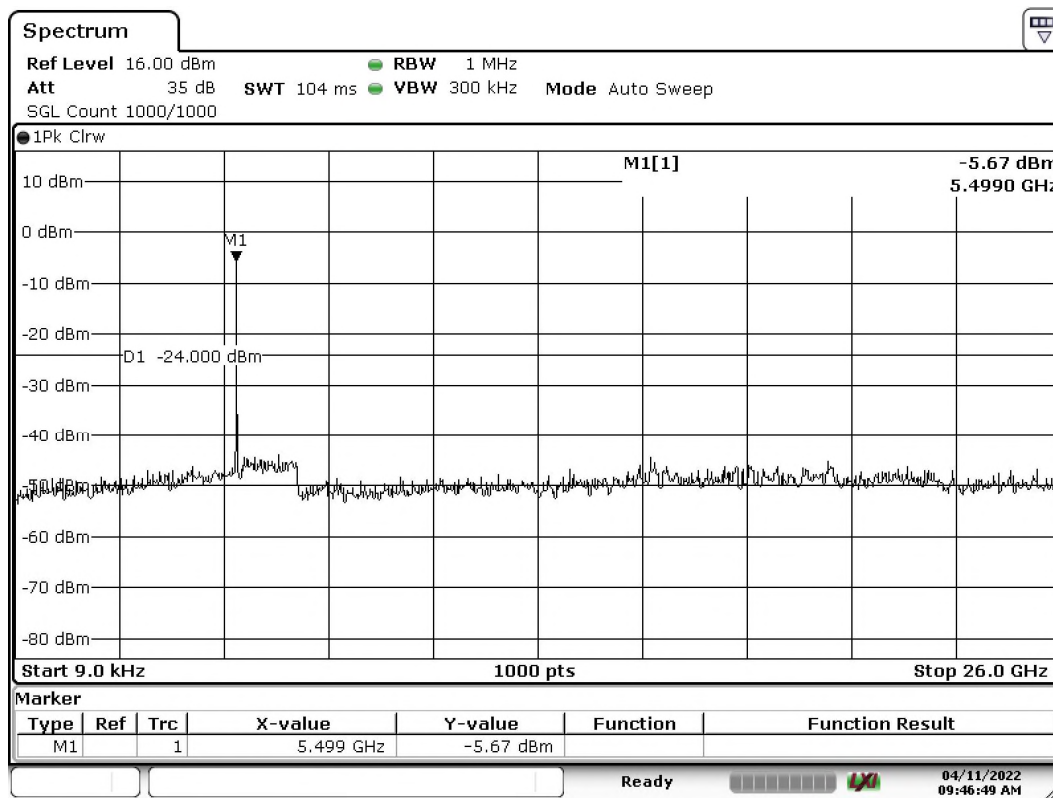




Product Service

SecureMesh WAN 2000 Series

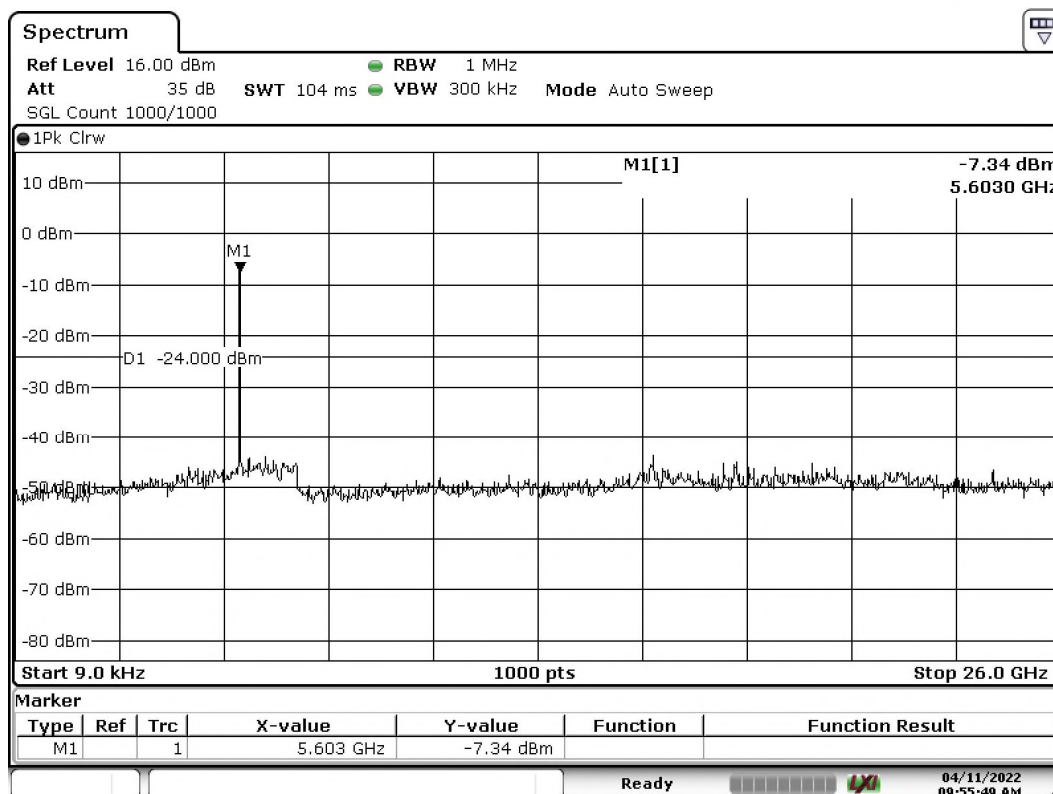
2.6.8.2 UNII_2c Band



Date: 11.APR.2022 09:46:50

Capture 33 : Test Results: OOB Emissions – 9kHz to 26GHz – 5500 MHz – 802.11a Modulation

Note: No spurious emissions exceeded the worst-case limit of -43.5 dBm/MHz, which is the applicable limit of -27 dBm/MHz applying a worst case antenna factor of 16.5 dBi.



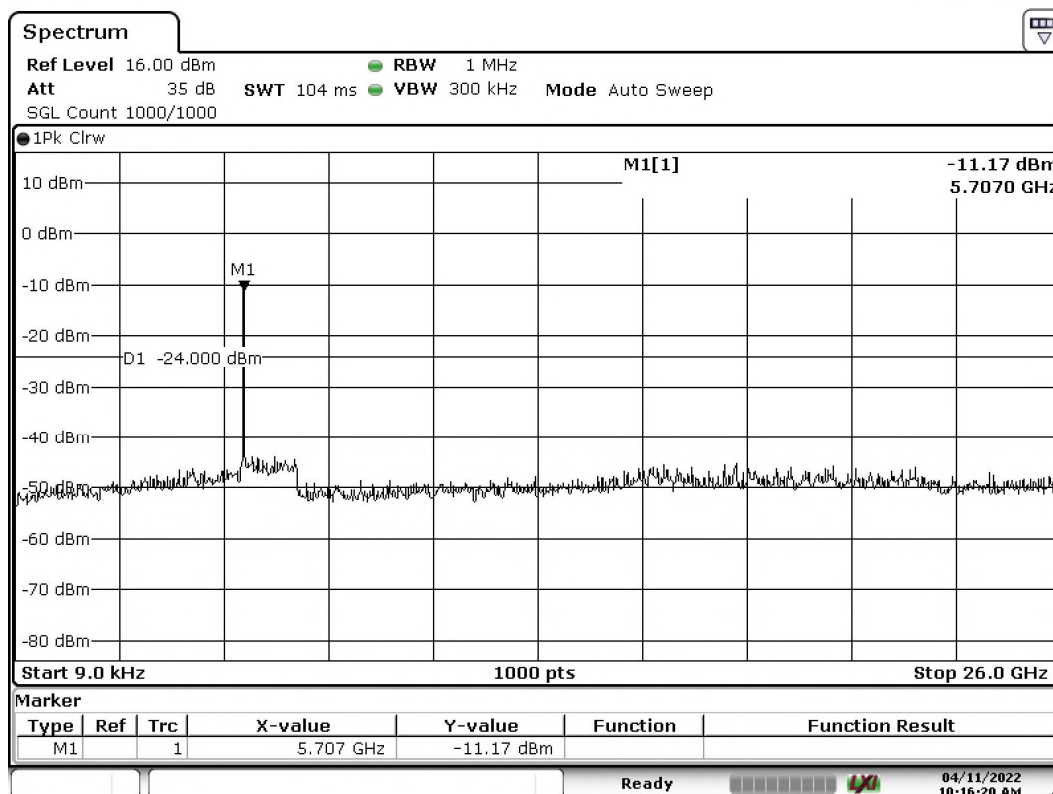
Date: 11.APR.2022 09:55:49

Capture 34 : Test Results: OOB Emissions – 9kHz to 26GHz – 5590 MHz – 802.11HT20 Modulation

Note: No spurious emissions exceeded the worst-case limit of -43.5 dBm/MHz, which is the applicable limit of -27 dBm/MHz applying a worst case antenna factor of 16.5 dBi.



Product Service



Date: 11.APR.2022 10:16:20

Capture 35 : Test Results: OBB Emissions – 9kHz to 26GHz – 5670 MHz – 802.11HT40 Modulation

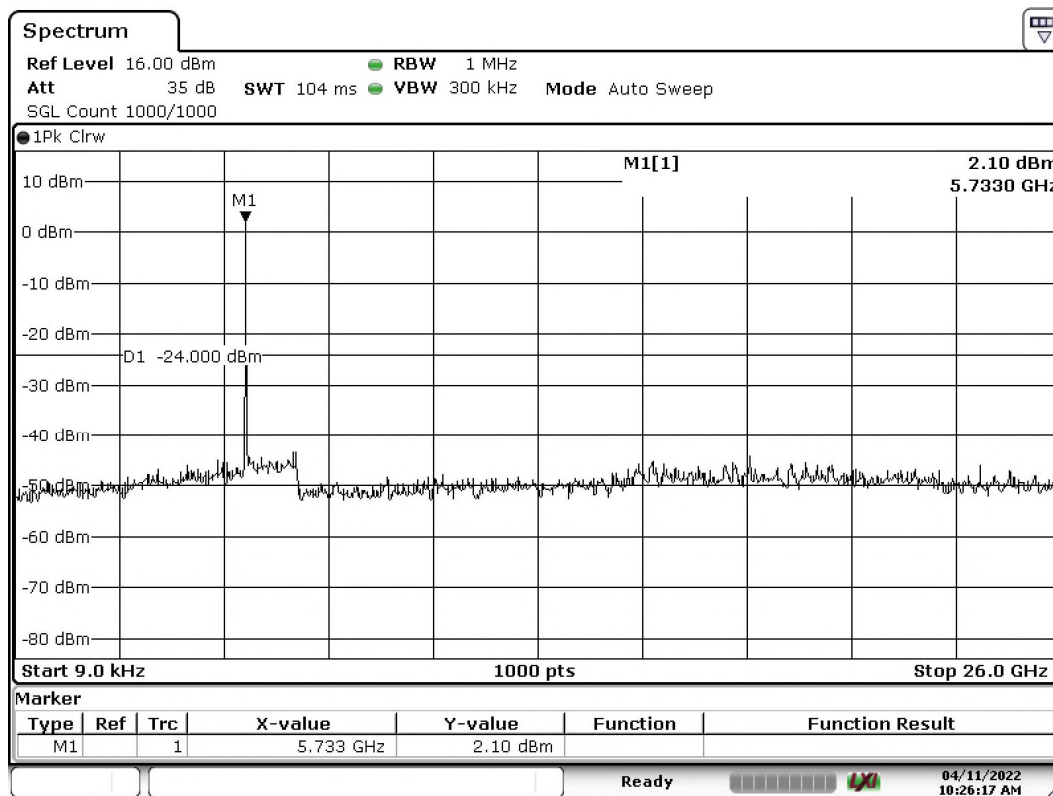
Note: No spurious emissions exceeded the worst-case limit of -43.5 dBm/MHz, which is the applicable limit of -27 dBm/MHz applying a worst case antenna factor of 16.5 dBi.



Product Service

SecureMesh WAN 2000 Series

2.6.8.3 UNII_3 Band



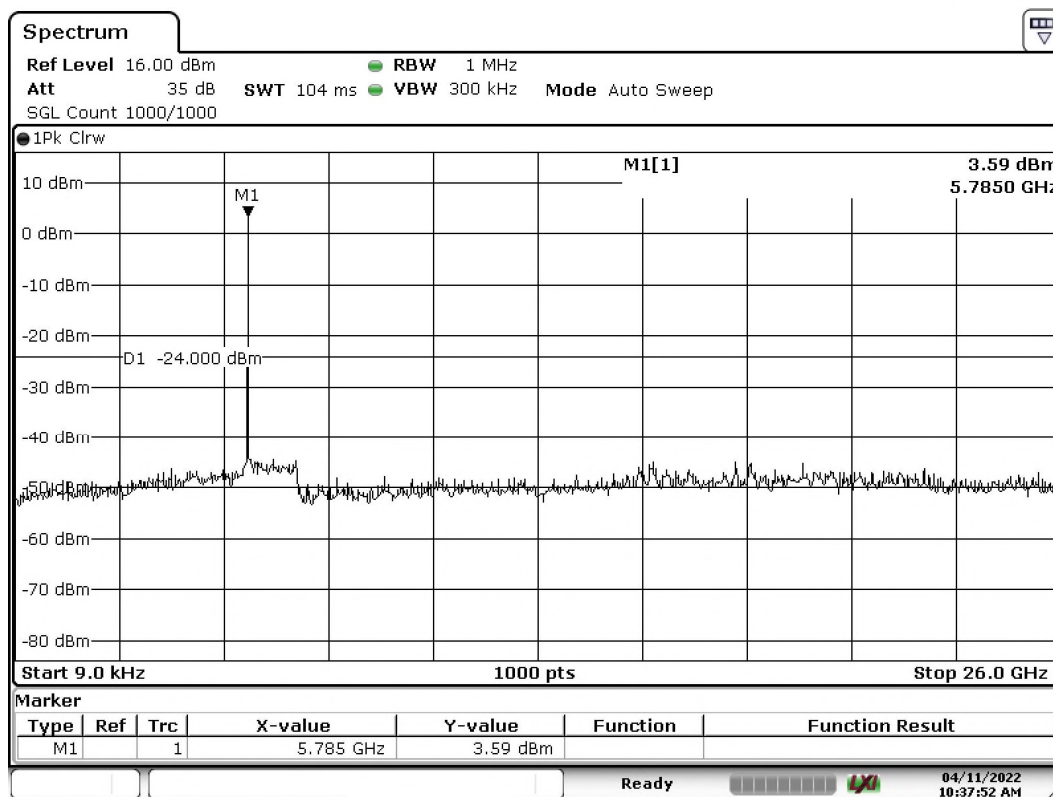
Date: 11.APR.2022 10:26:18

Capture 36 : Test Results: OOB Emissions – 9kHz to 26GHz – 5735 MHz – 802.11a Modulation

Note: No spurious emissions exceeded the worst-case limit of -43.5 dBm/MHz, which is the applicable limit of -27 dBm/MHz applying a worst case antenna factor of 16.5 dBi.



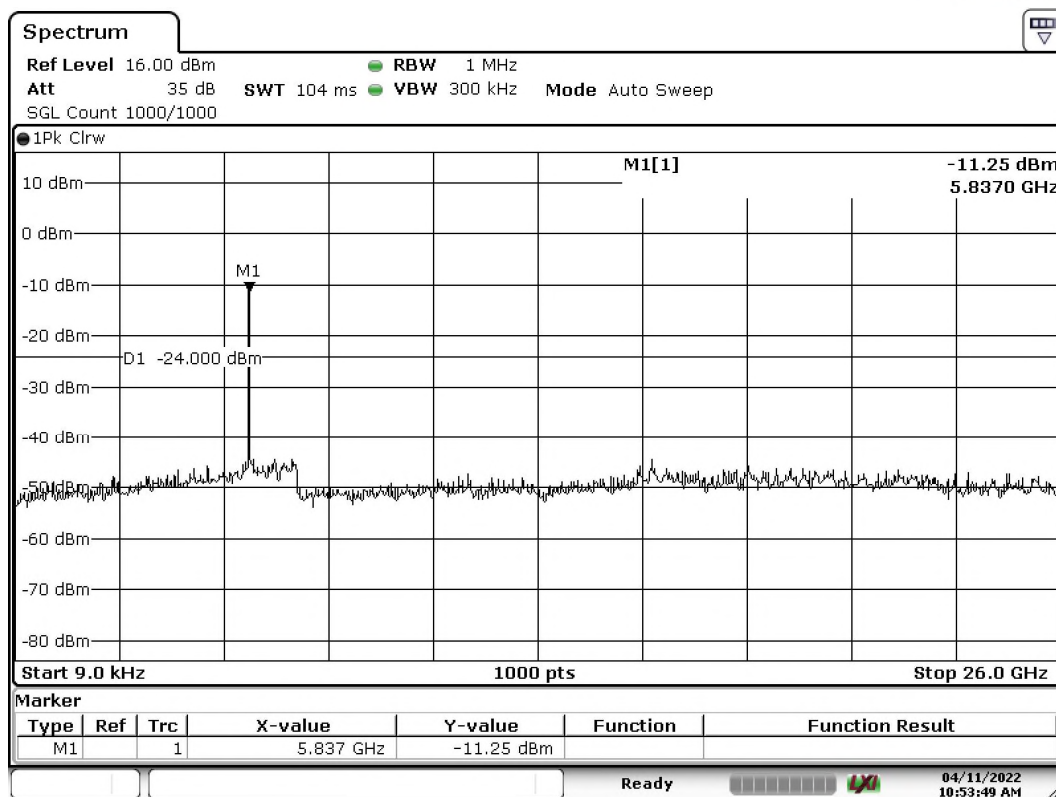
Product Service



Date: 11.APR.2022 10:37:53

Capture 37 : Test Results: OOB Emissions – 9kHz to 26GHz – 5785 MHz – 802.11HT20 Modulation

Note: No spurious emissions exceeded the worst-case limit of -43.5 dBm/MHz, which is the applicable limit of -27 dBm/MHz applying a worst case antenna factor of 16.5 dBi.



Date: 11.APR.2022 10:53:49

Capture 38 : Test Results: OOB Emissions – 9kHz to 26GHz – 5825 MHz – 802.11HT40 Modulation

Note: No spurious emissions exceeded the worst-case limit of -43.5 dBm/MHz, which is the applicable limit of -27 dBm/MHz applying a worst case antenna factor of 16.5 dBi.



2.7 Band Edge

2.7.1 Specification Reference

FCC Part 15, 15.407 (b) 2 through 4 and
RSS-247 section 6

Below 1 GHz the general limits of 15.209 apply.

