



TEST REPORT

Report Number: 3191769MIN-002N

Project Number: 3191769

**Testing performed on the
Simon iXT PCS Module**

**FCC ID: B4Z-801-IXT
Industry Canada ID: 1175C-801IXT**

**to
47 CFR Part 24:2008
RSS-133 Issue 5, February 2009**

**For
GE Security Inc.**

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

Test Authorized by:
GE Security Inc.
1275 Red Fox Road
Arden Hills, MN 55112

Prepared by: Uri Spector
Uri Spector

Date: October 30, 2009

Reviewed by: Norman Shpilsher
Norman Shpilsher

Date: October 30, 2009

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to copy or distribute this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program. This report must not be used to claim product endorsement by A2LA, NIST nor any other agency of the U.S. Government.



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 RF Output Power EIRP 8

3.1.1 Conducted EIRP..... 8

3.1.2 Radiated EIRP..... 12

3.2 Modulation Characteristics..... 13

3.3 Frequency Stability..... 15

3.4 99% Occupied Bandwidth..... 16

3.5 Antenna Conducted spurious emissions 20

3.6 Enclosure Radiated spurious emissions 30

3.7 Spurious emissions at Block Edges 41

3.8 RF Exposure Compliance 44

4.0 TEST EQUIPMENT..... 45

1.0 GENERAL DESCRIPTION

Model:	Simon iXT
Type of EUT:	Security Alarm
Part Number:	600-1054-95R-IXT
FCC ID:	B4Z-801-IXT
Industry Canada ID:	1175C-801IXT
Related Submittal(s) Grants:	N/A
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:	☒ 47 CFR, Part 24:2008 ☒ RSS-133, Issue 5, 2009 ☐ 47 CFR, Part 15:2008, §15.107 and §15.109, Class B ☐ Other
Type of radio:	☐ Stand -alone ☒ Module ☐ Hybrid
Date Sample Submitted:	September 28, 2009
Test Work Started:	September 28, 2009
Test Work Completed:	October 30, 2009
Test Sample Conditions:	☐ Damaged ☐ Poor (Usable) ☒ Good



1.1 Product Description; Test Facility

Product Description:	PCS 1900 Radio
Transmitter Type:	☐ FHSS ☒ Digital Modulation ☐ WiFi ☐ Blue Tooth
Operating Frequency Range(s):	From 1850.2 to 1909.8 MHz
Modulation:	GMSK
Emission Designator:	290KGXW
Antenna Gain:	3.4dBi maximum
Antenna Installation:	☐ User ☐ Professional ☐ Factory
Transmitter power configuration:	☐ Internal battery ☒ External power source ☒ 120VAC ☐ 230VAC ☐ 400VAC ☐ [] VDC ☐ Other: [] [] Amp. ☐ 50Hz ☒ 60Hz
Test Facility Accreditation:	A2LA (Certificate No. 1427.01)
Test Methodology:	Measurements performed according to the procedures in ANSI C63.4-2003, ANSI/TIA/EIA-603-A

1.2 EUT Configuration

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

- ☐ - Standby
- ☒ - Continuous transmissions (modulated signal)
- ☐ - Continuous transmissions (un-modulated signal)
- ☐ - Continuous receiving
- ☐ - Test program (customer specific)
- ☐ -

Operating modes of the EUT:

No.	Description
1	Continuous communication with Radio Communication Tester. Test was performed at low channel (512), middle channel (661), and upper channel (810)
2	

Cables:

No.	Type	Length	Designation	Note
1	N/A			
2				

Support equipment/Services:

No.	Item	Description
1	Rohde & Schwarz CMU 200	Universal Radio Communication Tester
2	Agilent 8960	GPRS Station
3	Mini-Circuits ZNDC-13-2G-S	800-2000MHz Coupler

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:	-30 to +50 ° C
---	----------------

1.4 Measurement uncertainty

The expanded uncertainty ($k = 2$) for radiated measurements has been determined to be:

± 4 dB at 10m and ± 5.4 dB at 3m

The expanded uncertainty ($k = 2$) for conducted measurements at antenna terminal has been determined to be:

± 1.0 dB

The expanded uncertainty ($k = 2$) for line conducted measurements 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
24.232/RSS-133 (6.4)	RF output power EIRP	Pass
2.1047/RSS-133 (6.2)	Modulation Characteristics	Pass
24.235/RSS-133 (6.3)	Frequency Stability	Pass
2.1049/RSS-133 (2.3)	Occupied Bandwidth	Pass
24.238/RSS-133 (6.5)	Antenna conducted spurious emissions	Pass
24.238/RSS-133 (6.5)	Enclosure Radiated spurious emissions	Pass
24.238/RSS-133 (6.5)	Spurious emissions at Block Edges	Pass
1.1310, 2.1091(c)/ RSS- Gen 5.5	RF Exposure Compliance	Pass

3.0 TEST CONDITIONS AND RESULTS

3.1 RF Output Power EIRP

3.1.1 Conducted EIRP

Test location: ☐ OATS ☐ Anechoic Chamber ☐ Other

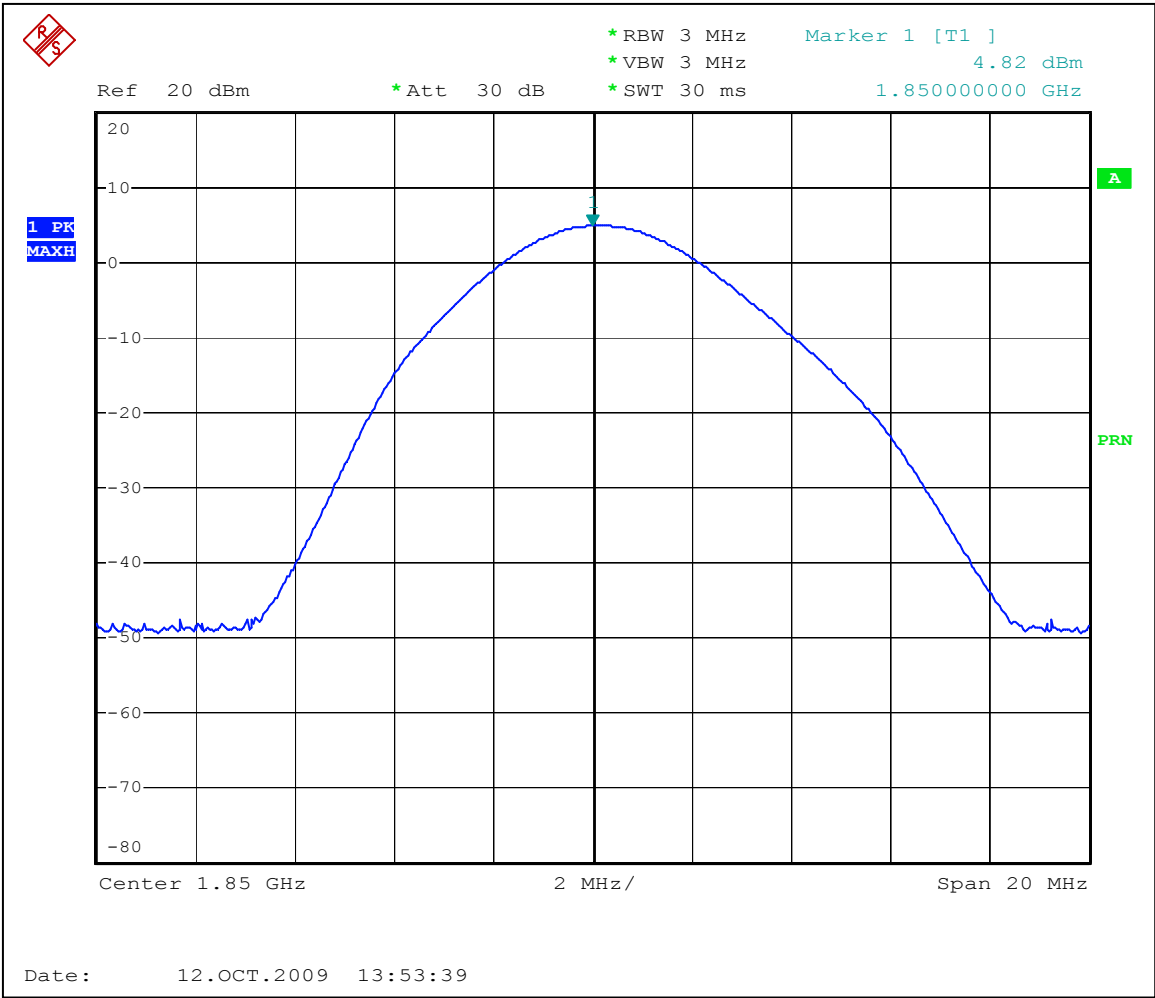
Test result: **Pass**

The maximum output EIRP is 24.12dBm or 0.26W

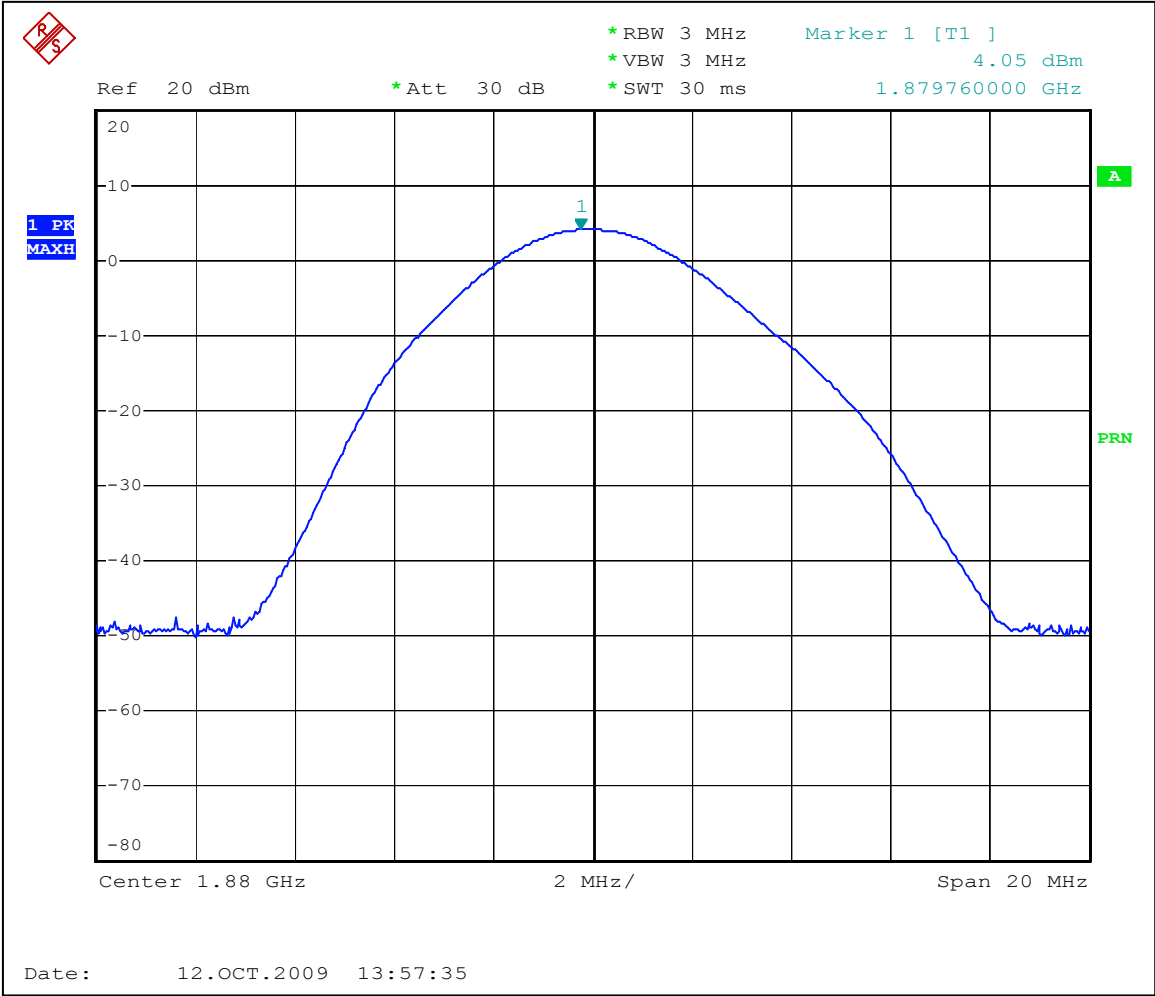
Max. Margin: 8.88 dB below the limits

Power Output:	Conducted				
Frequency Range:	☒ 1850.2-1909.8MHz				
Low Frequency MHz	Measured power dBm	Total CF dB	EIRP dBm	EIRP Limit dBm	Margin dB
1850.2	4.82	19.3	24.12	33.0	-8.88
Middle Frequency MHz					
1880.2	4.05	19.3	23.35	33.0	-9.65
Upper Frequency MHz					
1909.8	3.80	19.3	23.10	33.0	-9.90
RBW:	☐ 1MHz ☒ 3MHz ☐ 10MHz				
VBW:	☐ 1MHz ☒ 3MHz ☐ 10MHz				
CF=Cable/Coupler Insertion Loss:	☒ 15.9dB				
Antenna Gain (dBi)	☒ 3.4dBi				
Total CF=CF+Antenna Gain	☒ 19.3dBi				

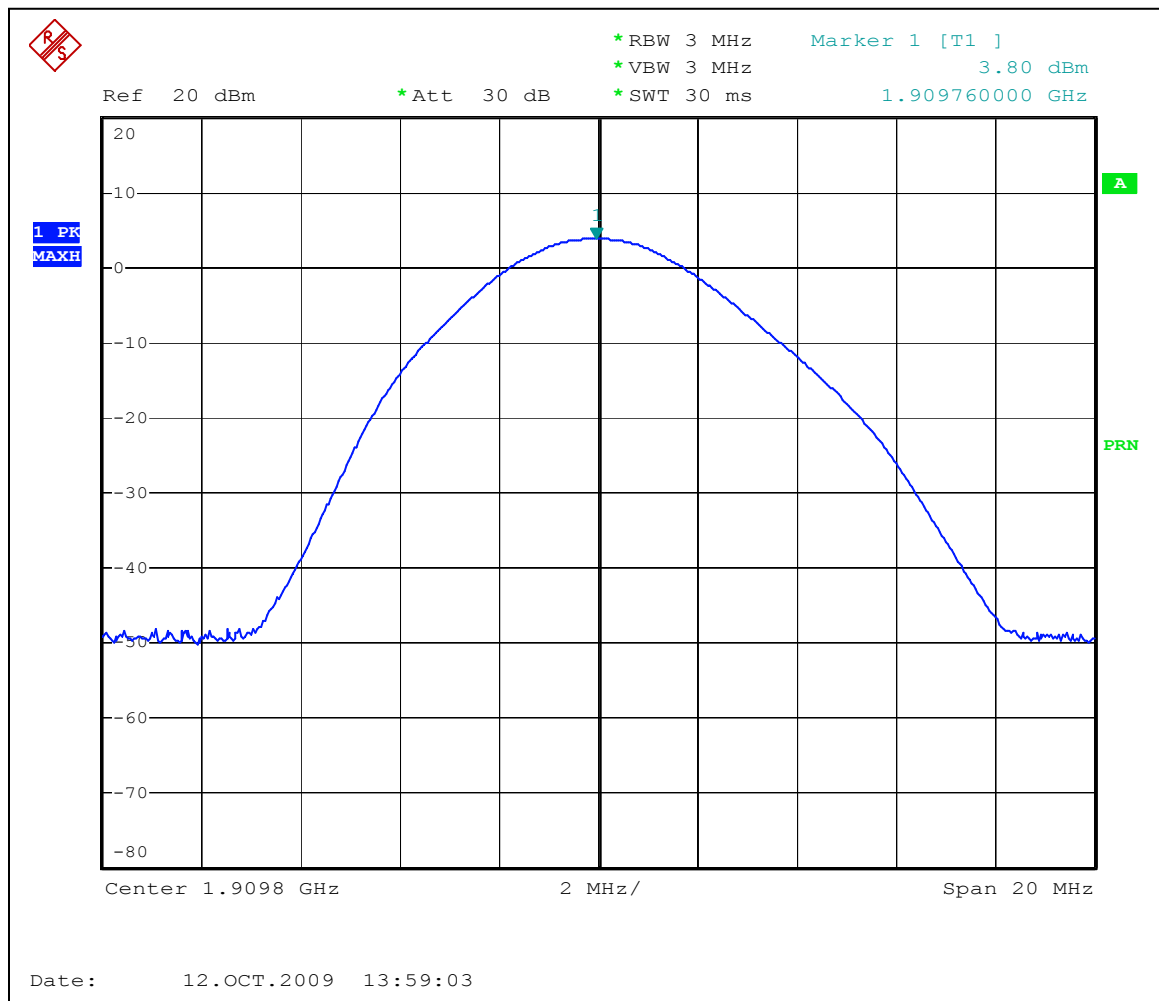
- Notes:**
- The Conducted RF output power measurements were made at the RF output terminal of the EUT using coupler and spectrum analyzer. The EUT was controlled via Rohde & Schwarz CMU 200 station selecting maximum power of the EUT and GMSK modulated signal.
 - Max ERP is 2W or 33.0dBm



