

RF Test Report

Test Report Number HID-24050731-LC-FCC-IC-RF-WLAN5G

FCC ID JQ6-BLUFIAC01
IC 2236B-BLUFIAC01

Applicant HID Global Corporation

Applicant Address 611 Center Ridge Drive, Austin, TX, 78753, USA

Product Name BLE and WiFi Gateway

Model (s) BluFi-AC01

Date of Receipt 06/21/2024

Date of Test 06/21/2024- 07/10/2024

Report Issue Date 07/17/2024

Test Standards 47CFR Part 15.407
RSS 247 Issue 3, Aug 2023
RSS-Gen Issue 5, Feb 2021

Test Result **PASS**



Issued by:

Vista Compliance Laboratories

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REVISION HISTORY

Report Number	Version	Description	Issued Date
HID-24050731-LC-FCC-IC-RF-WLAN5G	Original	Initial report	07/17/2024

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1 Test Summary

Test Item	Test Requirement	Test Method	Result
Antenna Requirement	47CFR Part 15.203	N/A	Pass
26 dB Bandwidth	47CFR Part 15.407 (a) RSS-247 Issue 3, Aug 2023	ANSI C63.10 (2020)	Pass
Occupied Bandwidth	47CFR Part 15.407 (a) RSS-Gen Issue 5, Feb 2021	ANSI C63.10 (2020) RSS-Gen Issue 5, Feb 2021	Pass
Maximum Conducted Output Power	47CFR Part 15.407 (a) RSS-247 Issue 3, Aug 2023	ANSI C63.10 (2020)	Pass
Power Spectral Density	47CFR Part 15.407 (a) RSS-247 Issue 3, Aug 2023	ANSI C63.10 (2020)	Pass
Radiated Spurious Emission	47CFR Part 15.407 (b) RSS-247 Issue 3, Aug 2023	ANSI C63.10 (2020)	Pass
Radiated Band-Edge into Restricted Frequency Bands	47CFR Part 15.205, 15.209 47CFR Part 15.407 (b) RSS-247 Issue 3, Aug 2023	ANSI C63.10 (2020)	Pass
AC Power Line Conducted Emissions	47CFR Part 15.207 RSS-Gen Issue 5, Feb 2021	ANSI C63.10 (2020) RSS-Gen Issue 5, Feb 2021	Pass

2 General Information

2.1 Applicant

Applicant	HID Global Corporation
Applicant address	611 Center Ridge Drive, Austin, TX, 78753, USA
Manufacturer	HID Global Corporation
Manufacturer Address	611 Center Ridge Drive, Austin, TX, 78753, USA

2.2 Product information

Product Name	BLE and WiFi Gateway
Product Description	BluFi-ACUS BLE and WiFi Gateway
Model Number	BluFi-AC01
Family Models	N/A
Serial Number	HID-21050342-LC-E001 (WIFI RF conducted test sample) HID-21050342-LC-E002 (WIFI RF Radiated test sample) HID-21050342-LC-E003 (WIFI DFS test sample)
Frequency Band	BLE: 2402-2480MHz 2.4G: 2412-2462MHz 5G: U-NII-1: 5150-5250MHz U-NII-2A: 5250-5350MHz U-NII-2C: 5470-5725MHz U-NII-3: 5725-5850MHz
Type of modulation	BT_LE: GFSK 2.4G 11b/g/n: CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 5G 11a/n/ac: 256QAM, 64QAM, 16QAM, QPSK, BPSK
Equipment Class	NII
Antenna Information	PCB trace antenna, Antenna Gain: 2.4GHz, 3 dBi 5GHz, 2.5dBi
Clock Frequencies	N/A
Input Power	120VAC, 60Hz
Power Adapter Manufacturer/Model	N/A
Power Adapter SN	N/A
Hardware version	N/A
Software version	N/A
Additional Info	Test sample is modified with external SMA connector for direct RF conducted measurement

2.3 Test standard and method

Test standard	47CFR Part 15.407 RSS-247 Issue 3, Aug 2023 RSS-Gen Issue 5, Mar 2019
Test method	ANSI C63.10 (2020) 789033 D02 General UNII Test Procedures New Rules v02r01

3 Test Site Information

Lab performing tests	Vista Laboratories, Inc.
Lab Address	1261 Puerta Del Sol, San Clemente, CA 92673 USA
Phone Number	+1 (949) 393-1123
Website	www.vista-compliance.com

Test Condition	Temperature	Humidity	Atmospheric Pressure
RF Testing	25.6°C	65.3%	996.3 mbar
Radiated Emission Testing	25.6°C	65.3%	996.3 mbar

4 Modification of EUT / Deviations from Standards

EUT test sample has external SMA connector for direct RF conducted measurement. It also has a USB to UART cable for programming purpose, to set EUT into test mode. No deviation from standards.

5 Test Configuration and Operation

5.1 EUT Test Configuration

The EUT is an engineering test sample loaded with RF testing firmware specifically designed to support the RF TX/RX measurement in different aspects.

The following software was used for testing and to monitor EUT performance

Software	Description
EMISoft Vasona	EMC/RF Spurious emission test software used during testing
Dmtest.exe	dmtest rev1
Linux console	To set WLAN into continuous TX and RX mode under different modulation, data rate and channel, etc.
iPerf.exe	To establish data traffice between access point and EUT in 5GHz WLAN DFS test

5.2 Supporting Equipment

Description	Manufacturer	Model #	Serial #	Remark
Laptop	Dell	XPS13-9333	G1H5102	N/A
USB to UART adapter	DSD TECH	SH-U09C5	N/A	Provided by client

5.3 Duty cycle Measurement

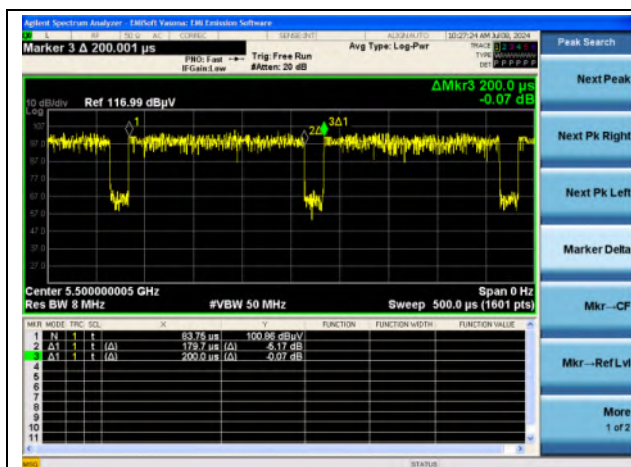
If Duty cycle of test signal is < 98 %, duty factor is required.

Mode	Duty Cycle (%)	DCF (dB)
802.11a	89.85%	0.465
802.11n (HT20)	98.02%	0
802.11ac (VHT20)	93.07%	0.312

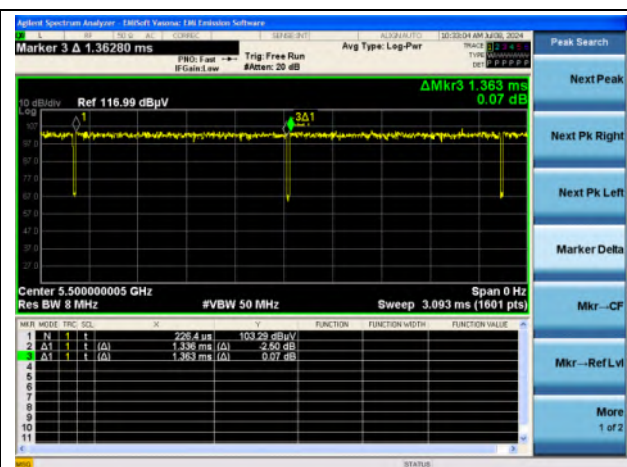
Note: Duty cycle = $T_{on}/T_{period} \times 100\%$

DCF = $10 \times \log(1/D)$

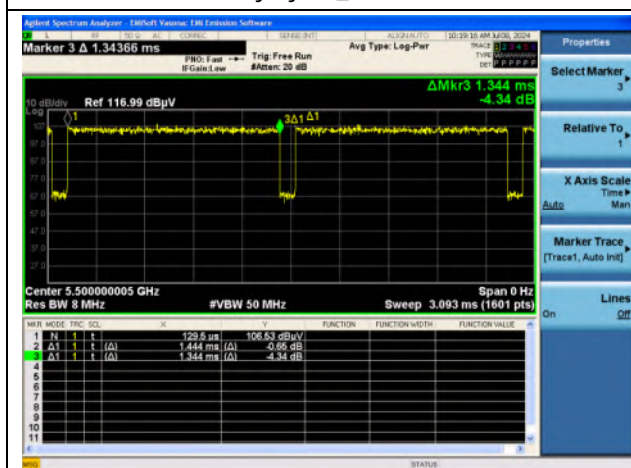
Where, $D = T_{on}/T_{period}$



Duty cycle_802.11a



Duty cycle_802.11n



Duty cycle_802.11ac

6 Uncertainty of Measurement

Test item	Measurement Uncertainty (dB)
RF Output Power (Conducted)	±1.2 dB
Power Spectral Density	±0.9 dB
Unwanted Emission (conducted)	±2.6 dB
Occupied Channel Bandwidth	±5 %
Radiated Emission (9KHz-30MHz)	±3.5 dB
Radiated Emission (30MHz-1GHz)	±4.6 dB
Radiated Emission (1-18GHz)	±4.9 dB
Radiated Emission (18-40GHz)	±3.5 dB

7 Test Results

7.1 Antenna Requirements

7.1.1 Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna requirement must meet at least one of the following:

- a) Antenna must be permanently attached to the device.
- b) The antenna must use a unique type of connector to attach to the device.
- c) Device must be professionally installed. The installer shall be responsible for ensuring that the correct antenna is employed by the device.

7.1.2 Conclusion

Analysis:

- EUT has a PCB trace antenna which is soldered onto the main board. The antenna gain is 3.0 dBi for 2.4GHz band, 2.5dBi for 5GHz band. This meets the requirement of permanent attachment.
-

Conclusion:

- EUT complies with antenna requirement in § 15.203.

7.2 26 dB Bandwidth & 6 dB Bandwidth

7.2.1 Requirement

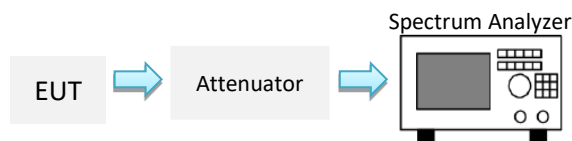
§ 15.407 (a) (2); RSS-247 §6.2.1.2

26 dB Bandwidth: This section is for reporting purpose only. There are no restriction limits for bandwidth.

§ 15.407 (e); RSS-247 §6.2.4.1

6 dB Bandwidth: Within the 5.725-5.850 GHz and 5.850-5.895 GHz bands, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

7.2.2 Test Setup



7.2.3 Test Procedure

26 dB Bandwidth:

According to subclause 12.4.1 of ANSI C63.10-2020:

subclause C.1 of 789033 D02 General UNII Test Procedures New Rules v02r01

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 26 dB, if the functionality described above (i.e., RBW, VBW $\geq 3 \times$ RBW, peak detector with maximum hold) is implemented by the instrumentation function.

- 1) Set RBW = approximately 1% of the emission bandwidth.
- 2) Set the VBW > RBW.
- 3) Detector = peak.
- 4) Trace mode = max hold.
- 5) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the instrument. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

According to subclause C.2 of 789033 D02 General UNII Test Procedures New Rules v02r01

6 dB Bandwidth:

- 1) Set RBW = 100 kHz.
- 2) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- 3) Detector = Peak.
- 4) Trace mode = max hold.
- 5) Sweep = auto couple.
- 6) Allow the trace to stabilize.
- 7) Use automatic bandwidth measurement capability on instrument to obtain BW result.

7.2.4 Test Result

U-NII-1 Band

Mode	Channel	Frequency (MHz)	Data rate	Measured 26dB Bandwidth (MHz)	Minimum Bandwidth (MHz)	Result
802.11a	36	5180	6Mbps	21.68	N/A	N/A
	44	5220	6Mbps	21.92	N/A	N/A
	48	5240	6Mbps	22.28	N/A	N/A
802.11n	36	5180	MCS0	23.35	N/A	N/A
	44	5220	MCS0	22.40	N/A	N/A
	48	5240	MCS0	22.28	N/A	N/A
802.11ac	36	5180	MCS0	24.31	N/A	N/A
	44	5220	MCS0	22.16	N/A	N/A
	48	5240	MCS0	22.63	N/A	N/A

U-NII-2A Band

Mode	Channel	Frequency (MHz)	Data rate	Measured 26dB Bandwidth (MHz)	Minimum Bandwidth (MHz)	Result
802.11a	52	5260	6Mbps	21.80	N/A	N/A
	60	5300	6Mbps	21.80	N/A	N/A
	64	5320	6Mbps	21.80	N/A	N/A
802.11n	52	5260	MCS0	22.04	N/A	N/A
	60	5300	MCS0	22.16	N/A	N/A
	64	5320	MCS0	21.80	N/A	N/A
802.11ac	52	5260	MCS0	21.92	N/A	N/A
	60	5300	MCS0	22.04	N/A	N/A
	64	5320	MCS0	22.16	N/A	N/A

U-NII-2C Band

Mode	Channel	Frequency (MHz)	Data rate	Measured 26dB Bandwidth (MHz)	Minimum Bandwidth (MHz)	Result
802.11a	100	5500	6Mbps	21.68	N/A	N/A
	116	5580	6Mbps	21.44	N/A	N/A
	140	5700	6Mbps	21.56	N/A	N/A
802.11n	100	5500	MCS0	21.92	N/A	N/A
	116	5580	MCS0	21.92	N/A	N/A
	140	5700	MCS0	21.80	N/A	N/A
802.11ac	100	5500	MCS0	21.92	N/A	N/A
	116	5580	MCS0	21.80	N/A	N/A
	140	5700	MCS0	21.80	N/A	N/A

U-NII-3 Band

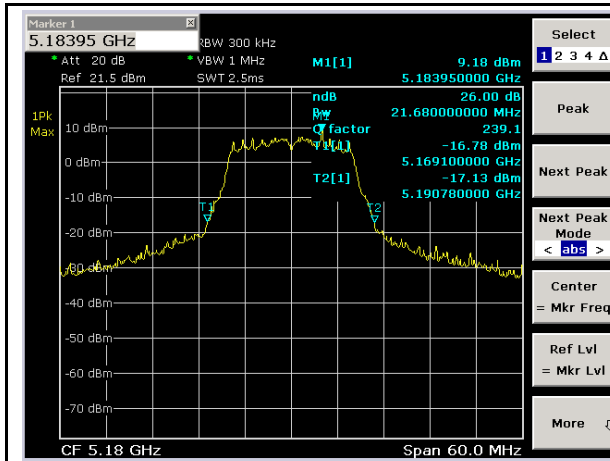
Mode	Channel	Frequency (MHz)	Data rate	Measured 6dB Bandwidth (MHz)	Minimum Bandwidth (MHz)	Result
802.11a	149	5745	6Mbps	15.41	0.5	PASS
	157	5785	6Mbps	15.38	0.5	PASS
	165	5825	6Mbps	15.44	0.5	PASS
802.11n	149	5745	MCS0	15.41	0.5	PASS
	157	5785	MCS0	15.5	0.5	PASS
	165	5825	MCS0	15.44	0.5	PASS
802.11ac	149	5745	MCS0	15.29	0.5	PASS
	157	5785	MCS0	15.50	0.5	PASS
	165	5825	MCS0	15.32	0.5	PASS

Cross Band

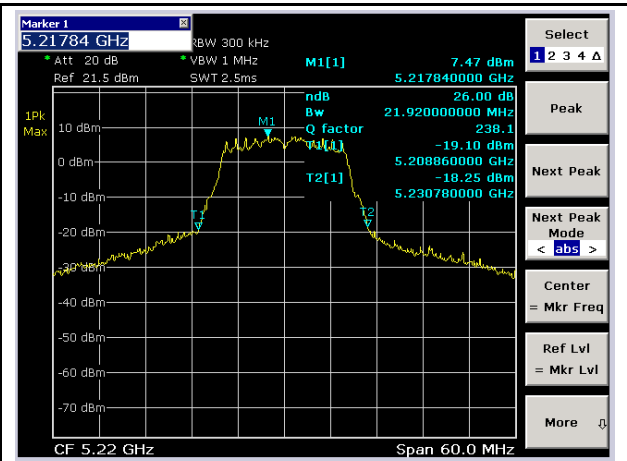
Mode	Channel	Frequency (MHz)	Data rate	Measured 26dB Bandwidth (MHz)	Measured 6dB Bandwidth (MHz)	Minimum Bandwidth (MHz)	Result
802.11a	144	5720	6Mbps	21.56	15.29	0.5	PASS
802.11n	144	5720	MCS0	21.80	15.29	0.5	PASS
802.11ac	144	5720	MCS0	21.92	15.29	0.5	PASS

7.2.5 Test Plots

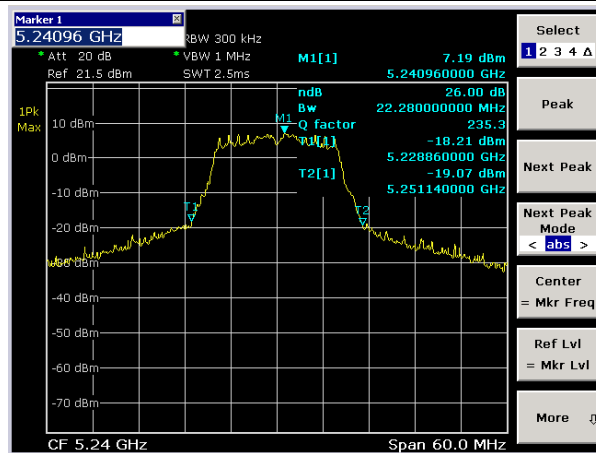
26 dB Bandwidth of U-NII-1 Band



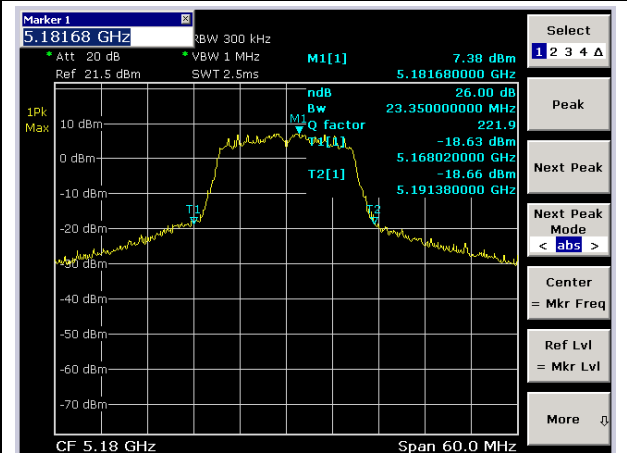
26 dB BW_U-NII-1_802.11a_5180



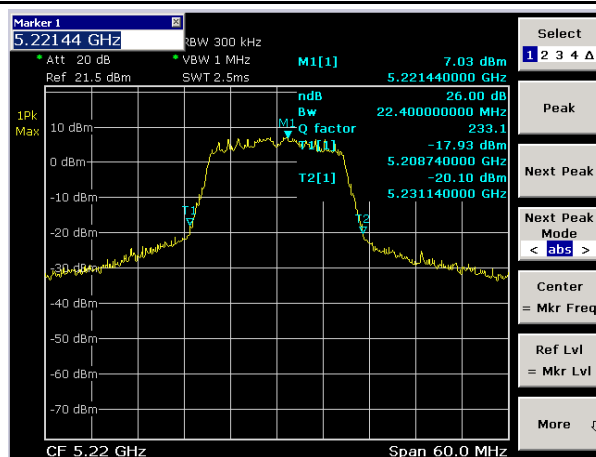
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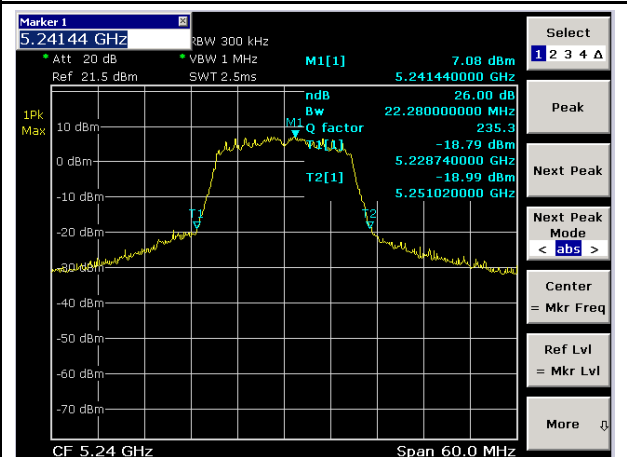
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26 dB BW_U-NII-1_802.11n_5180

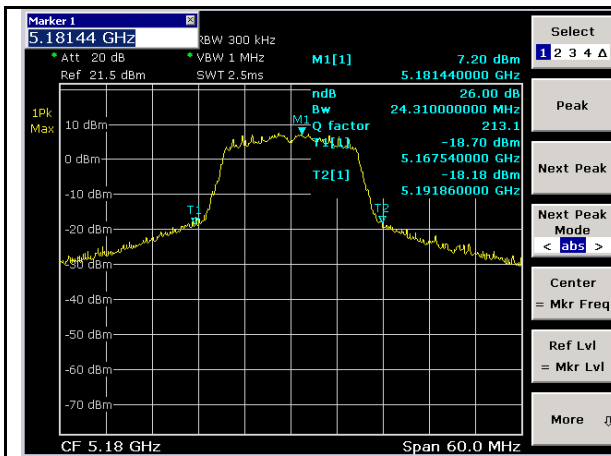


26 dB BW_U-NII-1_802.11n_5220

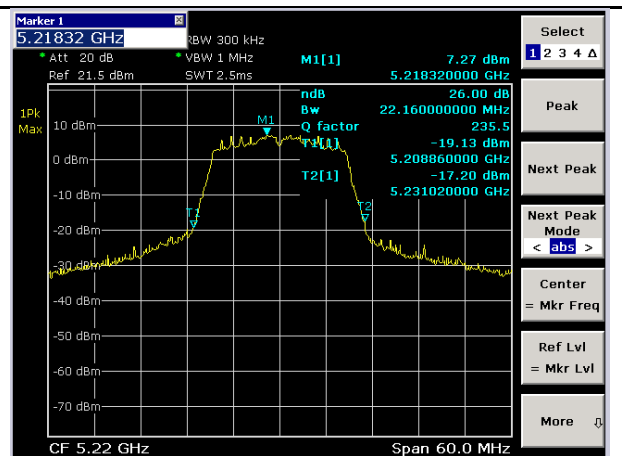


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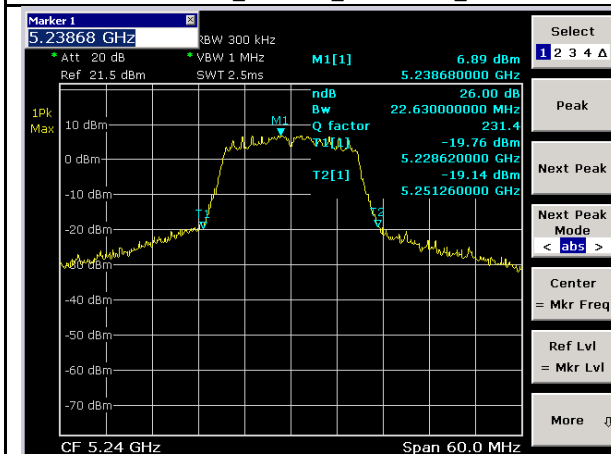
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26 dB BW_U-NII-1_802.11ac_5180

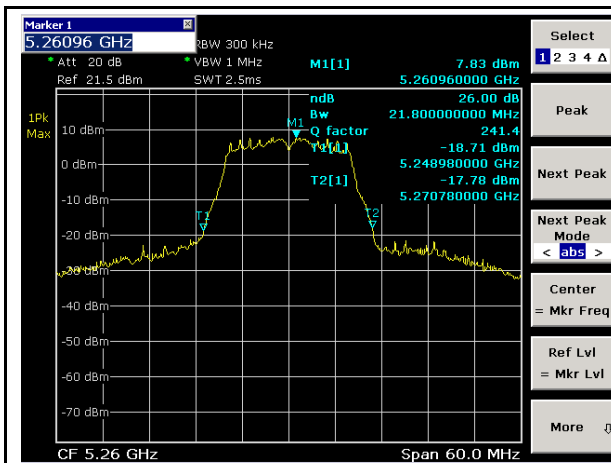


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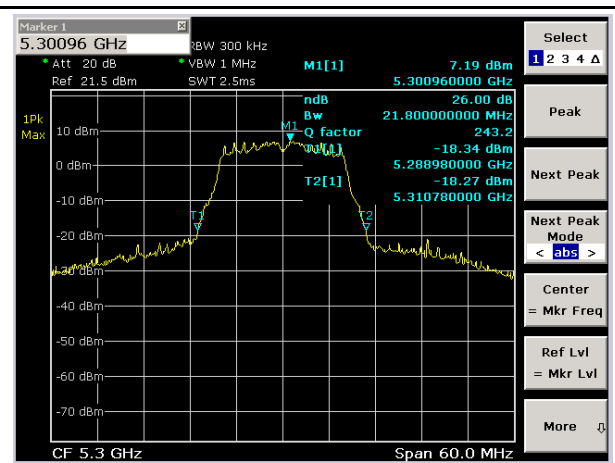


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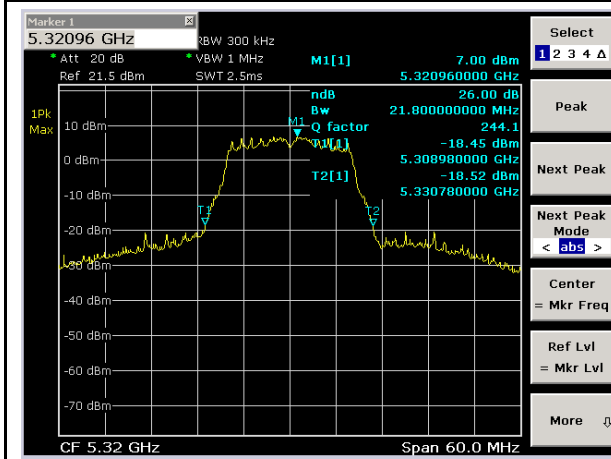
26 dB Bandwidth of U-NII-2A Band



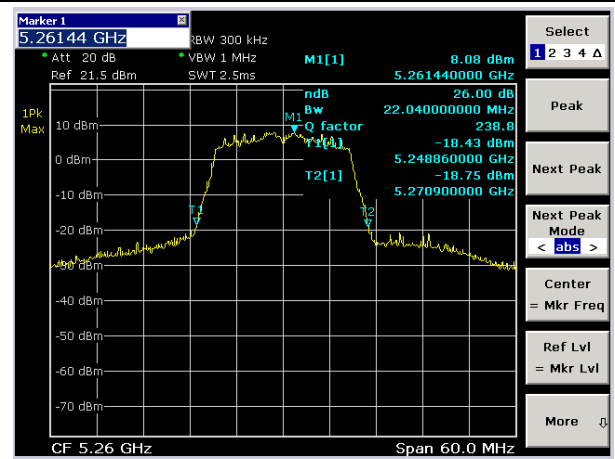
26 dB BW_U-NII-2A_802.11a_5260



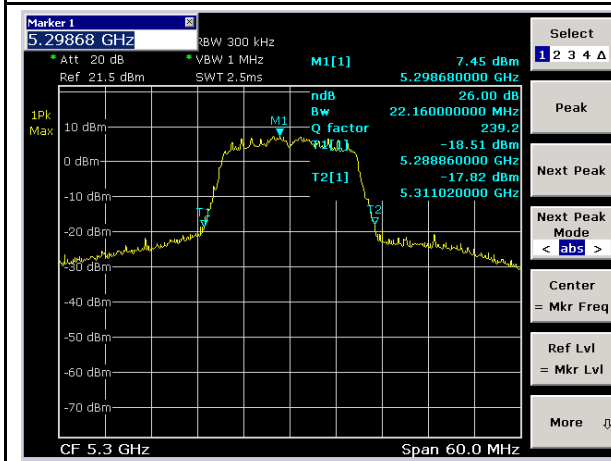
26 dB BW_U-NII-2A_802.11a_5300



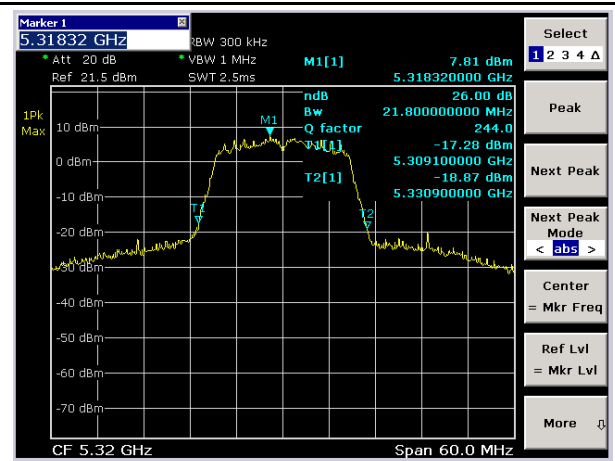
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26 dB BW_U-NII-2A_802.11n_5260

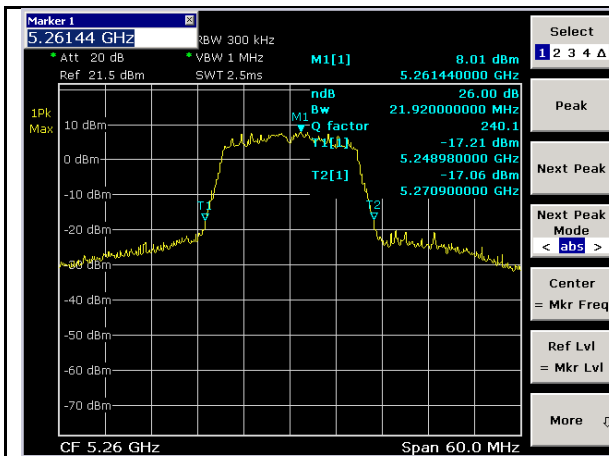


26 dB BW_U-NII-2A_802.11n_5300

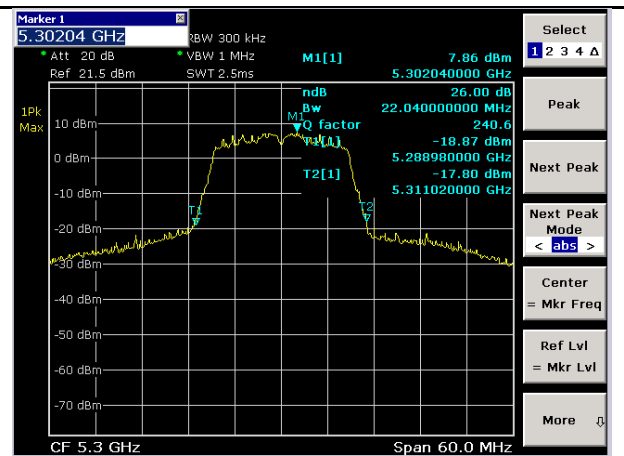


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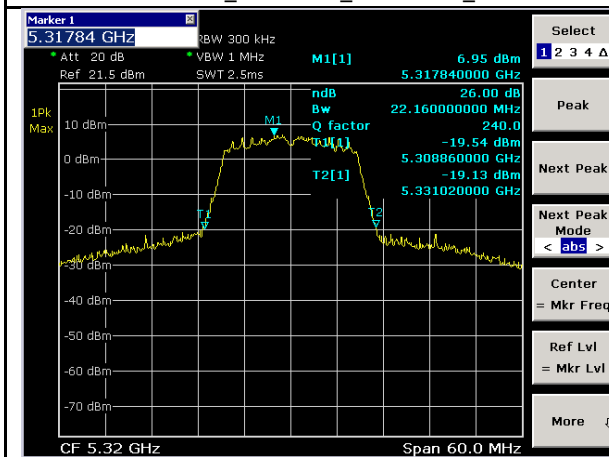
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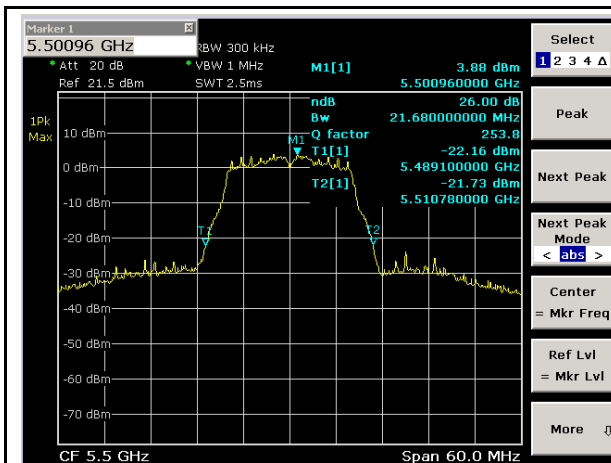


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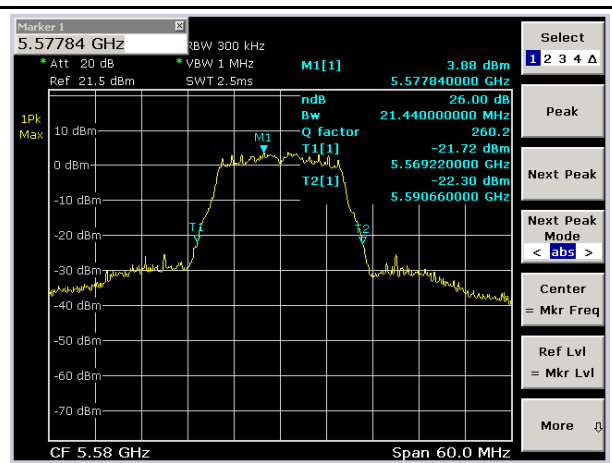


