

TEST REPORT

Report Number: R15500557-E2

Applicant : Sonos
301 Coromar Dr
Goleta, CA 93117 USA

Model : S51

Brand : Sonos

FCC ID : SBVRM051

IC : 5373A-RM051

EUT Description : Wireless Amplifier

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C
ISED RSS-247 ISSUE 4
ISED RSS-GEN ISSUE 5 + A1 + A2

Date Of Issue:
2026-02-03

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REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2025-11-10	Initial Issue	B. Kiewra
V2	2026-02-03	Revised table is section 6.2 to include only channels 1-11.	B. Kiewra

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Sonos
301 Coromar Dr
Goleta, CA 93117 USA

EUT DESCRIPTION: Wireless Amplifier

MODEL: S51

BRAND: Sonos

SERIAL NUMBER: 00E5813A1A36, 00E585a5CA27

SAMPLE RECEIPT DATE: 2025-09-22

DATE TESTED: 2025-09-22 to 2025-10-01

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	
ISED RSS-247 Issue 4	Refer to Section 2
ISED RSS-GEN Issue 5 + A1 + A2	

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the sample tested, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to ensure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document.

Approved & Released
For UL LLC By:

Prepared By:



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UL LLC

2. TEST RESULTS SUMMARY

This report contains info provided by the customer which can impact the validity of results. UL LLC is only responsible for the validity of results after the integration of the data provided by the customer.

Below is a list of the data/info provided by the customer:

- 1)Antenna gain and type (see section 6.3)
- 2)Worst-case data rates (see section 6.5)

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	ANSI C63.10 Section 11.6.
-	RSS-GEN 6.7	99% OBW	Reporting purposes only	ANSI C63.10 Section 6.9.3.
15.247 (a) (2)	RSS-247 6.3.1 (a)	6dB BW	Compliant	None
15.247 (b) (3)	RSS-247 6.3.2	Output Power		
See Comment		Average power	Reporting purposes only	Per ANSI C63.10, Section 11.9.2.3.2.
15.247 (e)	RSS-247 6.3.1 (b)	PSD	Compliant	None
15.247 (d)	RSS-247 6.6	Conducted Spurious Emissions		
15.209, 15.205	RSS-GEN 8.9, 8.10	Radiated Emissions		
15.207	RSS-Gen 8.8	AC Mains Conducted Emissions		

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC 47 CFR Part 2, FCC 47 CFR Part 15, ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024, KDB 558074 D01 15.247 Meas Guidance v05r02, KDB 414788 D01 Radiated Test Site v01r01, RSS-GEN Issue 5 + A1 + A2, and RSS-247 Issue 4.

4. FACILITIES AND ACCREDITATION

UL LLC is accredited by A2LA, certification # 0751.06, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
☐	Building: 12 Laboratory Dr Durham, NC 27713, U.S.A	US0067	2180C	825374
☒	Building: 2800 Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A		27265	

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Radio Frequency (Spectrum Analyzer)	141.2 Hz
Occupied Channel Bandwidth	1.22%
RF output power, conducted	1.3 dB (PK) 0.45 dB (AV)
Power Spectral Density, conducted	2.47 dB
Unwanted Emissions, conducted	1.94 dB
All emissions, radiated	6.01 dB
Conducted Emissions (0.150-30MHz) - LISN	3.40 dB
Temperature	0.57°C
Humidity	3.39%
DC Supply voltages	1.70%
Time	3.39%

Uncertainty figures are valid to a confidence level of 95%.

5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB)
– Preamp Gain (dB)
 $36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dBuV/m}$

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN
Insertion Loss.
 $36.5 \text{ dBuV} + 0 \text{ dB} + 10.1 \text{ dB} + 0 \text{ dB} = 46.6 \text{ dBuV}$

6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a Wireless Amplifier that transmits BLE, 2.4GHz WLAN, and 5GHz WLAN. This report covers testing on 2.4GHz WLAN.

6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b	27.99	629.51
2412 - 2462	802.11g	28.26	669.88
2412 - 2462	802.11n HT20	28.27	671.43
2412 - 2462	802.11ax HE20 26T	27.22	527.23
2412 - 2462	802.11ax HE20 52T	28.63	729.46
2422 - 2462	802.11ax HE20 106T	28.52	711.21
2422 - 2462	802.11ax HE20 242T	28.57	719.45
2422 - 2462	802.11ax HE20 SU	28.34	682.34

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes 4 antennas for diversity, chain 0 connects ANT 1 and ANT2, chain 1 connects to ANT3 and ANT 4. Through pretesting it was determined that antenna 1 and antenna 4 are the worst-case combination and result in the worst-case antenna gains as declared below.

Mode	Type	Declared Correlated Gain (dBi)	Declared Uncorrelated Gain (dBi)
2.4GHz WLAN 2Tx MIMO	Triband Monopole	5.3	1.1

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was 91.0-45210-diag-pallas-rel-202505220206.

6.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz, above 18GHz, and power line conducted emissions were performed with the EUT set to transmit at the mode and channel with highest output power as worst-case scenario.

Band edge and radiated emissions between 1GHz and 18GHz were performed with the EUT set to transmit at the highest power on low, middle(radiated emissions only) and high channels. Radiated emissions performed on the modes with the highest power and PSD per modulation type (CCK and OFDM).

The EUT is intended to operate in one orientation. Therefore, all testing was performed with the EUT in this intended orientation of operation.

Worst-case data rates as provided by the client were:

802.11b mode: 1 Mbps
802.11g mode: 6 Mbps
802.11n HT20mode: MCS0
802.11ax HE20mode: MCS0

Notes: All conducted testing with the exception of power was run at mid-channel power.
For 802.11ax mode, PSD run on 26T, 52T, and 106T. This also covers 242T and SU modes since smaller BW and power is lower or equivalent.
SISO and MIMO power levels are equivalent.
To reduce the size of report only representative plots are included for some conducted testing.

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Lenovo	T14s	PC2E1WMJ	NA
Laptop	Lenovo	T450s	PC06YXZG	NA
Speakers	Scosche	HD4004SD	PEA12112	NA

I/O CABLES

I/O Cable List						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Mains	1	Hardwired	Non-shielded	<3m	Mains
2	Ethernet	1	Ethernet	Non-Shielded	>3m	Connected to ENET switch
3	USB C	1	USB C	Non-Shielded	<3m	Connected to laptop
4	RCA	3	RCA-3.5mm	Non-Shielded	<3m	Connected to laptop
5	Speaker	8	Proprietary	Non-Shielded	<3m	Connected to speaker

TEST SETUP

The EUT is connected to a test laptop during the tests.

SETUP DIAGRAMS

Please refer to R15500557-EP1 for setup diagrams

7. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville – Chamber 4)

Equipment ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
0.009-30MHz					
135144	Active Loop Antenna	ETS-Lindgren	6502	2024-10-02	2025-10-02
	30-1000 MHz				
90628	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2024-01-02	2026-01-02
1-18 GHz					
206211	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2024-04-09	2026-04-09
18-40 GHz					
91186	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2024-05-16	2026-05-16
Gain-Loss Chains					
207638	Gain-loss string: 0.009-30MHz	Various	Various	2025-06-13	2026-06-13
207639	Gain-loss string: 25-1000MHz	Various	Various	2025-06-13	2026-06-13
207640	Gain-loss string: 1-18GHz	Various	Various	2025-06-13	2026-06-13
225795	Gain-loss string: 18-40GHz	Various	Various	2025-06-13	2026-06-13
Receiver & Software					
197954	Spectrum Analyzer	Rohde & Schwarz	ESW44	2025-04-21	2026-04-21
90411	Spectrum Analyzer	Keysight	N9030A	2025-07-30	2026-07-30
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
Additional Equipment used					
241204	Environmental Meter	Fisher Scientific	15-077-963	2025-08-05	2027-08-05

Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
90410	Spectrum Analyzer MY54410168	Keysight Technologies	N9030A	2025-07-10	2026-07-10
211055	Real-Time Peak Power Sensor 50MHz to 8GHz 12002	Boonton	RTP5000	2025-07-30	2026-07-30
211056	Real-Time Peak Power Sensor 50MHz to 8GHz 12001	Boonton	RTP5000	2025-07-30	2026-07-30
248881	Environmental Meter 240303668	Control Company	06-662-4	2024-04-10	2026-04-10
226566	2.92mm Coaxial 10dB Attenuator 40GHz	Fairview Microwave	SA4014-10	2025-08-30	2026-08-30
226567	2.92mm Coaxial 10dB Attenuator 40GHz	Fairview Microwave	SA4014-10	2025-09-02	2026-09-02
259603	Conducted Switch Box	UL	CSB	2025-03-12	2026-03-12
SOFTEMI	Antenna Port Software	UL	Version 2024.2.23		
Power Software	Boonton Power Analyzer	Boonton	Version 3.0.13.0		

Test Equipment Used - Line-Conducted Emissions – Voltage (Morrisville – Conducted 1)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
CBL087	Coax cable, RG223, N-male to BNC-male, 20-ft.	Pasternack	PE3W06143-240	2025-04-17	2026-04-17
179892	Environmental Meter	Fisher Scientific	15-077-963	2025-08-05	2026-08-05
91432	LISN, 50-ohm/50-uH, 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50-25-2-01-550V	2025-07-30	2026-07-30
75141	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2025-07-30	2026-07-30
52859	Transient Limiter, 0.009-100MHz	Electro-Metrics	EM-7600	2025-07-30	2026-07-30
694826	AC Power Source	Elgar	CW2501M	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		

8. MEASUREMENT METHOD

On Time and Duty Cycle: ANSI C63.10-2020 Section 11.6

6 dB BW: ANSI C63.10-2020 Subclause -11.8.1

Occupied BW (99%): ANSI C63.10-2020 Section 6.9.3

Output Power: ANSI C63.10-2020 Subclause -11.9.1.2 Method PKPM1 Peak-reading power meter
ANSI C63.10-2020 Subclause -11.9.2.3.2 Method AVGPM-G (Measurement using
a gated RF average-reading power meter)

PSD: ANSI C63.10-2020 Subclause -11.10.2 Method PKPSD (peak PSD)

Conducted emissions non-restricted frequency bands: ANSI C63.10-2020 Subclause -11.11 and 6.10.4

Radiated emissions restricted frequency bands: ANSI C63.10-2020 Subclause -11.12.1 and 6.10.5, 6.3 to 6.6.

AC Power-line conducted emissions: ANSI C63.10-2020, Section 6.2.

