# TEST REPORT

**Report Number: 100077996MIN-001**
**Project Number: G100077996**

**Testing performed on the**
**Simon iXT ver. 4.3 TT GSM Radio**

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

**to**
**47 CFR Part 22:2009**
**47 CFR Part 15:2008, §15.107 and §15.109, Class B**
**RSS-132 Issue 2, September 2005**
**ICES-003, Issue 4, February 2004**

**For**
**GE Security Inc.**

| Test Performed by: | Test Authorized by: |
|---|---|
| Intertek Testing Services NA, Inc. | GE Security Inc. |
| 7250 Hudson Blvd., Suite 100 | 1275 Red Fox Road |
| Oakdale, MN 55128 | Arden Hills, MN 55112 |

Prepared by: U. Spector — Uri Spector — Date: March 26, 2010

Reviewed by: S Khazon — Simon Khazon — Date: March 26, 2010

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## 1.0 GENERAL DESCRIPTION

| | |
|---|---|
| **Model:** | Simon iXT ver. 4.3 TT GSM Radio |
| **Type of EUT:** | Security Alarm |
| **Part Number:** | |
| **FCC ID:** | B4Z-801-IXT2 |
| **Industry Canada ID:** | 1175C- 801IXT2 |
| **Related Submittal(s) Grants:** | N/A |
| **Company:** | GE Security Inc. |
| **Customer:** | Mr. Rene Christian |
| **Address:** | 1275 Red Fox Road<br>Arden Hills, MN 55112 |
| **Phone:** | (877) 699-6787 |
| **Fax:** | (651) 779-4884 |
| **e-mail:** | Rene.Christian@ge.com |
| **Test Standards:** | ☒ 47 CFR, Part 22:2009<br>☒ RSS–132, Issue 2, 2005<br>☒ ICES-003, Issue 4, February 2004<br>☒ 47 CFR, Part 15:2009, §15.107 and §15.109, Class B<br>☐ Other |
| **Type of radio:** | ☐ Stand -alone ☒ Module ☐ Hybrid |
| **Date Sample Submitted:** | March 22, 2010 |
| **Test Work Started:** | March 22, 2010 |
| **Test Work Completed:** | March 26, 2010 |
| **Test Sample Conditions:** | ☐ Damaged ☐Poor (Usable) ☒ Good |

## 1.1 Product Description; Test Facility

| | |
|---|---|
| **Product Description:** | GSM 850 Radio |
| **Transmitter Type:** | ☐ FHSS ☒ Digital Modulation ☐ WiFi ☐ Blue Tooth |
| **Operating Frequency Range(s):** | From 824.2 to 848.8 MHz |
| **Modulation:** | GMSK |
| **Emission Designator:** | 244KGXW |
| **Antenna Gain:** | 2.0dBi |
| **Antenna Installation:** | ☐ User ☐ Professional ☐ Factory |
| **Transmitter power configuration:** | ☐ Internal battery ☒ External power source<br>☒ 120VAC ☐ 230VAC ☐ 400VAC ☐ VDC ☐ Other: Amp.<br>☐ 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 (128), middle channel (189), and upper channel (251) |

**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 | Will'Tek 4403 | Mobile Phone Tester |
| 2 | Mini-Circuits ZFRCS-42-S+ | 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(μV/m)
RA = Receiver Amplitude in dB(μV)
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(μV) 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(μV/m).

RA = 48.1 dB(μV)
AF = 7.4 dB($m^{-1}$)
CF = 1.6 dB
AG = 16.0 dB
FS = RA + AF + CF - AG
FS = 48.1 + 7.4 + 1.6 – 16.0
FS = 41.1 dB(μV/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 |
|---|---|---|
| 22.913/RSS-132 | RF output power ERP | Pass |
| 2.1047/RSS-132 | Modulation Characteristics | Pass |
| 22.355/RSS-132 | Frequency Stability | Pass |
| 2.1049/RSS-132 | Occupied Bandwidth | Pass |
| 22.917/RSS-132 | Antenna conducted spurious emissions | Pass |
| 22.917/RSS-132 | Enclosure Radiated spurious emissions | Pass |
| 22.917/RSS-132 | Antenna conducted spurious emissions at Block Edges | Pass |
| 1.1310, 2.1091( c )/RSS- Gen 5.5 | RF Exposure Compliance | 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 RF Output Power ERP

#### 3.1.1 Conducted ERP

**Test location:** ☐ OATS ☐ Anechoic Chamber ☐ Other

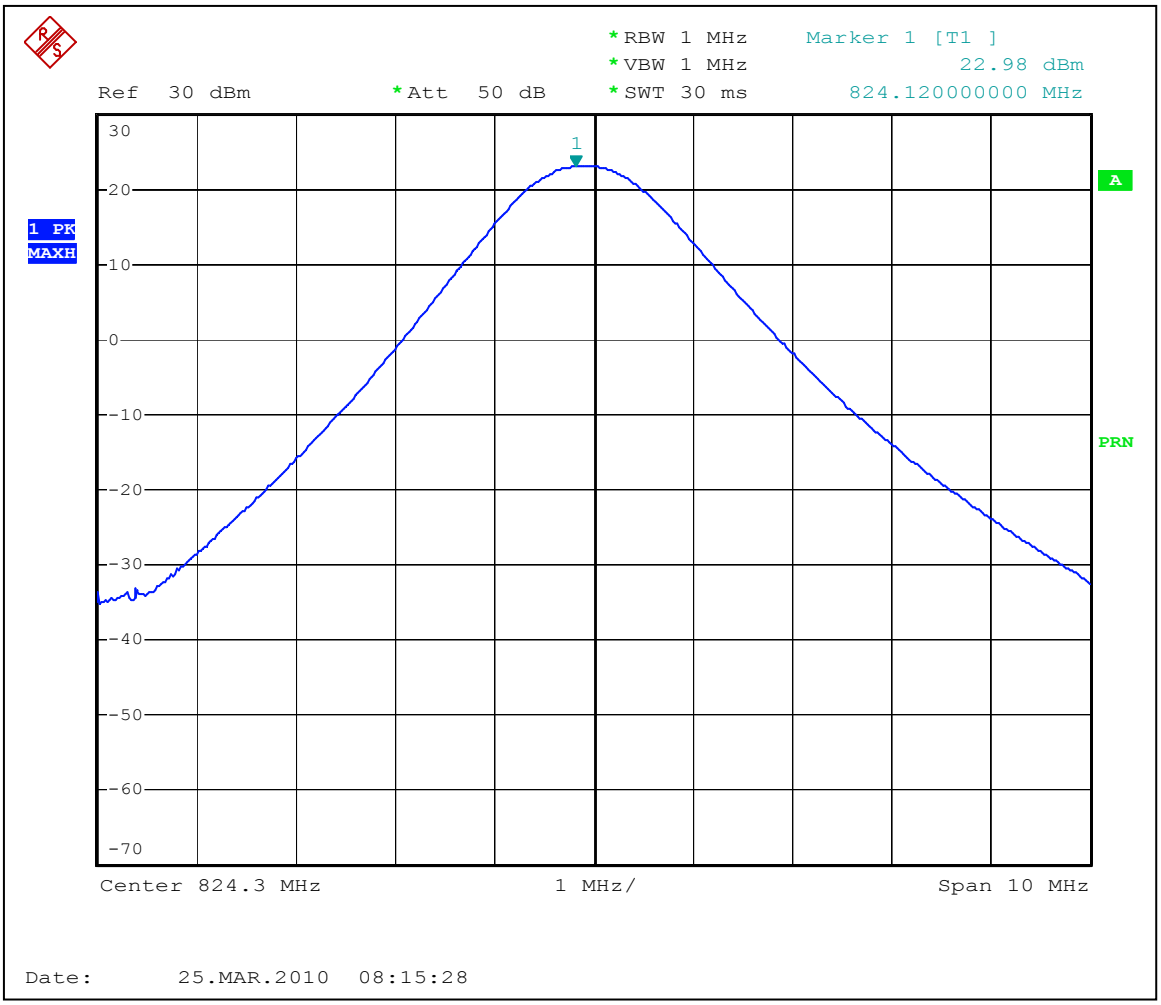
**Test result:** **Pass**

**Max. Margin:** 6.52 dB below the limits

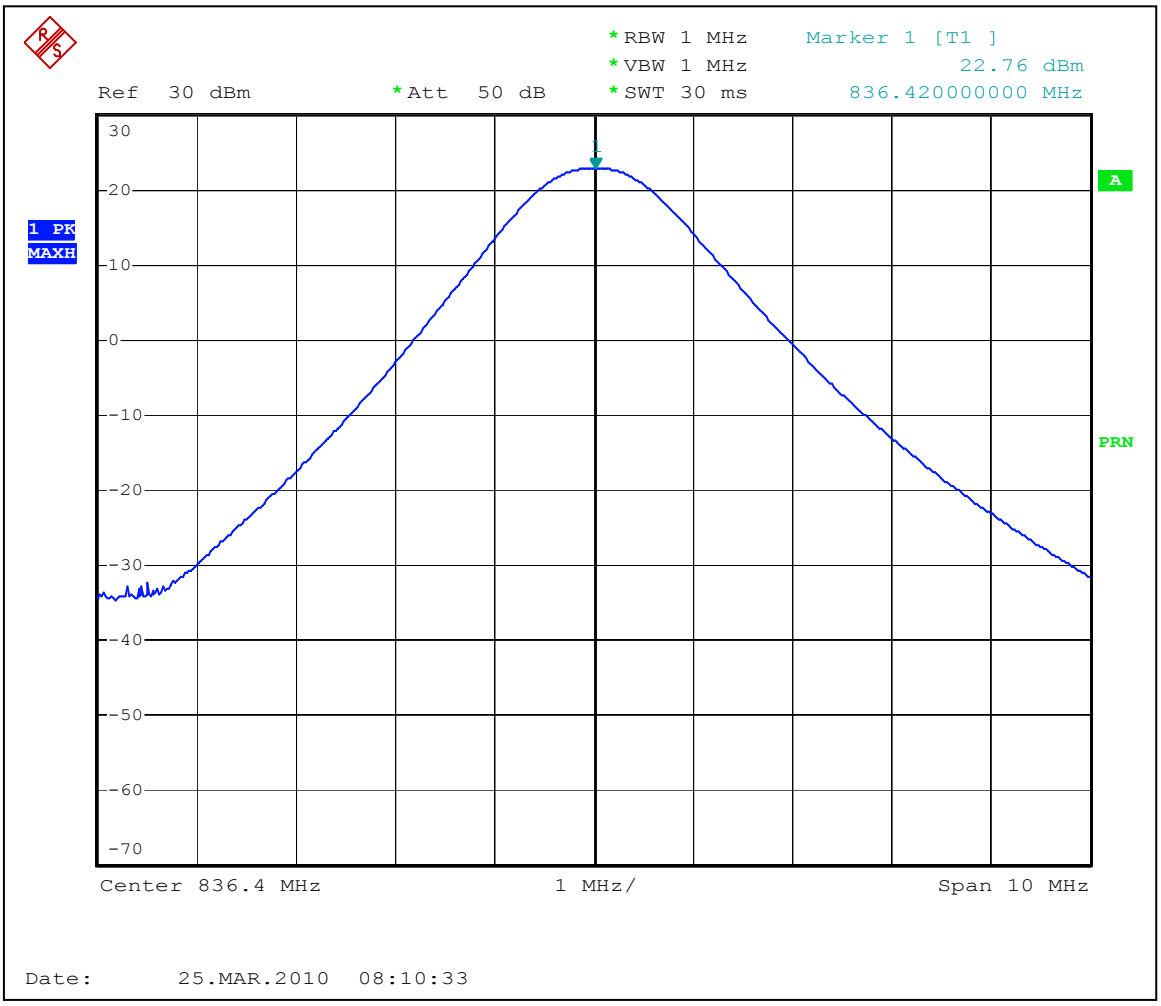
| **Power Output:** | **Conducted** | | | | |
|---|---|---|---|---|---|
| **Frequency Range:** | ☒ 824.2-848.8MHz | | | | |
| **Low Frequency MHz** | **Measured power dBm** | **Total CF dB** | **ERP dBm** | **ERP Limit dBm** | **Margin dB** |
| 824.30 | 22.98 | 9.0 | 31.98 | 38.5 | -6.52 |
| **Middle Frequency MHz** | | | | | |
| 836.40 | 22.76 | 9.0 | 31.76 | 38.5 | -6.74 |
| **Upper Frequency MHz** | | | | | |
| 848.80 | 22.96 | 9.0 | 31.96 | 38.5 | -6.54 |
| **RBW:** | ☒ 1MHz ☐ 3MHz ☐ 10MHz | | | | |
| **VBW:** | ☒ 1MHz ☐ 3MHz ☐ 10MHz | | | | |
| **CF=Cable/Coupler Insertion Loss:** | ☒ 7.0dB | | | | |
| **Antenna Gain (dBi)** | ☒ 2.0dBi | | | | |
| **Total CF=CF+Antenna Gain** | ☒ 9.0dBi | | | | |

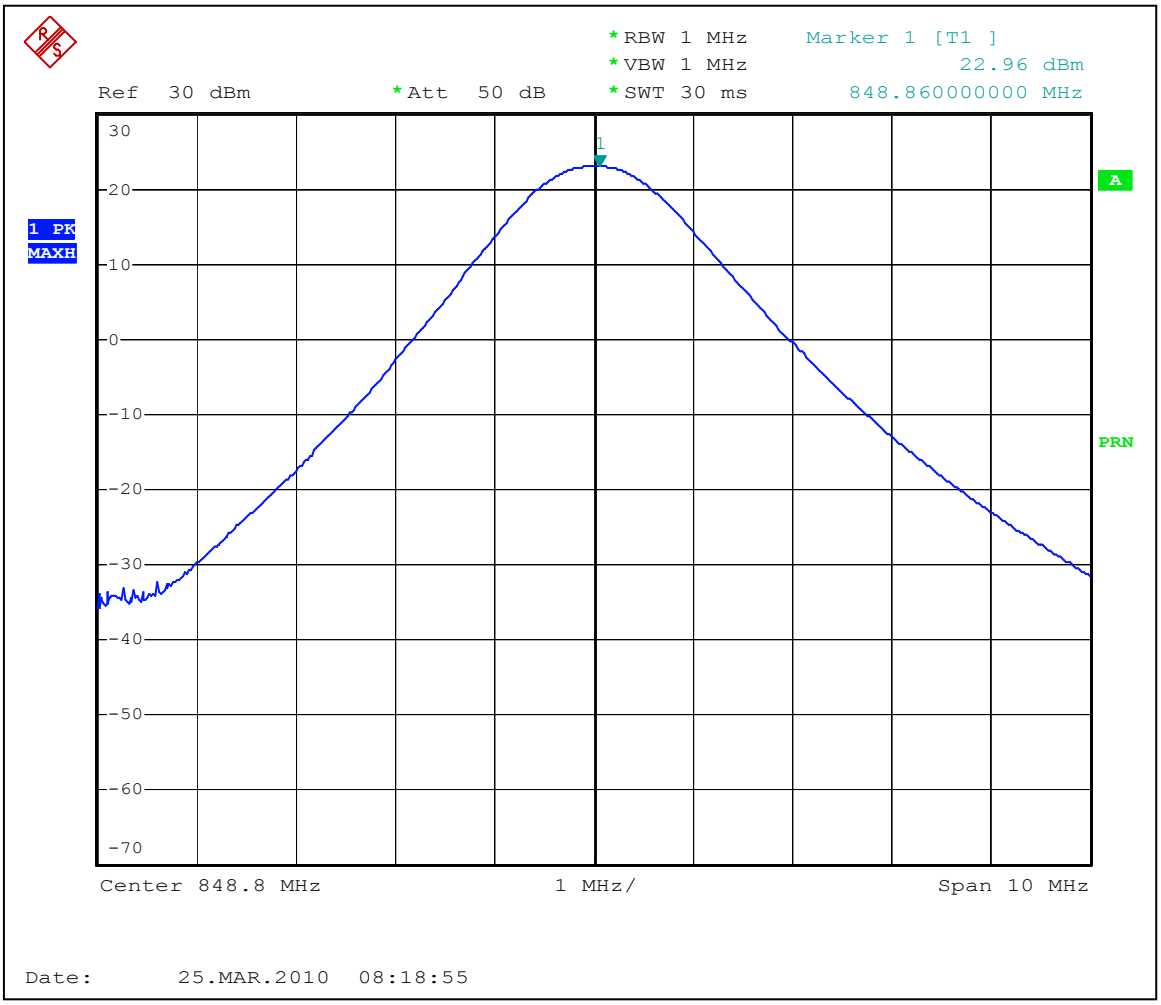
**Notes:**

1. 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 Will'Tek 4403 station selecting maximum power of the EUT and GMSK modulated signal.
2. Max ERP is 7W or 38.45dBm
3. The maximum output ERP is 31.98dBm or 1.57W


