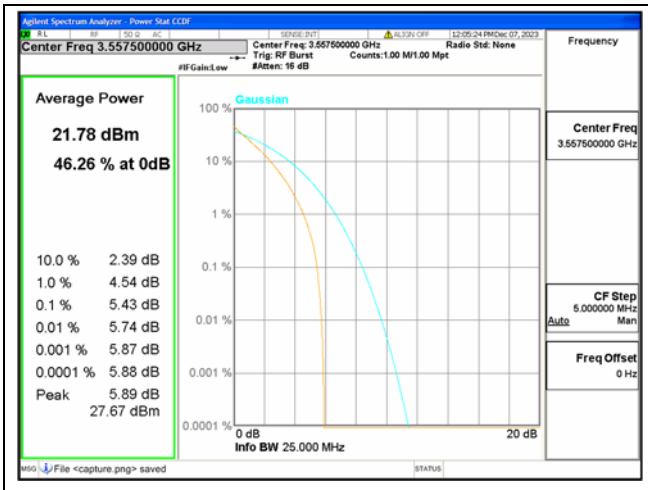
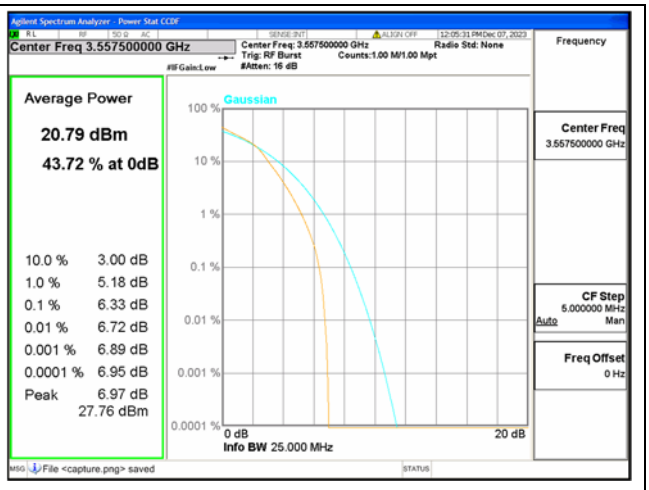
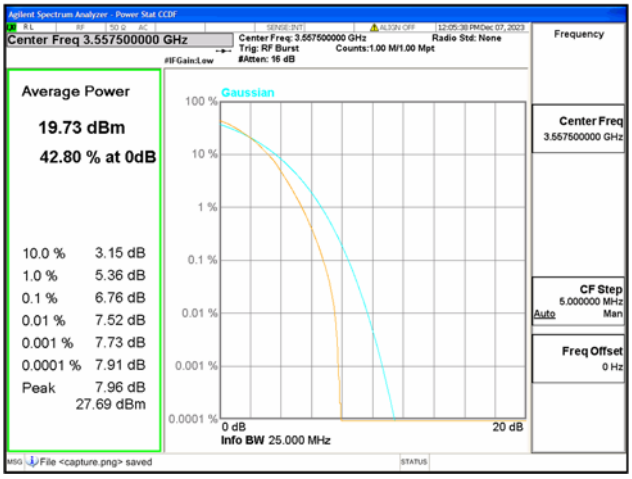


