

FCC Test Report

Report No.: AGC11805240901FR04

FCC ID : 2BK8B-DSDR23A
APPLICATION PURPOSE : Original Equipment
PRODUCT DESIGNATION : ATOM 2 Drone
BRAND NAME : Potensic
MODEL NAME : DSDR23A, DSDR23B, DSDR23C, DSDR23D
APPLICANT : Shenzhen Potensic Intelligent Co., Ltd.
DATE OF ISSUE : Dec. 18, 2024
STANDARD(S) : FCC Part 15 Subpart C §15.247
REPORT VERSION : V1.0

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Dec. 18, 2024	Valid	Initial Release

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1. General Information

Applicant	Shenzhen Potensic Intelligent Co., Ltd.
Address	Room 1901, Jinqizhigu Building, Tangling Road, Nanshan District, Shenzhen, China
Manufacturer	Shenzhen Potensic Intelligent Co., Ltd.
Address	Room 1901, Jinqizhigu Building, Tangling Road, Nanshan District, Shenzhen, China
Factory	Shenzhen Potensic Intelligent Co., Ltd.
Address	Room 1901, Jinqizhigu Building, Tangling Road, Nanshan District, Shenzhen, China
Product Designation	ATOM 2 Drone
Brand Name	Potensic
Test Model	DSDR23A
Series Model(s)	DSDR23B, DSDR23C, DSDR23D
Difference Description	All the same except the model name
Date of receipt of test item	Sep. 19, 2024
Date of Test	Sep. 19, 2024~Dec. 18, 2024
Deviation from Standard	No any deviation from the test method
Condition of Test Sample	Normal
Test Result	Pass
Test Report Form No	AGCER-FCC-2.4G-V1

Note: The test results of this report relate only to the tested sample identified in this report

Prepared By		
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Reviewed By		
	Calvin Liu (Reviewer)	Dec. 18, 2024
Approved By		
	Angela Li (Authorized Officer)	Dec. 18, 2024

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2. Product Information

2.1 Product Technical Description

Equipment Type	Custom IEEE 802.11 for 2.4GHz
Frequency Band	2400MHz~2483.5MHz
Operation Frequency	2415MHz~2470MHz
Output Power (Average)	16.84dBm
Output Power (Peak)	24.45dBm
Output Power (MIMO- Average)	19.69dBm
Output Power (MIMO- Peak)	27.15dBm
Modulation	OFDM (64-QAM, 16-QAM, QPSK, BPSK)
Number of channels	6
Hardware Version	V06
Software Version	V4.2.4
Antenna Designation	Dipole Antenna for ANT 1 (Chain A Port) Dipole Antenna for ANT 2 (Chain B Port)
Antenna Gain	Please refer to report section 2.9 description
Number of transmit chain	2 (Custom IEEE 802.11 support MIMO)
Power Supply	DC 7.7V by battery

2.2 Table of Carrier Frequency

Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2415 MHz	01	2425 MHz	02	2435 MHz
03	2445 MHz	04	2455 MHz	05	2465 MHz
06	2470 MHz	\	\	\	\

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2.4 Related Submittal(S) / Grant (S)

This submittal(s) (test report) is intended for FCC ID: **2BK8B-DSDR23A**, filing to comply with Part 2, Part 15 of the Federal Communication Commission rules.

2.5 Test Methodology

The tests were performed according to following standards:

No.	Identity	Document Title
1	FCC 47 CFR Part 2	Frequency allocations and radio treaty matters; general rules and regulations
2	FCC 47 CFR Part 15	Radio Frequency Devices
3	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices
4	KDB 662911	KDB 662911 D01 Multiple Transmitter Output v02r01Emissions Testing of Transmitters with Multiple Outputs in the Same Band (e.g., MIMO, Smart Antenna, etc)

2.6 Special Accessories

Refer to section 4.4.

2.7 Equipment Modifications

Not available for this EUT intended for grant.

2.8 Antenna Requirement

Standard Requirement
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(b) (4) requirement: The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi EUT Antenna: The non-detachable antenna inside the device cannot be replaced by the user at will. For the antenna gain, please refer to the description in Chapter 2.9 of the report.

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2.9 Description of Available Antennas

Antenna Type	Frequency Band (MHz)	TX Paths	Bandwidth (MHz)	Max Peak Gain (dBi)		Max Directional Gain (dBi)
				Chain A	Chain B	
Custom IEEE 802.11 FPC Antenna List (2.4GHz 2*2 MIMO)						
Dipole Antenna	2400~2483.5	2	20	2.38	3.15	6.16

Note 1: The EUT supports Cyclic Delay Diversity (CDD) technology for Custom IEEE 802.11(OFDM) mode.

Note 2: The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.

If all antennas have the same gain, G_{ANT} , Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

- For power spectral density (PSD) measurements on devices:
 - Array Gain = $10 \log (N_{ANT} / N_{SS})$ dB = 3.01;
- For power measurements on IEEE 802.11 devices:
 - Array Gain = 0 dB for $N_{ANT} \leq 4$;
 - Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;
 - Array Gain = $5 \log (N_{ANT} / N_{SS})$ dB or 3 dB, whichever is less, for 20 MHz channel widths with $N_{ANT} \geq 5$.

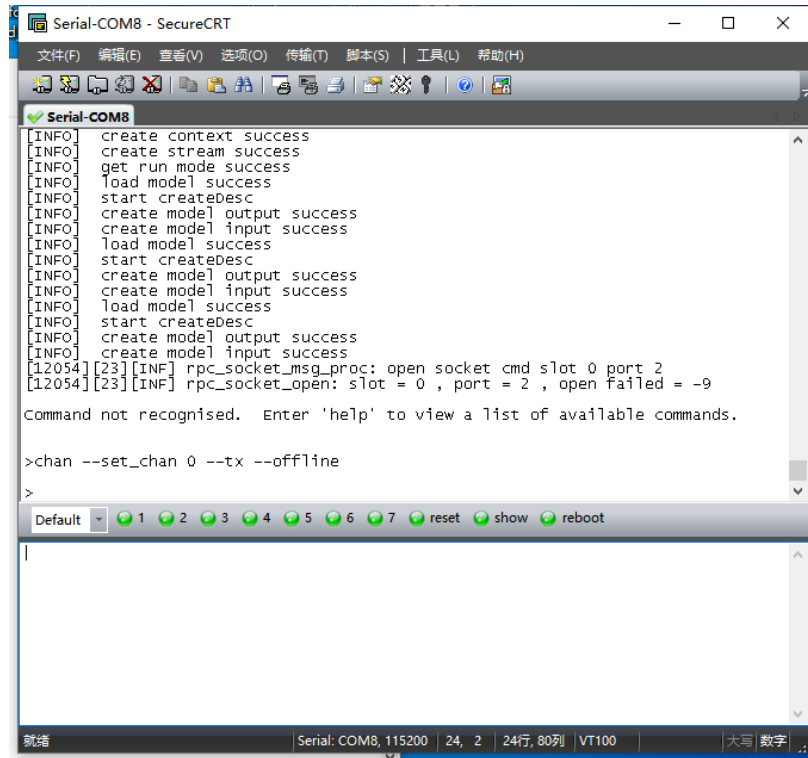
If antenna gains are not equal, Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain.

2.10 Description of Test Software

For Custom IEEE 802.11 mode:

The test utility software used during testing was “SecureCRT”, and the version was “6.6.1”.

Software Setting Diagram



Test Mode	Channel	Power Index	
		Chain A	Chain B
Custom IEEE 802.11	L/M/H	18	18

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3. Test Environment

3.1 Address of The Test Laboratory

Laboratory: Attestation of Global Compliance (Shenzhen) Co., Ltd.

Address: 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

3.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L5488

Attestation of Global Compliance (Shenzhen) Co., Ltd. has been assessed and proved to follow CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories).

A2LA-Lab Cert. No.: 5054.02

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to follow ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC-Registration No.: 975832

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files with Registration 975832.

IC-Registration No.: 24842 (CAB identifier: CN0063)

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Certification and Engineering Bureau of Industry Canada. The acceptance letter from the IC is maintained in our files with Registration 24842.

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3.3 Environmental Conditions

	Normal Conditions
Temperature range (°C)	15 - 35
Relative humidity range	20 % - 75 %
Pressure range (kPa)	86 - 106

3.4 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

Item	Measurement Uncertainty
Uncertainty of Conducted Emission for AC Port	$U_c = \pm 2.9 \text{ dB}$
Uncertainty of Radiated Emission for 9kHz-30MHz	$U_c = \pm 3.9 \text{ dB}$
Uncertainty of Radiated Emission for 30MHz-1GHz	$U_c = \pm 3.9 \text{ dB}$
Uncertainty of Radiated Emission above 1GHz	$U_c = \pm 4.9 \text{ dB}$
Uncertainty of RF Power Sensor, Conducted	$U_c = \pm 0.8 \text{ dB}$
Uncertainty of total RF Power, Conducted	$U_c = \pm 1.8 \text{ dB}$
Uncertainty of RF Power Density, Conducted	$U_c = \pm 2.6 \text{ dB}$
Uncertainty of Conducted Spurious Emissions for 9kHz-40GHz	$U_c = \pm 2.7 \text{ dB}$
Uncertainty of Occupied Channel Bandwidth	$U_c = \pm 2.0 \%$
Uncertainty of Dwell Time	$U_c = \pm 0.2 \%$

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3.5 List of Equipment Used

● RF Conducted Test System							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
☒	AGC-ER-E036	Spectrum Analyzer	Agilent	N9020A	MY49100060	2024-05-24	2025-05-23
☒	AGC-ER-E062	Power Sensor	Agilent	U2021XA	MY54110007	2024-02-01	2025-01-31
☒	AGC-ER-E063	Power Sensor	Agilent	U2021XA	MY54110009	2024-02-01	2025-01-31
☒	AGC-ER-A001	6dB Attenuator	Eeatsheep	LM-XX-6-5W	N/A	2023-09-21	2025-09-20
☒	N/A	RF Connection Cable	N/A	1#	N/A	Each time	N/A
☒	N/A	RF Connection Cable	N/A	2#	N/A	Each time	N/A

● Radiated Spurious Emission							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
☒	AGC-EM-E046	EMI Test Receiver	R&S	ESCI	10096	2024-02-01	2025-01-31
☒	AGC-EM-E116	EMI Test Receiver	R&S	ESCI	100034	2024-05-24	2025-05-23
☒	AGC-EM-E061	Spectrum Analyzer	Agilent	N9010A	MY53470504	2024-05-28	2025-05-27
☒	AGC-EM-E086	Loop Antenna	ZHINAN	ZN30900C	18051	2024-03-05	2026-03-04
☒	AGC-EM-E001	Wideband Antenna	SCHWARZBECK	VULB9168	D69250	2023-05-11	2025-05-10
☒	AGC-EM-E029	Broadband Ridged Horn Antenna	ETS	3117	00034609	2024-03-31	2025-03-30
☒	AGC-EM-E082	Horn Antenna	SCHWARZBECK	BBHA 9170	#768	2023-09-24	2025-09-23
☒	AGC-EM-E083	Pre-amplifier	CHENGXI	EMC184045SE	980508	2023-09-20	2025-09-19
☒	AGC-EM-E146	Pre-amplifier	ETS	3117-PA	00246148	2024-07-24	2026-07-23
☒	AGC-EM-A119	2.4G Filter	SongYi	N/A	N/A	2024-05-23	2025-05-22
☒	AGC-EM-A138	6dB Attenuator	Eeatsheep	LM-XX-6-5W	N/A	2023-06-09	2025-06-08

● Test Software					
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Version Information
☒	AGC-EM-S001	CE Test System	R&S	ES-K1	V1.71
☒	AGC-EM-S003	RE Test System	FARA	EZ-EMC	VRA-03A
☒	AGC-ER-S012	BT/WIFI Test System	Tonscend	JS1120-2	2.6
☒	AGC-EM-S011	RSE Test System	Tonscend	TS+-Ver2.1(JS36-RSE)	4.0.0.0

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4. System Test Configuration

4.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

4.2 EUT Exercise

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

4.3 Configuration of Tested System



4.4 Equipment Used in Tested System

The following peripheral devices and interface cables were connected during the measurement:

- ☐ Test Accessories Come from the Laboratory
- ☒ Test Accessories Come from the Manufacturer

No.	Equipment	Manufacturer	Model No.	Specification Information	Cable
1	Battery	Xi'an SAFTY Energy Technology Co., Ltd	DSBT02B	DC 7.7V 2230mAh	N/A

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4.5 Summary of Test Results

Item	FCC Rules	Description of Test	Result
1	§15.203&15.247(b)(4)	Antenna Equipment	Pass
2	§15.247 (b)(1)	RF Output Power	Pass
3	§15.247 (a)(1)	6 dB Bandwidth	Pass
4	§15.247 (e)	Power Spectral Density	Pass
5	§15.247 (d)	Conducted Band Edge and Out-of-Band Emissions	Pass
6	§15.247 (d)&15.209	Radiated Spurious Emission	Pass
7	§15.207	AC Power Line Conducted Emission	N/A

Note: The Custom IEEE 802.11 function cannot transmit when charging.

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5. Description of Test Modes

Summary table of Test Cases	
Test Item	Data Rate / Modulation
	Custom IEEE 802.11(OFDM)/MCS0-MCS7 Mbps
Radiated & Conducted Test Cases	Mode 1: Custom IEEE 802.11_TX CH00_2415 MHz_ MCS0 Mbps Mode 2: Custom IEEE 802.11_TX CH03_2445 MHz_ MCS0 Mbps Mode 3: Custom IEEE 802.11_TX CH06_2470 MHz_ MCS0 Mbps
AC Conducted Emission	N/A

Note:

1. The battery is full-charged during the test.
2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
3. For Conducted Test method, a temporary antenna connector is provided by the manufacture.
4. All modes and antennas in the radiation spurious test are pre-scanned. When there is no MIMO technology mode, antenna 1 is evaluated. When there is MIMO technology mode, antenna 1 + antenna 2 are evaluated as the worst data.

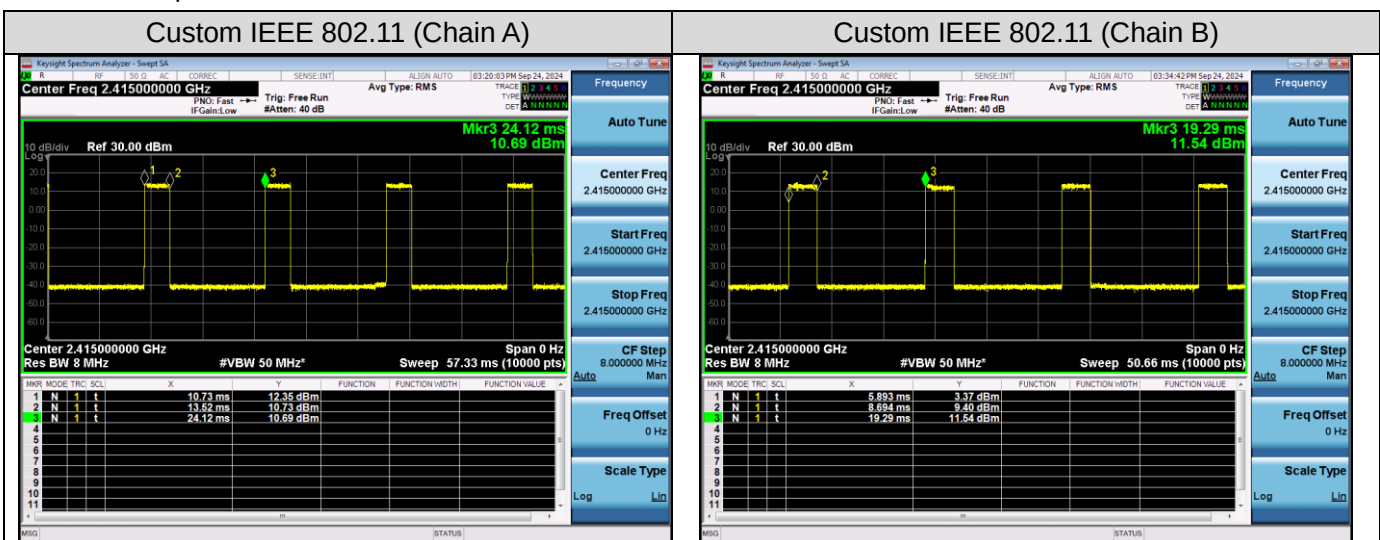
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6. Duty Cycle Measurement

Custom IEEE 802.11 (DTS) operation is possible in 20MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = Average. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

Operating mode	Data rates (Mbps)	Duty Cycle (%)	Duty Cycle Factor (dB)
Custom IEEE 802.11 (Chain A)	MCS0	21	6.78
Custom IEEE 802.11 (Chain B)	MCS0	21	6.78

- The test plots as follows:



Remark:

- Duty Cycle factor = $10 * \log (1/ \text{Duty cycle})$
- The duty cycle of each frequency band mode reflects the determination requirements of the low channel measurement value.

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7. RF Output Power Measurement

7.1 Provisions Applicable

For DTSSs employing digital modulation techniques operating in the bands 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1 W.

