



TEST REPORT

Report Number: 3177618MIN-007

Project Number: 3177618

Testing performed on the
Secure Scan

FCC ID: PB4ISS-LTOA
Industry Canada ID: 6900A-ISSLTOA

to
47 CFR Part 15. 225:2008
RSS- 210, Issue 7, 2007

For
Imation

Test Performed by:
Intertek Testing Services NA, Inc.
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Oakdale, MN 55128

Test Authorized by:
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Date: April 27, 2009

Reviewed by: Simon Khazon
Simon Khazon

Date: April 27, 2009

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TABLE OF CONTENTS

1.0 GENERAL DESCRIPTION.....3

1.1 Product Description; Test Facility 4

1.3 Environmental conditions..... 5

1.4 Measurement uncertainty 6

1.5 Field Strength Calculation..... 6

2.0 TEST SUMMARY..... 7

3.0 TEST CONDITIONS AND RESULTS..... 8

3.1 Transmitter field strength of emissions..... 8

3.2 Spurious and Out of Band Emissions..... 10

3.3 Bandwidth of Emissions..... 15

3.4 Frequency Tolerance 18

3.5 Transmitter power line conducted emissions 19

3.6 Receiver/digital device radiated emissions..... 22

3.7 Digital device conducted emissions..... 25

4.0 TEST EQUIPMENT.....28

1.0 GENERAL DESCRIPTION

Model:	Secure Scan
Type of EUT:	RF ID Scanner
Serial Number:	N/A
FCC ID:	PB4ISS-LTOA
Industry Canada ID:	6900A-ISSLTOA
Related Submittal(s) Grants:	N/A
Company:	Imation
Customer:	Mr. Bob Jackson
Address:	One Imation Place Oakdale, MN 55128
Phone:	(651) 704-4009
Fax:	(651) 704-6032
Test Standards:	☒ 47 CFR, Part 15:2008, §15.225 ☒ RSS-210, Issue 7, 2007 ☐ RSS-Gen, Issue 2, 2007 ☒ 47 CFR, Part 15:2008, §15.107 and §15.109, Class B ☐ Other
Type of radio:	☒ Stand -alone ☐ Module ☐ Hybrid
Date Sample Submitted:	April 16, 2009
Test Work Started:	April 16, 2009
Test Work Completed:	April 21, 2009
Test Sample Conditions:	☐ Damaged ☐ Poor (Usable) ☒ Good



1.1 Product Description; Test Facility

Product Description:	RFID Scanning Device
Operating Frequency	13.56 MHz
Modulation:	Amplitude (ASK)
Emission Designator:	10K0A1D
Antenna Installation:	☐ User ☒ Professional ☐ Factory
Transmitter power configuration:	☐ Internal battery ☐ External power source ☐ 120VAC ☐ 230VAC ☐ 400VAC ☐ VDC ☒ Other: 5VDC via Host computer Amp. ☐ 50Hz ☐ 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 C63.4-2003

1.2 EUT Configuration

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

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

Operating modes of the EUT:

No.	Description
1	The EUT was programmed to transmit continuously during testing

Cables:

No.	Type	Length	Designation	Note
1	2 Communication Cables	5ft	USB cables	

Support equipment/Services:

No.	Item	Description
1	HP nc6000 laptop PC	Host computer

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

☒ Extreme

- ☐ Temperature: 0 to +35 °C
- ☐ Temperature: -10 to +55 °C
- ☒ Temperature: -20 to +55 °C
- ☒ AC mains: $\pm 10\%$

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).

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

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

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

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

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

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

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

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
15.225(a) / RSS-210 A2.6(a)	Transmitter Field Strength Emission	Pass
15.225(d) / RSS-210 A2.6(b)	Out of Band Spurious Emissions	Pass
15.215 / RSS-210 A1.1.3	Bandwidth of Emission	Pass
15.225(e) / RSS-210 A2.6	Frequency Tolerance	Pass
15.205, 15.209 / RSS-210 A2.(d)	Field Strength Spurious 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 Transmitter field strength at fundamental

Test location: ☒ OATS ☐ Anechoic Chamber ☐ Other

Test distance: ☒ 10 meters ☐ 3 meters

Test result: **Pass**

Max. Emissions margin: 68.3 dB below the limits

Notes: None

Date:	April 17, 2009	Result: Pass
Standard:	FCC 15.225(a) / RSS-210 A2.6(a)	
Tested by:	Uri Spector	
Test Point:	Enclosure	
Operation mode:	See Page 5	
Note:		

Table # 3.1.1

Frequency MHz	Reading dB μ V	E Antenna Factor dB/m	Pre-Amp Gain (dB)	Net at 10m. dB μ V/m	Distance Factor (dB)	Limit dB μ V/m	Margin dB	Antenna pos.
13.559	29.0	34.3	28.5	34.8	19.1	84.0	-68.3	Front
13.559	25.8	34.3	28.5	31.6	19.1	84.0	-71.5	Side



3.2 Spurious and Out of Band Emissions

Test location: ☒ OATS ☒ Anechoic Chamber ☐ Other

Test distance: ☒ 10 meters ☒ 3 meters

Test result: **Pass**

Max. Emissions margin: 5.5dB below the limits

Notes: Pre-scan in frequency range below 30MHz was performed in the Anechoic Chamber at 3m measurement distance (see Graph 3.2.1), final testing was performed in the Open Area Test Site at 10m measurement distance (see Table 3.2.1).
Testing in frequency range from 30MHz to 1GHz was performed in the Anechoic Chamber at 3m measurement distance (see Table 3.2.2 and Graph 3.2.2)

