TEST REPORT

Report Number: 104916560MIN-001
Project Number: G104916560

Equipment Designator:
Hyperstat Conventional, Hyperstat P1P2

to
47 CFR, Part 15. 247:2022
RSS- 247, Issue 2, 2017
RSS-Gen, Issue 5, 2019, Amendment 2

For
75F Inc.

Test Performed by:	Test Authorized by:
Intertek Testing Services NA, Inc.	75F Inc.
40 51st Way NE, Suite 100	221 River Ridge Circle
Fridley, MN 55421 USA	Burnsville, MN 55337, USA

Prepared by: Richard Blonigen

Reviewed by: Uri Spector Date of issue: February 10, 2022

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1.0 GENERAL DESCRIPTION

Model:	Hyperstat Conventional (tested fully) Hyperstat P1P2 (Partially Tested to cover Radiated Emissions Spurious Emissions)
Type of EUT:	Wireless Thermostat Controller
Serial Number:	1501010030210060 (P1P2) 1501010013210432 (Conventional)
Related Submittal(s) Grants:	None
Company:	75F Inc.
Customer:	Sajul Babu
Address:	221 River Ridge Circle Burnsville, MN 55337, USA
Phone:	(763) 477-2026
e-mail:	sajul@75f.io
Test Standards:	☒ 47 CFR, Part 15:2022, §15.247 ☒ RSS–247, Issue 2, 2017 ☒ RSS-Gen, Issue 5, 2019, Amendment 2
Type of radio:	☒ Stand -alone ☐ Module ☐ Hybrid
Date Sample Submitted:	January 10, 2022
Test Work Started:	January 10, 2022
Test Work Completed:	January 31, 2022
Test Sample Conditions:	☐ Damaged ☐Poor (Usable) ☒ Good

1.1 Product Description; Test Facility

Product Description:	Wireless Thermostat Controller
Transmitter Type:	☐ FHSS ☒ Digital Modulation ☐ WiFi ☐ Blue Tooth The equipment under test is a Wireless Thermostat Controller with integrated 900MHz transceiver and containing a certified BLE transmitter module (FCC ID: A8TBM71S2, IC: 12246A-BM71S2). This test report covers the 900MHz transmitter. For the purpose of this scope the BLE module was deactivated.
Permitted Band of Operation	902 MHz- 928 MHz
Operating Frequency Range(s):	906 MHz – 924 MHz
Number of Channels:	10
Modulation:	BPSK-40-ALT
Antenna(s) Info:	Integral Microstrip Quarter wave PCB trace antenna. Antenna gain: -0.8dBi
Antenna Installation:	☐ User ☐ Professional ☒ Factory
Transmitter power configuration:	☐ Internal battery ☒ External power source ☒ 100-240VAC, 1.0 Amp. ☒ 50-60Hz
Special Test Arrangement:	Per client the EUT is mounted to the wall vertically, therefore testing was only performed in the Vertical orientation
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:

☒ - Continuous transmissions (modulated signal)
☐ - Continuous transmissions (un-modulated signal)
☐ - Continuous receiving

Operating modes of the EUT:

No.	Description
1	Test Mode – The EUT transmitted continuously and per client per client was configured to transmit with >98% duty cycle. Software used for testing: TeraTerm terminal emulation software v 4.1.
2	Test was performed at low channel (906MHz), middle channel (914MHz), and upper channel (924MHz)
3	Data Rate: 40kbits/sec Channels Output Power Setting per client was set to 0xC0 setting for maximum Tx power.

Other integrated wireless devices

No.	Type, Band of operation	Certifications	Operation details	Note
1	Microchip Technology Bluetooth RF Module, 2402-2480MHz	FCC ID: A8TBM71S2 IC: 12246A-BM71S2	Operation disabled	

Cables:

No.	Type	Length	Designation	Note
1	2-wire unshielded	>3m	AC Power	

Support equipment/Services:

No.	Item	Description
1	Lenovo 80JH	Laptop computer
2	MG Electronics MGT2440P	Power supply for Radiated Emissions
3	Schneider Electric ABL 2REM 24020	Power supply for Conducted Emissions

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, 3m	30-1000 MHz	4.5 dB
Radiated Emissions, 3m	1-6 GHz	4.6 dB
Radiated Emissions, 3m	6-18 GHz	4.6 dB
Radiated Emissions, 3m	18-26 GHz	4.8 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 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.

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

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 = 32.0
UF = $10^{(32\ dB\mu V / 20)}$ = 39.8 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 emissions bandwidth of the digital modulation	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

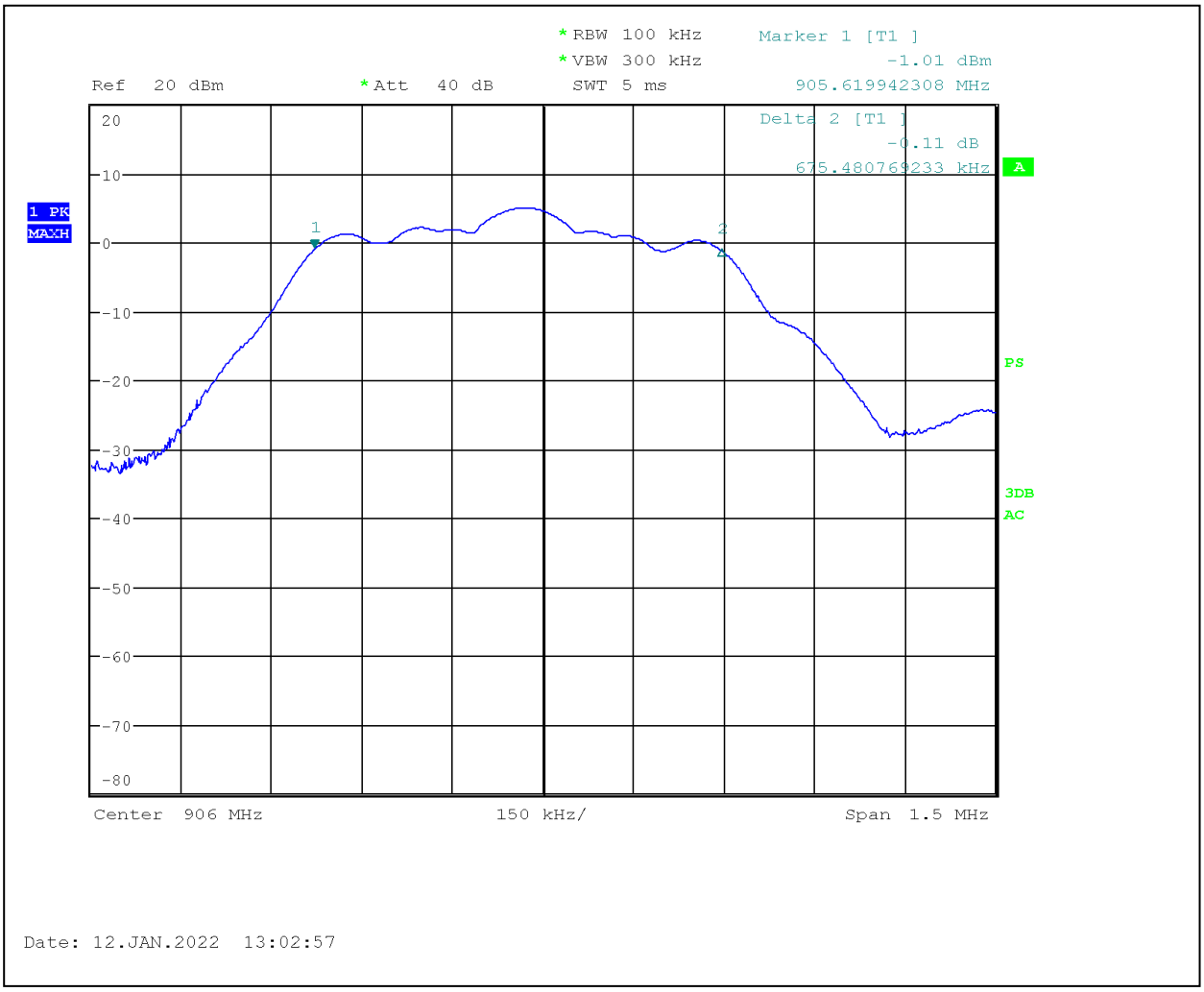
Note: Hyperstat Conventional Thermostat and Hyperstat P1P2 employ identical 900MHz radio. Per client the only difference is the Hyperstat P1P2 uses different interface board. Therefore 900MHz radio in Hyperstat Conventional Thermostat was tested fully and 900MHz radio in Hyperstat P1P2 was tested partially to cover Radiated Emissions Spurious Emissions.

3.0 TEST CONDITIONS AND RESULTS

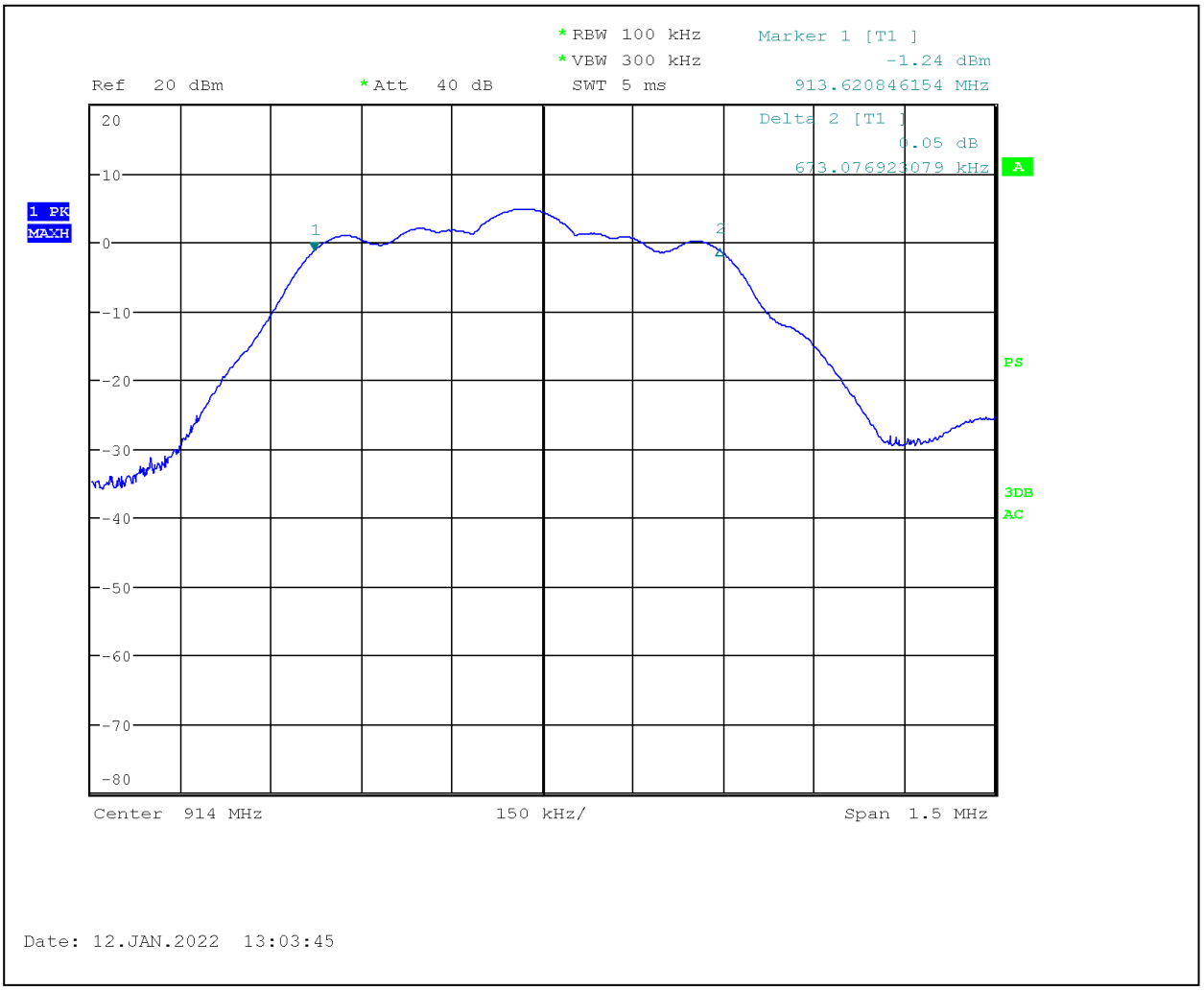
3.1 6dB Emission bandwidth (EBW) of the digital modulation

Low Frequency Channel kHz	Middle Frequency Channel kHz	Upper Frequency Channel kHz	Minimum Bandwidth kHz	Result
675.5	673.1	675.8	500	**Pass**
RBW: **VBW:**	☒ 100 kHz ☒ 300 kHz			

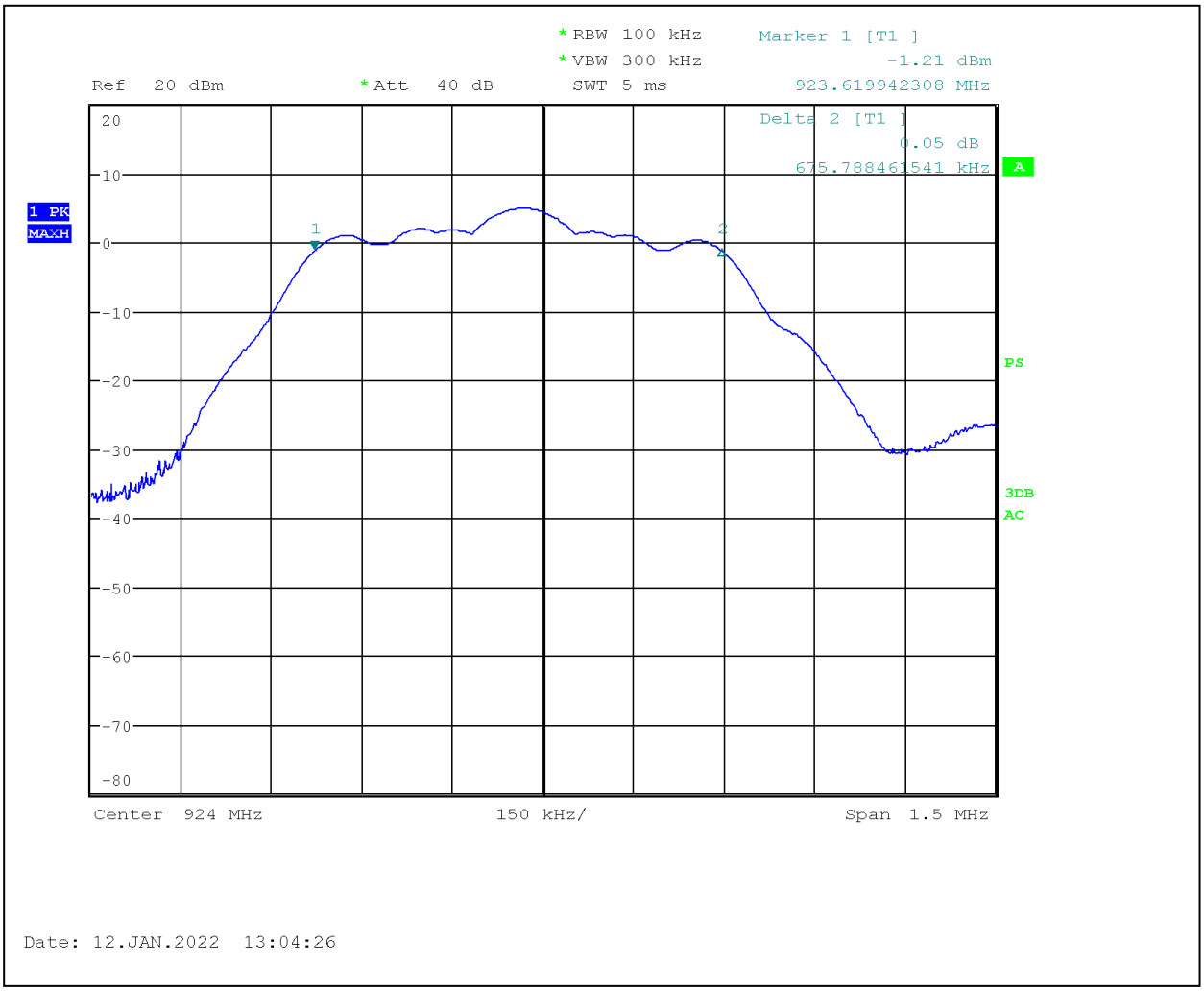
Notes:


* RBW 100 kHz
* VBW 300 kHz
Ref 20 dBm
* Att 40 dB
SWT 5 ms
Marker 1 [T1]
-1.01 dBm
905.619942308 MHz
Delta 2 [T1]
-0.11 dB
675.480769233 kHz
A
1 PK
MAXH
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
PS
3DB
AC
Center 906 MHz
150 kHz/
Span 1.5 MHz
Date: 12.JAN.2022 13:02:57

Graph 3.1.1


* RBW 100 kHz
* VBW 300 kHz
Ref 20 dBm
* Att 40 dB
SWT 5 ms
Marker 1 [T1]
-1.24 dBm
913.620846154 MHz
Delta 2 [T1]
0.05 dB
673.076923079 kHz
A
1 PK
MAXH
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 914 MHz
150 kHz/
Span 1.5 MHz
Date: 12.JAN.2022 13:03:45

Graph 3.1.2

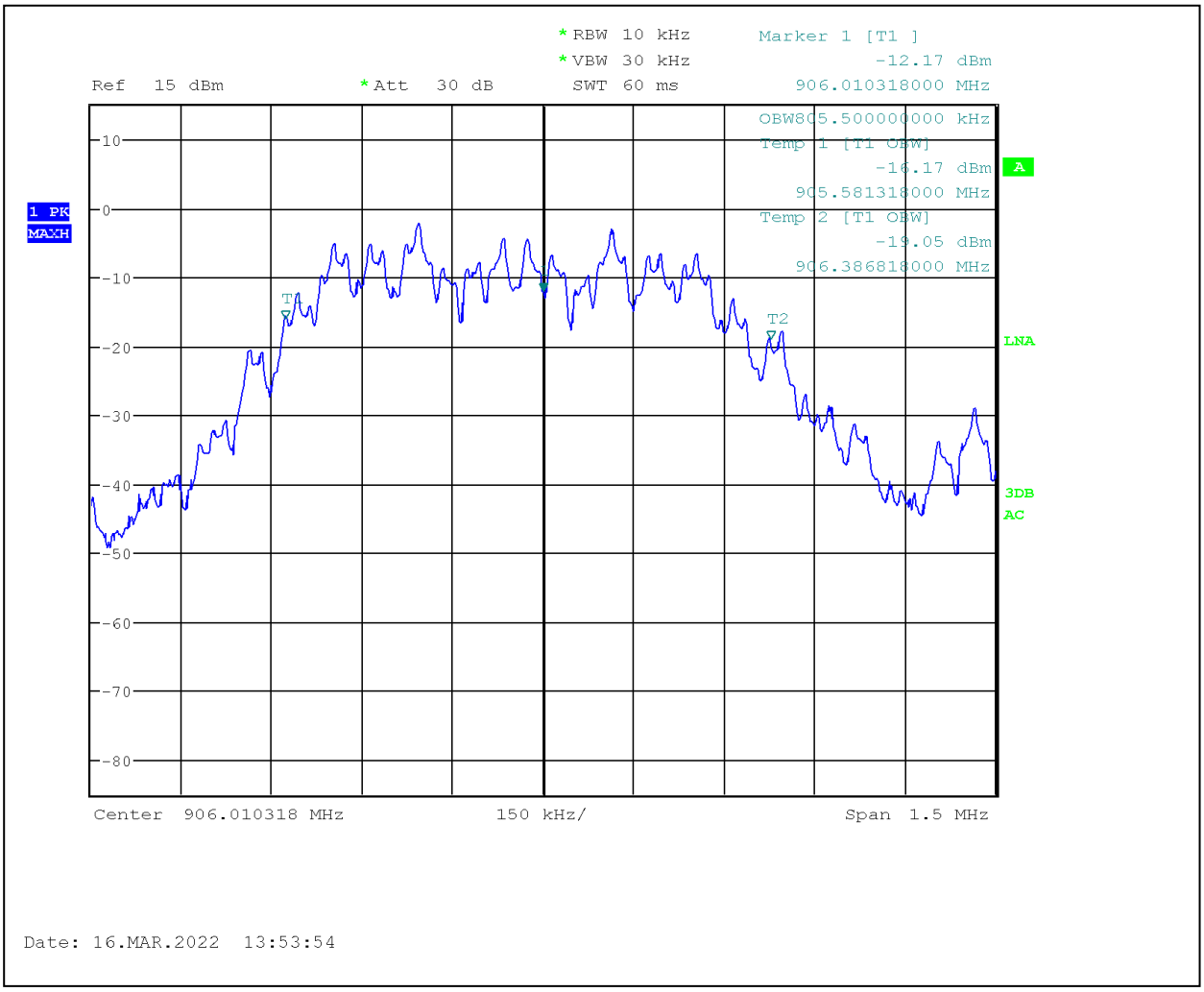

* RBW 100 kHz
* VBW 300 kHz
Ref 20 dBm
* Att 40 dB
SWT 5 ms
Marker 1 [T1]
-1.21 dBm
923.619942308 MHz
Delta 2 [T1]
0.05 dB
675.788461541 kHz
A
1 PK
MAXH
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
PS
3DB
AC
Center 924 MHz
150 kHz/
Span 1.5 MHz
Date: 12.JAN.2022 13:04:26

