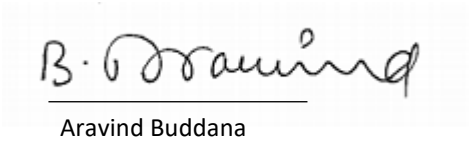
Regulatory Test Report

Prepared for Harman International Industries, Inc.

This report presents detailed information on

INFO3.6 CSM

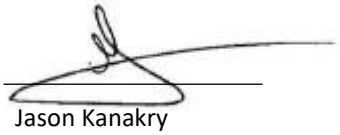
Prepared by



Aravind Buddana

Engineer II

Approved by



Jason Kanakry

General Manager

Issue date: 07/21/2023

Report No: AH22100701-HAR-053-TR2 v5

Contents

1. TEST REQUEST INFORMATION

Test Request #:	7700182604
Test Requested By:	Mark Bowman Harman International Industries, Inc. 30001 Cabot Drive, Novi, MI 48377
Test item Description:	INFO3.6 CSM
Part Number:	8457687
DUT Sample Number:	AH22100701-HAR-053#1, AH22100701-HAR-053#4, AH22100701-HAR-053#5
Hardware Version of DUT:	PV
Software Version of DUT:	17.80.200.219
Component Category of DUT:	N/A
FCC ID:	2AHPN-BE2866
ISED ID:	6434C-BE2866
Type of Test:	FCC/ISED Certification
Test Method:	CFR Title 47 FCC Part 15.407, ISED Canada RSS-247 Issue 2, ISED Canada RSS-Gen Issue 5, FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01 and ANSI C63.10-2013
Deviations from standard:	None
Approved Test Plan Number:	N/A
Test Plan Revision:	N/A
Date Test Sample Received:	10-07-2022
Date Test Started:	10-13-2022
Date Test Finished:	01-13-2023

2. TEST LABORATORY INFORMATION

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

3. STATEMENT OF CONFORMITY

RSS-GEN	RSS 247	Part 15	Comments
6.4		15.15(b)	There are no controls accessible to the user that varies the output power to operate in violation of the regulatory requirements.
		15.19	The label shown in the label exhibit.
		15.21	Information to the user shown in the instruction manual exhibit.
		15.27	No special accessories are required for compliance.
3.2		15.31	The EUT tested in accordance with the measurement standards in this section.
6.13.2		15.33	Frequency range investigated according to this section, unless noted in specific rule section under which the equipment operates.
6.13.1		15.35	The EUT emissions measured using the measurement detector and bandwidth specified in this section, unless noted in specific rule section under which the equipment operates.
6.8		15.203	EUT employs integrated PCB antenna with 4.39dBi (UNII-1) and 5.05dBi (UNII-3)
8.10		15.205 15.209	The fundamental is not in a Restricted band and the spurious and harmonic emissions in the Restricted bands comply with the general emission limits of 15.209 or RSS-Gen as applicable
8.8		15.207	N/A. EUT is vehicle battery powered only.

4. CONDUCTED TESTING

4.1 Test Summary

This test report supports an application for certification of a transmitter operating pursuant to:

CFR Title 47 FCC Part 15.407, ISED Canada RSS-247 Issue 2, ISED Canada RSS-Gen Issue 5, FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01 and ANSI C63.10-2013

The product is **INFO3.6 CSM** transmitter that operates in UNII-1 (5.15GHz – 5.25GHz) and UNII-3 (5.725GHz – 5.85GHz)

Details	Description
Frequency Range (MHz)	UNII-1 (5.15GHz – 5.25GHz) UNII-3 (5.725GHz – 5.85GHz)
Tested Modes	802.11a 802.11n(HT20, HT40) 802.11ac (VHT20, VHT40, VHT80).
Tested Channels	UNII-1 (36-48) UNII-3 (149-165)
DUT Antenna Type	Integrated PCB antenna
Number of transmit chains	1
Equipment Type	Unlicensed National Information Infrastructure Device
DUT Antenna Gain	4.39dBi (UNII-1) 5.05dBi (UNII-3) ☒ Provided by Customer with Gain Report ☐ Not Provided by Customer

Test samples received in good condition, we found that the product met the above requirements with modification.

Test Item	Sample #	Result
FCC 15.407 UNII-1	AH22100701-HAR-053#1	Meets Requirements
FCC 15.407 UNII-3	AH22100701-HAR-053#1	Meets Requirements

Worst-case emission obtained on low data rates so Full Testing performed on lowest data rate.

UNII-1 Test Results Summary

Test	Frequency (MHz)	802.11a	802.11n(HT20)	802.11ac (VHT20)
RF Output Power	**5180/5200/5240**	PASS	PASS	PASS
Power Spectral Density	**5180/5200/5240**	PASS	PASS	PASS
DTS Bandwidth (6dB)	**5180/5200/5240**	PASS	PASS	PASS
Occupied Channel Bandwidth 99%	**5180/5200/5240**	PASS	PASS	PASS
Emission Bandwidth 26 dB	**5180/5200/5240**	PASS	PASS	PASS
		802.11n(HT40)		**802.11ac(VHT40)**
RF Output Power	**5190/5230**	PASS		PASS
Power Spectral Density	**5190/5230**	PASS		PASS
DTS Bandwidth (6dB)	**5190/5230**	PASS		PASS
Occupied Channel Bandwidth 99%	**5190/5230**	PASS		PASS
Emission Bandwidth 26 dB	**5190/5230**	PASS		PASS
		802.11ac(VHT80)		
RF Output Power	**5210**	PASS		
Power Spectral Density	**5210**	PASS		
DTS Bandwidth (6dB)	**5210**	PASS		
Occupied Channel Bandwidth 99%	**5210**	PASS		
Emission Bandwidth 26 dB	**5210**	PASS		

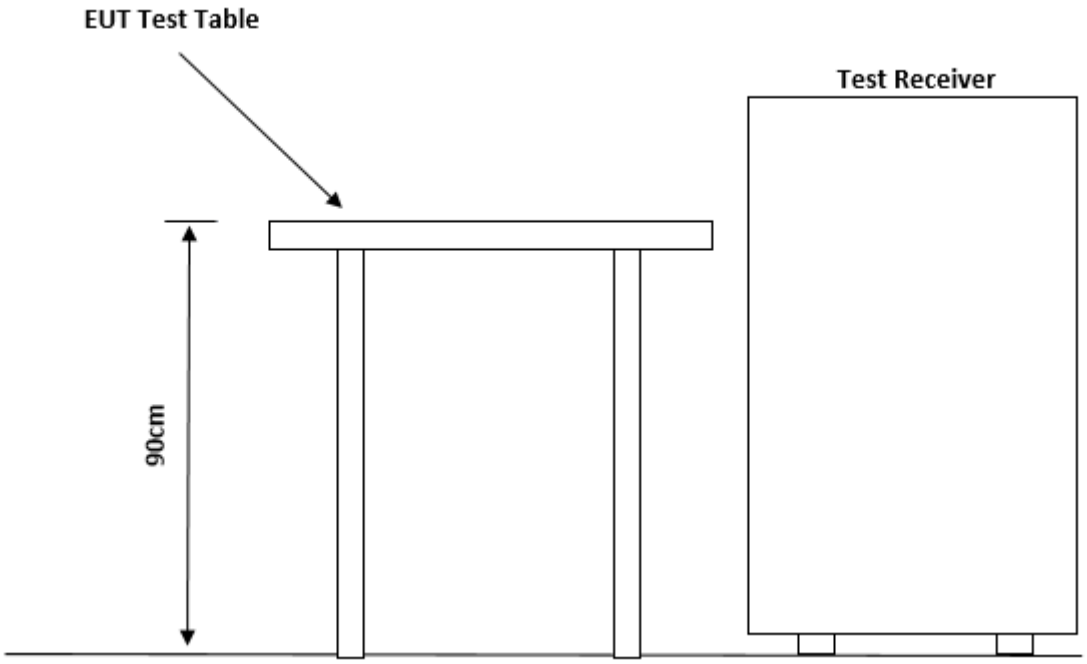
UNII-3 Test Results Summary

Test	Frequency (MHz)	802.11a	802.11n(HT20)	802.11ac (VHT20)
RF Output Power	**5745/5785/5825**	PASS	PASS	PASS
Power Spectral Density	**5745/5785/5825**	PASS	PASS	PASS
DTS Bandwidth (6dB)	**5745/5785/5825**	PASS	PASS	PASS
Occupied Channel Bandwidth 99%	**5745/5785/5825**	PASS	PASS	PASS
		802.11n(HT40)		**802.11ac(VHT40)**
RF Output Power	**5755/5795**	PASS		PASS
Power Spectral Density	**5755/5795**	PASS		PASS
DTS Bandwidth (6dB)	**5755/5795**	PASS		PASS
Occupied Channel Bandwidth 99%	**5755/5795**	PASS		PASS
		802.11ac(VHT80)		
RF Output Power	**5775**	PASS		
Power Spectral Density	**5775**	PASS		
DTS Bandwidth (6dB)	**5775**	PASS		
Occupied Channel Bandwidth 99%	**5775**	PASS		

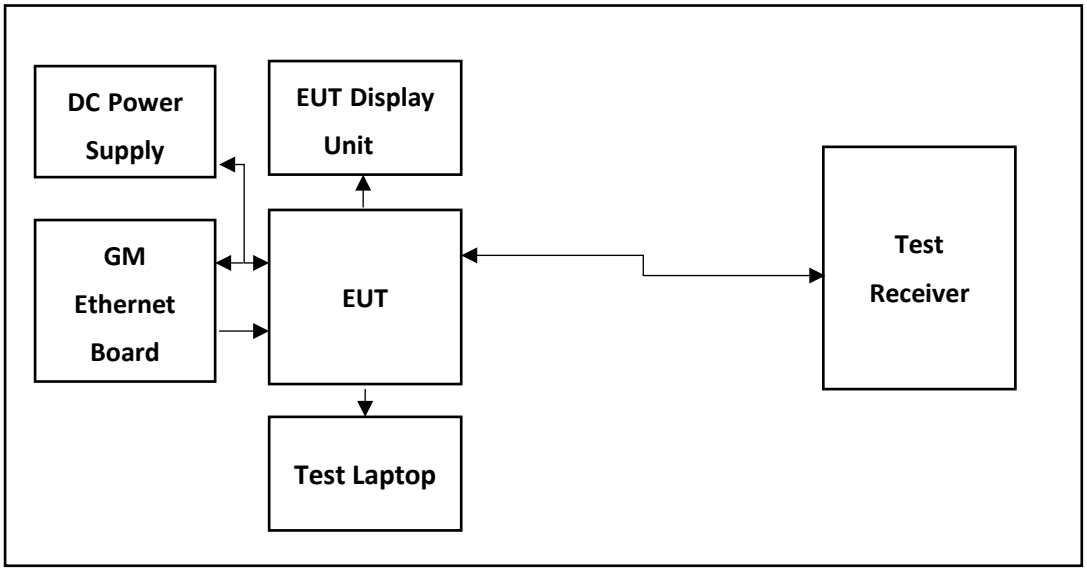
4.2 Test Setup

Conducted Test Site Description

Test site is accommodated with test tabletop and floor standing test equipment.



TEST SETUP DIAGRAM



4.3 Test Equipment Used

ID #	Equipment	Manufacturer	Model #	Serial #	Cal Due
BVD0226	Spectrum Analyzer 10Hz-44GHz	Rohde & Schwarz	FSV3044	101018	4/20/2024
BVD0227	8 port switch unit for Wireless Test system	Rohde & Schwarz	OSP150	101100	11/24/2025
BVD0228	8 port switch unit for Wireless Test system	Rohde & Schwarz	OSP220	101632	11/14/2025
BVD0224	Signal Generator 100kHz-40GHz	Rohde & Schwarz	SMB100A	181741	4/20/2024
BVD0225	Signal Generator 100k-6GHz with GPS simulator	Rohde & Schwarz	SMW200A	107664	4/20/2023
BVD0250	Wireless Connectivity Tester 70M-6GHz	Rohde & Schwarz	CMW270	102113	4/20/2024
BVD0302	DC power supply 1-15VDC 60A 110/220 11.5A max input	BK Precision	1693	257F17180	N/A
BVD0321	Fixed Attenuator 2W 20dB -40GHz	Mini-Circuits	BW-K20-2W44+	2103	3/21/2023
BVD0430	Multimeter	Fluke	117	49710262SV	11/11/2023
BVD0229	Temp and Humidity Meter	Fluke	971	12001009	5/1/2023
N/A	Test-PC	Lenovo ThinkPad	E560	PF0L0N9R	N/A

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

Customer Supplied Equipment

ID #	Equipment	Manufacturer	Model	Serial #	Version No.
N/A	Harness	Harman	N/A	N/A	N/A
N/A	Display Unit	Innolux Corp	INFOMM-15524	0024	N/A
N/A	Ethernet Board	GM	N/A	N/A	CSMate rev.4
N/A	GM BT WLAN Test Tool NXP Chips S/W	Harman	N/A	N/A	2.4

Equipment List (Software)

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

4.4 UNII-1

Mode	Channel	Frequency
802.11a **802.11n(HT20)** **802.11ac(VHT20)**	36	5180
802.11n(HT40) **802.11ac(VHT40)**	38	5190
802.11a **802.11n(HT20)** **802.11ac(VHT20)**	40	5200
802.11ac(VHT80)	42	5210
802.11n(HT40) **802.11ac(VHT40)**	46	5230
802.11a **802.11n(HT20)** **802.11ac(VHT20)**	48	5240

Notes: Channels and modes above were tested.

Power settings

802.11a		802.11n (HT20)		802.11ac (VHT20)	
Channel	**Power Setting**	**Channel**	**Power Setting**	**Channel**	**Power Setting**
36	15	**36**	15	**36**	15
40	15	**40**	15	**40**	15
48	15	**48**	15	**48**	15

802.11n (HT40)		802.11ac (VHT40)	
Channel	**Power Setting**	**Channel**	**Power Setting**
38	15	**38**	12
46	15	**46**	12

802.11ac (VHT80)	
Channel	**Power Setting**
42	12

4.4.1 RF output power and Duty Cycle

FCC

Test according to FCC title 47 part 15 §15.407(a), KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 II.E and ANSI C63.10-2013 (In Reference to KDB 789033 E.3.B)

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

Device has both client and access point modes and has identical RF characteristics and settings for both Limits are as follows:
15.407(a)(1)(i): 1W (30dBm) for outdoor access points with antenna gains less than 6dBi.
15.407(a)(1)(iv): 250mW (23.9dBm) for client devices with antenna gains less than 6dBi.
Since client devices are subject to more stringent limits, unit was tested against the limits for a client device.

802.11a

Data Rate	Gated RMS (dBm) 5180 MHz	Gated RMS (dBm) 5200 MHz	Gated RMS (dBm) 5240 MHz	Limit (dBm)	Duty Cycle (%)	Power Setting (dBm)
6 Mbps	12.969	13.122	13.428	23.9	99.043	15

802.11n (HT20)

Data Rate	Gated RMS (dBm) 5180 MHz	Gated RMS (dBm) 5200 MHz	Gated RMS (dBm) 5240 MHz	Limit (dBm)	Duty Cycle (%)	Power Setting (dBm)
MCS0	12.944	13.063	13.370	23.9	98.980	15

802.11ac (VHT20)

Data Rate	Gated RMS (dBm) 5180 MHz	Gated RMS (dBm) 5200 MHz	Gated RMS (dBm) 5240 MHz	Limit (dBm)	Duty Cycle (%)	Power Setting (dBm)
MCS0	12.909	13.096	13.374	23.9	98.984	15

802.11n (HT40)

Data Rate	Gated RMS (dBm) 5190 MHz	Gated RMS (dBm) 5230 MHz	Limit (dBm)	Duty Cycle (%)	Power Setting (dBm)
MCS0	12.905	13.297	23.9	98.000	15

802.11ac (VHT40)

Data Rate	Gated RMS (dBm) 5190 MHz	Gated RMS (dBm) 5230 MHz	Limit (dBm)	Duty Cycle (%)	Power Setting (dBm)
MCS0	9.290	9.779	23.9	97.810	12

802.11ac (VHT80)

Data Rate	Gated RMS (dBm) 5210 MHz	Limit (dBm)	Duty Cycle (%)	Power Setting (dBm)
MCS0	10.028	23.9	96.104	12

RSS-247

Per RSS-247 Issue 2 Section 6.2.1.1, limit for OEM devices installed in vehicles: Maximum EIRP shall not exceed 30mW or 1.76+10*log B, dBm, whichever is less (where B is 99% OBW in MHz). In addition, devices must be capable of reducing power by a least 3dB below the maximum permitted EIRP of 30mW, which is 11.77dBm.

For modulations with less than 20MHz 99% OBW; 802.11a, 802.11n (HT20) and 802.11ac (VHT20), worst case 99% OBW of 16.600MHz is assumed with resulting conservative limit of 13.96dBm. For modulations with more than 20MHz 99% OBW; 802.11n (HT40), 802.11ac (VHT40) and 802.11ac (VHT80), the limit is 30mW (14.77dBm)

802.11a

Data Rate	Gated RMS with TPC (dBm) 5180MHz	Antenna Gain(dBi)	EIRP (dBm)	Limit (dBm)	Power Setting (dBm)
6 Mbps	7.925	4.39	12.315	13.96	11
Data Rate	**Gated RMS (dBm) 5200MHz**	**Antenna Gain(dBi)**	**EIRP (dBm)**	**Limit (dBm)**	
6 Mbps	8.183	4.39	12.573	13.96	11
Data Rate	**Gated RMS (dBm) 5240MHz**	**Antenna Gain(dBi)**	**EIRP (dBm)**	**Limit (dBm)**	
6 Mbps	8.756	4.39	13.146	13.96	11

802.11n (HT20)

Data Rate	Gated RMS (dBm) 5180MHz	Antenna Gain(dBi)	EIRP (dBm)	Limit (dBm)	Power Setting (dBm)
MCS0	7.961	4.39	12.351	13.96	11
Data Rate	**Gated RMS (dBm) 5200MHz**	**Antenna Gain(dBi)**	**EIRP (dBm)**	**Limit (dBm)**	
MCS0	8.203	4.39	12.593	13.96	11
Data Rate	**Gated RMS (dBm) 5240MHz**	**Antenna Gain(dBi)**	**EIRP (dBm)**	**Limit (dBm)**	
MCS0	8.689	4.39	13.079	13.96	11

802.11ac (VHT20)

Data Rate	Gated RMS (dBm) 5180MHz	Antenna Gain(dBi)	EIRP (dBm)	Limit (dBm)	Power Setting (dBm)
MCS0	7.902	4.39	12.292	13.96	11
Data Rate	Gated RMS (dBm) 5200MHz	Antenna Gain(dBi)	EIRP (dBm)	Limit (dBm)	
MCS0	8.112	4.39	12.502	13.96	11
Data Rate	Gated RMS (dBm) 5240MHz	Antenna Gain(dBi)	EIRP (dBm)	Limit (dBm)	
MCS0	8.565	4.39	12.955	13.96	11

802.11n (HT40)

Data Rate	Gated RMS (dBm) 5190MHz	Antenna Gain(dBi)	EIRP (dBm)	Limit (dBm)	Power Setting (dBm)
MCS0	7.966	4.39	12.356	14.77	11
Data Rate	Gated RMS (dBm) 5230MHz	Antenna Gain(dBi)	EIRP (dBm)	Limit (dBm)	
MCS0	8.571	4.39	12.961	14.77	11

802.11ac (VHT40)

Data Rate	Gated RMS (dBm) 5190MHz	Antenna Gain(dBi)	EIRP (dBm)	Limit (dBm)	Power Setting (dBm)
MCS0	7.927	4.39	12.317	14.77	11
Data Rate	Gated RMS (dBm) 5230MHz	Antenna Gain(dBi)	EIRP (dBm)	Limit (dBm)	
MCS0	8.507	4.39	12.897	14.77	11

802.11ac (VHT80)

Data Rate	Gated RMS (dBm) 5210MHz	Antenna Gain(dBi)	EIRP (dBm)	Limit (dBm)	Power Setting (dBm)
MCS0	8.365	4.39	12.755	14.77	11

4.4.2 Power Spectral Density

Test according to FCC title 47 part 15 §15.407(a), KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 II.F with test method SA-1 and ANSI C63.10-2013.

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

FCC

Device has both client and access point modes and has identical RF characteristics and settings for both Limits are as follows:

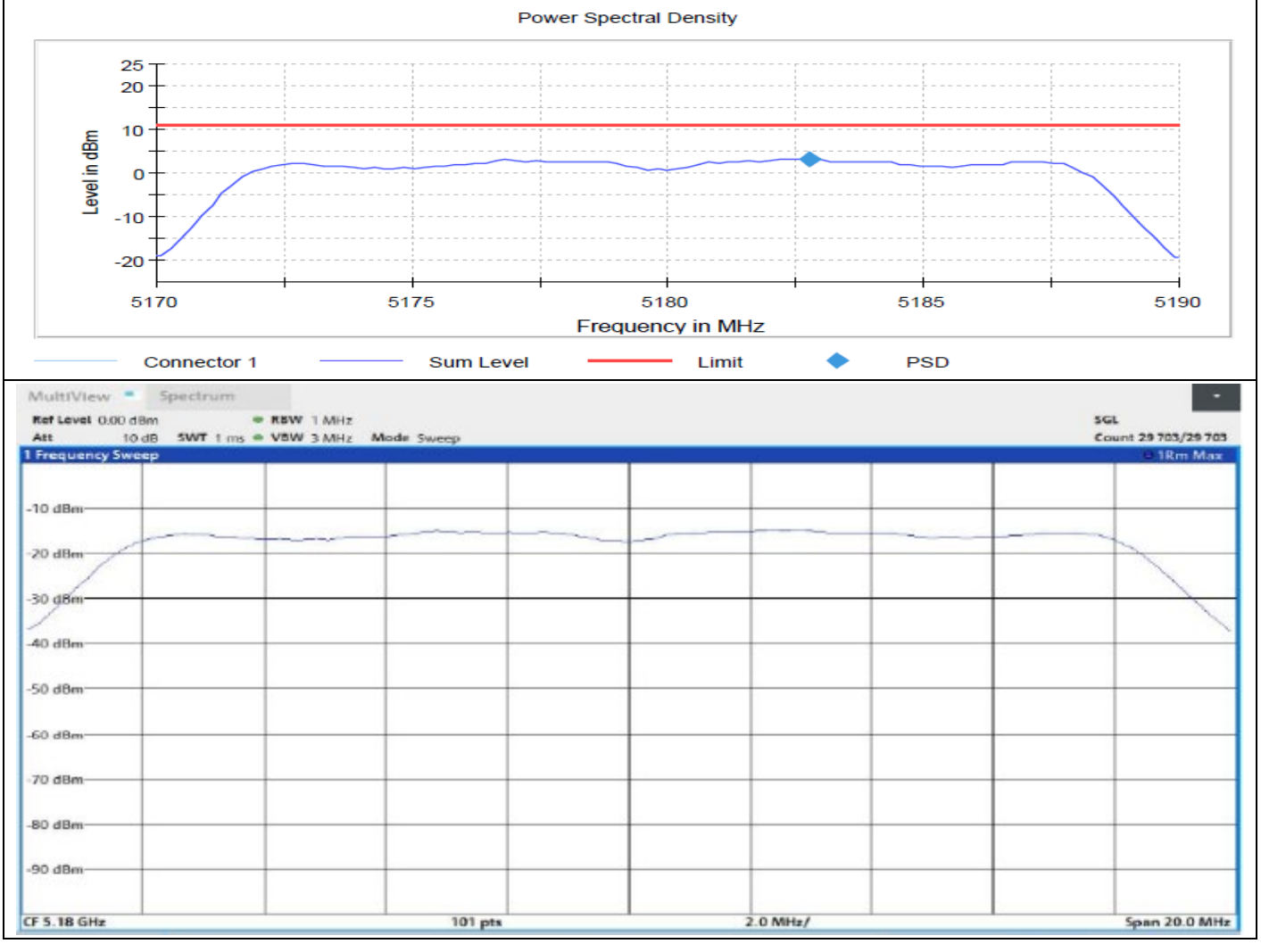
15.407(a)(1)(i): 17dBm for outdoor access points with antenna gains less than 6dBi.

15.407(a)(1)(iv):11dBm for client devices with antenna gains less than 6dBi.

Since client devices are subject to more stringent limits, unit tested against the limits for a client device.

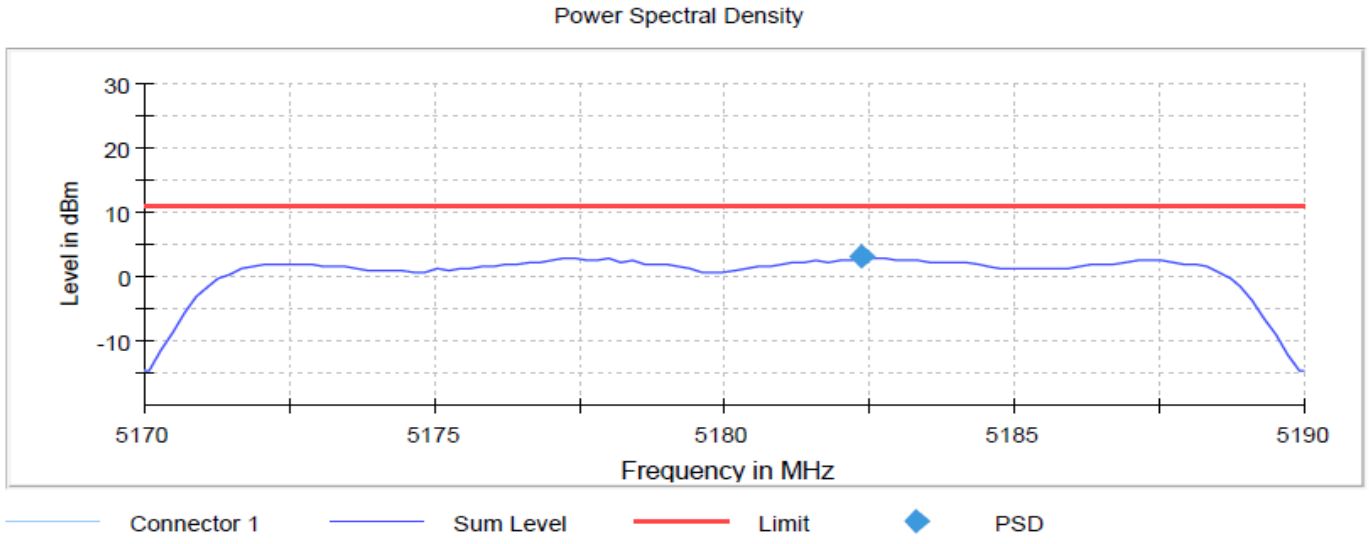
Mode	Data Rate	PSD (dBm) 5180 MHz	PSD (dBm) 5200 MHz	PSD (dBm) 5240 MHz	Limit (dBm)	Power Setting (dBm)
802.11a	**6Mbps**	3.186	3.184	3.596	11.0	15

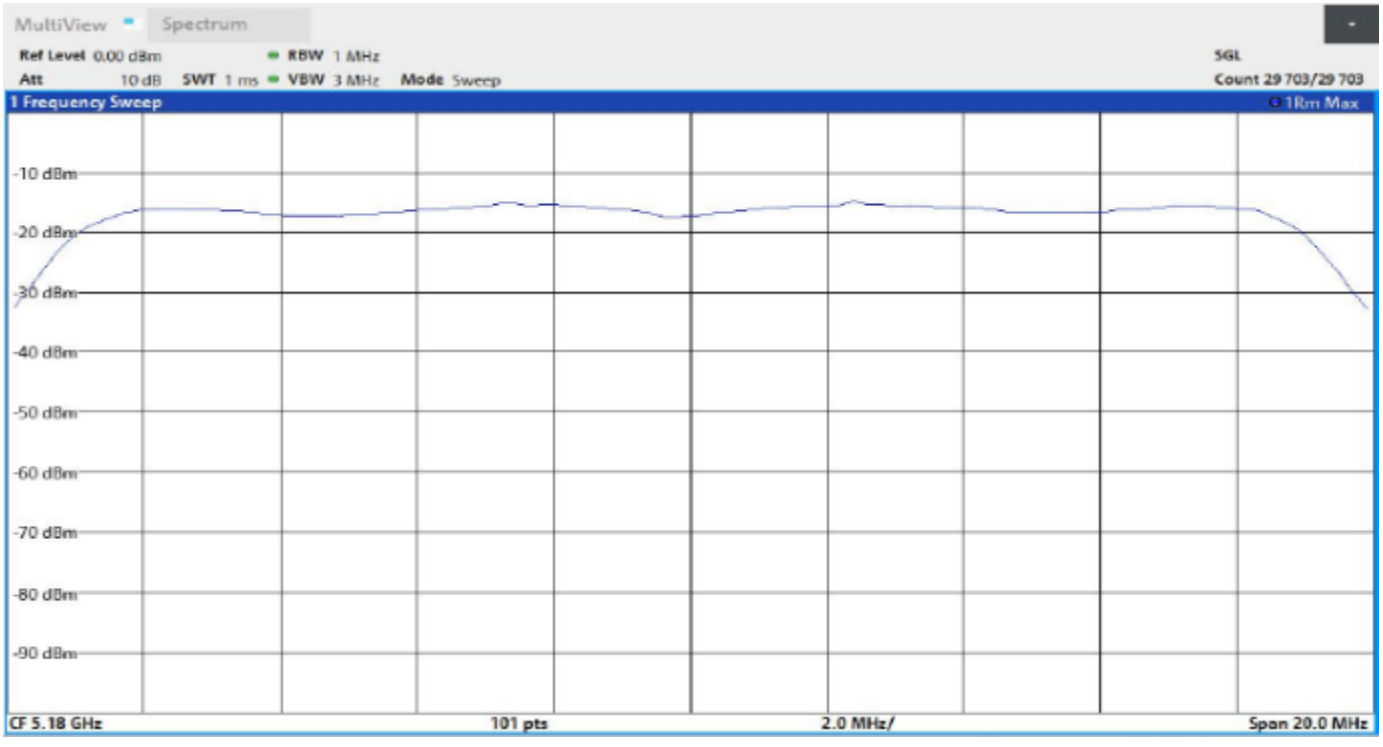
802.11a 5180 MHz 6Mbps



Mode	Data Rate	PSD (dBm) 5180 MHz	PSD (dBm) 5200 MHz	PSD (dBm) 5240 MHz	Limit (dBm)	Power Setting (dBm)
802.11n (HT20)	**MCS0**	3.264	3.237	3.380	11.0	15

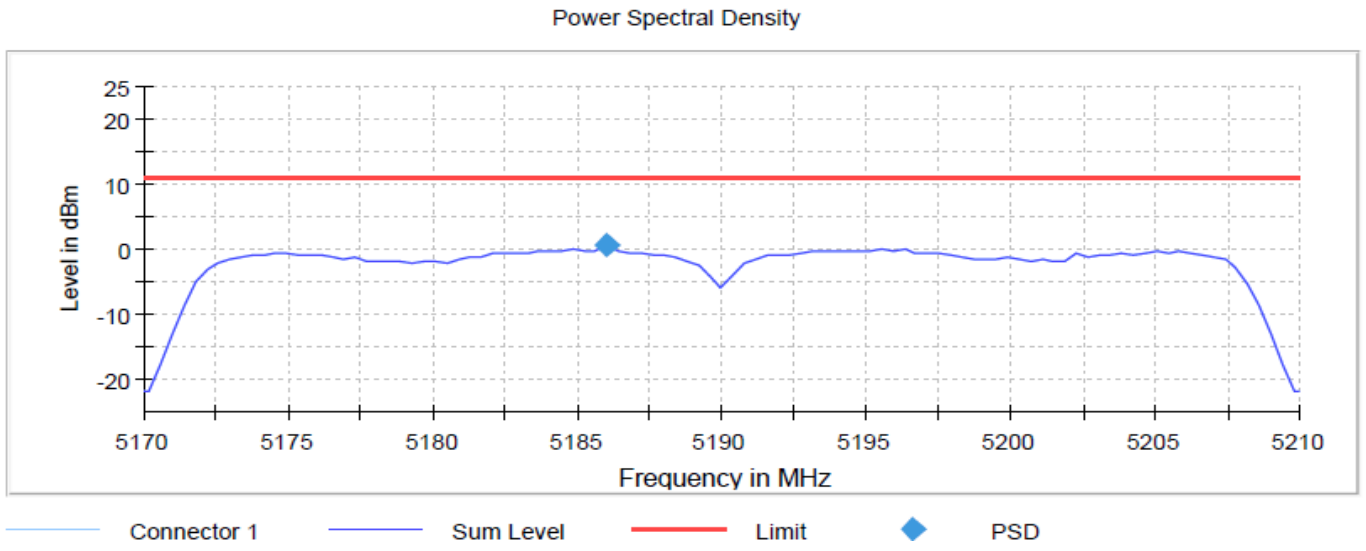
802.11n (HT20) 5180 MHz MCS0

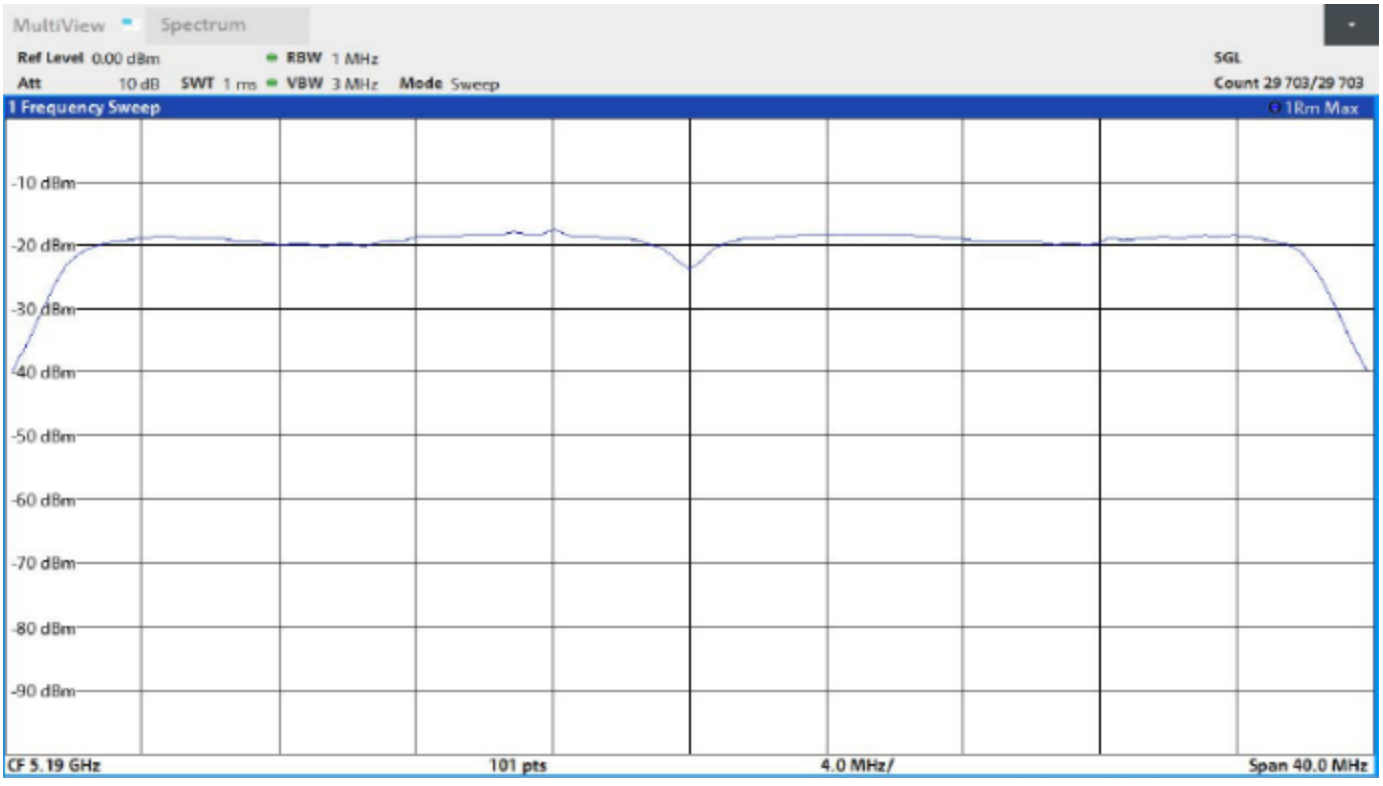




Mode	Data Rate	PSD (dBm) 5190 MHz	PSD (dBm) 5230 MHz	Limit (dBm)	Power Setting (dBm)
802.11n (HT40)	**MCS0**	0.515	0.572	11.0	15