26 dB BW_U-NII-2A_802.11ac_5320

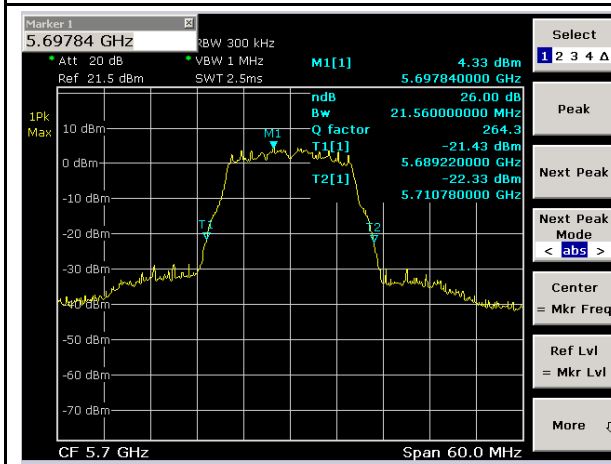
26 dB Bandwidth of U-NII-2C Band



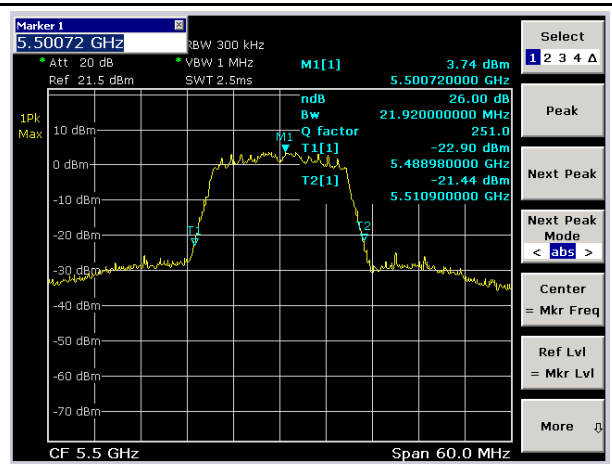
26 dB BW_U-NII-2C_802.11a_5500



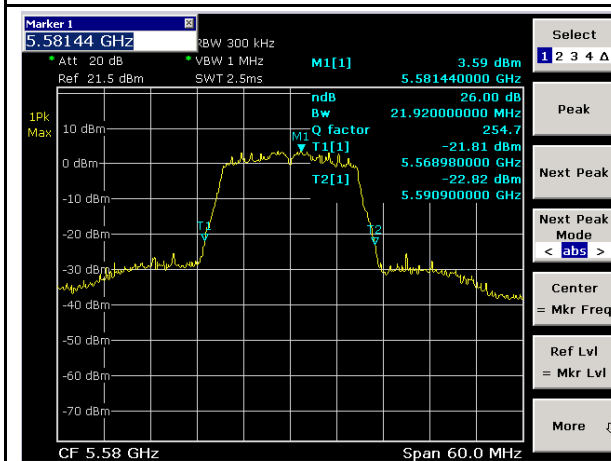
26 dB BW_U-NII-2C_802.11a_5580



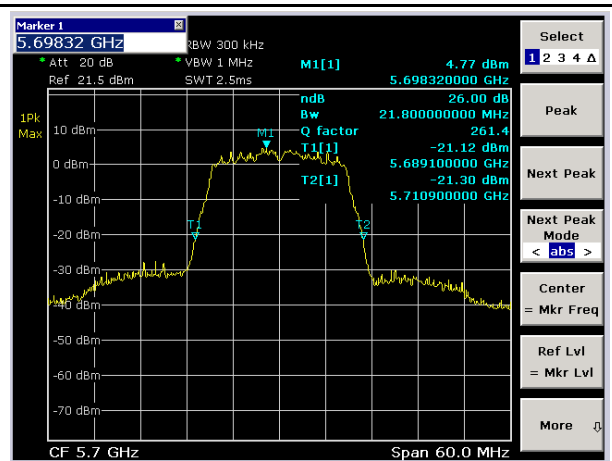
26 dB BW_U-NII-2C_802.11a_5700



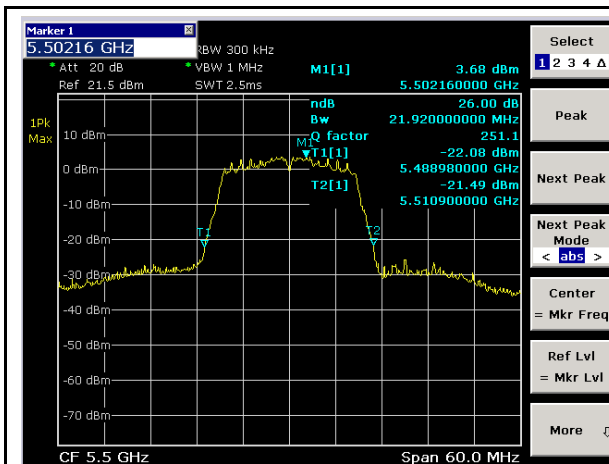
26 dB BW_U-NII-2C_802.11n_5500



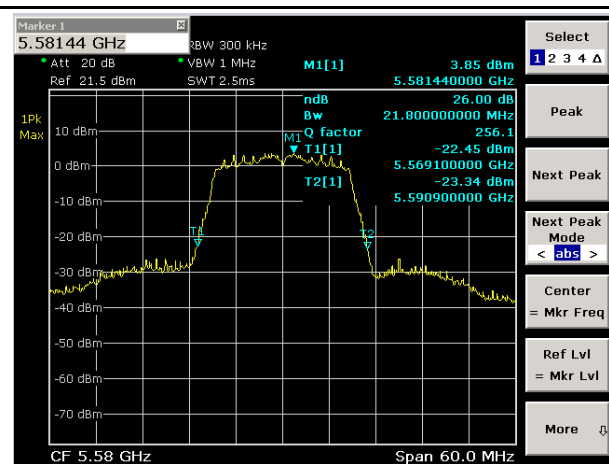
26 dB BW_U-NII-2C_802.11n_5580



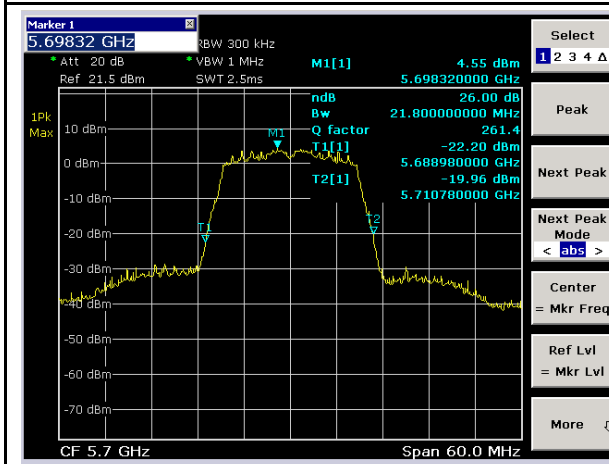
26 dB BW_U-NII-2C_802.11n_5700



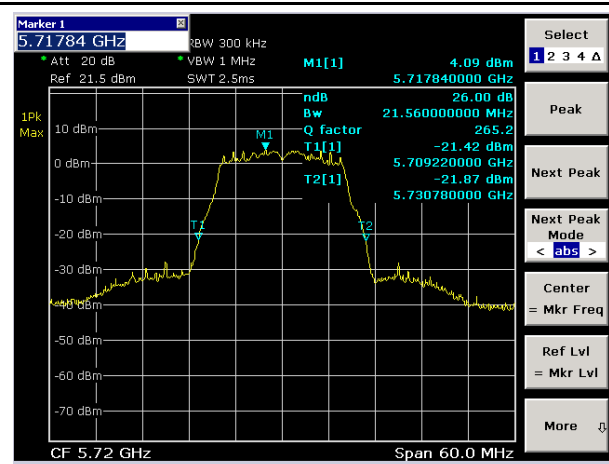
26 dB BW_U-NII-2C_802.11ac_5500



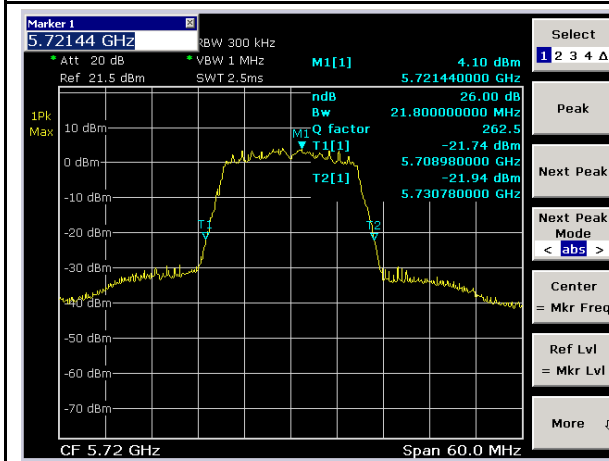
26 dB BW_U-NII-2C_802.11ac_5580



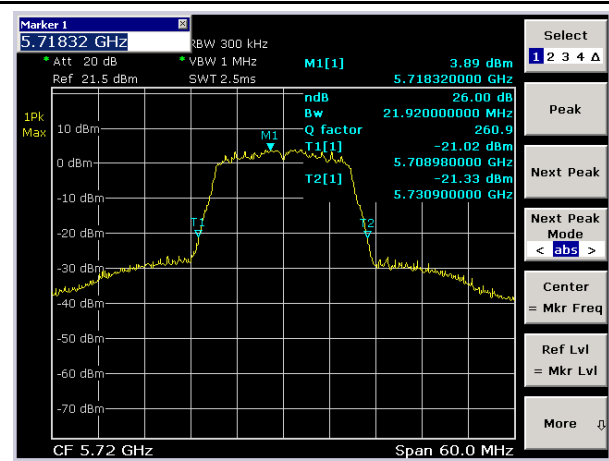
26 dB BW_U-NII-2C_802.11ac_5700



26 dB BW_U-NII-2C_802.11a_5720

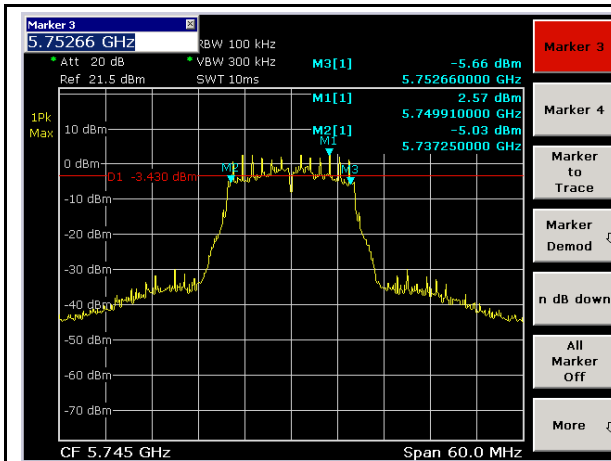


26 dB BW_U-NII-2C_802.11n_5720

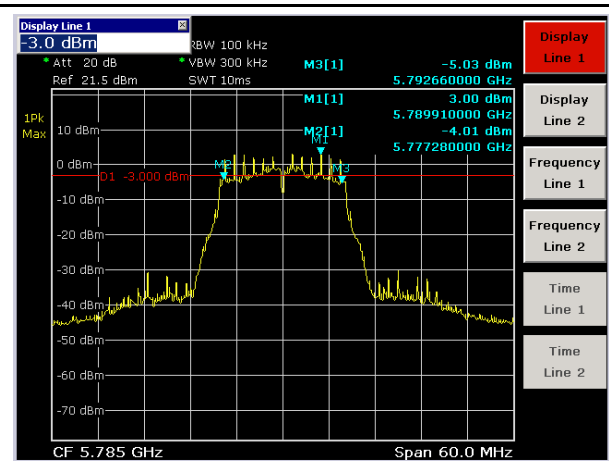


26 dB BW_U-NII-2C_802.11ac_5720

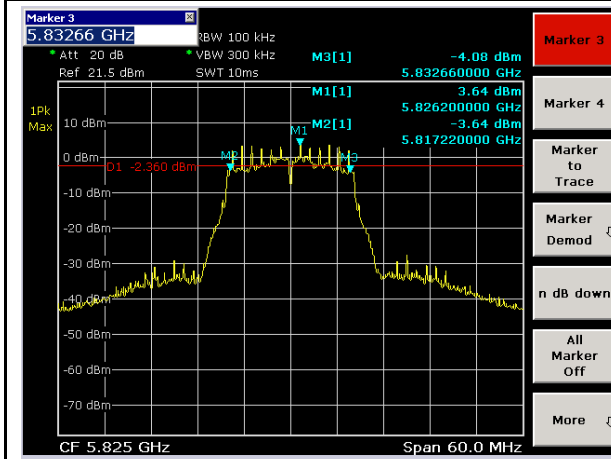
6 dB Bandwidth of U-NII-3 Band



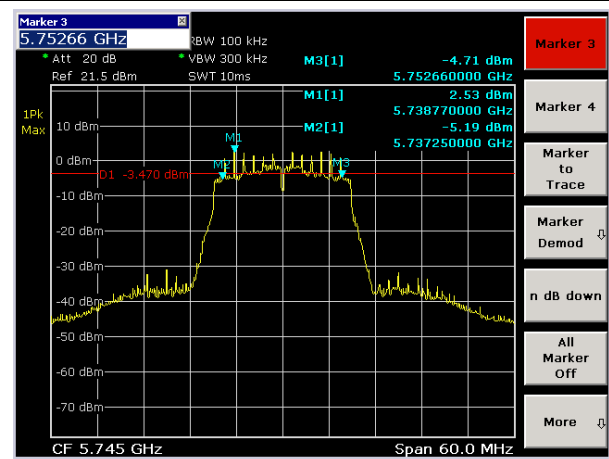
6 dB BW_U-NII-3_802.11a_5745



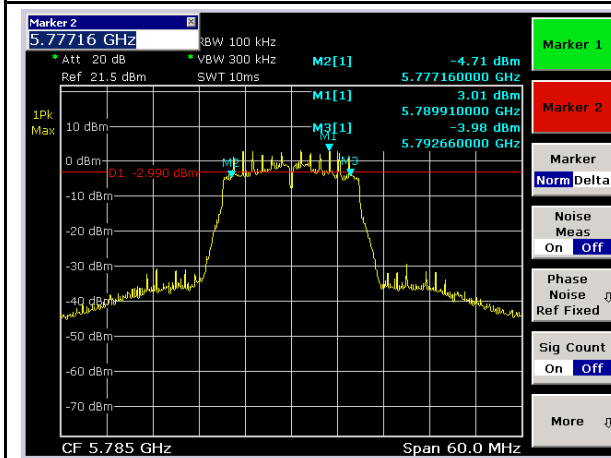
6 dB BW_U-NII-3_802.11a_5785



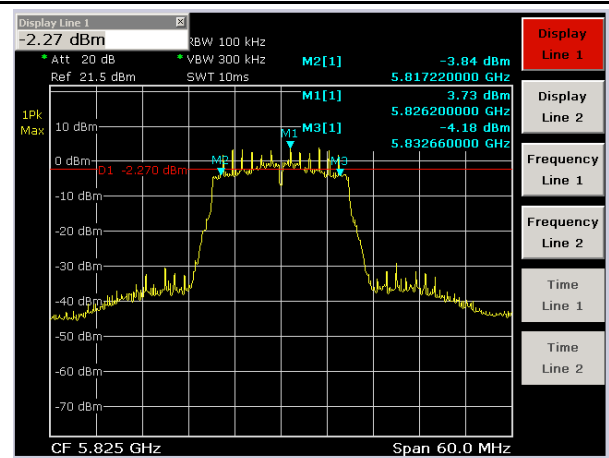
6 dB BW_U-NII-3_802.11a_5825



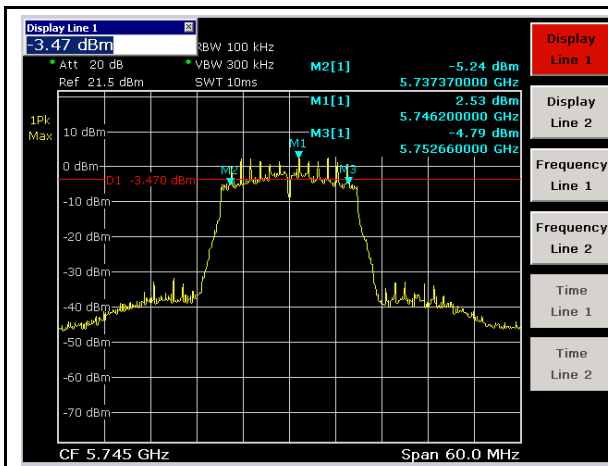
6 dB BW_U-NII-3_802.11n_5745



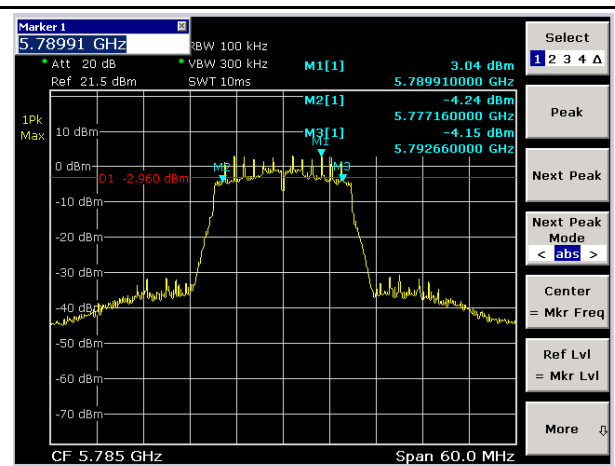
6 dB BW_U-NII-3_802.11n_5785



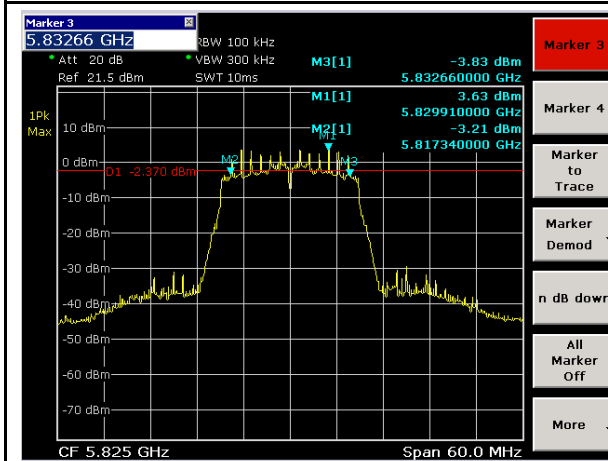
6 dB BW_U-NII-3_802.11n_5825



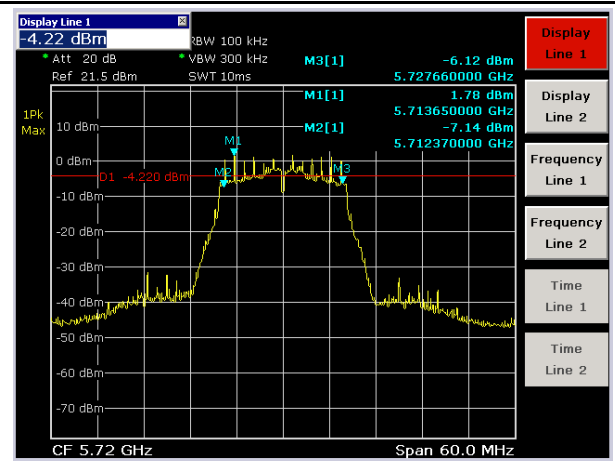
6 dB BW_U-NII-3_802.11ac_5745



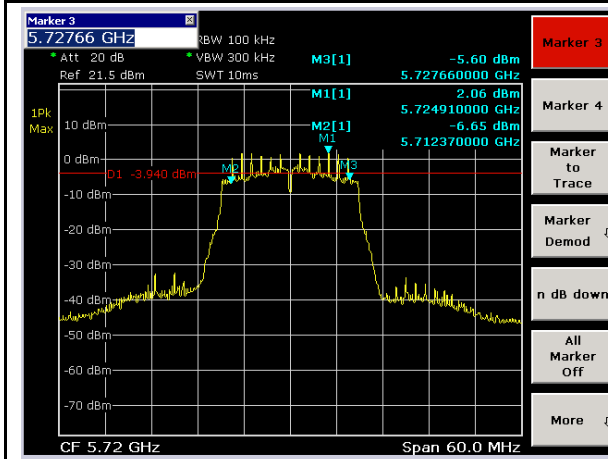
6 dB BW_U-NII-3_802.11ac_5785



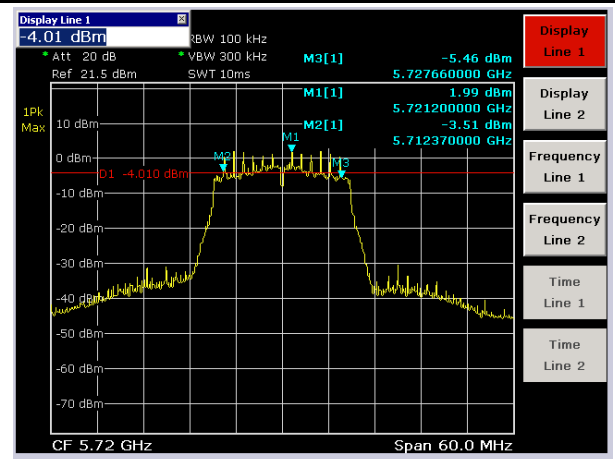
6 dB BW_U-NII-3_802.11ac_5825



6 dB BW_U-NII-3_802.11a_5720



6 dB BW_U-NII-3_802.11n_5720



6 dB BW_U-NII-3_802.11ac_5720

7.3 Occupied Bandwidth (99%)

7.3.1 Requirement

RSS-Gen §6.7

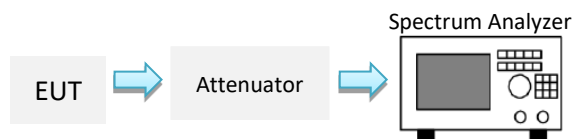
The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

7.3.2 Test Procedure

According to RSS-Gen §6.7 and subclause 6.9.3 of ANSI C63.10-2020:

1. Set RBW = 1% to 5% of the actual occupied BW.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Span = large enough to capture all products of the modulation process
7. Allow the trace to stabilize.
8. Use automatic bandwidth measurement capability on instrument to obtain BW result.

7.3.3 Test Setup



7.3.4 Test Result

U-NII-1 Band

Mode	Channel	Frequency (MHz)	Data rate	Measured Bandwidth (MHz)	Minimum Bandwidth (MHz)	Result
802.11a	36	5180	6Mbps	17.844	N/A	N/A
	44	5220	6Mbps	17.365	N/A	N/A
	48	5240	6Mbps	17.485	N/A	N/A
802.11n	36	5180	MCS0	18.443	N/A	N/A
	44	5220	MCS0	18.323	N/A	N/A
	48	5240	MCS0	18.443	N/A	N/A
802.11ac	36	5180	MCS0	18.323	N/A	N/A
	44	5220	MCS0	18.323	N/A	N/A
	48	5240	MCS0	18.323	N/A	N/A

U-NII-2A Band

Mode	Channel	Frequency (MHz)	Data rate	Measured Bandwidth (MHz)	Minimum Bandwidth (MHz)	Result
802.11a	52	5260	6Mbps	17.605	N/A	N/A
	60	5300	6Mbps	17.605	N/A	N/A
	64	5320	6Mbps	17.605	N/A	N/A
802.11n	52	5260	MCS0	18.683	N/A	N/A
	60	5300	MCS0	18.563	N/A	N/A
	64	5320	MCS0	18.683	N/A	N/A
802.11ac	52	5260	MCS0	18.563	N/A	N/A
	60	5300	MCS0	18.323	N/A	N/A
	64	5320	MCS0	18.563	N/A	N/A

U-NII-2C Band

Mode	Channel	Frequency (MHz)	Data rate	Measured Bandwidth (MHz)	Minimum Bandwidth (MHz)	Result
802.11a	100	5500	6Mbps	17.126	N/A	N/A
	116	5580	6Mbps	17.246	N/A	N/A
	140	5700	6Mbps	17.126	N/A	N/A
802.11n	100	5500	MCS0	18.284	N/A	N/A
	116	5580	MCS0	18.284	N/A	N/A
	140	5700	MCS0	18.323	N/A	N/A
802.11ac	100	5500	MCS0	18.084	N/A	N/A
	116	5580	MCS0	18.084	N/A	N/A
	140	5700	MCS0	18.204	N/A	N/A

U-NII-3 Band

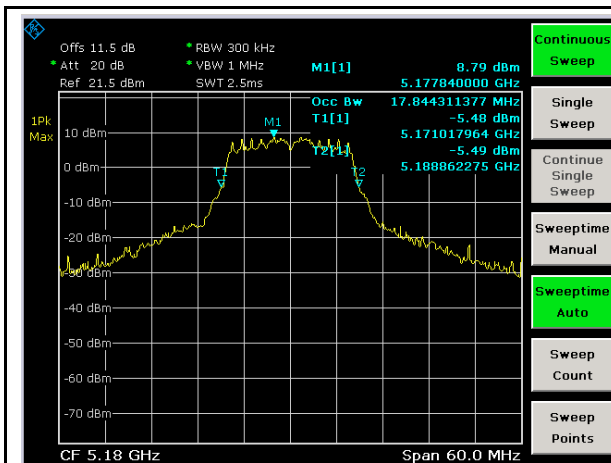
Mode	Channel	Frequency (MHz)	Data rate	Measured Bandwidth (MHz)	Minimum Bandwidth (MHz)	Result
802.11a	149	5745	6Mbps	17.126	N/A	N/A
	157	5785	6Mbps	17.006	N/A	N/A
	165	5825	6Mbps	16.886	N/A	N/A
802.11n	149	5745	MCS0	18.084	N/A	N/A
	157	5785	MCS0	18.084	N/A	N/A
	165	5825	MCS0	18.084	N/A	N/A
802.11ac	149	5745	MCS0	18.084	N/A	N/A
	157	5785	MCS0	18.084	N/A	N/A
	165	5825	MCS0	18.084	N/A	N/A

Cross Band

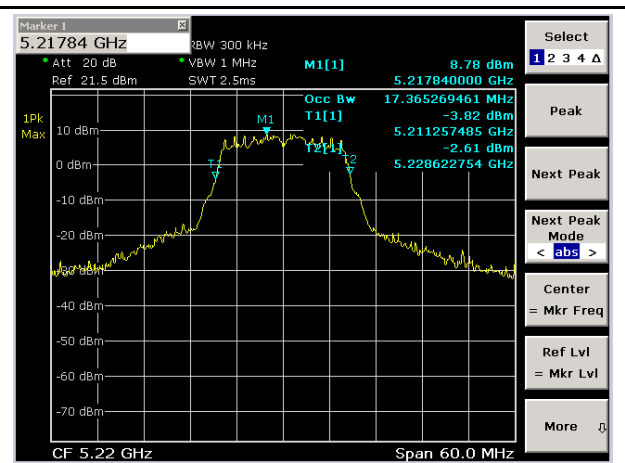
Mode	Channel	Frequency (MHz)	Data rate	Measured Bandwidth (MHz)	Minimum Bandwidth (MHz)	Result
802.11a	144	5720	6Mbps	17.126	N/A	PASS
802.11n	144	5720	MCS0	18.084	N/A	PASS
802.11ac	144	5720	MCS0	18.084	N/A	PASS

7.3.5 Test Plots

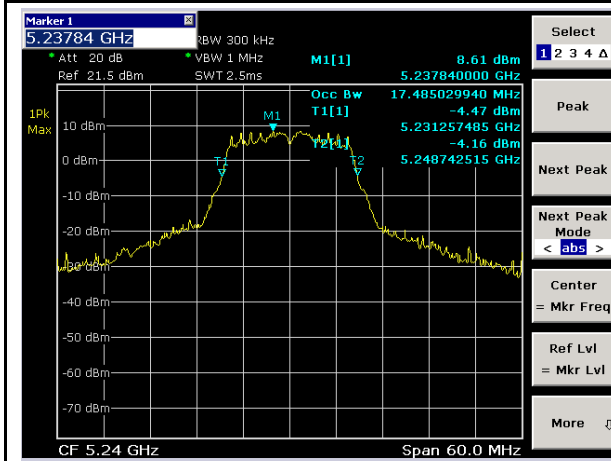
99% Bandwidth of U-NII-1 Band



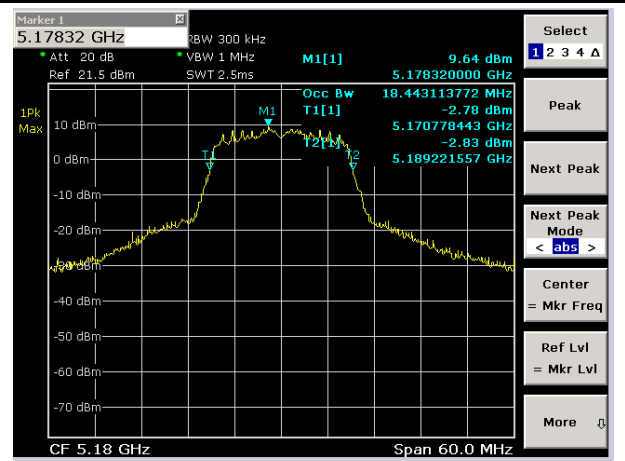
99% BW_U-NII-1_802.11a_5180



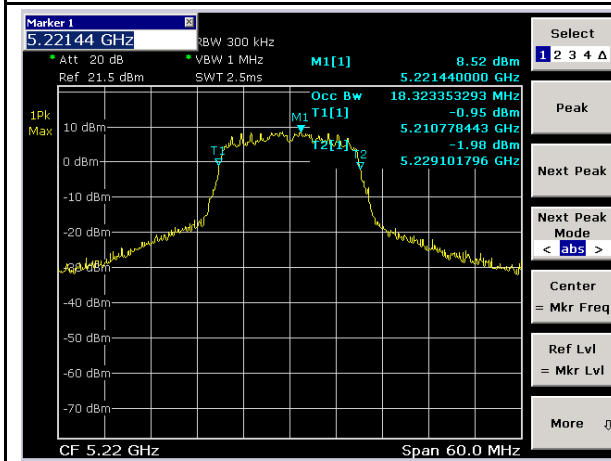
99% BW_U-NII-1_802.11a_5220



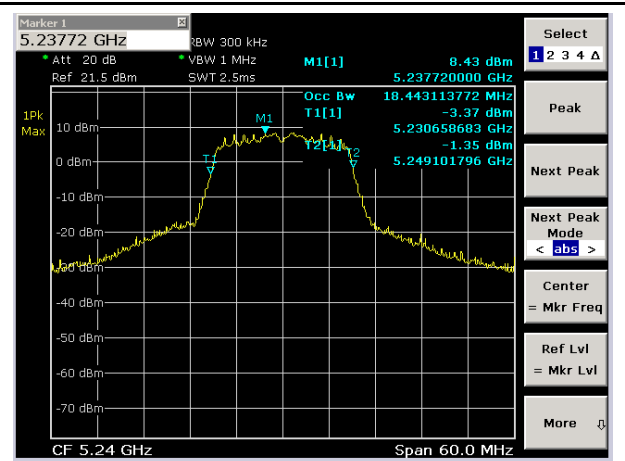
99% BW_U-NII-1_802.11a_5240



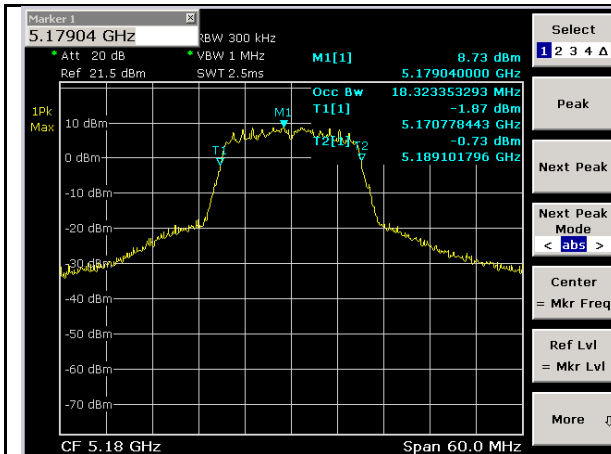
99% BW_U-NII-1_802.11n_5180



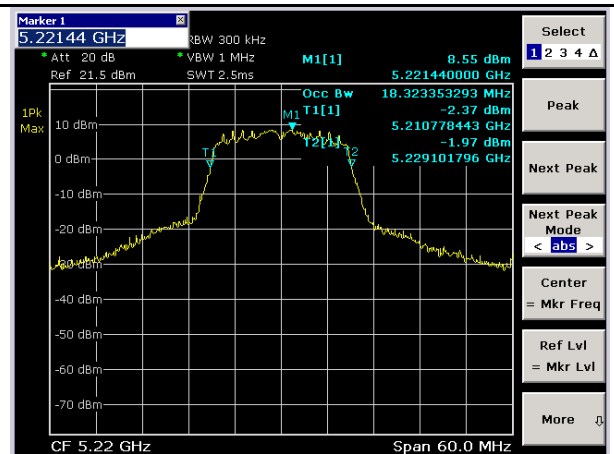
99% BW_U-NII-1_802.11n_5220



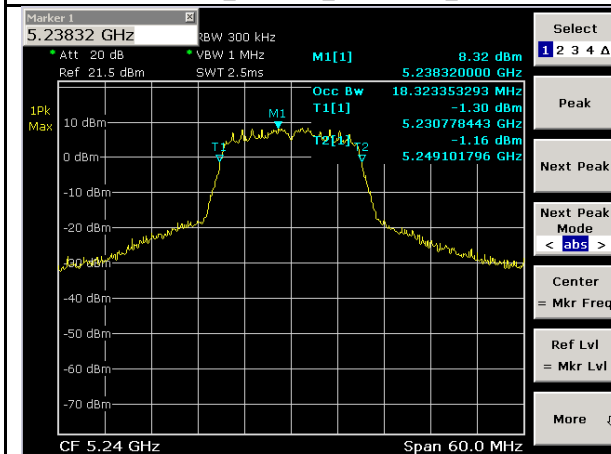
99% BW_U-NII-1_802.11n_5240



99% BW_U-NII-1_802.11ac_5180

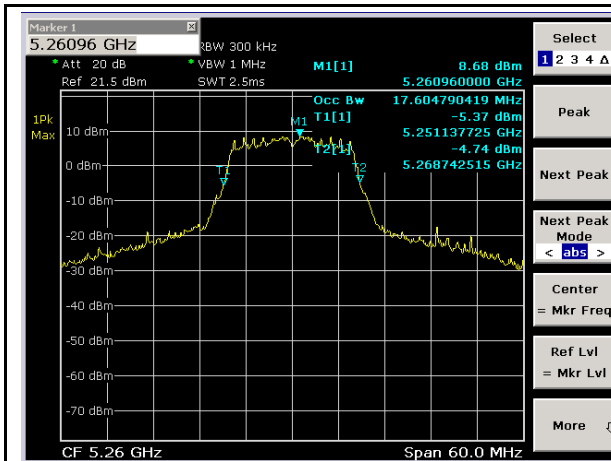


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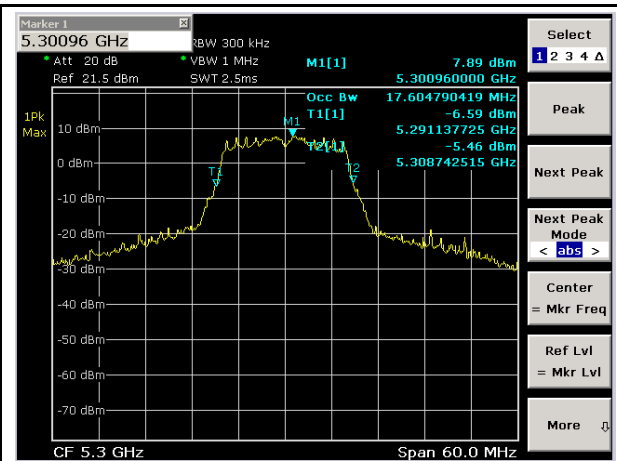


99% BW_U-NII-1_802.11ac_5240

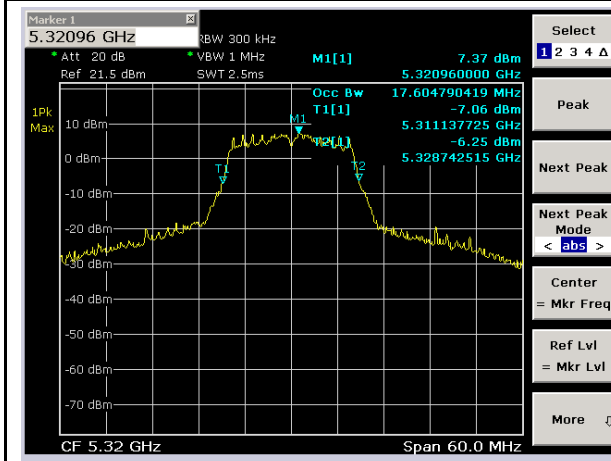
99% Bandwidth of U-NII-2A Band



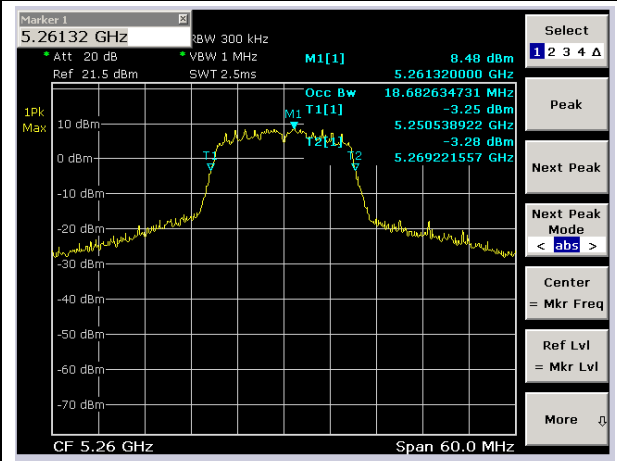
99% BW_U-NII-2A_802.11a_5260



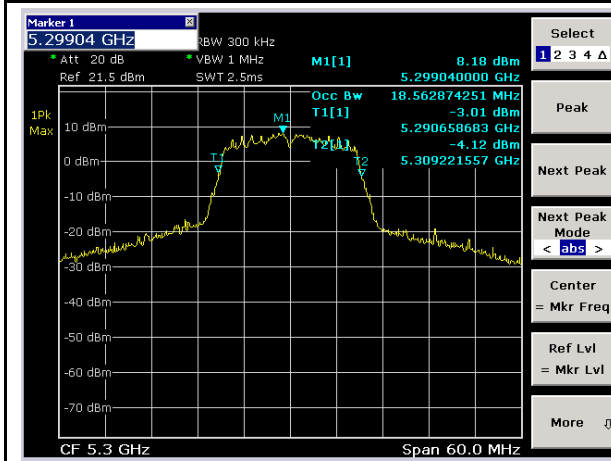
99% BW_U-NII-2A_802.11a_5300



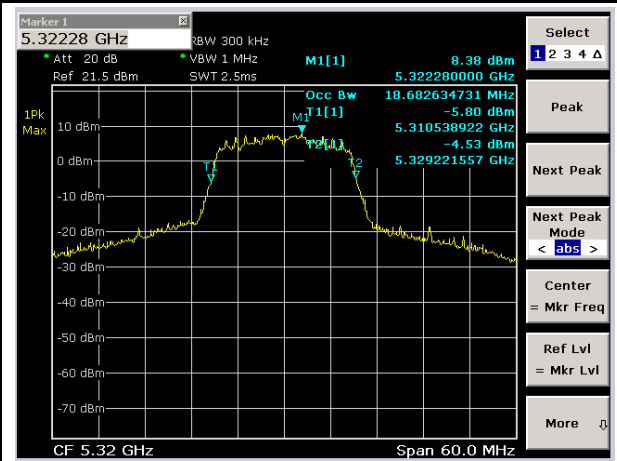
99% BW_U-NII-2A_802.11a_5320



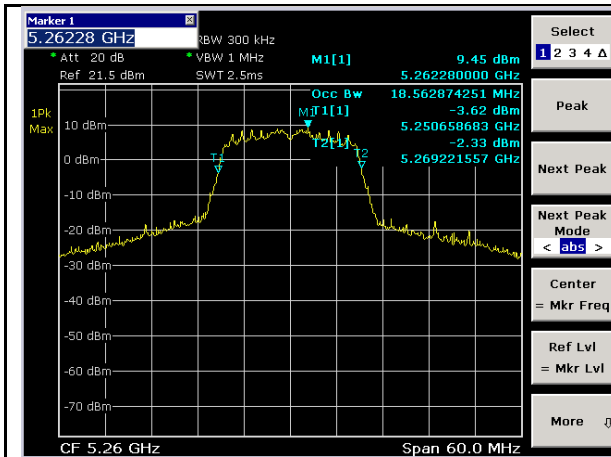
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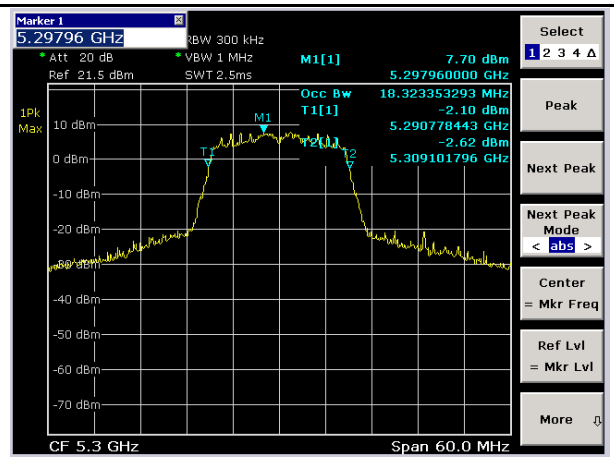
99% BW_U-NII-2A_802.11n_5300



