



TEST REPORT

Certificate #4312.01

Product Name: Wi-Fi 6 Extender and Access Point
Trade Mark: GRANDSTREAM
Model No.: GWN7660EM
Report Number: 25081819514RFC-1
Test Standards: FCC 47 CFR Part 15 Subpart C
FCC ID: YZZGWN7660EM
Test Result: PASS
Date of Issue: November 14, 2025

Prepared for:

Grandstream Networks, Inc.
126 Brookline Ave., 3rd Floor Boston, MA 02215, USA

Prepared by:

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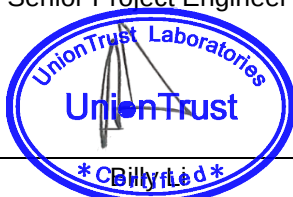
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Date:

November 14, 2025

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UTTR-RF-FCCPART15.247-V1.2

Version

Version No.	Date	Description
V1.0	November 14, 2025	Original



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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	Grandstream Networks, Inc.
Address of Applicant:	126 Brookline Ave., 3rd Floor Boston, MA 02215, USA
Manufacturer:	Grandstream Networks, Inc.
Address of Manufacturer:	126 Brookline Ave., 3rd Floor Boston, MA 02215, USA

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	Wi-Fi 6 Extender and Access Point		
Model No.:	GWN7660EM		
Trade Mark:	GRANDSTREAM		
DUT Stage:	Identical Prototype		
EUT Supports Function: (Provided by the customer)	2.4 GHz ISM Band:	IEEE 802.11b/g/n/ax	
	U-NII 5 GHz Bands:	5 150 MHz to 5 250 MHz	IEEE 802.11a/n/ac/ax
		5 250 MHz to 5 350 MHz	IEEE 802.11a/n/ac/ax
		5 470 MHz to 5 725 MHz	IEEE 802.11a/n/ac/ax
		5 725 MHz to 5 850 MHz	IEEE 802.11a/n/ac/ax
		5 850 MHz to 5 895 MHz	IEEE 802.11a/n/ac/ax
Software Version:	1.0.24.4(Provided by the customer)		
Hardware Version:	V1.1(Provided by the customer)		
Sample Received Date:	August 16, 2025		
Sample Tested Date:	August 27, 2025 October 22, 2025		
Remark:	The above EUT's information was provided by customer. Please refer to the specifications or user's manual for more detailed description.		

1.2.2 Description of Accessories

None.

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Frequency Band:	2400 MHz to 2483.5 MHz	
Frequency Range:	2412 MHz to 2462 MHz	
Support Standards:	IEEE 802.11b/g/n-HT20/n-HT40/ax-HE20/ax-HE40	
Type of Modulation:	IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ax: OFDM/OFDMA ^{Note 1} (1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK)	
Data Rate:	IEEE 802.11b: Up to 11 Mbps IEEE 802.11g: Up to 54 Mbps IEEE 802.11n-HT20/HT40: Up to MCS15 IEEE 802.11ax-HE20/ HE40: Up to MCS11	
Number of Channels:	IEEE 802.11b/g/n-HT20/ax-HE20: 11 IEEE 802.11n-HT40/ax-HE40: 7	
Channel Separation:	5 MHz	
Antenna Type: (Provided by the customer)	Antenna 1	PIFA Antenna
	Antenna 2	PIFA Antenna
Antenna Gain:	Antenna 1	2.86 dBi

(Provided by the customer)	Antenna 2	2.86 dBi
Normal Test Voltage:	120 Vac	
Note 1: For IEEE 802.11ax, the customer declaration the product supports only the Full RU mode.		

1.4 OTHER INFORMATION

Operation Frequency Each of Channel	
IEEE 802.11b, IEEE 802.11g, IEEE 802.11n-HT20 IEEE 802.11ax-HE20	$f = 2407 + 5k \text{ MHz}, k = 1, \dots, 11$
IEEE 802.11n-HT40 IEEE 802.11ax-HE40	$f = 2407 + 5k \text{ MHz}, k = 3, \dots, 9$
Note: f is the operating frequency (MHz); k is the operating channel.	

1.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested with associated equipment below.

1) Support Equipment

Description	Manufacturer	Model No.	Serial Number	Supplied by
Notebook	Lenovo	B40-80	MP12NEQ6	UnionTrust
Mouse	DELL	MS111	CN-011D3V-738	UnionTrust
Router	H3C	H3C Magic NX30 Pro	2023AP4524	UnionTrust

2) Support Cable

Cable No.	Description	Connector	Length (Meter)	Supplied by
1	Ethernet Cable	RJ45	1.5 Unshielded without ferrite	UnionTrust
2	Antenna Cable*2	SMA	0.1	Applicant

1.6 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

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Telephone: +86 (0) 755 2823 0888
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1.7 TEST FACILITY

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

CNAS-Lab Code: L9069

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

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A2LA-Lab Certificate No.: 4312.01

Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

ISED Wireless Device Testing Laboratories

CAB identifier: CN0032

FCC Accredited Lab.

Designation Number: CN1194

Test Firm Registration Number: 259480

1.8 DEVIATION FROM STANDARDS

None.

1.9 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.10 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

1.11 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Measurement Uncertainty
1	Conducted emission 9KHz-150KHz	±3.8 dB
2	Conducted emission 150KHz-30MHz	±3.4 dB
3	Radiated emission 9KHz-30MHz	±4.9 dB
4	Radiated emission 30MHz-1GHz	±4.7 dB
5	Radiated emission 1GHz-18GHz	±5.1 dB
6	Radiated emission 18GHz-26GHz	±5.2 dB
7	Radiated emission 26GHz-40GHz	±5.2 dB
8	Radio frequency	± 6.5 × 10 ⁻⁸
9	Occupied Channel Bandwidth	± 1.86 %
10	RF output power, conducted	± 0.68 dB
11	Power Spectral Density	± 0.6 dB
12	Spurious emissions, conducted	± 2.7 dB
13	Time	± 0.19 %

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2. TEST SUMMARY

FCC 47 CFR Part 15 Subpart C Test Cases			
Test Item	Test Requirement	Test Method	Result
Antenna Requirement	FCC 47 CFR Part 15 Subpart C Section 15.203/15.247 (b)(4)	N/A	PASS
AC Power Line Conducted Emission	FCC 47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2020 Clause 6.2	PASS
Conducted Peak Output Power	FCC 47 CFR Part 15 Subpart C Section 15.247 (b)(3)	ANSI C63.10-2020 Clause 11.9.1.3	PASS
6dB Bandwidth	FCC 47 CFR Part 15 Subpart C Section 15.247 (a)(2)	ANSI C63.10-2020 Clause 11.8.1	PASS
Power Spectral Density	FCC 47 CFR Part 15 Subpart C Section 15.247 (e)	ANSI C63.10-2020 Clause 11.10.2	PASS
Conducted Out of Band Emission	FCC 47 CFR Part 15 Subpart C Section 15.247(d)	ANSI C63.10-2020 Clause 11.11	PASS
Radiated Spurious Emissions	FCC 47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2020 Clause 11.11 & Clause 11.12	PASS
Band Edge Measurements (Radiated)	FCC 47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2020 Clause 11.13	PASS
Note: 1) N/A: In this whole report not applicable.			
Disclaimer and Explanations: The declared of product specification and data (e.g., antenna gain, RF specification, etc) for EUT presented in the report are provided by the customer, and the customer takes all the responsibilities for the accuracy of product specification.			

3. EQUIPMENT LIST

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Radiated Emission Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date	Cal. Due date
☒	3m SAC	ETS-LINDGREN	3m	Euroshiedpn-CT001270-1317	11-Nov-2023	10-Nov-2026
☒	Receiver	R&S	ESIB26	100114	25-Oct-2024	24-Oct-2025
☒	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	28-Mar-2025	27-Mar-2026
☒	Loop Antenna	ETS-LINDGREN	6502	00202525	28-Oct-2024	27-Oct-2025
☒	Broadband Antenna	ETS-LINDGREN	3142E	00201566	29-Oct-2024	28-Oct-2025
☒	6dB Attenuator	Talent	RA6A5-N-18	18103001	29-Oct-2024	28-Oct-2025
☒	Preamplifier	HP	8447F	2805A02960	25-Oct-2024	24-Oct-2025
☒	Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201541	29-Mar-2025	28-Mar-2026
☒	Pre-amplifier	ETS-Lindgren	00118385	00201874	29-Mar-2025	28-Mar-2026
☒	Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	28-Oct-2024	27-Oct-2025
☒	Pre-amplifier	ETS-Lindgren	00118384	00202652	28-Oct-2024	27-Oct-2025
☒	Band Rejection Filter (2400MHz~2500MHz)	Micro-Tronics	BRM50702	G590	21-Feb-2025	20-Feb-2026
☒	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A
☒	Test Software	Audix	e3	Software Version: 9.160323		

Conducted Emission Test						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date	Cal. Due date
☒	Receiver	R&S	ESC13	1166.5950.03	25-Oct-2024	24-Oct-2025
☒	LISN	ETS-Lindgren	3816/2SH	00201088	25-Oct-2024	24-Oct-2025
☒	Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	25-Oct-2024	24-Oct-2025
☒	Shielding room	ETS-Lindgren	843	Euroshiedpn-CT001270-1246	N/A	N/A
☒	Test Software	EZ-EMC	EZ-CON	Software Version: EMC-CON 3A1.1		

RF Conducted Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date	Cal. Due date
☒	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	28-Mar-2025	27-Mar-2026
☒	USB Wideband Power Sensor	KEYSIGHT	U2021XA	MY55430035	25-Oct-2024	24-Oct-2025
☒	Band Rejection Filter (2400MHz~2500MHz)	Micro-Tronics	BRM50702	G590	21-Feb-2025	20-Feb-2026

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4. TEST CONFIGURATION

4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

4.1.1 Normal or Extreme Test Conditions

Environment Parameter	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage (V)	Relative Humidity (%)
NT/NV	+15 to +35	120	20 to 75
Remark: 1) NV: Normal Voltage; NT: Normal Temperature			

4.1.2 Record of Normal Environment and Test Sample

Test Item	Temp. (°C)	Relative Humidity (%)	Pressure (kPa)	Sample No.	Tested by
AC Power Line Conducted Emission	22.3	44.2	99.7	S202508166685-ZJA01/5	Fire Huo
Conducted Peak Output Power	22.4	42.6	100.5	S202508166685-ZJA04/5	David Du
6dB Bandwidth					
Power Spectral Density					
Conducted Out of Band Emission	23.1	54.2	99.9	S202508166685-ZJA03/5	Leo Li
Radiated Spurious Emissions					
Band Edge Measurements (Radiated)					

4.2 TEST CHANNELS

Mode	Tx/Rx Frequency (MHz)	Test RF Channel Lists		
		Lowest(L)	Middle(M)	Highest(H)
IEEE 802.11b	2412-2462	Channel 1	Channel 6	Channel 11
IEEE 802.11g		2412 MHz	2437 MHz	2462 MHz
IEEE 802.11n-HT20				
IEEE 802.11ax-HE20				
Mode	Tx/Rx Frequency (MHz)	Test RF Channel Lists		
		Lowest(L)	Middle(M)	Highest(H)
IEEE 802.11n-HT40	2422-2452	Channel 3	Channel 6	Channel 9
IEEE 802.11ax-HE40		2422 MHz	2437 MHz	2452 MHz

4.3 EUT TEST STATUS

Mode	Tx/Rx Function	Description
IEEE 802.11b IEEE 802.11g	1Tx/1Rx	1. Keep the EUT in continuously transmitting or receiving with modulation and data rates test single. 2. Keep the equipment in normal operation and achieve a certain throughput.
IEEE 802.11n-HT20 IEEE 802.11n-HT40 IEEE 802.11ax-HE20 IEEE 802.11ax-HE40	2Tx/2Rx	

Test Software (Provided by the customer)
Test software name: MT7981 QA 0.0.2.78;

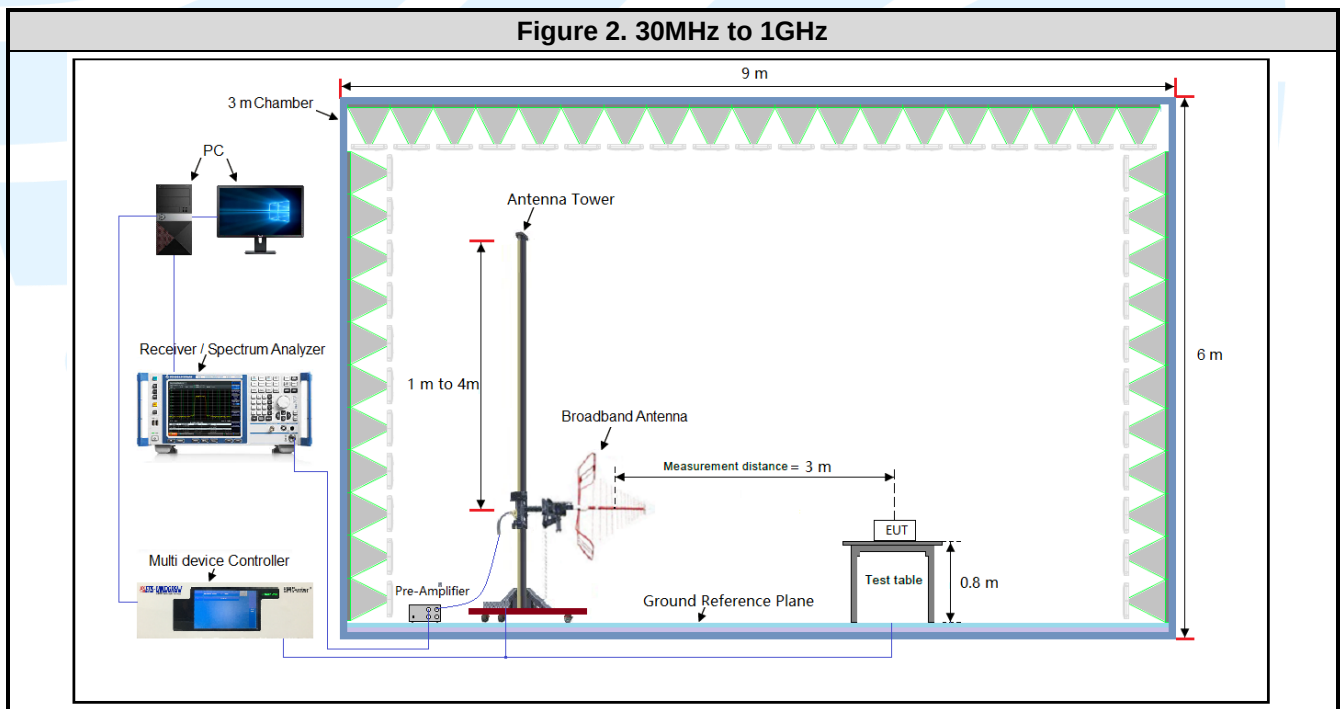
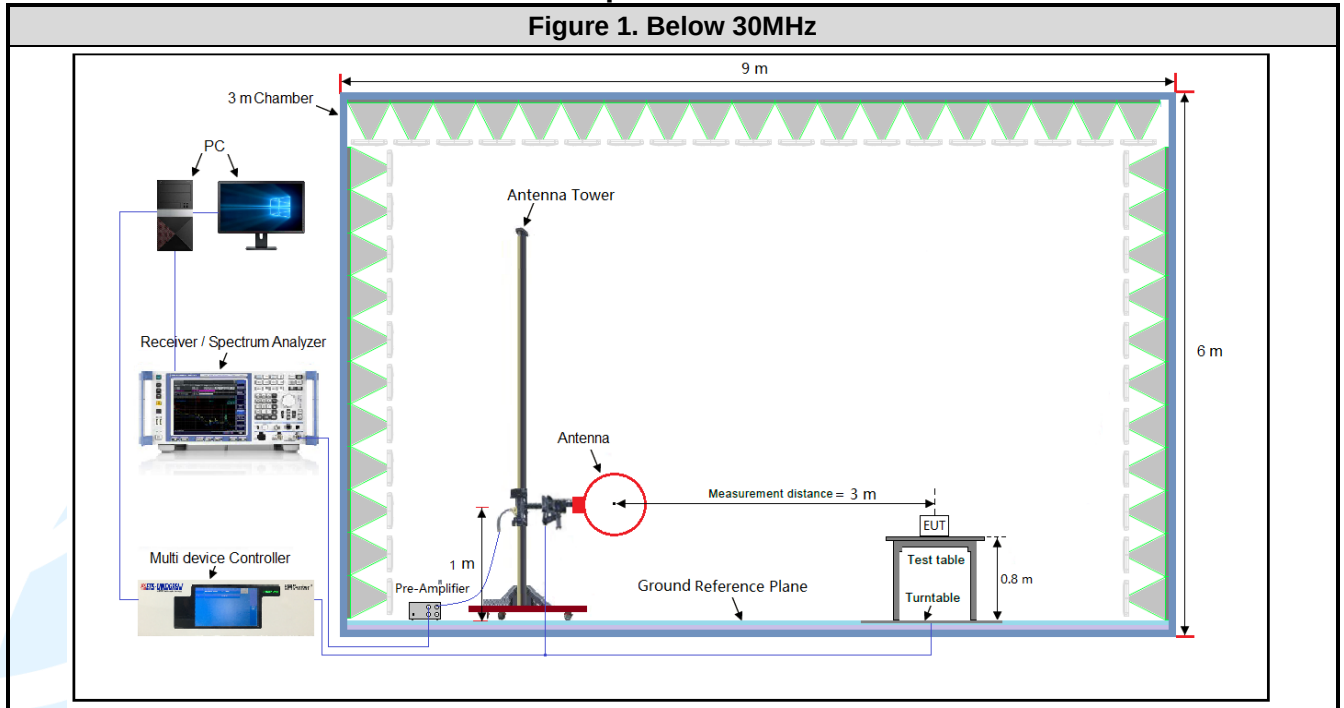
4.4 PRE-SCAN

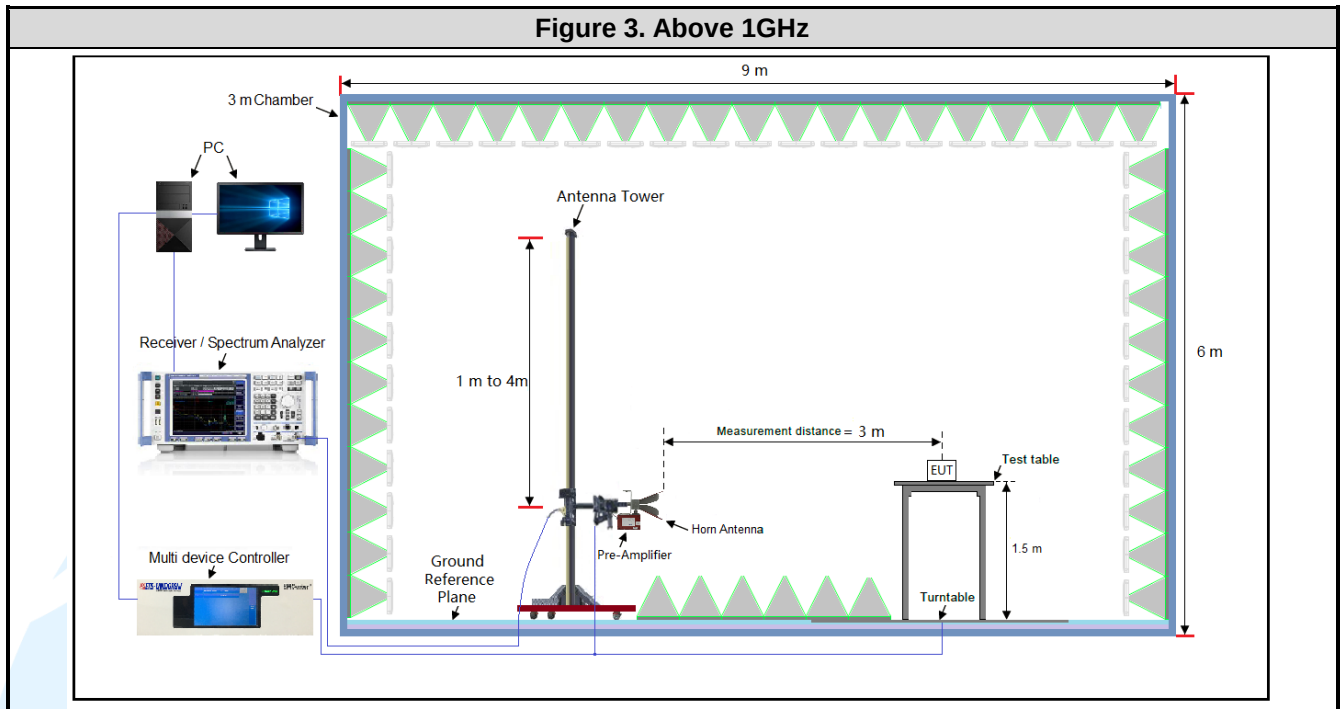
Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and data rate. Following data rate was (were) selected for the final test as listed below

Mode	Worst-case data rates
IEEE 802.11b	1 Mbps
IEEE 802.11g	6 Mbps
IEEE 802.11n-HT20	MCS8
IEEE 802.11n-HT40	MCS8
IEEE 802.11ax-HE20	MCS0
IEEE 802.11ax-HE40	MCS0

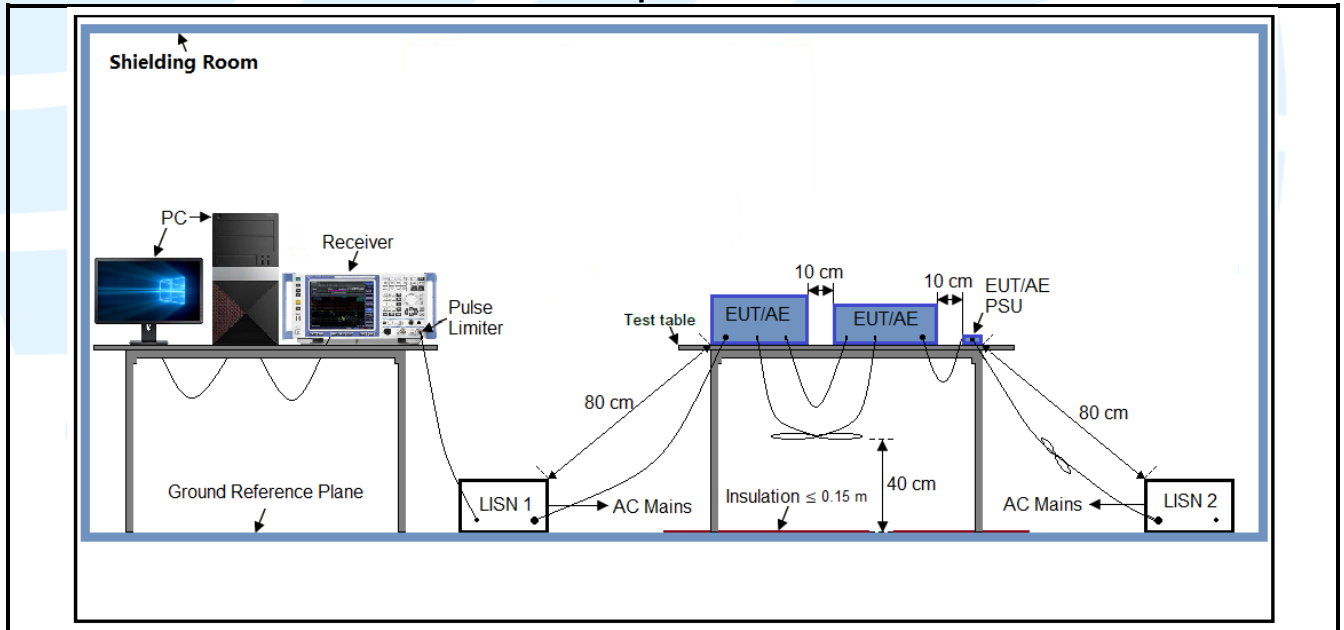
4.5 TEST SETUP

4.5.1 For Radiated Emissions test setup

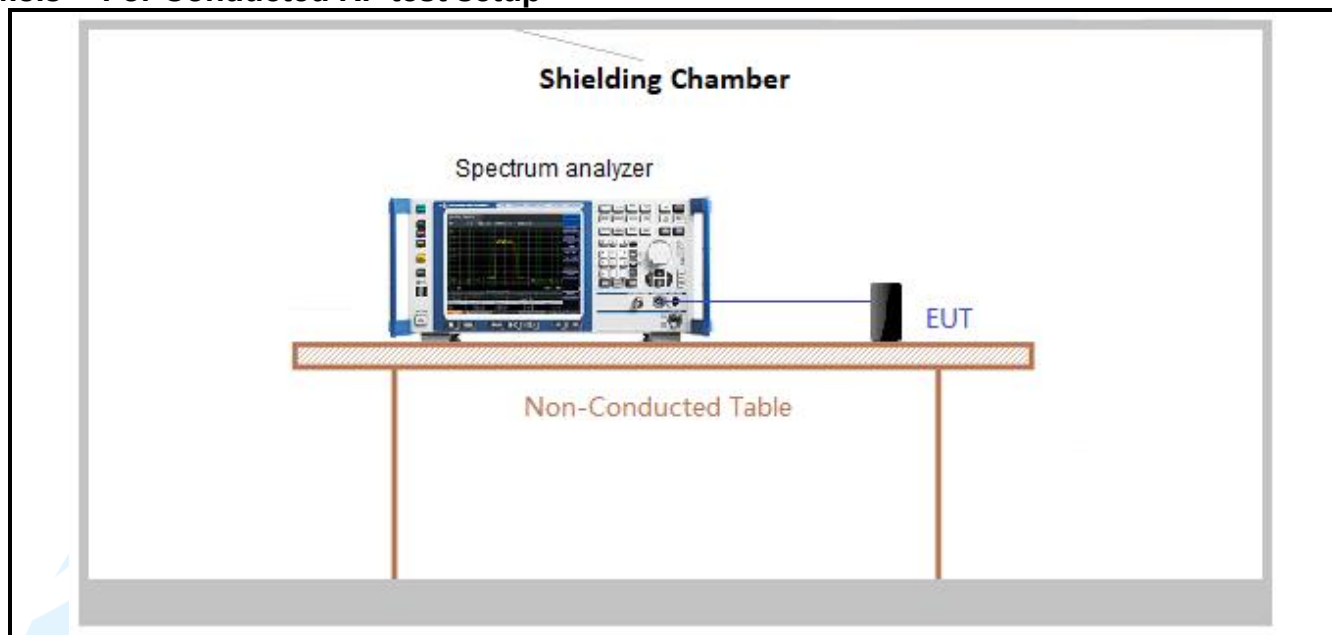




4.5.2 For Conducted Emissions test setup



4.5.3 For Conducted RF test setup



4.6 SYSTEM TEST CONFIGURATION

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, radiated emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario. Only the worst case data were recorded in this test report.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. Therefore, all final radiated testing was performed with the EUT in orientation.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

4.7 DUTY CYCLE

Test Procedure: ANSI C63.10-2020 Clause 11.6.

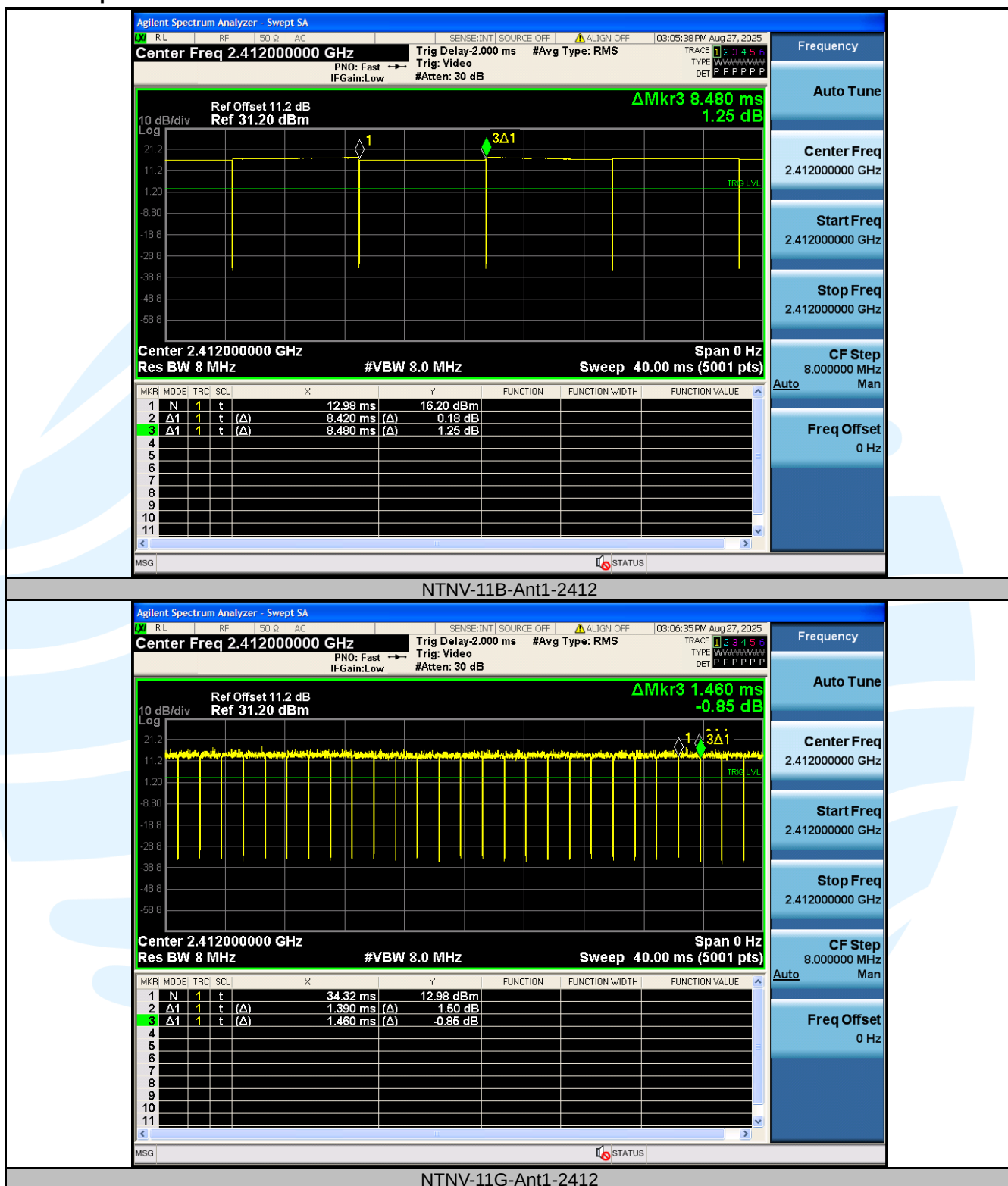
Test Results

Mode	RU	Data Rates	On Time (msec)	Period (msec)	Duty Cycle (linear)	Duty Cycle (%)	Duty Cycle Factor (dB)	1/T Minimum VBW (kHz)
IEEE 802.11b	N/A	1 Mbps	8.42	8.48	0.99	99.29	0.00	0.01
IEEE 802.11g	N/A	6 Mbps	1.39	1.46	0.95	95.21	0.21	0.72
IEEE 802.11n-HT20	N/A	MCS 8	0.68	0.74	0.92	91.89	0.37	1.47
IEEE 802.11n-HT40	N/A	MCS 8	0.35	0.4	0.88	87.50	0.58	2.86
IEEE 802.11ax-HE20	SU	MCS 0	0.21	0.27	0.78	77.78	1.09	4.76
IEEE 802.11ax-HE40	SU	MCS 0	0.21	0.26	0.81	80.77	0.93	4.76

Remark:

- 1) Duty cycle= On Time/ Period;
- 2) Duty Cycle factor = $10 * \log(1/ \text{Duty cycle})$;

The test plots as follows



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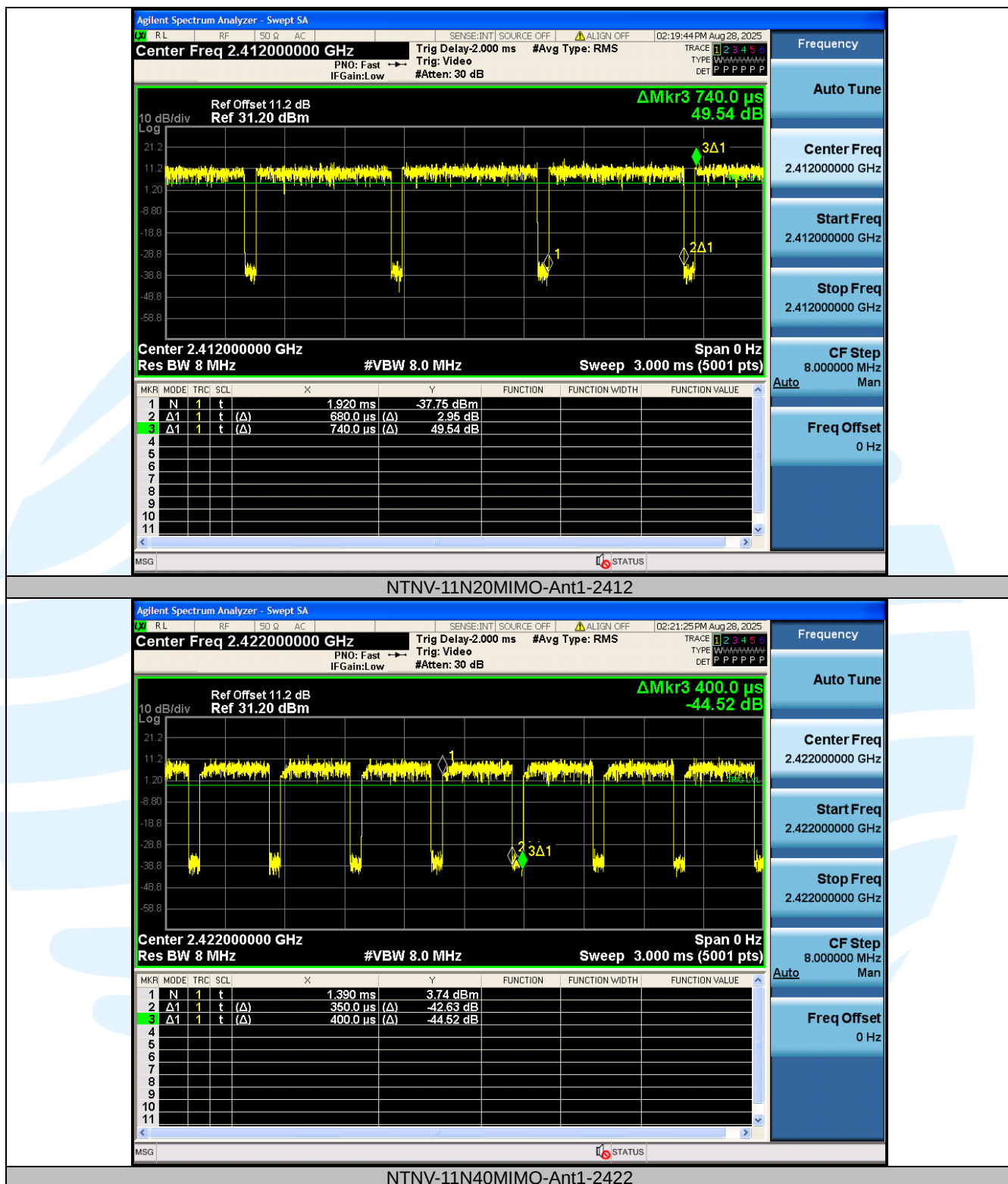
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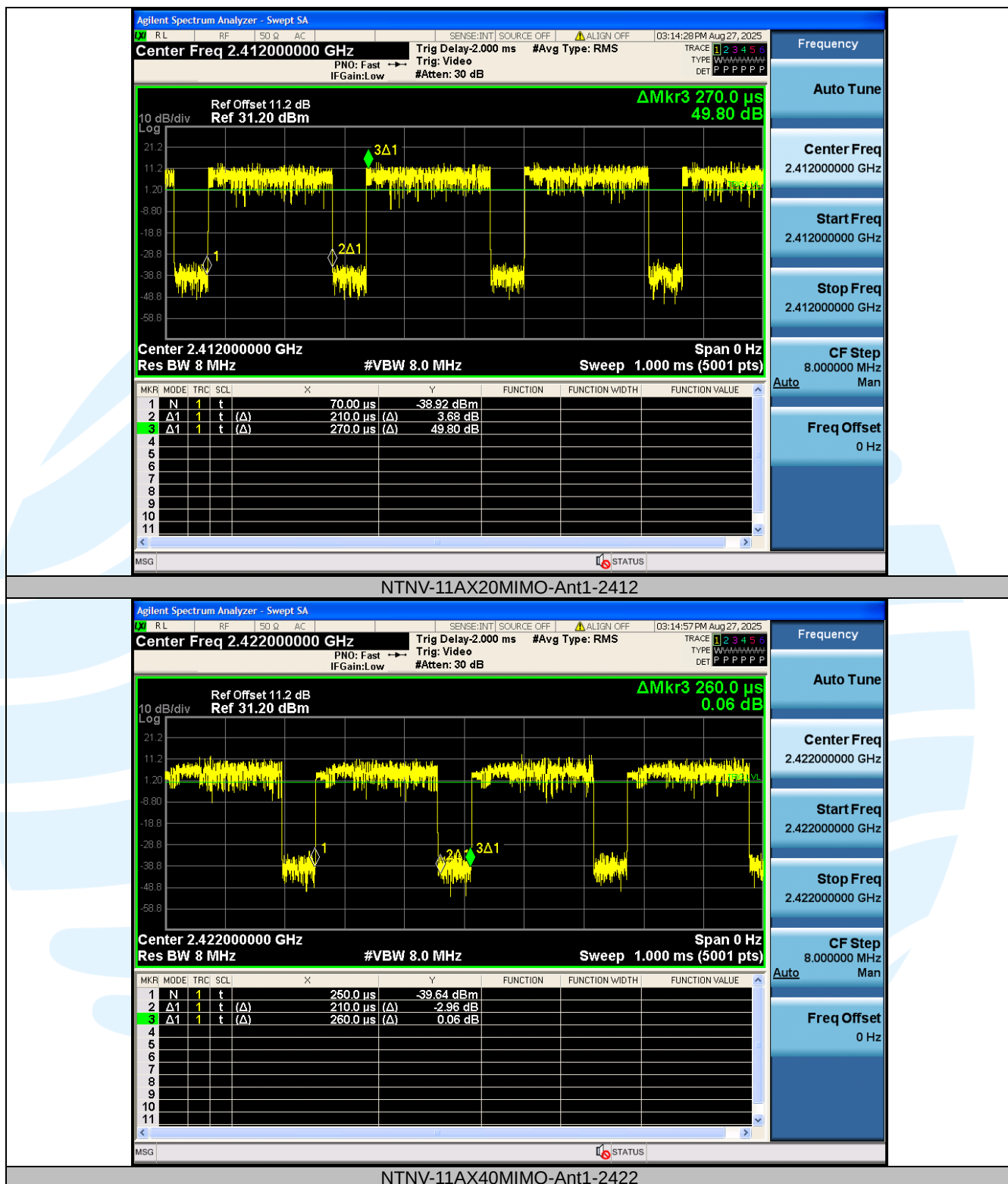
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5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION

5.1 REFERENCE DOCUMENTS FOR TESTING

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 C63.10-2020	American National Standard for Testing Unlicensed Wireless Devices
4	KDB 558074 D01 15.247 Meas Guidance v05r02	Guidance for compliance measurements on Digital Transmission Systems, Frequency Hopping Spread Spectrum system, and Hybrid system devices operating under Section 15.247 of the FCC rules
5	KDB 662911 D01 Multiple Transmitter Output v02r01	Emissions Testing of Transmitters with Multiple Outputs in the Same Band

5.2 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: Both antenna in the interior of the equipment and no consideration of replacement. The transmit signals are correlated with each other, the best case directional gain of the antenna is 5.87 dBi (See section 5.3).

5.3 CONDUCTED OUTPUT POWER

Test Requirement: FCC 47 CFR Part 15 Subpart C Section 15.247 (b)(3)

Test Method: ANSI C63.10-2020 Clause 11.9.1.3

Limit: For systems using digital modulation in the 2400-2483.5 MHz bands: 1 Watt.

Test Procedure:

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter.
2. Measure out each test modes' peak or average output power, record the power level.

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

Test Setup: Refer to section 4.5.3 for details.

Instruments Used: Refer to section 3 for details

Test Results:

Directional gain and the maximum output power limit.

