



Regulatory Test Report

Prepared for Harman International Industries, Inc.

This report presents detailed information on

R1 EXT NA 3B HW4

Prepared by

Aravind Buddana

Engineer II

Approved by

Jason Kanakry

General Manager

Issue date: 01/24/2025

Report No: J23133-R1 EXT NA 3B HW4-TR1 v2

This test result relates only to the described test object.

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The test is traceable to national standard or related international standard

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1. Test Request Information

Test Request #:	7700206789
Test Requested By:	Pranav Patel Harman International Industries, Inc. 30001 Cabot Drive, Novi, MI 48377
Test item Description:	R1 EXT NA 3B HW4
Part Number:	P68581660ZZ
DUT Sample Number:	J23133#4 NA 3B
FVIN :	FCA-MY24.MNL-OD.3426
Hardware Version of DUT:	N/A
Software Version of DUT:	N/A
Component Category of DUT:	N/A
FCC ID:	2AHPN-BE2877
ISED ID:	6434C-BE2877
Type of Test:	FCC/ISED Certification
Test Method:	CFR Title 47 FCC Part 15.247, ISED Canada RSS-247 Issue 3, ISED Canada RSS-GEN Issue 5, FCC KDB 558074 D01 15.247 Measurement Guidance v05r02 and ANSI C63.10-2013
Deviations from standard:	None
Approved Test Plan Number:	N/A
Test Plan Revision:	N/A
Date Test Sample Received:	06-26-2024
Date Test Started:	07-18-2024
Date Test Finished:	10-10-2024

2. Test Laboratory Information

Location of Test Lab:	The radiated and conducted emissions test sites are located at Bureau Veritas 815 N. Opdyke Rd #100, Auburn Hills, MI 48326, Phone: +1-248-836-4700
Key Contact:	Jason Kanakry (General Manager) Jason.Kanakry@BureauVeritas.com Phone: +1-248-836-4747
Laboratory Accreditations:	BUREAU VERITAS CONSUMER PRODUCTS SERVICES, INC is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories.
ISO/IEC 17025:2017:	5678.01
FCC Test Site Number:	US1278 (242530)
IC Test Site Number:	US0229 (26240)

3. Statement of Conformity

RSS-GEN	RSS 247	Part 15	Comments
6.4		15.15(b)	There are no controls accessible to the user that varies the output power to operate in violation of the regulatory requirements.
		15.19	The label shown in the label exhibit.
		15.21	Information to the user shown in the instruction manual exhibit.
		15.27	No special accessories are required for compliance.
3.2		15.31	The EUT tested in accordance with the measurement standards in this section.
6.13.2		15.33	Frequency range investigated according to this section, unless noted in specific rule section under which the equipment operates.
6.13.1		15.35	The EUT emissions are measured using the measurement detector and bandwidth specified in this section, unless noted in specific rule section under which the equipment operates.
6.8		15.203	EUT employs integrated PCB antenna with 1.43dBi gain.
8.10		15.205 15.209	The fundamental is not in a Restricted band and the spurious and harmonic emissions in the Restricted bands comply with the general emission limits of 15.209 or RSS-GEN as applicable
8.8		15.207	N/A. EUT is vehicle battery powered only.

4. Conducted Testing

4.1 Test Summary

This test report supports an application for certification of a transmitter operating pursuant to: **CFR Title 47 FCC Part 15.247, ISSED Canada RSS-247 Issue 3**. The product is **R1 EXT NA 3B HW4** a direct sequence spread spectrum transmitter that operates in the 2412-2462MHz frequency range.

Details	Description
Frequency Range (MHz)	2412 – 2462
Tested Modes	802.11b, 802.11g, 802.11n (HT20).
Number of Channels	11
Tested Channels	1, 6 ,11
DUT Antenna Type	Integrated PCB antenna
Number of transmit Chains	1
Equipment Type	Equipment with wideband modulation other than frequency hopping
DUT Antenna Gain	1.43dBi ☒ Provided by Customer with Gain Report ☐ Not Provided by Customer
DUT/EUT Operation	EUT is configured/programmed by an External Test Laptop with USB and Ethernet interfaces to set WLAN Test Mode, data rates, channels, bandwidth, band configurations etc., using labtool (MFGBridge_Tool).

Channels and Frequency

Channel	Freq. (MHz)	Channel	Freq. (MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432		
6	2437		
7	2442		

Notes:

- Channels marked bold were tested.
- Output power measurements performed at the lowest and highest data rate of each supported 802.11 mode.

Power Settings

802.11b		802.11g	
Channel	Power Setting	Channel	Power Setting
1	8	1	8
6	8	6	8
11	8	11	8
802.11n (HT20)			
Channel	Power Setting		
1	7		
6	7		
11	7		

Test Results

Test	Frequency (MHz)	802.11b	802.11g	802.11n (HT20)
RF Output Power	2412/2437/2462	PASS	PASS	PASS
Power Spectral Density	2412/2437/2462	PASS	PASS	PASS
DTS Bandwidth (6dB)	2412/2437/2462	PASS	PASS	PASS
Occupied Channel Bandwidth 99%	2412/2437/2462	PASS	PASS	PASS
Band Edges Low	2412	PASS	PASS	PASS
Band Edges High	2462	PASS	PASS	PASS
Conducted Spurious Emissions	2412/2437/2462	PASS	PASS	PASS

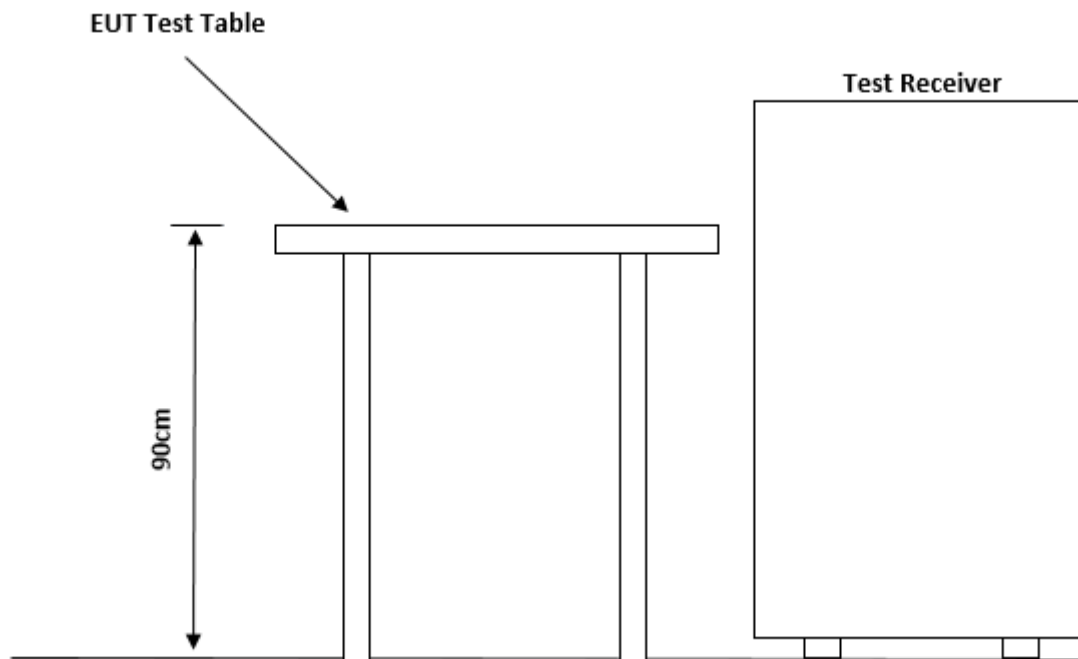
We found that the product met the requirements. Test samples received in good condition and remains good and functional post testing.

Test Item	Sample #	Result
FCC 15.247 2.4G WLAN	J23133#4 NA 3B	Meets Requirements

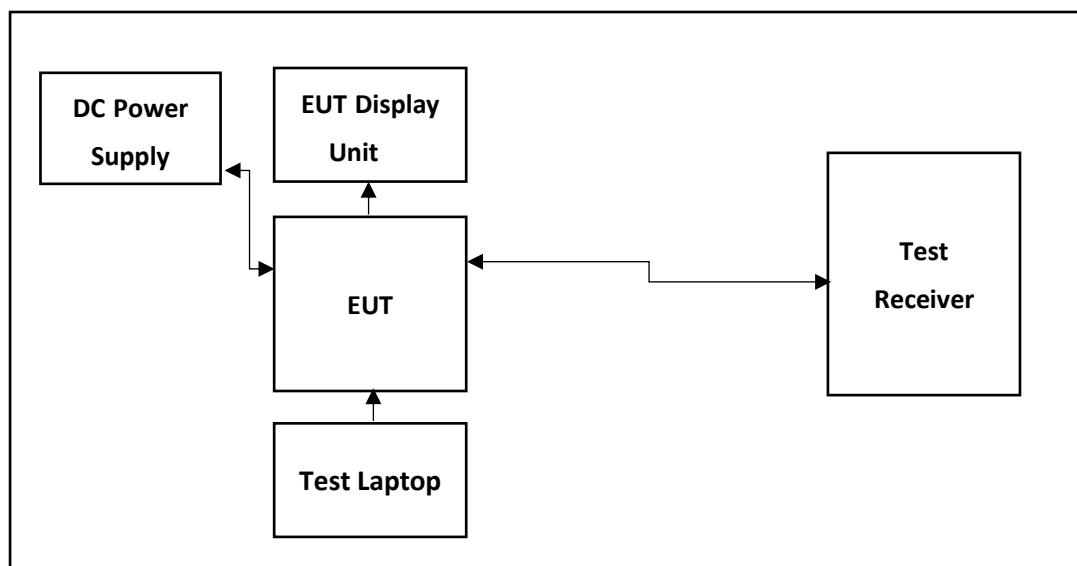
4.2 Test Setup

Conducted Test Site Description

The site is accommodated to test tabletop and floor standing test equipment.



TEST SETUP DIAGRAM



4.3 Test Equipment Used

ID #	Equipment	Manufacturer	Model #	Serial #	Cal Due
BVD0226	Spectrum Analyzer 10Hz-44GHz	Rohde & Schwarz	FSV3044	101018	4/20/2025
BVD0227	8 port switch unit for Wireless Test system	Rohde & Schwarz	OSP150	101100	11/24/2025
BVD0228	8 port switch unit for Wireless Test system	Rohde & Schwarz	OSP220	101632	11/14/2025
BVD0224	Signal Generator 100kHz-40GHz	Rohde & Schwarz	SMB100A	181741	4/20/2025
BVD0225	Signal Generator 100k-6GHz with GPS simulator	Rohde & Schwarz	SMW200A	107664	4/20/2025
BVD0250	Wireless Connectivity Tester 70M-6GHz	Rohde & Schwarz	CMW270	102113	4/20/2025
BVD0302	DC power supply 1-15VDC 60A 110/220 11.5A max input	BK Precision	1693	257F17180	N/A
BVD0321	Fixed Attenuator 2W 20dB -40GHz	Mini-Circuits	BW-K20-2W44+	2103	12/11/2024
BVD0430	Multimeter	Fluke	117	49710262SV	11/17/2024
BVD0229	Temp and Humidity Meter	Fluke	971	12001009	5/23/2025
N/A	Test-PC	Lenovo ThinkPad	E480	SL10Q37355	N/A

Notes:- DC power supply verified before use with calibrated Multimeter.

Customer Supplied Equipment

ID #	Equipment	Manufacturer	Model	Serial #	Version No.
N/A	Harness	Harman	N/A	N/A	N/A
N/A	Display Unit	MOBIS	BMM6100000	231107 01	N/A
N/A	Shark Fin Antenna	Alfa Romeo	B901	719147	N/A
N/A	Antenna	Aptiv	APN35409682	N/A	N/A
N/A	Camera	N/A	23295906C	N/A	N/A
N/A	MFGBridge_Tool/ Dut labtool	N/A	N/A	N/A	2.0.0.89

Equipment List (Software)

ID #	Equipment	Manufacturer	Model	Version No	
N/A	EMC Test Software	Rodhe & Schwarz	EMC32	11.20.00	N/A

4.4 Test Data

4.4.1 RF Output Power

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10-2013 11.9.2.3.2, RSS-247 5.4 (d)

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.

Expanded Combined Uncertainty of absolute Level Measurement (K=2) < 1 dB

802.11b

Data Rate	Gated RMS (dBm) 2412 MHz	Gated RMS (dBm) 2437 MHz	Gated RMS (dBm) 2462 MHz	Limit (dBm)	Duty Cycle (%)	Power Setting
1 Mbps	6.379	6.830	4.805	30	99.889	8

802.11g

Data Rate	Gated RMS (dBm) 2412 MHz	Gated RMS (dBm) 2437 MHz	Gated RMS (dBm) 2462 MHz	Limit (dBm)	Duty Cycle (%)	Power Setting
6 Mbps	6.361	6.292	5.613	30	98.855	8

802.11n (HT20)

Data Rate	Gated RMS (dBm) 2412 MHz	Gated RMS (dBm) 2437 MHz	Gated RMS (dBm) 2462 MHz	Limit (dBm)	Duty Cycle (%)	Power Setting
MCS0	5.556	6.007	4.772	30	98.785	7

4.4.2 Power Spectral Density

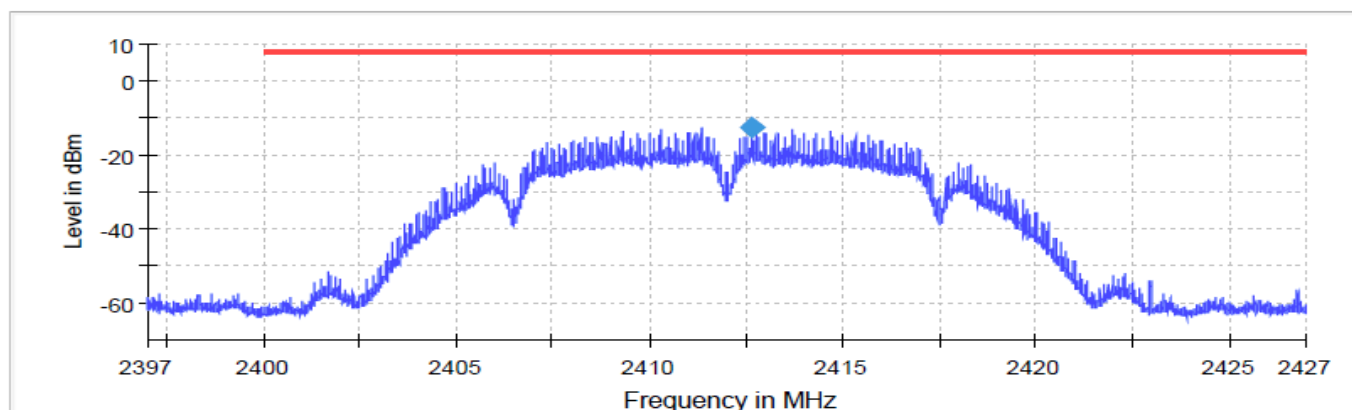
Test according to FCC title 47 part 15 §15.247(e), KDB 558074 D01 DTS Meas Guidance v05r02 F and ANSI C63.10-2013 Section 11.10.2, RSS-247 5.2 (b)

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 1.3 dB

Mode	Data Rate	PSD (dBm) 2412 MHz	PSD (dBm) 2437 MHz	PSD (dBm) 2462 MHz	Limit (dBm)
802.11b	1 Mbps	-12.606	-12.271	-13.934	8.0

802.11b 2412MHz 1Mbps

Power Spectral Density



Connector 1

Sum Level

Limit

PSD

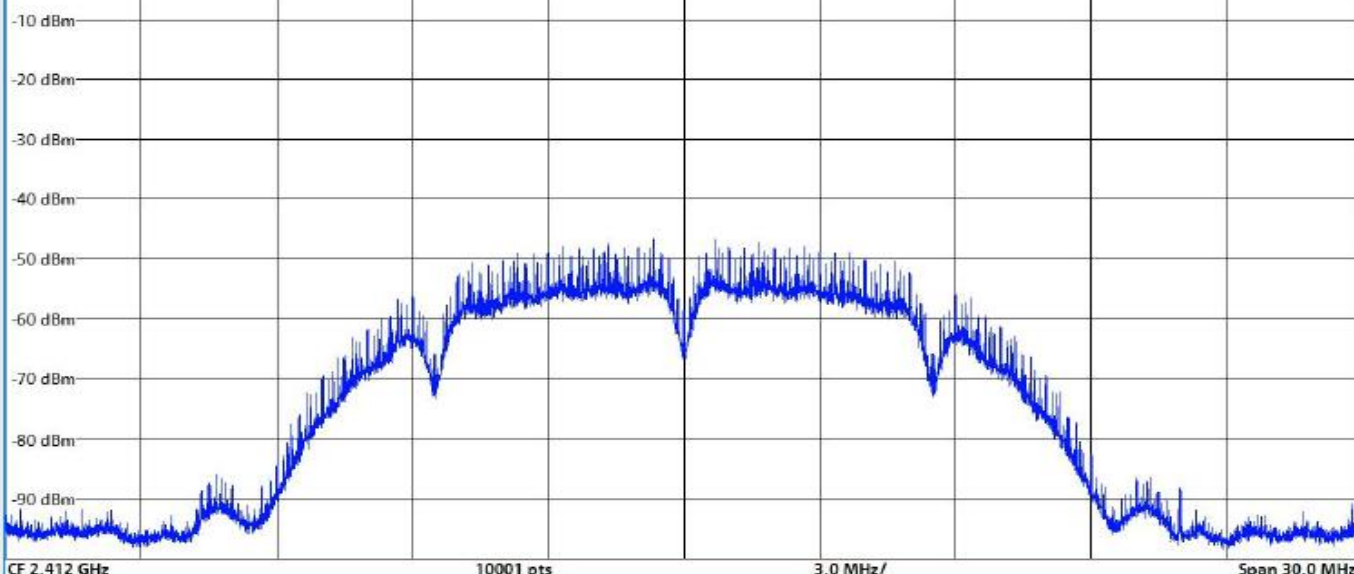
MultiView Spectrum

Ref Level 0.00 dBm RBW 3 kHz
Att 10 dB SWT 334 ms VBW 10 kHz Mode Sweep

SGL
Count 100/100

1 Frequency Sweep

TPk Max



CF 2.412 GHz

10001 pts

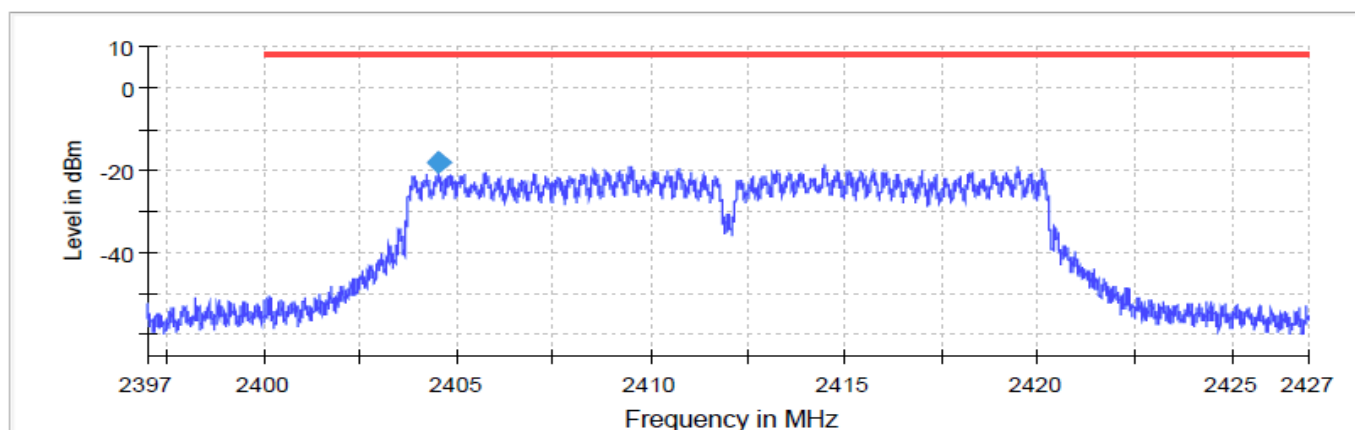
3.0 MHz/

Span 30.0 MHz

Mode	Data Rate	PSD (dBm) 2412 MHz	PSD (dBm) 2437 MHz	PSD (dBm) 2462 MHz	Limit (dBm)
802.11g	6 Mbps	-18.161	-18.975	-19.560	8.0

802.11g 2412MHz 6Mbps

Power Spectral Density



Connector 1 Sum Level Limit PSD

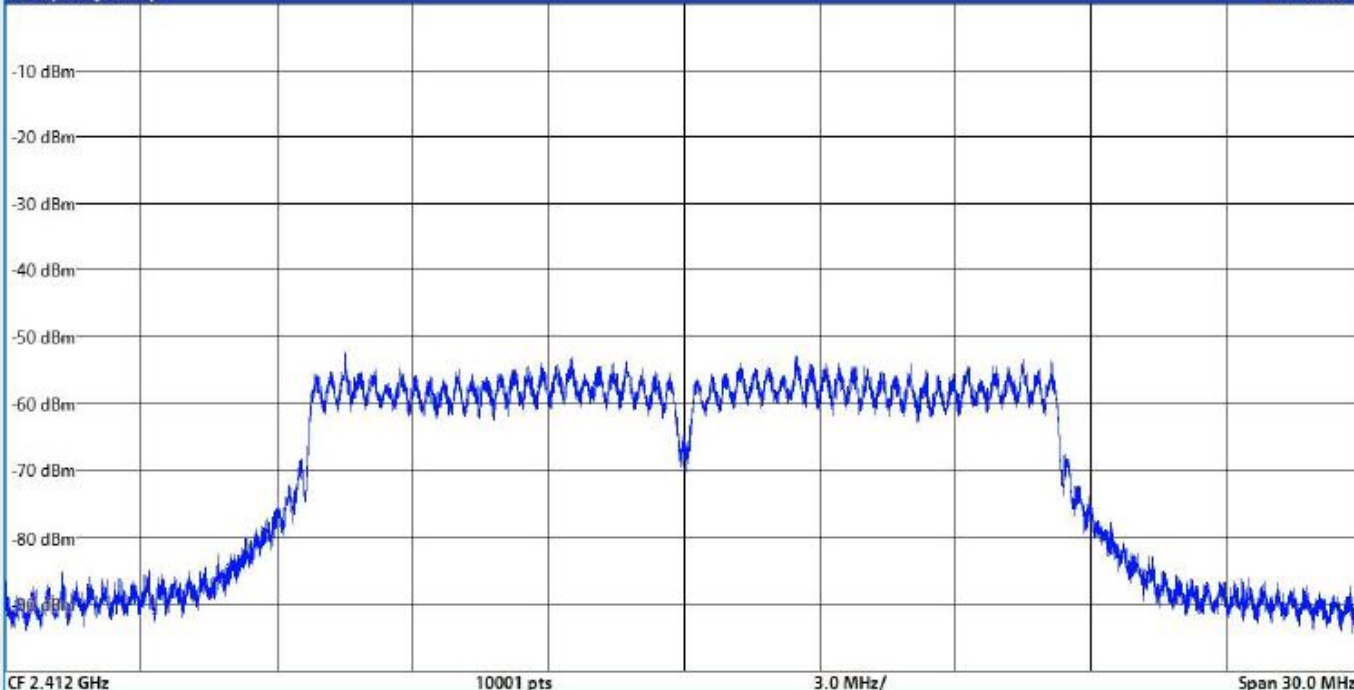
MultiView Spectrum

Ref Level 0.00 dBm RBW 3 kHz
Att 10 dB SWT 334 ms VBW 10 kHz Mode Sweep

SGL
Count 100/100

1 Frequency Sweep

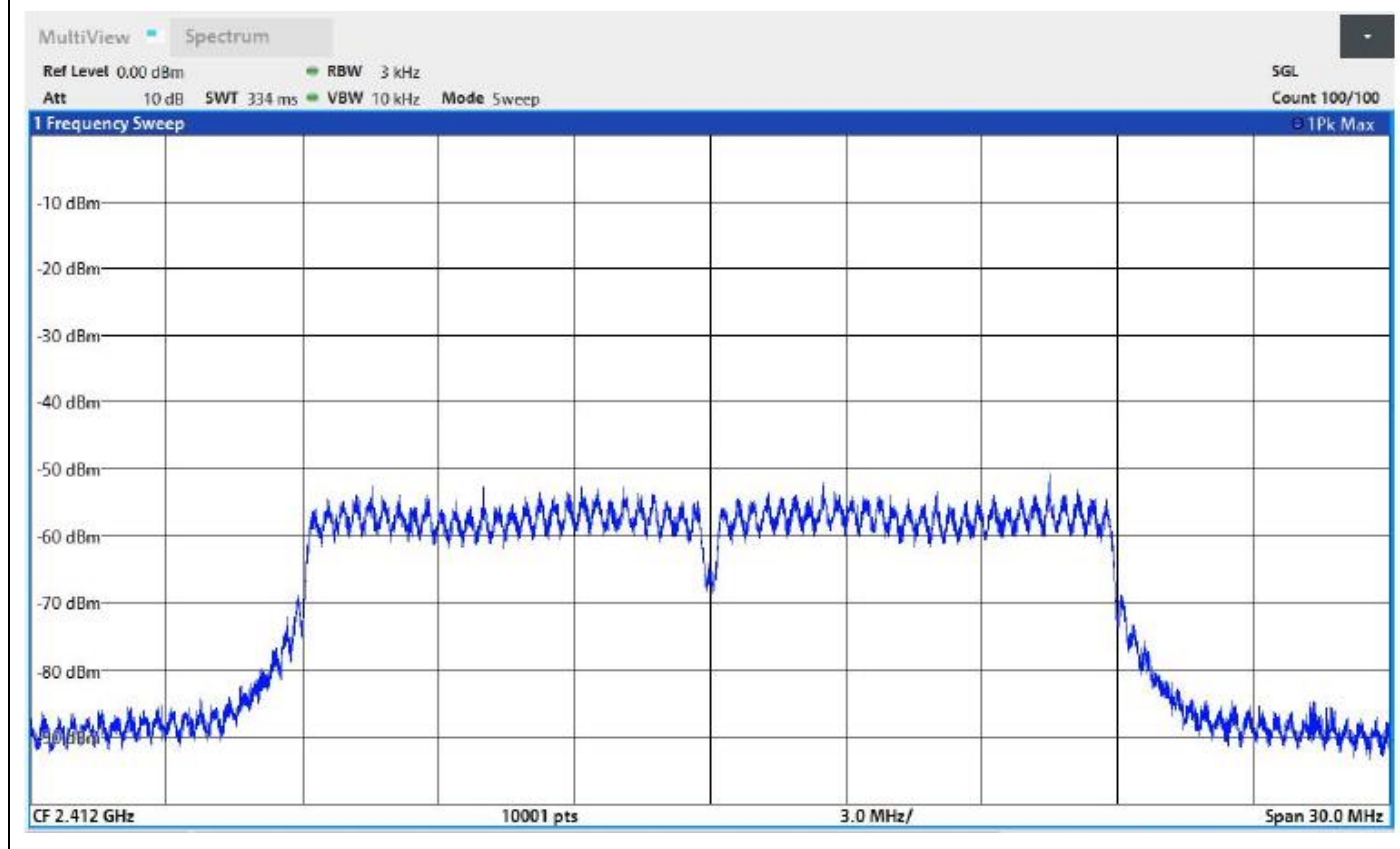
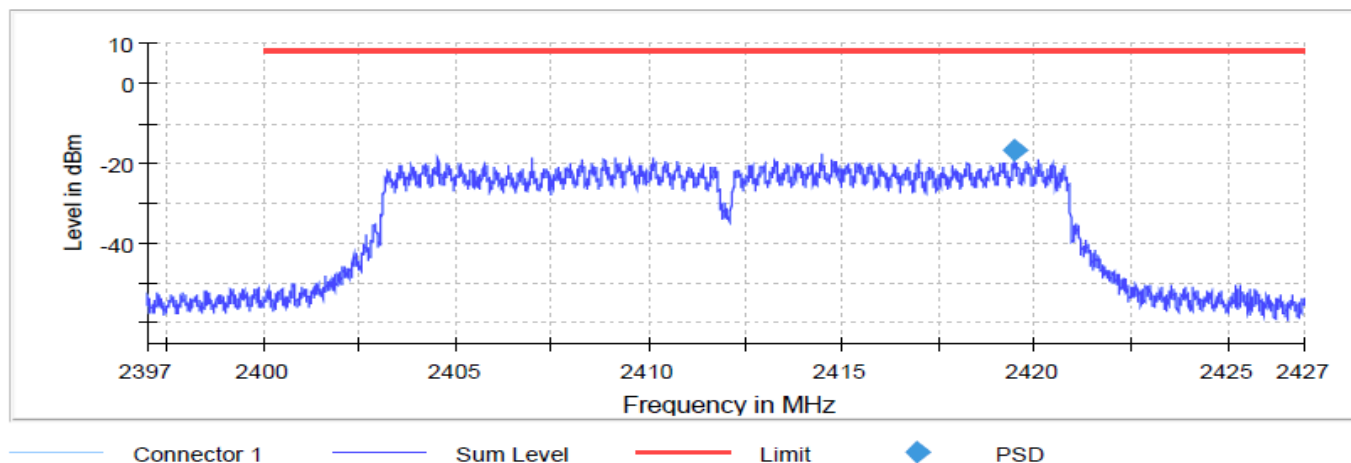
TPk Max



