



TEST REPORT

Report Number: 100356551MIN-001

Project Number: G100356551

Testing performed on the
XP-3

FCC ID: MMURTI1900
Industry Canada ID: 3166A-RTI1900

to
47 CFR Part 15. 249:2009
RSS- 210, Issue 8, 2010
47 CFR, Part 15:2009, §15.107 and §15.109, Class B
RSS-Gen, Issue 3, 2010
ICES-003, Issue 4:2004

For
Remote Technologies Inc

Test Performed by:
Intertek Testing Services NA, Inc.
7250 Hudson Blvd., Suite 100
Oakdale, MN 55128 USA

Test Authorized by:
Remote Technologies
5775-12th Avenue East, Suite 180
Shakopee, MN 55379

Prepared by: SKhejen
Simon Khazon

Date: May 23, 2011

Reviewed by: Norm Shpilsher
Norman Shpilsher

Date: May 23, 2011

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1.0 GENERAL DESCRIPTION

Model:	XP-3, with RTI AC Adaptor model KSAS0101200100M2
Type of EUT:	Advanced Control Processor
Serial Number:	N/A
FCC ID:	MMURTI1900
Industry Canada ID:	3166A-RTI1900
Related Submittal(s) Grants:	N/A
Company:	Remote Technologies Inc.
Customer:	Mr. Mark Melville
Address:	5775-12 th Avenue East Suite 180 Shakopee MN 55379
Phone:	(952) 253-3116
Fax:	(952) 253-3131
e-mail:	markm@rticorp.com
Test Standards:	☒ 47 CFR, Part 15:209, §15.249 ☒ RSS-210, Issue 8, 20010 ☒ RSS-Gen, Issue 3, 2010 ☒ 47 CFR, Part 15:209, §15.107 and §15.109, Class B ☒ ICES-003, Issue 4:2004 ☐ Other
Type of radio:	☒ Stand -alone ☐ Module ☐ Hybrid
Date Sample Submitted:	March 10, 2011
Test Work Started:	March 10, 2011
Test Work Completed:	March 25, 2011
Test Sample Conditions:	☐ Damaged ☐ Poor (Usable) ☒ Good



1.1 Product Description; Test Facility

Product Description:	Advanced Control Processor
Operating Frequency	2400-2483.5 MHz
Modulation:	Offset Quadrature Phase Shift Keying
Emission Designator:	3M6G1D
Antenna(s) Info:	Bobbintron SA-006-01 external ½ wavelength antenna
Antenna Installation:	☒ User ☐ Professional ☐ Factory
Transmitter Power Configuration:	☐ Internal battery ☐ External power source ☒ 10-240VAC ☐ 400VAC ☐ [REDACTED] VDC ☐ Other: USB 5VDC from the Host PC 0.4 Amp. ☒ 50/60Hz ☐ 60Hz
Special Test Arrangement:	None
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
- ☐ - Test program (customer specific)
- ☐ -

Operating modes of the EUT:

No.	Description
1	The device was pre-programmed to transmit continuously in three separate frequency channels, low, middle, and upper frequency channel, one channel being transmitted at a given time.
2	Standby/Receiving mode

Cables:

No.	Type	Length	Designation	Note
1	Shielded, USB	6ft.	Software loading	
2	8 wires, unshielded	6 ft	Power/Sense/Relays	
3	Unshielded, RJ45	15 ft	Ethernet	
4	Unshielded, RJ45	6 ft	RS-232	
5	(2) Unshielded, Audio	6 ft	Port 1 and 2	

Support equipment/Services:

No.	Item	Description
1	Dell Notebook, Latitude D610	Host PC

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).

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

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

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

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

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

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

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

General notes: None

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 and of harmonics and spurious emissions

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test distance: ☐ 10 meters ☒ 3 meters

Frequency range of measurements: 30MHz-25MHz

Test result: Pass

Max. Emissions margin at fundamental: 0.9 dB below the limits

Max. margin of harmonics and spurious emissions: 7.4 dB below the limits

Notes: None

Date:	March 25, 2011	Result: Pass
Standard:	FCC 15.249(a) / RSS-210 A2.9	
Tested by:	Simon Khazon	
Test Point:	Enclosure with antenna	
Operation mode:	See Page 5	
Note:	Measurements at Fundamental Frequency. Analyzer settings: RBW 1MHz, VBW 1MHz	

Table 3.1.1

Frequency MHz	Antenna		Ant. CF dB1/m	Cable loss dB	Pre-amp Gain (dB)	Peak Reading dBμV	Total @ 3m dBμV/m	Average Limit dBμV/m	Margin dB	Comments
	Polarity	Hts(cm)								
						Channel 11				
2404.38	V	110	28.2	3.5	0.0	59.6	91.3	94.0	-2.7	
2404.38	H	301	28.2	3.5	0.0	57.2	88.9	94.0	-5.1	
						Channel 18				
2440.42	V	100	28.3	3.6	0.0	60.3	92.1	94.0	-1.9	
2440.42	H	251	28.3	3.6	0.0	51.4	83.2	94.0	-10.8	
						Channel 26				
2479.43	V	100	28.3	3.6	0.0	61.2	93.1	94.0	-0.9	
2479.43	H	114	28.3	3.6	0.0	50.1	82.0	94.0	-12.0	

Date:	March 10, 2011	Result: Pass
Standard:	FCC 15.249(a) / RSS-210 A2.9	
Tested by:	Simon Khazon	
Test Point:	Enclosure with antenna	
Operation mode:	See Page 5	
Note:	Spurious emissions below 1 GHz. Analyzer settings: RBW 100kHz, VBW 300kHz	

Table 3.1.2

Frequency	Ant. Polarity	Peak Reading dBμV	Ant.Factor dB1/m	Total at 3m dBμV/m	QP Limit dBμV/m	Margin dB
			Channel 11			
31.018 MHz	V	14.6	19.8	34.4	40.0	-5.7
224.94 MHz	V	19.6	12.0	31.6	46.0	-14.4
962.05 MHz	V	13.9	26.0	39.9	46.0	-6.1
30.0 MHz	H	13.8	20.3	34.2	40.0	-5.9
179.37 MHz	H	21.5	11.1	32.6	46.0	-13.4
199.92 MHz	H	23.8	11.9	35.7	46.0	-10.3
224.94 MHz	H	23.7	12.0	35.7	46.0	-10.3
			Channel 18			
30.035 MHz	V	14.2	20.3	34.5	40.0	-5.5
224.94 MHz	V	20.6	12.0	32.6	46.0	-13.4
973.39 MHz	V	15.1	26.1	41.2	46.0	-4.8
175.04 MHz	H	20.0	11.3	31.3	46.0	-5.9
199.92 MHz	H	25.6	11.9	37.5	46.0	-8.5
224.94 MHz	H	24.6	12.0	36.6	46.0	-9.4
994.58 MHz	H	15.1	26.3	41.4	46.0	-4.6
			Channel 26			
30.175 MHz	V	15.1	20.2	35.3	40.0	-4.7
224.94 MHz	V	24.7	12.0	36.7	46.0	-9.3
998.03 MHz	V	14.9	26.4	41.2	46.0	-4.8
30.842 MHz	H	14.2	19.9	34.0	40.0	-5.9
224.94 MHz	H	28.2	12.0	40.2	46.0	-5.8
938.88 MHz	H	15.1	25.9	40.9	46.0	-5.1

Date:	March 25, 2011	Result: Pass
Standard:	FCC 15.249(a) / RSS-210 A2.9	
Tested by:	Simon Khazon	
Test Point:	Enclosure with antenna	
Operation mode:	See Page 5	
Note:	Band Edge Compliance. Analyzer settings: RBW 1MHz, VBW 1MHz	

Table 3.1.3

[illegible]

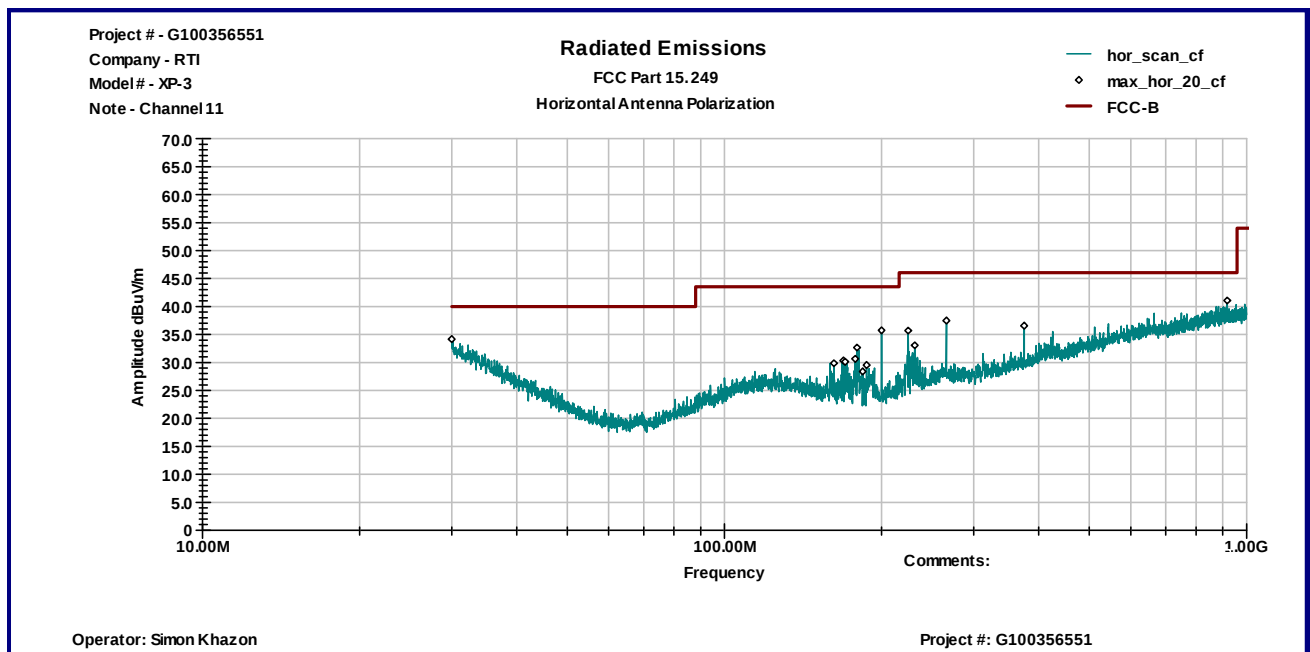
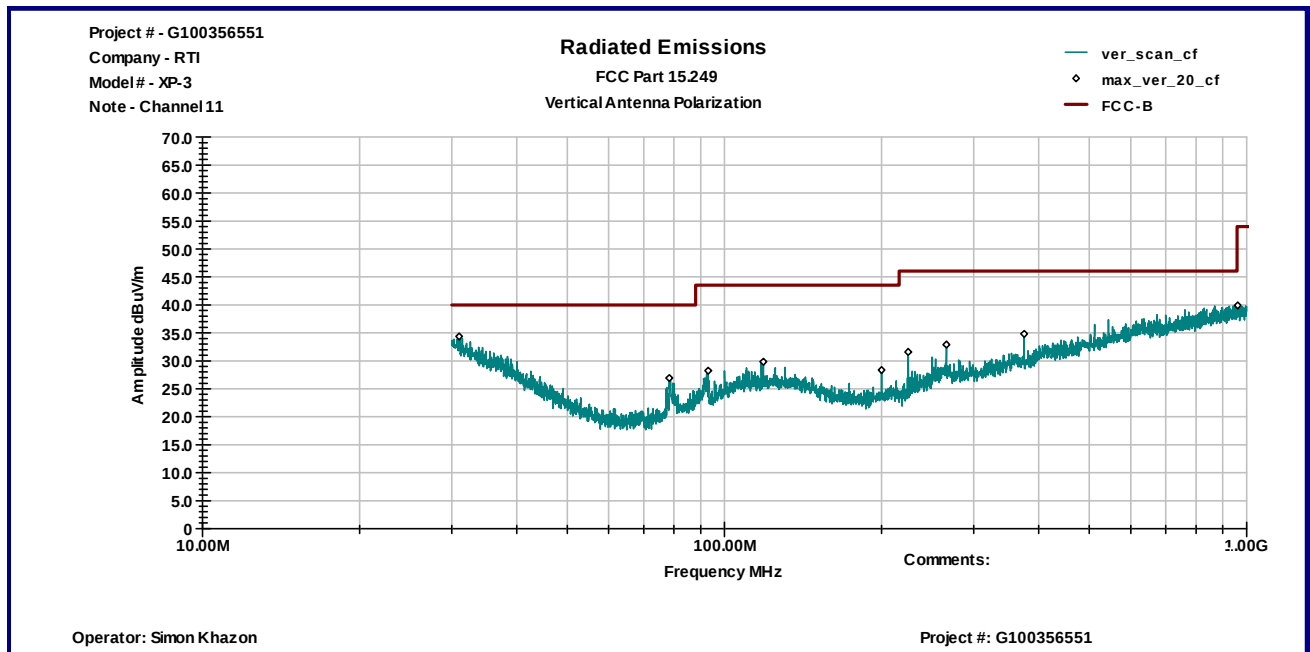
Date:	March 10, 2011	Result: Pass
Standard:	FCC 15.249(a) / RSS-210 A2.9	
Tested by:	Simon Khazon	
Test Point:	Enclosure with antenna	
Operation mode:	See Page 5	
Note:	Spurious and Harmonics emissions above 1 GHz. Average Value. Analyzer settings: RBW 1MHz, VBW 10Hz	