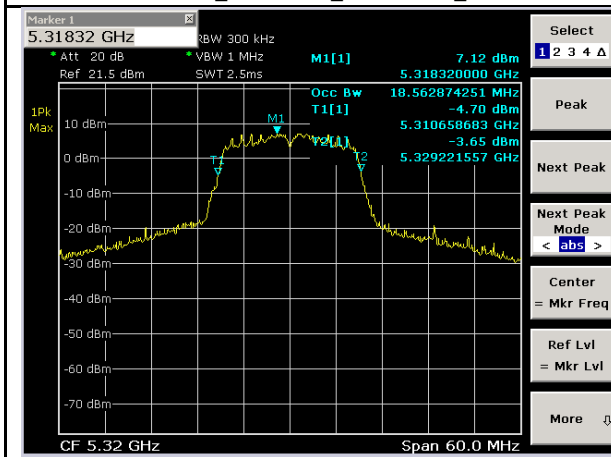
99% BW_U-NII-2A_802.11n_5320



99% BW_U-NII-2A_802.11ac_5260

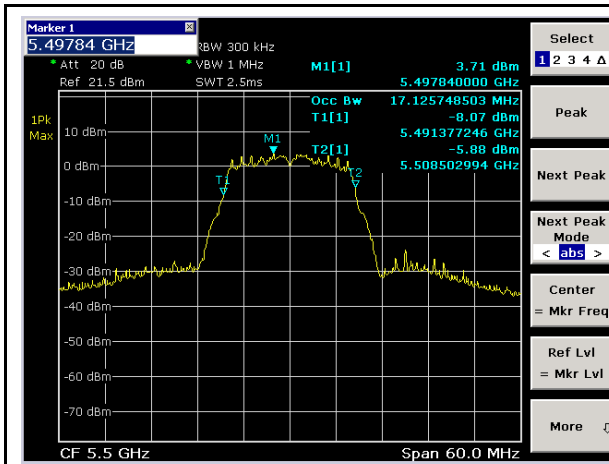


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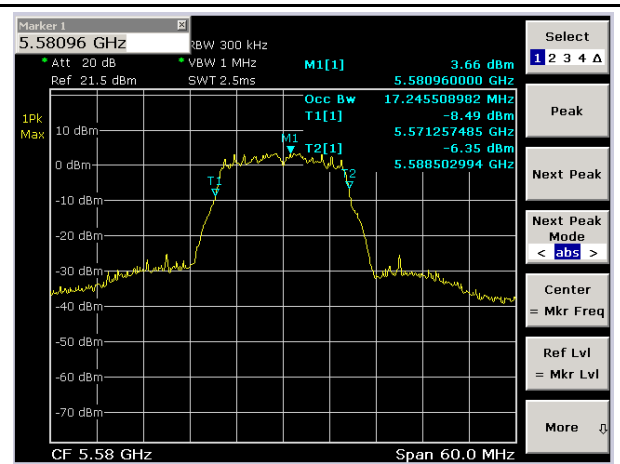


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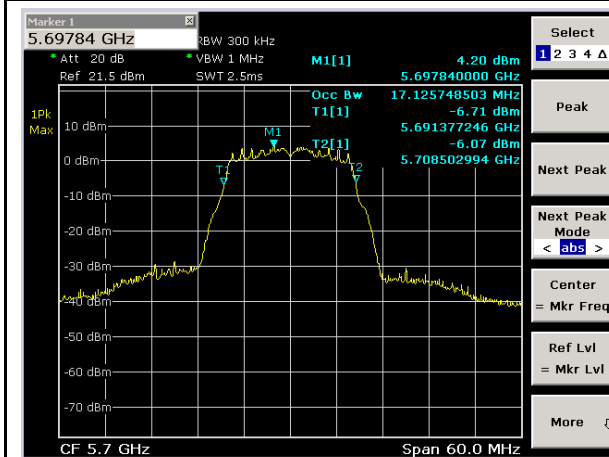
99% Bandwidth of U-NII-2C Band



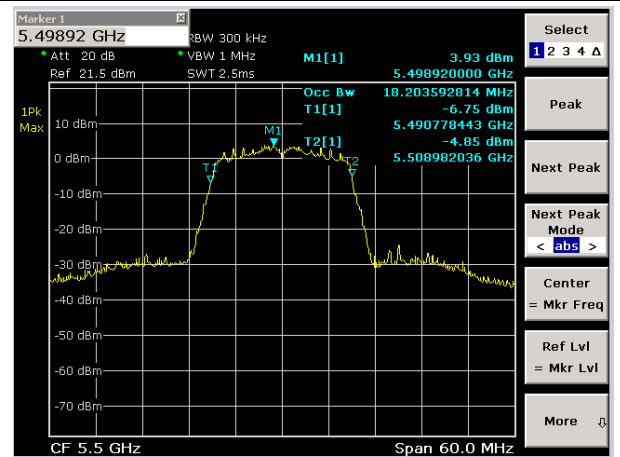
99% BW_U-NII-2C_802.11a_5500



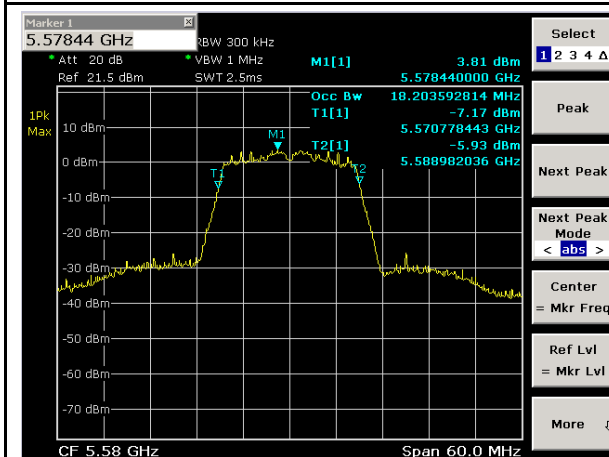
99% BW_U-NII-2C_802.11a_5580



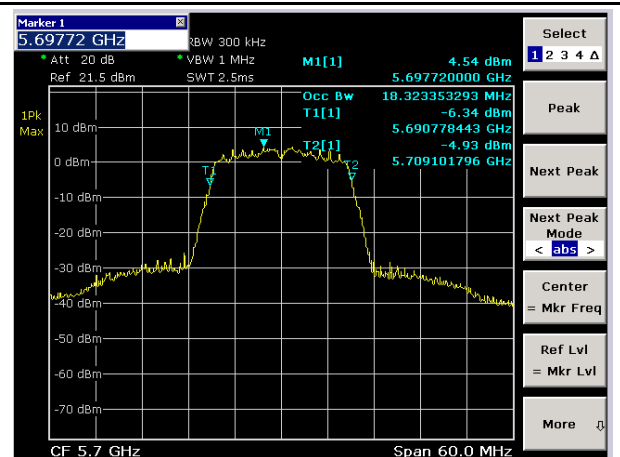
99% BW_U-NII-2C_802.11a_5700



99% BW_U-NII-2C_802.11n_5500

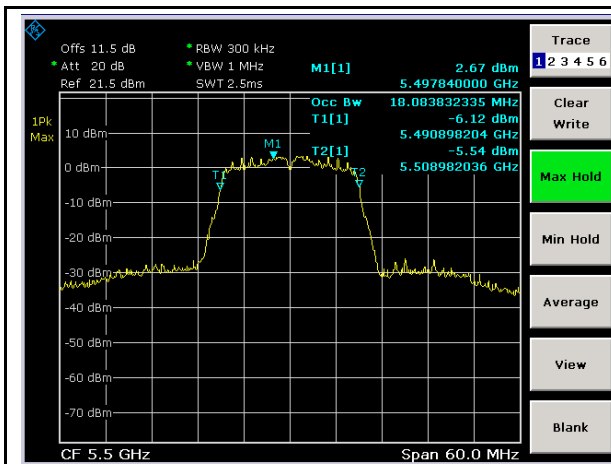


99% BW_U-NII-2C_802.11n_5580

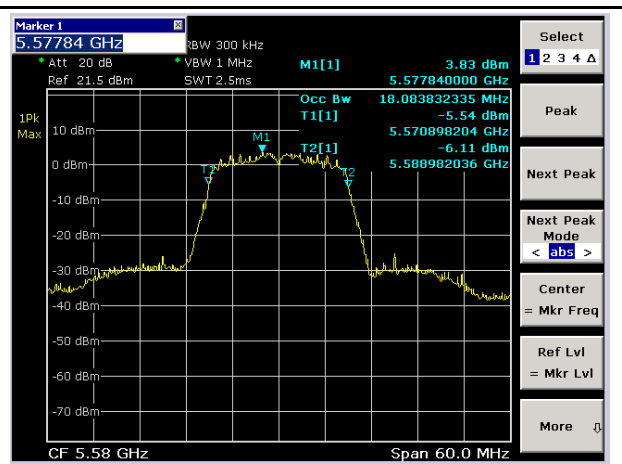


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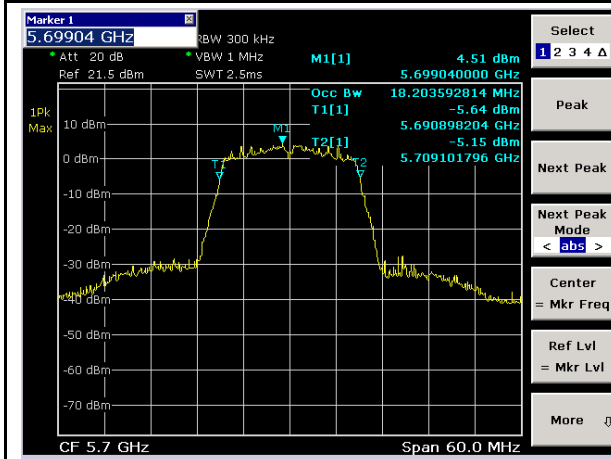
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99% BW_U-NII-2C_802.11ac_5500

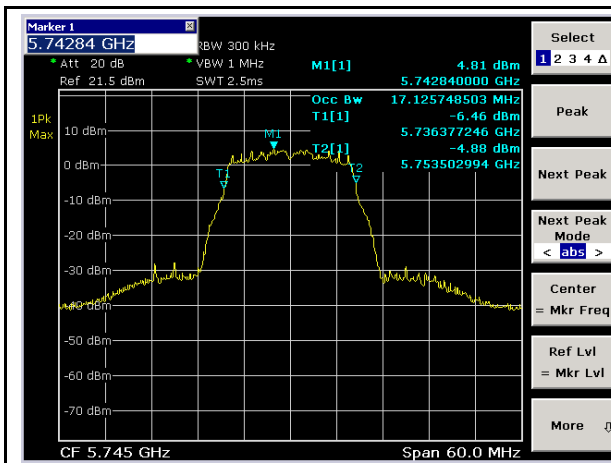


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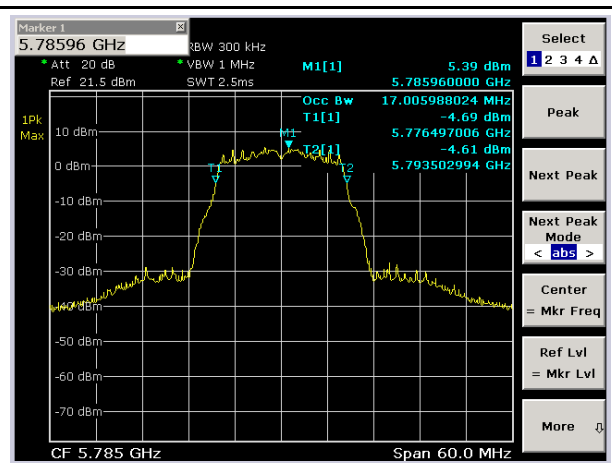


99% BW_U-NII-2C_802.11ac_5700

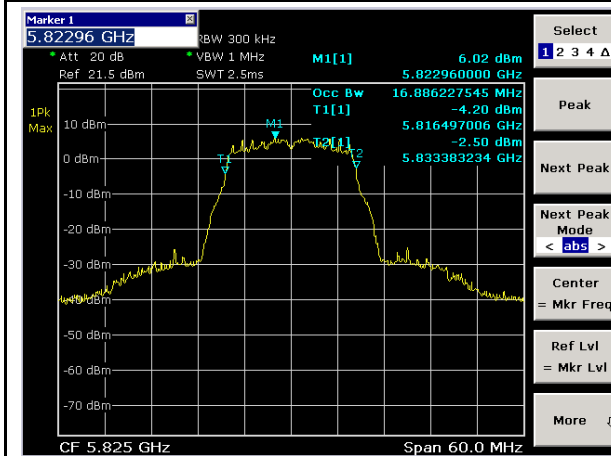
99% Bandwidth of U-NII-3 Band



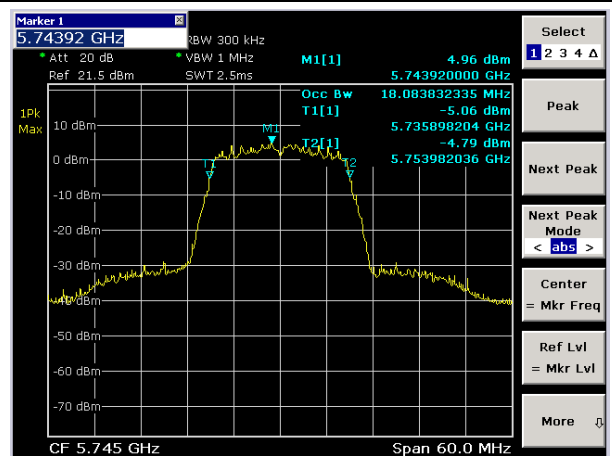
99% BW_U-NII-3_802.11a_5745



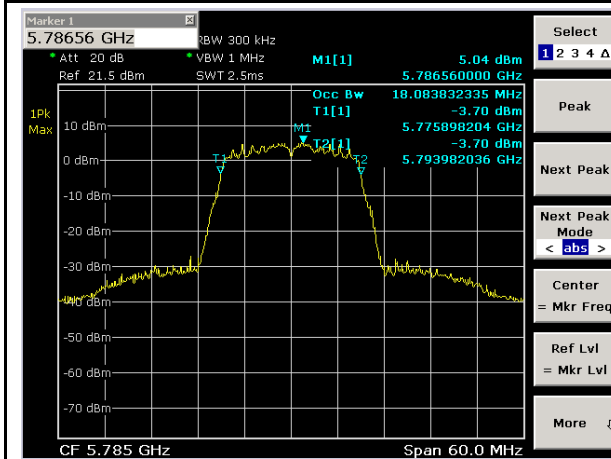
99% BW_U-NII-3_802.11a_5785



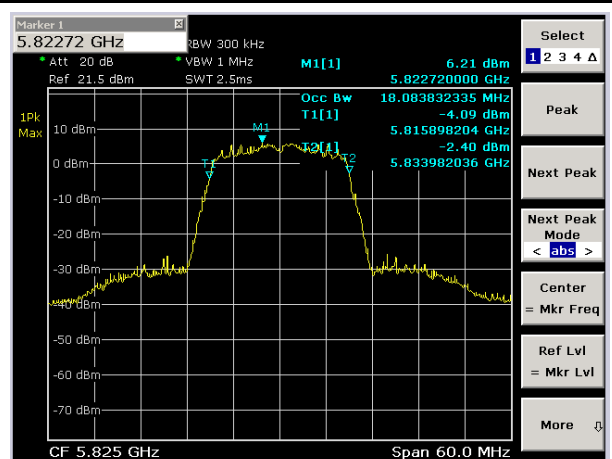
99% BW_U-NII-3_802.11a_5825



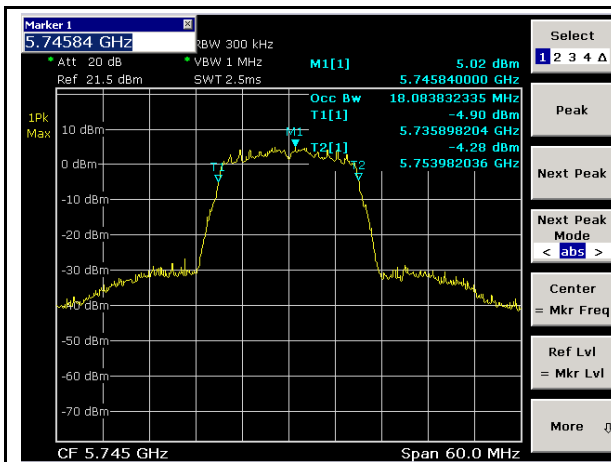
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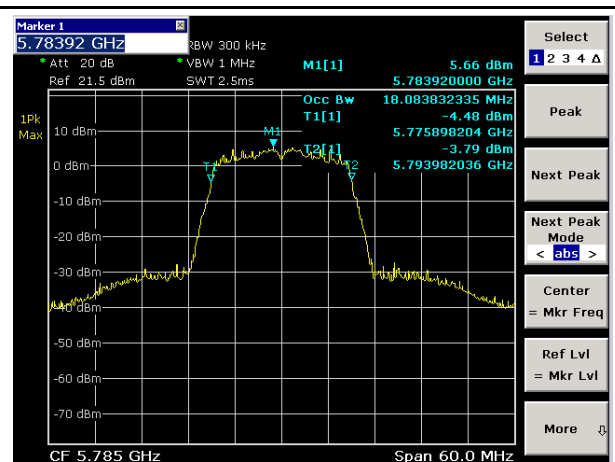
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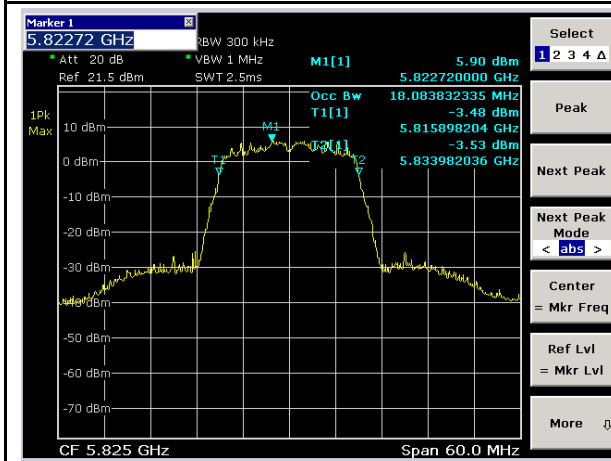
99% BW_U-NII-3_802.11n_5825



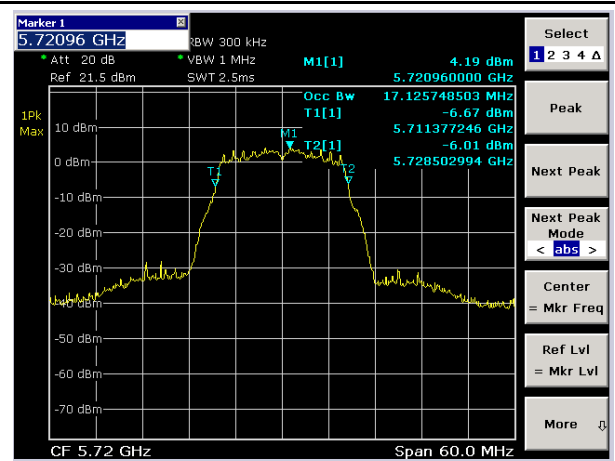
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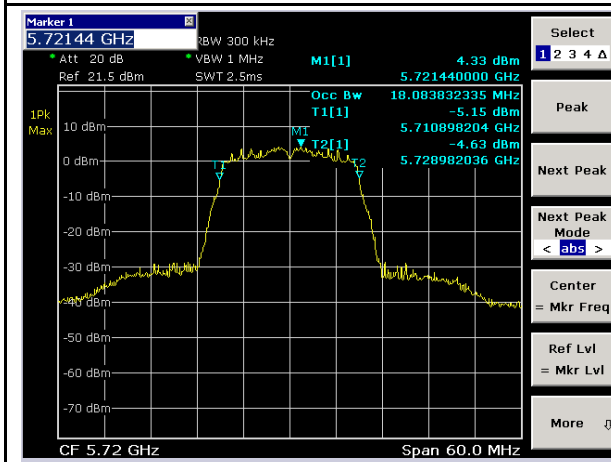
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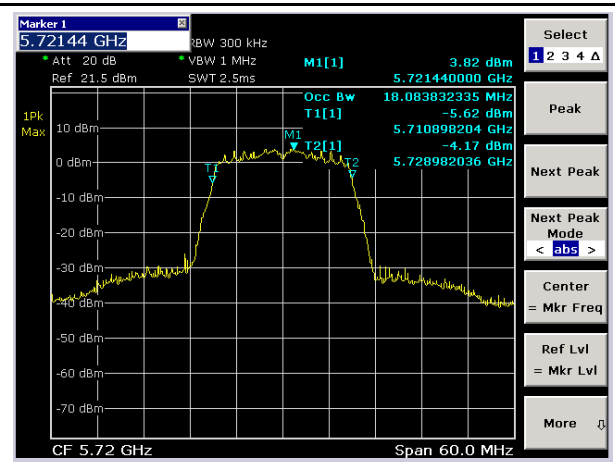
99% BW_U-NII-3_802.11ac_5825



99% BW_U-NII-3_802.11a_5720



99% BW_U-NII-3_802.11n_5720



99% BW_U-NII-3_802.11ac_5720

7.4 Maximum Conducted Output Power

7.4.1 Requirement

§ 15.407 (a)

(iv) For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz.

(3) (i) For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Note that U-NII-2 band, devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

RSS-247

6.2.1 Frequency band 5150-5250 MHz:

For other than devices installed in vehicles, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.

6.2.2 Frequency band 5250-5350 MHz:

For other than devices installed in vehicles, shall comply with the following:

- a) The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less.
- b) The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in MHz.

6.2.3 Frequency bands 5470-5600 MHz and 5650-5725 MHz

The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less.

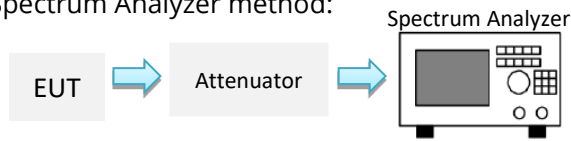
The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in mMHz.

6.2.4 Frequency band 5725-5850 MHz

The maximum conducted output power shall not exceed 1 W.

7.4.2 Test Setup

Spectrum Analyzer method:



7.4.3 Test Procedure

Spectrum Analyzer method:

According to subclause 12.3.2.2 of ANSI C63.10-2020:

subclause E.2.b of 789033 D02 General UNII Test Procedures New Rules v02r01

- 1) Set span to encompass the entire 26 dB EBW or 99% OBW of the signal.
- 2) Set RBW = 1 MHz
- 3) Set VBW $\geq$ 3 MHz.
- 4) Number of points in sweep $\geq [2 \times \text{span} / \text{RBW}]$. (This gives bin-to-bin spacing $\leq \text{RBW} / 2$, so that narrow band signals are not lost between frequency bins.)
- 5) Sweep time = auto
- 6) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
- 7) If transmit duty cycle < 98%, use a video trigger with the trigger level set to enable triggering only on full power pulses. The transmitter shall operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no OFF intervals) or at duty cycle $\geq$ 98%, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run."
- 8) Trace average at least 100 traces in power averaging (rms) mode.
- 9) Compute power by integrating the spectrum across the 26 dB EBW or 99% OBW of the signal using the instrument's band power measurement function, with band limits set equal to the EBW or OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in power units) at 1 MHz intervals extending across the 26 dB EBW or 99% OBW of the spectrum.

7.4.4 Test Result

Output power measurement result

U-NII-1 Band

Mode	Channel	Frequency (MHz)	Data rate	Measured Output Power (dBm)	Corrected Output Power with DCF (dBm)	Output Power Limit (dBm)	Result
802.11a	36	5180	6Mbps	16.12	16.585	24	PASS
	44	5220	6Mbps	15.26	15.725	24	PASS
	48	5240	6Mbps	15.95	16.415	24	PASS
802.11n	36	5180	MCS0	15.27	15.270	24	PASS
	44	5220	MCS0	15.15	15.150	24	PASS
	48	5240	MCS0	14.80	14.800	24	PASS
802.11ac	36	5180	MCS0	15.54	15.852	24	PASS
	44	5220	MCS0	16.39	16.702	24	PASS
	48	5240	MCS0	15.84	16.152	24	PASS

U-NII-2A Band

Mode	Channel	Frequency (MHz)	Data rate	Measured Output Power (dBm)	Corrected Output Power with DCF (dBm)	Output Power Limit (dBm)	Result
802.11a	52	5260	6Mbps	14.38	14.845	24	PASS
	60	5300	6Mbps	12.86	13.325	24	PASS
	64	5320	6Mbps	12.38	12.845	24	PASS
802.11n	52	5260	MCS0	13.31	13.310	24	PASS
	60	5300	MCS0	12.61	12.610	24	PASS
	64	5320	MCS0	12.06	12.060	24	PASS
802.11ac	52	5260	MCS0	14.73	15.042	24	PASS
	60	5300	MCS0	13.54	13.852	24	PASS
	64	5320	MCS0	12.23	12.542	24	PASS

U-NII-2C Band

Mode	Channel	Frequency (MHz)	Data rate	Measured Output Power (dBm)	Corrected Output Power with DCF (dBm)	Output Power Limit (dBm)	Result
802.11a	100	5500	6Mbps	11.82	12.285	24	PASS
	116	5580	6Mbps	12.77	13.235	24	PASS
	140	5700	6Mbps	13.36	13.825	24	PASS
802.11n	100	5500	MCS0	11.74	11.740	24	PASS
	116	5580	MCS0	12.72	12.720	24	PASS
	140	5700	MCS0	13.37	13.370	24	PASS
802.11ac	100	5500	MCS0	11.61	11.922	24	PASS
	116	5580	MCS0	12.85	13.162	24	PASS
	140	5700	MCS0	13.42	13.732	24	PASS

U-NII-3 Band

Mode	Channel	Frequency (MHz)	Data rate	Measured Output Power (dBm)	Corrected Output Power with DCF (dBm)	Output Power Limit (dBm)	Result
802.11a	149	5745	6Mbps	13.40	13.865	30	PASS
	157	5785	6Mbps	13.37	13.835	30	PASS
	165	5825	6Mbps	14.85	15.315	30	PASS
802.11n	149	5745	MCS0	14.08	14.080	30	PASS
	157	5785	MCS0	14.24	14.240	30	PASS
	165	5825	MCS0	14.34	14.340	30	PASS
802.11ac	149	5745	MCS0	13.72	14.032	30	PASS
	157	5785	MCS0	13.96	14.272	30	PASS
	165	5825	MCS0	14.78	15.092	30	PASS

Cross Band

Mode	Channel	Frequency (MHz)	Data rate	Measured Output Power (dBm)	Corrected Output Power with DCF (dBm)	Output Power Limit (dBm)	Result
802.11a	144	5720	6Mbps	12.48	12.945	24	PASS
802.11n	144	5720	MCS0	12.26	12.260	24	PASS
802.11ac	144	5720	MCS0	12.53	12.842	24	PASS

EIRP measurement result

U-NII-1 Band

Mode	Channel	Frequency (MHz)	Data rate	Corrected Output Power with DCF (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
802.11a	36	5180	6Mbps	16.585	2.5	19.085	22.515	PASS
	44	5220	6Mbps	15.725	2.5	18.225	22.397	PASS
	48	5240	6Mbps	16.415	2.5	18.915	22.427	PASS
802.11n	36	5180	MCS0	15.270	2.5	17.770	22.658	PASS
	44	5220	MCS0	15.150	2.5	17.650	22.630	PASS
	48	5240	MCS0	14.800	2.5	17.300	22.658	PASS
802.11ac	36	5180	MCS0	15.852	2.5	18.352	22.630	PASS
	44	5220	MCS0	16.702	2.5	19.202	22.630	PASS
	48	5240	MCS0	16.152	2.5	18.652	22.630	PASS

Note:

 EIRP Limit: 200 mW (23dBm) or $10 + 10 \log_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth.

U-NII-2A Band

Mode	Channel	Frequency (MHz)	Data rate	Corrected Output Power with DCF (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
802.11a	52	5260	6Mbps	14.845	2.5	17.345	29.456	PASS
	60	5300	6Mbps	13.325	2.5	15.825	29.456	PASS
	64	5320	6Mbps	12.845	2.5	15.345	29.456	PASS
802.11n	52	5260	MCS0	13.310	2.5	15.810	29.714	PASS
	60	5300	MCS0	12.610	2.5	15.110	29.686	PASS
	64	5320	MCS0	12.060	2.5	14.560	29.714	PASS
802.11ac	52	5260	MCS0	15.042	2.5	17.542	29.686	PASS
	60	5300	MCS0	13.852	2.5	16.352	29.630	PASS
	64	5320	MCS0	12.542	2.5	15.042	29.686	PASS

Note:

 EIRP Limit: 1W (30dBm) or $17 + 10 \log_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth.

U-NII-2C Band

Mode	Channel	Frequency (MHz)	Data rate	Corrected Output Power with DCF (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
802.11a	100	5500	6Mbps	12.285	2.5	14.785	29.337	PASS
	116	5580	6Mbps	13.235	2.5	15.735	29.367	PASS
	140	5700	6Mbps	13.825	2.5	16.325	29.337	PASS
802.11n	100	5500	MCS0	11.740	2.5	14.240	29.621	PASS
	116	5580	MCS0	12.720	2.5	15.220	29.621	PASS
	140	5700	MCS0	13.370	2.5	15.870	29.630	PASS
802.11ac	100	5500	MCS0	11.922	2.5	14.422	29.573	PASS
	116	5580	MCS0	13.162	2.5	15.662	29.573	PASS
	140	5700	MCS0	13.732	2.5	16.232	29.602	PASS

Note:

 EIRP Limit: 1W (30dBm) or $17 + 10 \log_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth.

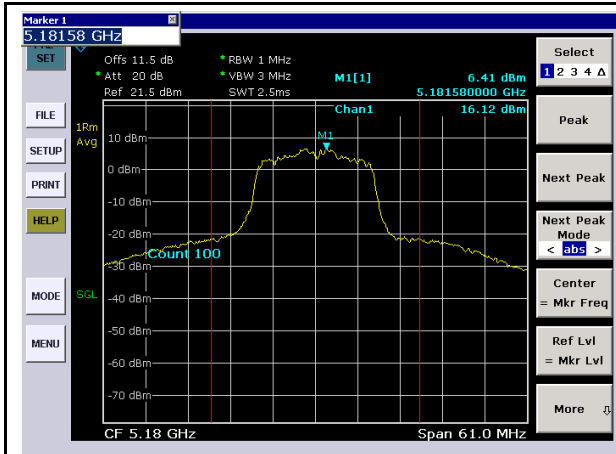
Cross Band

Mode	Channel	Frequency (MHz)	Data rate	Corrected Output Power with DCF (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
802.11a	144	5720	6Mbps	12.945	2.5	15.445	29.337	PASS
802.11n	144	5720	MCS0	12.260	2.5	14.760	29.573	PASS
802.11ac	144	5720	MCS0	12.842	2.5	15.342	29.573	PASS

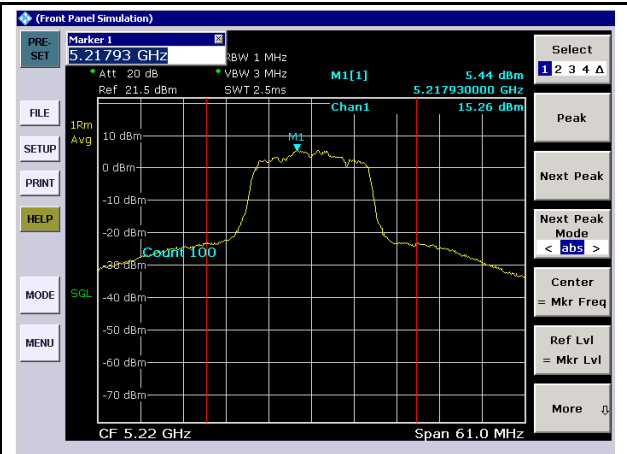
Note:

 EIRP Limit: 1W (30dBm) or $17 + 10 \log_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth.