7.2 Measurement Procedure

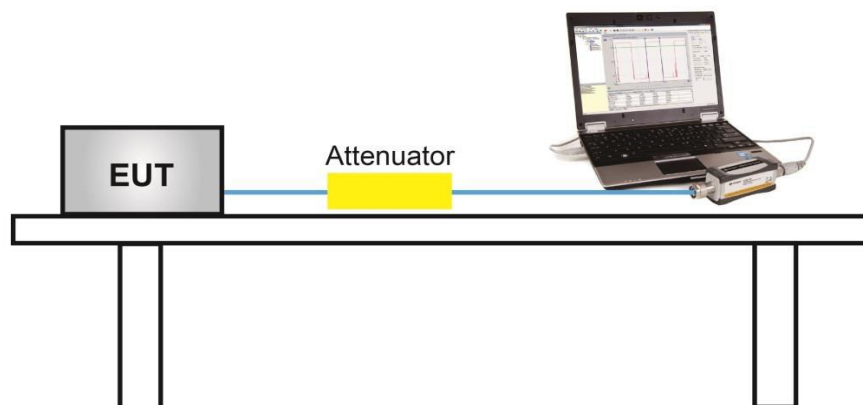
☒ Method PM is Measurement using an RF Peak power meter. The procedure for this method is as follows:

1. The testing follows the ANSI C63.10 Section 11.9.1.3
2. The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.

☒ Method PM is Measurement using an RF average power meter. The procedure for this method is as follows:

1. The testing follows the ANSI C63.10 Section 11.9.2.3
2. Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the following conditions are satisfied:
3. The EUT is configured to transmit continuously, or to transmit with a constant duty cycle.
4. At all times when the EUT is transmitting, it shall be transmitting at its maximum power control level.
5. The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
6. Determine according to the duty cycle of the equipment: when it is less than 98%, follow the steps below.
7. Measure the average power of the transmitter. This measurement is an average over both the ON and OFF periods of the transmitter.
8. Adjust the measurement in dBm by adding $[10 \log (1 / D)]$, where D is the duty cycle {e.g., $[10 \log (1 / 0.25)]$, if the duty cycle is 25%}.
9. Record the test results in the report.

7.3 Measurement Setup (Block Diagram of Configuration)



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7.4 Measurement Result

Test Data of Conducted Output Power-Chain A					
Test Mode	Test Frequency (MHz)	Average Power (dBm)	Peak Power (dBm)	Limits (dBm)	Pass or Fail
Custom IEEE 802.11	2415	16.84	24.19	≤ 30	Pass
	2445	16.36	24.45	≤ 30	Pass
	2470	16.16	23.72	≤ 30	Pass

Test Data of Conducted Output Power-Chain B					
Test Mode	Test Frequency (MHz)	Average Power (dBm)	Peak Power (dBm)	Limits (dBm)	Pass or Fail
Custom IEEE 802.11	2415	16.51	23.89	≤ 30	Pass
	2445	15.94	23.80	≤ 30	Pass
	2470	15.79	23.88	≤ 30	Pass

Test Data of Conducted Output Power-Total					
Test Mode	Test Frequency (MHz)	Average Power (dBm)	Peak Power (dBm)	Limits (dBm)	Pass or Fail
Custom IEEE 802.11	2412	19.69	27.05	≤ 30	Pass
	2437	19.17	27.15	≤ 30	Pass
	2462	18.99	26.81	≤ 30	Pass

Note:

1. The Total Average Conducted Output Power (dBm) = $10 \cdot \log \{10^{(\text{Chain A AVG} / 10)} + 10^{(\text{Chain B AVG} / 10)}\}$.
2. The Total Peak Conducted Output Power (dBm) = $10 \cdot \log \{10^{(\text{Chain A PK} / 10)} + 10^{(\text{Chain B PK} / 10)}\}$.

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8. 6dB Bandwidth Measurement

8.1 Provisions Applicable

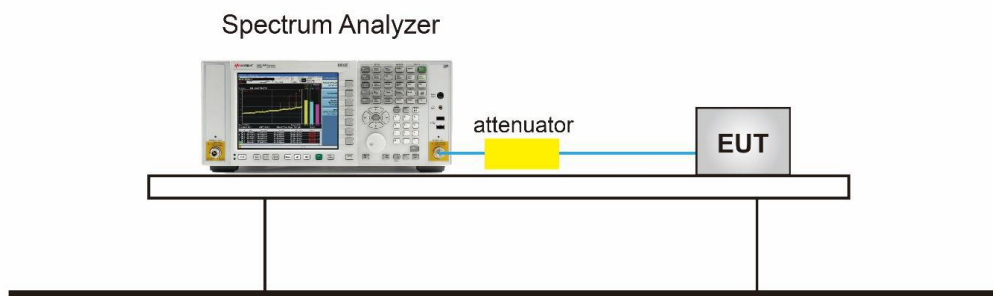
The minimum 6dB bandwidth shall be 500 kHz.

8.2 Measurement Procedure

The testing follows the ANSI C63.10 Section 6.9.3 (OBW) and 11.8.1 (6dB BW).

1. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. For 6dB Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement.
4. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1-5% of the OBW and set the Video bandwidth (VBW) $\geq 3 * RBW$.
5. Detector = peak
6. Trace mode = max hold.
7. Sweep = auto couple.
8. Allow the trace to stabilize.
9. Measure and record the results in the test report.

8.3 Measurement Setup (Block Diagram of Configuration)



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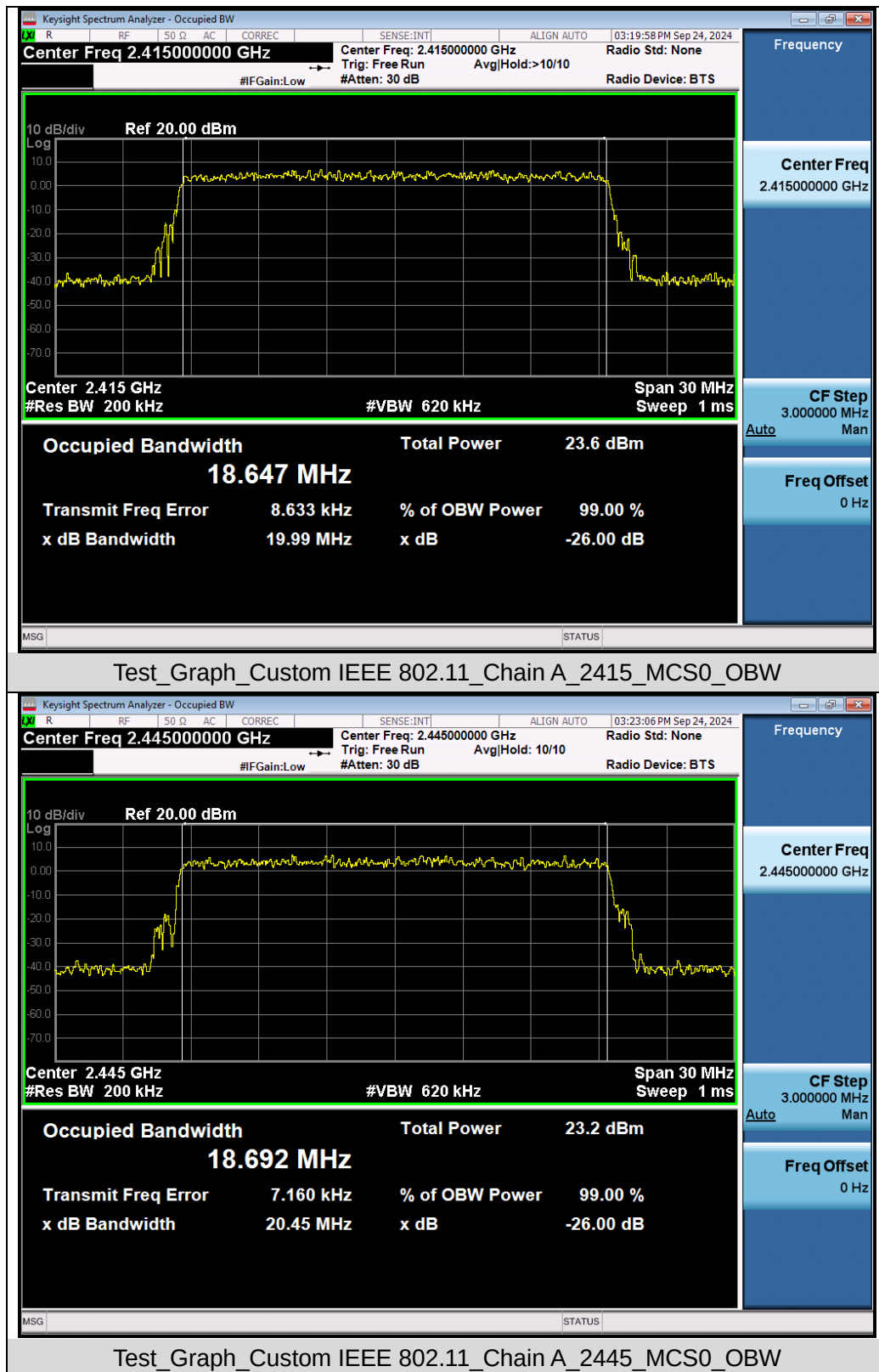
8.4 Measurement Result

Test Data of Occupied Bandwidth and DTS Bandwidth-Chain A					
Test Mode	Test Frequency (MHz)	99% Occupied Bandwidth (MHz)	DTS Bandwidth (MHz)	DTS Bandwidth Limits (MHz)	Pass or Fail
Custom IEEE 802.11	2415	18.647	18.873	≥ 0.5	Pass
	2445	18.692	18.893	≥ 0.5	Pass
	2470	18.726	18.841	≥ 0.5	Pass

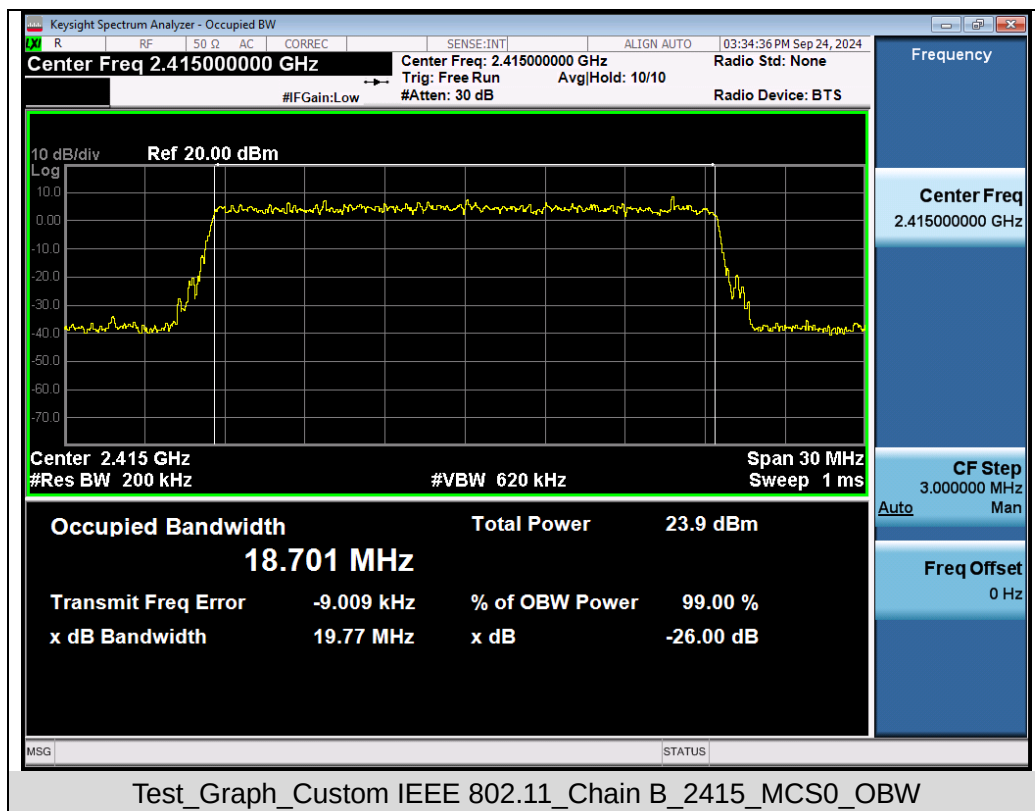
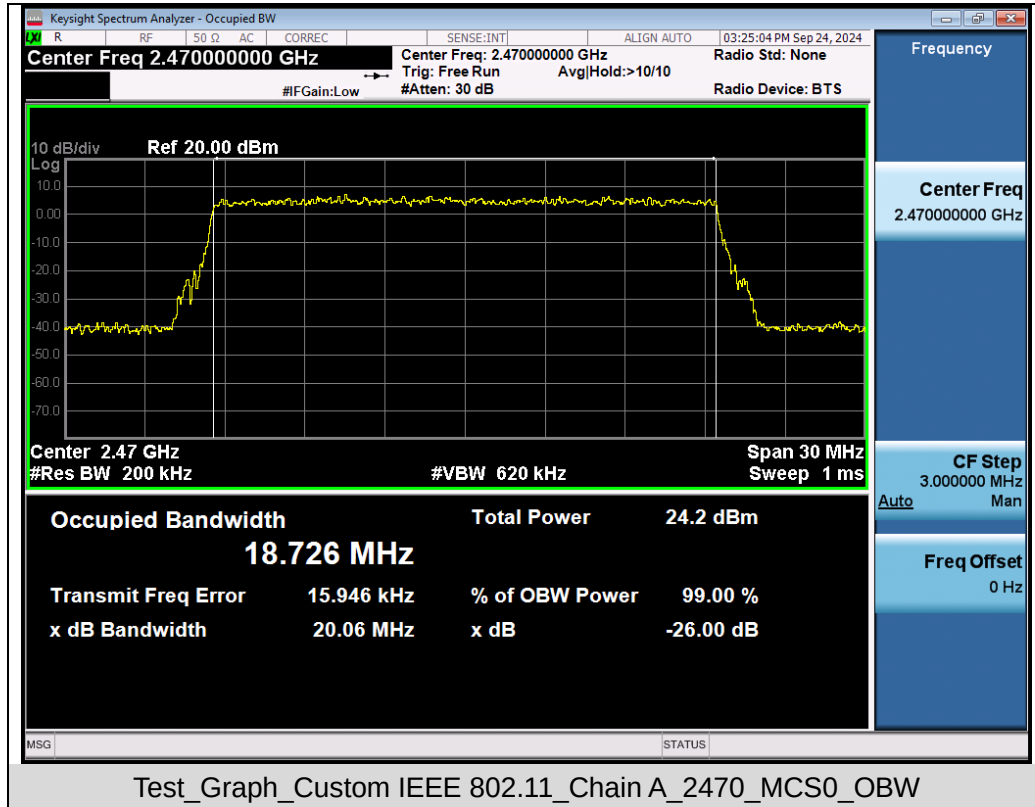
Test Data of Occupied Bandwidth and DTS Bandwidth-Chain B					
Test Mode	Test Frequency (MHz)	99% Occupied Bandwidth (MHz)	DTS Bandwidth (MHz)	DTS Bandwidth Limits (MHz)	Pass or Fail
Custom IEEE 802.11	2415	18.701	18.876	≥ 0.5	Pass
	2445	18.677	18.793	≥ 0.5	Pass
	2470	18.722	18.925	≥ 0.5	Pass

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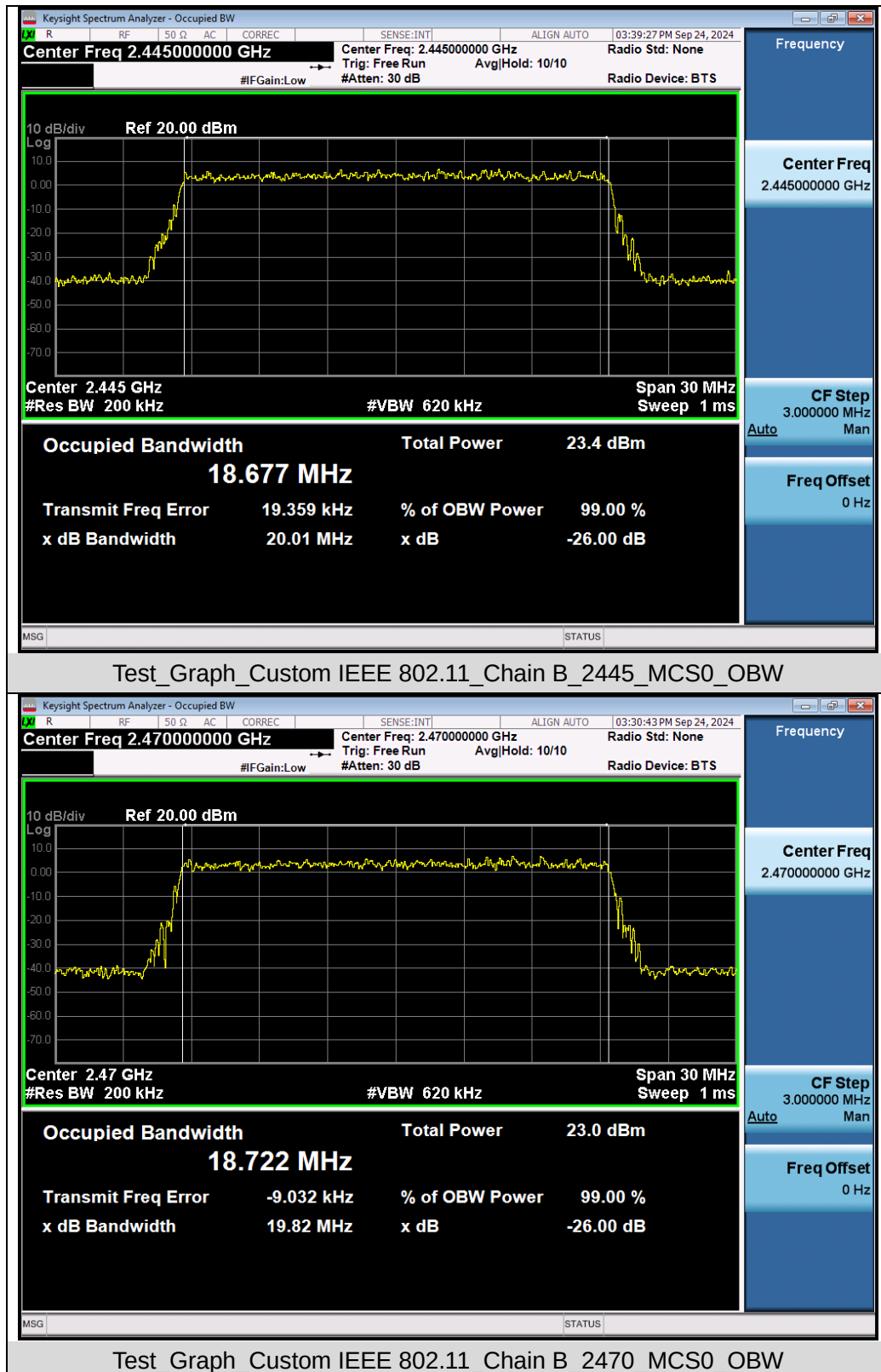
Test Graphs of Occupied Bandwidth