*RBW 1 MHz
*VBW 1 MHz
*SWT 30 ms
Marker 1 [T1 ]
22.98 dBm
824.120000000 MHz
Ref 30 dBm
*Att 50 dB
1 PK
MAXH
A
PRN
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 824.3 MHz
1 MHz/
Span 10 MHz
Date: 25.MAR.2010 08:15:28

**Graph 3.1.1**


*RBW 1 MHz
*VBW 1 MHz
*SWT 30 ms
Marker 1 [T1 ]
22.76 dBm
836.420000000 MHz
Ref 30 dBm
*Att 50 dB
1 PK
MAXH
A
PRN
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 836.4 MHz
1 MHz/
Span 10 MHz
Date: 25.MAR.2010 08:10:33


*RBW 1 MHz
*VBW 1 MHz
*SWT 30 ms
Marker 1 [T1 ]
22.96 dBm
848.860000000 MHz
Ref 30 dBm
*Att 50 dB
1 PK
MAXH
A
PRN
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 848.8 MHz
1 MHz/
Span 10 MHz
Date: 25.MAR.2010 08:18:55

### 3.1.2 Radiated ERP

**Test location:** ☐ OATS ☒ Anechoic Chamber ☐ Other

**Test result:** **Pass**

**Max. Margin:** 2.8dB below the limits

| | | | |
|---|---|---|---|
| **Date:** | March 26, 2010 | **Result:** | **Pass** |
| **Standard:** | FCC Part 22.913 | | |
| **Tested by:** | Uri Spector | | |
| **Test Point:** | EUT with Antenna | | |
| **Operation mode:** | Transmitting Mode | | |
| **Note:** | | | |

**Table 3.1.2**

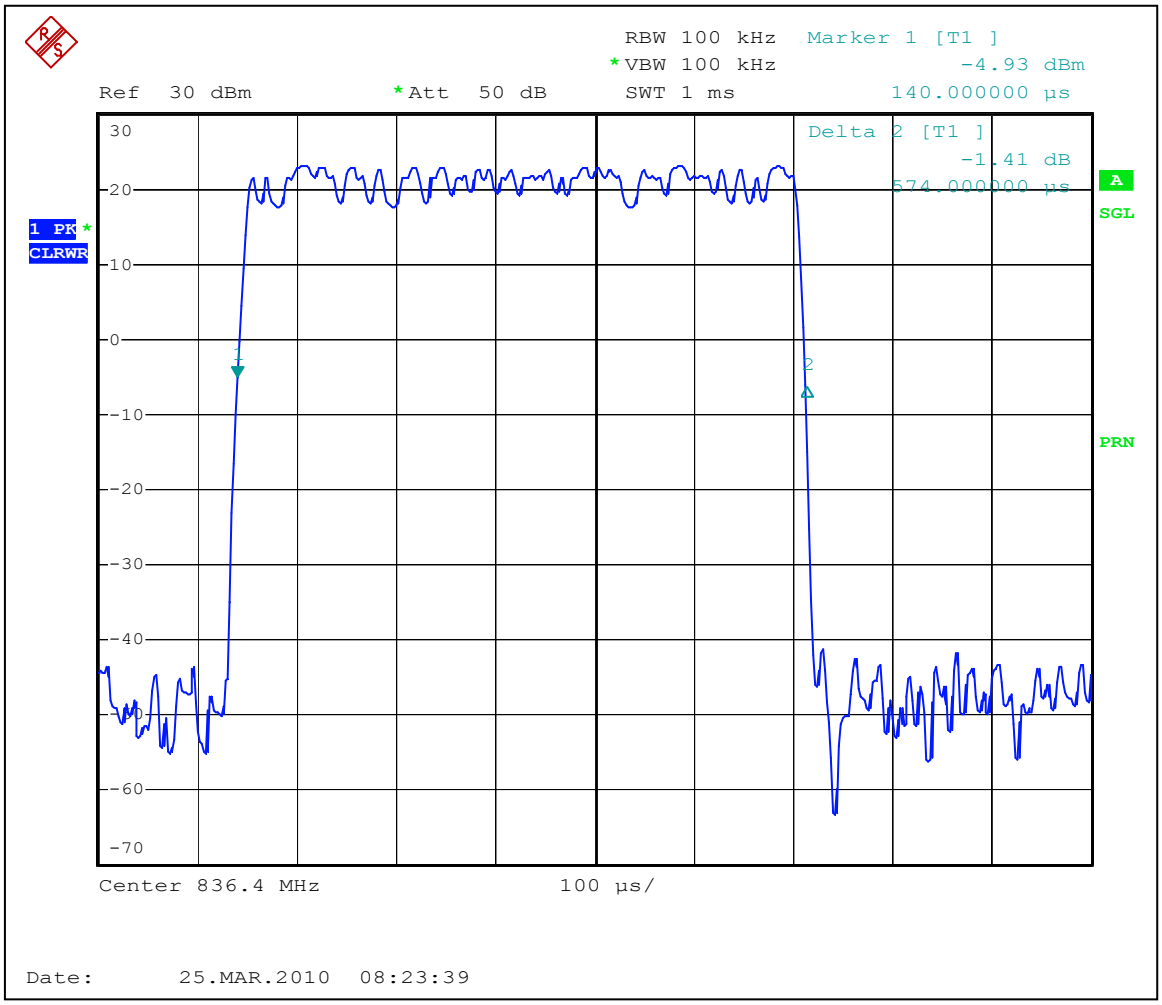
| Frequency MHz | Antenna Polarity | Substitution Antenna Power dBm | Substitution Antenna Gain dBd | Cable Loss dB | ERP Emissions dBm | Limit dBm | Margin dB |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| 824.13 | V | 29.7 | 0.0 | 0.3 | 29.4 | 38.5 | -9.1 |
| 836.47 | V | 33.1 | 0.0 | 0.3 | 32.8 | 38.5 | -5.7 |
| 848.80 | V | 30.6 | 0.0 | 0.3 | 30.3 | 38.5 | -8.2 |
| | | | | | | | |
| 824.13 | H | 34.1 | 0.0 | 0.3 | 33.8 | 38.5 | -4.7 |
| 836.47 | H | 36.0 | 0.0 | 0.3 | 35.7 | 38.5 | -2.8 |
| 848.80 | H | 35.8 | 0.0 | 0.3 | 35.5 | 38.5 | -3.0 |
| | | | | | | | |

**Special Config. Info:** Sabstitution Method
**Limits** 7W, or 38.5dBm

### 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**

## 3.3 Frequency Stability

**Table 3.3.1**

| Temperature Degree C | Frequency Deviation Hz | Frequency Stability ppm | Frequency error limit ppm | Test Result |
|---|---|---|---|---|
| -30 | 400.0 | 0.478 | ±1.5 | Pass |
| -20 | 310.0 | 0.371 | ±1.5 | Pass |
| -10 | 180.0 | 0.215 | ±1.5 | Pass |
| 0 | 100.0 | 0.120 | ±1.5 | Pass |
| 10 | 50.0 | 0.060 | ±1.5 | Pass |
| 20 | 30.0 | 0.036 | ±1.5 | Pass |
| 25 | 0.0 | 0.000 | ±1.5 | Pass |
| 30 | 24.0 | 0.029 | ±1.5 | Pass |
| 40 | 122.0 | 0.146 | ±1.5 | Pass |
| 50 | 520.0 | 0.622 | ±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**

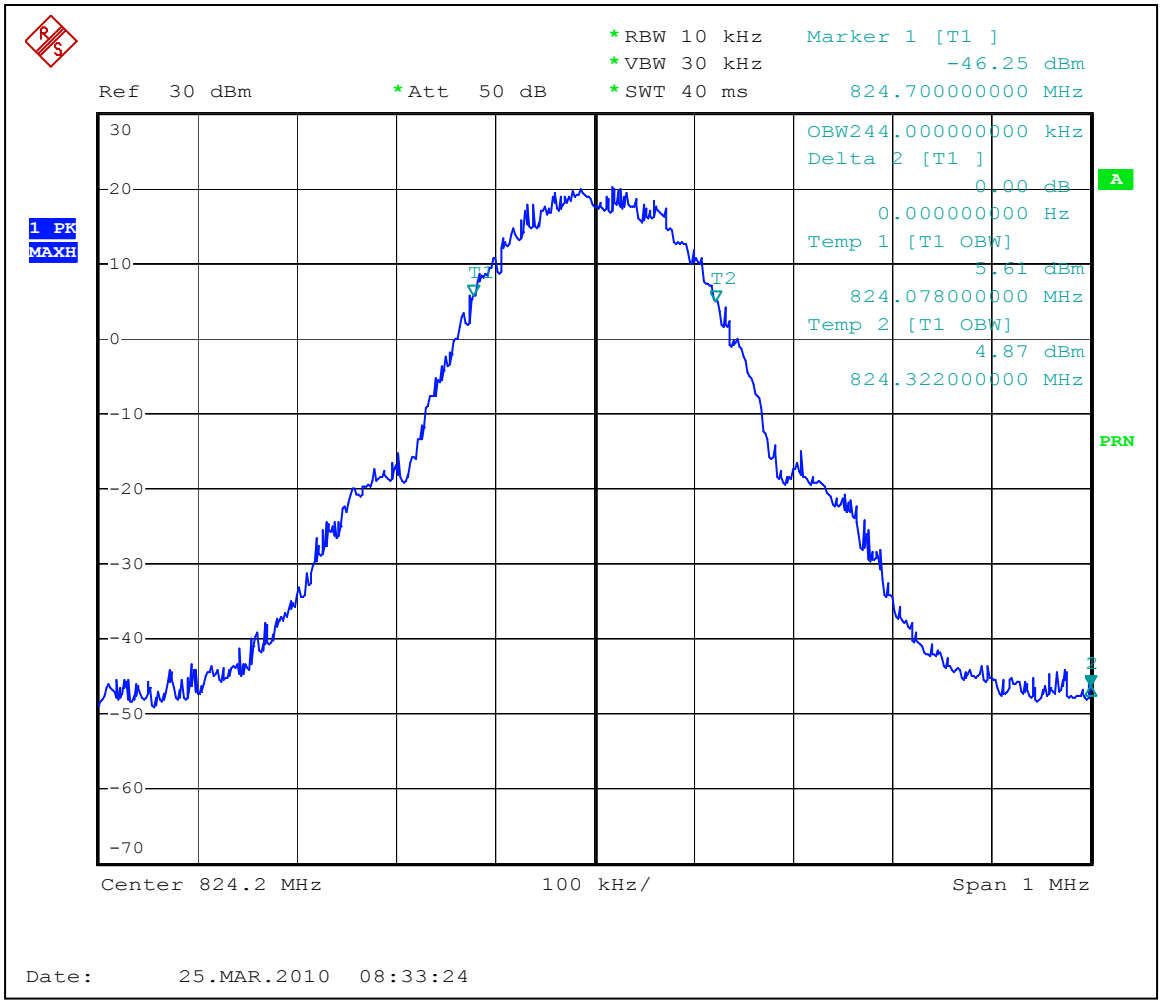
| Input Voltage V | Frequency Deviation Hz | Frequency Stability ppm | Frequency error limit ppm | Test Result |
|---|---|---|---|---|
| 138 | 50.0 | 0.060 | ±1.5 | Pass |
| 120 | 0.0 | 0.000 | ±1.5 | Pass |
| 102 | 80.0 | 0.096 | ±1.5 | Pass |

**Notes:** None

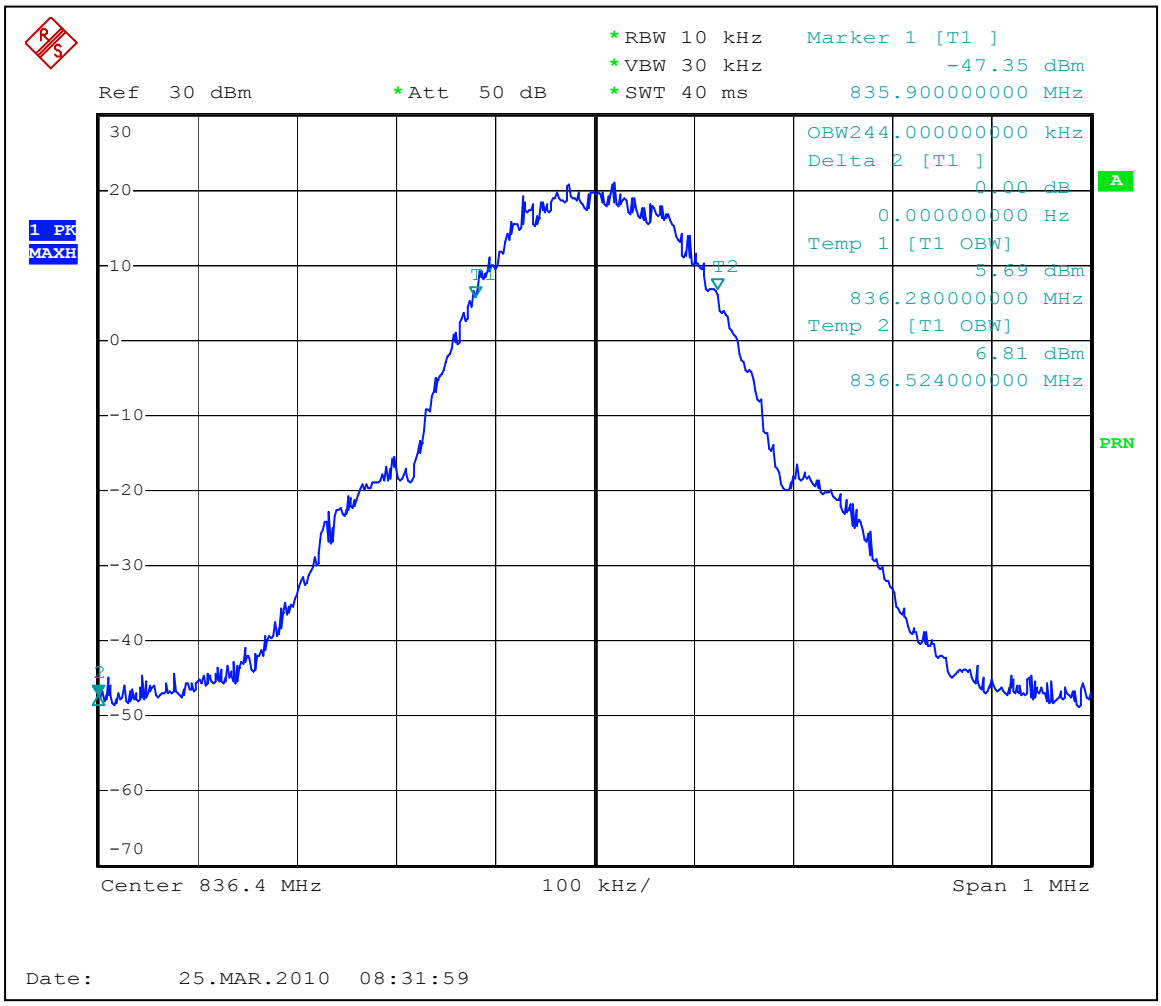
## 3.4 99% Occupied Bandwidth

| Low Frequency Channel kHz | Middle Frequency Channel kHz | Upper Frequency Channel kHz |
|---|---|---|
| 244 | 244 | 242 |
| **RBW:**<br>**VBW:** | ☒ 10kHz ☐ other kHz<br>☒ 30kHz ☐ 300kHz ☐ other kHz | |