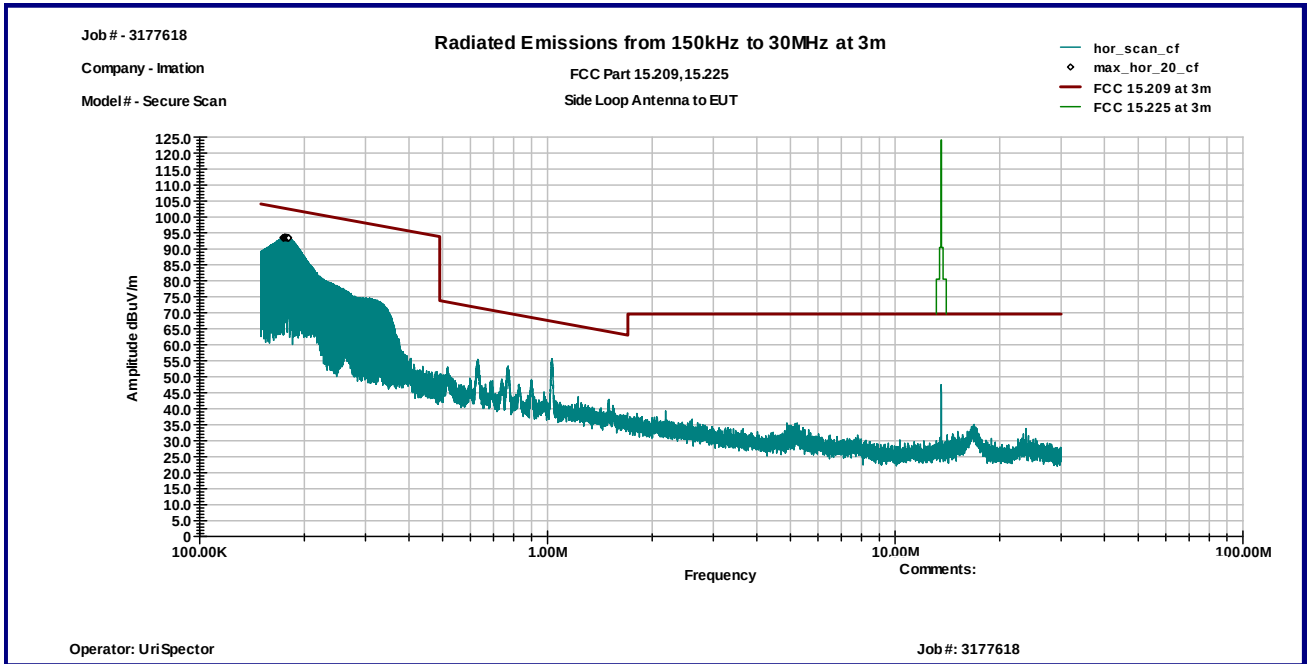
Date:	April 17, 2009	Result: Pass
Standard:	FCC 15.225	
Tested by:	Uri Spector	
Test Point:	Enclosure	
Operation mode:	See Page 5	
Note:		

Table # 3.2.1

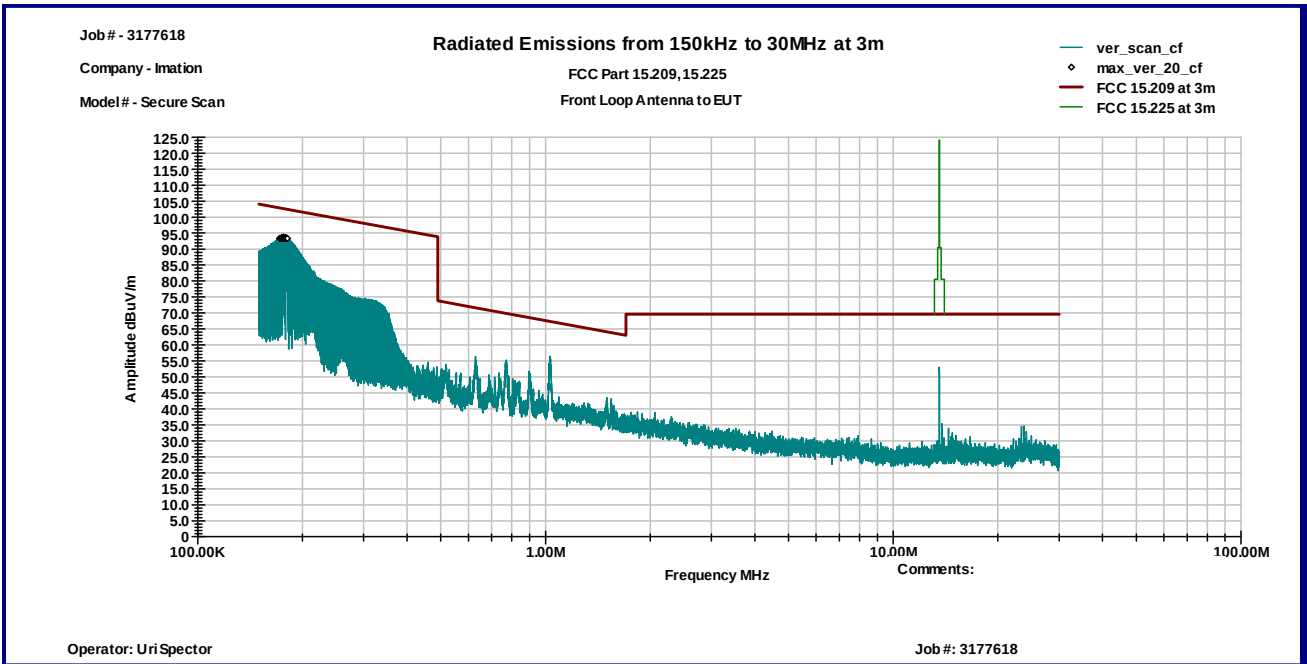
Frequency MHz	Reading dB μ V	E Antenna Factor dB/m	Pre-Amp Gain (dB)	Net at 10m. dB μ V/m	Distance Factor (dB)	Limit dB μ V/m	Margin dB	Antenna pos.
13.553	21.5	34.3	28.4	27.4	19.1	29.5	-21.2	Front
13.567	20.2	34.3	28.4	26.1	19.1	29.5	-22.5	Front
13.553	18.6	34.3	28.4	24.5	19.1	29.5	-24.1	Side
13.567	18.9	34.3	28.4	24.8	19.1	29.5	-23.8	Side
27.118	16.0	34.1	28.4	21.7	19.1	29.5	-26.9	Front
27.118	15.9	34.1	28.4	21.6	19.1	29.5	-27.0	Side

