TEST REPORT

Report Number: 104590627MIN-002
Project Number: G104590627

Testing performed on the
Flash Wireless Smart Thermostat (BLE)

to
47 CFR, Part 15. 247:2021
RSS- 247, Issue 2, 2017
RSS-Gen, Issue 5, 2019, Amendment 2

For
Ademco Inc.

Test Performed by:	Test Authorized by:
Intertek Testing Services NA, Inc.	Ademco Inc.
40 51st Way NE, Suite 100	1985 Douglas Dr N
Fridley, MN 55421 USA	Golden Valley, MN 55422, USA

Prepared by: Richard Blonigen

Reviewed by: Uri Spector Date of issue: August 24, 2021

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1.0 GENERAL DESCRIPTION

Model:	Flash
Type of EUT:	Wireless Smart Thermostat BLE Transceiver
Serial Number:	SN: 070 Radiated Unit SN: 330 Conducted Unit
Related Submittal(s) Grants:	None
Company:	Ademco Inc.
Customer:	Dave Mulhouse
Address:	1985 Douglas Dr N Golden Valley, MN 55422, USA
Fax:	Dave.mulhouse@resideo.com
e-mail:	Ademco Inc.
Test Standards:	☒ 47 CFR, Part 15:2021, §15.247 ☒ RSS–247, Issue 2, 2017 ☒ RSS-Gen, Issue 5, 2019, Amendment 2
Type of radio:	☒ Stand -alone ☐ Module ☐ Hybrid
Date Sample Submitted:	July 30, 2021
Test Work Started:	August 2, 2021
Test Work Completed:	August 24, 2021
Test Sample Conditions:	☐ Damaged ☐Poor (Usable) ☒ Good

1.1 Product Description; Test Facility

Product Description:	2.4GHz BLE
Transmitter Type:	☐ FHSS ☒ Digital Modulation ☐ Wi-Fi ☒ Bluetooth
Permitted Band of Operation	2400 to 2483.5MHz
Operating Frequency Range(s):	2402 MHz – 2480 MHz
Number of Channels:	40
Modulation:	GFSK
Antenna(s) Info:	PCB Trace Antenna Gain: 1.93dBi
Antenna Installation:	☐ User ☐ Professional ☒ Factory
Transmitter power configuration:	☒ External power source ☒ 24VAC via CUI Inc. 48A-24-500 power adapter
Special Test Arrangement:	None
Test Facility Accreditation:	A2LA (Certificate No. 1427.01)
Test Methodology:	Measurements performed according to the procedures in ANSI C63.10-2013 and FCC 558074 D01 DTS Measurement Guidance

1.2 EUT Configuration

The equipment under test was operated during the measurement under the following conditions:

☐ - Standby
☒ - Continuous transmissions (modulated signal)
☐ - Continuous transmissions (un-modulated signal)
☐ - Continuous receiving
☐ - Test program (customer specific)
☐ -

Operating modes of the EUT:

No.	Description
1	Test Mode – The EUT transmitted continuously and per client was configured to transmit with 98.5% duty cycle. Software used for testing: espRFTool version: 2.5
2	Test was performed at Ch.1 (2402MHz), Ch.19 (2440MHz), and Ch.39 (2480MHz)
3	BLE Data Rate: 1Mbps. Channels Output Power Setting (Test Software setting) per client request was set to 6 for all channels.

Notes: For conducted measurements client provided the sample configured with antenna connector instead of PCB trace antenna. For radiated measurements client provided the sample with PCB trace antenna.

Cables:

No.	Type	Length	Designation	Note
1	2-wire unshielded	2m	AC Power	

Support equipment/Services:

No.	Item	Description
1	Asus Laptop	Computer for setup only (disconnected during measurements)
2	CUI Inc. 48A-24-500 power adapter	24VAC Power Source

1.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

☒ **Normal**

Temperature:	+15 to +35 ° C
Humidity:	20-75 %
Atmospheric pressure:	86-106 kPa

☐ **Extreme**

☐ **Temperature:**	~~-20 to +50 ° C~~
☐ **Supply voltage:**	~~85% to +115%~~

1.4 Measurement uncertainty

Radiated Emissions:

Measurement	Frequency Range	Expanded Uncertainty (k=2)
Radiated Emissions, 3m	9 kHz-30 MHz	3.2 dB
Radiated Emissions, 10m	30-1000 MHz	4.0 dB
Radiated Emissions, 3m	30-1000 MHz	4.8 dB
Radiated Emissions, 3m	1-6 GHz	5.1 dB
Radiated Emissions, 3m	6-18 GHz	5.2 dB
Radiated Emissions, 3m	18-40 GHz	5.2 dB

AC Mains Conducted Emissions:

Measurement	Frequency Range	Expanded Uncertainty (k=2)
AC Line Conducted Emissions	150 kHz - 30 MHz	2.6 dB

Conducted Spurious RF Emissions:

The expanded uncertainty (k = 2) for Conducted Spurious Emissions has been determined to be: ±1.5 dB

1.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured emissions reading on the EMI Receiver.
The basic equation with a sample calculation is as follows:
FS = RA + AF + CF - AG

Where: FS = Field Strength in dB(µV/m)
RA = Receiver Amplitude in dB(µV)
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB(m^{-1})
AG = Amplifier Gain in dB

Assume a receiver reading of 48.1 dB(µV) is obtained. The antenna factor of 7.4 dB(m^{-1}) and cable factor of 1.6 dB is added and amplifier gain of 16.0 dB is subtracted giving field strength of 41.1 dB(µV/m).

RA = 48.1 dB(µV)
AF = 7.4 dB(m^{-1})
CF = 1.6 dB
AG = 16.0 dB
FS = RA + AF + CF - AG
FS = 48.1 + 7.4 + 1.6 – 16.0
FS = 41.1 dB(µV/m)

2.0 TEST SUMMARY

Referring to the performance criteria and the operating mode during the tests specified in this report, the equipment complies with the requirements according to the following standards.

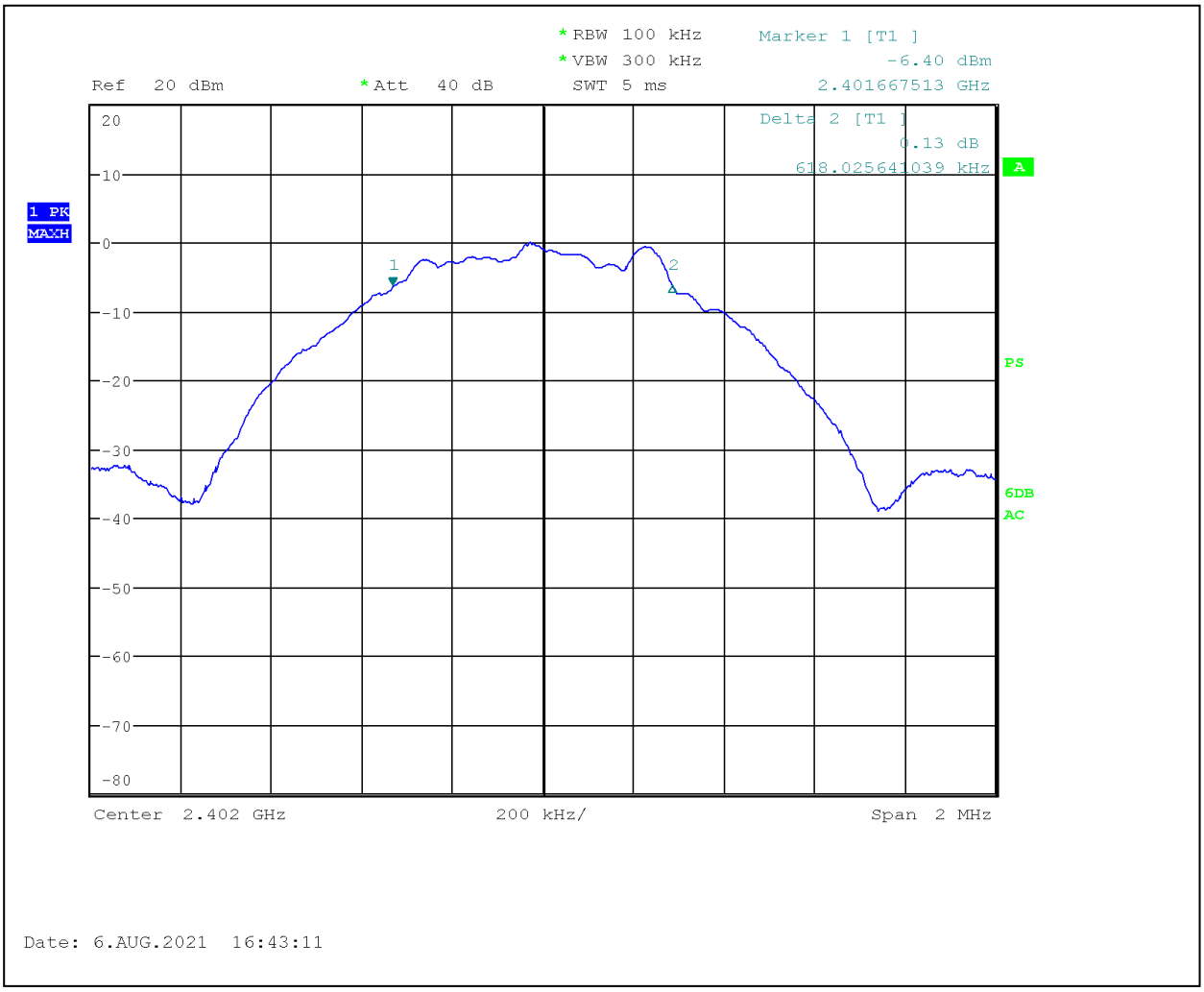
TEST SPECIFICATION	TEST PARAMETERS	RESULT
15.247(a) / RSS-247 5.2	6dB Emission bandwidth of a DTS Transmission	Pass
15.247(b), (c) / RSS-247 5.4	Maximum peak output power	Pass
15.247/(e) / RSS-247 5.2	Power spectral density	Pass
15.247(d) / RSS-247 5.5	Antenna conducted spurious emissions	Pass
15.247(d) / RSS-247 5.5	Radiated spurious emissions	Pass
15.247(i) / RSS- Gen 5.5	RF Exposure Compliance	Pass
15.207 / RSS-Gen 7.2.2	Transmitter Power Line conducted emissions	Pass

3.0 TEST CONDITIONS AND RESULTS

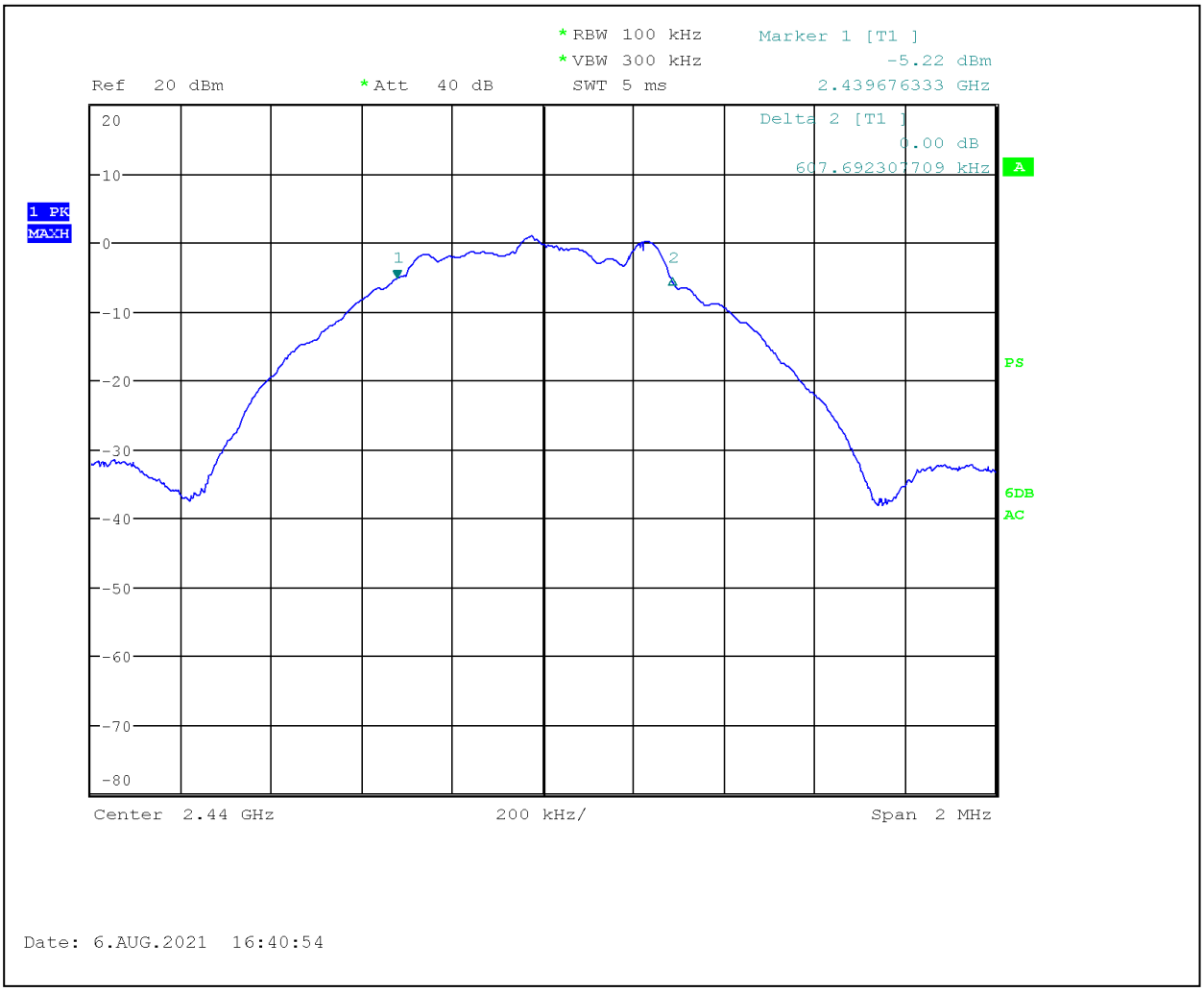
3.1 6dB Emission bandwidth of a DTS Transmission

Low Frequency Channel (1) kHz	Middle Frequency Channel (19) kHz	Upper Frequency Channel (39) kHz	Minimum Bandwidth kHz	Result
638.0	607.7	631.3	500	**Pass**
RBW: **VBW:**	☒ 100kHz ☒ 300kHz			

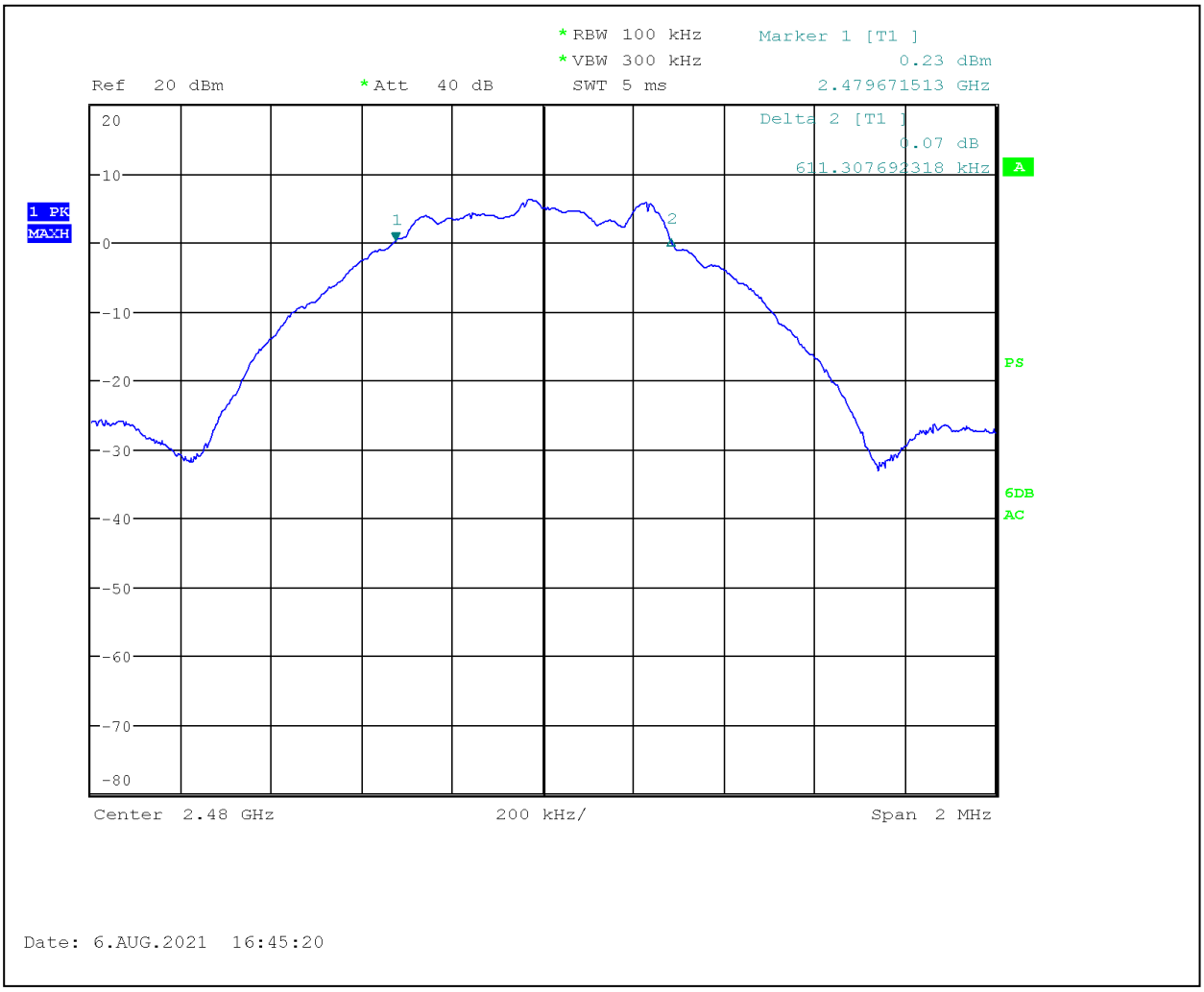
Notes:


* RBW 100 kHz
* VBW 300 kHz
Ref 20 dBm
* Att 40 dB
SWT 5 ms
Marker 1 [T1]
-6.40 dBm
2.401667513 GHz
Delta 2 [T1]
0.13 dB
618.025641039 kHz
A
1 PK
MAXH
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
2
PS
6DB
AC
Center 2.402 GHz
200 kHz/
Span 2 MHz
Date: 6.AUG.2021 16:43:11

Graph 3.1.1


* RBW 100 kHz
* VBW 300 kHz
Ref 20 dBm
* Att 40 dB
SWT 5 ms
Marker 1 [T1]
-5.22 dBm
2.439676333 GHz
Delta 2 [T1]
0.00 dB
607.692307709 kHz
A
1 PK
MAXH
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
PS
6DB
AC
Center 2.44 GHz
200 kHz/
Span 2 MHz
Date: 6.AUG.2021 16:40:54

Graph 3.1.2

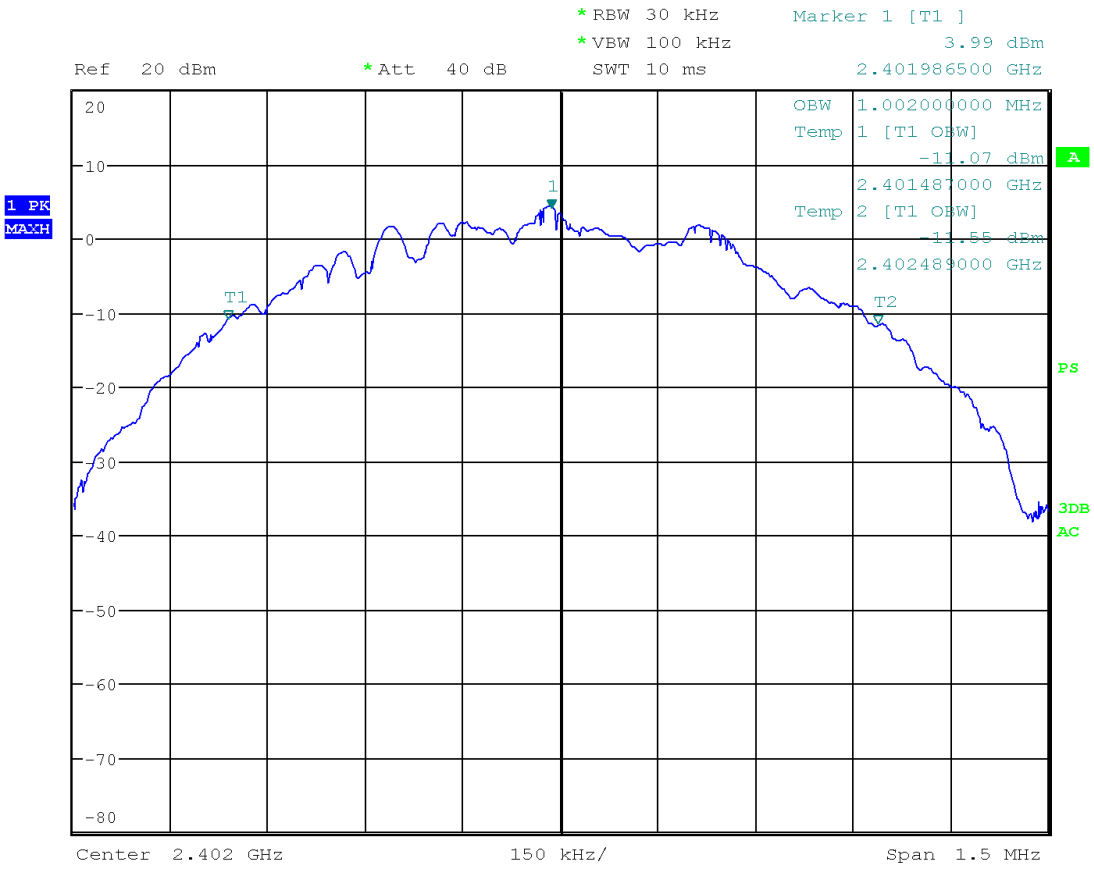

* RBW 100 kHz
* VBW 300 kHz
Ref 20 dBm
* Att 40 dB
SWT 5 ms
Marker 1 [T1]
0.23 dBm
2.479671513 GHz
Delta 2 [T1]
0.07 dB
611.307692318 kHz
A
1 PK
MAXH
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
PS
6DB
AC
Center 2.48 GHz
200 kHz/
Span 2 MHz
Date: 6.AUG.2021 16:45:20

