Regulatory Test Report

Prepared for Harman International

This report presents detailed information on

INFO3.7-3.8 CSM

Automotive Infotainment Unit.

Prepared by

Aravind Buddana

Engineer II

Approved by

Jason Kanakry

General Manager

Issue date: 09/03/2021

Report No: AH20110901-HAR-279-TR4 v5

Contents

- # Test Request Information

Test Request #:	7700040166
Test Requested By:	Mark Bowman Harman International Industries, Inc. 30001 Cabot Drive, Novi, MI 48377
Test item Description:	INFO3.7-3.8 CSM (Automotive Infotainment Unit with Bluetooth/WLAN)
Part Number:	84375197
DUT Sample Number:	AH20110901-HAR-279-08, AH20110901-HAR-279-10
Hardware Version of DUT:	PV
Software Version of DUT:	W156
Component Category of DUT:	N/A
FCC ID:	2AHPN-BE2854
IC:	6434C-BE2854
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 and ANSI C63.10-2013, 558074 D01 15.247 Meas Guidance v05r02
Deviations from standard:	None
Approved Test Plan Number:	N/A
Test Plan Revision:	N/A
Date test sample received:	01/14/2021
Date test started:	02/05/2021
Date test finished:	08/26/2021

- # 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 a non-detachable internal PCB trace antenna with 5.0dBi 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 and ANSI C63.10-2013, 558074 D01 15.247 Meas Guidance v05r02

The product is the **INFO3.7-3.8 CSM**. It is a frequency hopping spread spectrum transmitter that operates in the 2402 – 2480 MHz frequency range.

Details	Description
Frequency Range (MHz)	2402 – 2480
Modulation Type	GFSK
Number of Channels	40
Tested Frequencies	2402,2440,2480
DUT Antenna Type	Non-detachable PCB trace
DUT Antenna Gain	5.0dBi

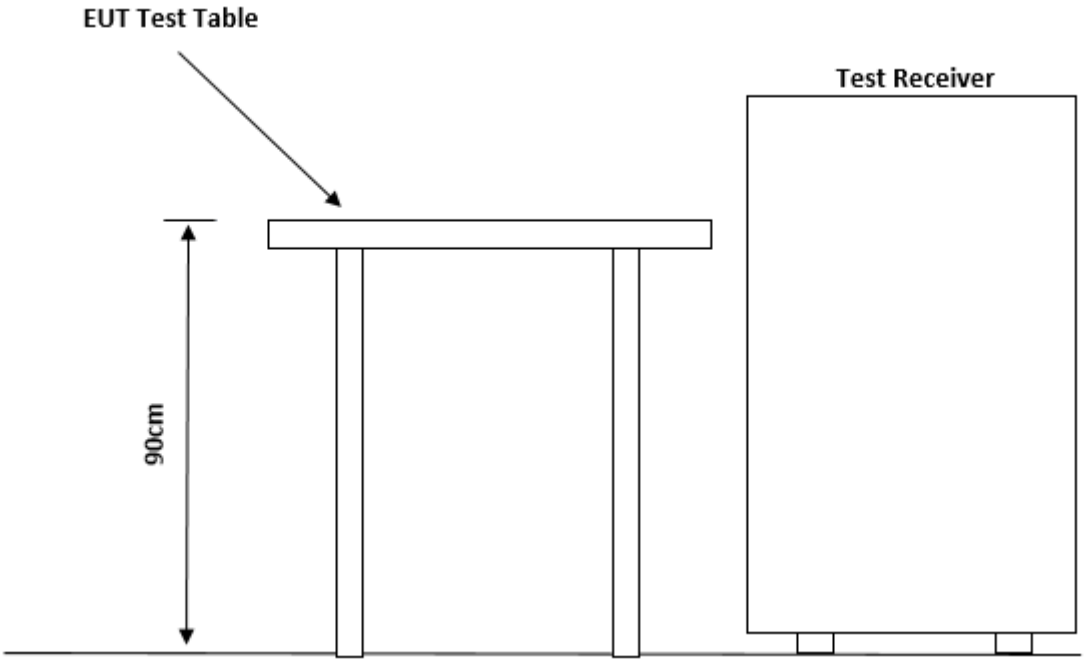
We found that the product met the above requirements without modification.
Test samples were received in good condition.

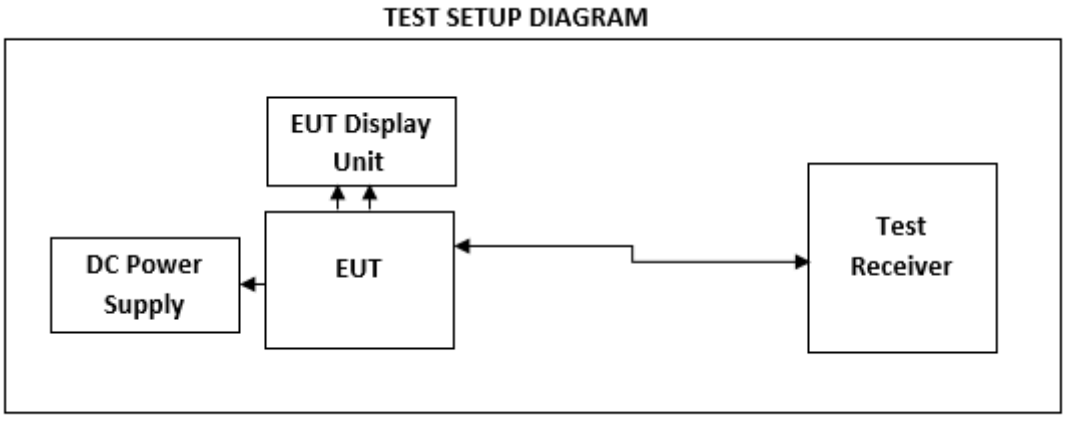
Test Item	Sample #	Result
EU 300328 Bluetooth Low Energy	AH20110901-HAR-279-10	Meets Requirements

Test Setup

Conducted Test Site Description

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





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	DUT Display	Harman	N/A	2133	N/A
N/A	Display Harness	Harman	N/A	N/A	N/A
N/A	Blue Molex Connector Harness	Harman	N/A	N/A	N/A
N/A	DUT 1M Harness	Harman	N/A	N/A	N/A
N/A	USB to DUT Harness	Harman	N/A	102161025	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 Bluetooth Low Energy

DUT Information

DUT Name:	INFO3.7-3.8 CSM
Manufacturer:	Harman International Industries, Inc.
Serial Number:	AH20110901-HAR-279-10

40 channels are provided for BLE mode:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
37	**2402**	9	2422	18	2442	28	2462
0	2404	10	2424	19	2444	29	2464
1	2406	38	2426	20	2446	30	2466
2	2408	11	2428	21	2448	31	2468
3	2410	12	2430	22	2450	32	2470
4	2412	13	2432	23	2452	33	2472
5	2414	14	2434	24	2454	34	2474
6	2416	15	2436	25	2456	35	2476
7	2418	16	2438	26	2458	36	2478
8	2420	**17**	**2440**	27	2460	**39**	**2480**

Notes: 2402, 2440 and 2480 Frequencies were selected as representative test channels.

Antenna gain	5.0 dBi
Number of transmit chains	1
Equipment type	Frequency Hopping Spread Spectrum

Test Results Summary

Test	Frequency (MHz)	LE CH-0 Result	LE CH-19 Result	LE CH-39 Result
Peak Output Power	2402	Pass	Pass	Pass
Minimum Emission Bandwidth 6Db	2402	Pass	Pass	Pass
Occupied Channel Bandwidth 99%	2402	Pass	Pass	Pass
Power Spectral Density	2402	Pass	Pass	Pass
Peak Power Spectral Density	2402	Pass	Pass	Pass
Tx Spurious Emissions	2402	Pass	Pass	Pass
Band Edge Low	2402	Pass	Pass	Pass
Peak Output Power	2440	Pass	Pass	Pass
Minimum Emission Bandwidth 6Db	2440	Pass	Pass	Pass
Occupied Channel Bandwidth 99%	2440	Pass	Pass	Pass
Power Spectral Density	2440	Pass	Pass	Pass
Peak Power Spectral Density	2440	Pass	Pass	Pass
Tx Spurious Emissions	2440	Pass	Pass	Pass
Peak Output Power	2480	Pass	Pass	Pass
Minimum Emission Bandwidth 6Db	2480	Pass	Pass	Pass
Occupied Channel Bandwidth 99%	2480	Pass	Pass	Pass
Power Spectral Density	2480	Pass	Pass	Pass
Peak Power Spectral Density	2480	Pass	Pass	Pass
Tx Spurious Emissions	2480	Pass	Pass	Pass
Band Edge High	2480	Pass	Pass	Pass

Peak output power

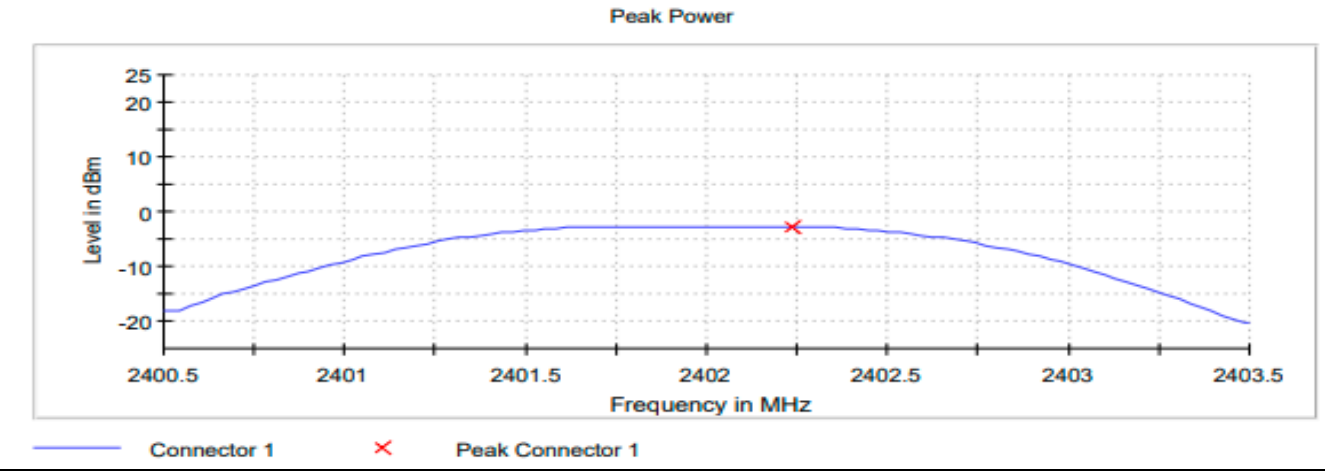
Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v05 and ANSI C63.10-2013 11.9.1.1

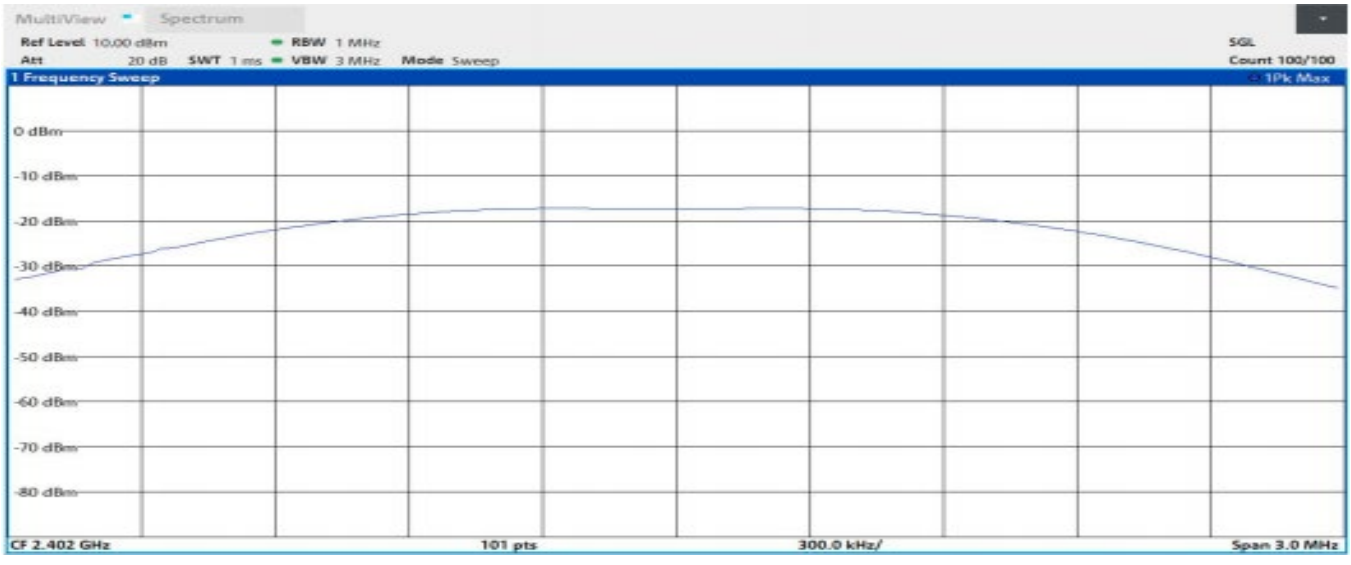
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Combined Uncertainty of absolute Level Measurement (K=2) < 1 dB

2402MHz

DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result
2402	-2.8	30.0	PASS
2440	-2.4	30.0	PASS
2480	-2.8	30.0	PASS

2402MHz DH1





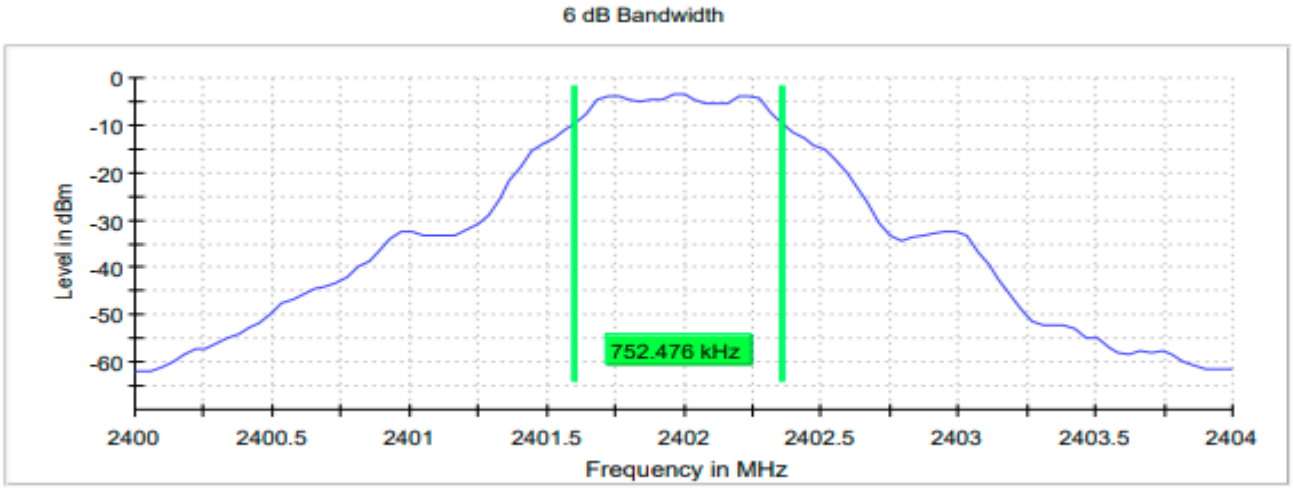
Minimum Emission Bandwidth 6 dB

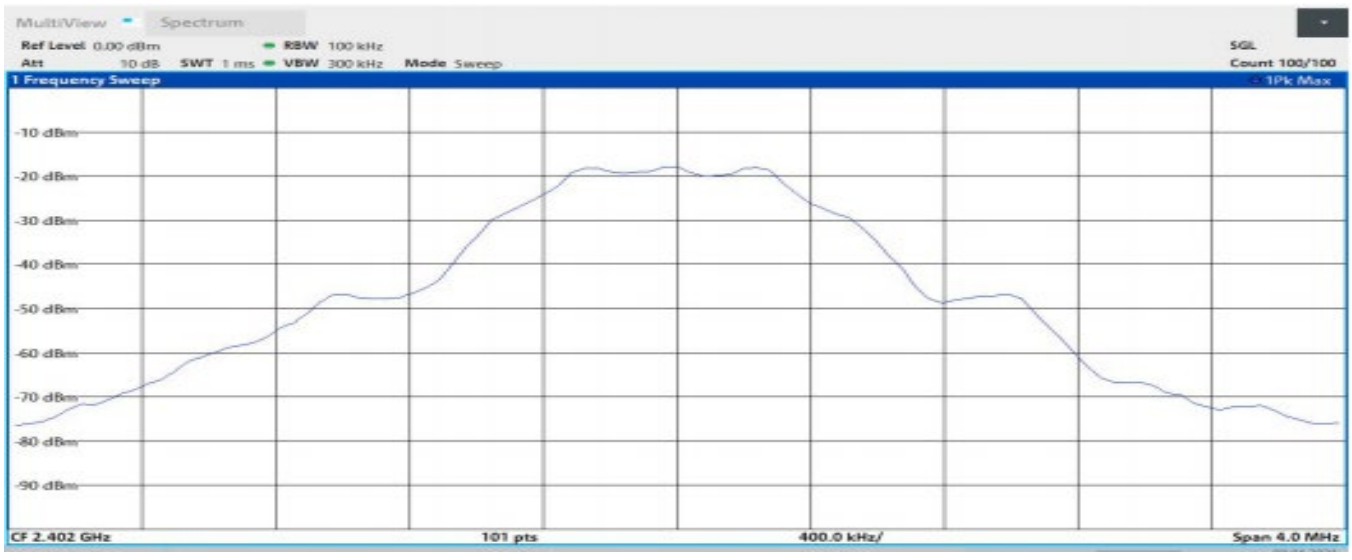
Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05 and ANSI C63.10-2013 11.8.1

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

Channel Frequency	Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Limit Min (MHz)
CH0-2402	0.752476	2401.603960	2402.356436	0.500000
CH19-2440	0.752476	2439.603960	2440.356436	0.500000
CH39-2480	0.792080	2479.603960	2480.396040	0.500000

CH0-2402MHz





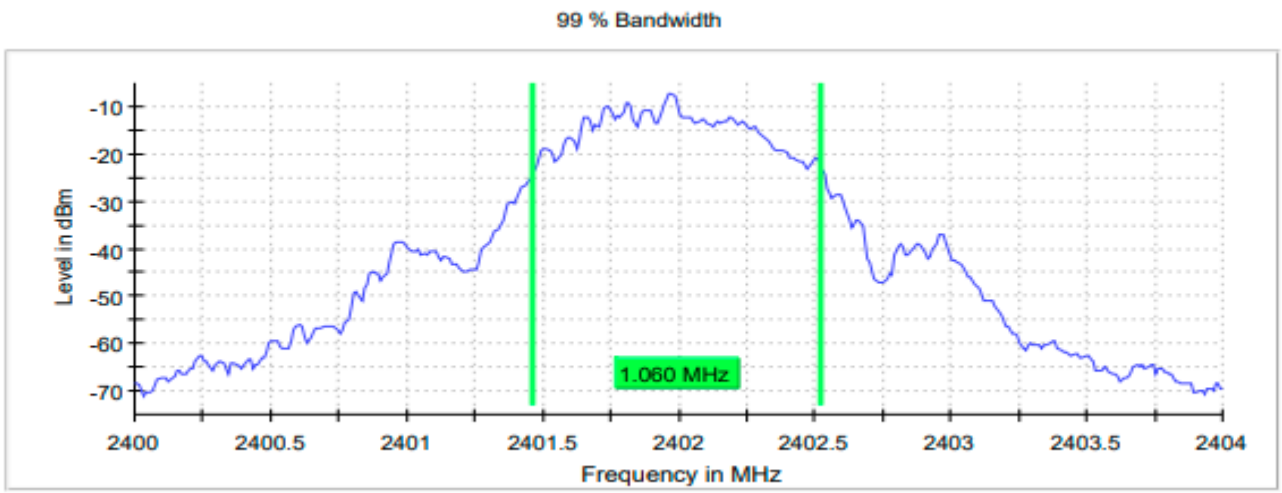
Occupied Channel Bandwidth

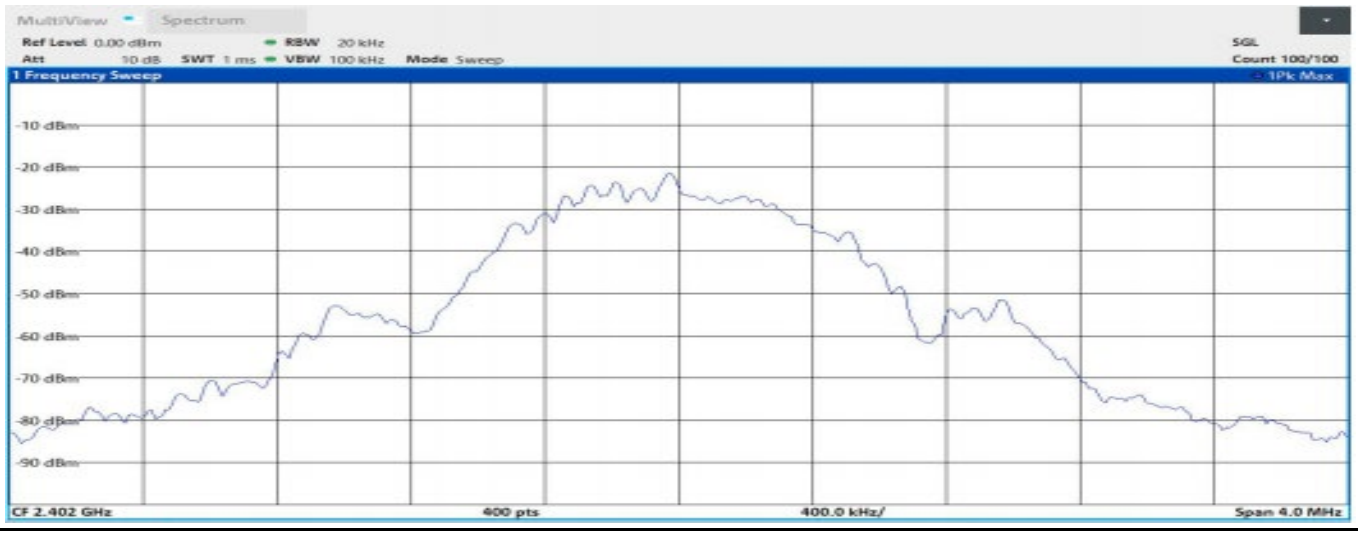
Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05 and ANSI C63.10-2013 11.8.1

