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**Middlefield, Ohio 44062**  
**United States of America**  
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## **CERTIFICATION TEST REPORT**

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**Manufacturer:** Knox Company  
1601 West Deer Valley Road  
Phoenix, Arizona 85027 USA

**Applicant:** Same as Above

**Product Name:** Radio Module

**Product Description:** Radio Module

**Operating Voltage/Freq.  
of EUT During Testing:** 120V/60 Hz

**Model(s):** CC3135MODRNMMOBR

**FCC ID:** 2AOVI-KNOXRT35

**Testing Commenced:** 2024-10-31

**Testing Ended:** 2024-11-07

**Summary of Test Results:** **In Compliance\***

The EUT complies with the EMC requirements when manufactured identically as the unit tested in this report, including any required modifications. Any changes to the design or build of this unit subsequent to this testing may deem it non-compliant.

*\*Test report reflects limited testing for PCII.*

**Rule(s):**

- **FCC Part 15 Subpart E – Unlicensed National Information Infrastructure Devices, Section 15.407 General technical requirements**



Order No(s): F2P33423, F2P33423-C1

Applicant: Knox Company  
Model(s): CC3135MODRNMMOBR

**Evaluation Conducted by:**

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**Report Reviewed by:**

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## **1 ADMINISTRATIVE INFORMATION**

### **1.1 Measurement Location:**

F2 Labs in Middlefield, Ohio. Site description and attenuation data are on file with the FCC's Sampling and Measurement Branch at the FCC Laboratory in Columbia, MD.

### **1.2 Measurement Procedure:**

All measurements were performed according to ANSI C63.10:2013 and recommended FCC procedure of measurement of devices operating under Section 15.407 and in KDB789033 v02r01. A list of the measurement equipment can be found in Section 6.



### 1.3 Uncertainty Budget:

The uncertainty in EMC measurements arises from several factors which affect the results, some associated with environmental conditions in the measurement room, the test equipment being used, and the measurement techniques adopted.

The measurement uncertainty budgets detailed below are calculated from the test and calibration data and are expressed with a 95% confidence factor using a coverage factor of  $k=2$ . The Uncertainty for a laboratory are referred to as  $U_{lab}$ . For Radiated and Conducted Emissions, the Expanded Uncertainty is compared to the  $U_{cispr}$  values to determine if a specific margin is required to deem compliance.

#### $U_{lab}$

Measurement Range	Combined Uncertainty	Expanded Uncertainty
Radiated Emissions <1 GHz @ 3m	2.54	5.07dB
Radiated Emissions <1 GHz @ 10m	2.55	5.09dB
Radiated Emissions 1 GHz to 2.7 GHz	1.81	3.62dB
Radiated Emissions 2.7 GHz to 18 GHz	1.55	3.10dB
AC Power Line Conducted Emissions, 150kHz to 30 MHz	1.38	2.76dB
AC Power Line Conducted Emissions, 9kHz to 150kHz	1.66	3.32dB

#### $U_{cispr}$

Measurement Range	Expanded Uncertainty
Radiated Emissions <1 GHz @ 3m	5.2dB
Radiated Emissions <1 GHz @ 10m	5.2dB
Radiated Emissions 1 GHz to 2.7 GHz	Under Consideration
Radiated Emissions 2.7 GHz to 18 GHz	Under Consideration
AC Power Line Conducted Emissions, 150kHz to 30 MHz	3.6dB
AC Power Line Conducted Emissions, 9kHz to 150kHz	4.0dB

If  $U_{lab}$  is less than or equal to  $U_{cispr}$ , then:

- compliance is deemed to occur if no measured disturbance exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance exceeds the disturbance limit.

If  $U_{lab}$  is greater than  $U_{cispr}$  in table 1, then:

- compliance is deemed to occur if no measured disturbance, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit.

Note: Only measurements listed in the tables above that relate to tests included in this Test Report are applicable.



Order No(s): F2P33423, F2P33423-C1

Applicant: Knox Company  
Model(s): CC3135MODRNMMOBR

#### 1.4 Document History

Document Number	Description	Issue Date	Approved By
F2P33423-03E	First Issue	2024-12-12	K. Littell



## 2 SUMMARY OF TEST RESULTS/MODIFICATIONS

Test Name	Standard(s)	Results
Radiated Spurious Emissions	CFR 47 Part 15.205 / KDB789033	Complies

Modifications Made to the Equipment
None



### **3 ENGINEERING STATEMENT**

This report has been prepared on behalf of Knox Company to provide documentation for the testing described herein. This equipment has been tested and found to comply with Part 15.407 of the FCC Rules using ANSI C63.10 and KDB789033 standards. The test results found in this test report relate only to the items tested.





## 4 EUT INFORMATION AND DATA

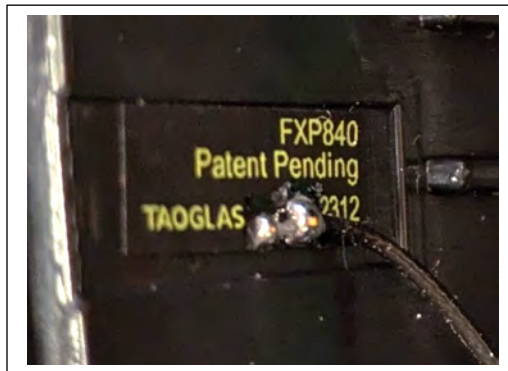
### 4.1 Equipment Under Test:

Product: Radio Module

Model(s): CC3135MODRNMMOBR

Serial No.: 32565

FCC ID: 2AOVI-KNOXRT35



### 4.2 Trade Name:

Knox Company

### 4.3 Power Supply:

120V/60 Hz

### 4.4 Applicable Rules:

CFR 47, Part 15.407, subpart E

### 4.5 Antenna:

Integral Antenna – 3.37dBi Gain

### 4.6 Accessories:

Device	Manufacturer	Model Number	Serial Number
Power Supply	Tensility	TSA1201A-1201000US	None Specified

### 4.7 Testing Algorithm:

EUT was set up to transmit continuously. The module was tested while connected to a Host due to the Host supplying power and communication for the module. The Host was not functioning.

**5 LIST OF MEASUREMENT INSTRUMENTATION**

Equipment Type	Asset Number	Manufacturer	Model	Serial Number	Calibration Due Date
Shielded Chamber	CL166-E	Albatross Projects	B83117-DF435-T261	US140023	2025-03-31
Receiver	CL151	Rohde & Schwarz	ESU40	100319	2025-04-09
Low Loss Cable Set	CL315 / CL318	Fairview Microwave	FMC0202914-72/FMC0202914-	None Spec.	2025-04-09
Pre-Amplifier	CL250	Com-Power	PAM-118A	18040011	2025-04-11
Antenna, JB3 Combination	CL175	Sunol Sciences	JB3	A030315	2025-09-18
Horn Antenna	CL098	Emco	3115	9809-5580	2025-01-02
Horn Antenna 18-26.5 GHz	CL114	A.H. Systems, Inc.	SAS-572	237	2026-01-09
Pre-Amplifier	CL153	Keysight Tech.	83006A	MY39500791	2025-12-04
Horn Antenna 26.5-40 GHz	CL188	Com-Power	AH-640	091065	Verified
Pre-Amplifier	CL189	Com-Power	PAM-840A	461303	2026-04-10
Software:	Tile Version 3.4.B.3		Software Verified: 2024-10-31 to 2024-11-07		
Software:	EMC 32, Version 8.53.0		Software Verified: 2024-10-31 to 2024-11-07		
Temp/Hum Rec	CL232	Extech	445814	01	2025-05-19



## 6 RADIATED SPURIOUS EMISSION

The EUT antenna port was fitted with its Integral Antenna, 3.37dBi Gain. Radiated emissions were measured in a Semi-Anechoic Chamber. All emissions generated that fall in the restricted bands per FCC Part 15.205 were examined.

