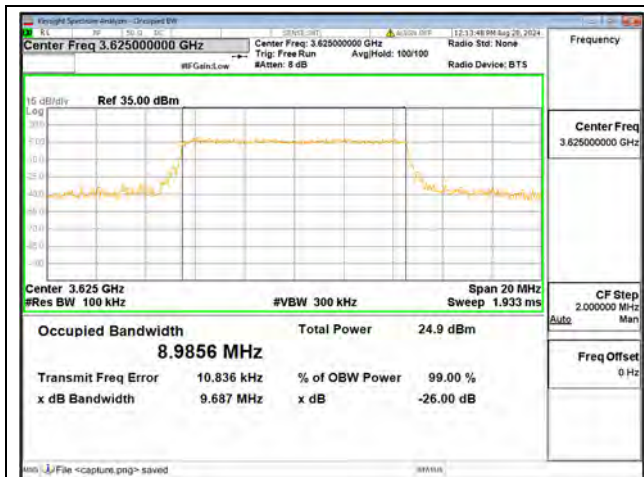
B48 / 10MHz / 256QAM/ Low CH



B48 / 10MHz / QPSK/ Mid CH



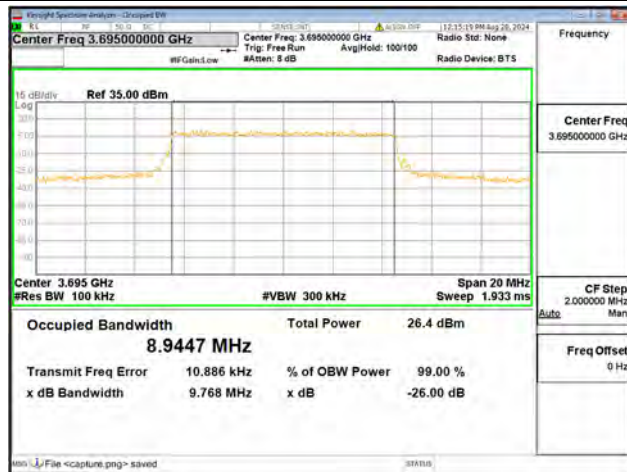
B48 / 10MHz / 16QAM/ Mid CH



B48 / 10MHz / 64QAM/ Mid CH



B48 / 10MHz / 256QAM/ Mid CH



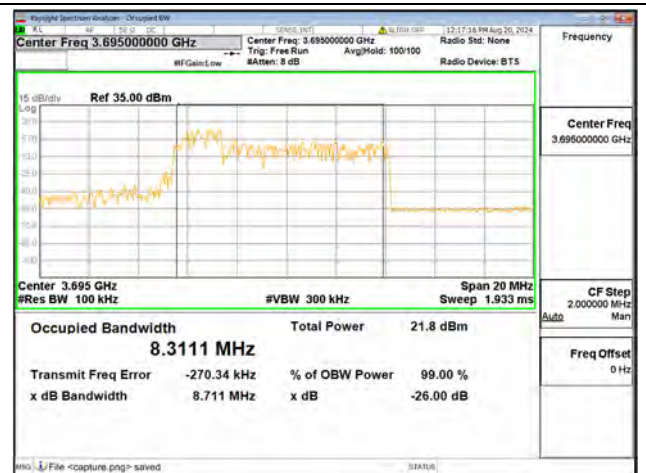
B48 / 10MHz / QPSK/ High CH



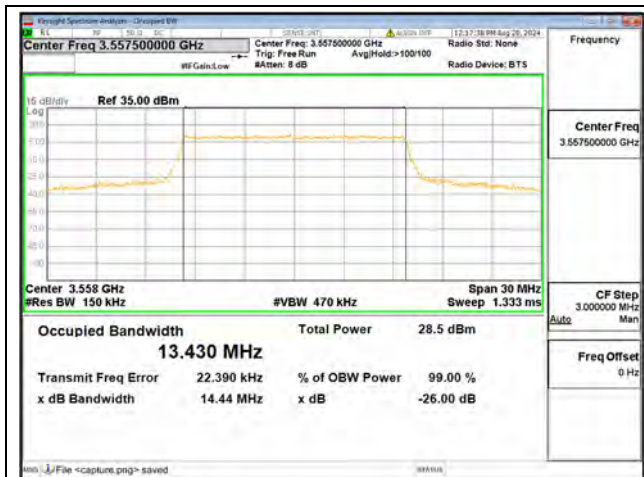
B48 / 10MHz / 16QAM/ High CH



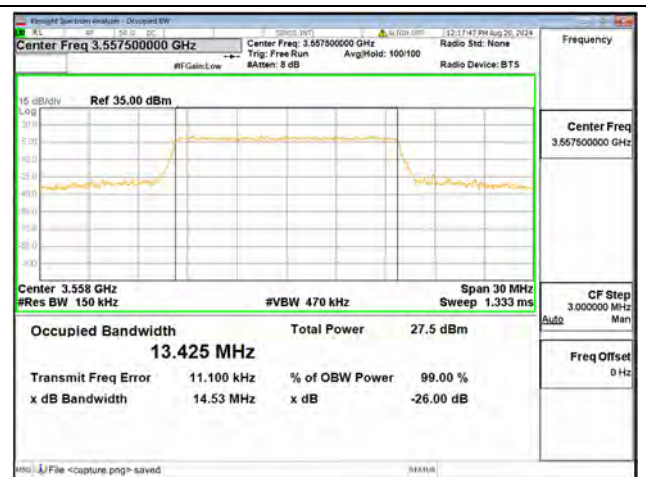
B48 / 10MHz / 64QAM/ High CH



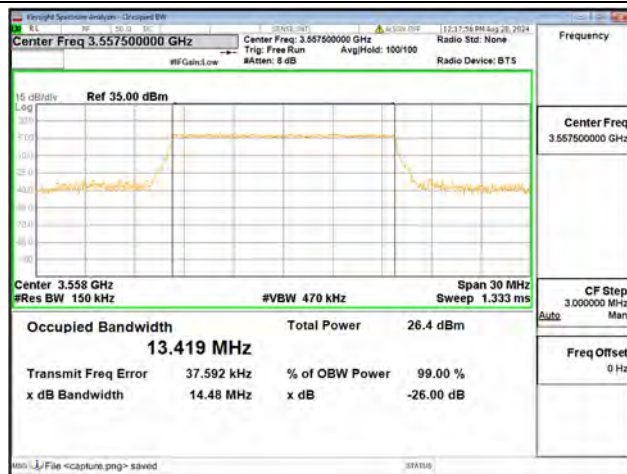
B48 / 10MHz / 256QAM/ High CH



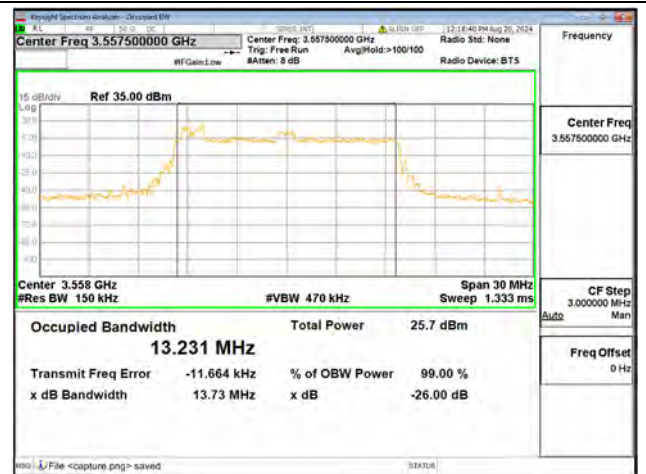
B48 / 15MHz / QPSK/ Low CH



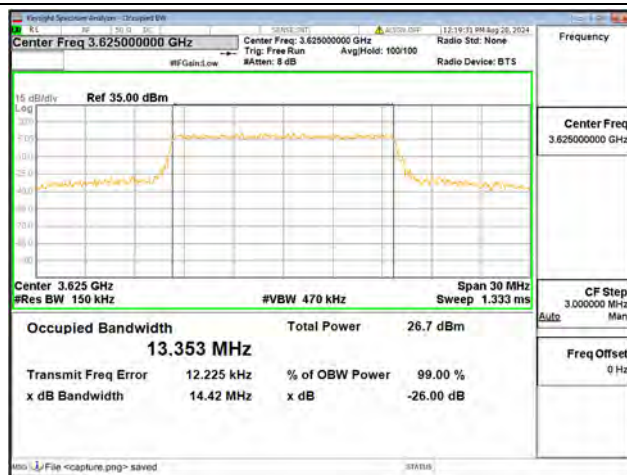
B48 / 15MHz / 16QAM/ Low CH



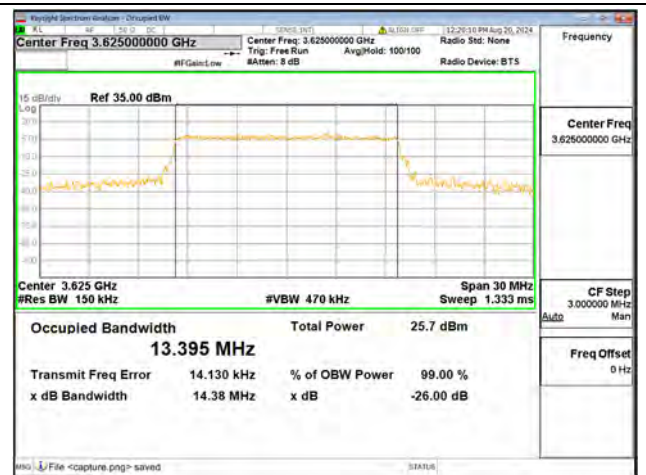
B48 / 15MHz / 64QAM/ Low CH



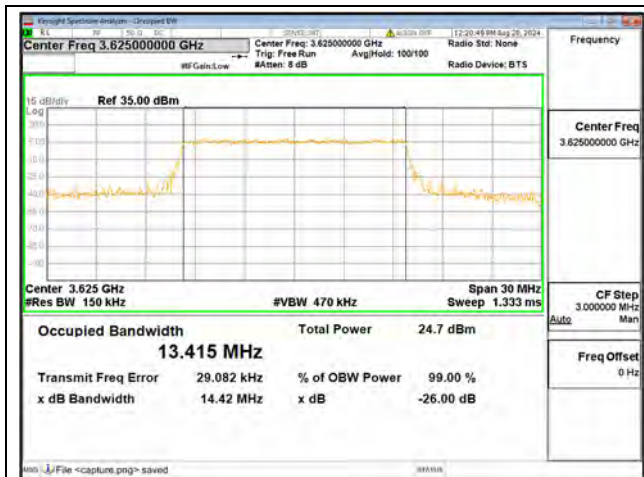
B48 / 15MHz / 256QAM/ Low CH



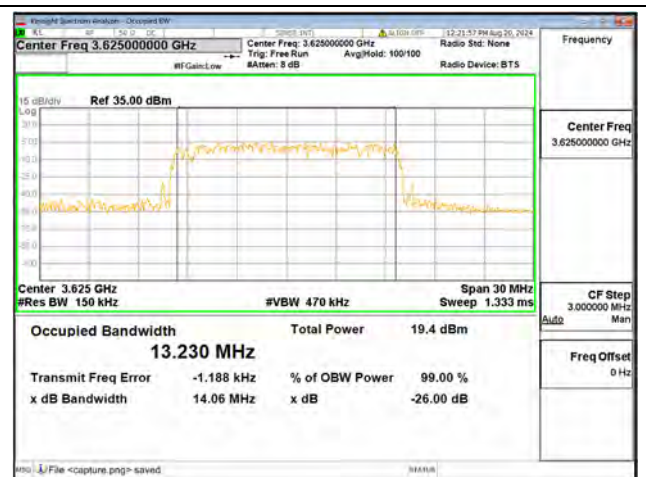
B48 / 15MHz / QPSK/ Mid CH



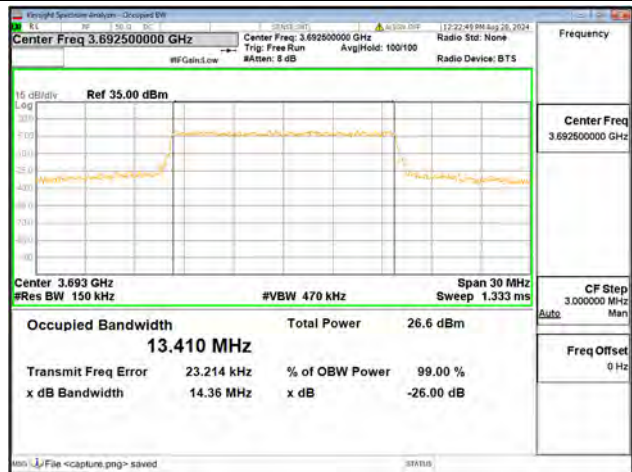
B48 / 15MHz / 16QAM/ Mid CH



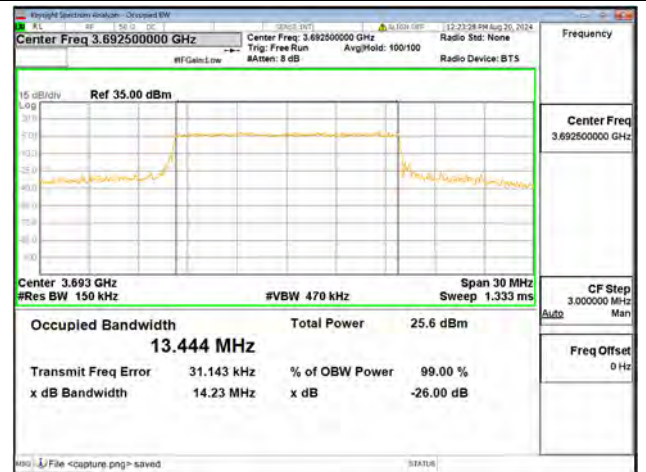
B48 / 15MHz / 64QAM/ Mid CH



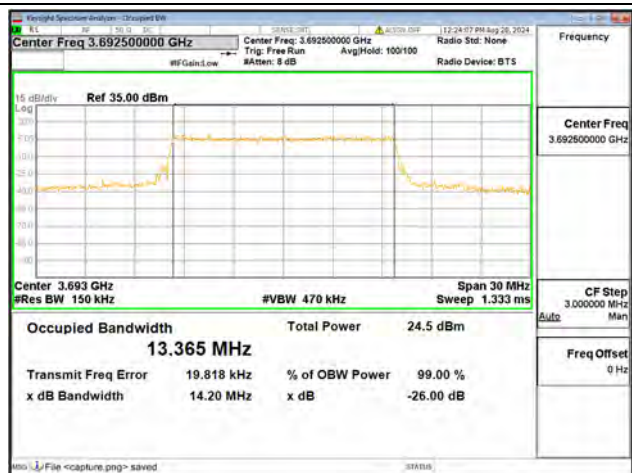
B48 / 15MHz / 256QAM/ Mid CH