Frequency (MHz)	Antenna Gain (dBi)		Directional gain (dBi)	Directional gain (dBi)	Limit	
	Ant .1	Ant .2	Power	PSD	Power (dBm)	PSD (dBm/3kHz)
2412 - 2462	2.86	2.86	5.87	5.87	30	8

Unequal antenna gains, with equal transmit powers. Directional gain is to be computed as follows:
If transmit signals are correlated, then
Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / NANT]$ dBi [Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

Mode	Freq.	RU&Index	Power Setting (Provided by the customer)	Max. Avg Power (dBm)				Result
	(MHz)			Ant. 1	Ant. 2	Total	Limit	
IEEE 802.11 b	2412	N/A	20.5	22.96	21.99	N/A	30.00	PASS
	2437	N/A	20.5	23.22	21.91	N/A	30.00	PASS
	2462	N/A	20.5	23.11	21.79	N/A	30.00	PASS
IEEE 802.11 g	2412	N/A	20.5	20.95	20.32	N/A	30.00	PASS
	2437	N/A	20.5	21.50	20.30	N/A	30.00	PASS
	2462	N/A	20.5	21.42	20.07	N/A	30.00	PASS
IEEE 802.11 n-HT20	2412	N/A	20.5	19.70	19.18	22.48	30.00	PASS
	2437	N/A	20.5	20.23	18.93	22.64		PASS
	2462	N/A	20.5	20.15	18.81	22.54		PASS
IEEE 802.11 n-HT40	2422	N/A	20.5	19.40	18.73	22.09		PASS
	2437	N/A	20.5	19.91	18.67	22.34		PASS
	2452	N/A	20.5	19.86	18.56	22.27		PASS
IEEE 802.11 ax-HE20	2412	SU	20.5	19.72	19.15	22.45		PASS
	2437	SU	20.5	20.15	18.90	22.58		PASS
	2462	SU	20.5	20.10	18.84	22.53		PASS
IEEE 802.11 ax-HE40	2422	SU	20.5	19.27	18.68	22.00		PASS
	2437	SU	20.5	19.75	18.70	22.27		PASS
	2452	SU	20.5	19.81	18.50	22.21		PASS

Note:

1. Total (Chain 1+2) = $10 \log[(10^{Chain 1/10} + 10^{Chain 2/10})]$
2. The Duty Cycle Factor is compensated in the Total Power.

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Mode	Freq.	RU&Index	Power Setting (Provided by the customer)	Max. Peak Power (dBm)				Result
	(MHz)			Ant. 1	Ant. 2	Total	Limit	
IEEE 802.11 b	2412	N/A	20.5	25.66	24.49	N/A	30.00	PASS
	2437	N/A	20.5	26.07	24.42	N/A	30.00	PASS
	2462	N/A	20.5	26.01	24.32	N/A	30.00	PASS
IEEE 802.11 g	2412	N/A	20.5	27.21	25.54	N/A	30.00	PASS
	2437	N/A	20.5	27.18	25.45	N/A	30.00	PASS
	2462	N/A	20.5	27.14	25.63	N/A	30.00	PASS
IEEE 802.11 n-HT20	2412	N/A	20.5	26.46	25.24	28.90	30.00	PASS
	2437	N/A	20.5	26.15	24.74	28.51		PASS
	2462	N/A	20.5	26.24	24.81	28.59		PASS
IEEE 802.11 n-HT40	2422	N/A	20.5	25.91	25.03	28.50		PASS
	2437	N/A	20.5	25.86	24.53	28.26		PASS
	2452	N/A	20.5	26.08	24.58	28.40		PASS
IEEE 802.11 ax-HE20	2412	SU	20.5	26.77	25.34	29.12		PASS
	2437	SU	20.5	26.28	24.86	28.64		PASS
	2462	SU	20.5	26.53	23.71	28.36		PASS
IEEE 802.11 ax-HE40	2422	SU	20.5	26.73	25.12	29.01		PASS
	2437	SU	20.5	26.21	24.72	28.54		PASS
	2452	SU	20.5	26.32	24.78	28.63		PASS

Note:

1. Total (Chain 1+2) = $10 \cdot \log[(10^{\text{Chain 1}/10}) + (10^{\text{Chain 2}/10})]$

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5.46 DB BANDWIDTH

Test Requirement:	FCC 47 CFR Part 15 Subpart C Section 15.247 (a)(2)
Test Method:	ANSI C63.10-2020 Clause 11.8.1
Limit:	For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz
Test Procedure:	Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer. Option 1: Use the following spectrum analyzer settings: - Set RBW = shall be in the range of 1% to 5% of the OBW but not less than 100 kHz. - Set the video bandwidth (VBW) $\geq 3 \times$ RBW. - Detector = Peak. - Trace mode = max hold. - Sweep = No faster than coupled (auto) time. - Allow the trace to stabilize. - Measure the maximum width of the emission by placing two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the “-6 dB down amplitude”. If a marker is below this “-6 dB down amplitude” value, then it shall be as close as possible to this value. Option 2: The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described in 11.8.1 (i.e., RBW = 100 kHz, VBW $\geq 3 \times$ RBW, and peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB. Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.
Test Setup:	Refer to section 4.5.3 for details.
Instruments Used:	Refer to section 3 for details
Test Mode:	Link mode
Test Results:	Please refer to Appendix A

5.5 POWER SPECTRAL DENSITY

Test Requirement:	FCC 47 CFR Part 15 Subpart C Section 15.247 (e)
Test Method:	ANSI C63.10-2020 Clause 11.10.2
Limit:	For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.
Test 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: - Set analyzer center frequency to DTS channel center frequency. - Set the span to 1.5 times the DTS bandwidth. - Set the RBW to: $3\text{ kHz} \leq \text{RBW} \leq 100\text{ kHz}$. - Set the VBW $\geq 3 \times \text{RBW}$. - Detector = peak. - Sweep time = auto couple. - Trace mode = max hold. - Allow trace to fully stabilize. - Use the peak marker function to determine the maximum amplitude level within the RBW. - If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat. Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.
Test Setup:	Refer to section 4.5.3 for details.
Instruments Used:	Refer to section 3 for details
Test Mode:	Link mode
Test Results:	Please refer to Appendix A

5.6 CONDUCTED OUT OF BAND EMISSION

Test Requirement: FCC 47 CFR Part 15 Subpart C Section 15.247(d)

Test Method: ANSI C63.10-2020 Clause 11.11

Limit: 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.

Test 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 REF

- a) Set instrument center frequency to DTS channel center frequency.
- b) Set the span to ≥ 1.5 times the DTS bandwidth.
- c) Set the RBW = 100 kHz.
- d) Set the VBW $\geq 3 \times$ RBW.
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum PSD level.
- j) Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

Step 2: Measurement Procedure OOB

- a) Set RBW = 100 kHz.
- b) Set VBW ≥ 300 kHz.
- c) Detector = peak.
- d) Sweep = auto couple.
- e) Trace Mode = max hold.
- f) Allow trace to fully stabilize.
- g) 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.

Test Setup: Refer to section 4.5.3 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Link mode

Test Results: Please refer to Appendix A

5.7 RADIATED SPURIOUS EMISSIONS

Test Requirement: FCC 47 CFR Part 15 Subpart C Section 15.205/15.209

Test Method: ANSI C63.10-2020 Clause 11.11 & Clause 11.12

Receiver Setup:

Frequency	RBW
0.009 MHz-0.150 MHz	200/300 kHz
0.150 MHz -30 MHz	9/10 kHz
30 MHz-1 GHz	100/120 kHz
Above 1 GHz	1 MHz

Limits:

Spurious Emissions

Frequency	Field strength (microvolt/meter)	Limit (dBμV/m)	Remark	Measurement distance (m)
0.009 MHz-0.490 MHz	2400/F(kHz)	--	--	300
0.490 MHz-1.705 MHz	24000/F(kHz)	--	--	30
1.705 MHz-30 MHz	30	--	--	30
30 MHz-88 MHz	100	40.0	Quasi-peak	3
88 MHz-216 MHz	150	43.5	Quasi-peak	3
216 MHz-960 MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1 GHz	500	54.0	Average	3

Remark:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBμV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

Test Setup: Refer to section 4.5.1 for details.

Test Procedures:

1. From 30 MHz to 1GHz test procedure as below:
 - 1) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
 - 2) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
 - 3) The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
 - 4) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotating table was turned from 0 degrees to 360 degrees to find the maximum reading.
 - 5) The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
 - 6) If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
2. Above 1GHz test procedure as below:
 - 1) Different from above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change from table 0.8 meter to 1.5 meter (Above 18GHz the distance is 1 meter and table is 1.5 meter).
 - 2) Test the EUT in the lowest channel, middle channel, the Highest channel

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- 3) The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the Z axis positioning which it is worse case.
- 4) Repeat above procedures until all frequencies measured was complete.

Equipment Used: Refer to section 3 for details.

Test Result: Pass

The measurement data as follows:

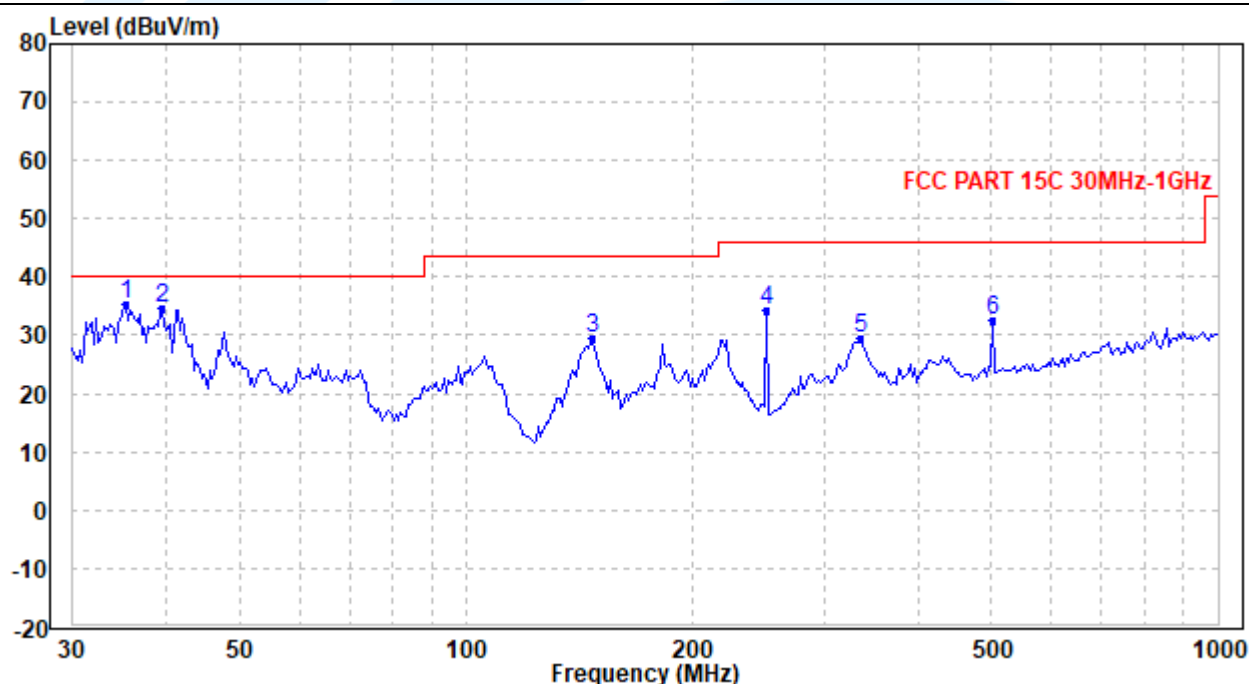
Radiated Emission Test Data (9 kHz ~ 30 MHz):

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Radiated Emission Test Data (30 MHz ~ 1 GHz):

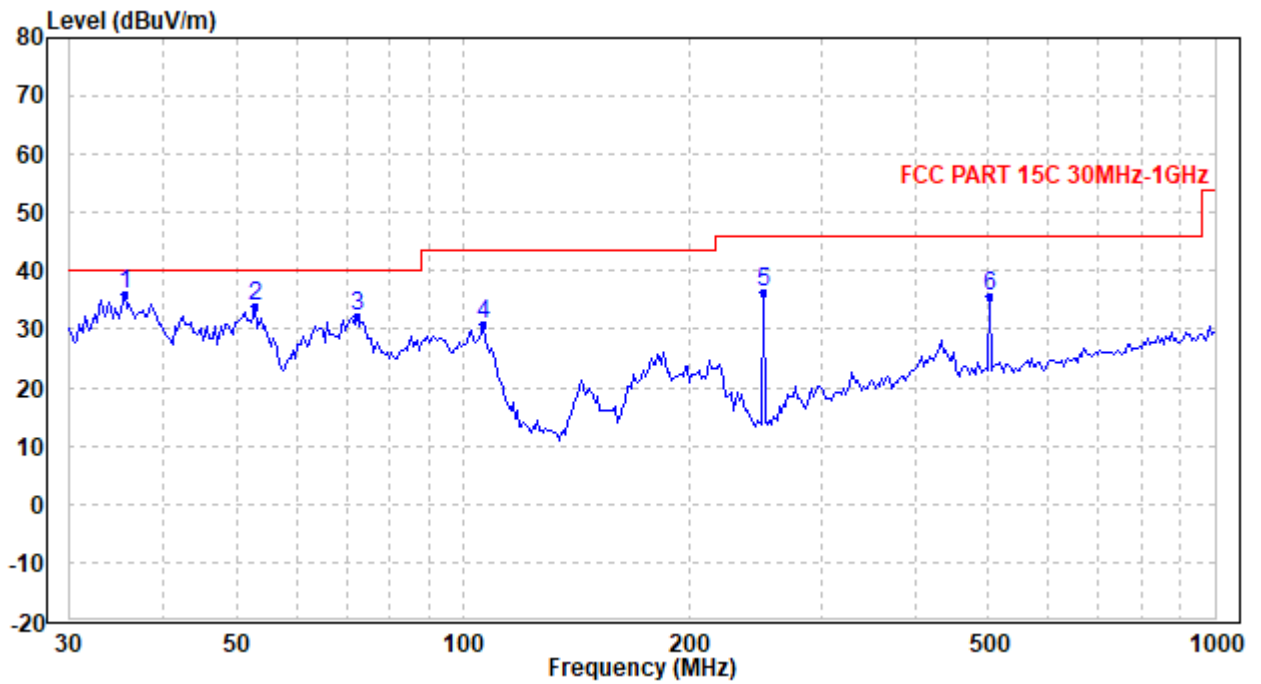
Worst-Case Configuration

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	35.263	42.45	-7.03	35.42	40.00	-4.58	QP
2	39.459	43.40	-8.86	34.54	40.00	-5.46	QP
3	146.839	44.19	-14.83	29.36	43.50	-14.14	QP
4	250.486	44.84	-10.61	34.23	46.00	-11.77	QP
5	334.126	36.63	-7.26	29.37	46.00	-16.63	QP
6	502.247	34.78	-2.26	32.52	46.00	-13.48	QP

Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	35.511	43.02	-7.08	35.94	40.00	-4.06	QP
2	53.006	49.04	-15.18	33.86	40.00	-6.14	QP
3	72.211	50.33	-18.18	32.15	40.00	-7.85	QP
4	106.281	46.46	-15.63	30.83	43.50	-12.67	QP
5	250.486	47.06	-10.61	36.45	46.00	-9.55	QP
6	502.247	38.00	-2.26	35.74	46.00	-10.26	QP

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Radiated Emission Test Data (Above 1GHz):

TX1_2.4G_B_2412 MHz 4824 MHz 7236 MHz								
1	4824	38.65	-2.07	36.58	54.00	-17.42	Average	Horizontal
2	4824	58.99	-2.07	56.92	74.00	-17.08	Peak	Horizontal
3	7236	44.81	1.30	46.11	54.00	-7.89	Average	Horizontal
4	7236	60.09	1.30	61.39	74.00	-12.61	Peak	Horizontal
5	4824	41.57	-2.07	39.50	54.00	-14.50	Average	Vertical
6	4824	66.16	-2.07	64.09	74.00	-9.91	Peak	Vertical
7	7236	41.14	1.30	42.44	54.00	-11.56	Average	Vertical
8	7236	61.08	1.30	62.38	74.00	-11.62	Peak	Vertical
TX1_2.4G_B_2437 MHz 4874 MHz 7311 MHz								
1	4874	38.23	-2.05	36.18	54.00	-17.82	Average	Horizontal
2	4874	55.44	-2.05	53.39	74.00	-20.61	Peak	Horizontal
3	7311	42.52	1.31	43.83	54.00	-10.17	Average	Horizontal
4	7311	59.10	1.31	60.41	74.00	-13.59	Peak	Horizontal
5	4874	39.16	-2.05	37.11	54.00	-16.89	Average	Vertical
6	4874	56.37	-2.05	54.32	74.00	-19.68	Peak	Vertical
7	7311	46.36	1.31	47.67	54.00	-6.33	Average	Vertical
8	7311	63.63	1.31	64.94	74.00	-9.06	Peak	Vertical
TX1_2.4G_B_2462 MHz 4924 MHz 7386 MHz								
1	4924	38.22	-2.03	36.19	54.00	-17.81	Average	Horizontal
2	4924	55.93	-2.03	53.90	74.00	-20.10	Peak	Horizontal
3	7386	43.82	1.31	45.13	54.00	-8.87	Average	Horizontal
4	7386	59.90	1.31	61.21	74.00	-12.79	Peak	Horizontal
5	4924	44.17	-2.03	42.14	54.00	-11.86	Average	Vertical
6	4924	62.70	-2.03	60.67	74.00	-13.33	Peak	Vertical
7	7386	49.92	1.31	51.23	54.00	-2.77	Average	Vertical
8	7386	67.27	1.31	68.58	74.00	-5.42	Peak	Vertical
TX1_2.4G_G_2412 MHz 4824 MHz 7236 MHz								
1	4824	36.98	-2.07	34.91	54.00	-19.09	Average	Horizontal
2	4824	48.39	-2.07	46.32	74.00	-27.68	Peak	Horizontal
3	7236	39.38	1.30	40.68	54.00	-13.32	Average	Horizontal
4	7236	55.80	1.30	57.10	74.00	-16.90	Peak	Horizontal
5	4824	39.57	-2.07	37.50	54.00	-16.50	Average	Vertical
6	4824	51.27	-2.07	49.20	74.00	-24.80	Peak	Vertical
7	7236	38.59	1.30	39.89	54.00	-14.11	Average	Vertical
8	7236	53.68	1.30	54.98	74.00	-19.02	Peak	Vertical
TX1_2.4G_G_2437 MHz 4874 MHz 7311 MHz								
1	4874	35.16	-2.05	33.11	54.00	-20.89	Average	Horizontal
2	4874	46.87	-2.05	44.82	74.00	-29.18	Peak	Horizontal
3	7311	41.44	1.31	42.75	54.00	-11.25	Average	Horizontal
4	7311	57.09	1.31	58.40	74.00	-15.60	Peak	Horizontal
5	4874	39.58	-2.05	37.53	54.00	-16.47	Average	Vertical
6	4874	50.54	-2.05	48.49	74.00	-25.51	Peak	Vertical
7	7311	44.39	1.31	45.70	54.00	-8.30	Average	Vertical
8	7311	59.86	1.31	61.17	74.00	-12.83	Peak	Vertical
TX1_2.4G_G_2462 MHz 4924 MHz 7386 MHz								
1	4924	39.67	-2.03	37.64	54.00	-16.36	Average	Horizontal
2	4924	51.10	-2.03	49.07	74.00	-24.93	Peak	Horizontal
3	7386	44.07	1.31	45.38	54.00	-8.62	Average	Horizontal
4	7386	58.90	1.31	60.21	74.00	-13.79	Peak	Horizontal
5	4924	38.64	-2.03	36.61	54.00	-17.39	Average	Vertical
6	4924	50.91	-2.03	48.88	74.00	-25.12	Peak	Vertical
7	7386	47.72	1.31	49.03	54.00	-4.97	Average	Vertical
8	7386	64.44	1.31	65.75	74.00	-8.25	Peak	Vertical
TX2_2.4G_B_2412 MHz 4824 MHz 7236 MHz								
1	4824	44.71	-2.07	42.64	54.00	-11.36	Average	Horizontal

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2	4824	58.58	-2.07	56.51	74.00	-17.49	Peak	Horizontal
3	7236	39.63	1.30	40.93	54.00	-13.07	Average	Horizontal
4	7236	54.99	1.30	56.29	74.00	-17.71	Peak	Horizontal
5	4824	46.76	-2.07	44.69	54.00	-9.31	Average	Vertical
6	4824	64.10	-2.07	62.03	74.00	-11.97	Peak	Vertical
7	7236	34.88	1.30	36.18	54.00	-17.82	Average	Vertical
8	7236	46.87	1.30	48.17	74.00	-25.83	Peak	Vertical
TX2 2.4G B 2437 MHz 4874 MHz 7311 MHz								
1	4874	42.04	-2.05	39.99	54.00	-14.01	Average	Horizontal
2	4874	60.37	-2.05	58.32	74.00	-15.68	Peak	Horizontal
3	7311	41.36	1.31	42.67	54.00	-11.33	Average	Horizontal
4	7311	55.05	1.31	56.36	74.00	-17.64	Peak	Horizontal
5	4874	42.64	-2.05	40.59	54.00	-13.41	Average	Vertical
6	4874	60.64	-2.05	58.59	74.00	-15.41	Peak	Vertical
7	7311	44.12	1.31	45.43	54.00	-8.57	Average	Vertical
8	7311	60.71	1.31	62.02	74.00	-11.98	Peak	Vertical
TX2 2.4G B 2462 MHz 4924 MHz 7386 MHz								
1	4924	41.18	-2.03	39.15	54.00	-14.85	Average	Horizontal
2	4924	58.71	-2.03	56.68	74.00	-17.32	Peak	Horizontal
3	7386	39.59	1.31	40.90	54.00	-13.10	Average	Horizontal
4	7386	55.81	1.31	57.12	74.00	-16.88	Peak	Horizontal
5	4924	40.05	-2.03	38.02	54.00	-15.98	Average	Vertical
6	4924	57.62	-2.03	55.59	74.00	-18.41	Peak	Vertical
7	7386	38.47	1.31	39.78	54.00	-14.22	Average	Vertical
8	7386	53.19	1.31	54.50	74.00	-19.50	Peak	Vertical
TX2 2.4G G 2412 MHz 4824 MHz 7236 MHz								
1	4824	42.77	-2.07	40.70	54.00	-13.30	Average	Horizontal
2	4824	54.78	-2.07	52.71	74.00	-21.29	Peak	Horizontal
3	7236	38.54	1.30	39.84	54.00	-14.16	Average	Horizontal
4	7236	52.04	1.30	53.34	74.00	-20.66	Peak	Horizontal
5	4824	45.09	-2.07	43.02	54.00	-10.98	Average	Vertical
6	4824	59.79	-2.07	57.72	74.00	-16.28	Peak	Vertical
7	7236	37.39	1.30	38.69	54.00	-15.31	Average	Vertical
8	7236	51.25	1.30	52.55	74.00	-21.45	Peak	Vertical
TX2 2.4G G 2437 MHz 4874 MHz 7311 MHz								
1	4874	41.72	-2.05	39.67	54.00	-14.33	Average	Horizontal
2	4874	54.87	-2.05	52.82	74.00	-21.18	Peak	Horizontal
3	7311	39.44	1.31	40.75	54.00	-13.25	Average	Horizontal
4	7311	54.50	1.31	55.81	74.00	-18.19	Peak	Horizontal
5	4874	43.09	-2.05	41.04	54.00	-12.96	Average	Vertical
6	4874	56.48	-2.05	54.43	74.00	-19.57	Peak	Vertical
7	7311	35.63	1.31	36.94	54.00	-17.06	Average	Vertical
8	7311	48.20	1.31	49.51	74.00	-24.49	Peak	Vertical
TX2 2.4G G 2462 MHz 4924 MHz 7386 MHz								
1	4924	41.07	-2.03	39.04	54.00	-14.96	Average	Horizontal
2	4924	52.41	-2.03	50.38	74.00	-23.62	Peak	Horizontal
3	7386	39.12	1.31	40.43	54.00	-13.57	Average	Horizontal
4	7386	51.84	1.31	53.15	74.00	-20.85	Peak	Horizontal
5	4924	39.61	-2.03	37.58	54.00	-16.42	Average	Vertical
6	4924	52.63	-2.03	50.60	74.00	-23.40	Peak	Vertical
7	7386	37.66	1.31	38.97	54.00	-15.03	Average	Vertical
8	7386	51.85	1.31	53.16	74.00	-20.84	Peak	Vertical

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TX1&TX2 2.4G N20 2412 MHz 4824 MHz 7236 MHz								
1	4824	38.97	-2.07	36.90	54.00	-17.10	Average	Horizontal
2	4824	50.59	-2.07	48.52	74.00	-25.48	Peak	Horizontal
3	7236	37.52	1.30	38.82	54.00	-15.18	Average	Horizontal
4	7236	51.64	1.30	52.94	74.00	-21.06	Peak	Horizontal
5	4824	45.89	-2.07	43.82	54.00	-10.18	Average	Vertical
6	4824	59.01	-2.07	56.94	74.00	-17.06	Peak	Vertical
7	7236	40.02	1.30	41.32	54.00	-12.68	Average	Vertical
8	7236	56.83	1.30	58.13	74.00	-15.87	Peak	Vertical
TX1&TX2 2.4G N20 2437 MHz 4874 MHz 7311 MHz								
1	4874	39.19	-2.05	37.14	54.00	-16.86	Average	Horizontal
2	4874	52.42	-2.05	50.37	74.00	-23.63	Peak	Horizontal
3	7311	41.87	1.31	43.18	54.00	-10.82	Average	Horizontal
4	7311	56.34	1.31	57.65	74.00	-16.35	Peak	Horizontal
5	4874	45.96	-2.05	43.91	54.00	-10.09	Average	Vertical
6	4874	58.63	-2.05	56.58	74.00	-17.42	Peak	Vertical
7	7311	44.25	1.31	45.56	54.00	-8.44	Average	Vertical
8	7311	60.11	1.31	61.42	74.00	-12.58	Peak	Vertical
TX1&TX2 2.4G N20 2462 MHz 4924 MHz 7386 MHz								
1	4924	39.00	-2.03	36.97	54.00	-17.03	Average	Horizontal
2	4924	51.69	-2.03	49.66	74.00	-24.34	Peak	Horizontal
3	7386	42.36	1.31	43.67	54.00	-10.33	Average	Horizontal
4	7386	57.93	1.31	59.24	74.00	-14.76	Peak	Horizontal
5	4924	44.55	-2.03	42.52	54.00	-11.48	Average	Vertical
6	4924	57.57	-2.03	55.54	74.00	-18.46	Peak	Vertical
7	7386	46.05	1.31	47.36	54.00	-6.64	Average	Vertical
8	7386	63.05	1.31	64.36	74.00	-9.64	Peak	Vertical
TX1&TX2 2.4G N40 2422 MHz 4844 MHz 7266 MHz								
1	4844	37.83	-2.06	35.77	54.00	-18.23	Average	Horizontal
2	4844	49.71	-2.06	47.65	74.00	-26.35	Peak	Horizontal
3	7266	40.40	1.31	41.71	54.00	-12.29	Average	Horizontal
4	7266	53.95	1.31	55.26	74.00	-18.74	Peak	Horizontal
5	4844	38.48	-2.06	36.42	54.00	-17.58	Average	Vertical
6	4844	49.95	-2.06	47.89	74.00	-26.11	Peak	Vertical
7	7266	41.60	1.31	42.91	54.00	-11.09	Average	Vertical
8	7266	54.27	1.31	55.58	74.00	-18.42	Peak	Vertical
TX1&TX2 2.4G N40 2437 MHz 4874 MHz 7311 MHz								
1	4874	38.18	-2.05	36.13	54.00	-17.87	Average	Horizontal
2	4874	50.01	-2.05	47.96	74.00	-26.04	Peak	Horizontal
3	7311	41.03	1.31	42.34	54.00	-11.66	Average	Horizontal
4	7311	52.66	1.31	53.97	74.00	-20.03	Peak	Horizontal
5	4874	44.45	-2.05	42.40	54.00	-11.60	Average	Vertical
6	4874	55.89	-2.05	53.84	74.00	-20.16	Peak	Vertical
7	7311	43.24	1.31	44.55	54.00	-9.45	Average	Vertical
8	7311	56.85	1.31	58.16	74.00	-15.84	Peak	Vertical
TX1&TX2 2.4G N40 2452 MHz 4904 MHz 7356 MHz								
1	4904	37.85	-2.04	35.81	54.00	-18.19	Average	Horizontal
2	4904	49.43	-2.04	47.39	74.00	-26.61	Peak	Horizontal
3	7356	40.64	1.31	41.95	54.00	-12.05	Average	Horizontal
4	7356	53.61	1.31	54.92	74.00	-19.08	Peak	Horizontal
5	4904	42.98	-2.04	40.94	54.00	-13.06	Average	Vertical
6	4904	54.22	-2.04	52.18	74.00	-21.82	Peak	Vertical
7	7356	42.69	1.31	44.00	54.00	-10.00	Average	Vertical
8	7356	56.22	1.31	57.53	74.00	-16.47	Peak	Vertical

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TX1&TX2 2.4G AX20 2412 MHz			4824 MHz	7236 MHz				
1	4824	43.23	-2.07	41.16	54.00	-12.84	Average	Horizontal
2	4824	55.01	-2.07	52.94	74.00	-21.06	Peak	Horizontal
3	7236	39.71	1.30	41.01	54.00	-12.99	Average	Horizontal
4	7236	56.26	1.30	57.56	74.00	-16.44	Peak	Horizontal
5	4824	45.92	-2.07	43.85	54.00	-10.15	Average	Vertical
6	4824	60.38	-2.07	58.31	74.00	-15.69	Peak	Vertical
7	7236	39.90	1.30	41.20	54.00	-12.80	Average	Vertical
8	7236	58.29	1.30	59.59	74.00	-14.41	Peak	Vertical
TX1&TX2 2.4G AX20 2437 MHz			4874 MHz	7311 MHz				
1	4874	42.49	-2.05	40.44	54.00	-13.56	Average	Horizontal
2	4874	56.82	-2.05	54.77	74.00	-19.23	Peak	Horizontal
3	7311	42.00	1.31	43.31	54.00	-10.69	Average	Horizontal
4	7311	57.15	1.31	58.46	74.00	-15.54	Peak	Horizontal
5	4874	45.41	-2.05	43.36	54.00	-10.64	Average	Vertical
6	4874	59.19	-2.05	57.14	74.00	-16.86	Peak	Vertical
7	7311	44.26	1.31	45.57	54.00	-8.43	Average	Vertical
8	7311	60.82	1.31	62.13	74.00	-11.87	Peak	Vertical
TX1&TX2 2.4G AX20 2462 MHz			4924 MHz	7386 MHz				
1	4924	40.53	-2.03	38.50	54.00	-15.50	Average	Horizontal
2	4924	54.20	-2.03	52.17	74.00	-21.83	Peak	Horizontal
3	7386	41.91	1.31	43.22	54.00	-10.78	Average	Horizontal
4	7386	56.30	1.31	57.61	74.00	-16.39	Peak	Horizontal
5	4924	41.26	-2.03	39.23	54.00	-14.77	Average	Vertical
6	4924	53.89	-2.03	51.86	74.00	-22.14	Peak	Vertical
7	7386	43.65	1.31	44.96	54.00	-9.04	Average	Vertical
8	7386	58.71	1.31	60.02	74.00	-13.98	Peak	Vertical
TX1&TX2 2.4G AX40 2422 MHz			4844 MHz	7266 MHz				
1	4844	40.98	-2.06	38.92	54.00	-15.08	Average	Horizontal
2	4844	53.95	-2.06	51.89	74.00	-22.11	Peak	Horizontal
3	7266	39.04	1.31	40.35	54.00	-13.65	Average	Horizontal
4	7266	51.12	1.31	52.43	74.00	-21.57	Peak	Horizontal
5	4844	41.66	-2.06	39.60	54.00	-14.40	Average	Vertical
6	4844	52.87	-2.06	50.81	74.00	-23.19	Peak	Vertical
7	7266	40.13	1.31	41.44	54.00	-12.56	Average	Vertical
8	7266	55.04	1.31	56.35	74.00	-17.65	Peak	Vertical
TX1&TX2 2.4G AX40 2437 MHz			4874 MHz	7311 MHz				
1	4874	40.31	-2.05	38.26	54.00	-15.74	Average	Horizontal
2	4874	53.04	-2.05	50.99	74.00	-23.01	Peak	Horizontal
3	7311	41.05	1.31	42.36	54.00	-11.64	Average	Horizontal
4	7311	55.97	1.31	57.28	74.00	-16.72	Peak	Horizontal
5	4874	41.98	-2.05	39.93	54.00	-14.07	Average	Vertical
6	4874	55.98	-2.05	53.93	74.00	-20.07	Peak	Vertical
7	7311	42.30	1.31	43.61	54.00	-10.39	Average	Vertical
8	7311	56.91	1.31	58.22	74.00	-15.78	Peak	Vertical
TX1&TX2 2.4G AX40 2452 MHz			4904 MHz	7356 MHz				
1	4904	38.82	-2.04	36.78	54.00	-17.22	Average	Horizontal
2	4904	51.26	-2.04	49.22	74.00	-24.78	Peak	Horizontal
3	7356	40.86	1.31	42.17	54.00	-11.83	Average	Horizontal
4	7356	54.10	1.31	55.41	74.00	-18.59	Peak	Horizontal
5	4904	42.26	-2.04	40.22	54.00	-13.78	Average	Vertical
6	4904	56.22	-2.04	54.18	74.00	-19.82	Peak	Vertical
7	7356	42.45	1.31	43.76	54.00	-10.24	Average	Vertical
8	7356	59.26	1.31	60.57	74.00	-13.43	Peak	Vertical

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Remark:

1. Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Limit – Result



5.8 BAND EDGE MEASUREMENTS (RADIATED)

Test Requirement: FCC 47 CFR Part 15 Subpart C Section 15.205/15.209

Test Method: ANSI C63.10-2020 Clause 11.13

Limits:

Radiated emissions which fall in the restricted bands, as defined in section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a).

Frequency	Limit (dBμV/m @3m)	Remark
30 MHz-88 MHz	40.0	Quasi-peak Value
88 MHz-216 MHz	43.5	Quasi-peak Value
216 MHz-960 MHz	46.0	Quasi-peak Value
960 MHz-1 GHz	54.0	Quasi-peak Value
Above 1 GHz	54.0	Average Value
	74.0	Peak Value

Test Setup: Refer to section 4.5.1 for details.

Test Procedures:

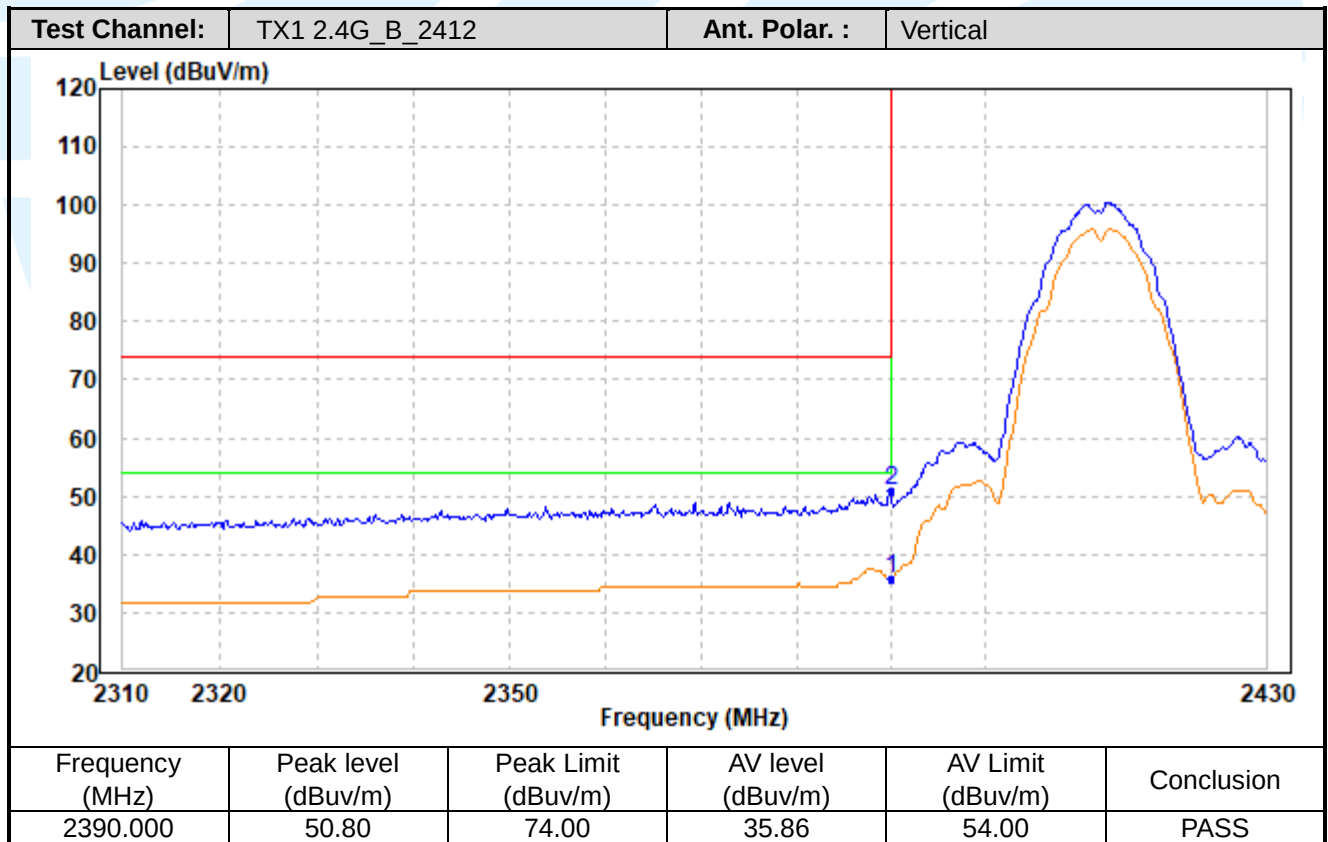
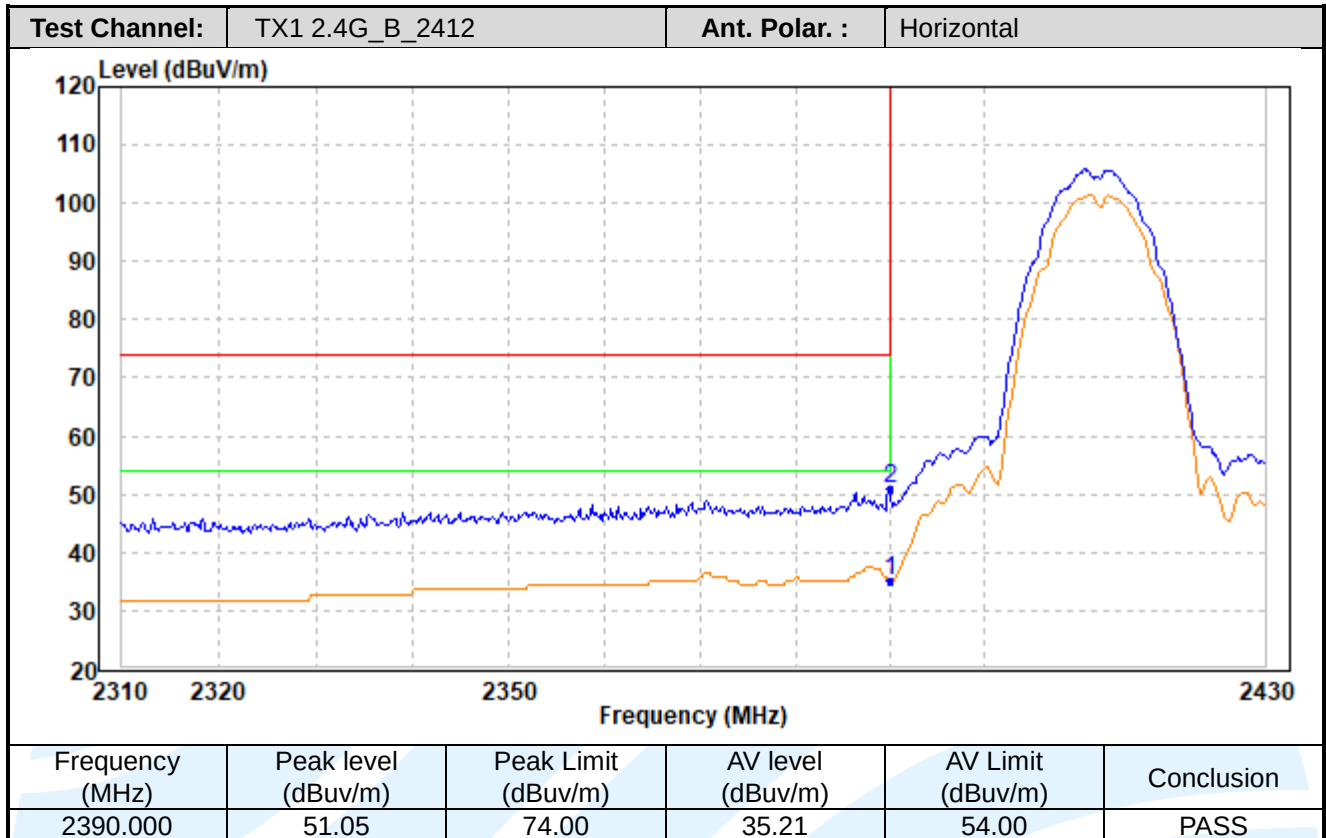
Radiated band edge measurements at 2390 MHz and 2483.5 MHz were made with the unit transmitting in the low end of the channel range and the high end closest to the restricted bands respectively. The emissions were made on the 966 Semi-Chamber. Use (resolution bandwidth (RBW) = 1 MHz, video bandwidth (VBW) = 3 MHz for peak levels and RBW = 1 MHz and VBW = 10 Hz or 1/T for average levels).