Mode	Data Rate	PSD (dBm) 2412 MHz	PSD (dBm) 2437 MHz	PSD (dBm) 2462 MHz	Limit (dBm)
802.11n	MCS0	-16.646	-17.802	-19.177	8.0

802.11n (HT20) 2412MHz MCS0

Power Spectral Density



4.4.3 Occupied Channel Bandwidth

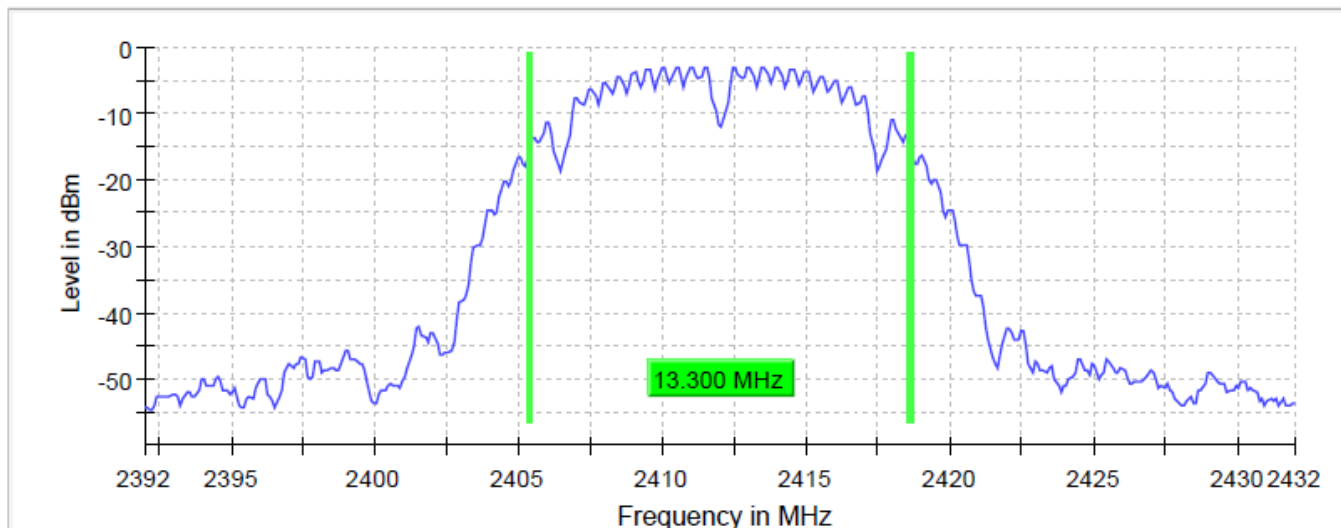
Test according to RSS-GEN Section 6.7, KDB 558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10-2013 Section 6.9.3

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 2%

Data Rate	DUT Frequency (MHz)	Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
802.11b 1Mbps	2412.000000	13.300000	2405.350000	2418.650000
802.11g 6Mbps	2412.000000	16.700000	2403.650000	2420.350000
802.11n (HT20) MCS0	2412.000000	17.700000	2403.150000	2420.850000
802.11b 1Mbps	2437.000000	13.300000	2430.350000	2443.650000
802.11g 6Mbps	2437.000000	16.600000	2428.750000	2445.350000
802.11n (HT20) MCS0	2437.000000	17.700000	2428.150000	2445.850000
802.11b 1Mbps	2462.000000	13.300000	2455.350000	2468.650000
802.11g 6Mbps	2462.000000	16.600000	2453.750000	2470.350000
802.11n (HT20) MCS0	2462.000000	17.700000	2453.150000	2470.850000

802.11b 1Mbps 2412MHz

99 % Bandwidth



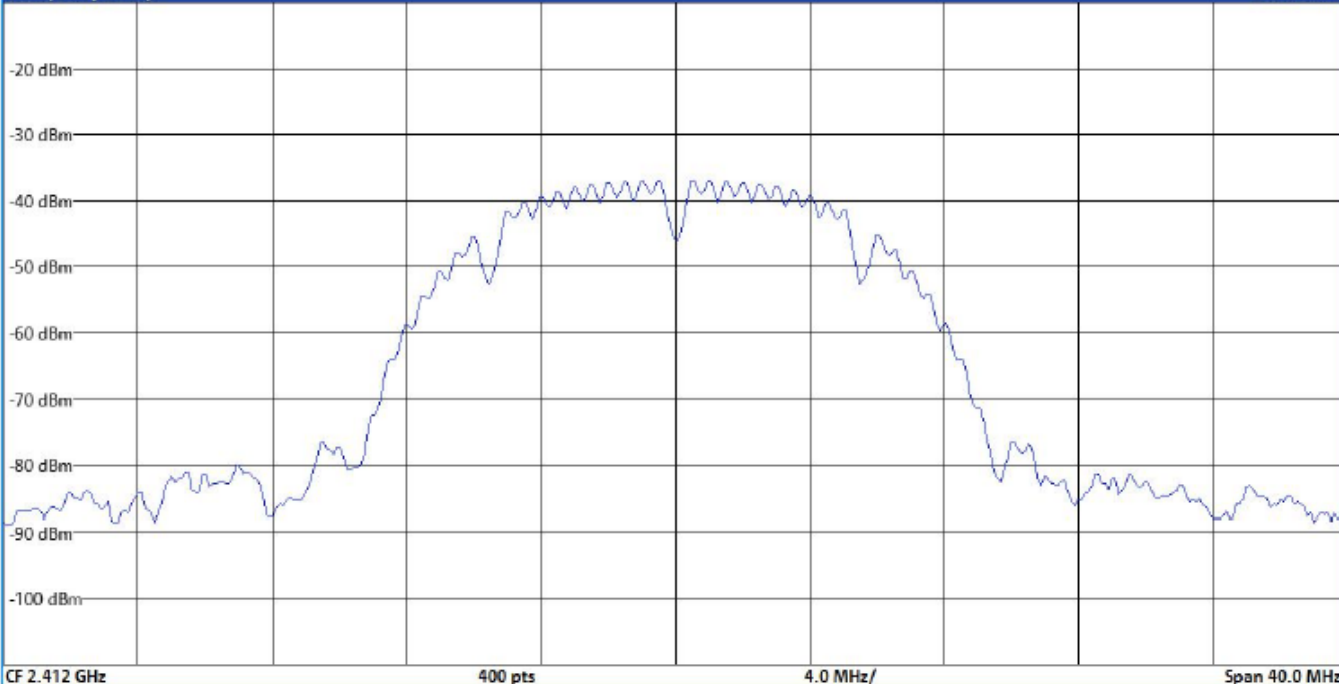
MultiView Spectrum

Ref Level -10.00 dBm Att 0 dB SWT 1 ms RBW 200 kHz VBW 1 MHz Mode Sweep

SGL Count 100/100

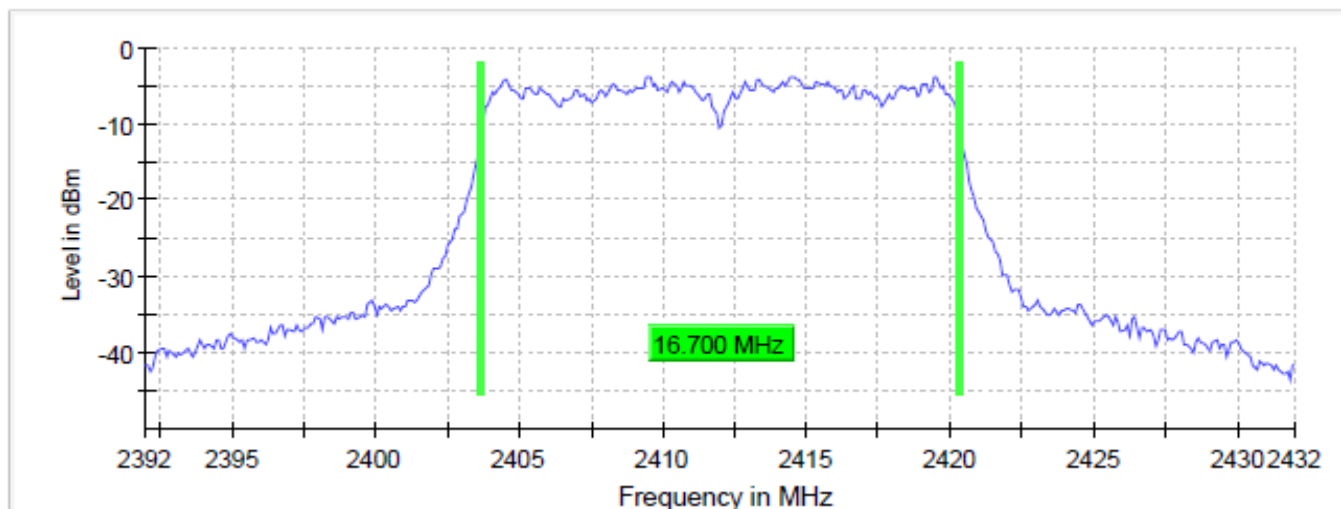
1 Frequency Sweep

1Pk Max



802.11g 6Mbps 2412MHz

99 % Bandwidth



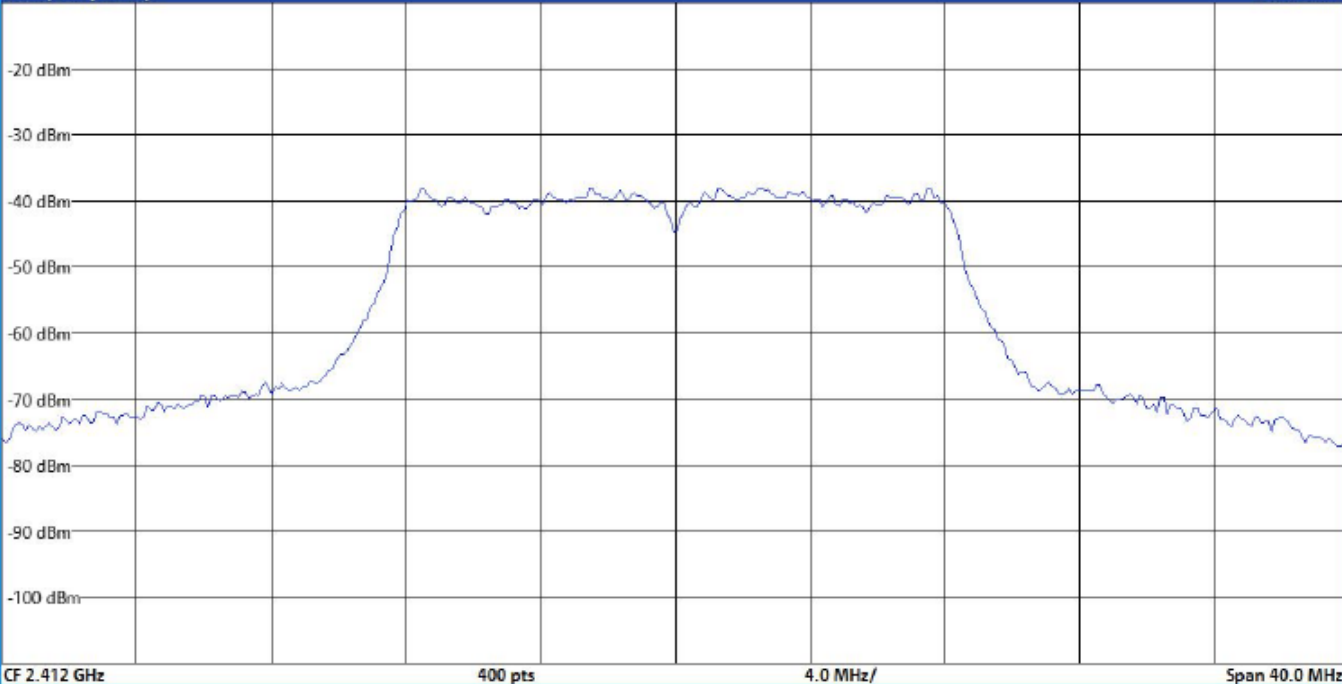
MultiView Spectrum

Ref Level -10.00 dBm
Att 0 dB SWT 1 ms RBW 200 kHz VBW 1 MHz Mode Sweep

SGL
Count 100/100

1 Frequency Sweep

1Pk Max



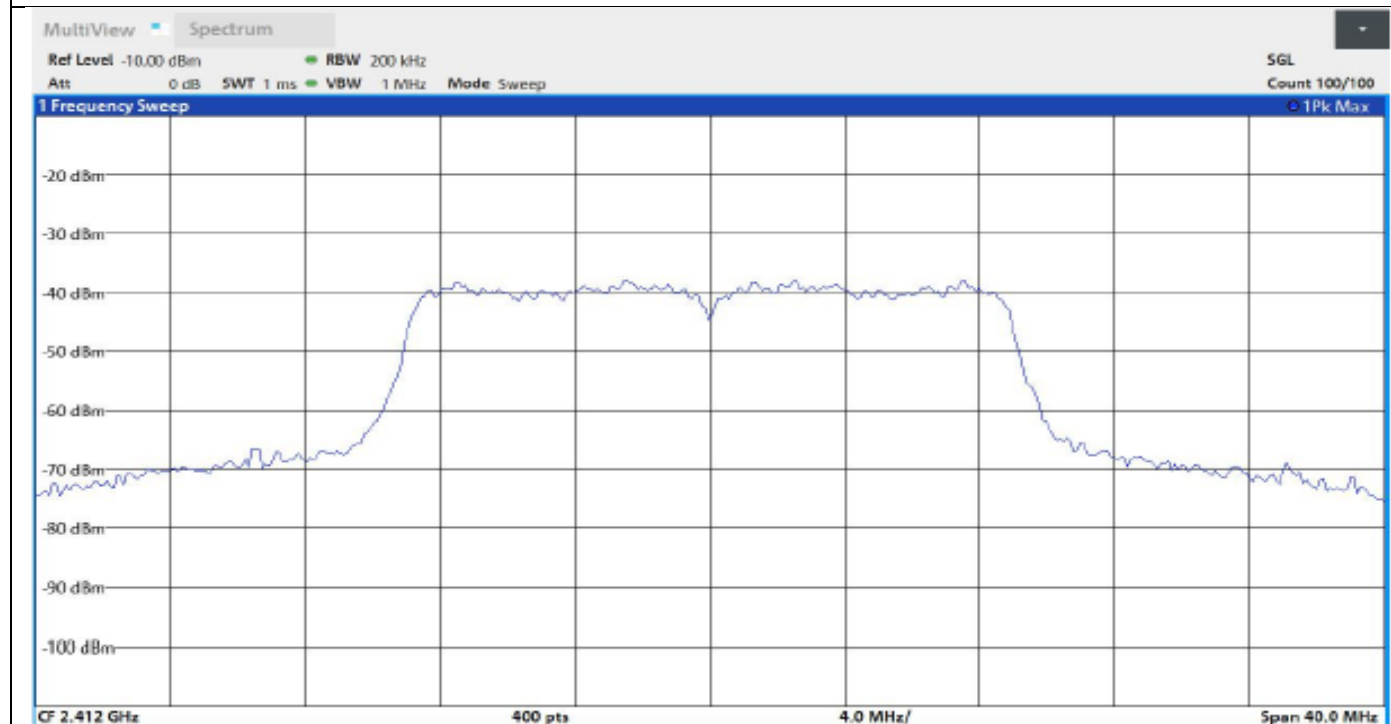
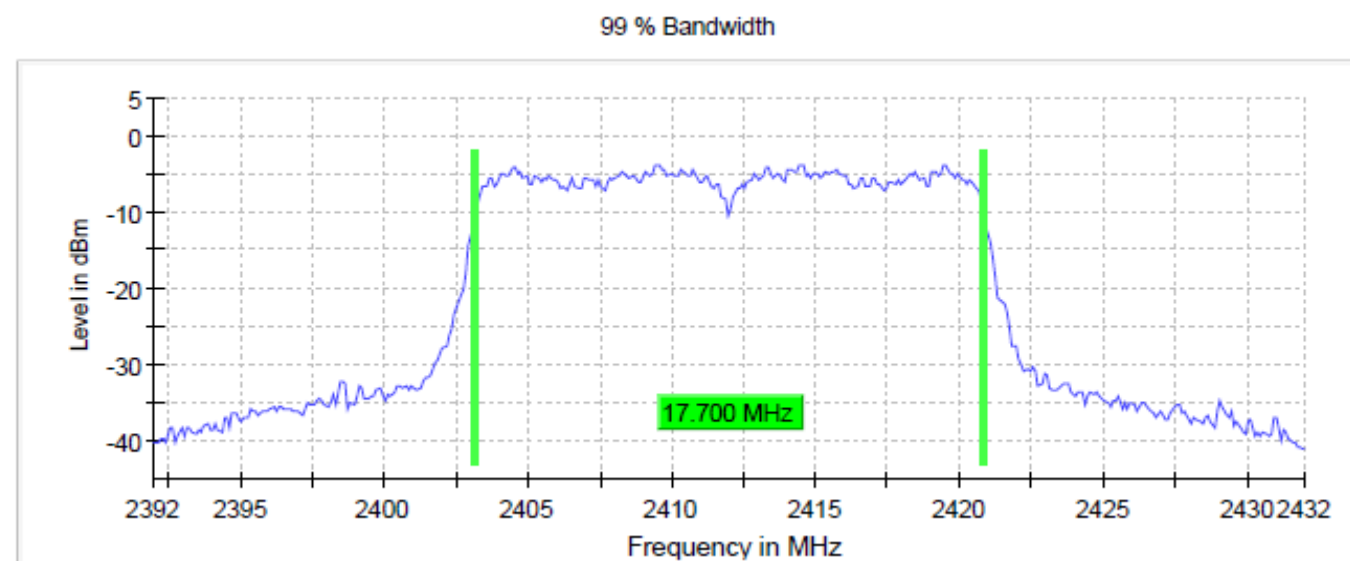
CF 2.412 GHz

400 pts

4.0 MHz/

Span 40.0 MHz

802.11n MCS0 2412MHz



4.4.4 DTS Bandwidth (6dB)

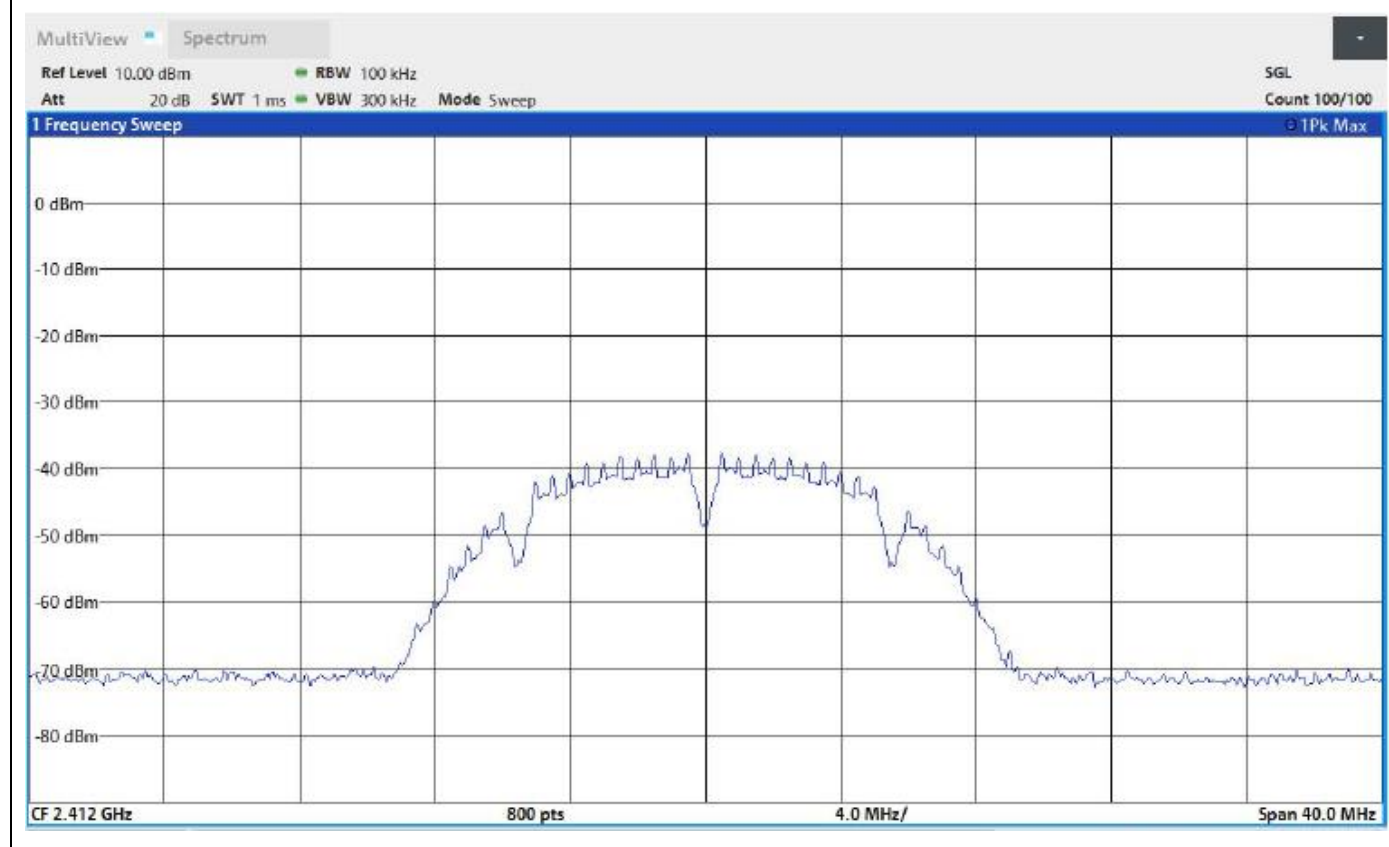
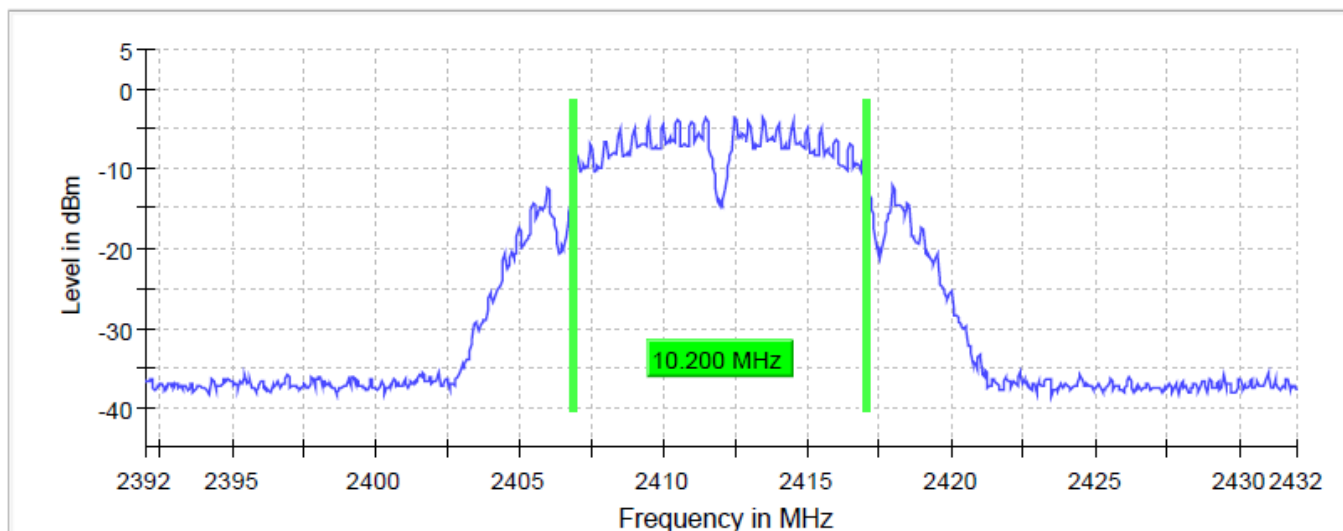
Definition: Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10-2013 11.8.1, RSS-247 5.2(a)

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 2%

Data Rate	DUT Frequency (MHz)	Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Minimum Limit (MHz)
802.11b 1Mbps	2412.000000	10.200000	2406.875000	2417.075000	0.500000
802.11g 6Mbps	2412.000000	16.450000	2403.775000	2420.225000	0.500000
802.11n (HT20) MCS0	2412.000000	17.600000	2403.175000	2420.775000	0.500000
802.11b 1Mbps	2437.000000	10.150000	2431.925000	2442.075000	0.500000
802.11g 6Mbps	2437.000000	16.450000	2428.775000	2445.225000	0.500000
802.11n (HT20) MCS0	2437.000000	17.650000	2428.175000	2445.825000	0.500000
802.11b 1Mbps	2462.000000	10.150000	2456.925000	2467.075000	0.500000
802.11g 6Mbps	2462.000000	16.450000	2453.775000	2470.225000	0.500000
802.11n (HT20) MCS0	2462.000000	17.650000	2453.175000	2470.825000	0.500000

