

TEST REPORT

Report Number: 100077996MIN-005

Project Number: G100077996

Testing performed on the
Simon iXT ver. 4.3 TT 319MHz Transmitter

FCC ID: B4Z-801-IXT2
Industry Canada ID: 1175C- 801IXT2

to
47 CFR Part 15. 231:2009
RSS- 210 , Issue 7, 2007

GE Security Inc.

Test Performed by:
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Test Authorized by:
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Date: March 30, 2010

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Date: March 30, 2010

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1.0 GENERAL DESCRIPTION

Model:	Simon iXT ver. 4.3 TT 319MHz Transmitter
Type of EUT:	Security Alarm
FCC ID:	B4Z-801-IXT2
Industry Canada ID:	1175C- 801IXT2
Related Submittal(s) Grants:	None
Company:	GE Security Inc.
Customer:	Rene Christian
Address:	1275 Red Fox Road Arden Hills, MN 55112
Phone:	(877) 699-6787
Fax:	(651) 779-4884
e-mail:	Rene.Christian@ge.com
Test Standards:	<input checked="" type="checkbox"/> 47 CFR, Part 15:2009, §15.231 <input checked="" type="checkbox"/> RSS-210, Issue 7, 2007 <input checked="" type="checkbox"/> RSS-Gen, Issue 2, 2007 <input type="checkbox"/> 47 CFR, Part 15:2008, §15.107 and §15.109, Class <input type="checkbox"/> Other
Type of radio:	<input type="checkbox"/> Stand -alone <input checked="" type="checkbox"/> Module <input type="checkbox"/> Hybrid
Date Sample Submitted:	March 22, 2010
Test Work Started:	March 22, 2010
Test Work Completed:	March 26, 2010
Test Sample Conditions:	<input type="checkbox"/> Damaged <input type="checkbox"/> Poor (Usable) <input checked="" type="checkbox"/> Good



1.1 Product Description; Test Facility

Product Description:	319MHz Transmitter
Operating Frequency	319.48MHz
Modulation:	ON / OFF Keying
Emission Designator:	271KX1D
Antenna(s) Info:	Antenna: Two wire soldered to PCB Gain 2dBi
Antenna Installation:	<input type="checkbox"/> User <input type="checkbox"/> Professional <input type="checkbox"/> Factory
Transmitter power configuration:	<input type="checkbox"/> Internal battery <input checked="" type="checkbox"/> External power source <input checked="" type="checkbox"/> 120VAC <input type="checkbox"/> 230VAC <input type="checkbox"/> 400VAC <input type="checkbox"/> [REDACTED] VDC <input type="checkbox"/> Other: [REDACTED] [REDACTED] Amp. <input type="checkbox"/> 50Hz <input checked="" type="checkbox"/> 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	Continuous transmitting mode.

Cables:

No.	Type	Length	Designation	Note
1	Phone Cable	> 6ft	Not shielded, RJ11	
2	Line Cable	> 6ft	Not shielded, RJ45	
3	LAN Device Cable	> 6ft	Not shielded, RJ45	
4	HW1 I/O wire	6ft	Not shielded, terminal connector	
5	HW DC OUT wire	6ft	Not shielded, terminal connector	
6	HW2 IN wire	6ft	Not shielded, terminal connector	

Support equipment/Services:

No.	Item	Description
1	None	

General notes: None

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).

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

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

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

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

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

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

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

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
15.231(a) / RSS-210 A1.1.1(a)	Transmitter deactivation time	Pass
15.231(b) / RSS-210 A1.1.2	Transmitter field strength of emissions	Pass
15.231(c) / RSS-210 A1.1.3	Bandwidth of the emission	Pass
15.207/RSS-Gen 7.2.2	Transmitter Power Line conducted emissions	Pass