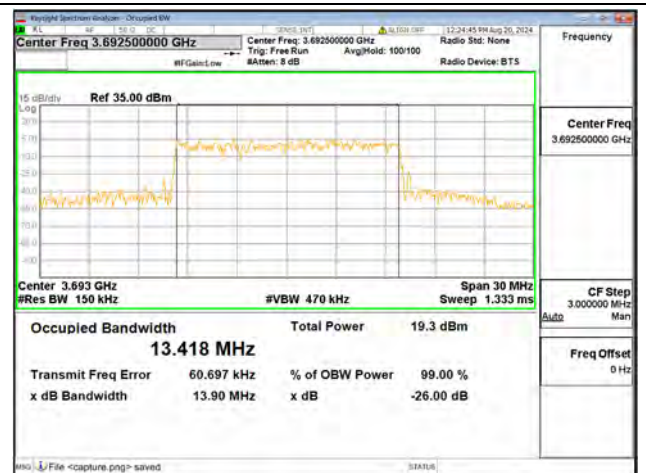
B48 / 15MHz / QPSK/ High CH



B48 / 15MHz / 16QAM/ High CH



B48 / 15MHz / 64QAM/ High CH



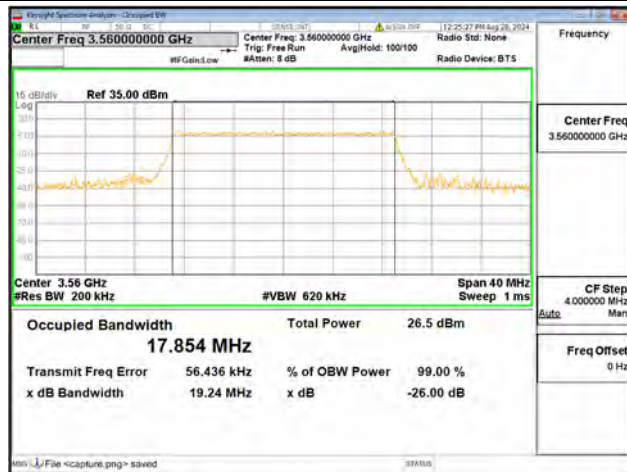
B48 / 15MHz / 256QAM/ High CH



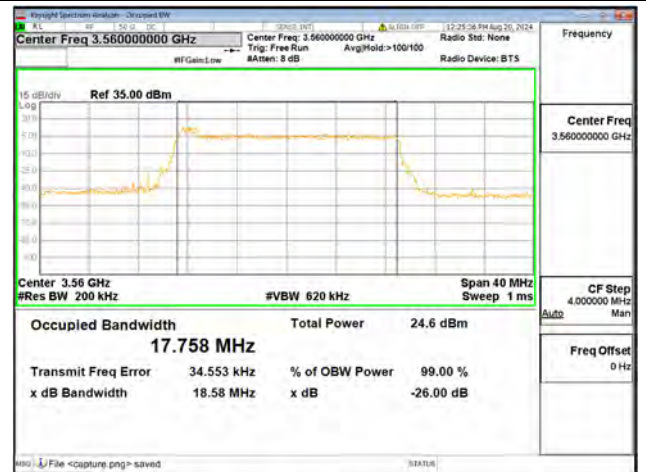
B48 / 20MHz / QPSK/ Low CH



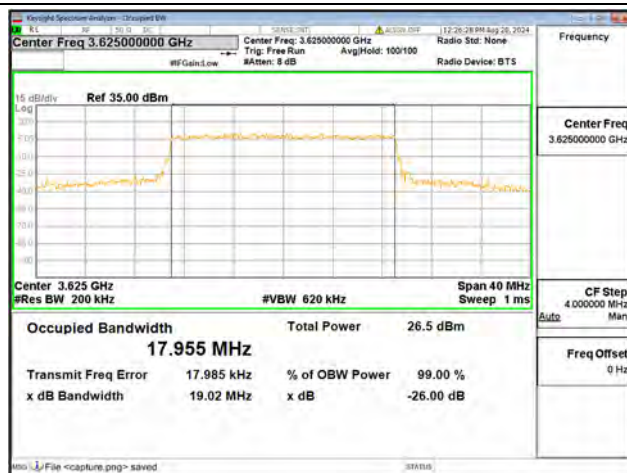
B48 / 20MHz / 16QAM/ Low CH



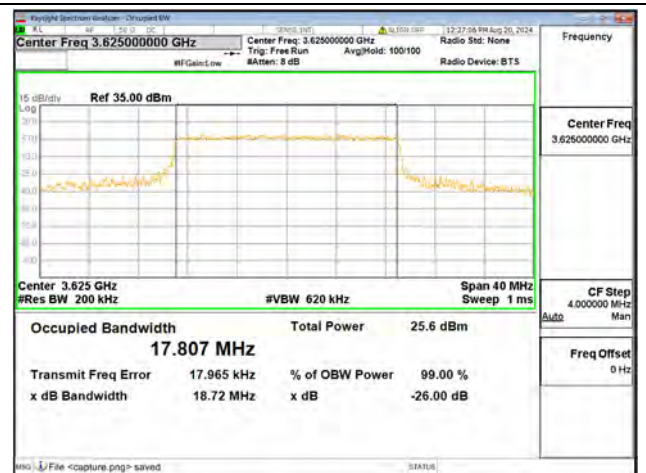
B48 / 20MHz / 64QAM/ Low CH



B48 / 20MHz / 256QAM/ Low CH



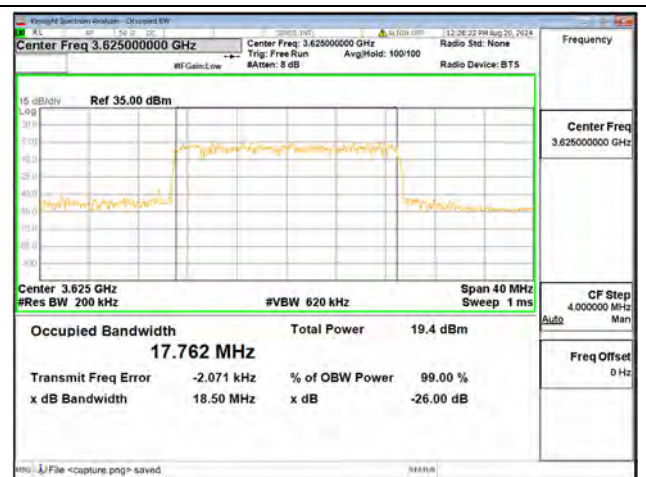
B48 / 20MHz / QPSK/ Mid CH



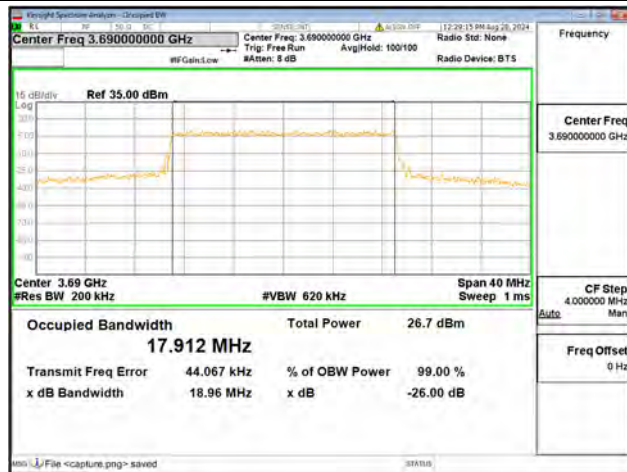
B48 / 20MHz / 16QAM/ Mid CH



B48 / 20MHz / 64QAM/ Mid CH



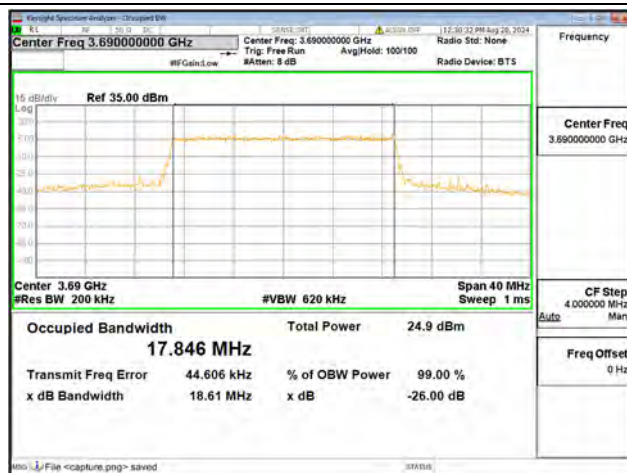
B48 / 20MHz / 256QAM/ Mid CH



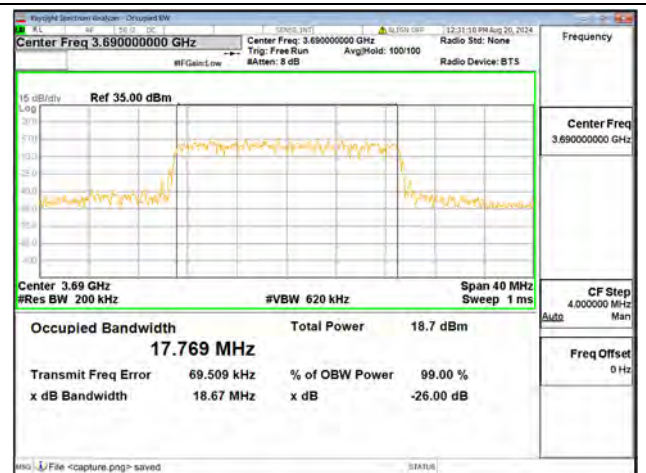
B48 / 20MHz / QPSK/ High CH



B48 / 20MHz / 16QAM/ High CH



B48 / 20MHz / 64QAM/ High CH



B48 / 20MHz / 256QAM/ High CH

2.3. Frequency Stability

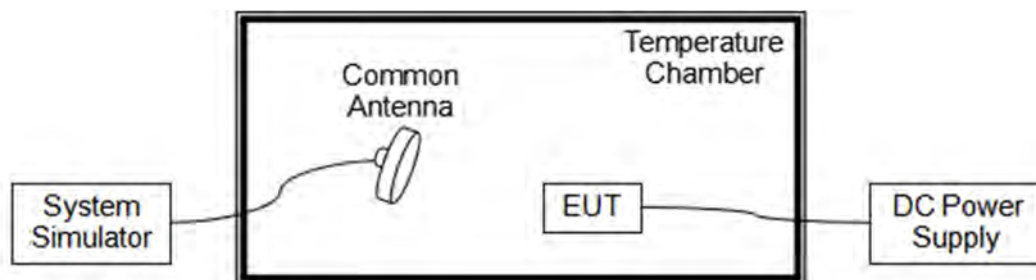
2.3.1. Requirement

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 $+50^{\circ}\text{C}$ 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 -20°C to 55°C , which are specified by the applicant.