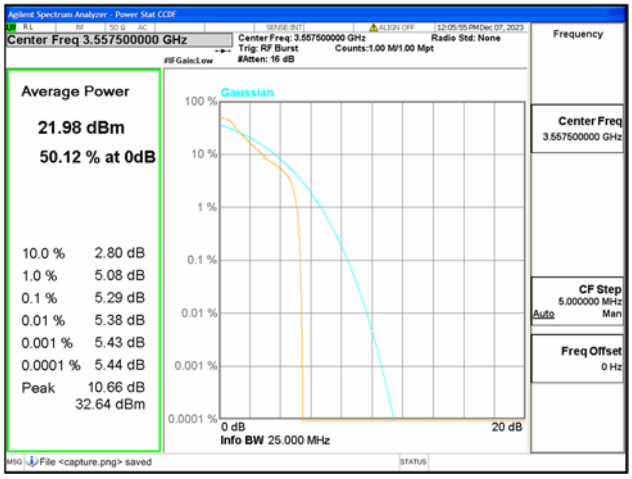
B48 / 15MHz / Low CH / QPSK



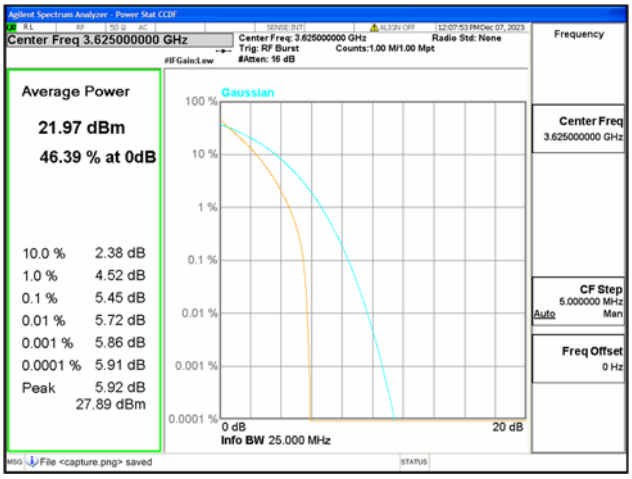
B48 / 15MHz / Low CH / 16QAM



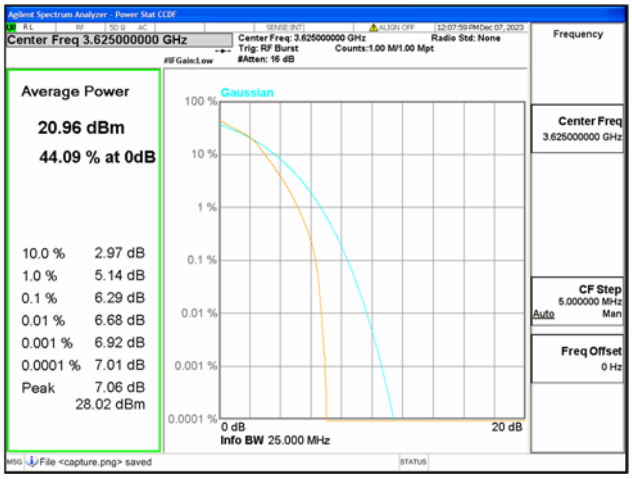
B48 / 15MHz / Low CH / 64QAM



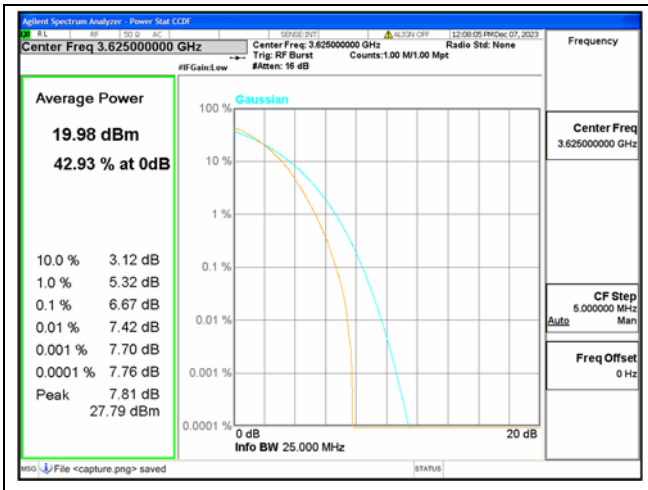
B48 / 15MHz / Low CH / 256QAM



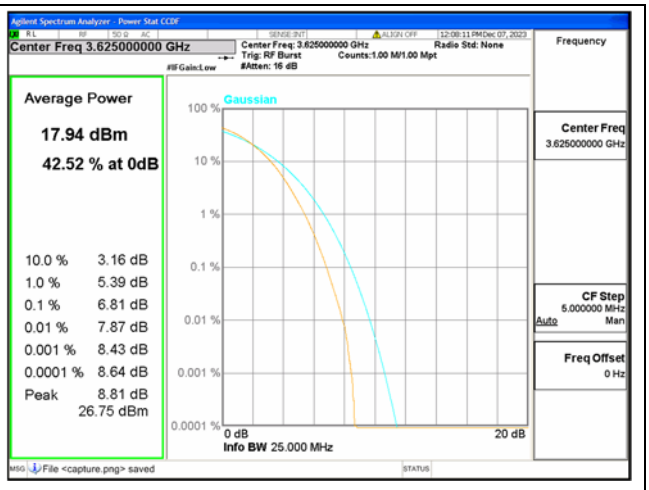
B48 / 15MHz / Mid CH / QPSK



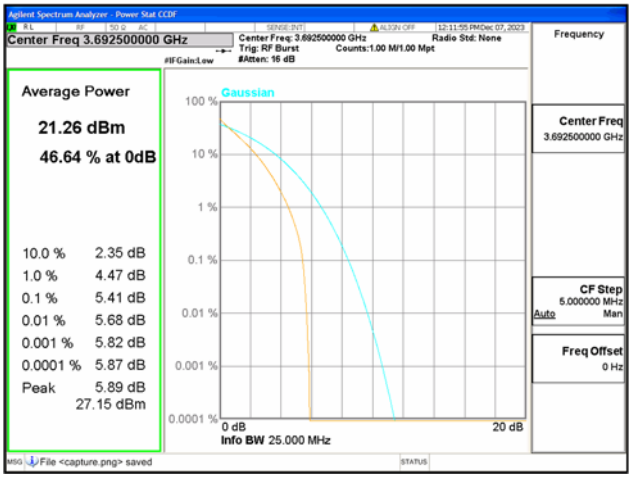
B48 / 15MHz / Mid CH / 16QAM



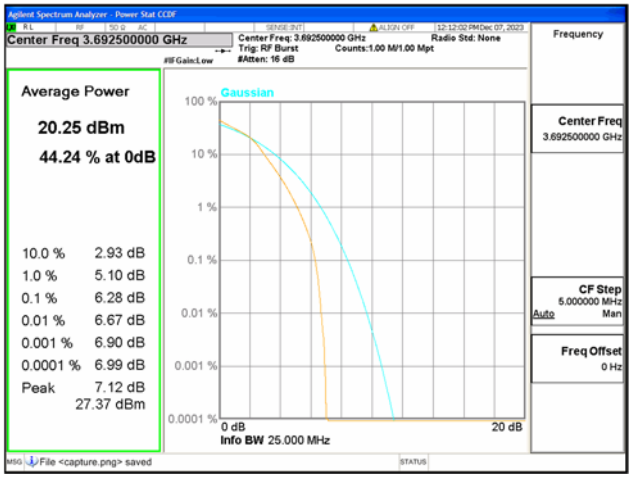
B48 / 15MHz / Mid CH / 64QAM



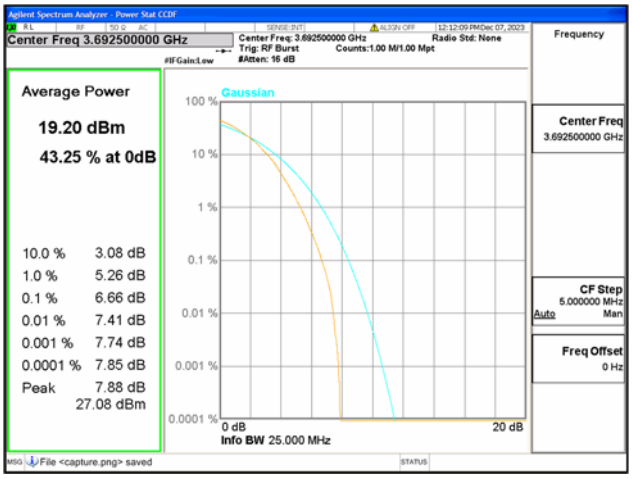
B48 / 15MHz / Mid CH / 256QAM



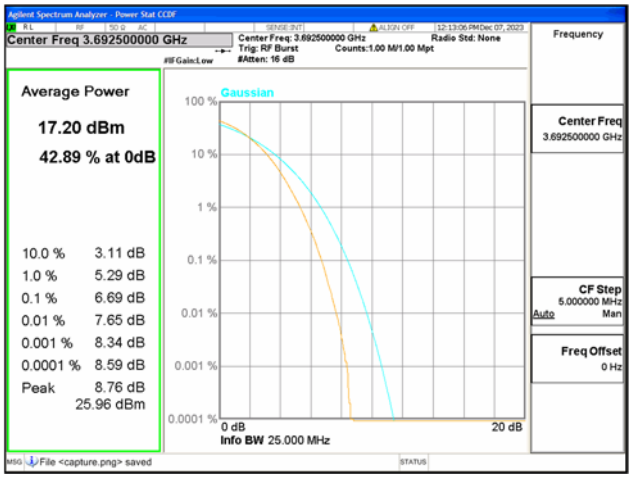
B48 / 15MHz / High CH / QPSK



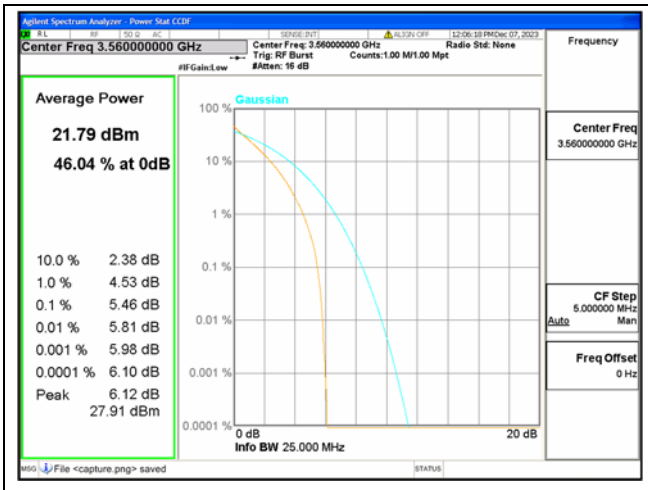
B48 / 15MHz / High CH / 16QAM



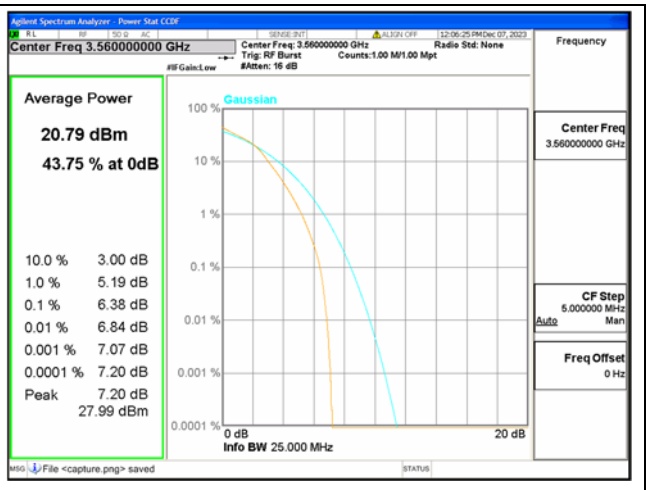
B48 / 15MHz / High CH / 64QAM



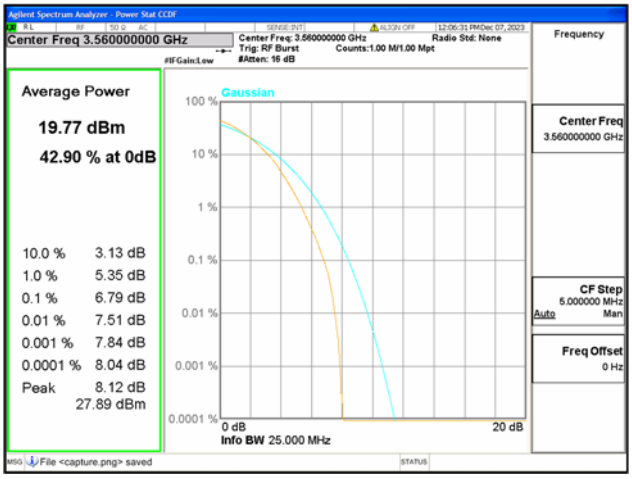
B48 / 15MHz / High CH / 256QAM



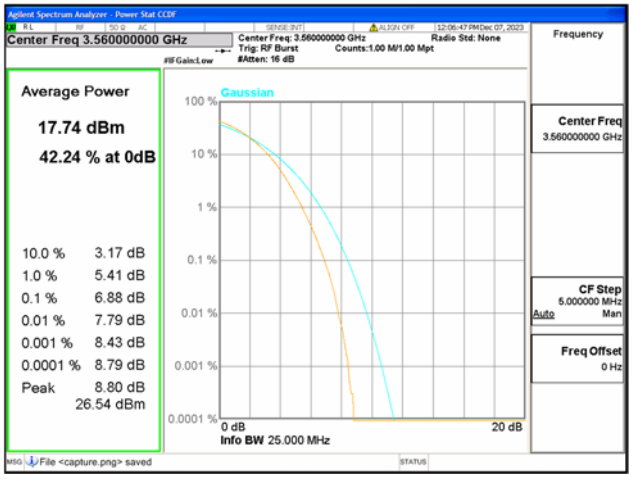
B48 / 20MHz / Low CH / QPSK