Graph 3.2.1

Side antenna orientation



Front antenna orientation



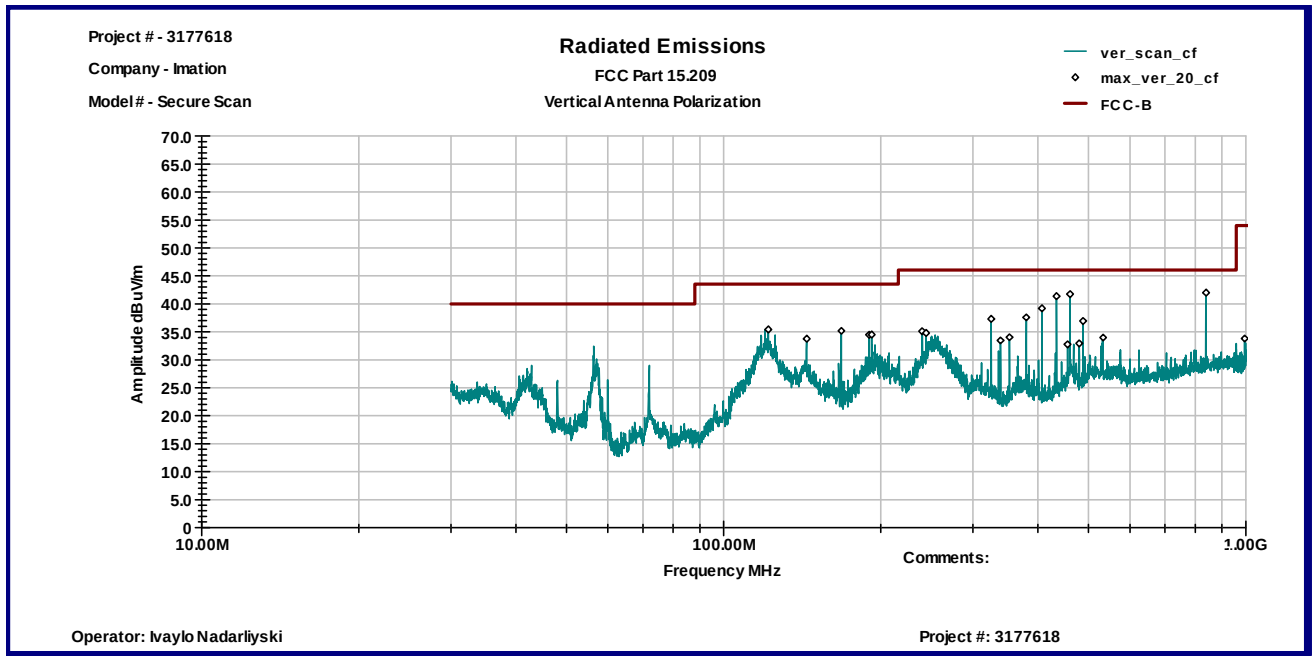
Date:	April 21, 2009	Result: Pass
Standard:	FCC 15.225	
Tested by:	Uri Spector	
Test Point:	Enclosure	
Operation mode:	See Page 5	
Note:		

Table # 3.2.2

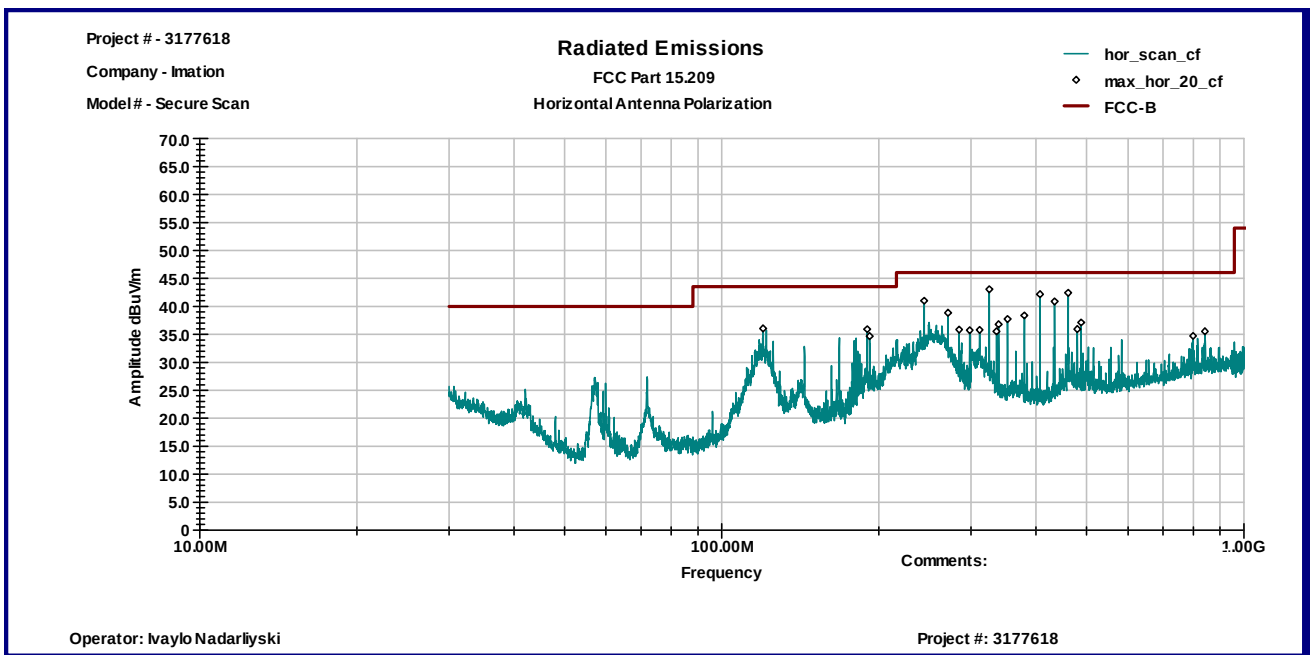
Frequency	Ant. Polarity	QP Reading dBμV	Ant.Factor dB1/m	Total at 3m dBμV/m	QP Limit dBμV/m	Margin dB
121.76 MHz	V	17.9	13.9	31.8	43.5	-11.7
168.04 MHz	V	20.4	11.9	32.3	43.5	-11.3
192.14 MHz	V	20.5	11.6	32.1	43.5	-11.4
239.96 MHz	V	19.7	13.9	33.6	46.0	-12.4
325.54 MHz	V	18.9	16.7	35.6	46.0	-10.4
406.94 MHz	V	17.7	19.3	37.0	46.0	-9.1
434.16 MHz	V	19.3	19.8	39.1	46.0	-6.9
460.94 MHz	V	19.6	19.8	39.4	46.0	-6.7
839.84 MHz	V	15.6	24.9	40.5	46.0	-5.5
119.99 MHz	H	18.8	13.9	32.7	43.5	-10.8
244.16 MHz	H	23.2	14.3	37.5	46.0	-8.5
325.54 MHz	H	22.9	16.7	39.6	46.0	-6.4
379.71 MHz	H	18.5	18.4	36.9	46.0	-9.1
406.94 MHz	H	19.1	19.3	38.4	46.0	-7.7
434.16 MHz	H	19.8	19.8	39.6	46.0	-6.4
460.94 MHz	H	18.8	19.8	38.6	46.0	-7.5
479.89 MHz	H	14.9	20.1	35.0	46.0	-11.0
488.13 MHz	H	16.1	20.3	36.4	46.0	-9.6

Graph 3.2.1

Vertical antenna polarization



Horizontal antenna polarization



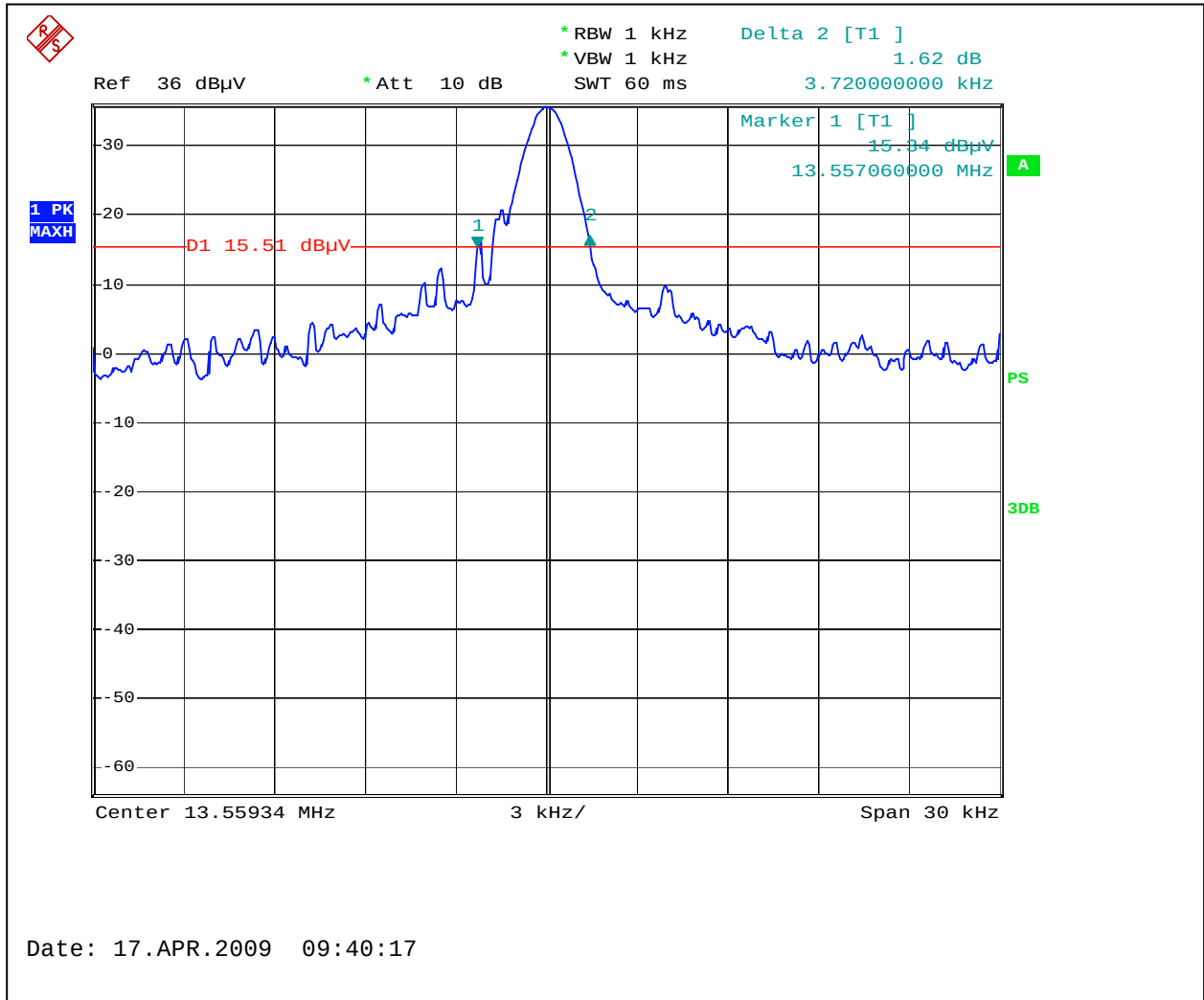
3.3 Bandwidth of Emissions

Center Frequency of operation MHz	Measured 20dB bandwidth kHz	Measured 99% bandwidth kHz	Result
13.56	3.72	4.8	Pass

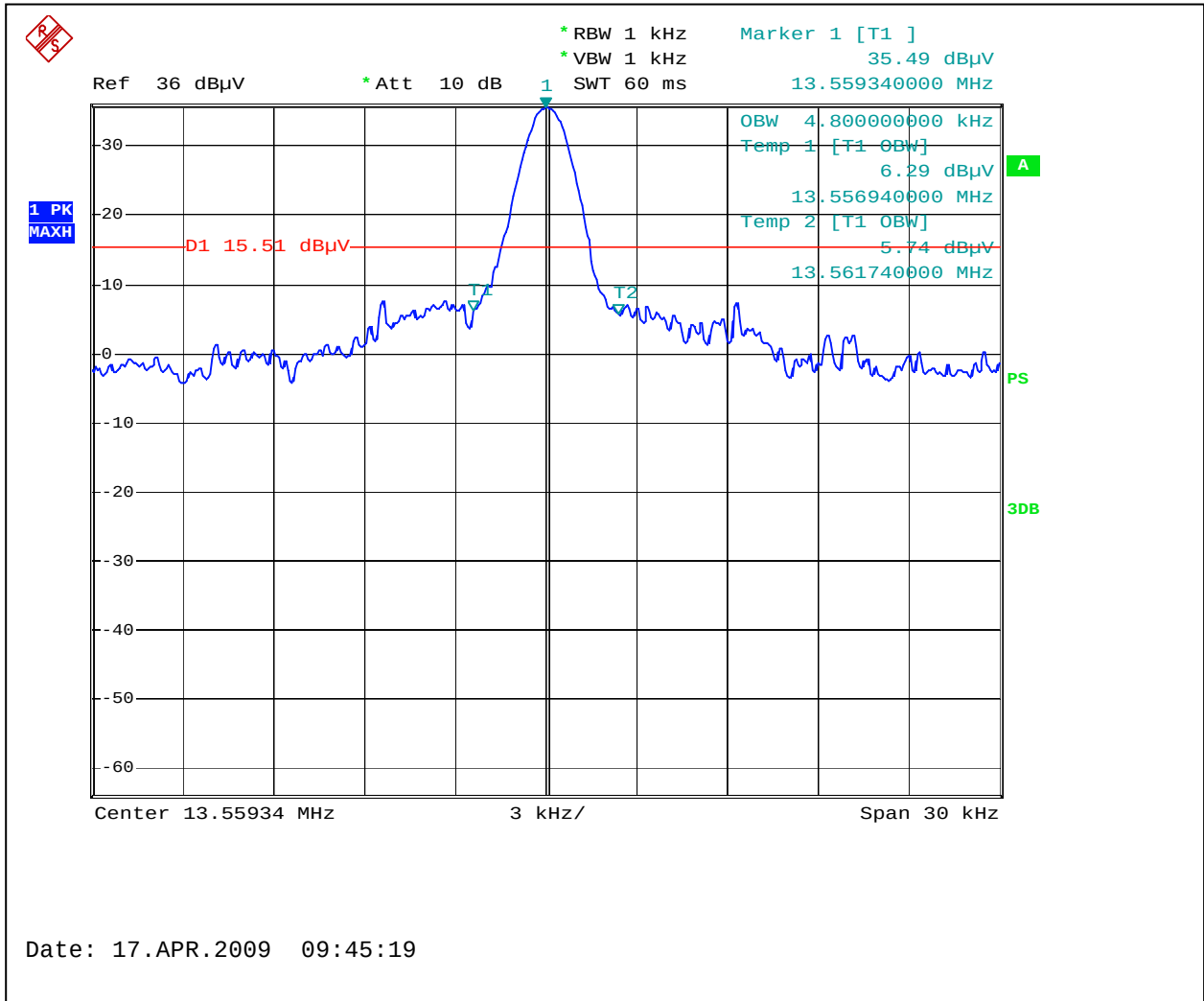
Graphs 3-3-1 and 3-3-2 are show bandwidth of emissions

Notes:

Graph 3.3.1



Graph 3.3.2



3.4 Frequency Tolerance

Date:	April 20, 2009	Result: Pass
Standard:	FCC 15.225 (e) / RSS-210 A2.6	
Tested by:	Uri Spector	
Operation mode:	See Page 5	
Note:		

Table 3.4.1

Temperature Degree C	Output Frequency MHz	Frequency Stability Hz	Max. Deviation +/- 0.01% Hz	Test Result
-20	13.56	120	1356	Pass
23	13.56	0	1356	Pass
50	13.56	50	1356	Pass
Input Power AC Voltage V	Output Frequency MHz	Frequency Stability Hz	Freq. Tolerance +/- 0.01% Hz	Test Result
102	13.56	0	1356	Pass
110	13.56	0	1356	Pass
120	13.56	0	1356	Pass
130	13.56	0	1356	Pass
138	13.56	0	1356	Pass

Notes: None



3.5 Transmitter power line conducted emissions

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test result: **Pass**

Frequency range: 0.15MHz-30MHz

Max. Emissions margin: 2.5 dB below the limits

Notes: None

Date:	April 17, 2009	Result: Pass
Standard:	FCC 15.207	
Tested by:	Uri Spector	
Test Point:	Power Line	
Operation mode:	See page 5	
Note:		

Table 3.5.1

Line 1

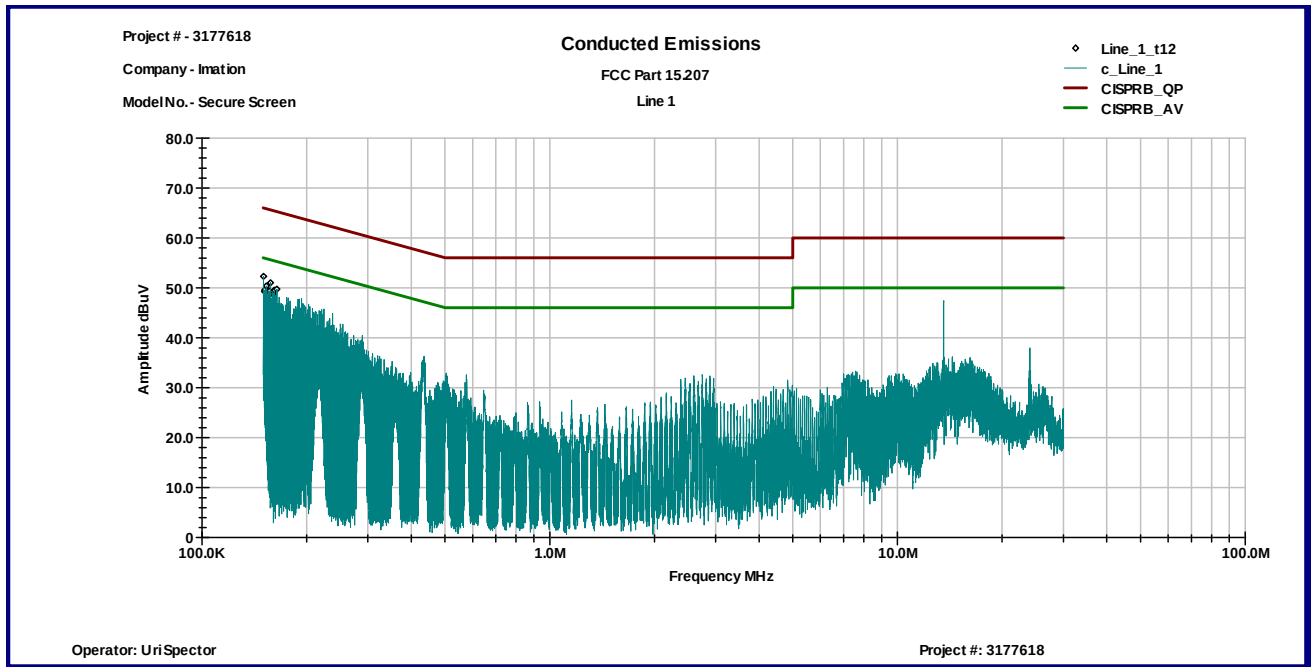
Frequency	Peak dBμV	QP Limit dBμV	AVG Limit dBμV	QP Margin dB	AVG Margin dB
150.39 KHz	52.3	66.0	56.0	-13.7	-3.7
153.03 KHz	50.4	65.8	55.8	-15.5	-5.5
155.59 KHz	48.5	65.7	55.7	-17.2	-7.2
159.48 KHz	49.2	65.5	55.5	-16.3	-6.3
164.06 KHz	49.7	65.3	55.3	-15.5	-5.5
13.556 MHz	47.5	60.0	50.0	-12.5	-2.5

Line 2

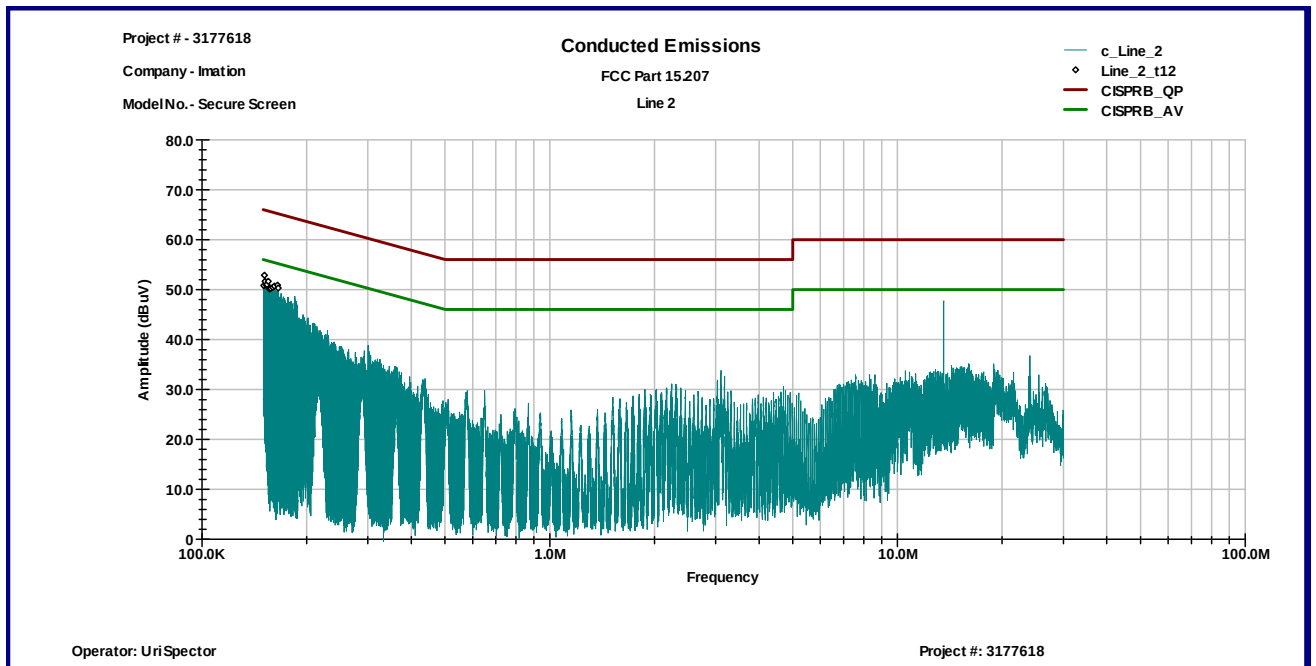
Frequency	Peak dBμV	QP Limit dBmV	AVG Limit dBmV	QP Margin dB	AVG Margin dB
150.54 KHz	50.8	66.0	56.0	-15.2	-5.2
153.81 KHz	51.0	65.8	55.8	-14.8	-4.8
157.69 KHz	50.2	65.6	55.6	-15.4	-5.4
161.57 KHz	50.7	65.4	55.4	-14.7	-4.7
164.84 KHz	50.9	65.2	55.2	-14.4	-4.4
13.556 MHz	47.0	60.0	50.0	-13.0	-3.0

Graph 3.5.1

Line 1



Line 2





3.6 Receiver/digital device radiated emissions

Test location: ☐ OATS ☒ Anechoic Chamber

Test distance: ☐ 10 meters ☒ 3 meters

Test result: **Pass**

Frequency range: 30MHz-1000MHz

Max. Emissions margin: 5.9dB below the limits

Notes: None

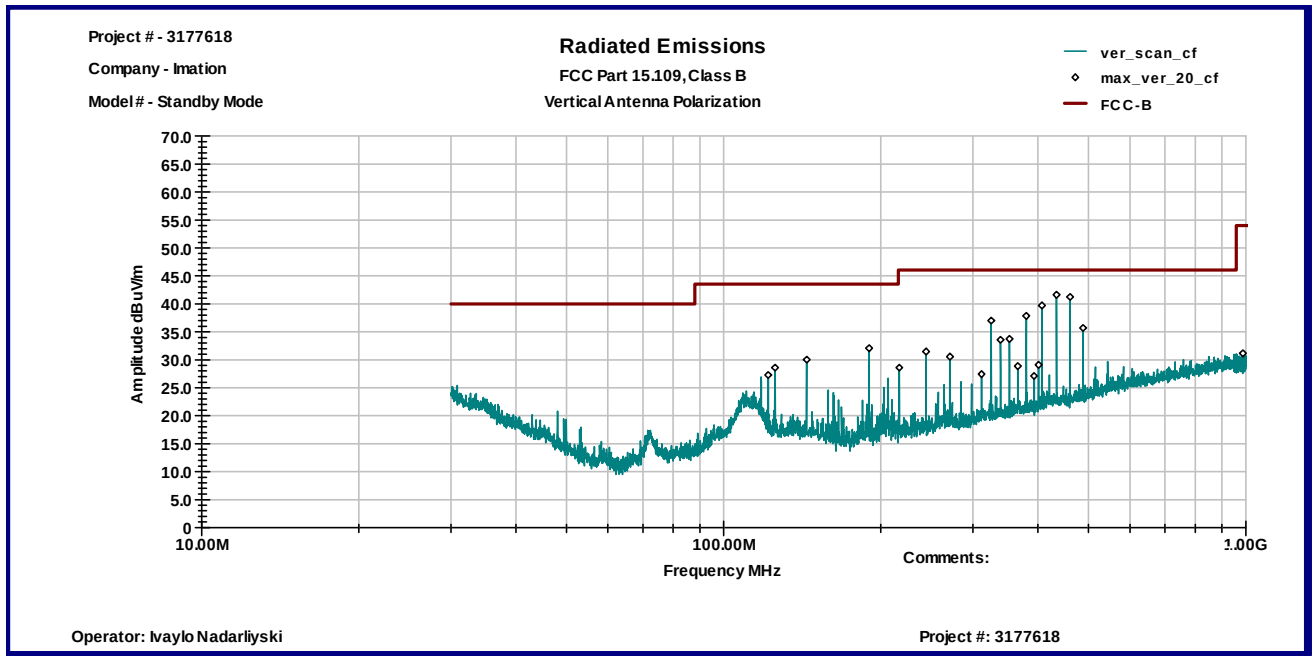
Date:	April 16, 2009	Result: Pass
Standard:	FCC Part 15.109, Class B	
Tested by:	Ivaylo Nadarliyski	
Test Point:	Enclosure	
Operation mode:	See page 5	
Note:		