### 6.1 Requirements:

All emissions that fall in the restricted bands defined in FCC Part 15.205 shall not exceed the maximum field strength listed in FCC Part 15.209(a).

All other undesirable emission that do not fall under the provisions of Part 15.205, shall meet the following limits:

- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.*
- (2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.*
- (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.*
- (4) For transmitters operating in the 5.725-5.85 GHz band: 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.*



## 6.2 Radiated Spurious Emission Test Data

<b>Test Date(s):</b>	2024-10-31 to 2024-11-07	<b>Test Engineer(s):</b>	E. Tobin, J. Chiller
<b>Standards:</b>	CFR 47 Part 15.407; Part 15.209 / KDB789033	<b>Air Temperature:</b>	21.1°C
		<b>Relative Humidity:</b>	52%

Notes: Plots are peak, max hold prescan data included only to determine what frequencies to investigate and measure. The EUT was initially placed in a semi-anechoic chamber, and rotated in all three orthogonal positions to maximize the emissions. The orthogonal position that showed the highest emissions was used. Characterization measurements were then performed to determine at which frequencies significant emissions occurred. These graphs are shown below.

The equipment was fully exercised with all cabling attached to the EUT and was positioned in a semi-anechoic chamber for maximum emissions. All antennas were mounted, and all transmitters were on and transmitting at the same time to set worst-case Radiated Emissions and Beamforming due to MIMO configuration. While the equipment was energized, the receiving antenna was scanned from 1.0 meter to 4.0 meters in both vertical and horizontal polarities while the turntable was adjusted 360 degrees to determine the maximum field strength. The tables of measured results can be found below.

In the following plots, emissions to be found by the EUT were measured and listed in tables. The black lines are active scans while the green lines are the max peak scan of the unit during rotations. The plots are for reference only and the limit lines are not actual limit lines but merely a guide.

Limits are indicated as follows:

Solid Red = 15.407 Avg

Green = Restricted Band Avg

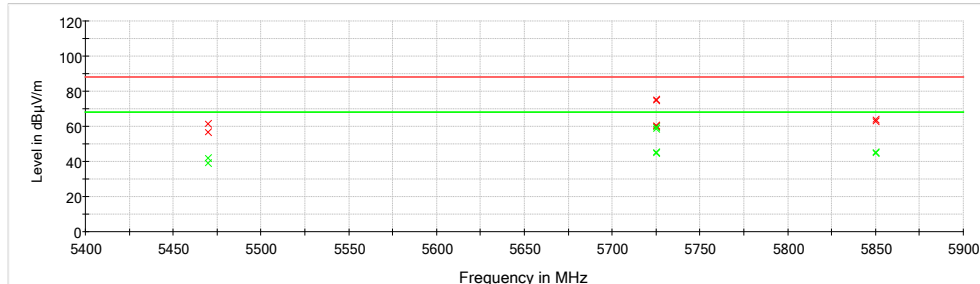
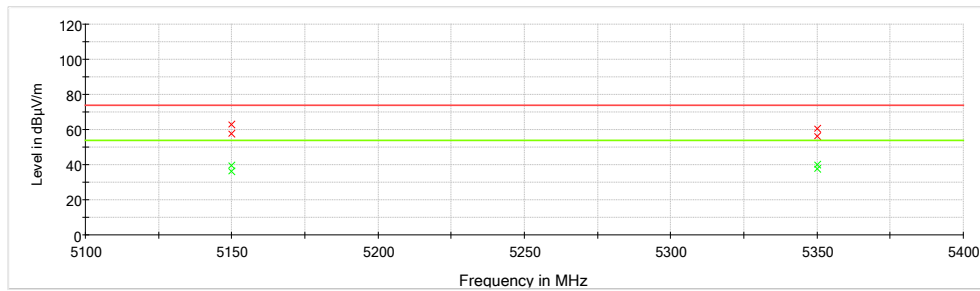
Blue = Restricted Band Peak

*In the UNII-1 (5.15-5.25 GHz) band, UNII-2A (5.25-5.35 GHz) band, and lower end of the UNII-2C (5.47-5.725 GHz) band, there are restricted bands that apply from 4.5-5.15 GHz, and from 5.35-5.46 GHz. In these restricted bands, the limits are 54 dBuV/m Avg and 74 dBuV/m Peak.*



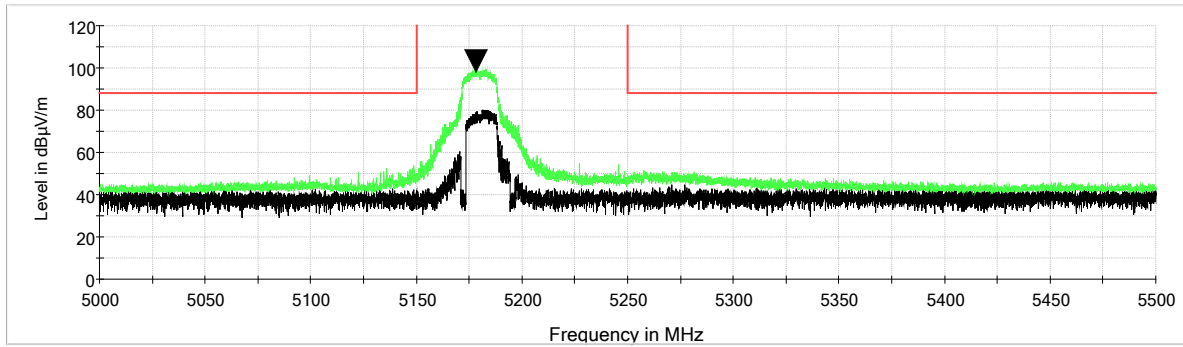
## Band Edge Measurements

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBμV/m)	Comment
5150.000000	62.8	39.4	1000.000	150.0	V	353.0	-4.4	14.6	54.0	
5150.000000	57.6	36.1	1000.000	150.0	H	4.0	-4.4	17.9	54.0	
5350.000000	56.4	37.6	1000.000	150.0	H	341.0	-3.9	16.4	54.0	
5350.000000	60.2	40.0	1000.000	150.0	V	4.0	-3.9	14.0	54.0	
5470.000000	56.6	39.2	1000.000	150.0	H	340.0	-3.6	29.03	68.23	
5470.000000	61.3	42.1	1000.000	150.0	V	39.0	-3.6	26.13	68.23	
5725.000000	60.1	44.8	1000.000	150.0	H	0.0	-3.6	23.43	68.23	Unii-2 Upper
5725.000000	60.5	45.2	1000.000	150.0	V	25.0	-3.6	23.03	68.23	Unii-2 Upper
5725.000000	74.5	58.7	1000.000	150.0	H	355.0	-3.6	9.53	68.23	Unii-3 Lower
5725.000000	75.2	59.3	1000.000	150.0	V	15.0	-3.6	8.93	68.23	Unii-3 Lower
5850.000000	62.9	44.9	1000.000	150.0	H	344.0	-3.6	23.33	68.23	
5850.000000	63.6	45.4	1000.000	150.0	V	39.0	-3.6	22.83	68.23	