3.0 TEST CONDITIONS AND RESULTS

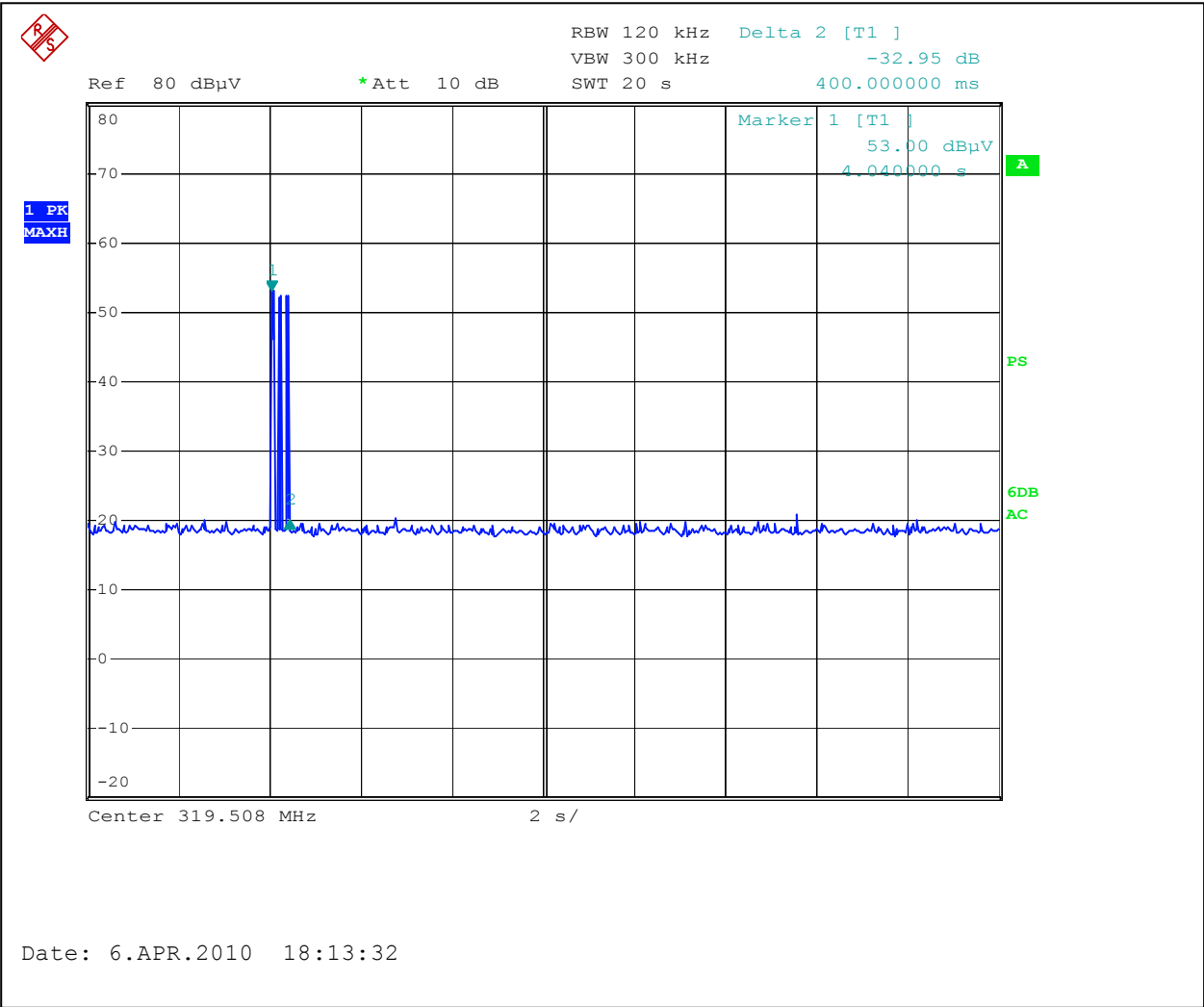
3.1 Transmitter deactivation time

Maximum allowed deactivation time: 5 sec

Measured deactivation time: 400msec

Test result: Pass

Notes: None



Graph 3.1.1



3.2 Transmitter field strength of emissions

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test distance: ☐ 10 meters ☒ 3 meters

Frequency range of measurements: 30MHz-4000MHz

Test result: **Pass**

Max. Emissions margin at fundamental: 4.0dB below the limits

Max. margin of harmonics and spurious emissions: 13.0dB below the limits

Notes: None

Date:	March 23, 2010	Result: Pass
Standard:	FCC 15.231(b) / RSS-210 A1.1.2	
Tested by:	Uri Spector	
Test Point:	Enclosure with antenna	
Operation mode:	See Page 5	
Note:		

Table 3.2.1

Frequency MHz	Antenna		Ant. CF dB1/m	Cable loss dB	Pre-amp Gain (dB)	Reading dBμV	AVG CF expected	Total @ 3m dBμV/m	Limit dBμV/m	Margin dB	Comments
	Polarity	Hts(cm)									
			Emissions at Fundamental Frequency								
319.48	V	100	14.3	2.0	0.0	71.2	0.0	87.5	95.9	-8.4	Peak
319.48	H	106	14.3	2.0	0.0	75.3	0.0	91.6	95.9	-4.3	Peak
319.48	V	100	14.3	2.0	0.0	71.2	19.7	87.5	75.9	-8.1	AVG value
319.48	H	106	14.3	2.0	0.0	75.3	19.7	91.6	75.9	-4.0	AVG value
			Spurious and Harmonics Emissions								
640.00	V		19.6	3.0	0.0			22.6	55.9	N/A	1
640.00	H		19.6	3.0	0.0			22.6	55.9	N/A	1
958.45	V		21.6	3.7	0.0			25.3	55.9	N/A	1
958.45	H		21.6	3.7	0.0			25.3	55.9	N/A	1

Comments: Outside restricted band of operation 15.205

Date:	March 23, 2010	Result: Pass
Standard:	FCC 15.231(b) / RSS-210 A1.1.2	
Tested by:	March 23, 2010	
Test Point:	Enclosure with antenna	
Operation mode:	See Page 5	
Note:		