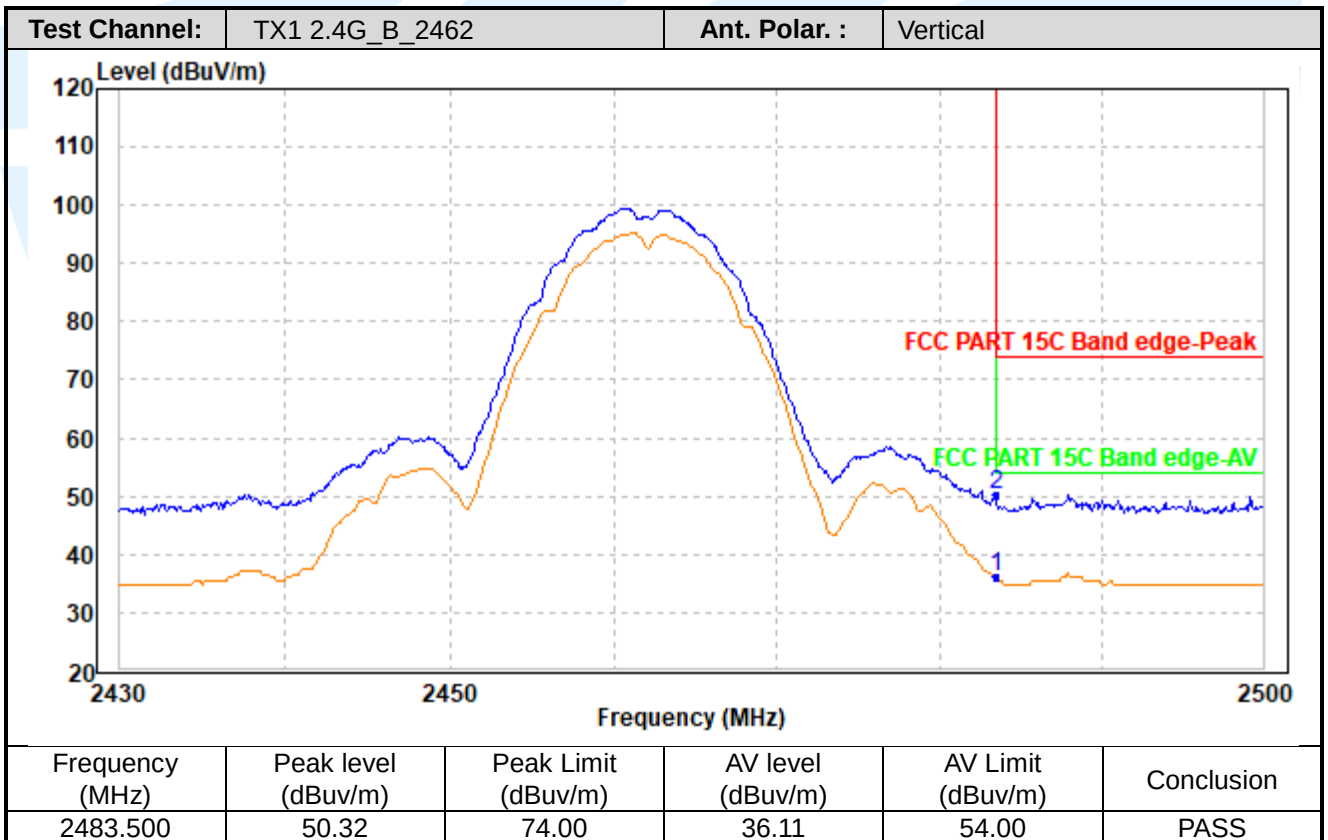
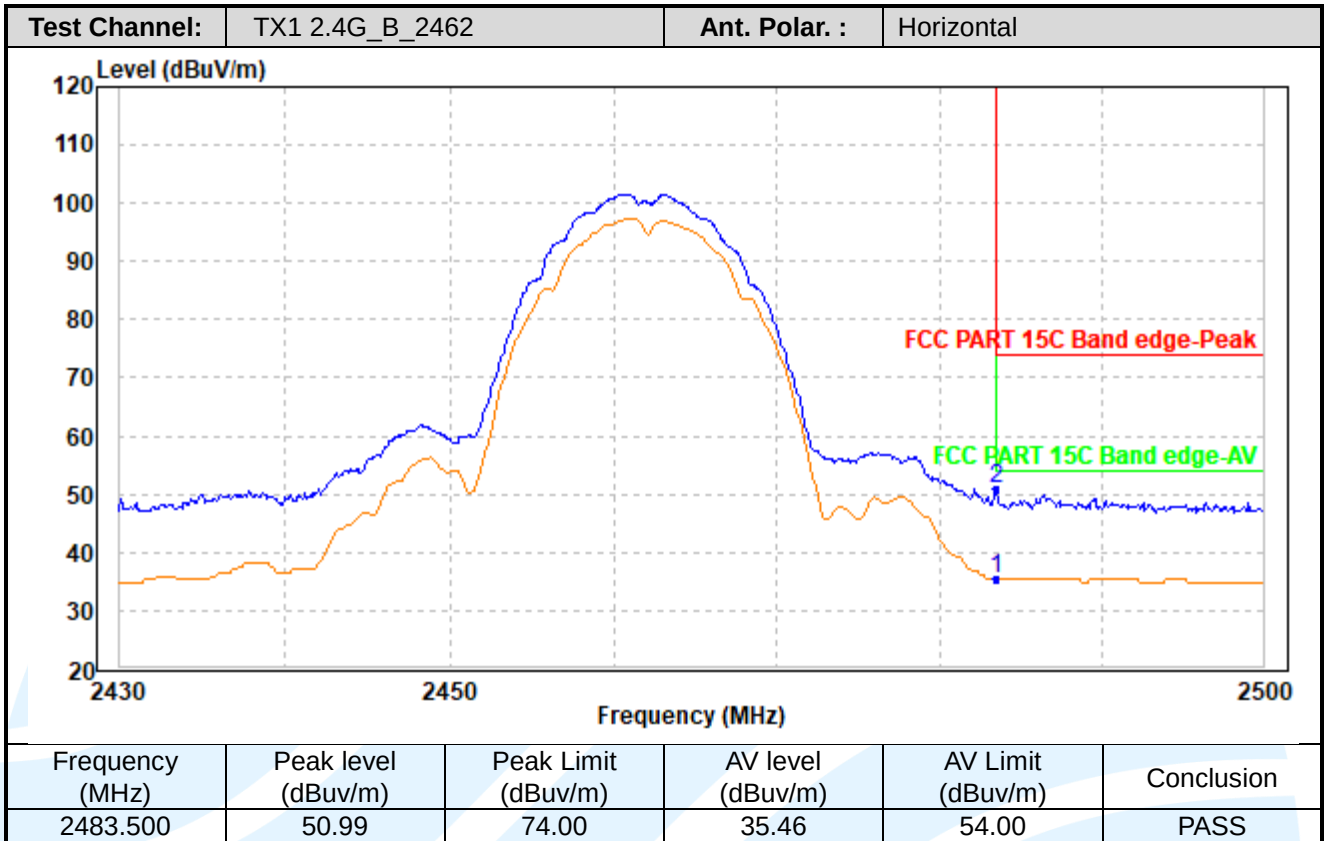
1. Use radiated spurious emission test procedure described in clause 5.7. The transmitter output (antenna port) was connected to the test receiver.
2. Set the PK and AV limit line.
3. Record the fundamental emission and emissions out of the band-edge.
4. Determine band-edge compliance as required.

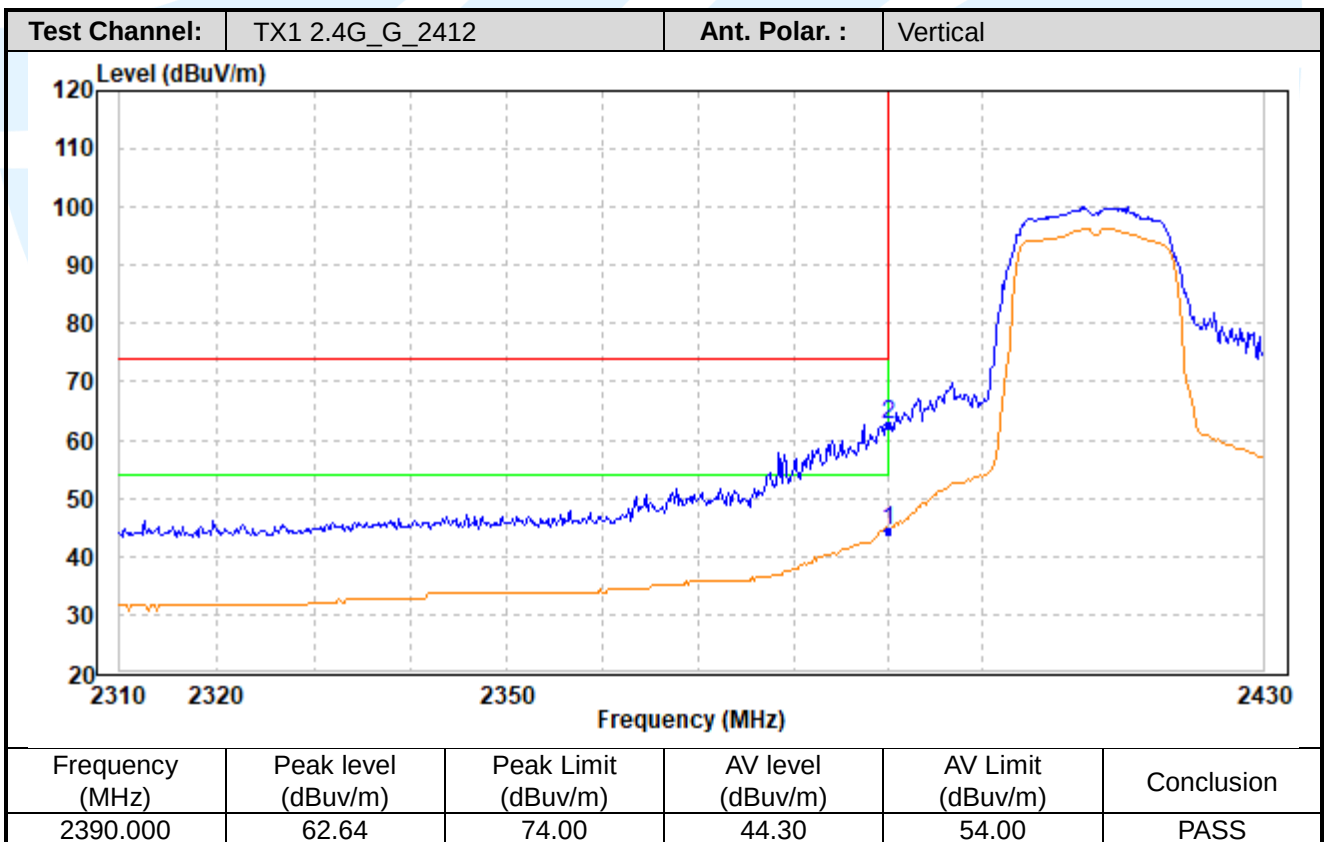
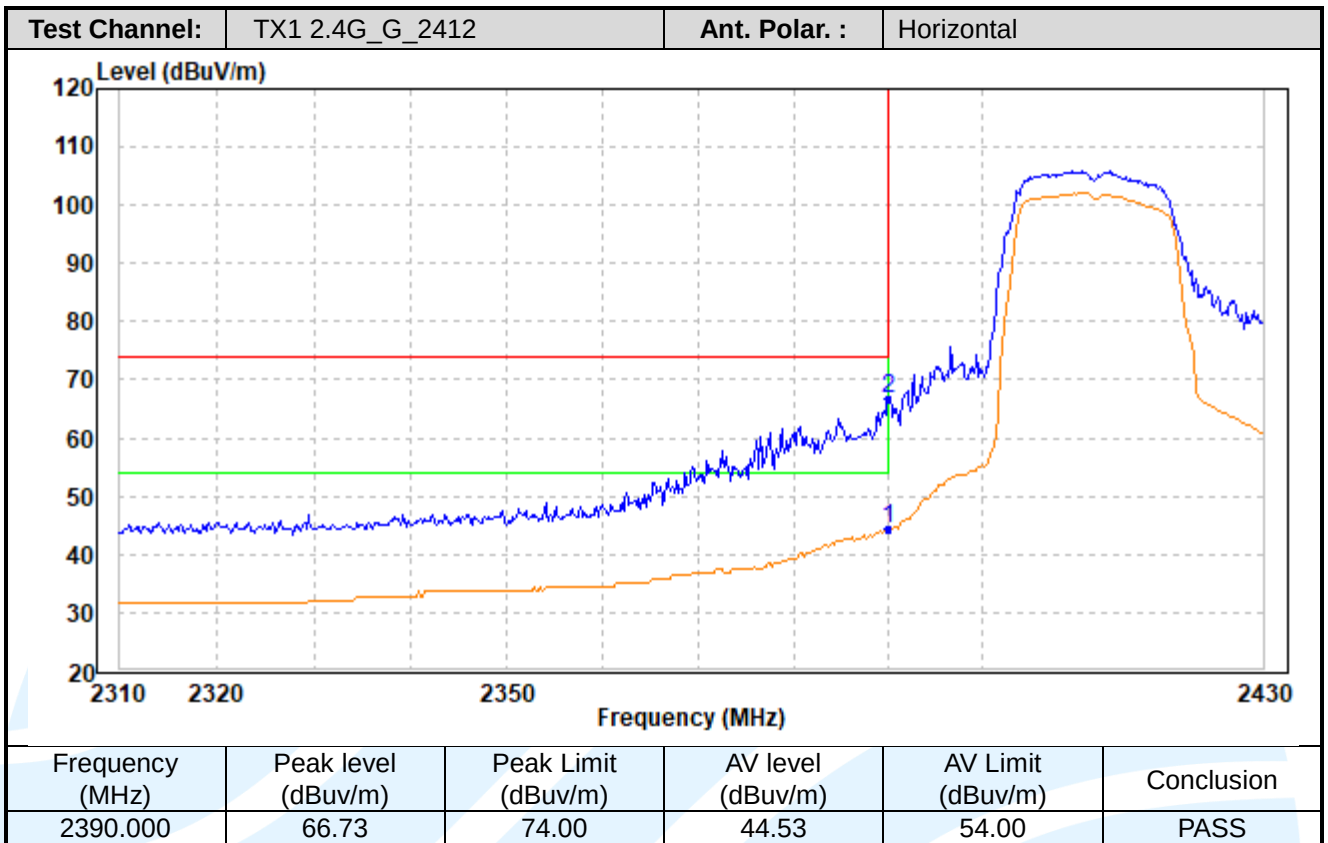
Equipment Used: Refer to section 3 for details.

Test Result: Pass

The measurement data as follows:







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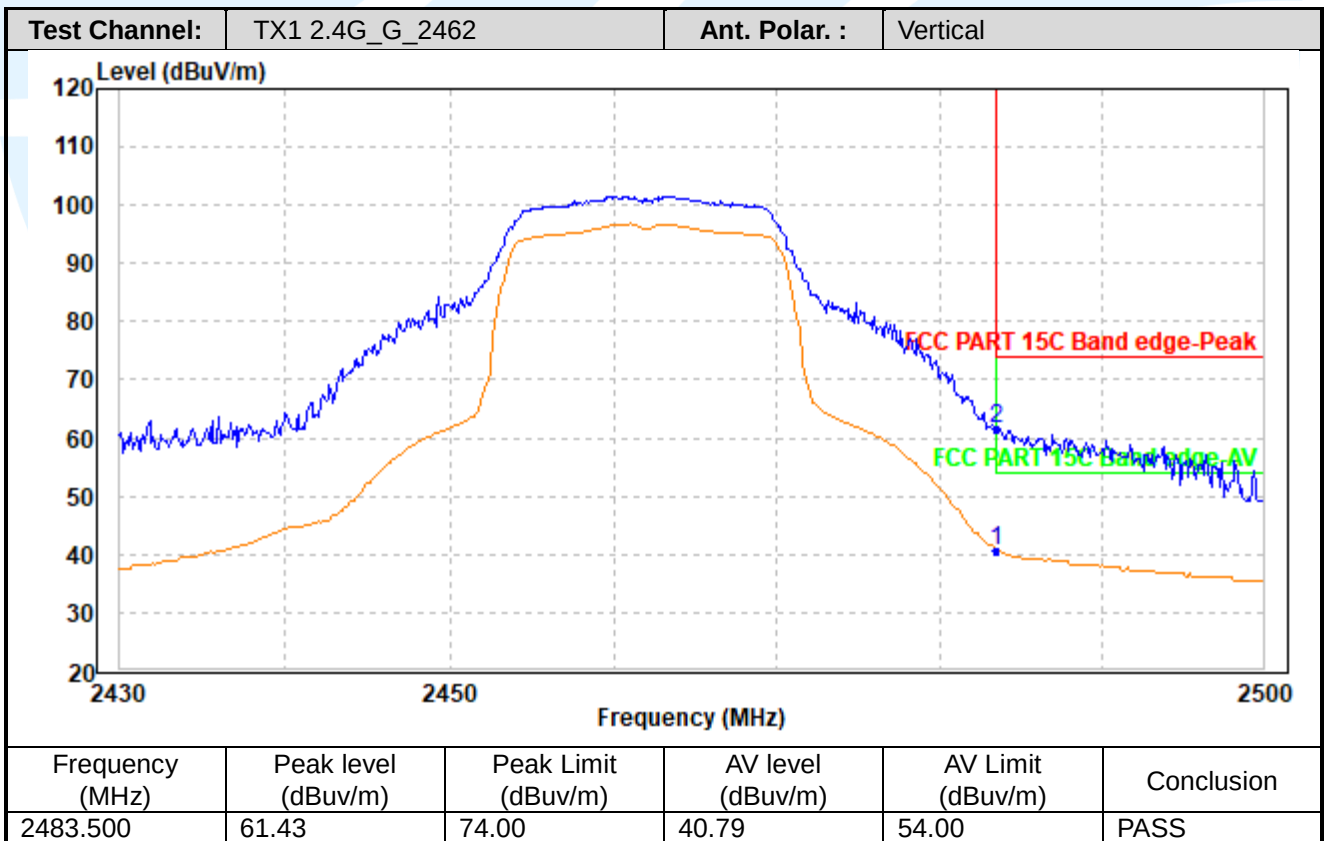
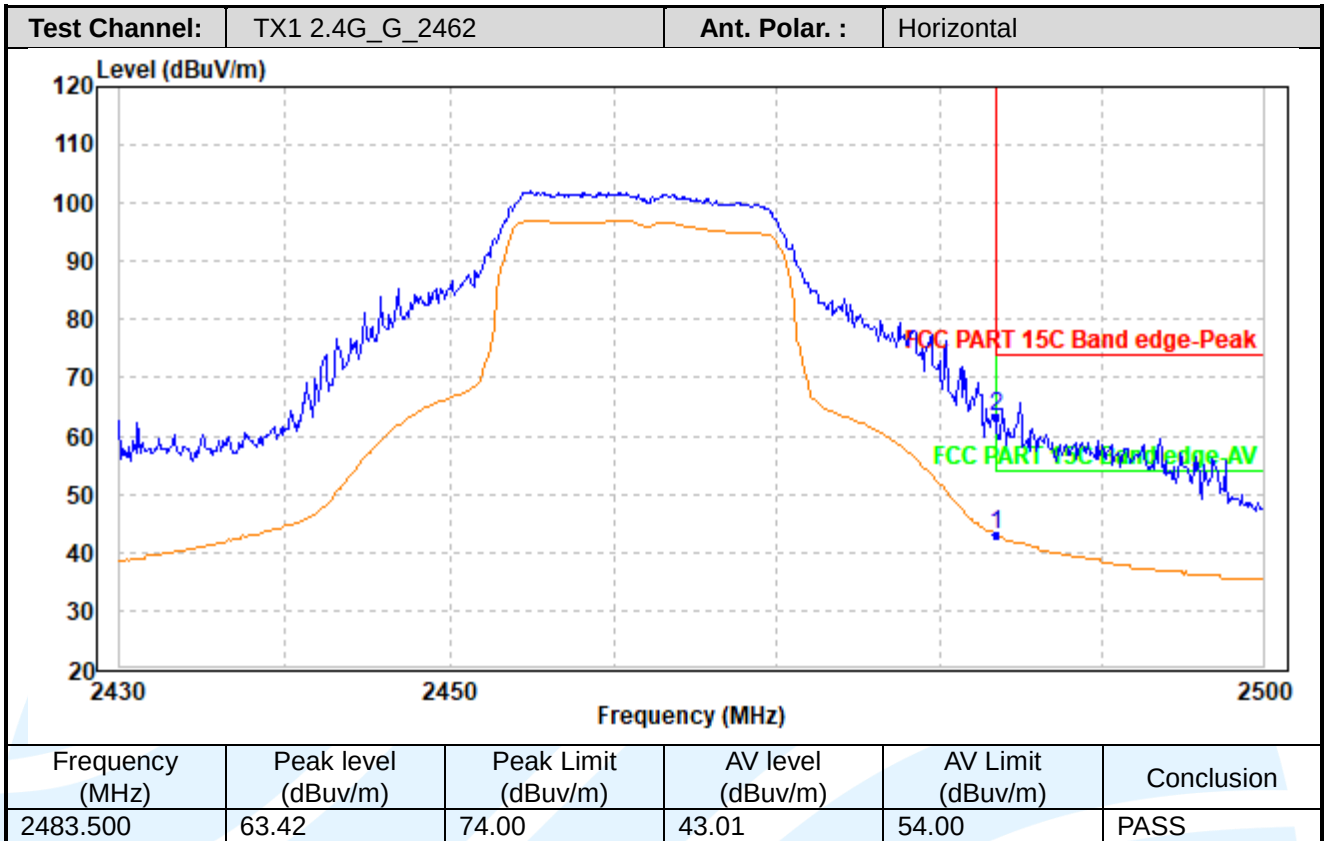
Tel: +86-755-28230888