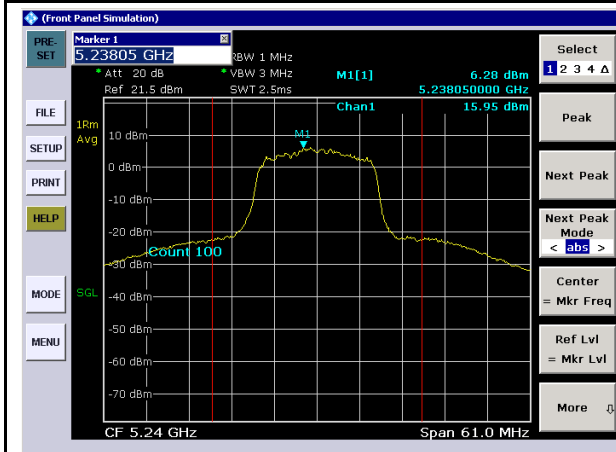
7.4.5 Test Plots



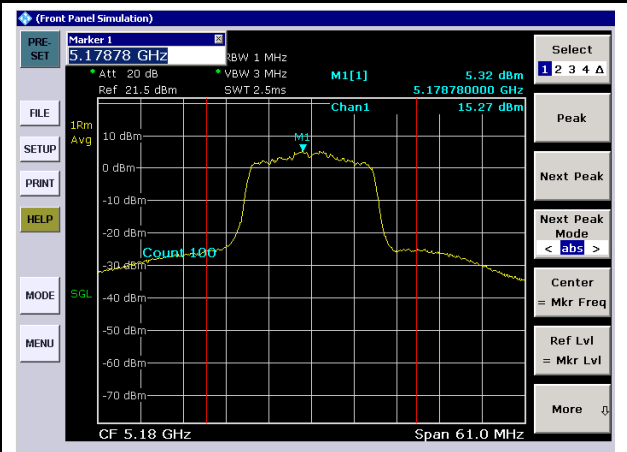
Output Power_U-NII-1_802.11a_5180



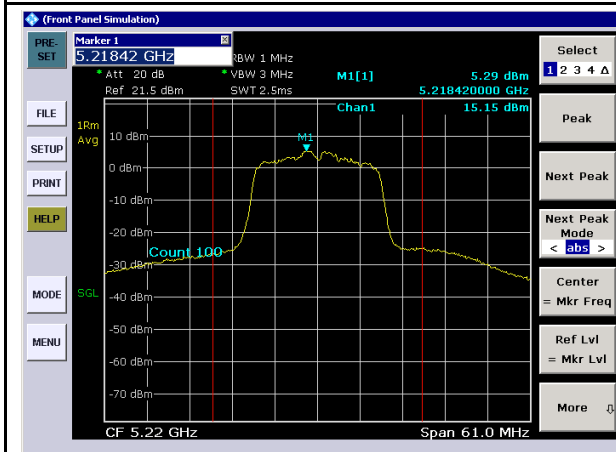
Output Power_U-NII-1_802.11a_5220



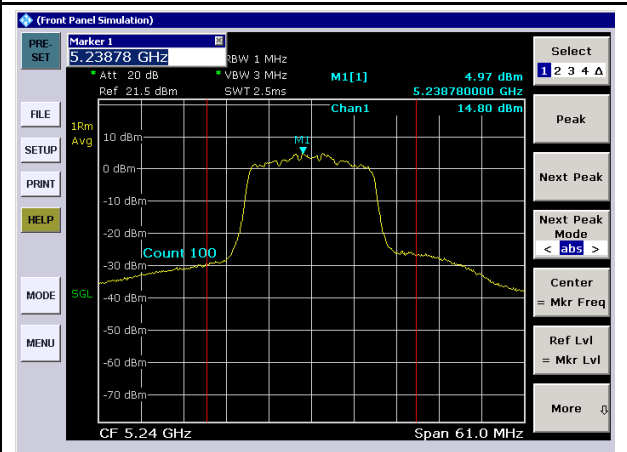
Output Power_U-NII-1_802.11a_5240



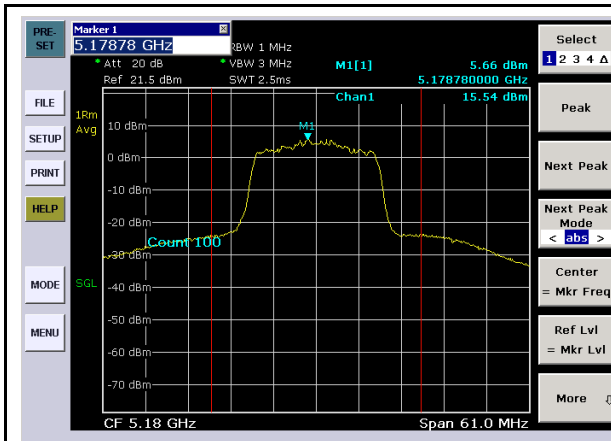
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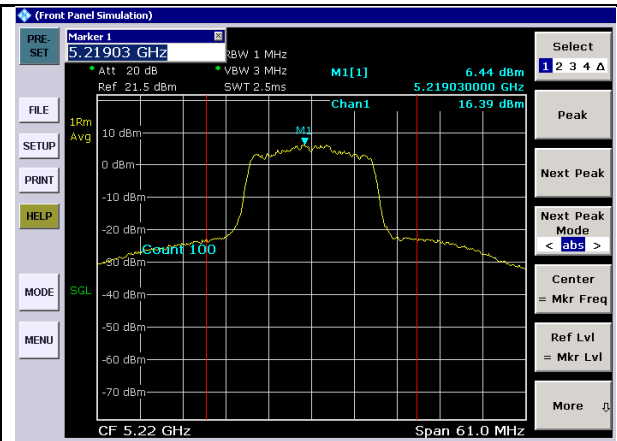
Output Power_U-NII-1_802.11n_5220



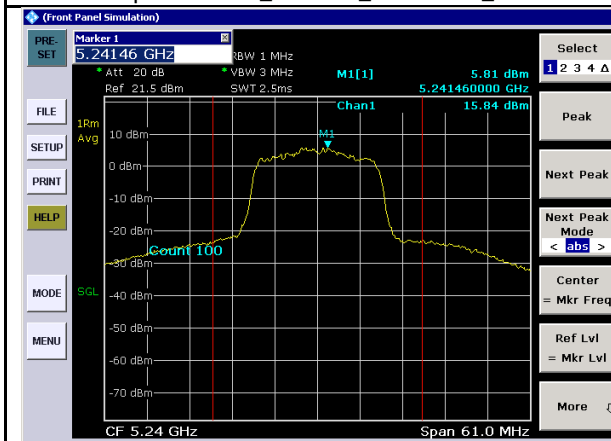
Output Power_U-NII-1_802.11n_5240



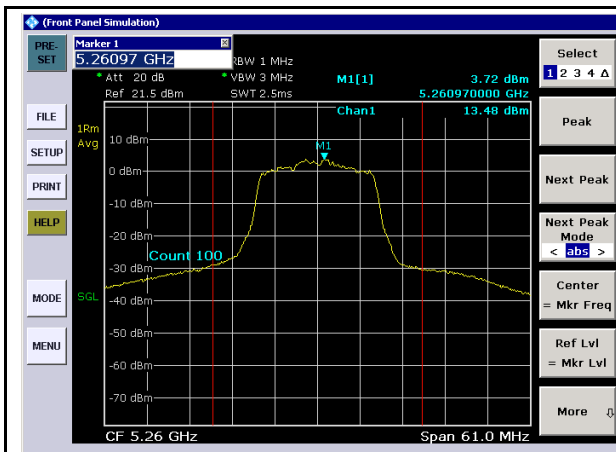
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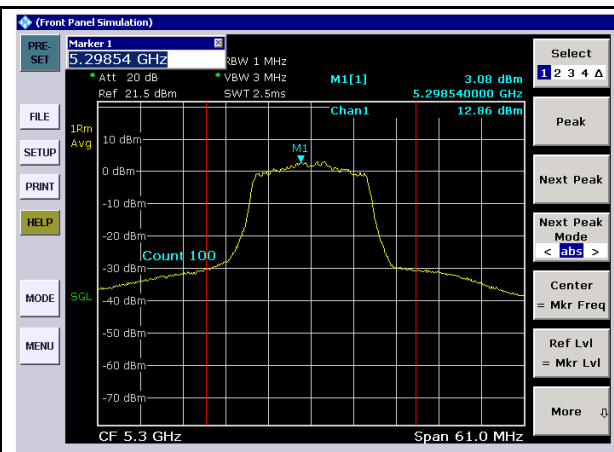
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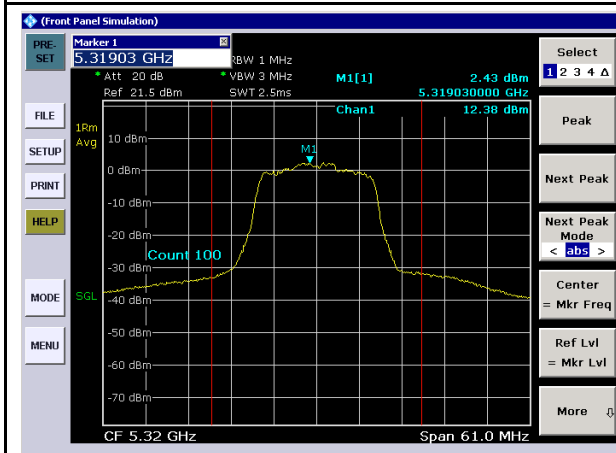
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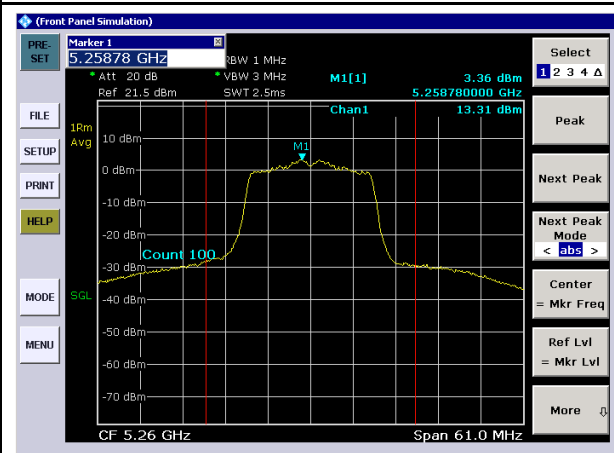
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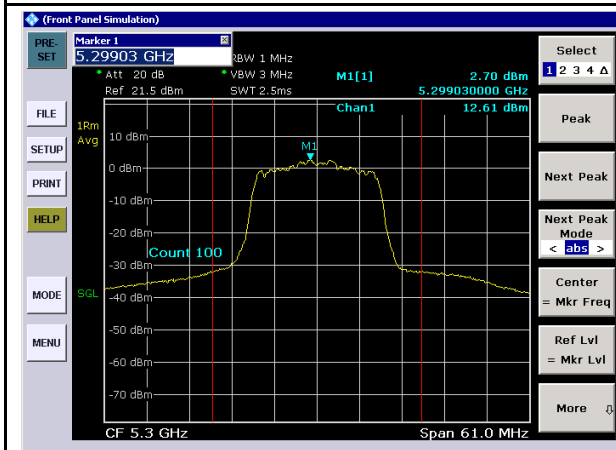
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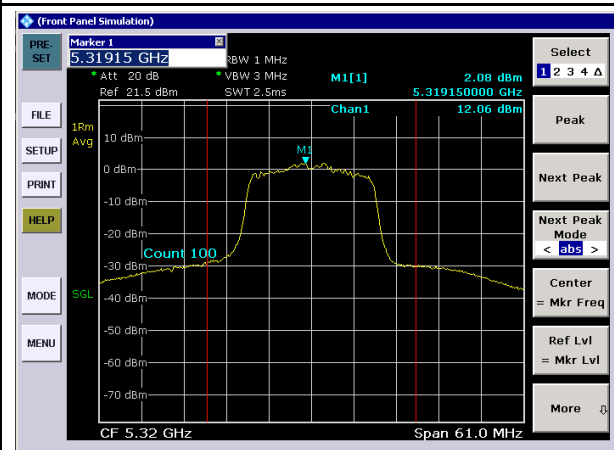
Output Power_U-NII-2A_802.11a_5320



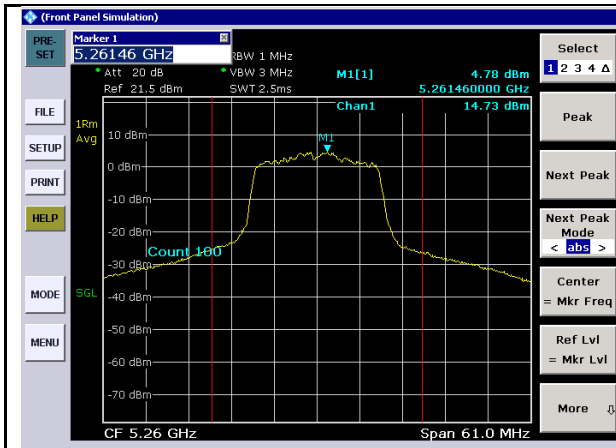
Output Power_U-NII-2A_802.11n_5260



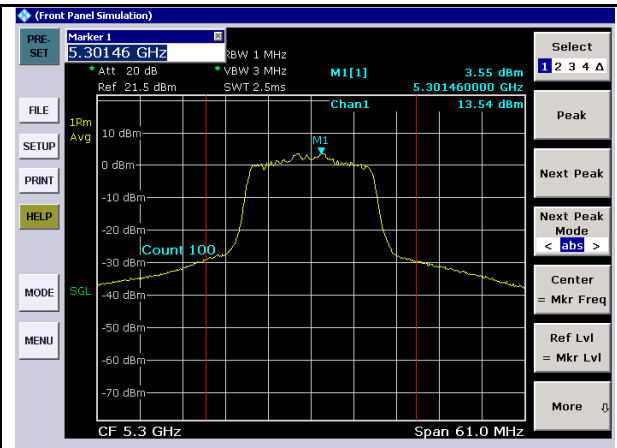
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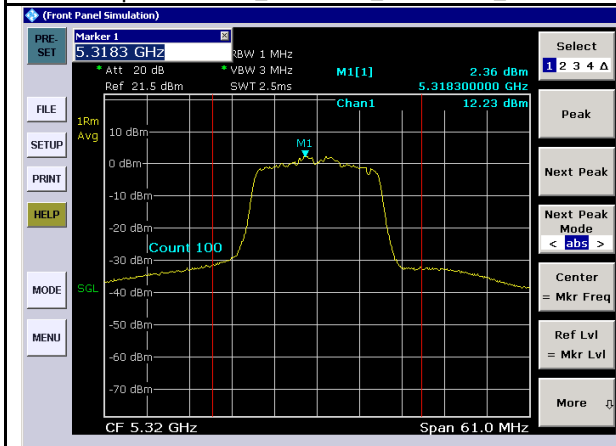
Output Power_U-NII-2A_802.11n_5320



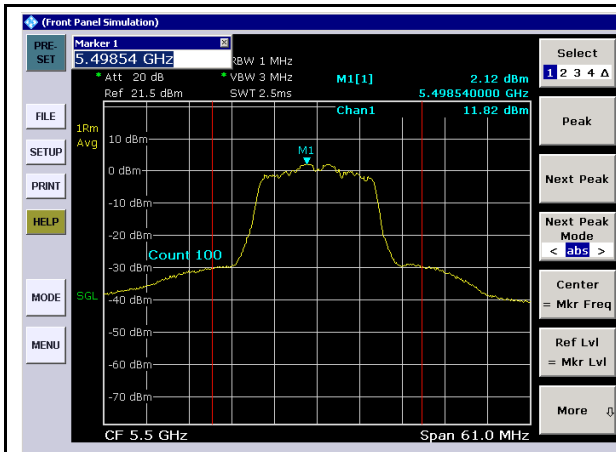
Output Power _U-NII-2A_802.11ac_5260



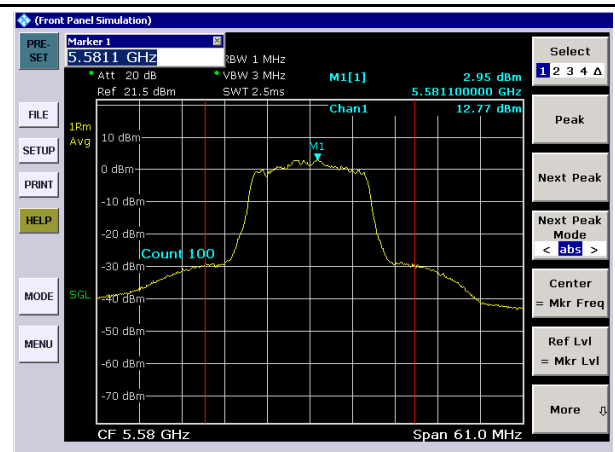
Output Power _U-NII-2A_802.11ac_5300



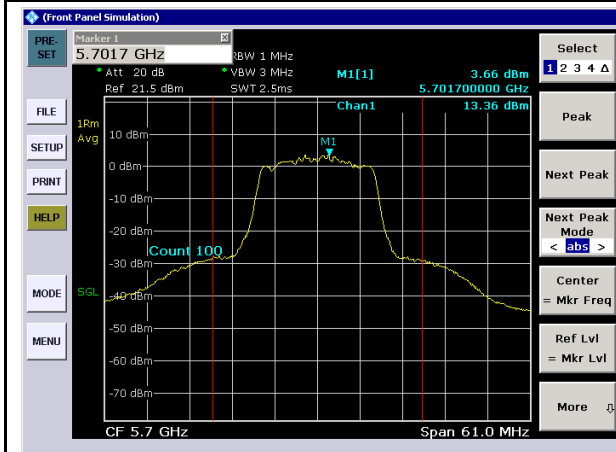
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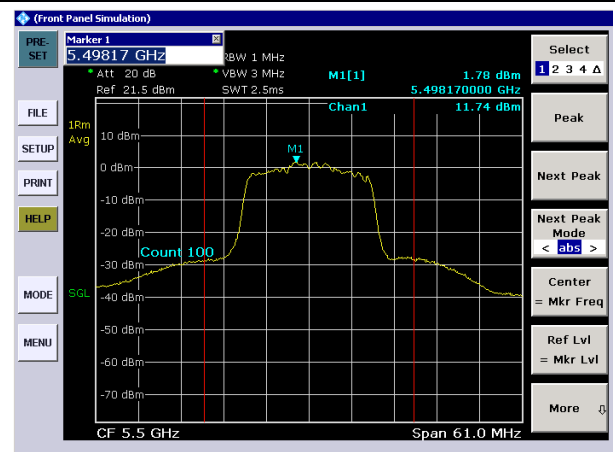
Output Power_U-NII-2C_802.11a_5500



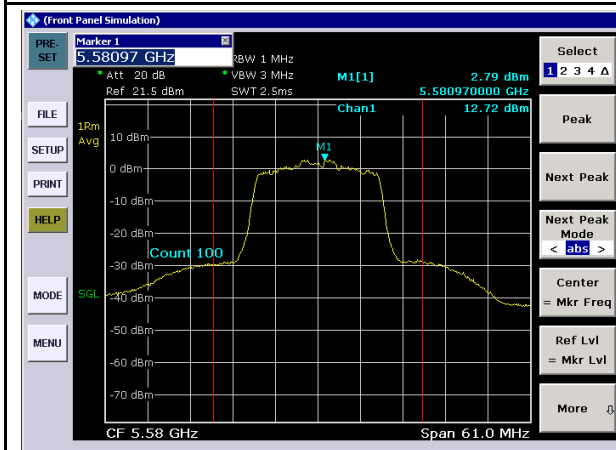
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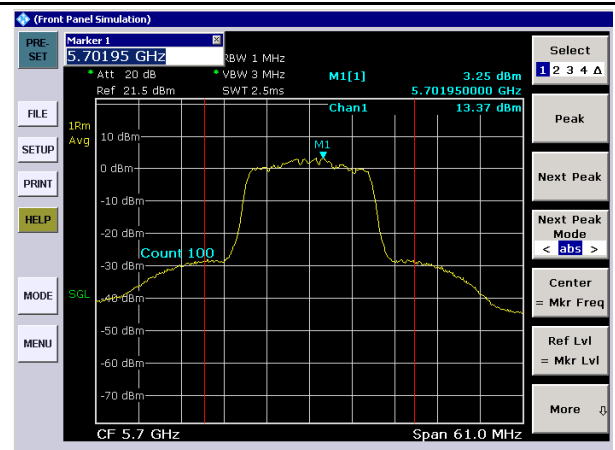
Output Power_U-NII-2C_802.11a_5700



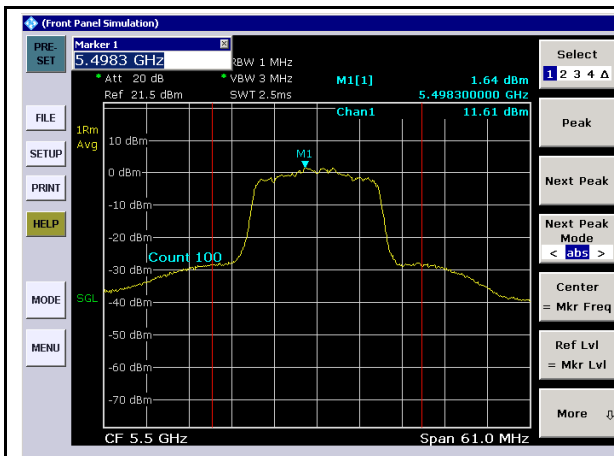
Output Power_U-NII-2C_802.11n_5500



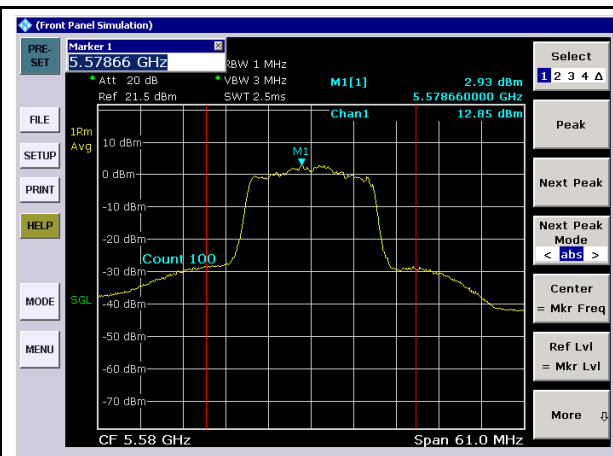
Output Power_U-NII-2C_802.11n_5580



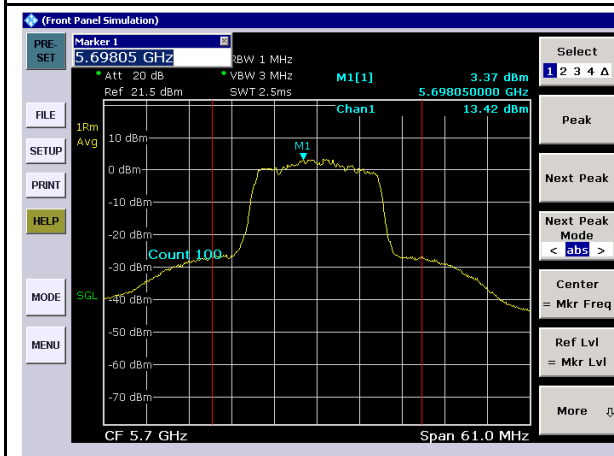
Output Power_U-NII-2C_802.11n_5700



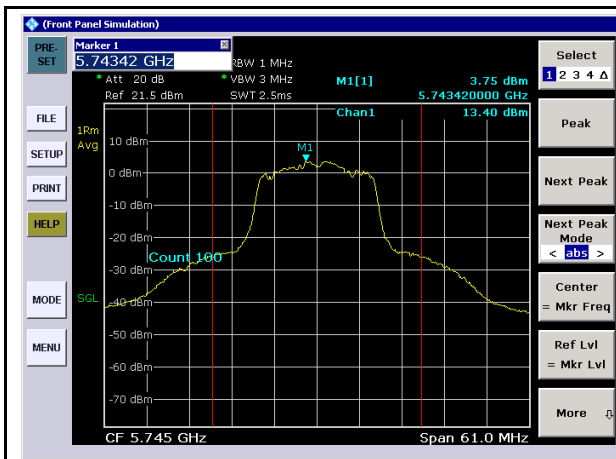
Output Power _U-NII-2C_802.11ac_5500



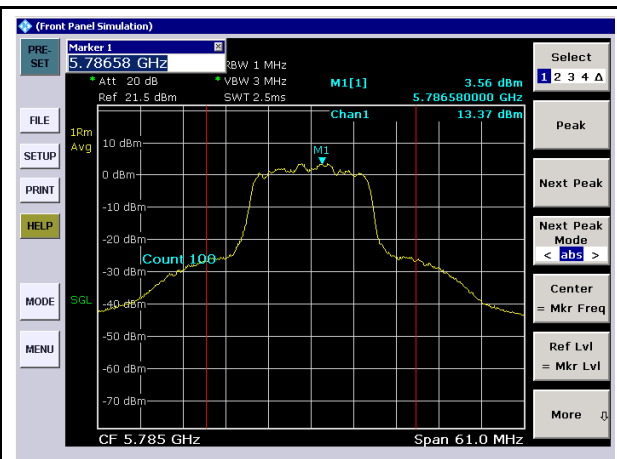
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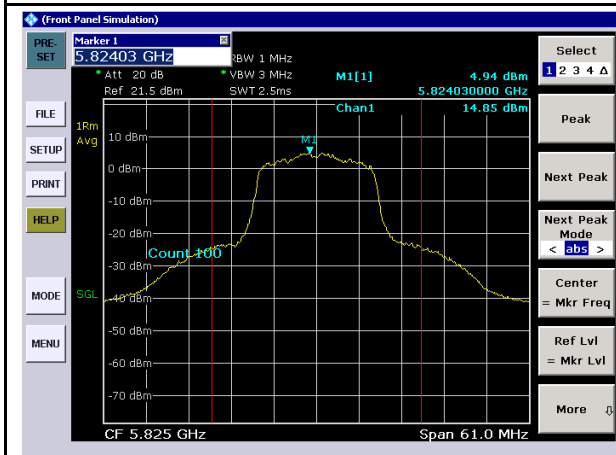
Output Power _U-NII-2C_802.11ac_5700



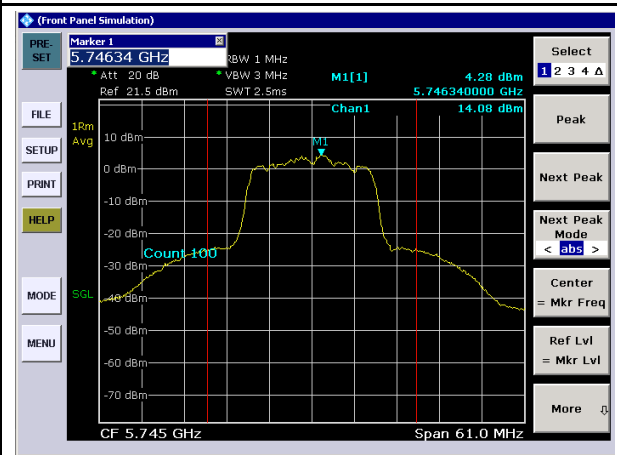
Output Power _U-NII-3_802.11a_5745



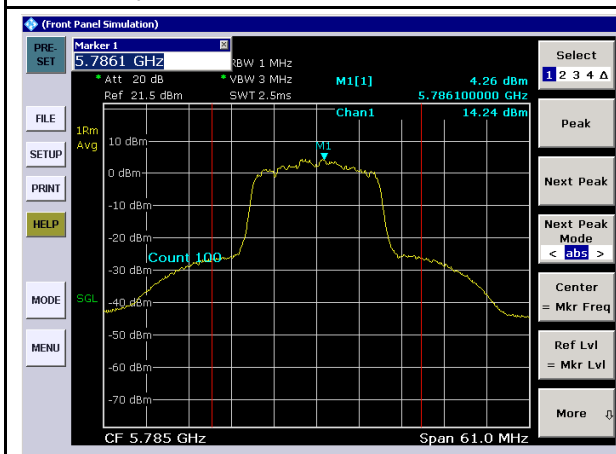
Output Power _U-NII-3_802.11a_5785



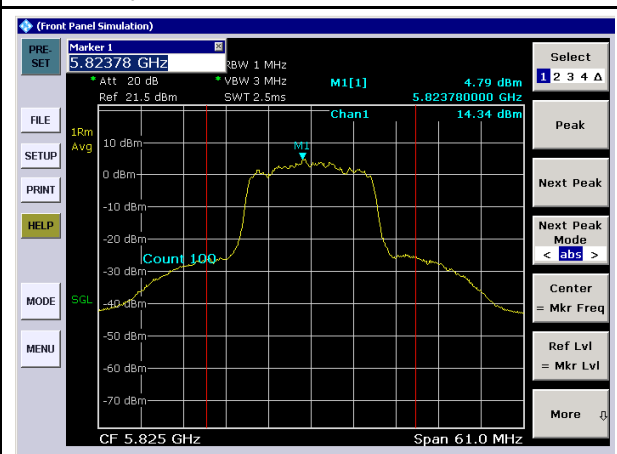
Output Power _U-NII-3_802.11a_5825



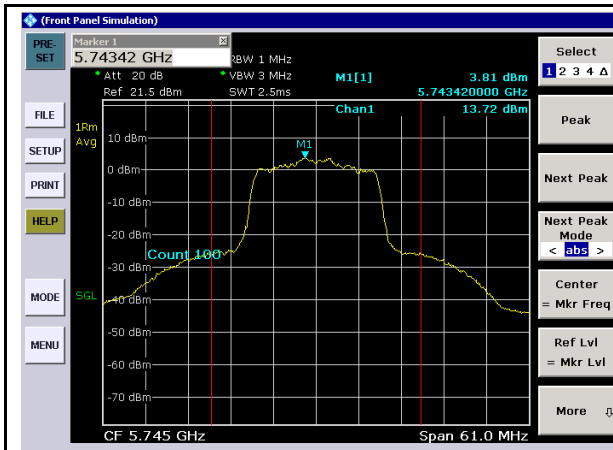
Output Power _U-NII-3_802.11n_5745



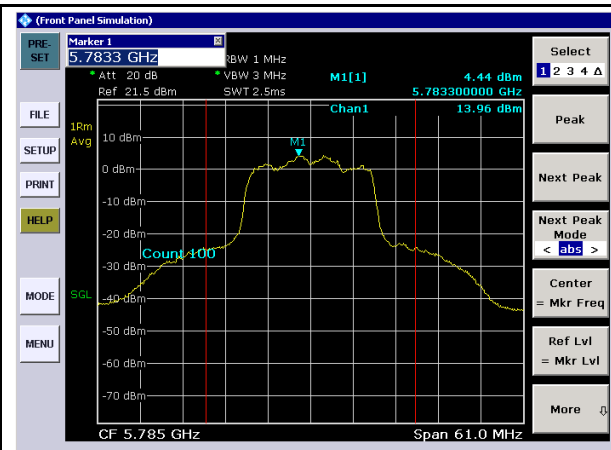
Output Power _U-NII-3_802.11n_5785



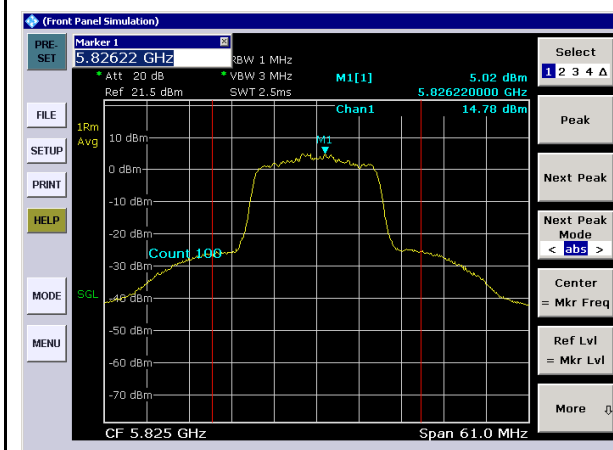
Output Power _U-NII-3_802.11n_5825



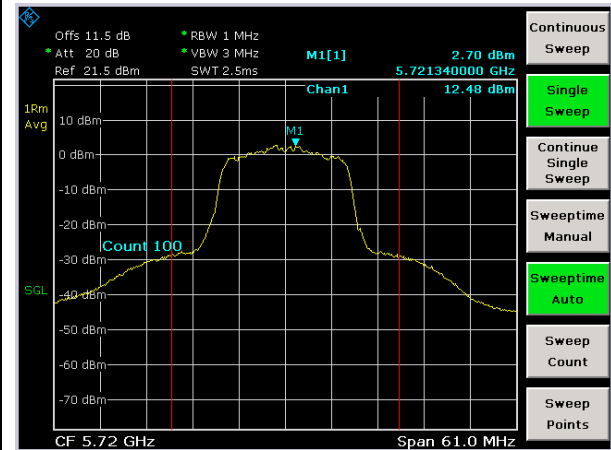
Output Power_U-NII-3_802.11ac_5745



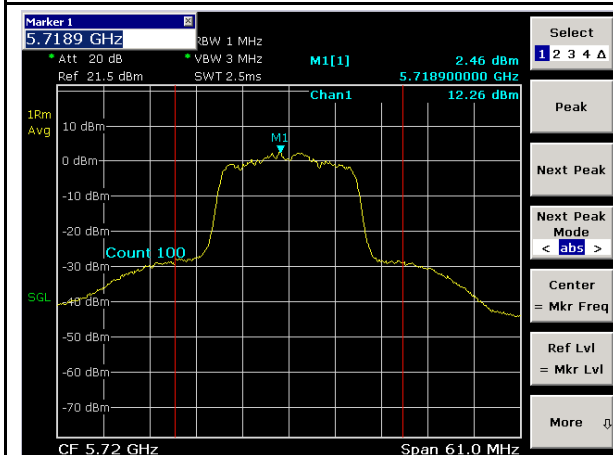
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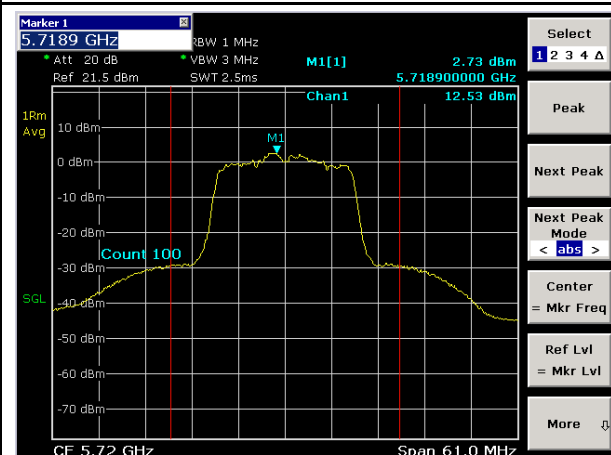
Output Power_U-NII-3_802.11ac_5825



Output Power_U-NII-2C_802.11a_5720



Output Power_U-NII-2C_802.11n_5720



Output Power_U-NII-2C_802.11ac_5720

7.5 Power Spectral Density

7.5.1 Requirement

§ 15.407 (a)

(iv) For client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1MHz band.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands. The maximum power spectral density shall not exceed 11 dBm in any 1MHz band.

(3) (i) For the band 5.725-5.850 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.

If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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6.2.1 Frequency band 5150-5250 MHz:

The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

6.2.2 Frequency band 5250-5350 MHz:

The power spectral density shall not exceed 11 dBm in any 1.0 MHz band

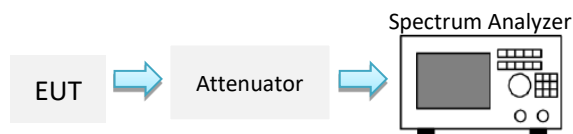
6.2.3 Frequency bands 5470-5600 MHz and 5650-5725 MHz

The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

6.2.4 Frequency band 5725-5850 MHz

The output power spectral density shall not exceed 30 dBm in any 500 kHz band.

7.5.2 Test Setup



7.5.3 Test Procedure

According to subclause 12.5 of ANSI C63.10-2020:

subclause F of 789033 D02 General UNII Test Procedures New Rules v02r01

- 1) Create an average power spectrum for the EUT operating mode being tested by following the instructions in 12.3.2 for measuring maximum conducted output power using a spectrum analyzer or EMI receiver; that is, select the appropriate test method (SA-1, SA-2, SA-3, or their respective alternatives) and apply it up to, but not including, the step labeled, "Compute power...." (This procedure is required even if the maximum conducted output power measurement was performed using the power meter method PM.)
- 2) Use the peak search function on the instrument to find the peak of the spectrum.
- 3) Make the following adjustments to the peak value of the spectrum, if applicable:
 - a. If method SA-2 or SA-2A was used, then add $[10 \log (1 / D)]$, where D is the duty cycle, to the peak of the spectrum.
 - b. If method SA-3A was used and the linear mode was used in step h) of 12.3.2.7, add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.
- 4) The result is the PPSD.
- 5) The procedure in item a) through item c) requires the use of 1 MHz resolution bandwidth to satisfy the 1 MHz measurement bandwidth specified by some regulatory authorities.⁹⁵ This requirement also permits use of resolution bandwidths less than 1 MHz "provided that the measured power is integrated to show the total power over the measurement bandwidth" (i.e., 1 MHz). If measurements are performed using a reduced resolution bandwidth and integrated over 1 MHz bandwidth, the following adjustments to the procedures apply:
 - a. Set $RBW \geq 1 / T$, where T is defined in 12.2 a).
 - b. Set $VBW \geq [3 \times RBW]$.
 - c. If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10 \log (500 \text{ kHz} / RBW)$ to the measured result, whereas $RBW (< 500 \text{ kHz})$ is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
 - d. If measurement bandwidth of Maximum PSD is specified in 1 MHz, add $10 \log (1 \text{ MHz} / RBW)$ to the measured result, whereas $RBW (< 1 \text{ MHz})$ is the reduced resolution bandwidth of spectrum analyzer set during measurement.
 - e. Care shall be taken such that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

7.5.4 Test Result

U-NII-1 Band

Mode	Channel	Frequency (MHz)	Data rate	Measured PSD (dBm/MHz)	Corrected PSD with DCF (dBm/MHz)	PSD Limit (dBm/MHz)	Result
802.11a	36	5180	6Mbps	6.41	6.875	11	PASS
	44	5220	6Mbps	5.44	5.905	11	PASS
	48	5240	6Mbps	6.28	6.745	11	PASS
802.11n	36	5180	MCS0	5.32	5.320	11	PASS
	44	5220	MCS0	5.29	5.290	11	PASS
	48	5240	MCS0	4.97	4.970	11	PASS
802.11ac	36	5180	MCS0	5.66	5.972	11	PASS
	44	5220	MCS0	6.44	6.752	11	PASS
	48	5240	MCS0	5.81	6.122	11	PASS

U-NII-1 Band (EIRP PSD)

Mode	Channel	Frequency (MHz)	Data rate	Corrected PSD with DCF (dBm/MHz)	Antenna Gain (dBi)	EIRP PSD (dBi)	EIRP PSD Limit (dBm/MHz)	Result
802.11a	36	5180	6Mbps	6.41	2.5	8.910	10	PASS
	44	5220	6Mbps	5.44	2.5	7.940	10	PASS
	48	5240	6Mbps	6.28	2.5	8.780	10	PASS
802.11n	36	5180	MCS0	5.32	2.5	7.820	10	PASS
	44	5220	MCS0	5.29	2.5	7.790	10	PASS
	48	5240	MCS0	4.97	2.5	7.470	10	PASS
802.11ac	36	5180	MCS0	5.66	2.5	8.160	10	PASS
	44	5220	MCS0	6.44	2.5	8.940	10	PASS
	48	5240	MCS0	5.81	2.5	8.310	10	PASS

U-NII-2A Band

Mode	Channel	Frequency (MHz)	Data rate	Measured PSD (dBm/MHz)	Corrected PSD with DCF (dBm/MHz)	PSD Limit (dBm/MHz)	Result
802.11a	52	5260	6Mbps	3.72	4.185	11	PASS
	60	5300	6Mbps	3.08	3.545	11	PASS
	64	5320	6Mbps	2.43	2.895	11	PASS
802.11n	52	5260	MCS0	3.36	3.360	11	PASS
	60	5300	MCS0	2.70	2.700	11	PASS
	64	5320	MCS0	2.08	2.080	11	PASS
802.11ac	52	5260	MCS0	4.78	5.092	11	PASS
	60	5300	MCS0	3.55	3.862	11	PASS
	64	5320	MCS0	2.36	2.672	11	PASS

U-NII-2C Band

Mode	Channel	Frequency (MHz)	Data rate	Measured PSD (dBm/MHz)	Corrected PSD with DCF (dBm/MHz)	PSD Limit (dBm/MHz)	Result
802.11a	100	5500	6Mbps	2.12	2.585	11	PASS
	116	5580	6Mbps	2.95	3.415	11	PASS
	140	5700	6Mbps	3.66	4.125	11	PASS
802.11n	100	5500	MCS0	1.78	1.780	11	PASS
	116	5580	MCS0	2.79	2.790	11	PASS
	140	5700	MCS0	3.25	3.250	11	PASS
802.11ac	100	5500	MCS0	1.64	1.952	11	PASS
	116	5580	MCS0	2.93	3.242	11	PASS
	140	5700	MCS0	3.37	3.682	11	PASS

Cross Band (in band 5470-5725MHz)

Mode	Channel	Frequency (MHz)	Data rate	Measured PSD (dBm/MHz)	Corrected PSD with DCF (dBm/MHz)	PSD Limit (dBm/MHz)	Result
802.11a	144	5720	6Mbps	2.70	3.165	11	PASS
802.11n	144	5720	MCS0	2.46	2.460	11	PASS
802.11ac	144	5720	MCS0	2.73	3.042	11	PASS

Cross Band (in band 5725-5850MHz)

