



TEST REPORT

Report Number: 101277992MIN-011C

Project Number: G101277992

Testing performed on the
Model 4500, Clinician Programmer

FCC ID: [REDACTED]

Industry Canada ID: [REDACTED]

to

47 CFR Part 15. 249:2013

RSS- 210, Issue 8, 2010

RSS-Gen, Issue 3, 2010

47 CFR, Part 15:2013, §15.107 and §15.109, Class B / ICES-003, Issue 5:2012

For

Minnetronix

Test Performed by:
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Oakdale, MN 55128 USA

Test Authorized by:
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Date: October 30, 2013

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Date: October 30, 2013

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1.0 GENERAL DESCRIPTION

Model:	4500
Type of EUT:	Clinician Programmer, Wakeup Radio
Serial Number:	DBR 1471
FCC ID:	
Industry Canada ID:	
Related Submittal(s) Grants:	N/A
Company:	Minnetronix
Customer:	Sue Sibilski
Address:	1635 Energy Park Drive St. Paul, MN 55108
Phone:	(651) 917-4060
Fax:	(651) 917-4066
e-mail:	ssibilski@minnetronix.com
Test Standards:	☒ 47 CFR, Part 15:2013, §15.249 ☒ RSS-210, Issue 8, 20010 ☒ RSS-Gen, Issue 3, 2010 ☒ 47 CFR, Part 15:2013, §15.107 and §15.109, Class B ☒ ICES-003, Issue 5:2012 ☐ Other
Type of radio:	☒ Stand -alone ☐ Module ☐ Hybrid
Date Sample Submitted:	August 16, 2013
Test Work Started:	September 12, 2013
Test Work Completed:	September 30, 2013
Test Sample Conditions:	☐ Damaged ☐ Poor (Usable) ☒ Good



1.1 Product Description; Test Facility

Product Description:	Clinician Programmer
Operating Frequency	2.45GHz
Power Level Setting	127
Modulation:	OOK
Emission Designator:	3MX1D
Antenna(s) Info:	-2dBi Chip antenna
Antenna Installation:	☐ User ☐ Professional ☒ Factory
Transmitter Power Configuration:	☐ Internal battery ☒ External power source ☒ 100-240VAC ☐ 400VAC ☐ DC ☐ Other: ☒ 50-60Hz
Special Test Arrangement:	As a hand-held device the EUT was rotated through three orthogonal axes to determine and tested with the maximum emissions
Test Facility Accreditation:	A2LA (Certificate No. 1427.01)
Test Methodology:	Measurements performed according to the procedures in ANSI C63.10-2009

1.2 EUT Configuration

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

- ☒ - Standby
- ☒ - Continuous
- ☒ - Continuous un-modulated
- ☒ - Continuous modulated
- ☐ - Test program (customer specific)
- ☒ - Below

Operating modes of the EUT:

No.	Description
1	The EUT was powered 120VAC and was activated to transmit continuously at 2.45GHz.

Cables:

No.	Type	Length	Designation	Note
1	Not shielded USB Power cable	2m	Power Cable	
2	Shielded USB cable	2m	Communication Cable	
3	Shielded HDMI cable	2m	HDMI Cable	

Support equipment/Services:

No.	Item	Description
1	None	

General notes: The 4500 Clinician Programmer utilizes two identical antennas for 2.45GHz wakeup radio operation. Since the antennas are identical only radiated spurious and harmonics testing was performed for two antennas.. All other tests were performed using one antenna.

1.3 Environmental conditions

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

☒ Normal

Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 86-106 kPa



1.4 Measurement uncertainty

The expanded uncertainty ($k = 2$) for radiated emissions from 30 to 1000 MHz has been determined to be: ± 4 dB at 10m and ± 5.4 dB at 3m

The expanded uncertainty ($k = 2$) for conducted emissions from 150 kHz to 30 MHz has been determined to be:
 ± 2.6 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(μ V/m)

RA = Receiver Amplitude in dB(μ V)

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(μ V) 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(μ V/m).

$$RA = 48.1 \text{ dB}(\mu V)$$

$$AF = 7.4 \text{ dB}(m^{-1})$$

$$CF = 1.6 \text{ dB}$$

$$AG = 16.0 \text{ dB}$$

$$FS = RA + AF + CF - AG$$

$$FS = 48.1 + 7.4 + 1.6 - 16.0$$

$$FS = 41.1 \text{ dB}(\mu V/m)$$

General notes:



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
15.249(a) / RSS-210 A2.9(a)	Field strength of fundamental	Pass
15.249(a) / RSS-210 A2.9(a)	Field strength of harmonics	Pass
15.249(d) / RSS-210 A2.9(b)	Field strength of spurious emissions	Pass
15.215(c) / RSS- Gen 4.6.1	Bandwidth of the emission	Pass
15.207/RSS-Gen 7.2.2	Transmitter Power Line conducted emissions	Pass
15.109/ICES-003	Receiver/digital device radiated emissions	Pass
15.107/ ICES-003	Digital device conducted emissions	Pass



3.0 TEST CONDITIONS AND RESULTS

3.1 Field strength of fundamental

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test distance: ☐ 10 meters ☒ 3 meters

Frequency range of measurements: 2.45GHz

Test result: Pass

Max. Emissions margin at fundamental: 1.8dB below the limits

Notes: None



Date:	September 12, 2013	Result: Pass
Standard:	FCC 15.249(a) / RSS-210 A2.9	
Tested by:	Uri Spector	
Test Point:	Enclosure with antenna	
Operation mode:	See Page 5	
Note:	Emission at fundamental	

Table 3.1.1

Frequency MHz	Antenna		Ant. CF dB1/m	Cable loss dB	Pre-amp Gain (dB)	Reading dBμV	AVG CF dB	Total @ 3m dBμV/m	Limit dBμV/m	Margin dB	Comments
	Polarity	Hts(cm)									
Peak Limits											
2450.00	V	151	28.4	2.9	0.0	73.2	0.0	104.5	114.0	-9.5	
2450.00	H	143	28.4	2.9	0.0	77.3	0.0	108.6	114.0	-5.4	
Average Limits											
2450.00	V	151	28.4	2.9	0.0	73.2	16.5	88.1	94.0	-5.9	
2450.00	H	143	28.4	2.9	0.0	77.3	16.5	92.2	94.0	-1.8	



3.2 Field strength of harmonics and spurious emissions

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test distance: ☐ 10 meters ☒ 3 meters

Frequency range of measurements: 30MHz-26000MHz

Test result: **Pass**

Max. margin of harmonics and spurious emissions: 3.3dB below the limits

Notes: The radiated harmonics and spurious emissions test was performed in the Anechoic chamber at 3m measurement distance (see Tables 3.2.1, 3.2.2, 3.2.3, 3.2.4 and Graphs 3.2.1, 3.2.2, 3.2.3, 3.2.4, 3.2.5).



Date:	September 30, 2013	Result: Pass
Standard:	FCC 15.249(a) / RSS-210 A2.9	
Tested by:	Uri Spector	
Test Point:	Enclosure with antenna	
Operation mode:	See Page 5	
Note:	Antenna 0. Harmonics and spurious emissions 30MHz-1GHz	

Table 3.2.1

Frequency	Ant. Polarity	Peak Reading dBμV	Total C.F. dB1/m	Total at 3m dBμV/m	Limit dBμV/m	Margin dB
32.217 MHz	V	16.6	18.9	35.4	40.0	-4.6
36.407 MHz	V	19.2	16.6	35.7	40.0	-4.3
57.222 MHz	V	28.9	7.5	36.4	40.0	-3.6
59.75 MHz	V	29.2	7.2	36.4	40.0	-3.6
60.235 MHz	V	28.4	7.1	35.5	40.0	-4.5
141.5 MHz	V	22.8	13.2	36.0	43.5	-7.6
149.21 MHz	V	25.5	12.7	38.2	43.5	-5.3
149.86 MHz	V	27.3	12.6	39.9	43.5	-3.7
150.66 MHz	V	22.0	12.5	34.5	43.5	-9.0
151.95 MHz	V	24.9	12.5	37.4	43.5	-6.1
841.56 MHz	V	15.2	24.7	39.9	46.0	-6.1
858.53 MHz	V	14.6	24.9	39.4	46.0	-6.6
107.31 MHz	H	19.5	13.3	32.9	43.5	-10.7
117.01 MHz	H	20.4	13.8	34.2	43.5	-9.4
119.55 MHz	H	21.9	13.9	35.8	43.5	-7.7
210.3 MHz	H	20.2	12.0	32.2	43.5	-11.3
218.98 MHz	H	20.4	12.0	32.4	46.0	-13.6
299.36 MHz	H	22.8	15.9	38.7	46.0	-7.3
301.39 MHz	H	16.6	16.0	32.6	46.0	-13.4

Date:	September 30, 2013	Result: Pass
Standard:	FCC 15.249(a) / RSS-210 A2.9	
Tested by:	Uri Spector	
Test Point:	Enclosure with antenna	
Operation mode:	See Page 5	
Note:	Antenna 1. Harmonics and spurious emissions 30MHz-1GHz	

Table 3.2.2

Frequency	Ant. Polarity	Peak Reading dBμV	Total C.F. dB1/m	Total at 3m dBμV/m	Limit dBμV/m	Margin dB
30.104 MHz	V	16.5	20.2	36.7	40.0	-3.3
36.234 MHz	V	20.1	16.7	36.8	40.0	-3.2
59.923 MHz	V	23.1	7.2	30.3	40.0	-9.7
60.477 MHz	V	24.9	7.1	32.0	40.0	-8.0
119.18 MHz	V	21.6	13.9	35.5	43.5	-8.0
119.62 MHz	V	22.4	13.9	36.3	43.5	-7.2
120.74 MHz	V	18.8	14.0	32.8	43.5	-10.8
141.34 MHz	V	22.3	13.2	35.5	43.5	-8.0
146.16 MHz	V	25.8	12.9	38.6	43.5	-4.9
148.89 MHz	V	23.5	12.7	36.2	43.5	-7.4
150.98 MHz	V	24.0	12.5	36.5	43.5	-7.0
115.97 MHz	H	18.4	13.8	32.2	43.5	-11.3
117.68 MHz	H	18.7	13.9	32.5	43.5	-11.0
151.3 MHz	H	20.3	12.5	32.8	43.5	-10.7
230.23 MHz	H	19.7	12.9	32.6	46.0	-13.4
237.79 MHz	H	19.0	13.7	32.7	46.0	-13.3
242.13 MHz	H	19.2	14.1	33.2	46.0	-12.8
245.34 MHz	H	19.0	14.3	33.3	46.0	-12.7
297.91 MHz	H	19.8	15.8	35.7	46.0	-10.3
299.68 MHz	H	25.5	15.9	41.4	46.0	-4.7
302.42 MHz	H	18.5	16.0	34.5	46.0	-11.5

Date:	September 13, 2013	Result: Pass
Standard:	FCC 15.249(a) / RSS-210 A2.9	
Tested by:	Uri Spector	
Test Point:	Enclosure with antenna	
Operation mode:	See Page 5	
Note:	Harmonics and spurious emissions 1GHz-26GHz. Emission at fundamental frequency was excluded from the table.	

Table 3.2.3

Frequency MHz	Antenna		Ant. CF dB1/m	Cable loss dB	Pre-amp Gain (dB)	Reading dBμV	AVG CF dB	Total @ 3m dBμV/m	Limit dBμV/m	Margin dB	Comments
	Polarity	Hts(cm)									
Antenna 0											
2321.71	V	135	28.1	2.9	0.0	28.2	0.0	59.1	74.0	-14.9	Peak
2321.71	V	135	28.1	2.9	0.0	28.2	16.5	42.6	54.0	-11.4	AVG
2321.71	H	163	28.1	2.9	0.0	32.0	0.0	62.9	74.0	-11.1	Peak
2321.71	H	163	28.1	2.9	0.0	32.0	16.5	46.4	54.0	-7.6	AVG
4900.00	V	122	33.1	4.2	42.0	61.1	0.0	56.4	74.0	-17.6	Peak
4900.00	V	122	33.1	4.2	42.0	61.1	16.5	39.9	54.0	-14.1	AVG
4900.00	H	115	33.1	4.2	42.0	56.0	0.0	51.3	74.0	-22.7	Peak
4900.00	H	115	33.1	4.2	42.0	56.0	16.5	34.8	54.0	-19.2	AVG
Antenna 1											
2322.21	V	171	28.1	2.9	0.0	25.9	0.0	56.8	74.0	-17.2	Peak
2322.21	V	171	28.1	2.9	0.0	25.9	16.5	40.3	54.0	-13.7	AVG
2322.21	H	161	28.1	2.9	0.0	30.1	0.0	61.0	74.0	-13.0	Peak
2322.21	H	161	28.1	2.9	0.0	30.1	16.5	44.5	54.0	-9.5	AVG
4900.00	V	123	33.1	4.2	42.0	63.7	0.0	59.0	74.0	-15.0	Peak
4900.00	V	123	33.1	4.2	42.0	63.7	16.5	42.5	54.0	-11.5	AVG
4900.00	H	115	33.1	4.2	42.0	61.3	0.0	56.6	74.0	-17.4	Peak
4900.00	H	115	33.1	4.2	42.0	61.3	16.5	40.1	54.0	-13.9	AVG

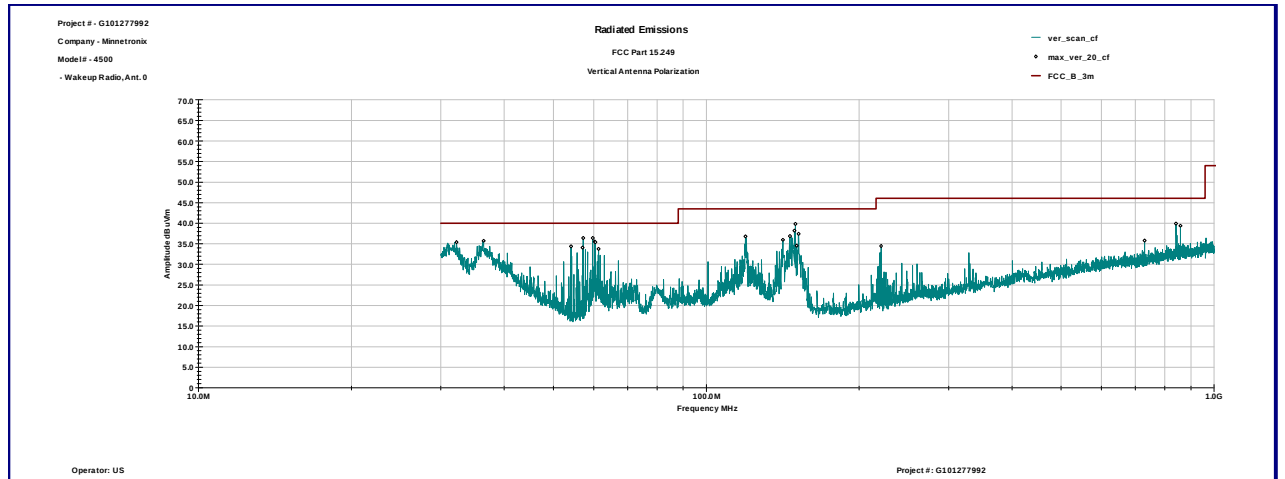
Table 3.2.4

Frequency MHz	Antenna		Ant. CF dB1/m	Cable loss dB	Pre-amp Gain (dB)	Reading dBμV	AVG CF dB	Total @ 3m dBμV/m	Limit dBμV/m	Margin dB	Comments
2400.00	V	114	28.3	2.9	0.0	27.9	0.0	59.1	74.0	-14.9	Peak
2400.00	V	114	28.3	2.9	0.0	27.9	16.5	42.6	54.0	-11.4	AVG
2400.00	H	163	28.3	2.9	0.0	33.6	0.0	64.8	74.0	-9.2	Peak
2400.00	H	163	28.3	2.9	0.0	33.6	16.5	48.3	54.0	-5.7	AVG
2483.50	V	159	28.5	3.0	0.0	29.5	0.0	61.0	74.0	-13.0	Peak
2483.50	V	159	28.5	3.0	0.0	29.5	16.5	44.5	54.0	-9.5	AVG
2483.50	H	141	28.5	3.0	0.0	34.5	0.0	66.0	74.0	-8.0	Peak
2483.50	H	141	28.5	3.0	0.0	34.5	16.5	49.5	54.0	-4.5	AVG

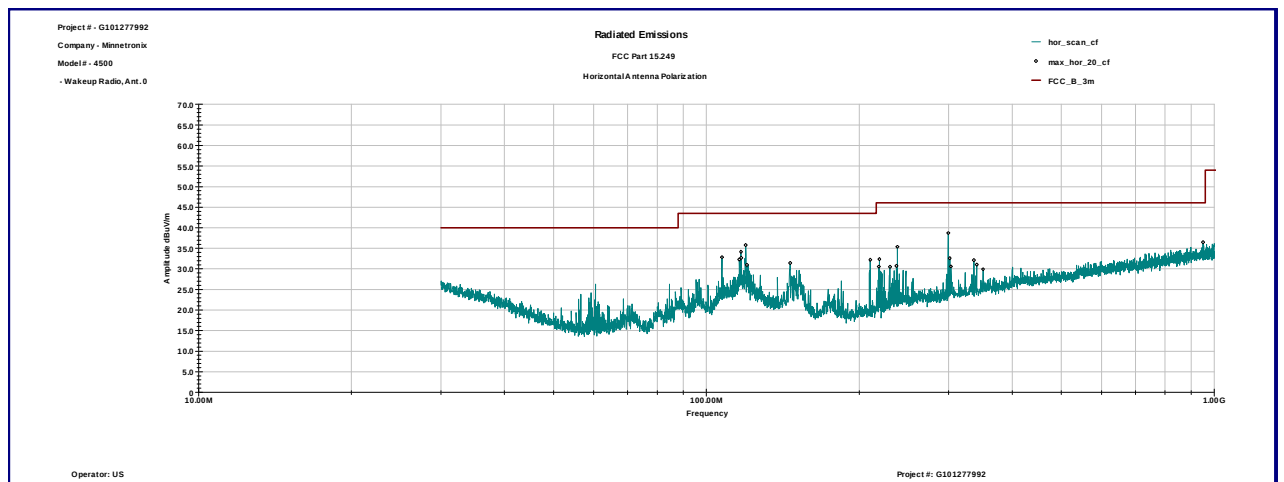


Graph 3.2.1

Vertical antenna polarization



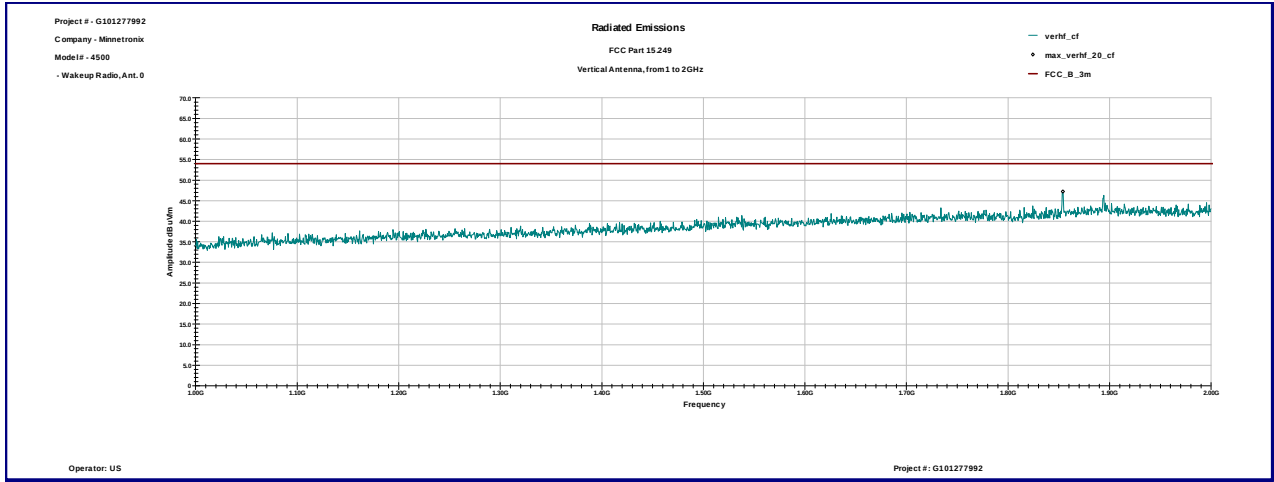
Horizontal antenna polarization



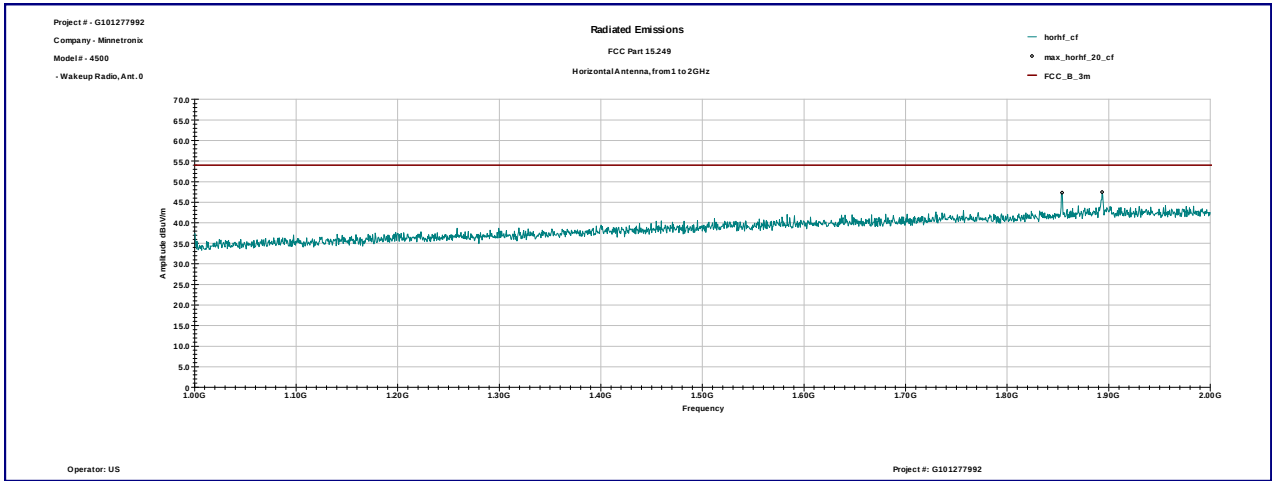


Graph 3.2.2

Vertical antenna polarization



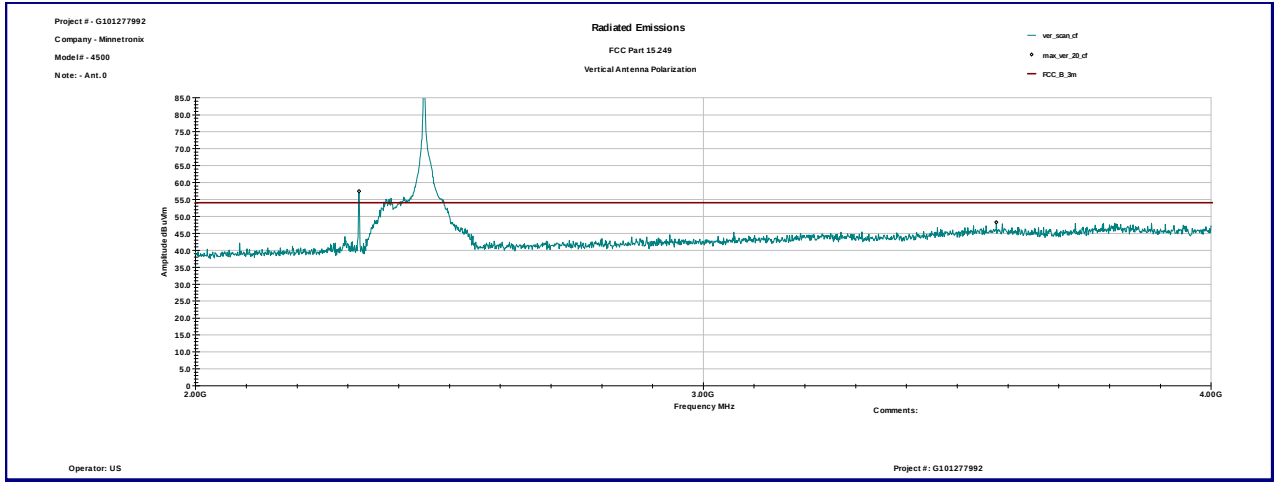
Horizontal antenna polarization



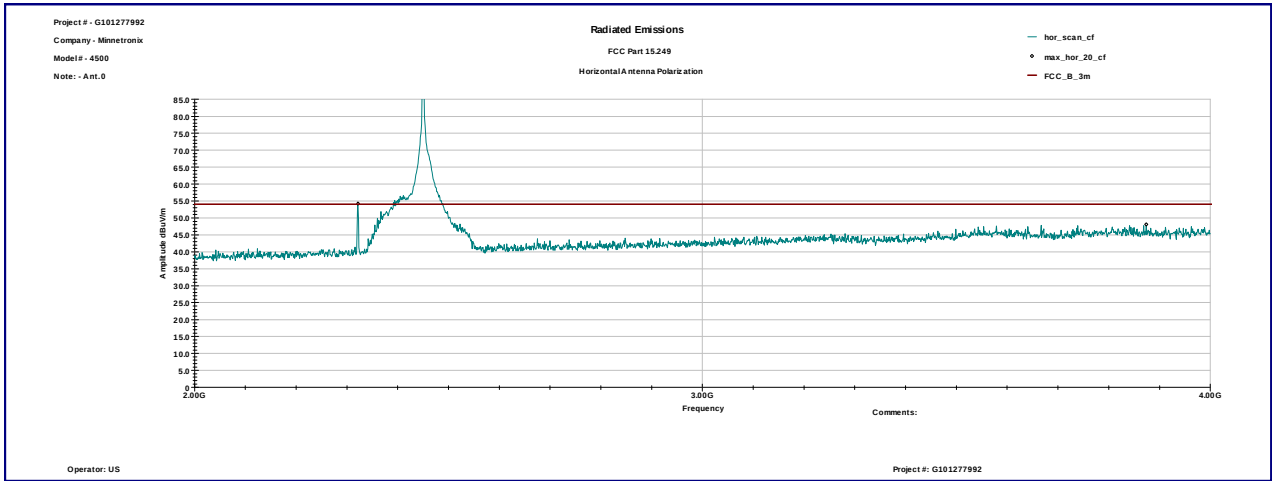


Graph 3.2.3

Vertical antenna polarization



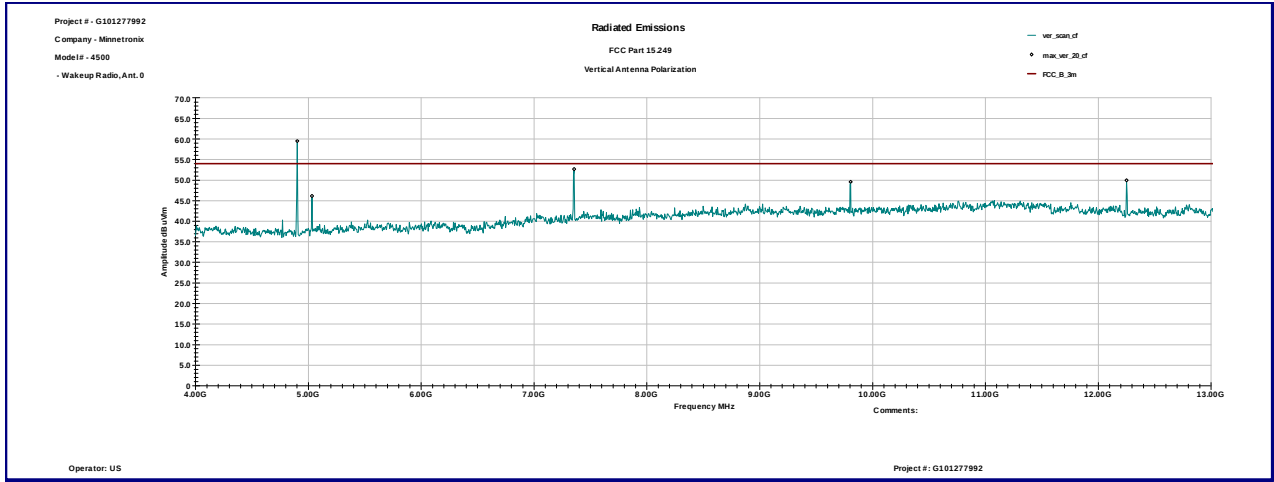
Horizontal antenna polarization



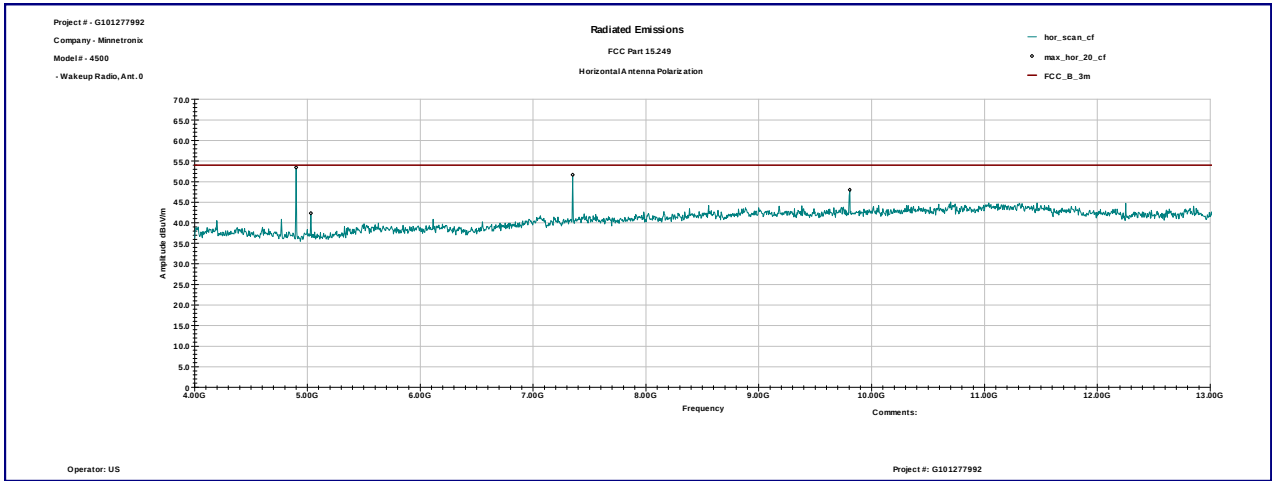


Graph 3.2.4

Vertical antenna polarization



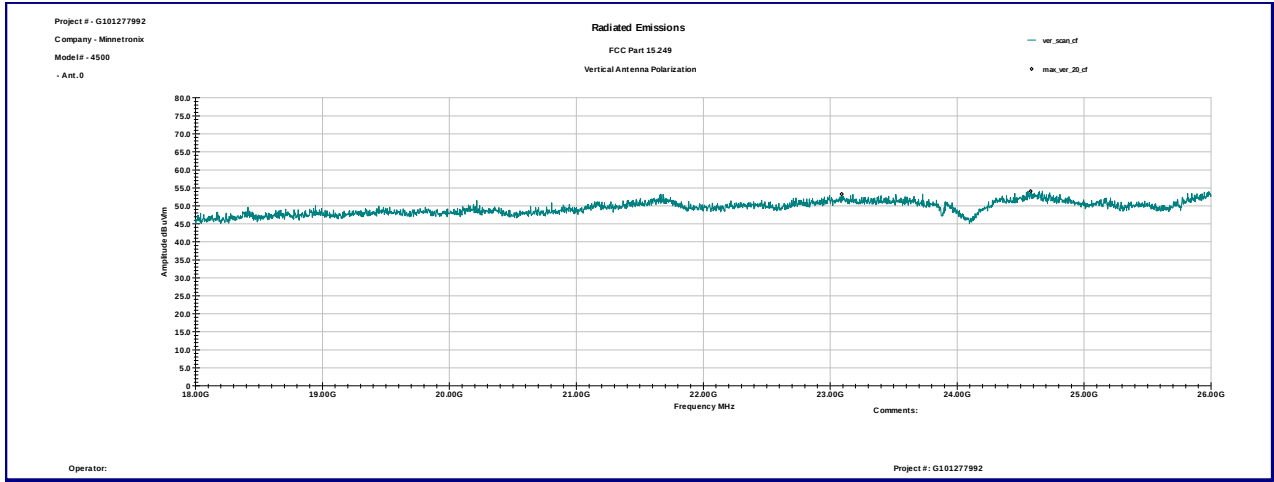
Horizontal antenna polarization



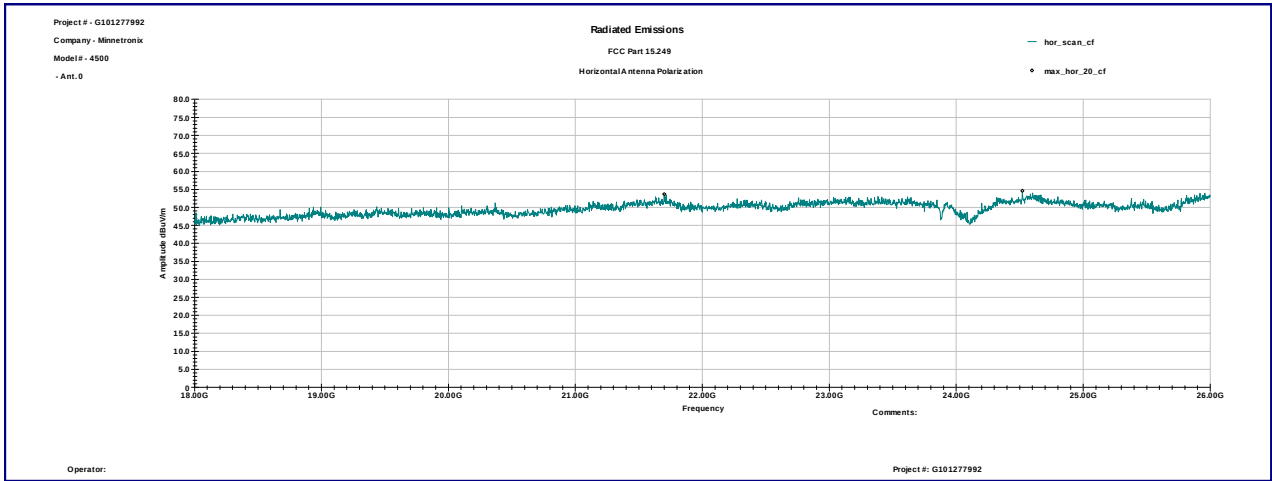


Graph 3.2.5

Vertical antenna polarization



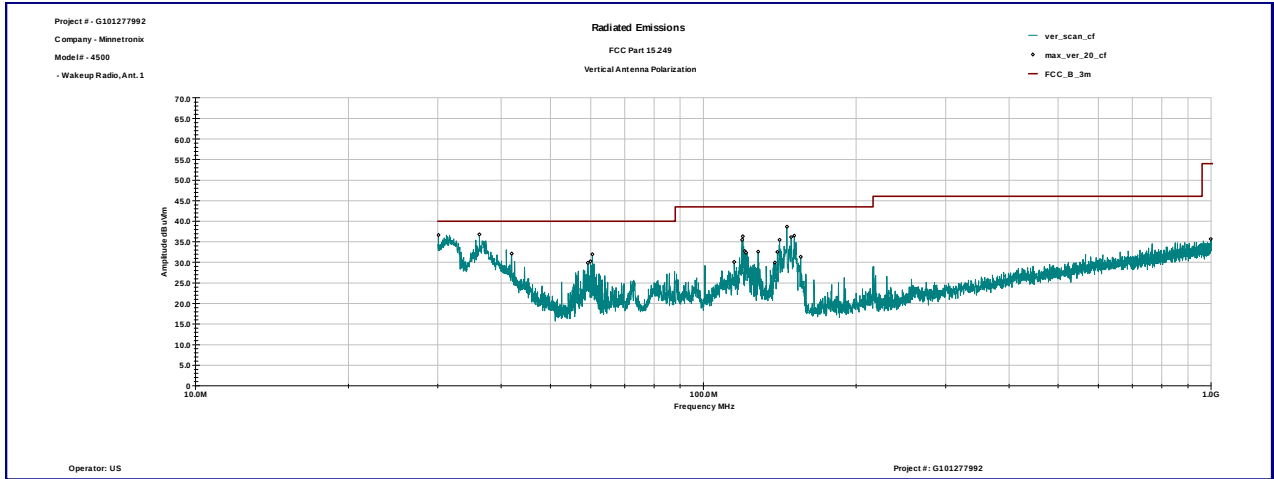
Horizontal antenna polarization



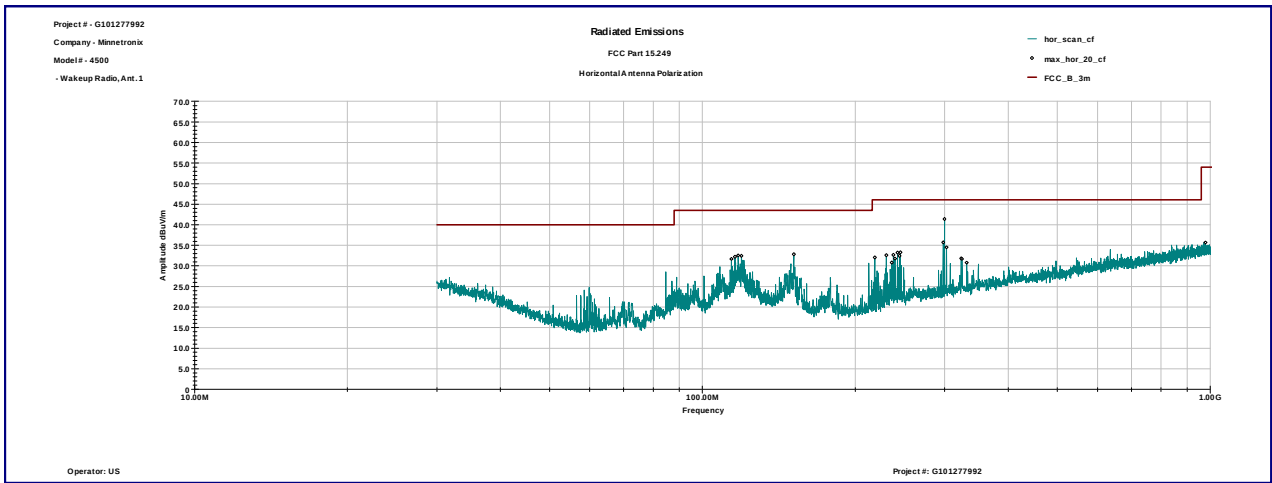


Graph 3.2.6

Vertical antenna polarization



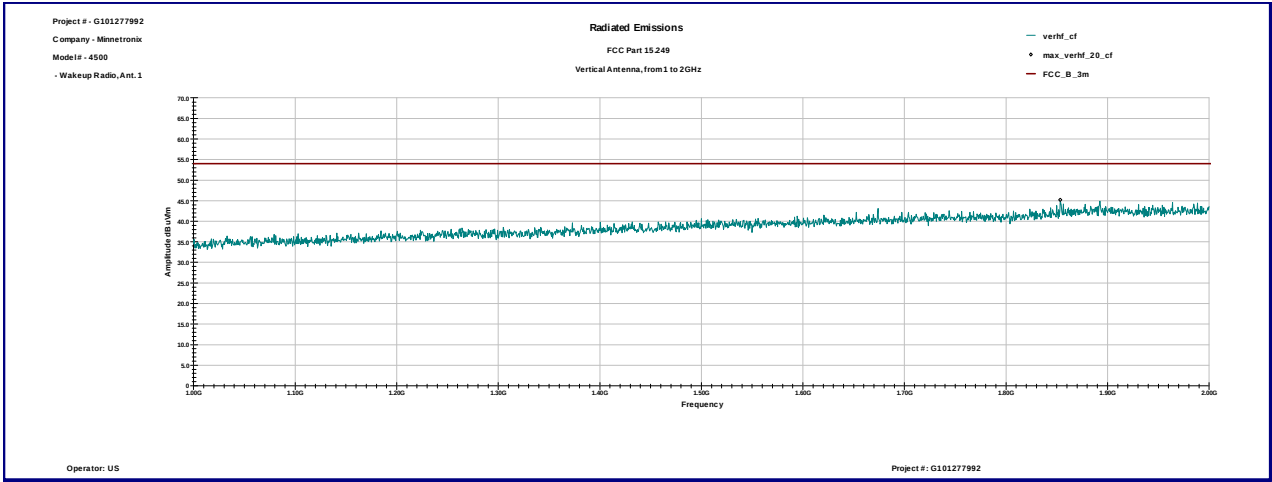
Horizontal antenna polarization



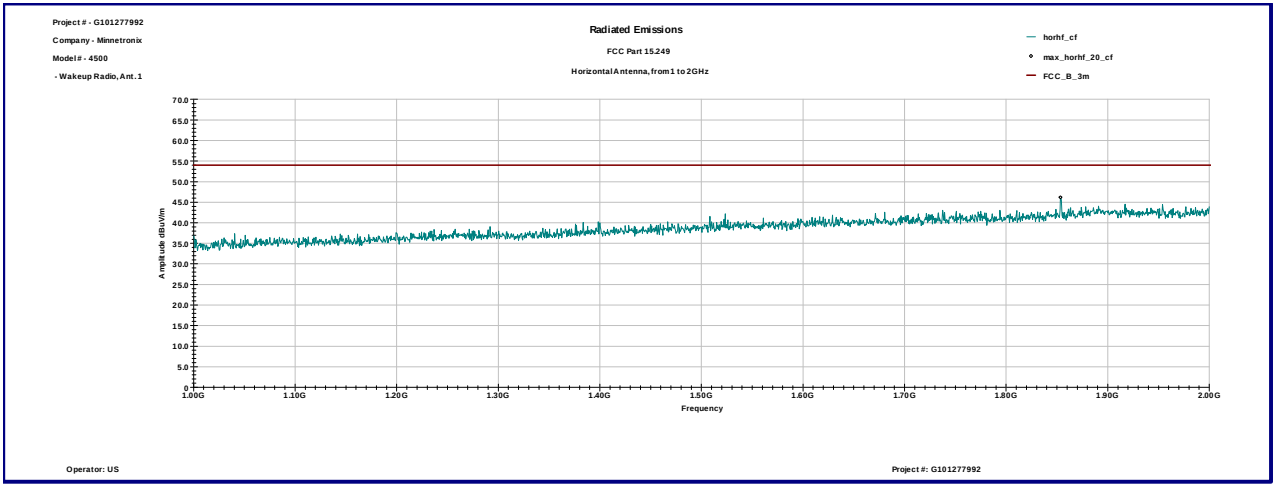


Graph 3.2.7

Vertical antenna polarization



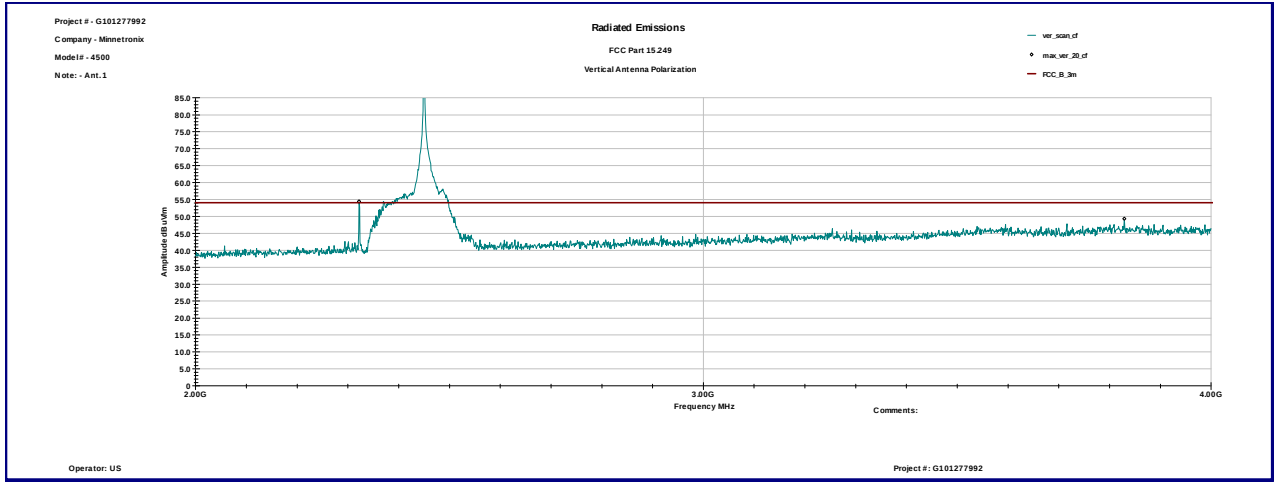
Horizontal antenna polarization



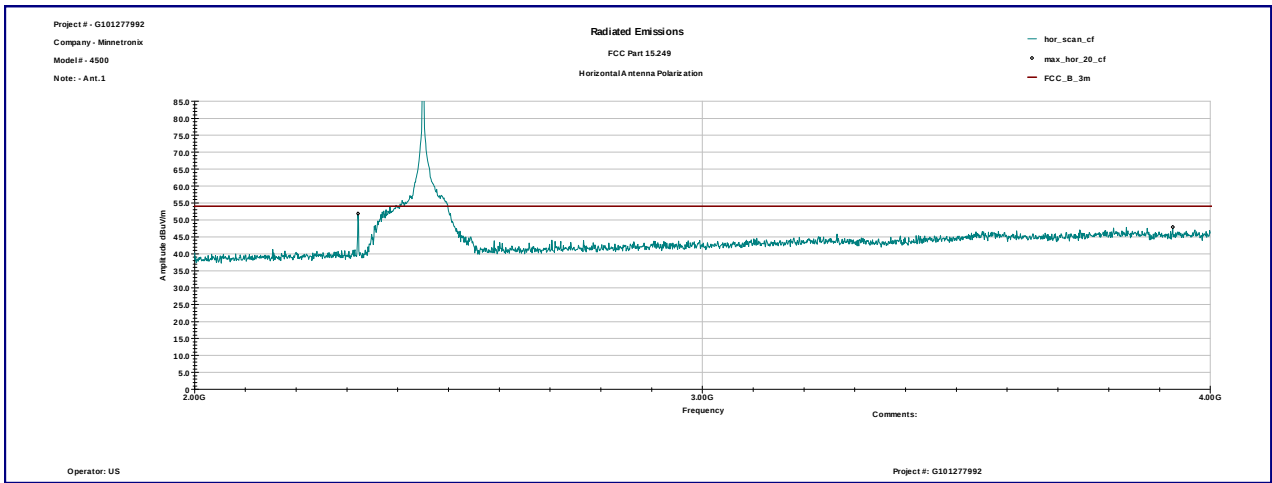


Graph 3.2.8

Vertical antenna polarization



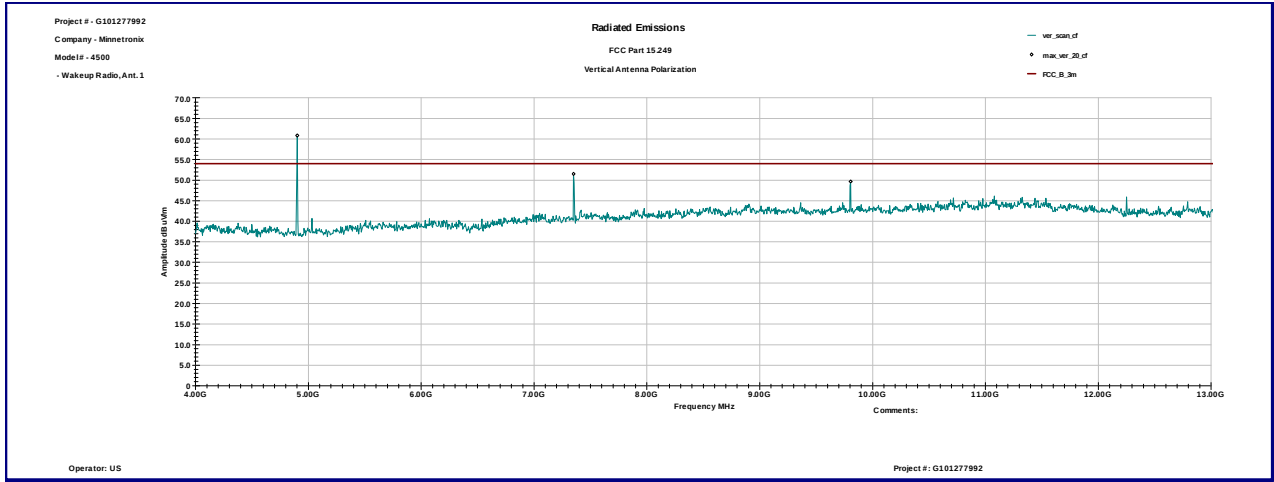
Horizontal antenna polarization



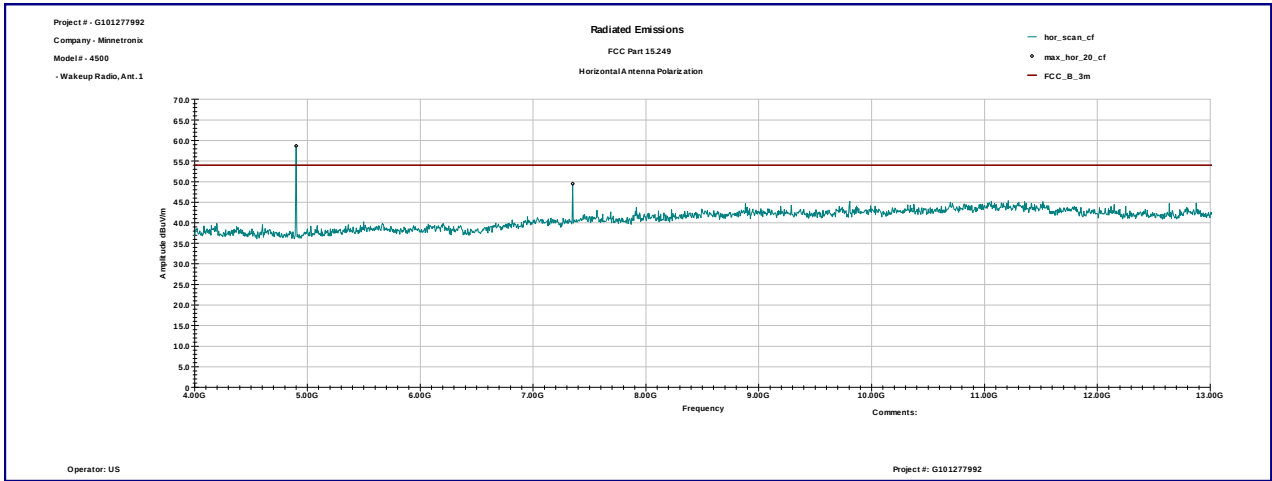


Graph 3.2.9

Vertical antenna polarization



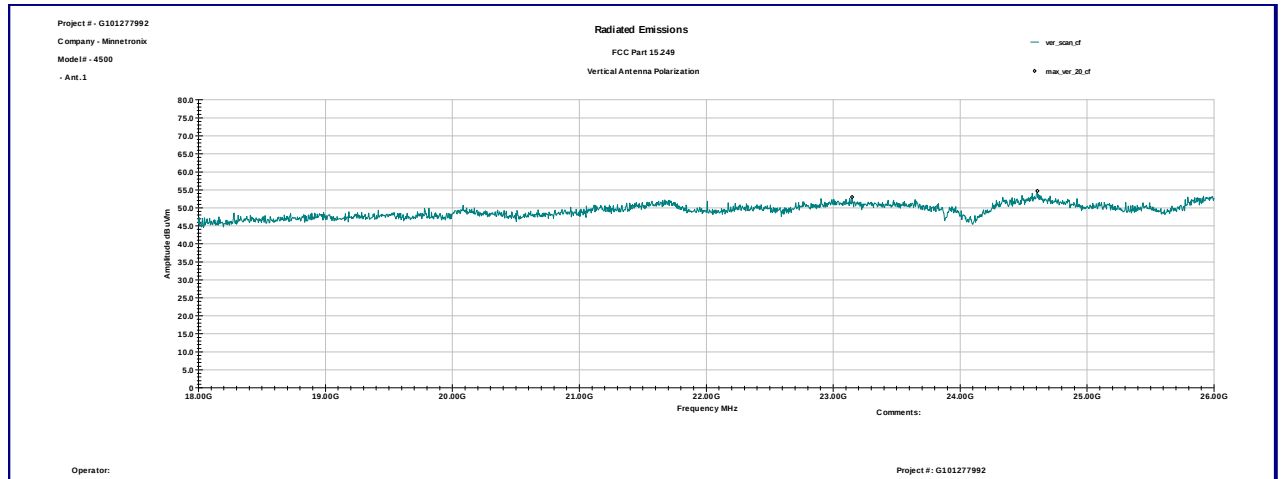
Horizontal antenna polarization



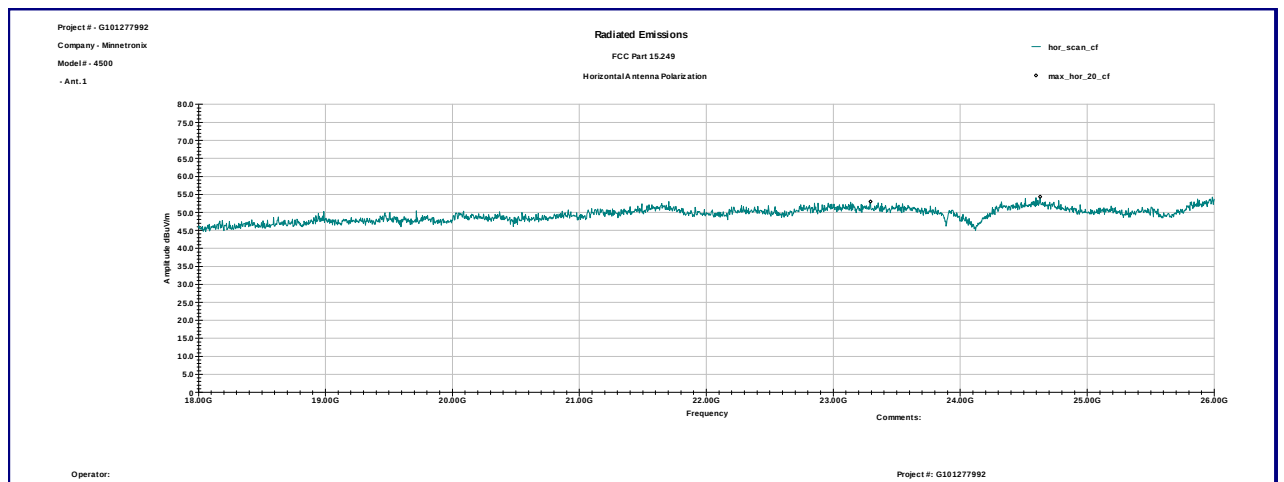


Graph 3.2.10

Vertical antenna polarization



Horizontal antenna polarization





3.2.1 Average correction factor calculation

An Average correction factor is calculated by averaging one complete pulse train.

Time of one pulse is 4.697µsec (see Graph 3.2.6). There are 32 pulses over 1msec period (see Graph 3.2.7) or 3200 pulses over 100msec period.

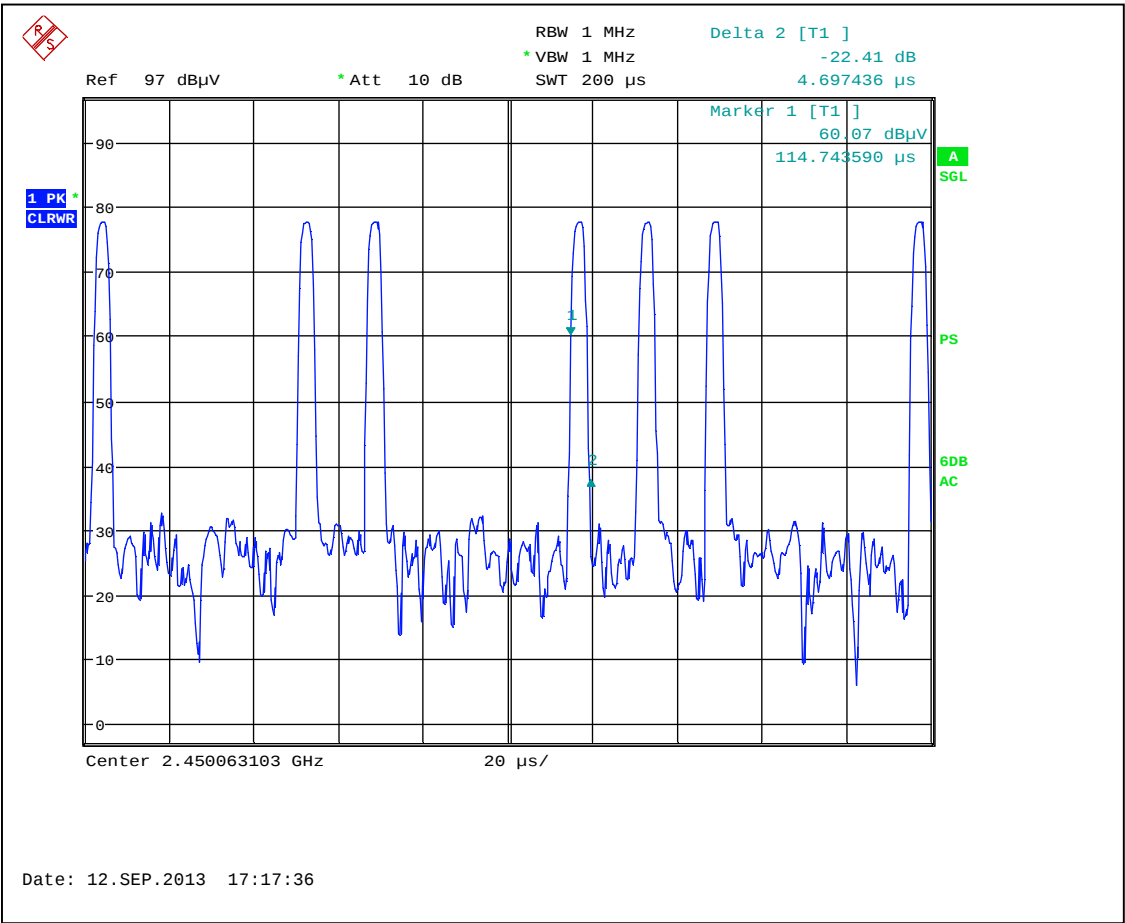
Time with field strength is in its maximum value (length of pulses) = $3200 * 4.697\mu\text{sec} = 15.38\text{ms}$

Average Correction Factor = $20\text{Log}(15\text{ms}/100\text{ms}) = -16.5\text{dB}$

Graphs 3-2-6 to 3-2-7 show pulse train timing.