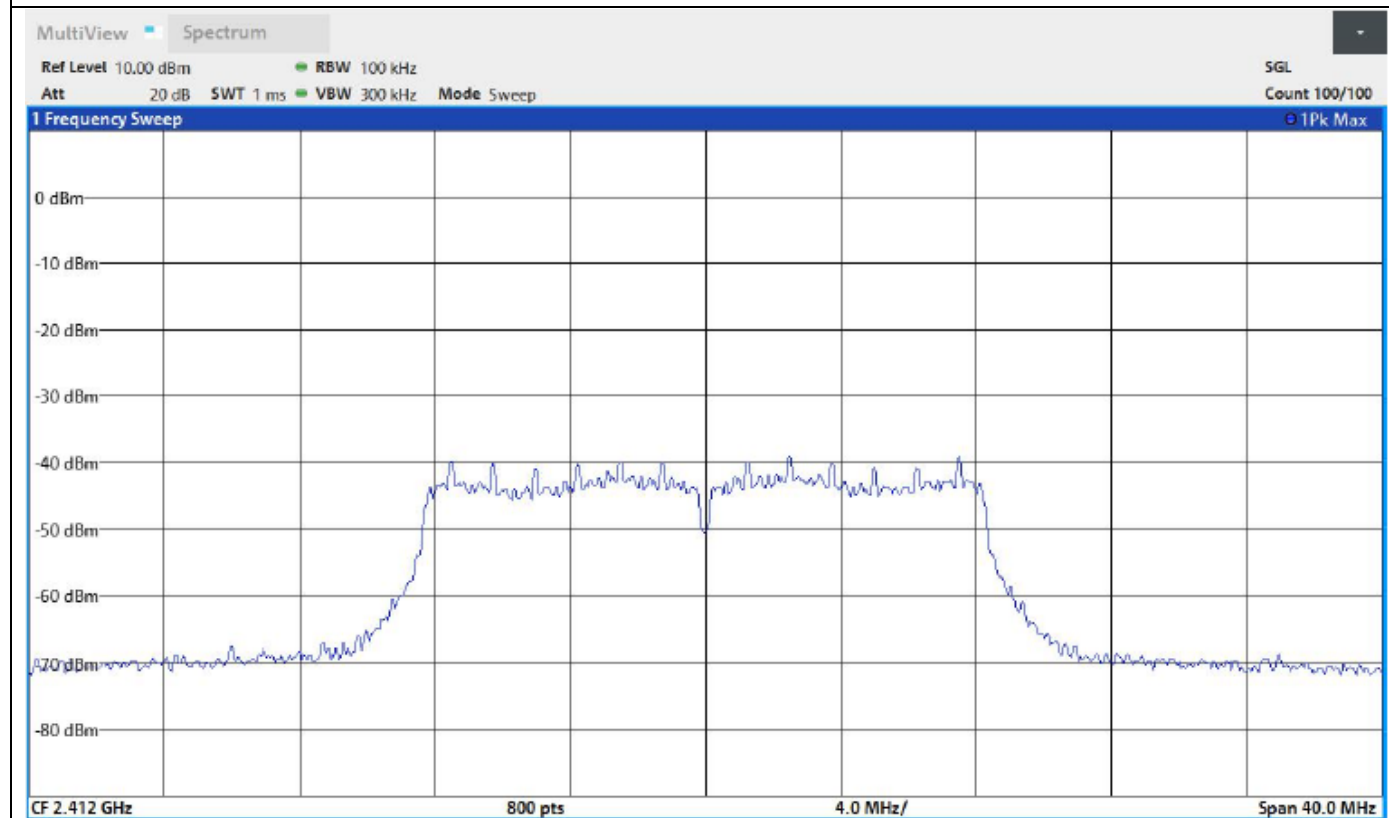
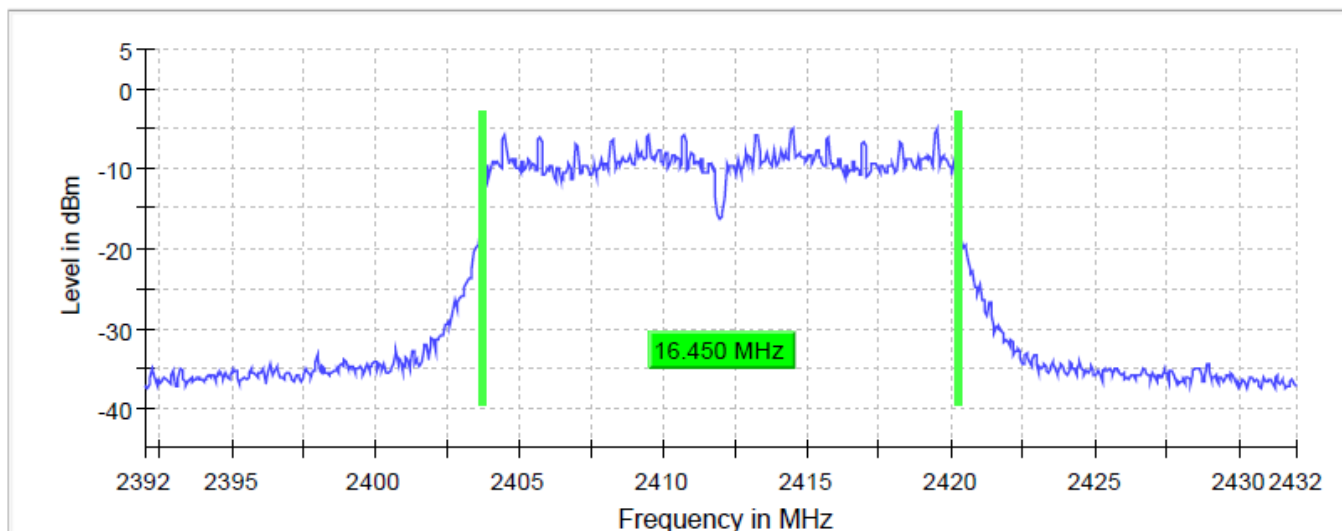
802.11b 2412MHz 1Mbps

6 dB Bandwidth



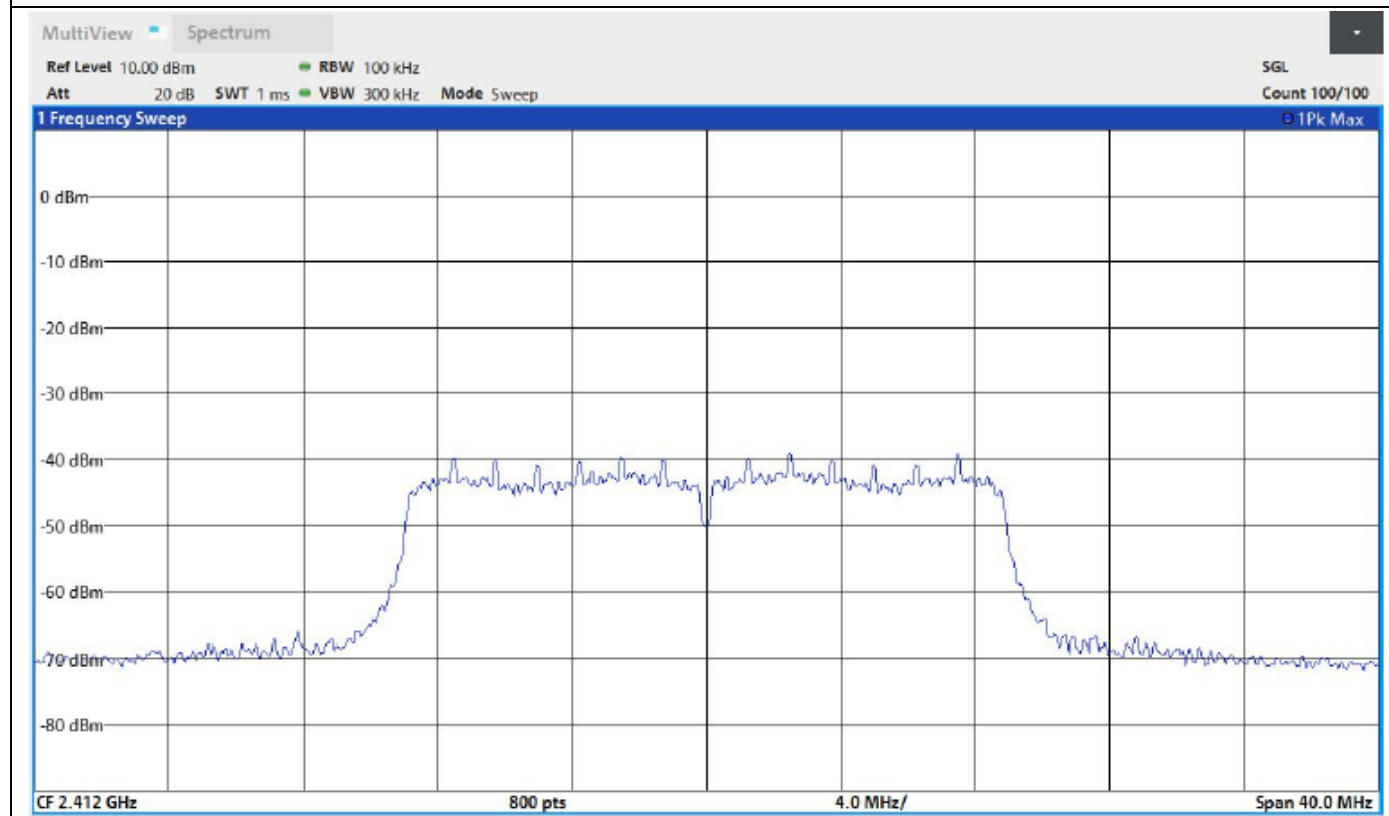
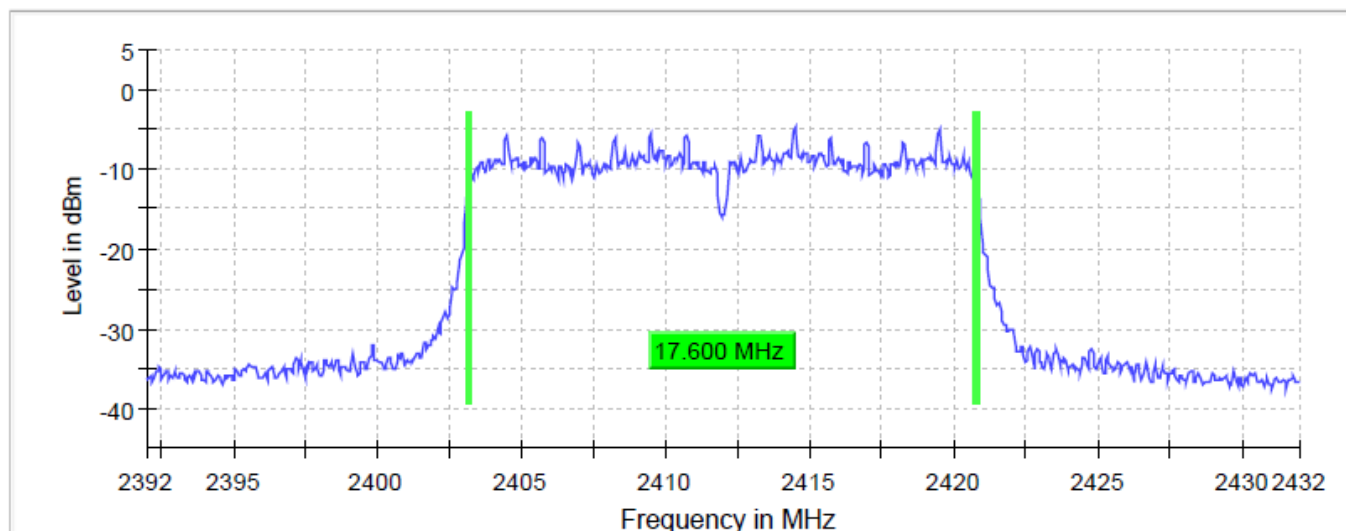
802.11g 2412MHz 6Mbps

6 dB Bandwidth



802.11n 2412MHz MCS0

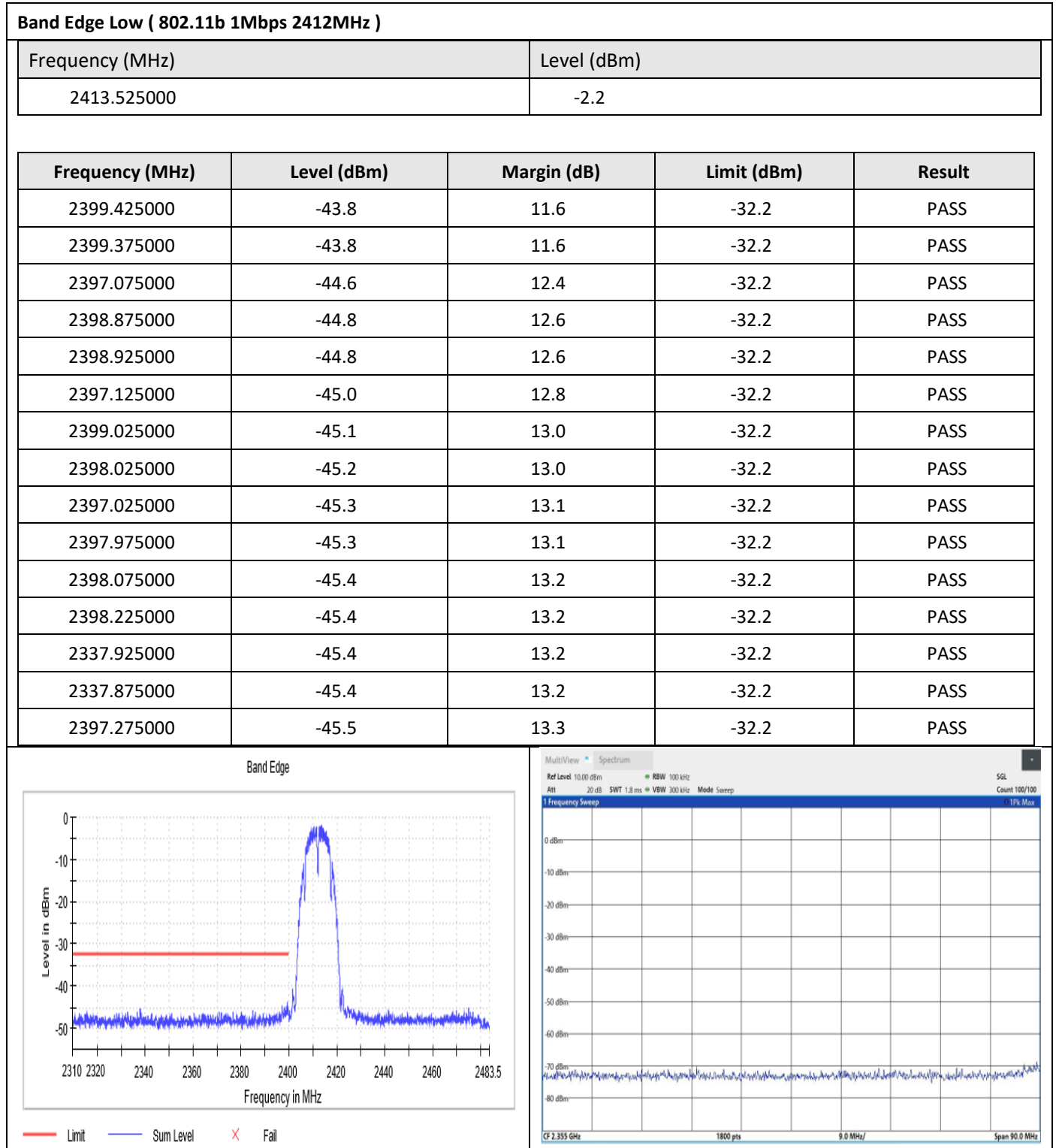
6 dB Bandwidth



4.4.5 Conducted Band Edge

Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v05r02 Section 8.7 and ANSI C63.10-2013 Section 11.11.3, RSS-247 5.5

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 0.8 dB

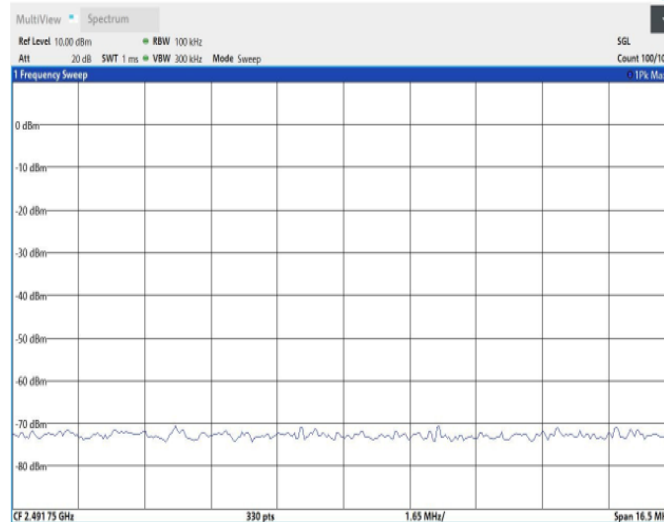
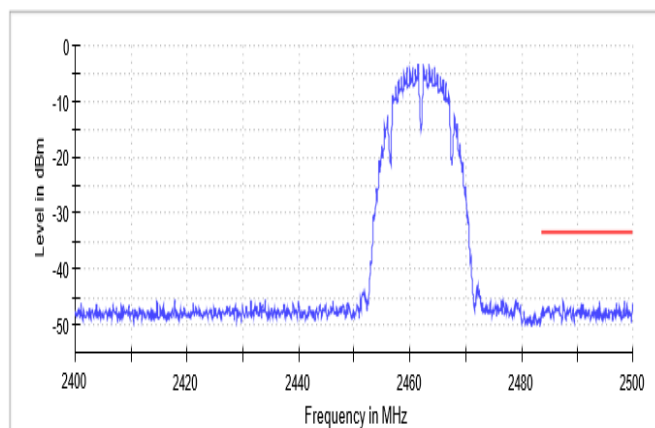


Band Edge High (802.11b 1Mbps 2462MHz)

Frequency (MHz)	Level (dBm)
2461.525000	-3.4

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2494.125000	-45.6	12.2	-33.4	PASS
2487.575000	-45.7	12.2	-33.4	PASS
2498.525000	-45.8	12.4	-33.4	PASS
2494.075000	-45.9	12.5	-33.4	PASS
2500.000000	-46.0	12.6	-33.4	PASS
2499.975000	-46.0	12.6	-33.4	PASS
2490.675000	-46.1	12.6	-33.4	PASS
2497.075000	-46.1	12.7	-33.4	PASS
2490.725000	-46.1	12.7	-33.4	PASS
2497.025000	-46.2	12.8	-33.4	PASS
2498.475000	-46.2	12.8	-33.4	PASS
2498.875000	-46.4	12.9	-33.4	PASS
2487.525000	-46.4	13.0	-33.4	PASS
2491.025000	-46.4	13.0	-33.4	PASS
2491.075000	-46.5	13.1	-33.4	PASS

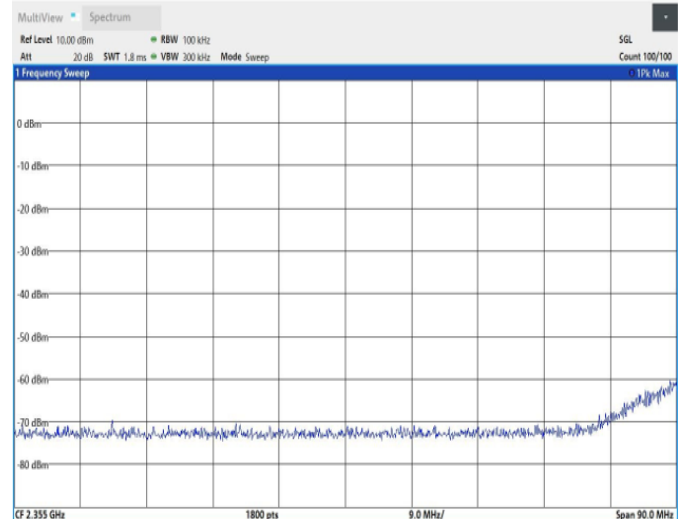
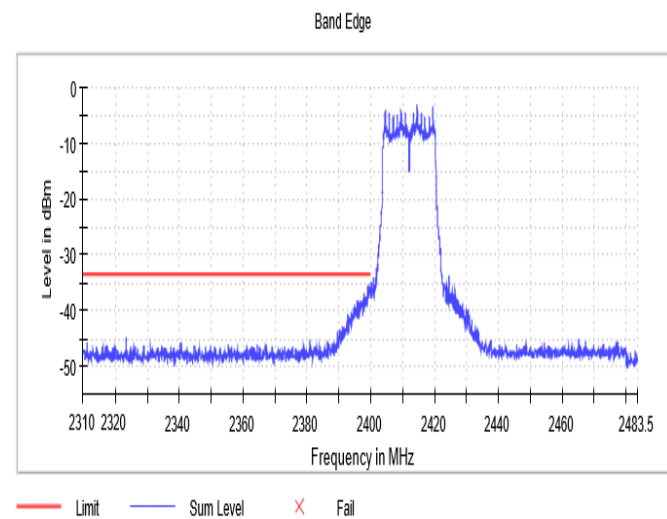
Band Edge



Band Edge Low (802.11g 6Mbps 2412MHz)

Frequency (MHz)	Level (dBm)
2414.525000	-3.2

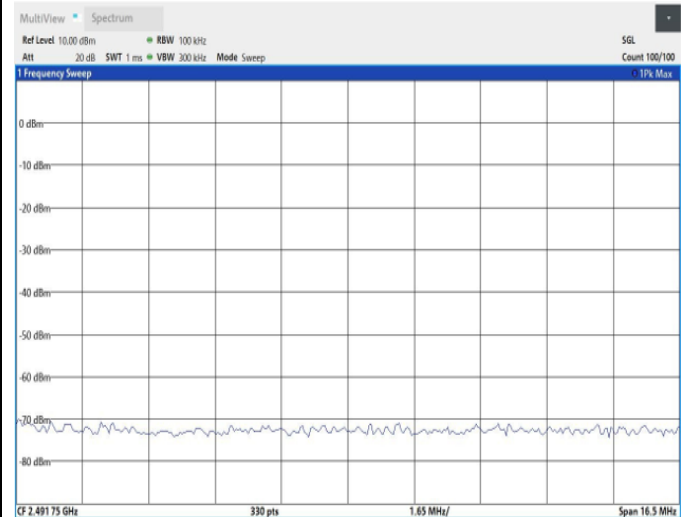
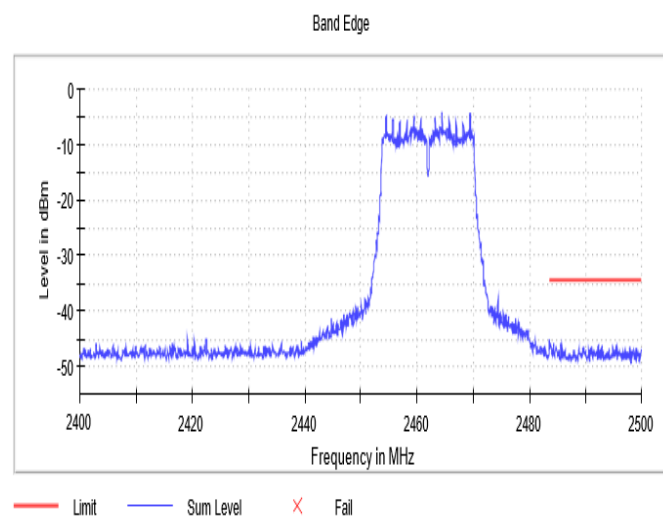
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.125000	-35.5	2.2	-33.2	PASS
2399.075000	-35.7	2.5	-33.2	PASS
2399.525000	-35.9	2.7	-33.2	PASS
2399.875000	-35.9	2.7	-33.2	PASS
2399.925000	-36.1	2.9	-33.2	PASS
2399.225000	-36.1	2.9	-33.2	PASS
2399.825000	-36.2	3.0	-33.2	PASS
2399.725000	-36.3	3.1	-33.2	PASS
2399.275000	-36.3	3.1	-33.2	PASS
2399.575000	-36.3	3.1	-33.2	PASS
2399.175000	-36.3	3.1	-33.2	PASS
2399.675000	-36.4	3.2	-33.2	PASS
2399.775000	-36.5	3.3	-33.2	PASS
2399.625000	-36.6	3.4	-33.2	PASS
2399.475000	-36.7	3.5	-33.2	PASS



Band Edge High (802.11g 6Mbps 2462MHz)

Frequency (MHz)	Level (dBm)
2464.525000	-4.3

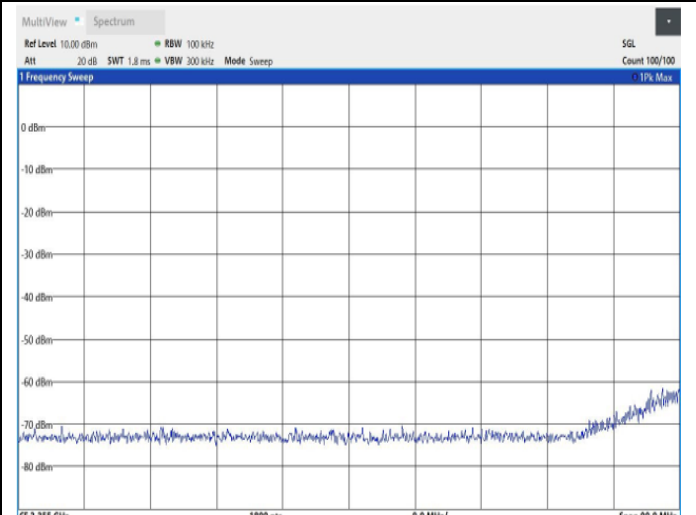
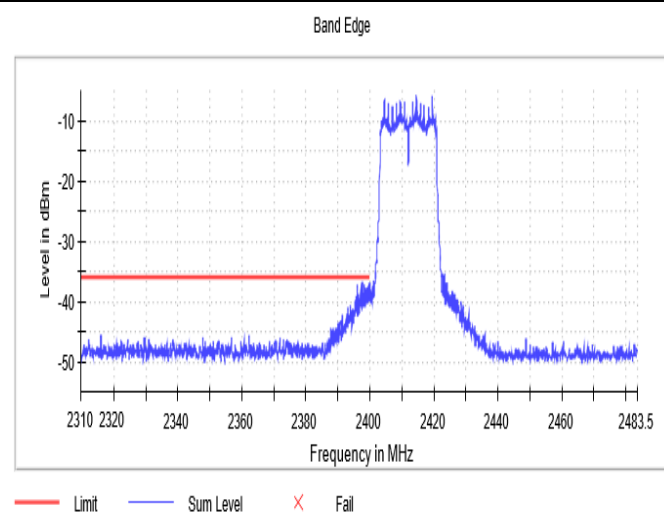
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2483.575000	-45.1	10.8	-34.3	PASS
2483.625000	-45.5	11.2	-34.3	PASS
2484.375000	-45.6	11.3	-34.3	PASS
2483.825000	-45.7	11.4	-34.3	PASS
2485.625000	-45.7	11.5	-34.3	PASS
2485.925000	-46.0	11.7	-34.3	PASS
2495.475000	-46.1	11.8	-34.3	PASS
2483.775000	-46.1	11.9	-34.3	PASS
2492.325000	-46.1	11.9	-34.3	PASS
2493.025000	-46.1	11.9	-34.3	PASS
2492.975000	-46.2	11.9	-34.3	PASS
2485.875000	-46.2	11.9	-34.3	PASS
2483.525000	-46.2	12.0	-34.3	PASS
2484.825000	-46.2	12.0	-34.3	PASS
2483.725000	-46.3	12.0	-34.3	PASS



Band Edge Low (802.11n (HT20) MCS0 2412MHz)

Frequency (MHz)	Level (dBm)
2414.525000	-5.8

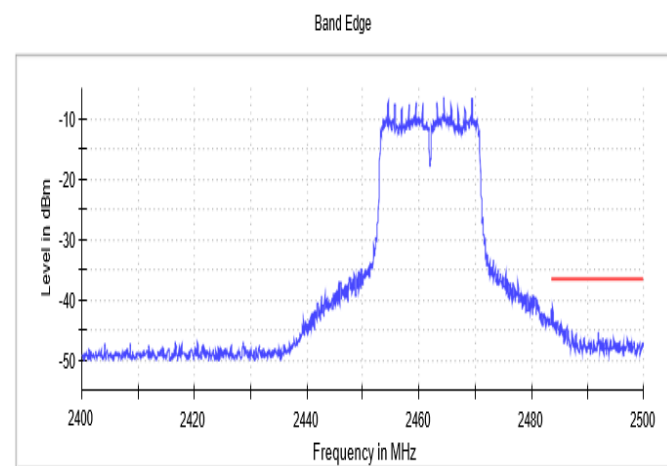
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2397.675000	-36.7	0.9	-35.8	PASS
2397.625000	-36.9	1.1	-35.8	PASS
2399.875000	-37.0	1.2	-35.8	PASS
2399.925000	-37.1	1.3	-35.8	PASS
2399.775000	-37.1	1.3	-35.8	PASS
2396.125000	-37.1	1.3	-35.8	PASS
2398.275000	-37.1	1.3	-35.8	PASS
2397.725000	-37.2	1.3	-35.8	PASS
2396.075000	-37.2	1.3	-35.8	PASS
2399.825000	-37.4	1.5	-35.8	PASS
2399.525000	-37.5	1.6	-35.8	PASS
2398.325000	-37.5	1.6	-35.8	PASS
2399.125000	-37.6	1.7	-35.8	PASS
2399.175000	-37.6	1.8	-35.8	PASS
2399.475000	-37.7	1.8	-35.8	PASS



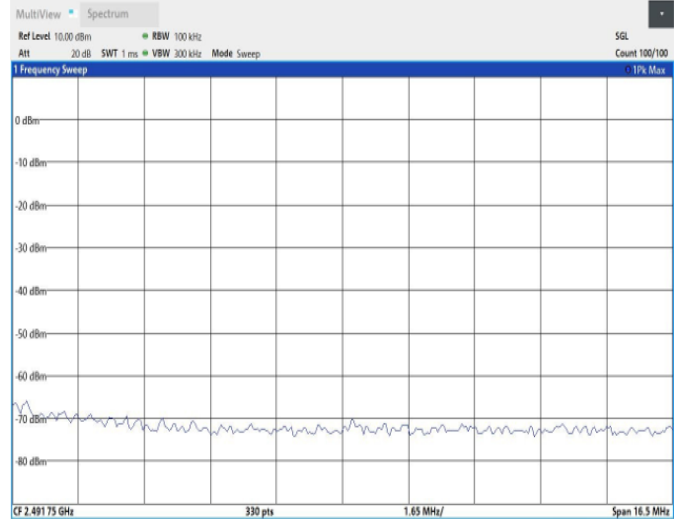
Band Edge High (802.11n (HT20) MCS0 2462MHz)