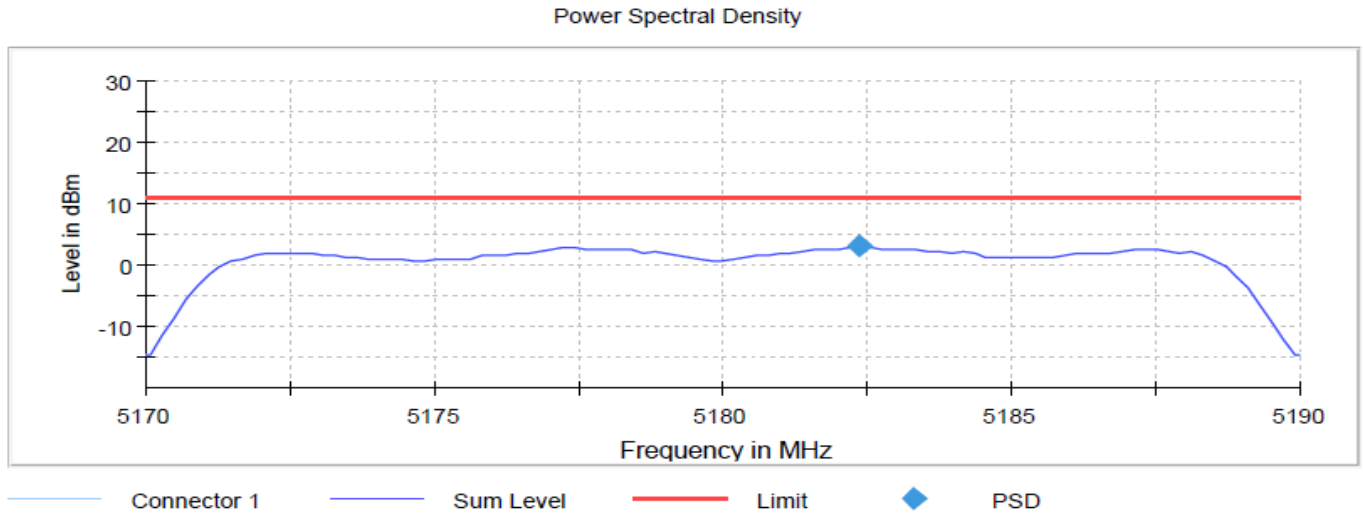
802.11n (HT40) 5190 MHz MCS0

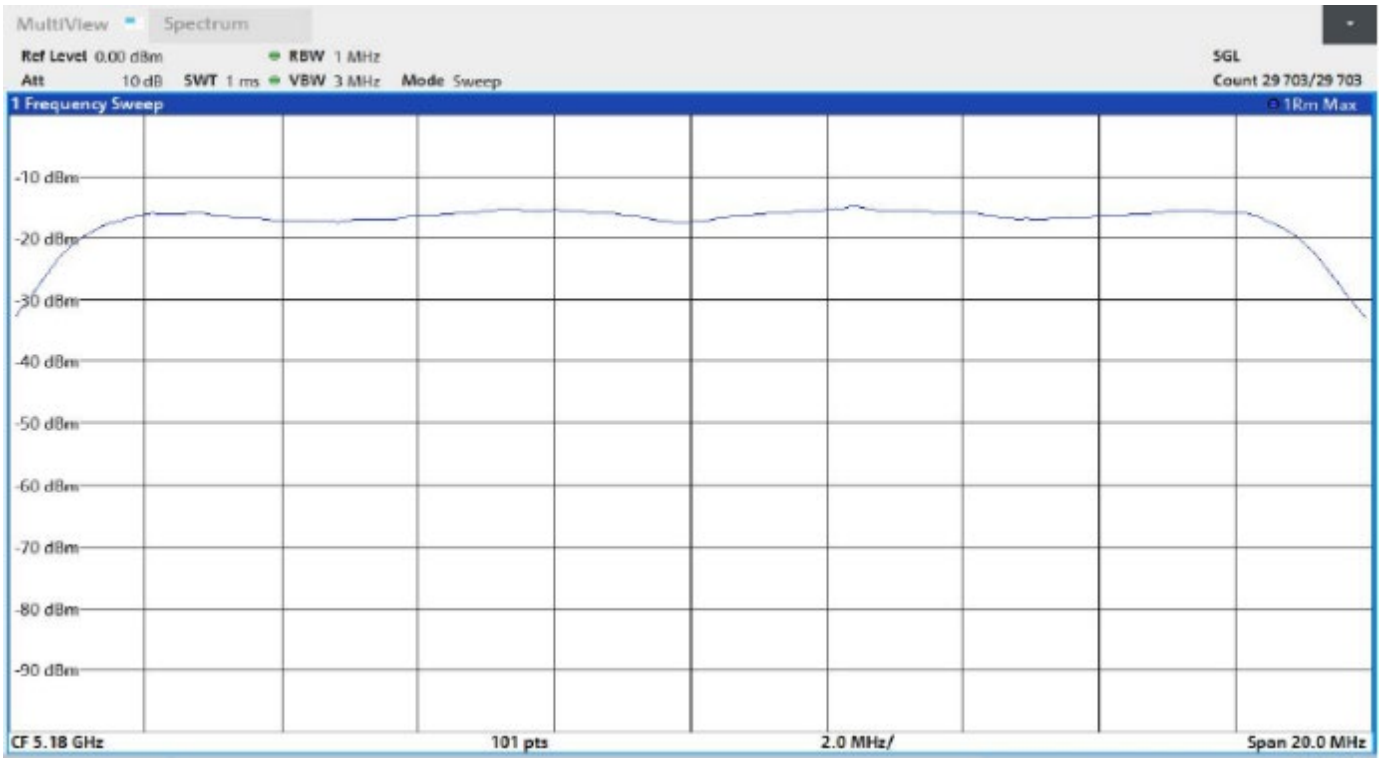




Mode	Data Rate	PSD (dBm) 5180 MHz	PSD (dBm) 5200 MHz	PSD (dBm) 5240 MHz	Limit (dBm)	Power Setting (dBm)
802.11ac (VHT20)	**MCS0**	3.279	3.057	3.627	11.0	15

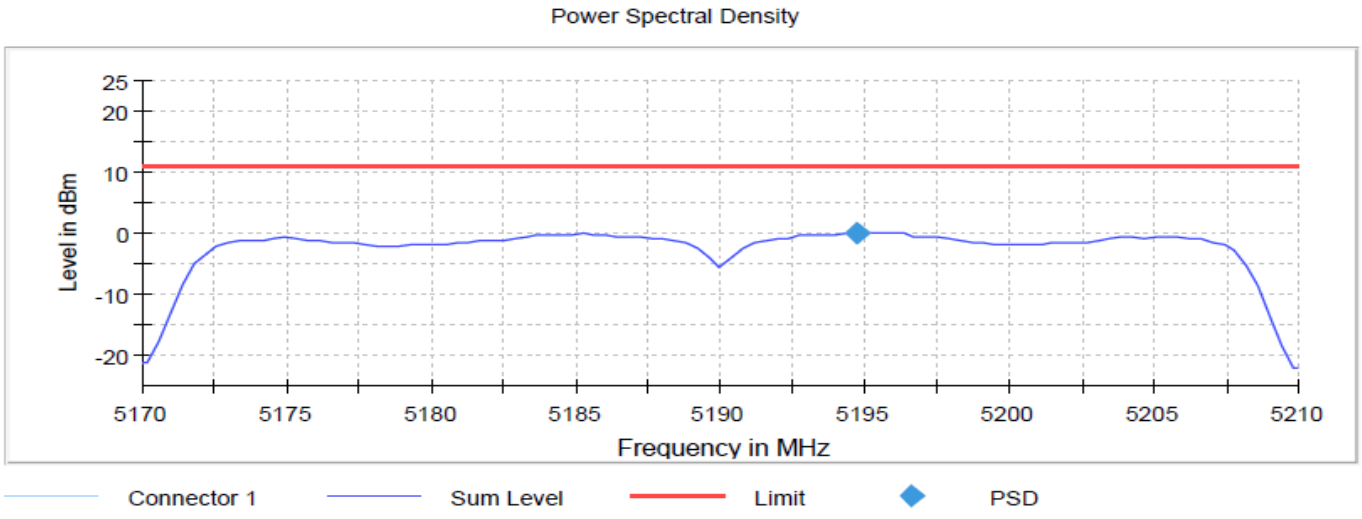
802.11ac (VHT20) 5180 MHz MCS0

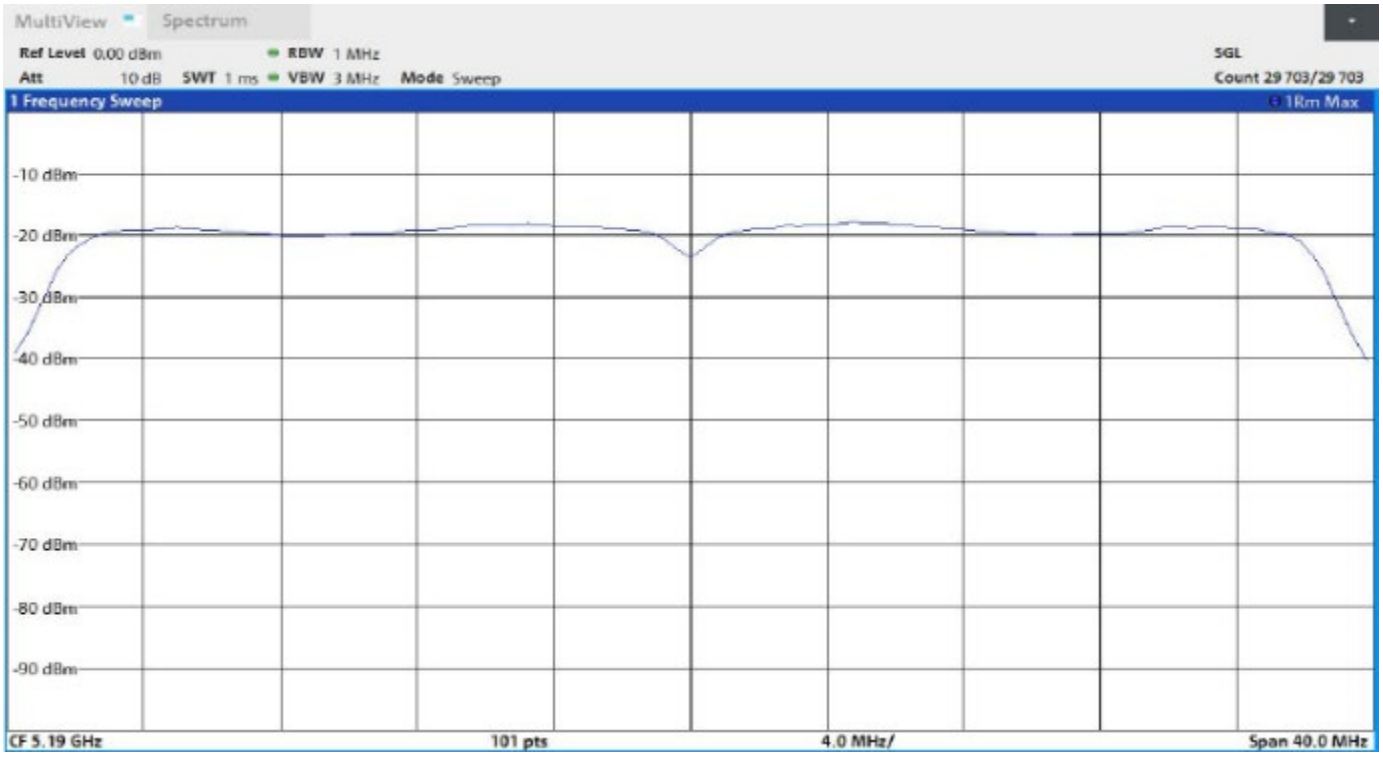




Mode	Data Rate	PSD (dBm) 5190 MHz	PSD (dBm) 5230 MHz	Limit (dBm)	Power Setting (dBm)
802.11ac (VHT40)	**MCS0**	0.147	0.705	11.0	12

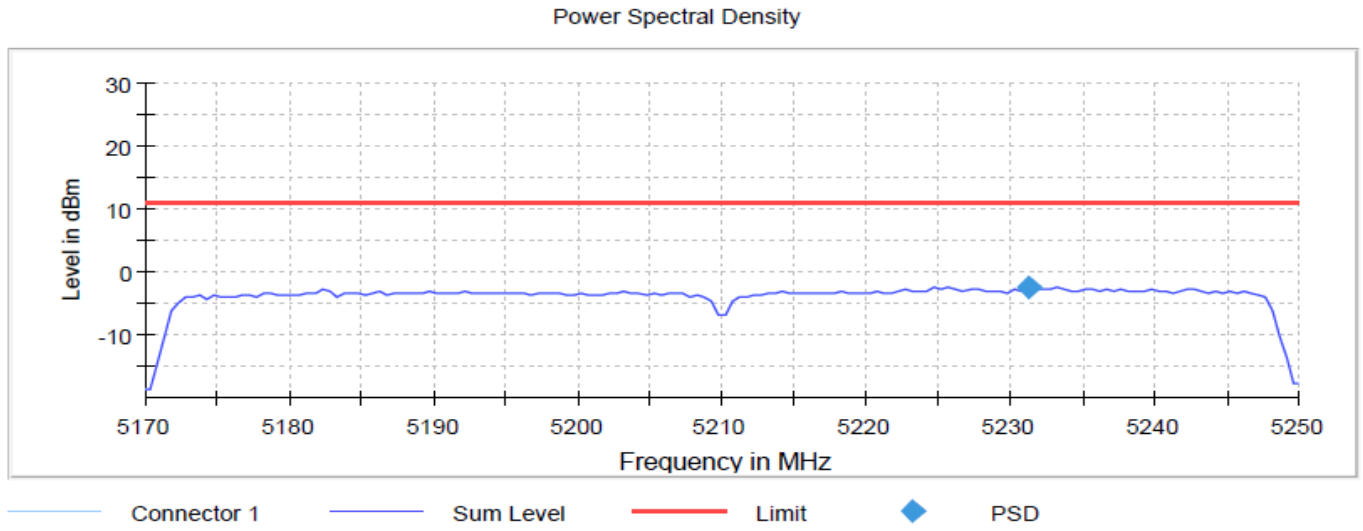
802.11ac (VHT40) 5190 MHz MCS0

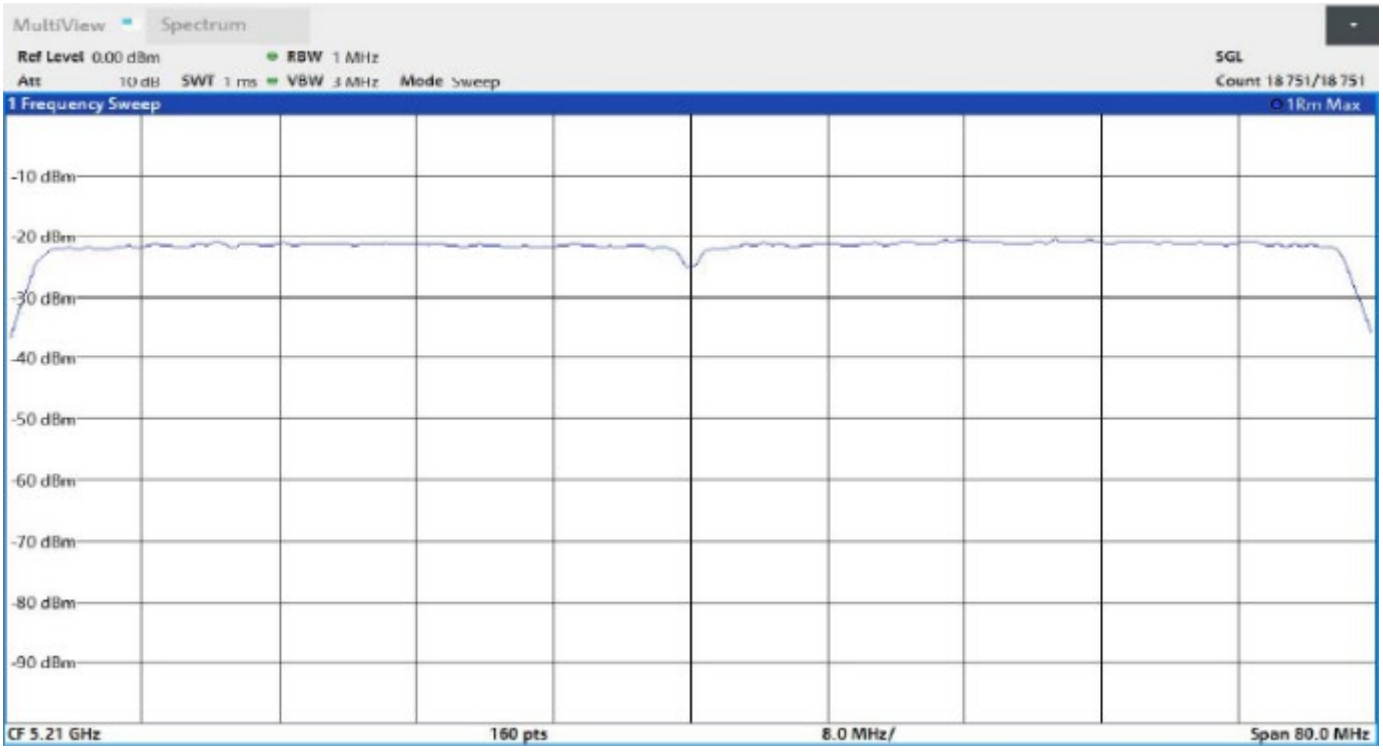




Mode	Data Rate	PSD (dBm) 5210 MHz	Limit (dBm)	Power Setting (dBm)
802.11ac (VHT80)	**MCS0**	-2.483	11.0	12

802.11ac (VHT80) 5210 MHz MCS0





RSS-247

802.11a

Data Rate	PSD(dBm) 5180MHz	Antenna Gain (dBi)	EIRP PSD (dBm)	Limit (dBm)	Power Setting (dBm)
6 Mbps	-1.668	4.39	2.722	10.0	11
Data Rate	**PSD(dBm) 5200MHz**	**Antenna Gain (dBi)**	**EIRP PSD (dBm)**	**Limit (dBm)**	**Power Setting (dBm)**
6 Mbps	-1.568	4.39	2.822	10.0	11
Data Rate	**PSD(dBm) 5240MHz**	**Antenna Gain (dBi)**	**EIRP PSD (dBm)**	**Limit (dBm)**	**Power Setting (dBm)**
6 Mbps	-1.071	4.39	3.319	10.0	11

802.11n (HT20)

Data Rate	PSD(dBm) 5180MHz	Antenna Gain (dBi)	EIRP PSD (dBm)	Limit (dBm)	Power Setting (dBm)
MCS0	-1.658	4.39	2.732	10.0	11
Data Rate	**PSD(dBm) 5200MHz**	**Antenna Gain (dBi)**	**EIRP PSD (dBm)**	**Limit (dBm)**	**Power Setting (dBm)**
MCS0	-1.535	4.39	2.855	10.0	11
Data Rate	**PSD(dBm) 5240MHz**	**Antenna Gain (dBi)**	**EIRP PSD (dBm)**	**Limit (dBm)**	**Power Setting (dBm)**
MCS0	-0.960	4.39	3.43	10.0	11

802.11n (HT40)

Data Rate	PSD(dBm) 5190MHz	Antenna Gain (dBi)	EIRP PSD (dBm)	Limit (dBm)	Power Setting (dBm)
MCS0	-4.184	4.39	0.206	10.0	11
Data Rate	**PSD(dBm) 5230MHz**	**Antenna Gain (dBi)**	**EIRP PSD (dBm)**	**Limit (dBm)**	**Power Setting (dBm)**
MCS0	-4.132	4.39	0.258	10.0	11

802.11ac (VHT20)

Data Rate	PSD(dBm) 5180MHz	Antenna Gain (dBi)	EIRP PSD (dBm)	Limit (dBm)	Power Setting (dBm)
MCS0	-1.552	4.39	2.838	10.0	11
Data Rate	**PSD(dBm) 5200MHz**	**Antenna Gain (dBi)**	**EIRP PSD (dBm)**	**Limit (dBm)**	**Power Setting (dBm)**
MCS0	-1.510	4.39	2.88	10.0	11
Data Rate	**PSD(dBm) 5240MHz**	**Antenna Gain (dBi)**	**EIRP PSD (dBm)**	**Limit (dBm)**	**Power Setting (dBm)**
MCS0	-1.010	4.39	3.38	10.0	11

802.11ac (VHT40)

Data Rate	PSD(dBm) 5190MHz	Antenna Gain (dBi)	EIRP PSD (dBm)	Limit (dBm)	Power Setting (dBm)
MCS0	-4.545	4.39	-0.155	10.0	11
Data Rate	**PSD(dBm) 5230MHz**	**Antenna Gain (dBi)**	**EIRP PSD (dBm)**	**Limit (dBm)**	**Power Setting (dBm)**
MCS0	-3.953	4.39	0.437	10.0	11

802.11ac (VHT80)

Data Rate	PSD(dBm) 5210MHz	Antenna Gain (dBi)	EIRP PSD (dBm)	Limit (dBm)	Power Setting (dBm)
MCS0	-7.222	4.39	-2.832	10.0	11

4.4.3 DTS Bandwidth 6dB

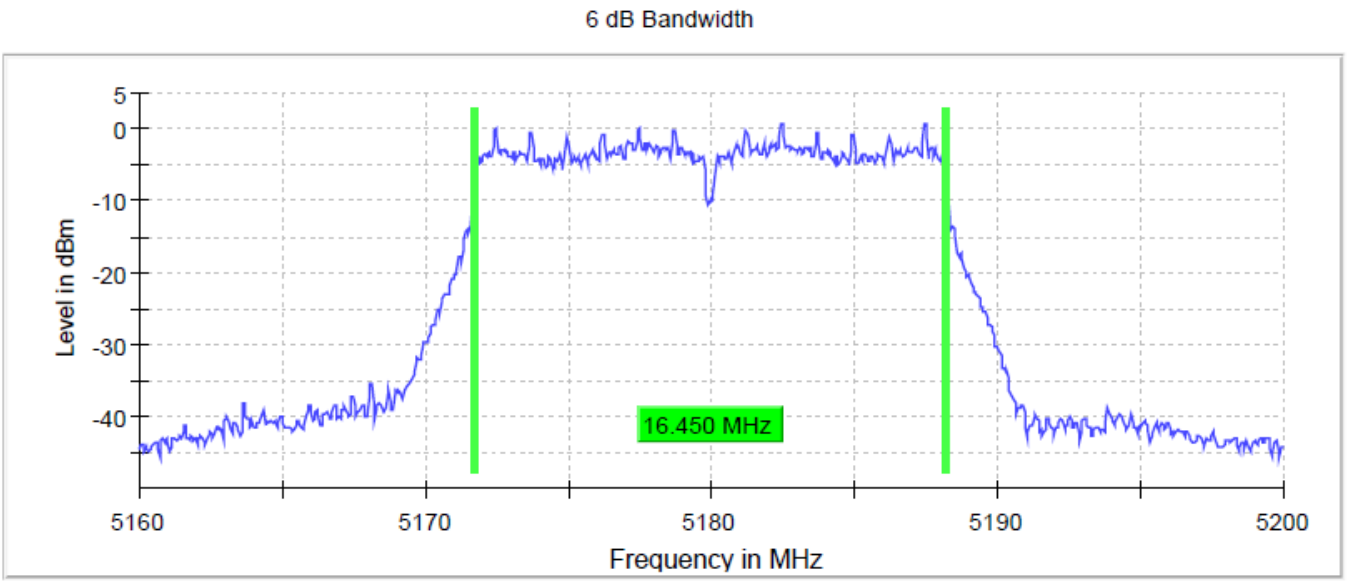
FCC and RSS-247

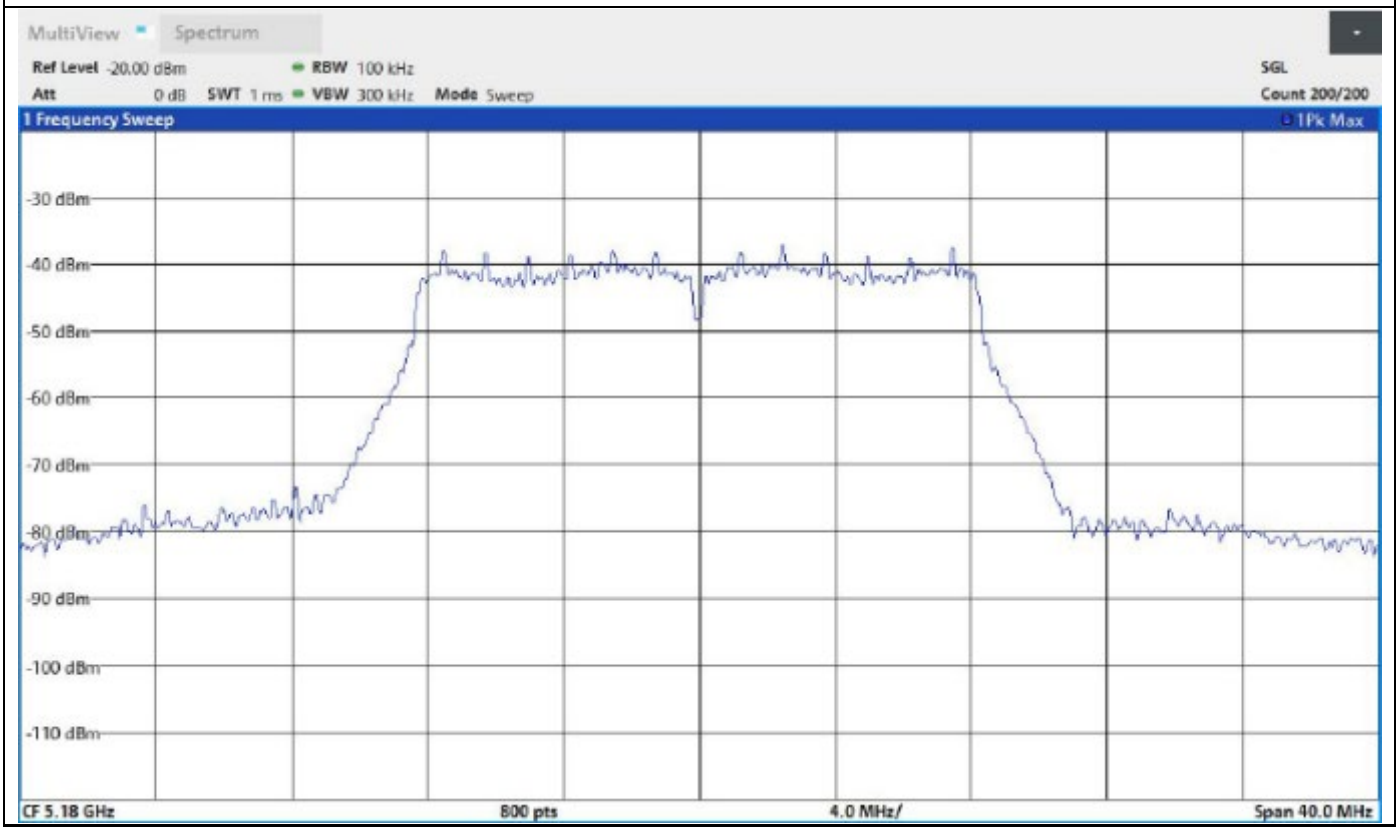
Test according to FCC title 47 part 15 §15.407(a) (e), KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 Section C.2 and ANSI C63.10-2013, ISEDC RSS-247 6.2.4(1)

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

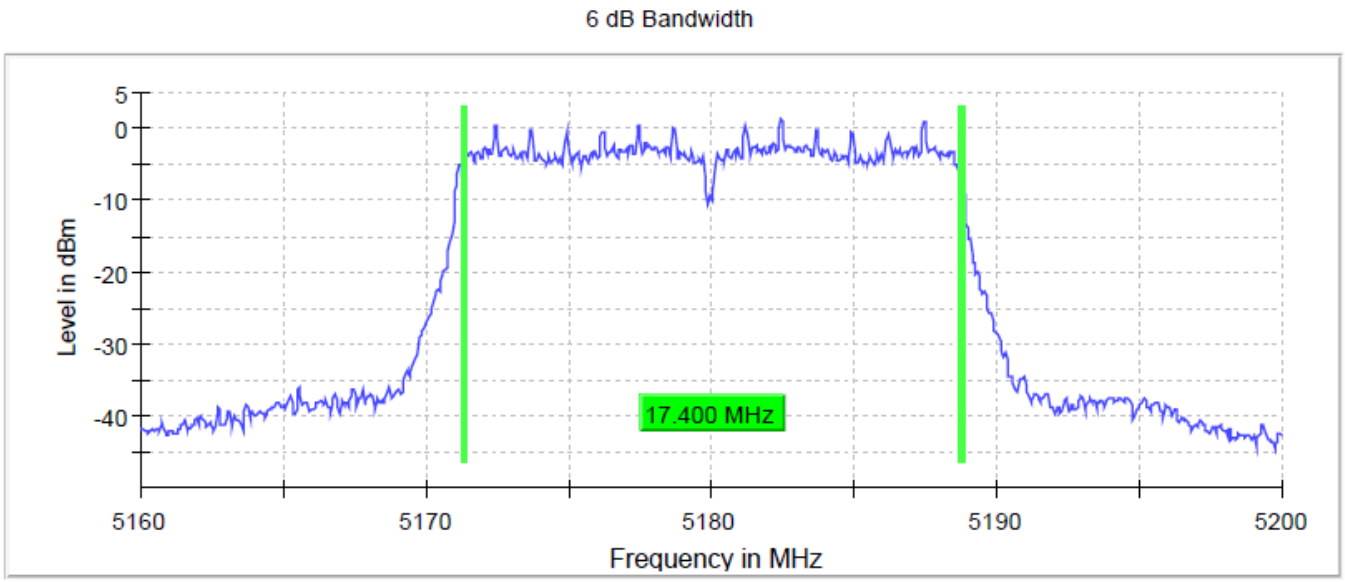
Data Rate	DUT Frequency (MHz)	Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Minimum Limit (MHz)
802.11a 6Mbps	5180.000000	16.450000	5171.725000	5188.175000	0.5
802.11n (HT20) MCS0	5180.000000	17.400000	5171.375000	5188.775000	0.5
802.11ac (VHT20) MCS0	5180.000000	17.400000	5171.125000	5188.525000	0.5
802.11n (HT40) MCS0	5190.000000	35.900000	5172.025000	5207.925000	0.5
802.11ac (VHT40) MCS0	5190.000000	35.900000	5172.025000	5207.925000	0.5
802.11ac (VHT80) MCS0	5210.000000	76.400000	5171.775000	5248.175000	0.5
802.11a 6Mbps	5200.000000	16.450000	5191.725000	5208.175000	0.5
802.11n (HT20) MCS0	5200.000000	17.600000	5191.125000	5208.725000	0.5
802.11ac (VHT20) MCS0	5200.000000	17.400000	5191.325000	5208.725000	0.5
802.11n (HT40) MCS0	5230.000000	35.750000	5212.175000	5247.925000	0.5
802.11ac (VHT40) MCS0	5230.000000	35.900000	5212.025000	5247.925000	0.5
802.11a 6Mbps	5240.000000	16.450000	5231.725000	5248.175000	0.5
802.11n (HT20) MCS0	5240.000000	17.400000	5231.325000	5248.725000	0.5
802.11ac (VHT20) MCS0	5240.000000	17.600000	5231.125000	5248.725000	0.5

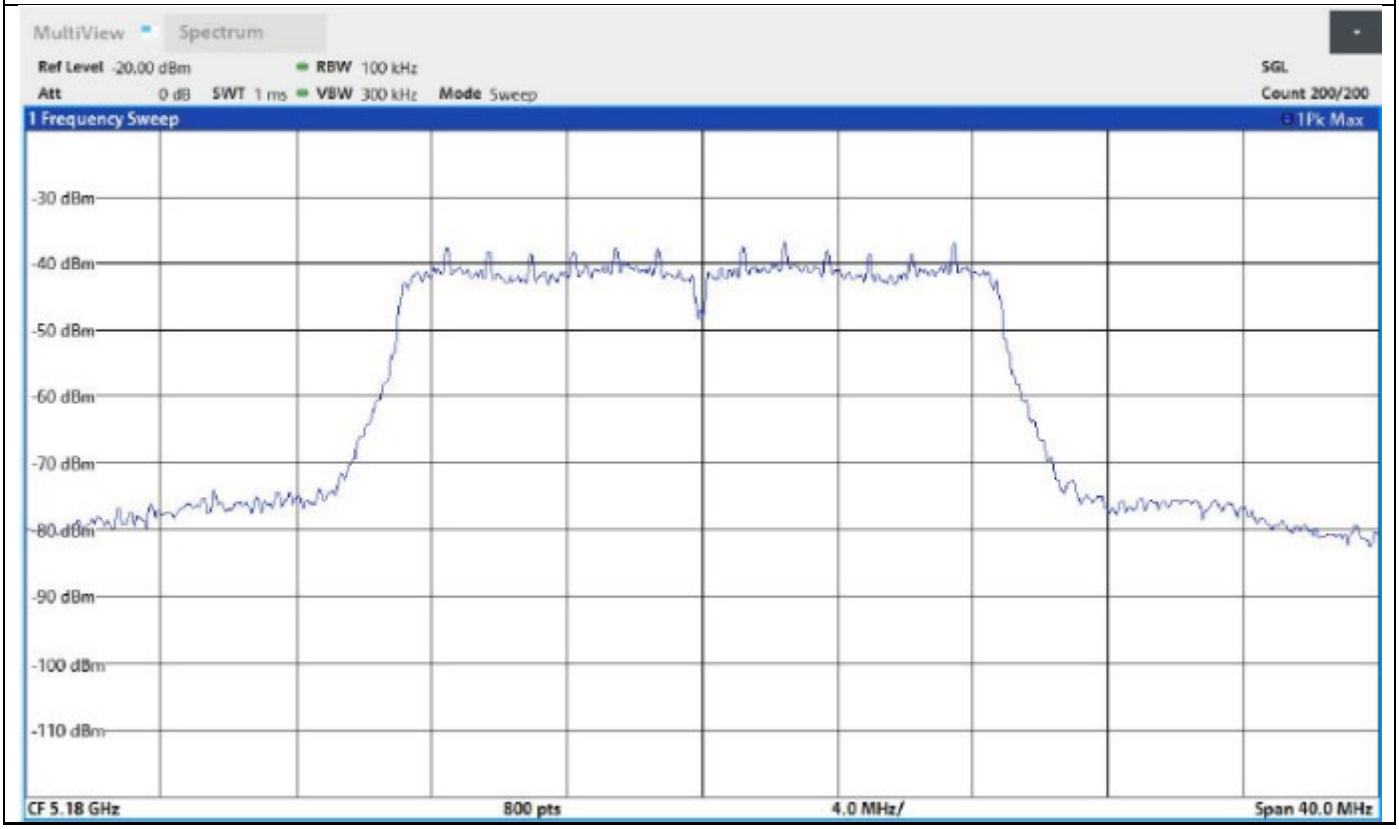
802.11a 5180MHz 6Mbps



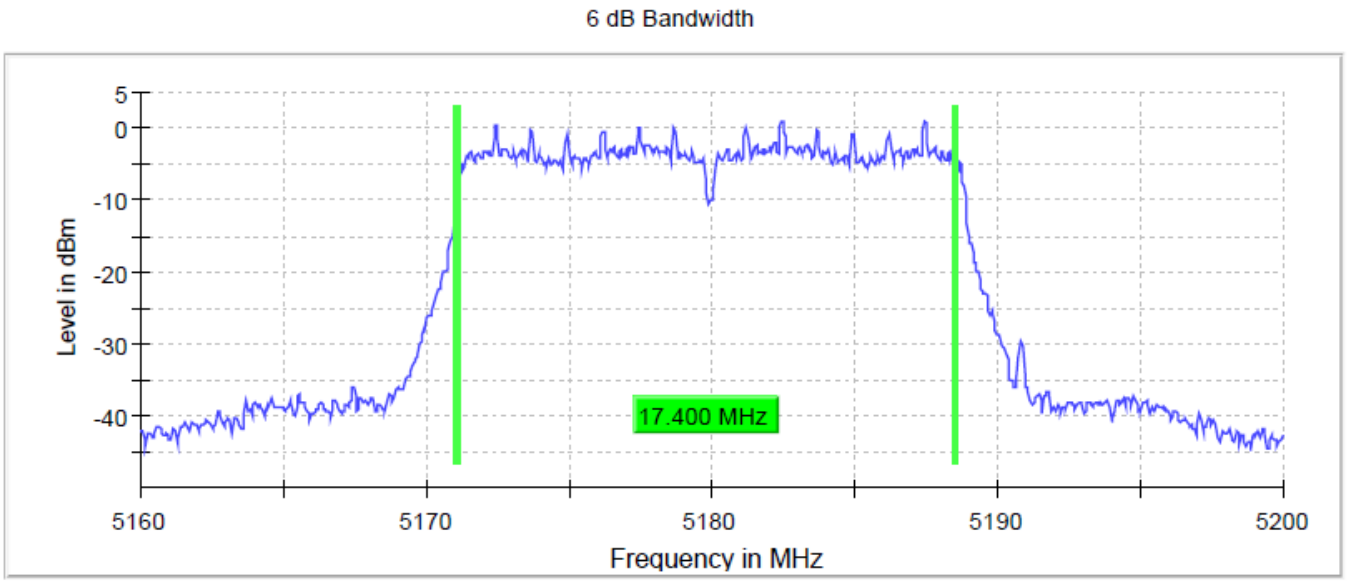


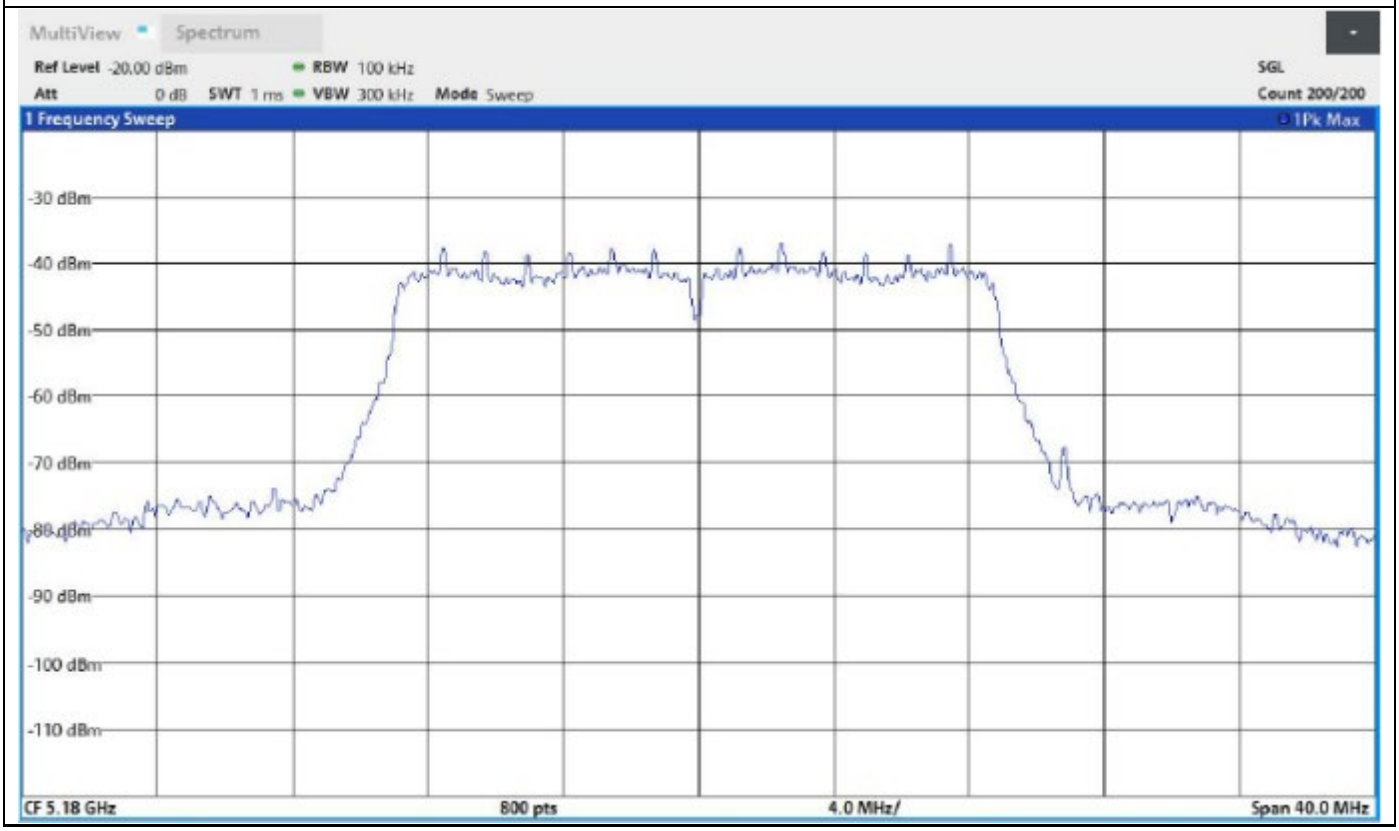
802.11n 5180MHz MCS0





802.11ac 5180MHz MCS0





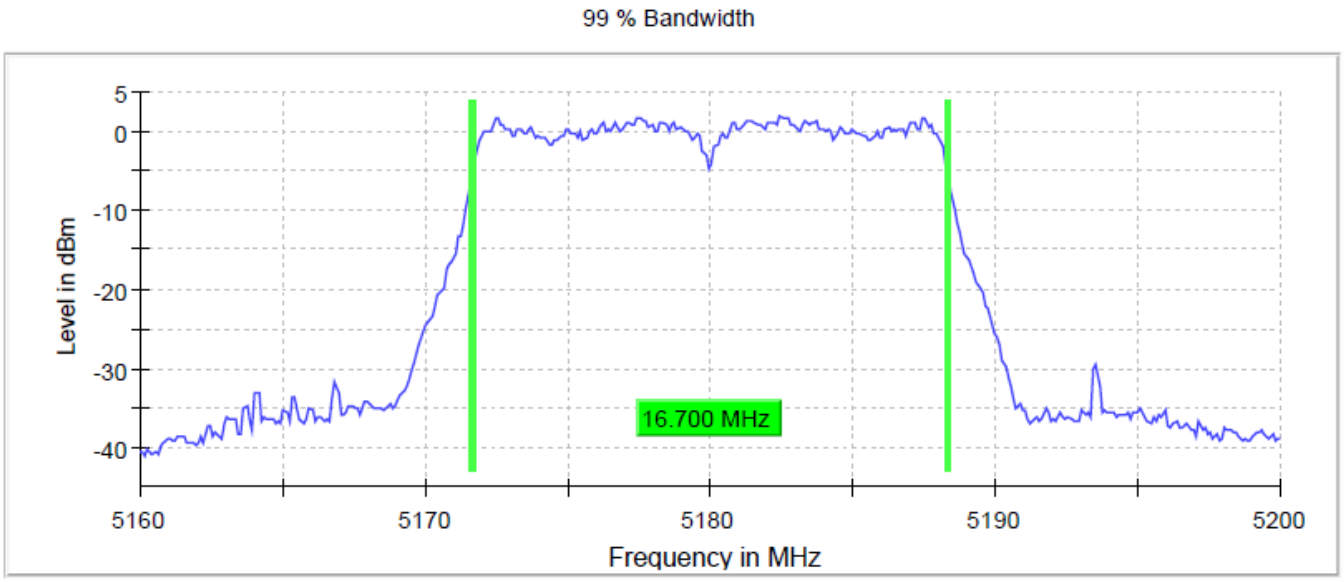
4.4.4 Occupied Channel Bandwidth

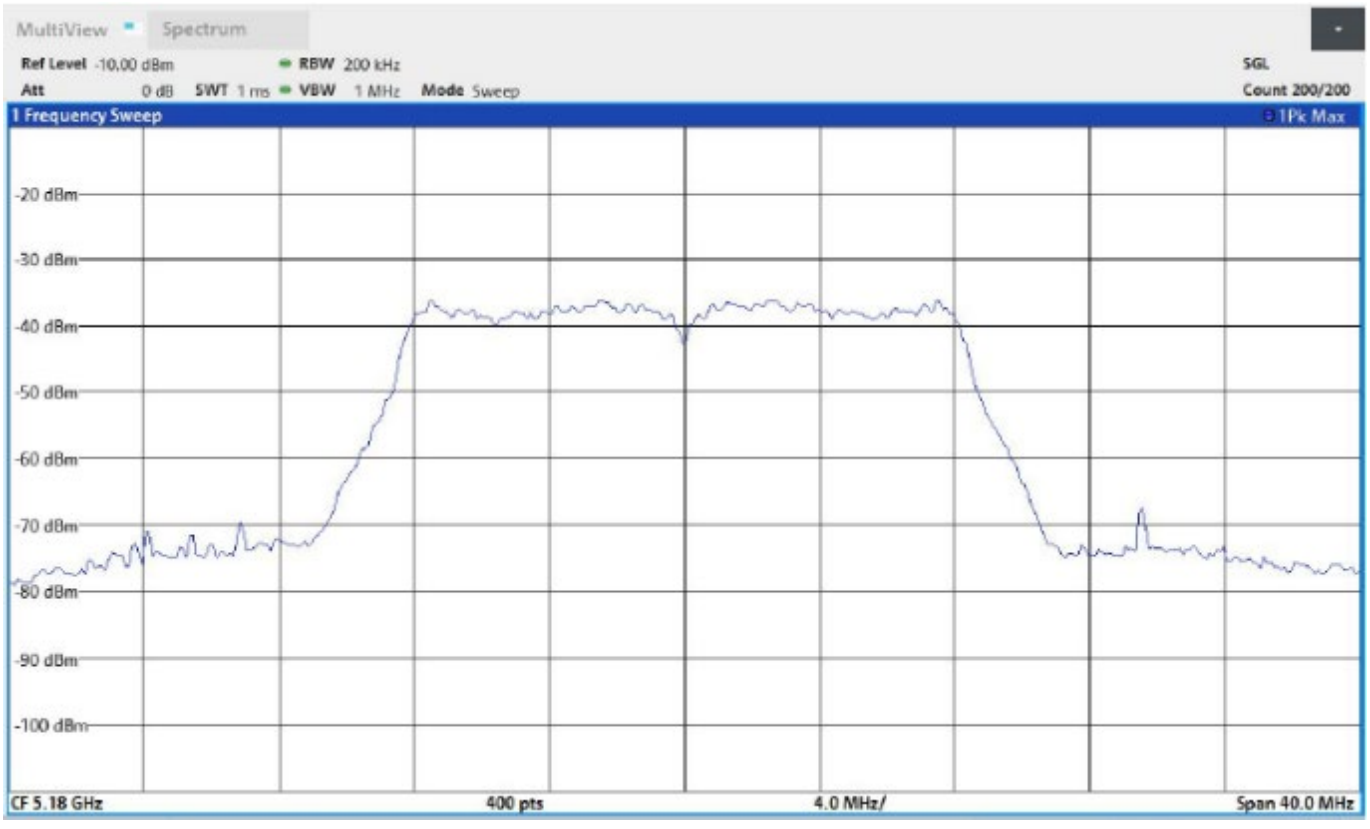
Test according to RSS-GEN Section 6.7, KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 D and ANSI C63.10-2013.