2.3.2. Test Description



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

2.3.3. Test procedure

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

**2.3.4.Test Result**

The nominal, highest and lowest extreme voltages are separately 3.85V, 4.20V and 3.40V, which are specified by the applicant; the normal temperature here used is 20°C.

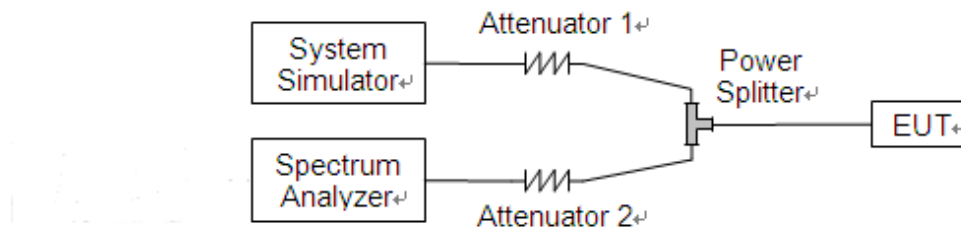
LTE Band 48, 256QAM, Channel 55990, Frequency 3625.0MHz					
Limit =Within Authorized Band					
Voltage (%)	Power (VDC)	Temp(°C)	Fre. Dev.(Hz)	Deviation (ppm)	Result
Normal	3.85	+20(Ref)	12	0.003	PASS
Normal		-20	14	0.004	
Normal		-10	4	0.001	
Normal		0	14	0.004	
Normal		+10	5	0.001	
Normal		+20	13	0.004	
Normal		+30	0	0.000	
Normal		+40	19	0.005	
Normal		+50	9	0.002	
Normal		+55	19	0.005	
High	4.20	+20	13	0.004	PASS
BATT.ENDPOINT	3.40	+20	-23	-0.006	

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

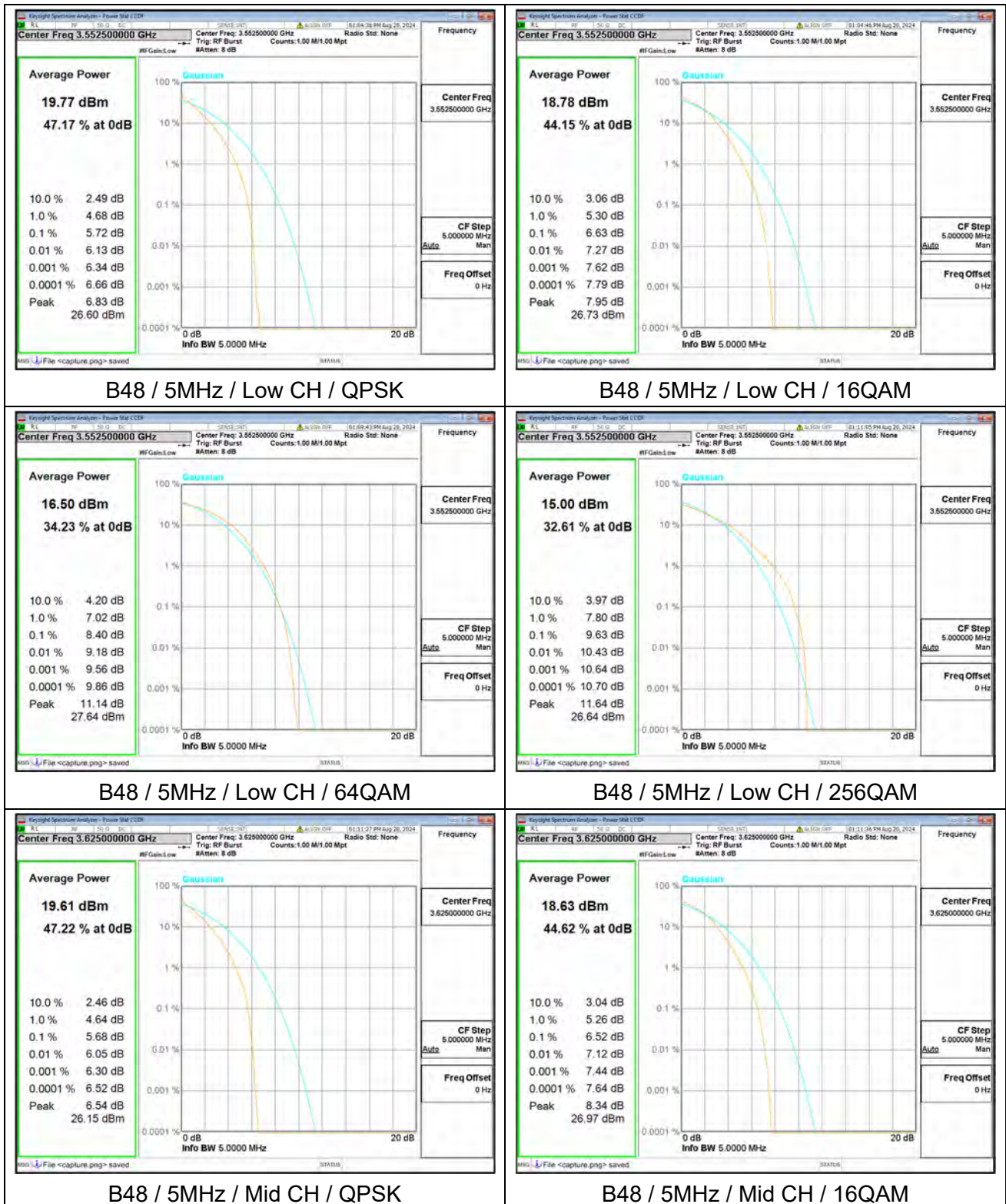
KDB 971168 D01v03 Section 5.7 and ANSI/TIA-603-E-2016.