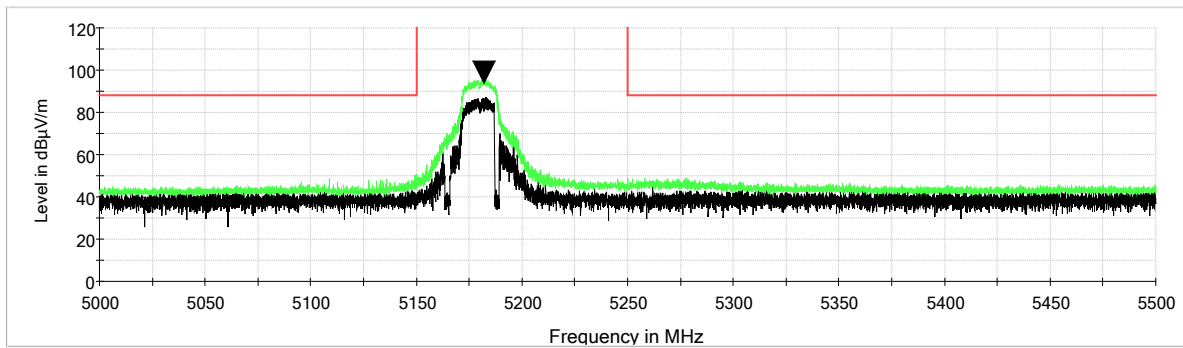




### Radiated Band Edge: 5180, Channel 36 - Vertical

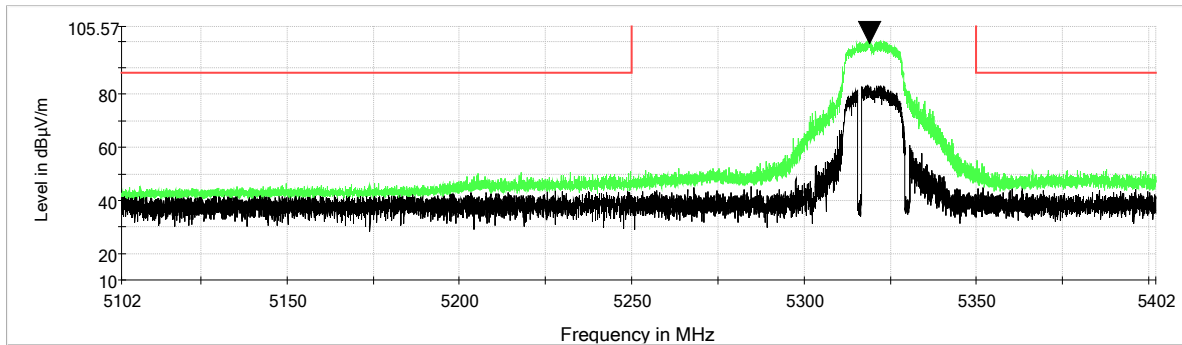


### Radiated Band Edge: 5180, Channel 36 - Horizontal

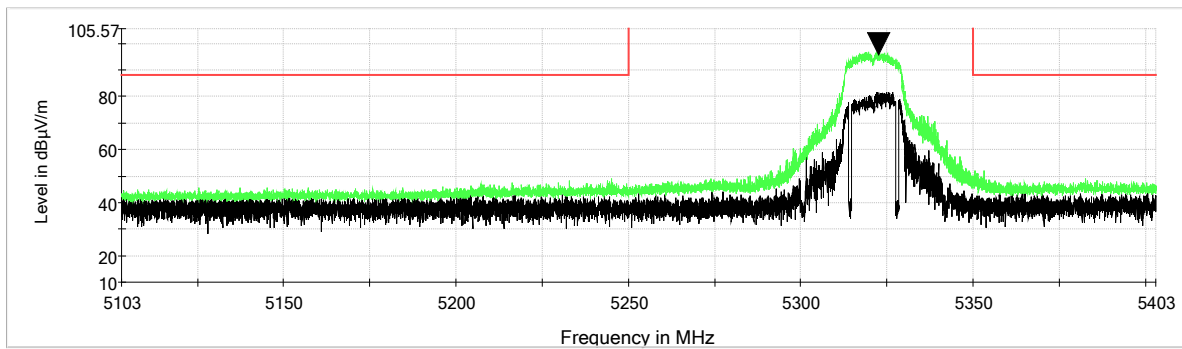




### Radiated Band Edge: 5320, Channel 64 - Vertical

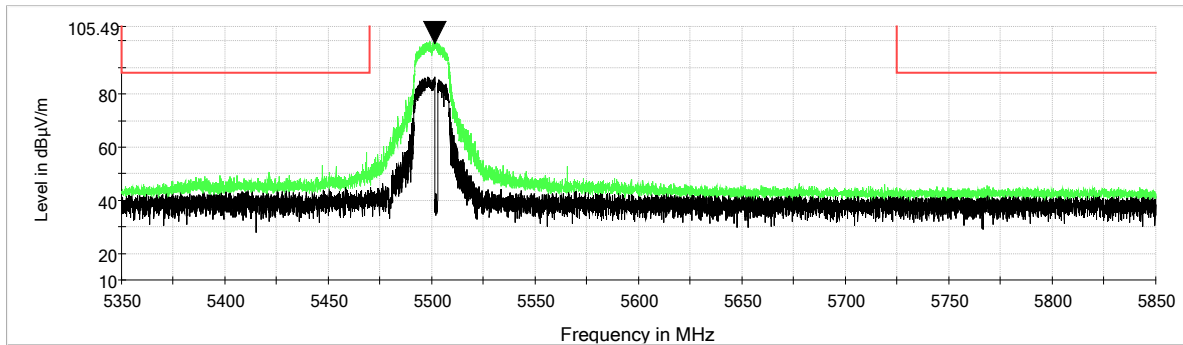


### Radiated Band Edge: 5320, Channel 64 - Horizontal

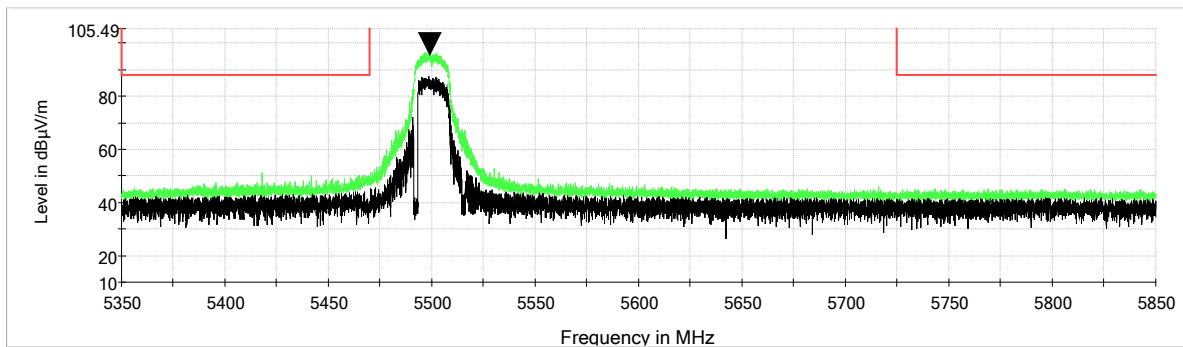




### Radiated Band Edge: 5500, Channel 100 - Vertical



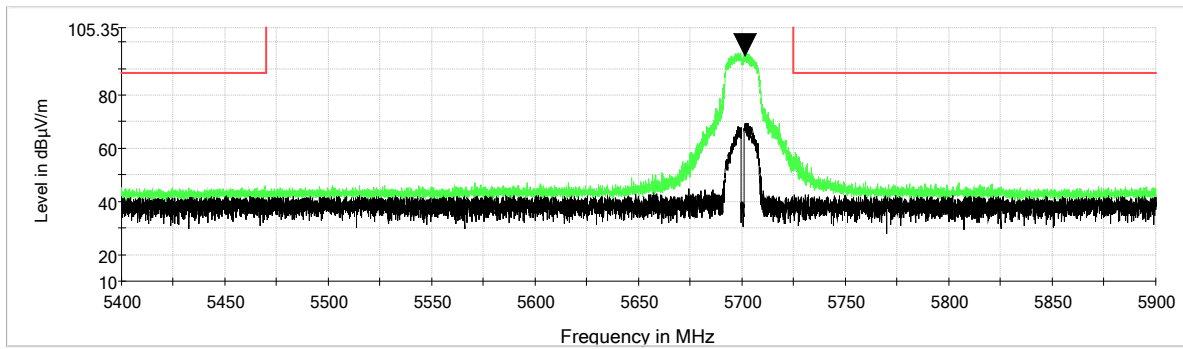
### Radiated Band Edge: 5500, Channel 100 - Horizontal