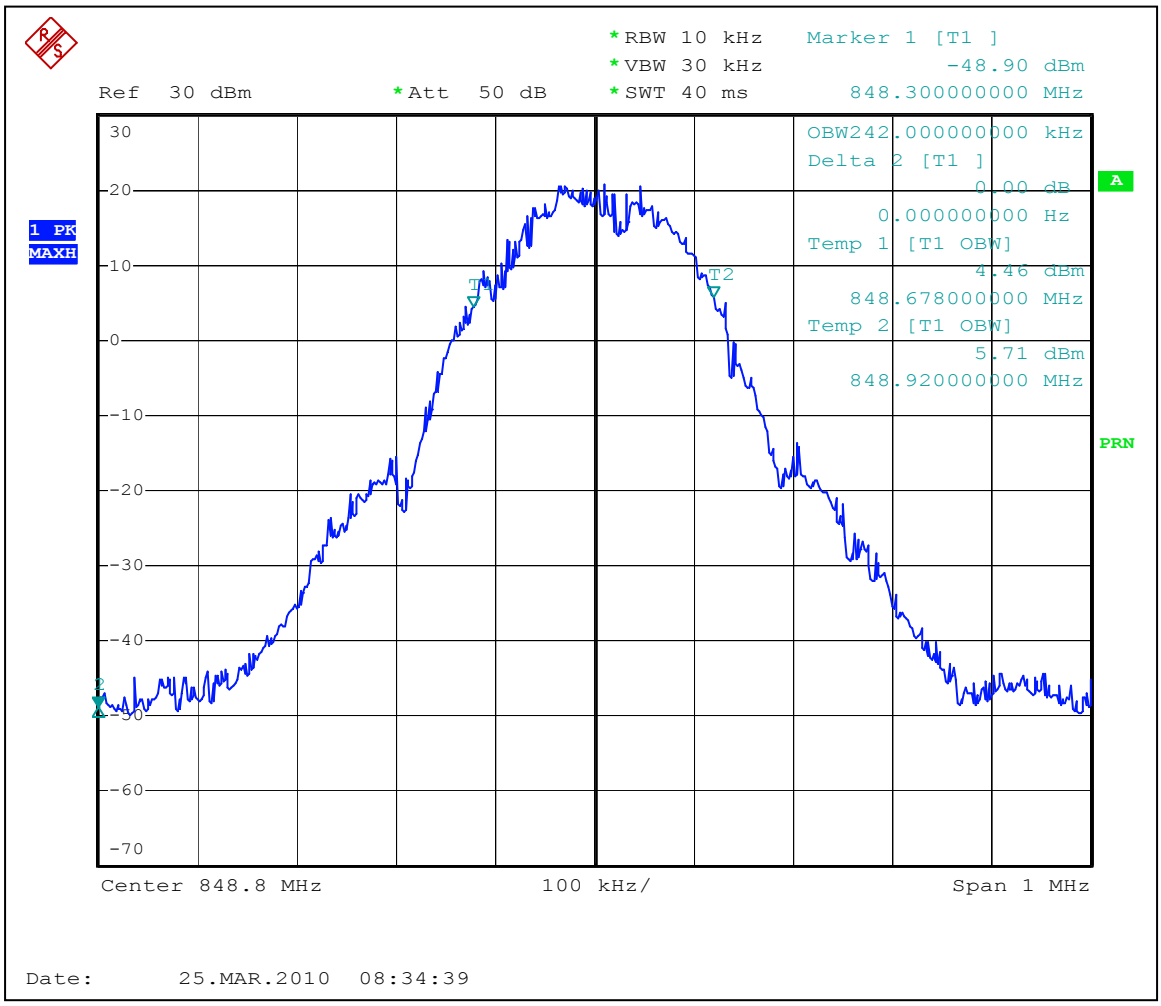
**Notes:** None


*RBW 10 kHz
*VBW 30 kHz
*SWT 40 ms
Marker 1 [T1 ]
-46.25 dBm
824.700000000 MHz
Ref 30 dBm
*Att 50 dB
OBW244.000000000 kHz
Delta 2 [T1 ]
0.00 dB
0.000000000 Hz
Temp 1 [T1 OBW]
5.61 dBm
824.078000000 MHz
Temp 2 [T1 OBW]
4.87 dBm
824.322000000 MHz
1 PK
MAXH
A
PRN
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
T1
T2
Center 824.2 MHz
100 kHz/
Span 1 MHz
Date: 25.MAR.2010 08:33:24

**Graph 3.4.1**


*RBW 10 kHz
*VBW 30 kHz
Ref 30 dBm
*Att 50 dB
*SWT 40 ms
Marker 1 [T1 ]
-47.35 dBm
835.900000000 MHz
OBW244.000000000 kHz
Delta 2 [T1 ]
0.00 dB
0.000000000 Hz
Temp 1 [T1 OBW]
5.69 dBm
836.280000000 MHz
Temp 2 [T1 OBW]
6.81 dBm
836.524000000 MHz
1 PK
MAXH
A
PRN
T1
T2
30
-20
-10
0
-10
-20
-30
-40
-50
-60
-70
Center 836.4 MHz
100 kHz/
Span 1 MHz
Date: 25.MAR.2010 08:31:59

**Graph 3.4.2**


*RBW 10 kHz
*VBW 30 kHz
*SWT 40 ms
Marker 1 [T1 ]
-48.90 dBm
848.300000000 MHz
Ref 30 dBm
*Att 50 dB
OBW242.000000000 kHz
Delta 2 [T1 ]
0.00 dB
0.000000000 Hz
Temp 1 [T1 OBW]
4.46 dBm
848.678000000 MHz
Temp 2 [T1 OBW]
5.71 dBm
848.920000000 MHz
1 PK
MAXH
A
PRN
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
T1
T2
Center 848.8 MHz
100 kHz/
Span 1 MHz
Date: 25.MAR.2010 08:34:39

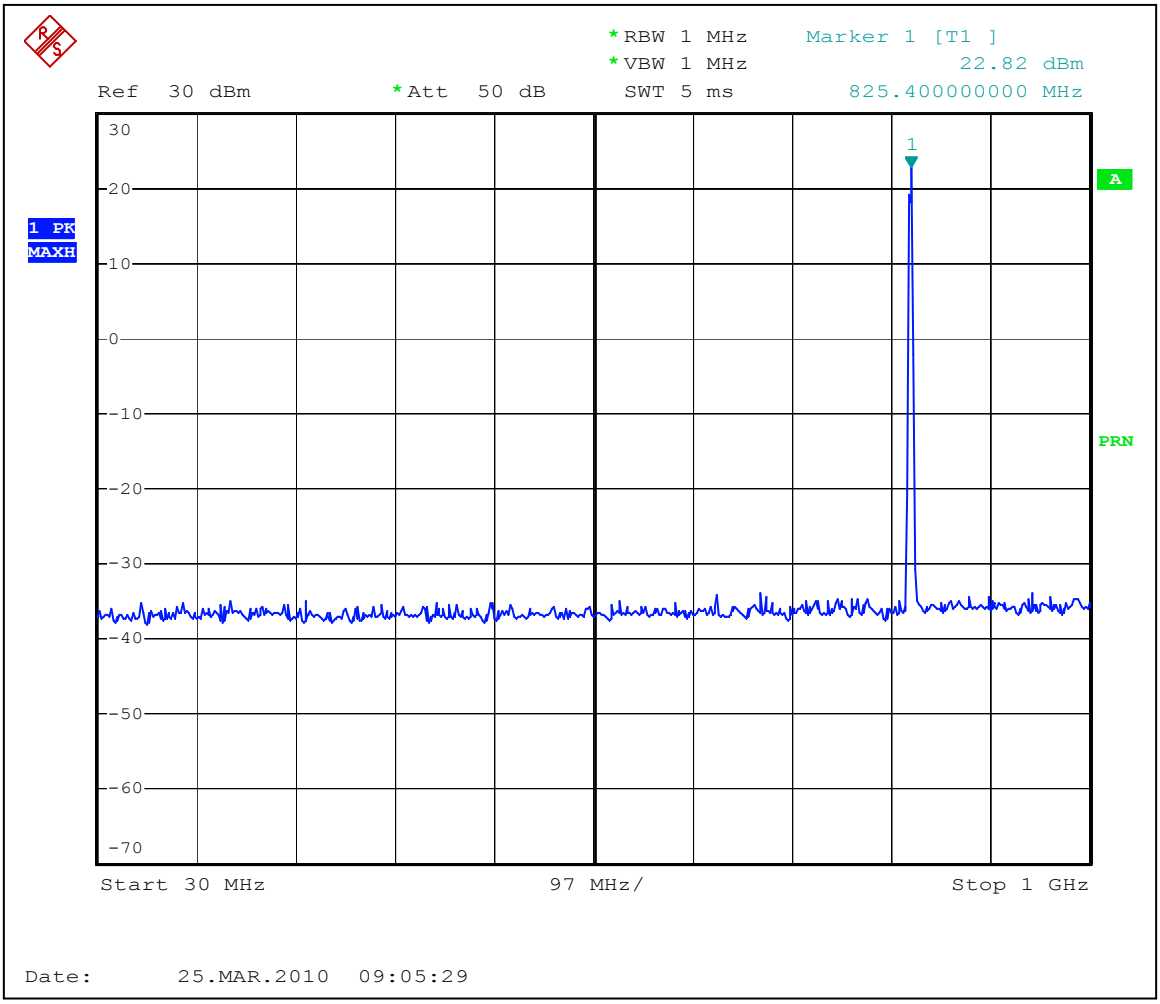
**Graph 3.4.3**

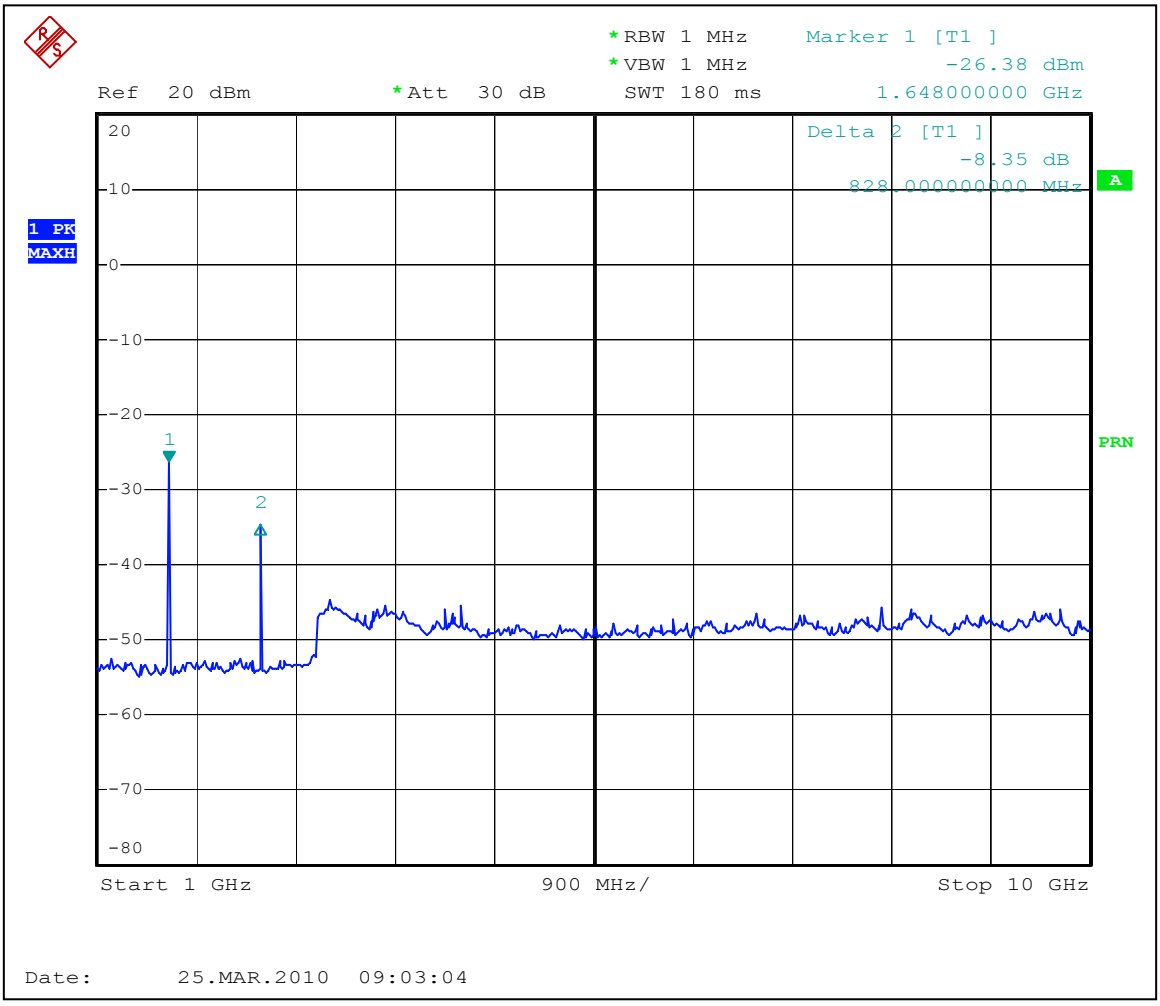
### 3.5 Antenna conducted spurious emissions