Frequency (MHz)	Level (dBm)
2464.525000	-6.6

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2483.875000	-40.9	4.3	-36.6	PASS
2483.575000	-41.7	5.1	-36.6	PASS
2483.625000	-41.7	5.1	-36.6	PASS
2483.825000	-41.7	5.1	-36.6	PASS
2483.525000	-41.9	5.3	-36.6	PASS
2483.775000	-42.0	5.4	-36.6	PASS
2483.925000	-42.2	5.6	-36.6	PASS
2483.675000	-42.8	6.2	-36.6	PASS
2483.975000	-43.4	6.8	-36.6	PASS
2484.825000	-43.5	6.8	-36.6	PASS
2484.775000	-43.7	7.1	-36.6	PASS
2484.475000	-43.8	7.2	-36.6	PASS
2484.225000	-43.8	7.2	-36.6	PASS
2484.675000	-43.9	7.3	-36.6	PASS
2484.525000	-43.9	7.3	-36.6	PASS



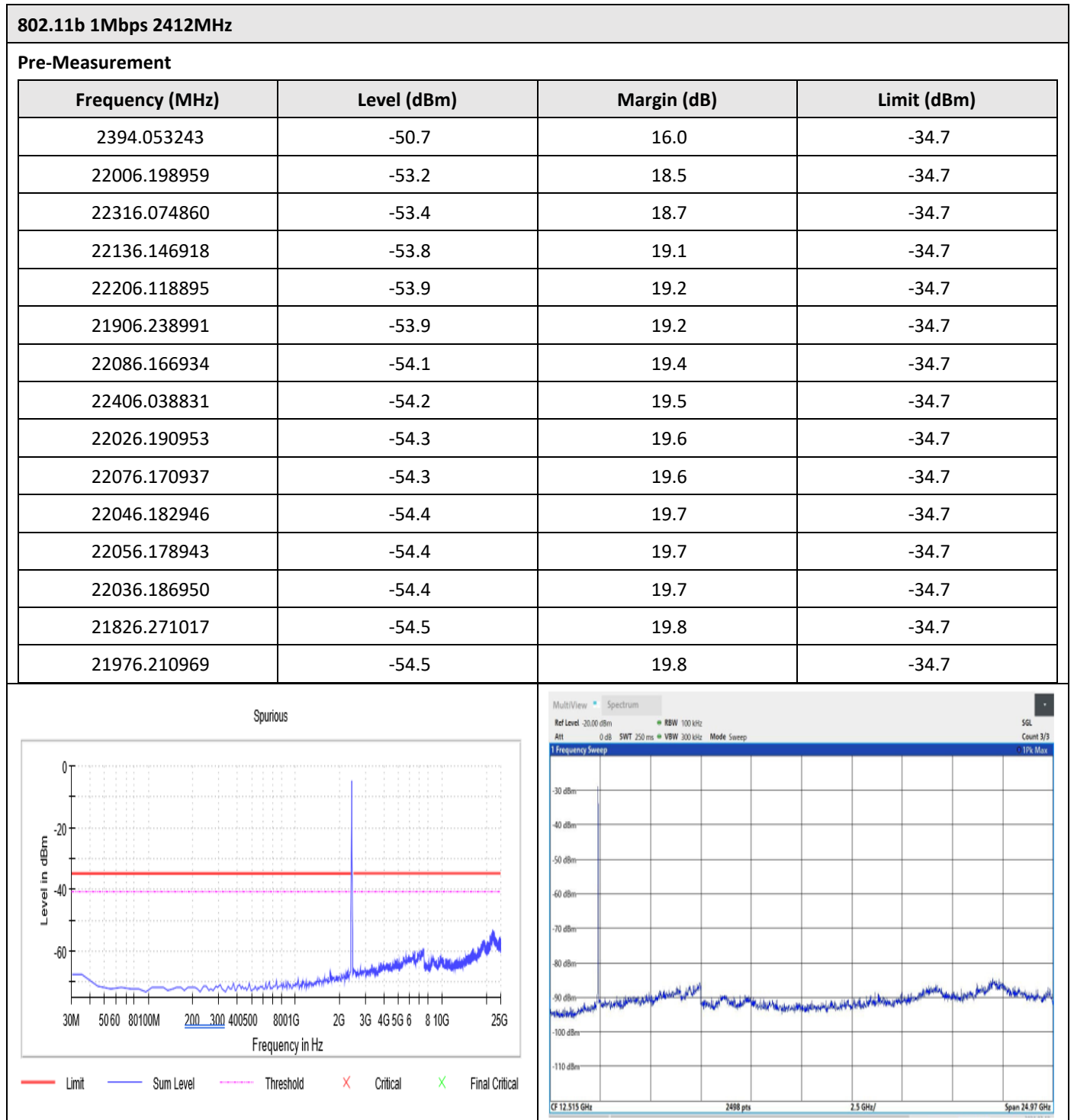
— Limit — Sum Level × Fail



4.4.6 Tx Spurious Emissions

Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v05r02 8.5 and ANSI C63.10-2013 11.11.2 & 11.11.3, RSS-247 5.5

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 1.8 dB

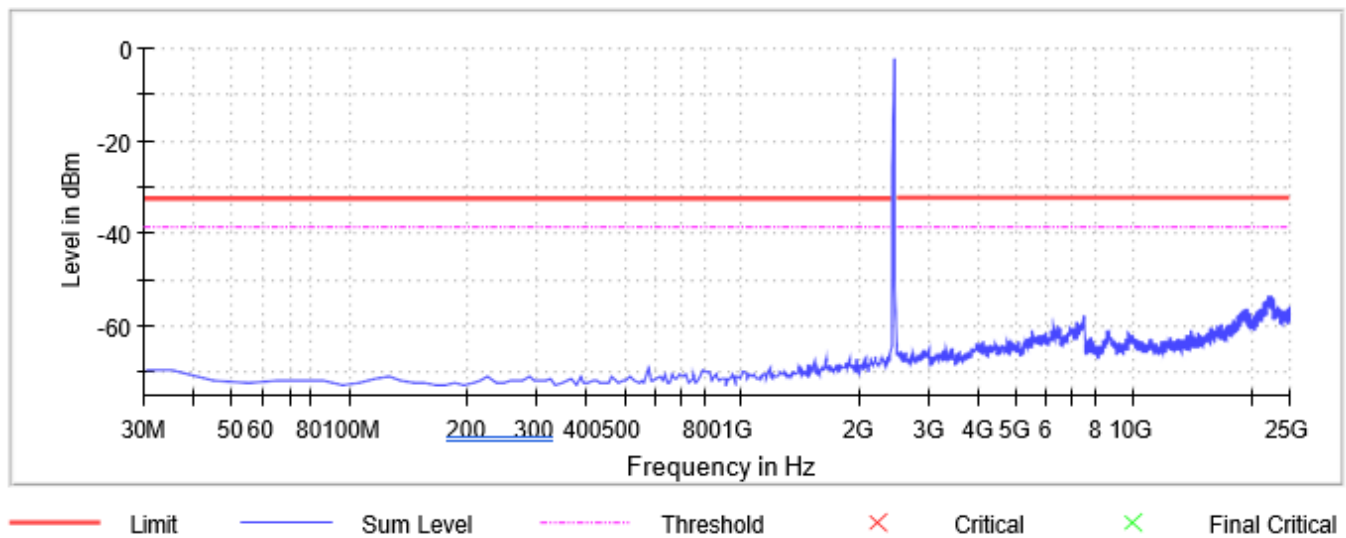


802.11b 1Mbps 2437MHz

Pre-Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
22036.186950	-53.5	21.0	-32.5
22466.014812	-53.6	21.1	-32.5
22316.074860	-53.8	21.2	-32.5
22645.942754	-53.8	21.2	-32.5
22406.038831	-53.9	21.4	-32.5
22086.166934	-54.2	21.6	-32.5
21996.202962	-54.2	21.7	-32.5
22046.182946	-54.3	21.7	-32.5
21976.210969	-54.3	21.8	-32.5
22306.078863	-54.4	21.8	-32.5
21916.234988	-54.5	21.9	-32.5
21906.238991	-54.5	21.9	-32.5
22176.130905	-54.5	22.0	-32.5
22116.154924	-54.5	22.0	-32.5
22246.102882	-54.6	22.0	-32.5

Spurious

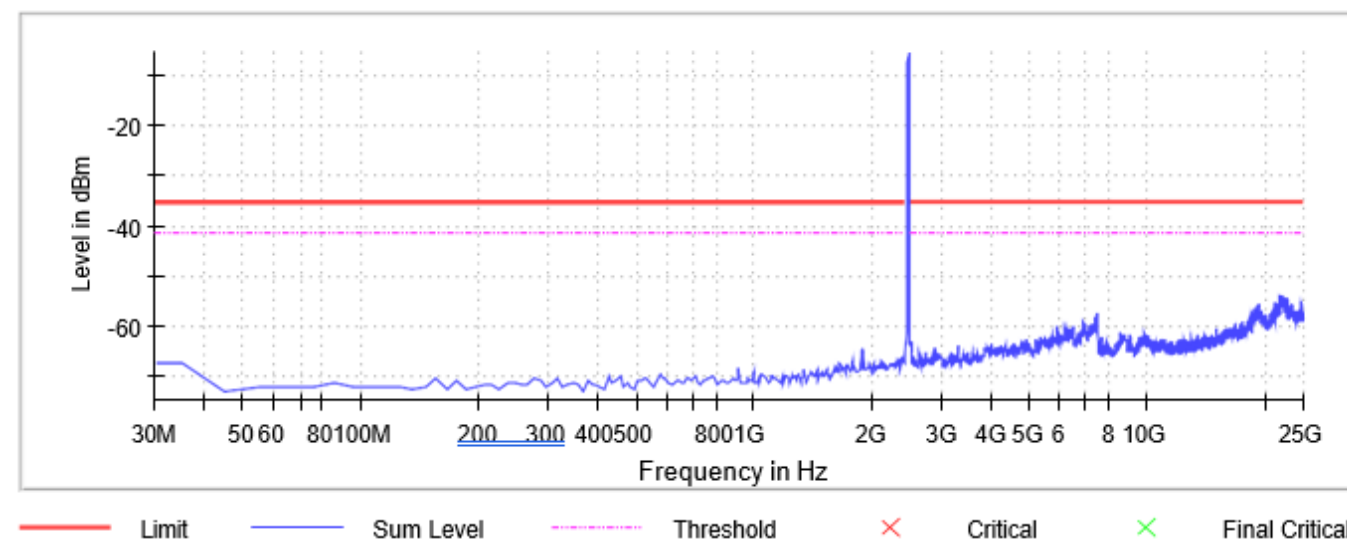


802.11b 1Mbps 2462MHz

Pre-Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
22196.122898	-53.8	18.5	-35.3
21796.283026	-53.8	18.5	-35.3
22106.158927	-53.9	18.6	-35.3
22096.162930	-54.1	18.8	-35.3
22605.958767	-54.3	19.0	-35.3
22046.182946	-54.3	19.0	-35.3
21936.226982	-54.4	19.1	-35.3
22116.154924	-54.4	19.1	-35.3
22056.178943	-54.5	19.2	-35.3
22136.146918	-54.6	19.3	-35.3
2484.017214	-54.6	19.3	-35.3
21836.267014	-54.6	19.3	-35.3
21906.238991	-54.7	19.4	-35.3
21806.279023	-54.7	19.4	-35.3
22246.102882	-54.7	19.4	-35.3

Spurious



802.11g 6Mbps 2412MHz

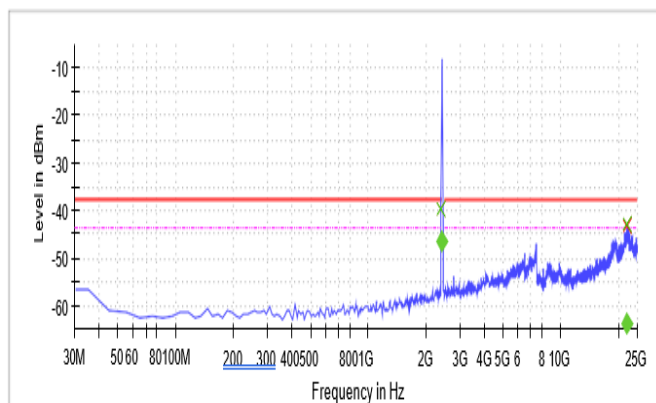
Final-Measurement

Frequency (MHz)	Level Pre Measurement (dBm)	Level (dBm)	Margin (dB)	Limit (dBm)
2398.841273	-24.3	-46.5	8.9	-37.6
22062.234790	-43.0	-63.6	26.0	-37.6

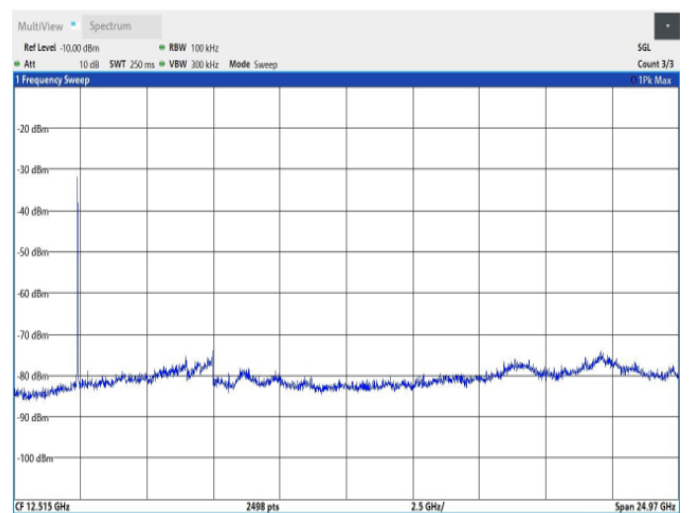
Pre-Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
2394.053243	-39.5	1.9	-37.6
22066.174940	-43.0	5.3	-37.6
22056.178943	-43.1	5.5	-37.6
22156.138911	-43.2	5.6	-37.6
22326.070857	-43.7	6.0	-37.6
22136.146918	-43.9	6.2	-37.6
22016.194956	-43.9	6.3	-37.6
22106.158927	-44.0	6.4	-37.6
21986.206966	-44.2	6.5	-37.6
22406.038831	-44.2	6.5	-37.6
21956.218975	-44.2	6.5	-37.6
22096.162930	-44.2	6.6	-37.6
22046.182946	-44.2	6.6	-37.6
22146.142914	-44.3	6.7	-37.6
21496.403122	-44.4	6.7	-37.6

Spurious



— Limit
— Sum Level
— Threshold
X Final Critical
♦ Fail
♦ Pass
X Critical

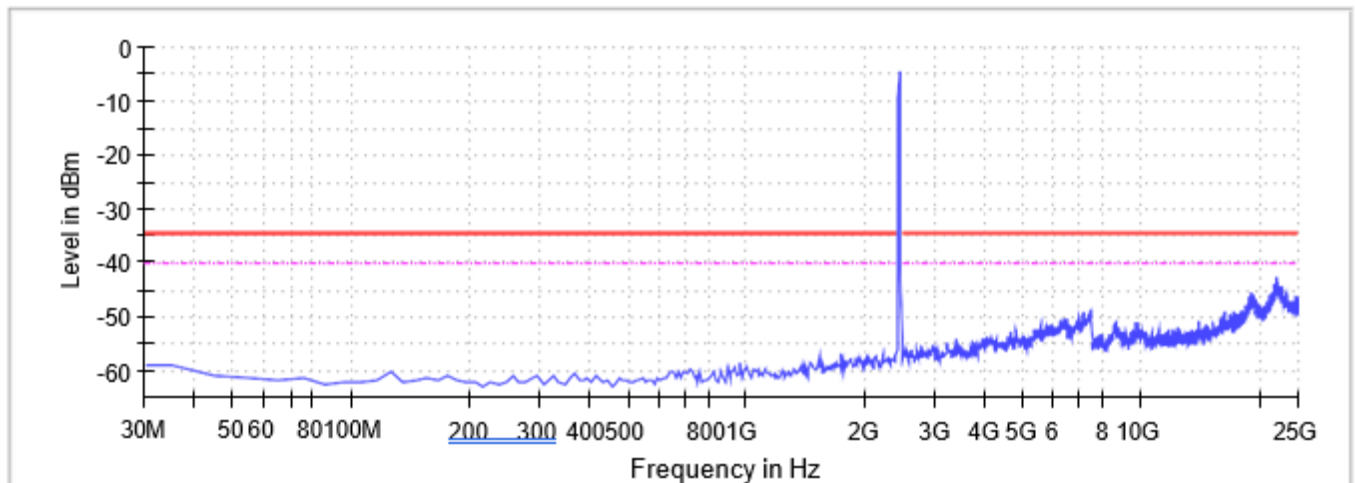


802.11g 6Mbps 2437MHz

Pre-Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
22096.162930	-42.6	8.2	-34.4
22086.166934	-43.4	8.9	-34.4
21996.202962	-43.5	9.1	-34.4
22106.158927	-43.5	9.1	-34.4
22066.174940	-43.7	9.3	-34.4
22076.170937	-43.9	9.5	-34.4
21926.230985	-43.9	9.5	-34.4
22056.178943	-43.9	9.5	-34.4
22226.110889	-44.1	9.7	-34.4
22016.194956	-44.1	9.7	-34.4
22036.186950	-44.1	9.7	-34.4
22635.946757	-44.1	9.7	-34.4
22346.062850	-44.3	9.9	-34.4
22046.182946	-44.4	10.0	-34.4
22176.130905	-44.5	10.1	-34.4

Spurious



802.11g 6Mbps 2462MHz

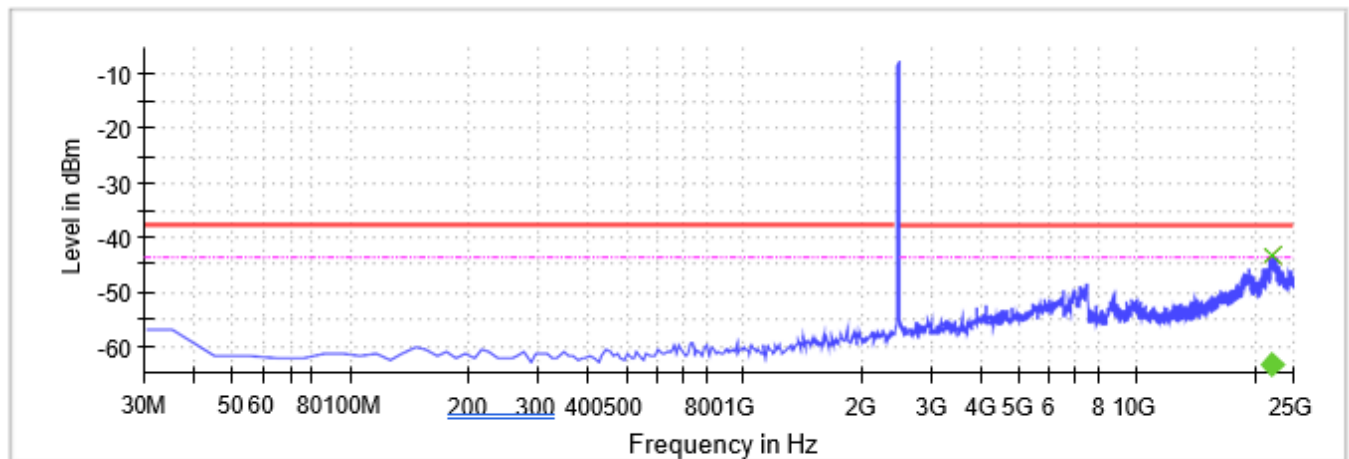
Final-Measurement

Frequency (MHz)	Level Pre Measurement (dBm)	Level (dBm)	Margin (dB)	Limit (dBm)
22054.462248	-43.6	-63.3	25.8	-37.5

Pre-Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
22046.182946	-43.3	5.8	-37.5
21876.251001	-43.5	6.0	-37.5
22555.978783	-43.6	6.1	-37.5
22056.178943	-43.7	6.2	-37.5
22016.194956	-43.7	6.2	-37.5
22406.038831	-43.7	6.3	-37.5
22545.982786	-43.7	6.3	-37.5
22026.190953	-43.8	6.3	-37.5
22376.050841	-43.8	6.3	-37.5
22066.174940	-44.0	6.5	-37.5
22226.110889	-44.0	6.6	-37.5
22446.022818	-44.1	6.6	-37.5
22086.166934	-44.1	6.7	-37.5
22096.162930	-44.2	6.7	-37.5
22116.154924	-44.2	6.7	-37.5

Spurious



— Limit
X Final Critical
— Sum Level
◆ Fail
— Threshold
◆ Pass
X Critical

802.11n (HT20) MCS0 2412MHz

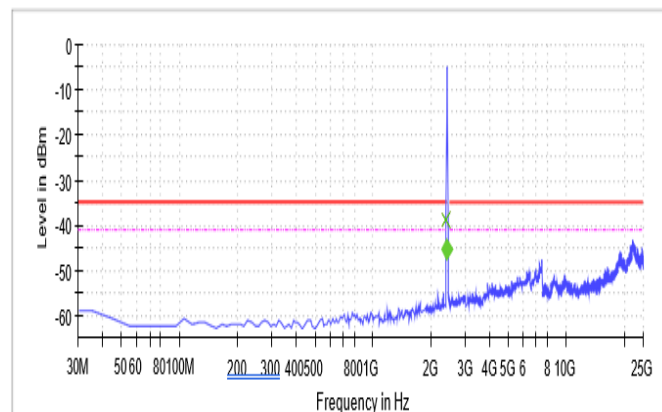
Final-Measurement

Frequency (MHz)	Level Pre Measurement (dBm)	Level (dBm)	Margin (dB)	Limit (dBm)
2399.788904	-21.2	-45.5	10.6	-34.9

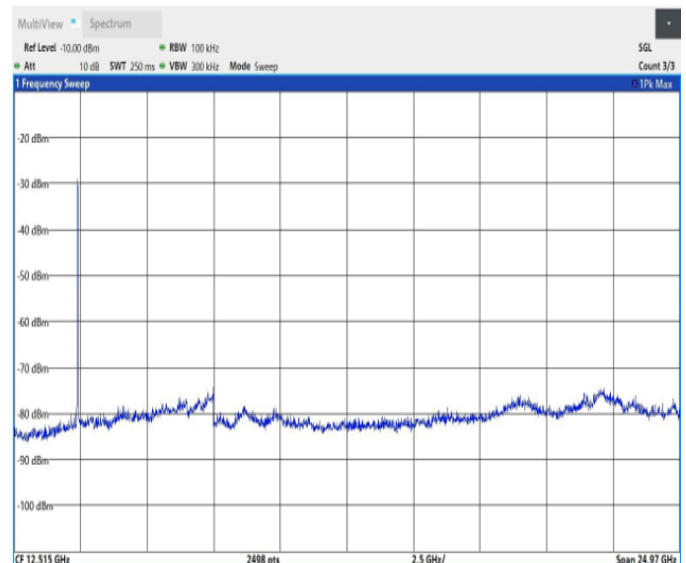
Pre-Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
2394.053243	-38.9	4.0	-34.9
22166.134908	-43.3	8.4	-34.9
22036.186950	-43.5	8.6	-34.9
21976.210969	-43.7	8.8	-34.9
22126.150921	-43.8	8.9	-34.9
22396.042834	-44.0	9.1	-34.9
22106.158927	-44.1	9.2	-34.9
21996.202962	-44.1	9.2	-34.9
22046.182946	-44.1	9.3	-34.9
22026.190953	-44.2	9.3	-34.9
22176.130905	-44.2	9.4	-34.9
22056.178943	-44.2	9.4	-34.9
22096.162930	-44.3	9.4	-34.9
22076.170937	-44.3	9.4	-34.9
21926.230985	-44.4	9.5	-34.9

Spurious



— Limit
— Sum Level
— Threshold
X Critical
X Final Critical
♦ Fail
♦ Pass

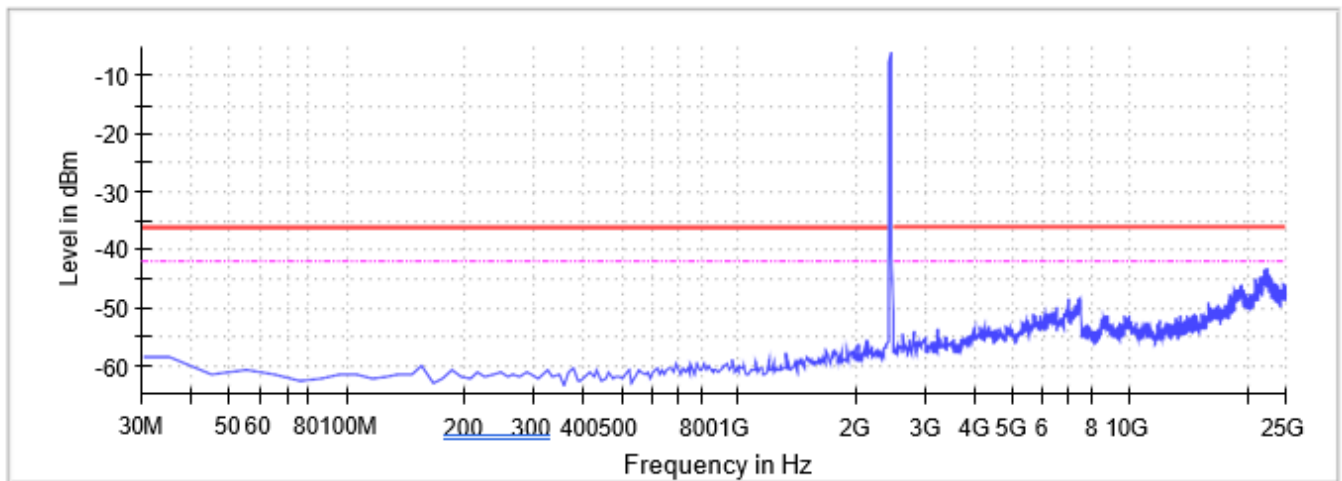


802.11n (HT20) MCS0 2437MHz

Pre-Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
22496.002802	-43.2	7.1	-36.1
22146.142914	-43.5	7.4	-36.1
22036.186950	-43.6	7.5	-36.1
22076.170937	-43.6	7.5	-36.1
22046.182946	-43.8	7.7	-36.1
22116.154924	-43.9	7.8	-36.1
22086.166934	-43.9	7.8	-36.1
22186.126902	-44.1	8.0	-36.1
21946.222978	-44.2	8.1	-36.1
21956.218975	-44.3	8.2	-36.1
21966.214972	-44.3	8.2	-36.1
22096.162930	-44.3	8.2	-36.1
22126.150921	-44.4	8.3	-36.1
21996.202962	-44.4	8.3	-36.1
22026.190953	-44.4	8.3	-36.1