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

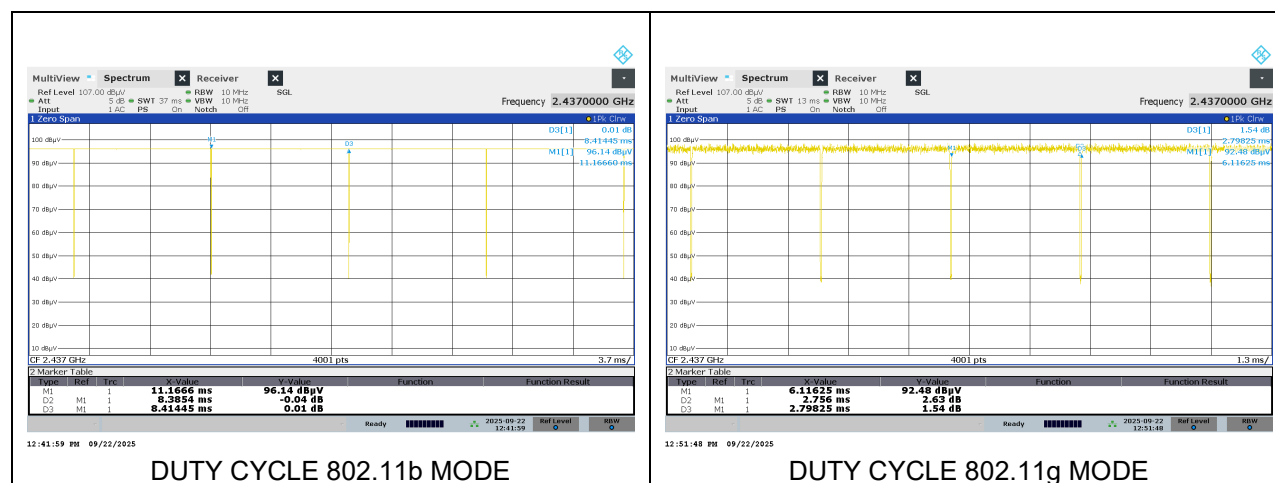
PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

Mode	ON Time B (ms)	Period (ms)	Duty Cycle x (linear)	Duty Cycle (%)	Voltage Duty Cycle Correction Factor (dB)	RMS Duty Cycle Correction Factor (dB)
802.11b	8.385	8.414	0.997	99.70	0.00	0.00
802.11g	2.756	2.798	0.985	98.50	0.00	0.00
802.11n HT20	5.086	5.128	0.992	99.20	0.00	0.00
802.11be HE20 26T	0.580	0.615	0.942	94.20	0.52	0.26
802.11be HE20 52T	0.496	0.532	0.933	93.30	0.60	0.30
802.11be HE20 106T	0.436	0.472	0.925	92.50	0.68	0.34
802.11be HE20 242T	0.376	0.411	0.913	91.30	0.79	0.40
802.11be HE20 SU	4.099	4.141	0.990	99.00	0.00	0.00

Tester ID: 19289

Test Location: Chamber 4





DUTY CYCLE 802.11n HT20 MODE



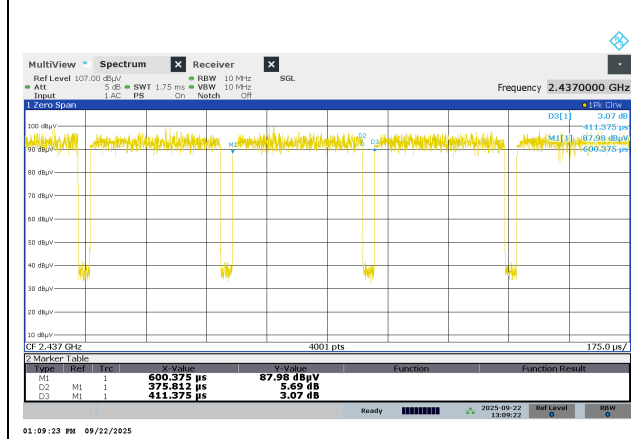
DUTY CYCLE 802.11ax HE20 26T MODE



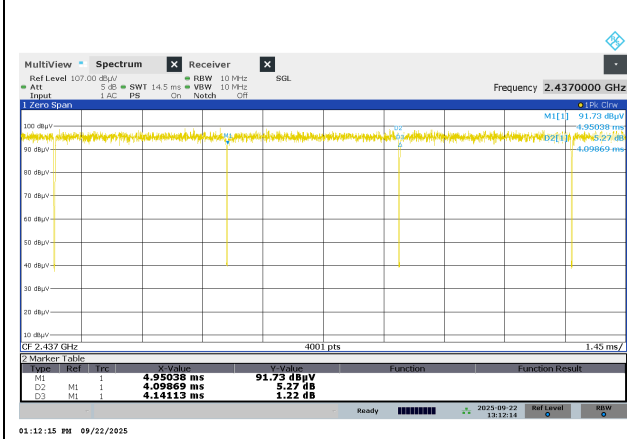
DUTY CYCLE 802.11ax HE20 52T MODE



DUTY CYCLE 802.11ax HE20 106T MODE



DUTY CYCLE 802.11ax HE20 242T MODE



DUTY CYCLE 802.11ax HE20 SU MODE

9.2. 99% BANDWIDTH

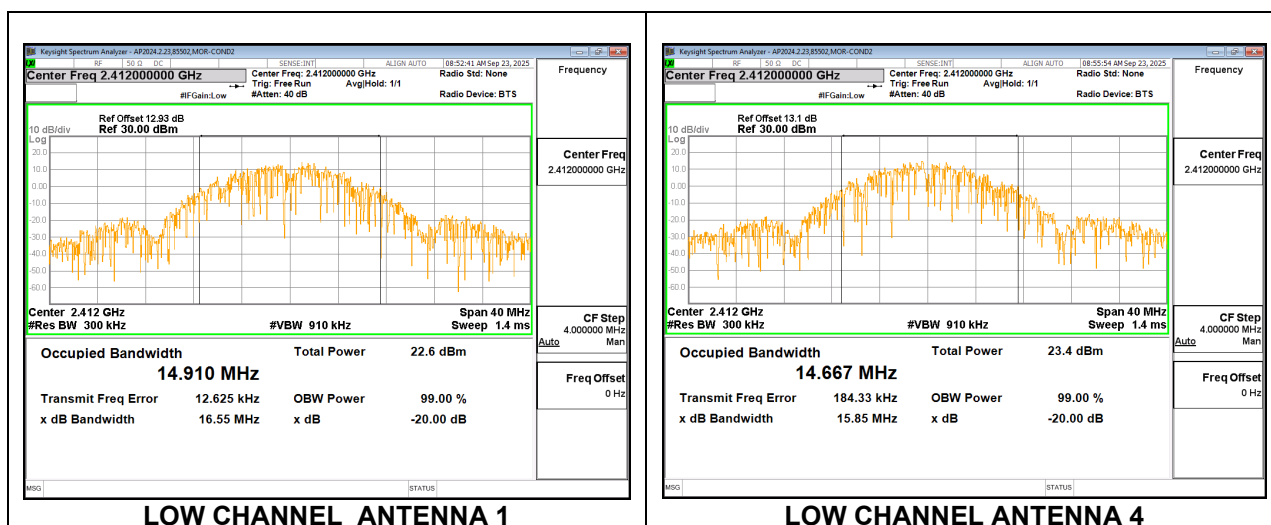
LIMITS

None; for reporting purposes only.

9.2.1. 802.11b MODE

2TX ANTENNA 1 + ANTENNA 4 CDD MODE

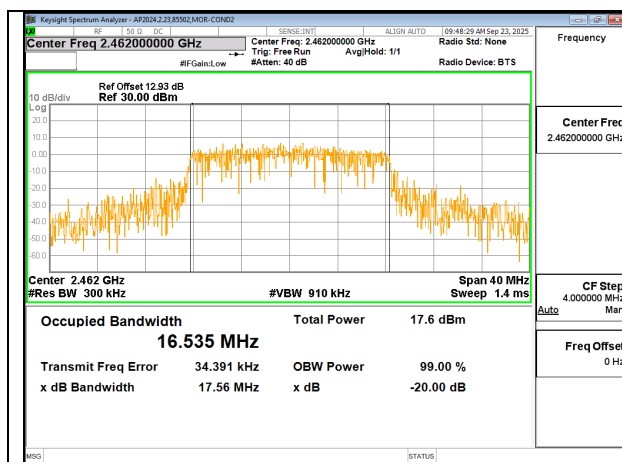
Channel	Frequency (MHz)	99% Bandwidth ANTENNA 1 (MHz)	99% Bandwidth ANTENNA 4 (MHz)
Low	2412	14.910	14.667
Mid	2437	14.479	14.788
High	2462	14.644	14.644



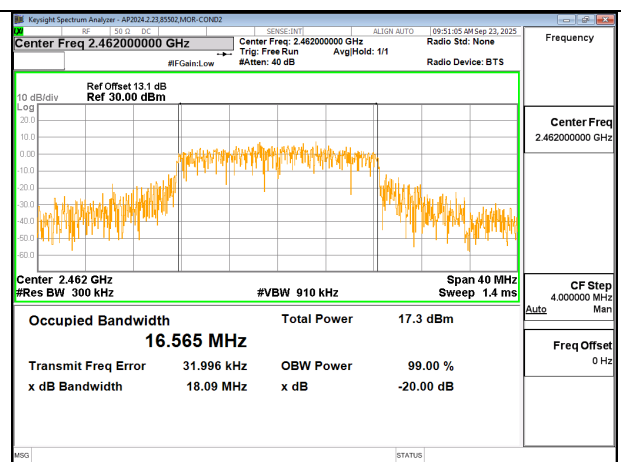
9.2.2. 802.11g MODE

2TX ANTENNA 1 + ANTENNA 4 CDD MODE

Channel	Frequency (MHz)	99% Bandwidth ANTENNA 1 (MHz)	99% Bandwidth ANTENNA 4 (MHz)
Low	2412	16.482	16.451
Mid	2437	16.442	16.595
High	2462	16.535	16.565



HIGH CHANNEL ANTENNA 1

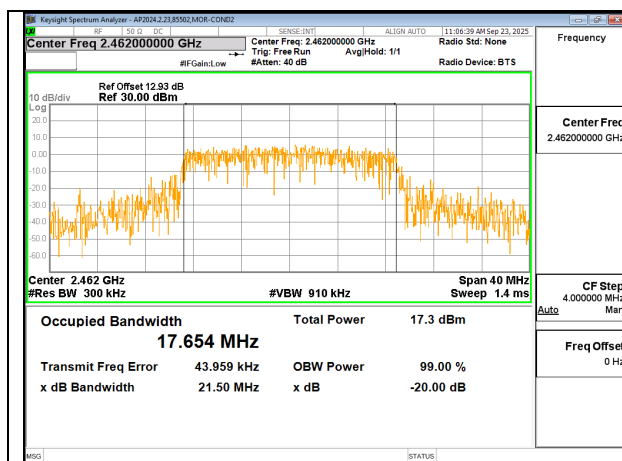


HIGH CHANNEL ANTENNA 4

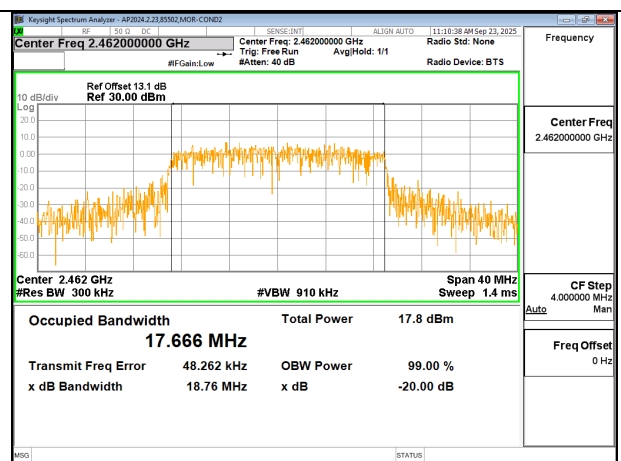
9.2.3. 802.11n HT20 MODE

2TX ANTENNA 1 + ANTENNA 4 CDD MODE

Channel	Frequency (MHz)	99% Bandwidth ANTENNA 1 (MHz)	99% Bandwidth ANTENNA 4 (MHz)
Low	2412	17.684	17.548
Mid	2437	17.671	17.658
High	2462	17.654	17.666