Note: For band 2a and 2c, OOB Emissions exclude emissions which occur within 2 MHz (2 x RBW) of the band edge. For band 3, OOB emissions exclude emissions which occur within 75 MHz above or below the band edge. These emissions are reported in the 'Band Edge' emissions section of this report.

2.7.2 Standard Applicable

For transmitters operating in the 5.25 to 5.35 GHz, limited to a level of -27 dBm/MHz from 5.35 GHz to 5.352 GHz.

For transmitters operating in the 5.47–5.725 GHz, limited to a level of -27 dBm/MHz from 5.468 GHz to 5.47 GHz and limited to a level of -27 dBm/MHz from 5.725 GHz to 5.728 GHz.

For transmitters operating in the 5.725–5.85 GHz band:

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

2.7.3 Equipment Under Test and Modification State

- PoE Model XBGR-2040: Modification state 0 (No modification)

2.7.4 Day of Test

01-04-2022

2.7.5 Test equipment used

The major items of test equipment used for the above tests are identified in Section 3.1.



2.7.6 Environmental Conditions

Test performed at TÜV SÜD Canada, Kanata Location.

Ambient Temperature	21.2
Relative Humidity	15%
ATM Pressure	102kPa

2.7.7 Additional Observations

- This is a conducted test.
- Test methodology is per Clause 6.10 and 11.13 of ANSI C63.10-2013
- For information purposes, Marker 1 at 50kHz from the edge and band power integration of 100kHz.
- Marker 2 at 0.5MHz from the edge and band power integration of 1MHz



2.7.8 Test Results

Modulation	Channel	Frequency (MHz)	Band Edge (MHz)	Limit (dBm)	Limit with Ant .Factor (dBm)	Results
Modulation 802.11a	Lowest	5260	5150	-27	-43.5	Pass
	Highest	5320	5350	-27	-43.5	Pass
802.11HT20	Lowest	5260	5150	-27	-43.5	Pass
	Highest	5320	5350	-27	-43.5	Pass
802.11HT40	Lowest	5270	5150	-27	-43.5	Pass
	Highest	5310	5350	-27	-43.5	Pass

Table 27 – Out Band Emission UNII 2a Band – Results

Modulation	Channel	Frequency (MHz)	Band Edge (MHz)	Limit (dBm)	Limit with Ant Factor (dBm)	Results
Modulation 802.11a	Lowest	5500	5470	-27	-43.5	Pass
	Highest	5690	5725	-27	-43.5	Pass
802.11HT20	Lowest	5500	5470	-27	-43.5	Pass
	Highest	5690	5725	-27	-43.5	Pass
802.11HT40	Lowest	5510	5470	-27	-43.5	Pass
	Highest	5680	5725	-27	-43.5	Pass



Table 28 – Out Band Emission UNII 2c Band – Results

Modulation	Channel	Frequency (MHz)	Band Edge (MHz)	Limit (dBm)	Results
	Lowest	5735			
	Lowest	5735			
Modulation 802.11a	Lowest	5735			Pass
	Highest	5835			Pass
	Highest	5835			
	Highest	5835			
802.11HT20	Lowest	5735			Pass
	Highest	5835			Pass
802.11HT40	Lowest	5755			Pass
	Highest	5825			Pass

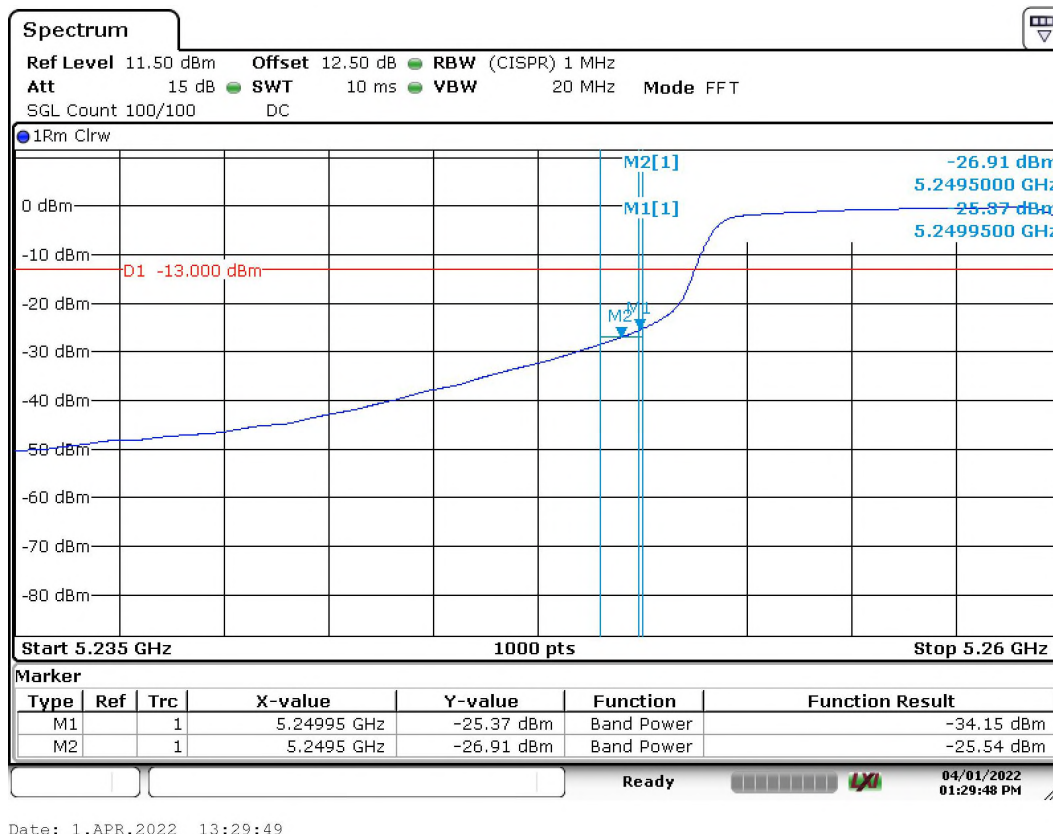
Table 29 – Out Band Emission UNII 3 Band – Results



Product Service

2.7.9 Sample of Test Plots

2.7.9.1 UNII_2a Band

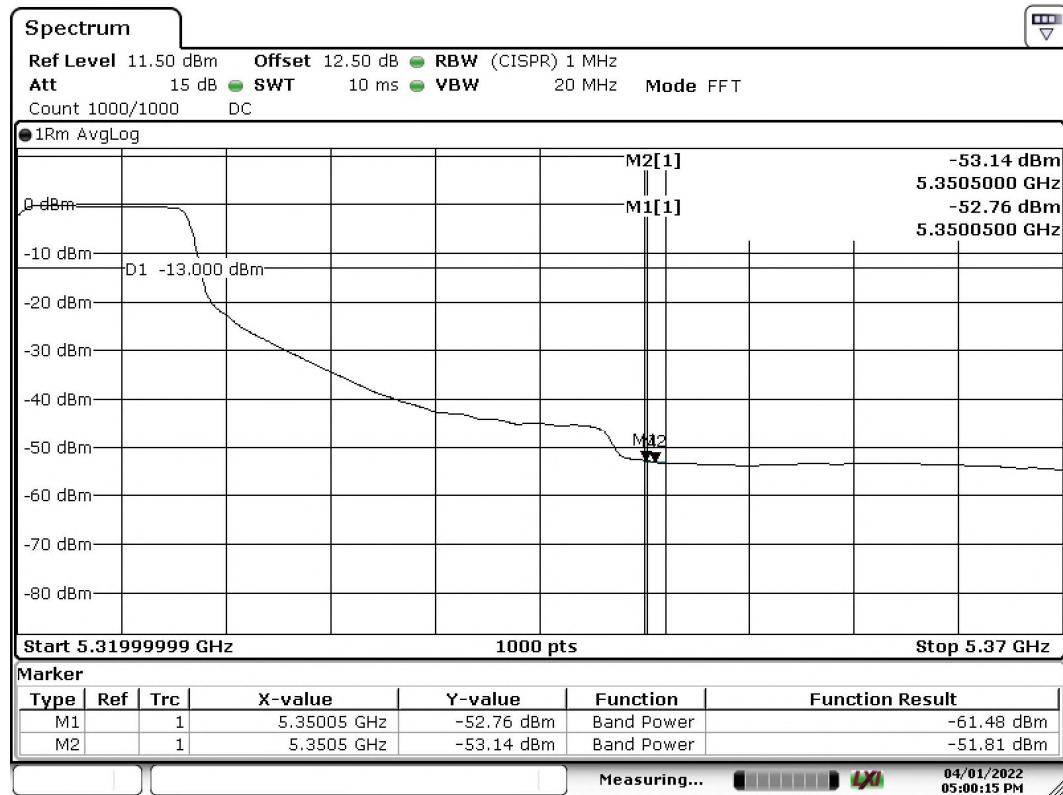


Capture 39 : Test Results: Band Edge (Bottom Chanel) – 5260 MHz – 802.11a Modulation

Note: Emissions below 5.235 GHz were below the -43.5 dBm /MHz requirement.



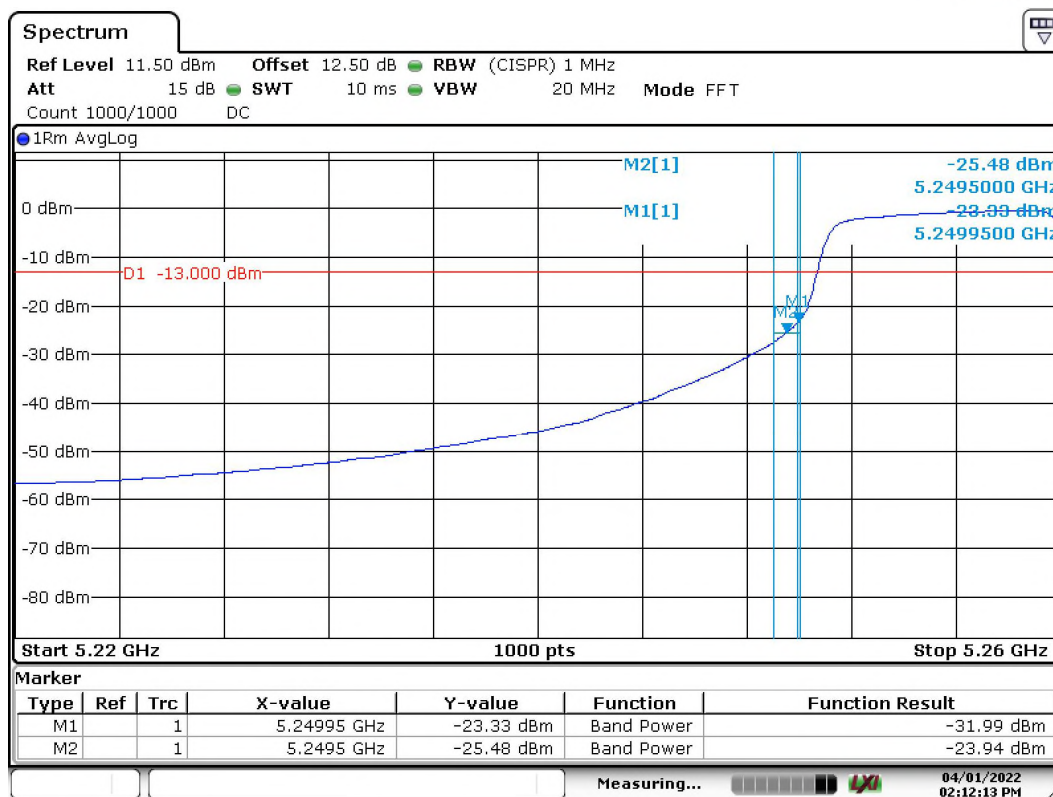
Product Service



Date: 1.APR.2022 17:00:15

Note: Emissions above 5.35 GHz were below the -43.5 dBm /MHz requirement.

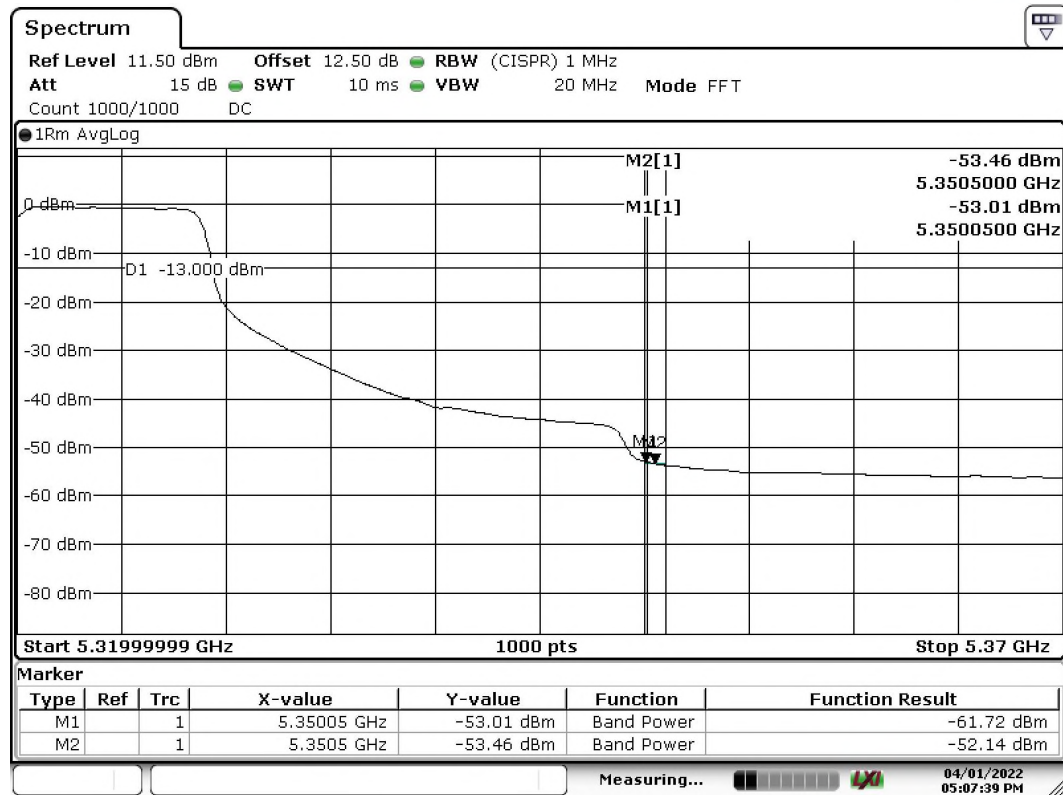
Capture 40 : Test Results: Band Edge (High Channel)– 5320 MHz – 802.11a Modulation



Date: 1.APR.2022 14:12:13

Capture 41 : Test Results: Band Edge (Low Channel)– 5260 MHz – 802.11nHT20 Modulation

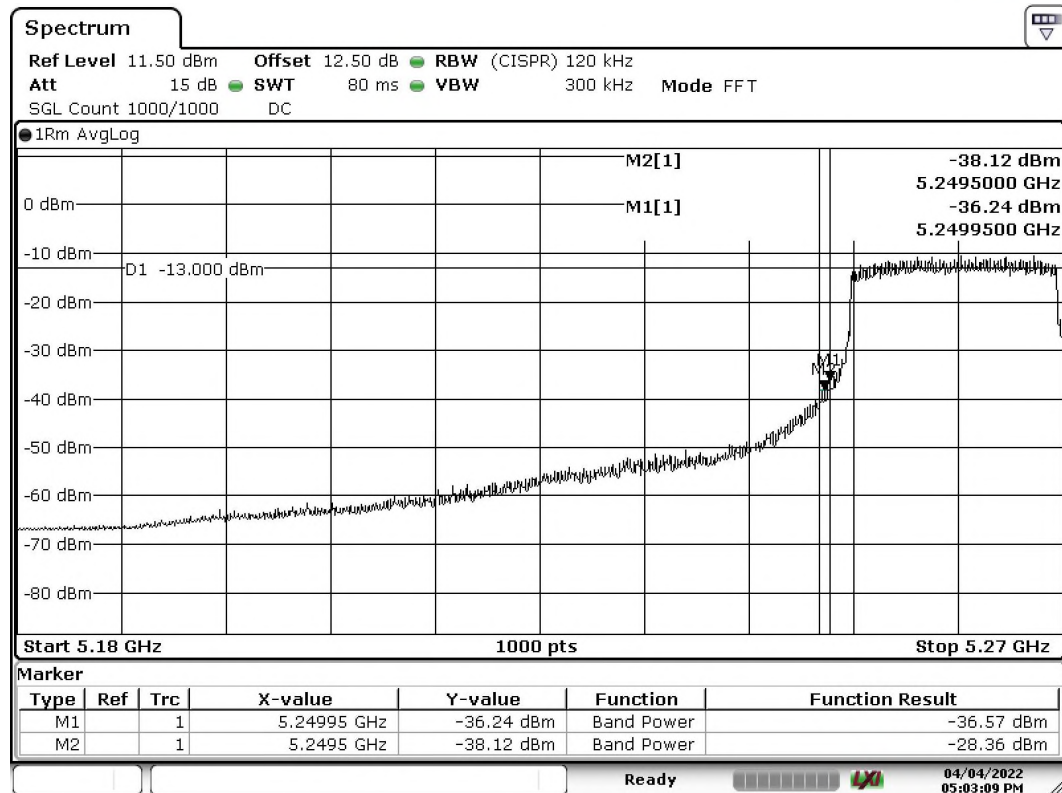
Note: Emissions below 5.235 GHz were below the -43.5 dBm /MHz requirement.



Date: 1.APR.2022 17:07:40

Capture 42 : Test Results: Band Edge (High Channel) – 5320 MHz – 802.11nHT20 Modulation

Note: Emissions above 5.35 GHz were below the worst case -43.5 dBm /MHz requirement.