Table 3.1.4

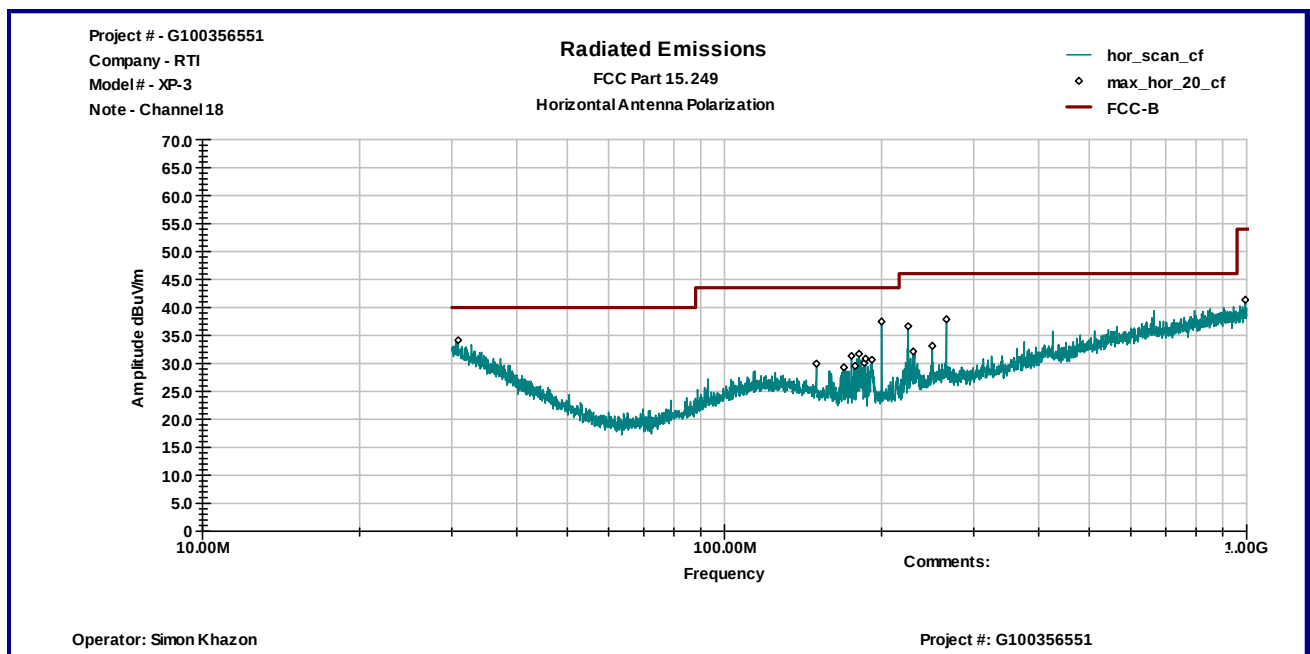
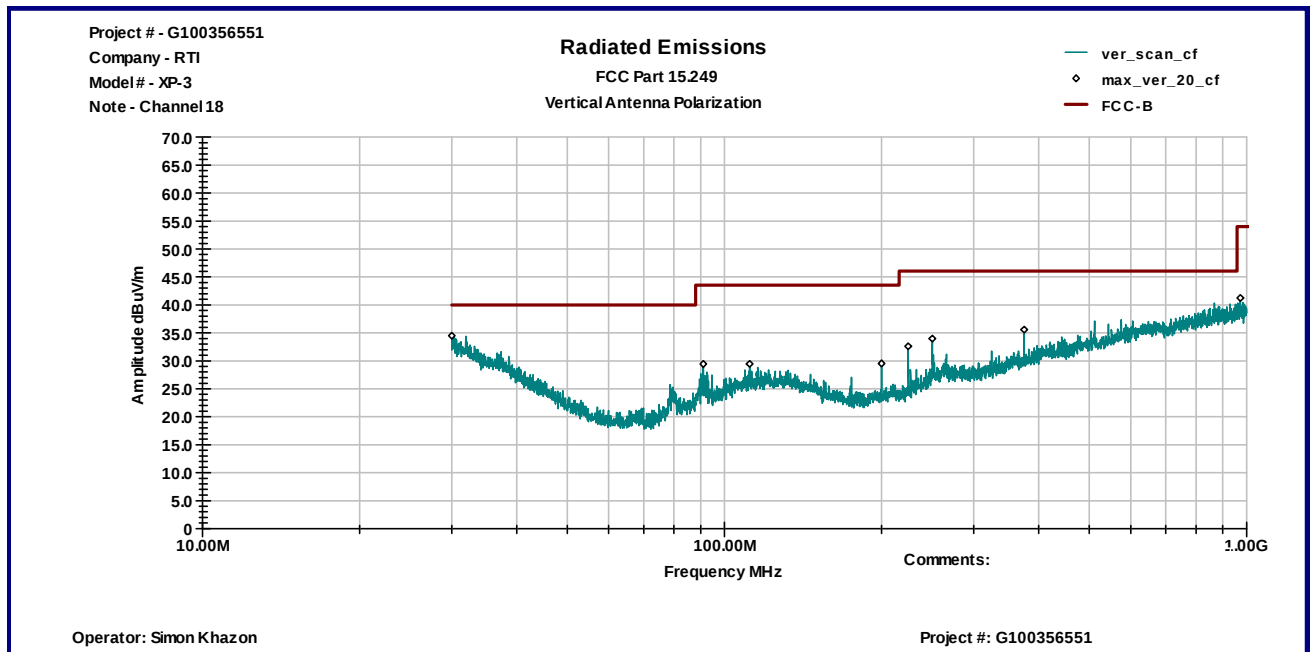
Frequency MHz	Antenna		Ant. CF dB1/m	Cable loss dB	Pre-amp Gain (dB)	Reading dBμV	Total @ 3m dBμV/m	Limit dBμV/m	Margin dB	Comments
	Polarity	Hts(cm)								
			Channel 11							
4810.88	V	197	32.7	4.9	36.7	45.6	46.6	54.0	-7.4	
			Channel 18							
4880.94	V	207	32.9	4.9	36.6	44.8	46.0	54.0	-8.0	
			Channel 26							
4960.80	V	207	33.0	5.0	36.6	45.8	47.2	54.0	-6.8	

Note: No Spurious / Harmonics emissions above ambient in the Frequency range above 1 GHz other than 2nd Harmonics were detected.

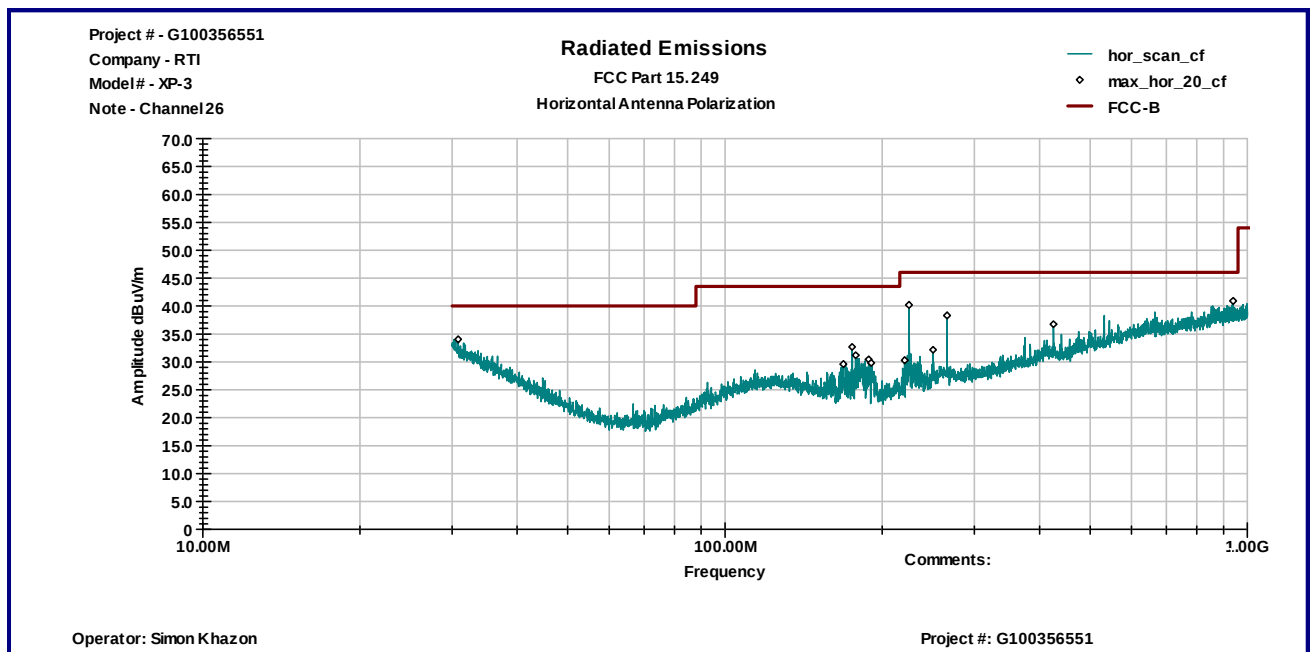
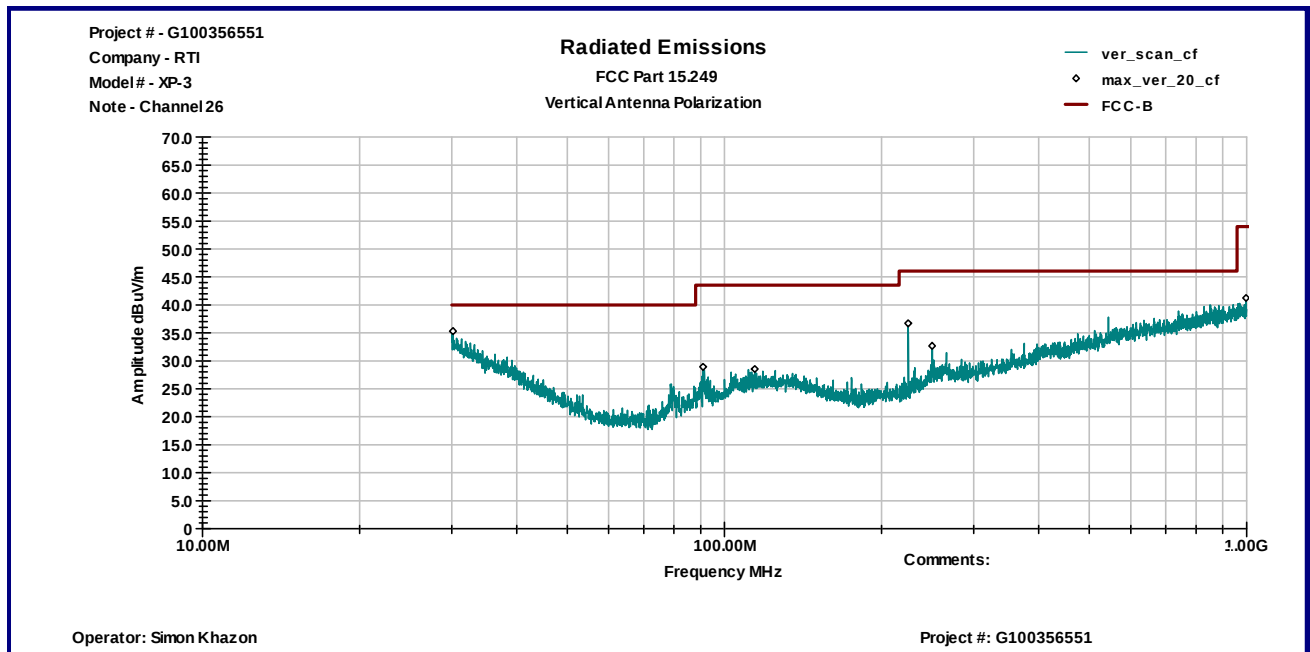
Graph 3.1.1



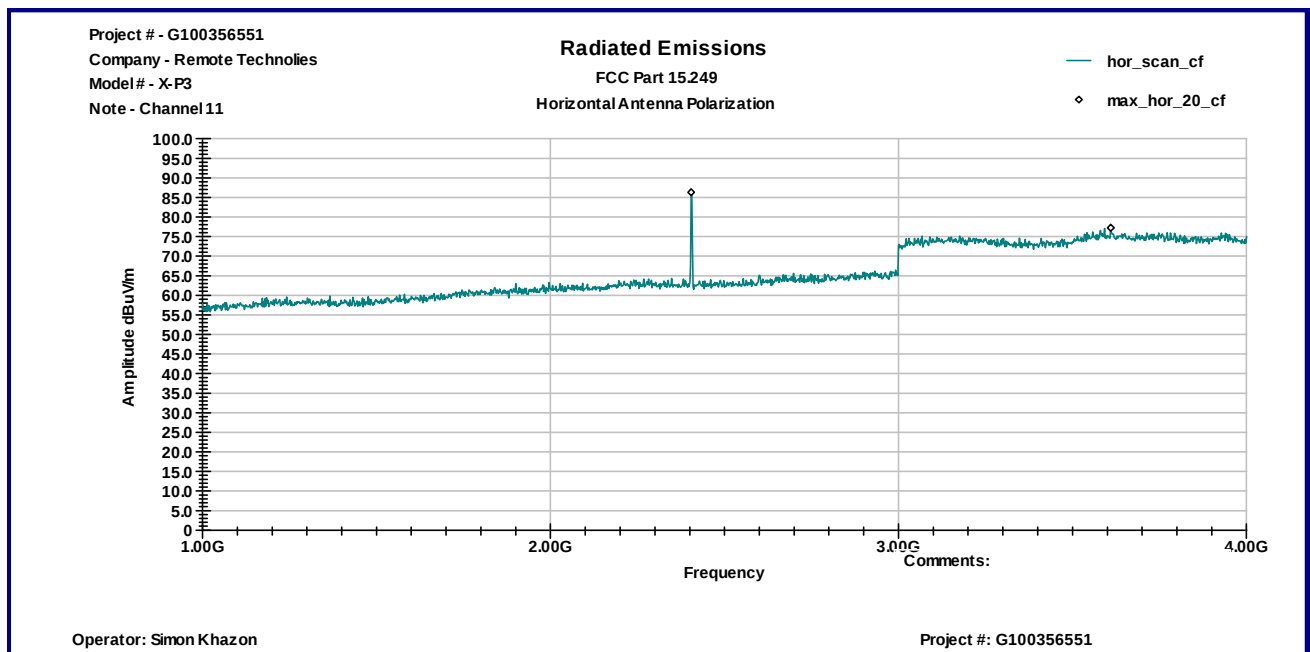
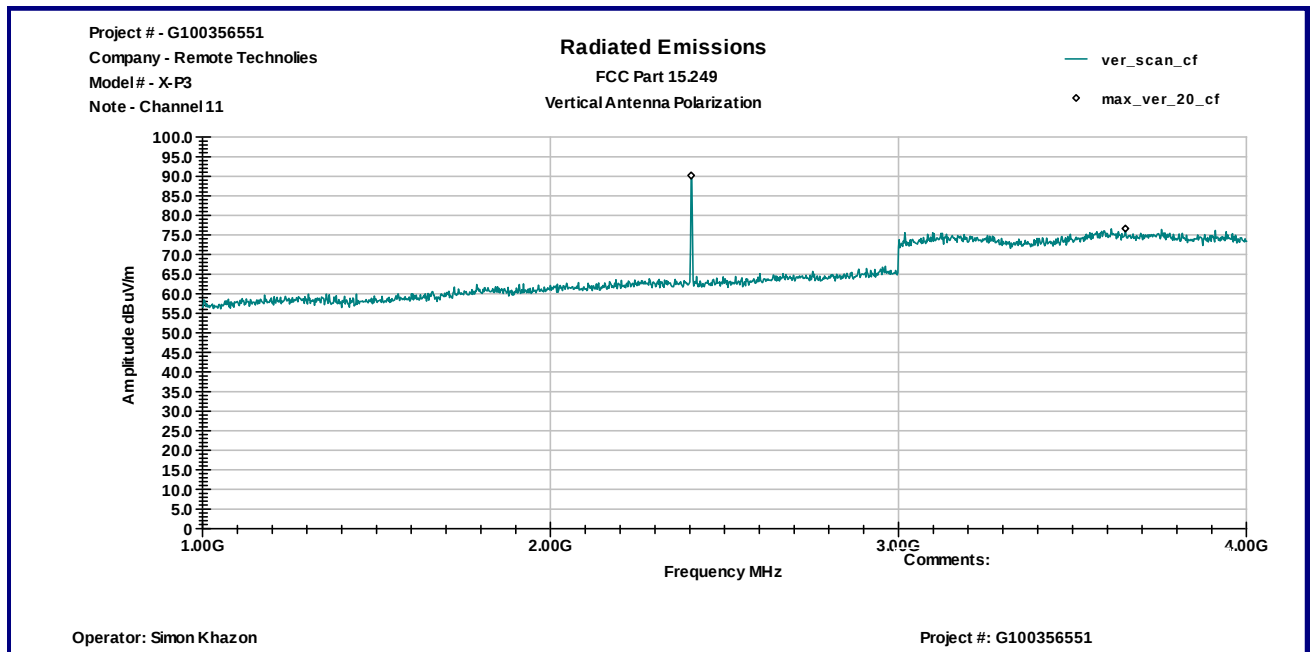
Graph 3.1.2