HIGH CHANNEL ANTENNA 1

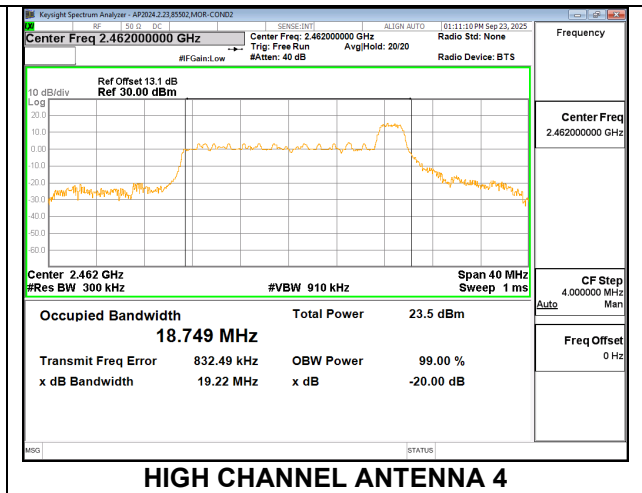
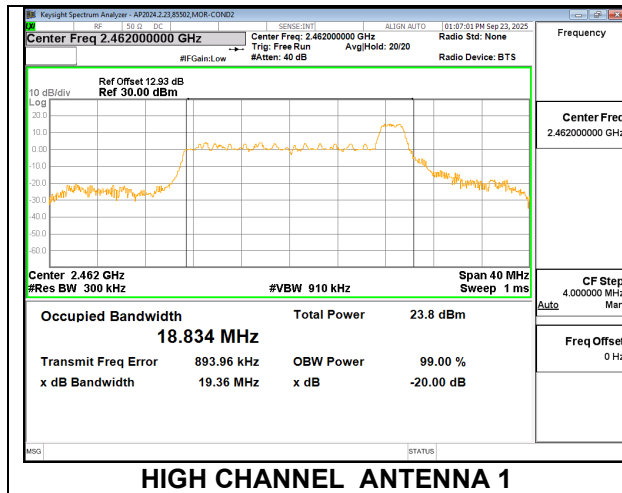


HIGH CHANNEL ANTENNA 4

9.2.4. 802.11ax HE20 MODE 2TX

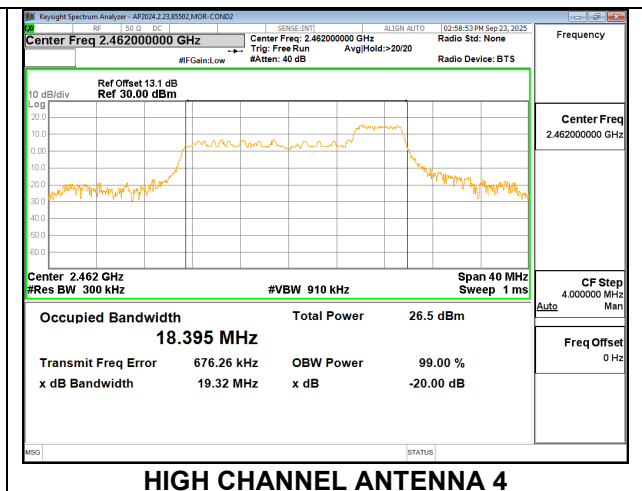
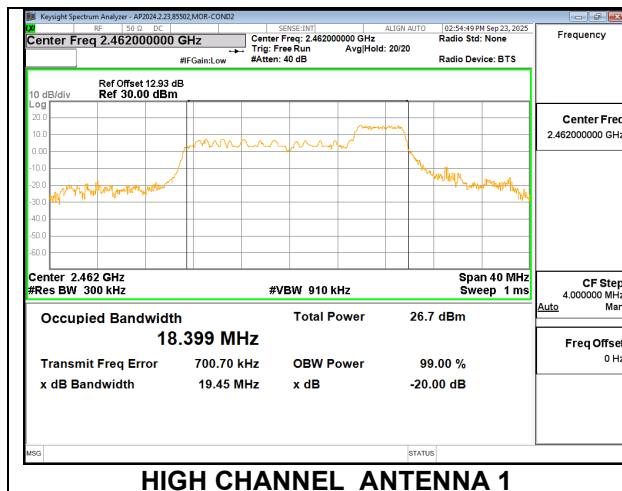
2TX ANTENNA 1 + ANTENNA 4 CDD MODE: 26T

Channel	Frequency (MHz)	99% Bandwidth ANTENNA 1 (MHz)	99% Bandwidth ANTENNA 4 (MHz)
Low	2412	18.831	18.691
Mid	2437	17.057	17.084
High	2462	18.834	18.749



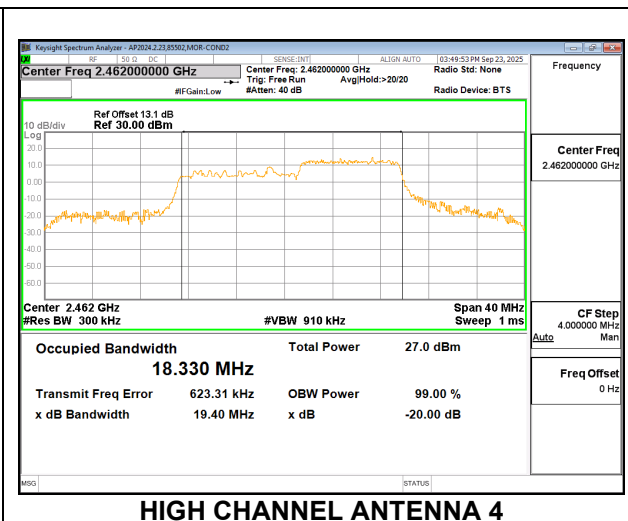
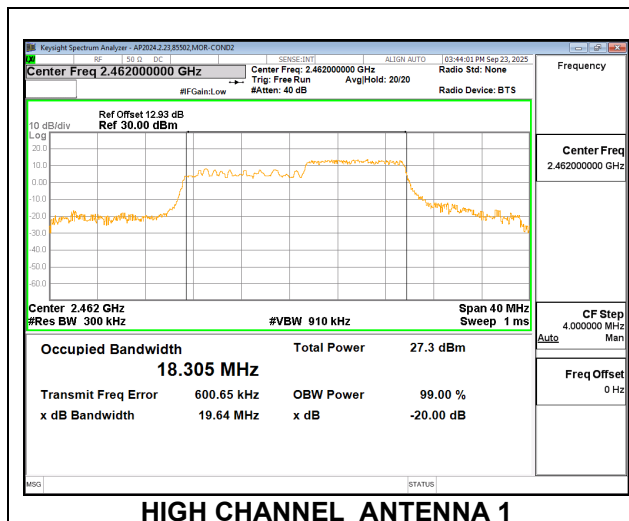
2TX ANTENNA 1 + ANTENNA 4 CDD MODE: 52T

Channel	Frequency (MHz)	99% Bandwidth ANTENNA 1 (MHz)	99% Bandwidth ANTENNA 4 (MHz)
Low	2412	18.392	18.358
Mid	2437	17.147	17.047
High	2462	18.399	18.395



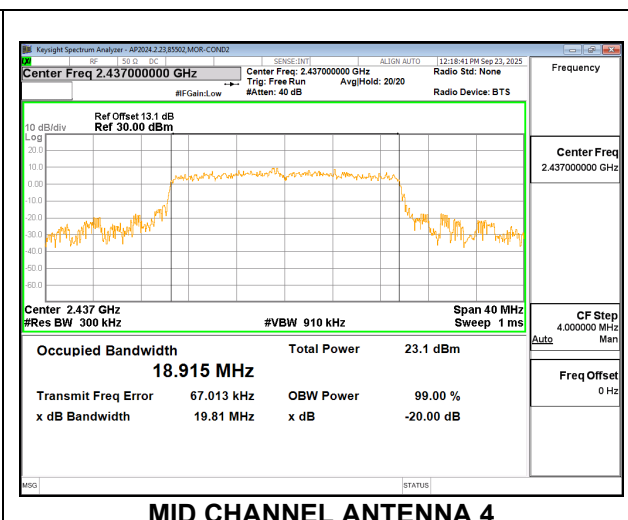
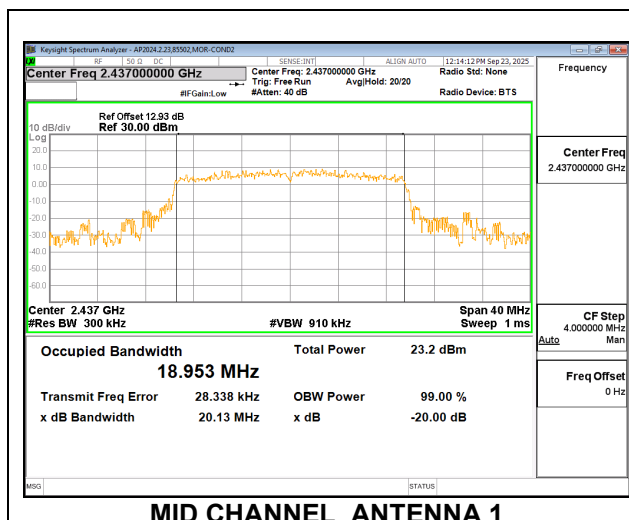
2TX ANTENNA 1 + ANTENNA 4 CDD MODE: 106T

Channel	Frequency (MHz)	99% Bandwidth ANTENNA 1 (MHz)	99% Bandwidth ANTENNA 4 (MHz)
Low	2412	18.346	18.281
Mid	2437	18.369	18.242
High	2462	18.305	18.330



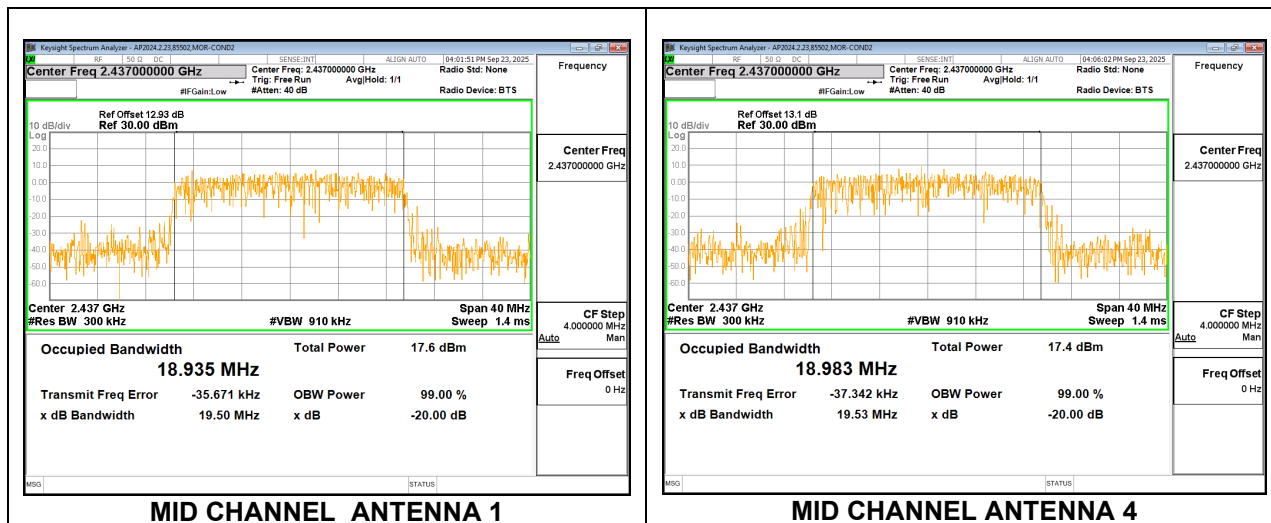
2TX ANTENNA 1 + ANTENNA 4 CDD MODE: 242T

Channel	Frequency (MHz)	99% Bandwidth ANTENNA 1 (MHz)	99% Bandwidth ANTENNA 4 (MHz)
Low	2412	18.929	18.934
Mid	2437	18.953	18.915
High	2462	18.891	18.900