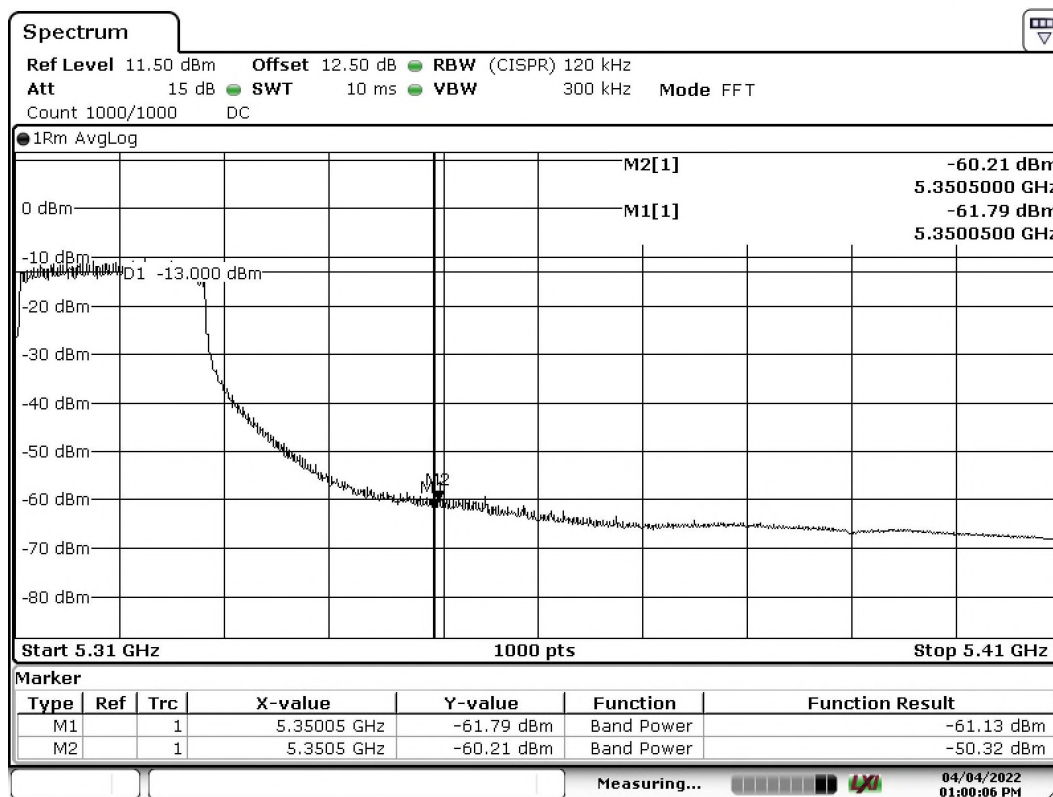
Date: 4.APR.2022 17:03:09

Capture 43 : Test Results: Band Edge (Low Channel) – 5270 MHz – 802.11HT40 Modulation

Note: Emissions below 5.18 GHz were below the worst case -43.5 dBm /MHz requirement.



Product Service



Date: 4.APR.2022 13:00:07

Capture 44 : Test Results: Band Edge (High Channel) – 5310 MHz – 802.11HT40 Modulation

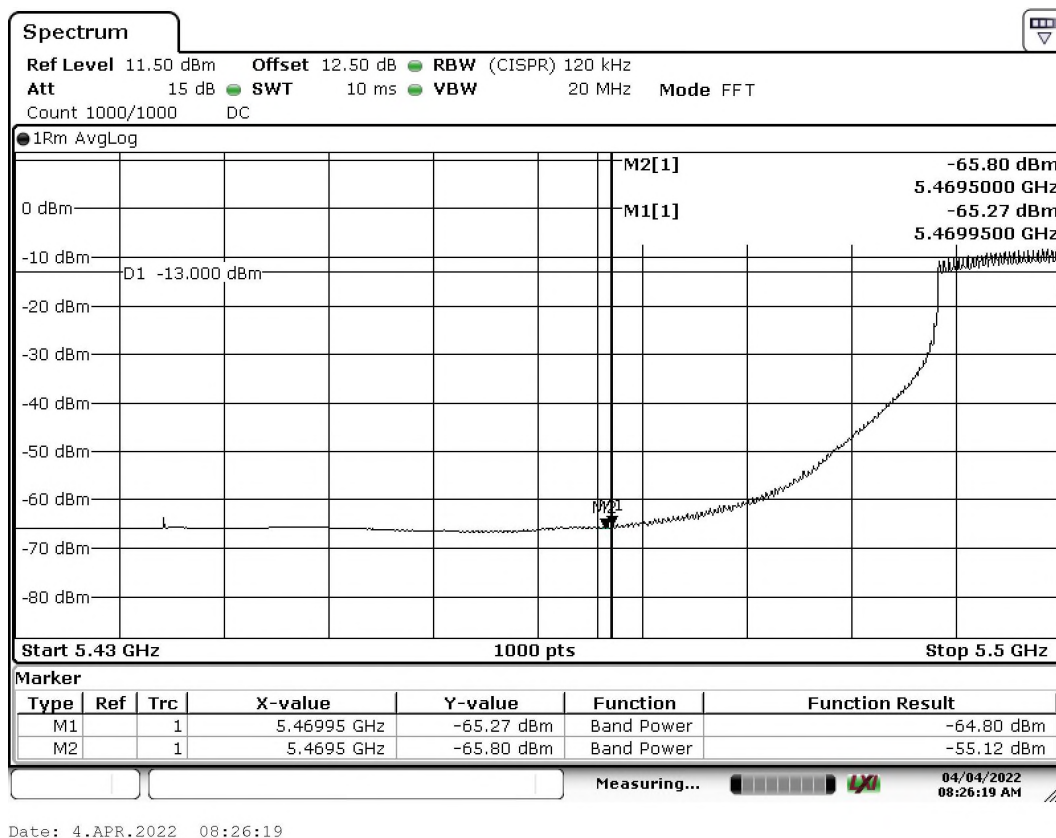
Note: Emissions above 5.35 GHz were below the worst case -43.5 dBm /MHz requirement.



Product Service

SecureMesh WAN 2000 Series

2.7.9.2 UNII_2c Band

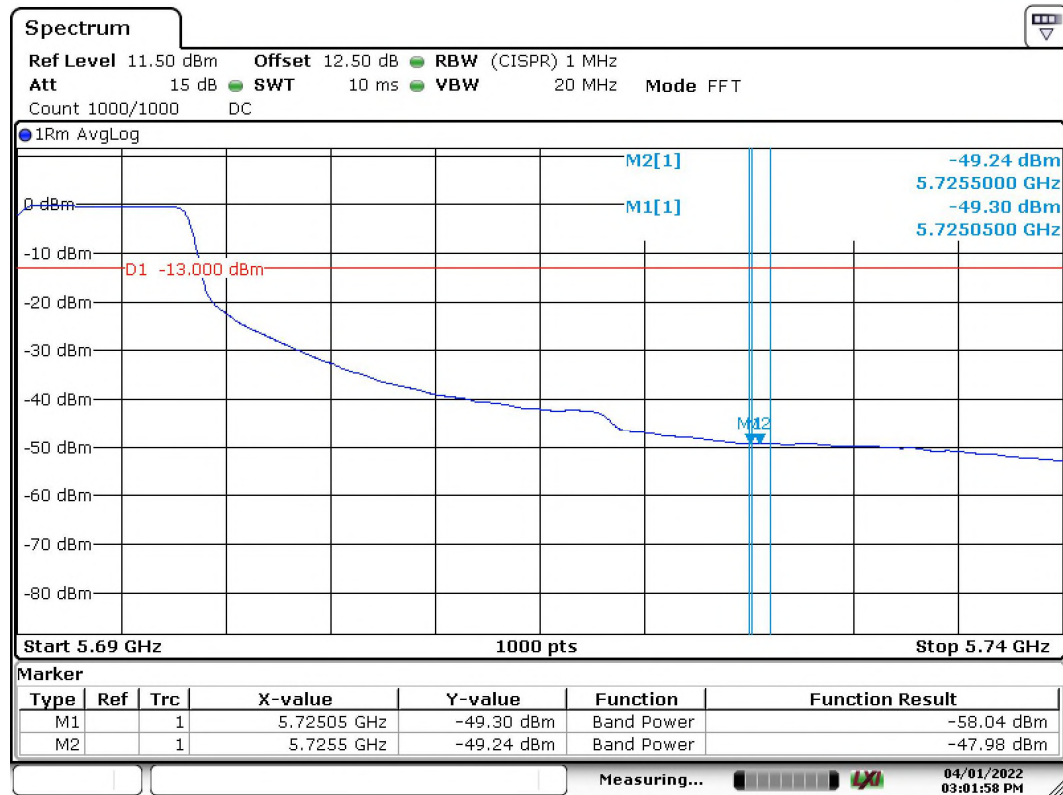


Capture 45 : Test Results: Band Edge (Lower Chanel) – 5500 MHz – 802.11a Modulation

Note: Emissions below 5.47 GHz were below the worst case -43.5 dBm /MHz requirement.



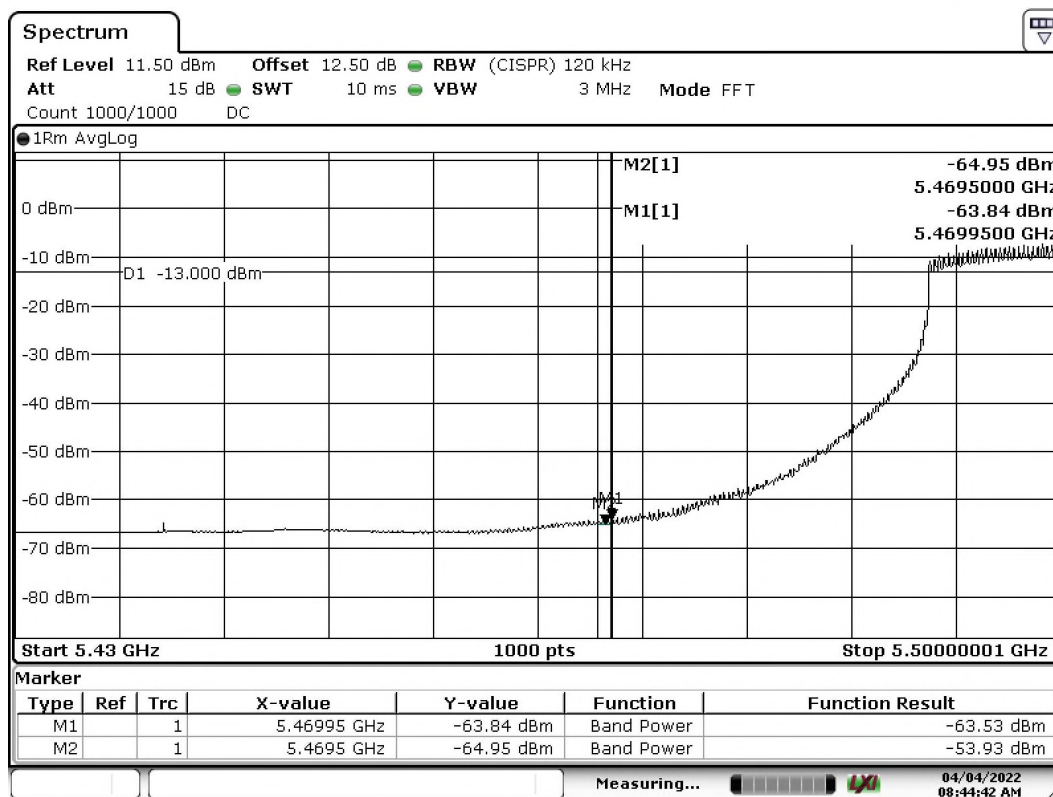
Product Service



Date: 1.APR.2022 15:01:58

Capture 46 : Test Results: Band Edge (High Channel) – 5690 MHz – 802.11a Modulation

Note: Emissions above 5.725 GHz were below the worst case -43.5 dBm /MHz requirement.



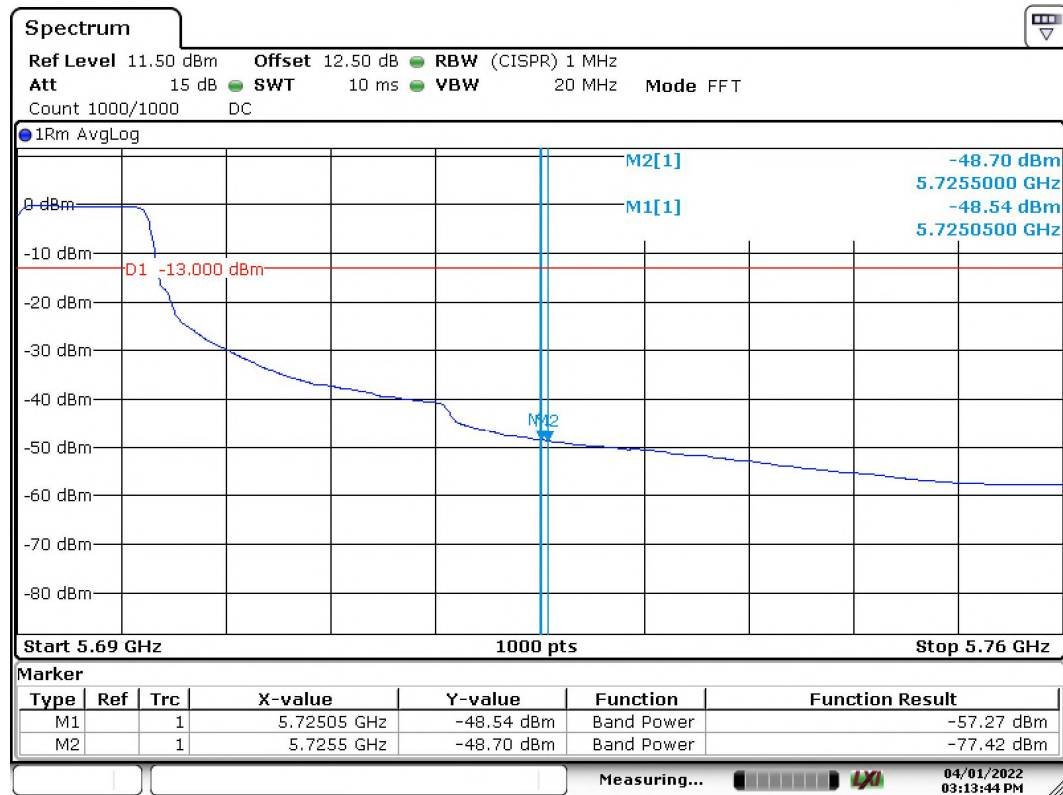
Date: 4.APR.2022 08:44:42

Capture 47 : Test Results: Band Edge (Lower Channel) – 5500 MHz – 802.11nHT20 Modulation

Note: Emissions below 5.47 GHz were below the worst case -43.5 dBm /MHz requirement.



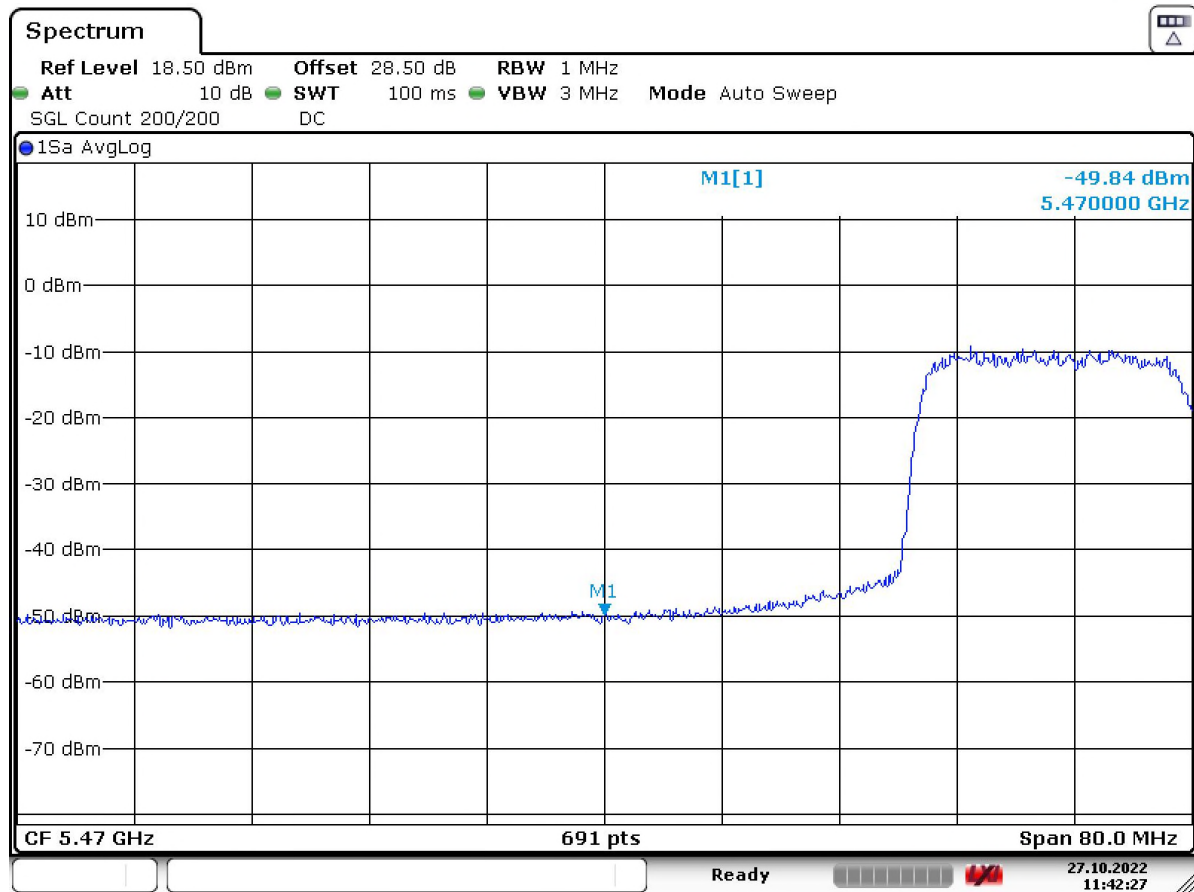
Product Service



Date: 1.APR.2022 15:13:44

Capture 48 : Test Results: Band Edge (High Channel) – 5690 MHz – 802.11nHT20 Modulation

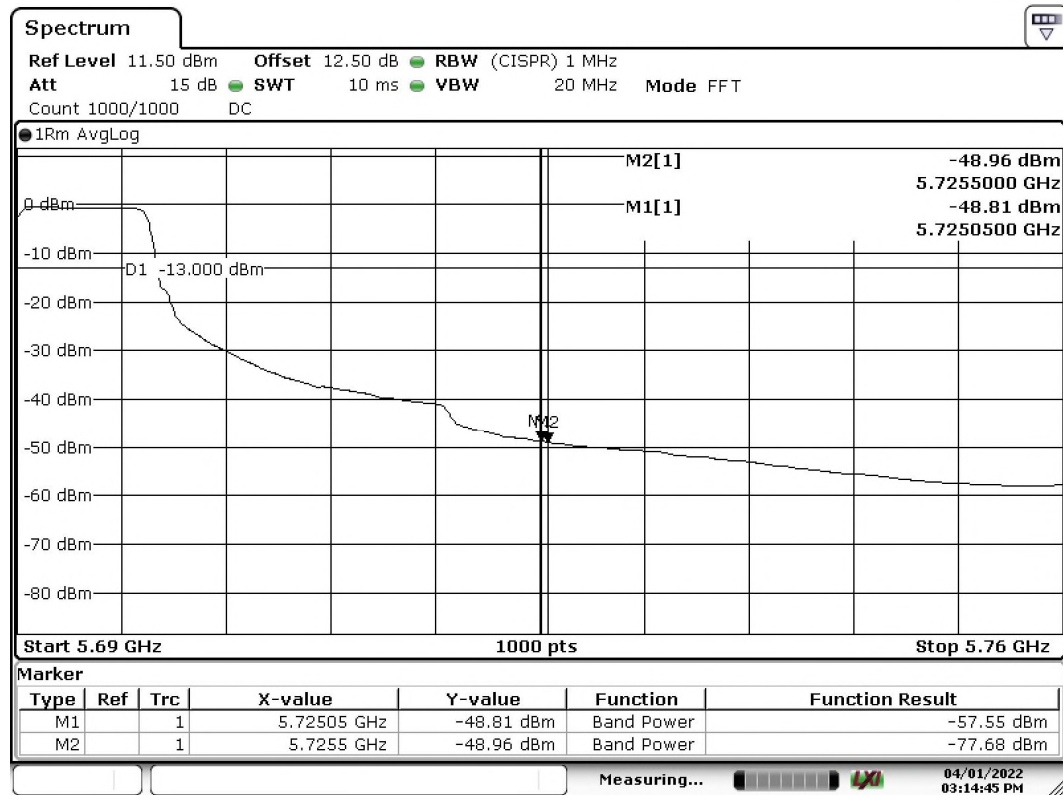
Note: Emissions above 5.725 GHz were below the worst case -43.5 dBm /MHz requirement.