Spurious



— Limit
 — Sum Level
 — Threshold
 × Critical
 × Final Critical

802.11n (HT20) MCS0 2462MHz

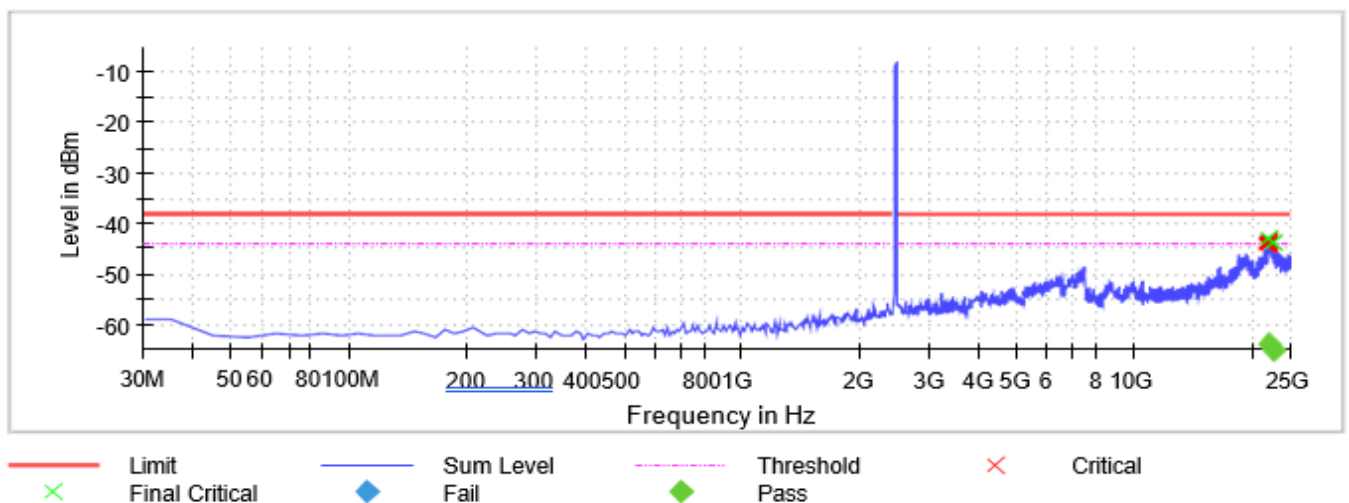
Final-Measurement

Frequency (MHz)	Level Pre Measurement (dBm)	Level (dBm)	Margin (dB)	Limit (dBm)
22061.266225	-43.5	-63.7	25.7	-38.0
22619.516846	-45.4	-65.0	27.0	-38.0

Pre-Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
22056.178943	-42.9	4.9	-38.0
22036.186950	-42.9	4.9	-38.0
22096.162930	-43.4	5.4	-38.0
22046.182946	-43.4	5.4	-38.0
21996.202962	-43.7	5.7	-38.0
22625.950761	-43.7	5.7	-38.0
21896.242994	-43.8	5.8	-38.0
22016.194956	-44.0	6.0	-38.0
21886.246998	-44.0	6.0	-38.0
22086.166934	-44.0	6.0	-38.0
22166.134908	-44.1	6.0	-38.0
22066.174940	-44.1	6.1	-38.0
22216.114892	-44.3	6.2	-38.0
22446.022818	-44.3	6.3	-38.0
22176.130905	-44.3	6.3	-38.0

Spurious



5. Radiated Testing

5.1 Test Summary

Start: 07-24-2024	End: 08-01-2024	Temperature: 22.7°C Humidity: 51.0%R.H	Initials: AP/AB
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DUT S/N	J23133#4 NA 3B	DUT Operating Mode		2.4GHz WLAN
Comment	Worst case modulations 802.11b 1Mbps and 802.11n MCS0 from each family selected for full testing.			
Antenna	Frequency Range	Polarization	Result Over/Under Limit	Notes
Loop	9kHz-30MHz	Parallel	☐ Over ☒ Under	√
		Perpendicular	☐ Over ☒ Under	√
		Ground-Parallel	☐ Over ☒ Under	√
Log Periodic	30MHz-1GHz	Horizontal	☐ Over ☒ Under	√
		Vertical	☐ Over ☒ Under	√
Horn	1GHz-18GHz	Horizontal	☐ Over ☒ Under	√
		Vertical	☐ Over ☒ Under	√
Horn	18GHz-27.5GHz	Horizontal	☐ Over ☒ Under	√
		Vertical	☐ Over ☒ Under	√

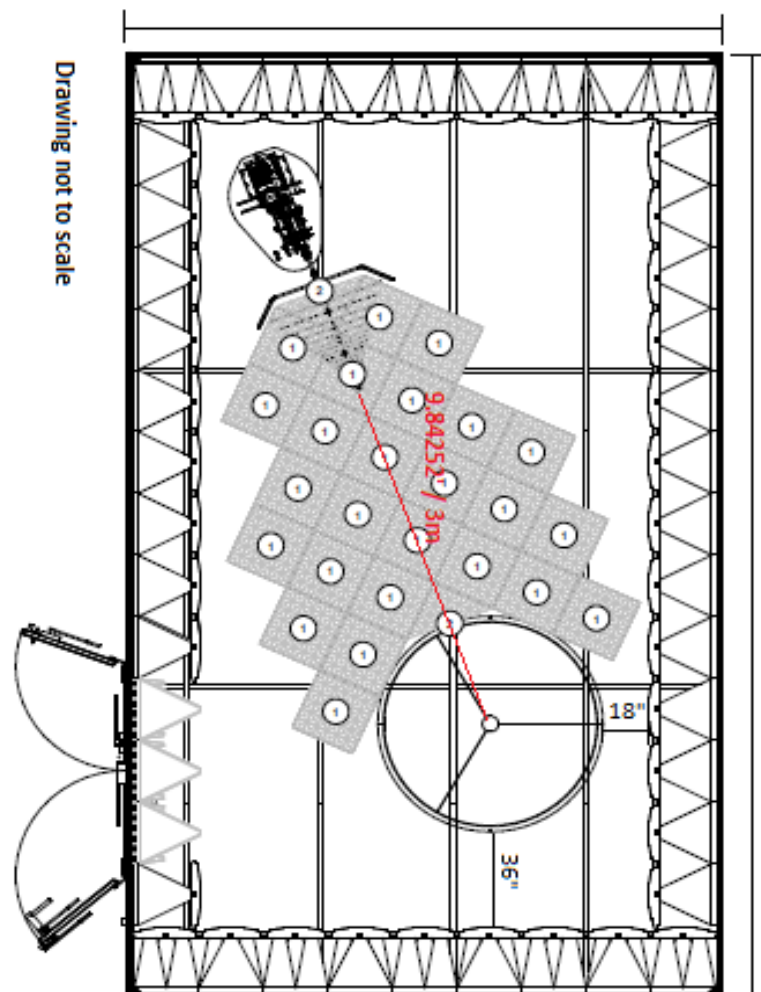
Notes: √ meets the requirements of the acceptance criteria.

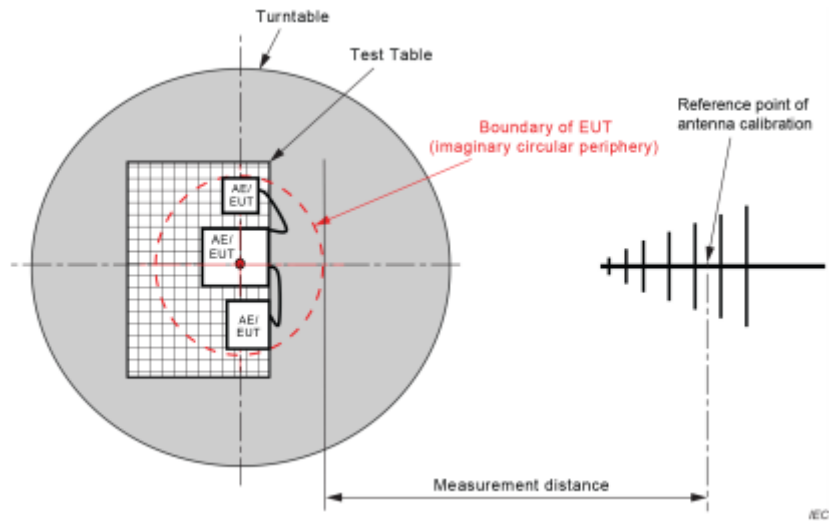
5.2 Test Setup

Semi-Anechoic Chamber Test Site-3 meter

Chamber Location	815 N Opdyke Rd Auburn Hills, Michigan 48326
Chamber Manufacturer:	ETS-Lindgren
Chamber Type	Semi-Anechoic
Model	FACT™ 3-2.0 Plus
Chamber Dimensions (L x W x H)	18'x18'x30'
Quiet Zone Diameter	2.0 meters
Quiet Zone Test Heights	1 & 2 meters (front only)
Test Distance	3.0 meters
Test Frequency Range	1-40 GHz
Measured Performance	4.87 dB Site sVSWR

Chamber Dimensions





5.3 Test Equipment Used

ID #	Equipment	Manufacturer	Model #	Serial #	Cal Due
BVD0217	Receiver 2Hz-44GHz	Rohde & Schwarz	ESW44	101871	4/21/2025
BVD0118	Antenna Mast Position Controller	ETS	7006-001	00214778/00214648	N/A
BVD0111	3 Meter Anechoic Chamber	ETS	N/A	N/A	N/A
BVD0247	Turn Table	ETS	920250	N/A	N/A
BVD0323	Foam Test Table For 3 Meter Chamber	ETS-Lindgren	LDT-1.5	N/A	N/A
BVD0069	Bore Sight Tower	ETS	2171B	226732	N/A
BVD0312	Optima 12V Blue top Marine battery	Optima	D34M	N/A	N/A
BVD0187	Preamplifier 25dB cal to 100kHz-1GHz	Rohde & Schwarz	TS-PR1	102080	1/23/2025
BVD0184	Preamplifier 29dB 1-18GHz	Rohde & Schwarz	TS-PR18	101646	6/20/2025
BVD0185	Preamplifier 45dB 18-40GHz	Rohde & Schwarz	TS-PR1840	100064	6/20/2025
BVD0011	Loop Antenna 9kHz-30MHz	Rohde & Schwarz	FMZB1519B	145	6/10/2025
BVD0021	UltraLog Antenna 30-6000MHz	Rohde & Schwarz	HL562E	101113	6/26/2025
BVD0267	Double Ridge Waveguide 800MHz-18GHz	Rohde & Schwarz	HF907	102832	6/27/2025
BVD0320	18-40GHz Horn Antenna	L3 Narda ATM	PNR 180-442-KF	136164-01	7/15/2025
BVD0045	Field Probe Mast	Rohde & Schwarz	TS-FPMA	N/A	N/A
BVD0480	Band Reject Filter 50dB from 2400 to 2500MHz	Micro-Tronics	BRM50702	G482	6/17/2025
BVD0394	Double Shielded N-Type Cable 6.9 Meter	Rohde & Schwarz	N-Type	N/A	4/8/2025
BVD0398	Double Shielded N-Type Cable 2 Meter	Rohde & Schwarz	N-Type	N/A	4/8/2025
BVD0563	RF Cable Assembly	Huber+Suhner, inc	SUCOFLEX 102A	502215/2A	10/17/2024
BVD0407	Double Shielded N-Type Cable 410mm (For PreAmp)	Rohde & Schwarz	N-Type	N/A	10/15/2025
BVD0495	SMA Shielded Cable approx 100mm (for Pre-Amp)	Rohde & Schwarz	SMA-Type	N/A	7/15/2025
BVD0587	Double Shielded N-Type Cable 440mm (For PreAmp)	Winchester Interconnect	250-251-660157 REV A	N/A	1/9/2025
BVD0229	Temp and Humidity Meter	Fluke	971	12001009	5/23/2025

Equipment List (Software)

ID #	Equipment	Manufacturer	Model	Version No.	
N/A	EMC Test Software	Rodhe & Schwarz	EMC32	2024.0.8.0	N/A

Customer Supplied Equipment

ID #	Equipment	Manufacturer	Model	Serial #	Version No.
N/A	Harness	Harman	N/A	N/A	N/A
N/A	Display Unit	MOBIS	BMM6100000	231107 01	N/A
N/A	Shark Fin Antenna	Alfa Romeo	B901	719147	N/A
N/A	Antenna	Aptiv	APN35409682	N/A	N/A
N/A	Camera	N/A	23295906C	N/A	N/A
N/A	MFGBridge_Tool/Dut labtool	N/A	N/A	N/A	2.0.0.89

5.4 Test Limits and Procedures

Radiated emissions that 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). Other emissions shall be at least 20dB below the highest level of the desired power.

Frequencies (MHz)	Field strength ($\mu\text{V/m}$)	Field strength (dB $\mu\text{V/m}$)	Measurement distance (meters)
0.009 ~ 0.490	2400/F(kHz)	48.5 - 13.8	300
0.490 ~ 1.705	24000/F(kHz)	33.8 - 23	30
1.705 ~ 30.0	30	29.54	30
30 ~ 88	100	40.0	3
88 ~ 216	150	43.5	3
216 ~ 960	200	46.0	3
Above 960	500	54.0	3

Note:

- The lower limit shall apply at the transition frequencies.
- As per 15.35(b), for frequencies above 1000MHz, the field strength limits 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 20dB under any condition of modulation.
- For performing measurements at a specified distance of 3m, the values are extrapolated using extrapolation factor.
Frequencies below 30MHz are extrapolated using 40dB/decade.
Frequencies above 30MHz are extrapolated using 20dB/decade.

Frequencies (MHz)	Formula for Limits derivation for below 30MHz	Limits for frequencies below 30MHz (dB $\mu\text{V/m}$)
0.009 ~ 0.490	2400/F(kHz) + 40 Log (300m/3m)	128.5 ~ 93.8
0.490 ~ 1.705	24000/F(kHz) + 40 Log (30m/3m)	73.8 ~ 62.96
1.705 ~ 30.0	29.54 + 40 Log (30m/3m)	69.54

Radiated emissions that fall in restricted bands, as defined in RSS-GEN Section 8.10 must also comply with radiated emissions limits specified in RSS-GEN Section 8.9

The limits in CFR 47, Part 15, Subpart C, paragraph 15.209 (a), are identical to those in RSS-GEN Section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377 Ω .

The measurement procedures are as per ANSI C63.10-2013 Sections 6.3, Section 6.4, Section 6.5, and Section 6.6

1. The table height for emissions measurements
 - i) Below 1 GHz, the table height is 80 cm above the reference ground plane.
 - ii) Above 1 GHz, the table height is 1.5 m
2. Radiated emission tests are performed in the frequency range
 - i) 9 kHz to 30 MHz, using a calibrated loop antenna
 - ii) 30 MHz to 1GHz, using a calibrated log antenna
 - iii) Above 1 GHz using a calibrated horn antenna
3. Measurements performed with the EUT rotated from 0° to 360°, the antenna height scanned between 1m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

5.5 EMI Test Receiver/Spectrum Analyzer Settings

Below 1GHz

Frequency	RBW	Detector
9KHz to 30MHz	9KHz	Peak

Frequency	RBW	Detector
30MHz to 1GHz	120KHz	Peak/Quasi Peak

Above 1GHz

Frequency	RBW	Detector
1GHz to 40GHz	1 MHz	Peak/ Power Averaging (RMS)

Note: Trace average is 100 traces for continuous transmission else the traces shall be increased by a factor of $1/x$, where x is the duty cycle. Duty cycle $> 98\%$ no correction factor needed and for Duty cycle $< 98\%$ the correction factor $10 \log (1/x)$, where x is the duty cycle.

5.6 Test Data

Uncertainty

Radiated Emissions (30MHz to 40GHz)

Test Engineer Initials: AP/AB

The test is to measure the radiated emissions of the EUT. Some error sources that can contribute to the total uncertainty:

- Uncertainty of the receiver
- Uncertainty of the antenna
- Uncertainty of cables
- Uncertainty due to the mismatches
- NSA Calibration
- Etc., details see the below table

30MHz to 1GHZ

Source of Uncertainty	Value (dB)	ProbabilityDistribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Receiver Reading	0.12	Rectangular	1.732	1	0.069284
Cable Insertion Loss	0.21	Normal	2	1	0.105
Filter Insertion Loss	0.25	Normal	2	1	0.125
Antenna Factor	0.65	Normal	2	1	0.325
Receiver CW accuracy	0.5	Rectangular	1.732	1	0.2886836
Pulse Amplitude Response	1.5	Rectangular	1.732	1	0.86605081
PRF Response	1.5	Rectangular	1.732	1	0.86605081
Mismatch Filter – Receiver	0.25	U-Shape	2.449	1	0.1768033
NSA Calibration	4.0	Triangular	1.414	1	1.633332
ETS Foam Table (LDT-1.5)	1.8	Rectangular	1.732	1	1.039261
Combined Standard Uncertainty (square root of the sum of the squares)					2.113781
Expanded Uncertainty (K=2)					4.227562

The total derived measurement uncertainty is +/- 4.228 dB

1GHz to 40GHz

Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Receiver Reading	0.12	Rectangular	1.732	1	0.069284
Cable Insertion Loss	0.21	Normal	2	1	0.105000
Filter Insertion Loss	0.25	Normal	2	1	0.125000
Antenna Factor	0.65	Normal	2	1	0.325000
Receiver CW accuracy	0.5	Rectangular	1.732	1	0.2886836
Pulse Amplitude Response	1.5	Rectangular	1.732	1	0.866051
PRF Response	1.5	Rectangular	1.732	1	0.866051
Mismatch Filter – Receiver	0.25	U-Shape	1.414	1	0.176803
VSWR Calibration	2.0	Triangular	2.449	1	0.816659
ETS Foam Table (LDT-1.5)	1.8	Rectangular	1.732	1	1.039261
Combined Standard Uncertainty (square root of the sum of the squares)					1.869213
Expanded Uncertainty (K=2)					3.738426

The total derived measurement uncertainty is +/- 3.738 dB.

Remarks:

1. Level Q-Peak Reading (dBμV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

Remarks:

1. Level Peak Reading (dBμV/m) = Raw Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Peak Reading – Limit

Remarks:

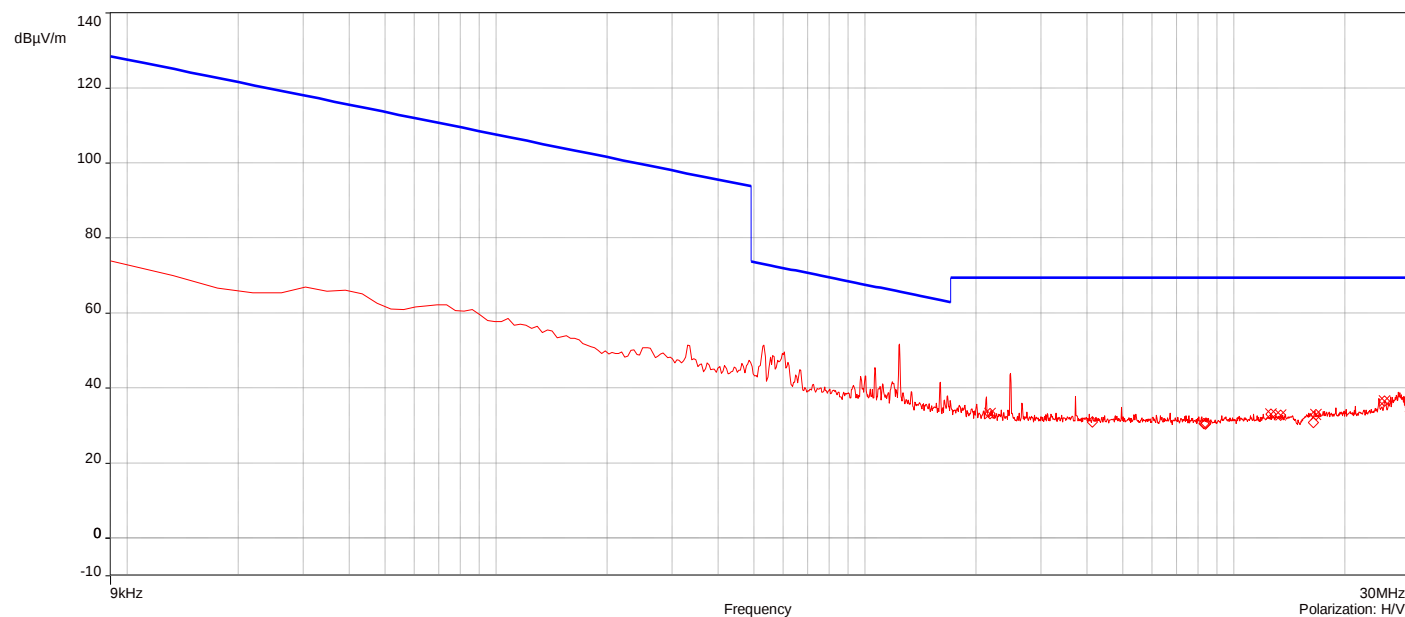
1. Level Average Reading (dBμV/m) = Raw Average Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Average Reading – Limit

J23133#4_2.4G 802.11b_Ch 6_9kHz-30MHz_Ground-Parallel

8/1/2024 10:46:25 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	2.177231MHz	33.18	19.59	69.54	-36.36	1.00	3.00	H/V	Passed
2.	12.577024MHz	33.04	19.84	69.54	-36.50	1.00	217.80	H/V	Passed
3.	13.369757MHz	32.75	19.90	69.54	-36.79	1.00	130.90	H/V	Passed
4.	16.694949MHz	32.90	20.11	69.54	-36.64	1.00	152.70	H/V	Passed
5.	25.582123MHz	36.59	21.15	69.54	-32.95	1.00	243.60	H/V	Passed
6.	30MHz	35.06	22.04	40.00	-4.94	1.00	159.10	H/V	Passed

Overall Graphs:

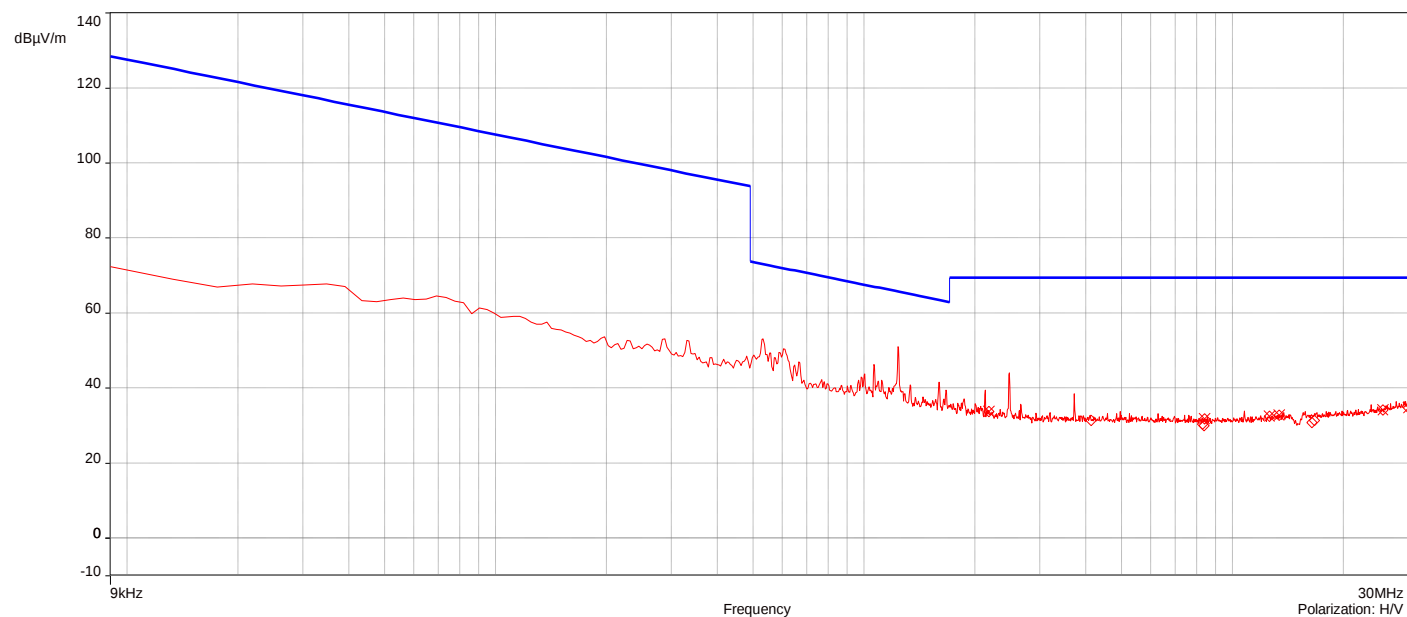


J23133#4_2.4G 802.11b_Ch 6_9kHz-30MHz_Parallel

8/1/2024 10:37:53 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	2.177231MHz	33.83	19.59	69.54	-35.71	1.00	146.30	H/V	Passed
2.	8.38197MHz	31.87	19.52	69.54	-37.67	1.00	202.70	H/V	Passed
3.	12.577024MHz	32.57	19.84	69.54	-36.97	1.00	183.20	H/V	Passed
4.	13.365472MHz	32.78	19.90	69.54	-36.76	1.00	20.70	H/V	Passed
5.	25.582123MHz	34.26	21.15	69.54	-35.28	1.00	152.70	H/V	Passed
6.	30MHz	34.70	22.04	40.00	-5.30	1.00	189.60	H/V	Passed

Overall Graphs:

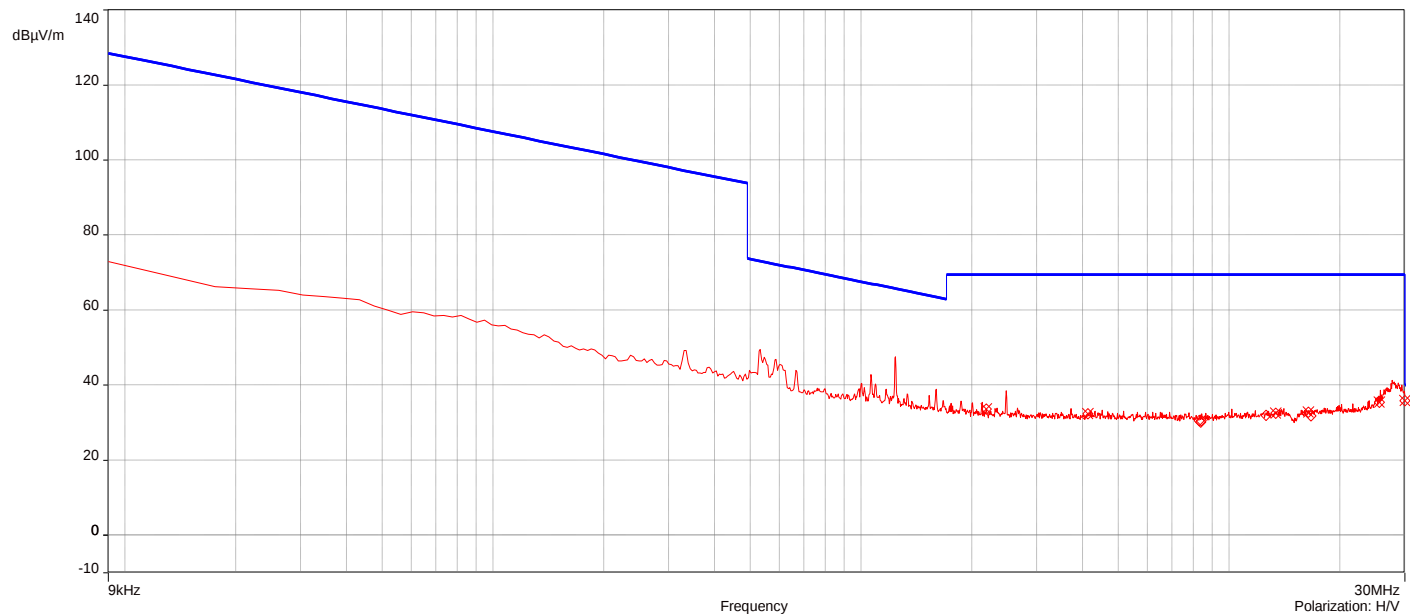


J23133#4_2.4G 802.11b_Ch 6_9kHz-30MHz_Perpendicular

8/1/2024 10:42:39 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	2.185801MHz	33.65	19.59	69.54	-35.89	1.00	180.10	H/V	Passed
2.	4.126924MHz	32.40	19.74	69.54	-37.14	1.00	349.20	H/V	Passed
3.	13.369757MHz	32.59	19.90	69.54	-36.95	1.00	86.20	H/V	Passed
4.	16.420706MHz	32.79	20.07	69.54	-36.75	1.00	358.10	H/V	Passed
5.	25.534988MHz	35.50	21.14	69.54	-34.04	1.00	304.30	H/V	Passed
6.	30MHz	35.89	22.04	40.00	-4.11	1.00	258.70	H/V	Passed

Overall Graphs:

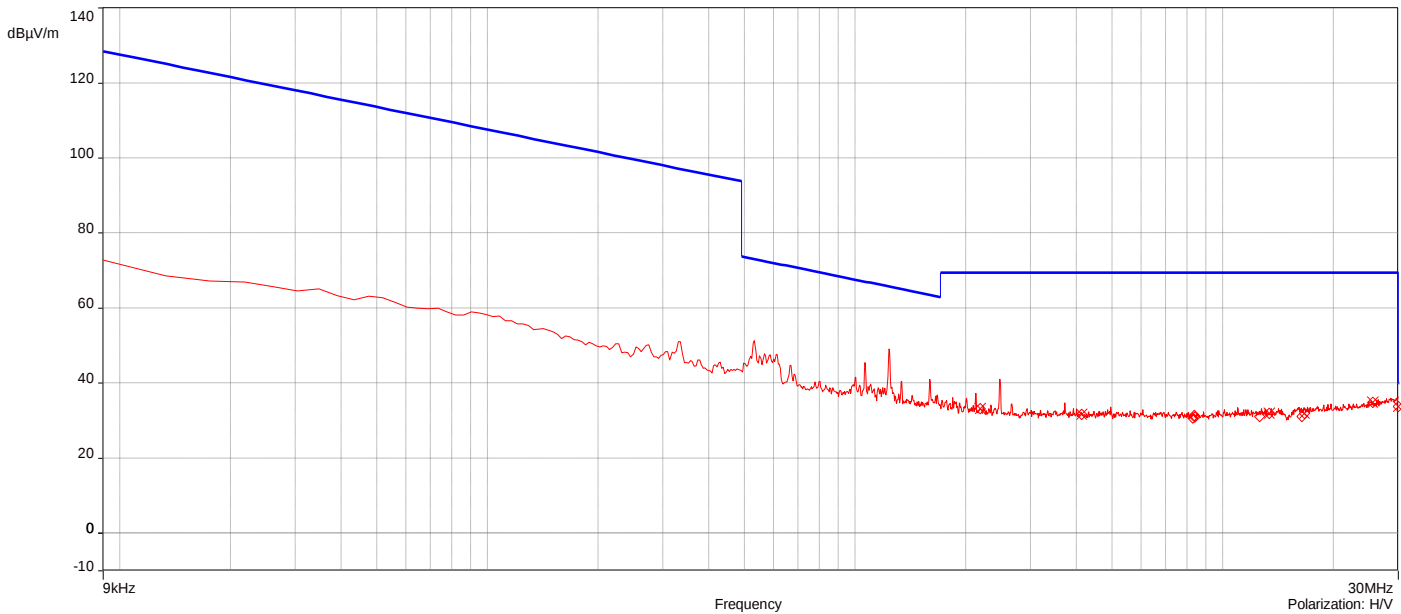


J23133#4_2.4G 802.11n_Ch 6_9kHz-30MHz_Ground-Parallel

8/1/2024 10:52:33 PM

No	Frequency (MHz)	Level Q- Peak Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	2.190086MHz	33.24	19.59	69.54	-36.30	1.00	276.00	H/V	Passed
2.	4.126924MHz	31.63	19.74	69.54	-37.91	1.00	87.00	H/V	Passed
3.	13.382612MHz	32.00	19.90	69.54	-37.54	1.00	289.10	H/V	Passed
4.	16.694949MHz	31.98	20.11	69.54	-37.56	1.00	34.70	H/V	Passed
5.	25.594978MHz	34.95	21.15	69.54	-34.59	1.00	175.80	H/V	Passed
6.	30MHz	33.85	22.04	40.00	-6.15	1.00	178.20	H/V	Passed

Overall Graphs:

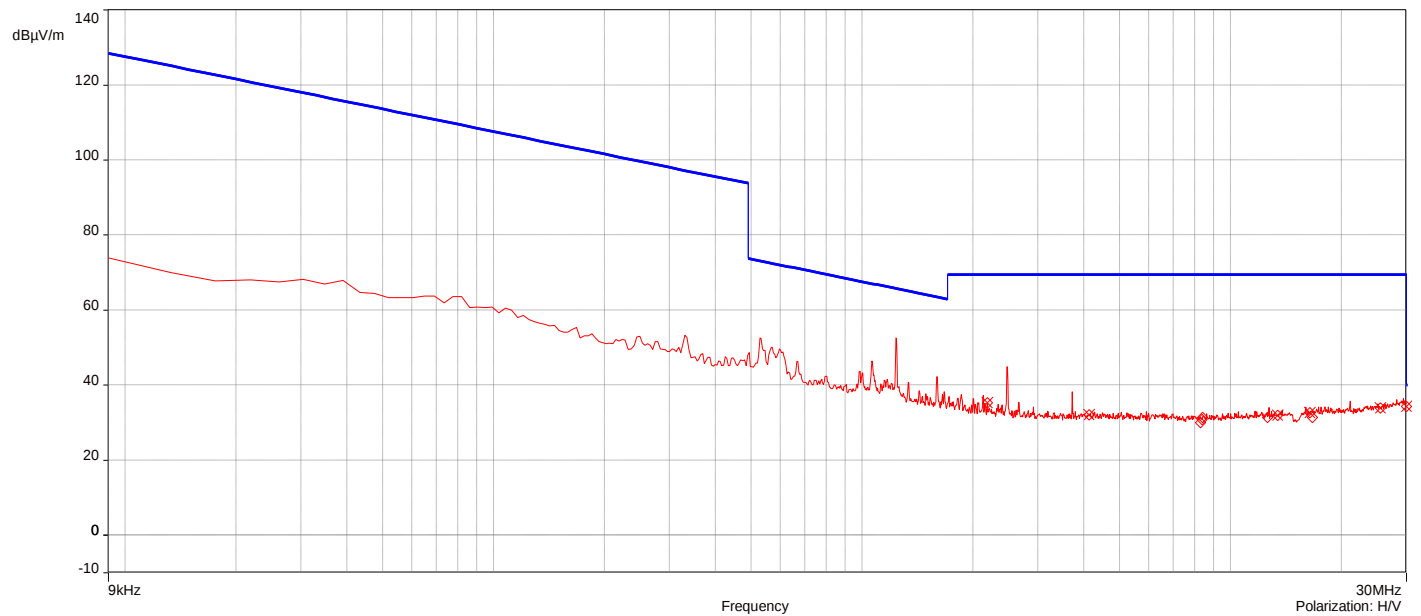


J23133#4_2.4G 802.11n_Ch 6_9kHz-30MHz_Parallel

8/1/2024 10:58:52 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	2.185801MHz	35.29	19.59	69.54	-34.25	1.00	78.80	H/V	Passed
2.	4.126924MHz	32.05	19.74	69.54	-37.49	1.00	0.10	H/V	Passed
3.	13.395467MHz	32.03	19.90	69.54	-37.51	1.00	344.00	H/V	Passed
4.	16.420706MHz	32.61	20.07	69.54	-36.93	1.00	148.20	H/V	Passed
5.	25.517847MHz	33.89	21.14	69.54	-35.65	1.00	0.10	H/V	Passed
6.	30MHz	34.37	22.04	40.00	-5.63	1.00	163.40	H/V	Passed

Overall Graphs:

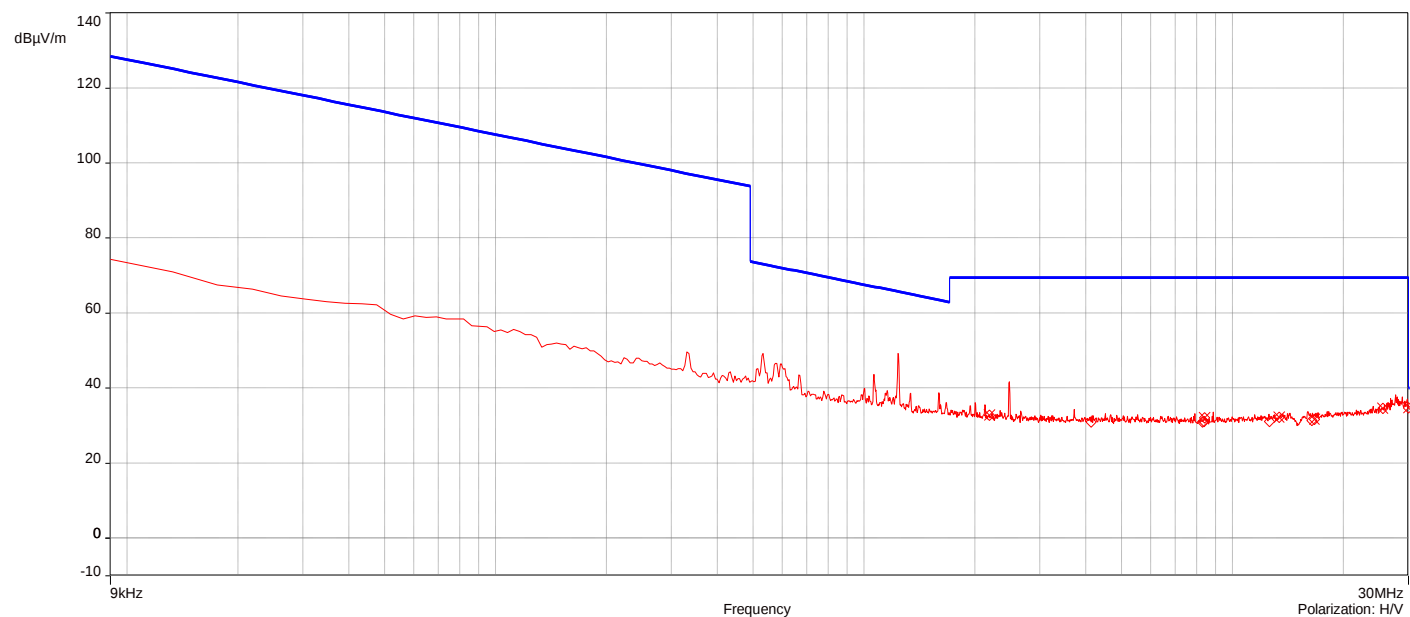


J23133#4_2.4G 802.11n_Ch 6_9kHz-30MHz_Perpendicular

8/1/2024 10:55:26 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	2.185801MHz	32.78	19.59	69.54	-36.76	1.00	35.30	H/V	Passed
2.	8.38197MHz	32.11	19.52	69.54	-37.43	1.00	15.90	H/V	Passed
3.	13.369757MHz	32.22	19.90	69.54	-37.32	1.00	11.90	H/V	Passed
4.	16.694949MHz	31.72	20.11	69.54	-37.82	1.00	135.20	H/V	Passed
5.	25.599263MHz	34.56	21.15	69.54	-34.98	1.00	197.90	H/V	Passed
6.	30MHz	34.78	22.04	40.00	-5.22	1.00	115.40	H/V	Passed

Overall Graphs:

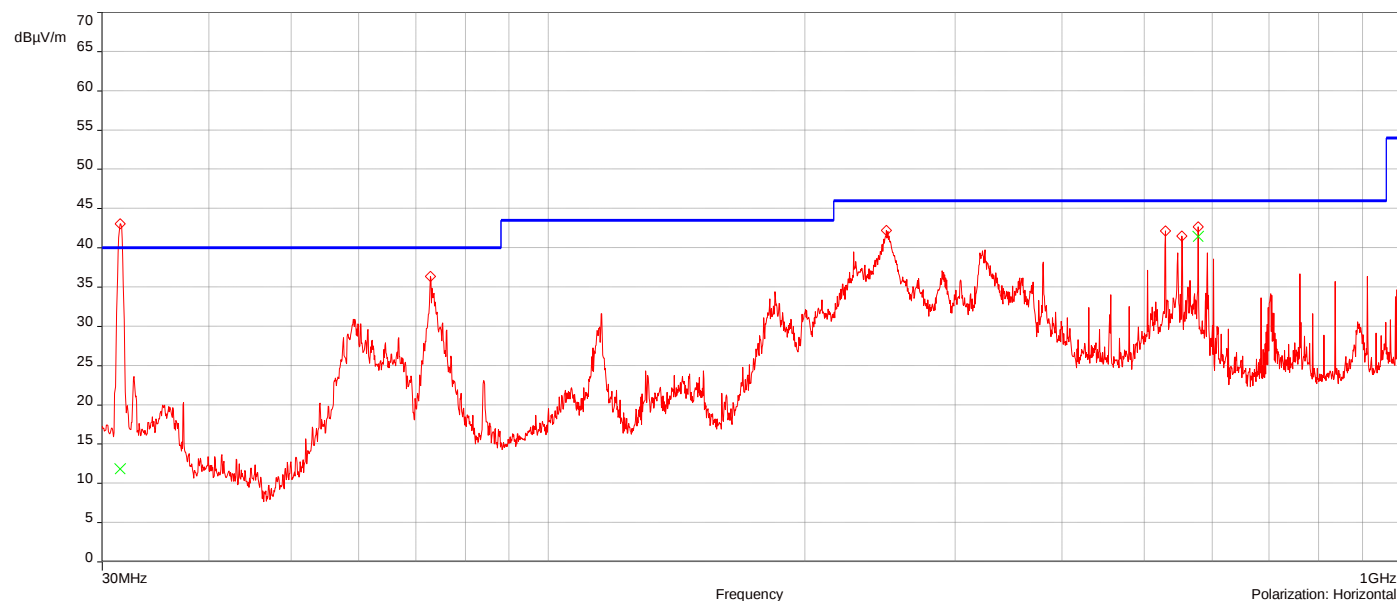


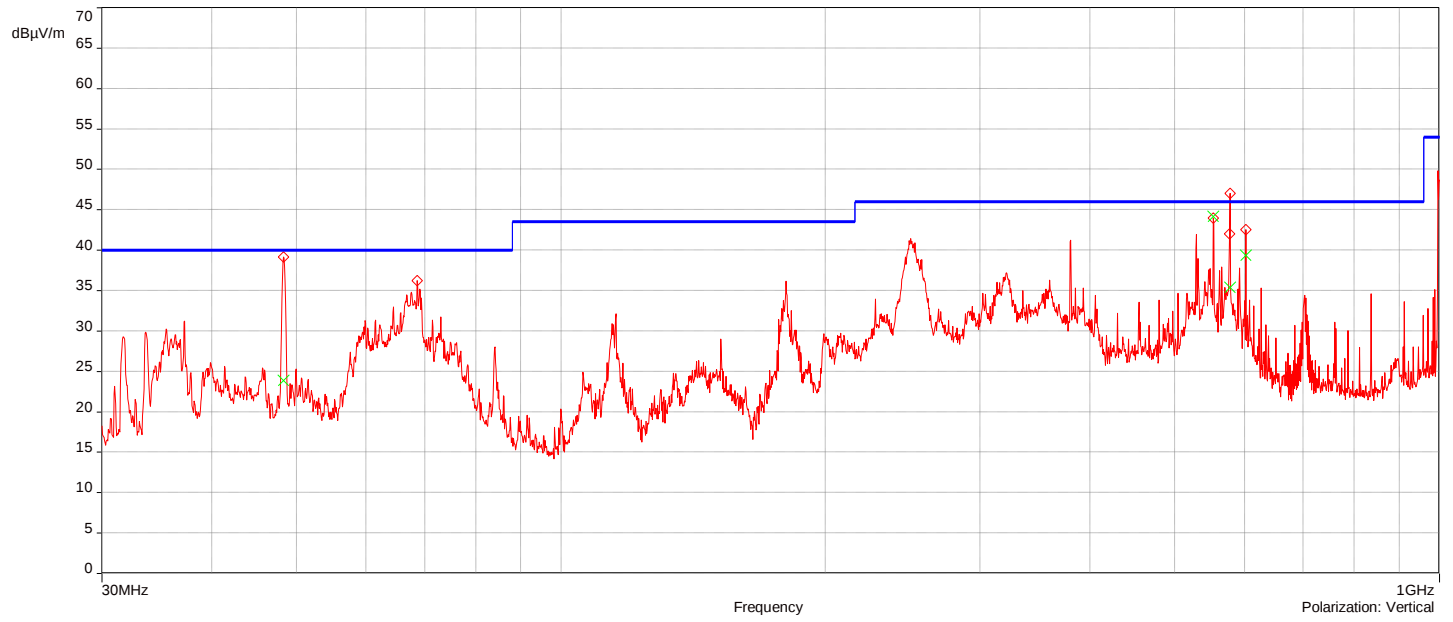
J23133#4_2.4G_802.11b_1Mbps_Ch 6_30MHz-1GHz

7/31/2024 3:58:53 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	48.31696MHz	23.87	-17.35	40.00	-16.13	2.00	229.90	Vertical	Passed
2.	552.97488MHz	44.19	-6.50	46.00	-1.81	1.00	153.10	Vertical	Passed
3.	577.56868MHz	35.42	-5.79	46.00	-10.58	1.00	163.10	Vertical	Passed
4.	602.16248MHz	39.36	-5.30	46.00	-6.64	1.00	349.90	Vertical	Passed
5.	31.483617MHz	11.86	-5.85	40.00	-28.14	2.50	224.90	Horizontal	Passed
6.	577.56868MHz	41.47	-4.73	46.00	-4.53	1.50	84.10	Horizontal	Passed

Overall Graphs:



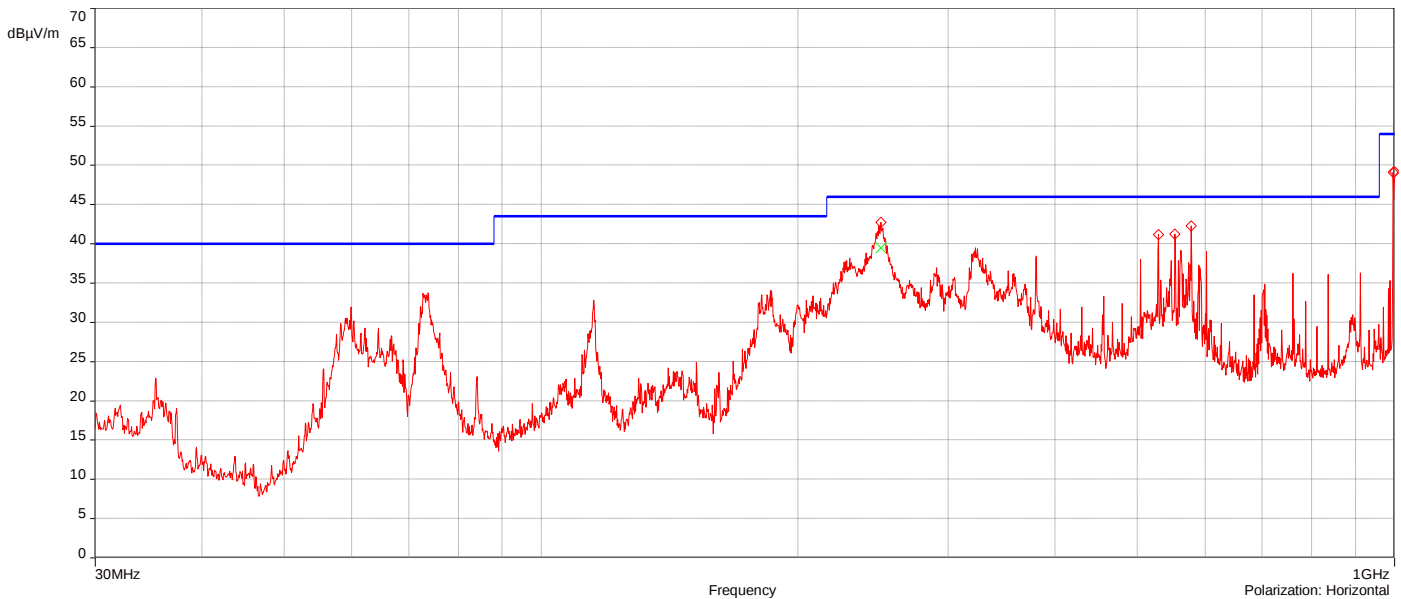


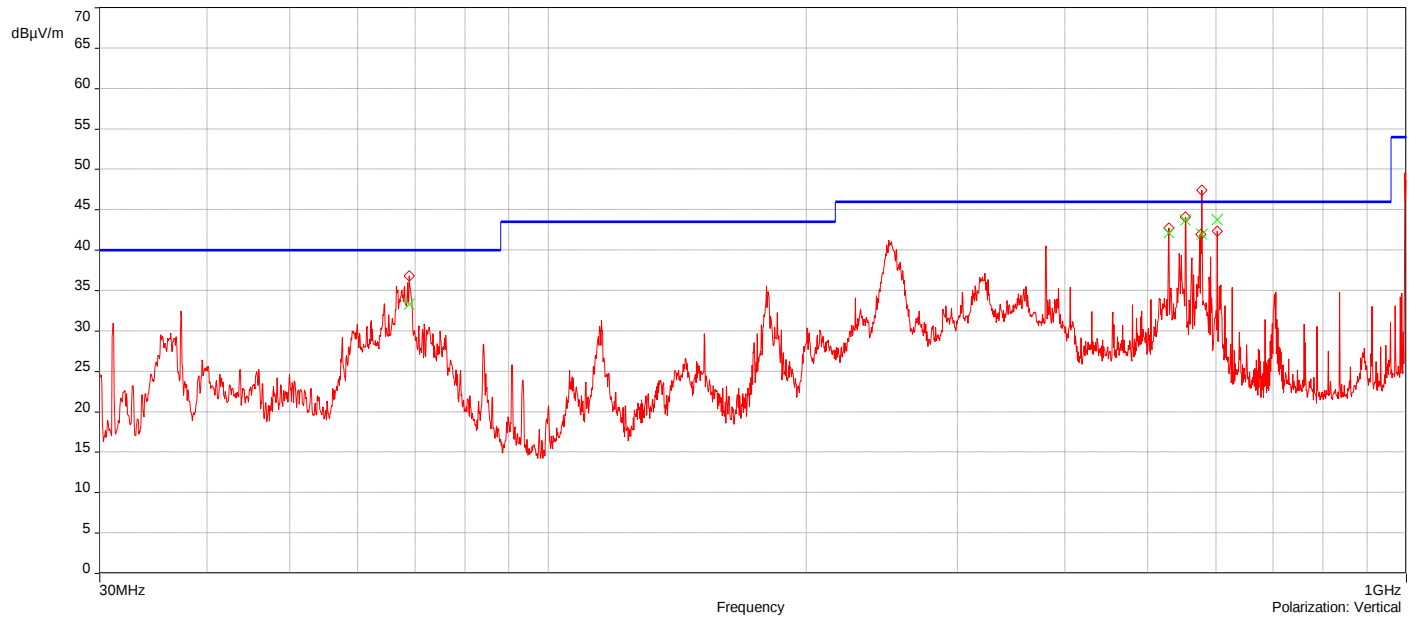
J23133#4_2.4G_802.11n_MCS0_Ch 6_30MHz-1GHz

7/31/2024 4:19:11 PM

No	Frequency (MHz)	Level Q- Peak Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	68.802282MHz	33.34	-16.89	40.00	-6.66	1.50	46.10	Vertical	Passed
2.	528.38108MHz	42.15	-6.89	46.00	-3.85	1.00	155.10	Vertical	Passed
3.	552.97488MHz	43.75	-6.50	46.00	-2.25	1.00	166.90	Vertical	Passed
4.	577.56868MHz	41.96	-5.79	46.00	-4.04	1.00	158.10	Vertical	Passed
5.	602.16248MHz	43.81	-5.30	46.00	-2.19	1.00	347.90	Vertical	Passed
6.	249.9747MHz	39.50	-12.94	46.00	-6.50	1.50	309.90	Horizontal	Passed

Overall Graphs:





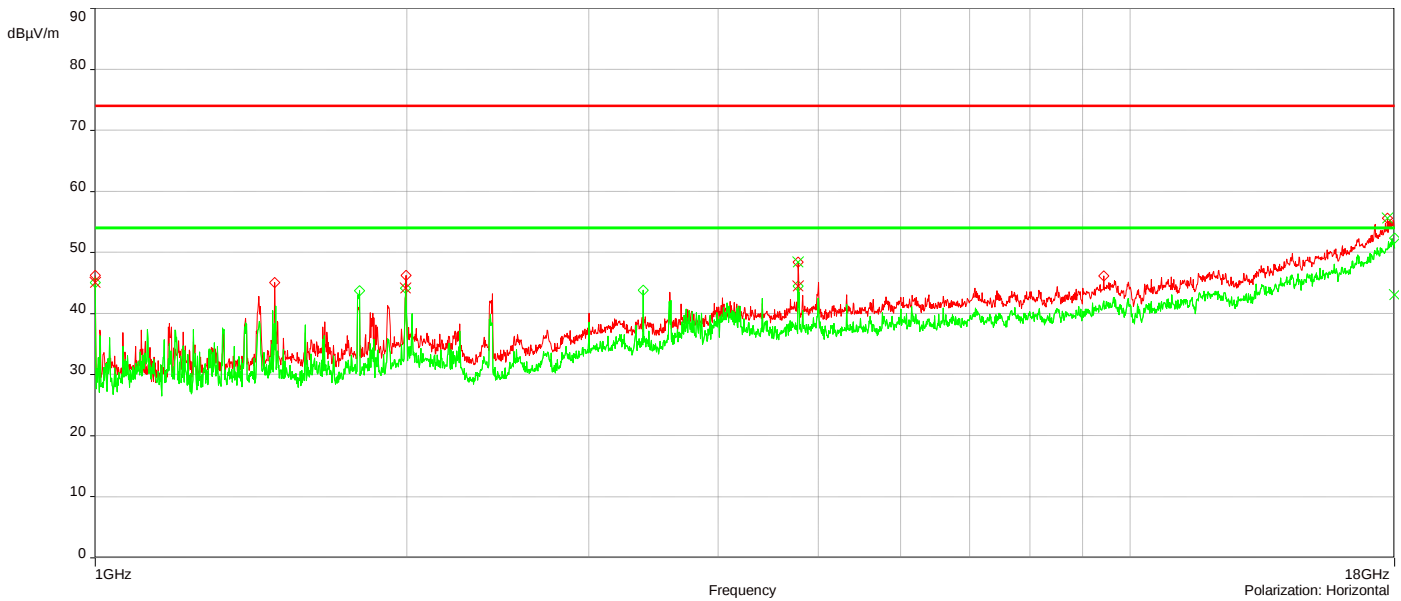
J23133#4_2.4G_802.11b_1Mbps_Ch 1_1-18GHz

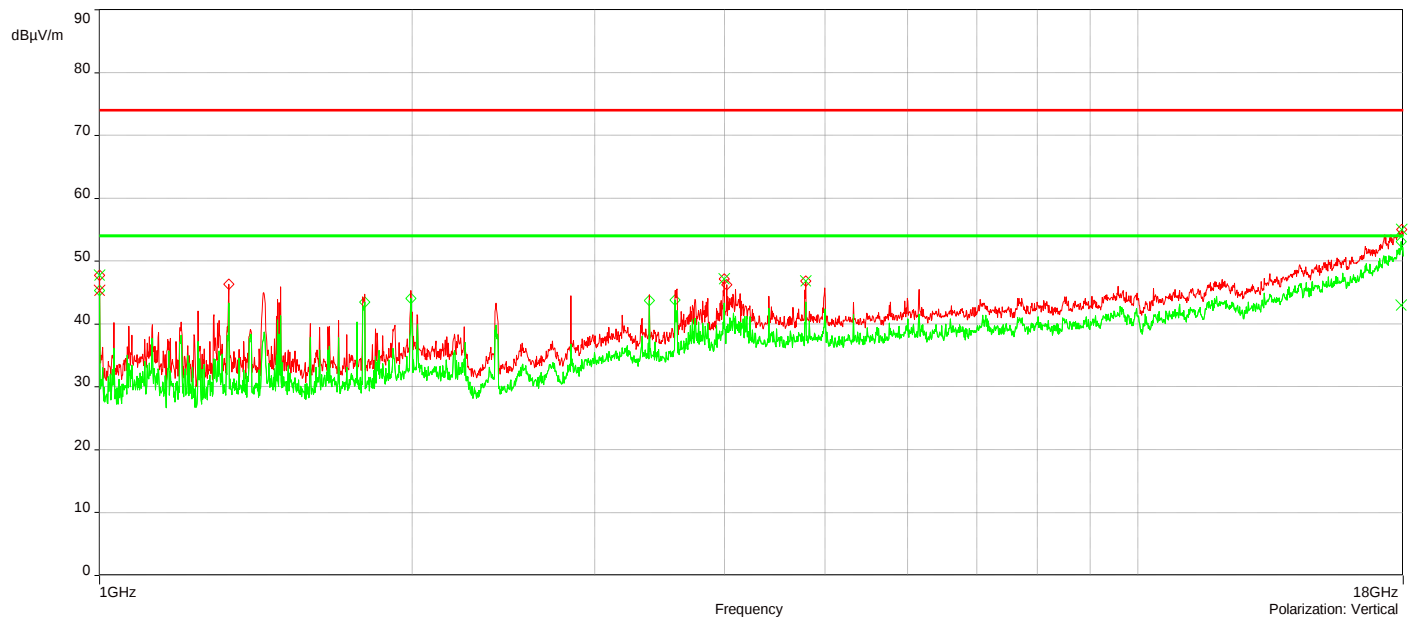
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No	Frequency (MHz)	Level Peak Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	1GHz	47.77	-7.69	74.00	-26.23	1.50	317.10	Vertical	Passed
2.	3.9955881GHz	47.17	3.37	74.00	-26.83	2.50	115.20	Vertical	Passed
3.	4.7846113GHz	46.82	4.79	74.00	-27.18	1.00	93.20	Vertical	Passed
4.	17.947998GHz	55.08	21.15	74.00	-18.92	2.00	6.40	Vertical	Passed
5.	4.7781111GHz	48.45	4.84	74.00	-25.55	4.00	341.70	Horizontal	Passed
6.	17.718492GHz	55.63	20.48	74.00	-18.37	2.00	115.10	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	1GHz	45.36	-7.69	54.00	-8.64	1.50	317.10	Vertical	Passed
2.	17.926498GHz	43.02	21.20	54.00	-10.98	1.00	359.90	Vertical	Passed
3.	1GHz	45.07	-7.97	54.00	-8.93	3.50	282.90	Horizontal	Passed
4.	1.9945293GHz	44.13	-2.22	54.00	-9.87	2.00	0.10	Horizontal	Passed
5.	4.7781111GHz	44.54	4.84	54.00	-9.46	4.00	341.70	Horizontal	Passed
6.	17.9945GHz	43.11	21.91	54.00	-10.89	3.00	32.10	Horizontal	Passed