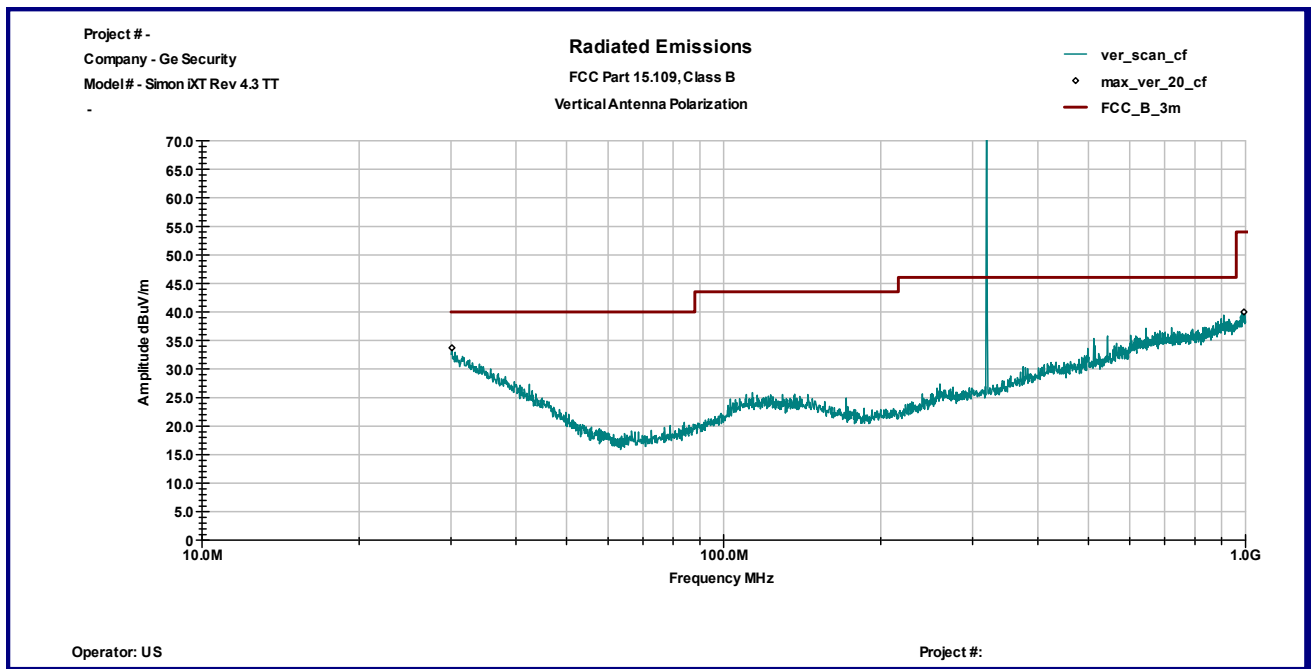
Table 3.2.2

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)								
1277.90	V	198	24.2	2.6	42.6	56.0	40.2	55.9	-15.7	1
1277.90	H	148	24.2	2.6	42.6	57.6	41.8	55.9	-14.1	1
1597.38	V	100	25.3	2.9	42.8	57.5	42.9	55.9	-13.0	
1597.38	H	188	25.3	2.9	42.8	54.0	39.4	55.9	-16.5	

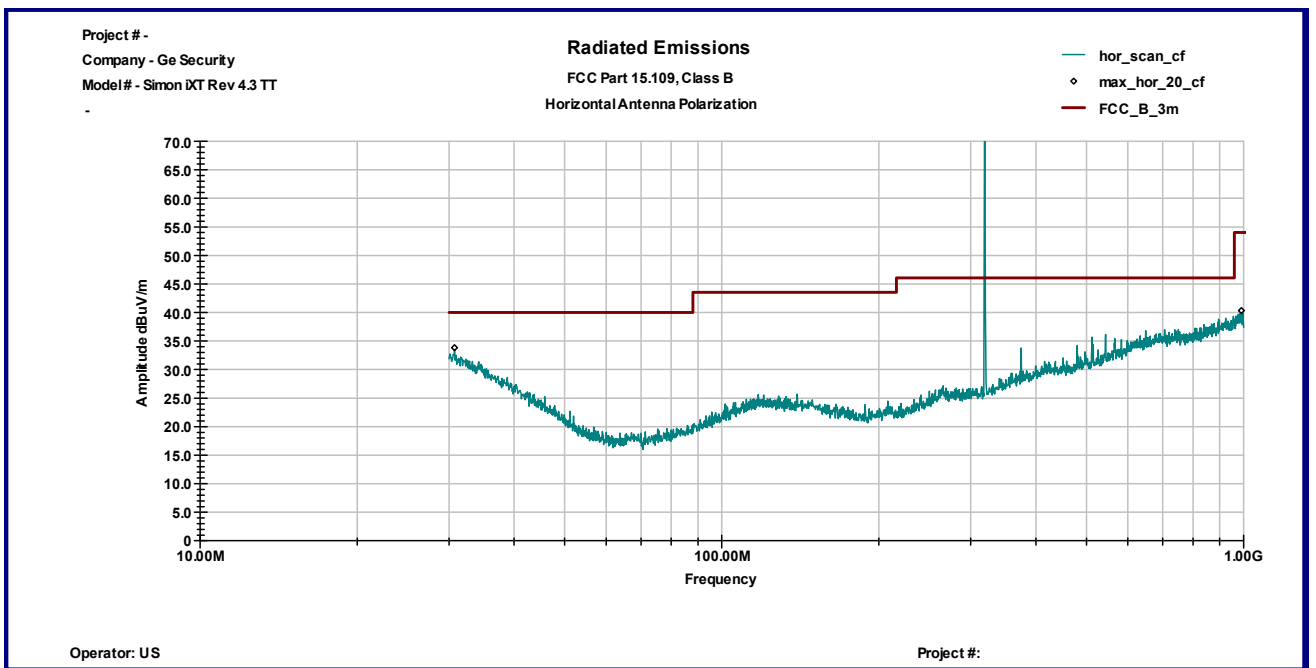
Comments: 1. Outside restricted band of operation 15.205

Graph 3.2.1

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.

One complete pulse train, including blanking intervals is longer than 100ms (see Graph 3.2.1), therefore average correction factor is calculated from the average absolute field strength during 100 ms interval.

Number of pulses is 80 (see Graph 3.2.2)

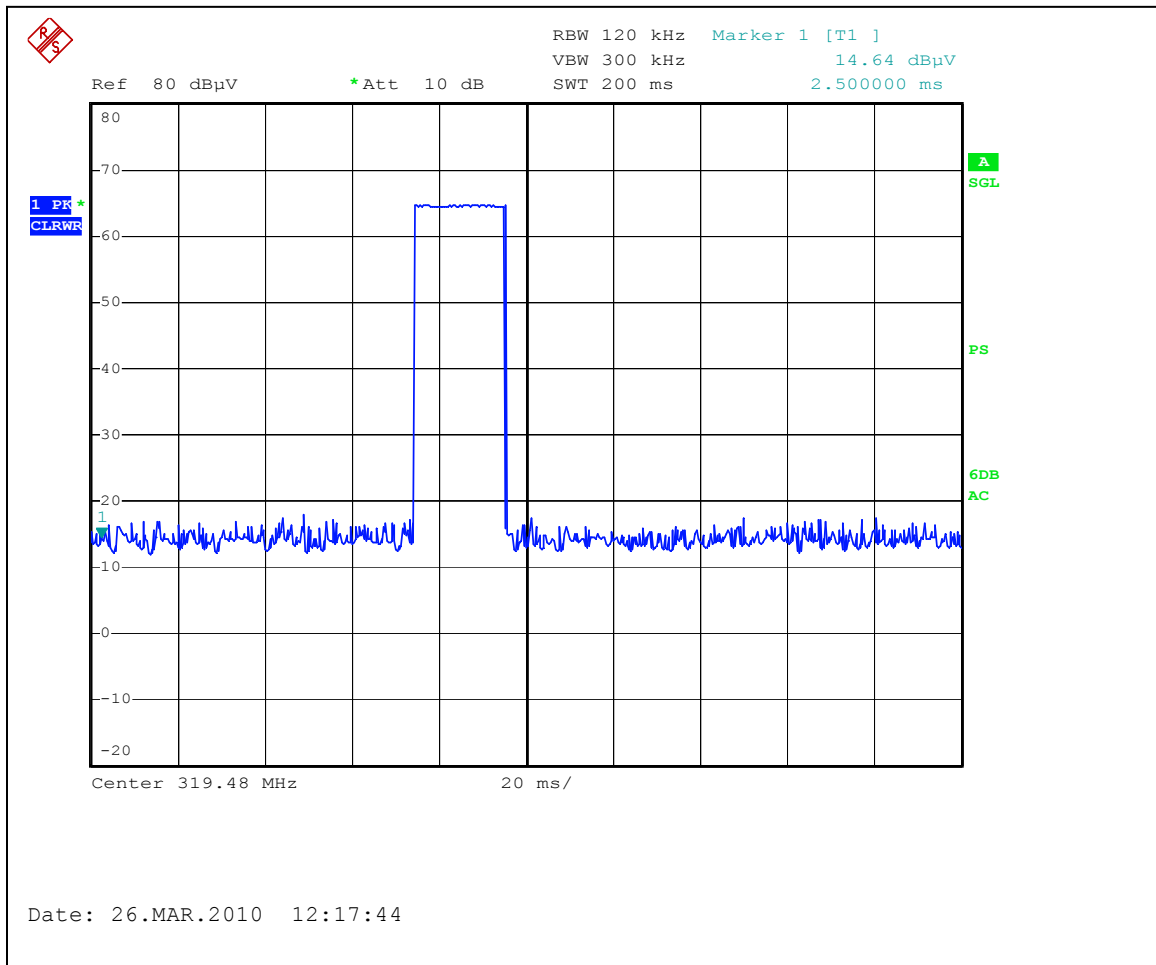
Width of the pulse is 130µsec (see Graphs 3.2.3, 3.2.4)

Time with field strength is in its maximum value (length of pulses) = 130µsec x 80 pulses = 10.4ms

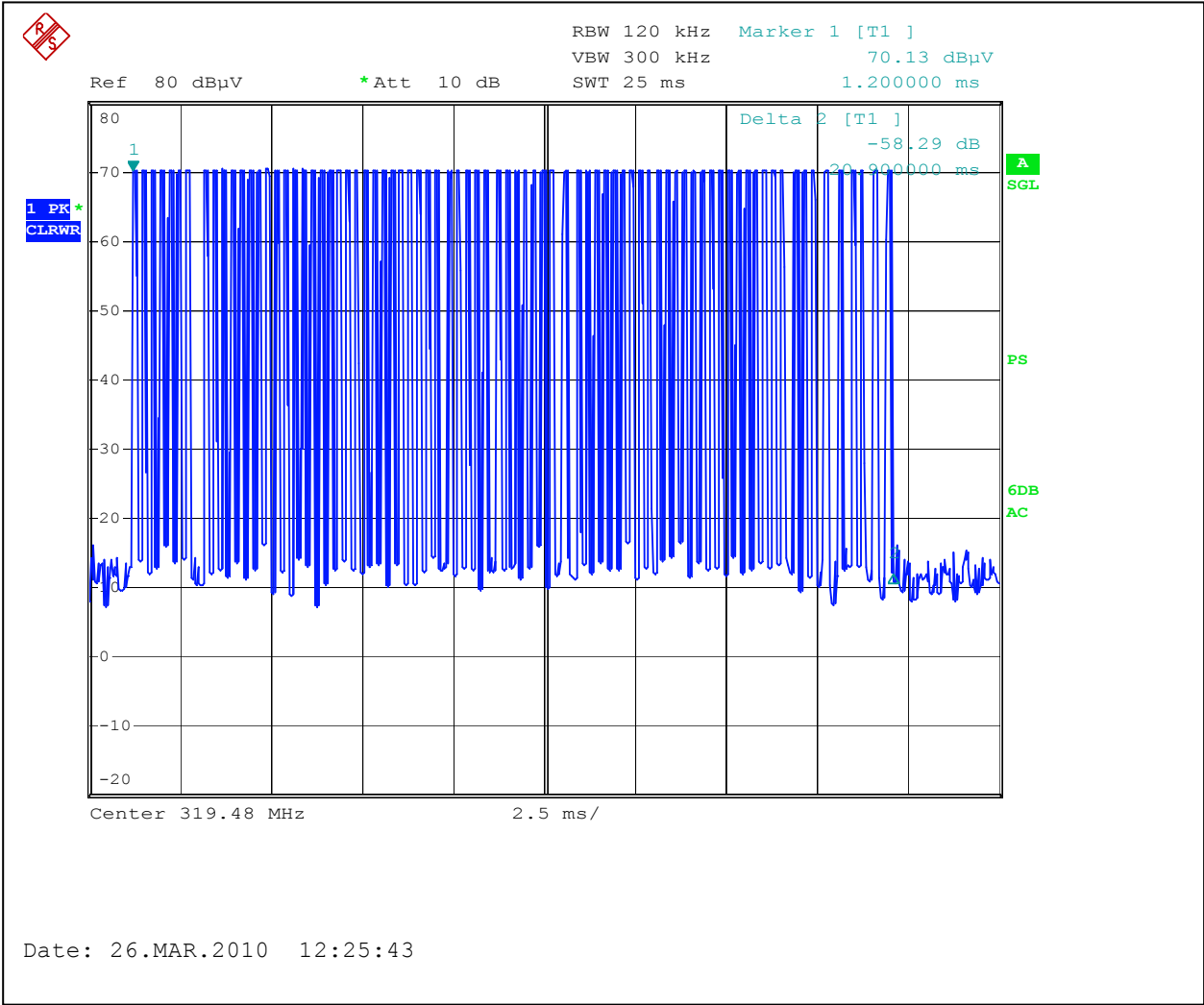
Average Correction Factor = $20\text{Log}(10.4\text{ms}/100\text{ms}) = -19.66\text{dB}$