Graph 3.1.1



Graph 3.1.2



Graph 3.1.3



3.1.2 Radiated EIRP

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test result: **Pass**

Max. Margin: 8.7dB below the limits

Date:	October 30, 2009	Result: Pass
Standard:	FCC Part 24.232	
Tested by:	Uri Spector	
Test Point:	EUT with Antenna	
Operation mode:	Transmitting Mode	
Note:		

Table 3.1.2

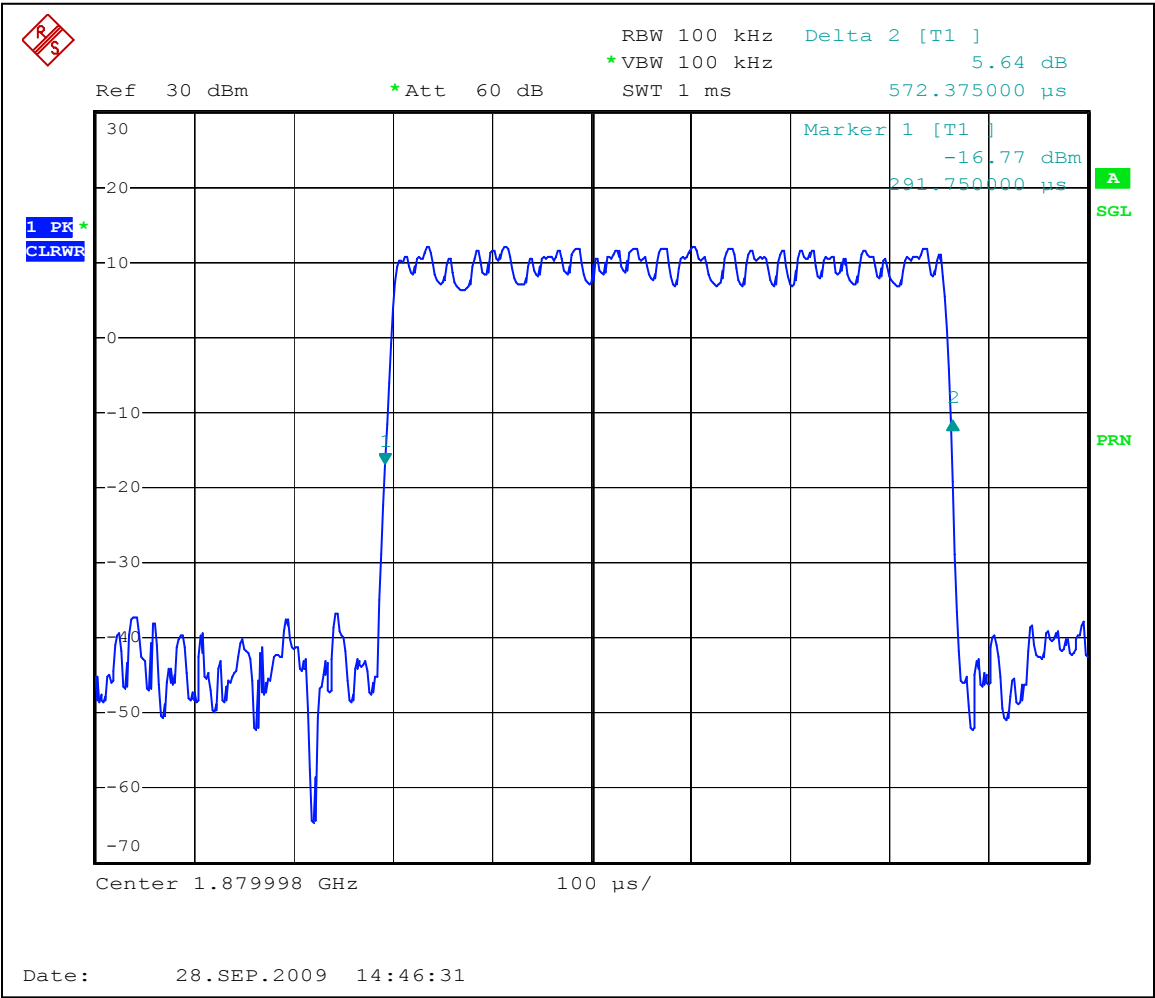
Frequency MHz	Antenna Polarity	Substitution Antenna Power dBm	Substitution Antenna Gain dBi	Cable Loss dB	EIRP Emissions dBm	Limit dBm	Margin dB
1850.18	V	15.5	9.3	0.5	24.3	33.0	-8.7
1879.96	V	15.1	9.4	0.5	24.0	33.0	-9.0
1909.70	V	15.0	9.4	0.5	23.9	33.0	-9.1
1850.18	H	14.6	9.3	0.5	23.4	33.0	-9.6
1879.96	H	14.1	9.4	0.5	23.0	33.0	-10.0
1909.70	H	14.4	9.4	0.5	23.3	33.0	-9.7

Special Config. Info: Substitution Method
Limits 2W, or 33dBm

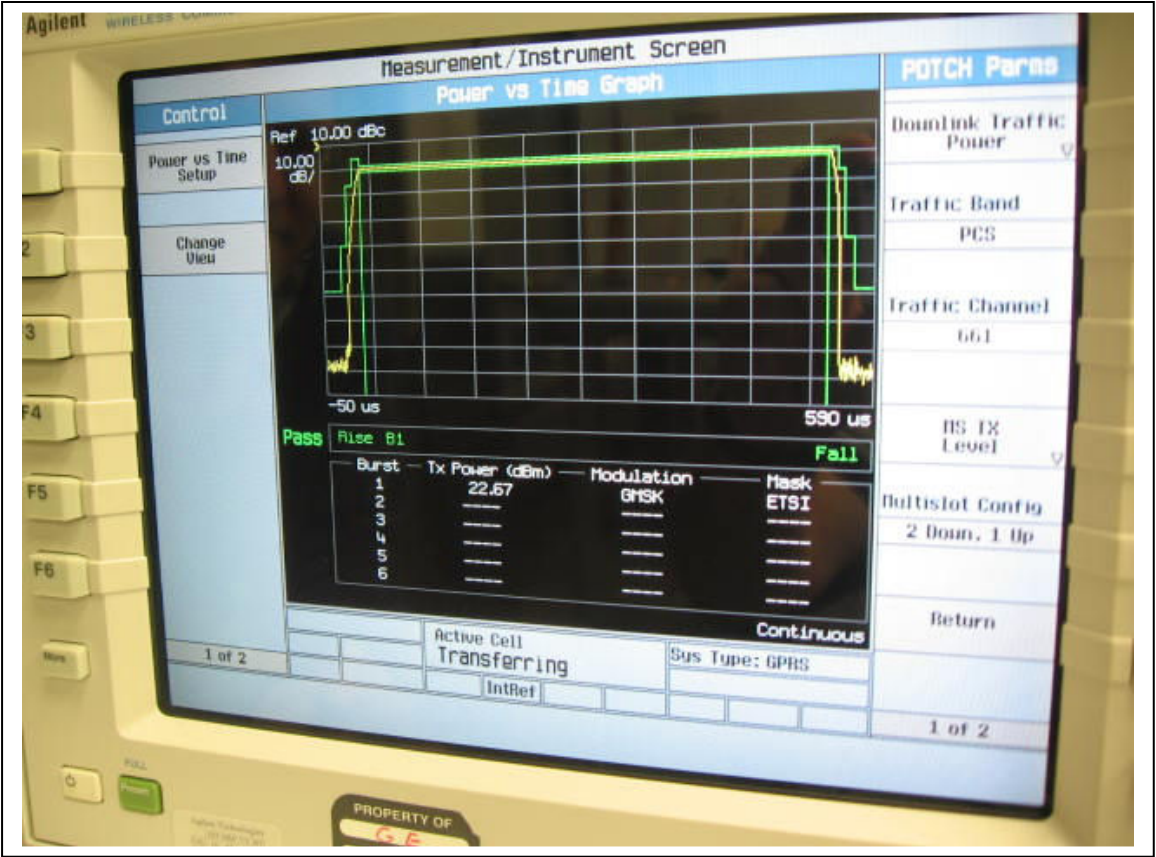
3.2 Modulation Characteristics

The EUT uses GMSK modulation in which information is digitized and coded into a bit system.

The following graph and picture show the modulation scheme in the EUT.



Graph 3.2.1



Picture

3.3 Frequency Stability

Table 3.3.1

Temperature Degree C	Frequency Deviation Hz	Frequency Stability ppm	Frequency error limit ppm	Test Result
-30	-30.0	-0.016	±1.5	Pass
-20	-24.0	-0.129	±1.5	Pass
-10	-18.0	-0.010	±1.5	Pass
0	-14.0	-0.007	±1.5	Pass
10	-15.0	-0.008	±1.5	Pass
20	-17.0	-0.009	±1.5	Pass
30	-21.0	-0.011	±1.5	Pass
40	-19.0	-0.010	±1.5	Pass
50	18.0	0.010	±1.5	Pass

Frequency stability over voltage variations measurements were made at room temperature at the ±15% of the nominal mains 120VAC.

Table 3.3.2

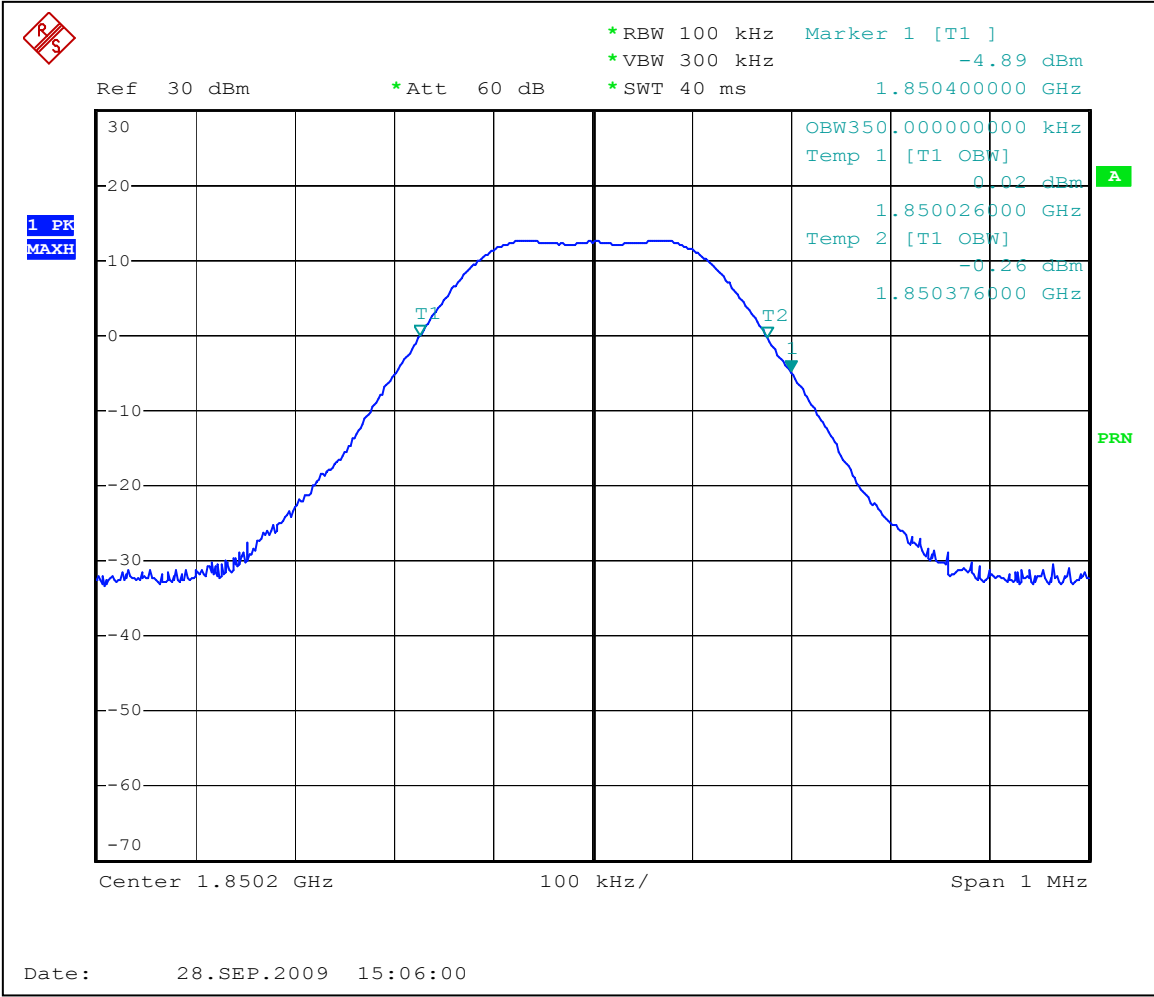
Input Voltage VAC	Frequency Error Hz	Frequency Error (ppm)	Test Result
138.0	-11	-0.006	Pass
102.0	-14	-0.008	Pass

Notes: The maximum frequency error was measured using the frequency meter of CMU200

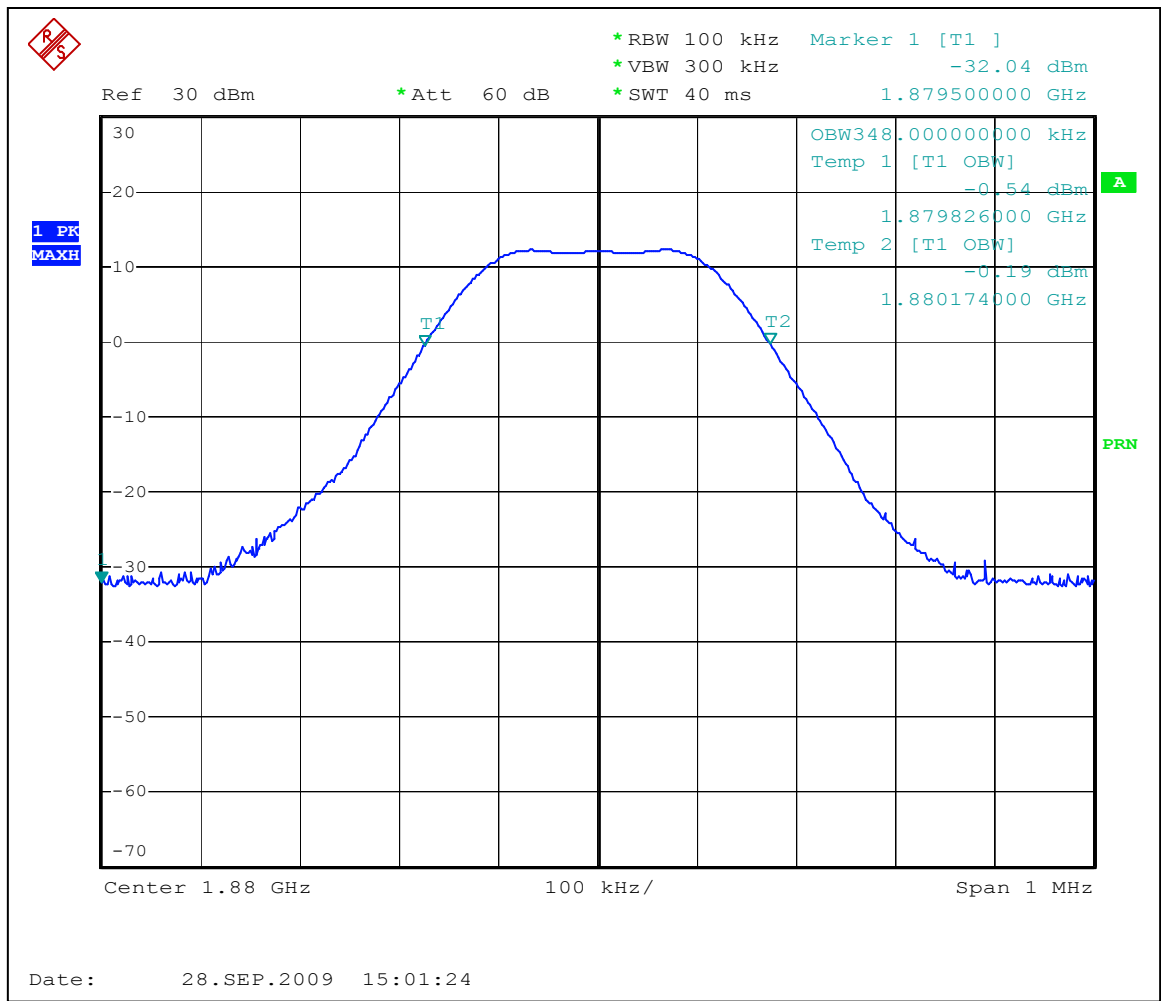
3.4 99% Occupied Bandwidth

Low Frequency Channel kHz	Middle Frequency Channel kHz	Upper Frequency Channel kHz
350	348	344
RBW: VBW:	☒ 100kHz ☐ other kHz ☐ 30kHz ☒ 300kHz ☐ other kHz	

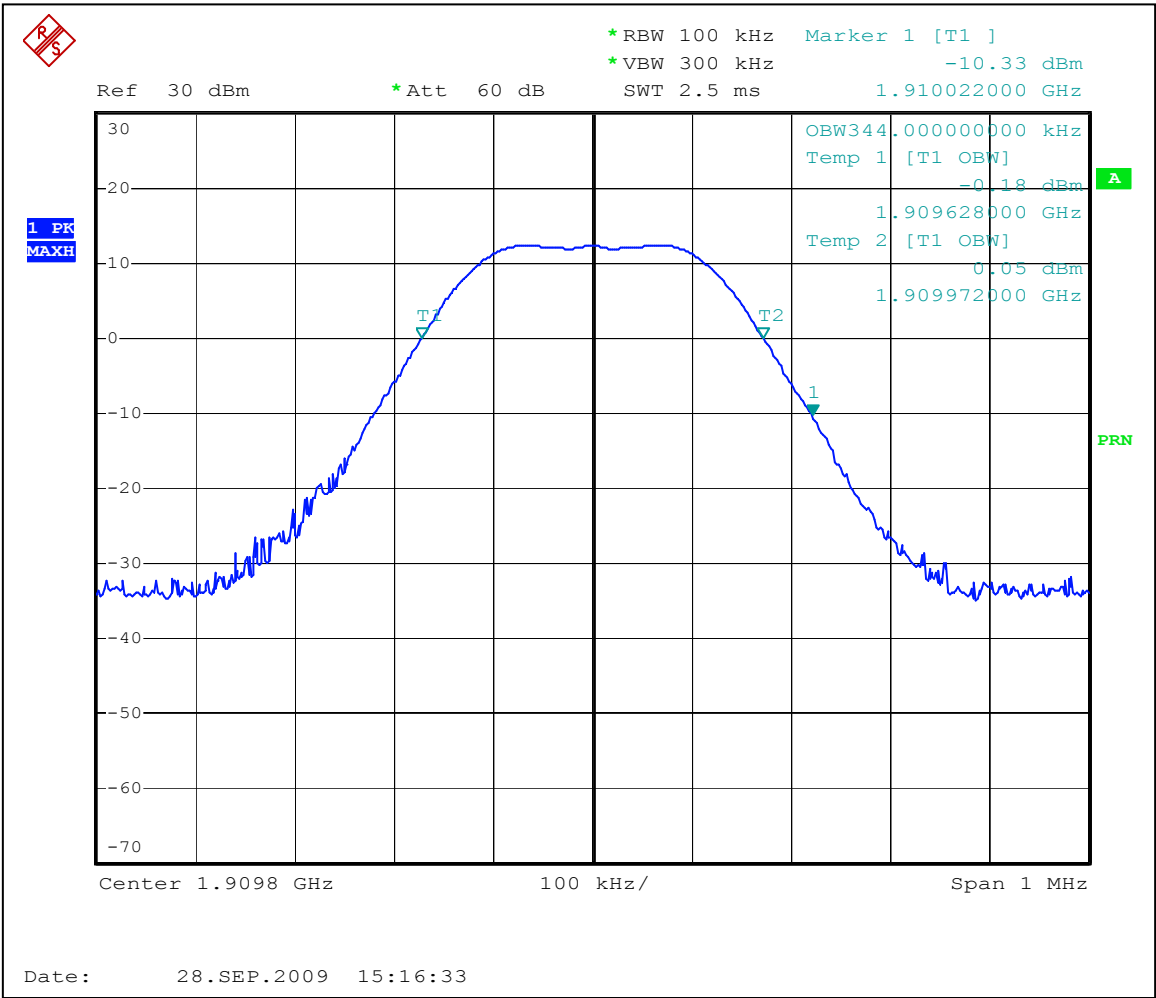
Notes: None



Graph 3.4.1



Graph 3.4.2



Graph 3.4.3

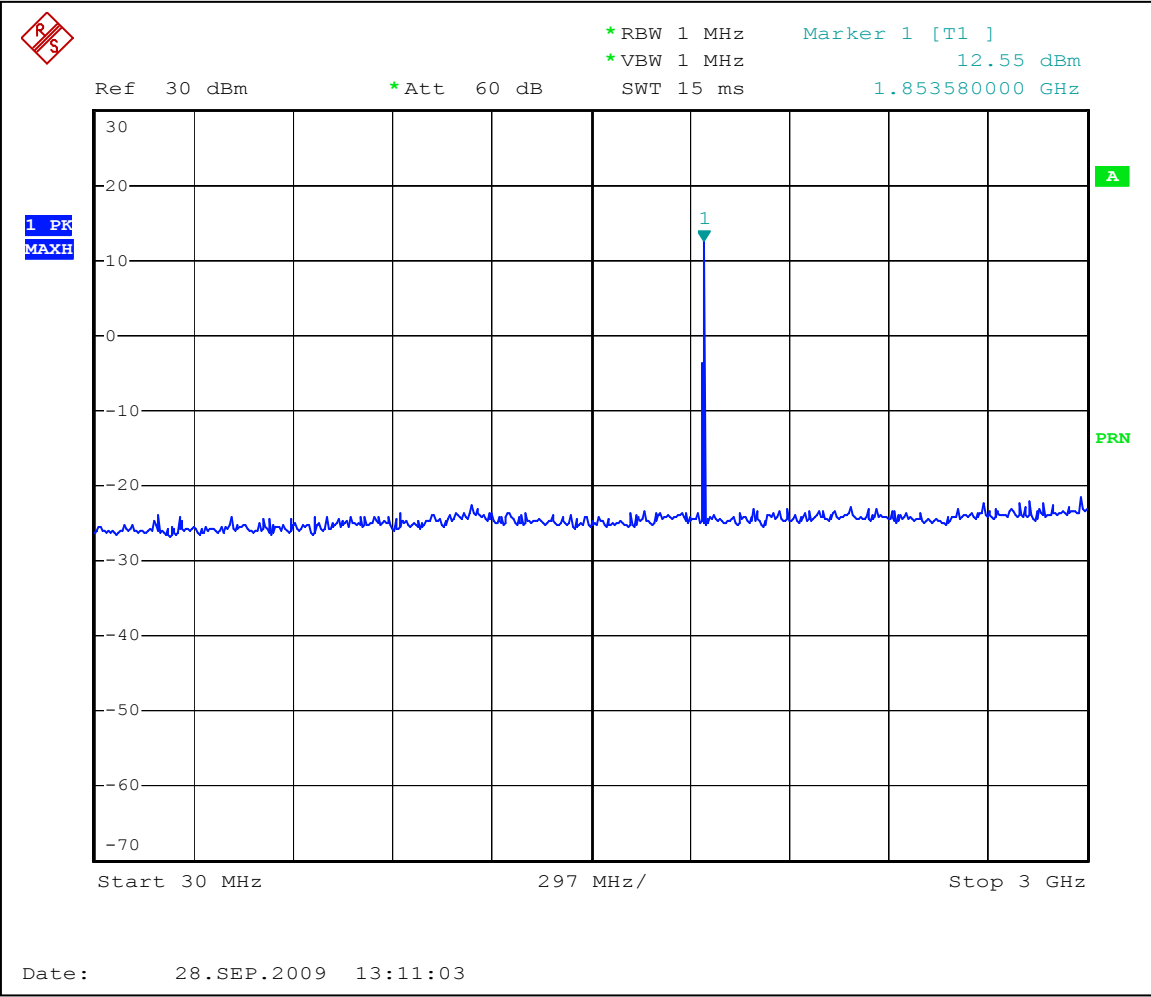


3.5 Antenna Conducted spurious emissions

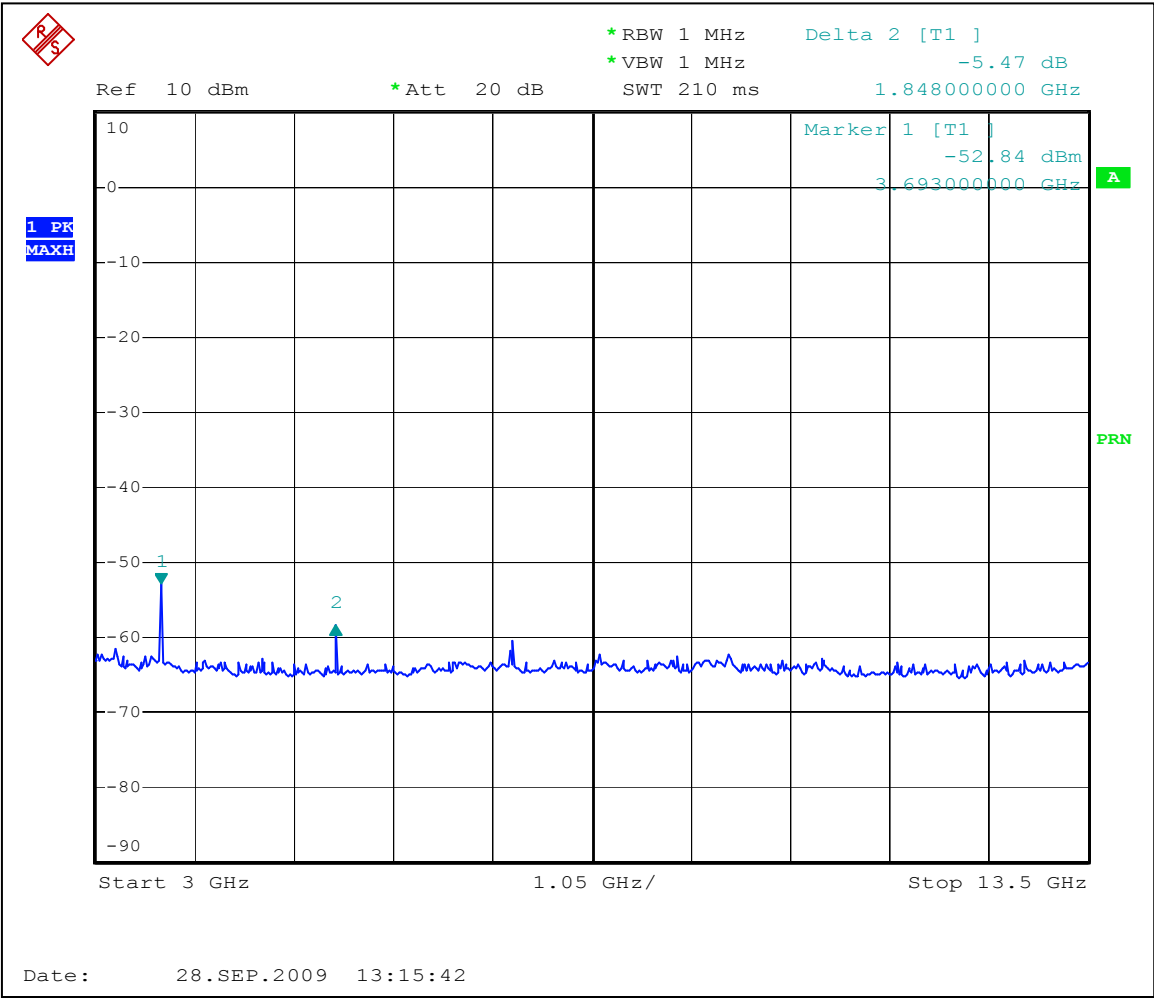
Test location: ☐ OATS ☐ Anechoic Chamber ☐ Other

Test result: **Pass**

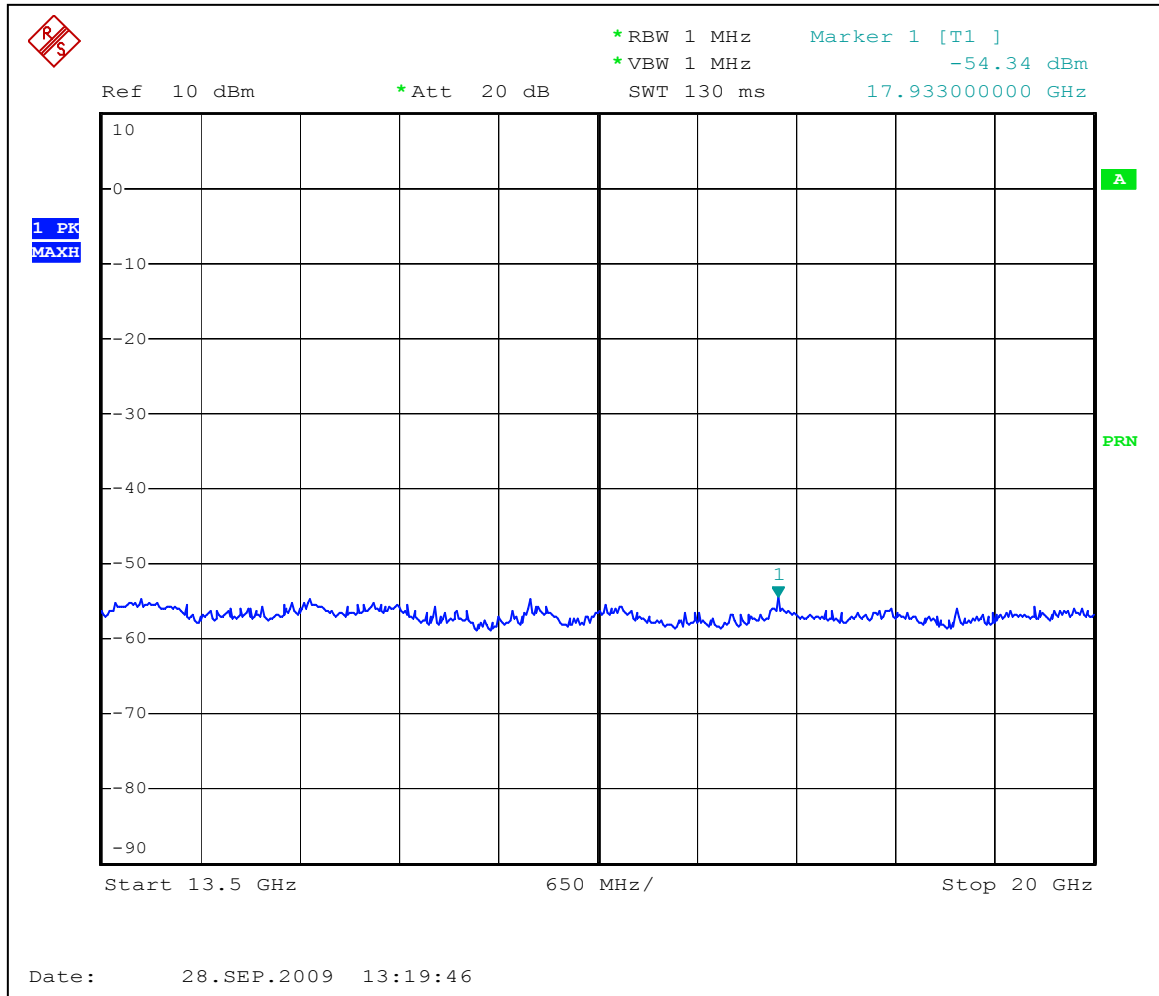
Notes: The power of spurious emissions should be attenuated at least $43+10\log(P)$ dB, P in watts, so that the level in dBm is -13dBm.
The maximum detected spurious emission is -52.84dBm or -33.54dBm ERP. The margin of the maximum emissions is $-33.54\text{dB} - (-13\text{dB}) = -20.54\text{dB}$. For passing results see Graphs 3.5.1-3.5.9. Fundamental frequencies are excluded from the measurements.



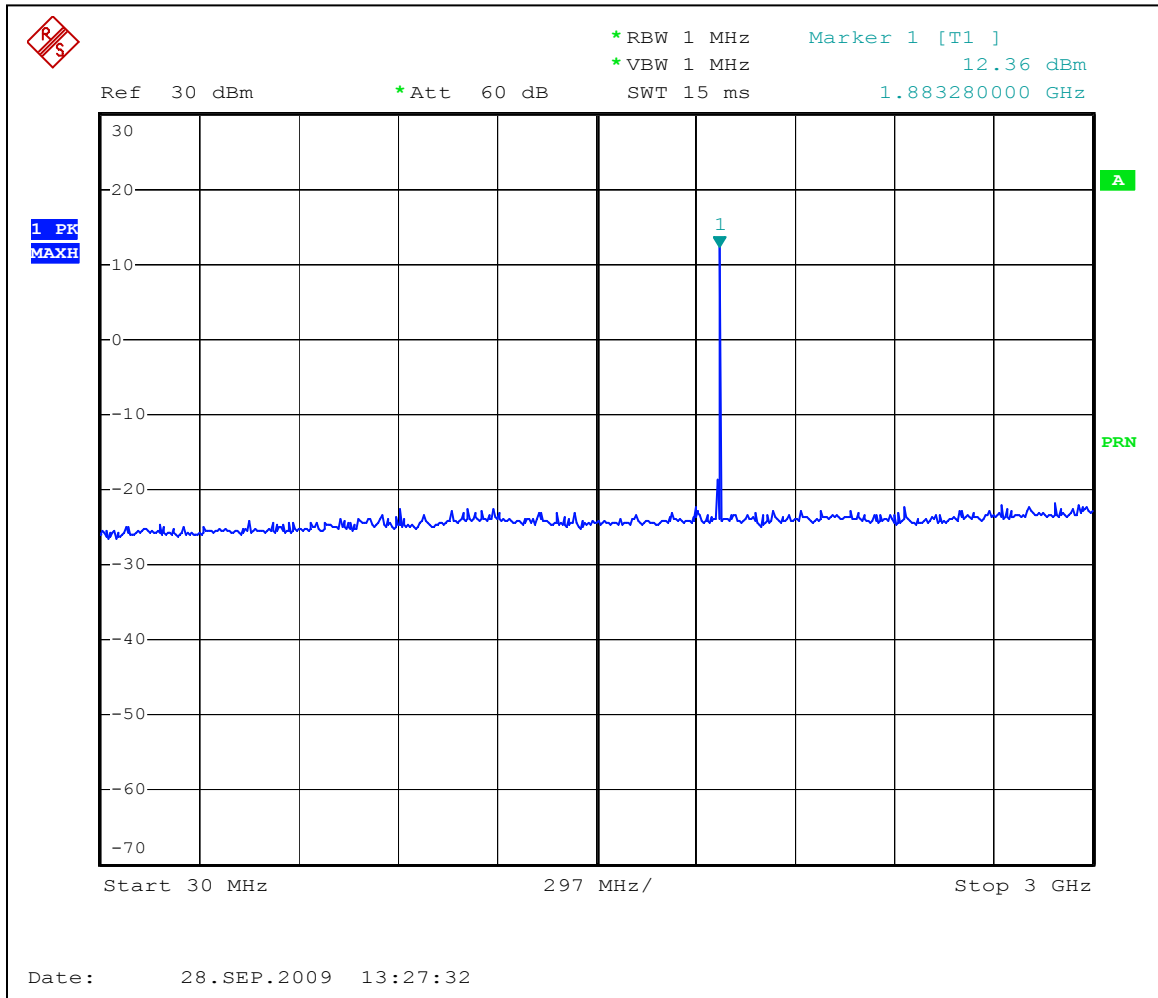
Graph 3.5.1



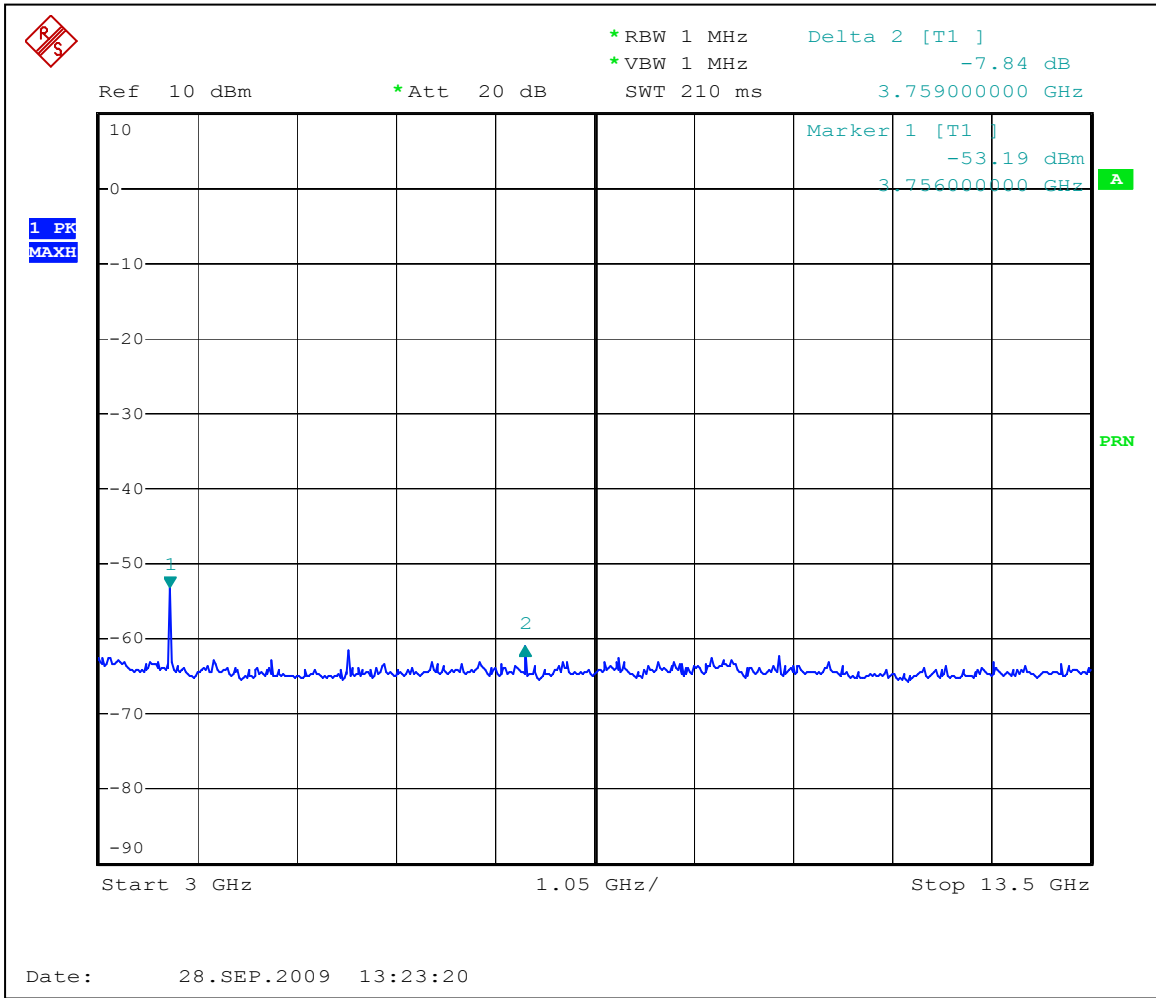
Graph 3.5.2



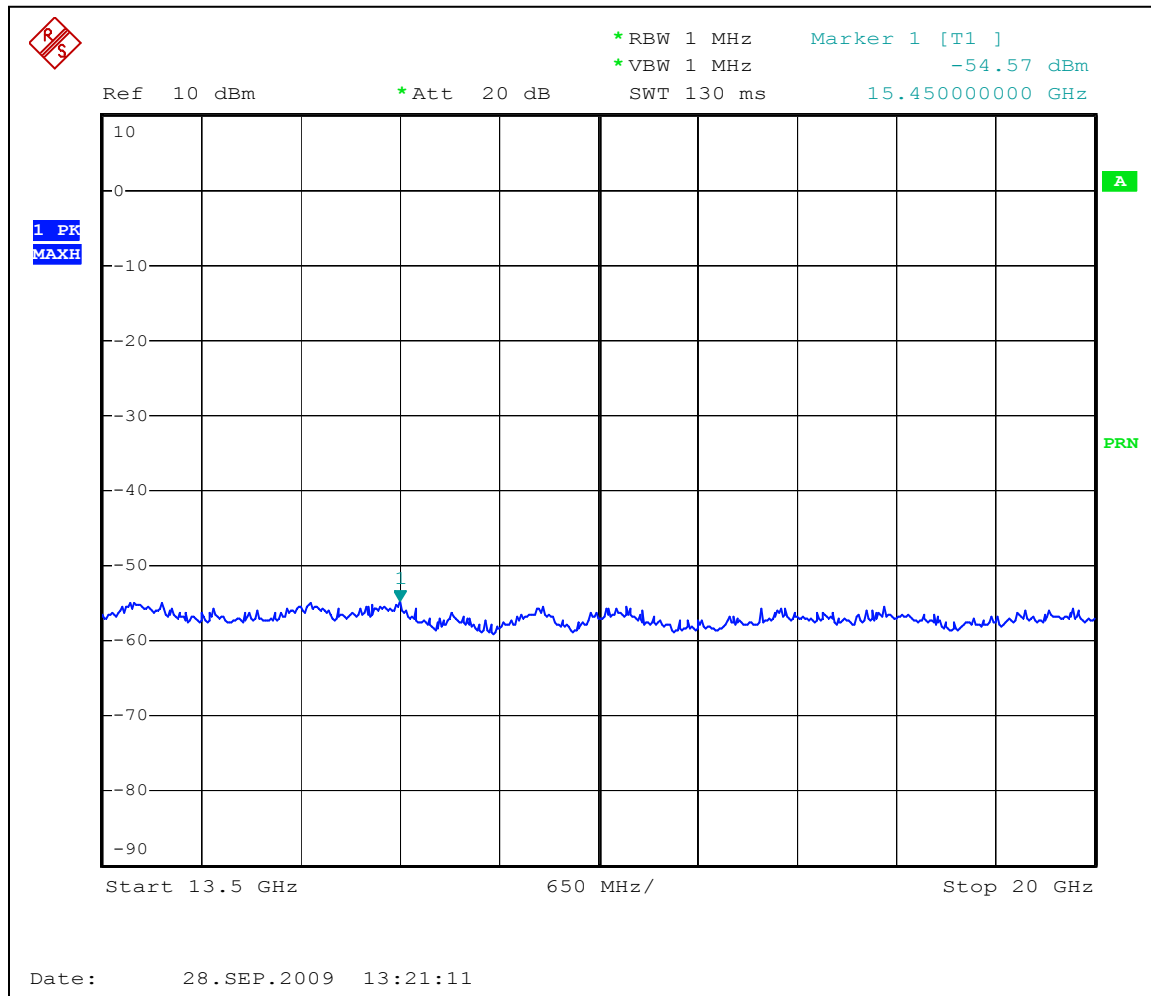
Graph 3.5.3



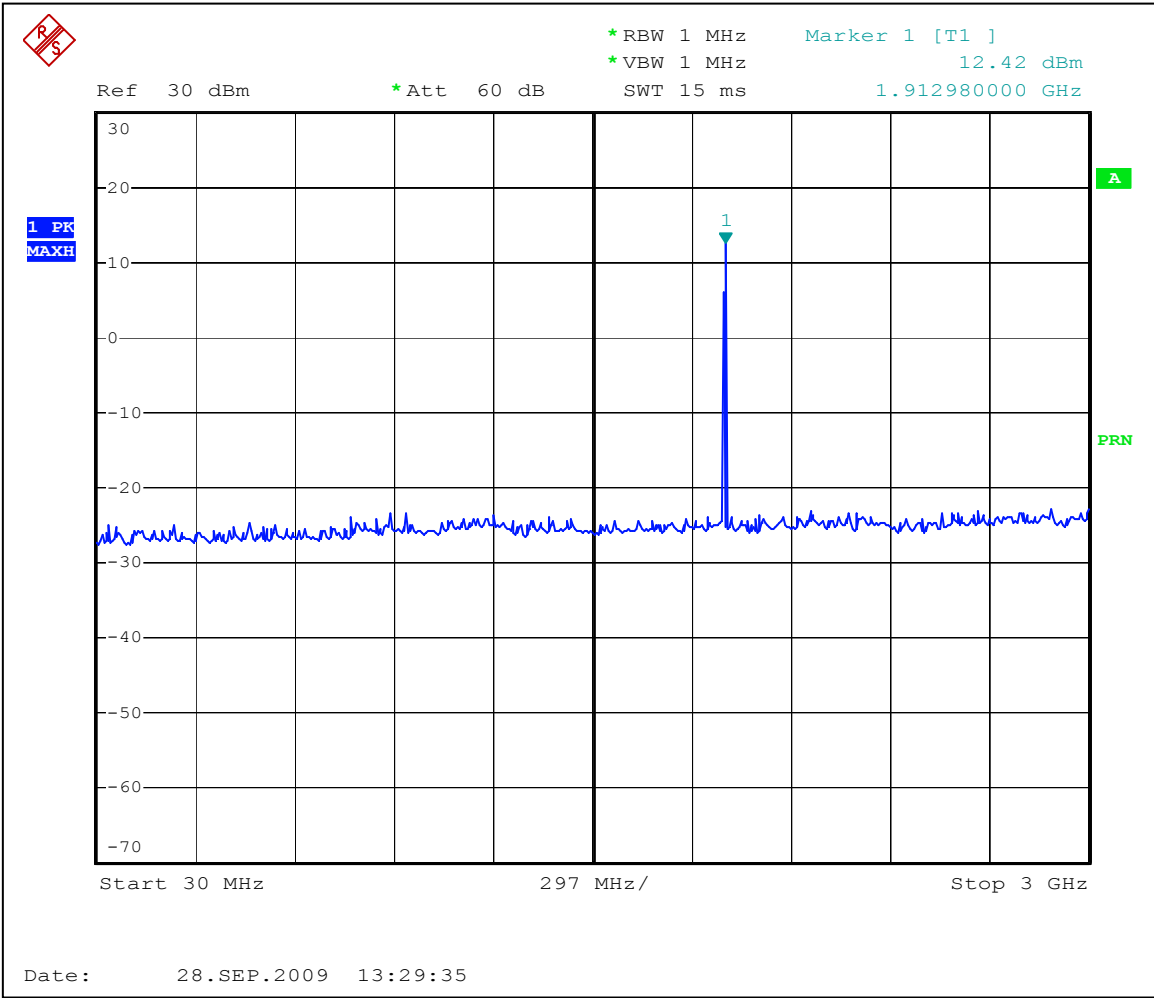
Graph 3.5.4



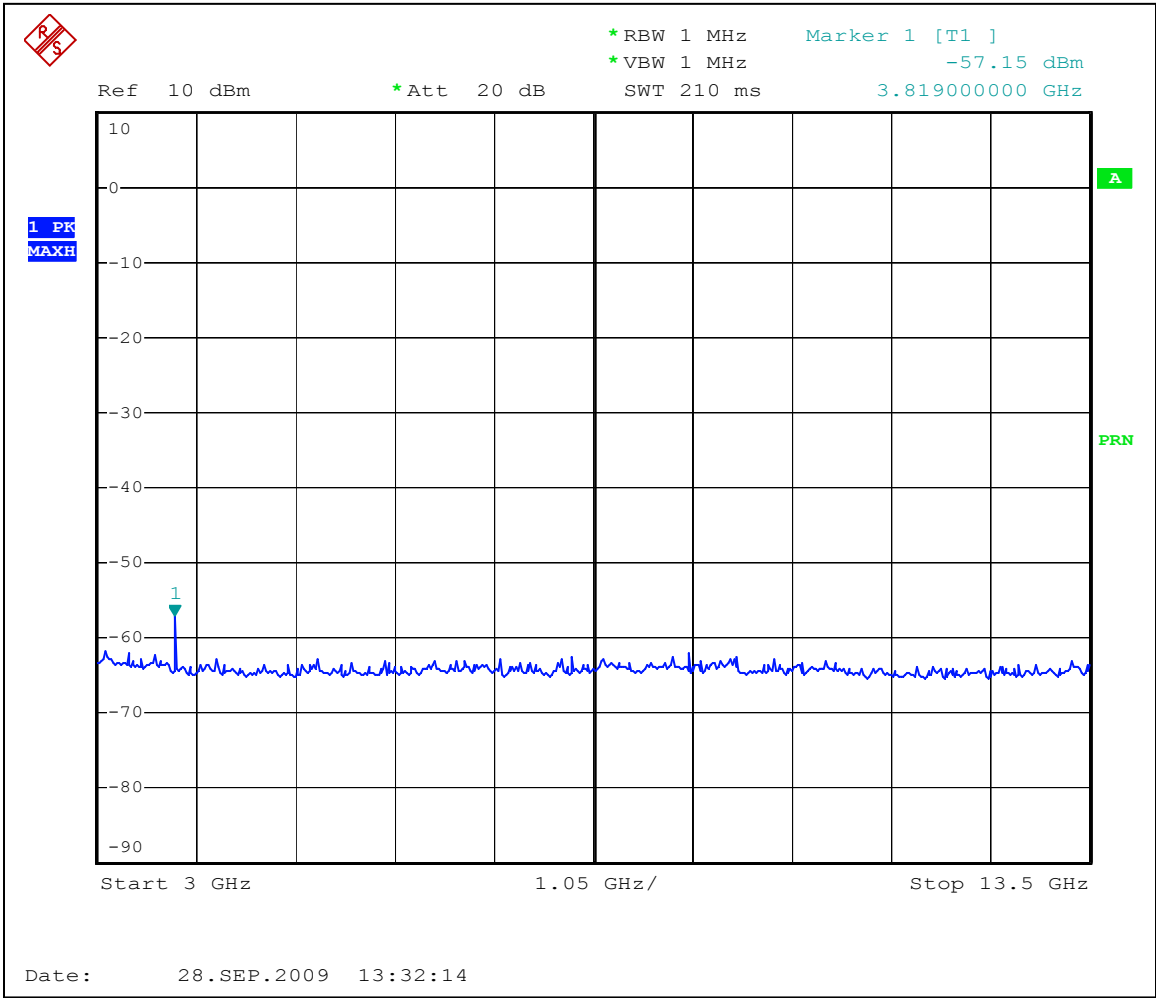
Graph 3.5.5



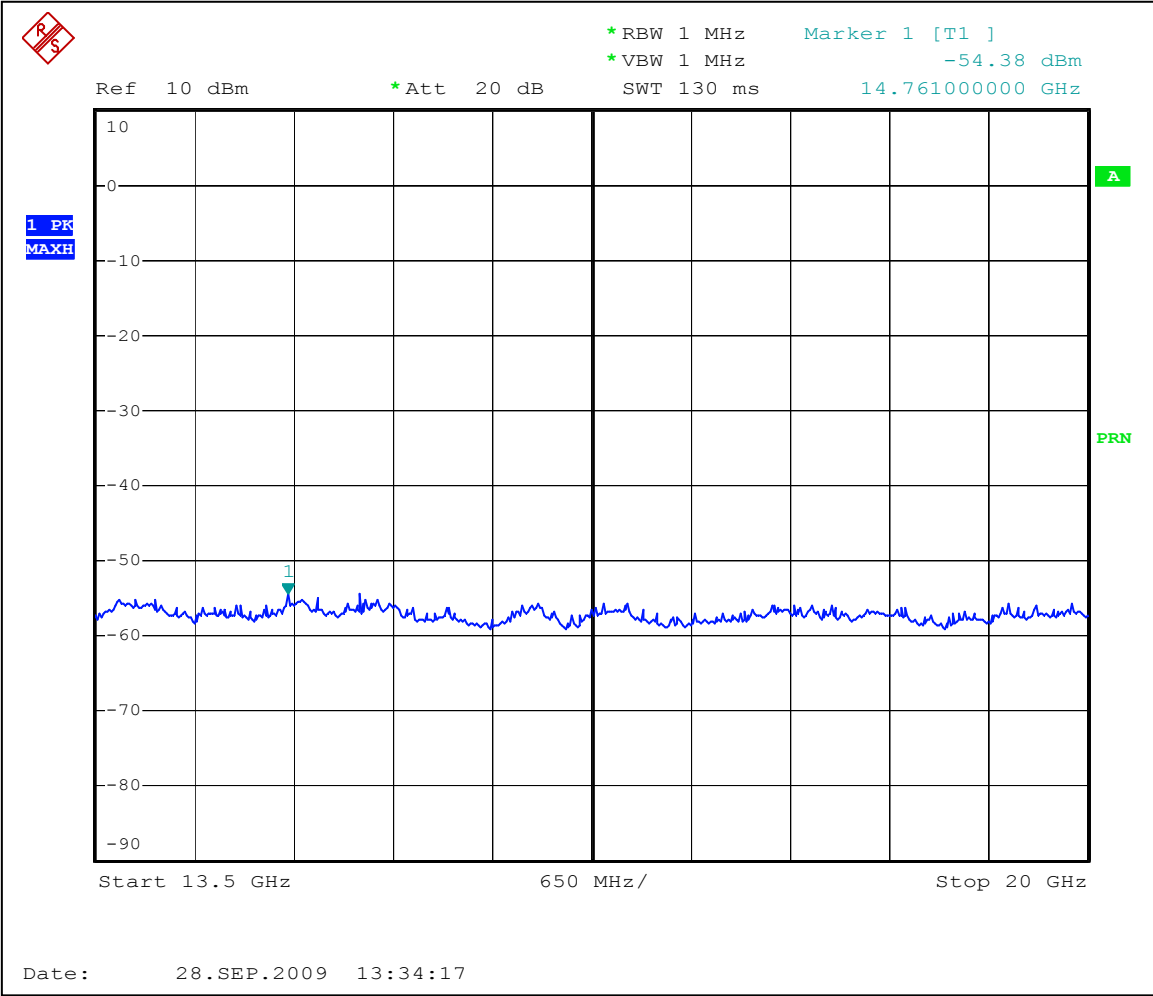
Graph 3.5.6



Graph 3.5.7



Graph 3.5.8



Graph 3.5.9

3.6 Enclosure Radiated spurious emissions

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test result: **Pass**

Tables 3.6.1-3.6.2 show detected Spurious Radiated Emissions from 30MHz to 1GHz and from 1GHz-20GHz respectively.

Graphs 3.6.1- to 3.6.12 show the EUT peak Radiated Emissions.

The Spurious Radiated Power limits of -13dBm was correlated with field strength reference level of 82.2dBμV/m during field strength measurements at 3m measurement distance.

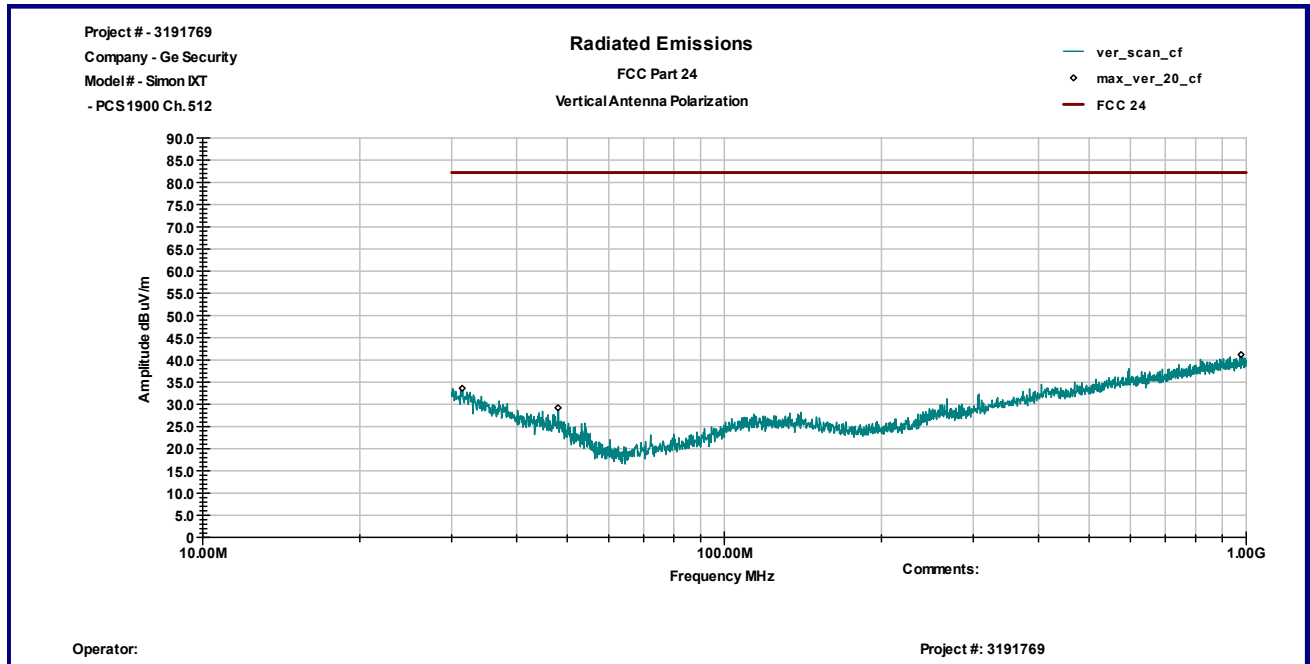
No emissions were chosen for substitution measurements as the maximum emission is more than 20dB below the reference limit. The transmitting fundamental frequency was excluded from the measurements.

Table 3.6.1

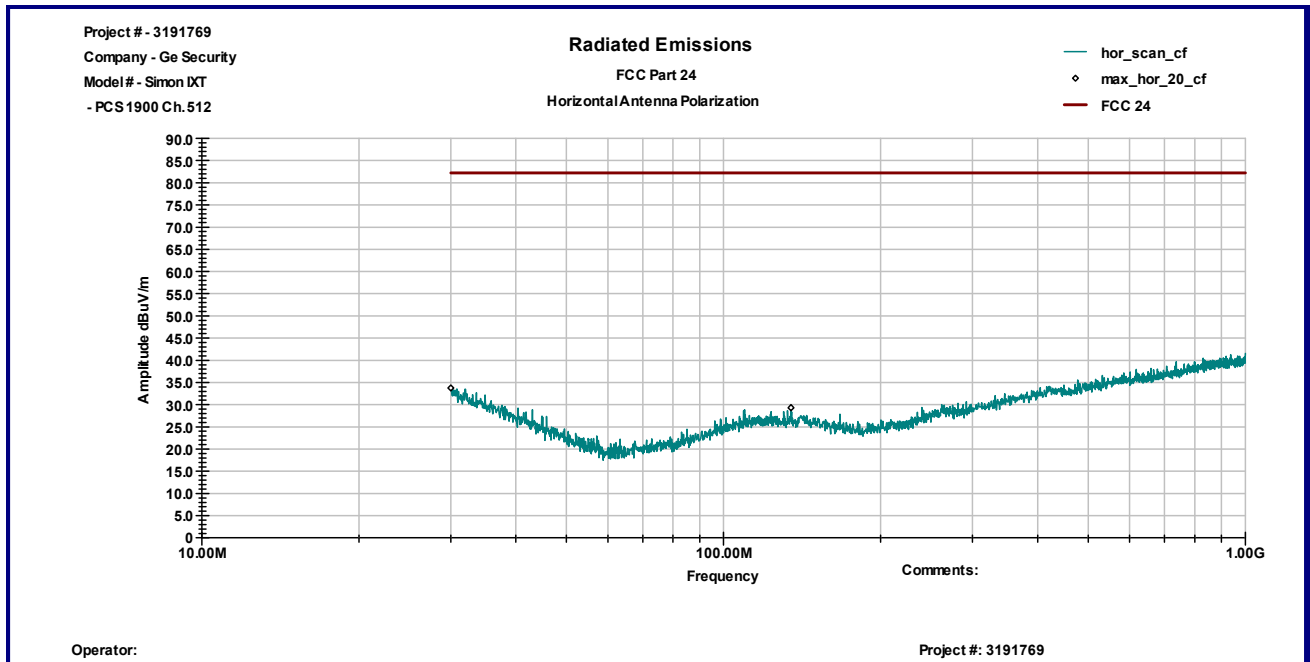