2TX ANTENNA 1 + ANTENNA 4 CDD MODE: SU

Channel	Frequency (MHz)	99% Bandwidth ANTENNA 1 (MHz)	99% Bandwidth ANTENNA 4 (MHz)
Low	2412	18.915	18.930
Mid	2437	18.935	18.983
High	2462	18.922	18.908



9.3. 6 dB BANDWIDTH

LIMITS

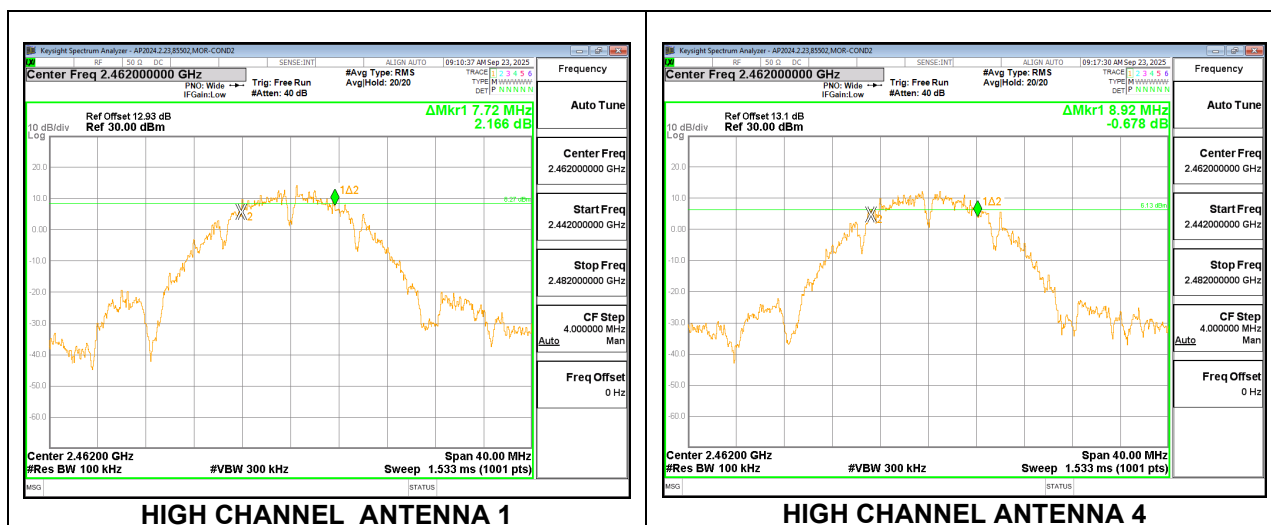
FCC §15.247 (a) (2)
RSS-247 5.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

9.3.1. 802.11b MODE

2TX ANTENNA 1 + ANTENNA 4 CDD MODE

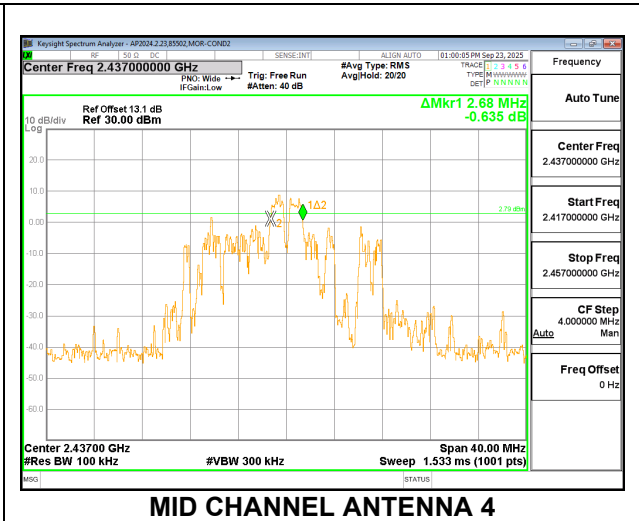
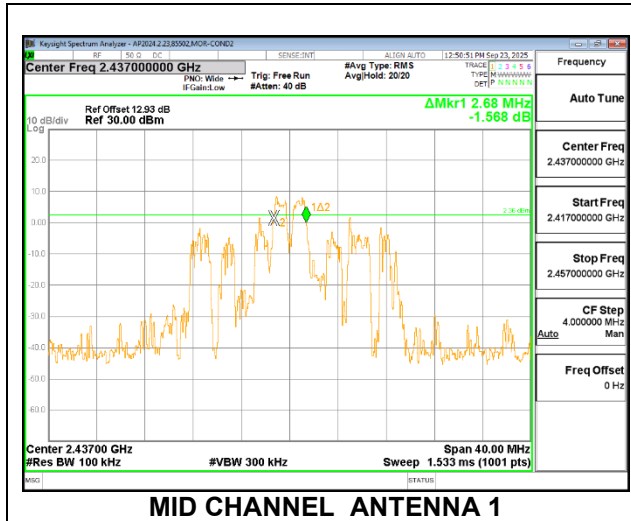
Channel	Frequency (MHz)	6dB Bandwidth ANTENNA 1 (MHz)	6dB Bandwidth ANTENNA 4 (MHz)	Minimum Limit (MHz)
Low	2412	7.20	8.28	0.500
Mid	2437	7.68	8.20	0.500
High	2462	7.72	8.92	0.500



9.3.4. 802.11ax HE20 MODE 2TX

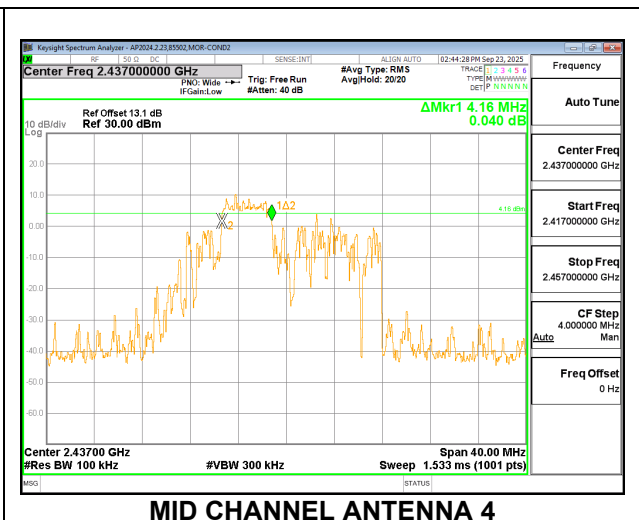
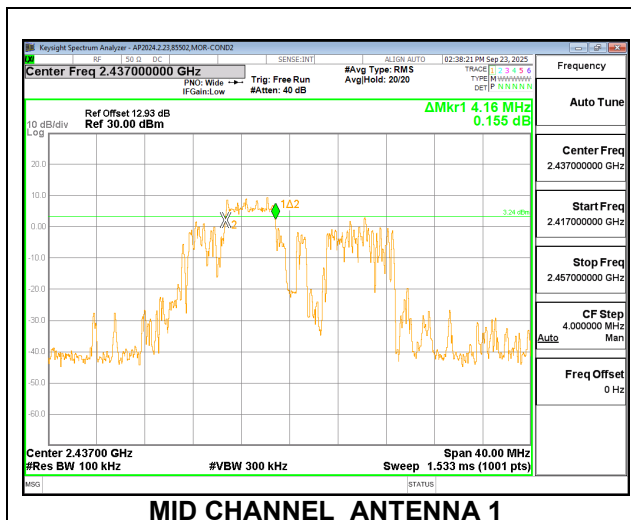
2TX ANTENNA 1 + ANTENNA 4 CDD MODE: 26T

Channel	Frequency (MHz)	6dB Bandwidth ANTENNA 1 (MHz)	6dB Bandwidth ANTENNA 4 (MHz)	Minimum Limit (MHz)
Low	2412	2.08	2.12	0.500
Mid	2437	2.68	2.68	0.500
High	2462	2.12	2.12	0.500



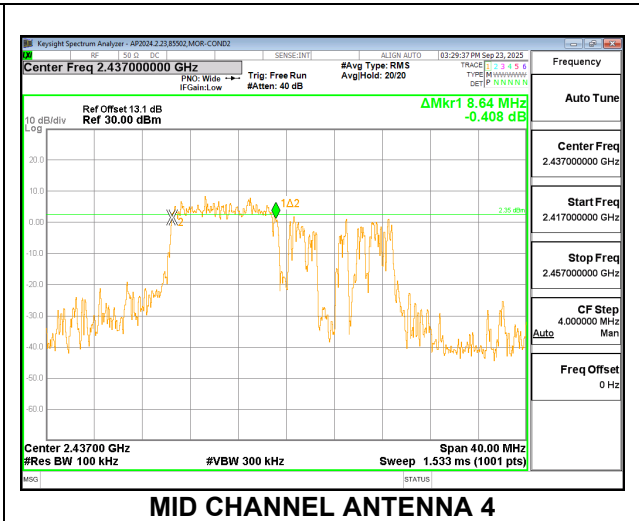
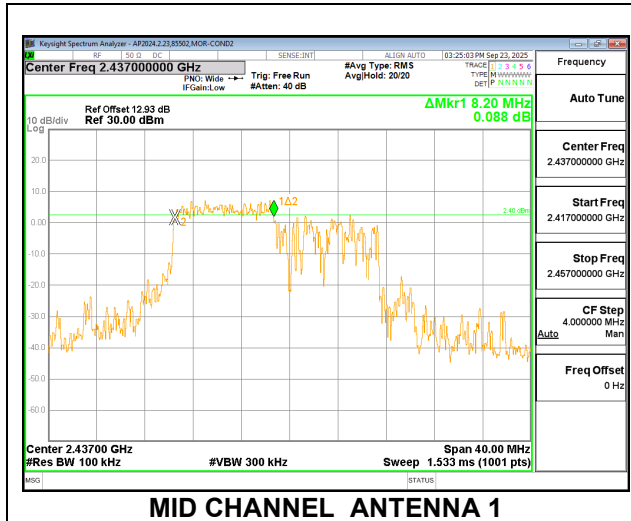
2TX ANTENNA 1 + ANTENNA 4 CDD MODE: 52T

Channel	Frequency (MHz)	6dB Bandwidth ANTENNA 1 (MHz)	6dB Bandwidth ANTENNA 4 (MHz)	Minimum Limit (MHz)
Low	2412	4.12	4.08	0.500
Mid	2437	4.16	4.16	0.500
High	2462	4.08	4.08	0.500



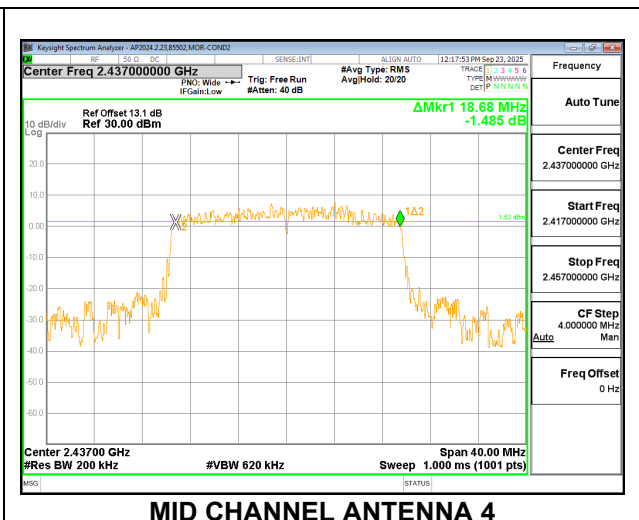
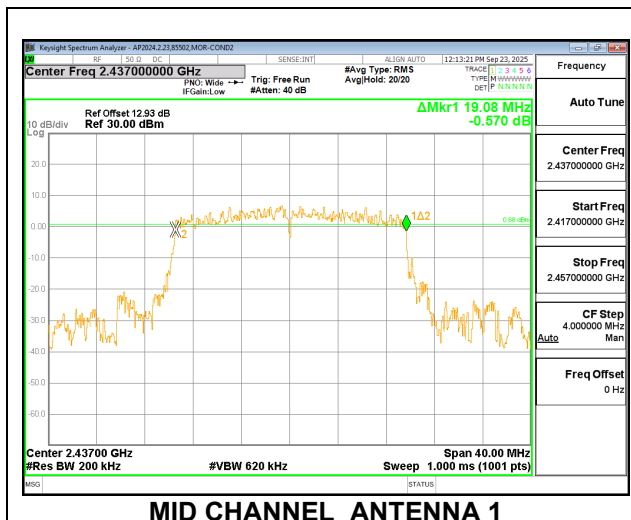
2TX ANTENNA 1 + ANTENNA 4 CDD MODE: 106T