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

Channel Frequency	Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Limit
CH0-2402	1.060000	2401.465000	2402.525000	2400-2483.5
CH19-2440	1.050000	2439.475000	2440.525000	2400-2483.5
CH39-2480	1.050000	2479.475000	2480.525000	2400-2483.5

CH0-2402MHz





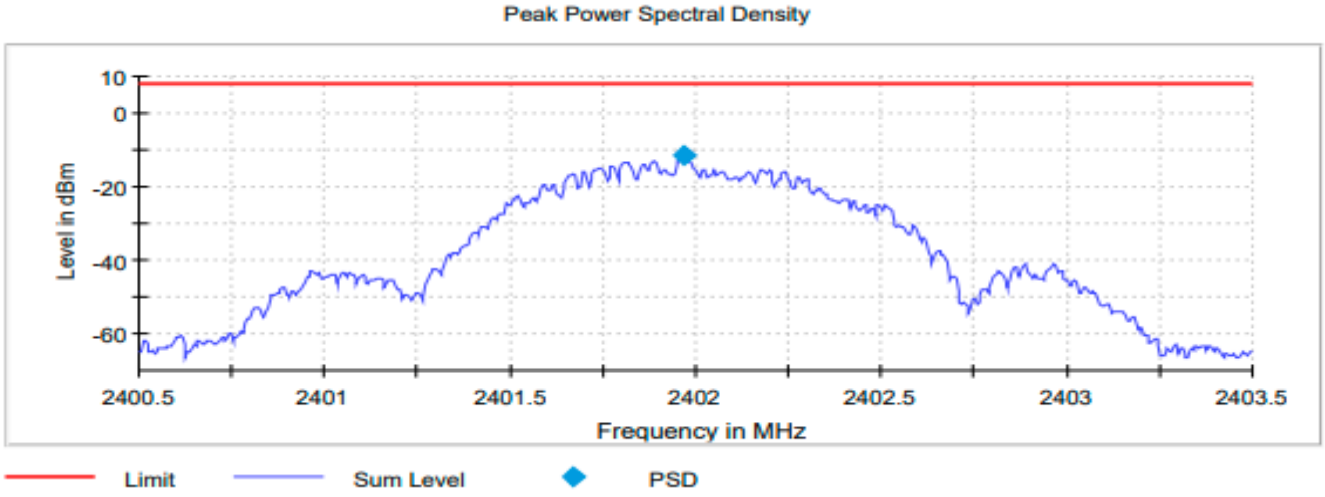
Peak Power Spectral Density

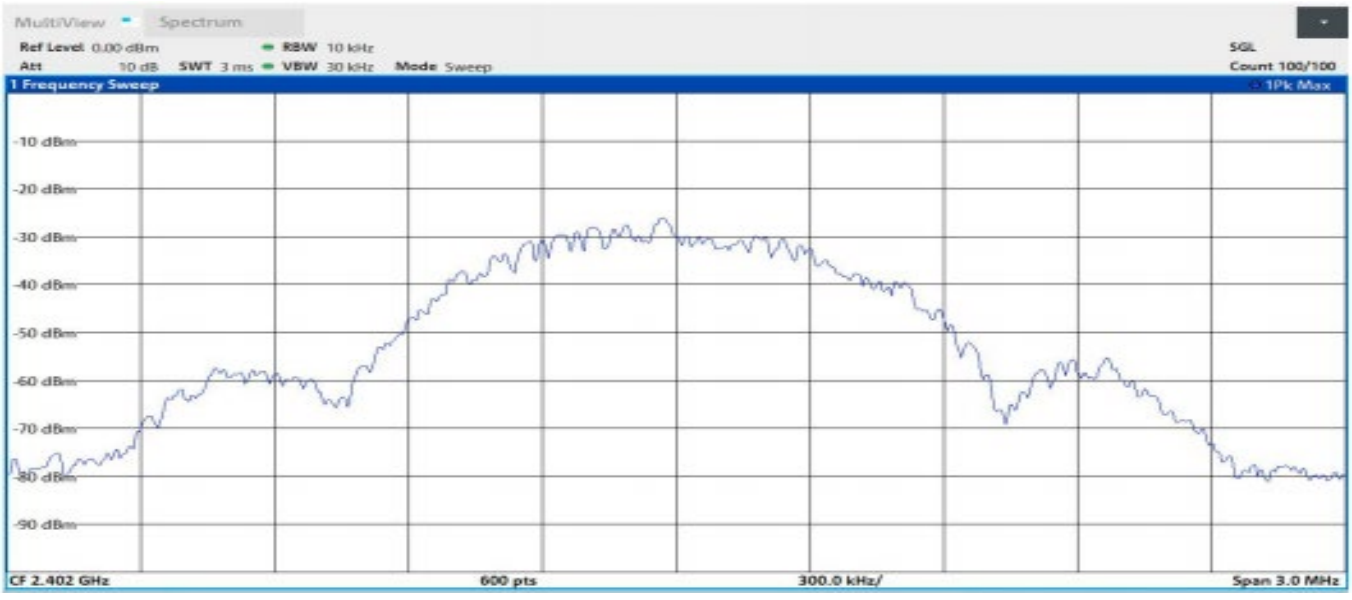
Test according to FCC title 47 part 15 §15.247(a),(e), KDB 558074 D01 DTS Meas Guidance v05 F and ANSI C63.10-2013

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

Channel	DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit (dBm)
CH0-2402	2402.000000	2401.967500	-11.584	8.0
CH19-2440	2440.000000	2439.972500	-11.317	8.0
CH39-2480	2480.000000	2479.972500	-11.827	8.0

CH0-2402MHz





Tx Spurious Emission

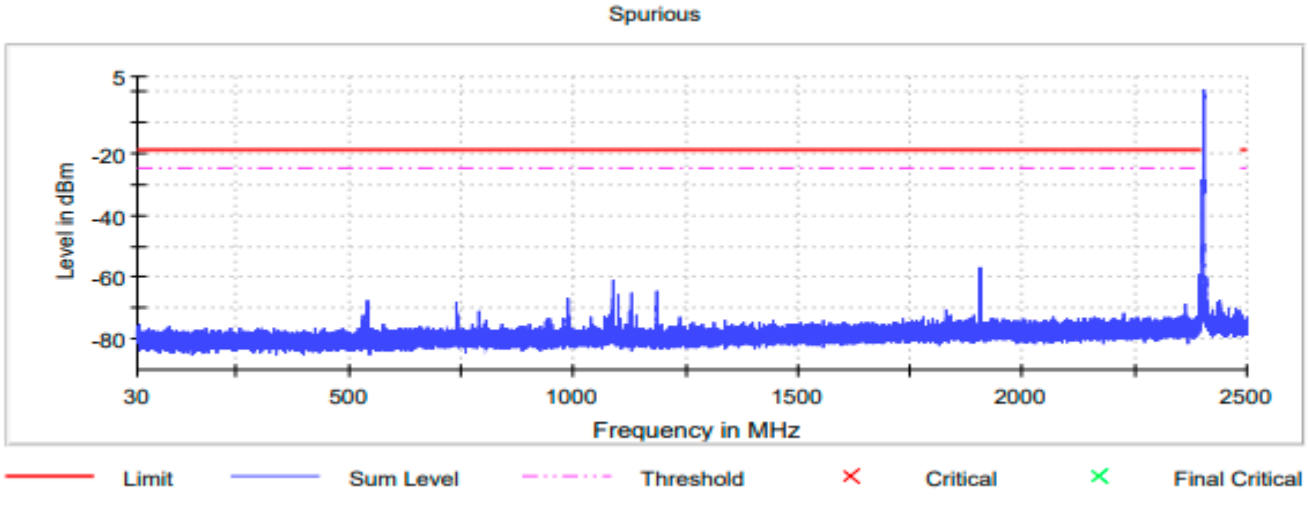
Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v05 8.5 and ANSI C63.10-2013 11.11.2 & 11.11.3

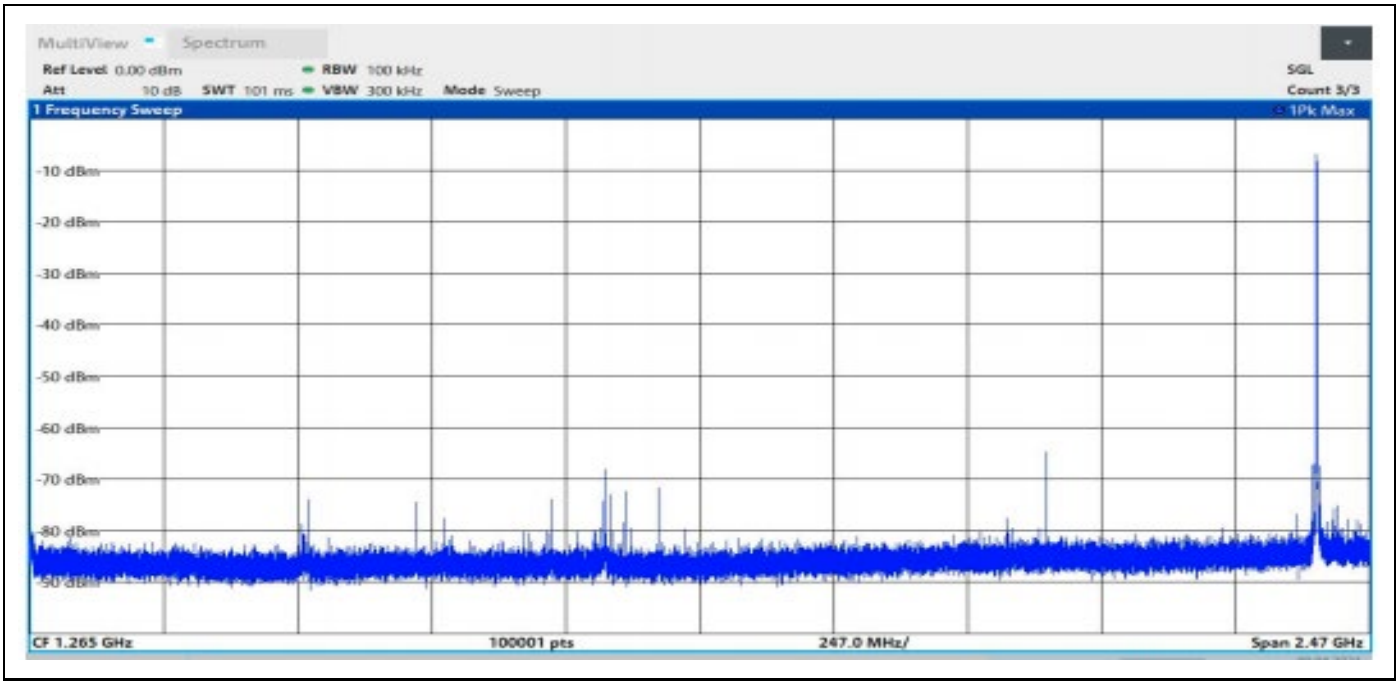
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 1.8 dB

CH0-2402MHz

Pre Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
1904.773002	-57.0	38.1	-18.9
1904.797702	-57.1	38.1	-18.9
1904.748303	-58.3	39.3	-18.9
1904.822402	-58.4	39.5	-18.9
2399.978350	-59.2	40.3	-18.9
1904.575404	-59.2	40.3	-18.9
1904.600104	-59.3	40.3	-18.9
2394.964300	-59.3	40.4	-18.9
2399.953650	-59.3	40.4	-18.9
2394.989000	-59.3	40.4	-18.9
1904.550704	-59.7	40.8	-18.9
2394.939601	-60.2	41.3	-18.9
2395.013700	-60.4	41.4	-18.9
1904.847102	-60.5	41.6	-18.9
1904.624804	-60.6	41.7	-18.9

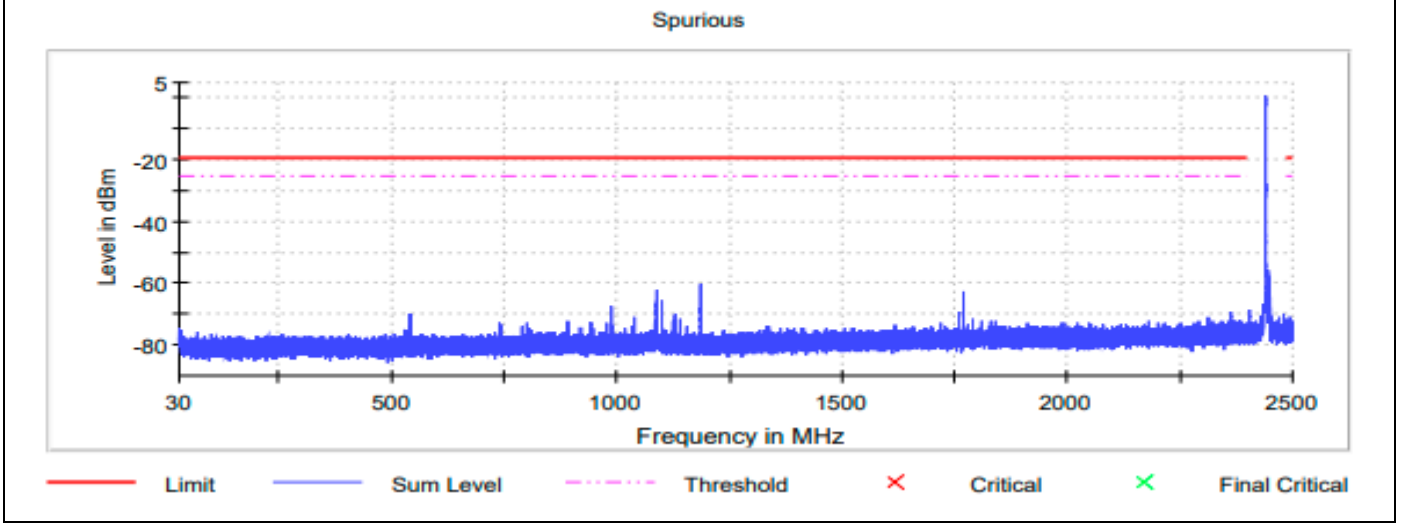


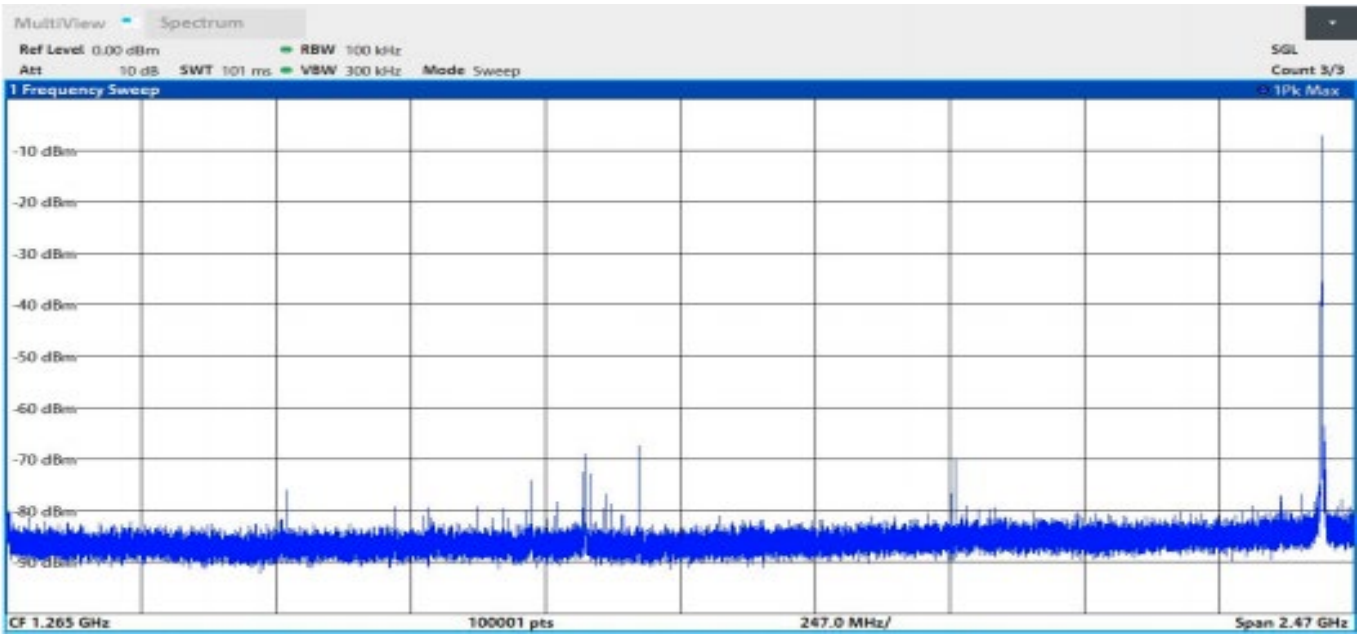

MultiView
Spectrum
Ref Level 0.00 dBm
RBW 100 kHz
SGL
Att 10 dB
SWT 101 ms
VBW 300 kHz
Mode Sweep
Count 3/3
1 Frequency Sweep
1Pk Max
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
CF 1.265 GHz
100001 pts
247.0 MHz/
Span 2.47 GHz

CH19-2440MHz

Pre Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
1187.986170	-60.2	41.0	-19.3
1187.961470	-60.3	41.0	-19.3
1188.010870	-60.7	41.4	-19.3
1187.936771	-61.6	42.3	-19.3
1089.014260	-61.9	42.7	-19.3
1088.989560	-62.0	42.8	-19.3
1089.038960	-62.2	42.9	-19.3
1768.652663	-62.5	43.2	-19.3
1768.627964	-62.6	43.3	-19.3
1188.035570	-62.7	43.5	-19.3
1768.677363	-62.9	43.7	-19.3
1088.964860	-63.1	43.9	-19.3
1088.940161	-63.7	44.4	-19.3
1089.063659	-63.9	44.6	-19.3
1187.912071	-64.0	44.8	-19.3