**Test location:** ☐ OATS ☐ Anechoic Chamber ☐ Other

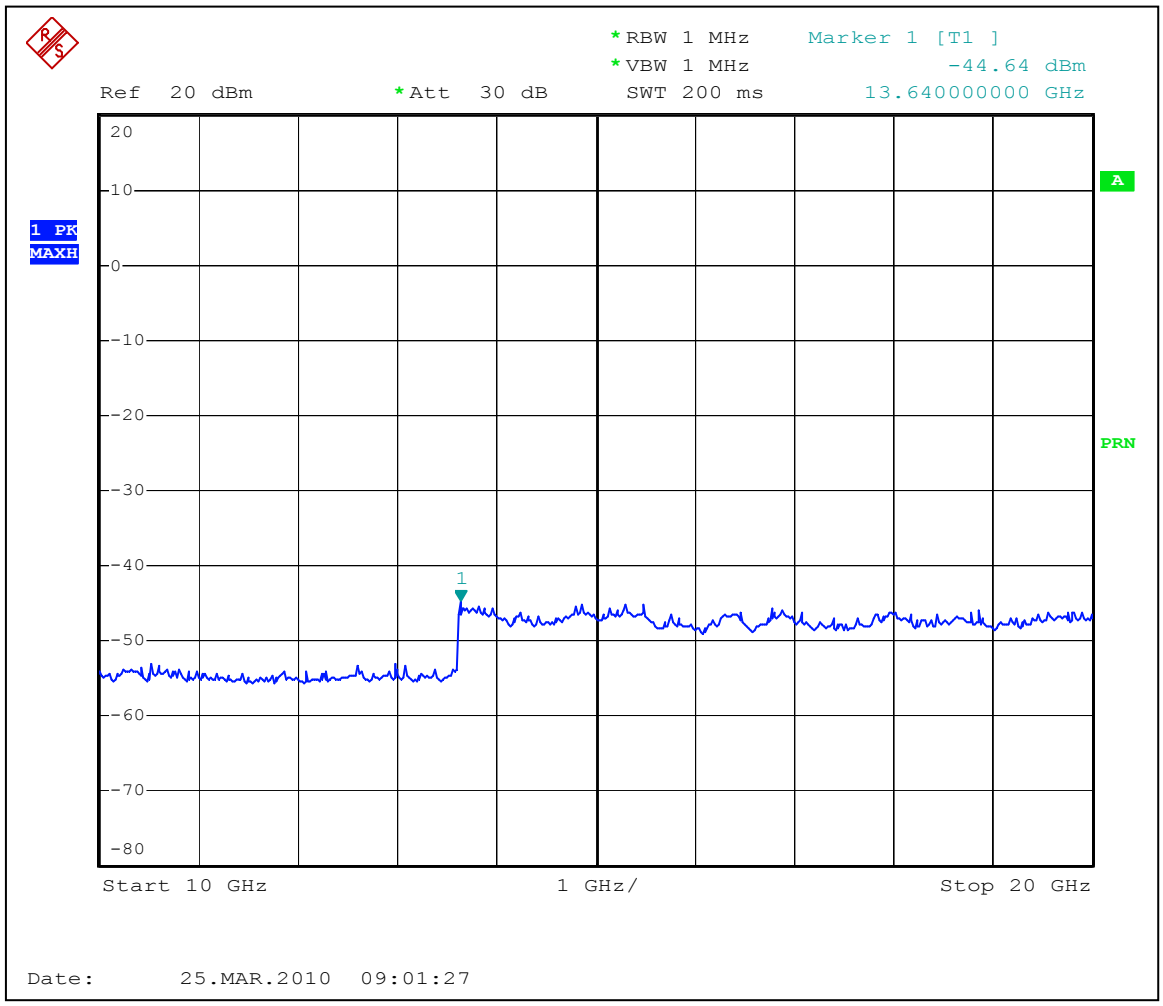
**Test result:** **Pass**

**Notes:** The power of spurious emissions should be attenuated at least 43+10log(P) dB, P in watts, so that the level in dBm is -13dBm.
The maximum detected spurious emission is -26.38dBm or -17.4dBm ERP. The margin of the maximum emissions is -17.4dB-(-13dB) = -4.4dB. For passing results see Graphs 3.5.1-3.5.9. Fundamental frequencies are excluded form the measurements.

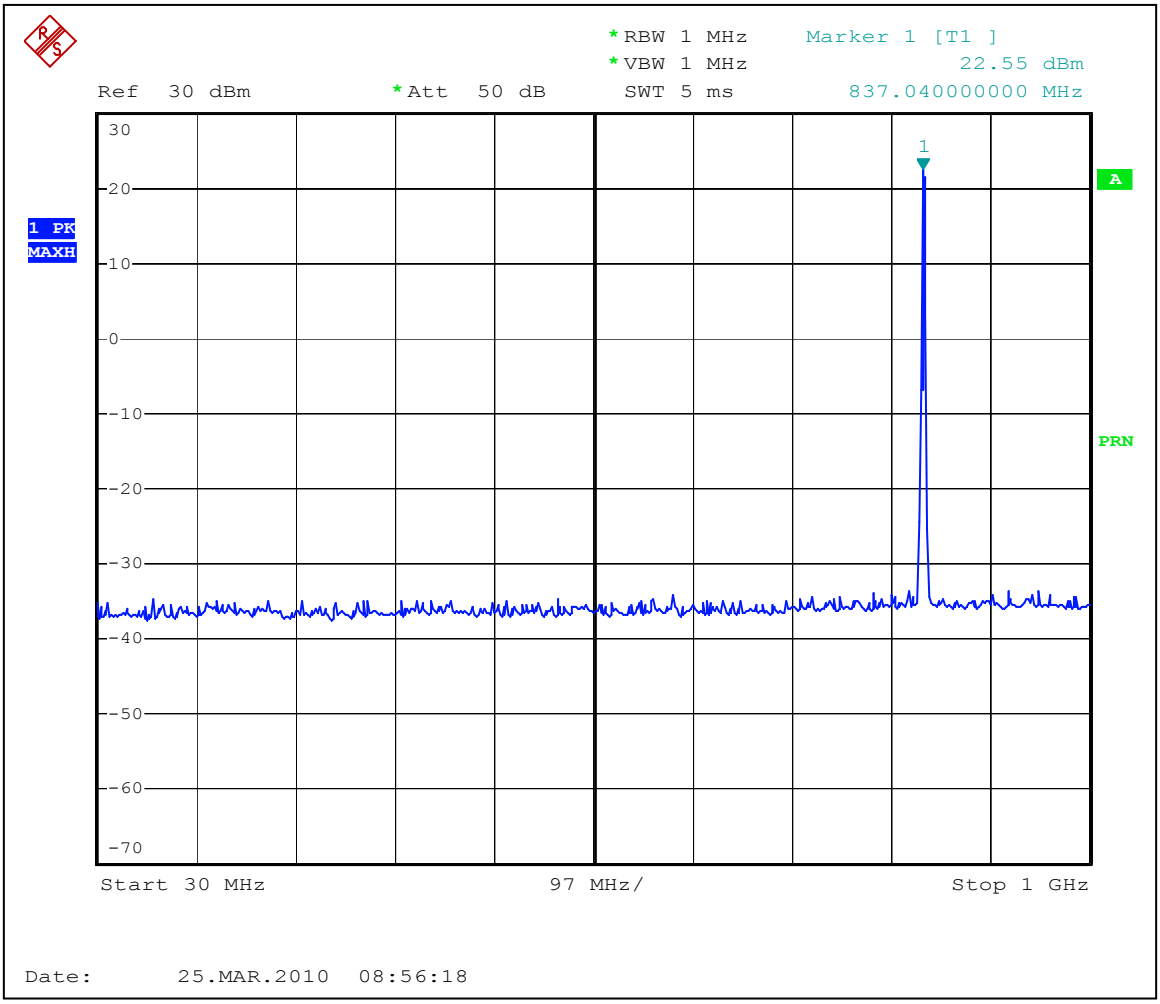

*RBW 1 MHz
*VBW 1 MHz
Marker 1 [T1 ]
22.82 dBm
Ref 30 dBm
*Att 50 dB
SWT 5 ms
825.400000000 MHz
1 PK
MAXH
A
PRN
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 25.MAR.2010 09:05:29


*RBW 1 MHz
*VBW 1 MHz
Ref 20 dBm
*Att 30 dB
SWT 180 ms
Marker 1 [T1 ]
-26.38 dBm
1.648000000 GHz
Delta 2 [T1 ]
-8.35 dB
828.000000000 MHz
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 25.MAR.2010 09:03:04

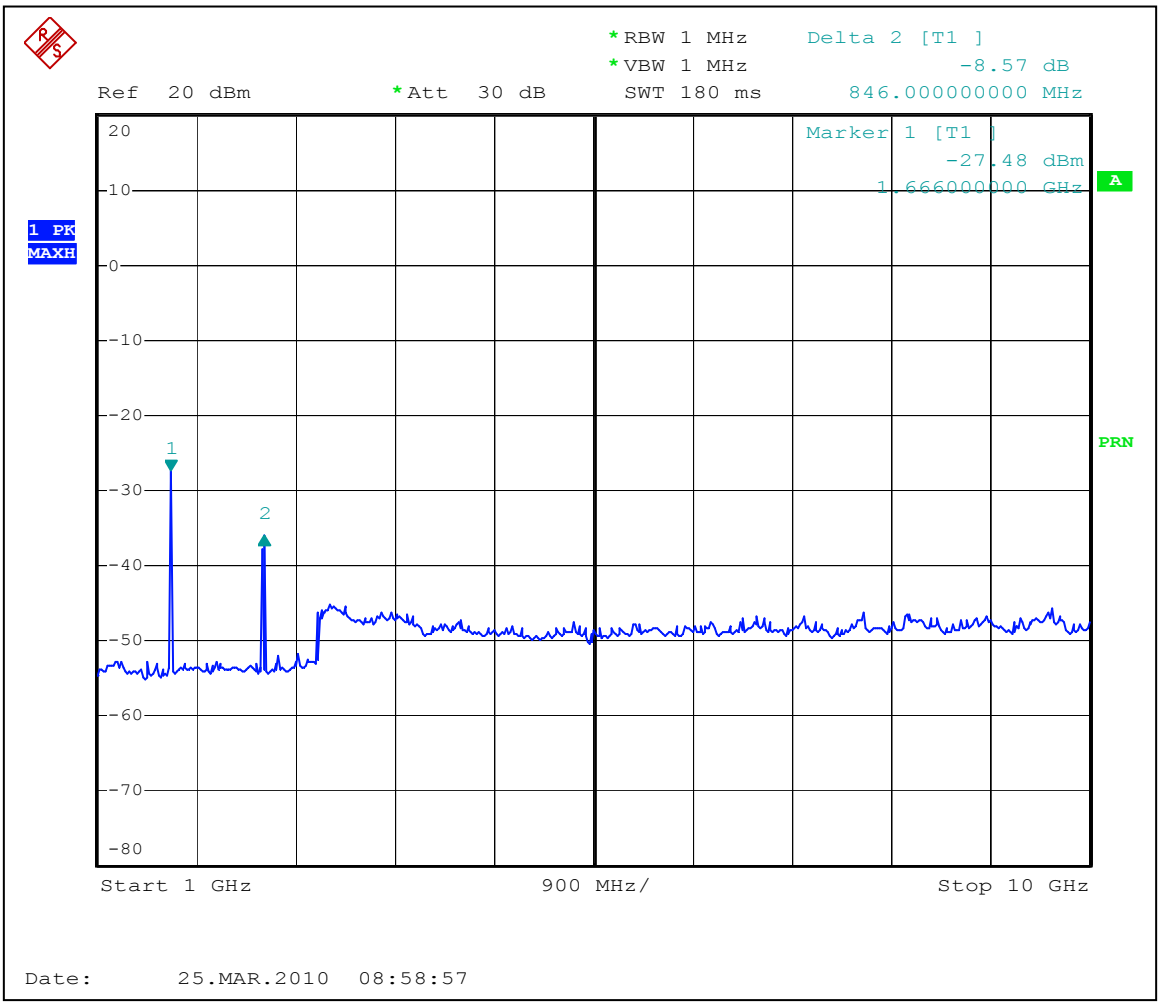
**Graph 3.5.2**


*RBW 1 MHz
*VBW 1 MHz
Marker 1 [T1 ]
-44.64 dBm
13.640000000 GHz
Ref 20 dBm
*Att 30 dB
SWT 200 ms
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 10 GHz
1 GHz/
Stop 20 GHz
Date: 25.MAR.2010 09:01:27

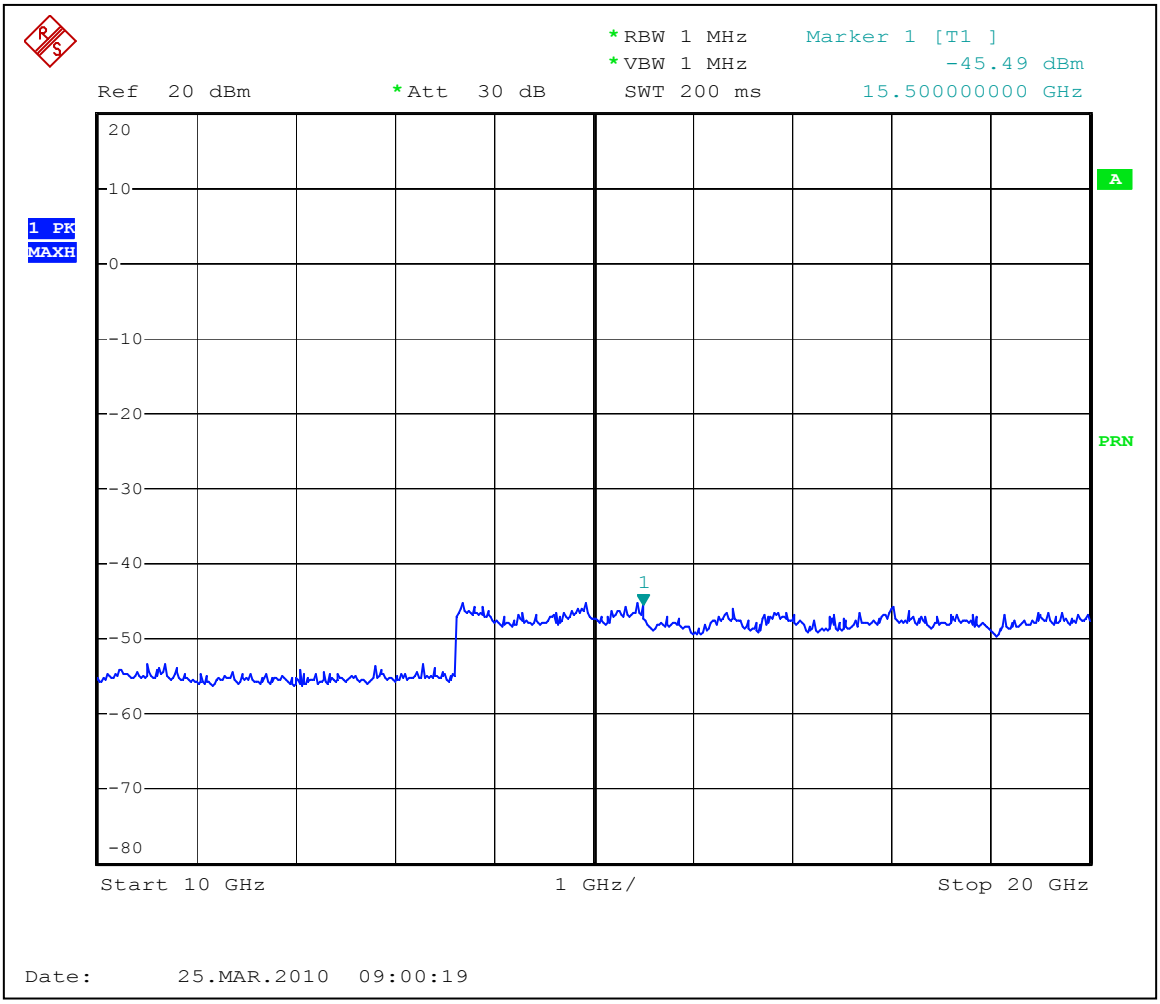
**Graph 3.5.3**


*RBW 1 MHz
*VBW 1 MHz
Marker 1 [T1 ]
22.55 dBm
Ref 30 dBm
*Att 50 dB
SWT 5 ms
837.040000000 MHz
1 PK
MAXH
A
PRN
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 25.MAR.2010 08:56:18

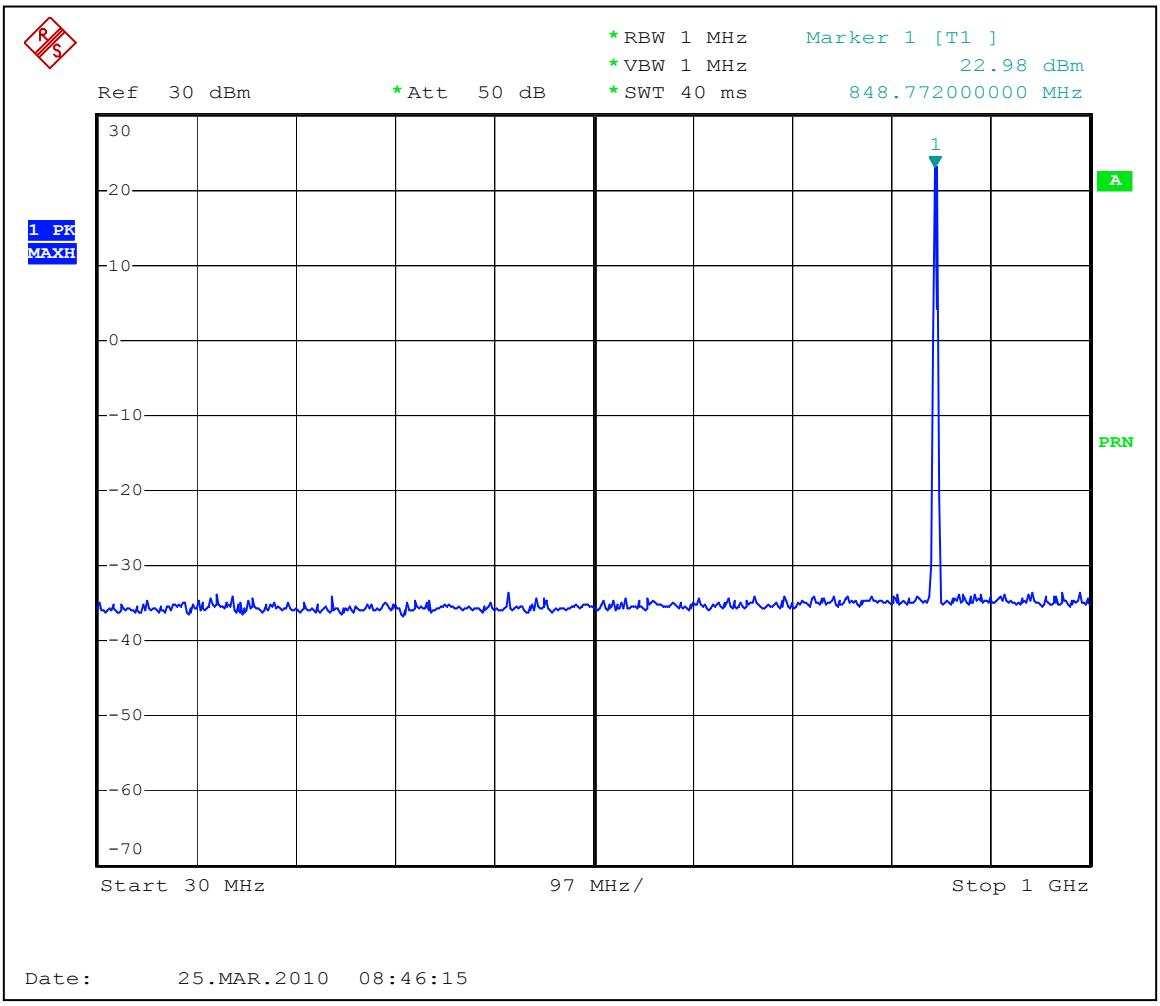
**Graph 3.5.4**


*RBW 1 MHz
*VBW 1 MHz
Ref 20 dBm
*Att 30 dB
SWT 180 ms
Delta 2 [T1 ]
-8.57 dB
846.000000000 MHz
Marker 1 [T1 ]
-27.48 dBm
1.666000000 GHz
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 25.MAR.2010 08:58:57

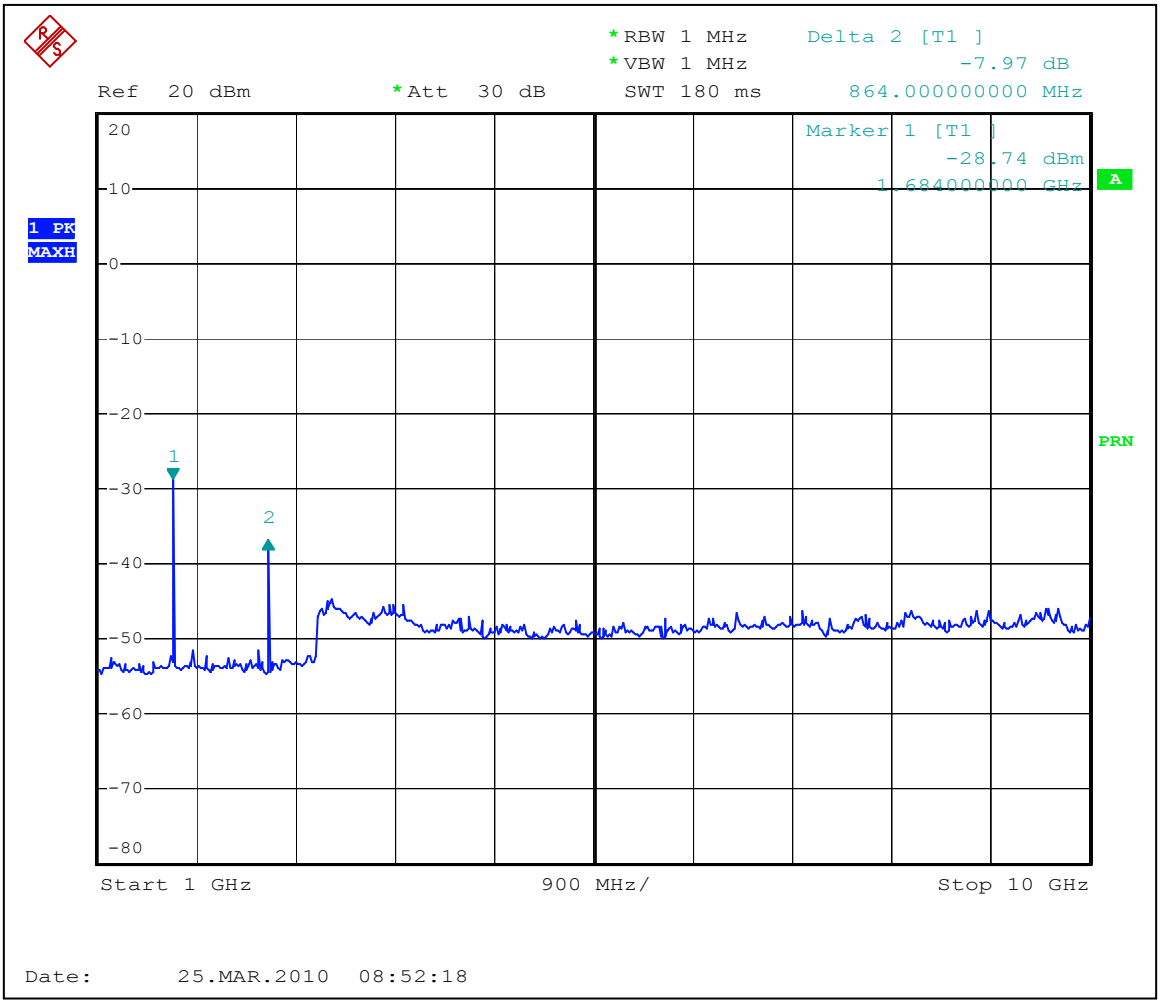
**Graph 3.5.5**


*RBW 1 MHz
*VBW 1 MHz
Marker 1 [T1 ]
-45.49 dBm
Ref 20 dBm
*Att 30 dB
SWT 200 ms
15.500000000 GHz
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 10 GHz
1 GHz/
Stop 20 GHz
Date: 25.MAR.2010 09:00:19

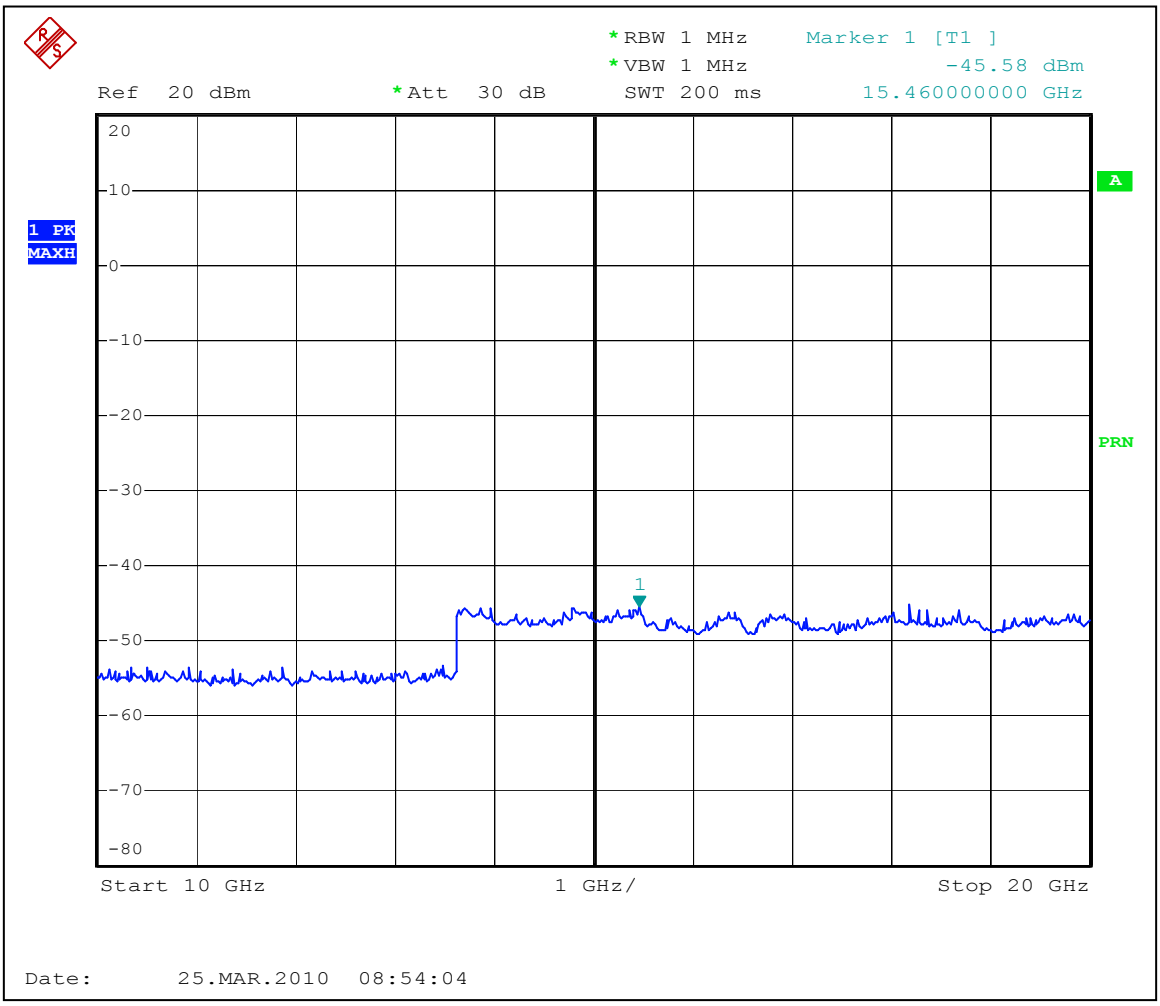
**Graph 3.5.6**


*RBW 1 MHz
*VBW 1 MHz
*SWT 40 ms
Marker 1 [T1 ]
22.98 dBm
848.772000000 MHz
Ref 30 dBm
*Att 50 dB
1 PK
MAXH
A
PRN
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 25.MAR.2010 08:46:15

**Graph 3.5.7**


*RBW 1 MHz
*VBW 1 MHz
Delta 2 [T1 ]
-7.97 dB
Ref 20 dBm
*Att 30 dB
SWT 180 ms
864.000000000 MHz
Marker 1 [T1 ]
-28.74 dBm
1.684000000 GHz
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 25.MAR.2010 08:52:18

**Graph 3.5.8**


*RBW 1 MHz
*VBW 1 MHz
Marker 1 [T1 ]
-45.58 dBm
15.460000000 GHz
Ref 20 dBm
*Att 30 dB
SWT 200 ms
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 10 GHz
1 GHz/
Stop 20 GHz
Date: 25.MAR.2010 08:54:04

**Graph 3.5.9**

### 3.6 Enclosure Radiated spurious emissions

**Test location:** ☐ OATS ☒ Anechoic Chamber ☐ Other

**Test result:** **Pass**

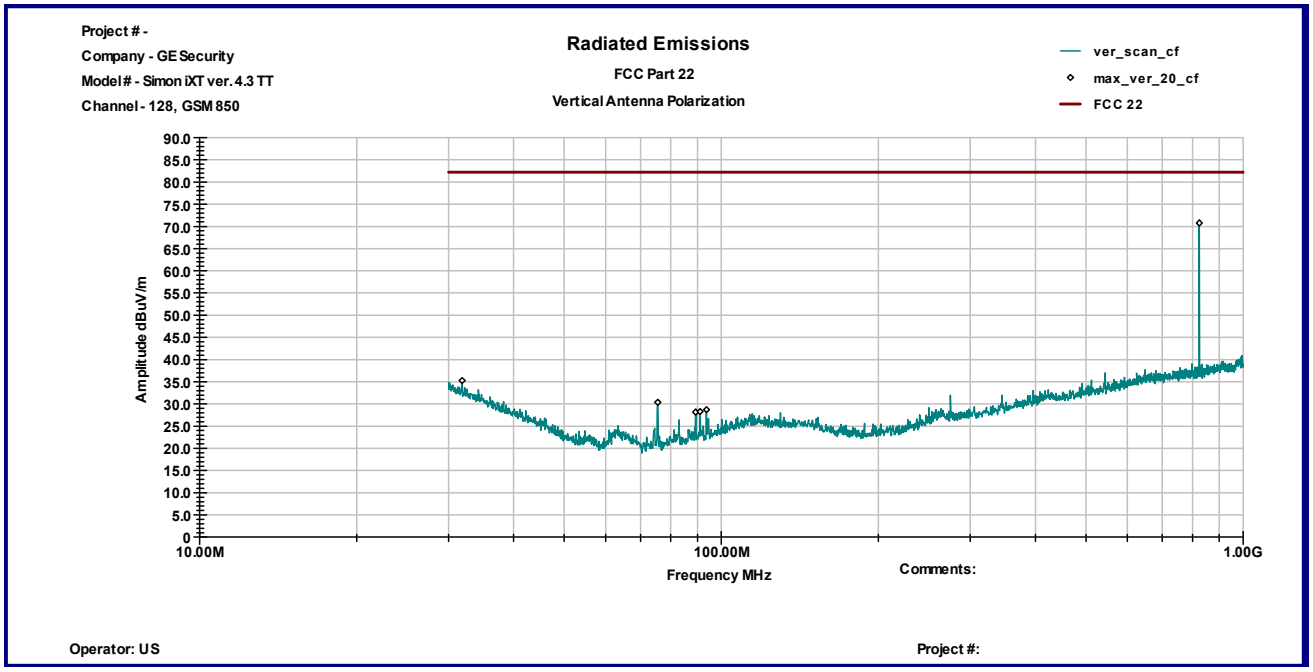
Tables 3.6.1-3.6.2 show detected Spurious Radiated Emissions from 30MHz to 1GHz and from 1GHz-10GHz respectively.
Graphs 3.6.1- to 3.6.12 show the EUT peak Radiated Emissions.
The Spurious Radiated Power limits of -13dBm was correlated with field strength reference level of 82.2dBµV/m during field strength 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 form the measurements.

**Table 3.6.1**

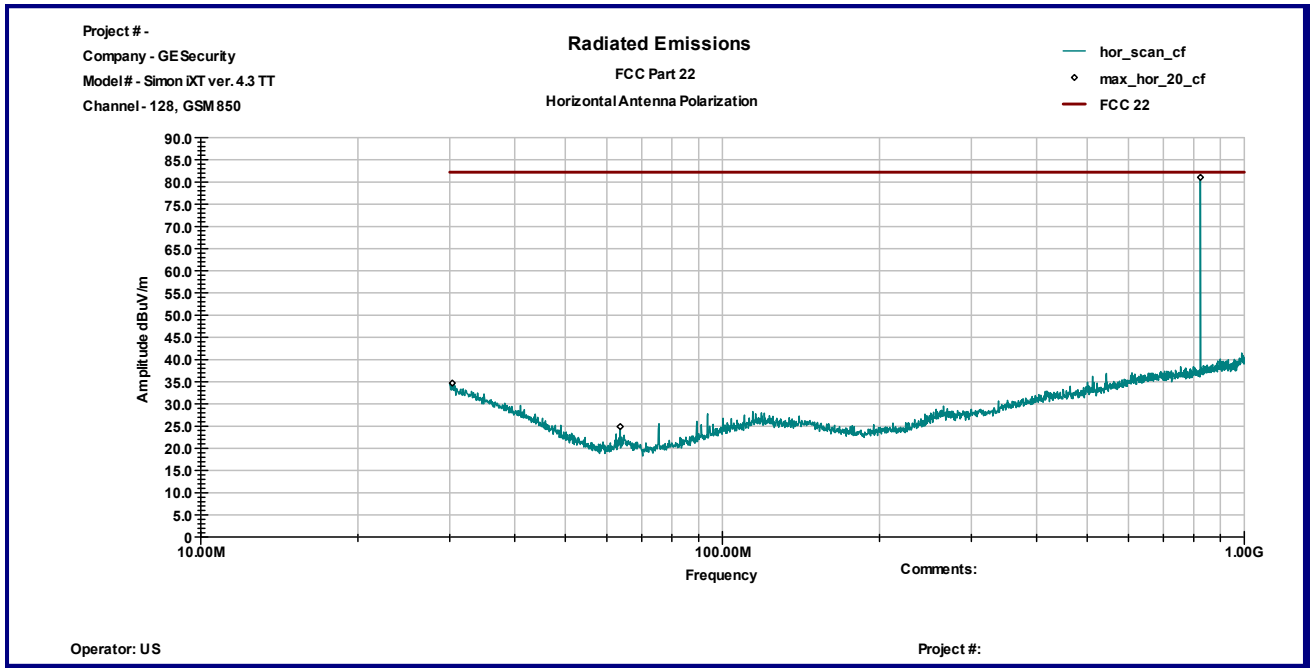
| Frequency | Ant. Polarity | Peak Reading dBµV | Ant.Factor dB1/m | Total at 3m dBµV/m | QP Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| | | **Channel 128** | | | | |
| 30.416 MHz | V | 13.2 | 20.9 | 34.1 | 82.2 | -48.2 |
| 115.22 MHz | V | 14.6 | 14.0 | 28.5 | 82.2 | -53.7 |
| 239.88 MHz | V | 20.4 | 13.9 | 34.3 | 82.2 | -47.9 |
| | | | | | | |
| 30.208 MHz | H | 12.8 | 21.0 | 33.8 | 82.2 | -48.4 |
| 239.88 MHz | H | 20.2 | 13.9 | 34.1 | 82.2 | -48.1 |
| | | **Channel 189** | | | | |
| 30.139 MHz | V | 12.6 | 21.0 | 33.7 | 82.2 | -48.5 |
| 48.009 MHz | V | 19.3 | 11.4 | 30.7 | 82.2 | -51.5 |
| 53.966 MHz | V | 18.4 | 8.9 | 27.3 | 82.2 | -54.9 |
| 140.86 MHz | V | 15.2 | 13.4 | 28.6 | 82.2 | -53.6 |
| | | | | | | |
| 30.831 MHz | H | 13.5 | 20.6 | 34.1 | 82.2 | -48.1 |
| 240.2 MHz | H | 19.8 | 14.0 | 33.8 | 82.2 | -48.4 |
| | | **Channel 251** | | | | |
| 31.732 MHz | V | 13.4 | 20.1 | 33.5 | 82.2 | -48.7 |
| 48.009 MHz | V | 16.7 | 11.4 | 28.1 | 82.2 | -54.1 |
| 54.312 MHz | V | 18.7 | 8.8 | 27.5 | 82.2 | -54.7 |
| 120.59 MHz | V | 15.2 | 13.9 | 29.1 | 82.2 | -53.1 |
| 239.88 MHz | V | 18.5 | 13.9 | 32.4 | 82.2 | -49.8 |
| | | | | | | |
| 31.316 MHz | H | 13.9 | 20.3 | 34.2 | 82.2 | -48.0 |
| 122.83 MHz | H | 15.5 | 13.9 | 29.5 | 82.2 | -52.7 |
| 239.88 MHz | H | 20.2 | 13.9 | 34.2 | 82.2 | -48.0 |
| | | | | | | |

**Table 3.6.2**

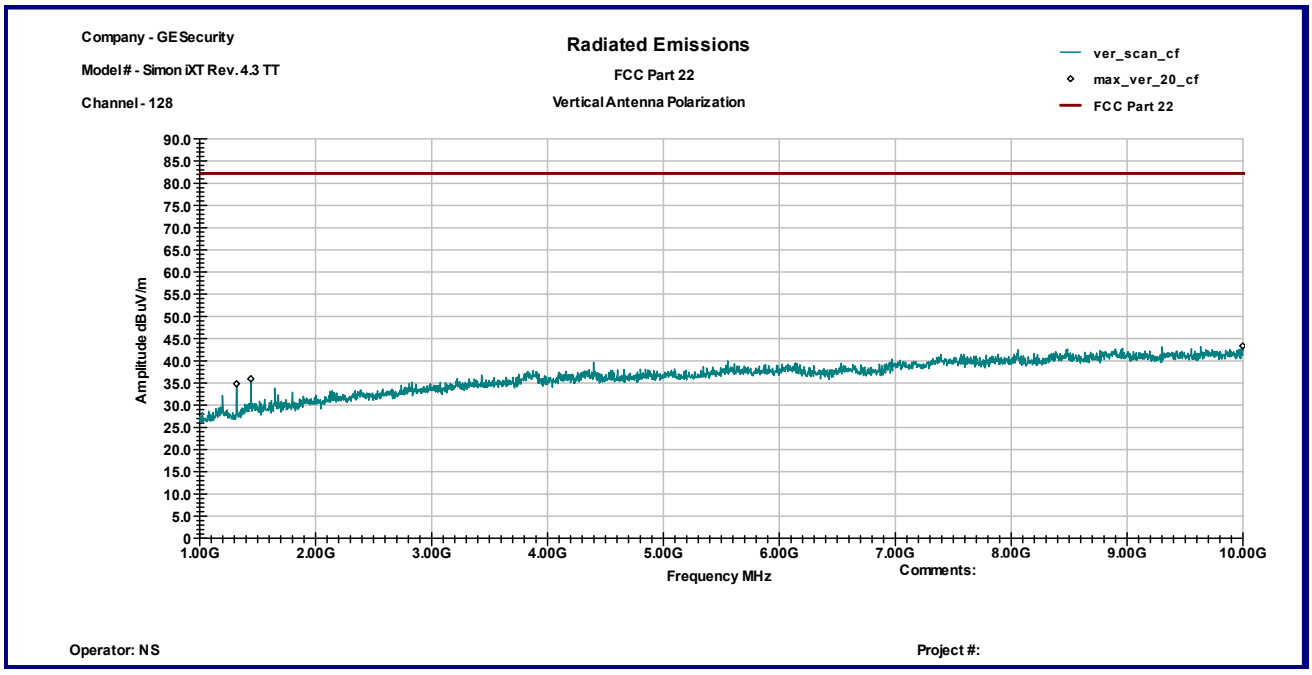
| Frequency MHz | Antenna Polarity | Reading dBµV | Total C.F. dB1/m | Pre-Amp. Gain (dB) | Total at 3m dBµV/m | QP Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|---|
| **Channel 128** | | | | | | | |
| 1.318 GHz | V | 50.1 | 27.4 | 42.6 | 34.8 | 82.2 | -47.4 |
| 1.441 GHz | V | 50.7 | 27.9 | 42.7 | 36.0 | 82.2 | -46.3 |
| 9.997 GHz | V | 38.6 | 45.7 | 41.0 | 43.3 | 82.2 | -38.9 |
| | | | | | | | |
| 1.078 GHz | H | 48.9 | 26.3 | 42.5 | 32.7 | 82.2 | -49.5 |
| 1.198 GHz | H | 50.6 | 26.8 | 42.6 | 34.9 | 82.2 | -47.3 |
| 1.441 GHz | H | 51.8 | 27.9 | 42.7 | 37.0 | 82.2 | -45.2 |
| 1.561 GHz | H | 52.5 | 28.4 | 42.8 | 38.2 | 82.2 | -44.0 |
| 1.801 GHz | H | 49.2 | 29.5 | 43.1 | 35.7 | 82.2 | -46.5 |
| 9.736 GHz | H | 39.3 | 45.3 | 40.8 | 43.8 | 82.2 | -38.4 |
| | | | | | | | |
| **Channel 189** | | | | | | | |
| 1.318 GHz | V | 49.1 | 27.4 | 42.6 | 33.8 | 82.2 | -48.4 |
| 1.441 GHz | V | 51.1 | 27.9 | 42.7 | 36.3 | 82.2 | -45.9 |
| 1.672 GHz | V | 50.1 | 28.9 | 42.9 | 36.1 | 82.2 | -46.1 |
| 8.851 GHz | V | 38.9 | 44.4 | 40.2 | 43.2 | 82.2 | -39.1 |
| | | | | | | | |
| 1.198 GHz | H | 51.1 | 26.8 | 42.6 | 35.4 | 82.2 | -46.8 |
| 1.441 GHz | H | 50.3 | 27.9 | 42.7 | 35.5 | 82.2 | -46.7 |
| 1.561 GHz | H | 53.5 | 28.4 | 42.8 | 39.1 | 82.2 | -43.1 |
| 1.672 GHz | H | 50.5 | 28.9 | 42.9 | 36.5 | 82.2 | -45.7 |
| 9.748 GHz | H | 38.6 | 45.3 | 40.8 | 43.1 | 82.2 | -39.1 |
| | | | | | | | |
| **Channel 251** | | | | | | | |
| 1.198 GHz | V | 49.5 | 26.8 | 42.6 | 33.8 | 82.2 | -48.4 |
| 1.321 GHz | V | 49.1 | 27.4 | 42.6 | 33.8 | 82.2 | -48.4 |
| 1.441 GHz | V | 51.7 | 27.9 | 42.7 | 36.9 | 82.2 | -45.3 |
| 1.699 GHz | V | 51.9 | 29.1 | 42.9 | 38.0 | 82.2 | -44.2 |
| 9.496 GHz | V | 38.8 | 44.9 | 40.6 | 43.2 | 82.2 | -39.0 |
| | | | | | | | |
| 1.198 GHz | H | 47.9 | 26.8 | 42.6 | 32.2 | 82.2 | -50.0 |
| 1.441 GHz | H | 49.4 | 27.9 | 42.7 | 34.6 | 82.2 | -47.6 |
| 1.561 GHz | H | 48.7 | 28.4 | 42.8 | 34.3 | 82.2 | -47.9 |
| 9.976 GHz | H | 38.5 | 45.7 | 41.0 | 43.2 | 82.2 | -39.0 |
| | | | | | | | |



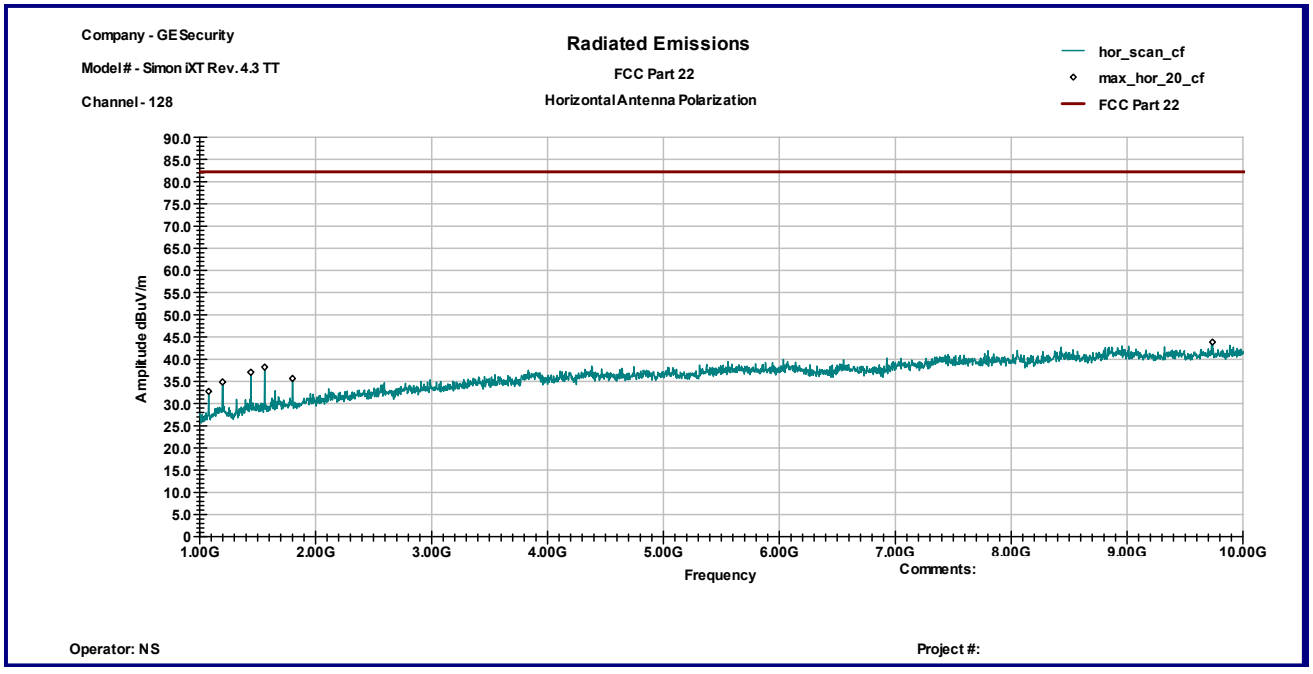

**Graph 3.6.1**



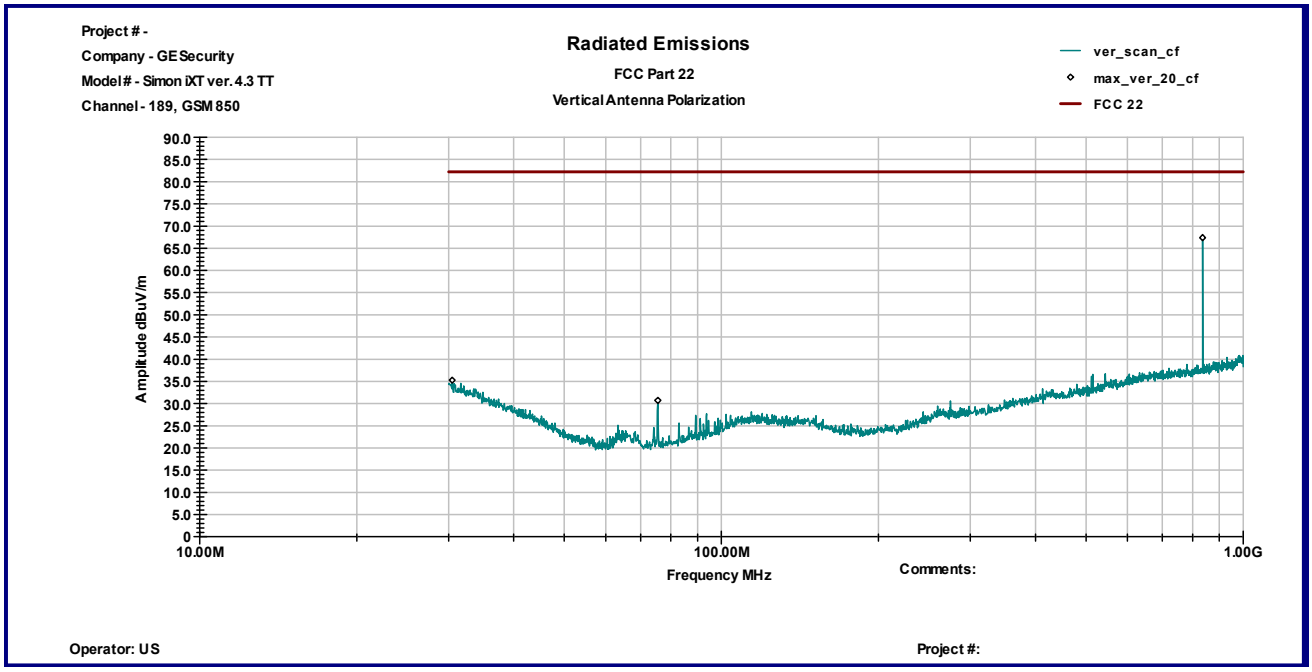

**Graph 3.6.2**



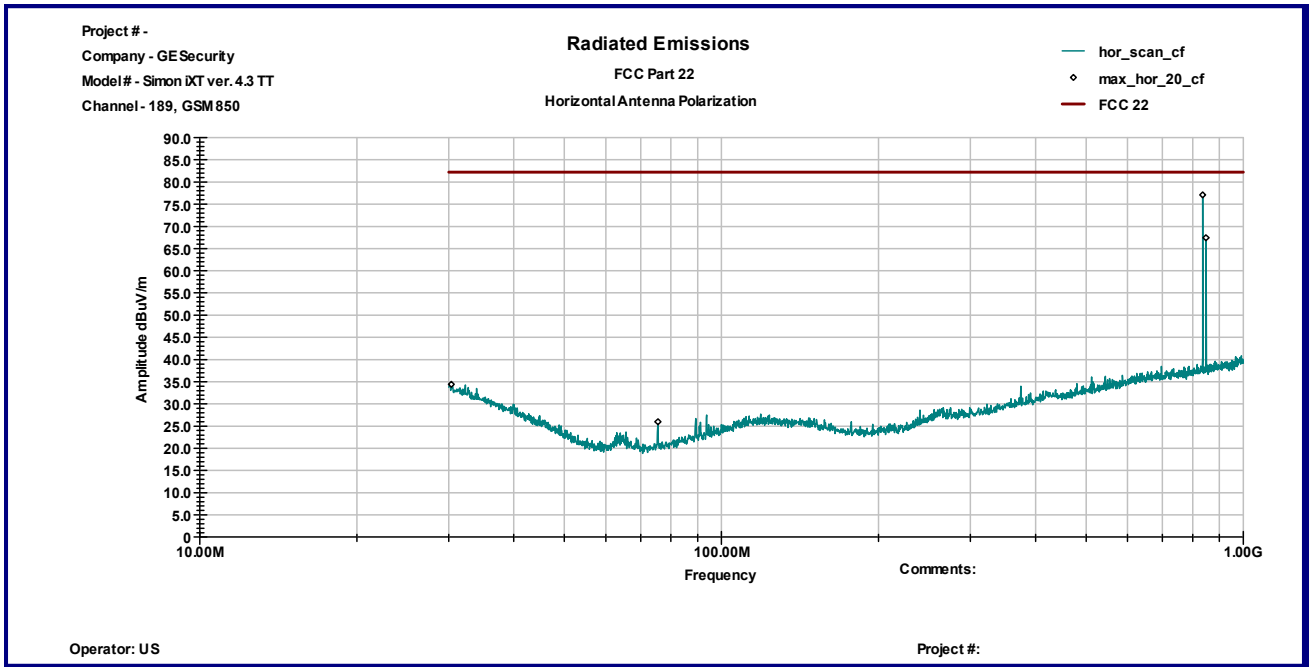

**Graph 3.6.3**



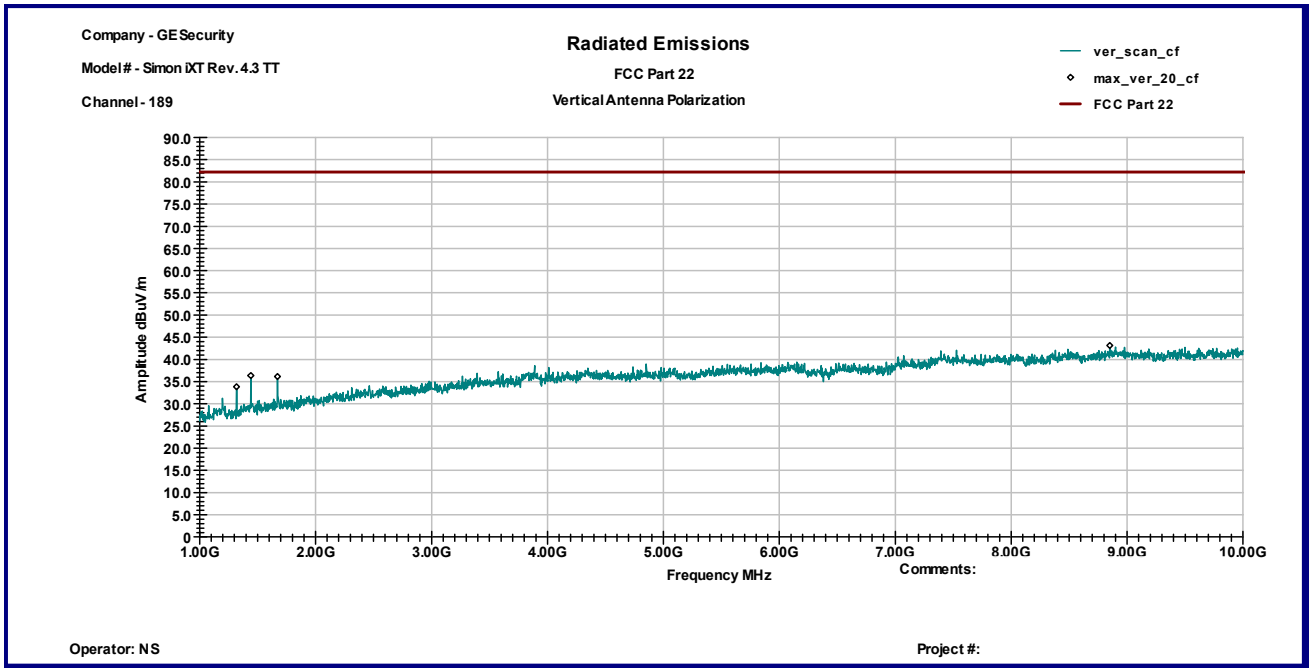

**Graph 3.6.4**



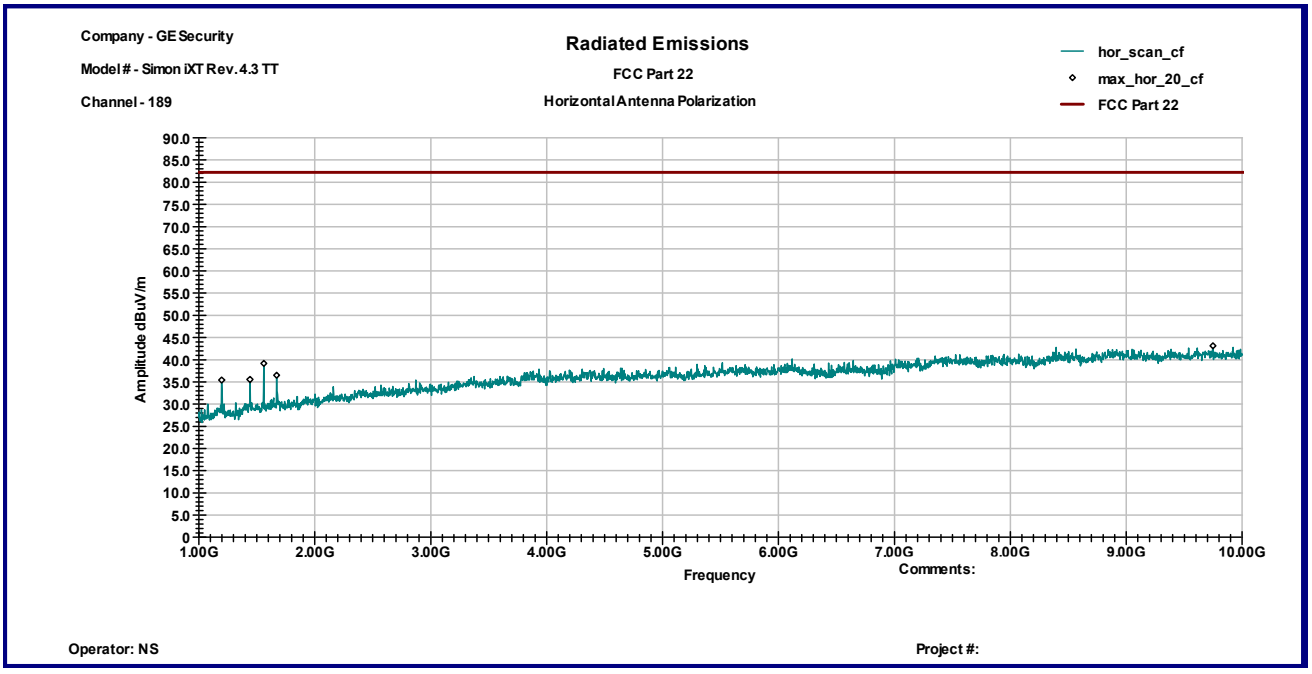

**Graph 3.6.5**



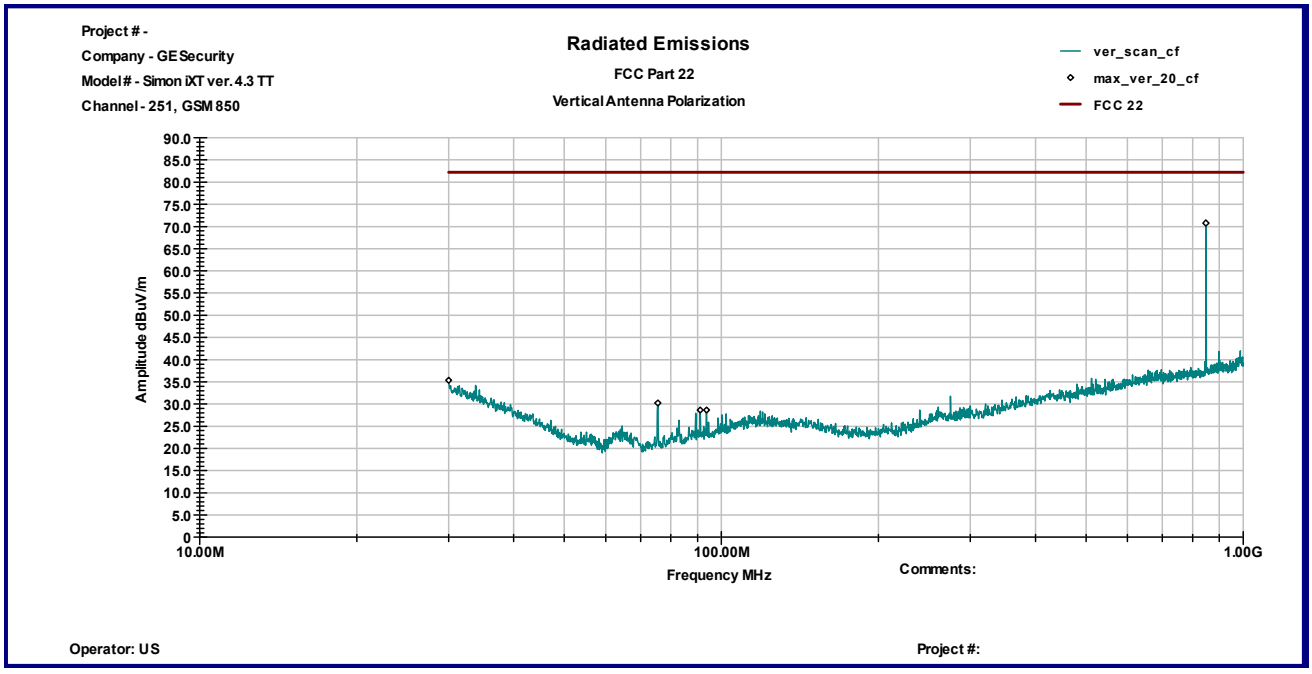

**Graph 3.6.6**



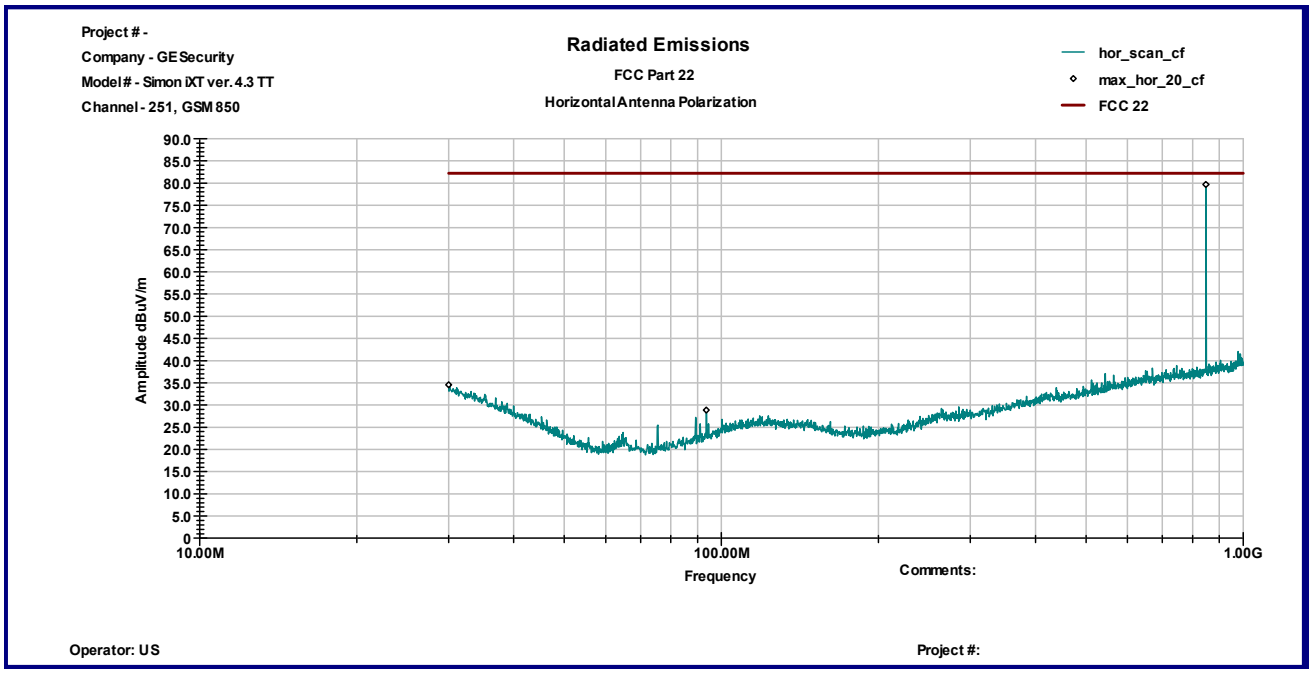

**Graph 3.6.7**



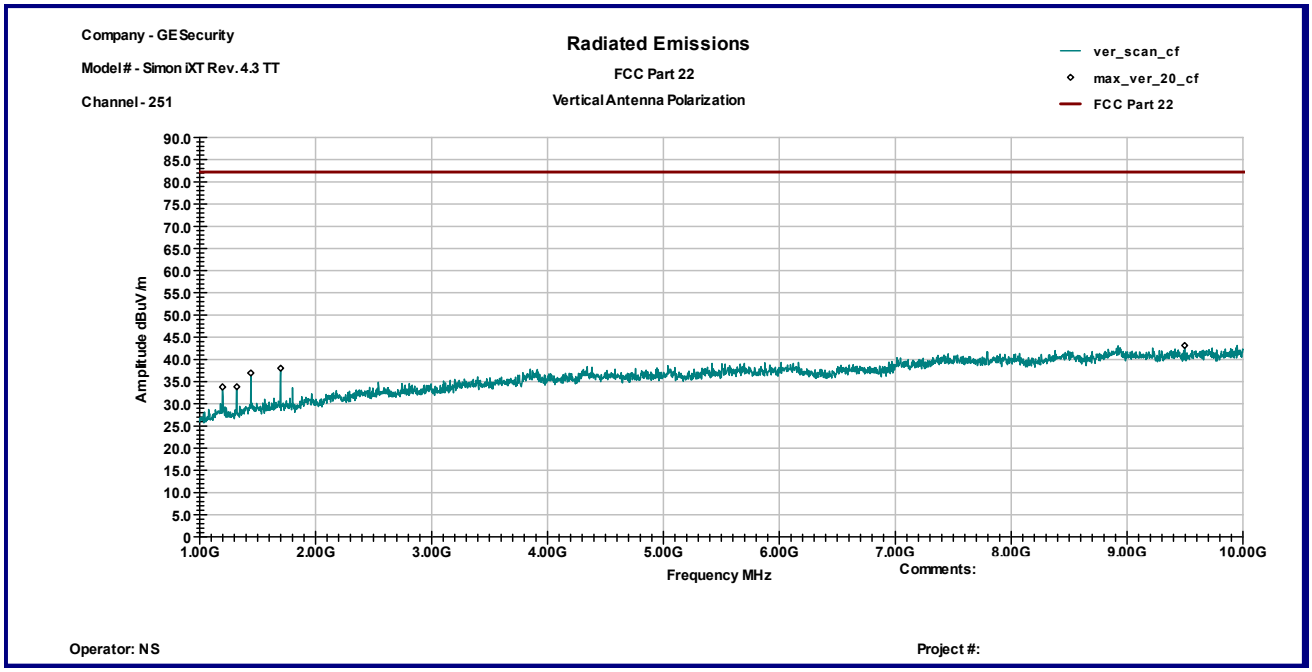

**Graph 3.6.8**



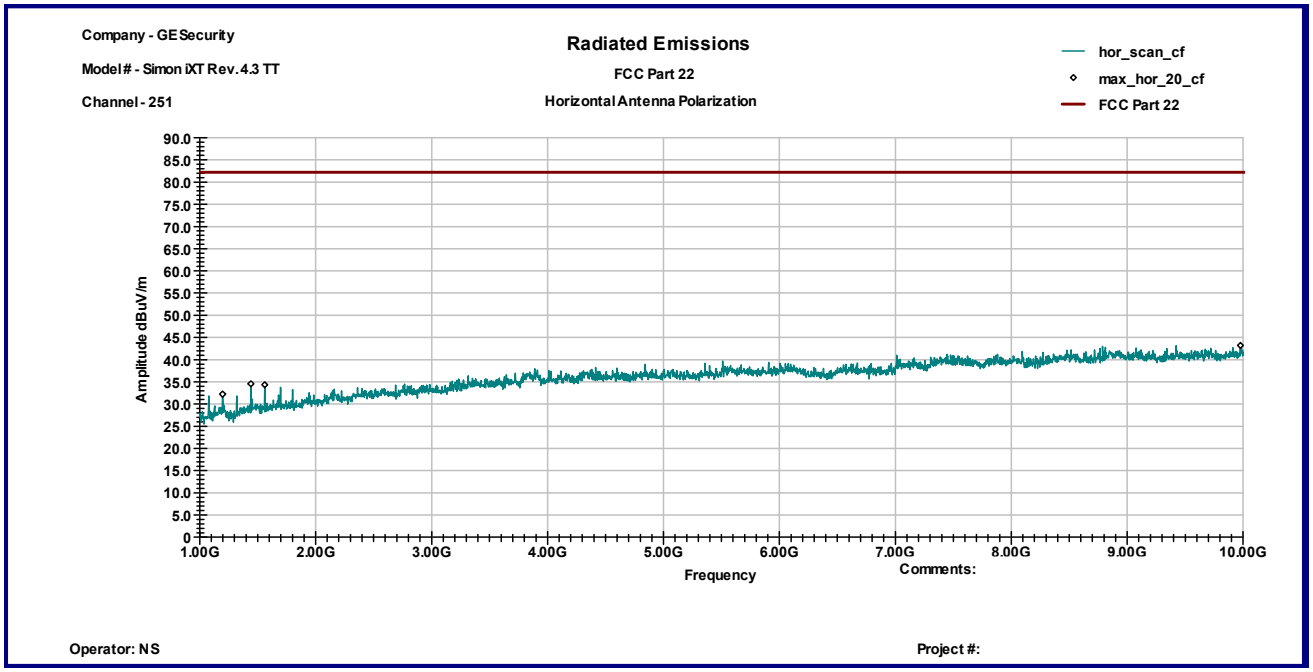

**Graph 3.6.9**




**Graph 3.6.10**




**Graph 3.6.11**




**Graph 3.6.12**

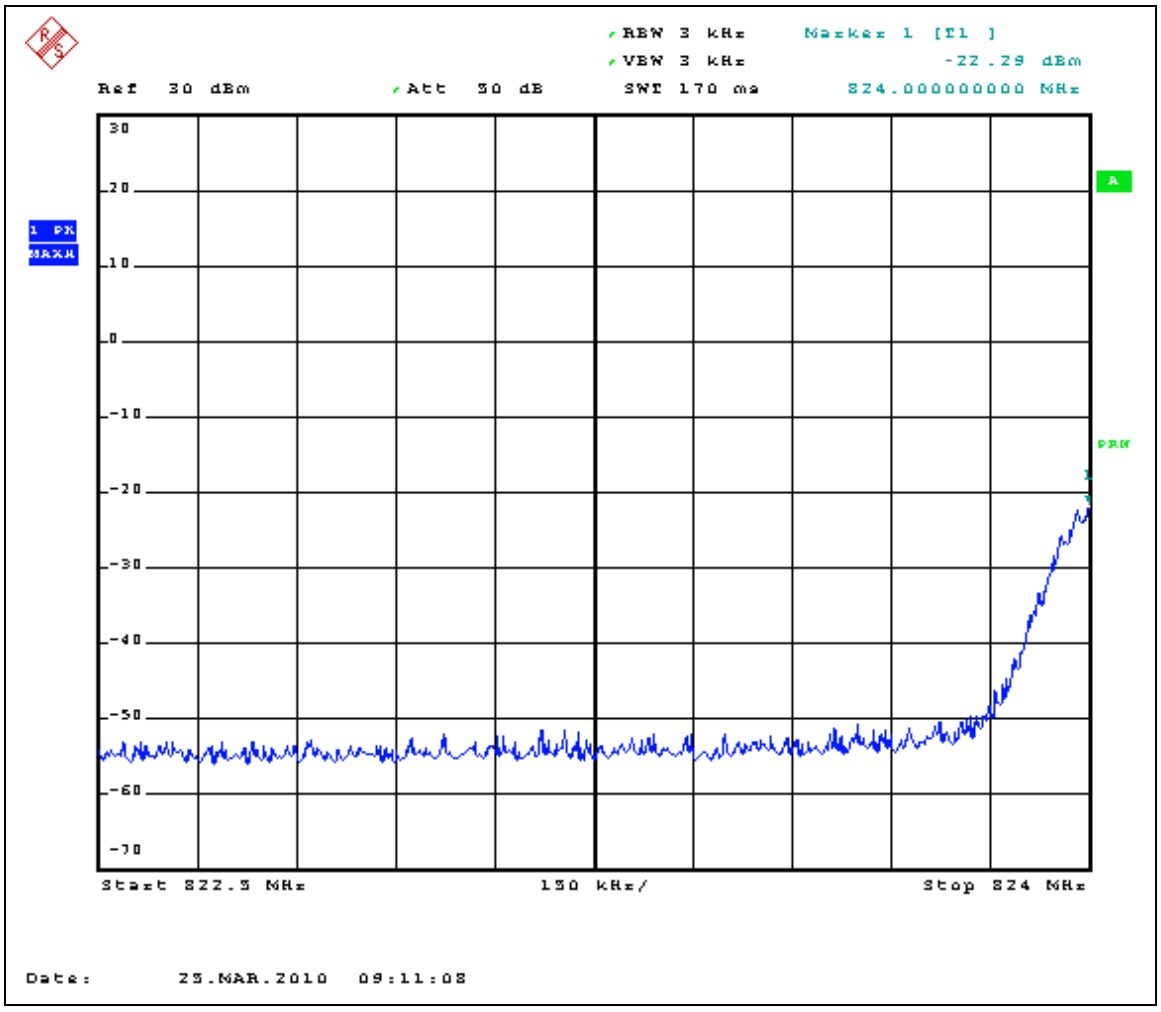
### 3.7 Spurious emissions at antenna terminal at Block Edges

**Test location:** ☐ OATS ☐ Anechoic Chamber ☐ Other

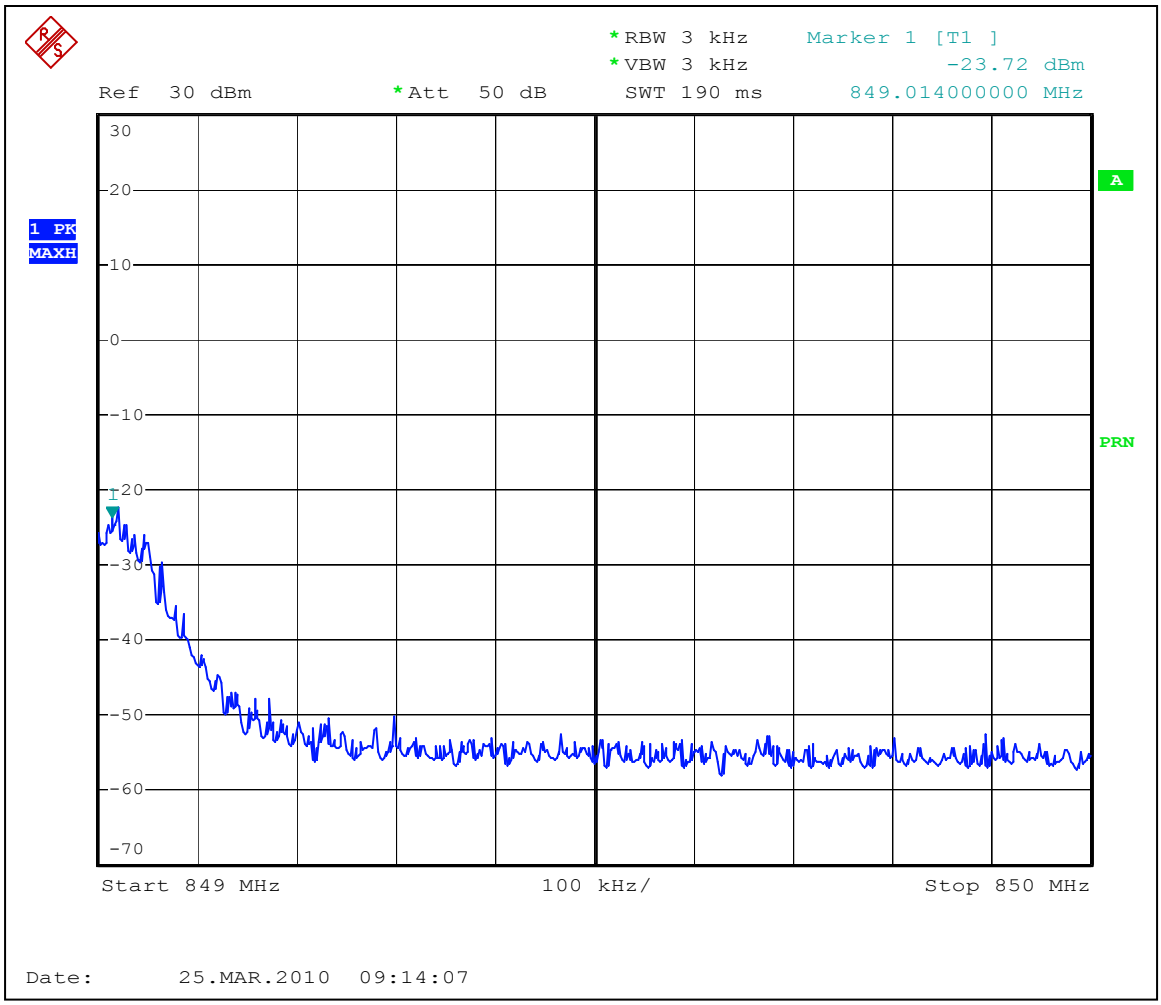
**Test result:** **Pass**

| Low Channel | Measured power dBm | Total CF dB | Total dBm | Limit dBm | Margin dB |
|---|---|---|---|---|---|
| 128 | -22.29 | 9.0 | -13.29 | -13.0 | -0.29 |
| **Highest Channel** | | | | | |
| 251 | -23.72 | 9.0 | -14.72 | -13.0 | -1.72 |
| **CF=Cable/Coupler Insertion Loss:** | ☒ 7.0dB | | | | |