Channel	Frequency (MHz)	6dB Bandwidth ANTENNA 1 (MHz)	6dB Bandwidth ANTENNA 4 (MHz)	Minimum Limit (MHz)
Low	2412	8.28	8.60	0.500
Mid	2437	8.20	8.64	0.500
High	2462	8.24	8.32	0.500



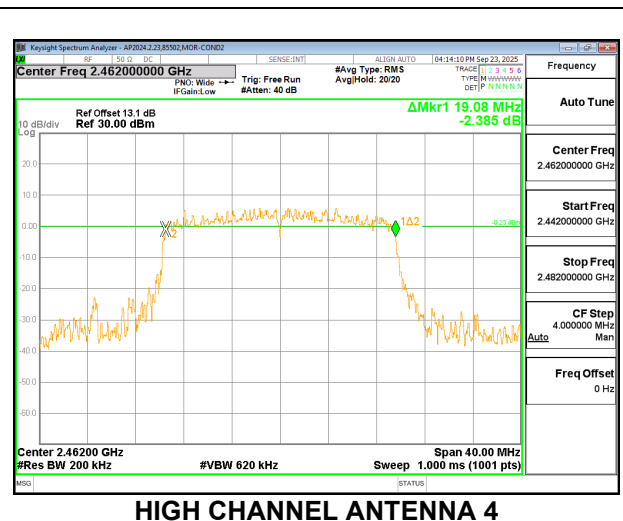
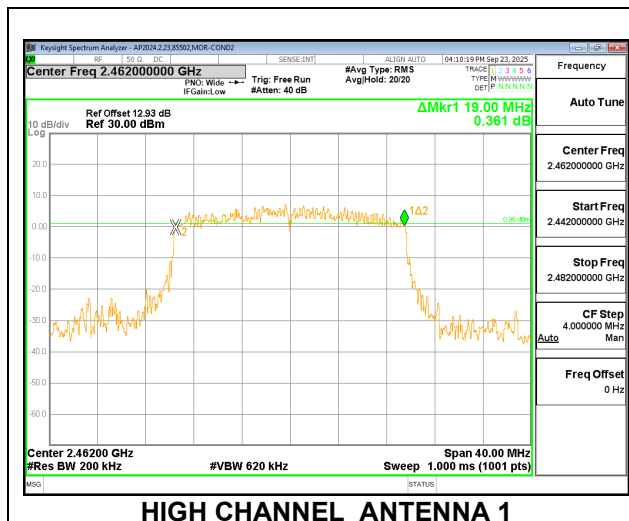
2TX ANTENNA 1 + ANTENNA 4 CDD MODE: 242T

Channel	Frequency (MHz)	6dB Bandwidth ANTENNA 1 (MHz)	6dB Bandwidth ANTENNA 4 (MHz)	Minimum Limit (MHz)
Low	2412	19.04	18.92	0.500
Mid	2437	19.08	18.68	0.500
High	2462	18.84	18.76	0.500



2TX ANTENNA 1 + ANTENNA 4 CDD MODE: SU

Channel	Frequency (MHz)	6dB Bandwidth ANTENNA 1 (MHz)	6dB Bandwidth ANTENNA 4 (MHz)	Minimum Limit (MHz)
Low	2412	18.76	19.00	0.500
Mid	2437	18.92	18.64	0.500
High	2462	19.00	19.08	0.500



9.4. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)
RSS-247 5.4 (d)

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 12.66dB (including 9.93 dB pad and 2.73 dB cable) for ANTENNA 1 and 12.85dB (including 10.17dB pad and 2.68 dB cable) for ANTENNA 4 was entered as an offset in the power meter.

The power output was measured on the EUT antenna port using SMA cable with 10dB attenuator connected to a power meter via wideband power sensor. Peak output power was read directly from power meter.

Test Engineer:	85502
Test Date:	2025-09-22 to 2025-09-23

9.4.1. 802.11b MODE

2TX ANTENNA 1 + ANTENNA 4 CDD MODE

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	Max Power (dBm)
Low 1	2412	1.10	30.00	30.00
Low 2	2417	1.10	30.00	30.00
Low 3	2422	1.10	30.00	30.00
Low 4	2427	1.10	30.00	30.00
Mid 6	2437	1.10	30.00	30.00
High 10	2462	1.10	30.00	30.00
High 11	2462	1.10	30.00	30.00

Results

Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	20.35	20.29	23.33	30.00	-6.67
Low 2	2417	23.55	23.69	26.63	30.00	-3.37
Low 3	2422	24.62	24.01	27.34	30.00	-2.66
Low 4	2427	25.01	24.36	27.71	30.00	-2.29
Mid 6	2437	25.00	24.96	27.99	30.00	-2.01
High 10	2457	24.39	24.33	27.37	30.00	-2.63
High 11	2462	23.61	23.54	26.59	30.00	-3.41

9.4.2. 802.11g MODE

2TX ANTENNA 1 + ANTENNA 4 CDD MODE

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	Max Power (dBm)
Low 1	2412	1.10	30.00	30.00
Mid 6	2437	1.10	30.00	30.00
High 10	2457	1.10	30.00	30.00
High 11	2462	1.10	30.00	30.00

Results

Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	25.01	25.16	28.10	30.00	-1.90
Mid 6	2437	25.25	25.24	28.26	30.00	-1.74
High 10	2457	24.31	24.26	27.30	30.00	-2.70
High 11	2462	23.09	23.25	26.18	30.00	-3.82

9.4.3. 802.11n HT20 MODE

2TX ANTENNA 1 + ANTENNA 4 CDD MODE

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	Max Power (dBm)
Low 1	2412	1.10	30.00	30.00
Low 2	2417	1.10	30.00	30.00
Mid 6	2437	1.10	30.00	30.00
High 10	2457	1.10	30.00	30.00
High 11	2462	1.10	30.00	30.00

Results

Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	24.17	24.43	27.31	30.00	-2.69
Low 2	2417	24.88	24.68	27.79	30.00	-2.21
Mid 6	2437	25.29	25.23	28.27	30.00	-1.73
High 10	2457	24.69	24.47	27.59	30.00	-2.41
High 11	2462	23.03	23.03	26.04	30.00	-3.96

9.4.4. 802.11ax HE20 MODE 2TX

2TX ANTENNA 1 + ANTENNA 4 CDD MODE: 26T

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	Max Power (dBm)
Low 1	2412	1.10	30.00	30.00
Mid 6	2437	1.10	30.00	30.00
High 11	2462	1.10	30.00	30.00

Results

Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	22.92	23.30	26.12	30.00	-3.88
Mid 6	2437	22.30	22.59	25.46	30.00	-4.54
High 11	2462	24.24	24.18	27.22	30.00	-2.78

2TX ANTENNA 1 + ANTENNA 4 CDD MODE: 52T

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	Max Power (dBm)
Low 1	2412	1.10	30.00	30.00
Mid 6	2437	1.10	30.00	30.00
High 7	2442	1.10	30.00	30.00
High 8	2447	1.10	30.00	30.00
High 9	2452	1.10	30.00	30.00
High 10	2457	1.10	30.00	30.00
High 11	2462	1.10	30.00	30.00

Results

Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	25.61	25.62	28.63	30.00	-1.37
Mid 6	2437	25.09	25.10	28.11	30.00	-1.89
High 7	2442	25.44	24.78	28.13	30.00	-1.87
High 8	2447	25.40	24.78	28.11	30.00	-1.89
High 9	2452	25.28	24.78	28.05	30.00	-1.95
High 10	2457	25.17	25.03	28.11	30.00	-1.89
High 11	2462	24.34	24.18	27.27	30.00	-2.73

2TX ANTENNA 1 + ANTENNA 4 CDD MODE: 106T

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	Max Power (dBm)
Low 1	2412	1.10	30.00	30.00
Low 2	2417	1.10	30.00	30.00
Low 3	2422	1.10	30.00	30.00
Mid 6	2437	1.10	30.00	30.00
High 8	2447	1.10	30.00	30.00
High 9	2452	1.10	30.00	30.00
High 10	2457	1.10	30.00	30.00
High 11	2462	1.10	30.00	30.00

Results

Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	24.86	24.56	27.72	30.00	-2.28
Low 2	2417	25.37	24.76	28.09	30.00	-1.91
Low 3	2422	25.39	24.89	28.16	30.00	-1.84
Mid 6	2437	25.55	25.47	28.52	30.00	-1.48
High 8	2447	25.49	24.86	28.20	30.00	-1.80
High 9	2452	25.38	24.75	28.09	30.00	-1.91
High 10	2457	25.32	24.65	28.01	30.00	-1.99
High 11	2462	23.37	23.12	26.26	30.00	-3.74

2TX ANTENNA 1 + ANTENNA 4 CDD MODE: 242T

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	Max Power (dBm)
Low 1	2412	1.10	30.00	30.00
Low 2	2417	1.10	30.00	30.00
Low 3	2422	1.10	30.00	30.00
Mid 6	2437	1.10	30.00	30.00
High 8	2447	1.10	30.00	30.00
High 9	2452	1.10	30.00	30.00
High 10	2457	1.10	30.00	30.00
High 11	2462	1.10	30.00	30.00

Results

Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	24.22	24.33	27.29	30.00	-2.71
Low 2	2417	25.29	24.78	28.05	30.00	-1.95
Low 3	2422	25.07	24.69	27.89	30.00	-2.11
Mid 6	2437	25.61	25.50	28.57	30.00	-1.43
High 8	2447	25.43	24.87	28.17	30.00	-1.83
High 9	2452	25.31	24.74	28.04	30.00	-1.96
High 10	2457	25.22	25.18	28.21	30.00	-1.79
High 11	2462	23.03	22.96	26.01	30.00	-3.99

2TX ANTENNA 1 + ANTENNA 4 CDD MODE: SU

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	Max Power (dBm)
Low 1	2412	1.10	30.00	30.00
Low 2	2417	1.10	30.00	30.00
Mid 6	2437	1.10	30.00	30.00
High 9	2452	1.10	30.00	30.00
High 10	2457	1.10	30.00	30.00
High 11	2462	1.10	30.00	30.00

Results

Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	24.40	24.54	27.48	30.00	-2.52
Low 2	2417	24.48	24.76	27.63	30.00	-2.37
Mid 6	2437	25.36	25.29	28.34	30.00	-1.66
High 9	2452	25.29	25.22	28.27	30.00	-1.73
High 10	2457	23.46	23.57	26.53	30.00	-3.47
High 11	2462	21.01	20.92	23.98	30.00	-6.02

9.5. AVERAGE POWER

LIMITS

None; for reporting purposes only

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 12.66dB (including 9.93 dB pad and 2.73 dB cable) for ANTENNA 1 and 12.85dB (including 10.17dB pad and 2.68 dB cable) for ANTENNA 4 was entered as an offset in the power meter.

The power output was measured on the EUT antenna port using SMA cable with 10dB attenuator connected to a power meter via wideband power sensor. Gated average output power was read directly from power meter.