Frequency	Ant. Polarity	Peak Reading dBμV	Ant.Factor dB1/m	Total at 3m dBμV/m	QP Limit dBμV/m	Margin dB
Channel 512						
31.455 MHz	V	13.4	20.2	33.6	82.2	-48.6
48.009 MHz	V	17.8	11.4	29.2	82.2	-53.0
30.0 MHz	H	12.6	21.1	33.7	82.2	-48.5
134.62 MHz	H	15.5	13.8	29.3	82.2	-52.9
31.662 MHz	V	14.2	20.1	34.3	82.2	-47.9
115.07 MHz	V	15.3	14.0	29.3	82.2	-53.0
30.623 MHz	H	13.0	20.7	33.7	82.2	-48.5
123.28 MHz	H	15.0	13.9	28.9	82.2	-53.3
874.09 MHz	H	16.7	25.2	41.9	82.2	-40.3
Channel 810						
32.009 MHz	V	13.6	19.9	33.5	82.2	-48.7
48.078 MHz	V	17.9	11.4	29.3	82.2	-52.9
116.12 MHz	V	15.2	14.0	29.1	82.2	-53.1
31.385 MHz	H	13.9	20.3	34.2	82.2	-48.1
105.37 MHz	H	15.5	13.2	28.6	82.2	-53.6

Table 3.6.2

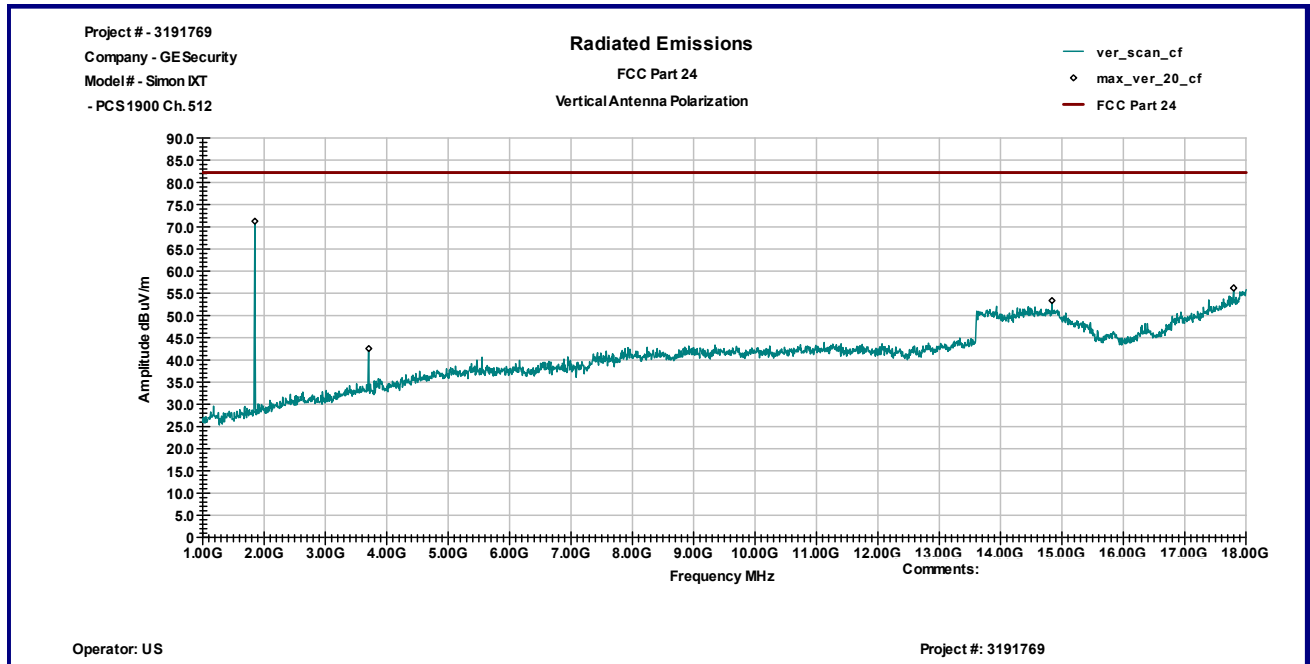
Frequency MHz	Antenna Polarity	Reading dBμV	Total C.F. dB1/m	Pre-Amp. Gain (dB)	Total at 3m dBμV/m	QP Limit dBμV/m	Margin dB
Channel 512							
3.7064 GHz	V	49.4	36.3	43.1	42.5	82.2	-39.7
5.5492 GHz	H	43.4	41.2	41.6	43.0	82.2	-39.2
Channel 661							
3.7625 GHz	H	55.2	36.4	43.1	48.5	82.2	-33.7
5.641 GHz	H	44.3	41.2	41.6	43.9	82.2	-38.3
Channel 810							
3.822 GHz	V	46.6	36.6	43.0	40.2	82.2	-42.0
3.822 GHz	H	47.2	36.6	43.0	40.8	82.2	-41.4
5.726 GHz	H	43.2	41.2	41.6	42.7	82.2	-39.5



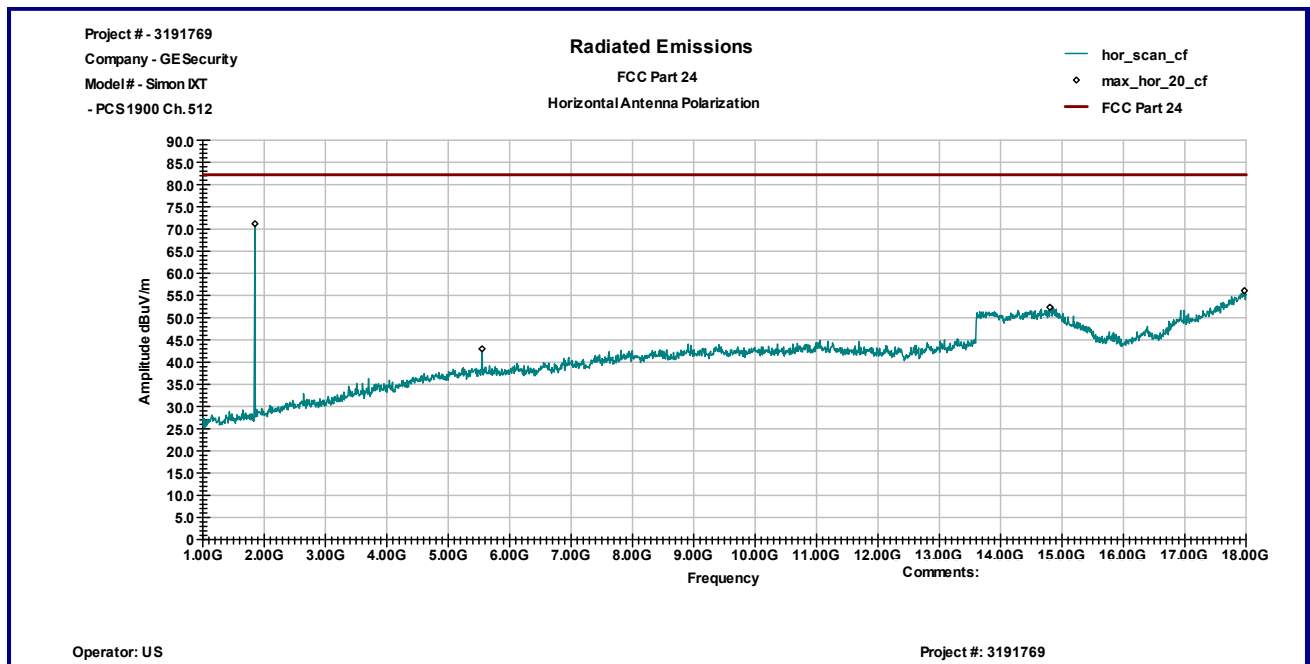
Graph 3.6.1



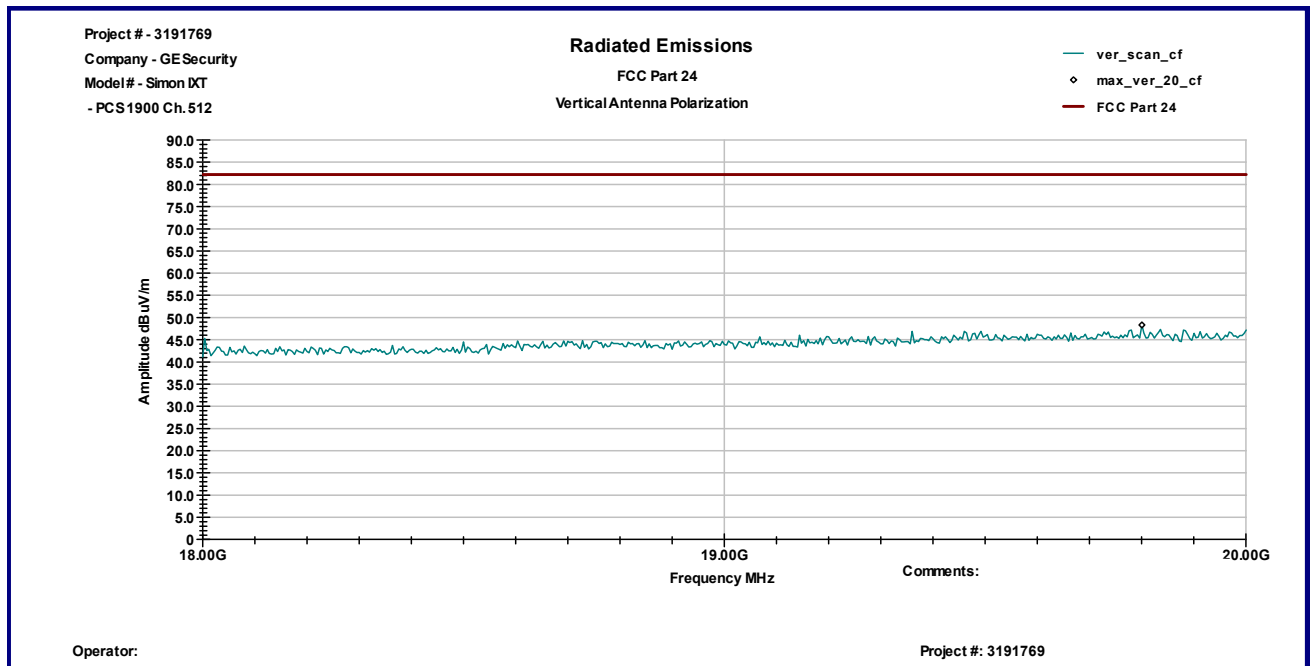
Graph 3.6.2



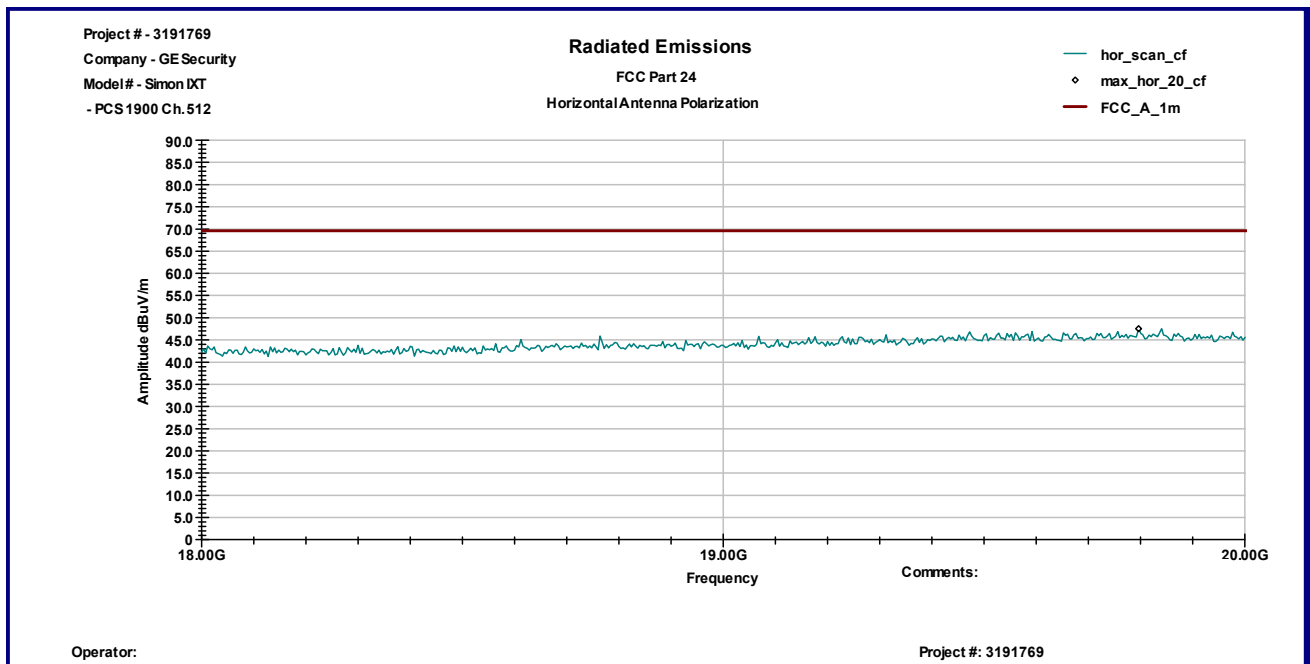
Graph 3.6.3



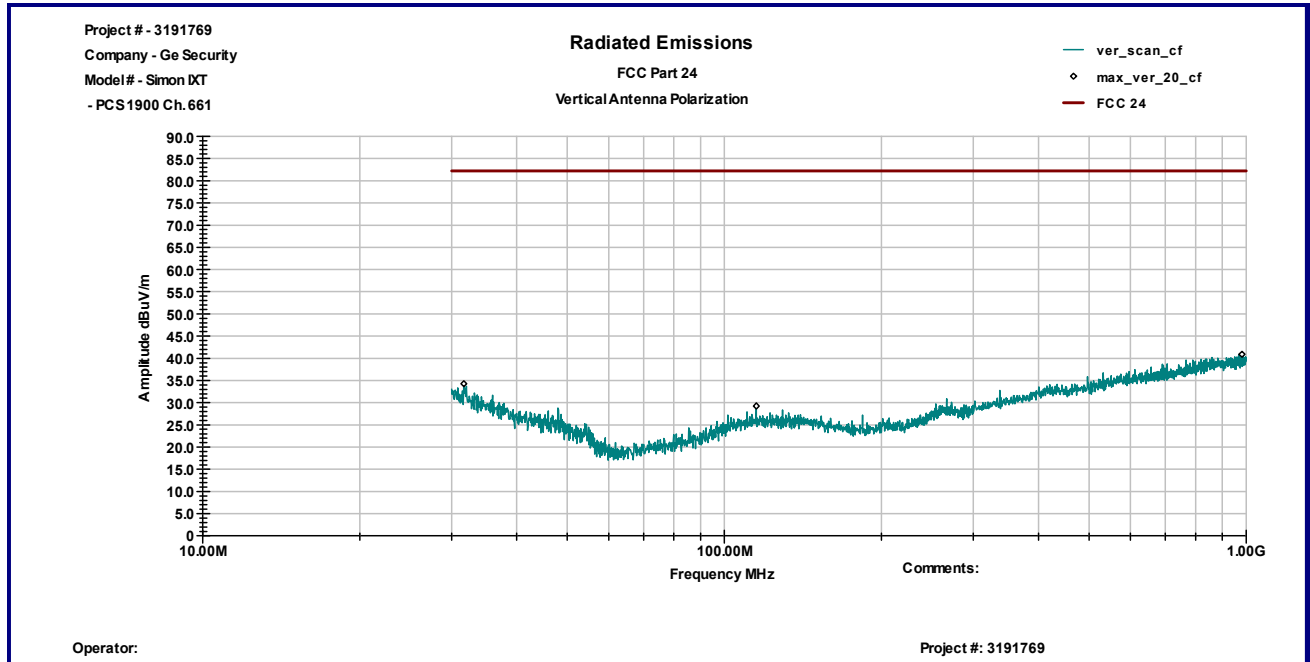
Graph 3.6.4



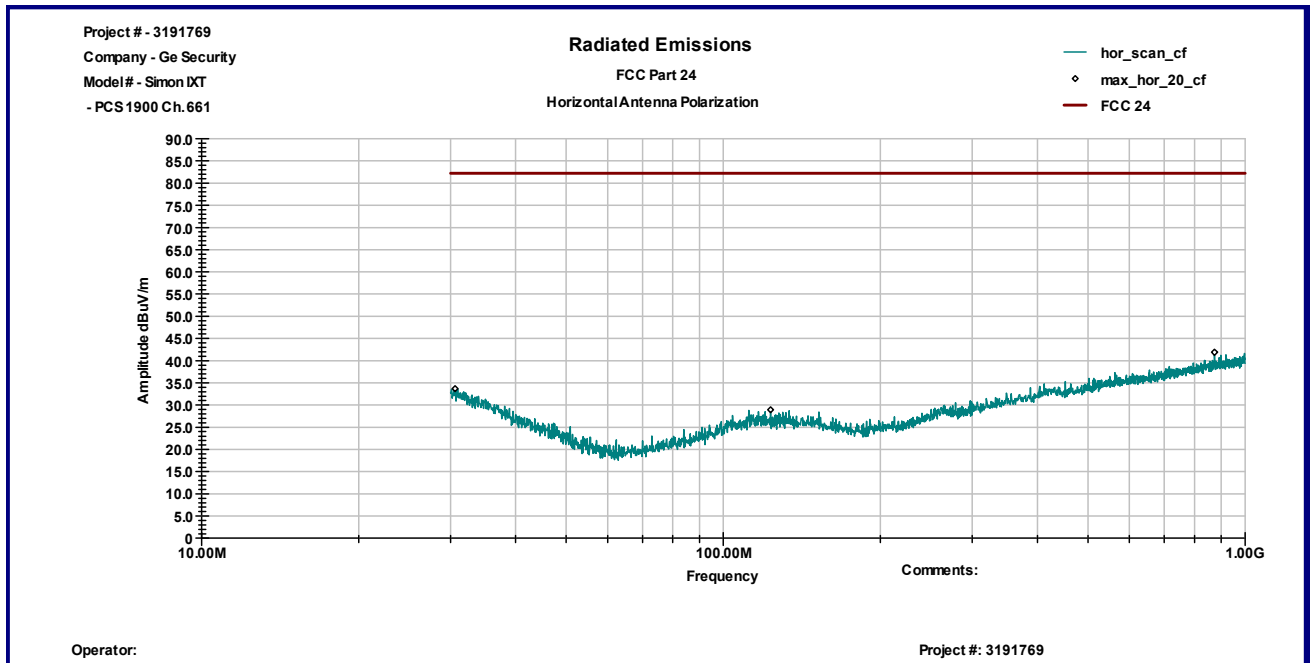
Graph 3.6.5



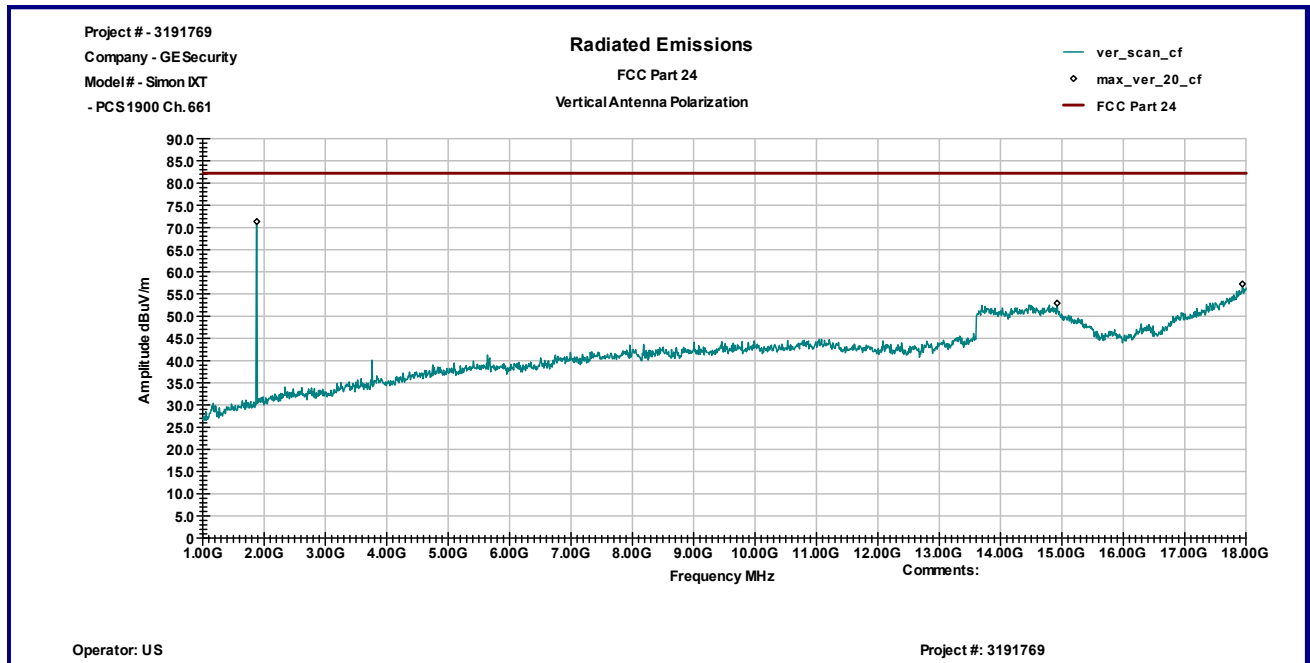
Graph 3.6.6



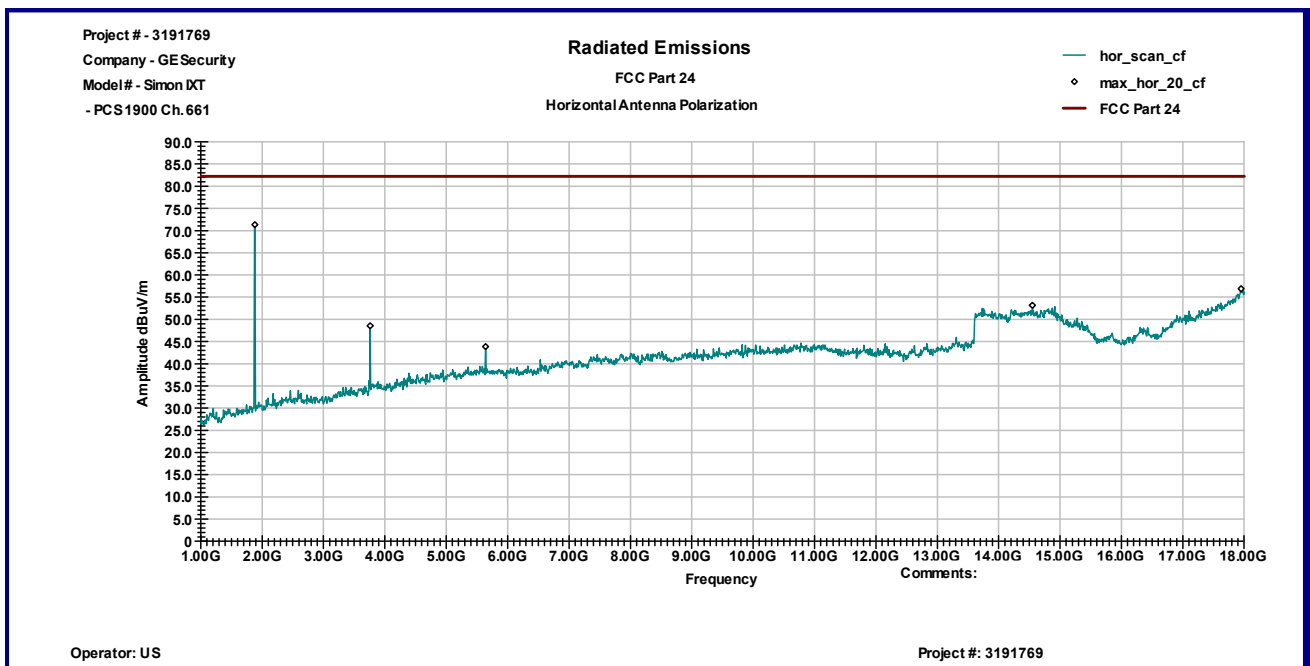
Graph 3.6.7



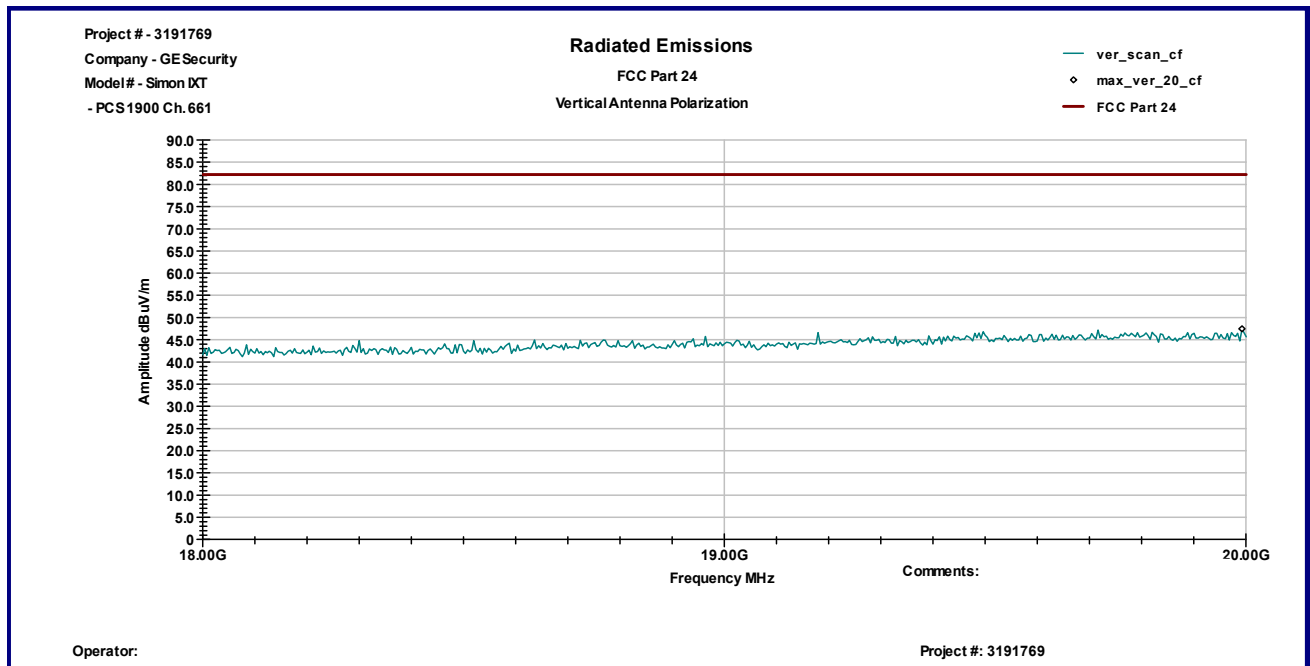
Graph 3.6.8



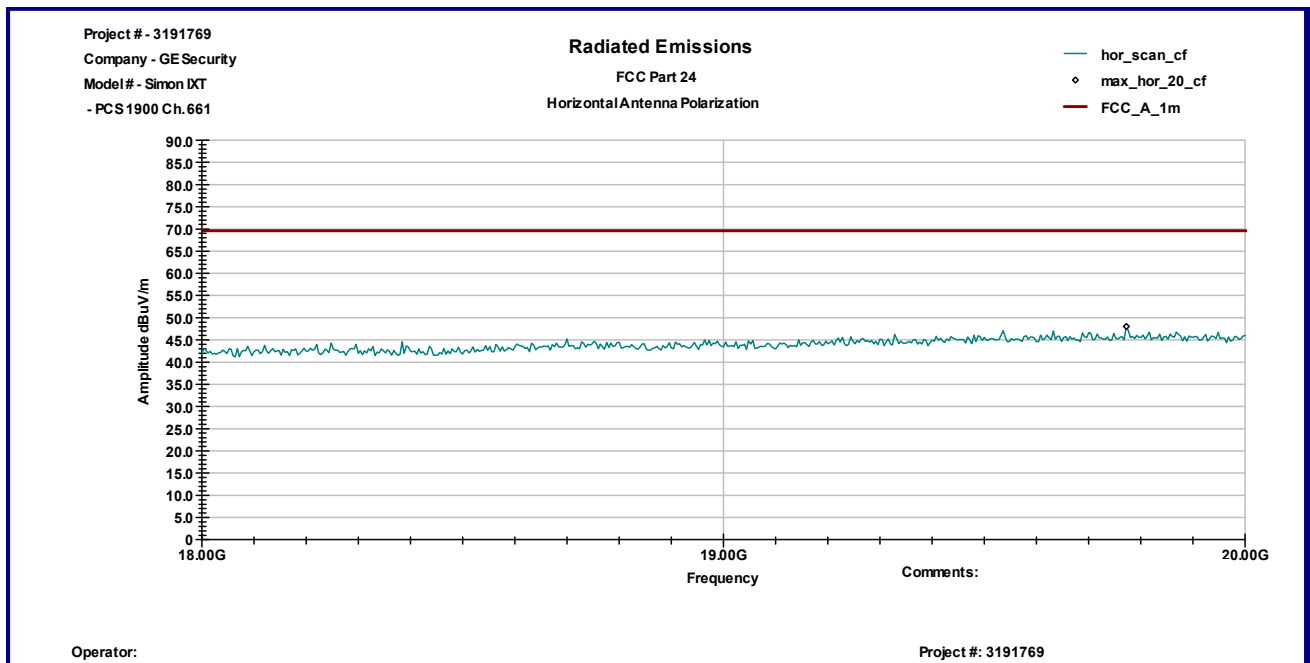
Graph 3.6.9



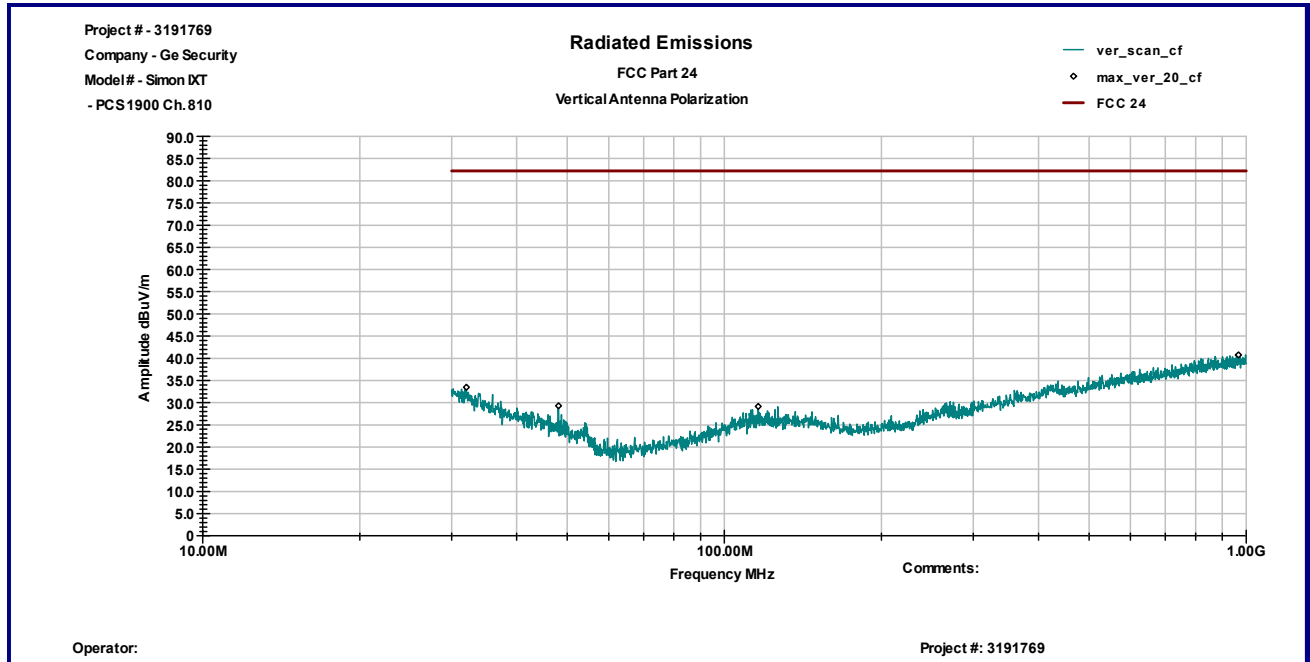
Graph 3.6.10



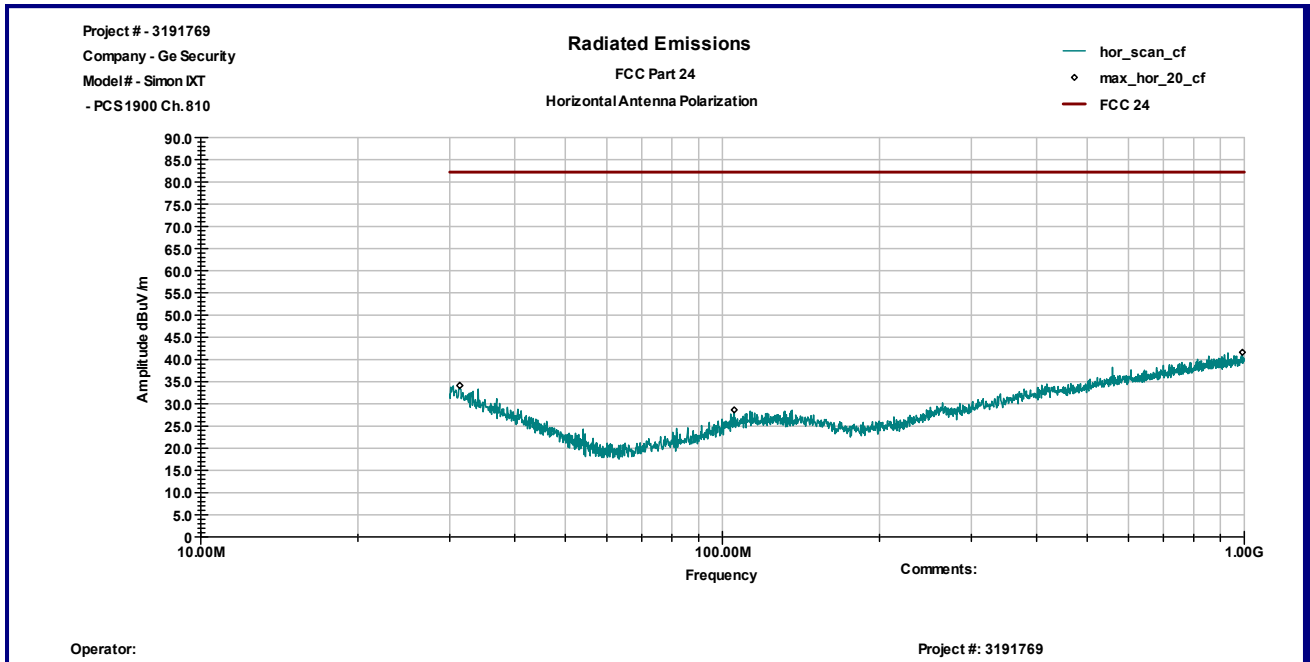
Graph 3.6.11



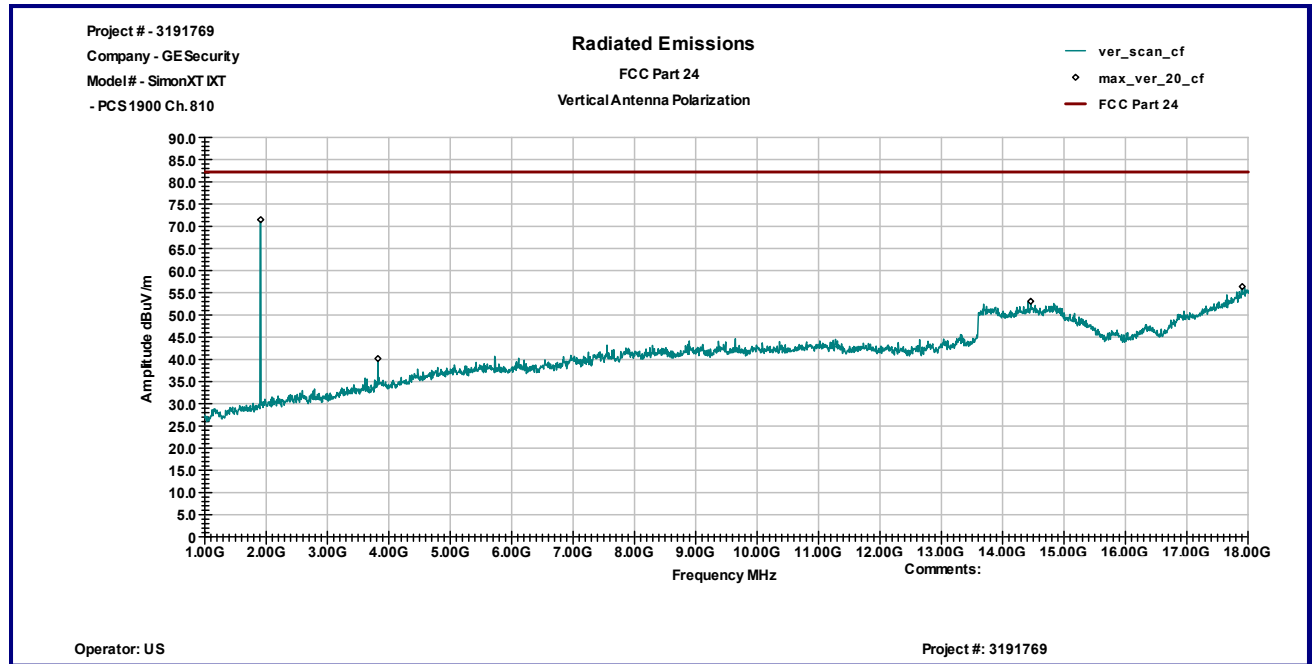
Graph 3.6.12



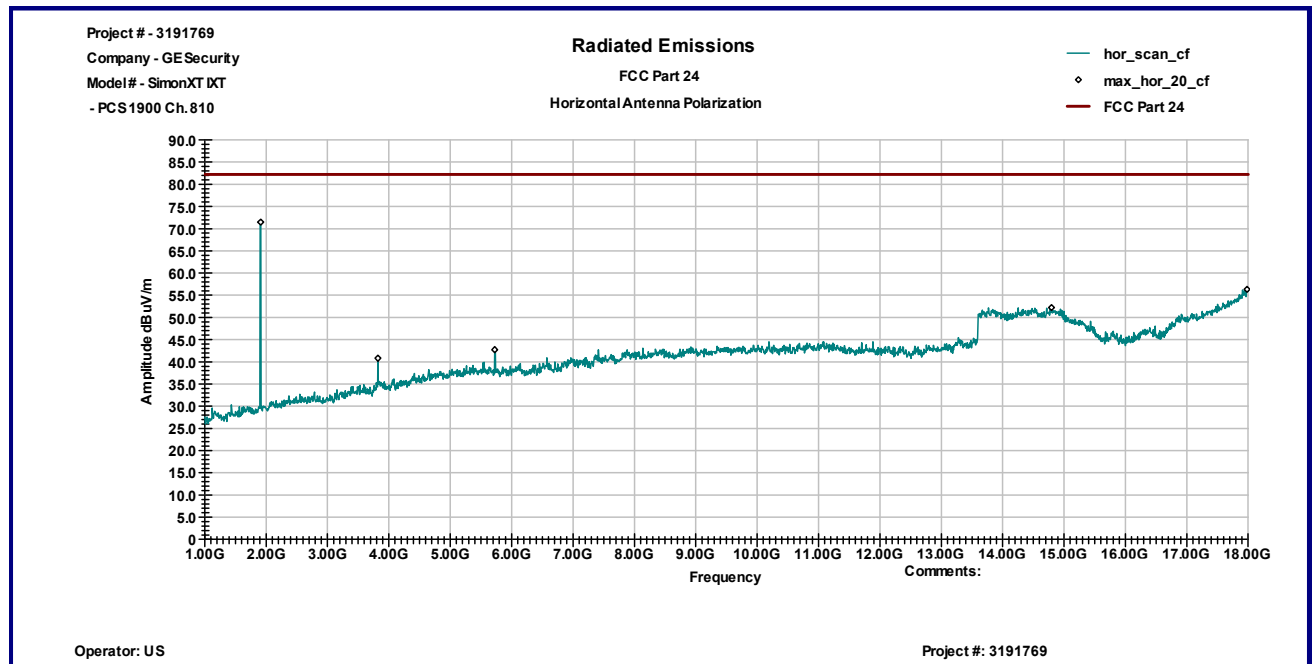
Graph 3.6.13



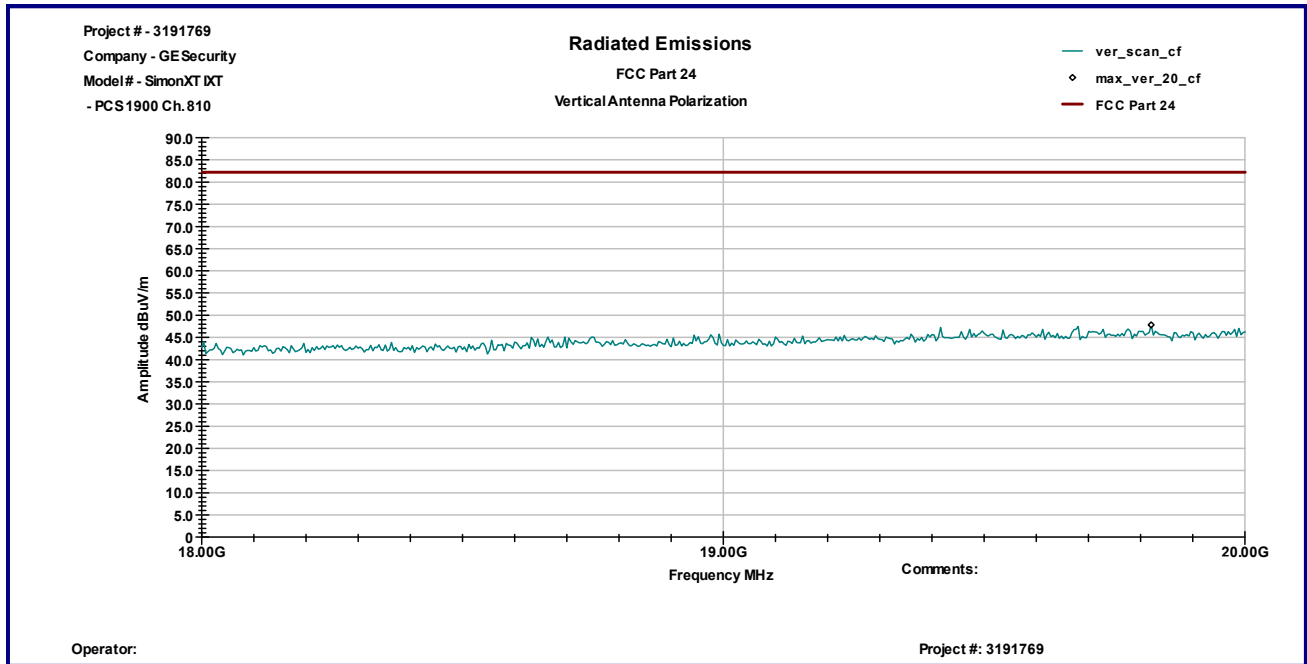
Graph 3.6.14



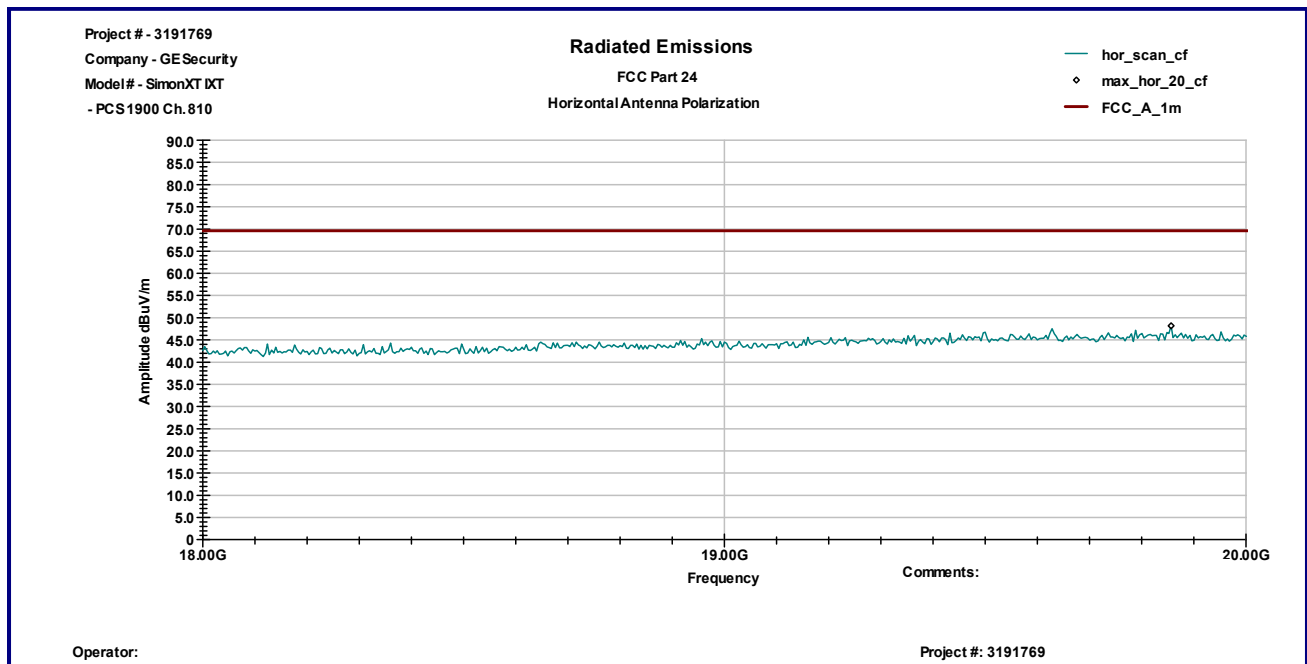
Graph 3.6.15



Graph 3.6.16



Graph 3.6.17



Graph 3.6.18

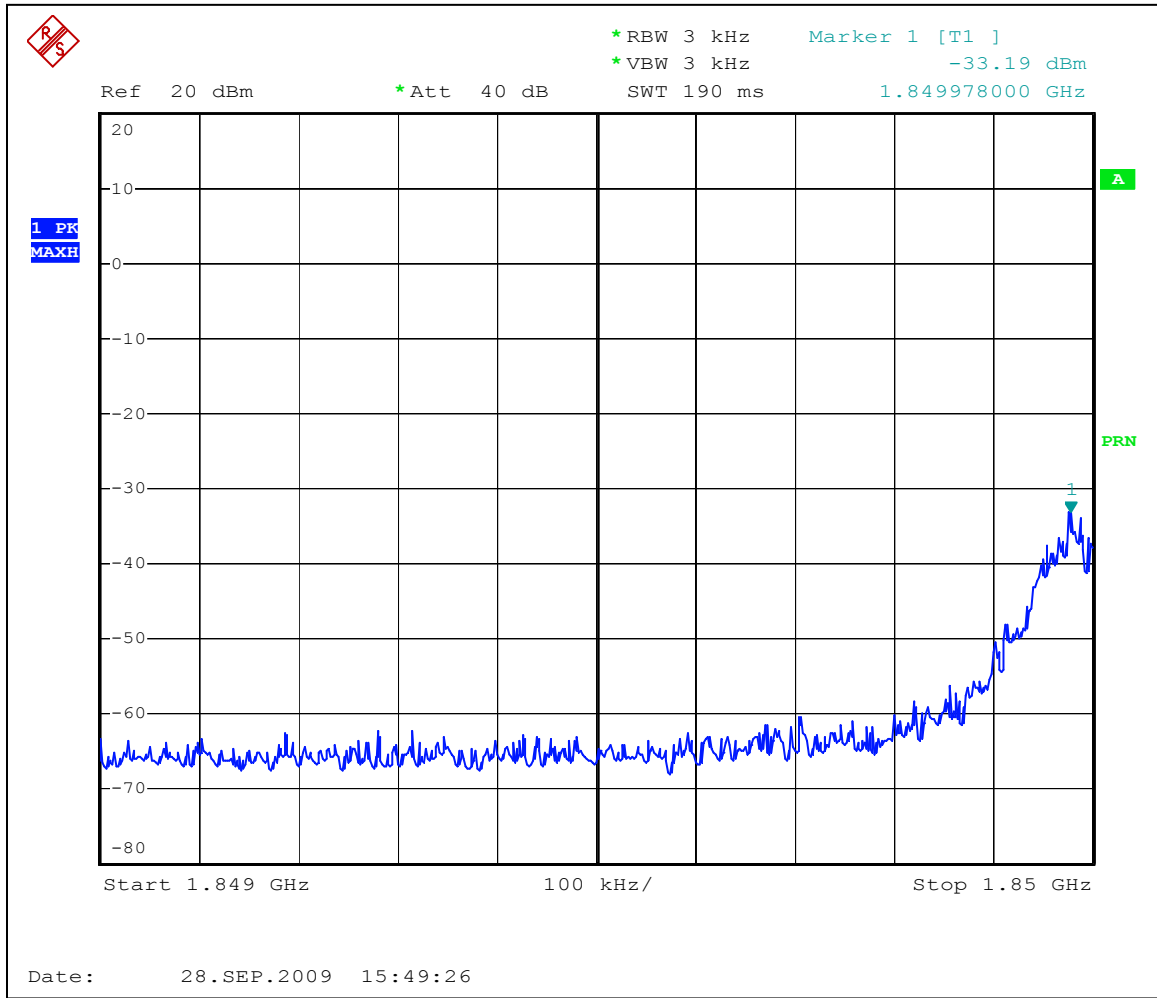
3.7 Spurious emissions at Block Edges

Test location: ☐ OATS ☐ Anechoic Chamber ☐ Other

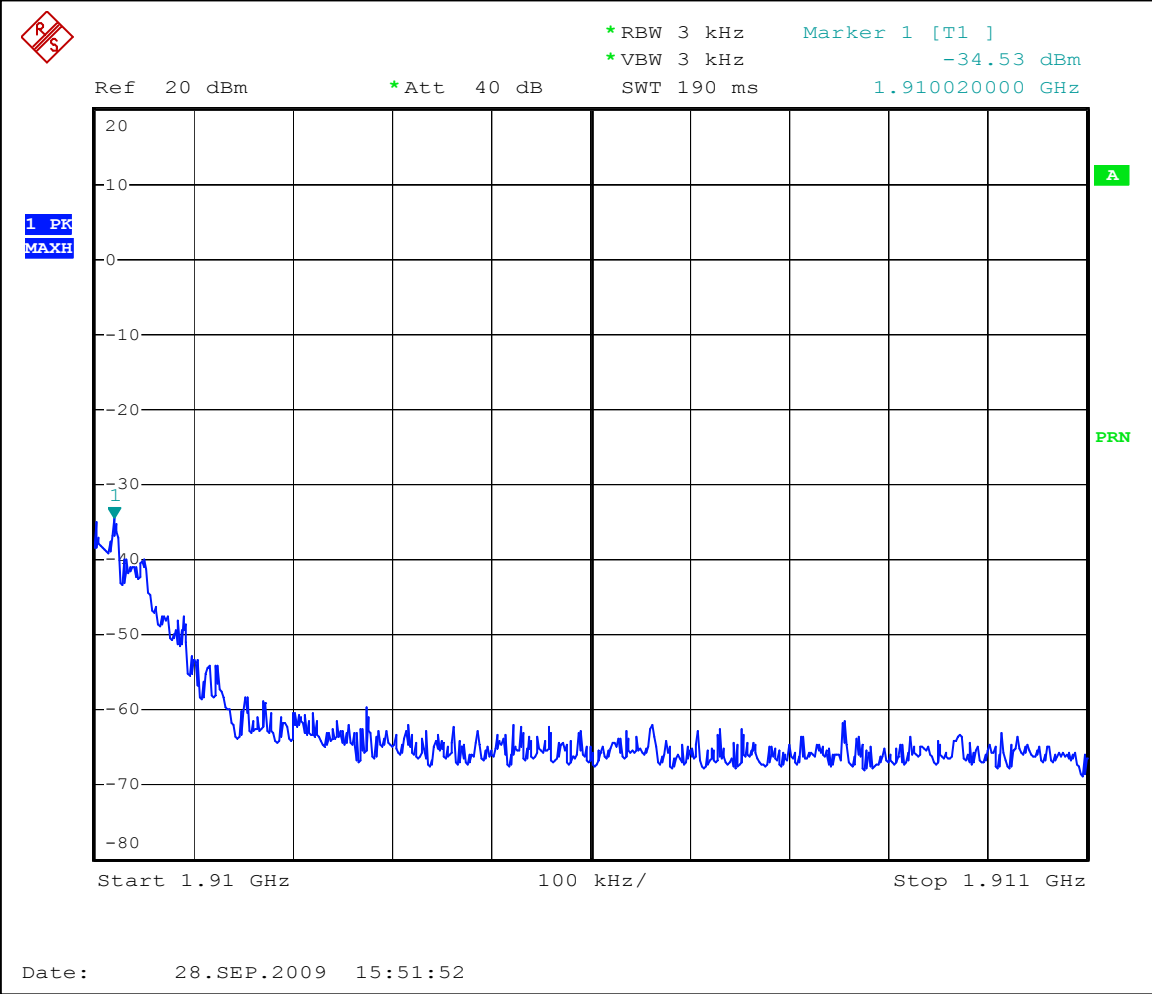
Test result: **Pass**

Low Channel	Measured power dBm	Total CF dB	Total dBm	Limit dBm	Margin dB
512	-33.19	19.3	-13.89	-13.0	-0.89
Highest Channel					
810	-34.53	19.3	-15.23	-13.0	-2.23
CF=Cable/Coupler Insertion Loss:	☒ 15.9dB				
Antenna Gain (dBi)	☒ 3.4dBi				

Notes: For passing results see Graphs 3.7.1-3.7.2. Fundamental frequencies are excluded from the measurements.



Graph 3.7.1



Graph 3.7.2

3.8 RF Exposure Compliance

MPE Requirement:

1.0 mW/cm²

Calculation:

Antenna Gain= 3.4di

The maximum EIRP power = 0.26W

D = distance of 20cm