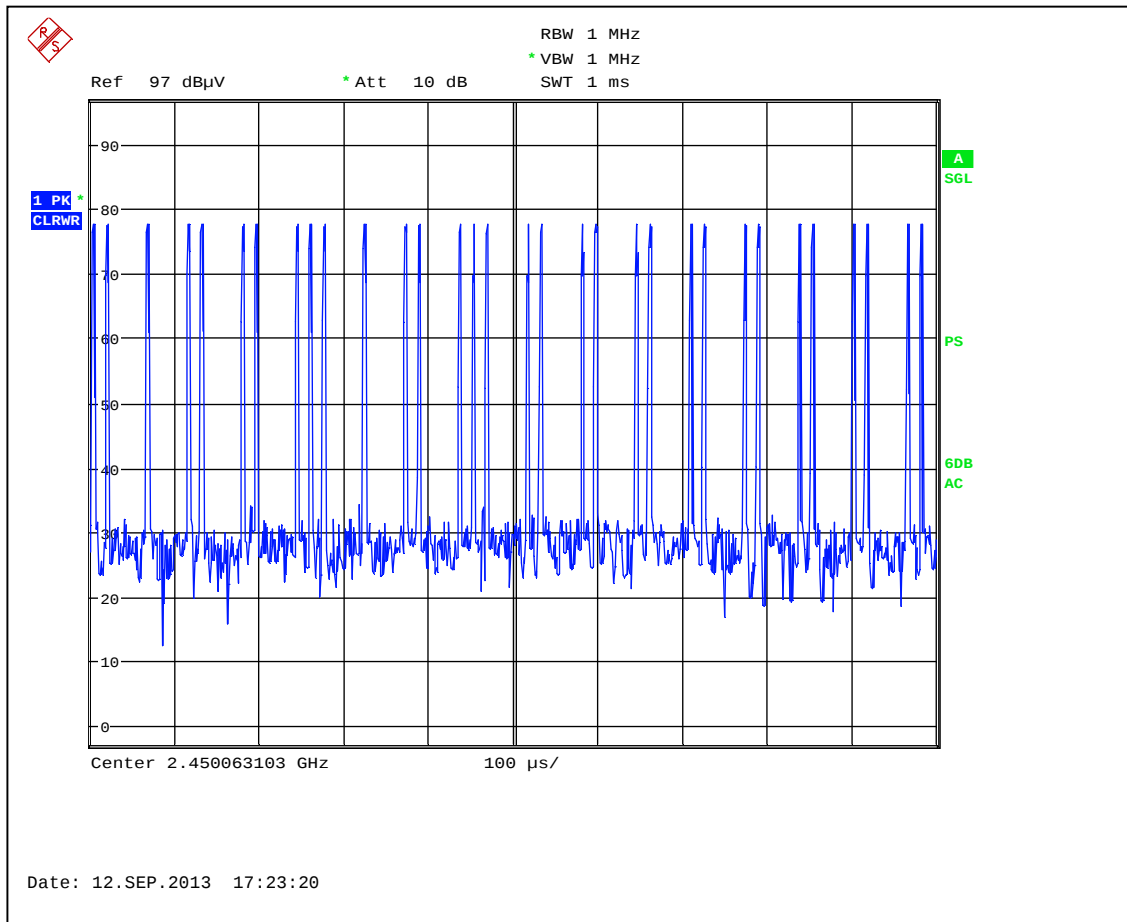


Graph 3.2.6





Graph 3.2.7





3.3 Bandwidth of Emissions

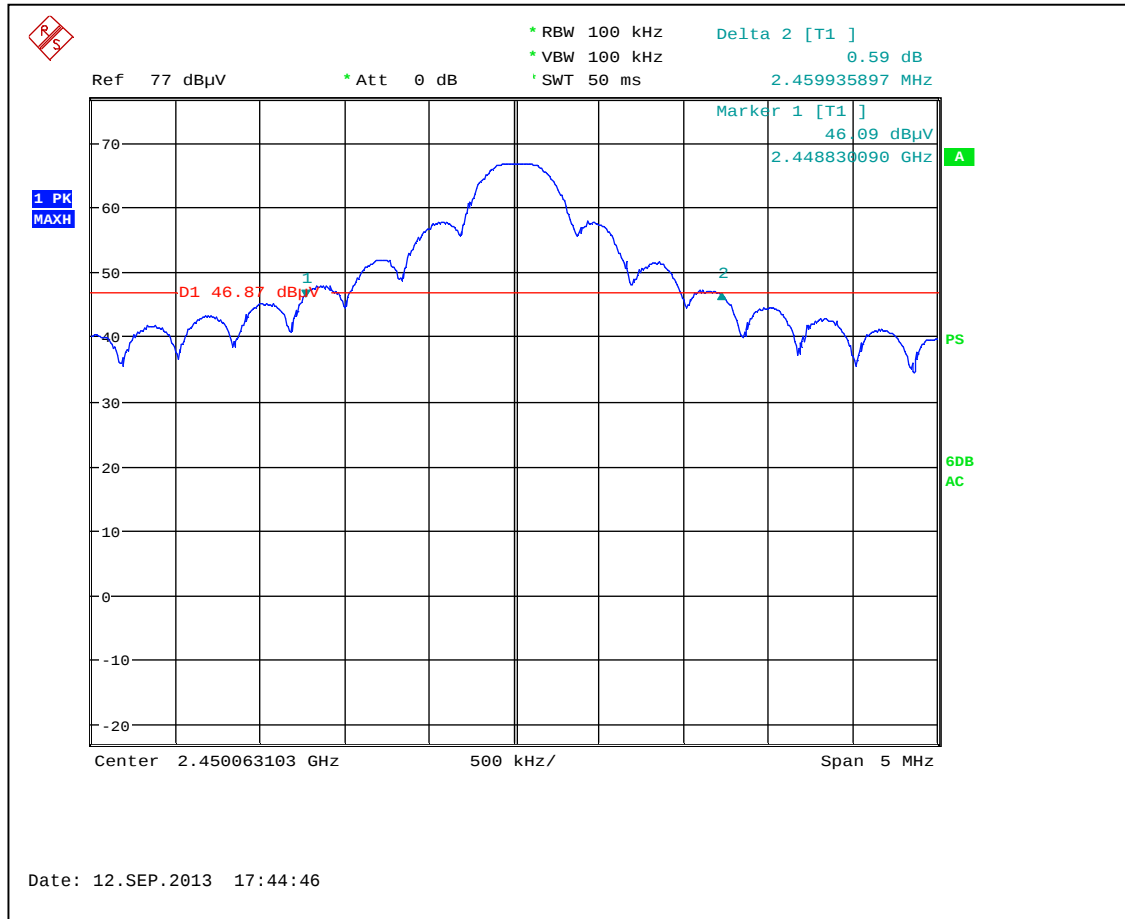
Center Frequency of operation MHz	Measured 20dB bandwidth MHz	Measured 99% bandwidth MHz
2450	2.46	3.00

Graphs 3-3-1 and 3-3-2 are show bandwidth of emissions

Notes: The bandwidth of emissions is contained within the frequency band of operation

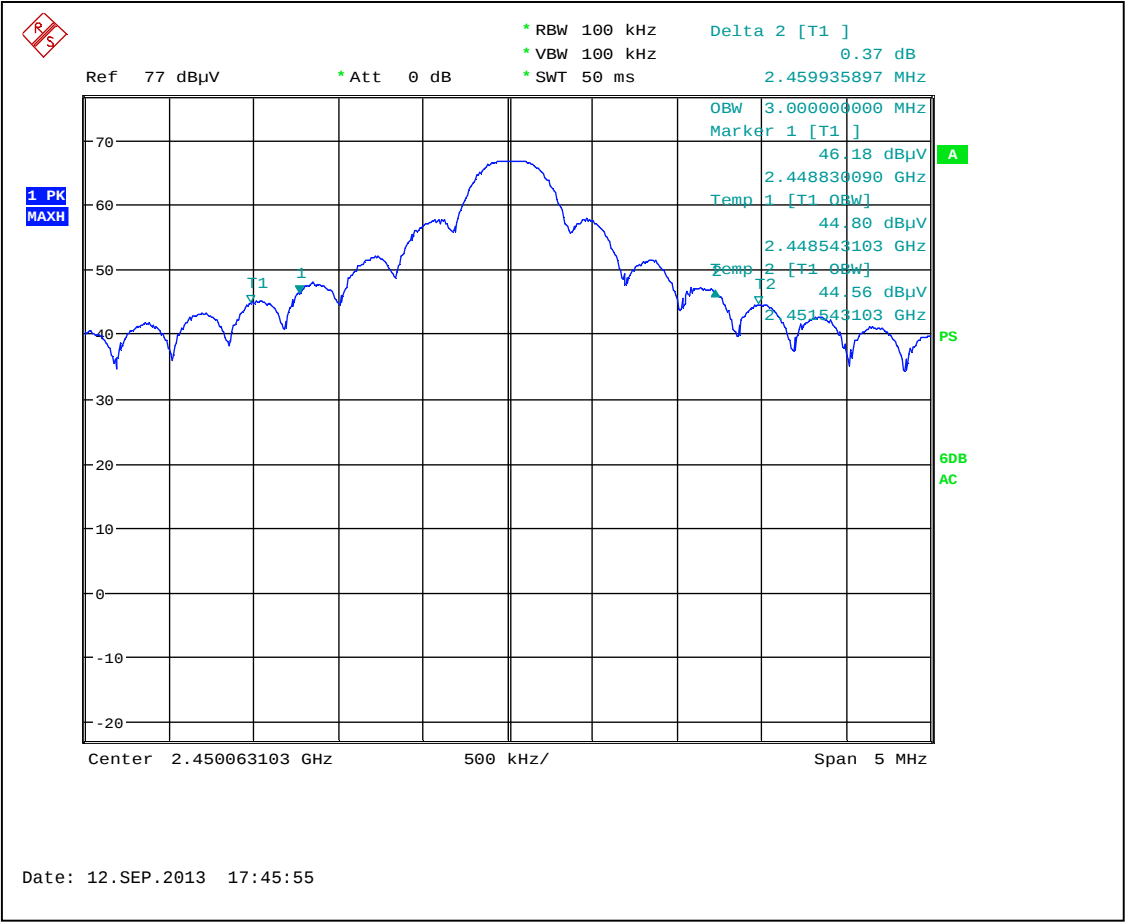


Graph 3.3.1





Graph 3.3.2





3.4 Transmitter power line conducted emissions

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test result: **Pass**

Frequency range: 0.15MHz-30MHz

Max. Emissions margin: 9.9dB below the limits

Notes: None



Date:	September 16, 2013	Result: Pass
Standard:	FCC 15.207	
Tested by:	Uri Spector	
Test Point:	Power Line	
Operation mode:	See Page 5	
Note:	None	

Table 3.4.1

Line 1

Frequency MHz	QP dBμV	AVG dBμV	Cable Loss dB	QP Lim dBμV	AVG Lim dBμV	QP Margin dB	AVG Margin dB
0.158	55.6	29.7	0.1	65.6	55.6	-9.9	-25.8
0.202	51.7	29.3	0.1	63.5	53.5	-11.7	-24.1
0.271	46.8	25.9	0.1	61.1	51.1	-14.2	-25.1
0.363	40.7	20.9	0.1	58.7	48.7	-17.8	-27.6
0.632	39.4	28.3	0.2	56.0	46.0	-16.4	-17.5
1.322	38.8	27.7	0.3	56.0	46.0	-16.9	-18.0

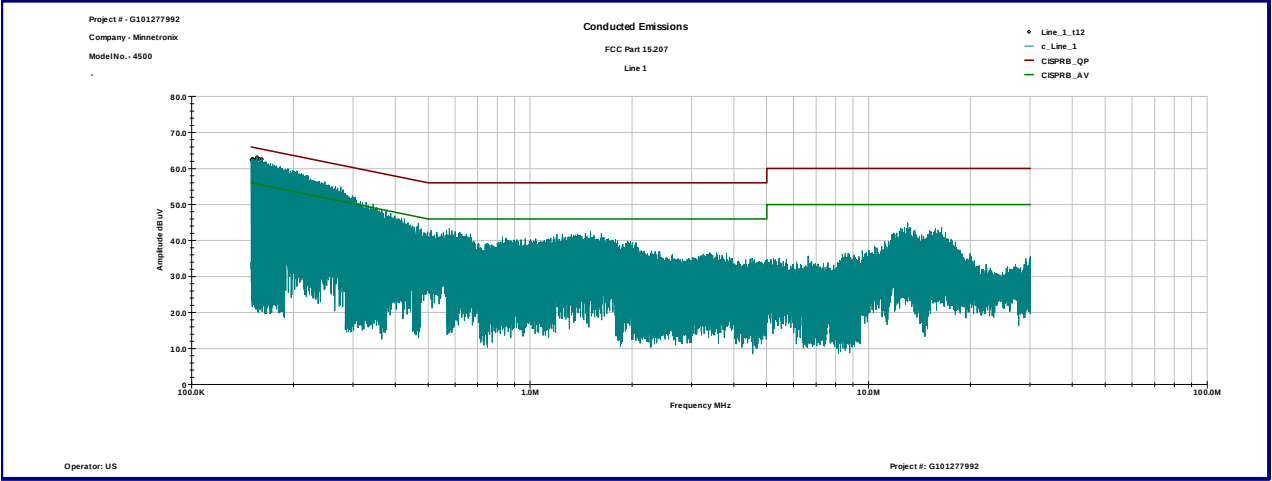
Line 2

Frequency MHz	QP dBμV	AVG dBμV	Cable Loss dB	QP Lim dBμV	AVG Lim dBμV	QP Margin dB	AVG Margin dB
0.151	54.6	27.5	0.1	65.9	55.9	-11.3	-28.4
0.175	51.8	26.4	0.1	64.7	54.7	-12.8	-28.2
0.280	43.7	21.3	0.1	60.8	50.8	-17.0	-29.4
0.382	37.4	16.4	0.1	58.2	48.2	-20.7	-31.7
12.707	33.8	23.6	0.9	60.0	50.0	-25.3	-25.5
16.355	33.6	20.0	1.0	60.0	50.0	-25.4	-29.0

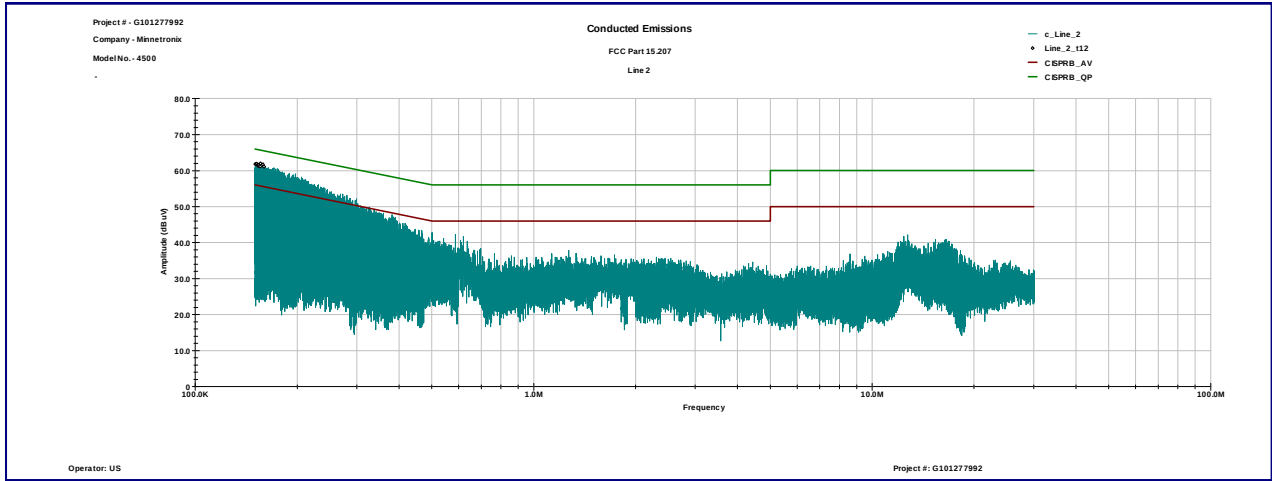


Graph 3.4.1

Line 1



Line 2





3.5 Receiver/digital device radiated emissions

Test location: ☐ OATS ☒ Anechoic Chamber

Test distance: ☐ 10 meters ☒ 3 meters

Test result: **Pass**

Frequency range: 30MHz-13000MHz

Max. Emissions margin: 2.4dB below the limits

Notes: The Radiated Emissions test was performed in the Anechoic chamber at 3m measurement distance (see Table 3.5.1 and Graphs 3.5.1 to 3.5.2).



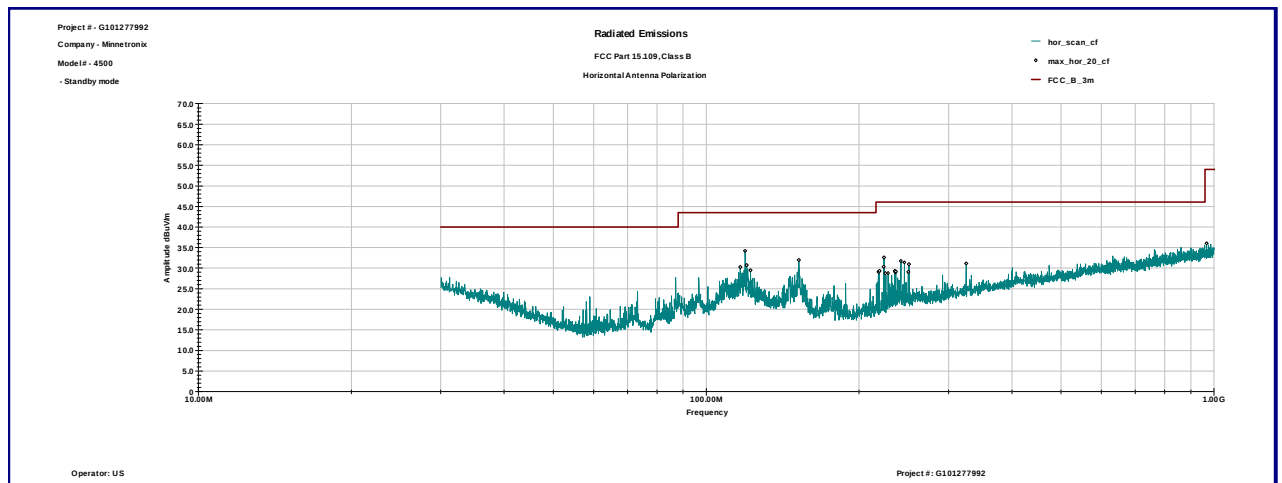
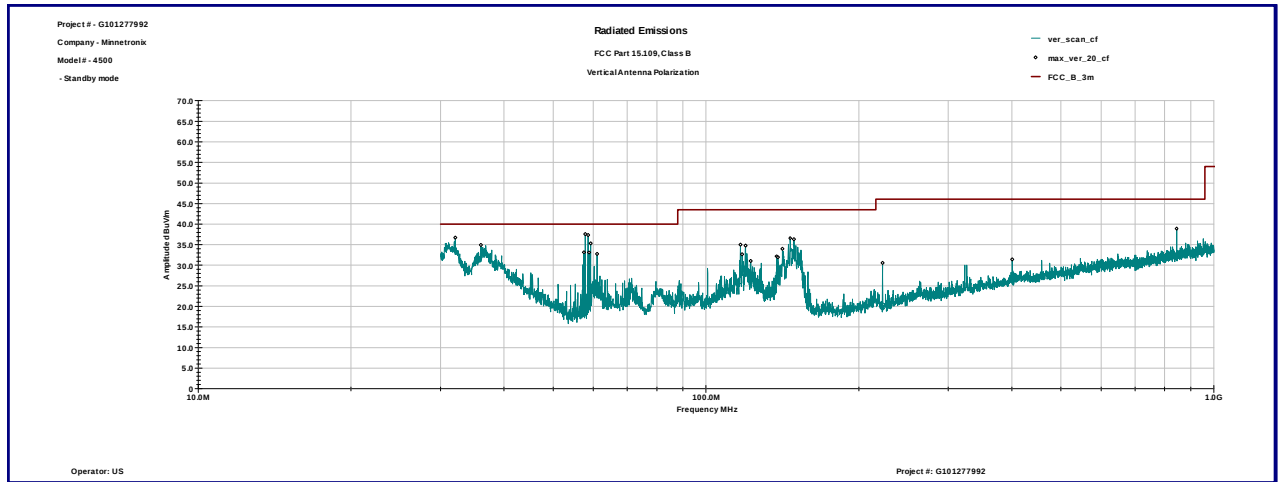
Date:	September 27, 2013	Result: Pass
Standard:	FCC Part 15.109, Class B	
Tested by:	Uri Spector	
Test Point:	Enclosure	
Operation mode:	Standby/Receiving mode	
Note:	No radiated spurious emissions were detected above 1GHz (see Graph 3.5.2).	

Table 3.5.1

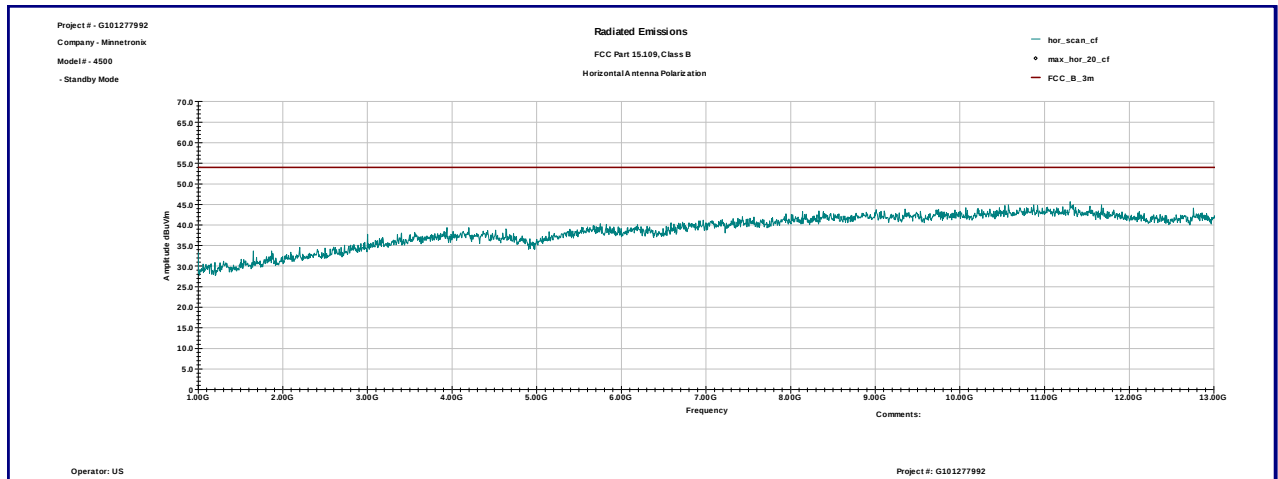
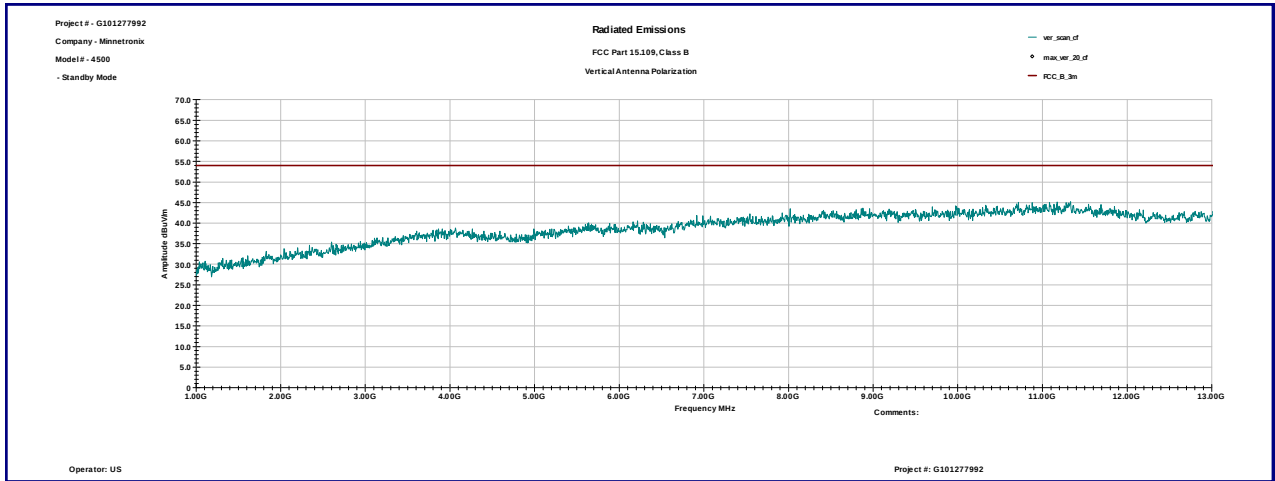
Frequency	Ant. Polarity	Peak Reading dB μ V	Total C.F. dB1/m	Total at 3m dB μ V/m	Limit dB μ V/m	Margin dB
32.113 MHz	V	17.8	18.9	36.7	40.0	-3.3
36.026 MHz	V	18.2	16.8	35.0	40.0	-5.0
57.845 MHz	V	30.1	7.5	37.6	40.0	-2.4
58.607 MHz	V	30.0	7.3	37.4	40.0	-2.6
119.62 MHz	V	20.9	13.9	34.8	43.5	-8.7
141.5 MHz	V	20.8	13.2	34.0	43.5	-9.5
146.48 MHz	V	23.8	12.8	36.6	43.5	-6.9
149.05 MHz	V	23.7	12.7	36.4	43.5	-7.2
400.78 MHz	V	12.5	18.9	31.4	46.0	-14.6
844.74 MHz	V	14.2	24.8	38.9	46.0	-7.1
119.25 MHz	H	20.3	13.9	34.2	43.5	-9.3
152.27 MHz	H	19.5	12.5	32.0	43.5	-11.6
223.96 MHz	H	20.2	12.4	32.6	46.0	-13.5
241.65 MHz	H	17.7	14.0	31.7	46.0	-14.3
245.5 MHz	H	17.0	14.3	31.4	46.0	-14.6
324.94 MHz	H	14.5	16.6	31.2	46.0	-14.9



Graph 3.5.1



Graph 3.5.2





3.6 Digital device conducted emissions

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test result: **Pass**

Frequency range: 0.15MHz-30MHz

Max. Emissions margin: 11.1dB below the limits

Notes: None



Date:	September 16, 2013	Result: Pass
Standard:	FCC 15.107, Class B	
Tested by:	Uri Spector	
Test Point:	Power Line	
Operation mode:	Receiving mode	
Note:	None	

Table 3.6.1

Line 1

Frequency MHz	QP dBμV	AVG dBμV	Cable Loss dB	QP Lim dBμV	AVG Lim dBμV	QP Margin dB	AVG Margin dB
0.156	54.5	28.1	0.1	65.7	55.7	-11.1	-27.5
0.176	50.9	26.9	0.1	64.7	54.7	-13.7	-27.7
0.233	46.9	24.8	0.1	62.3	52.3	-15.3	-27.4
0.298	41.7	21.7	0.1	60.3	50.3	-18.5	-28.5
0.443	33.5	19.2	0.1	57.0	47.0	-23.4	-27.7
0.606	38.8	27.1	0.2	56.0	46.0	-17.0	-18.7

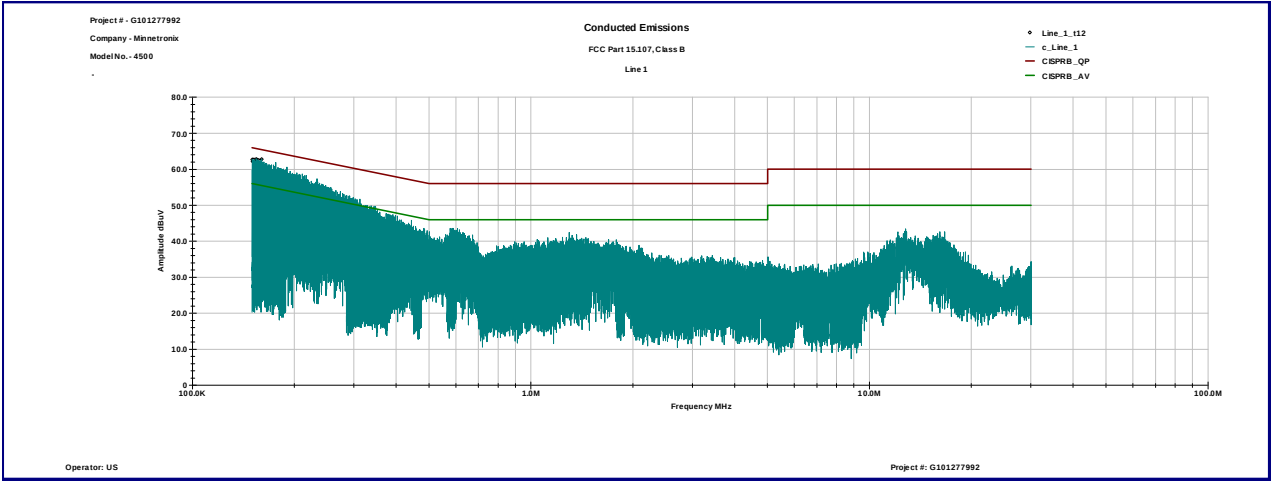
Line 2

Frequency MHz	QP dBμV	AVG dBμV	Cable Loss dB	QP Lim dBμV	AVG Lim dBμV	QP Margin dB	AVG Margin dB
0.151	54.8	27.2	0.1	65.9	55.9	-11.1	-28.7
0.163	52.8	26.8	0.1	65.3	55.3	-12.4	-28.4
0.193	50.1	24.9	0.1	63.9	53.9	-13.7	-28.9
0.258	44.0	21.6	0.1	61.5	51.5	-17.4	-29.8
12.553	33.9	23.5	0.8	60.0	50.0	-25.3	-25.7
16.813	32.6	19.3	1.0	60.0	50.0	-26.4	-29.7

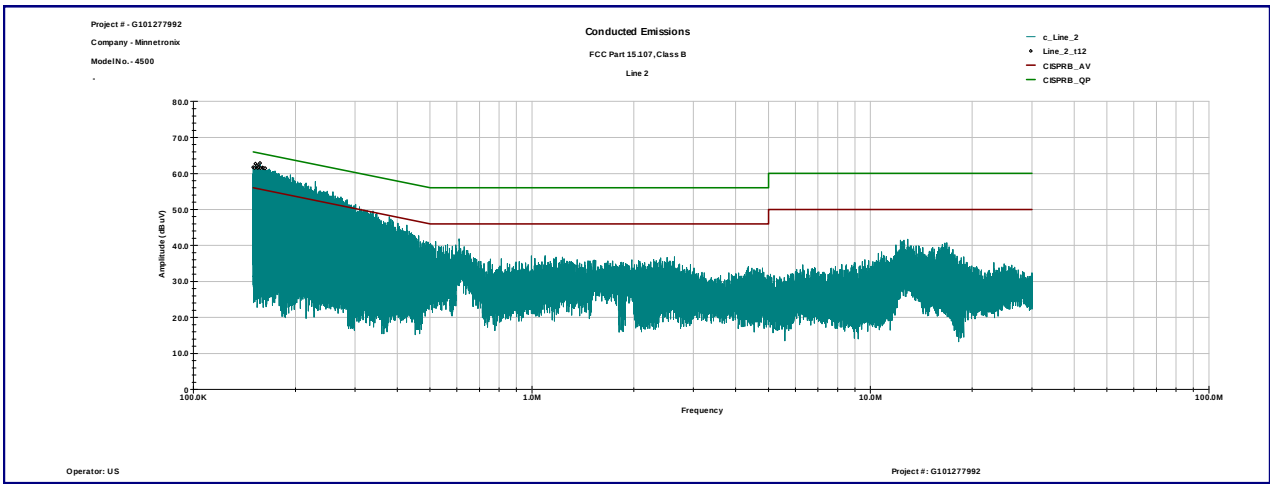


Graph 3.6.1

Line 1



Line 2





4.0 TEST EQUIPMENT

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO.	INTERTEK ID	CAL DUE	USED
Spectrum Analyzer	R & S	ESU	100398	25283	12/19/2013	☒
Spectrum Analyzer	R & S	FSP 40	100024	12559	11/29/2013	☒
Bicono-Log Antenna	Schaffner-Teseq	CBL6112B	2468	9734	11/30/2013	☒
Horn Antenna	EMCO	3115	6579	15580	07/18/2014	☒
LISN	Fischer Custom Communications	FCC-LISN-50-25-2	2014	9665	04/23/2014	☒
System	Quantum Change	TILE! Instrument Control	Ver. 3.4.K.29	15259	VBU	☒
Pre-Amplifier	MITEQ	AMF-5D-00501800-28-13P	1122951	13475	11/01/2013	☒