Graph 3.1.3

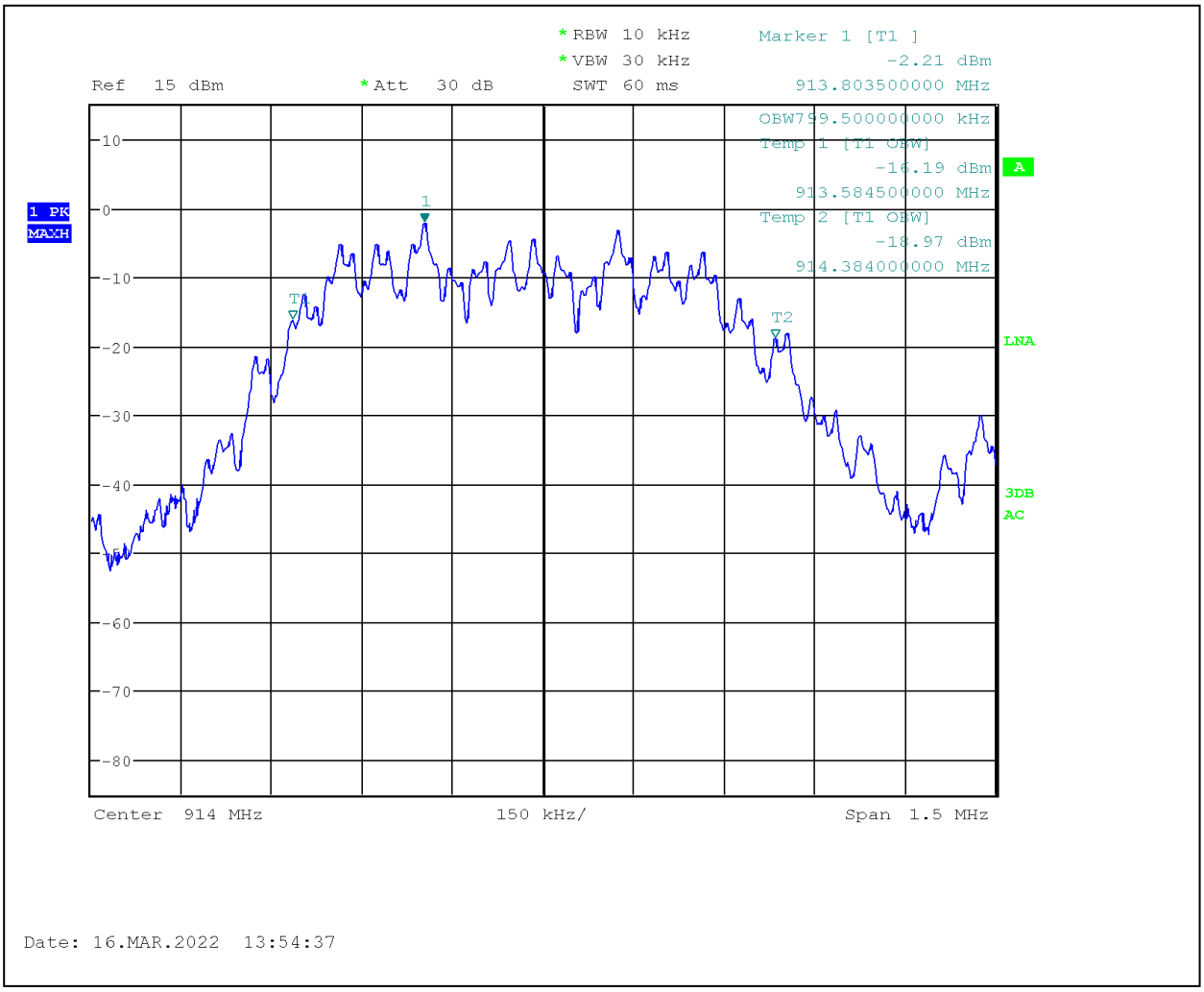
3.2 Occupied bandwidth (OBW) (99%)

Low Frequency Channel kHz	Middle Frequency Channel kHz	Upper Frequency Channel kHz
805.5	799.5	781.5
RBW: **VBW:**	☒ 10kHz ☒ 30kHz	

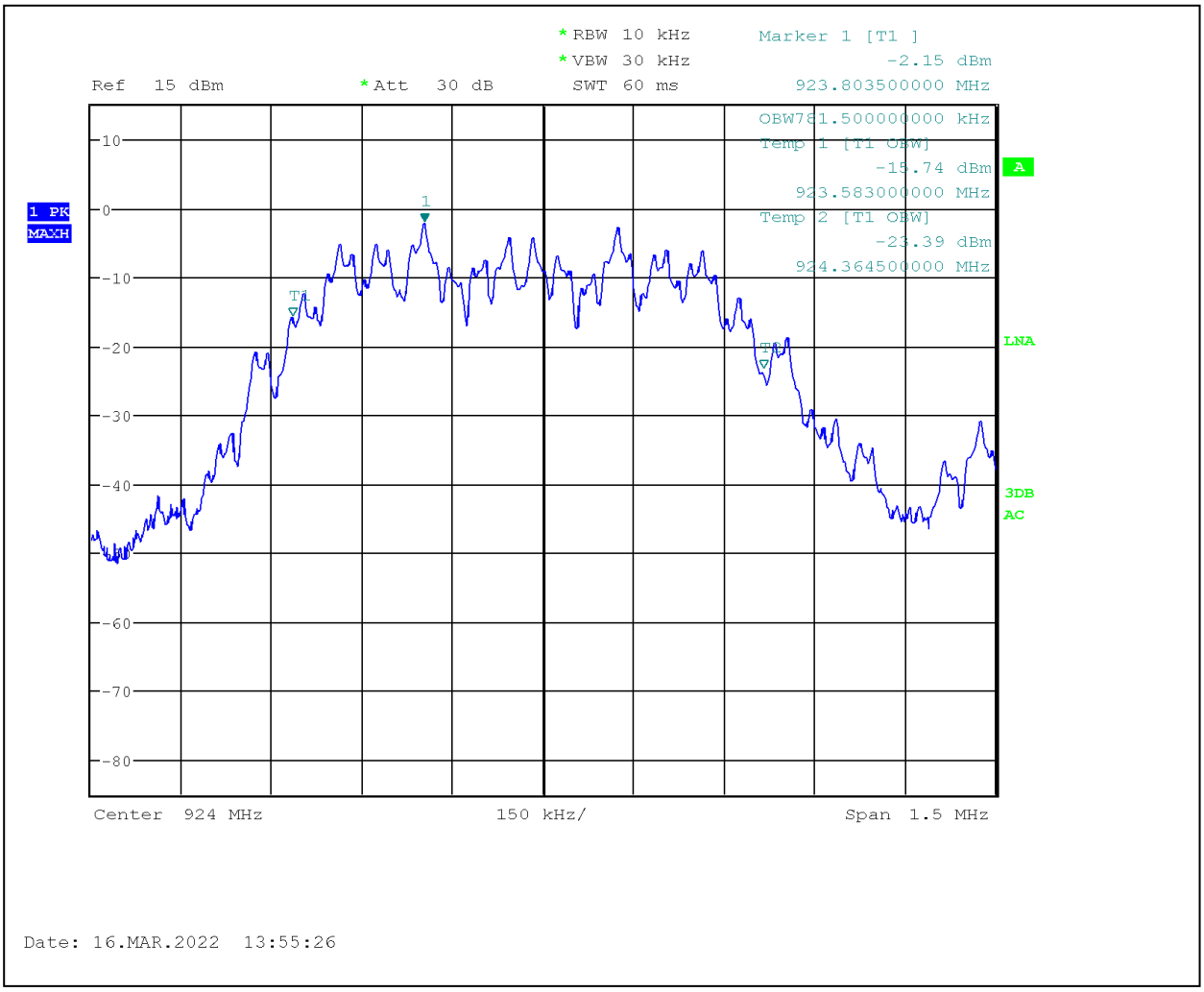
Notes:


* RBW 10 kHz
* VBW 30 kHz
Ref 15 dBm
* Att 30 dB
SWT 60 ms
Marker 1 [T1]
-12.17 dBm
906.010318000 MHz
OBW865.500000000 kHz
Temp 1 [T1 OBW]
-16.17 dBm
905.581318000 MHz
Temp 2 [T1 OBW]
-19.05 dBm
906.386818000 MHz
1 PK
MAXH
A
LNA
3DB
AC
10
0
-10
-20
-30
-40
-50
-60
-70
-80
T1
T2
Center 906.010318 MHz
150 kHz/
Span 1.5 MHz
Date: 16.MAR.2022 13:53:54

Graph 3.2.1


* RBW 10 kHz
* VBW 30 kHz
Ref 15 dBm
* Att 30 dB
SWT 60 ms
Marker 1 [T1]
-2.21 dBm
913.803500000 MHz
OBW799.500000000 kHz
Temp 1 [T1 OBW]
-16.19 dBm
913.584500000 MHz
Temp 2 [T1 OBW]
-18.97 dBm
914.384000000 MHz
1 PK
MAXH
A
LNA
3DB
AC
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 914 MHz
150 kHz/
Span 1.5 MHz
Date: 16.MAR.2022 13:54:37

Graph 3.2.2


* RBW 10 kHz
* VBW 30 kHz
Ref 15 dBm
* Att 30 dB
SWT 60 ms
Marker 1 [T1]
-2.15 dBm
923.803500000 MHz
OBW 781.500000000 kHz
Temp 1 [T1 OBW]
-15.74 dBm
923.583000000 MHz
Temp 2 [T1 OBW]
-23.39 dBm
924.364500000 MHz
1 PK
MAXH
A
LNA
3DB
AC
10
0
-10
-20
-30
-40
-60
-70
-80
Center 924 MHz
150 kHz/
Span 1.5 MHz
Date: 16.MAR.2022 13:55:26

Graph 3.2.3

3.3 Maximum peak output power

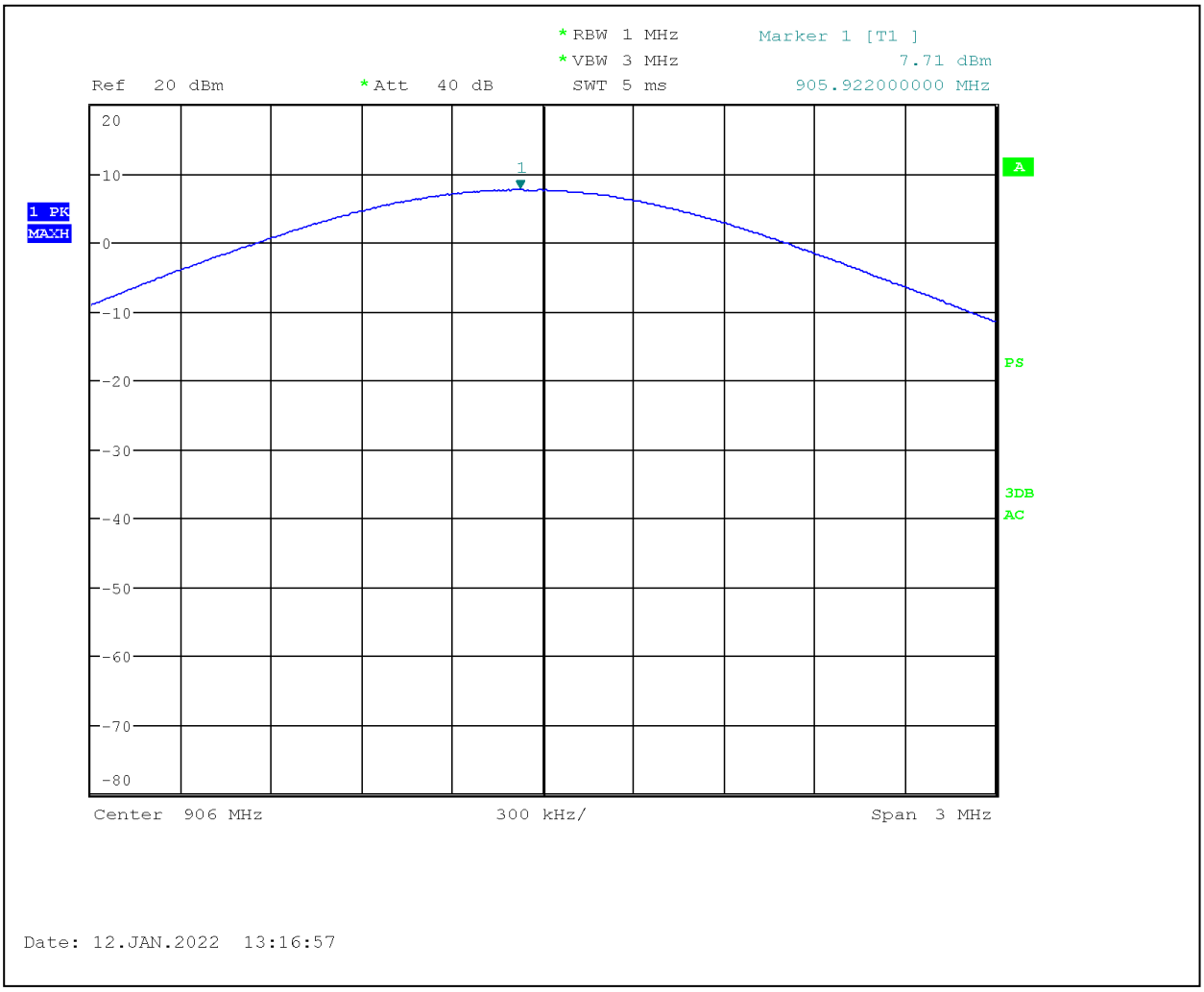
Test result: **Pass**

Max. Margin: 9.3dBm (8.51mW / 0.00851W) Margin: 20.7dB 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**
906	7.7	1.5	9.2	30	0	20.8
Middle Frequency MHz						
914	7.7	1.5	9.2	30	0	20.8
Upper Frequency MHz						
924	7.8	1.5	9.3	30	0	20.7
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, Sections 11.9.1 and 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]
7.71 dBm
905.922000000 MHz
Ref 20 dBm
* Att 40 dB
1 PK
MAXH
A
PS
3DB
AC
Center 906 MHz
300 kHz/
Span 3 MHz
Date: 12.JAN.2022 13:16:57

Graph 3.3.1


* RBW 1 MHz
* VBW 3 MHz
SWT 5 ms
Marker 1 [T1]
7.67 dBm
913.949192308 MHz
Ref 20 dBm
* Att 40 dB
1 PK
MAXH
A
PS
3DB
AC
Center 914 MHz
300 kHz/
Span 3 MHz
Date: 12.JAN.2022 13:18:05

Graph 3.3.2

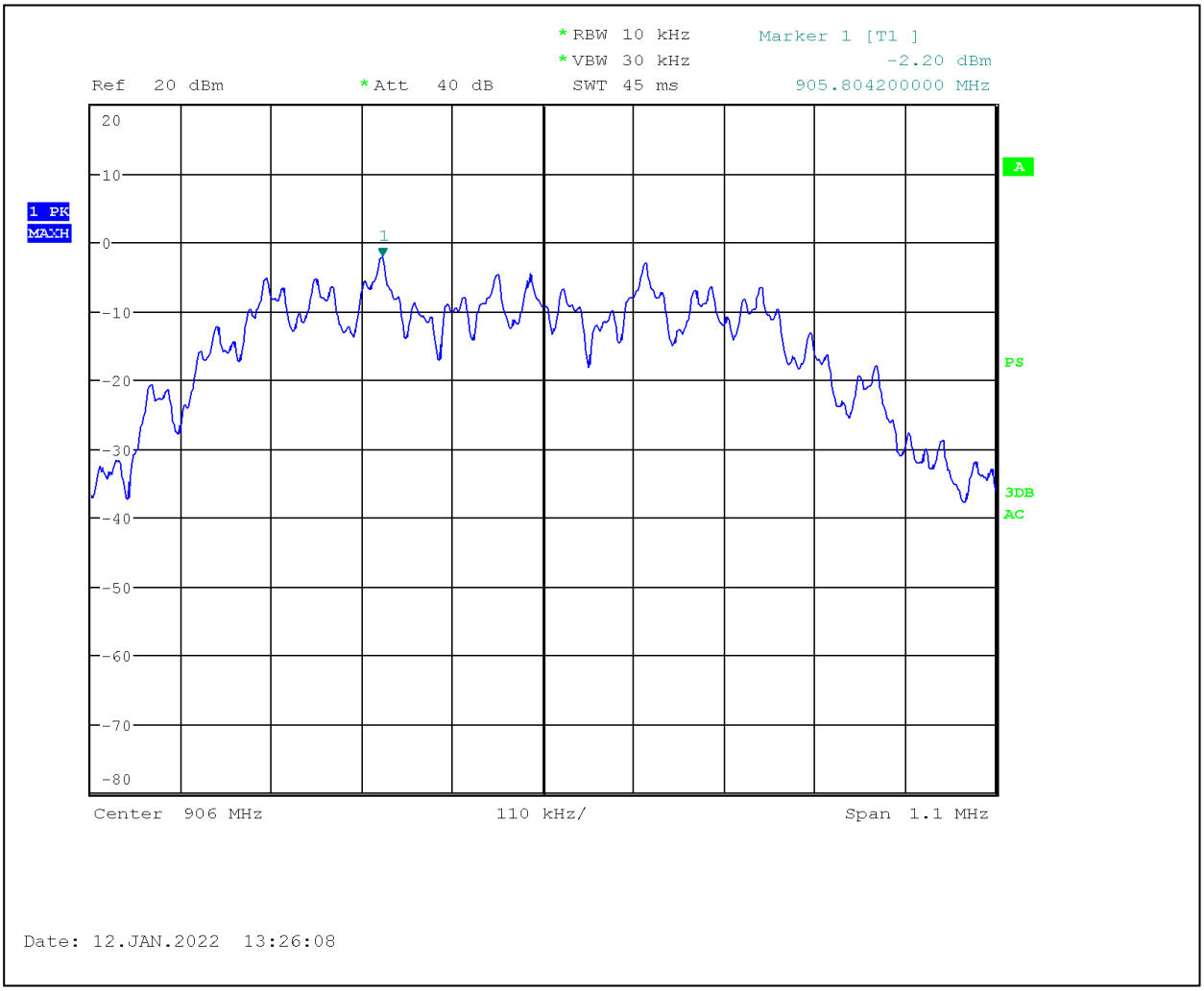

* RBW 1 MHz
* VBW 3 MHz
SWT 5 ms
Marker 1 [T1]
7.76 dBm
923.939538462 MHz
Ref 20 dBm
* Att 40 dB
1 PK
MAXH
A
PS
3DB
AC
Center 924 MHz
300 kHz/
Span 3 MHz
Date: 12.JAN.2022 13:18:28