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

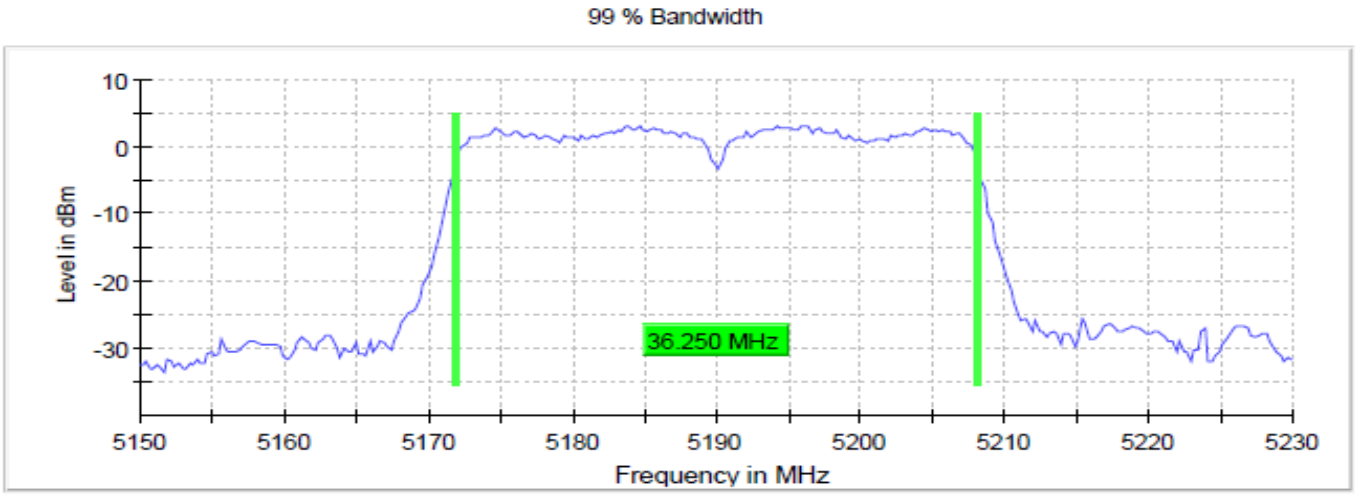
Data Rate	DUT Frequency (MHz)	Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Band Limit (MHz)
802.11a 6Mbps	5180.000000	16.700000	5171.650000	5188.350000	5150-5250
802.11n (HT20) MCS0	5180.000000	17.700000	5171.150000	5188.850000	5150-5250
802.11ac (VHT20) MCS0	5180.000000	17.700000	5171.150000	5188.850000	5150-5250
802.11n (HT40) MCS0	5190.000000	36.250000	5171.875000	5208.125000	5150-5250
802.11ac (VHT40) MCS0	5190.000000	36.250000	5171.875000	5208.125000	5150-5250
802.11ac (VHT80) MCS0	5210.000000	77.000000	5171.750000	5248.750000	5150-5250
802.11a 6Mbps	5200.000000	16.700000	5191.650000	5208.350000	5150-5250
802.11n (HT20) MCS0	5200.000000	17.700000	5191.150000	5208.850000	5150-5250
802.11ac (VHT20) MCS0	5200.000000	17.700000	5191.150000	5208.850000	5150-5250
802.11n (HT40) MCS0	5230.000000	36.500000	5211.625000	5248.125000	5150-5250
802.11ac (VHT40) MCS0	5230.000000	36.250000	5211.875000	5248.125000	5150-5250
802.11a 6Mbps	5240.000000	16.600000	5231.650000	5248.250000	5150-5250
802.11n (HT20) MCS0	5240.000000	17.700000	5231.150000	5248.850000	5150-5250
802.11ac (VHT20) MCS0	5240.000000	17.600000	5231.150000	5248.750000	5150-5250

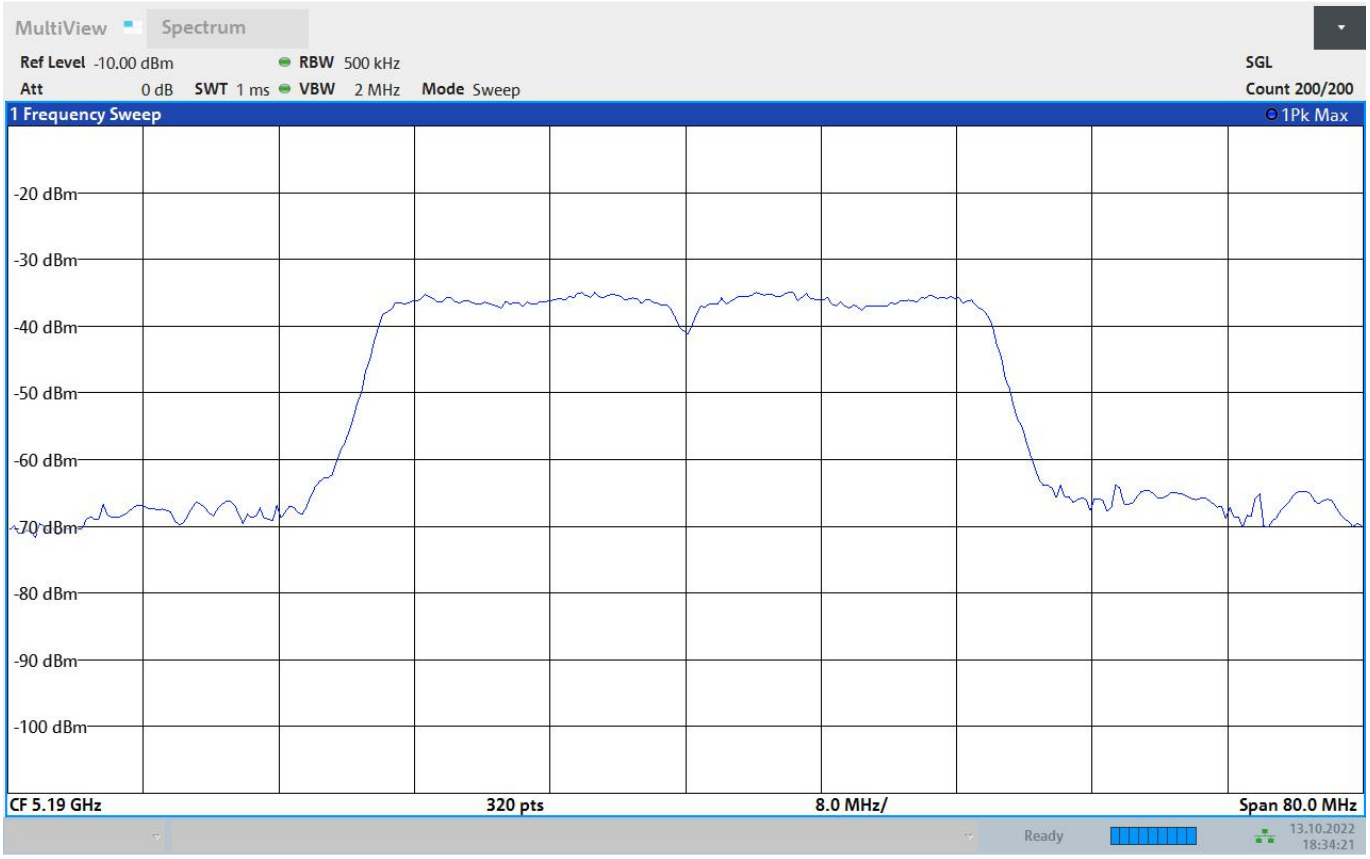
802.11a 5180MHz 6Mbps



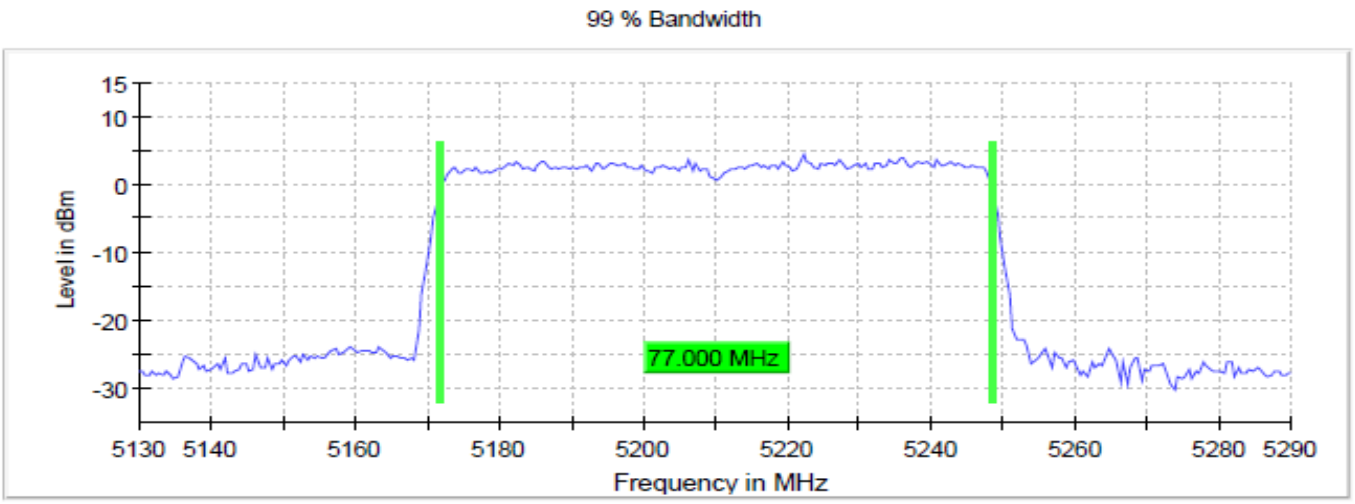


802.11n (HT40) 5190MHz MCS0

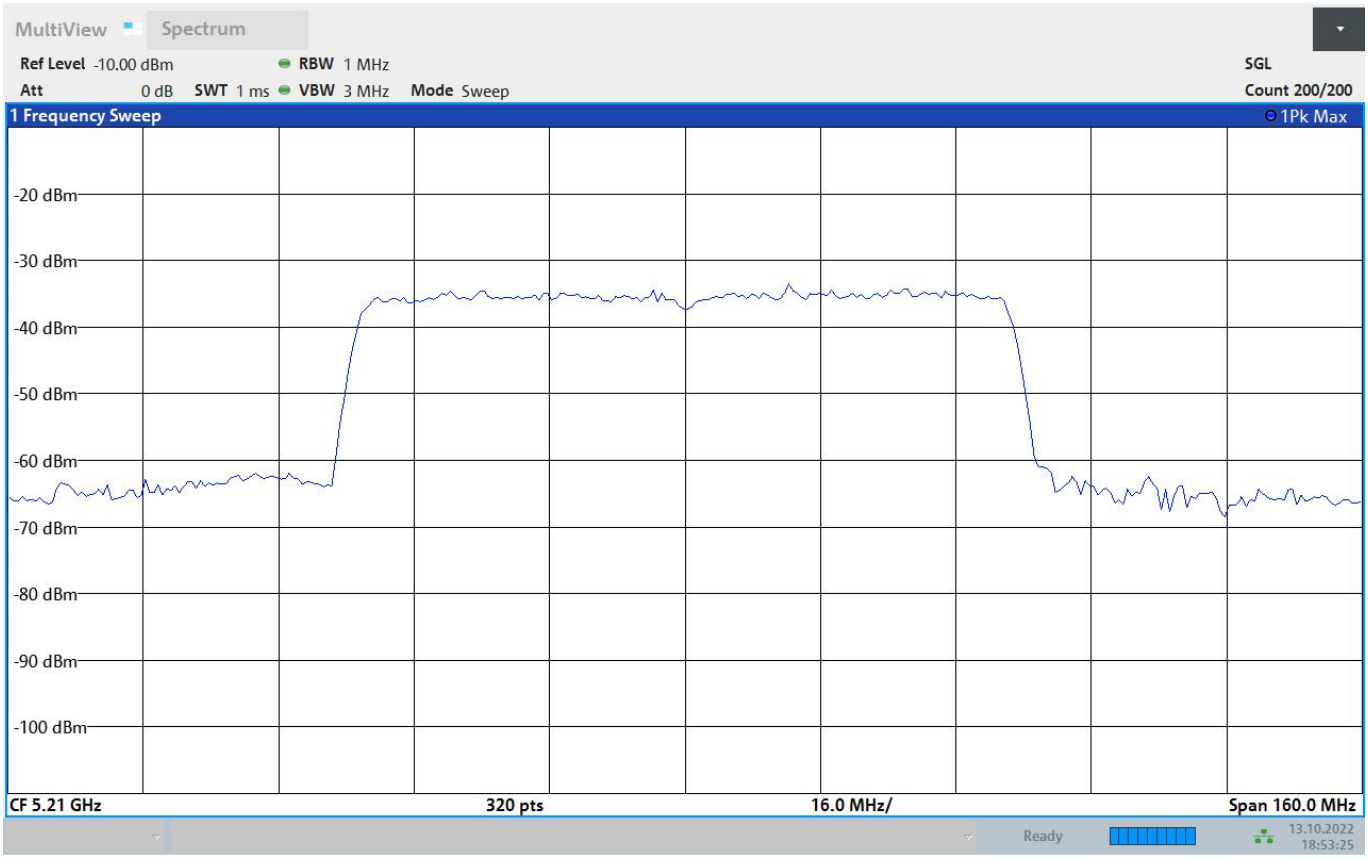




802.11ac (VHT80) 5210MHz MCS0



HAR-004 - HCH - DH1 - DFLTpwrSET - PWR



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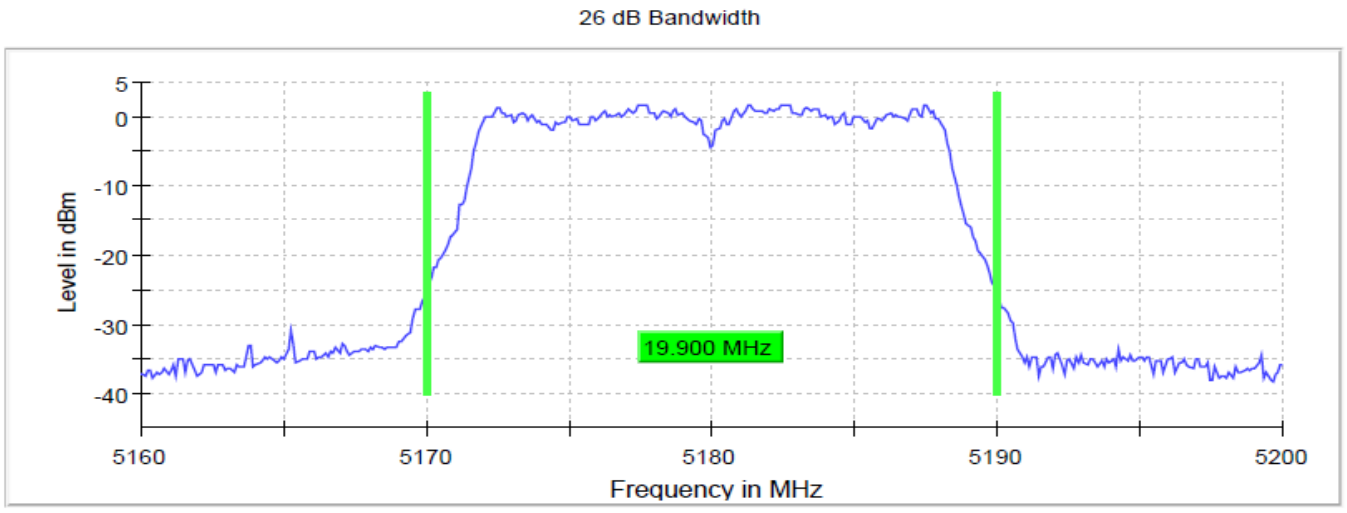
4.4.5 Emission Bandwidth 26 dB

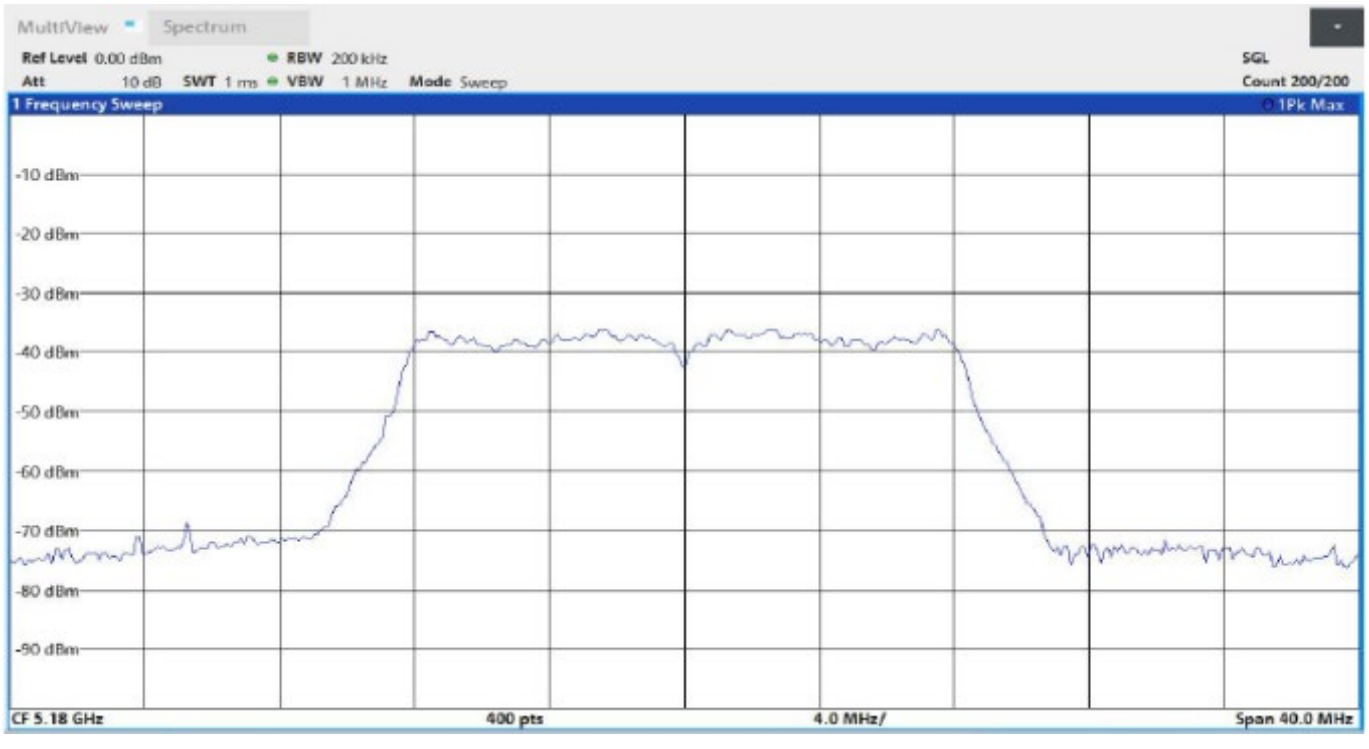
Test according to FCC title 47 part 15 §15.407(a) (e), KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 D and ANSI C63.10-2013

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

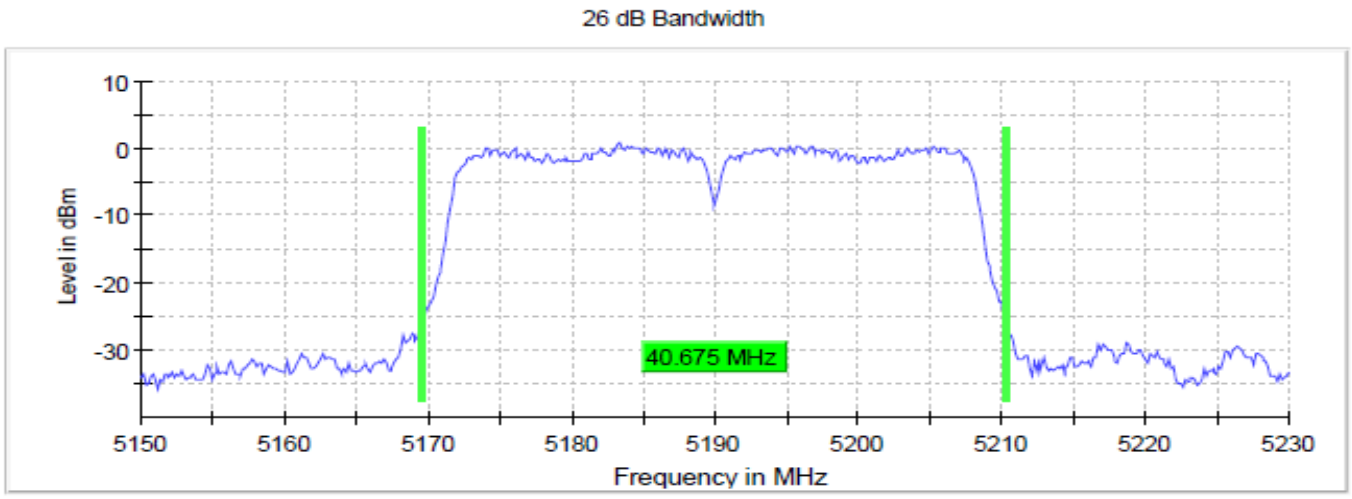
Data Rate	DUT Frequency (MHz)	Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
802.11a 6Mbps	5180.000000	19.900000	5170.050000	5189.950000
802.11n (HT20) MCS0	5180.000000	20.300000	5169.850000	5190.150000
802.11ac (VHT20) MCS0	5180.000000	20.300000	5169.850000	5190.150000
802.11n (HT40) MCS0	5190.000000	40.675422	5169.587242	5210.262664
802.11ac (VHT40) MCS0	5190.000000	40.675422	5169.737336	5210.412758
802.11ac (VHT80) MCS0	5210.000000	83.500000	5168.250000	5251.750000
802.11a 6Mbps	5200.000000	19.800000	5190.150000	5209.950000
802.11n (HT20) MCS0	5200.000000	20.400000	5189.750000	5210.150000
802.11ac (VHT20) MCS0	5200.000000	20.300000	5189.850000	5210.150000
802.11n (HT40) MCS0	5230.000000	40.525328	5209.737336	5250.262664
802.11ac (VHT40) MCS0	5230.000000	40.825516	5209.587242	5250.412758
802.11a 6Mbps	5240.000000	19.900000	5230.050000	5249.950000
802.11n (HT20) MCS0	5240.000000	20.200000	5229.950000	5250.150000
802.11ac (VHT20) MCS0	5240.000000	20.200000	5229.850000	5250.050000

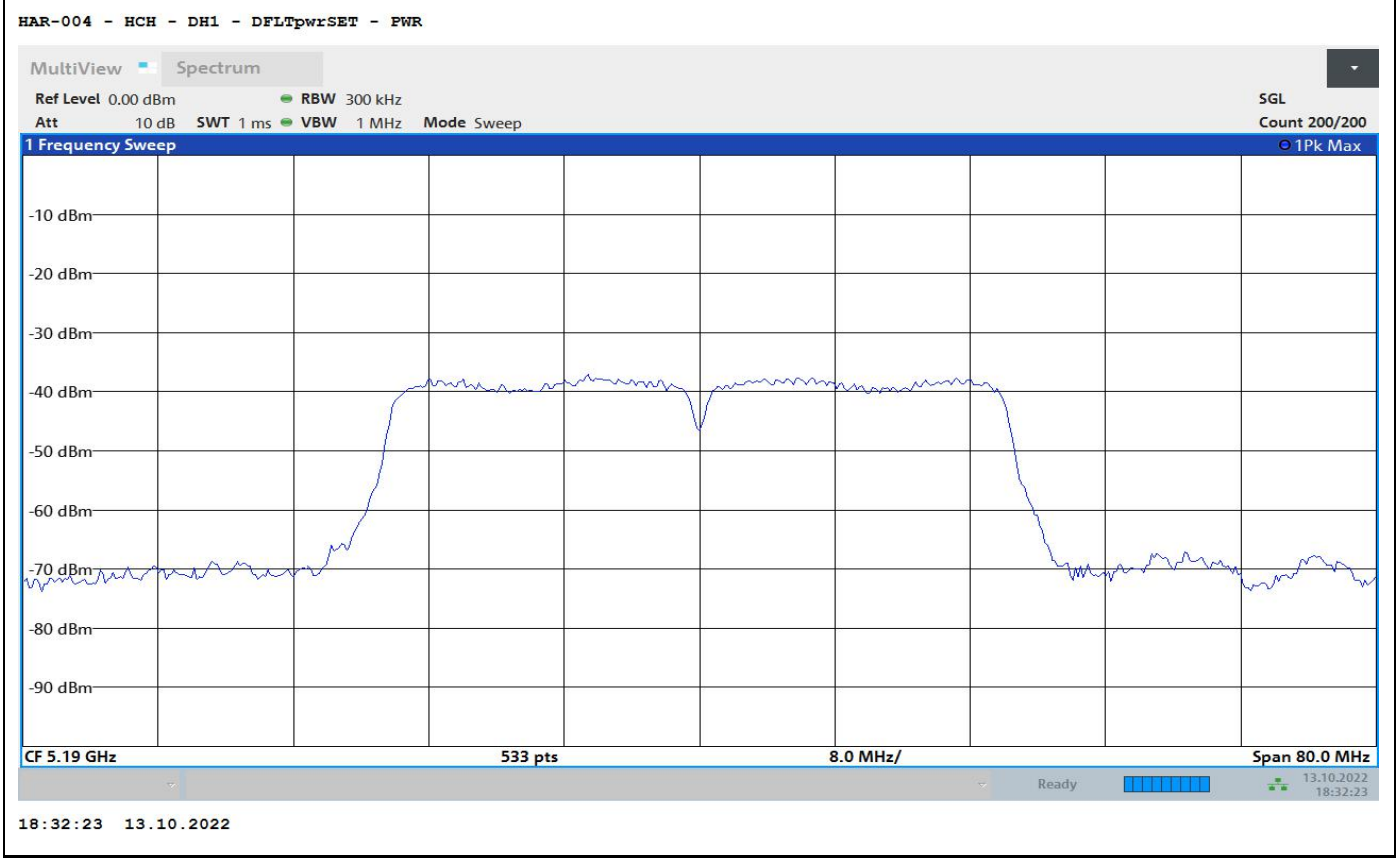
802.11a 5180MHz 6Mbps



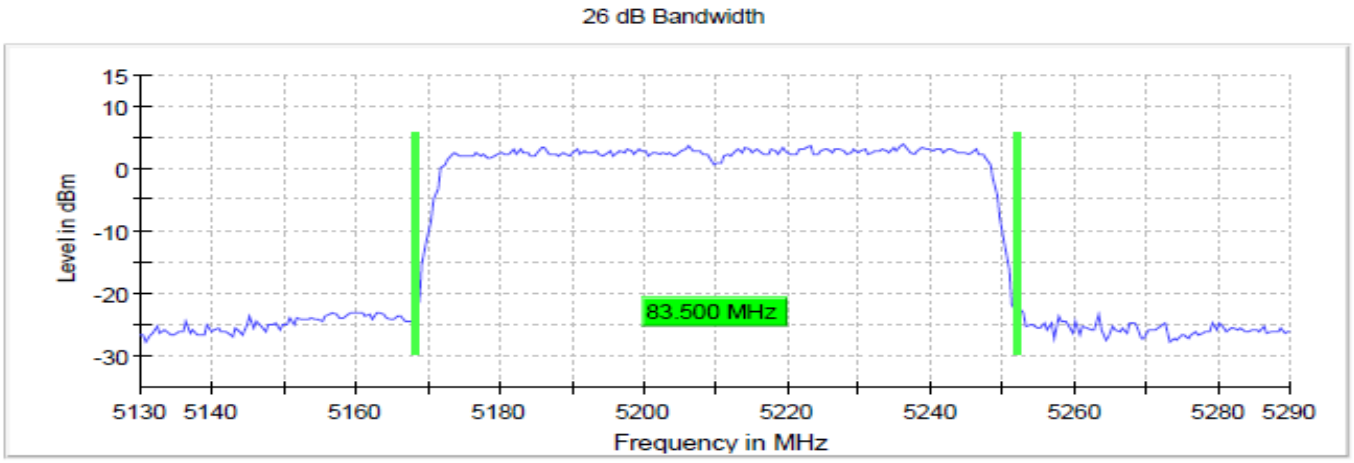


802.11n (HT40) 5190MHz MCS0

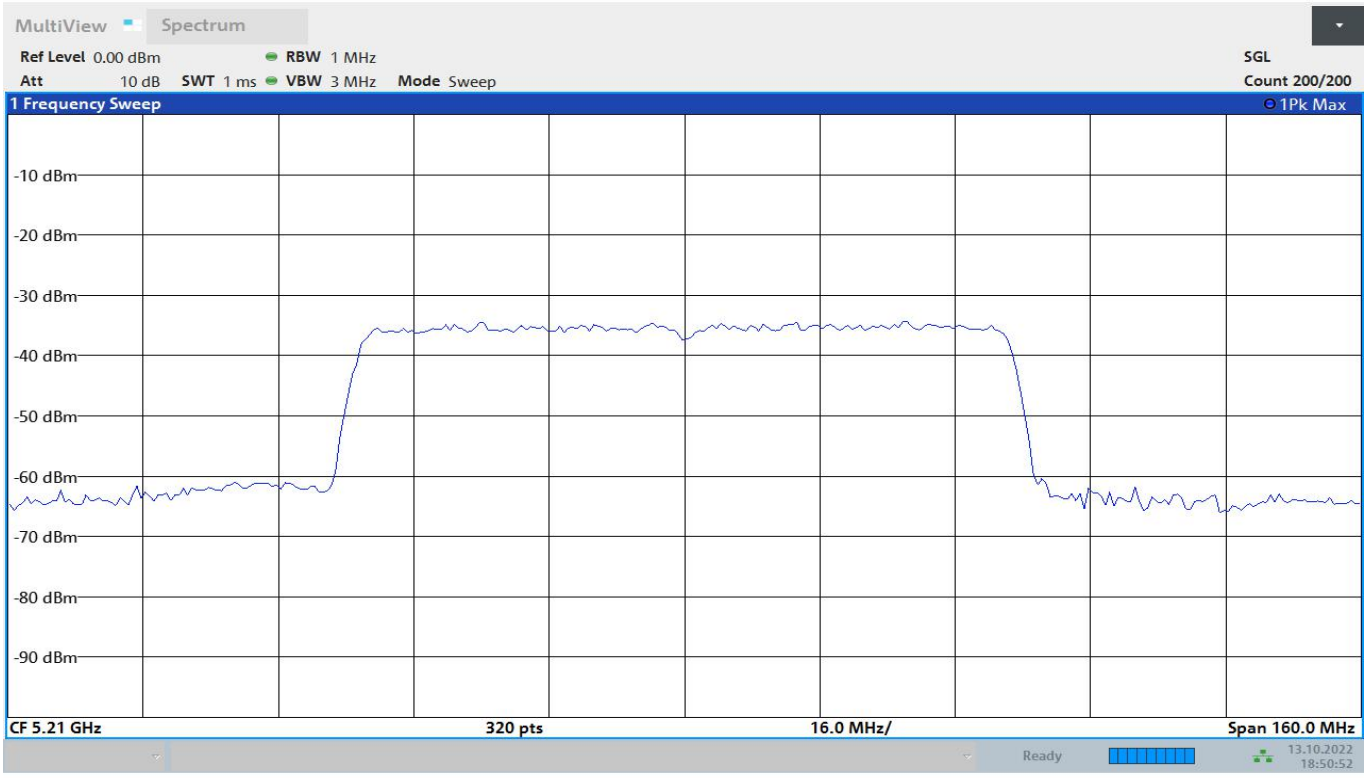




802.11ac (VHT80) 5210MHz MCS0



HAR-004 - HCH - DH1 - DFLTpwrSET - PWR



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4.5 UNII-3

Mode	Channel	Frequency
802.11a **802.11n(HT20)** **802.11ac(VHT20)**	149	5745
802.11n(HT40) **802.11ac(VHT40)**	151	5755
802.11ac(VHT80)	155	5775
802.11a **802.11n(HT20)** **802.11ac(VHT20)**	157	5785
802.11n(HT40) **802.11ac(VHT40)**	159	5795
802.11a **802.11n(HT20)** **802.11ac(VHT20)**	165	5825

Notes:- Output power measurements performed on all supported worst data rate of each supported 802.11 mode.