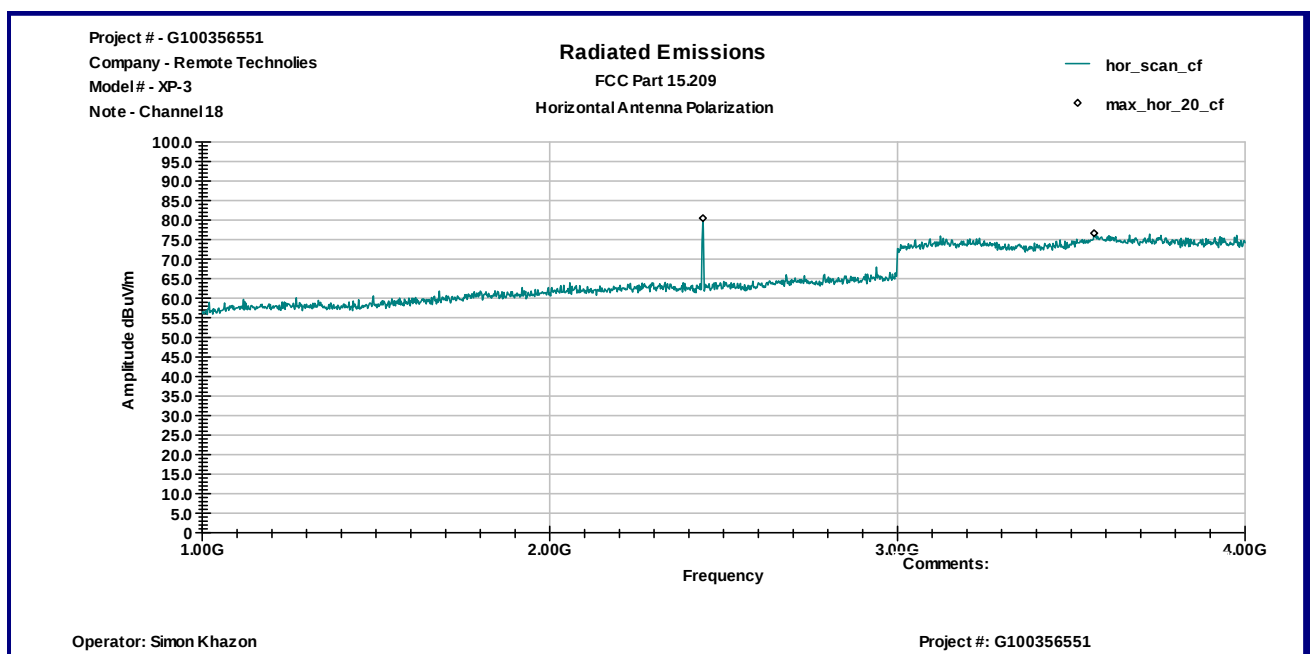
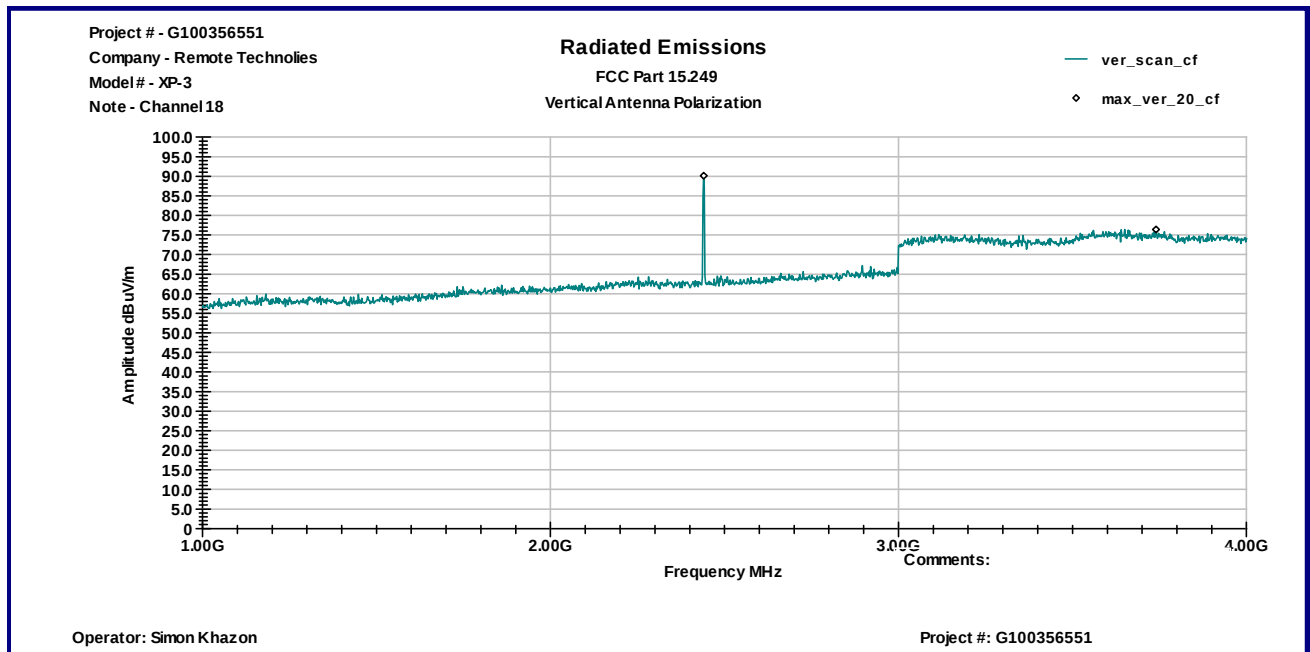
Graph 3.1.3



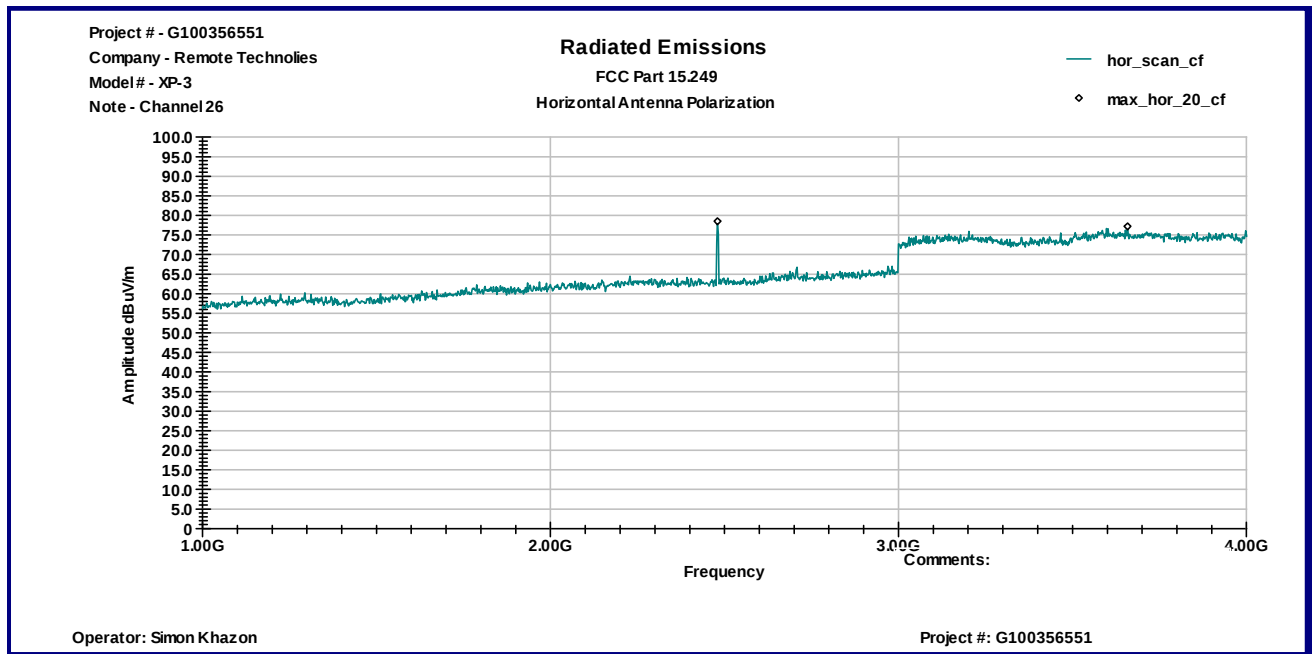
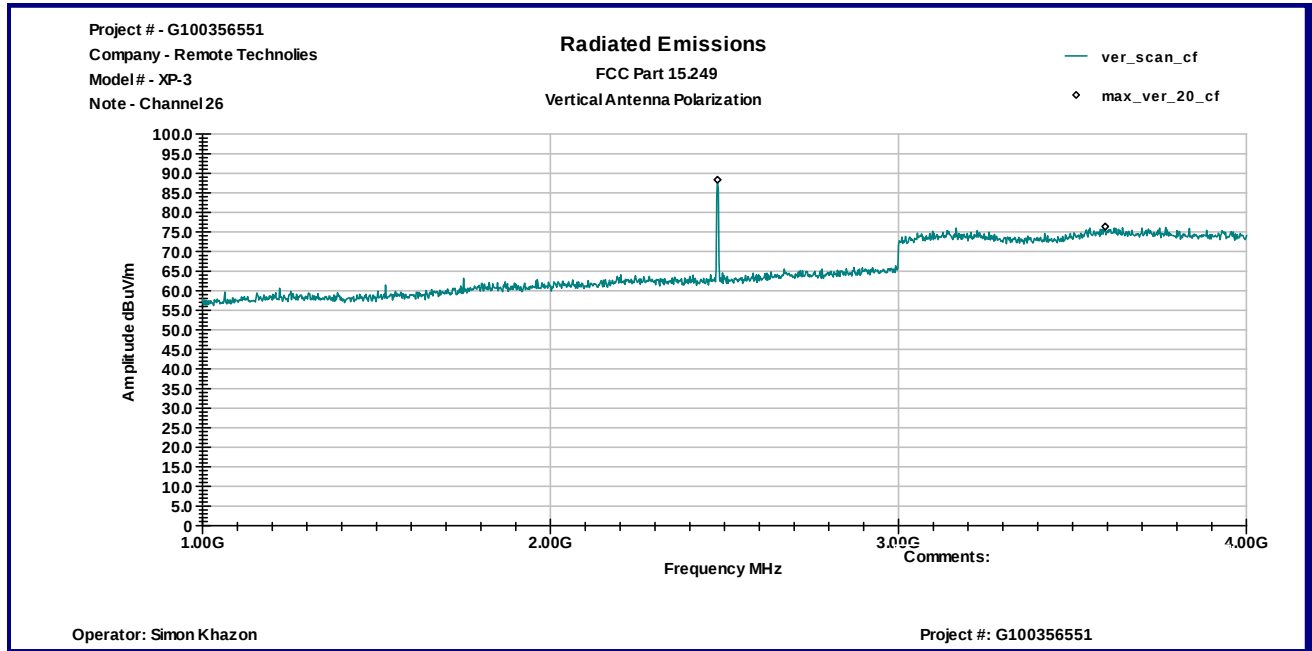
Graph 3.1.4



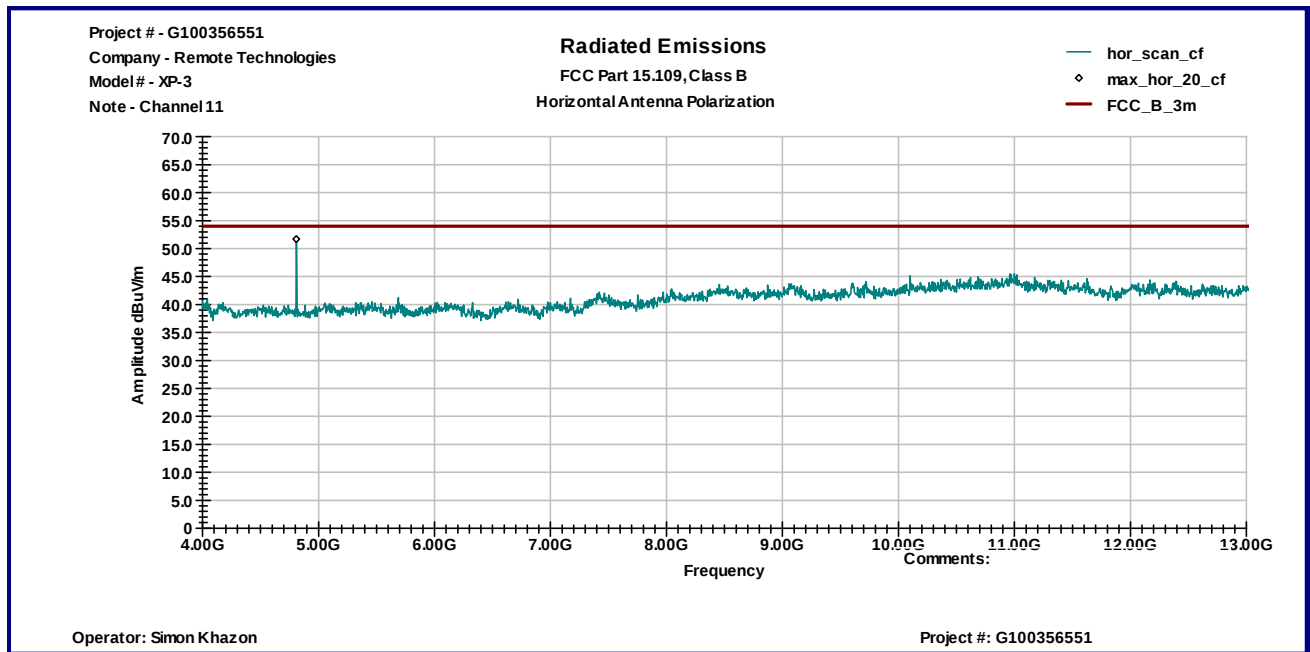
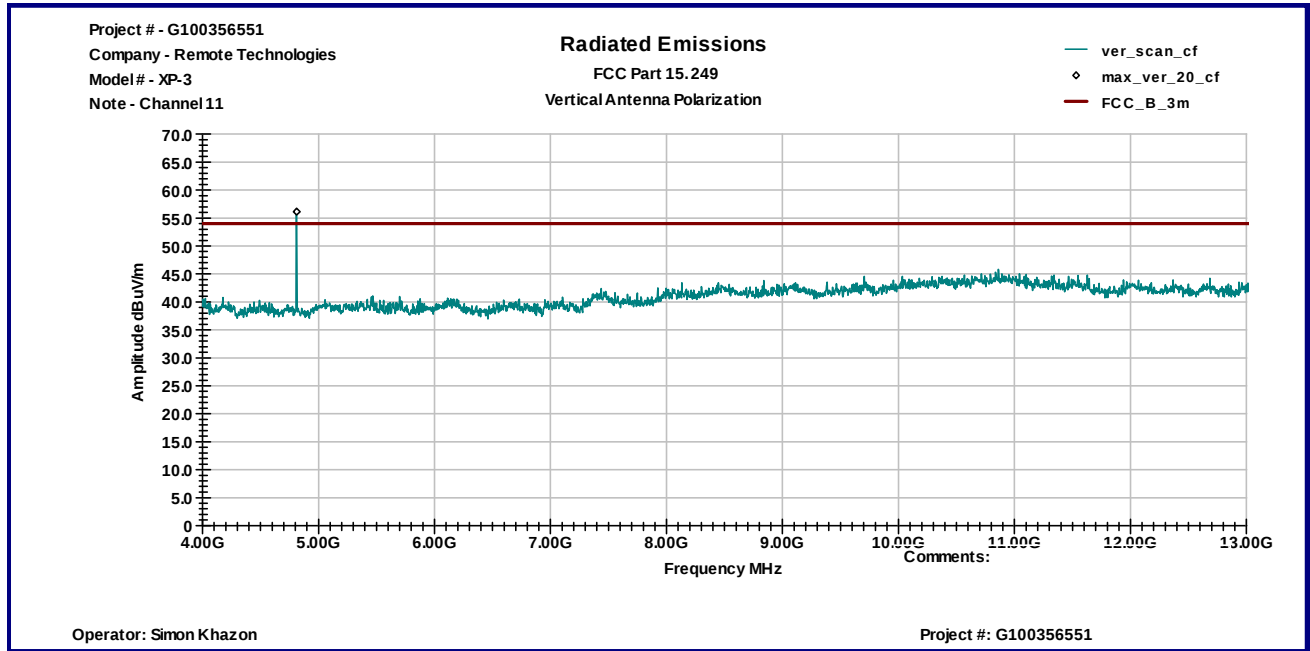
Graph 3.1.5