Graph 3.1.3

3.2 Occupied bandwidth (OBW) (99%)

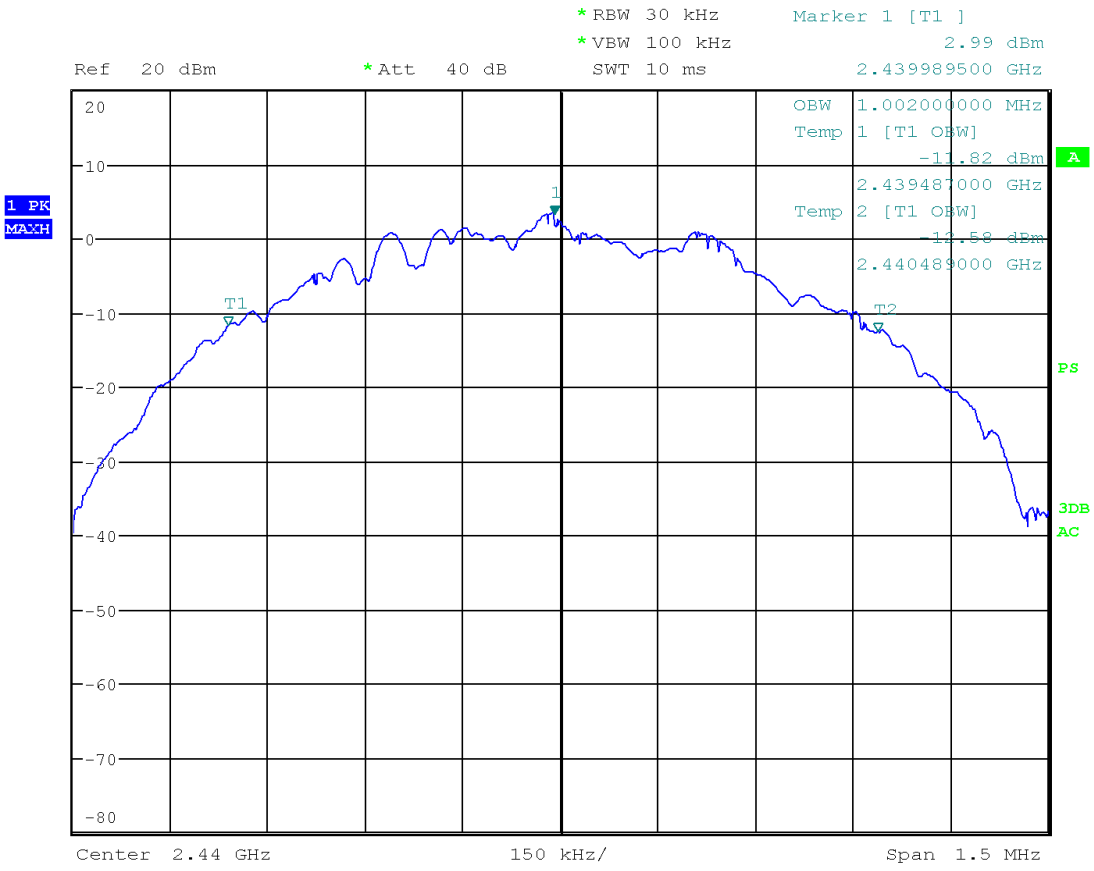
Low Frequency Channel (1) kHz	Middle Frequency Channel (19) kHz	Upper Frequency Channel (39) kHz	Result
1002.0	1002.0	1002.0	**Pass**
RBW: **VBW:**	☒ 30kHz ☒ 300kHz		

Notes:



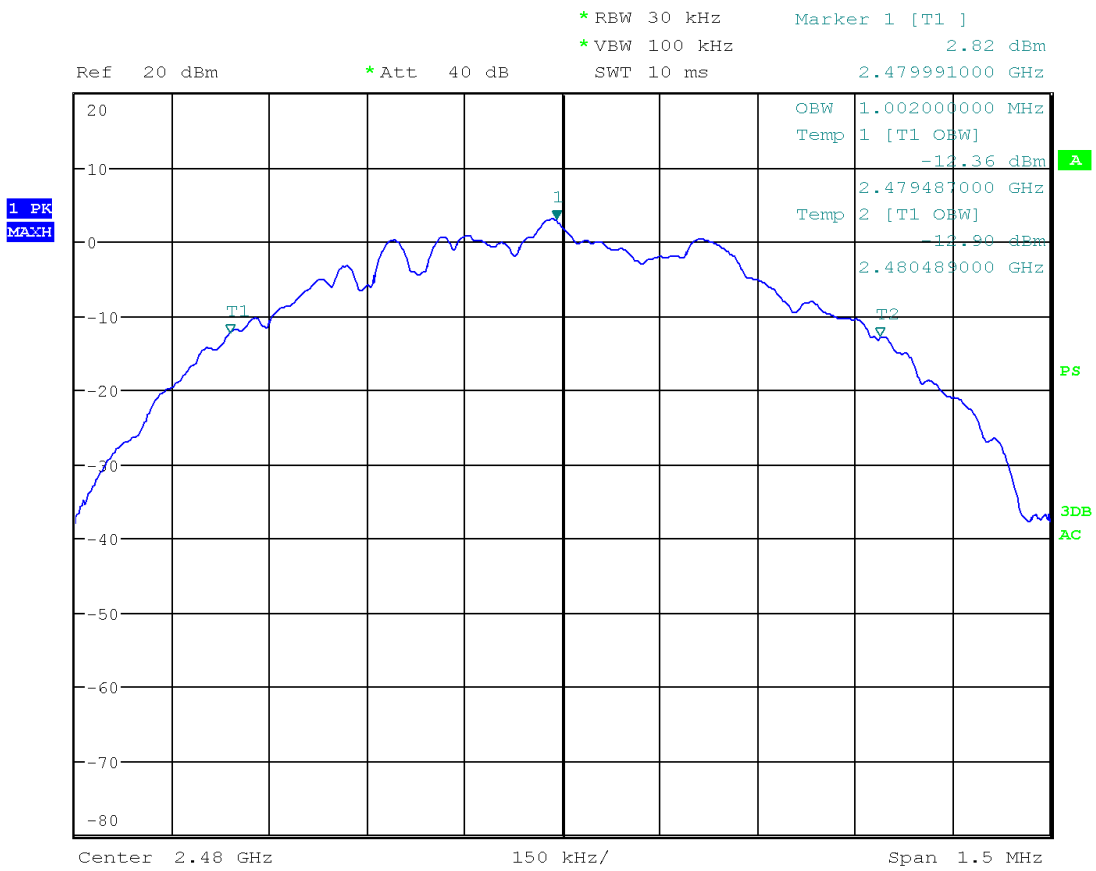
Date: 21.SEP.2021 13:11:43

Graph 3.2.1



Date: 21.SEP.2021 13:11:06

Graph 3.2.2



Date: 21.SEP.2021 13:10:31

Graph 3.2.3

3.3 Maximum conducted peak output power

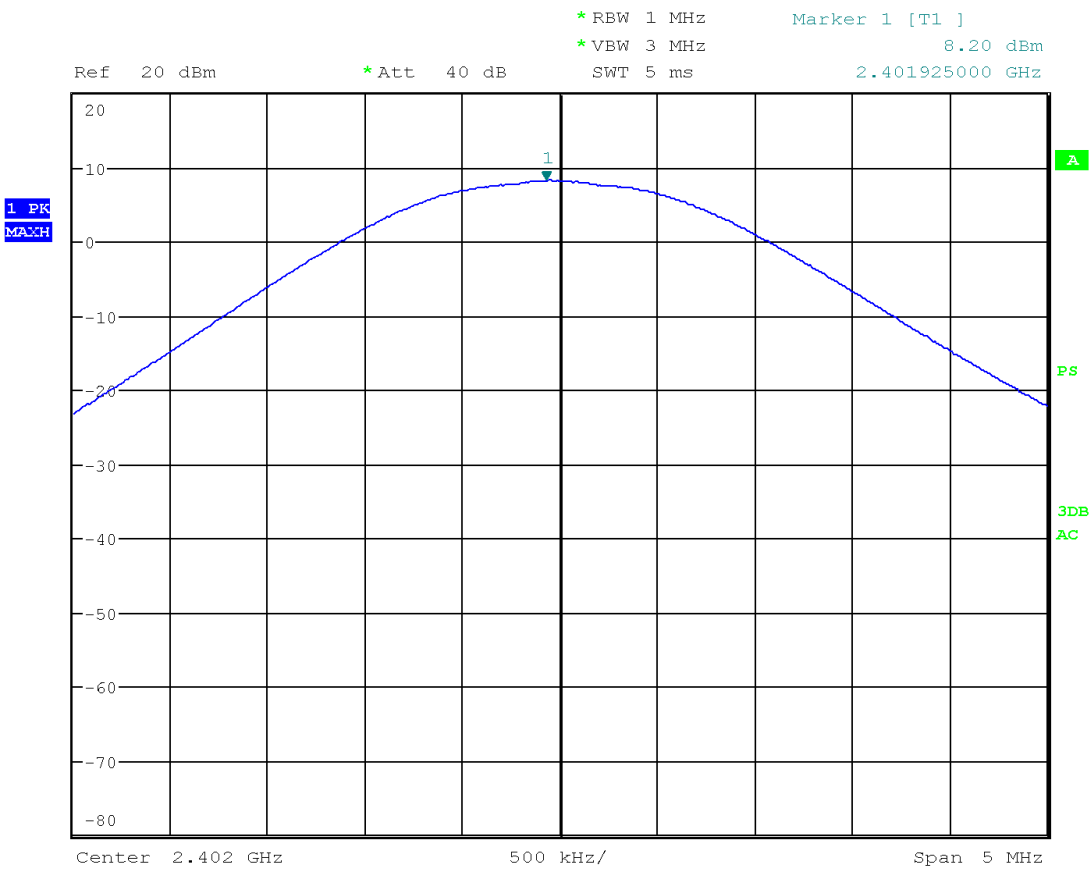
Test result: **Pass**

Maximum Power: 9.7dBm (9.33mW / 0.00933W) Margin: 20.3dB below the limits

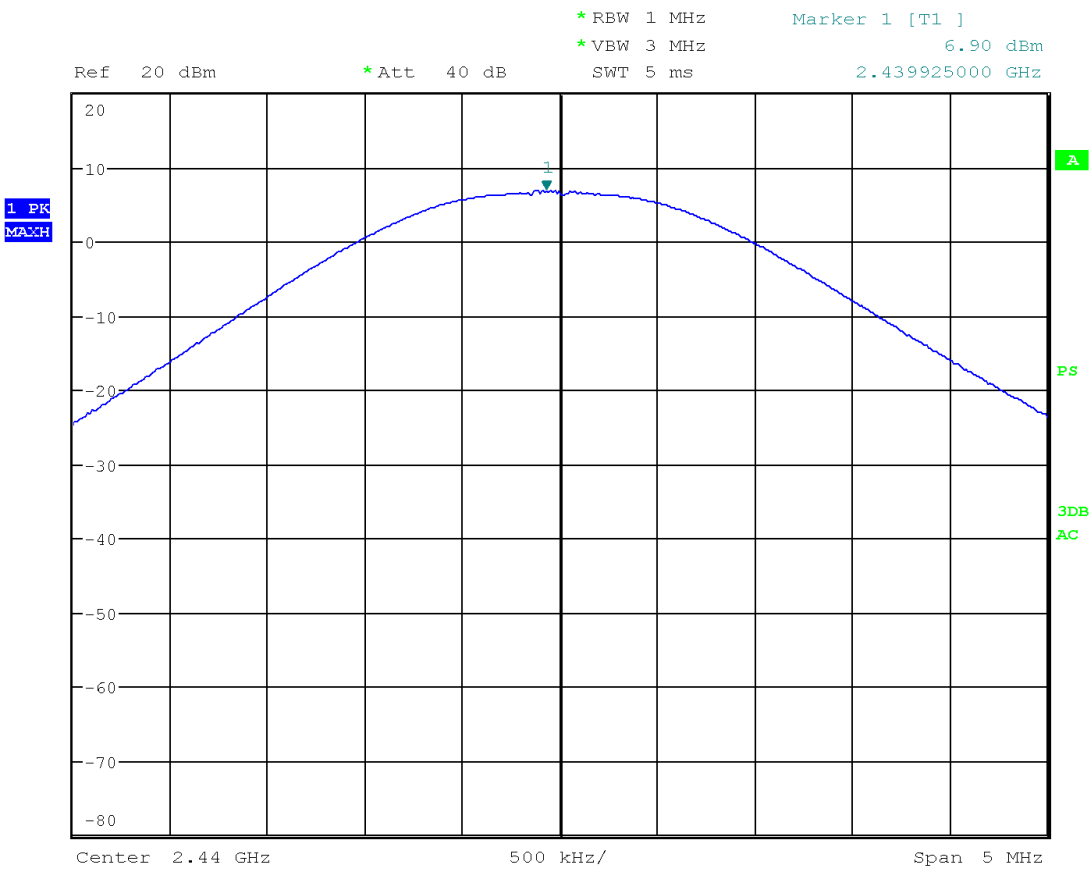
Power Output:	**Conducted**					
Frequency Range:	☐ 902-928MHz		☒ 2400-2483.5MHz		☐ 5725-5850MHz	
Low Frequency MHz	**Measured power dBm**	**Attenuaton dB**	**Power at Antenna dBm**	**Limit dBm**	**Limit Reduction dB**	**Margin dB**
2402	8.2	1.5	9.7	30	0	-20.3
Middle Frequency MHz						
2440	6.9	1.5	8.4	30	0	-21.6
Upper Frequency MHz						
2480	6.4	1.5	7.9	30	0	-22.1
RBW:	☒ 1MHz	☐ 3MHz	☐ 10MHz			
VBW:	☐ 1MHz	☒ 3MHz	☐ 10MHz			
Antenna Gain:	☒ < 6dBi	☐ >6dBi and = dBi, Output power reduction = dB				

Notes: The procedure described in ANSI C63.10-2013 was used. Specifically, Section 11.9.1.1 RBW ≥ DTS bandwidth was utilized as the spectrum analyser's resolution bandwidth was greater than the DTS bandwidth.

The maximum peak conducted output power limit is 1 W, or 30dBm.
Graphs 3.3.1, 3.3.2, 3.3.3 show the conducted output power.

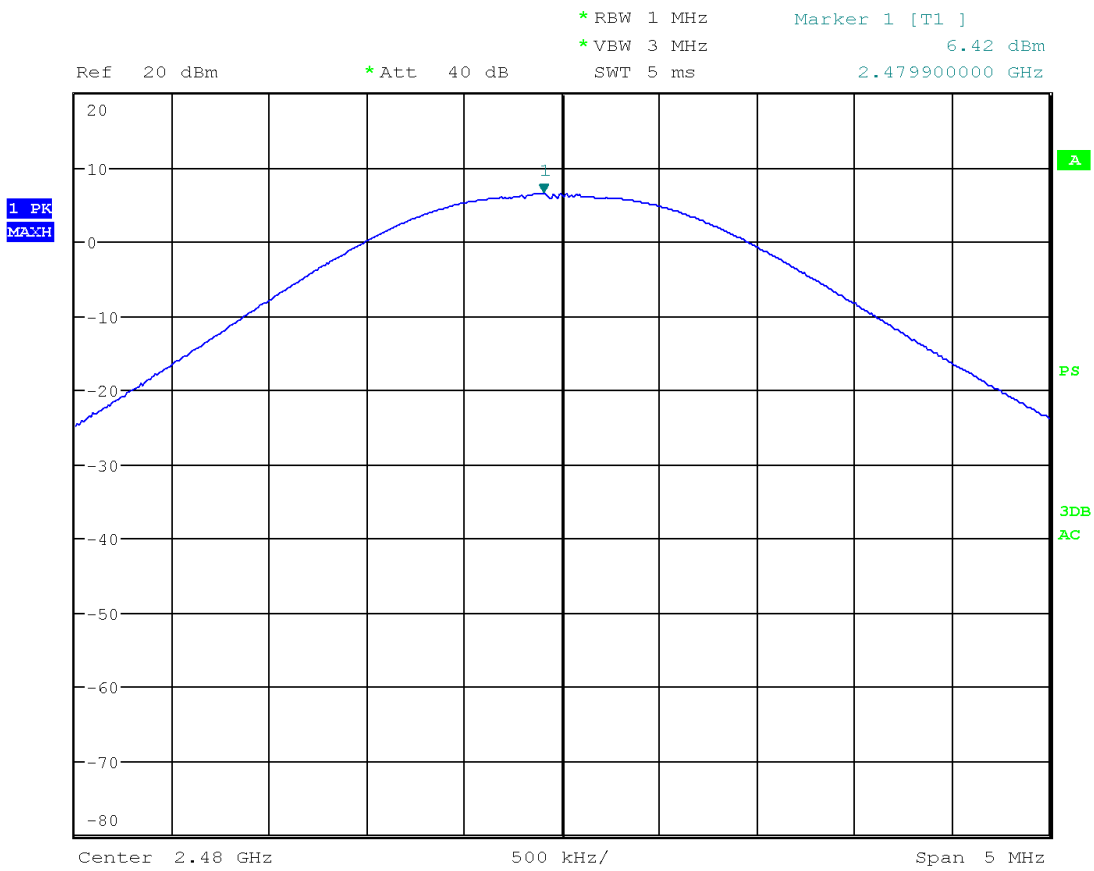

* RBW 1 MHz
* VBW 3 MHz
SWT 5 ms
Marker 1 [T1]
8.20 dBm
2.401925000 GHz
Ref 20 dBm
* Att 40 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.402 GHz
500 kHz/
Span 5 MHz
Date: 30.AUG.2021 17:32:42