Graph 3.3.3

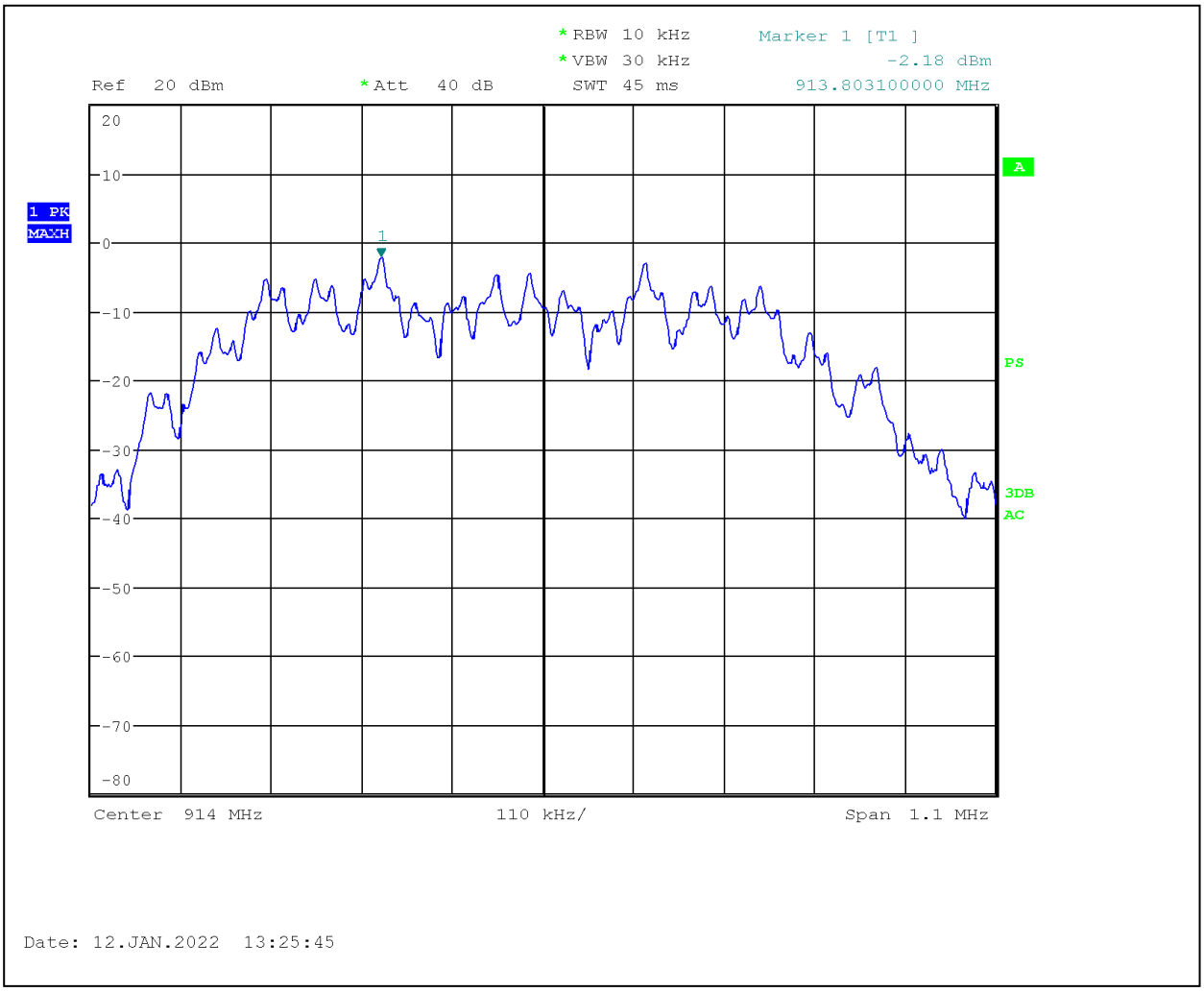
3.4 Power spectral density

Power Output:	☒ Conducted ☐ Radiated			
	Measured Density dBm	**Power Density at Antenna dBm**	**Limit dBm**	**Margin dB**
Low Frequency Channel	-2.2	-0.7	8	-8.7
Middle Frequency Channel	-2.2	-0.7	8	-8.7
Upper Frequency Channel	-2.1	-0.6	8	-8.6
Analyzer Settings:	☒ RBW=10KHz ☒ VBW=30KHz ☒ Span=1.1MHz ☒ Sweep=Auto			
Antenna Gain:	☒ < 6dBi and = dBi ☐ >6dBi and = dBi, limit reduction = dB			

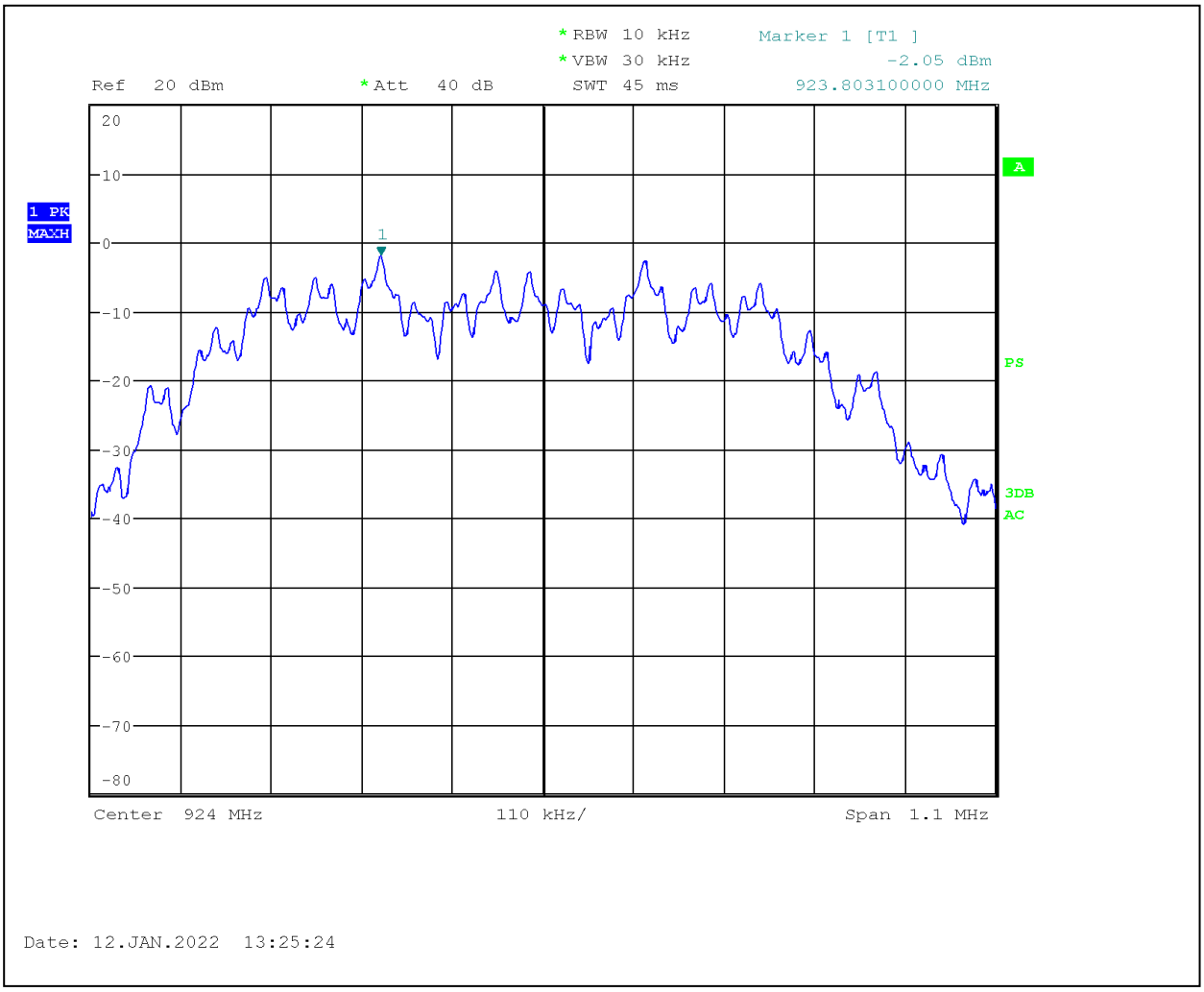
Notes: The Power Spectral Density at Antenna was calculated adding the cable loss of 1.5dB from the measured density value.


* RBW 10 kHz
* VBW 30 kHz
SWT 45 ms
Marker 1 [T1]
-2.20 dBm
905.804200000 MHz
Ref 20 dBm
* Att 40 dB
1 PK
MAXH
A
PS
3DB
AC
Center 906 MHz
110 kHz/
Span 1.1 MHz
Date: 12.JAN.2022 13:26:08

Graph 3.4.1


* RBW 10 kHz
* VBW 30 kHz
SWT 45 ms
Marker 1 [T1]
-2.18 dBm
913.803100000 MHz
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 914 MHz
110 kHz/
Span 1.1 MHz
Date: 12.JAN.2022 13:25:45

Graph 3.4.2

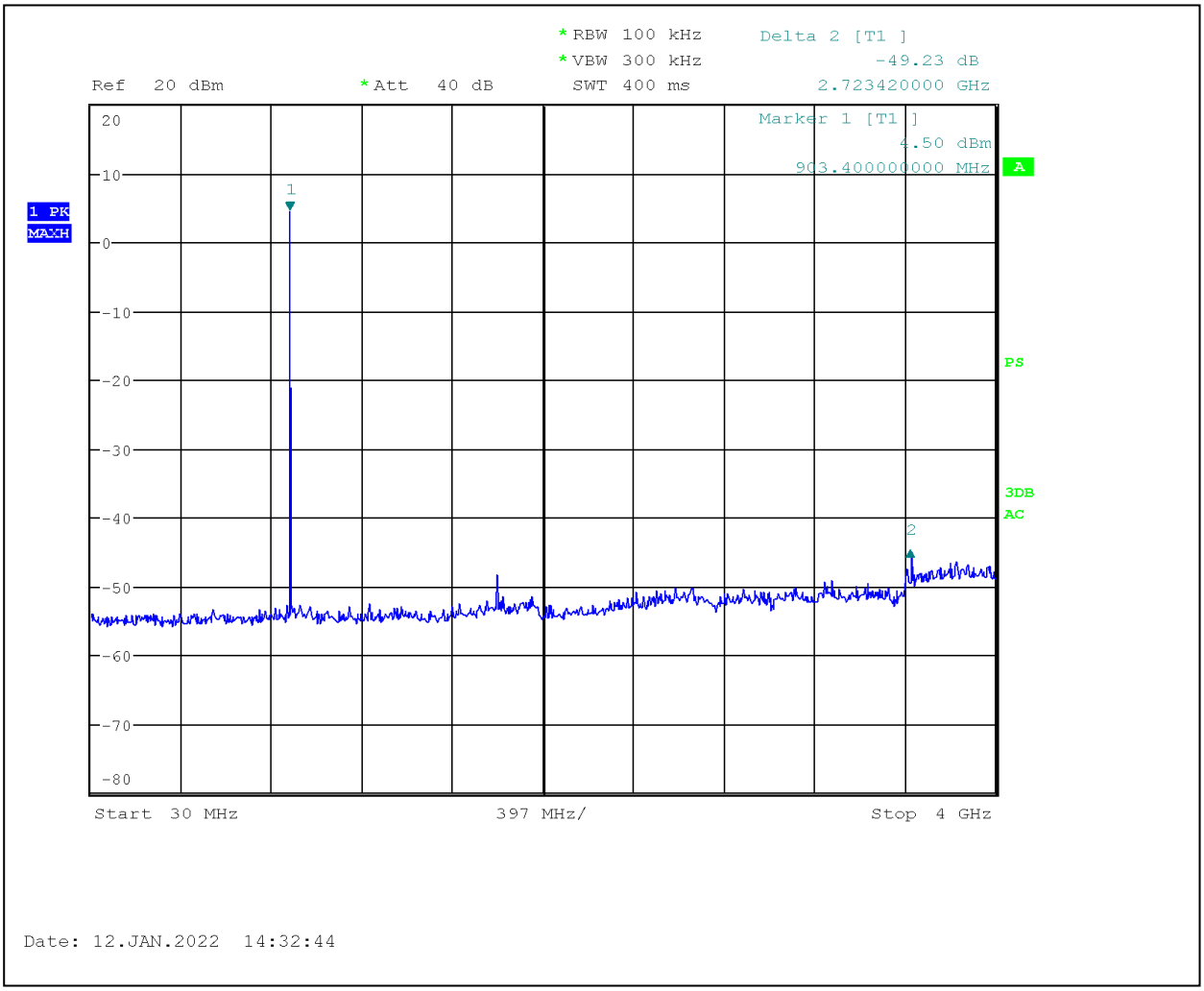

* RBW 10 kHz
* VBW 30 kHz
SWT 45 ms
Marker 1 [T1]
-2.05 dBm
923.803100000 MHz
Ref 20 dBm
* Att 40 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 924 MHz
110 kHz/
Span 1.1 MHz
Date: 12.JAN.2022 13:25:24

Graph 3.4.3

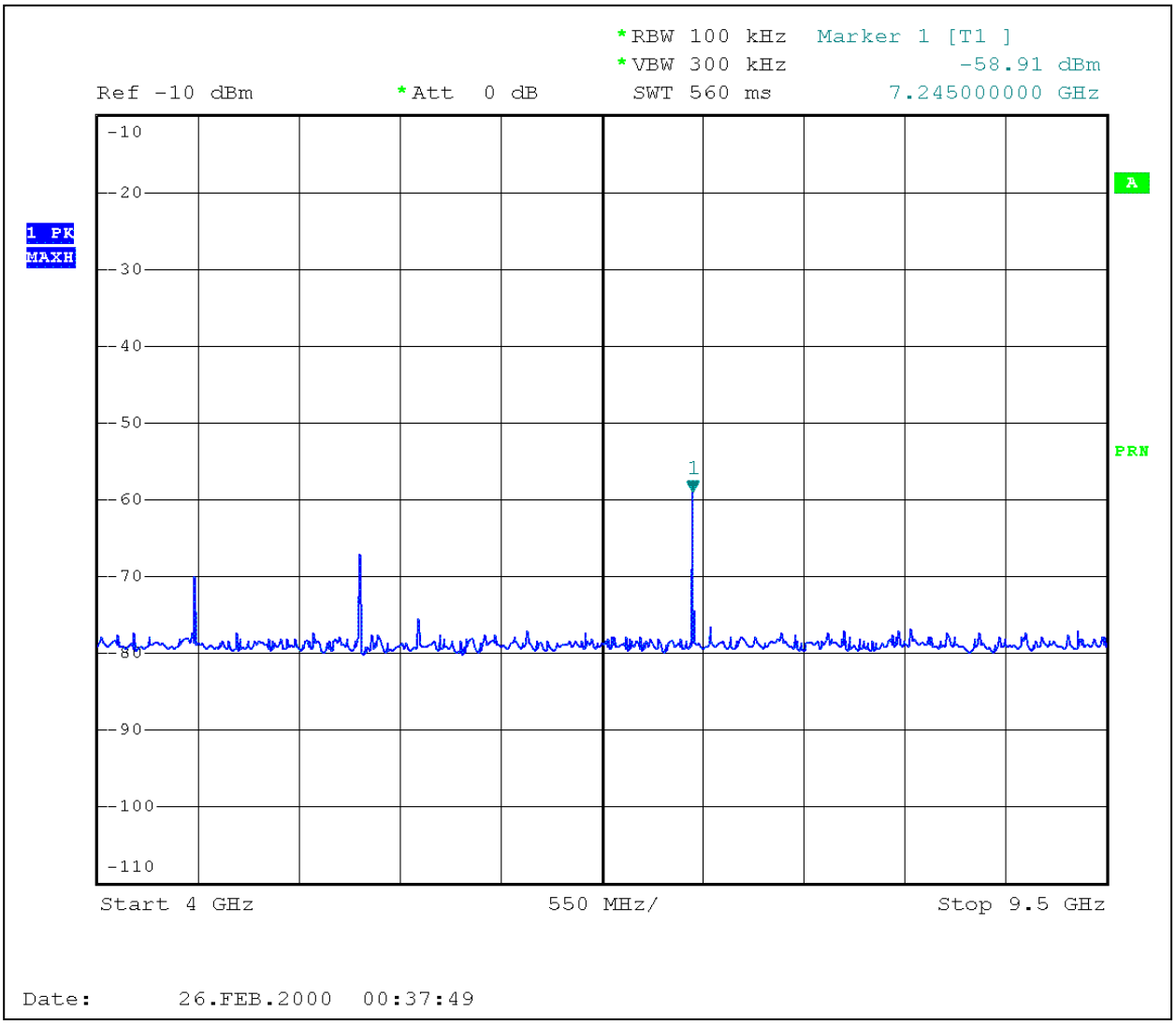
3.5 Antenna conducted spurious emissions

	Minimum Measured Attenuation dB	Minimum Allowed Attenuation dB	Margin dB
Low Frequency Channel	-49.2	-20	-29.2
Middle Frequency Channel	-49.6	-20	-29.6
Upper Frequency Channel	-48.8	-20	-28.8
Analyzer Settings:	☒ RBW=100KHz		
Minimum Allowed Attenuation:	☒ 20dB ☐ 30dB (for digital systems with conducted power measured using RMS averaging over a time interval)		

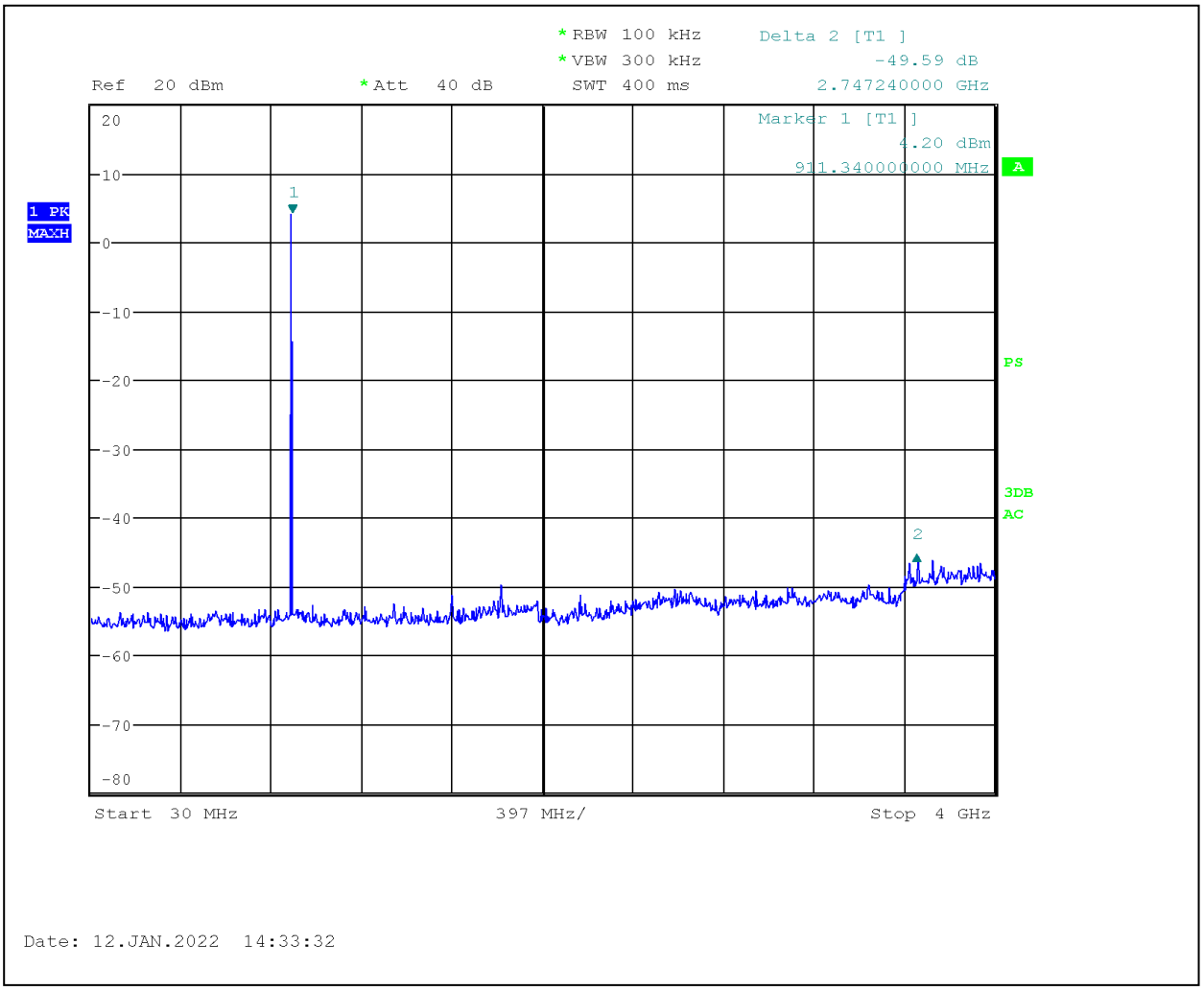
Notes: Graphs 3.5.1 - 3.5.6 show antenna conducted spurious emissions.
Graphs 3.5.7 - 3.5.8 show band edge compliance.