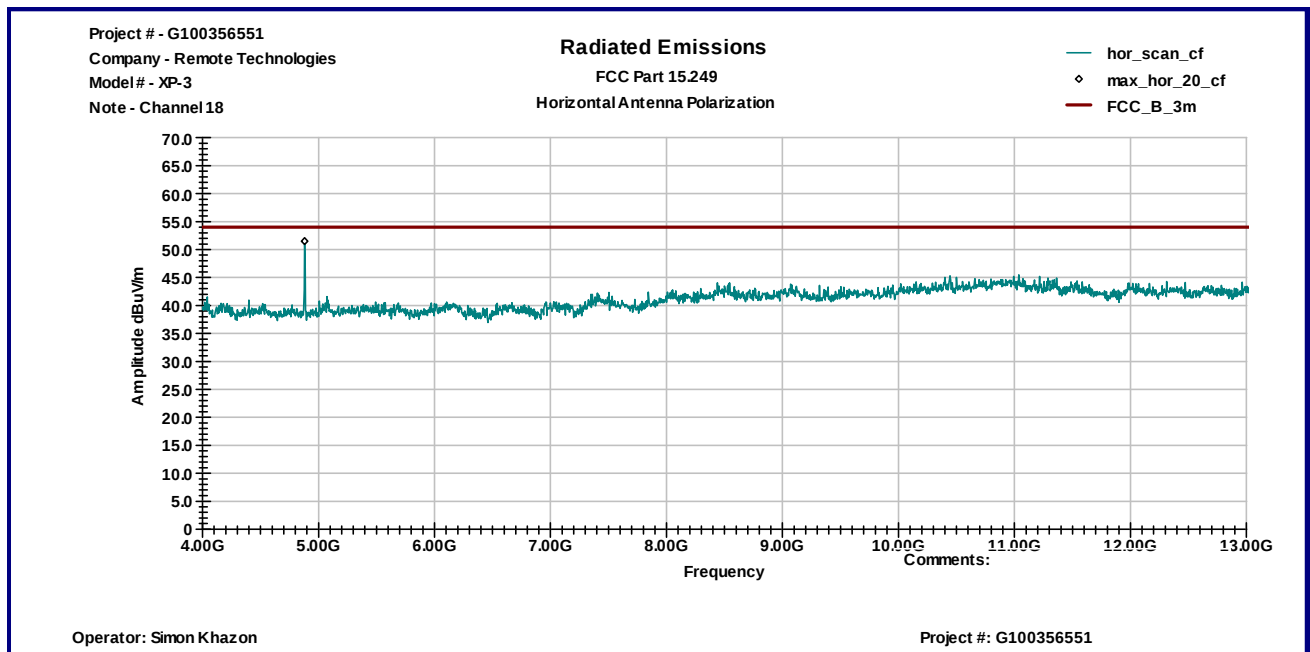
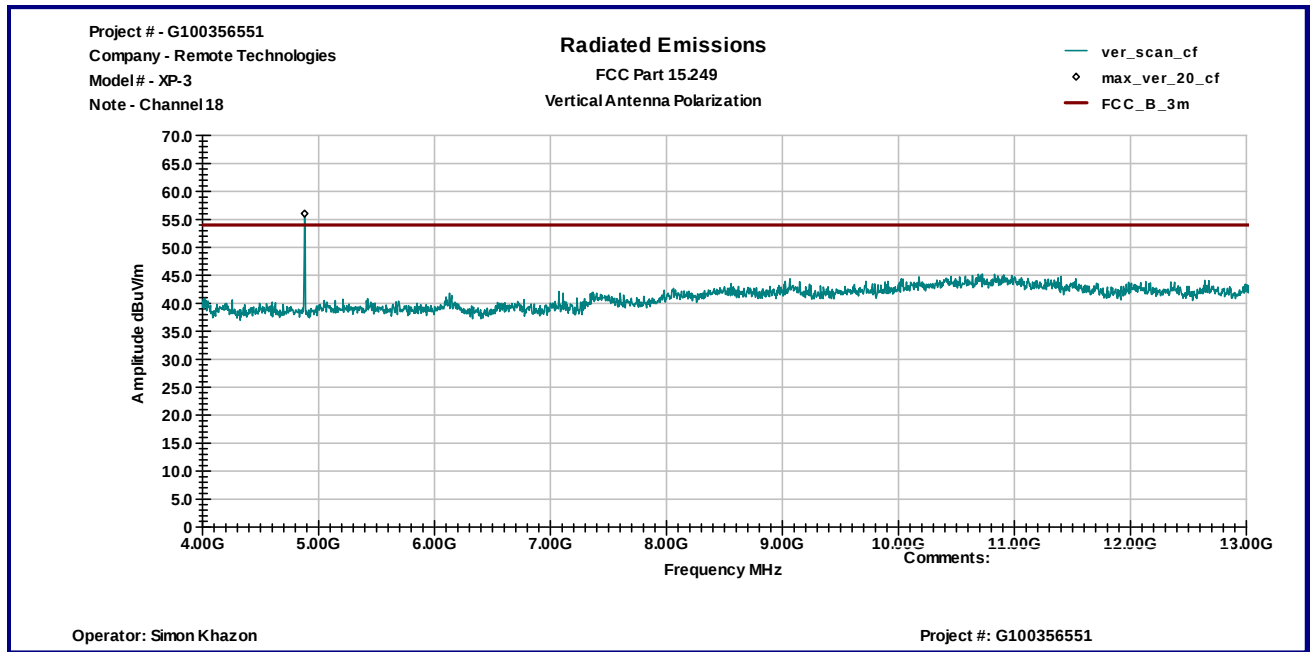
Graph 3.1.6



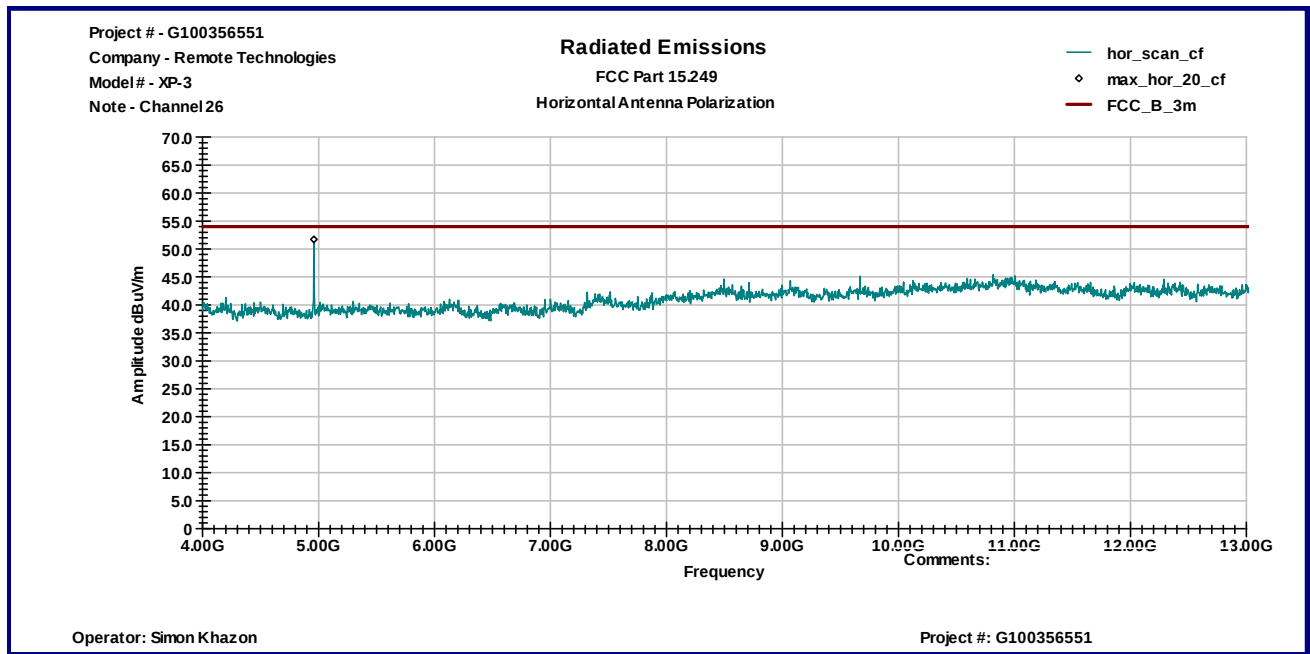
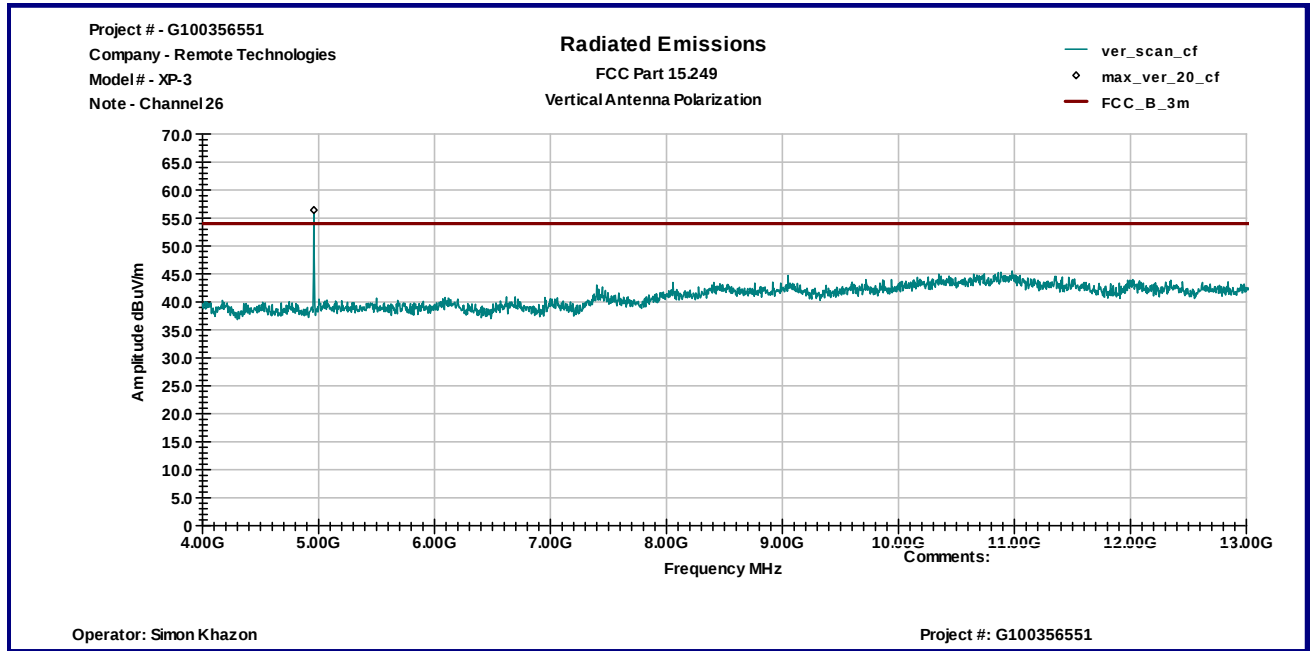
Graph 3.1.7



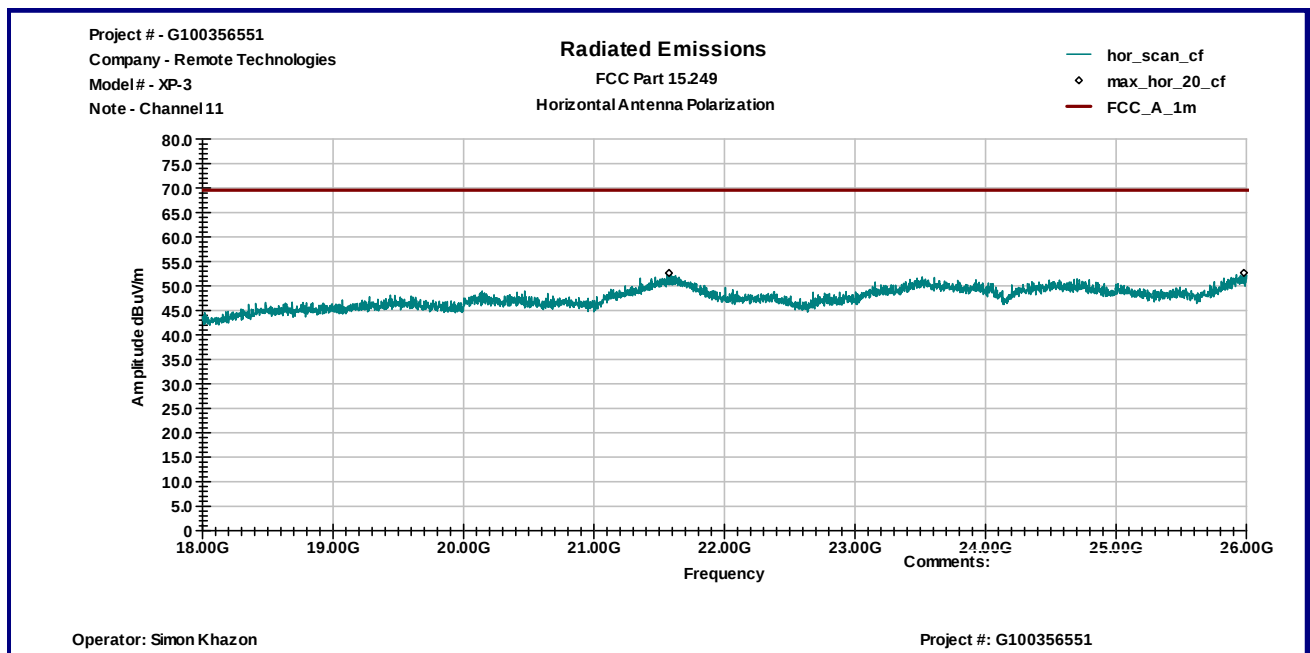
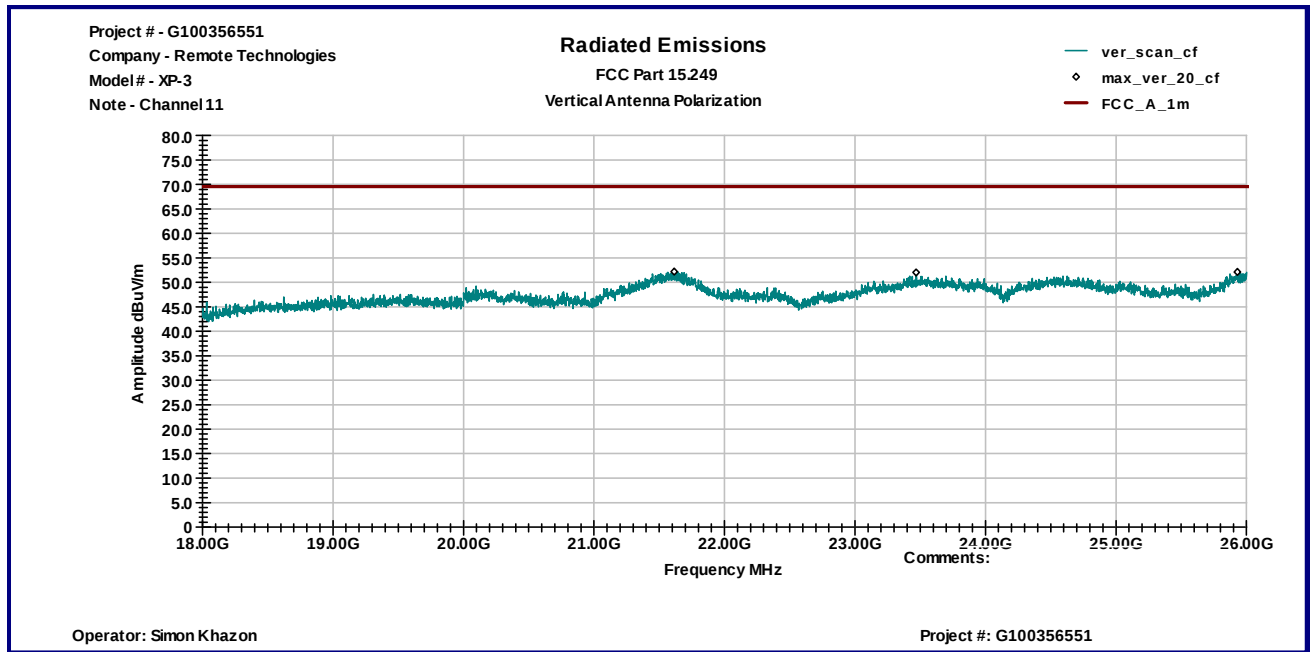
Graph 3.1.8