Mode	Channel	Frequency (MHz)	Data rate	Measured PSD (dBm/100kHz)	Corrected PSD (dBm/500kHz) *	PSD Limit (dBm/500kHz)	Result
802.11a	144	5720	6Mbps	6.59	13.58	30	PASS
802.11n	144	5720	MCS0	6.46	13.45	30	PASS
802.11ac	144	5720	MCS0	6.47	13.46	30	PASS

U-NII-3 Band in 500kHz band

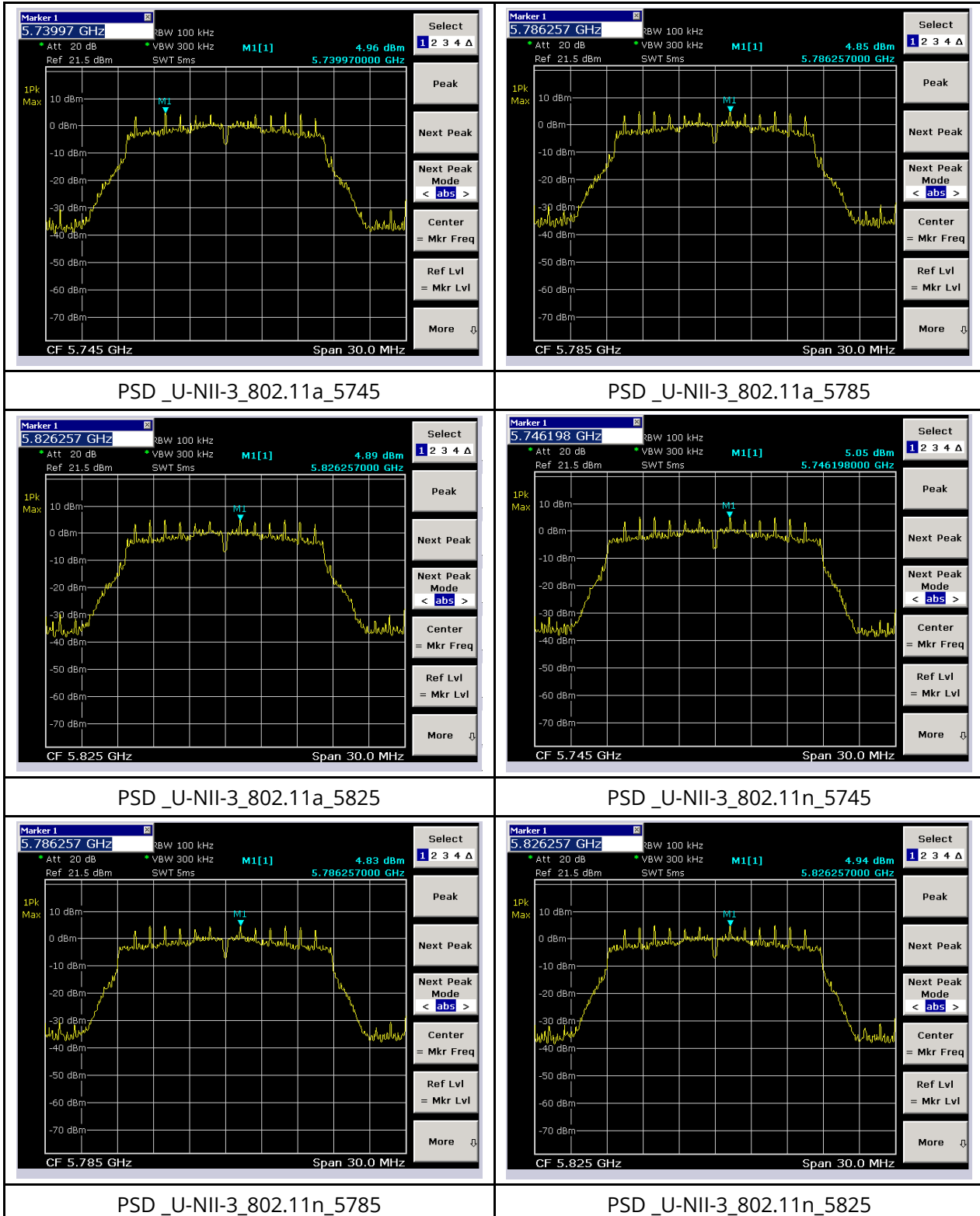
Mode	Channel	Frequency (MHz)	Data rate	Measured PSD (dBm/100kHz)	Corrected PSD (dBm/500kHz) *	PSD Limit (dBm/500kHz)	Result
802.11a	149	5745	6Mbps	4.96	11.95	30	PASS
	157	5785	6Mbps	4.85	11.84	30	PASS
	165	5825	6Mbps	4.89	11.88	30	PASS
802.11n	149	5745	MCS0	5.05	12.04	30	PASS
	157	5785	MCS0	5.83	12.82	30	PASS
	165	5825	MCS0	4.94	11.93	30	PASS
802.11ac	149	5745	MCS0	5.12	12.11	30	PASS
	157	5785	MCS0	4.94	11.93	30	PASS
	165	5825	MCS0	4.98	11.97	30	PASS

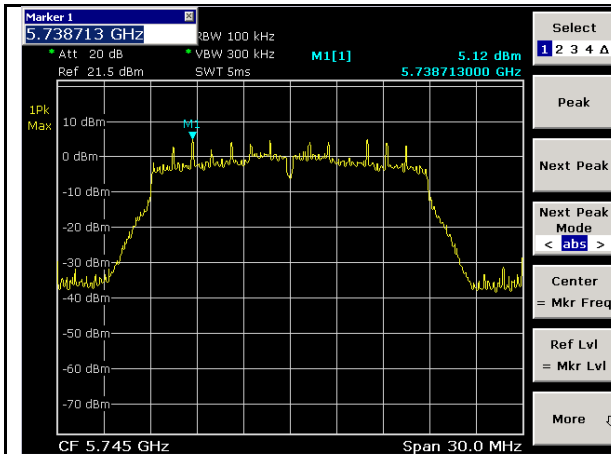
Note: Corrected PSD (dBm/500kHz) * = Measured PSD (dBm/100kHz) + Correction Factor[10*log(500/RBW)]
 = Measured PSD (dBm/100kHz) + 10*Log (500/100)
 = Measured PSD (dBm/100kHz) + 6.99

7.5.5 Test Plots

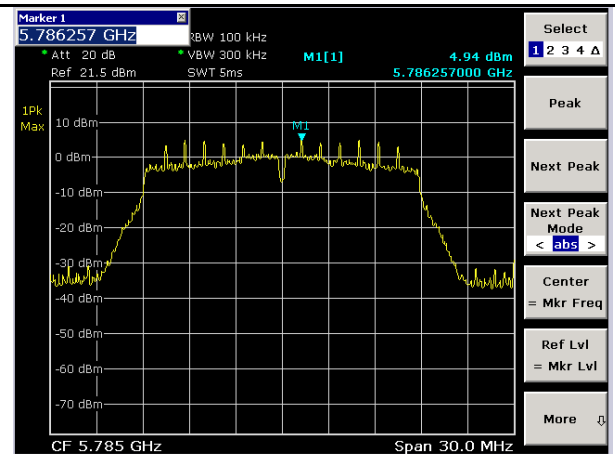
For non- U-NII-3 band, please Refer to test plots in 7.4.5

S

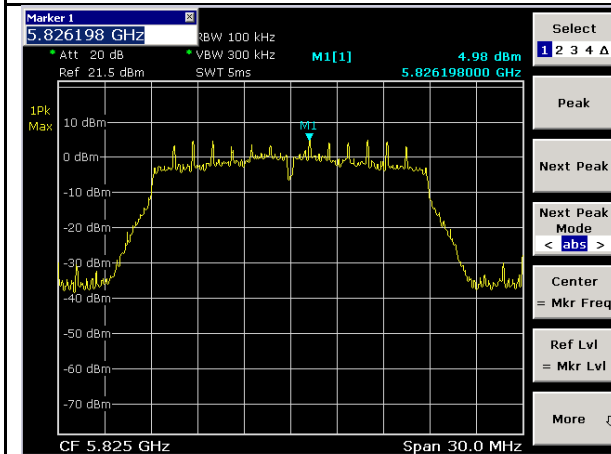




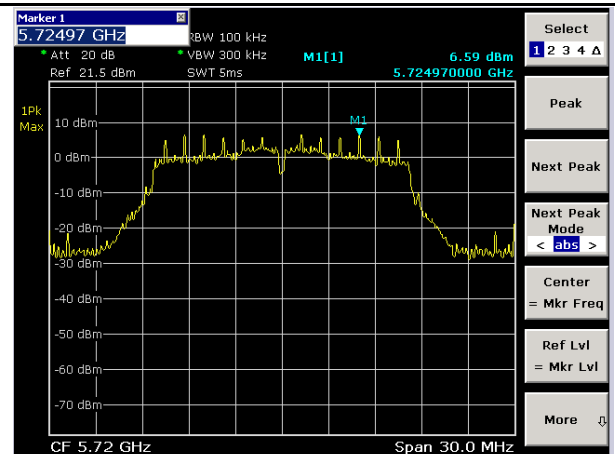
PSD_U-NII-3_802.11ac_5745



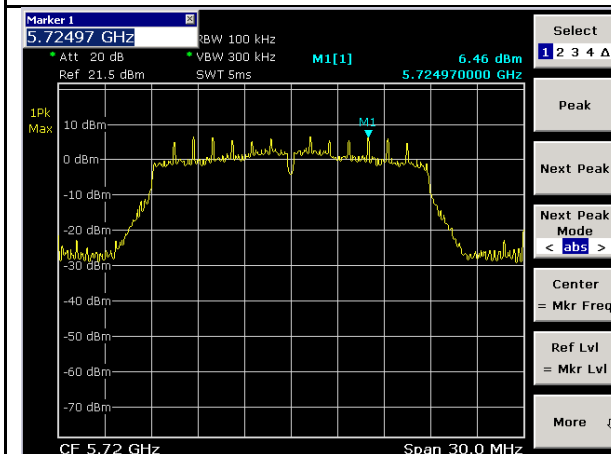
PSD_U-NII-3_802.11ac_5785



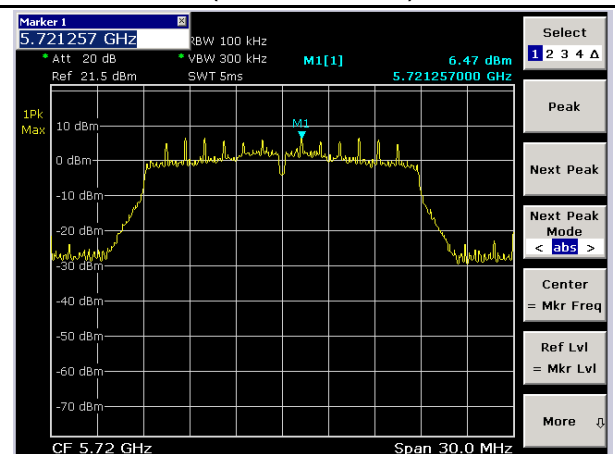
PSD_U-NII-3_802.11ac_5825



PSD_Cross channel_802.11a_5720
(In U-NII-3 Band)



PSD_Cross channel_802.11n_5720
(In U-NII-3 Band)



PSD_Cross channel_802.11ac_5720
(In U-NII-3 Band)

7.6 Dynamic Frequency Selection (DFS)

7.6.1 Requirement

Interference Threshold values, Master or Client incorporating In-Service Monitoring

Maximum Transmit Power	Value (see note)
≥ 200 milliwatt	-64 dBm
EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz	-62 dBm
EIRP < 200 milliwatt that do not meet the power spectra density requirement	-64 dBm

Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna.
 Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.
 Note3: EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.

DFS Response requirement values

Parameter	Value
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds See Note 1.
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
U-NII Detection Bandwidth	Minimum 100% of the UNII 99% transmission power bandwidth See Note 3.

Note 1: Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.
 Note 2: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required facilitating a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.
 Note 3: During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

7.6.2 Radar type and test waveforms

This section provides the parameters for required test waveforms, minimum percentage of successful detections, and the minimum number of trials that must be used for determining DFS conformance. Step intervals of 0.1 microsecond for Pulse Width, 1 microsecond for PRI, 1 MHz for chirp width and 1 for the number of pulses will be utilized for the random determination of specific test waveforms

Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (μsec)	PRI (μsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Trials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a	Roundup $\{ (1/360) * (19 * 10^6 / PRI_{\mu sec}) \}$	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 μsec, with a minimum increment of 1 μsec, excluding PRI values selected in Test A	-		
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120
Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.					

Long Pulse Radar Test Waveform

Radar Type	Pulse Width (μsec)	Chirp Width (MHz)	PRI (μsec)	Number of Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

The parameters for this waveform are randomly chosen. Thirty unique waveforms are required for the Long Pulse radar test signal. If more than 30 waveforms are used for the Long Pulse radar test signal, then each additional waveform must also be unique and not repeated from the previous

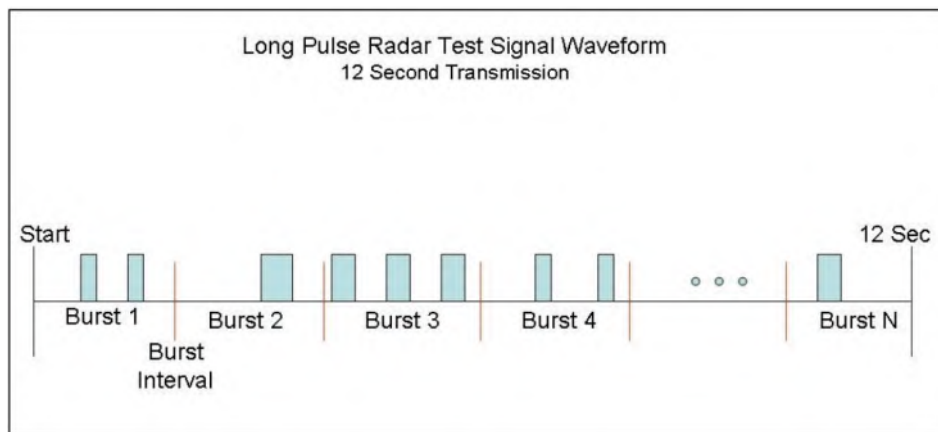
waveforms.

Each waveform is defined as follows:

- 1) The transmission period for the Long Pulse Radar test signal is 12 seconds.
- 2) There are a total of 8 to 20 Bursts in the 12 second period, with the number of Bursts being randomly chosen. This number is Burst Count.
- 3) Each Burst consists of 1 to 3 pulses, with the number of pulses being randomly chosen. Each Burst within the 12 second sequence may have a different number of pulses.
- 4) The pulse width is between 50 and 100 microseconds, with the pulse width being randomly chosen. Each pulse within a Burst will have the same pulse width. Pulses in different Bursts may have different pulse widths.
- 5) Each pulse has a linear FM chirp between 5 and 20 MHz, with the chirp width being randomly chosen. Each pulse within a Burst will have the same chirp width. Pulses in different Bursts may have different chirp widths. The chirp is centered on the pulse. For example, with a radar frequency of 5300 MHz and a 20 MHz chirped signal, the chirp starts at 5290 MHz and ends at 5310 MHz
- 6) If more than one pulse is present in a Burst, the time between the pulses will be between 1000 and 2000 microseconds, with the time being randomly chosen. If three pulses are present in a Burst, the time between the first and second pulses is chosen independently of the time between the second and third pulses.
- 7) The 12 second transmission period is divided into even intervals. The number of intervals is equal to Burst Count. Each interval is of length $(12,000,000 / \text{Burst Count})$ microseconds. Each interval contains one Burst. The start time for the Burst, relative to the beginning of the interval, is between 1 and $[(12,000,000 / \text{Burst Count}) - (\text{Total Burst Length}) + (\text{One Random PRI Interval})]$ microseconds, with the start time being randomly chosen. The step interval for the start time is 1 microsecond. The start time for each Burst is chosen independently.

A representative example of a Long Pulse radar test waveform:

- 1) The total test signal length is 12 seconds.
- 2) 8 Bursts are randomly generated for the Burst Count.
- 3) Burst 1 has 2 randomly generated pulses.
- 4) The pulse width (for both pulses) is randomly selected to be 75 microseconds.
- 5) The PRI is randomly selected to be at 1213 microseconds.
- 6) Bursts 2 through 8 are generated using steps 3 – 5.
- 7) Each Burst is contained in even intervals of 1,500,000 microseconds. The starting location for Pulse 1, Burst 1 is randomly generated (1 to 1,500,000 minus the total Burst 1 length + 1 random PRI interval) at the 325,001 microsecond step. Bursts 2 through 8 randomly fall in successive 1,500,000 microsecond intervals (i.e. Burst 2 falls in the 1,500,001 – 3,000,000 microsecond range).



Frequency Hopping Radar Type

Radar Type	Pulse Width (μsec)	PRI (μsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Trials
6	1	333	9	.333	300	70%	30

For the Frequency Hopping Radar Type, the same Burst parameters are used for each waveform. The hopping sequence is different for each waveform and a 100-length segment is selected 1 from the hopping sequence defined by the following algorithm:

The first frequency in a hopping sequence is selected randomly from the group of 475 integer frequencies from 5250 – 5724 MHz. Next, the frequency that was just chosen is removed from the group and a frequency is randomly selected from the remaining 474 frequencies in the group. This process continues until all 475 frequencies are chosen for the set. For selection of a random frequency, the frequencies remaining within the group are always treated as equally likely.

7.6.3 Dynamic Frequency Selection (DFS) Applicability

7.6.3.1 Requirement

A U-NII network will employ a DFS function to detect signals from radar systems and to avoid co-channel operation with these systems. This applies to the 5250-5350 MHz and/or 5470-5725 MHz bands.¹

Within the context of the operation of the DFS function, a U-NII device will operate in either Master Mode or Client Mode. U-NII devices operating in Client Mode can only operate in a network controlled by a UNII device operating in Master Mode.

Following tables shown below summarize the DFS testing applicability.

Applicability of DFS Requirements Prior to Use of a Channel

Requirement	Operational Mode		
	Master	Client Without Radar Detection	Client With Radar Detection
<i>Non-Occupancy Period</i>	Yes	Not required	Yes
<i>DFS Detection Threshold</i>	Yes	Not required	Yes
<i>Channel Availability Check Time</i>	Yes	Not required	Not required
<i>U-NII Detection Bandwidth</i>	Yes	Not required	Yes

Applicability of DFS requirements during normal operation

Requirement	Operational Mode	
	Master Device or Client with Radar Detection	Client Without Radar Detection
<i>DFS Detection Threshold</i>	Yes	Not required
<i>Channel Closing Transmission Time</i>	Yes	Yes
<i>Channel Move Time</i>	Yes	Yes
<i>U-NII Detection Bandwidth</i>	Yes	Not required

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar Detection	Client Without Radar Detection
<i>U-NII Detection Bandwidth and Statistical Performance Check</i>	All BW modes must be tested	Not required
<i>Channel Move Time and Channel Closing Transmission Time</i>	Test using widest BW mode available	Test using the widest BW mode available for the link
<i>All other tests</i>	Any single BW mode	Not required
Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.		

7.6.4 Conclusion

EUT is client device without radar detection function. Only the Channel Closing Transmission Time, Channel Move time and Non-Occupancy period testing are required. EUT only support 20MHz bandwidth.

7.6.5 Dynamic Frequency Selection (DFS) Testing

7.6.5.1 Requirement

Channel Closing Transmission Time

The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

The channel closing transmission time shall be less than (200 milliseconds + an aggregate of 60 milliseconds) over remaining 10 second period

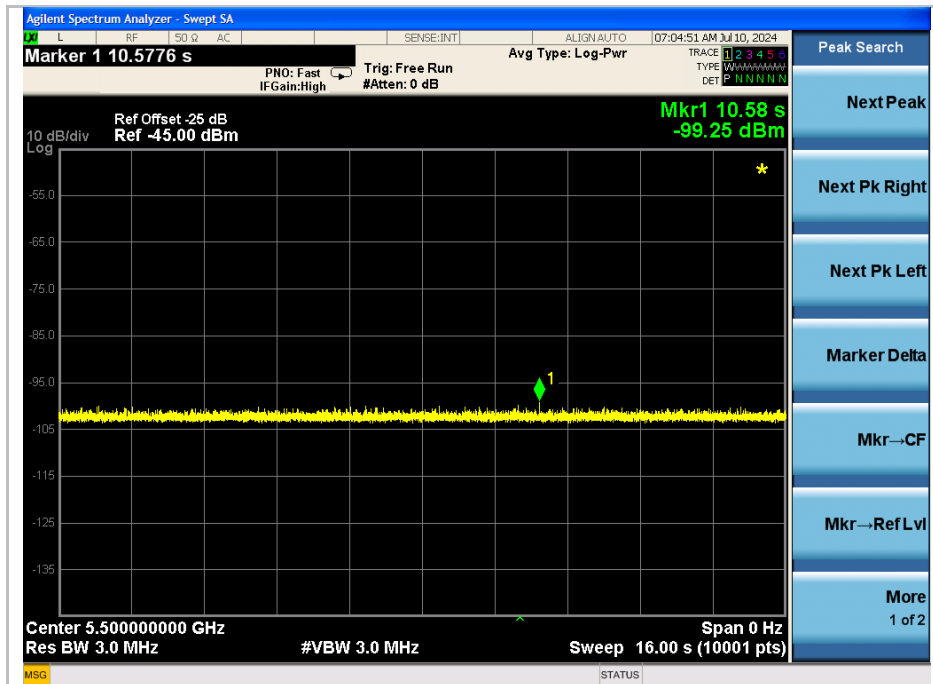
Channel Move Time

After a radar's presence is detected, all transmissions shall cease on the operating channel within 10 seconds. Transmissions during this period shall consist of normal traffic for a maximum of 200 ms after detection of the radar signal. In addition, intermittent management and control signals can be sent during the remaining time to facilitate vacating the operating channel.

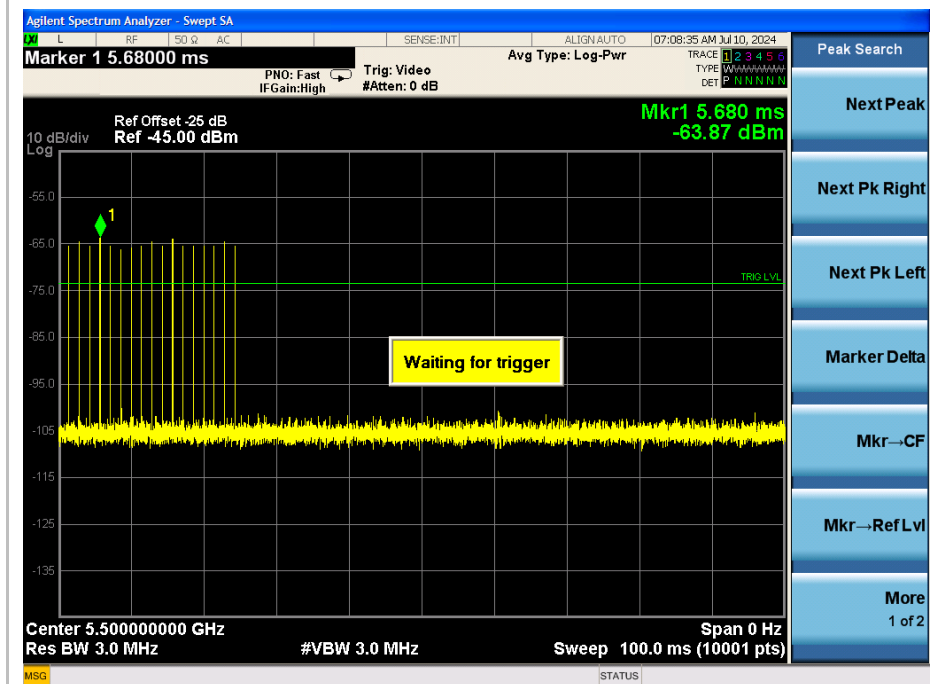
7.6.5.2 Radar Waveform Calibration

The following equipment setup was used to calibrate the conducted Radar Waveform. A spectrum analyzer was used to establish the test signal level for each radar type. During this process there were no transmissions by either the Master or Client Device. The spectrum analyzer was switched to the zero span (Time Domain) mode at the frequency of the Radar Waveform generator. Peak detection was utilized.

Calibration Test Plots



System Noise Floor @ 5500MHz



Radar Type 0 @ 5500MHz

7.6.5.3 DFS Test Procedure

In-Service Monitoring for Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period

These tests define how the following DFS parameters are verified during In-Service Monitoring; Channel Closing Transmission Time, Channel Move Time, and Non-Occupancy Period.

The steps below define the procedure to determine the above-mentioned parameters when a radar Burst with a level equal to the DFS Detection Threshold + 1dB is generated on the Operating Channel of the U-NII device.

UUT operating as a Client Device will associate with the Master at test Channel. DFS testing was performed while EUT is associated with the HME master device (Remote Transceiver) that it's designed to use with. EUT communicates with master device through the unique frame structure with fixed data rate and duty cycle.

At time T0 the Radar Waveform generator sends a Burst of pulses for each of the radar types.

Observe the transmissions of the UUT at the end of the radar Burst on the Operating Channel for duration greater than 10 seconds. Measure and record the transmissions from the UUT during the observation time (Channel Move Time). Compare the Channel Move Time and Channel Closing Transmission Time results to the limits defined in the DFS Response requirement values table.

Channel Closing Transmission Time- Measurement

A type 1 waveform was introduced to the EUT and the Spectrum Analyzer sweep time was set to 1s for monitoring and capturing the plot. A LabVIEW program was created to collect trace data and capturing the plot. The program will calculate the channel closing time base on the spectrum analyzer result. The result will be calculated based on FCC procedure.

$$C = N * Dwell$$

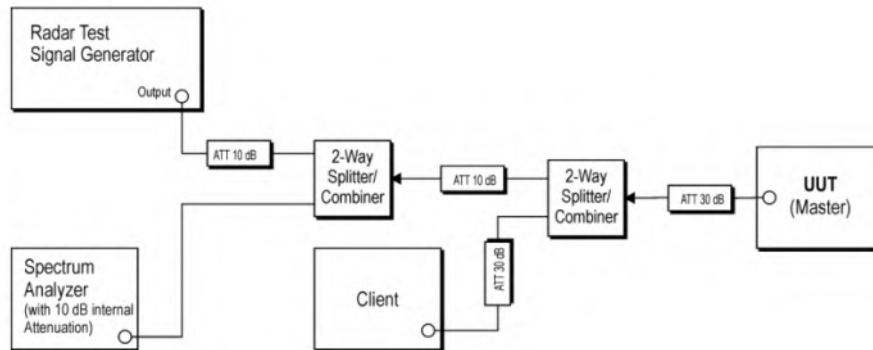
C is the closing time, N is the number of spectrum analyzer sampling bins showing a U-NII transmission and dwell is the dwell time per bin.

$$Dwell = S/B$$

Where Dwell is the dwell time per spectrum analyzer sampling bin, S is the sweep time and B is the number of spectrum analyzer sampling bins.

7.6.5.4 DFS Test Setup

Conducted measurement setup was used for full DFS testing.
Test Setup Block Diagram for conducted measurement is as below,



The radio was set at the center channel frequency of tested Channel.
An FCC approved Master device – (FCC ID: Q87-EA8300) AP was used to establish link with DUT device.

Iperf.exe program is used to set the AP as data server, and DUT as client for establishing the data traffic between AP and DUT.

The master device provides, on aggregate, uniform loading of the spectrum across all devices by selecting an operating channel among the available channels using a random algorithm.

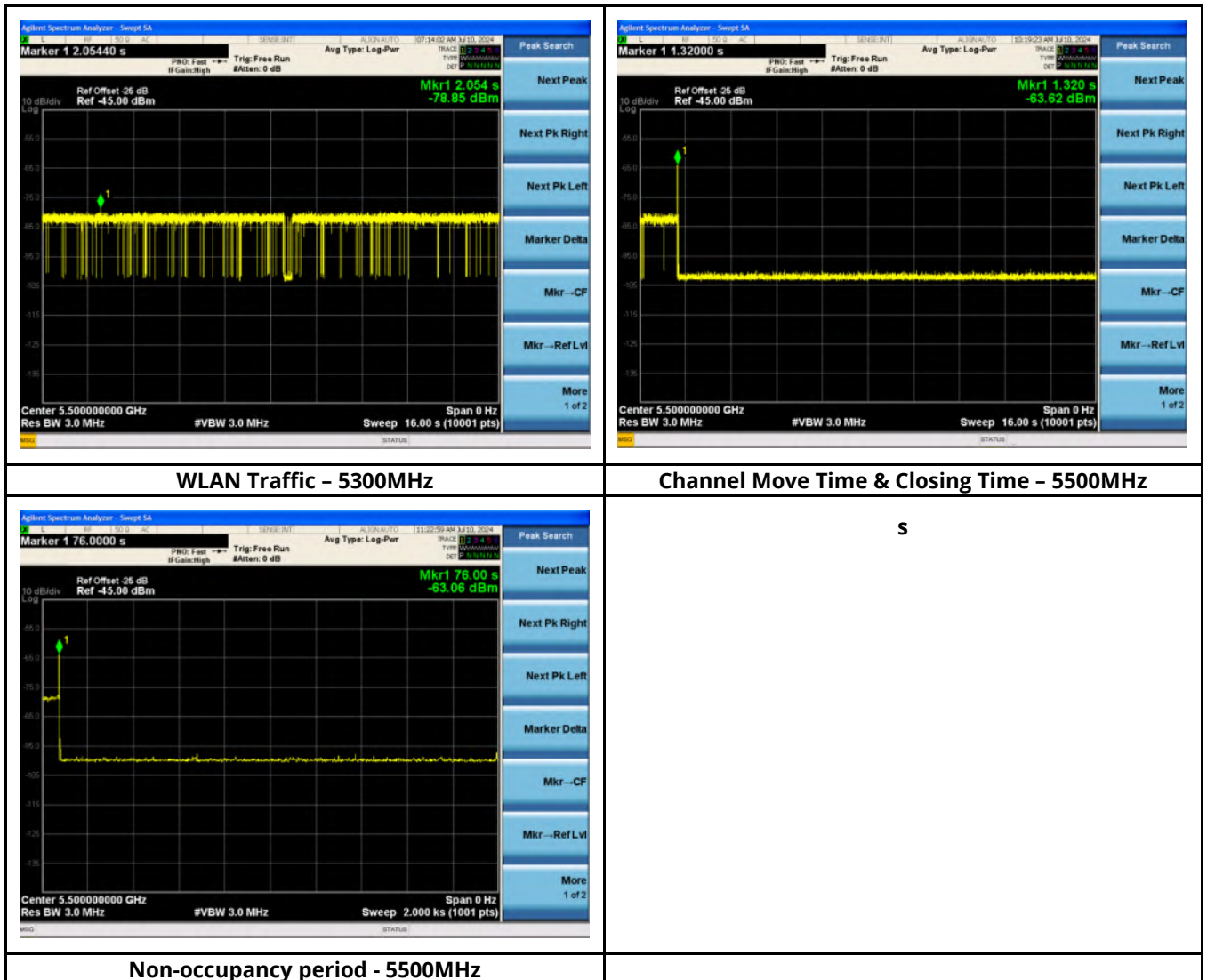
The rated output power of the Master unit is > 23 dBm (EIRP). Therefore, the required interference threshold is – 64 dBm. After correction for procedural adjustment, the required radiated threshold at the antenna port is $-64 + 1 = -63$ dBm.

The calibrated radiated DFS detection threshold level is set to -63 dBm. The tested level is lower than the required level hence it provides margining to the limit.

7.6.5.5 DFS Test Results

BW / Channel	Test Item	Test Result	Limit	Verdict
11n-5500MHz	Channel Move Time	< 10s	< 10s	Pass
11n-5500MHz	Channel Closing Transmission Time	0ms	< 260ms	Pass
11n-5500MHz	Non-Occupancy Period	> 30min (1800 s)	≥ 30 min (1800 s)	Pass

7.6.5.6 DFS Test Plots



7.7 Radiated Spurious Emission

7.7.1 Requirement

§ 15.407 (b) RSS-247 6.2

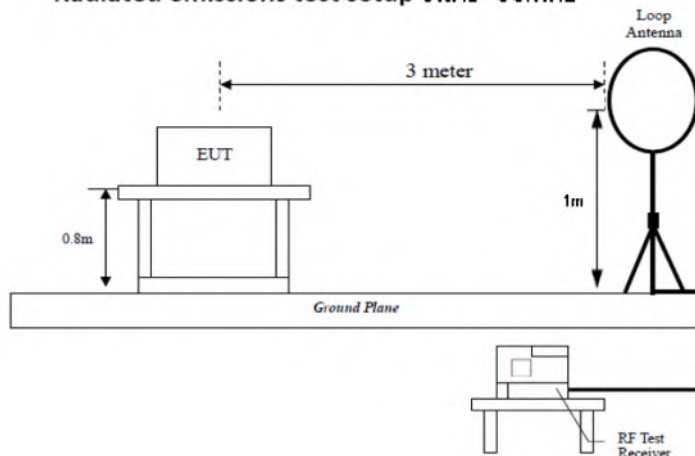
- 1) For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.
- 2) For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- 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 EIRP of -27 dBm/MHz.
- 4) For transmitters operating in the 5.725-5.825 GHz band: 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.
- 5) Restricted band, emission must also comply with the radiated emission limits specified in 15.209

Attenuation below the general limits specified in §15.209(a) and RSS-Gen is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

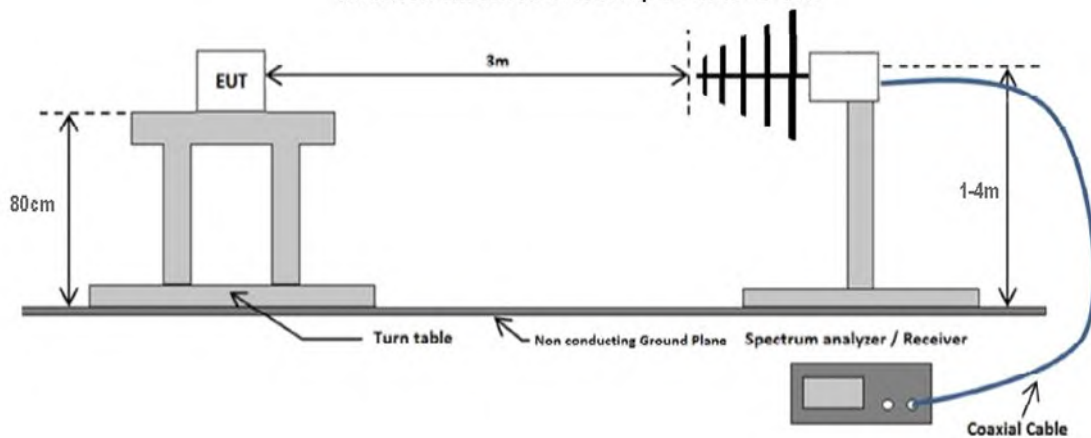
Frequency Range (MHZ)	Field Strength (µV/m)	Measurement Distance (m)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 960	200	3
Above 960	500	3

7.7.2 Test Setup

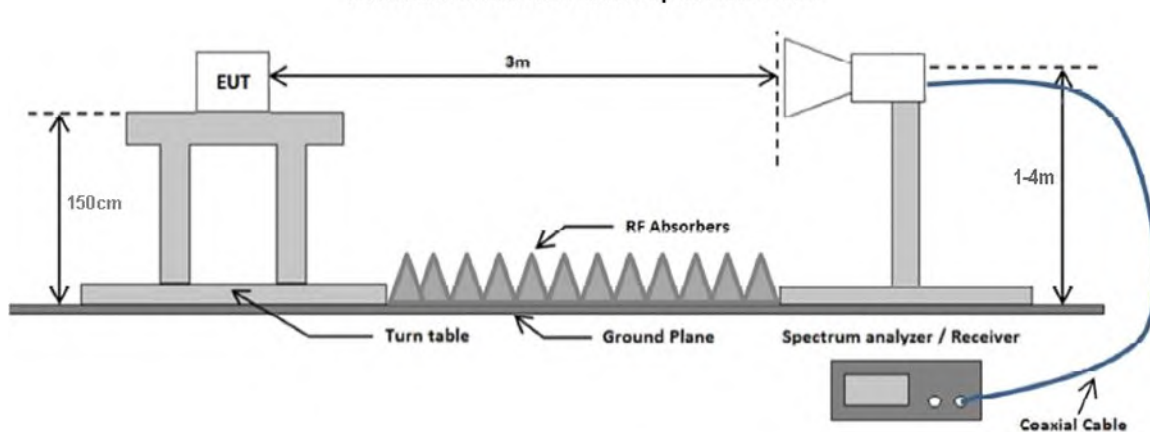
Radiated emissions test setup 9KHz - 30MHz



Radiated emissions test setup 30 MHz - 1 GHz



Radiated emissions test setup above 1 GHz



7.7.3 Test Procedure

According to subclause 12.7, radiated spurious emission measurements, in ANSI C63.10-2020:

- 1) The EUT was switched on and allowed to warm up to its normal operating condition.
- 2) The test was carried out at the selected frequency points obtained from the EUT characterization. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:
 - a. Vertical or horizontal polarization (whichever gave the higher emission level over a full rotation of the EUT was chosen.
 - b. The EUT was then rotated to the direction that gave the maximum emission.
 - c. Finally, the antenna height was adjusted to the height that gave the maximum emission.
- 3) The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 300Hz for frequencies below 150kHz.
- 4) The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 10kHz for frequency between 150kHz-30MHz.
- 5) The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for quasi-peak detection at frequency between 30MHz-1GHz.
- 6) The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz with peak detection for peak and average measurement at frequency above 1GHz.
- 7) Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.