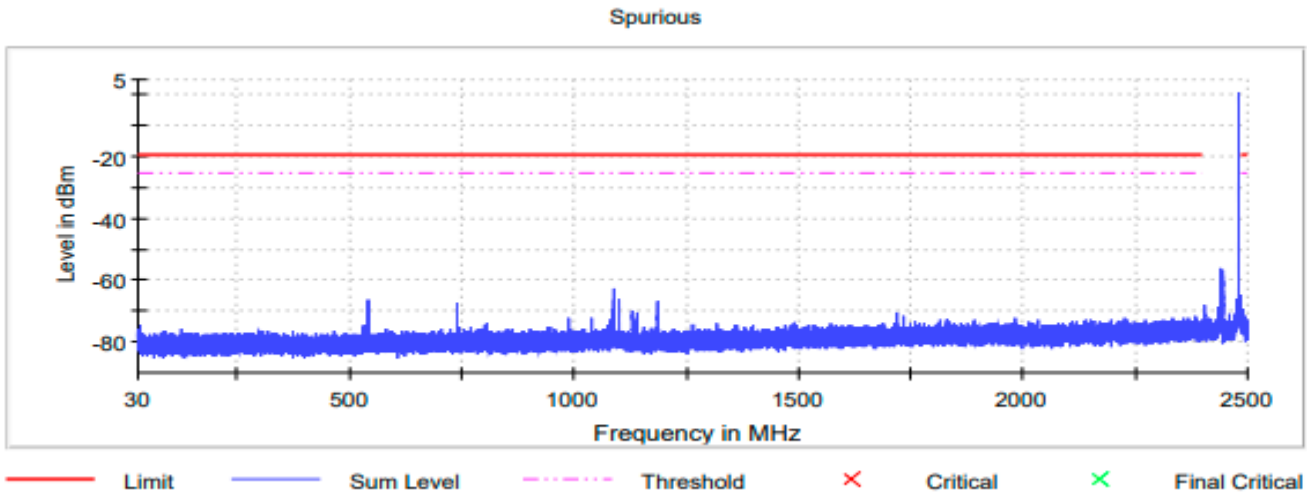


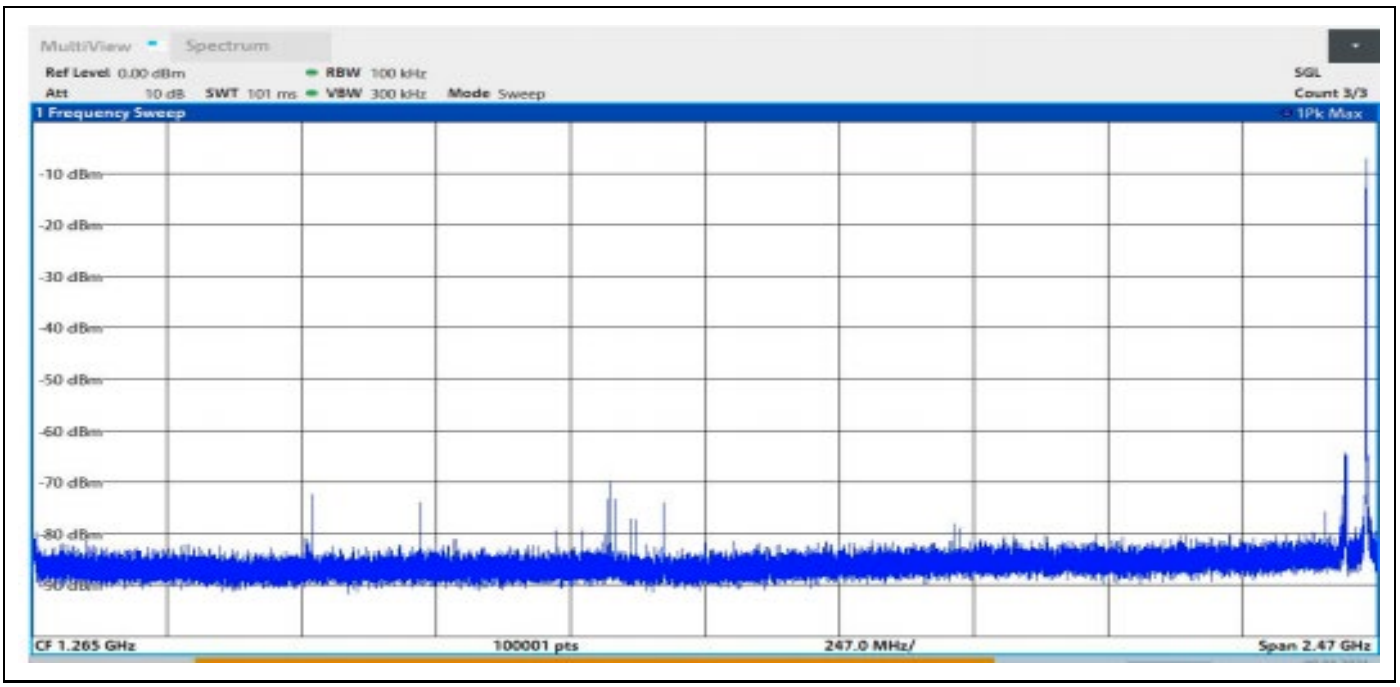

MultiView
Spectrum
Ref Level 0.00 dBm
RBW 100 kHz
SGL
Att 10 dB
SWT 101 ms
VBW 300 kHz
Mode Sweep
Count 3/3
1 Frequency Sweep
1Pk Max
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
CF 1.265 GHz
100001 pts
247.0 MHz/
Span 2.47 GHz

CH39-2480MHz

Pre Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
1088.964860	-62.7	43.5	-19.2
1088.989560	-62.9	43.7	-19.2
1088.940161	-62.9	43.7	-19.2
1089.038960	-63.8	44.6	-19.2
1089.014260	-63.8	44.6	-19.2
1088.915461	-64.3	45.1	-19.2
1089.063659	-64.9	45.7	-19.2
544.434106	-66.1	46.8	-19.2
544.409406	-66.1	46.9	-19.2
1088.372066	-66.2	47.0	-19.2
1098.918861	-66.2	47.0	-19.2
1098.943561	-66.2	47.0	-19.2
1088.396766	-66.3	47.1	-19.2
1088.347367	-66.4	47.1	-19.2
1088.890761	-66.4	47.2	-19.2




Multi View
Spectrum
Ref Level 0.00 dBm
RBW 100 kHz
SGL
Att 10 dB
SWT 101 ms
VBW 300 kHz
Mode Sweep
Count 3/3
1 Frequency Sweep
1Pk Max
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 1.265 GHz
100001 pts
247.0 MHz/
Span 2.47 GHz

Band Edge Low (2402 MHz)

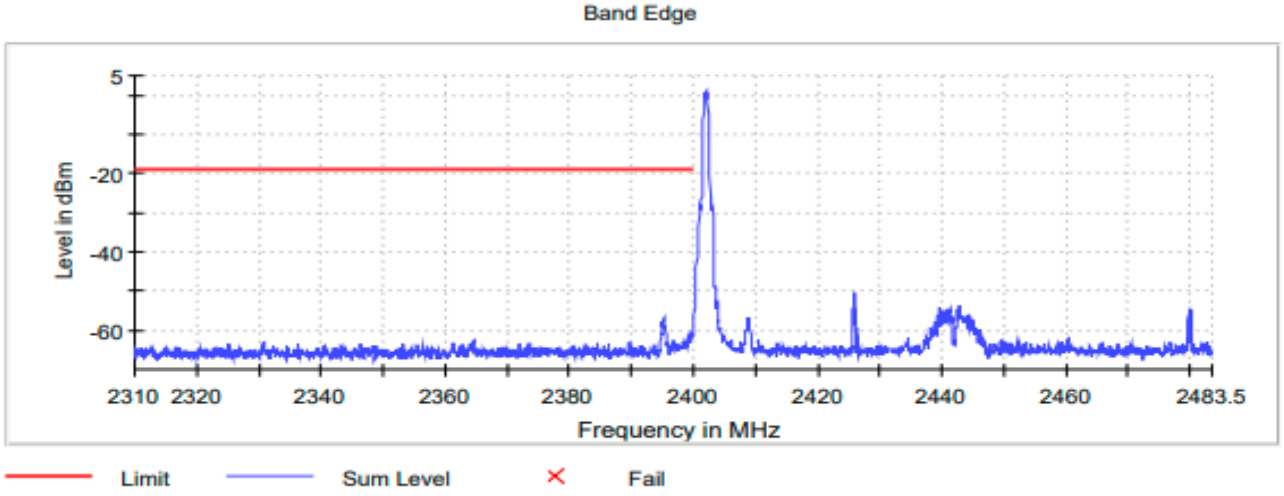
Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v05 and ANSI C63.10-2013 7.8.6

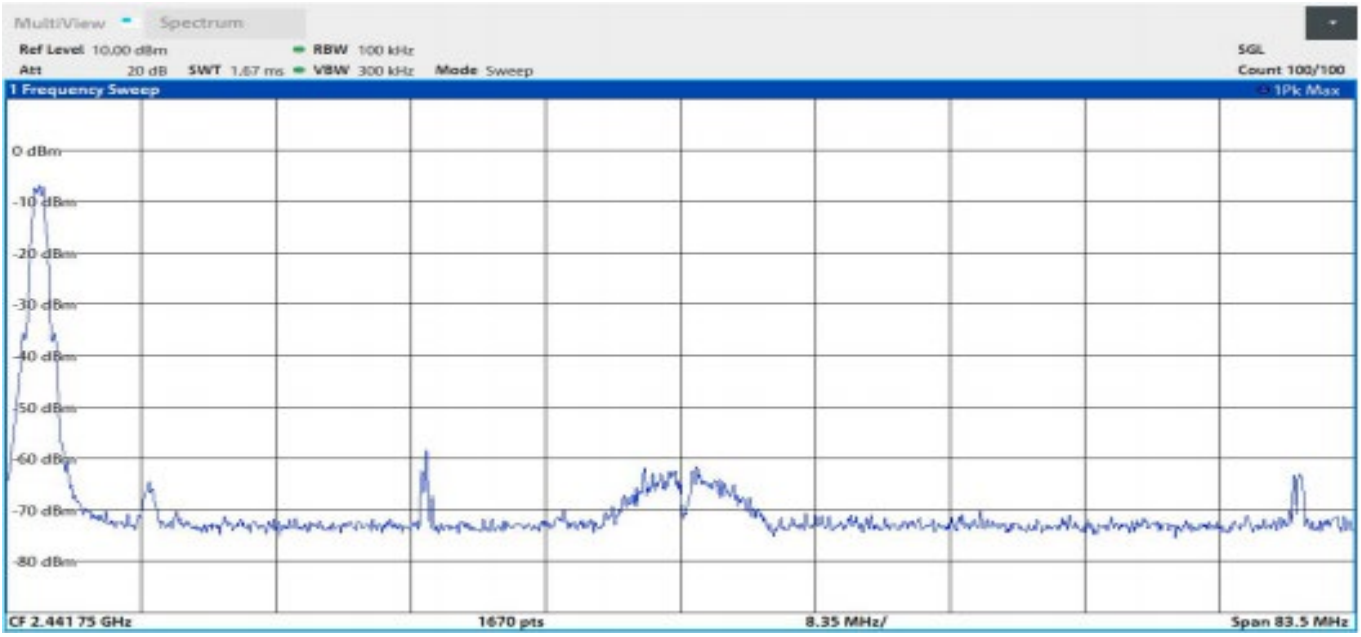
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 0.8 dB

DUT Frequency (MHz)	Frequency (MHz)	Level(dBm)
2402	2401.975000	1.1

2402MHz DH1

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.975000	-56.5	37.7	-18.9	PASS
2395.225000	-56.7	37.8	-18.9	PASS
2395.175000	-57.1	38.2	-18.9	PASS
2394.975000	-57.9	39.1	-18.9	PASS
2395.275000	-58.1	39.2	-18.9	PASS
2394.925000	-58.2	39.3	-18.9	PASS
2395.125000	-58.3	39.5	-18.9	PASS
2399.925000	-58.3	39.5	-18.9	PASS
2395.075000	-58.6	39.8	-18.9	PASS
2395.425000	-58.9	40.1	-18.9	PASS
2395.025000	-59.1	40.2	-18.9	PASS
2395.375000	-59.4	40.6	-18.9	PASS
2395.475000	-59.4	40.6	-18.9	PASS
2395.325000	-59.8	40.9	-18.9	PASS
2394.825000	-60.6	41.7	-18.9	PASS


Band Edge
Level in dBm
5
-20
-40
-60
2310
2320
2340
2360
2380
2400
2420
2440
2460
2483.5
Frequency in MHz
Limit
Sum Level
Fail


Multi View
Spectrum
Ref Level 10.00 dBm
RBW 100 kHz
SGL
Att 20 dB
SWT 1.67 ms
VBW 300 kHz
Mode Sweep
Count 100/100
1 Frequency Sweep
1Pk Max
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.441 75 GHz
1670 pts
8.35 MHz/
Span 83.5 MHz

Band Edge High (2480 MHz)

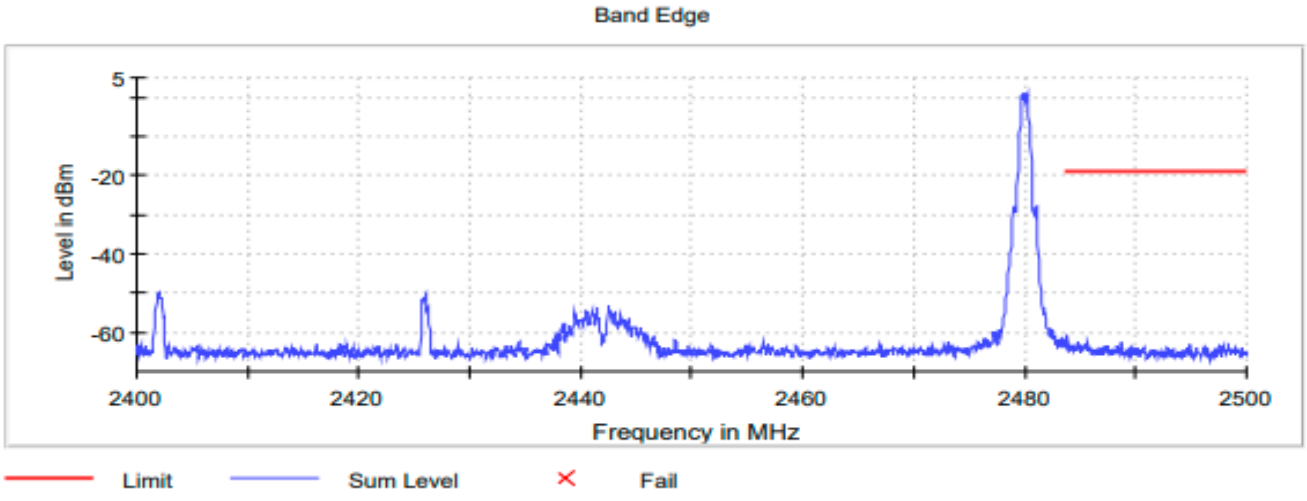
Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v05 and ANSI C63.10-2013 7.8.6

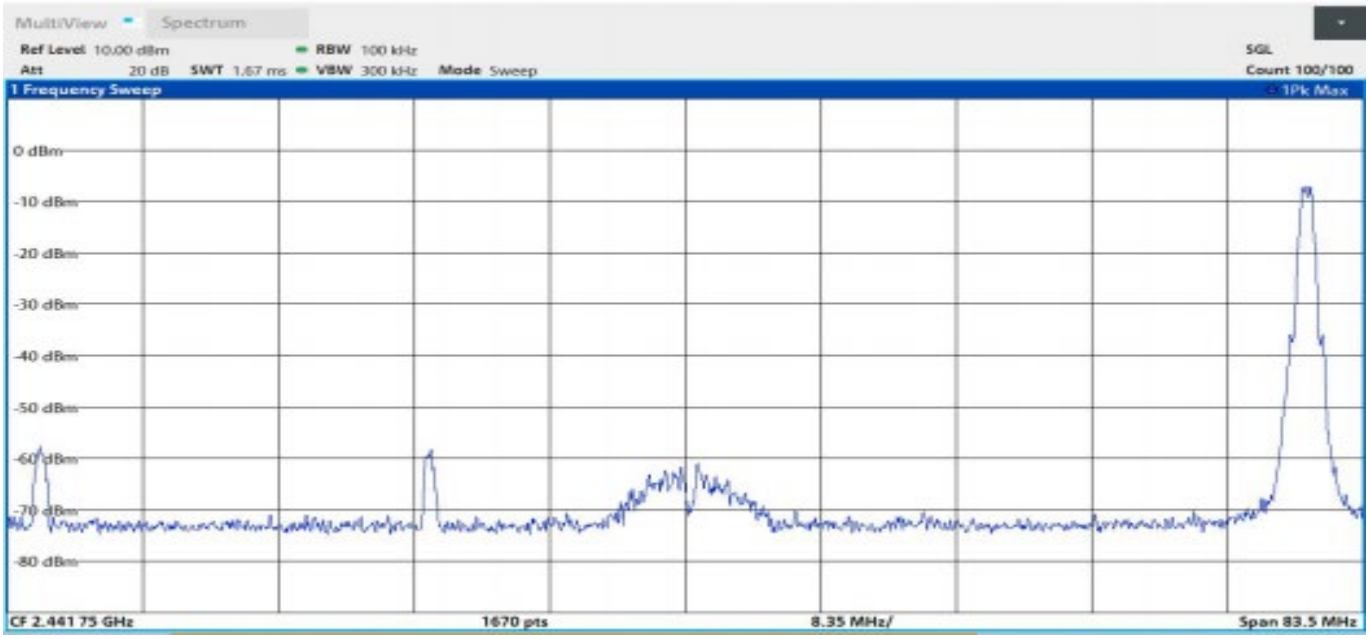
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 0.8 dB

DUT Frequency (MHz)	Frequency (MHz)	Level(dBm)
2480	2480.025000	0.9

2402MHz DH1

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2483.825000	-60.8	41.8	-19.1	PASS
2483.875000	-61.2	42.1	-19.1	PASS
2488.725000	-62.4	43.3	-19.1	PASS
2485.725000	-62.5	43.4	-19.1	PASS
2485.675000	-62.5	43.4	-19.1	PASS
2483.625000	-62.5	43.4	-19.1	PASS
2484.825000	-62.5	43.5	-19.1	PASS
2483.675000	-62.7	43.6	-19.1	PASS
2484.875000	-62.9	43.8	-19.1	PASS
2488.675000	-63.1	44.0	-19.1	PASS
2485.425000	-63.1	44.0	-19.1	PASS
2494.875000	-63.2	44.1	-19.1	PASS
2497.625000	-63.2	44.1	-19.1	PASS
2494.825000	-63.3	44.2	-19.1	PASS
2488.325000	-63.3	44.2	-19.1	PASS


Band Edge
Level in dBm
5
-20
-40
-60
2400
2420
2440
2460
2480
2500
Frequency in MHz
Limit
Sum Level
Fail


MultiView
Spectrum
Ref Level 10.00 dBm
RBW 100 kHz
SGL
Att 20 dB
SWT 1.67 ms
VBW 300 kHz
Mode Sweep
Count 100/100
1 Frequency Sweep
1Pk Max
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.441 75 GHz
1670 pts
8.35 MHz/
Span 83.5 MHz

- **Radiated Testing**

Test Summary

Start: 8/10/2021	End: 8/26/2021	Temperature: 24°C Humidity: 48%	Initials: RP

DUT S/N	AH20110901-HAR-279-08		DUT Operating Mode	2.4GHz BLE
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-25GHz	Horizontal	☐Over ☒Under	√
		Vertical	☐Over ☒Under	√

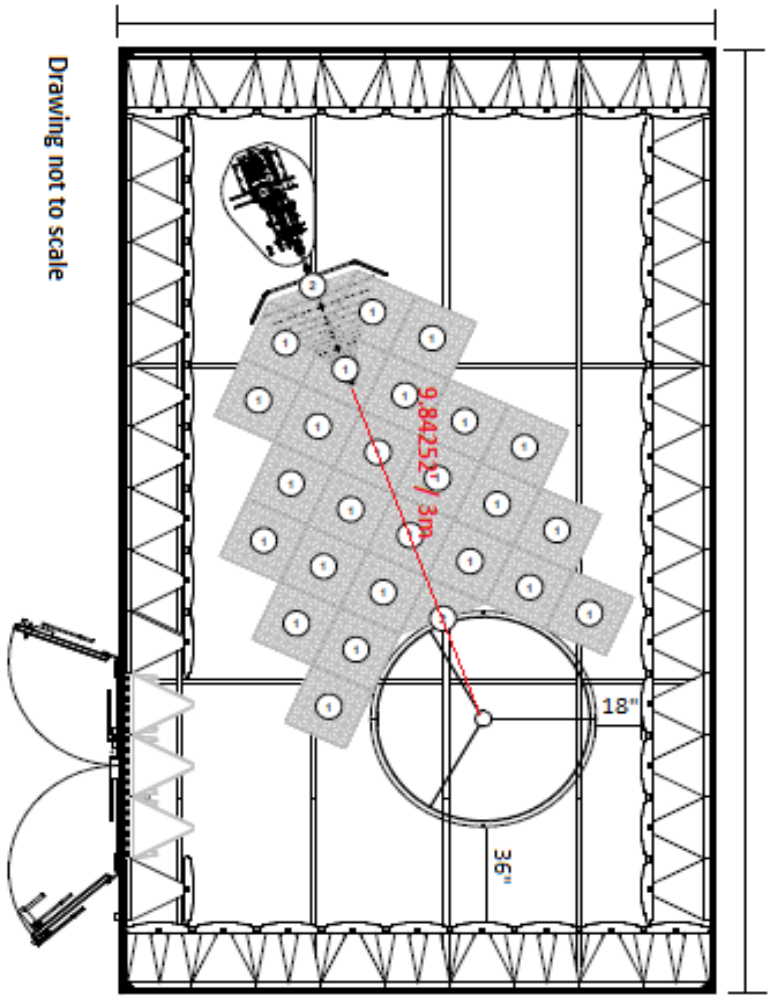
Notes: √ meets the requirements of the acceptance criteria.