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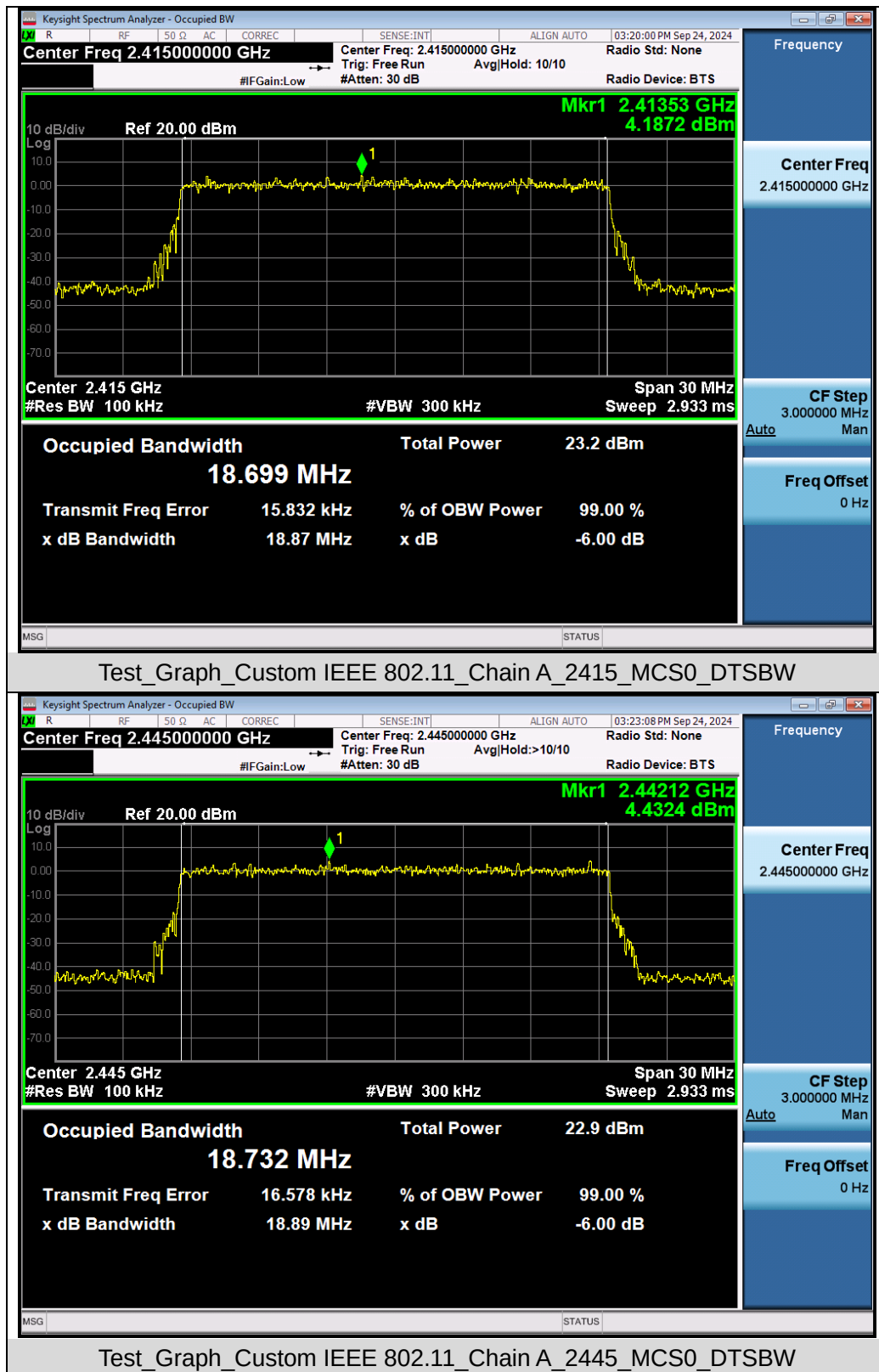


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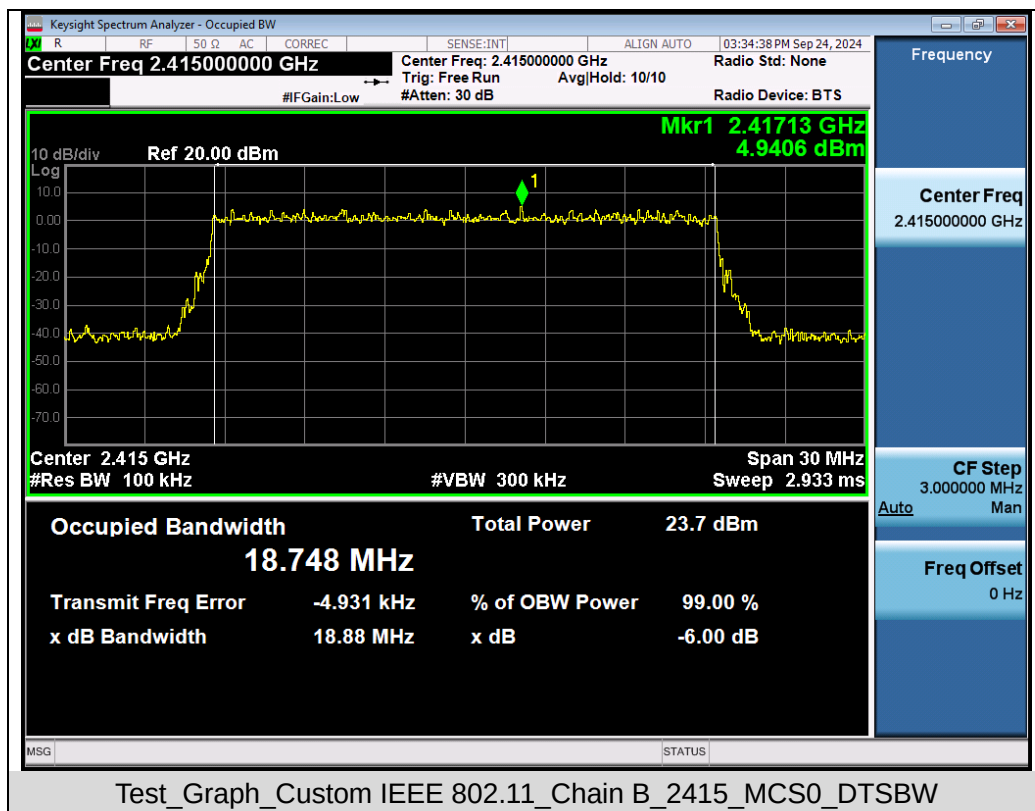
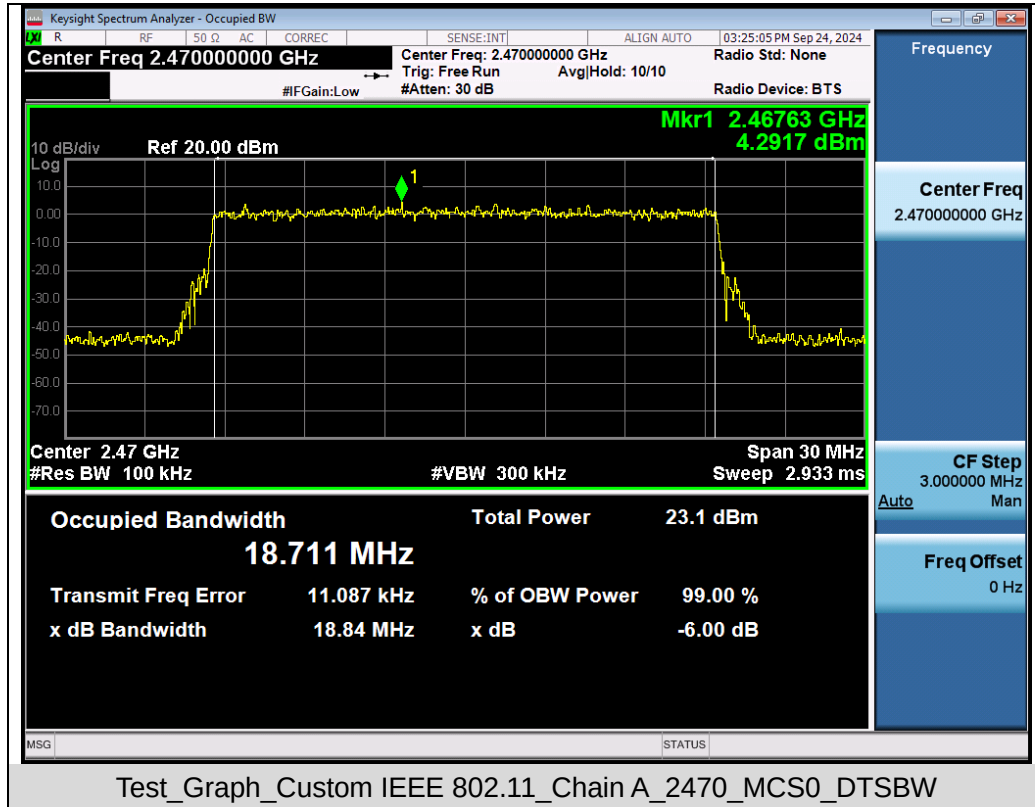


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Test Graphs of DTS Bandwidth

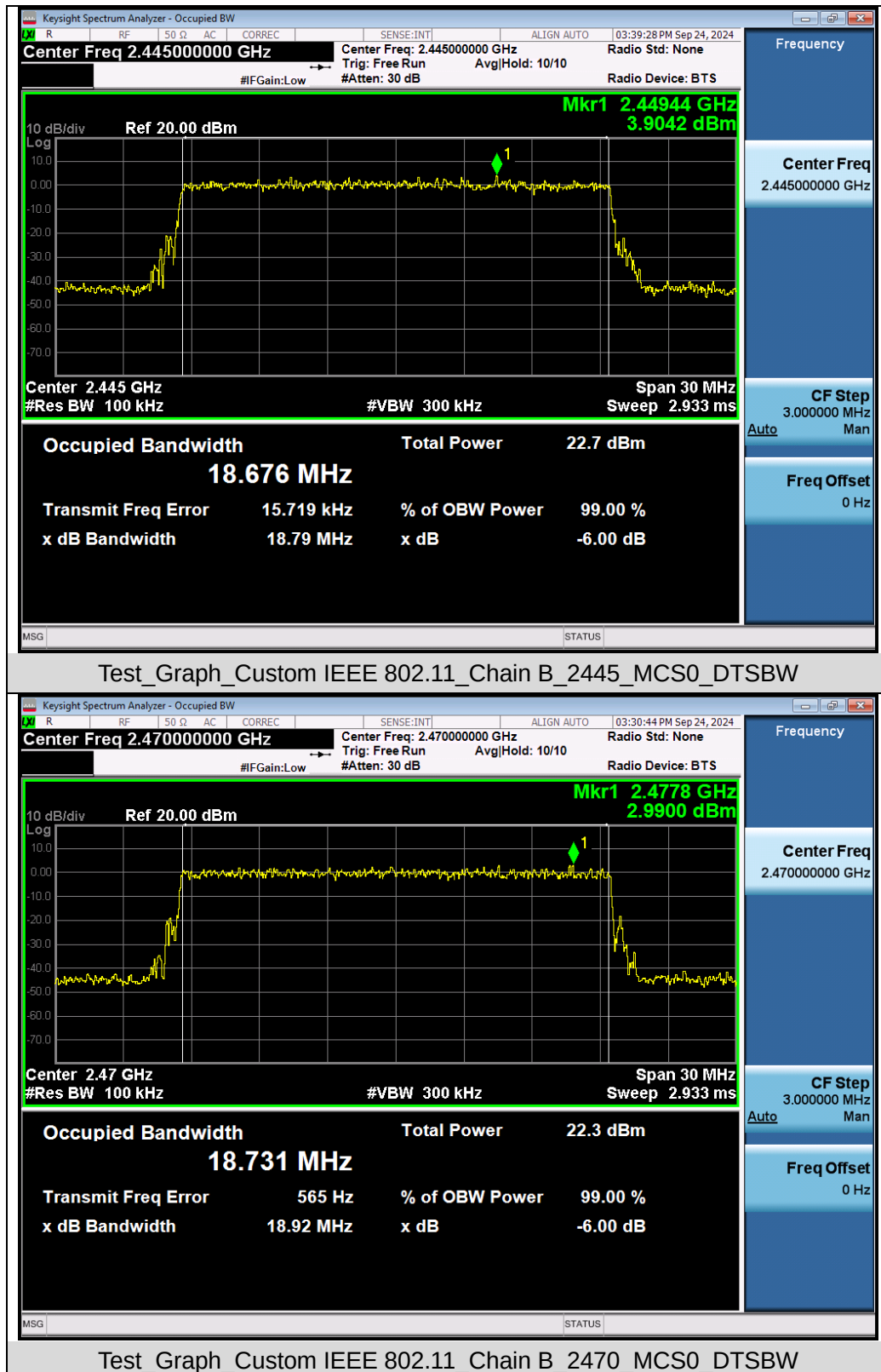


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9. Power Spectral Density Measurement

9.1 Provisions Applicable

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

9.2 Measurement Procedure

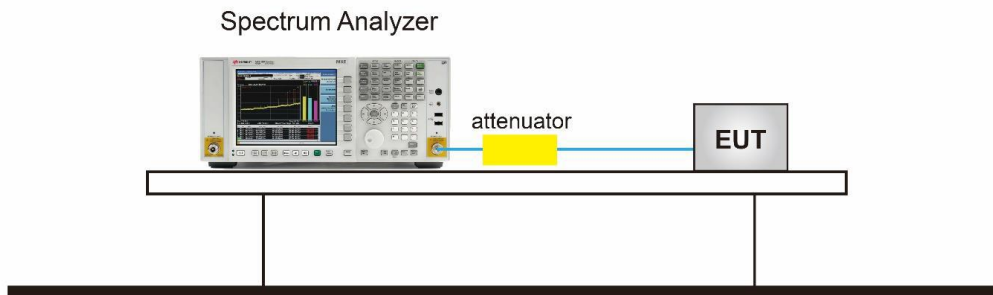
☒ For Peak power spectral density test:

1. The testing follows the ANSI C63.10 Section 11.10.2 Method PKPSD.
2. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator.
3. Set the RBW = 20 kHz.
4. Set the VBW $\geq [3 \times \text{RBW}]$.
5. Set the Span $\geq [1.5 \times \text{DTS bandwidth}]$.
6. Sweep time=Auto couple.
7. Detector function=Peak.
8. Trace Mode=Max hold.
9. When the measurement bandwidth of the maximum PSD is 3 kHz, a constant factor of $10 \cdot \log(3\text{kHz}/20\text{kHz}) = -8.23 \text{ dB}$ is added to the measurement result.
10. Allow trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission.
11. The indicated level is the peak output power, after any corrections for external attenuators and cables.

☐ For Average power spectral density test:

1. The testing follows the ANSI C63.10 Section 11.10.5 Method AVPSD.
2. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator.
3. Set Span to at least 1.5 times the OBW.
4. Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
5. Set VBW $\geq [3 \times \text{RBW}]$.
6. Sweep Time=Auto couple.
7. Detector function=RMS (i.e., power averaging).
8. Trace average at least 100 traces in power averaging (rms) mode.
9. When the measurement bandwidth of the maximum PSD is 3 kHz, a constant factor of $10 \cdot \log(3\text{kHz}/20\text{kHz}) = -8.23 \text{ dB}$ is added to the measurement result.
10. Determine according to the duty cycle of the equipment: when it is less than 98%, follow the steps below.
11. Add $[10 \log (1 / D)]$, where D is the duty cycle, to the measured power to compute the average power during the actual transmission times (because the measurement represents an average over both the ON and OFF times of the transmission). For example, add $[10 \log (1/0.25)] = 6 \text{ dB}$ if the duty cycle is 25%.
12. Record the test results in the report.