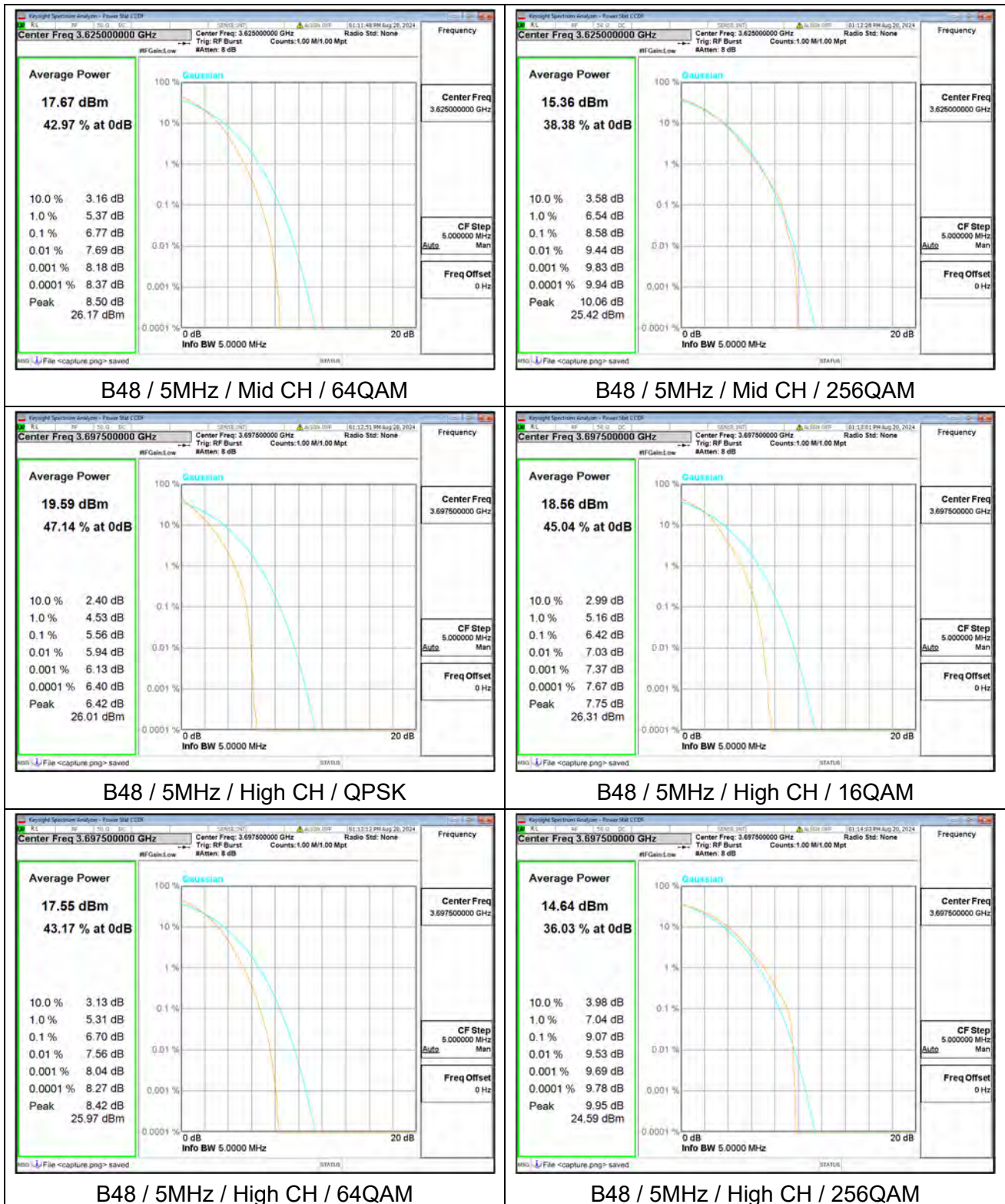
**2.4.4. Test Result**

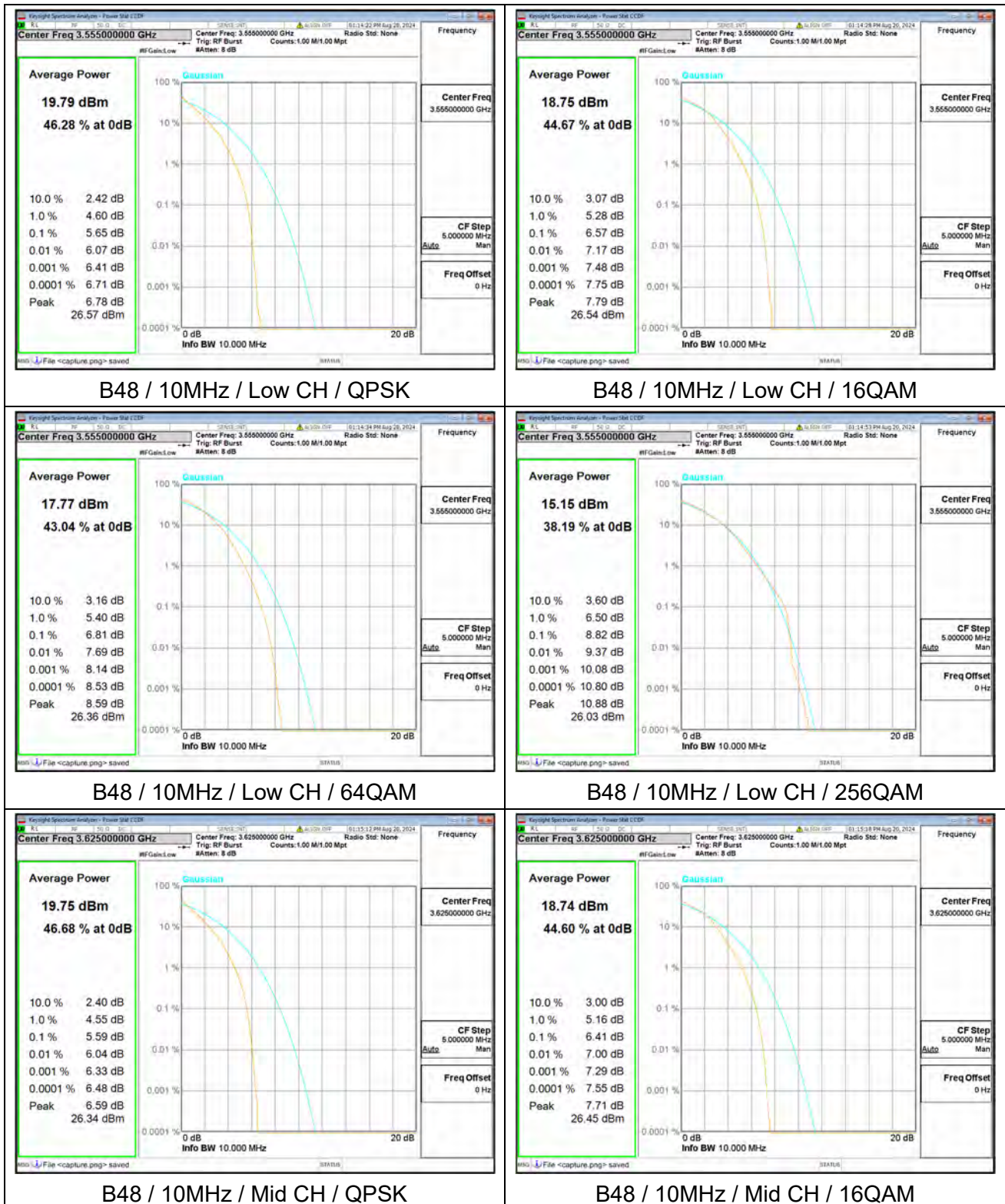
LTE Band	BW(MHz)	Channel Level	Channel	Frequency (MHz)	Modulation	Peak to Average Radio(dB)	Verdict
B48	5	Low	55265	3552.5	QPSK	5.72	PASS
B48	5	Low	55265	3552.5	16QAM	6.63	PASS
B48	5	Low	55265	3552.5	64QAM	8.40	PASS
B48	5	Low	55265	3552.5	256QAM	9.63	PASS
B48	5	Mid	55990	3625	QPSK	5.68	PASS
B48	5	Mid	55990	3625	16QAM	6.52	PASS
B48	5	Mid	55990	3625	64QAM	6.77	PASS
B48	5	Mid	55990	3625	256QAM	8.58	PASS
B48	5	High	56715	3697.5	QPSK	5.56	PASS
B48	5	High	56715	3697.5	16QAM	6.42	PASS
B48	5	High	56715	3697.5	64QAM	6.70	PASS
B48	5	High	56715	3697.5	256QAM	9.07	PASS
B48	10	Low	55290	3555	QPSK	5.65	PASS
B48	10	Low	55290	3555	16QAM	6.57	PASS
B48	10	Low	55290	3555	64QAM	6.81	PASS
B48	10	Low	55290	3555	256QAM	8.82	PASS
B48	10	Mid	55990	3625	QPSK	5.59	PASS
B48	10	Mid	55990	3625	16QAM	6.41	PASS
B48	10	Mid	55990	3625	64QAM	6.75	PASS
B48	10	Mid	55990	3625	256QAM	6.82	PASS
B48	10	High	56690	3695	QPSK	5.58	PASS
B48	10	High	56690	3695	16QAM	6.40	PASS
B48	10	High	56690	3695	64QAM	6.71	PASS
B48	10	High	56690	3695	256QAM	8.48	PASS
B48	15	Low	55315	3557.5	QPSK	5.41	PASS
B48	15	Low	55315	3557.5	16QAM	6.34	PASS
B48	15	Low	55315	3557.5	64QAM	6.75	PASS
B48	15	Low	55315	3557.5	256QAM	8.85	PASS
B48	15	Mid	55990	3625	QPSK	5.39	PASS
B48	15	Mid	55990	3625	16QAM	6.25	PASS
B48	15	Mid	55990	3625	64QAM	6.67	PASS
B48	15	Mid	55990	3625	256QAM	9.01	PASS
B48	15	High	56665	3692.5	QPSK	5.35	PASS

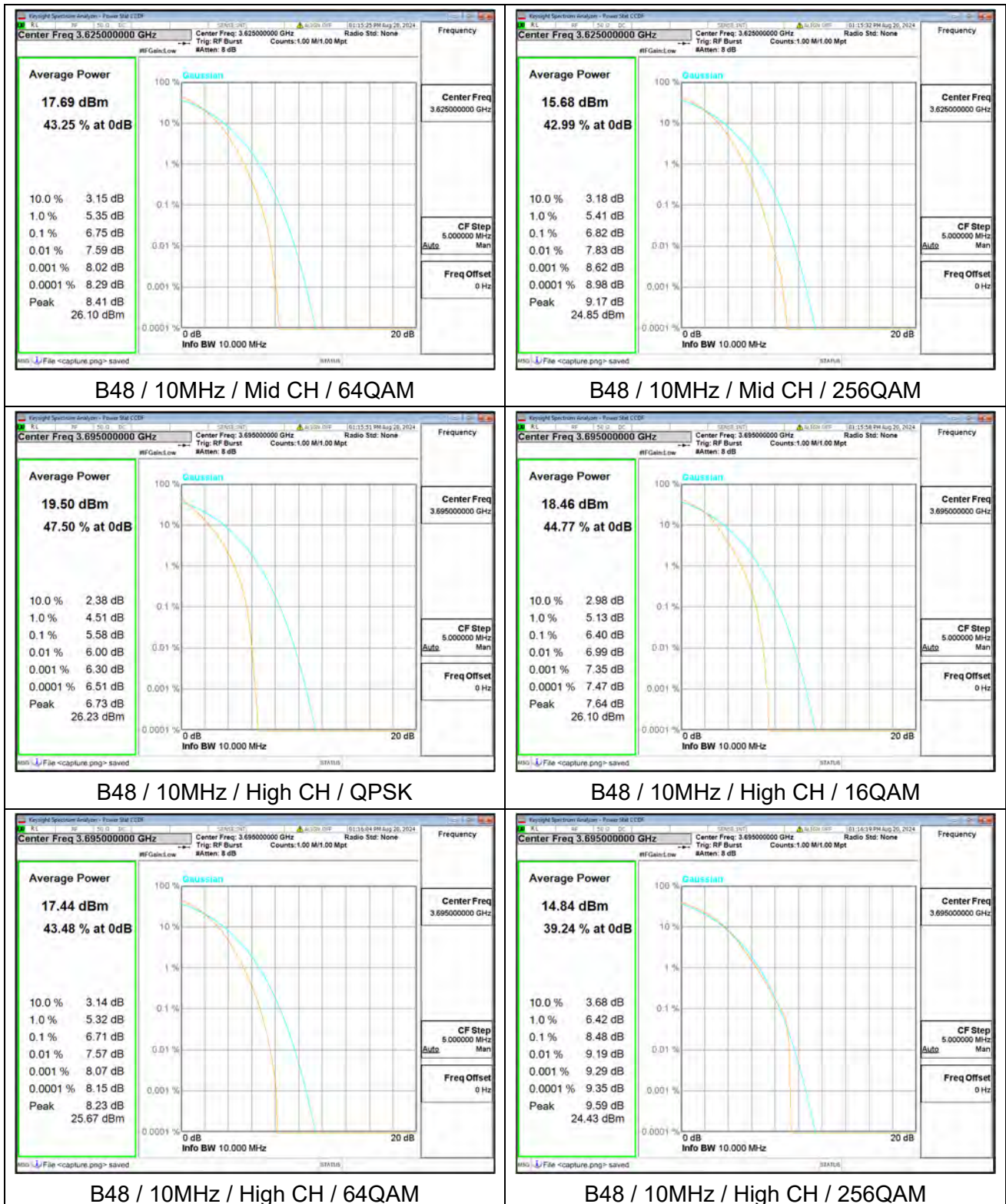


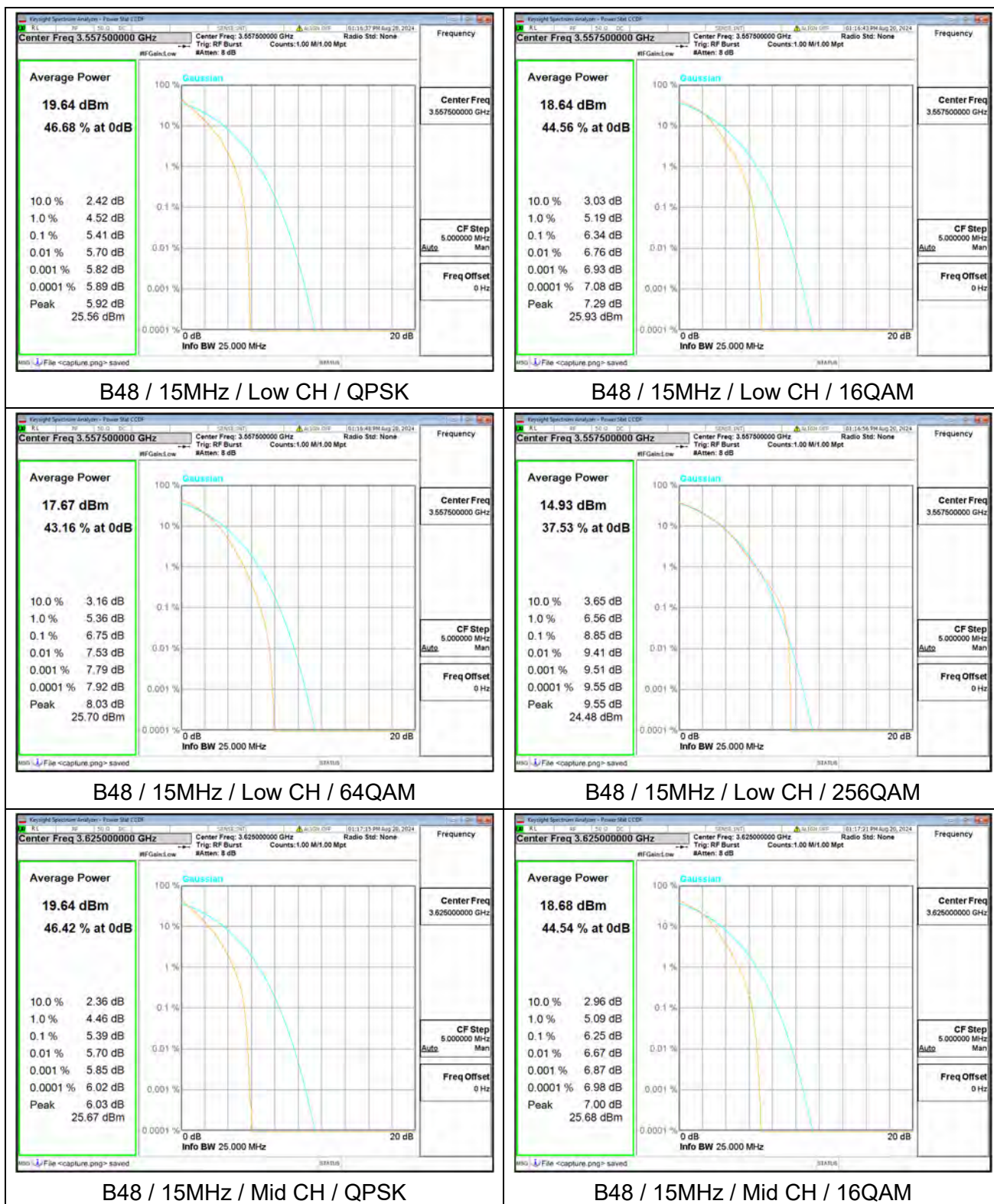
B48	15	High	56665	3692.5	16QAM	6.22	PASS
B48	15	High	56665	3692.5	64QAM	6.66	PASS
B48	15	High	56665	3692.5	256QAM	8.16	PASS
B48	20	Low	55340	3560	QPSK	5.49	PASS
B48	20	Low	55340	3560	16QAM	6.43	PASS
B48	20	Low	55340	3560	64QAM	6.38	PASS
B48	20	Low	55340	3560	256QAM	6.92	PASS
B48	20	Mid	55990	3625	QPSK	5.49	PASS
B48	20	Mid	55990	3625	16QAM	6.36	PASS
B48	20	Mid	55990	3625	64QAM	6.69	PASS
B48	20	Mid	55990	3625	256QAM	6.86	PASS
B48	20	High	56640	3690	QPSK	5.45	PASS
B48	20	High	56640	3690	16QAM	6.36	PASS
B48	20	High	56640	3690	64QAM	6.70	PASS
B48	20	High	56640	3690	256QAM	6.73	PASS

