



Regulatory Test Report

Prepared for Harman/Becker Automotive Systems

This report presents detailed information on
HERMES 3.0

Prepared by

Aravind Buddana

Engineer II

Approved by

Jason Kanakry

General Manager

Issue date: 10/12/2021

Report No: AH21042001-HAR-017-TR1 v1.1

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The test is traceable to national standard or related international standard

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- **Test Request Information**

Test Request #:	OUS2150001
Test Requested By:	Imad Hjije 7layers GmbH Borsigstrasse 11, 40880 Ratingen, Germany
Test item Description:	HERMES 3.0
Part Number:	M598
DUT Sample Number:	AH21042001-HAR-017 #1, AH21042001-HAR-017 #2
Hardware Version of DUT:	LTE NAFTA
Software Version of DUT:	FW1.7
Component Category of DUT:	N/A
FCC ID:	T8GHERMES3
IC:	6434A-HERMES3
Type of Test:	FCC/ISED Certification
Test Method:	CFR Title 47 FCC Part 15.247, ISED Canada RSS-247 Issue 2, ISED Canada RSS-Gen Issue 5, FCC KDB 558074 D01 15.247 Measurement Guidance v05 and ANSI C63.10-2013
Deviations from standard:	None
Approved Test Plan Number:	N/A
Test Plan Revision:	N/A
Date test sample received:	04-19-2021
Date test started:	04-22-2021
Date test finished:	09-15-2021

• 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)

- **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 is shown in the label exhibit.
		15.21	Information to the user is shown in the instruction manual exhibit.
		15.27	No special accessories are required for compliance.
3.2		15.31	The EUT was tested in accordance with the measurement standards in this section.
6.13.2		15.33	Frequency range was investigated according to this section, unless noted in specific rule section under which the equipment operates.
6.13.1		15.35	The EUT emissions were 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 detachable external antenna with 5.63dBi 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.

CFR Title 47 FCC Part 15.247, ISED Canada RSS-247 Issue 2

- **Conducted Testing**

Test Summary

This test report supports an application for certification of a transmitter operating pursuant to:
CFR Title 47 FCC Part 15.247, ISED Canada RSS-247 Issue 2, ISED Canada RSS-Gen Issue 5, FCC KDB 558074 D01 15.247 Measurement Guidance v05 and ANSI C63.10-2013

The product is the HERMES 3.0, It is 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	External detachable
DUT Antenna Gain	5.63dBi

We found that the product met the requirements.

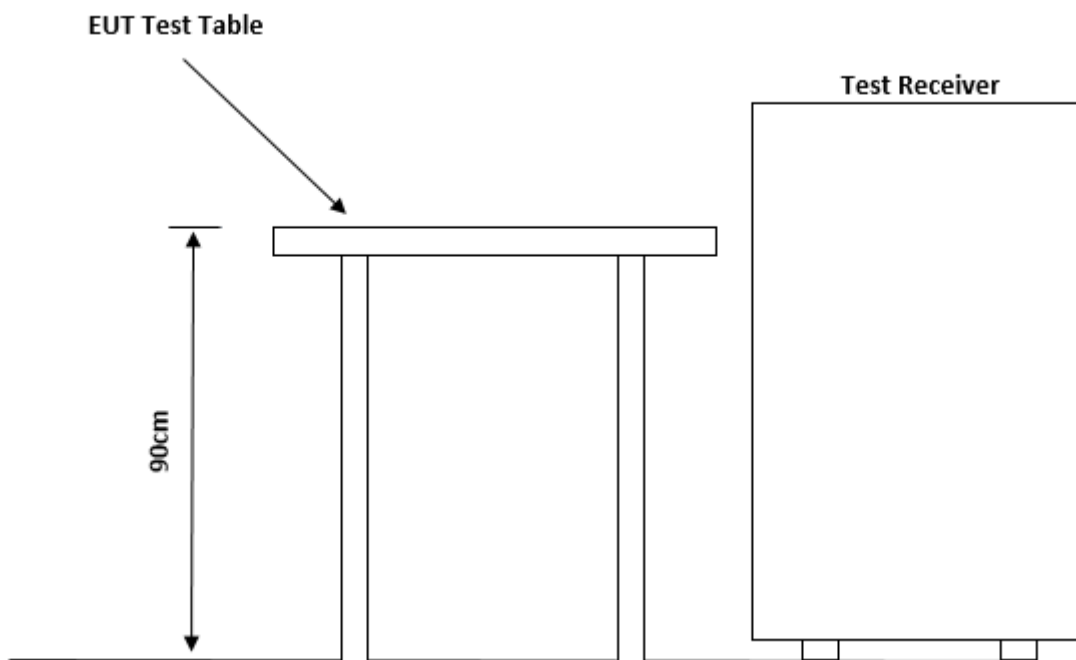
Test samples were received in good condition and remains good and functional post testing.

Test Item	Sample #	Result	Tested By
FCC 15.247 2.4G WLAN	AH21042001-HAR-017 #1	Meets Requirements	Aravind Buddana

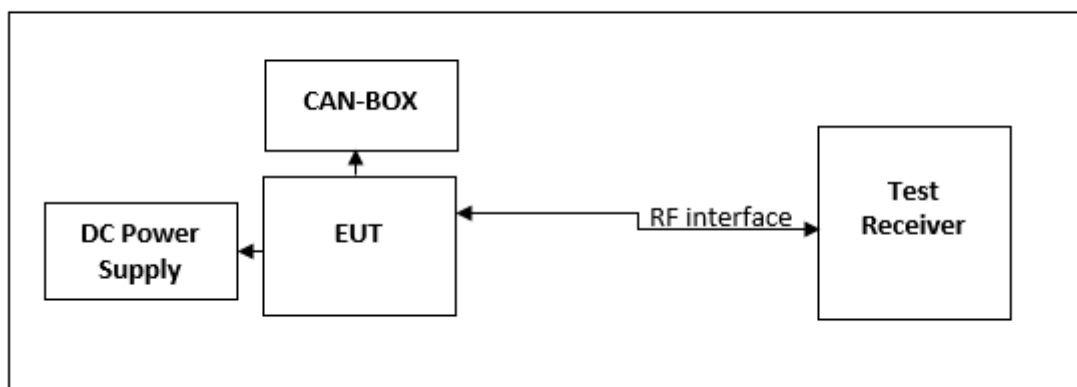
Test Setup

Conducted Test Site Description

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



TEST SETUP DIAGRAM



Test Equipment Used

ID #	Equipment	Manufacturer	Model #	Serial #	Cal Due
BVD0226	Spectrum Analyzer 10Hz-44GHz	Rohde & Schwarz	FSV3044	101018	1/14/2022
BVD0227	8 port switch unit for Wireless Test system	Rohde & Schwarz	OSP150	101100	N/A
BVD0228	8 port switch unit for Wireless Test system	Rohde & Schwarz	OSP220	101632	N/A
BVD0224	Signal Generator 100kHz-40GHz	Rohde & Schwarz	SMB100A	181741	11/19/2021
BVD0225	Signal Generator 100k-6GHz with GPS simulator	Rohde & Schwarz	SMW200A	107664	11/18/2021
BVD0250	Wireless Connectivity Tester 70M-6GHz	Rohde & Schwarz	CMW270	102113	11/18/2021
BVD0343	DC Regulated Power Supply	Circuit Specialists, INC	CSI3020X	595215	N/A
BVD0321	Fixed Attenuator 2W 20dB - 40GHz	Mini-Circuits	BW-K20-2W44+	2103	N/A
BVD0477	10db Attenuator -18GHz	Mouser	BW-S10W2+	2043	N/A
BVD0229	Temp and Humidity Meter	Fluke	971	12001009	3/26/2022

Customer Supplied Equipment

ID #	Equipment	Manufacturer	Model	Serial #	Version No.
N/A	Cable Harness	Harman	N/A	N/A	N/A
N/A	CAN-BOX	Harman	N/A	J0035176	N/A
N/A	USB to DUT Harness	Harman	N/A	N/As	N/A

Equipment List (Software)

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

FCC 15.247 2.4G WLAN

Channels and modes available

802.11b, 802.11g and 802.11n (HT20)

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

Antenna Gain	5.63dBi
Number of transmit Chains	1
Equipment Type	Equipment with wideband modulation other than frequency hopping

Power Settings

802.11b		802.11g	
Channel	Power Setting	Channel	Power Setting
1	15	1	15
6	15	6	15
11	15	11	15
802.11n (HT20)			
Channel	Power Setting		
1	15		
6	15		
11	15		

Test Results Summary

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
Tx Spurious Emissions	2412/2437/2462	PASS	PASS	PASS

RF Output Power

RF output power is defined as the mean equivalent isotropic radiated power (e.i.r.p.) of the equipment during a transmission burst.

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	11.159	11.081	10.587	30	99.790%	15 €
11 Mbps	11.337	11.392	10.785	30	98.071%	15 €

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	11.200	11.151	10.708	30	98.508%	15 €
54 Mbps	11.443	11.401	10.872	30	88.948%	15 €

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	11.174	11.160	10.661	30	98.402%	15 €
MCS7	11.446	11.433	10.890	30	88.030%	15 €

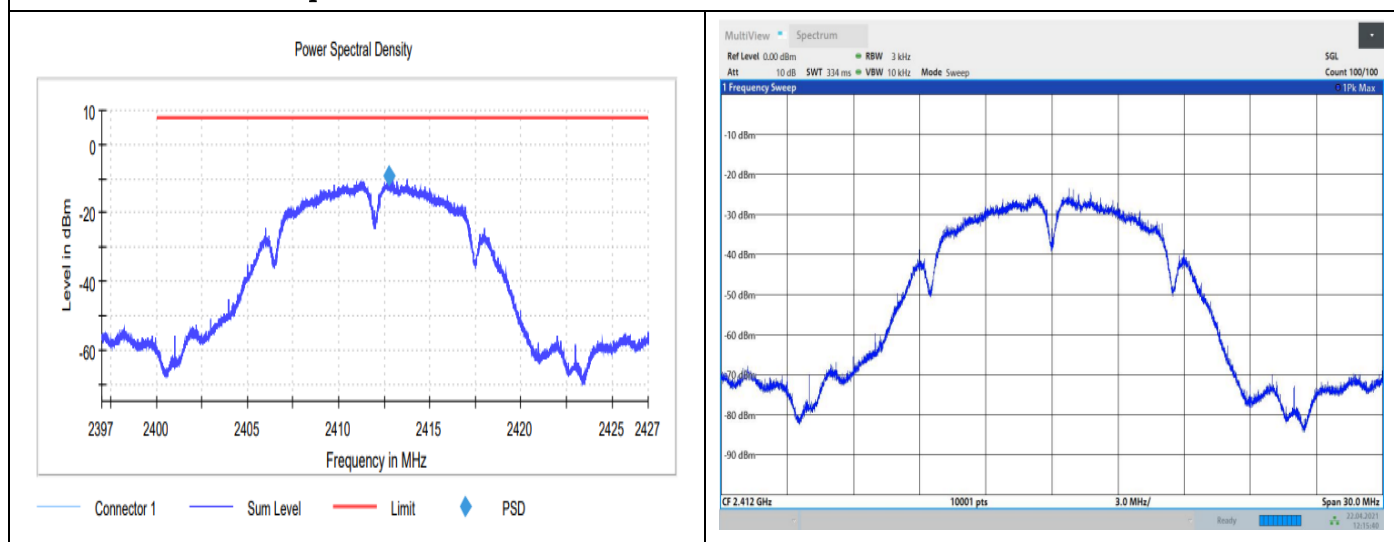
Power Spectral Density

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05 F and ANSI C63.10-2013

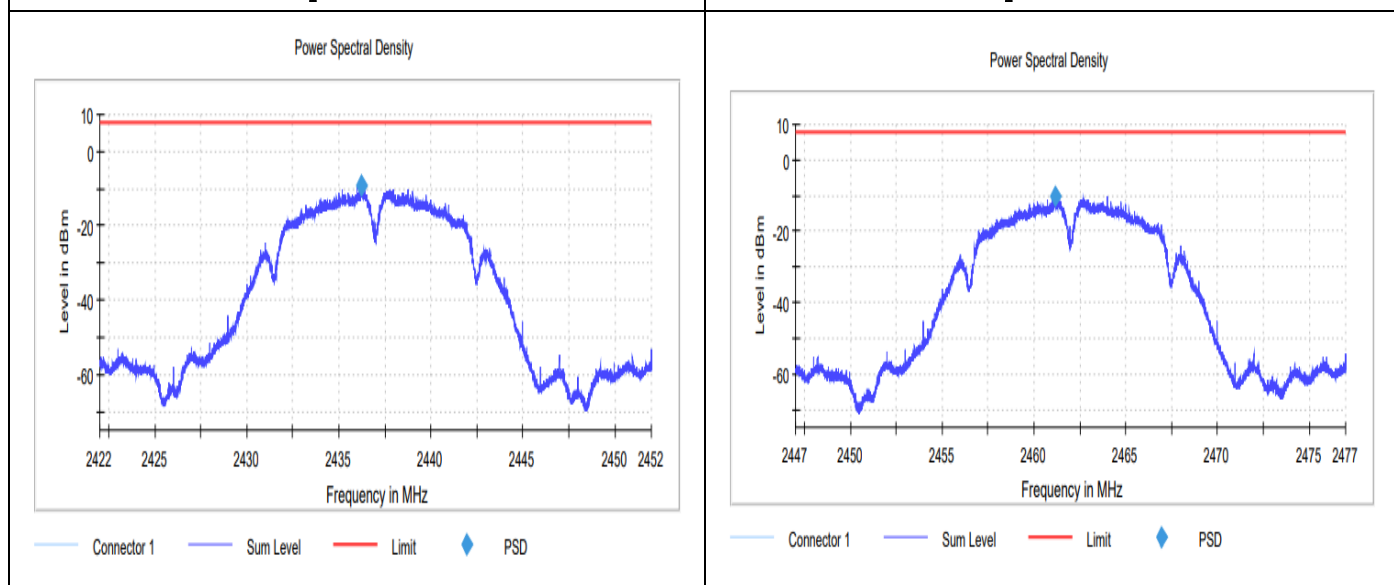
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 1.3 dB

Mode	Data Rate	PSD (dBm) 2412 MHz	PSD (dBm) 2437 MHz	PSD (dBm) 2462 MHz	Limit (dBm)
802.11b	1Mbps	-9.184	-9.128	-10.226	8.0
	11Mbps	-10.150	-10.327	-10.899	8.0

802.11b 2412MHz 1Mbps

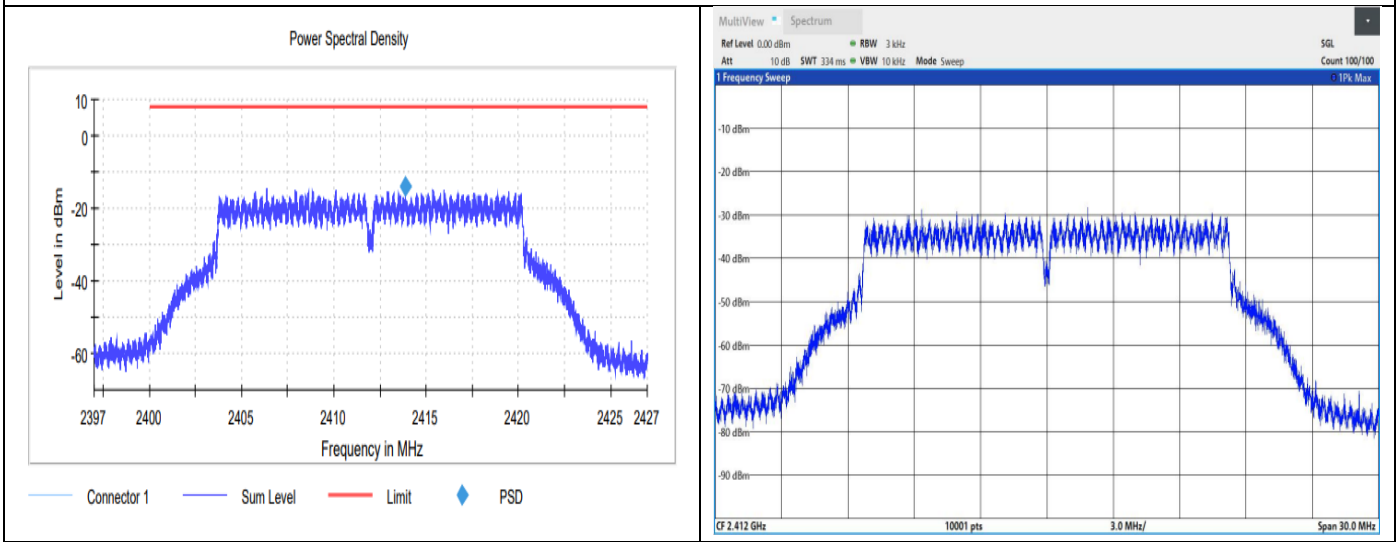


802.11b 2437MHz 1Mbps

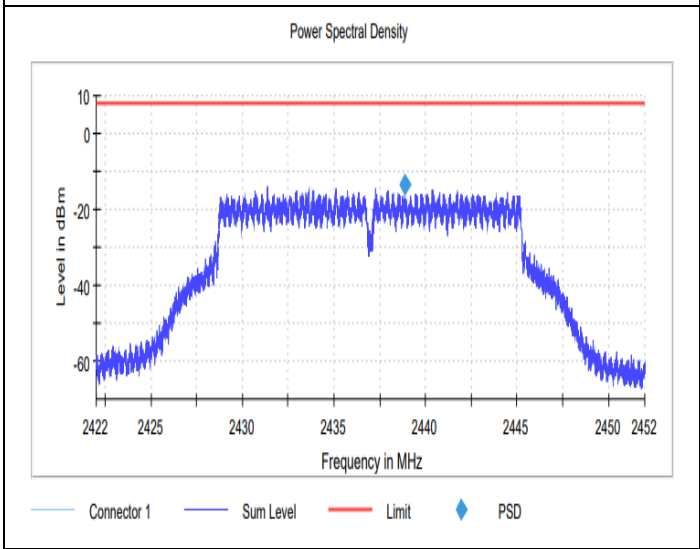


Mode	Data Rate	PSD (dBm) 2412 MHz	PSD (dBm) 2437 MHz	PSD (dBm) 2462 MHz	Limit (dBm)
802.11g	6 Mbps	-13.991	-13.650	-14.298	8.0
	54 Mbps	-14.960	-15.245	-15.221	8.0

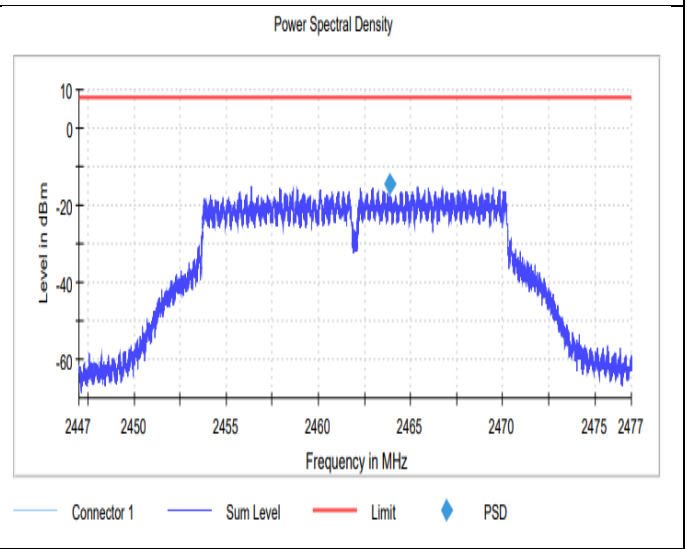
802.11g 2412MHz 6Mbps



802.11g 2437MHz 6Mbps

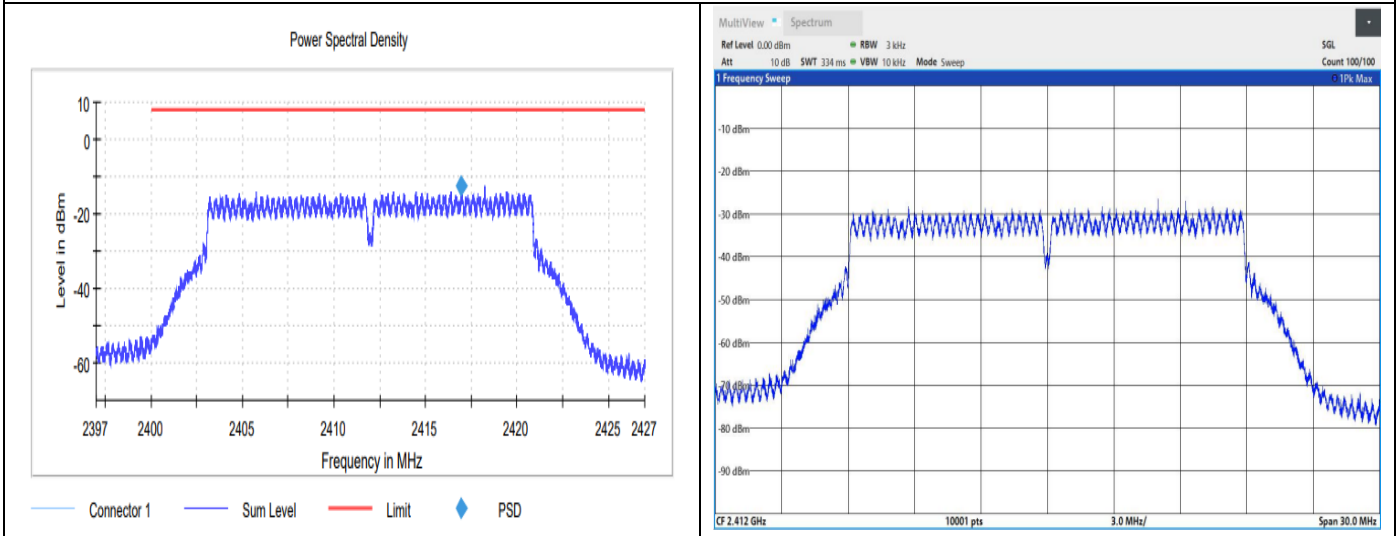


802.11g 2462MHz 6Mbps

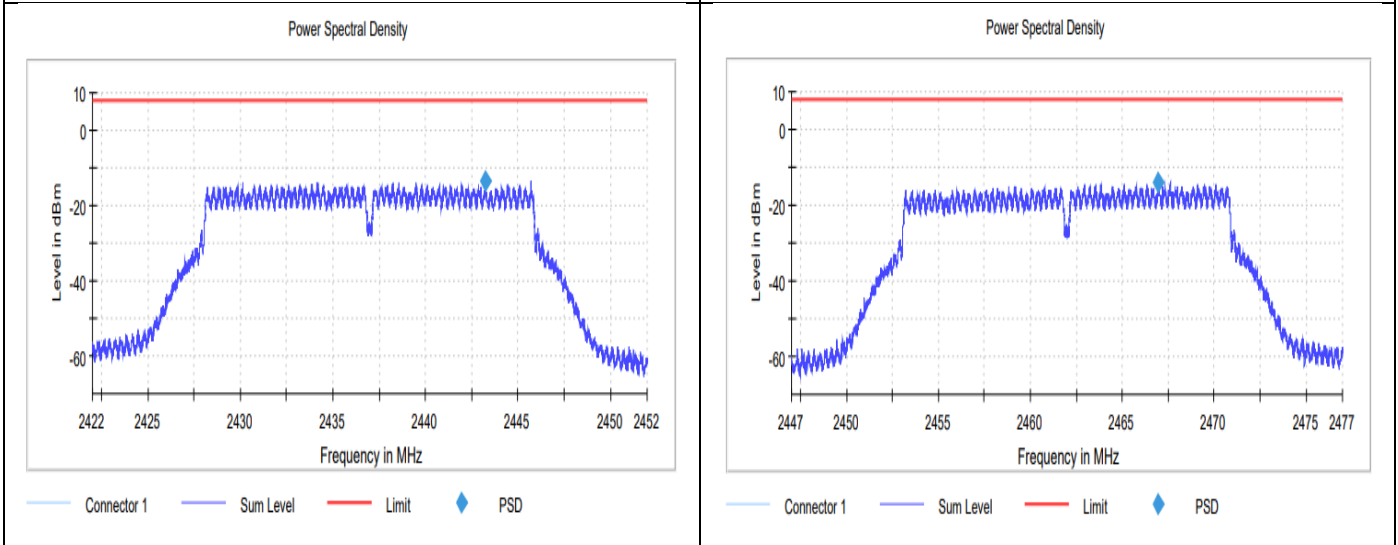


Mode	Data Rate	PSD (dBm) 2412 MHz	PSD (dBm) 2437 MHz	PSD (dBm) 2462 MHz	Limit (dBm)
802.11n (HT20)	MCS0	-12.271	-13.622	-13.973	8.0
	MCS7	-13.300	-13.277	-13.468	8.0

802.11n (HT20) 2412MHz MCS0



802.11n (HT20) 2437MHz MCS0



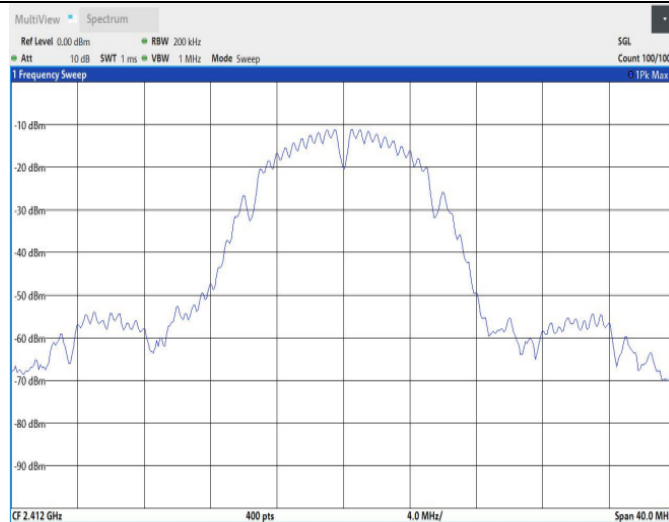
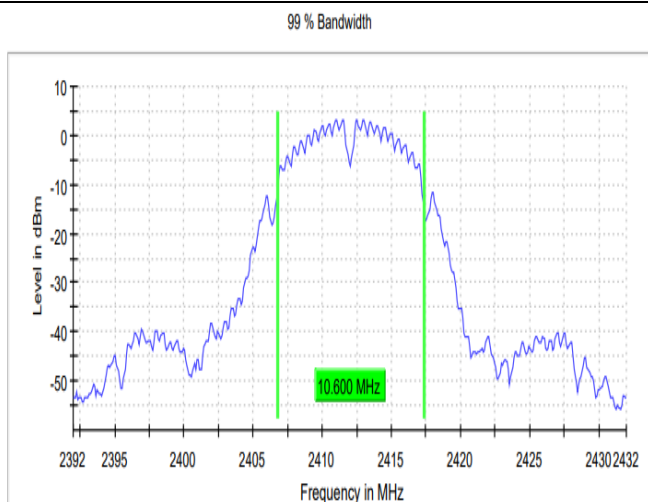
Occupied Channel Bandwidth

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05 and ANSI C63.10-2013 11.8.1

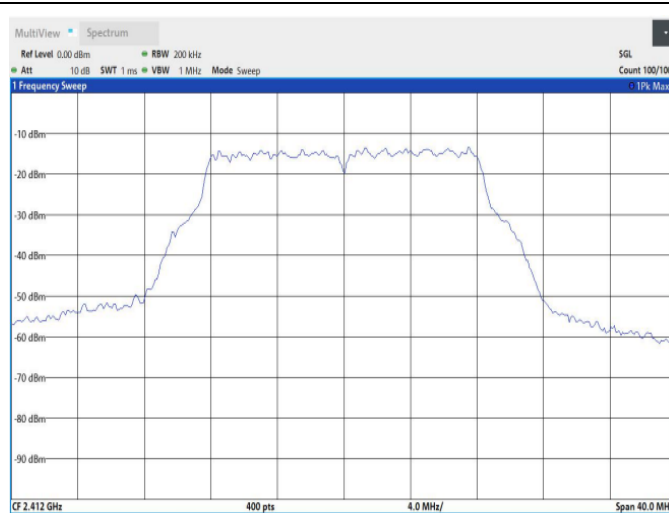
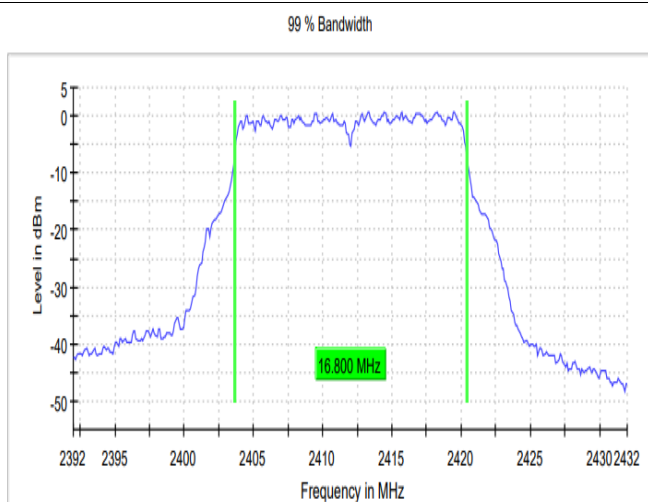
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 2%

Data Rate	DUT Frequency (MHz)	Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
802.11b 1Mbps	2412.000	10.600000	2406.750000	2417.350000
802.11g 6Mbps	2412.000	16.800000	2403.650000	2420.450000
802.11n (HT20) MCS0	2412.000	18.000000	2403.050000	2421.050000
802.11b 1Mbps	2437.000	10.500000	2431.750000	2442.250000
802.11g 6Mbps	2437.000	16.700000	2428.650000	2445.350000
802.11n (HT20) MCS0	2437.000	17.900000	2428.050000	2445.950000
802.11b 1Mbps	2462.000	10.700000	2456.850000	2467.550000
802.11g 6Mbps	2462.000	16.800000	2453.650000	2470.450000
802.11n (HT20) MCS0	2462.000	18.000000	2453.050000	2471.050000