Graph 3.3.1



Date: 30.AUG.2021 17:33:16

Graph 3.3.2



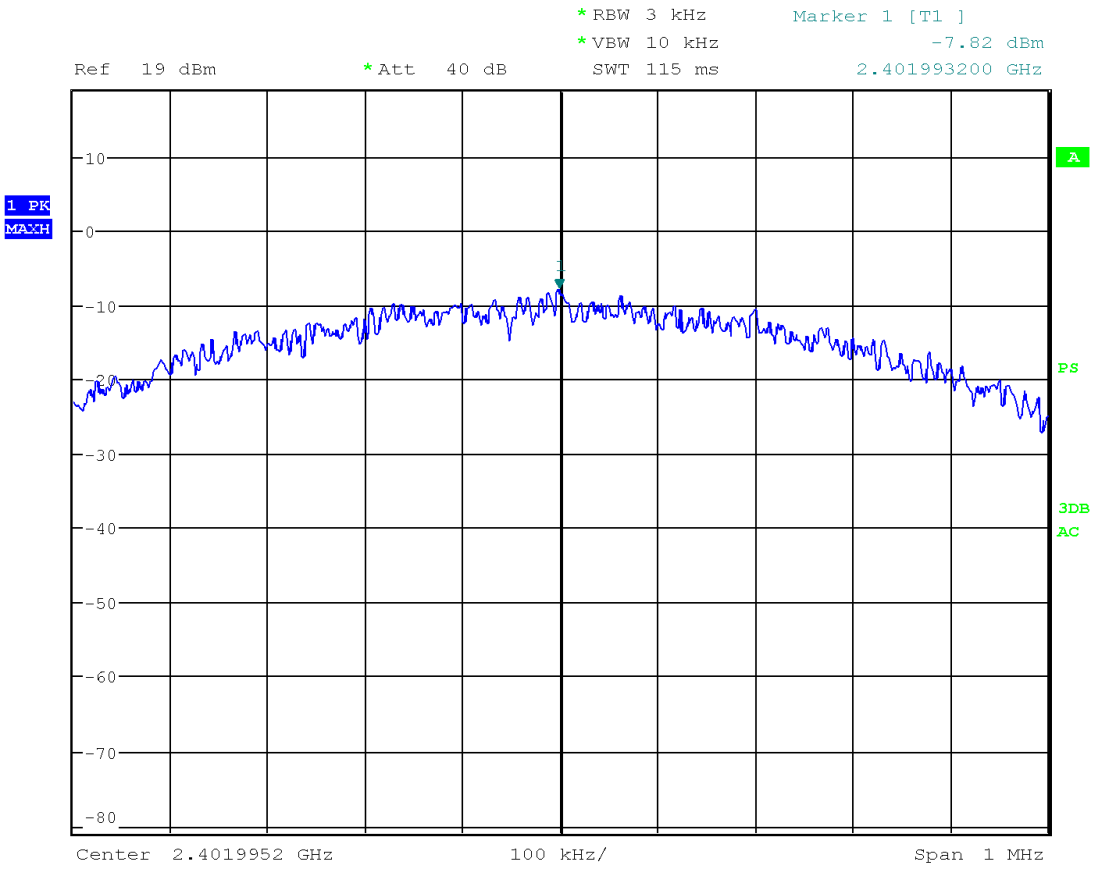
Date: 30.AUG.2021 17:33:54

Graph 3.3.3

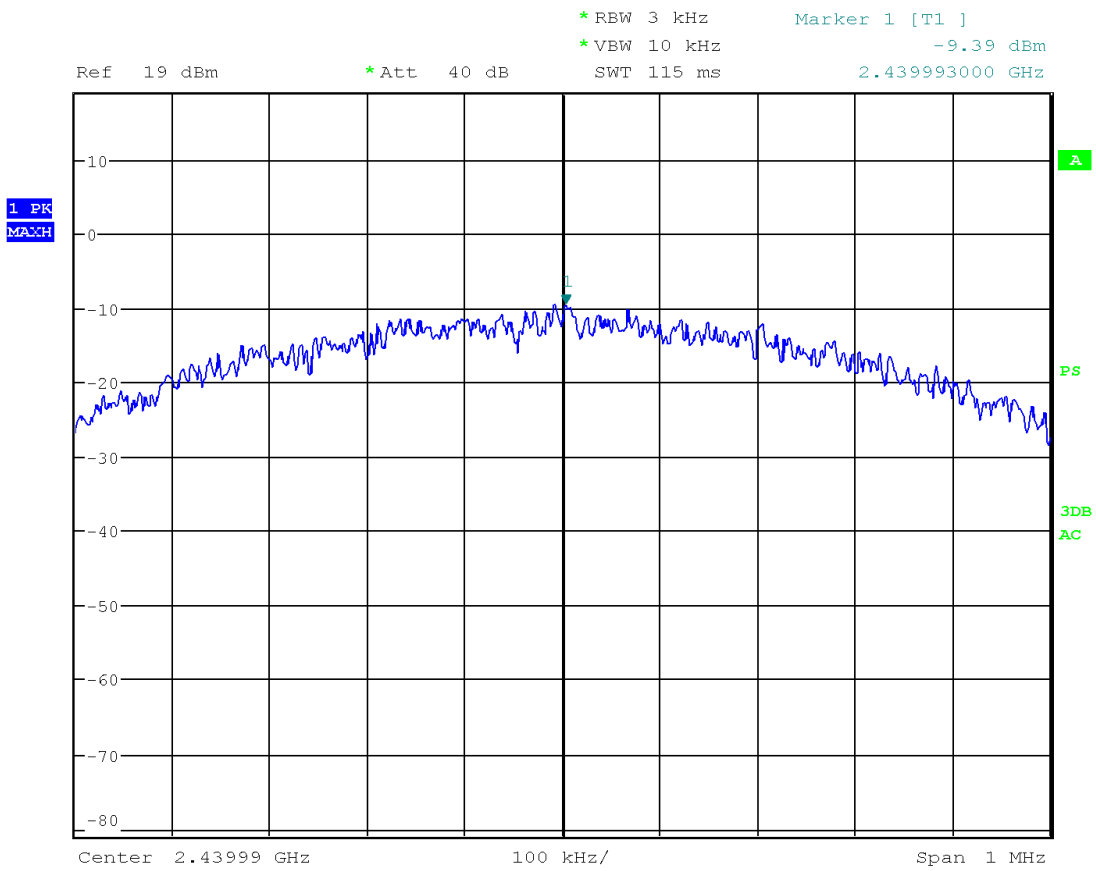
3.4 Power spectral density

Power Output:	☒ Conducted ☐ Radiated			
	Measured Density dBm	**Power Density at Antenna dBm**	**Limit dBm**	**Margin dB**
Low Frequency Channel	-7.8	-6.3	8	-14.3
Middle Frequency Channel	-9.4	-7.9	8	-15.9
Upper Frequency Channel	-9.9	-8.4	8	-16.4
Analyzer Settings:	☒ RBW=3KHz ☒ VBW=10KHz ☒ Span=1MHz ☒ Sweep=Auto			
Antenna Gain:	☒ < 6dBi and = dBi ☐ >6dBi and = dBi, limit reduction = dB			

Notes: The Power Spectral Density at Antenna was calculated adding the cable loss of 1.5dB from the measured density value.

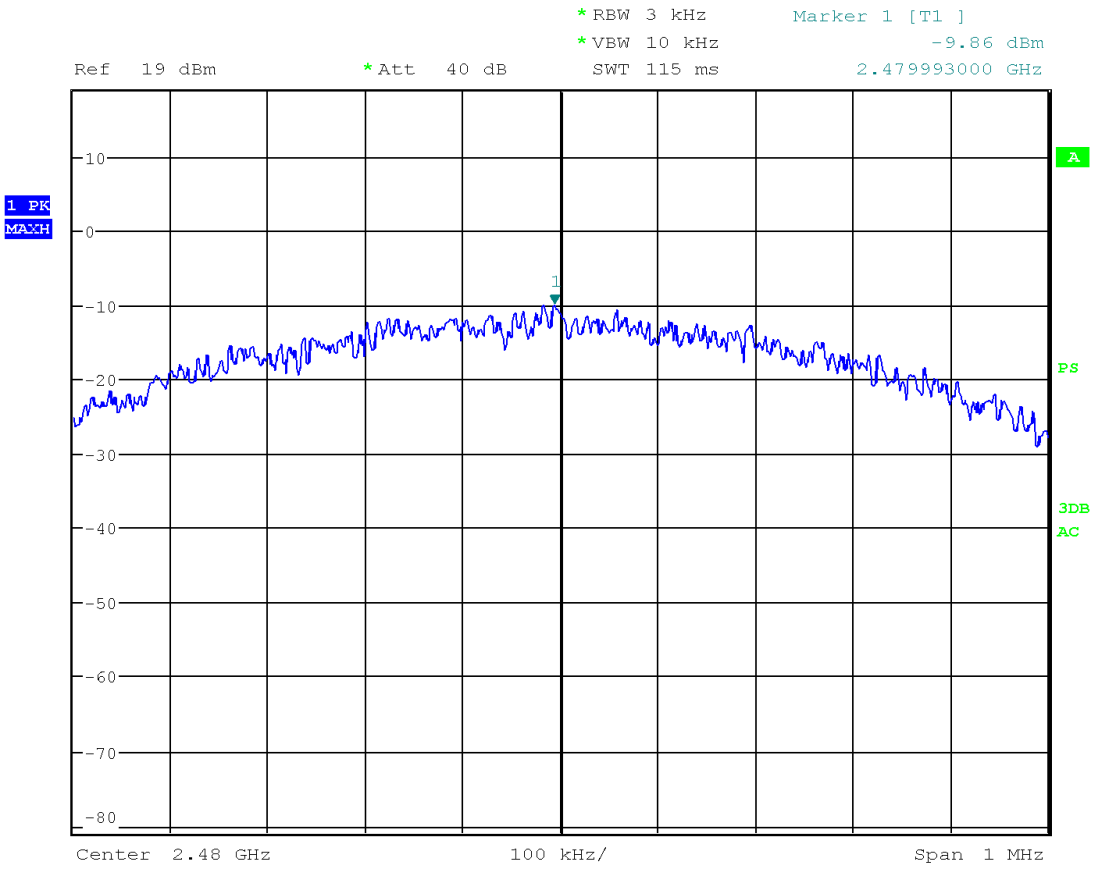

*RBW 3 kHz
*VBW 10 kHz
SWT 115 ms
Marker 1 [T1]
-7.82 dBm
2.401993200 GHz
Ref 19 dBm
*Att 40 dB
1 PK
MAXH
A
PS
3DB
AC
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.4019952 GHz
100 kHz/
Span 1 MHz
Date: 31.AUG.2021 16:35:02

Graph 3.4.1



Date: 31.AUG.2021 16:35:28

Graph 3.4.2



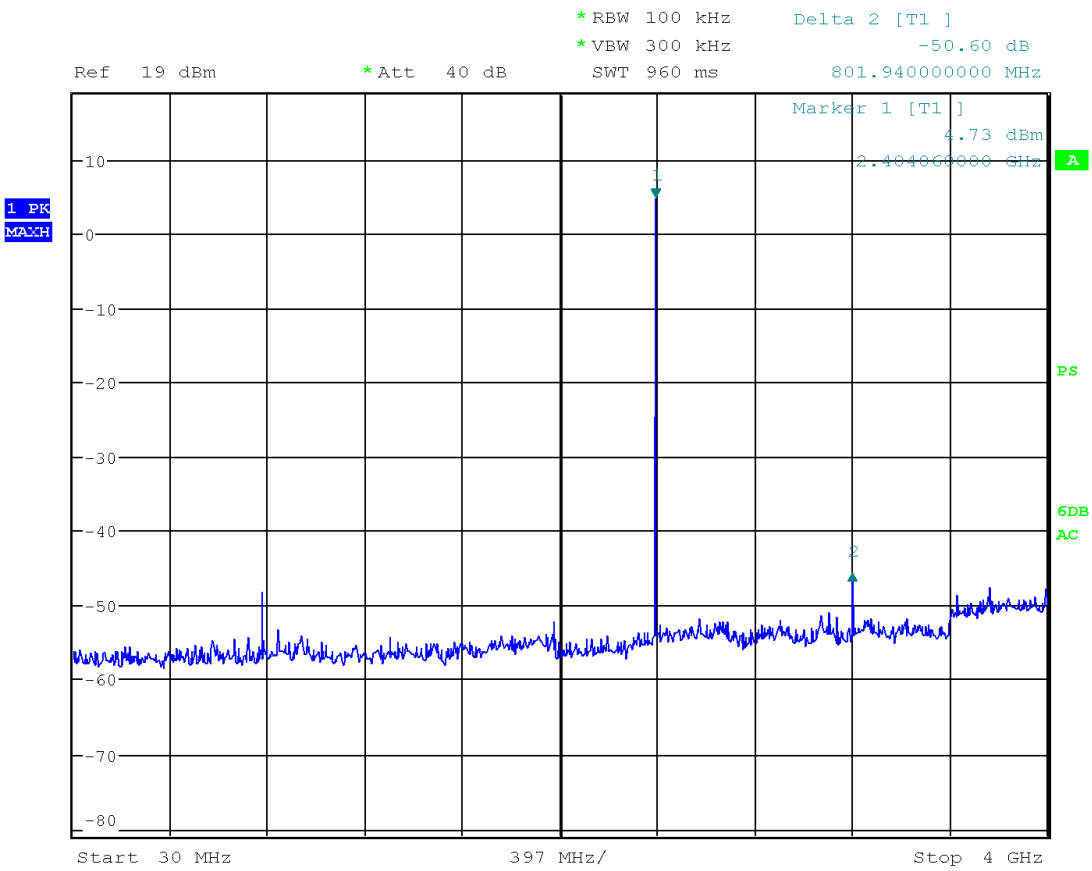
Date: 31.AUG.2021 16:35:59

Graph 3.4.3

3.5 Antenna conducted spurious emissions

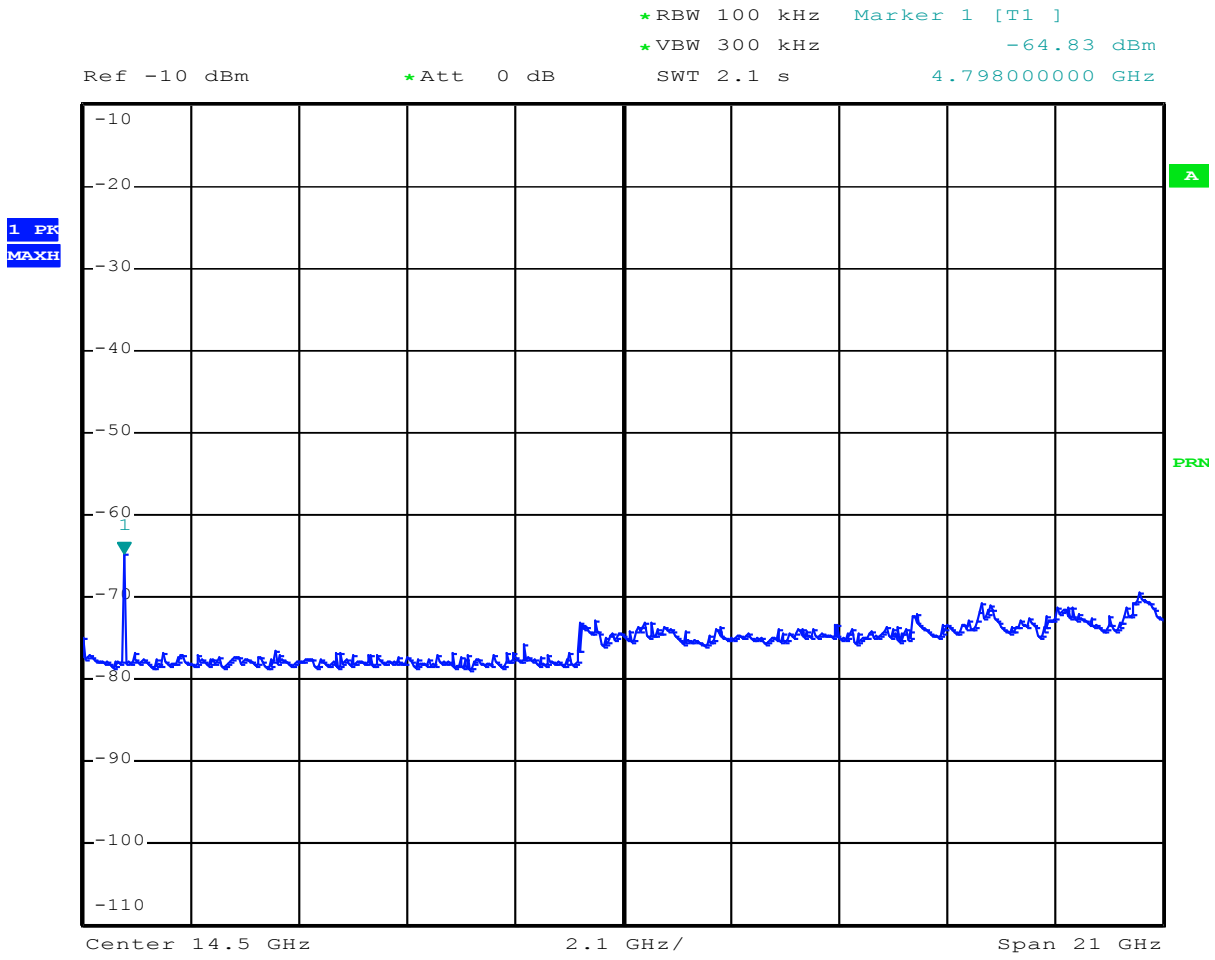
	Minimum Measured Attenuation dB	Minimum Allowed Attenuation dB	Margin dB
Low Frequency Channel	-50.6	-20	-30.6
Middle Frequency Channel	-51.4	-20	-31.4
Upper Frequency Channel	-52.3	-20	-32.3
Analyzer Settings:	☒ RBW=100KHz		
Minimum Allowed Attenuation:	☒ 20dB ☐ 30dB (for digital systems with conducted power measured using RMS averaging over a time interval)		

Notes: Graphs 3.5.1 - 3.5.6 show antenna conducted spurious emissions.
Graphs 3.5.7 - 3.5.8 show band edge compliance.

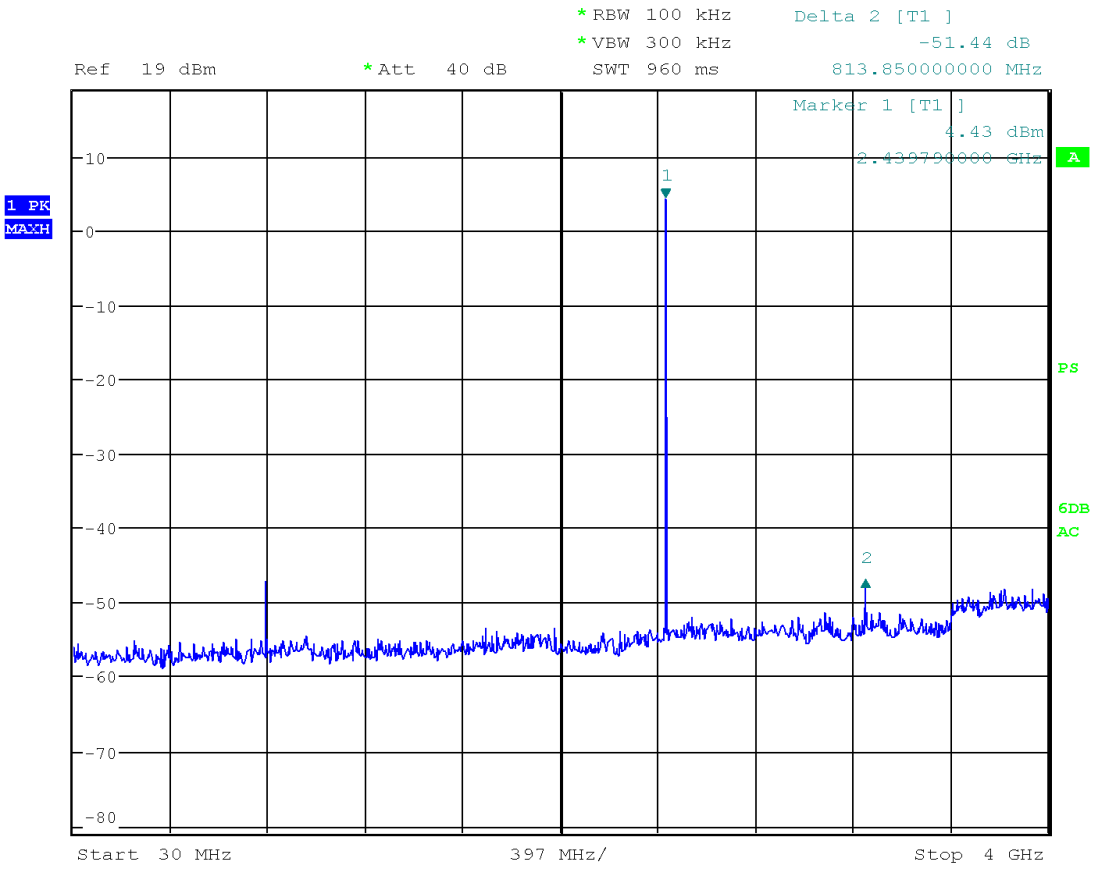


Date: 31.AUG.2021 16:38:41

Graph 3.5.1

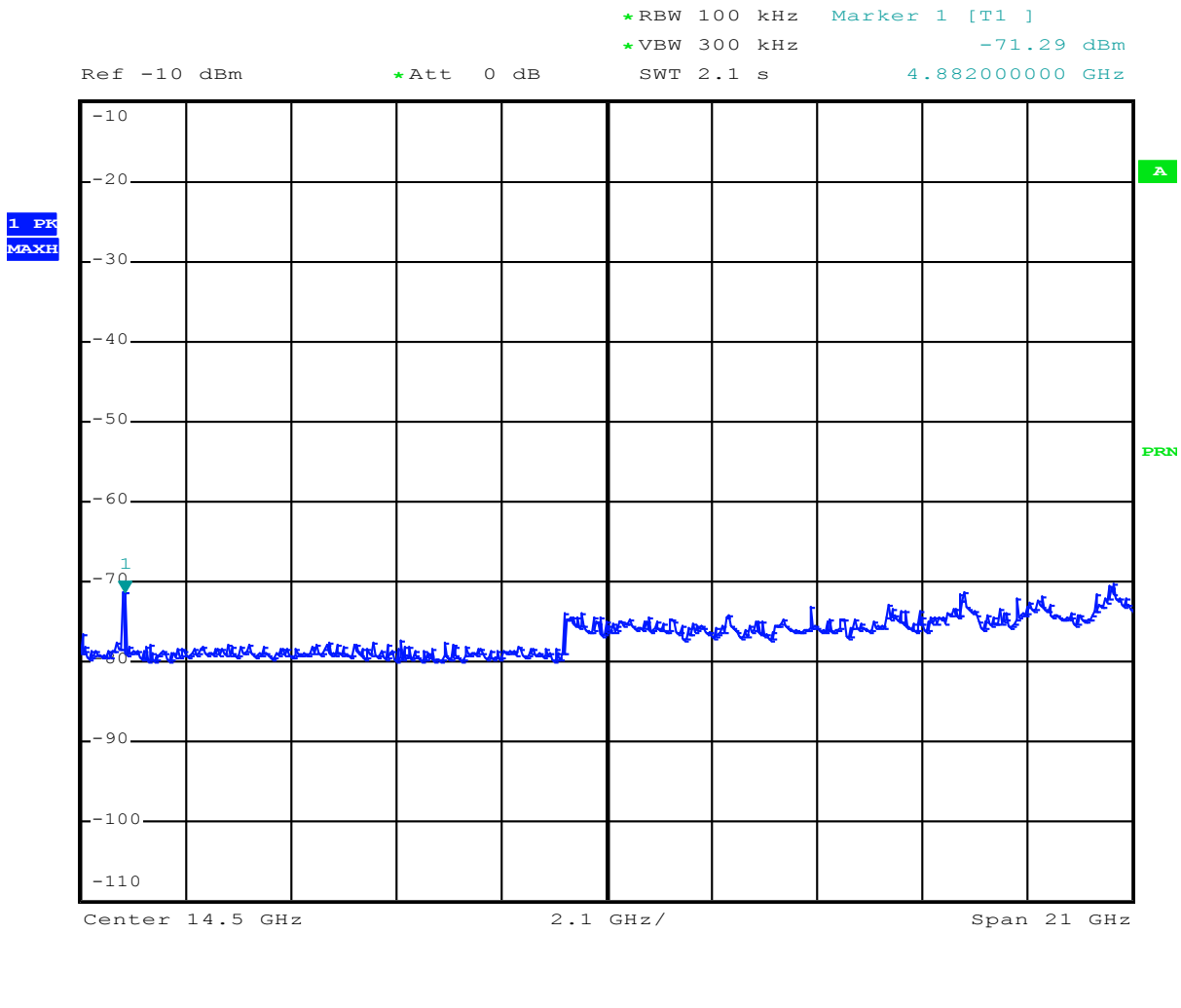

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-64.83 dBm
Ref -10 dBm
*Att 0 dB
SWT 2.1 s
4.798000000 GHz
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
1 PK
MAXH
A
PRN
1
Center 14.5 GHz
2.1 GHz/
Span 21 GHz
Date: 20.JUL.2000 20:03:22