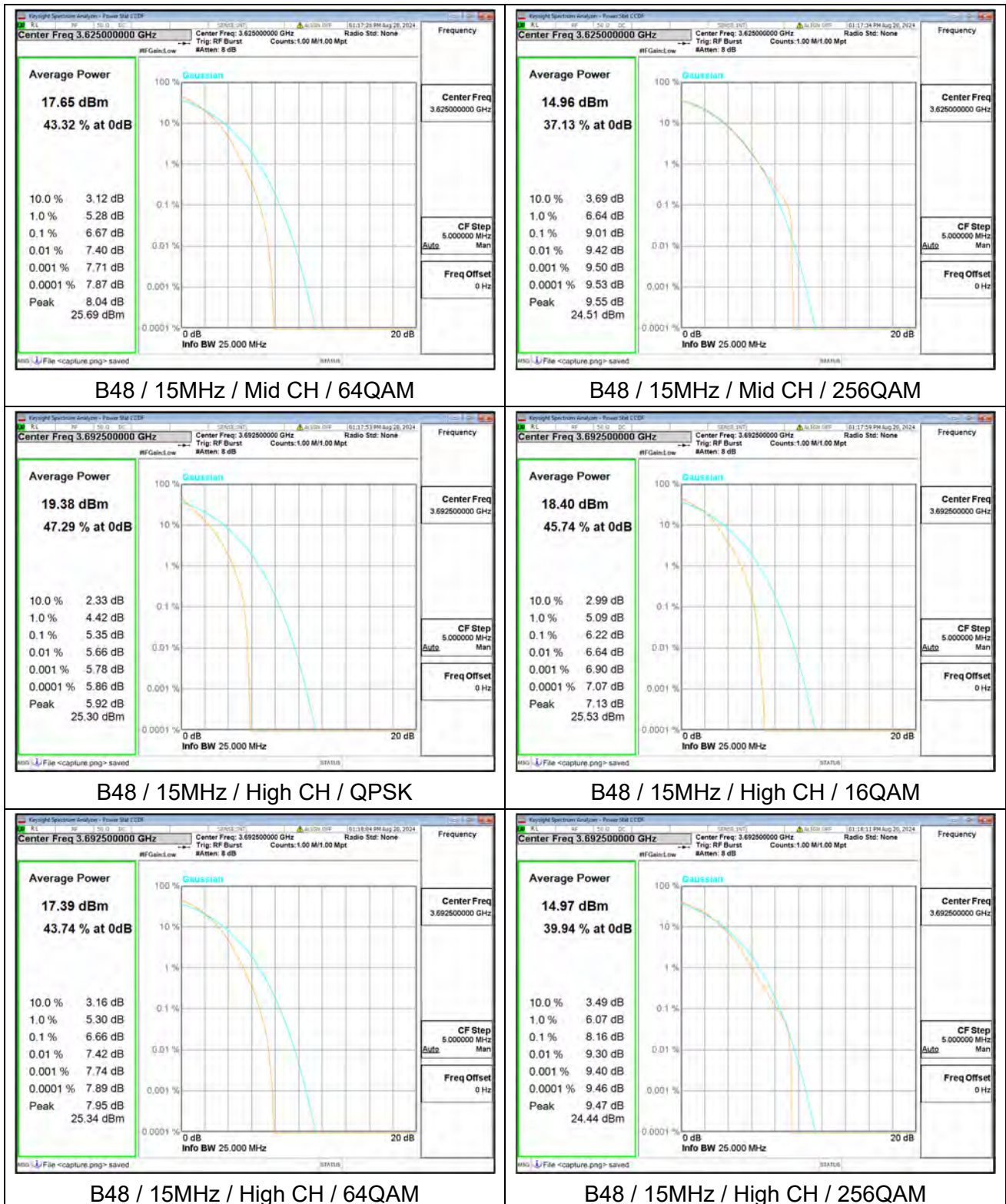


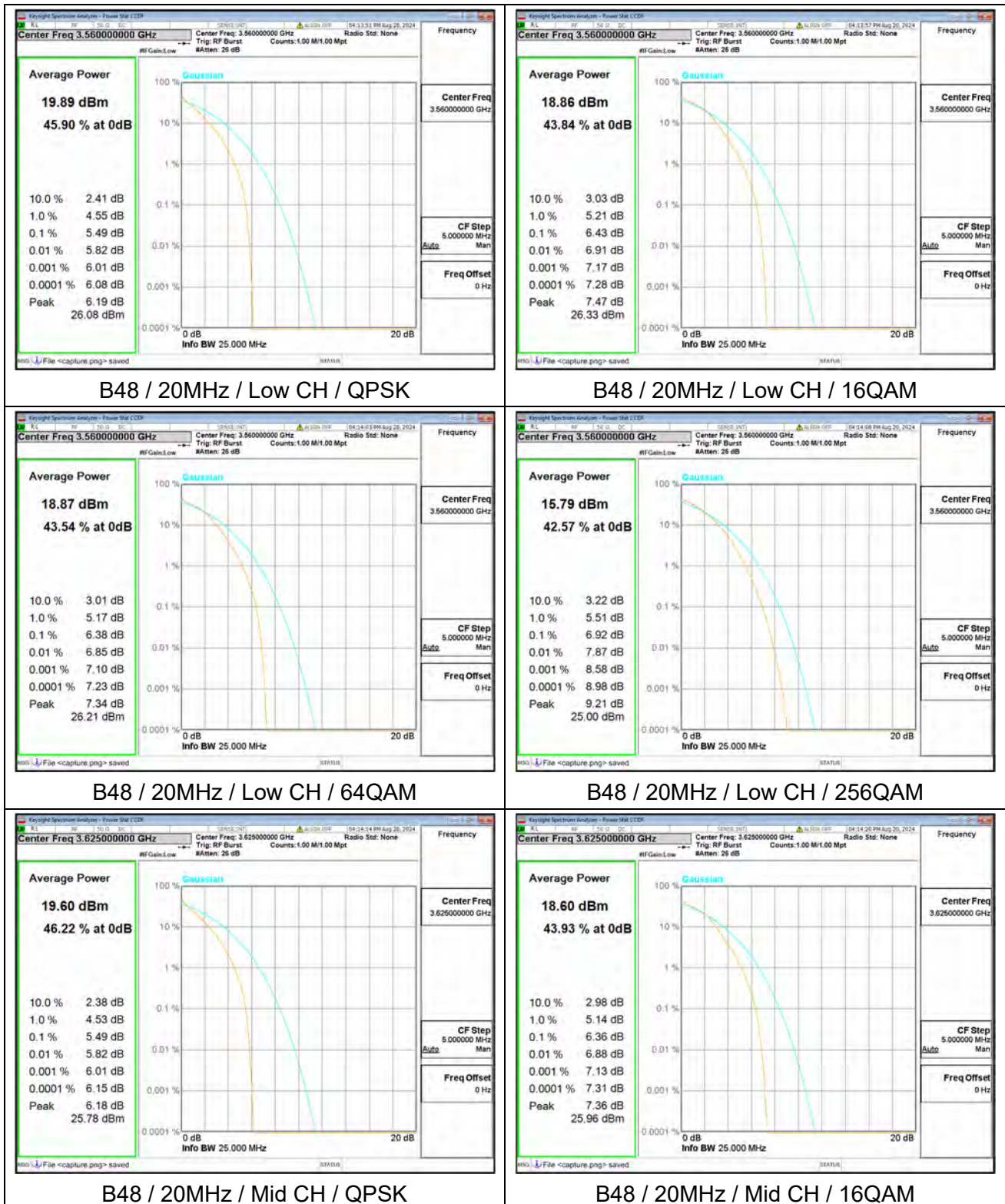


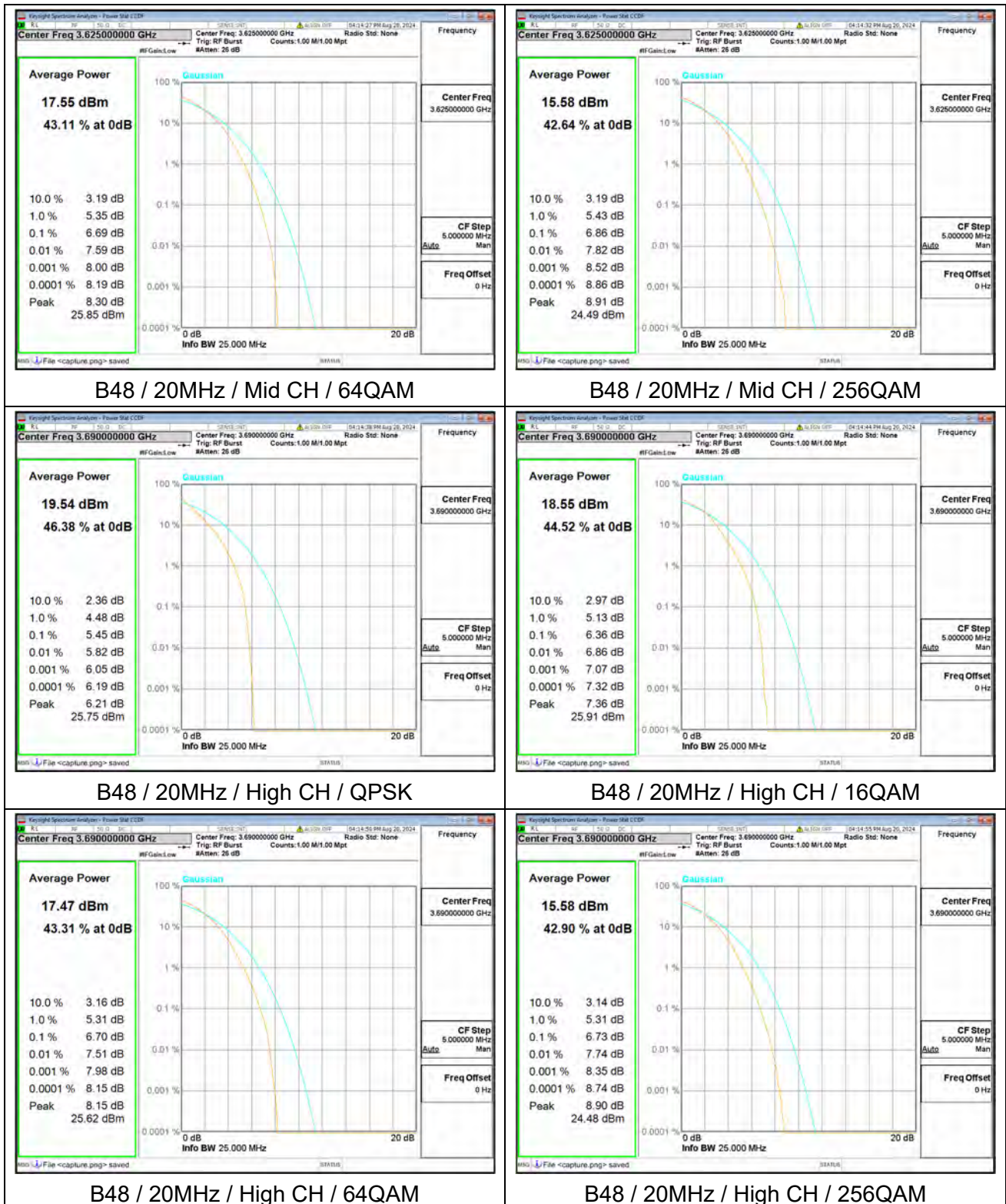










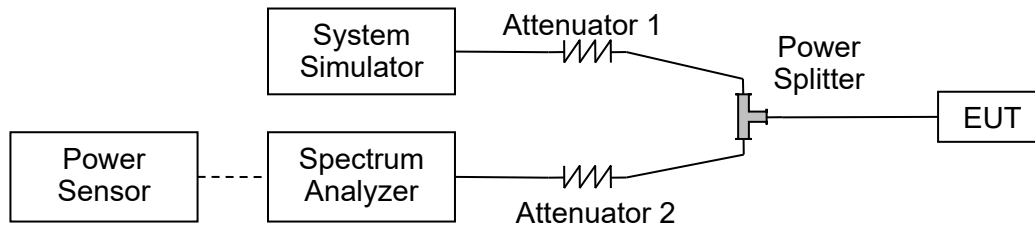


2.5. Conducted Spurious Emissions

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



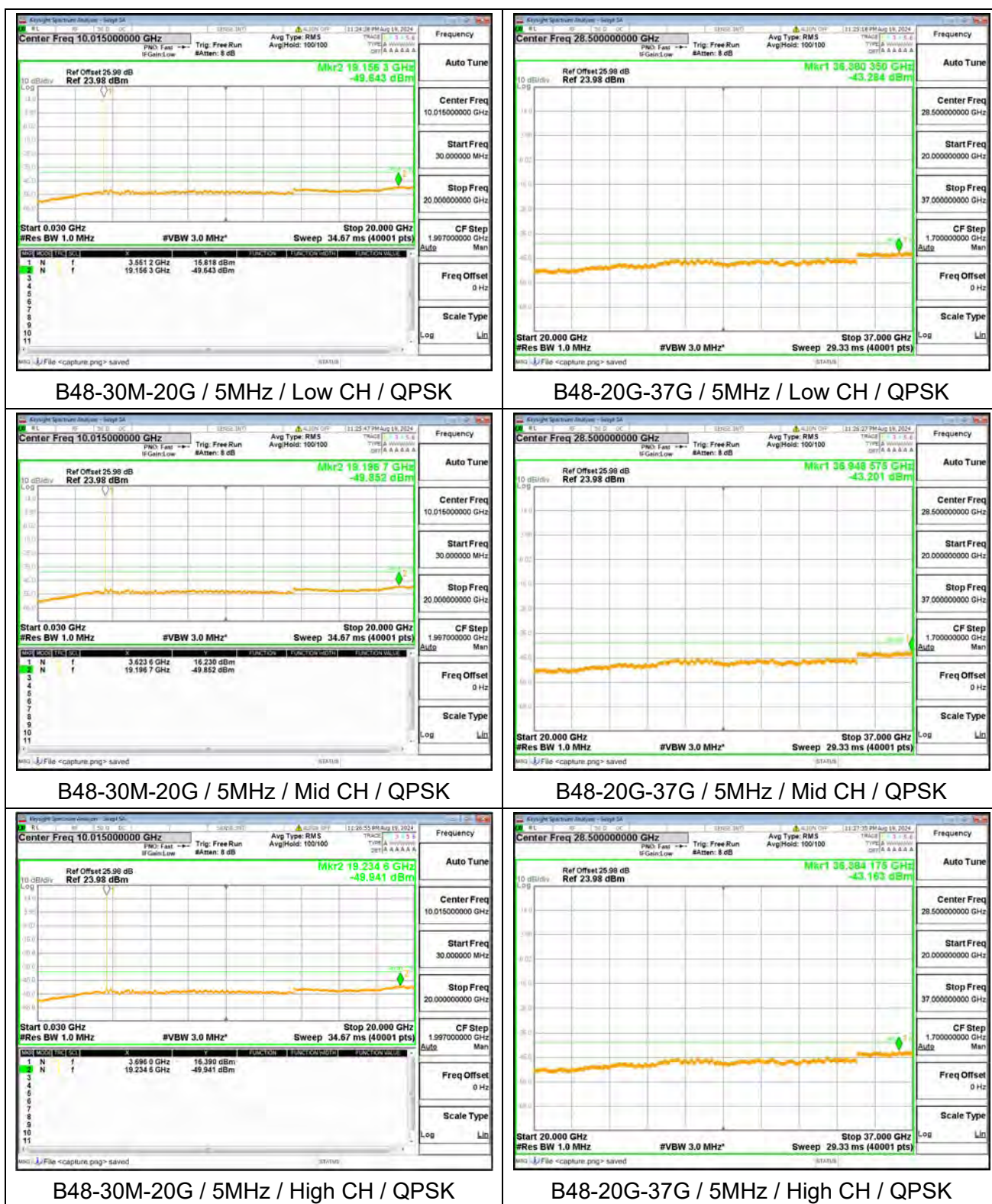
The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum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

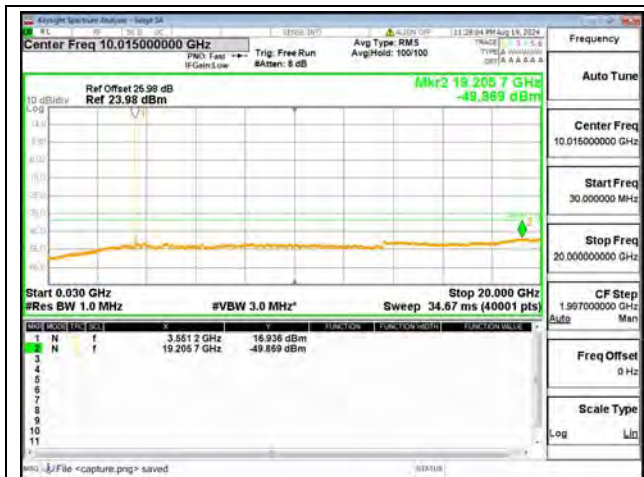
2.5.1. Test procedure

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



2.5.2. Test Result





B48-30M-20G / 10MHz / Low CH / QPSK



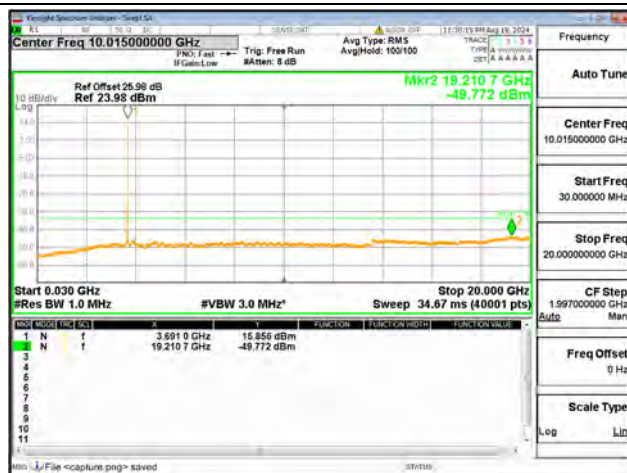
B48-20G-37G / 10MHz / Low CH / QPSK



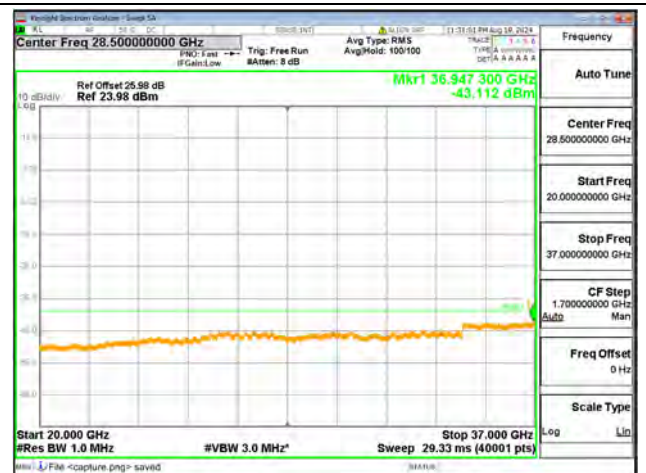
B48-30M-20G / 10MHz / Mid CH / QPSK