Date: 27.OCT.2022 11:42:27

Capture 49 : Test Results: Band Edge (Lower Channel) – 5510 MHz – 802.11HT40 Modulation

Note: Emissions below 5.47 GHz were below the worst case -43.5 dBm /MHz requirement.



Date: 1.APR.2022 15:14:45

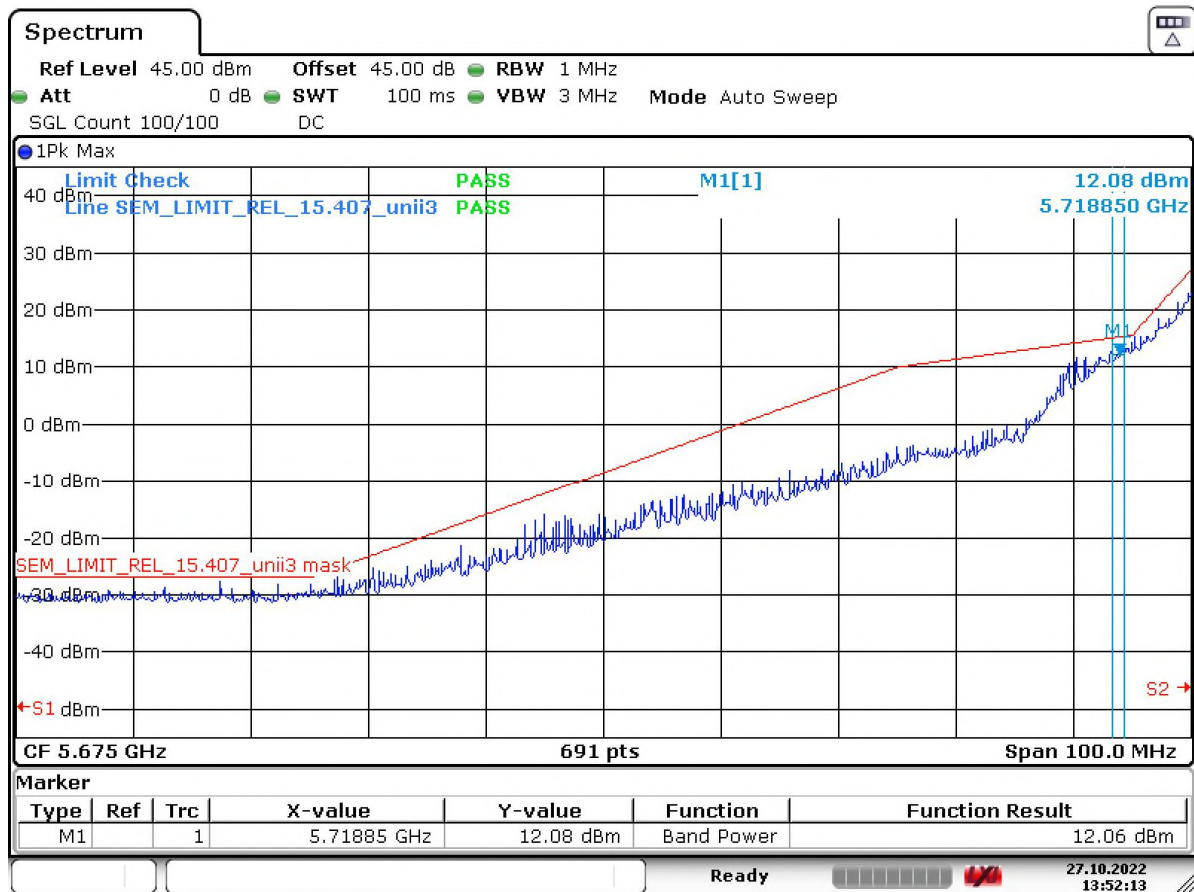
Capture 50 : Test Results: Band Edge (High Channel) – 5680 MHz – 802.11HT40 Modulation

Note: Emissions above 5.725 GHz were below the worst case -43.5 dBm /MHz requirement.



Product Service

2.7.9.1 UNII_3 Band



Date: 27.OCT.2022 13:52:14

Capture 51 : Test Results: Band Edge (Low Channel) – 5735 MHz – 802.11a Modulation

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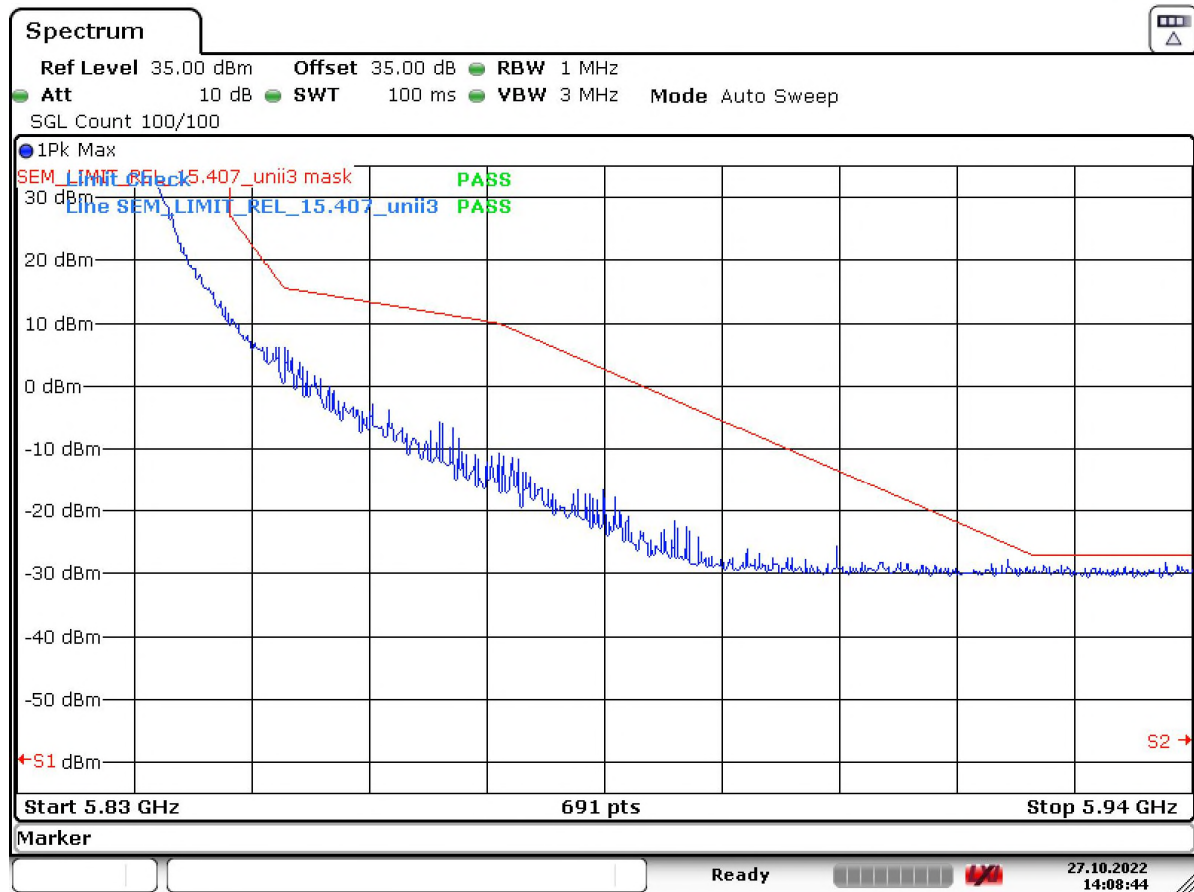
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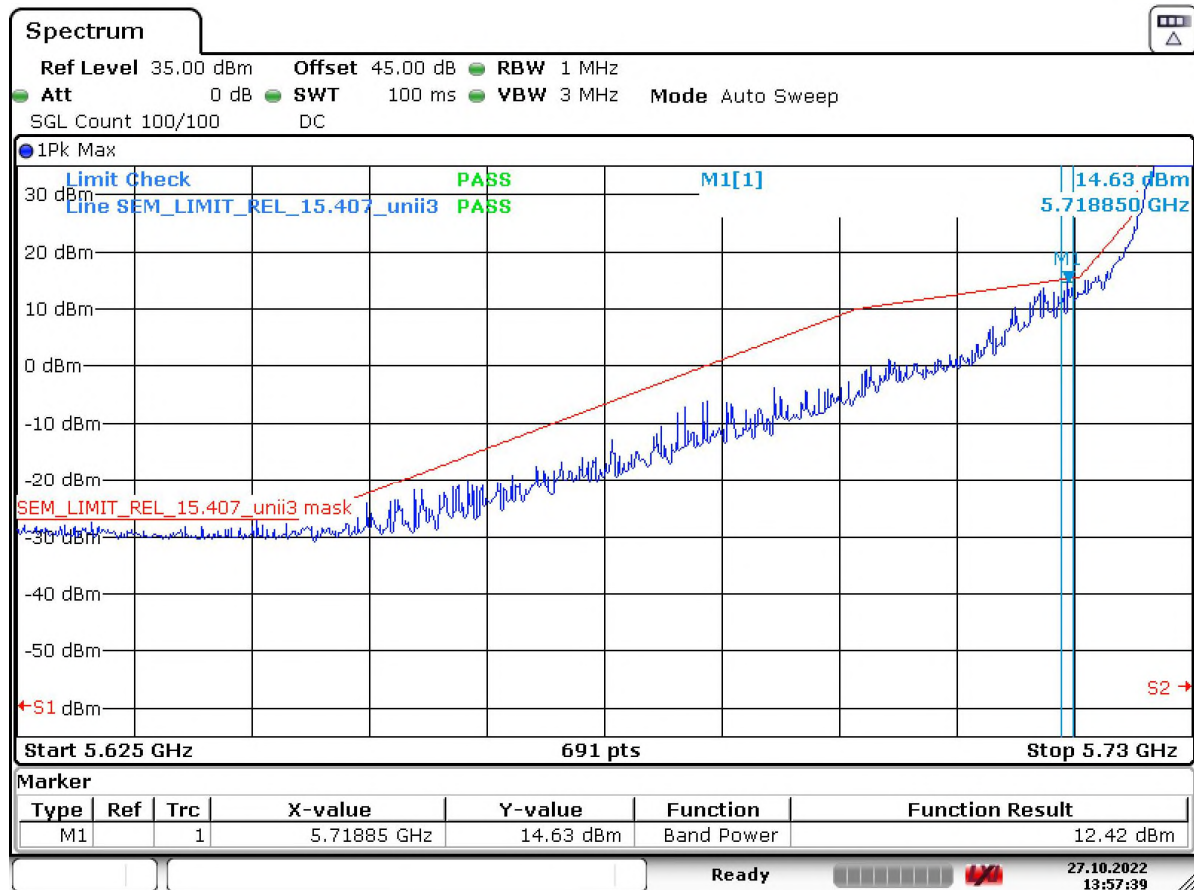
Product Service

SecureMesh WAN 2000 Series



Date: 27.OCT.2022 14:08:45

Capture 52 : Test Results: Band Edge (High Channel) – 5835 MHz – 802.11a Modulation

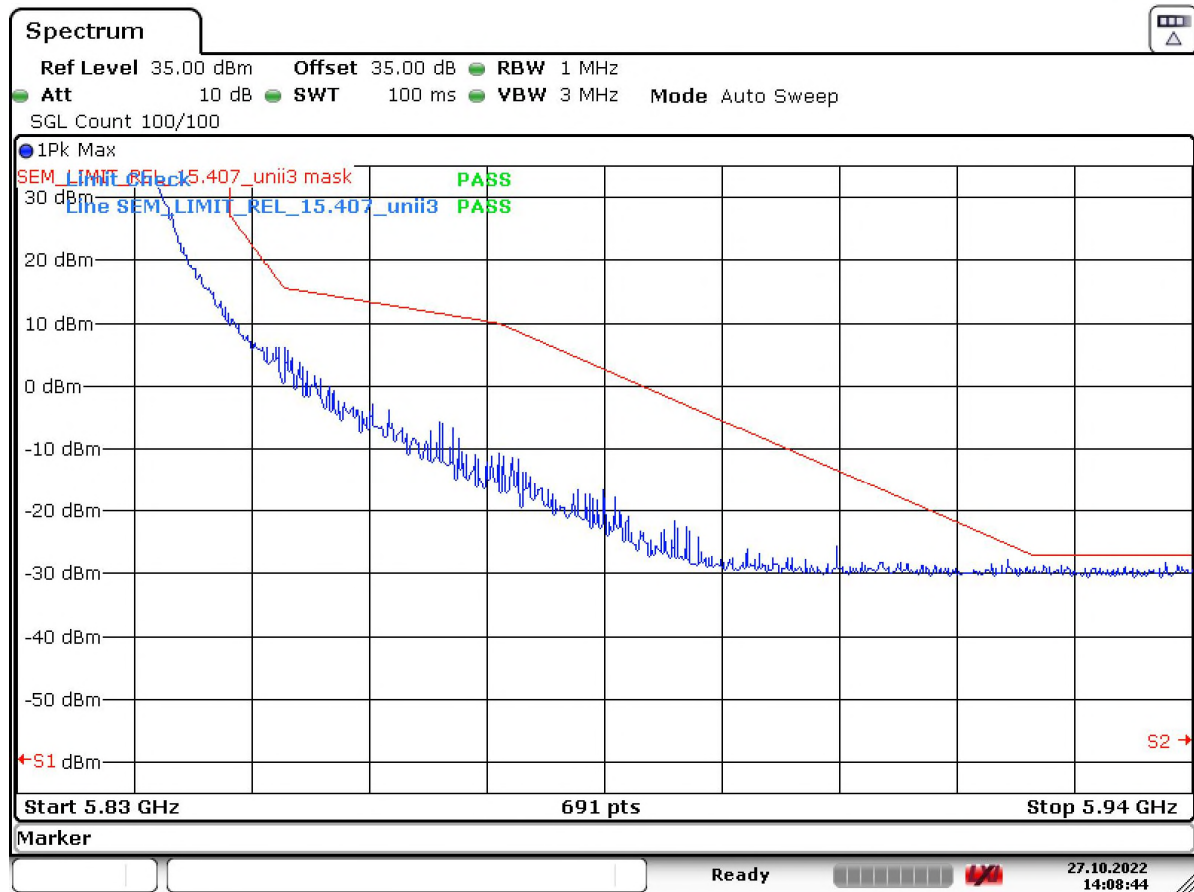


Date: 27.OCT.2022 13:57:40

Capture 53 : Test Results: Band Edge (Low Channel) – 5735 MHz – 802.11nHT20 Modulation

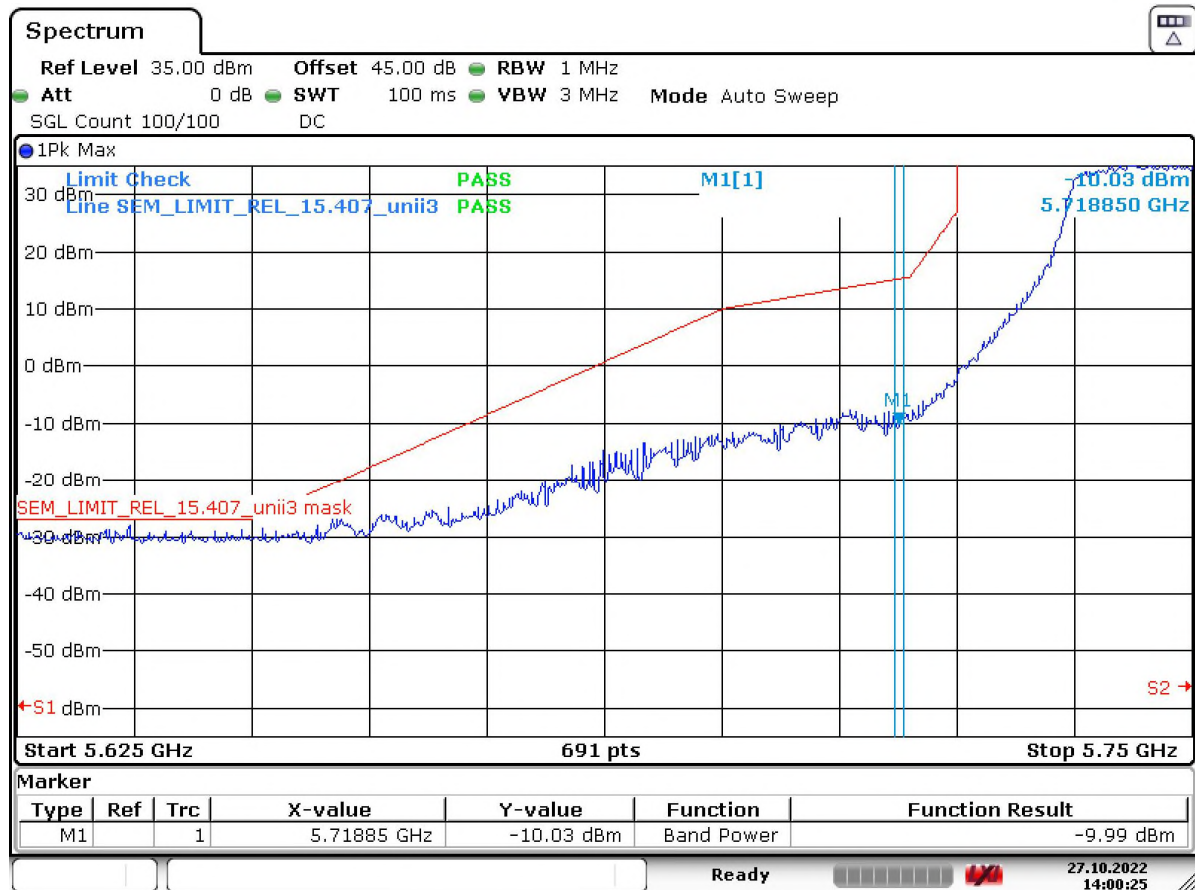


Product Service



Date: 27.OCT.2022 14:08:45

Capture 54 : Test Results: Band Edge (High Channel) – 5835 MHz – 802.11nHT20 Modulation