9.3 Measurement Setup (Block Diagram of Configuration)



9.4 Measurement Result

Test Data of Conducted Output Power Spectral Density-Chain A					
Test Mode	Test Frequency (MHz)	Power Spectral density (dBm/20kHz)	Power Spectral density (dBm/3kHz)	Limit (dBm/3kHz)	Pass or Fail
Custom IEEE 802.11	2415	-3.611	-11.850	≤8	Pass
	2445	-2.696	-10.935	≤8	Pass
	2470	-4.059	-12.298	≤8	Pass

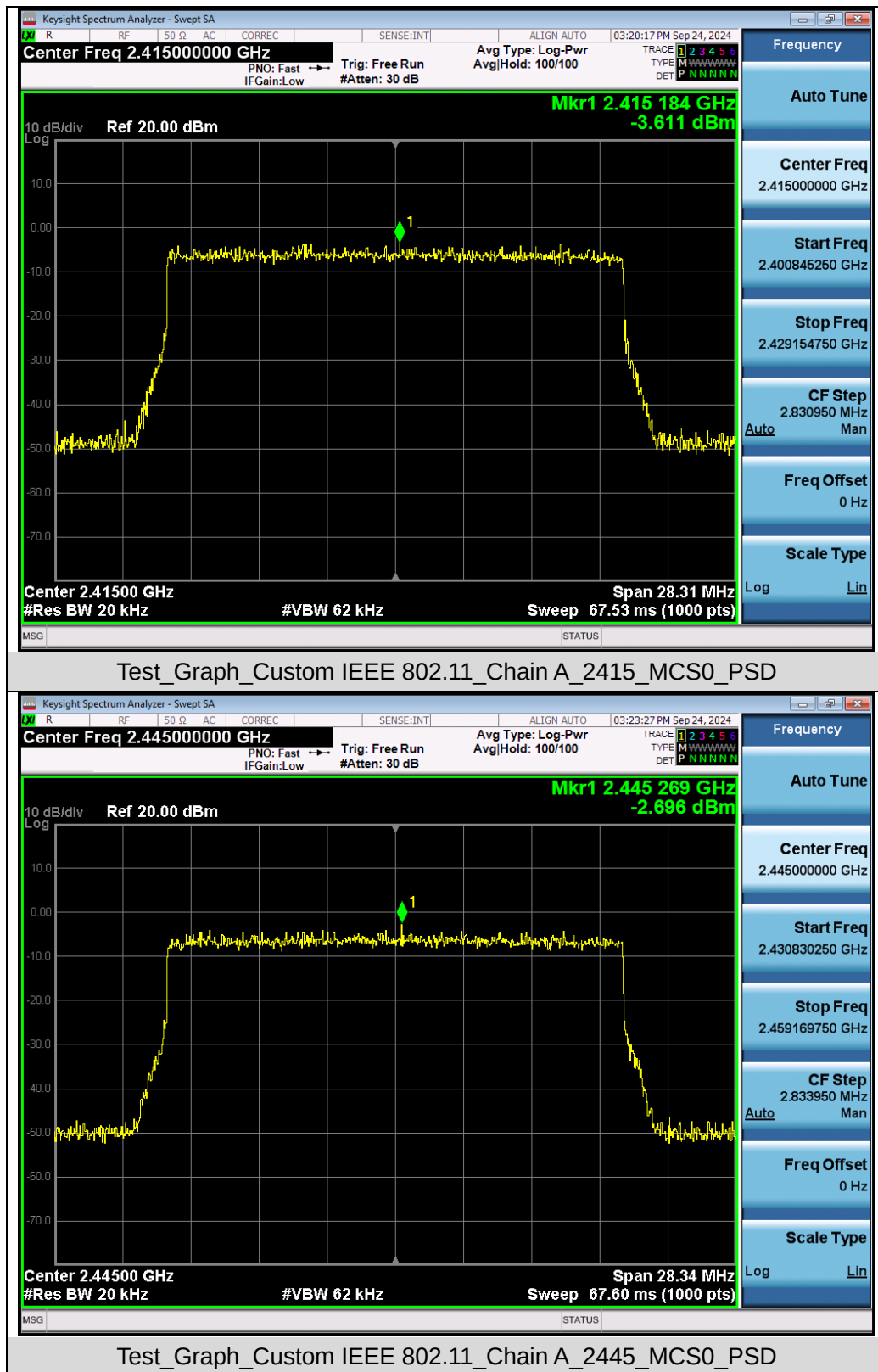
Test Data of Conducted Output Power Spectral Density-Chain B					
Test Mode	Test Frequency (MHz)	Power Spectral density (dBm/20kHz)	Power Spectral density (dBm/3kHz)	Limit (dBm/3kHz)	Pass or Fail
Custom IEEE 802.11	2415	-3.281	-11.520	≤8	Pass
	2445	-3.643	-11.882	≤8	Pass
	2470	-4.239	-12.478	≤8	Pass

Test Data of Conducted Output Power Spectral Density-Total					
Test Mode	Test Frequency (MHz)	Power Spectral density (dBm/20kHz)	Power Spectral density (dBm/3kHz)	Limit (dBm/3kHz)	Pass or Fail
Custom IEEE 802.11	2415	-0.43	-8.67	≤8	Pass
	2445	-0.13	-8.37	≤8	Pass
	2470	-1.14	-9.38	≤8	Pass

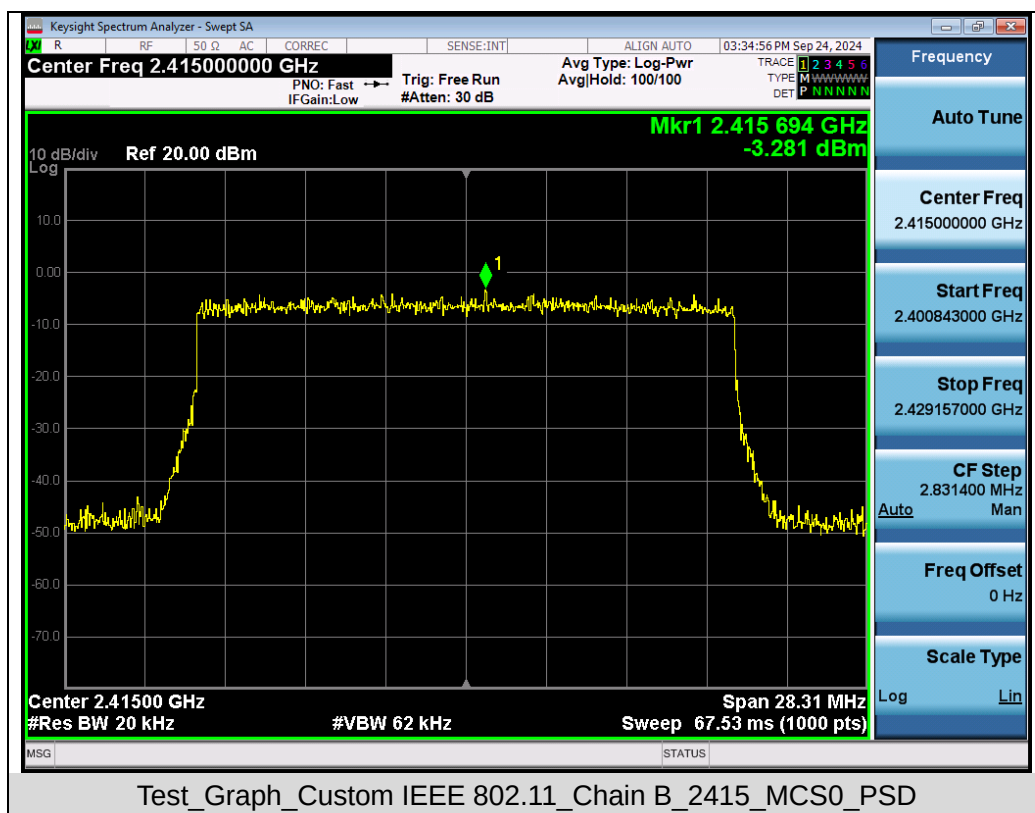
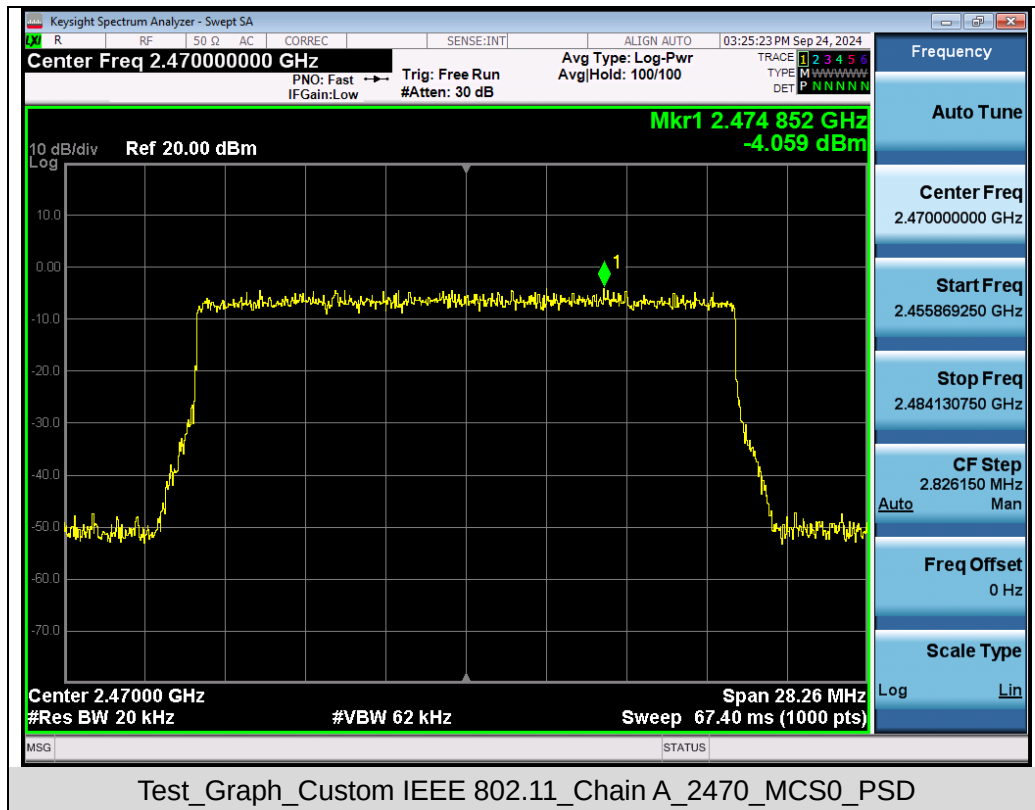
Note: The Total Power Spectral Density (dBm) = $10 \cdot \log_{10} \{ 10^{(\text{Chain A PSD} / 10)} + 10^{(\text{Chain B PSD} / 10)} \}$.

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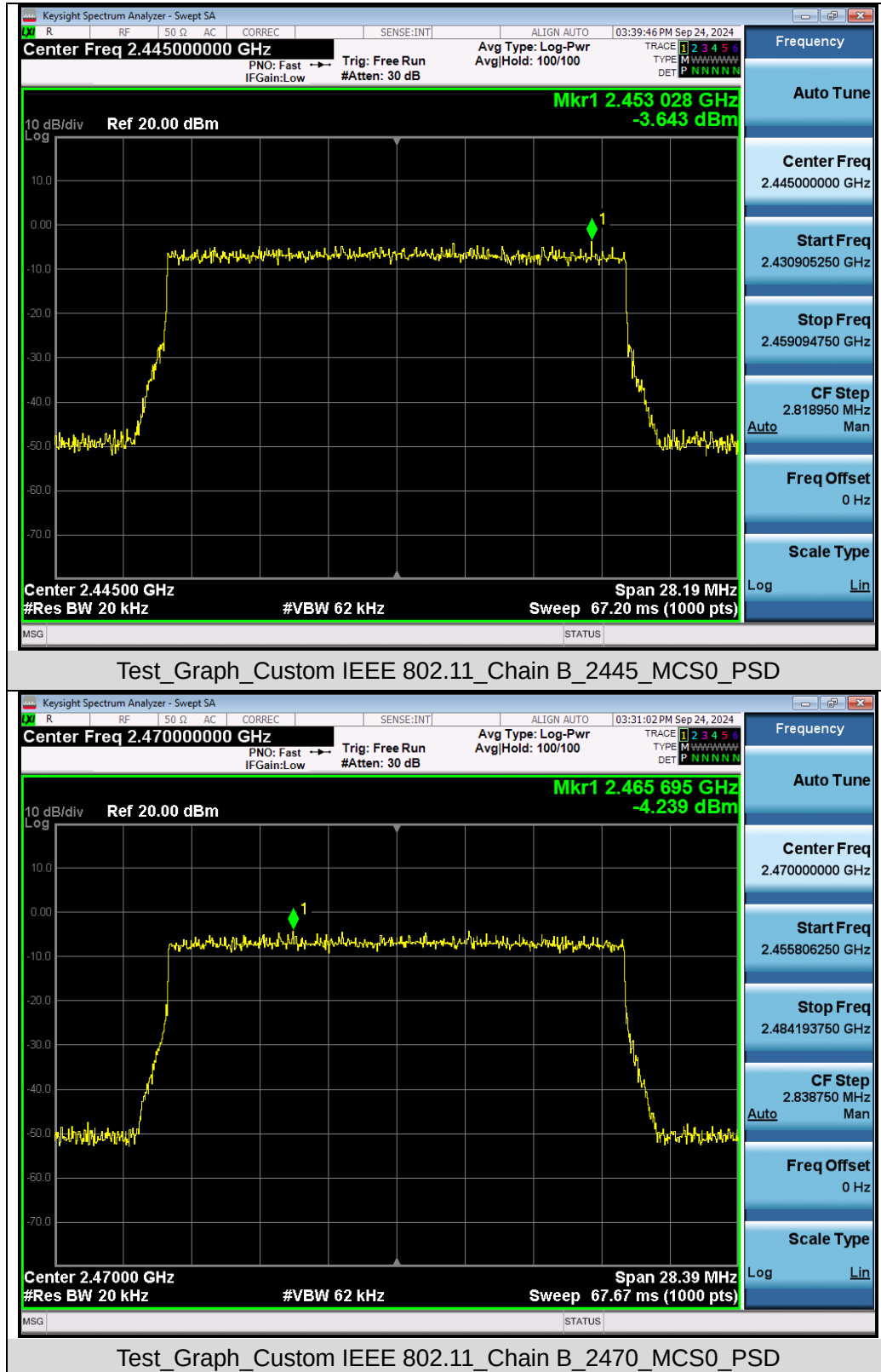
Test Graphs of Conducted Output Power Spectral Density



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10. Conducted Band Edge and Out-of-Band Emissions

10.1 Provisions Applicable

In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

10.2 Measurement Procedure

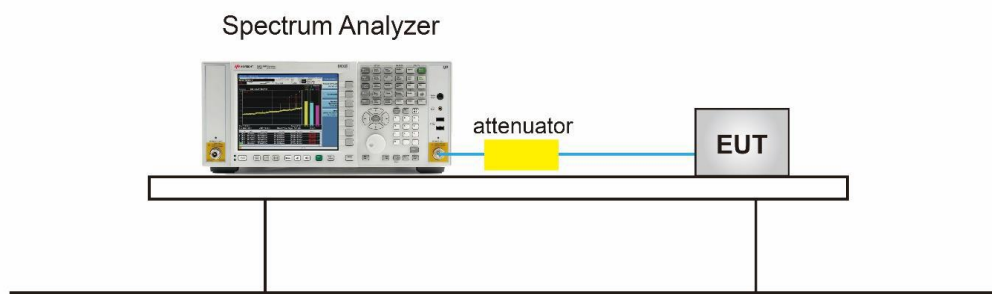
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

Use the following spectrum analyzer settings:

- Step 1: Measurement Procedure In-Band Reference Level
 1. Set instrument center frequency to DTS channel center frequency.
 2. Set the span to ≥ 1.5 times the DTS bandwidth.
 3. Set the RBW = 100 kHz.
 4. Set the VBW $\geq 3 \times$ RBW.
 5. Detector = peak.
 6. Sweep time = auto couple.
 7. Trace mode = max hold.
 8. Allow trace to fully stabilize.
 9. Use the peak marker function to determine the maximum PSD level.
 10. Note that the channel found to contain the maximum PSD level can be used to establish the reference level.
 11. For reference level values, please refer to DTS bandwidth test.
- Step 2: Measurement Procedure Out of Band Emission
 1. Set RBW = 100 kHz.
 2. Set VBW ≥ 300 kHz.
 3. Detector = peak.
 4. Sweep = auto couple.
 5. Trace Mode = max hold.
 6. Allow trace to fully stabilize.
 7. Use the peak marker function to determine the maximum amplitude level.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

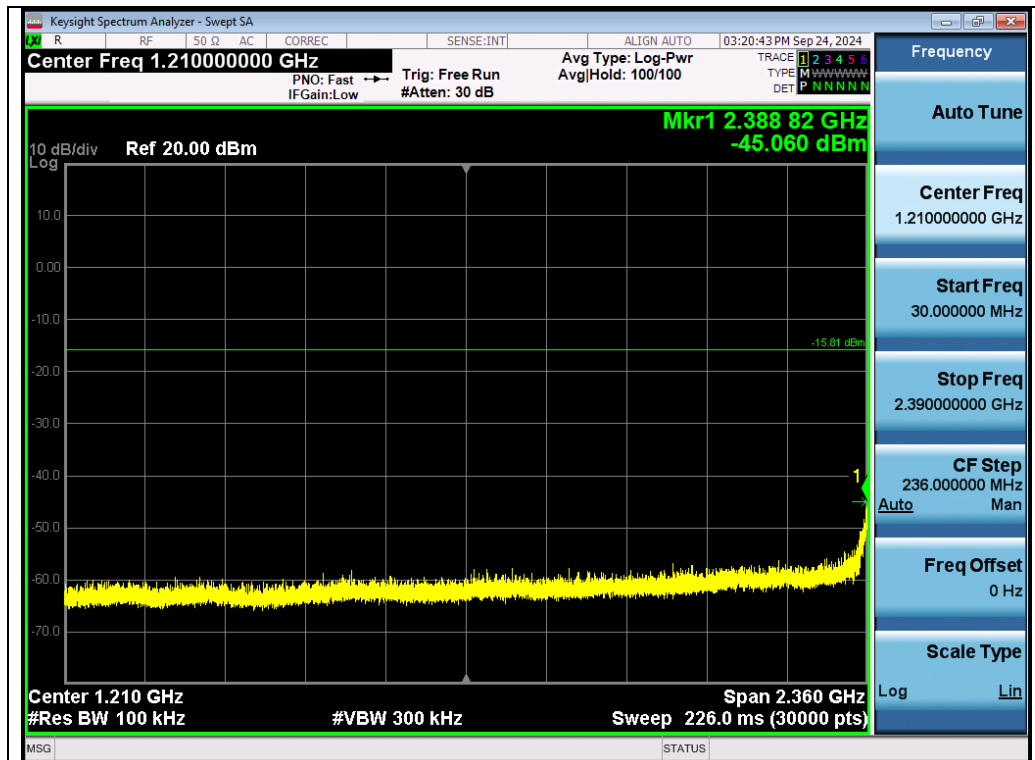
10.3 Measurement Setup (Block Diagram of Configuration)