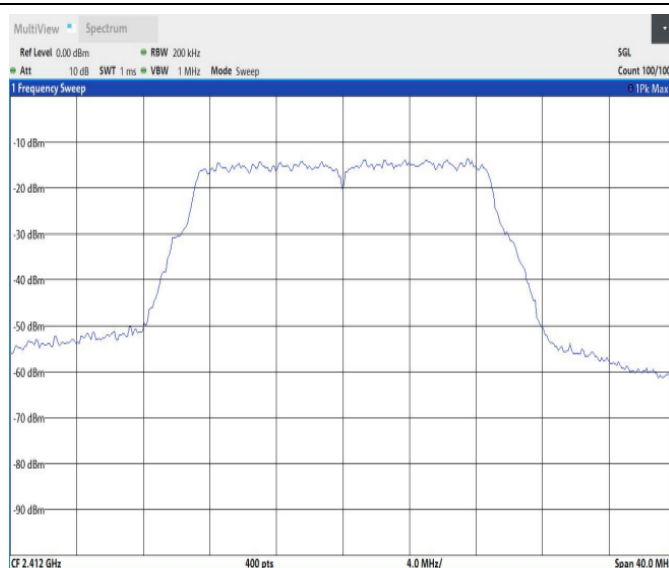
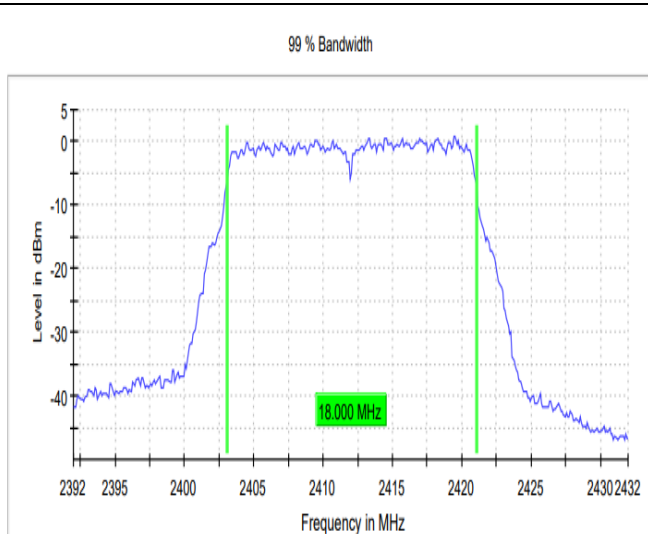
802.11b 2412MHz 1Mbps



802.11g 2412MHz 6Mbps



802.11n (HT20) 2412MHz MCS0



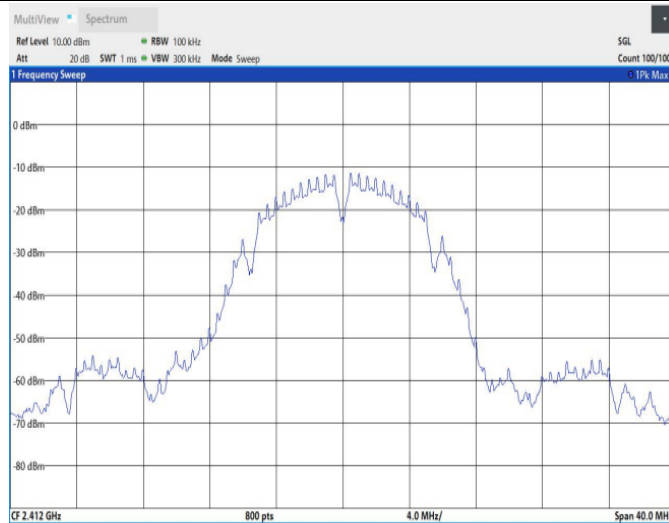
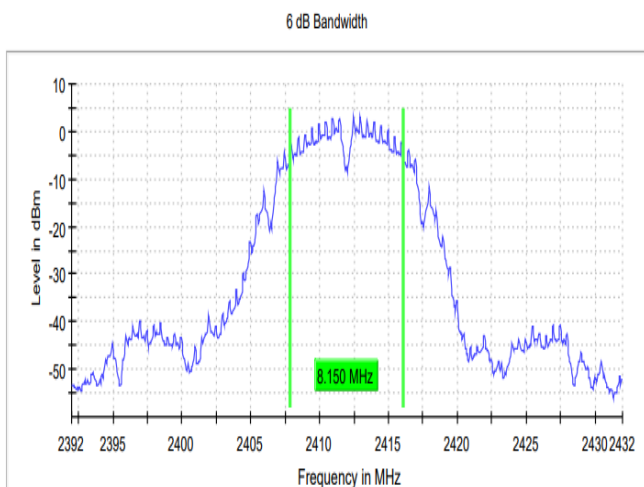
DTS Bandwidth (6dB)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05 and ANSI C63.10-2013 11.8.1

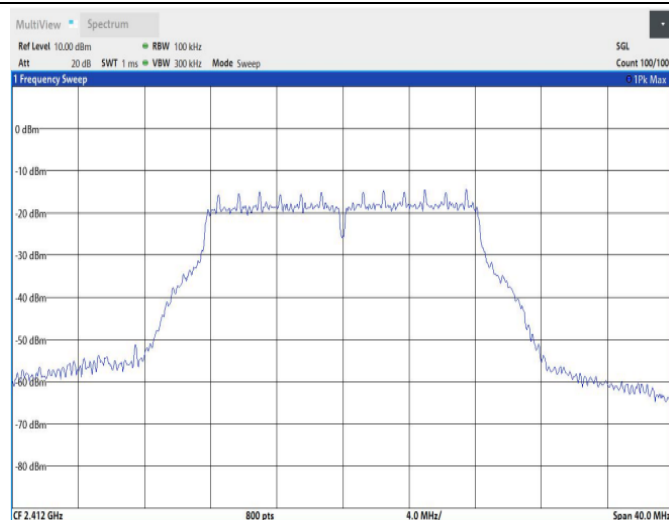
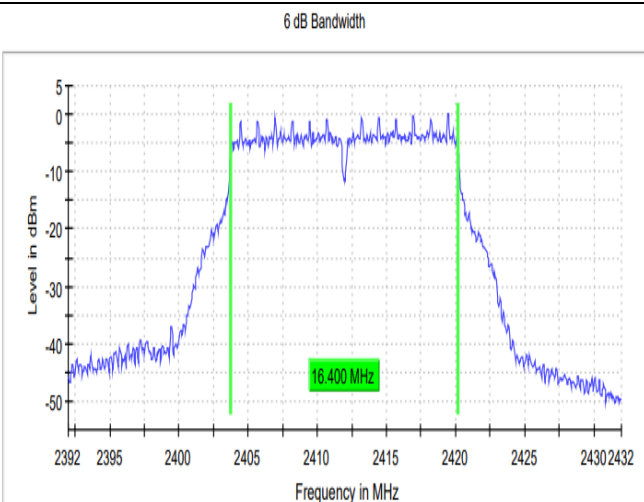
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 2%

Data Rate	DUT Frequency (MHz)	Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Minimum Limit (MHz)
802.11b 1Mbps	2412.000	8.150000	2407.875000	2416.025000	0.5
802.11g 6Mbps	2412.000	16.400000	2403.775000	2420.175000	0.5
802.11n (HT20) MCS0	2412.000	17.700000	2403.125000	2420.825000	0.5
802.11b 1Mbps	2437.000	8.150000	2432.875000	2441.025000	0.5
802.11g 6Mbps	2437.000	16.450000	2428.725000	2445.175000	0.5
802.11n (HT20) MCS0	2437.000	17.700000	2428.125000	2445.825000	0.5
802.11b 1Mbps	2462.000	8.100000	2457.925000	2466.025000	0.5
802.11g 6Mbps	2462.000	16.400000	2453.775000	2470.175000	0.5
802.11n (HT20) MCS0	2462.000	17.700000	2453.125000	2470.825000	0.5

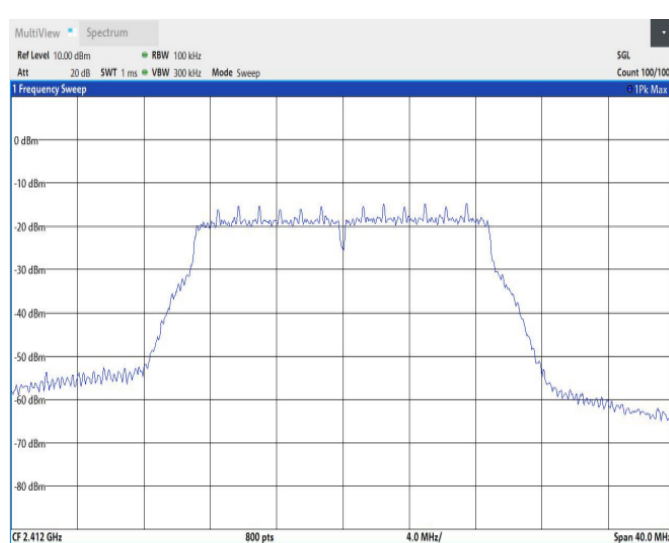
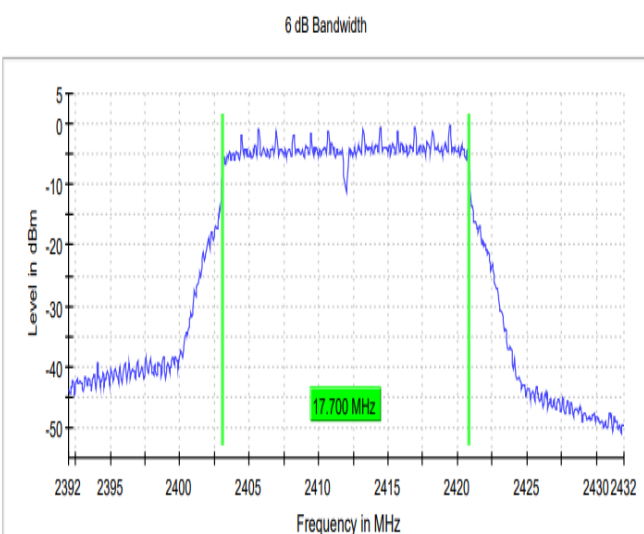
802.11b 2412MHz 1Mbps



802.11g 2412MHz 6Mbps



802.11n (HT20) 2412MHz MCS0



Conducted Band Edge

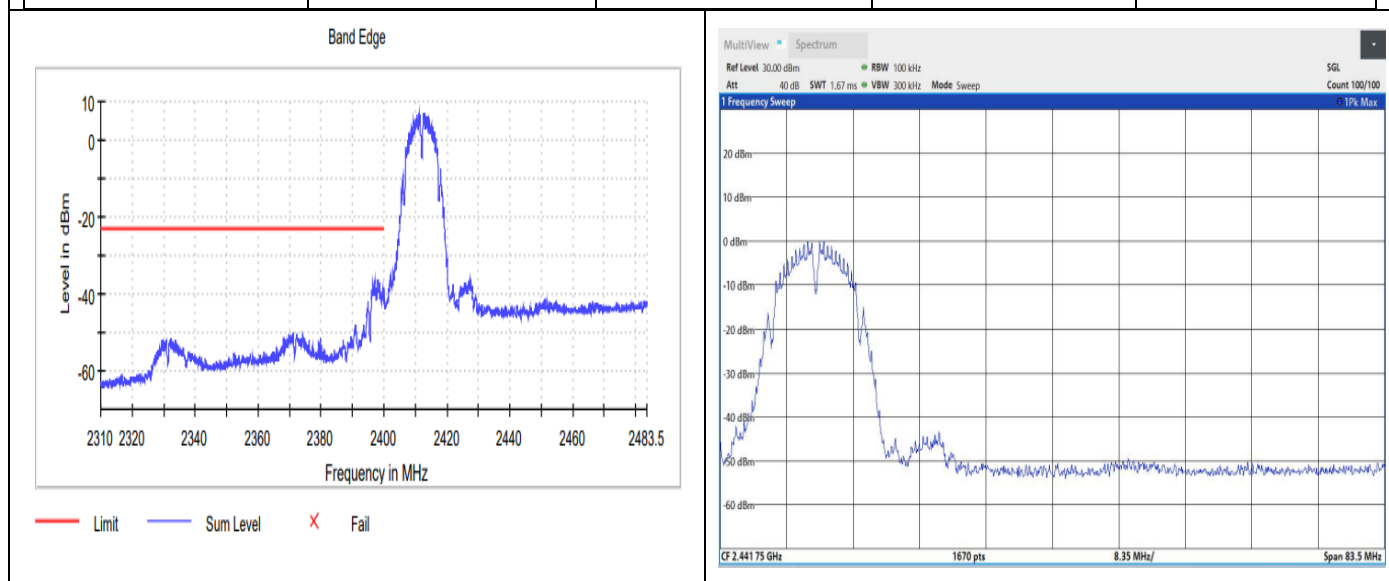
Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v05 8.7 and ANSI C63.10-2013

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

Band Edge Low 802.11b 2412MHz 1Mbps

Frequency (MHz)	Level (dBm)
2412.975000	7.1

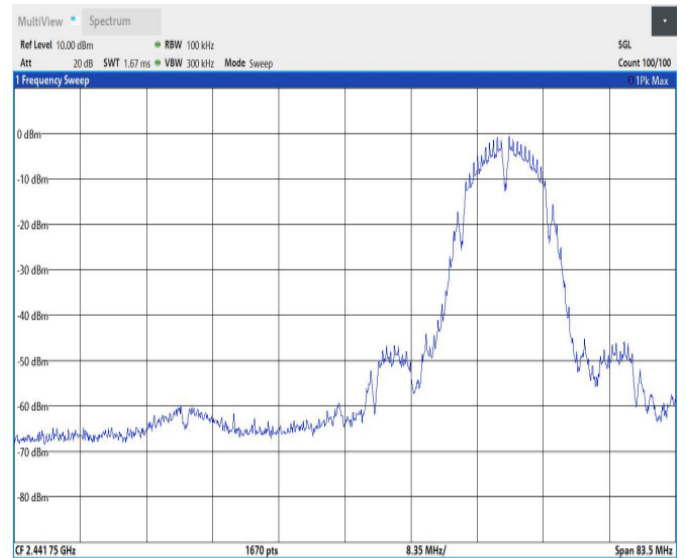
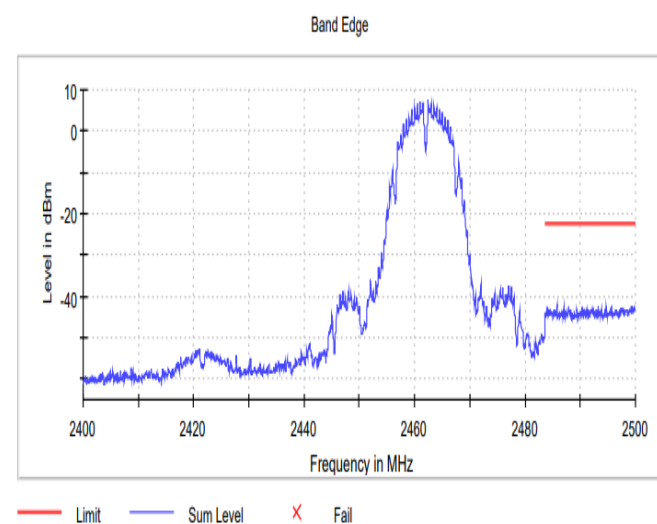
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2397.975000	-36.5	13.6	-22.9	PASS
2398.025000	-36.5	13.6	-22.9	PASS
2397.025000	-36.5	13.6	-22.9	PASS
2396.975000	-36.6	13.7	-22.9	PASS
2396.475000	-37.0	14.1	-22.9	PASS
2396.525000	-37.0	14.1	-22.9	PASS
2398.525000	-37.1	14.2	-22.9	PASS
2398.475000	-37.1	14.2	-22.9	PASS
2397.475000	-38.3	15.4	-22.9	PASS
2397.525000	-38.4	15.5	-22.9	PASS
2399.525000	-38.5	15.6	-22.9	PASS
2399.475000	-38.5	15.6	-22.9	PASS
2398.075000	-38.6	15.7	-22.9	PASS
2397.075000	-38.7	15.8	-22.9	PASS
2397.925000	-38.8	15.9	-22.9	PASS



Band Edge High 802.11b 2462MHz 1Mbps

Frequency (MHz)	Level (dBm)
2462.475000	7.4

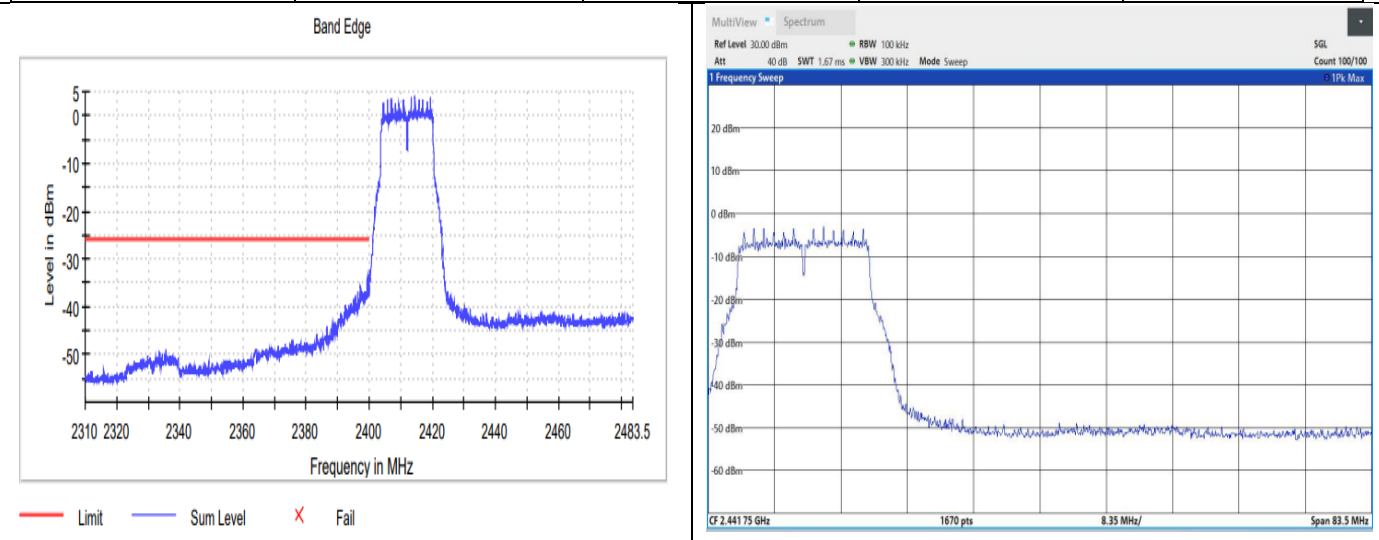
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2485.775000	-42.0	19.4	-22.6	PASS
2485.825000	-42.2	19.6	-22.6	PASS
2487.925000	-42.3	19.7	-22.6	PASS
2494.725000	-42.4	19.8	-22.6	PASS
2490.325000	-42.5	19.9	-22.6	PASS
2499.275000	-42.5	19.9	-22.6	PASS
2487.875000	-42.5	19.9	-22.6	PASS
2499.225000	-42.5	20.0	-22.6	PASS
2484.025000	-42.6	20.0	-22.6	PASS
2493.225000	-42.7	20.1	-22.6	PASS
2499.725000	-42.7	20.1	-22.6	PASS
2499.325000	-42.7	20.1	-22.6	PASS
2495.625000	-42.7	20.1	-22.6	PASS
2486.975000	-42.7	20.1	-22.6	PASS
2484.225000	-42.7	20.2	-22.6	PASS



Band Edge Low 802.11g 2412MHz 6Mbps

Frequency (MHz)	Level (dBm)
2414.475000	4.1

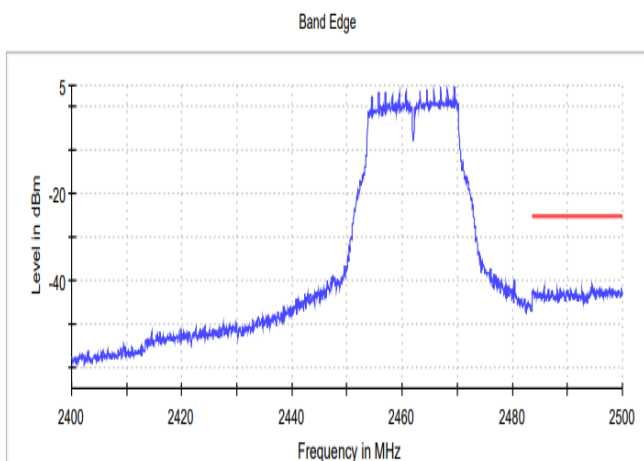
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.475000	-33.1	7.3	-25.9	PASS
2399.525000	-33.2	7.3	-25.9	PASS
2399.425000	-34.4	8.6	-25.9	PASS
2397.275000	-35.7	9.8	-25.9	PASS
2397.225000	-35.7	9.9	-25.9	PASS
2399.575000	-35.9	10.0	-25.9	PASS
2399.825000	-35.9	10.1	-25.9	PASS
2399.875000	-36.1	10.3	-25.9	PASS
2399.975000	-36.4	10.5	-25.9	PASS
2397.325000	-36.6	10.7	-25.9	PASS
2397.875000	-36.7	10.8	-25.9	PASS
2399.775000	-36.7	10.9	-25.9	PASS
2397.775000	-36.8	10.9	-25.9	PASS
2398.575000	-36.8	11.0	-25.9	PASS
2396.375000	-36.8	11.0	-25.9	PASS



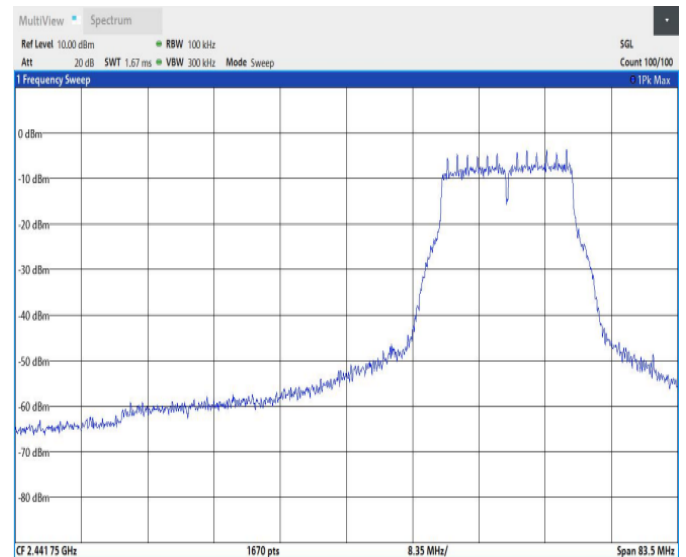
Band Edge High 802.11g 2462MHz 6Mbps

Frequency (MHz)	Level (dBm)
2469.475000	4.7

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2494.525000	-41.0	15.6	-25.3	PASS
2485.825000	-41.2	15.9	-25.3	PASS
2485.775000	-41.3	15.9	-25.3	PASS
2494.375000	-41.7	16.4	-25.3	PASS
2499.825000	-41.8	16.4	-25.3	PASS
2495.825000	-41.8	16.5	-25.3	PASS
2488.675000	-41.8	16.5	-25.3	PASS
2497.725000	-41.9	16.6	-25.3	PASS
2490.575000	-41.9	16.6	-25.3	PASS
2491.625000	-42.0	16.7	-25.3	PASS
2494.325000	-42.0	16.7	-25.3	PASS
2494.825000	-42.0	16.7	-25.3	PASS
2496.025000	-42.1	16.8	-25.3	PASS
2494.475000	-42.1	16.8	-25.3	PASS
2490.625000	-42.1	16.8	-25.3	PASS



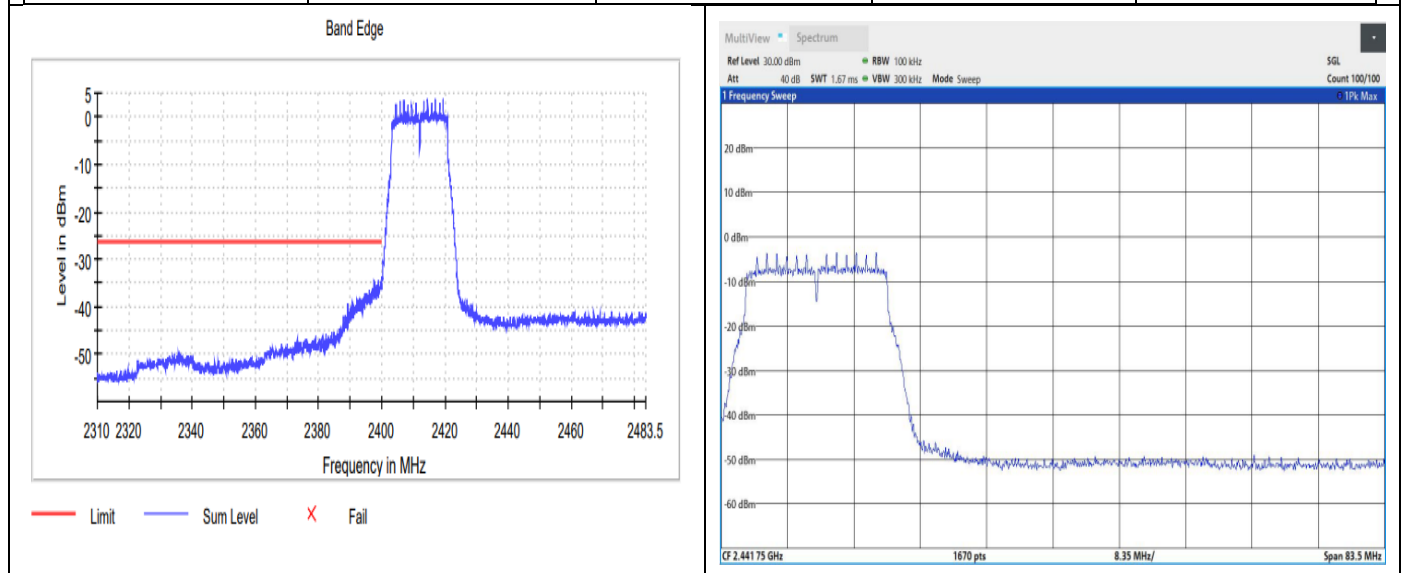
— Limit — Sum Level X Fail



Band Edge Low 802.11n (HT20) 2412MHz MCS0

Frequency (MHz)	Level (dBm)
2419.475000	3.8

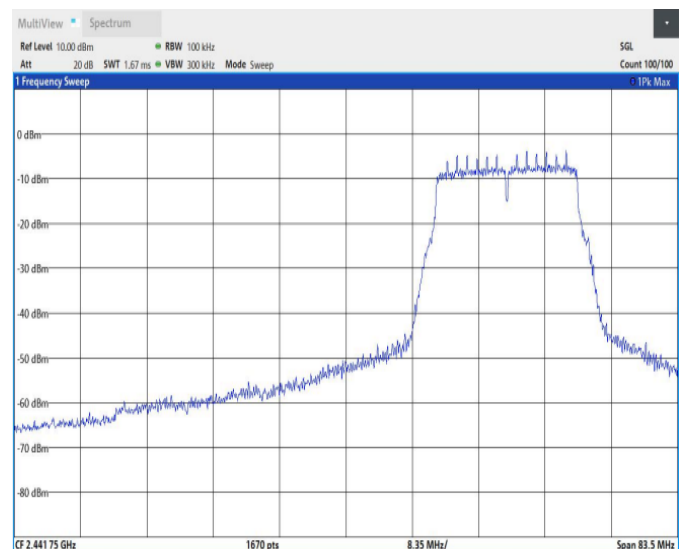
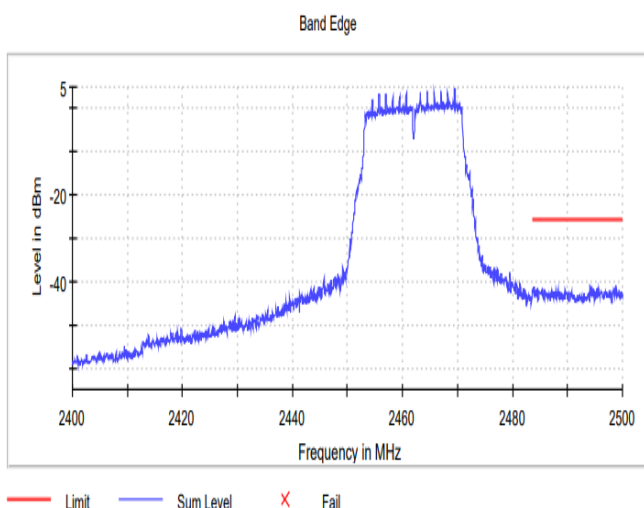
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2397.625000	-34.2	8.0	-26.2	PASS
2398.875000	-34.5	8.3	-26.2	PASS
2398.925000	-34.5	8.3	-26.2	PASS
2399.725000	-34.7	8.5	-26.2	PASS
2397.575000	-34.8	8.6	-26.2	PASS
2399.775000	-34.8	8.6	-26.2	PASS
2397.675000	-34.9	8.7	-26.2	PASS
2399.825000	-35.2	9.0	-26.2	PASS
2399.975000	-35.4	9.2	-26.2	PASS
2398.825000	-35.5	9.3	-26.2	PASS
2399.225000	-35.6	9.4	-26.2	PASS
2398.525000	-35.6	9.4	-26.2	PASS
2398.325000	-35.6	9.4	-26.2	PASS
2399.275000	-35.7	9.4	-26.2	PASS
2398.475000	-35.7	9.5	-26.2	PASS