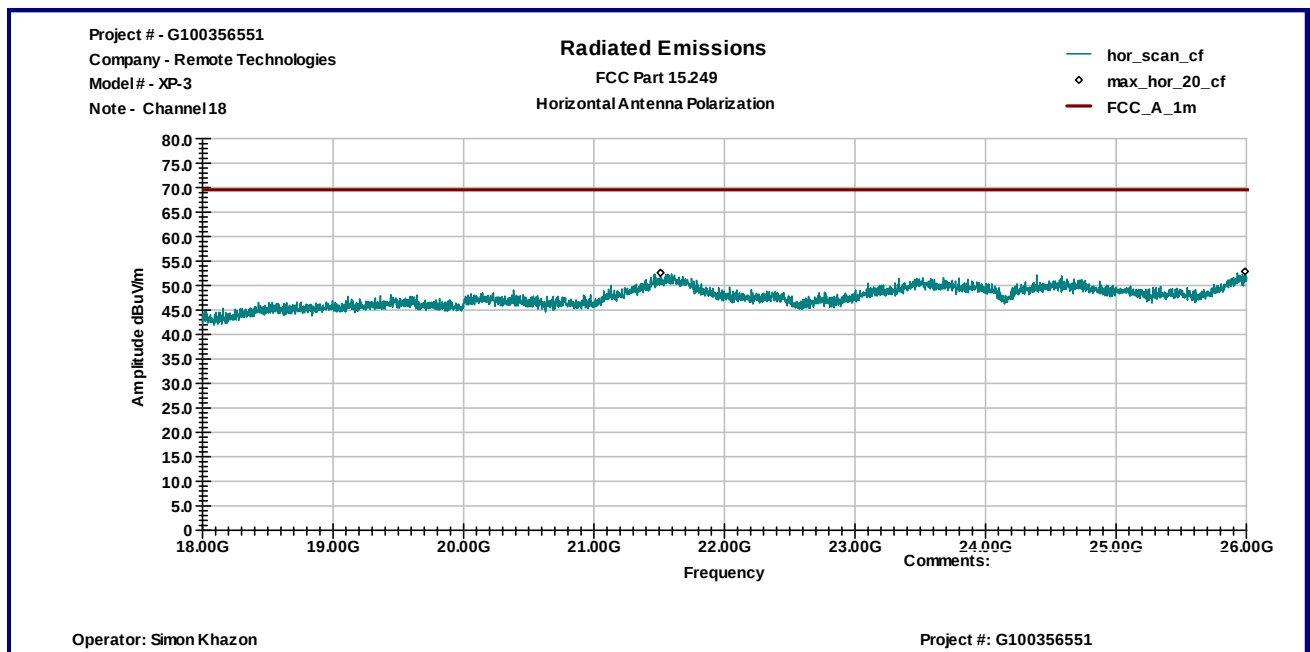
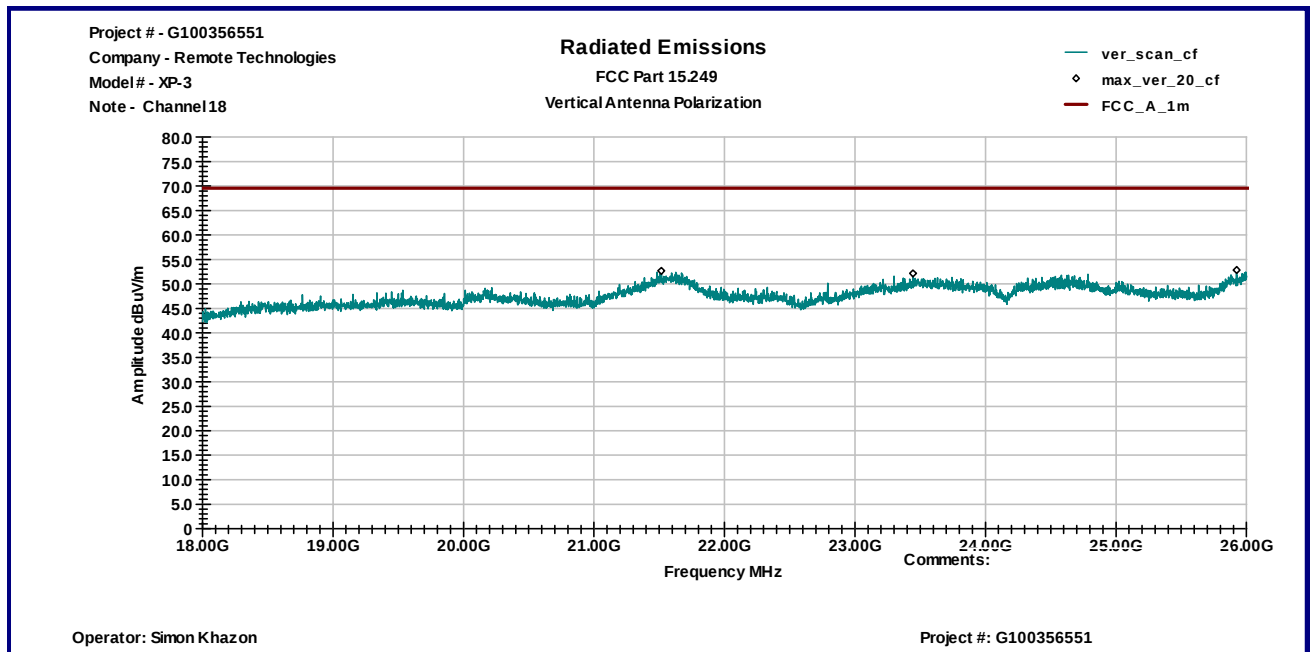
Graph 3.1.9



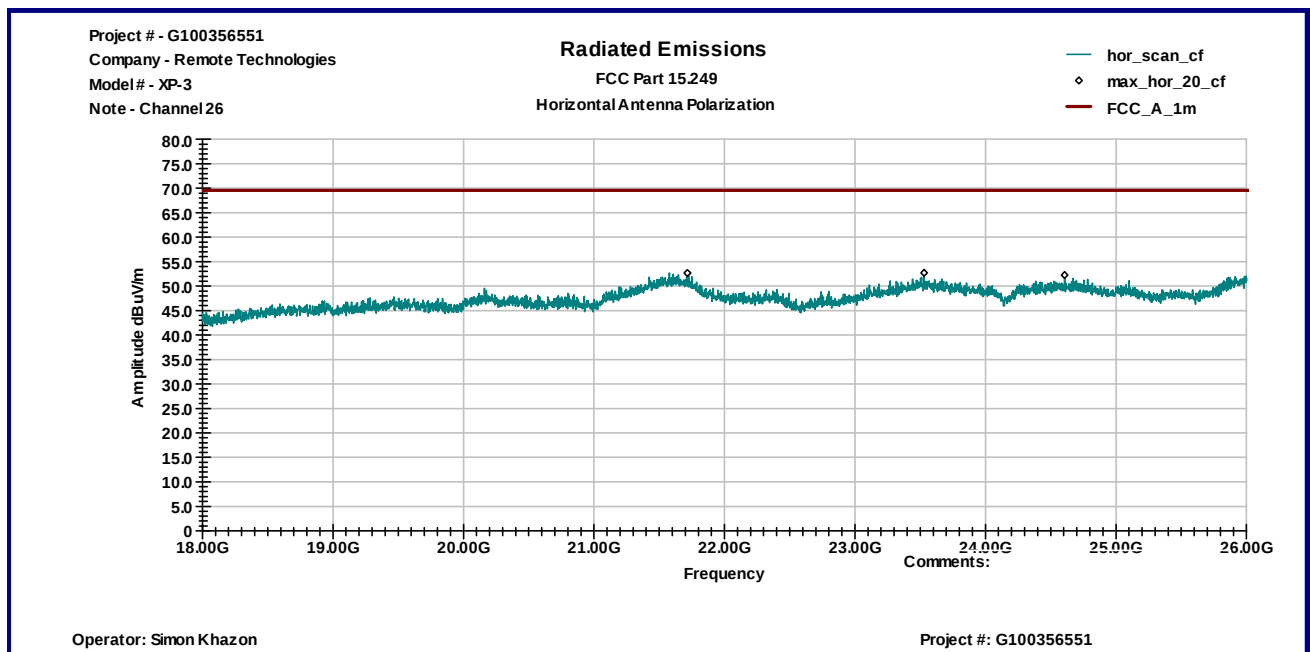
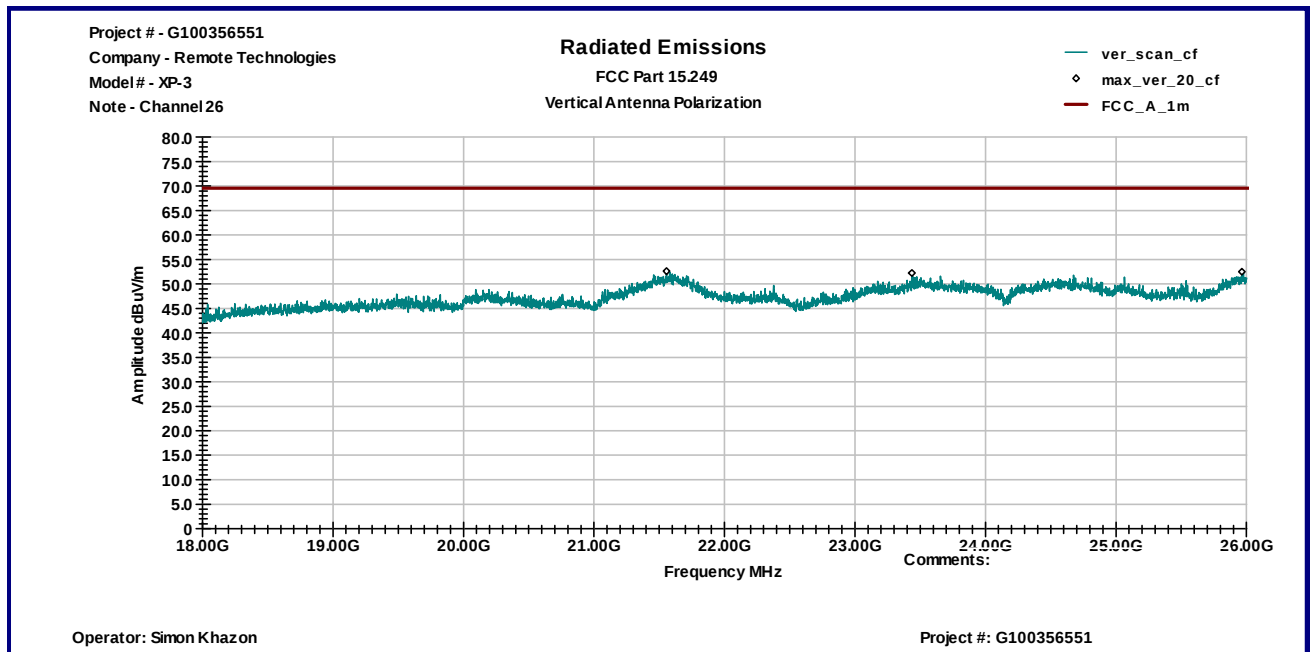
Graph 3.1.10



Graph 3.1.11



Graph 3.1.12



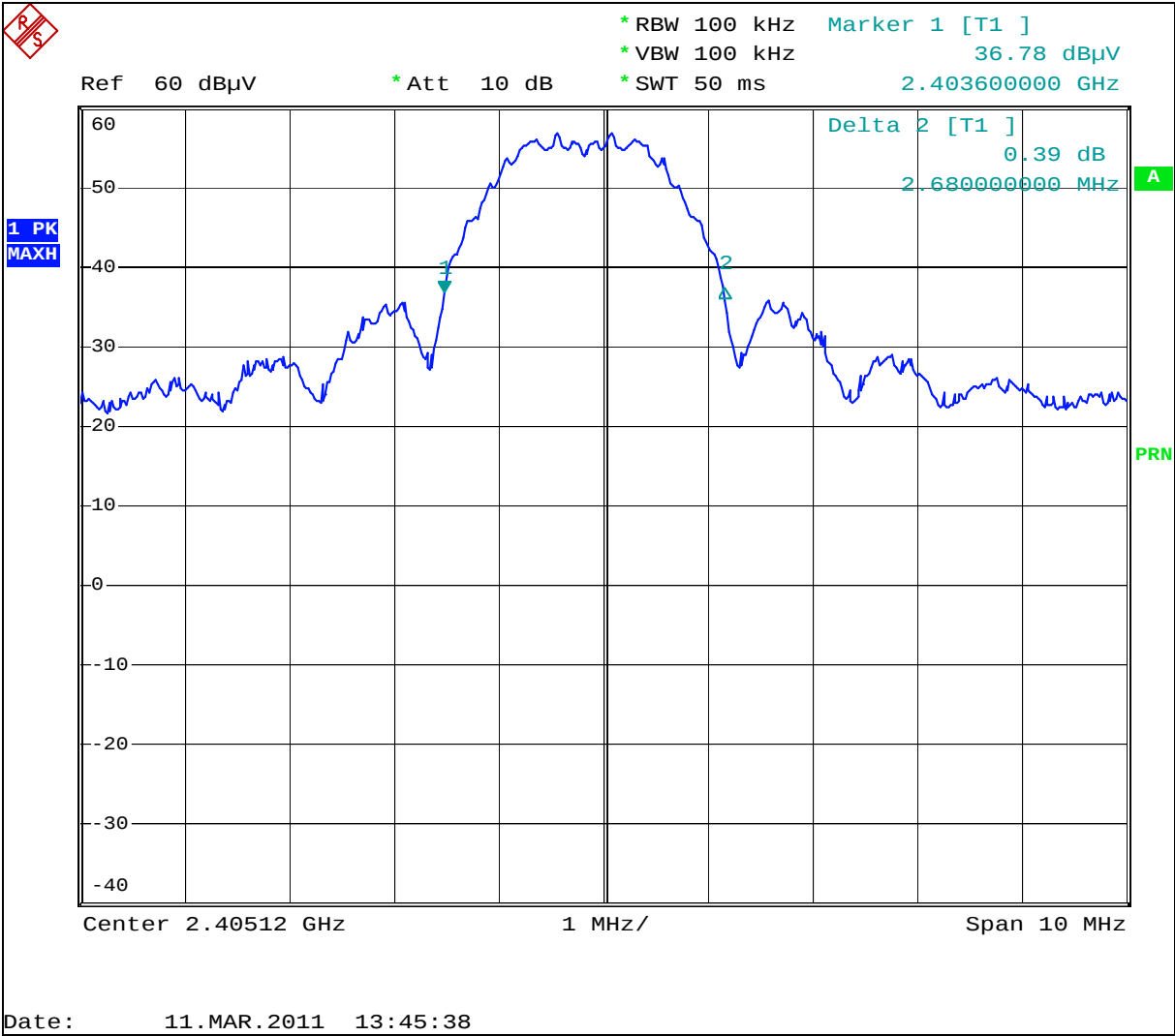
3.2 Bandwidth of Emissions

Center Frequency of operation MHz	Measured 20dB bandwidth MHz	Measured 99% bandwidth MHz
2405	2.680	2.680
2440	2.640	2.600
2479	2.660	3.360