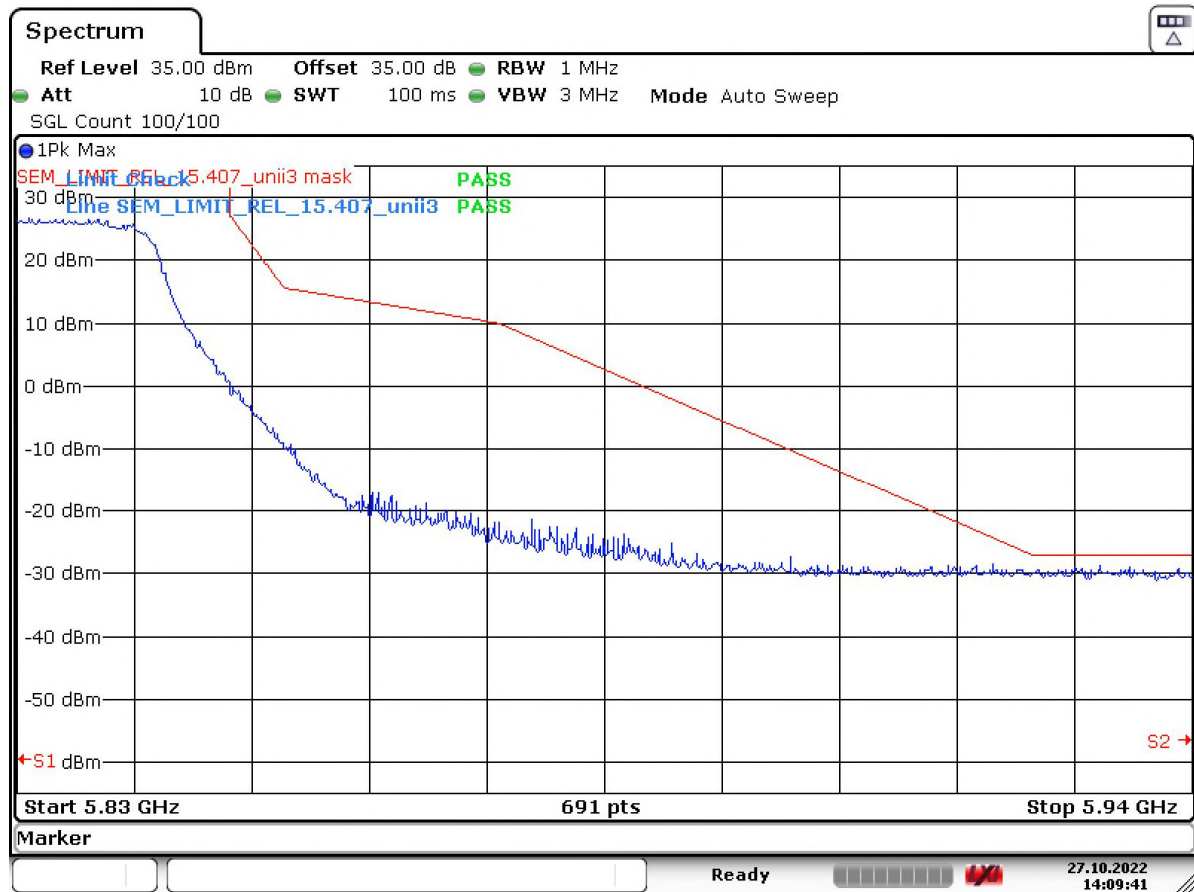


Date: 27.OCT.2022 14:00:25

Capture 55 : Test Results: Band Edge (Low Channel) – 5755 MHz – 802.11HT40 Modulation



Product Service



Date: 27.OCT.2022 14:09:41

Capture 56 : Test Results: Band Edge (High Channel) – 5825 MHz – 802.11HT40 Modulation



2.8 Radiated Spurious Emission – Receive mode.

2.8.1 Specification Reference

Part 15 Subpart C §15.209

RSS-247 5.5

The method is given in Section 12.1 of FCC KDB 558074 and ANSI C 63.10

2.8.2 Standard Applicable

0.009 MHz – 0.490 MHz, 2400/F (kHz) $\mu\text{V/m}$ at 300 m¹

0.490 MHz – 1.705 MHz, 24000/F (kHz) $\mu\text{V/m}$ at 30 m¹

1.705 MHz – 30 MHz, 30 $\mu\text{V/m}$ at 30 m¹

30 MHz – 88 MHz, 100 $\mu\text{V/m}$ (40.0 dBuV/m¹) at 3 m

88 MHz – 216 MHz, 150 $\mu\text{V/m}$ (43.5 dBuV/m¹) at 3 m

216 MHz – 960 MHz, 200 $\mu\text{V/m}$ (46.0 dBuV/m¹) at 3 m

Above 960 MHz, 500 $\mu\text{V/m}$ (54.0 dBuV/m¹) at 3 m

Above 1000 MHz, 500 $\mu\text{V/m}$ (54 dBuV/m²) at 3m

Above 1000 MHz, 500 $\mu\text{V/m}$ (74 dBuV/m³) at 3m

¹Limit is with Quasi Peak detector with bandwidths as defined in CISPR-16-1-1

²Limit is with 1 MHz measurement bandwidth and using an Average detector

³Limit is with 1 MHz measurement bandwidth and using a Peak detector

2.8.3 Equipment Under Test and Modification State

- PoE Model XBGR-2040: Modification state 0 (No modification)

2.8.4 Date of Test

Dec 14 2021 and Oct 7 2022

2.8.5 Test equipment used

The major items of test equipment used for the above tests are identified in Section 3.1.



2.8.6 Environmental Conditions

Test performed at TÜV SÜD Canada, Kanata Location.

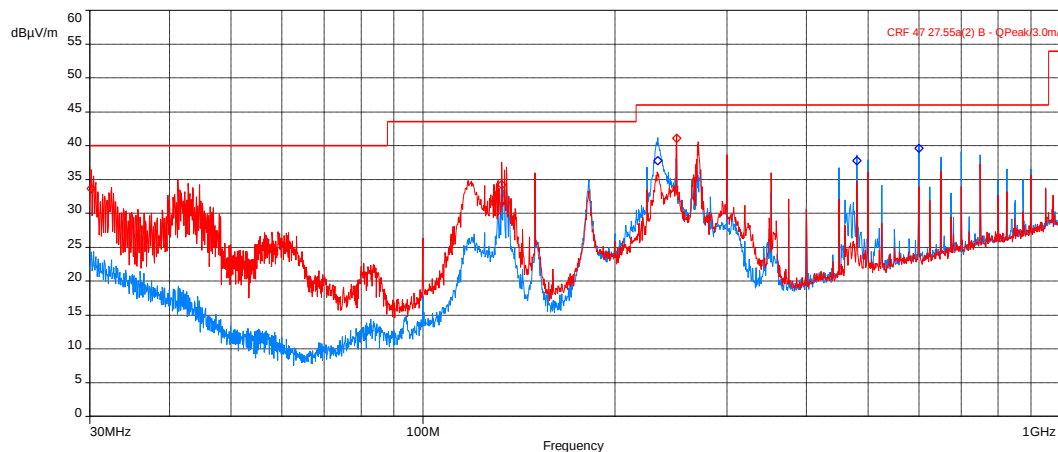
Ambient Temperature	24.3
Relative Humidity	30%
ATM Pressure	101kPa

2.8.7 Additional Observations

- This is a radiated test.
- Test methodology is per Clause 6.4 and 6.11 of ANSI C63.10-2020

2.8.8 Test Results

2.8.8.1.1 Test Below 1GHz (Receiver Mode)

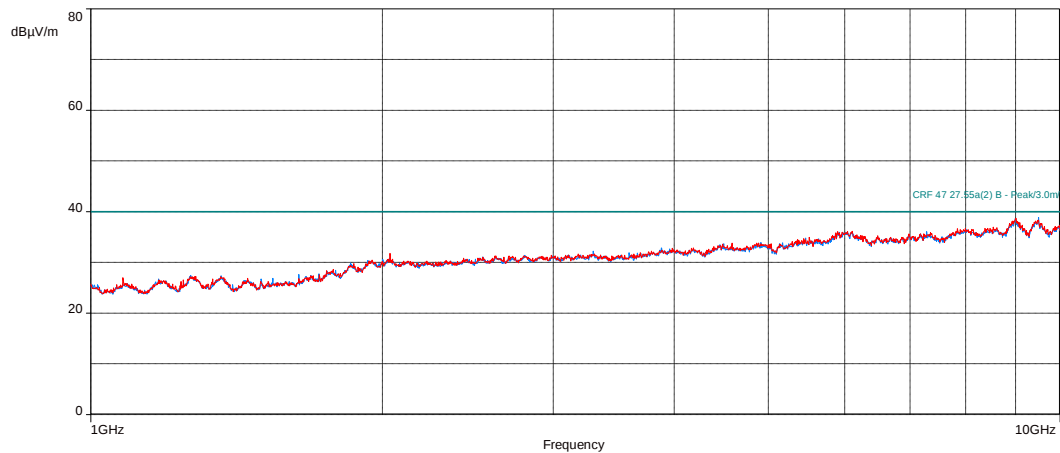


Capture 57 : Test Results: RE 30MHz to 1GHz – Vertical (red trace)– and Blue (horizontal)– polarizations

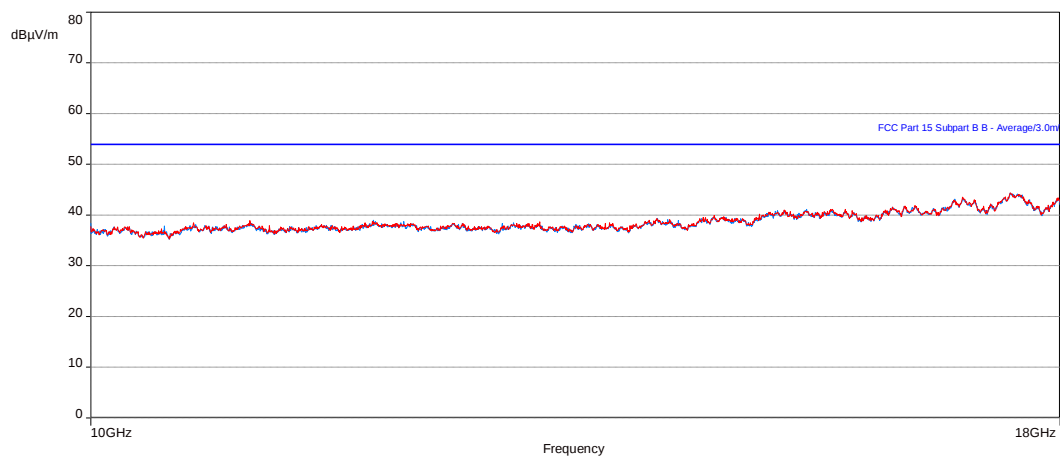
Frequency (MHz)	S R	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (m)	Azimuth (°)	Polarization	Correction (dB)
30.15	1	33.71	40.00	-6.29	1.00	18.75	Vertical	-2.90
133.03	1	34.20	43.52	-9.32	3.12	191.75	Vertical	-9.47
250.01	1	41.10	46.02	-4.92	1.83	261.75	Vertical	-7.91
233.49	2	37.79	46.02	-8.23	1.00	134.50	Horizontal	-9.53
480.02	2	37.79	46.02	-8.23	4.00	312.00	Horizontal	-2.73
600.02	2	39.57	46.02	-6.45	1.73	360.25	Horizontal	-0.58



2.8.8.1.2 Test Above 1GHz (Receiver Mode)



Capture 58 : Test Results: RE 1GHz to 10GHz – Vertical (red trace)– and Blue (horizontal)– polarizations



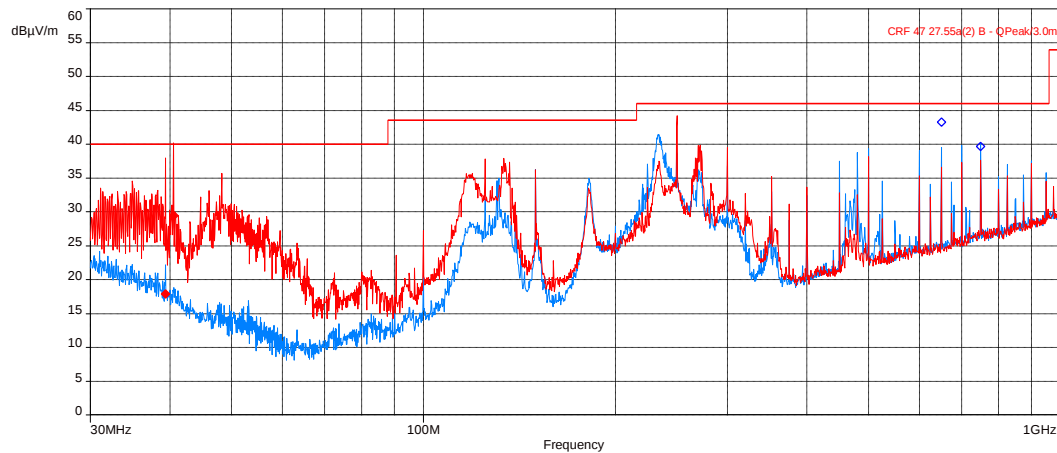
Capture 59 : Test Results: RE 10GHz to 18GHz – Vertical (red trace)– and Blue (horizontal)– polarizations

Note. No significant emission recorded.



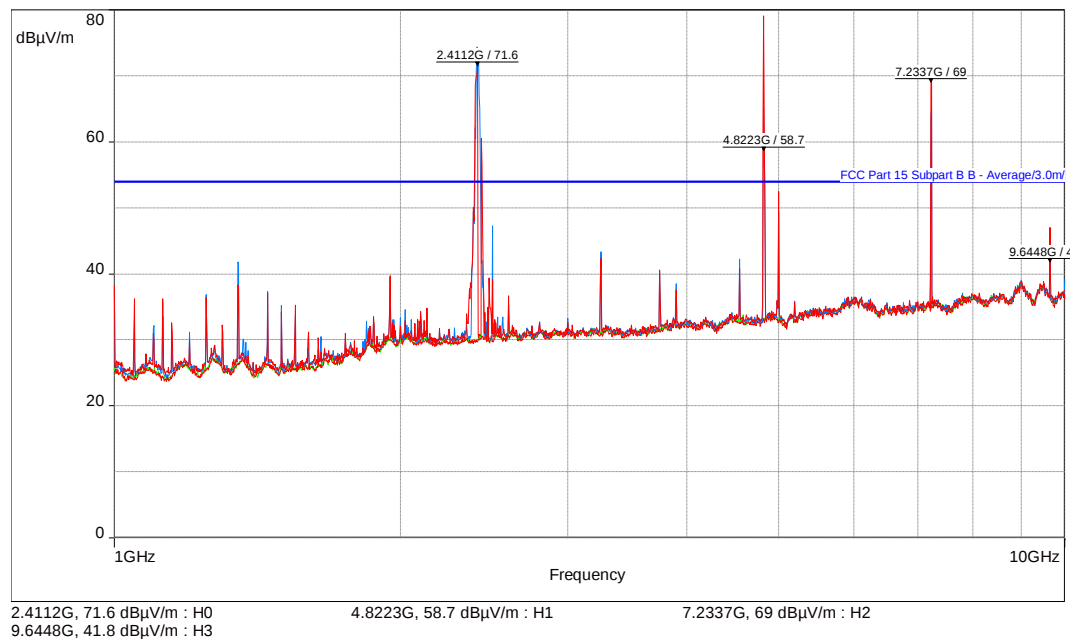
Product Service

2.8.8.1.1 Test Below 1GHz (Worst-Case Configuration)



Capture 60 : Test Results: RE 30MHz to 1GHz – 5735MHz – 802.11nHT20 Modulation – Vertical (red trace)– and Blue (horizontal)– polarizations

2.8.8.1.2 Test Above 1GHz (WLAN 2.4 GHz Tx Worst Case Configuration)



2.4112G, 71.6 dBμV/m : H0
9.6448G, 41.8 dBμV/m : H3

4.8223G, 58.7 dBμV/m : H1

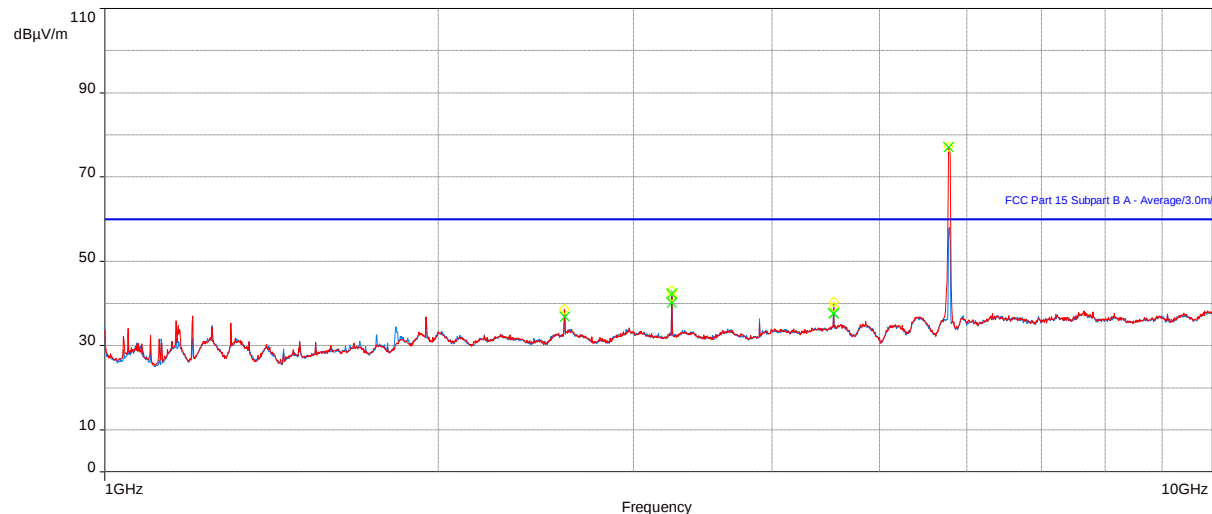
7.2337G, 69 dBμV/m : H2

*Harmonics of 2.4GHz depicted as H1, H2 and H3
2.4 GHz transmitter already certified.*

Capture 61 : Test Results: RE 1GHz to 10GHz – 2.4GHz and 5.8 GHz Wi-Fi on Vertical (red trace)– and Blue (horizontal)– polarizations



2.8.8.1.1 Test Above 1GHz (WLAN – 5.8 GHz only Worst Case Configuration)



Capture 62 : Test Results: RE 1GHz to 10GHz –5.8 GHz Wi-Fi on Vertical (red trace)– and Blue (horizontal)– polarizations

Red=Vertical, Blue=Horizontal
Note: a 5.8 GHz notch filter was used.