Power Settings

802.11a		802.11n (HT20)		802.11ac (VHT20)	
Channel	**Power Setting**	**Channel**	**Power Setting**	**Channel**	**Power Setting**
149	15	**149**	15	**149**	15
157	15	**157**	15	**157**	15
165	15	**165**	15	**165**	15

802.11n (HT40)		802.11ac (VHT40)	
Channel	**Power Setting**	**Channel**	**Power Setting**
151	15	**151**	15
159	15	**159**	15

802.11ac (VHT80)	
Channel	**Power Setting**
155	15

4.5.1 RF output power and Duty-Cycle

FCC and RSS-247

Test according to FCC title 47 part 15 §15.407(a), KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 II.E and ANSI C63.10-2013 (In Reference to KDB 789033 E.3.B)

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

802.11a

Data Rate	Gated RMS (dBm) 5745 MHz	Gated RMS (dBm) 5785 MHz	Gated RMS (dBm) 5825 MHz	Limit (dBm)	Duty Cycle (%)
6 Mbps	10.482	10.759	8.828	30.0	99.057

802.11n (HT20)

Data Rate	Gated RMS (dBm) 5745 MHz	Gated RMS (dBm) 5785 MHz	Gated RMS (dBm) 5825 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	10.579	10.692	8.878	30.0	98.994

802.11ac (VHT20)

Data Rate	Gated RMS (dBm) 5745 MHz	Gated RMS (dBm) 5785 MHz	Gated RMS (dBm) 5825 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	10.505	10.768	8.807	30.0	99.000

802.11n (HT40)

Data Rate	Gated RMS (dBm) 5755 MHz	Gated RMS (dBm) 5795 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	10.767	10.923	30.0	98.022

802.11ac (VHT40)

Data Rate	Gated RMS (dBm) 5755 MHz	Gated RMS (dBm) 5795 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	10.707	10.879	30.0	98.040

802.11ac (VHT80)

Data Rate	Gated RMS (dBm) 5775 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	10.910	30.0	96.119

4.5.2 Power Spectral Density

FCC and RSS-247

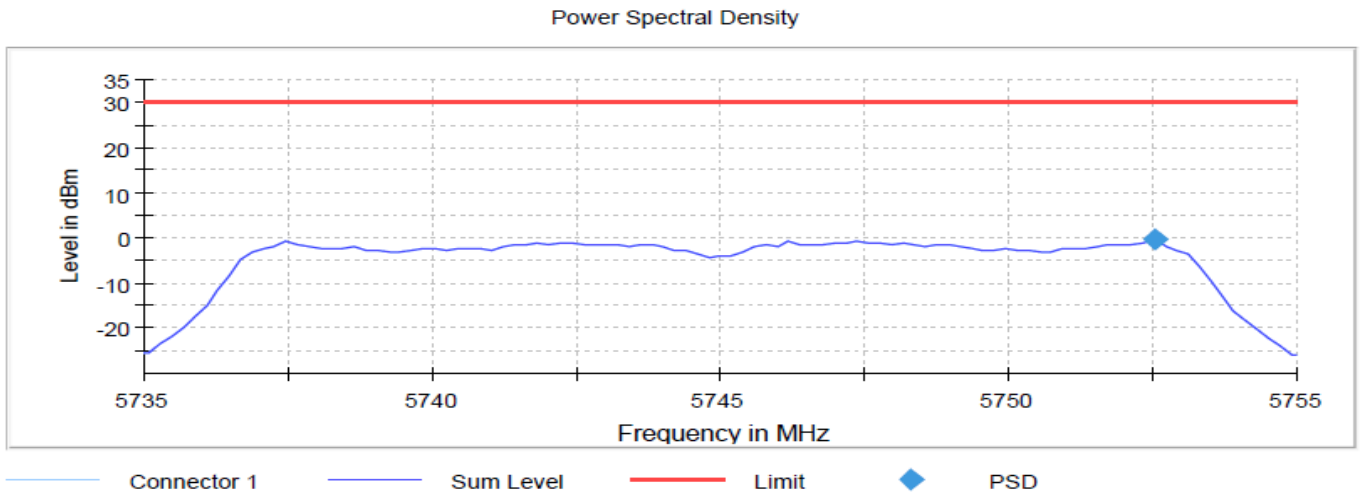
Test according to FCC title 47 part 15 §15.407(a), KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 II.F with test method SA-1 and ANSI C63.10-2013

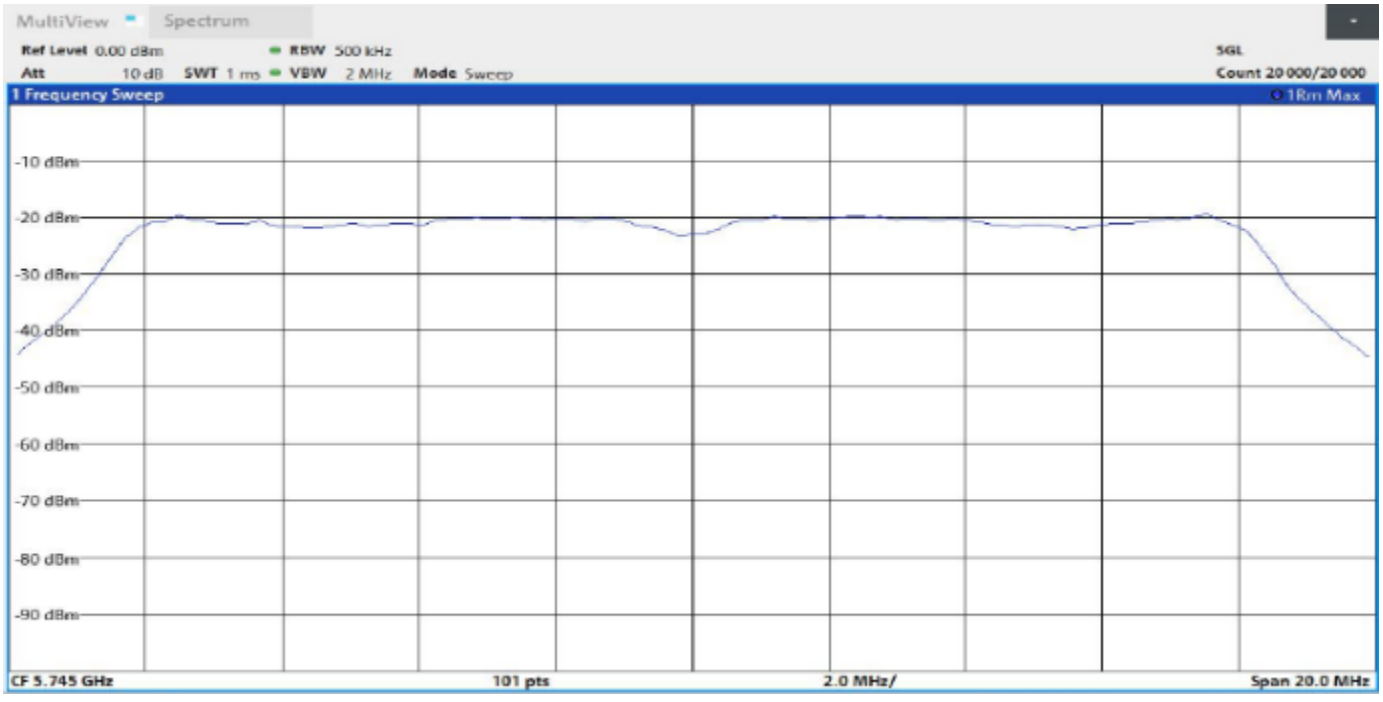
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 1.3 dB

802.11a 6Mbps

Data Rate	PSD (dBm) 5745 MHz	PSD (dBm) 5785 MHz	PSD (dBm) 5825 MHz	Limit (dBm)
6Mbps	-0.535	-0.433	-2.638	30.0

802.11a 5745 MHz 6Mbps





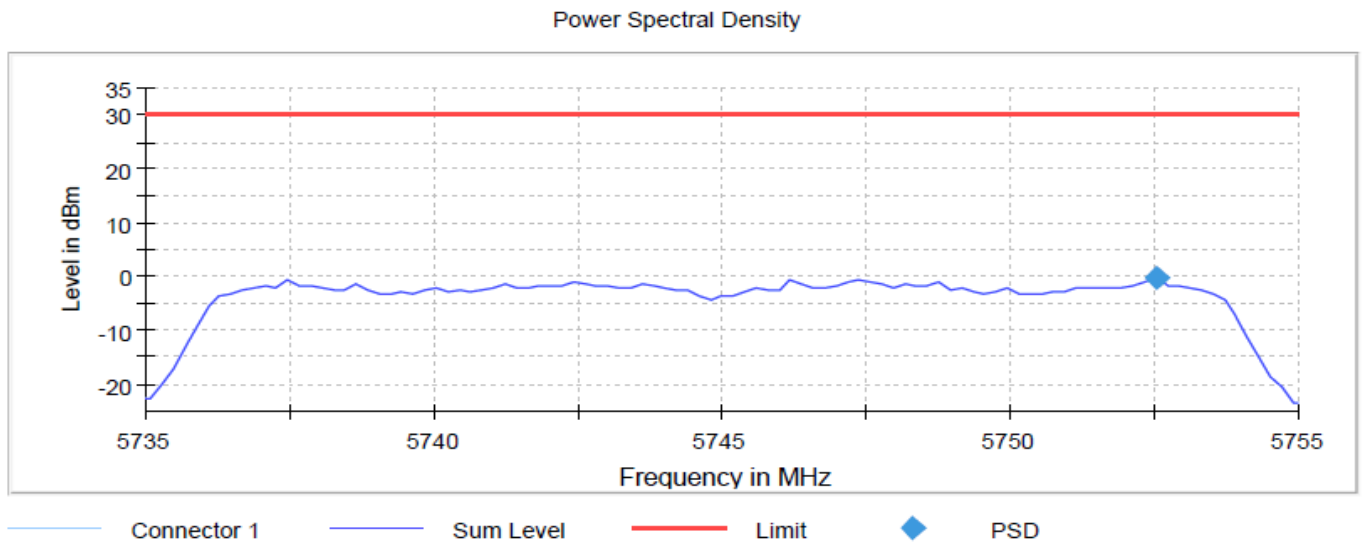
802.11n (HT20)

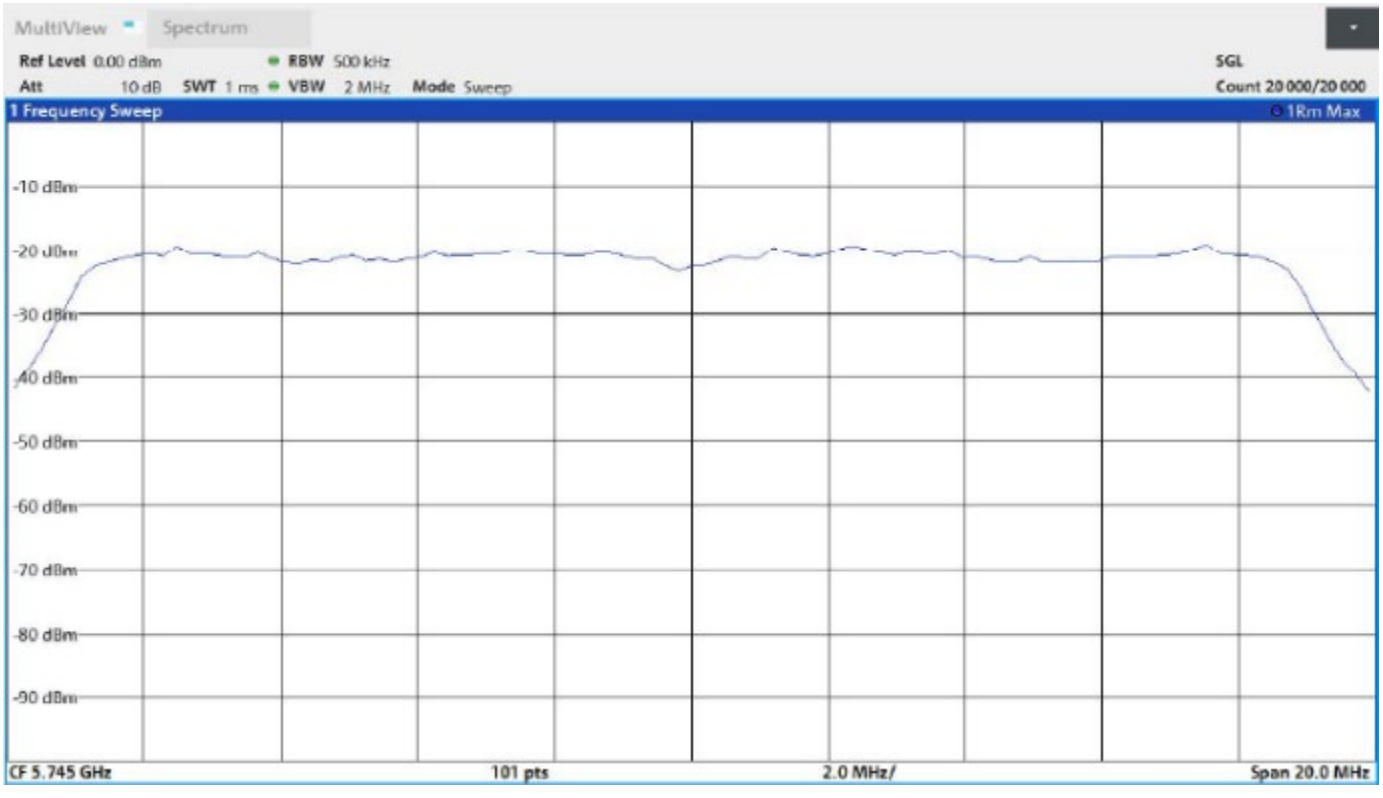
Data Rate	PSD (dBm) 5745 MHz	PSD (dBm) 5785 MHz	PSD (dBm) 5825 MHz	Limit (dBm)
MCS0	-0.220	-0.224	-2.434	30.0

802.11n (HT40)

Data Rate	PSD (dBm) 5755 MHz	PSD (dBm) 5795 MHz	Limit (dBm)
MCS0	-2.419	-2.474	30.0

802.11n (HT20) 5745 MHz MCS0





802.11ac (VHT20)

Data Rate	PSD (dBm) 5745 MHz	PSD (dBm) 5785 MHz	PSD (dBm) 5825 MHz	Limit (dBm)
MCS0	-0.149	-0.162	-2.332	30.0

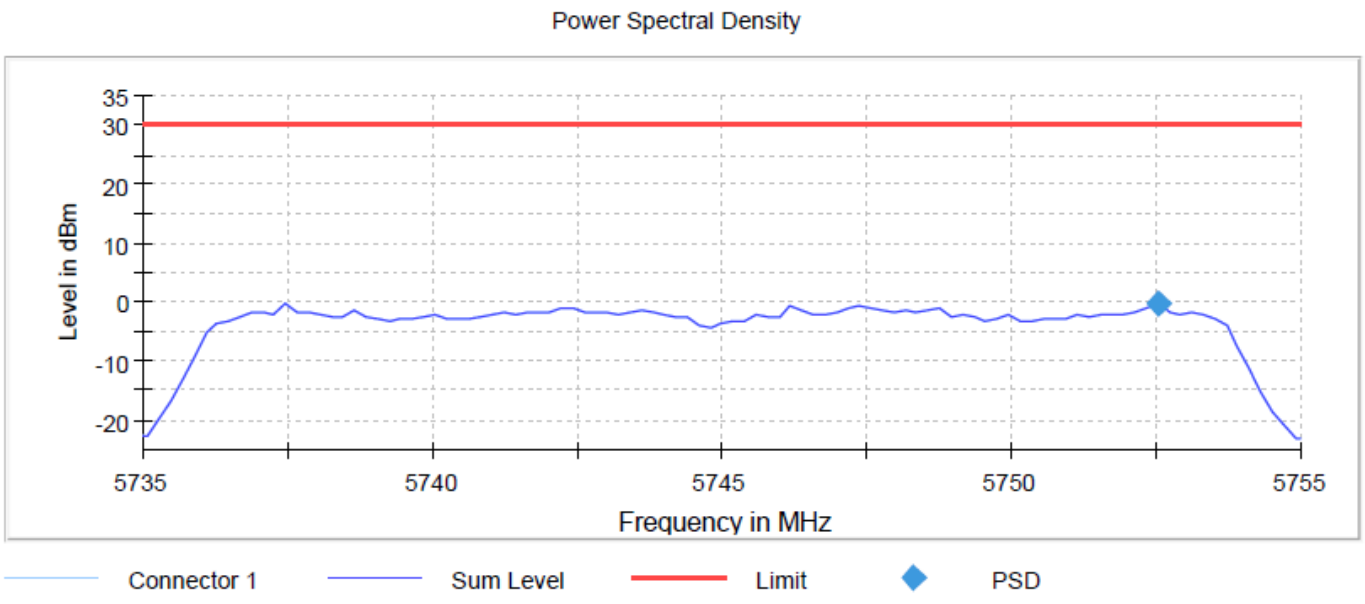
802.11ac (VHT40)

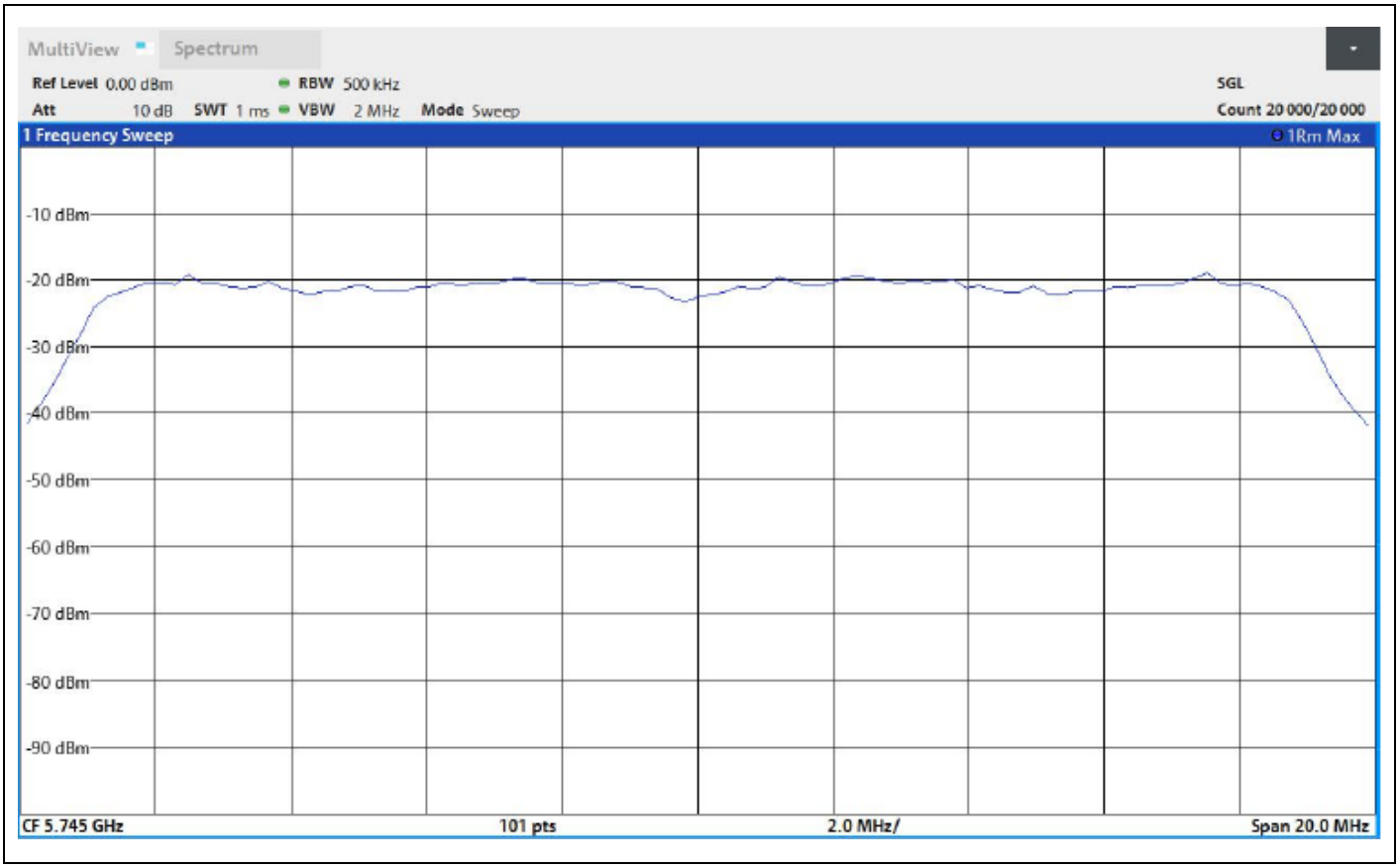
Data Rate	PSD (dBm) 5755 MHz	PSD (dBm) 5795 MHz	Limit (dBm)
MCS0	-2.585	-2.551	30.0

802.11ac (VHT80)

Data Rate	PSD (dBm) 5775 MHz	Limit (dBm)
MCS0	-4.379	30.0

802.11a (VHT20) 5745 MHz MCS0




MultiView
Spectrum
Ref Level 0.00 dBm
RBW 500 kHz
SGL
Att 10 dB
SWT 1 ms
VBW 2 MHz
Mode Sweep
Count 20 000/20 000
1 Frequency Sweep
1Rm Max
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
CF 5.745 GHz
101 pts
2.0 MHz/
Span 20.0 MHz

4.5.3 DTS Bandwidth 6dB

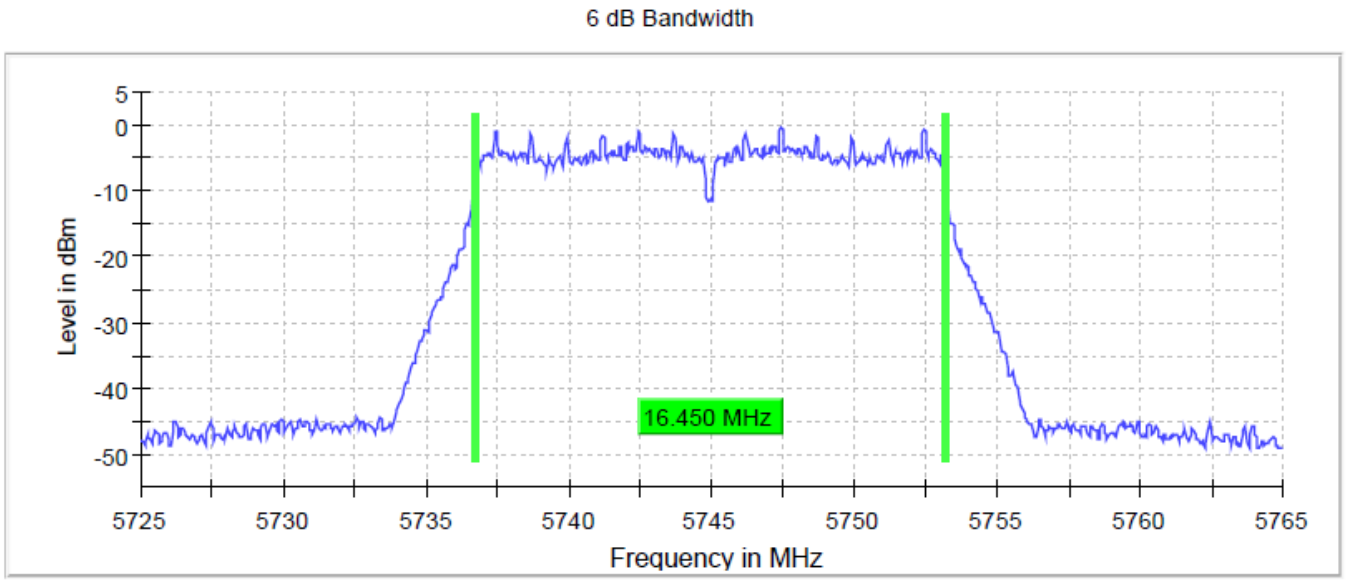
FCC and RSS-247

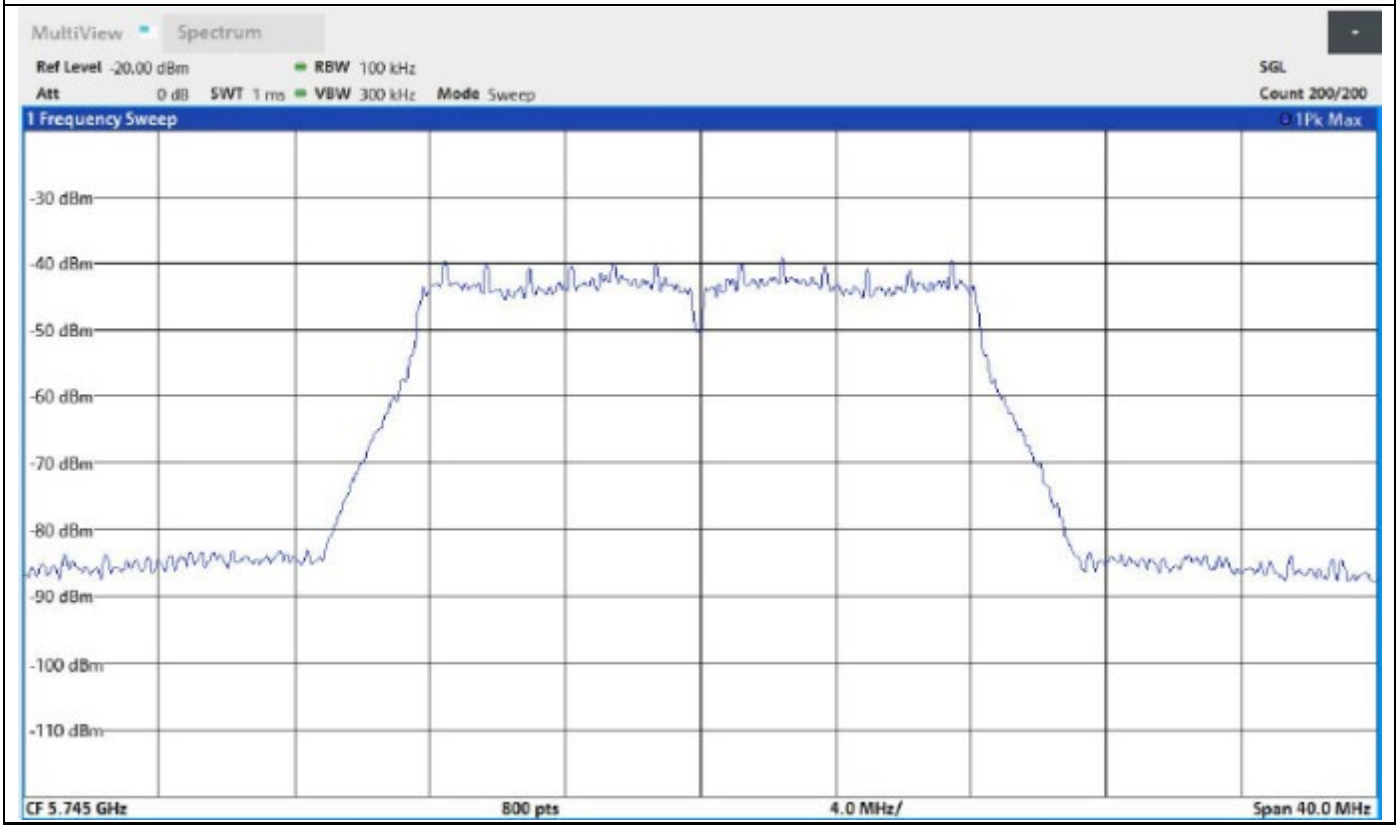
Test according to FCC title 47 part 15 §15.407(a) (e), KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 Section C.2 and ANSI C63.10-2013, ISEDC RSS-247 6.2.4(1)

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

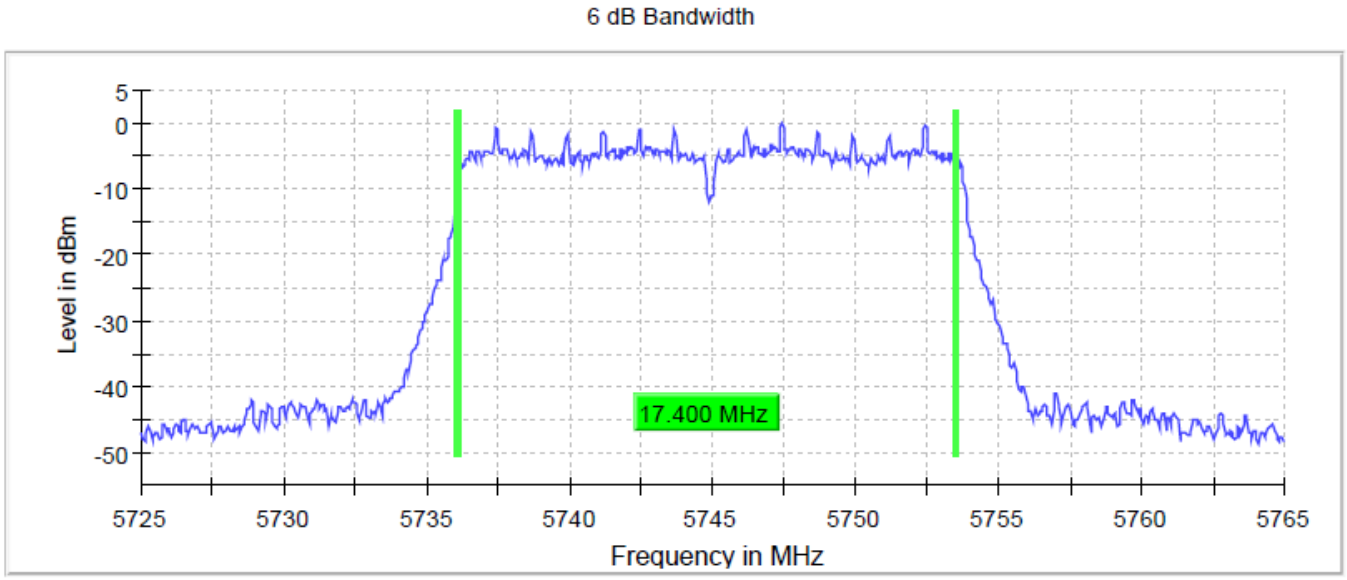
Data Rate	DUT Frequency (MHz)	Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Minimum Band Limit (MHz)
802.11a 6Mbps	5745.000000	16.450000	5736.725000	5753.175000	0.500000
802.11n (HT20) MCS0	5745.000000	17.400000	5736.125000	5753.525000	0.500000
802.11ac (VHT20) MCS0	5745.000000	17.600000	5736.125000	5753.725000	0.500000
802.11n (HT40) MCS0	5755.000000	35.900000	5737.025000	5772.925000	0.500000
802.11ac (VHT40) MCS0	5755.000000	35.900000	5737.025000	5772.925000	0.500000
802.11ac (VHT80) MCS0	5775.000000	76.400000	5736.775000	5813.175000	0.500000
802.11a 6Mbps	5785.000000	16.450000	5776.725000	5793.175000	0.500000
802.11n (HT20) MCS0	5785.000000	17.200000	5776.325000	5793.525000	0.500000
802.11ac (VHT20) MCS0	5785.000000	17.400000	5776.125000	5793.525000	0.500000
802.11n (HT40) MCS0	5795.000000	35.750000	5777.025000	5812.775000	0.500000
802.11ac (VHT40) MCS0	5795.000000	35.750000	5777.025000	5812.775000	0.500000
802.11a 6Mbps	5825.000000	16.450000	5816.725000	5833.175000	0.500000
802.11n (HT20) MCS0	5825.000000	17.600000	5816.125000	5833.725000	0.500000
802.11ac (VHT20) MCS0	5825.000000	17.600000	5816.125000	5833.725000	0.500000