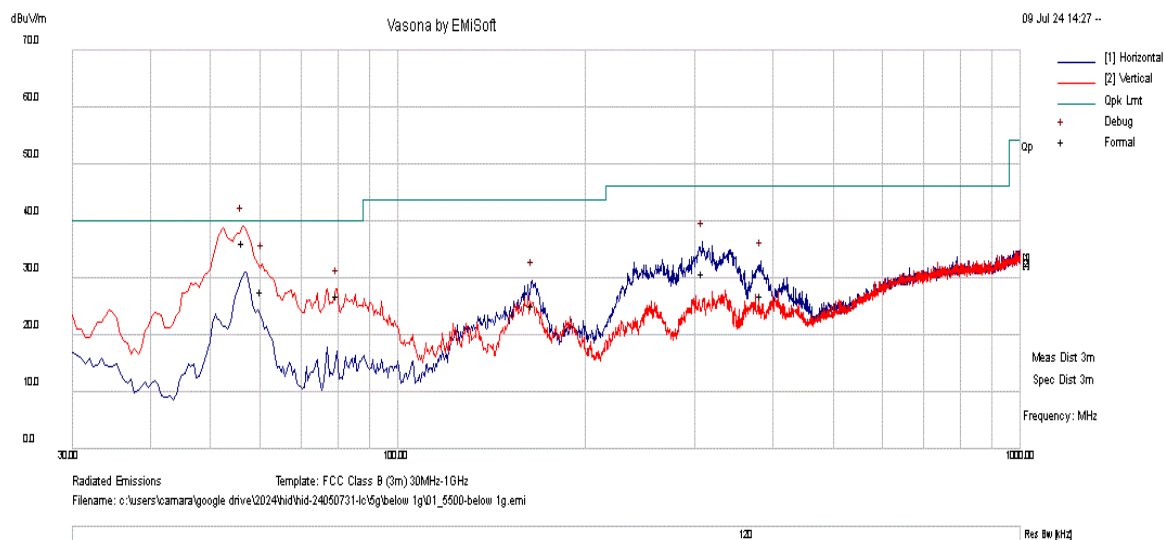
7.7.4 Test Result

Radiated Emission between 9KHz – 30MHz test result

Note: between 9KHz - 30MHz, no substantial emission close to limits. Different modes have been verified.

RADIATED SPURIOUS EMISSION BELOW 1GHZ

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11a, 5500MHz
Frequency Range:	30 MHz - 1 GHz	Test Date:	06/25/2024
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Lining
Remark:	N/A	Test Result:	Pass



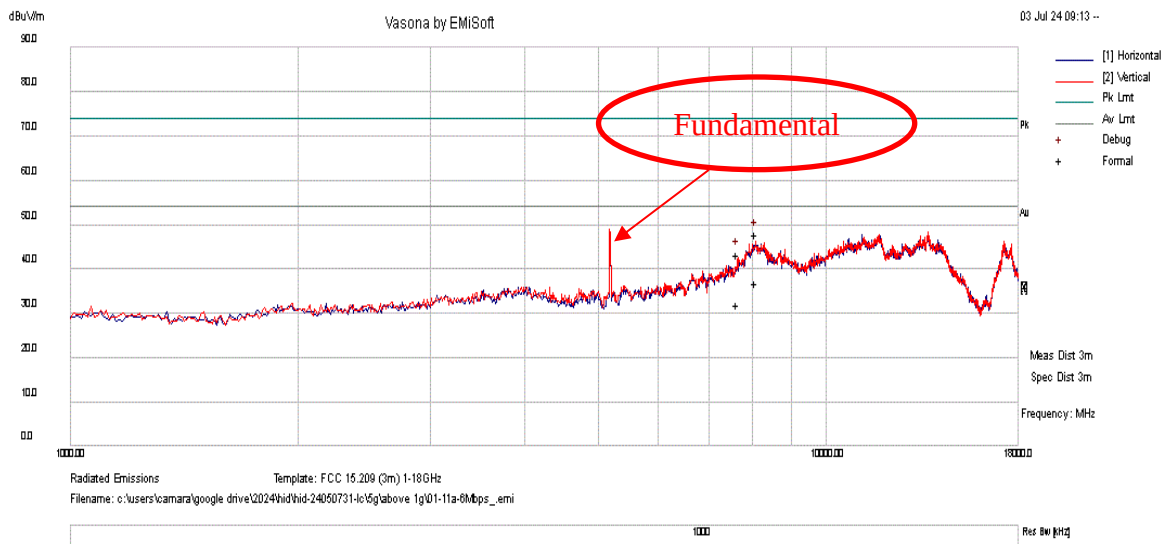
No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	56.36	54.30	2.93	-21.12	36.11	Quasi Max	V	100	158	40.00	-3.89	Pass
2	60.38	45.75	3.00	-21.02	27.73	Quasi Max	V	160	126	40.00	-12.27	Pass
3	308.28	37.73	5.74	-12.68	30.79	Quasi Max	H	112	326	46.00	-15.21	Pass
4	80.0	44.40	3.32	-20.74	26.98	Quasi Max	V	155	190	40.00	-13.02	Pass
5	383.09	29.03	6.27	-8.44	26.86	Quasi Max	H	120	219	46.00	-19.14	Pass
6	164.5	38.14	4.40	-17.45	25.09	Quasi Max	H	161	294	43.50	-18.41	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

RADIATED SPURIOUS EMISSION ABOVE 1GHZ

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11a, 5180MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

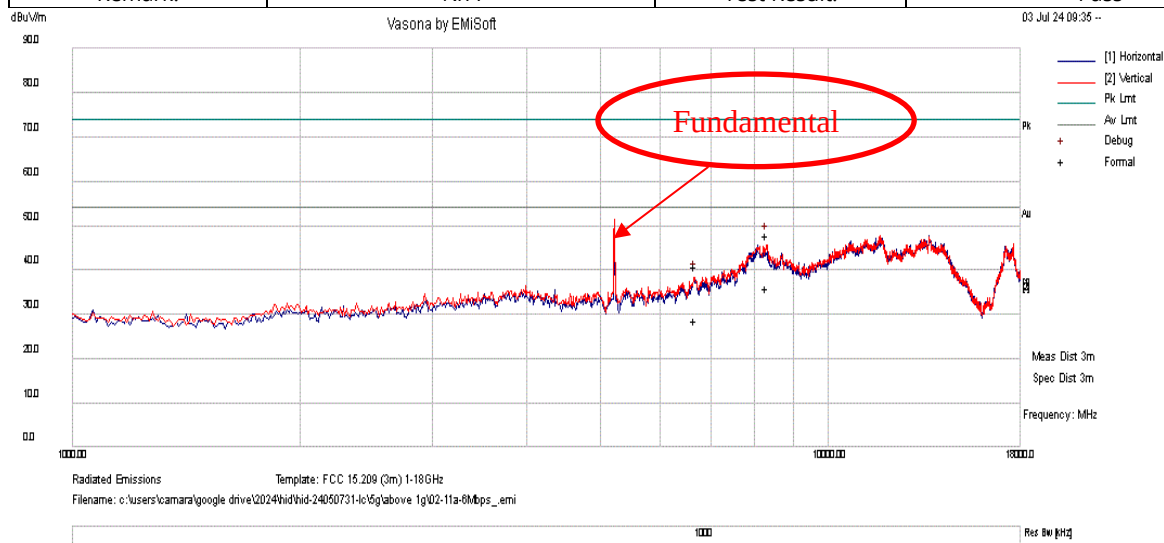


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8088.31	17.95	14.23	15.74	47.92	Peak Max	V	159	96	74.00	-26.08	Pass
2	7651.62	18.30	13.56	11.32	43.18	Peak Max	H	132	68	74.00	-30.82	Pass
3	8088.31	6.86	14.23	15.74	36.83	Average Max	V	159	96	54.00	-17.17	Pass
4	7651.62	7.17	13.56	11.32	32.05	Average Max	H	132	68	54.00	-21.95	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11a, 5220MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

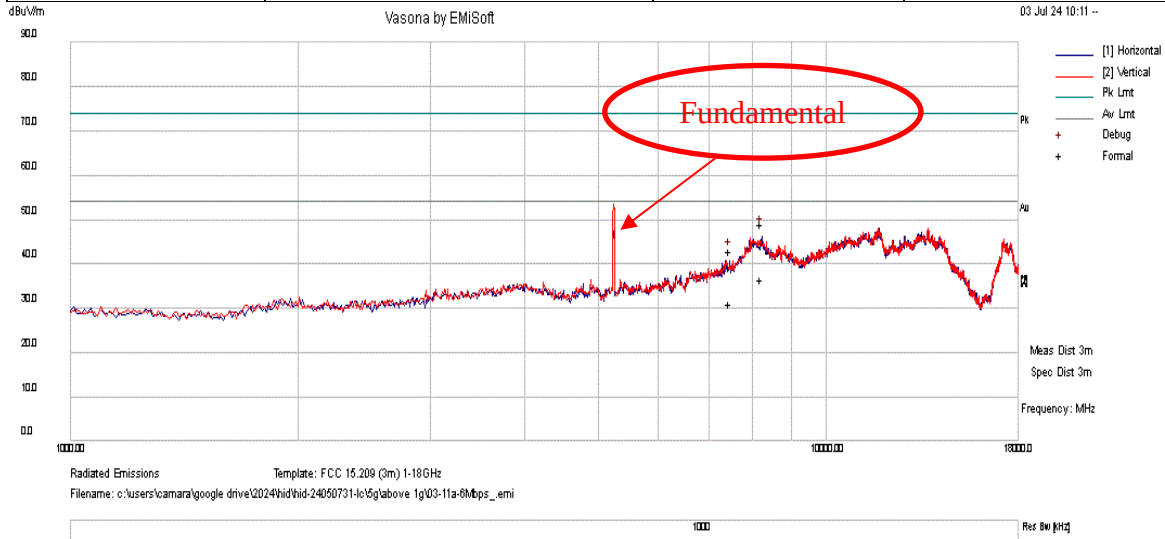


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8309.61	18.64	14.17	15.00	47.81	Peak Max	V	136	158	74.00	-26.19	Pass
2	6680.38	20.89	12.07	7.99	40.95	Peak Max	V	126	120	74.00	-33.05	Pass
3	8309.61	6.85	14.17	15.00	36.02	Average Max	V	136	158	54.00	-17.98	Pass
4	6680.38	8.68	12.07	7.99	28.74	Average Max	V	126	120	54.00	-25.26	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11a, 5240MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

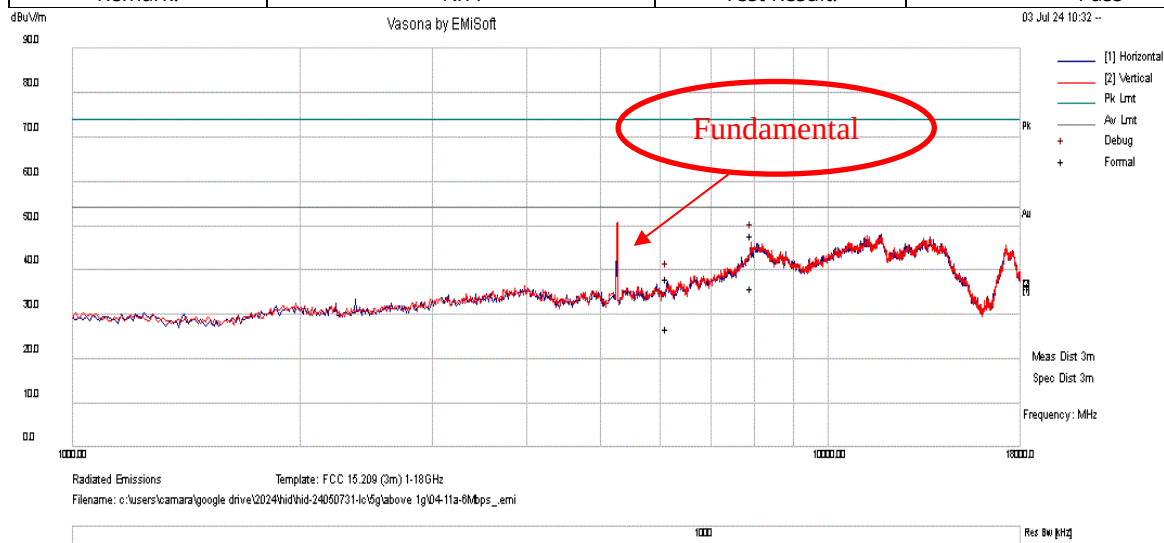


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8234.78	19.40	14.16	15.62	49.18	Peak Max	H	137	106	74.00	-24.82	Pass
2	7470.77	19.63	13.26	10.05	42.94	Peak Max	H	180	26	74.00	-31.06	Pass
3	8234.78	6.98	14.16	15.62	36.76	Average Max	H	137	106	54.00	-17.24	Pass
4	7470.77	7.68	13.26	10.05	30.99	Average Max	H	180	26	54.00	-23.01	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11a, 5260MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

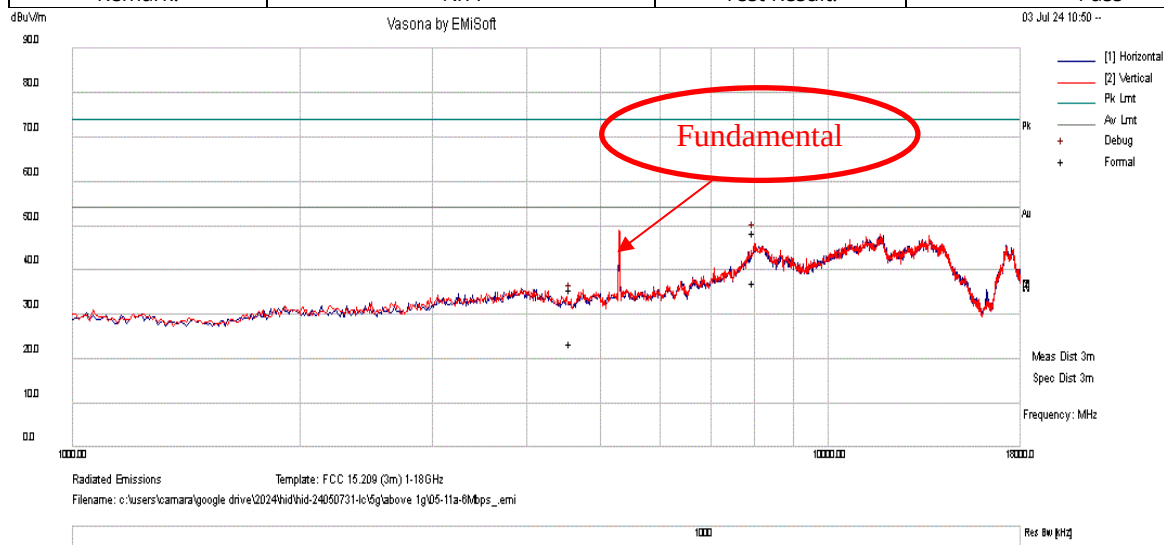


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	7926.23	18.98	14.11	14.81	47.90	Peak Max	V	180	116	74.00	-26.10	Pass
2	6133.06	19.60	11.83	6.76	38.19	Peak Max	H	169	66	74.00	-35.81	Pass
3	7926.23	7.17	14.11	14.81	36.09	Average Max	V	180	116	54.00	-17.91	Pass
4	6133.06	8.35	11.83	6.76	26.94	Average Max	H	169	66	54.00	-27.06	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11a, 5300MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

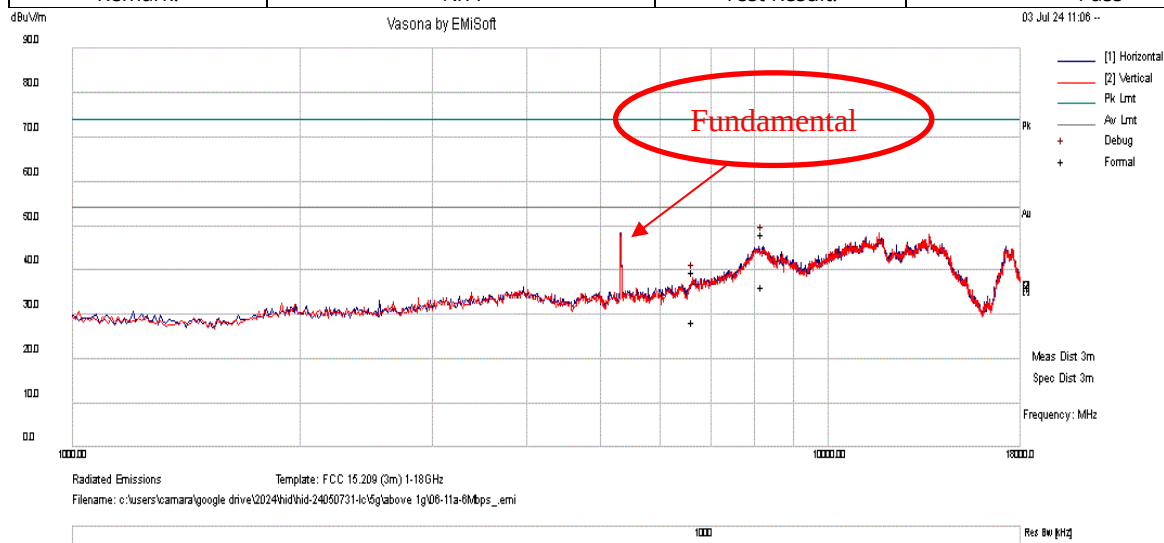


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	7989.99	18.68	14.25	15.72	48.65	Peak Max	V	140	0	74.00	-25.35	Pass
2	4569.42	21.46	8.68	5.53	35.67	Peak Max	H	114	66	74.00	-38.33	Pass
3	7989.99	7.15	14.25	15.72	37.12	Average Max	V	140	0	54.00	-16.88	Pass
4	4569.42	9.23	8.68	5.53	23.44	Average Max	H	114	66	54.00	-30.56	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11a, 5320MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

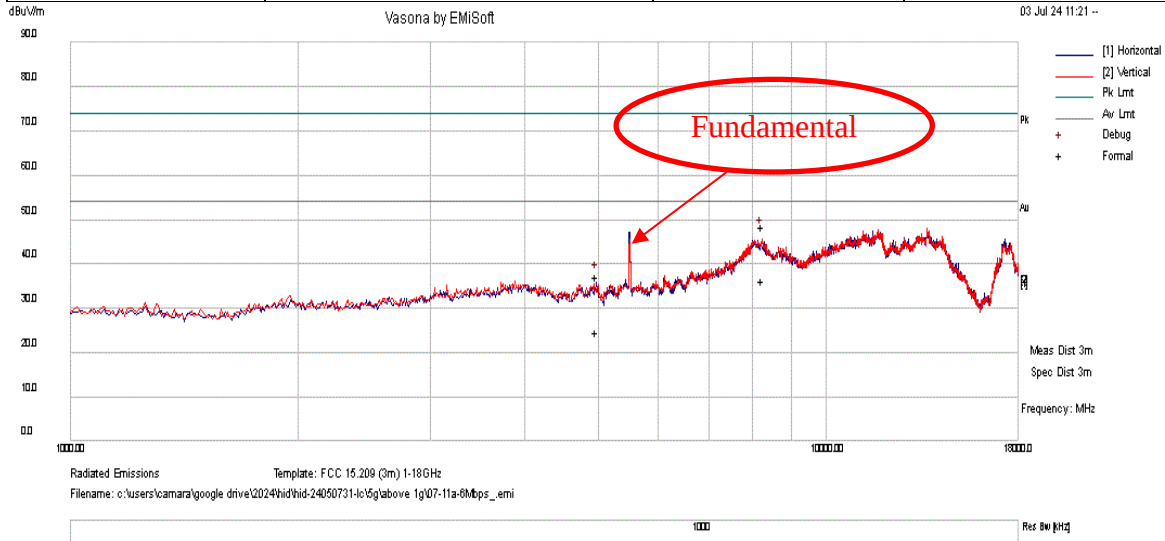


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8202.05	18.48	14.18	15.60	48.26	Peak Max	H	144	80	74.00	-25.74	Pass
2	6625.4	19.77	12.13	7.79	39.69	Peak Max	V	112	125	74.00	-34.31	Pass
3	8202.05	6.60	14.18	15.60	36.38	Average Max	H	144	80	54.00	-17.62	Pass
4	6625.4	8.43	12.13	7.79	28.35	Average Max	V	112	125	54.00	-25.65	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11a, 5500MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

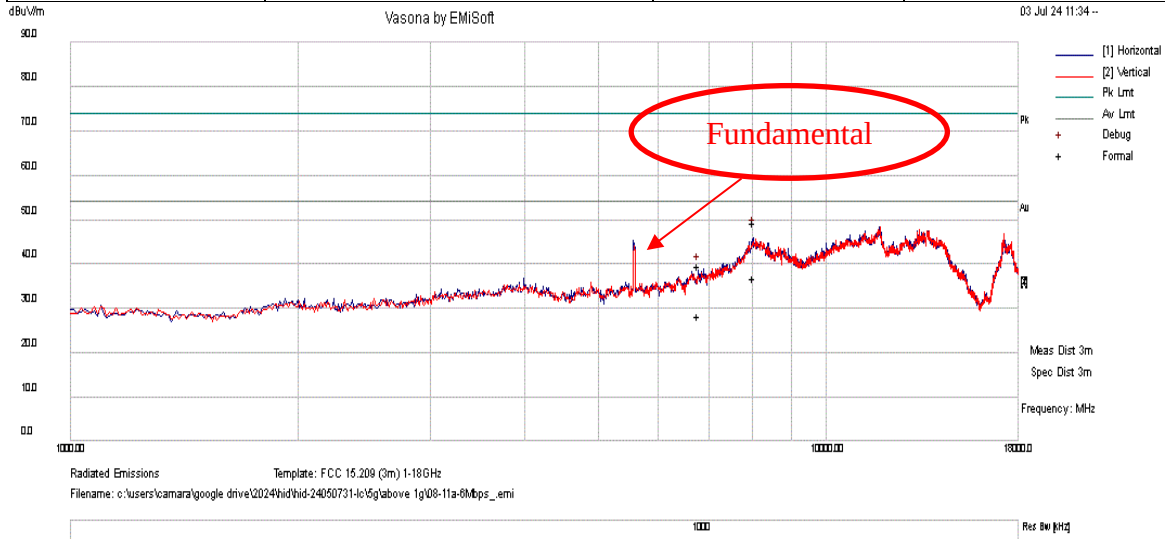


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8235.78	18.74	14.16	15.62	48.52	Peak Max	V	169	0	74.00	-25.48	Pass
2	4975.21	22.20	9.48	5.59	37.27	Peak Max	H	122	56	74.00	-36.73	Pass
3	8235.78	6.69	14.16	15.62	36.47	Average Max	V	169	0	54.00	-17.53	Pass
4	4975.21	9.58	9.48	5.59	24.65	Average Max	H	122	56	54.00	-29.35	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11a, 5580MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

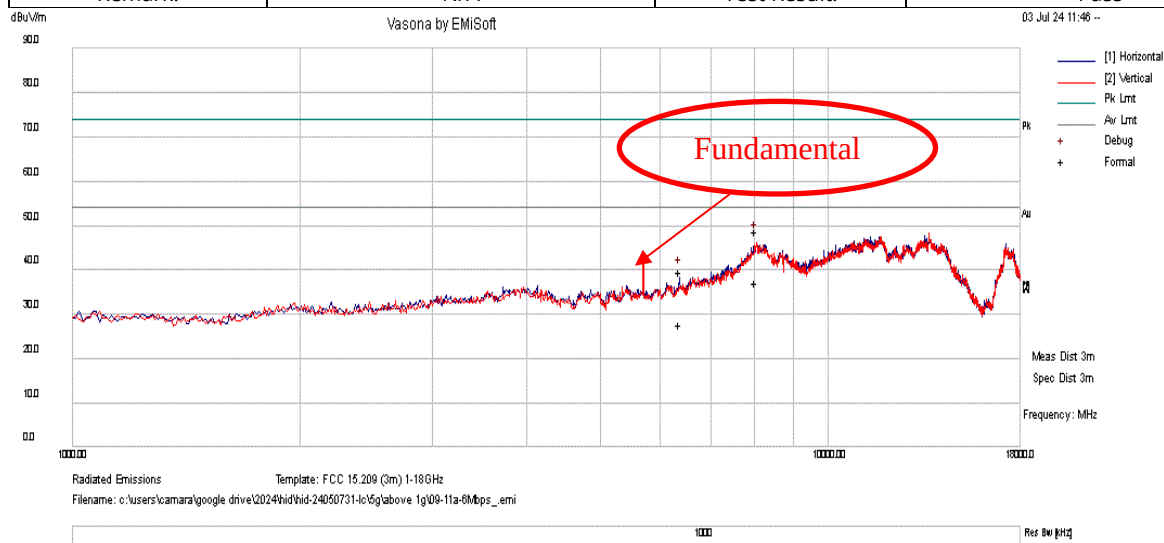


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8031.98	19.45	14.26	15.84	49.55	Peak Max	H	193	181	74.00	-24.45	Pass
2	6784.18	19.04	12.07	8.46	39.57	Peak Max	H	122	172	74.00	-34.43	Pass
3	8031.98	6.98	14.26	15.84	37.08	Average Max	H	193	181	54.00	-16.92	Pass
4	6784.18	7.99	12.07	8.46	28.52	Average Max	H	122	172	54.00	-25.48	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11a, 5700MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

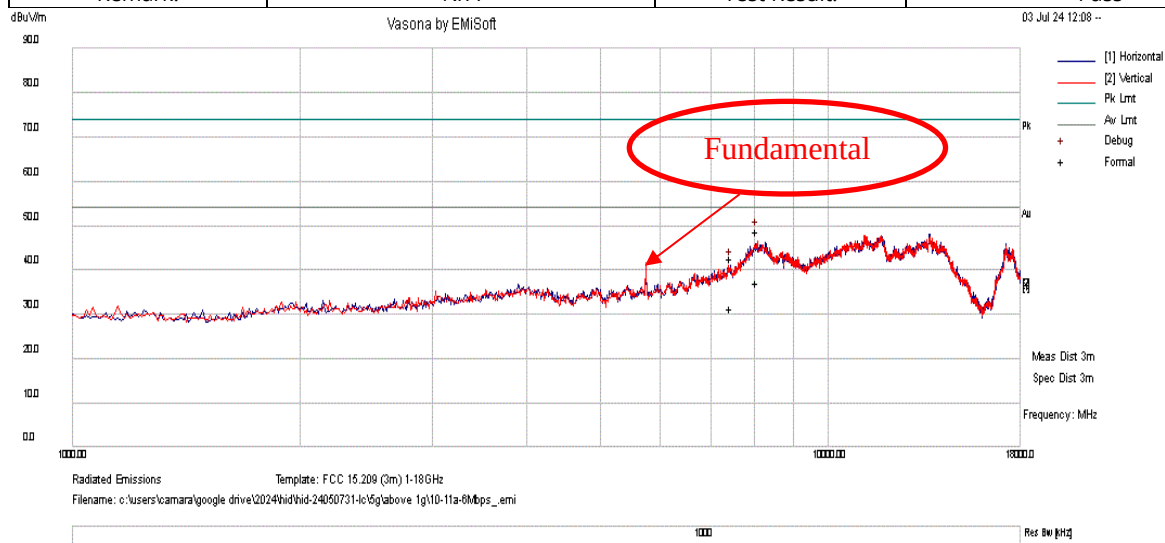


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8046.1	18.70	14.25	15.83	48.78	Peak Max	V	111	39	74.00	-25.22	Pass
2	6365.84	20.83	12.04	6.78	39.65	Peak Max	H	114	123	74.00	-34.35	Pass
3	8046.1	7.06	14.25	15.83	37.14	Average Max	V	111	39	54.00	-16.86	Pass
4	6365.84	9.11	12.04	6.78	27.93	Average Max	H	114	123	54.00	-26.07	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11a, 5745MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

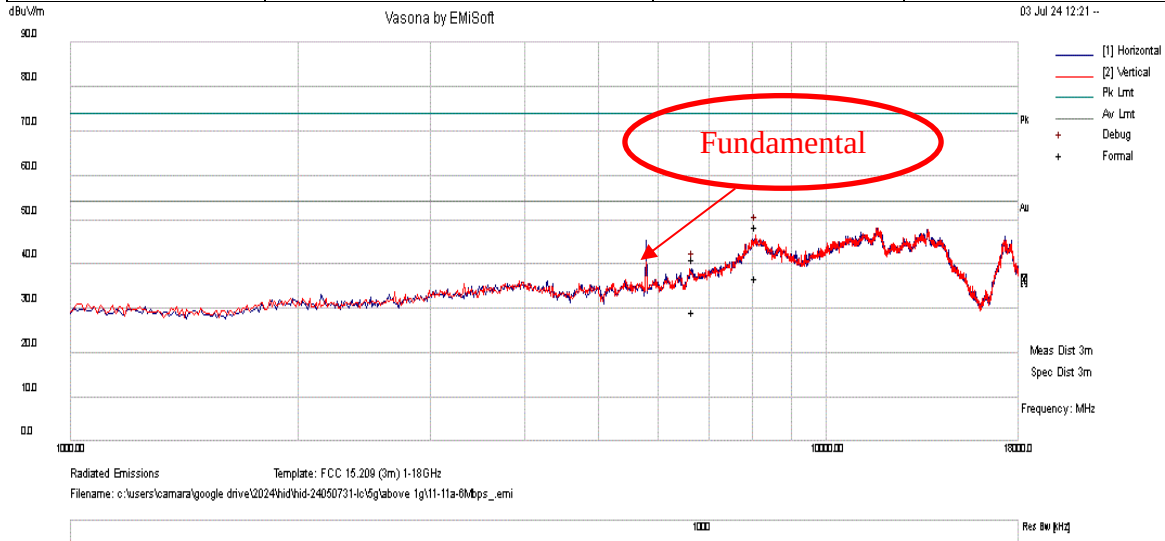


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8063.91	18.82	14.24	15.79	48.85	Peak Max	V	180	0	74.00	-25.15	Pass
2	7433.92	19.49	13.17	9.99	42.65	Peak Max	H	153	137	74.00	-31.35	Pass
3	8063.91	7.12	14.24	15.79	37.15	Average Max	V	180	0	54.00	-16.85	Pass
4	7433.92	8.37	13.17	9.99	31.53	Average Max	H	153	137	54.00	-22.47	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11a, 5785MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

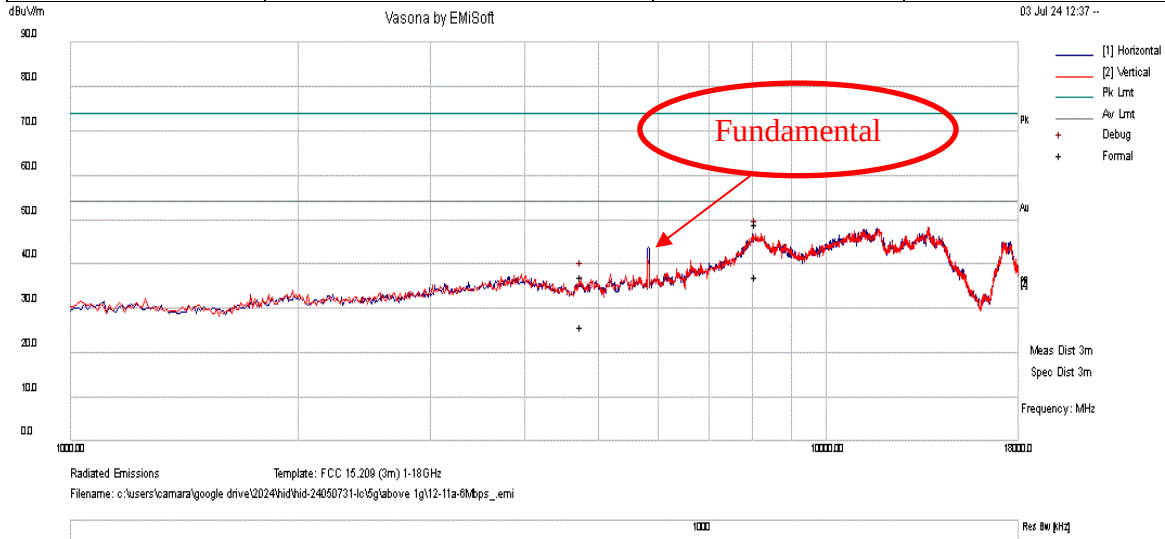


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8087.05	18.46	14.23	15.74	48.43	Peak Max	V	112	6	74.00	-25.57	Pass
2	6678.91	21.23	12.07	7.99	41.29	Peak Max	H	114	82	74.00	-32.71	Pass
3	8087.05	6.84	14.23	15.74	36.81	Average Max	V	112	6	54.00	-17.19	Pass
4	6678.91	9.15	12.07	7.99	29.21	Average Max	H	114	82	54.00	-24.79	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11a, 5825MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

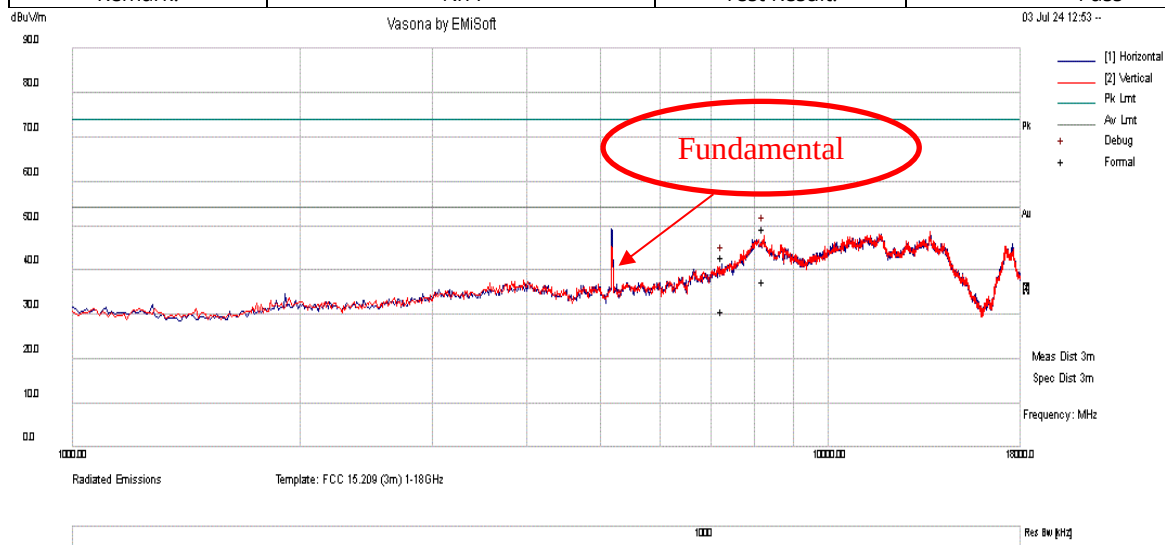


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8076.65	19.22	14.24	15.77	49.23	Peak Max	H	102	111	74.00	-24.77	Pass
2	4749.47	22.45	9.02	5.92	37.39	Peak Max	V	142	76	74.00	-36.61	Pass
3	8076.65	7.38	14.24	15.77	37.39	Average Max	H	102	111	54.00	-16.61	Pass
4	4749.47	11.15	9.02	5.92	26.09	Average Max	V	142	76	54.00	-27.91	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11ac, 5180MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

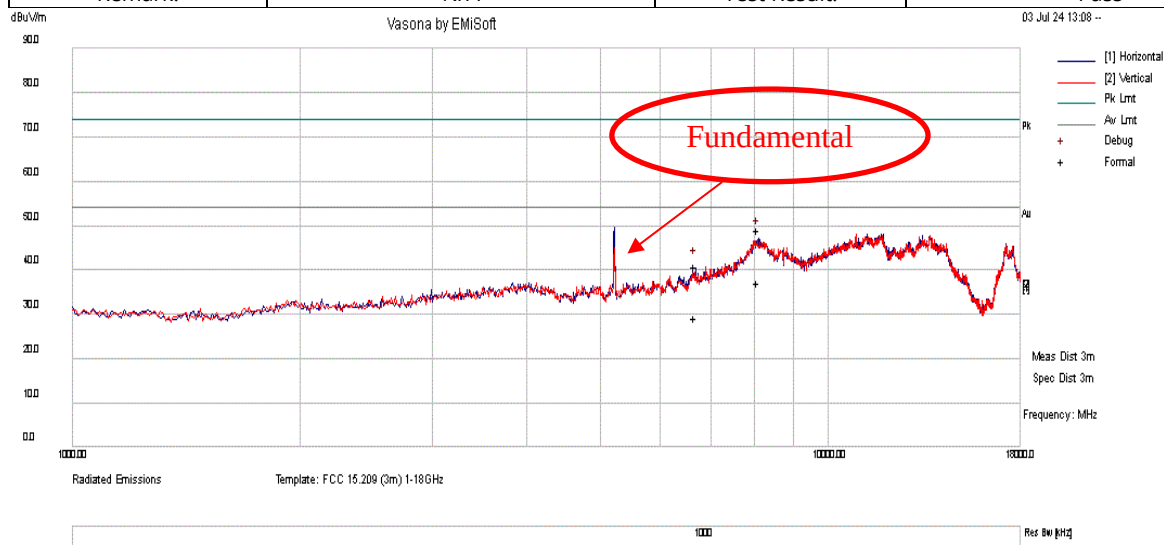


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8235.09	19.75	14.16	15.62	49.53	Peak Max	V	152	102	74.00	-24.47	Pass
2	7249.8	21.03	12.70	9.42	43.15	Peak Max	H	135	95	74.00	-30.85	Pass
3	8235.09	7.64	14.16	15.62	37.42	Average Max	V	152	102	54.00	-16.58	Pass
4	7249.8	8.66	12.70	9.42	30.78	Average Max	H	135	95	54.00	-23.22	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11ac, 5220MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