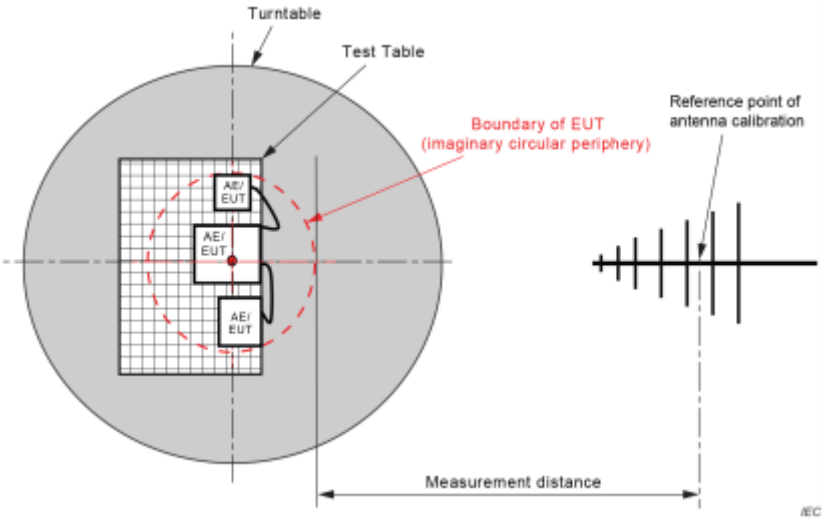
Test Setup

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 *s*VSWR
Test Completion	December 18th, 2019

Chamber Dimensions




Turntable
Test Table
Boundary of EUT
(imaginary circular periphery)
Reference point of
antenna calibration
AE/
EUT
AE/
EUT
AE/
EUT
Measurement distance
IEC

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	7/22/2021
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	00214778/00214648	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	8/28/2021
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
BVD0481	Band Reject Filter 40dB from 5150 to 5880MHz	Micro-Tronics	BRM50716	G336	N/A
N/A	Support Laptop	Lenovo	E560	LW10USAUH01ABUD	N/A

Equipment List (Software)

Equipment	Manufacturer	Model	Version No.
EMC Test Software	Nexio	BAT-EMC	3.20.0.21

Customer Supplied Equipment

ID #	Equipment	Manufacturer	Model	Serial #	Version No.
N/A	Display	Harman	N/A	1683	N/A
N/A	Display Harness	Harman	N/A	N/A	N/A
N/A	Bluetooth LAN	Harman	N/A	84375197	N/A
N/A	Antenna	Harman	N/A	20072	N/A
N/A	Blue Molex Connector Harness	Harman	N/A	N/A	N/A
N/A	DUT 1M Harness	Harman	N/A	N/A	N/A
N/A	USB to DUT Harness	Harman	N/A	102161025	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

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

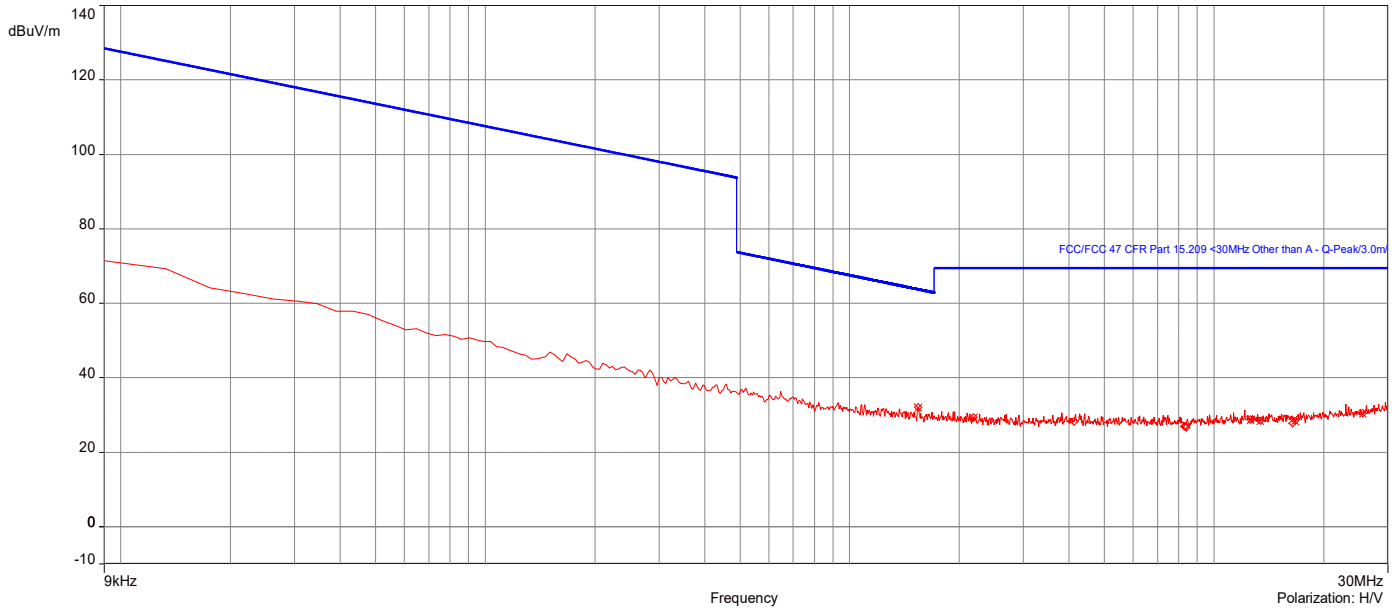
1. Raw Q-Peak Level (dBuV/m) = Level Q-Peak Reading - Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level – Limit

AH20110901-HAR-279-08_2.4G BLE_2441MHz_9kHz-30MHz_Ground-Parallel

8/25/2021 16:24:58

No	Frequency	Level Peak Reading (dBuV/m)	Correction Factor (dB)	Limit dBuV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	1.543045MHz	32.09	19.14	63.84	-31.75	1.00	130.90	H/V	Passed
2.	2.185801MHz	29.34	19.10	69.54	-40.21	1.00	158.10	H/V	Passed
3.	12.577024MHz	28.76	19.57	69.54	-40.78	1.00	253.20	H/V	Passed
4.	13.395467MHz	28.56	19.62	69.54	-40.98	1.00	246.40	H/V	Passed
5.	16.694949MHz	28.50	19.70	69.54	-41.04	1.00	324.70	H/V	Passed
6.	25.603548MHz	30.50	20.70	69.54	-39.04	1.00	205.70	H/V	Passed

Overall Graphs:

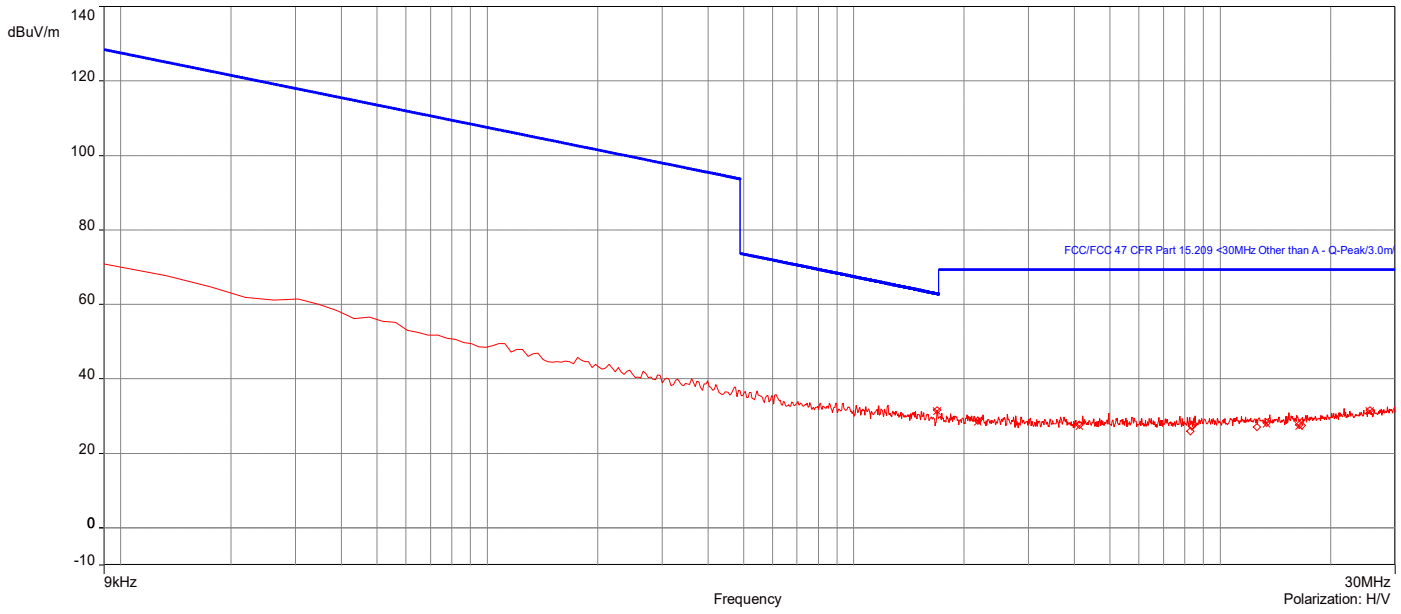


AH20110901-HAR-279-08_2.4G BLE_2441MHz_9kHz-30MHz_Parallel

8/25/2021 16:22:58

No	Frequency	Level Peak Reading (dBuV/m)	Correction Factor (dB)	Limit dBuV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	1.688736MHz	31.58	19.13	63.05	-31.48	1.00	266.60	H/V	Passed
2.	2.181516MHz	28.76	19.10	69.54	-40.79	1.00	72.90	H/V	Passed
3.	4.126924MHz	27.70	19.21	69.54	-41.84	1.00	231.30	H/V	Passed
4.	13.391182MHz	28.26	19.62	69.54	-41.29	1.00	203.80	H/V	Passed
5.	16.420706MHz	27.60	19.70	69.54	-41.95	1.00	338.50	H/V	Passed
6.	25.573553MHz	31.64	20.70	69.54	-37.90	1.00	159.00	H/V	Passed

Overall Graphs:

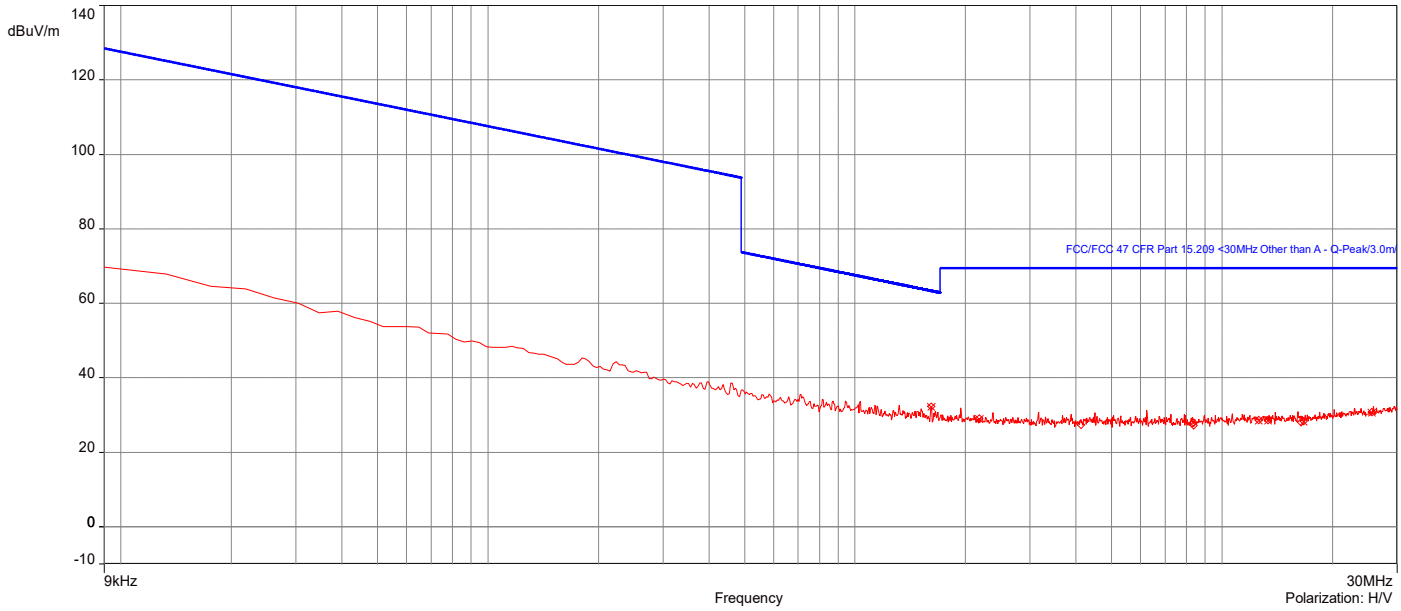


AH20110901-HAR-279-08_2.4G BLE_2441MHz_9kHz-30MHz_Perpendicular

8/25/2021 16:18:18

No	Frequency	Level Peak Reading (dBuV/m)	Correction Factor (dB)	Limit dBuV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	1.611605MHz	32.29	19.14	63.46	-31.17	1.00	101.70	H/V	Passed
2.	2.181516MHz	29.09	19.10	69.54	-40.45	1.00	0.10	H/V	Passed
3.	12.577024MHz	28.70	19.57	69.54	-40.84	1.00	355.80	H/V	Passed
4.	13.361187MHz	28.63	19.61	69.54	-40.91	1.00	24.70	H/V	Passed
5.	16.694949MHz	28.31	19.70	69.54	-41.24	1.00	248.80	H/V	Passed
6.	25.569268MHz	30.74	20.69	69.54	-38.80	1.00	348.20	H/V	Passed

Overall Graphs:

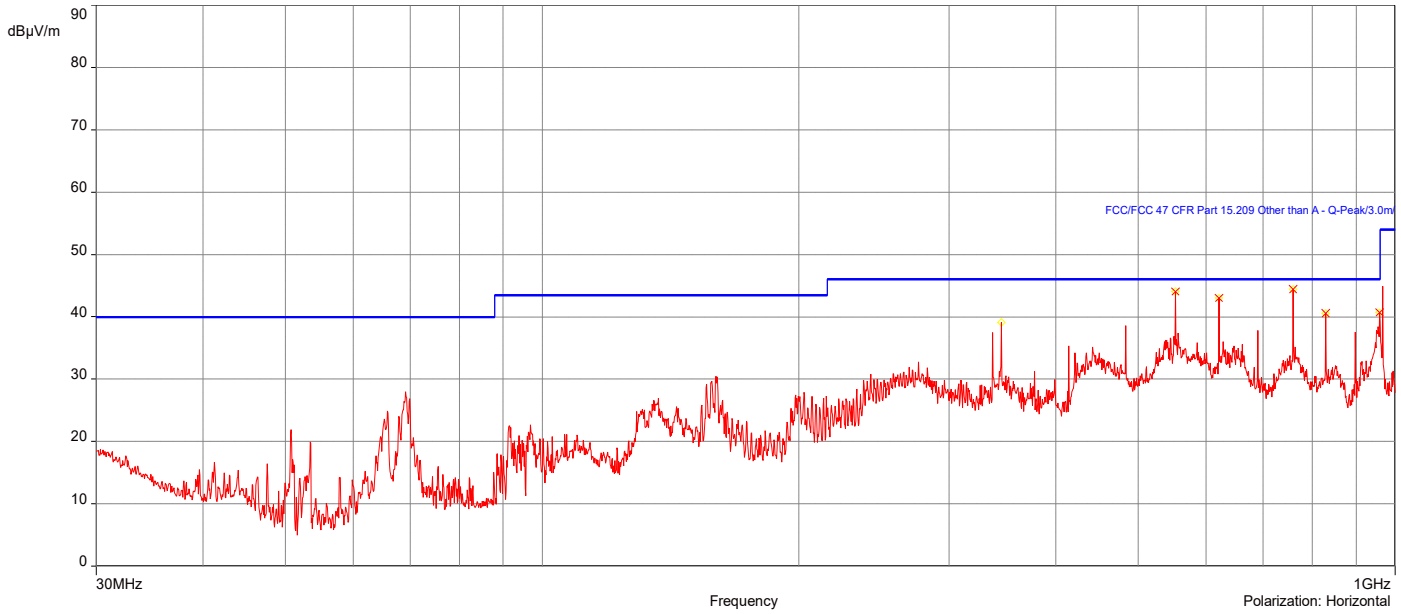


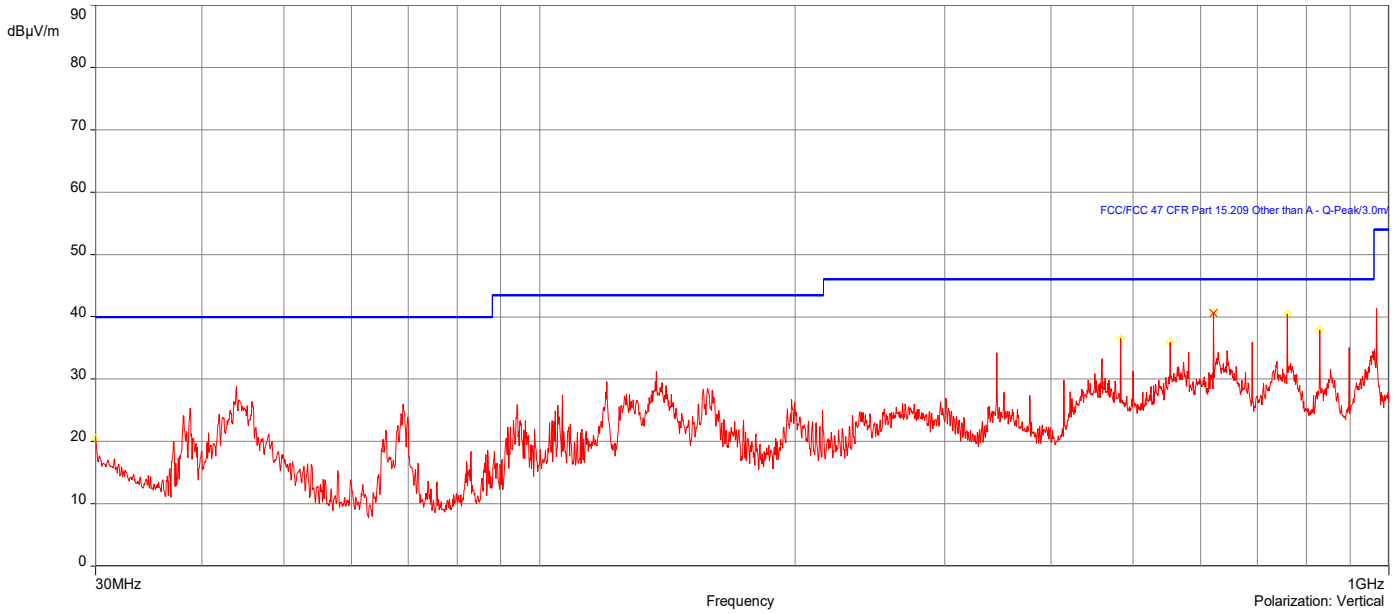
AH20110901-HAR-279-08_2.4G BLE_2402MHz_30MHz-1GHz

8/20/2021 20:39:15

No	Frequency	Level Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
7.	621.4495MHz	40.68	-4.78	46.00	-5.32	2.00	331.60	Vertical	Passed
8.	552.40426MHz	44.06	-5.30	46.00	-1.94	2.00	0.10	Horizontal	Passed
9.	621.50656MHz	43.07	-3.73	46.00	-2.93	2.00	205.60	Horizontal	Passed
10.	759.59704MHz	44.44	-1.84	46.00	-1.56	2.50	334.70	Horizontal	Passed
11.	828.64227MHz	40.59	-0.51	46.00	-5.41	1.50	101.00	Horizontal	Passed
12.	959.59998MHz	40.70	0.71	46.00	-5.30	1.00	319.70	Horizontal	Passed

Overall Graphs:



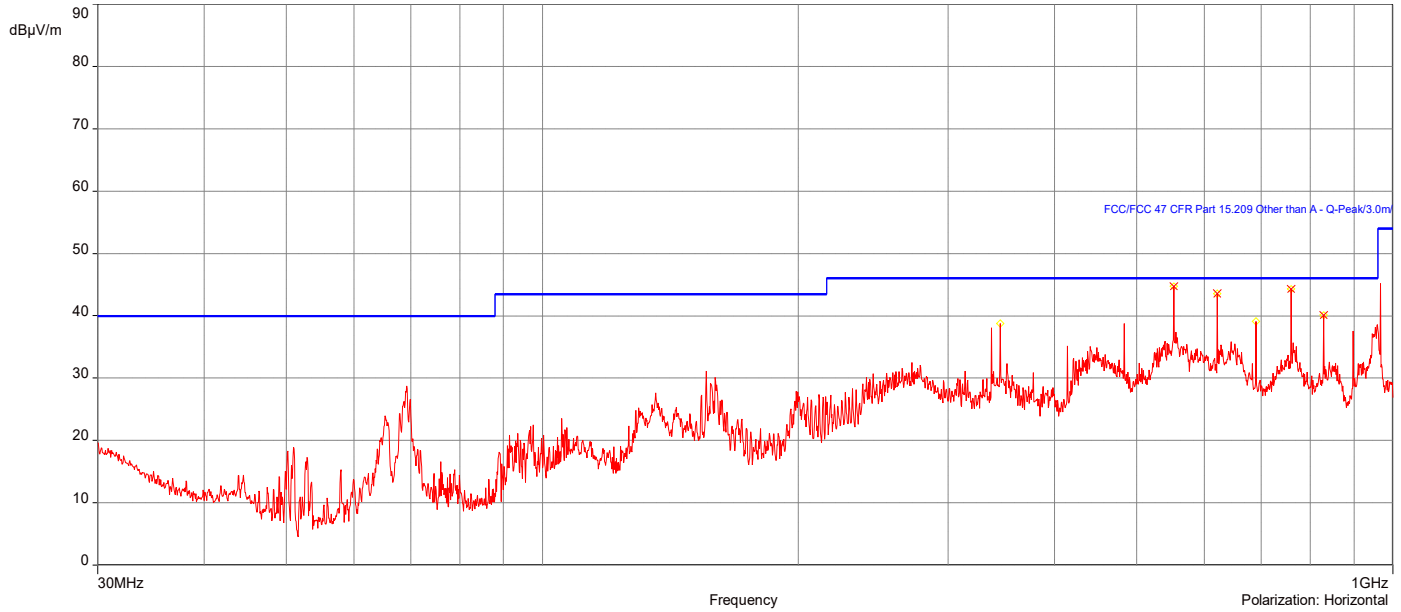

dBµV/m
90
80
70
60
50
40
30
20
10
0
FCC/FCC 47 CFR Part 15.209 Other than A - Q-Peak/3.0m
30MHz
Frequency
1GHz
Polarization: Vertical

