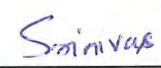
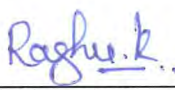


<b>Prüfbericht - Nr.:</b>	<b>ULR-TC568819300000087F</b>	<b>Seite 1 von 69</b>
<i>Test Report No.:</i>		<i>Page 1 of 69</i>
<b>Auftraggeber:</b> <i>Client:</i>	<b>Honeywell</b> 12, Clintonville Rd, Northford, CT, USA 06472; +1 203 4847161	
<b>Gegenstand der Prüfung:</b> <i>Test item:</i>	<b>GLSS Gateway</b>	
<b>Bezeichnung:</b> <i>Identification:</i>	<b>CGW-MB</b>	<b>Serien-Nr.:</b> 850020000300129B70045 <i>Serial No.</i>
<b>Wareneingangs-Nr.:</b> <i>Receipt No.:</i>	<b>166211445</b>	<b>Eingangsdatum:</b> 04.12.2019 <i>Date of receipt:</i>
<b>Prüfört:</b> <i>Testing location:</i>	<b>Refer Page 5 of 69 for Test site details</b>	
<b>Prüfgrundlage:</b> <i>Test specification:</i>	<b>FCC Part 15 Subpart E 15.407 &amp; ANSI C63.10 2013</b>	
<b>Prüfergebnis:</b> <i>Test Result:</i>	<b>Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n).</b> <i>The test items passed the test specification(s).</i>	
<b>Prüflaboratorium:</b> <i>Testing Laboratory:</i>	<b>TÜV Rheinland (India) Pvt. Ltd.</b> 27/B, 2nd Cross Road, Electronic City Phase1, Bangalore – 560 100, India FCC Test Site Registration No.: 496599	
<b>geprüft / tested by:</b>	<b>kontrolliert / reviewed by:</b>	
17.12.2019 Srinivasa B R Engineer 	29.01.2020 Raghavendra Katti Assistant Manager 	
<b>Datum</b> <i>Date</i>	<b>Name/Stellung</b> <i>Name/Position</i>	<b>Unterschrift</b> <i>Signature</i>
<b>Datum</b> <i>Date</i>	<b>Name/Stellung</b> <i>Name/Position</i>	<b>Unterschrift</b> <i>Signature</i>
<b>Sonstiges / Other Aspects:</b>	<b>FCC ID:PV3CGWMB</b>	
<b>Abkürzungen:</b>	<b>P(ass) = entspricht Prüfgrundlage</b>	<b>Abbreviations: P(ass) = passed</b>
<b>F(ail) = entspricht nicht Prüfgrundlage</b>	<b>N/A = nicht anwendbar</b>	<b>F(ail) = failed</b>
<b>N/T = nicht getestet</b>		<b>N/A = not applicable</b>
		<b>N/T = not tested</b>
<b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b>		
<i>This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.</i>		

## TEST SUMMARY

Test item	FCC clause	Result
Emission Bandwidth	15.407 (a)	Pass
Maximum conducted output power	15.407 (a)	Pass
Maximum Power spectral density	15.407 (a)	Pass
DFS testing	15.407(h)	Pass
Restricted bands of emission and Restricted bands of operation	15.407 (b) / (15.205 &15.209)	Pass

**Note:** Conducted measurements performed as per the procedure given in KDB No. 789033 D02 General UNII test Procedures v02r0

Product Category: Electronics Testing  
Test Discipline : EMC Test Facility

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# **1 GENERAL REMARKS**

## **1.1 Complimentary Materials**

All attachments are integral part of this test report. This applies especially to below mentioned items.

- 1. Test Setup Photo**
- 2. EUT External Photo**
- 3. EUT Internal Photo**
- 4. FCC Label and Label Location**
- 5. Block Diagram**
- 6. Specification of EUT**
- 7. Schematic Diagrams**
- 8. Bill of Material**
- 9. User Manual**
- 10. Maximum Permissible Exposure Information**

## 2 TEST SITES

### 2.1 Testing Facilities

TÜV Rheinland (India) Private Limited.  
27/B, 2nd Cross,  
Electronic City Phase1  
Bangalore – 560 100,  
India

TUV Rheinland (India) Private Limited.  
108 , Beside ISBR Business School,  
Electronic City Phase1  
Bangalore - 560 100.  
India

### 2.2 List of Test and Measurement Instruments

**Table 1: List of test and measurement instruments**

Equipment	Manufacturer	Model Name	Serial Number	Firmware Versions	Calibration Due Date	Periodicity	Used for Test Items
USB Wideband Power Sensor	AIMIL Ltd	55006	10231	-	22-12-2019	Yearly	Antenna - Port Measurements
Spectrum Analyser	Agilent Technologies	E4407B	US41192772	A.14.06	28-03-2020	Yearly	
EMI Test Receiver	Rohde & Schwarz	ESU 40	100288	4.43 SP3	11-10-2020	Yearly	Radiated Spurious Emission
Active loop antenna	Frankonia	LAX-10	LAX-10-800	-	15-01-2020	Yearly	
Biconical Antenna	Schwarzbeck mess-elektronik	VHBB-9124 / BBA-9106	9124-656	-	16-01-2020	Yearly	
Log-Periodic Antenna	Schwarzbeck	FMZB 1519 B	1519B-00111	-	16-01-2020	Yearly	
Broadband Horn Antenna	Frankonia	BBHA 9120 D	9120D-1944	-	16-01-2020	Yearly	
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA 9170-0904	-	21-01-2020	Yearly	
Semi Anechoic Chamber	Frankonia	-	-	-	-	-	
Fully Anechoic Chamber	Albatross	-	-	-	-	-	
EMI Receiver	Rohde & Schwarz	ESR7	101133	V7.0-4-62-2	16-01-2020	Yearly	AC Power line conducted emission
LISN	Rohde & Schwarz	ENV 216	100022	-	05-09-2020	Yearly	
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100811	-	01-08-2020	Yearly	

**Table 2: Instrument application Software versions**

<b>SL. No.</b>	<b>Test Type</b>	<b>Application software</b>	<b>Version</b>
1	Radiated spurious emission measurement	EMC 32	10.50.00

## 3 GENERAL PRODUCT INFORMATION

### 3.1 Product Function and Intended Use

Gateway Connect is an embedded and intelligent gateway for connected buildings. It enables system maintenance providers as well as end users to remotely manage connected fire detection systems. The gateway also supports them to ensure compliance.

**Operational description:** The gateway acts as a portal among fire alarm panels, and peripheral devices. The gateway connection with the fire alarm panel enables reading the inventory and transmitting the data. The connection with Cloud facilities remotely monitoring and managing the fire detection systems.

### 3.2 Ratings and System Details declared by client\*

**Table 3: Ratings and System Details**

Radio Protocol	WLAN (2.4GHz)	BLE	BLUETOOTH	WLAN (5GHz)
Operating Frequency Range	2412MHz – 2462MHz	2402MHz – 2480MHz		5160MHz to 5240MHz 5260MHz to 5340MHz 5500MHz to 5700MHz
No. of Channel and Supporting Bandwidth	11 Channels , 20MHz	40	79	Only 20MHz
Channel Spacing	5MHz	2MHz	1MHz	10MHz
Modulation	802.11b: CCK and DSSS 802.11g: OFDM 802.11n: OFDM	GFSK	GFSK, pi/4-DQPSK, 8-DPSK	802.11a: OFDM 802.11n: OFDM
Number of antennas	2	1	1	2
Antenna Gain & Type	3dBi & Printed F Antenna			6.5 dBi & Printed F Antenna
Supply Voltage to Product	24V DC			
Dimensions	200mm x 70mm x 255mm			
Environmental conditions (Operating and Storage)	-10°C to +60° C			

**Note:** The product does not support simultaneous transmission. Conducted output power measured with respect to each protocol with single transmission chain.

**\*Disclaimer:** The information/data is supplied by the client and the same is considered to arrive at the final value. Any changes made apart from the specified specification, can directly impact on the tests results.

**Table 4: Report No. References**

SL. No.	RF Protocol / Frequency Bands	Report No.
1	WLAN (2.4GHz) and BLUETOOTH LOW ENERGY	ULR-TC568819300000085F
2	BLUETOOTH	ULR-TC568819300000086F
3	WLAN (5GHz)	ULR-TC568819300000087F

### 3.3 Measurement Uncertainty:

**Table 5: Measurement Uncertainty**

Parameter	Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±1.5 dB
Power Spectral Density, conducted	±3 dB
Unwanted Emissions, conducted	±3 dB
SAC, radiated measurement	±6 dB
FAC, radiated measurement	±6 dB
Temperature	±3 °C
Supply Voltages	±3 %
Time	±5 %

Note: The listed uncertainties are the worst case uncertainty for the entire range of measurements and are for the reporting purpose only and are not used in determining the PASS/FAIL of the results.



## 4 TEST SET-UP AND OPERATION MODE

### 4.1 Principle of Configuration Selection

Transmission enabled with highest possible duty cycle transmission on low, mid and high channel.

### 4.2 Test Operation and Test Software

Test Software and Hardware Name : FW 2.0, PC Utility 1.4  
Software version : 2.1.7.0  
Hardware name : CCM-BM28  
Hardware version : RevA

### 4.3 Test modes – data rates and modulations

For an antenna port measurement and radiated spurious emissions, the tests were performed for both antennas and worst test results are reported in this test report.

### 4.4 Special Accessories and Auxiliary Equipment

- Test laptop and USB cable

### 4.5 Countermeasures to achieve EMC Compliance

- None

### 4.6 List of frequencies

Frequency Band (MHz)	Channel No.	Channel Frequency (MHz)
2400 - 2483.5	1	2412
	2	2417
	3	2422
	4	2427
	5	2432
	6	2437
	7	2437
	8	2447
	9	2452
	10	2457
	11	2462

Table 6: List of Wi-Fi center Frequencies

Frequency Band	Channel No.	Frequency (MHz)
5150–5350 MHz	36	5180
	48	5240
	64	5320
5470-5725 MHz	100	5500
	140	5700

Table 7: 5GHz WLAN -20MHz Bandwidth Channels List

Frequency Band (MHz)	Channel No.	Channel Frequency (MHz)
2400 – 2483.5	0	2402
	1	2404
	2	2406
	3	2408
	:	:
	:	:
	18	2438
	19	2440
	20	2437
	:	:
	:	:
	36	2474
	37	2476
	38	2478
	39	2480

Table 8: List of BLE center Frequencies

Frequency Band (MHz)	Channel No.	Channel Frequency (MHz)
2400 – 2483.5 BT(BDR+EDR)	0	2402
	1	2403
	2	2404
	3	2405
	:	:
	:	:
	:	:
	37	2439
	38	2440
	39	2441
	40	2442
	:	:
	:	:
	:	:
	74	2476
	75	2477
	:	:
:	:	
78	2480	

Table 9: List of Bluetooth center Frequencies

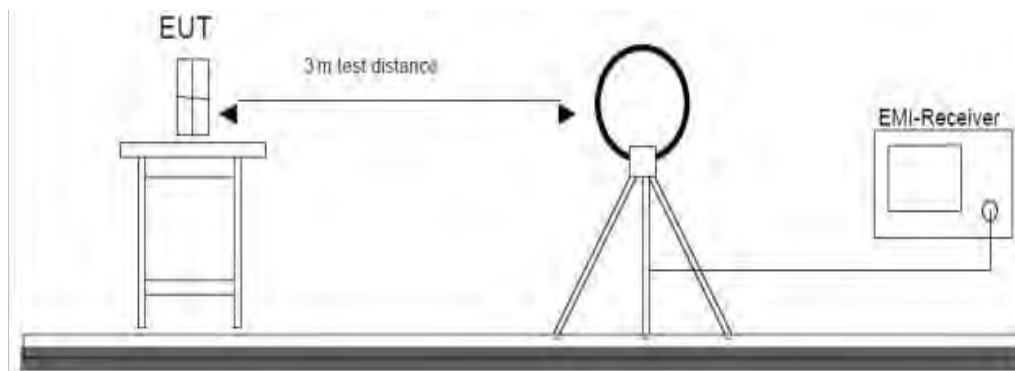
## 5 TEST METHODOLOGY

### 5.1 Radiated Emission Test

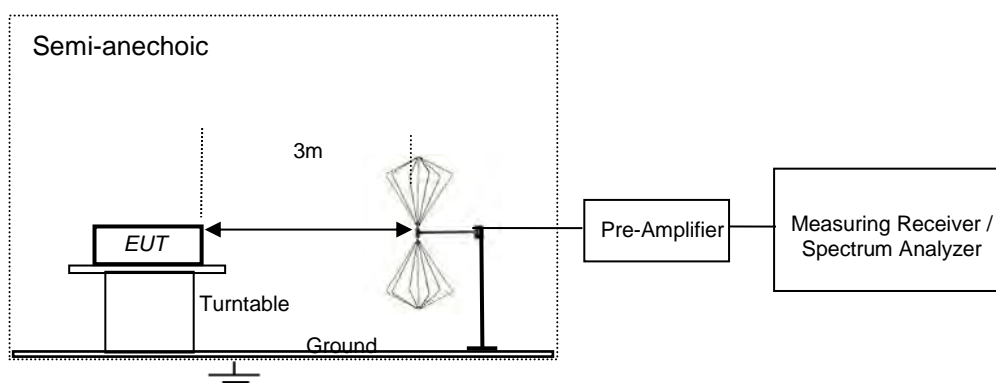
The radiated emission measurement was performed according to the procedures in ANSI C63.10-2013. The equipment under test (EUT) was placed at the middle of the 80 cm high turntable for below 1 GHz & 1.5 m height for above 1 GHz measurement, and the EUT is 3 meters far from the measuring antenna. The turntable was rotated 360° for obtaining the maximum emission. The height of the measuring antennas was scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained. The measurement above 1000 MHz was performed by horn antenna, The measurement below 30 MHz was performed by loop antenna, Measurement from 30 MHz to 200 MHz was performed by Baloon and Biconical Antenna, and measurement from 200 MHz to 1 GHz was performed by Log-Periodic Antenna.

The EUT was rotated around the X-, Y-, and Z-Axis and the results from worst case axis are recorded.

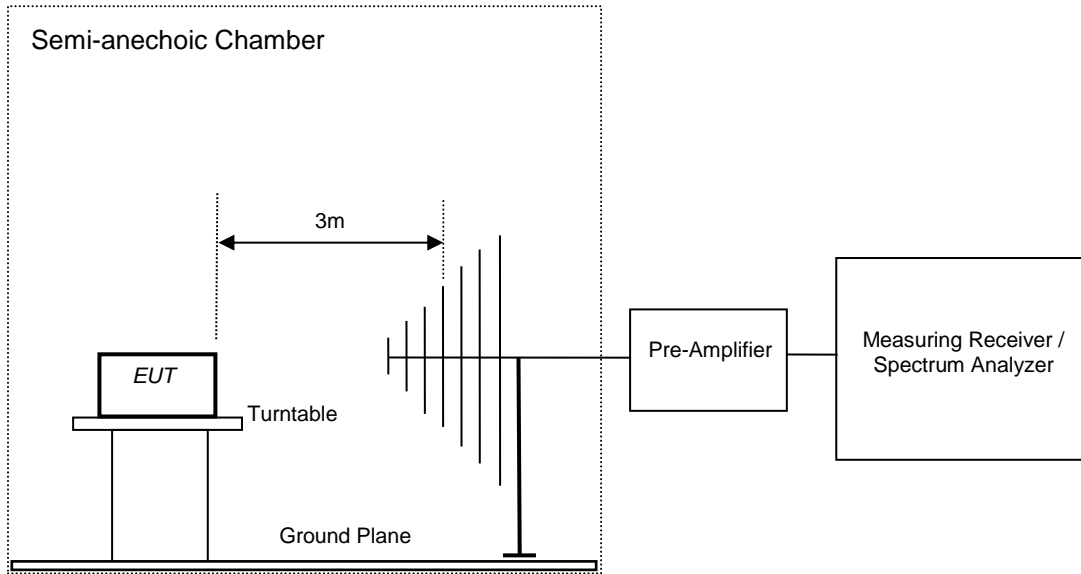
#### 5.1.1 Test Setup Configuration



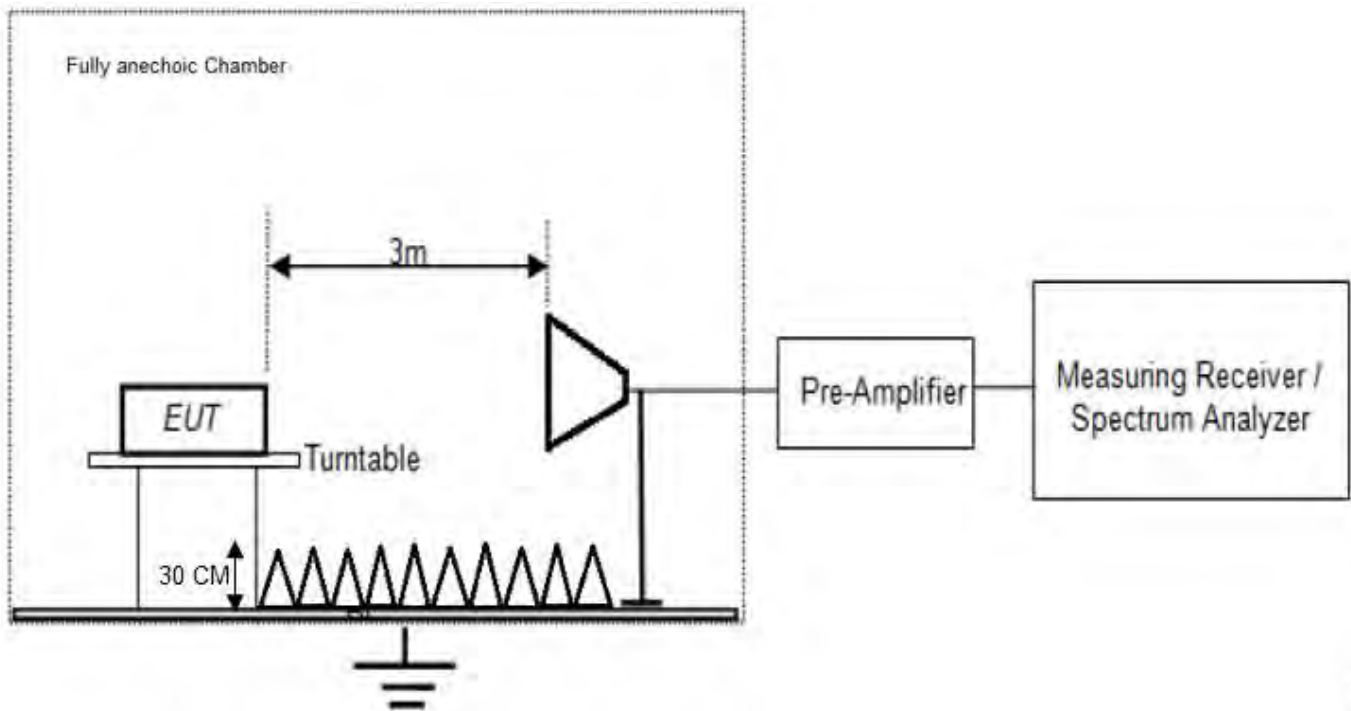
**Figure 1: Frequency Range 9 kHz- 30 MHz**



**Figure 2: Frequency Range 30 MHz – 200 MHz**



**Figure 3: Frequency Range 200 MHz - 1GHz**



**Figure 4: Frequency Range 1GHz – 40GHz**

## 6 TEST RESULTS: WLAN 5GHz

### 6.1 Maximum Conducted Output Power

**Result**

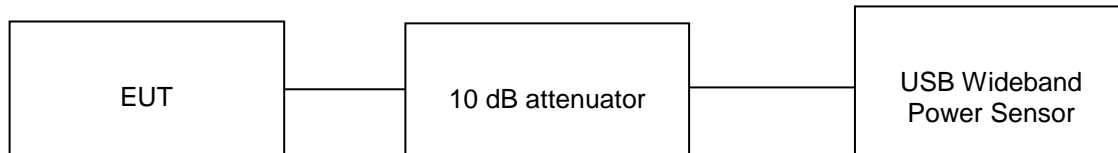
**Pass**

Test Specification FCC Part 15 Subpart E 15.407 Section (a)(1)(iv) & (a)(2)

Detector Average

Port of testing Antenna port

Requirement For 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 & 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



#### Environmental and Test conditions:

Normal Temperature = +24.2 °C

Voltage (V norm) = 24 VDC

RH = 74.2 %

#### Test results:

**Note:** 10 dB attenuator + 2.5 dB Cable loss = 12.5 dB offset is considered in below results

**Table 10: Maximum conducted output power test results**

#### Antenna 1

Mode	Data rate (Mbps)	Channel Frequency (MHz)	Measured power (dBm)	Duty cycle correction Factor (dB)	Total power (dBm)	Limit (dBm)	Margin (dB)
802.11a	6	5180	13.70	0.1729	13.87	23.5	-9.63
		5240	12.42	0.1729	12.59	23.5	-10.91
		5260	12.73	0.1729	12.90	23.5	-10.6
		5320	10.87	0.1729	11.04	23.5	-12.46
		5500	10.06	0.1729	10.23	23.5	-13.27
		5700	10.10	0.1729	10.27	23.5	-13.23
802.11 n	MCS0	5180	14.03	0.2108	14.24	23.5	-9.26
		5240	13.11	0.2108	13.32	23.5	-10.18
		5260	13.36	0.2108	13.57	23.5	-9.93
		5320	11.62	0.2108	11.83	23.5	-11.67
		5500	10.82	0.2108	11.03	23.5	-12.47
		5700	10.67	0.2108	10.88	23.5	-12.62

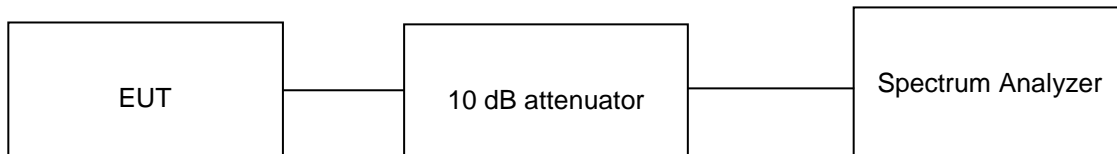
**Note:** The transmitting antenna gain of the EUT is 6.5 dBi, which exceeds 6dBi antenna gain by 0.5 dB. Therefore the conducted output power limit is reduced to 23.5 dBm from 24dBm.

## 6.2 Maximum Power Spectral Density

### Result

### Pass

Test Specification	FCC Part 15 Subpart E 15.407 Section (a)(1)(iv) & (a)(2)
Detector Function	Average
Port of testing	Antenna port
Requirement	Maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band



### Environmental and Test conditions:

Normal Temperature = +24.2 °C

Voltage (V norm) = 24 VDC

RH = 74.2 %

### Test results:

**Note:** 10 dB attenuator + 2.5 dB Cable loss = 12.5 dB offset is considered in below results

**Table 11: Maximum power spectral density test results**

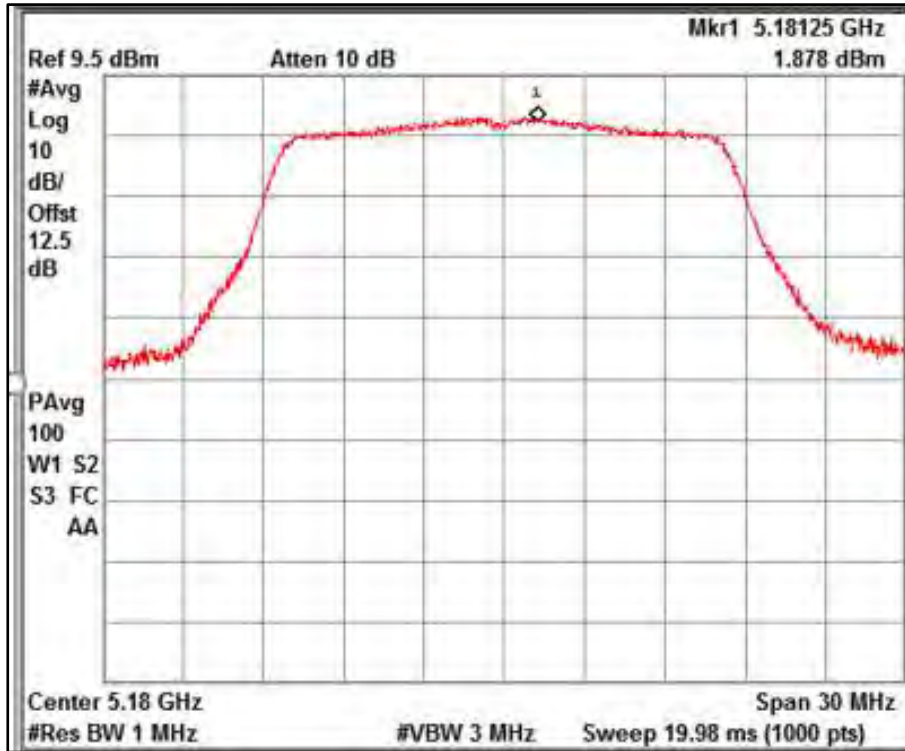
### Antenna 1

Mode	Data rate (Mbps)	Channel Frequency (MHz)	Measured PSD (dBm)	Duty cycle correction Factor (dB)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
802.11a	6	5180	1.88	0.1729	2.05	10.5	-8.45
		5240	0.28	0.1729	0.45	10.5	-10.05
		5260	1.17	0.1729	1.34	10.5	-9.16
		5320	-0.89	0.1729	-0.72	10.5	-11.22
		5500	-2.23	0.1729	-2.05	10.5	-12.55
		5700	-0.62	0.1729	-0.45	10.5	-10.95
802.11 n	MCS0	5180	1.94	0.2108	2.15	10.5	-8.35
		5240	0.76	0.2108	0.97	10.5	-9.53
		5260	0.98	0.1729	1.15	10.5	-9.35
		5320	-0.52	0.2108	-0.31	10.5	-10.81
		5500	-0.63	0.2108	-0.42	10.5	-10.92
		5700	-0.90	0.2108	-0.69	10.5	-11.19

**Note:** The transmitting antenna gain of the EUT is 6.5 dBi, which exceeds 6dBi antenna gain by 0.5 dB . therefore the PSD limit is reduced to 10.5 dBm from 11dBm.

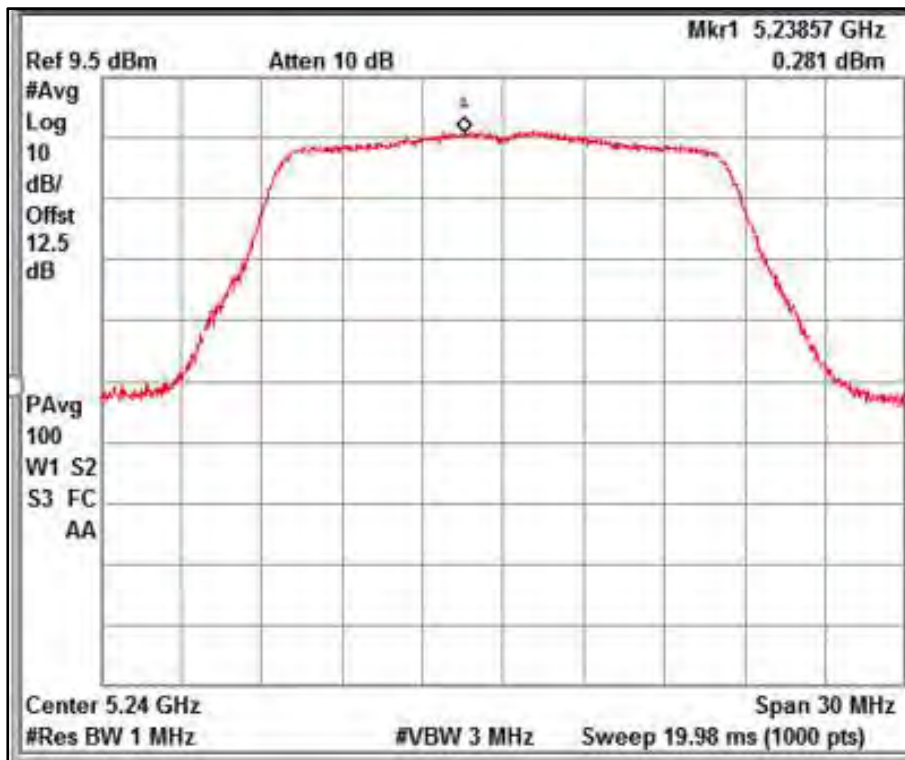
**Test plots 1: Measured PSD plots**

802.11a mode



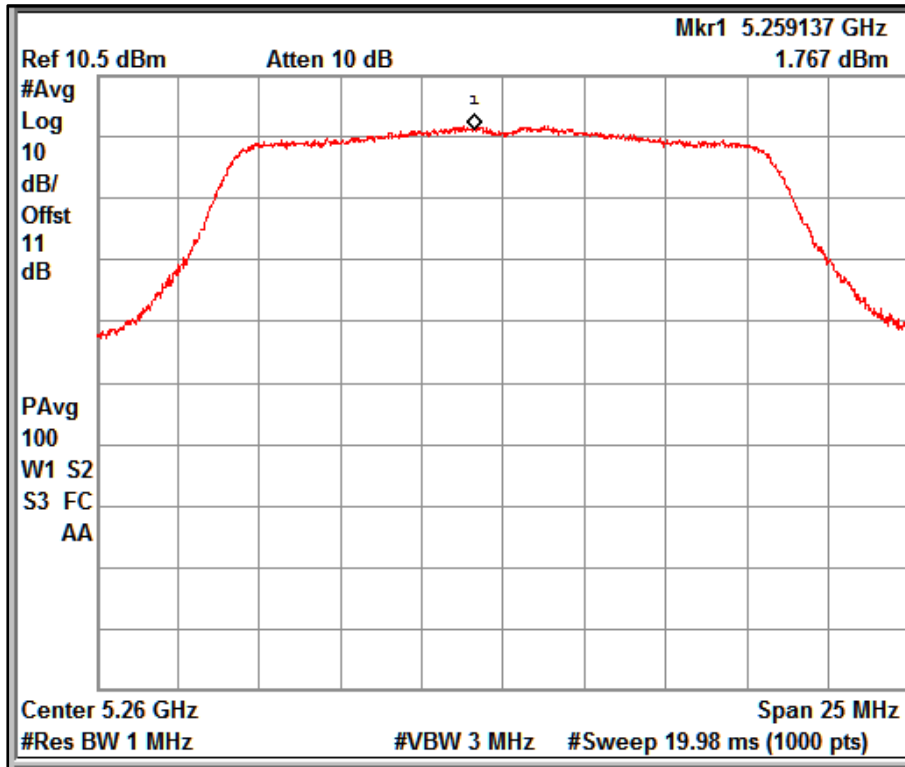
Channel Frequency: 5180 MHz

Data rate: 6Mbps



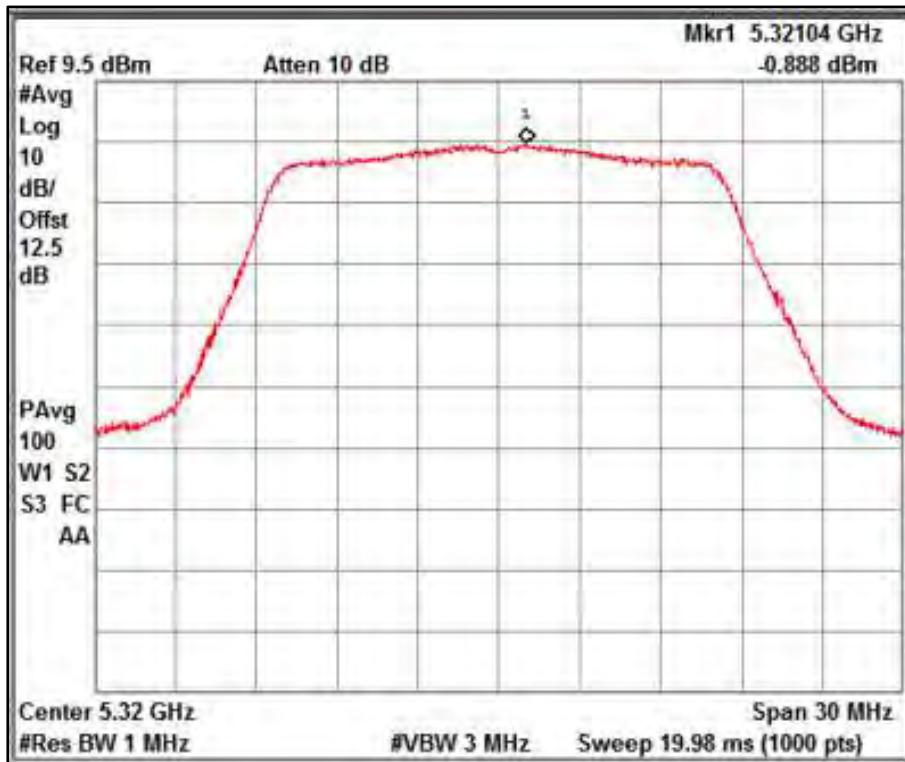
Channel Frequency: 5240MHz

Data rate: 6Mbps



Channel Frequency: 5260MHz

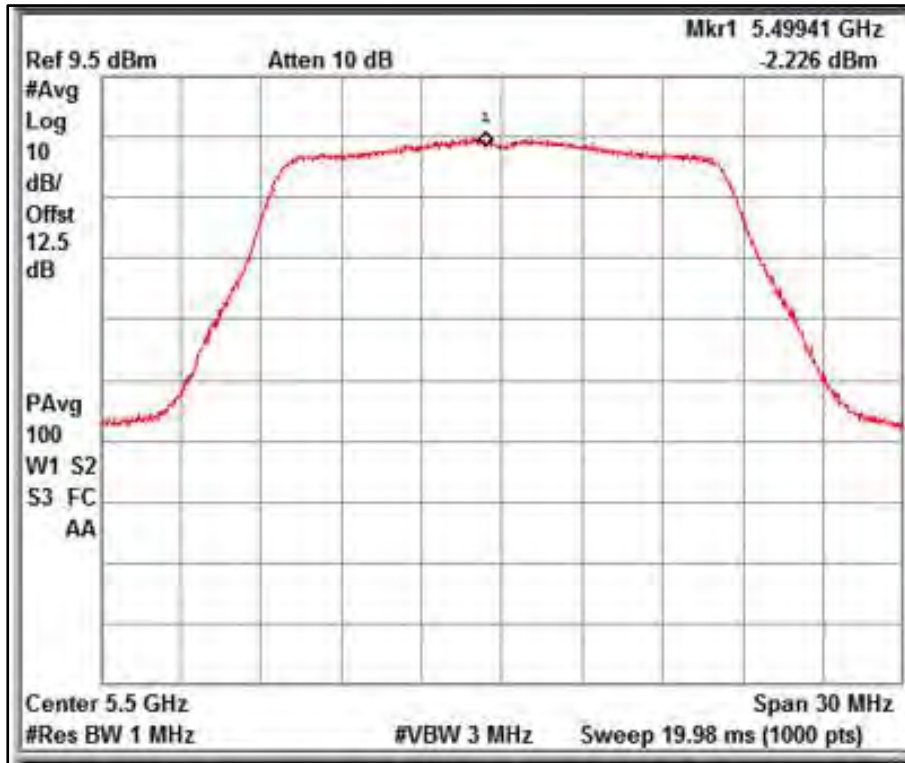
Data rate: 6Mbps



Channel Frequency: 5320MHz

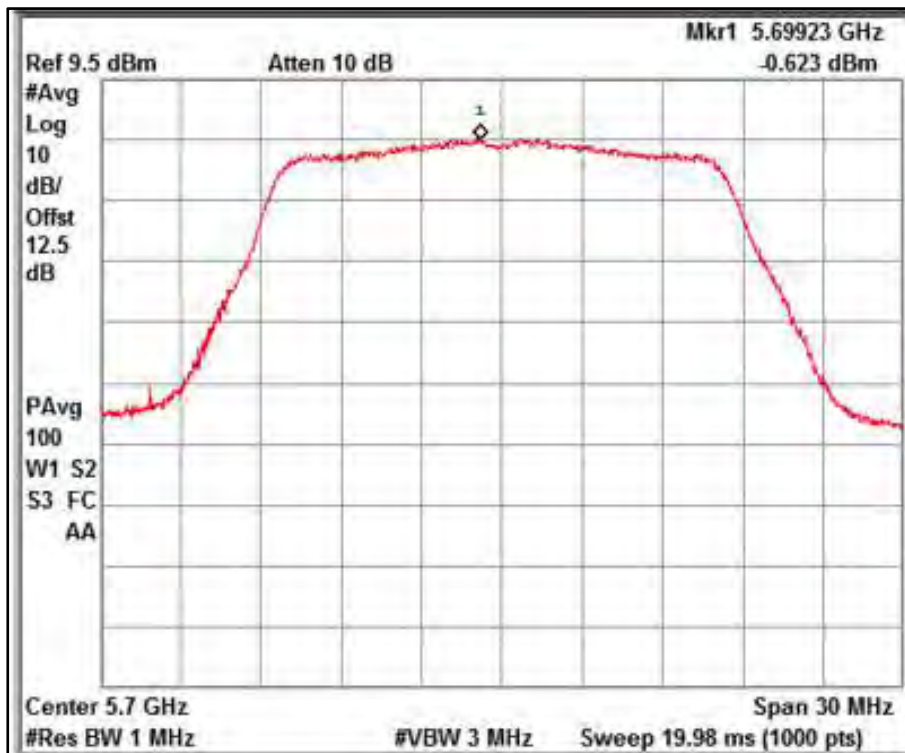
Data rate: 6Mbps





Channel Frequency: 5500MHz

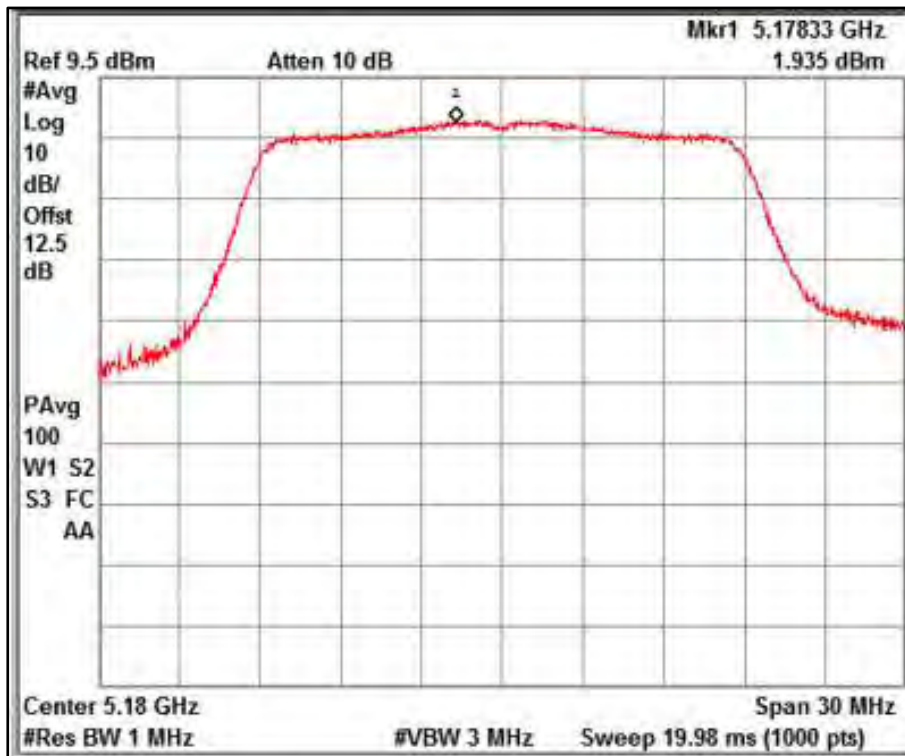
Data rate: 6Mbps



Channel Frequency: 5700MHz

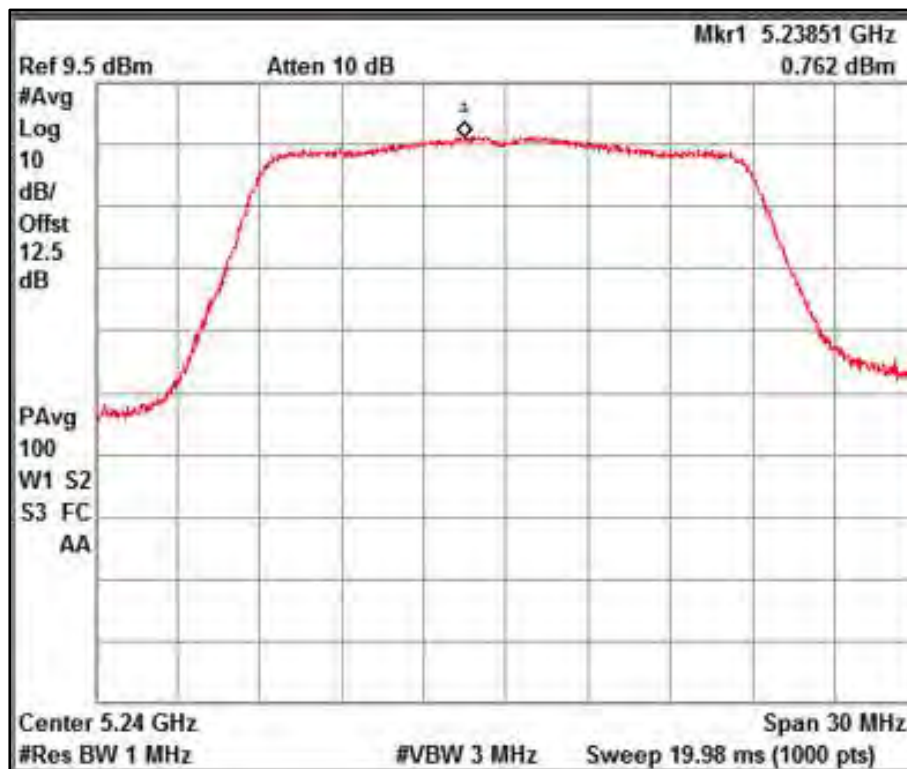
Data rate: 6Mbps

802.11n mode:



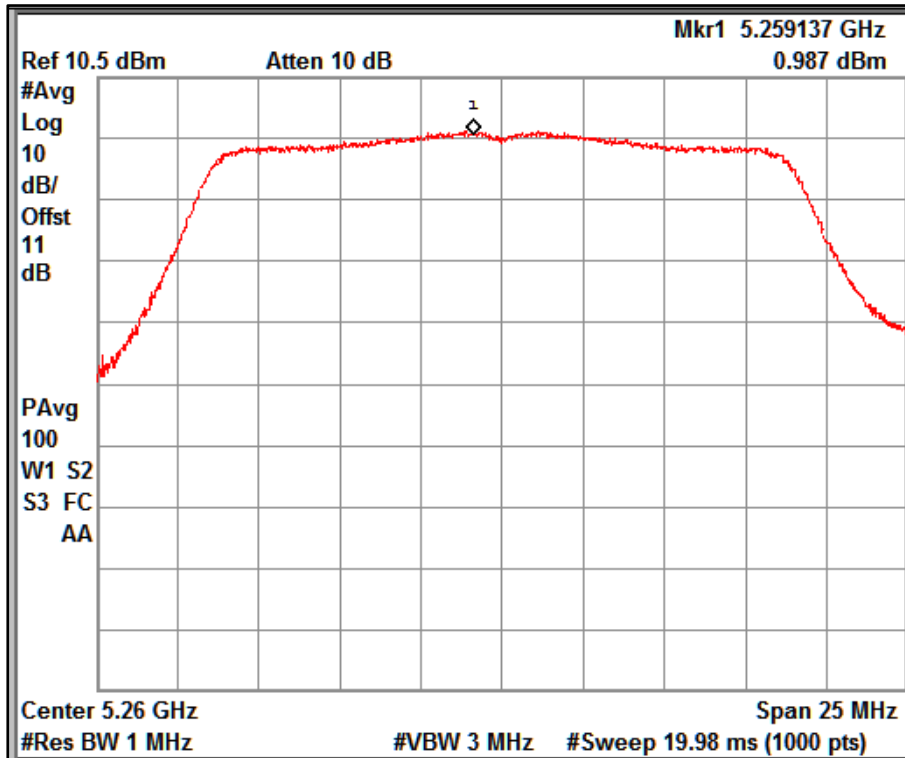
Channel Frequency: 5180MHz

Data rate: MCS0



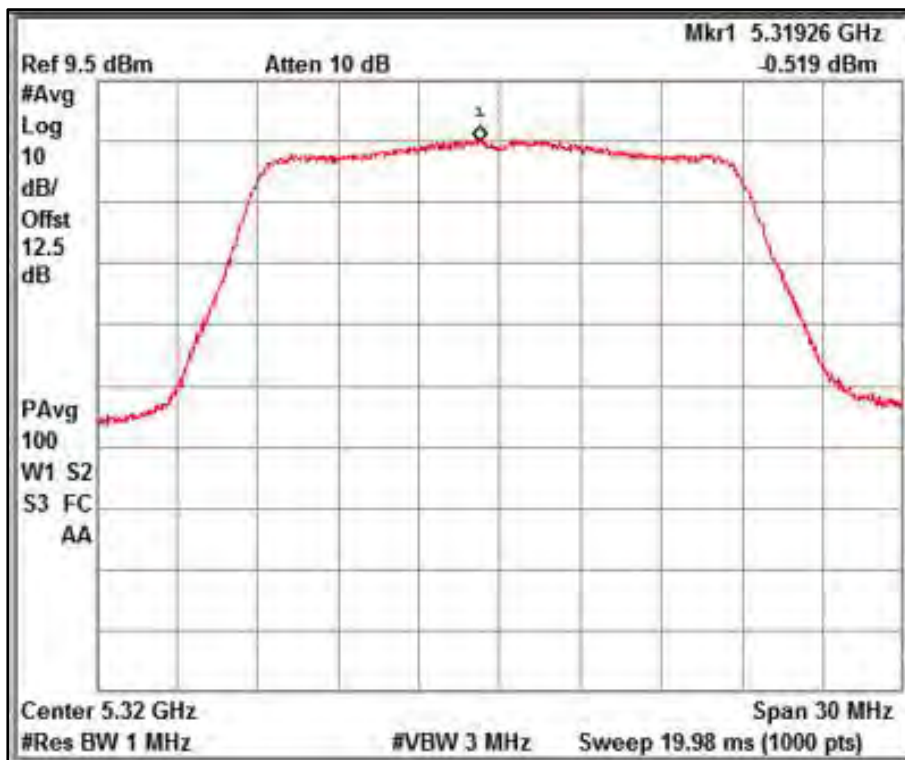
Channel Frequency: 5240MHz

Data rate: MCS0



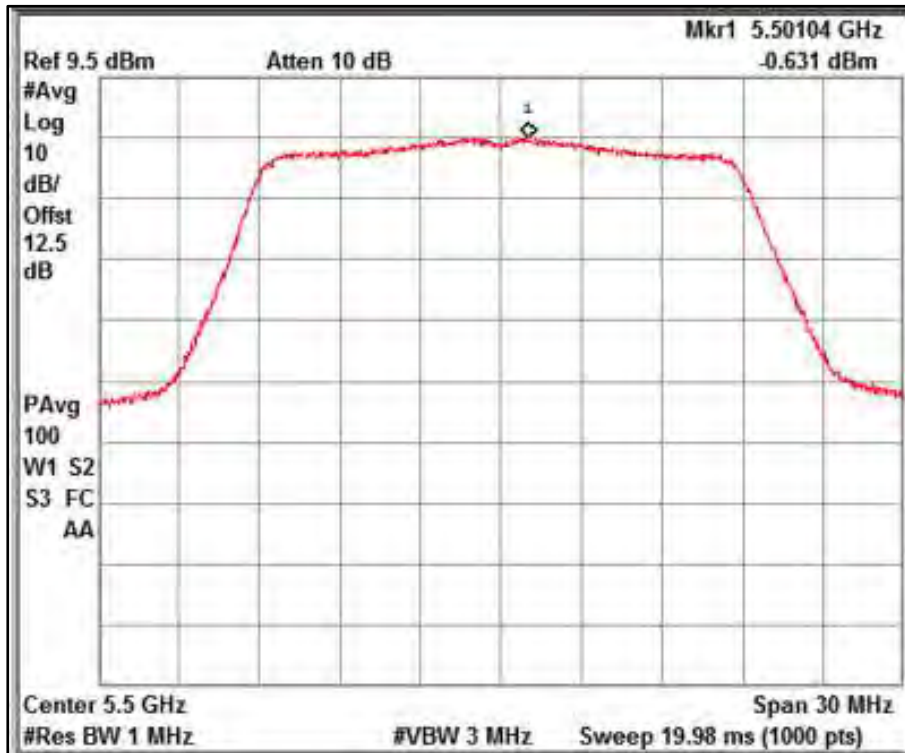
Channel Frequency: 5240MHz

Data rate: MCS0



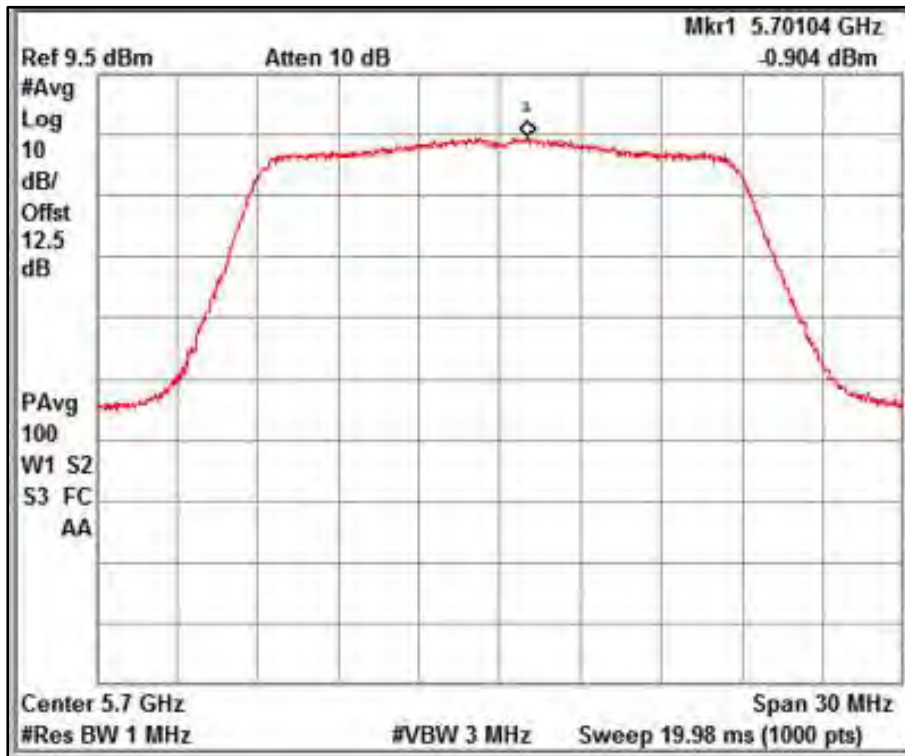
Channel Frequency: 5320MHz

Data rate: MCS0



Channel Frequency: 5500MHz

Data rate MCS0



Channel Frequency: 5700MHz

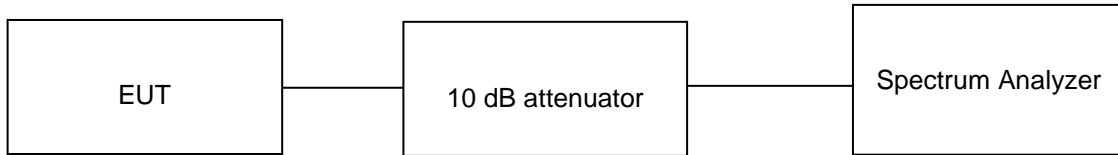
Data rate MCS0

### 6.3 Emission Bandwidth

**Result**

**Pass**

Test Specification	FCC Part 15 Subpart E Section 15.407(a)
Measurement bandwidth	300 KHz
Detector	Peak
Port of testing	Antenna Port



**Environmental and Test conditions:**

Normal Temperature = +24.2 °C

Voltage (V norm) = 24 VDC

RH = 74.2 %

**Test results:**

**Note:**

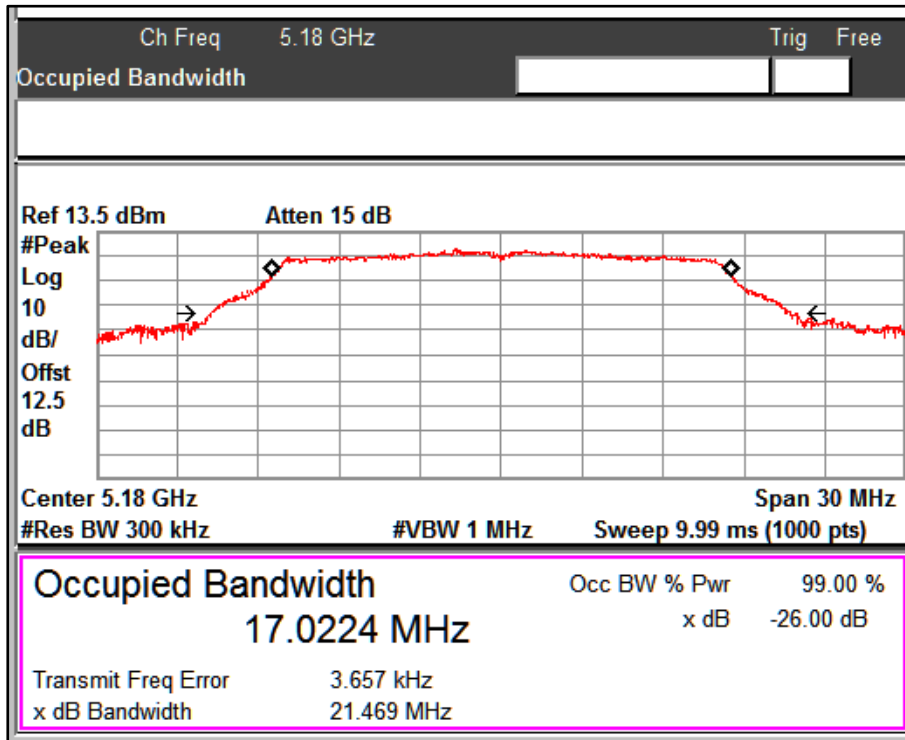
10 dB attenuator + 2.5 dB Cable loss = 12.5 dB offset is considered in below result.

**Table 12: OBW and Emission bandwidth results**

Mode	Data rate (Mbps)	Channel Frequency (MHz)	Measured OBW (MHz)	Emission BW (MHz)
802.11a	6	5180	17.02	21.46
		5240	16.95	21.39
		5260	17.11	23.15
		5320	16.97	21.39
		5500	17.01	21.39
		5700	16.97	21.46
802.11 n	MCS0	5180	18.16	24.37
		5240	18.14	22.29
		5260	18.13	23.23
		5320	18.11	21.74
		5500	18.10	21.99
		5700	18.10	21.65

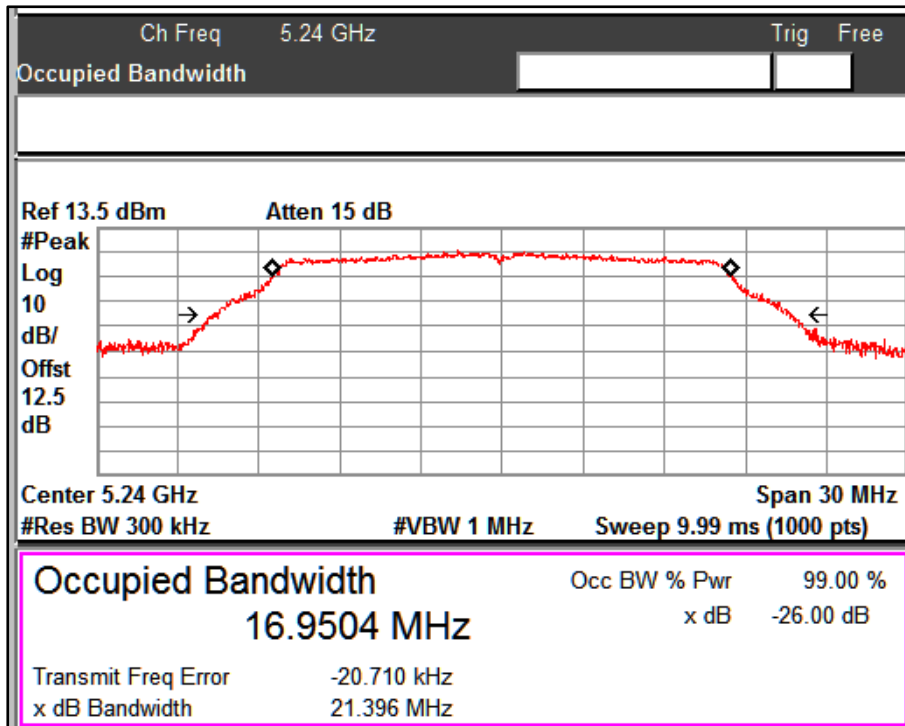
**Test plots 2: Measured Emission bandwidth plots**

**802.11a mode**



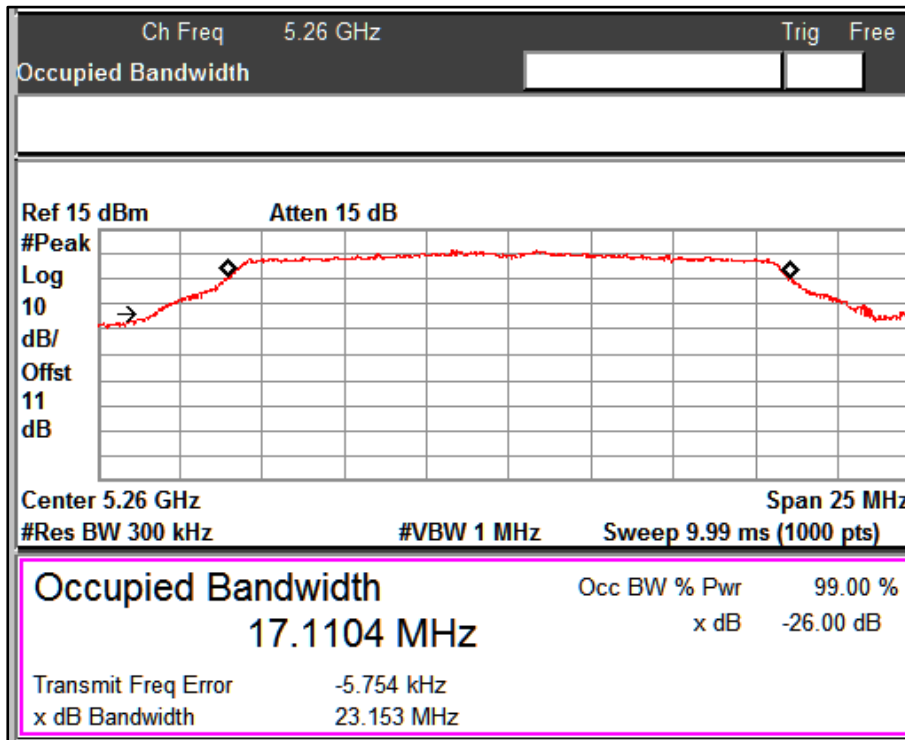
Channel Frequency: 5180 MHz

Data rate: 6Mbps



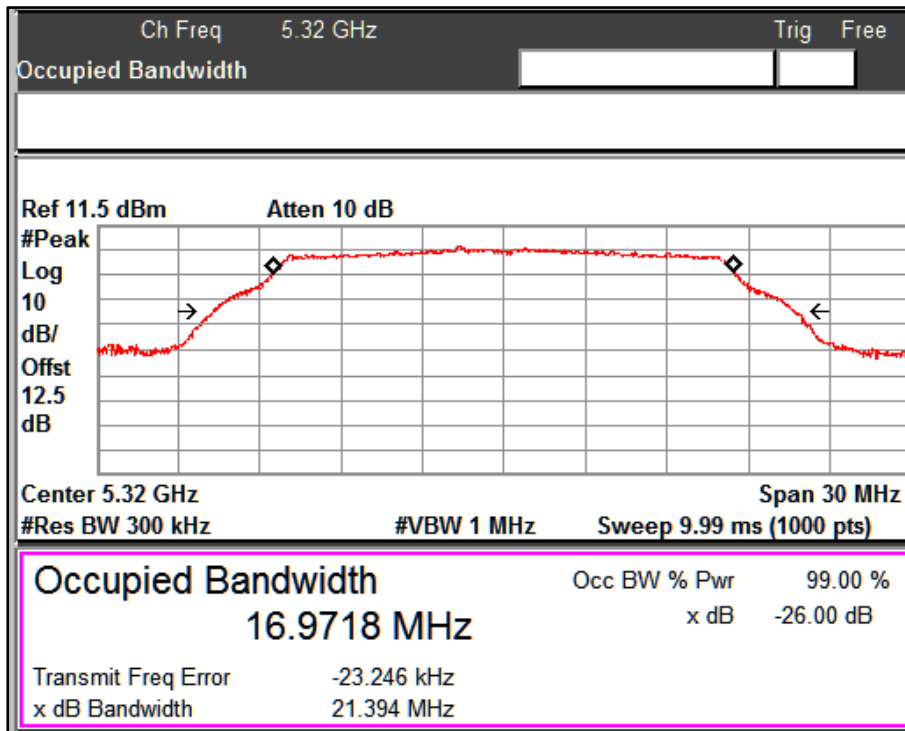
Channel Frequency: 5240MHz

Data rate: 6Mbps



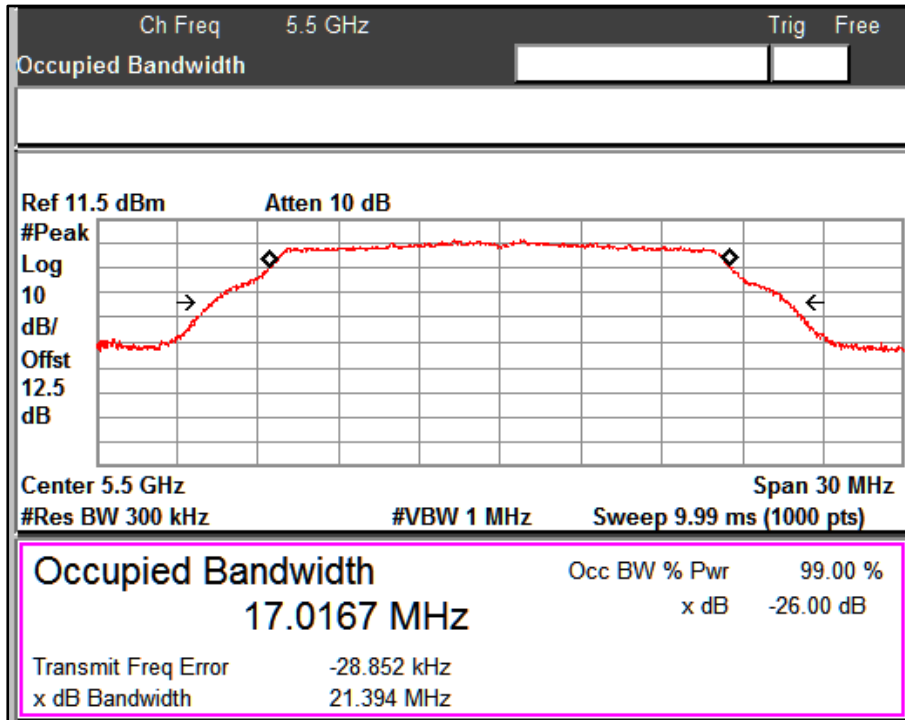
Channel Frequency: 5260MHz

Data rate: 6Mbps



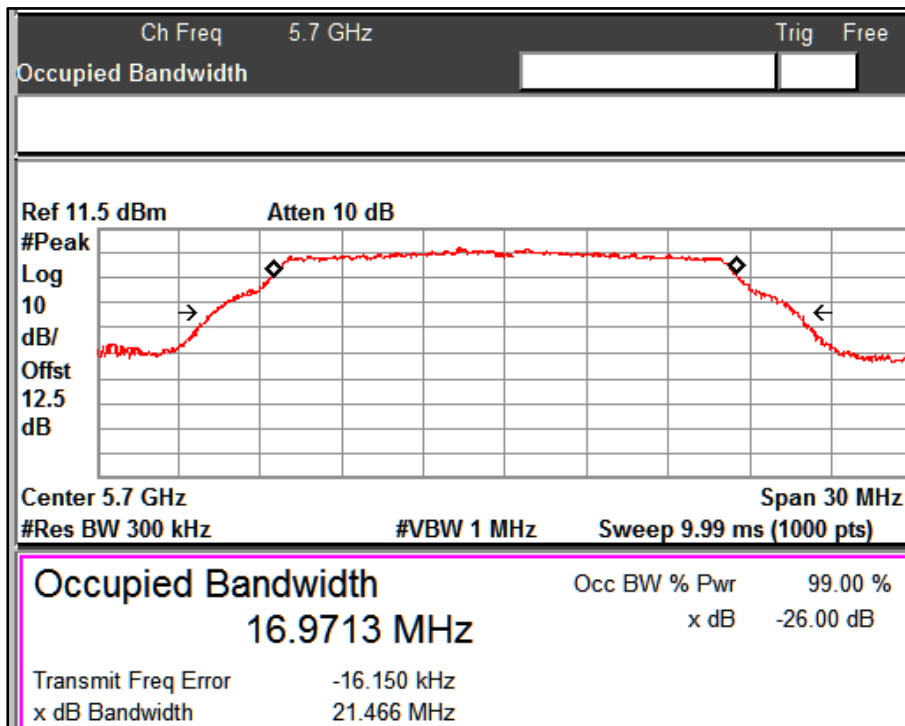
Channel Frequency: 5320MHz

Data rate: 6Mbps



Channel Frequency: 5500MHz

Data rate: 6Mbps

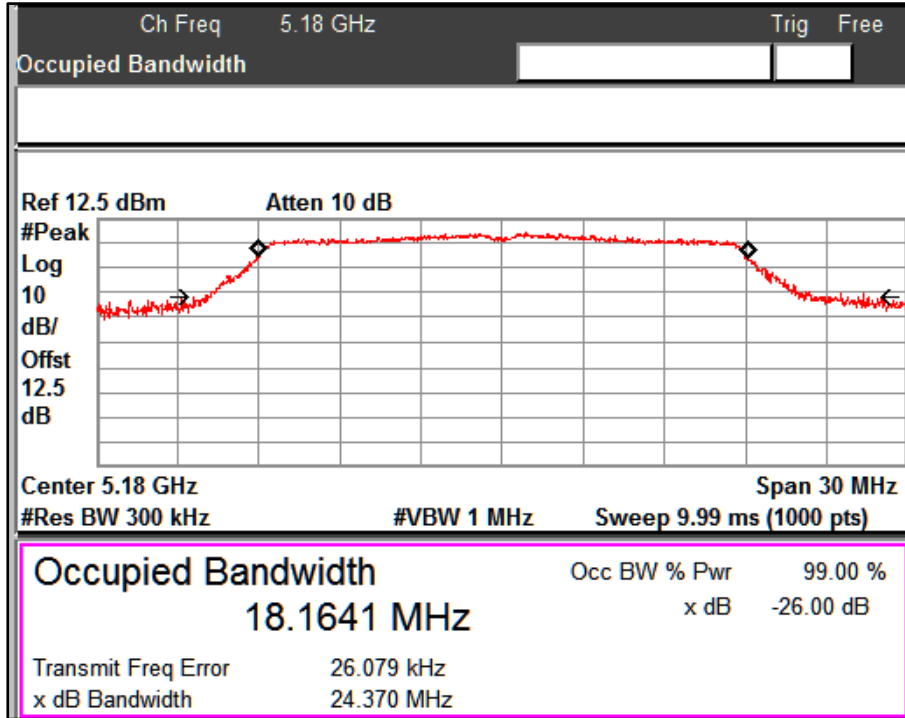


Channel Frequency: 5700MHz

Data rate: 6Mbps

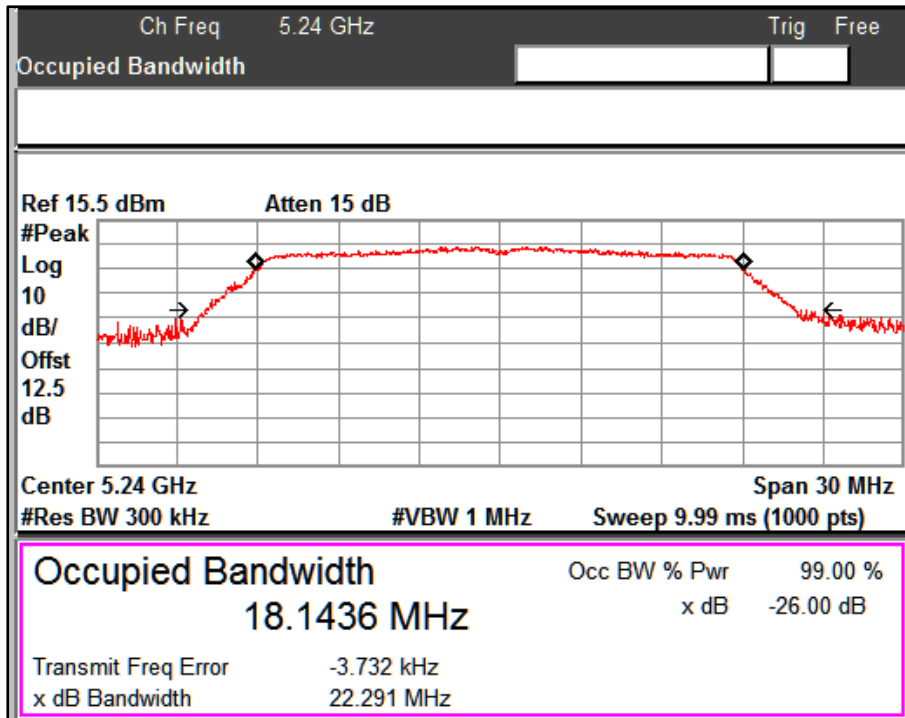


802.11n mode



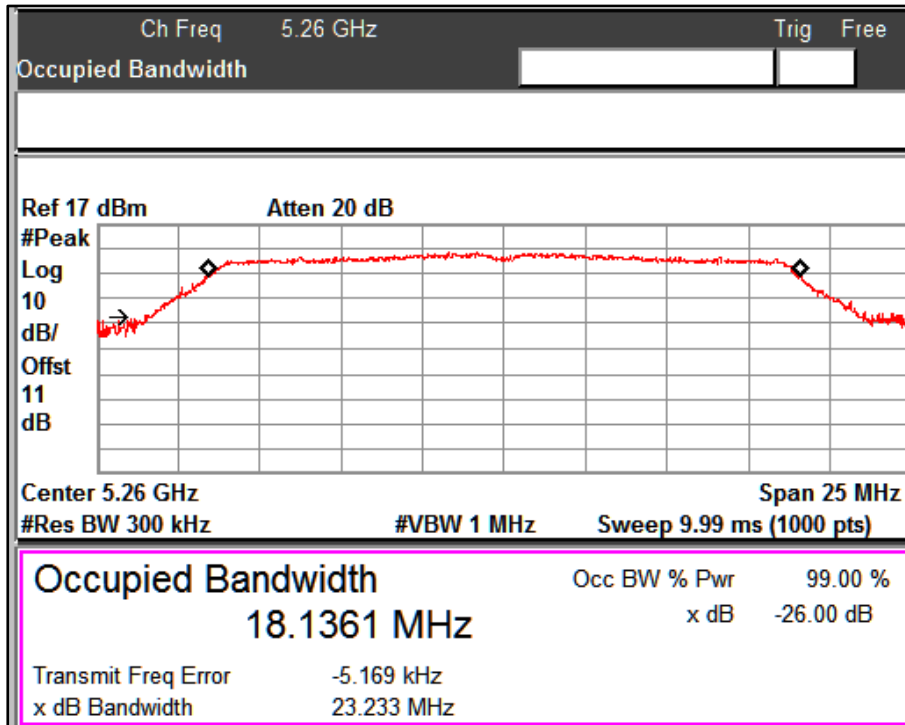
Channel Frequency: 5180MHz

Data rate: MCS0



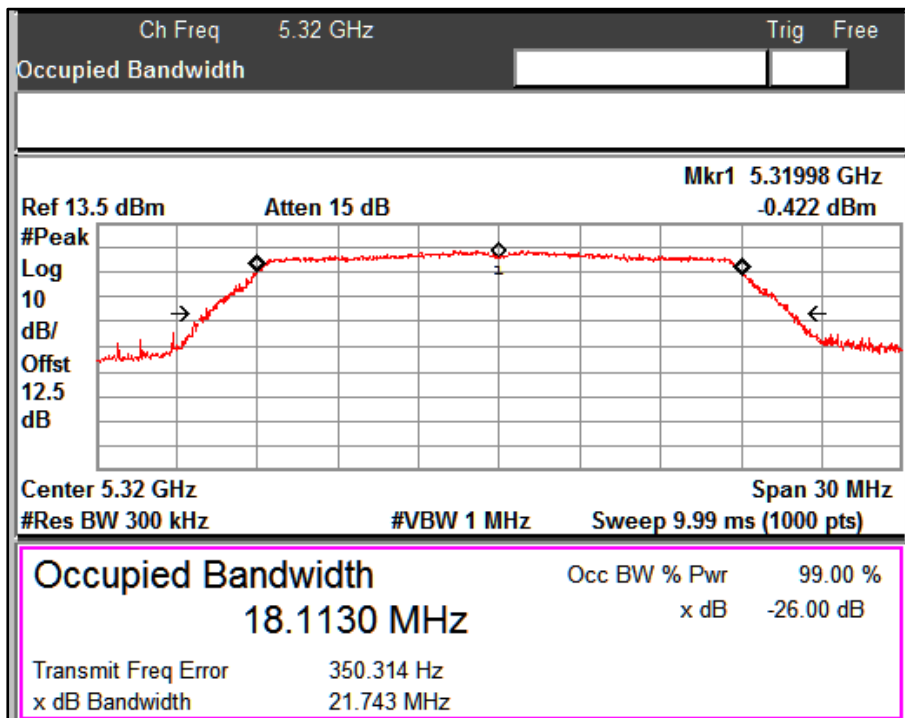
Channel Frequency: 5240MHz

Data rate: MCS0



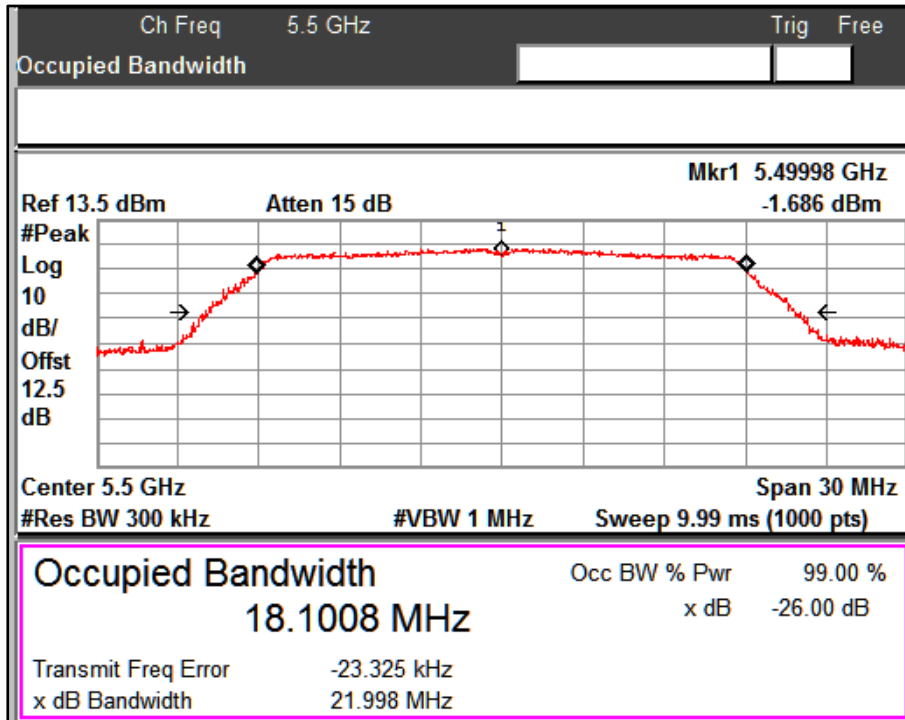
Channel Frequency: 5260MHz

Data rate: MCS0



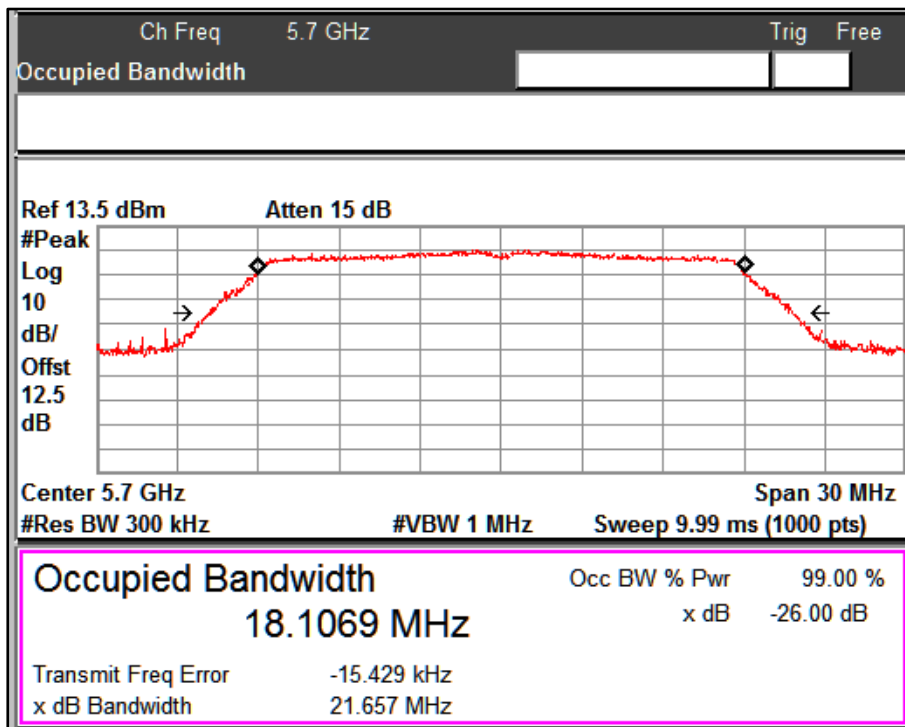
Channel Frequency: 5320MHz

Data rate: MCS0



Channel Frequency: 5500 MHz

Data rate: MCS0



Channel Frequency: 5700MHz

Data rate: MCS0

## 6.4 Dynamic Frequency Selection

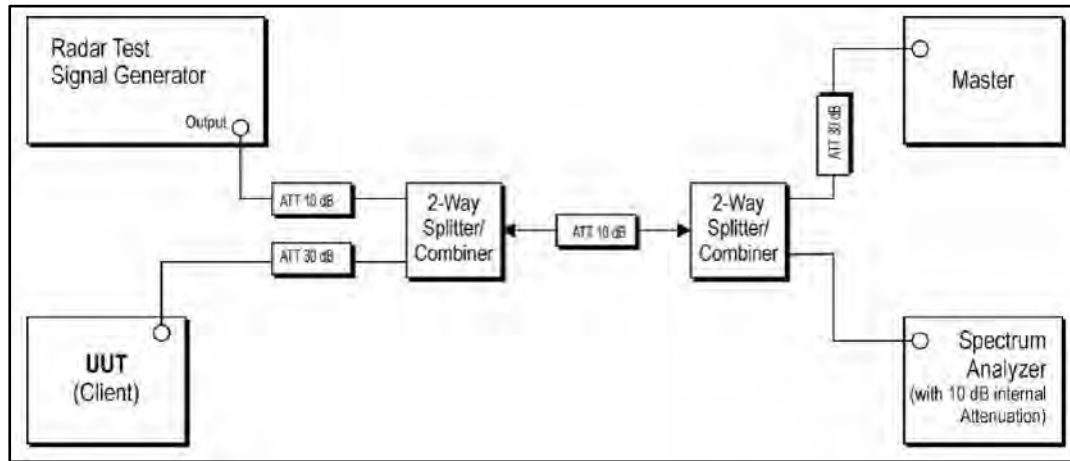
**Result**

**Pass**

Test Specification Part 15 Section 15.407(h)

Below set-up is a set-up whereby the UUT is an RLAN device operating in slave mode without Radar Interference Detection function. This set-up also contains an RLAN device operating in master mode. The Radar test signals are injected into the master device. The UUT (slave device) is associated with the master device.

### Test Setup:



**Note:** FCC Certified Access Point is used for testing with FCC ID: LDK102073

**Table 2: 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

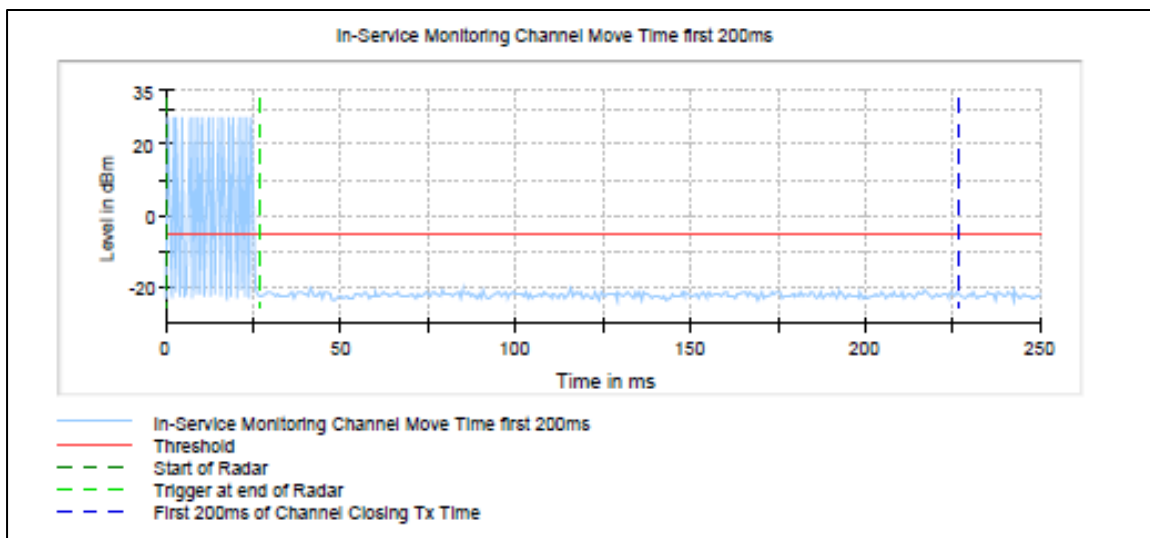
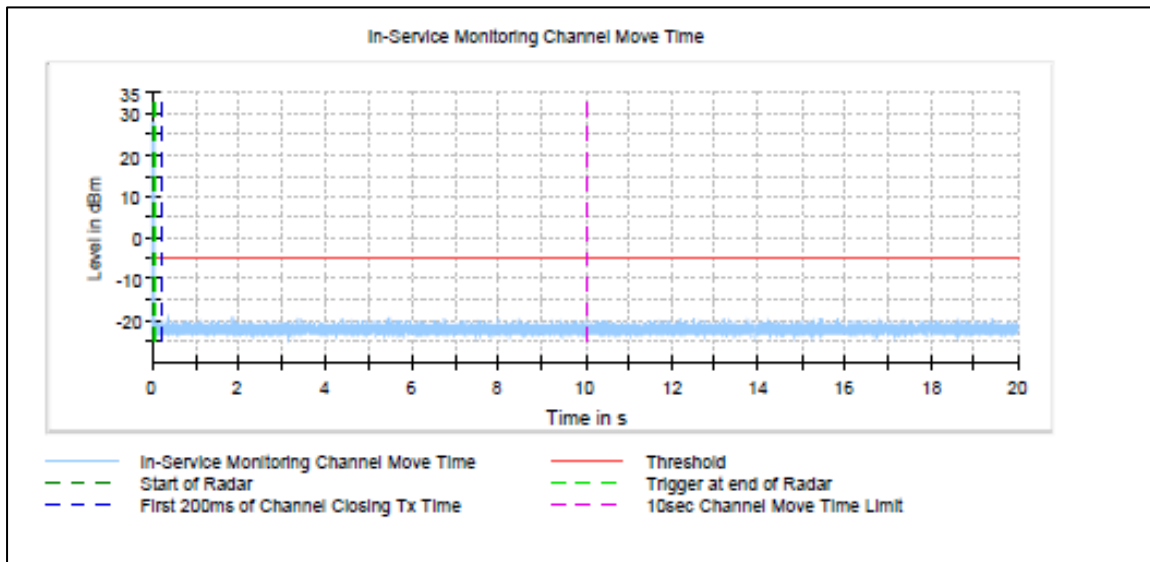
**Note:** The Radio module supports DFS feature in client without radar detection.

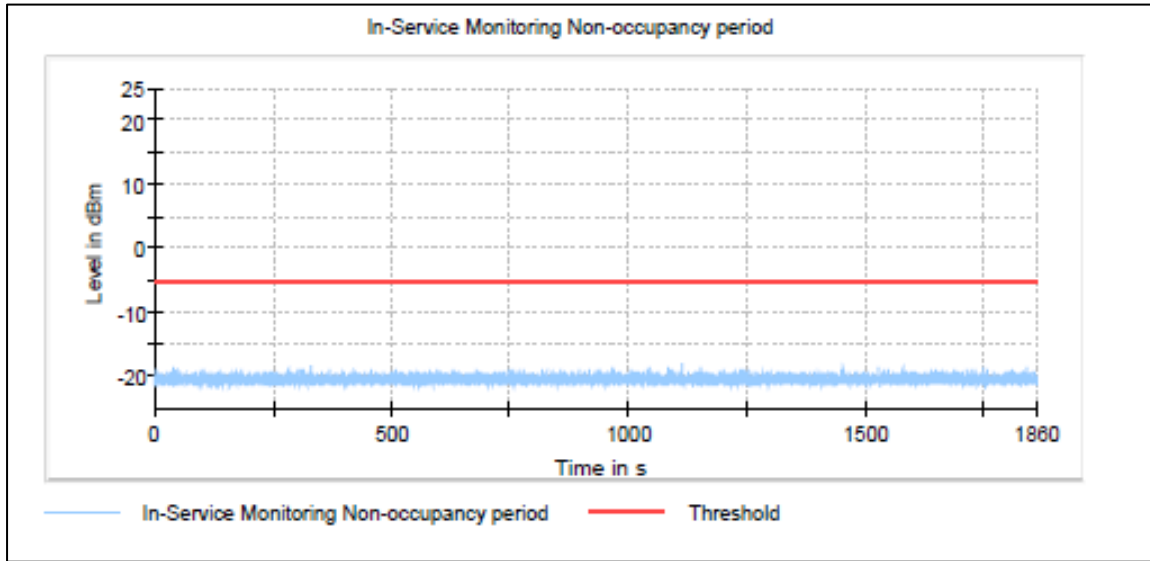
Channel Move Time and the Channel Closing Transmission Time test is performed with Radar Type 0

**Channel Frequency: 5300MHz**

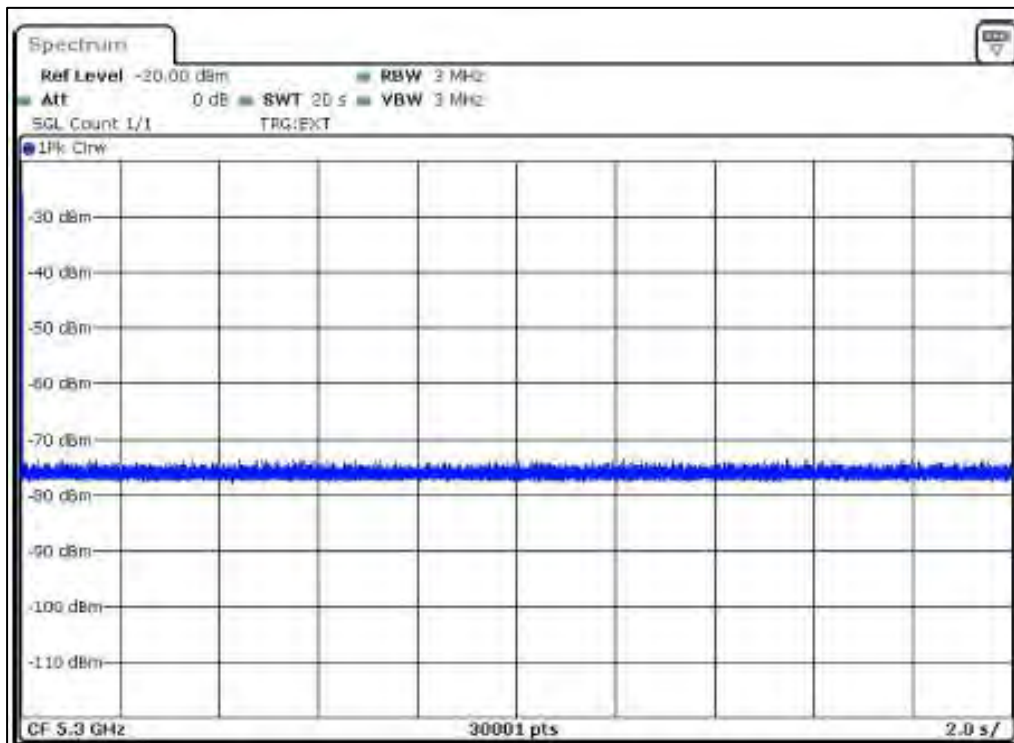
**Channel Shutdown and Non-Occupancy period:**

Operating Frequency (MHz)	Test	Measured Value	Limit
5300MHz	Channel move Time	0.0sec	10 sec
	Channel Closing Transmission Time	First 200ms: 0 ms Remaining 10 seconds period: 0 ms	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period
	Non Occupancy Time	0	Min 30 minutes

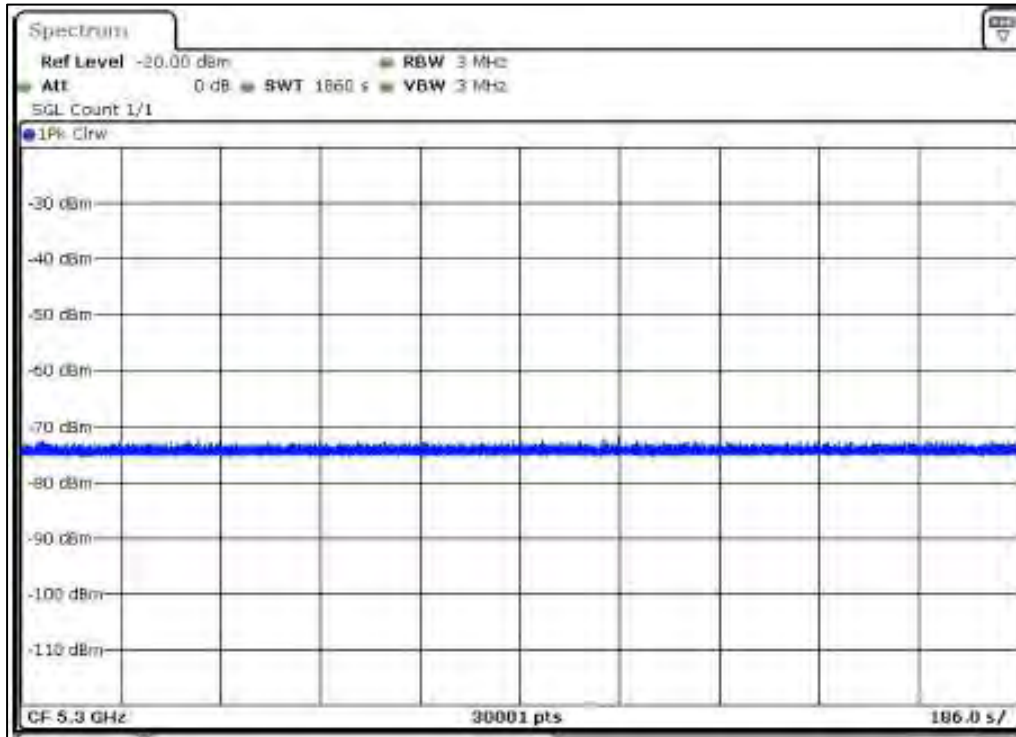




**In-service Monitoring channel move time**



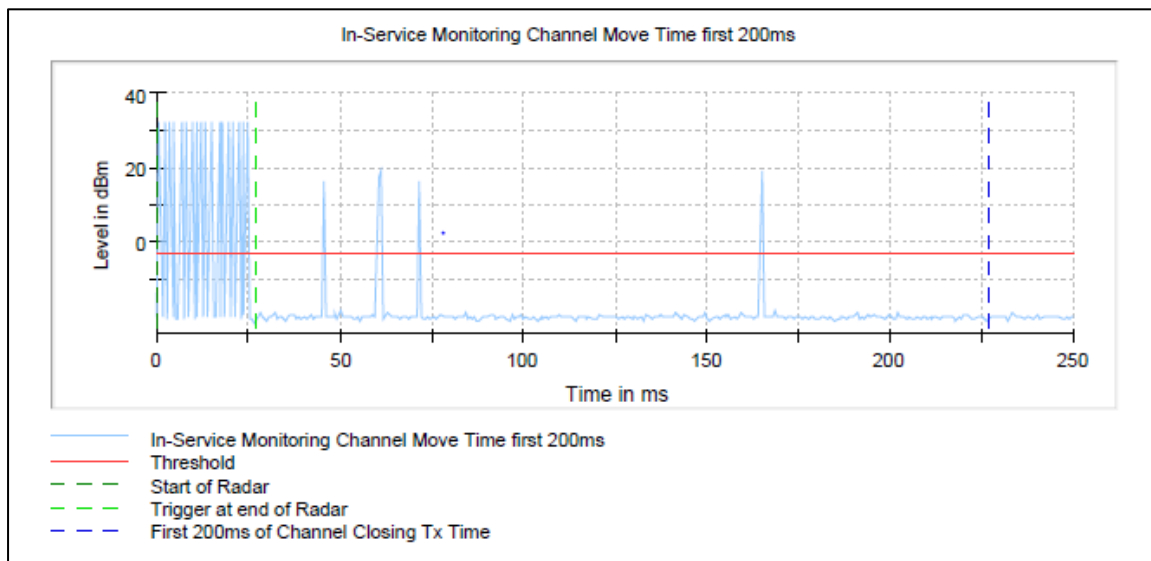
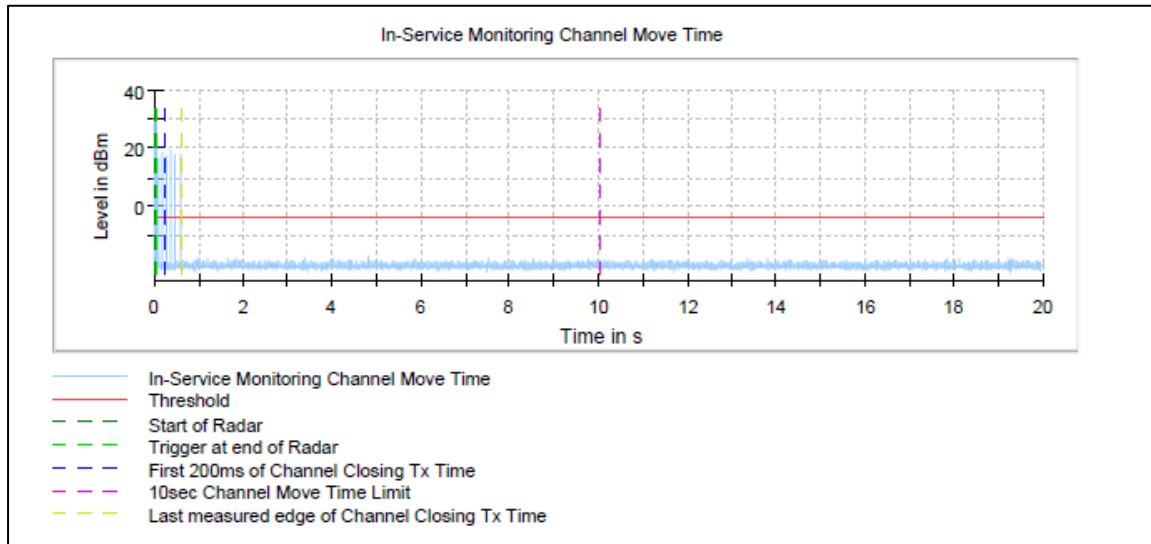
**In-Service Monitoring Non-occupancy period**



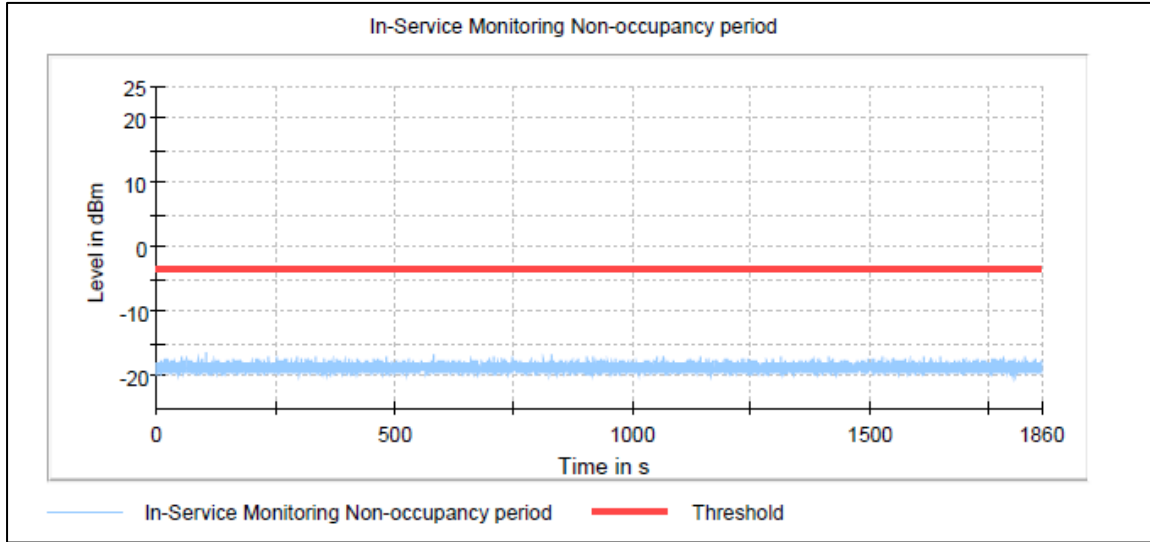
**Channel Frequency: 5500 MHz**

**Channel Shutdown and Non-Occupancy period:**

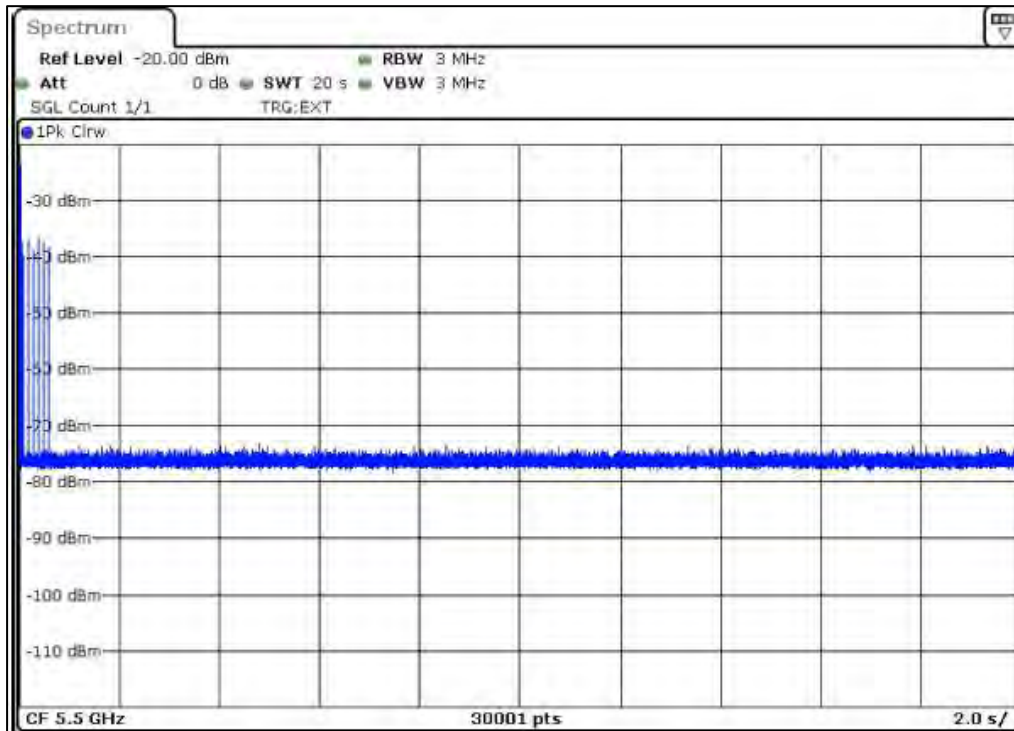
Operating Frequency (MHz)	Test	Measured Value	Limit
5500MHz	Channel move Time	0.556sec	10 sec
	Channel Closing Transmission Time	First 200ms: 0.940 ms Remaining 10 seconds period: 1.260 ms	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period
	Non Occupancy Time	0	Min 30 minutes



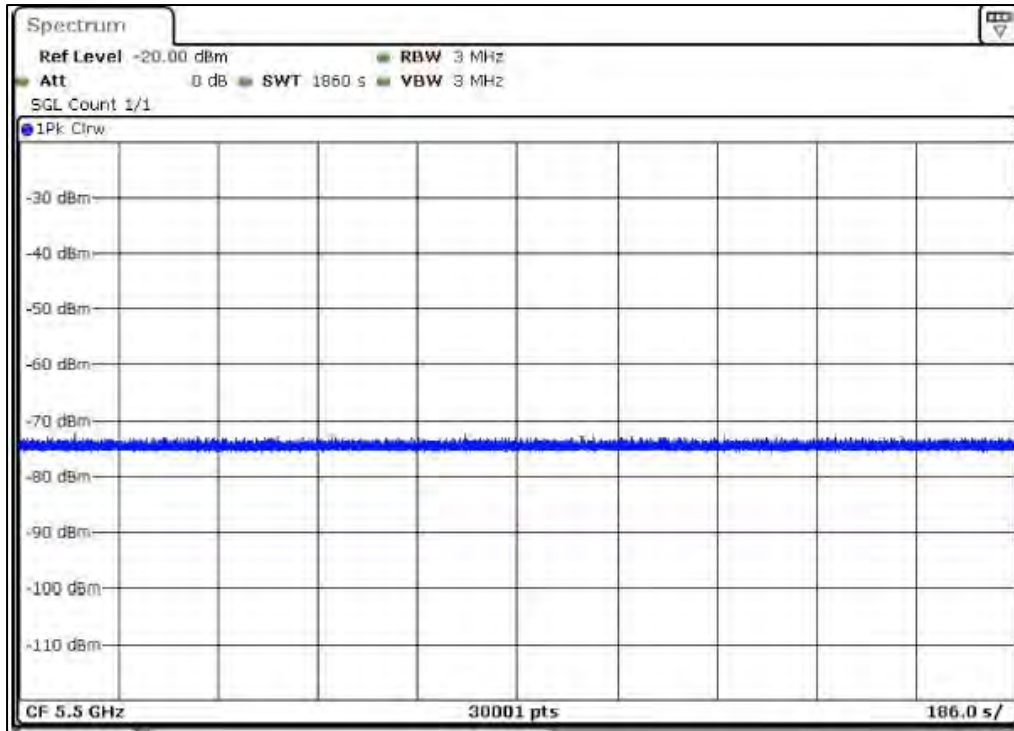




**Inservice Monitoring Channel move time**



**In-service Monitoring Non-occupancy period**



## 6.5 Spurious Radiated Emissions & Restricted Bands of Operation

**Result**

**Pass**

Test Specification	FCC Part 15 Subpart E Section 15.407
Test Method	ANSI C 63.10 – 2013
Measurement Location	Semi Anechoic Chamber < 1 GHz Fully Anechoic Chamber > 1 GHz
Measuring Distance	3 m
Detector	QP for frequency below 1 GHz, average for frequency above 1 GHz
Requirement	As per the limits mentioned in the Table 13 & Section 15.407(b)

**Table 13: Transmitter limits for Radiated emission**

Frequency (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Distance of Measurement (m)
0.009 – 0.490	2400/F(kHz)	48.50 – 13.80	300*
0.490 – 1.705	24000/F(kHz)	33.80 – 23.00	30*
1.705 -30	30	29.54	30*
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

Remark: \* The limit shows in the table above of frequency range 0.009 – 0.490, 0.490 – 1.705 MHz and 1.705-30MHz is at 300 meter, 30 meter and 30 meter range respectively, which corresponds to 128.51 – 93.80, 73.80 – 62.96 and 69.54 dBμV/m at 3m range by extrapolation calculation and the measurement of loop antenna.

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz Radiated emission limits in these three bands are based on measurements employing an average detector.

**Test Conditions:**

Supply Voltage: 110 V AC, 60Hz  
Supply Voltage for Module: 24 V DC

**Environmental conditions:**

Temperature: +23.5 °C                      RH: 54 %

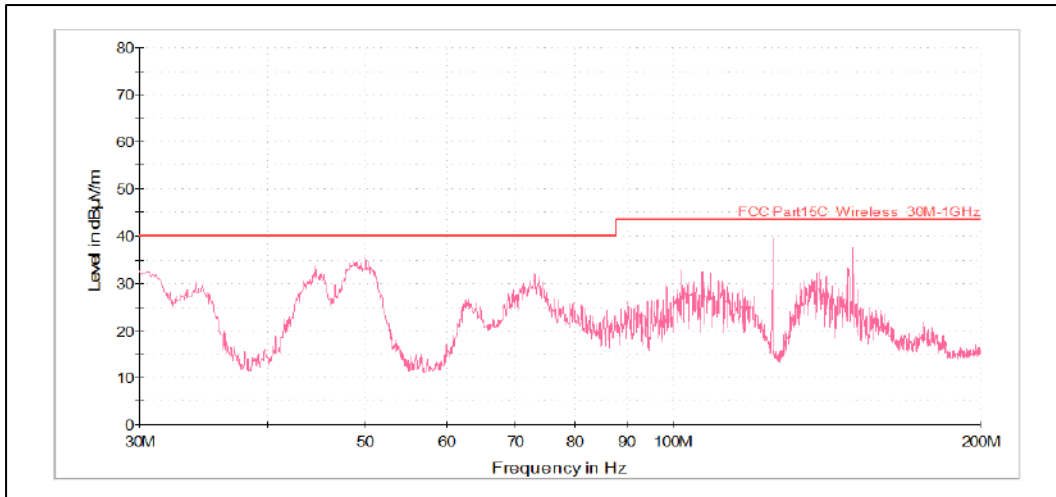
**Test results:**

Testing configuration was set to worst power measured at MCSO 5180MHz

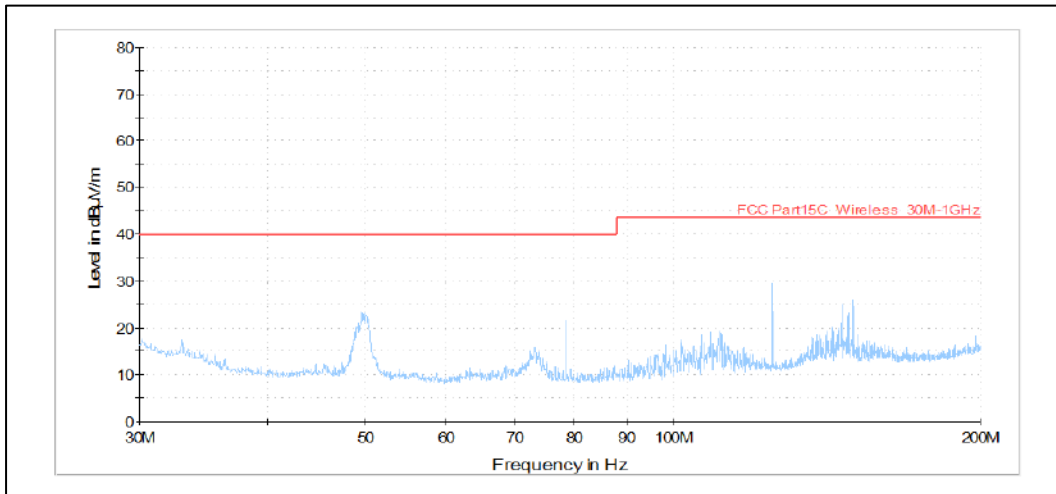
No Emissions found in the frequency range 9kHz – 30MHz

**Power Mode: RS232**

**Frequency range : 30MHz – 200MHz**



Polarization: Vertical

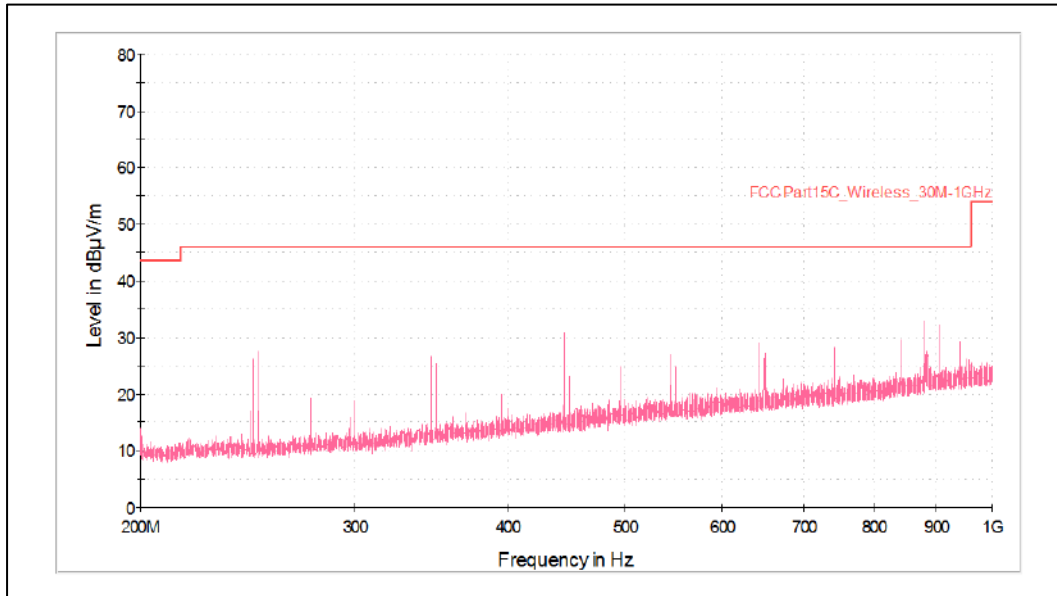


Polarization: Horizontal

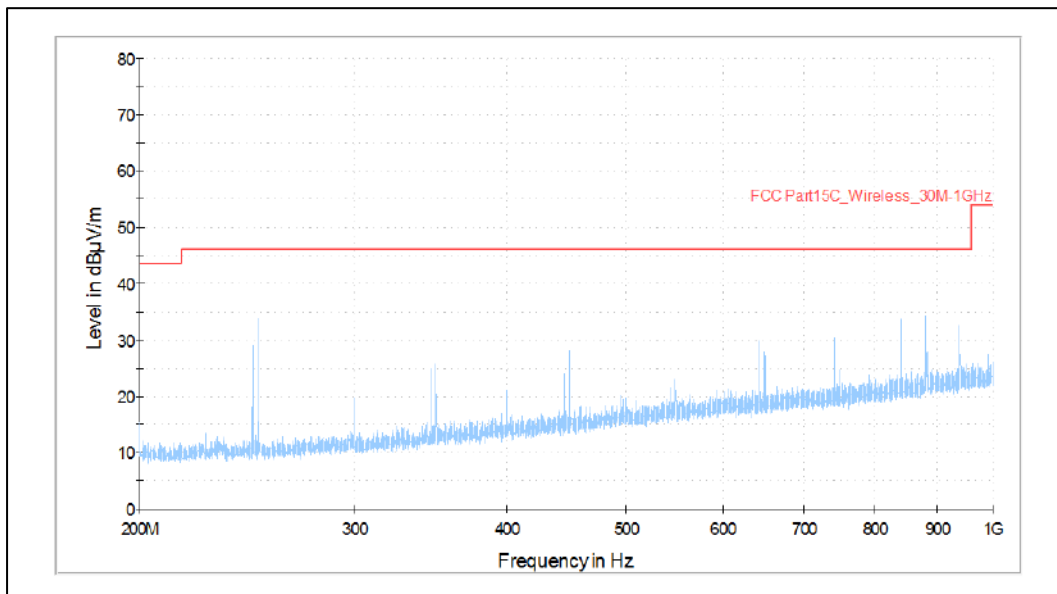
**Test results:**

Antenna Polarization	Measured Frequency (MHz)	Quasi Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Vertical	30.60	29.50	40.00	7.57
Vertical	49.97	31.36	40.00	4.43
Vertical	73.16	29.22	40.00	7.83
Horizontal	78.51	4.62	40.00	18.38
Horizontal	124.95	27.07	43.50	14.86
Vertical	125.01	38.36	43.50	3.72
Vertical	149.97	35.88	43.50	5.93

Frequency range : 200MHz – 1GHz



Polarization: Vertical



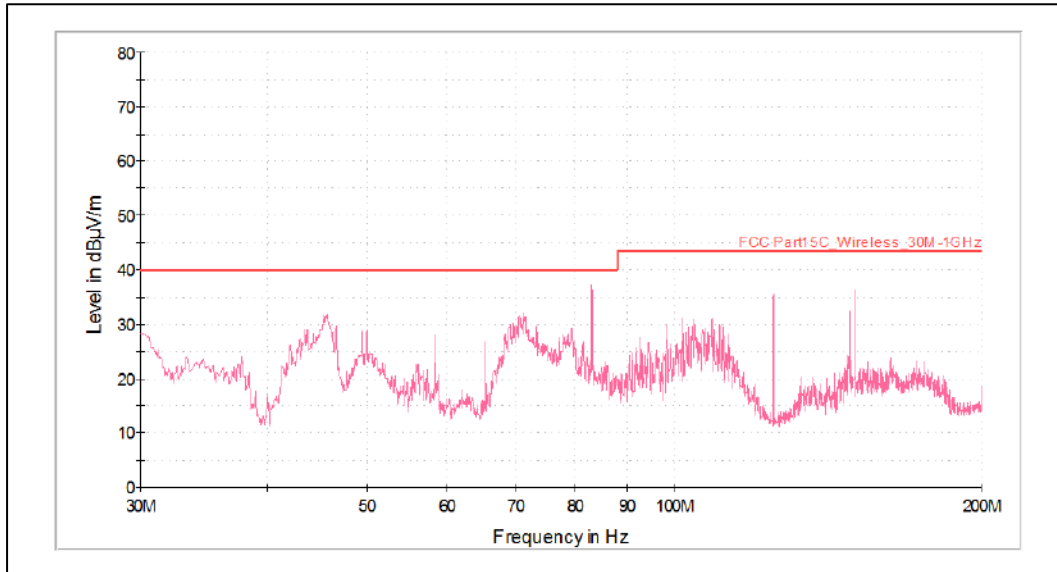
Polarization: Horizontal

Test result :

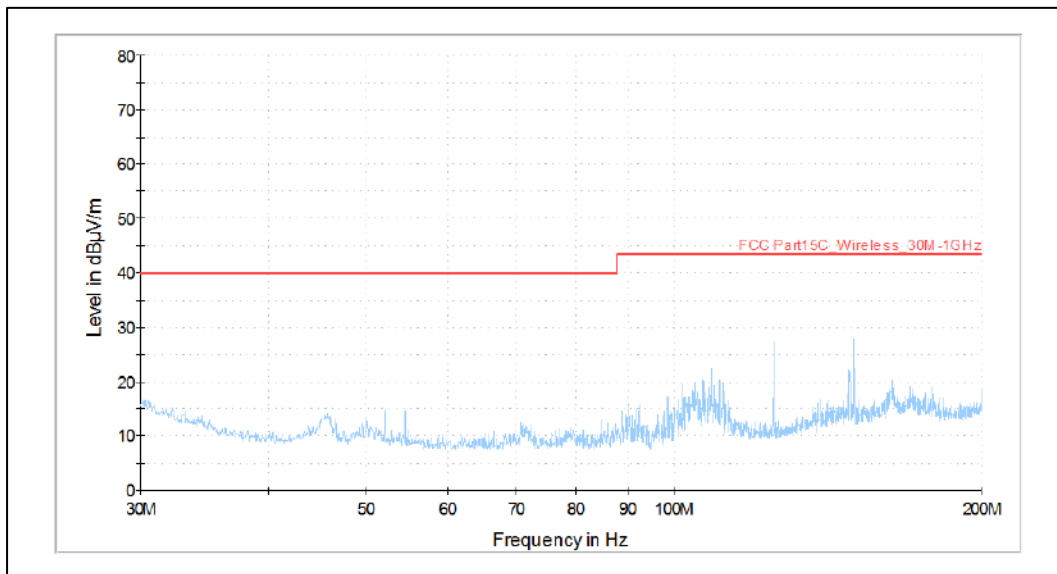
Antenna Polarization	Measured Frequency (MHz)	Quasi Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Horizontal	250.00	33.73	46.00	12.27
Vertical	445.50	27.44	46.00	18.56
Horizontal	841.50	33.83	46.00	12.17
Horizontal	880.60	32.13	46.00	13.87
Vertical	903.55	19.21	46.00	26.79
Horizontal	940.50	30.00	46.00	16.00

**Power Mode: 24V DC**

**Frequency range: 30MHz – 200MHz**



**Polarization: Vertical**

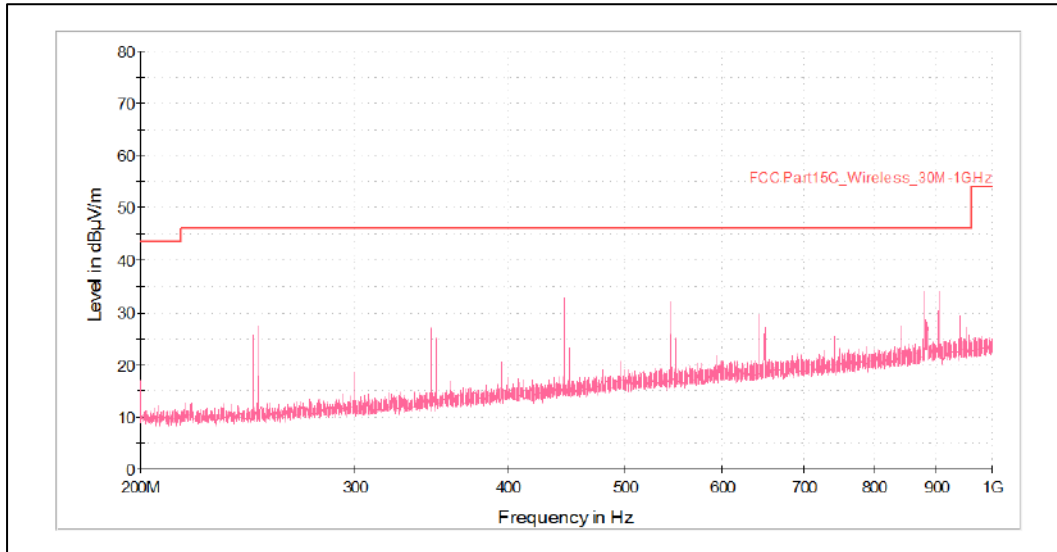


**Polarization: Horizontal**

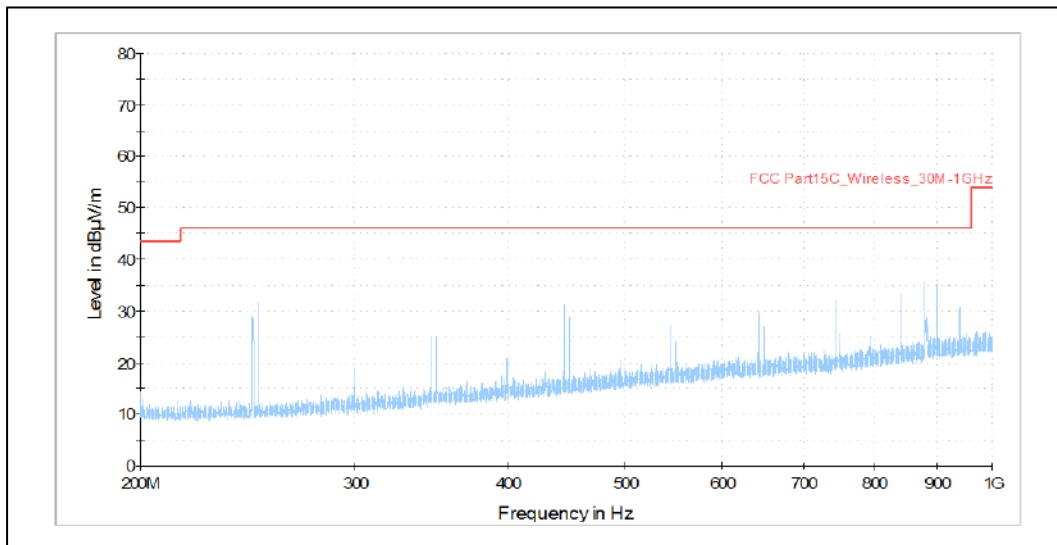
**Test results :**

Antenna Polarization	Measured Frequency (MHz)	Quasi Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Vertical	45.42	24.92	40.00	15.08
Vertical	83.12	17.21	40.00	22.79
Horizontal	124.95	24.11	43.50	19.39
Vertical	125.01	33.59	43.50	9.91
Vertical	148.51	30.58	43.50	12.92
Horizontal	149.97	25.48	43.50	18.02
Vertical	150.03	33.28	43.50	10.22

Frequency range : 200MHz – 1GHz



**Polarization: Vertical**



**Polarization: Horizontal**

Test results :

Antenna Polarization	Measured Frequency (MHz)	Quasi Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Vertical	247.45	21.48	46.00	24.52
Horizontal	247.50	28.56	46.00	17.44
Vertical	249.95	19.44	46.00	26.56
Horizontal	250.00	32.22	46.00	13.78
Horizontal	880.60	32.81	46.00	13.19

Frequency range: 1GHz to 40GHz

Antenna 1

Table 14: Restricted bands of operation and spurious radiated emission test results ( 802.11a mode & 6 Mbps data rate)

Channel Frequency (MHz)	Measured Frequency (MHz)	Antenna Polarization	Measured Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
5180	5150(Pk)	Vertical	69.16	74	-4.84
	5150(Av)		50.29	54	-3.71
	5180(Pk)		106.99	*	-
	5180(Av)		97.99	*	-
	10360(Pk)		53.33	68.2	-14.87
	10360(Av)		38.92	68.2	-29.28
	15540(Pk)		No Harmonics Found		
	15540(Av)	No Harmonics Found			
	5150(Pk)	Horizontal	65.19	74	-8.81
	5150(Av)		46.42	54	-7.58
	5180(Pk)		103.41	*	-
	5180(Av)		94.29	*	-
	10360(Pk)		52.25	68.2	-15.95
	10360(Av)		39.02	68.2	-29.18
	15540(Pk)		No Harmonics Found		
	15540(Av)	No Harmonics Found			
5240	5240(Pk)	Vertical	103.96	*	-
	5240(Av)		94.87	*	-
	5350(Pk)		44.85	74	-29.15
	5350(Av)		32.26	54	-21.74
	10480(Pk)		52.77	68.2	-15.43
	10480(Av)		39.00	68.2	-29.20
	15720(Pk)		No Harmonics Found		
	15720(Av)	No Harmonics Found			
	5240(Pk)	Horizontal	107.95	*	-
	5240(Av)		98.87	*	-
	5350(Pk)		46.33	74	-27.67
	5350(Av)		34.37	54	-19.63
	10480(Pk)		52.10	68.2	-16.10
	10480(Av)		38.98	68.2	-29.22
15720(Pk)	No Harmonics Found				
15720(Av)	No Harmonics Found				
5260	5260(Pk)	Vertical	102.63	*	-
	5260(Av)		93.63	*	-
	5350(Pk)		44.27	74	-29.73
	5350(Av)		32.89	54	-21.11
	10520(Pk)		52.13	68.2	-16.07
	10520(Av)		38.25	68.2	-29.95
	15780(Pk)		No Harmonics Found		
	15780(Av)	No Harmonics Found			
	5260(Pk)	Horizontal	102.79	*	-
	5260(Av)		93.71	*	-
	5350(Pk)		44.66	74	-29.34
	5350(Av)		32.81	54	-21.19
	10520(Pk)		52.90	68.2	-15.30
	10520(Av)		38.27	68.2	-29.93
15780(Pk)	No Harmonics Found				
15780(Av)	No Harmonics Found				



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Channel Frequency (MHz)	Measured Frequency (MHz)	Antenna Polarization	Measured Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	
5320	5320(Pk)	Vertical	103.42	*	-	
	5320(Av)		94.34	*	-	
	5350(Pk)		60.85	74	-13.15	
	5350(Av)		44.48	54	-9.52	
	10640(Pk)		53.16	68.2	-15.04	
	10640(Av)		39.94	68.2	-28.26	
	No Harmonics Found					
	5320(Pk)	Horizontal	106.36	*	-	
	5320(Av)		97.35	*	-	
	5350(Pk)		65.35	74	-8.65	
	5350(Av)		48.37	54	-5.63	
	10640(Pk)		52.91	68.2	-15.29	
	10640(Av)		39.96	68.2	-28.24	
	No Harmonics Found					
	5500	5500(Pk)	Vertical	102.73	*	-
		5500(Av)		93.46	*	-
		11000(Pk)		54.83	68.2	-13.37
		11000(Av)		41.54	68.2	-26.66
No Harmonics Found						
5500(Pk)		Horizontal	106.40	*	-	
5500(Av)			97.32	*	-	
11000(Pk)			54.68	88.2	-33.52	
11000(Av)			41.54	68.2	-26.66	
No Harmonics Found						
5700		5700(Pk)	Vertical	101.56	*	-
		5700(Av)		92.44	*	-
	11400(Pk)	54.33		68.2	-13.87	
	11400(Av)	41.49		68.2	-26.71	
	No Harmonics Found					
	5700(Pk)	Horizontal	105.01	*	-	
	5700(Av)		96.41	*	-	
	11400(Pk)		54.56	68.2	-13.64	
	11400(Av)		41.65	68.2	-26.55	
	No Harmonics Found					
		17100(Pk)				
		17100(Av)				

**Pk:** Peak detector

**Av:** Average detector

**Note:** Peak limit for spurious emissions is set to 20 dB above the average limit for FCC part 15.205

No harmonics found beyond 3rd harmonics.

RBW=1MHz, VBW=3MHz

Limits are considered as per FCC part 15.407 and 15.205.

**Table 15: Resticted bands of operation and spurious radiated emission test results ( 802.11n mode & MCS0 data rate)**

Channel Frequency (MHz)	Measured Frequency (MHz)	Antenna Polarization	Measured Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5180	5150(Pk)	Vertical	61.91	74	-12.09
	5150(Av)		46.01	54	-7.99
	5180(Pk)		104.20	*	-
	5180(Av)		94.79	*	-
	10360(Pk)		51.37	68.2	-16.83
	10360(Av)		39.08	68.2	-29.12
	15540(Pk)		No Harmonics Found		
	15540(Av)		No Harmonics Found		
	5150(Pk)	Horizontal	67.34	74	-6.66
	5150(Av)		50.74	54	-3.26
	5180(Pk)		108.44	*	-
	5180(Av)		98.20	*	-
	10360(Pk)		52.38	68.2	-15.82
	10360(Av)		39.08	68.2	-29.12
	15540(Pk)		No Harmonics Found		
	15540(Av)		No Harmonics Found		
5240	5240(Pk)	Vertical	104.50	*	-
	5240(Av)		94.71	*	-
	5350(Pk)		44.58	74	-29.42
	5350(Av)		32.42	54	-21.58
	10480(Pk)		53.01	68.2	-15.19
	10480(Av)		39.08	68.2	-29.12
	15720(Pk)		No Harmonics Found		
	15720(Av)	No Harmonics Found			
	5240(Pk)	Horizontal	108.10	*	-
	5240(Av)		97.50	*	-
	5350(Pk)		52.24	74	-21.76
	5350(Av)		39.02	54	-14.98
	10480(Pk)		52.24	68.2	-15.96
	10480(Av)		39.02	68.2	-29.18
15720(Pk)	No Harmonics Found				
15720(Av)	No Harmonics Found				
5260	5260(Pk)	Vertical	106.01	*	-
	5260(Av)		95.73	*	-
	5350(Pk)		45.43	74	-28.57
	5350(Av)		33.46	54	-20.54
	10520(Pk)		50.82	68.2	-17.38
	10520(Av)		38.47	68.2	-29.73
	15780(Pk)		54.70	68.2	-13.50
	15780(Av)		40.55	68.2	-27.65
	5260(Pk)	Horizontal	106.25	*	-
	5260(Av)		96.97	*	-
	5350(Pk)		46.61	74	-27.39
	5350(Av)		34.13	54	-19.87
	10520(Pk)		51.16	68.2	-17.04
	10520(Av)		38.45	68.2	-29.75
	15780(Pk)		54.95	68.2	-13.25
	15780(Av)		40.54	68.2	-27.66

Channel Frequency (MHz)	Measured Frequency (MHz)	Antenna Polarization	Measured Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	
5320	5320(Pk)	Vertical	102.15	*	-	
	5320(Av)		92.56	*	-	
	5350(Pk)		54.94	74	-19.06	
	5350(Av)		37.11	54	-16.89	
	10640(Pk)		53.03	68.2	-15.17	
	10640(Av)		40.00	68.2	-28.20	
	15960(Pk)		No Harmonics Found			
	15960(Av)		No Harmonics Found			
	5320(Pk)	Horizontal	105.01	*	-	
	5320(Av)		95.27	*	-	
	5350(Pk)		61.02	74	-12.98	
	5350(Av)		39.89	54	-14.11	
	10640(Pk)		52.93	68.2	-15.27	
	10640(Av)		40.02	68.2	-28.18	
	15960(Pk)		No Harmonics Found			
	15960(Av)		No Harmonics Found			
5500	5500(Pk)	Vertical	99.99	*	-	
	5500(Av)		90.52	*	-	
	11000(Pk)		53.81	68.2	-14.39	
	11000(Av)		41.53	68.2	-26.67	
	16500(Pk)		No Harmonics Found			
	16500(Av)	No Harmonics Found				
	5500(Pk)	Horizontal	104.54	*	-	
	5500(Av)		94.48	*	-	
	11000(Pk)		54.48	68.2	-13.72	
	11000(Av)		41.58	68.2	-26.62	
	16500(Pk)		No Harmonics Found			
	16500(Av)	No Harmonics Found				
5700	5700(Pk)	Vertical	98.72	*	-	
	5700(Av)		89.07	*	-	
	11400(Pk)		55.49	68.2	-12.71	
	11400(Av)		41.57	68.2	-26.63	
	17100(Pk)		No Harmonics Found			
	17100(Av)	No Harmonics Found				
	5700(Pk)	Horizontal	102.81	*	-	
	5700(Av)		92.79	*	-	
	11400(Pk)		55.05	68.2	-13.15	
	11400(Av)		41.81	68.2	-26.39	
	17100(Pk)		No Harmonics Found			
	17100(Av)		No Harmonics Found			

**Pk:** Peak detector

**Av:** Average detector

**Note:** Peak limit for spurious emissions is set to 20 dB above the average limit for FCC part 15.205

No harmonics found beyond 3rd harmonics.

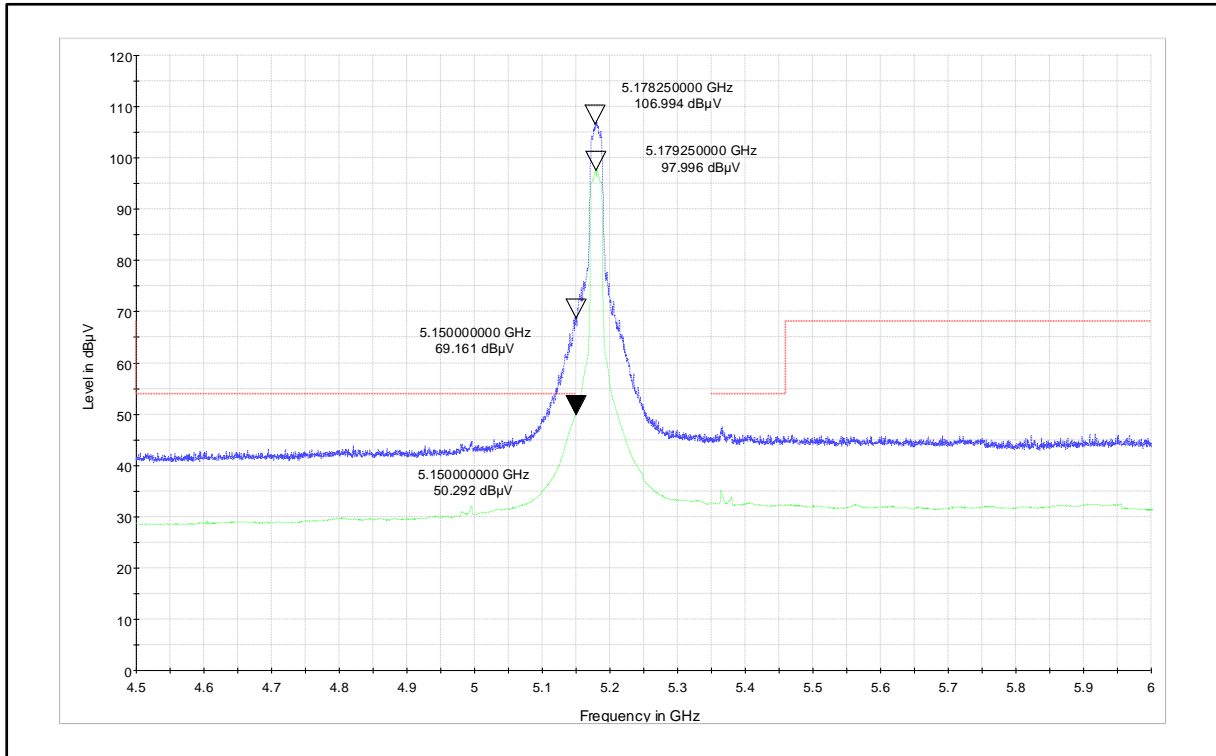
RBW=1MHz, VBW=3MHz

Limits are considered as per FCC part 15.407 and 15.205.

**Test plots 3: Worst case emissions for Restricted Frequency Bands**

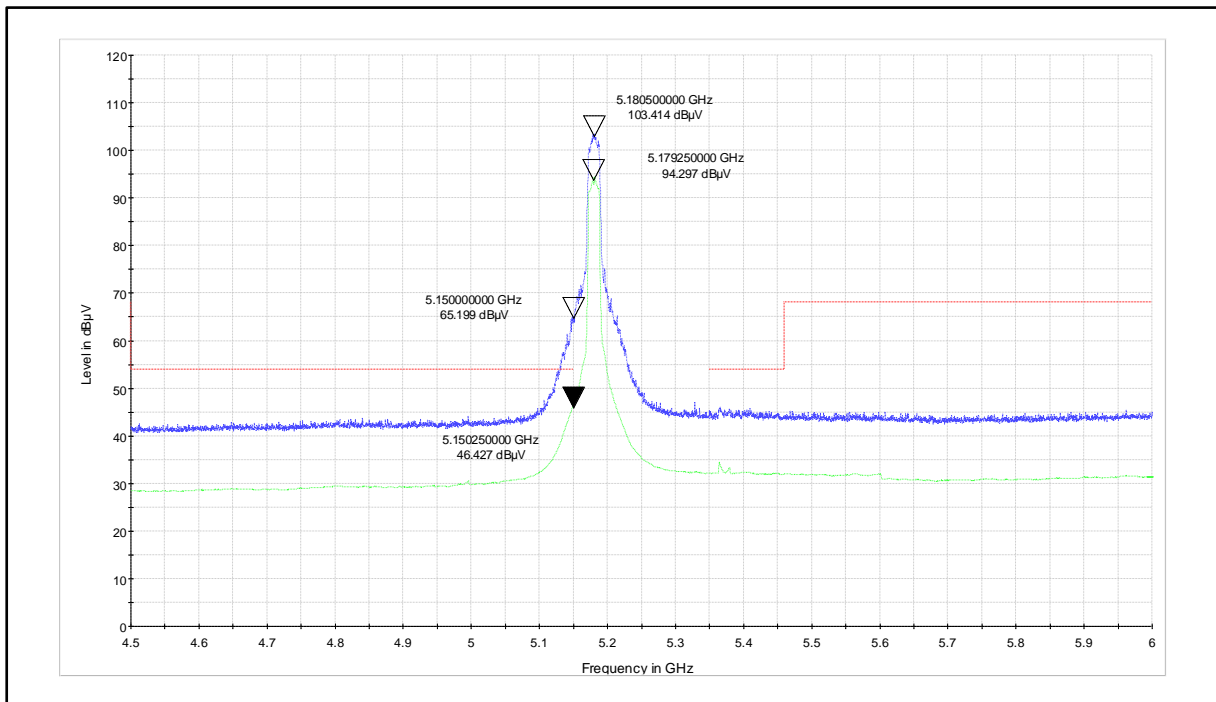
**Antenna 1**

**Data rate: 6Mbps**



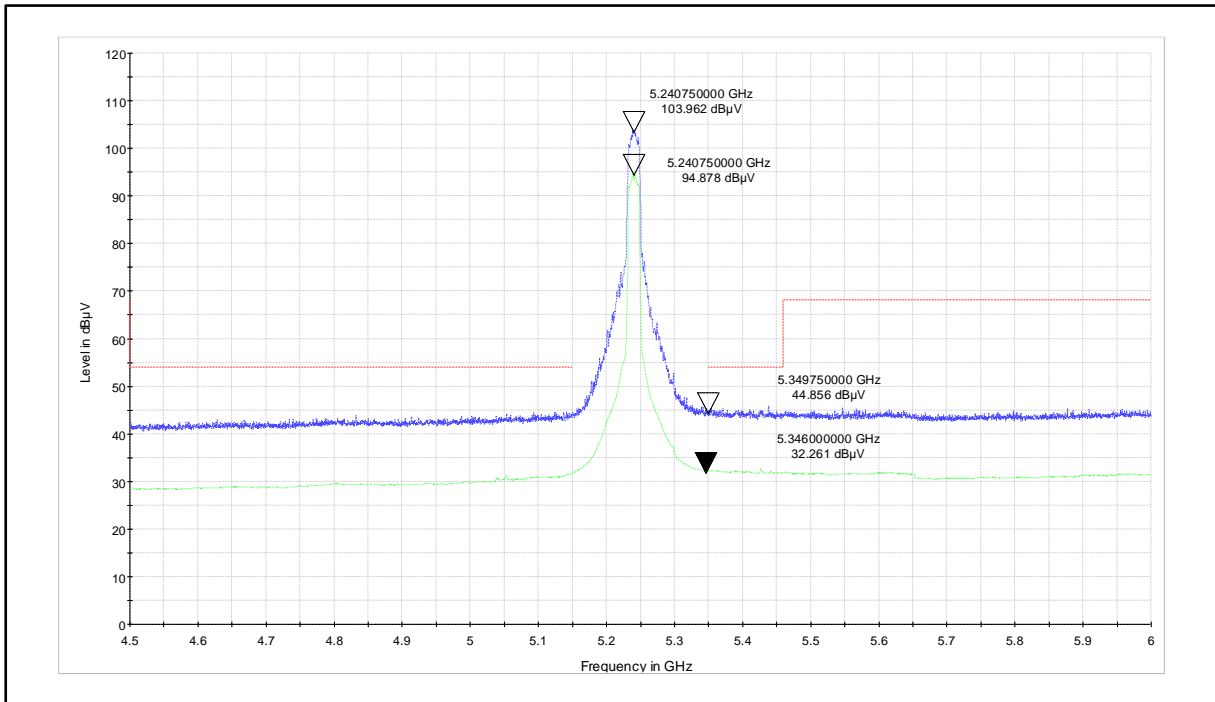
Channel Frequency: 5180MHz

Polarization: Vertical



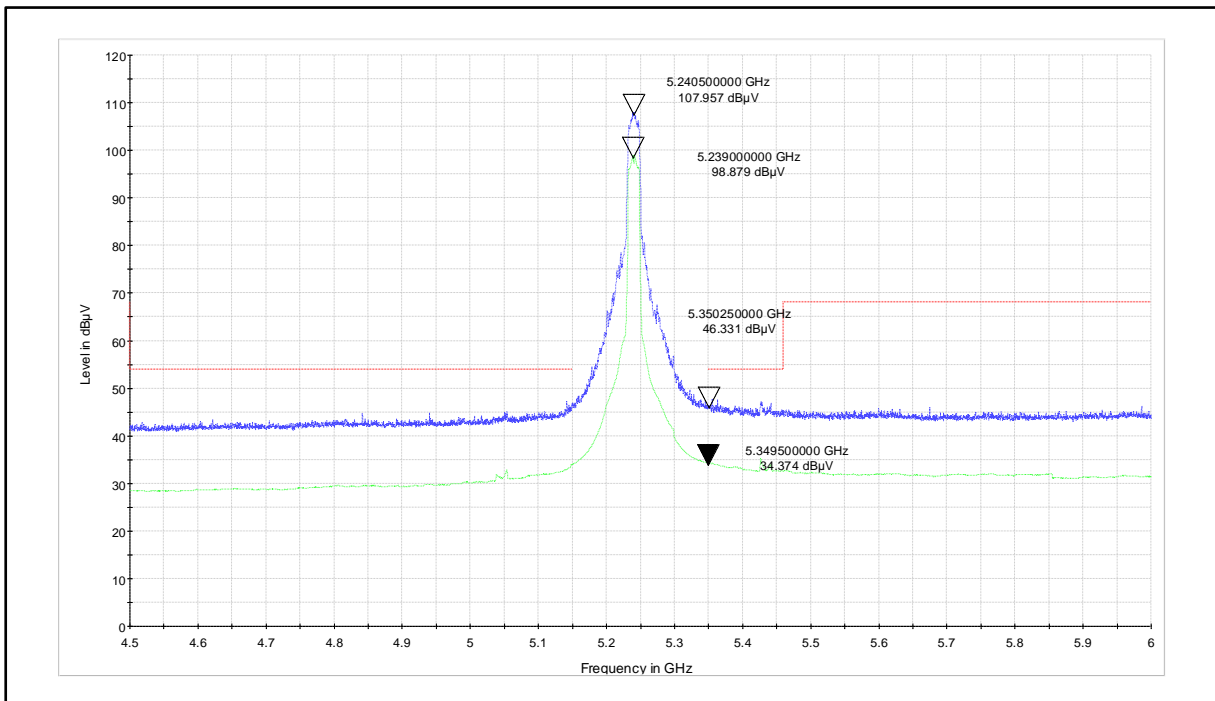
Channel Frequency: 5180MHz

Polarization: Horizontal



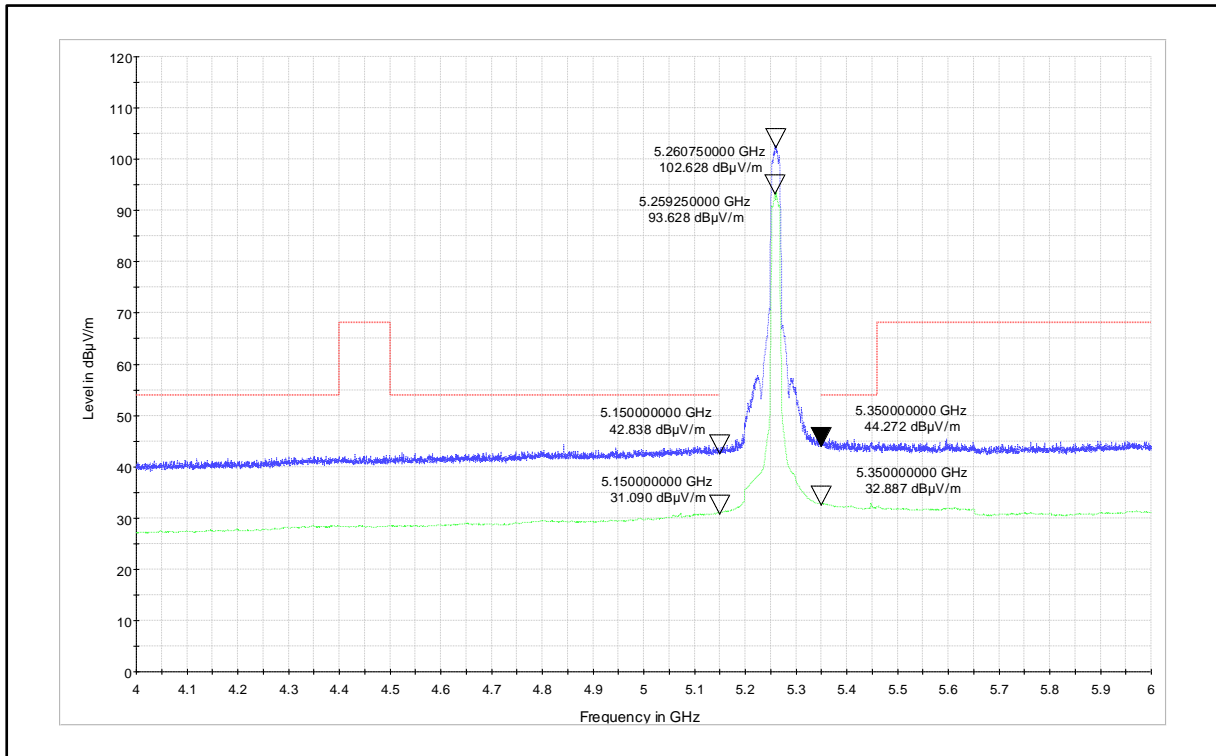
Channel Frequency: 5240MHz

Polarization: Vertical



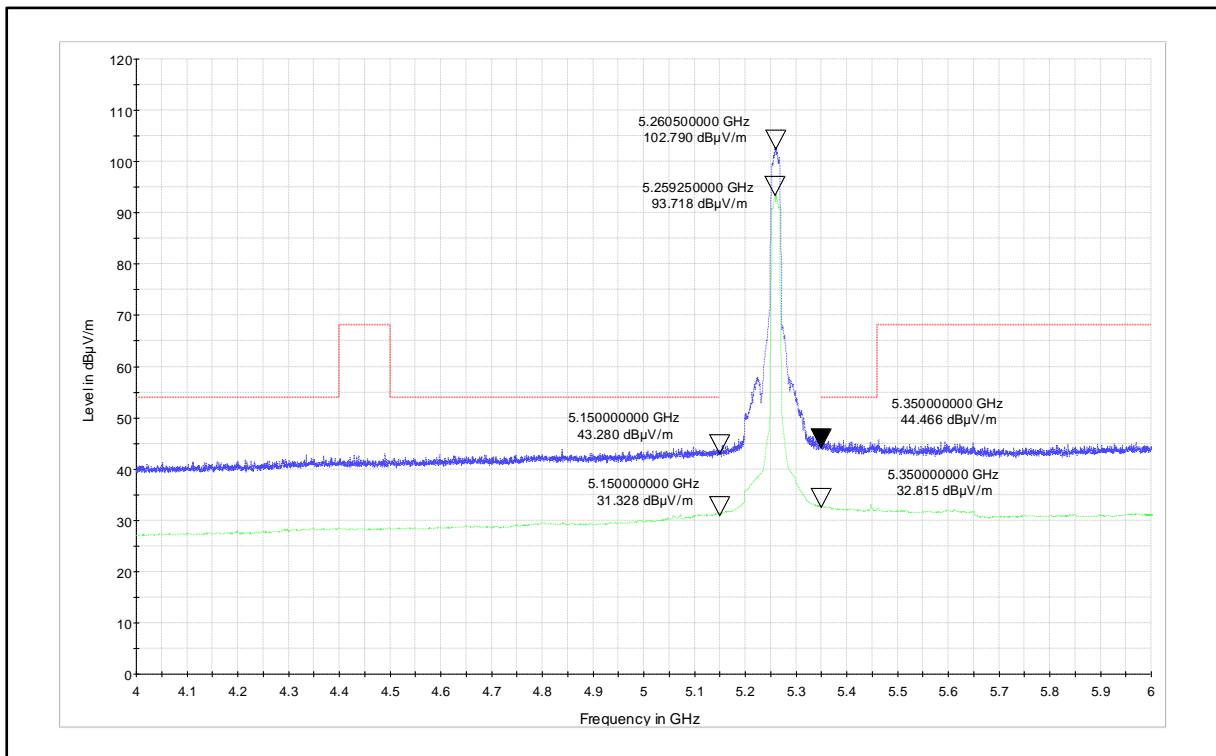
Channel Frequency: 5240MHz

Polarization: Horizontal



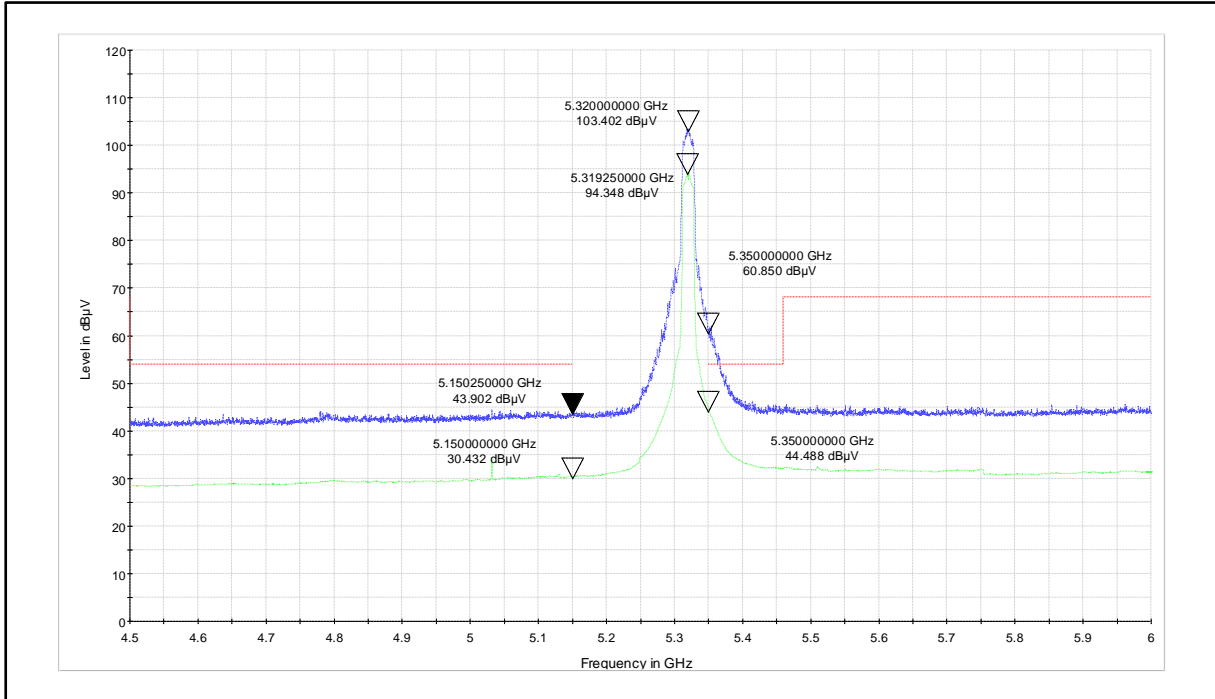
Channel Frequency: 5260MHz

Polarization: Vertical



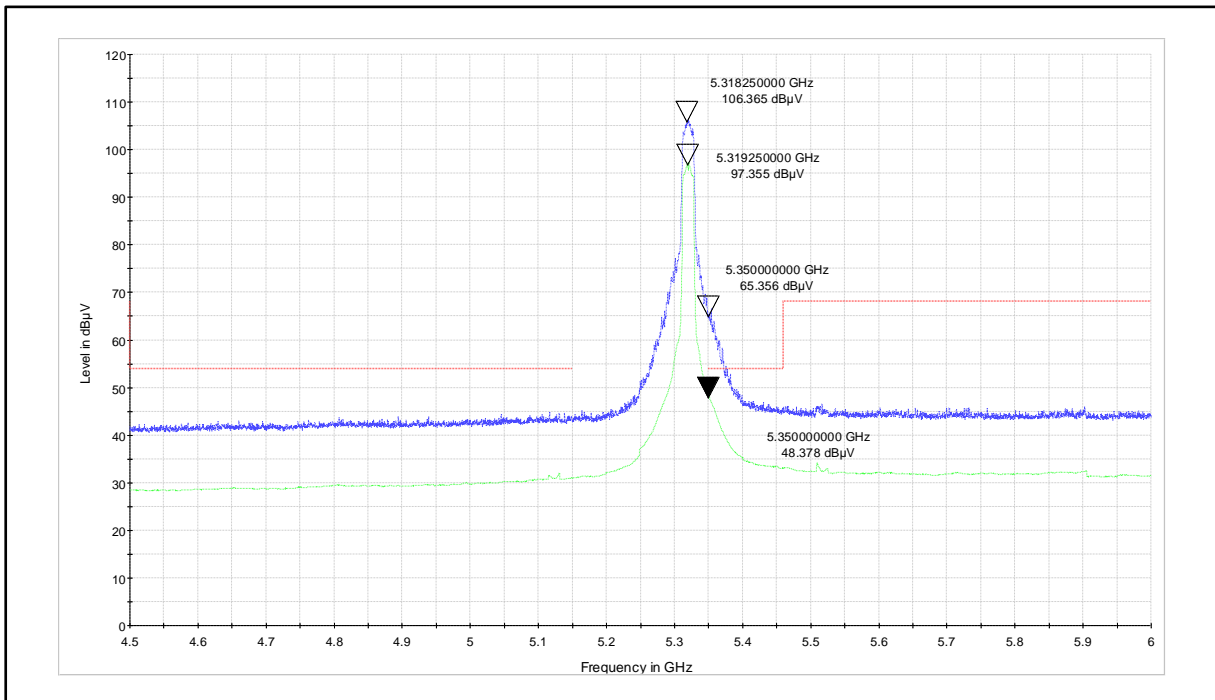
Channel Frequency: 5260MHz

Polarization: Horizontal



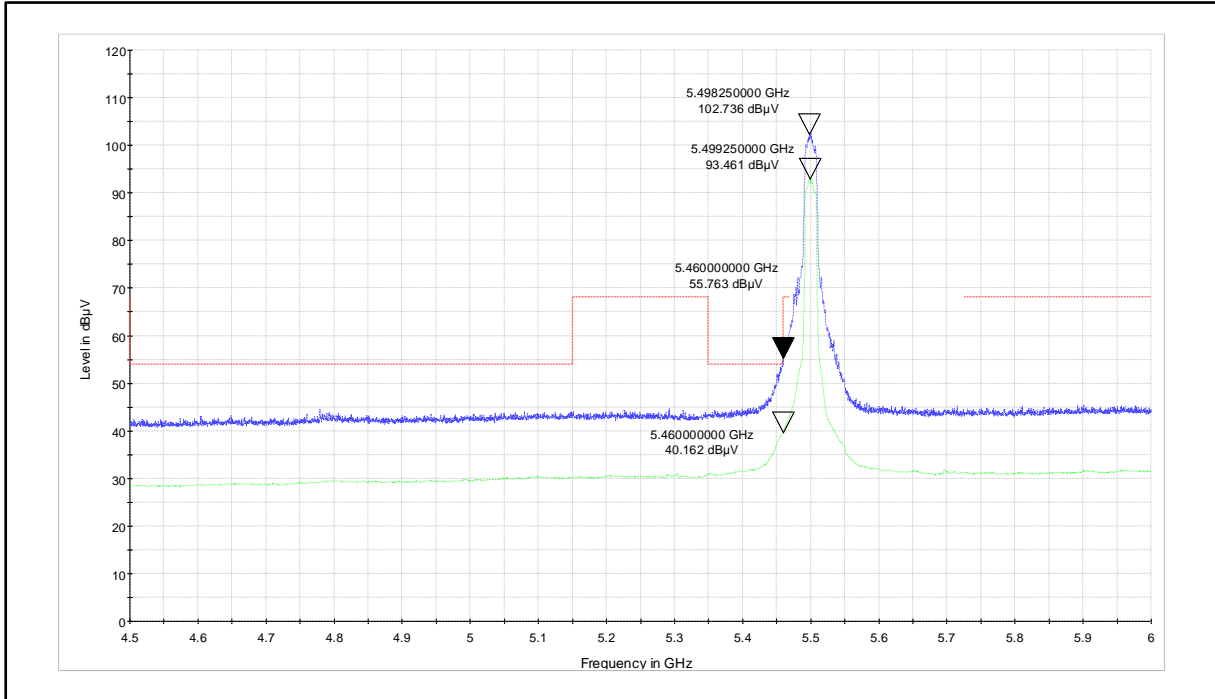
Channel Frequency: 5320MHz

Polarization: Vertical



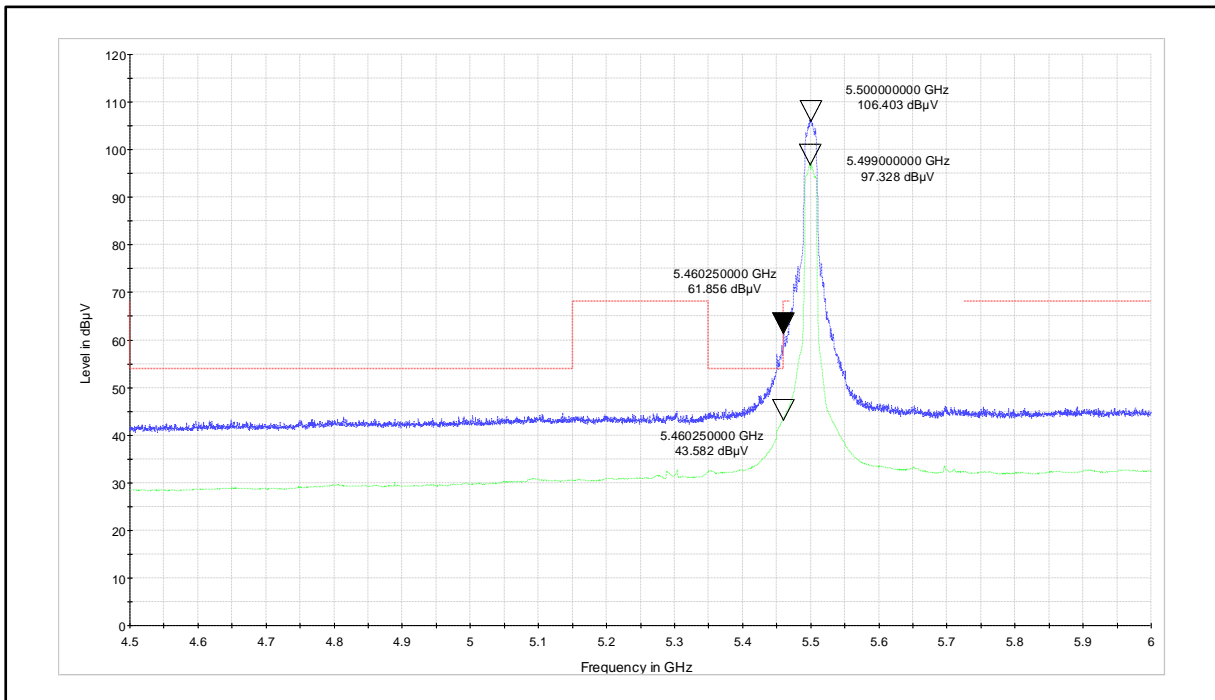
Channel Frequency: 5320MHz

Polarization: Horizontal



Channel Frequency: 5500MHz

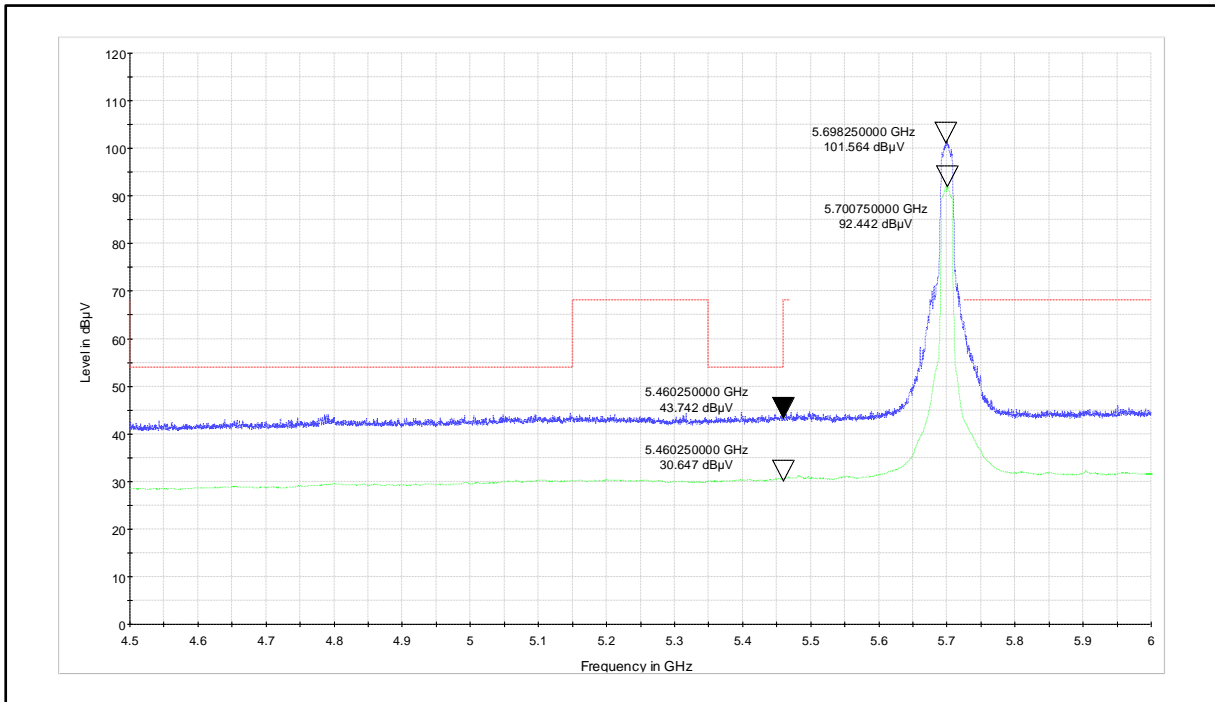
Polarization: Vertical



Channel Frequency: 5500MHz

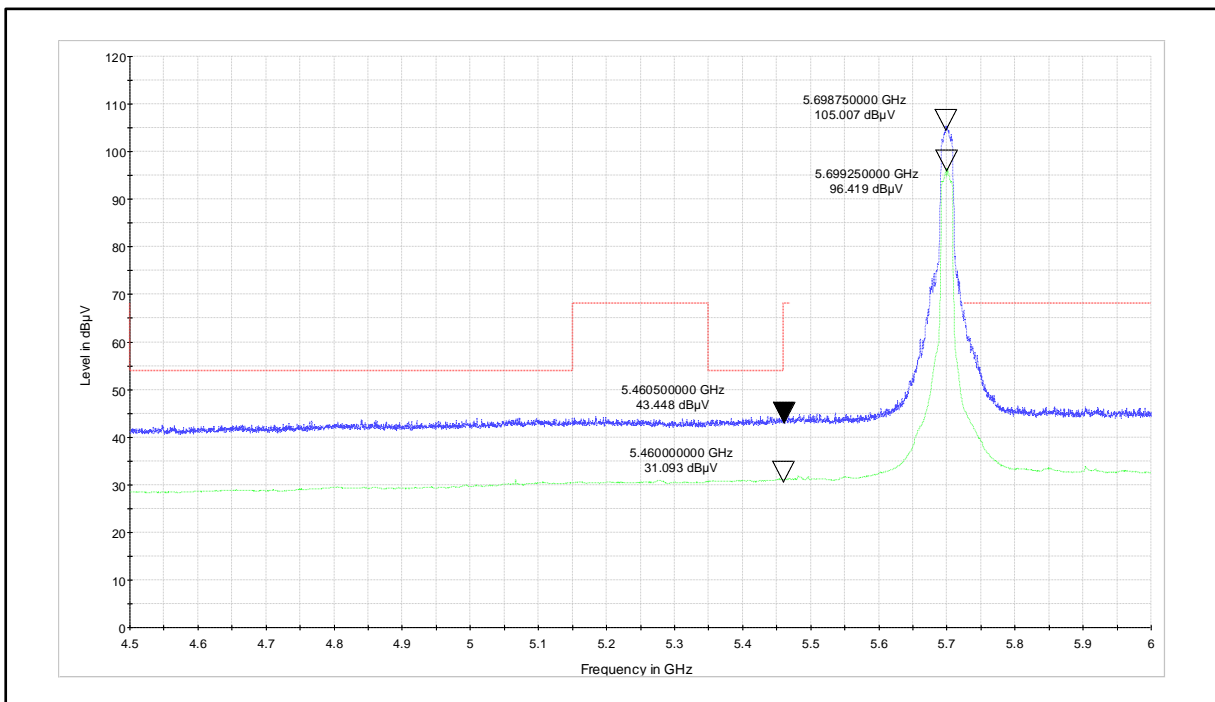
Polarization: Horizontal





Channel Frequency: 5700MHz

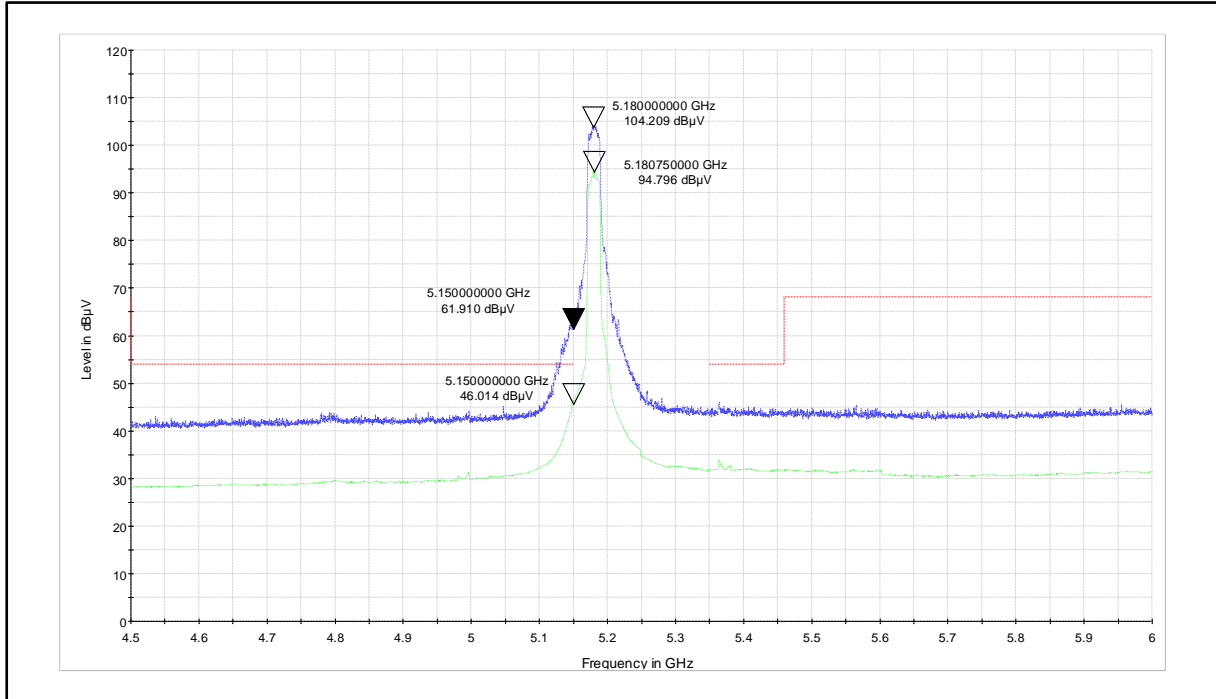
Polarization: Vertical



Channel Frequency: 5700MHz

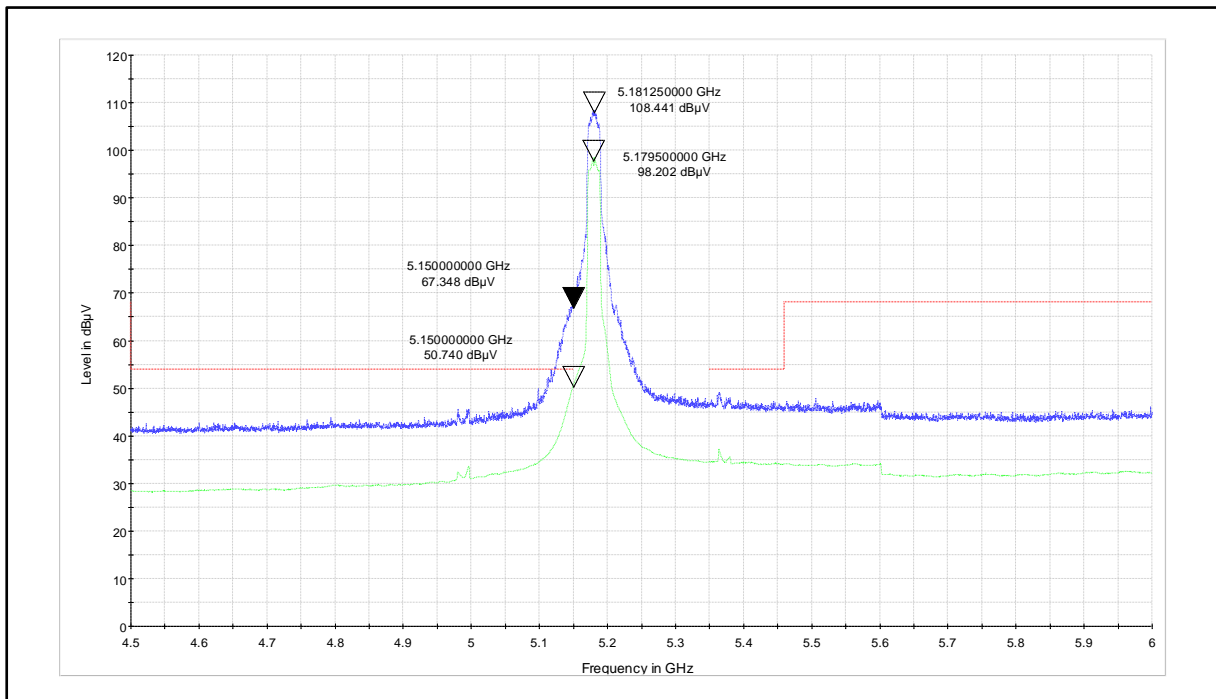
Polarization: Horizontal

**Data rate: MCS0**



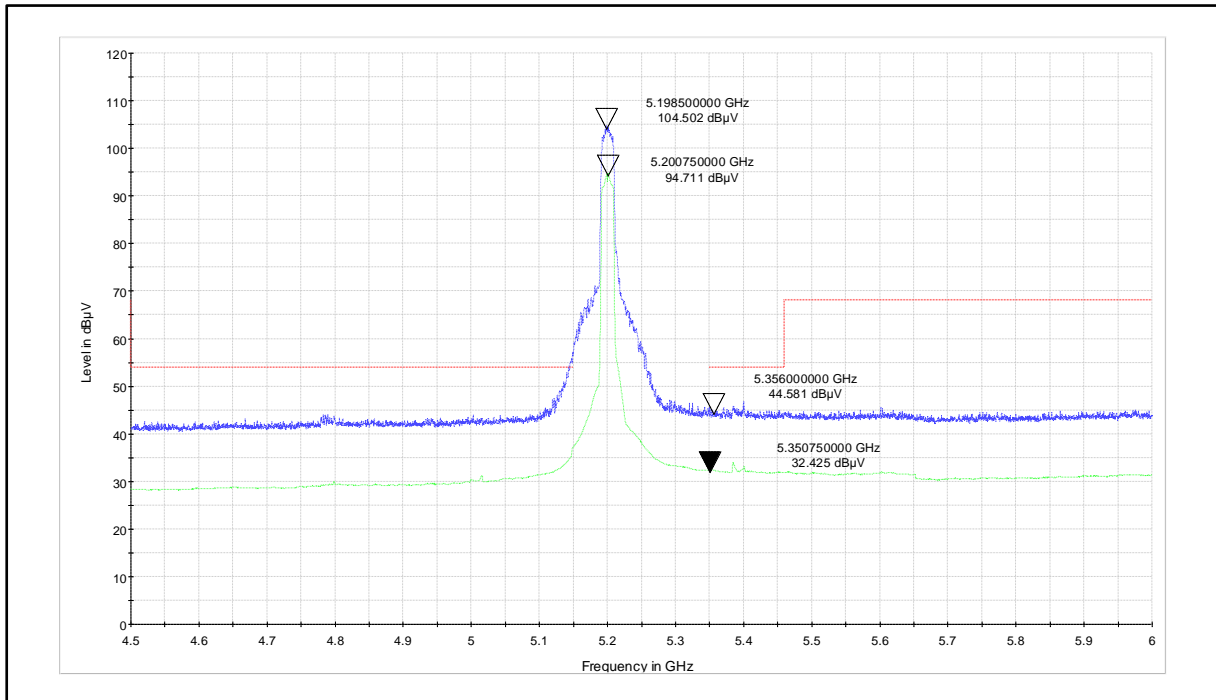
Channel Frequency: 5180MHz

Polarization: Vertical



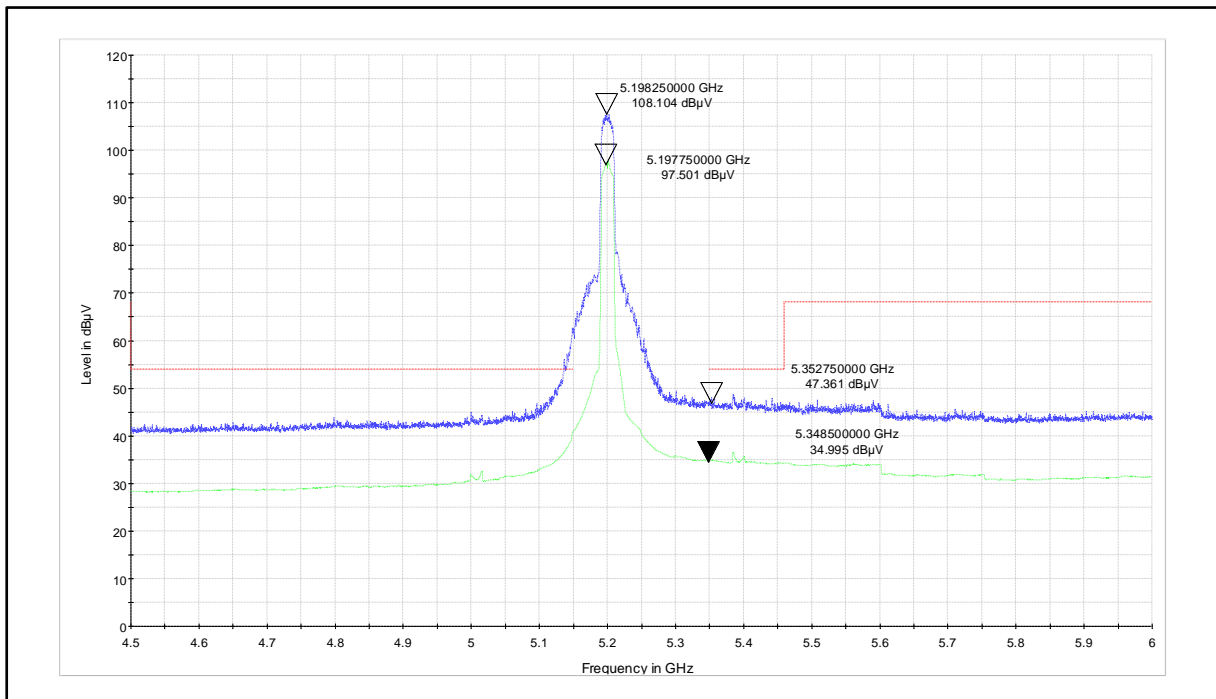
Channel Frequency: 5180MHz

Polarization: Horizontal



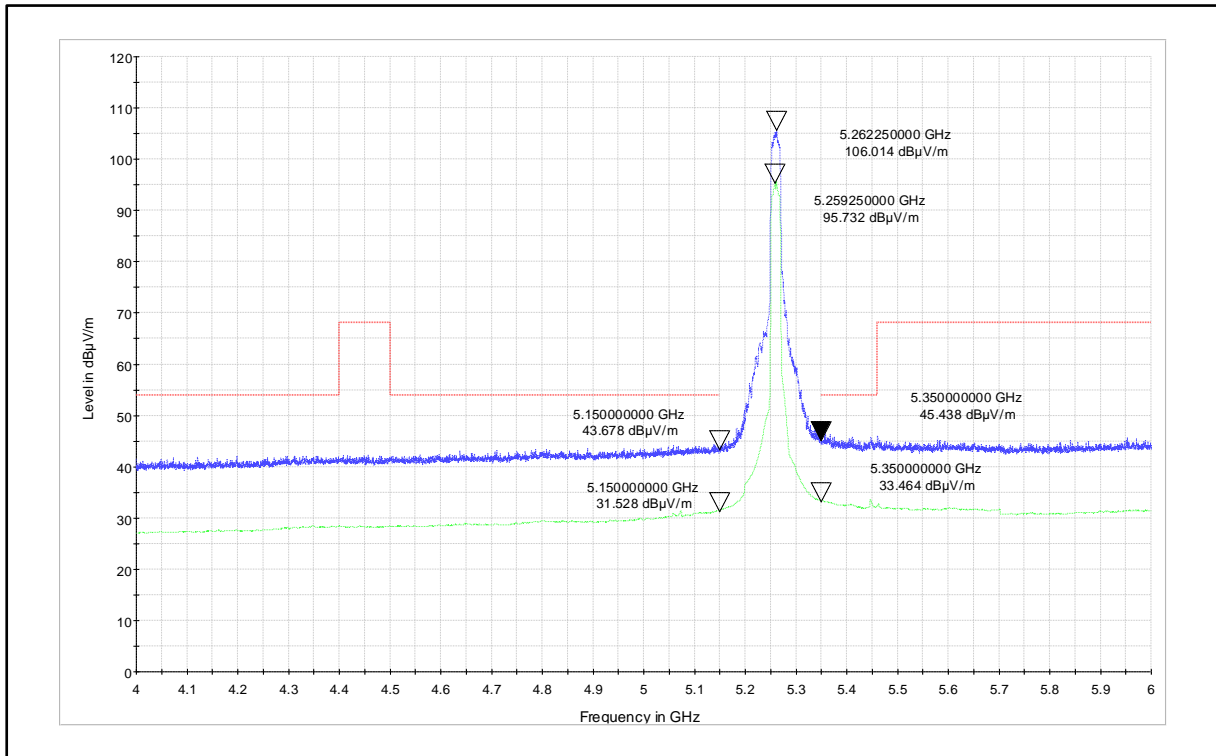
Channel Frequency: 5240MHz

Polarization: Vertical



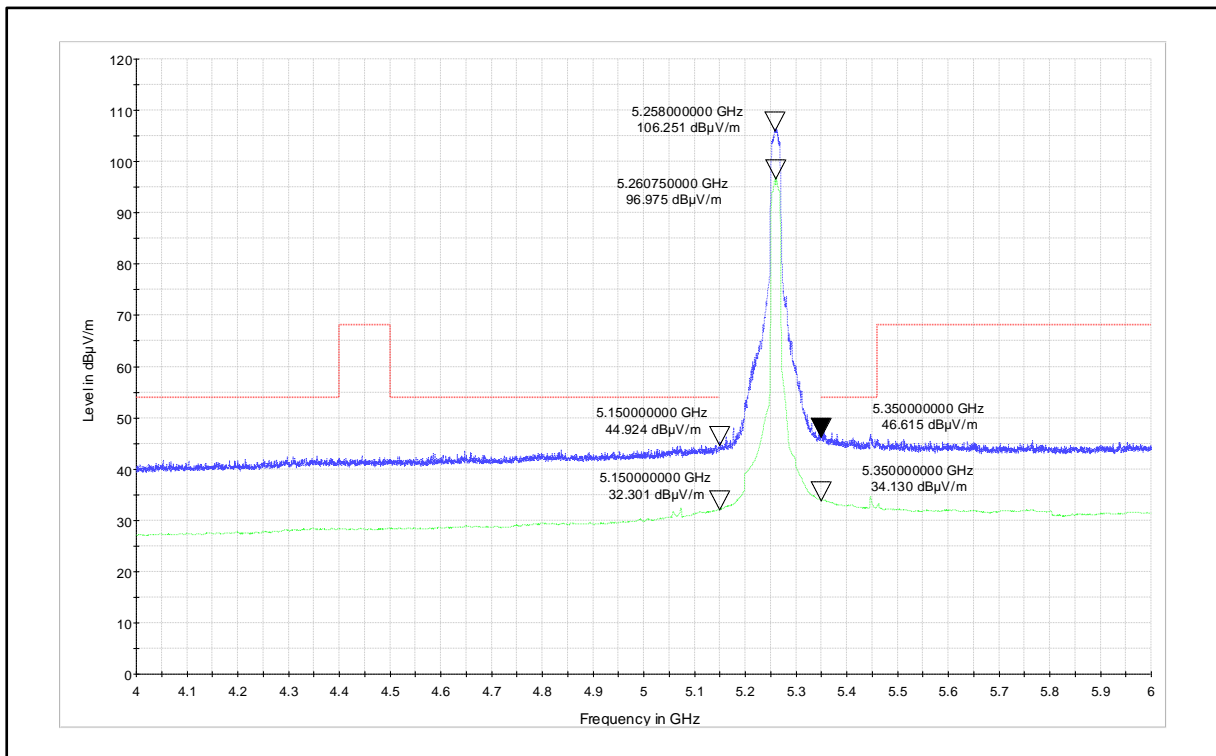
Channel Frequency: 5240MHz

Polarization: Horizontal



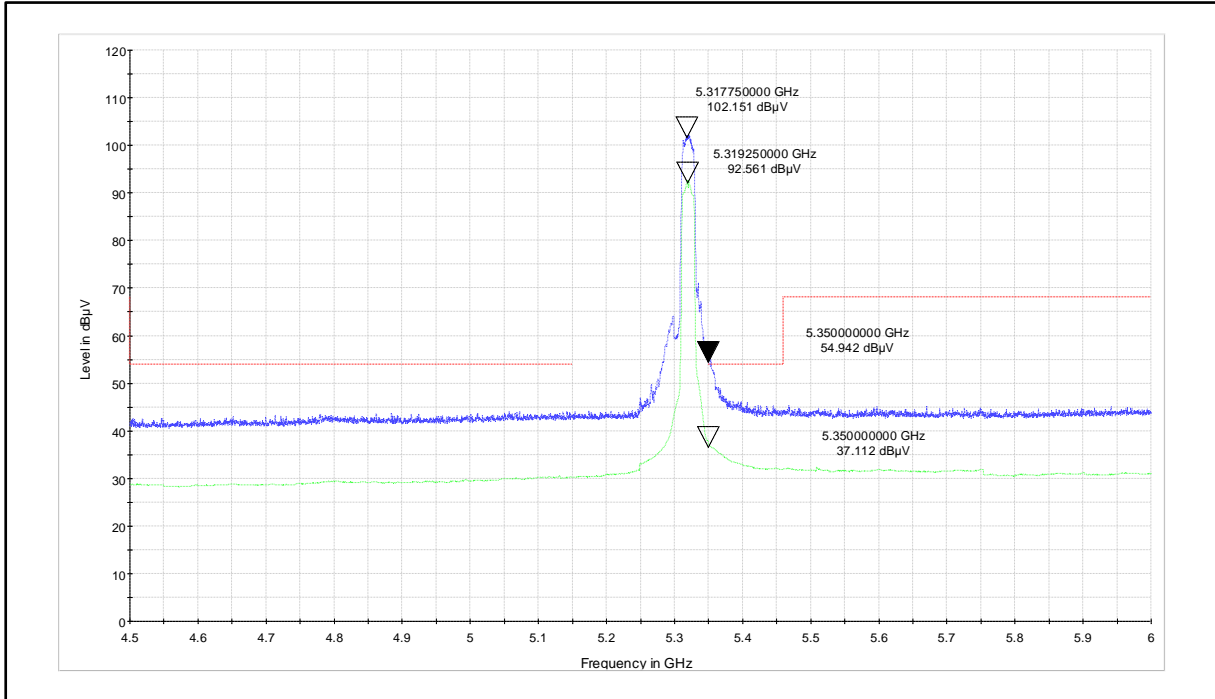
Channel Frequency: 5260MHz

Polarization: Vertical



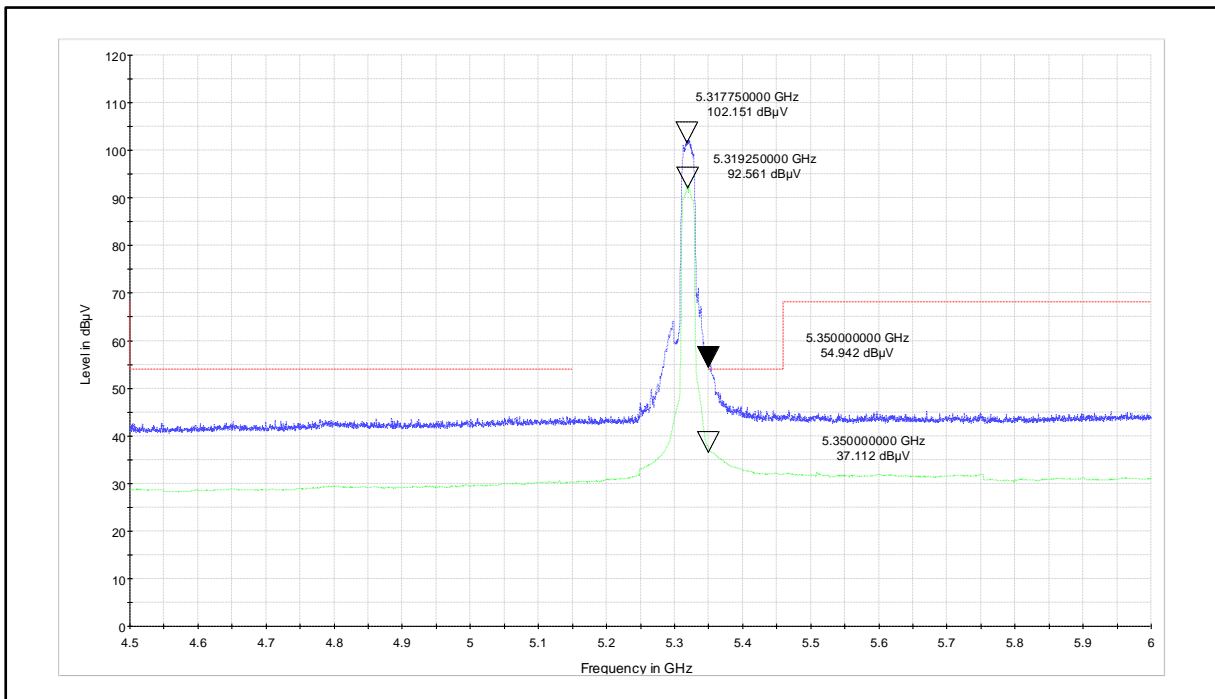
Channel Frequency: 5260MHz

Polarization: Horizontal



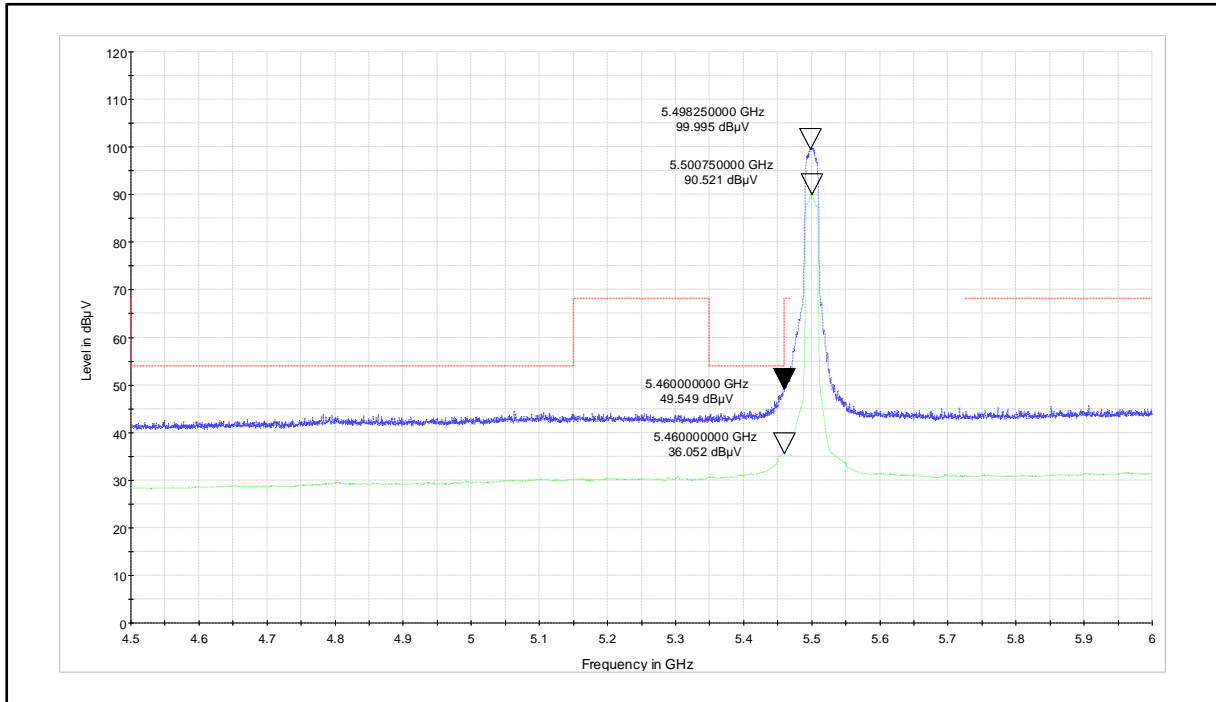
Channel Frequency: 5320MHz

Polarization: Vertical



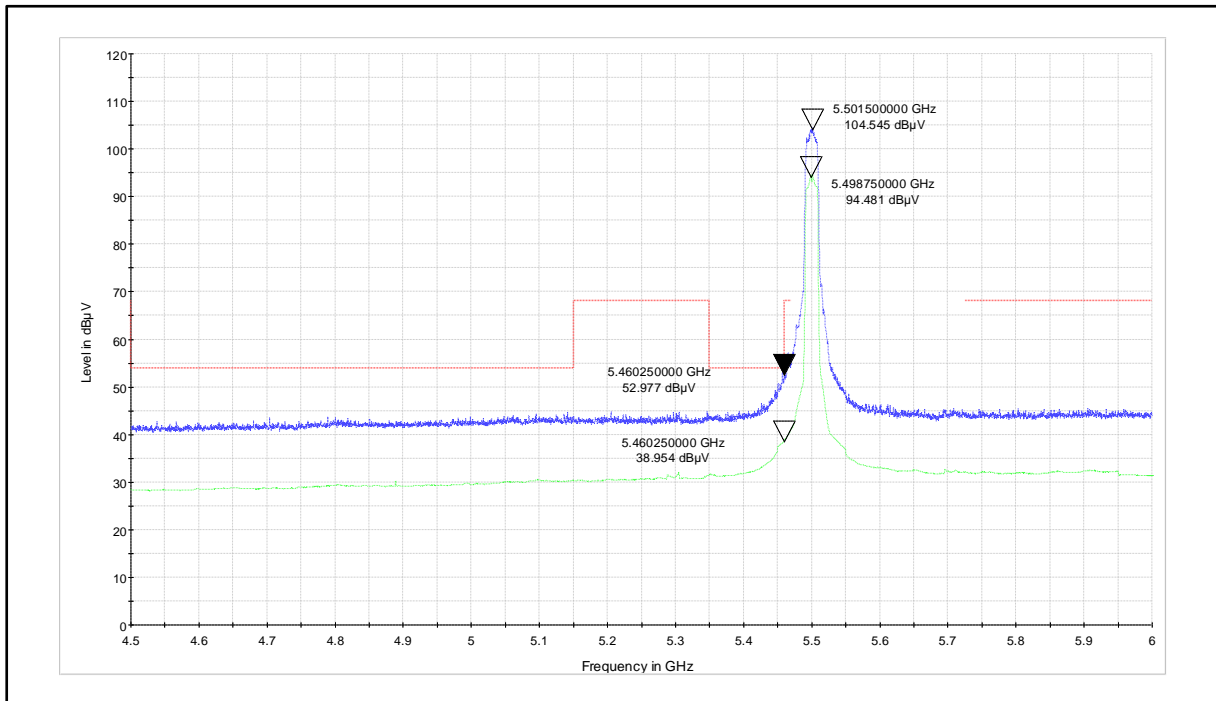
Channel Frequency: 5320MHz

Polarization: Horizontal



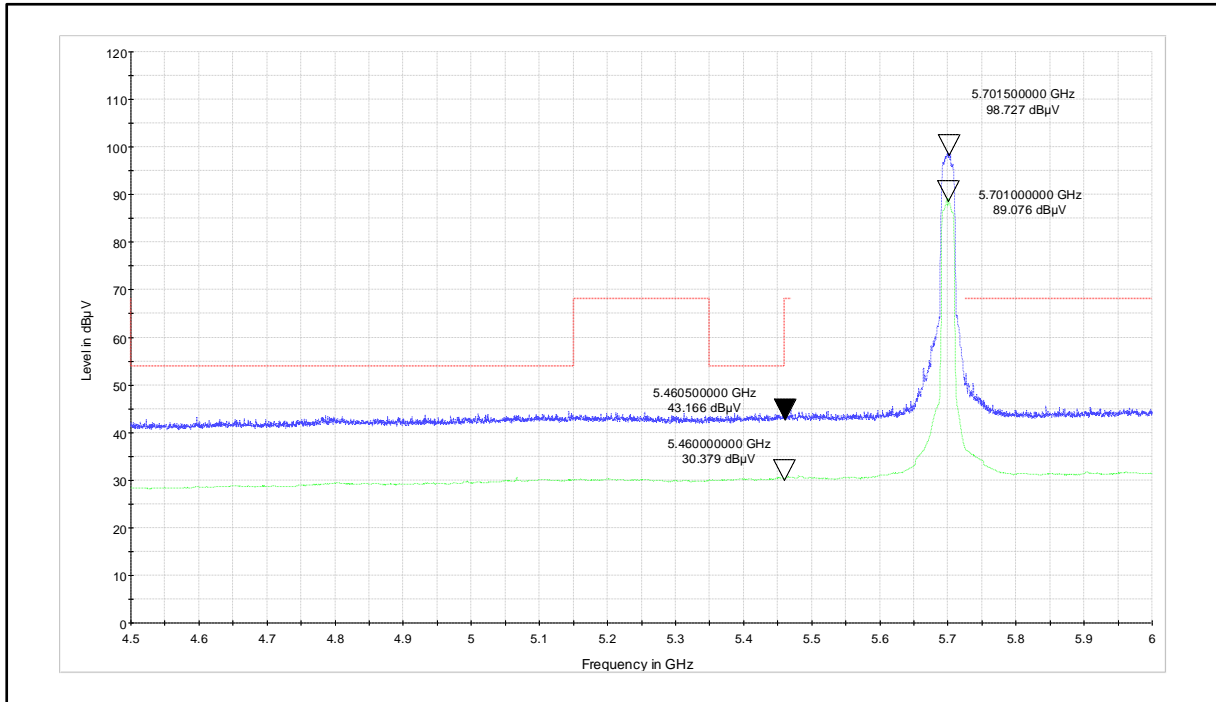
Channel Frequency: 5500MHz

Polarization: Vertical



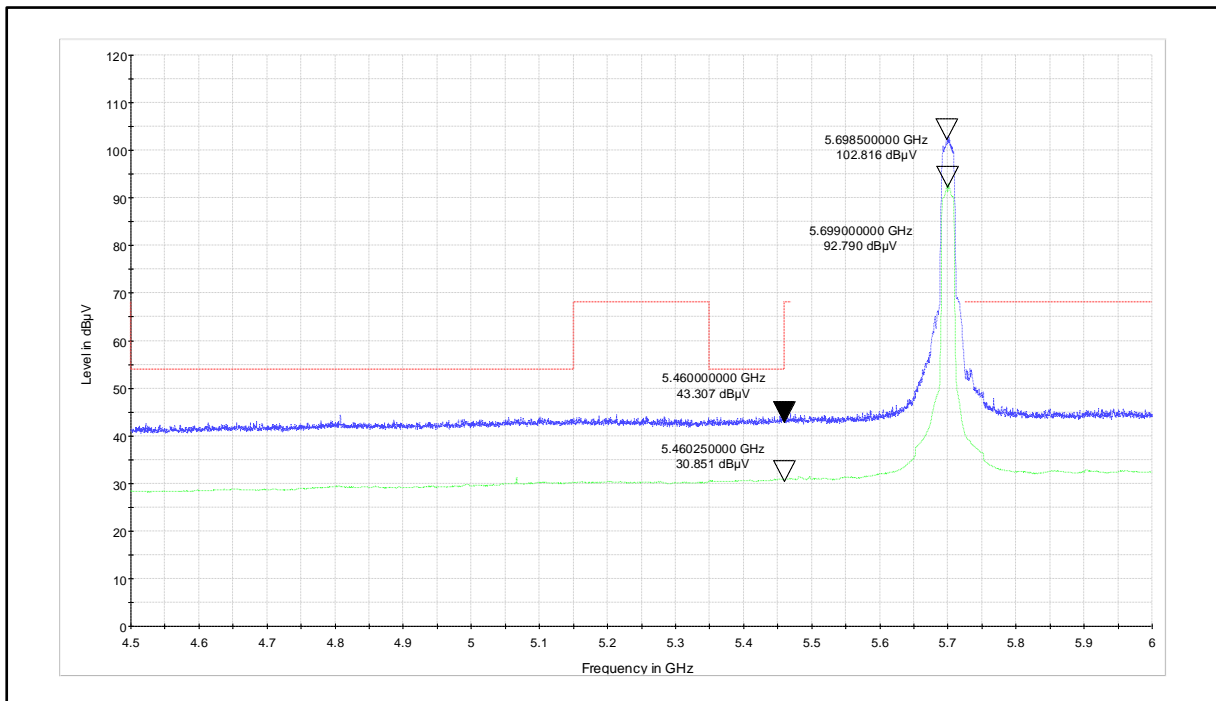
Channel Frequency: 5500MHz

Polarization: Horizontal



Channel Frequency: 5700MHz

Polarization: Vertical



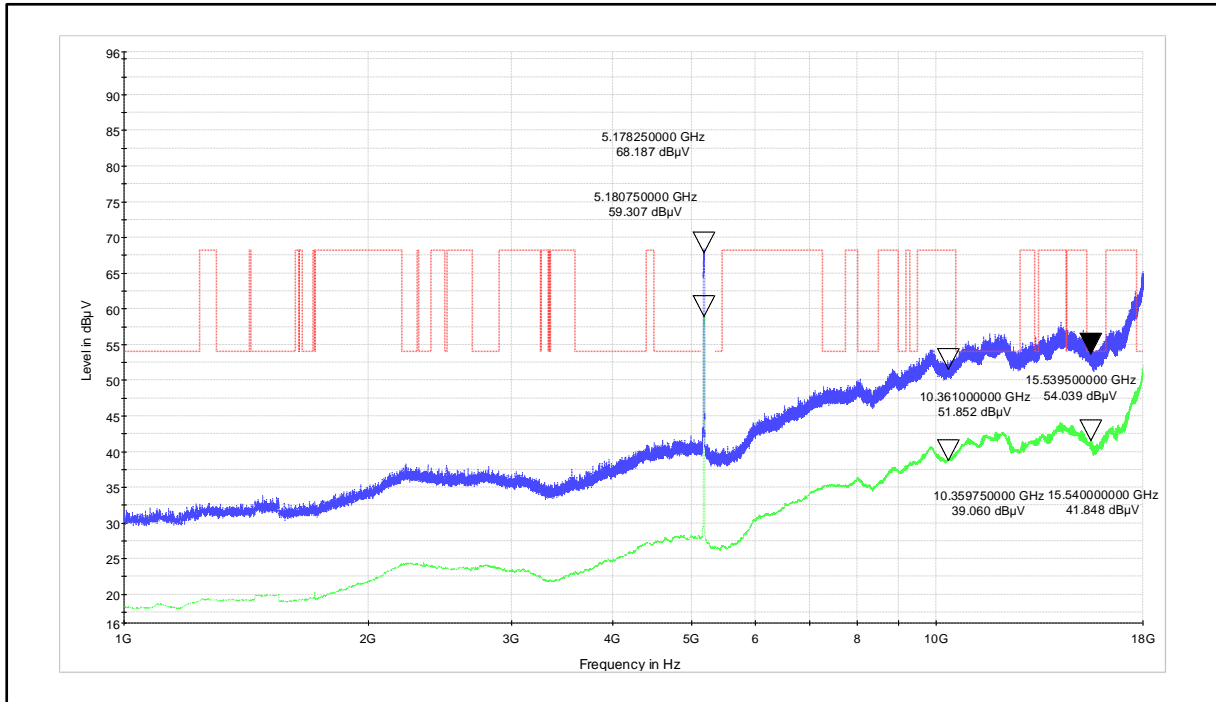
Channel Frequency: 5700MHz

Polarization: Horizontal

**Test plots 4: Worst case emissions for Spurious radiated emissions above 1GHz**

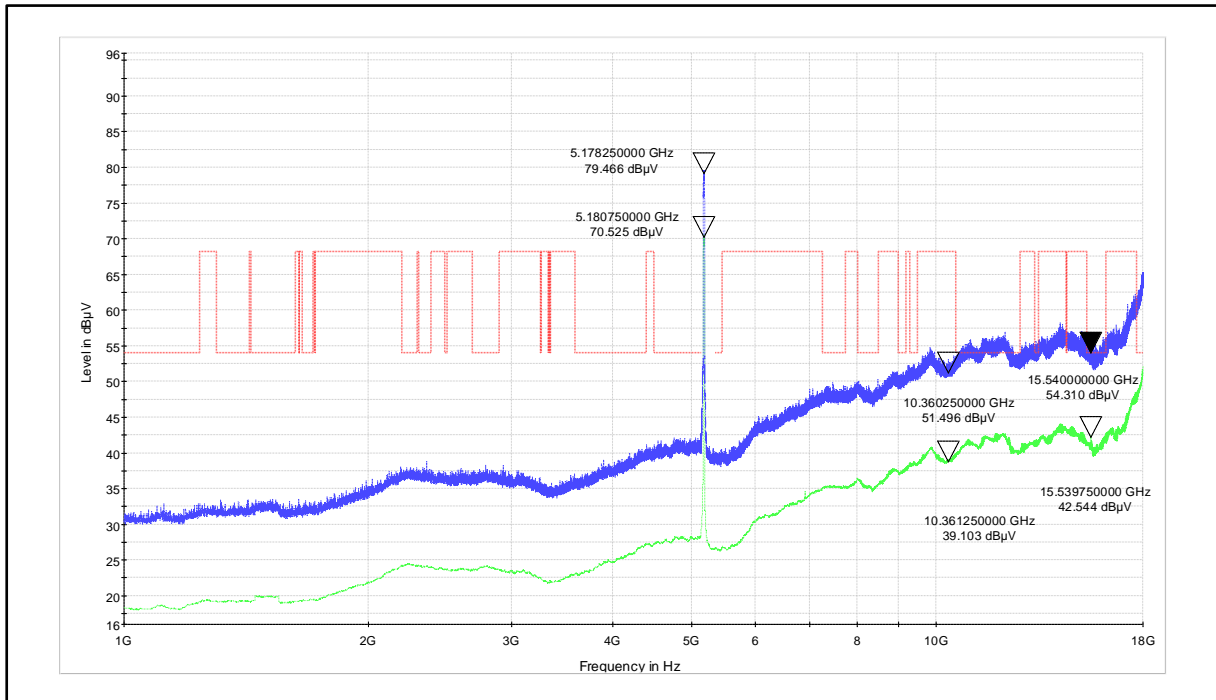
**Antenna 1**

**Data rate: 6Mbps**



Frequency Range: 1GHz to 8GHz

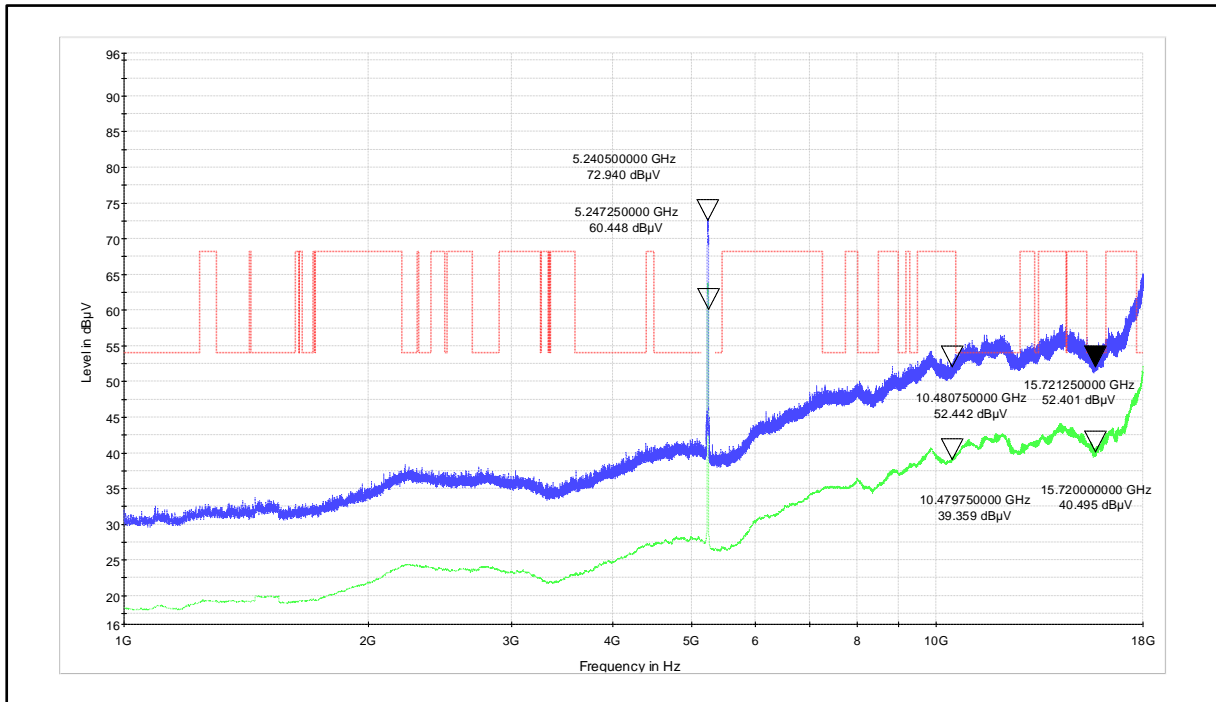
Polarization: Vertical



Frequency Range: 1 to 18GHz

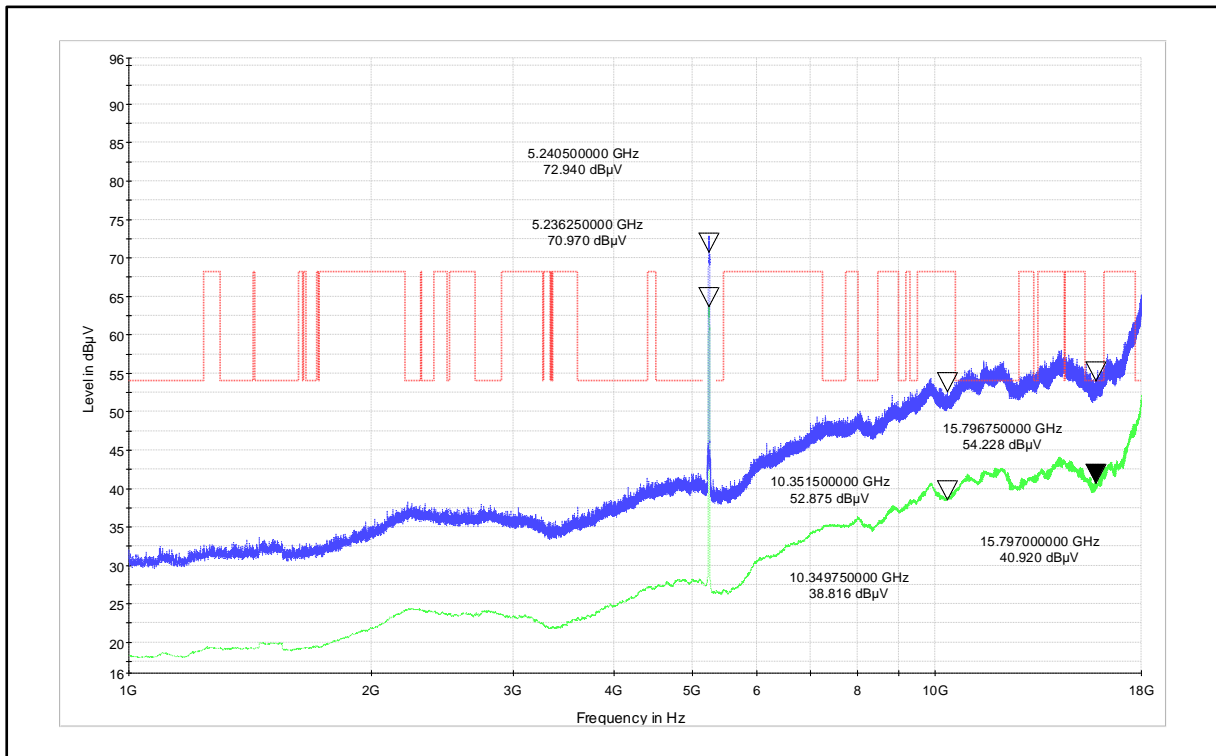
Polarization: Horizontal





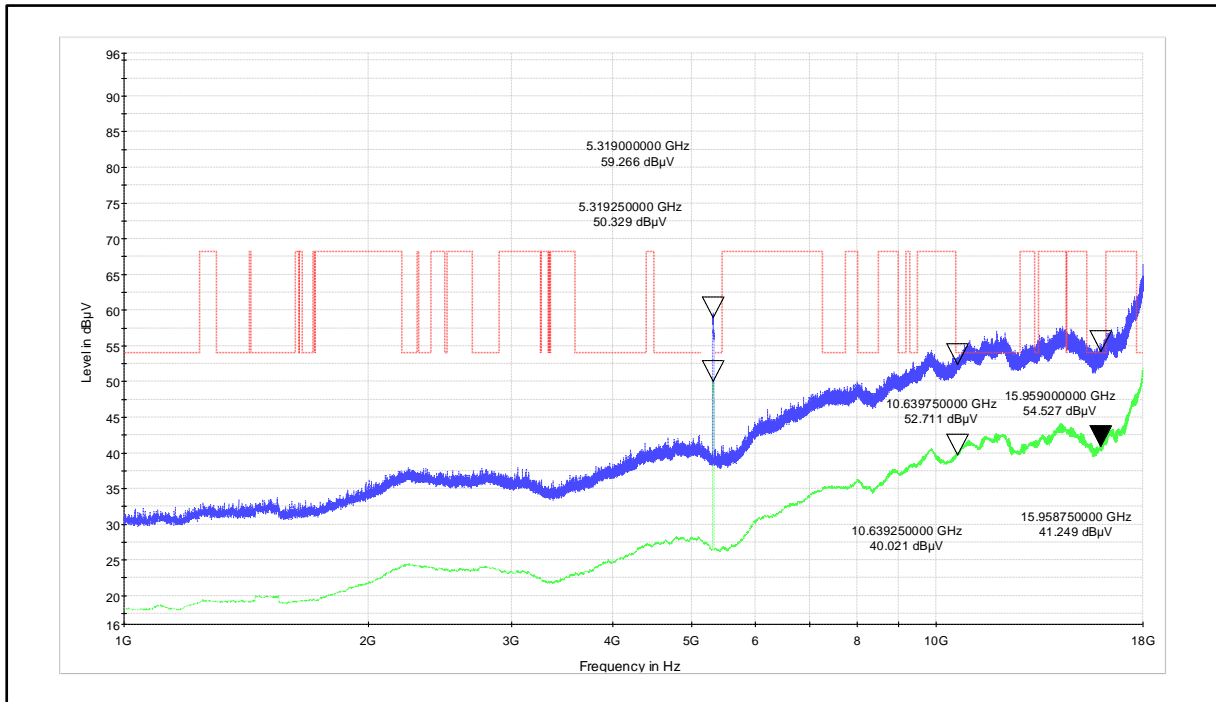
Frequency Range: 1 to 18GHz

Polarization: Vertical



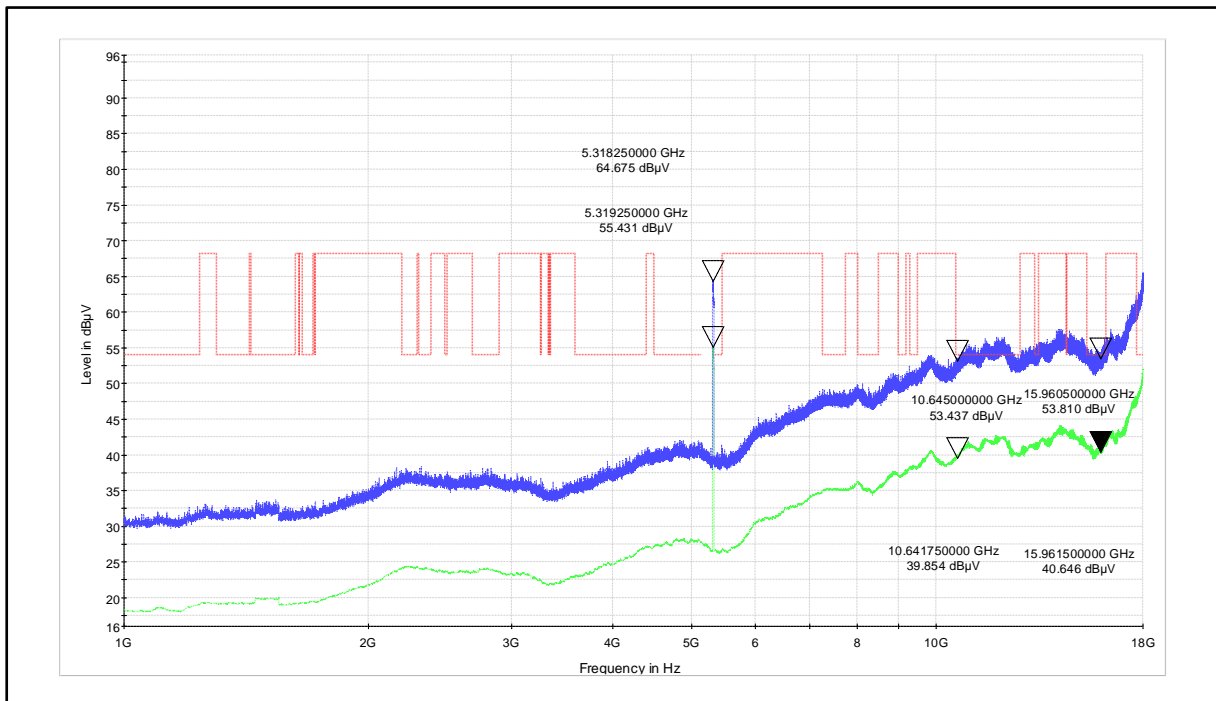
Frequency Range: 1 to 18GHz

Polarization: Horizontal



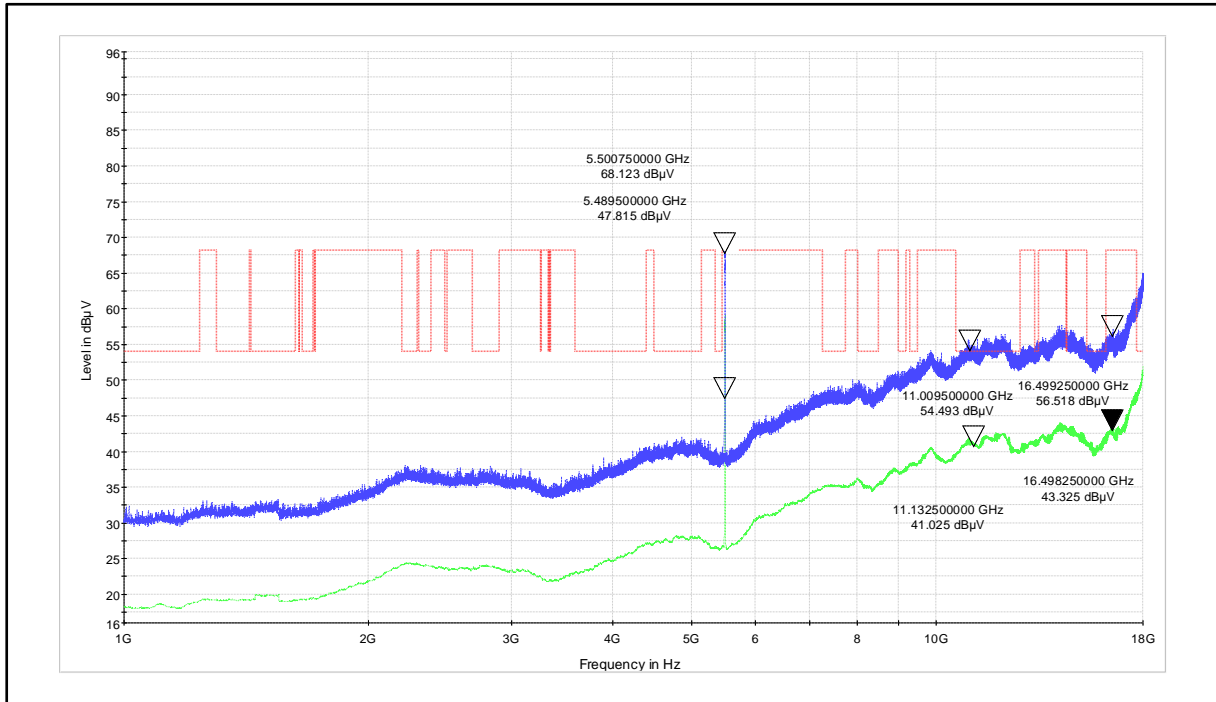
Frequency Range: 1 to 18GHz

Polarization: Vertical



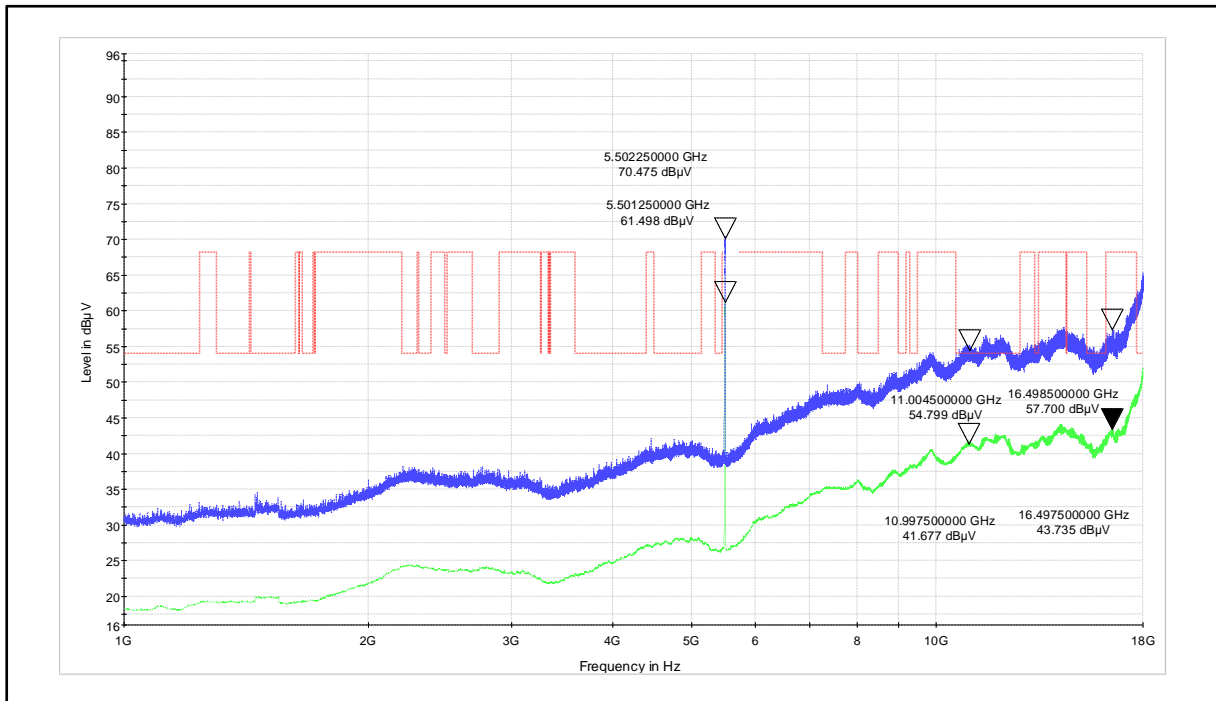
Frequency Range: 1 to 18 GHz

Polarization: Horizontal



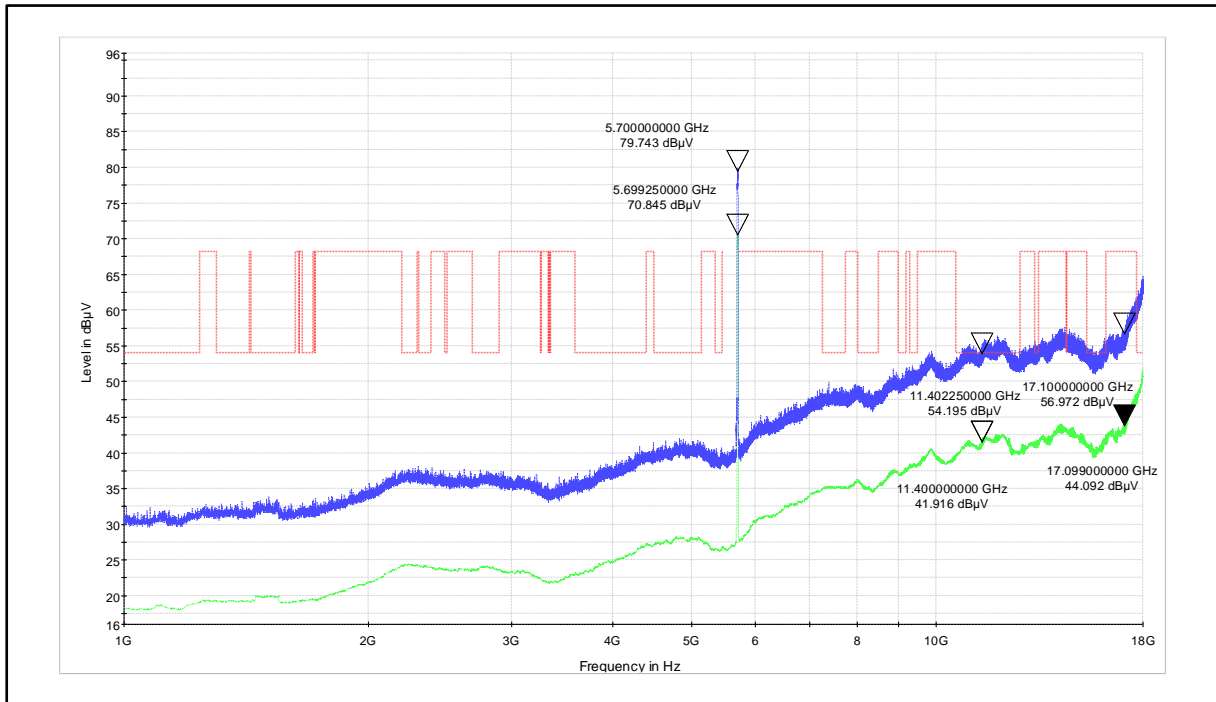
Frequency Range: 1 to 18GHz

Polarization: Vertical



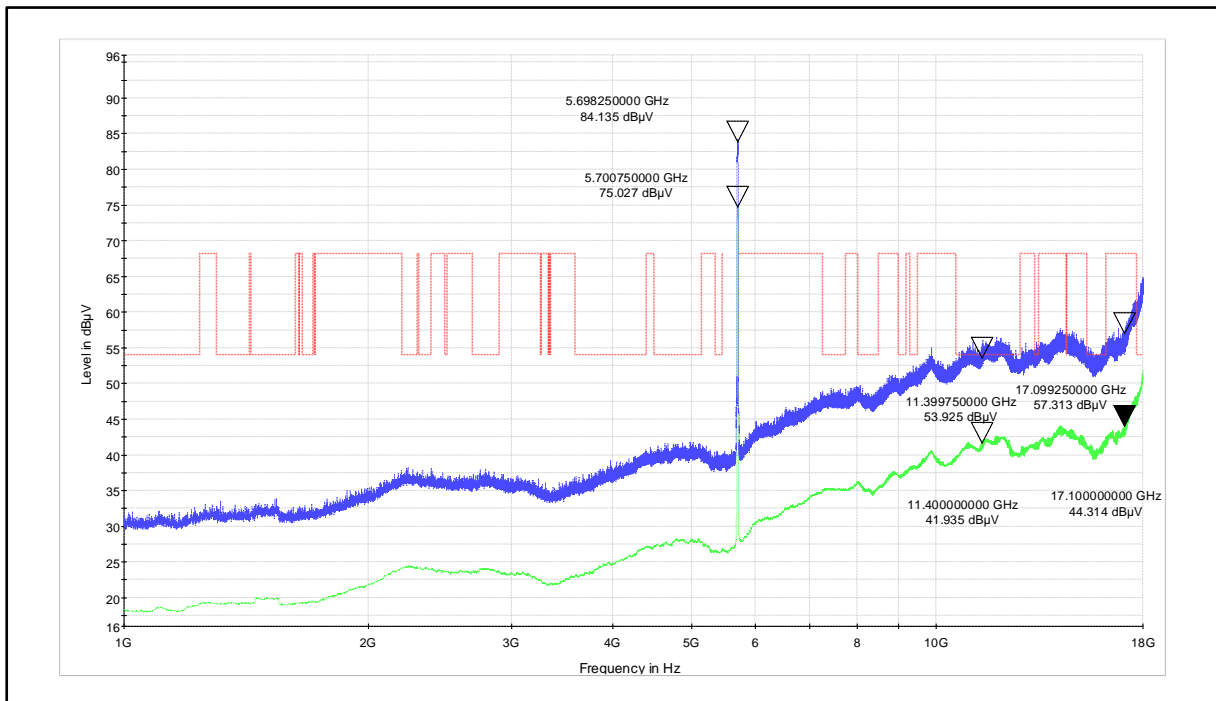
Frequency Range: 1 to 18GHz

Polarization: Horizontal



Frequency Range: 1 to 18GHz

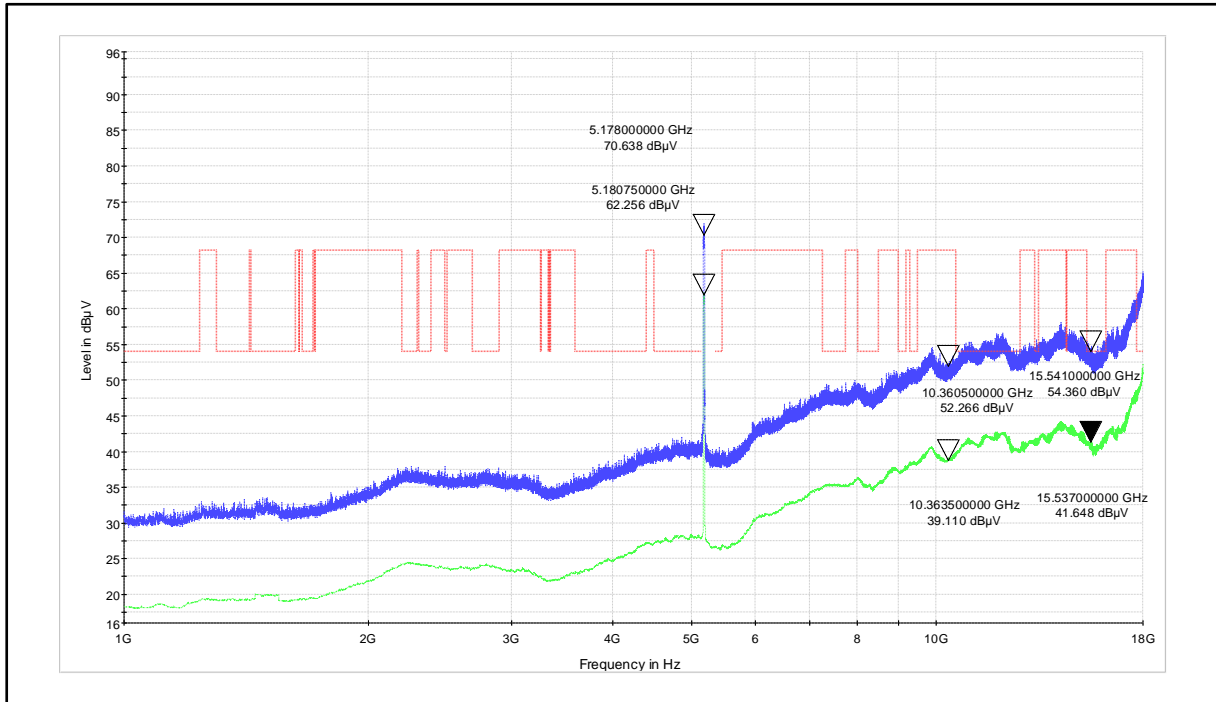
Polarization: Vertical



Frequency Range: 1 to 18GHz

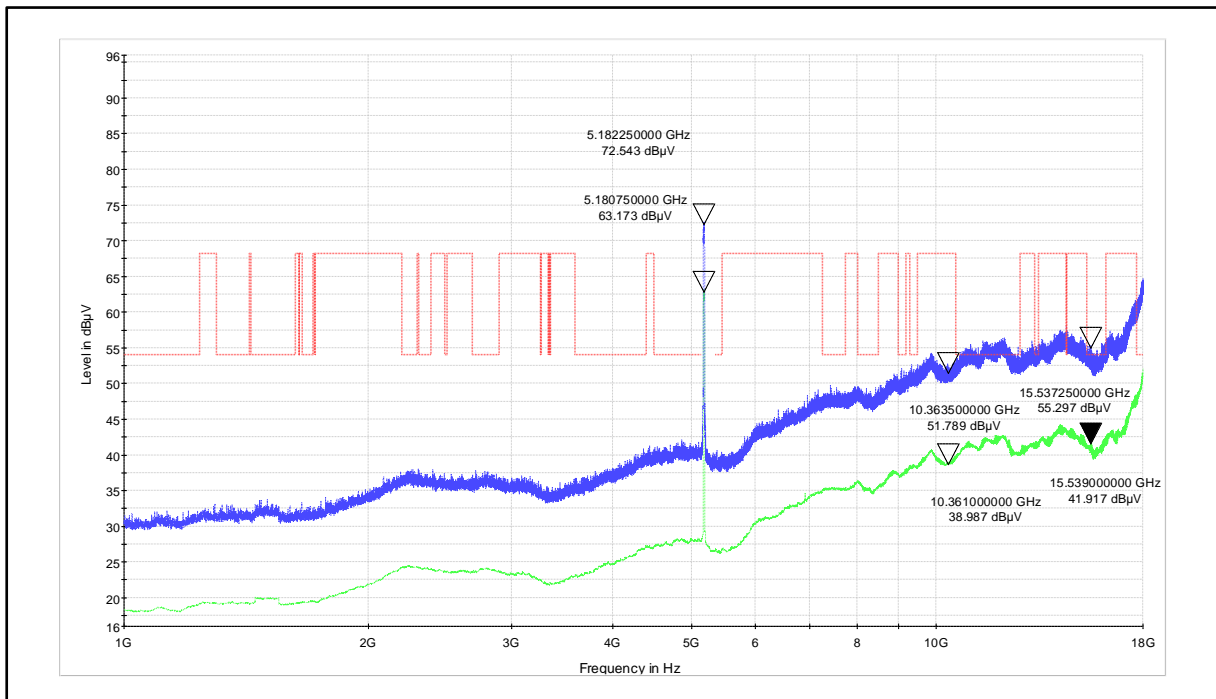
Polarization: Horizontal

Data rate: MCS0



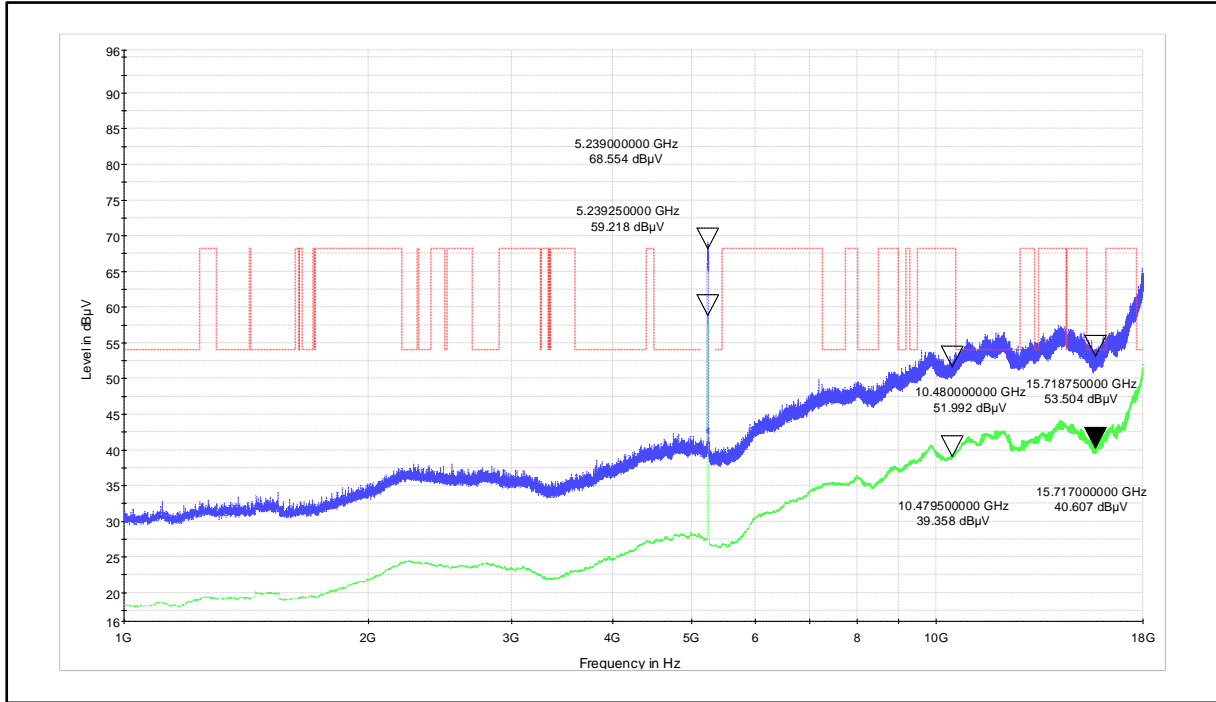
Frequency Range: 1 to 18GHz

Polarization: Vertical



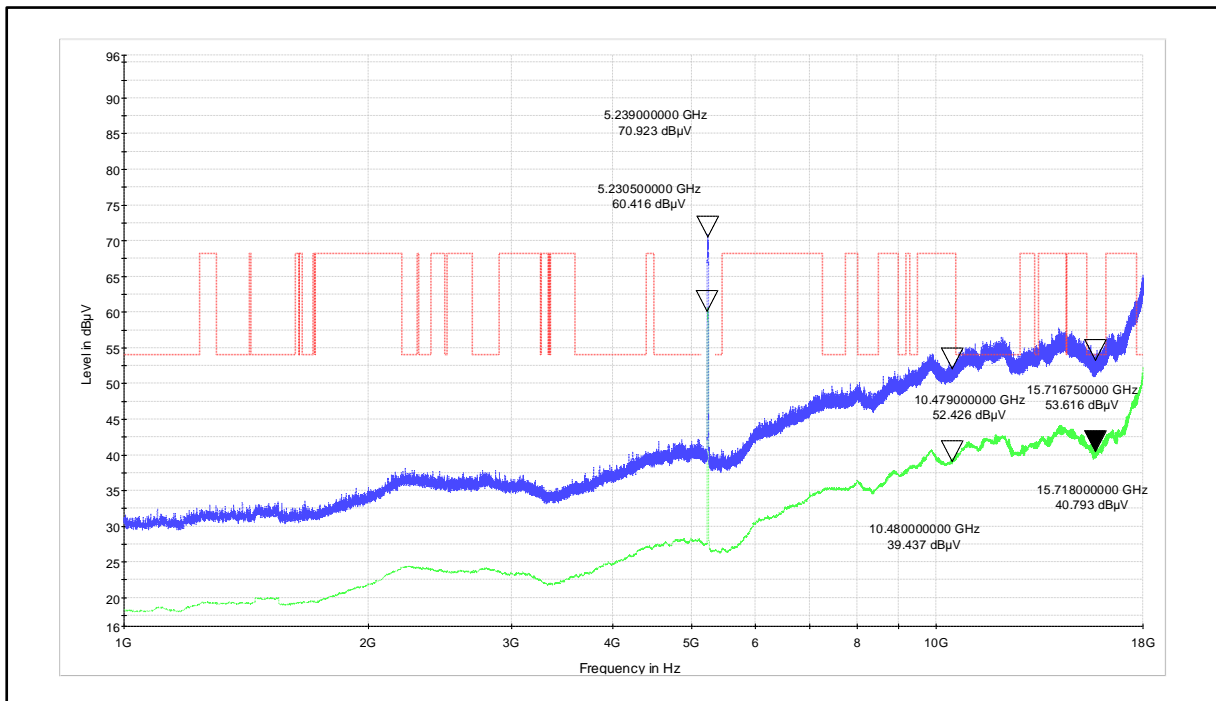
Frequency Range: 1 to 18GHz

Polarization: Horizontal



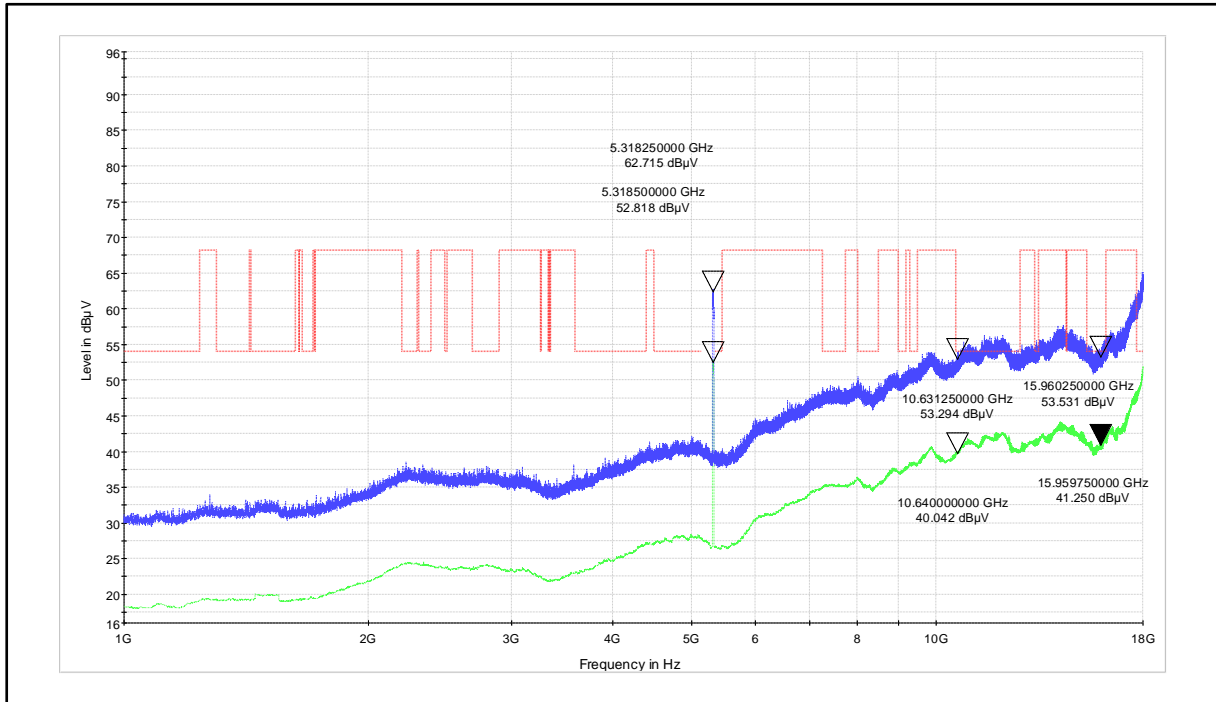
Frequency Range: 1-18GHz

Polarization: Vertical



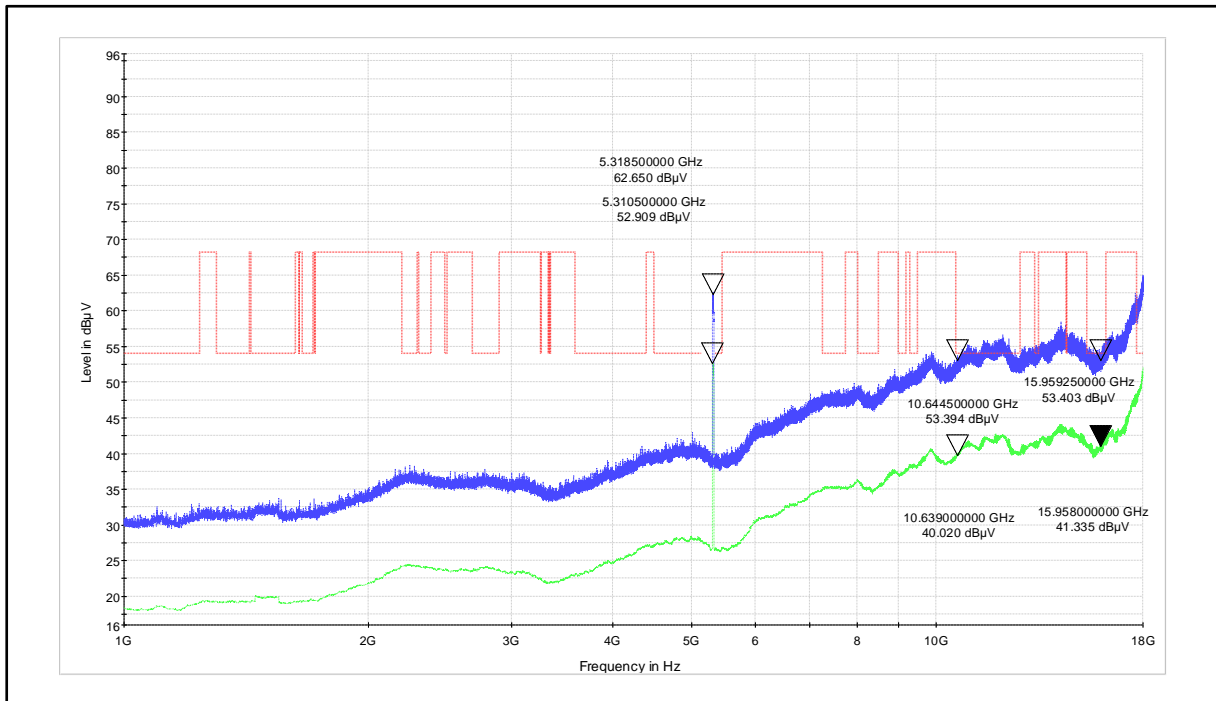
Frequency Range: 1 to 18GHz

Polarization: Horizontal



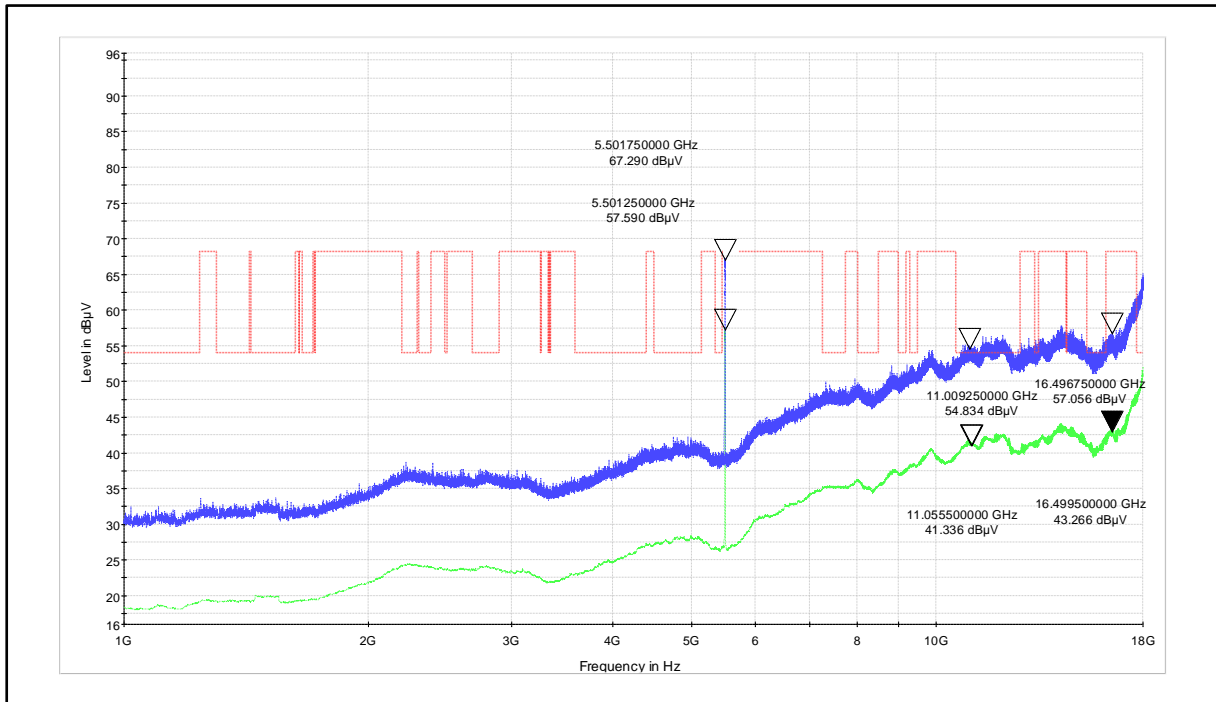
Frequency Range: 1 to 18GHz

Polarization: Vertical



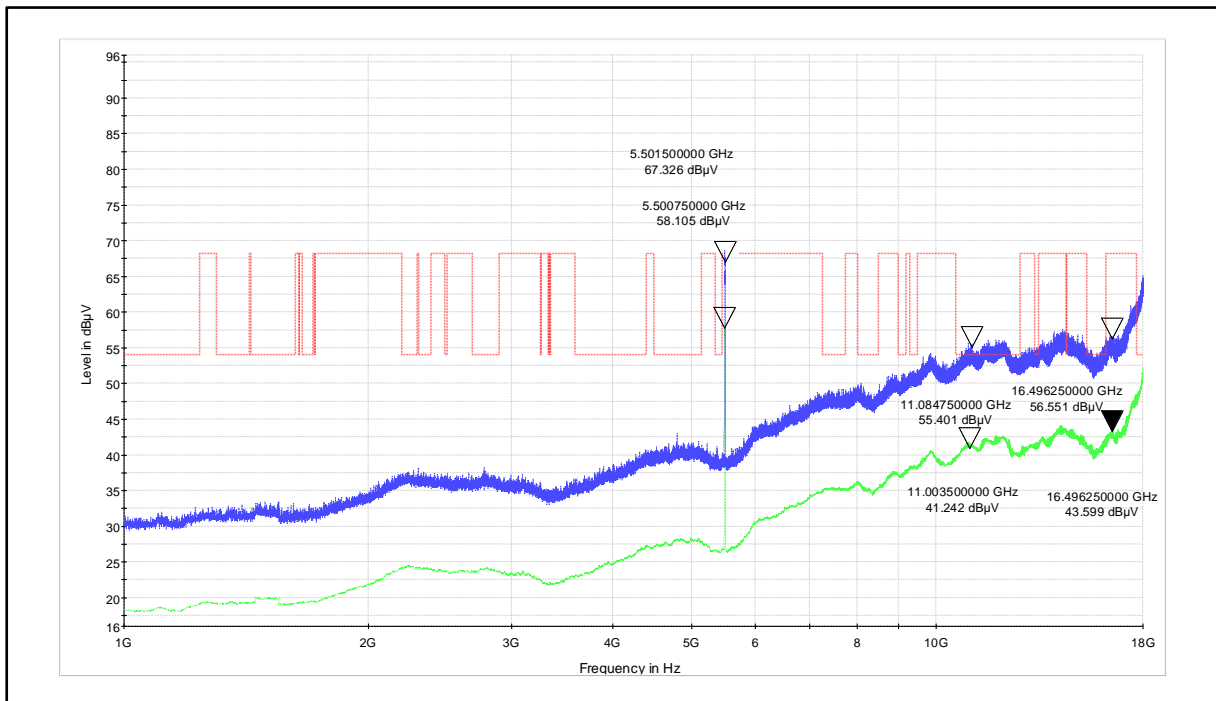
Frequency Range: 1 to 18GHz

Polarization: Horizontal



Frequency Range: 1 to 18GHz

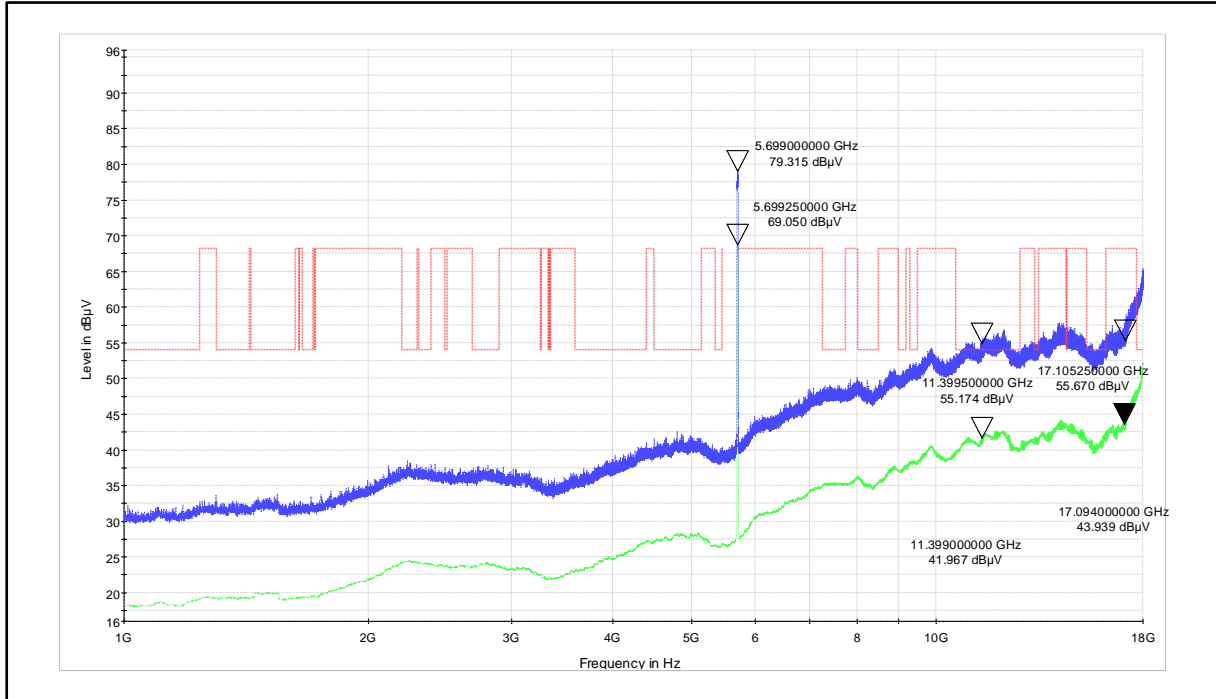
Polarization: Vertical



Frequency Range: 1 to 18GHz

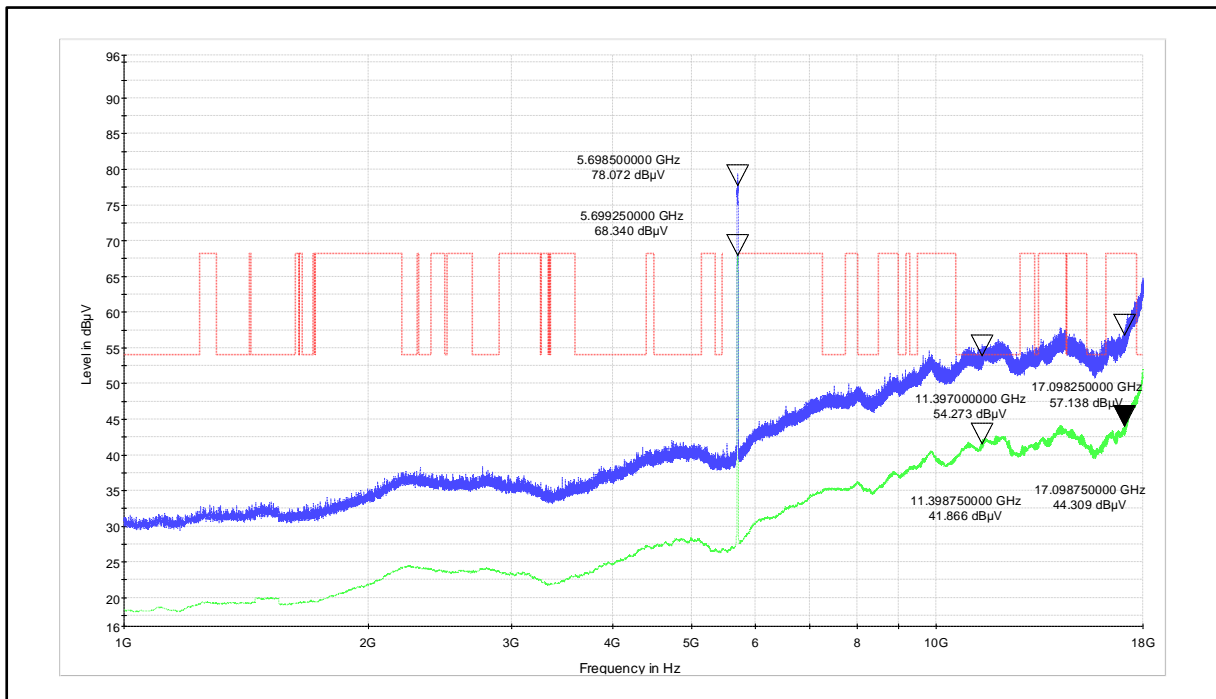
Polarization: Horizontal





Frequency Range: 1 to 18GHz

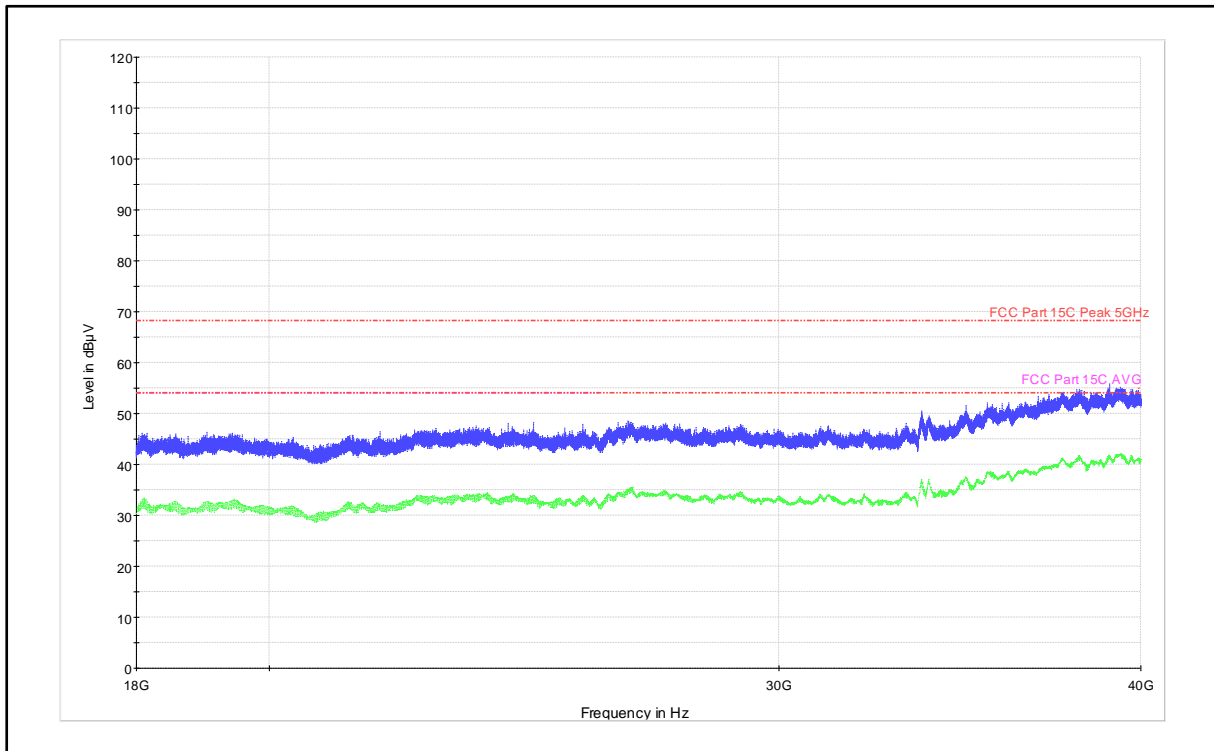
Polarization: Vertical



Frequency Range: 1 to 18GHz

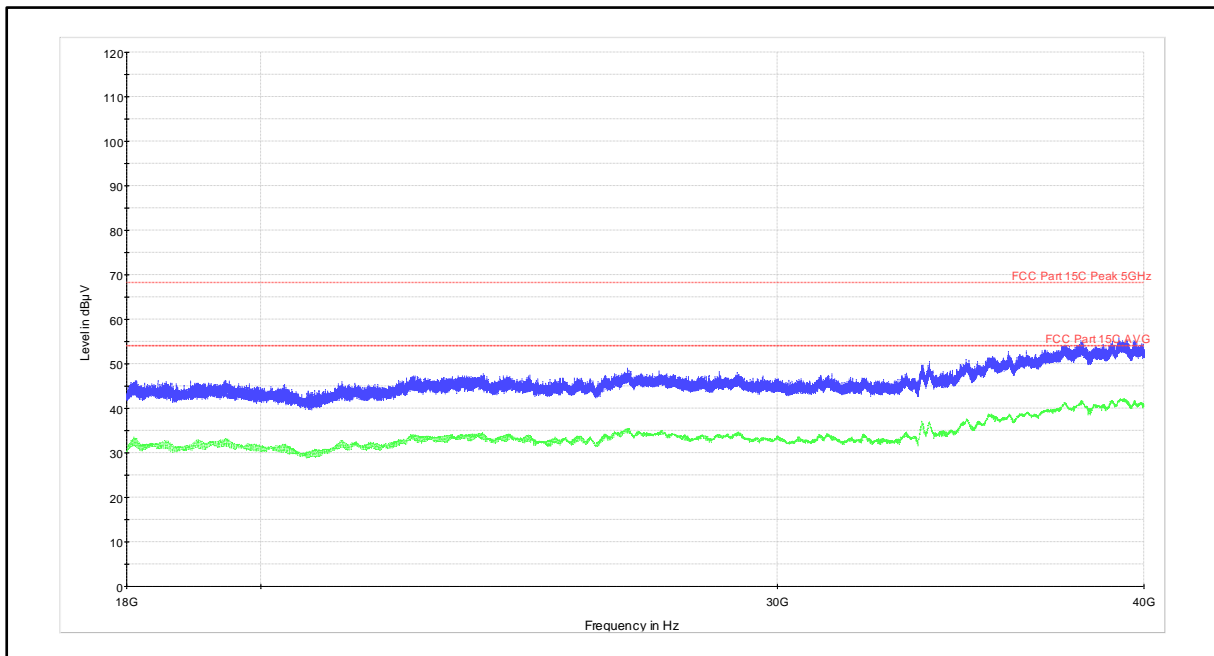
Polarization: Horizontal

Data rate: 6Mbps



Frequency Range:18 to 40GHz

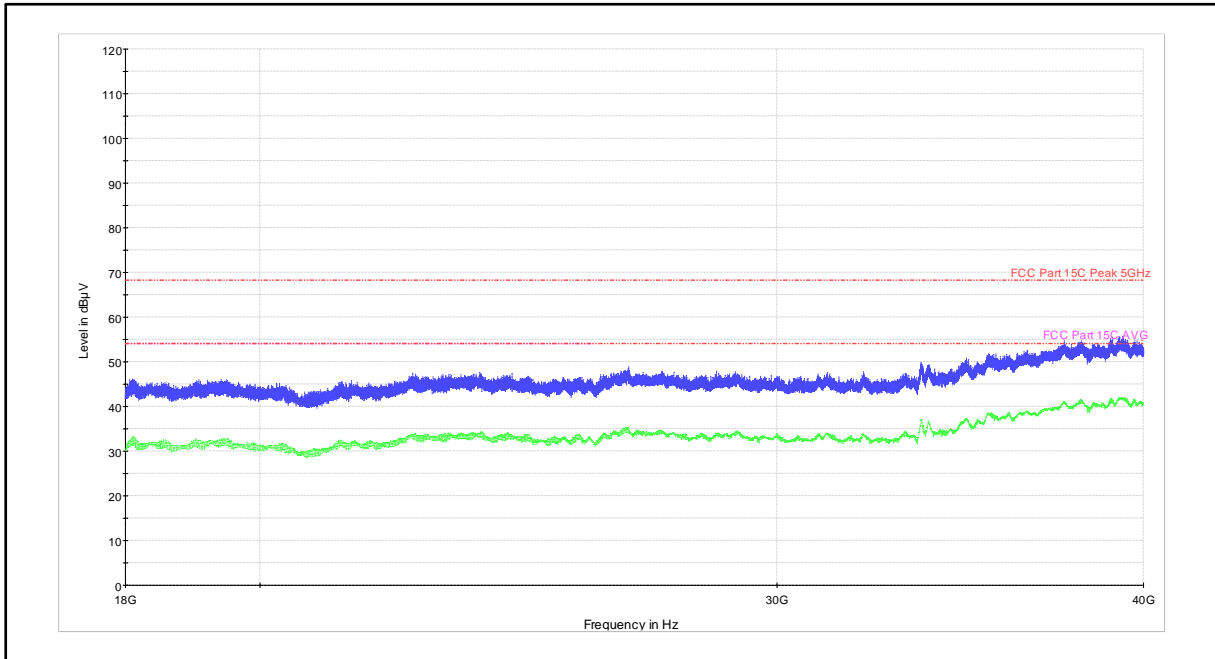
Polarization: Vertical



Frequency Range:18 to 40GHz

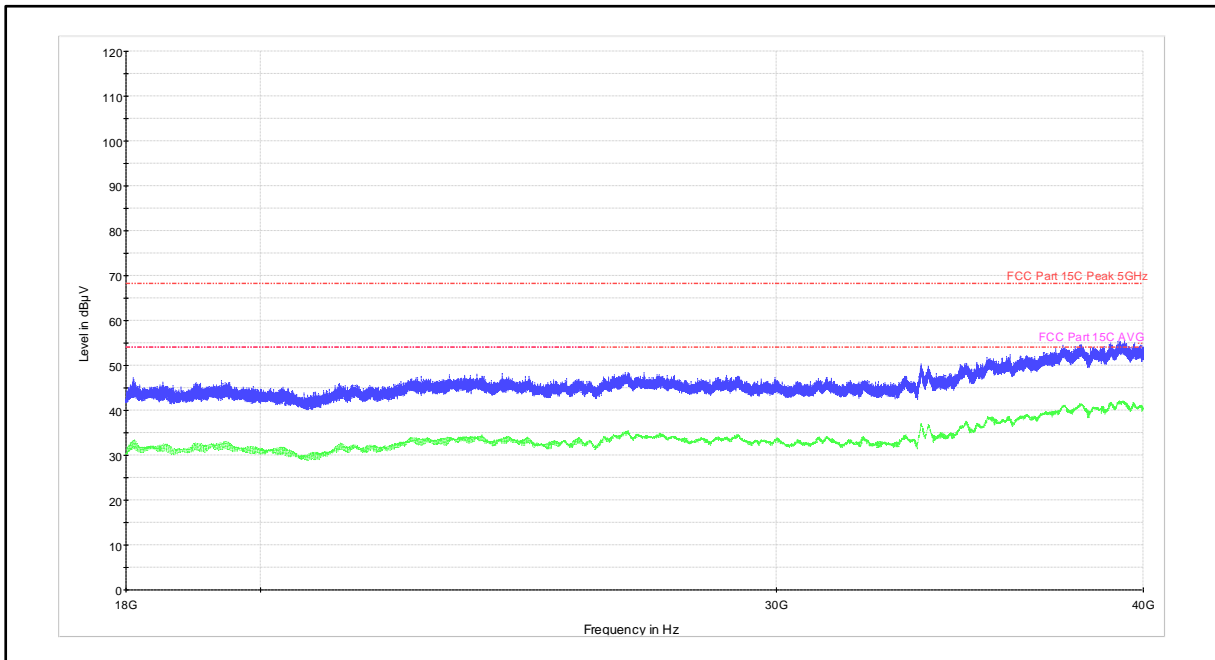
Polarization: Horizontal

Data rate: MCS0



Frequency Range:18 to 40GHz

Polarization: Vertical



Frequency Range:18 to 40GHz

Polarization: Horizontal

**Table 16: Power ratings**

Data rate (Mbps)	Frequency (MHz)	Set Power (dBm)
6Mbps	5180	15 for Ant. 1
		14 for Ant. 2
	5240	13 for Ant.1
		13 for Ant.2
	5260	11 for Ant. 1
		11 for Ant. 2
	5320	11 for Ant. 1
		12 for Ant. 2
	5500	11 for Ant. 1
		11 for Ant. 2
	5700	11 for Ant. 1
		11 for Ant. 2
24 Mbps	5180	14 for Ant.1
		14 for Ant.2
	5240	13 for Ant.1
		13 for Ant.2
	5260	11 for Ant. 1
		11 for Ant. 2
	5320	12 for Ant.1
		12 for Ant.2
	5500	11 for Ant.1
		11 for Ant.2
	5700	11 for Ant.1
		11 for Ant.2
54 Mbps	5180	14 for Ant.1
		14 for Ant.2
	5240	13 for Ant.1
		13 for Ant.2
	5260	11 for Ant. 1
		11 for Ant. 2
	5320	12 for Ant.1
		12 for Ant.2
	5500	11 for Ant.1
		11 for Ant.2
	5700	11 for Ant.1
		11 for Ant.2
MCS0	5180	16 for Ant. 1
		15 for Ant. 2
	5240	14 for Ant.1
		14 for Ant.2
	5700	12 for Ant. 1
		11 for Ant. 2
MSC4	5180	15 for Ant.1
		15 for Ant.2
	5240	14 for Ant.1
		14 for Ant.2
	5700	11 for Ant.1
		11 for Ant.2
MCS7	5180	15 for Ant.1
		15 for Ant.2
	5240	14 for Ant.1
		14 for Ant.2
	5700	11 for Ant.1
		11 for Ant.2

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\*\*\*END OF TEST REPORT\*\*\*