Test Engineer:	85502
Test Date:	2025-09-22 to 2025-09-23

9.5.1. 802.11b MODE

2TX ANTENNA 1 + ANTENNA 4 CDD MODE

Results

Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Total Corr'd Power (dBm)
Low 1	2412	17.83	17.68	20.77
Low 2	2417	21.04	21.17	24.12
Low 3	2422	22.28	21.89	25.10
Low 4	2427	22.78	22.52	25.66
Mid 6	2437	23.26	22.89	26.09
High 10	2457	21.97	21.83	24.91
High 11	2462	21.20	20.93	24.08

9.5.2. 802.11g MODE

2TX ANTENNA 1 + ANTENNA 4 CDD MODE

Results

Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Total Corr'd Power (dBm)
Low 1	2412	16.81	16.86	19.85
Mid 6	2437	17.36	17.55	20.47
High 10	2457	16.32	16.25	19.30
High 11	2462	15.33	15.34	18.35

9.5.3. 802.11n HT20 MODE

2TX ANTENNA 1 + ANTENNA 4 CDD MODE

Results

Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Total Corr'd Power (dBm)
Low 1	2412	16.06	16.10	19.09
Low 2	2417	16.65	16.51	19.59
Mid 6	2437	17.30	17.58	20.45
High 10	2457	16.30	16.42	19.37
High 11	2462	14.82	15.04	17.94

9.5.4. 802.11ax HE20 MODE 2TX

2TX ANTENNA 1 + ANTENNA 4 CDD MODE: 26T

Results

Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Total Corr'd Power (dBm)
Low 1	2412	13.83	14.05	16.95
Mid 6	2437	14.10	14.33	17.23
High 11	2462	14.14	14.02	17.09

2TX ANTENNA 1 + ANTENNA 4 CDD MODE: 52T

Results

Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Total Corr'd Power (dBm)
Low 1	2412	16.31	16.55	19.44
Mid 6	2437	16.98	17.14	20.07
High 7	2442	17.17	16.89	20.04
High 8	2447	16.61	15.98	19.32
High 9	2452	15.60	15.07	18.35
High 10	2457	15.55	15.55	18.56
High 11	2462	14.27	14.09	17.19

2TX ANTENNA 1 + ANTENNA 4 CDD MODE: 106T

Results

Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Total Corr'd Power (dBm)
Low 1	2412	15.90	15.64	18.78
Low 2	2417	16.46	16.14	19.31
Low 3	2422	16.96	16.67	19.83
Mid 6	2437	18.02	18.09	21.07
High 8	2447	18.17	17.51	20.86
High 9	2452	17.67	17.06	20.39
High 10	2457	15.68	15.10	18.41
High 11	2462	14.21	14.07	17.15

2TX ANTENNA 1 + ANTENNA 4 CDD MODE: 242T

Results

Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Total Corr'd Power (dBm)
Low 1	2412	15.29	15.04	18.18
Low 2	2417	15.91	15.61	18.77
Low 3	2422	15.82	15.55	18.70
Mid 6	2437	17.38	17.55	20.48
High 8	2447	17.45	16.97	20.23
High 9	2452	16.54	16.01	19.29
High 10	2457	15.50	15.40	18.46
High 11	2462	13.14	13.03	16.10

2TX ANTENNA 1 + ANTENNA 4 CDD MODE: SU

Results

Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 4 Meas Power (dBm)	Total Corr'd Power (dBm)
Low 1	2412	15.87	15.99	18.94
Low 2	2417	16.39	16.49	19.45
Mid 6	2437	17.40	17.50	20.46
High 9	2452	17.52	17.36	20.45
High 10	2457	15.41	15.35	18.39
High 11	2462	13.02	12.99	16.02

9.6. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)
RSS-247 (5.2) (b)

The 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.

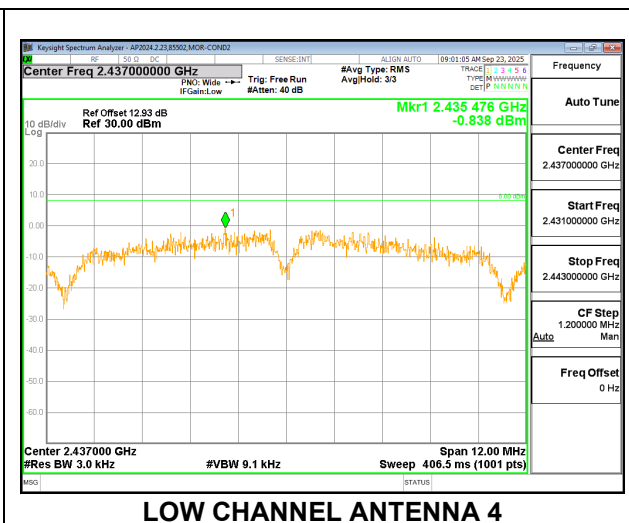
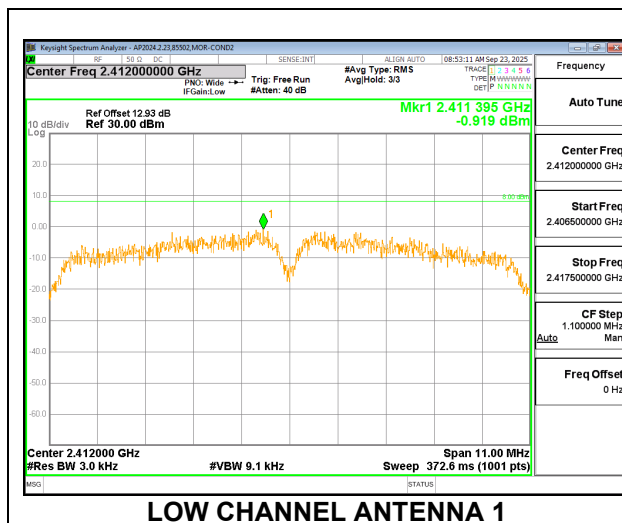
RESULTS

9.6.1. 802.11b MODE

2TX ANTENNA 1 + ANTENNA 4 CDD MODE

PSD Results

Channel	Frequency (MHz)	Antenna 1 Meas (dBm/ 3kHz)	Antenna 4 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-0.92	0.05	2.60	8.0	-5.4
Mid 6	2437	-0.84	-0.70	2.24	8.0	-5.8
High 11	2462	-0.66	-0.91	2.23	8.0	-5.8

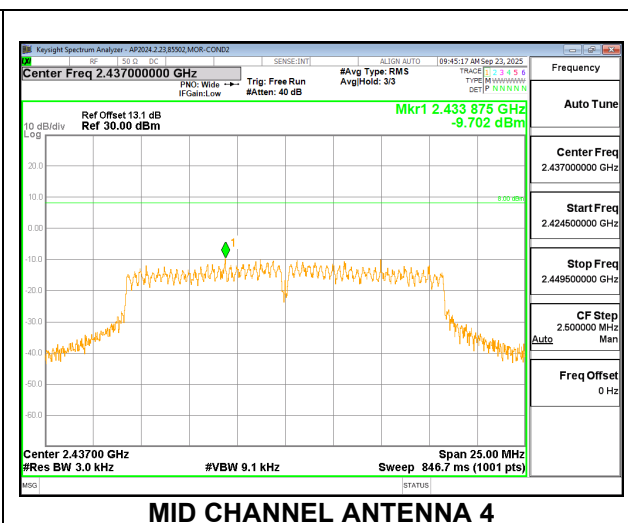
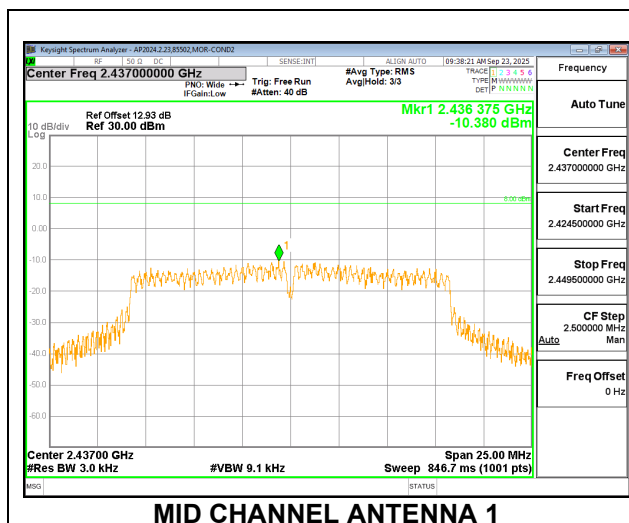


9.6.2. 802.11g MODE

2TX ANTENNA 1 + ANTENNA 4 CDD MODE

PSD Results

Channel	Frequency (MHz)	Antenna 1 Meas (dBm/ 3kHz)	Antenna 4 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-10.51	-10.09	-7.29	8.0	-15.3
Mid 6	2437	-10.38	-9.70	-7.02	8.0	-15.0
High 11	2462	-10.22	-10.16	-7.18	8.0	-15.2

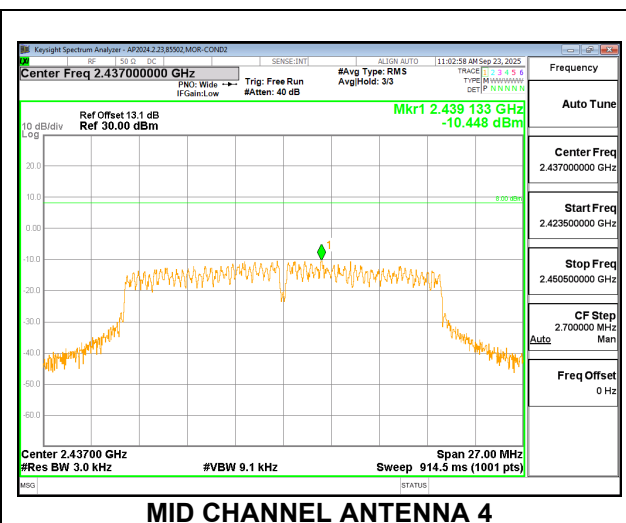
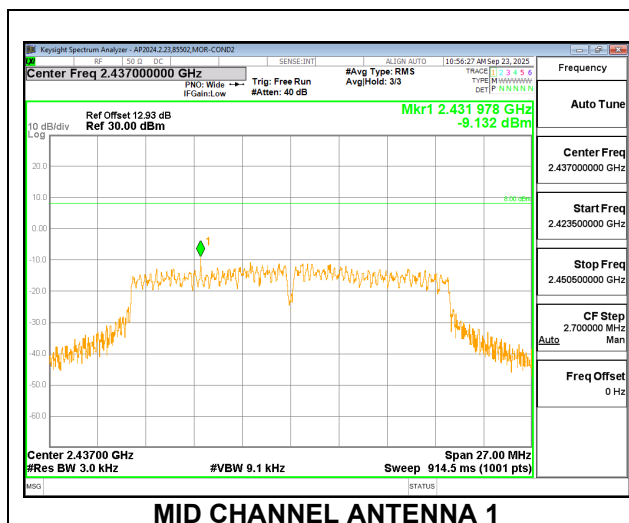


9.6.3. 802.11n HT20 MODE

2TX ANTENNA 1 + ANTENNA 4 CDD MODE

PSD Results

Channel	Frequency (MHz)	Antenna 1 Meas (dBm/ 3kHz)	Antenna 4 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-10.80	-9.79	-7.25	8.0	-15.3
Mid 6	2437	-9.13	-10.45	-6.73	8.0	-14.7
High 11	2462	-10.61	-9.35	-6.92	8.0	-14.9