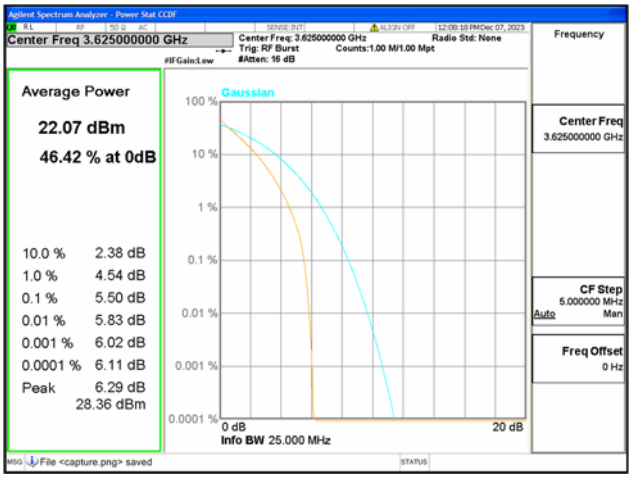
B48 / 20MHz / Low CH / 16QAM



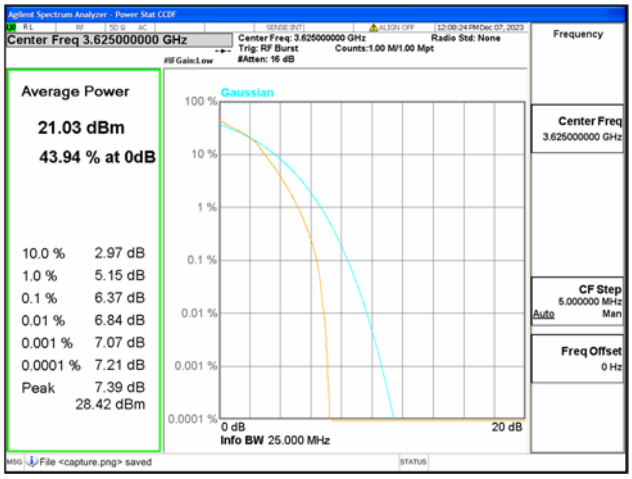
B48 / 20MHz / Low CH / 64QAM



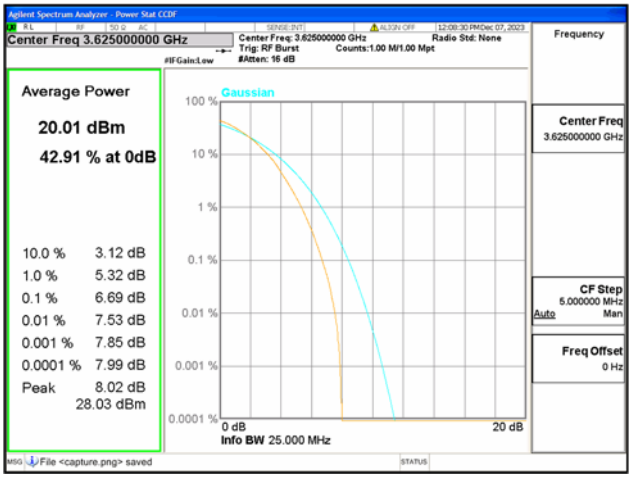
B48 / 20MHz / Low CH / 256QAM



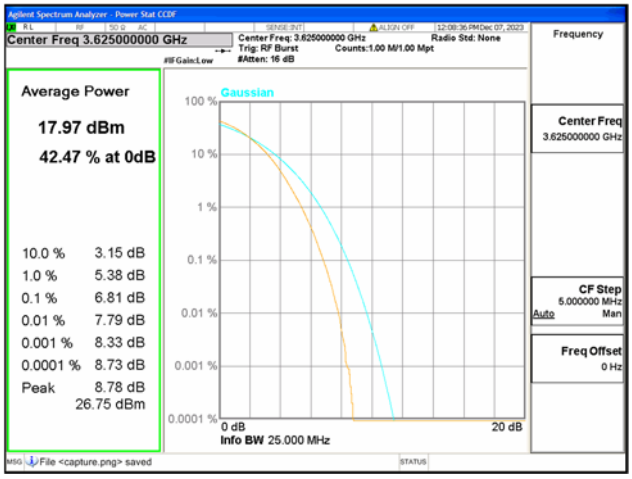
B48 / 20MHz / Mid CH / QPSK



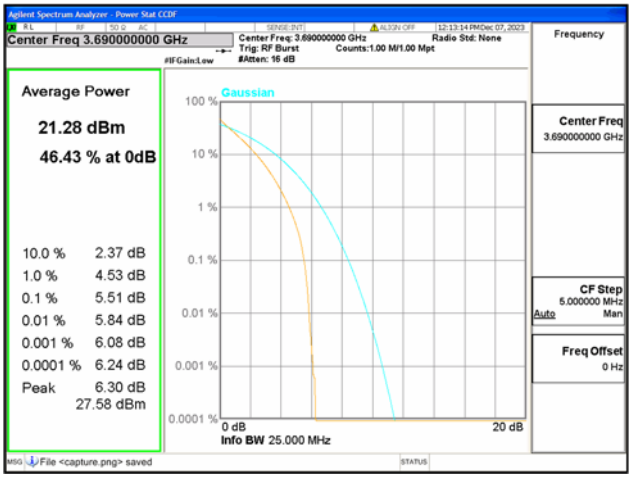
B48 / 20MHz / Mid CH / 16QAM



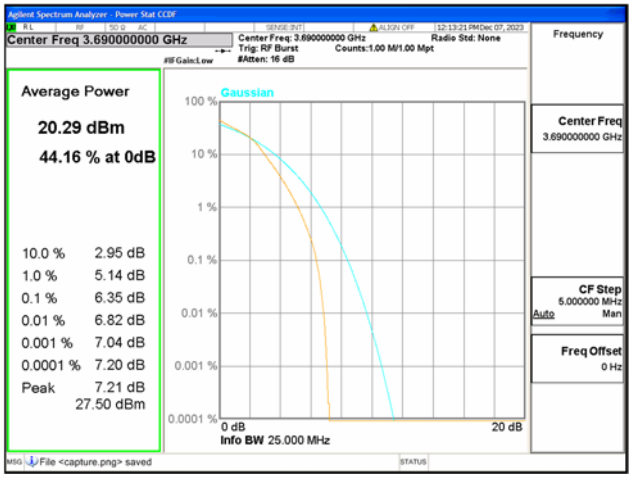
B48 / 20MHz / Mid CH / 64QAM



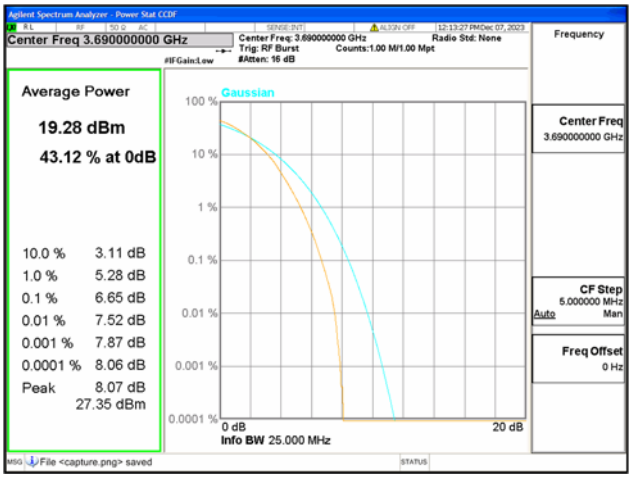
B48 / 20MHz / Mid CH / 256QAM



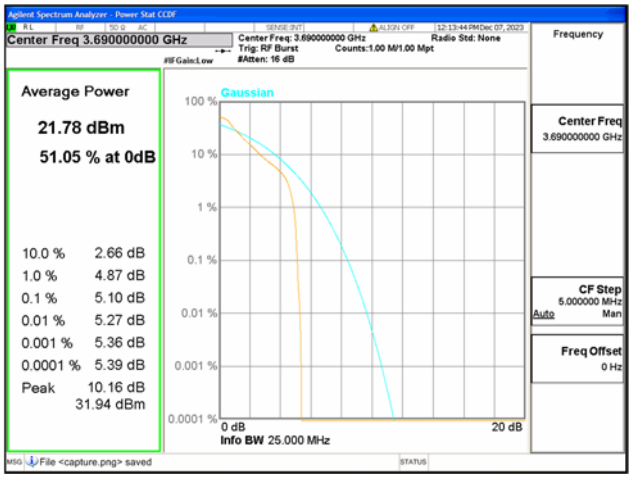
B48 / 20MHz / High CH / QPSK



B48 / 20MHz / High CH / 16QAM



B48 / 20MHz / High CH / 64QAM



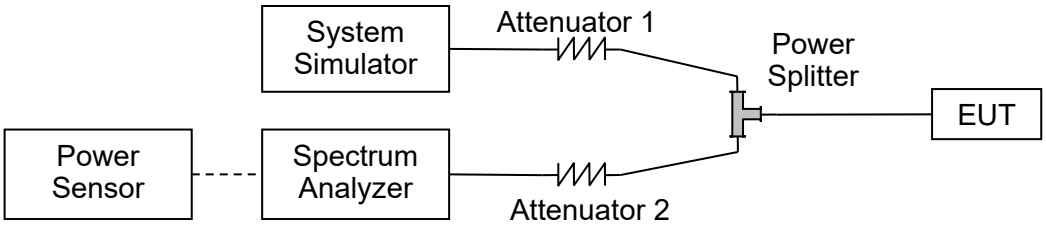
B48 / 20MHz / High CH / 256QAM

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



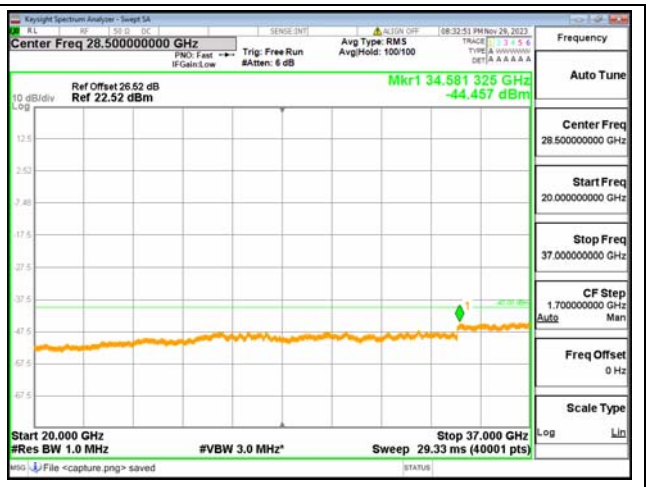
The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum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

2.5.1.Test procedure

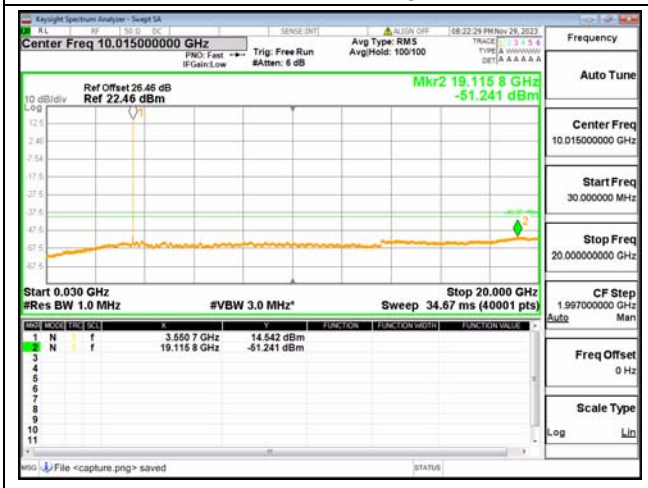
KDB 971168 D01v03 Section 6.0 and ANSI/TIA-603-E-2016.

2.5.2.Test Result

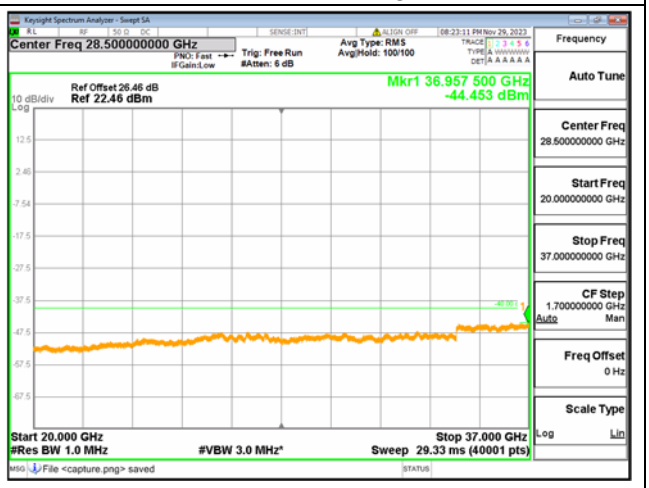
B48-30M-20G / 5MHz / High CH / QPSK



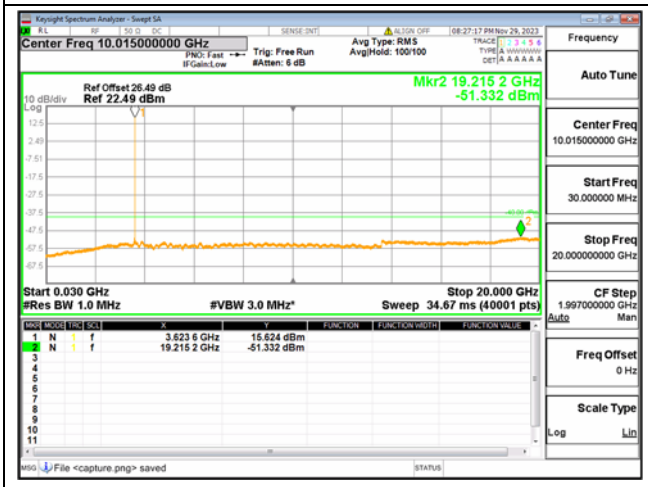
B48-20G-37G / 5MHz / High CH / QPSK



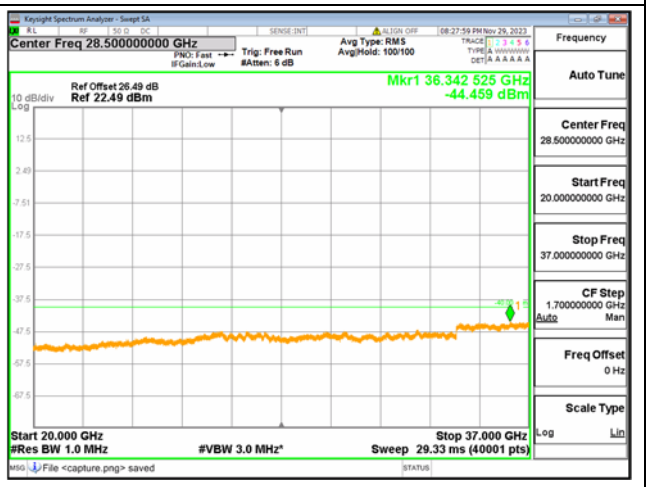
B48-30M-20G / 5MHz / Low CH / QPSK



B48-20G-37G / 5MHz / Low CH / QPSK

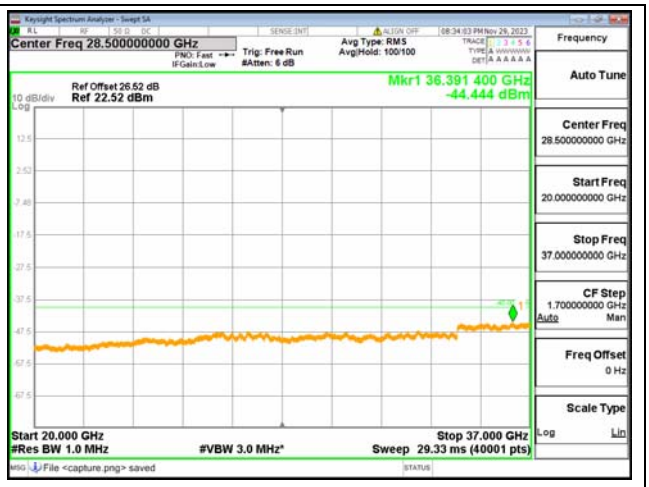


B48-30M-20G / 5MHz / Mid CH / QPSK



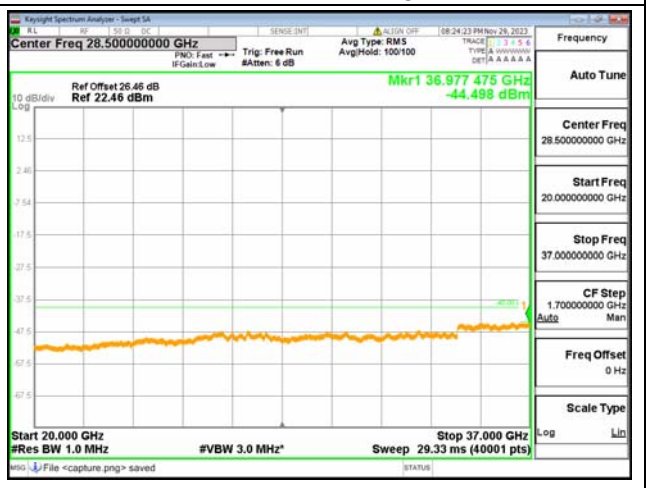
B48-20G-37G / 5MHz / Mid CH / QPSK

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



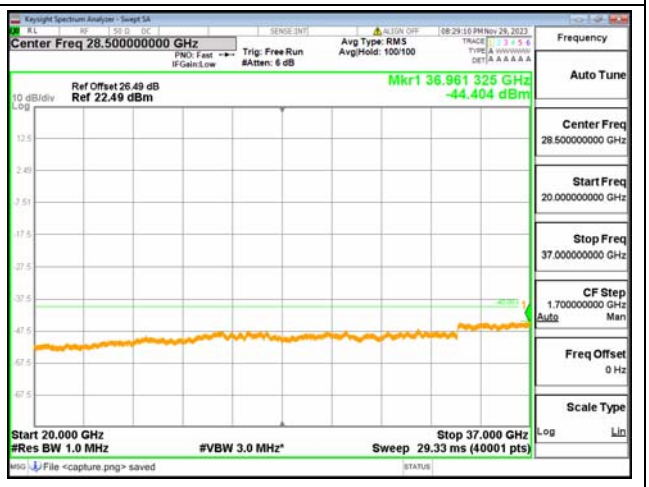
B48-20G-37G / 10MHz / High CH / QPSK

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

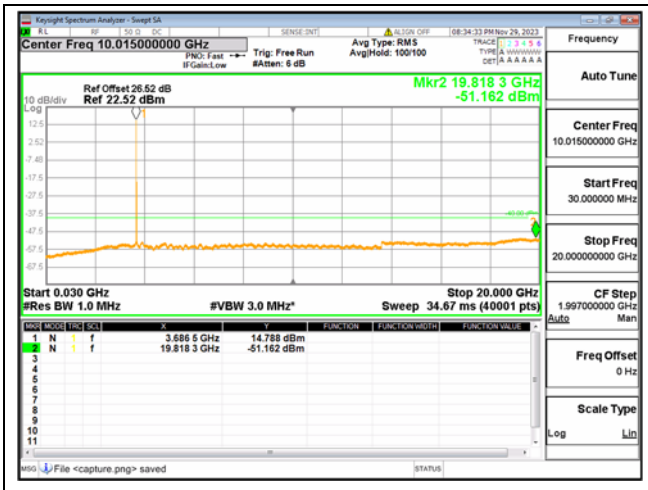


B48-20G-37G / 10MHz / Low CH / QPSK

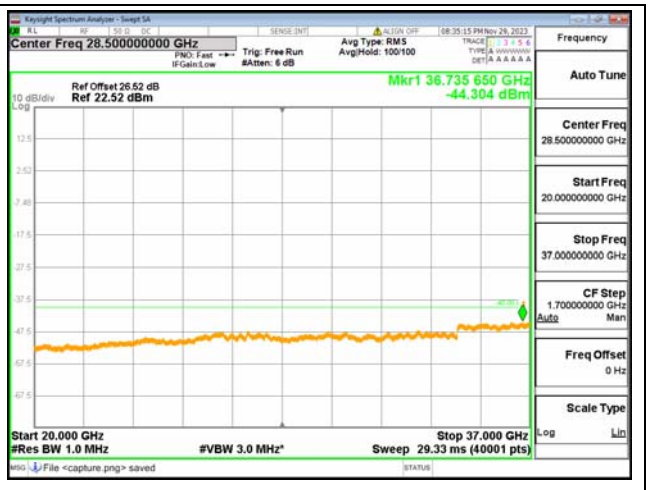
B48-30M-20G / 10MHz / Mid CH / QPSK



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

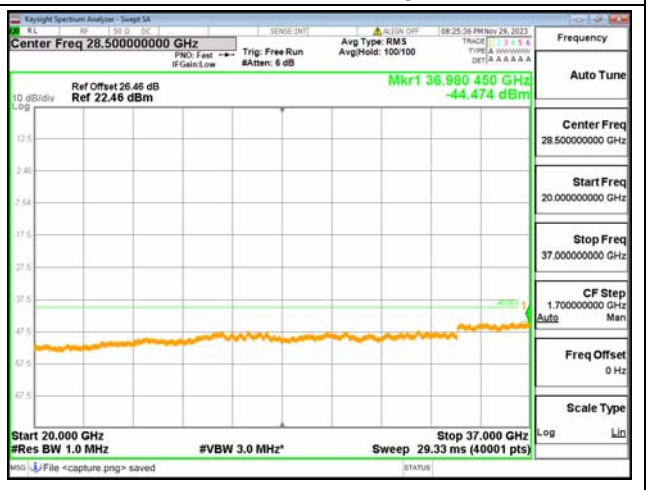


B48-30M-20G / 15MHz / High CH / QPSK

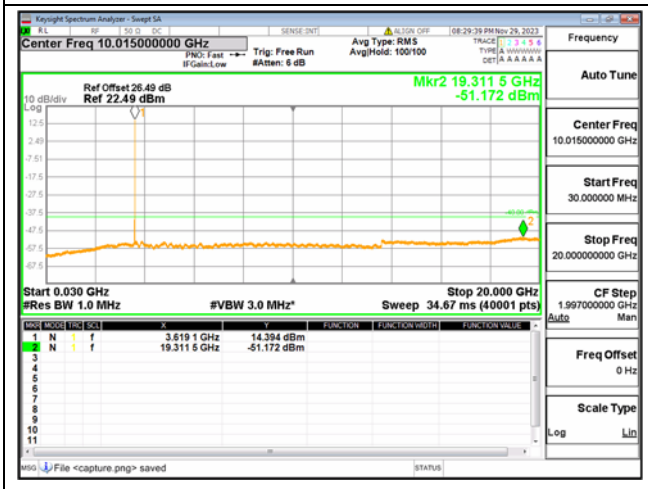


B48-20G-37G / 15MHz / High CH / QPSK

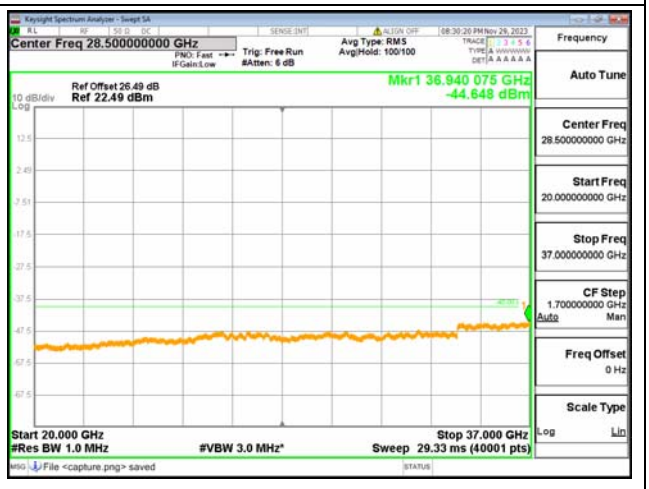
B48-30M-20G / 15MHz / Low CH / QPSK



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

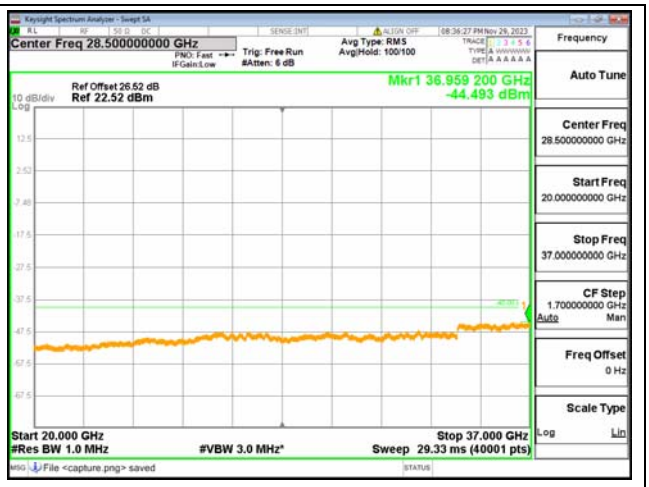


B48-30M-20G / 15MHz / Mid CH / QPSK



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

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

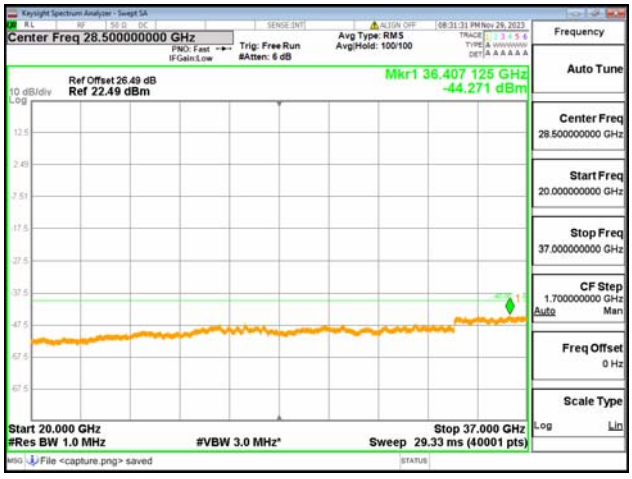


B48-20G-37G / 20MHz / High CH / QPSK

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

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

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



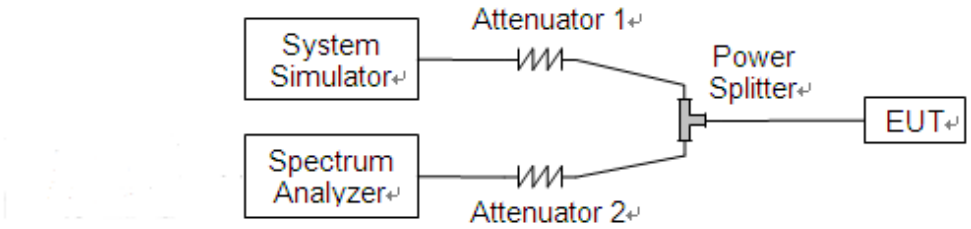
B48-20G-37G / 20MHz / Mid CH / QPSK

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

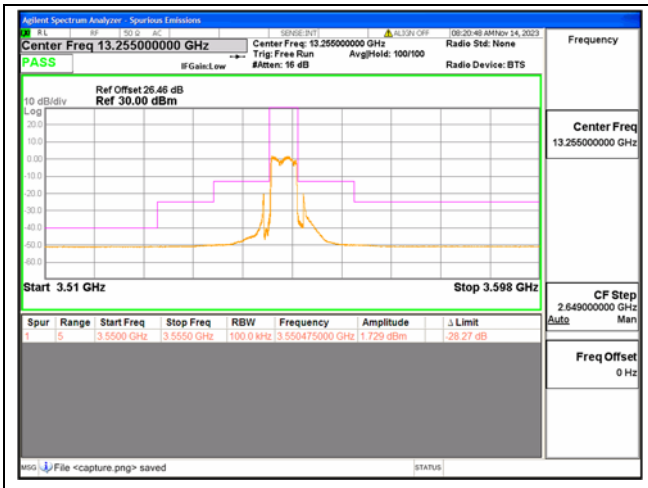


The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum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

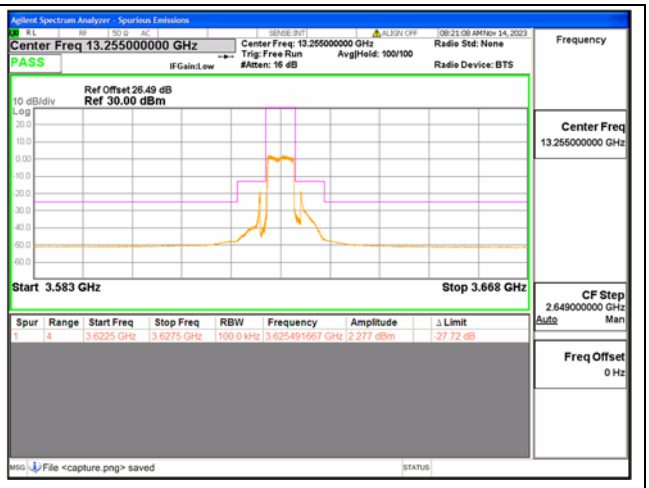
2.6.3.Test procedure

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

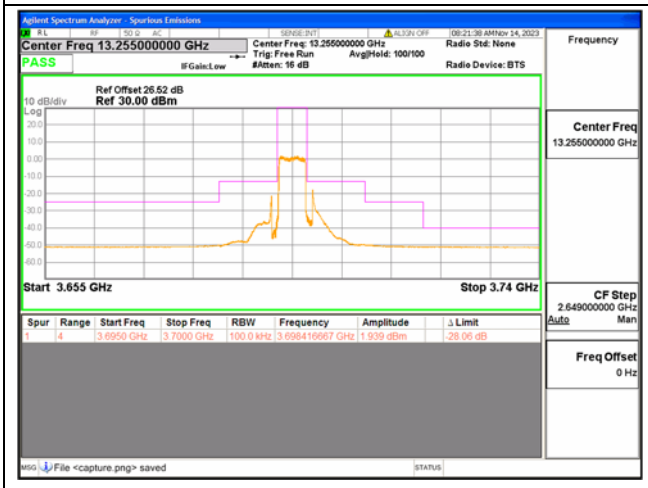
2.6.4.Test Result



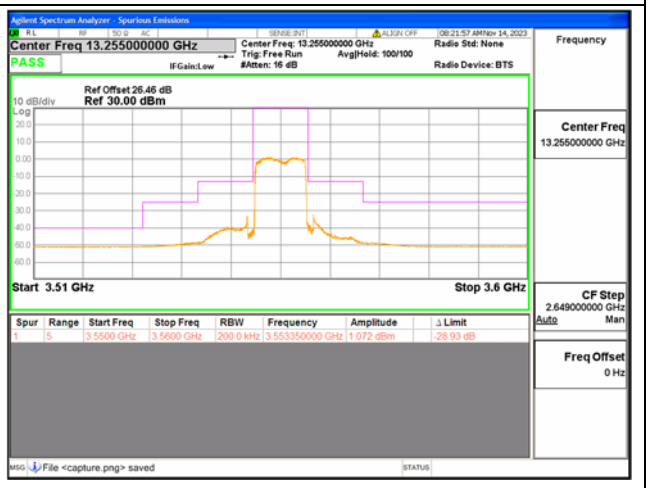
B48 / 5MHz / Low CH / QPSK / FULL RB



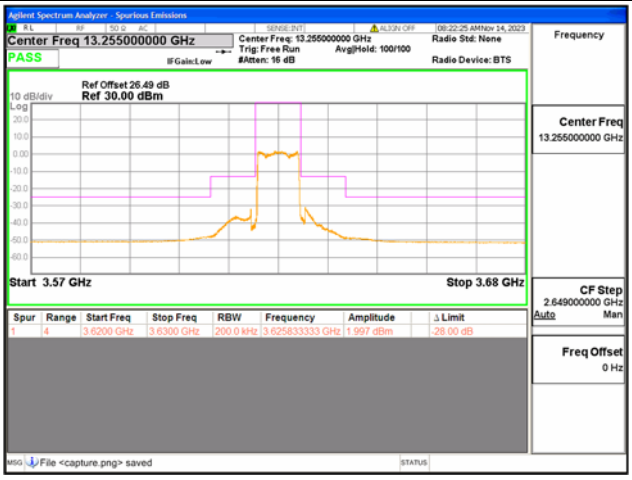
B48 / 5MHz / Mid CH / QPSK / FULL RB



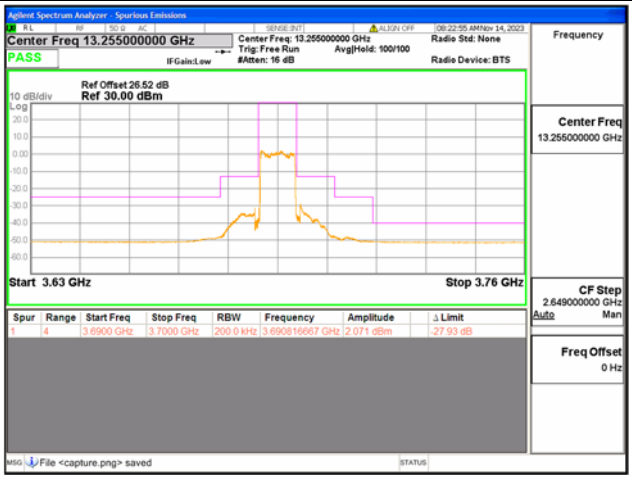
B48 / 5MHz / High CH / QPSK / FULL RB



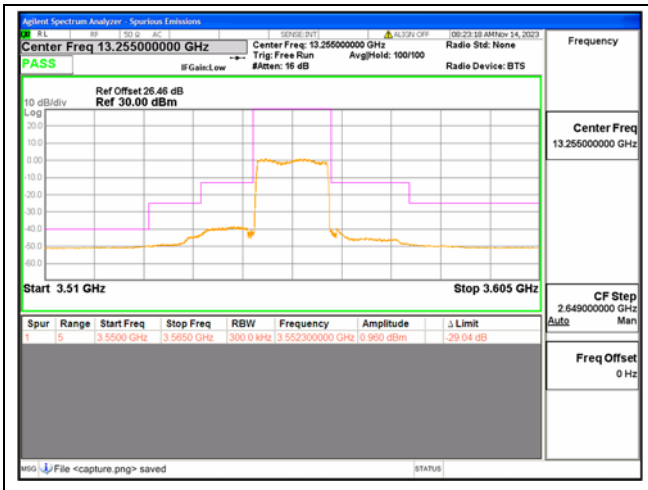
B48 / 10MHz / Low CH / QPSK / FULL RB



B48 / 10MHz / Mid CH / QPSK / FULL RB

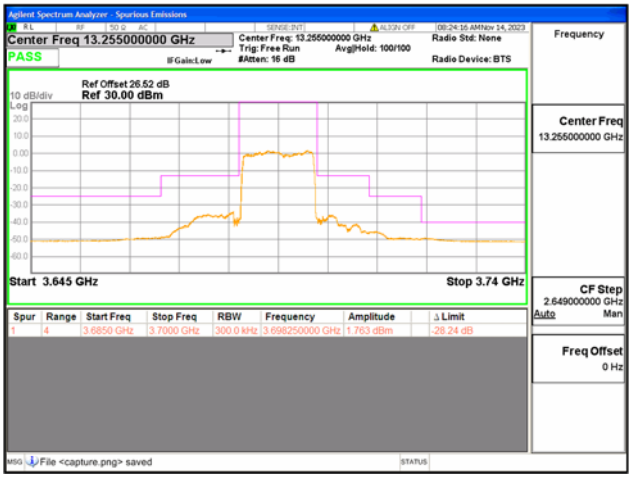


B48 / 10MHz / High CH / QPSK / FULL RB

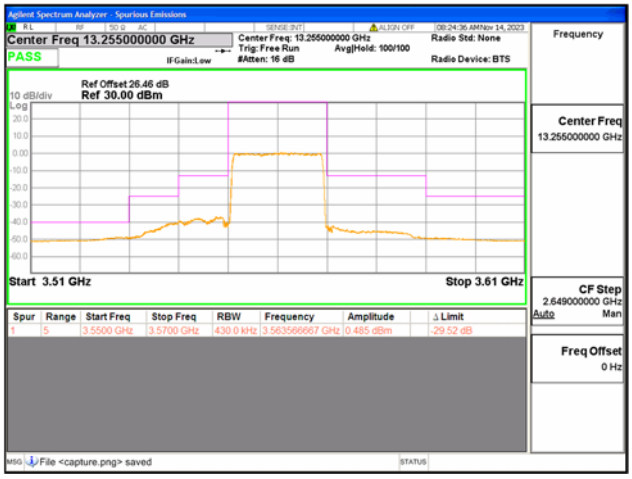


B48 / 15MHz / Low CH / QPSK / FULL RB

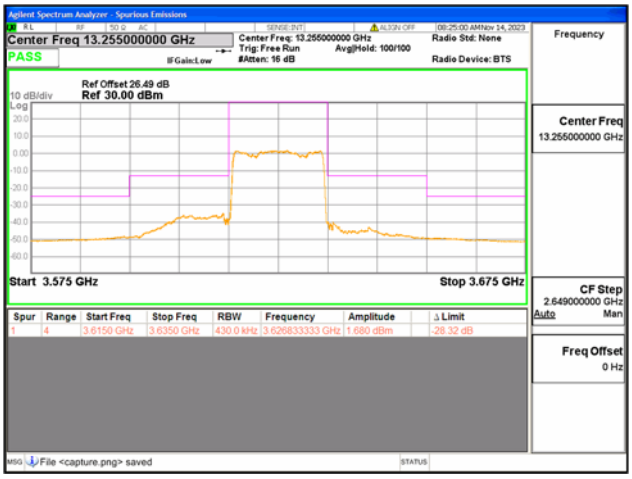
B48 / 15MHz / Mid CH / QPSK / FULL RB



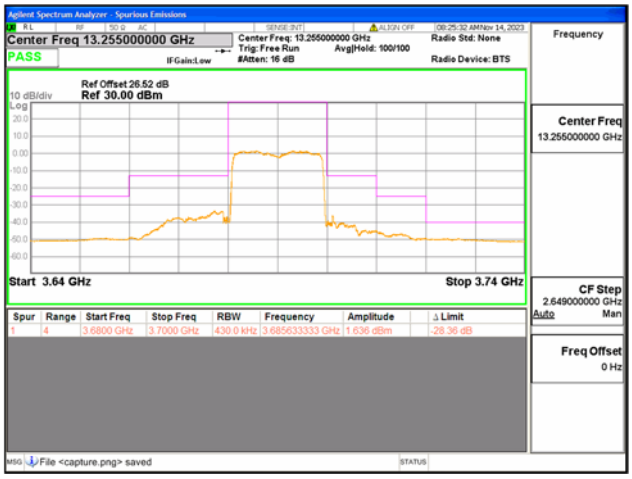
B48 / 15MHz / High CH / QPSK / FULL RB



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



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



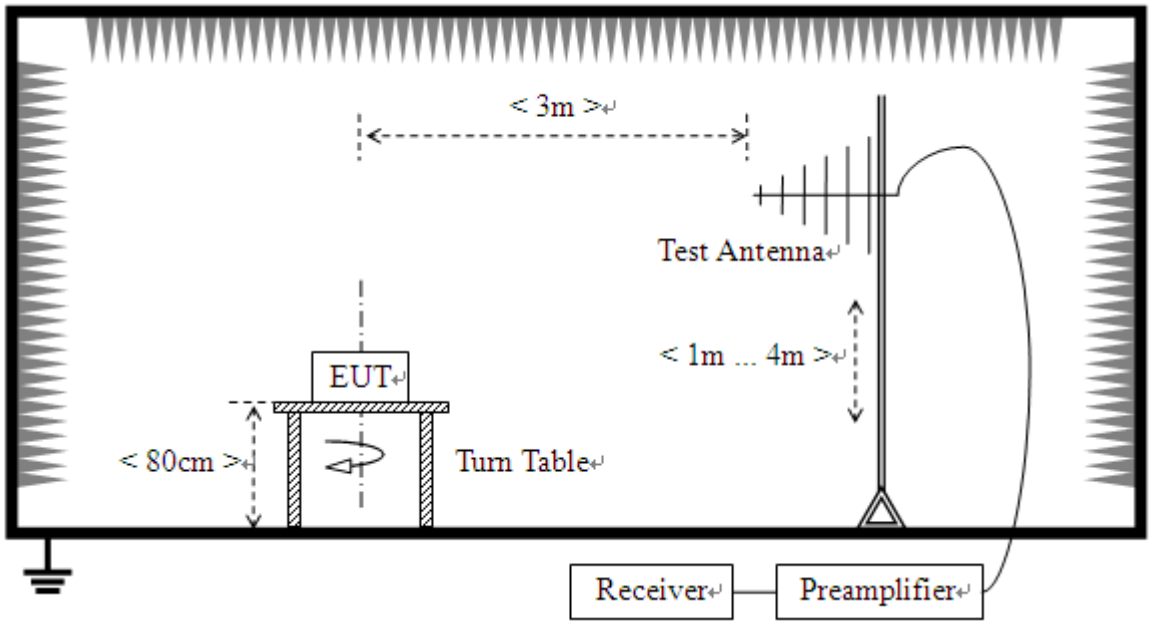
B48 / 20MHz / High CH / QPSK / FULL RB

2.7. Radiated Spurious Emissions

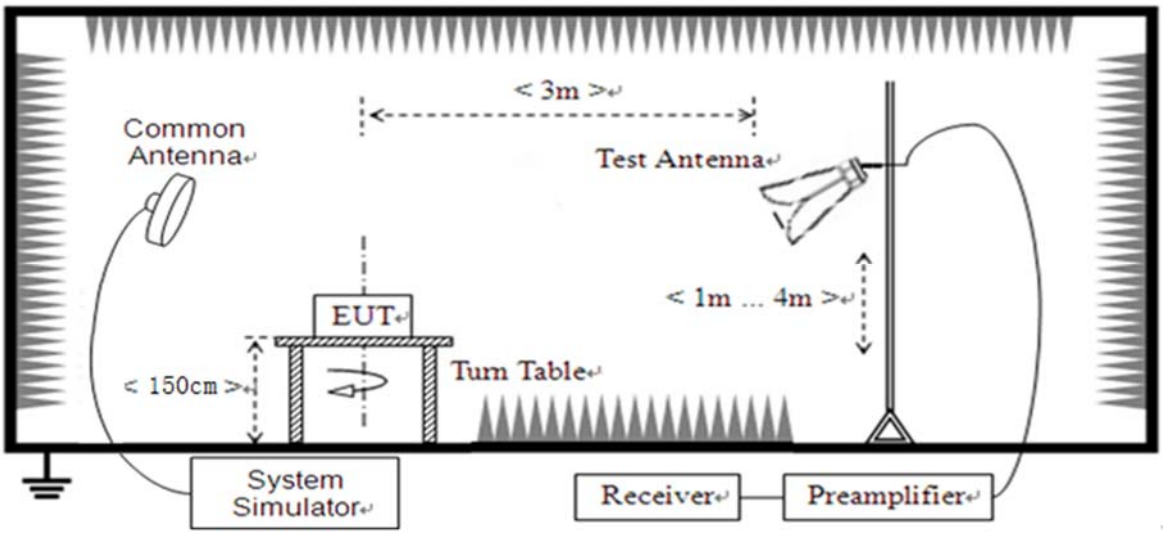
2.7.1.Requirement

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 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}.

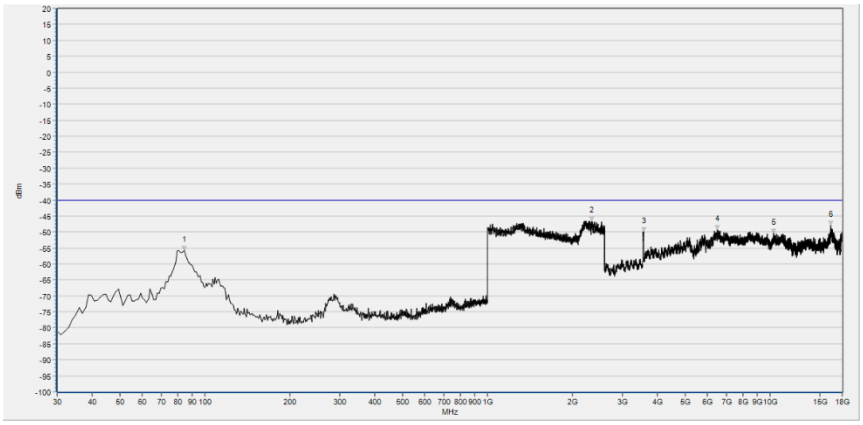
Note1: The power of the EUT transmitting frequency should be ignored.

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.

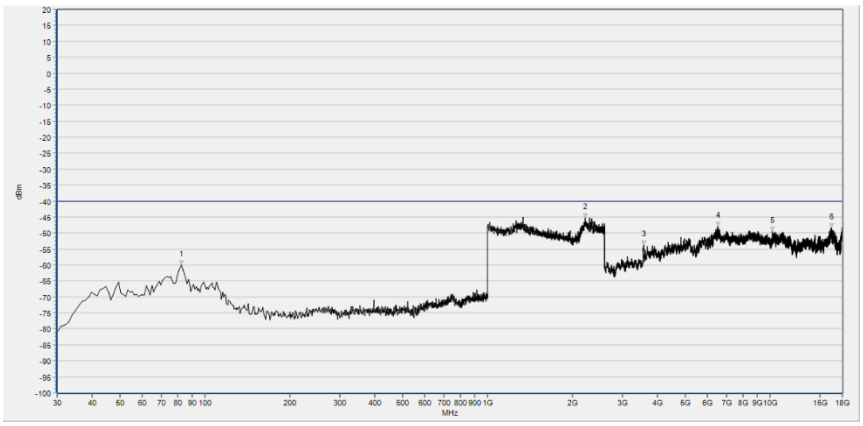
Note3: All bandwidth and modulation were considered and evaluated respectively by performing full test for each band, only the worst cases (Max Bandwidth and QPSK mode) were recorded in this test report.

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

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

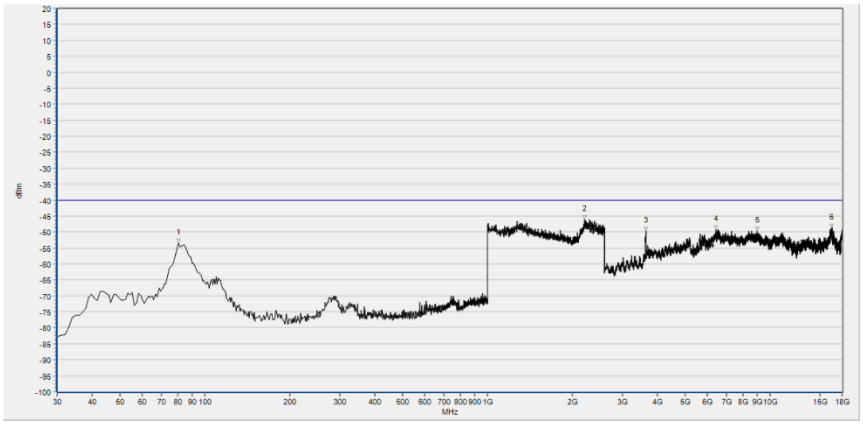


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	84.374	-55.68	-40.00	Horizontal	PASS
2	2337.337	-46.70	-40.00	Horizontal	PASS
3	3564.233	-49.84	-40.00	Horizontal	N/A
4	6521.624	-49.29	-40.00	Horizontal	PASS
5	10316.943	-50.42	-40.00	Horizontal	PASS
6	16419.644	-47.94	-40.00	Horizontal	PASS

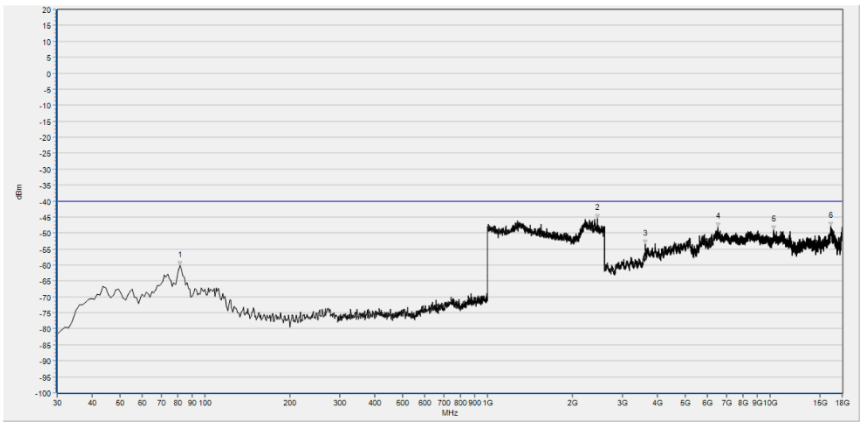


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	82.432	-60.01	-40.00	Vertical	PASS
2	2218.819	-45.31	-40.00	Vertical	PASS
3	3567.313	-53.76	-40.00	Vertical	PASS
4	6533.947	-47.94	-40.00	Vertical	PASS
5	10209.122	-49.60	-40.00	Vertical	PASS
6	16539.788	-48.29	-40.00	Vertical	PASS

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

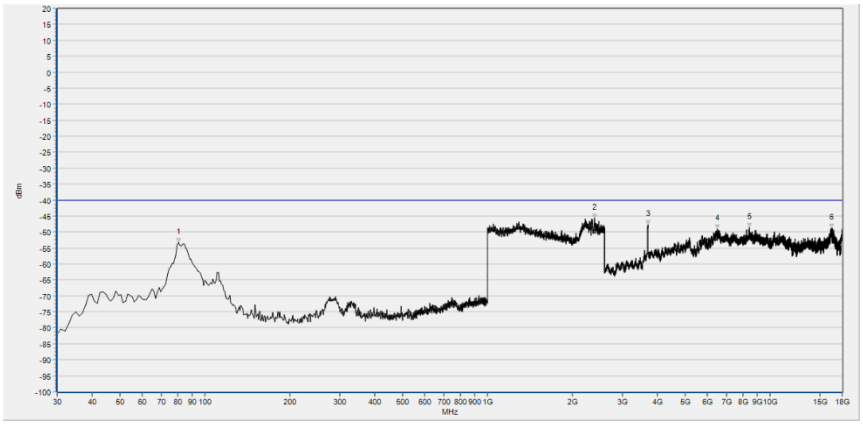


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	80.490	-53.52	-40.00	Horizontal	PASS
2	2209.209	-46.14	-40.00	Horizontal	PASS
3	3632.006	-49.66	-40.00	Horizontal	N/A
4	6432.286	-49.23	-40.00	Horizontal	PASS
5	8992.278	-49.63	-40.00	Horizontal	PASS
6	16456.611	-48.88	-40.00	Horizontal	PASS

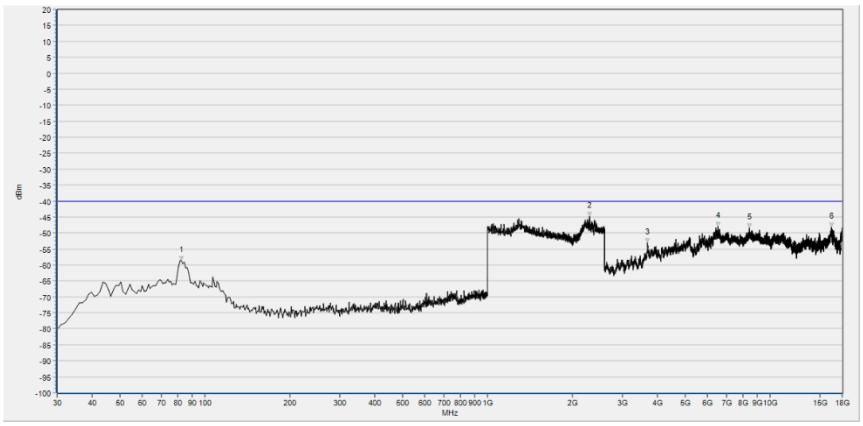


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	81.461	-60.19	-40.00	Vertical	PASS
2	2444.645	-45.48	-40.00	Vertical	PASS
3	3622.765	-53.59	-40.00	Vertical	N/A
4	6543.189	-48.26	-40.00	Vertical	PASS
5	10316.943	-49.05	-40.00	Vertical	PASS
6	16361.112	-47.96	-40.00	Vertical	PASS

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



No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	80.490	-53.20	-40.00	Horizontal	PASS
2	2394.995	-45.80	-40.00	Horizontal	PASS
3	3696.699	-47.82	-40.00	Horizontal	N/A
4	6518.544	-48.97	-40.00	Horizontal	PASS
5	8434.687	-48.57	-40.00	Horizontal	PASS
6	16530.546	-48.78	-40.00	Horizontal	PASS



No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	82.432	-58.55	-40.00	Vertical	PASS
2	2303.704	-44.74	-40.00	Vertical	PASS
3	3684.377	-53.00	-40.00	Vertical	N/A
4	6537.027	-48.01	-40.00	Vertical	PASS
5	8434.687	-48.44	-40.00	Vertical	PASS
6	16539.788	-48.22	-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 listedbelow. 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 authorizationsignal transmitted by a CBSD, including the frequencies and power limits for their operationAn End User Device must discontinue operations, change frequencies, or change its operationapower 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	±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	2023.06.21	2024.06.20
Communication Test Station	6261830572	MT8821C	Anritsu	2023.06.21	2024.06.20
Temperature Chamber	S022177101 00089002	KMT-36LF 1A0	KOMEG	2023.09.19	2024.09.18

4.2 List of Software Used

Description	Manufacturer	Software Version
Morlab FCC LTE Test System	MORLAB	V6.45
MORLAB EMCR	MORLAB	V1.2

4.3 Radiated Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Due Date
System Simulator	152038	CMW500	R&S	2023.10.17	2024.10.16
Receiver	MY54130016	N9038A	Agilent	2023.06.21	2024.06.20
Test Antenna - Bi-Log	9163-519	VULB 9163	Schwarzbeck	2023.07.01	2024.06.30
Test Antenna - Horn	9120D-963	BBHA 9120D	Schwarzbeck	2023.06.27	2024.06.26
RF Coaxial Cable (DC-18GHz)	MRE001	PE330	Pasternack	2023.06.27	2024.06.26
RF Coaxial Cable (DC-18GHz)	MRE002	CLU18	Pasternack	2023.06.27	2024.06.26
RF Coaxial Cable (DC-18GHz)	MRE003	CLU18	Pasternack	2023.06.27	2024.06.26
RF Coaxial Cable (DC-40GHz)	22290045	QA360-40-KK-0.5	Qualwave	2023.07.04	2024.07.03
RF Coaxial Cable (DC-40GHz)	22290046	QA360-40-KKF-2	Qualwave	2023.07.04	2024.07.03
Preamplifier (10MHz-6GHz)	46732	S10M100L3802	LUCIX CORP.	2023.07.04	2024.07.03
Preamplifier (2GHz-18GHz)	61171/61172	S020180L3203	LUCIX CORP.	2023.06.27	2024.06.26
Preamplifier (18GHz-40GHz)	DS77209	DCLNA0118-40C-S	Decentest	2023.06.27	2024.06.26
Notch Filter	N/A	WRCGV -LTE B42	Wainwright	N/A	N/A
Notch Filter	N/A	WRCGV -LTE B43	Wainwright	N/A	N/A
Notch Filter	N/A	WRCGV -LTE B48	Wainwright	N/A	N/A
Anechoic Chamber	N/A	9m*6m*6m	CRT	2022.05.10	2025.05.09

END OF REPORT