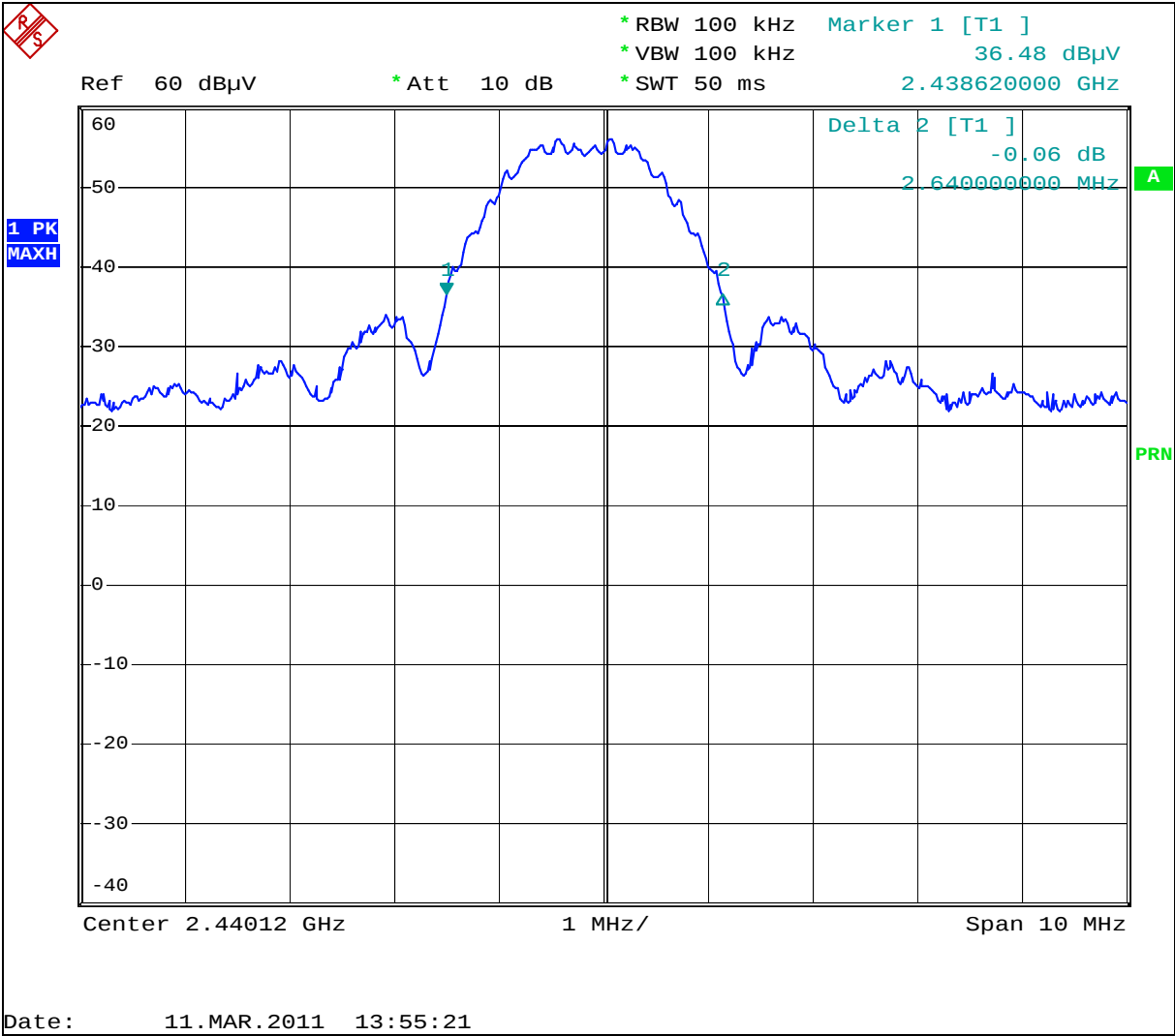
Graphs from 3-2-1 to 3-2-6 are show bandwidth of emissions