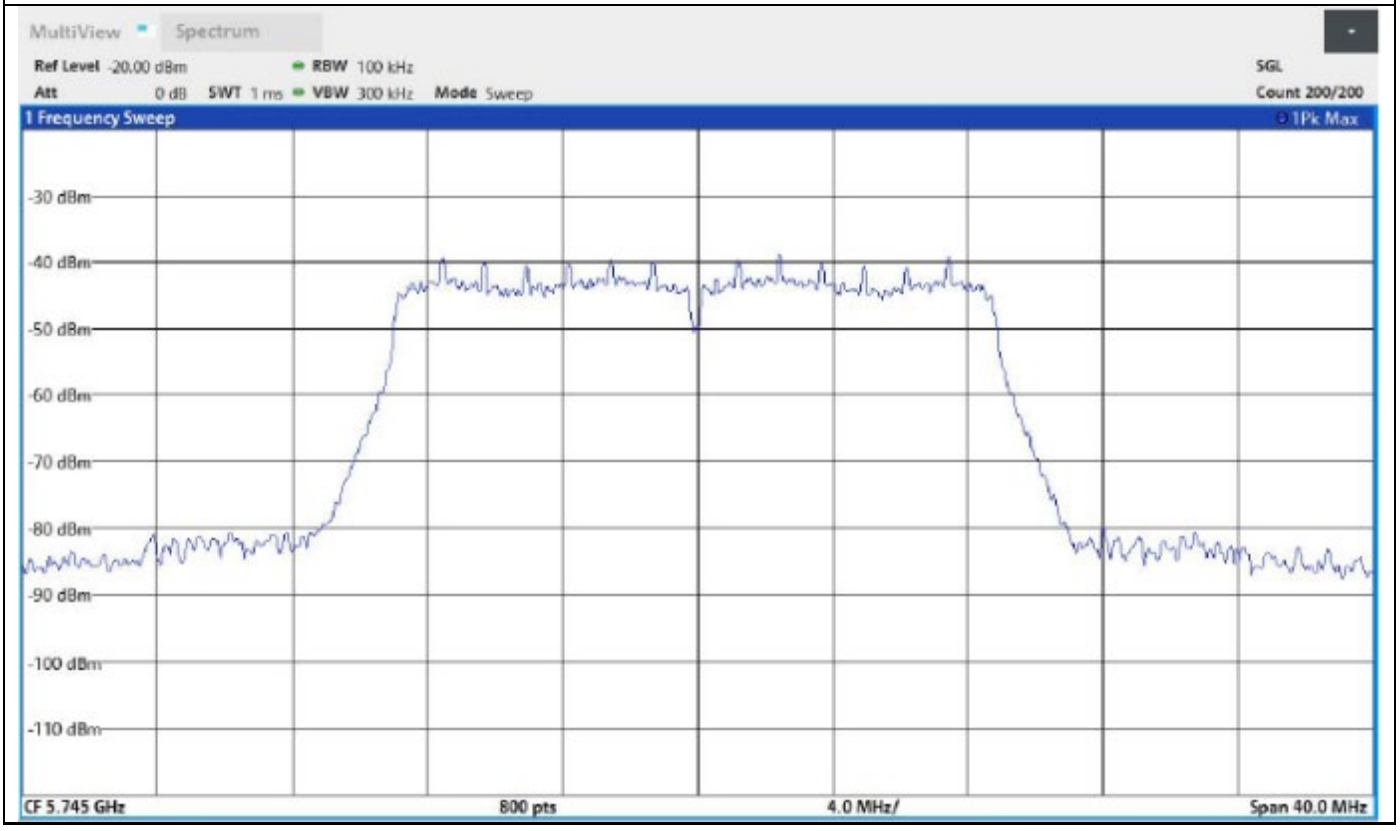
802.11a 5745MHz 6Mbps



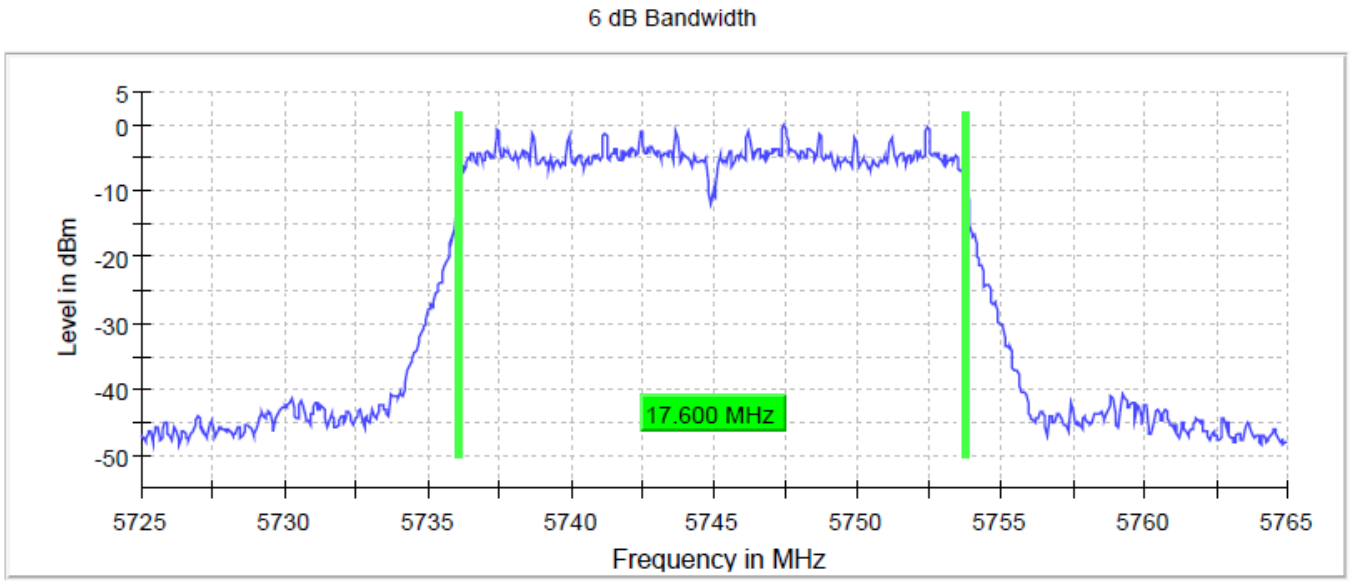


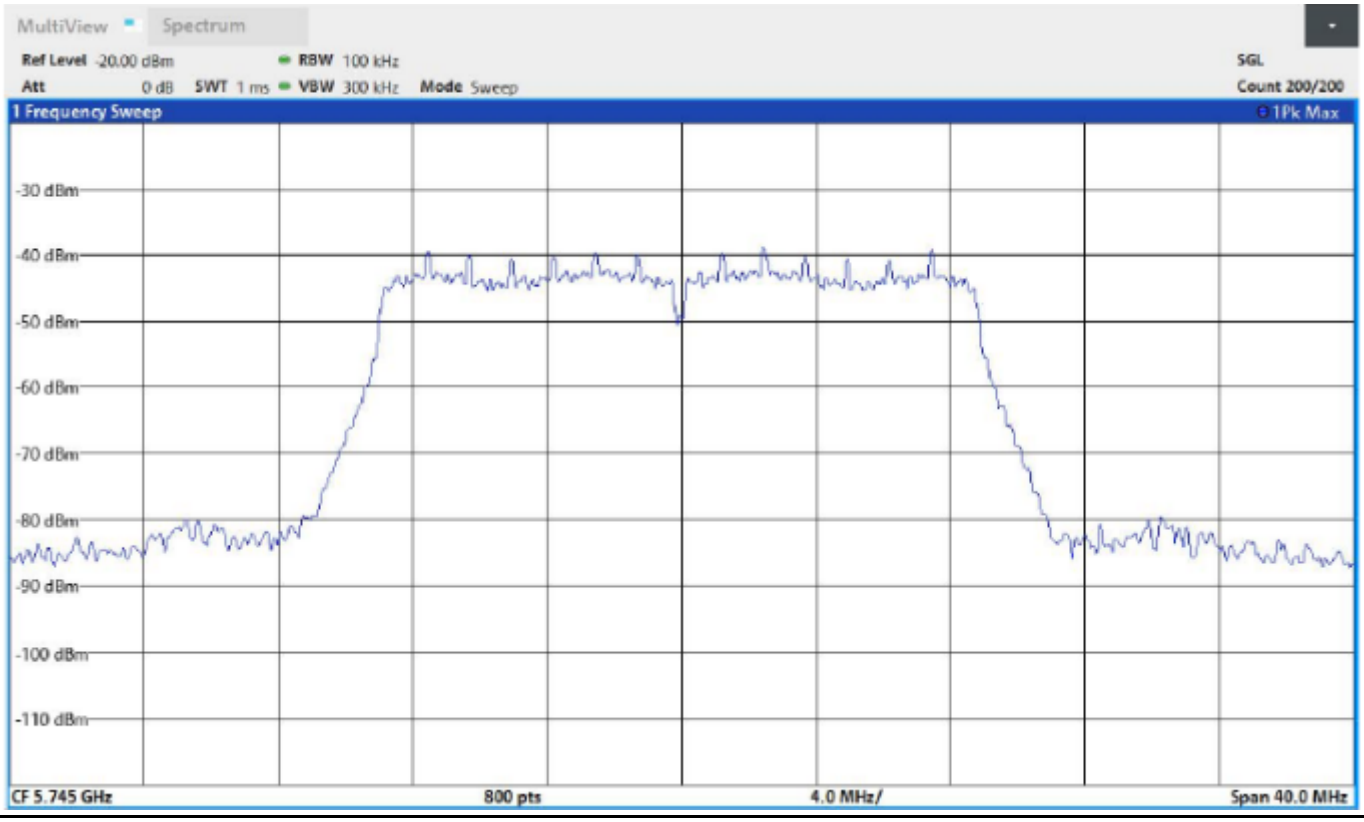
802.11n (HT20) 5745MHz MCS0





802.11ac (VHT20) 5745MHz MCS0





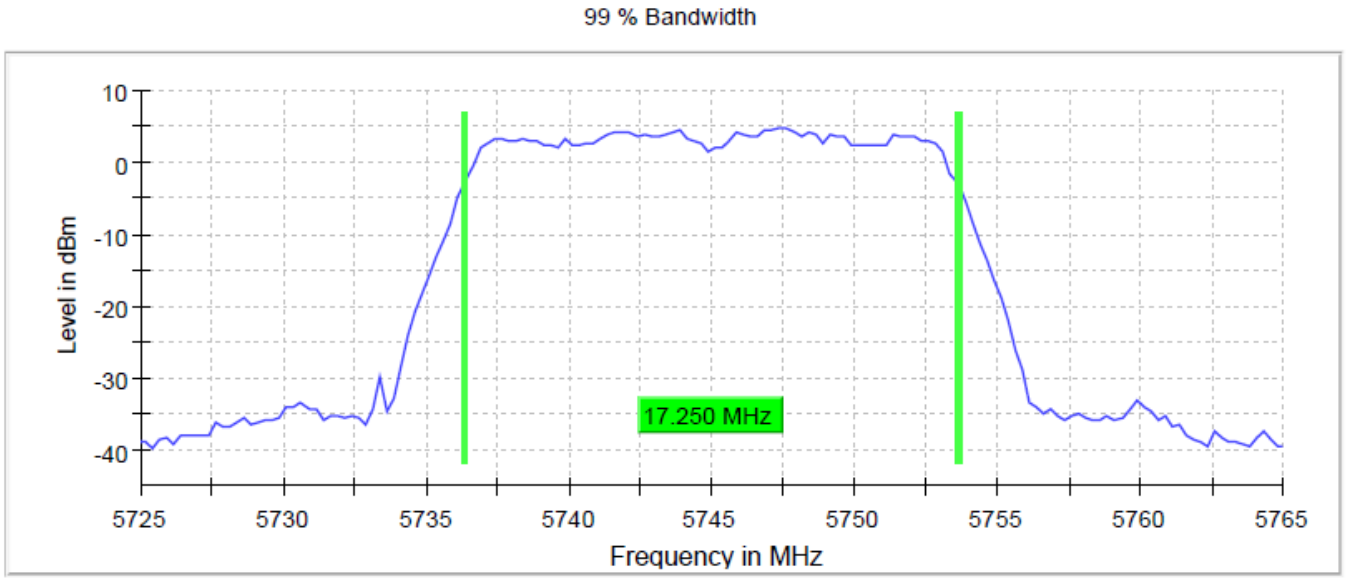
4.5.4 Occupied Channel Bandwidth

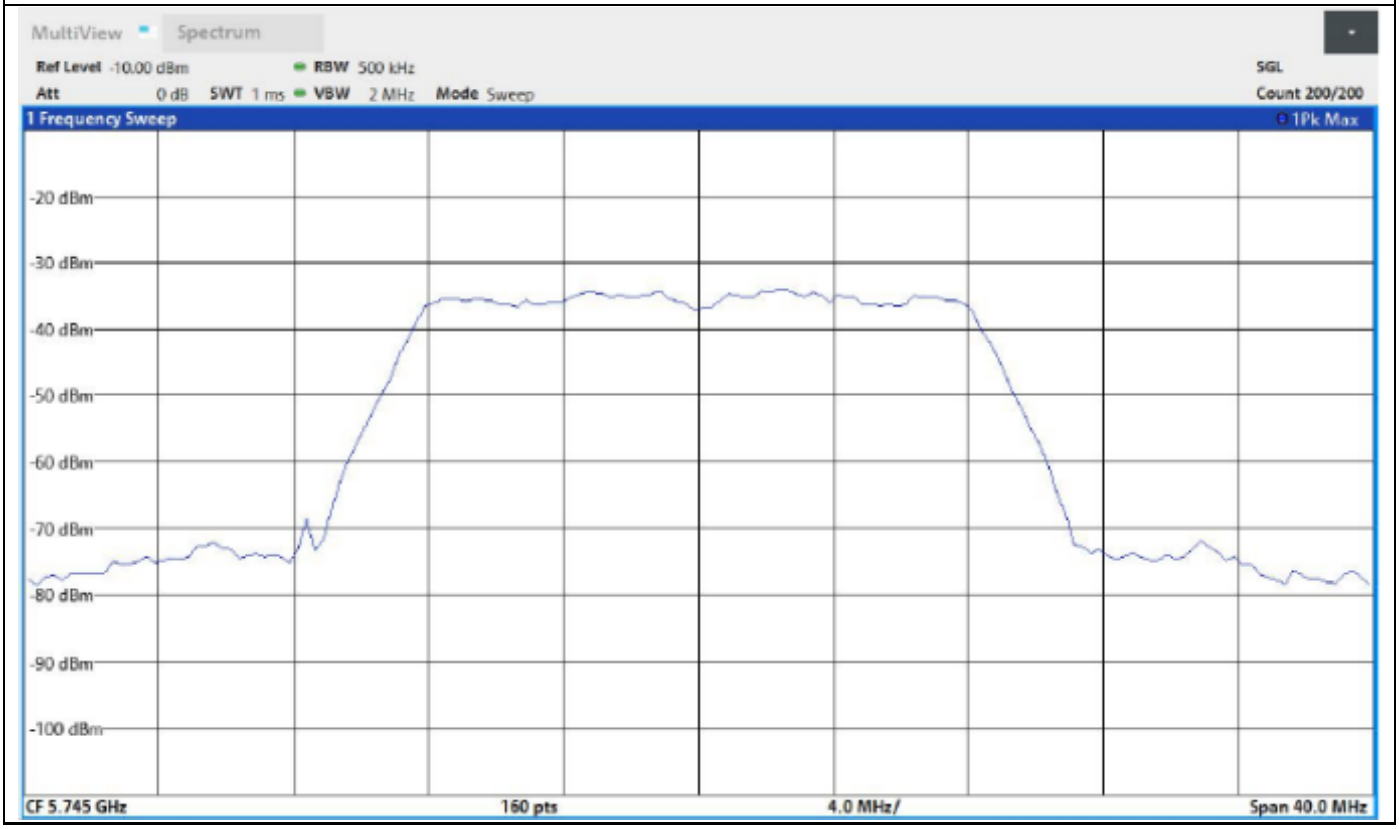
Test according to RSS-GEN Section 6.7, KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 D and ANSI C63.10-2013

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

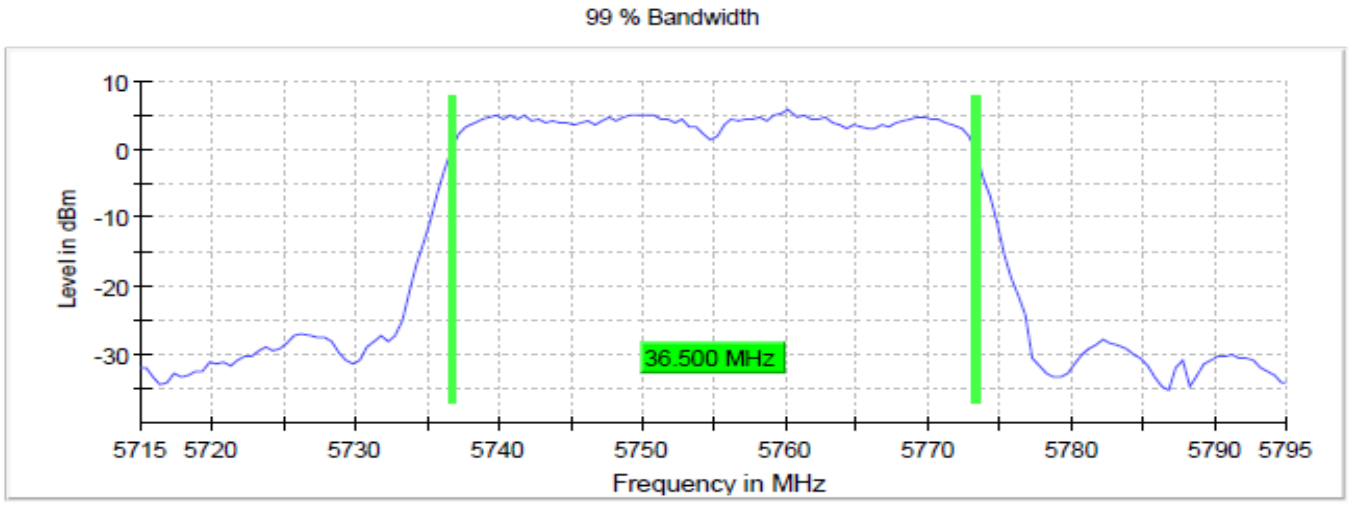
Data Rate	DUT Frequency (MHz)	Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Band Limit (MHz)
802.11a 6Mbps	5745.000000	17.250000	5736.375000	5753.625000	5725-5850
802.11n (HT20) MCS0	5745.000000	18.250000	5735.875000	5754.125000	5725-5850
802.11ac (VHT20) MCS0	5745.000000	18.250000	5735.875000	5754.125000	5725-5850
802.11n (HT40) MCS0	5755.000000	36.500000	5736.750000	5773.250000	5725-5850
802.11ac (VHT40) MCS0	5755.000000	36.500000	5736.750000	5773.250000	5725-5850
802.11ac (VHT80) MCS0	5775.000000	77.000000	5736.500000	5813.500000	5725-5850
802.11a 6Mbps	5785.000000	17.250000	5776.375000	5793.625000	5725-5850
802.11n (HT20) MCS0	5785.000000	18.250000	5775.875000	5794.125000	5725-5850
802.11ac (VHT20) MCS0	5785.000000	18.250000	5775.875000	5794.125000	5725-5850
802.11n (HT40) MCS0	5795.000000	36.500000	5776.750000	5813.250000	5725-5850
802.11ac (VHT40) MCS0	5795.000000	36.500000	5776.750000	5813.250000	5725-5850
802.11a 6Mbps	5825.000000	17.250000	5816.375000	5833.625000	5725-5850
802.11n (HT20) MCS0	5825.000000	18.250000	5815.875000	5834.125000	5725-5850
802.11ac (VHT20) MCS0	5825.000000	18.250000	5815.875000	5834.125000	5725-5850

802.11a 5745MHz 6Mbps

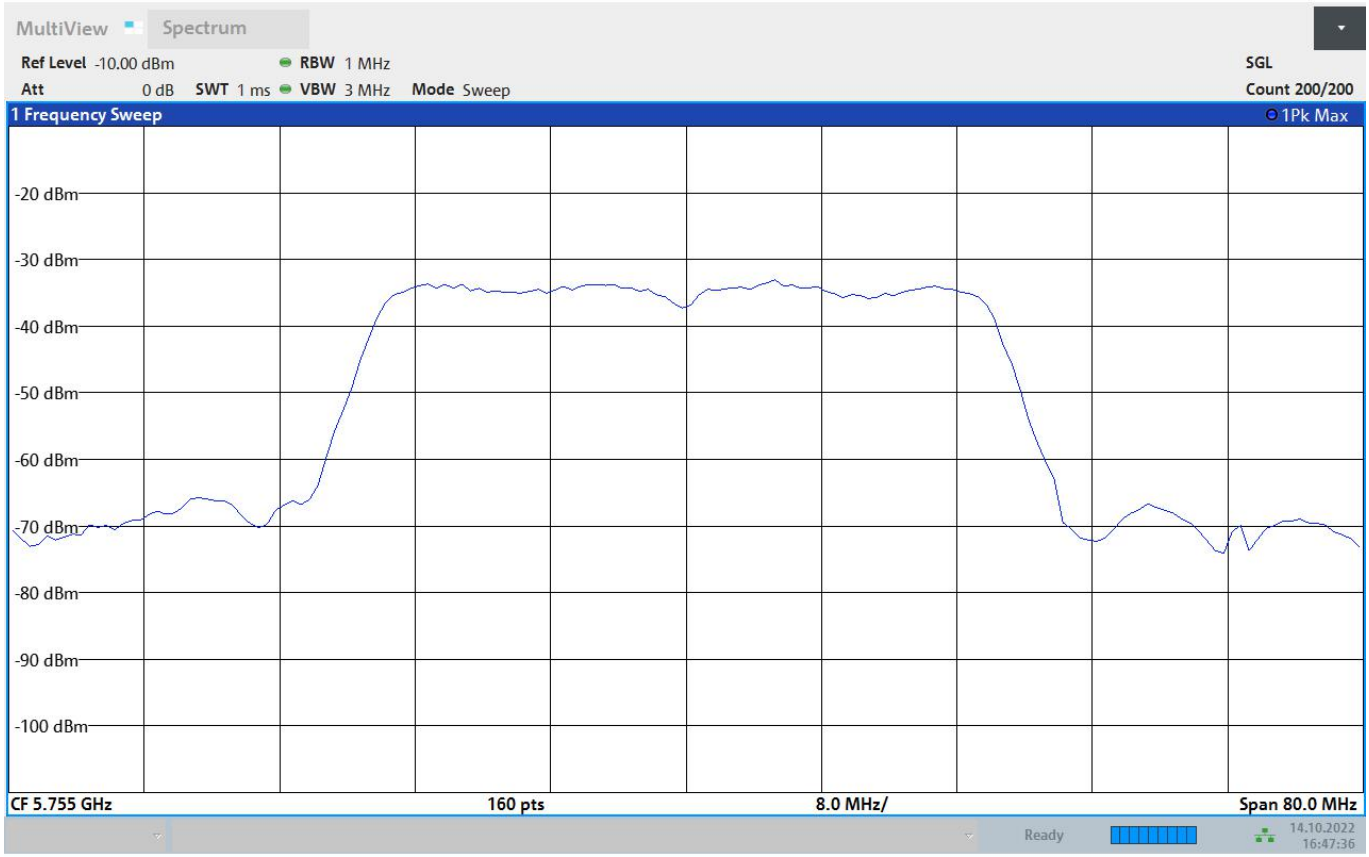




802.11n (HT40) 5755MHz MCS0



HAR-004 - HCH - DH1 - DFLTpwrSET - PWR



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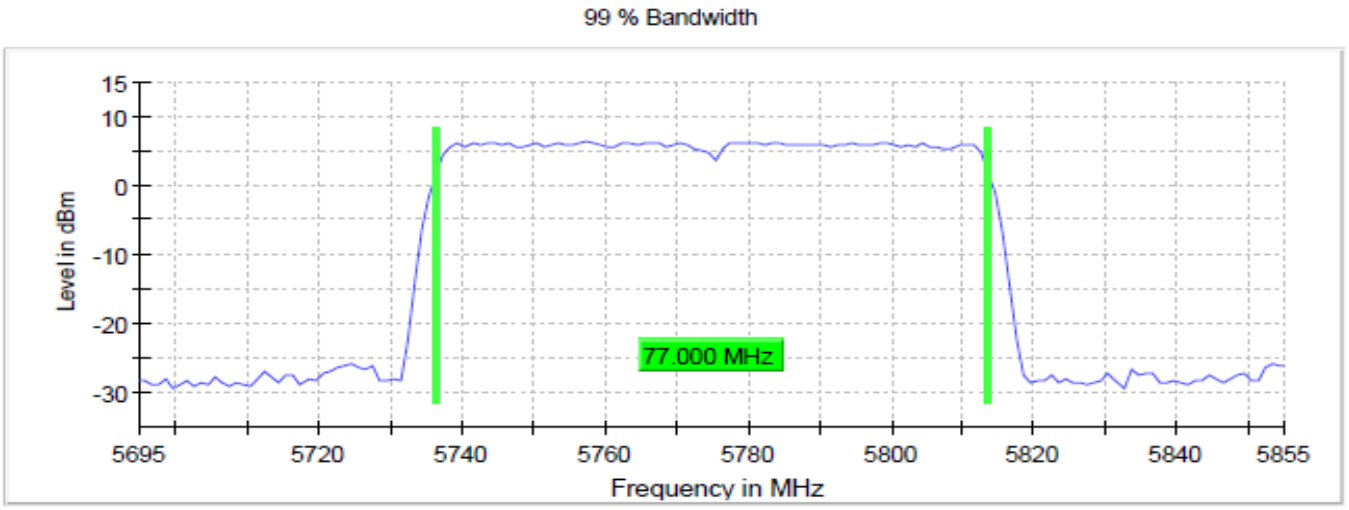
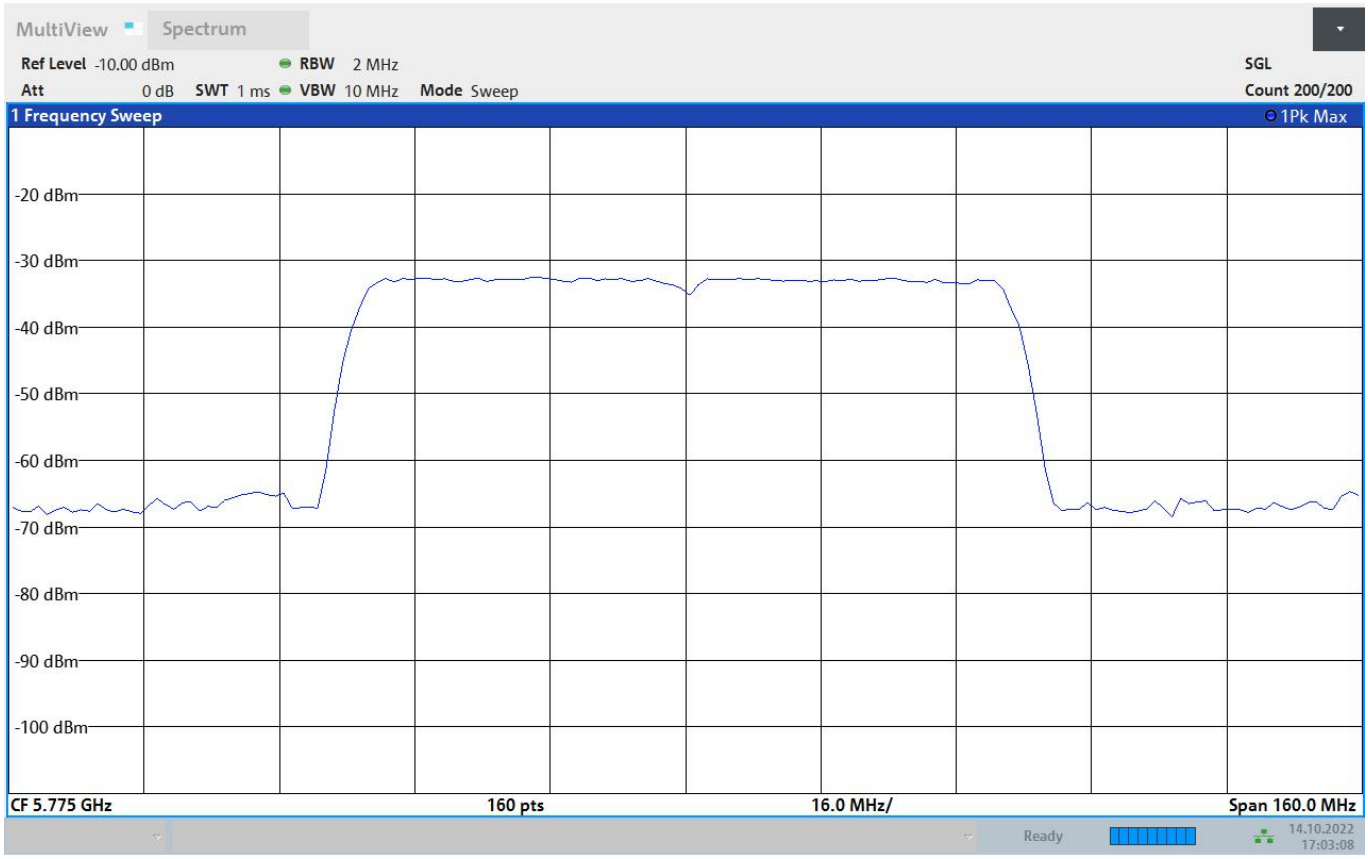
802.11ac (VHT80) 5775MHz MCS0



HAR-004 - HCH - DH1 - DFLTpwrSET - PWR



17:03:09 14.10.2022

5. RADIATED TESTING

5.1 Test Summary

Start: 11/18/2022	End: 01/13/2023	Temperature: 23.2°C Humidity: 23.8 %R.H	Initials: AB

DUT S/N	AH22100701-HAR-053#4 AH22100701-HAR-053#5	DUT Operating Mode	5GHz WLAN
Comment	UNII-1: 802.11a for all 20MHz channels. 802.11ac for all 40MHz and 80MHz channels. UNII-3: 802.11a for all 20MHz channels. 802.11ac for all 40MHz channels. 802.11ac for all 80MHz channels. Worst-case modes tested from 20MHz, 40MHz and 80MHz channels.		

Antenna	Frequency Range	Polarization	Result Over/Under Limit	Notes
Loop	9kHz-30MHz	Parallel	☐Over ☒Under	√
		Perpendicular	☐Over ☒Under	√
		Ground-Parallel	☐Over ☒Under	√
Log Periodic	30MHz-1GHz	Horizontal	☐Over ☒Under	√
		Vertical	☐Over ☒Under	√
Horn	1GHz-18GHz	Horizontal	☐Over ☒Under	√
		Vertical	☐Over ☒Under	√
Horn	18GHz-27.5GHz	Horizontal	☐Over ☒Under	√
		Vertical	☐Over ☒Under	√

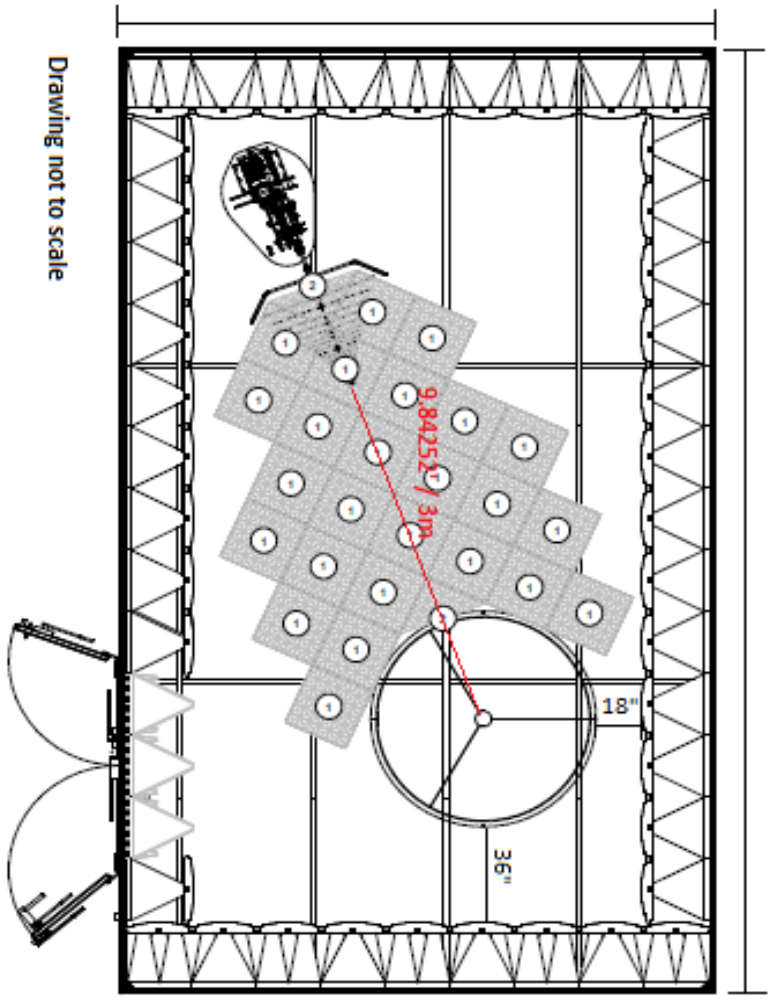
Notes: √ meets the requirements of the acceptance criteria.

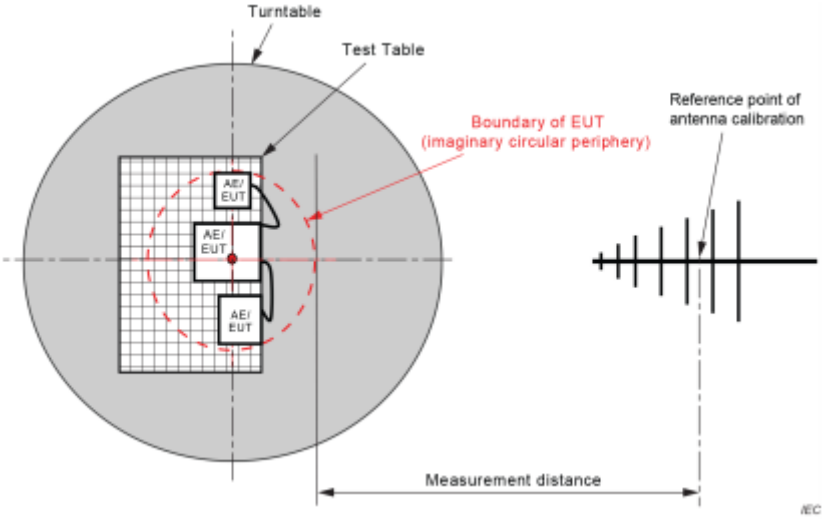
5.2 Test Setup

Semi-Anechoic Chamber Test Site-3 meter

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

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

5.3 Test Equipment Used

ID #	Equipment	Manufacturer	Model #	Serial #	Cal Due
BVD0217	Receiver 2Hz-44GHz	Rohde & Schwarz	ESW44	101871	4/20/2023
BVD0118	Antenna Mast Position Controller	ETS	7006-001	00214778/00214648	N/A
BVD0111	3 Meter Anechoic Chamber	ETS	N/A	N/A	N/A
BVD0247	Turn Table	ETS	920250	N/A	N/A
BVD0323	Foam Test Table For 3 Meter Chamber	ETS-Lindgren	LDT-1.5	N/A	N/A
BVD0069	Bore Sight Tower	ETS	2171B	226732	N/A
BVD0259	Optima 12V Blue top Marine battery	Optima	D34M	N/A	N/A
BVD0184	Preamplifier 29dB 1-18GHz	Rohde & Schwarz	TS-PR18	101646	5/6/2023
BVD0185	Preamplifier 45dB 18-40GHz	Rohde & Schwarz	TS-PR1840	100064	4/6/2023
BVD0267	Double Ridge Waveguide 800MHz-18GHz	Rohde & Schwarz	HF907	102832	5/5/2023
BVD0021	UltraLog Antenna 30-6000 MHz	Rohde & Schwarz	HL562E	101113	7/21/2023
BVD0320	18-40GHz Horn Antenna	L3 Narda ATM	PNR 180-442-KF	136164-01	4/4/2023
BVD0011	Loop Antenna 9kHz-30MHz	Rohde & Schwarz	FMZB1519B	145	5/4/2023
BVD0045	Field Probe Mast	Rohde & Schwarz	TS-FPMA	N/A	N/A
BVD0481	Band Reject Filter 40dB from 5150 to 5880MHz	Micro-Tronics	BRM50716	G336	4/11/2023
BVD0394	Double Shielded N-Type Cable 6.9 Meter	Rohde & Schwarz	N-Type	N/A	3/11/2023
BVD0398	Double Shielded N-Type Cable 2 Meter	Rohde & Schwarz	N-Type	N/A	12/29/2024
BVD0486	Sucoflex K-Type Coaxial Cable 5 Meter	Huber+Suhner, inc	K-Type Coaxial	474343	3/7/2023
BVD0407	Double Shielded N-Type Cable 410mm (For PreAmp)	Rohde & Schwarz	N-Type	N/A	8/31/2023
BVD0495	SMA Shielded Cable approx 100mm (for Pre-Amp)	Rohde & Schwarz	SMA-Type	N/A	4/6/2023
BVD0552	Double Shielded N-Type Cable 440mm (For PreAmp)	Electronic Assemblies	N-Type	N/A	5/7/2023
BVD0229	Temp and Humidity Meter	Fluke	971	12001009	5/1/2023

Equipment List (Software)

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

Customer Supplied Equipment

ID #	Equipment	Manufacturer	Model	Serial #	Version No.
N/A	Harness	Harman	N/A	N/A	N/A
N/A	Display Unit	Innolux Corp	INFOMM-15524	0024	N/A
N/A	Ethernet Board	GM	N/A	N/A	CSMate rev.4
N/A	GM BT WLAN Test Tool NXP Chips S/W	Harman	N/A	N/A	2.4

5.4 Test Limits and Procedure

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

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

Note:

a) The lower limit shall apply at the transition frequencies.

b) For performing measurements at a specified distance of 3m, the values are extrapolated using extrapolation factor.
Frequencies below 30MHz are extrapolated using 40dB/decade.
Frequencies above 30MHz are extrapolated using 20dB/decade.

Frequencies (MHz)	Formula for Limits derivation for below 30MHz	Limits for frequencies below 30MHz (dBuV/m)
0.009 ~ 0.490	2400/F(kHz) + 40 Log (300m/3m)	128.5 ~ 93.8
0.490 ~ 1.705	24000/F(kHz) + 40 Log (30m/3m)	73.8 ~ 62.96
1.705 ~ 30.0	29.54 + 40 Log (30m/3m)	69.54

c) For frequencies above 1000MHz, the field strength limits based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 30dB under any condition of modulation.

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

For example, the measurement frequency 2190KHz resulted in a level of 28.50 dBuV/m, which is equivalent to 28.50 - 51.48 = -22.98 dBuA/m, which has the same margin, -41.04 dB, to the corresponding RSS-GEN Table 6 limit as it has to the 15.209(a) limit.

The measurement procedures are as per **789033 D02 General UNII Test Procedures New Rules v02r01, ISED RSS-247 6.2**

The Limits for Unwanted emissions out of the Restricted Bands are as follows.

Procedure	Limits	
	Peak (dBµV/m)	Average (dBµV/m)
KDB 789033 D02 General UNII Test Procedures New Rules v02r01	74	54

§ 15.407

(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15–5.25 GHz band: All emissions outside of the 5.15–5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

(2) For transmitters operating in the 5.25–5.35 GHz band: All emissions outside of the 5.15–5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

(3) For transmitters operating in the 5.47–5.725 GHz band: All emissions outside of the 5.47–5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

(4) For transmitters operating in the 5.725–5.85 GHz band:

(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Procedure	Peak Limit (dBµV/m)
15.407(b)(1)	68.23
15.407(b)(2)	
15.407(b)(3)	
15.407(b)(4)	As stated above

1. The table height for emissions measurements
   i) Below 1 GHz, the table height is 80 cm above the reference ground plane.
   ii) Above 1 GHz, the table height is 1.5 m
2. Measurements performed with the EUT rotated from 0° to 360°, the antenna height scanned between 1m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

5.5 Test Data

Uncertainty

Radiated Emissions (30MHz to 40GHz)

Test Engineer Initials: AB

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

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

30MHz to 1GHZ

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

The total derived measurement uncertainty is +/- 4.228 dB

1GHz to 40GHz

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

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

Remarks:

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

Remarks:

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

Remarks:

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

AH22100701-HAR-053#5_5G UNII-1 802.11a_Ch 40_9kHz-30MHz_Ground-Parallel

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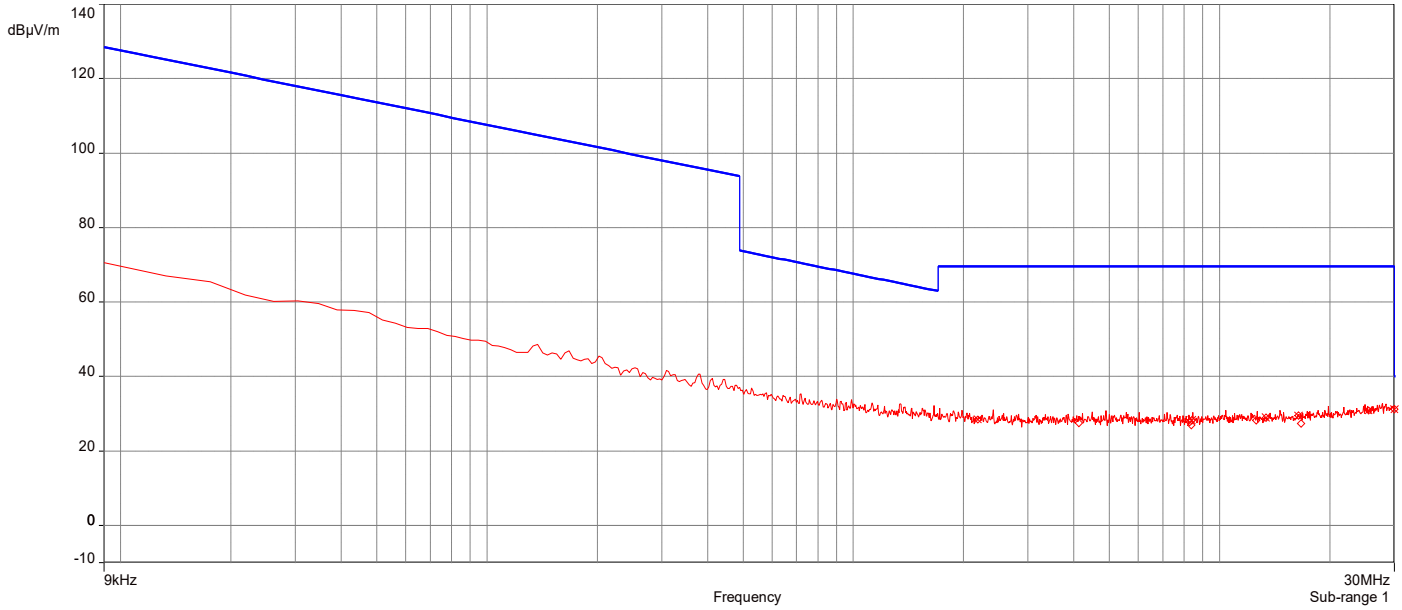
No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	2.190086MHz	28.50	19.49	69.54	-41.04	3.05	69.40	H/V	Passed
2.	8.386255MHz	28.17	19.45	69.54	-41.37	3.05	38.40	H/V	Passed
3.	13.395467MHz	28.93	19.85	69.54	-40.61	3.05	129.90	H/V	Passed
4.	16.420706MHz	29.57	19.89	69.54	-39.97	3.05	338.00	H/V	Passed
5.	25.534988MHz	30.88	20.98	69.54	-38.66	3.05	100.70	H/V	Passed
6.	30MHz	31.29	21.85	40.00	-8.71	3.05	283.20	H/V	Passed

Overall Graphs:



Remarks:

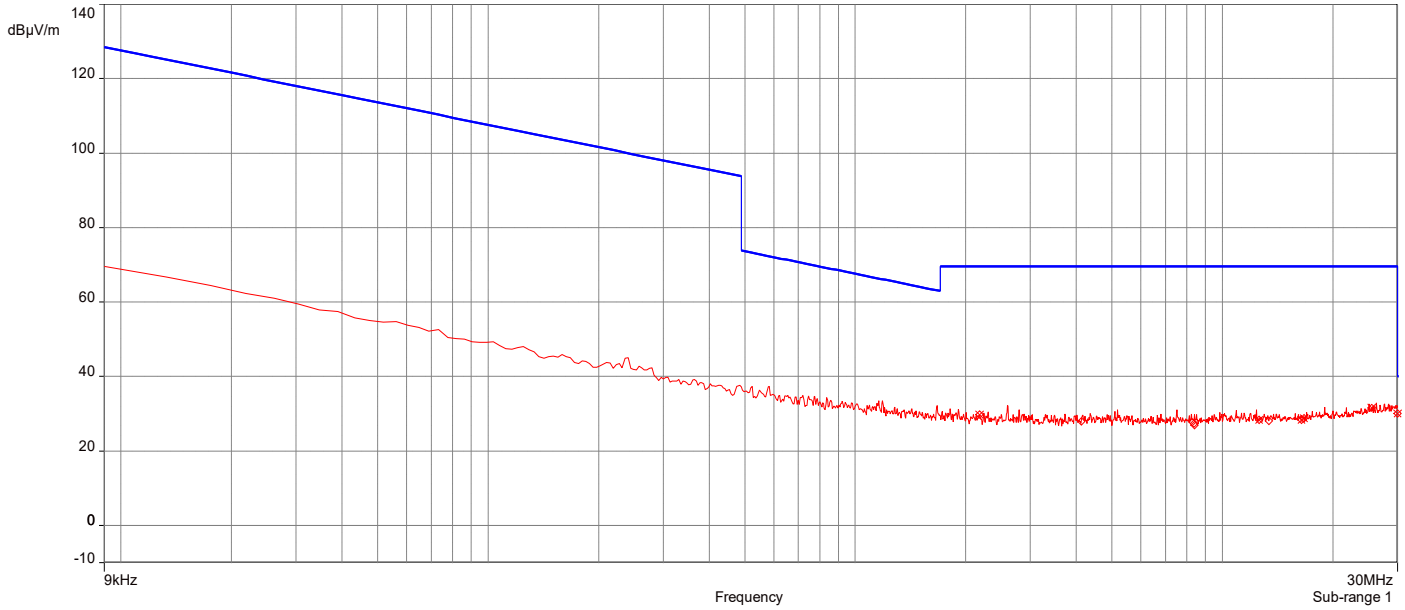
1. Level Q-Peak Reading (dBµV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

AH22100701-HAR-053#5_5G UNII-1 802.11a_Ch 40_9kHz-30MHz_Parallel

12/1/2022 3:11:02 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1	2.181516MHz	29.75	19.49	69.54	-39.79	3.05	346.10	H/V	Passed
2	12.577024MHz	28.43	19.83	69.54	-41.11	3.05	248.70	H/V	Passed
3	16.420706MHz	28.37	19.89	69.54	-41.17	3.05	58.00	H/V	Passed
4	16.694949MHz	28.85	19.92	69.54	-40.69	3.05	66.30	H/V	Passed
5	25.530703MHz	31.60	20.98	69.54	-37.94	3.05	136.40	H/V	Passed
6	30MHz	30.05	21.85	40.00	-9.95	3.05	268.90	H/V	Passed

Overall Graphs:



Remarks:

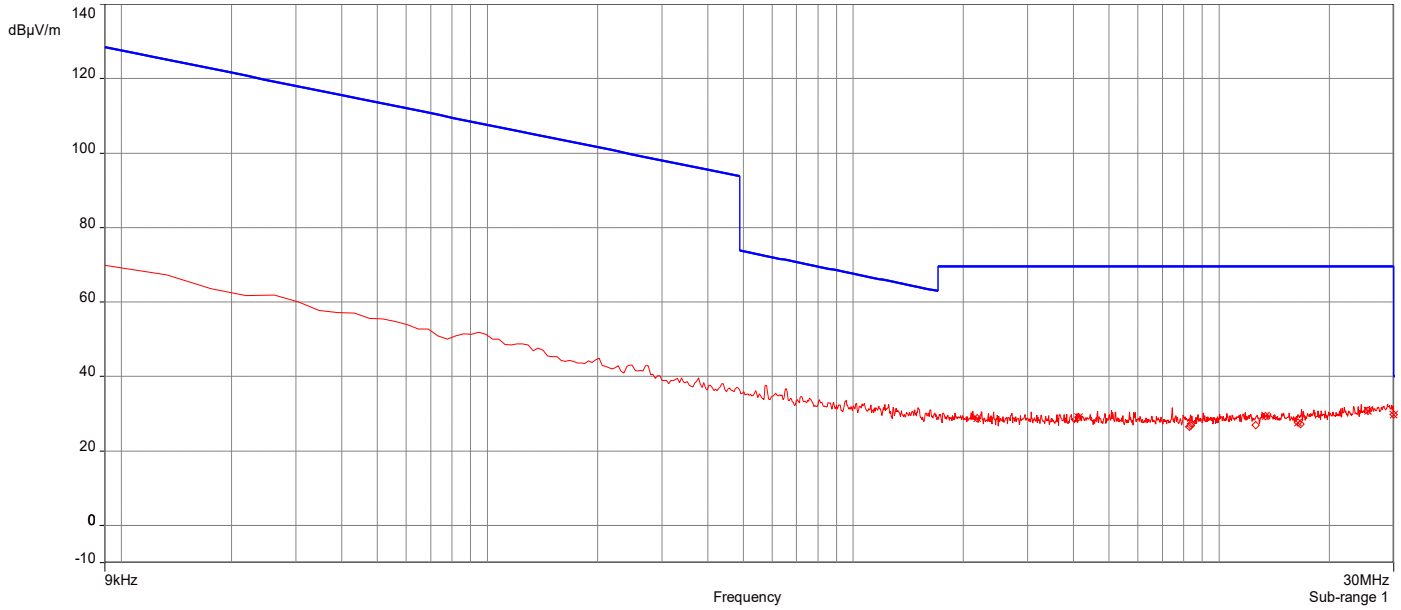
1. Level Q-Peak Reading (dBµV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

AH22100701-HAR-053#5_5G UNII-1 802.11a_Ch 40_9kHz-30MHz_Perpendicular

12/1/2022 3:16:24 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1	2.181516MHz	28.74	19.49	69.54	-40.80	3.05	1.50	H/V	Passed
2	4.126924MHz	29.04	19.69	69.54	-40.50	3.05	190.30	H/V	Passed
3	13.382612MHz	29.32	19.85	69.54	-40.22	3.05	137.60	H/V	Passed
4	16.420706MHz	27.69	19.89	69.54	-41.85	3.05	310.80	H/V	Passed
5	25.526417MHz	30.76	20.98	69.54	-38.78	3.05	55.10	H/V	Passed
6	30MHz	29.76	21.85	40.00	-10.24	3.05	60.00	H/V	Passed

Overall Graphs:



Remarks:

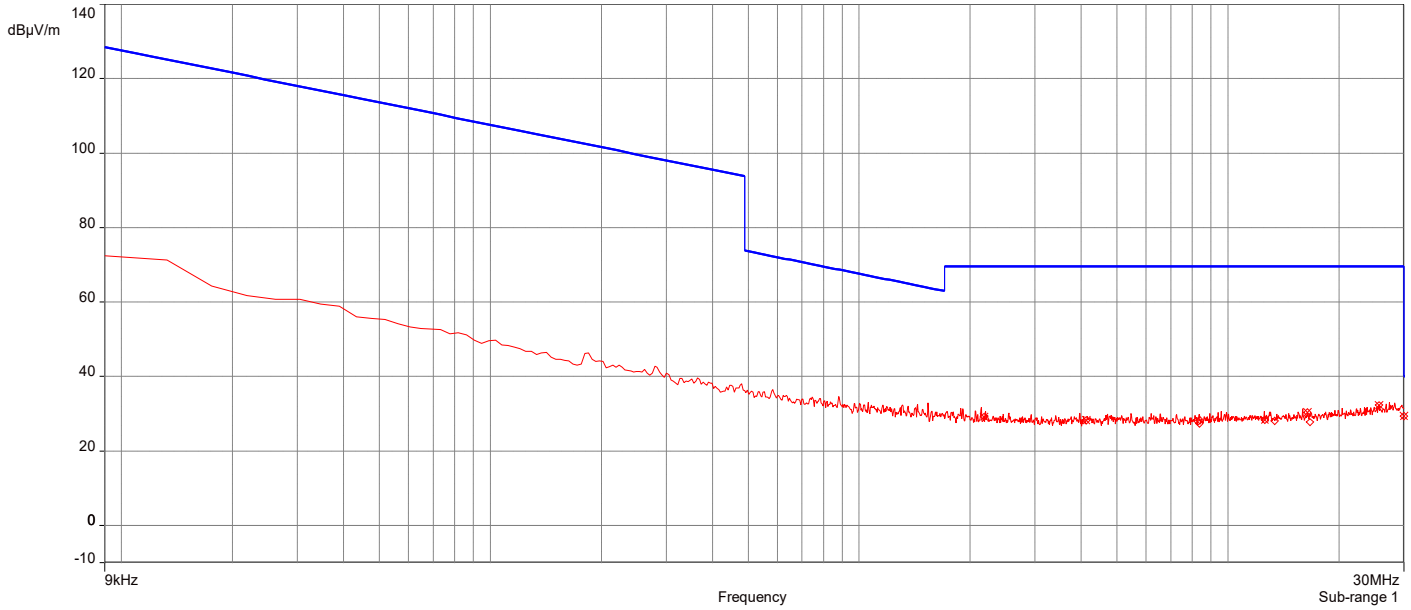
1. Level Q-Peak Reading (dBµV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

AH22100701-HAR-053#4_5G UNII-1 802.11ac_Ch 40_9kHz-30MHz_Ground-Parallel

12/28/2022 6:19:47 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1	2.181516MHz	29.21	19.49	69.54	-40.33	1.00	357.60	H/V	Passed
2	4.126924MHz	28.23	19.69	69.54	-41.31	1.00	3.10	H/V	Passed
3	12.577024MHz	28.35	19.83	69.54	-41.19	1.00	0.10	H/V	Passed
4	16.420706MHz	30.40	19.89	69.54	-39.14	1.00	49.20	H/V	Passed
5	25.659254MHz	32.42	20.99	69.54	-37.12	1.00	80.90	H/V	Passed
6	30MHz	29.36	21.85	40.00	-10.64	1.00	337.60	H/V	Passed

Overall Graphs:



Remarks:

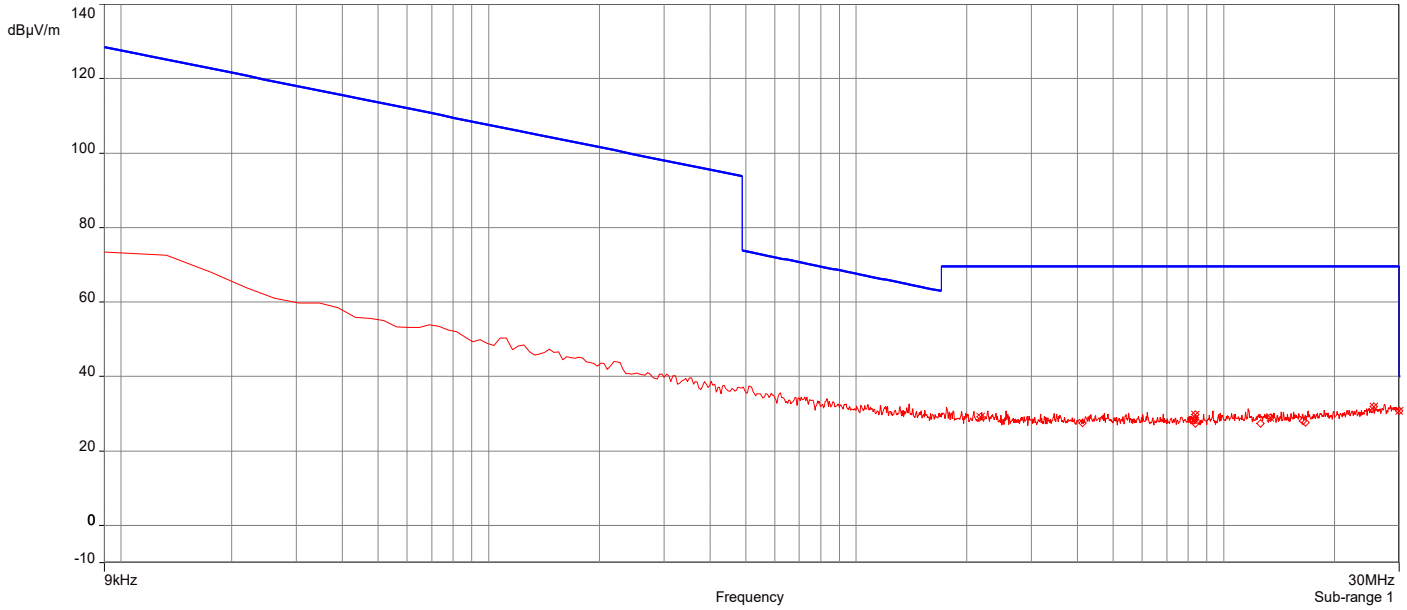
1. Level Q-Peak Reading (dBµV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

AH22100701-HAR-053#4_5G UNII-1 802.11ac_Ch 40_9kHz-30MHz_Parallel

12/28/2022 6:22:21 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1	2.181516MHz	29.17	19.49	69.54	-40.37	1.00	351.80	H/V	Passed
2	8.291984MHz	28.29	19.45	69.54	-41.25	1.00	195.30	H/V	Passed
3	8.38197MHz	29.80	19.45	69.54	-39.74	1.00	106.60	H/V	Passed
4	13.391182MHz	28.91	19.85	69.54	-40.63	1.00	358.90	H/V	Passed
5	25.616403MHz	31.96	20.99	69.54	-37.58	1.00	108.30	H/V	Passed
6	30MHz	30.73	21.85	40.00	-9.27	1.00	216.00	H/V	Passed

Overall Graphs:



Remarks:

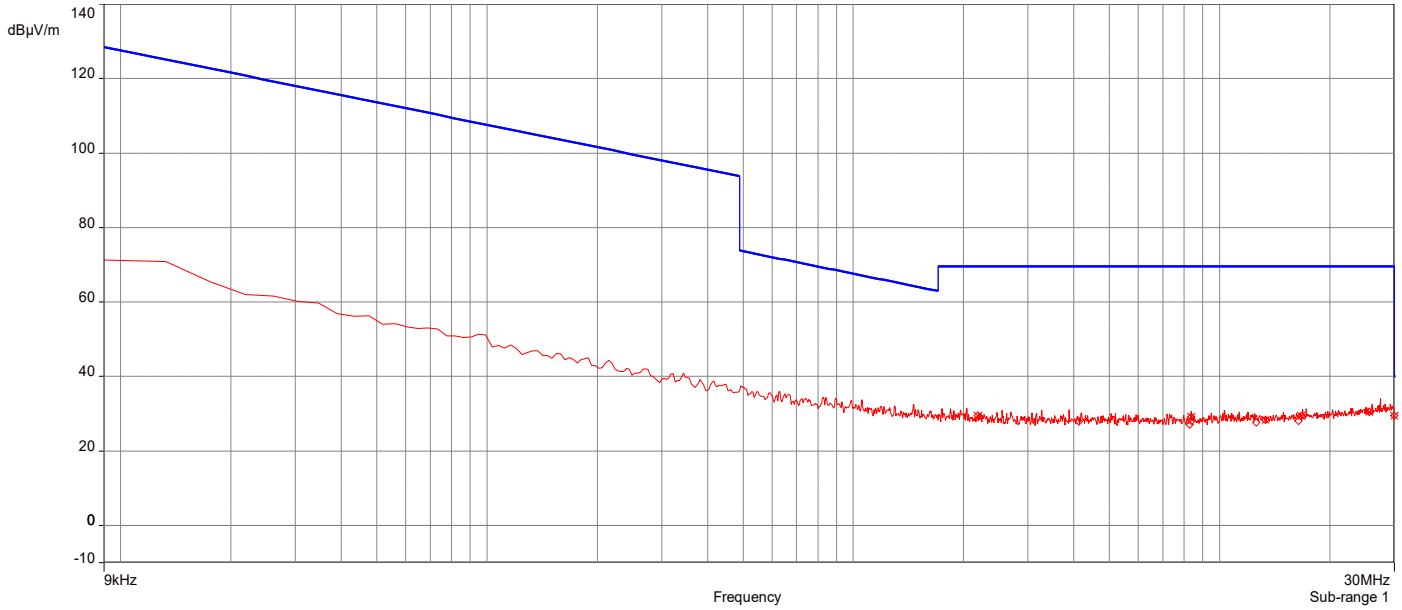
1. Level Q-Peak Reading (dBµV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

AH22100701-HAR-053#4_5G UNII-1 802.11ac_Ch 40_9kHz-30MHz_Perpendicular

12/28/2022 6:17:26 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1	2.185801MHz	29.48	19.49	69.54	-40.06	1.00	345.50	H/V	Passed
2	8.364829MHz	29.26	19.45	69.54	-40.28	1.00	52.90	H/V	Passed
3	13.361187MHz	28.43	19.85	69.54	-41.11	1.00	339.50	H/V	Passed
4	16.694949MHz	29.38	19.92	69.54	-40.16	1.00	113.40	H/V	Passed
5	25.599263MHz	30.56	20.99	69.54	-38.98	1.00	259.10	H/V	Passed
6	30MHz	29.46	21.85	40.00	-10.54	1.00	344.20	H/V	Passed

Overall Graphs:



Remarks:

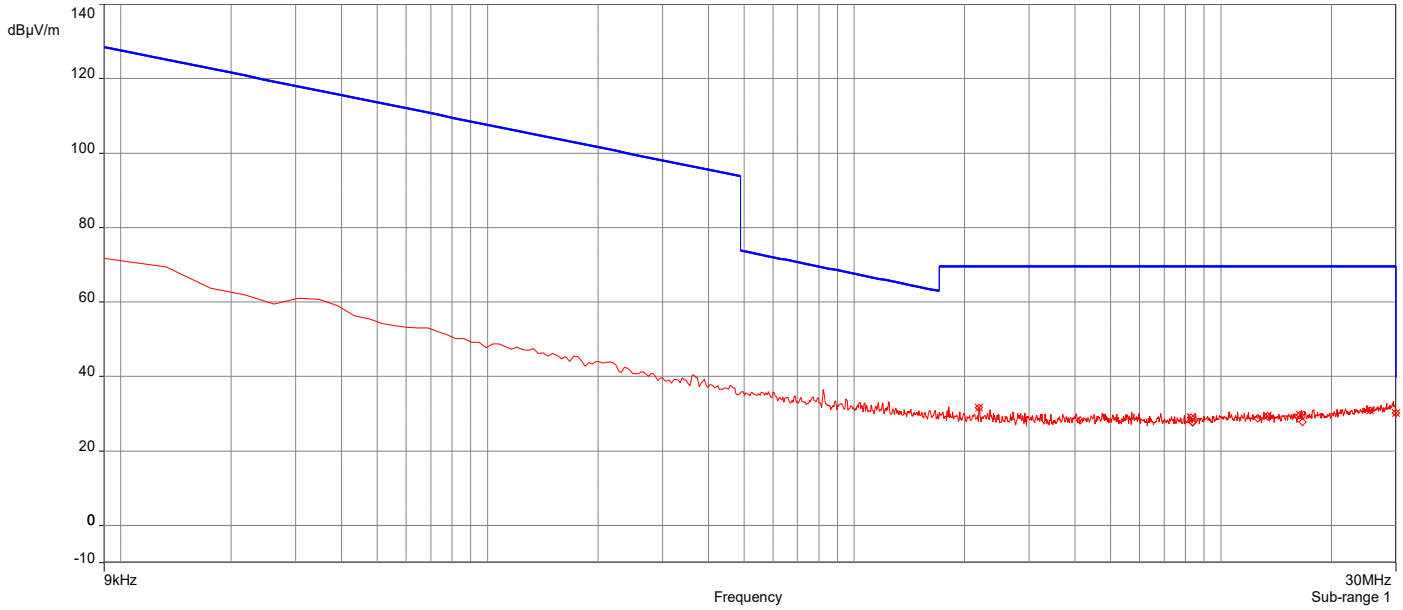
1. Level Q-Peak Reading (dBµV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

AH22100701-HAR-053#5_5G UNII-3 802.11n_Ch 157_9kHz-30MHz_Ground-Parallel

12/1/2022 3:26:56 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1	2.190086MHz	31.65	19.49	69.54	-37.89	3.05	50.70	H/V	Passed
2	8.291984MHz	28.90	19.45	69.54	-40.64	3.05	222.30	H/V	Passed
3	13.391182MHz	29.37	19.85	69.54	-40.17	3.05	110.90	H/V	Passed
4	16.420706MHz	29.63	19.89	69.54	-39.91	3.05	151.10	H/V	Passed
5	25.500707MHz	30.94	20.98	69.54	-38.60	3.05	207.00	H/V	Passed
6	30MHz	30.25	21.85	40.00	-9.75	3.05	182.10	H/V	Passed

Overall Graphs:



Remarks:

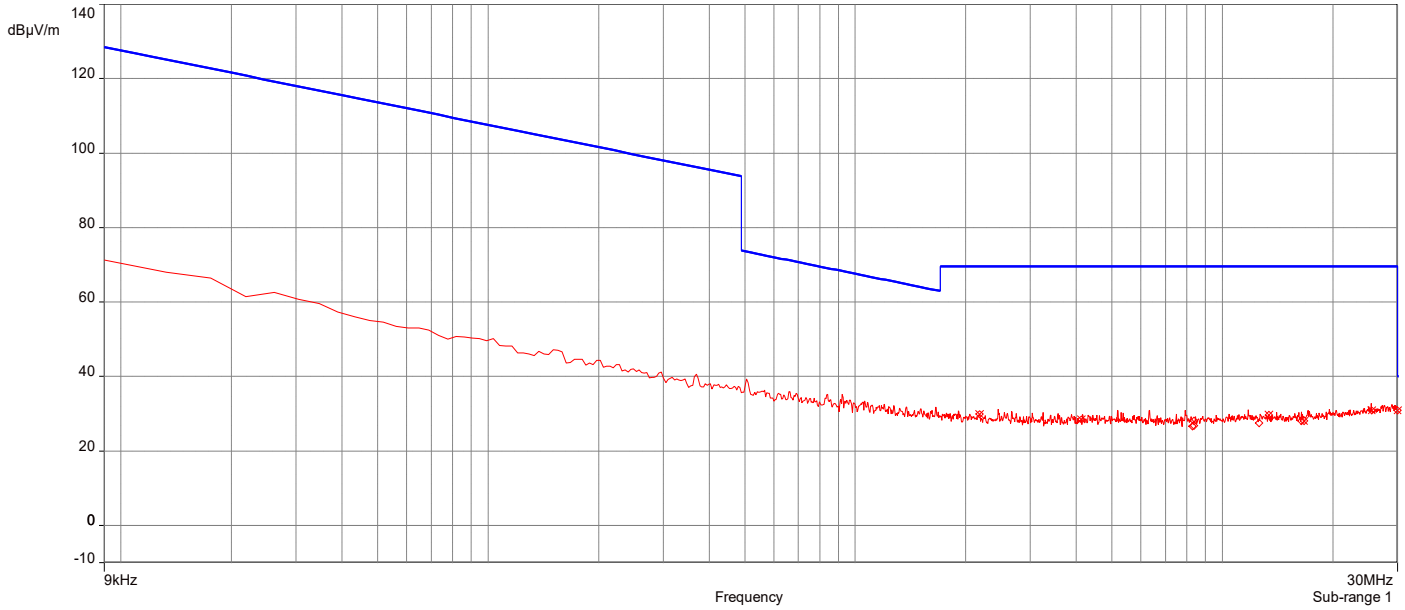
1. Level Q-Peak Reading (dBµV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

AH22100701-HAR-053#5_5G UNII-3 802.11n_Ch 157_9kHz-30MHz_Parallel

12/1/2022 3:38:08 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1	2.181516MHz	29.88	19.49	69.54	-39.66	1.00	166.20	H/V	Passed
2	4.126924MHz	28.48	19.69	69.54	-41.06	1.00	248.10	H/V	Passed
3	13.391182MHz	29.61	19.85	69.54	-39.93	1.00	38.20	H/V	Passed
4	16.694949MHz	28.12	19.92	69.54	-41.42	1.00	127.80	H/V	Passed
5	25.556413MHz	30.92	20.98	69.54	-38.62	1.00	16.50	H/V	Passed
6	30MHz	30.95	21.85	40.00	-9.05	1.00	1.10	H/V	Passed

Overall Graphs:



Remarks:

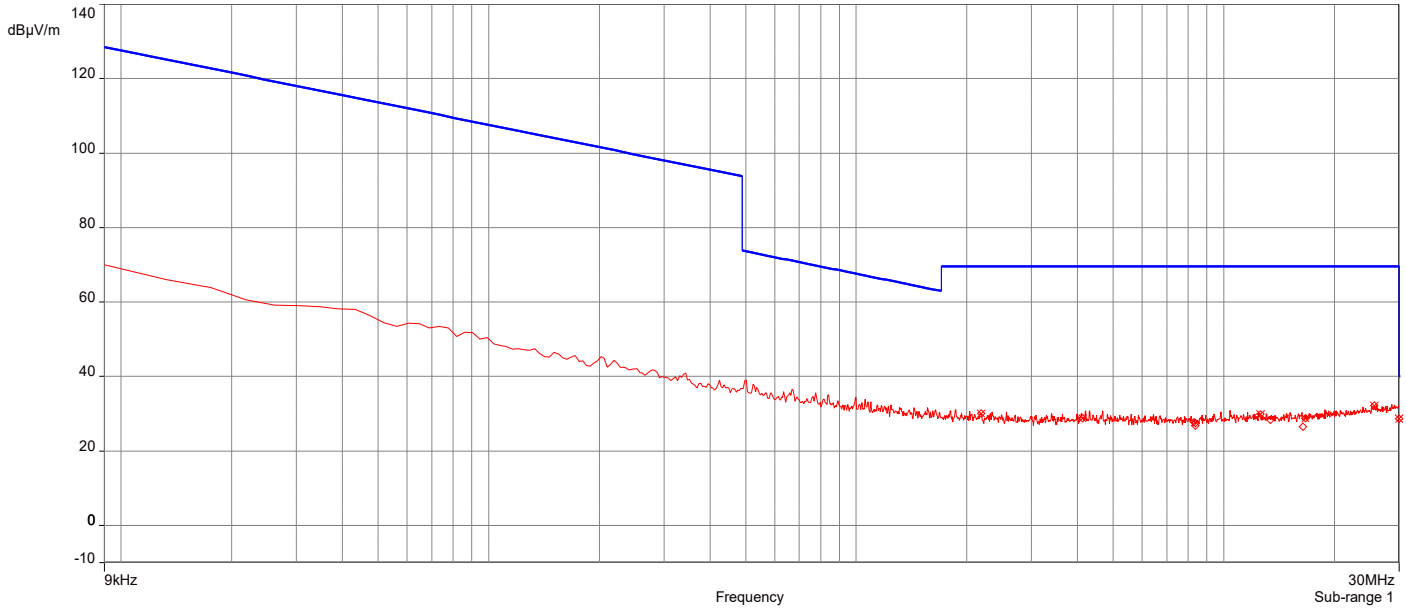
1. Level Q-Peak Reading (dBµV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

AH22100701-HAR-053#5_5G UNII-3 802.11n_Ch 157_9kHz-30MHz_Perpendicular

12/1/2022 3:31:05 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1	2.185801MHz	30.03	19.49	69.54	-39.51	3.05	354.20	H/V	Passed
2	4.126924MHz	28.73	19.69	69.54	-40.81	3.05	30.20	H/V	Passed
3	12.577024MHz	30.00	19.83	69.54	-39.54	3.05	0.50	H/V	Passed
4	16.694949MHz	28.75	19.92	69.54	-40.79	3.05	22.40	H/V	Passed
5	25.663539MHz	32.24	20.99	69.54	-37.30	3.05	246.60	H/V	Passed
6	30MHz	28.71	21.85	40.00	-11.29	3.05	196.30	H/V	Passed

Overall Graphs:



Remarks:

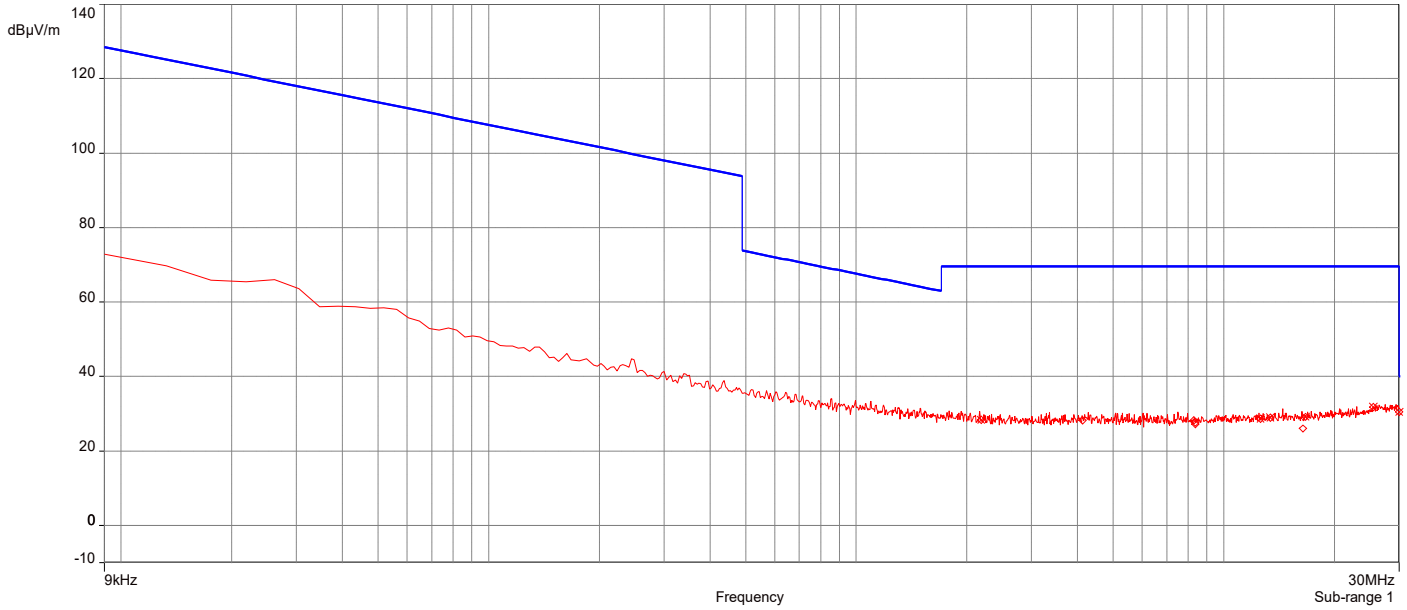
1. Level Q-Peak Reading (dBµV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

AH22100701-HAR-053#4_5G UNII-3 802.11a_Ch 157_9kHz-30MHz_Ground-Parallel

12/28/2022 6:30:12 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1	2.185801MHz	28.39	19.49	69.54	-41.15	1.00	357.80	H/V	Passed
2	12.577024MHz	28.61	19.83	69.54	-40.93	1.00	48.50	H/V	Passed
3	13.374042MHz	29.00	19.85	69.54	-40.54	1.00	8.20	H/V	Passed
4	16.694949MHz	29.17	19.92	69.54	-40.37	1.00	103.90	H/V	Passed
5	25.500707MHz	31.82	20.98	69.54	-37.72	1.00	53.30	H/V	Passed
6	30MHz	30.44	21.85	40.00	-9.56	1.00	53.30	H/V	Passed

Overall Graphs:



Remarks:

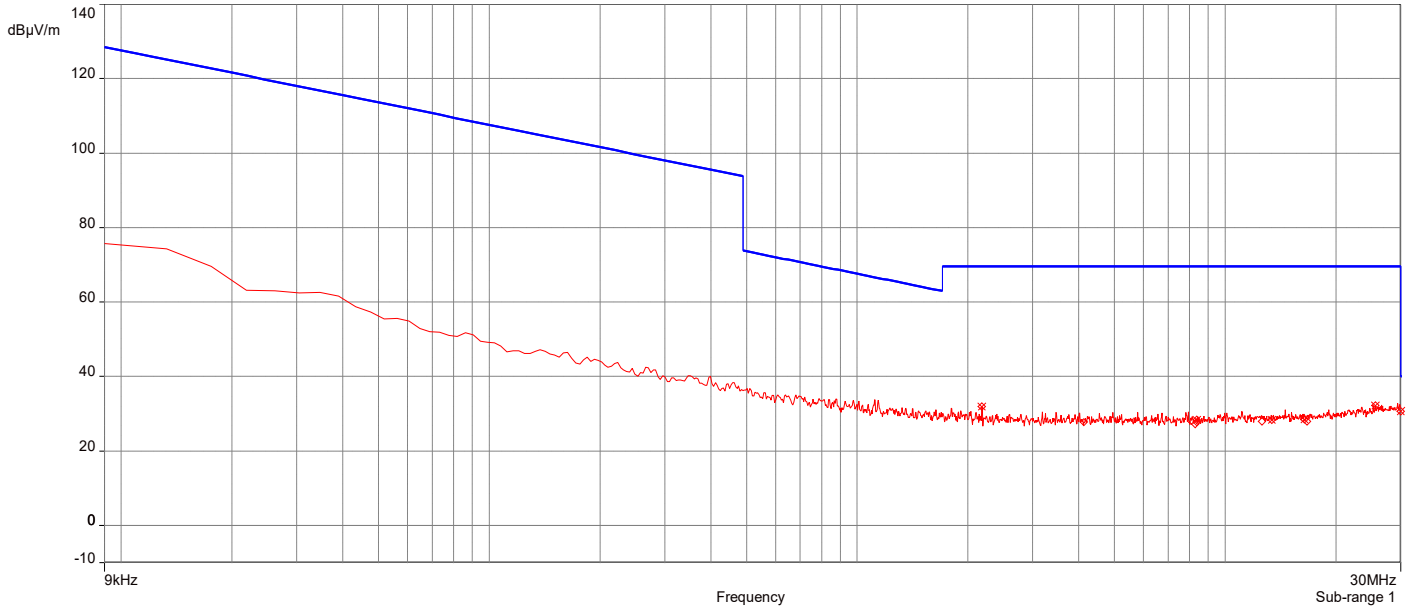
1. Level Q-Peak Reading (dBµV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

AH22100701-HAR-053#4_5G UNII-3 802.11a_Ch 157_9kHz-30MHz_Parallel

12/28/2022 6:27:58 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1	2.181516MHz	31.99	19.49	69.54	-37.55	1.00	0.10	H/V	Passed
2	8.364829MHz	28.39	19.45	69.54	-41.15	1.00	355.90	H/V	Passed
3	13.399752MHz	28.37	19.85	69.54	-41.17	1.00	172.30	H/V	Passed
4	16.420706MHz	28.58	19.89	69.54	-40.96	1.00	327.50	H/V	Passed
5	25.607833MHz	32.19	20.99	69.54	-37.35	1.00	90.10	H/V	Passed
6	30MHz	30.67	21.85	40.00	-9.33	1.00	252.60	H/V	Passed

Overall Graphs:



Remarks:

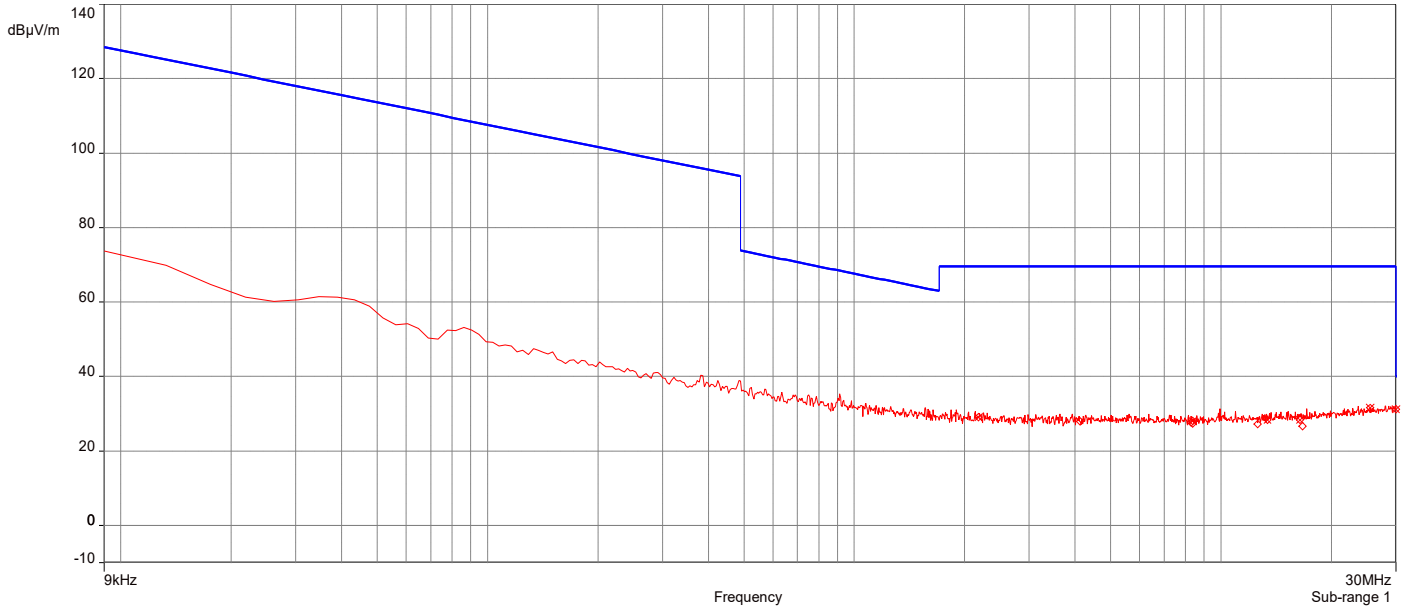
1. Level Q-Peak Reading (dBµV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

AH22100701-HAR-053#4_5G UNII-3 802.11a_Ch 157_9kHz-30MHz_Perpendicular

12/28/2022 6:33:03 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1	2.177231MHz	29.06	19.49	69.54	-40.48	1.00	0.10	H/V	Passed
2	8.377685MHz	28.10	19.45	69.54	-41.44	1.00	110.10	H/V	Passed
3	13.369757MHz	28.43	19.85	69.54	-41.11	1.00	353.90	H/V	Passed
4	16.420706MHz	28.39	19.89	69.54	-41.15	1.00	160.10	H/V	Passed
5	25.534988MHz	31.58	20.98	69.54	-37.96	1.00	323.10	H/V	Passed
6	30MHz	31.22	21.85	40.00	-8.78	1.00	0.10	H/V	Passed

Overall Graphs:



Remarks:

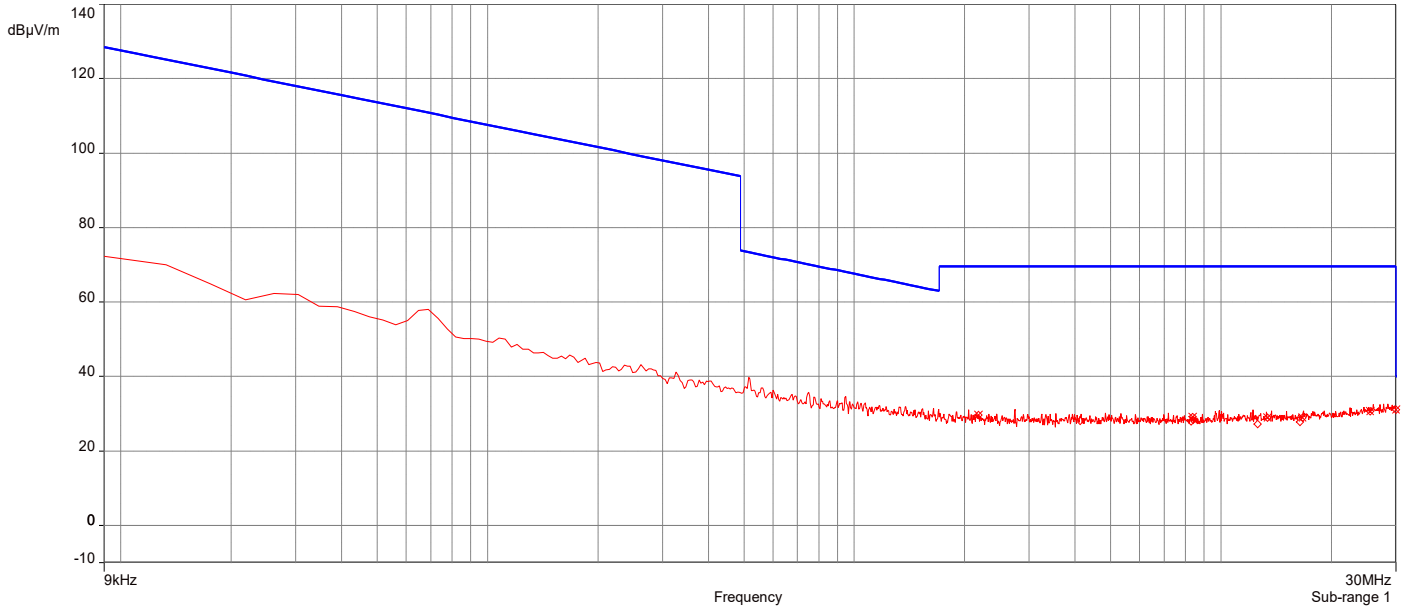
1. Level Q-Peak Reading (dBµV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

AH22100701-HAR-053#4_5G UNII-3 802.11ac_Ch 157_9kHz-30MHz_Ground-Parallel

12/28/2022 6:40:00 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1	2.181516MHz	29.60	19.49	69.54	-39.94	1.00	0.10	H/V	Passed
2	8.364829MHz	29.21	19.45	69.54	-40.33	1.00	116.20	H/V	Passed
3	13.395467MHz	28.98	19.85	69.54	-40.56	1.00	32.70	H/V	Passed
4	16.694949MHz	28.92	19.92	69.54	-40.62	1.00	6.50	H/V	Passed
5	25.543558MHz	30.69	20.98	69.54	-38.85	1.00	323.50	H/V	Passed
6	30MHz	31.05	21.85	40.00	-8.95	1.00	46.30	H/V	Passed