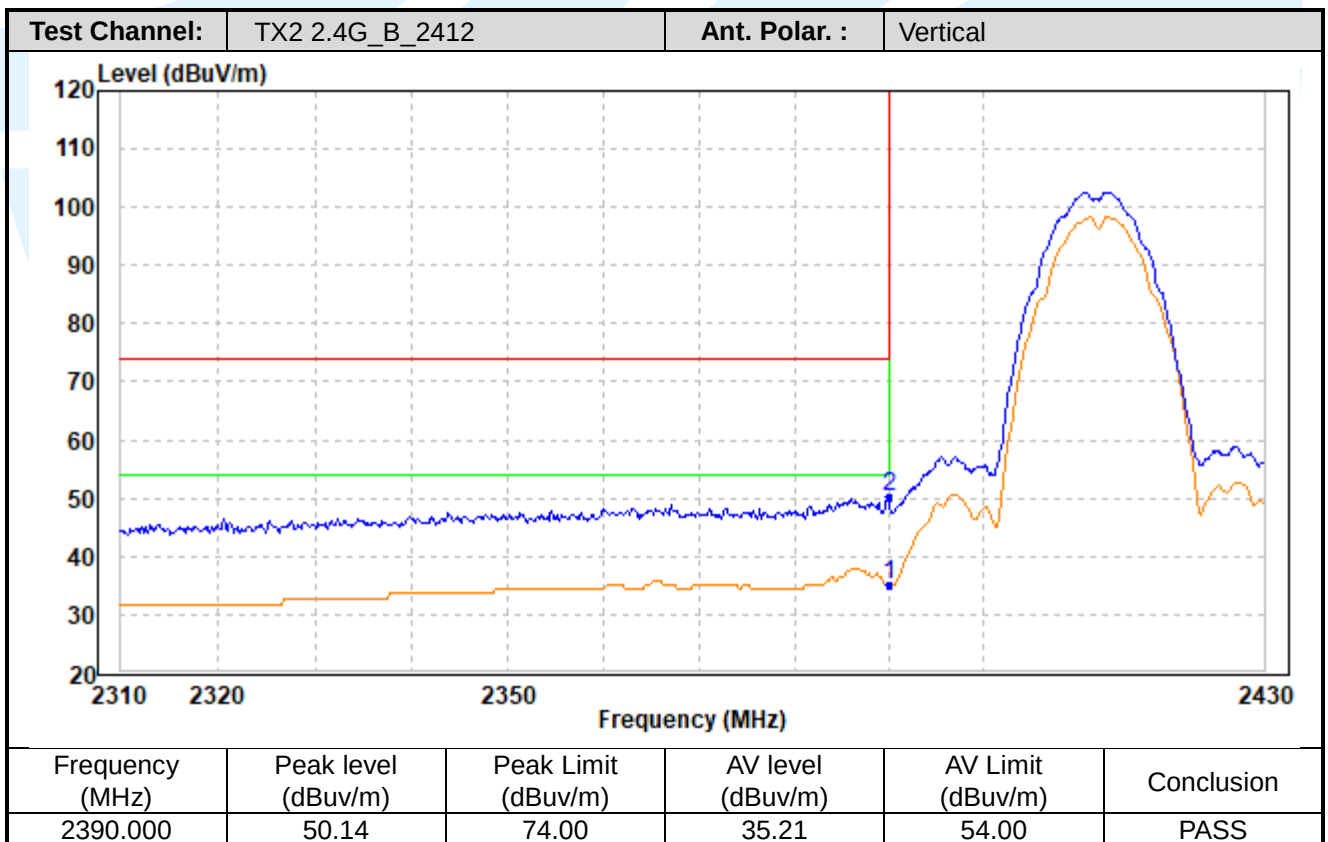
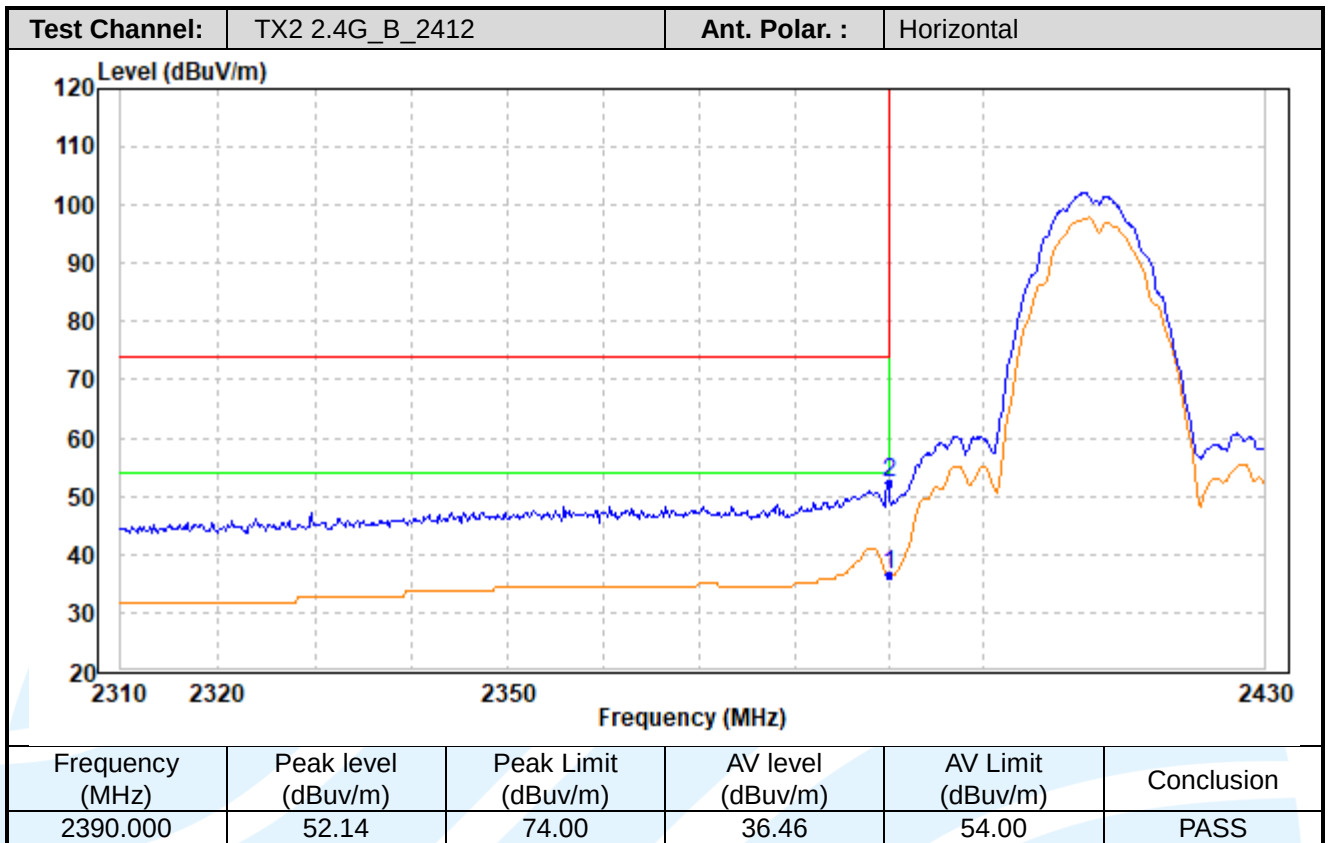
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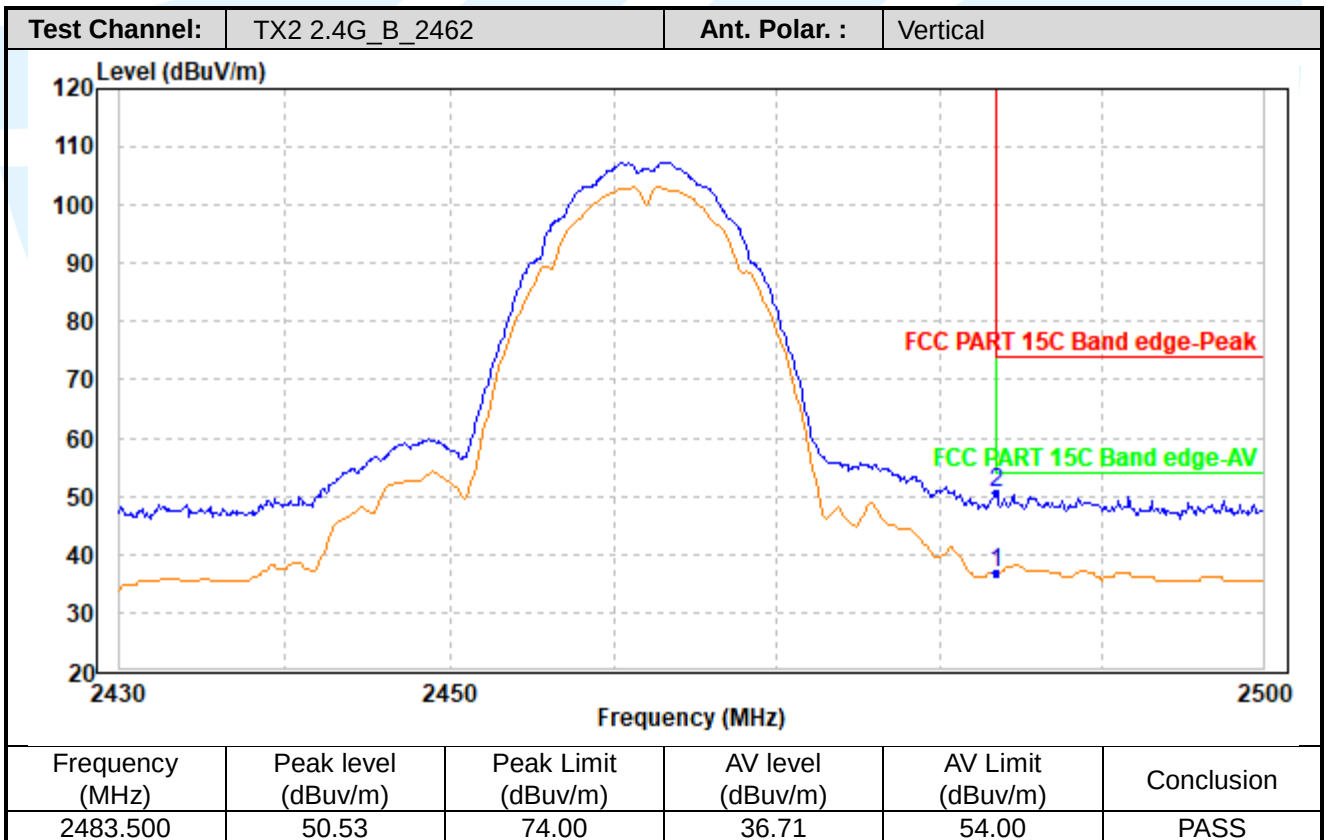
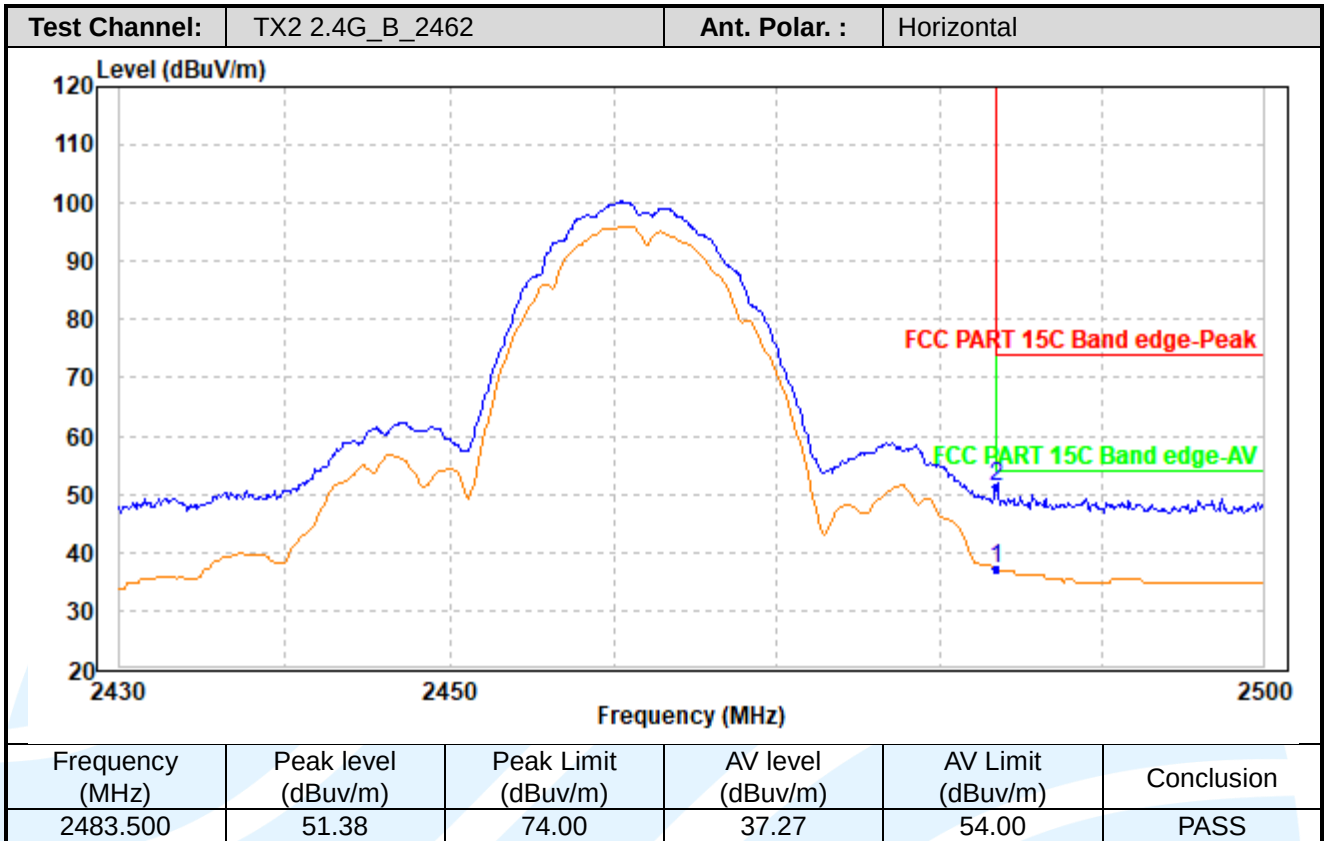
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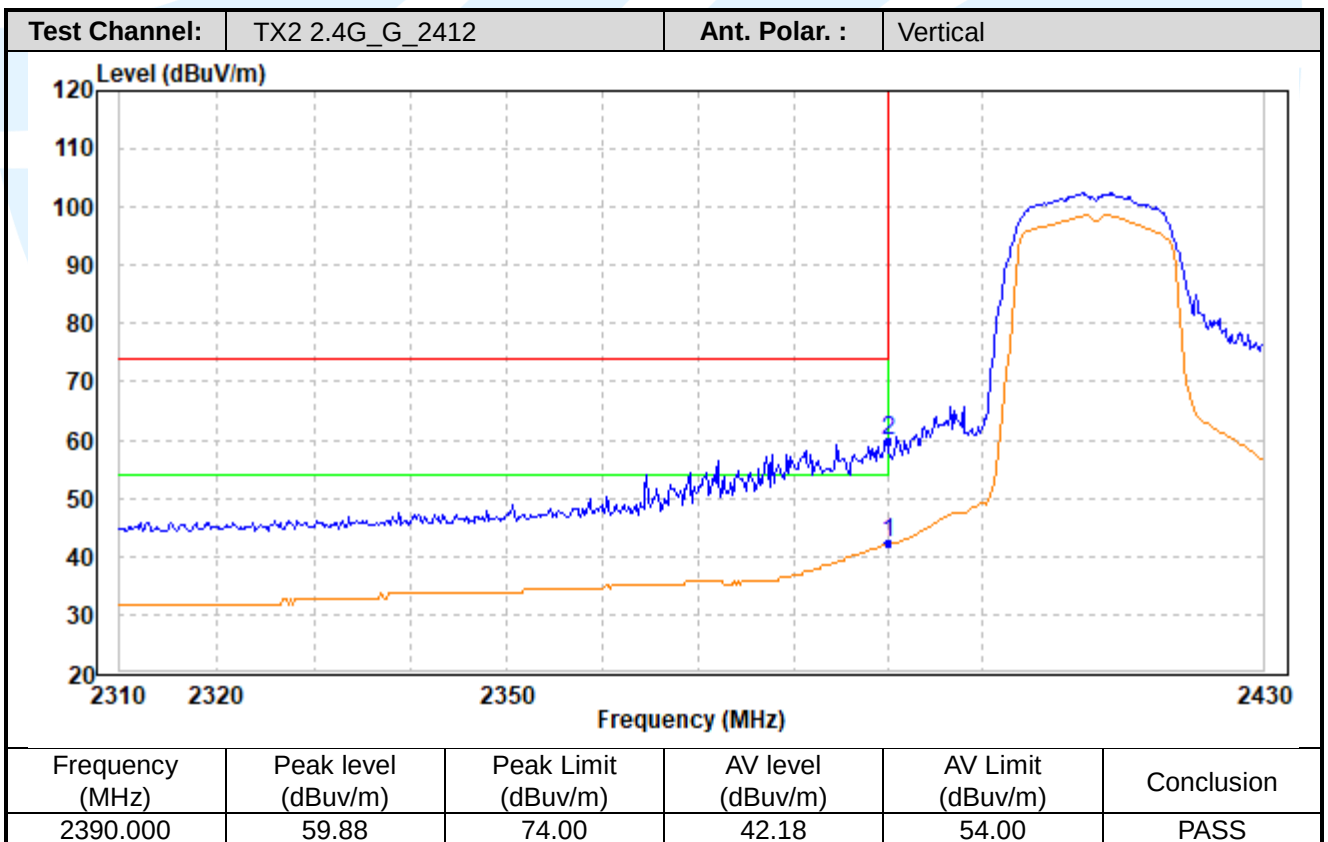
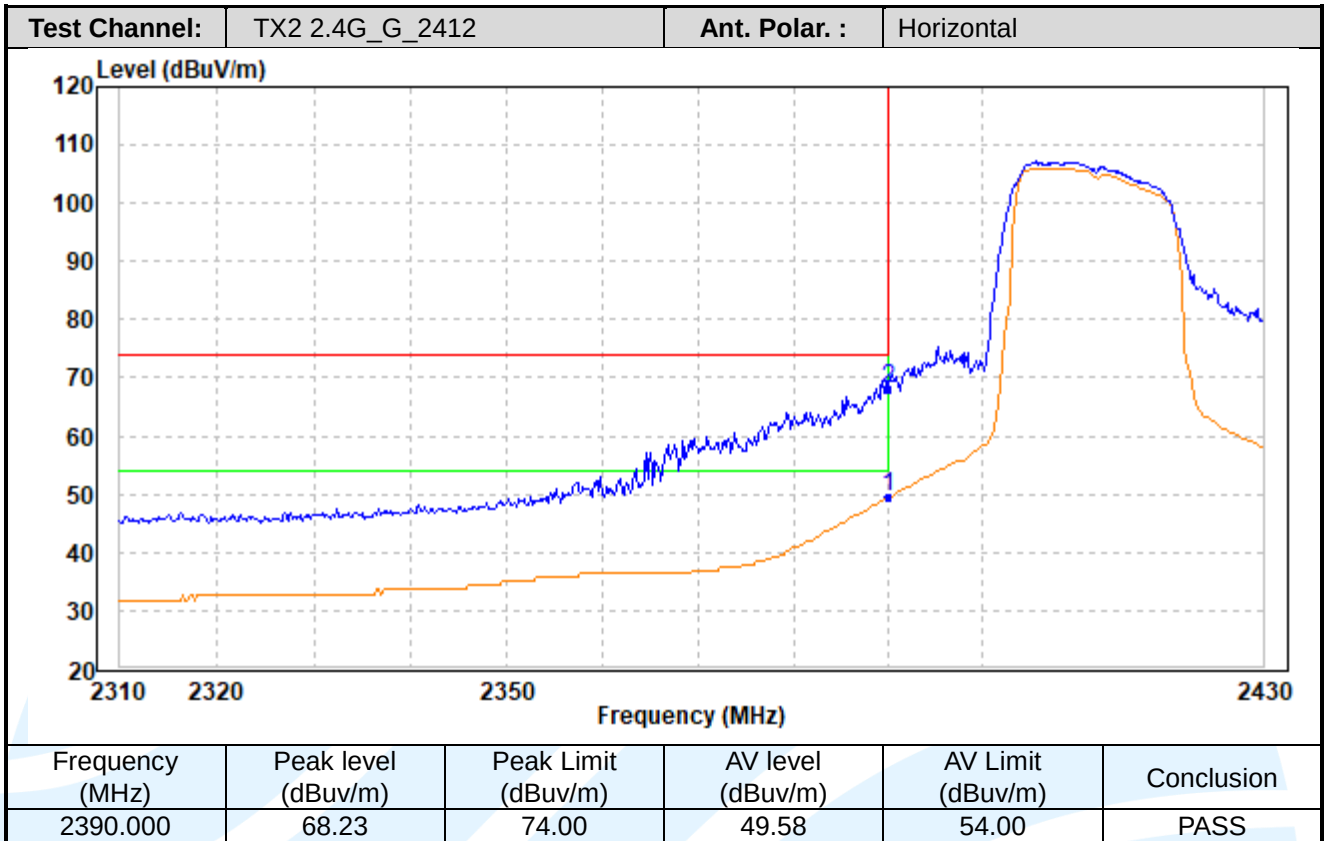
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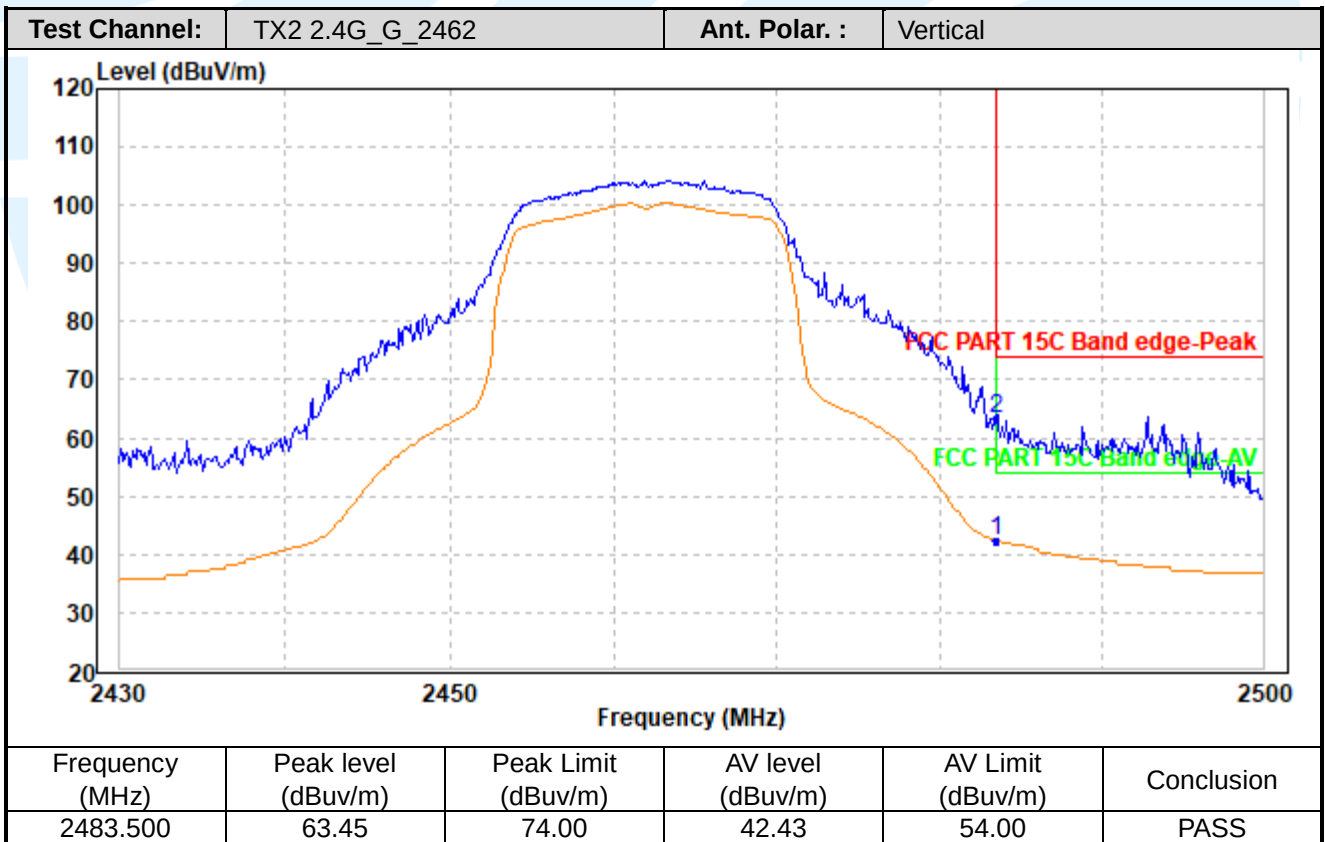
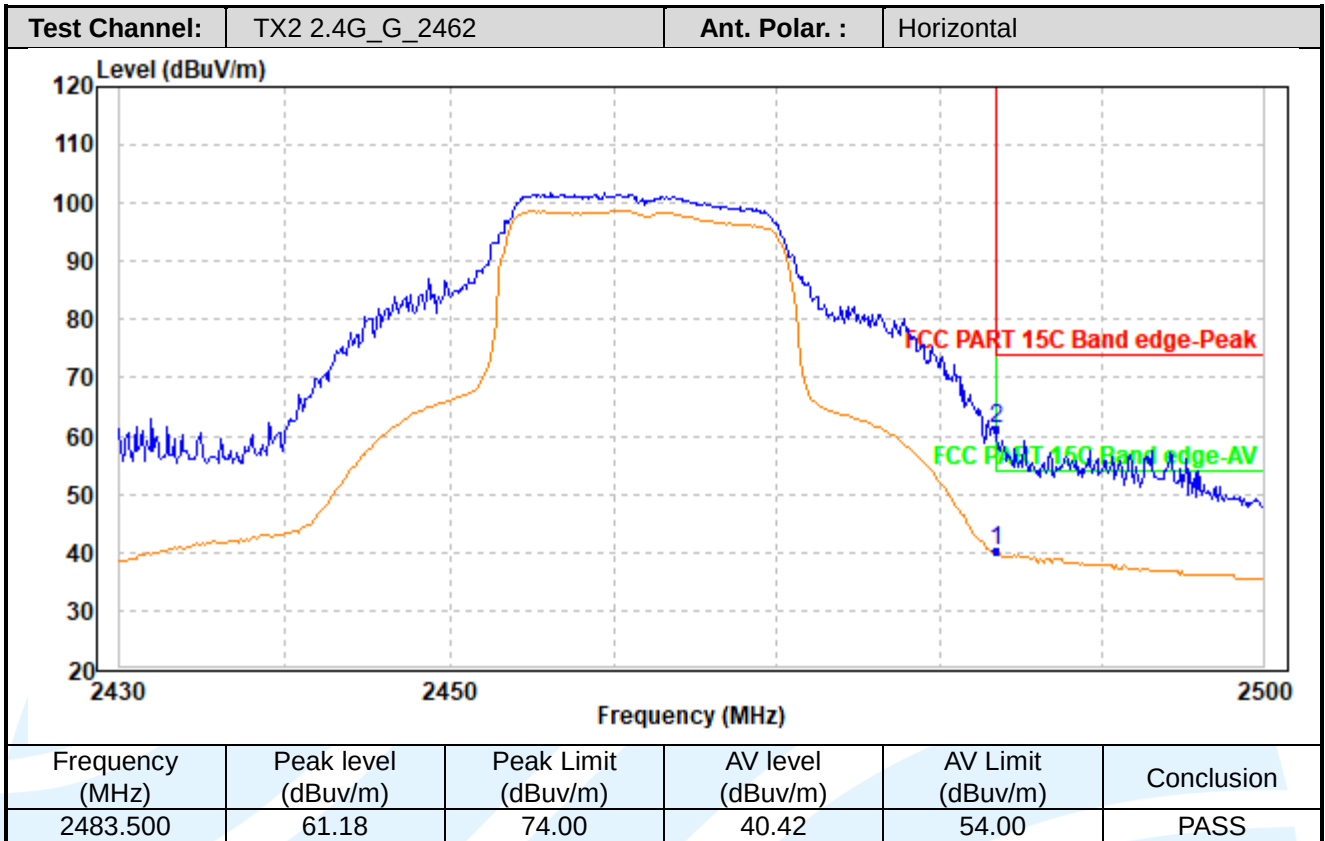
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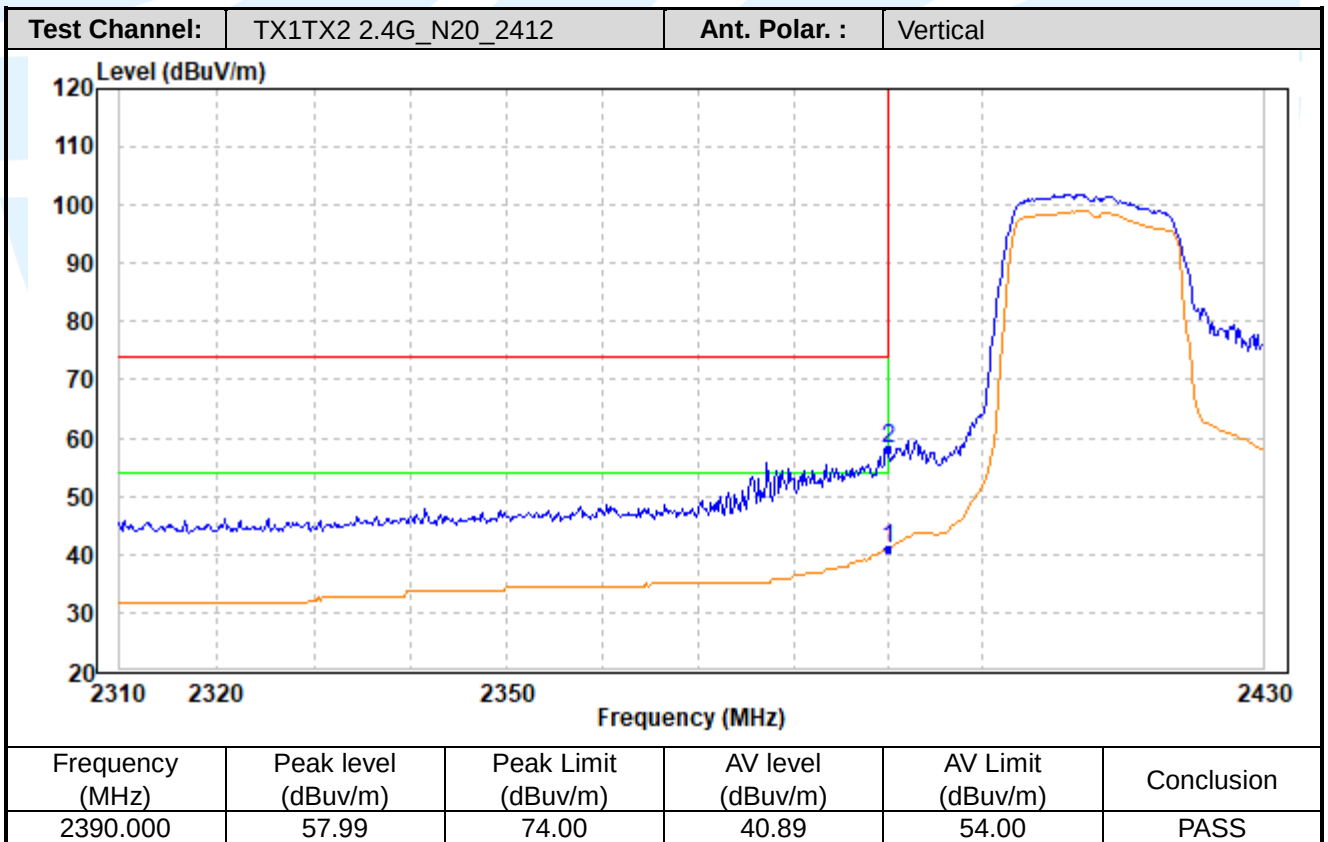
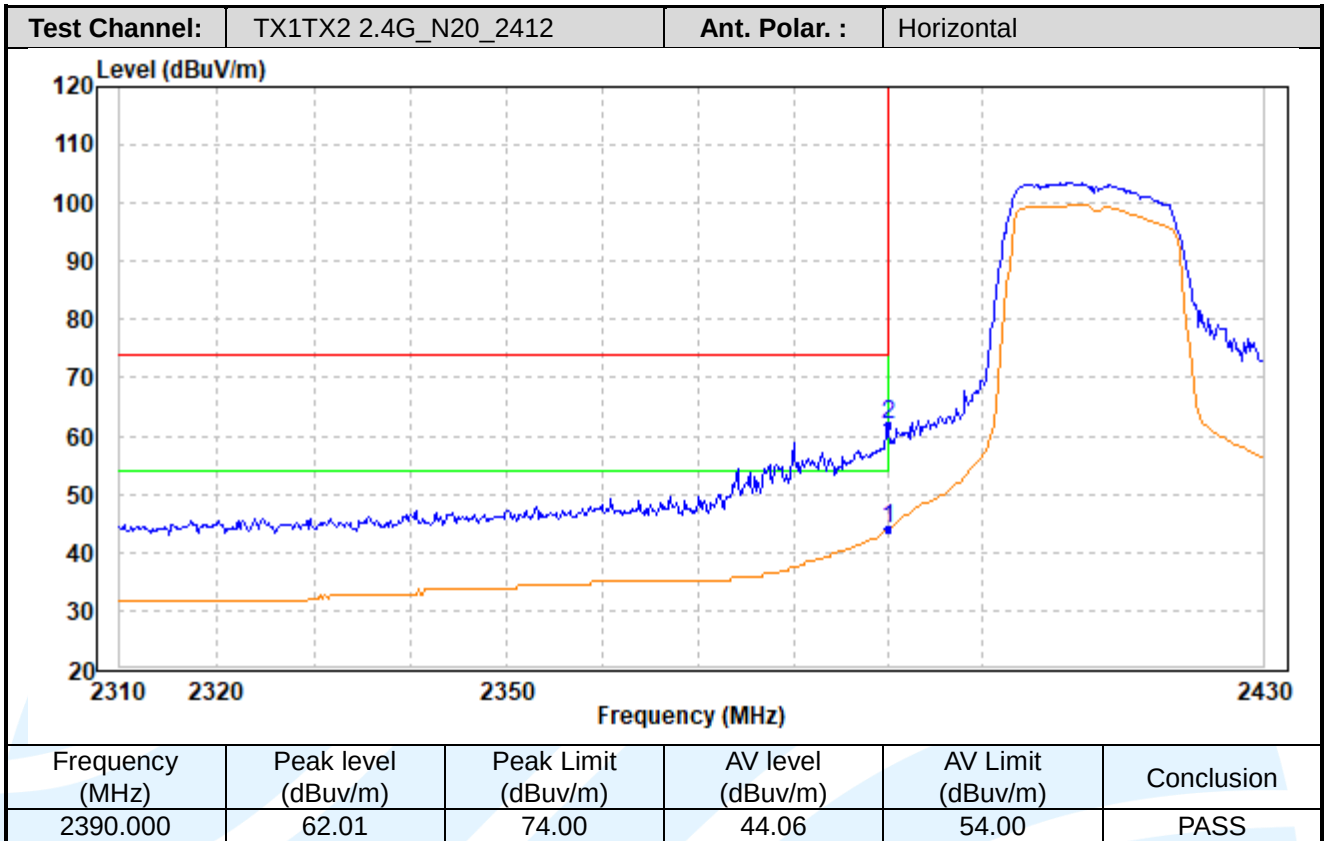
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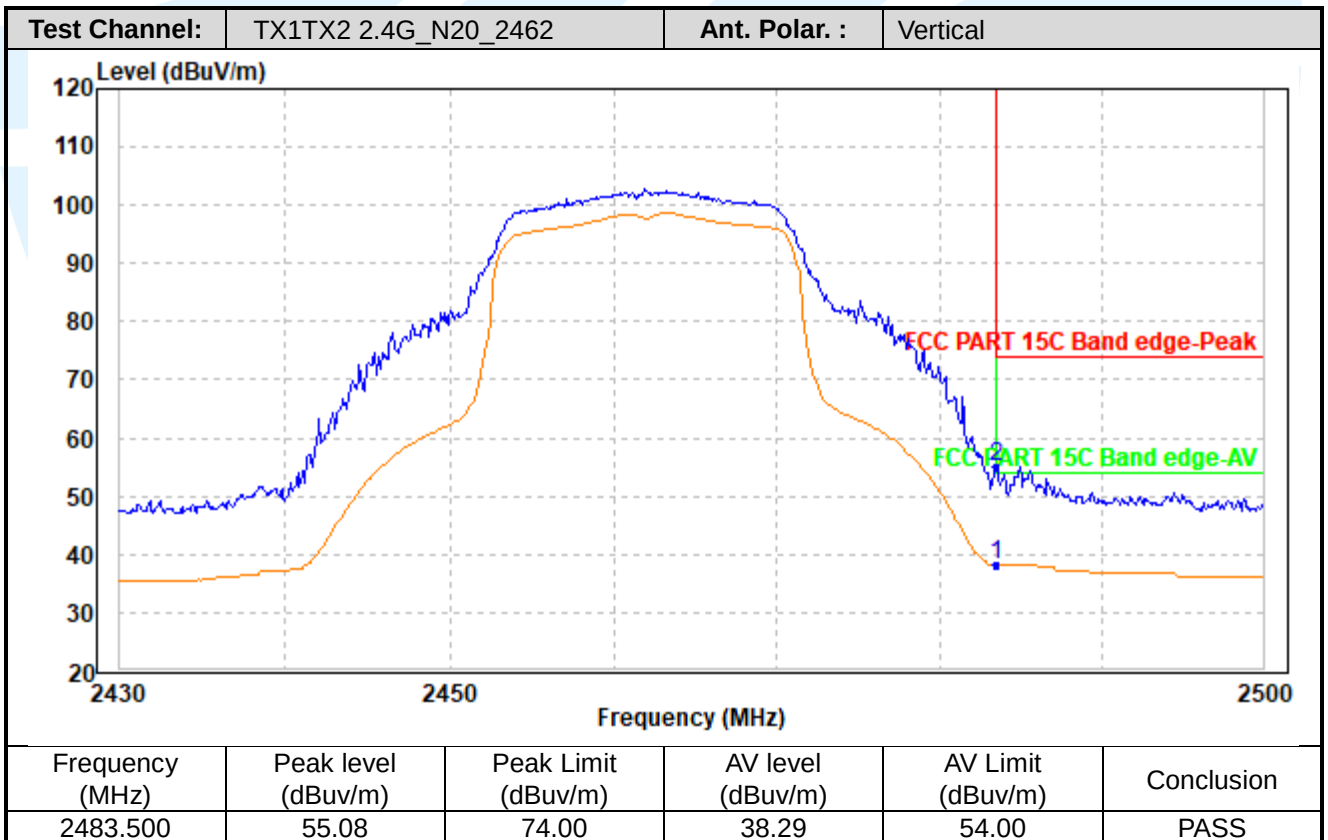
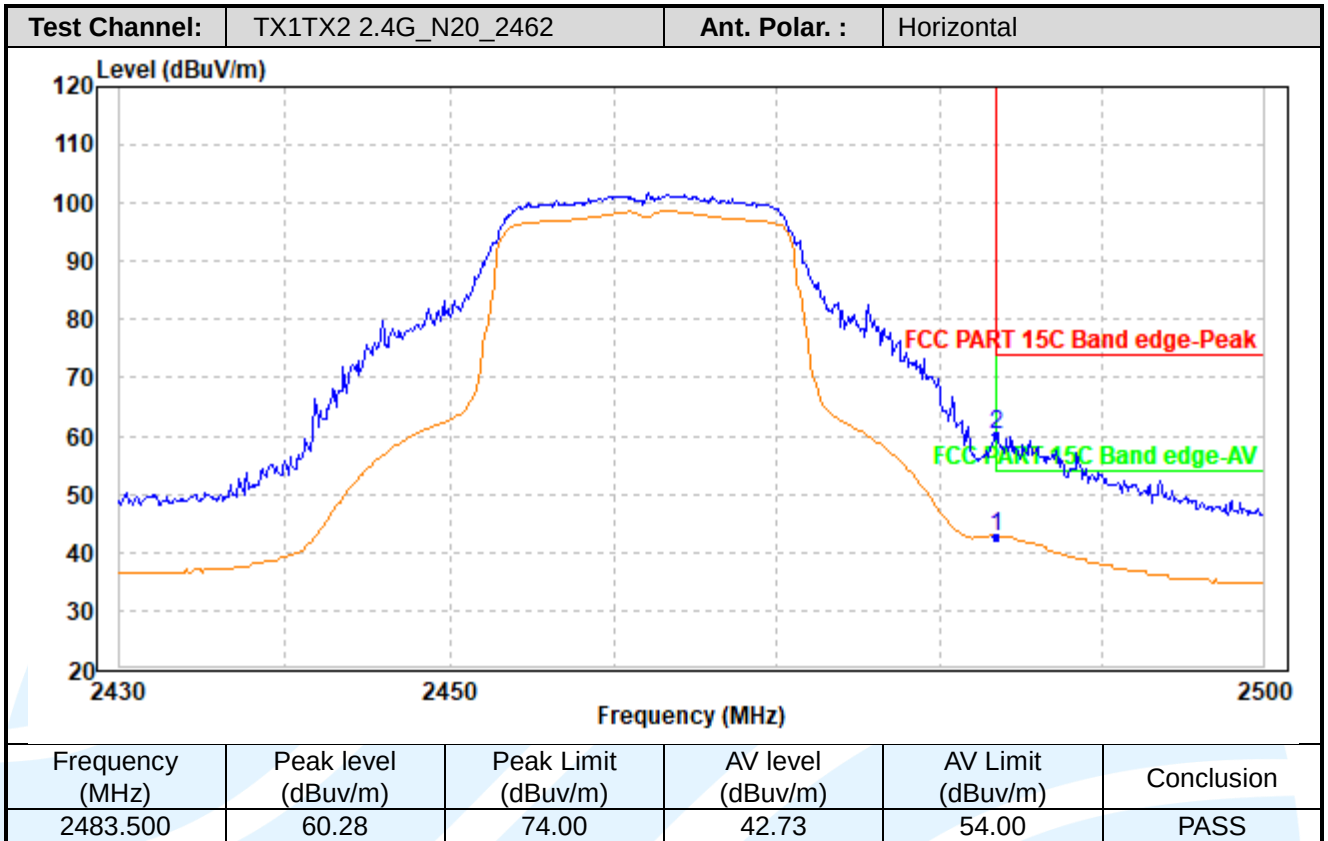
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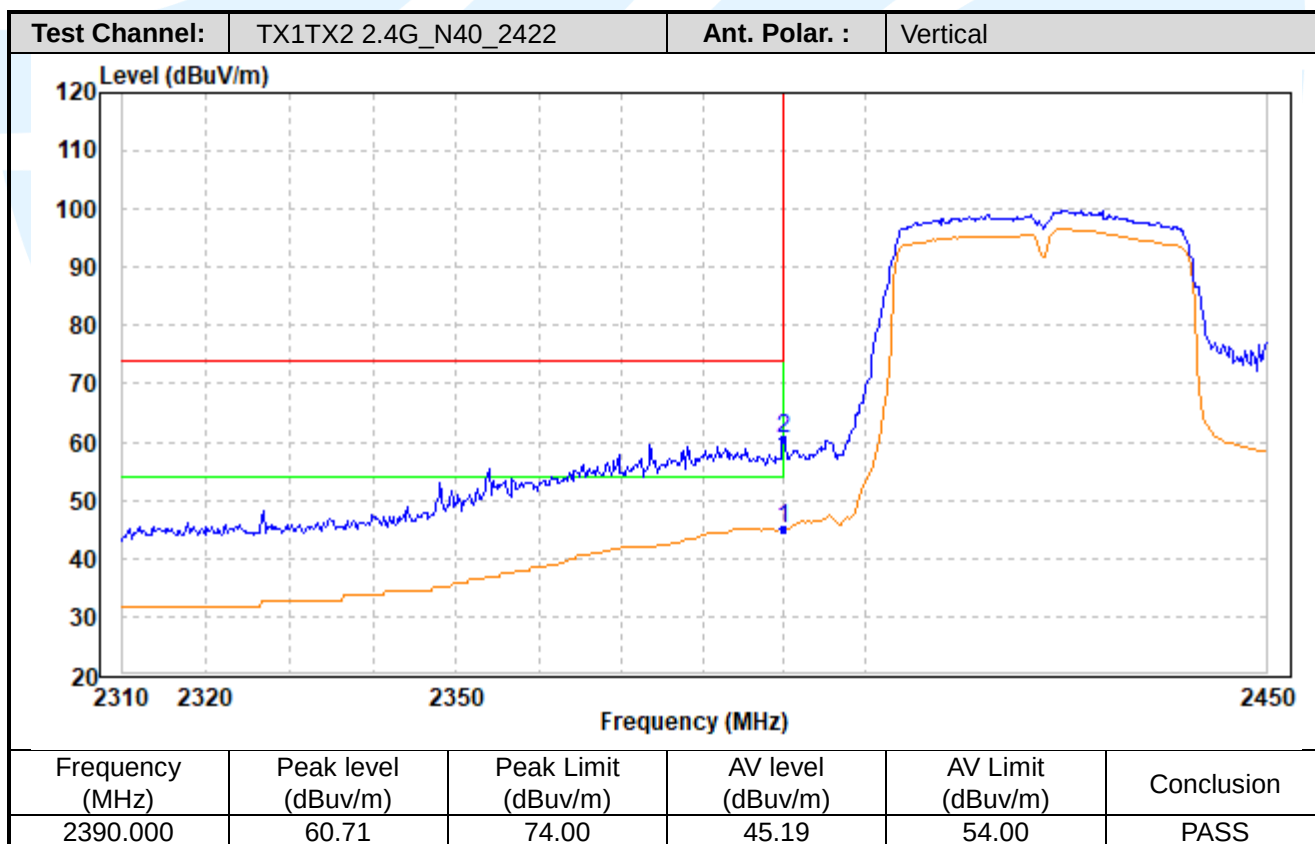
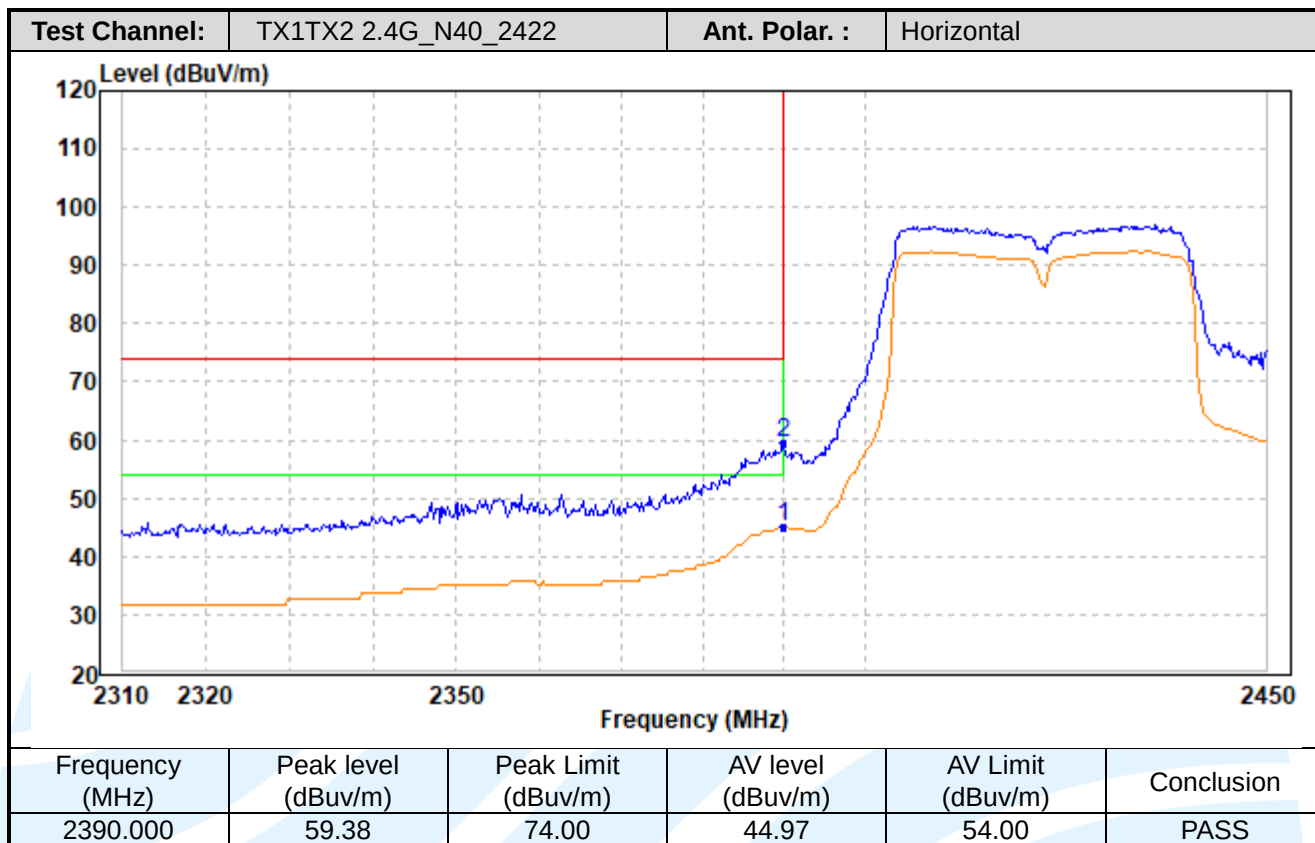
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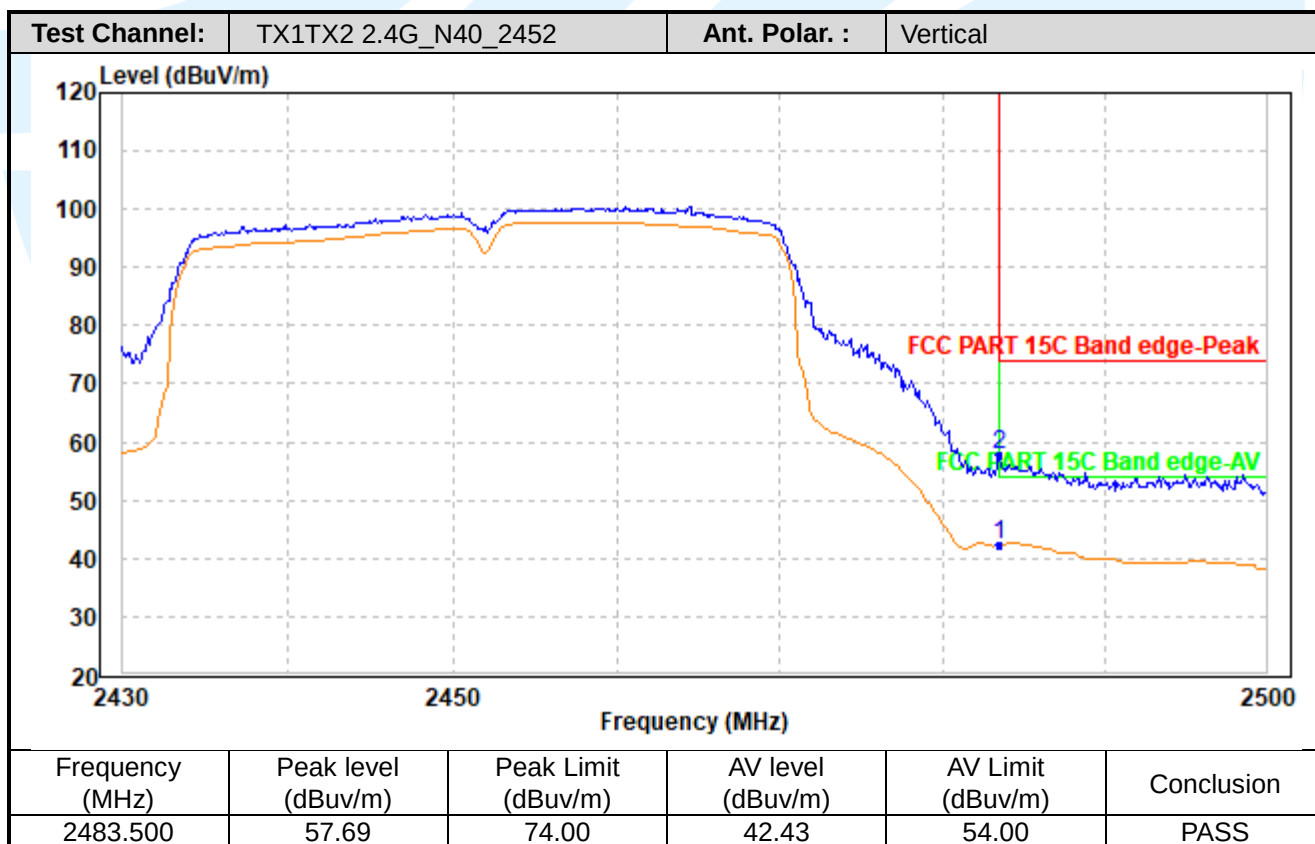
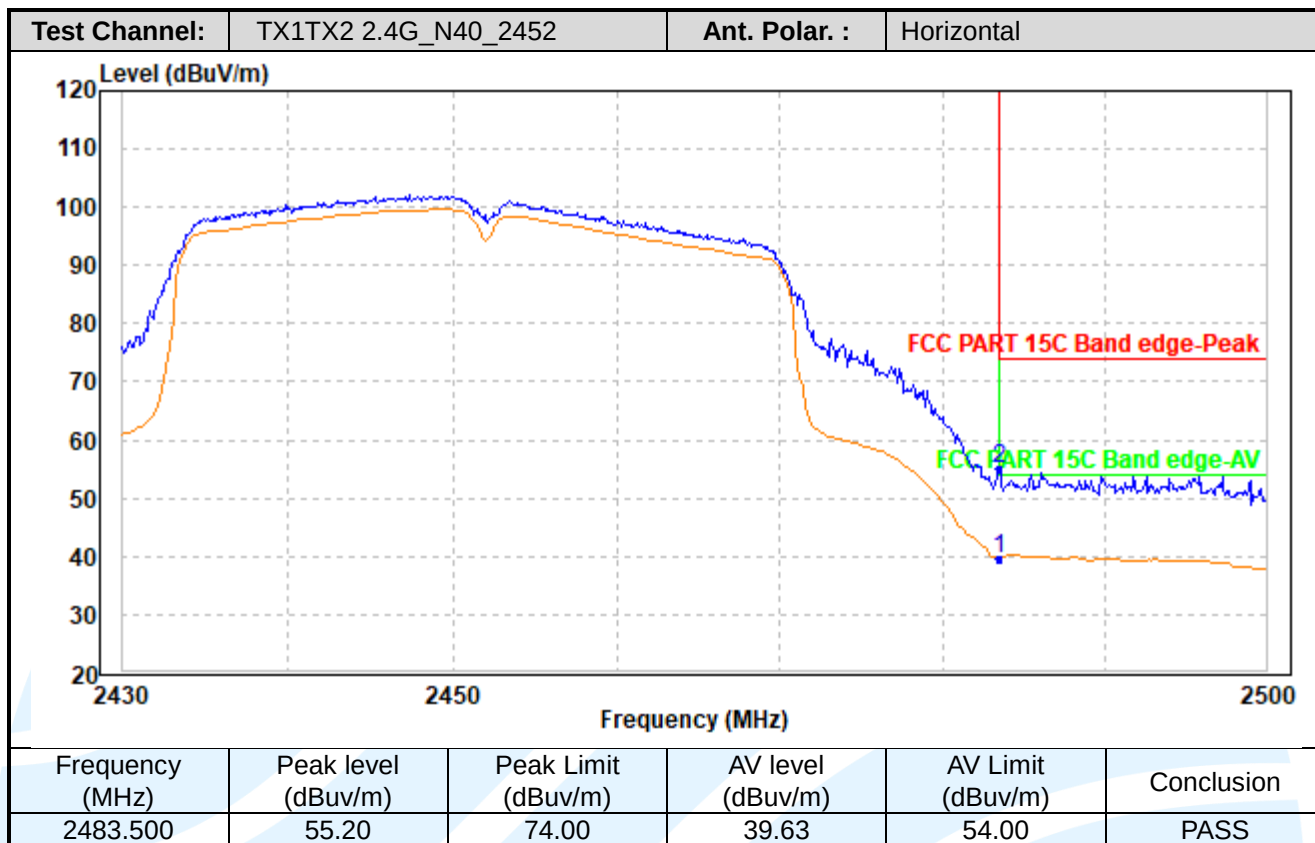
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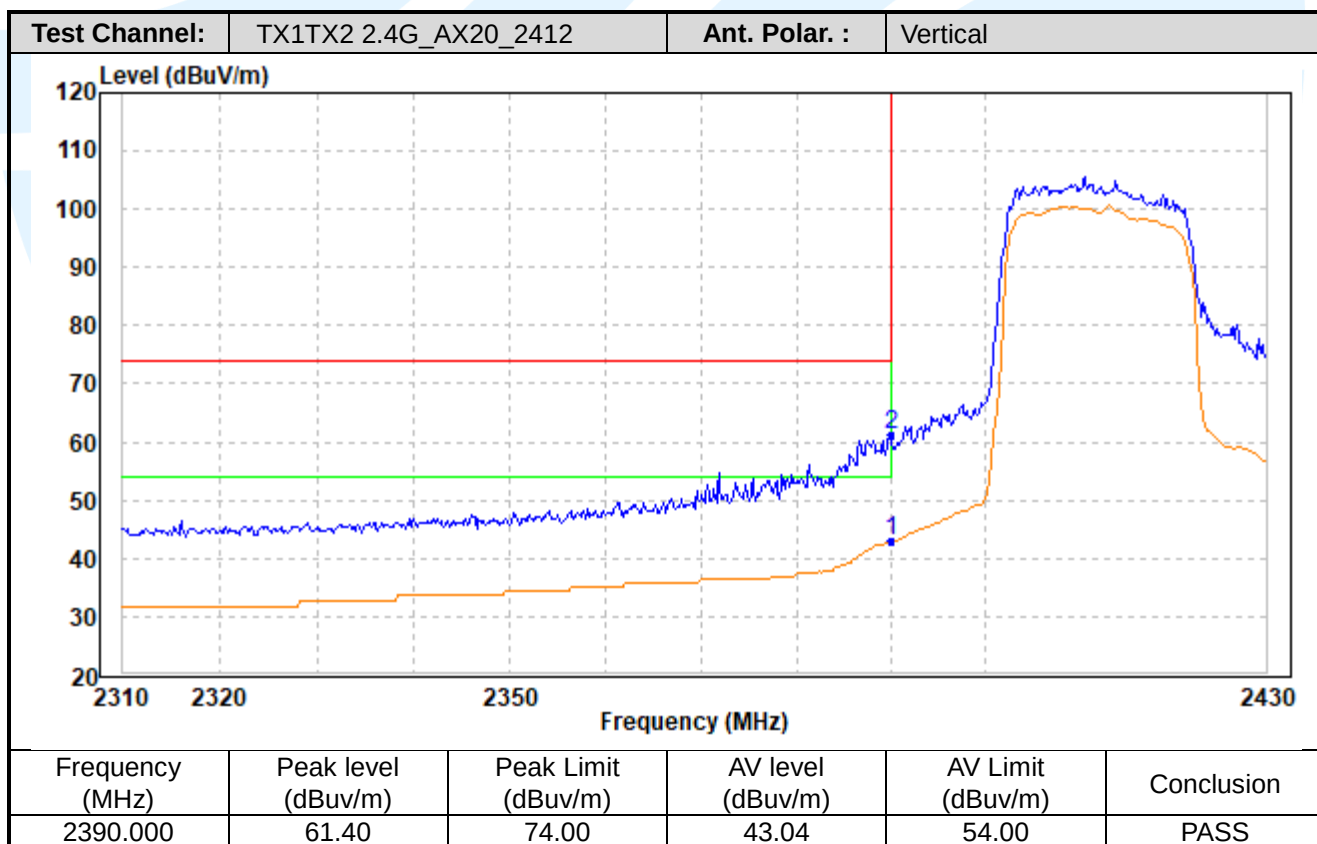
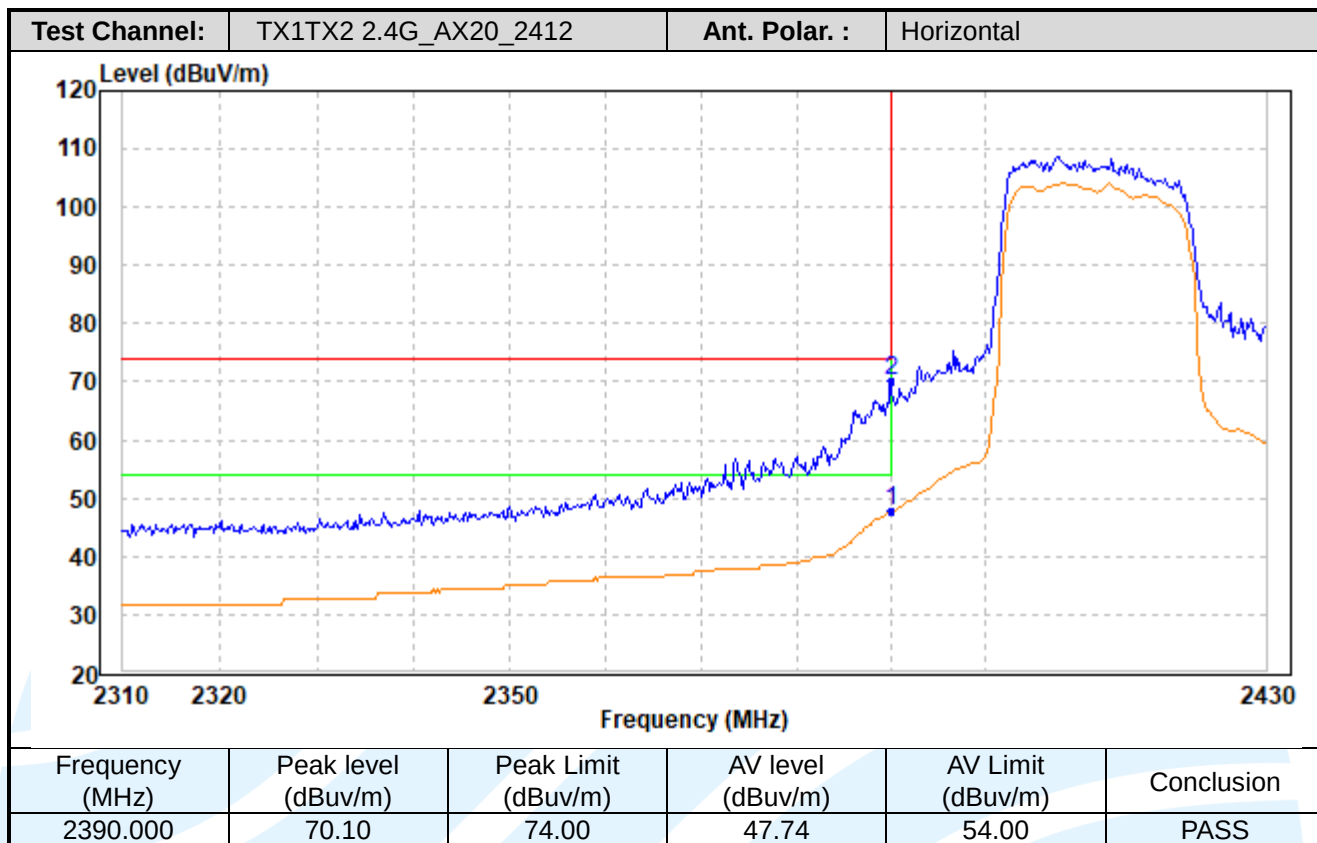
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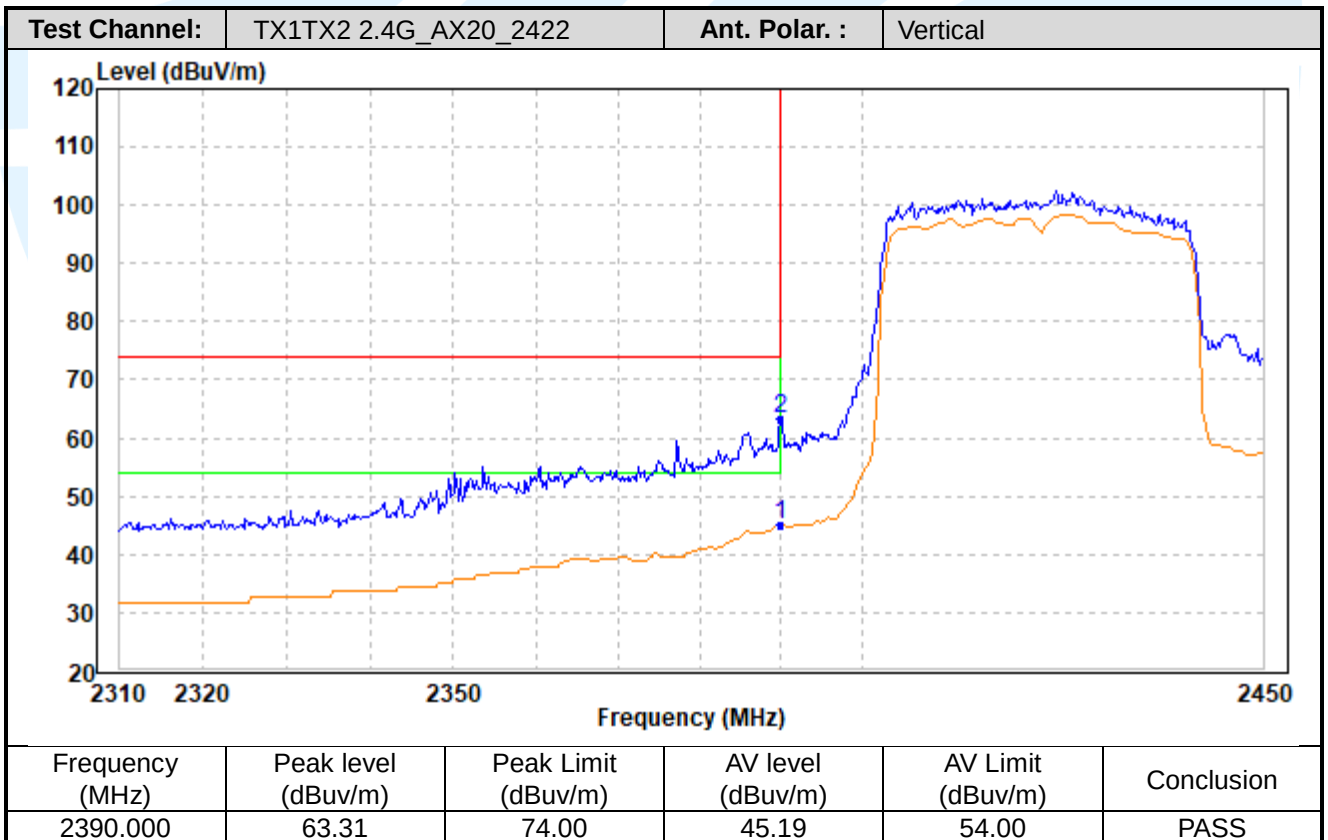
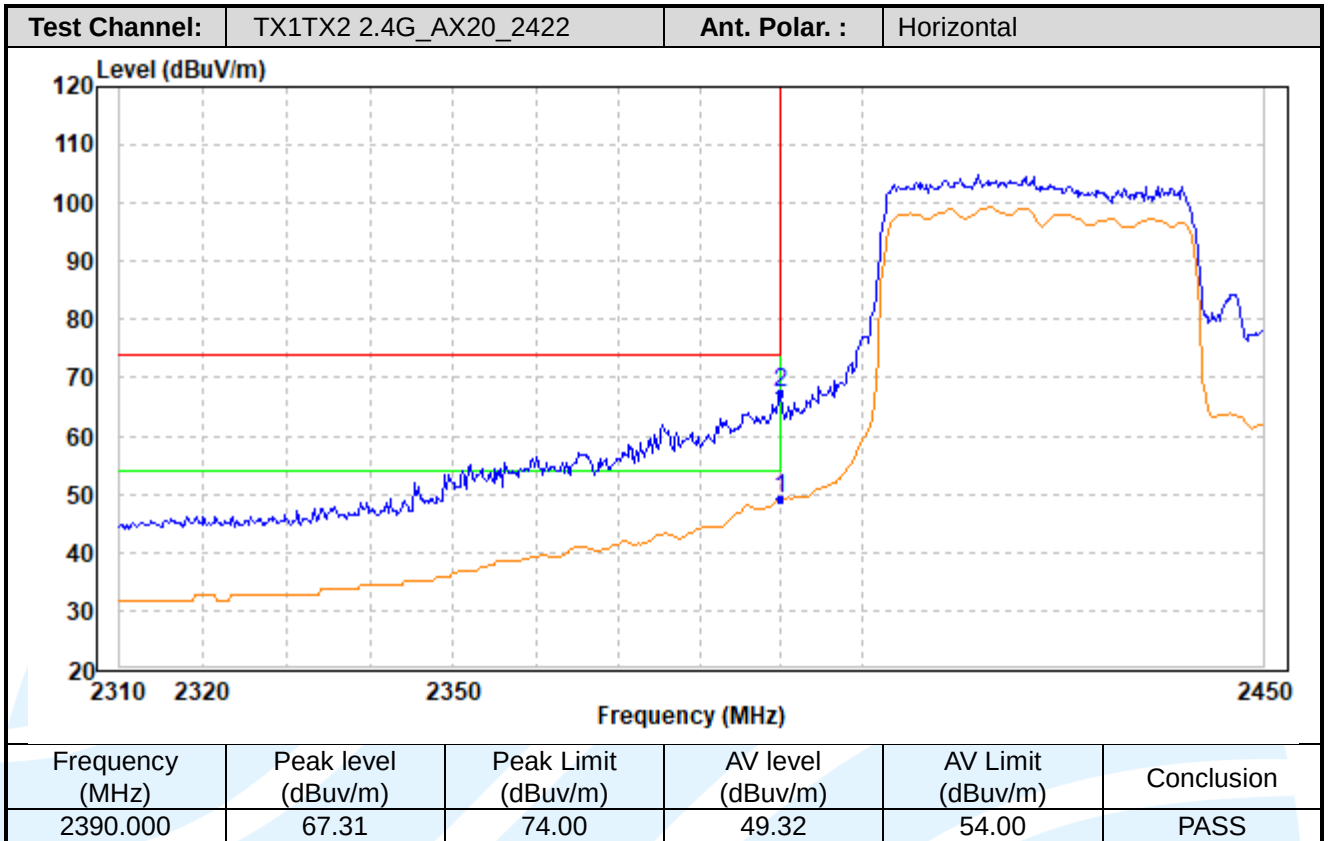
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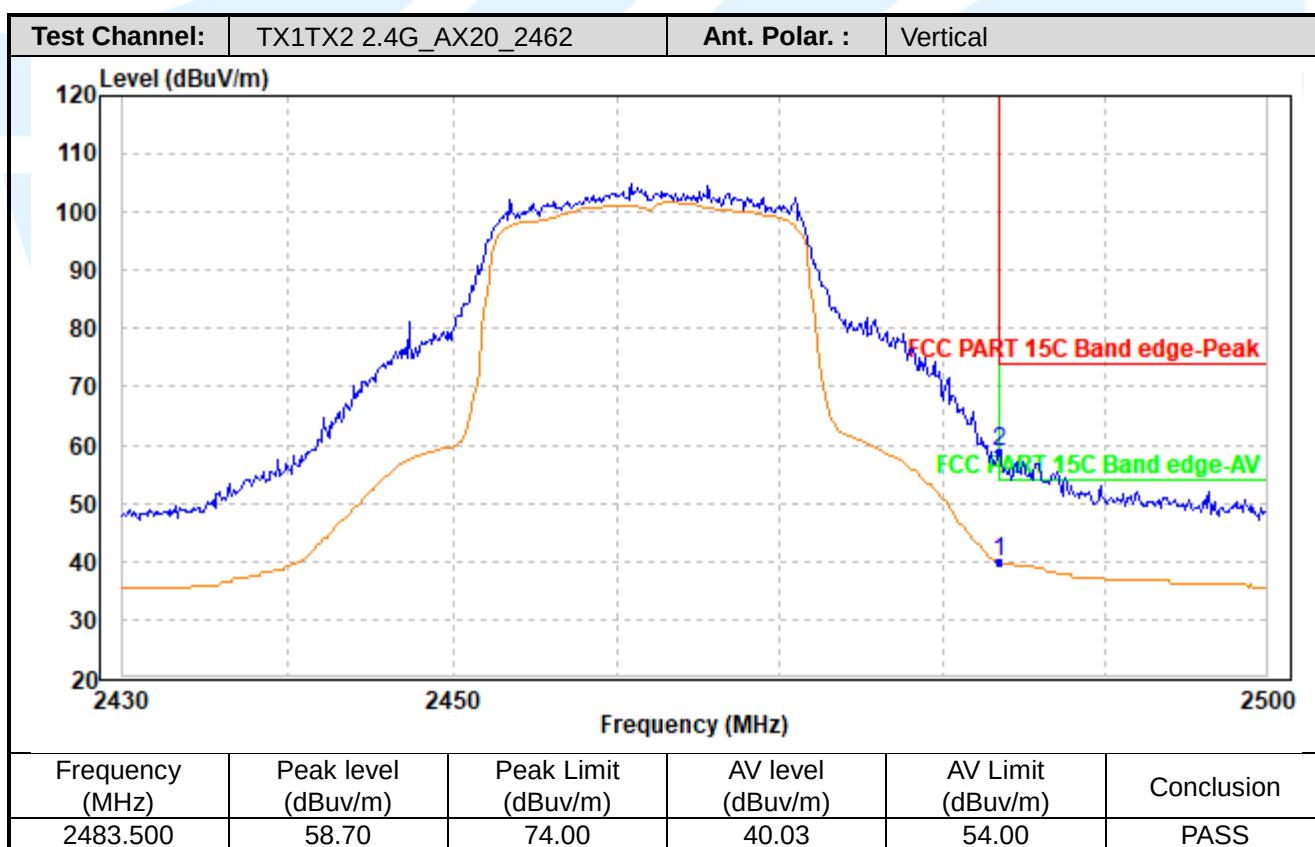
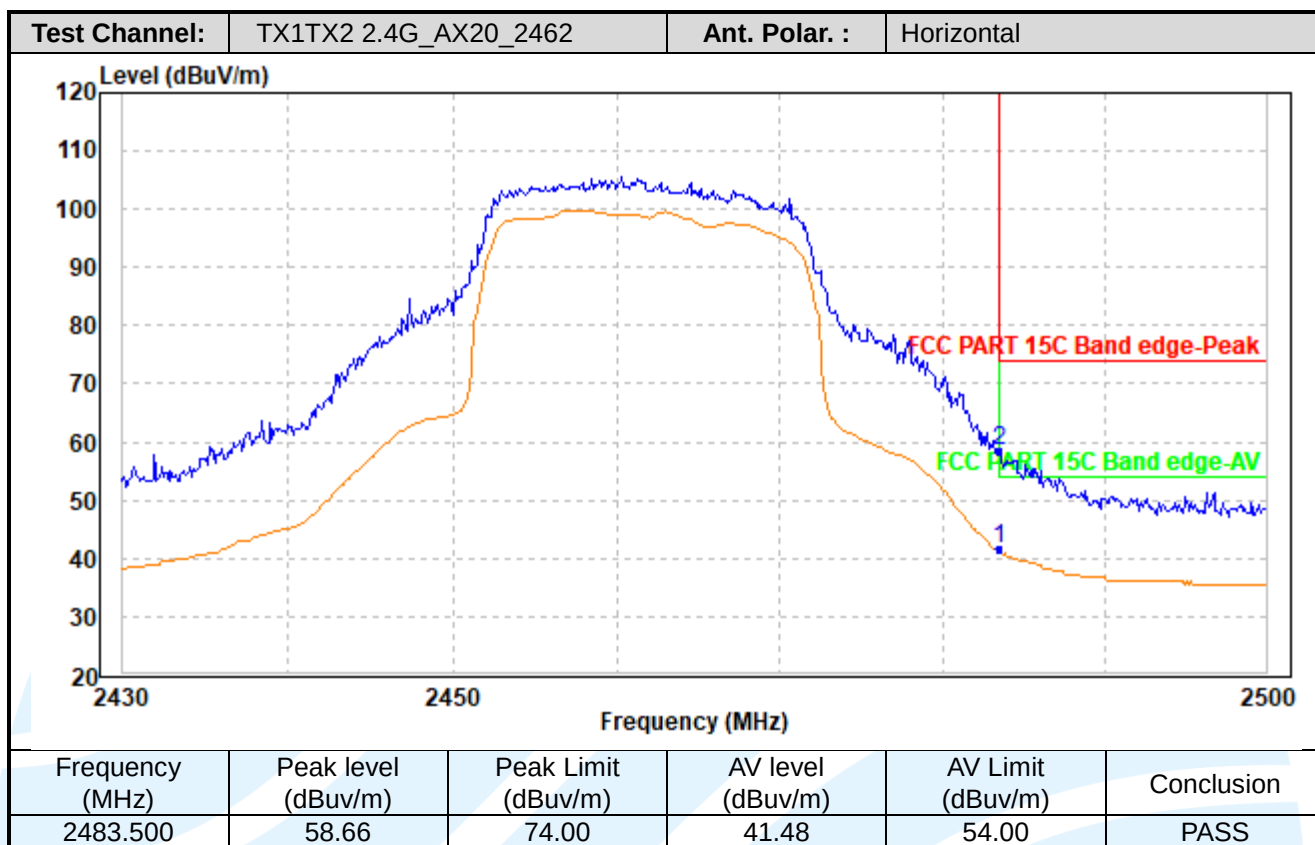
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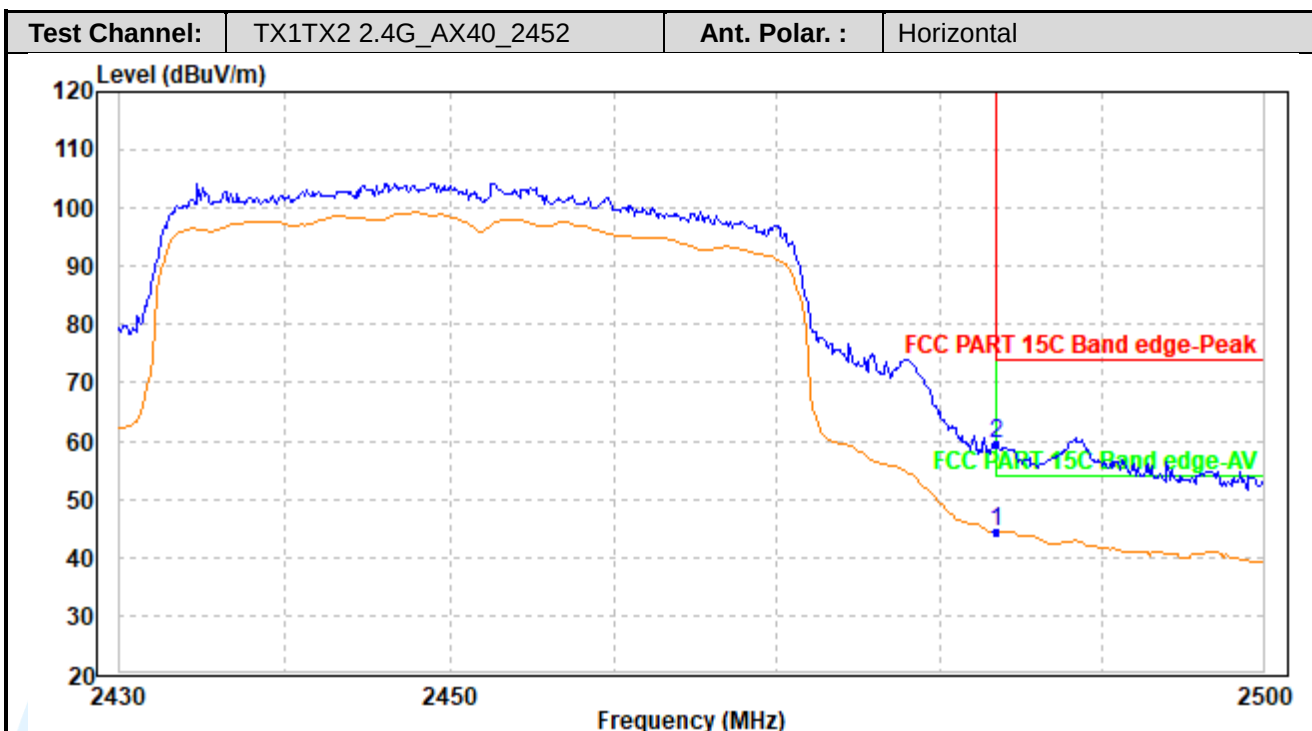
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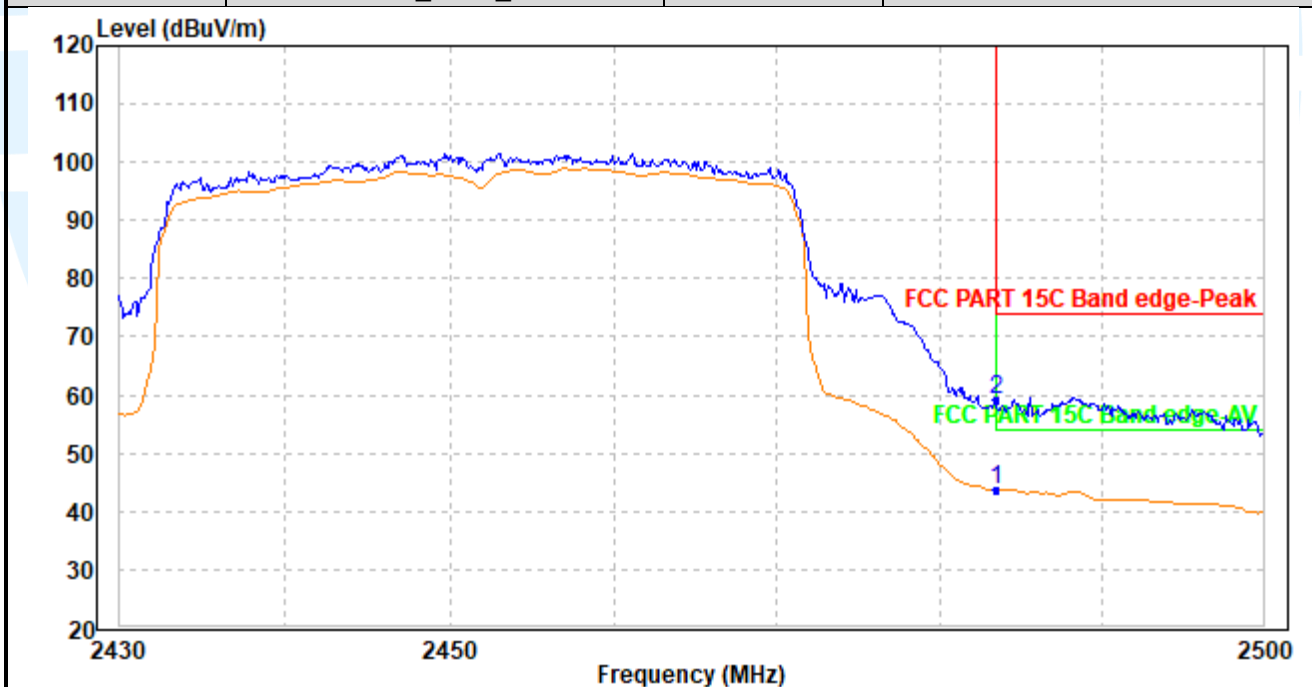
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Frequency (MHz)	Peak level (dBuV/m)	Peak Limit (dBuV/m)	AV level (dBuV/m)	AV Limit (dBuV/m)	Conclusion
2483.500	59.60	74.00	44.55	54.00	PASS