Overall Graphs:





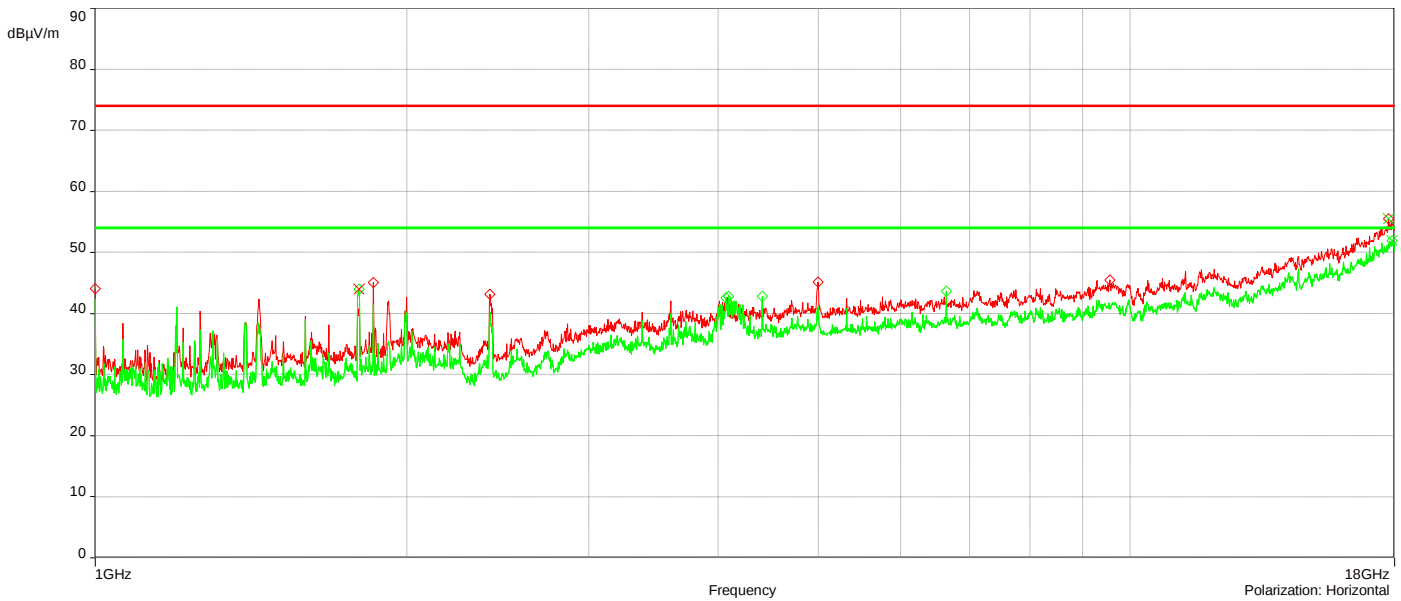
J23133#4_2.4G_802.11b_1Mbps_Ch 6_1-18GHz

7/24/2024 7:48:32 PM

No	Frequency (MHz)	Level Peak Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	1GHz	47.83	-7.69	74.00	-26.17	1.50	283.70	Vertical	Passed
2.	4.1415924GHz	47.51	3.22	74.00	-26.49	4.00	83.50	Vertical	Passed
3.	6.644666GHz	48.36	7.07	74.00	-25.64	4.00	102.20	Vertical	Passed
4.	11.701315GHz	47.66	12.16	74.00	-26.34	3.00	0.10	Vertical	Passed
5.	17.991GHz	55.33	21.89	74.00	-18.67	4.00	138.90	Vertical	Passed
6.	17.753493GHz	55.57	20.55	74.00	-18.43	3.00	191.90	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	1GHz	45.79	-7.69	54.00	-8.21	1.50	283.70	Vertical	Passed
2.	1.7990235GHz	43.78	-4.51	54.00	-10.22	1.00	353.80	Vertical	Passed
3.	4.7781111GHz	44.47	4.77	54.00	-9.53	1.00	0.10	Vertical	Passed
4.	17.834495GHz	42.96	21.12	54.00	-11.04	1.00	0	Vertical	Passed
5.	1.7990235GHz	44.04	-4.24	54.00	-9.96	1.00	359.90	Horizontal	Passed
6.	17.891497GHz	51.94	21.17	54.00	-2.06	4.00	0	Horizontal	Passed

Overall Graphs:





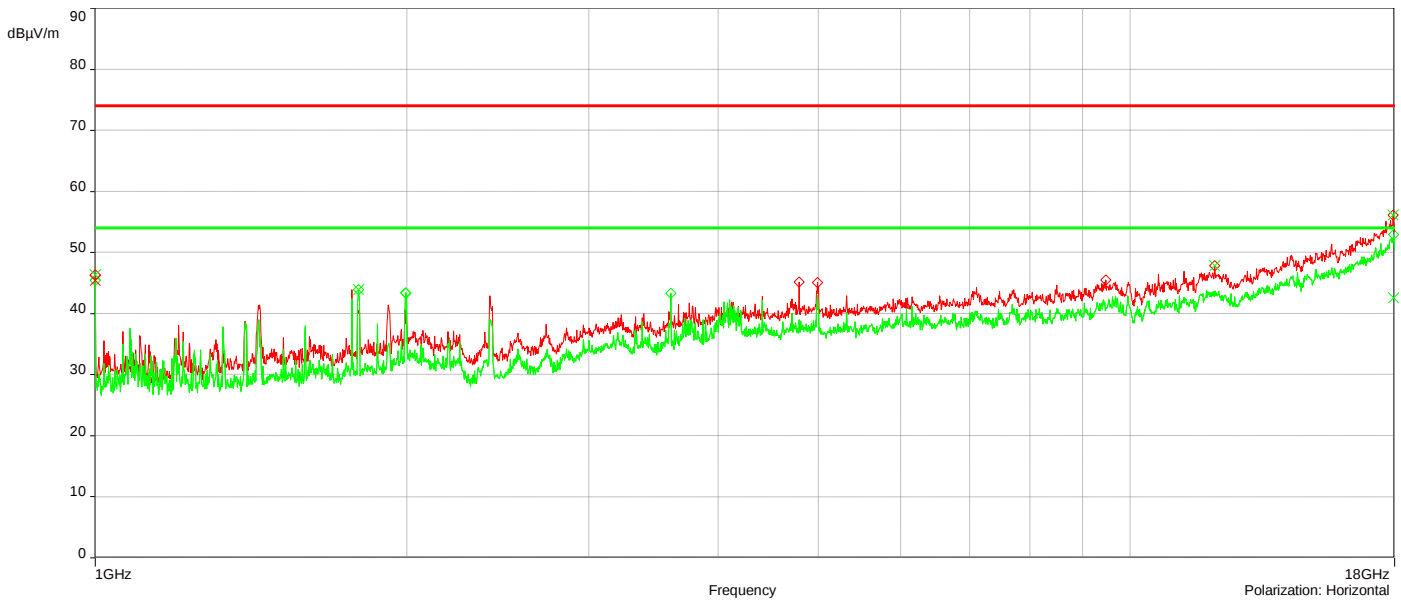
J23133#4_2.4G_802.11b_1Mbps_Ch 11_1-18GHz

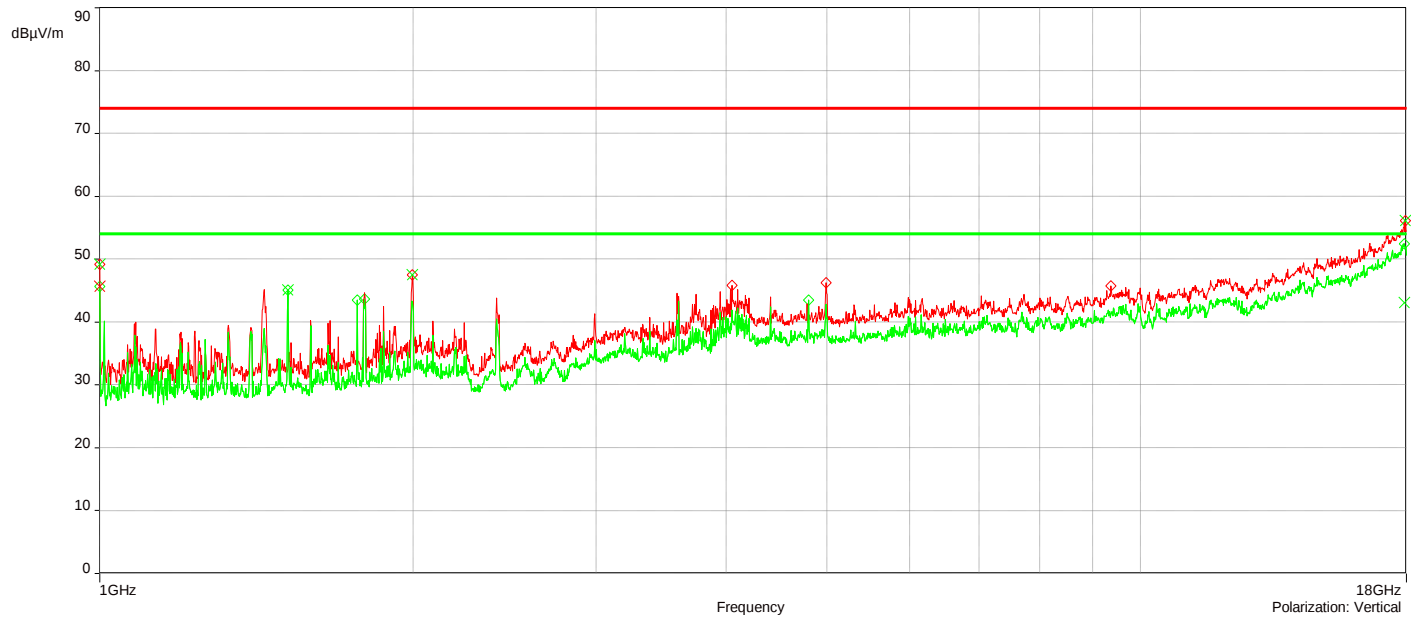
7/24/2024 8:11:06 PM

No	Frequency (MHz)	Level Peak Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	1GHz	49.20	-7.69	74.00	-24.80	3.00	315.70	Vertical	Passed
2.	1.9975293GHz	47.55	-2.22	74.00	-26.45	4.00	77.30	Vertical	Passed
3.	17.959999GHz	56.17	21.30	74.00	-17.83	1.00	33.90	Vertical	Passed
4.	1GHz	46.34	-7.97	74.00	-27.66	2.50	280.10	Horizontal	Passed
5.	12.069826GHz	47.85	12.26	74.00	-26.15	3.50	327.10	Horizontal	Passed
6.	17.947498GHz	56.13	21.06	74.00	-17.87	2.50	67.10	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	1GHz	45.67	-7.69	54.00	-8.33	3.00	315.70	Vertical	Passed
2.	1.5170152GHz	45.10	-5.62	54.00	-8.90	1.00	0	Vertical	Passed
3.	17.928498GHz	43.07	21.19	54.00	-10.93	1.00	222.90	Vertical	Passed
4.	1GHz	45.39	-7.97	54.00	-8.61	2.50	280.10	Horizontal	Passed
5.	1.7965234GHz	43.95	-4.27	54.00	-10.05	1.00	0	Horizontal	Passed
6.	17.969999GHz	42.59	21.39	54.00	-11.41	3.50	0.20	Horizontal	Passed

Overall Graphs:





J23133#4_2.4G_802.11n_MCS0_Ch 1_1-18GHz

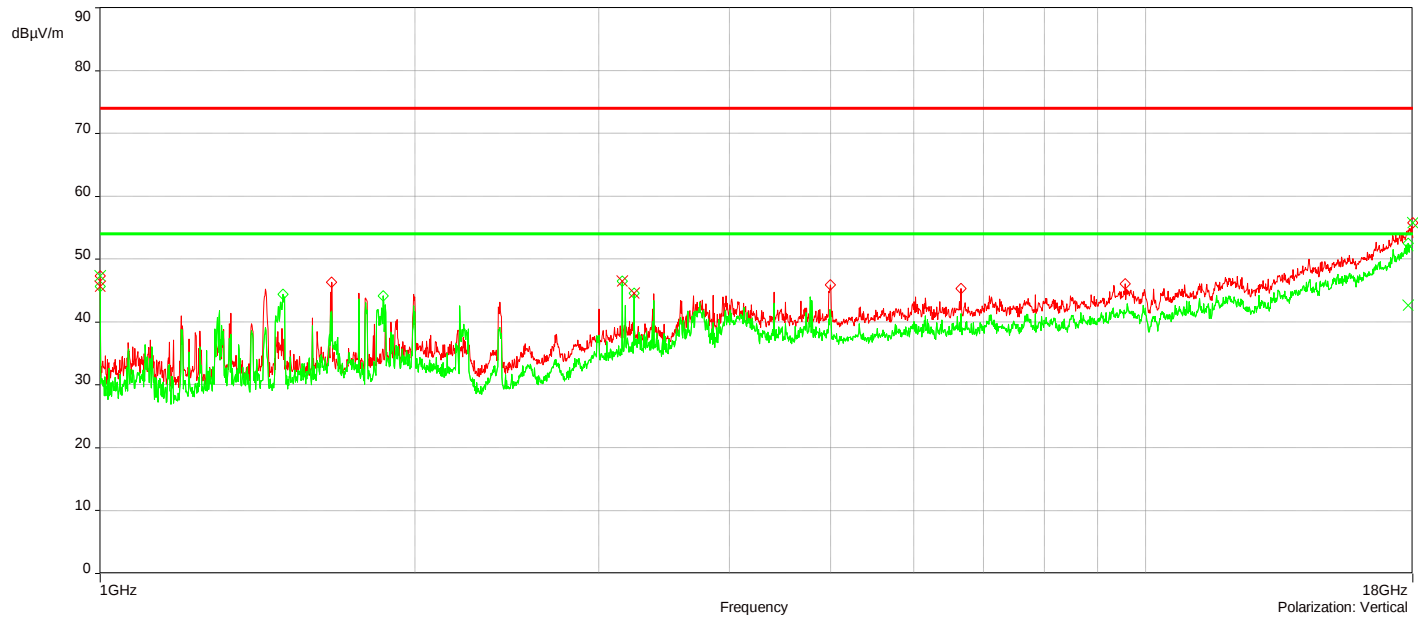
7/24/2024 7:02:59 PM

No	Frequency (MHz)	Level Peak Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	1GHz	47.35	-7.69	74.00	-26.65	2.50	307.30	Vertical	Passed
2.	17.991GHz	55.82	21.89	74.00	-18.18	3.50	242.70	Vertical	Passed
3.	1.8460249GHz	46.95	-3.84	74.00	-27.05	1.50	82.70	Horizontal	Passed
4.	1.8480249GHz	47.70	-3.84	74.00	-26.30	1.50	64.60	Horizontal	Passed
5.	1.8575252GHz	48.08	-3.82	74.00	-25.92	1.50	64.60	Horizontal	Passed
6.	17.926498GHz	56.16	21.12	74.00	-17.84	4.00	324.00	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	1GHz	45.65	-7.69	54.00	-8.35	2.50	307.30	Vertical	Passed
2.	3.1580635GHz	46.54	1.83	54.00	-7.46	1.00	359.90	Vertical	Passed
3.	3.2395659GHz	44.60	1.78	54.00	-9.40	1.00	359.90	Vertical	Passed
4.	17.817495GHz	42.67	21.02	54.00	-11.33	1.00	359.90	Vertical	Passed
5.	1GHz	45.36	-7.97	54.00	-8.64	1.00	0	Horizontal	Passed
6.	17.926498GHz	43.13	21.12	54.00	-10.87	4.00	324.00	Horizontal	Passed

Overall Graphs:





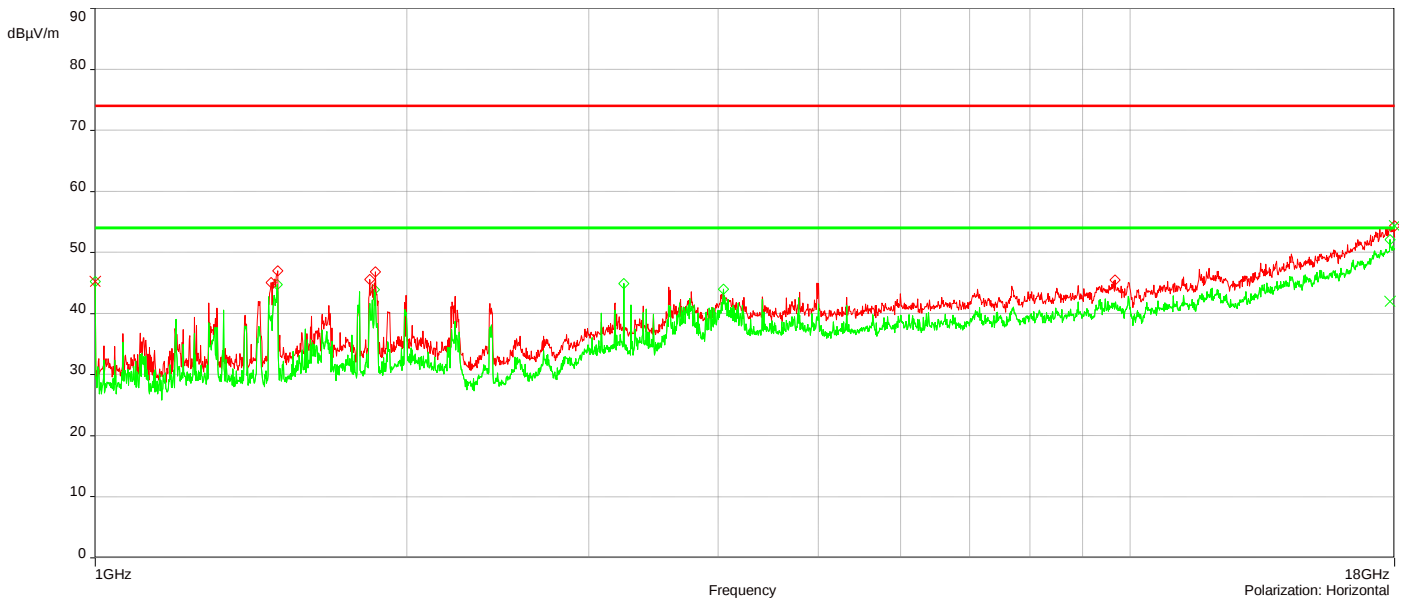
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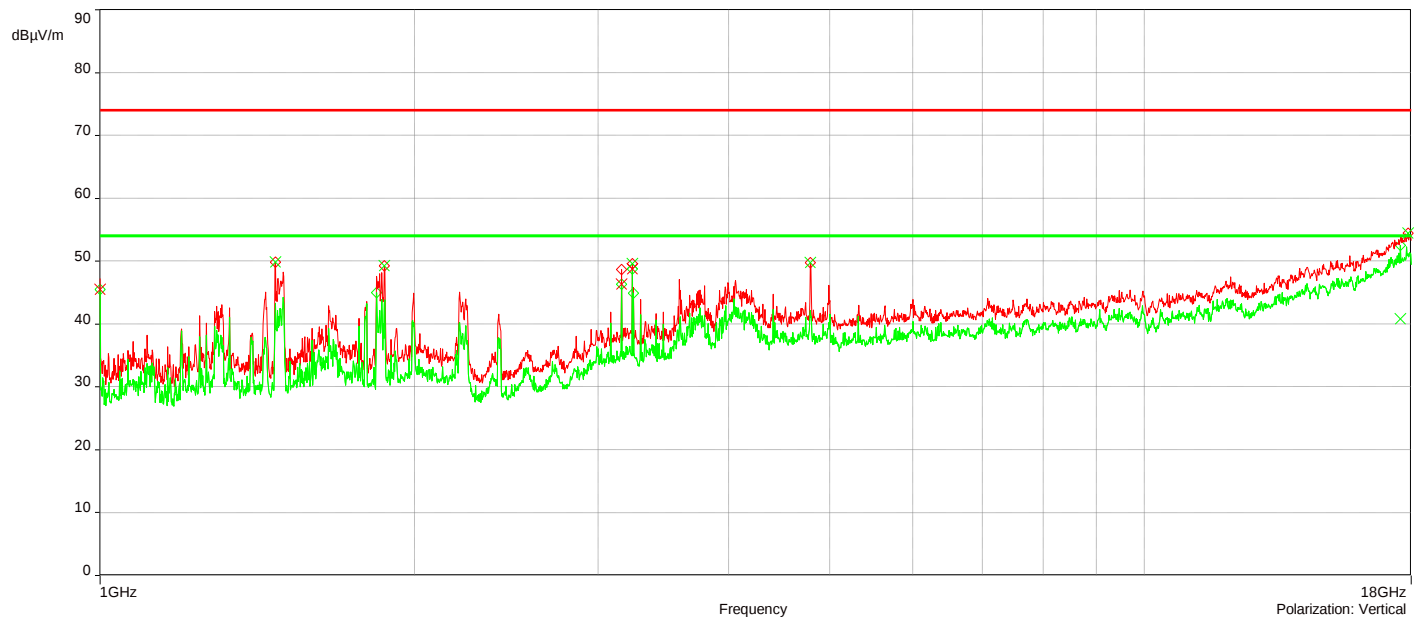
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No	Frequency (MHz)	Level Peak Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	1.4715139GHz	49.83	-6.46	74.00	-24.17	3.50	8.70	Vertical	Passed
2.	1.8715256GHz	49.27	-4.22	74.00	-24.73	3.50	63.60	Vertical	Passed
3.	3.2335657GHz	49.58	1.36	74.00	-24.42	3.50	44.90	Vertical	Passed
4.	4.7886114GHz	49.80	4.63	74.00	-24.20	2.50	120.80	Vertical	Passed
5.	17.881497GHz	54.43	20.55	74.00	-19.57	3.50	63.60	Vertical	Passed
6.	17.996GHz	54.40	21.40	74.00	-19.60	3.50	79.70	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	1GHz	45.54	-7.88	54.00	-8.46	1.00	317.20	Vertical	Passed
2.	3.1580635GHz	46.34	1.35	54.00	-7.66	3.50	63.60	Vertical	Passed
3.	3.2335657GHz	48.80	1.36	54.00	-5.20	3.50	44.90	Vertical	Passed
4.	17.580488GHz	40.86	20.00	54.00	-13.14	1.50	336.90	Vertical	Passed
5.	1GHz	45.26	-8.16	54.00	-8.74	1.00	359.90	Horizontal	Passed
6.	17.812994GHz	42.01	20.29	54.00	-11.99	3.00	359.90	Horizontal	Passed

Overall Graphs:





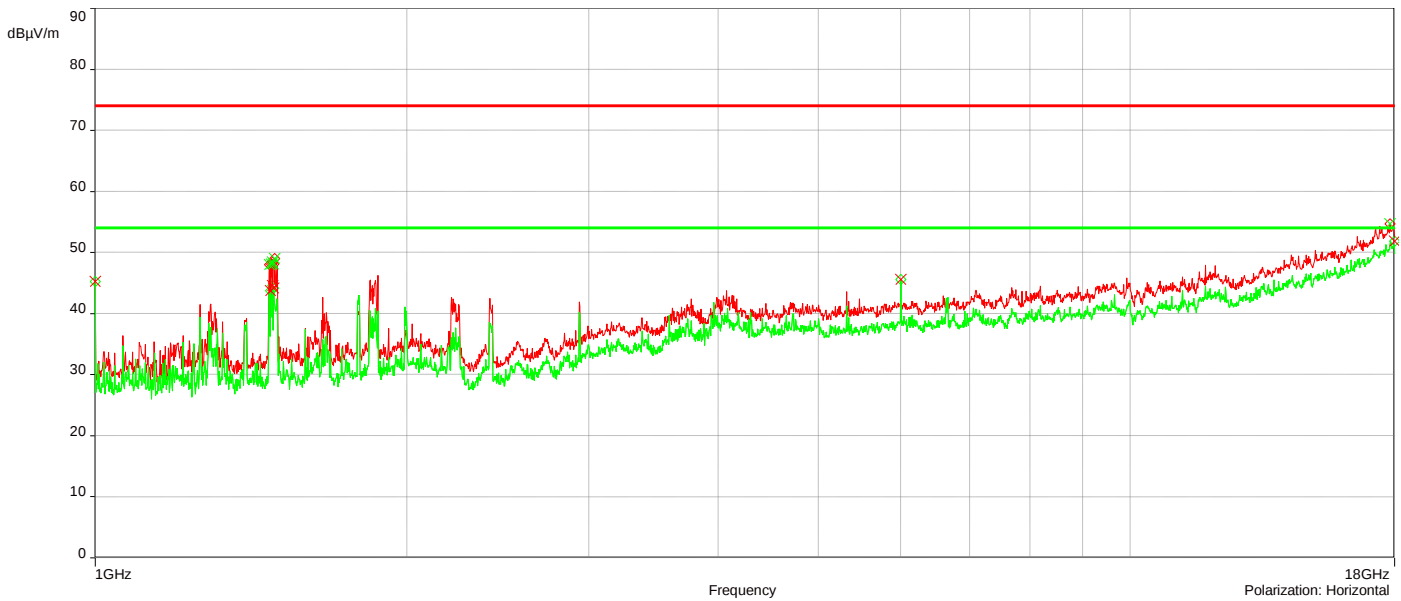
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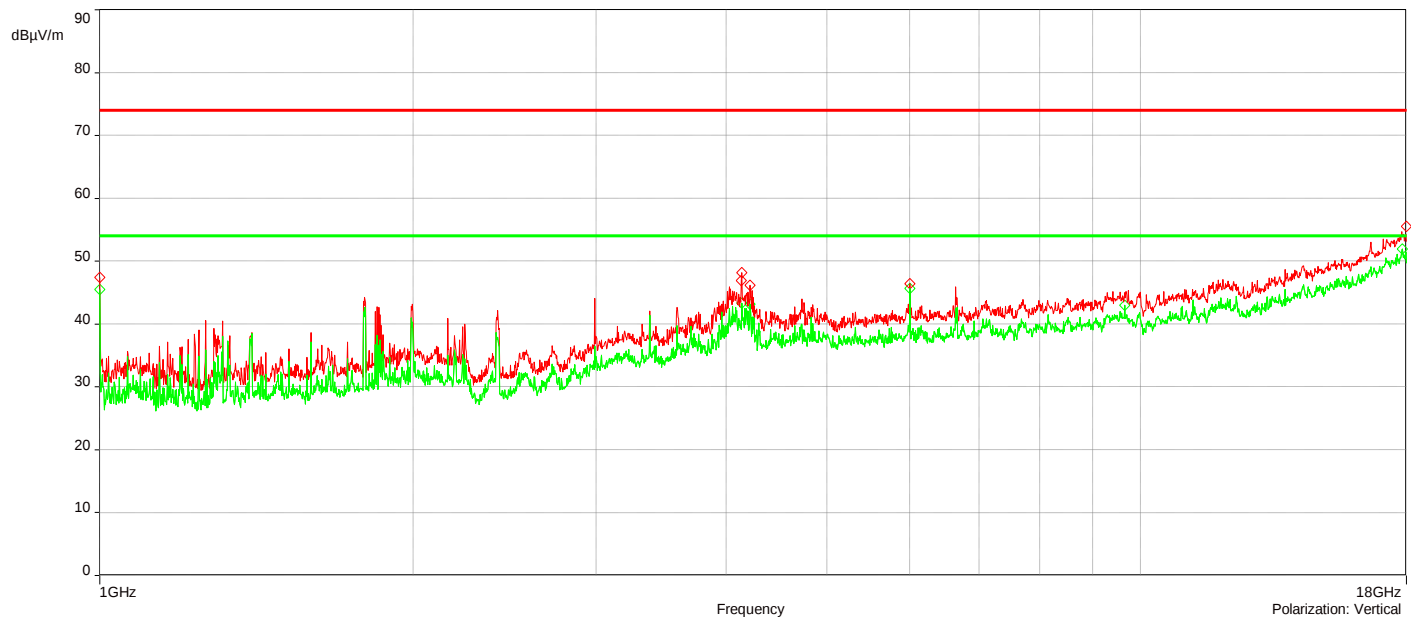
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No	Frequency (MHz)	Level Peak Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	1.4735139GHz	48.05	-6.54	74.00	-25.95	4.00	29.40	Horizontal	Passed
2.	1.4800141GHz	48.08	-6.52	74.00	-25.92	4.00	29.40	Horizontal	Passed
3.	1.4840142GHz	48.45	-6.49	74.00	-25.55	4.00	47.80	Horizontal	Passed
4.	1.4870143GHz	48.14	-6.47	74.00	-25.86	4.00	19.60	Horizontal	Passed
5.	1.4905144GHz	49.06	-6.43	74.00	-24.94	4.00	29.40	Horizontal	Passed
6.	17.814995GHz	54.71	20.30	74.00	-19.29	4.00	178.70	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	1GHz	45.23	-8.16	54.00	-8.77	3.00	359.90	Horizontal	Passed
2.	1.477514GHz	43.74	-6.53	54.00	-10.26	4.00	19.60	Horizontal	Passed
3.	1.4840142GHz	44.62	-6.49	54.00	-9.38	4.00	47.80	Horizontal	Passed
4.	1.4870143GHz	44.19	-6.47	54.00	-9.81	4.00	19.60	Horizontal	Passed
5.	6.0001471GHz	45.61	6.08	54.00	-8.39	1.00	359.90	Horizontal	Passed
6.	17.992GHz	51.90	21.29	54.00	-2.10	3.00	359.90	Horizontal	Passed