* RBW 100 kHz
* VBW 300 kHz
SWT 400 ms
Delta 2 [T1]
-49.23 dB
2.723420000 GHz
Ref 20 dBm
* Att 40 dB
Marker 1 [T1]
4.50 dBm
903.400000000 MHz
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 30 MHz
397 MHz/
Stop 4 GHz
Date: 12.JAN.2022 14:32:44

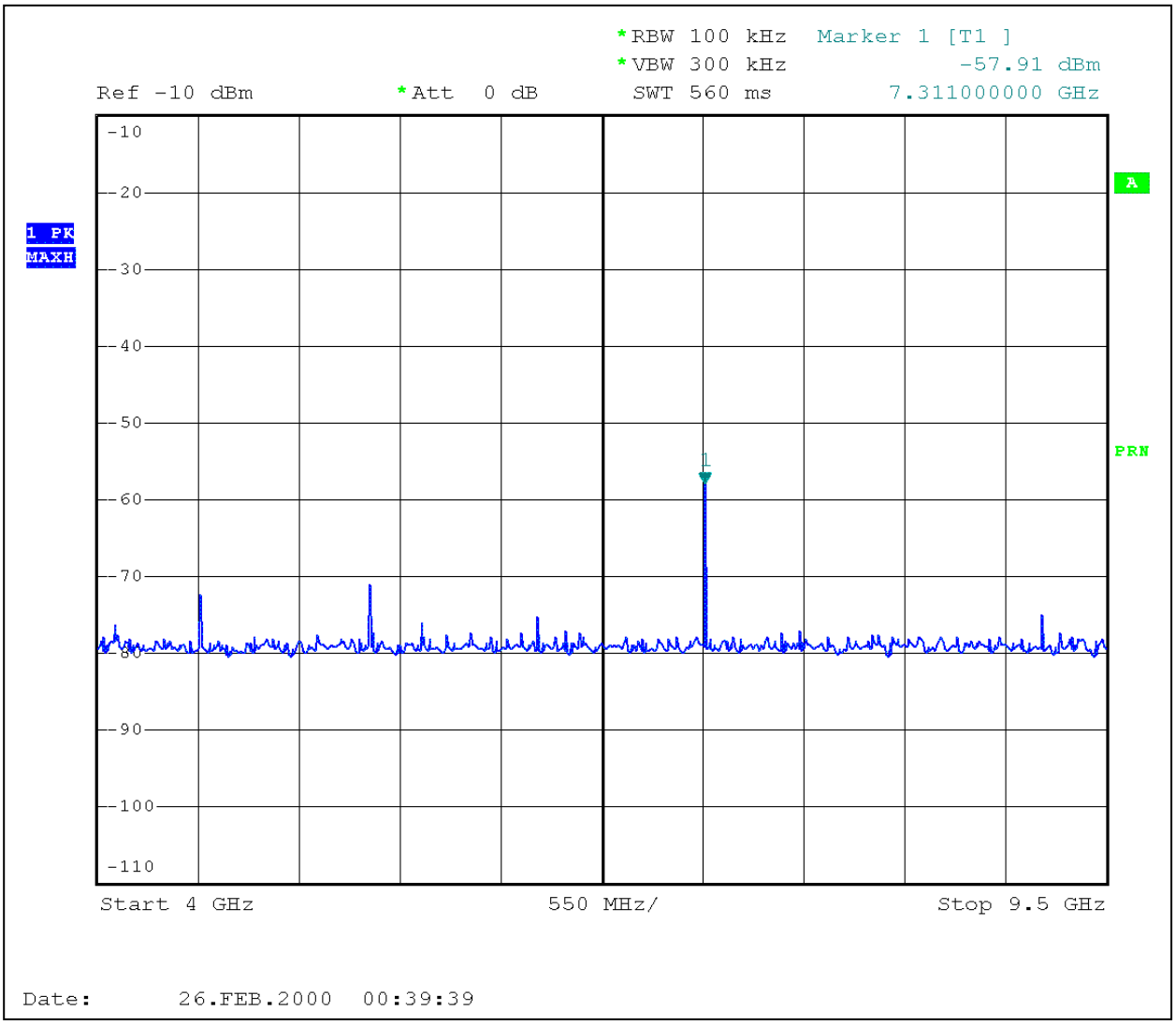
Graph 3.5.1


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-58.91 dBm
Ref -10 dBm
*Att 0 dB
SWT 560 ms
7.245000000 GHz
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
1 PK
MAXH
A
PRN
1
Start 4 GHz
550 MHz/
Stop 9.5 GHz
Date: 26.FEB.2000 00:37:49

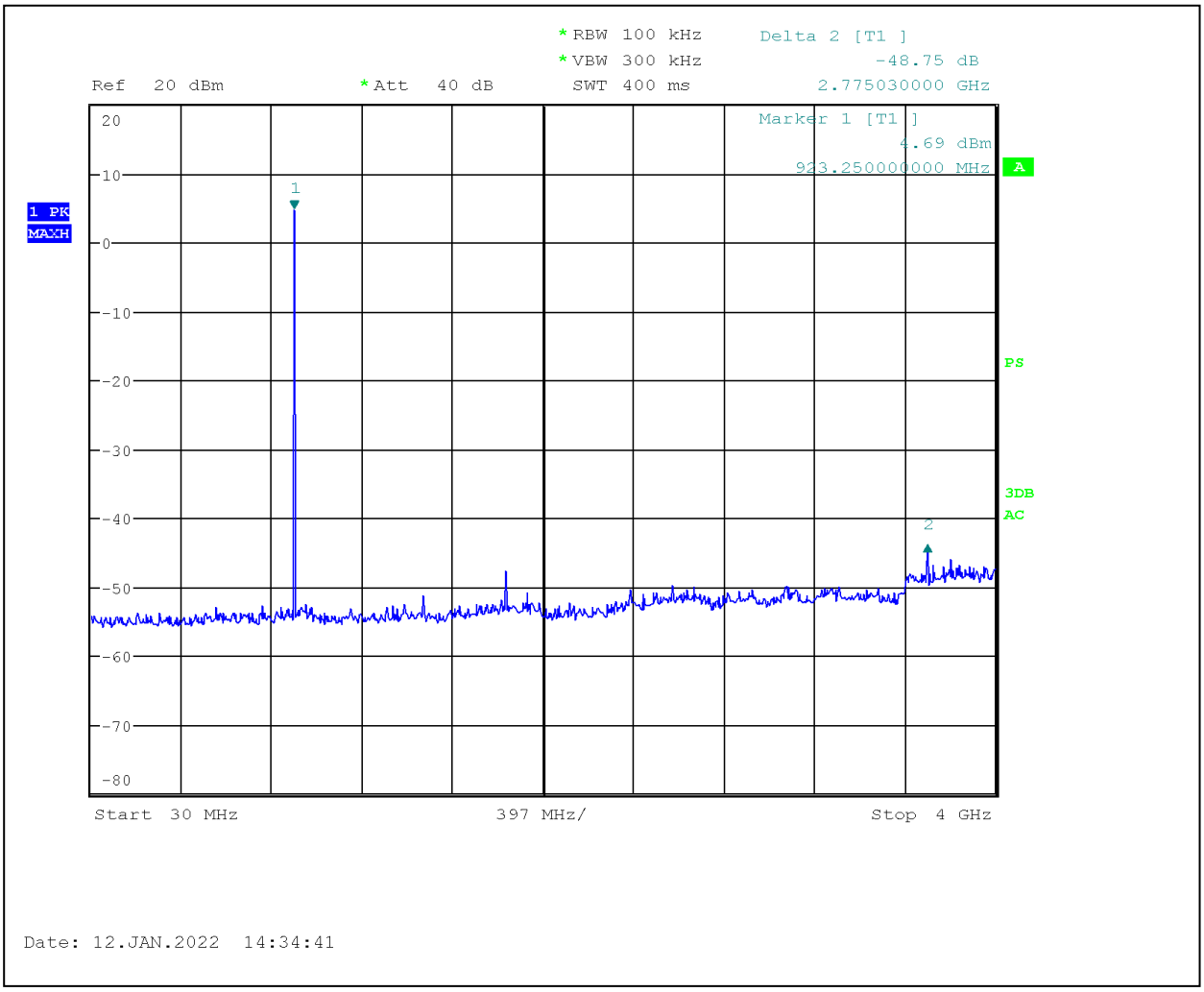
Graph 3.5.2


* RBW 100 kHz
* VBW 300 kHz
SWT 400 ms
Delta 2 [T1]
-49.59 dB
2.747240000 GHz
Ref 20 dBm
* Att 40 dB
Marker 1 [T1]
4.20 dBm
911.340000000 MHz
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 30 MHz
397 MHz/
Stop 4 GHz
Date: 12.JAN.2022 14:33:32

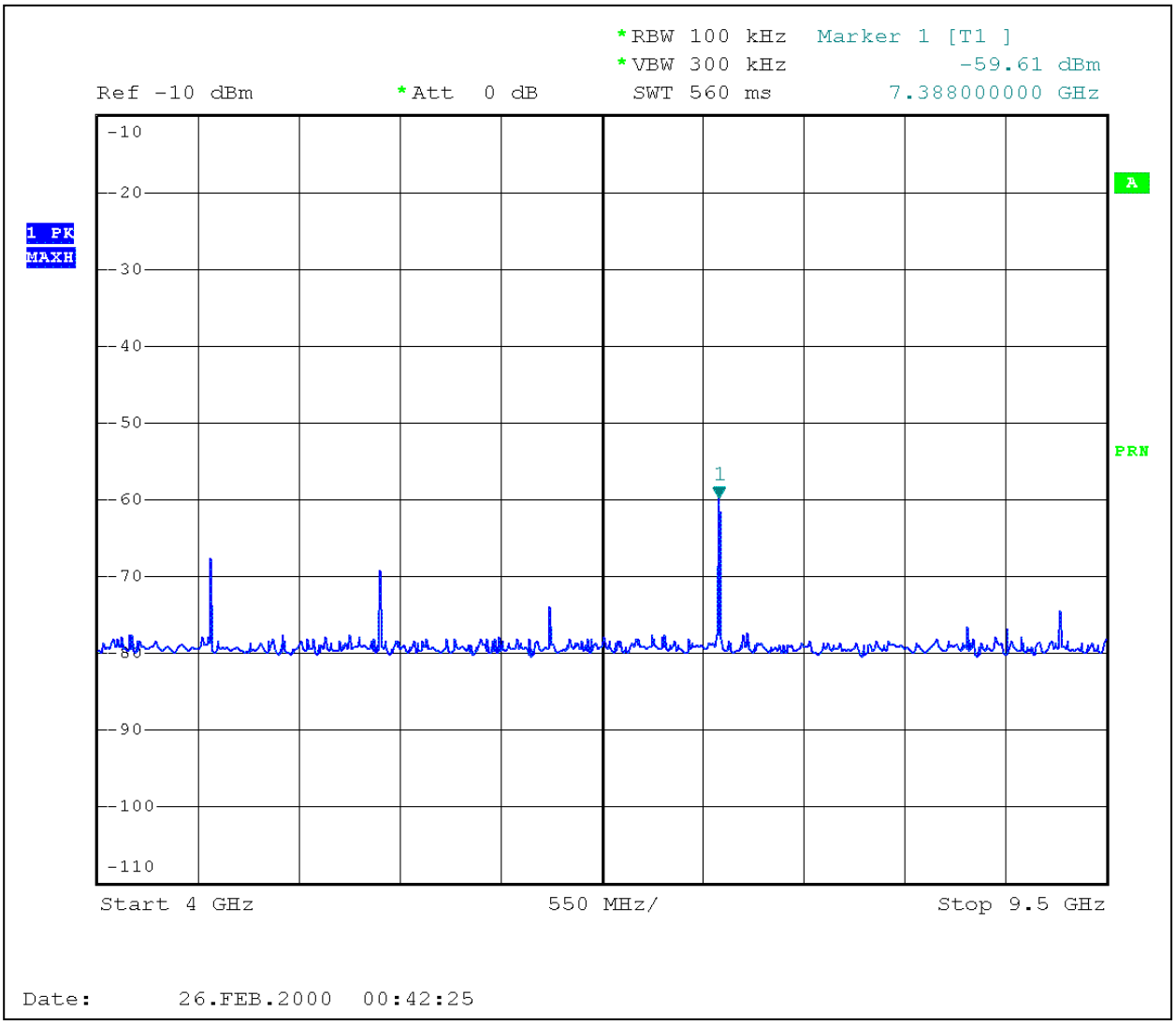
Graph 3.5.3


*RBW 100 kHz
*VBW 300 kHz
SWT 560 ms
Marker 1 [T1]
-57.91 dBm
7.311000000 GHz
Ref -10 dBm
*Att 0 dB
1 PK
MAXH
A
PRN
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
Start 4 GHz
550 MHz/
Stop 9.5 GHz
Date: 26.FEB.2000 00:39:39

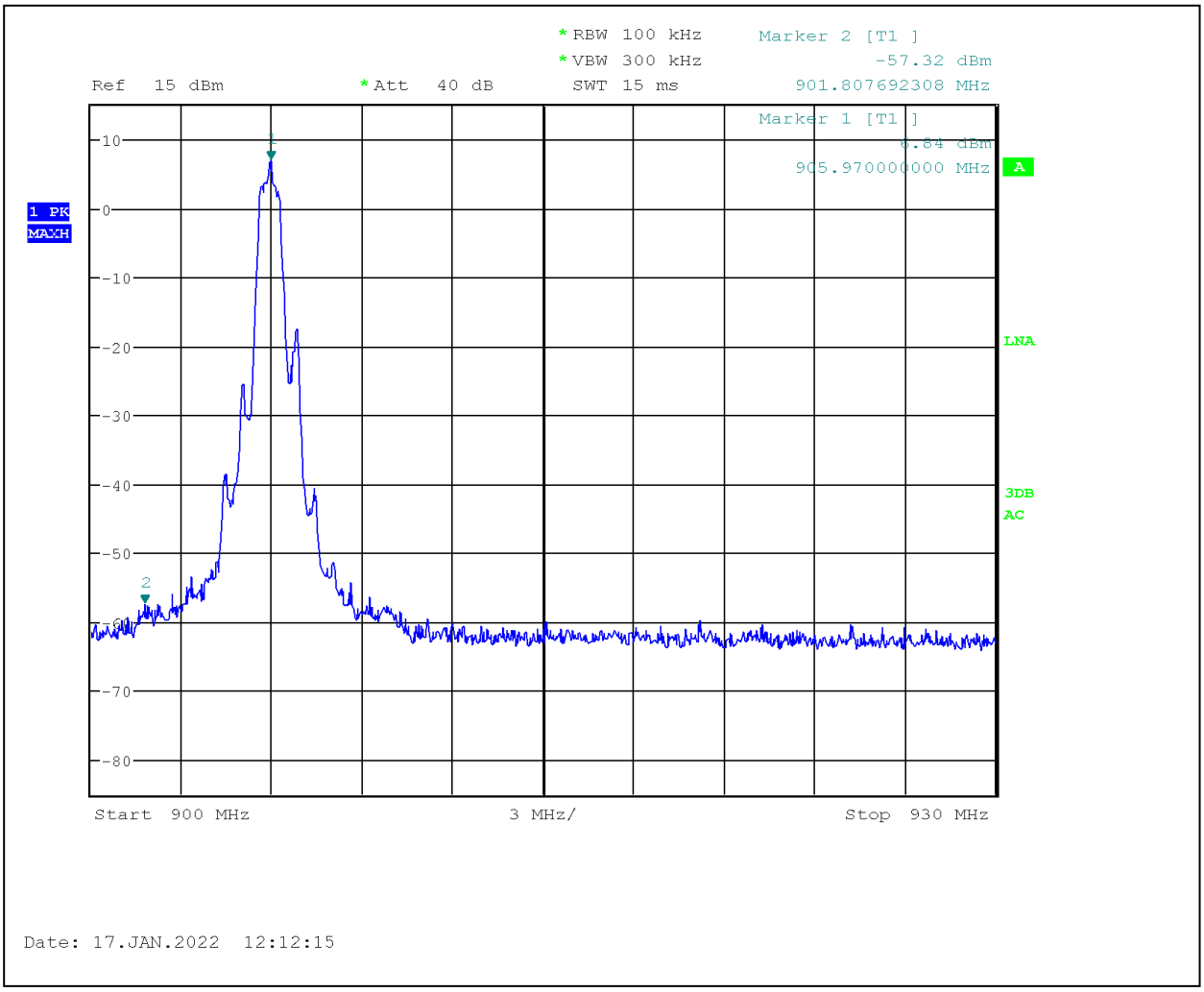
Graph 3.5.4


* RBW 100 kHz
* VBW 300 kHz
SWT 400 ms
Delta 2 [T1]
-48.75 dB
2.775030000 GHz
Ref 20 dBm
* Att 40 dB
Marker 1 [T1]
4.69 dBm
923.250000000 MHz
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 30 MHz
397 MHz/
Stop 4 GHz
Date: 12.JAN.2022 14:34:41

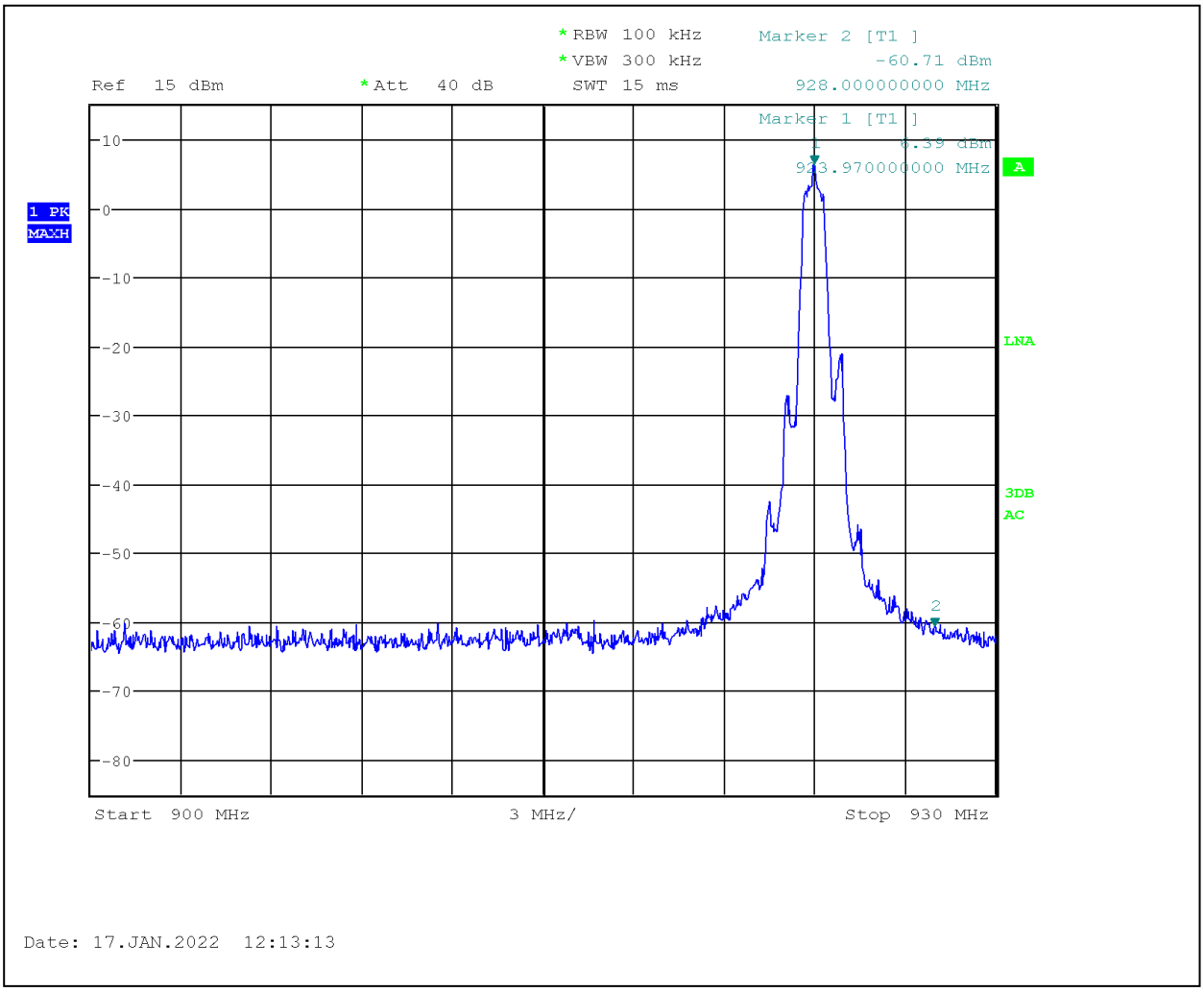
Graph 3.5.5


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-59.61 dBm
Ref -10 dBm
*Att 0 dB
SWT 560 ms
7.388000000 GHz
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
1 PK
MAXH
A
PRN
1
Start 4 GHz
550 MHz/
Stop 9.5 GHz
Date: 26.FEB.2000 00:42:25

Graph 3.5.6


* RBW 100 kHz
* VBW 300 kHz
Ref 15 dBm
* Att 40 dB
SWT 15 ms
Marker 2 [T1]
-57.32 dBm
901.807692308 MHz
Marker 1 [T1]
6.84 dBm
905.970000000 MHz
1 PK
MAXH
A
LNA
3DB
AC
10
0
-10
-20
-30
-40
-50
-70
-80
Start 900 MHz
3 MHz/
Stop 930 MHz
Date: 17.JAN.2022 12:12:15

Graph 3.5.7


* RBW 100 kHz
* VBW 300 kHz
Ref 15 dBm
* Att 40 dB
SWT 15 ms
Marker 2 [T1]
-60.71 dBm
928.000000000 MHz
Marker 1 [T1]
1 6.39 dBm
923.970000000 MHz
1 PK
MAXH
A
LNA
3DB
AC
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 900 MHz
3 MHz/
Stop 930 MHz
Date: 17.JAN.2022 12:13:13

Graph 3.5.8

3.6 Radiated spurious emissions

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test result: **Pass**

Max. Margin Spurious: 0.1 dB below the limits
Max. Margin Bandedge: 13.3 dB below the limits

EUT was configured to transmit continuously. Radiated emission measurements were performed from 9 kHz to 13 GHz according to the procedure described in ANSI C63.10.

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 Average detector. The Quasi-peak level of radiated emissions was measured with a CISPR Quasi-peak detector.

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. No Radiated and Spurious emissions were detected in the frequency range 9 kHz to 30MHz and 10GHz to 13GHz.

Note: 2. Radiated Spurious testing was performed on both the Hyperstat Conventional and Hyperstat P1P2.

Note: 3. In frequency range 1GHz – 10GHz, the Peak limit lines were shown in the graphs to show readings are compliant with Peak limits.

Date:	January 10 – 31, 2022	**Result: Pass**
Tested by:	Richard Blonigen	
Standard:	FCC part 15.247(d)	
Test Point:	Enclosure	
Operation mode:	See page 5	
Environmental Conditions:	21°C; 40%(RH); 98kPa	
Equipment Verification:	☒	
Note:	Model: Hyperstat Conventional Frequency Range: 30MHz – 1GHz	

Table 3.6.1

Frequency MHz	Antenna Polarity	Peak Reading dBµV	Total C.F. dB1/m	Total at 3m dBµV/m	QP Limit dBµV/m	Margin dB
Low Channel						
119.99 MHz	V	15.8	17.8	33.7	43.5	-9.8
143.95 MHz	V	19.5	16.5	36.0	43.5	-7.5
215.97 MHz	V	17.7	15.6	33.3	43.5	-10.2
264.02 MHz	V	18.5	19.6	38.1	46.0	-7.9
311.93 MHz	V	19.5	20.0	39.5	46.0	-6.5
239.99 MHz	H	17.0	17.5	34.5	46.0	-11.5
264.02 MHz	H	19.3	19.6	38.9	46.0	-7.1
288.04 MHz	H	15.7	19.0	34.7	46.0	-11.3
311.93 MHz	H	24.0	20.0	44.0	46.0	-2.0
359.83 MHz	H	15.9	21.7	37.6	46.0	-8.5
Mid Channel						
167.98 MHz	V	19.5	15.5	35.1	43.5	-8.5
215.97 MHz	V	20.2	15.6	35.7	43.5	-7.8
264.02 MHz	V	15.7	19.6	35.3	46.0	-10.7
311.93 MHz	V	20.9	20.0	40.9	46.0	-5.1
264.02 MHz	H	20.1	19.6	39.7	46.0	-6.3
288.04 MHz	H	18.0	19.0	37.0	46.0	-9.0
311.93 MHz	H	25.9	20.0	45.9	46.0	-0.1
335.8 MHz	H	21.3	20.4	41.7	46.0	-4.3
359.83 MHz	H	18.4	21.7	40.0	46.0	-6.0
High Channel						
167.98 MHz	V	21.4	15.5	36.9	43.5	-6.6
215.97 MHz	V	19.8	15.6	35.4	43.5	-8.2
264.02 MHz	V	16.0	19.6	35.6	46.0	-10.5
311.93 MHz	V	21.9	20.0	41.9	46.0	-4.2
264.02 MHz	H	19.1	19.6	38.7	46.0	-7.3
288.04 MHz	H	18.8	19.0	37.9	46.0	-8.2
311.93 MHz	H	24.8	20.0	44.8	46.0	-1.2
335.8 MHz	H	21.4	20.4	41.8	46.0	-4.2
359.83 MHz	H	18.5	21.7	40.2	46.0	-5.8

Date:	January 10 – 31, 2022	**Result: Pass**
Tested by:	Richard Blonigen	
Standard:	FCC part 15.247(d)	
Test Point:	Enclosure	
Operation mode:	See page 5	
Environmental Conditions:	21°C; 40%(RH); 98kPa	
Equipment Verification:	☒	
Note:	Model: Hyperstat Conventional Frequency Range: 1GHz – 13GHz	

Table 3.6.2

Frequency	Antenna		Ant. CF	Cable loss	Pre-amp	Reading	Total @ 3m	AVG Limit	Margin	Comments
MHz	Polarity	Hts(cm)	dB1/m	dB	Gain (dB)	dBµV	dBµV/m	dBµV/m	dB	
Low Channel										
1600.00	V	110	25.6	3.7	42.2	59.7	46.8	54.0	-7.2	Peak
1812.00	V	152	26.4	4.0	42.3	52.6	40.7	54.0	-13.3	Peak
1998.00	V	122	27.2	4.2	42.4	52.0	41.0	54.0	-13.0	Peak
2718.00	V	145	29.1	4.9	42.4	59.0	50.6	54.0	-3.4	Peak
3624.00	V	157	31.5	5.7	42.7	47.0	41.4	54.0	-12.6	Peak
4784.00	V	153	32.8	6.5	43.2	45.3	41.5	54.0	-12.5	Peak
1600.00	H	118	25.6	3.7	42.2	51.3	38.4	54.0	-15.6	Peak
1812.00	H	151	26.4	4.0	42.3	55.1	43.2	54.0	-10.8	Peak
2000.00	H	180	27.2	4.2	42.4	50.4	39.4	54.0	-14.6	Peak
2718.00	H	162	29.1	4.9	42.4	46.0	37.6	54.0	-16.4	Peak
3626.00	H	154	31.5	5.7	42.7	52.8	47.2	54.0	-6.7	Peak
Mid Channel										
1598.00	V	166	25.6	3.7	42.2	61.7	48.8	54.0	-5.2	Peak
1828.00	V	155	26.5	4.0	42.3	52.5	40.7	54.0	-13.3	Peak
1998.00	V	121	27.2	4.2	42.4	51.8	40.8	54.0	-13.2	Peak
2742.00	V	153	29.2	4.9	42.4	51.0	42.7	54.0	-11.3	Peak
3656.00	V	151	31.5	5.7	42.7	48.7	43.2	54.0	-10.8	Peak
1408.00	H	109	25.0	3.5	42.2	60.6	46.9	54.0	-7.1	Peak
1598.00	H	199	25.6	3.7	42.2	52.2	39.3	54.0	-14.7	Peak
1828.00	H	153	26.5	4.0	42.3	63.0	51.2	54.0	-2.8	Peak
2742.00	H	161	29.2	4.9	42.4	60.2	51.9	54.0	-2.1	Peak
3656.00	H	156	31.5	5.7	42.7	49.6	44.1	54.0	-9.9	Peak
High Channel										
1596.00	V	240	25.6	3.7	42.2	57.0	44.1	54.0	-9.9	Peak
1848.00	V	143	26.6	4.0	42.3	57.1	45.4	54.0	-8.6	Peak
2000.00	V	100	27.2	4.2	42.4	50.8	39.8	54.0	-14.2	Peak
2588.00	V	100	28.7	4.8	42.4	47.7	38.7	54.0	-15.3	Peak
2772.00	V	147	29.3	5.0	42.4	54.3	46.1	54.0	-7.9	Peak
3696.00	V	155	31.7	5.7	42.7	46.9	41.5	54.0	-12.4	Peak
1200.00	H	135	24.5	3.2	42.1	54.0	39.6	54.0	-14.3	Peak
1596.00	H	145	25.6	3.7	42.2	52.2	39.3	54.0	-14.7	Peak
1848.00	H	150	26.6	4.0	42.3	68.5	56.8	74.0	-17.2	Peak
1848.00	H	150	26.6	4.0	42.3	63.1	51.4	54.0	-2.6	AVG
2774.00	H	157	29.3	5.0	42.4	66.4	58.2	74.0	-15.8	Peak
2774.00	H	157	29.3	5.0	42.4	60.3	52.1	54.0	-1.9	AVG
3338.00	V	133	30.7	5.5	42.6	57.0	50.6	54.0	-3.4	Peak
3696.00	H	151	31.7	5.7	42.7	52.0	46.6	54.0	-7.3	Peak

Date:	January 10 – 31, 2022	**Result: Pass**
Tested by:	Richard Blonigen	
Standard:	FCC part 15.247(d)	
Test Point:	Enclosure	
Operation mode:	See page 5	
Environmental Conditions:	21°C; 40%(RH); 98kPa	
Equipment Verification:	☒	
Note:	Model: Hyperstat P1P2 Frequency Range: 30MHz – 1GHz	

Table 3.6.3

Frequency MHz	Antenna Polarity	Peak Reading dBµV	Total C.F. dB1/m	Total at 3m dBµV/m	QP Limit dBµV/m	Margin dB
Low Channel						
119.99 MHz	V	15.8	17.8	33.7	43.5	-9.8
143.95 MHz	V	19.5	16.5	36.0	43.5	-7.5
167.98 MHz	V	15.6	15.5	31.1	43.5	-12.4
191.94 MHz	V	14.2	15.0	29.2	43.5	-14.3
215.97 MHz	V	17.7	15.6	33.3	43.5	-10.2
82.144 MHz	H	10.7	12.7	23.4	40.0	-16.7
107.97 MHz	H	11.3	17.4	28.7	43.5	-14.9
123.55 MHz	H	11.0	17.8	28.7	43.5	-14.8
215.97 MHz	H	15.9	15.6	31.4	43.5	-12.1
239.99 MHz	H	17.0	17.5	34.5	46.0	-11.5
Mid Channel						
119.99 MHz	V	19.3	17.8	37.1	43.5	-6.4
144.02 MHz	V	21.1	16.4	37.6	43.5	-6.0
215.97 MHz	V	21.9	15.6	37.4	43.5	-6.1
239.99 MHz	V	22.4	17.5	39.9	46.0	-6.1
264.02 MHz	V	20.4	19.6	40.0	46.0	-6.0
311.93 MHz	V	17.9	20.0	37.9	46.0	-8.1
215.97 MHz	H	18.7	15.6	34.3	43.5	-9.2
239.99 MHz	H	20.7	17.5	38.2	46.0	-7.8
264.02 MHz	H	24.6	19.6	44.2	46.0	-1.8
287.93 MHz	H	13.8	19.0	32.9	46.0	-13.2
311.93 MHz	H	23.2	20.0	43.2	46.0	-2.8
High Channel						
119.92 MHz	V	19.4	17.9	37.2	43.5	-6.3
144.02 MHz	V	20.8	16.4	37.2	43.5	-6.3
215.97 MHz	V	22.0	15.6	37.5	43.5	-6.0
239.99 MHz	V	22.1	17.5	39.6	46.0	-6.4
264.02 MHz	V	20.7	19.6	40.3	46.0	-5.8
311.93 MHz	V	19.2	20.0	39.2	46.0	-6.8
215.97 MHz	H	18.6	15.6	34.2	43.5	-9.3
239.99 MHz	H	20.4	17.5	37.9	46.0	-8.1
264.02 MHz	H	25.1	19.6	44.7	46.0	-1.4
311.93 MHz	H	22.5	20.0	42.5	46.0	-3.5
335.97 MHz	H	15.5	20.4	35.9	46.0	-10.1

Date:	January 10 – 31, 2022	**Result: Pass**
Tested by:	Richard Blonigen	
Standard:	FCC part 15.247(d)	
Test Point:	Enclosure	
Operation mode:	See page 5	
Environmental Conditions:	21°C; 40%(RH); 98kPa	
Equipment Verification:	☒	
Note:	Model: Hyperstat P1P2 Frequency Range: 1GHz – 13GHz	

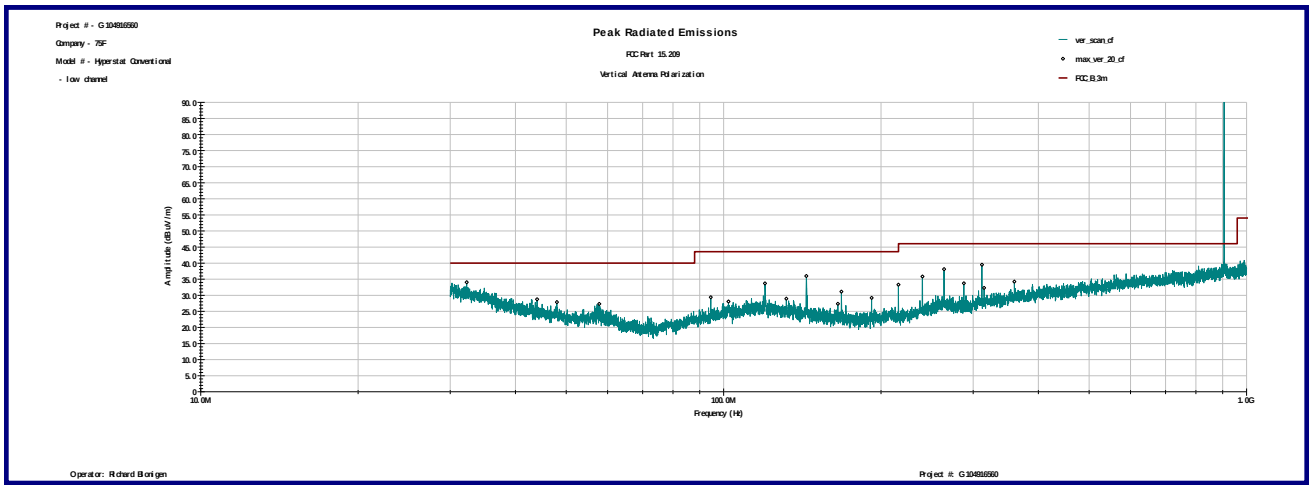
Table 3.6.4

Frequency	Antenna		Ant. CF	Cable loss	Pre-amp	Reading	Total @ 3m	AVG Limit	Margin	Comments
MHz	Polarity	Hts(cm)	dB1/m	dB	Gain (dB)	dBµV	dBµV/m	dBµV/m	dB	
Low Channel										
1596.00	V	115	25.6	3.7	42.2	61.9	49.0	54.0	-5.0	Peak
1812.00	V	153	26.4	4.0	42.3	51.2	39.3	54.0	-14.7	Peak
1994.00	V	168	27.2	4.2	42.4	54.2	43.2	54.0	-10.8	Peak
2716.00	V	157	29.1	4.9	42.4	47.5	39.0	54.0	-14.9	Peak
3624.00	V	151	31.5	5.7	42.7	45.6	40.0	54.0	-14.0	Peak
4858.00	V	145	32.9	6.6	43.2	50.2	46.5	54.0	-7.5	Peak
1600.00	H	122	25.6	3.7	42.2	51.5	38.6	54.0	-15.4	Peak
1812.00	H	148	26.4	4.0	42.3	60.1	48.2	54.0	-5.8	Peak
1994.00	H	220	27.2	4.2	42.4	51.4	40.4	54.0	-13.6	Peak
2718.00	H	151	29.1	4.9	42.4	55.7	47.3	54.0	-6.7	Peak
3624.00	H	153	31.5	5.7	42.7	52.1	46.5	54.0	-7.5	Peak
Middle Channel										
1596.00	V	120	25.6	3.7	42.2	53.9	41.0	54.0	-13.0	Peak
1828.00	V	155	26.5	4.0	42.3	56.7	44.9	54.0	-9.1	Peak
2000.00	V	175	27.2	4.2	42.4	51.4	40.4	54.0	-13.6	Peak
2796.00	V	149	29.3	5.0	42.4	47.9	39.8	54.0	-14.2	Peak
3656.00	V	153	31.5	5.7	42.7	47.6	42.1	54.0	-11.9	Peak
1594.00	H	230	25.6	3.7	42.2	56.1	43.2	54.0	-10.8	Peak
1828.00	H	153	26.5	4.0	42.3	63.2	51.4	54.0	-2.6	Peak
1994.00	H	235	27.2	4.2	42.4	53.3	42.3	54.0	-11.7	Peak
2742.00	H	151	29.2	4.9	42.4	60.2	51.9	54.0	-2.1	Peak
3658.00	H	149	31.6	5.7	42.7	51.9	46.4	54.0	-7.6	Peak
High Channel										
1594.00	V	135	25.6	3.7	42.2	58.6	45.7	54.0	-8.3	Peak
1850.00	V	154	26.6	4.0	42.3	61.2	49.5	54.0	-4.5	Peak
2774.00	V	153	29.3	5.0	42.4	57.6	49.4	54.0	-4.6	Peak
3696.00	V	159	31.7	5.7	42.7	47.5	42.1	54.0	-11.8	Peak
1598.00	H	233	25.6	3.7	42.2	56.2	43.3	54.0	-10.7	Peak
1848.00	H	145	26.6	4.0	42.3	63.3	51.6	54.0	-2.4	Peak
2774.00	H	153	29.3	5.0	42.4	65.9	57.7	74.0	-16.3	Peak
2774.00	H	153	29.3	5.0	42.4	59.7	51.5	54.0	-2.5	AVG
3696.00	H	157	31.7	5.7	42.7	49.6	44.2	54.0	-9.7	Peak

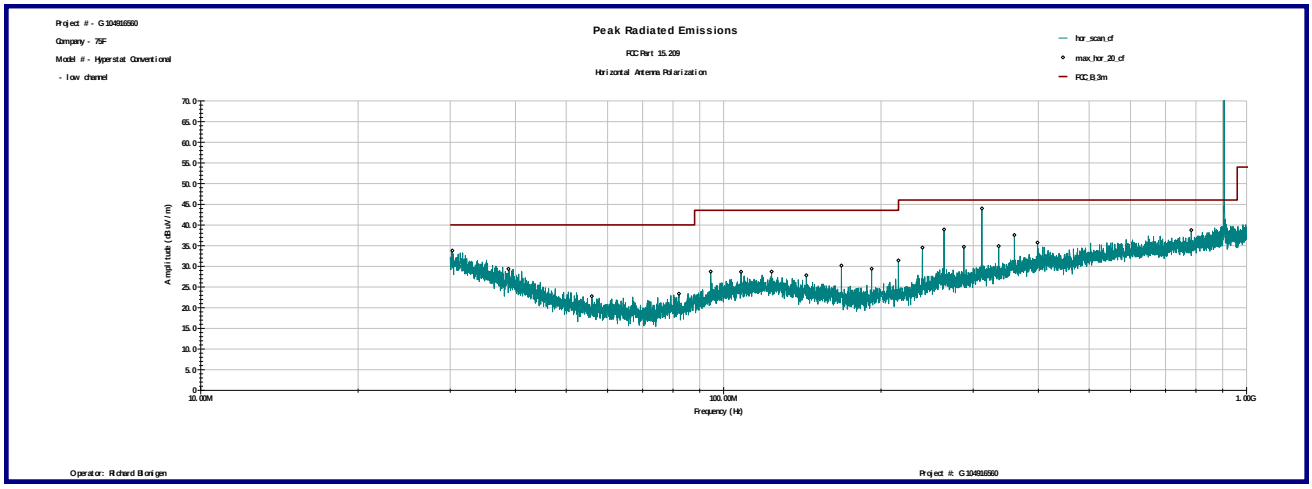
Date:	January 10 – 31, 2022	**Result: Pass**
Tested by:	Richard Blonigen	
Standard:	FCC part 15.247(d)	
Test Point:	Enclosure	
Operation mode:	See page 5	
Environmental Conditions:	21°C; 40%(RH); 98kPa	
Equipment Verification:	☒	
Note:	Bandedge Compliance	

Table 3.6.5

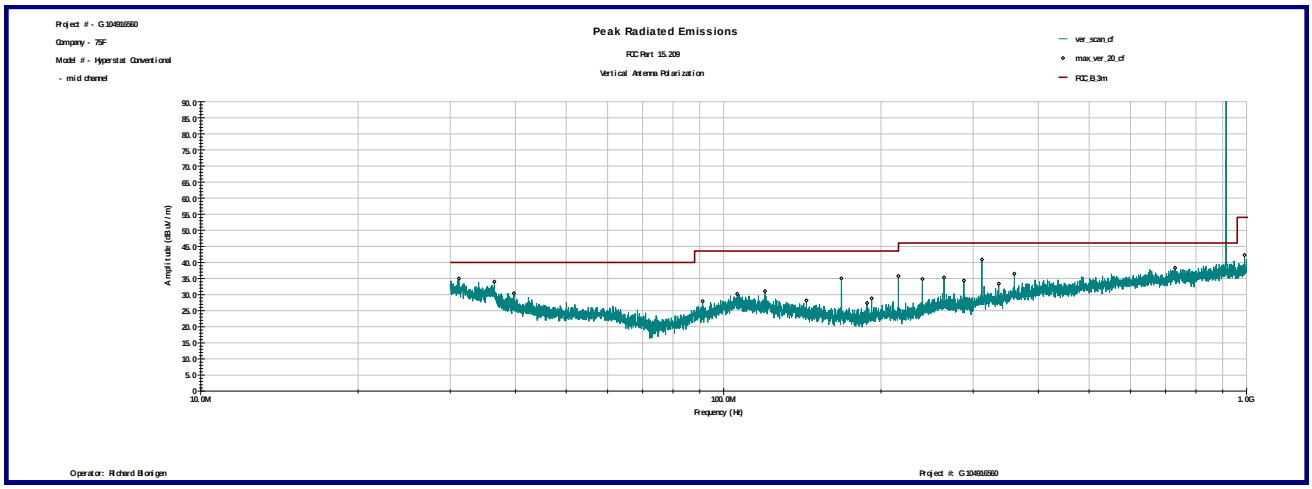
Frequency	Antenna		Ant. CF	Cable loss	Pre-amp	Peak Reading	Total @ 3m	Limit	Margin	Comments
MHz	Polarity	Hts(cm)	dB1/m	dB	Gain (dB)	dBµV	dBµV/m	dBµV/m	dB	Power
Hyperstat Conventional										
902.00	V	100	26.0	1.8	0.0	4.9	32.7	46.0	-13.4	
902.00	H	100	26.0	1.8	0.0	4.8	32.6	46.0	-13.5	
928.00	V	100	26.0	1.8	0.0	4.7	32.5	46.0	-13.5	
928.00	H	100	26.0	1.8	0.0	4.9	32.7	46.0	-13.3	
Hyperstat P1P2										
902.00	V	100	26.0	1.8	0.0	4.8	32.6	46.0	-13.5	
902.00	H	100	26.0	1.8	0.0	4.9	32.7	46.0	-13.4	
928.00	V	100	26.0	1.8	0.0	4.7	32.5	46.0	-13.5	
928.00	H	100	26.0	1.8	0.0	4.9	32.7	46.0	-13.3	