Overall Graphs:



Remarks:

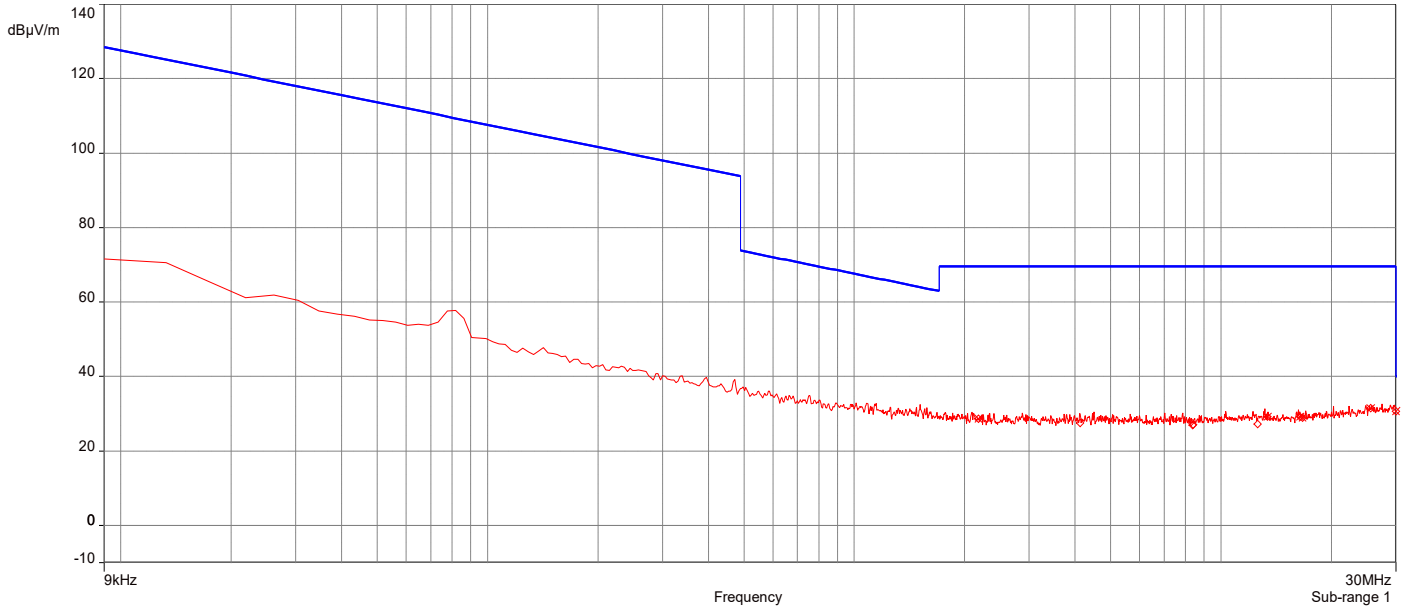
1. Level Q-Peak Reading (dBµV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

AH22100701-HAR-053#4_5G UNII-3 802.11ac_Ch 157_9kHz-30MHz_Parallel

12/28/2022 6:43:27 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1	2.181516MHz	28.64	19.49	69.54	-40.90	1.00	57.60	H/V	Passed
2	13.369757MHz	29.21	19.85	69.54	-40.33	1.00	111.90	H/V	Passed
3	16.420706MHz	29.23	19.89	69.54	-40.31	1.00	124.50	H/V	Passed
4	16.694949MHz	28.97	19.92	69.54	-40.57	1.00	126.20	H/V	Passed
5	25.633544MHz	31.48	20.99	69.54	-38.06	1.00	191.90	H/V	Passed
6	30MHz	30.59	21.85	40.00	-9.41	1.00	286.80	H/V	Passed

Overall Graphs:



Remarks:

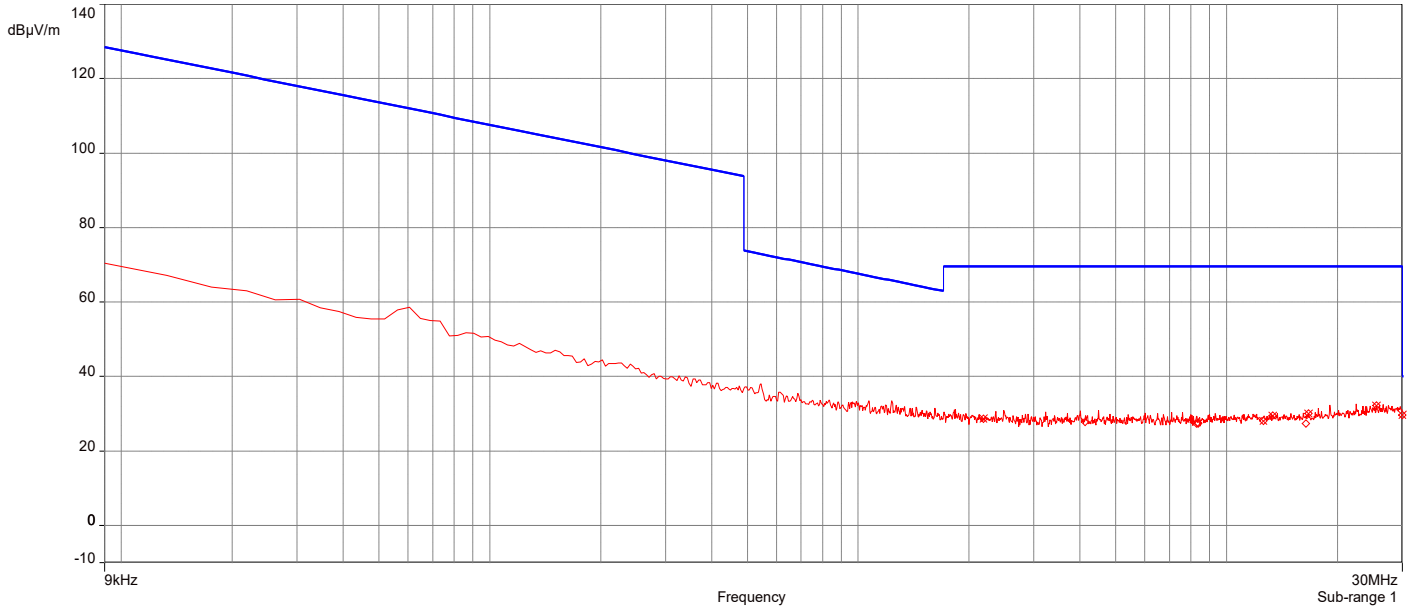
1. Level Q-Peak Reading (dBµV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

AH22100701-HAR-053#4_5G UNII-3 802.11ac_Ch 157_9kHz-30MHz_Perpendicular

12/28/2022 6:37:42 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1	2.190086MHz	28.68	19.49	69.54	-40.86	1.00	0.10	H/V	Passed
2	12.577024MHz	28.04	19.83	69.54	-41.50	1.00	112.00	H/V	Passed
3	13.361187MHz	29.48	19.85	69.54	-40.06	1.00	276.10	H/V	Passed
4	16.694949MHz	30.14	19.92	69.54	-39.40	1.00	358.90	H/V	Passed
5	25.552128MHz	32.27	20.98	69.54	-37.27	1.00	337.40	H/V	Passed
6	30MHz	29.60	21.85	40.00	-10.40	1.00	169.60	H/V	Passed

Overall Graphs:



Remarks:

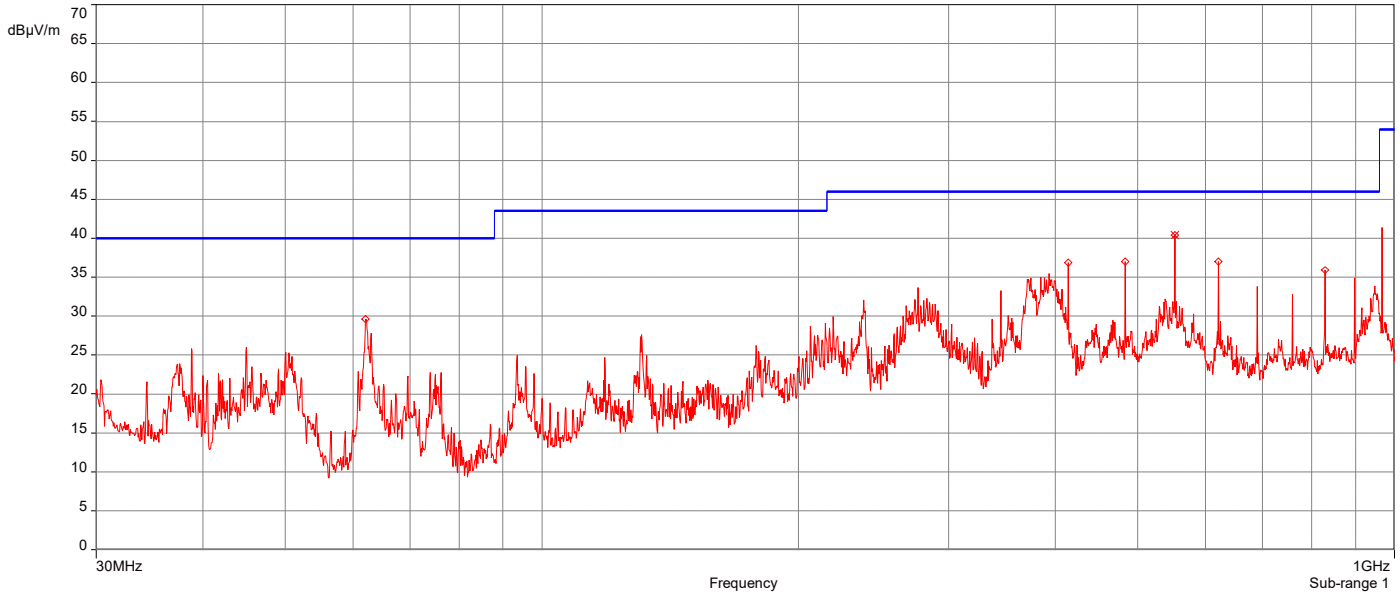
1. Level Q-Peak Reading (dBµV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

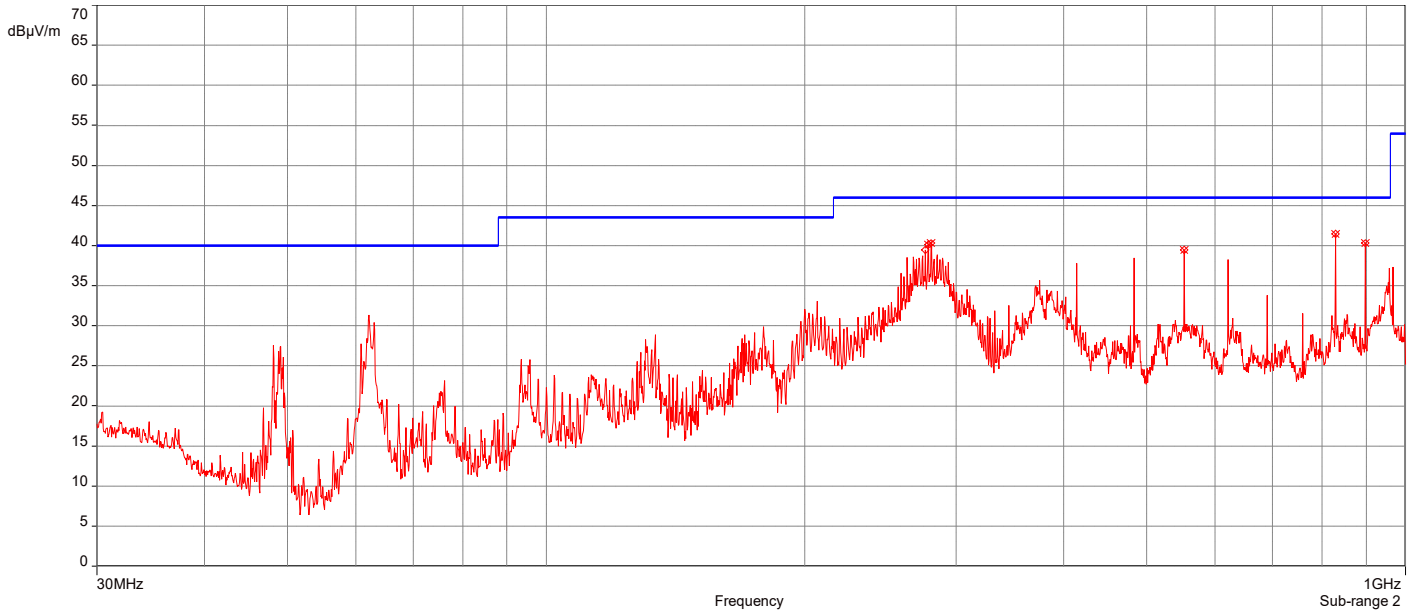
AH22100701-HAR-053#5_5G UNII-1 802.11a_Ch 40_30MHz-1GHz

11/29/2022 10:30:10 AM

No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	552.40426MHz	40.42	-6.60	46.00	-5.58	1.25	222.40	Vertical	Passed
2.	278.33461MHz	40.10	-11.92	46.00	-5.90	1.50	165.00	Horizontal	Passed
3.	280.56003MHz	40.33	-11.96	46.00	-5.67	1.00	307.70	Horizontal	Passed
4.	552.40426MHz	39.45	-5.66	46.00	-6.55	1.00	297.00	Horizontal	Passed
5.	828.64227MHz	41.43	-0.85	46.00	-4.57	1.00	135.50	Horizontal	Passed
6.	897.68751MHz	40.36	-0.39	46.00	-5.64	1.50	138.00	Horizontal	Passed

Overall Graphs:





Remarks:

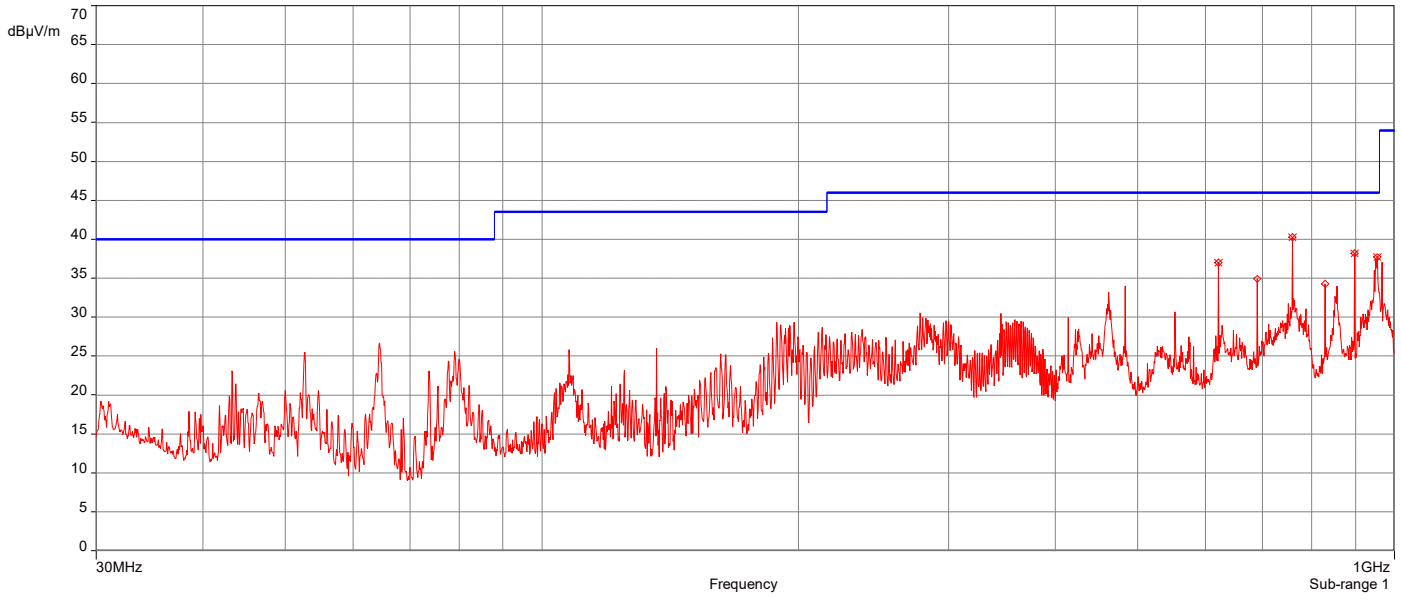
1. Level Q-Peak Reading (dBµV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

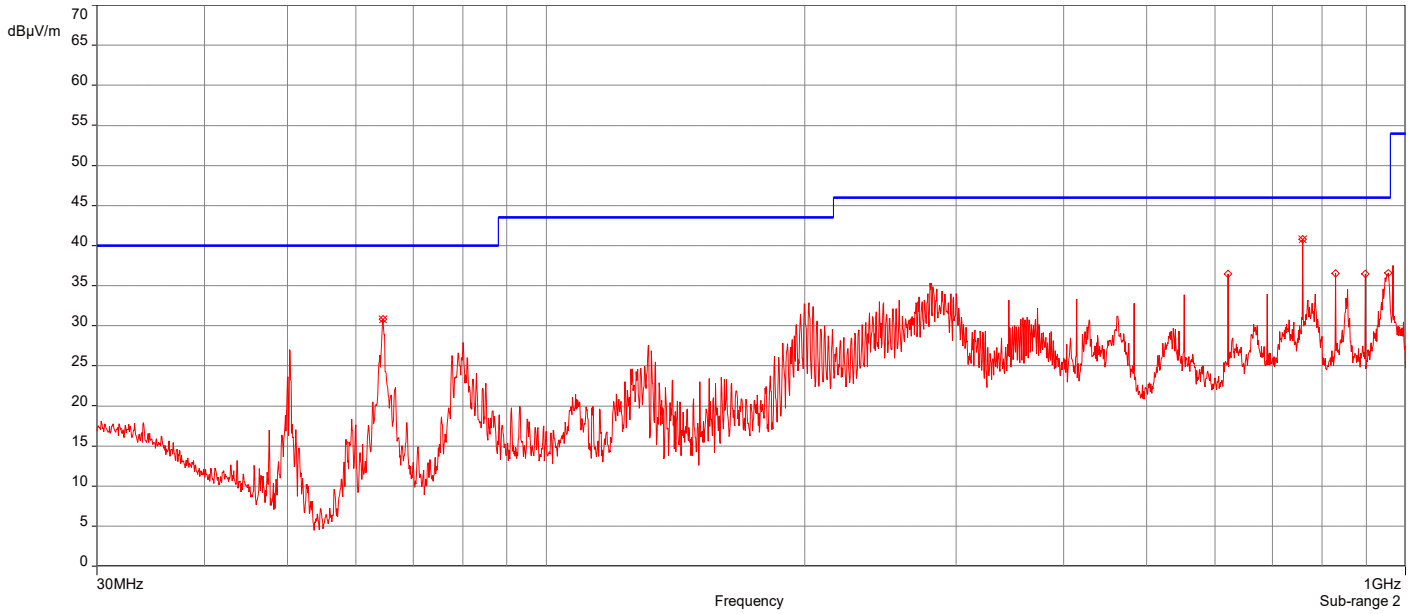
AH22100701-HAR-053#5_5G UNII-1 802.11ac_Ch 40_30MHz-1GHz

12/29/2022 5:20:14 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1	621.4495MHz	36.98	-5.19	46.00	-9.02	1.00	107.60	Vertical	Passed
2	759.59704MHz	40.24	-3.29	46.00	-5.76	1.25	155.40	Vertical	Passed
3	897.68751MHz	38.21	-1.69	46.00	-7.79	1.25	181.80	Vertical	Passed
4	955.32031MHz	37.73	-1.04	46.00	-8.27	1.25	340.30	Vertical	Passed
5	64.579681MHz	30.80	-17.94	40.00	-9.20	4.00	8.00	Horizontal	Passed
6	759.59704MHz	40.80	-2.19	46.00	-5.20	1.00	69.00	Horizontal	Passed

Overall Graphs:





Remarks:

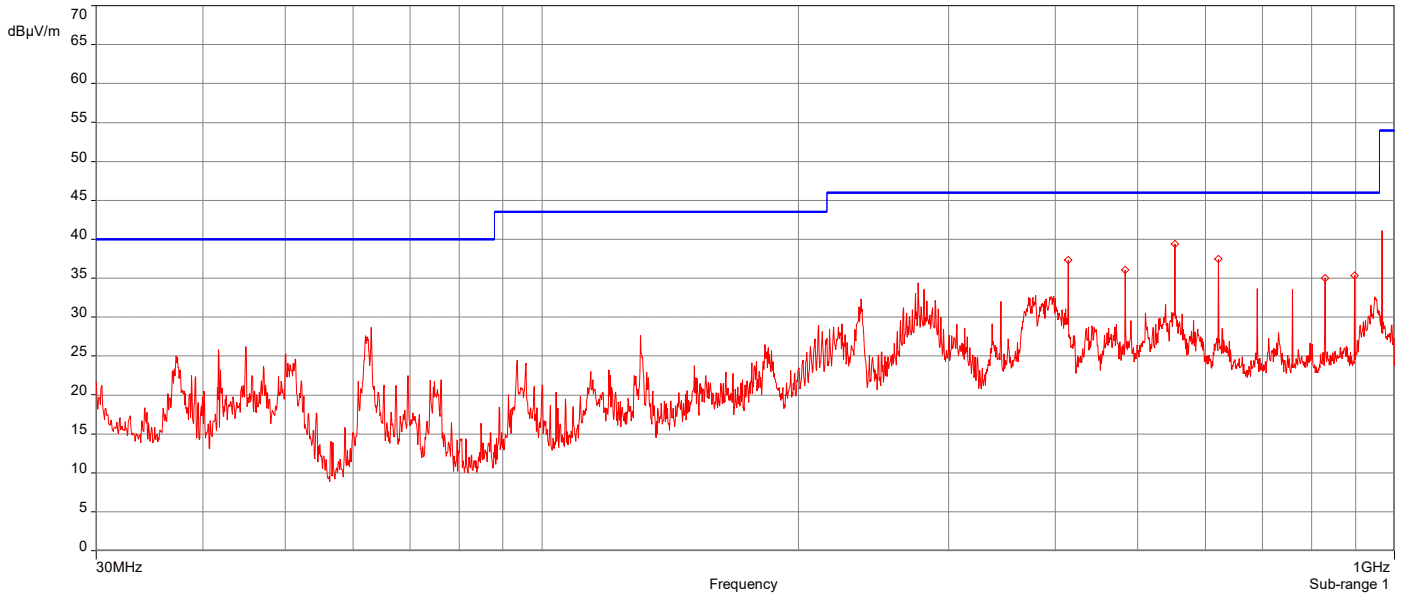
1. Level Q-Peak Reading (dBµV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

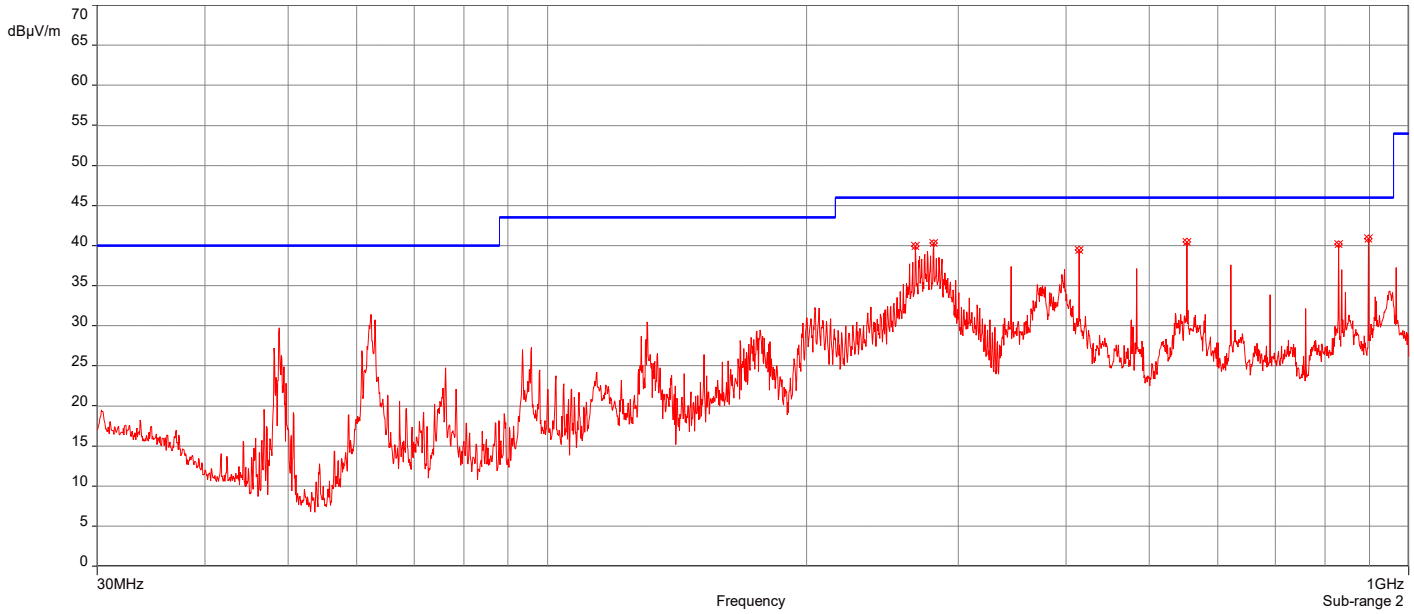
AH22100701-HAR-053#5_5G UNII-1 802.11ac_Ch 38_30MHz-1GHz

11/29/2022 11:35:27 AM

No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1	267.54986MHz	39.92	-11.99	46.00	-6.08	1.50	307.60	Horizontal	Passed
2	280.67416MHz	40.33	-11.95	46.00	-5.67	1.25	189.90	Horizontal	Passed
3	414.31378MHz	39.45	-8.30	46.00	-6.55	1.25	200.40	Horizontal	Passed
4	552.40426MHz	40.43	-5.66	46.00	-5.57	1.00	291.10	Horizontal	Passed
5	828.64227MHz	40.22	-0.85	46.00	-5.78	1.00	142.60	Horizontal	Passed
6	897.68751MHz	40.86	-0.39	46.00	-5.14	1.50	140.40	Horizontal	Passed

Overall Graphs:





Remarks:

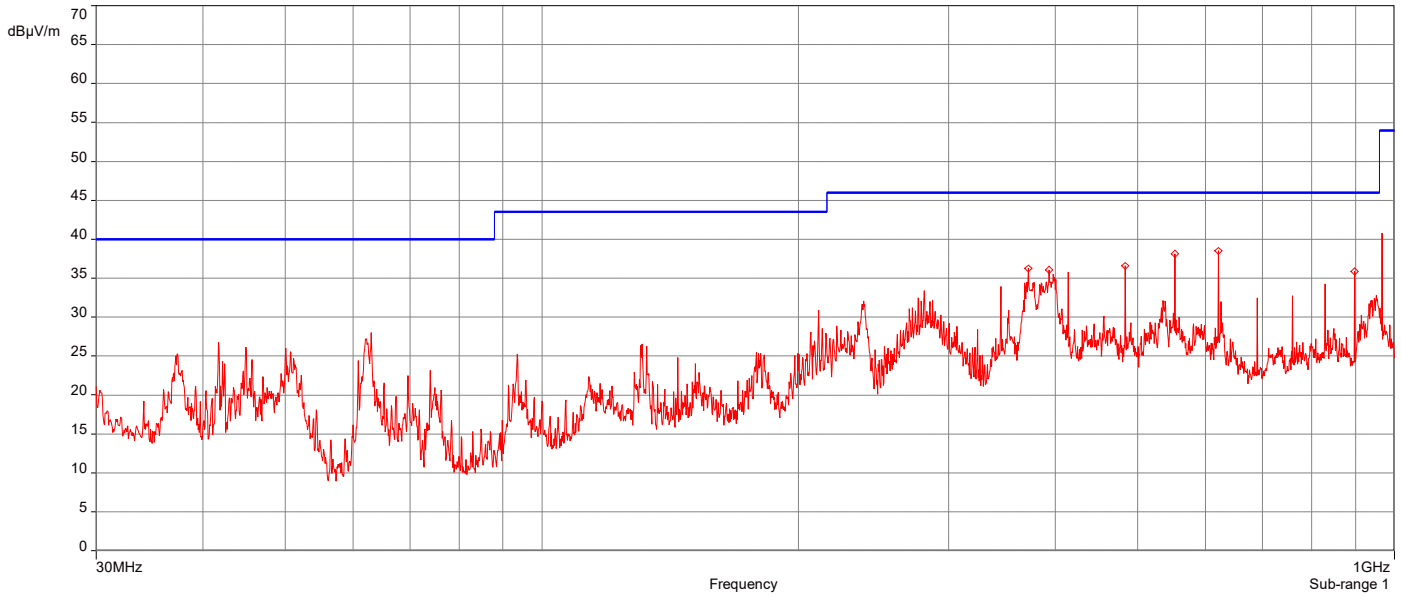
1. Level Q-Peak Reading (dBµV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

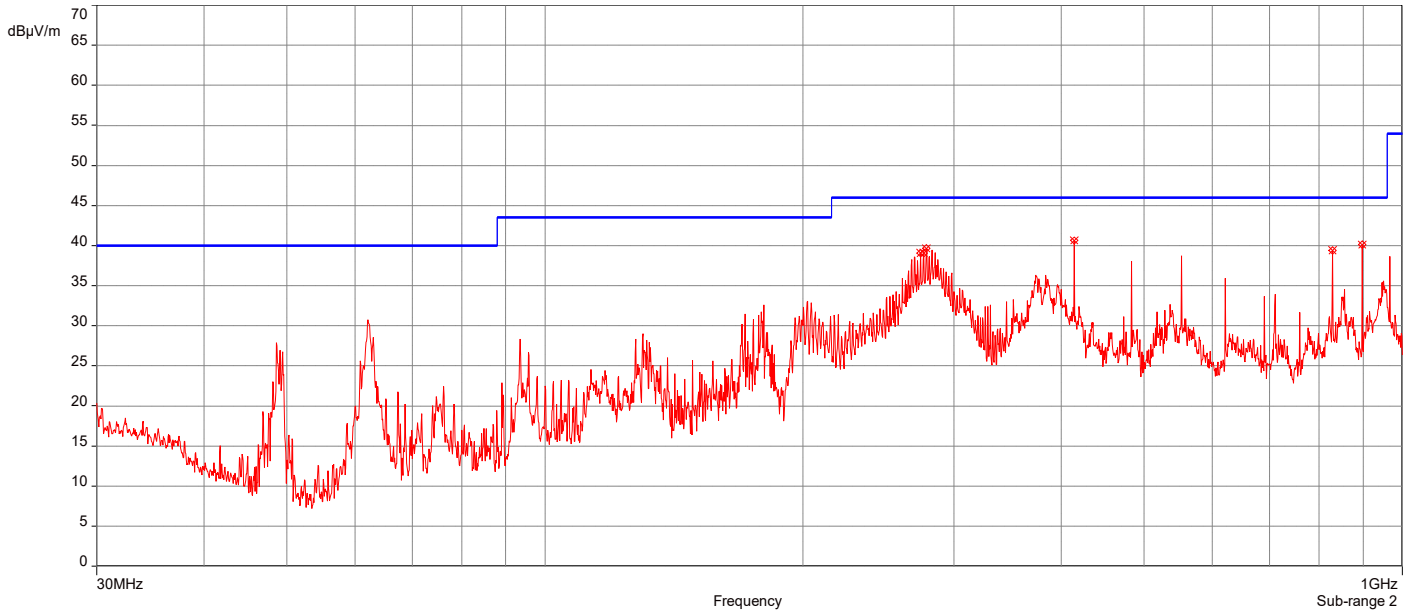
AH22100701-HAR-053#5_5G UNII-1 802.11ac_Ch 46_30MHz-1GHz

11/29/2022 12:03:15 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1	274.16907MHz	39.07	-11.91	46.00	-6.93	1.00	161.00	Horizontal	Passed
2	276.45156MHz	39.07	-11.97	46.00	-6.93	1.50	304.50	Horizontal	Passed
3	278.56286MHz	39.69	-11.93	46.00	-6.31	1.50	182.40	Horizontal	Passed
4	414.31378MHz	40.69	-8.30	46.00	-5.31	1.00	210.10	Horizontal	Passed
5	828.64227MHz	39.42	-0.85	46.00	-6.58	1.00	139.10	Horizontal	Passed
6	897.68751MHz	40.11	-0.39	46.00	-5.89	1.50	125.50	Horizontal	Passed

Overall Graphs:





Remarks:

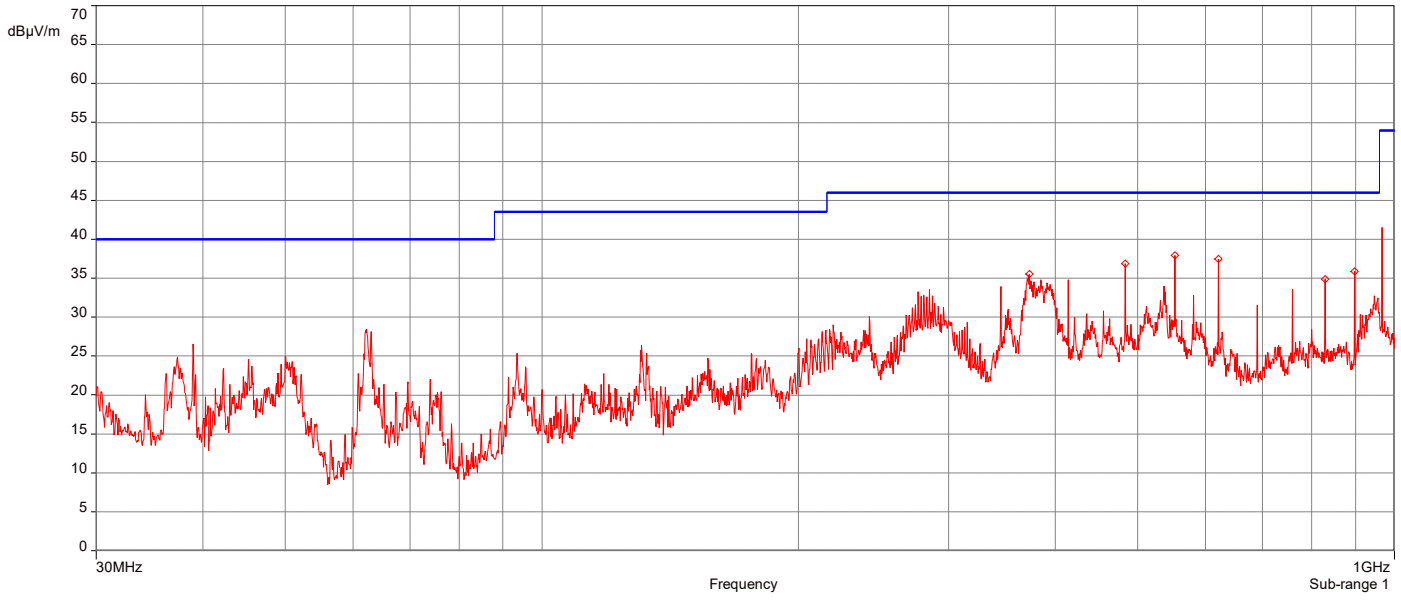
1. Level Q-Peak Reading (dBµV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

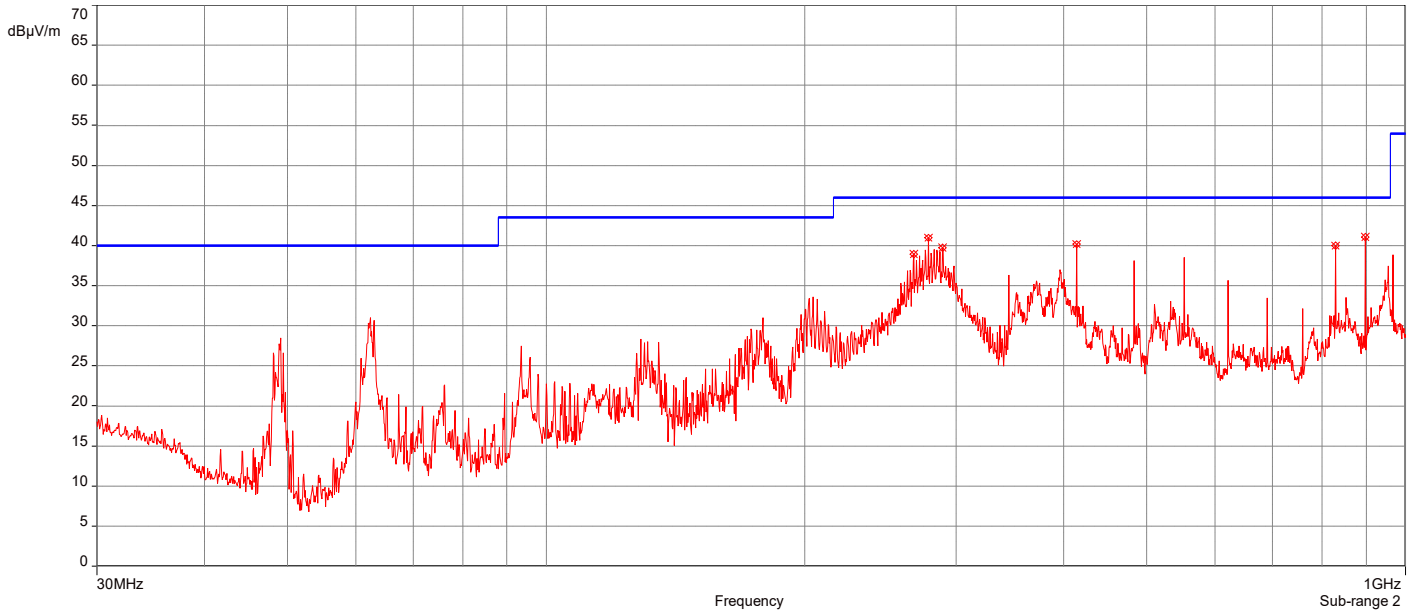
AH22100701-HAR-053#5_5G UNII-1 802.11ac_Ch 42_30MHz-1GHz

11/30/2022 11:26:47 AM

No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1	267.60692MHz	38.94	-11.99	46.00	-7.06	1.50	308.60	Horizontal	Passed
2	278.44873MHz	40.99	-11.93	46.00	-5.01	1.00	170.60	Horizontal	Passed
3	289.40467MHz	39.75	-11.66	46.00	-6.25	1.25	311.70	Horizontal	Passed
4	414.31378MHz	40.21	-8.30	46.00	-5.79	1.25	209.10	Horizontal	Passed
5	828.64227MHz	40.02	-0.85	46.00	-5.98	1.00	134.20	Horizontal	Passed
6	897.68751MHz	41.05	-0.39	46.00	-4.95	1.50	132.40	Horizontal	Passed

Overall Graphs:





Remarks:

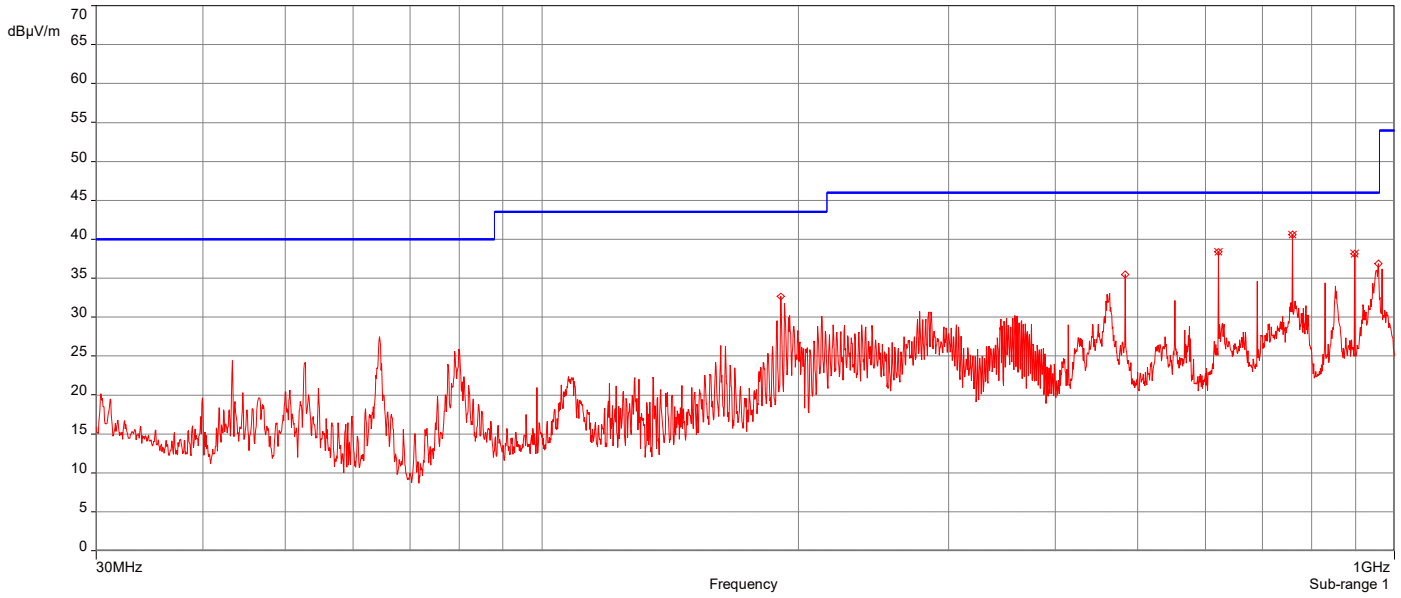
1. Level Q-Peak Reading (dBµV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

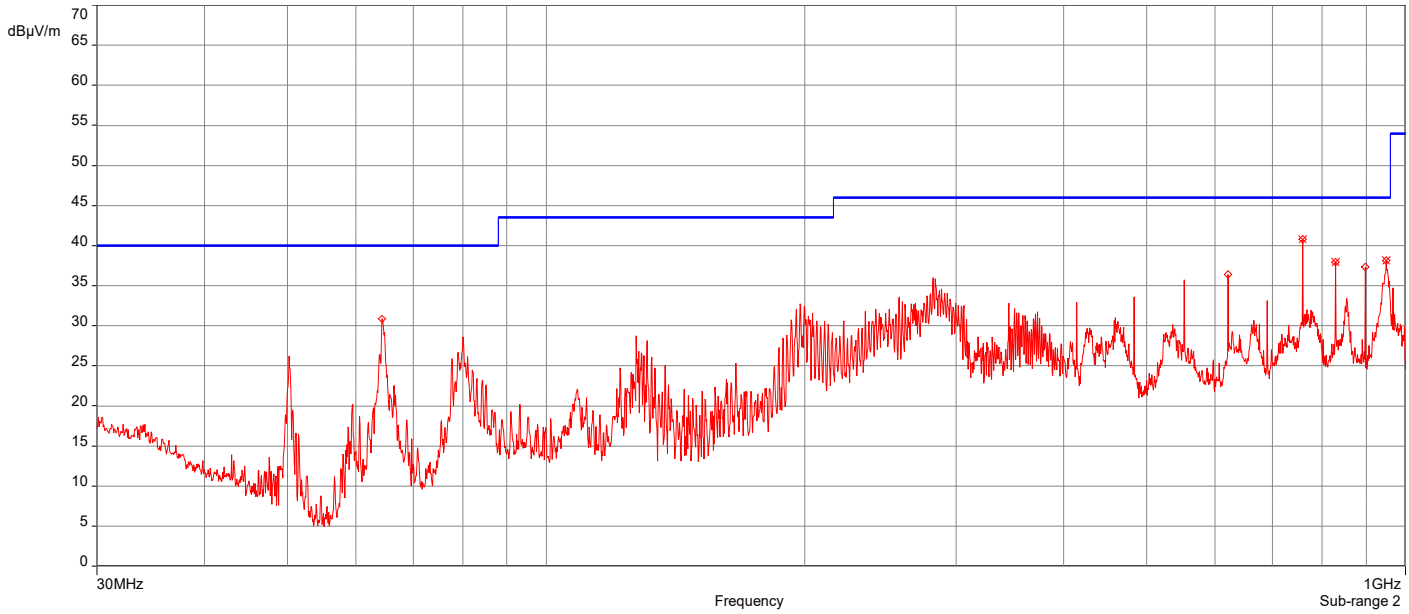
AH22100701-HAR-053#5_5G UNII-3 802.11a_Ch 157_30MHz-1GHz

1/3/2023 11:35:03 AM

No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1	621.4495MHz	38.40	-5.19	46.00	-7.60	1.00	107.40	Vertical	Passed
2	759.59704MHz	40.58	-3.29	46.00	-5.42	1.25	146.90	Vertical	Passed
3	897.68751MHz	38.11	-1.69	46.00	-7.89	1.25	175.50	Vertical	Passed
4	759.59704MHz	40.80	-2.19	46.00	-5.20	1.00	67.50	Horizontal	Passed
5	828.64227MHz	37.92	-0.86	46.00	-8.08	1.00	38.20	Horizontal	Passed
6	949.49997MHz	38.15	0.00	46.00	-7.85	1.00	342.40	Horizontal	Passed

Overall Graphs:





Remarks:

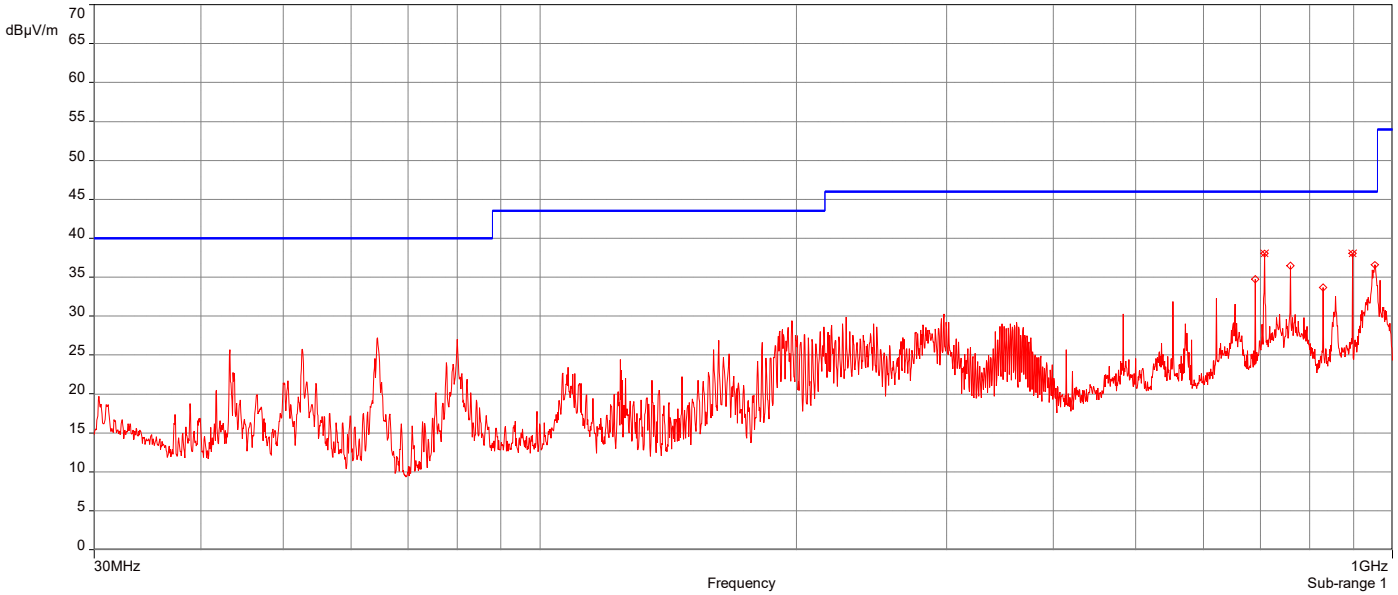
1. Level Q-Peak Reading (dBµV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

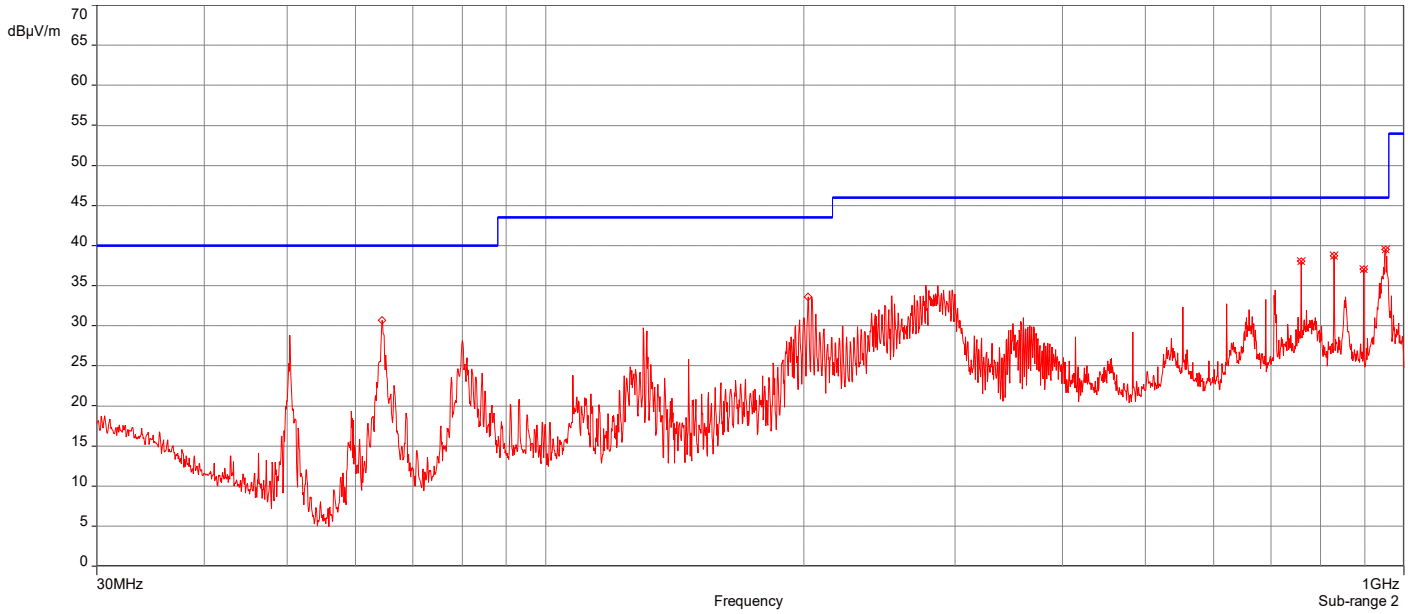
AH22100701-HAR-053#5_5G UNII-3 802.11ac_Ch 157_30MHz-1GHz

1/3/2023 12:00:19 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1	707.55633MHz	38.07	-3.87	46.00	-7.93	1.25	82.90	Vertical	Passed
2	897.68751MHz	38.09	-1.69	46.00	-7.91	1.25	169.70	Vertical	Passed
3	759.59704MHz	38.09	-2.19	46.00	-7.91	1.25	70.30	Horizontal	Passed
4	828.64227MHz	38.70	-0.86	46.00	-7.30	1.00	40.90	Horizontal	Passed
5	897.68751MHz	37.08	-0.39	46.00	-8.92	1.00	69.40	Horizontal	Passed
6	951.7254MHz	39.51	0.02	46.00	-6.49	1.00	340.00	Horizontal	Passed

Overall Graphs:





Remarks:

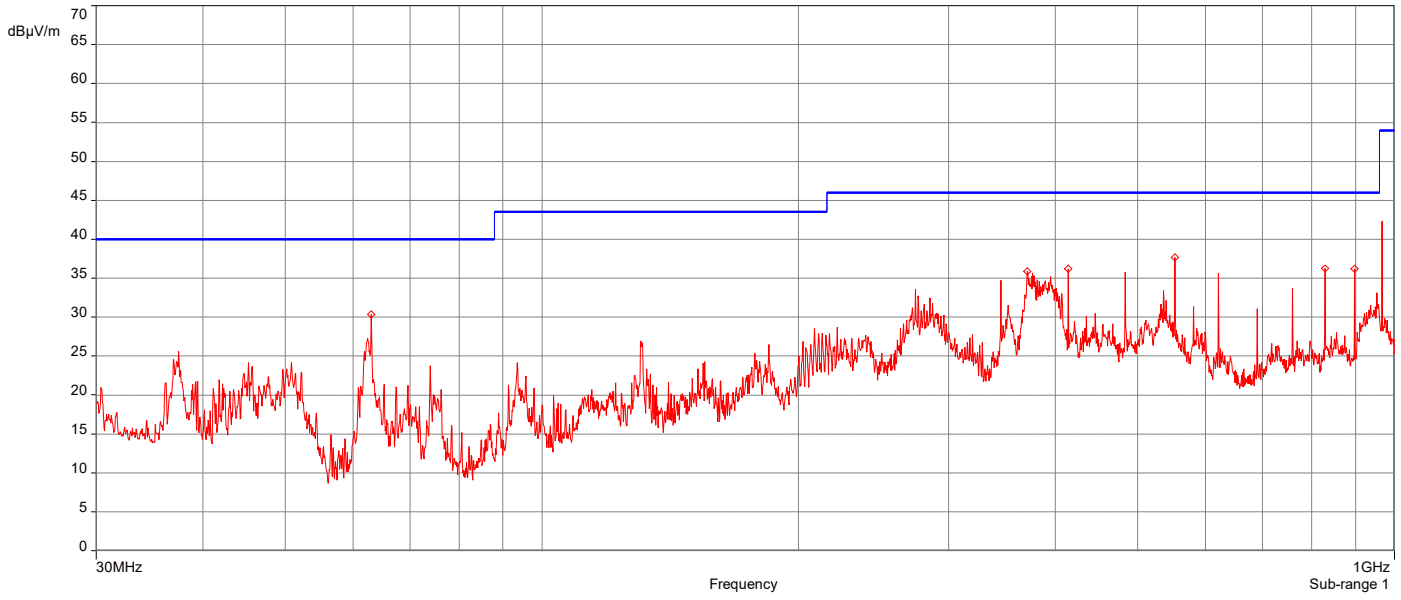
1. Level Q-Peak Reading (dBµV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

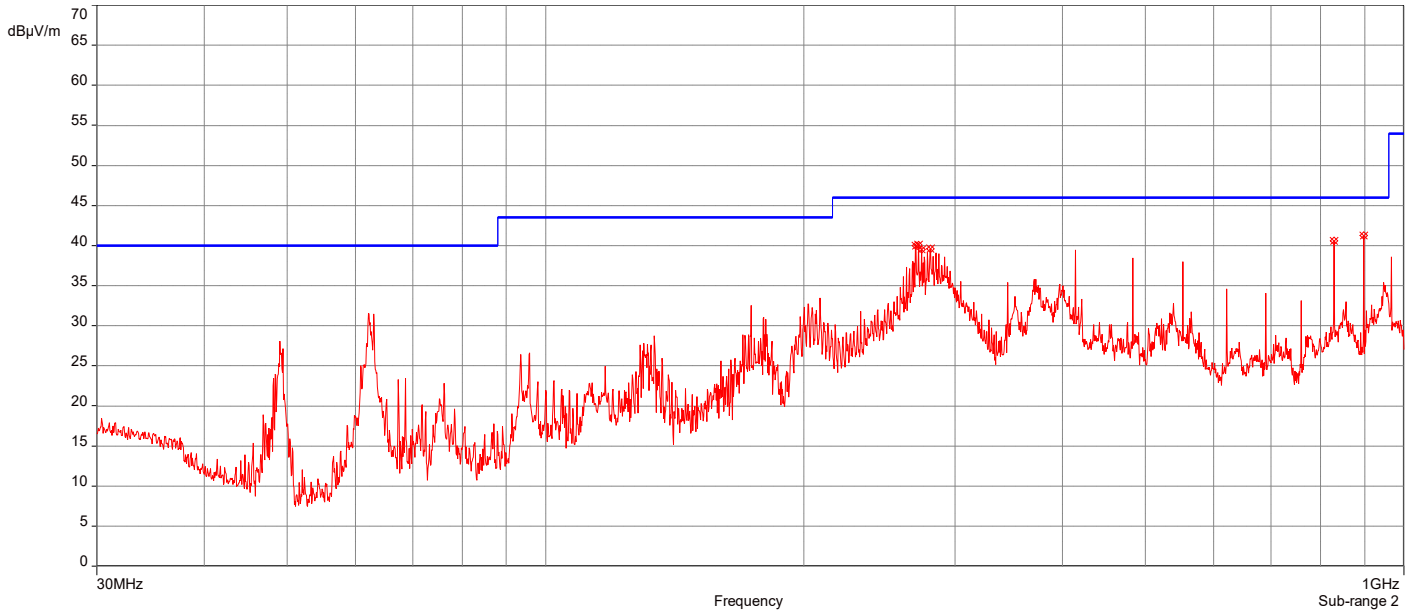
AH22100701-HAR-053#5_5G UNII-3 802.11n_Ch 151_30MHz-1GHz

11/30/2022 5:23:50 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1	269.88941MHz	40.01	-12.04	46.00	-5.99	1.25	307.50	Horizontal	Passed
2	271.94364MHz	40.04	-12.02	46.00	-5.96	1.25	162.50	Horizontal	Passed
3	274.11201MHz	39.56	-11.91	46.00	-6.44	1.00	173.00	Horizontal	Passed
4	280.78828MHz	39.56	-11.95	46.00	-6.44	1.00	305.60	Horizontal	Passed
5	828.64227MHz	40.60	-0.85	46.00	-5.40	1.00	145.20	Horizontal	Passed
6	897.68751MHz	41.29	-0.39	46.00	-4.71	1.50	132.60	Horizontal	Passed

Overall Graphs:





Remarks:

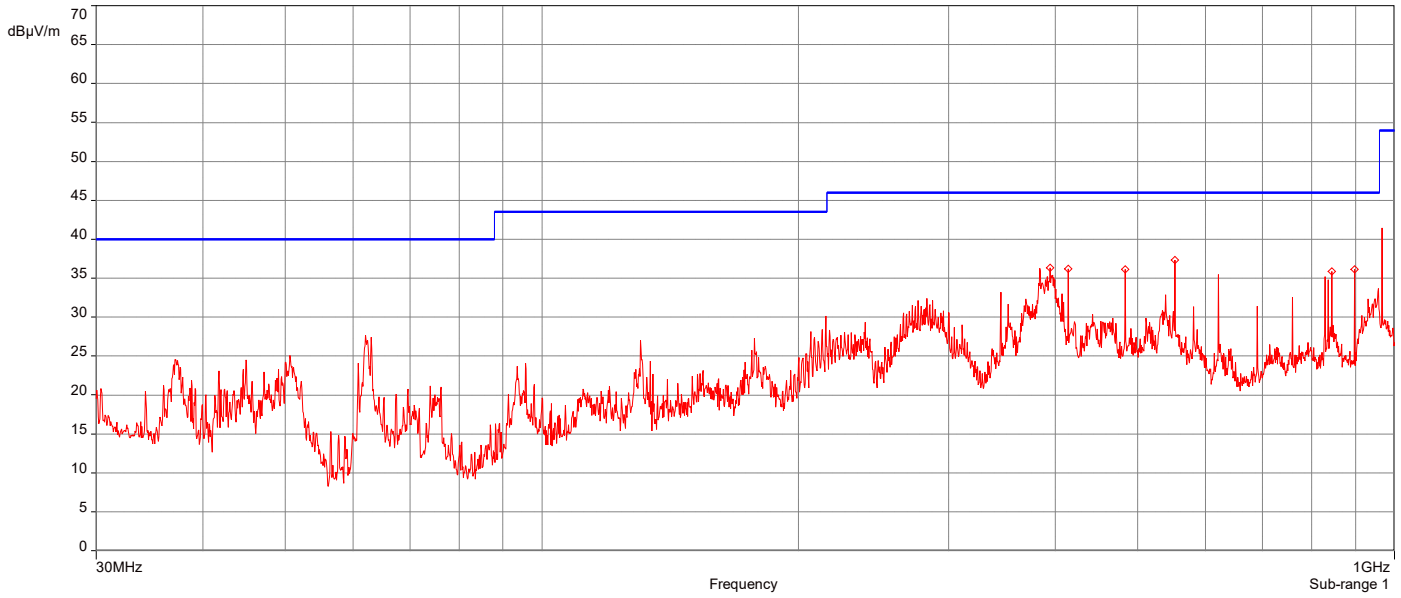
1. Level Q-Peak Reading (dBµV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

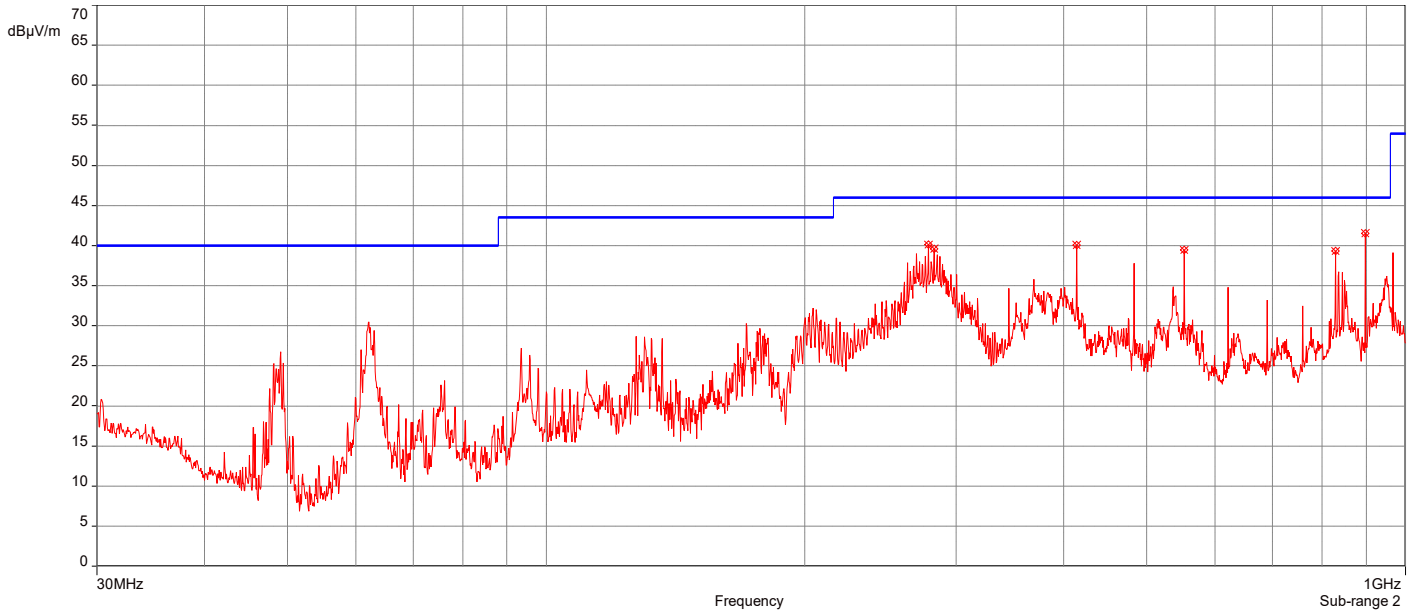
AH22100701-HAR-053#5_5G UNII-3 802.11n_Ch 159_30MHz-1GHz

11/30/2022 5:46:23 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1	278.44873MHz	40.12	-11.93	46.00	-5.88	1.25	329.10	Horizontal	Passed
2	282.78546MHz	39.57	-11.81	46.00	-6.43	1.50	303.10	Horizontal	Passed
3	414.31378MHz	40.09	-8.30	46.00	-5.91	1.25	213.50	Horizontal	Passed
4	552.40426MHz	39.44	-5.66	46.00	-6.56	1.00	301.20	Horizontal	Passed
5	828.64227MHz	39.33	-0.85	46.00	-6.67	1.00	144.30	Horizontal	Passed
6	897.68751MHz	41.56	-0.39	46.00	-4.44	1.50	133.80	Horizontal	Passed

Overall Graphs:





Remarks:

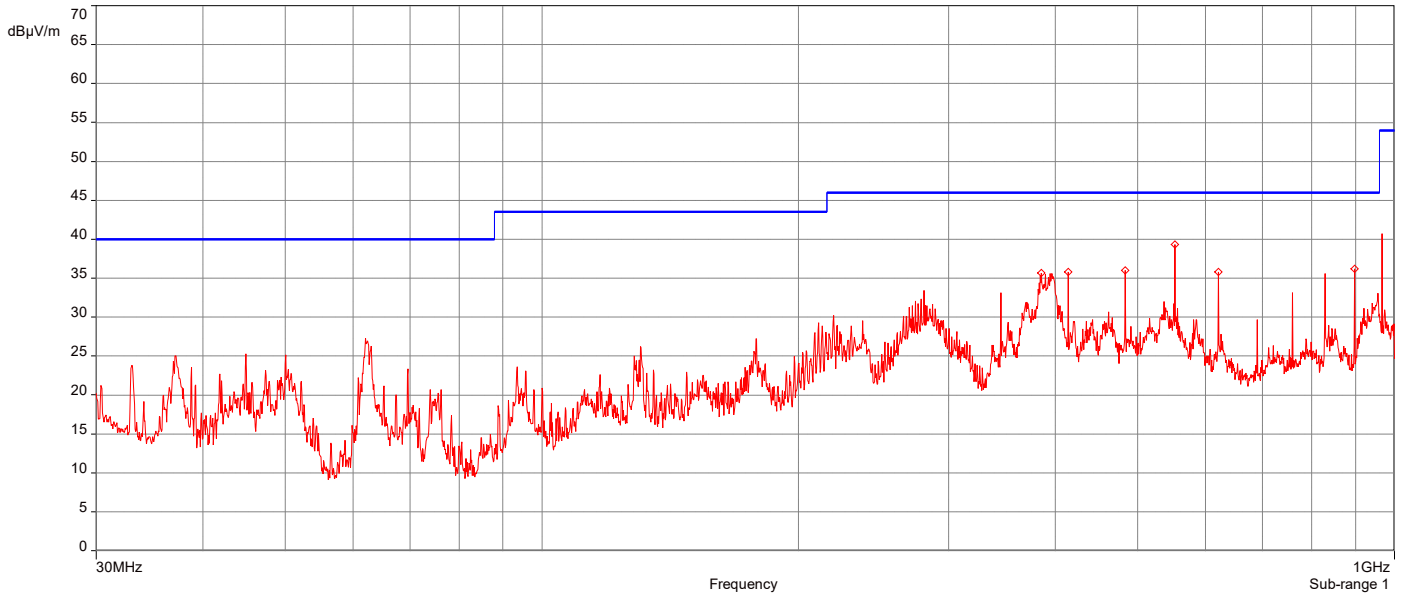
1. Level Q-Peak Reading (dBµV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

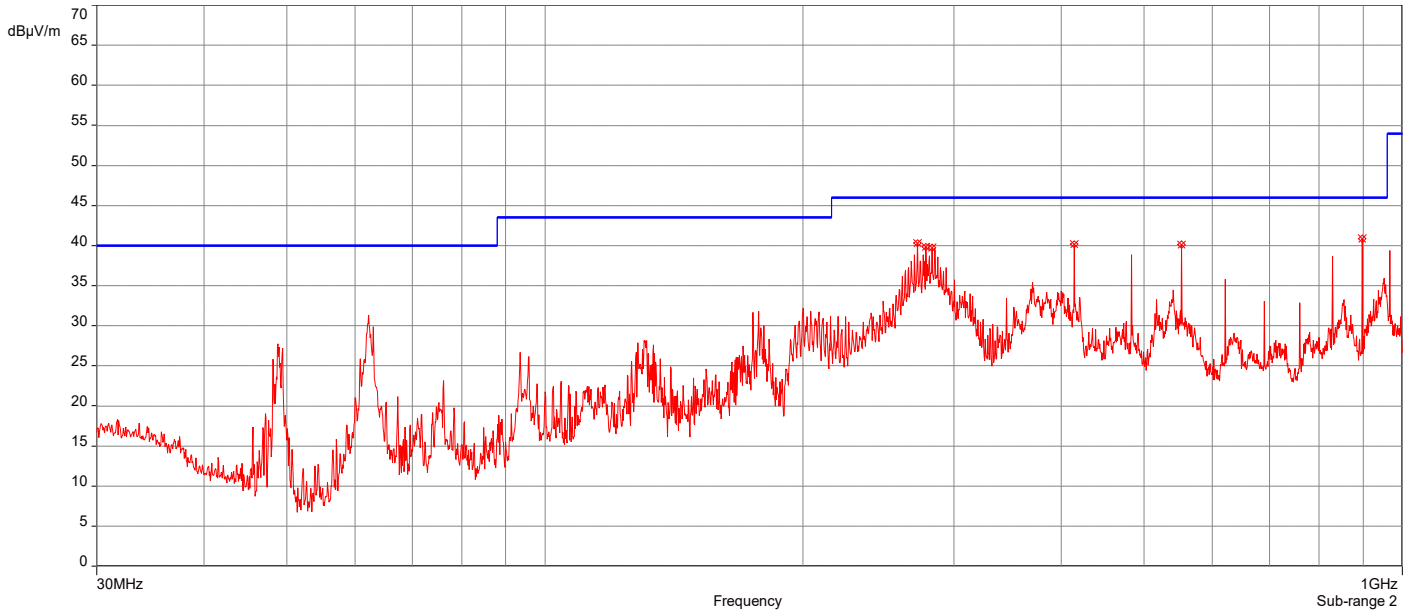
AH22100701-HAR-053#5_5G UNII-3 802.11ac_Ch 155_30MHz-1GHz

11/30/2022 6:10:01 PM

No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1	271.94364MHz	40.32	-12.02	46.00	-5.68	1.00	314.10	Horizontal	Passed
2	278.22048MHz	39.88	-11.92	46.00	-6.12	1.25	310.70	Horizontal	Passed
3	282.89958MHz	39.71	-11.81	46.00	-6.29	1.00	296.30	Horizontal	Passed
4	414.31378MHz	40.17	-8.30	46.00	-5.83	1.00	206.40	Horizontal	Passed
5	552.40426MHz	40.16	-5.66	46.00	-5.84	1.00	303.40	Horizontal	Passed
6	897.68751MHz	40.83	-0.39	46.00	-5.17	1.50	132.30	Horizontal	Passed

Overall Graphs:





Remarks:

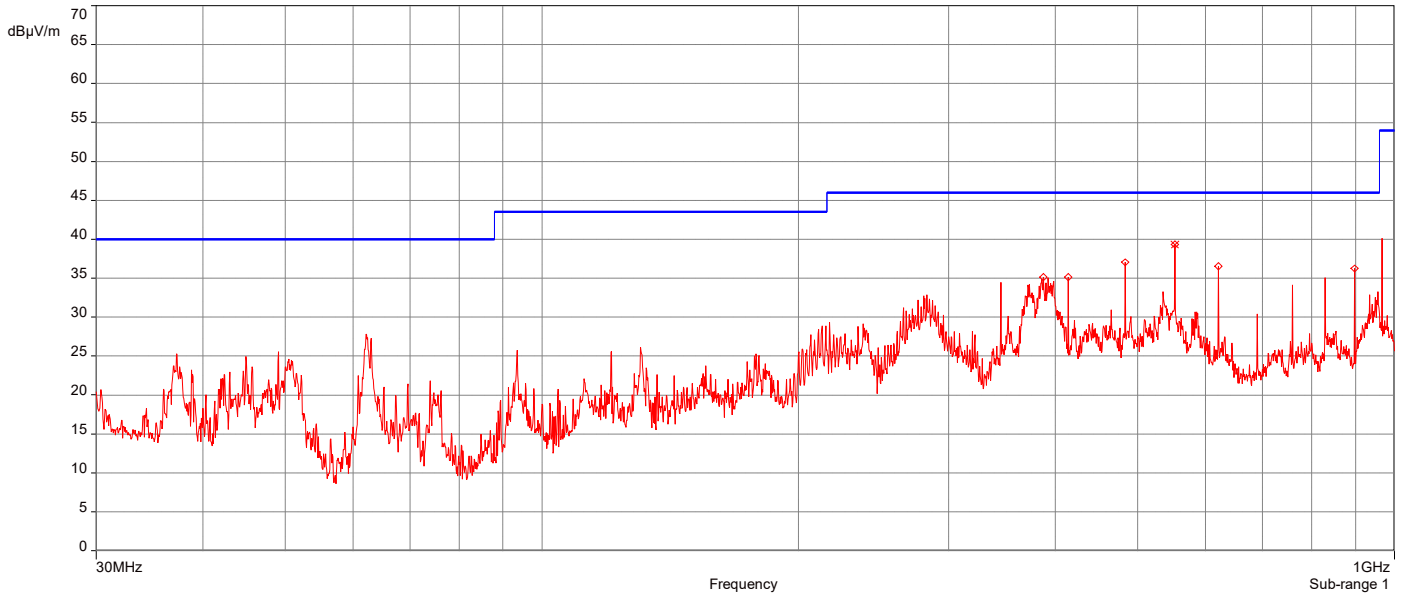
1. Level Q-Peak Reading (dBµV/m) = Raw Q-Peak Level + Correction Factor
2. Correction Factor (dB) = Antenna Factor + Cable Loss – Preamplifier Gain
3. Margin = Level Q-Peak Reading – Limit

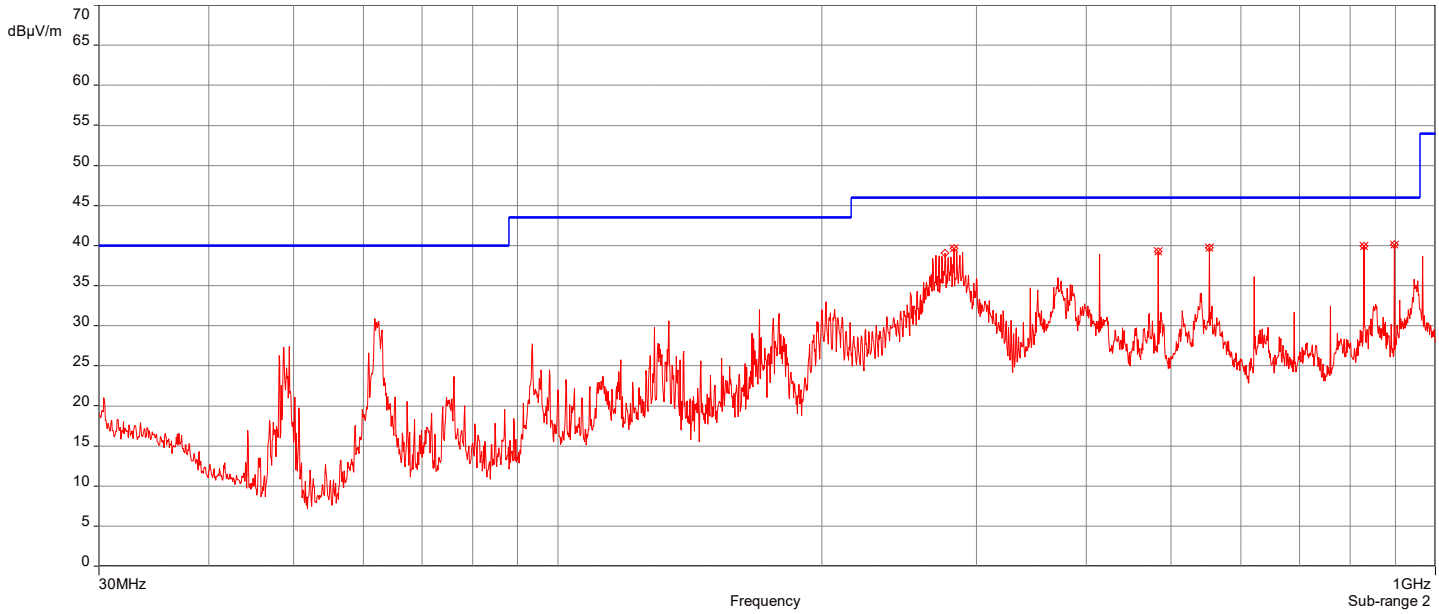
AH22100701-HAR-053#5_5G UNII-3 802.11n_Ch 157_30MHz-1GHz

11/30/2022 11:58:19 AM

No	Frequency (MHz)	Level Q-Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
7.	552.40426MHz	39.30	-6.60	46.00	-6.70	1.00	222.10	Vertical	Passed
8.	282.7284MHz	39.67	-11.81	46.00	-6.33	1.00	308.00	Horizontal	Passed
9.	483.35902MHz	39.27	-6.80	46.00	-6.73	1.00	206.90	Horizontal	Passed
10.	552.40426MHz	39.73	-5.66	46.00	-6.27	1.00	295.50	Horizontal	Passed
11.	828.64227MHz	39.90	-0.85	46.00	-6.10	1.00	136.20	Horizontal	Passed
12.	897.68751MHz	40.15	-0.39	46.00	-5.85	1.50	131.60	Horizontal	Passed

Overall Graphs:





Remarks:

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

AH22100701-HAR-053#5_5G UNII-1 802.11a Ch 36_1-18GHz

11/18/2022 10:34:39 AM

No	Frequency (MHz)	Level Peak Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgement
1.	10.359775GHz	55.32	9.35	68.23	-12.91	3.50	86.40	Vertical	Passed
2.	17.9915GHz	55.54	21.28	74.00	-18.46	2.00	0.10	Vertical	Passed
3.	2.2285361GHz	46.05	-2.80	74.00	- 27.95	3.00	359.90	Horizontal	Passed
4.	7.1281802GHz	45.23	7.53	68.23	-23	1.50	101.70	Horizontal	Passed
5.	14.835907GHz	50.70	15.68	68.23	-17.53	3.50	171.70	Horizontal	Passed
6.	17.9955GHz	55.96	21.34	74.00	-18.04	4.00	3.40	Horizontal	Passed

No	Frequency (MHz)	Level Average Reading (dBµV/m)	Correction Factor (dB)	Limit dBµV/m	Margin (dB)	Height (m)	Angle (°)	Polarization	Judgment
1.	12.326833GHz	34.01	11.98	54.00	-19.99	1.50	57.10	Vertical	Passed
2.	17.745993GHz	41.22	19.62	54.00	-12.78	2.00	318.10	Vertical	Passed
3.	17.967999GHz	42.73	20.89	54.00	-11.27	1.00	353.90	Horizontal	Passed

Overall Graphs: