THYNK, INC.
TEST REPORT

SCOPE OF WORK
RADIO TESTING – THYNK AV HEADSET

REPORT NUMBER
106114493ATL-004

ISSUE DATE	**[REVISED DATE]**
26 February 2025	[N/A]

PAGES
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DOCUMENT CONTROL NUMBER
Non-Specific Radio Report Shell Rev. January 2025

RADIO TEST REPORT

Report Number:	**106114493ATL-004**
Project Number:	**G106114493**
Report Issue Date:	**26 February 2025**
Model(s) Tested:	**TYK1001**
FCC ID:	**2BNQO-TYK1001**
IC:	**33578-TYK1001**
Standards:	**47 CFR Part 15 Subpart C, 15.247** **RSS-247, Issue 3** **ANSI C63.10-2020+Cor.1-2023** **RSS-GEN, Issue 5**

Test Location:

Intertek
1950 Evergreen Blvd., Suite 100
Duluth, GA 30096 USA
FCC Designation: US1046
CAB Designator: US0128

Client:

Thynk, Inc.
9731 Chestnut Ridge Dr.
Windermere, FL 34786 USA

Report prepared by:

Jeremy Pickens / Senior Staff Engineer

Report reviewed by:

Brian Lackey / EMC Staff Engineer

Table of Contents

1 Introduction and Conclusion

The tests indicated in Section 2 were performed on the product constructed as described in Section 4. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested **complies** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

2 Test Summary

Section	Test Description	Test Specification		Result
6	Occupied and DTS Bandwidth	15.247(a)(2)	RSS-247 S5.2(a) RSS-GEN S6.7	Compliant
7	Peak Output Power	15.247(b)(3)	RSS-247 S5.4(d)	Compliant
8	Power Spectral Density	15.247(e)	RSS-247 S5.2(b)	Compliant
9	Spurious Emissions / Band Edge	15.247(d)	RSS-247 S5.5	Compliant
10	Emissions in Restricted Frequency Bands	15.247(d) 15.205(a), 15.209(a)	RSS-GEN S8.9-8.10	Compliant
11	AC Mains Conducted Emissions	15.207	RSS-GEN S8.8	Compliant
NA	Antenna Requirement	15.203	RSS-GEN S6.8	Compliant[1]

1) The antenna is a PCB Inverted F.

3 Client Information

This evaluation was performed at the request of:

Client: Thynk, Inc.
9731 Chestnut Ridge Dr.
Windermere, FL 34786 USA

Contact: Linda Ystueta

Email: linda@thynk.com

4 Description of Equipment Under Test and Variant Models

Manufacturer: Thynk, Inc.
9731 Chestnut Ridge Dr.
Windermere, FL 34786 USA

Equipment Under Test			
Description	**Manufacturer**	**Model Number**	**Serial Number**
Thynk AV Headset	Thynk, Inc.	TYK1001	20241023-002

Receive Date:	03 February 2025
Received Condition:	Good
Type:	Production

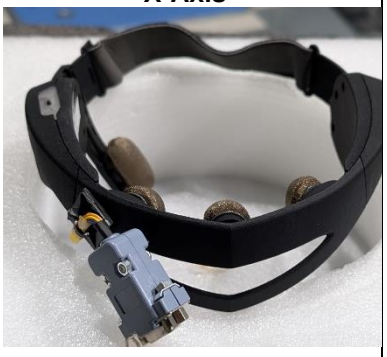
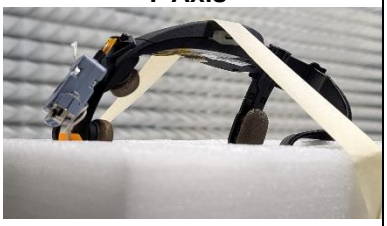
Description of Equipment Under Test (provided by client)
The Thynk AV headset integrates an electroencephalographic (EEG) headset, which measures and adapts to a child's attention levels, directly influencing a game's outcome.

Equipment Under Test Power Configuration			
Rated Voltage	**Rated Current**	**Rated Frequency**	**Number of Phases**
5Vdc	100mA	NA	NA

Operating modes of the EUT

No.	Descriptions of EUT Exercising
1	Using the BTool software, the DUT was configured to transmit on low, middle, and high channels.
2	Using prescans, the worst-case orientation was the Y-Axis for both fundamental and spurious emissions.

Device Orientations

X-Axis	Y-Axis	Z-Axis
		

Software used by the EUT

No.	Description of EUT Software
1	Texas Instruments, BTool – Bluetooth Low Energy PC Application v1.40.15

Radio/Receiver Characteristics	
Frequency Band(s)	2402-2480MHz
Modulation Type(s)	GFSK
Data Rate(s)	1Mbps
Maximum Output Power (EIRP):	-1.59dBm
Test Channels	2402MHz, 2440MHz, 2480MHz
Power Setting	Btool Setting 0
Occupied Bandwidth (99%)	1.172MHz
MIMO Information (# of Transmit and Receive antenna ports)	SISO
Equipment Type	Full Device
Antenna Type and Gain	Circuit Board PIFA: Min: +3.3dBi / Max: +5.3dBi (Retrieved from Texas Instruments Reference Design Application Note AN043 - Intertek takes no responsibility for the accuracy of this information.)

5 System Setup and Method

Cables					
ID	**Description**	**Length (m)**	**Shielding**	**Ferrites**	**Termination**
1	AC Power	1.0	None	None	Mains
2	USB	1.1	Yes	None	Power Adapter

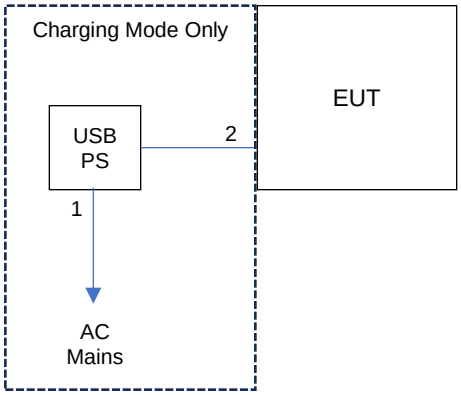
1) Note: Cables only present during charging mode to provide AC conducted emissions data.

System Configuration			
Description	**Manufacturer**	**Model Number**	**Serial Number**
Thynk AV Headset	Thynk, Inc.	TYK1001	20241023-001
USB Power Adapter	Phihong	PSAA05A-050QL6	Not Labeled

5.1 Method

Configuration as required by ANSI C63.10.

5.2 EUT Block Diagram



6 Bandwidth

6.1 Method

The procedures from ANSI C63.10: 2013 clause 11.8 and 558074 D01 DTS Meas Guidance v05r2 were used to determine the 6 dB bandwidth.

The procedures from ANSI C63.10: 2013 clause 6.9.2 were used to measure the 99% Occupied Bandwidth.

TEST SITE: RF Bench

The RF bench consists of a Rohde & Schwarz TS8997 automated test system coupled with a temperature/humidity environmental chamber. Measurements are automated using the Rohde & Schwarz EMC32 test software. The TS8997 system houses a switch matrix (OSP), along with a spectrum analyzer, vector network analyzer, and analog signal generator.

6.2 Test Equipment

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
213502	Spectrum Analyzer (2Hz-43.5GHz)	Rohde & Schwarz	FSW43	102972	08/01/2024	08/01/2025

Software Utilized

Name	Manufacturer	Version
EMC32	Rohde & Schwarz	11.70.00

6.3 Results

The sample tested was found to Comply.

6.4 Test Data – 6dB Bandwidth

Frequency (MHz)	6dB Bandwidth (MHz)	Limit Min (MHz)	Result
2402	0.744	0.500	Pass
2440	0.784	0.500	Pass
2480	0.774	0.500	Pass

Sample Plot

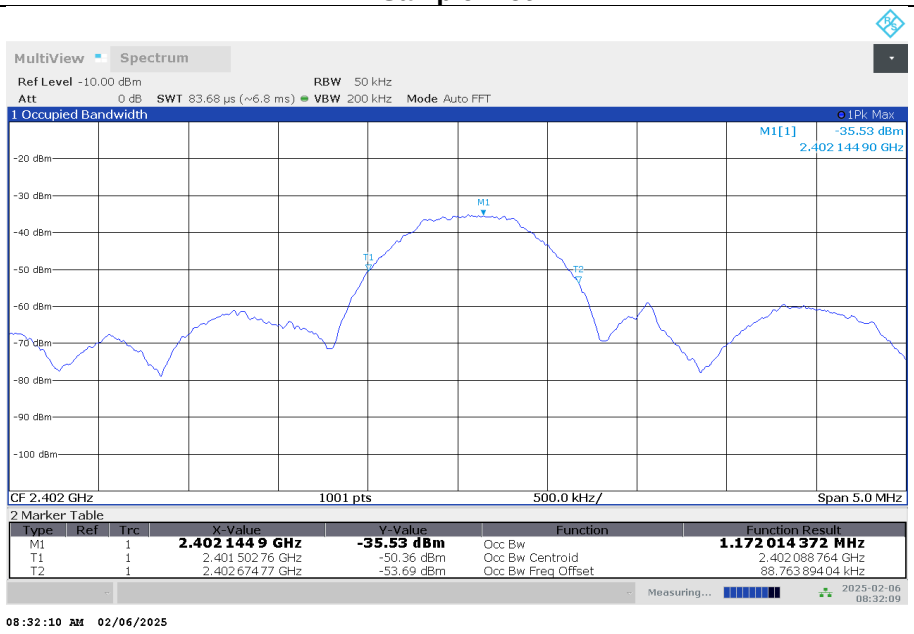
Measurement Settings

Setting	Instrument Value
Start Frequency	2395 MHz
Stop Frequency	2405 MHz
Span	5 MHz
RBW	100 kHz
VBW	300 kHz
Sweep Points	1001
Sweep Time	Auto (41.84µs)
Reference Level	-10 dBm
Attenuation	0 dB
Detector	Max Peak
Filter	3dB
Trace Mode	Max Hold
Sweep Type	Auto FFT

6.5 Test Data – 99% Occupied Bandwidth

Frequency (MHz)	99% OBW (MHz)	Limit Min (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Result
2402	1.172	--	2401.5	2402.7	Reported
2440	1.166	--	2439.5	2440.7	Reported
2480	1.141	--	2479.5	2480.6	Reported

Sample Plot



Measurement Settings

Setting	Instrument Value
Start Frequency	2395 MHz
Stop Frequency	2405 MHz
Span	5 MHz
RBW	20 kHz
VBW	200 kHz
Sweep Points	1001
Sweep Time	Auto (83.68µs)
Reference Level	-10 dBm
Attenuation	0 dB
Detector	Max Peak
Filter	3dB
Trace Mode	Max Hold
Sweep Type	Auto FFT

Test Personnel: Jeremy Pickens
Test Date: 6 February 2025
Supervising/Reviewing Engineer: (Where Applicable)
Ambient Temperature: 18.5ºC
Product Standard: ANSI C63.10
Relative Humidity: 10.2%
Input Voltage: 5Vdc Battery
Atmospheric Pressure: 98.7kPa

7 Peak Output Power

7.1 Method

Using radiated methods, the peak power procedures from KDB 558074 D01 DTS Meas Guidance v05r2 and ANSI C63.10 Clause 11.9.1 were applied. The fundamental emission was maximized using the procedures in ANSI C63.10 and, using a correction of 95.2dB, the value was converted from a 3m field strength measurement in dBµV/m to an EIRP value in dBm.

TEST SITE: 10 Meter Chamber

10 Meter Semi-Anechoic Chamber The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096. It is a 10-meter semi-anechoic chamber manufactured by Panashield. Embedded in the floor is a 3-meter diameter turntable.

7.2 Test Equipment

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
200162	EMI Receiver (20Hz-40GHz)	Rohde & Schwarz	ESU 40	100314	9/26/2024	9/26/2025
211262	Controller - Turntable and Mast	Sunol	SC99V	SC99V-1	VBU	VBU
212165	Barometric Pressure/Humidity Datalogger	Extech	SD700	110344	4/3/2024	4/3/2025
213453	Preamplifier 500MHz-18GHz	Com-Power	PAM-118A	18040030	10/16/2024	10/16/2025
213058A	Antenna, Horn, <18 GHz	A.H. Systems	SAS-200/571	246	3/22/2024	3/22/2025
MM1	RF Coax Cable 10KHz-18GHz	Maury Microwave	UC-N-MM36	161471	10/21/2024	10/21/2025
MP11	RF Coax Cable 9KHz-18GHz	Fairview Microwave	SCE18060505-500CM	MP11	6/6/2024	6/6/2025

Software Utilized

Name	Manufacturer	Version
RSCommander	Rohde & Schwarz	2.4.2 64-bit (2023)

7.3 Results

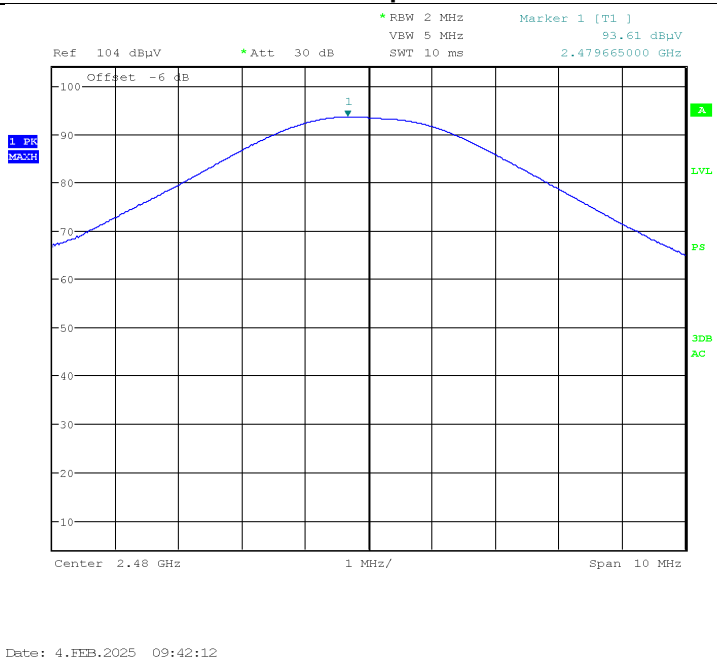
The sample tested was found to Comply.

7.4 Test Data

Frequency (MHz)	Raw Reading (dBµV)	Correction[1] (dB/m)	Peak Field Strength (dBµV/m)	Peak Power EIRP (dBm)	Min Antenna Gain[2] (dBi)	Conducted Power (dBm)	Limit (dBm)	Result
2402	99.53	-6.1	93.43	-1.77	3.3	-5.07.	30	Pass
2440	99.54	-6.1	93.44	-1.76	3.3	-5.06	30	Pass
2480	99.61	-6.0	93.61	-1.59	3.3	-4.89	30	Pass

1) Correction = Antenna Factor + Cable Loss – Preamplifier Gain
2) Min antenna gain used for worst-case conducted power.

Sample Plot



Offset applied accounts for antenna and cable losses and preamplifier gain.

Measurement Settings

Setting	Instrument Value
Start Frequency	2475 MHz
Stop Frequency	2485 MHz
Span	10 MHz
RBW	2 MHz
VBW	5 MHz
Sweep Points	1001
Sweep Time	Auto (10 ms)
Reference Level	104 dBµV
Attenuation	30 dB
Detector	Peak
Filter	3 dB
Trace Mode	Max Hold

Test Personnel: Jeremy Pickens
Test Date: 4 February 2025
Supervising/Reviewing Engineer: (Where Applicable)
Product Standard: ANSI C63.10
Limit Applied: 15.247/RSS-247 (1W Conducted / 4W EIRP)
Input Voltage: 5Vdc Battery
Pretest Verification w/ Ambient Signals or BB Source: BB
Ambient Temperature: 19.2ºC
Relative Humidity: 12.7%
Atmospheric Pressure: 98.9kPa

8 Power Spectral Density

8.1 Method

Using radiated methods, the peak PSD procedures from KDB 558074 D01 DTS Meas Guidance v05r2 and ANSI C63.10 Clause 11.9.1 were applied. The fundamental emission was maximized using the procedures in ANSI C63.10 and, using a correction of 95.2dB, the value was converted from a 3m field strength measurement in dBµV/m to a Peak EIRP PSD value in dBm.

TEST SITE: 10 Meter Chamber

10 Meter Semi-Anechoic Chamber The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096. It is a 10-meter semi-anechoic chamber manufactured by Panashield. Embedded in the floor is a 3-meter diameter turntable.

8.2 Test Equipment

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
200162	EMI Receiver (20Hz-40GHz)	Rohde & Schwarz	ESU 40	100314	9/26/2024	9/26/2025
211262	Controller - Turntable and Mast	Sunol	SC99V	SC99V-1	VBU	VBU
212165	Barometric Pressure/Humidity Datalogger	Extech	SD700	110344	4/3/2024	4/3/2025
213453	Preamplifier 500MHz-18GHz	Com-Power	PAM-118A	18040030	10/16/2024	10/16/2025
213058A	Antenna, Horn, <18 GHz	A.H. Systems	SAS-200/571	246	3/22/2024	3/22/2025
MM1	RF Coax Cable 10KHz-18GHz	Maury Microwave	UC-N-MM36	161471	10/21/2024	10/21/2025
MP11	RF Coax Cable 9KHz-18GHz	Fairview Microwave	SCE18060505-500CM	MP11	6/6/2024	6/6/2025

Software Utilized

Name	Manufacturer	Version
RSCommander	Rohde & Schwarz	2.4.2 64-bit (2023)

8.3 Results

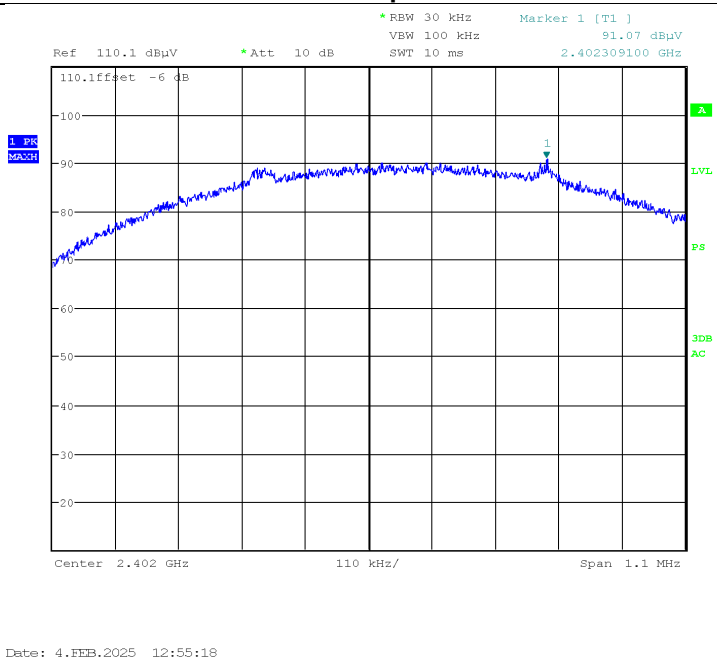
The sample tested was found to Comply.

8.4 Test Data

Frequency (MHz)	Raw Reading (dBµV)	Correction[1] (dB/m)	PPSD Field Strength (dBµV/m)	PPSD - EIRP (dBm)	Min Antenna Gain[2] (dBi)	Conducted PPSD (dBm)	Limit (dBm)	Result
2402	97.17	-6.1	91.07	-4.13	3.3	-7.43	8	Pass
2440	96.92	-6.1	90.82	-4.38	3.3	-7.68	8	Pass
2480	95.4	-6.0	89.40	-5.80	3.3	-9.1	8	Pass

1) Correction = Antenna Factor + Cable Loss – Preamplifier Gain
2) Min antenna gain used for worst-case conducted power.

Sample Plot



Offset applied accounts for antenna and cable losses and preamplifier gain.

Measurement Settings

Setting	Instrument Value
Start Frequency	2401.45 MHz
Stop Frequency	2402.55 MHz
Span	1.1 MHz
RBW	30 kHz
VBW	100 kHz
Sweep Points	1001
Sweep Time	Auto (10 ms)
Reference Level	110.1 dBµV
Attenuation	10 dB
Detector	Peak
Filter	3 dB
Trace Mode	Max Hold

Test Personnel: Jeremy Pickens
Test Date: 4 February 2025
Supervising/Reviewing Engineer: (Where Applicable)
Product Standard: ANSI C63.10
Limit Applied: 15.247/RSS-247 (8dBm/3kHz)
Input Voltage: 5Vdc Battery
Pretest Verification w/ Ambient Signals or BB Source: BB
Ambient Temperature: 19.2ºC
Relative Humidity: 12.7%
Atmospheric Pressure: 98.9kPa

9 Spurious Emissions / Band Edge

9.1 Method

Using radiated methods, the procedures from KDB 558074 D01 DTS Meas Guidance v05r2 and ANSI C63.10 Clause 11.11 were applied.

The limit is 20 dB below the measured peak power in any 100kHz band.

TEST SITE: 10 Meter Chamber

10 Meter Semi-Anechoic Chamber The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096. It is a 10-meter semi-anechoic chamber manufactured by Panashield. Embedded in the floor is a 3-meter diameter turntable.

9.2 Test Equipment

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
200003	Attenuator, 03 dB, <18GHz	Weinschel Corp	2	BK7899	05/07/2024	05/07/2025
200074	Preamplifier, 10 MHz to 2000 MHz	Mini-Circuits	ZKL-2	D052005	9/10/2024	9/10/2025
200080	Preamplifier, 18-40GHz, 29 dB Gain	Miteq	JS41800400-30-5P-S	818197	10/17/2024	10/17/2025
200162	EMI Receiver (20Hz-40GHz)	Rohde & Schwarz	ESU 40	100314	9/26/2024	9/26/2025
211262	Controller - Turntable and Mast	Sunol	SC99V	SC99V-1	VBU	VBU
211264	Mast - Antenna	Sunol	TWR95	NNN2	VBU	VBU
211386	Antenna, BiLog, 20-2000MHz	Chase	CBL6112B	2622	6/6/2024	6/6/2025
212165	Barometric Pressure/Humidity Datalogger	Extech	SD700	110344	4/3/2024	4/3/2025
213023	Antenna, Horn, 18-40 GHz	EMCO	3116	9310-2222	01/05/2024	01/05/2025
213365	PreAmplifier 100Hz-30MHz	Com-Power	PAL-010	181492	06/11/2024	06/11/2025
213451	Omni -directional Comb Generator	Com-Power	CGO-520	281266	VBU	VBU
213453	Preamplifier 500MHz-18GHz	Com-Power	PAM-118A	18040030	10/16/2024	10/16/2025
213058A	Antenna, Horn, <18 GHz	A.H. Systems	SAS-200/571	246	3/22/2024	3/22/2025
E401	Cable E401, 40 GHz, 2.9, 9"	Megaphase	TM40 K1K1 9	E401	10/17/2024	10/17/2025
MM1	RF Coax Cable 9KHz-18GHz	Maury Microwave	UC-N-MM36	161471	10/21/2024	10/21/2025
MM5	RF Coax Cable 9KHz-18GHz	Maury Microwave	UC-N-MM-118	163203	3/25/2024	3/25/2025
MM8	RF Coax Cable 9KHz-18GHz	Maury Microwave	UC-N-MM-267	1635289	10/16/2024	10/16/2025
MM12	RF Coax Cable 9KHz-18GHz	Fairview Microwave	SCE18110505-600CM	MM12	08/23/2024	08/23/2025
MP10	RF Coax Cable 9KHz-18GHz	Fairview Microwave	FMCA1282-394	MP10	06/13/2024	06/13/2025
MP11	RF Coax Cable 9KHz-18GHz	Fairview Microwave	SCE18060505-500CM	MP11	6/6/2024	6/6/2025
MP-HF-3	RF Coax Cable 1-40GHz	Megaphase	GC12-K1K1-233-H	20809305001	10/21/2024	10/21/2025
NYM-EMC-36	Passive Loop Antenna (10 kHz - 30 MHz)	EMCO	6512	9810-1228	06/10/2024	06/10/2025
TW4 211413	RF Coax Cable 9KHz-18GHz	Fairview Microwave	FMCA1282-472	TW4	6/13/2024	6/13/2025

Software Utilized

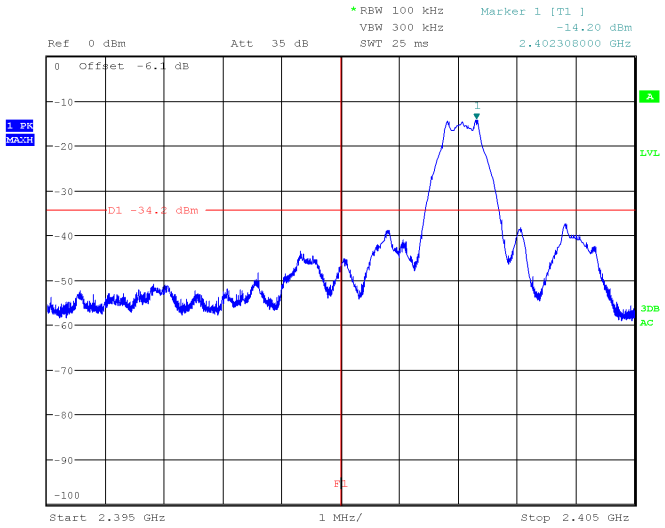
Name	Manufacturer	Version
EMC32	Rohde & Schwarz	11.70.00

9.3 Results

The sample tested was found to Comply.

9.4 Test Data

Lower Band Edge – Low Channel



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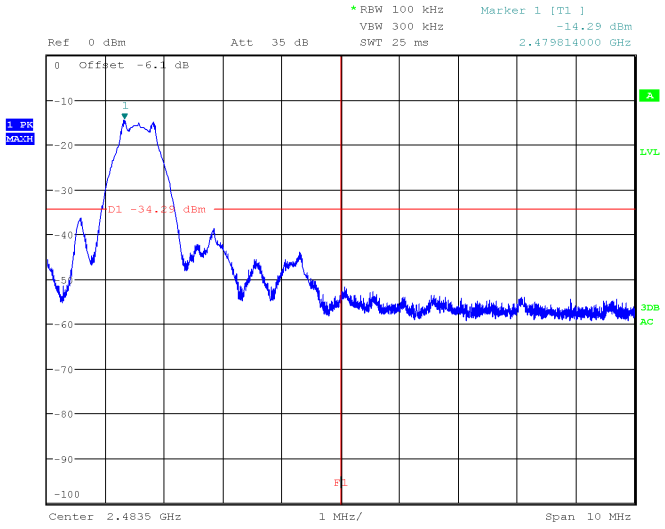
Upper Band Edge – High Channel



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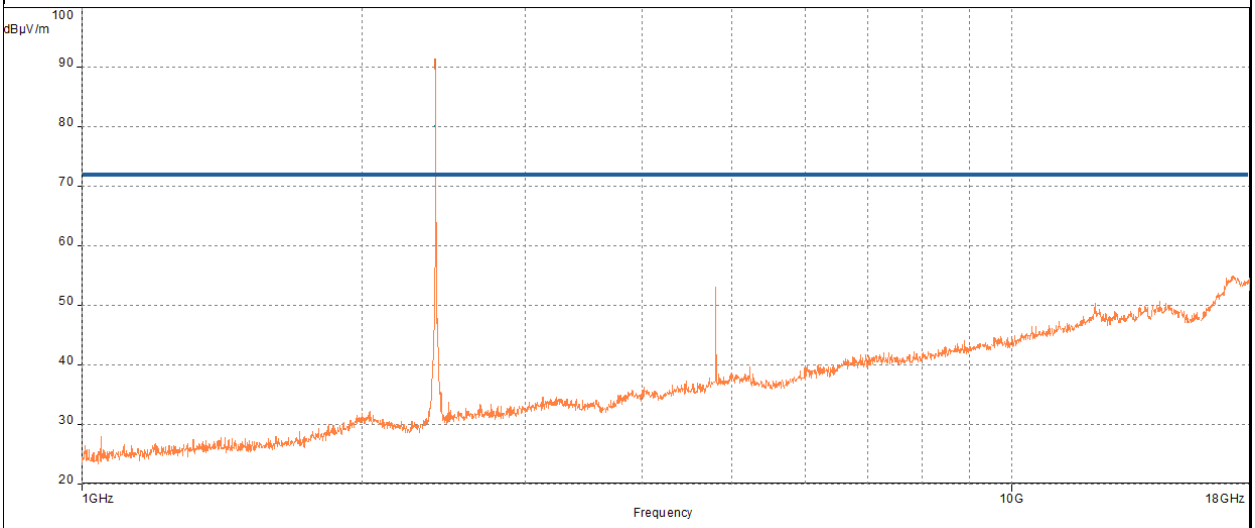
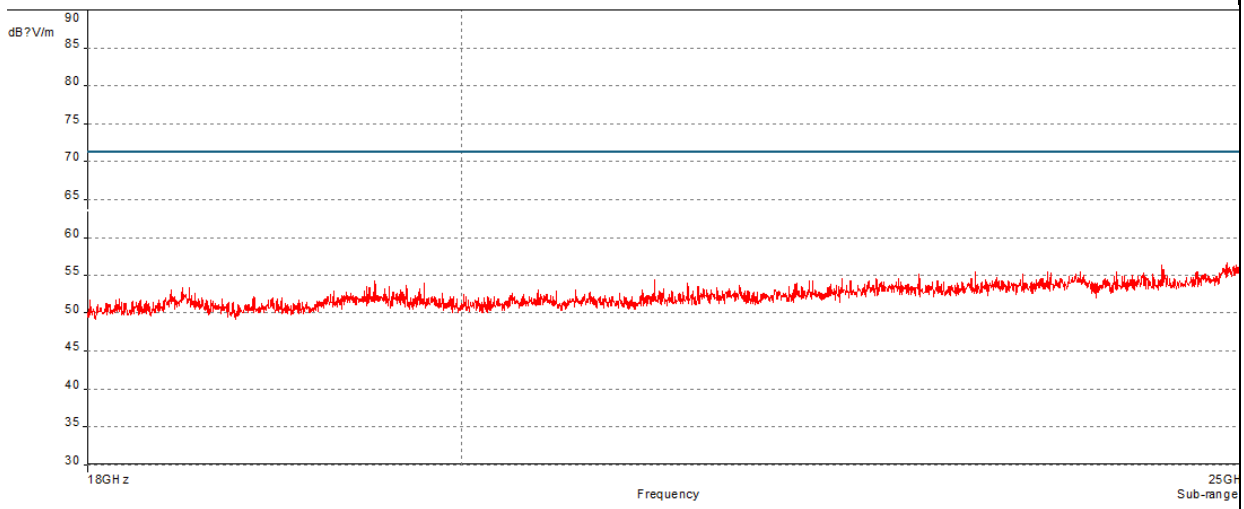
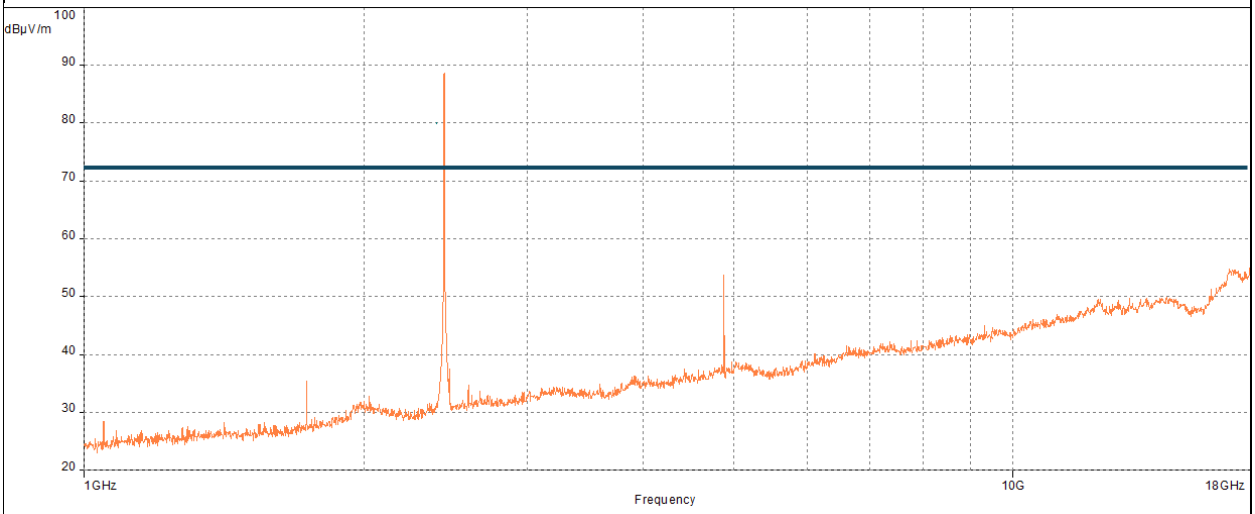
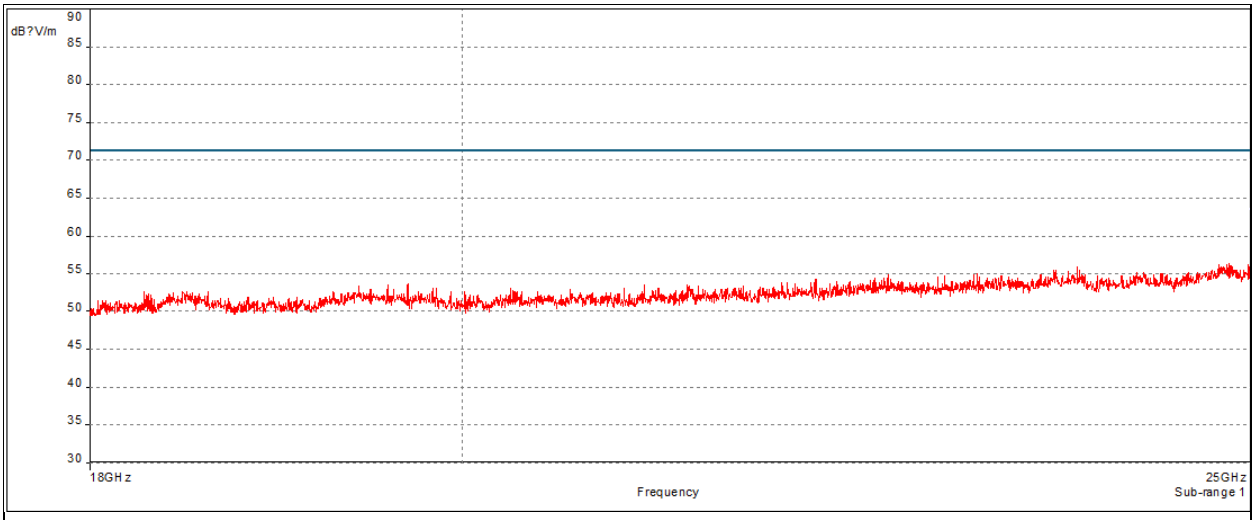
Spurious Emissions – Low Channel (1-25GHz)
Note: No emissions were detected below 1GHz



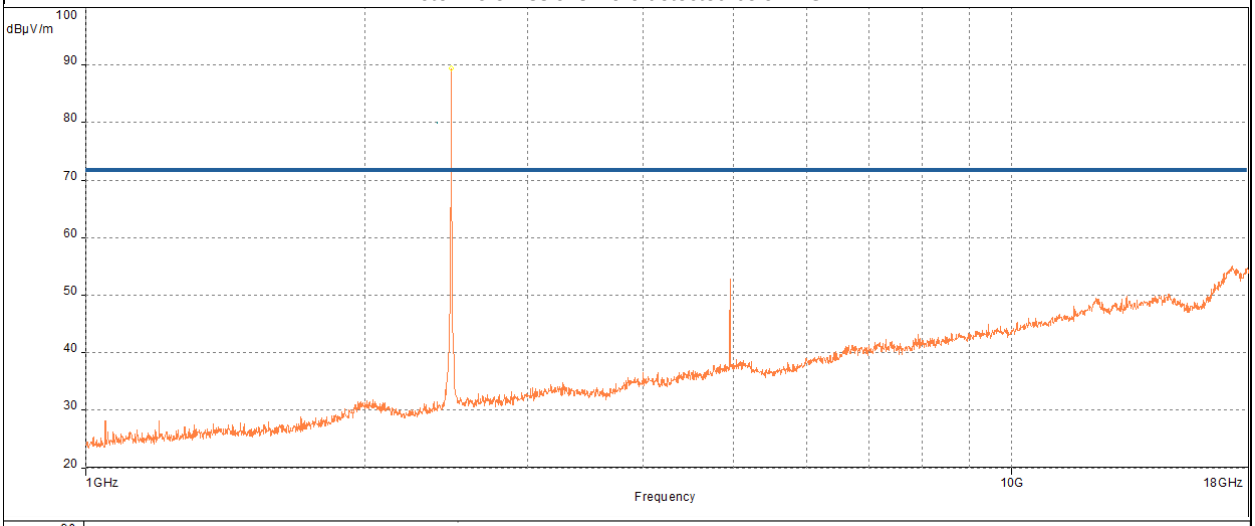


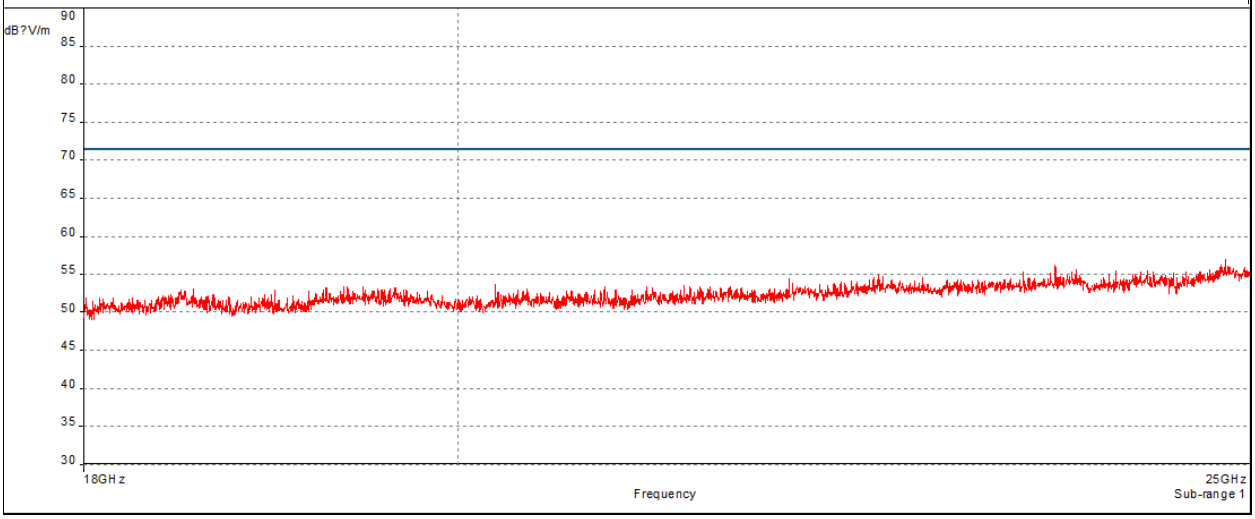
Spurious Emissions – Mid Channel (1-25GHz)
Note: No emissions were detected below 1GHz





Spurious Emissions – High Channel (1-25GHz)
Note: No emissions were detected below 1GHz





Test Personnel:	Jeremy Pickens	Test Date:	4 February 2025
Supervising/Reviewing Engineer: (Where Applicable)			
Product Standard:	ANSI C63.10	Limit Applied:	15.247(d) / RSS-247 S5.5
Input Voltage:	5Vdc Battery		
Pretest Verification w/ Ambient Signals or BB Source:	BB	Ambient Temperature:	19.2ºC
		Relative Humidity:	12.7%
		Atmospheric Pressure:	98.9kPa

10 Radiated Spurious Emissions / Restricted Frequency Bands

10.1 Method

Tests were performed in accordance with ANSI C63.10.

TEST SITE: 10 Meter Chamber

10 Meter Semi-Anechoic Chamber The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096. It is a 10-meter semi-anechoic chamber manufactured by Panashield. Embedded in the floor is a 3-meter diameter turntable.

Sample Calculation

The field strength was calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG

Where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.
Assume a receiver reading of 52.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

FS = 32 dBμV/m
RA = 52.0 dBμV
CF = 1.6 dB
AF = 7.4 dB/m
AG = 29.0 dB

To convert from dBμV to μV or mV the following was used

UF = $10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0dBμV/m
UF = $10^{(32\ dB\mu V/m\ /\ 20)}$ = 39.8 μV/m

10.2 Test Equipment

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
200003	Attenuator, 03 dB, <18GHz	Weinschel Corp	2	BK7899	05/07/2024	05/07/2025
200074	Preamplifier, 10 MHz to 2000 MHz	Mini-Circuits	ZKL-2	D052005	9/10/2024	9/10/2025
200080	Preamplifier, 18-40GHz, 29 dB Gain	Miteq	JS41800400-30-5P-S	818197	10/17/2024	10/17/2025
200162	EMI Receiver (20Hz-40GHz)	Rohde & Schwarz	ESU 40	100314	9/26/2024	9/26/2025
211262	Controller - Turntable and Mast	Sunol	SC99V	SC99V-1	VBU	VBU
211264	Mast - Antenna	Sunol	TWR95	NNN2	VBU	VBU
211386	Antenna, BiLog, 20-2000MHz	Chase	CBL6112B	2622	6/6/2024	6/6/2025
212165	Barometric Pressure/Humidity Datalogger	Extech	SD700	110344	4/3/2024	4/3/2025
213023	Antenna, Horn, 18-40 GHz	EMCO	3116	9310-2222	01/05/2024	01/05/2025
213365	PreAmplifier 100Hz-30MHz	Com-Power	PAL-010	181492	06/11/2024	06/11/2025
213451	Omni -directional Comb Generator	Com-Power	CGO-520	281266	VBU	VBU
213453	Preamplifier 500MHz-18GHz	Com-Power	PAM-118A	18040030	10/16/2024	10/16/2025
213058A	Antenna, Horn, <18 GHz	A.H. Systems	SAS-200/571	246	3/22/2024	3/22/2025
E401	Cable E401, 40 GHz, 2.9, 9"	Megaphase	TM40 K1K1 9	E401	10/17/2024	10/17/2025
MM1	RF Coax Cable 9KHz-18GHz	Maury Microwave	UC-N-MM36	161471	10/21/2024	10/21/2025
MM5	RF Coax Cable 9KHz-18GHz	Maury Microwave	UC-N-MM-118	163203	3/25/2024	3/25/2025
MM8	RF Coax Cable 9KHz-18GHz	Maury Microwave	UC-N-MM-267	1635289	10/16/2024	10/16/2025
MM12	RF Coax Cable 9KHz-18GHz	Fairview Microwave	SCE18110505-600CM	MM12	08/23/2024	08/23/2025
MP10	RF Coax Cable 9KHz-18GHz	Fairview Microwave	FMCA1282-394	MP10	06/13/2024	06/13/2025
MP11	RF Coax Cable 9KHz-18GHz	Fairview Microwave	SCE18060505-500CM	MP11	6/6/2024	6/6/2025
MP-HF-3	RF Coax Cable 1-40GHz	Megaphase	GC12-K1K1-233-H	20809305001	10/21/2024	10/21/2025
NYM-EMC-36	Passive Loop Antenna (10 kHz - 30 MHz)	EMCO	6512	9810-1228	06/10/2024	06/10/2025
TW4 211413	RF Coax Cable 9KHz-18GHz	Fairview Microwave	FMCA1282-472	TW4	6/13/2024	6/13/2025

Software Utilized

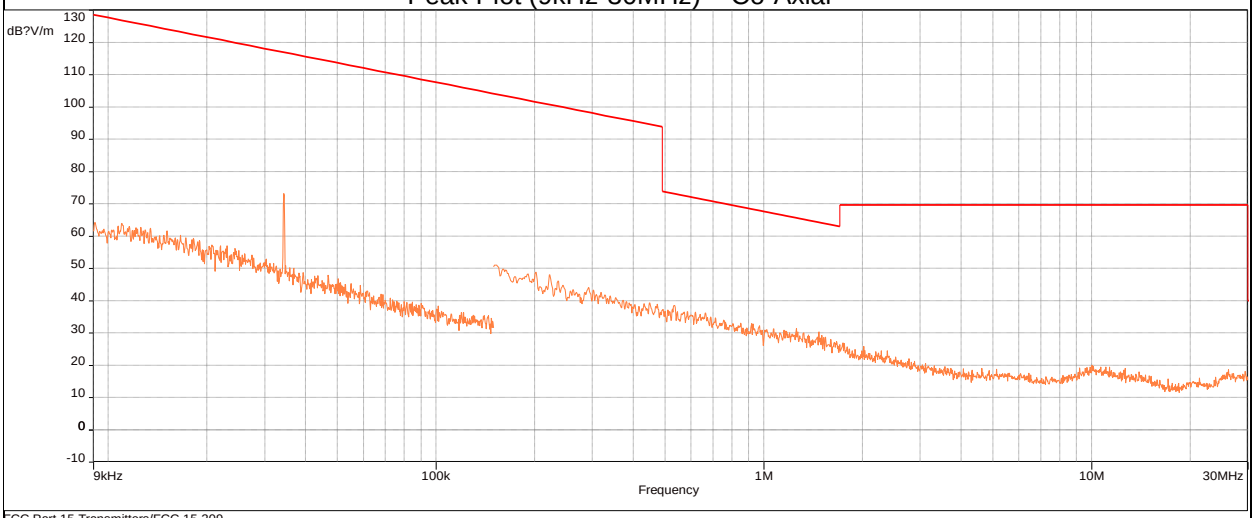
Name	Manufacturer	Version
BAT EMC	NEXIO	3.19.1.18

10.3 Results

The sample tested was found to Comply.

10.5 Plots/Data

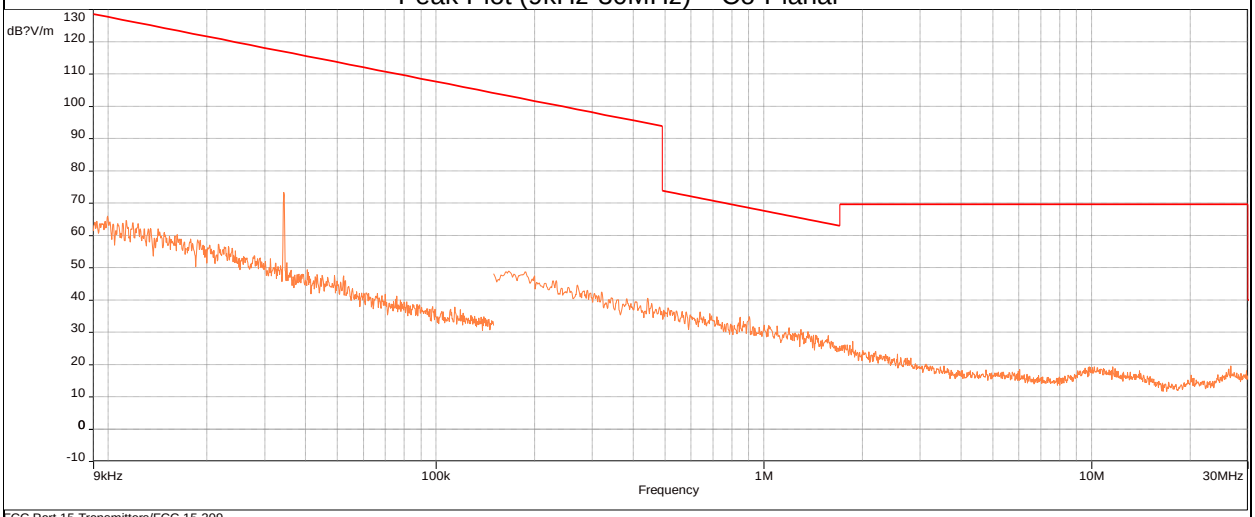
Peak Plot (9kHz-30MHz) – Co-Axial



FCC Part 15 Transmitters/FCC 15.209

Note: There was no discernible difference among channels in this frequency range

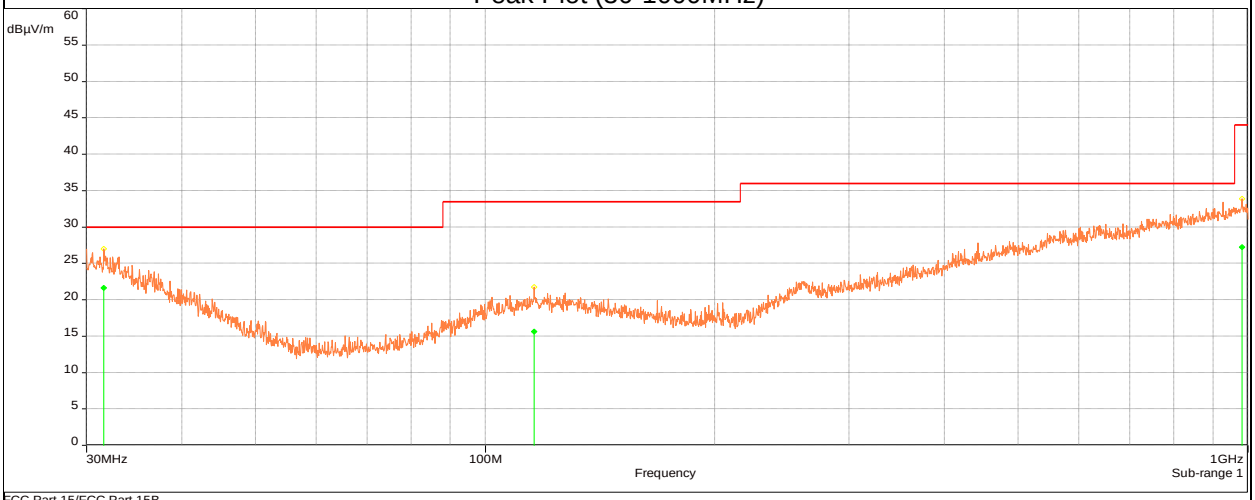
Peak Plot (9kHz-30MHz) – Co-Planar



FCC Part 15 Transmitters/FCC 15.209

Note: There was no discernible difference among channels in this frequency range

Peak Plot (30-1000MHz)



FCC Part 15/FCC Part 15B

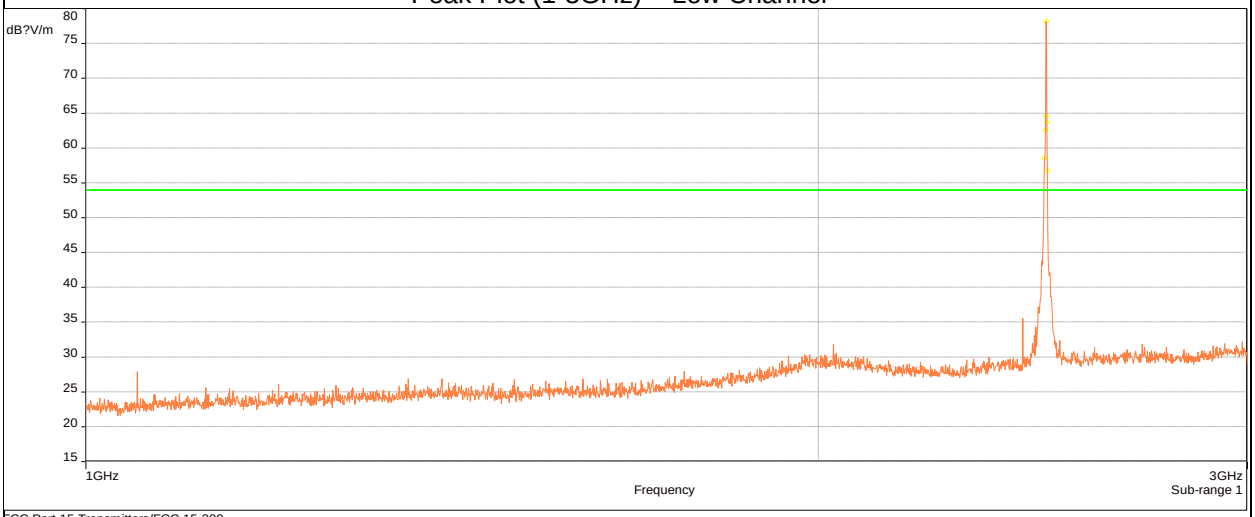
Note: There was no discernible difference among channels in this frequency range

Tabular Data (30-1000MHz)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Polarity	RBW (kHz)	Correction (dB)
31.604	21.66	30	-8.34	184	3.04	Horizontal	120	-15.3
115.846	15.66	33.5	-17.84	190	2.95	Horizontal	120	-19.91
981.918	27.22	44	-16.78	144	2.01	Vertical	120	-6.49

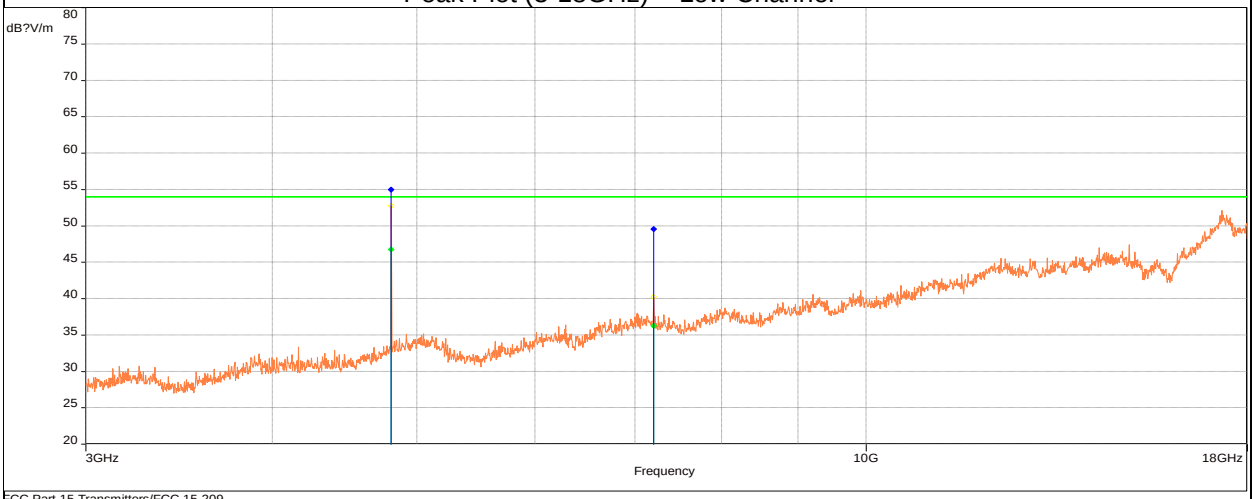
Note: There was no discernible difference among channels in this frequency range

Peak Plot (1-3GHz) – Low Channel



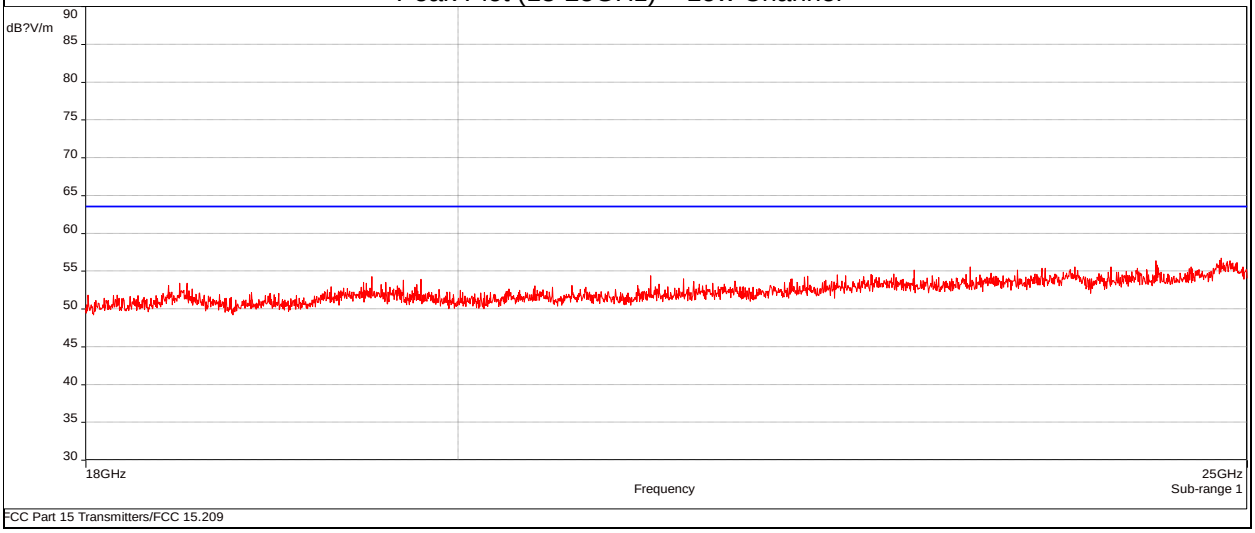
FCC Part 15 Transmitters/FCC 15.209

Peak Plot (3-18GHz) – Low Channel



FCC Part 15 Transmitters/FCC 15.209

Peak Plot (18-25GHz) – Low Channel



FCC Part 15 Transmitters/FCC 15.209

Tabular Data (1-25GHz) – Low Channel

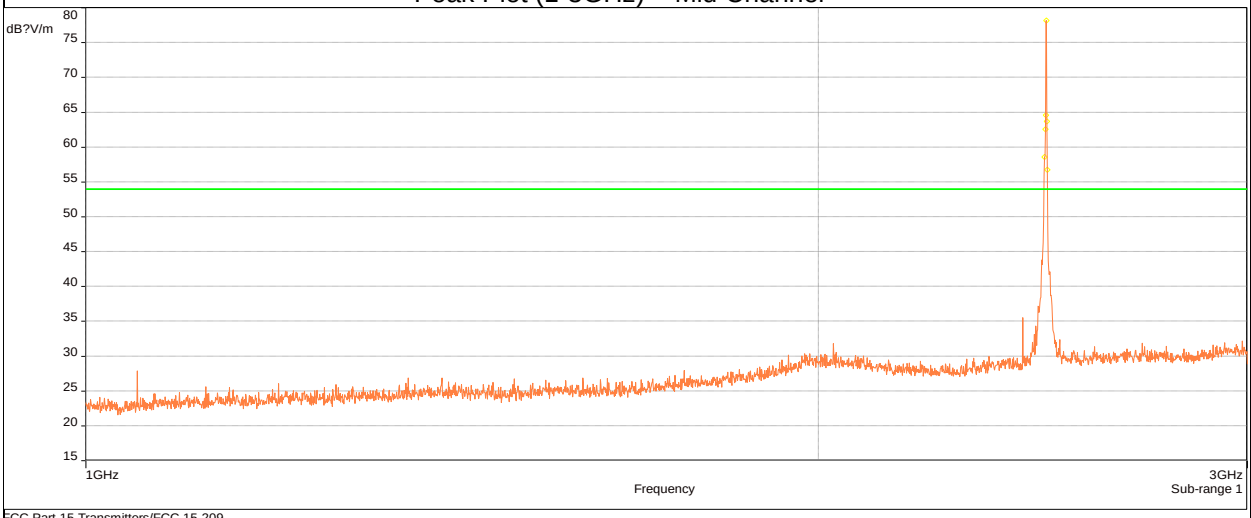
Peak Data

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Polarity	RBW (MHz)	Correction (dB)
4804.000	55.95	74	-18.05	1	1.54	Horizontal	1	-3.06
7206.000	49.24	74	-24.76	225	2.47	Vertical	1	1.43

Average Data

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Polarity	RBW (MHz)	Correction (dB)
4804.000	49.81	54	-4.19	1	1.54	Horizontal	1	-3.06
7206.000	43.15	54	-10.85	225	2.47	Vertical	1	1.43

Peak Plot (1-3GHz) – Mid Channel

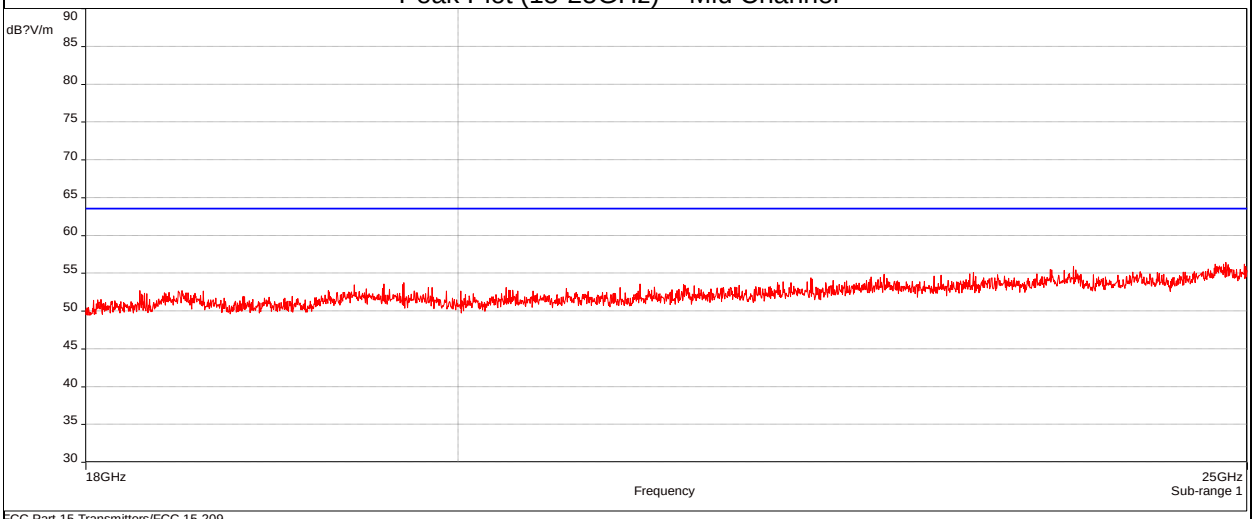


FCC Part 15 Transmitters/FCC 15.209

Peak Plot (3-18GHz) – Mid Channel

FCC Part 15 Transmitters/FCC 15.209

Peak Plot (18-25GHz) – Mid Channel



FCC Part 15 Transmitters/FCC 15.209

Tabular Data (1-25GHz) – Mid Channel

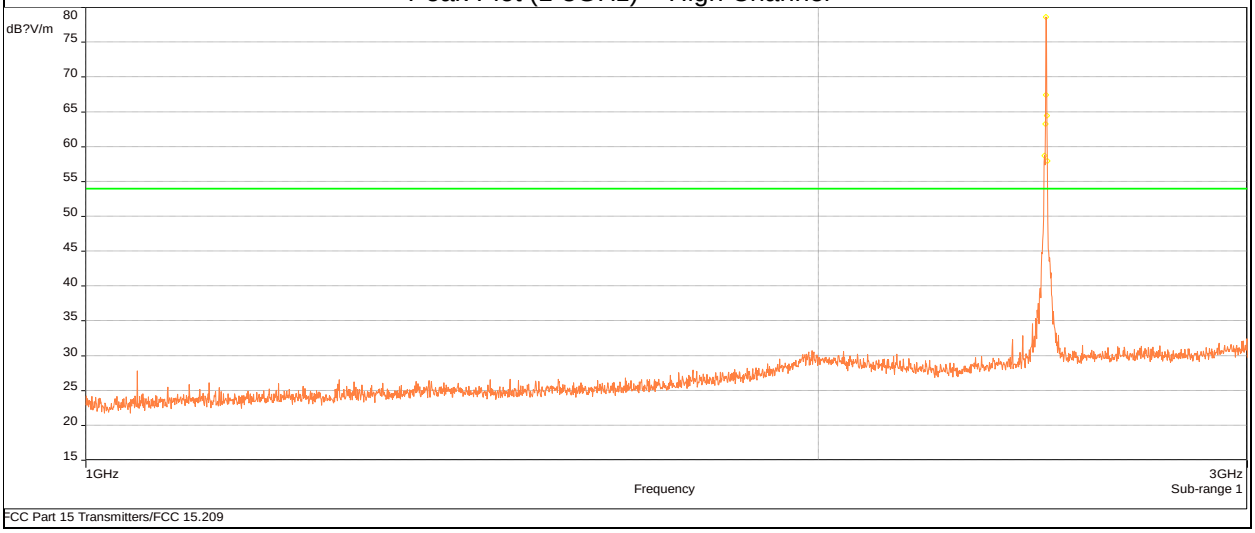
Peak Data

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Polarity	RBW (MHz)	Correction (dB)
4880.000	56.79	74	-17.21	355	1.41	Horizontal	1	-2.79
7320.000	51.85	74	-22.15	149	1.08	Vertical	1	1.47

Average Data

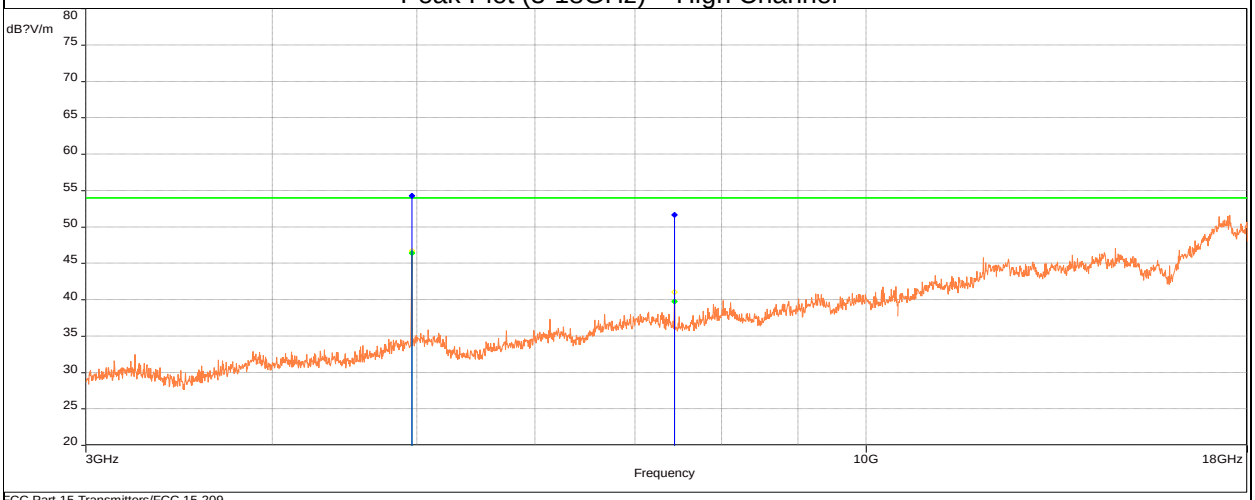
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Polarity	RBW (MHz)	Correction (dB)
4880.000	50.29	54	-3.71	355	1.41	Horizontal	1	-2.79
7320.000	45.62	54	-8.38	149	1.08	Vertical	1	1.47

Peak Plot (1-3GHz) – High Channel



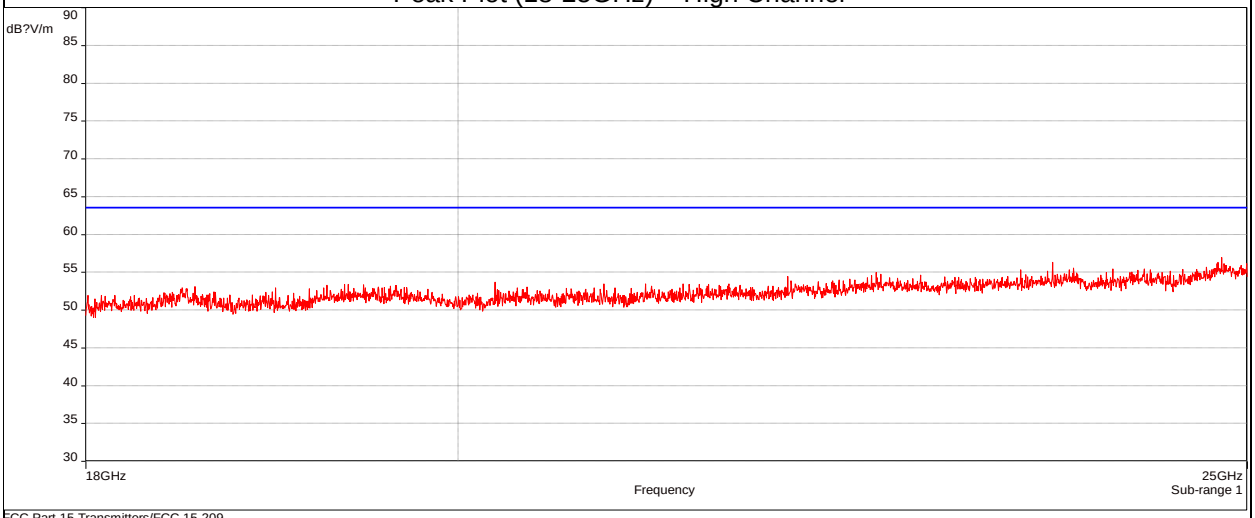
FCC Part 15 Transmitters/FCC 15.209

Peak Plot (3-18GHz) – High Channel



FCC Part 15 Transmitters/FCC 15.209

Peak Plot (18-25GHz) – High Channel



FCC Part 15 Transmitters/FCC 15.209

Tabular Data (1-25GHz) – High Channel

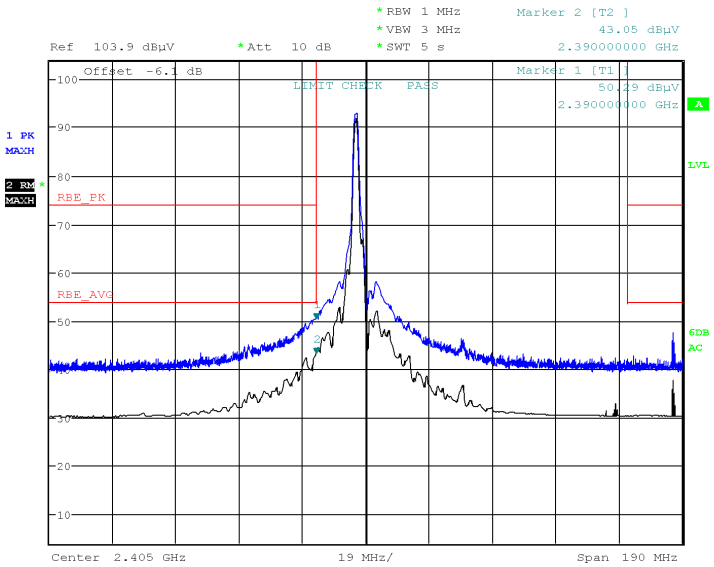
Peak Data

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Polarity	RBW (MHz)	Correction (dB)
4960.000	54.28	74	-19.72	352	2.23	Horizontal	1	-2.48
7440.000	51.65	74	-22.35	140	1.91	Vertical	1	1.29

Average Data

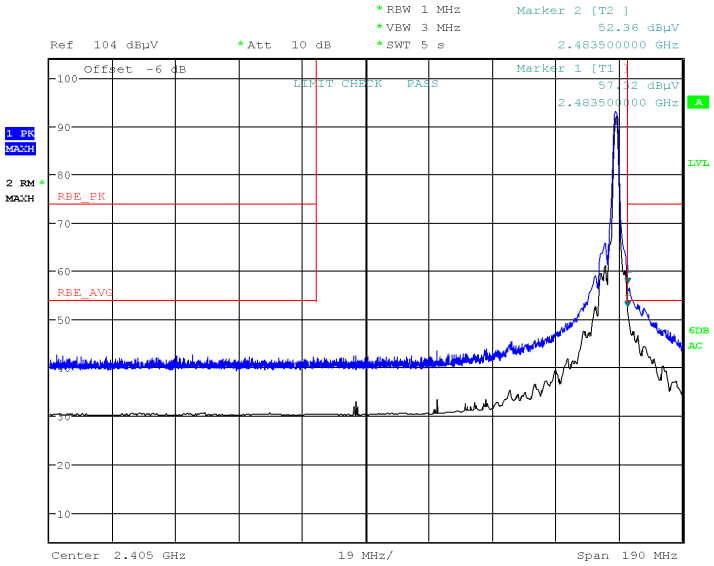
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Polarity	RBW (MHz)	Correction (dB)
4960.000	48.21	54	-5.79	352	2.23	Horizontal	1	-2.48
7440.000	45.44	54	-8.56	140	1.91	Vertical	1	1.29

Band Edges – Low Channel



Date: 4.FEB.2025 10:07:34

Band Edges – High Channel



Date: 4.FEB.2025 09:46:22

Tabular Data – Band Edges

Peak Data

TX Frequency (MHz)	Measured Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	RBW (MHz)	Correction (dB)
2402.000	2390.000	50.29	74	-23.71	4	113	1	-6.1
2480.000	2483.500	57.32	74	-16.68	12	240	1	-6

Average Data

TX Frequency (MHz)	Measured Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	RBW (MHz)	Correction (dB)
2402.000	2390.000	43.05	54	-10.95	4	113	1	-6.1
2480.000	2483.500	52.36	54	-1.64	12	240	1	-6

Test Personnel:	Jeremy Pickens	Test Date:	3-4 February 2025
Supervising/Reviewing Engineer: (Where Applicable)			
Product Standard:	ANSI C63.10	Limit Applied:	15.209
Input Voltage:	5Vdc Battery		
Pretest Verification w/ Ambient Signals or BB Source:	BB	Ambient Temperature:	18.6 – 19.2ºC
		Relative Humidity:	9.8 – 12.7%
		Atmospheric Pressure:	98.6 – 98.9kPa

Deviations, Additions, or Exclusions: None

11 AC Conducted Emissions

11.1 Method

Tests were performed in accordance with ANSI C63.10.

TEST SITE: 10 Meter Chamber

10 Meter Semi-Anechoic Chamber The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096. It is a 10 meter semi-anechoic chamber manufactured by Panashield. Embedded in the floor is a 3-meter diameter turntable.

Sample Calculations

The following calculations were used to determine the net line-conducted measurements:

NF = RF + LF + CF + AF

Where NF = Net Reading in dBμV
RF = Reading from receiver in dBμV
LF = LISN or ISN Correction Factor in dB
CF = Cable Correction Factor in dB
AF = Attenuator Loss Factor in dB

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

NF = RF + LF + CF + AF = 28.5 + 0.2 + 0.4 + 20.0 = 49.1 dBμV
$UF = 10^{(49.1\ dB\mu V / 20)}$ = 285.1 μV/m

11.2 Test Equipment

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
200162	EMI Receiver (20Hz-40GHz)	Rohde & Schwarz	ESU 40	100314	10/26/2024	10/26/2025
212165	Barometric Pressure/Humidity Datalogger	Extech	SD700	110344	04/03/2024	04/03/2025
213498	Two-Line V-Network	Rohde & Schwarz	ENV216	101577	10/09/2024	10/09/2025
MM12	RF Coax Cable 9KHz-18GHz	Fairview Microwave	SCE18110505-600CM	MM12	08/23/2024	08/23/2025

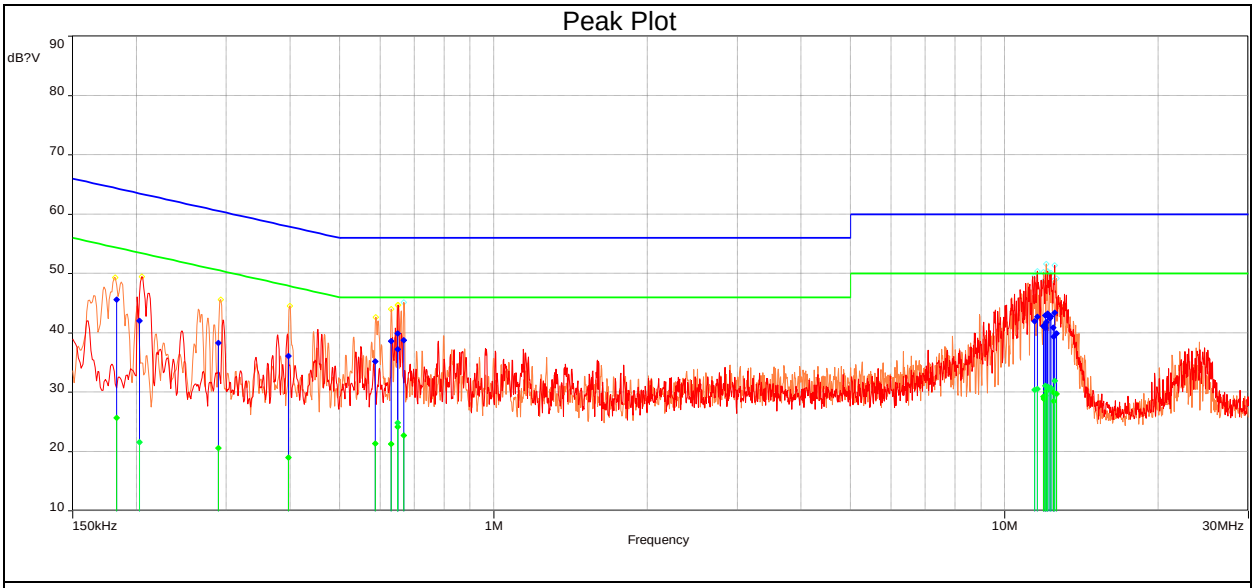
Software Utilized

Name	Manufacturer	Version
EMC BAT	Nexio	3.19.1.18

11.3 Results

The sample tested was found to Comply.

11.4 Plots/Data



Tabular Data

Frequency (MHz)	AVG Level (dBµV)	QP Level (dBµV)	Limit AVG (dBuV)	Limit QP (dBuV)	AVG Margin (dB)	QP Margin (QP)	Line	Correction (dB)
0.203	21.53	42.01	53.5	63.5	-31.96	-21.48	Phase 1	9.9
0.649	24.83	37.25	46.0	56.0	-21.17	-18.75	Phase 1	9.9
11.440	30.41	41.98	50.0	60.0	-19.59	-18.02	Phase 1	9.8
11.583	30.56	42.73	50.0	60.0	-19.44	-17.27	Phase 1	9.8
12.019	31.07	42.91	50.0	60.0	-18.93	-17.09	Phase 1	9.8
12.128	30.76	42.84	50.0	60.0	-19.24	-17.16	Phase 1	9.8
12.145	30.92	43.24	50.0	60.0	-19.08	-16.76	Phase 1	9.8
12.270	30.61	42.45	50.0	60.0	-19.39	-17.55	Phase 1	9.8
12.317	30.72	42.74	50.0	60.0	-19.28	-17.26	Phase 1	9.8
12.540	31.94	43.37	50.0	60.0	-18.06	-16.63	Phase 1	9.8
0.182	25.68	45.6	54.4	64.4	-28.68	-18.76	Phase 2	9.7
0.290	20.58	38.27	50.5	60.5	-29.97	-22.27	Phase 2	9.8
0.397	19	36.08	47.9	57.9	-28.92	-21.84	Phase 2	9.8
0.587	21.33	35.15	46.0	56.0	-24.67	-20.85	Phase 2	9.8
0.630	21.3	38.57	46.0	56.0	-24.7	-17.43	Phase 2	9.8
0.648	24.17	39.86	46.0	56.0	-21.83	-16.14	Phase 2	9.8
0.667	22.71	38.73	46.0	56.0	-23.29	-17.27	Phase 2	9.8
11.914	29.25	41.07	50.0	60.0	-20.75	-18.93	Phase 2	9.8
11.939	28.9	41.17	50.0	60.0	-21.1	-18.83	Phase 2	9.8
12.002	29.4	40.83	50.0	60.0	-20.6	-19.17	Phase 2	9.8
12.057	30.12	41.81	50.0	60.0	-19.88	-18.19	Phase 2	9.8
12.457	30.02	40.88	50.0	60.0	-19.98	-19.12	Phase 2	9.8
12.484	28.5	39.39	50.0	60.0	-21.5	-20.61	Phase 2	9.8
12.627	29.73	39.92	50.0	60.0	-20.27	-20.08	Phase 2	9.8

Test Personnel: Jeremy Pickens
Test Date: 03 February 2024
Supervising/Reviewing Engineer: (Where Applicable)
Product Standard: ANSI C63.10
Limit Applied: 15.207 / RSS-Gen S8.8
Input Voltage: 120Vac, 60Hz
Pretest Verification w/ Ambient Signals or BB Source: BB
Ambient Temperature: 19.2 ºC
Relative Humidity: 25.9 %
Atmospheric Pressure: 98.7 kPa

Deviations, Additions, or Exclusions: None

12 Measurement Uncertainty

Parameter	Expanded Uncertainty for Normal k factor equal to 2
Radio Frequency	0.07
Total RF Power (Conducted)	0.65
Power Density (Conducted)	0.65
RF Spurious (Conducted)	1.8 dB
Radiated Emissions (9kHz-30MHz)	4.7 dB
Radiated Emissions (30MHz-1GHz)	4.1 dB
Radiated Emissions (1GHz-18GHz)	4.5dB
Radiated Emissions (18GHz-40GHz)	4.7 dB
AC Line Conducted Emissions	2.8 dB
Temperature	0.7°
Humidity	3.9%

13 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	26 February 2025	106114493ATL-004	JOP	BL	Original Issue