Table # 3.6.1

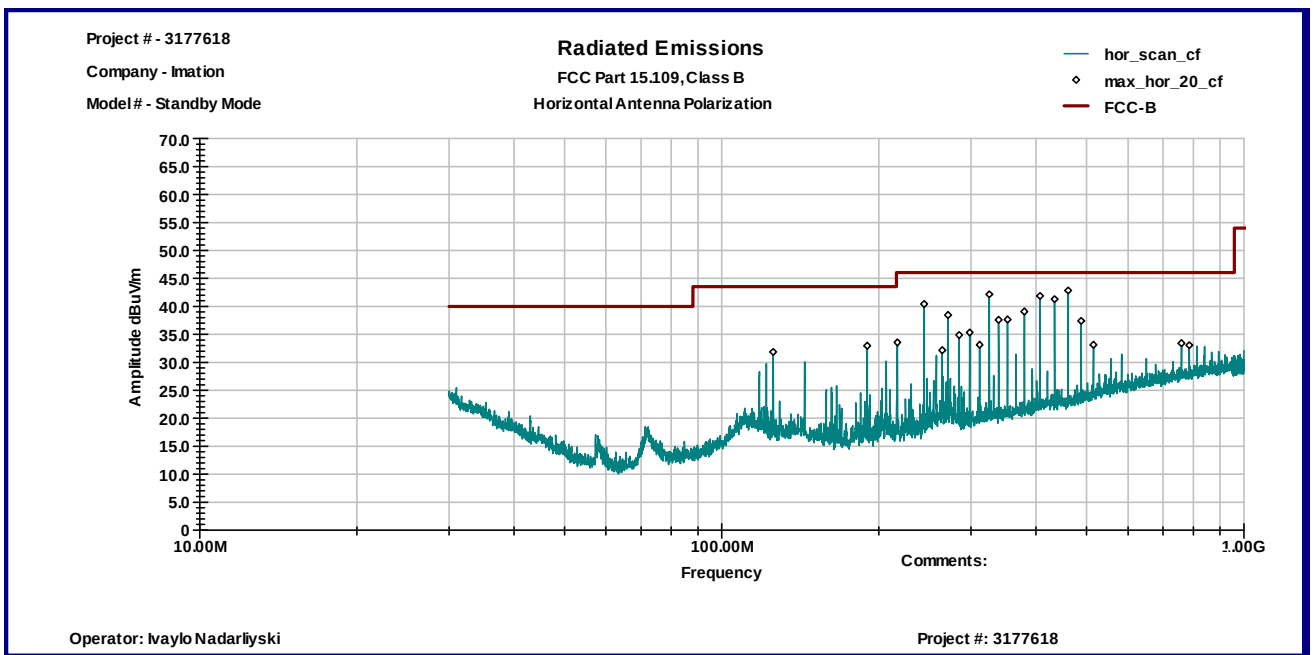
Frequency	Ant. Polarity	QP Reading dBμV	Ant.Factor dB1/m	Total at 3m dBμV/m	QP Limit dBμV/m	Margin dB
144.2 MHz	V	15.3	13.2	28.5	43.5	-15.0
189.93 MHz	V	19.5	11.5	31.0	43.5	-12.5
325.54 MHz	V	19.4	16.7	36.1	46.0	-9.9
379.71 MHz	V	18.3	18.4	36.7	46.0	-9.3
406.94 MHz	V	19.0	19.3	38.3	46.0	-7.8
434.16 MHz	V	19.1	19.8	38.9	46.0	-7.1
460.94 MHz	V	19.2	19.8	39.0	46.0	-7.1
488.13 MHz	V	14.1	20.3	34.4	46.0	-11.6
189.93 MHz	H	19.8	11.5	31.3	43.5	-12.2
244.16 MHz	H	22.3	14.3	36.6	46.0	-9.4
271.32 MHz	H	21.7	15.6	37.3	46.0	-8.7
325.54 MHz	H	21.5	16.7	38.2	46.0	-7.8
339.01 MHz	H	19.6	17.1	36.7	46.0	-9.3
352.77 MHz	H	19.4	17.6	37.0	46.0	-9.0
379.71 MHz	H	19.9	18.4	38.3	46.0	-7.7
406.94 MHz	H	20.1	19.3	39.4	46.0	-6.7
434.16 MHz	H	20.3	19.8	40.1	46.0	-5.9
460.94 MHz	H	19.8	19.8	39.6	46.0	-6.5
488.13 MHz	H	16.6	20.3	36.9	46.0	-9.1
515.32 MHz	H	12.0	20.9	32.9	46.0	-13.1
759.41 MHz	H	8.8	23.9	32.7	46.0	-13.3

Graph 3.6.1

Vertical antenna polarization



Horizontal antenna polarization





3.7 Digital device conducted emissions

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test result: **Pass**

Frequency range: 0.15MHz-30MHz

Max. Emissions margin: 2.5 dB below the limits

Notes: None

Date:	April 17, 2009	Result: Pass
Standard:	FCC 15.107, Class B	
Tested by:	Uri Spector	
Test Point:	Power Line	
Operation mode:	See page 5	
Note:		