Test Channel:	TX1TX2 2.4G_AX40_2452	Ant. Polar. :	Vertical
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Frequency (MHz)	Peak level (dBuV/m)	Peak Limit (dBuV/m)	AV level (dBuV/m)	AV Limit (dBuV/m)	Conclusion
2483.500	59.01	74.00	43.56	54.00	PASS

Remark:

1. Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Limit – Result

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5.9 CONDUCTED EMISSION

Test Requirement: 47 CFR Part 15C Section 15.207

Test Method: ANSI C63.10-2020 Section 6.2

Limits:

Frequency range (MHz)	Limits (dB(μV))	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

Remark:

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

Test Setup: Refer to section 4.5.2 for details.

Test Procedures:

Test frequency range :150KHz-30MHz

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Equipment Used: Refer to section 3 for details.

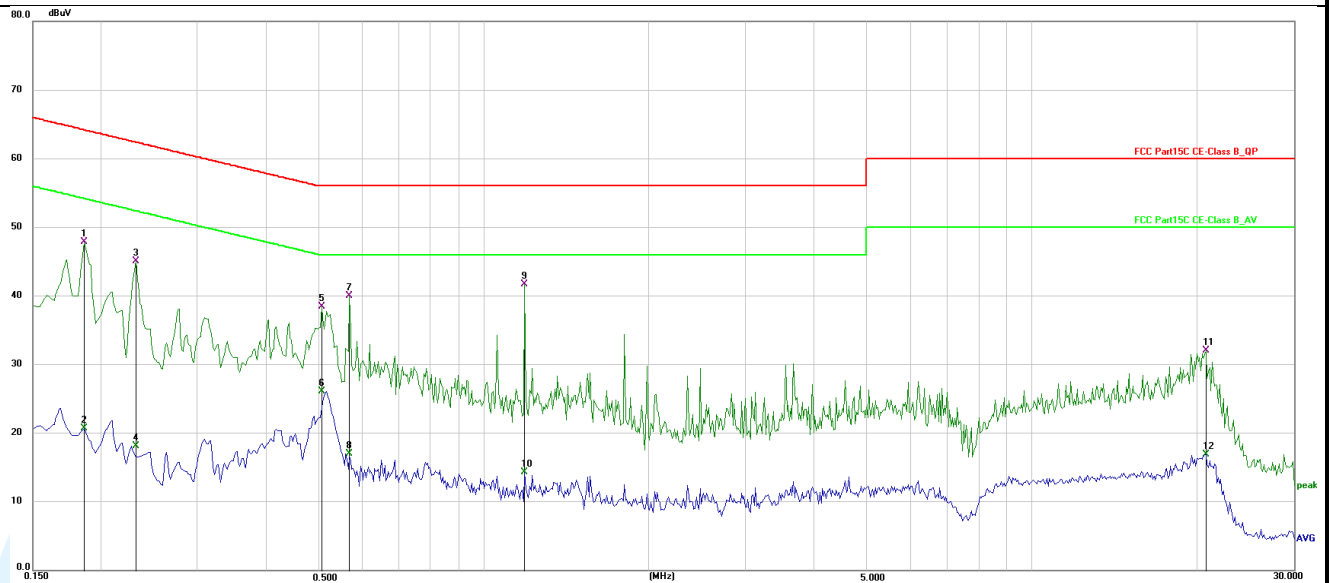
Test Result: Pass

The worst measurement data as follows:

Quasi Peak and Average:

Mode: WIFI Link

Live Line



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1860	38.05	9.79	47.84	64.21	-16.37	QP
2	0.1860	10.91	9.79	20.70	54.21	-33.51	AVG
3	0.2310	35.32	9.78	45.10	62.41	-17.31	QP
4	0.2310	8.36	9.78	18.14	52.41	-34.27	AVG
5	0.5053	28.63	9.79	38.42	56.00	-17.58	QP
6	0.5053	16.33	9.79	26.12	46.00	-19.88	AVG
7	0.5685	30.22	9.79	40.01	56.00	-15.99	QP
8	0.5685	7.23	9.79	17.02	46.00	-28.98	AVG
9	1.1895	31.94	9.71	41.65	56.00	-14.35	QP
10	1.1895	4.57	9.71	14.28	46.00	-31.72	AVG
11	20.7823	22.13	9.92	32.05	60.00	-27.95	QP
12	20.7823	7.01	9.92	16.93	50.00	-33.07	AVG

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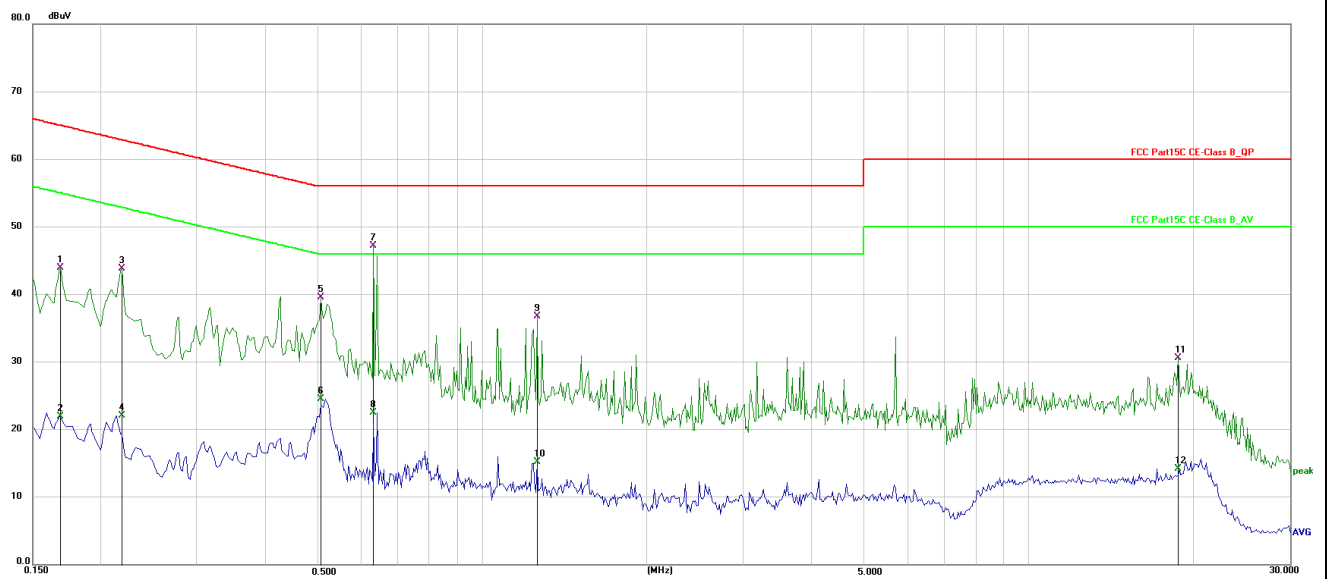
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Neutral Line



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1680	34.13	9.80	43.93	65.06	-21.13	QP
2	0.1680	12.17	9.80	21.97	55.06	-33.09	AVG
3	0.2174	34.01	9.77	43.78	62.92	-19.14	QP
4	0.2174	12.24	9.77	22.01	52.92	-30.91	AVG
5	0.5054	29.74	9.76	39.50	56.00	-16.50	QP
6	0.5054	14.76	9.76	24.52	46.00	-21.48	AVG
7	0.6314	37.48	9.74	47.22	56.00	-8.78	QP
8	0.6314	12.76	9.74	22.50	46.00	-23.50	AVG
9	1.2570	26.96	9.75	36.71	56.00	-19.29	QP
10	1.2570	5.50	9.75	15.25	46.00	-30.75	AVG
11	18.8160	20.79	9.84	30.63	60.00	-29.37	QP
12	18.8160	4.36	9.84	14.20	50.00	-35.80	AVG

Remark:

1. Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Factor, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result - Limit
4. An initial pre-scan was performed on the Phase and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

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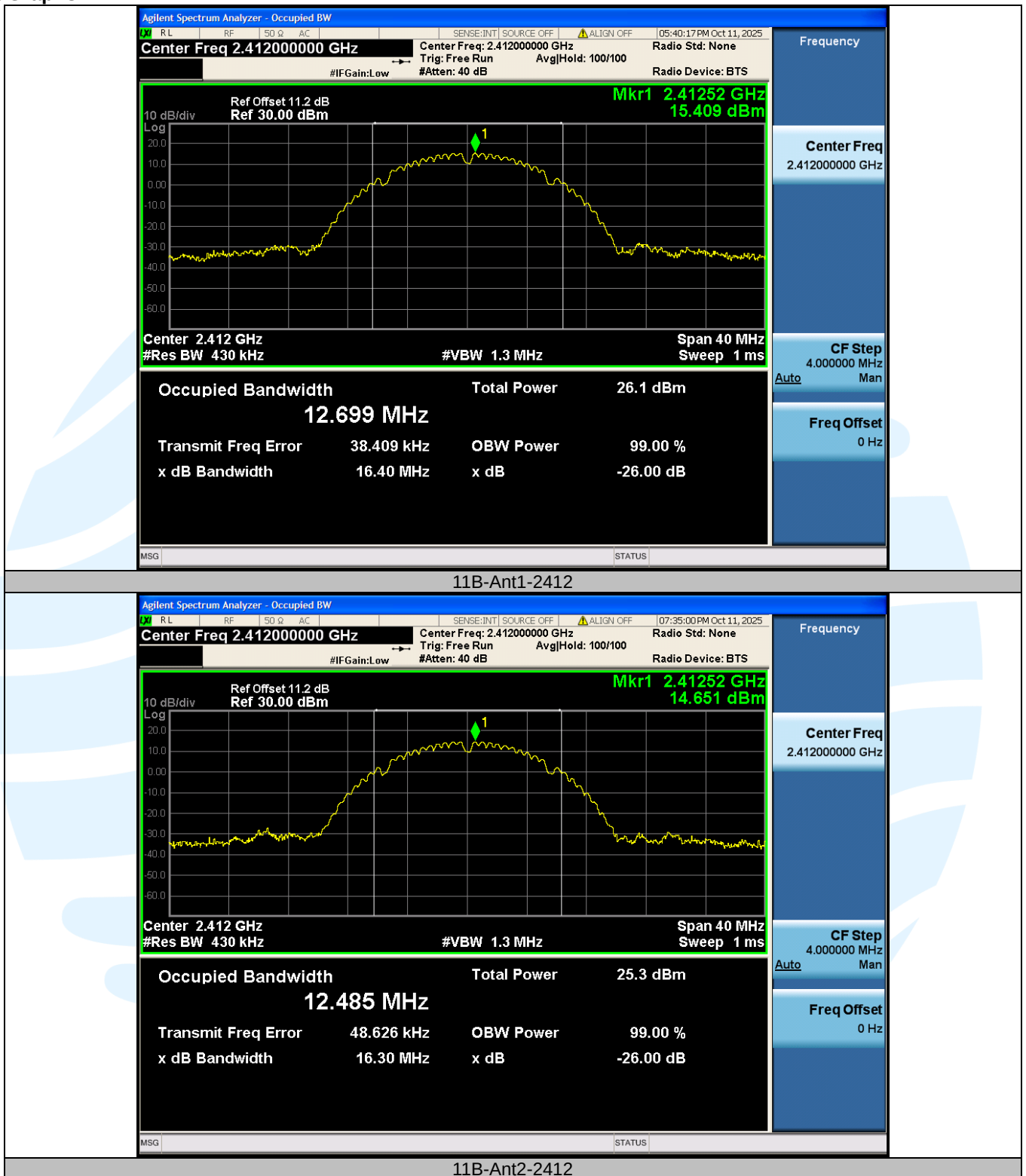
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APPENDIX A RF TEST DATA

A.1 99% BANDWIDTH

Test Mode	Antenna	Channel Frequency [MHz]	OCB [MHz]	FL [MHz]	FH [MHz]
11B	Ant1	2412	12.699	2405.6889	2418.3879
11B	Ant2	2412	12.485	2405.8061	2418.2911
11B	Ant1	2437	12.563	2430.7619	2443.3249
11B	Ant2	2437	12.542	2430.7845	2443.3265
11B	Ant1	2462	12.552	2455.7768	2468.3288
11B	Ant2	2462	12.616	2455.7379	2468.3539
11G	Ant1	2412	17.212	2403.5097	2420.7217
11G	Ant2	2412	17.372	2403.4706	2420.8426
11G	Ant1	2437	17.233	2428.3975	2445.6305
11G	Ant2	2437	17.143	2428.4732	2445.6162
11G	Ant1	2462	17.186	2453.4476	2470.6336
11G	Ant2	2462	17.083	2453.5283	2470.6113
11N20MIMO	Ant1	2412	18.118	2403.0216	2421.1396
11N20MIMO	Ant2	2412	17.986	2403.0670	2421.0530
11N20MIMO	Ant1	2437	18.283	2427.8787	2446.1617
11N20MIMO	Ant2	2437	17.958	2428.0539	2446.0119
11N20MIMO	Ant1	2462	18.119	2452.9908	2471.1098
11N20MIMO	Ant2	2462	17.999	2453.0352	2471.0342
11N40MIMO	Ant1	2422	36.410	2404.0122	2440.4222
11N40MIMO	Ant2	2422	36.396	2403.9988	2440.3948
11N40MIMO	Ant1	2437	36.499	2418.7865	2455.2855
11N40MIMO	Ant2	2437	36.568	2418.7843	2455.3523
11N40MIMO	Ant1	2452	36.554	2433.6748	2470.2288
11N40MIMO	Ant2	2452	36.493	2433.7958	2470.2888
11AX20MIMO	Ant1	2412	19.004	2402.5339	2421.5379
11AX20MIMO	Ant2	2412	19.009	2402.5316	2421.5406
11AX20MIMO	Ant1	2437	19.125	2427.4967	2446.6217
11AX20MIMO	Ant2	2437	19.159	2427.4547	2446.6137
11AX20MIMO	Ant1	2462	19.093	2452.4856	2471.5786
11AX20MIMO	Ant2	2462	19.169	2452.4644	2471.6334
11AX40MIMO	Ant1	2422	37.738	2403.2866	2441.0246
11AX40MIMO	Ant2	2422	37.910	2403.1855	2441.0955
11AX40MIMO	Ant1	2437	37.913	2418.1397	2456.0527
11AX40MIMO	Ant2	2437	37.876	2418.1687	2456.0447
11AX40MIMO	Ant1	2452	37.863	2433.0642	2470.9272
11AX40MIMO	Ant2	2452	37.905	2433.0189	2470.9239