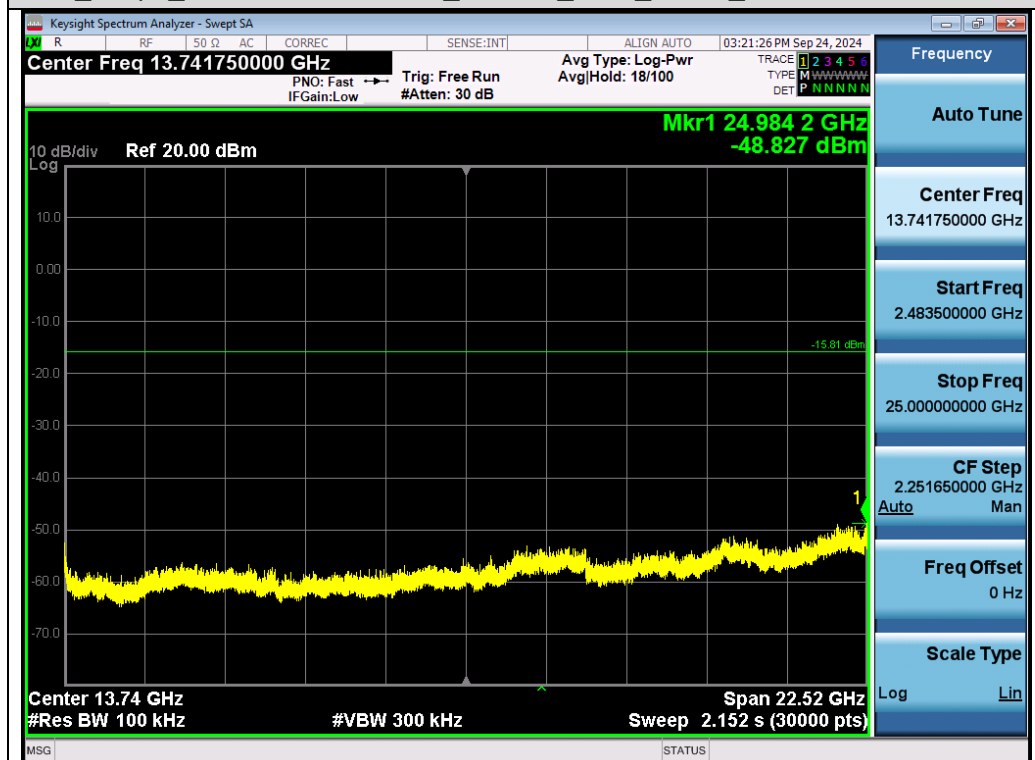
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10.4 Measurement Result

Test Graphs of Spurious Emissions in Non-Restricted Frequency Bands

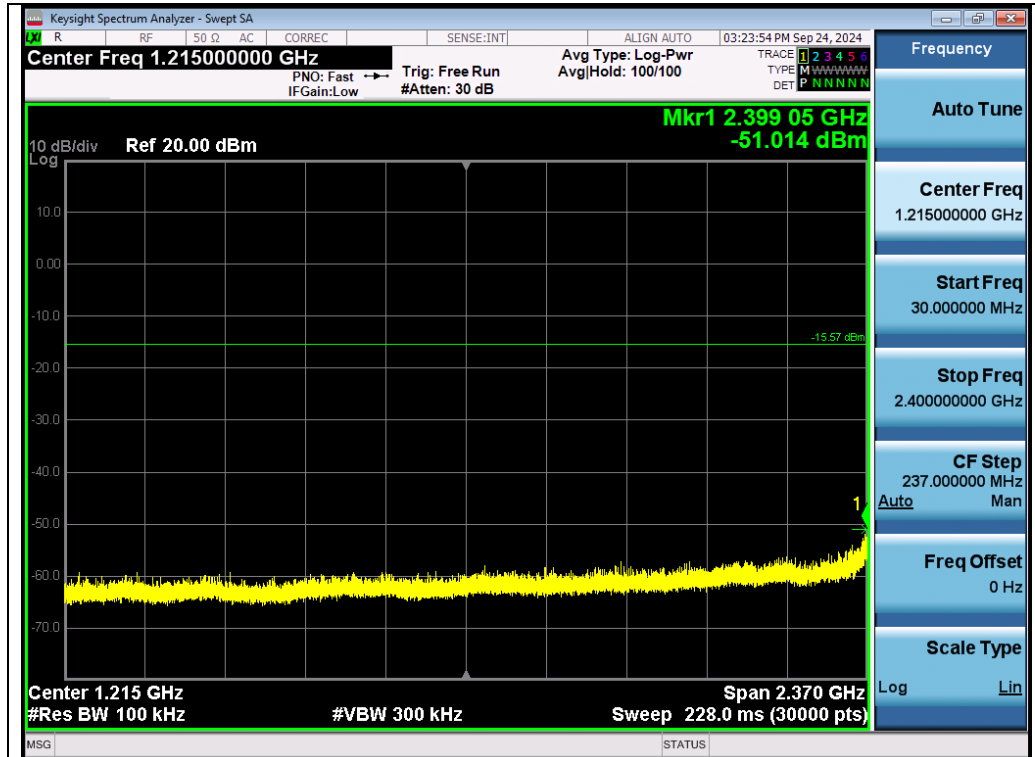


Test_Graph_Custom IEEE 802.11_Chain A_2415_MCS0_Lower Band Emissions



Test_Graph_Custom IEEE 802.11_Chain A_2415_MCS0_Higher Band Emissions

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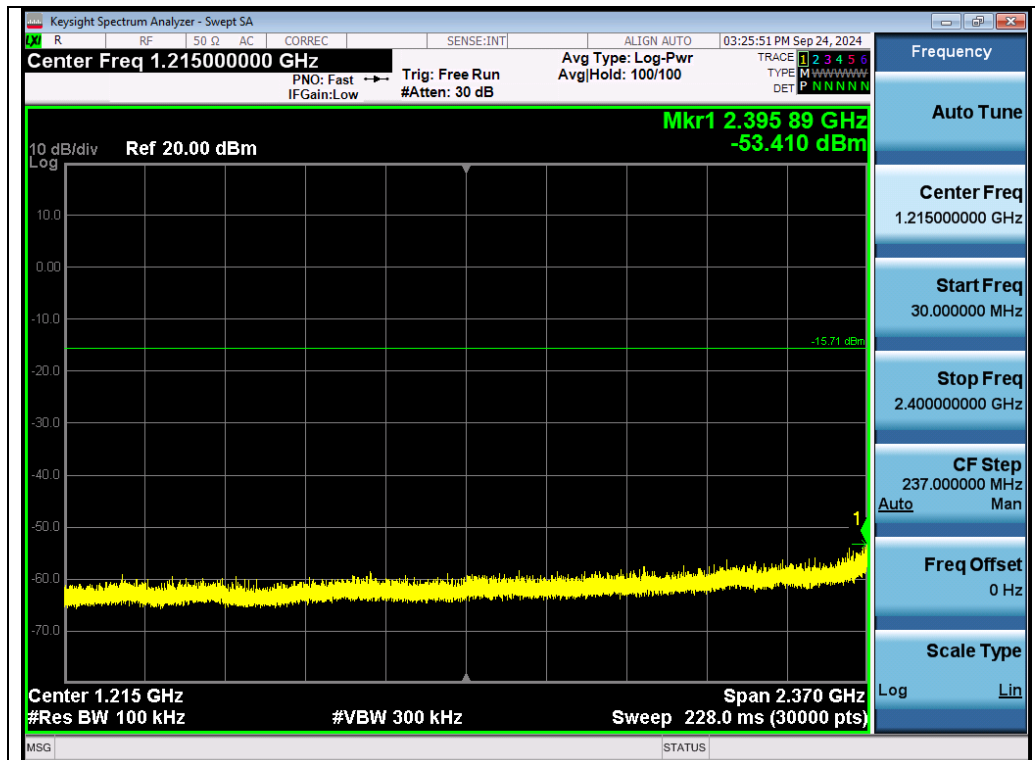


Test_Graph_Custom IEEE 802.11_Chain A_2445_MCS0_Lower Band Emissions



Test_Graph_Custom IEEE 802.11_Chain A_2445_MCS0_Higher Band Emissions

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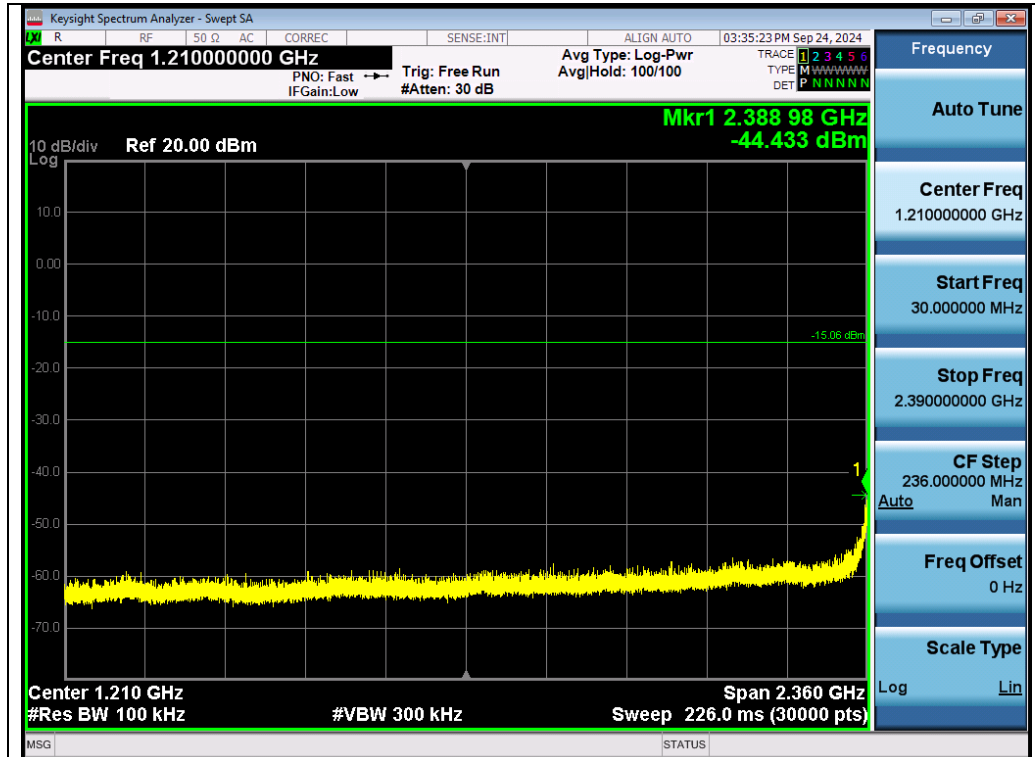


Test_Graph_Custom IEEE 802.11_Chain A_2470_MCS0_Lower Band Emissions



Test_Graph_Custom IEEE 802.11_Chain A_2470_MCS0_Higher Band Emissions

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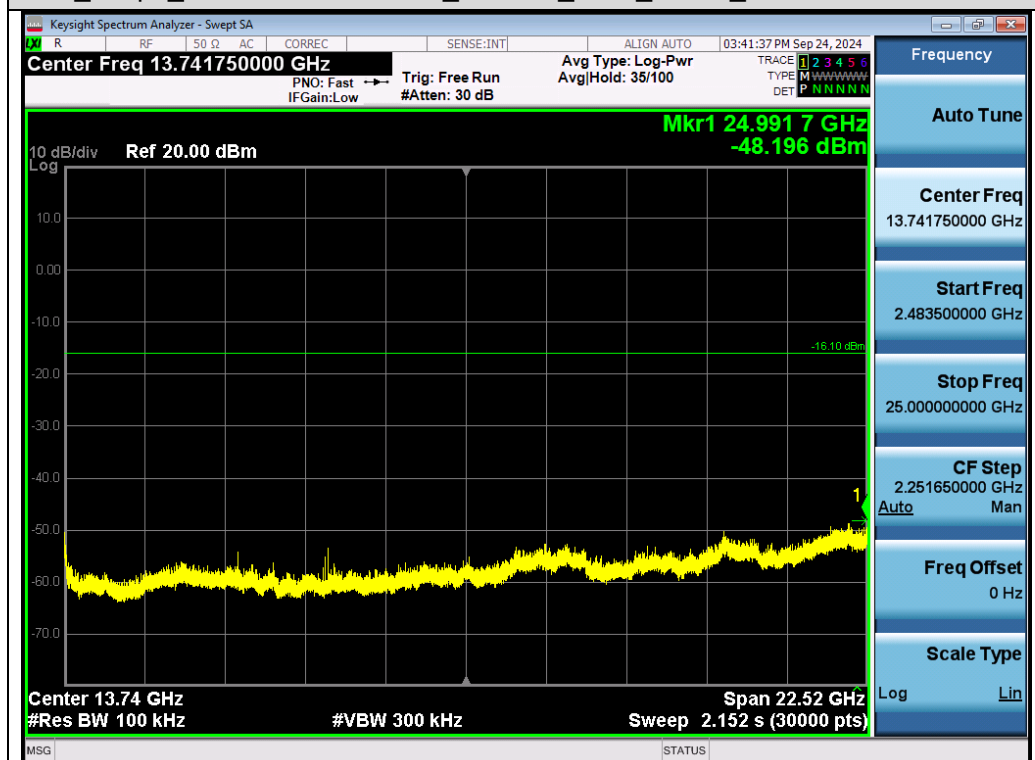
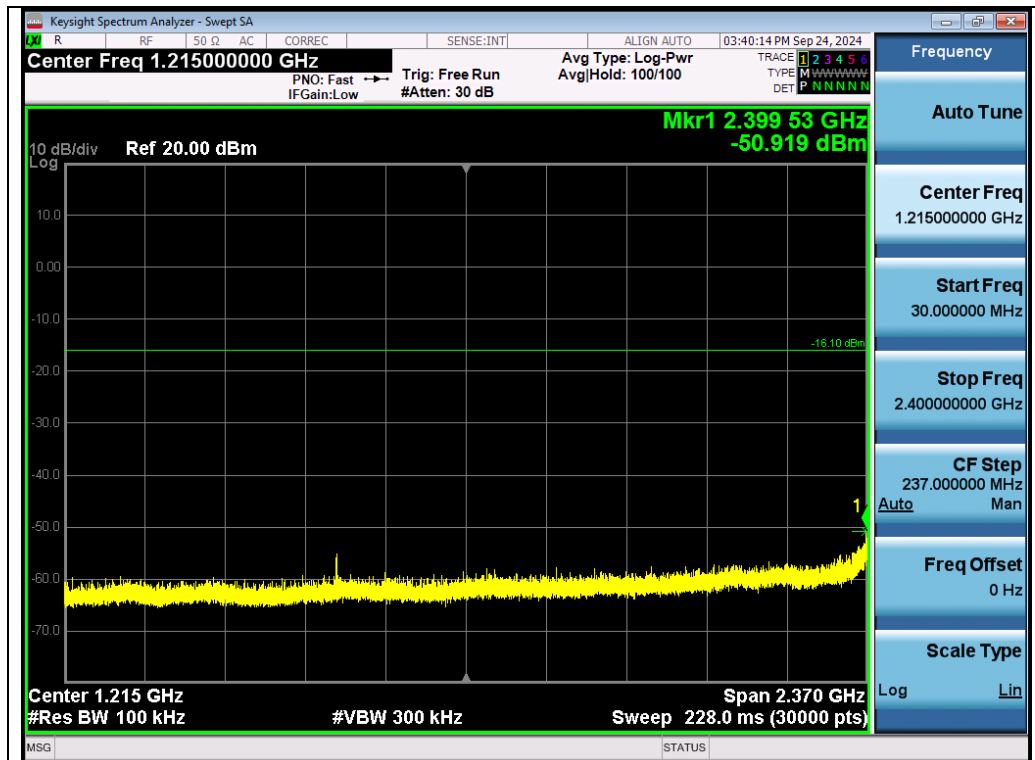
Test_Graph_Custom IEEE 802.11_Chain B_2415_MCS0_Lower Band Emissions