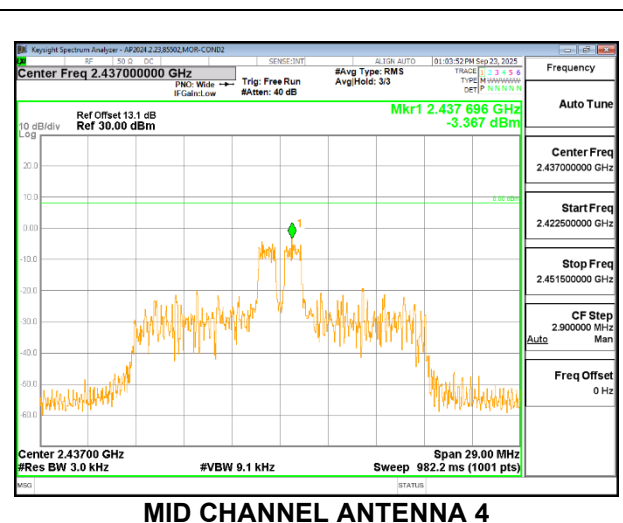
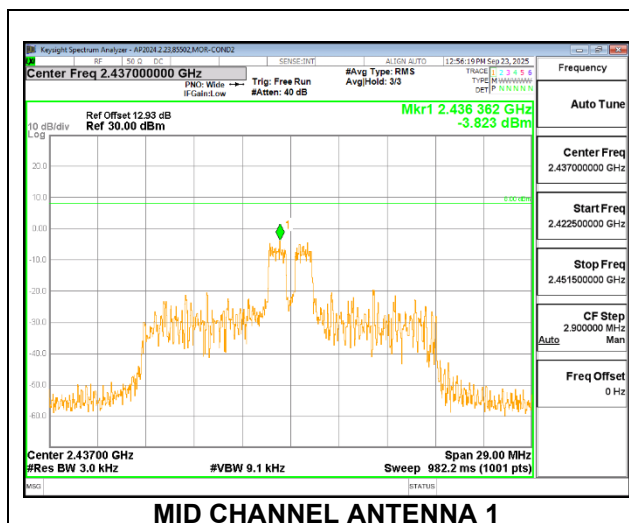


9.6.4. 802.11ax HE20 MODE 2TX

2TX ANTENNA 1 + ANTENNA 4 CDD MODE: 26T

PSD Results

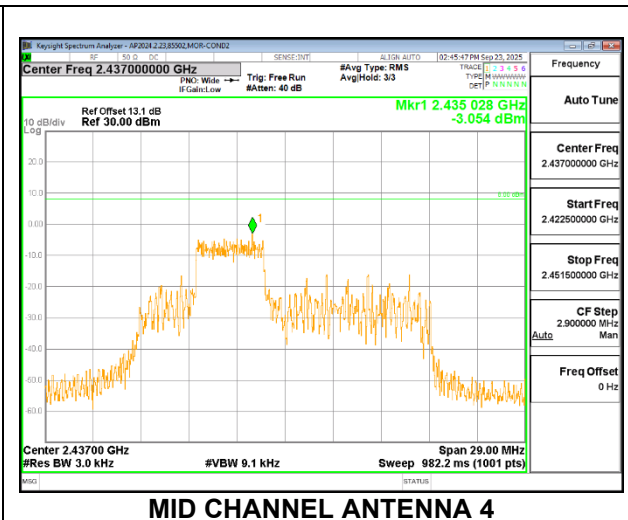
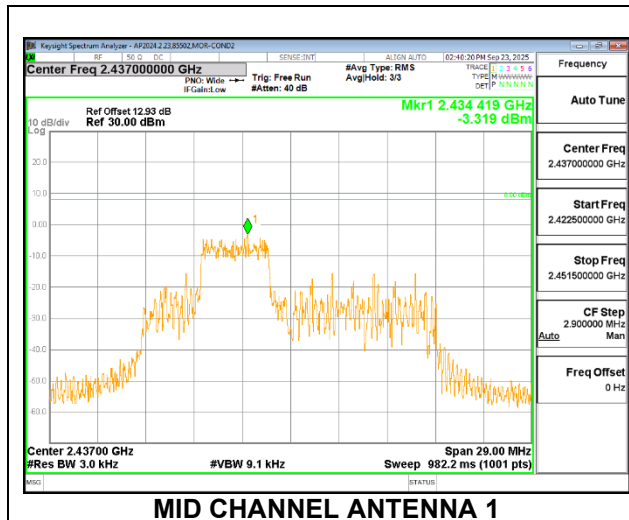
Channel	Frequency (MHz)	Antenna 1 Meas (dBm/ 3kHz)	Antenna 4 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-2.97	-4.47	-0.64	8.0	-8.6
Mid 6	2437	-3.82	-3.37	-0.58	8.0	-8.6
High 11	2462	-4.17	-4.77	-1.45	8.0	-9.4



2TX ANTENNA 1 + ANTENNA 4 CDD MODE: 52T

PSD Results

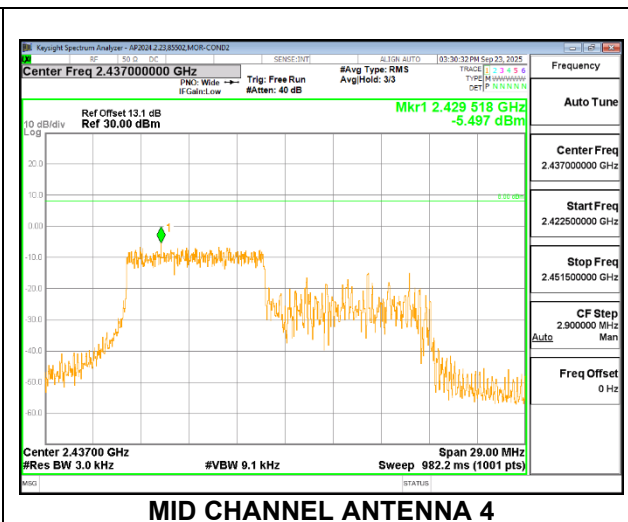
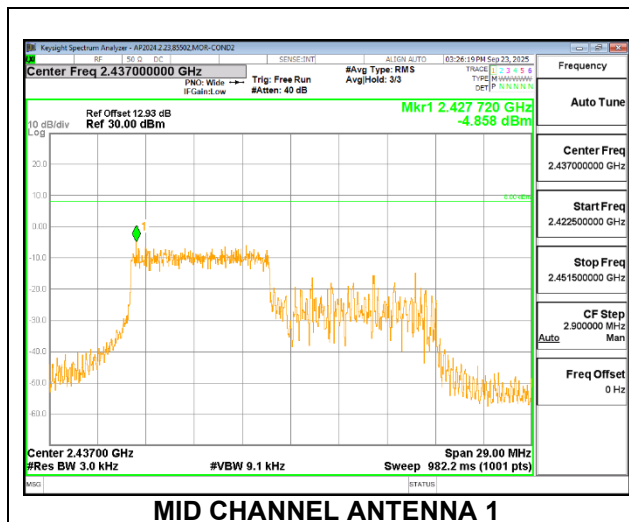
Channel	Frequency (MHz)	Antenna 1 Meas (dBm/ 3kHz)	Antenna 4 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-4.37	-4.89	-1.61	8.0	-9.6
Mid 6	2437	-3.32	-3.05	-0.17	8.0	-8.2
High 11	2462	-3.22	-4.89	-0.96	8.0	-9.0



2TX ANTENNA 1 + ANTENNA 4 CDD MODE: 106T

PSD Results

Channel	Frequency (MHz)	Antenna 1 Meas (dBm/ 3kHz)	Antenna 4 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-6.33	-5.30	-2.77	8.0	-10.8
Mid 6	2437	-4.86	-5.50	-2.16	8.0	-10.2
High 11	2462	-5.99	-6.05	-3.01	8.0	-11.0