Test Graphs



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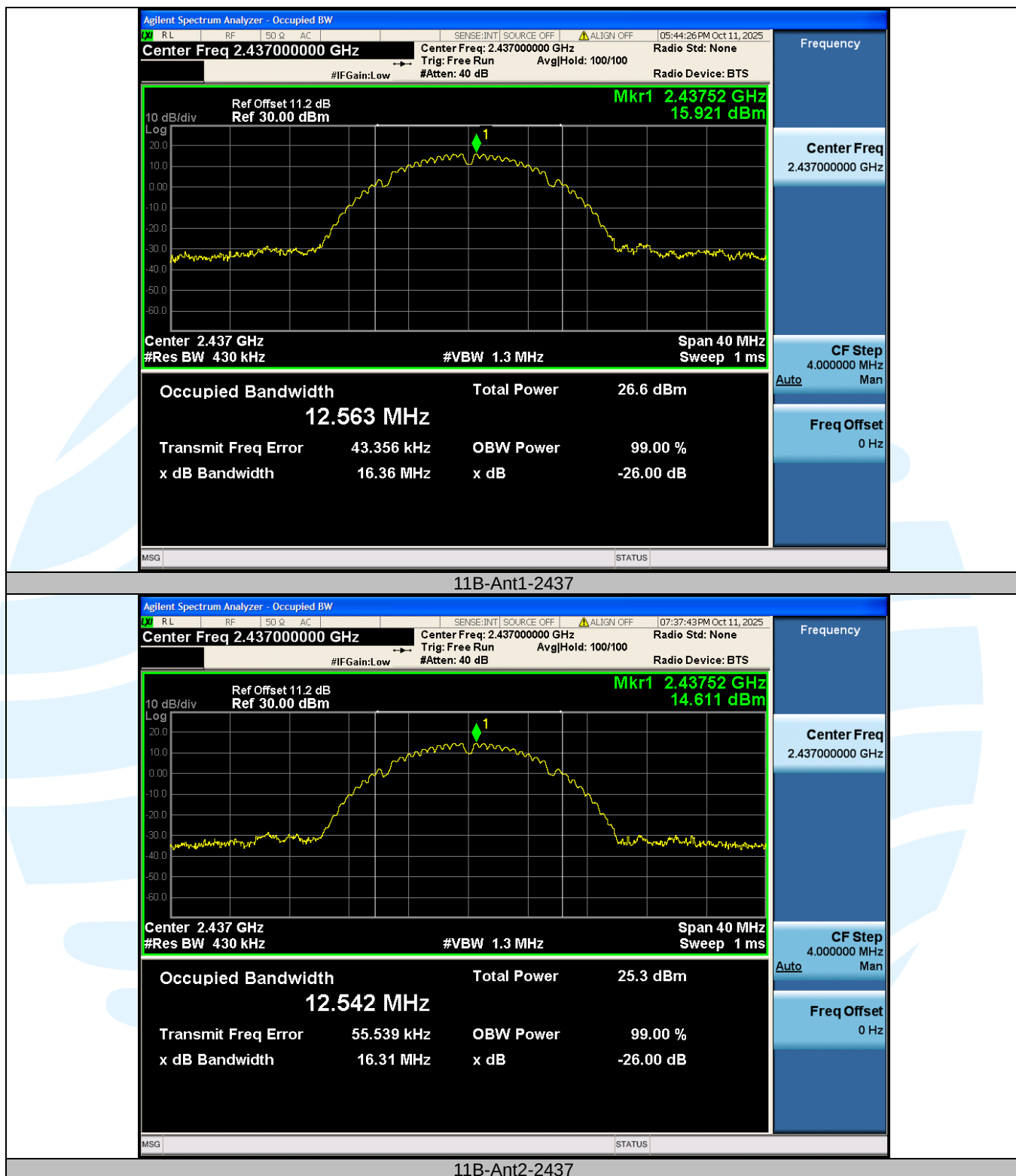
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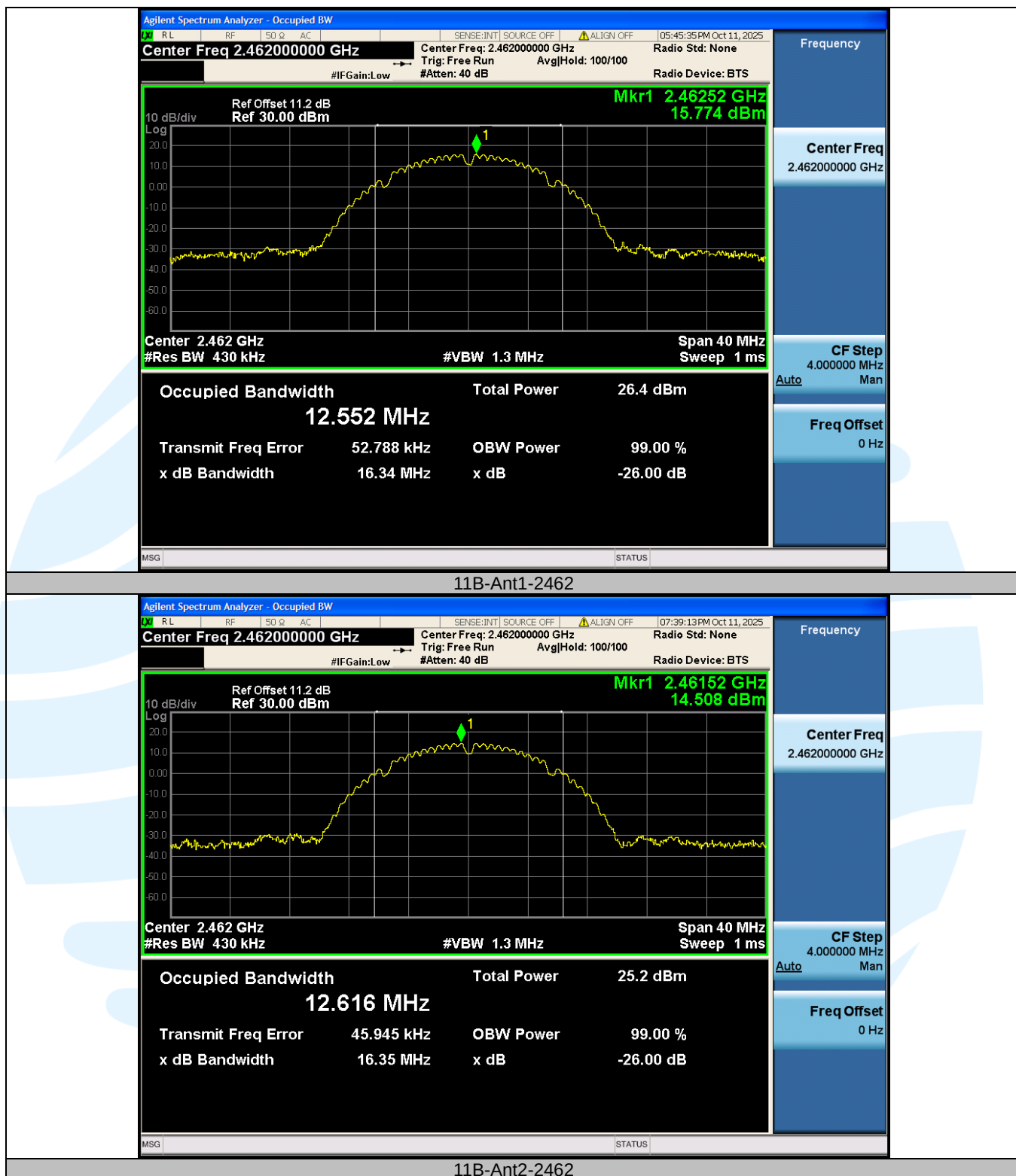
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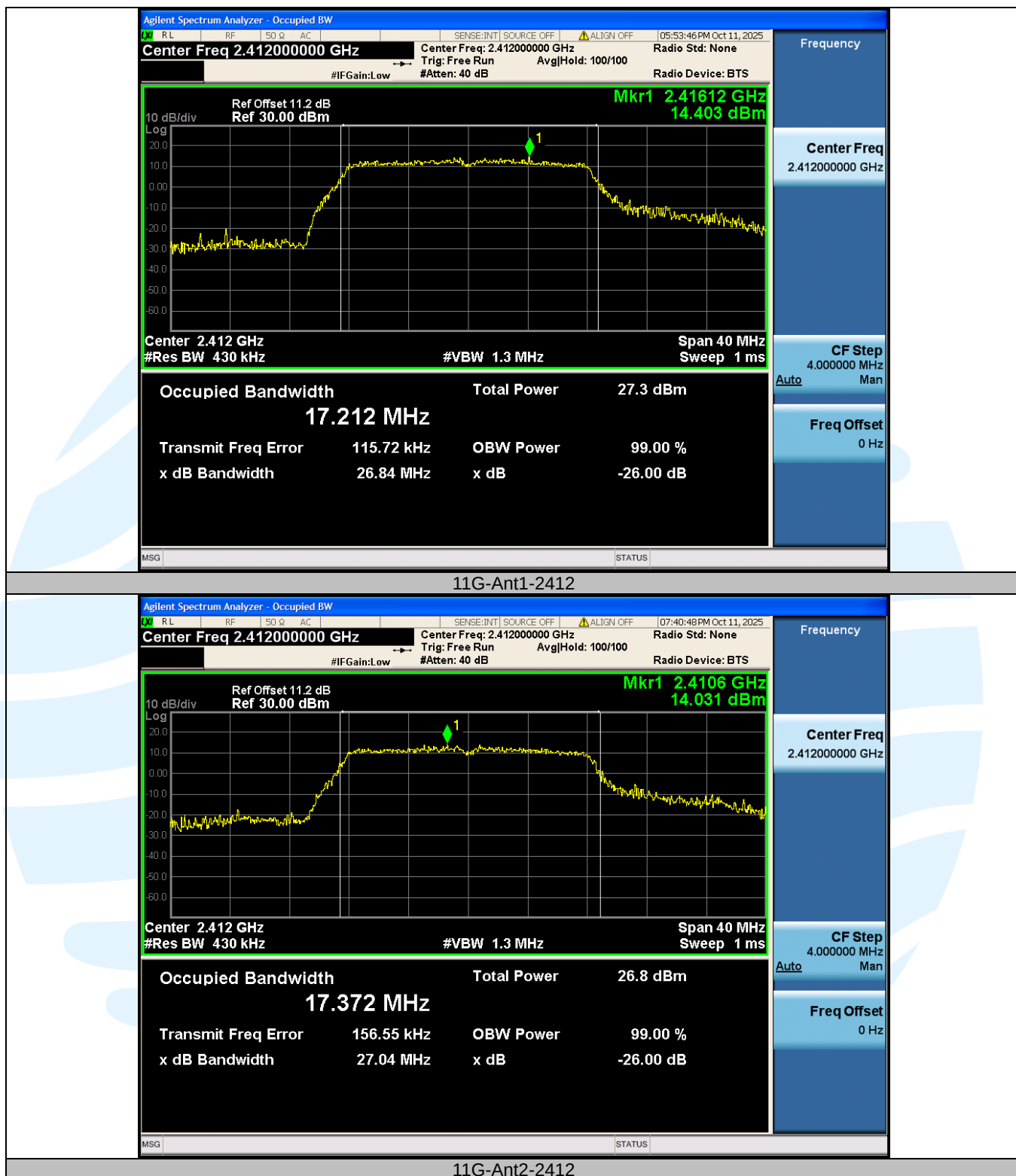
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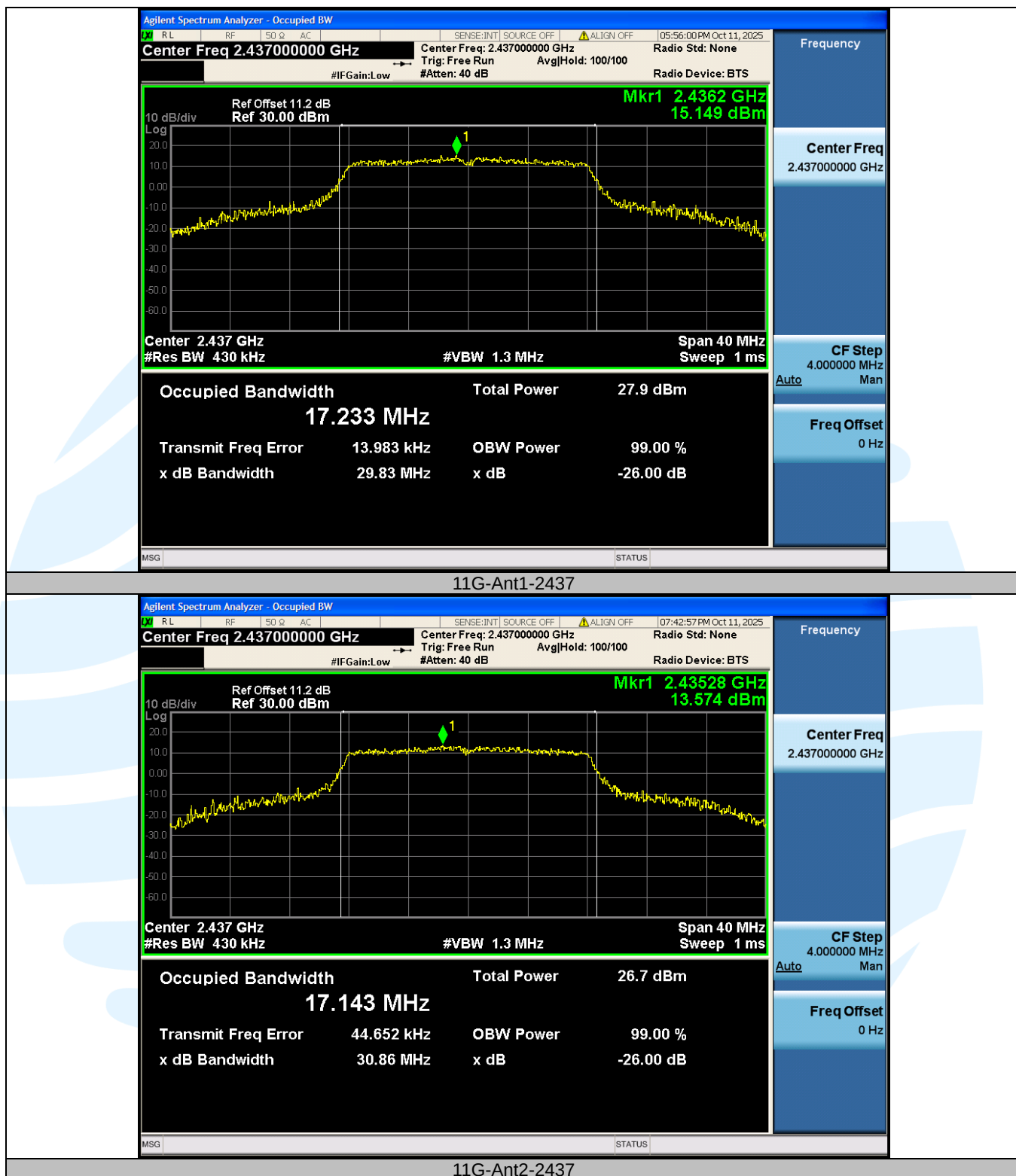
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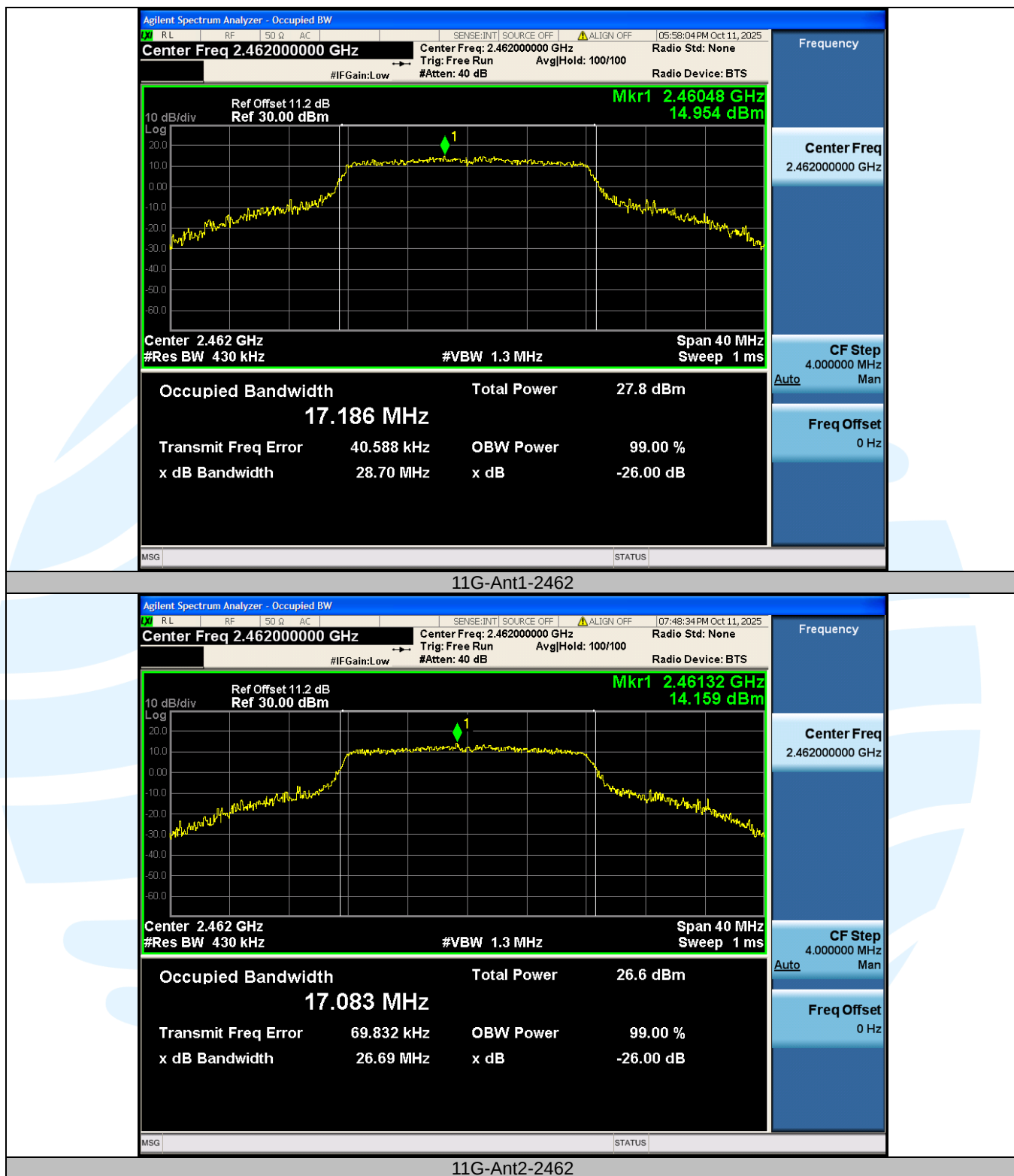
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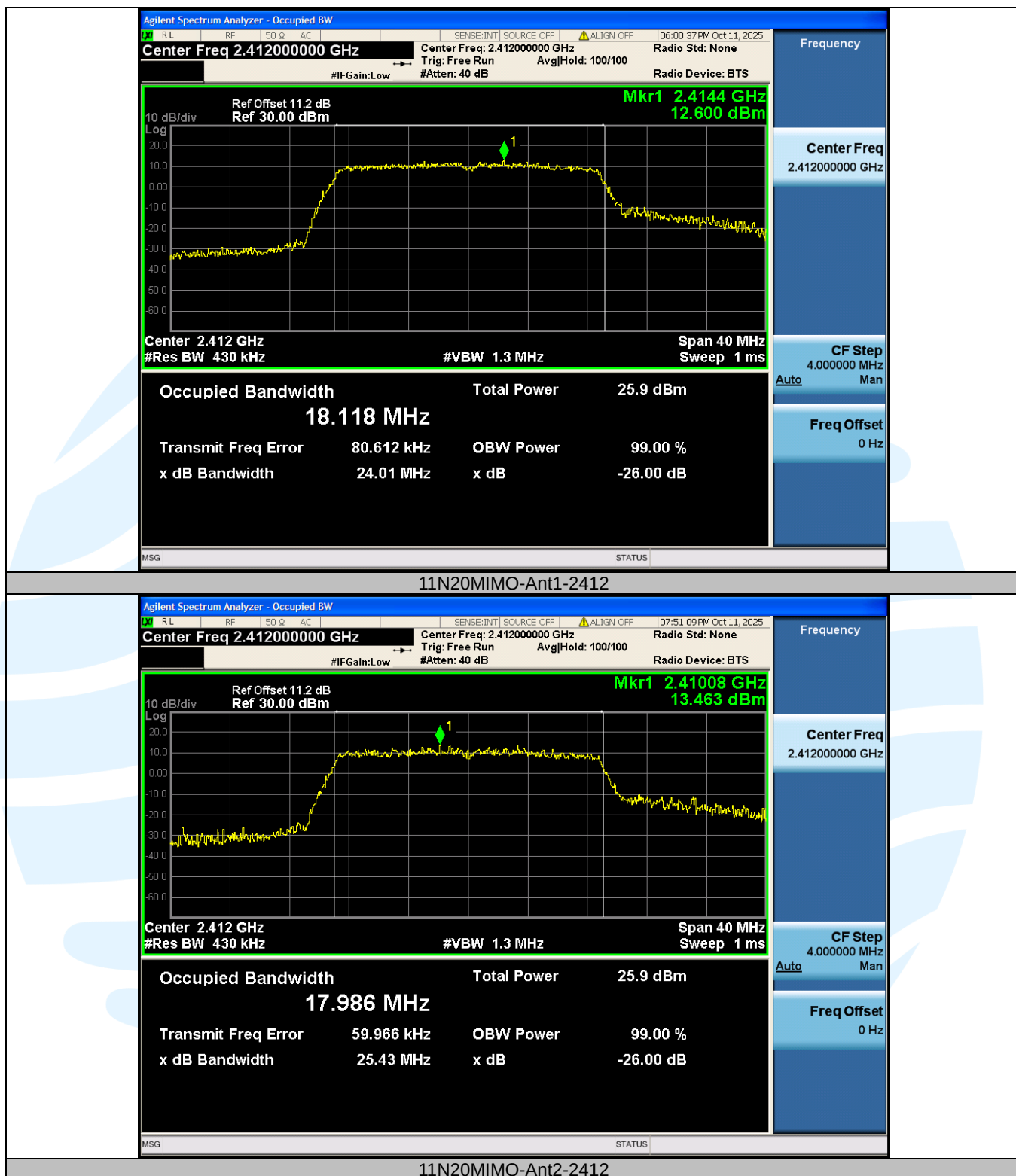
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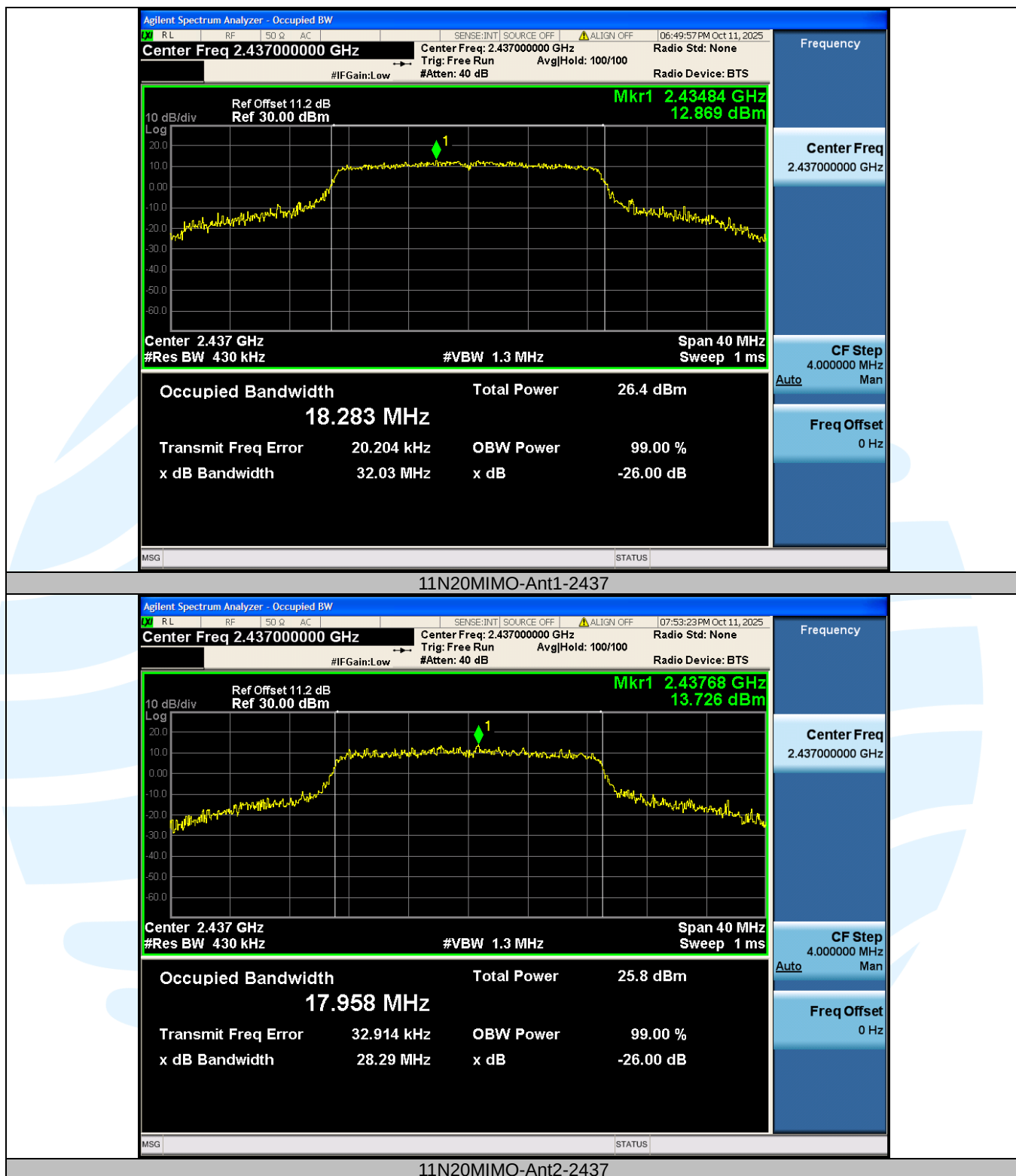
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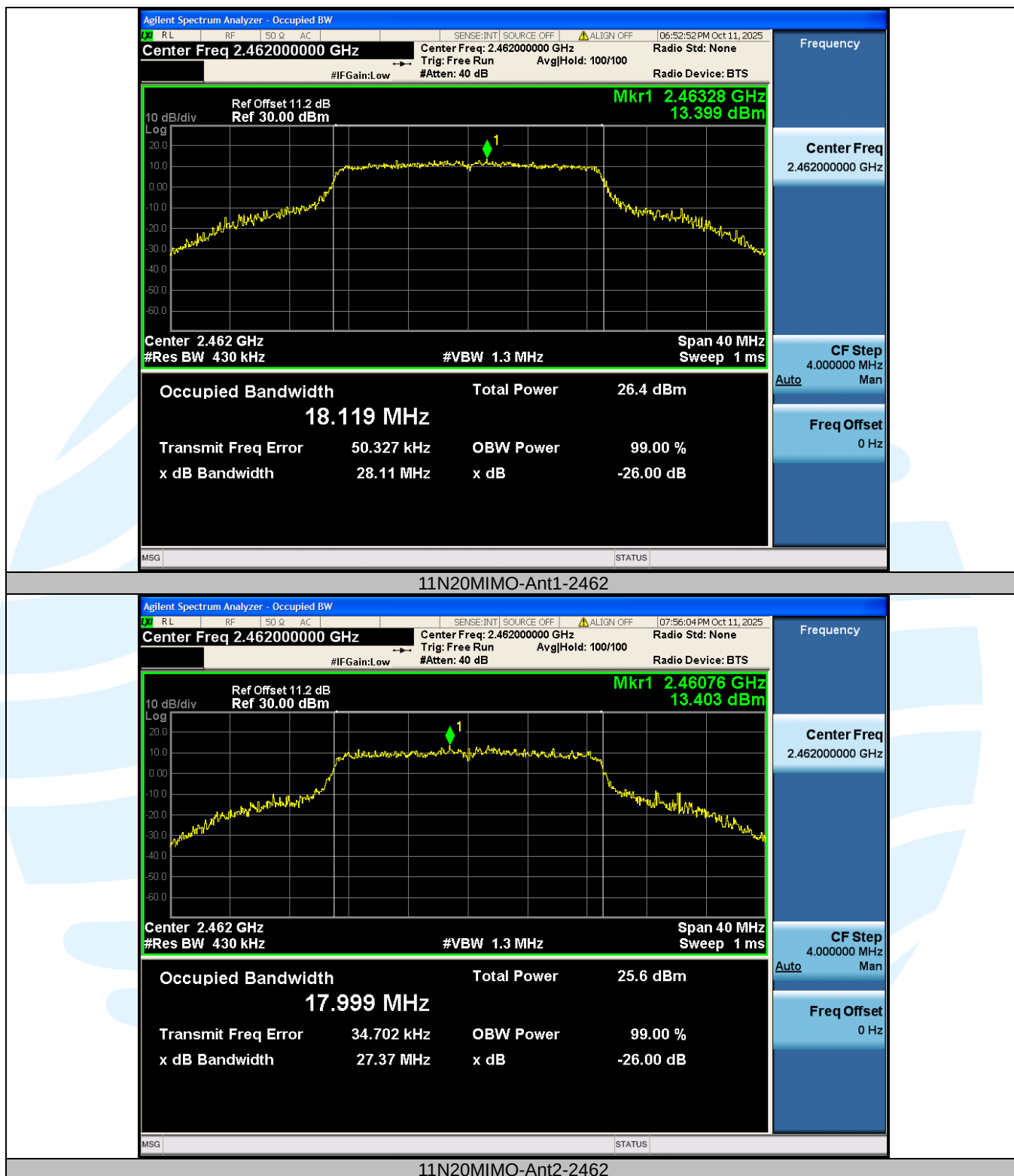
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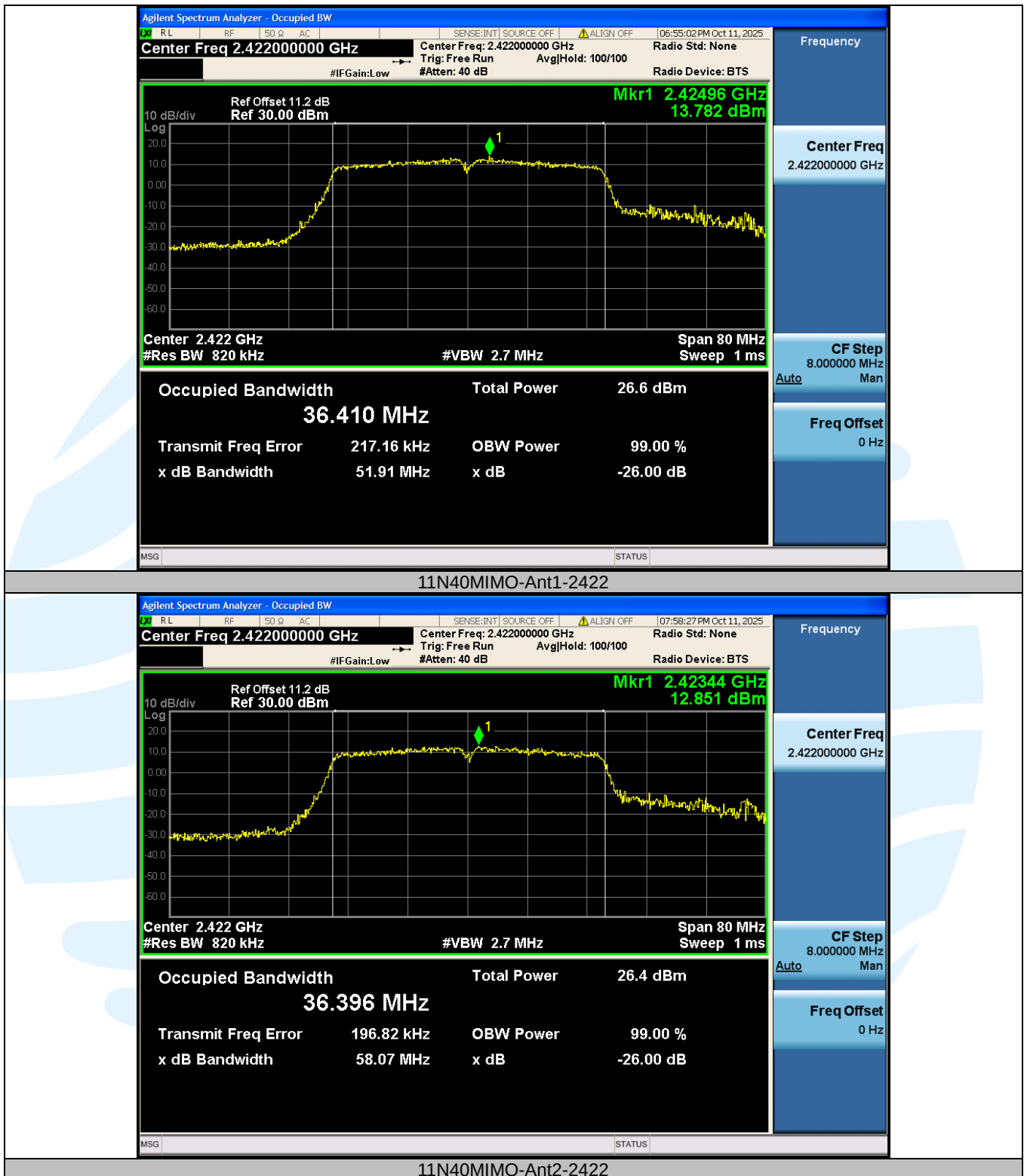
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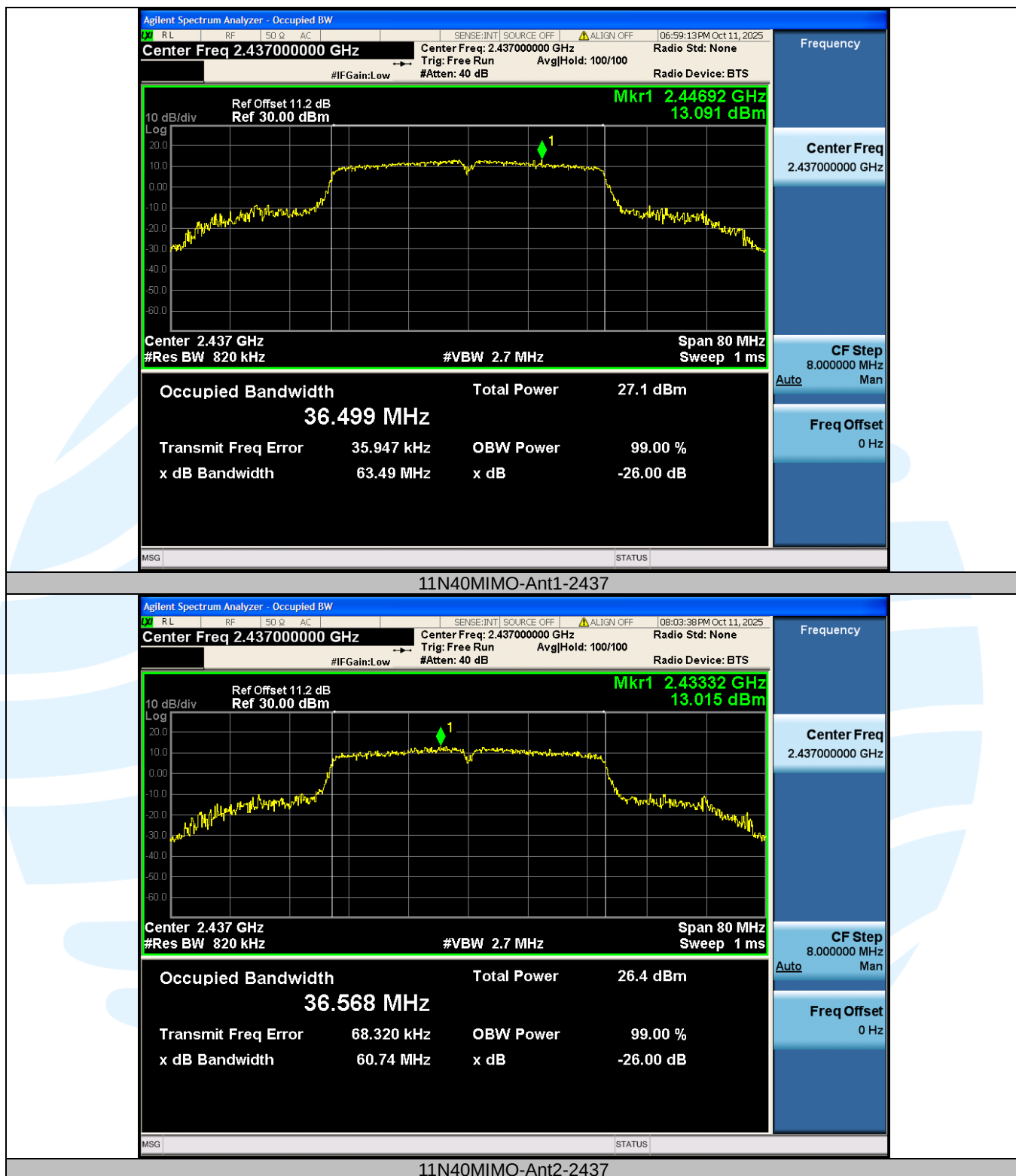
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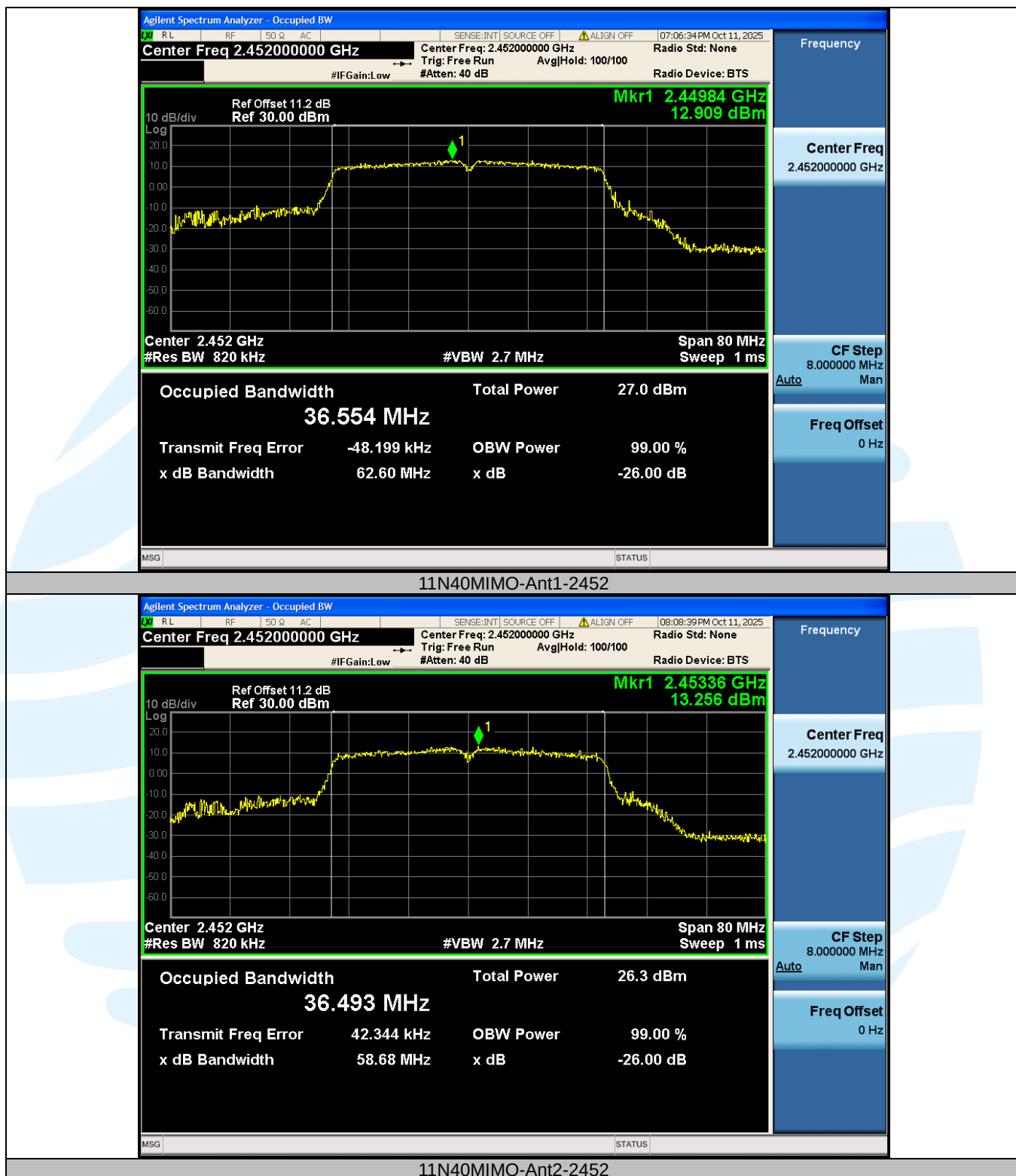
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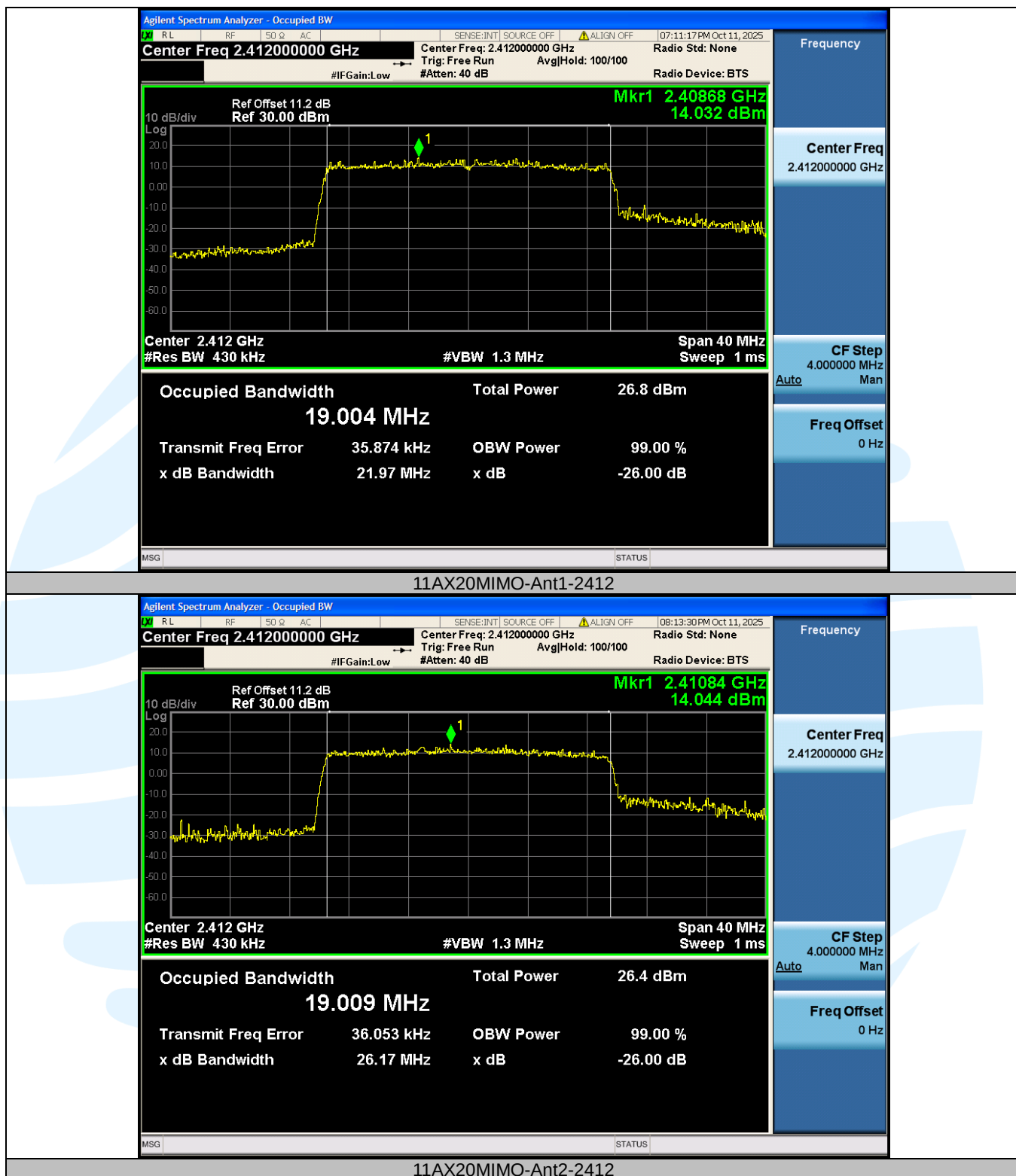
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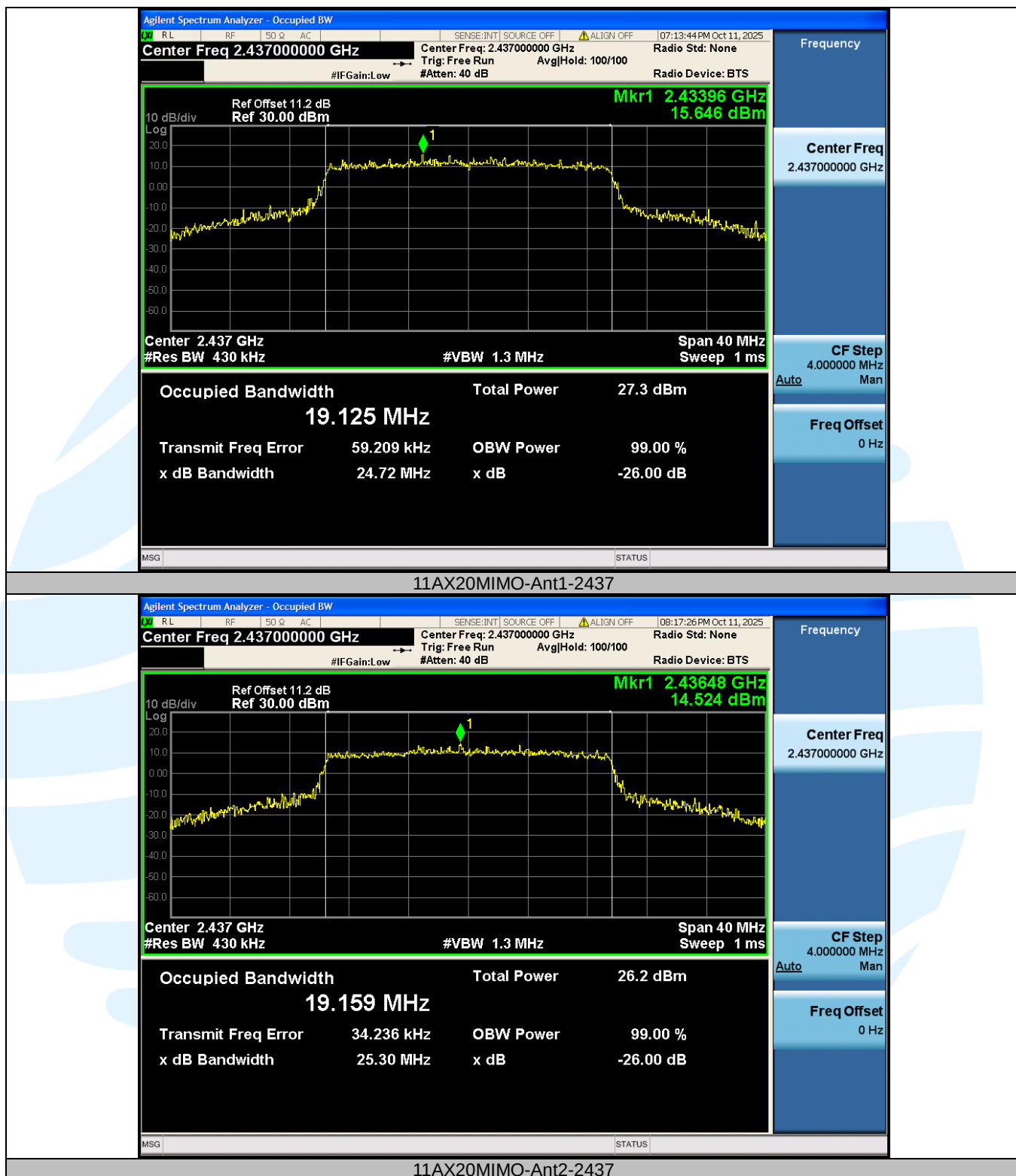
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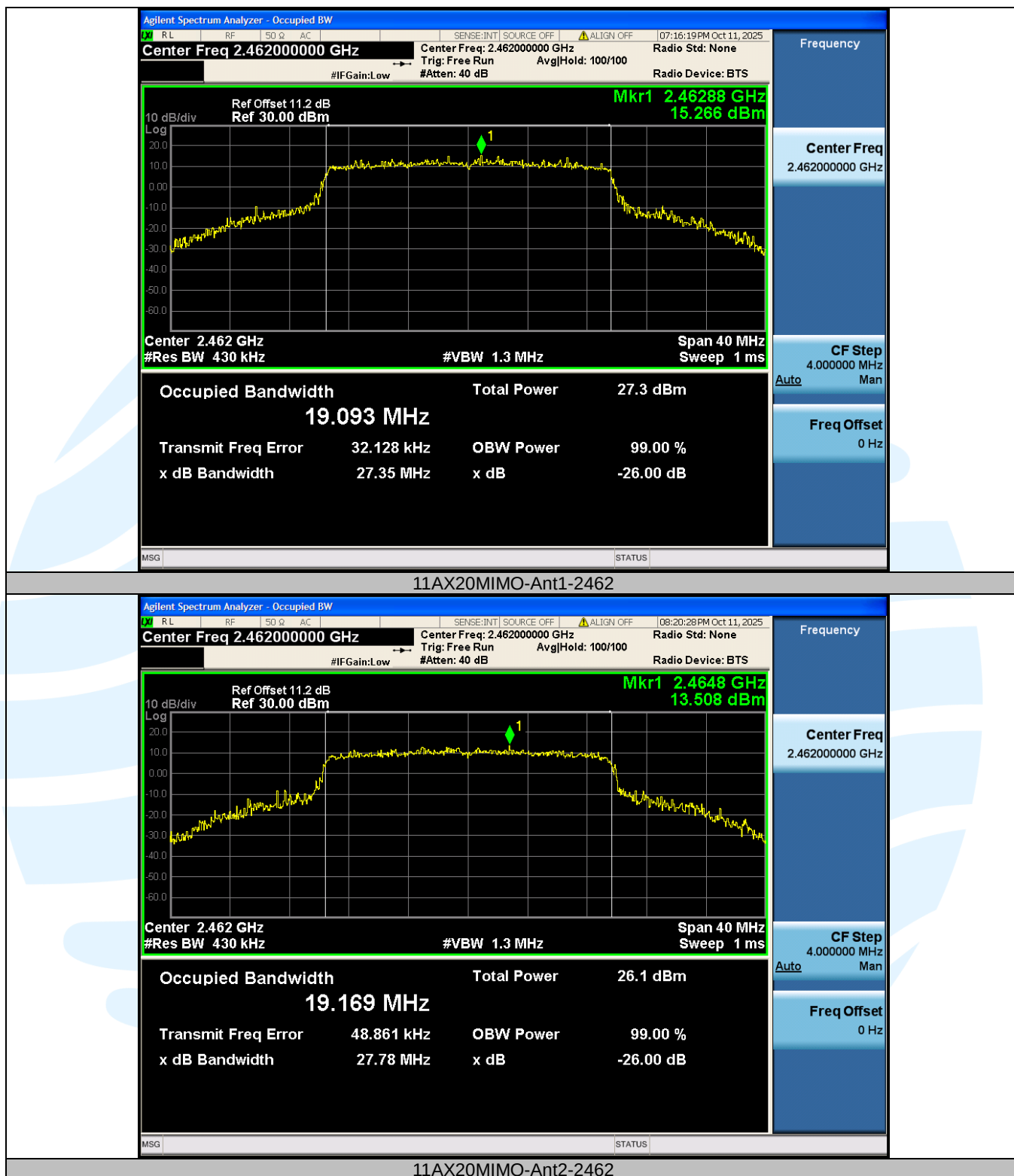
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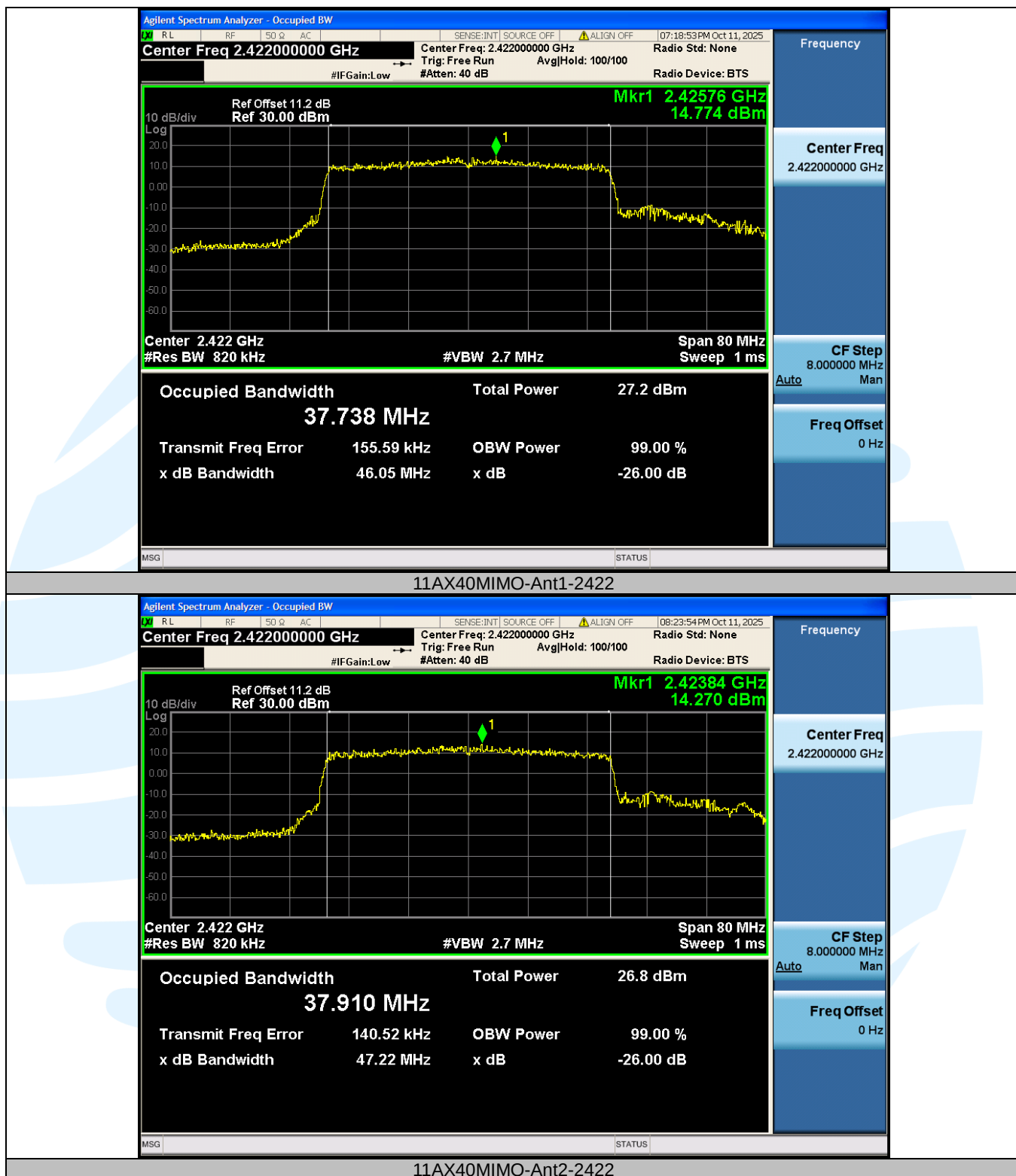
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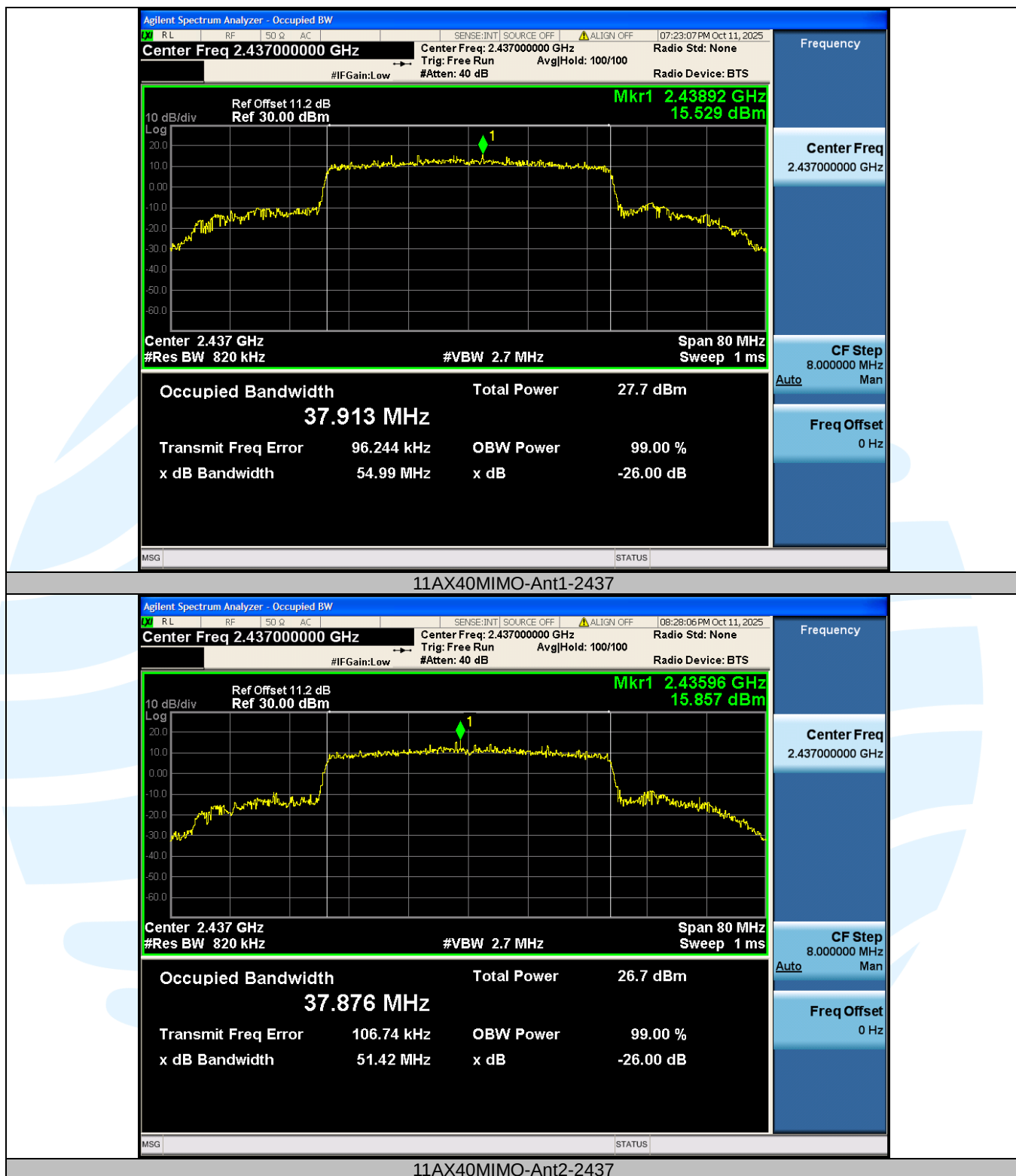
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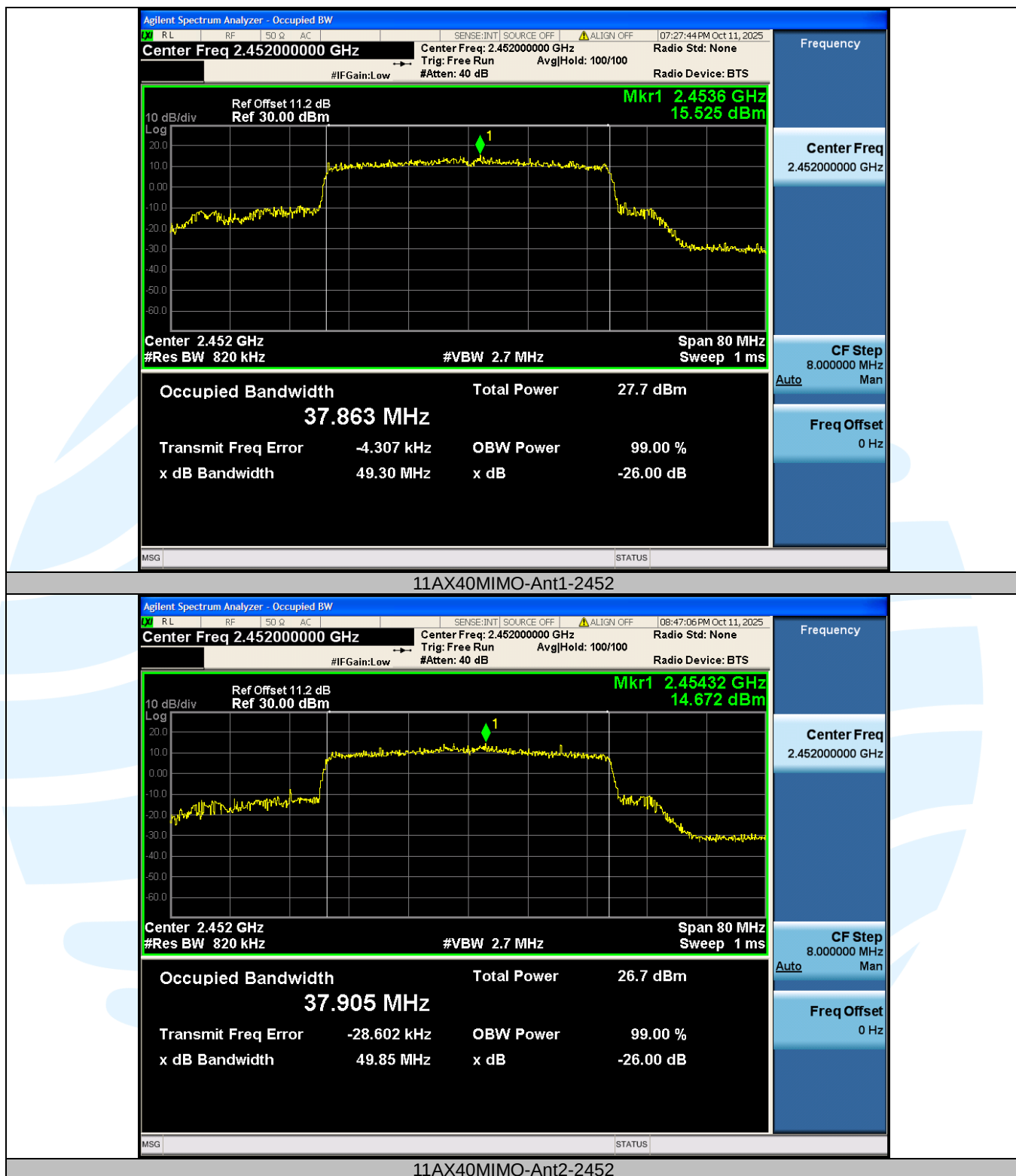
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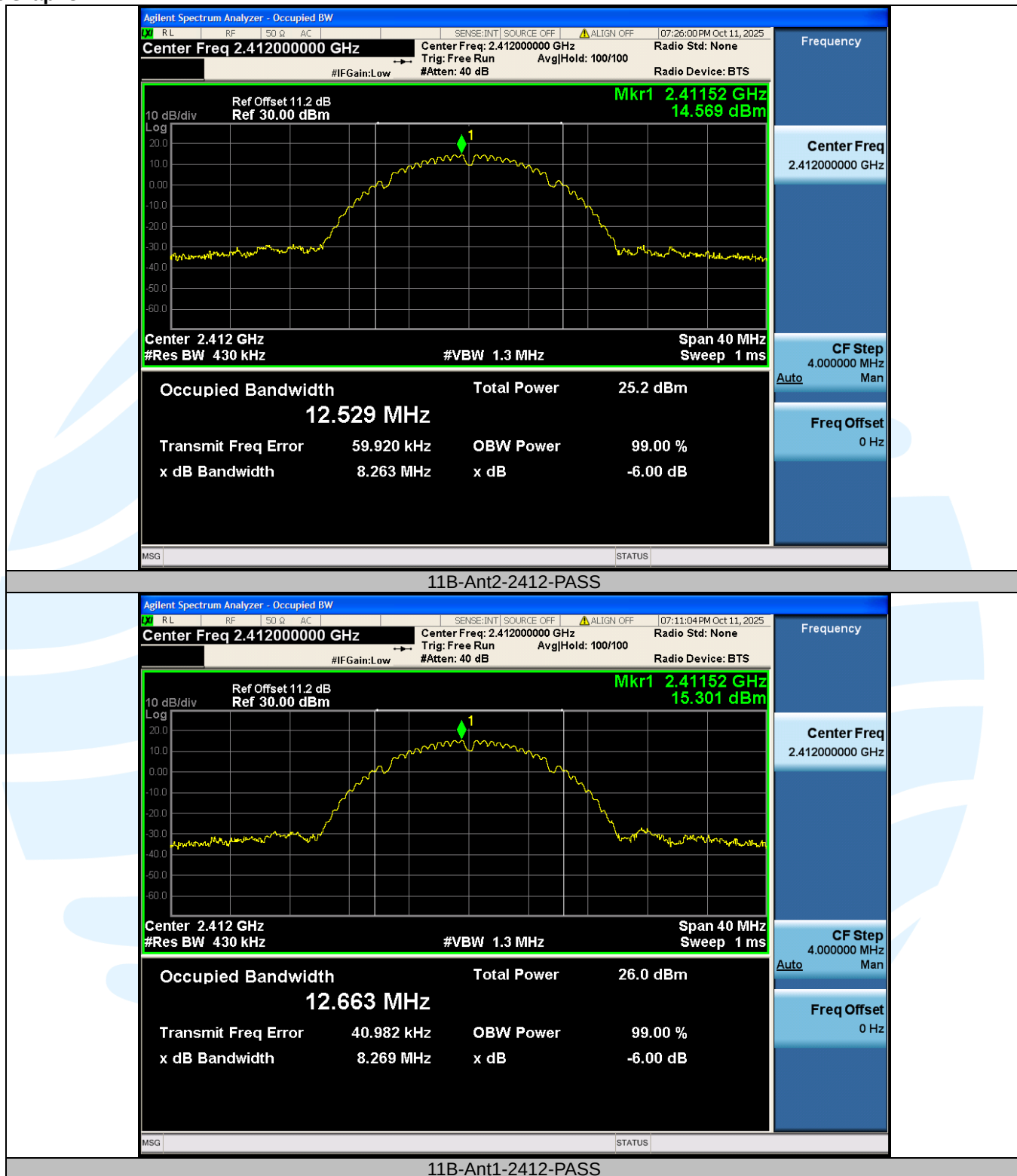
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A.2 6DB BANDWIDTH