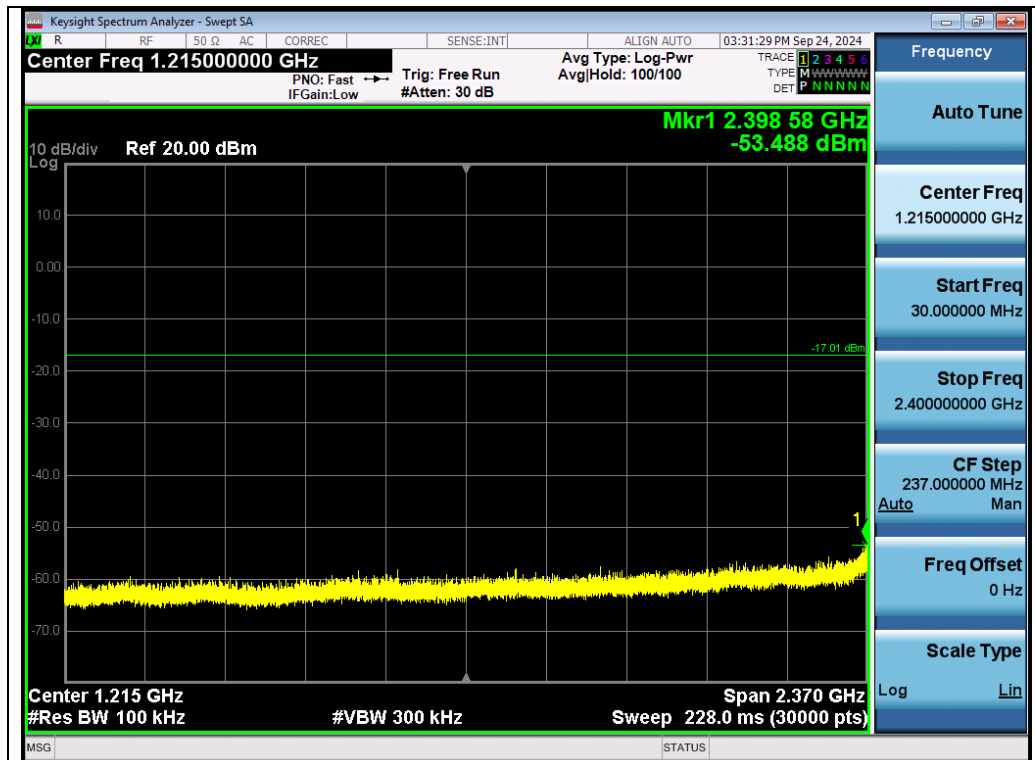
Test_Graph_Custom IEEE 802.11_Chain B_2415_MCS0_Higher Band Emissions

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Test_Graph_Custom IEEE 802.11_Chain B_2470_MCS0_Lower Band Emissions

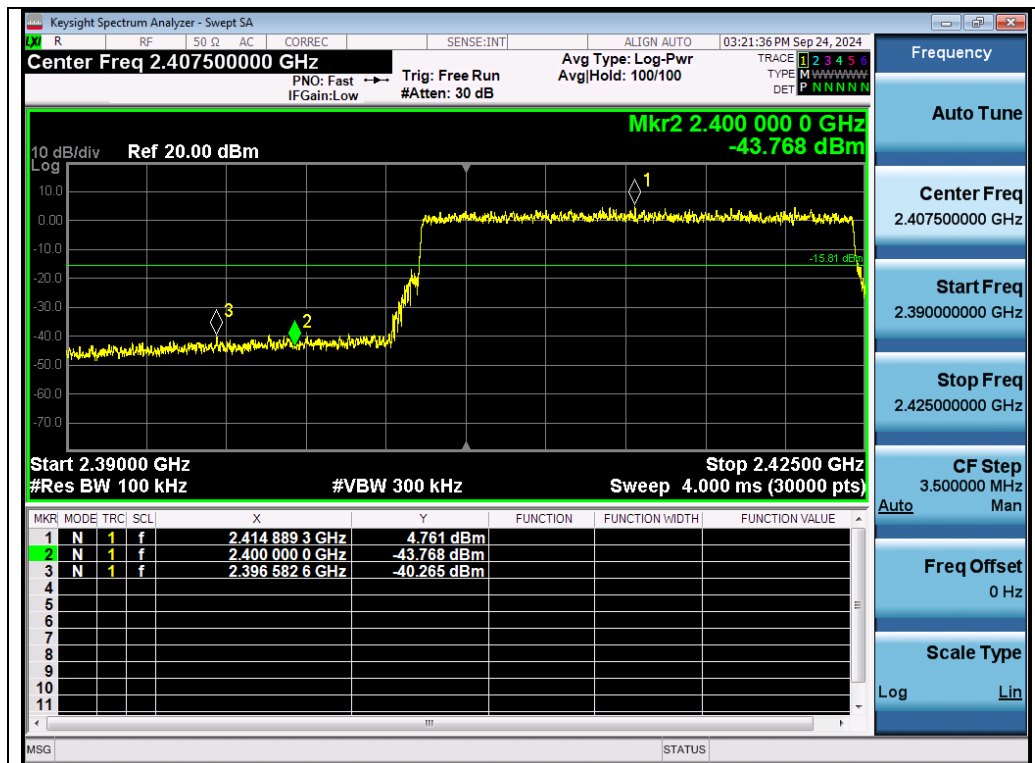


Test_Graph_Custom IEEE 802.11_Chain B_2470_MCS0_Higher Band Emissions

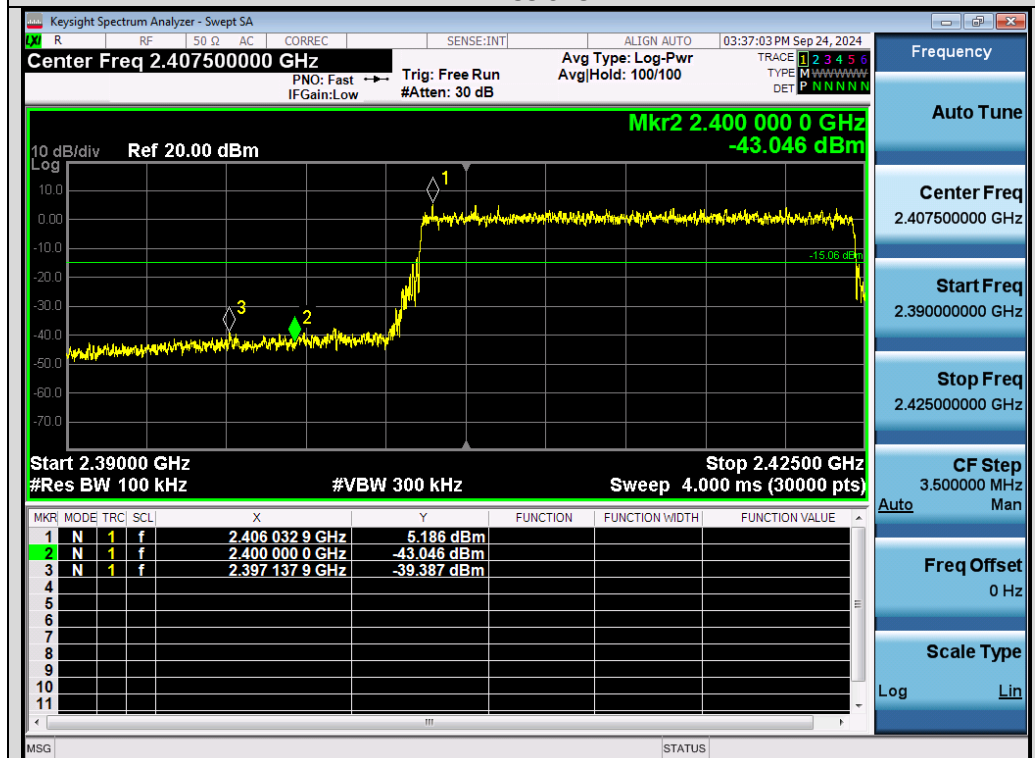
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Test Graphs of Band Edge Emissions in Non-Restricted Frequency Bands



Test_Graph_Custom IEEE 802.11_Chain A_2415_MCS0_Lower Band Edge Emissions



Test_Graph_Custom IEEE 802.11_Chain B_2415_MCS0_Lower Band Edge Emissions

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11. Radiated Spurious Emission

11.1 Measurement Limits

15.209(a) Limit in the below table has to be followed

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Note: All modes were tested for restricted band radiated emission, the test records reported below are the worst result compared to other modes.

11.2 Measurement Procedure

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds.

As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the

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pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.

8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.
11. Support MIMO technology. When testing a single antenna transmission, the software compensation coefficient has been added to the constant $10 \cdot \log_{10}(N)$ to calculate the margin, confirming that it meets the exemption test MIMO mode.

◆ The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start ~Stop Frequency	9kHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150kHz~30MHz/RB 9kHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120kHz for QP
Start ~Stop Frequency	1GHz~26.5GHz 1MHz/3MHz for Peak, 1MHz/3MHz for Average

Receiver Parameter	Setting
Start ~Stop Frequency	9kHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150kHz~30MHz/RB 9kHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120kHz for QP

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● **Quasi-Peak Measurements below 1GHz**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = as shown in the table above
4. Detector = CISPR quasi-peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

● **Peak Measurements above 1GHz**

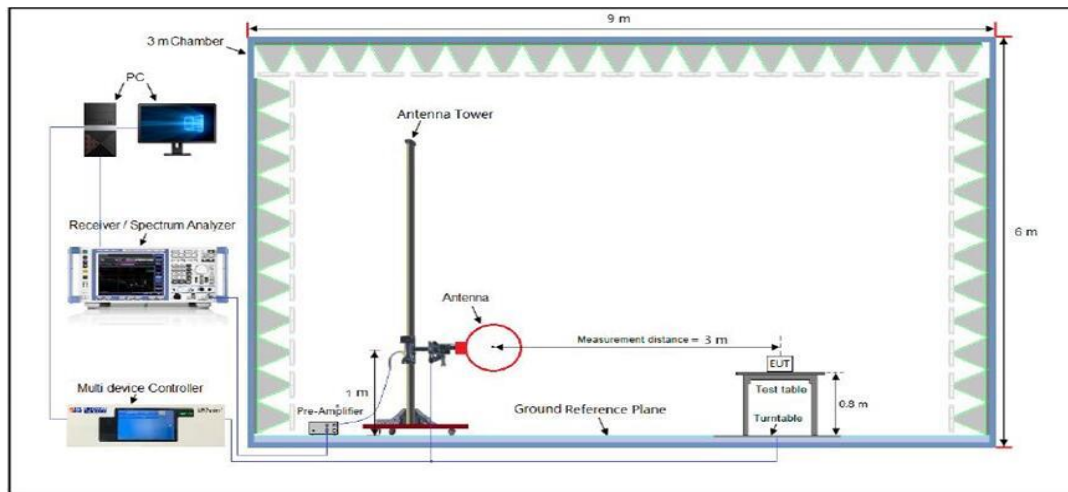
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

● **Average Measurements above 1GHz**

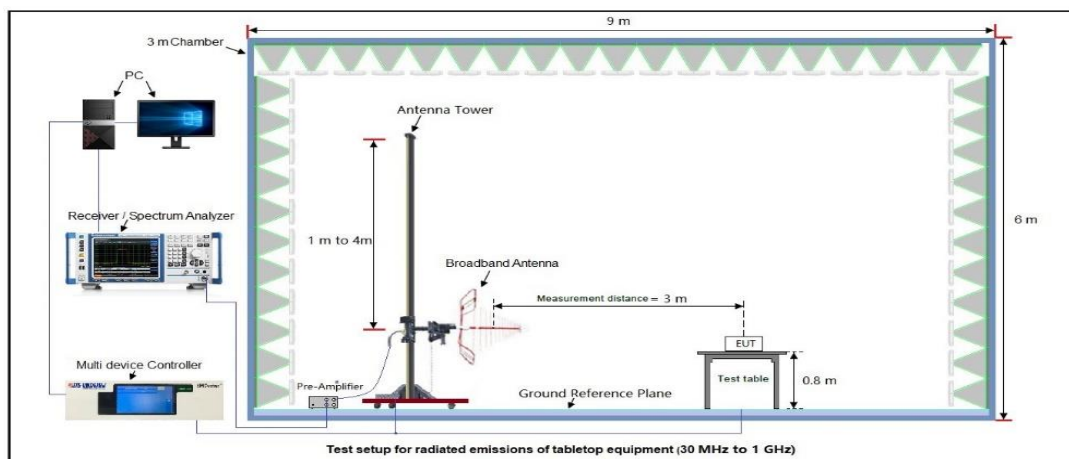
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW $\geq [3 \times \text{RBW}]$
4. Detector = Power averaging (rms)
5. Averaging type = power (i.e., rms)
6. Sweep time = auto
7. Perform a trace average of at least 100 traces.
8. The applicable correction factor is $[10 \cdot \log(1 / D)]$, where D is the duty cycle. The factor had been edited in the "Input Correction" of the Spectrum Analyzer.

11.3 Measurement Setup (Block Diagram of Configuration)

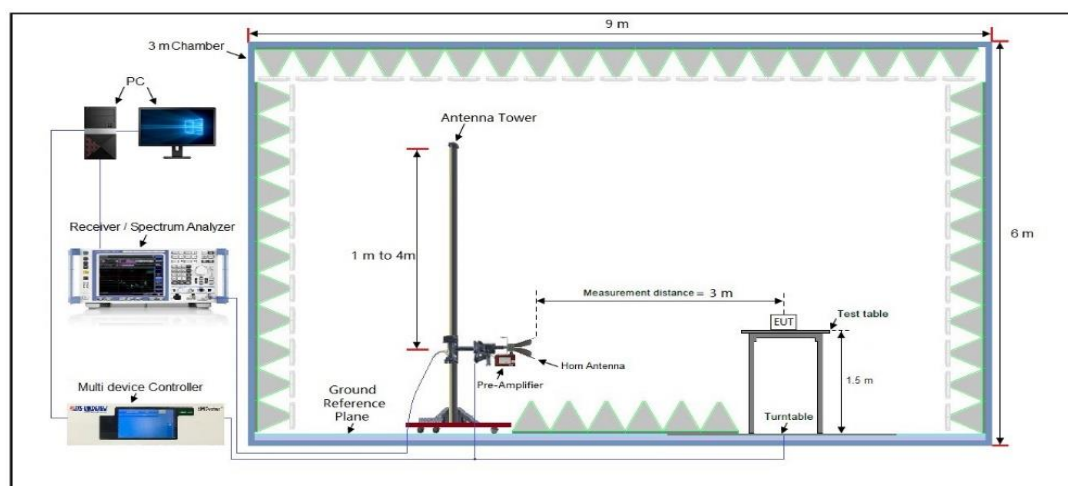
Radiated Emission Test Setup 9kHz-30MHz



Radiated Emission Test Setup 30MHz-1000MHz



Radiated Emission Test Setup Above 1000MHz

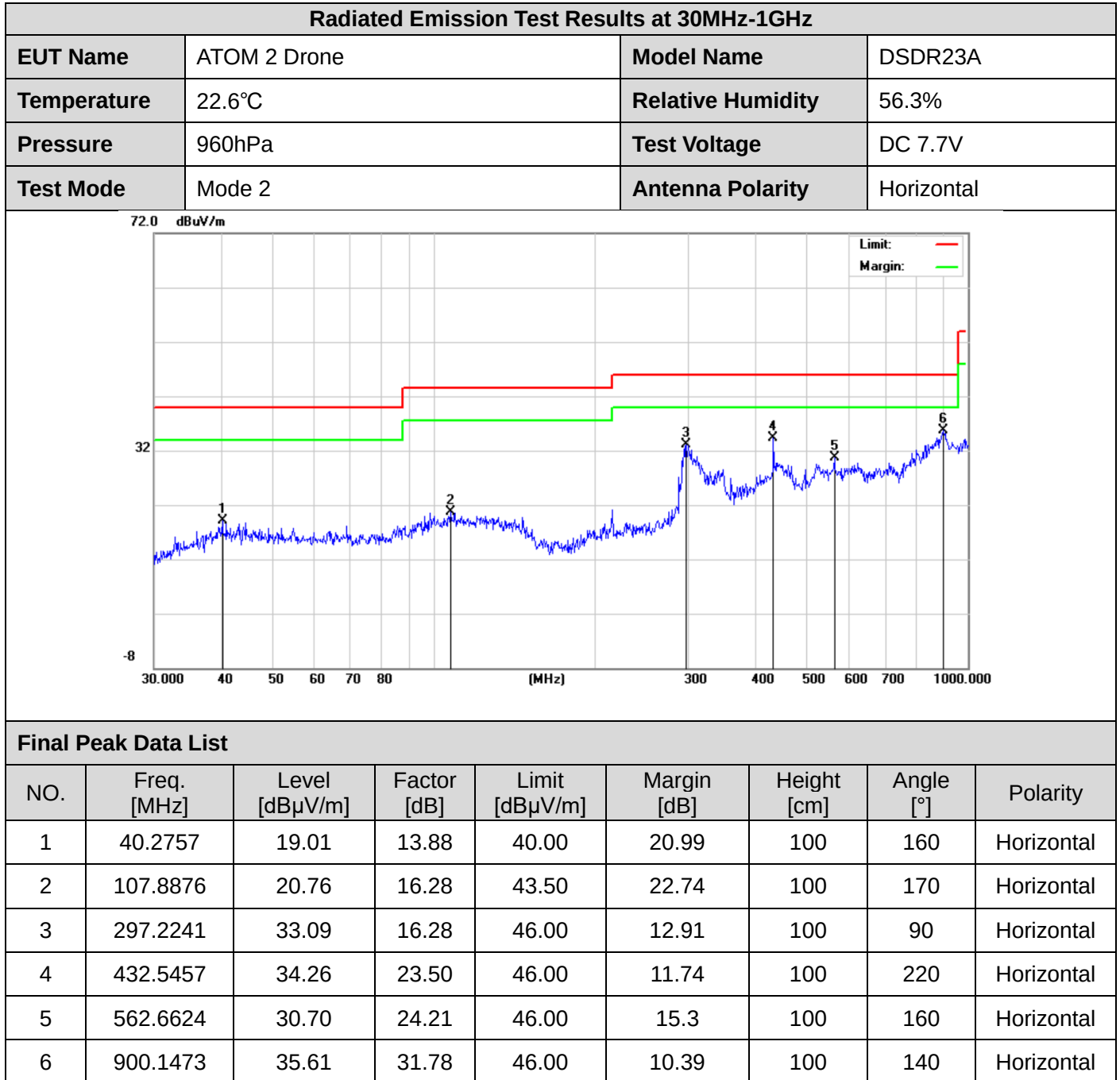


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11.4 Measurement Result

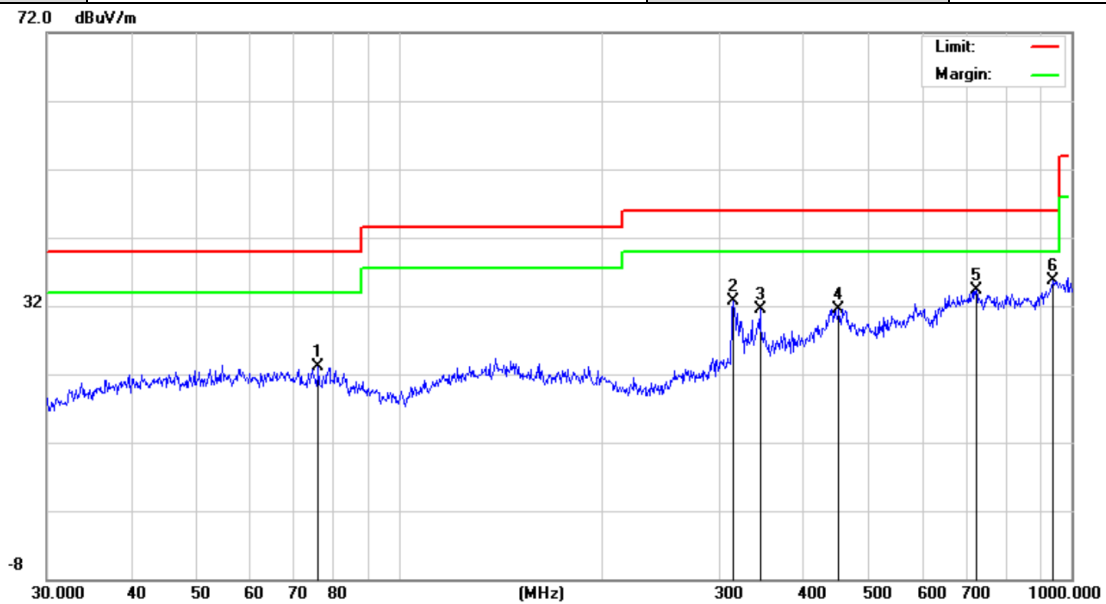
Radiated Emission at 9kHz-30MHz

The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.