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

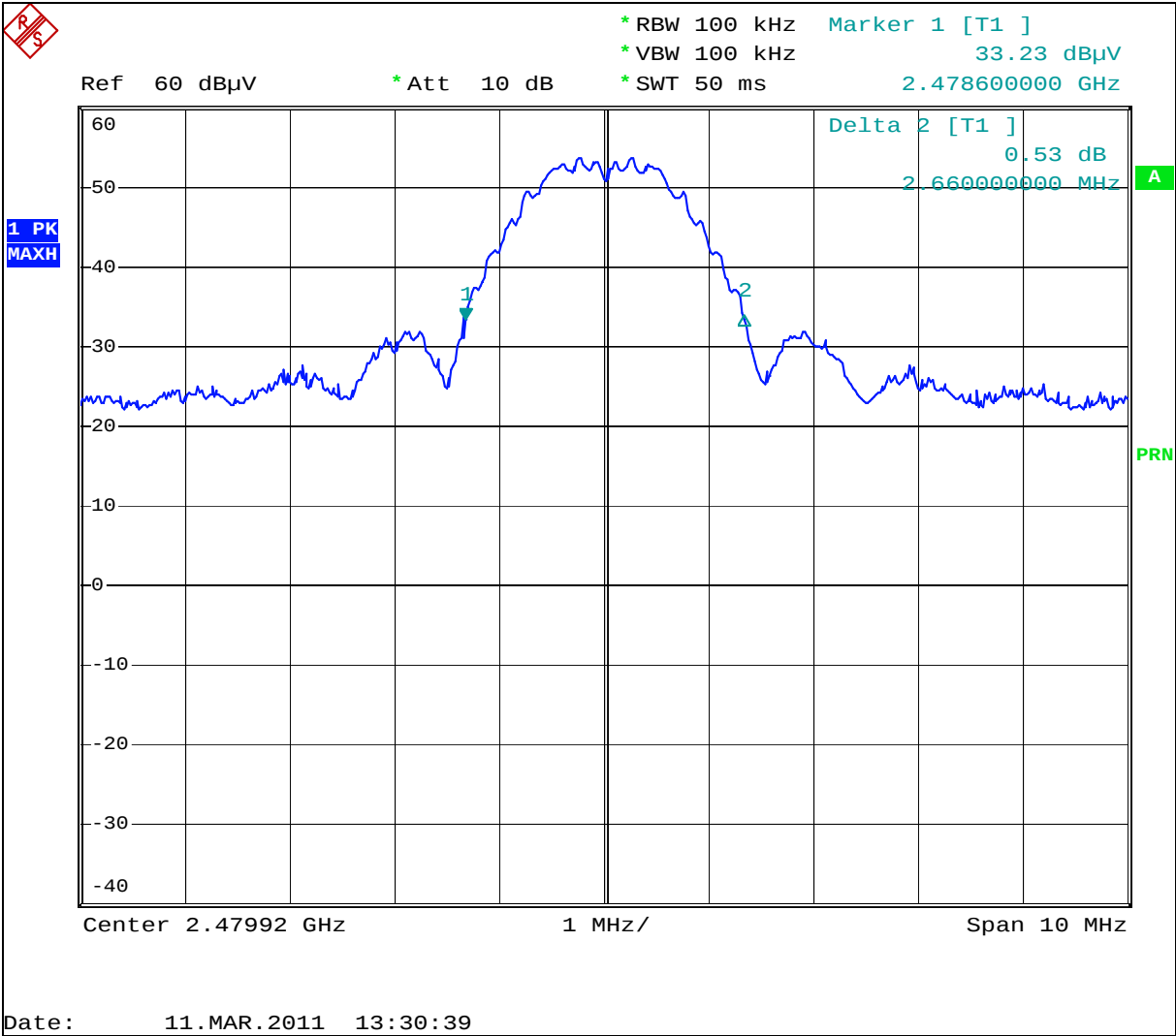
Graph 3.2.1



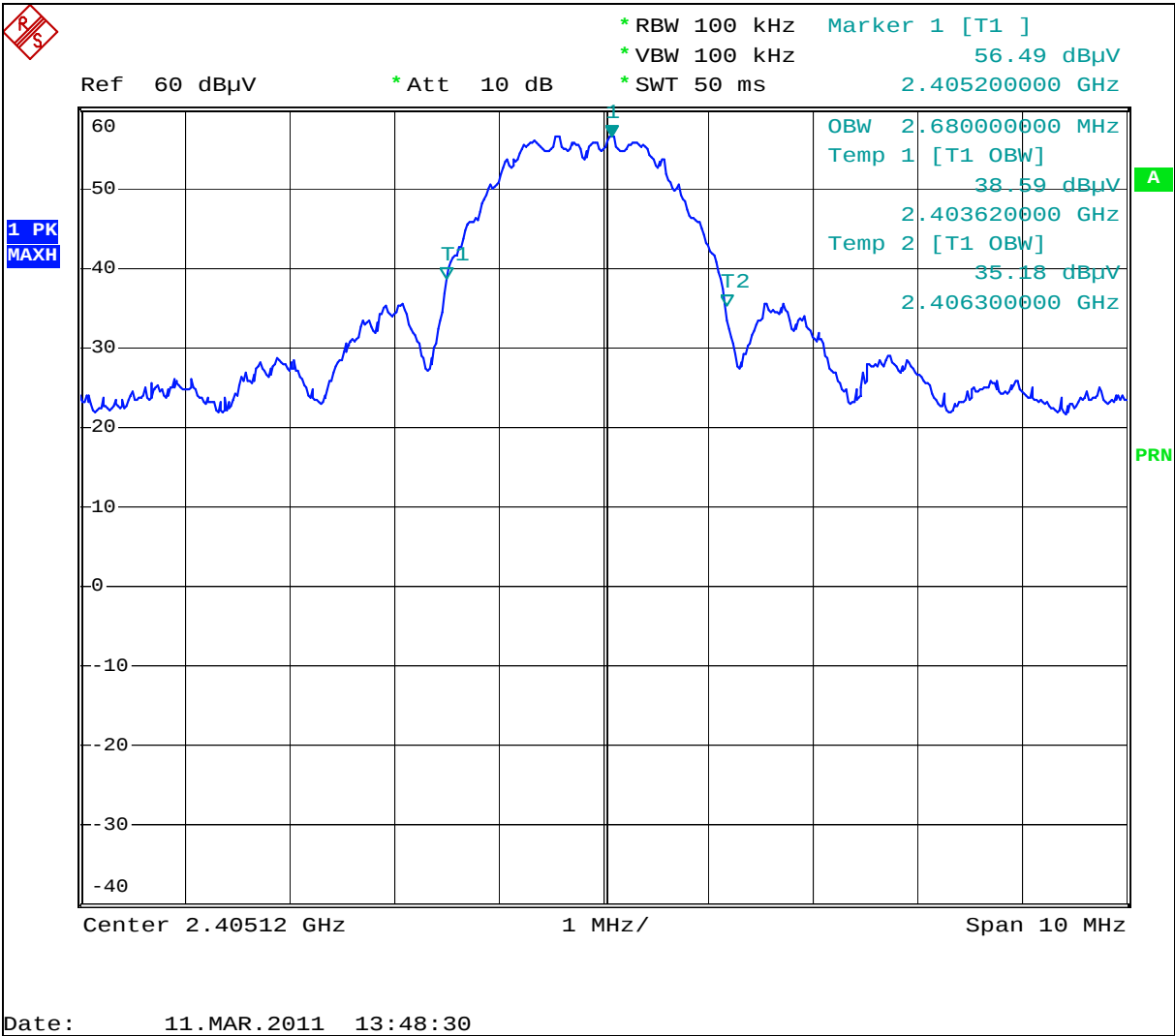
Graph 3.2.2



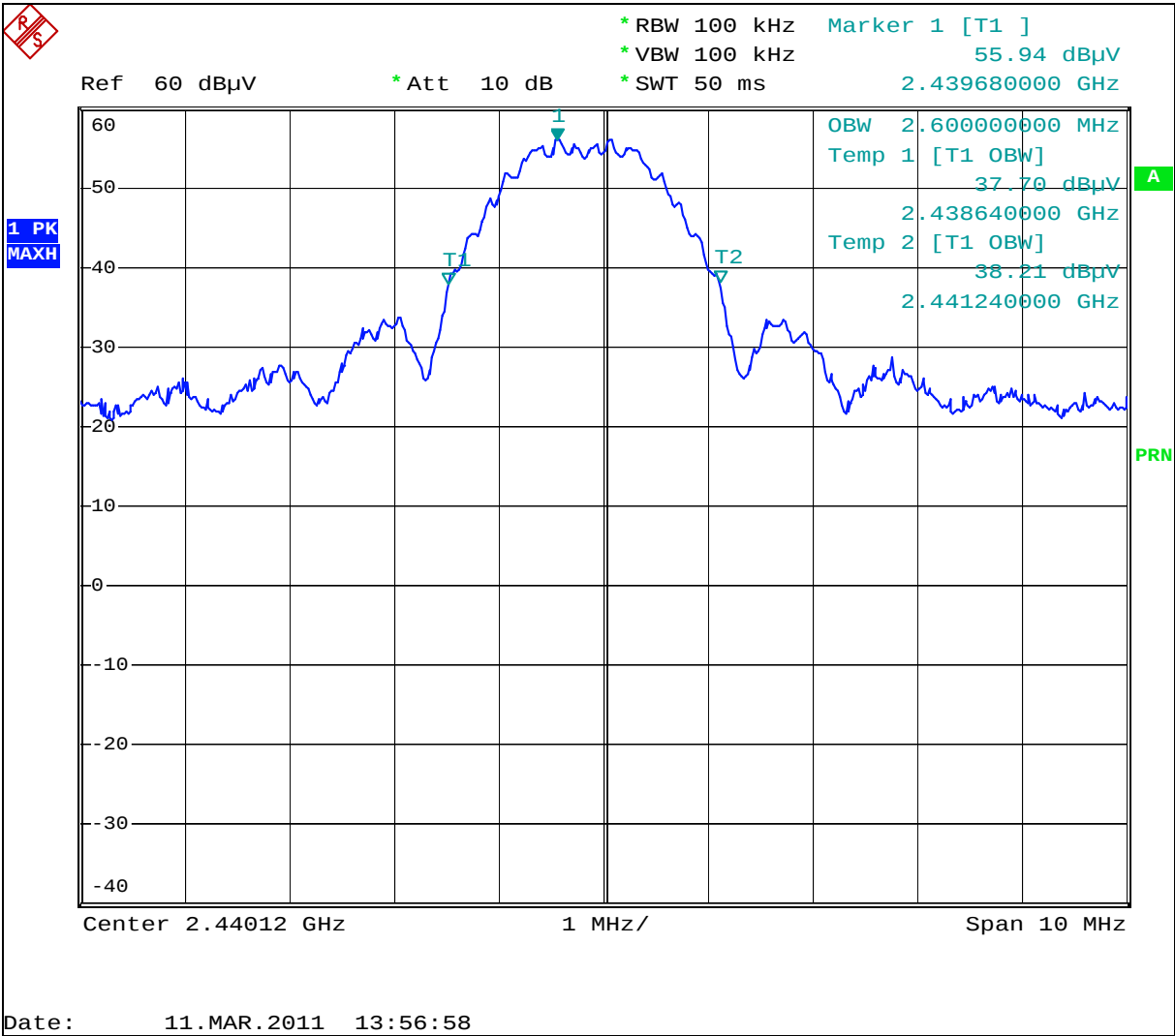
Graph 3.2.3



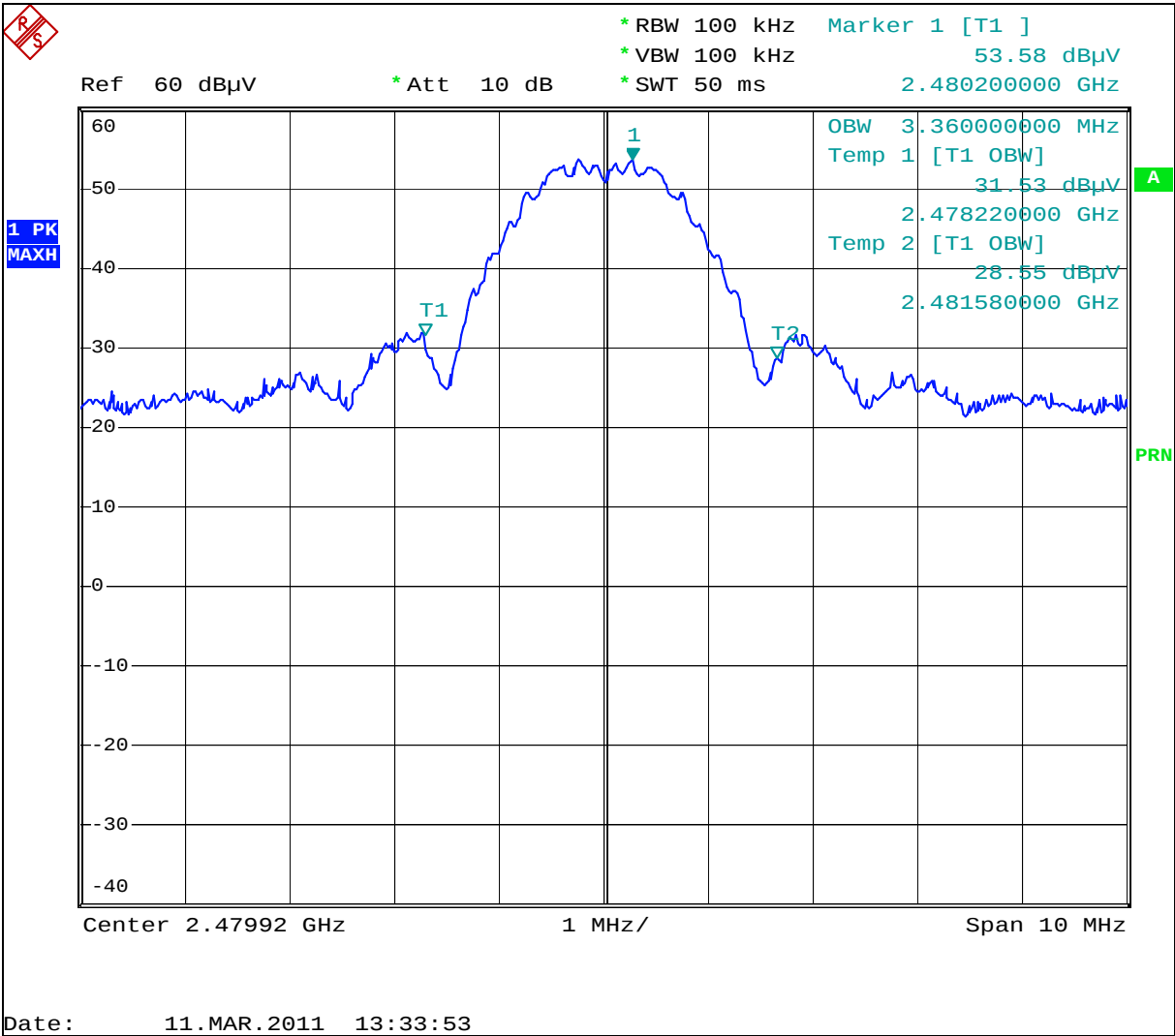
Graph 3.2.4



Graph 3.2.5



Graph 3.2.6





3.3 Transmitter power line conducted emissions

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test result: **Pass**

Frequency range: 0.15MHz-30MHz

Max. Emissions margin: 2.6 dB below the limits

Notes: None

Date:	March 10, 2011	Result: Pass
Standard:	FCC 15.207	
Tested by:	Simon Khazon	
Test Point:	Power Line	
Operation mode:	See Page 5	
Note:	None	

Table 3.3.1

Line 1

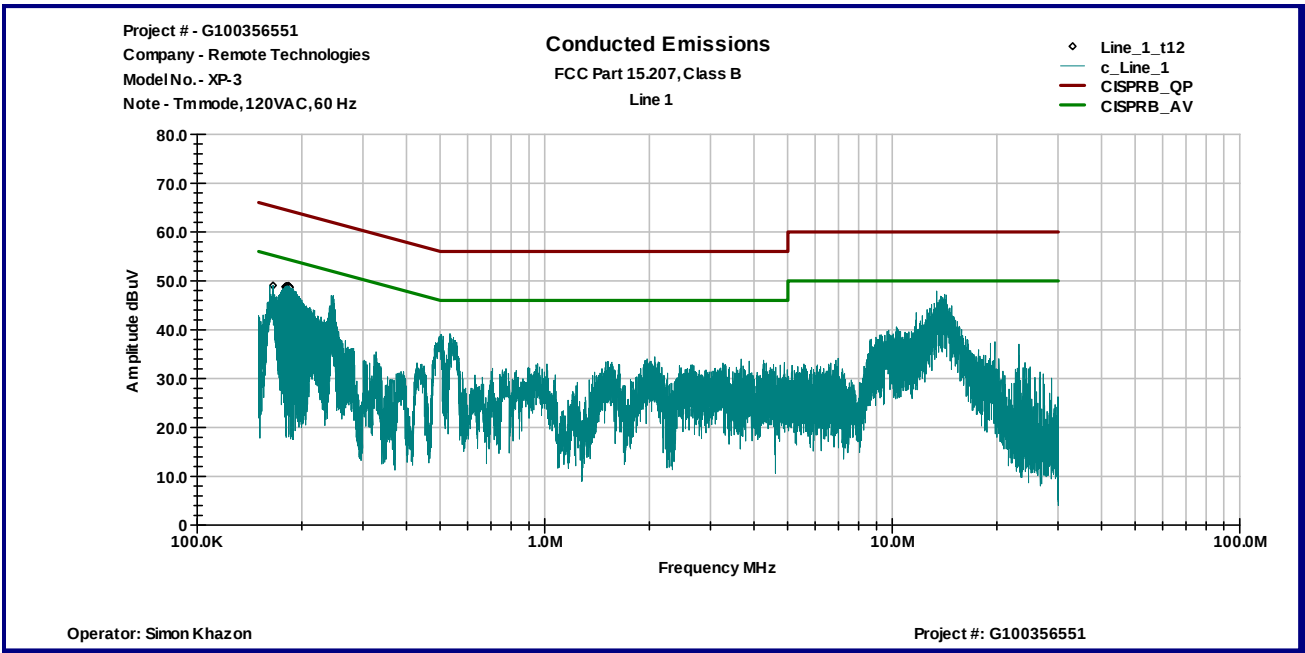
Frequency	Peak dB μ V	QP Limit dB μ V	AVG Limit dB μ V	QP Margin dB	AVG Margin dB
165.22 KHz	49.0	65.2	55.2	-16.2	-6.2
180.45 KHz	48.9	64.5	54.5	-15.6	-5.6
182.0 KHz	48.8	64.4	54.4	-15.6	-5.6
183.32 KHz	48.9	64.3	54.3	-15.4	-5.4
184.33 KHz	48.8	64.3	54.3	-15.5	-5.5
184.57 KHz	48.6	64.3	54.3	-15.7	-5.7

Line 2

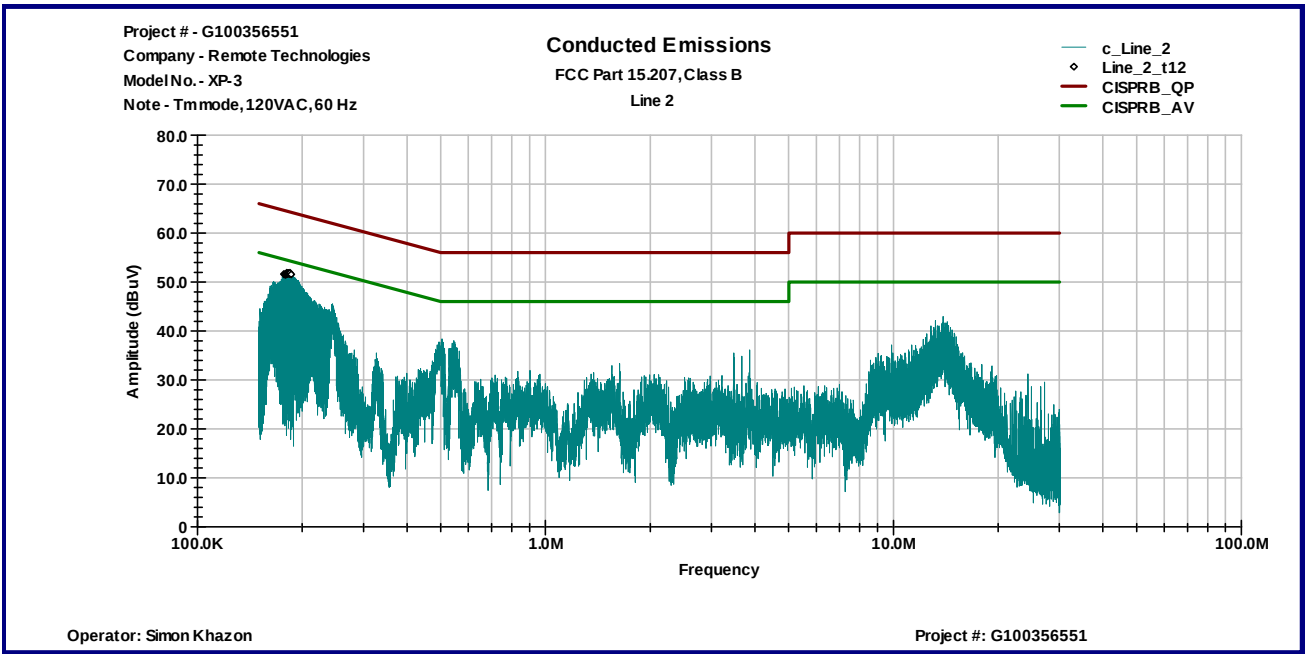
Frequency	Peak dB μ V	QP Limit dBmV	AVG Limit dBmV	QP Margin dB	AVG Margin dB
177.26 KHz	51.6	64.6	54.6	-13.0	-3.0
179.21 KHz	51.5	64.5	54.5	-13.0	-3.0
181.15 KHz	51.7	64.4	54.4	-12.8	-2.8
182.47 KHz	51.8	64.4	54.4	-12.6	-2.6
183.79 KHz	51.7	64.3	54.3	-12.6	-2.6
185.73 KHz	51.6	64.2	54.2	-12.7	-2.7

Graph 3.4.1

Line 1



Line 2





3.4 Receiver/digital device radiated emissions

Test location: ☐ OATS ☒ Anechoic Chamber

Test distance: ☐ 10 meters ☒ 3 meters

Test result: **Pass**

Frequency range: 30MHz-1300MHz

Max. Emissions margin: 6.1dB below the limits

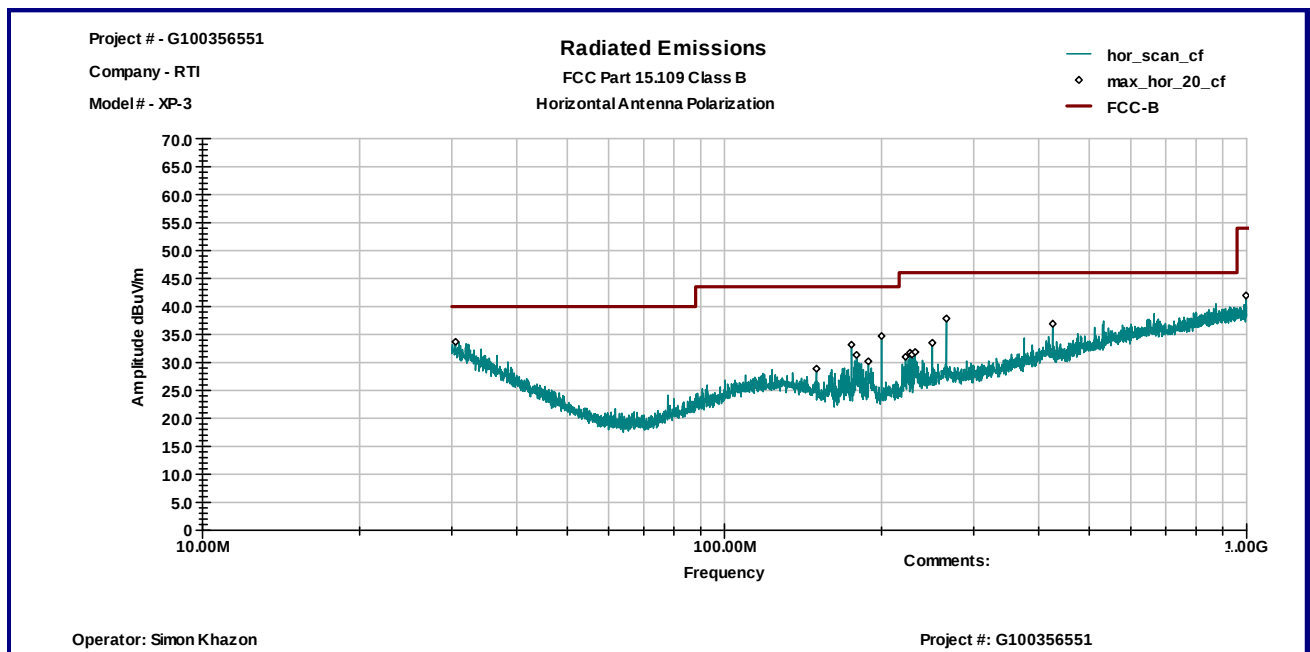
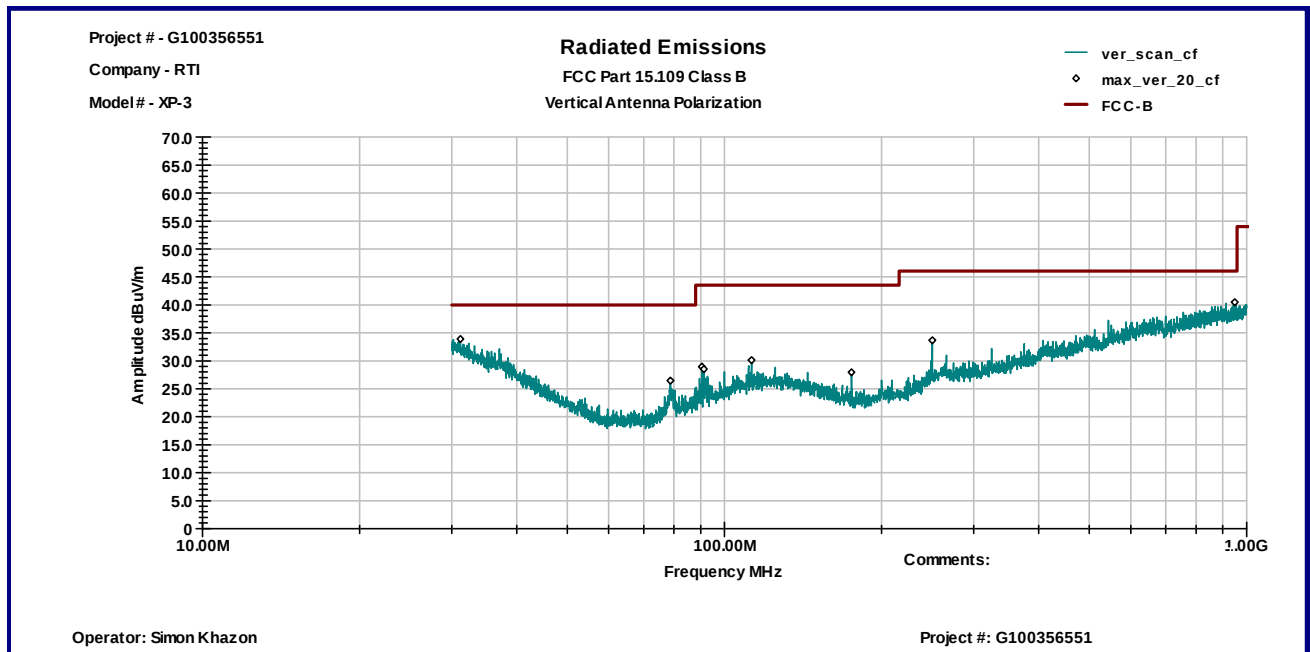
Notes: The Radiated Emissions test was performed in the Anechoic chamber at 3m measurement distance (see Tables 3.4.1, 3.4.2 and Graphs 3.4.1 to 3.4.2)

Date:	March 10, 2011	Result: Pass
Standard:	FCC Part 15.109, Class B	
Tested by:	Simon Khazon	
Test Point:	Enclosure	
Operation mode:	Standby mode/Receiver mode	
Note:	No emissions were detected above 1GHz	