Test Mode	Antenna	Frequency [MHz]	DTS BW [MHz]	Limit [MHz]	Verdict
11B	Ant2	2412	8.263	0.5	PASS
11B	Ant1	2412	8.269	0.5	PASS
11B	Ant2	2437	8.260	0.5	PASS
11B	Ant1	2437	8.267	0.5	PASS
11B	Ant2	2462	8.266	0.5	PASS
11B	Ant1	2462	8.269	0.5	PASS
11G	Ant2	2412	16.42	0.5	PASS
11G	Ant1	2412	16.45	0.5	PASS
11G	Ant2	2437	16.23	0.5	PASS
11G	Ant1	2437	16.25	0.5	PASS
11G	Ant2	2462	16.36	0.5	PASS
11G	Ant1	2462	16.30	0.5	PASS
11N20MIMO	Ant2	2412	17.37	0.5	PASS
11N20MIMO	Ant1	2412	17.56	0.5	PASS
11N20MIMO	Ant2	2437	17.58	0.5	PASS
11N20MIMO	Ant1	2437	17.51	0.5	PASS
11N20MIMO	Ant2	2462	17.30	0.5	PASS
11N20MIMO	Ant1	2462	17.48	0.5	PASS
11N40MIMO	Ant2	2422	35.40	0.5	PASS
11N40MIMO	Ant1	2422	35.90	0.5	PASS
11N40MIMO	Ant2	2437	35.53	0.5	PASS
11N40MIMO	Ant1	2437	36.08	0.5	PASS
11N40MIMO	Ant2	2452	35.97	0.5	PASS
11N40MIMO	Ant1	2452	35.94	0.5	PASS
11AX20MIMO	Ant2	2412	18.68	0.5	PASS
11AX20MIMO	Ant1	2412	18.74	0.5	PASS
11AX20MIMO	Ant2	2437	18.81	0.5	PASS
11AX20MIMO	Ant1	2437	18.74	0.5	PASS
11AX20MIMO	Ant2	2462	18.51	0.5	PASS
11AX20MIMO	Ant1	2462	18.64	0.5	PASS
11AX40MIMO	Ant2	2422	34.06	0.5	PASS
11AX40MIMO	Ant1	2422	36.98	0.5	PASS
11AX40MIMO	Ant2	2437	36.17	0.5	PASS
11AX40MIMO	Ant1	2437	34.91	0.5	PASS
11AX40MIMO	Ant1	2452	37.43	0.5	PASS
11AX40MIMO	Ant2	2452	36.37	0.5	PASS