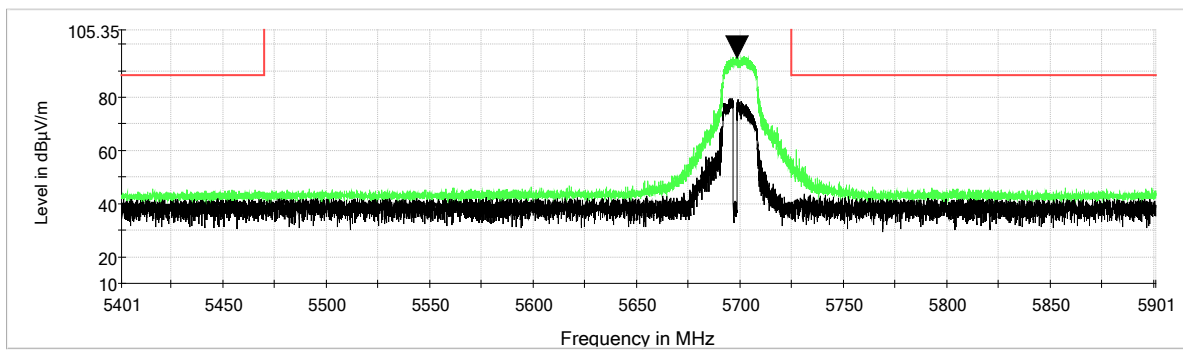




### Radiated Band Edge: 5700, Channel 140 - Vertical

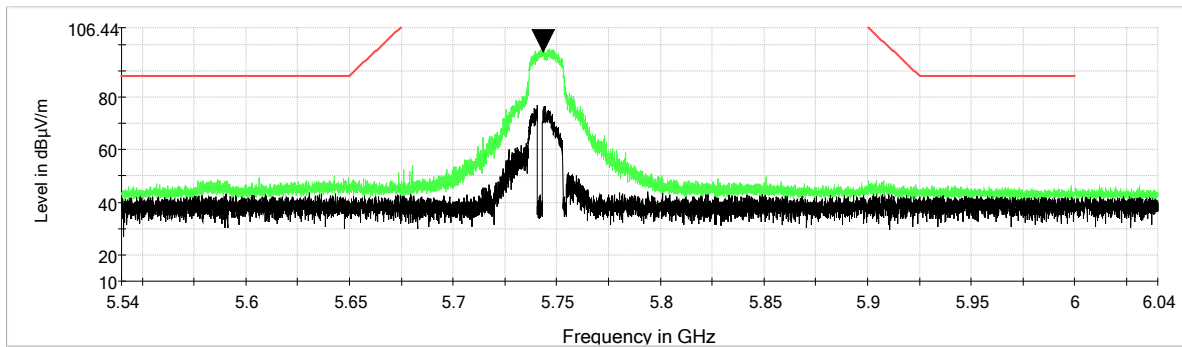


### Radiated Band Edge: 5700, Channel 140 - Horizontal

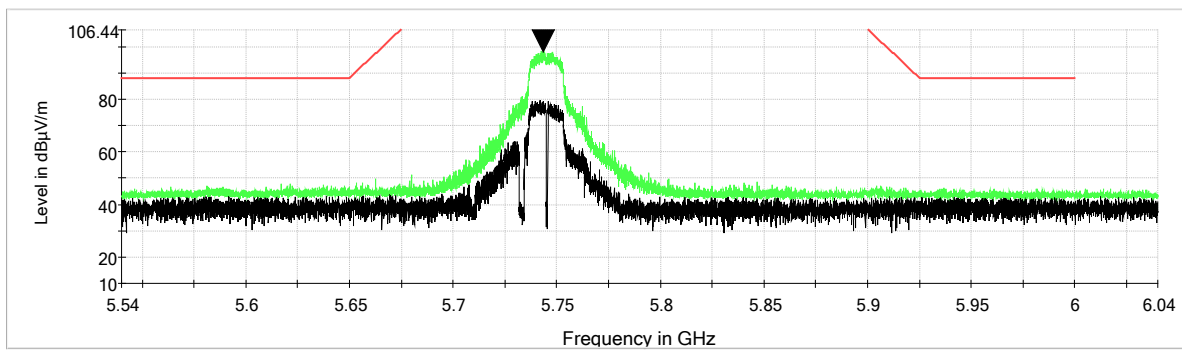




### Radiated Band Edge: 5745, Channel 149 - Vertical

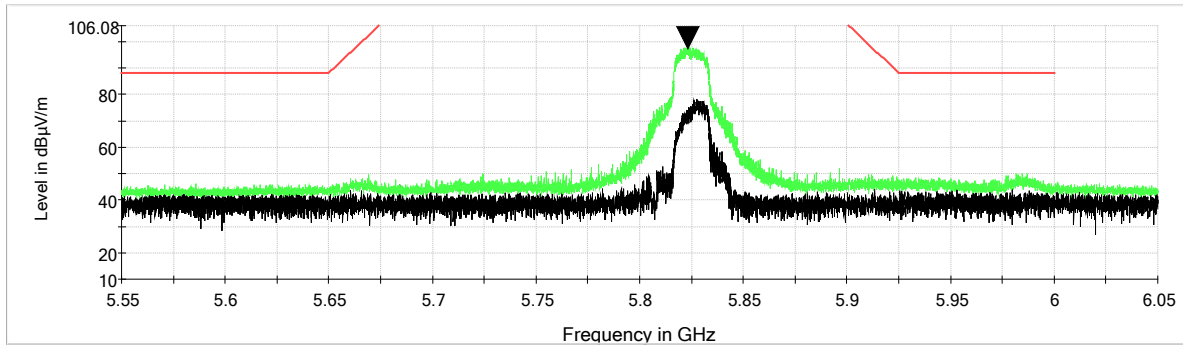


### Radiated Band Edge: 5745, Channel 149 - Horizontal

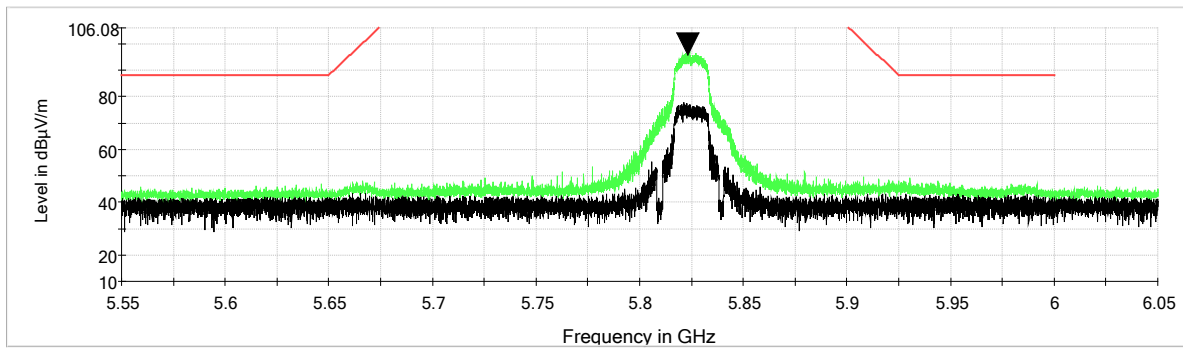




### Radiated Band Edge: 5825, Channel 165 - Vertical



### Radiated Band Edge: 5825, Channel 165 - Horizontal

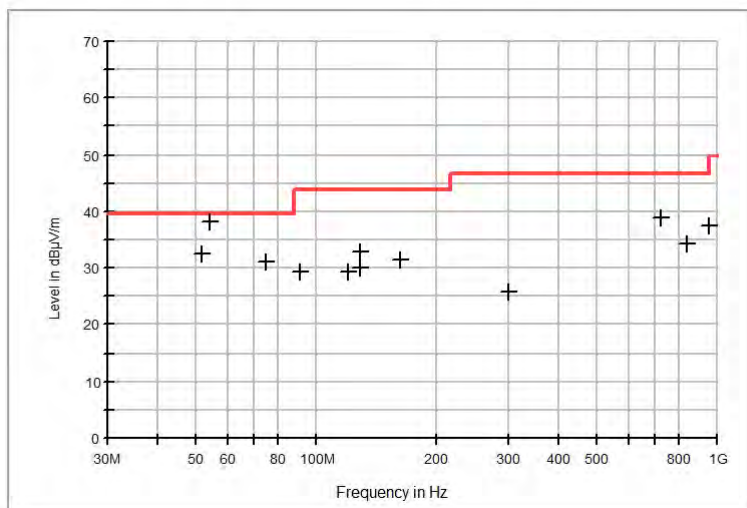




Scans were performed one at a time on each channel at each modulation and in each UNII band. Each channel at every modulation in all bands were scanned for Beamforming and again in Non-Beamforming. The following plots are worse case scans from all channels, all modulations, in all bands. The measurements in the tables are from all channels and modulations.