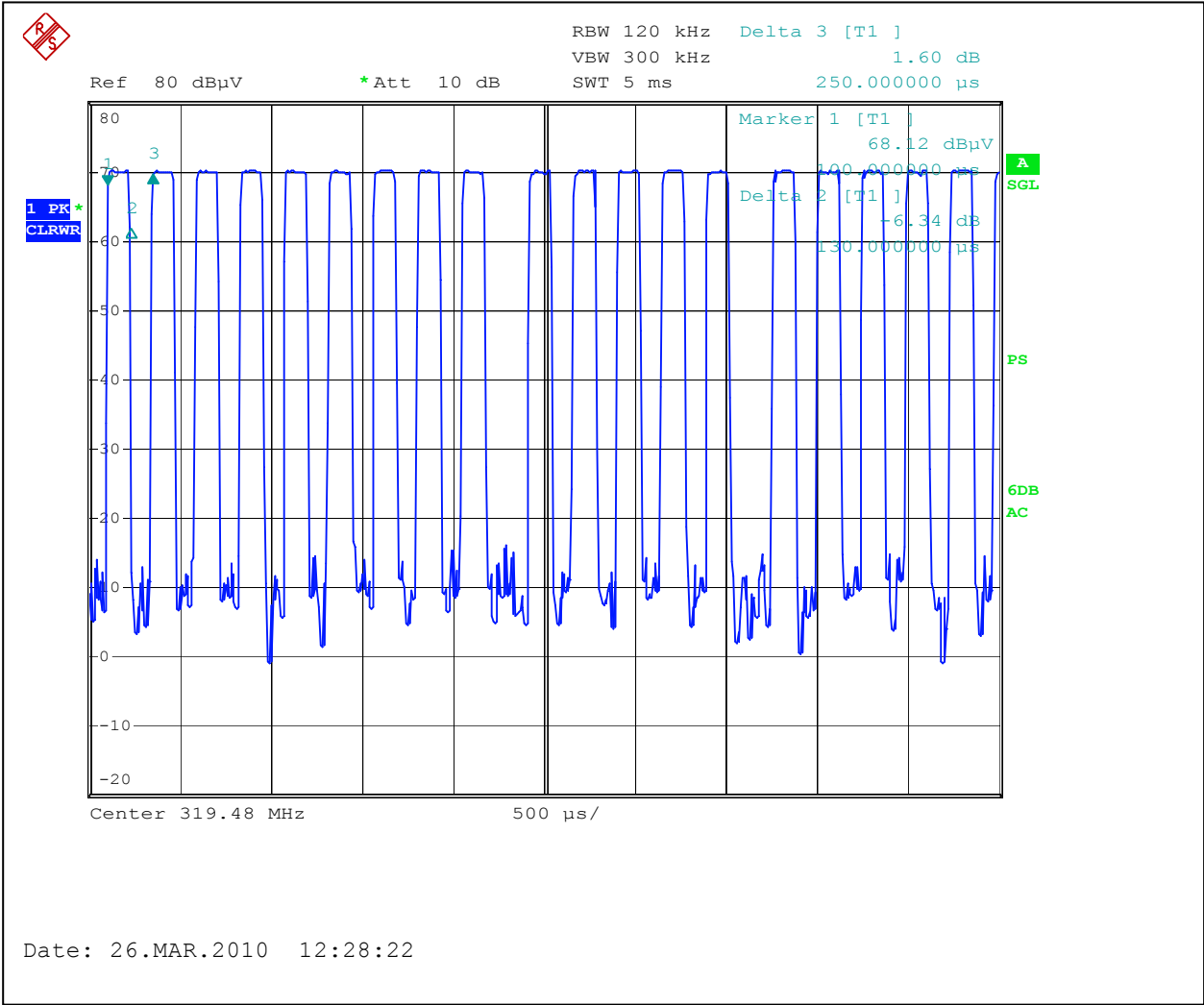
Graph 3.2.1



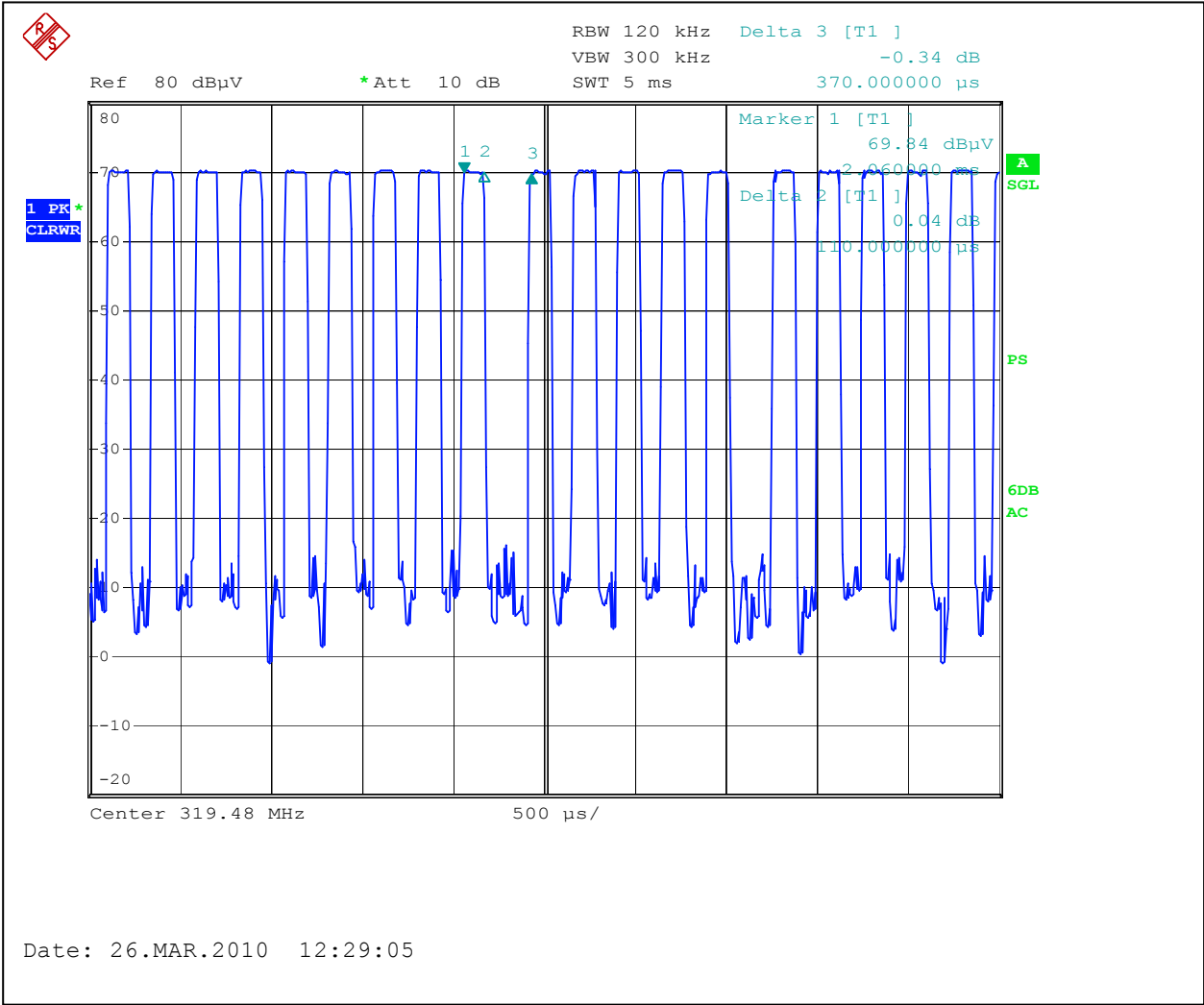
Graph 3.2.2



Graph 3.2.3



Graph 3.2.4



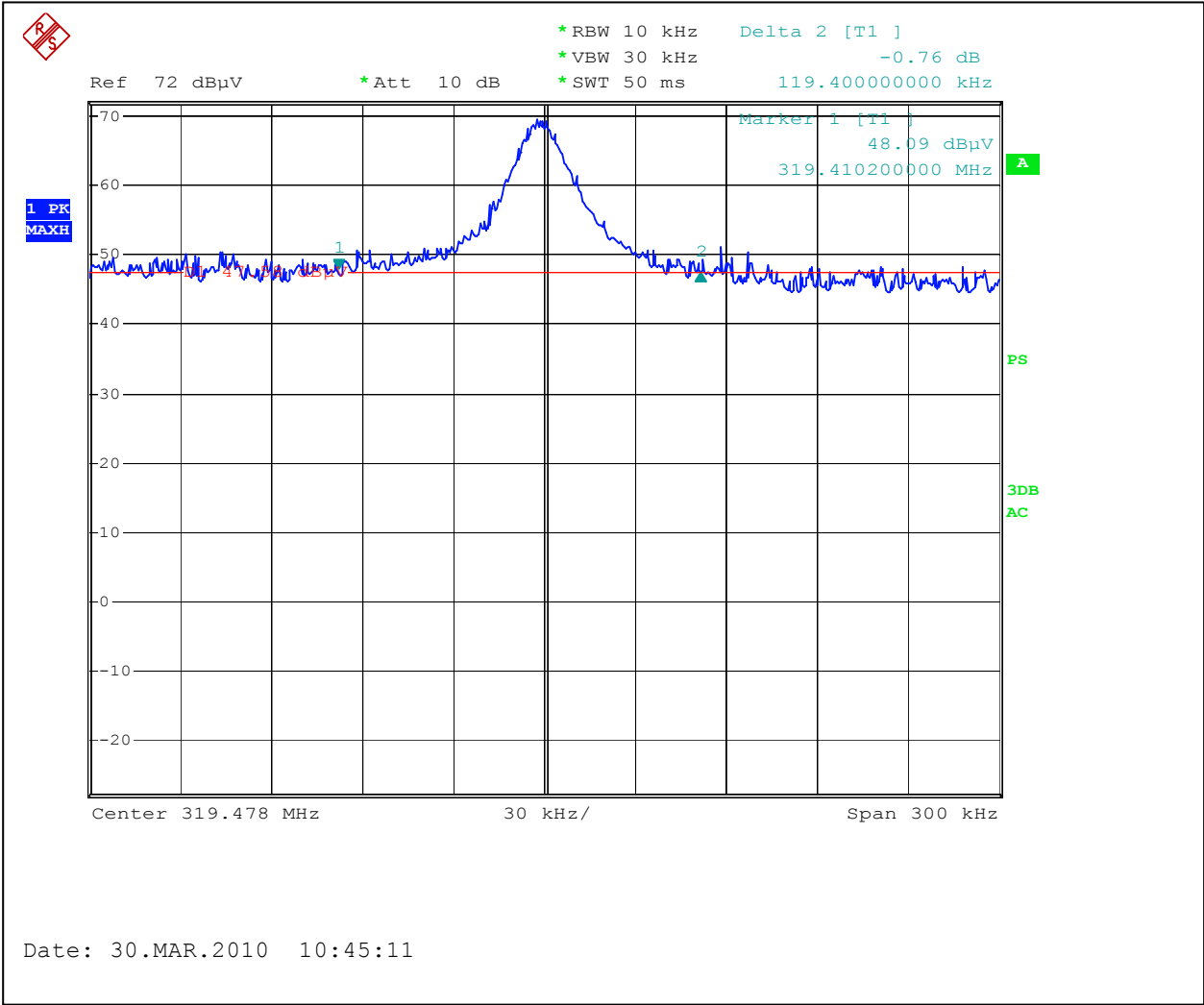
3.3 Bandwidth of Emissions

Center Frequency of operation MHz	Maximum allowed bandwidth kHz	Measured 20dB bandwidth kHz	Measured 99% bandwidth kHz	Result
319.49	798.72	119.4	271.2	Pass
Maximum allowed bandwidth:	<input checked="" type="checkbox"/> 0.25% of the centre operating frequency <input type="checkbox"/> 0.5% of the centre operating frequency			
RBW:	<input checked="" type="checkbox"/> 10kHz	<input type="checkbox"/> 100kHz	<input type="checkbox"/> other	kHz
VBW:	<input checked="" type="checkbox"/> 30kHz	<input type="checkbox"/> 300kHz	<input type="checkbox"/> other	kHz