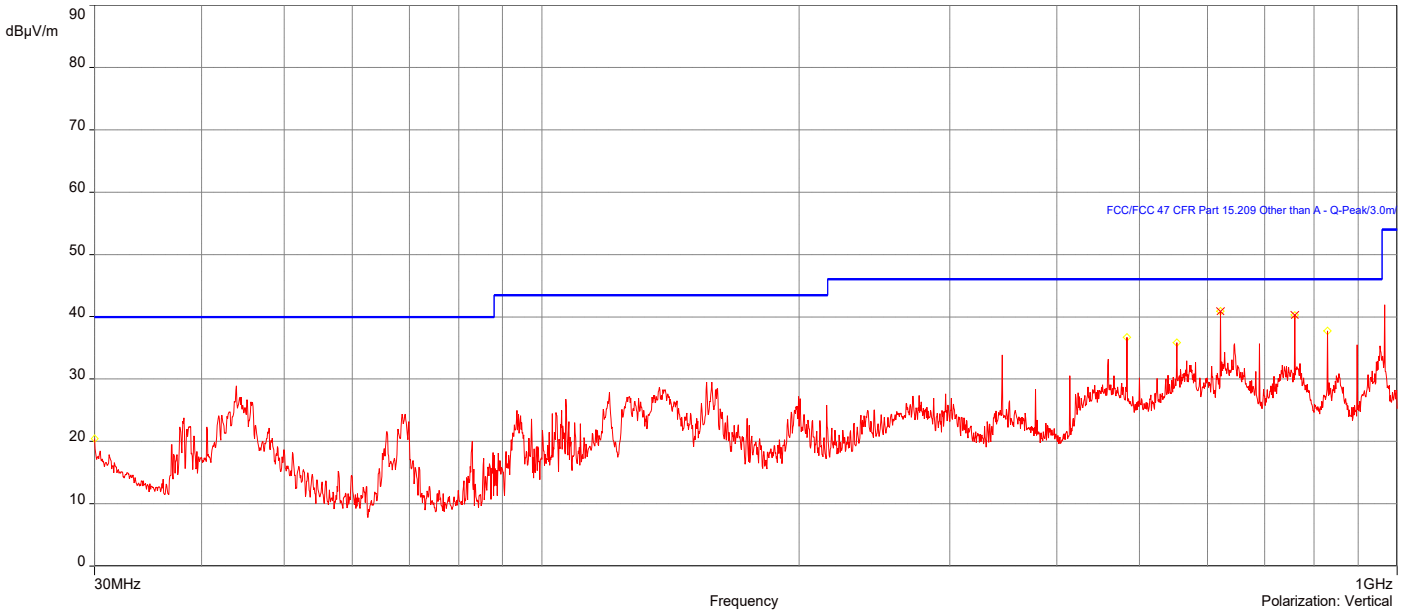
AH20110901-HAR-279-08_2.4G BLE_2441MHz_30MHz-1GHz

8/20/2021 20:55:48

No	Frequency	Level Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	621.4495MHz	40.93	-4.78	46.00	-5.07	2.00	343.90	Vertical	Passed
2.	759.59704MHz	40.35	-2.94	46.00	-5.65	1.50	349.80	Vertical	Passed
3.	552.40426MHz	44.75	-5.30	46.00	-1.25	2.00	358.50	Horizontal	Passed
4.	621.4495MHz	43.57	-3.74	46.00	-2.43	2.00	216.60	Horizontal	Passed
5.	759.59704MHz	44.31	-1.84	46.00	-1.69	2.50	333.60	Horizontal	Passed
6.	828.64227MHz	40.12	-0.51	46.00	-5.88	1.50	160.70	Horizontal	Passed

Overall Graphs:



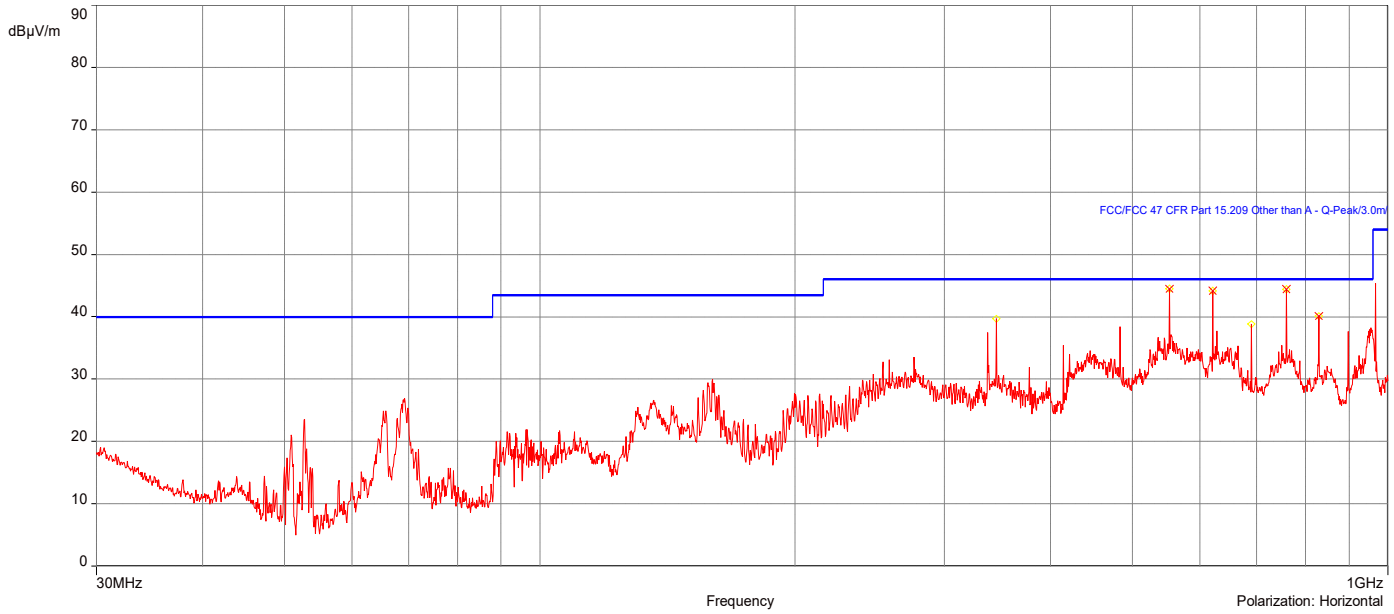

dBµV/m
90
80
70
60
50
40
30
20
10
0
FCC/FCC 47 CFR Part 15.209 Other than A - Q-Peak/3.0m
30MHz
1GHz
Frequency
Polarization: Vertical

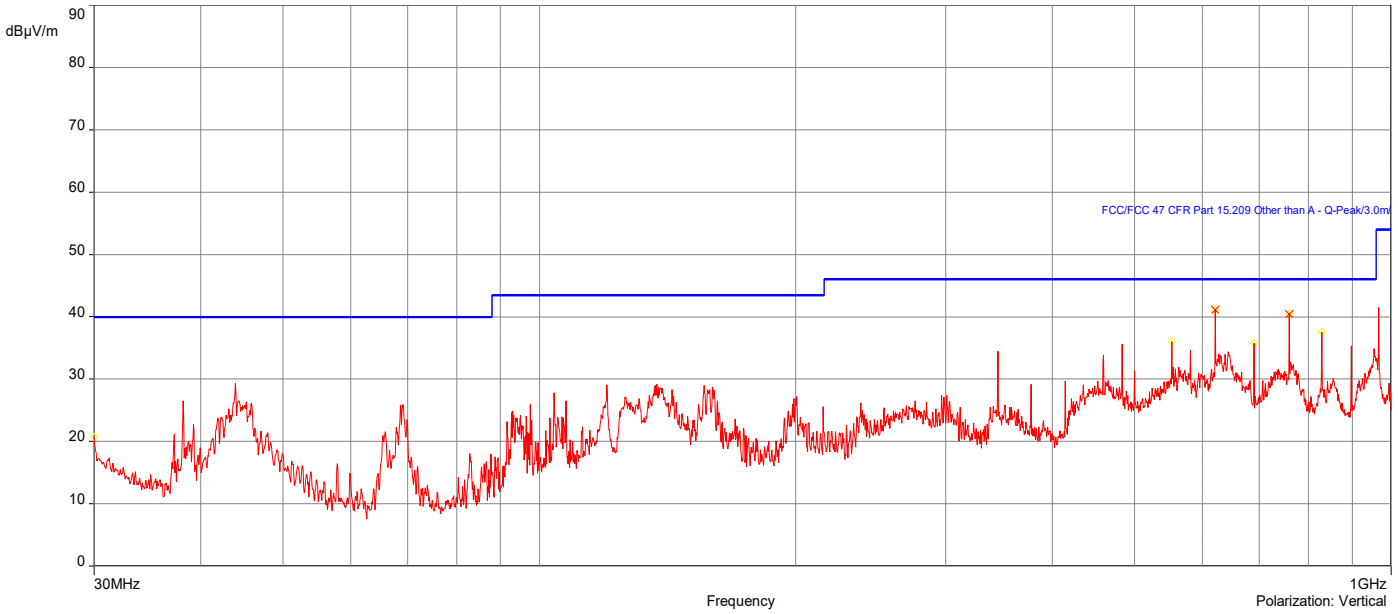
AH20110901-HAR-279-08_2.4G BLE_2480MHz_30MHz-1GHz

8/20/2021 21:12:58

No	Frequency	Level Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
	621.4495MHz	41.17	-4.78	46.00	-4.83	2.00	336.10	Vertical	Passed
	759.59704MHz	40.46	-2.94	46.00	-5.54	1.50	343.60	Vertical	Passed
	552.40426MHz	44.51	-5.30	46.00	-1.49	2.00	0.10	Horizontal	Passed
	621.4495MHz	44.12	-3.74	46.00	-1.88	2.00	217.90	Horizontal	Passed
	759.59704MHz	44.43	-1.84	46.00	-1.57	2.50	331.80	Horizontal	Passed
	828.64227MHz	40.12	-0.51	46.00	-5.88	1.50	96.10	Horizontal	Passed

Overall Graphs:




dBµV/m
90
80
70
60
50
40
30
20
10
0
FCC/FCC 47 CFR Part 15.209 Other than A - Q-Peak/3.0m
30MHz
Frequency
1GHz
Polarization: Vertical

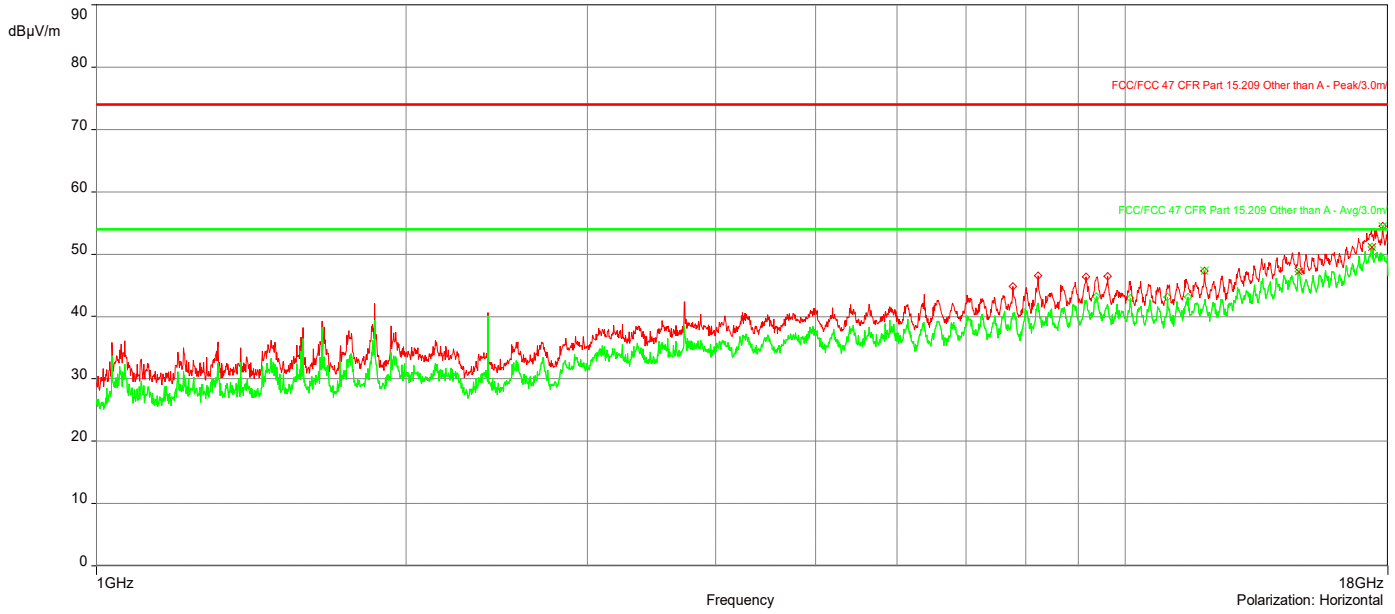
AH20110901-HAR-279-08_2.4G BLE 2402MHz_1-18GHz

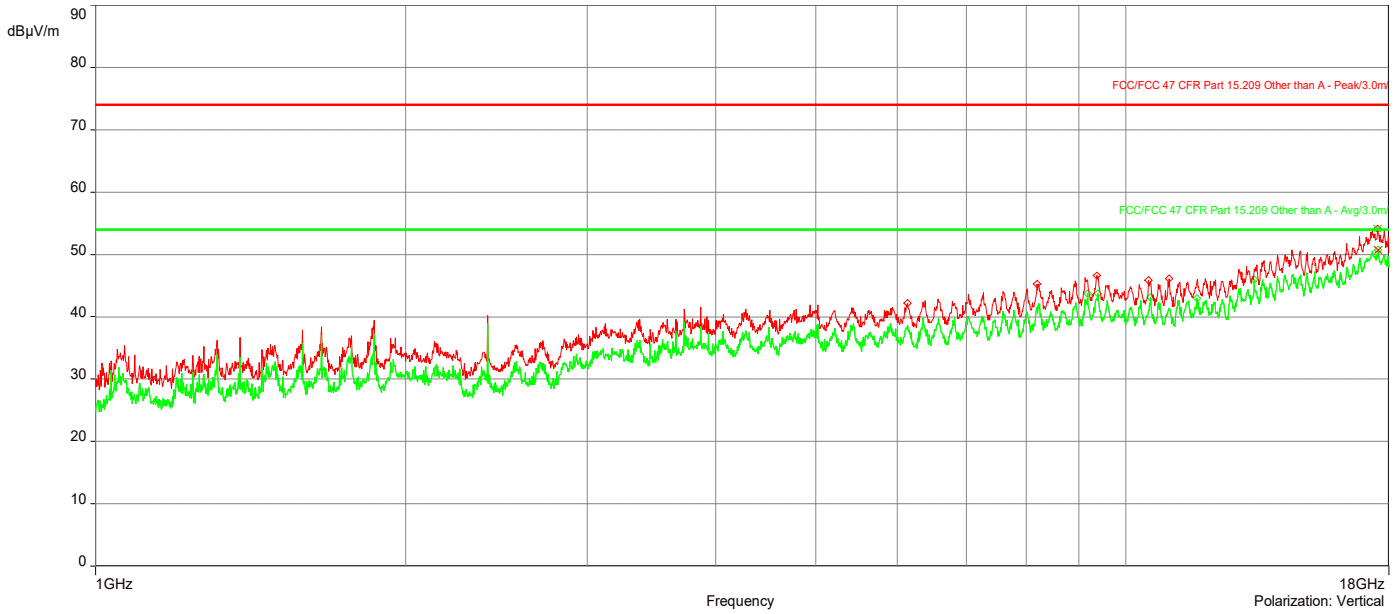
8/19/2021 17:15:39

No	Frequency (MHz)	Level Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	17.545987GHz	54.16	18.89	74.00	-19.84	1.50	304.10	Vertical	
2.	11.947322GHz	47.35	10.01	74.00	-26.65	2.00	173.10	Horizontal	
3.	17.795994GHz	54.53	18.88	74.00	-19.47	2.00	329.20	Horizontal	

No	Frequency (MHz)	Level Average Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	17.567987GHz	50.74	18.88	54.00	-3.26	1.50	334.10	Vertical	
2.	14.739404GHz	47.23	14.79	54.00	-6.77	3.50	139.30	Horizontal	
3.	17.361981GHz	51.21	18.53	54.00	-2.79	1.50	156.90	Horizontal	

Overall Graphs:




dBµV/m
90
80
70
60
50
40
30
20
10
0
FCC/FCC 47 CFR Part 15.209 Other than A - Peak/3.0m
FCC/FCC 47 CFR Part 15.209 Other than A - Avg/3.0m
1GHz
Frequency
18GHz
Polarization: Vertical

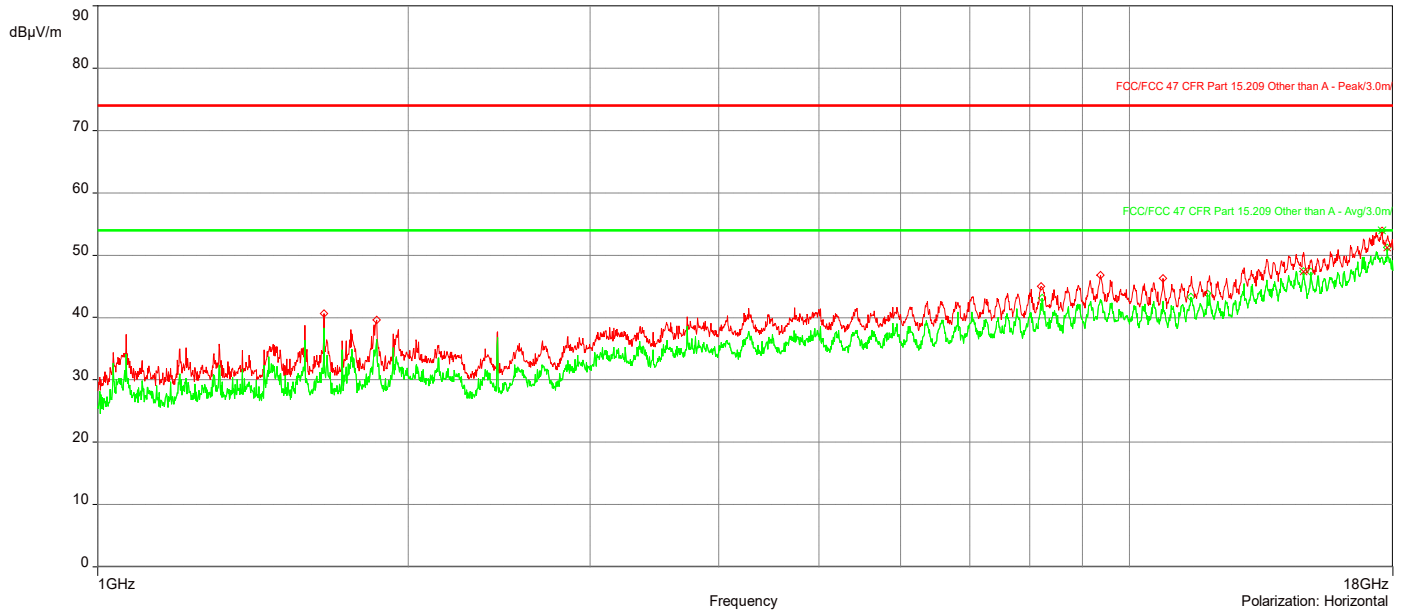
AH20110901-HAR-279-08_2.4G BLE 2441MHz_1-18GHz