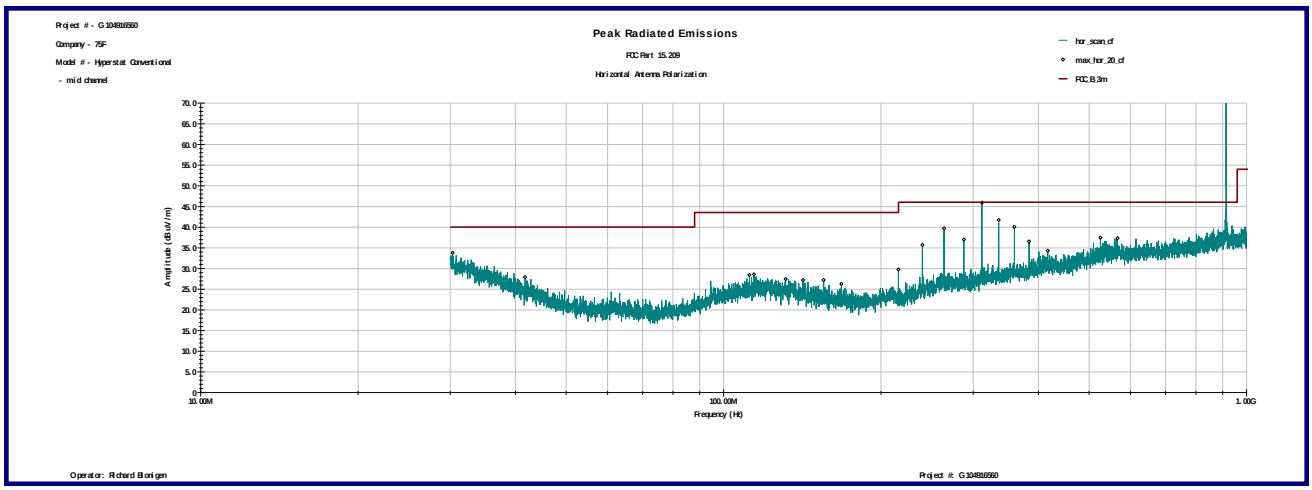
Graph 3.6.1



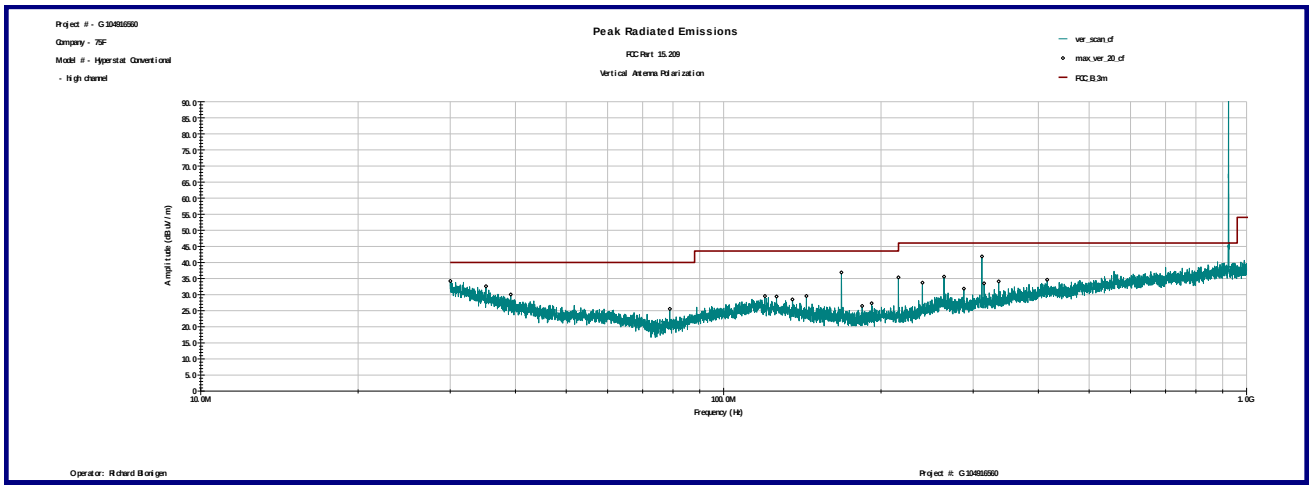
Graph 3.6.2



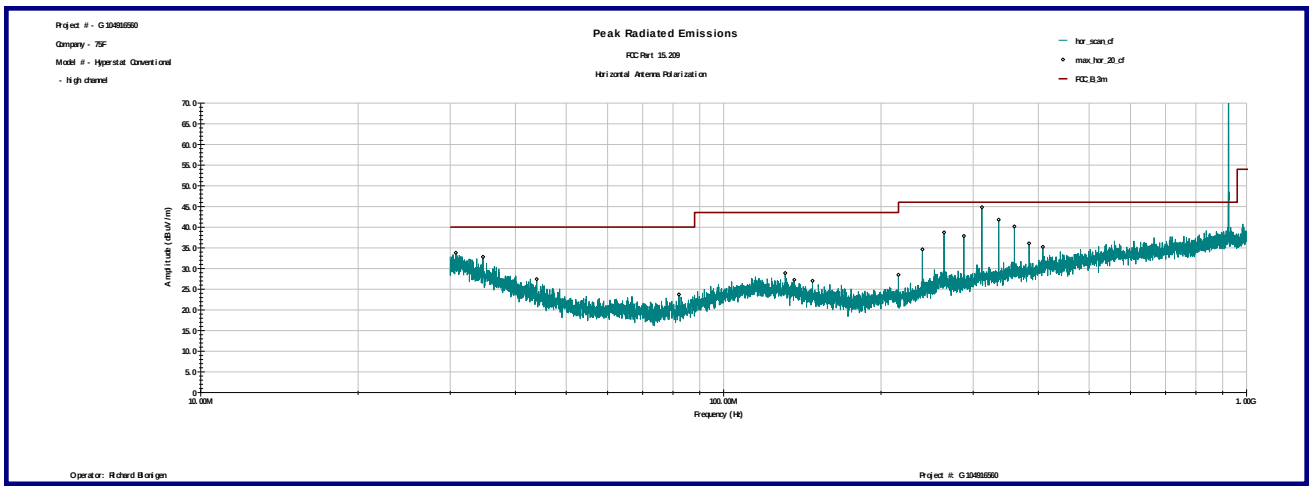
Graph 3.6.3



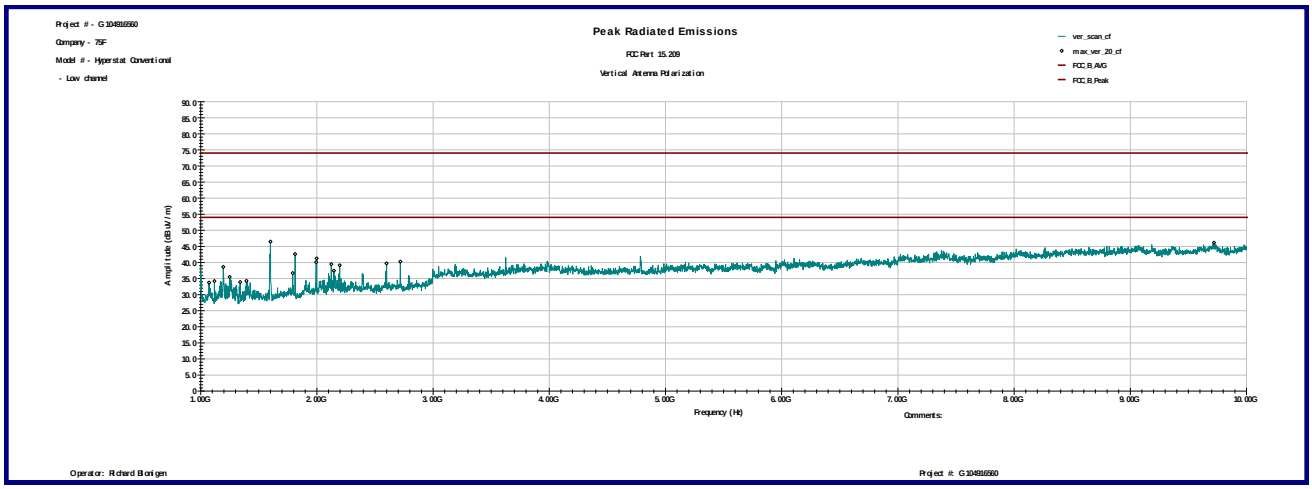
Graph 3.6.4



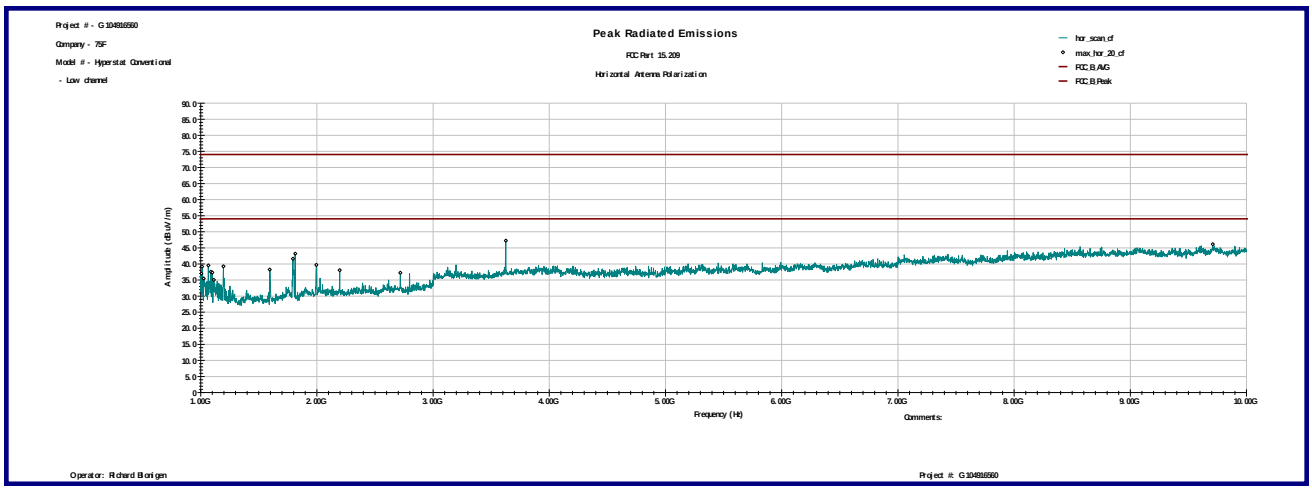
Graph 3.6.5



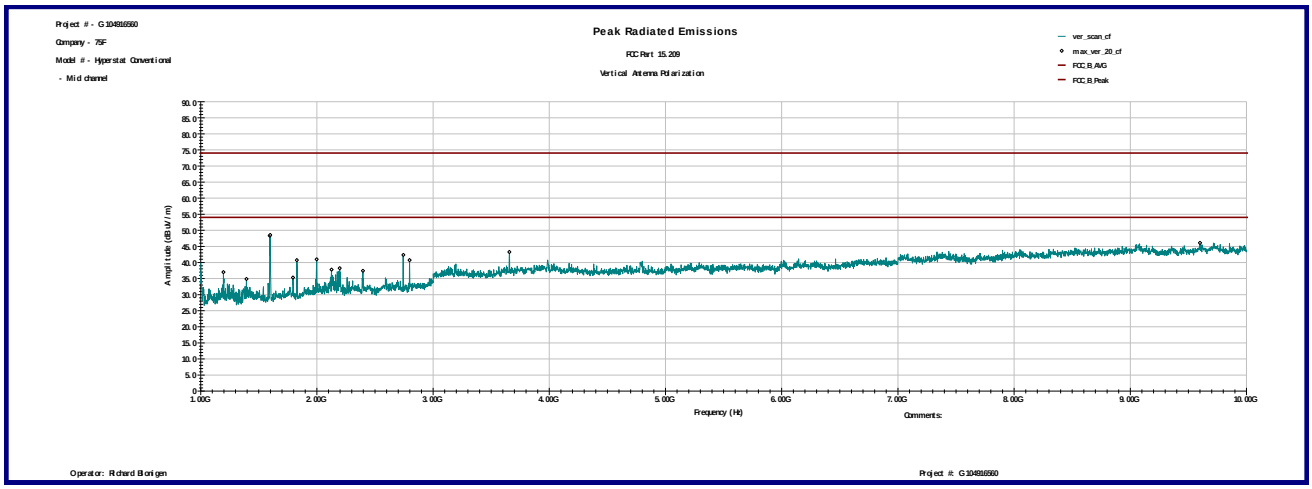
Graph 3.6.6



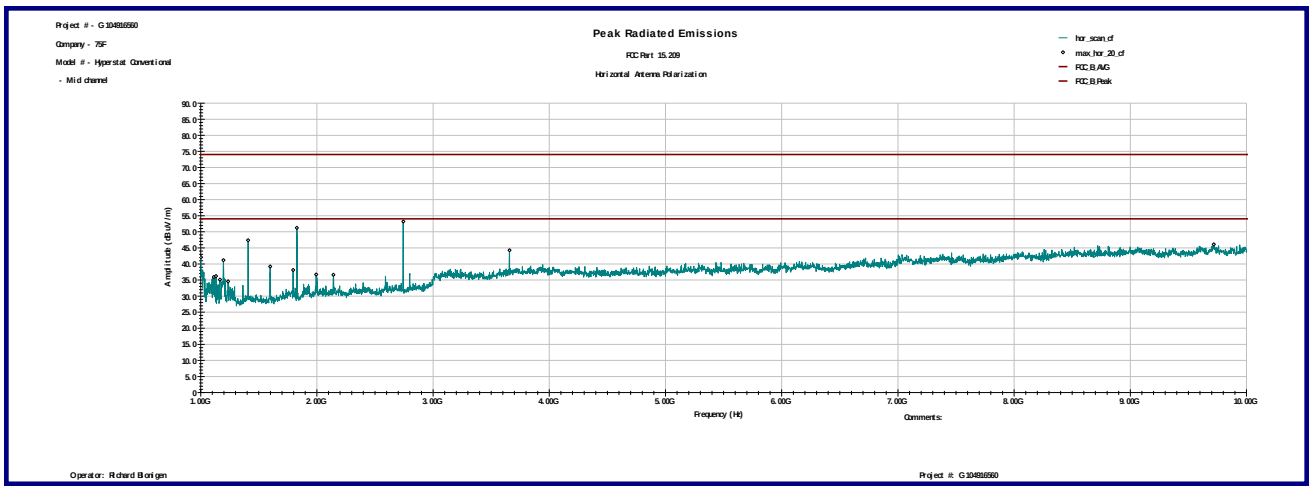
Graph 3.6.7



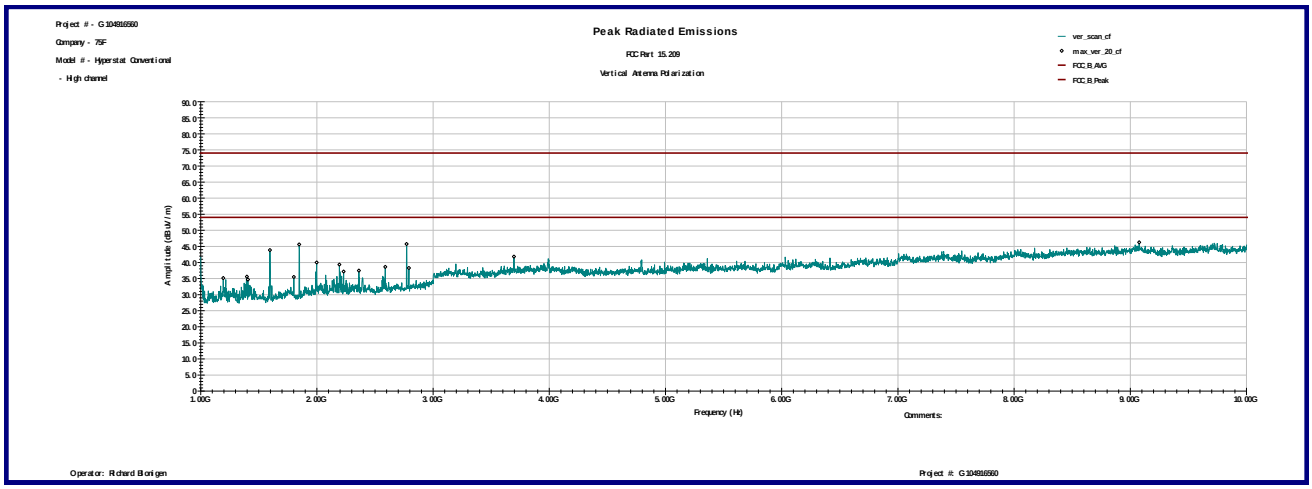
Graph 3.6.8



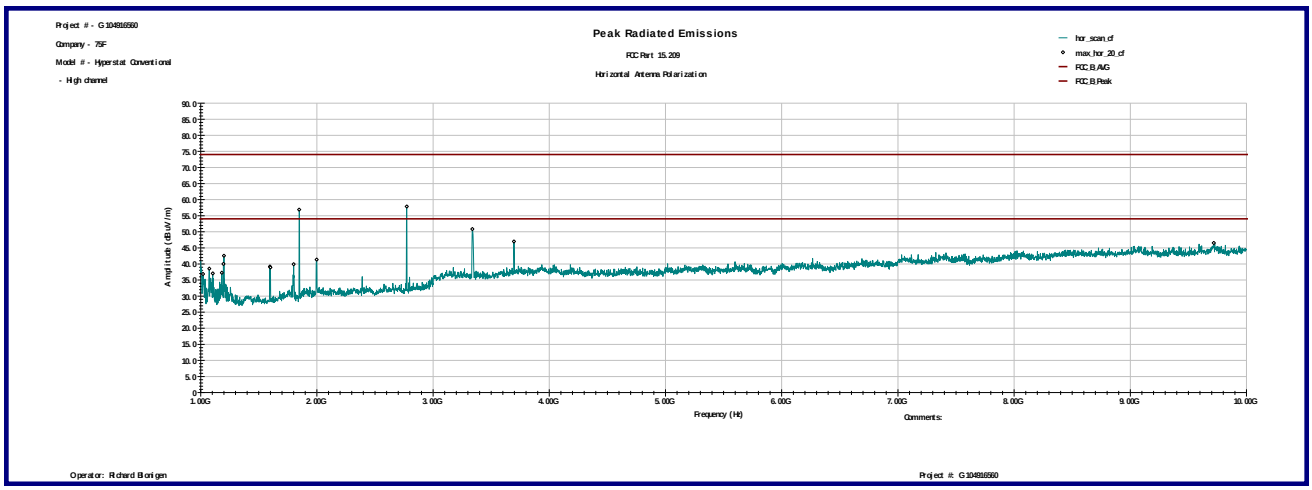
Graph 3.6.9



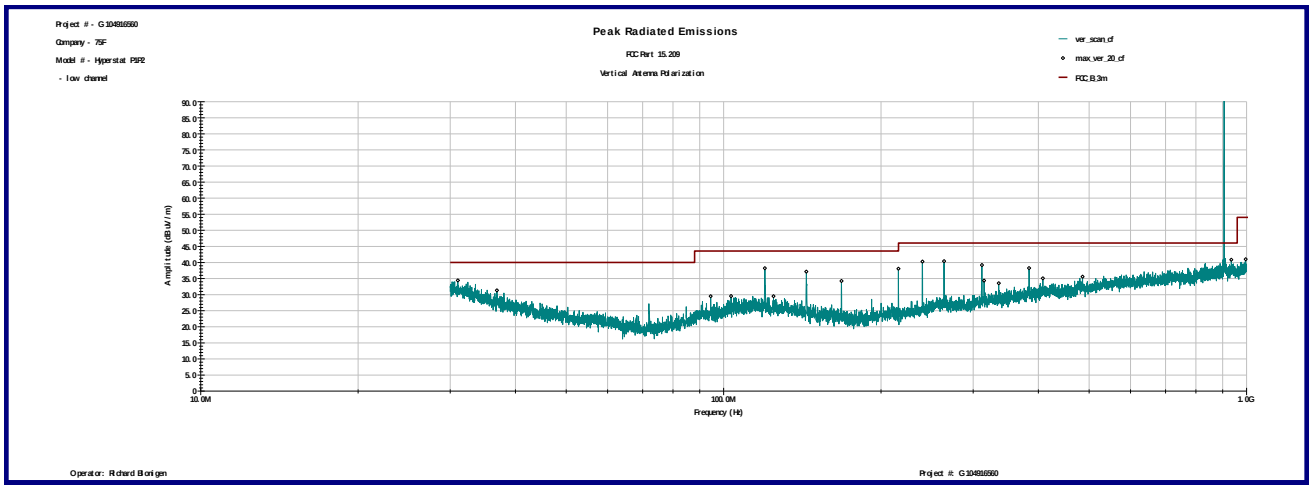
Graph 3.6.10



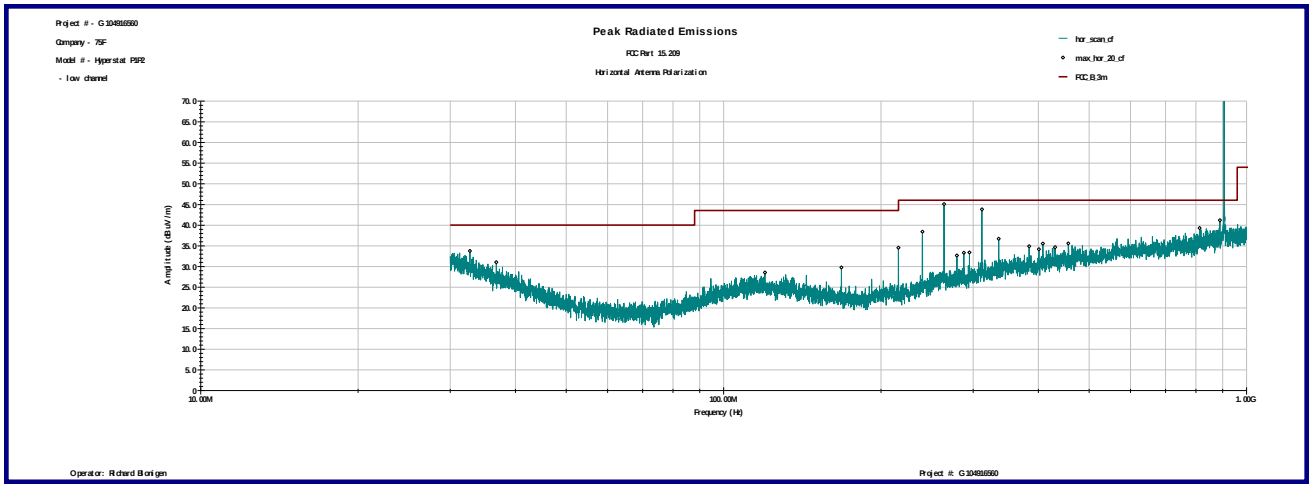
Graph 3.6.11



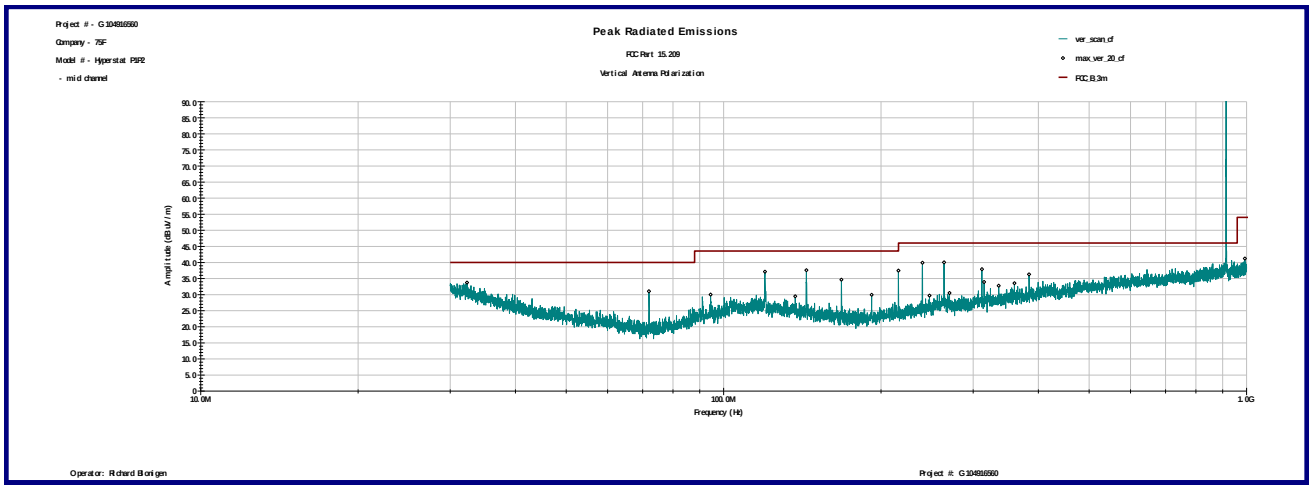
Graph 3.6.12



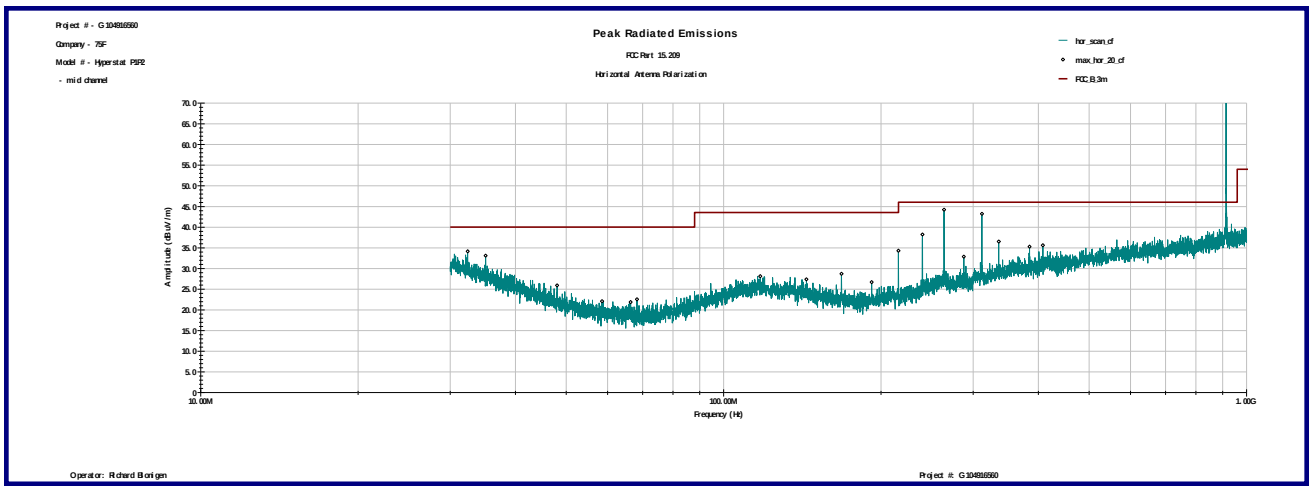
Graph 3.6.13



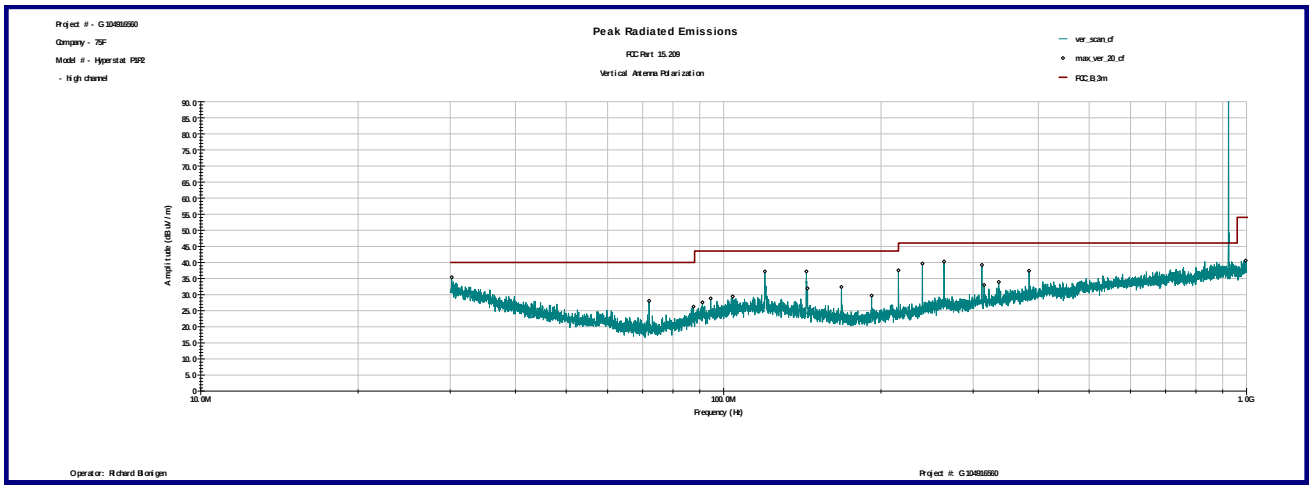
Graph 3.6.14



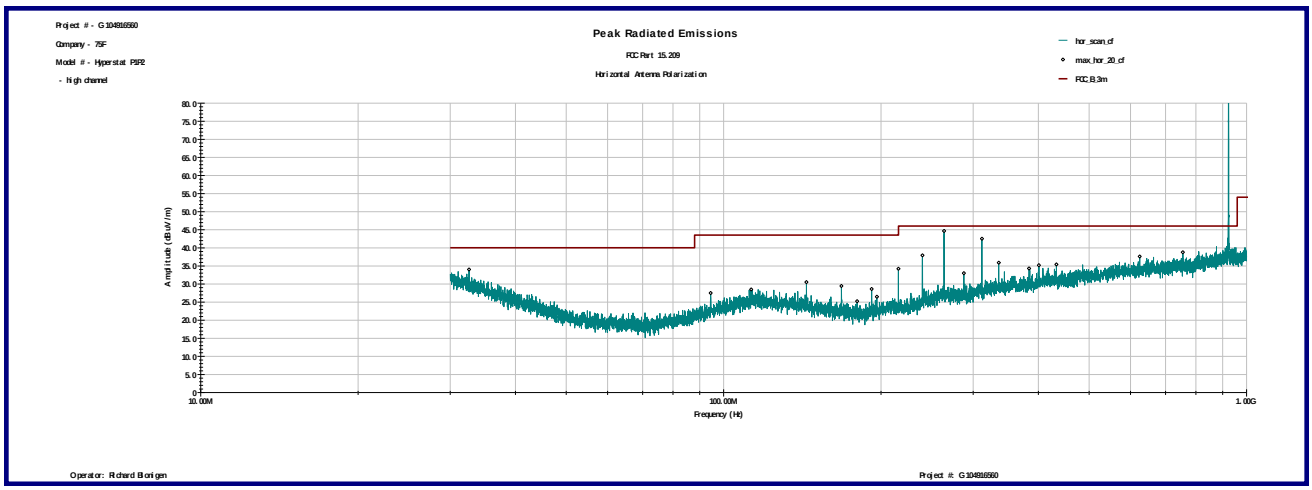
Graph 3.6.15



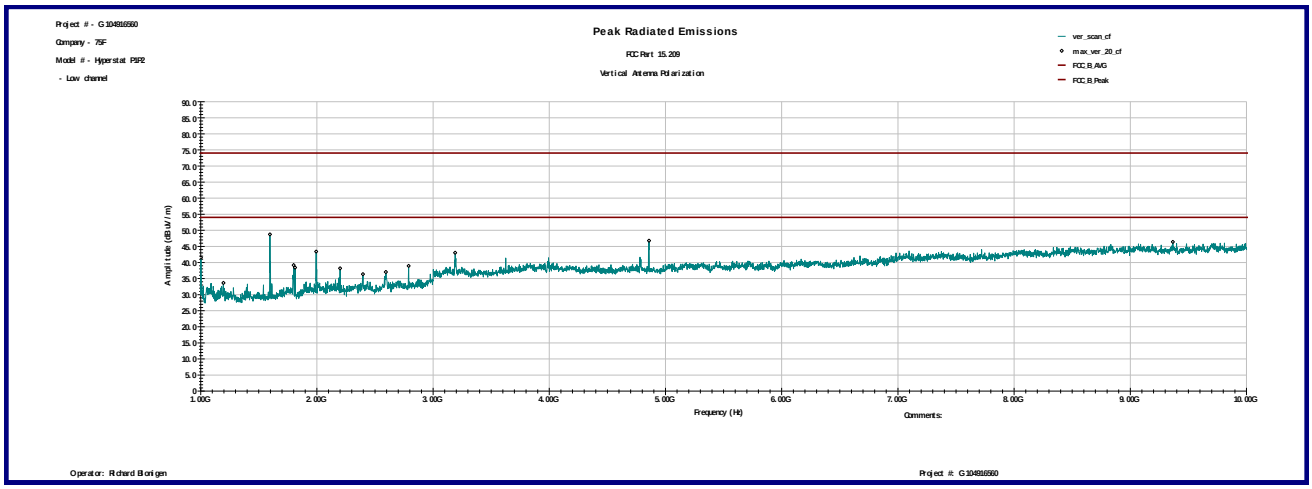
Graph 3.6.16



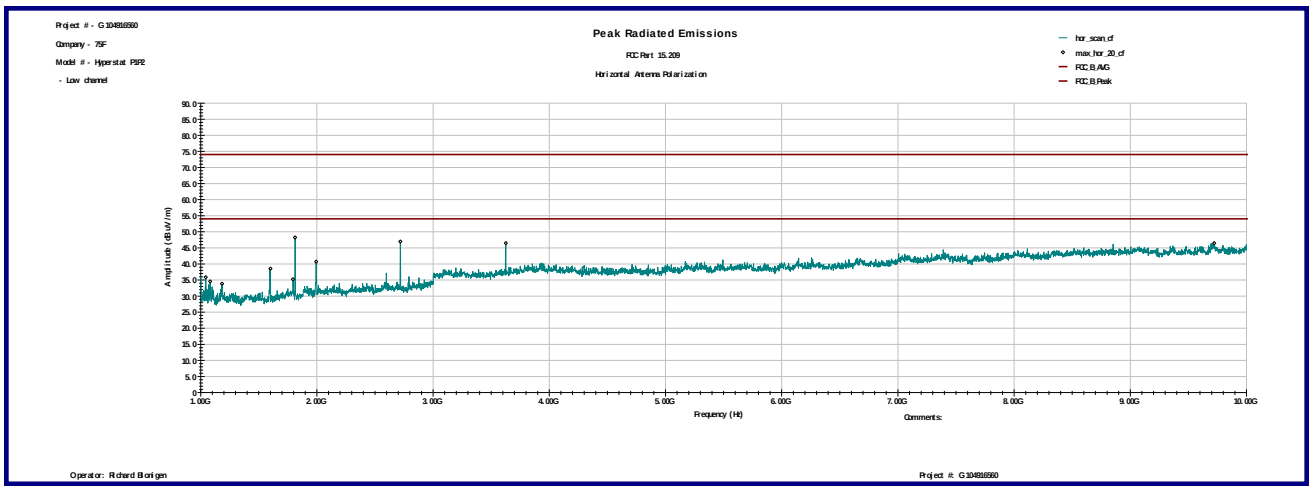
Graph 3.6.17



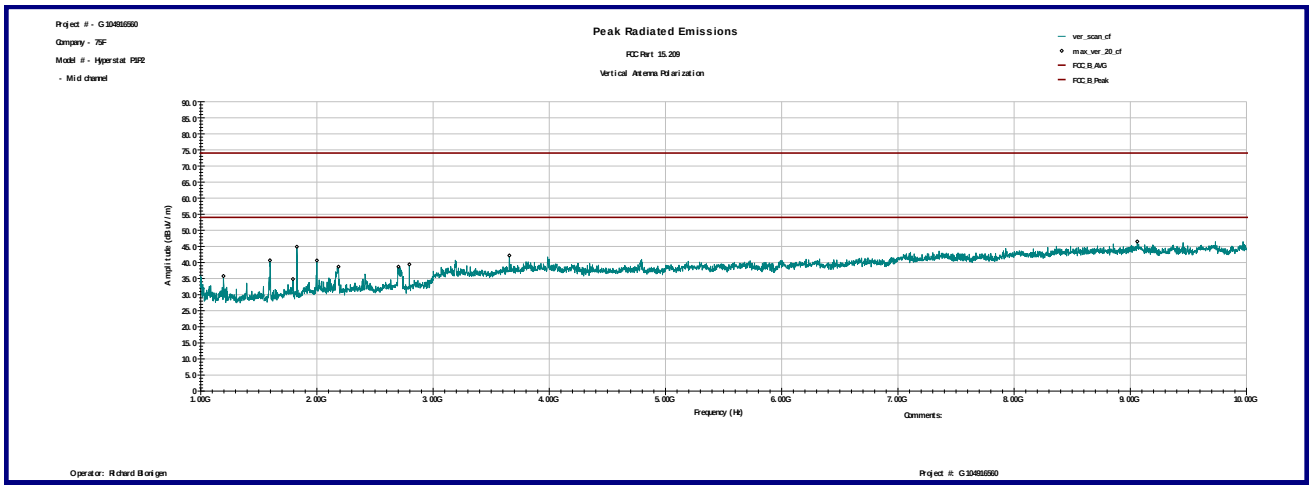
Graph 3.6.18



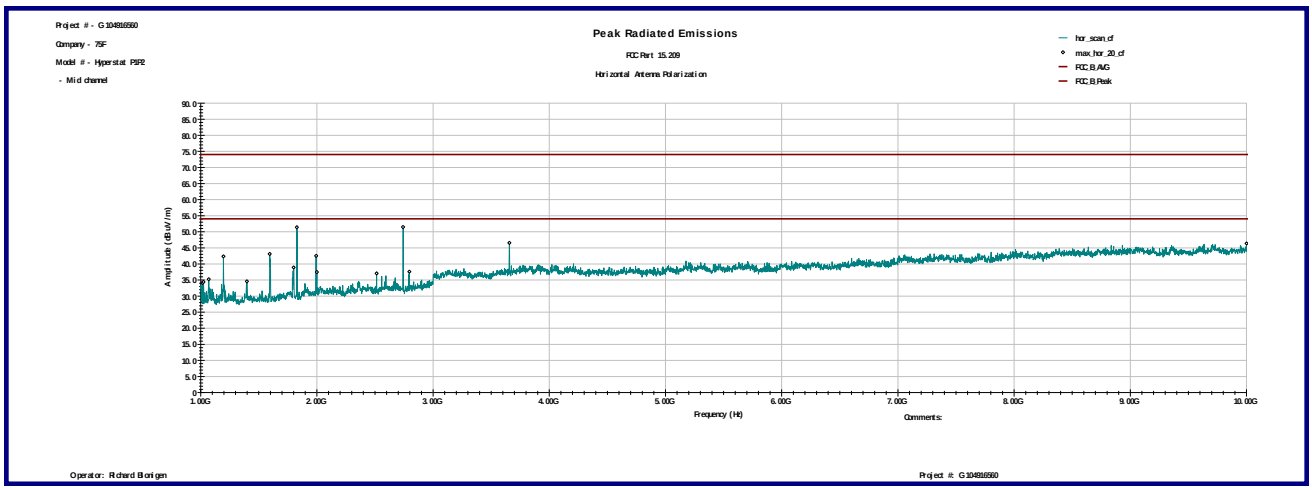
Graph 3.6.19



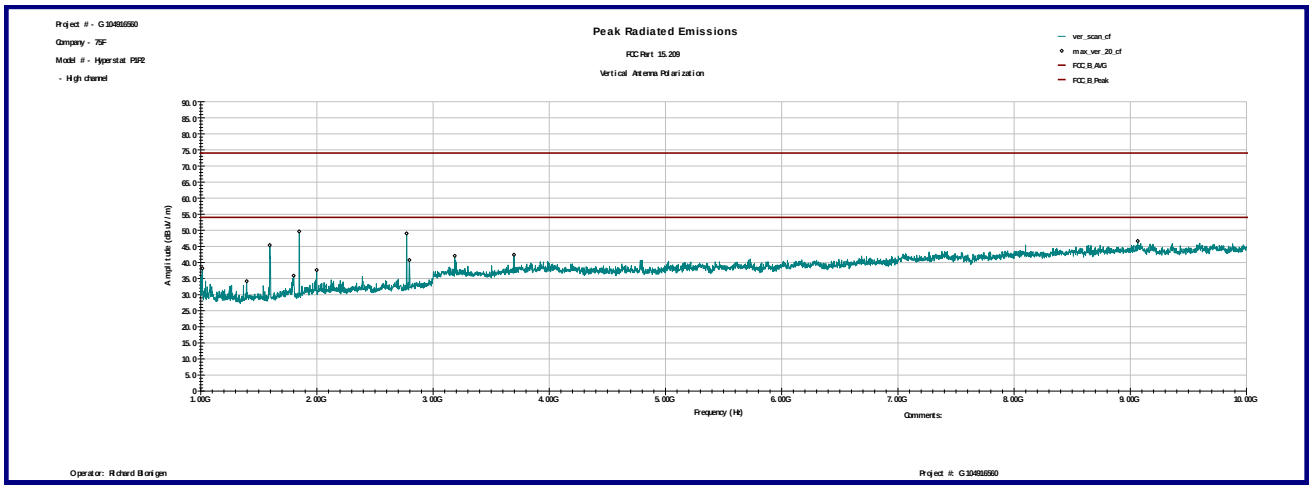
Graph 3.6.20



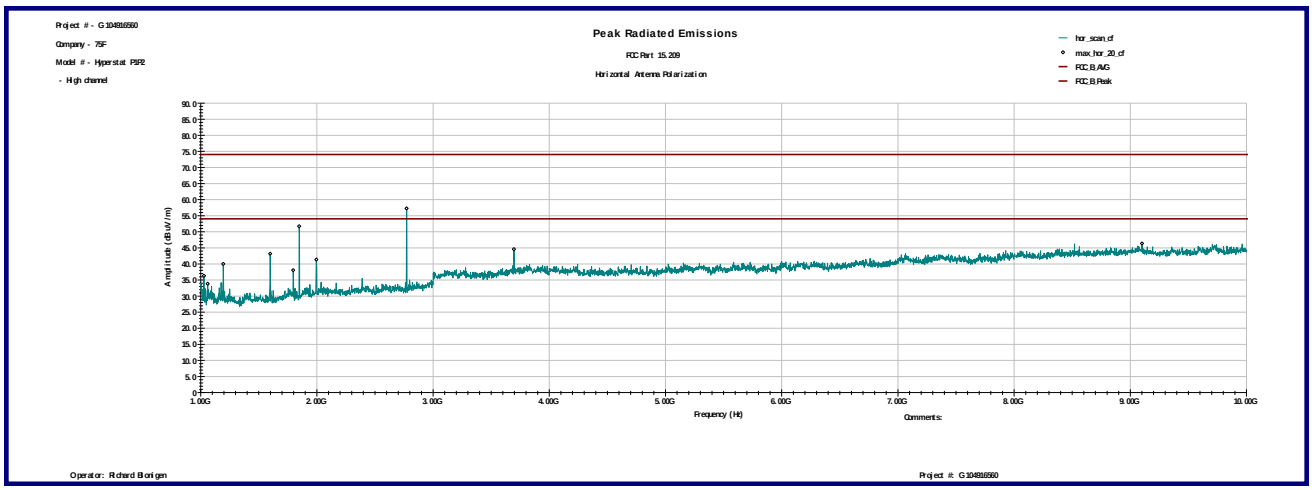
Graph 3.6.21



Graph 3.6.22



Graph 3.6.23



Graph 3.6.24

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)

RF Exposure Compliance for Model: Hyperstat Conventional

The maximum measured antenna conducted power, P is 9.3dBm

The antenna gain, G is -0.8dBi

Therefore, the maximum EIRP power = P
EIRP = 9.3 dBm, or 8.5 mW

The limits for Maximum Permissible Exposure (MPE) reference to Table 1 and Table 2 in section 3.6.

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,
$S = 8.5 / 4\pi 20^2$,
$S = 0.00169 mW/cm^2$, or $0.0169 W/m^2$ below the Maximum Permissible Exposure (MPE)

For the transmitter:

The maximum measured antenna conducted power, P is 0.8dBm

The antenna gain, G is 0.1dBi

The maximum EIRP power = P + G
EIRP = 0.8+0.1 = 0.9 dBm, or 1.23 mW

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

If antenna Safe Separation Distance is 20cm,
$S = 1.23 / 4\pi 20^2$,
$S = 0.000244 mW/cm^{2,}$, or $0.00244 W/m^2$ below the Maximum Permissible Exposure (MPE)

Note: Data was taken from the FCC filing, FCC ID: A8TBM71S2. Intertek takes no responsibility for the accuracy of the data.

FCC: $\Sigma(Si/MPEi) = (0.00169/0.6) + (0.000244/1) = 0.00306 < 1$
ISED Canada: $\Sigma(Si/MPEi) = (0.0169/2.74) + (0.00244/5.35) = 0.00662 < 1$

3.8 Transmitter power line conducted emissions

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test result: **Pass**

Frequency range: 0.15MHz-30MHz

Max. Emissions margin: 4.8dB below the limits for Model: Hyperstat Conventional

4.4dB below the limits for Model: Hyperstat P1P2

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.

Sample Calculations

The following is how net line-conducted readings were determined:

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

Example:

NF = RF + LF + CF + AF = 28.5 + 0.2 + 0.4 + 20.0 = 49.1 dBμV

Date:	January 31, 2022	**Result: Pass**
Tested by:	Richard Blonigen	
Standard:	FCC part 15.207	
Test Point:	Power Line	
Operation mode:	See page 5	
Environmental Conditions:	21°C; 39%(RH); 98kPa	
Equipment Verification:	☒	
Note:	Model: Hyperstat Conventional	

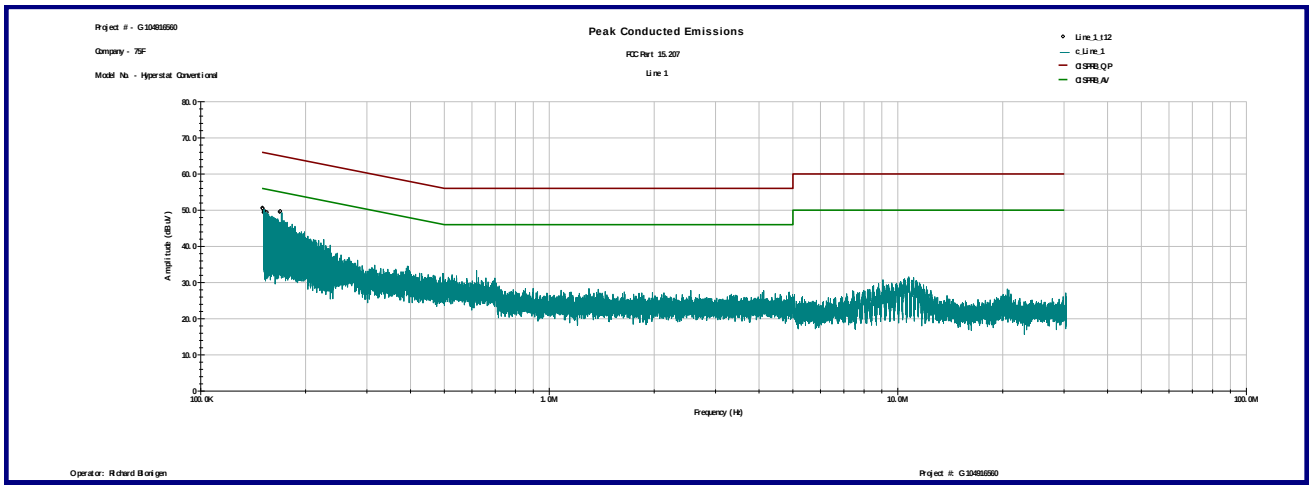
Table 3.8.1