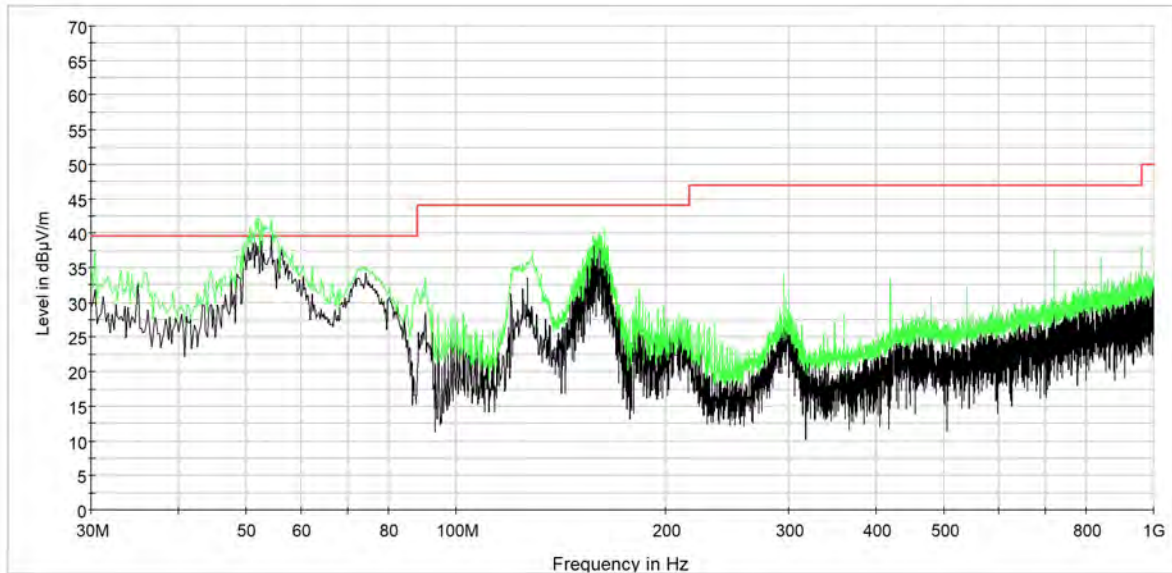
**5320, 6 MHz, Radiated Spurious Emissions: Measurements, 30 MHz to 1000 MHz**

Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
51.730000	32.5	120.000	100.0	V	36.0	-32.4	27.1	39.6
54.250000	38.2	120.000	100.0	V	0.0	-32.6	21.5	39.6
74.230000	31.1	120.000	100.0	V	220.0	-31.6	28.5	39.6
90.330000	29.2	120.000	100.0	V	196.0	-32.2	34.8	44.0
120.020000	29.2	120.000	252.0	H	186.0	-25.7	34.8	44.0
128.550000	30.1	120.000	132.0	H	169.0	-25.5	33.9	44.0
128.550000	33.0	120.000	100.0	V	348.0	-25.5	31.0	44.0
160.760000	31.4	120.000	110.0	V	21.0	-26.9	32.6	44.0
300.050000	25.7	120.000	100.0	H	0.0	-25.1	41.2	46.9
720.060000	39.0	120.000	105.0	H	336.0	-17.2	27.9	46.9
840.140000	34.4	120.000	100.0	H	265.0	-14.9	32.5	46.9
960.040000	37.4	120.000	110.0	H	0.0	-12.2	32.6	50.0