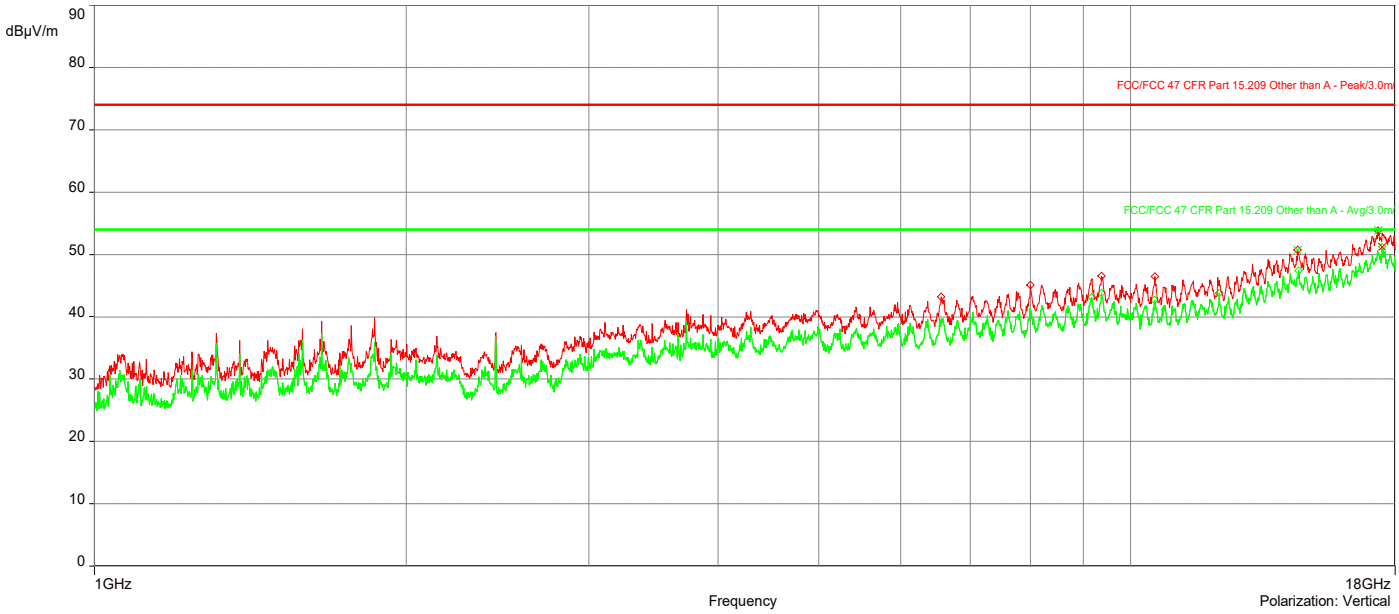
8/19/2021 17:34:56

No	Frequency (MHz)	Level Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	14.497897GHz	50.76	14.74	74.00	-23.24	3.00	223.60	Vertical	Passed
2.	17.33348GHz	53.79	18.40	74.00	-20.21	4.00	90.70	Vertical	Passed
3.	17.572987GHz	54.00	18.87	74.00	-20.00	3.00	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.	17.487985GHz	51.25	18.80	54.00	-2.75	1.50	321.70	Vertical	Passed
2.	14.748904GHz	47.40	14.77	54.00	-6.60	2.00	117.10	Horizontal	Passed
3.	17.772993GHz	51.26	18.87	54.00	-2.74	3.00	170.20	Horizontal	Passed

Overall Graphs:




dBµV/m
90
80
70
60
50
40
30
20
10
0
FCC/FCC 47 CFR Part 15.209 Other than A - Peak/3.0m
FCC/FCC 47 CFR Part 15.209 Other than A - Avg/3.0m
1GHz
18GHz
Frequency
Polarization: Vertical

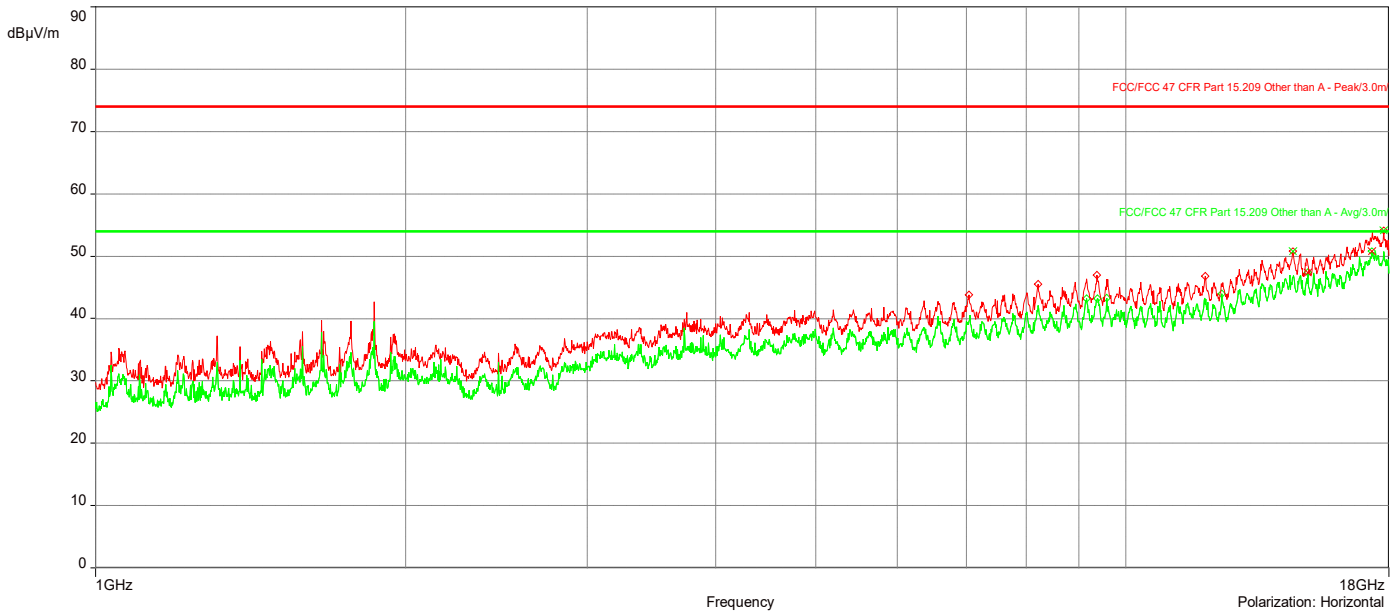
AH20110901-HAR-279-08_2.4G BLE 2480MHz_1-18GHz

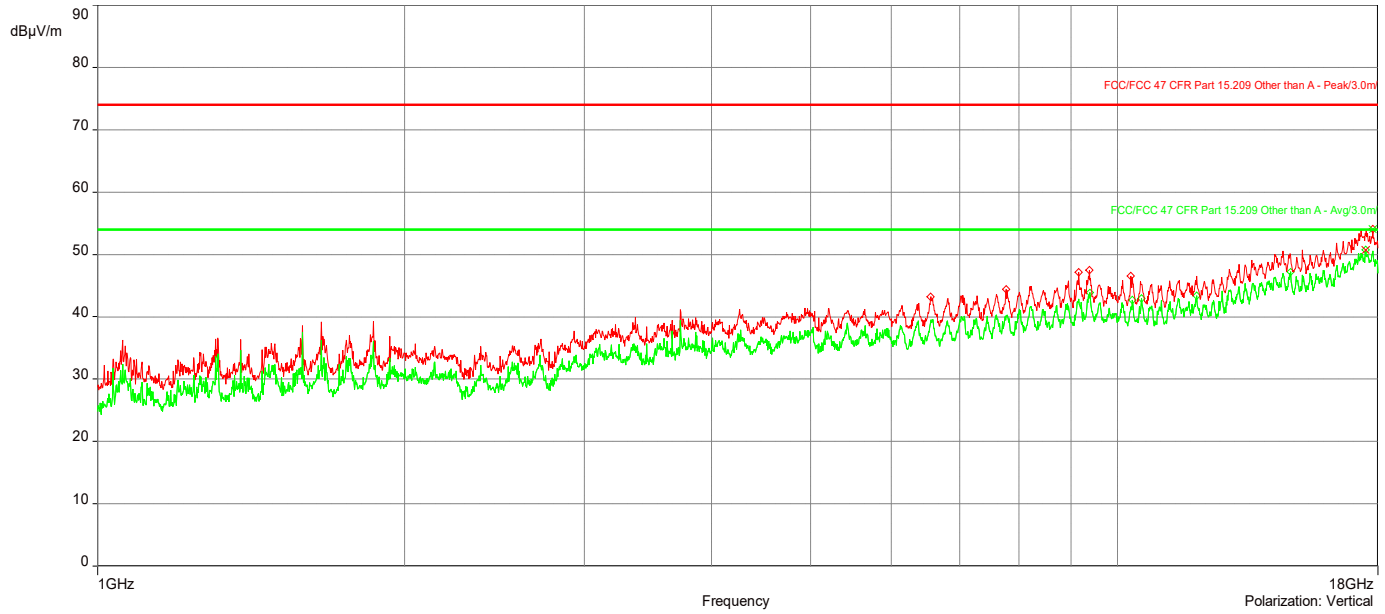
8/19/2021 17:53:26

No	Frequency (MHz)	Level Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	17.790494GHz	54.05	18.88	74.00	-19.95	1.00	2.30	Vertical	Passed
2.	14.530398GHz	50.83	14.75	74.00	-23.17	3.00	0.10	Horizontal	Passed
3.	17.792494GHz	54.17	18.88	74.00	-19.83	4.00	309.50	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	17.519486GHz	50.72	18.83	54.00	-3.28	1.00	7.10	Vertical	Passed
2.	15.014912GHz	47.37	14.49	54.00	-6.63	2.00	279.80	Horizontal	Passed
3.	17.32448GHz	50.85	18.36	54.00	-3.15	3.50	139.80	Horizontal	Passed

Overall Graphs:




dBµV/m
90
80
70
60
50
40
30
20
10
0
FCC/FCC 47 CFR Part 15.209 Other than A - Peak/3.0m
FCC/FCC 47 CFR Part 15.209 Other than A - Avg/3.0m
1GHz
Frequency
18GHz
Polarization: Vertical

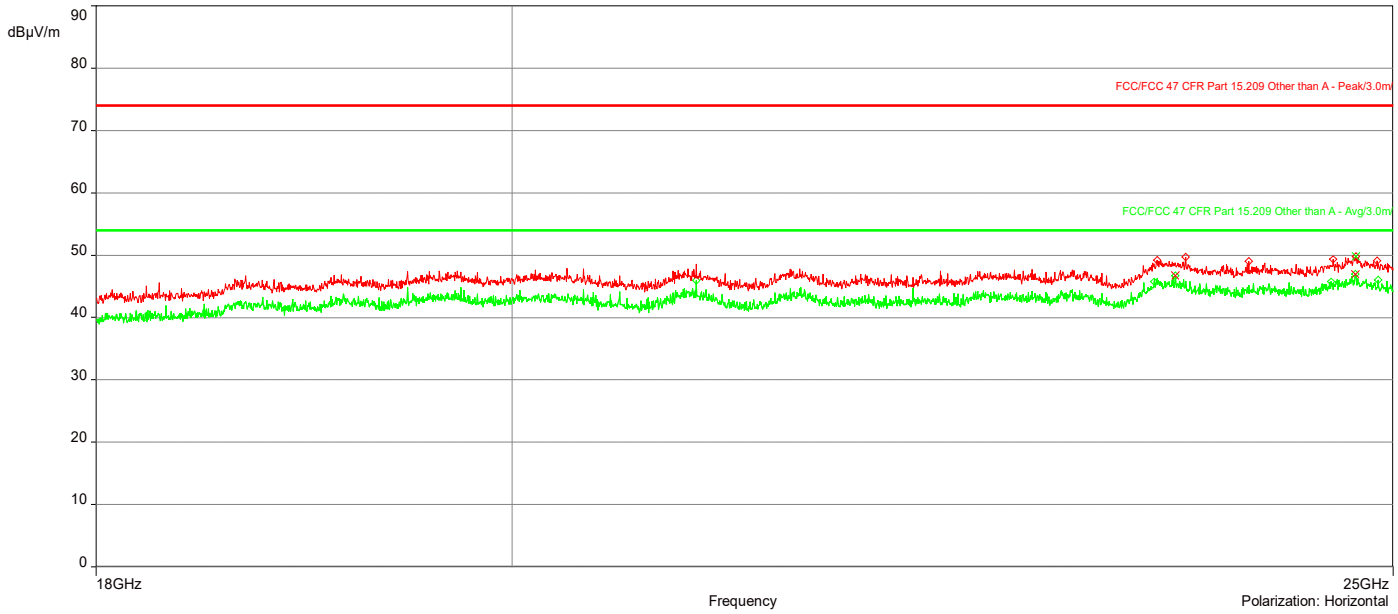
AH20110901-HAR-279-08_BLE_2402MHz_18-25GHz

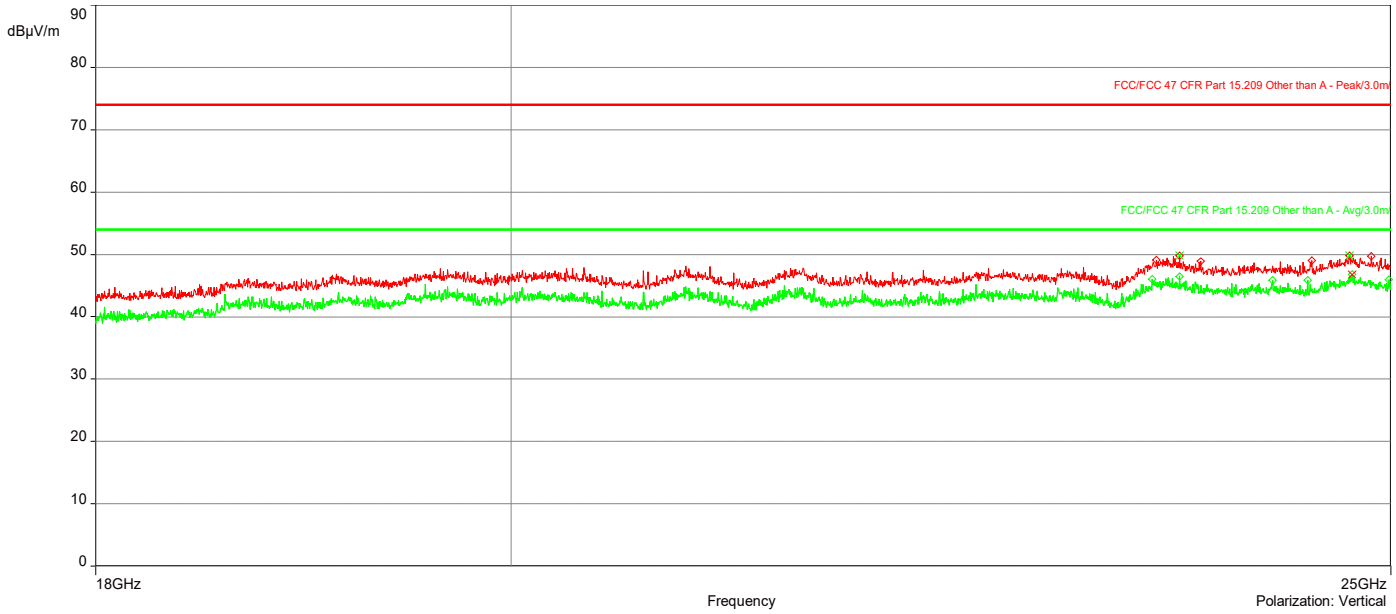
8/18/2021 20:32:00

No	Frequency (MHz)	Level Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
4.	23.694407GHz	49.79	1.84	74.00	-24.21	3.66	292.40	Vertical	Passed
5.	24.737981GHz	49.81	2.93	74.00	-24.19	1.15	314.90	Vertical	Passed
6.	24.763983GHz	49.76	2.93	74.00	-24.24	2.58	202.40	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
4.	24.755483GHz	46.83	2.94	54.00	-7.17	3.82	224.90	Vertical	Passed
5.	23.657904GHz	46.73	1.92	54.00	-7.27	2.05	292.40	Horizontal	Passed
6.	24.761483GHz	46.99	2.94	54.00	-7.01	2.14	224.90	Horizontal	Passed

Overall Graphs:




dBµV/m
90
80
70
60
50
40
30
20
10
0
FCC/FCC 47 CFR Part 15.209 Other than A - Peak/3.0m
FCC/FCC 47 CFR Part 15.209 Other than A - Avg/3.0m
18GHz
Frequency
25GHz
Polarization: Vertical

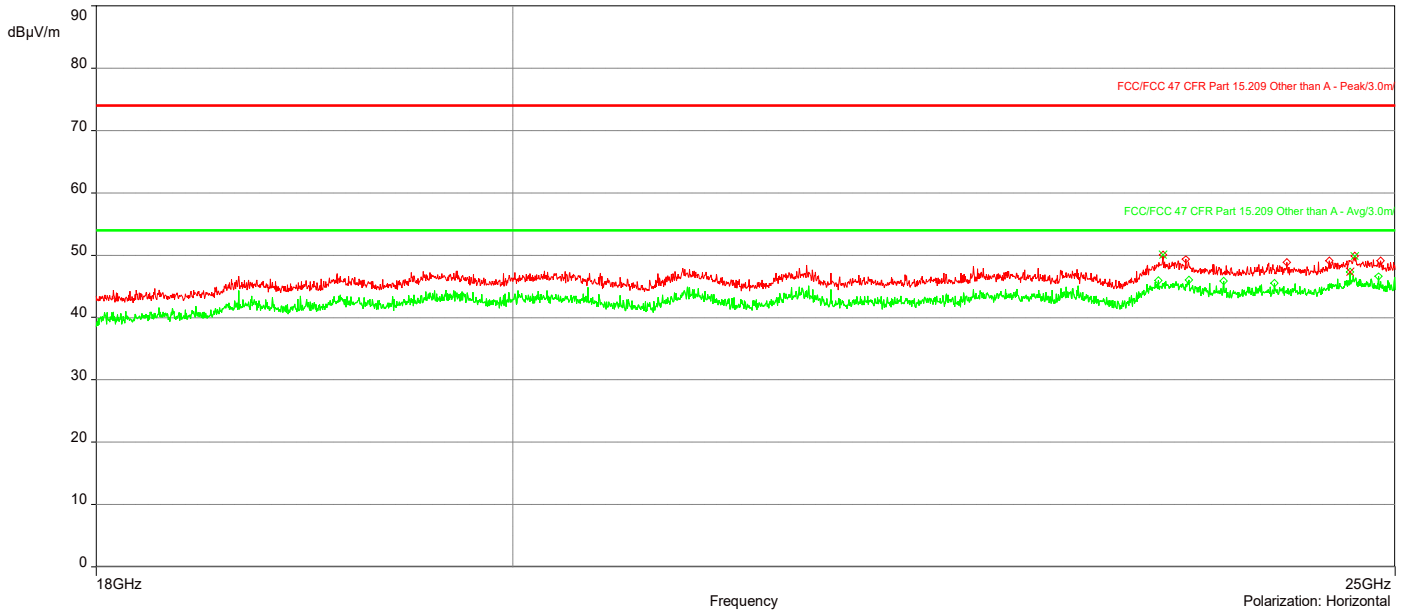
AH20110901-HAR-279-08_BLE_2441MHz_18-25GHz

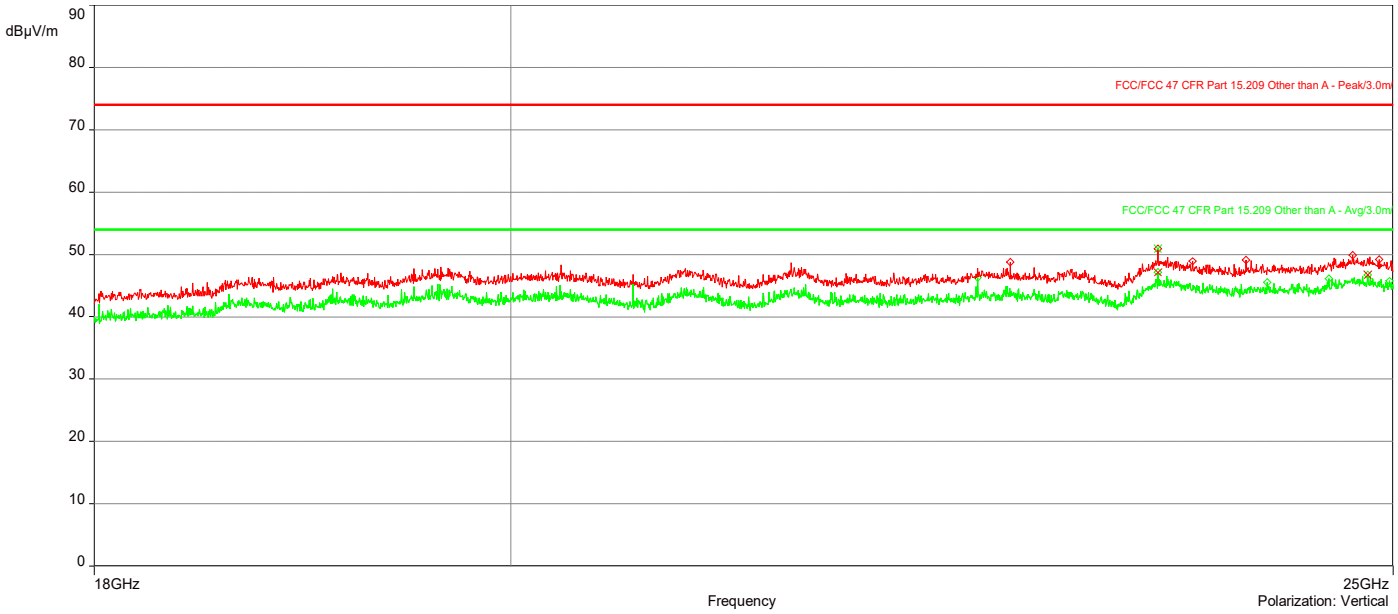
8/18/2021 20:54:32

No	Frequency (MHz)	Level Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	23.556897GHz	50.90	2.22	74.00	-23.10	3.66	180.20	Vertical	Passed
2.	23.573398GHz	50.03	2.14	74.00	-23.97	2.94	202.50	Horizontal	Passed
3.	24.744482GHz	49.90	2.97	74.00	-24.10	3.42	45.00	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	23.556897GHz	47.11	2.22	54.00	-6.89	3.66	180.20	Vertical	Passed
2.	24.838988GHz	46.70	2.78	54.00	-7.30	1.29	337.40	Vertical	Passed
3.	24.71548GHz	47.31	2.87	54.00	-6.69	4.00	270.10	Horizontal	Passed