Line 1

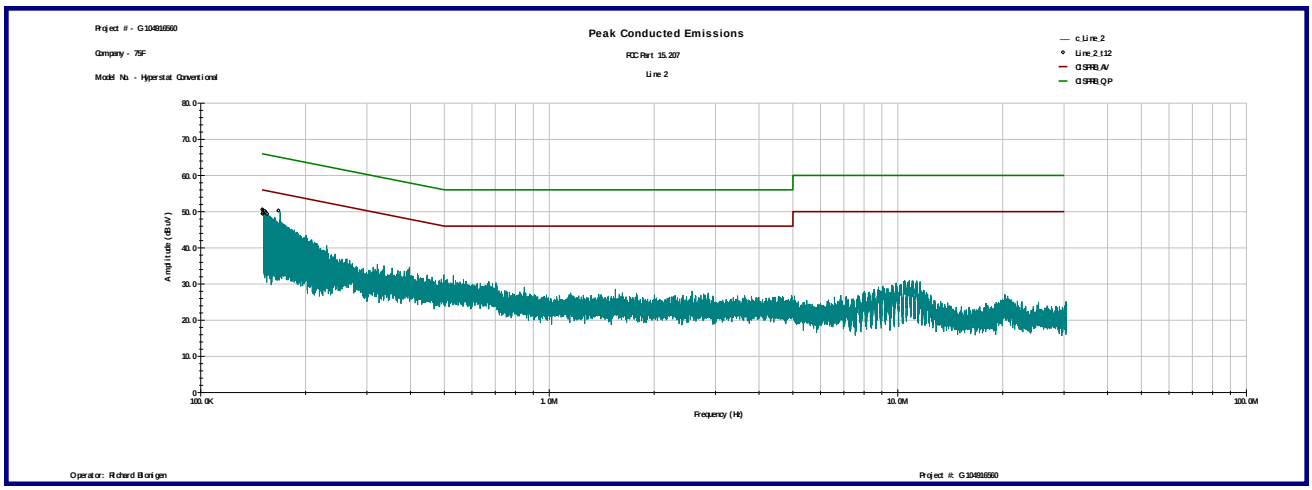
Frequency	Peak dBµV	QP Limit dBµV	AVG Limit dBµV	QP Margin dB	AVG Margin dB
150.35 KHz	50.7	66.0	56.0	-15.3	-5.3
150.54 KHz	50.5	66.0	56.0	-15.5	-5.5
151.55 KHz	49.4	65.9	55.9	-16.6	-6.6
151.67 KHz	49.8	65.9	55.9	-16.1	-6.1
151.83 KHz	49.7	65.9	55.9	-16.2	-6.2
152.17 KHz	49.9	65.9	55.9	-16.0	-6.0
152.95 KHz	49.5	65.8	55.8	-16.3	-6.3
153.11 KHz	49.5	65.8	55.8	-16.3	-6.3
153.5 KHz	49.4	65.8	55.8	-16.4	-6.4
154.78 KHz	49.4	65.7	55.7	-16.3	-6.3
168.53 KHz	49.6	65.0	55.0	-15.5	-5.5
169.07 KHz	49.8	65.0	55.0	-15.3	-5.3

Line 2

Frequency	Peak dBµV	QP Limit dBmV	AVG Limit dBmV	QP Margin dB	AVG Margin dB
150.16 KHz	50.6	66.0	56.0	-15.4	-5.4
150.47 KHz	49.4	66.0	56.0	-16.6	-6.6
150.97 KHz	50.4	66.0	56.0	-15.6	-5.6
151.13 KHz	49.8	65.9	55.9	-16.1	-6.1
151.48 KHz	50.3	65.9	55.9	-15.7	-5.7
152.25 KHz	49.9	65.9	55.9	-16.0	-6.0
152.45 KHz	50.0	65.9	55.9	-15.9	-5.9
152.76 KHz	50.2	65.9	55.9	-15.7	-5.7
153.57 KHz	49.8	65.8	55.8	-16.0	-6.0
154.08 KHz	49.7	65.8	55.8	-16.1	-6.1
155.01 KHz	49.4	65.7	55.7	-16.3	-6.3
167.05 KHz	50.3	65.1	55.1	-14.8	-4.8



Graph 3.8.1



Graph 3.8.2

Date:	January 31, 2022	**Result: Pass**
Tested by:	Richard Blonigen	
Standard:	FCC part 15.207	
Test Point:	Power Line	
Operation mode:	See page 5	
Environmental Conditions:	21°C; 39%(RH); 98kPa	
Equipment Verification:	☒	
Note:	Model: Hyperstat P1P2	

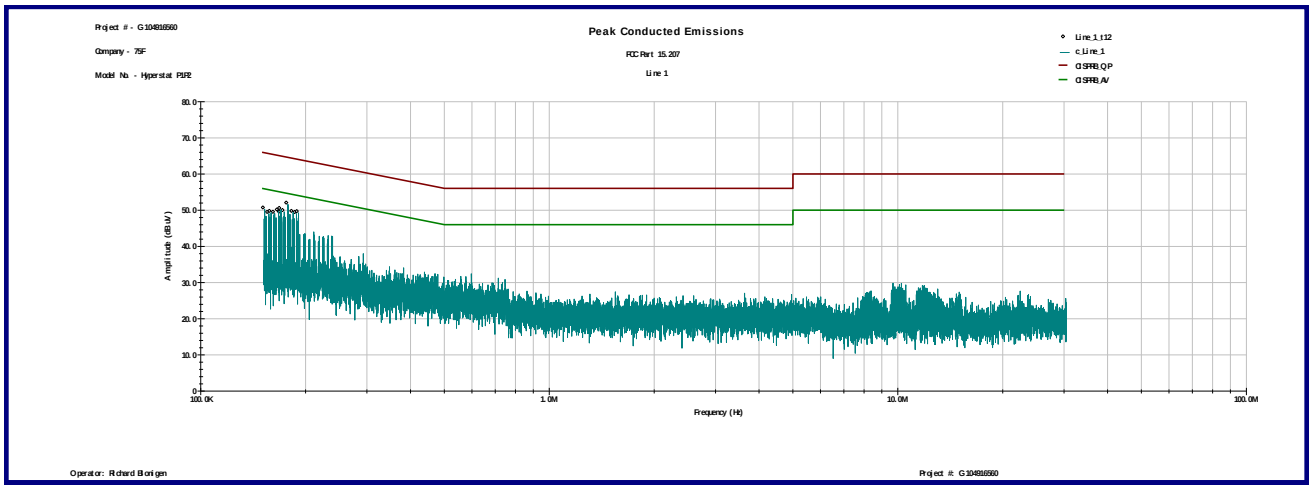
Table 3.8.2

Line 1

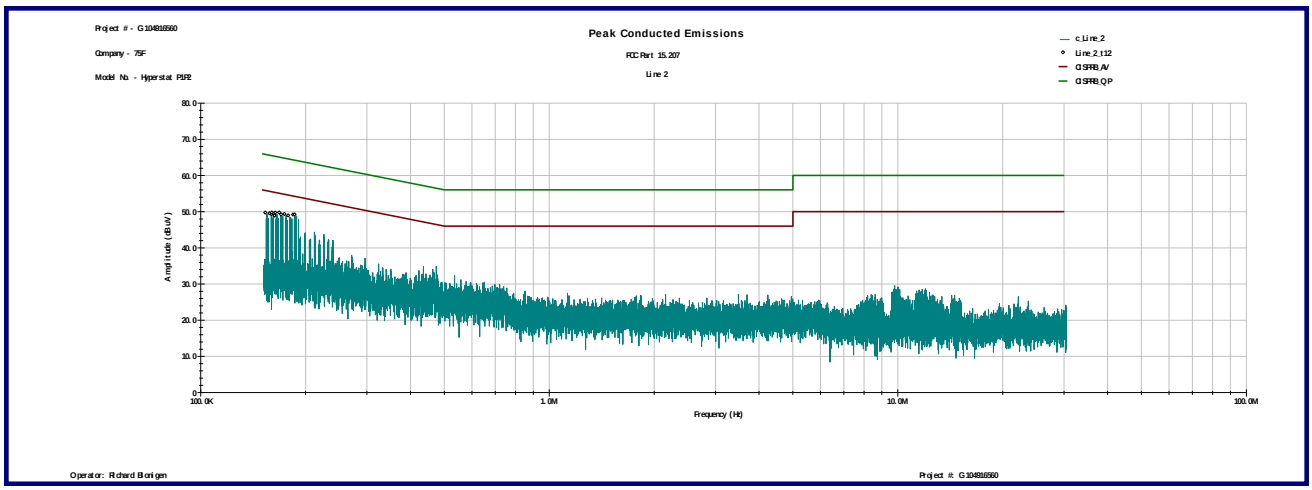
Frequency	Peak dBµV	QP Limit dBµV	AVG Limit dBµV	QP Margin dB	AVG Margin dB
150.82 KHz	50.7	66.0	56.0	-15.2	-5.2
155.05 KHz	49.5	65.7	55.7	-16.2	-6.2
157.38 KHz	49.8	65.6	55.6	-15.8	-5.8
161.11 KHz	49.6	65.4	55.4	-15.9	-5.9
165.38 KHz	50.2	65.2	55.2	-15.0	-5.0
167.71 KHz	49.6	65.1	55.1	-15.5	-5.5
167.98 KHz	50.6	65.1	55.1	-14.5	-4.5
171.71 KHz	50.0	64.9	54.9	-14.9	-4.9
175.98 KHz	52.1	64.7	54.7	-12.6	-2.6
182.0 KHz	49.8	64.4	54.4	-14.6	-4.6
186.12 KHz	49.5	64.2	54.2	-14.7	-4.7
188.61 KHz	49.7	64.1	54.1	-14.4	-4.4

Line 2

Frequency	Peak dBµV	QP Limit dBmV	AVG Limit dBmV	QP Margin dB	AVG Margin dB
153.22 KHz	49.8	65.8	55.8	-16.1	-6.1
157.57 KHz	49.6	65.6	55.6	-16.0	-6.0
159.67 KHz	49.3	65.5	55.5	-16.2	-6.2
159.94 KHz	49.8	65.5	55.5	-15.7	-5.7
162.93 KHz	48.9	65.3	55.3	-16.4	-6.4
163.59 KHz	49.7	65.3	55.3	-15.5	-5.5
167.98 KHz	49.8	65.1	55.1	-15.3	-5.3
170.04 KHz	49.3	65.0	55.0	-15.7	-5.7
173.73 KHz	49.4	64.8	54.8	-15.4	-5.4
178.16 KHz	49.0	64.6	54.6	-15.6	-5.6
184.1 KHz	49.2	64.3	54.3	-15.1	-5.1
185.89 KHz	49.3	64.2	54.2	-15.0	-5.0



Graph 3.8.3



Graph 3.8.4

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
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 RE Cable	Coleman	RG214/U M17/164-00001		172505	06/09/2021	06/09/2022
CE Cable	Pasternack Enterprises LLC	RG217/U		172515	06/09/2021	06/09/2022
Horn Antenna	EMCO	3115	9507-4513	9936	08/19/2021	08/19/2022
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
System	Quantum Change	TILE! Instrument Control	Ver. 3.4.K.29	15259	VBU	VBU
HP Filter	Reactel, Inc.	9HS-1.0/18G-S12	SN20-01		04/08/2021	04/08/2022

5.0 Revision History

REVISION LEVEL	DATE	REPORT NUMBER	PREPARED	REVIEWED	NOTES
0	2-10-2022	104916560MIN-001	RB	US	Original Issue
1	3-15-2022	104916560MIN-001	RB 	US 	Updated tested spurious frequency range, spurious data tables, and OBW graphs