Test Graphs



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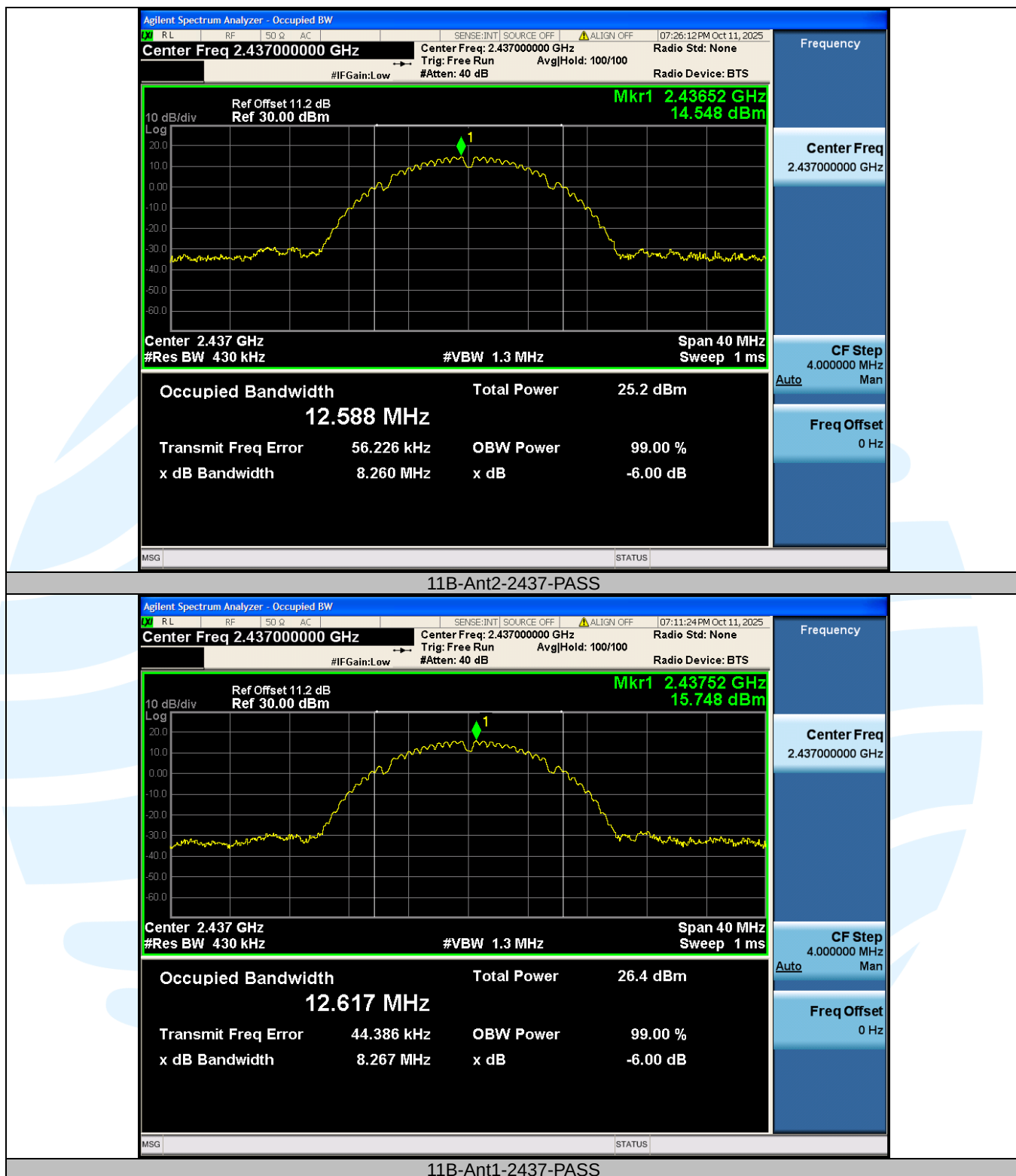
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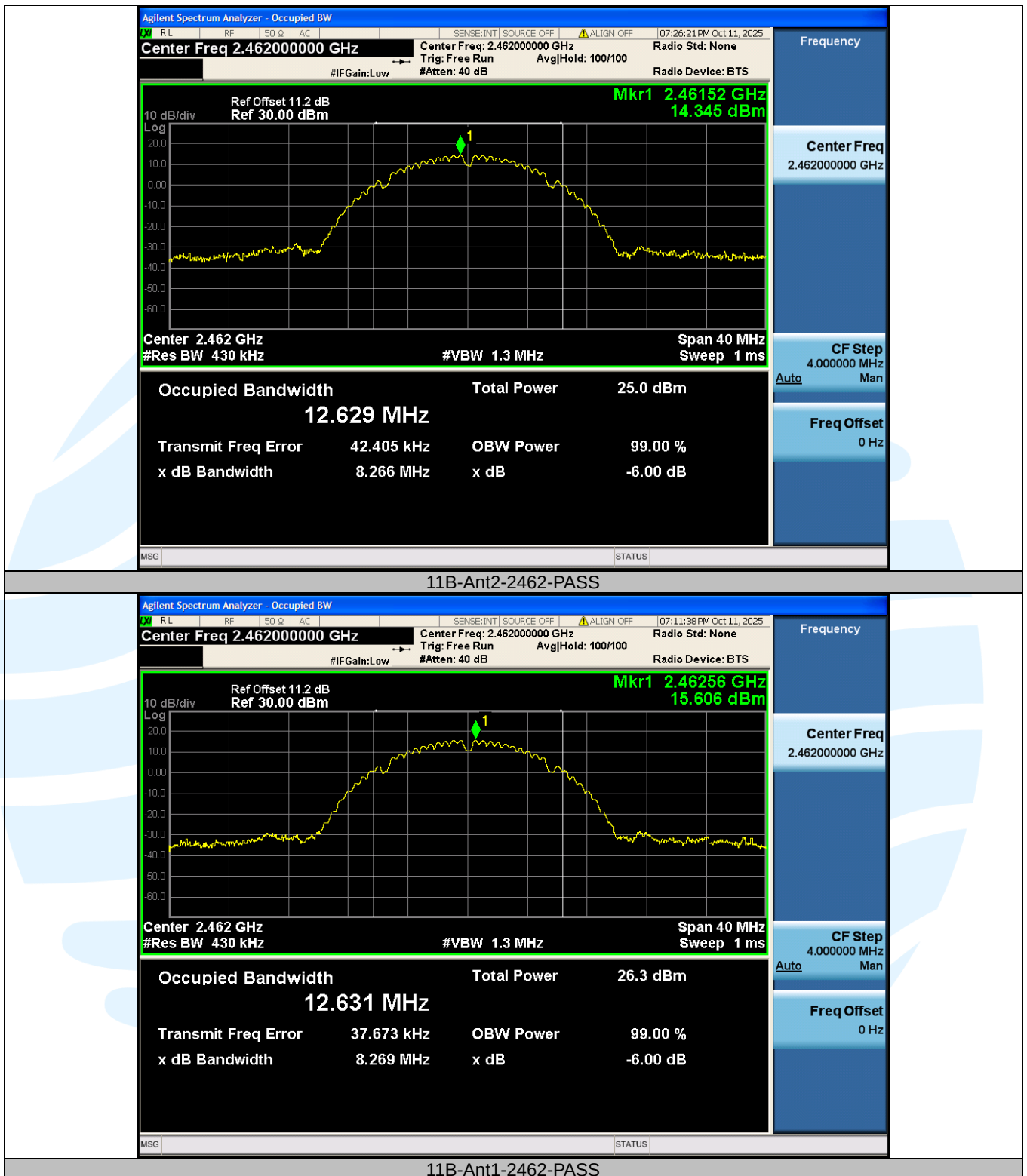
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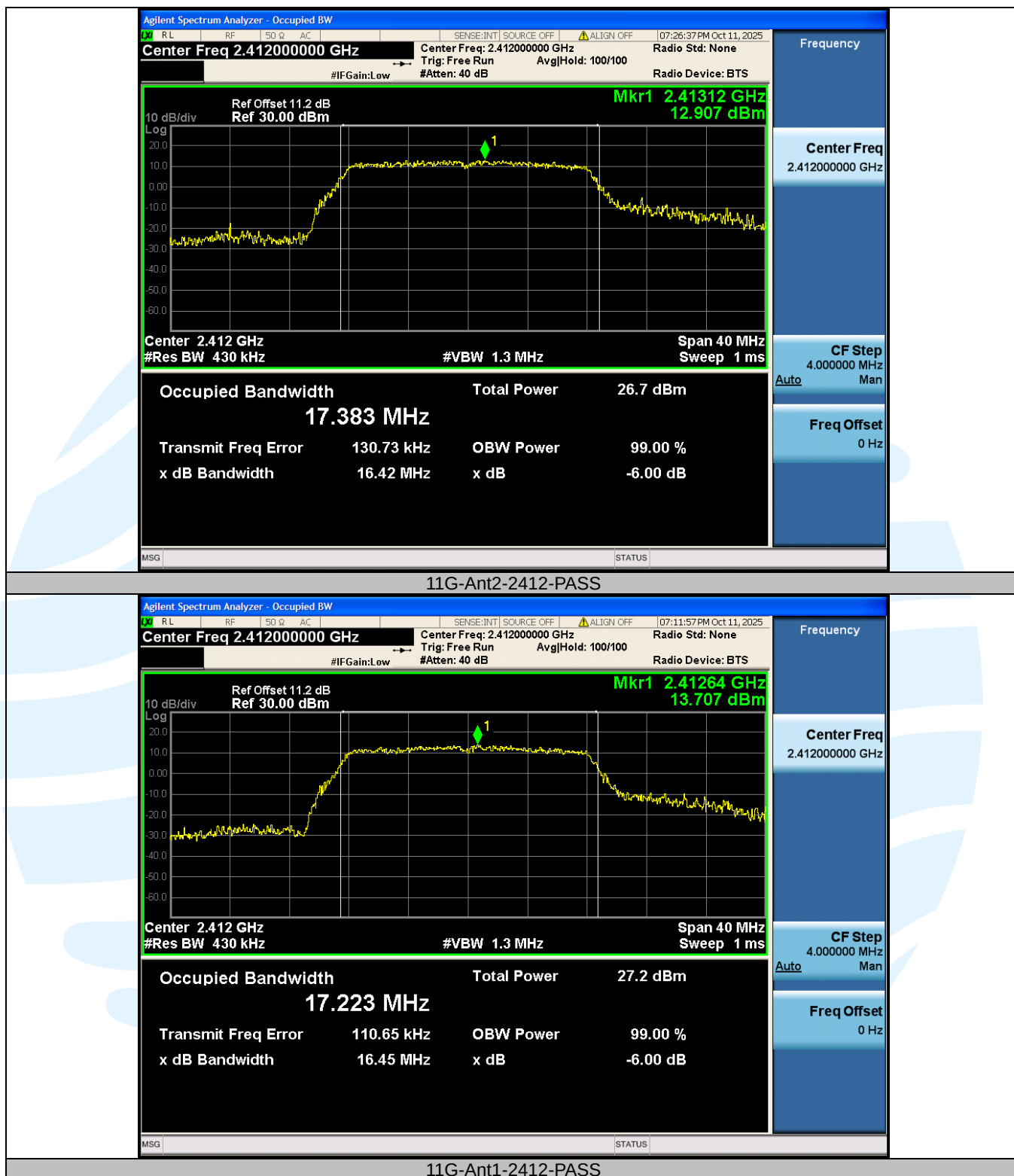
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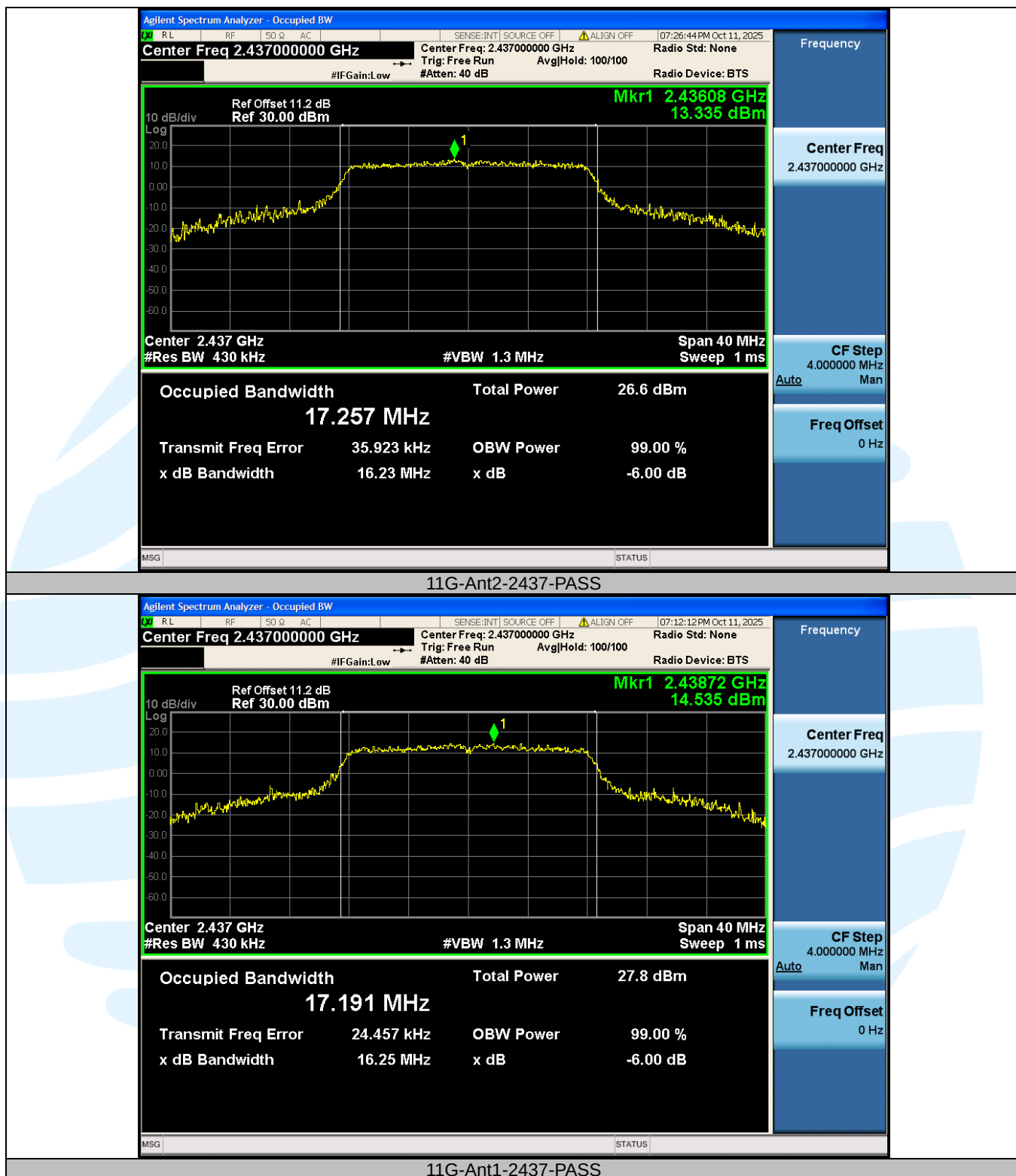
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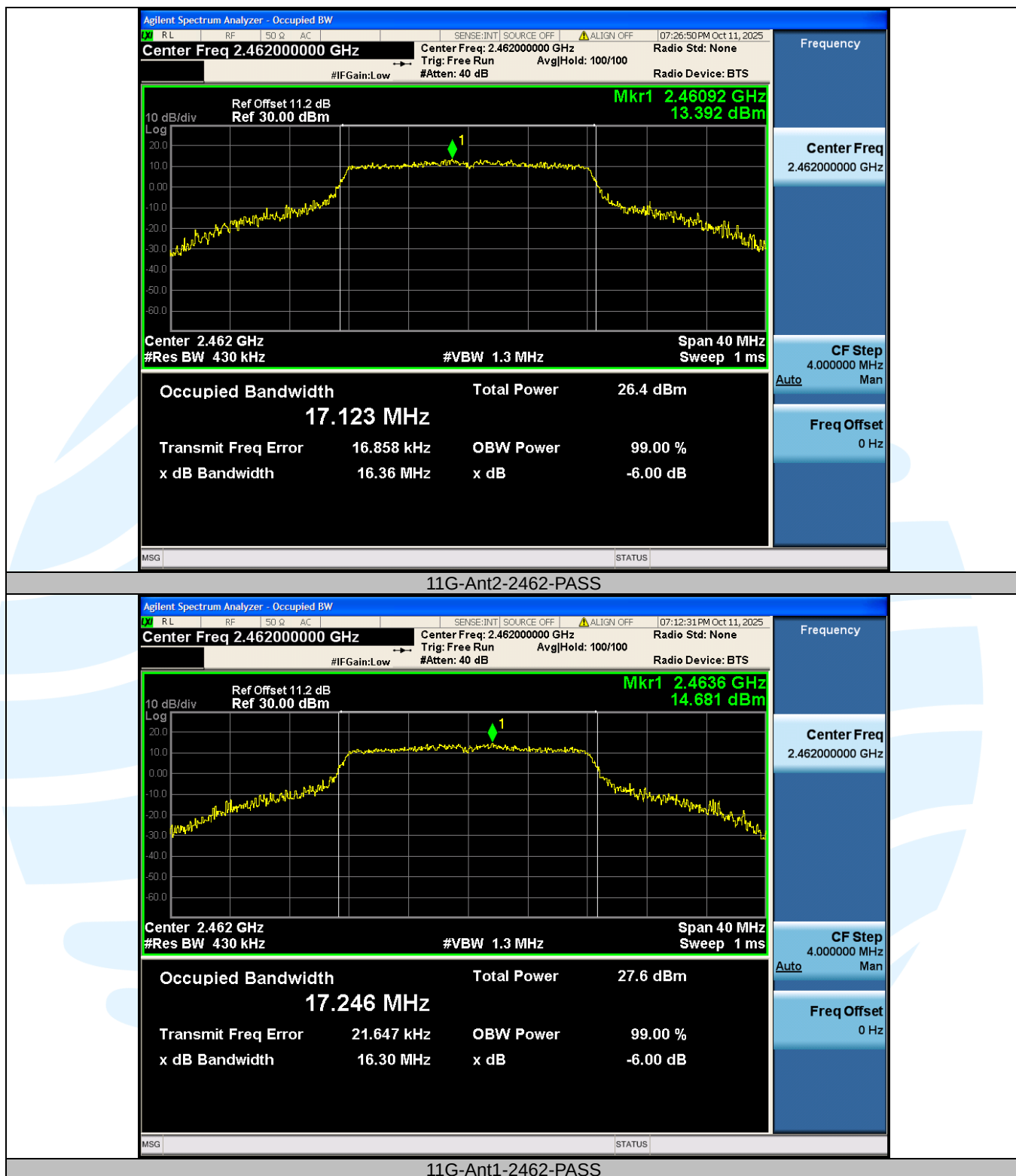
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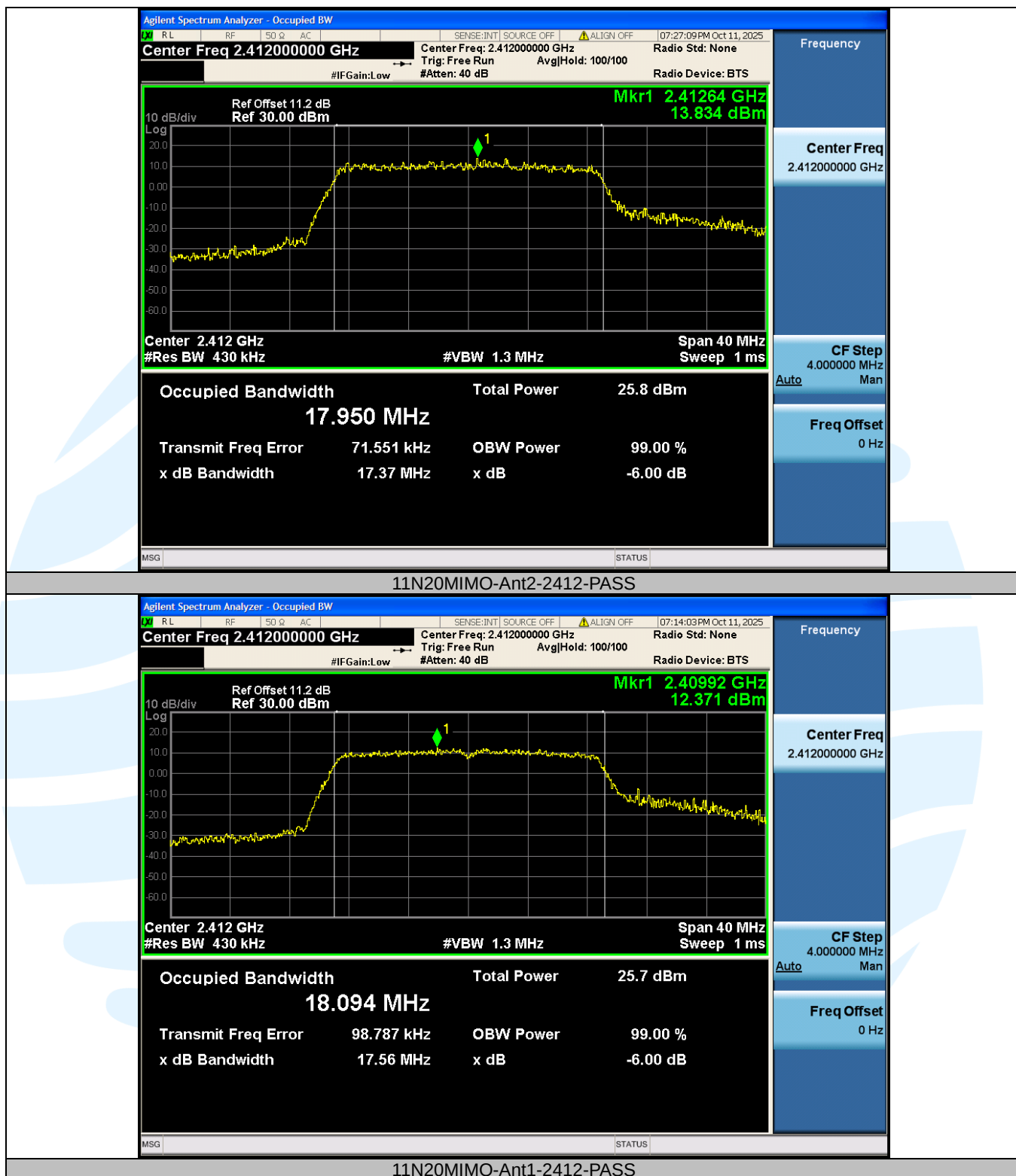
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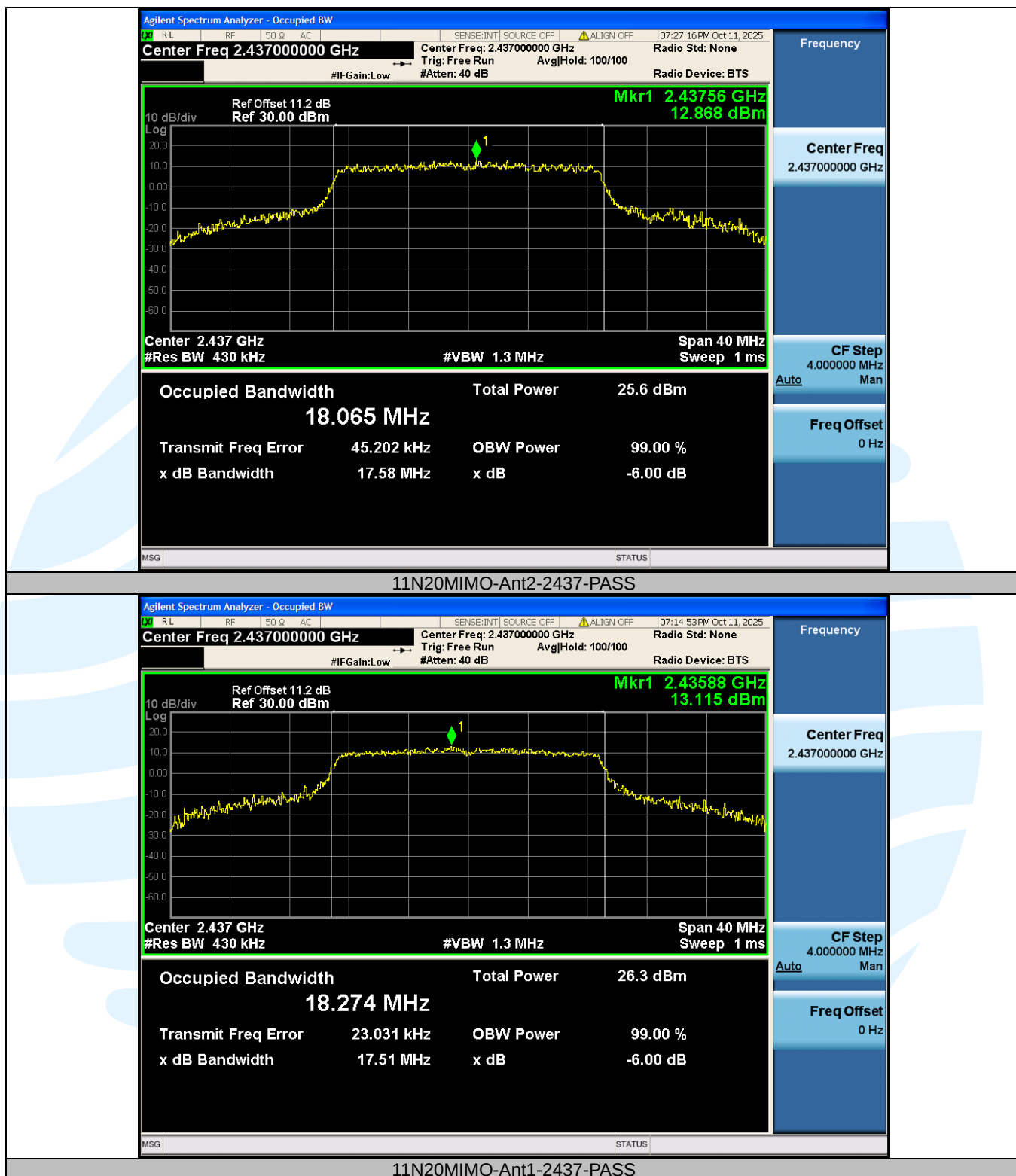
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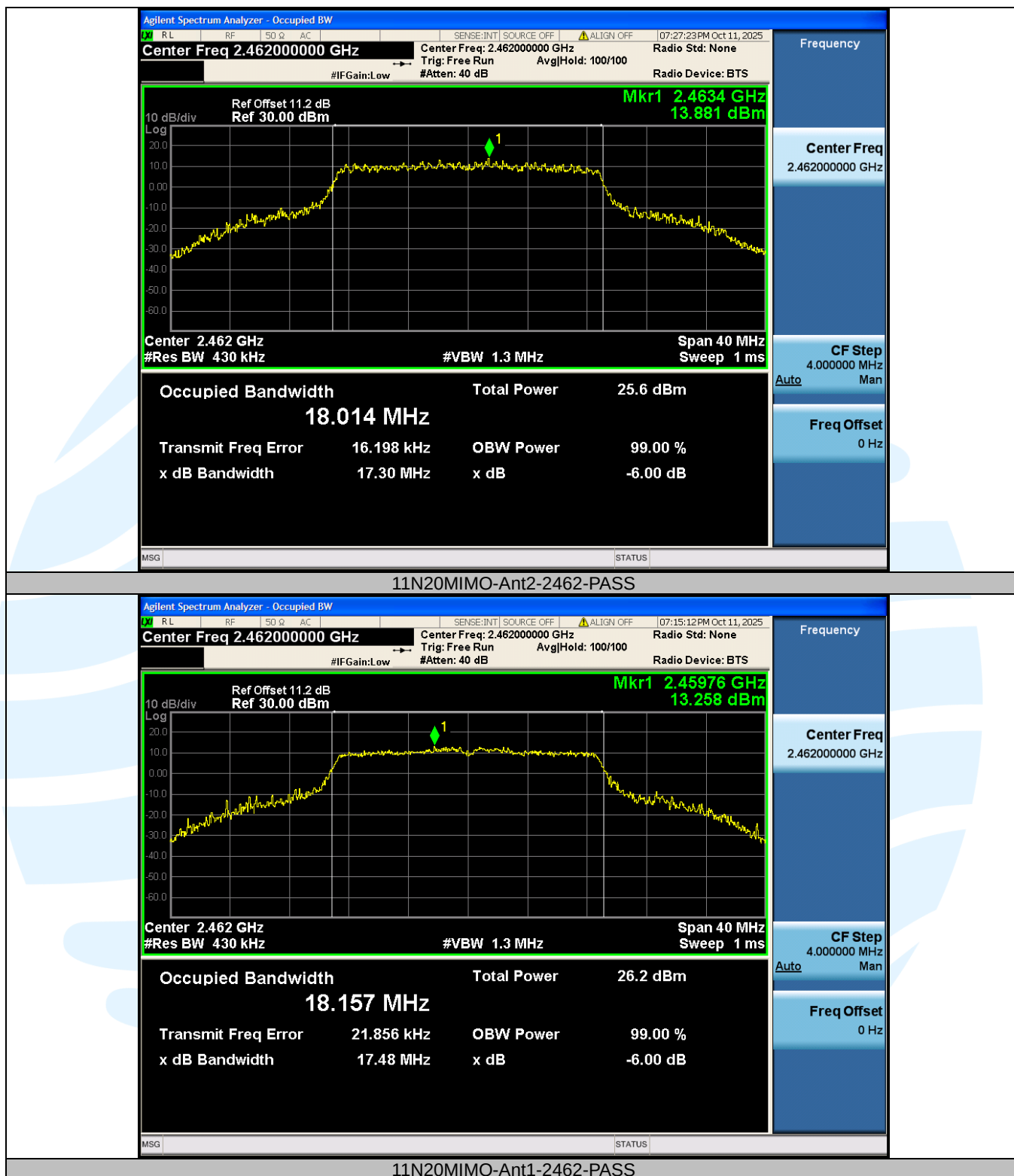
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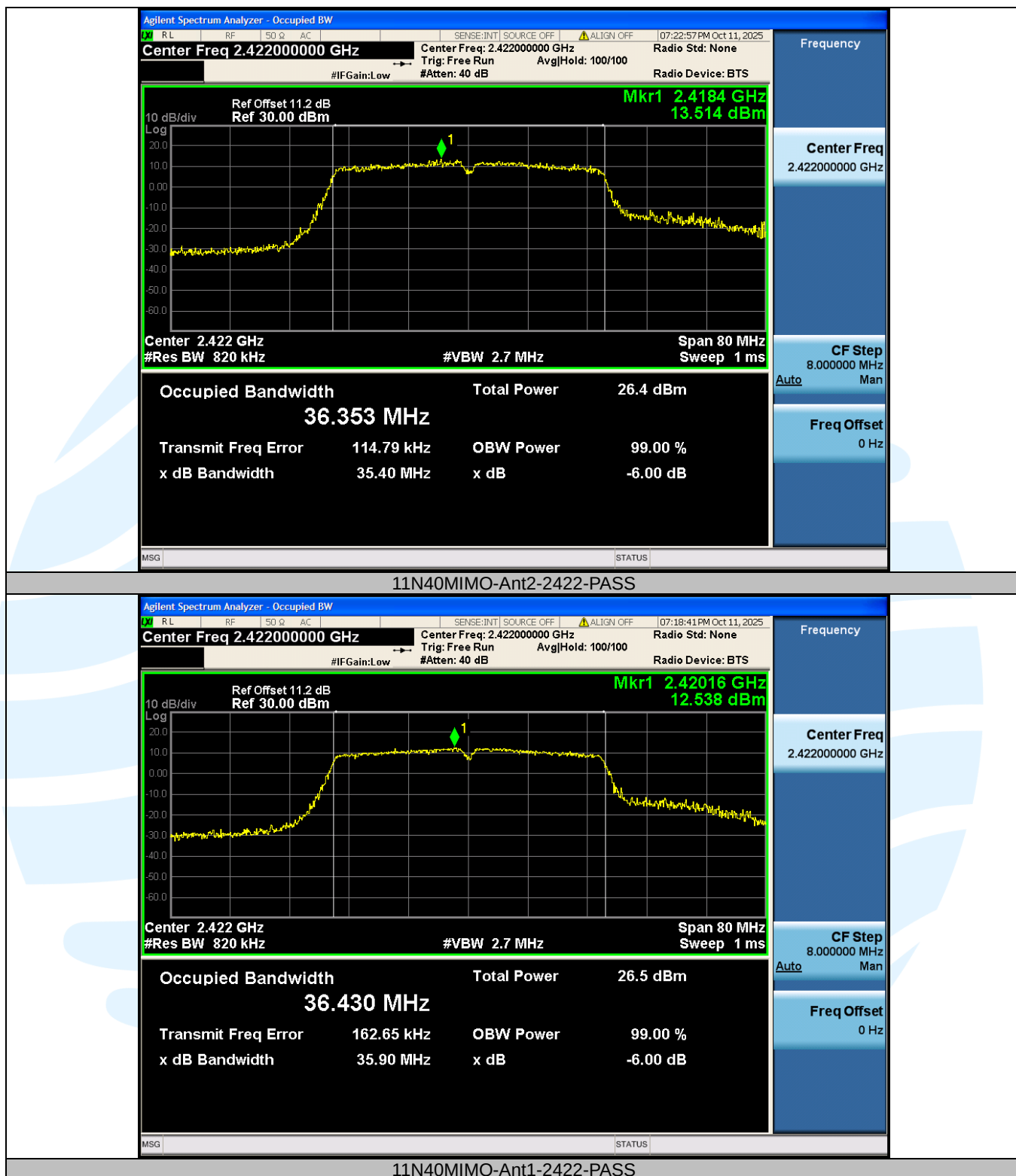
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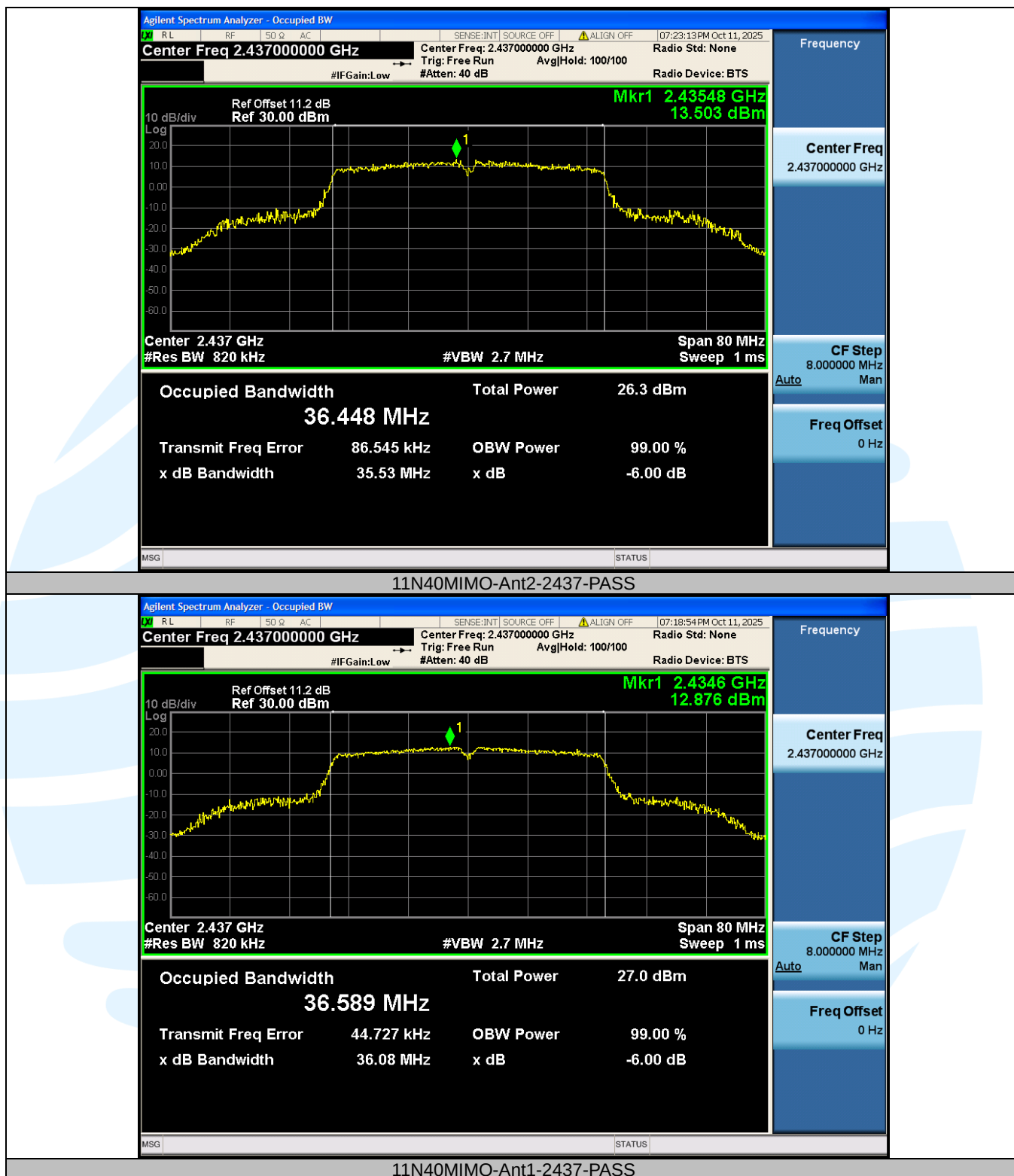
Fax: +86-755-28230886

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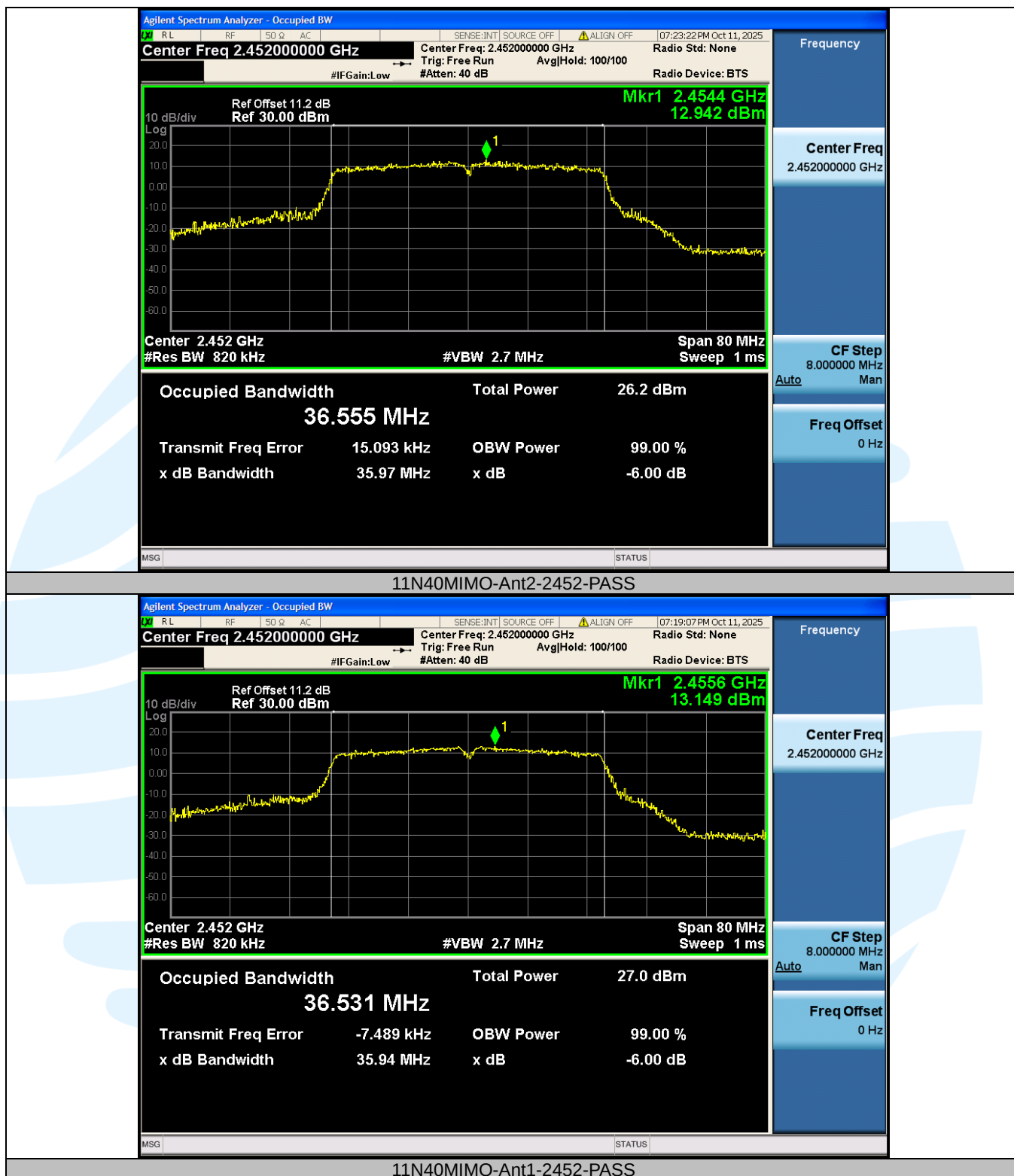
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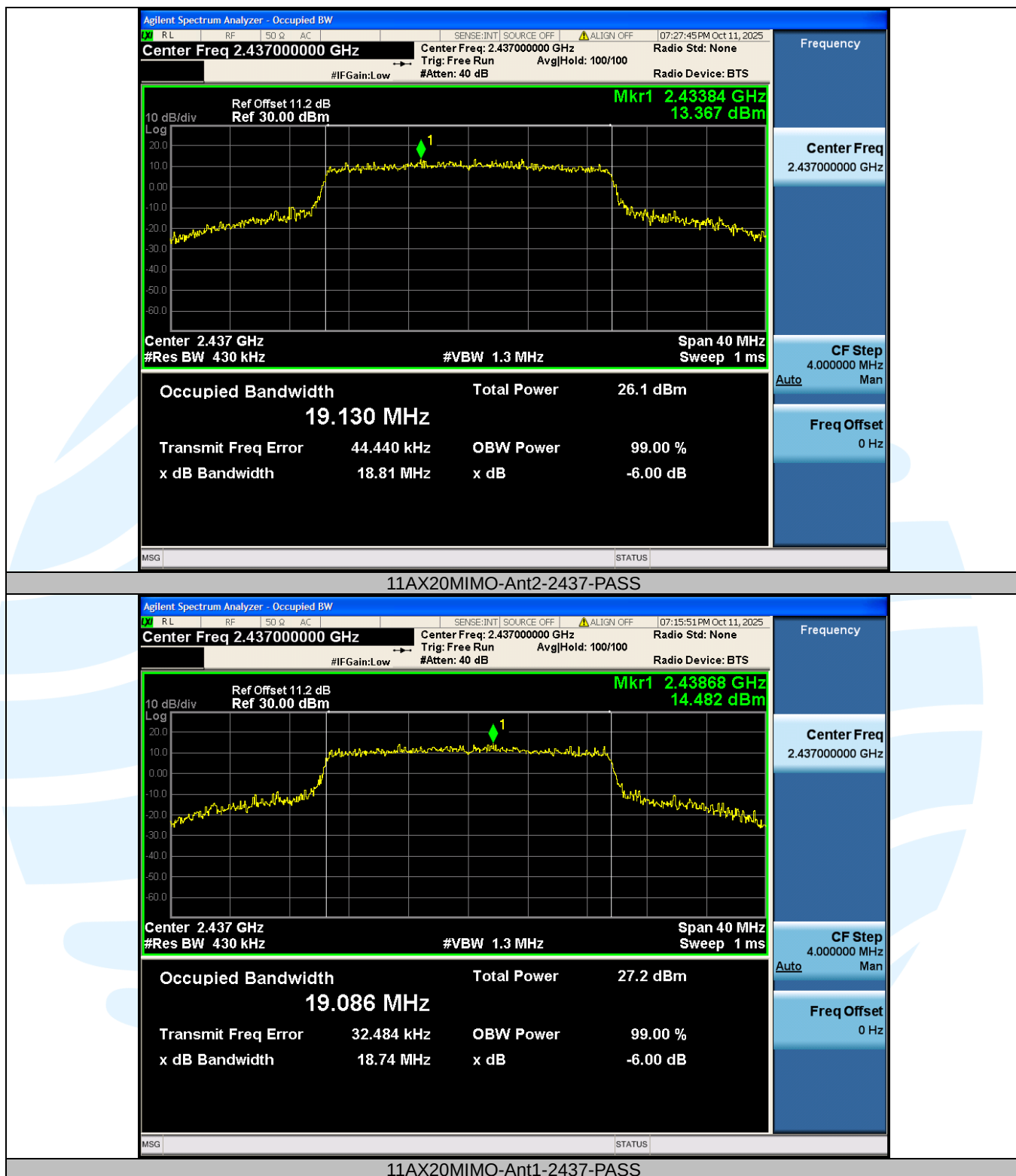
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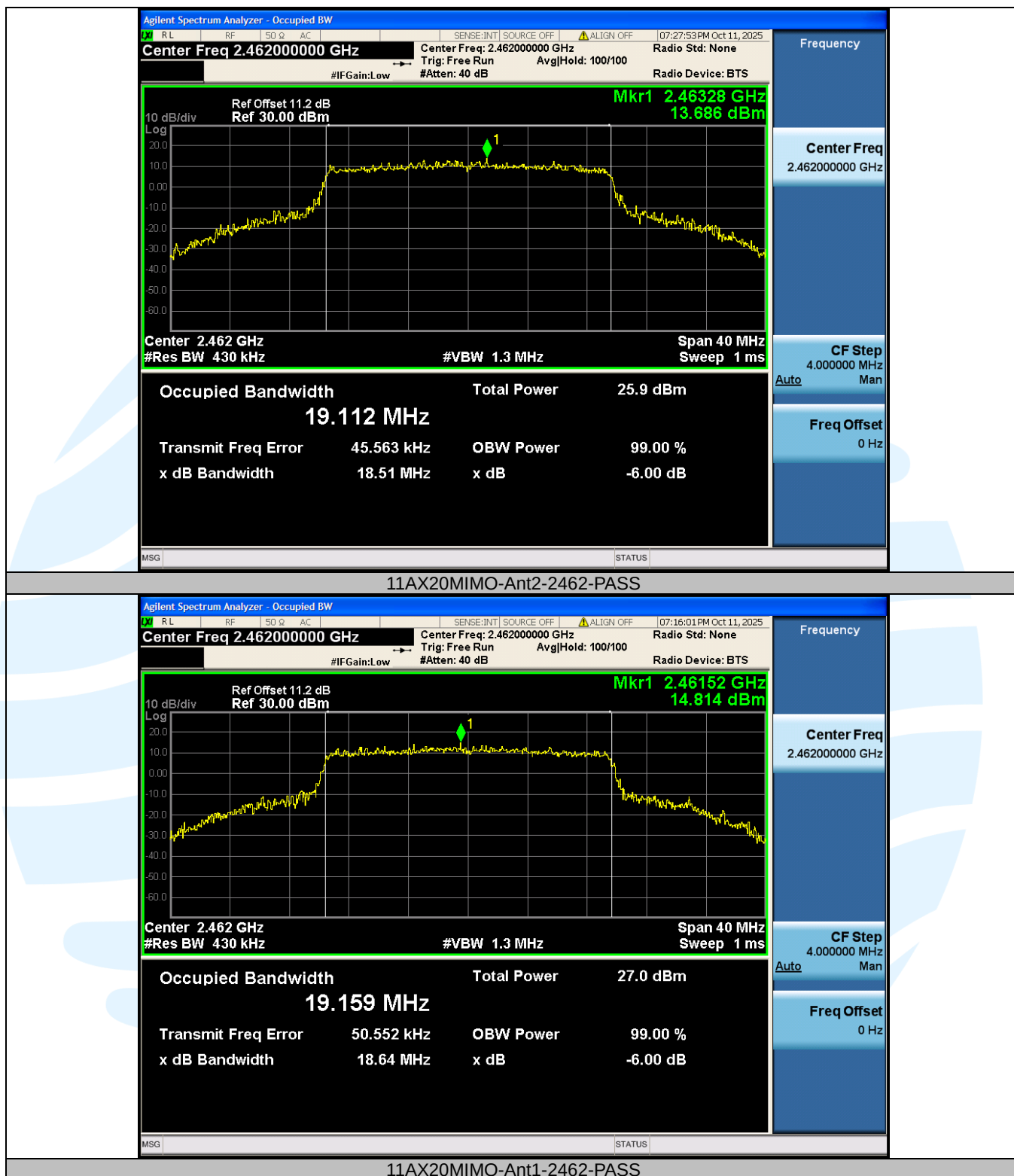
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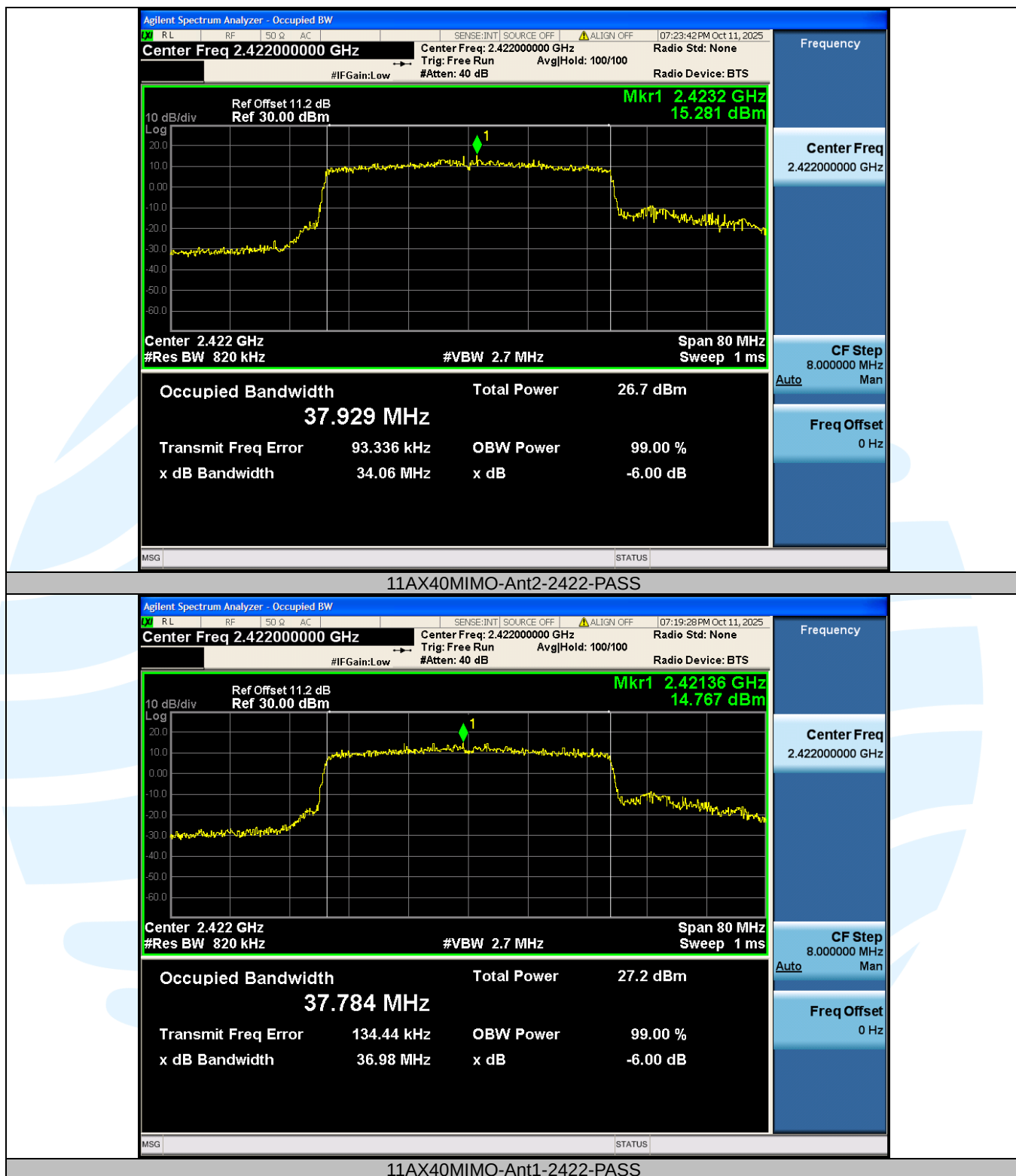
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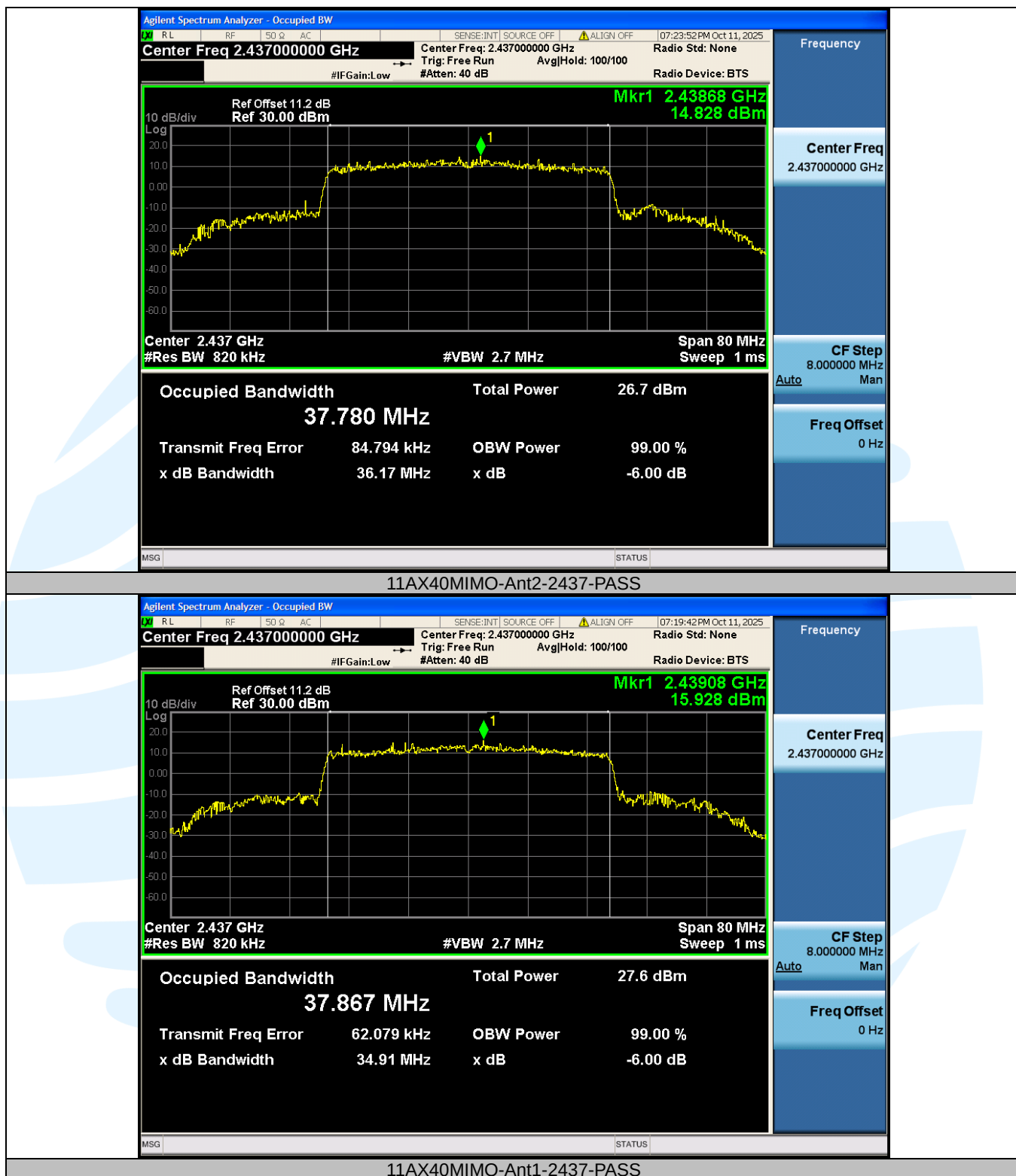
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