9.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

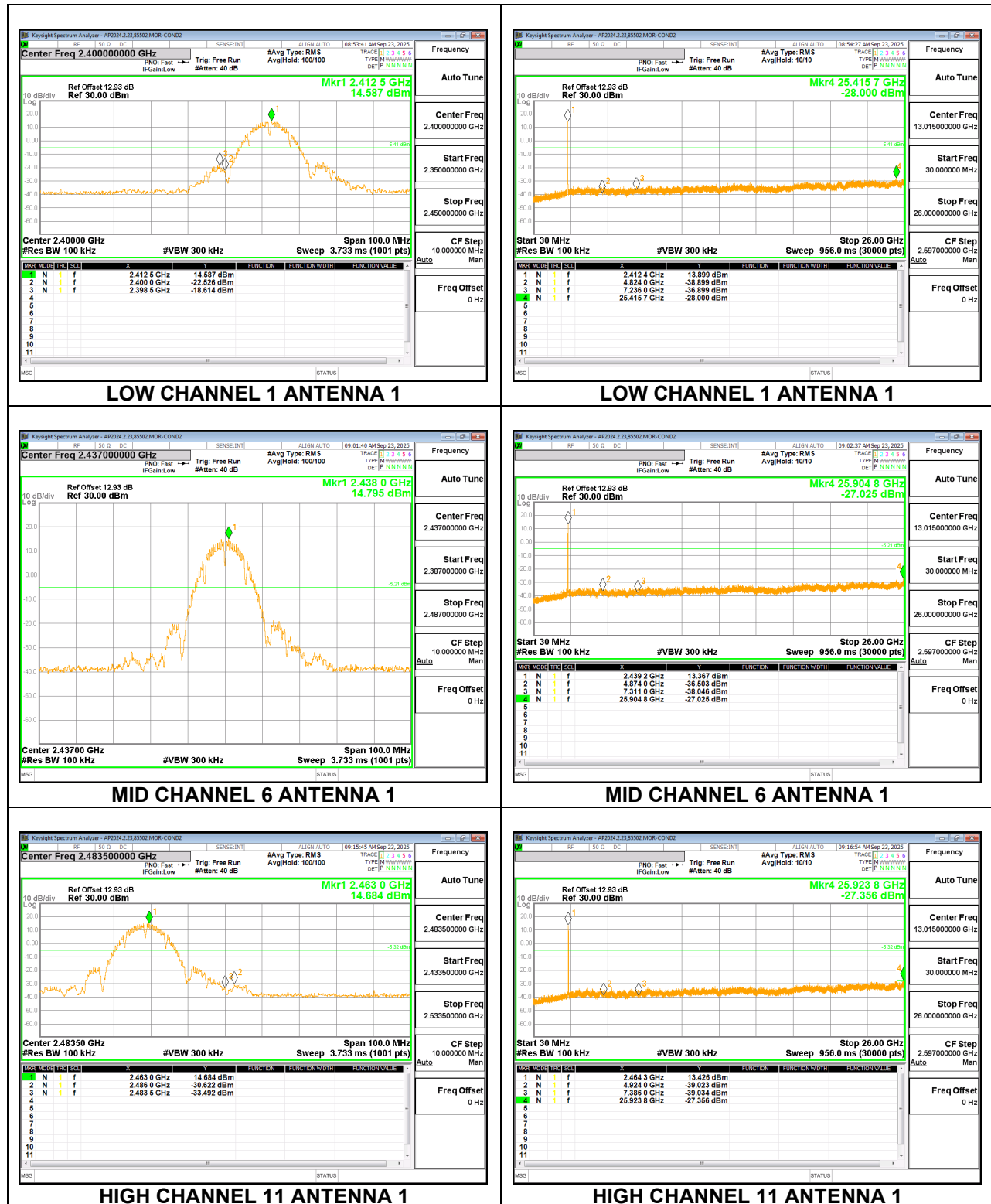
FCC §15.247 (d)
RSS-247 5.5

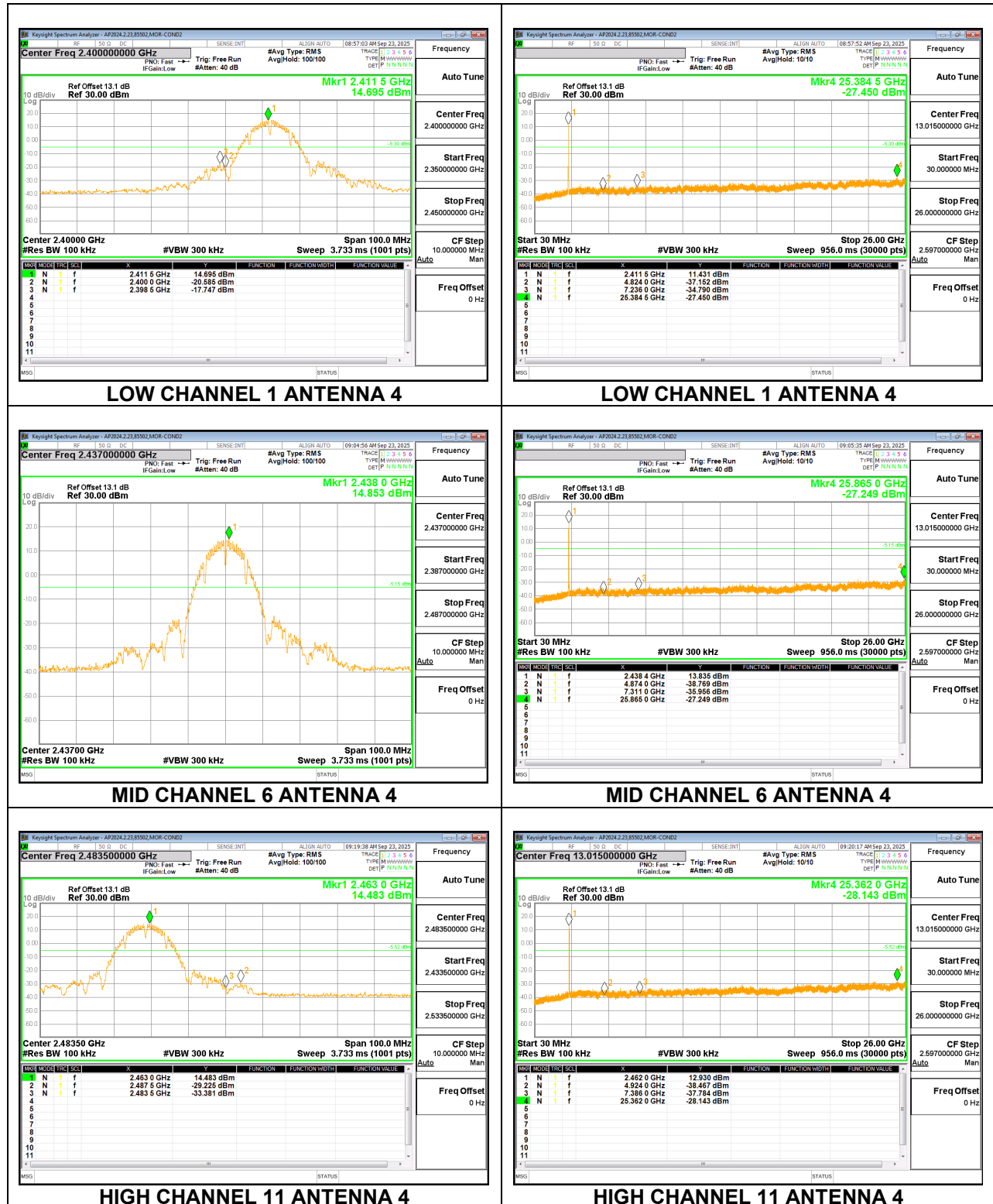
Output power was measured based on the use of peak measurement; therefore, the required attenuation is -20 dBc.

RESULTS

9.7.1. 802.11b MODE

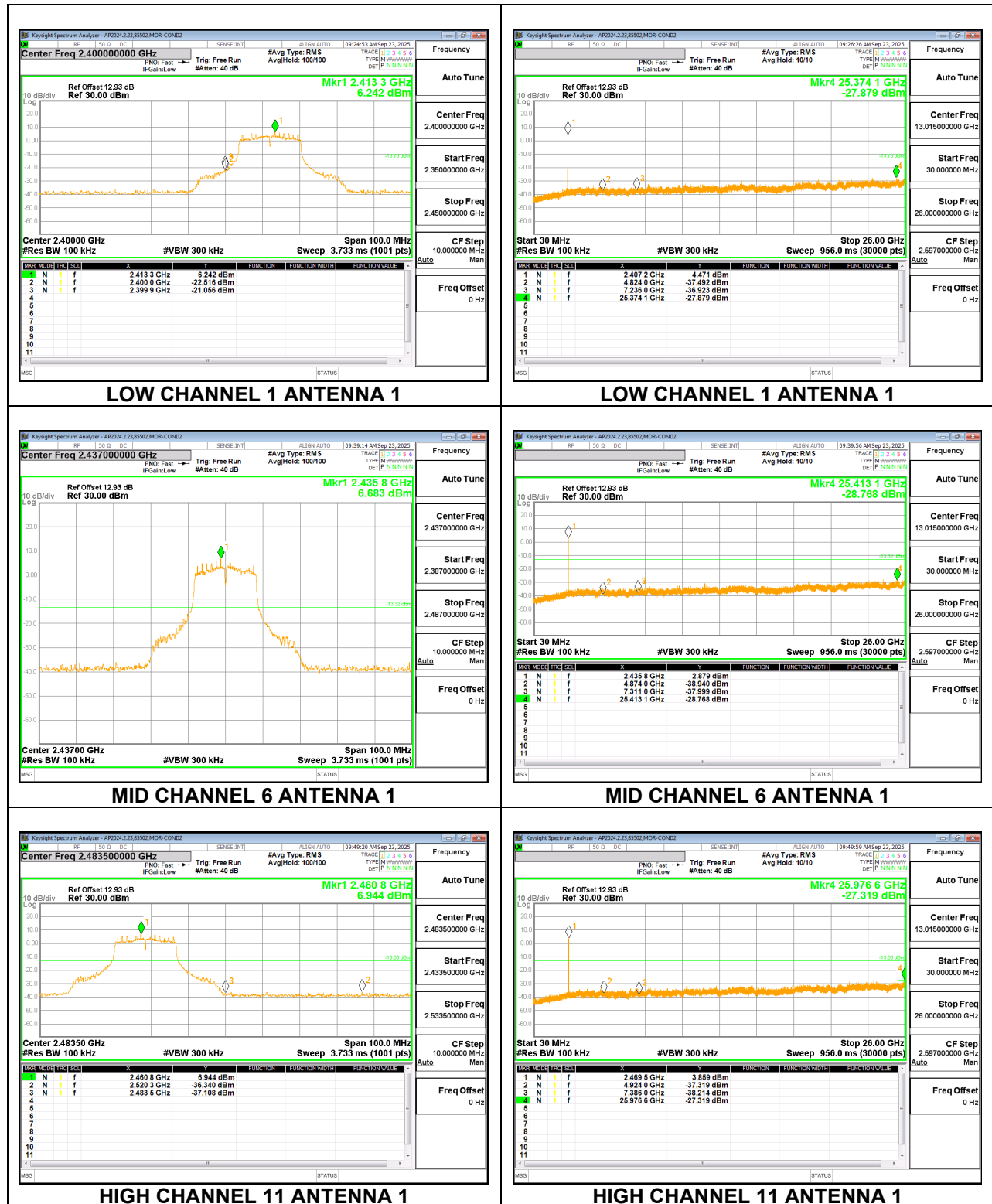
2TX ANTENNA 1 + ANTENNA 4 CDD MODE

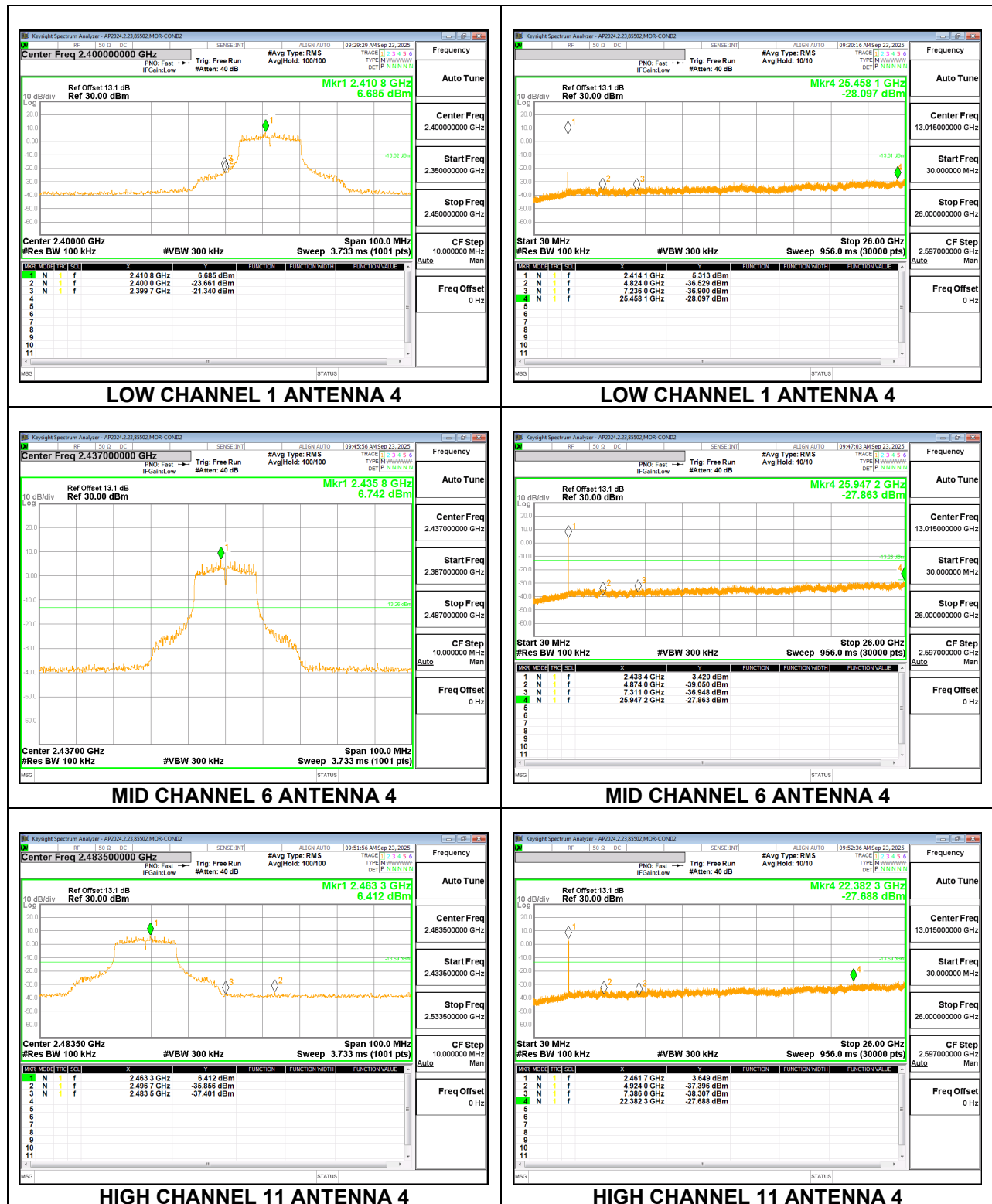




9.7.2. 802.11g MODE

2TX ANTENNA 1 + ANTENNA 4 CDD MODE





9.7.3. 802.11n HT20 MODE

2TX ANTENNA 1 + ANTENNA 4 CDD MODE