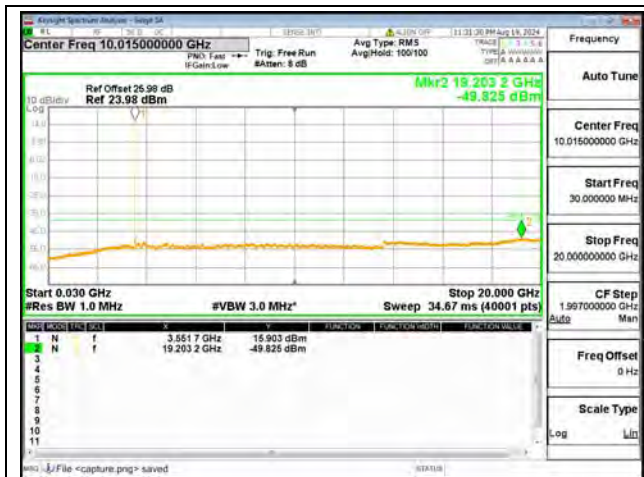
B48-20G-37G / 10MHz / Mid CH / QPSK



B48-30M-20G / 10MHz / High CH / QPSK



B48-20G-37G / 10MHz / High CH / QPSK



B48-30M-20G / 15MHz / Low CH / QPSK



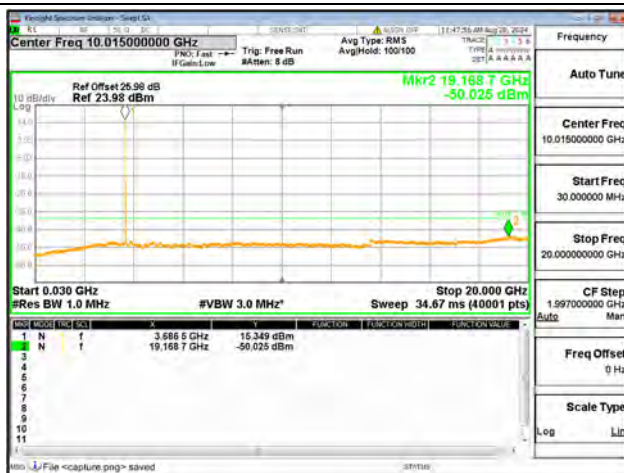
B48-20G-37G / 15MHz / Low CH / QPSK



B48-30M-20G / 15MHz / Mid CH / QPSK



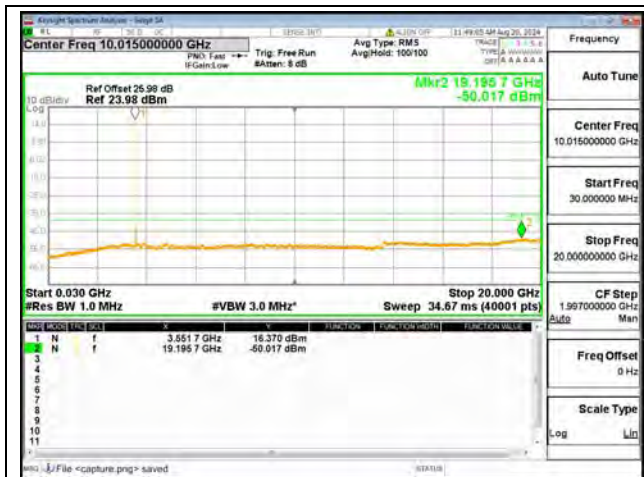
B48-20G-37G / 15MHz / Mid CH / QPSK



B48-30M-20G / 15MHz / High CH / QPSK



B48-20G-37G / 15MHz / High CH / QPSK



B48-30M-20G / 20MHz / Low CH / QPSK



B48-20G-37G / 20MHz / Low CH / QPSK



B48-30M-20G / 20MHz / Mid CH / QPSK



B48-20G-37G / 20MHz / Mid CH / QPSK



B48-30M-20G / 20MHz / High CH / QPSK



B48-20G-37G / 20MHz / High CH / QPSK



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.

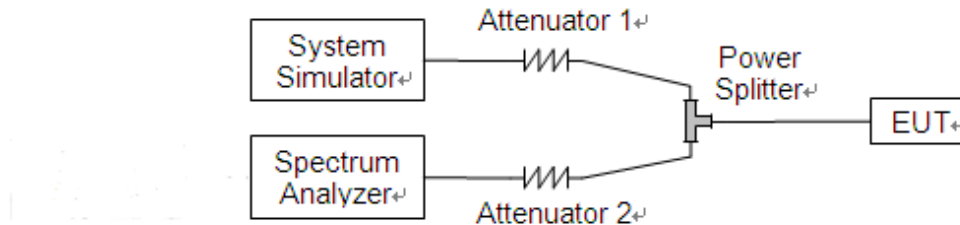
Part 96.41(e)(1)(ii)

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 -40 dBm/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.

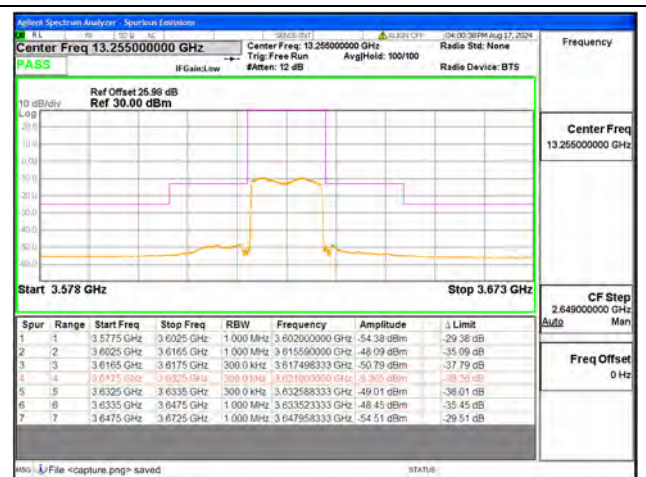


2.6.4. Test Result

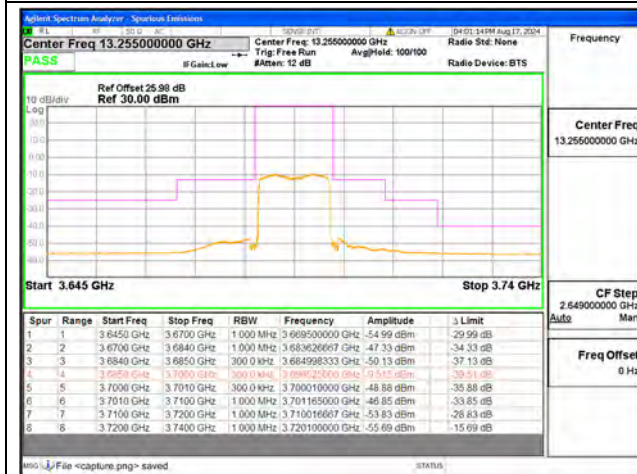




B48 / 15MHz / Low CH / QPSK / FULL RB



B48 / 15MHz / Mid CH / QPSK / FULL RB



B48 / 15MHz / High CH / QPSK / FULL RB



B48 / 20MHz / Low CH / QPSK / FULL RB



B48 / 20MHz / Mid CH / QPSK / FULL RB



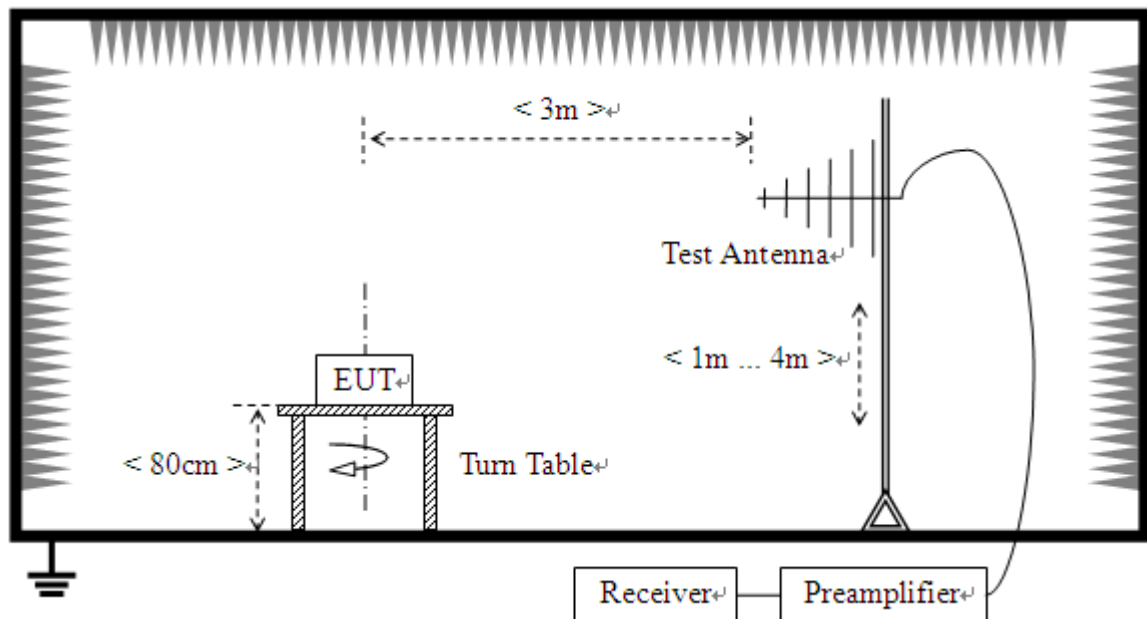
B48 / 20MHz / High CH / QPSK / FULL RB

2.7. Radiated Spurious Emissions

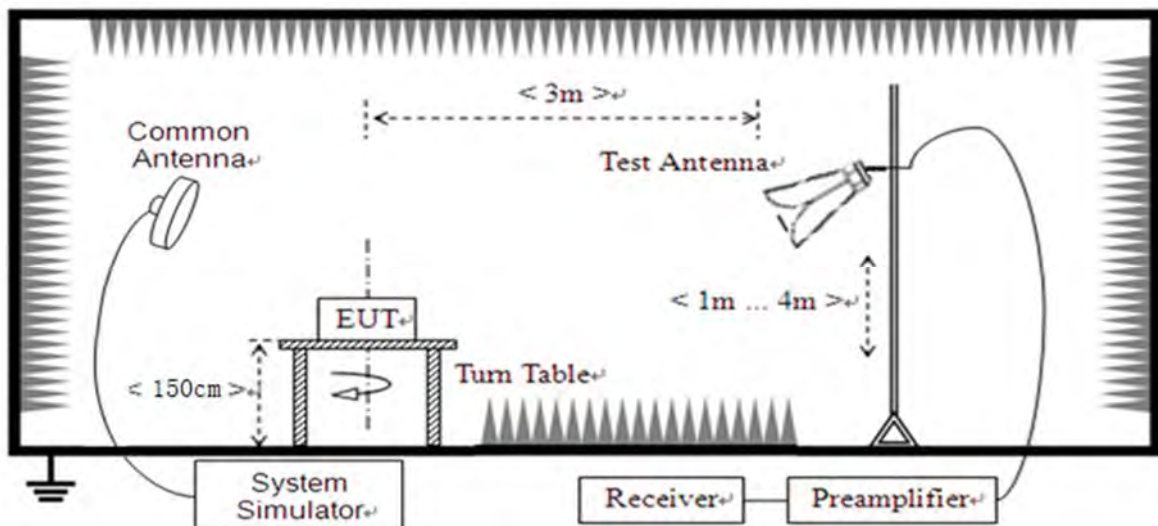
2.7.1. Requirement

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 to 1GHz)



(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:

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

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

Where A_{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_{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} .

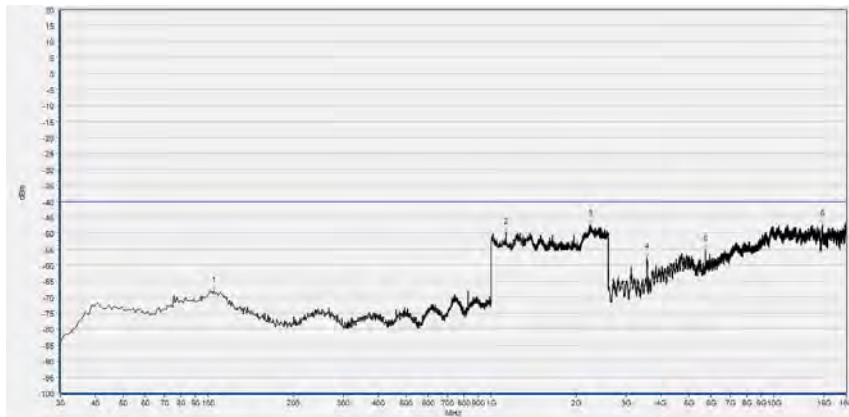
Note1: The power of the EUT transmitting frequency should be ignored.

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.

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

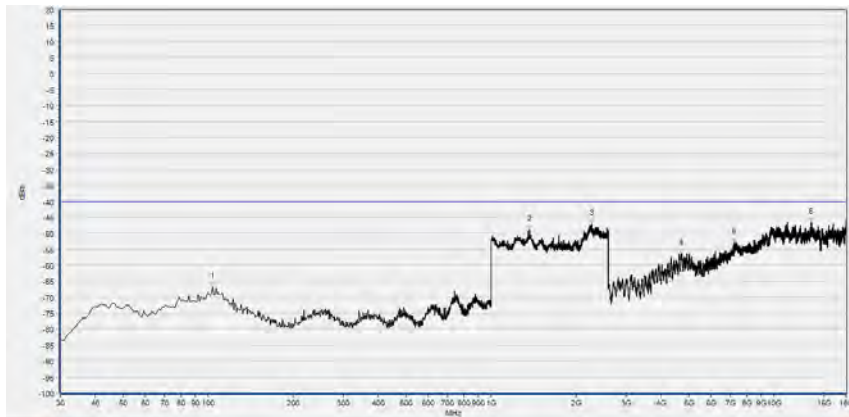


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	104.765	-68.00	-40.00	Horizontal	PASS
2	1129.730	-49.66	-40.00	Horizontal	PASS
3	2241.241	-47.24	-40.00	Horizontal	PASS
4	3558.072	-57.52	-40.00	Horizontal	PASS
5	5736.067	-55.24	-40.00	Horizontal	PASS
6	14839.288	-47.18	-40.00	Horizontal	PASS

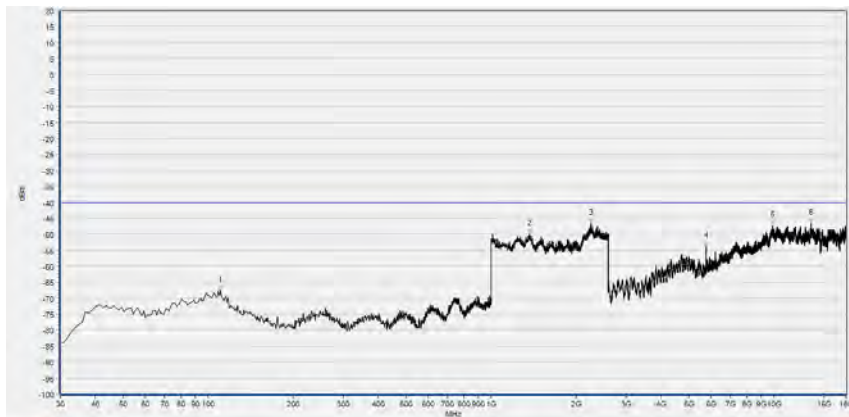


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	109.620	-66.63	-40.00	Vertical	PASS
2	1366.767	-49.44	-40.00	Vertical	PASS
3	2257.257	-47.00	-40.00	Vertical	PASS
4	4928.946	-55.55	-40.00	Vertical	PASS
5	7984.917	-52.48	-40.00	Vertical	PASS
6	12947.790	-47.49	-40.00	Vertical	PASS

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

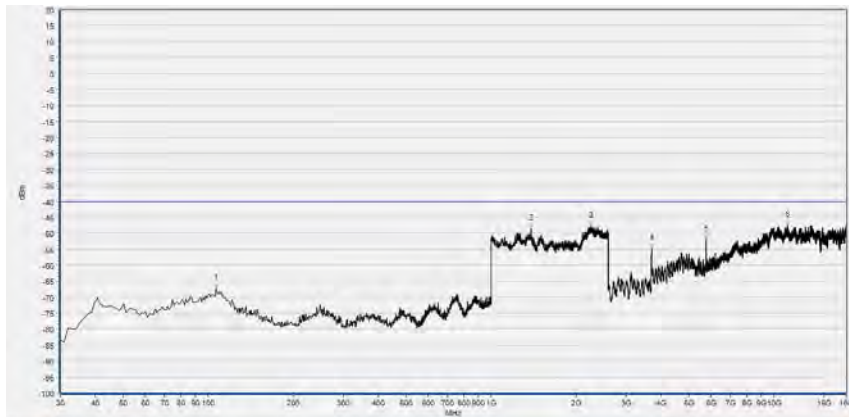


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	103.794	-66.75	-40.00	Horizontal	PASS
2	1369.970	-48.79	-40.00	Horizontal	PASS
3	2268.468	-47.07	-40.00	Horizontal	PASS
4	4694.819	-56.45	-40.00	Horizontal	PASS
5	7227.085	-52.92	-40.00	Horizontal	PASS
6	13573.155	-46.61	-40.00	Horizontal	PASS



No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	110.591	-67.64	-40.00	Vertical	PASS
2	1365.165	-49.98	-40.00	Vertical	PASS
3	2254.054	-46.66	-40.00	Vertical	PASS
4	5745.309	-53.68	-40.00	Vertical	PASS
5	9897.980	-47.36	-40.00	Vertical	PASS
6	13560.832	-46.52	-40.00	Vertical	PASS

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



No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	106.707	-67.11	-40.00	Horizontal	PASS
2	1382.783	-48.66	-40.00	Horizontal	PASS
3	2258.859	-47.76	-40.00	Horizontal	PASS
4	3696.699	-54.76	-40.00	Horizontal	PASS
5	5748.390	-51.89	-40.00	Horizontal	PASS
6	11194.919	-47.56	-40.00	Horizontal	PASS



No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	107.678	-66.06	-40.00	Vertical	PASS
2	1352.352	-50.27	-40.00	Vertical	PASS
3	2254.054	-46.89	-40.00	Vertical	PASS
4	4710.222	-55.86	-40.00	Vertical	PASS
5	7381.116	-51.77	-40.00	Vertical	PASS
6	11786.397	-47.39	-40.00	Vertical	PASS



2.8. End User Device Additional Requirements (CBSD Protocol)

2.8.1. Requirement

According to FCC section Part 96.47,

- (a) End User Devices may operate only if they can positively receive and decode an authorization signal transmitted by a CBSD, including the frequencies and power limits for their operation. An End User Device must discontinue operations, change frequencies, or change its operational power level within 10 seconds of receiving instructions from its associated CBSD.
- (b) Any device operated at higher power than specified for End User Devices in Part 96.41 will be classified as, and subject to, the operational requirements of a CBSD.

2.8.2. Test Description

End user device additional requirements (CBSD Protocol) are tested per the test procedures listed below. During testing, the EUT is connected to a certified CBSD (Kingsignal LBS7320 FCC ID: 2AVFNLBS7320) as a companion device to show compliance with Part 96.47. End User Devices may operate only if they can positively receive and decode an authorization signal transmitted by a CBSD, including the frequencies and power limits for their operation. An End User Device must discontinue operations, change frequencies, or change its operation power level within 10 seconds of receiving instructions from its associated CBSD.

2.8.3. Test Procedure

KDB 940660 D01 Part 96 CBRS Eqpt v02.

2.8.4. Test Result

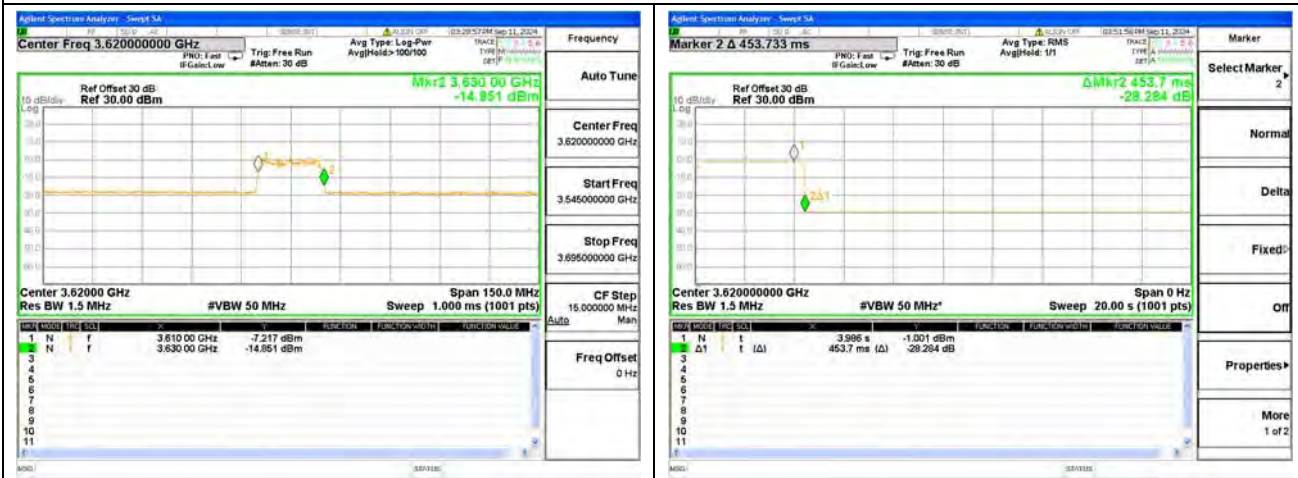
The EUT was connected via an RF cable to a certified CBSD and spectrum analyzer
Test Graph 1:

- a. Setup frequency with 3610MHz - 3630MHz
- b. Check EUT Tx frequency.
- c. Disable AP service and check EUT stop transmission within 10s.

Test Graph 2:

- a. Setup frequency with 3660MHz - 3680MHz
- b. Check EUT Tx frequency.
- c. Disable AP service and check EUT stop transmission within 10s

Test Graph 1

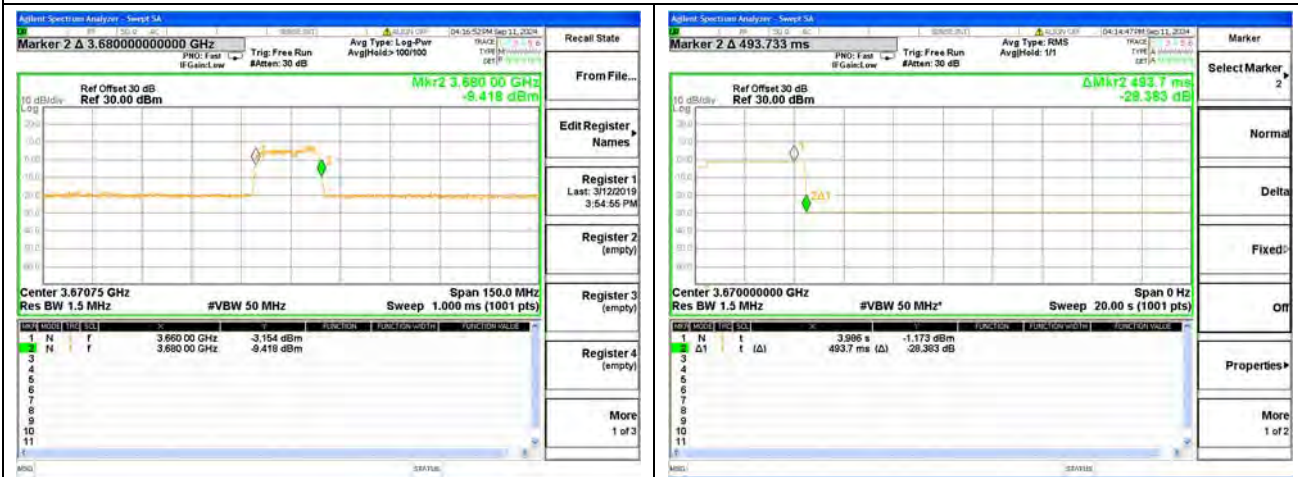


Note:

Marker 1: CBSD sends instructions to discontinue LTE operations.

Marker 2: EUT discontinues operation

Test Graph 2



Note:

Marker 1: CBSD sends instructions to discontinue LTE operations.

Marker 2: EUT discontinues operation



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	$\pm 5\%$
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 C63.10-2013 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	2024.06.19	2025.06.18
Communication Test Station	6200995016	MT8820C	Anritsu	2023.09.19	2024.09.18
Temperature Chamber	S022177101 00089002	KMT-36LF 1A0	KOMEG	2023.09.19	2024.09.18

4.2 List of Software Used

Description	Manufacturer	Software Version
MOR-2023E Test System	MORLAB	V7.99
MORLAB EMCR	MORLAB	V1.2

**4.3 Radiated Test Equipments**

Equipment	Serial No.	Type	Manufacturer	Cal. Date	Due Date
System Simulator	152038	CMW500	R&S	2023.10.17	2024.10.16
Signal Analyzer	MY56060145	N9020A	Agilent	2024.05.30	2025.05.29
Test Antenna - Bi-Log	9163-519	VULB 9163	Schwarzbeck	2024.06.22	2025.06.21
Test Antenna - Horn	9120D-963	BBHA 9120D	Schwarzbeck	2024.06.22	2025.06.21
RF Coaxial Cable (DC-18GHz)	MRE001	PE330	Pasternack	2024.05.30	2025.05.29
RF Coaxial Cable (DC-18GHz)	MRE002	CLU18	Pasternack	2024.05.30	2025.05.29
RF Coaxial Cable (DC-18GHz)	MRE003	CLU18	Pasternack	2024.05.30	2025.05.29
RF Coaxial Cable (DC-40GHz)	22290045	QA360-40-KK- 0.5	Qualwave	2024.07.03	2025.07.02
RF Coaxial Cable (DC-40GHz)	22290046	QA360-40-KK F-2	Qualwave	2024.07.03	2025.07.02
Preamplifier (10MHz-6GHz)	46732	S10M100L380 2	LUCIX CORP.	2024.05.30	2025.05.29
Preamplifier (2GHz-18GHz)	61171/61172	S020180L320 3	LUCIX CORP.	2024.05.30	2025.05.29
Notch Filter	N/A	WRCGV -LTE 48	Wainwright	N/A	N/A
Anechoic Chamber	N/A	9m*6m*6m	CRT	2022.05.10	2025.05.09

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