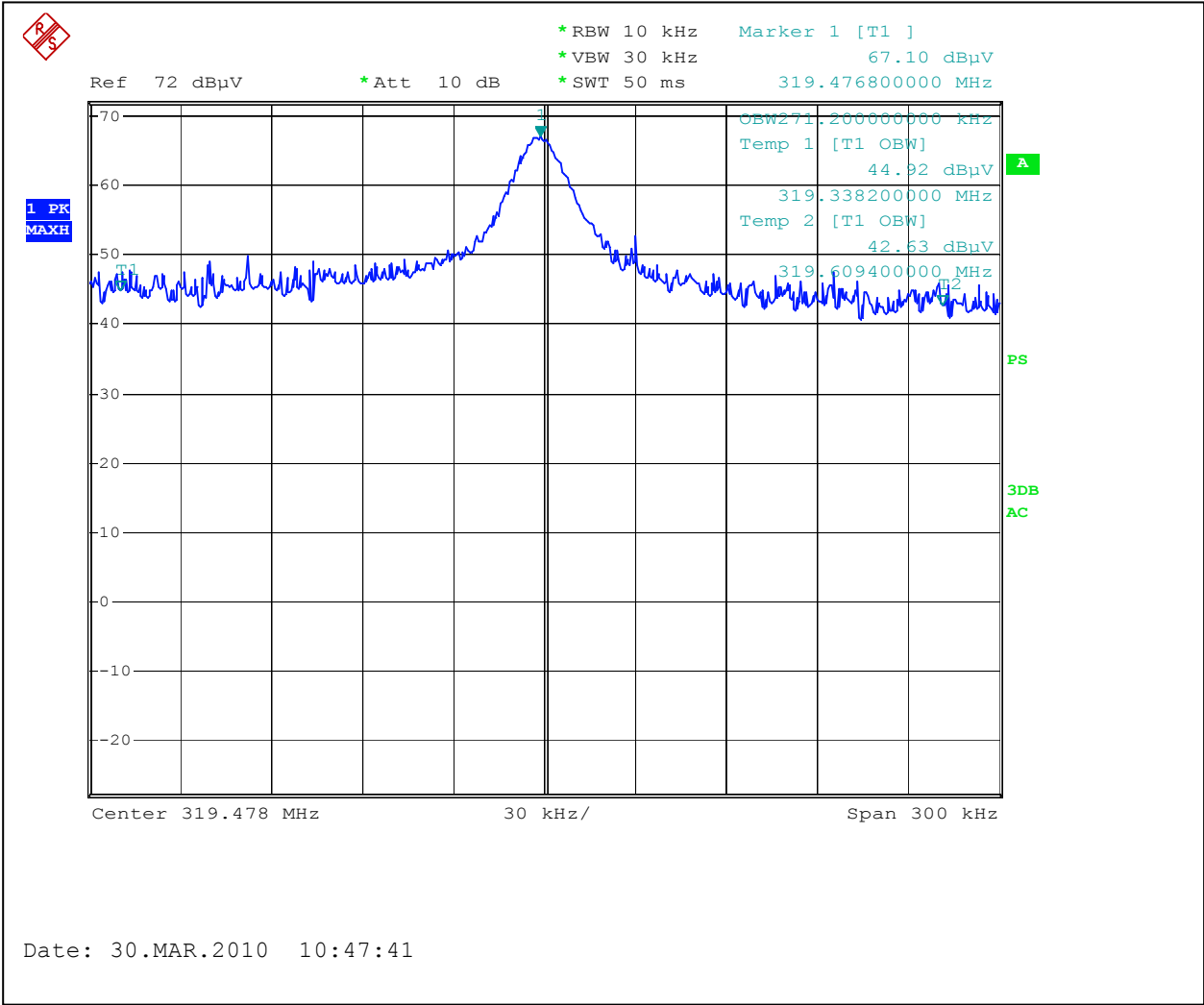
Graphs 3-3-1 and 3-3-2 are show bandwidth of emissions

Notes:

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: 13.9dB below the limits

Notes: None

Date:	March 26, 2010	Result: Pass
Standard:	FCC 15.207	
Tested by:	Norman Shpilsher	
Test Point:	Power Line	
Operation mode:	See Page 5	
Note:		