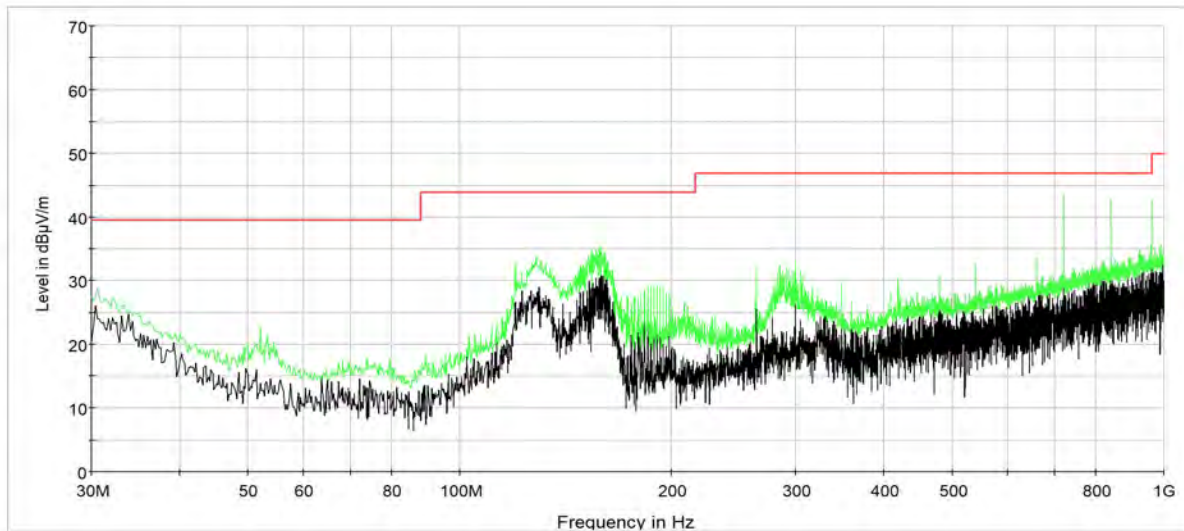




**5320, 6 MHz, Radiated Spurious Emissions: 30 MHz to 1000 MHz, Vertical**



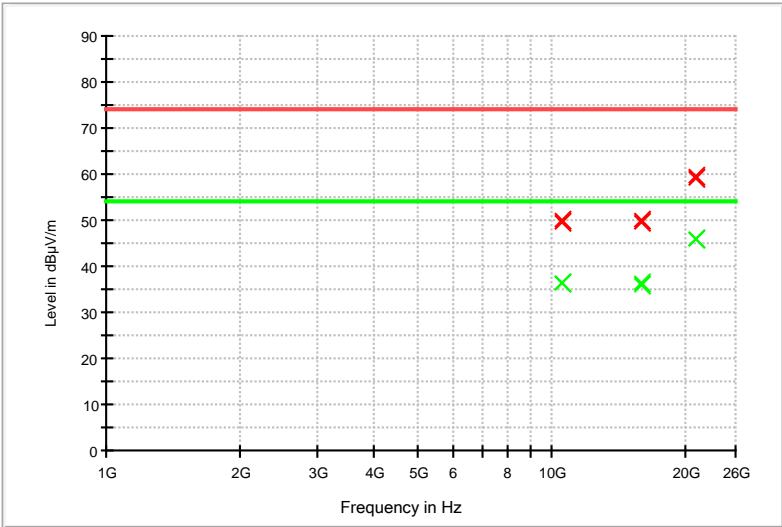
**5320, 6 MHz, Radiated Spurious Emissions: 30 MHz to 1000 MHz, Horizontal**





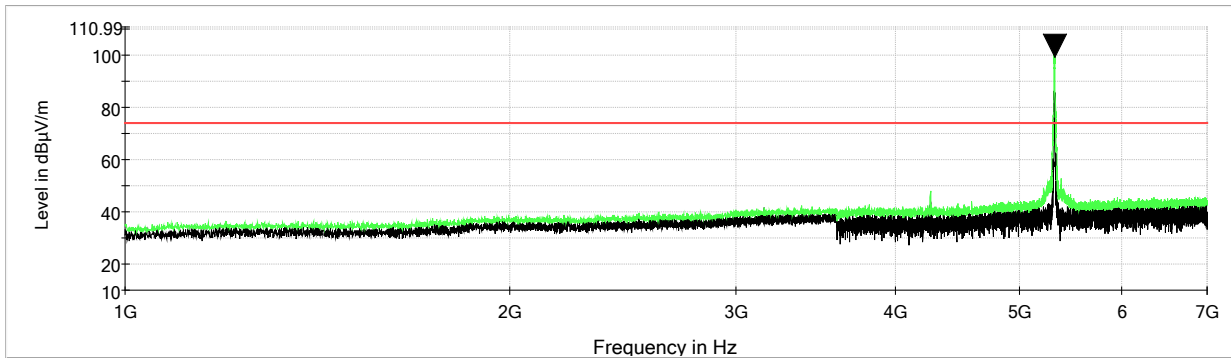
5320, 6 MHz, Radiated Spurious Emissions: Measurements, Above 1GHz

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBμV/m)	Comment
10640.000000	49.6	36.2	1000.000	150.0	V	295.0	1.9	17.8	54.0	
10640.000000	49.9	36.4	1000.000	150.0	H	15.0	1.9	17.6	54.0	
15960.000000	49.8	36.1	1000.000	150.0	V	0.0	1.7	17.9	54.0	
15960.000000	50.1	36.4	1000.000	150.0	H	307.0	1.7	17.6	54.0	
21280.000000	59.3	45.7	1000.000	150.0	V	336.0	17.2	8.3	54.0	
21280.000000	59.5	45.7	1000.000	150.0	H	19.0	17.2	8.3	54.0	