Suspects

Manual suspects (6)

Frequency (MHz)	SR	Level (dBμV/m)	Height (m)	Angle (°)	Position
2599.9	1	38.64	1.50	122.25	Vertical
3250.3	1	41.68	1.00	357.25	Vertical
4550.2	1	39.10	1.00	327.50	Vertical
5778.4	1	77.17	1.00	190.25	Vertical
3250.3	2	42.97	1.49	238.50	Horizontal
4550.5	2	40.40	1.49	112.25	Horizontal

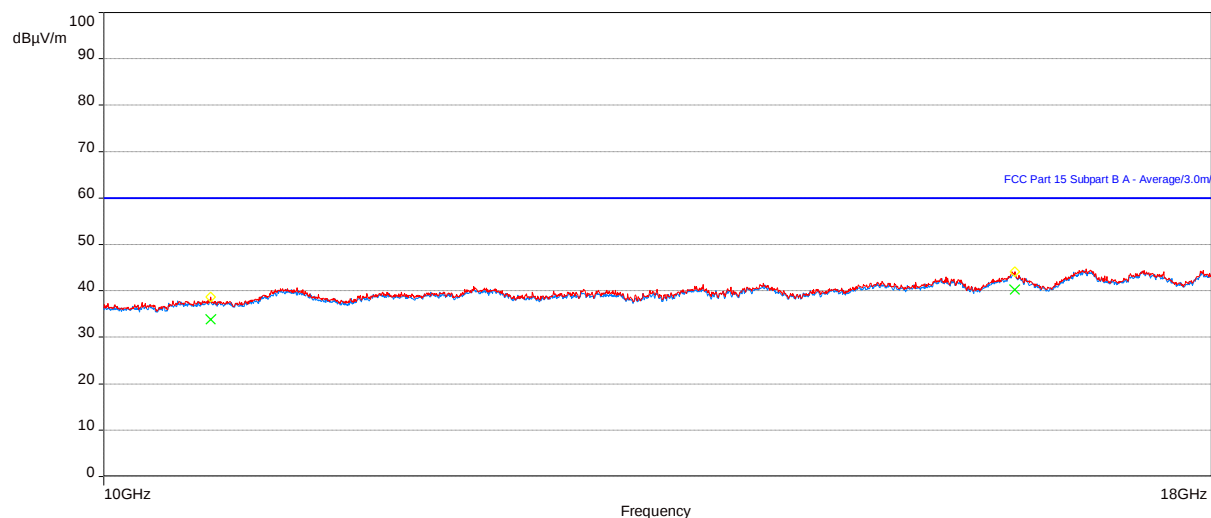
Finals

AVG (6)

Frequency (MHz)	SR	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (m)	Azimuth (°) (dB)	Polarization (dB)	Correction (dB)
2600.135577	1	36.88	59.96	-23.08	1.50	127.25	Vertical	-5.09
3250.176603	1	40.13	59.96	-19.83	1.00	0.00	Vertical	-4.40
4550.230449	1	37.65	59.96	-22.31	1.00	326.50	Vertical	-2.72



5778.4432 69	1	77.05	59.96	17.09	1.00	189.00	Vertical	-0.28
3250.1509 62	2	42.31	59.96	-17.65	1.50	239.50	Horizontal	-4.40
4550.3830 13	2	37.63	59.96	-22.33	1.50	156.25	Horizontal	-2.72



Capture 63 : Test Results: RE 1GHz to 10GHz – 2.4GHz and 5.8 GHz Wi-Fi on Vertical (red trace)– and Blue (horizontal)– polarizations

Red=Vertical, Blue=Horizontal
Note: a 7GHz High pass filter was used.

Finals

AVG (2)

Frequency (MHz)	SR	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (m) (dB)	Azimuth (°) (dB)	Polarization (dB)	Correction (dB)
10583.937 5	1	33.89	59.96	-26.07	1.00	177.00	Vertical	6.84
16215.785 88	1	40.23	59.96	-19.73	1.00	2.00	Vertical	14.74

Note: Emissions were scanned to 40 GHz. No emissions were detected above 18 GHz and the emission level noise floor was below the applicable limit.



2.9 Frequency Stability

2.9.1 Specification Reference

RSS-GEN 8.11
FCC 15.407(g)

2.9.2 Standard Applicable

If the frequency stability of the license-exempt radio apparatus is not specified in the applicable RSS, the fundamental emissions of the radio apparatus should be kept within at least the central 80% of its permitted operating frequency band in order to minimize the possibility of out-of-band operation. In addition, its occupied bandwidth shall be entirely outside the restricted bands and the prohibited TV bands of 54-72 MHz, 76-88 MHz, 174-216 MHz, and 470-602 MHz, unless otherwise indicated.

2.9.3 Equipment Under Test and Modification State

- PoE Model XBGR-2040: Modification state 0 (No modification)

2.9.4 Day of Test

15-02-2022

2.9.5 Test equipment used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.9.6 Environmental Conditions

Test performed at TÜV SÜD Canada, Kanata Location.

Ambient	
Temperature	21.3
Relative	
Humidity	35%
ATM	
Pressure	101kPa

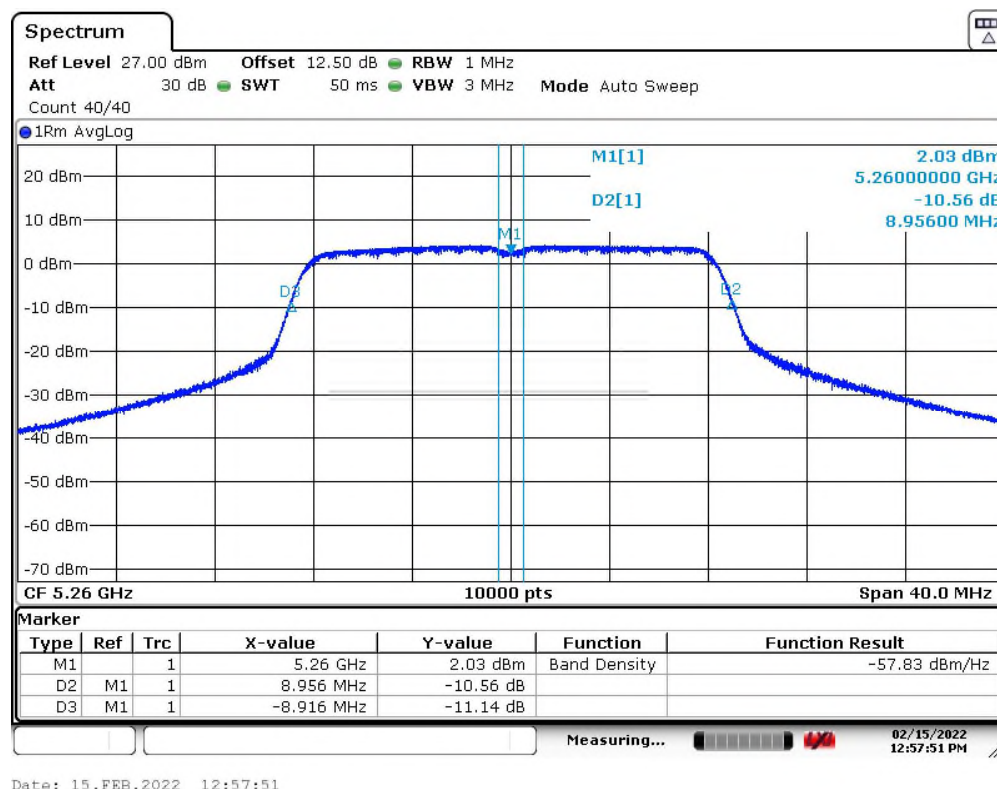
2.9.7 Additional Observations



- EUT operating frequency UNII-2a and modulation 802.11a

2.9.8 Test Results

The EUT complies.



Capture 64 : UNII 2a – Modulation 802.11a – 5260 MHz at +70°C

Sample computation: f1 = 5260 MHz – 8.916 MHz (D2 in Plot 71)
= 5251.1MHz

Sample computation: f2 = 5260 MHz + 8.956 MHz (D3 in Plot 71)
= 5268.96MHz

Center frequency= (f1 + f2)/2
= (5251.1MHz + 5268.96MHz)/2
= 5260.03MHz

Frequency error = 5260 – 5260.03 MHz
= 0.03 MHz
= (0.03/5260) x1, 000,000
= 5.7 ppm



2.10 Transmit Power Control (TPC)

2.10.1 Test Specifications

REFERENCE STANDARD	FCC 15 Subpart 15.407(h) / RSS-247
SPECIFICATIONS	Clauses: (h)
Limit – 6dB Bandwidth	See Table
Frequency range (MHz)	UNII_2a: 5260 & 5320 UNII_2c: 5500 & 5690
UUT	
Identification	GWBR-2040 (000ABD2A007F)
Voltage Input	POE
ENVIROMENTAL & TEST INFO	
Test Date (YYYY-MM-DD)	2022-02-17
Temperature (°C)	23
Humidity (%)	20
Atmospheric Pressure kPa (For Info Only)	100.1
Tester	Jose Martinez



2.10.2 Purposes & Methods

- Test procedure according to Clause 15.407(h)

2.10.3 Specification Reference

FCC 15 Subpart 15.407(h)

2.10.4 Standard Applicable

Transmit power control (TPC). U-NII devices operating in the 5.25-5.35 GHz band and the 5.47-5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

2.10.5 Additional Observations

- This is a conducted test (UUT with a temporary antenna connector provided).
- An offset of 12.5dB was added to compensate for the external attenuator and cable used.
- Observed duty cycle was determined by the formula: $(Tx\ on \times No\ Pulses / (Tx\ on + Tx\ off))$.



2.10.6 Test Results

2.10.7 P_L , P_H & Power Density

Frequency (MHz)	Modulation	Bands	Temperature (° C)	P_L (dBm)	Results
5260	802.11a	UNII-2a	+23	-2.68	Pass
5290	802.11nHT20	UNII-2a	+23	-2.72	Pass

Table 30 Test Results – Transmit Power Control – P_L (Power Low)

Frequency (MHz)	Modulation	Bands	Temperature (° C)	P_H (dBm)	Results
5260	802.11a	UNII-2a	+23	4.48	Pass
5290	802.11nHT20	UNII-2a	+23	4.14	Pass
5580	802.11nHT40	UNII-2c	+23	12.29	Pass

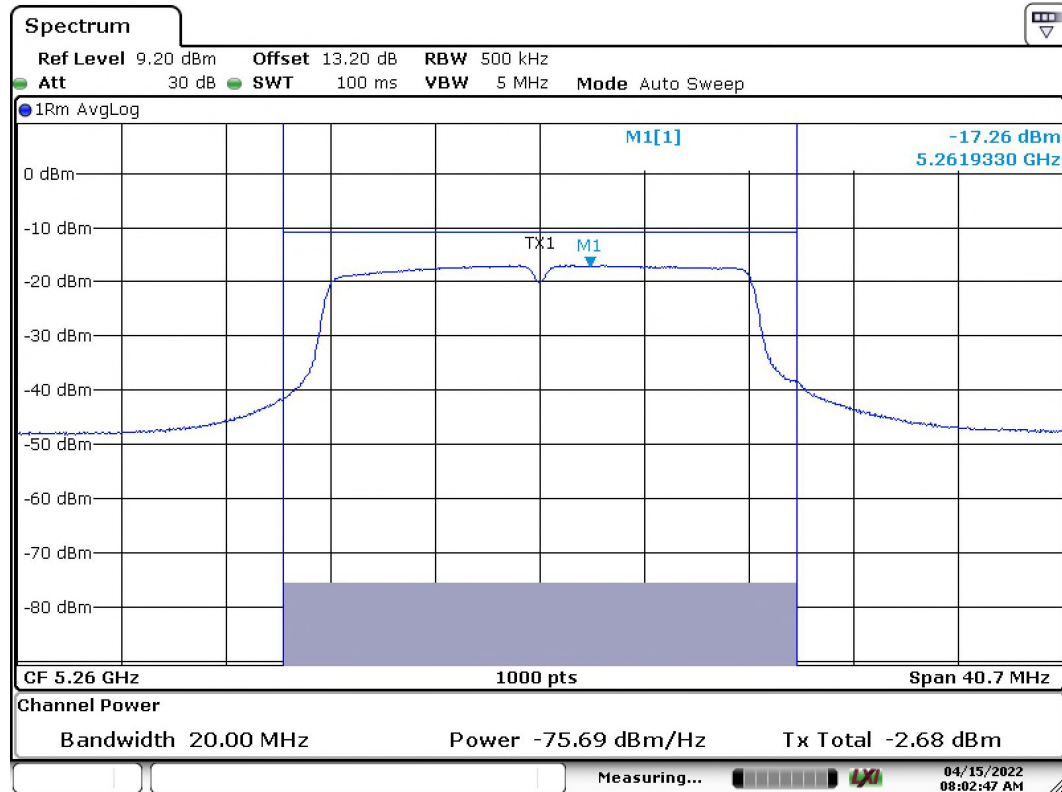
Table 31 Test Results – Transmit Power Control – P_H (Power High)



Product Service

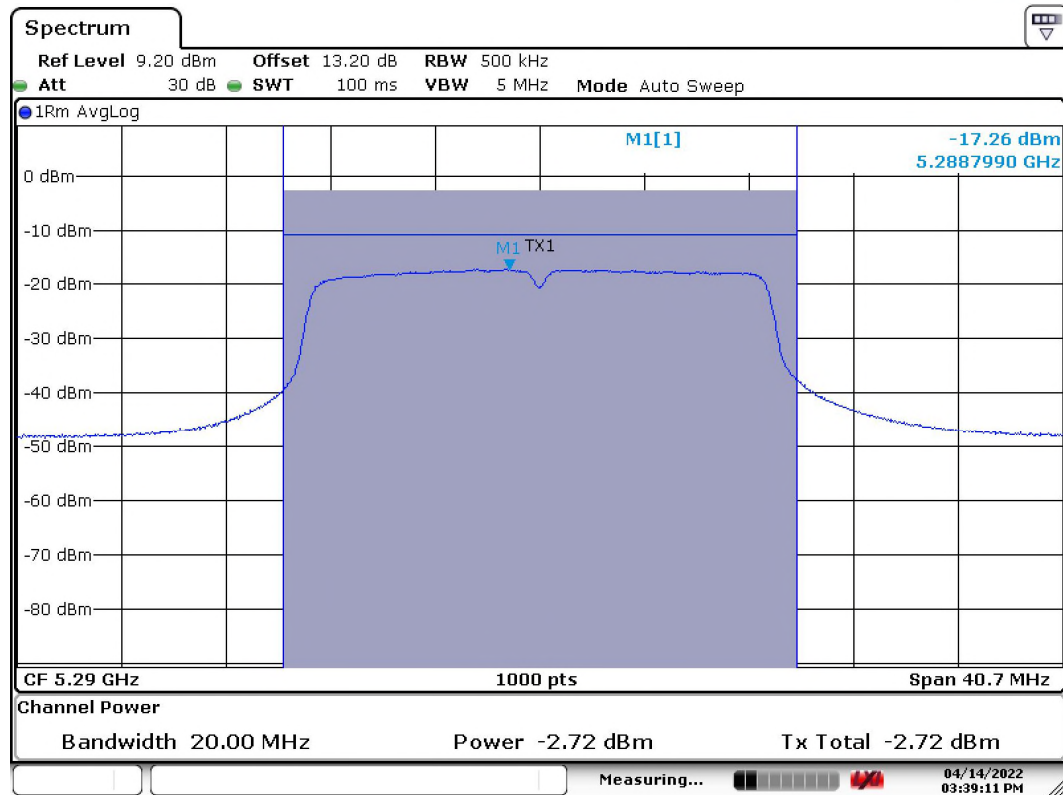
2.10.8 Sample of Test Plots

2.10.8.1 P_L – Power Low



Date: 15.APR.2022 08:02:47

Capture 65 : Test Results – P_L – 5260MHz – 802.11a Modulation (+23°C)



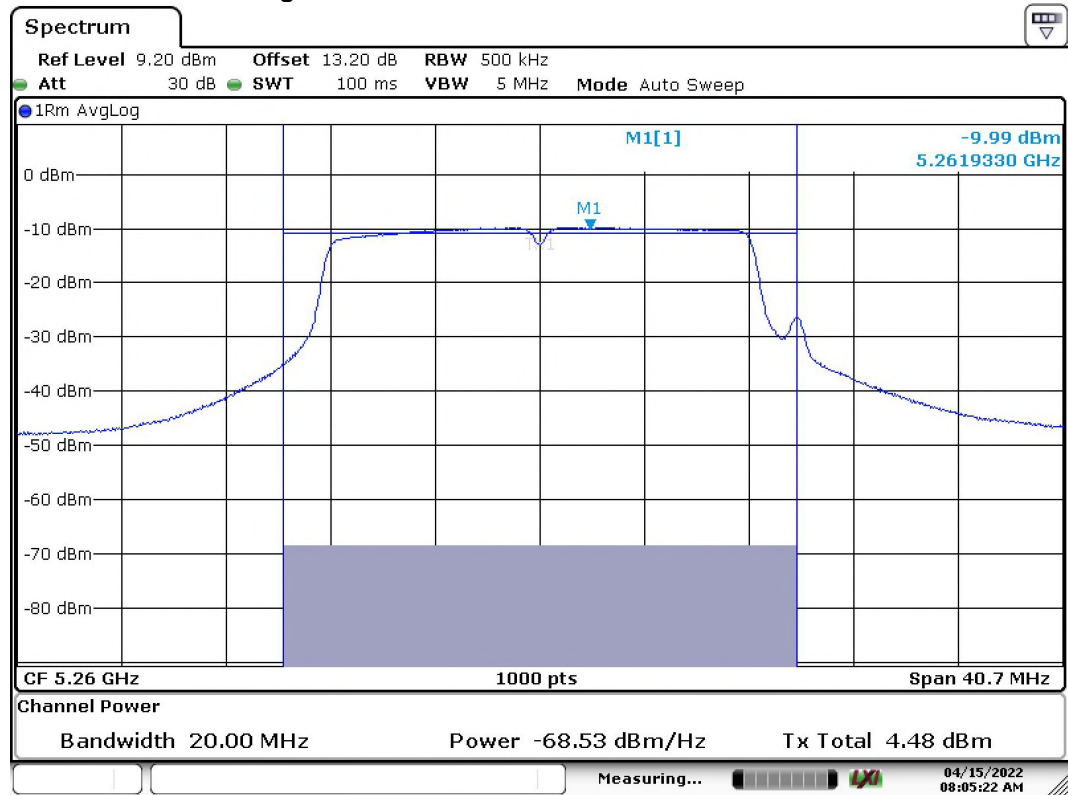
Date: 14.APR.2022 15:39:11

Capture 66 : Test Results – P_L – 5290MHz – 802.11nHT20 Modulation (+23°C)