Overall Graphs:





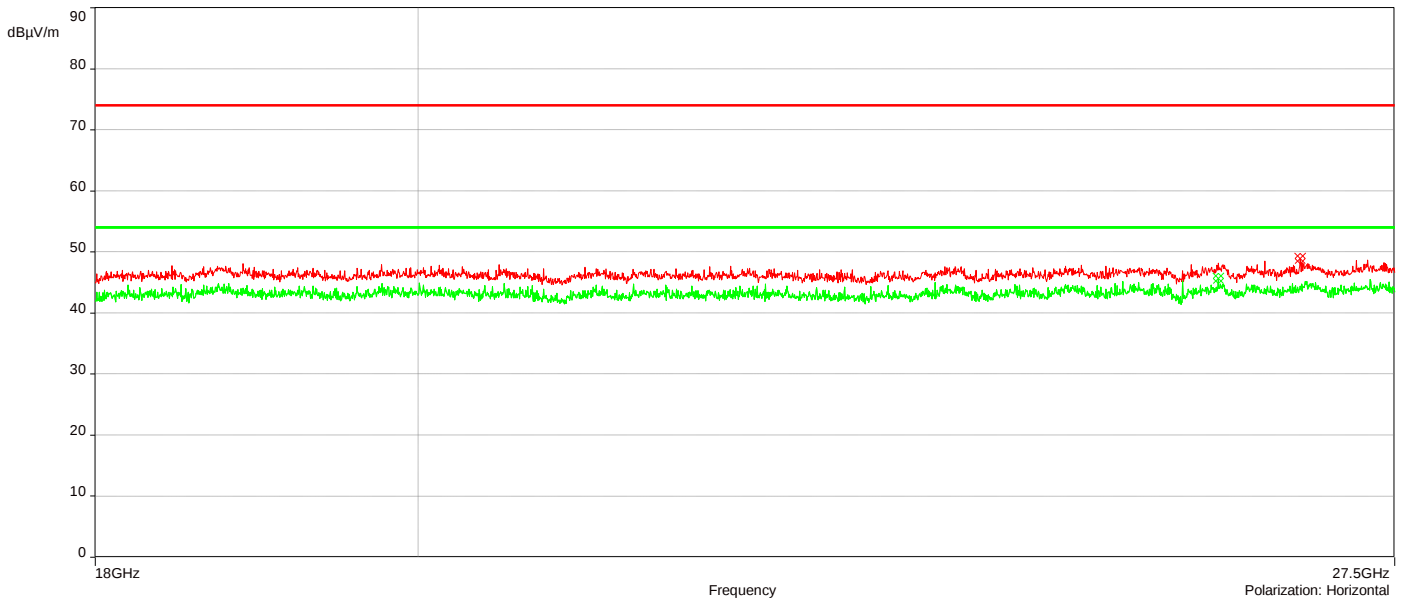
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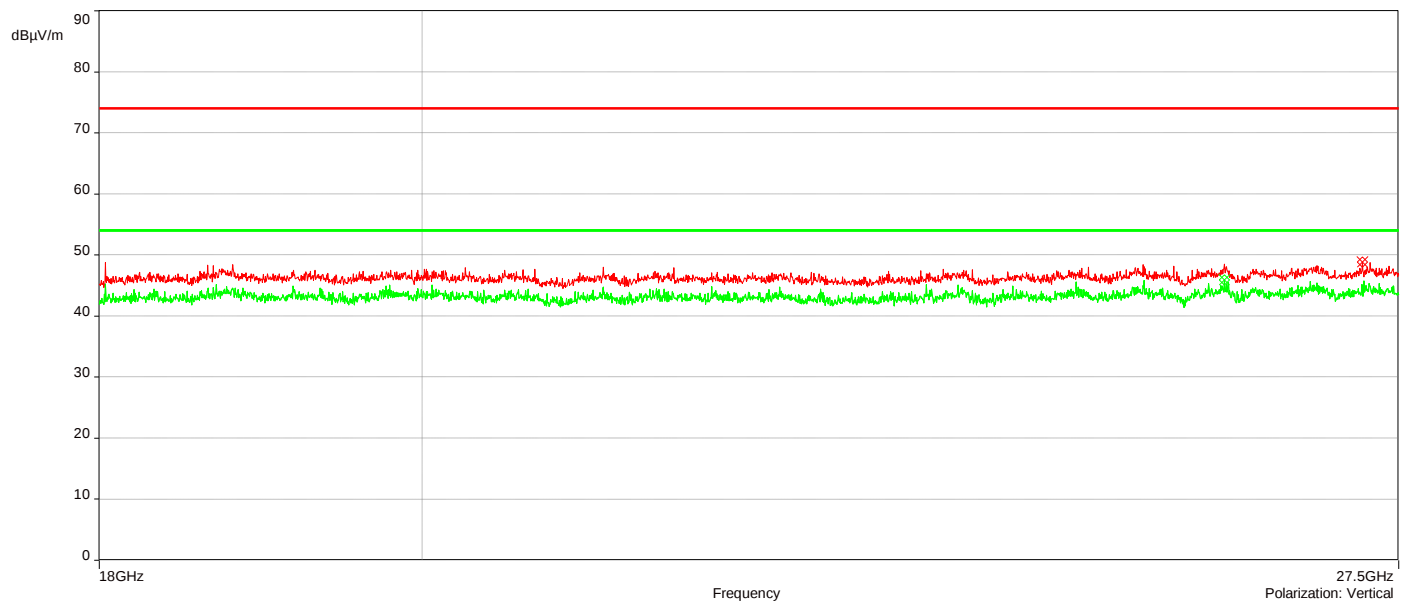
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No	Frequency (MHz)	Level Peak Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	27.176509GHz	48.83	1.09	74.00	-25.17	2.79	135.10	Vertical	Passed
2.	26.665858GHz	48.96	1.25	74.00	-25.04	1.16	0.10	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	25.979924GHz	45.96	1.44	54.00	-8.04	2.79	315.10	Vertical	Passed
2.	25.960923GHz	45.70	1.32	54.00	-8.30	2.20	315.10	Horizontal	Passed

Overall Graphs:





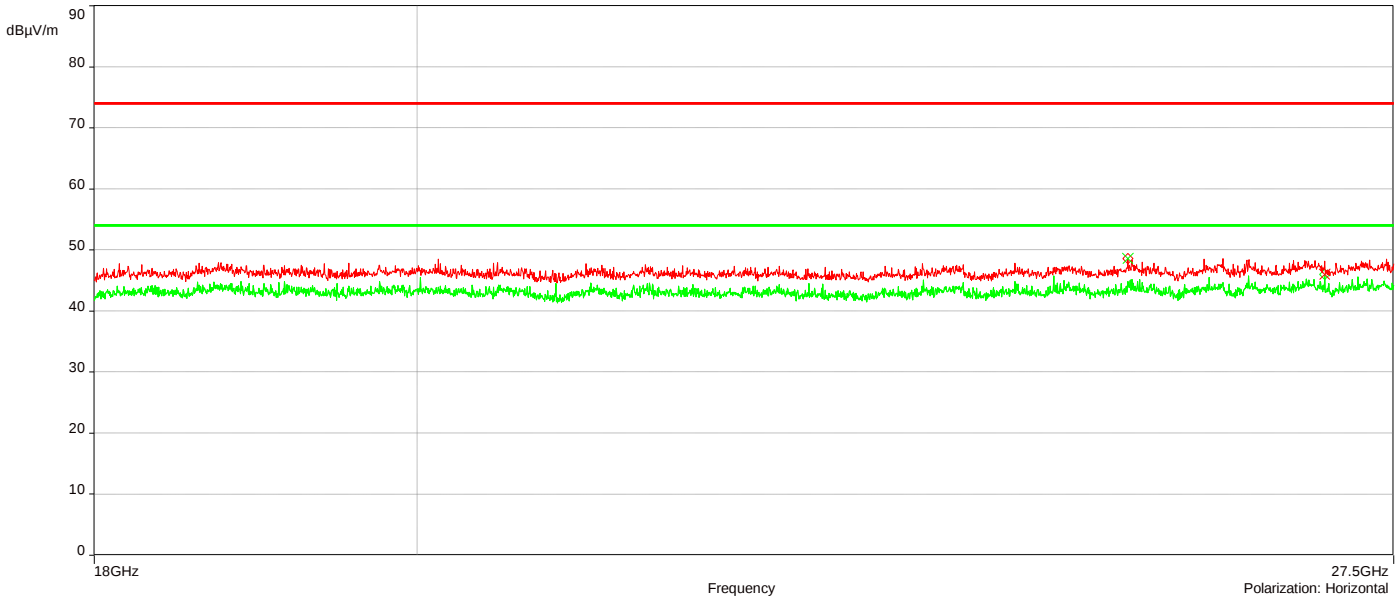
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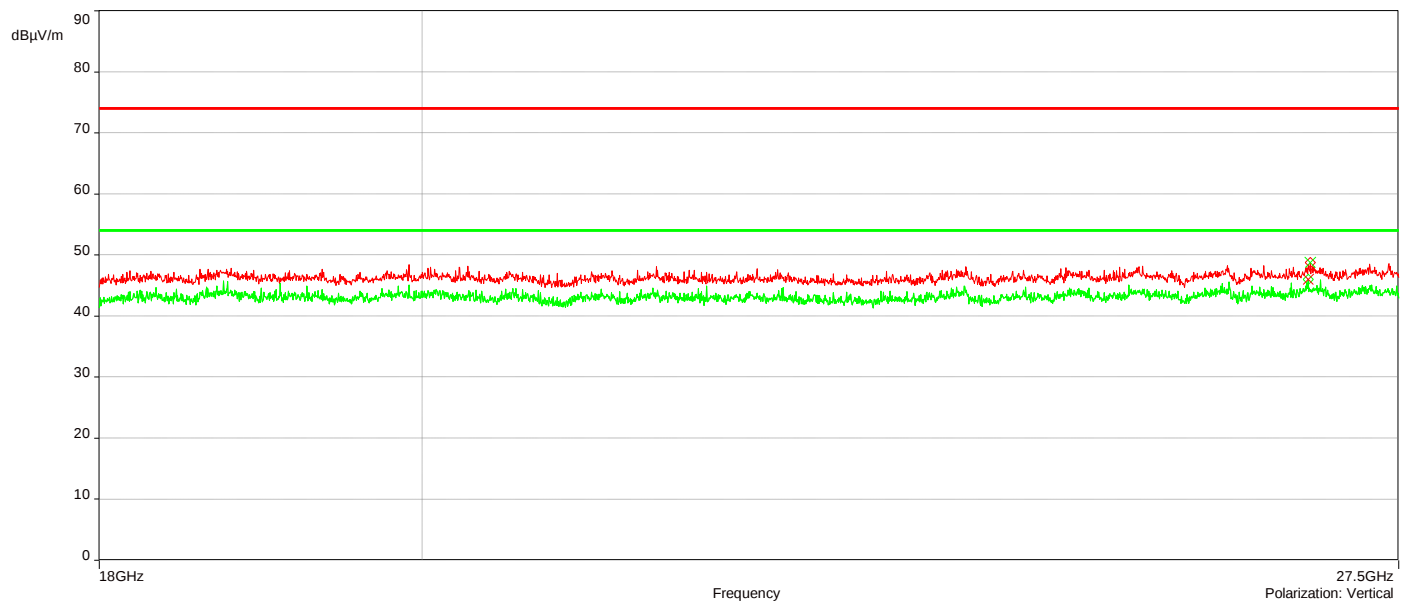
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No	Frequency (MHz)	Level Peak Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	26.716211GHz	48.75	1.44	74.00	-25.25	3.02	22.40	Vertical	Passed
2.	25.217986GHz	48.64	0.51	74.00	-25.36	1.57	314.90	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	26.70196GHz	46.02	1.33	54.00	-7.98	4.00	0.10	Vertical	Passed
2.	26.887694GHz	45.98	1.37	54.00	-8.02	1.00	179.90	Horizontal	Passed

Overall Graphs:





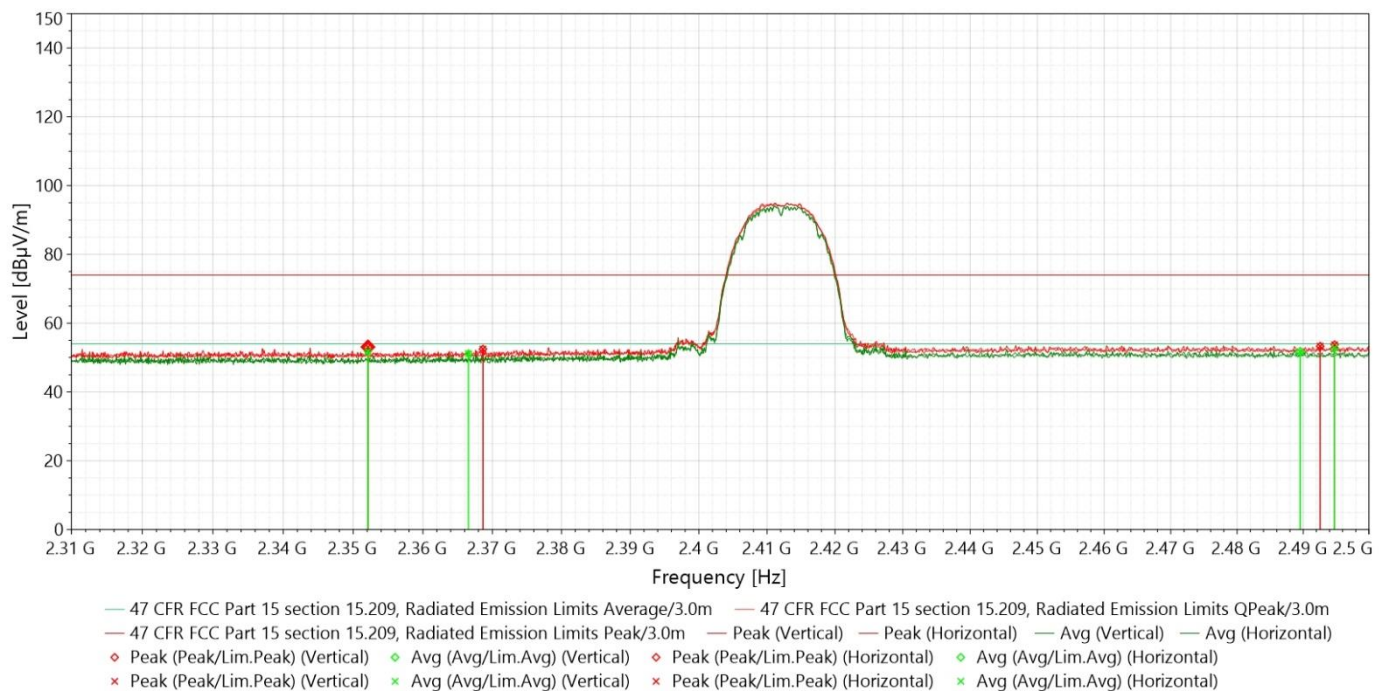
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No	Frequency (MHz)	Level Peak Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	2.3521061GHz	53.10	-2.60	74.00	-20.90	4.00	177.40	Vertical	Passed
2.	2.4947724GHz	53.74	-1.84	74.00	-20.26	3.50	161.00	Vertical	Passed
3.	2.3686443GHz	52.50	-2.64	74.00	-21.50	3.50	39.90	Horizontal	Passed
4.	2.4925863GHz	53.32	-1.81	74.00	-20.68	1.50	358.90	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	2.3521061GHz	51.88	-2.60	54.00	-2.12	4.00	177.40	Vertical	Passed
2.	2.4947724GHz	52.82	-1.84	54.00	-1.18	3.50	161.00	Vertical	Passed
3.	2.3665533GHz	51.14	-2.68	54.00	-2.86	2.50	301.10	Horizontal	Passed
4.	2.4895448GHz	51.73	-1.81	54.00	-2.27	3.50	310.80	Horizontal	Passed

Overall Graphs:



J23133#4_2.4G_Restricted Bandedge_802.11b_1Mbps_Ch 11

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No	Frequency (MHz)	Level Peak Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	2.3829015GHz	52.92	-2.32	74.00	-21.08	2.50	248.90	Vertical	Passed
2.	2.4897349GHz	54.04	-1.83	74.00	-19.96	3.00	62.10	Vertical	Passed
3.	2.382046GHz	52.84	-2.45	74.00	-21.16	2.00	299.50	Horizontal	Passed
4.	2.4967684GHz	53.14	-1.82	74.00	-20.86	4.00	129.40	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	2.3543872GHz	52.11	-2.59	54.00	-1.89	1.50	60.00	Vertical	Passed
2.	2.4897349GHz	52.18	-1.83	54.00	-1.82	3.00	62.10	Vertical	Passed
3.	2.3849925GHz	51.28	-2.42	54.00	-2.72	3.50	93.40	Horizontal	Passed
4.	2.4884042GHz	51.80	-1.80	54.00	-2.20	1.00	188.10	Horizontal	Passed

Overall Graphs:



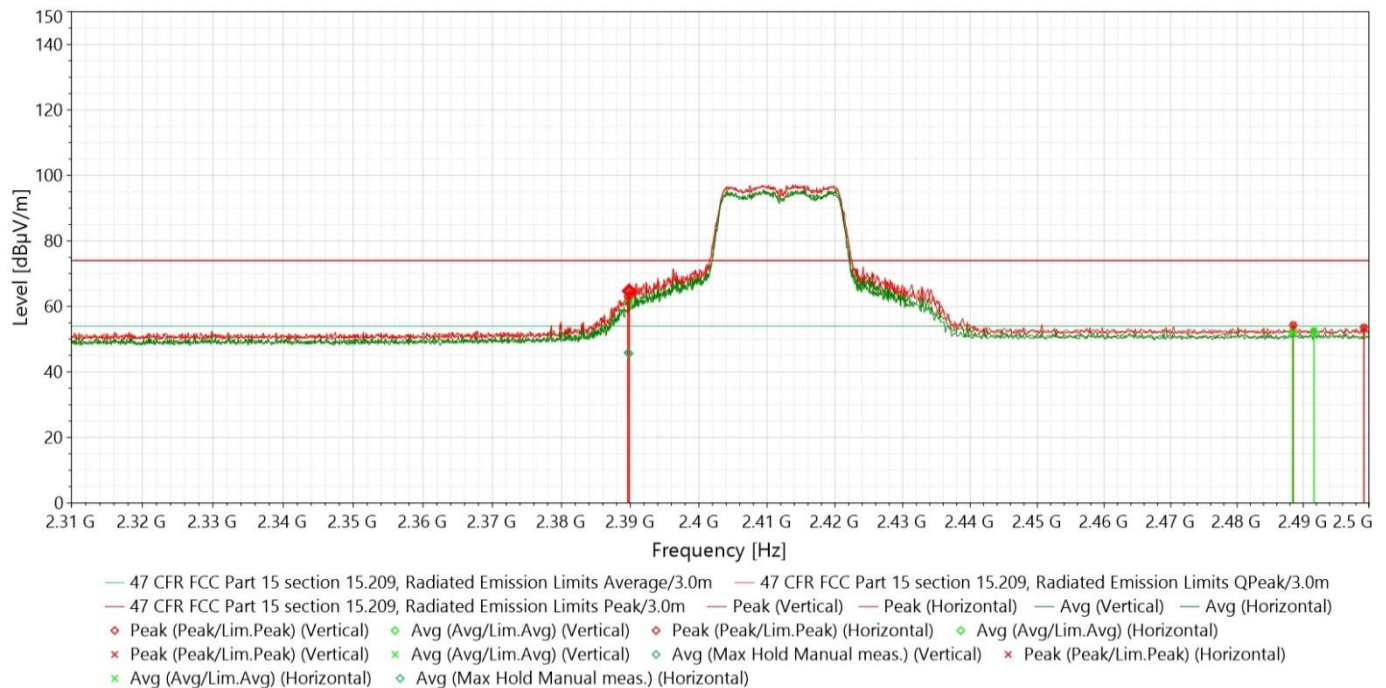
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No	Frequency (MHz)	Level Peak Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	2.3898399GHz	64.73	-2.31	74.00	-9.27	3.00	140.10	Vertical	Passed
2.	2.4884992GHz	54.25	-1.84	74.00	-19.75	4.00	358.90	Vertical	Passed
3.	2.3896498GHz	63.10	-2.37	74.00	-10.90	1.50	281.90	Horizontal	Passed
4.	2.4992396GHz	53.50	-1.81	74.00	-20.50	2.00	49.90	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	2.3898399GHz	45.63	-2.31	54.00	-8.37	3.00	140.10	Vertical	Passed
2.	2.4916358GHz	52.38	-1.83	54.00	-1.62	1.50	356.90	Vertical	Passed
3.	2.3896498GHz	45.85	-2.37	54.00	-8.15	1.50	281.90	Horizontal	Passed
4.	2.4884042GHz	52.11	-1.80	54.00	-1.89	2.50	127.60	Horizontal	Passed

Overall Graphs:



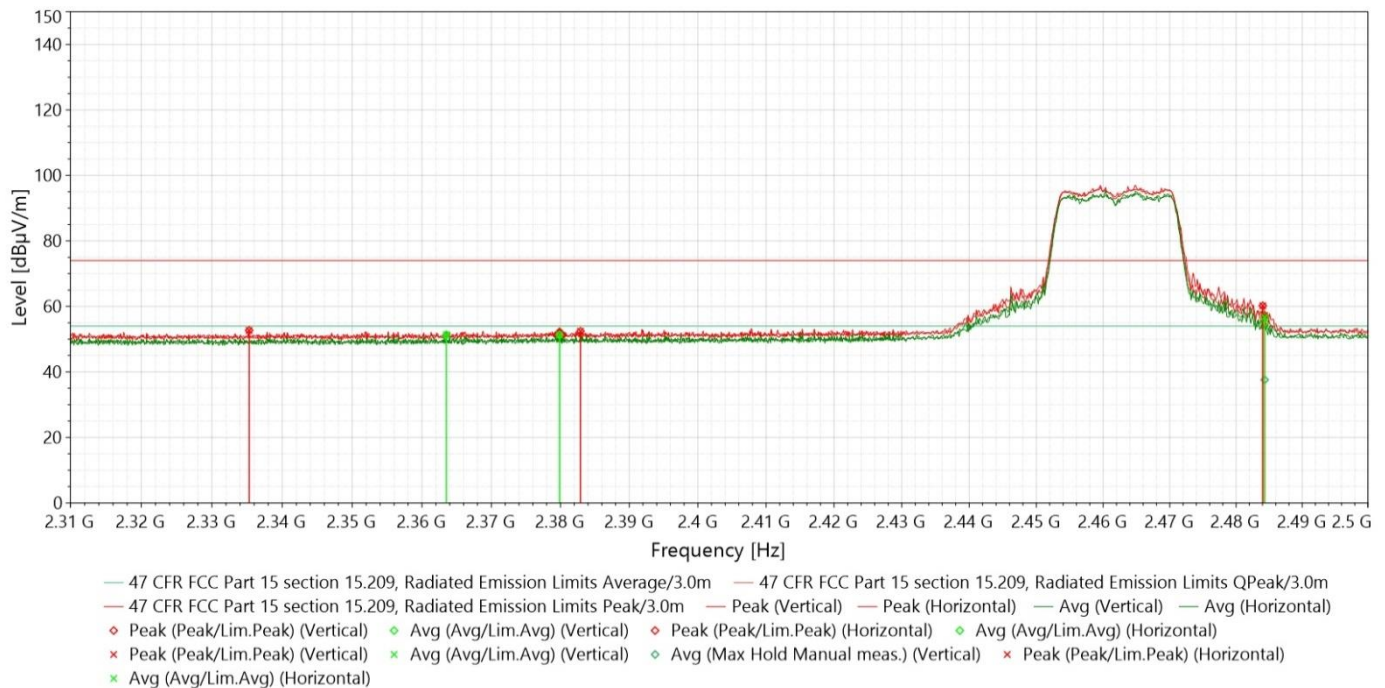
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No	Frequency (MHz)	Level Peak Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	2.3894597GHz	64.57	-2.31	74.00	-9.43	3.00	37.90	Vertical	Passed
2.	2.4835568GHz	53.38	-1.87	74.00	-20.62	1.00	154.10	Vertical	Passed
3.	2.3893647GHz	64.12	-2.38	74.00	-9.88	2.00	300.10	Horizontal	Passed
4.	2.4937269GHz	53.51	-1.81	74.00	-20.49	3.00	130.40	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	2.3897449GHz	43.29	-2.31	54.00	-10.71	2.50	128.10	Vertical	Passed
2.	2.4835568GHz	52.10	-1.87	54.00	-1.90	1.00	154.10	Vertical	Passed
3.	2.388034GHz	43.04	-2.39	54.00	-10.96	2.00	298.10	Horizontal	Passed
4.	2.487929GHz	51.83	-1.80	54.00	-2.17	3.00	348.40	Horizontal	Passed

Overall Graphs:



Document Revisions

Version	Date	Modifier	Changes
1.0	10/23/2024	Aravind Buddana	Initial Release
2.0	01/24/2025	Aravind Buddana	- Updated Section 1 and Section 4.1 with RSS 247 Issue version. - Updated Section 1 with EUT FVIN Information - Updated Section 4.1 with DUT/EUT Operation Information. - Updated Section 4.4.3 Ansi Reference.

End of Report