Overall Graphs:




dBµV/m
90
80
70
60
50
40
30
20
10
0
FCC/FCC 47 CFR Part 15.209 Other than A - Peak/3.0m
FCC/FCC 47 CFR Part 15.209 Other than A - Avg/3.0m
18GHz
Frequency
25GHz
Polarization: Vertical

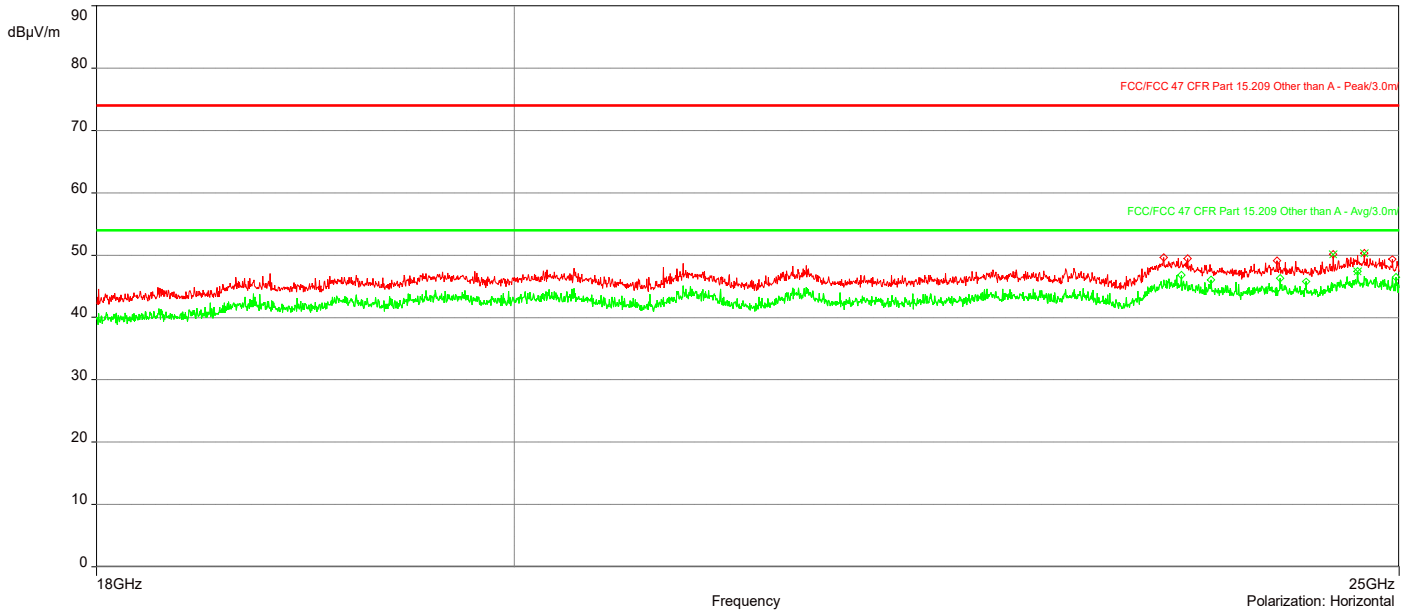
AH20110901-HAR-279-08_BLE_2480MHz_18-25GHz

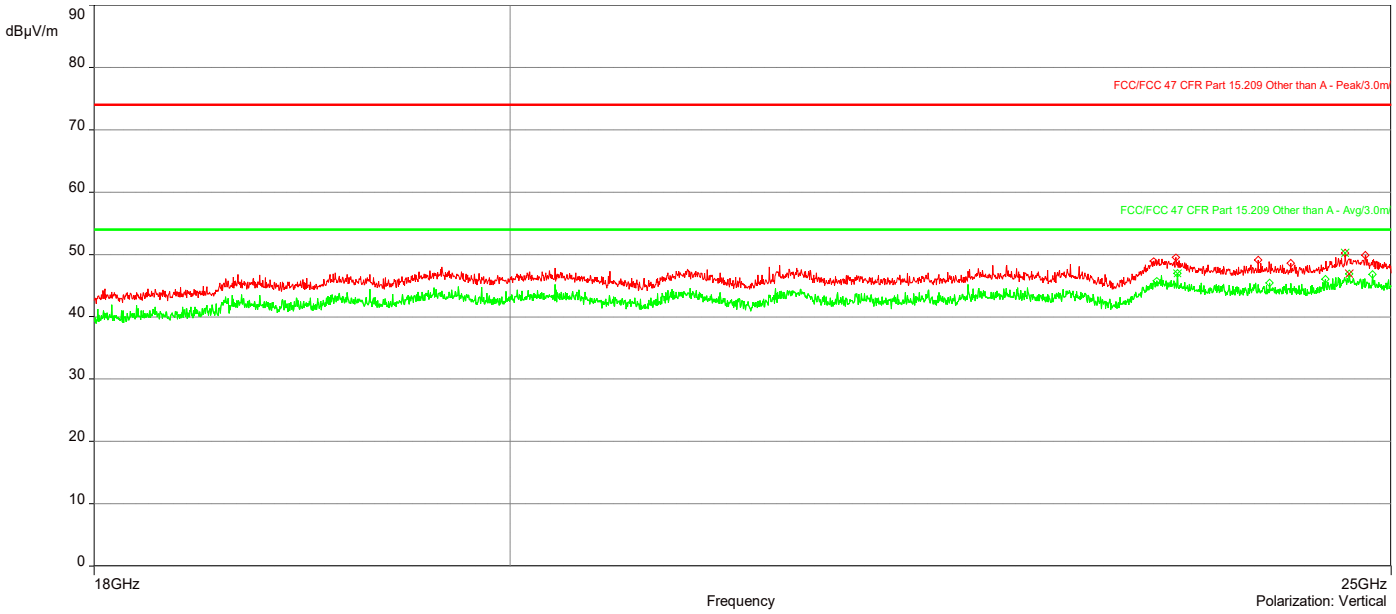
8/18/2021 21:15:46

No	Frequency (MHz)	Level Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	24.708979GHz	50.26	2.83	74.00	-23.74	4.00	44.90	Vertical	Passed
2.	24.58647GHz	50.13	2.24	74.00	-23.87	1.72	224.90	Horizontal	Passed
3.	24.780984GHz	50.33	2.88	74.00	-23.67	2.71	67.40	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	23.684406GHz	46.94	1.86	54.00	-7.06	1.11	112.40	Vertical	Passed
2.	24.737481GHz	46.85	2.93	54.00	-7.15	1.02		Vertical	Passed
3.	24.738481GHz	47.37	2.95	54.00	-6.63	3.69	22.40	Horizontal	Passed

Overall Graphs:




dBµV/m
90
80
70
60
50
40
30
20
10
0
FCC/FCC 47 CFR Part 15.209 Other than A - Peak/3.0m
FCC/FCC 47 CFR Part 15.209 Other than A - Avg/3.0m
18GHz
Frequency
25GHz
Polarization: Vertical

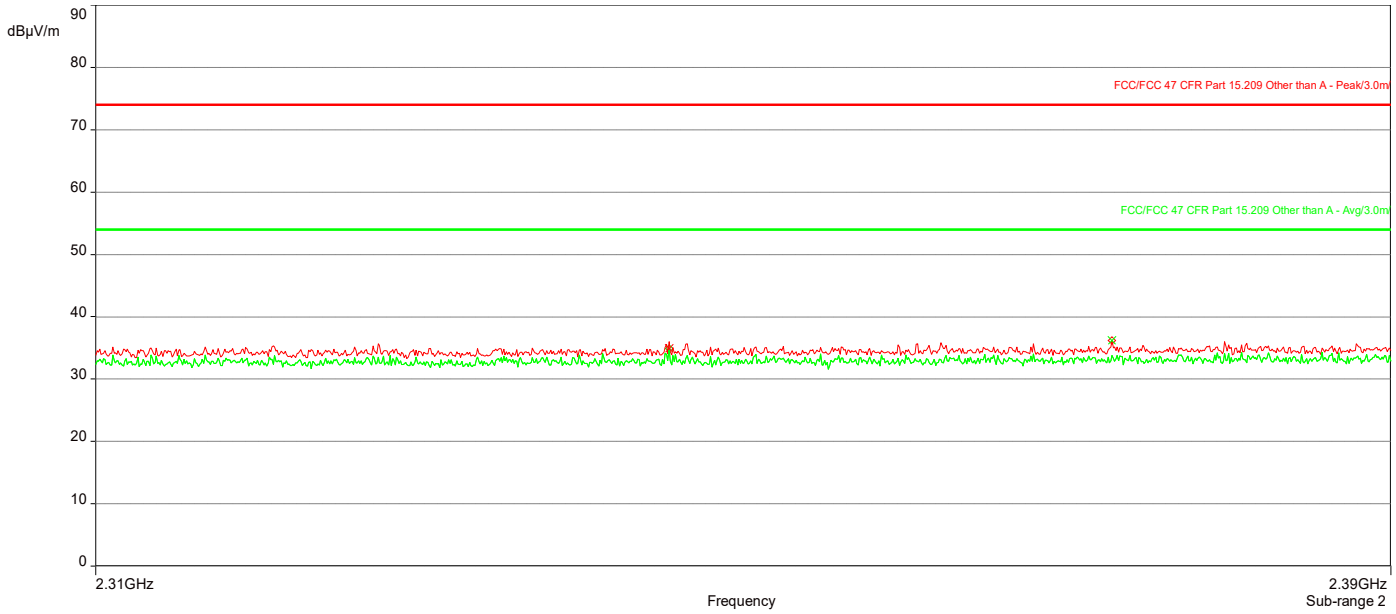
AH20110901-HAR-279-08_Bandedge_BLE_2402MHz

8/10/2021 13:12:16

No	Frequency (MHz)	Level Peak Reading (dBuV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	2.3897598GHz	55.17	-2.81	74.00	-18.83	1.00	345.40	Vertical	Passed
2.	2.3725425GHz	36.16	-2.91	74.00	-37.84	4.00	345.50	Horizontal	Passed
3.	2.4988769GHz	44.85	-2.07	74.00	-29.15	3.50	2.20	Vertical	Passed
4.	2.4917748GHz	59.03	-2.10	74.00	-14.97	2.00	0.10	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dBuV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	2.3897598GHz	53.74	-2.81	54.00	-0.26	1.00	345.40	Vertical	Passed
2.	2.3450751GHz	34.88	-3.06	54.00	-19.12	1.50	342.90	Horizontal	Passed
3.	2.4987613GHz	44.14	-2.07	54.00	-9.86	3.50	2.20	Vertical	Passed
4.	2.4917748GHz	22.83	-2.10	54.00	-31.17	2.00	0.10	Horizontal	Passed

Overall Graphs:


dBµV/m
90
80
70
60
50
40
30
20
10
0
FCC/FCC 47 CFR Part 15.209 Other than A - Peak/3.0m
FCC/FCC 47 CFR Part 15.209 Other than A - Avg/3.0m
2.31GHz
Frequency
2.39GHz
Sub-range 2


dBµV/m
90
80
70
60
50
40
30
20
10
0
FCC/FCC 47 CFR Part 15.209 Other than A - Peak/3.0m
FCC/FCC 47 CFR Part 15.209 Other than A - Avg/3.0m
2.4835GHz
Frequency
2.5GHz
Sub-range 3


dBµV/m
90
80
70
60
50
40
30
20
10
0
FCC/FCC 47 CFR Part 15.209 Other than A - Peak/3.0m
FCC/FCC 47 CFR Part 15.209 Other than A - Avg/3.0m
2.4835GHz
Frequency
2.5GHz
Sub-range 4

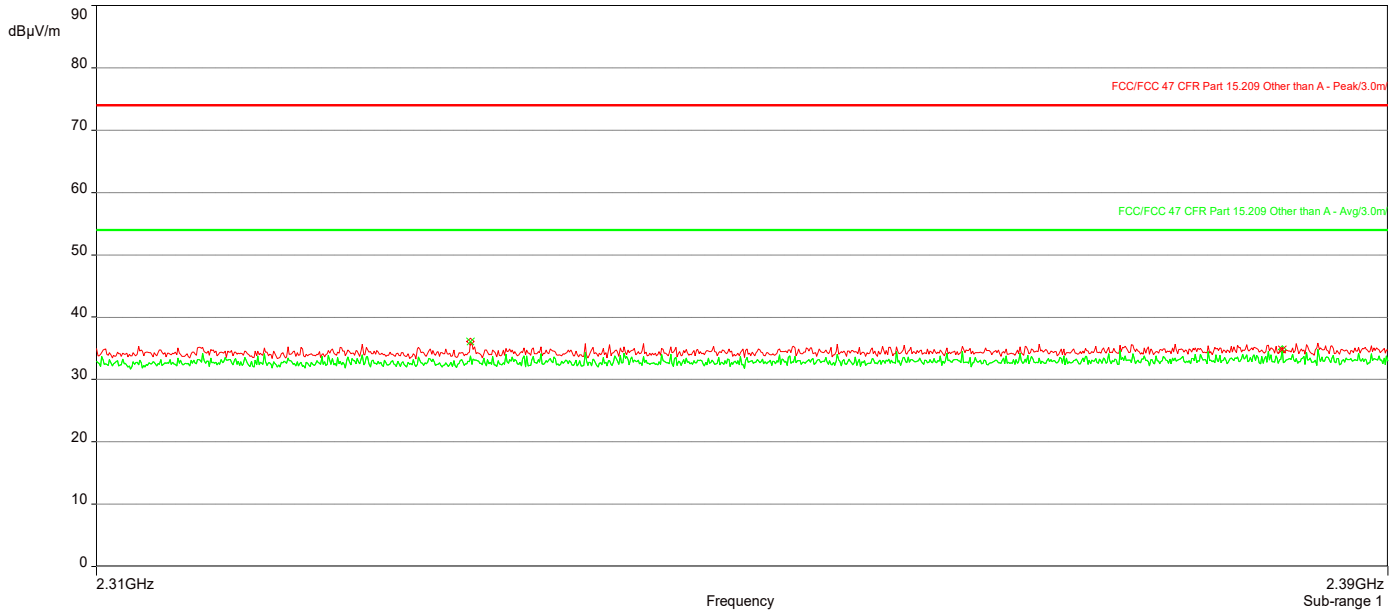
AH20110901-HAR-279-08_Bandedge_BLE_2480MHz

8/10/2021 13:52:02

No	Frequency (MHz)	Level Peak Reading (dBuV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	2.3329029GHz	36.12	-3.11	74.00	-37.88	3.50	331.90	Vertical	Passed
2.	2.3442743GHz	52.35	-3.06	74.00	-21.65	1.50	173.00	Horizontal	Passed
3.	2.484524GHz	63.94	-2.13	74.00	-10.06	1.00	143.90	Vertical	Passed
4.	2.4841772GHz	39.14	-2.13	74.00	-34.86	2.00	326.70	Horizontal	Passed

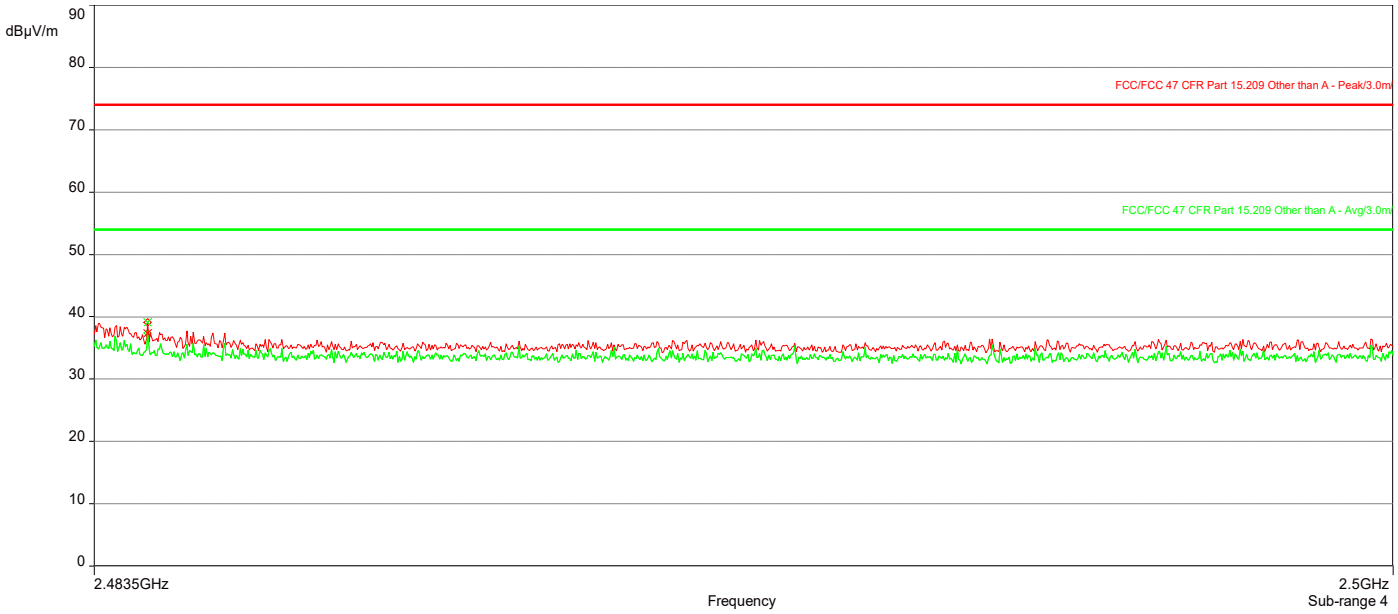
No	Frequency (MHz)	Level Average Reading (dBuV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	2.3833534GHz	34.86	-2.85	54.00	-19.14	1.00	116.30	Vertical	Passed
2.	2.3442743GHz	51.56	-3.06	54.00	-2.44	1.50	173.00	Horizontal	Passed
3.	2.484524GHz	23.03	-2.13	54.00	-30.97	1.00	143.90	Vertical	Passed
4.	2.4841772GHz	37.37	-2.13	54.00	-16.63	2.00	326.70	Horizontal	Passed

Overall Graphs:




dBµV/m
90
80
70
60
50
40
30
20
10
0
FCC/FCC 47 CFR Part 15.209 Other than A - Peak/3.0m
FCC/FCC 47 CFR Part 15.209 Other than A - Avg/3.0m
2.31GHz
Frequency
2.39GHz
Sub-range 2


dBµV/m
90
80
70
60
50
40
30
20
10
0
FCC/FCC 47 CFR Part 15.209 Other than A - Peak/3.0m
FCC/FCC 47 CFR Part 15.209 Other than A - Avg/3.0m
2.4835GHz
Frequency
2.5GHz
Sub-range 3

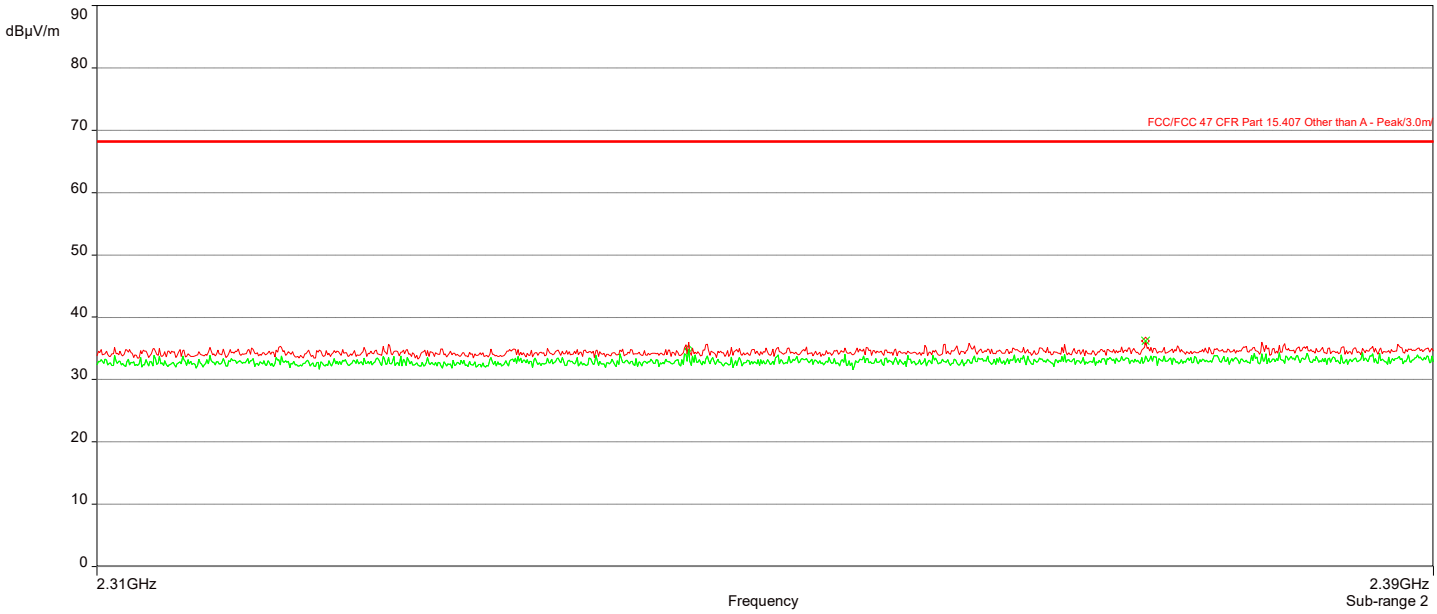

dBµV/m
90
80
70
60
50
40
30
20
10
0
FCC/FCC 47 CFR Part 15.209 Other than A - Peak/3.0m
FCC/FCC 47 CFR Part 15.209 Other than A - Avg/3.0m
2.4835GHz
Frequency
2.5GHz
Sub-range 4

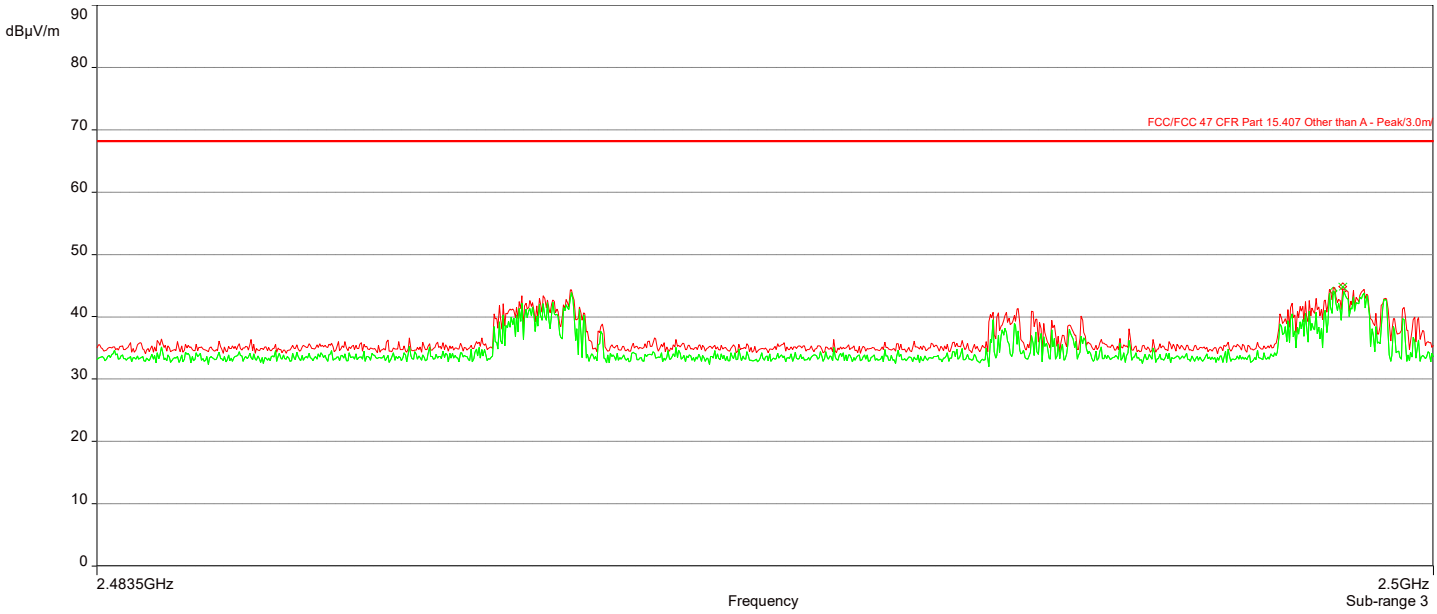
AH20110901-HAR-279-08_Unrestricted_Bandedge_BLE_2402MHz

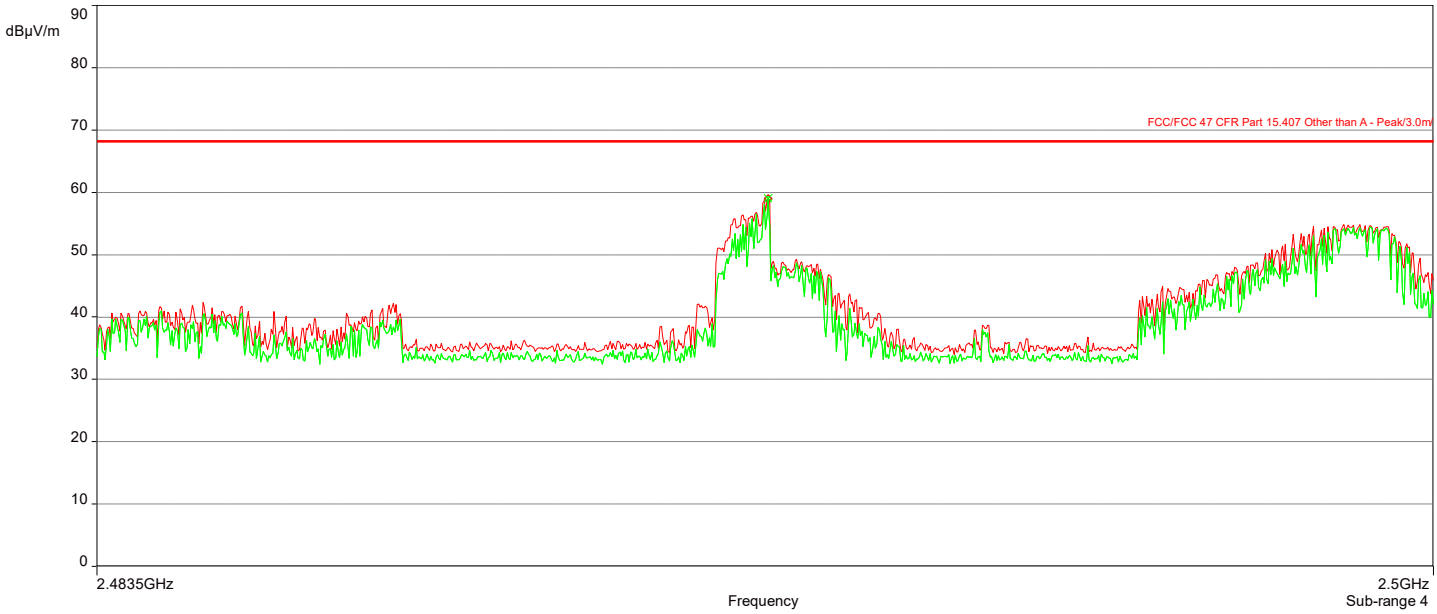
8/10/2021 13:12:16

No	Frequency (MHz)	Level Peak Reading (dBuV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	2.3897598GHz	55.17	-2.81	68.23	-13.06	1.00	345.40	Vertical	Passed
2.	2.3725425GHz	36.16	-2.91	68.23	-32.07	4.00	345.50	Horizontal	Passed
3.	2.4988769GHz	44.85	-2.07	68.23	-23.38	3.50	2.20	Vertical	Passed
4.	2.4917748GHz	59.03	-2.10	68.23	-9.20	2.00	0.10	Horizontal	Passed

Graphs:




dBµV/m
90
80
70
60
50
40
30
20
10
0
FCC/FCC 47 CFR Part 15.407 Other than A - Peak/3.0m
2.4835GHz
Frequency
2.5GHz
Sub-range 3

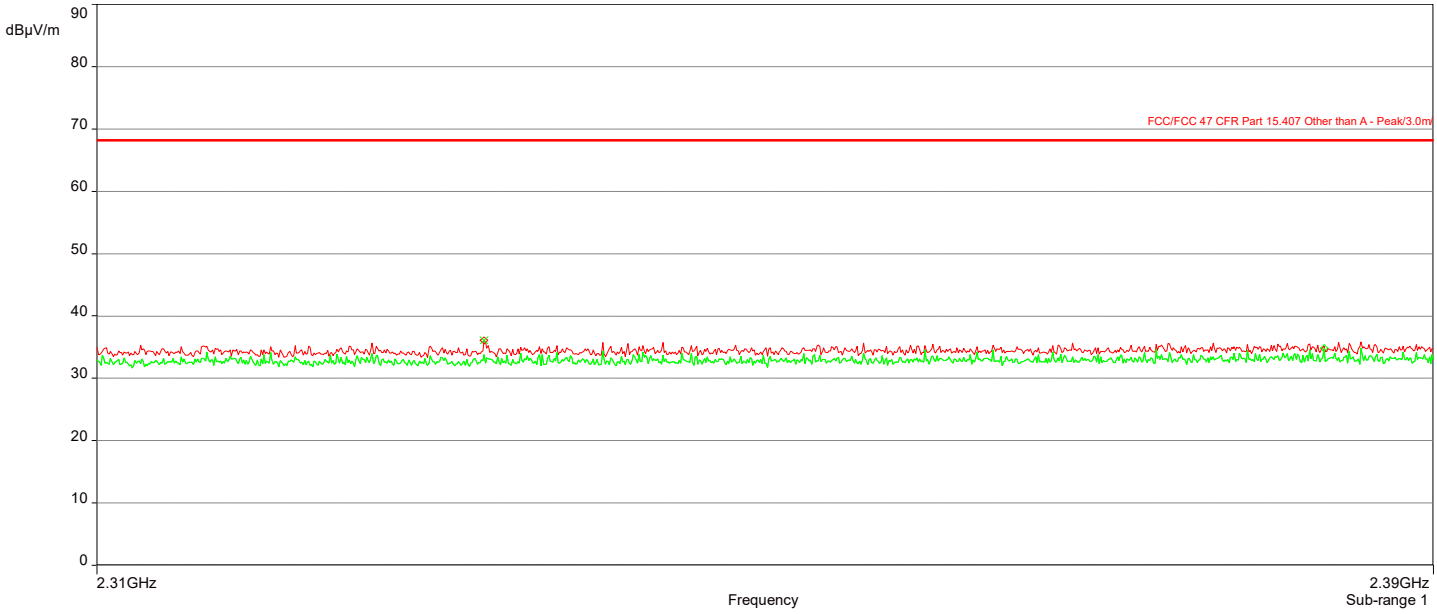

dBµV/m
90
80
70
60
50
40
30
20
10
0
FCC/FCC 47 CFR Part 15.407 Other than A - Peak/3.0m
2.4835GHz
Frequency
2.5GHz
Sub-range 4

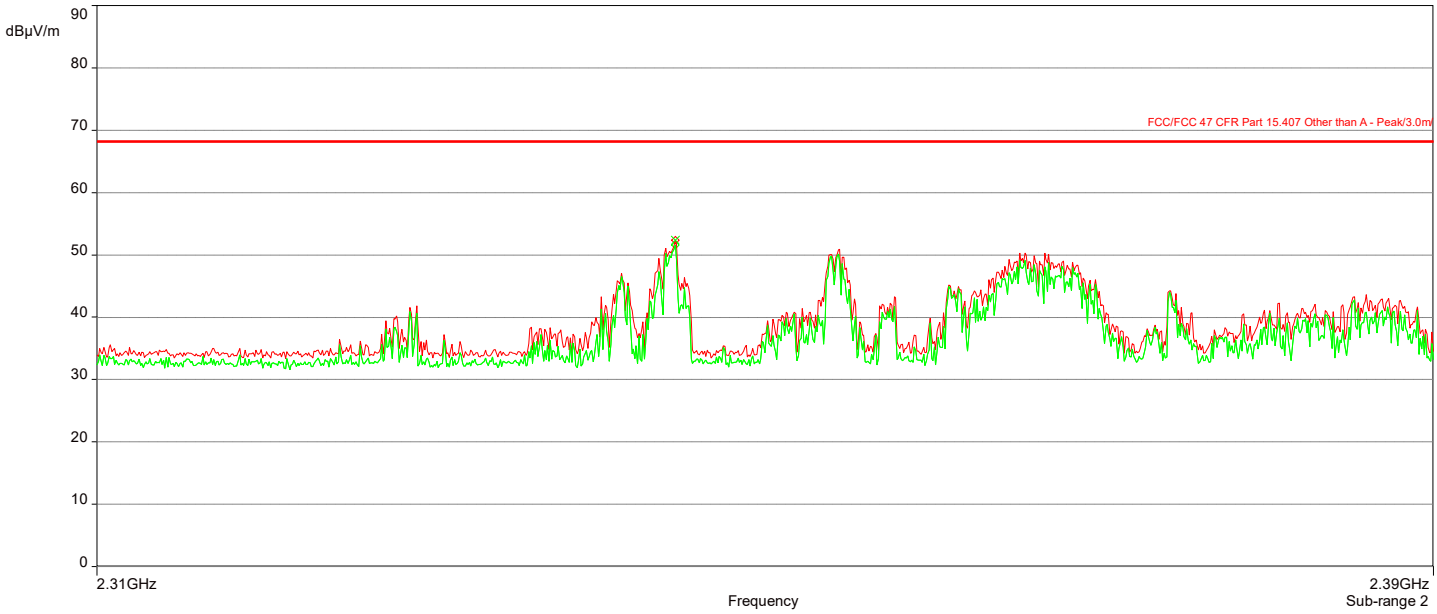
AH20110901-HAR-279-08_Unrestricted_Bandedge_BLE_2480MHz

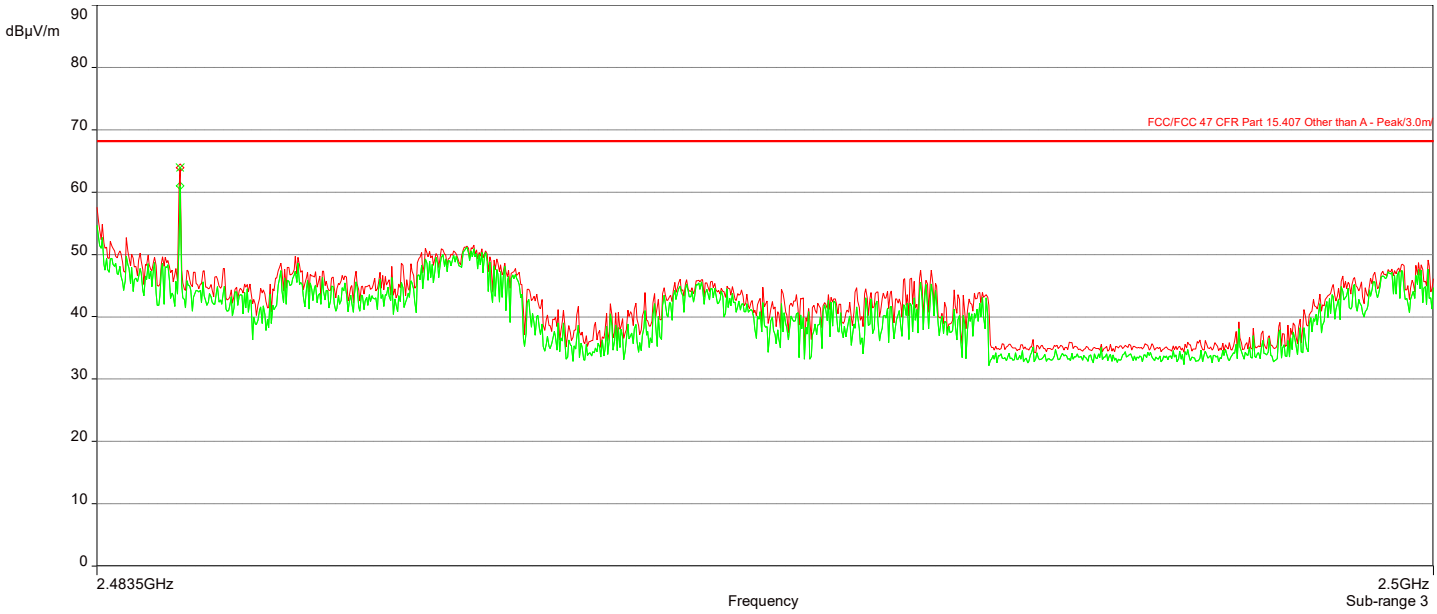
8/10/2021 13:52:02

No	Frequency (MHz)	Level Peak Reading (dBuV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	2.3329029GHz	36.12	-3.11	68.23	-32.11	3.50	331.90	Vertical	Passed
2.	2.3442743GHz	52.35	-3.06	68.23	-15.88	1.50	173.00	Horizontal	Passed
3.	2.484524GHz	63.94	-2.13	68.23	-4.29	1.00	143.90	Vertical	Passed
4.	2.4841772GHz	39.14	-2.13	68.23	-29.09	2.00	326.70	Horizontal	Passed

Graphs:






dBµV/m
90
80
70
60
50
40
30
20
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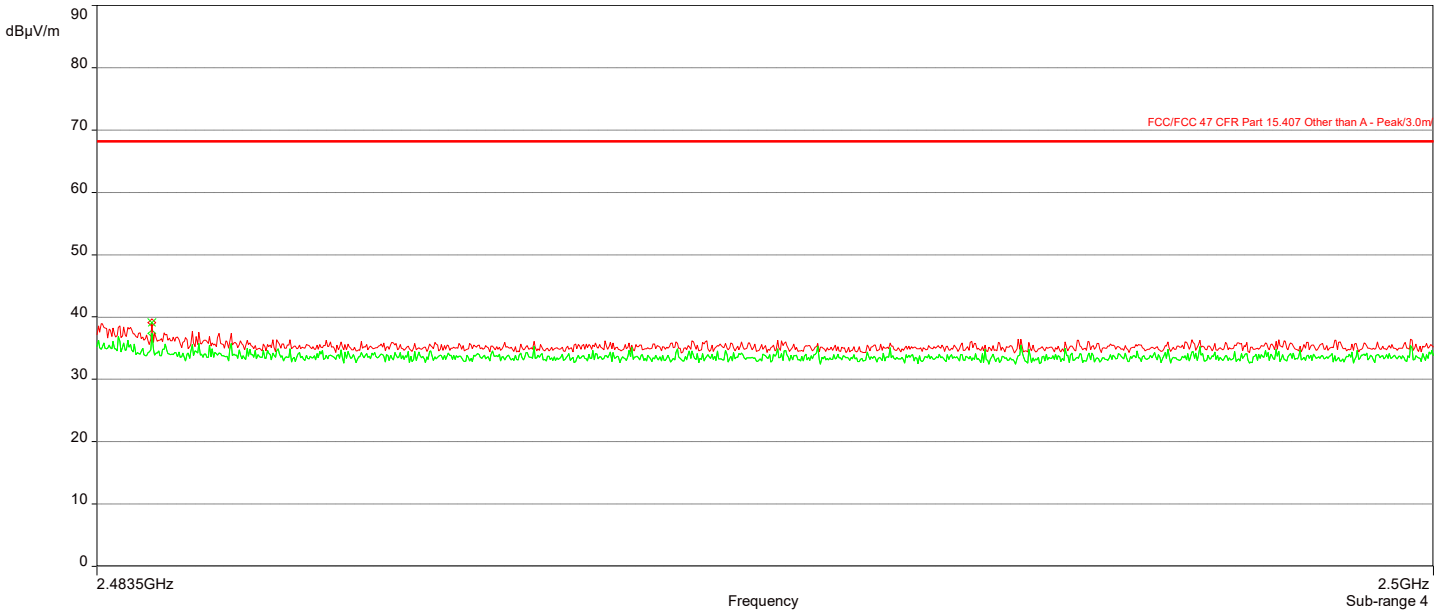
0
FCC/FCC 47 CFR Part 15.407 Other than A - Peak/3.0m
2.4835GHz
Frequency
2.5GHz
Sub-range 3


dBµV/m
90
80
70
60
50
40
30
20
10
0
FCC/FCC 47 CFR Part 15.407 Other than A - Peak/3.0m
2.4835GHz
Frequency
2.5GHz
Sub-range 4

Document Revisions

Version	Date	Modifier	Changes
1.0	04-28-2021	Aravind Buddana	• Initial Draft
2.0	05-06-2021	Aravind Buddana	• Updated Report Number. Test Request Addition Information, Laboratory Additional Information • Updated Test Setup Information, Statement of conformity • Moved DUT and Test setup pictures to additional document.
3.0	07-16-2021	Aravind Buddana	• Updated FCC designation and ISED Identifier of Test Firm. • Removed duplicate data for Power Spectral Density
3.0	07-16-2021	Ryan Philips	• Updated H-field measurement missing 9kHz – 30MHz
4.0	09-01-2021	Ryan Philips	• Updated Band Edge Tests
5.0	09-03-2021	Aravind Buddana	• Updated Unrestricted Band Edge Tests

End of Report