Graph 3.5.2

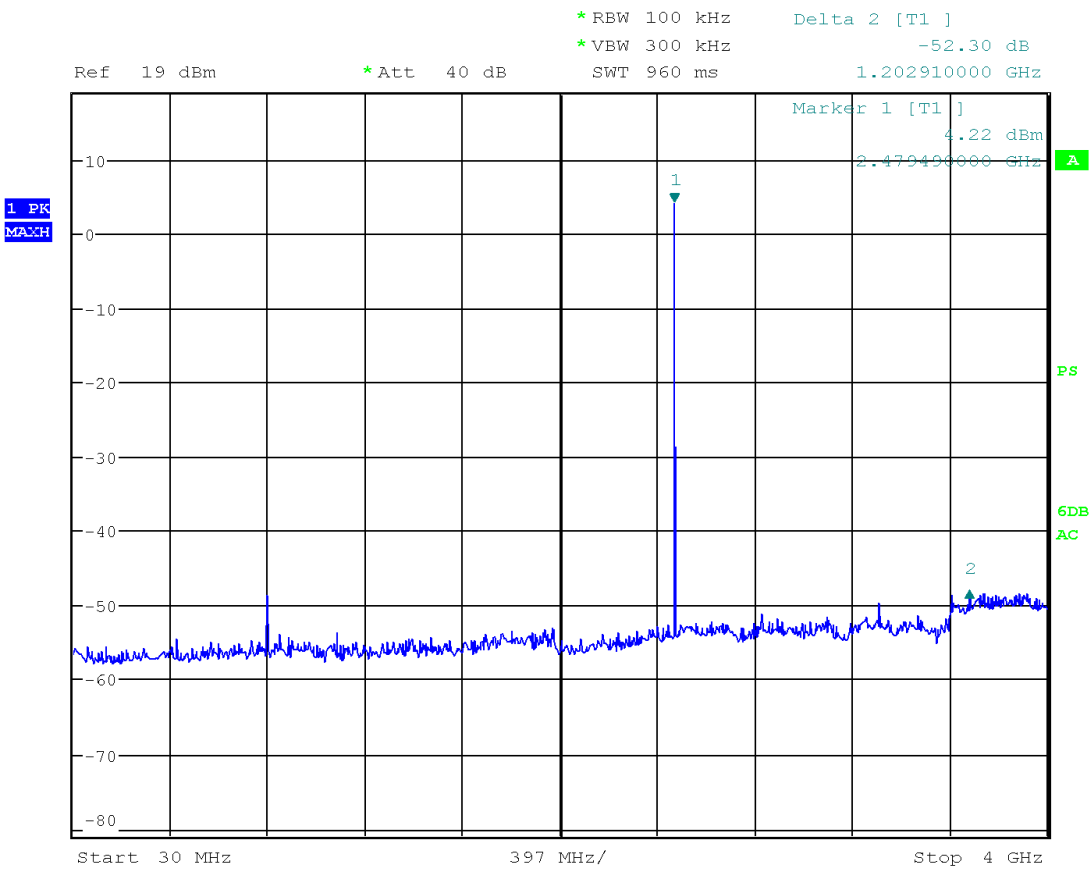


Date: 31.AUG.2021 16:39:06

Graph 3.5.3

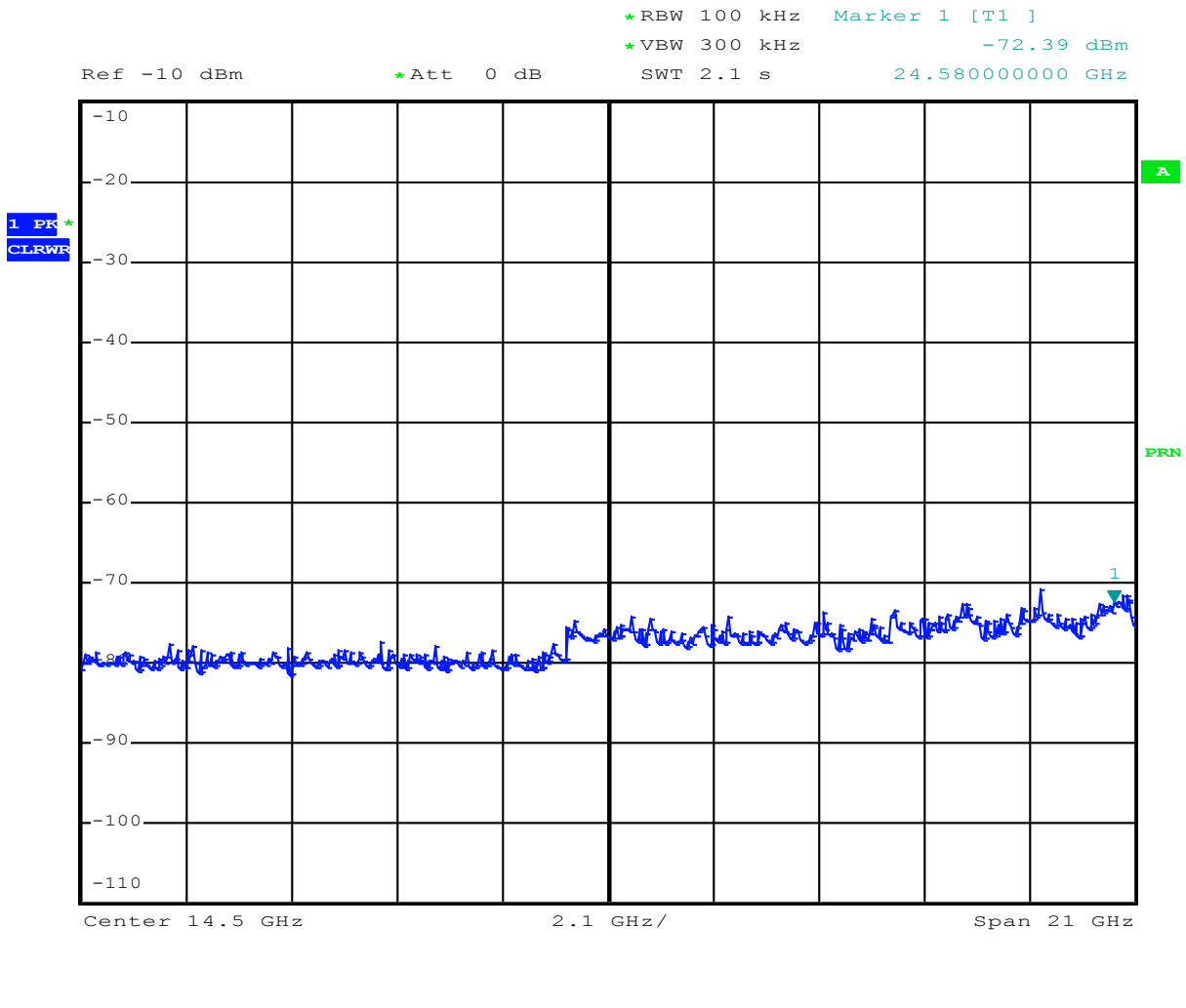

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-71.29 dBm
Ref -10 dBm
*Att 0 dB
SWT 2.1 s
4.882000000 GHz
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
1 PK
MAXH
A
PRN
1
Center 14.5 GHz
2.1 GHz/
Span 21 GHz
Date: 20.JUL.2000 20:04:55

Graph 3.5.4

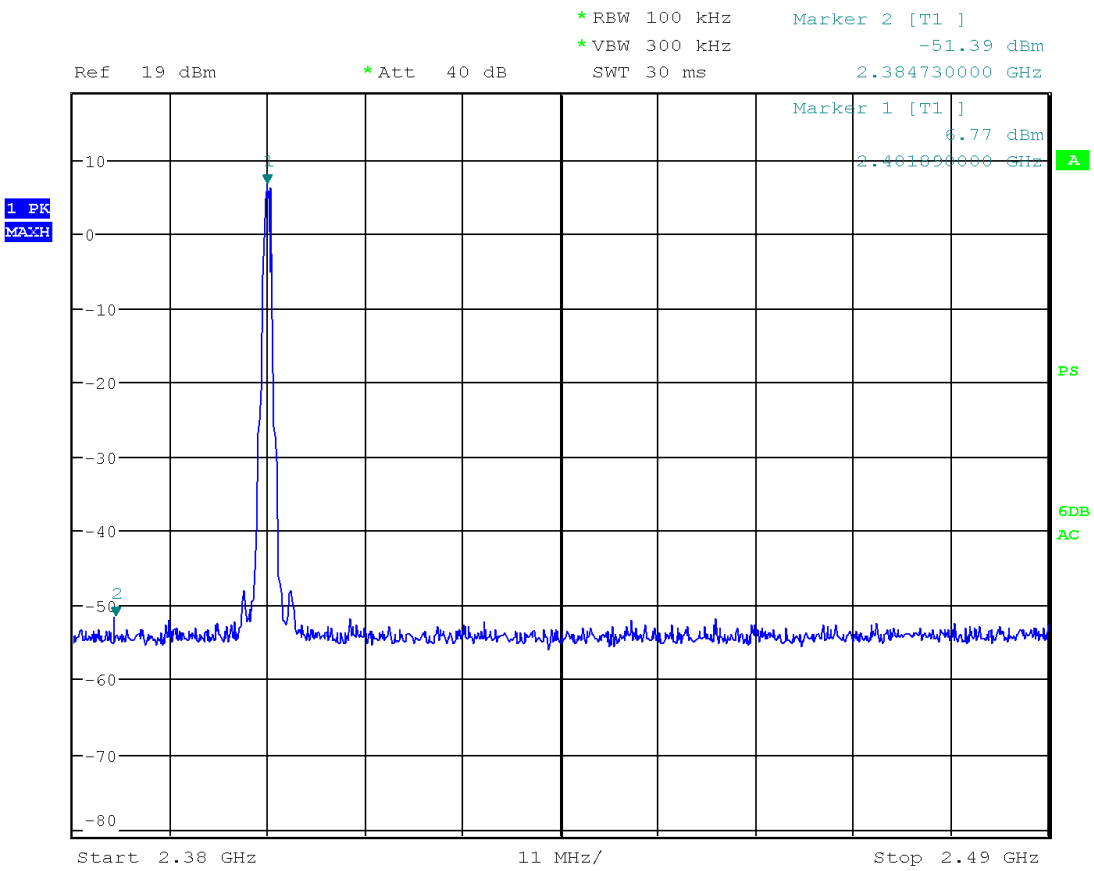


Date: 31.AUG.2021 16:39:50

Graph 3.5.5

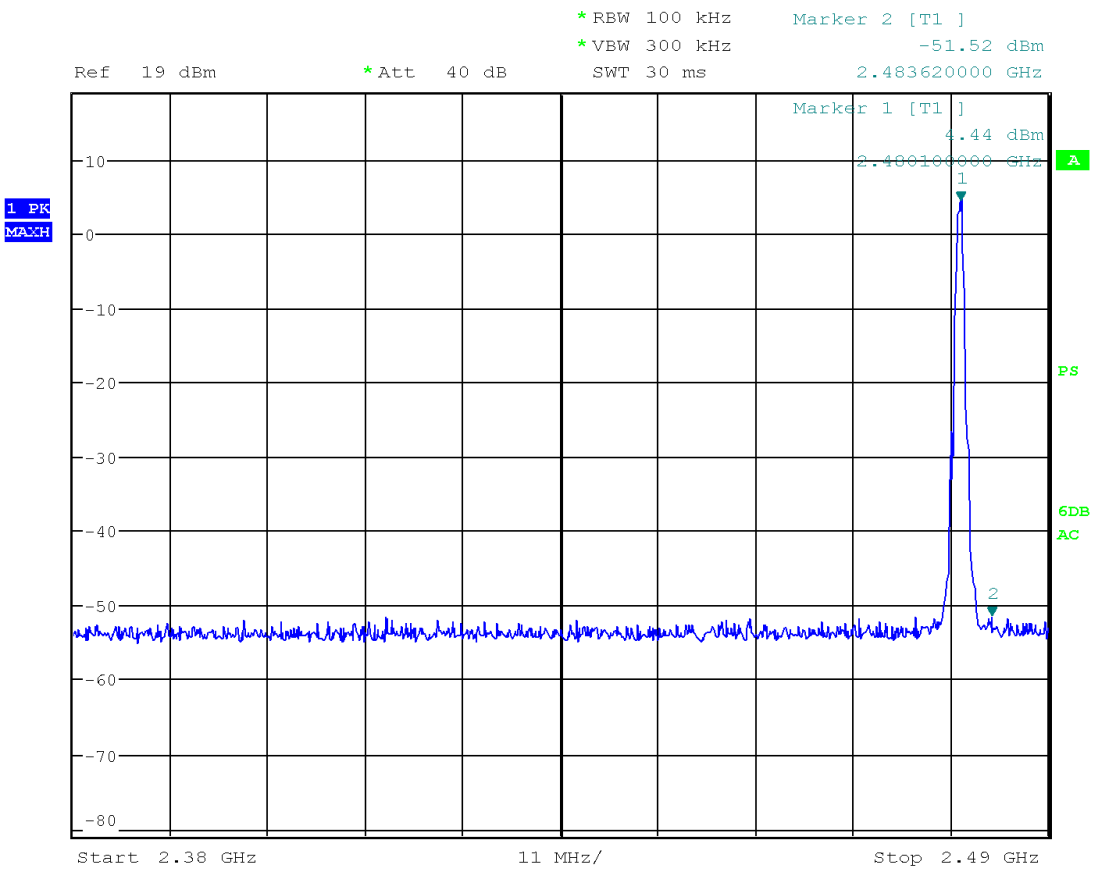

*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-72.39 dBm
Ref -10 dBm
*Att 0 dB
SWT 2.1 s
24.580000000 GHz
-10
-20
-30
-40
-50
-60
-70
-90
-100
-110
1 PK *
CLRWR
A
PRN
1
Center 14.5 GHz
2.1 GHz/
Span 21 GHz
Date: 20.JUL.2000 20:06:20

Graph 3.5.6



Date: 31.AUG.2021 16:44:09

Graph 3.5.7



Date: 31.AUG.2021 16:43:30

Graph 3.5.8

3.6 Radiated spurious emissions

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test result: **Pass**

Max. Margin Spurious : 10.9dB below the limits
Max. Margin Bandedge: 11.6dB below the limits

EUT was configured to transmit continuously. Radiated emission measurements were performed from 9 kHz to 25 GHz according to the procedure described in ANSI C64.10.

Spectrum analyzer resolution bandwidth is 200 Hz for frequencies 9 kHz to 150 kHz. Resolution bandwidth is 120 kHz for frequencies 30 MHz to 1000 MHz and 1 MHz for frequencies above 1 GHz. Above 1 GHz, both Peak and Average measurements were performed. The Peak level of radiated emissions was measured with a peak detector. The Average level of radiated emissions was measured with an RMS detector with trace averaging.

The EUT is placed on a non-conductive turntable that is 80 cm in height for frequencies 30 MHz to 1000 MHz, 1.5 meters for frequency above 1000 MHz. If the EUT attaches to peripherals, they are connected and operational (as typical as possible). During testing, all cables were manipulated to produce worst-case emissions. The signal is maximized through rotation. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Data included is representative of the worst-case configuration (the configuration which resulted in the highest emission levels). Data provided is corrected for distance, cables, preamp, filters and antenna factors then compared to the limits

Note 1: Per client specification, the EUT is installed in vertical orientation. The installation orientation should be reflected in the user manual.
Note 2: No Spurious emissions were detected in the frequency range 9 kHz to 30MHz and above 2nd harmonic.

Date:	August 16 – 24, 2021	**Result: Pass**
Tested by:	Richard Blonigen	
Standard:	FCC part 15.247(d)	
Test Point:	Enclosure	
Operation mode:	See page 5	
Environmental Conditions:	22°C; 43%(RH); 98kPa	
Equipment Verification:	☒	
Note:	BLE	

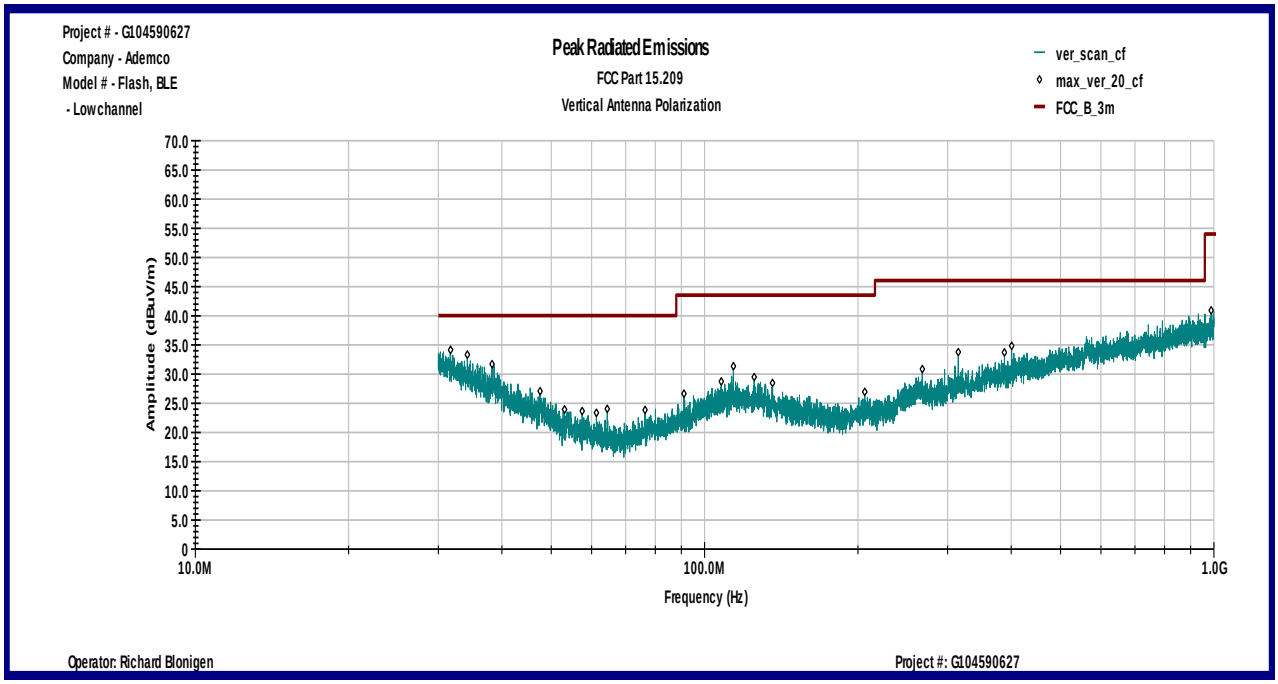
Table 3.6.1

Frequency	Antenna		Ant. CF	Cable loss	Pre-amp	Peak Reading	Total @ 3m	Limit	Margin	Comments
MHz	Polarity	Hts(cm)	dB1/m	dB	Gain (dB)	dBµV	dBµV/m	dBµV/m	dB	
BLE channel low										
4803.00	V	100	32.9	2.7	43.2	50.7	43.1	54.0	-10.9	
4803.00	H	100	32.9	2.7	43.2	49.7	42.1	54.0	-11.9	
BLE channel mid										
4882.00	V	100	33.0	2.7	43.2	49.5	42.0	54.0	-12.0	
4882.00	H	100	33.0	2.7	43.2	48.1	40.6	54.0	-13.4	
BLE channel high										
4960.00	V	100	33.1	2.7	43.3	48.7	41.2	54.0	-12.7	
4960.00	H	100	33.1	2.7	43.3	47.1	39.6	54.0	-14.3	

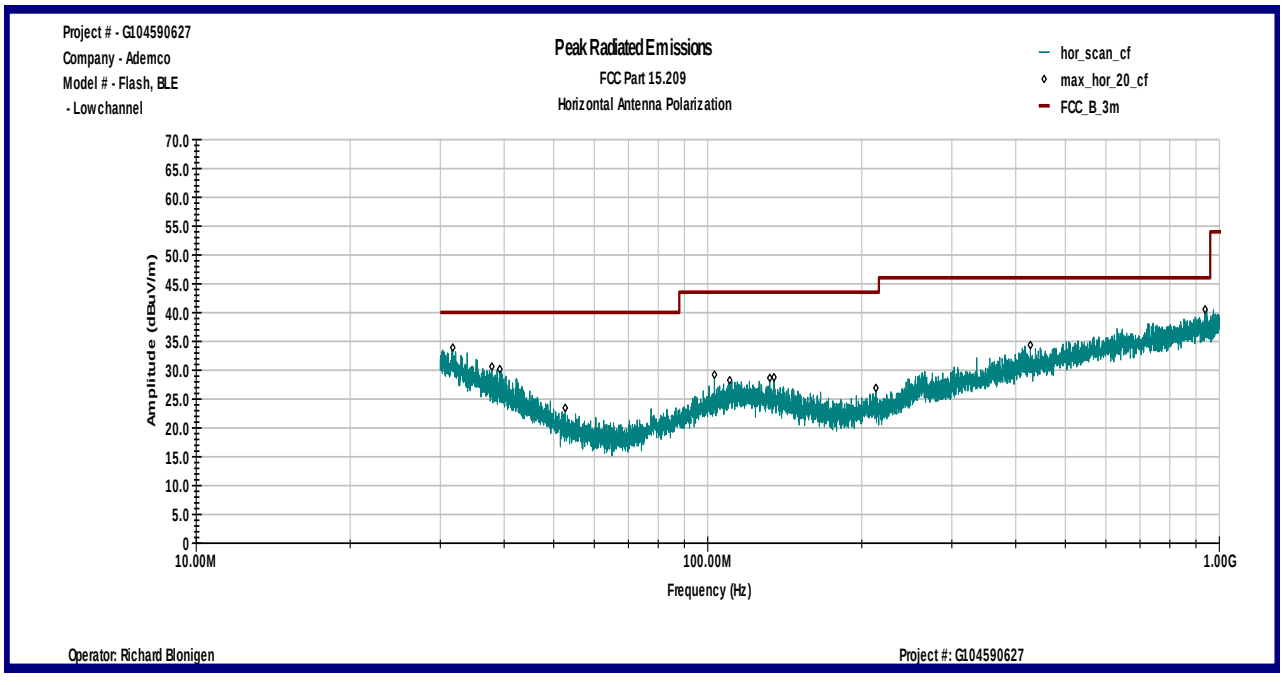
Date:	August 16 – 24, 2021	**Result: Pass**
Tested by:	Richard Blonigen	
Standard:	FCC part 15.247(d)	
Test Point:	Enclosure	
Operation mode:	See page 5	
Environmental Conditions:	22°C; 43%(RH); 98kPa	
Equipment Verification:	☒	
Note:	Bandedge Compliance	

Table 3.6.2

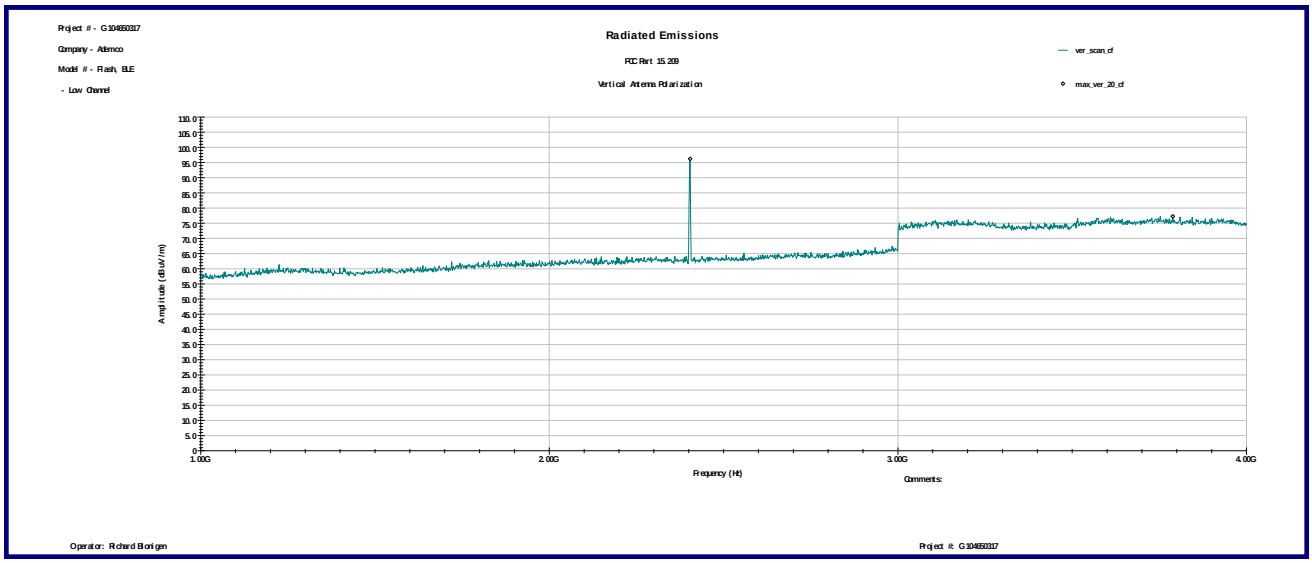
Frequency	Antenna		Ant. CF	Cable loss	Pre-amp	Peak Reading	Total @ 3m	Limit	Margin	Comments
MHz	Polarity	Hts(cm)	dB1/m	dB	Gain (dB)	dBµV	dBµV/m	dBµV/m	dB	Power
BLE										
2390.00	V	100	28.1	1.9	0.0	11.6	41.6	54.0	-12.4	
2390.00	H	100	28.1	1.9	0.0	11.8	41.8	54.0	-12.2	
2483.50	V	100	28.4	1.9	0.0	12.1	42.4	54.0	-11.6	
2483.50	H	100	28.4	1.9	0.0	11.9	42.2	54.0	-11.8	



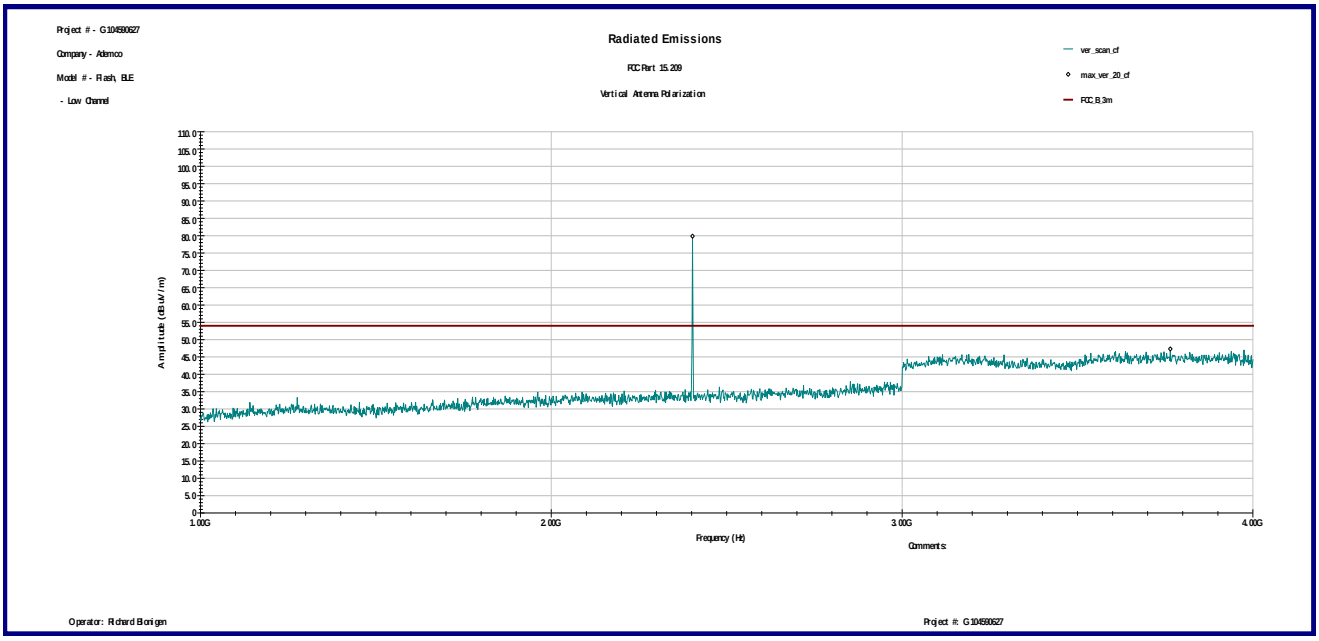
Graph 3.6.1



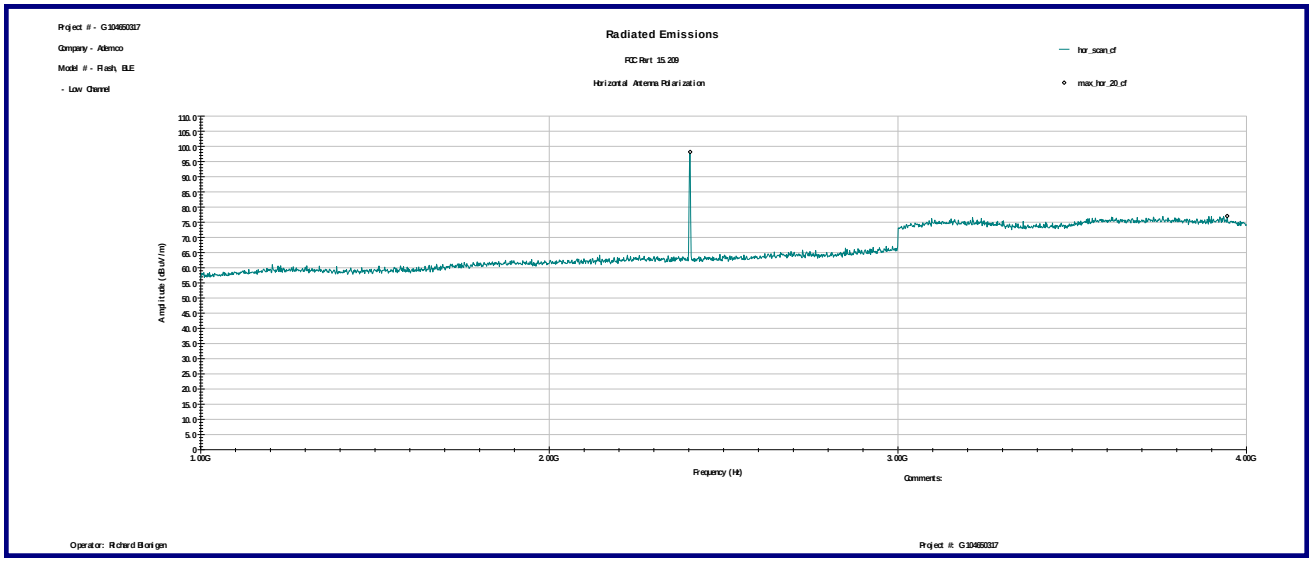
Graph 3.6.2



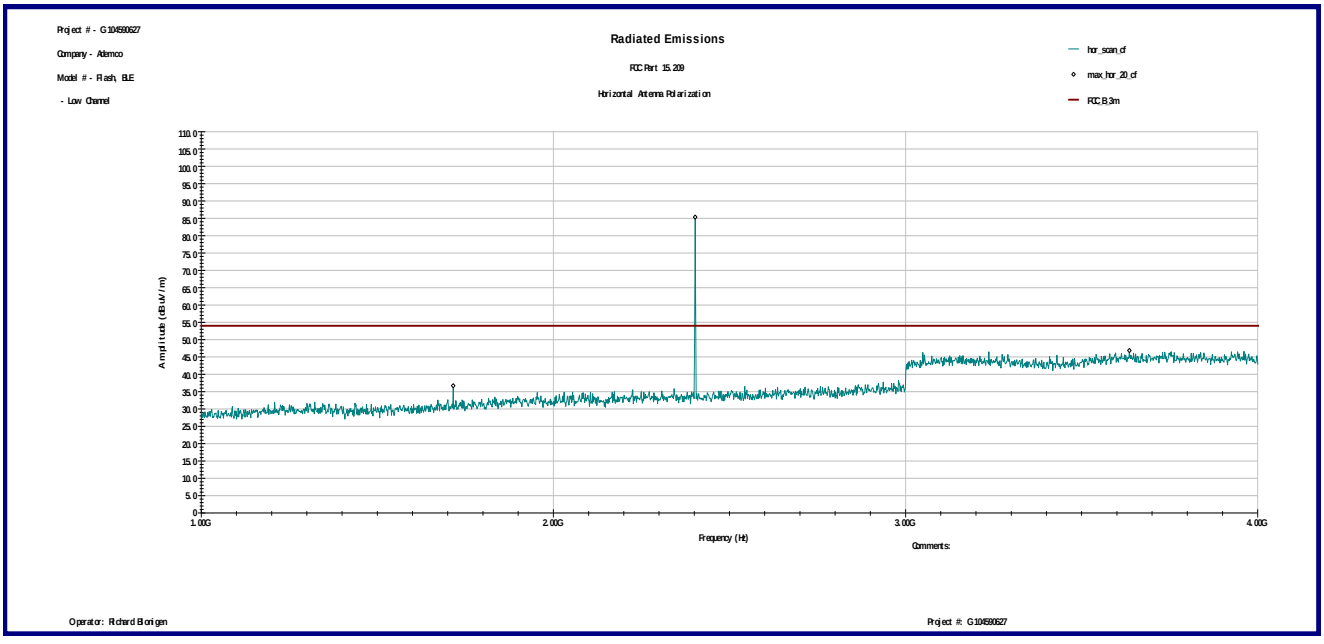
Graph 3.6.3



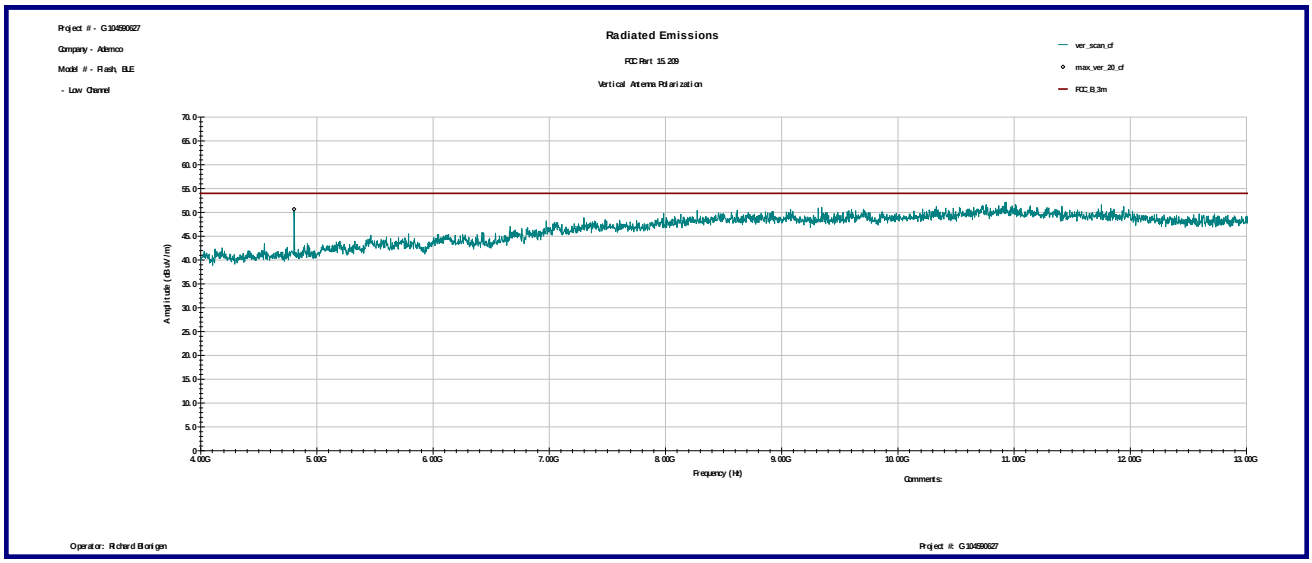
Graph 3.6.4 (Average Scan)



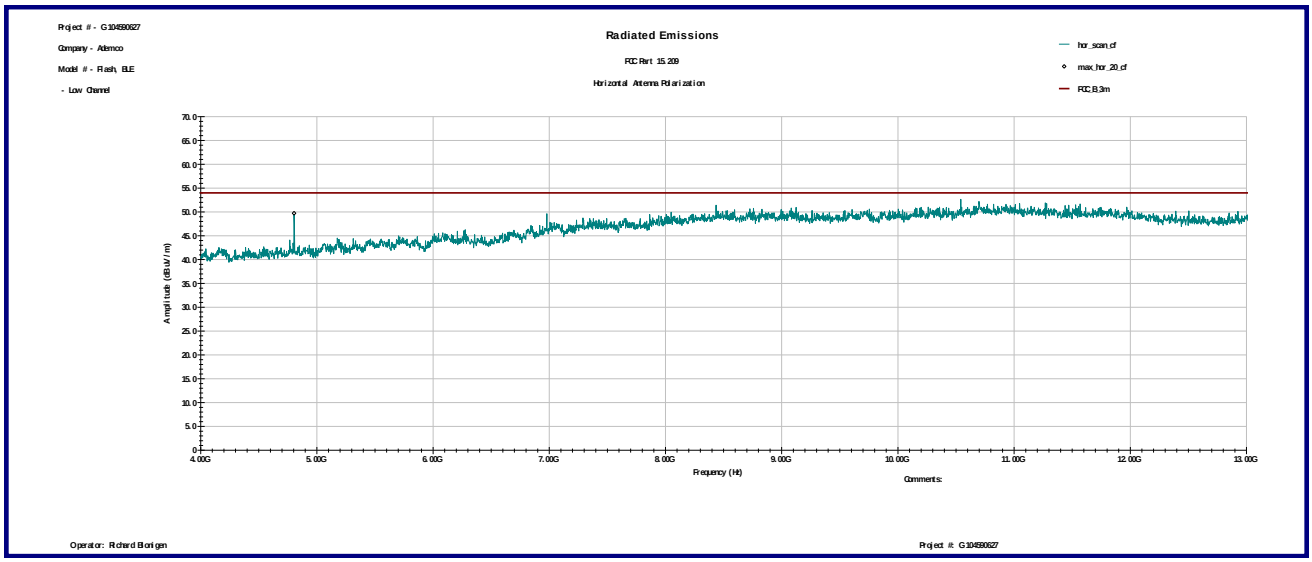
Graph 3.6.5



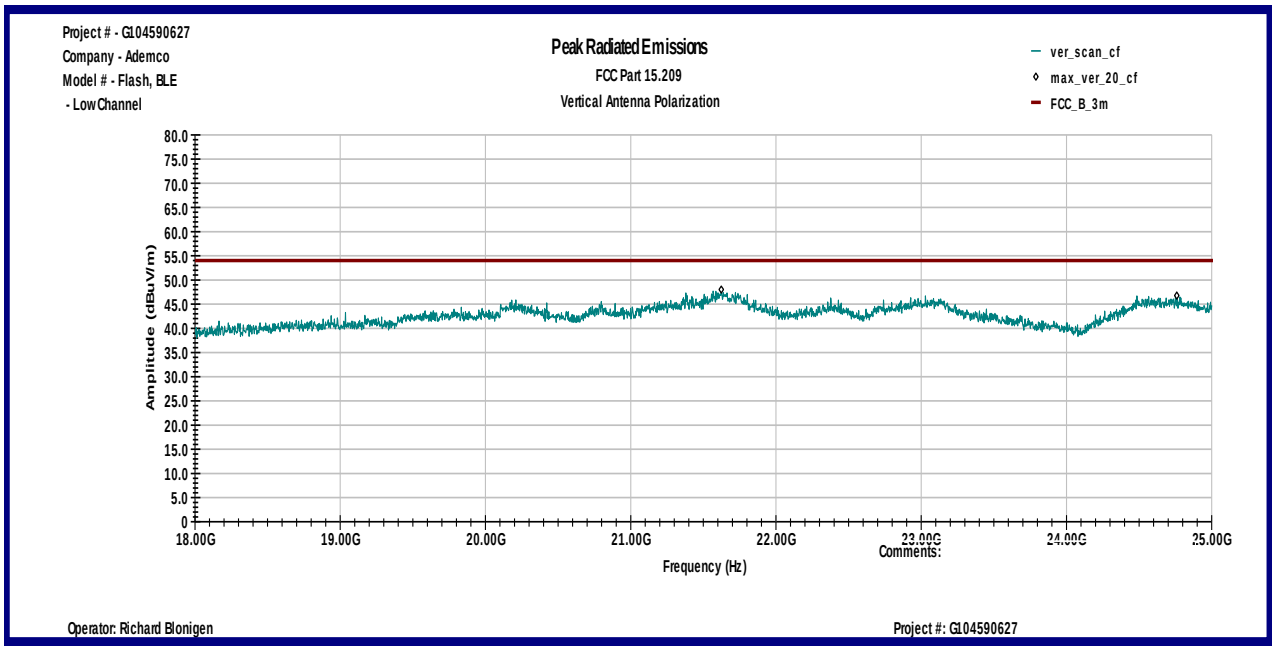
Graph 3.6.6 (Average Scan)



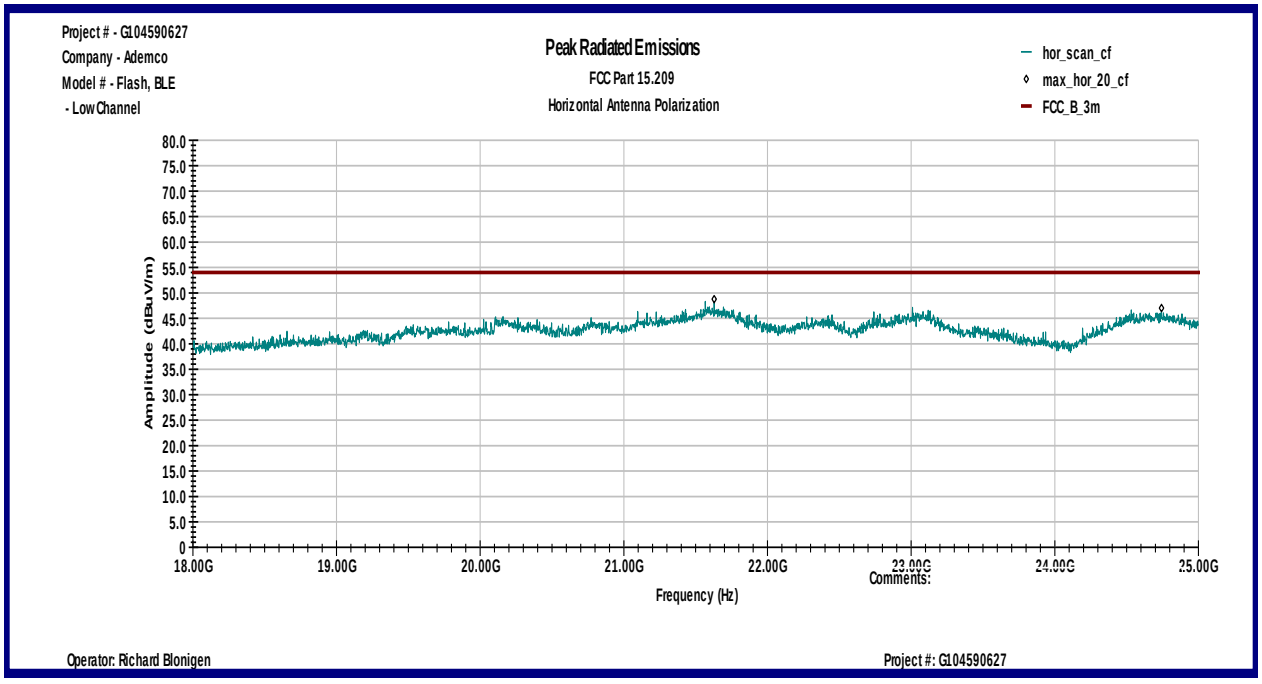
Graph 3.6.7



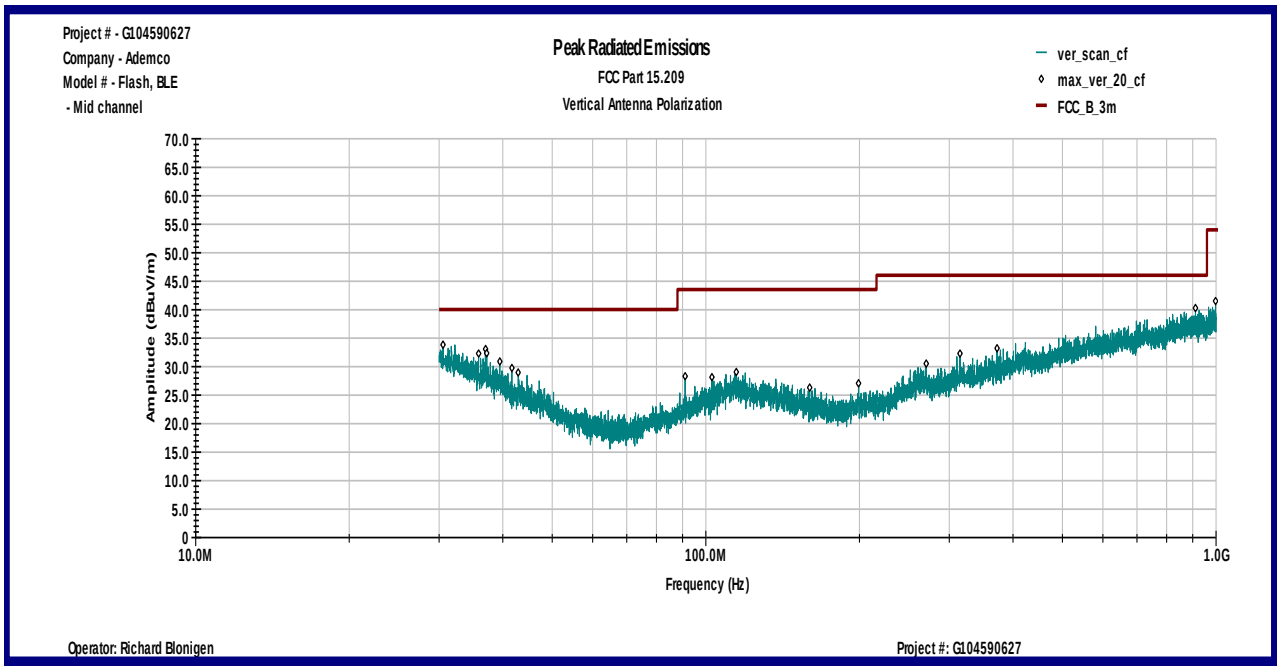
Graph 3.6.8



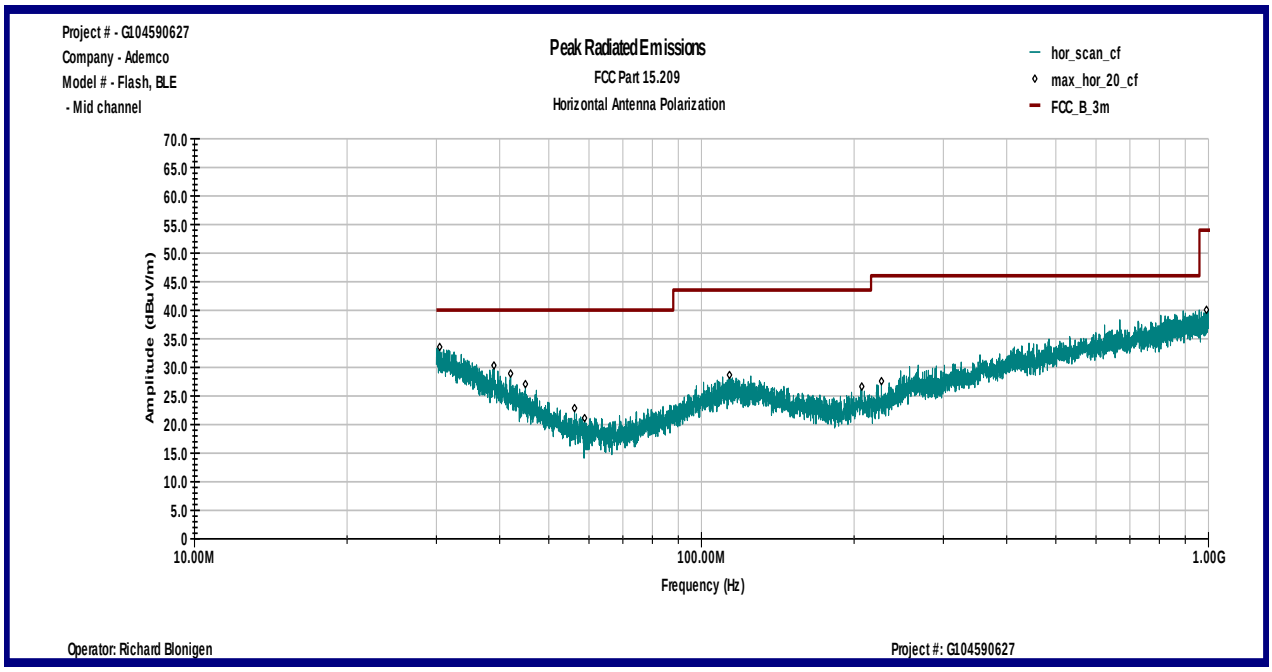
Graph 3.6.9



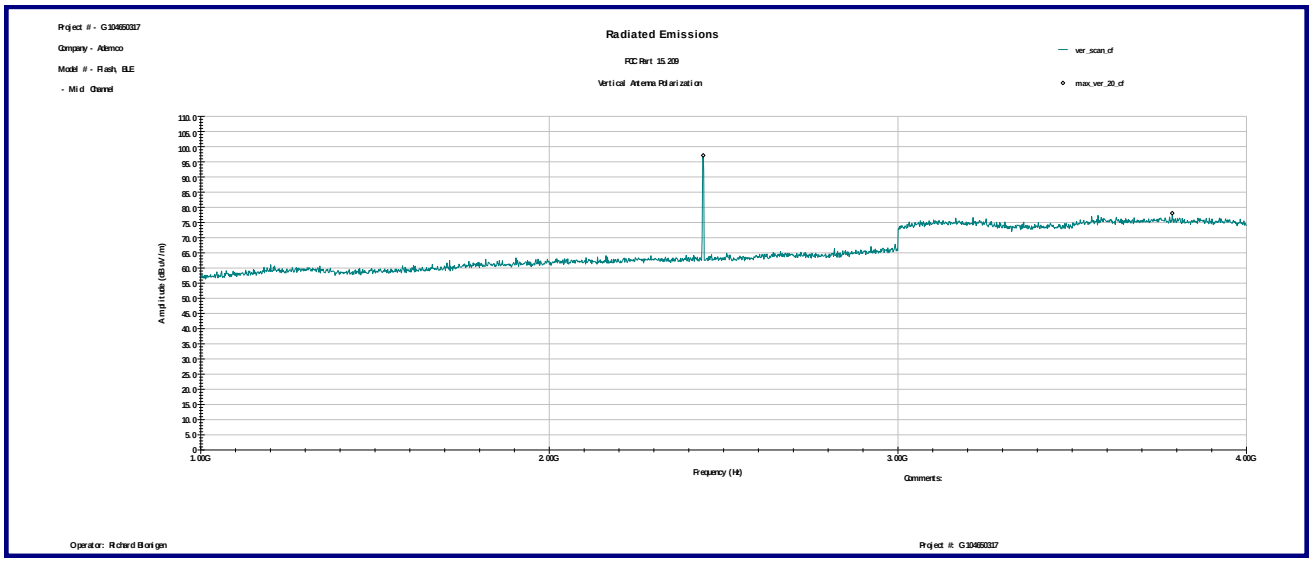
Graph 3.6.10



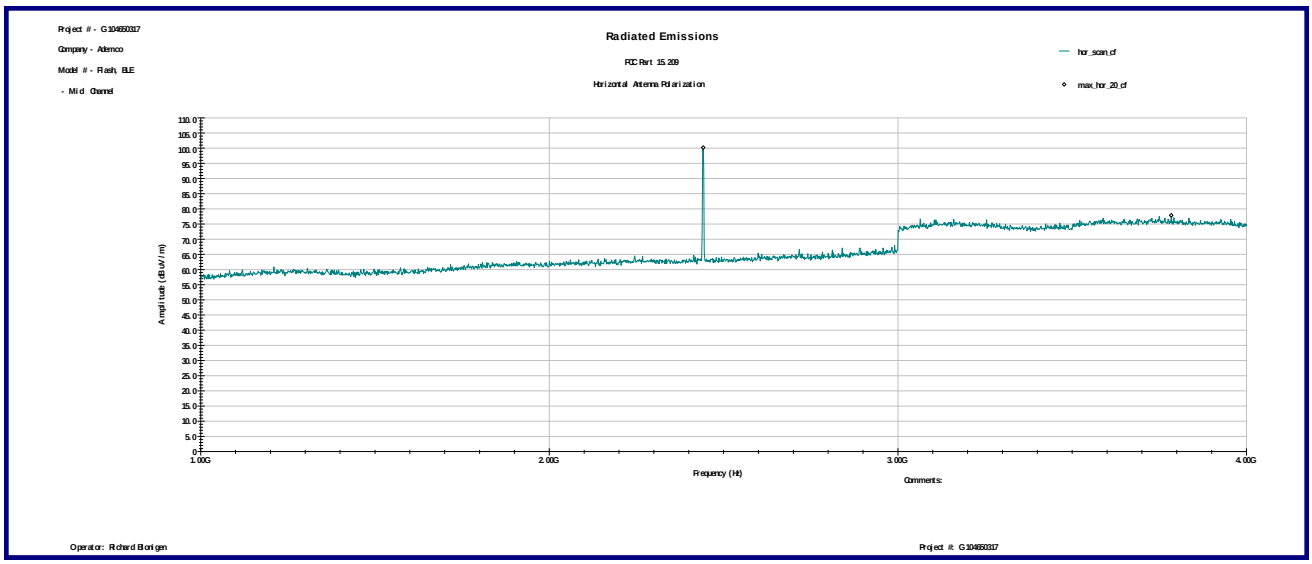
Graph 3.6.11



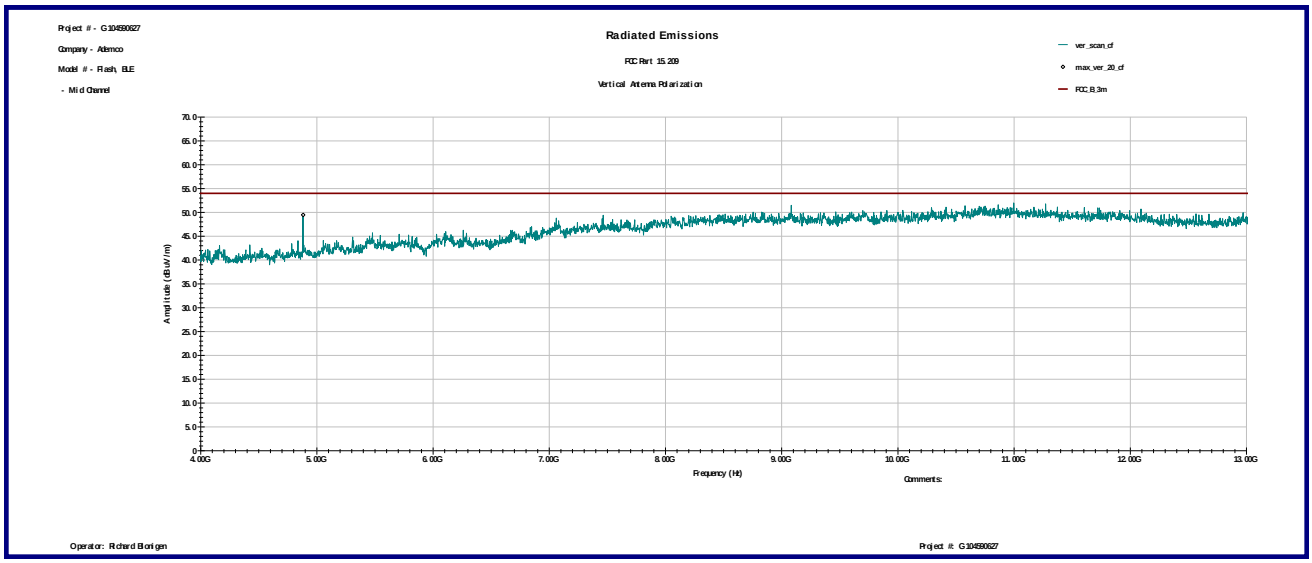
Graph 3.6.12



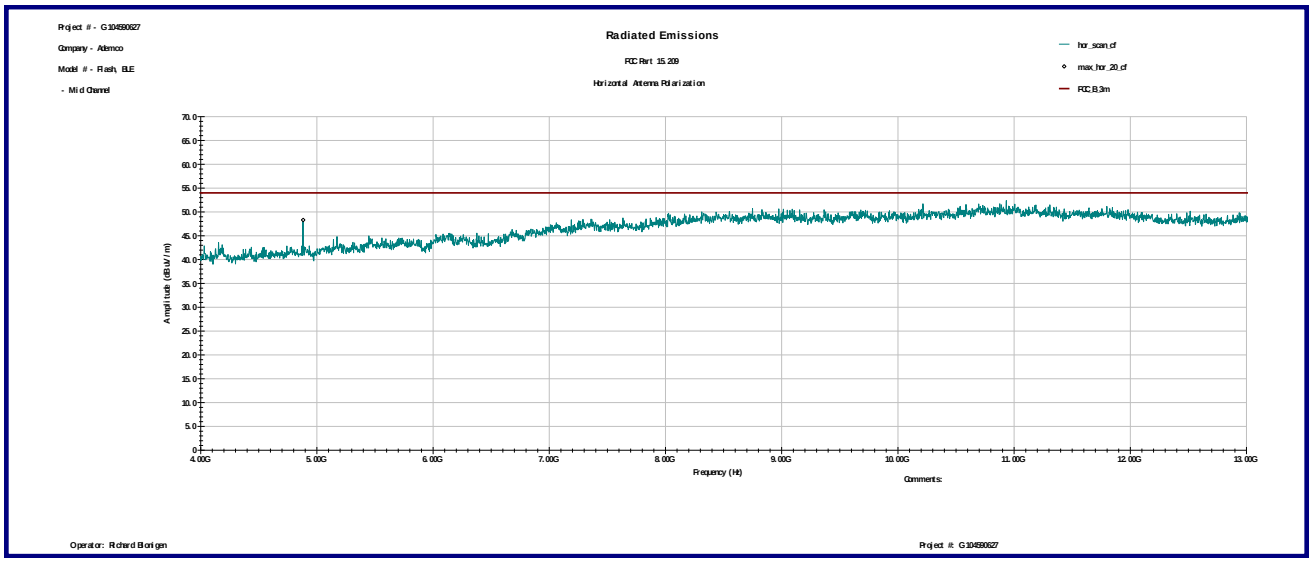
Graph 3.6.13



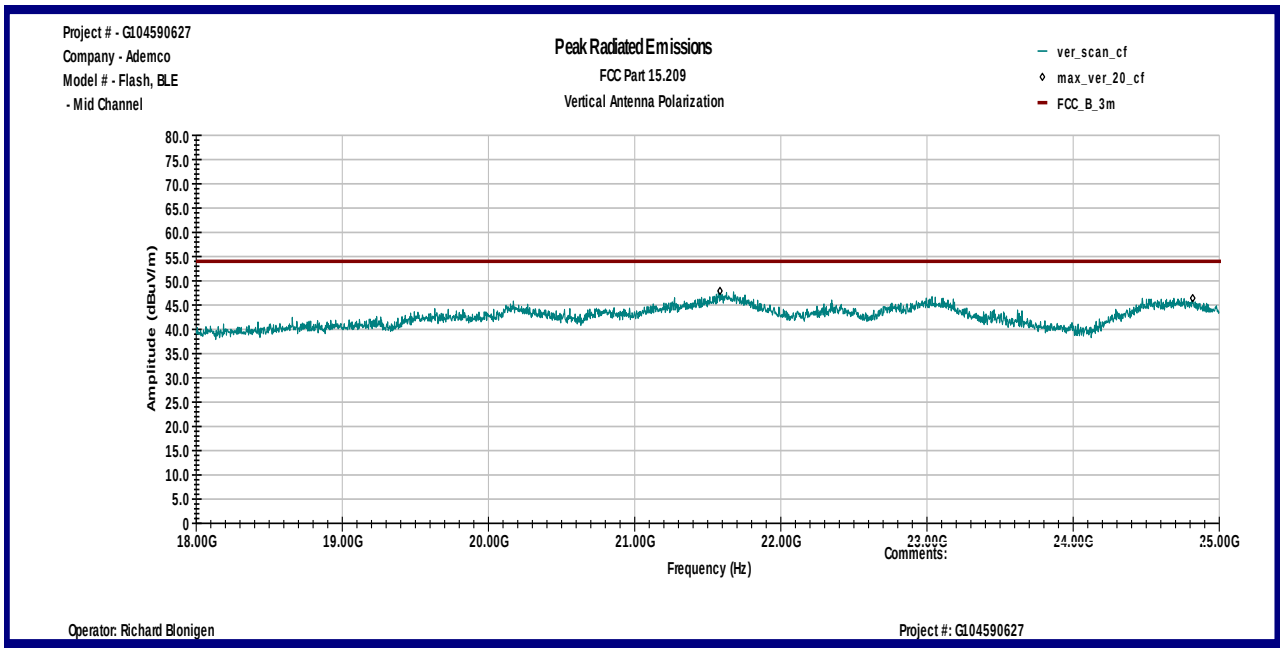
Graph 3.6.14



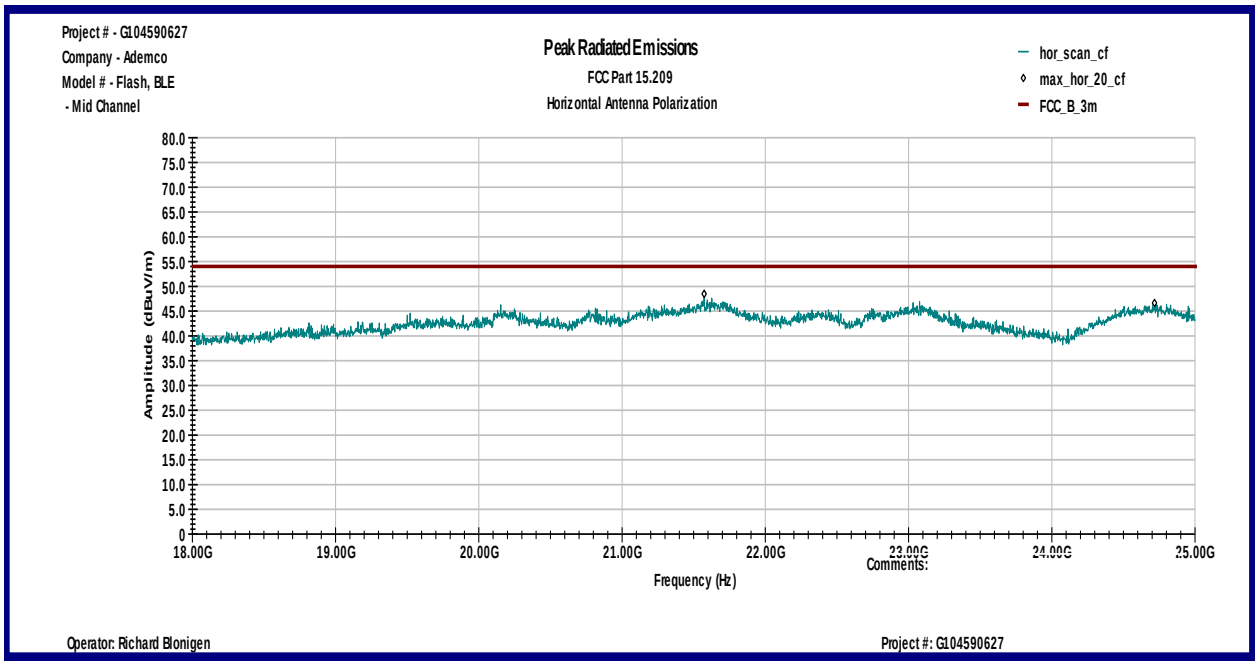
Graph 3.6.15



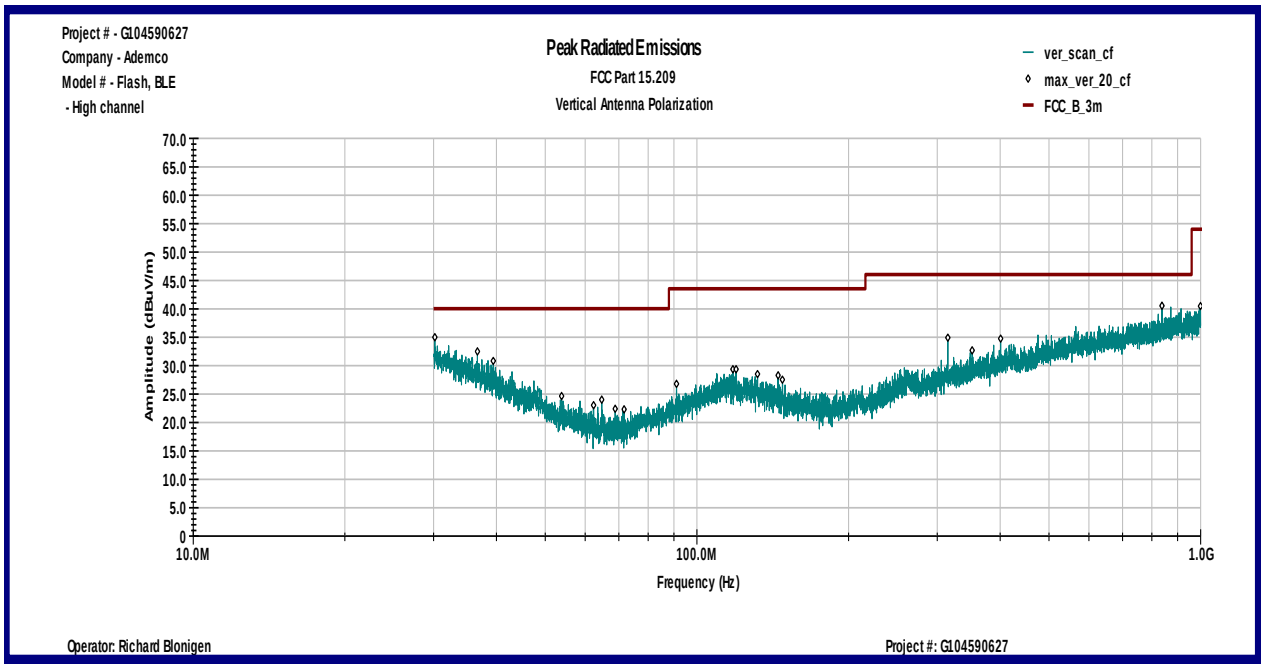
Graph 3.6.16



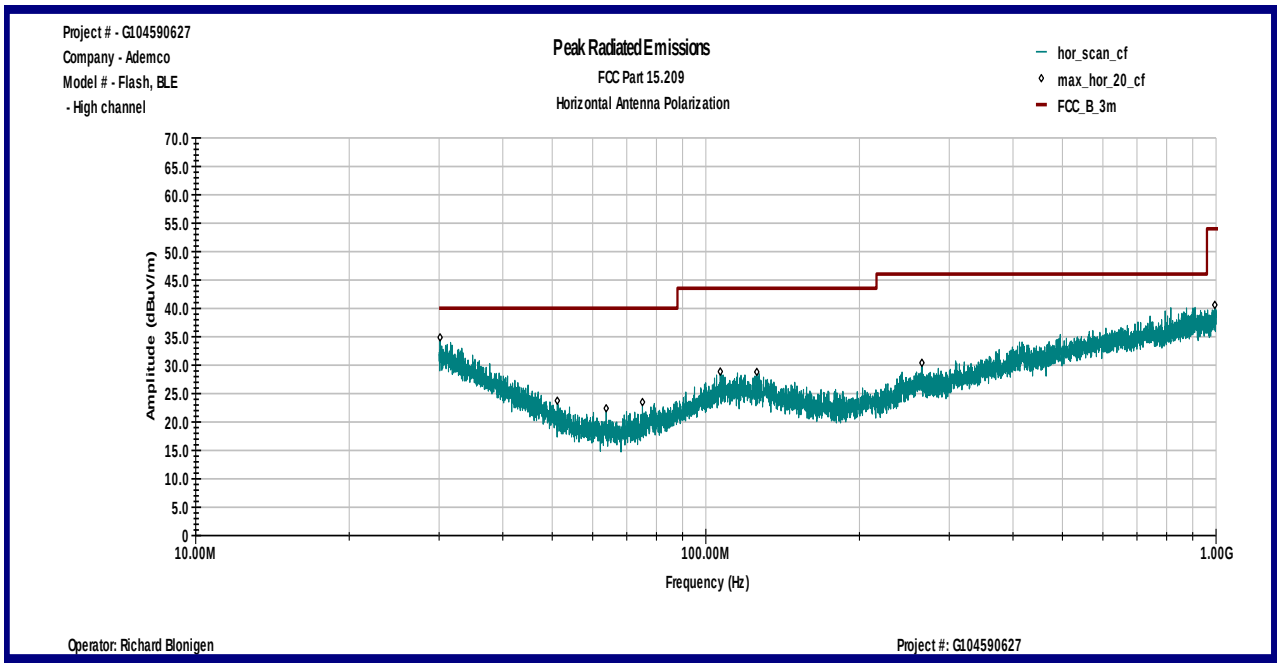
Graph 3.6.17



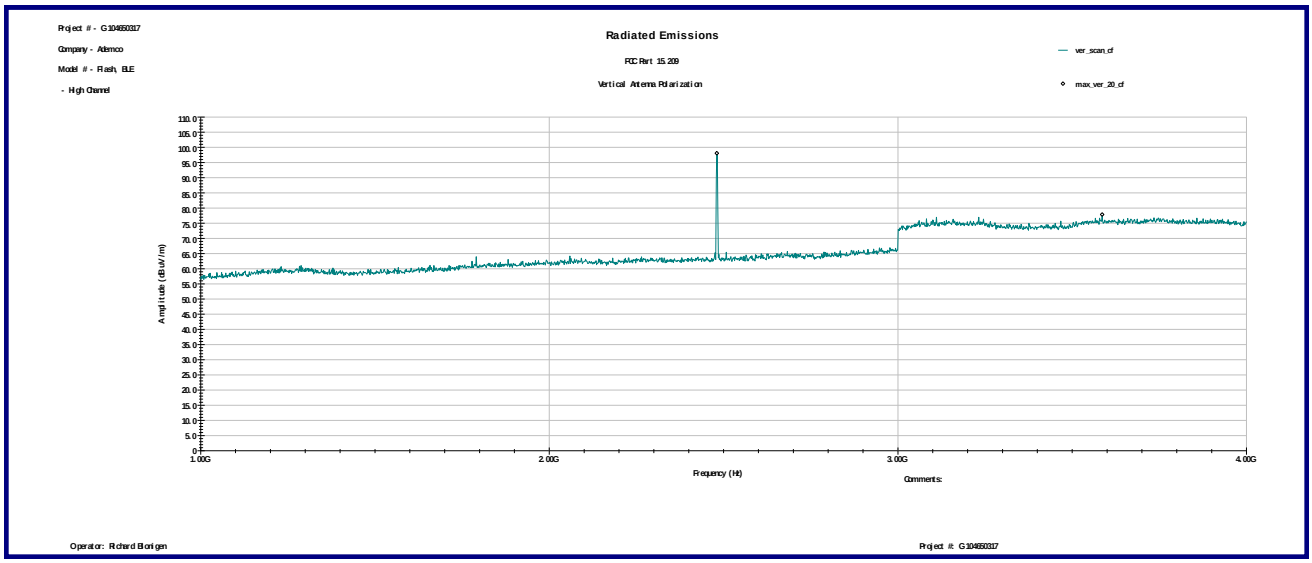
Graph 3.6.18



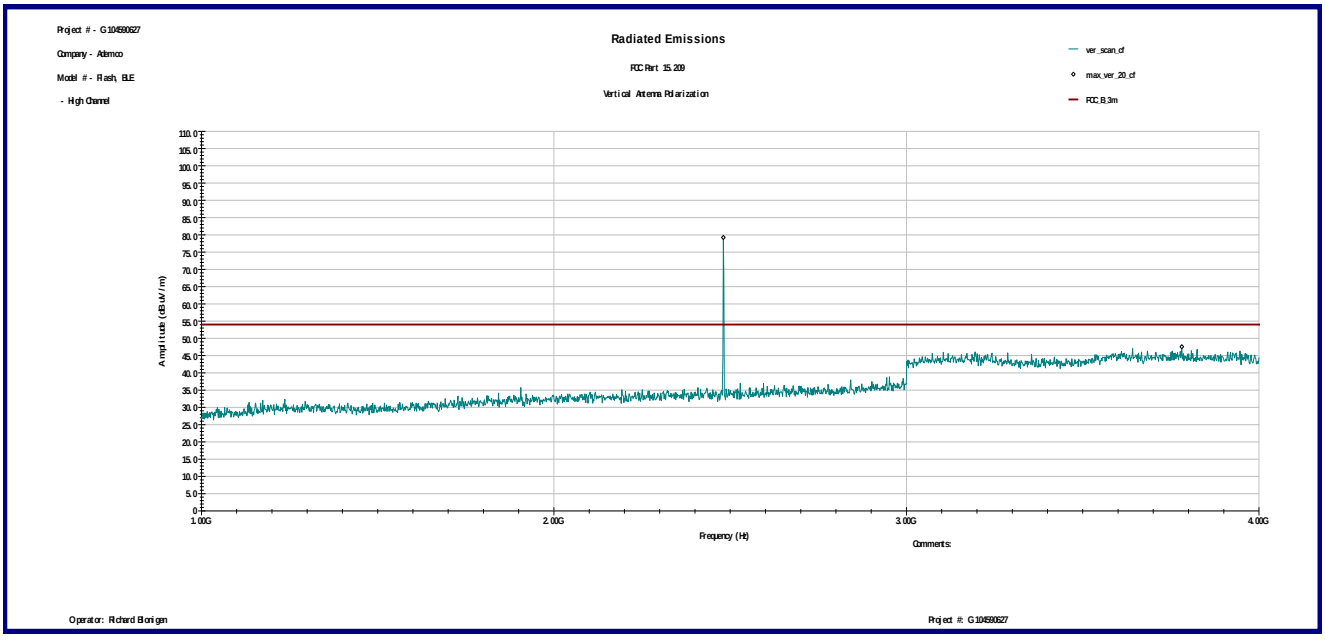
Graph 3.6.19



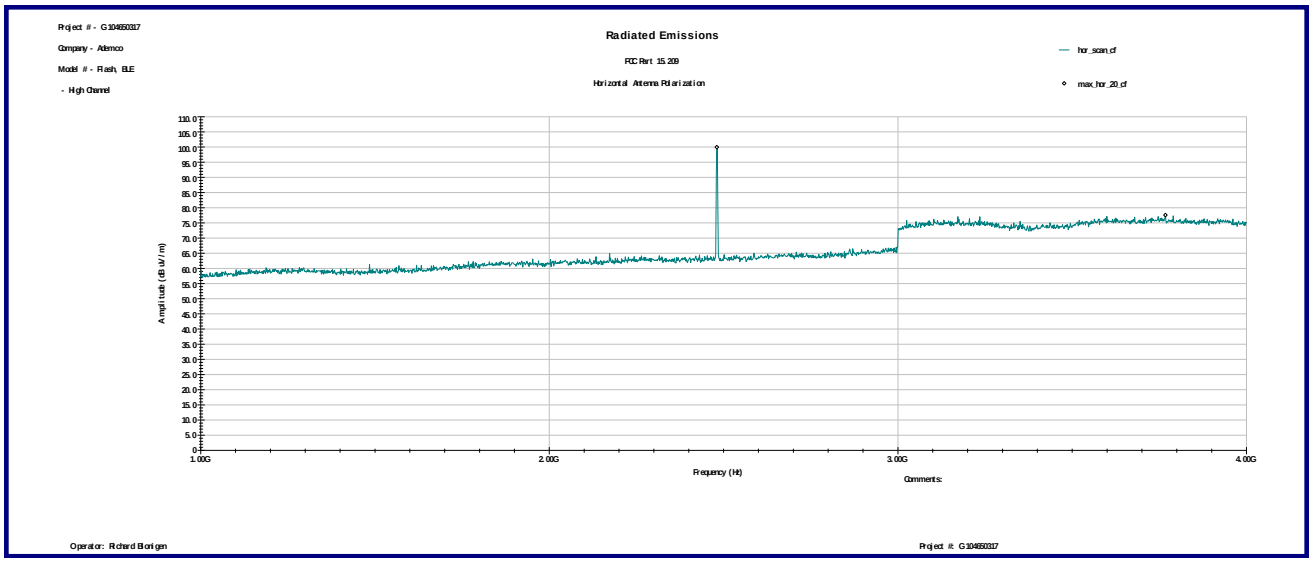
Graph 3.6.20



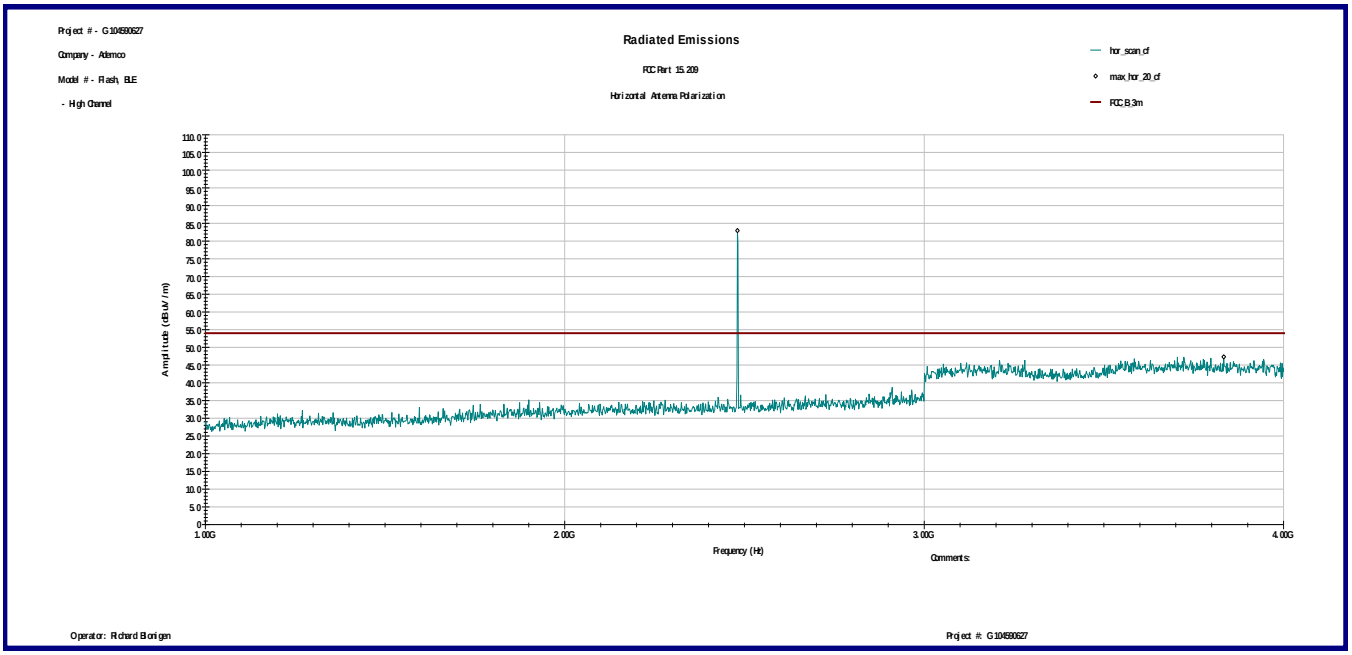
Graph 3.6.21



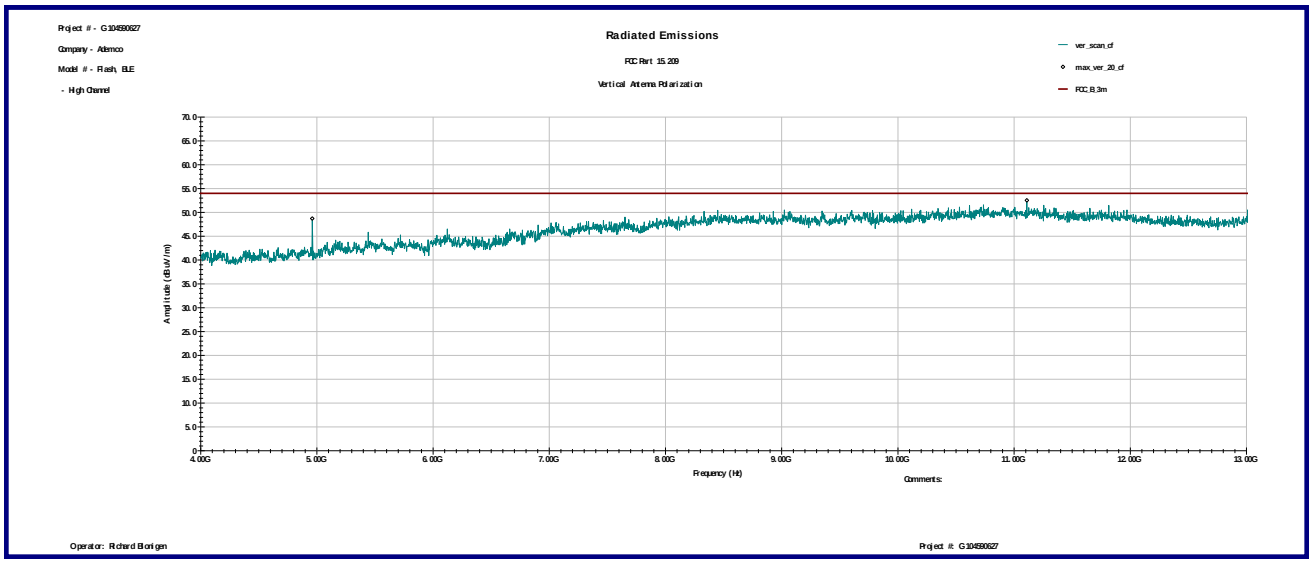
Graph 3.6.22 (Average Scan)



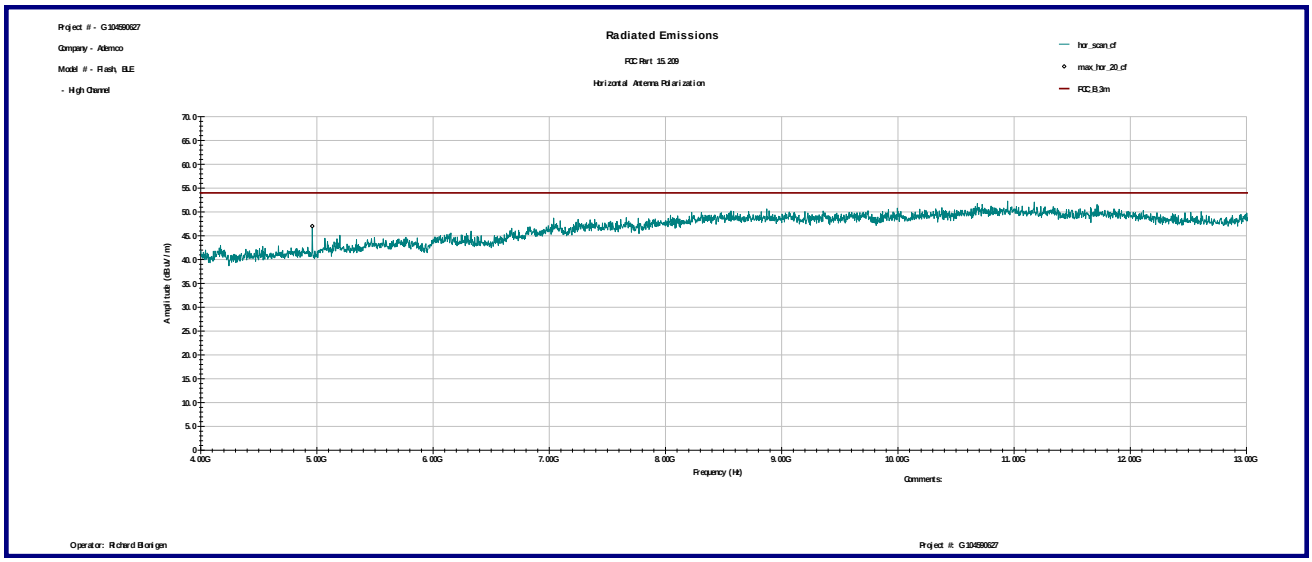
Graph 3.6.23



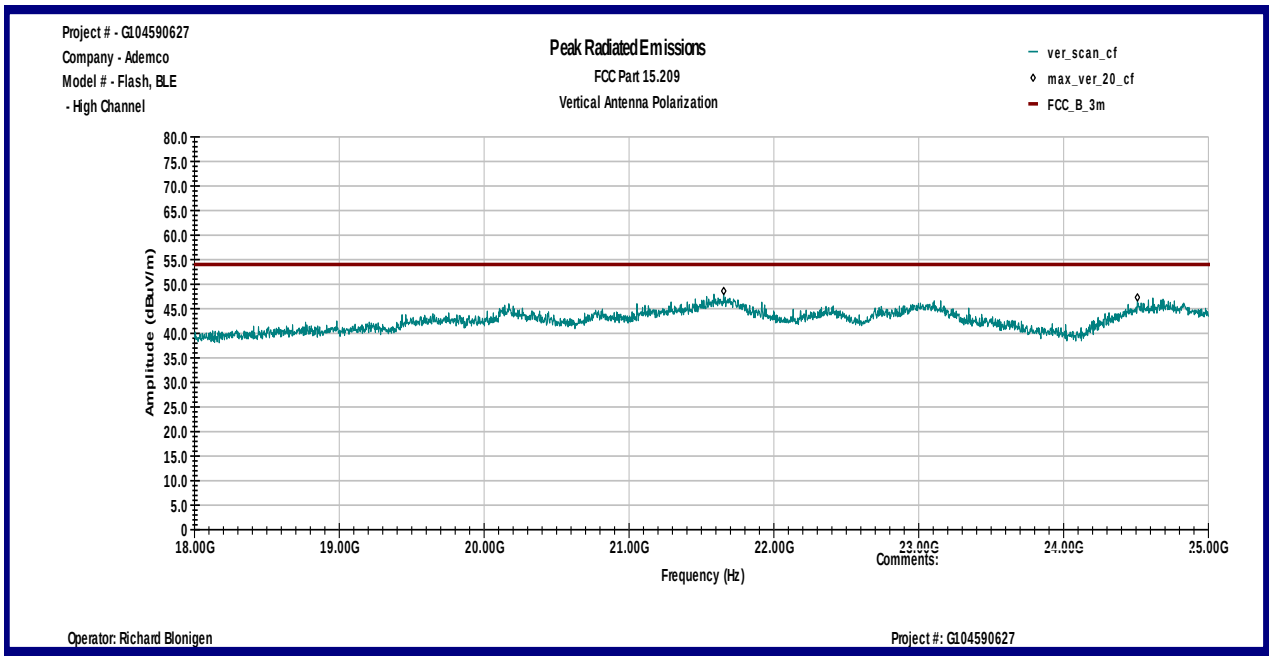
Graph 3.6.24 (Average Scan)



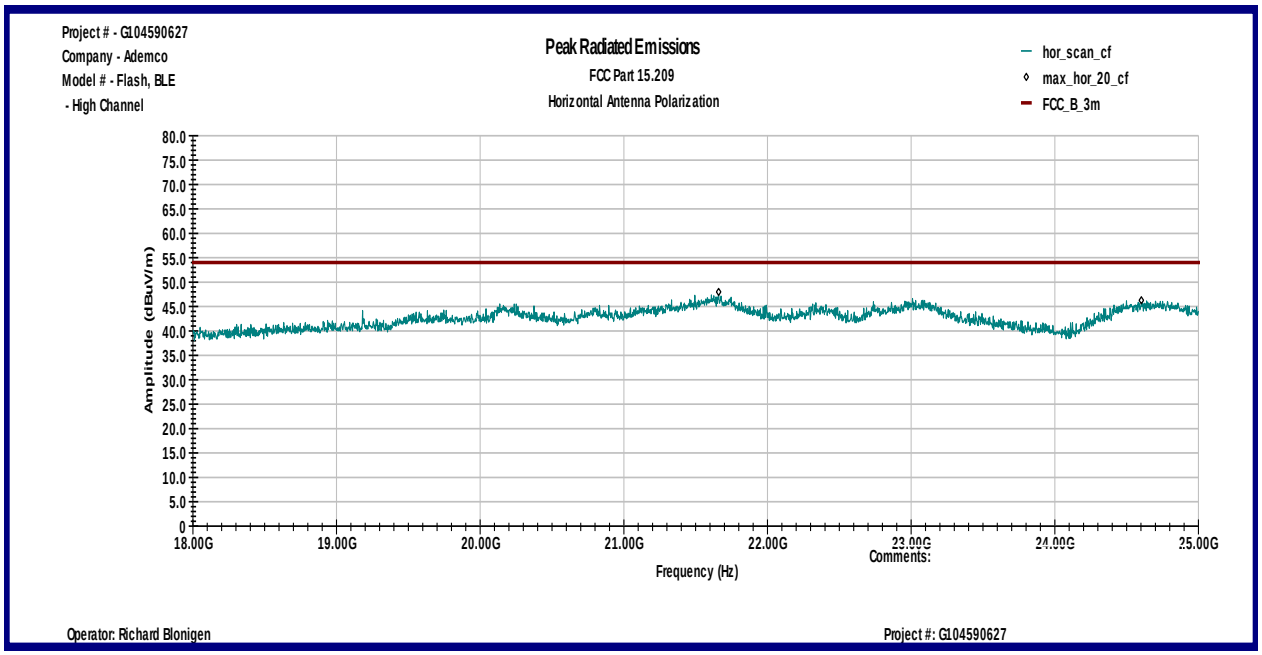
Graph 3.6.25



Graph 3.6.26



Graph 3.6.27



Graph 3.6.28

3.7 RF Exposure Compliance

FCC §1.1310 Radiofrequency radiation exposure limits

Table 1 below sets forth limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic field.

Table 1 – Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power Density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	$*900/f^2$	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	842/f	2.19/f	$*180/f^2$	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

F = frequency in MHz * = Plane-wave equivalent power density

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Table 2 below sets forth limits for the RF field strength.

Table 2 – RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

Frequency range (MHz)	Electric field strength (V/m rms)	Magnetic field strength (A/m rms)	Power Density (W/m^2)	Reference Period (minutes)
0.003-10	83	90	-	Instantaneous*
0.1-10	-	$0.73/f$	-	6**
1.1-10	$87/f^{0.5}$	-	-	6**
10-20	27.46	0.0728	-2	6
20-48	$58.07/f^{0.25}$	$0.1540/f^{0.25}$	$8.944/f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	$3.142 f^{0.3417}$	$0.008335 f^{0.3417}$	$0.02619 f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	$616000/f^{1.2}$
150000-300000	$0.158 f^{0.5}$	$4.21 \times 10^{-4} f^{0.5}$	$6.67 \times 10^{-5} f$	$616000/f^{1.2}$

Note: f is frequency in MHz. *Based on nerve stimulation (NS) **Based on specific absorption rate (SAR)

The maximum measured antenna conducted power P is 8.2dBm

The antenna gain, G is 1.93dBi

The maximum EIRP power = P + G
ERP = 8.2+ 1.93= 10.13dBm, or 10.3mW=0.0103W

The limits for Maximum Permissible Exposure (MPE) reference to Table 1 and Table 2 in section 3.7

The Power Density, S in mW/cm^2 is related to EIRP in mW and Antenna Separation Distance, D in cm with the equation:

$S = EIRP / 4\pi D^2$

If antenna Safe Separation Distance is 20cm,
$S = 10.3 / 4\pi 20^2$,
$S = 0.00205 mW/cm^2 = 0.0205 W/m^2$ or below the Maximum Permissible Exposure (MPE)

3.8 AC line conducted emissions

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test result: **Pass**

Frequency range: 0.15MHz-30MHz

Max. Emissions margin: 24.5dB below the limits

Note ~~1~~: EUT was configured to transmit continuously. Conducted emission measurements were performed from 150 kHz to 30 MHz. Analyzer setting used: Resolution Bandwidth is 9 kHz and Video Bandwidth is 30 kHz.

Test performed at 120VAC power input of the 24VAC Power Source

Date:	August 23, 2021	**Result: Pass**
Tested by:	Richard Blonigen	
Standard:	FCC part 15.207	
Test Point:	Power Line	
Operation mode:	See page 5	
Environmental Conditions:	22°C; 42%(RH); 98kPa	
Equipment Verification:	☒	
Note:	None	

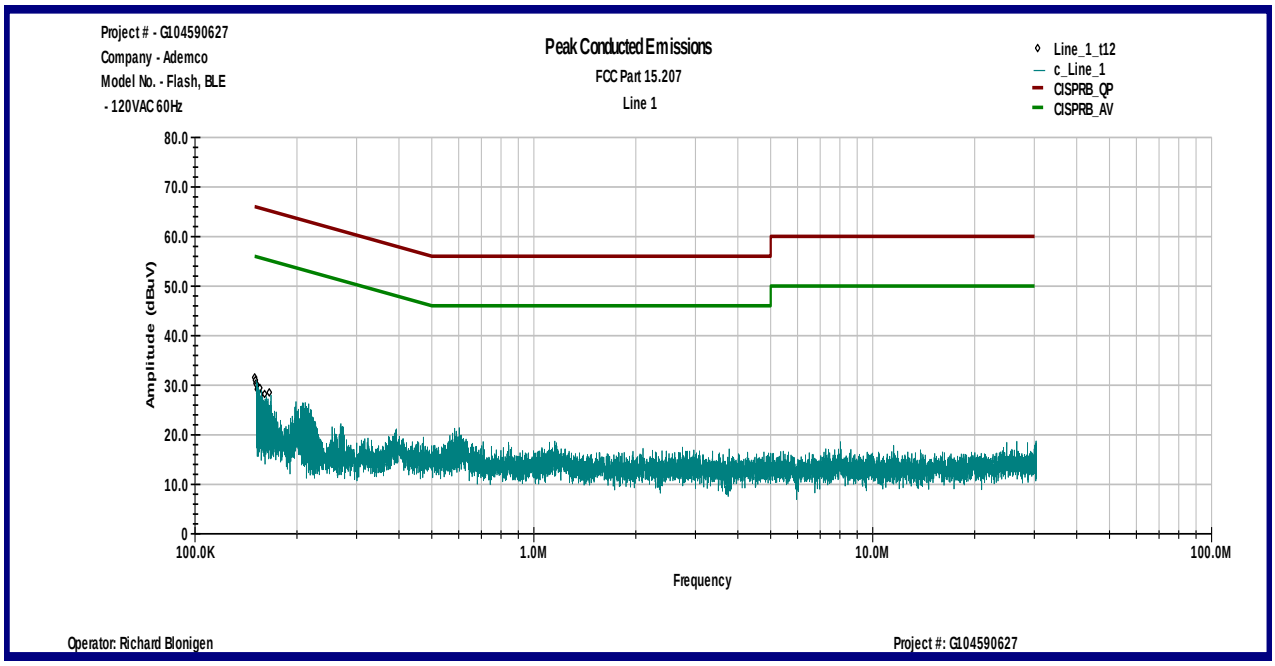
Table 3.8.1

Line 1

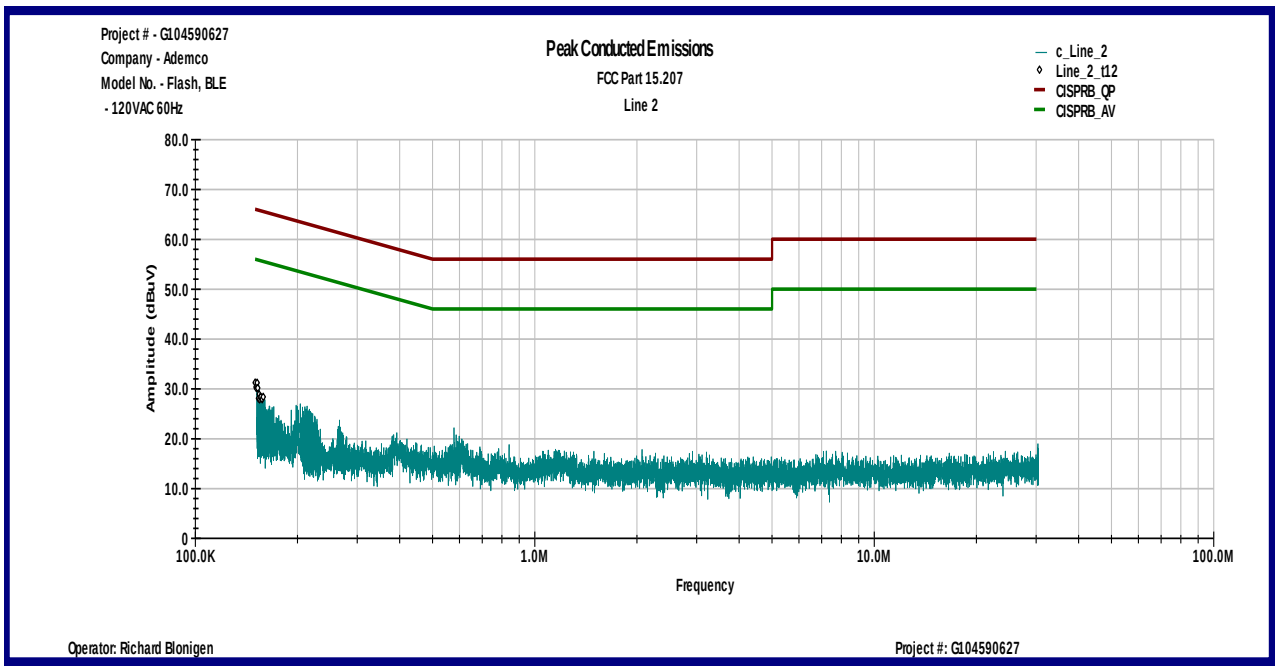
Frequency	Peak dBµV	QP Limit dBµV	AVG Limit dBµV	QP Margin dB	AVG Margin dB
150.0 KHz	31.5	66.0	56.0	-34.5	-24.5
150.78 KHz	31.0	66.0	56.0	-35.0	-25.0
151.32 KHz	30.3	65.9	55.9	-35.6	-25.6
152.1 KHz	30.1	65.9	55.9	-35.8	-25.8
152.72 KHz	29.2	65.9	55.9	-36.7	-26.7
153.42 KHz	29.5	65.8	55.8	-36.4	-26.4
154.04 KHz	28.3	65.8	55.8	-37.5	-27.5
155.2 KHz	28.4	65.7	55.7	-37.3	-27.3
155.36 KHz	29.4	65.7	55.7	-36.3	-26.3
156.6 KHz	28.1	65.6	55.6	-37.5	-27.5
160.56 KHz	28.2	65.4	55.4	-37.2	-27.2
165.77 KHz	28.5	65.2	55.2	-36.7	-26.7

Line 2

Frequency	Peak dBµV	QP Limit dBmV	AVG Limit dBmV	QP Margin dB	AVG Margin dB
150.08 KHz	31.2	66.0	56.0	-34.8	-24.8
150.85 KHz	30.4	66.0	56.0	-35.6	-25.6
151.4 KHz	30.1	65.9	55.9	-35.8	-25.8
152.1 KHz	31.2	65.9	55.9	-34.7	-24.7
152.72 KHz	30.1	65.9	55.9	-35.7	-25.7
153.42 KHz	28.1	65.8	55.8	-37.8	-27.8
154.12 KHz	28.9	65.8	55.8	-36.9	-26.9
154.74 KHz	27.9	65.7	55.7	-37.9	-27.9
155.28 KHz	28.3	65.7	55.7	-37.4	-27.4
155.98 KHz	28.4	65.7	55.7	-37.3	-27.3
157.3 KHz	27.9	65.6	55.6	-37.7	-27.7
158.54 KHz	28.4	65.5	55.5	-37.2	-27.2



Graph 3.8.1



Graph 3.8.2

4.0 TEST EQUIPMENT

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO.	INTERTEK ID	LAST CAL DATE	CAL DUE
Spectrum Analyzer	R & S	FSP 40	100024	12559	02/12/2021	02/12/2022
Spectrum Analyzer	R & S	ESU	100398	25283	07/26/2021	07/26/2022
Spectrum Analyzer	R & S	ESCI	100358	12909	02/10/2021	02/10/2022
Bicono-Log Antenna	Teseq	CBL6112D	32859	25289	05/18/2021	05/18/2022
Chamber HF Cable	Insulated Wire Inc.	SPS-2303-3600-SPRX		12670	06/09/2021	06/09/2022
Chamber HF Cable	Insulated Wire Inc.	SPS-2301-3600-SPS		172517	06/09/2021	06/09/2022
Chamber RE Cable	Coleman	RG214/U M17/164-00001		172505	06/09/2021	06/09/2022
Horn Antenna	EMCO	3115	9504-4504	172463	08/03/2021	08/03/2022
Waveguide Horn Antenna	EMCO	3116	9904-2423	9705	01/22/2021	01/22/2022
Loop Antenna	ETS	6512	00060486	19942	02/22/2021	02/22/2022
LISN	COM-Power	Li-215A	191970	172315	08/09/2021	08/09/2022
Pre-Amplifier	MITEQ	LNA-40-00101800-35-15P	2108525	172474	06/30/2021	06/30/2022
Pre-Amplifier	MITEQ	AMF-6F-16002600-25-10P	1222383	MIN-0065	01/20/2021	01/20/2022
High Pass Filter	Reactel	9HS-4G/24-S12	20-01		04/08/2021	04/08/2022
System	Quantum Change	TILE! Instrument Control	Ver. 3.4.K.29	15259	VBU	VBU

5.0 Revision History

REVISION LEVEL	DATE	REPORT NUMBER	PREPARED	REVIEWED	NOTES
0	8-24-2021	104590627MIN-002	RB	US	Original Issue
1	9-8-2021	104590627MIN-002	RB 	US 	Conducted measurements were retested
2	9-22-2021	104590627MIN-002	RB 	US 	Fixed typo, conducted measurements were retested, plots for average measurements were added