Band Edge High 802.11n (HT20) 2462MHz MCS0

Frequency (MHz)	Level (dBm)
2469.475000	4.6

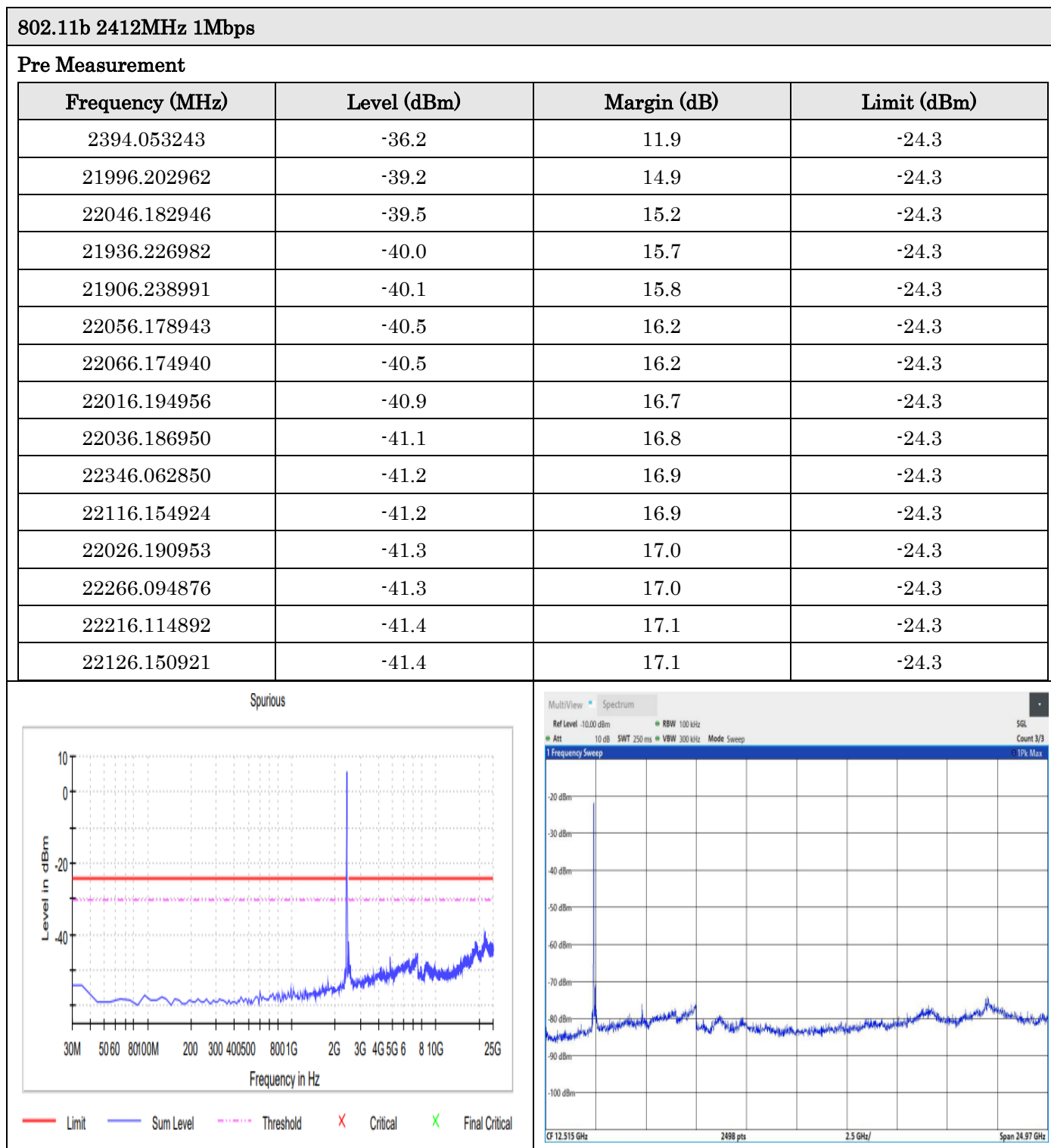
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2498.775000	-40.9	15.4	-25.4	PASS
2494.125000	-41.1	15.7	-25.4	PASS
2483.875000	-41.2	15.8	-25.4	PASS
2498.825000	-41.3	15.9	-25.4	PASS
2494.225000	-41.3	15.9	-25.4	PASS
2483.925000	-41.4	16.0	-25.4	PASS
2494.175000	-41.5	16.1	-25.4	PASS
2483.825000	-41.5	16.1	-25.4	PASS
2495.475000	-41.6	16.1	-25.4	PASS
2498.525000	-41.6	16.1	-25.4	PASS
2489.625000	-41.6	16.2	-25.4	PASS
2487.975000	-41.6	16.2	-25.4	PASS
2494.475000	-41.6	16.2	-25.4	PASS
2484.575000	-41.7	16.3	-25.4	PASS
2494.725000	-41.7	16.3	-25.4	PASS



Tx Spurious Emissions

Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v05 8.5 and ANSI C63.10-2013 11.11.2 & 11.11.3

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

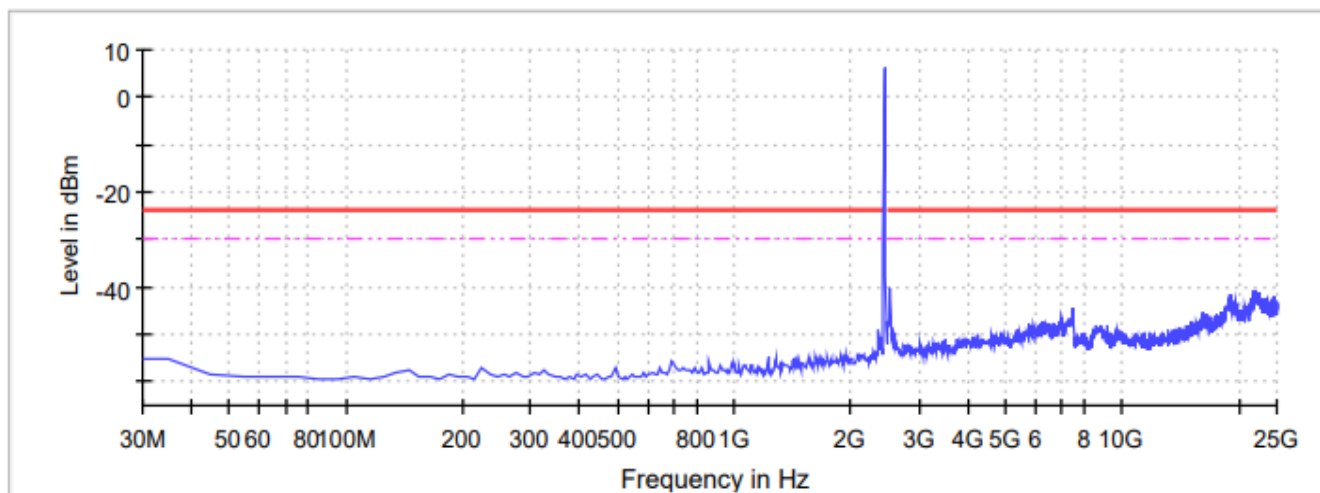


802.11b 2437MHz 1Mbps

Pre Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
2514.005204	-40.1	16.2	-24.0
22046.182946	-40.5	16.5	-24.0
22056.178943	-40.6	16.6	-24.0
21876.251001	-40.6	16.7	-24.0
22436.026821	-40.9	16.9	-24.0
22486.006805	-40.9	17.0	-24.0
22026.190953	-41.0	17.0	-24.0
22036.186950	-41.1	17.1	-24.0
22116.154924	-41.1	17.2	-24.0
22386.046837	-41.2	17.2	-24.0
22066.174940	-41.2	17.2	-24.0
22286.086869	-41.2	17.3	-24.0
22196.122898	-41.3	17.3	-24.0
22076.170937	-41.4	17.5	-24.0
21866.255004	-41.5	17.5	-24.0

Spurious



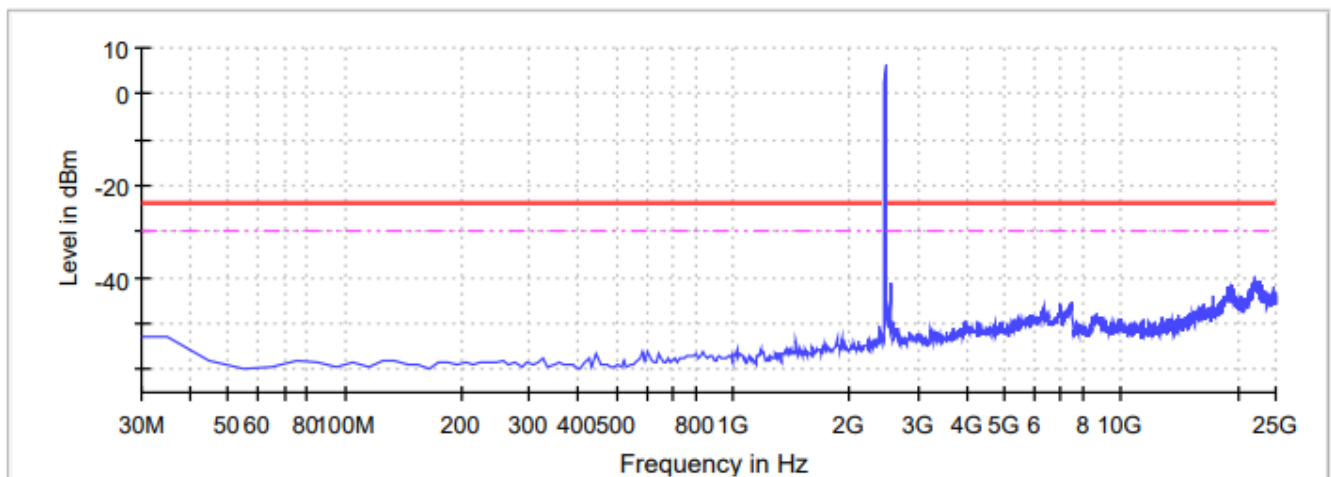
— Limit — Sum Level - - - Threshold × Critical × Final Critical

802.11b 2462MHz 1Mbps

Pre Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
22066.174940	-39.8	16.2	-23.6
22695.922738	-40.7	17.1	-23.6
22515.994796	-40.7	17.1	-23.6
22036.186950	-40.7	17.1	-23.6
22446.022818	-40.9	17.3	-23.6
22126.150921	-41.1	17.4	-23.6
21856.259007	-41.1	17.5	-23.6
22296.082866	-41.1	17.5	-23.6
22076.170937	-41.1	17.5	-23.6
22106.158927	-41.1	17.5	-23.6
2543.993195	-41.2	17.5	-23.6
22356.058847	-41.4	17.8	-23.6
22186.126902	-41.4	17.8	-23.6
22286.086869	-41.5	17.9	-23.6
22246.102882	-41.5	17.9	-23.6

Spurious



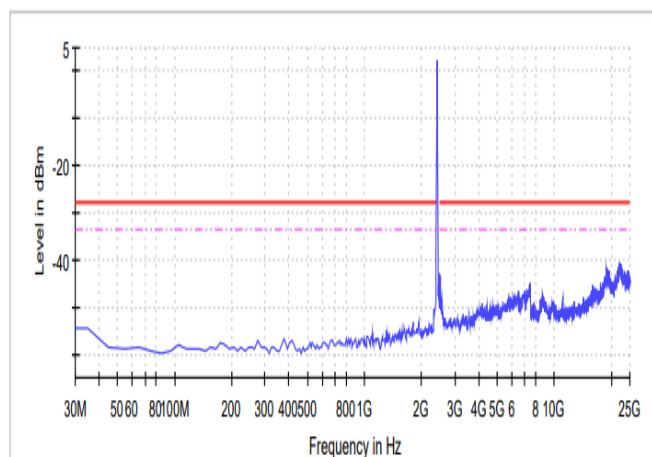
— Limit — Sum Level - - - - Threshold × Critical × Final Critical

802.11g 2412MHz 6Mbps

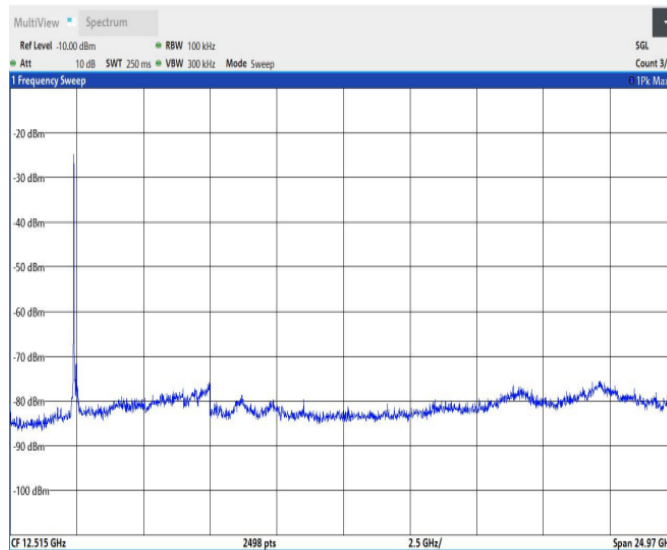
Pre Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
2394.053243	-38.4	10.7	-27.7
22126.150921	-40.7	13.0	-27.7
22086.166934	-40.7	13.0	-27.7
22276.090873	-40.8	13.1	-27.7
22505.998799	-41.0	13.3	-27.7
22166.134908	-41.2	13.5	-27.7
21846.263010	-41.2	13.5	-27.7
22096.162930	-41.2	13.5	-27.7
22036.186950	-41.5	13.8	-27.7
22316.074860	-41.5	13.8	-27.7
18877.451962	-41.6	13.9	-27.7
22056.178943	-41.6	13.9	-27.7
22216.114892	-41.6	13.9	-27.7
22156.138911	-41.6	13.9	-27.7
22076.170937	-41.6	13.9	-27.7

Spurious



— Limit — Sum Level — Threshold X Critical X Final Critical

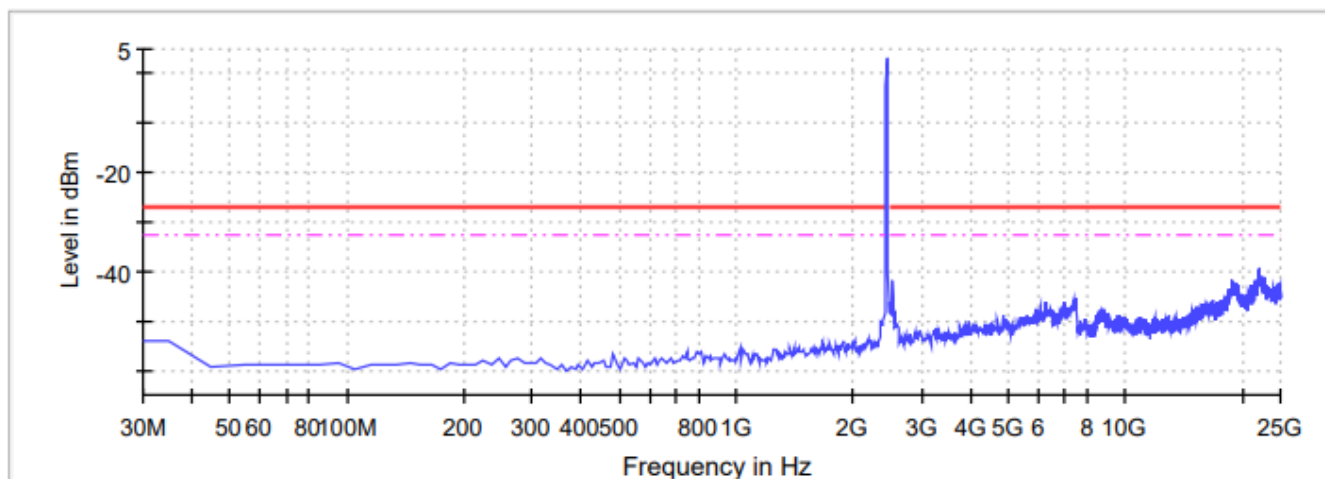


802.11g 2437MHz 6Mbps

Pre Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
22126.150921	-39.2	12.4	-26.8
22056.178943	-39.4	12.6	-26.8
22096.162930	-39.7	12.9	-26.8
22076.170937	-40.3	13.5	-26.8
22186.126902	-40.8	14.0	-26.8
21966.214972	-41.0	14.2	-26.8
22116.154924	-41.1	14.3	-26.8
22456.018815	-41.1	14.3	-26.8
22196.122898	-41.1	14.3	-26.8
22066.174940	-41.3	14.5	-26.8
22176.130905	-41.3	14.5	-26.8
22366.054844	-41.4	14.6	-26.8
22206.118895	-41.4	14.6	-26.8
22086.166934	-41.4	14.6	-26.8
22036.186950	-41.4	14.6	-26.8

Spurious

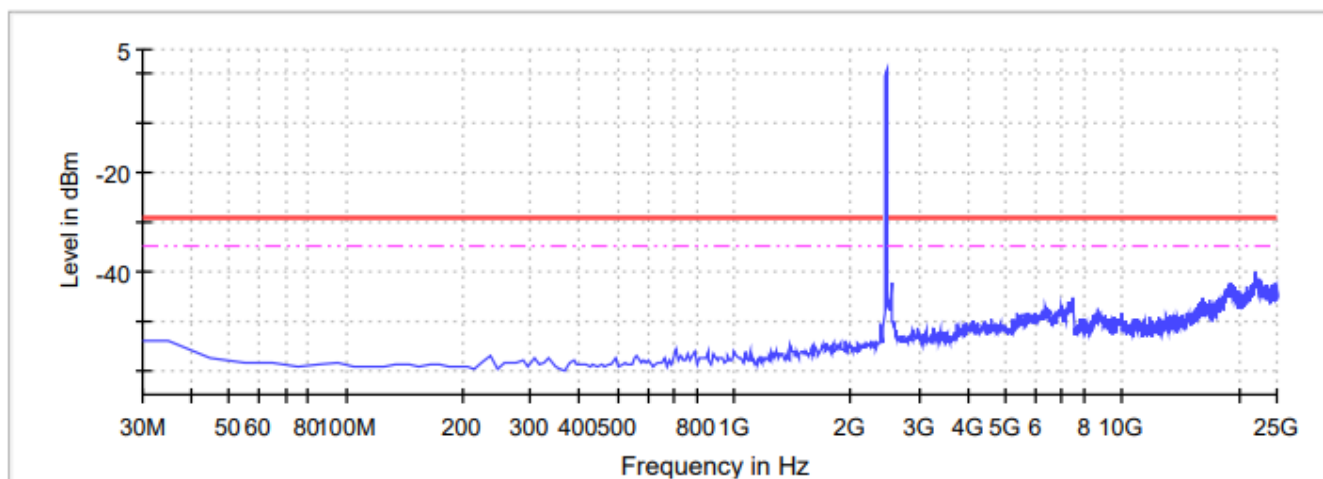


802.11g 2462MHz 6Mbps

Pre Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
22046.182946	-40.1	11.2	-28.9
22096.162930	-40.2	11.3	-28.9
21996.202962	-40.5	11.6	-28.9
22196.122898	-40.6	11.7	-28.9
22076.170937	-41.0	12.1	-28.9
22386.046837	-41.2	12.3	-28.9
22036.186950	-41.3	12.4	-28.9
22116.154924	-41.3	12.4	-28.9
22106.158927	-41.4	12.5	-28.9
21956.218975	-41.5	12.6	-28.9
22086.166934	-41.6	12.7	-28.9
22026.190953	-41.6	12.7	-28.9
22166.134908	-41.6	12.7	-28.9
22136.146918	-41.6	12.7	-28.9
22575.970777	-41.8	12.9	-28.9

Spurious



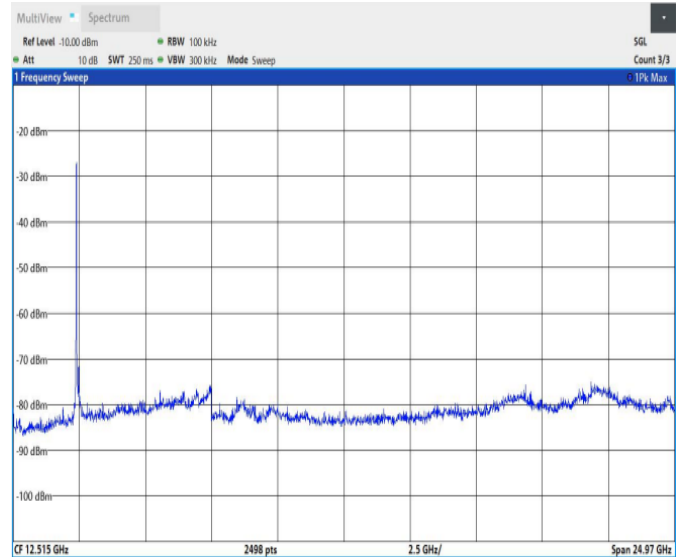
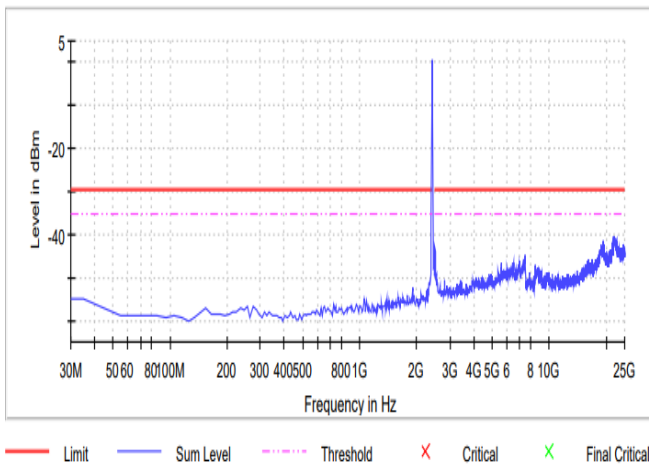
— Limit — Sum Level - - - - Threshold × Critical × Final Critical

802.11n (HT20) 2412MHz MCS0

Pre Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
2394.053243	-36.9	7.4	-29.4
21846.263010	-40.4	11.0	-29.4
21976.210969	-40.7	11.3	-29.4
22036.186950	-40.8	11.3	-29.4
22076.170937	-40.9	11.5	-29.4
22326.070857	-41.1	11.7	-29.4
22106.158927	-41.3	11.8	-29.4
19367.255805	-41.3	11.9	-29.4
22026.190953	-41.3	11.9	-29.4
22555.978783	-41.4	12.0	-29.4
21956.218975	-41.4	12.0	-29.4
21876.251001	-41.4	12.0	-29.4
22316.074860	-41.5	12.0	-29.4
22386.046837	-41.5	12.0	-29.4
22486.006805	-41.5	12.0	-29.4

Spurious

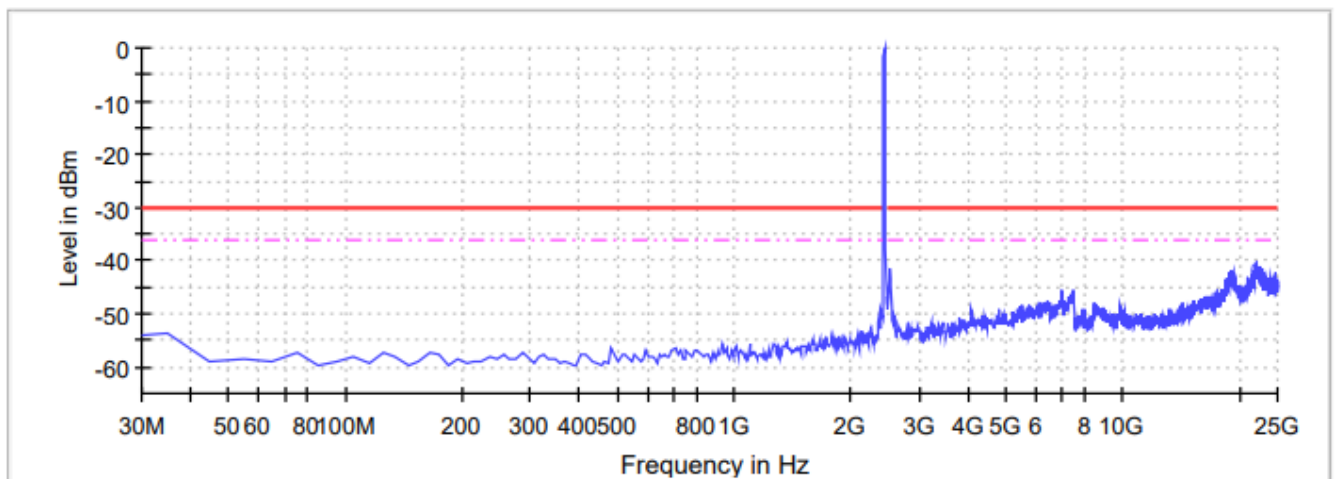


802.11n (HT20) 2437MHz MCS0

Pre Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
22116.154924	-40.3	10.2	-30.1
21936.226982	-40.7	10.6	-30.1
22396.042834	-41.1	11.0	-30.1
21976.210969	-41.2	11.1	-30.1
22176.130905	-41.4	11.3	-30.1
22106.158927	-41.4	11.3	-30.1
22006.198959	-41.5	11.4	-30.1
22196.122898	-41.5	11.4	-30.1
22246.102882	-41.6	11.4	-30.1
2514.005204	-41.6	11.5	-30.1
22745.902722	-41.6	11.5	-30.1
22096.162930	-41.6	11.5	-30.1
22016.194956	-41.6	11.5	-30.1
22066.174940	-41.6	11.5	-30.1
21966.214972	-41.6	11.5	-30.1

Spurious



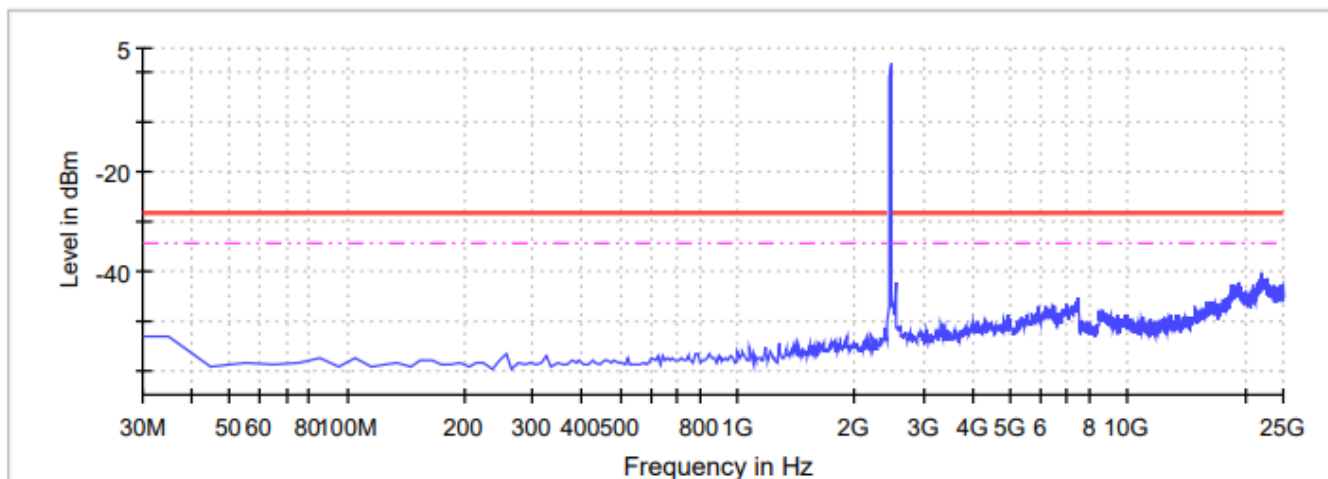
— Limit — Sum Level - - - - - Threshold × Critical × Final Critical

802.11n (HT20) 2462MHz MCS0

Pre Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
22016.194956	-40.5	12.2	-28.2
22166.134908	-40.6	12.4	-28.2
22106.158927	-40.7	12.5	-28.2
21996.202962	-40.9	12.6	-28.2
22196.122898	-41.3	13.1	-28.2
22086.166934	-41.4	13.1	-28.2
22725.910729	-41.4	13.1	-28.2
22056.178943	-41.5	13.3	-28.2
22006.198959	-41.6	13.3	-28.2
22256.098879	-41.6	13.4	-28.2
22136.146918	-41.7	13.4	-28.2
22026.190953	-41.7	13.4	-28.2
22076.170937	-41.7	13.4	-28.2
21676.331065	-41.7	13.4	-28.2
22226.110889	-41.7	13.4	-28.2

Spurious



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

• Radiated Testing

Test Summary

Start: 5/13/2021	End: 9/15/2021	Temperature: 24°C Humidity: 48%	Initials: RP
------------------	----------------	------------------------------------	--------------

DUT S/N	AH21042001-HAR-017#02		DUT Operating Mode		WLAN 2.4GHz
Comment					
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	√

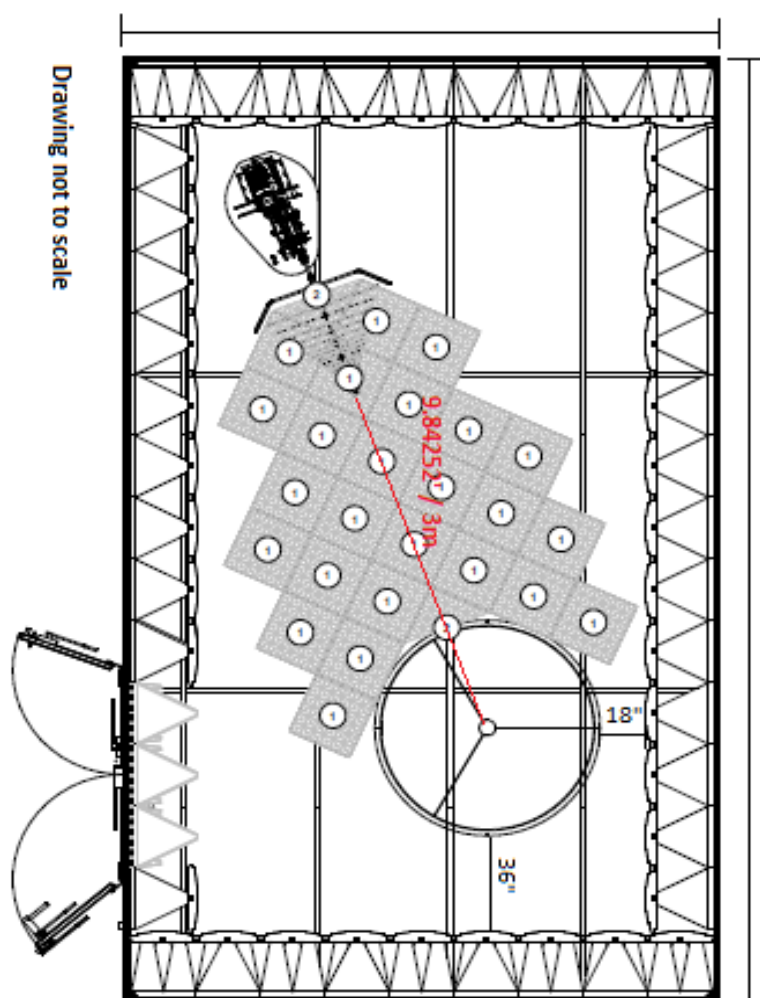
Notes: √ meets the requirements of the acceptance criteria.