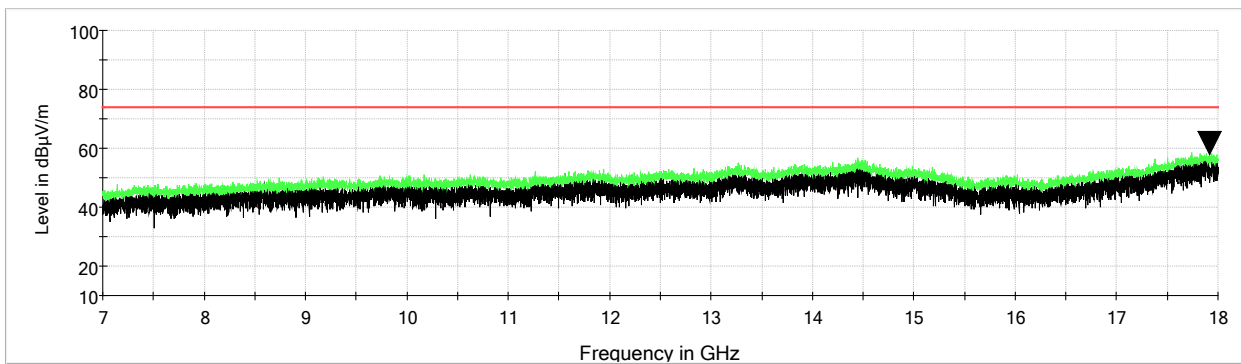




### 5320, 6 MHz, Radiated Spurious Emissions: 1 GHz to 7 GHz, Vertical

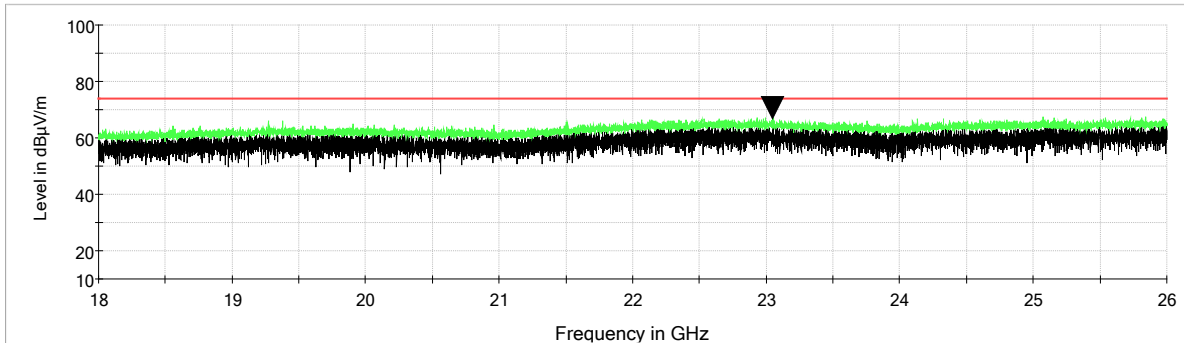


### 5320, 6 MHz, Radiated Spurious Emissions: 7 GHz to 18 GHz, Vertical

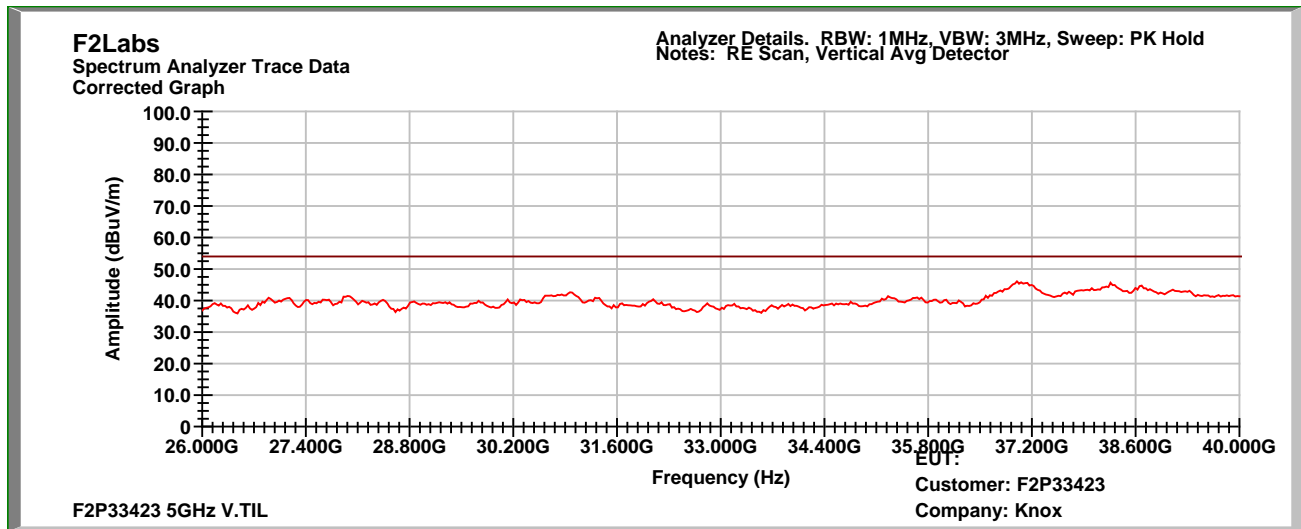




### 5320, 6 MHz, Radiated Spurious Emissions: 18 GHz to 26 GHz, Vertical



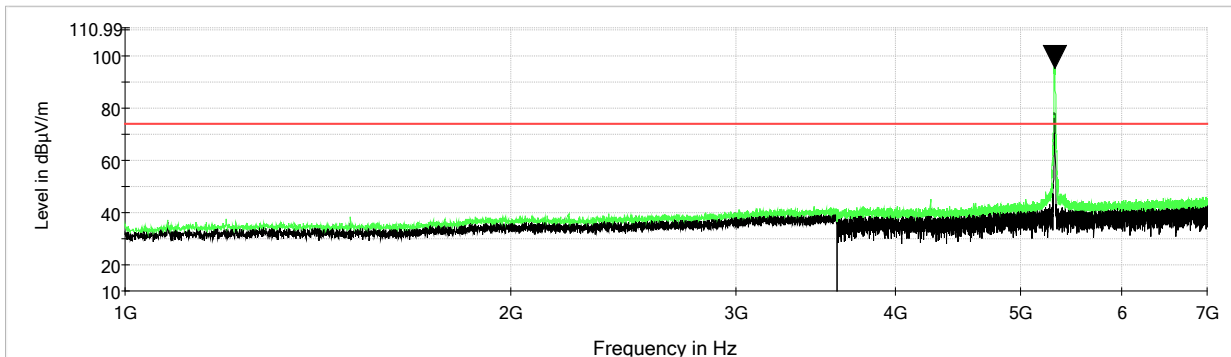
### 5320, 6 MHz, Radiated Spurious Emissions: 26 GHz to 40 GHz, Vertical