Table 3.7.1

Line 1

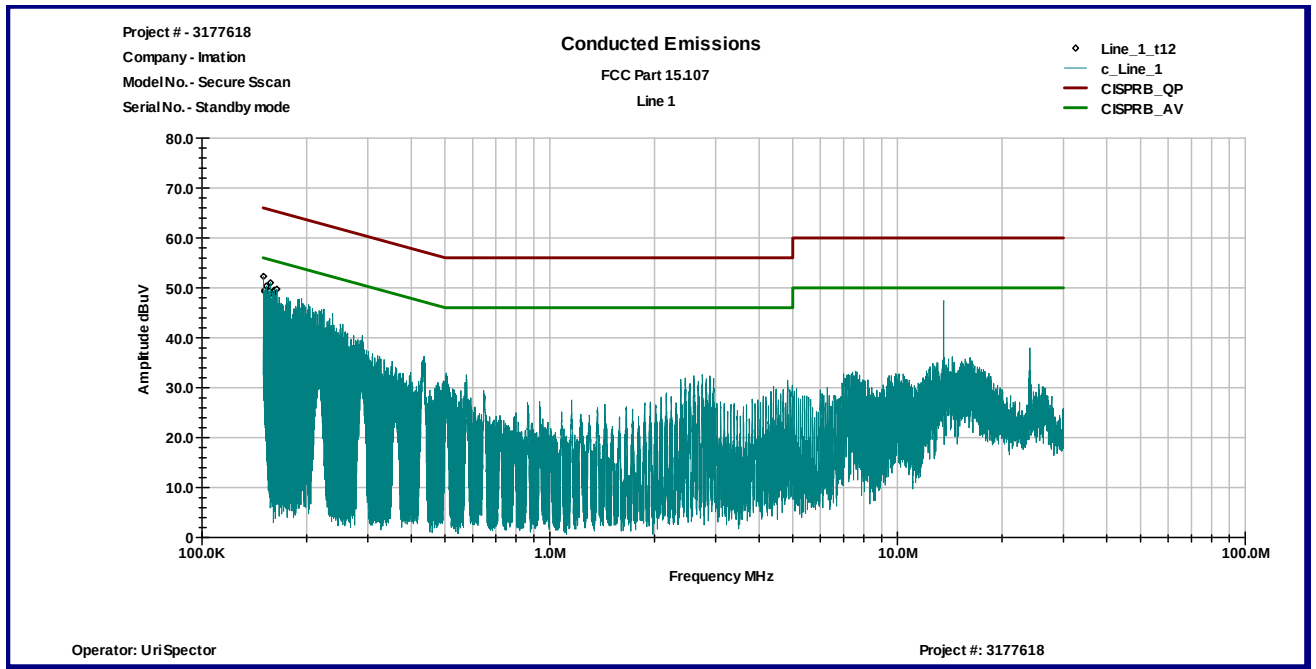
Frequency	Peak dB μ V	QP Limit dB μ V	AVG Limit dB μ V	QP Margin dB	AVG Margin dB
150.39 KHz	52.3	66.0	56.0	-13.7	-3.7
153.03 KHz	50.4	65.8	55.8	-15.5	-5.5
155.59 KHz	48.5	65.7	55.7	-17.2	-7.2
159.48 KHz	49.2	65.5	55.5	-16.3	-6.3
164.06 KHz	49.7	65.3	55.3	-15.5	-5.5
13.556 MHz	47.5	60.0	50.0	-12.5	-2.5

Line 2

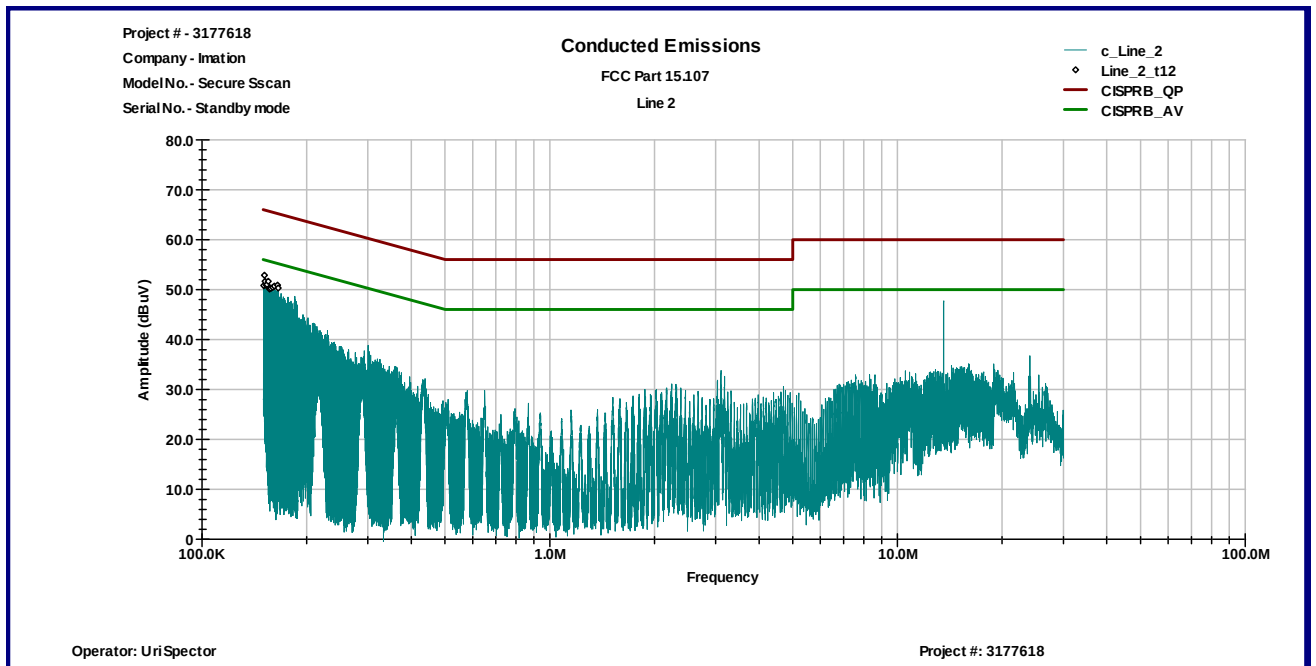
Frequency	Peak dB μ V	QP Limit dBmV	AVG Limit dBmV	QP Margin dB	AVG Margin dB
150.54 KHz	50.8	66.0	56.0	-15.2	-5.2
153.81 KHz	51.0	65.8	55.8	-14.8	-4.8
157.69 KHz	50.2	65.6	55.6	-15.4	-5.4
161.57 KHz	50.7	65.4	55.4	-14.7	-4.7
164.84 KHz	50.9	65.2	55.2	-14.4	-4.4
13.556 MHz	47.0	60.0	50.0	-13.0	-3.0

Graph 3.7.1

Line 1



Line 2





4.0 TEST EQUIPMENT

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO.	INTERTEK ID	CAL DUE	USED
Receiver RF Section	HP	85462A	3549A00306	9995	02/27/2010	☒
RF Filter Section	HP	85460A	3448A00276	9937	02/27/2010	☒
Spectrum Analyzer	R & S	ESCI	100358	12909	05/07/2009	☒
LISN	Fischer Custom Communications	FCC-LISN-2 MOD.SD	316	9945	10/28/2009	☒
Bicono-Log Antenna	Schaffner-Chase	CBL 6112 B	2468	14459	08/27/2009	☒
Loop Antenna	ETS	6512	00060486	19942	08/05/2009	☒
System	TILE! Instrument Control		Ver. 3.4.K.29	15259	VBU	☒