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Radiated Emission Test Results at 30MHz-1GHz			
EUT Name	ATOM 2 Drone	Model Name	DSDR23A
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 7.7V
Test Mode	Mode 2	Antenna Polarity	Vertical



Final Peak Data List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	75.9773	23.08	16.94	40.00	16.92	100	120	Vertical
2	314.3765	32.70	19.91	46.00	13.3	100	180	Vertical
3	344.3855	31.42	19.95	46.00	14.58	100	90	Vertical
4	451.1350	31.57	25.60	46.00	14.43	100	210	Vertical
5	721.7259	34.26	28.64	46.00	11.74	100	180	Vertical
6	938.8326	35.78	30.84	46.00	10.22	100	100	Vertical

RESULT: Pass

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. All test modes had been pre-tested. The mode 2 is the worst case and recorded in the report.

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Radiated Emissions Test Results above 1 GHz

EUT Name	ATOM 2 Drone	Model Name	DSDR23A
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 7.7V
Test Mode	Mode 1	Antenna Polarity	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4830.000	50.74	0.08	50.82	74.00	-23.18	peak
4830.000	41.06	0.08	41.14	54.00	-12.86	AVG
7245.000	48.77	2.21	50.98	74.00	-23.02	peak
7245.000	41.36	2.21	43.57	54.00	-10.43	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	ATOM 2 Drone	Model Name	DSDR23A
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 7.7V
Test Mode	Mode 1	Antenna Polarity	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4830.000	51.12	0.08	51.2	74.00	-22.80	peak
4830.000	41.05	0.08	41.13	54.00	-12.87	AVG
7245.000	49.33	2.21	51.54	74.00	-22.46	peak
7245.000	40.05	2.21	42.26	54.00	-11.74	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RESULT: Pass

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Radiated Emissions Test Results above 1GHz

EUT Name	ATOM 2 Drone	Model Name	DSDR23A
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 7.7V
Test Mode	Mode 2	Antenna Polarity	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4890.000	50.01	0.14	50.15	74.00	-23.85	peak
4890.000	40.37	0.14	40.51	54.00	-13.49	AVG
7335.000	49.32	2.36	51.68	74.00	-22.32	peak
7335.000	40.01	2.36	42.37	54.00	-11.63	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	ATOM 2 Drone	Model Name	DSDR23A
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 7.7V
Test Mode	Mode 2	Antenna Polarity	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4890.000	50.01	0.14	50.15	74.00	-23.85	peak
4890.000	40.37	0.14	40.51	54.00	-13.49	AVG
7335.000	49.32	2.36	51.68	74.00	-22.32	peak
7335.000	40.01	2.36	42.37	54.00	-11.63	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RESULT: Pass

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Radiated Emissions Test Results above 1GHz

EUT Name	ATOM 2 Drone	Model Name	DSDR23A
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 7.7V
Test Mode	Mode 3	Antenna Polarity	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4940.000	50.01	0.22	50.23	74.00	-23.77	peak
4940.000	40.39	0.22	40.61	54.00	-13.39	AVG
7410.000	47.63	2.64	50.27	74.00	-23.73	peak
7410.000	40.01	2.64	42.65	54.00	-11.35	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	ATOM 2 Drone	Model Name	DSDR23A
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 7.7V
Test Mode	Mode 3	Antenna Polarity	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4940.000	48.96	0.22	49.18	74.00	-24.82	peak
4940.000	41.34	0.22	41.56	54.00	-12.44	AVG
7410.000	46.55	2.64	49.19	74.00	-24.81	peak
7410.000	41.27	2.64	43.91	54.00	-10.09	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RESULT: Pass

Note:

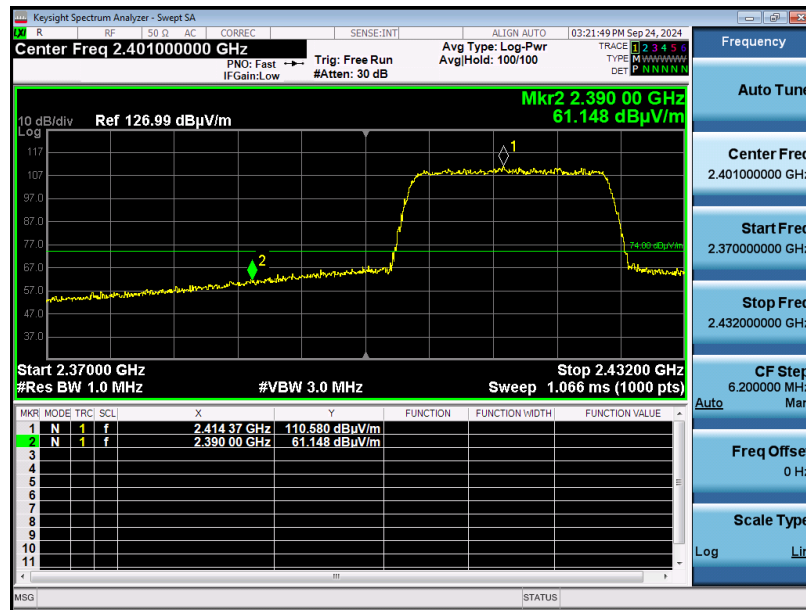
- The amplitude of other spurious emissions from 1G to 26 GHz which are attenuated more than 20 dB below the permissible value need not be reported.
- Factor = Antenna Factor + Cable loss – Pre-amplifier gain, Margin =Emission Level-Limit.
- The “Factor” value can be calculated automatically by software of measurement system.

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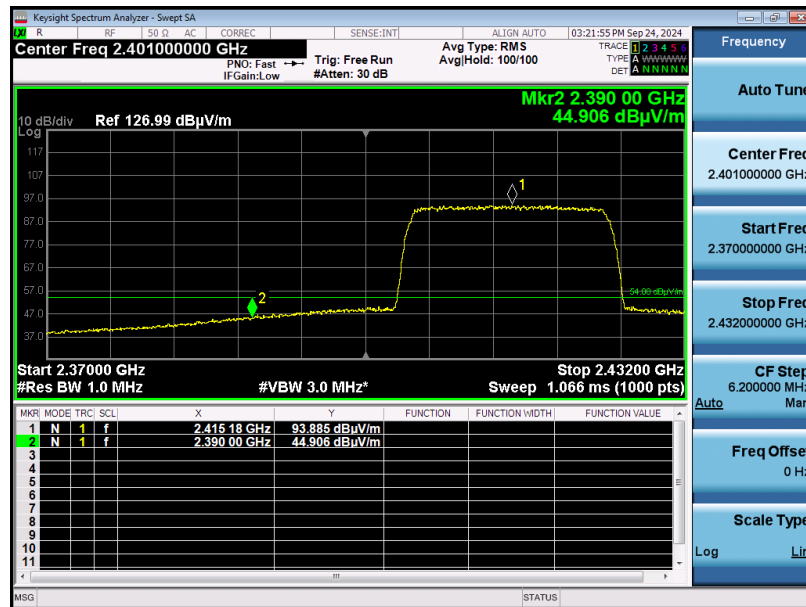
Band Edge Emission Test Results for Restricted Bands-Chain A

EUT Name	ATOM 2 Drone	Model Name	DSDR23A
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 7.7V
Test Mode	Mode 1	Antenna Polarity	Horizontal

Test Graph for Peak Measurement



Test Graph for Average Measurement



RESULT: Pass

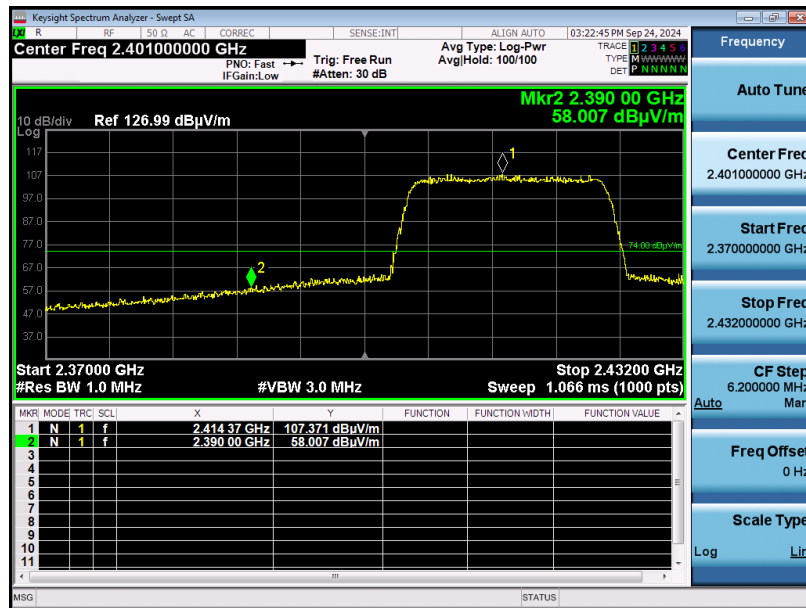
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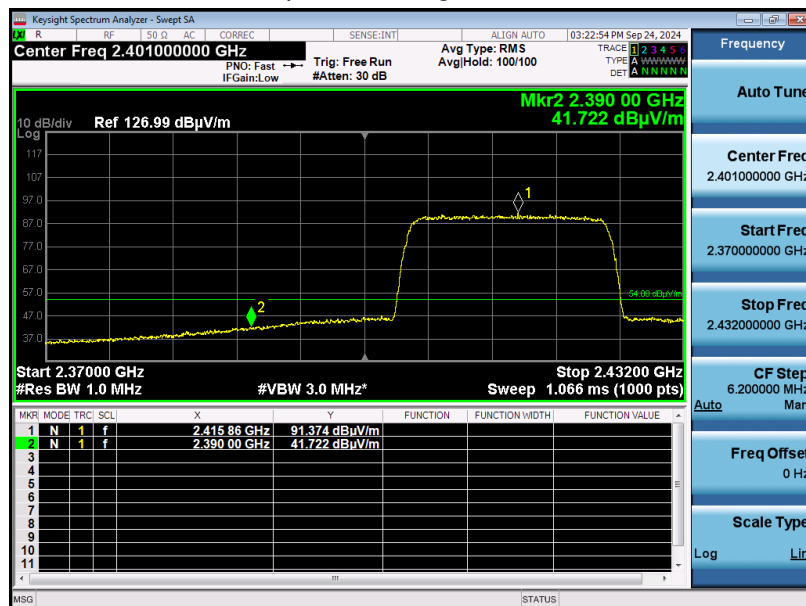
Band Edge Emission Test Results for Restricted Bands-Chain A

EUT Name	ATOM 2 Drone	Model Name	DSDR23A
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 7.7V
Test Mode	Mode 1	Antenna Polarity	Vertical

Test Graph for Peak Measurement



Test Graph for Average Measurement



RESULT: Pass

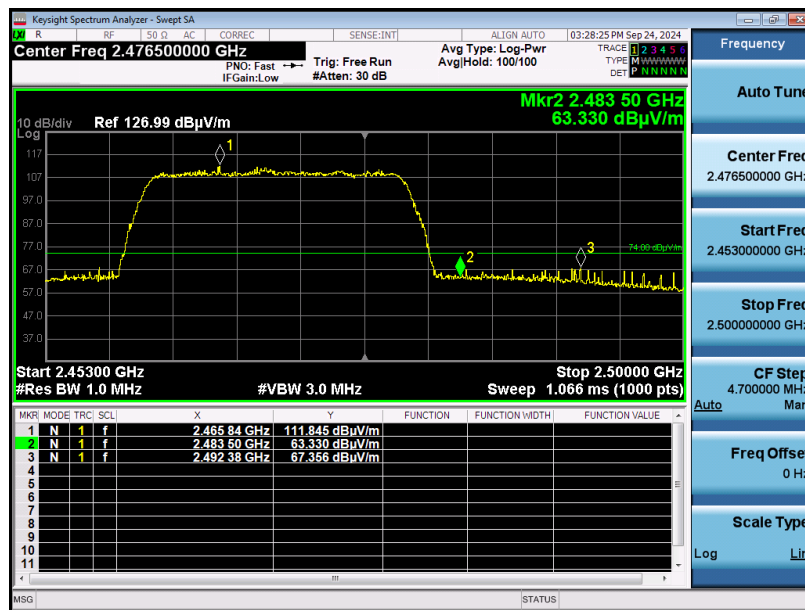
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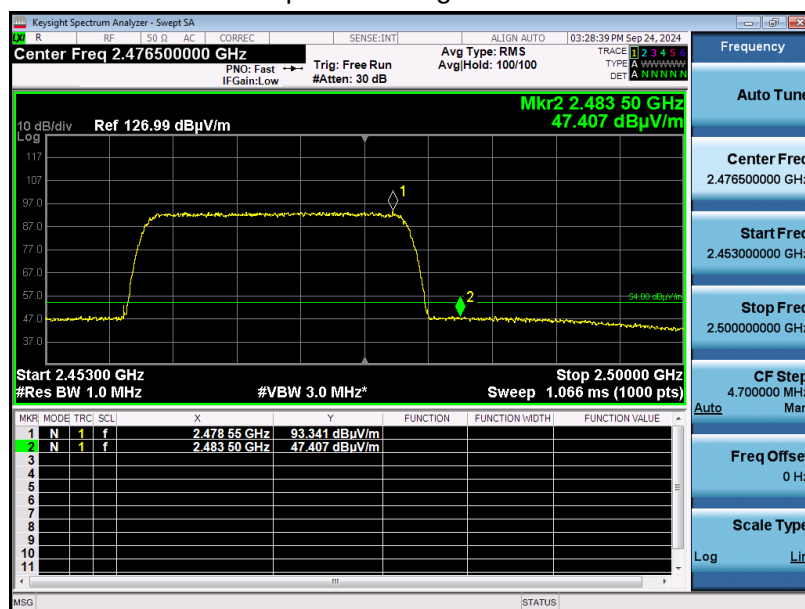
Band Edge Emission Test Results for Restricted Bands-Chain A

EUT Name	ATOM 2 Drone	Model Name	DSDR23A
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 7.7V
Test Mode	Mode 3	Antenna Polarity	Horizontal