$S_{(mW)} = ERP_{(mW)} / 4\pi D^2$, or $S_{(mW)} = 250 / 4\pi 400 = 0.05 \text{ mW/cm}^2$, < 1.0 mW/cm²



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	☒
Spectrum Analyzer	Agilent	E7402A	MY44212200	12660	11/13/2009	☒
Bicono-Log Antenna	Schaffner-Chase	CBL 6112 B	2468	14459	09/22/2010	☒
Horn Antenna	EMCO	3115	9507-4513	9936	03/04/2010	☒
Horn Antenna	EMCO	3115	6579	15580	04/03/2010	☒
Signal Generator	R & S	SMT 03	DE12157	9950	09/22/2010	☒
Roberts Antenna	CDI	A100	00599	9965	VBV	☒
LISN	Fischer Custom Communications	FCC-LISN-2 MOD.SD	316	9945	10/28/2009	☒
Waveguide Horn Antenna	EMCO	3116	9904-2423	9705	08/06/2010	☒
Pre-Amplifier	MITEQ	AMF-5D-00501800-28-13P	1402232	172081	08/07/2010	☒
Pre-Amplifier	MITEQ	AMF-6F-16002600-25-10P	1222383	MIN-0065	08/07/2010	☒
System	TILE! Instrument Control		Ver. 3.4.K.29	15259	VBV	☒