Table 3.4.1

Line 1

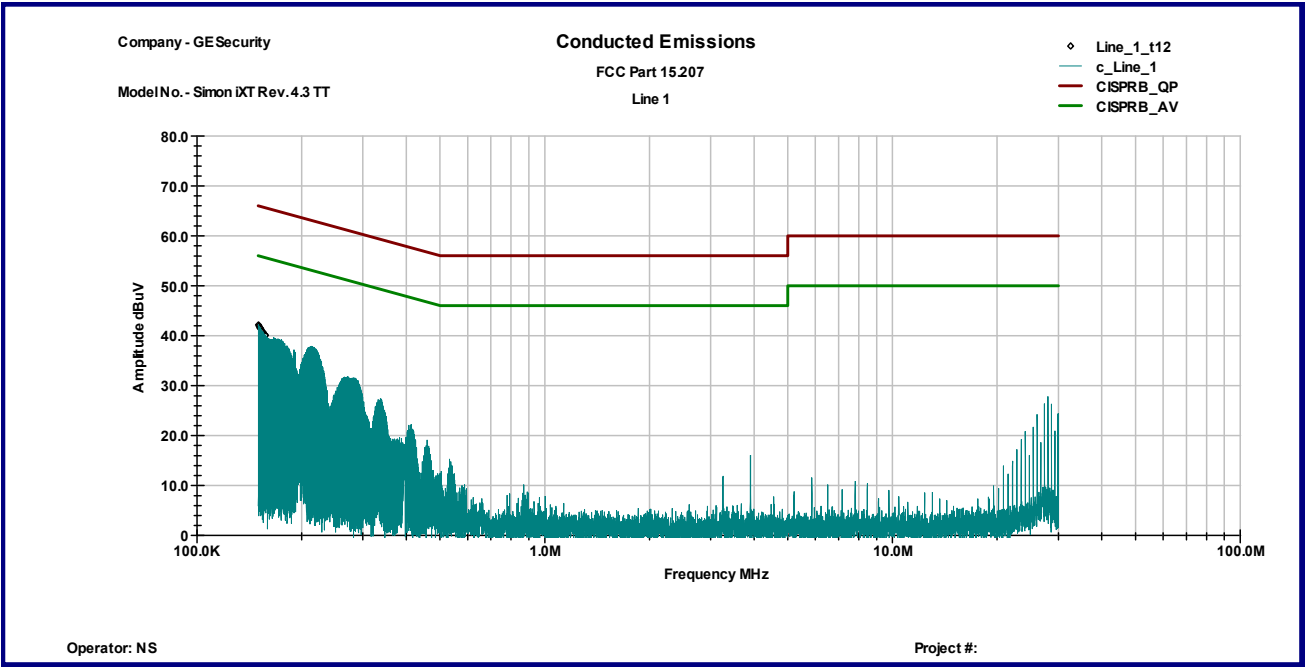
Frequency	Peak dBμV	QP Limit dBμV	AVG Limit dBμV	QP Margin dB	AVG Margin dB
150.54 KHz	42.1	66.0	56.0	-23.9	-13.9
154.43 KHz	40.9	65.8	55.8	-24.9	-14.9
157.77 KHz	40.3	65.6	55.6	-25.3	-15.3
3.921 MHz	15.2	56.0	46.0	-40.8	-30.8
5.229 MHz	12.7	60.0	50.0	-47.3	-37.3
27.466 MHz	26.4	60.0	50.0	-33.6	-23.6

Line 2

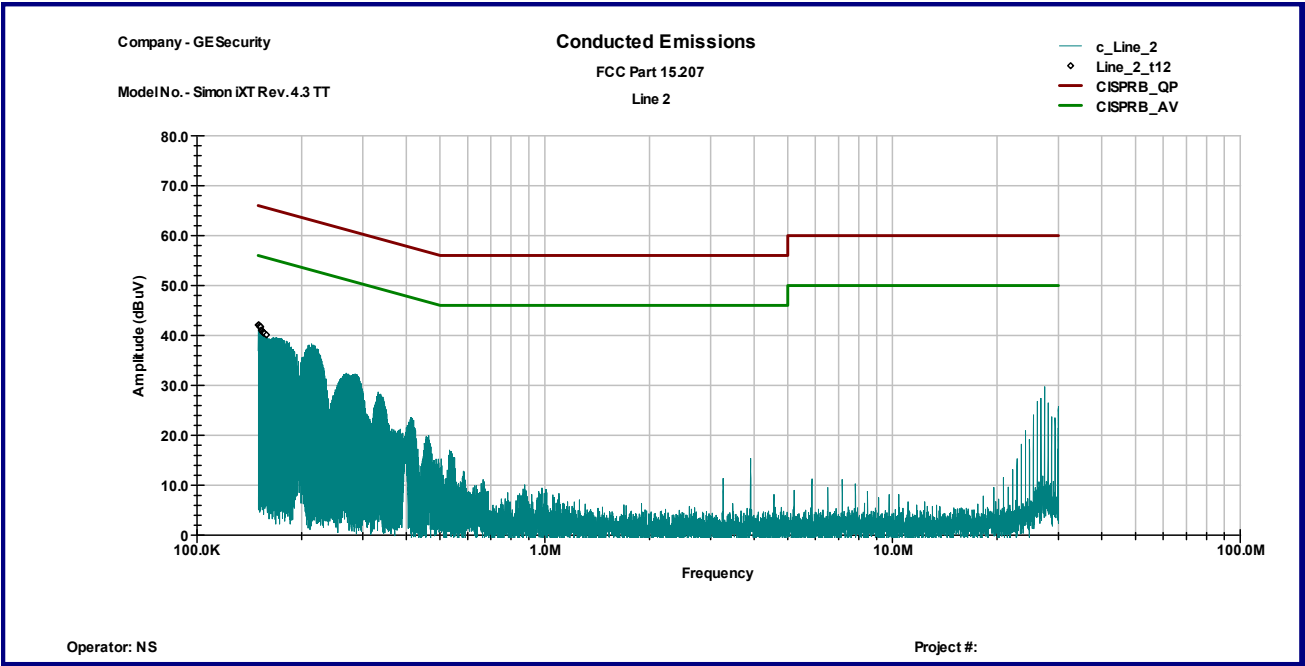
Frequency	Peak dBμV	QP Limit dBmV	AVG Limit dBmV	QP Margin dB	AVG Margin dB
150.39 KHz	42.0	66.0	56.0	-24.0	-14.0
154.27 KHz	40.9	65.8	55.8	-24.9	-14.9
158.16 KHz	40.4	65.6	55.6	-25.2	-15.2
3.921 MHz	14.2	56.0	46.0	-41.8	-31.8
5.229 MHz	11.4	60.0	50.0	-48.6	-38.6
27.466 MHz	29.8	60.0	50.0	-30.2	-20.2

Graph 3.4.1

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	09/10/2010	<input checked="" type="checkbox"/>
Spectrum Analyzer	R & S	ESCI	100358	12909	05/18/2010	<input checked="" type="checkbox"/>
Bicono-Log Antenna	Schaffner-Chase	CBL 6112 B	2468	14459	09/22/2010	<input checked="" type="checkbox"/>
Horn Antenna	EMCO	3115	6579	15580	04/03/2010	<input checked="" type="checkbox"/>
LISN	Fischer Custom Communications	FCC-LISN-2 MOD.SD	316	9945	11/06/2010	<input checked="" type="checkbox"/>
Pre-Amplifier	MITEQ	AMF-5D-00501800-28-13P	1402232	172081	08/07/2010	<input checked="" type="checkbox"/>
System	TILE! Instrument Control		Ver. 3.4.K.29	15259	VBU	<input checked="" type="checkbox"/>