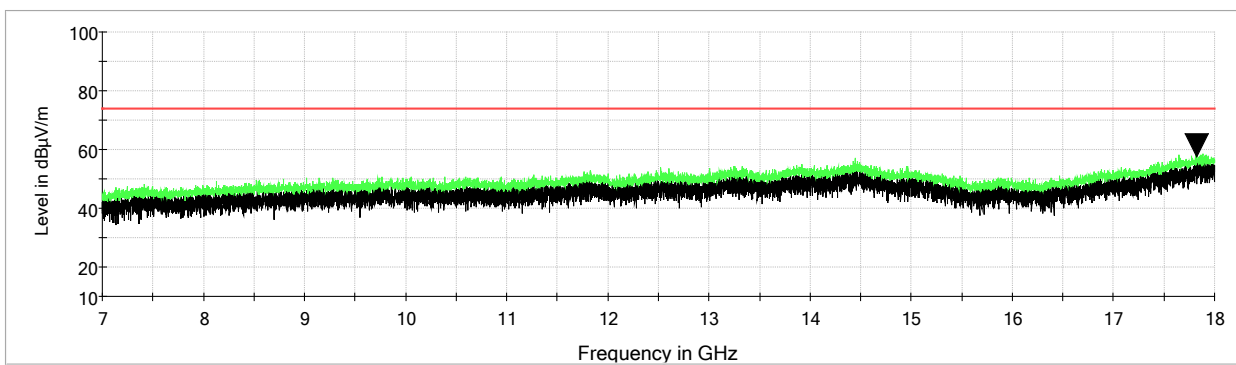




### 5320, 6 MHz, Radiated Spurious Emissions: 1 GHz to 7 GHz, Horizontal

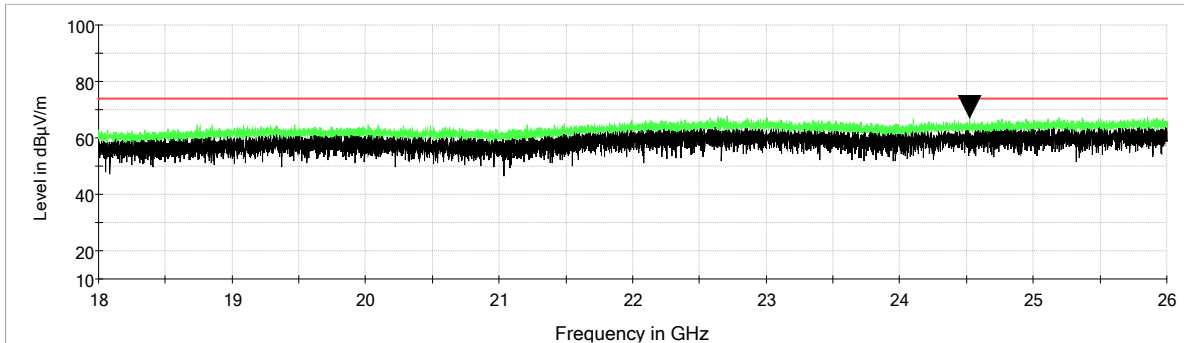


### 5320, 6 MHz, Radiated Spurious Emissions: 7 GHz to 18 GHz, Horizontal

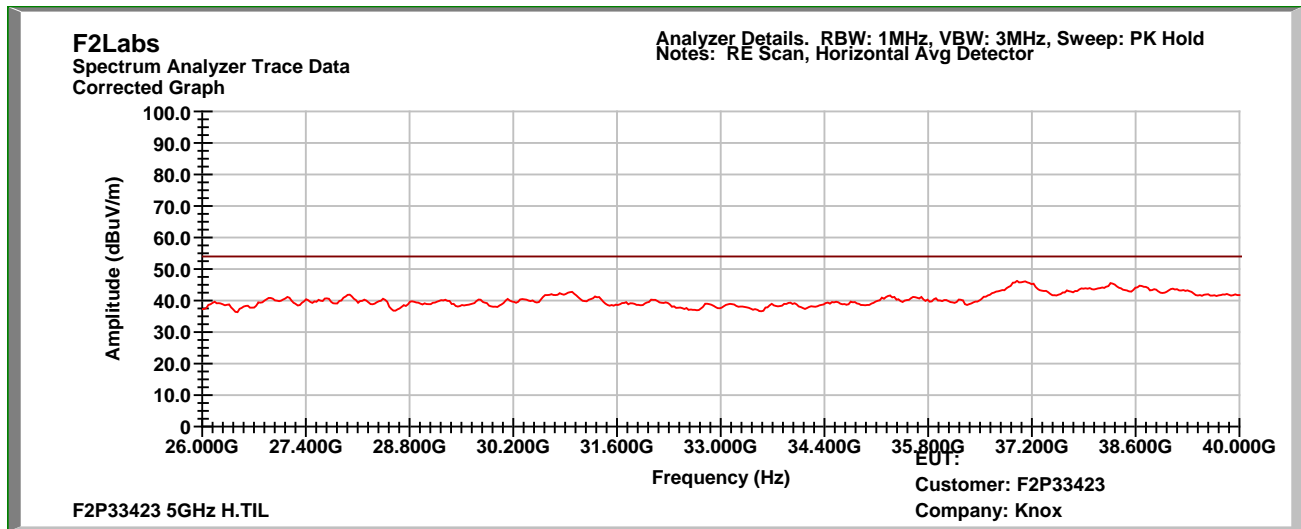




### 5320, 6 MHz, Radiated Spurious Emissions: 18 GHz to 26 GHz, Horizontal



### 5320, 6 MHz, Radiated Spurious Emissions: 26 GHz to 40 GHz, Horizontal



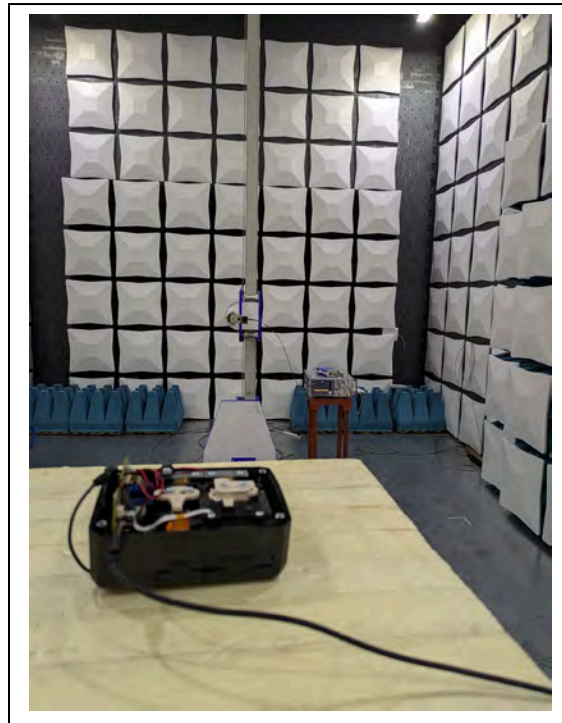
**6 TEST SETUP PHOTOGRAPH(S)**

*Note: The module was tested while connected to a Host due to the Host supplying power and communication for the module. The Host was not functioning.*

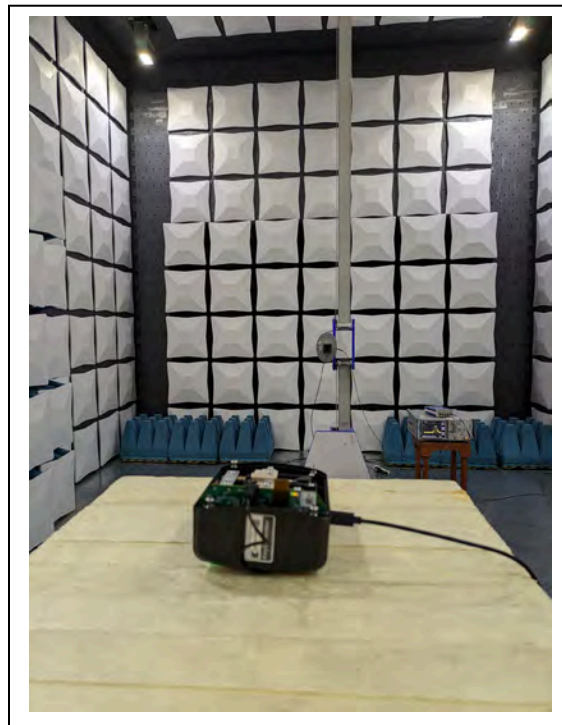
**Radiated Spurious Emissions: 30 MHz to 1000 MHz****Radiated Spurious Emissions: 1 GHz to 18 GHz**



### Radiated Spurious Emissions: 18 GHz to 26 GHz



### Radiated Spurious Emissions: 26 GHz to 40 GHz



END OF TEST REPORT – NO APPENDIX.