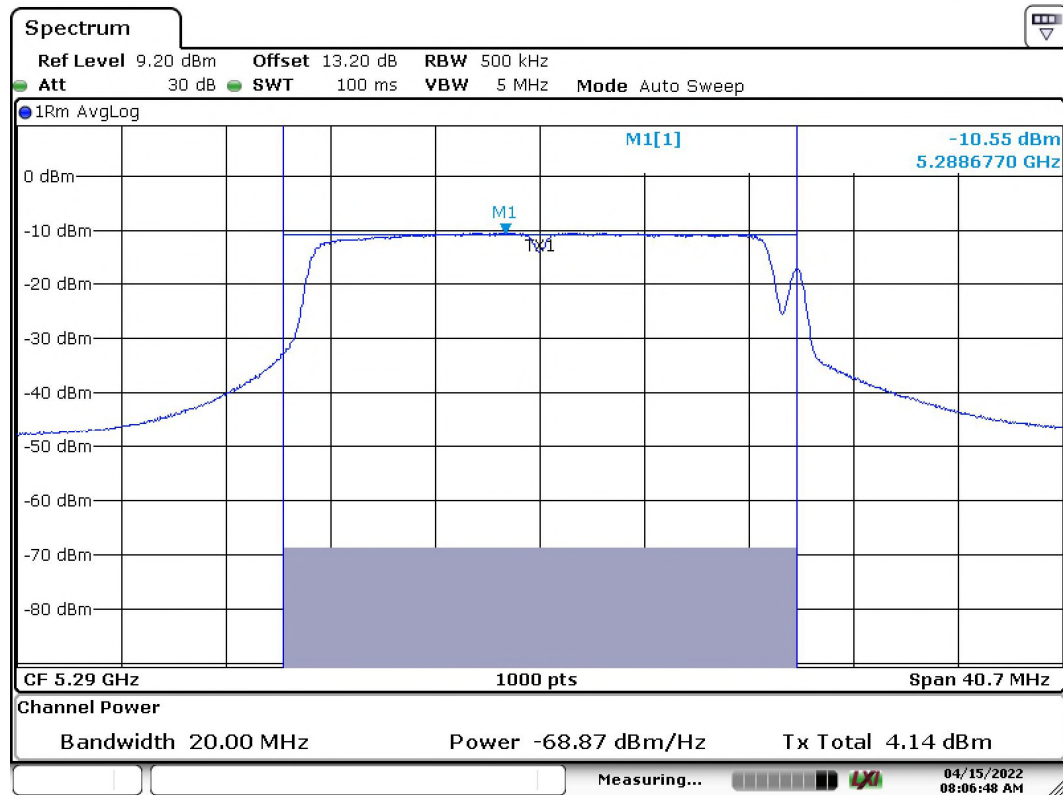
Product Service

2.10.8.2 P_H – Power High



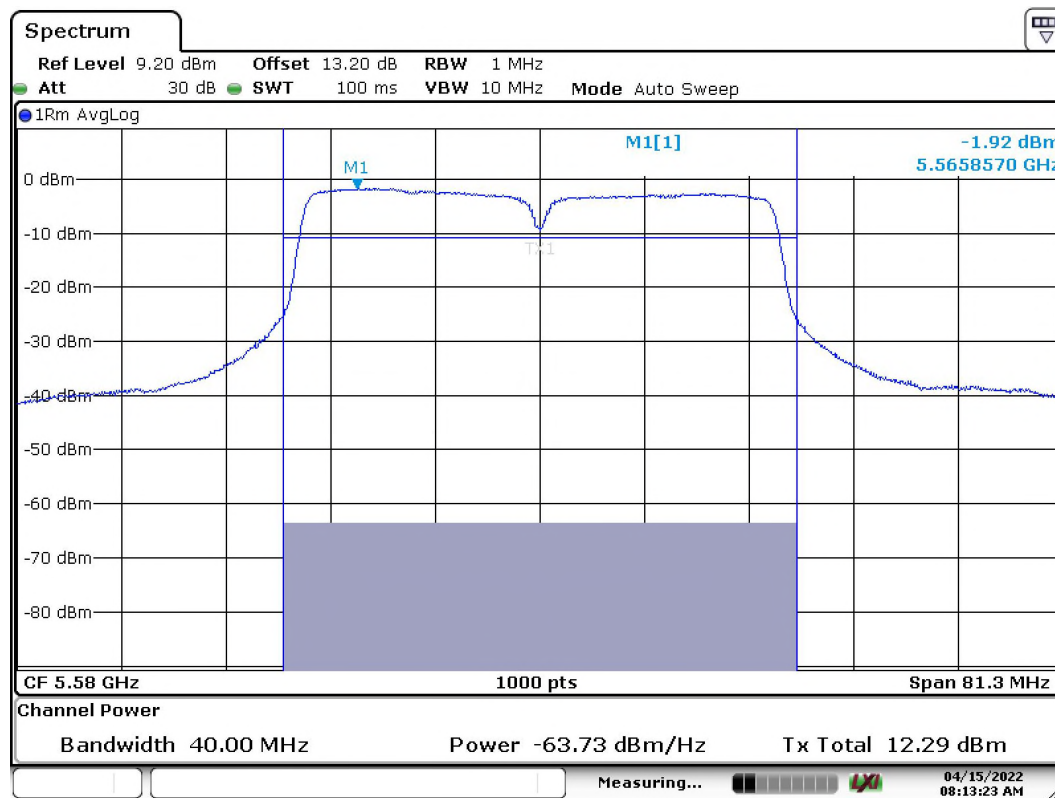
Date: 15.APR.2022 08:05:22

Capture 67 : Test Results – P_H – 5260MHz – 802.11a Modulation (+23°C)



Date: 15.APR.2022 08:06:48

Capture 68 : Test Results – P_H – 5290MHz – 802.11nHT20 Modulation (+23°C)



Date: 15.APR.2022 08:13:24

Capture 69 : Test Results – P_H – 5580MHz – 802.11nHT40 Modulation (+23°C)



Product Service

2.10.9 Test Instruments

This test was carried out in Kanata, Ottawa test location. And the test instrumentation used is depicted in [Section 3](#).



2.11 Dynamic Frequency Selection

2.11.1 Test Specifications

REFERENCE STANDARD [FCC 15 Subpart 15.407\(h\)](#) / RSS-247

SPECIFICATIONS Clauses: (h)

Limit – 6dB Bandwidth See Table

Frequency range (MHz) 5260 & 5270

UUT

Identification

- GWBR-2040 (000ABD2A007F)
- Fiber Model GWBR-2040-F: Modification State 0 (No modification)

Voltage Input POE

ENVIROMENTAL & TEST INFO

Test Date (YYYY-MM-DD) 2022-05-31

Temperature (°C) 21

Humidity (%) 16

Atmospheric Pressure kPa (For Info Only) 100

Tester Jose Martinez



2.11.2 Purposes & Methods

- Test procedure according to 5.4.4.2 as per clause §5.4.4.2.1.1

2.11.3 Specification Reference

[FCC 15 Subpart 15.407\(h\)](#)
[905462 D02 UNII DFS Compliance Procedure New Rules v02.](#)

2.11.4 Standard Applicable

Radar Detection Function of Dynamic Frequency Selection (DFS). U-NII devices operating with any part of its 26 dB emission bandwidth in the 5.25-5.35 GHz and 5.47-5.725 GHz bands shall employ a DFS radar detection mechanism to detect the presence of radar systems and to avoid co-channel operation with radar systems. Operators shall only use equipment with a DFS mechanism that is turned on when operating in these bands. The device must sense for radar signals at 100 percent of its emission bandwidth. The minimum DFS detection threshold for devices with a maximum e.i.r.p. of 200 mW to 1 W is -64 dBm. For devices that operate with less than 200 mW e.i.r.p. and a power spectral density of less than 10 dBm in a 1 MHz band, the minimum detection threshold is -62 dBm. The detection threshold is the received power averaged over 1 microsecond referenced to a 0 dBi antenna. For the initial channel setting, the manufacturers shall be permitted to provide for either random channel selection or manual channel selection.

2.11.5 Additional Observations

- This is a conducted test (UUT with a temporary antenna connector provided).
- An offset of 12.5dB was added to compensate for the external attenuator and cable used.
- The EUT operates as Master operation Mode as indicated in Figure4.
- TS8997 was used for testing
- Correction tables for these paths were determined:
 - o Signal generator to OSP
 - o Vector Signal Generator to OSP
 - o OSP to Spectrum Analyzer (FSV)



Product Service

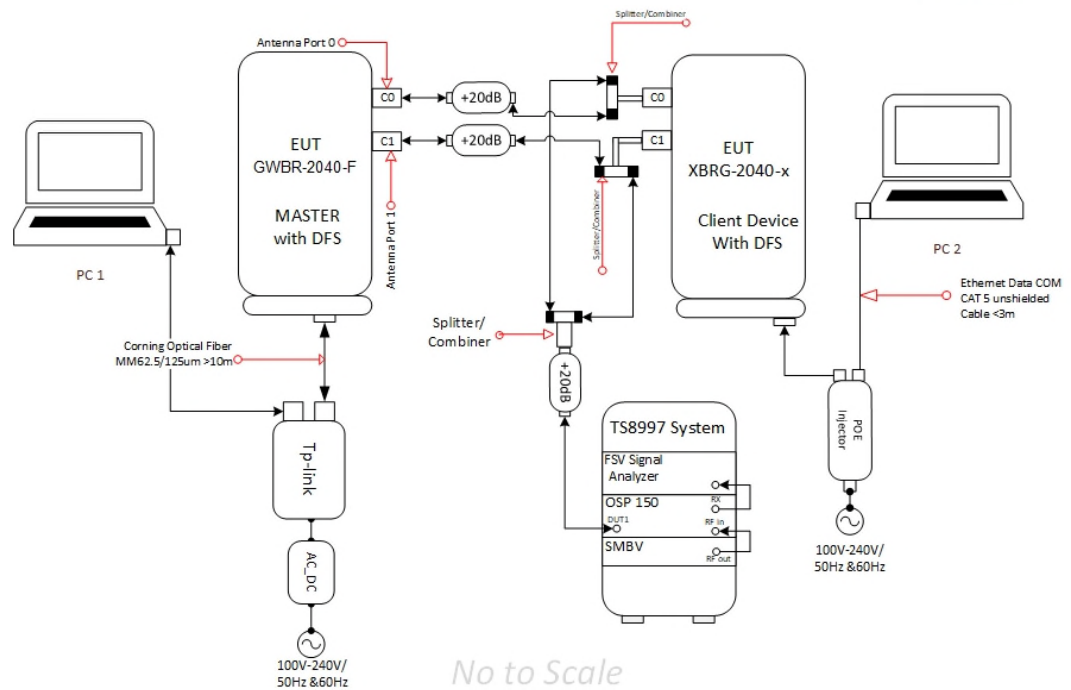


Figure 4: RE Setup – DFS Conducted Measurements



2.11.6 TS8997 Settings

FCC 15.407 DFS only 2018

DUT Information

DUT Name: XBGR-2040
Manufacturer: Trilliant Network Inc.
Serial Number: XBGR-2040:NFQD0000052
Hardware Rev: UCC WAN: CXL-R0366A-5.0; UCC Mesh: CL-R0366D-4.2: Switch Board: CL-R0398A-5.1; LED Board: CL-0408B-2.1
Software Rev: 2.6.0 dev13
Comment: DFS Testing Configuration
Extreme Conditions: Normal Condition
Supply Voltage: PoE
Ambient Temperature: 22oC
Humidity: 30%

Frequencies

WLAN CH 52 (5260 MHz)	WLAN CH 58 (5290 MHz)	WLAN CH 64 (5320 MHz)
WLAN CH 54 (5270 MHz)	WLAN CH 62 (5310 MHz)	WLAN CH 100 (5500 MHz)
WLAN CH 118 (5590 MHz)	WLAN CH 138 (5690 MHz)	WLAN CH 102 (5510 MHz)
WLAN CH 116 (5580 MHz)	WLAN CH 149 (5745 MHz)	WLAN CH 157 (5785 MHz)
WLAN CH 165 (5825 MHz)	WLAN CH 151 (5755 MHz)	WLAN CH 159 (5795 MHz)

Bandwidths

20 MHz (20 MHz)	40 MHz (40 MHz)
-----------------	-----------------

Power

13.500 dBm (13.5 dBm)

Beamforming Gain

Powerstep name (value)	Beamforming gain table names
13.500 dBm (13.5 dBm)	---

Gain Tables

Powerstep name (value)	Gain table names
13.500 dBm (13.5 dBm)	Port 1: ---;

DUT Settings

No. of transmission chains	1
DFS capability	Yes
DFS Mode	Master
Startup time (incl. CAC)	110 seconds
Startup time delay	0 seconds
Conf. occ. bandwidth for :	nom. Bandwidth '20000000' = 20 MHz
Conf. occ. bandwidth for :	nom. Bandwidth '40000000' = 40 MHz



Hardware Setup: WMS Measurements\HW-DFS

Spectrum Analyzer: SA FSV 40 (SA FSV 40) @ VISA (ADR
TCPIP0::178.168.48.30::inst0::instr), SN 1321.3008K40/101844, FW
3.40

Vector Generator: VG SMBV100A (VG SMBV100A) @ VISA (ADR
TCPIP0::178.168.48.22::inst0::instr), SN 261706, FW 4.15.125.49

Generator: SMB100A (SMB100A) @ VISA (ADR
TCPIP0::178.168.48.20::inst0::INSTR), SN 115430, FW 3.20.390.24
/ Drv:Rev 2.21.0, 07/2016, CVI 2015

OSP: OSP-B157W (OSP-B157W) @ VISA (ADR
TCPIP::169.254.26.101::inst0::instr), SN 1527.1144. /, FW 1.27.0.0



2.11.7 Channel Availability Check Time

2.11.7.1 Clause h(2)(ii)

2.11.7.1.1 Results

Test	Frequency (MHz)	Nominal Power (dBm)	Nominal Bandwidth (MHz)	Result
DFS Channel Availability Check	5260.000	13.0	20.000000	PASS

2.11.7.1.1.1 Measurement Summary

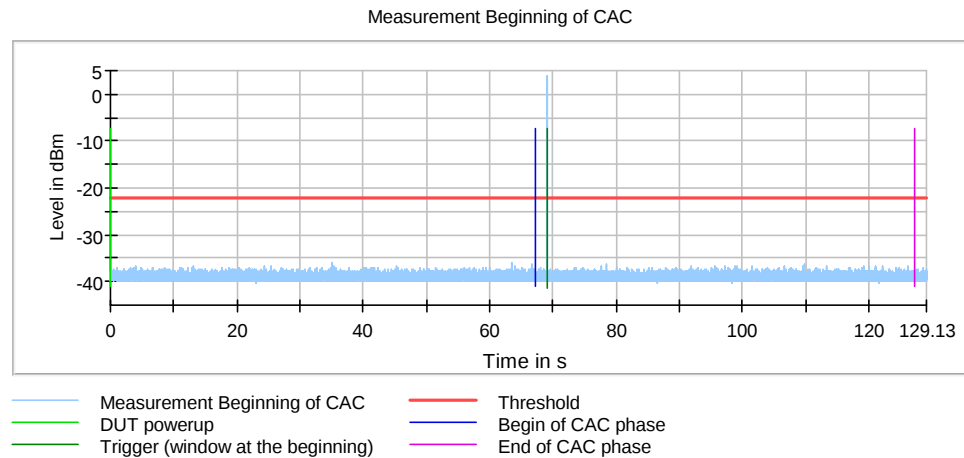
DUT Frequency	Radar Waveform Filename used	CAC Type	Overall Result	Overall Comment
5260.000000	Type 0	Begin of CAC	PASS	
5260.000000	Type 0	End of CAC	PASS	

2.11.7.1.1.2 Measurement Detailed Results

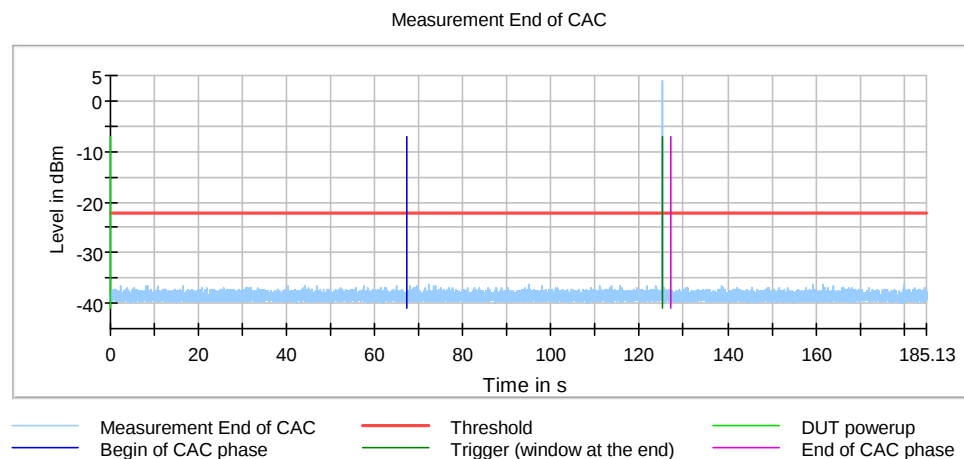
DUT Frequency (MHz)	Radar Type No.	CAC Type	Kind of Measurement	Time of Tx Start (s)	Limit (s)
5260.000000	0	Begin of CAC Phase	Before Radar Injection	0.000	0.00
5260.000000	0	Begin of CAC Phase	After Radar Injection	>67.0 <Note1>	>60.0
5260.000000	0	End of CAC Phase	Before Radar Injection	0.000	0.00
5260.000000	0	End of CAC Phase	After Radar Injection	>127.0 <Note2>	>60.0
Note 1. See plot 77. Note 2. See plot 78.					