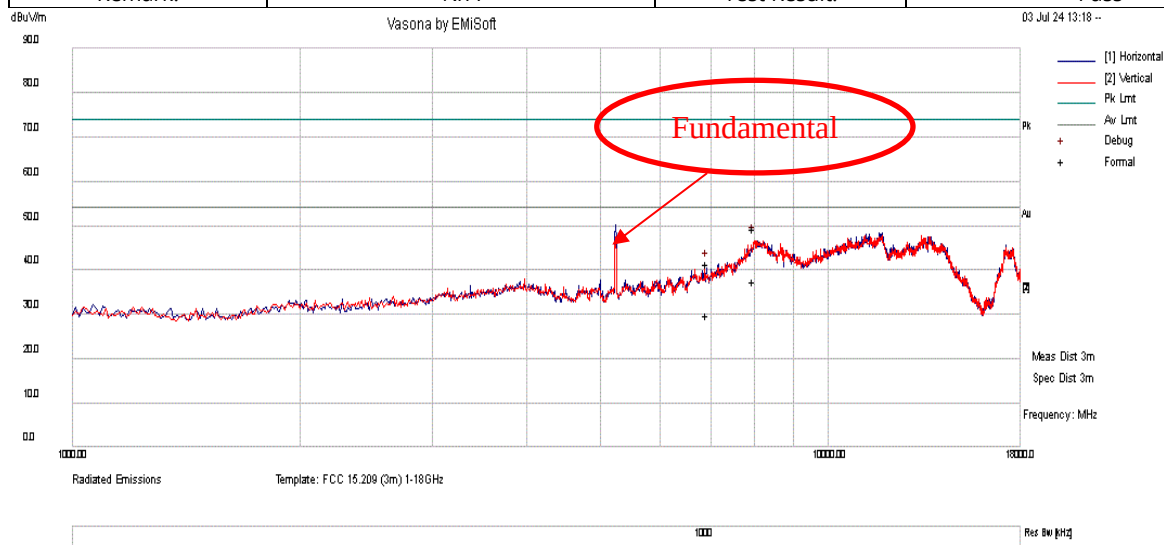


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8097.99	19.17	14.23	15.72	49.12	Peak Max	H	159	158	74.00	-24.88	Pass
2	6680.88	20.90	12.07	7.99	40.96	Peak Max	H	100	97	74.00	-33.04	Pass
3	8097.99	7.26	14.23	15.72	37.21	Average Max	H	159	158	54.00	-16.79	Pass
4	6680.88	9.17	12.07	7.99	29.23	Average Max	H	100	97	54.00	-24.77	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11ac, 5240MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

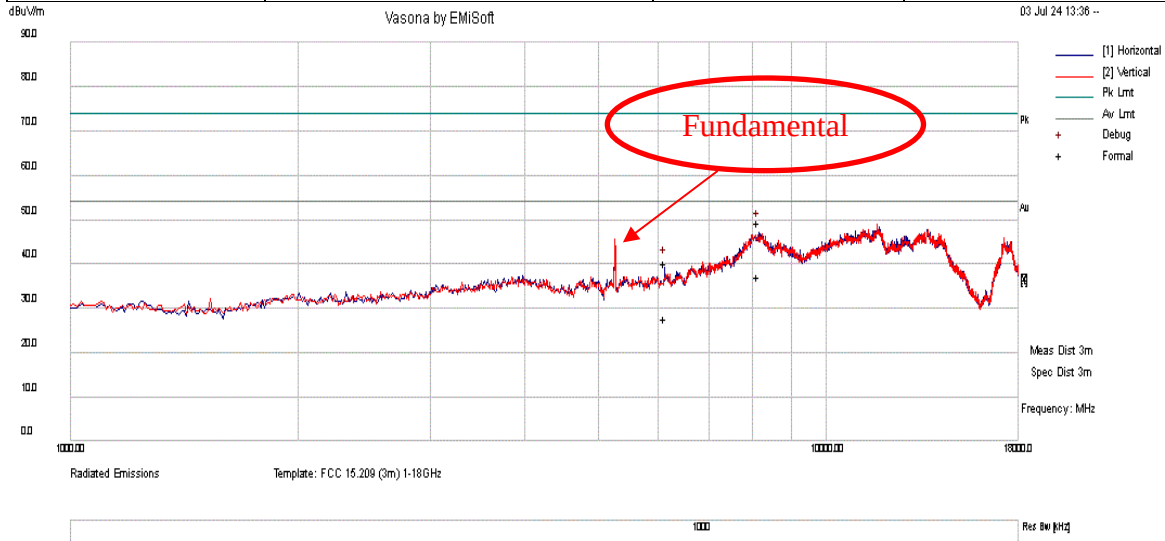


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	7978.17	19.61	14.22	15.54	49.37	Peak Max	H	137	162	74.00	-24.63	Pass
2	6914.7	20.47	12.40	8.76	41.63	Peak Max	H	107	172	74.00	-32.37	Pass
3	7978.17	7.73	14.22	15.54	37.49	Average Max	H	137	162	54.00	-16.51	Pass
4	6914.7	8.64	12.40	8.76	29.80	Average Max	H	107	172	54.00	-24.20	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11ac, 5260MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

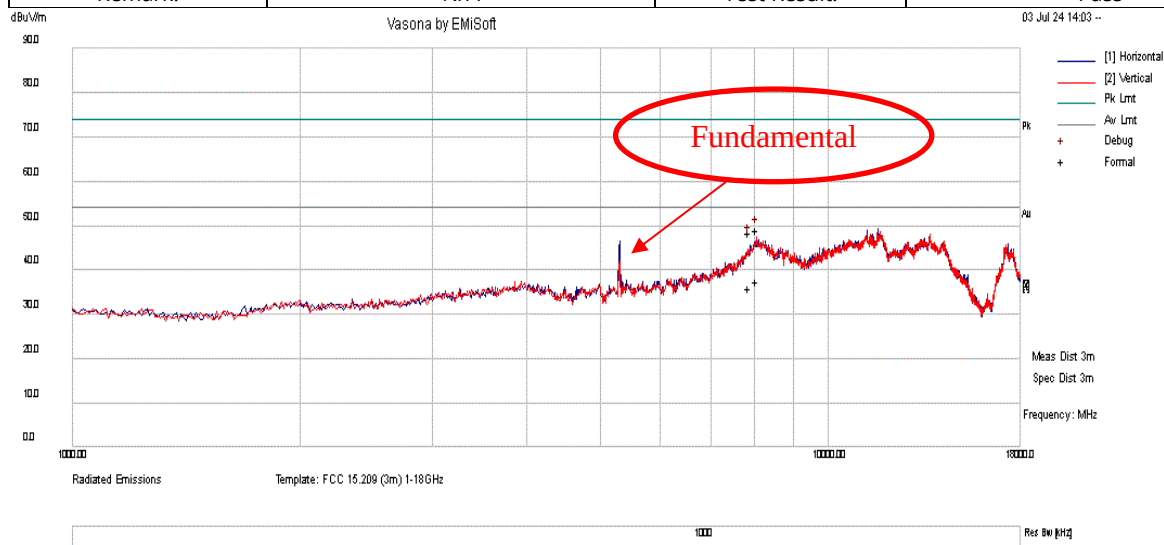


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8150.84	19.65	14.20	15.64	49.49	Peak Max	H	160	138	74.00	-24.51	Pass
2	6119.58	21.66	11.83	6.73	40.22	Peak Max	H	129	111	74.00	-33.78	Pass
3	8150.84	7.27	14.20	15.64	37.11	Average Max	H	160	138	54.00	-16.89	Pass
4	6119.58	9.25	11.83	6.73	27.81	Average Max	H	129	111	54.00	-26.19	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11ac, 5300MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

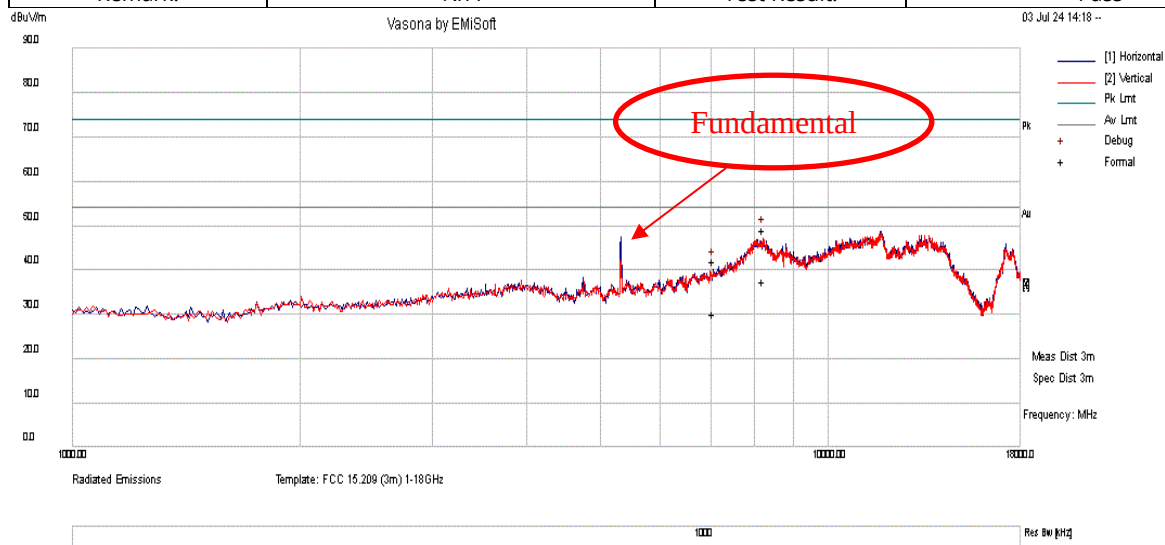


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8053.47	18.94	14.25	15.82	49.01	Peak Max	V	118	68	74.00	-24.99	Pass
2	7884.48	20.24	14.01	14.21	48.46	Peak Max	H	153	161	74.00	-25.54	Pass
3	8053.47	7.59	14.25	15.82	37.66	Average Max	V	118	68	54.00	-16.34	Pass
4	7884.48	7.92	14.01	14.21	36.14	Average Max	H	153	161	54.00	-17.86	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11ac, 5320MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

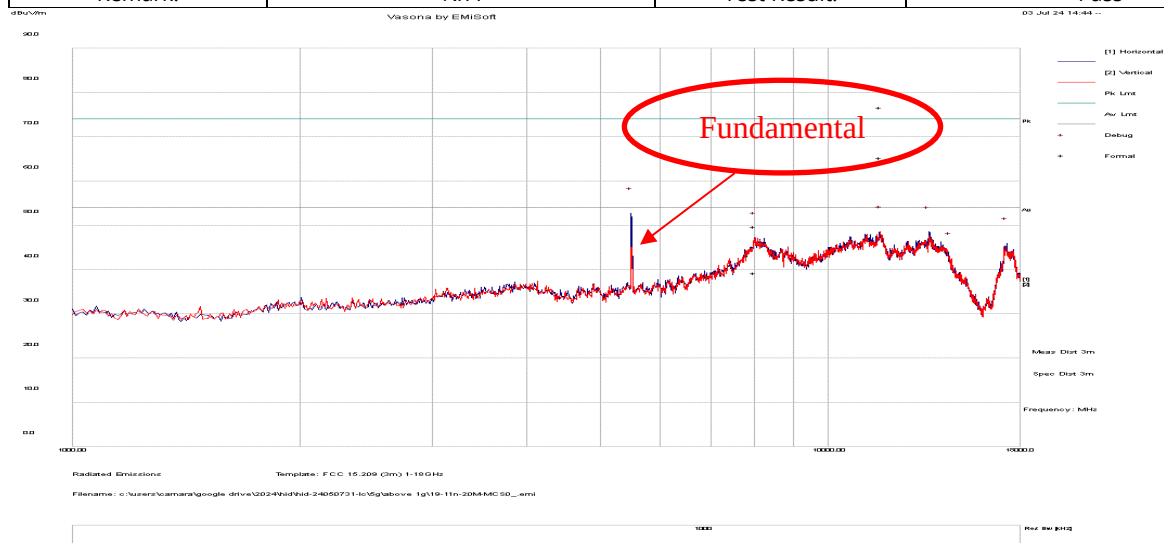


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8226.17	19.23	14.17	15.61	49.01	Peak Max	V	132	11	74.00	-24.99	Pass
2	7053.22	20.46	12.62	9.14	42.22	Peak Max	H	122	21	74.00	-31.78	Pass
3	8226.17	7.62	14.17	15.61	37.40	Average Max	V	132	11	54.00	-16.60	Pass
4	7053.22	8.47	12.62	9.14	30.23	Average Max	H	122	21	54.00	-23.77	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11ac, 5500MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

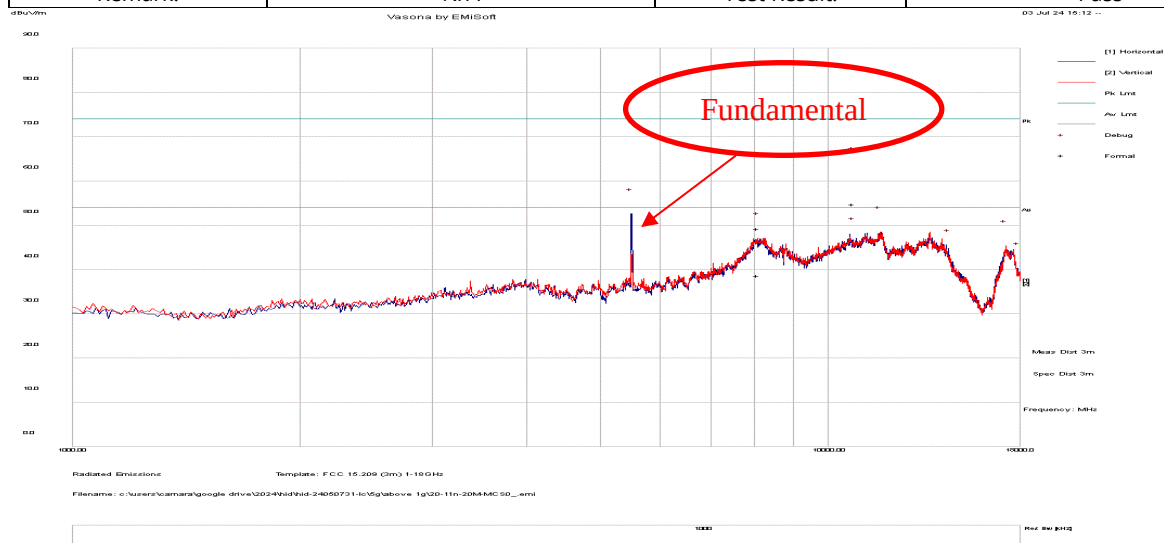


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	11741.56	22.19	18.34	16.15	56.68	Peak Max	V	132	84	74.00	-17.32	Pass
2	8011.57	19.61	14.26	15.85	49.72	Peak Max	V	171	122	74.00	-24.28	Pass
3	11741.56	0.80	18.30	16.10	35.20	Average Max	V	132	84	54.00	-18.80	Pass
4	8011.57	9.13	14.26	15.85	39.24	Average Max	V	171	122	54.00	-14.76	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11ac, 5580MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

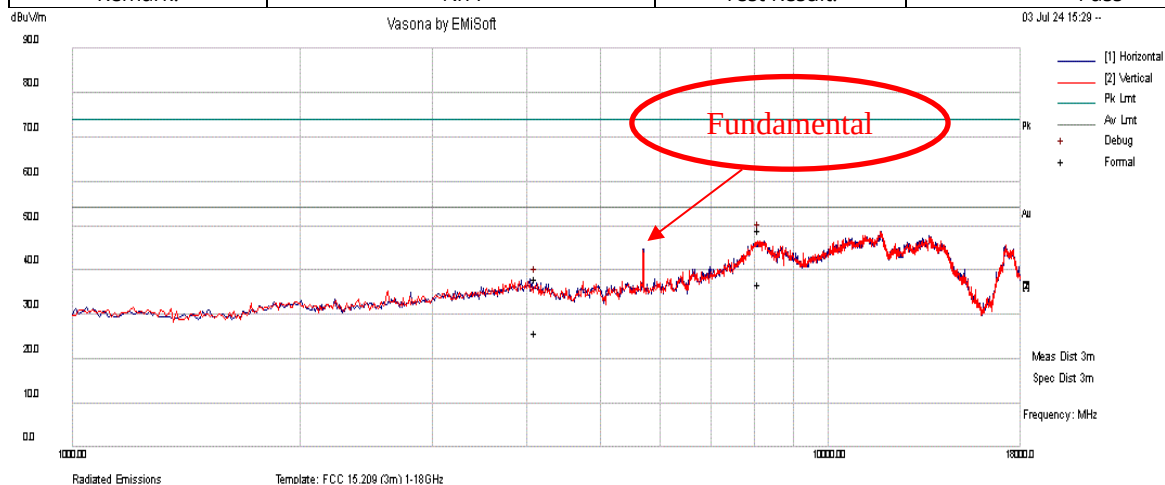


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8074.28	19.28	14.24	15.77	49.29	Peak Max	V	173	39	74.00	-24.71	Pass
2	10806.35	35.27	17.27	15.02	67.56	Peak Max	H	108	249	74.00	-6.44	Pass
3	8074.28	8.70	14.24	15.77	38.71	Average Max	V	173	39	54.00	-15.29	Pass
4	10806.35	12.50	17.30	15.00	44.80	Average Max	H	108	249	54.00	-9.20	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11ac, 5700MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

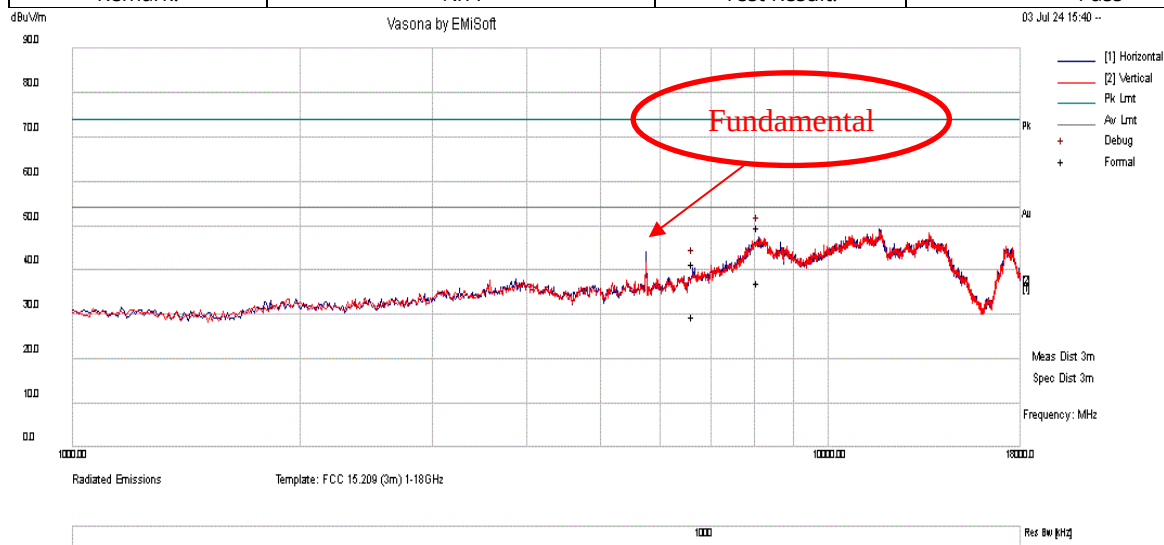


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8106.283	19.30	14.20	15.70	49.20	Peak Max	H	163	112	74	-24.80	Pass
2	4102.076	23.30	9.80	5.00	38.10	Peak Max	H	151	1	74	-35.90	Pass
3	8106.283	7.10	14.20	15.70	37.00	Average Max	H	163	112	54	-17.00	Pass
4	4102.076	11.10	9.80	5.00	25.90	Average Max	H	151	1	54	-28.10	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11ac, 5745MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

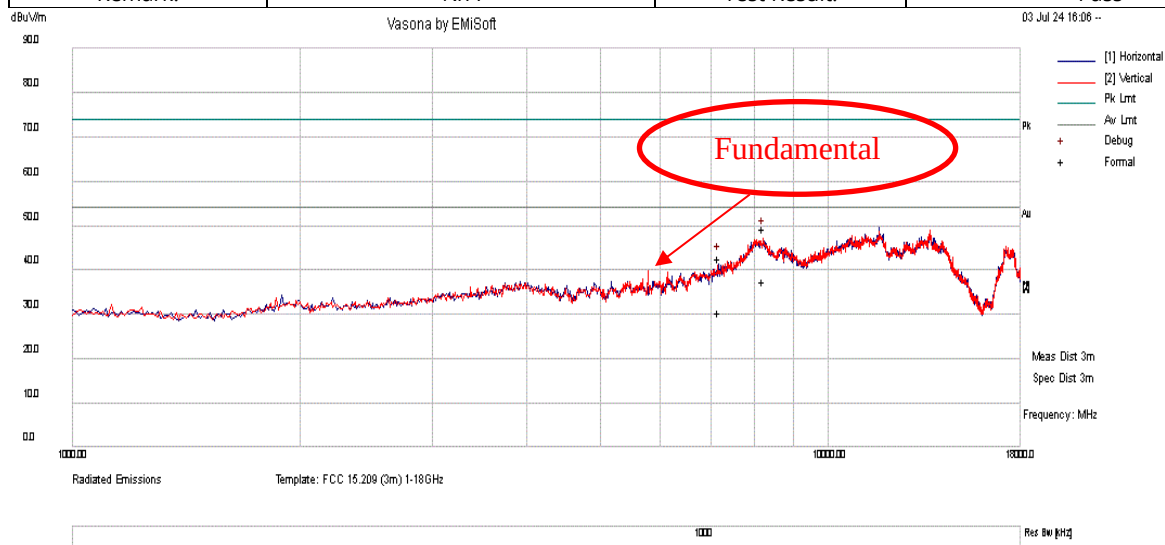


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8098.3	19.84	14.23	15.72	49.79	Peak Max	H	191	131	74.00	-24.21	Pass
2	6631.18	21.66	12.13	7.81	41.60	Peak Max	H	154	6	74.00	-32.40	Pass
3	8098.3	7.26	14.23	15.72	37.21	Average Max	H	191	131	54.00	-16.79	Pass
4	6631.18	9.58	12.13	7.81	29.52	Average Max	H	154	6	54.00	-24.48	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11ac, 5785MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

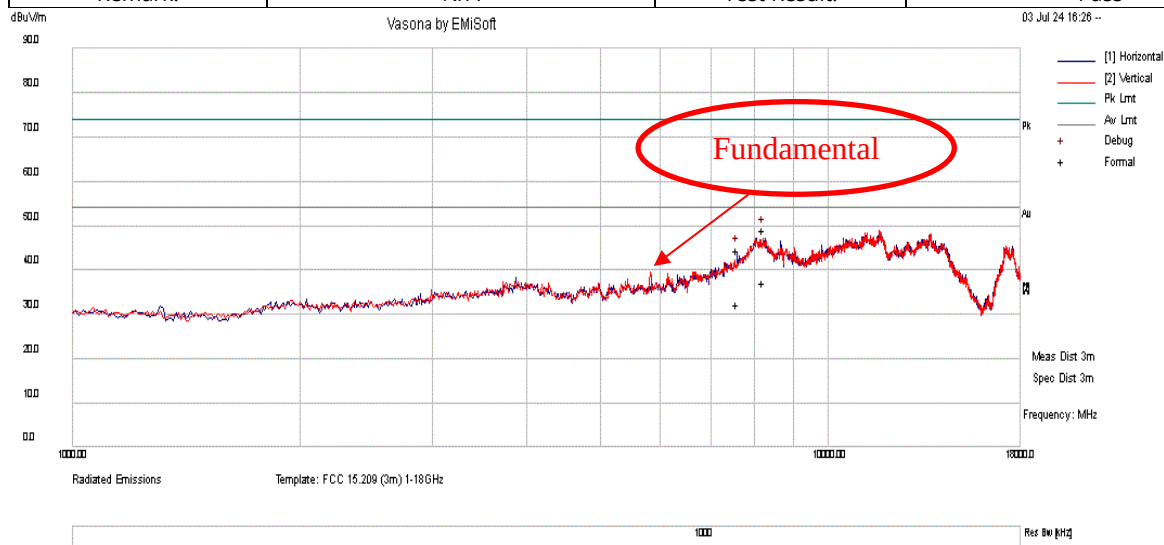


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8223.55	19.59	14.17	15.61	49.37	Peak Max	V	168	96	74.00	-24.63	Pass
2	7171.65	20.63	12.67	9.34	42.64	Peak Max	H	168	162	74.00	-31.36	Pass
3	8223.55	7.64	14.17	15.61	37.42	Average Max	V	168	96	54.00	-16.58	Pass
4	7171.65	8.57	12.67	9.34	30.58	Average Max	H	168	162	54.00	-23.42	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11ac, 5825MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

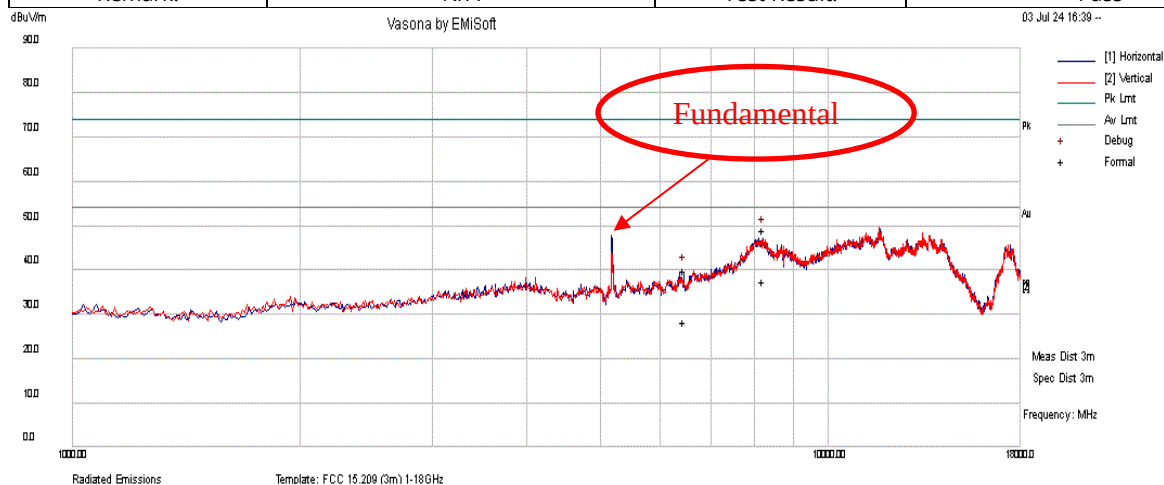


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8223.95	19.48	14.17	15.61	49.26	Peak Max	V	131	27	74.00	-24.74	Pass
2	7601.61	20.11	13.49	10.84	44.44	Peak Max	H	100	0	74.00	-29.56	Pass
3	8223.95	7.57	14.17	15.61	37.35	Average Max	V	131	27	54.00	-16.65	Pass
4	7601.61	7.98	13.49	10.84	32.31	Average Max	H	100	0	54.00	-21.69	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11n, 5180MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

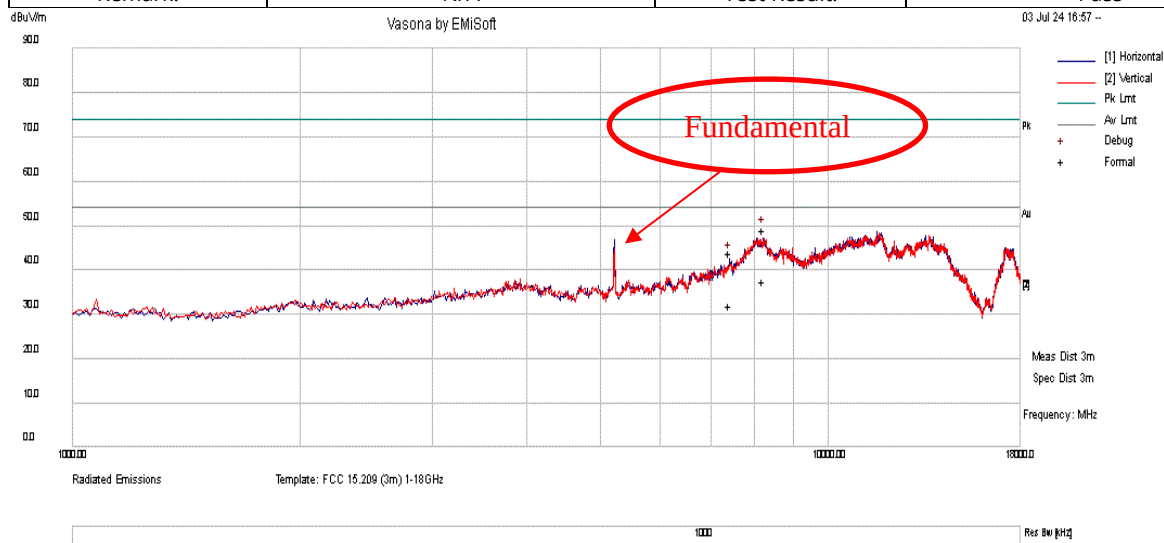


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8225.51	19.46	14.17	15.61	49.24	Peak Max	H	122	74	74.00	-24.76	Pass
2	6450.53	20.64	12.19	7.00	39.83	Peak Max	H	126	25	74.00	-34.17	Pass
3	8225.51	7.64	14.17	15.61	37.42	Average Max	H	122	74	54.00	-16.58	Pass
4	6450.53	9.19	12.19	7.00	28.38	Average Max	H	126	25	54.00	-25.62	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11n, 5220MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/03/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

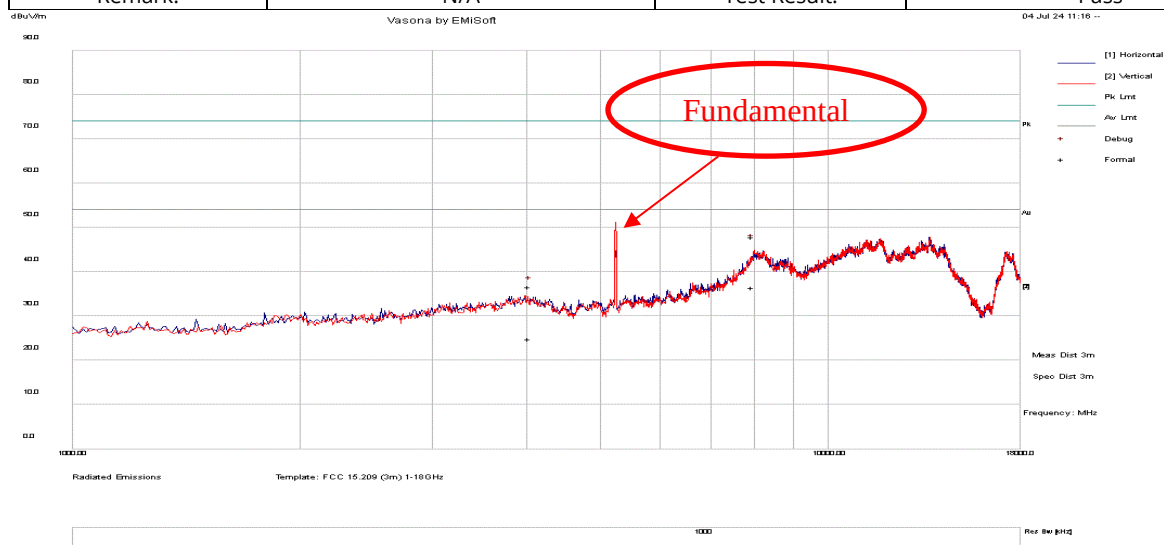


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8224.03	19.41	14.17	15.61	49.19	Peak Max	H	154	159	74.00	-24.81	Pass
2	7428.07	20.73	13.15	9.98	43.86	Peak Max	H	162	20	74.00	-30.14	Pass
3	8224.03	7.62	14.17	15.61	37.40	Average Max	H	154	159	54.00	-16.60	Pass
4	7428.07	8.82	13.15	9.98	31.95	Average Max	H	162	20	54.00	-22.05	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11n, 5240MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/04/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

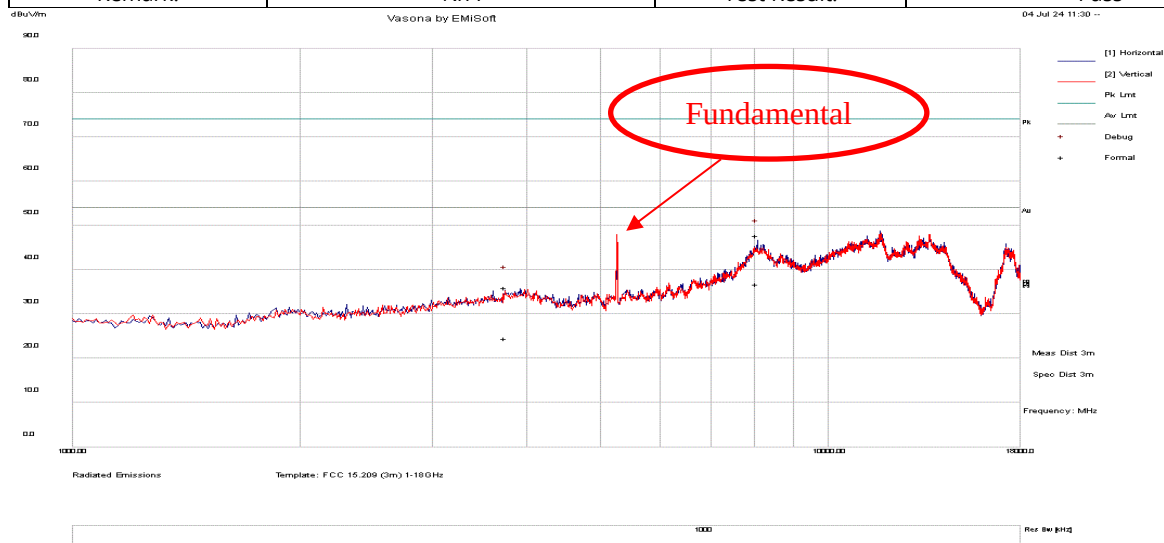


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	7965.44	18.34	14.19	15.36	47.89	Peak Max	H	130	181	74.00	-26.11	Pass
2	4031.61	21.61	9.91	5.09	36.61	Peak Max	H	181	121	74.00	-37.39	Pass
3	7965.44	6.93	14.19	15.36	36.48	Average Max	H	130	181	54.00	-17.52	Pass
4	4031.61	9.90	9.91	5.09	24.90	Average Max	H	181	121	54.00	-29.10	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11n, 5260MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/04/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

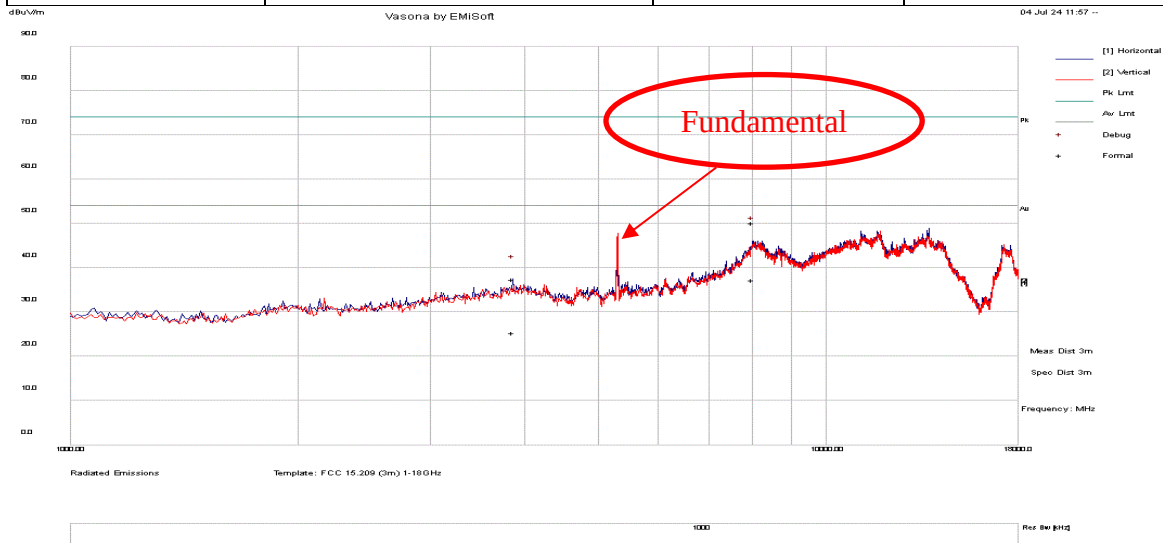


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8067.762	17.80	14.20	15.80	47.80	Peak Max	H	166	142	74	-26.20	Pass
2	3742.642	22.30	8.80	5.00	36.10	Peak Max	H	129	162	74	-37.90	Pass
3	8067.762	6.80	14.20	15.80	36.80	Average Max	H	166	142	54	-17.20	Pass
4	3742.642	10.90	8.80	5.00	24.70	Average Max	H	129	162	54	-29.30	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11n, 5300MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/04/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

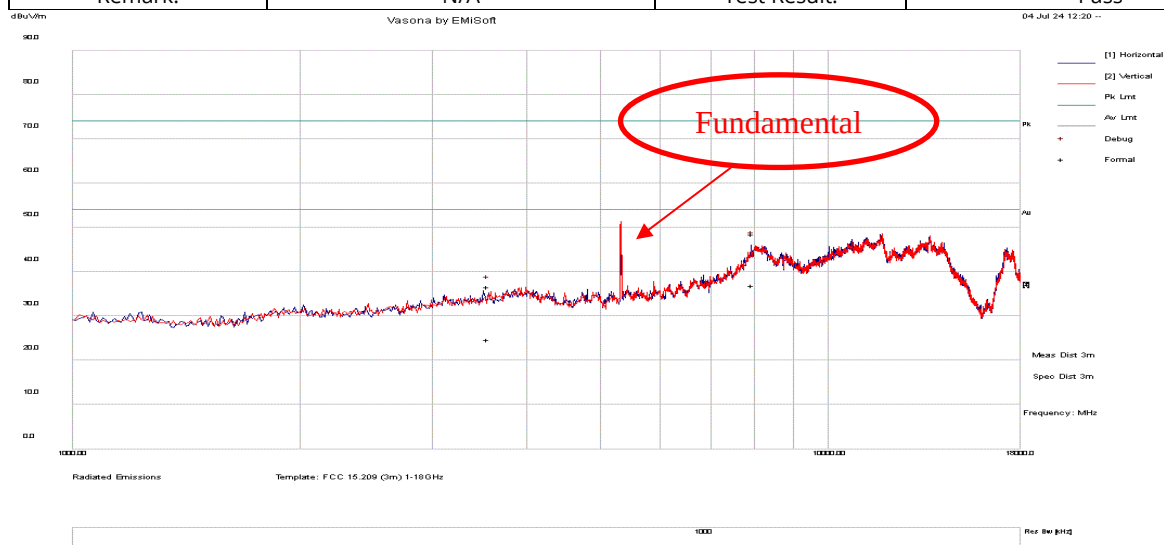


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8012.517	20.10	14.30	15.90	50.30	Peak Max	H	156	39	74	-23.70	Pass
2	3851.703	22.70	9.30	5.50	37.50	Peak Max	H	184	0	74	-36.50	Pass
3	8012.517	7.20	14.30	15.90	37.40	Average Max	H	156	39	54	-16.60	Pass
4	3851.703	10.50	9.30	5.50	25.30	Average Max	H	184	0	54	-28.70	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11n, 5320MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/04/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

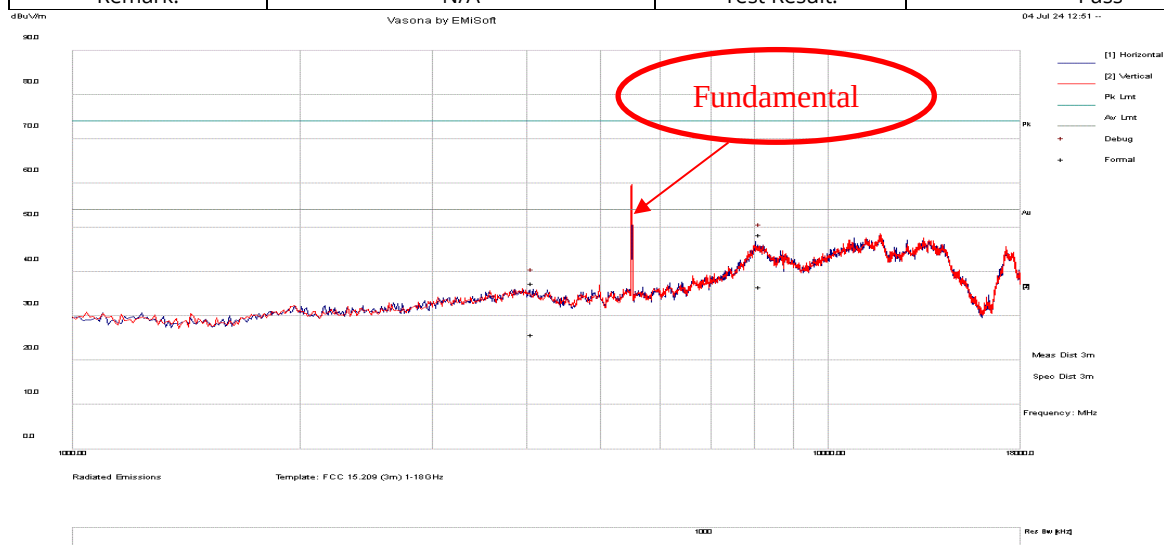


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	7965.34	19.00	14.20	15.40	48.60	Peak Max	H	155	135	74	-25.40	Pass
2	3547.177	23.90	8.30	4.40	36.60	Peak Max	H	156	52	74	-37.40	Pass
3	7965.34	7.40	14.20	15.40	37.00	Average Max	H	155	135	54	-17.00	Pass
4	3547.177	12.00	8.30	4.40	24.70	Average Max	H	156	52	54	-29.30	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11n, 5500MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/04/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

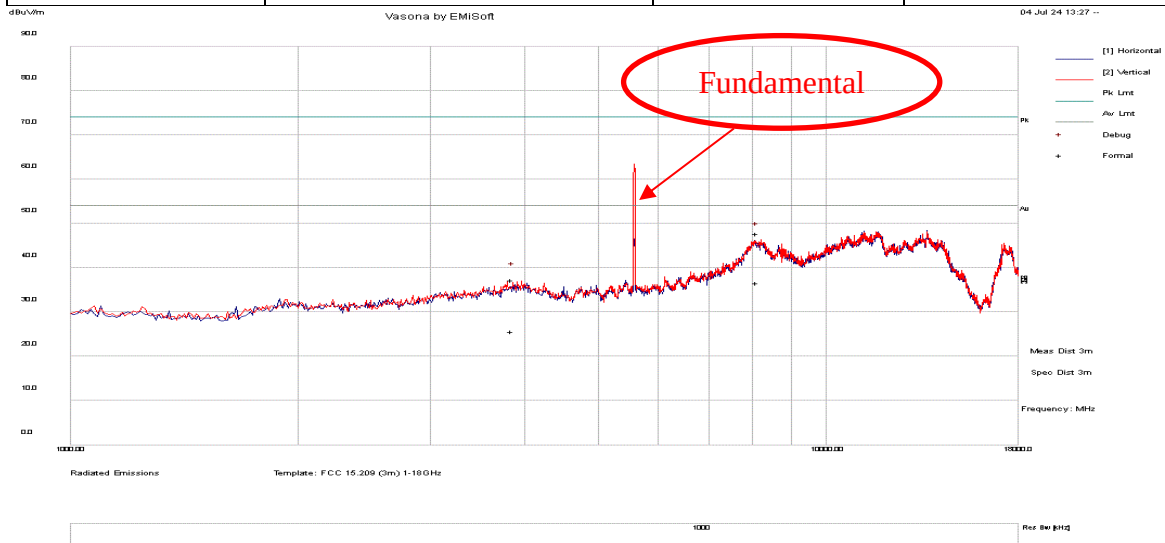


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8151.605	18.60	14.20	15.60	48.40	Peak Max	H	160	147	74	-25.60	Pass
2	4062.139	22.60	9.90	5.00	37.50	Peak Max	H	100	53	74	-36.50	Pass
3	8151.605	6.80	14.20	15.60	36.60	Average Max	H	160	147	54	-17.40	Pass
4	4062.139	10.90	9.90	5.00	25.80	Average Max	H	100	53	54	-28.20	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11n, 5580MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/04/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

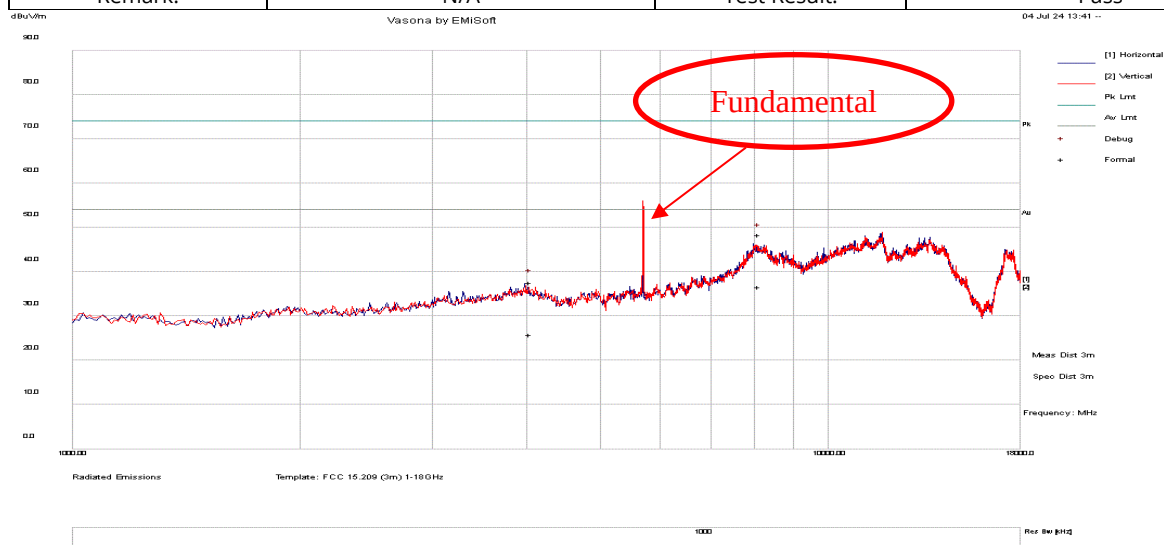


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8104.338	17.90	14.20	15.70	47.80	Peak Max	H	130	108	74	-26.20	Pass
2	3849.386	22.60	9.30	5.50	37.40	Peak Max	H	100	124	74	-36.60	Pass
3	8104.338	6.70	14.20	15.70	36.60	Average Max	H	130	108	54	-17.40	Pass
4	3849.386	10.90	9.30	5.50	25.70	Average Max	H	100	124	54	-28.30	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11n, 5700MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/04/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

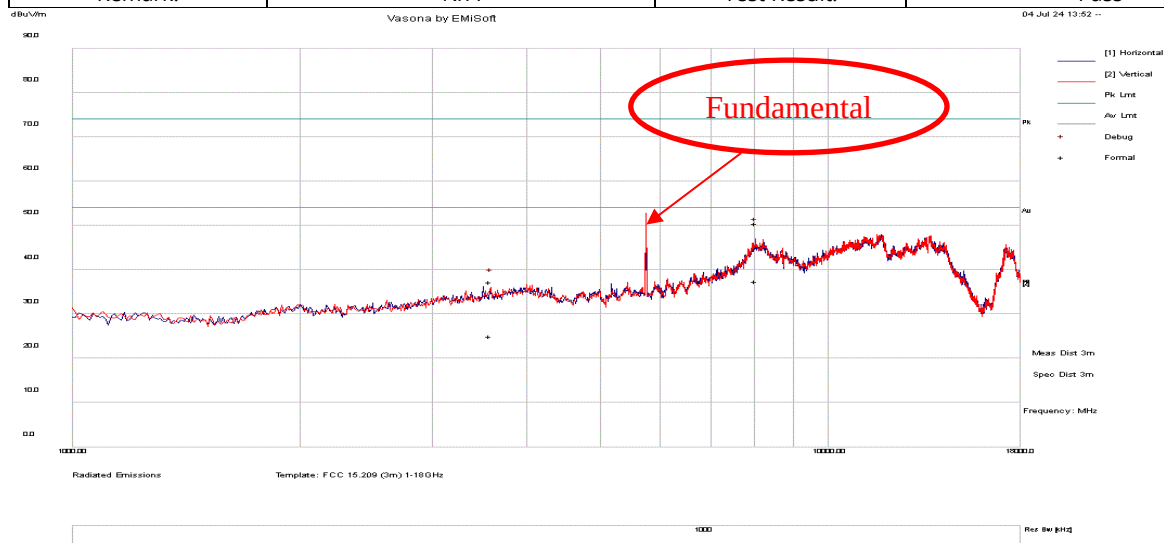


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8106.605	18.50	14.20	15.70	48.40	Peak Max	H	178	120	74	-25.60	Pass
2	4044.121	22.70	9.90	5.10	37.70	Peak Max	H	165	0	74	-36.30	Pass
3	8106.605	6.70	14.20	15.70	36.60	Average Max	H	178	120	54	-17.40	Pass
4	4044.121	10.80	9.90	5.10	25.80	Average Max	H	165	0	54	-28.20	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11n, 5745MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/04/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

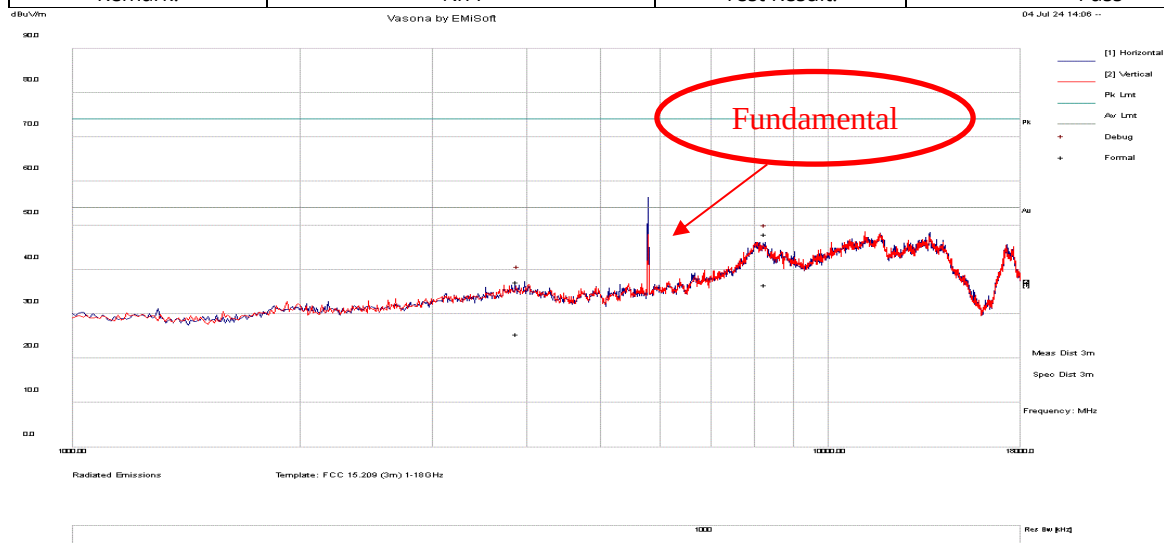


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8021.947	20.30	14.30	15.80	50.40	Peak Max	H	201	0	74	-23.60	Pass
2	3580.155	24.40	8.40	4.50	37.30	Peak Max	H	150	42	74	-36.70	Pass
3	8021.947	7.40	14.30	15.80	37.50	Average Max	H	201	0	54	-16.50	Pass
4	3580.155	12.10	8.40	4.50	25.00	Average Max	H	150	42	54	-29.00	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11n, 5785MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/04/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass

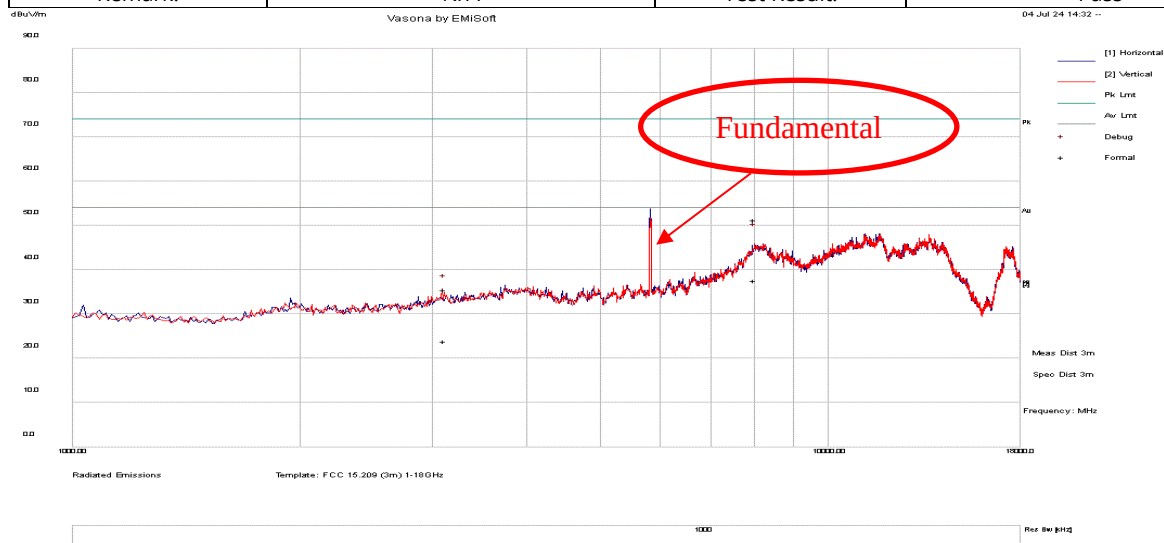


No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8269.913	18.50	14.20	15.40	48.10	Peak Max	H	167	79	74	-25.90	Pass
2	3888.485	22.30	9.50	5.50	37.30	Peak Max	H	182	170	74	-36.70	Pass
3	8269.913	7.10	14.20	15.40	36.70	Average Max	H	167	79	54	-17.30	Pass
4	3888.485	10.50	9.50	5.50	25.50	Average Max	H	182	170	54	-28.50	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

Test Standard:	FCC15.407, 15.209, RSS-247	Mode:	11n, 5825MHz
Frequency Range:	1 GHz - 18 GHz	Test Date:	07/04/2024
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Minoush
Remark:	N/A	Test Result:	Pass



No.	Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass/Fail
1	8000.391	21.20	14.30	15.90	51.40	Peak Max	H	176	51	74	-22.60	Pass
2	3108.846	24.60	7.70	3.20	35.50	Peak Max	H	134	0	74	-38.50	Pass
3	8000.391	7.50	14.30	15.90	37.70	Average Max	H	176	51	54	-16.30	Pass
4	3108.846	13.00	7.70	3.20	23.90	Average Max	H	134	0	54	-30.10	Pass

Remarks:

1. Level (dBuV/m) = Raw (dBuV) + Cable loss(dB) + AF (dB/m).
2. AF(dB/m) = Antenna Factor (dB/m) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value(dBuV/m)

18GHz – 40GHz test result

Note: no substantial emission close to limits.

Restricted Band measurement result

Mode	Data rate	Channel	Frequency (MHz)	Level (dBuV/m)	Measurement Type	Limit (dBuV/m)	Margin (dB)	Pass/Fail
802.11a	6Mbps	36	5149.2	55.61	Peak Max	74	-18.39	Pass
			5150.0	41.07	Average Max	54	-12.93	Pass
		64	5353.09	57.62	Peak Max	74	-16.38	Pass
			5350.00	37.05	Average Max	54	-16.95	Pass
		100	5450.58	54.69	Peak Max	74	-19.31	Pass
			5459.86	34.41	Average Max	54	-19.59	Pass
802.11n	MCS0	36	5148.0	60.56	Peak Max	74	-13.44	Pass
			5150.0	45.94	Average Max	54	-8.06	Pass
		64	5353.16	62.65	Peak Max	74	-11.35	Pass
			5350.00	45.72	Average Max	54	-8.28	Pass
		100	5459.66	58.55	Peak Max	74	-15.45	Pass
			5460.00	41.65	Average Max	54	-12.35	Pass
802.11ac	MCS0	36	5150.00	59.62	Peak Max	74	-14.38	Pass
			5150.00	49.30	Average Max	54	-4.70	Pass
		64	5350.76	65.94	Peak Max	74	-8.06	Pass
			5350.00	50.00	Average Max	54	-4.00	Pass
		100	5458.63	58.97	Peak Max	74	-15.03	Pass
			5460.00	42.20	Average Max	54	-11.80	Pass

Test plots



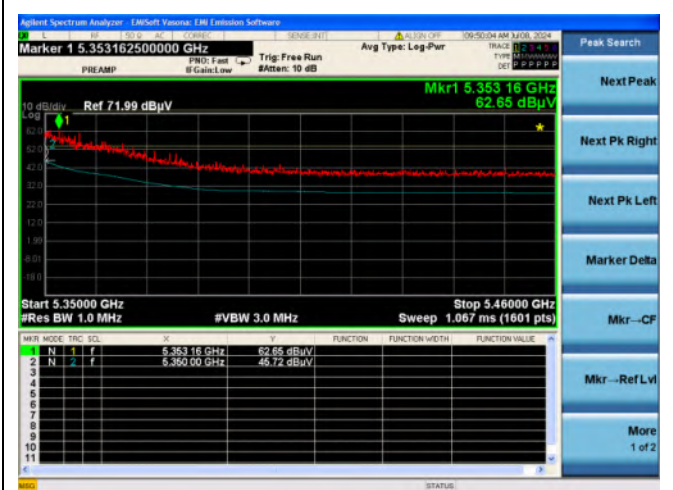
Restricted Band -11a-5180MHz



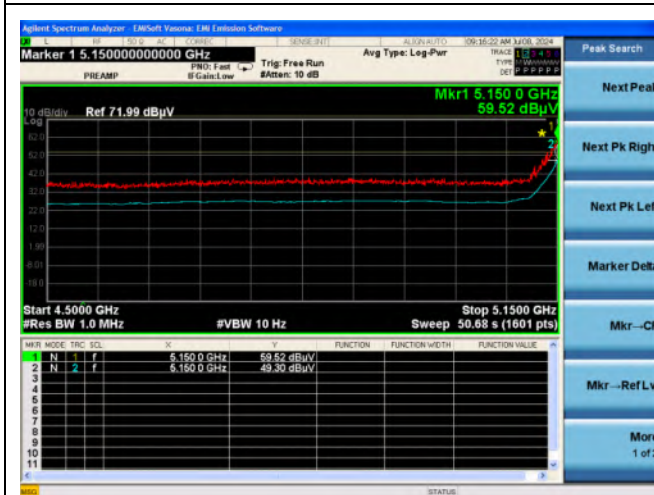
Restricted Band -11a-5320MHz



Restricted Band -11n-5180MHz



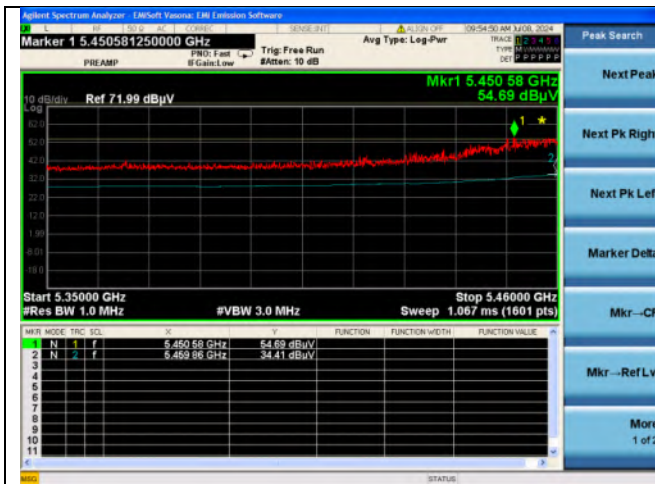
Restricted Band -11n-5320MHz



Restricted Band -11ac-5180MHz



Restricted Band -11ac-5320MHz



Restricted Band -11a-5500MHz



Restricted Band -11n-5500MHz



Restricted Band -11ac-5500MHz

7.8 Conducted Emissions

7.8.1 Requirement

Per § 15.207 (a), RSS Gen 8.8

An intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN).

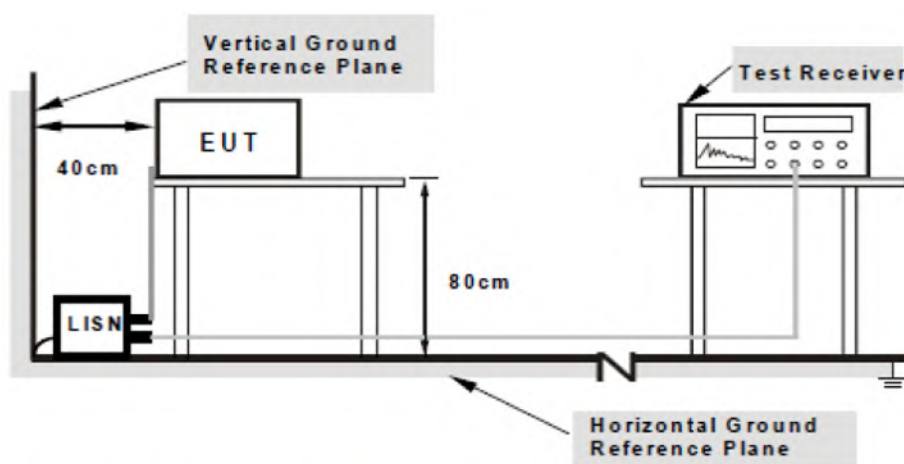
Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Limits for Conducted Emissions at the Mains Ports

Section	Frequency ranges (MHz)	Limit (dBuV)	
		QP	Average
Class B devices	0.15 – 0.5	66 – 56	56 – 46
	0.5 – 5	56	46
	5 - 30	60	50

NOTE 1 The lower limit shall apply at the transition frequencies.

7.8.2 Test setup



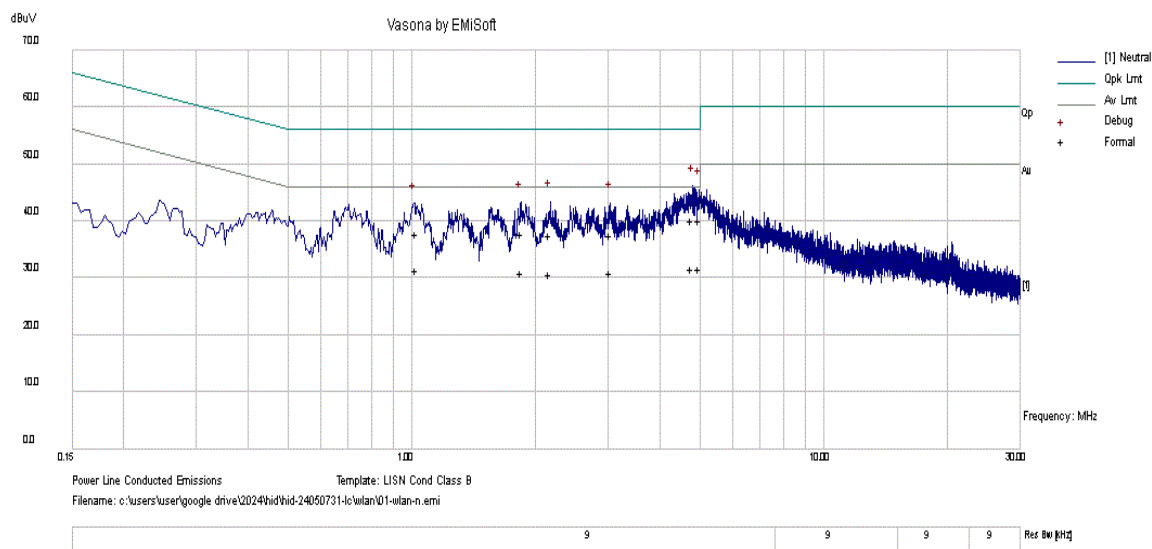
Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.

7.8.3 Test Procedure

1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table.
2. The power supply for the EUT was fed through a 50 Ω /50 μ H EUT LISN, connected to filtered mains.
3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable. The LISN bonded to the reference ground plane used has a direct current (dc) resistance of less than 2.5 m Ω .
4. All other supporting equipment was powered separately from another main supply.
5. The EUT was switched on and allowed to warm up to its normal operating condition.
6. A scan was made on the Live / Neutral line (for AC mains) or Earth line (for DC power) over the required frequency range using an EMI test receiver.
7. High peaks, relative to the limit line, were then selected.
8. The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10 kHz. For FCC tests, only Quasi-peak measurements were made; while for CISPR/EN tests, both Quasi-peak and Average measurements were made
9. All possible modes of operation were investigated. Only the worst case emissions were measured and reported. All other emissions were relatively insignificant.

7.8.4 Test Result

Test Standard:	Part 15.207, RSS Gen	Mode:	WLAN
Frequency Range:	0.15-30MHz	Test Date:	07/01/2024
Line:	Neutral	Test Personnel:	Lining
Remark:	120VAC, 60Hz	Test Result:	Pass

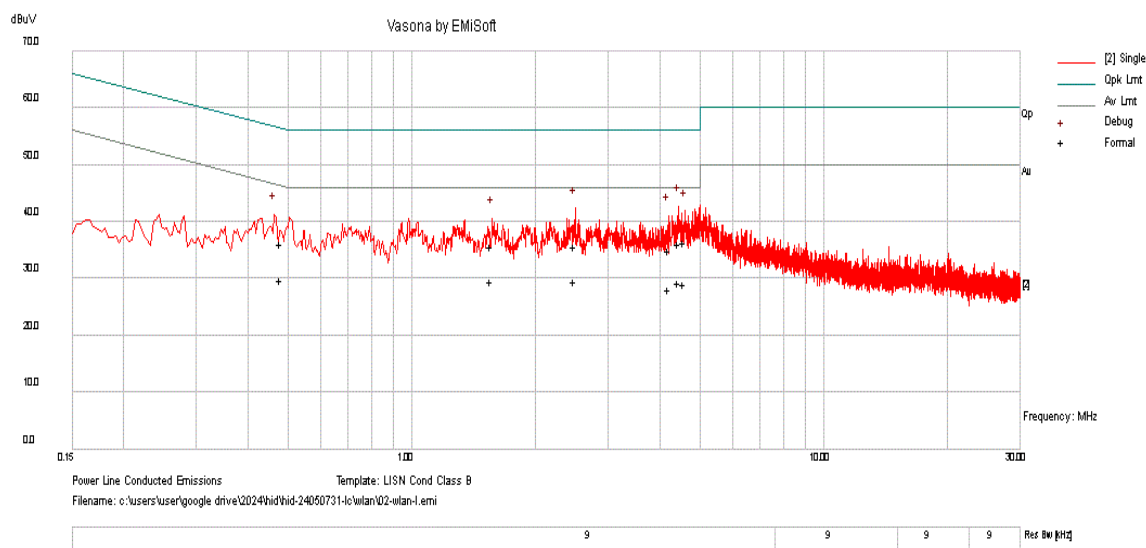


No.	Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Meas. Type	Line	Limit (dBuV)	Margin (dB)	Pass /Fail
1	4.8	29.52	10.38	0.15	40.05	Quasi Peak	Neutral	56.00	-15.95	Pass
2	4.98	29.66	10.39	0.14	40.19	Quasi Peak	Neutral	56.00	-15.81	Pass
3	2.17	27.12	10.23	0.10	37.45	Quasi Peak	Neutral	56.00	-18.55	Pass
4	1.85	27.36	10.21	0.10	37.67	Quasi Peak	Neutral	56.00	-18.33	Pass
5	3.03	27.23	10.28	0.12	37.63	Quasi Peak	Neutral	56.00	-18.37	Pass
6	1.03	27.61	10.15	0.10	37.86	Quasi Peak	Neutral	56.00	-18.14	Pass
7	4.8	21.25	10.38	0.15	31.78	Average	Neutral	46.00	-14.22	Pass
8	4.98	21.25	10.39	0.14	31.78	Average	Neutral	46.00	-14.22	Pass
9	2.17	20.49	10.23	0.10	30.82	Average	Neutral	46.00	-15.18	Pass
10	1.85	20.70	10.21	0.10	31.01	Average	Neutral	46.00	-14.99	Pass
11	3.03	20.45	10.28	0.12	30.85	Average	Neutral	46.00	-15.15	Pass
12	1.03	21.16	10.15	0.10	31.41	Average	Neutral	46.00	-14.59	Pass

REMARKS:

- The emission levels of other frequencies were very low against the limit.
- Factor = Inert loss of LISN
- Margin value = Emission level - Limit value
- Emission Level = Raw Value + Cable loss + Factors Value.

Test Standard:	Part 15.207, RSS Gen	Mode:	WLAN
Frequency Range:	0.15 - 30MHz	Test Date:	07/01/2024
Line:	Live	Test Personnel:	Lining
Remark:	120VAC, 60Hz	Test Result:	Pass



No.	Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Meas. Type	Line	Limit (dBuV)	Margin (dB)	Pass /Fail
1	4.45	25.68	10.36	0.14	36.18	Quasi Peak	Live	56.00	-19.82	Pass
2	2.49	25.31	10.25	0.11	35.67	Quasi Peak	Live	56.00	-20.33	Pass
3	4.59	25.81	10.37	0.14	36.32	Quasi Peak	Live	56.00	-19.68	Pass
4	4.2	24.42	10.35	0.14	34.91	Quasi Peak	Live	56.00	-21.09	Pass
5	0.48	25.86	10.11	0.11	36.08	Quasi Peak	Live	56.32	-20.24	Pass
6	1.56	25.40	10.19	0.10	35.69	Quasi Peak	Live	56.00	-20.31	Pass
7	4.45	18.84	10.36	0.14	29.34	Average	Live	46.00	-16.66	Pass
8	2.49	19.11	10.25	0.11	29.47	Average	Live	46.00	-16.53	Pass
9	4.59	18.61	10.37	0.14	29.12	Average	Live	46.00	-16.88	Pass
10	4.2	17.74	10.35	0.14	28.23	Average	Live	46.00	-17.77	Pass
11	0.48	19.60	10.11	0.11	29.82	Average	Live	46.32	-16.50	Pass
12	1.56	19.30	10.19	0.10	29.59	Average	Live	46.00	-16.41	Pass

REMARKS:

1. The emission levels of other frequencies were very low against the limit.
2. Factor = Inert loss of LISN
3. Margin value = Emission level - Limit value
4. Emission Level = Raw Value + Cable loss + Factors Value.

8 EUT and Test Setup Photos

Refer to FCC exhibits

9 Test Instrument List

Equipment	Manufacturer	Model	Instrument Number	Cal. Date	Cal. Due
Semi-Anechoic Chamber	ETS-Lindgren	10M	VL001	10/18/2023	10/18/2024
Shielding Control Room	ETS-Lindgren	Series 81	VL006	N/A1)	N/A1)
Spectrum Analyzer	Keysight	N9020A	MY50110074	05/15/2024	05/15/2025
Spectrum Analyser (9kHz-43GHz)	Anritsu	MS2830A	6201145210	05/16/2024	05/16/2025
EMC Test Receiver	R&S	ESL6	100230	05/14/2024	05/14/2025
LISN (9KHz – 30MHz)	EMCO	3816/2	9705-1066	05/28/2024	05/28/2025
Bi-Log Antenna	ETS-Lindgren	3142E	217921	07/19/2023	07/19/2024
Horn Antenna (1-18GHz)	Electro-Metrics	EM-6961	6292	07/21/2023	07/21/2024
Horn Antenna (18-40GHz)	Com-Power	AH-840	101109	07/21/2023	07/21/2024
Preamplifier	RF Bay, Inc.	LPA-10-20	11180621	07/16/2023	07/16/2024
True RMS Multi-meter	UNI-T	UT181A	C173014829	05/15/2024	05/15/2025
Temp / Humidity / Pressure Meter	PCE Instruments	PCE-THB 40	R062028	05/17/2024	05/17/2025
RF Attenuator	Pasternack	PE7005-3	VL061	N/A2)	N/A2)
EM Center Control	ETS-Lindgren	7006-001	160136	N/A1)	N/A1)
Turn Table	ETS-Lindgren	2181-3.03	VL002	N/A1)	N/A1)
Boresight Antenna Tower	ETS-Lindgren	2171B	VL003	N/A1)	N/A1)
Loop Antenna (9k-30MHz)	Com-Power	AL-130	121012	05/17/2024	05/17/2025
RE test cable (below 6GHz)	Vista	RE-6GHz-01	RE-6GHz-01	07/16/2023	07/16/2024
RE test cable (1-18GHz)	PhaseTrack	II-240	RE-18GHz-01	07/16/2023	07/16/2024
RE test cable (>18GHz)	Sucoflex	104	344903/4	07/16/2023	07/16/2024
Pulse limiter	Com-Power	LIT-930A	531727	07/16/2023	07/16/2024
CE test cable #1	FIRST RF	FRF-C-1002-001	CE-6GHz-01	07/16/2023	07/16/2024
CE test cable#2	FIRST RF	FRF-C-1002-001	CE-6GHz-02	07/16/2023	07/16/2024
Agilent Signal Generator	MXG N5182A	N5182A	US47080548	05/15/2024	05/15/2025
Power Splitter/Combiner	Mini-Circuits	ZFSC-2-9G+	VL052	N/A1)	N/A1)
Power Splitter/Combiner	Mini-Circuits	ZFSC-2-9G+	VL053	N/A1)	N/A1)
Power Splitter/Combiner	Mini-Circuits	ZFSC-2-9G+	VL054	N/A1)	N/A1)
Power Splitter/Combiner	Mini-Circuits	ZFSC-2-9G+	VL055	N/A1)	N/A1)

Note:

- 1) This equipment is not for measurement purpose and only require functional verification. Calibration is not required.
- 2) his equipment is part of test system that to be calibrated as a system. It's verified together with the test system prior to testing.

---END---