Test Graph for Peak Measurement



Test Graph for Average Measurement



RESULT: Pass

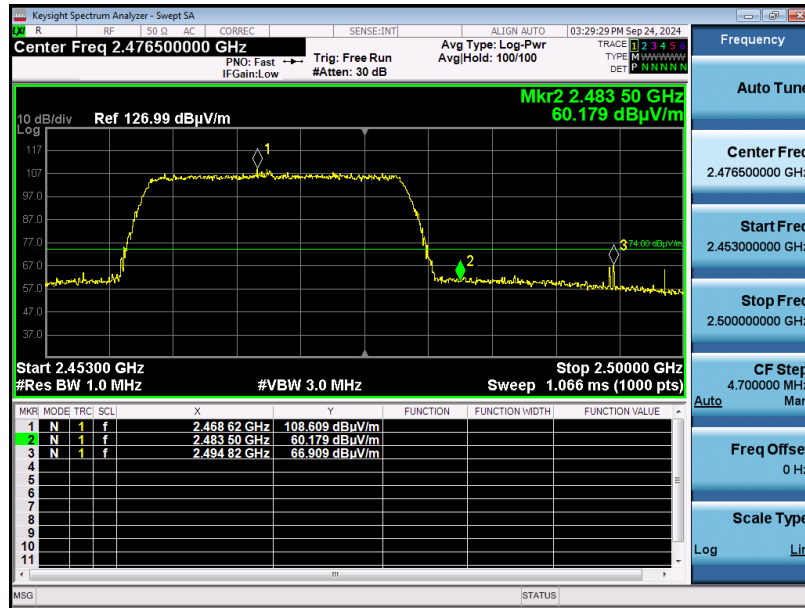
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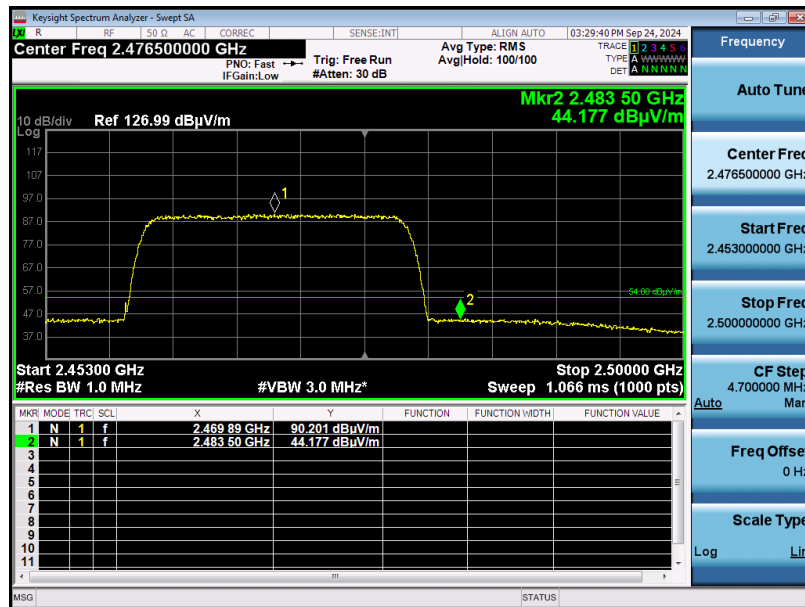
Band Edge Emission Test Results for Restricted Bands-Chain A

EUT Name	ATOM 2 Drone	Model Name	DSDR23A
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 7.7V
Test Mode	Mode 3	Antenna Polarity	Vertical

Test Graph for Peak Measurement



Test Graph for Average Measurement



RESULT: Pass

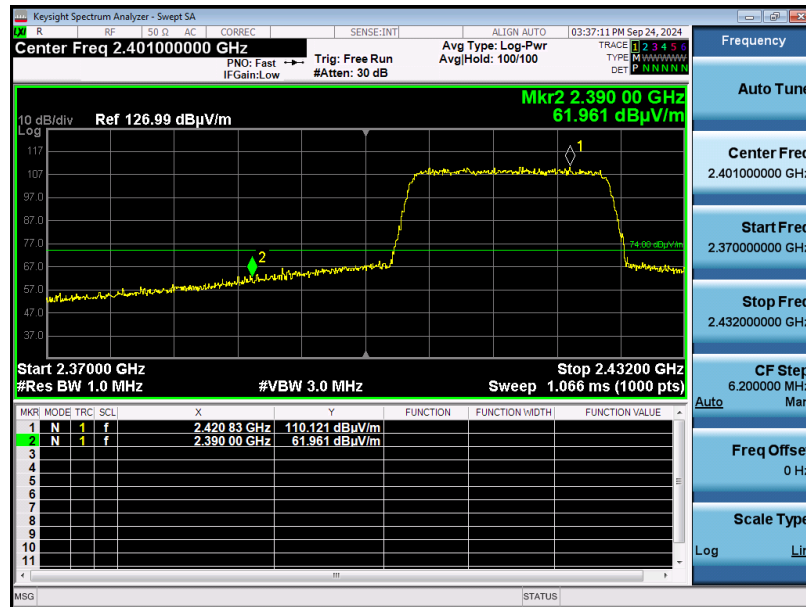
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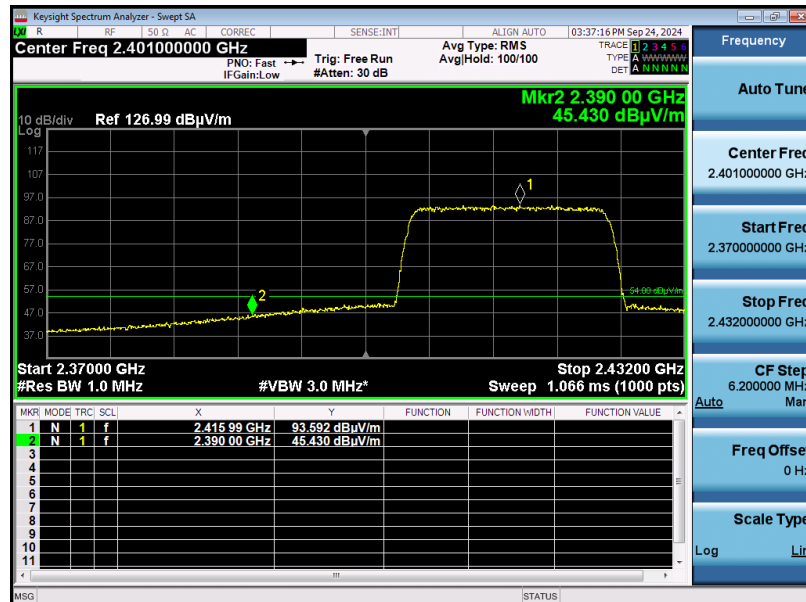
Test result for band edge emission at restricted bands-Chain B

EUT	ATOM 2 Drone	Model Name	DSDR23A
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 7.7V
Test Mode	802.11b with data rate 1 2412MHz	Antenna	Horizontal

Test Graph for Peak Measurement



Test Graph for Average Measurement



RESULT: PASS

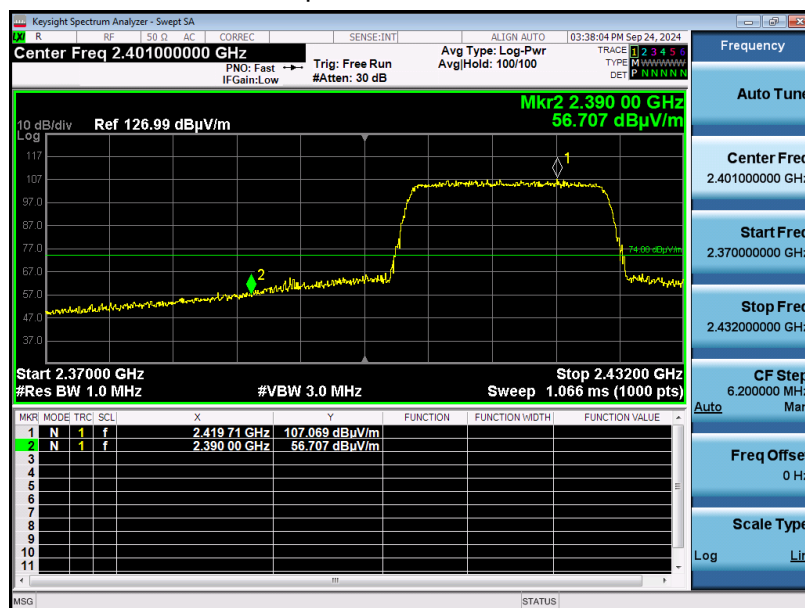
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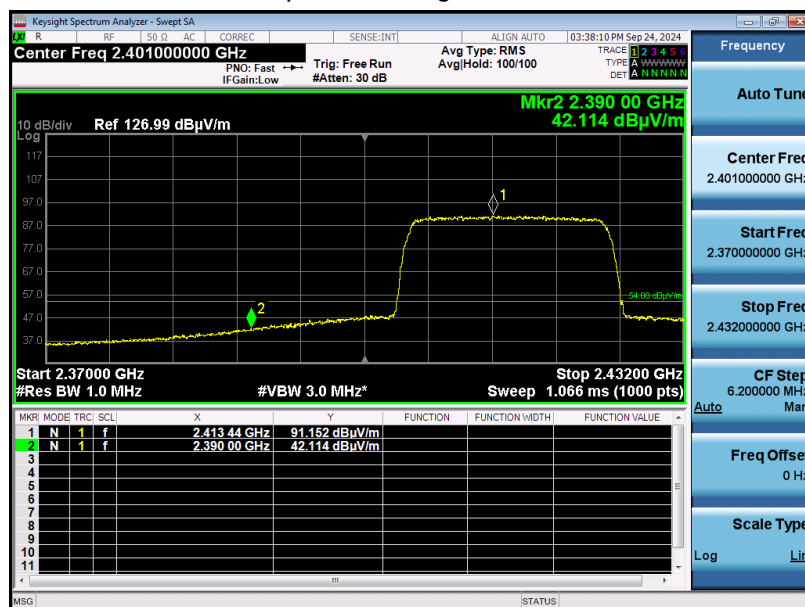
Test result for band edge emission at restricted bands-Chain B

EUT	ATOM 2 Drone	Model Name	DSDR23A
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 7.7V
Test Mode	802.11b with data rate 1 2412MHz	Antenna	Vertical

Test Graph for Peak Measurement



Test Graph for Average Measurement



RESULT: PASS

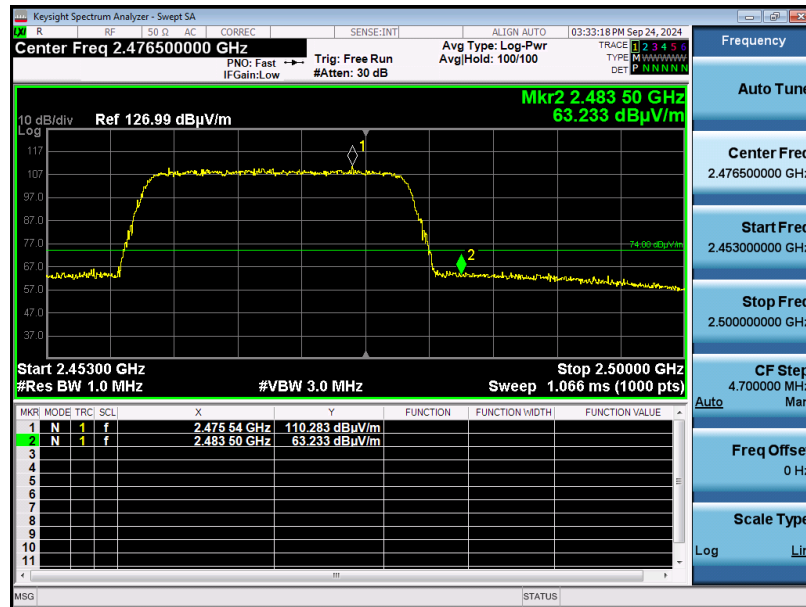
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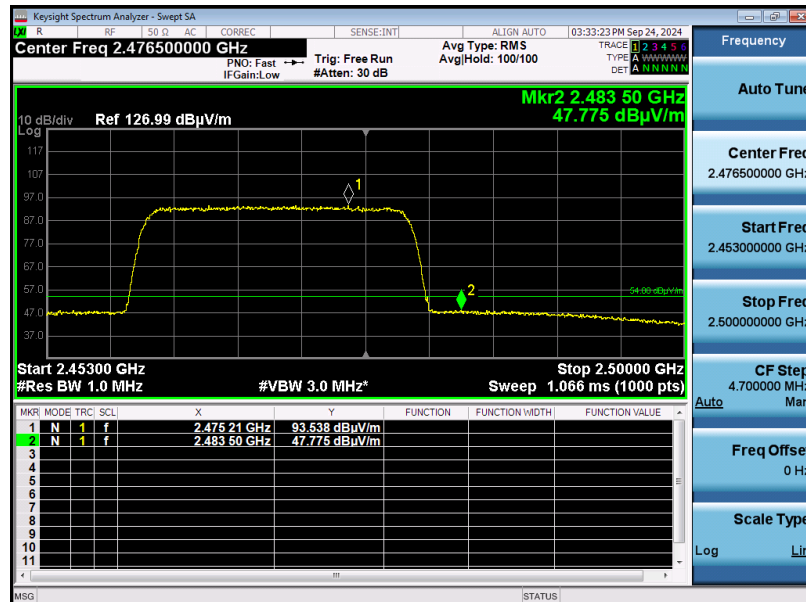
Test result for band edge emission at restricted bands-Chain B

EUT	ATOM 2 Drone	Model Name	DSDR23A
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 7.7V
Test Mode	802.11b with data rate 1 2462MHz	Antenna	Horizontal

Test Graph for Peak Measurement



Test Graph for Average Measurement



RESULT: PASS

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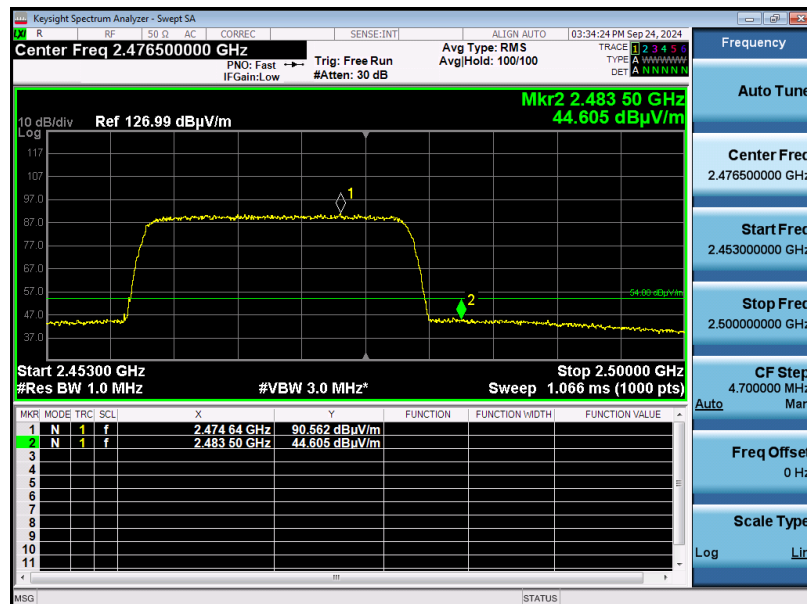
Test result for band edge emission at restricted bands-Chain B

EUT	ATOM 2 Drone	Model Name	DSDR23A
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 7.7V
Test Mode	802.11b with data rate 1 2462MHz	Antenna	Vertical

Test Graph for Peak Measurement



Test Graph for Average Measurement



RESULT: PASS

Note: The factor had been edited in the “Input Correction” of the Spectrum Analyzer.

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12. AC Power Line Conducted Emission

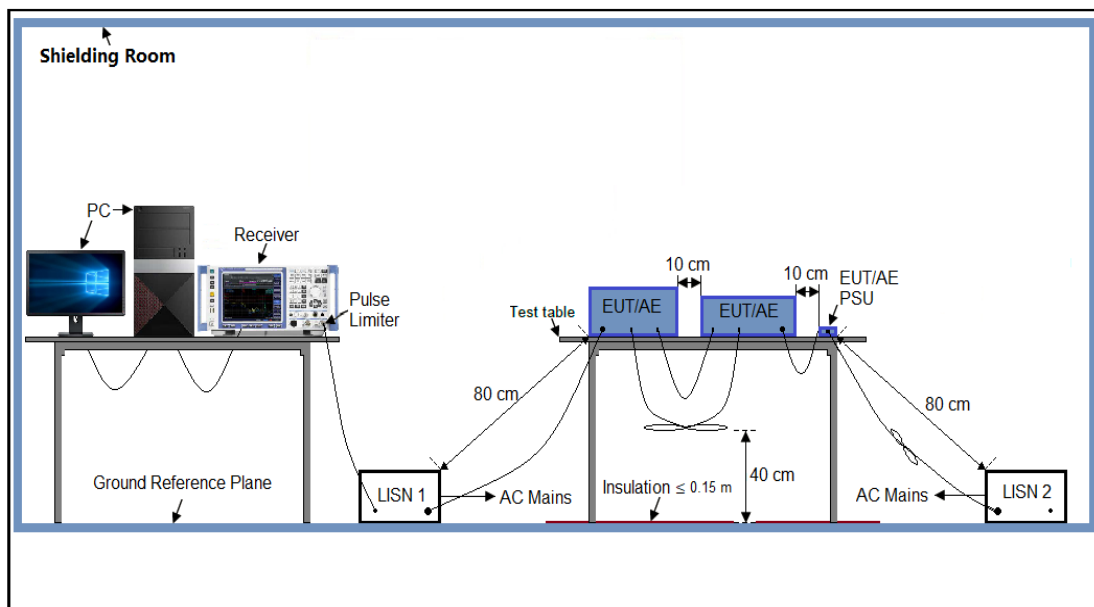
12.1 Measurement Limits

Frequency	Maximum RF Line Voltage	
	Q.P (dBμV)	Average (dBμV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz

12.2 Block Diagram of Line Conducted Emission Test



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12.3 Preliminary Procedure of Line Conducted Emission Test

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipment received AC120V/60Hz power from a LISN, if any.
5. The EUT received DC 5V power from adapter which received AC120V/60Hz power from a LISN.
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 Ohm load; the second scan had Line 1 connected to a 50 Ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

12.4 Final Procedure of Line Conducted Emission Test

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less – 2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case was reported on the Summary Data page.

12.5 Test Result of Line Conducted Emission Test

N/A

Note: The Custom IEEE 802.11 function cannot transmit when charging.

Appendix I: Photographs of Test Setup

Refer to the Report No.: AGC11805240901AP01

Appendix II: Photographs of Test EUT

Refer to the Report No.: AGC11805240901AP02

-----End of Report-----

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3. The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.
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8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.
9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

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