2.11.7.1.2 Sample of Plots



Capture 70 : Test Results: Channel Availability to Check (CaC at 5260 MHz) Beginning of Radar Injection



Capture 71 : Test Results: Channel Availability to Check (CaC at 5260 MHz) After of Radar Injection



2.11.8 Channel Move Time

- FCC 15.407 Clause § h(2)(iii)
-

2.11.8.1 Results

2.11.8.1.1 Measurement summary

DUT Frequency (MHz)	Radar Type No.	Type of Measurement value	Overall Result	Overall Comment
5260.000000	0	First of all transmit test	PASS	DUT is transmitting
5260.000000	0	Channel move time	PASS	
5260.000000	0	Channel closing	PASS	

2.11.8.1.2 Transmitting test detailed results

DUT Frequency (MHz)	Tx-Test Tx Time (s)	Tx-Test No. of Pulses found	Tx-Test Duty Cycle (%)	Tx-Test Result	Tx-Test Comment
5260.000000	0.000	2	0.103	PASS	

2.11.8.1.3 Channel closing transmission time detailed results

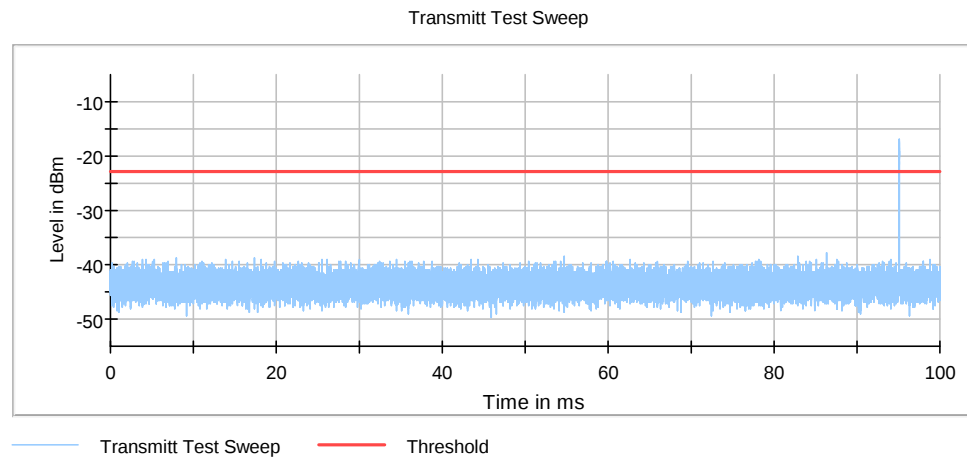
DUT Frequency (MHz)	Radar Type No.	CCTT No. of Pulses found	CCTT Tx Time (ms)	CCTT Tx Time Limit	CCTT Result
5260.000000	0	17	5.127	1000.000	PASS

2.11.8.1.4 Channel move time detailed results

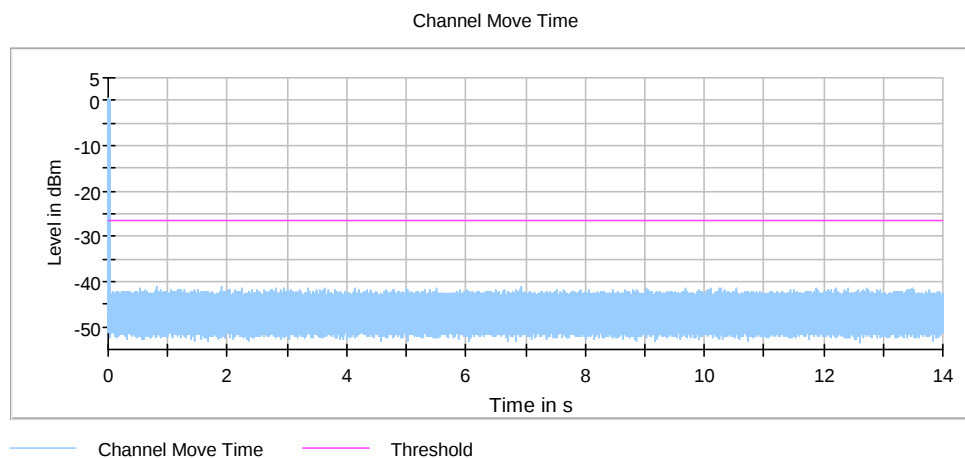
DUT Frequency (MHz)	Radar Type No.	CMT Tx Time (s)	CMT Limit (s)	CMT Result	CMT Comment
5260.000000	0	0.036	10.000	PASS	Tx Time value is last trailing edge



2.11.8.1 Sample of Plots



Capture 72 : Test Results: Transmit Test Sweep – 5260 MHz



Capture 73 : Test Results: Channel Move Time – 5260 MHz

2.11.9 Channel Shutdown and Non-Occupancy Period

- FCC 15.407 Clause §h(2)(iv)



2.11.9.1.1 Result summary

Test	Frequency (MHz)	Nominal Power (dBm)	Nominal Bandwidth (MHz)	Result
DFS Channel Shutdown and Non-Occupancy Period	5260.000	13.0	20.000000	PASS

2.11.9.1.2 Measurement summary

DUT Frequency	Radar Type No.	Type of Measurement value	Overall Result	Overall Comment
5260.000000	0	First of all transmit test	PASS	DUT is transmitting
5260.000000	0	Channel move time	PASS	
5260.000000	0	Channel closing transmission time	PASS	
5260.000000	0	Non-occupancy period	PASS	

2.11.9.1.3 Transmitting test detailed results

DUT Frequency (MHz)	Tx-Test Tx Time (s)	Tx-Test No. of Pulses found	Tx-Test Duty Cycle (%)	Tx-Test Result	Tx-Test Comment
5260.000000	0.002	18	2.013	PASS	

2.11.10 Channel move time detailed results

DUT Frequency (MHz)	Radar Type No.	CMT Tx Time (s)	CMT Limit (s)	CMT Result	CMT Comment
5260.000000	0	0.000	10.000	PASS	Tx Time value is last trailing edge found within sweep. See Note 1.

Note 1. Because of the radar pulse event at the beginning, the investigation of the trace begins with an offset of 28.7 ms conforming to the end of the Radar burst.

2.11.11 Channel closing transmission time detailed results

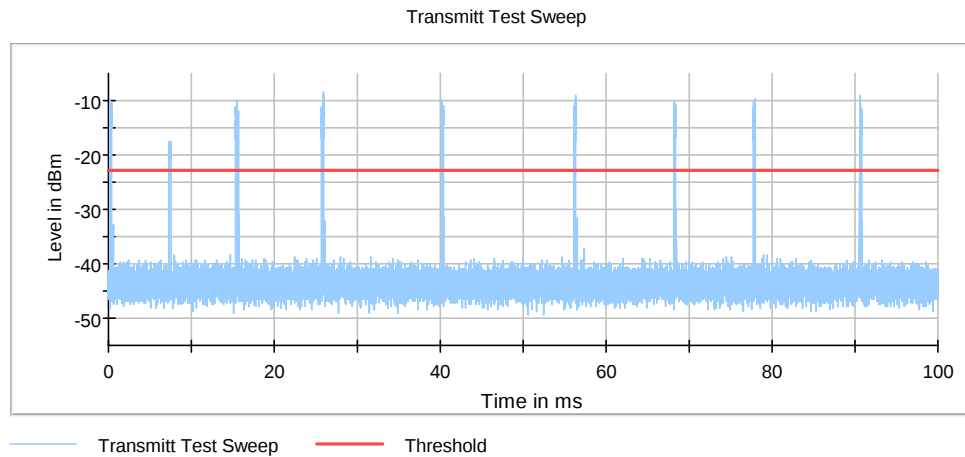
DUT Frequency (MHz)	Radar Type No.	CCTT No. of Pulses found	CCTT Tx Time (ms)	CCTT Tx Time Limit (ms)	CCTT Result
5260.000000	0	0	1.00	1000.000	PASS



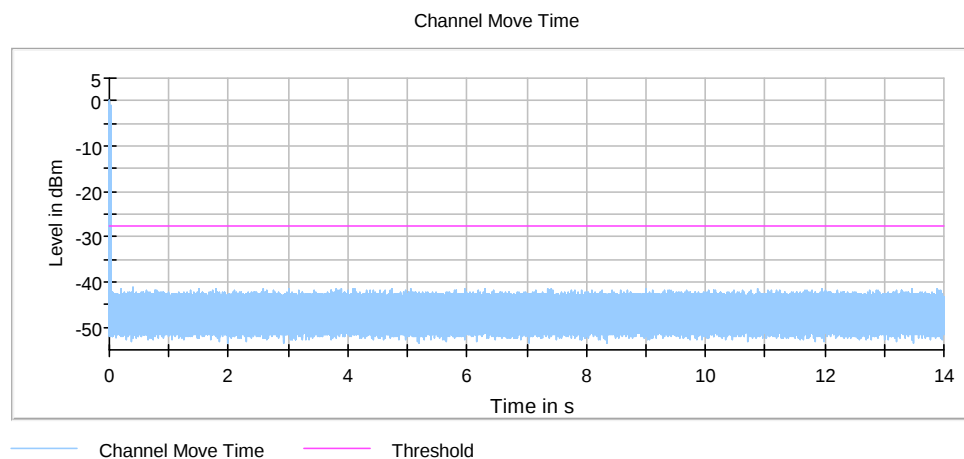
2.11.12 Non-occupancy period detailed results

DUT Frequency (MHz)	Radar Type No.	NOP No. of Pulses found	NOP No. of Pulses Limit	NOP Tx Time (s)	NOP Tx Time Limit (s)	NOP Result
5260.000000	0	0	0	0.000	1800.00	PASS

2.11.12.1 Sample of Plots



Capture 74 : Transmit Test Sweep – 5260 MHz

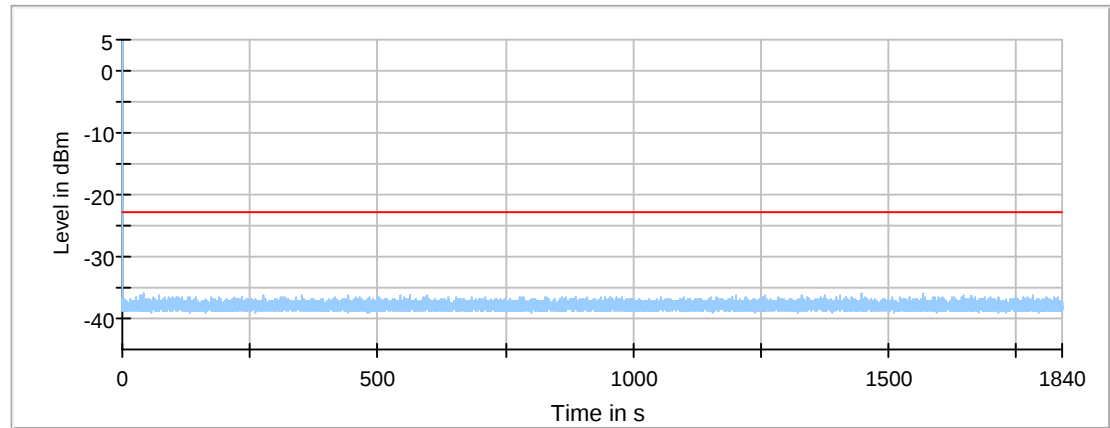


Capture 75 : Channel Move Time – 5260 MHz (14s)



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and Non-occupancy period



— and Non-occupancy period — Threshold

Capture 76 : Non-Occupancy period – 5260 MHz (180s)



2.12 DFS Detection Threshold (20MHz & 40 MHz)

2.12.1.1.1 Result summary

Test	Frequency (MHz)	Nominal Power (dBm)	Nominal Bandwidth (MHz)	Result
DFS Radar Detection Threshold	5260.000	13.0	20.000000	PASS
DFS Radar Detection Threshold	5270.000	13.0	40.000000	PASS

2.12.1.1.2 Measurement Summary (20MHz)

DUT Frequency (MHz)	No. of Trials	No. of Detections	Detection Limit	Overall Result	Overall Comment
5260.000000	20	18	12 of 20	PASS	

2.12.1.1.3 Detailed Results of all Trials (20MHz)

Trial Number	Random Trial used	Radar Type No.	Detected	Detailed Result	Comment
1	12	1	YES	PASS	
2	8	2	YES	PASS	
3	7	3	YES	PASS	
4	9	4	No	FAIL	
5	11	5	YES	PASS	
6	3	6	YES	PASS	
7	17	1	YES	PASS	
8	1	2	YES	PASS	
9	20	3	YES	PASS	
10	19	4	YES	PASS	
11	4	5	YES	PASS	
12	13	6	YES	PASS	
13	15	1	YES	PASS	
14	14	2	YES	PASS	
15	6	3	YES	PASS	
16	2	4	YES	PASS	
17	5	5	No	FAIL	
18	10	6	YES	PASS	
19	18	1	YES	PASS	
20	16	2	YES	PASS	



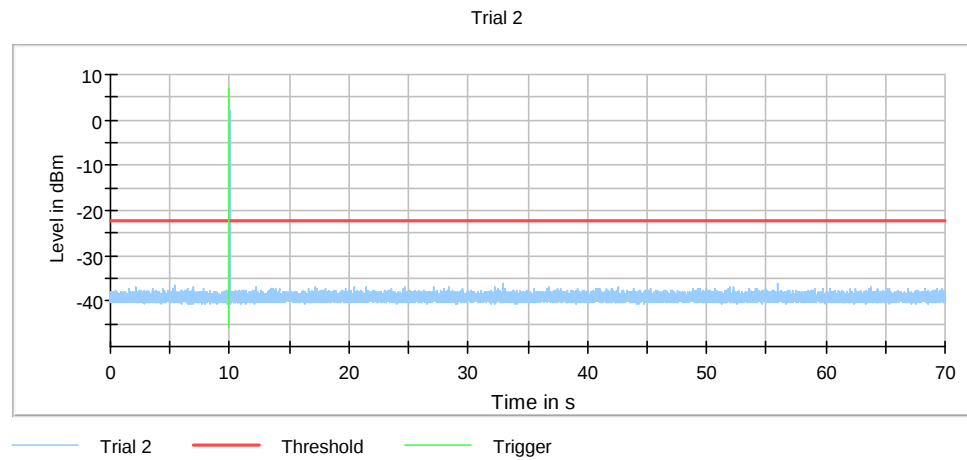
2.12.1.1.4 Radar Pulse Detailed Results (20MHz)

Trial Number	Random Trial used	Radar Type No.	Pulse Width (µs)	PRI (µs)	No. of Pulses	Comment
1	12	1	3.200	2724.700	10	
2	8	2	9.500	1801.800	15	
3	7	3	11.400	336.300	25	
4	9	4	28.400	285.200	20	
5	11	5	1.400	3257.300	20	
6	3	6	1.200	1919.300	30	
7	17	1	0.800	3787.800	10	
8	1	2	0.700	1381.200	15	
9	20	3	14.900	280.500	25	
10	19	4	24.100	337.300	20	
11	4	5	1.100	3115.200	30	
12	13	6	1.900	1472.700	30	
13	15	1	4.700	3412.900	10	
14	14	2	2.000	736.300	15	
15	6	3	9.200	414.500	25	
16	2	4	26.900	366.100	20	
17	5	5	1.200	2949.800	20	
18	10	6	1.700	1996.000	45	
19	18	1	4.200	1555.200	10	
20	16	2	14.400	907.400	15	

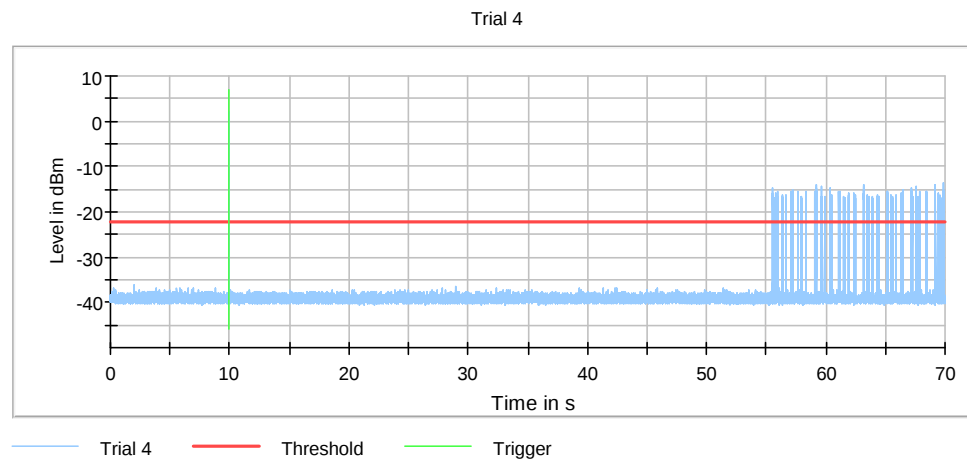


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2.12.1.1.5 Sample of Plots (20MHz)



Capture 77 : Radar Detection – Trial 2



Capture 78 : Radar Detection – Trial 4



2.12.1.1.6 Measurement Summary (40MHz)

DUT Frequency (MHz)	No. of Trials	No. of Detections	Detection Limit	Overall Result	Overall Comment
5270.000000	20	20	12 of 20	PASS	

2.12.1.1.7 Detailed Results of all Trials (40MHz)

Trial Number	Random Trial used	Radar Type No.	Detected	Detailed Result	Comment
1	15	1	YES	PASS	
2	3	2	YES	PASS	
3	10	3	YES	PASS	
4	2	4	YES	PASS	
5	9	5	YES	PASS	
6	20	6	YES	PASS	
7	7	1	YES	PASS	
8	18	2	YES	PASS	
9	19	3	YES	PASS	
10	12	4	YES	PASS	
11	4	5	YES	PASS	
12	6	6	YES	PASS	
13	5	1	YES	PASS	
14	17	2	YES	PASS	
15	13	3	YES	PASS	
16	14	4	YES	PASS	
17	11	5	YES	PASS	
18	8	6	YES	PASS	
19	1	1	YES	PASS	
20	16	2	YES	PASS	