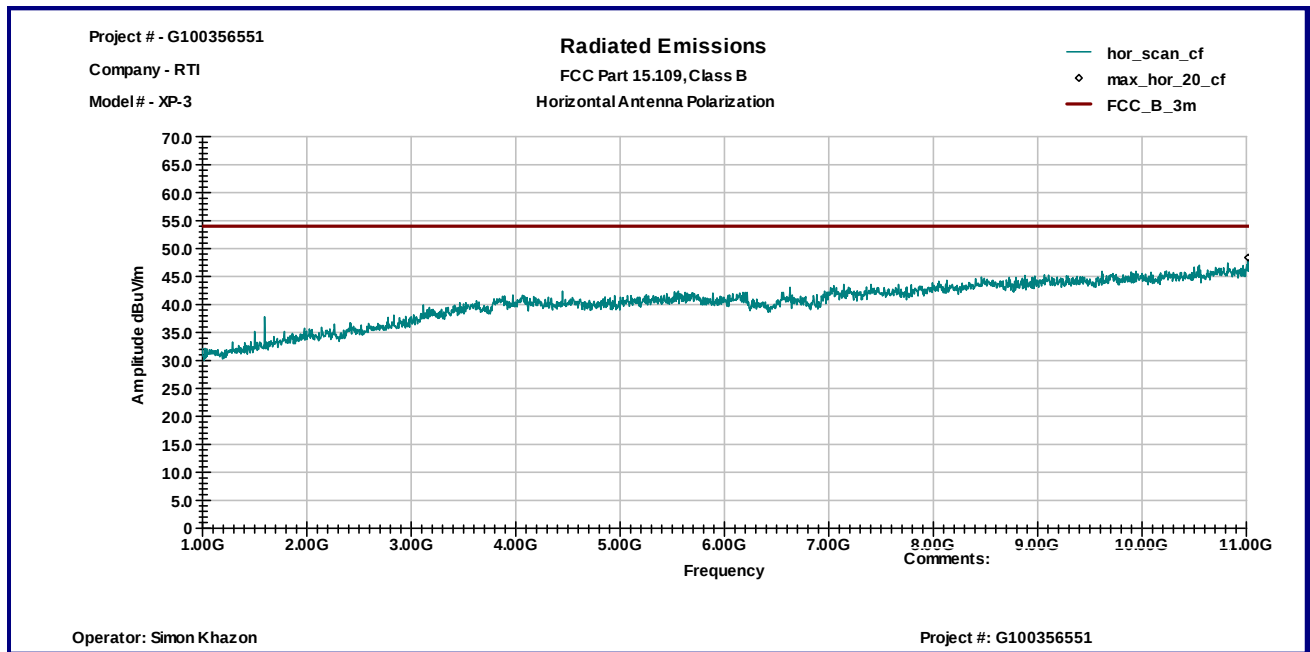
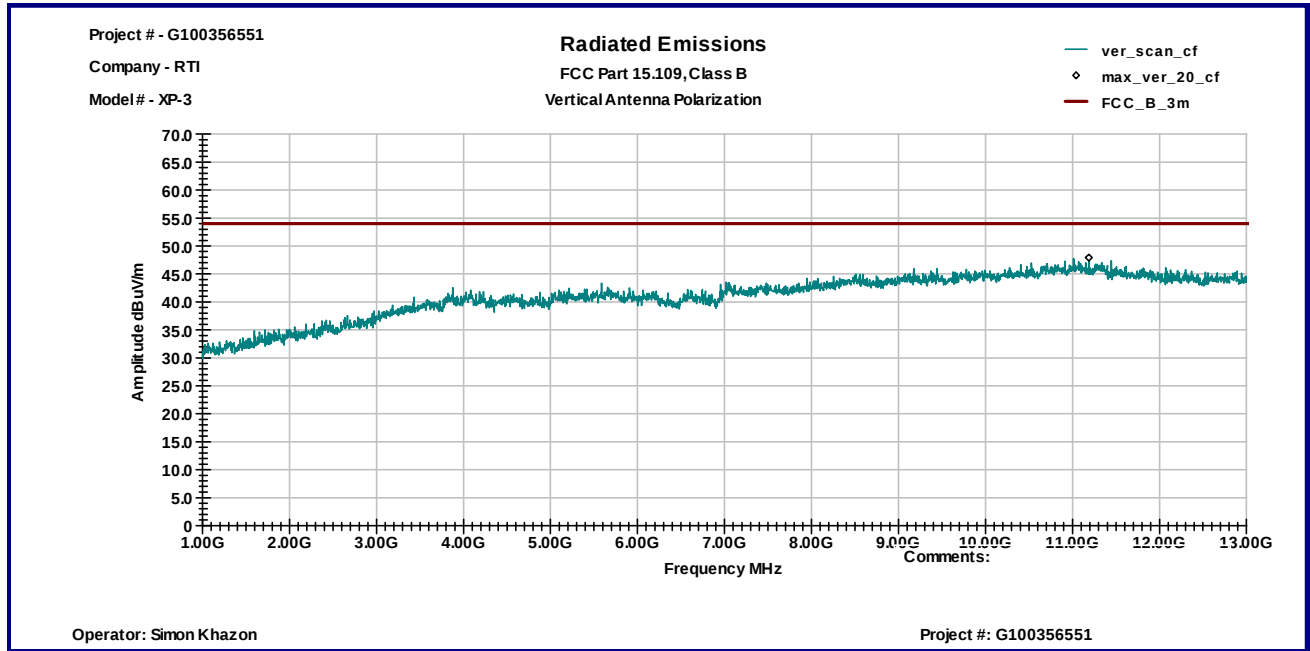
Table 3.4.1

Frequency	Ant. Polarity	Peak Reading dB μ V	Ant.Factor dB1/m	Total at 3m dB μ V/m	QP Limit dB μ V/m	Margin dB
31.193 MHz	V	14.2	19.7	33.9	40.0	-6.1
78.794 MHz	V	17.7	8.7	26.5	40.0	-13.6
90.519 MHz	V	18.5	10.5	28.9	40.0	-11.1
91.312 MHz	V	17.9	10.6	28.5	40.0	-11.5
112.64 MHz	V	16.4	13.8	30.1	40.0	-9.9
175.04 MHz	V	16.6	11.3	27.9	40.0	-12.1
250.18 MHz	V	18.8	14.8	33.7	47.0	-13.4
949.23 MHz	V	14.6	25.9	40.5	47.0	-6.5
30.526 MHz	H	13.7	20.0	33.7	40.0	-6.3
150.03 MHz	H	16.2	12.7	28.9	40.0	-11.1
175.04 MHz	H	21.9	11.3	33.2	40.0	-6.9
178.95 MHz	H	20.2	11.2	31.3	40.0	-8.7
188.59 MHz	H	18.9	11.3	30.2	40.0	-9.8
199.92 MHz	H	22.8	11.9	34.7	40.0	-5.3
222.28 MHz	H	18.9	12.1	31.0	40.0	-9.0
226.71 MHz	H	19.4	12.3	31.7	40.0	-8.3
228.7 MHz	H	18.7	12.7	31.4	40.0	-8.6
232.02 MHz	H	18.7	13.2	31.9	47.0	-15.2
250.18 MHz	H	18.6	14.8	33.5	47.0	-13.5
266.12 MHz	H	21.7	16.2	37.8	47.0	-9.2
425.28 MHz	H	17.3	19.6	36.9	47.0	-10.1
998.03 MHz	H	15.6	26.4	42.0	47.0	-5.0

Graph 3.4.1



Graph 3.4.2





3.5 Digital device conducted emissions

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test result: **Pass**

Frequency range: 0.15MHz-30MHz

Max. Emissions margin: 2.4dB below the limits

Notes: None

Date:	March 11, 2011	Result: Pass
Standard:	FCC 15.107, Class B	
Tested by:	Simon Khazon	
Test Point:	Power Line	
Operation mode:	Standby mode	
Note:	None	

Table 3.5.1

Line 1

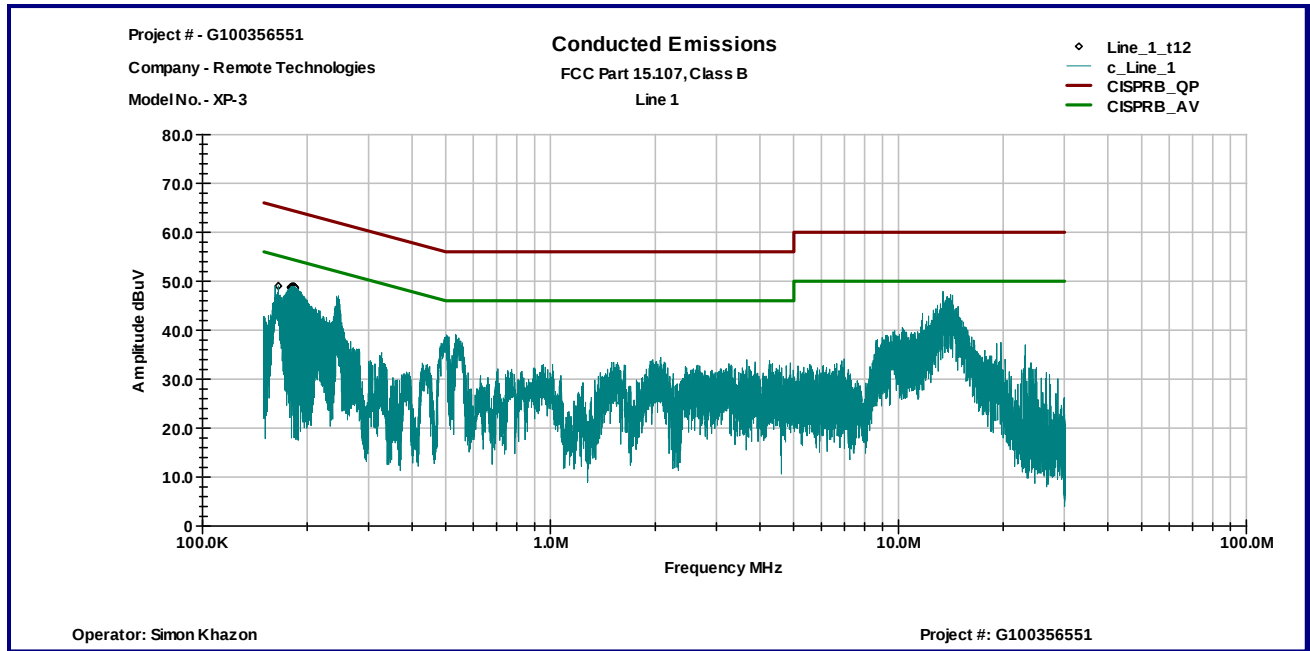
Frequency	Peak dBμV	QP Limit dBμV	AVG Limit dBμV	QP Margin dB	AVG Margin dB
165.22 KHz	49.0	65.2	55.2	-16.2	-6.2
179.13 KHz	48.8	64.5	54.5	-15.8	-5.8
179.44 KHz	48.8	64.5	54.5	-15.7	-5.7
180.06 KHz	48.6	64.5	54.5	-15.9	-5.9
180.45 KHz	48.9	64.5	54.5	-15.6	-5.6
180.68 KHz	48.9	64.5	54.5	-15.5	-5.5
181.77 KHz	48.9	64.4	54.4	-15.5	-5.5
182.0 KHz	48.8	64.4	54.4	-15.6	-5.6
183.01 KHz	49.0	64.4	54.4	-15.4	-5.4
183.32 KHz	48.9	64.3	54.3	-15.4	-5.4
184.33 KHz	48.8	64.3	54.3	-15.5	-5.5
184.57 KHz	48.6	64.3	54.3	-15.7	-5.7

Line 2

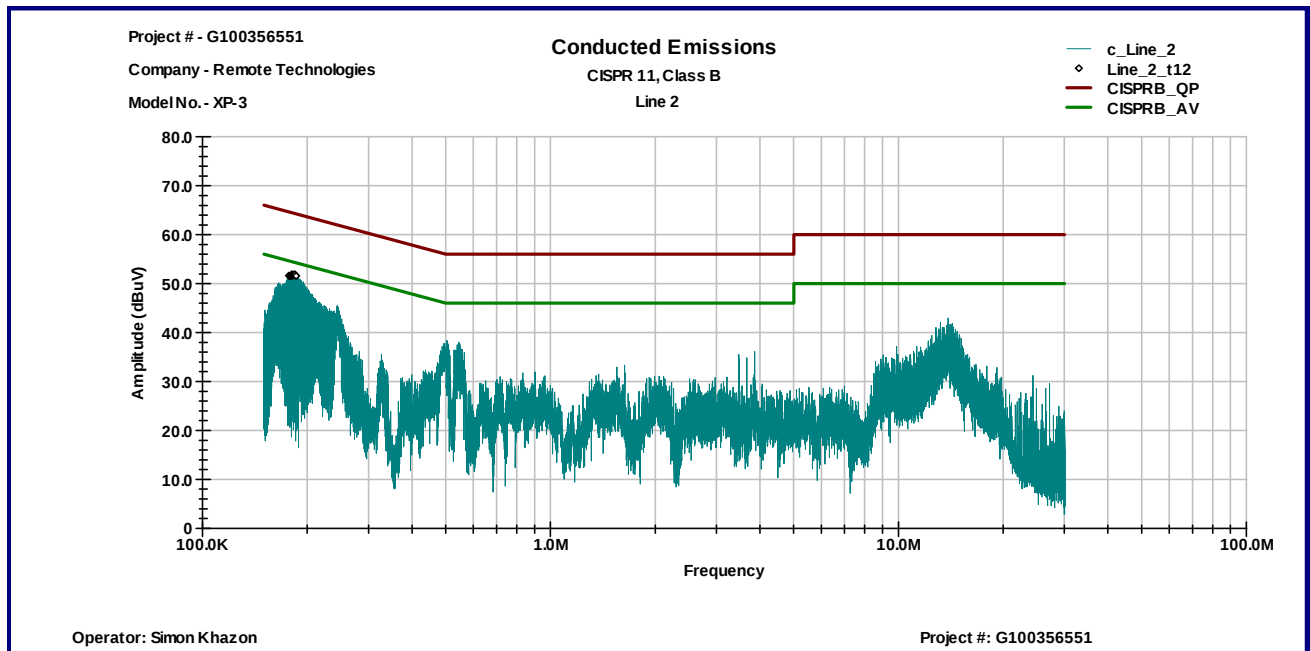
Frequency	Peak dBμV	QP Limit dBmV	AVG Limit dBmV	QP Margin dB	AVG Margin dB
177.26 KHz	51.6	64.6	54.6	-13.0	-3.0
178.59 KHz	51.5	64.6	54.6	-13.0	-3.0
179.21 KHz	51.5	64.5	54.5	-13.0	-3.0
179.83 KHz	51.6	64.5	54.5	-12.9	-2.9
180.53 KHz	51.8	64.5	54.5	-12.6	-2.6
181.15 KHz	51.7	64.4	54.4	-12.8	-2.8
181.85 KHz	51.8	64.4	54.4	-12.6	-2.6
182.47 KHz	51.8	64.4	54.4	-12.6	-2.6
183.17 KHz	51.8	64.3	54.3	-12.6	-2.6
183.79 KHz	51.7	64.3	54.3	-12.6	-2.6
184.41 KHz	51.8	64.3	54.3	-12.4	-2.4
185.73 KHz	51.6	64.2	54.2	-12.7	-2.7

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	FSP 40	100024	12559	12/07/2011	☒
Spectrum Analyzer	R & S	ESCI	100358	12909	07/12/2011	☒
Bicono-Log Antenna	Schaffner-Chase	CBL 6112 B	2468	14459	10/18/2011	☒
Horn Antenna	EMCO	3115	9507-4513	9936	04/13/2011	☒
Horn Antenna	EMCO	3115	6579	15580	04/29/2011	☒
Waveguide Horn Antenna	EMCO	3116	9904-2423	9705	10/04/2011	☒
LISN	Fischer Custom Communications	FCC-LISN-2 MOD.SD	316	9945	03/11/2011	☒
High Pass Filter	Reactel	7HS-4G-S12	0223	015274	VBV	☒
Pre-Amplifier	MITEQ	AMF-5D-00501800-28-13P	1122951	13475	10/06/2011	☒
Pre-Amplifier	MITEQ	AMF-6F-26004000-40-8P	13224444	MIN-0064	10/06/2011	☒
System	TILE! Instrument Control		Ver. 3.4.K.29	15259	VBV	☒