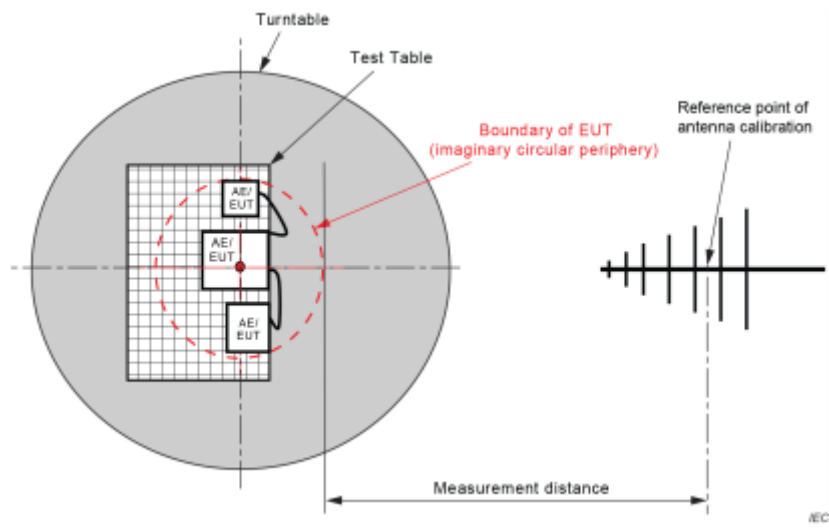
Test Setup

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
Test Completion	December 18 th , 2019

Chamber Dimensions





Test Equipment Used

ID #	Equipment	Manufacturer	Model	Serial #	Cal Due
BVD0011	Loop Antenna 9kHz-30MHz	Rohde & Schwarz	FMZB1519B	145	3/23/2022
BVD0021	UltraLog Antenna 30-6000 MHz	Rohde & Schwarz	HL562E	101113	7/23/2022
BVD0069	Bore Sight Tower	ETS	2171B	226732	N/A
BVD0111	3 Meter Anechoic Chamber	ETS	N/A	N/A	10/16/2022
BVD0118	Antenna Mast Position Controller	ETS	7006-001	00214778/002 14648	N/A
BVD0165	Multimeter	Fluke	287	46320228	2/26/2022
BVD0184	Preamplifier 29dB 1-18GHz	Rohde & Schwarz	TS-PR18	101646	4/26/2022
BVD0185	Preamplifier 45dB 18-40GHz	Rohde & Schwarz	TS-PR1840	100064	3/2/2022
BVD0190	Preamplifier 25dB 30MHz-8GHz	Rohde & Schwarz	TS-PR8	102351	3/5/2022
BVD0218	Receiver 2Hz-44GHz	Rohde & Schwarz	ESW44	101870	9/25/2021
BVD0247	Turn Table	ETS	920250	N/A	N/A
BVD0258	Optima 12V Blue top Marine battery	Optima	D34M	N/A	N/A
BVD0267	Double Ridge Waveguide 800MHz-18GHz	Rohde & Schwarz	HF907	102832	9/9/2022
BVD0307	Optima 12V Blue top Marine battery	Optima	D34M	N/A	N/A
BVD0320	18-40GHz Horn Antenna	L3 Narda ATM	PNR 180- 442-KF	136164-01	3/8/2022
BVD0323	Foam Test Table For 3 Meter Chamber	ETS-Lindgren	LDT-1.5	N/A	N/A
BVD0394	Double Shielded N-Type Cable 6.9 Meter	Rohde & Schwarz	N-Type	N/A	12/29/2022
BVD0398	Double Shielded N-Type Cable 2 Meter	Rohde & Schwarz	N-Type	N/A	12/29/2022
BVD0407	Double Shielded N-Type Cable 410mm (For PreAmp)	Rohde & Schwarz	N-Type	N/A	8/5/2022
BVD0480	Band Reject Filter 50dB from 2400 to 2500MHz	Micro-Tronics	BRM50702	G482	N/A
N/A	Support Laptop	Lenovo	E560	LW10USAU H01ABUD	N/A

Equipment List (Software):

Equipment	Manufacturer	Model	Version No.
EMC Test Software	Nexio	BAT-EMC	3.21.0.12

Customer Supplied Equipment

ID #	Equipment	Manufacturer	Model	Serial #	Version No.
N/A	Harness	Harman	1.7m	N/A	N/A

Radiated Emissions

Radiated emissions were maximized by rotating the EUT and its external antenna around Horizontal and vertical Polarizations.

Test Plots

Uncertainty

Radiated Emissions (30MHz to 18GHz)

Test Engineer: Ryan Phillips

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)	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	0.105
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	0.8660508
					1
PRF Response	1.5	Rectangular	1.732	1	0.8660508
					1
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:

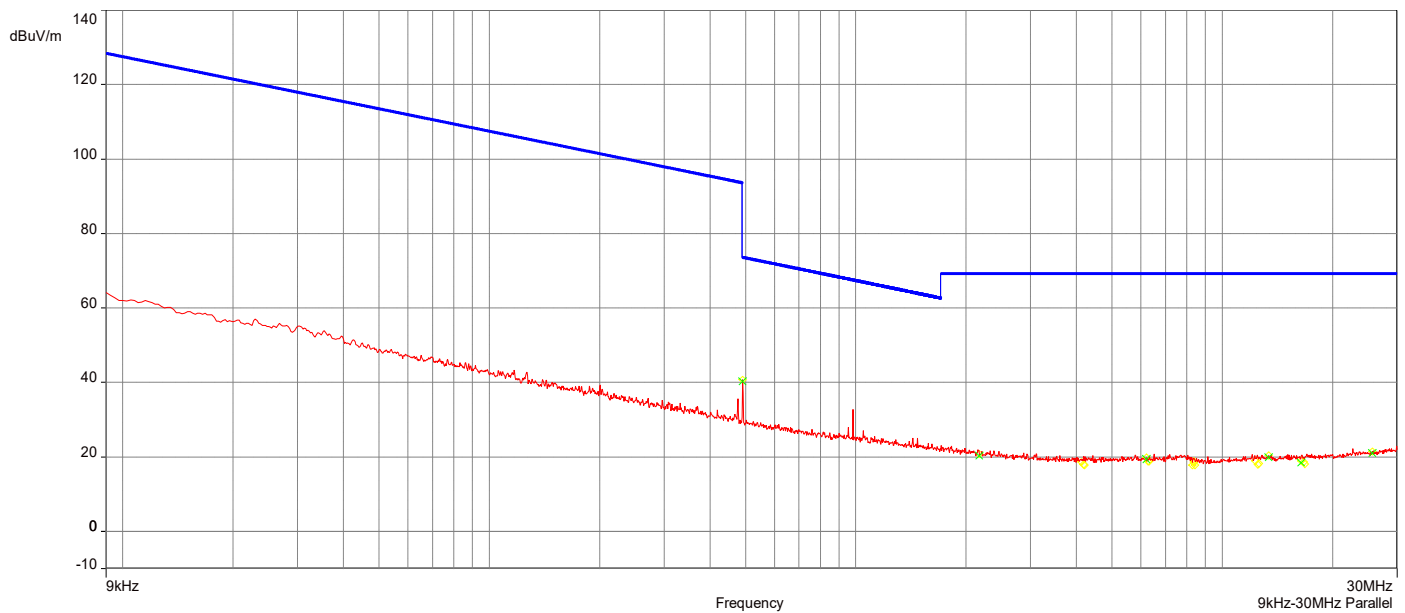
1. Raw Peak Level (dBuV/m) = Level Peak Reading – Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level – Limit

AH21042001-HAR-017#002_802.11b DH2 CH6_9kHz-30MHz_Parallel

6/11/2021 11:46:08 AM

No	Frequency (MHz)	Level Q- Peak Reading (dBuV/m)	Correction Factor (dB)	Limit dBuV /m	Margin (dB)	Height (m)	Angle (°)	Judgement
1.	491.25kHz	40.77	18.88	73.78	-33.00	1.00	29.90	Passed
2.	2.17425MHz	20.82	19.10	69.54	-48.72	1.00	29.90	Passed
3.	6.21525MHz	19.86	19.23	69.54	-49.68	1.00	269.90	Passed
4.	13.3995MHz	20.44	19.62	69.54	-49.10	1.00	329.90	Passed
5.	16.42075MHz	18.99	19.70	69.54	-50.56	1.00	29.90	Passed
6.	25.66375MHz	21.55	20.71	69.54	-47.99	1.00	89.90	Passed

Overall Graphs:

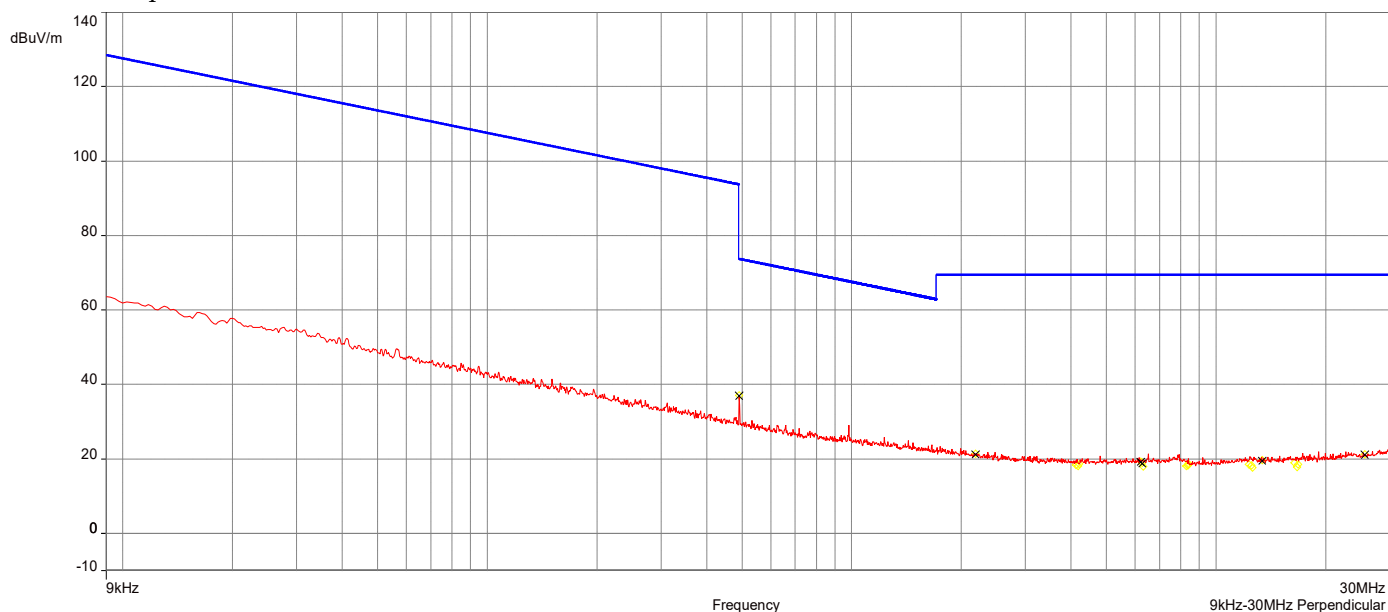


AH21042001-HAR-017#002_802.11b DH2 CH6_9kHz-30MHz_Perpendicular

6/11/2021 11:52:17 AM

No	Frequency (MHz)	Level Q-Peak Reading (dBuV/m)	Correction Factor (dB)	Limit dBuV/m	Margin (dB)	Height (m)	Angle (°)	Judgement
1.	491.5kHz	37.06	18.88	73.77	-36.72	1.00	150.20	Passed
2.	2.1895MHz	21.34	19.10	69.54	-48.20	1.00	180.10	Passed
3.	6.21775MHz	19.45	19.23	69.54	-50.09	1.00	60.20	Passed
4.	6.26775MHz	18.90	19.23	69.54	-50.64	1.00	240.10	Passed
5.	13.3895MHz	19.63	19.62	69.54	-49.91	1.00	270.10	Passed
6.	25.57025MHz	21.29	20.69	69.54	-48.26	1.00	90.10	Passed

Overall Graphs:

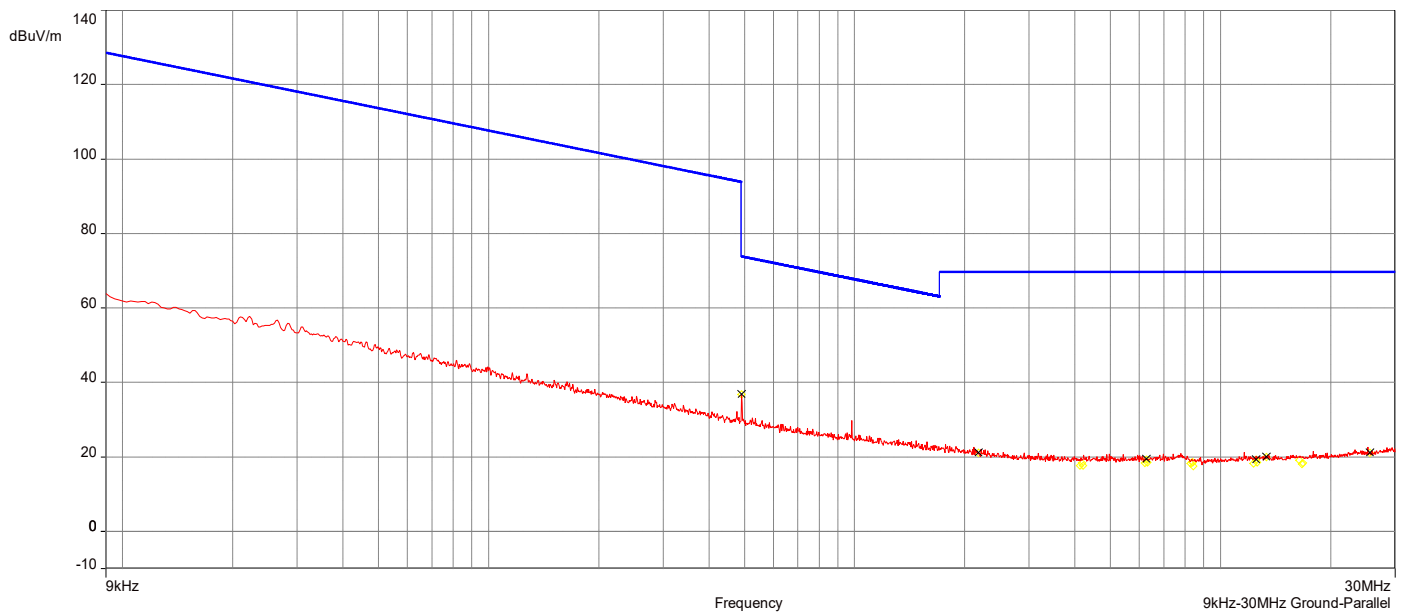


AH21042001-HAR-017#002_802.11b DH2 CH6_9kHz-30MHz_Ground-Parallel

6/11/2021 11:34:04 AM

No	Frequency (MHz)	Level Q-Peak Reading (dBuV/m)	Correction Factor (dB)	Limit dBuV/m	Margin (dB)	Height (m)	Angle (°)	Judgement
1.	491.25kHz	36.76	18.88	73.78	-37.02	1.00	60.00	Passed
2.	2.181MHz	21.04	19.10	69.54	-48.51	1.00	90.20	Passed
3.	6.268MHz	19.32	19.23	69.54	-50.22	1.00	270.10	Passed
4.	12.52MHz	19.25	19.57	69.54	-50.29	1.00	210.10	Passed
5.	13.36475MHz	19.96	19.61	69.54	-49.58	1.00	180.10	Passed
6.	25.603MHz	21.12	20.70	69.54	-48.43	1.00	60.00	Passed

Overall Graphs:

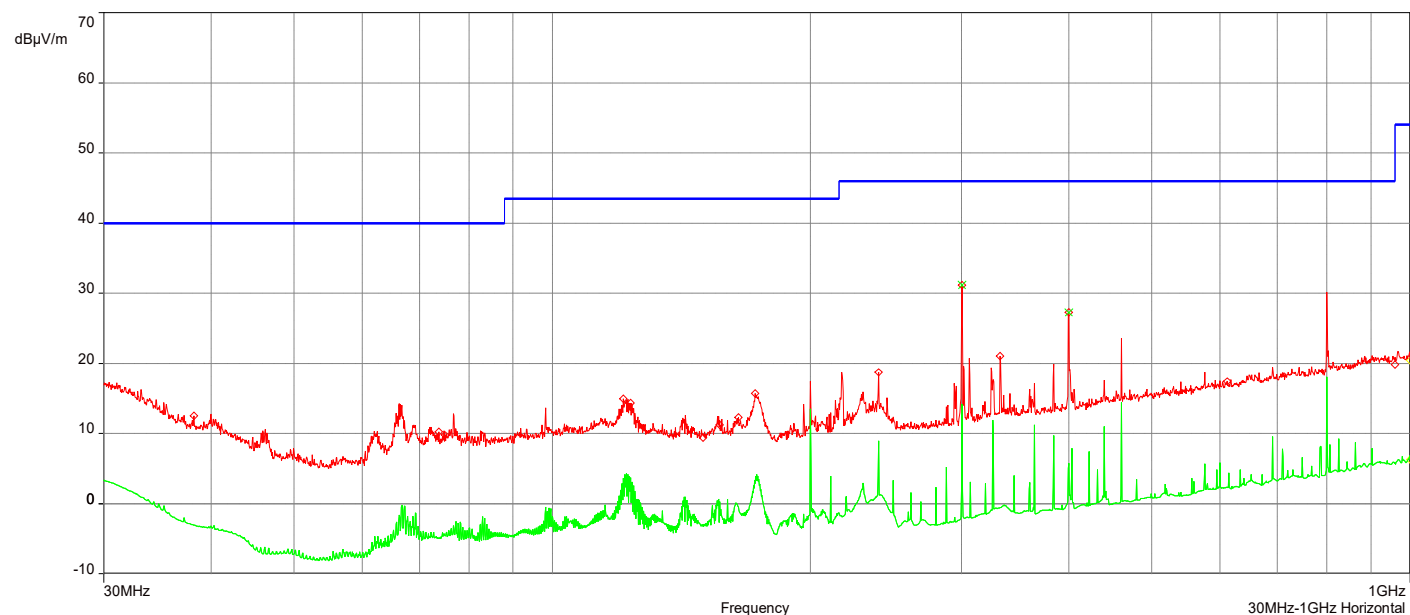


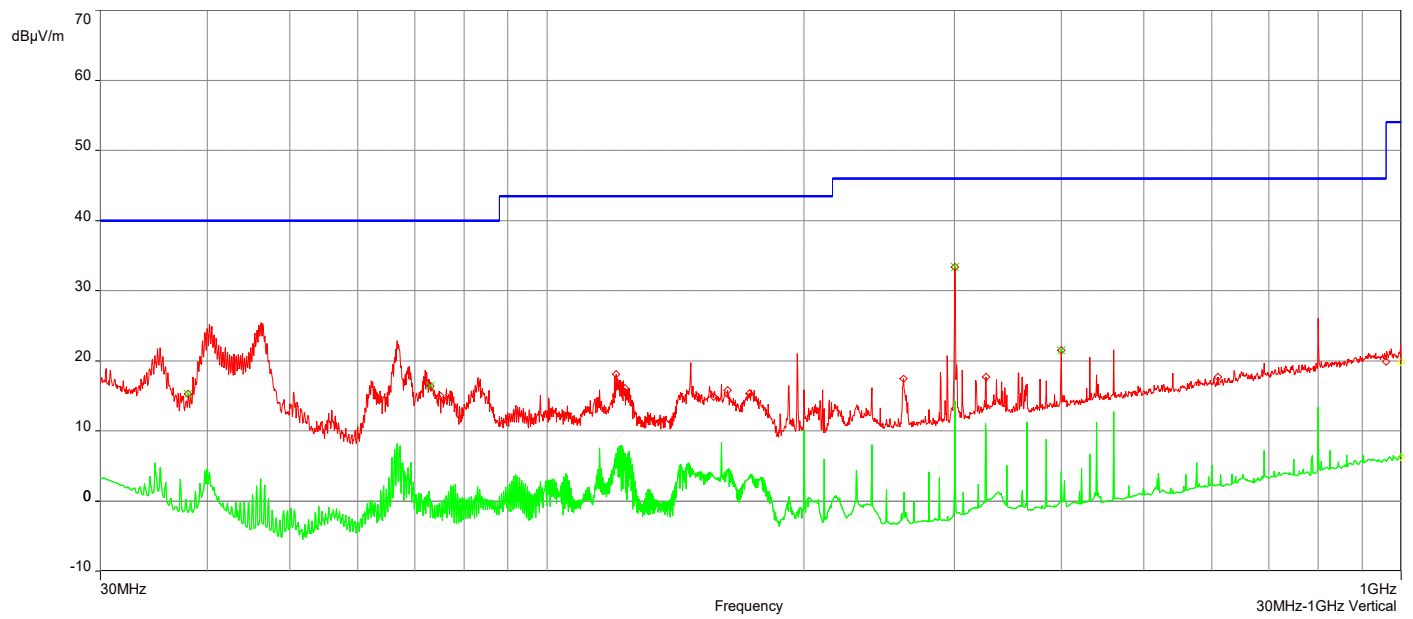
AH21042001-HAR-017#002_802.11b DH2 CH1_30M-1GHz

6/17/2021 8:52:26 AM

No	Frequency (MHz)	Level Q-Peak Reading (dB μ V/m)	Correction Factor (dB)	Limit dB μ V/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	300.24MHz	33.36	-15.66	46.00	-12.64	1.00	329.90	Vertical	Passed
2.	300.3MHz	31.11	-15.66	46.00	-14.89	1.00	269.90	Horizontal	Passed
3.	399.9MHz	27.25	-13.43	46.00	-18.75	1.00	119.90	Horizontal	Passed
4.	73.02MHz	16.42	-18.17	40.00	-23.58	1.50	300.10	Vertical	Passed
5.	399.93MHz	21.52	-13.43	46.00	-24.48	1.00	299.90	Vertical	Passed
6.	38.01MHz	15.26	-12.14	40.00	-24.74	1.00	89.90	Vertical	Passed

Overall Graphs:



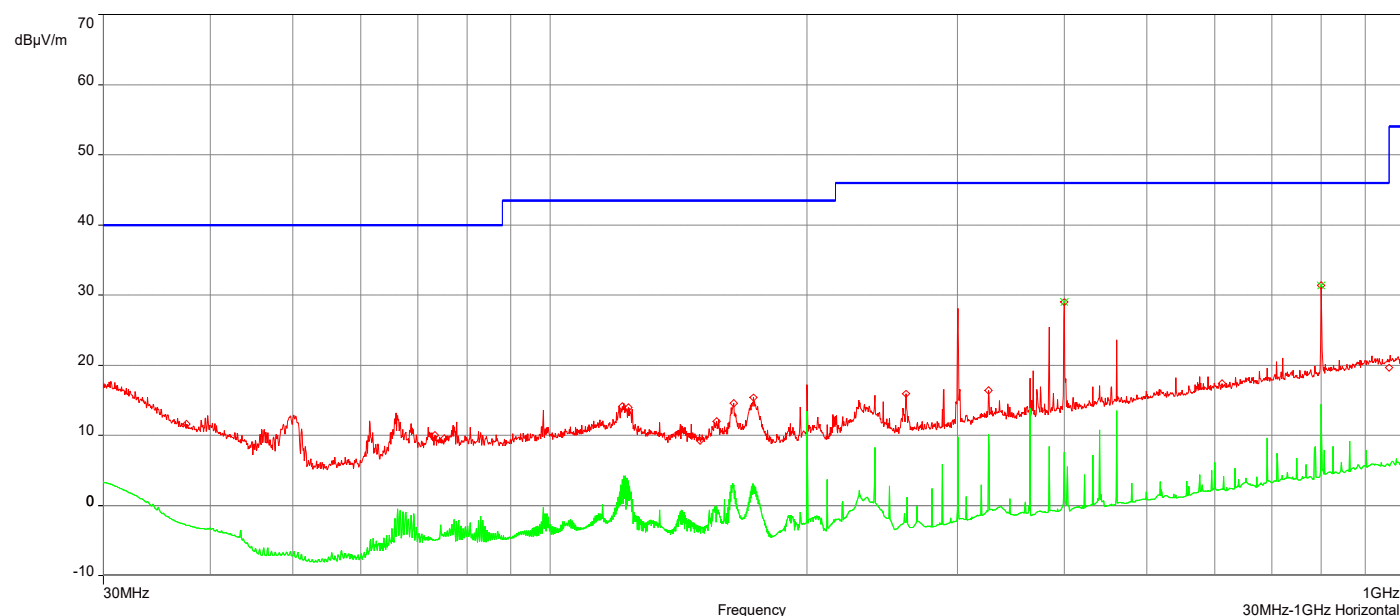


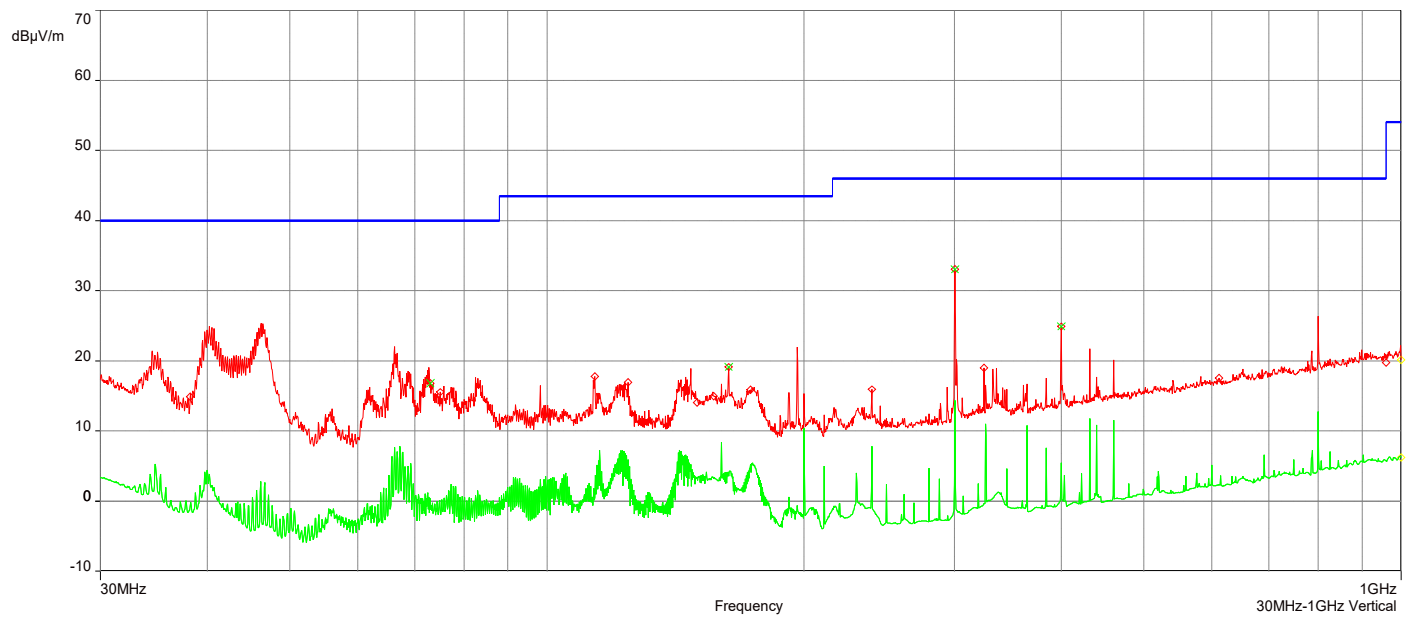
AH21042001-HAR-017#002_802.11b DH2 CH6_30M-1GHz

5/13/2021 1:45:46 PM

No	Frequency (MHz)	Level Q-Peak Reading (dB μ V/m)	Correction Factor (dB)	Limit dB μ V/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	300.3MHz	33.06	-15.66	46.00	-12.94	2.00	300.10	Vertical	Passed
2.	799.98MHz	31.38	-6.86	46.00	-14.62	1.00	329.90	Horizontal	Passed
3.	399.99MHz	29.01	-13.43	46.00	-16.99	1.00	329.90	Horizontal	Passed
4.	399.93MHz	24.93	-13.43	46.00	-21.07	1.50	329.90	Vertical	Passed
5.	73.02MHz	16.74	-18.17	40.00	-23.26	1.00	270.10	Vertical	Passed
6.	163.23MHz	19.12	-17.93	43.50	-24.38	2.00	210.10	Vertical	Passed

Overall Graphs:



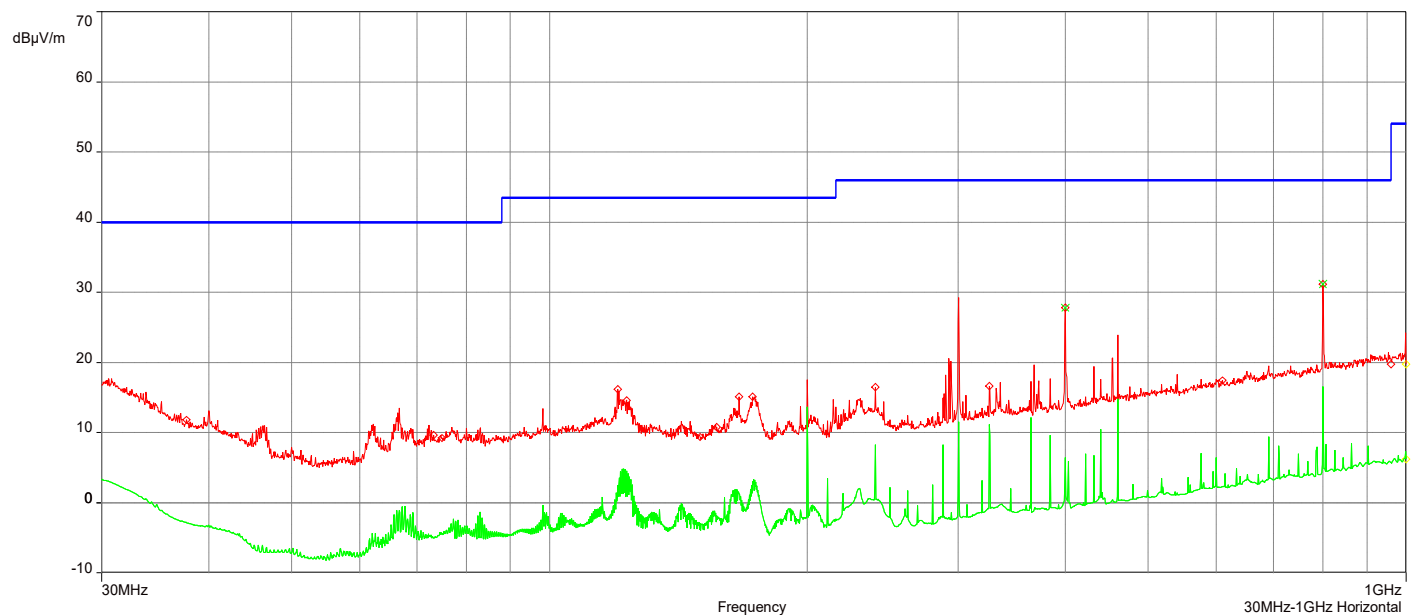


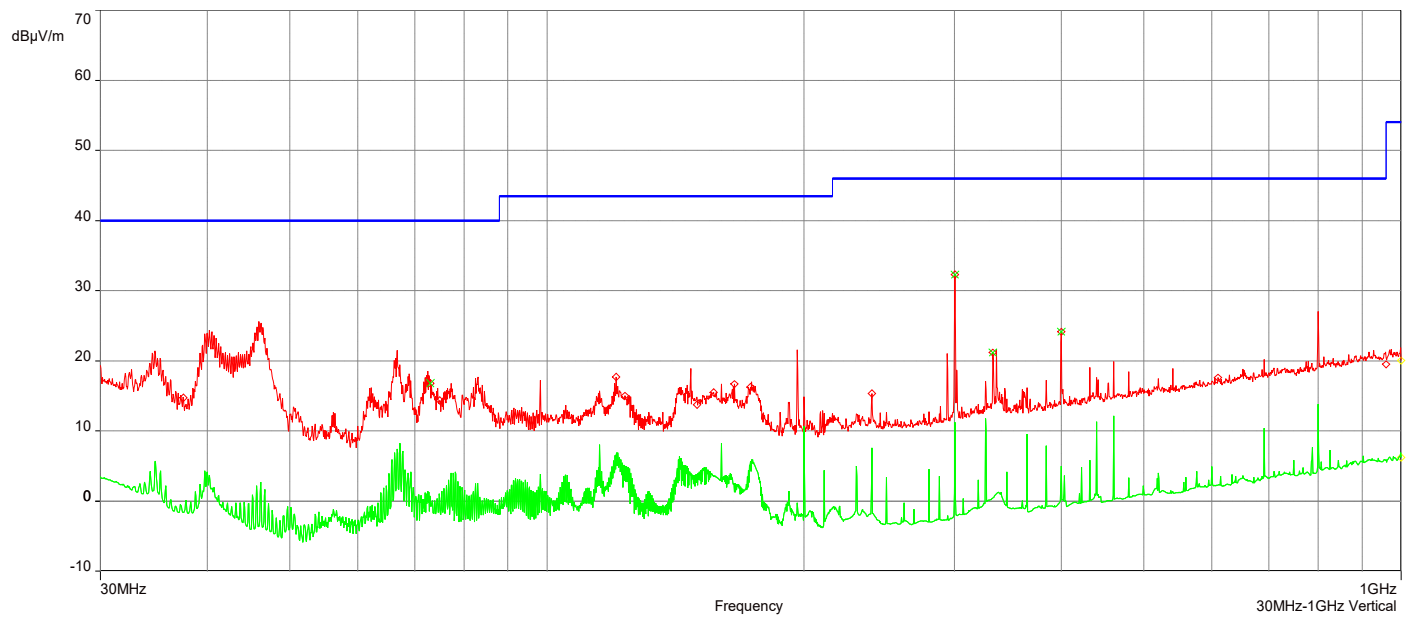
AH21042001-HAR-017#002_802.11b DH2 CH11_30M-1GHz

5/13/2021 1:29:21 PM

No	Frequency (MHz)	Level Q-Peak Reading (dB μ V/m)	Correction Factor (dB)	Limit dB μ V/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	300.33MHz	32.27	-15.66	46.00	-13.73	2.00	299.90	Vertical	Passed
2.	799.86MHz	31.13	-6.86	46.00	-14.87	2.50	329.90	Horizontal	Passed
3.	399.93MHz	27.80	-13.43	46.00	-18.20	1.00	119.90	Horizontal	Passed
4.	399.93MHz	24.12	-13.43	46.00	-21.88	1.00	329.90	Vertical	Passed
5.	73.02MHz	16.79	-18.17	40.00	-23.21	1.00	269.90	Vertical	Passed
6.	332.79MHz	21.15	-14.68	46.00	-24.85	1.50	60.10	Vertical	Passed

Overall Graphs:





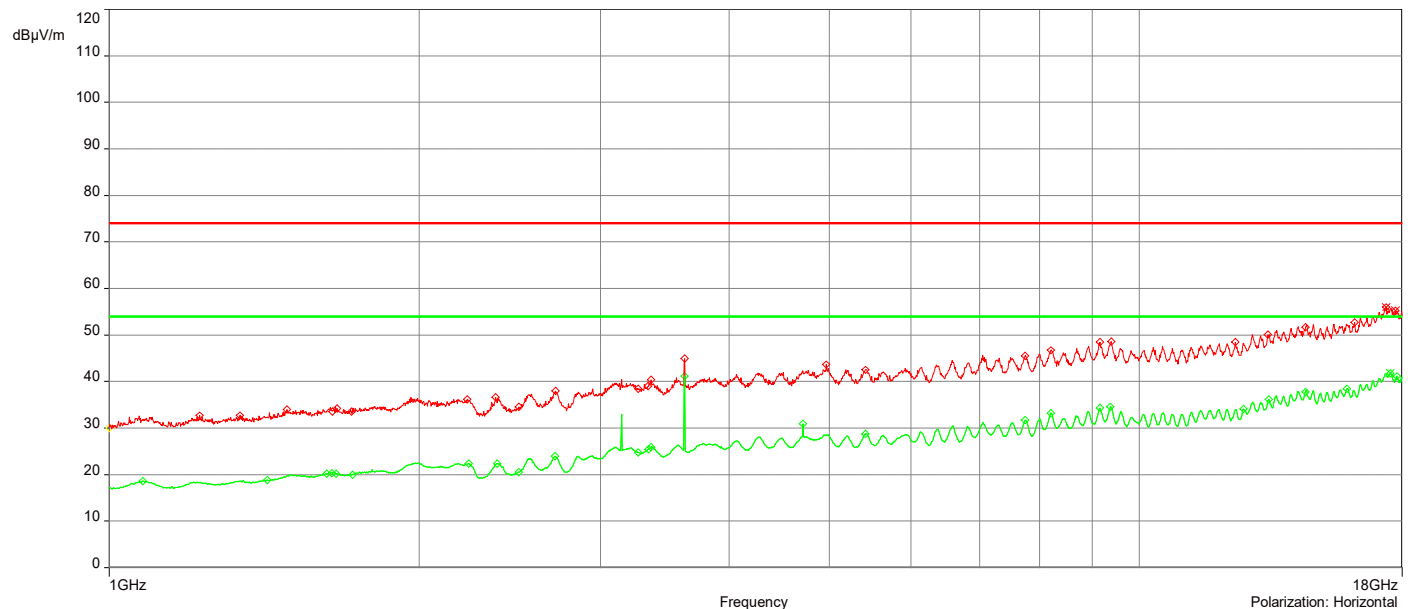
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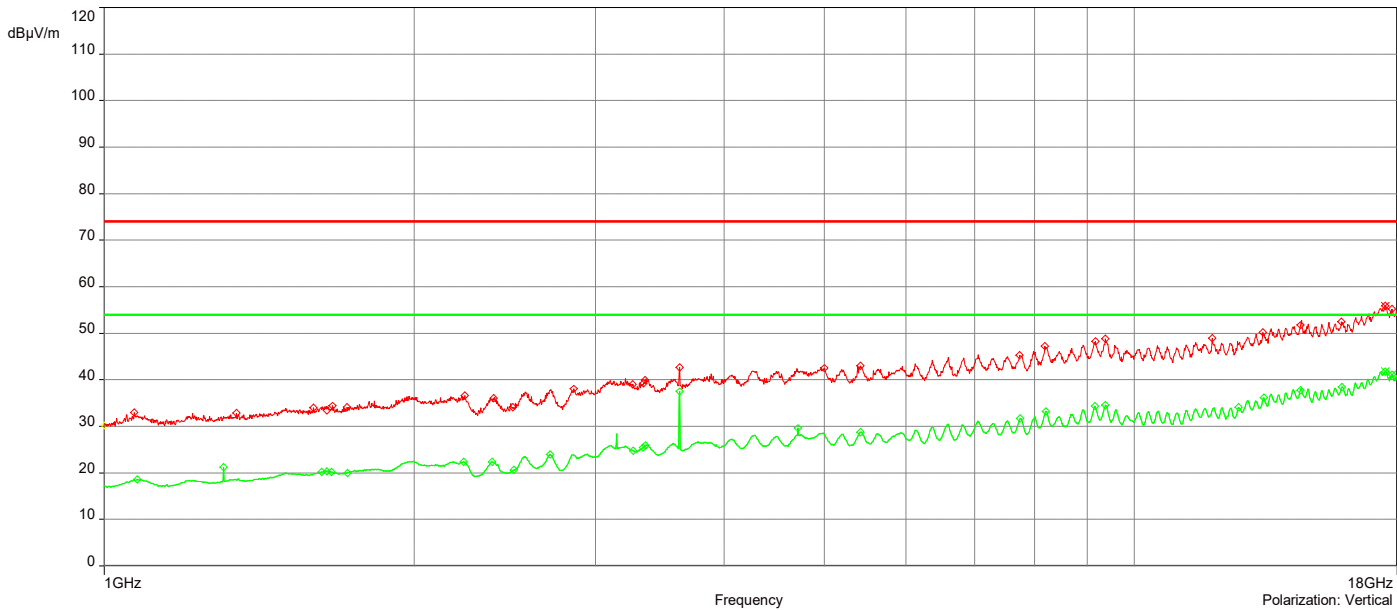
6/23/2021 8:29:29 AM

No	Frequency (MHz)	Level Peak Reading (dB μ V/m)	Correction Factor (dB)	Limit dB μ V/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	17.53675GHz	55.88	18.87	74.00	-18.12	3.00	119.90	Vertical	Passed
2.	17.3675GHz	55.97	18.55	74.00	-18.03	3.50	270.10	Horizontal	Passed
3.	17.73425GHz	55.25	18.88	74.00	-18.75	1.00	179.90	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dB μ V/m)	Correction Factor (dB)	Limit dB μ V/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	17.5385GHz	41.77	18.87	54.00	-12.23	4.00	119.90	Vertical	Passed
2.	17.79775GHz	41.22	18.88	54.00	-12.78	3.00	179.90	Vertical	Passed
3.	17.53675GHz	41.80	18.87	54.00	-12.20	4.00	269.90	Horizontal	Passed

Overall Graphs:





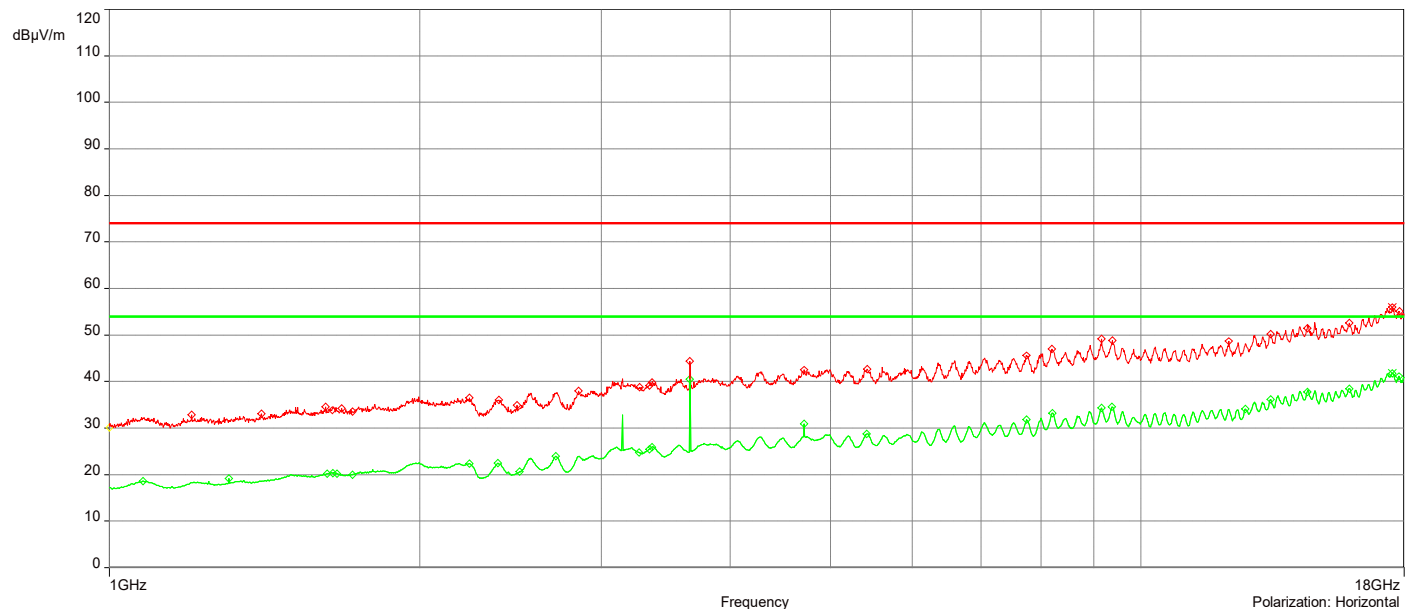
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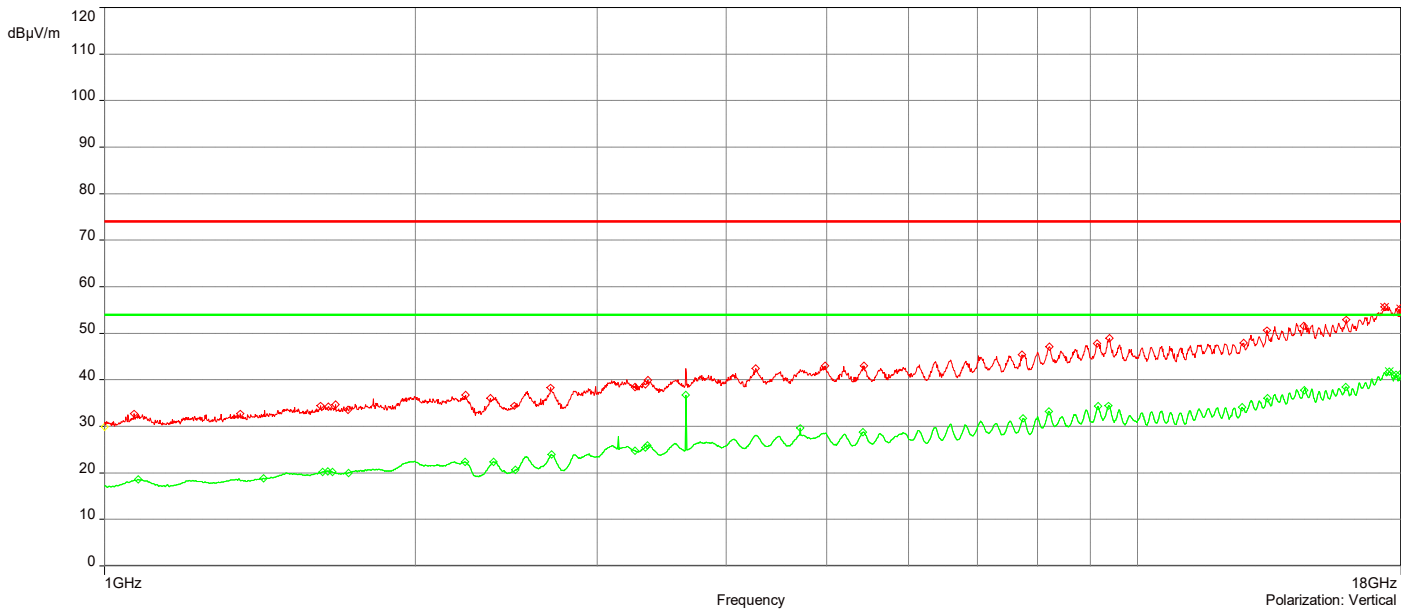
6/23/2021 9:51:46 AM

No	Frequency (MHz)	Level Peak Reading (dB μ V/m)	Correction Factor (dB)	Limit dB μ V/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	17.33825GHz	55.73	18.42	74.00	-18.27	4.00	90.00	Vertical	Passed
2.	17.97825GHz	55.38	19.13	74.00	-18.62	3.50	239.90	Vertical	Passed
3.	17.53875GHz	56.07	18.87	74.00	-17.93	3.50	29.90	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dB μ V/m)	Correction Factor (dB)	Limit dB μ V/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	17.53725GHz	41.74	18.87	54.00	-12.26	1.00	240.10	Vertical	Passed
2.	17.79775GHz	41.20	18.88	54.00	-12.80	4.00	90.00	Vertical	Passed
3.	17.5385GHz	41.78	18.87	54.00	-12.22	4.00	90.00	Horizontal	Passed

Overall Graphs:





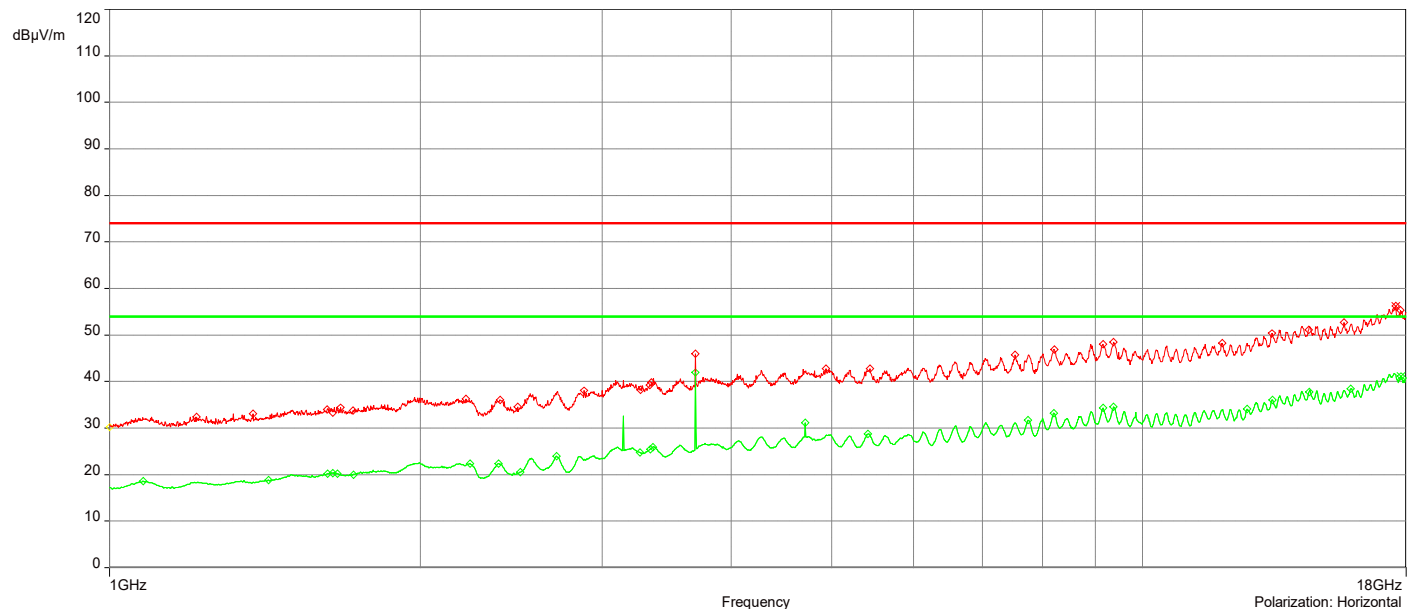
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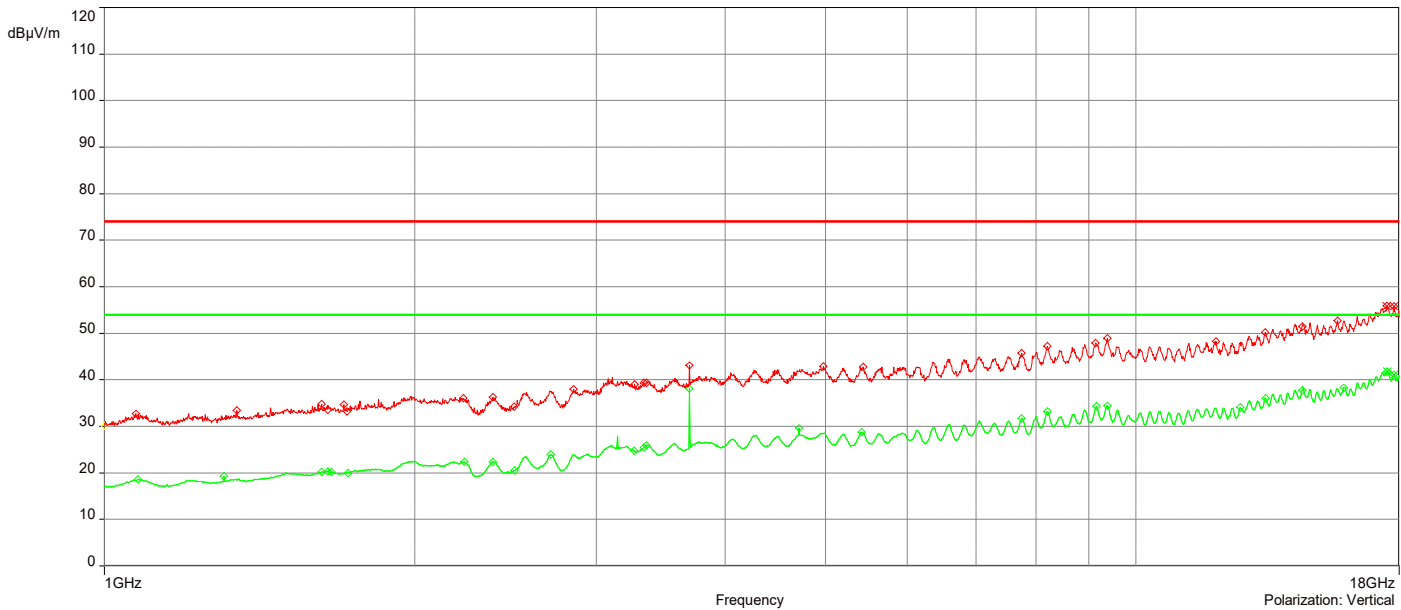
6/23/2021 11:11:04 AM

No	Frequency (MHz)	Level Peak Reading (dB μ V/m)	Correction Factor (dB)	Limit dB μ V/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	17.51825GHz	55.87	18.83	74.00	-18.13	1.00	179.90	Vertical	Passed
2.	17.7865GHz	55.74	18.88	74.00	-18.26	4.00	209.90	Vertical	Passed
3.	17.5795GHz	56.23	18.86	74.00	-17.77	1.50	329.90	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dB μ V/m)	Correction Factor (dB)	Limit dB μ V/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	17.53725GHz	41.71	18.87	54.00	-12.29	3.50	329.90	Vertical	Passed
2.	17.79725GHz	41.19	18.88	54.00	-12.81	4.00	239.90	Vertical	Passed
3.	17.79475GHz	41.17	18.88	54.00	-12.83	4.00	329.90	Horizontal	Passed

Overall Graphs:





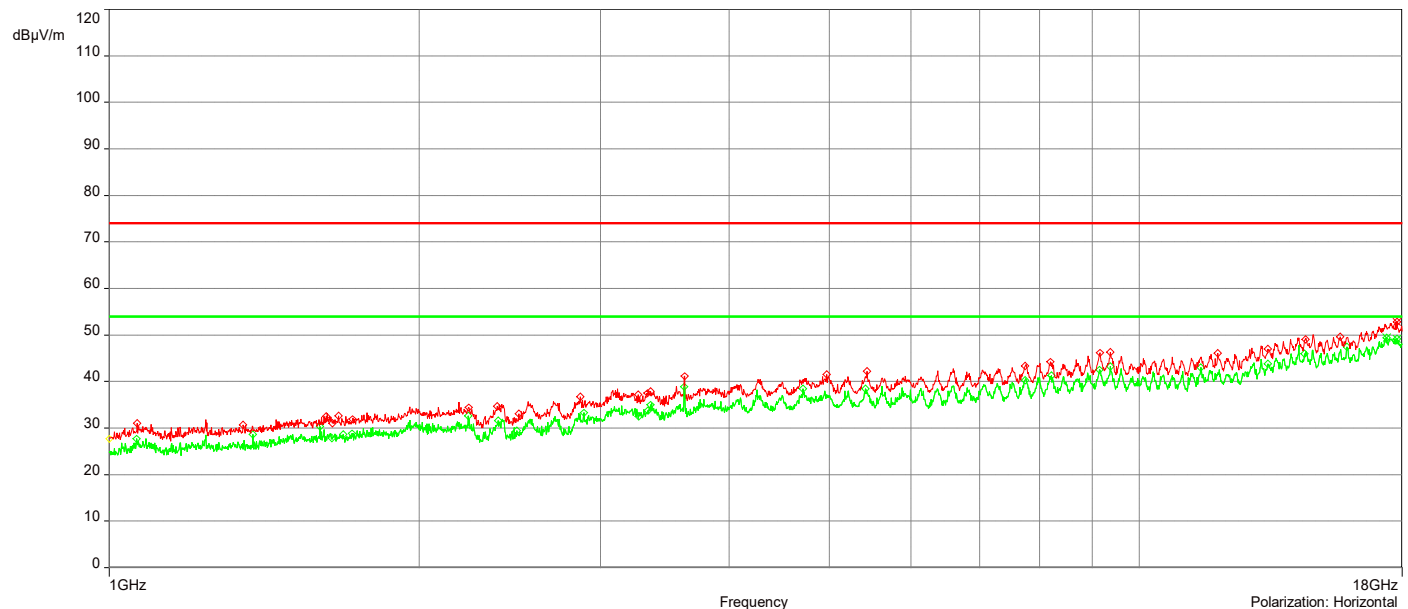
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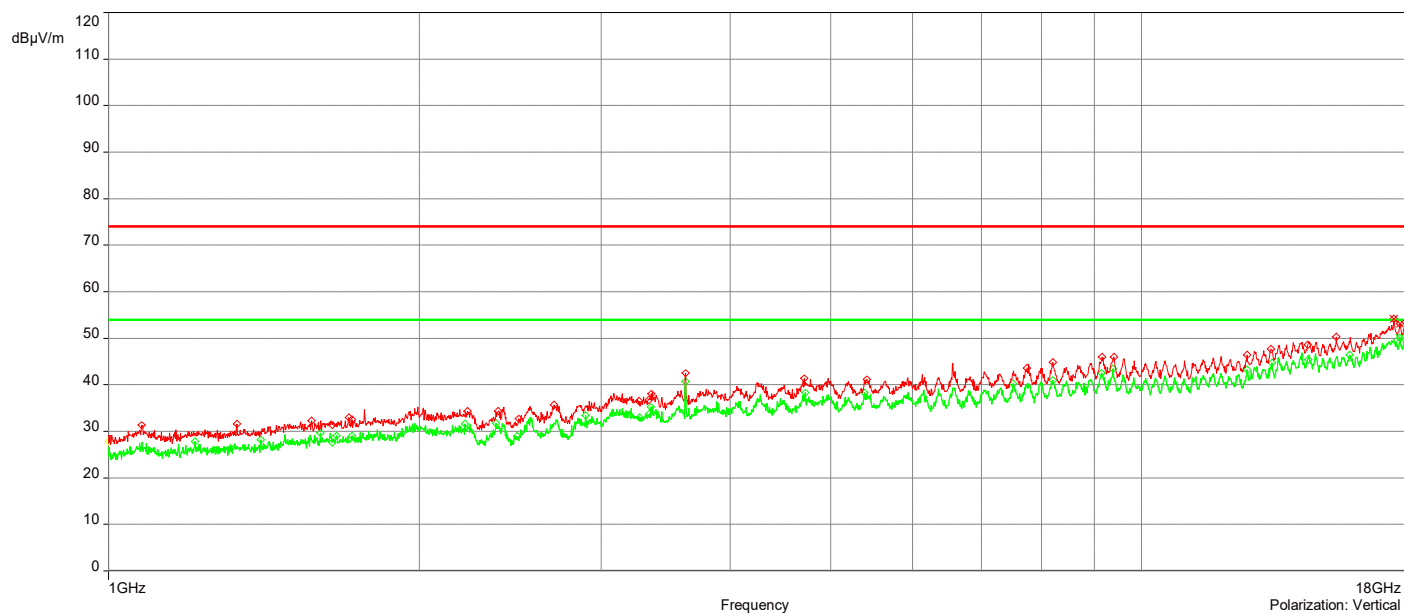
6/30/2021 10:16:42 AM

No	Frequency (MHz)	Level Peak Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	17.548487GHz	54.14	18.89	74.00	-19.86	3.21	59.90	Vertical	Passed
2.	17.792994GHz	53.13	18.88	74.00	-20.87	1.27	239.90	Vertical	Passed
3.	17.783994GHz	52.87	18.88	74.00	-21.13	1.61	119.90	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	17.792994GHz	50.13	18.88	54.00	-3.87	1.27	239.90	Vertical	Passed
2.	17.391982GHz	49.46	18.67	54.00	-4.54	2.53	29.90	Horizontal	Passed
3.	17.799994GHz	49.20	18.89	54.00	-4.80	2.87	89.90	Horizontal	Passed

Overall Graphs:





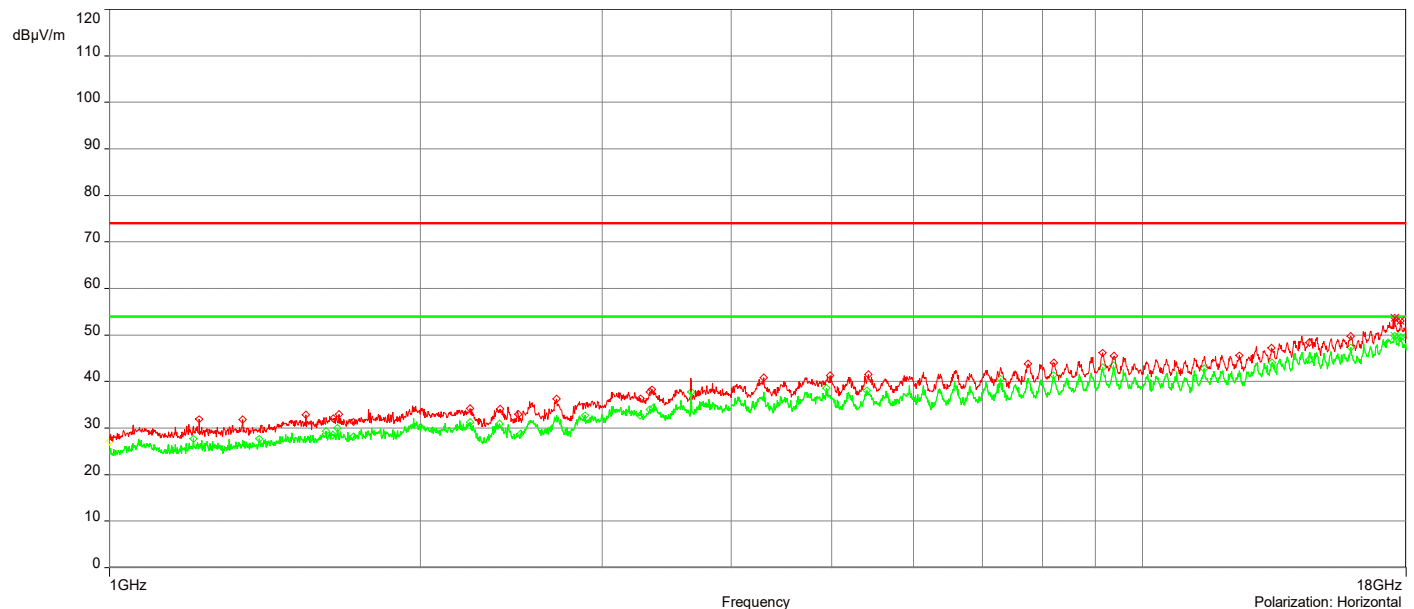
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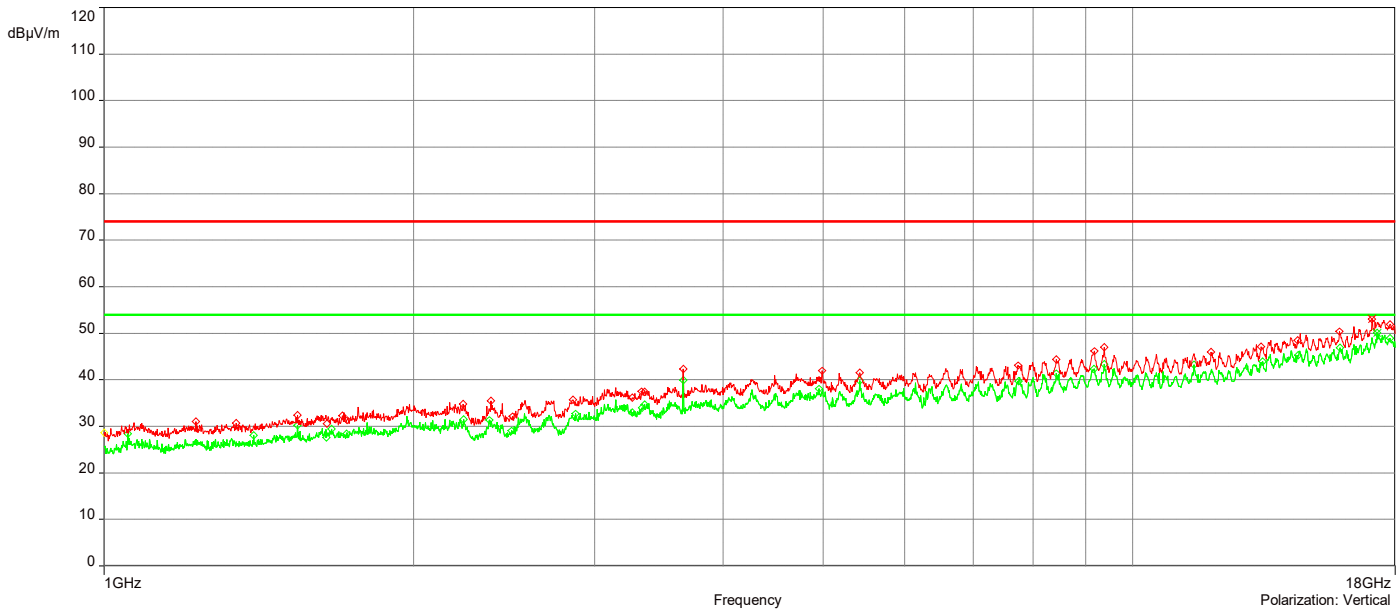
6/30/2021 10:37:17 AM

No	Frequency (MHz)	Level Peak Reading (dB μ V/m)	Correction Factor (dB)	Limit dB μ V/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	17.081973GHz	53.04	17.54	74.00	-20.96	1.00	60.10	Vertical	Passed
2.	17.546987GHz	53.69	18.89	74.00	-20.31	3.94	150.00	Horizontal	Passed
3.	17.768993GHz	53.04	18.87	74.00	-20.96	1.13	150.00	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dB μ V/m)	Correction Factor (dB)	Limit dB μ V/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	17.296979GHz	50.04	18.25	54.00	-3.96	2.47	150.00	Vertical	Passed
2.	17.546987GHz	49.88	18.89	54.00	-4.12	3.94	150.00	Horizontal	Passed
3.	17.797994GHz	49.54	18.88	54.00	-4.46	1.66	0	Horizontal	Passed

Overall Graphs:





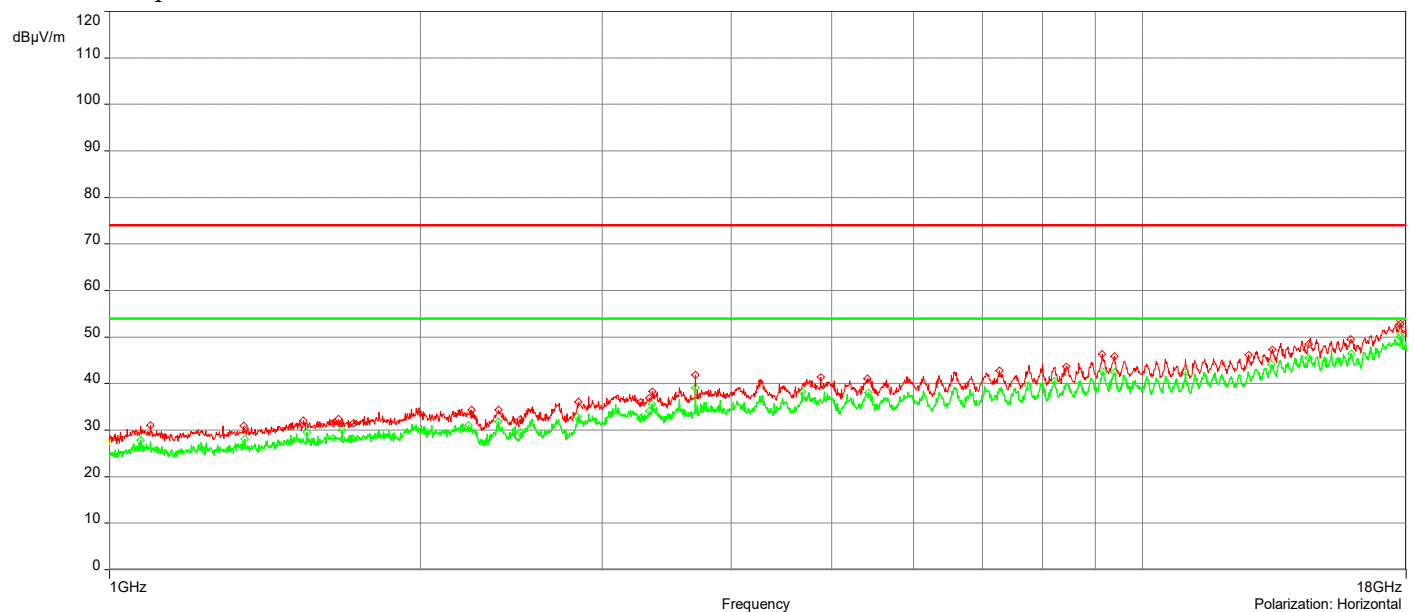
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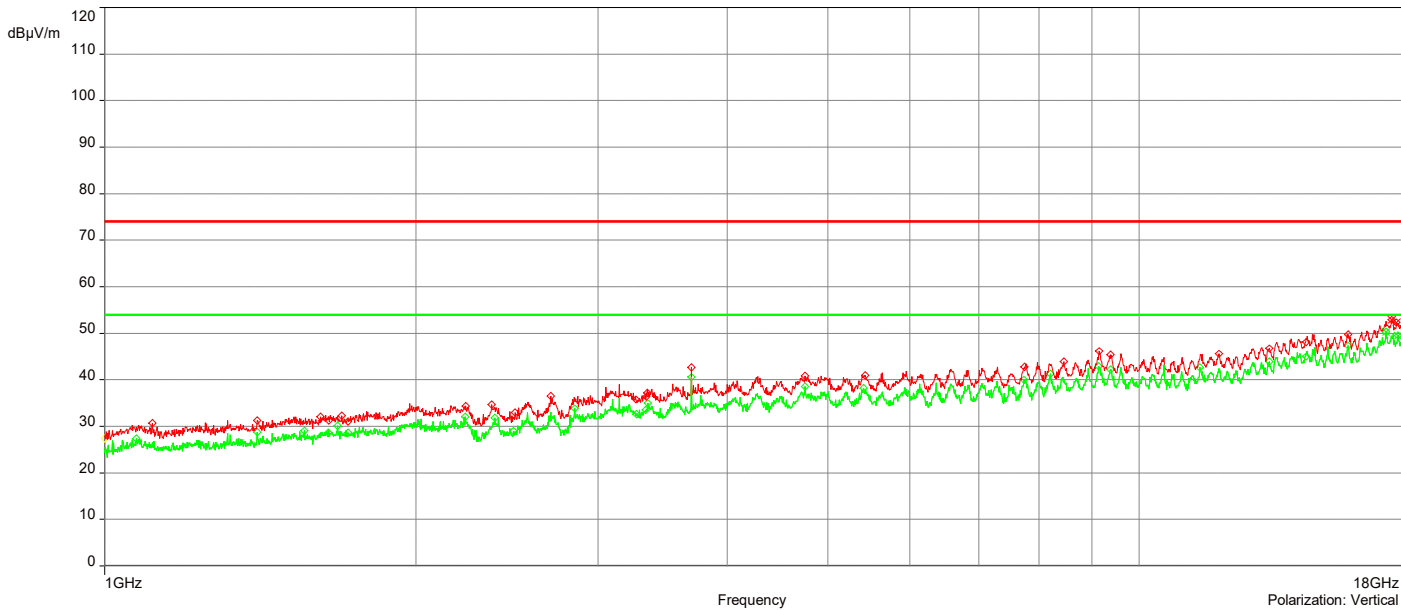
6/30/2021 10:57:15 AM

No	Frequency (MHz)	Level Peak Reading (dB μ V/m)	Correction Factor (dB)	Limit dB μ V/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	17.542487GHz	52.96	18.88	74.00	-21.04	4.00	179.90	Vertical	Passed
2.	17.740992GHz	52.33	18.87	74.00	-21.67	4.00	179.90	Vertical	Passed
3.	17.773993GHz	52.88	18.87	74.00	-21.12	3.75	299.90	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dB μ V/m)	Correction Factor (dB)	Limit dB μ V/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	17.32348GHz	50.33	18.36	54.00	-3.67	1.84	209.90	Vertical	Passed
2.	17.797994GHz	49.55	18.88	54.00	-4.45	2.64	239.90	Vertical	Passed
3.	17.771993GHz	50.07	18.87	54.00	-3.93	4.00	329.90	Horizontal	Passed

Overall Graphs:





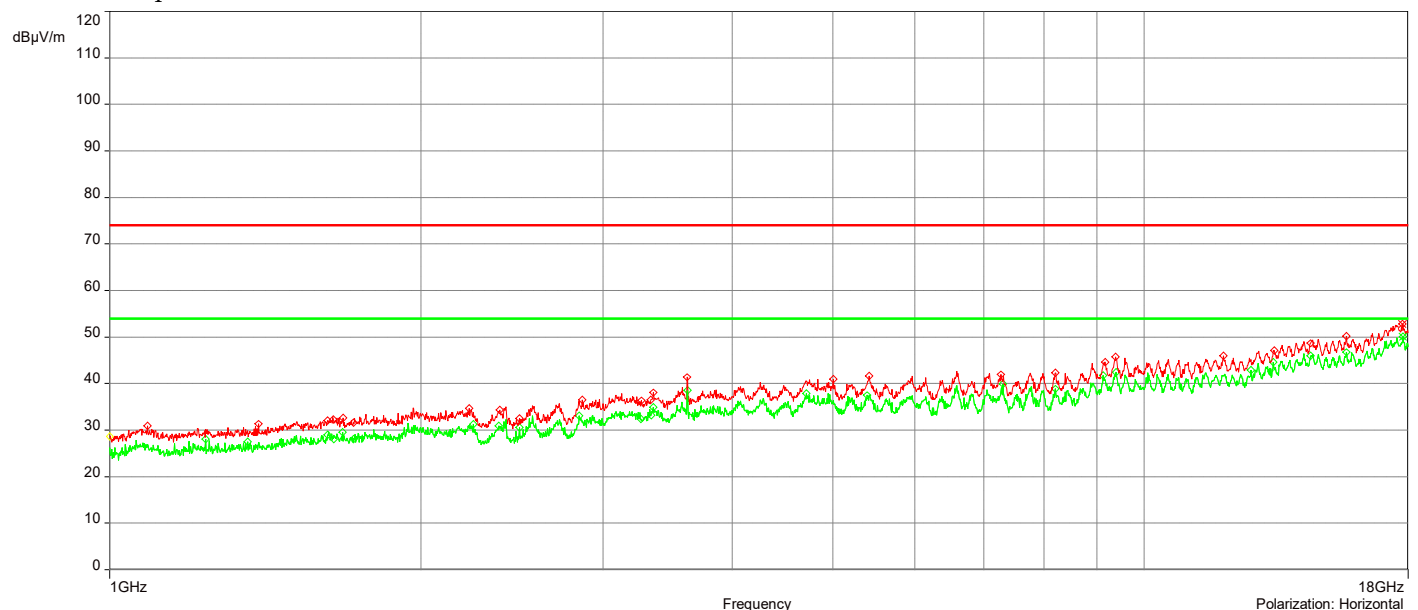
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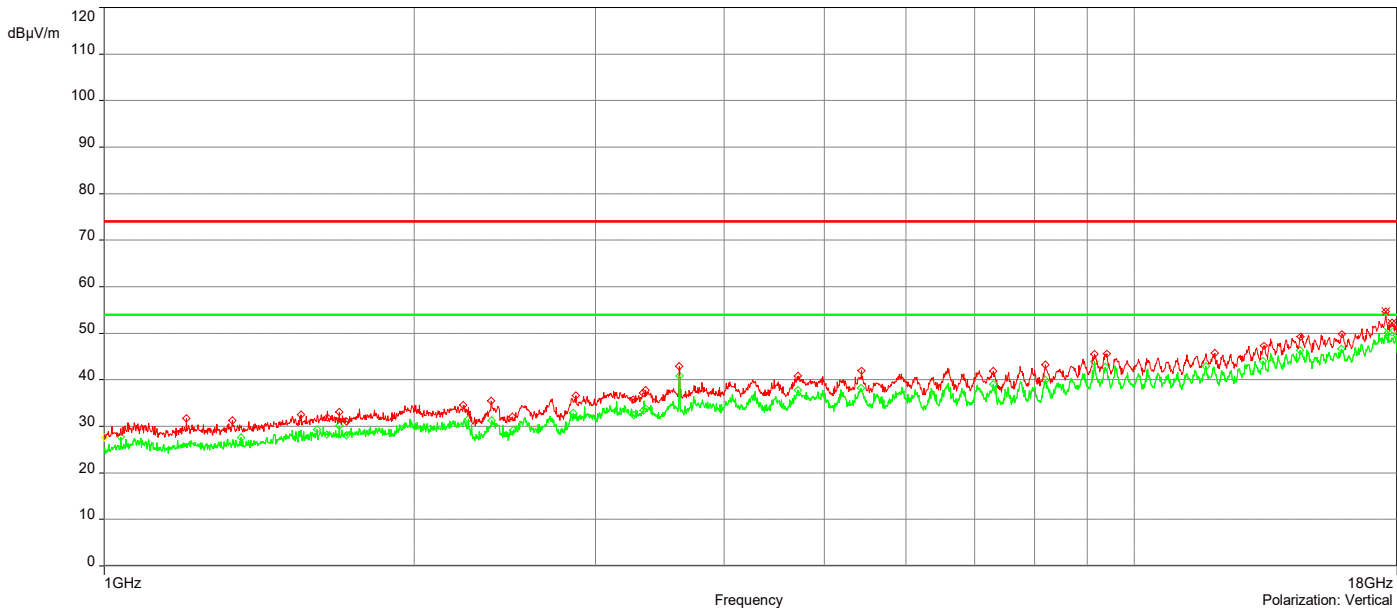
6/30/2021 11:16:24 AM

No	Frequency (MHz)	Level Peak Reading (dB μ V/m)	Correction Factor (dB)	Limit dB μ V/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1	17.545487GHz	54.63	18.89	74.00	-19.37	1.76	0.20	Vertical	Passed
2	17.797494GHz	52.28	18.88	74.00	-21.72	3.73	270.10	Vertical	Passed
3	17.775993GHz	52.87	18.87	74.00	-21.13	1.89	300.10	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dB μ V/m)	Correction Factor (dB)	Limit dB μ V/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	17.979499GHz	49.49	19.13	54.00	-4.51	3.47	210.20	Vertical	Passed
2.	17.799494GHz	50.10	18.88	54.00	-3.90	2.97	0.20	Horizontal	Passed
3.	17.64549GHz	50.20	19.01	54.00	-3.80	1.27	150.20	Vertical	Passed

Overall Graphs:





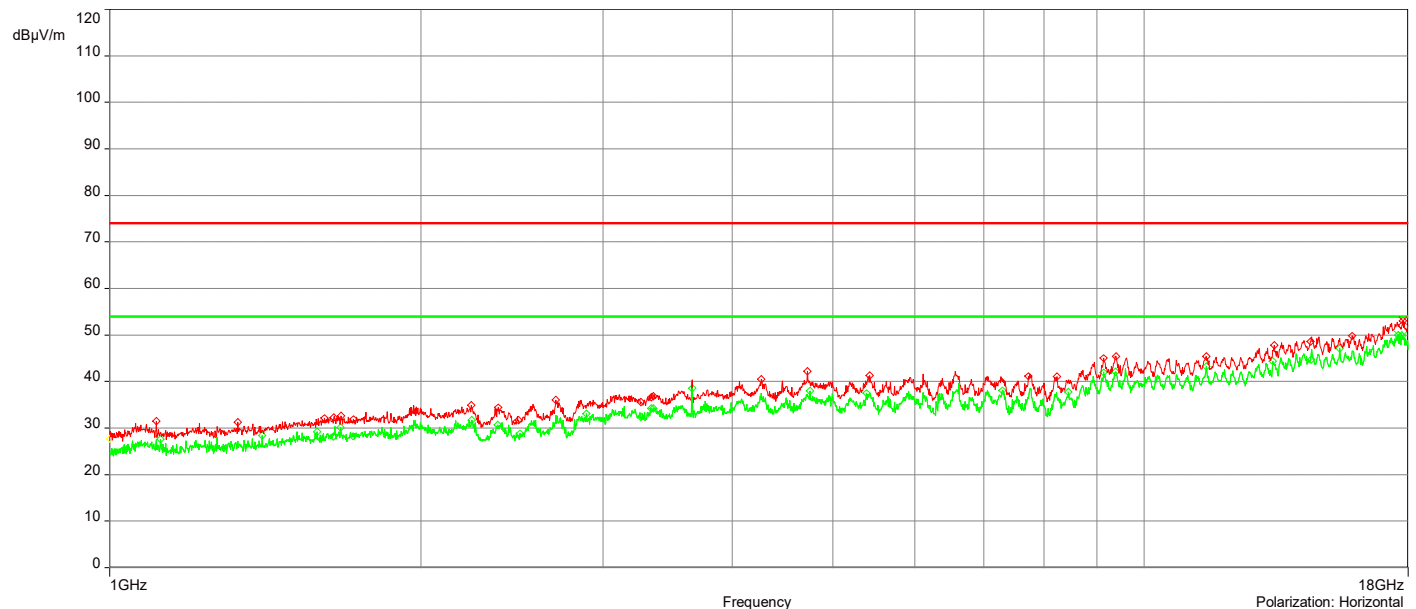
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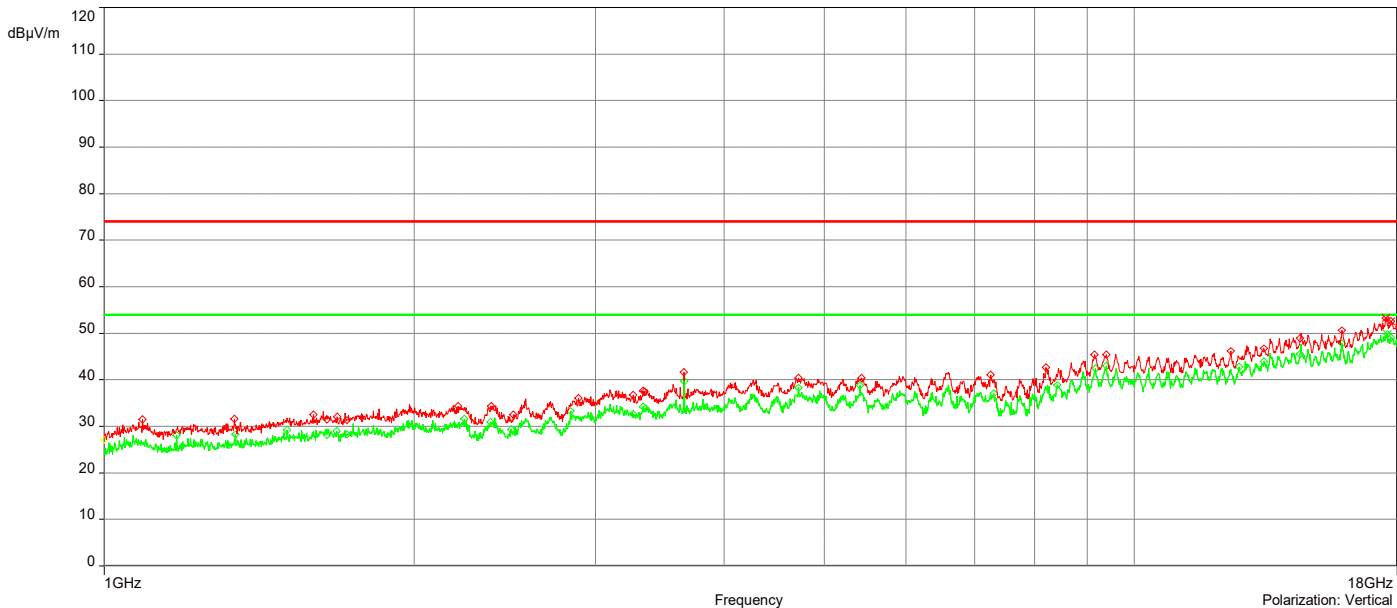
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No	Frequency (MHz)	Level Peak Reading (dB μ V/m)	Correction Factor (dB)	Limit dB μ V/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	17.552987GHz	53.26	18.89	74.00	-20.74	3.20	119.90	Vertical	Passed
2.	17.794494GHz	53.09	18.88	74.00	-20.91	2.55	0.20	Horizontal	Passed
3.	17.760493GHz	52.56	18.86	74.00	-21.44	3.64	179.90	Vertical	Passed

No	Frequency (MHz)	Level Average Reading (dB μ V/m)	Correction Factor (dB)	Limit dB μ V/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	17.769993GHz	49.85	18.87	54.00	-4.15	2.12	269.90	Horizontal	Passed
2.	17.616489GHz	49.90	18.91	54.00	-4.10	2.43	89.90	Vertical	Passed
3.	17.615989GHz	49.95	18.91	54.00	-4.05	1.00	0.20	Horizontal	Passed

Overall Graphs:





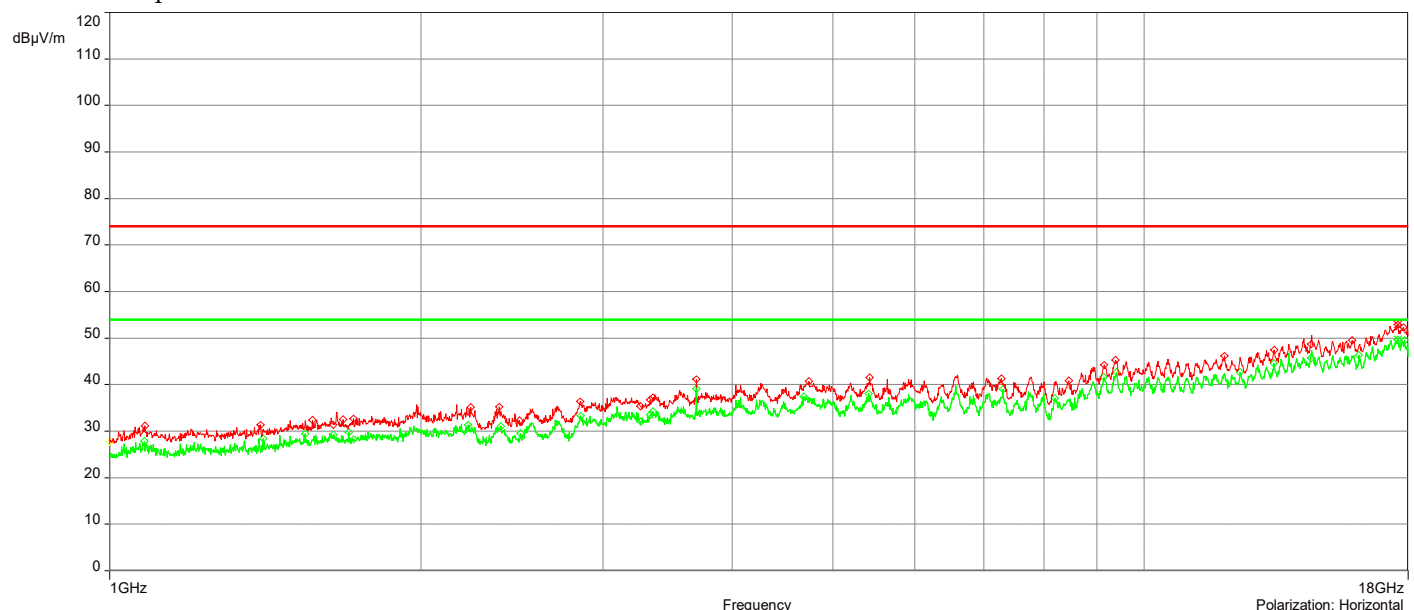
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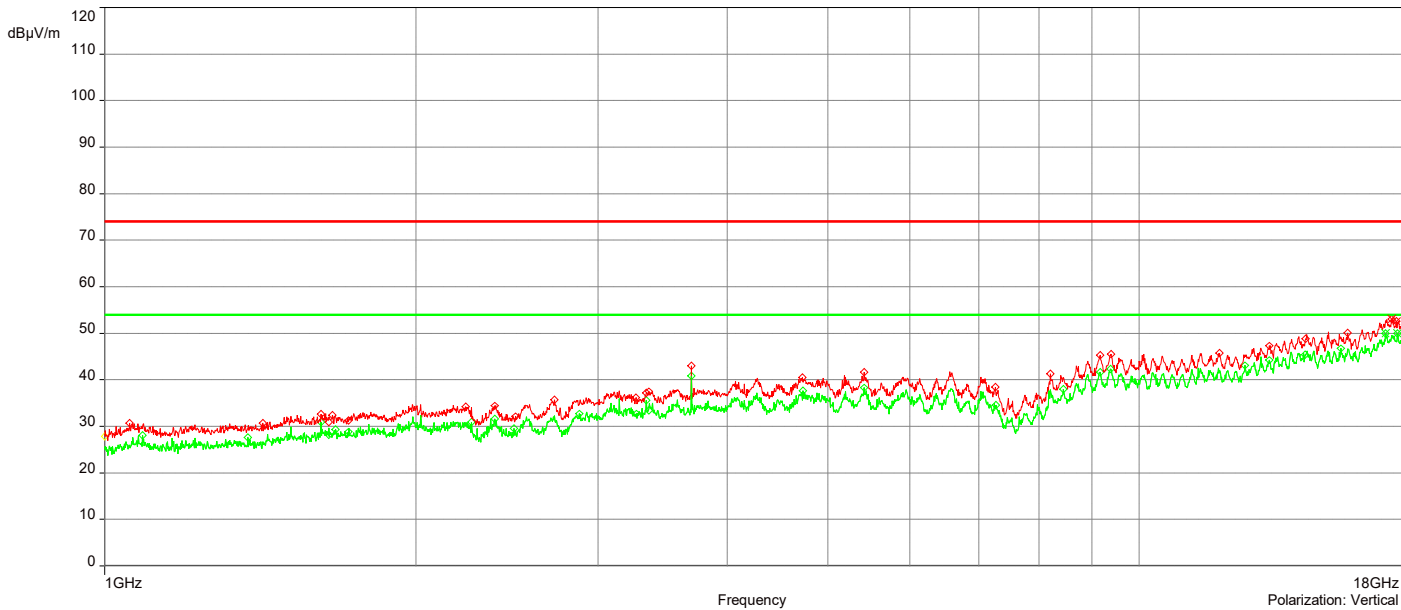
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No	Frequency (MHz)	Level Peak Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	17.728492GHz	52.60	18.89	74.00	-21.40	1.00	180.00	Vertical	Passed
2.	17.591988GHz	52.99	18.85	74.00	-21.01	3.93	329.90	Horizontal	Passed
3.	17.547487GHz	53.00	18.89	74.00	-21.00	2.69	240.10	Vertical	Passed

No	Frequency (MHz)	Level Average Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	17.30998GHz	50.00	18.30	54.00	-4.00	1.00	300.10	Vertical	Passed
2.	17.779994GHz	49.92	18.87	54.00	-4.08	2.70	90.10	Vertical	Passed
3.	17.590988GHz	49.64	18.85	54.00	-4.36	3.12	150.20	Horizontal	Passed

Overall Graphs:





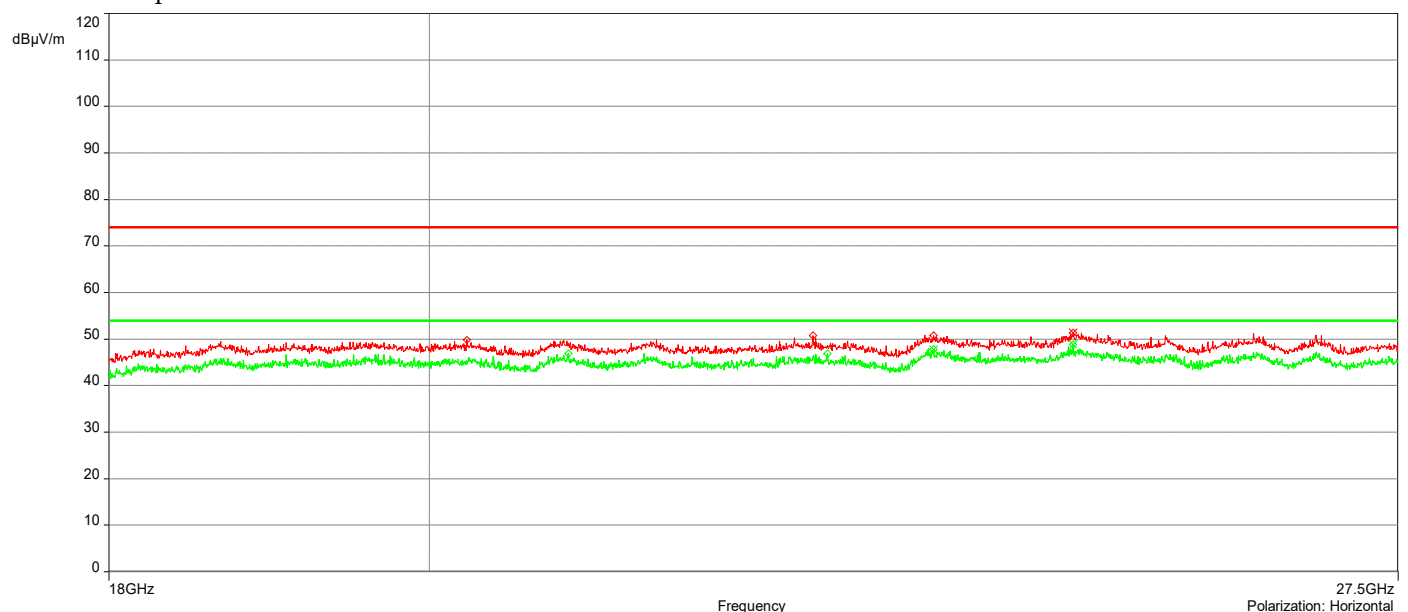
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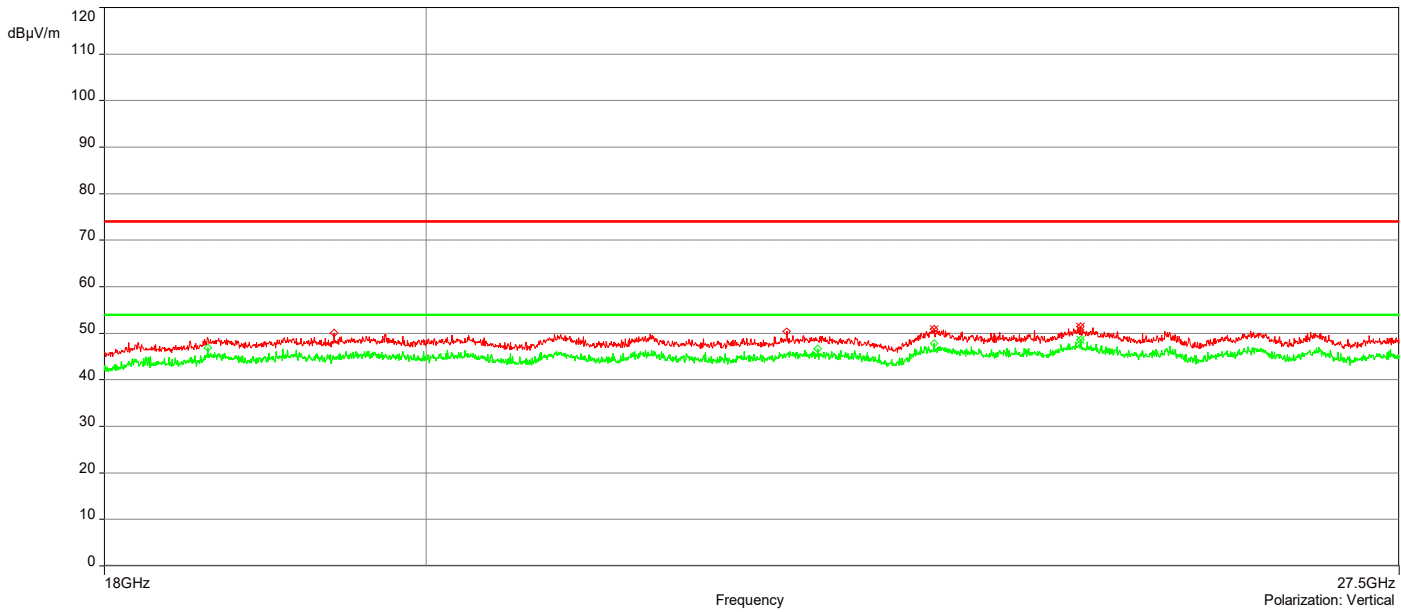
6/28/2021 6:24:03 AM

No	Frequency (MHz)	Level Peak Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	23.616296GHz	50.83	3.56	74.00	-23.17	3.10	329.90	Vertical	Passed
2.	24.777857GHz	51.44	4.39	74.00	-22.56	3.02	90.10	Vertical	Passed
3.	24.713853GHz	51.38	4.40	74.00	-22.62	3.82	180.10	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	24.777857GHz	48.64	4.39	54.00	-5.36	3.02	90.10	Vertical	Passed
2.	23.605295GHz	47.80	3.56	54.00	-6.20	1.20	60.10	Horizontal	Passed
3.	24.713853GHz	48.77	4.40	54.00	-5.23	3.82	180.10	Horizontal	Passed

Overall Graphs:





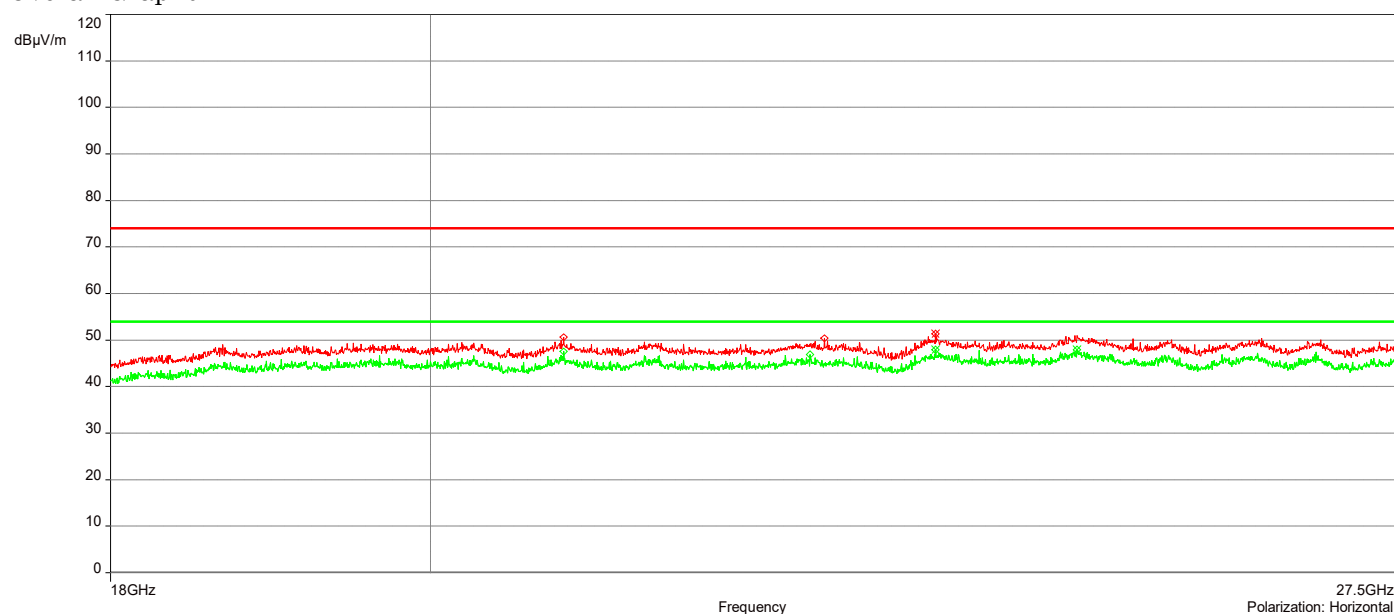
AH21042001-HAR-017#002_802.11b DH2 CH11_18-27.5GHz

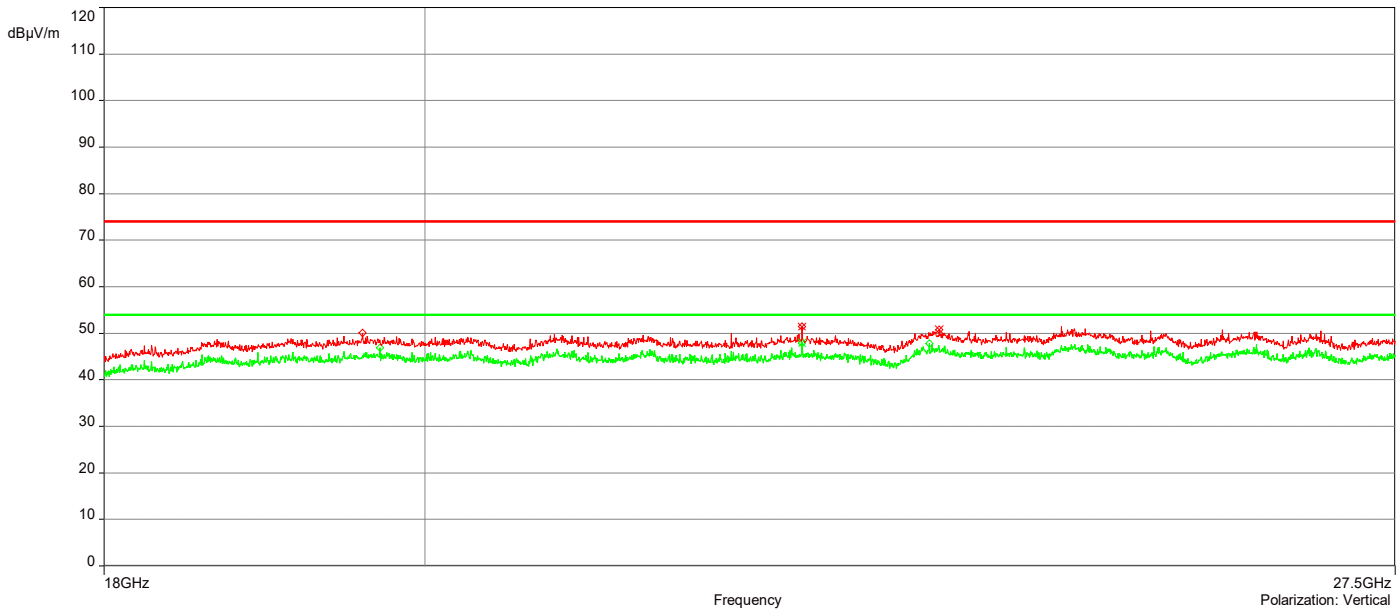
6/28/2021 7:02:22 AM

No	Frequency (MHz)	Level Peak Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	22.634744GHz	51.50	2.32	74.00	-22.50	3.81	90.10	Vertical	Passed
2.	23.677799GHz	50.72	3.41	74.00	-23.28	3.50	300.10	Vertical	Passed
3.	23.617296GHz	51.34	3.54	74.00	-22.66	1.00	329.90	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	22.634744GHz	47.88	2.32	54.00	-6.12	3.81	90.10	Vertical	Passed
2.	23.617296GHz	47.93	3.54	54.00	-6.07	1.00	329.90	Horizontal	Passed
3.	24.743855GHz	47.96	4.50	54.00	-6.04	3.65	90.10	Horizontal	Passed

Overall Graphs:





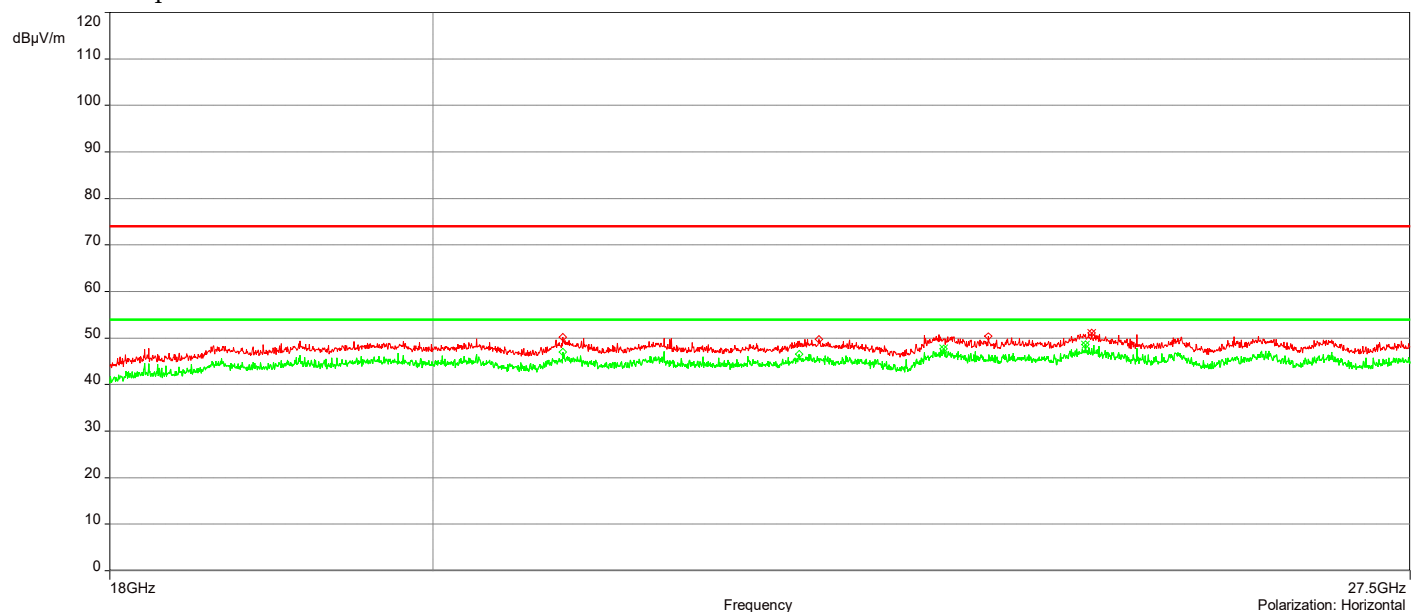
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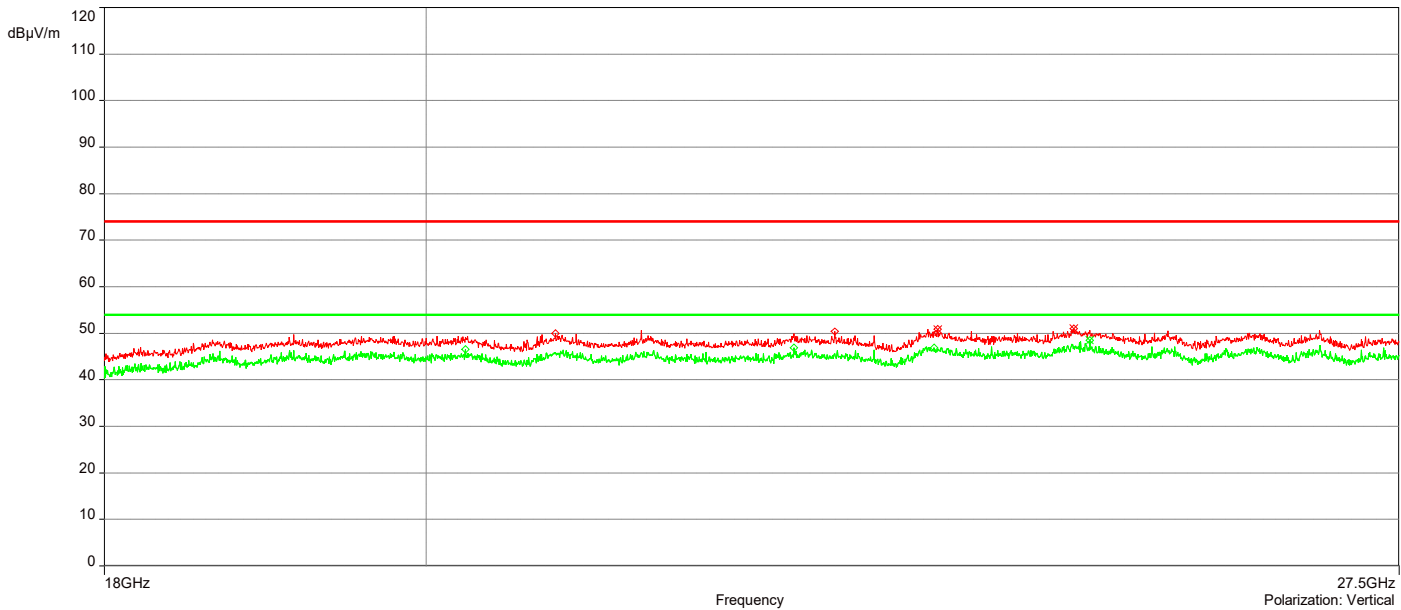
6/28/2021 6:47:12 AM

No	Frequency (MHz)	Level Peak Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	23.646797GHz	50.90	3.48	74.00	-23.10	2.20	329.90	Vertical	Passed
2.	24.721854GHz	51.04	4.40	74.00	-22.96	2.32	269.90	Vertical	Passed
3.	24.790357GHz	51.06	4.37	74.00	-22.94	4.00	209.90	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dBμV/m)	Correction Factor (dB)	Limit dBμV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	24.852861GHz	48.45	4.31	54.00	-5.55	3.51	149.90	Vertical	Passed
2.	23.621296GHz	47.68	3.53	54.00	-6.32	3.18	149.90	Horizontal	Passed
3.	24.738855GHz	48.57	4.48	54.00	-5.43	2.98	299.90	Horizontal	Passed

Overall Graphs:





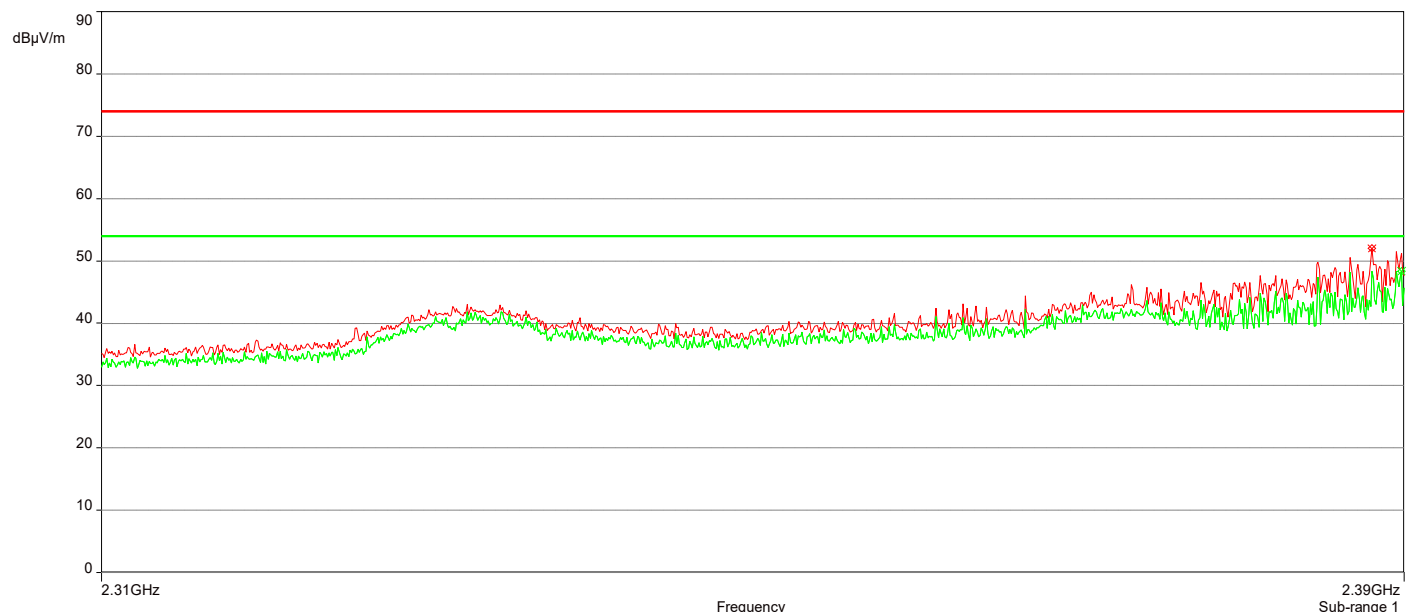
AH21042001-HAR-017#002_Restricted Bandedge_2.4G 802.11b_Ch-1

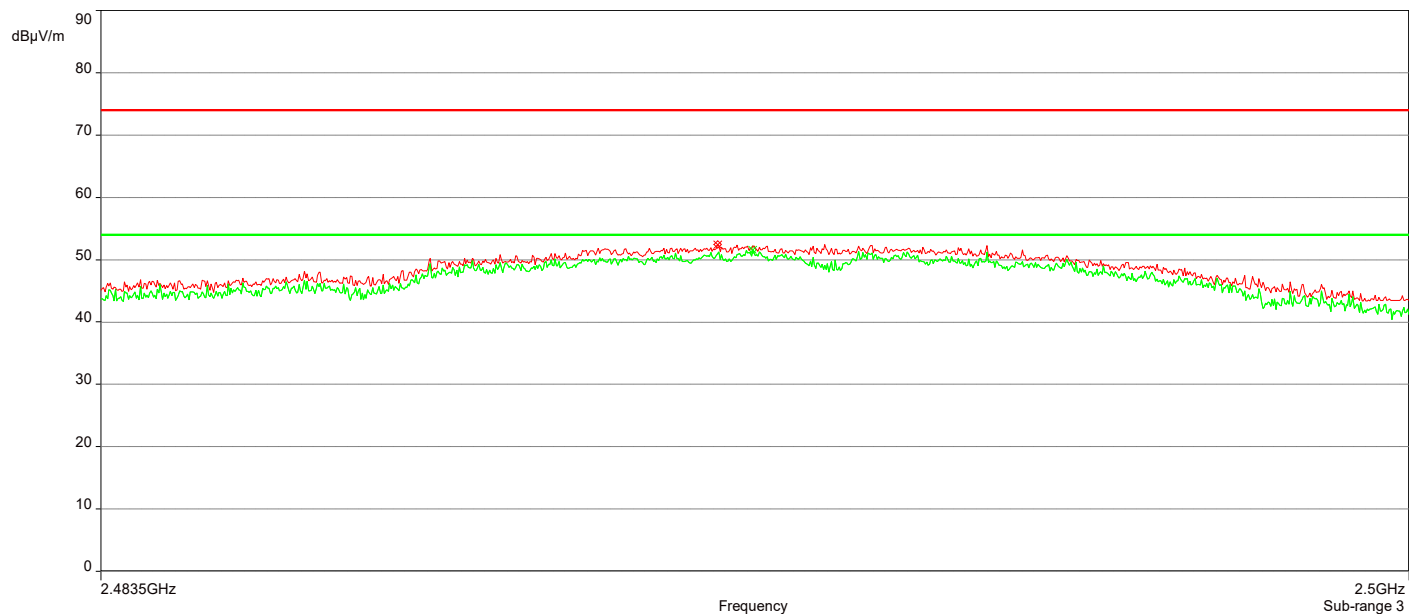
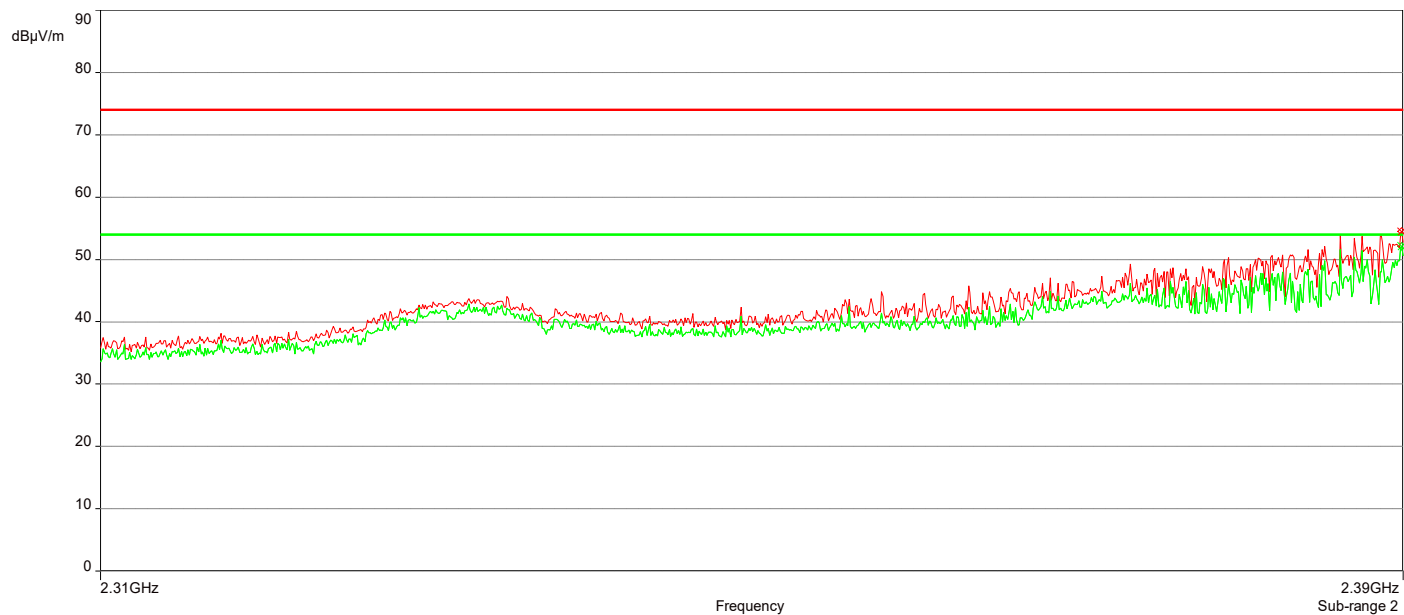
9/1/2021 10:30:44 AM

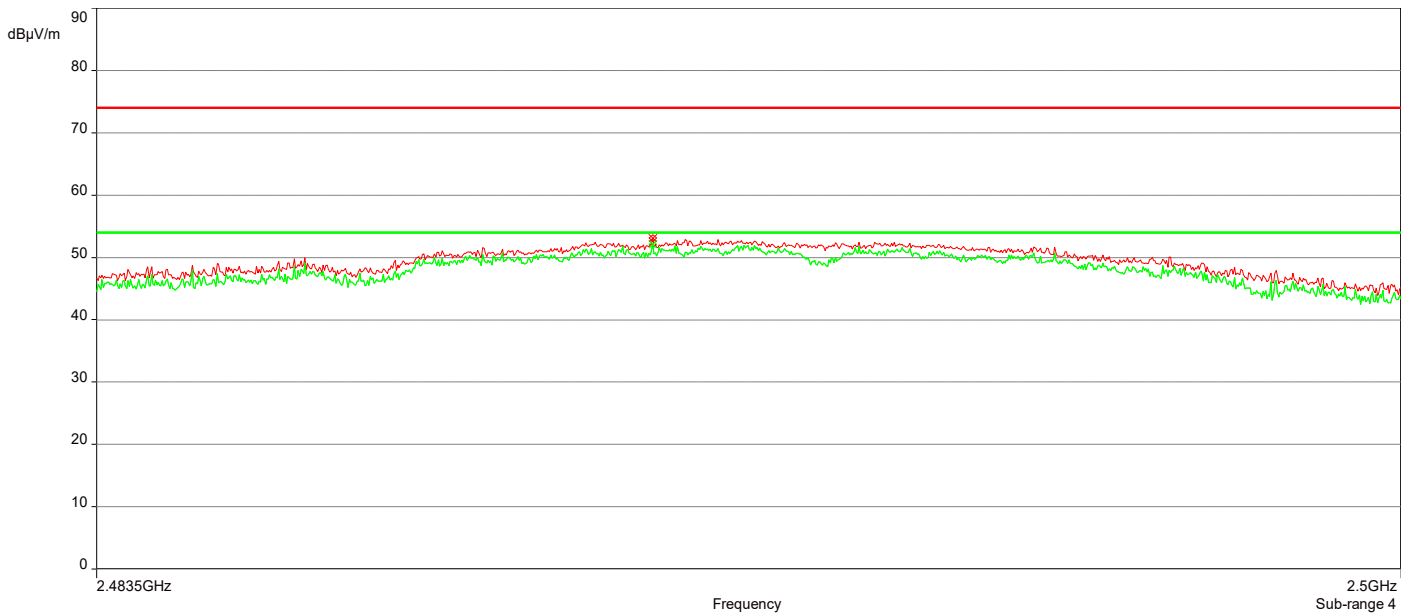
No	Frequency (MHz)	Level Peak Reading (dBuV/m)	Correction Factor (dB)	Limit dBuV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	2.387998GHz	52.03	-3.15	74.00	-21.97	4.00	0.10	Vertical	Passed
2.	2.4912628GHz	52.45	-2.44	74.00	-21.55	3.59	0.10	Vertical	Passed
3.	2.4905195GHz	53.17	-2.45	74.00	-20.83	1.97	22.40	Horizontal	Passed
4.	2.3899199GHz	54.48	-3.13	74.00	-19.52	1.50	22.40	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dBuV/m)	Correction Factor (dB)	Limit dBuV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	2.3898398GHz	48.37	-3.13	54.00	-5.63	4.00	0.10	Vertical	Passed
2.	2.4917087GHz	51.60	-2.44	54.00	-2.40	3.59	0.10	Vertical	Passed
3.	2.3899199GHz	52.10	-3.13	54.00	-1.90	1.50	22.40	Horizontal	Passed
4.	2.4905195GHz	52.10	-2.45	54.00	-1.90	1.97	22.40	Horizontal	Passed

Overall Graphs:







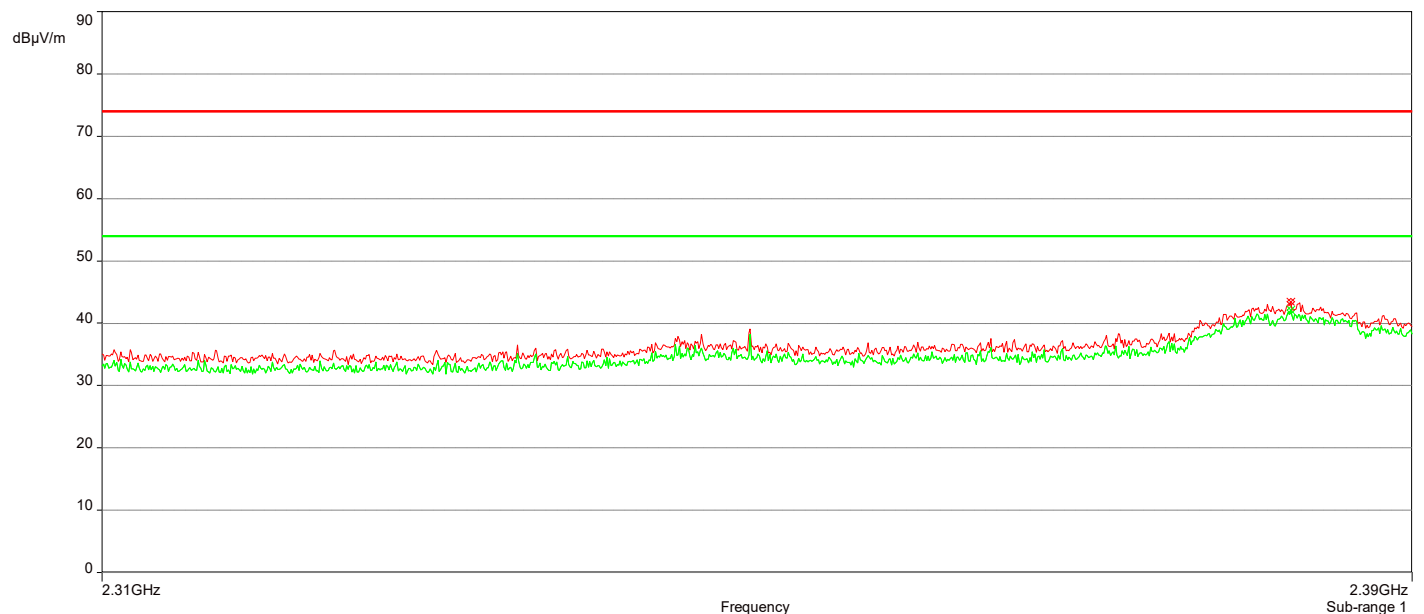
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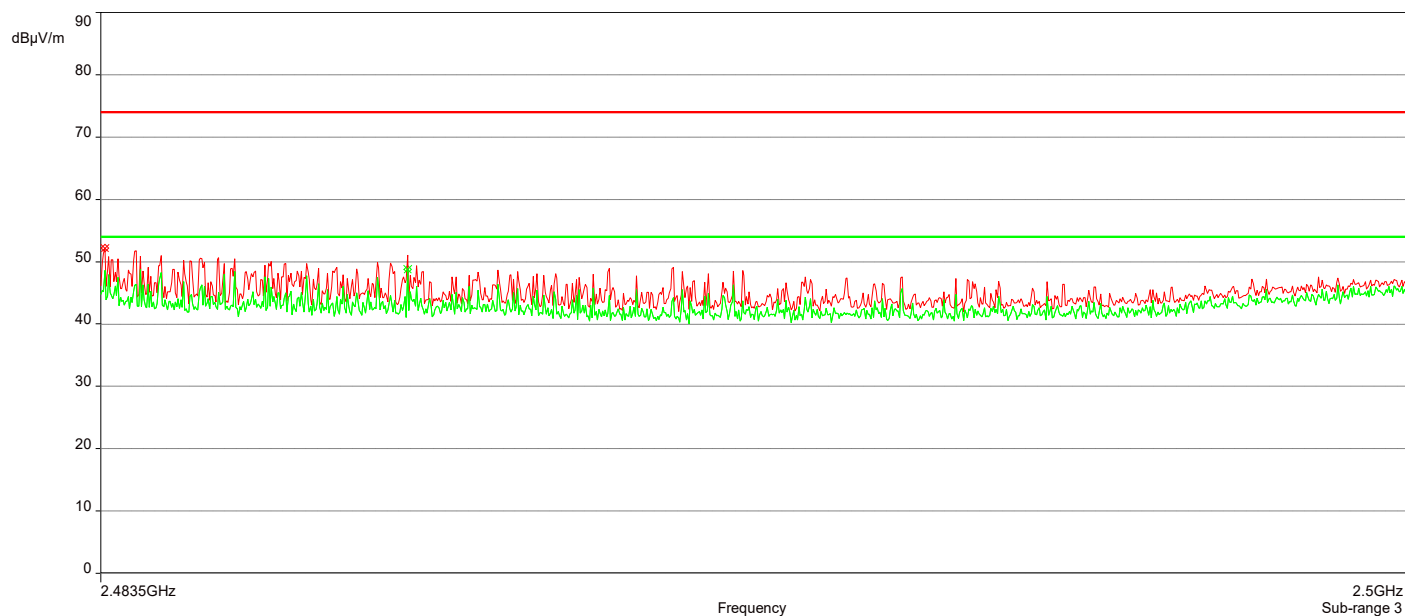
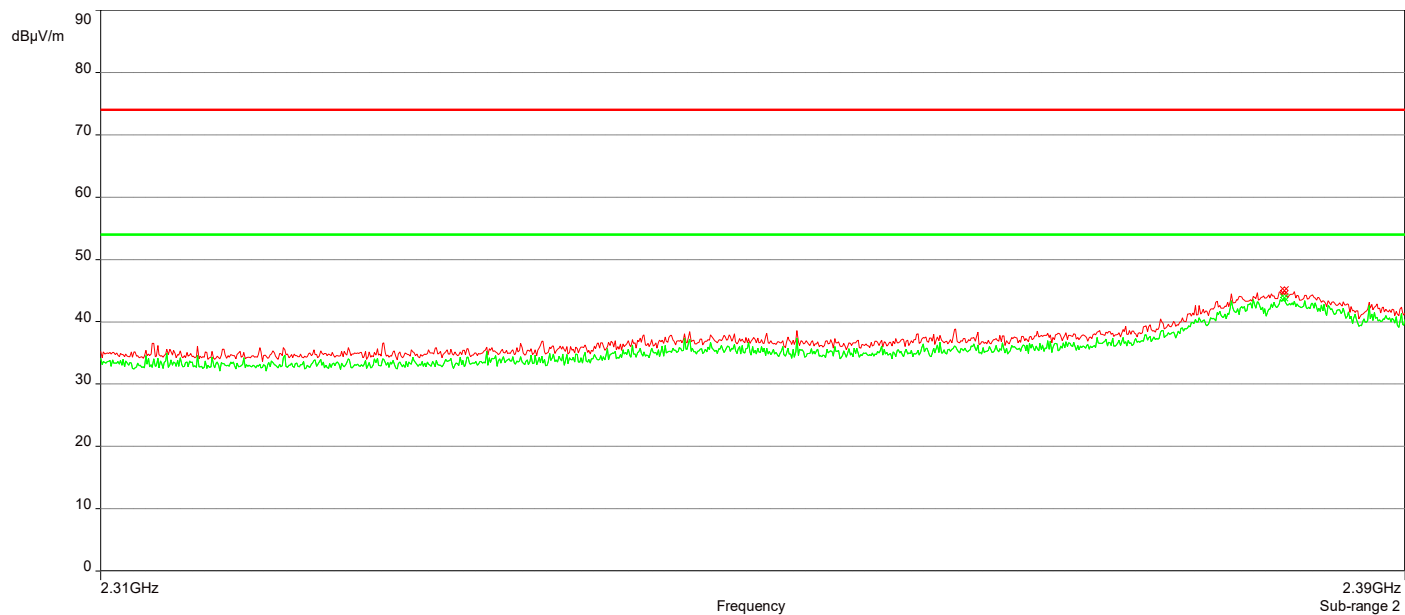
9/1/2021 11:09:30 AM

No	Frequency (MHz)	Level Peak Reading (dBuV/m)	Correction Factor (dB)	Limit dBuV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	2.4836321GHz	54.42	-2.47	74.00	-19.58	1.98	337.40	Horizontal	Passed
2.	2.4835496GHz	52.21	-2.47	74.00	-21.79	3.07	315.10	Vertical	Passed
3.	2.3824725GHz	44.98	-3.18	74.00	-29.02	2.30	337.40	Horizontal	Passed
4.	2.3824725GHz	43.46	-3.18	74.00	-30.54	2.77	315.10	Vertical	Passed

No	Frequency (MHz)	Level Average Reading (dBuV/m)	Correction Factor (dB)	Limit dBuV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	2.4839955GHz	51.10	-2.47	54.00	-2.90	1.98	337.40	Horizontal	Passed
2.	2.4873649GHz	48.80	-2.46	54.00	-5.20	3.44	315.10	Vertical	Passed
3.	2.3824725GHz	43.88	-3.18	54.00	-10.12	2.30	337.40	Horizontal	Passed
4.	2.3824725GHz	42.11	-3.18	54.00	-11.89	2.77	315.10	Vertical	Passed

Overall Graphs:







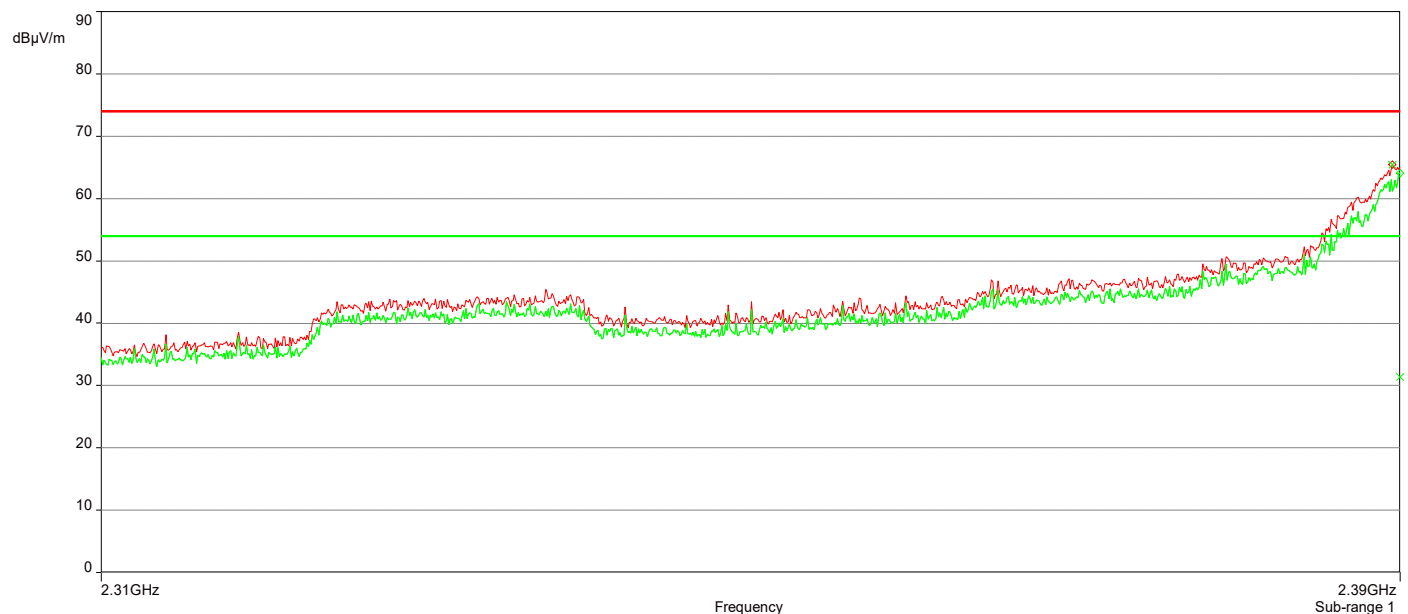
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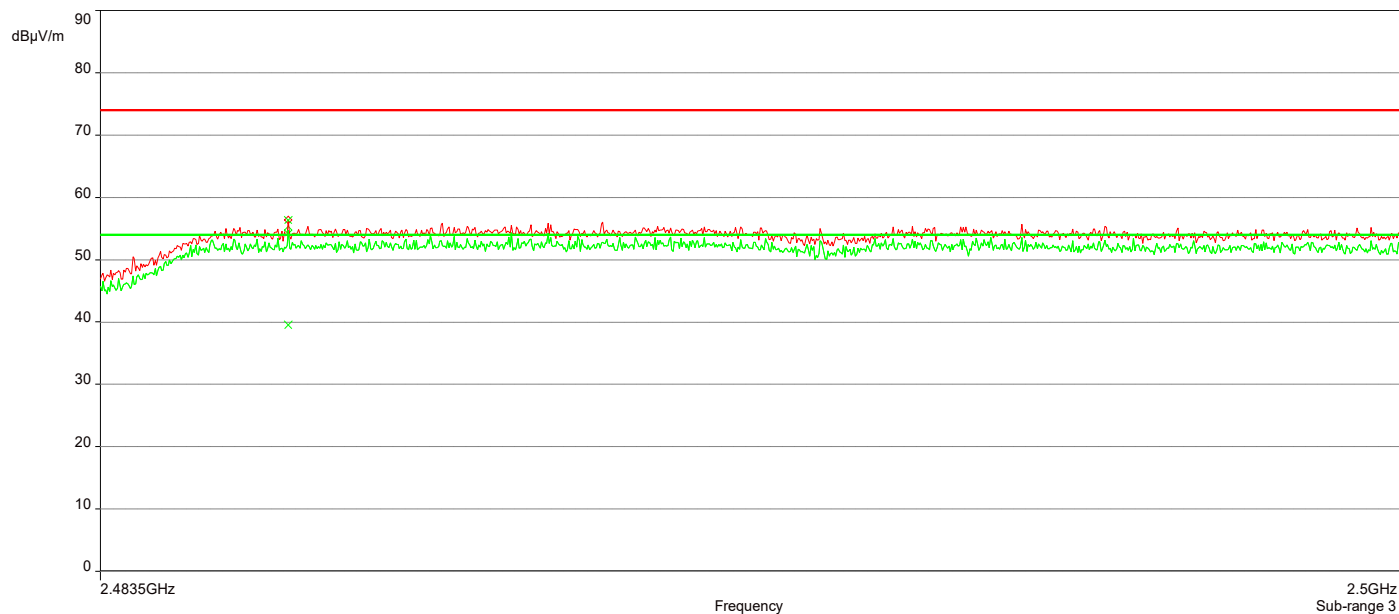
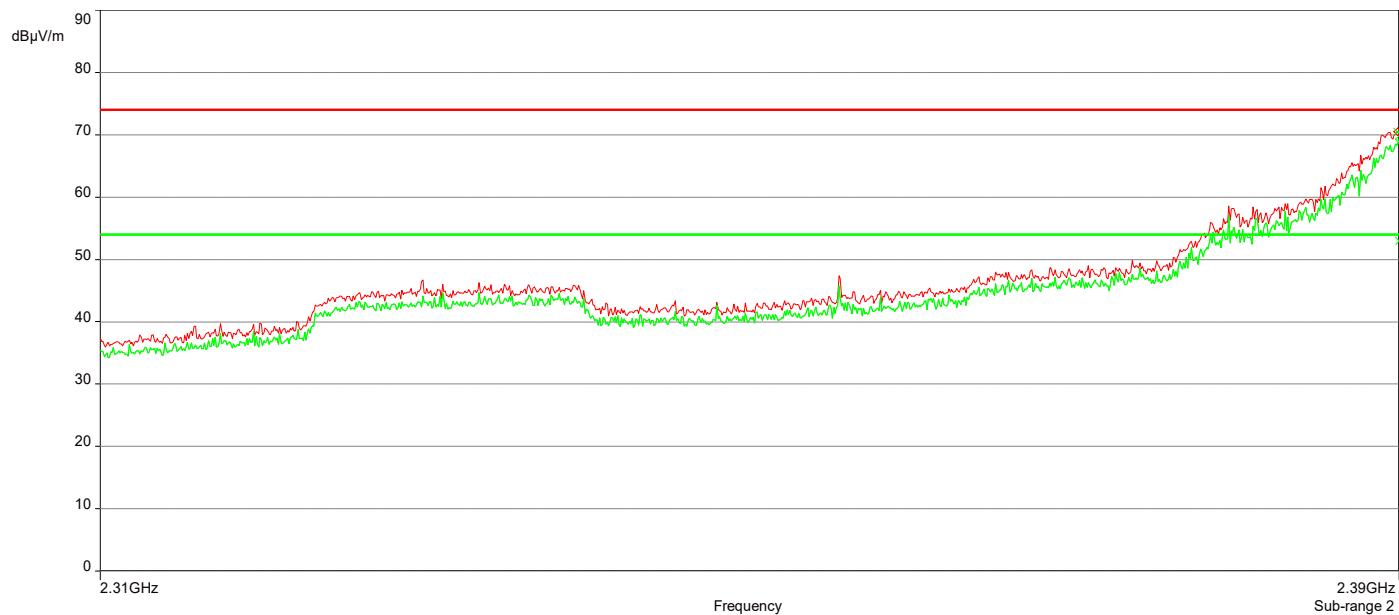
9/1/2021 11:51:22 AM

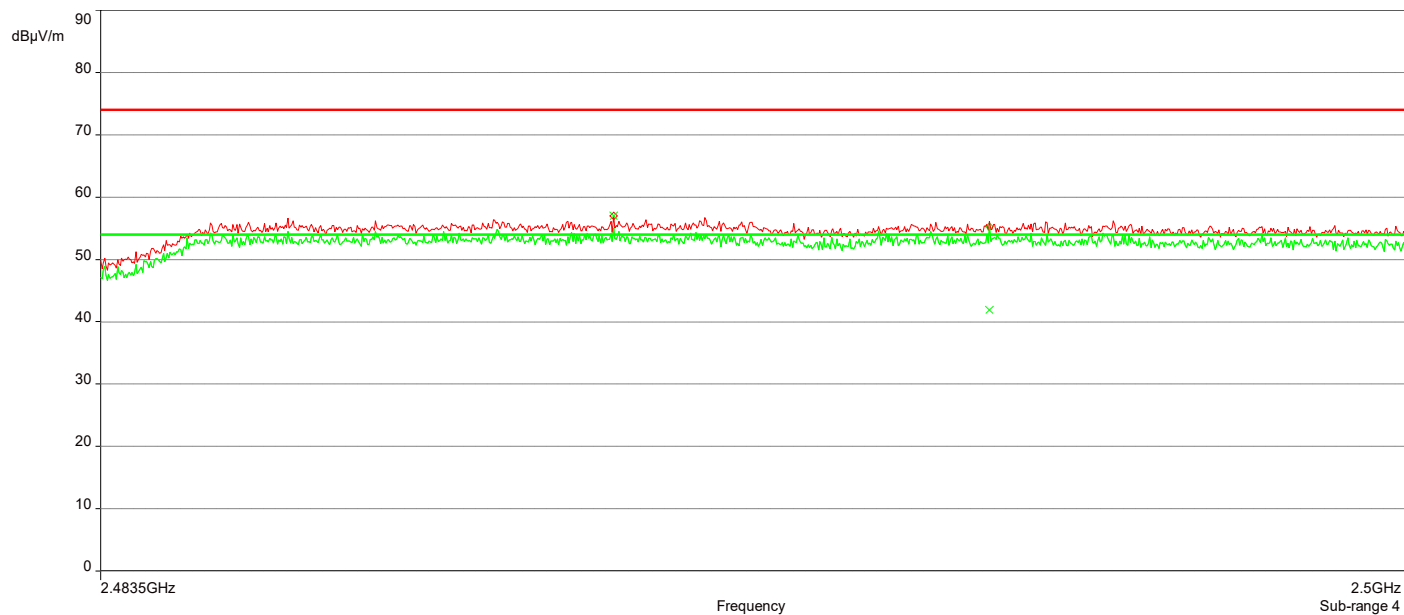
No	Frequency (MHz)	Level Peak Reading (dBuV/m)	Correction Factor (dB)	Limit dBuV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	2.3899199GHz	70.47	-3.13	74.00	-3.53	2.06	337.40	Horizontal	Passed
2.	2.3895195GHz	65.47	-3.14	74.00	-8.53	2.78	314.90	Vertical	Passed
3.	2.4899745GHz	57.00	-2.45	74.00	-17.00	1.84	337.40	Horizontal	Passed
4.	2.4858784GHz	56.38	-2.46	74.00	-17.62	3.71	0.10	Vertical	Passed

No	Frequency (MHz)	Level Average Reading (dBuV/m)	Correction Factor (dB)	Limit dBuV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	2.39GHz	31.40	-3.13	54.00	-22.60	4.00	315.10	Vertical	Passed
2.	2.4858784GHz	39.49	-2.46	54.00	-14.51	3.71	0.10	Vertical	Passed
3.	2.4947312GHz	41.96	-2.43	54.00	-12.04	1.84	336.90	Horizontal	Passed
4.	2.39GHz	52.98	-3.13	54.00	-1.02	1.24	336.90	Horizontal	Passed

Overall Graphs:







AH21042001-HAR-017#002_Restricted Bandedge_2.4G 802.11g_Ch-11

9/7/2021 7:56:14 AM

No	Frequency (MHz)	Level Peak Reading (dBuV/m)	Correction Factor (dB)	Limit dBuV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	2.484032GHz	68.74	-2.47	74.00	-5.26	3.82	44.90	Horizontal	Passed
2.	2.4835568GHz	69.80	-2.47	74.00	-4.20	3.44	337.40	Vertical	Passed
3.	2.3870835GHz	45.08	-3.15	74.00	-28.92	3.52	314.90	Vertical	Passed
4.	2.3864182GHz	46.54	-3.16	74.00	-27.46	1.02	67.40	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dBuV/m)	Correction Factor (dB)	Limit dBuV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	2.484032GHz	52.23	-2.47	54.00	-1.77	3.82	44.90	Horizontal	Passed
2.	2.4835568GHz	49.14	-2.47	54.00	-4.86	3.44	337.40	Vertical	Passed
3.	2.3797649GHz	44.68	-3.19	54.00	-9.32	3.97	44.90	Horizontal	Passed
4.	2.3861331GHz	43.89	-3.16	54.00	-10.11	3.97	337.40	Vertical	Passed

Overall Graphs:





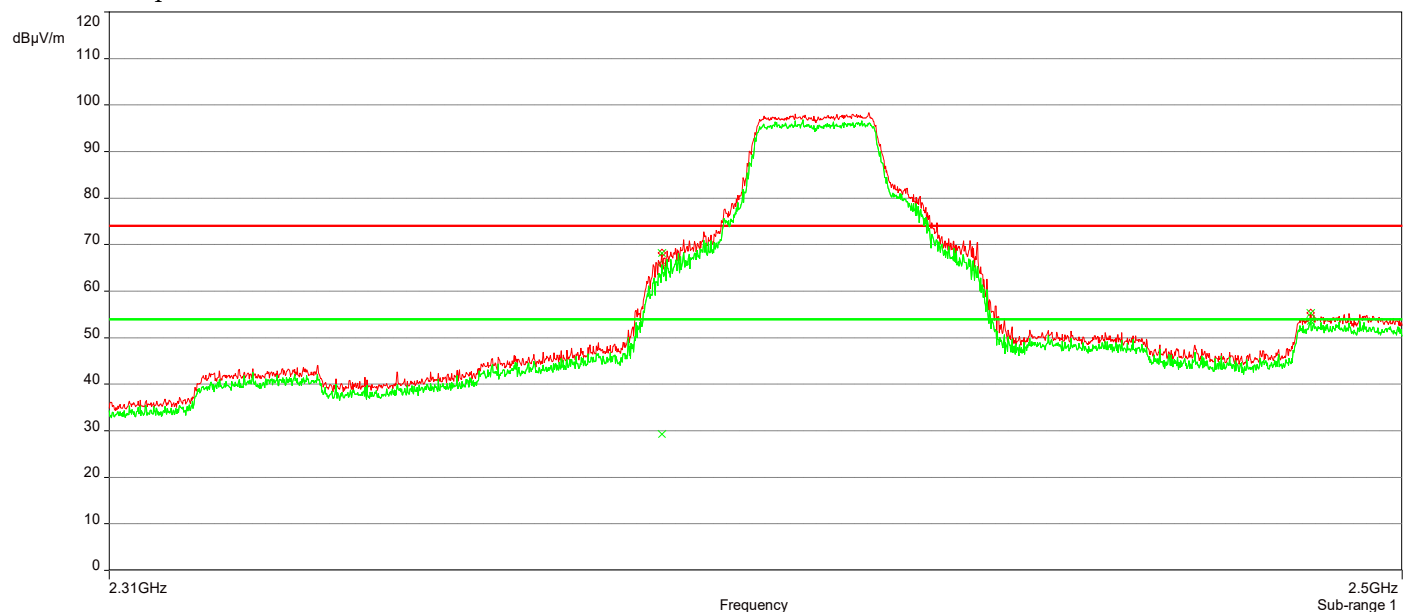
AH21042001-HAR-017#002_Restricted Bandedge_2.4G 802.11n_Ch-1

9/7/2021 6:56:12 AM

No	Frequency (MHz)	Level Peak Reading (dBuV/m)	Correction Factor (dB)	Limit dBuV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	2.3893647GHz	68.17	-3.14	74.00	-5.83	4.00	314.90	Vertical	Passed
2.	2.486028GHz	55.30	-2.46	74.00	-18.70	3.65	0.10	Vertical	Passed
3.	2.389935GHz	72.37	-3.13	74.00	-1.63	2.90	22.10	Horizontal	Passed
4.	2.4946773GHz	57.25	-2.43	74.00	-16.75	3.18	45.10	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dBuV/m)	Correction Factor (dB)	Limit dBuV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	2.3893647GHz	29.36	-3.14	54.00	-24.64	4.00	314.90	Vertical	Passed
2.	2.486028GHz	53.64	-2.46	54.00	-0.36	3.65	0.10	Vertical	Passed
3.	2.389935GHz	52.55	-3.13	54.00	-1.45	2.90	22.10	Horizontal	Passed
4.	2.4946773GHz	45.01	-2.43	54.00	-8.99	3.18	45.10	Horizontal	Passed

Overall Graphs:





AH21042001-HAR-017#002_Restricted Bandedge_2.4G 802.11n_Ch-11

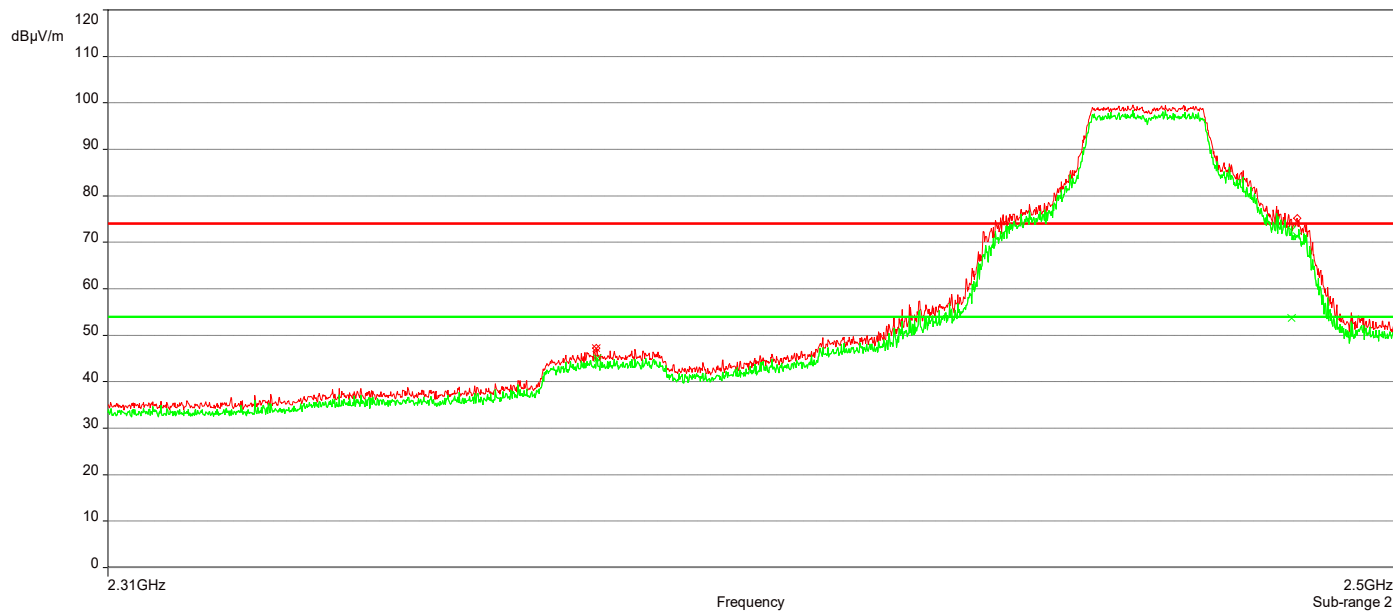
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No	Frequency (MHz)	Level Peak Reading (dBuV/m)	Correction Factor (dB)	Limit dBuV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	2.4846973GHz	71.33	-2.47	74.00	-2.67	2.31	337.40	Horizontal	Passed
2.	2.4838419GHz	70.26	-2.47	74.00	-3.74	3.76	0.10	Vertical	Passed
3.	2.3802401GHz	47.19	-3.19	74.00	-26.81	1.83	337.40	Horizontal	Passed
4.	2.3850875GHz	45.38	-3.16	74.00	-28.62	3.66	314.90	Vertical	Passed

No	Frequency (MHz)	Level Average Reading (dBuV/m)	Correction Factor (dB)	Limit dBuV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	2.4838419GHz	53.75	-2.47	54.00	-0.25	2.31	337.40	Horizontal	Passed
2.	2.3803352GHz	45.05	-3.19	54.00	-8.95	1.83	337.40	Horizontal	Passed
3.	2.3877489GHz	43.60	-3.15	54.00	-10.40	3.54	314.90	Vertical	Passed
4.	2.483937GHz	41.98	-2.47	54.00	-12.02	3.97	337.40	Vertical	Passed

Overall Graphs:





Document Revisions

Version	Date	Modifier	Changes
1.0	09-18-2021	Aravind Buddana Ryan Philips	Initial Draft
1.1	10-12-2021	Aravind Buddana	Updated correct FCC/IC ID

-End of Report-