| **Antenna Gain (dBi)** | ☒ 2.0dBi | | | | |

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


RBW 3 kHz
VBW 3 kHz
SWT 170 ms
Marker 1 [T1 ]
-22.29 dBm
824.000000000 MHz
Ref 30 dBm
Att 30 dB
1 PK
MAXH
A
PRN
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Start 822.5 MHz
150 kHz/
Stop 824 MHz
Date: 25.MAR.2010 09:11:08

**Graph 3.7.1**


*RBW 3 kHz
*VBW 3 kHz
Marker 1 [T1 ]
-23.72 dBm
Ref 30 dBm
*Att 50 dB
SWT 190 ms
849.014000000 MHz
1 PK
MAXH
A
PRN
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Start 849 MHz
100 kHz/
Stop 850 MHz
Date: 25.MAR.2010 09:14:07

**Graph 3.7.2**

## 3.8 RF Exposure Compliance

**MPE Requirement:**

S=f/1500 mW/cm$^2$
f= operating frequency
S=824/1500=0.55 mW/cm$^2$

**Calculation:**

Antenna Gain= 2.0d**i**
The maximum ERP power = 1.57W
D = distance of 20cm

$S_{(mW)}$ = ERP$_{(mW)}$ / 4πD$^2$, or $S_{(mW)}$ = 1570 / 4π400= 0.312 mW/cm$^2$, < 0.55 mW/cm$^2$

### 3.9 Receiver/digital device radiated emissions, FCC Part 15.109

**Test location:** ☐ OATS ☒ Anechoic Chamber

**Test distance:** ☐ 10 meters ☒ 3 meters

**Test result:** **Pass**

**Frequency range:** 30MHz-2000MHz

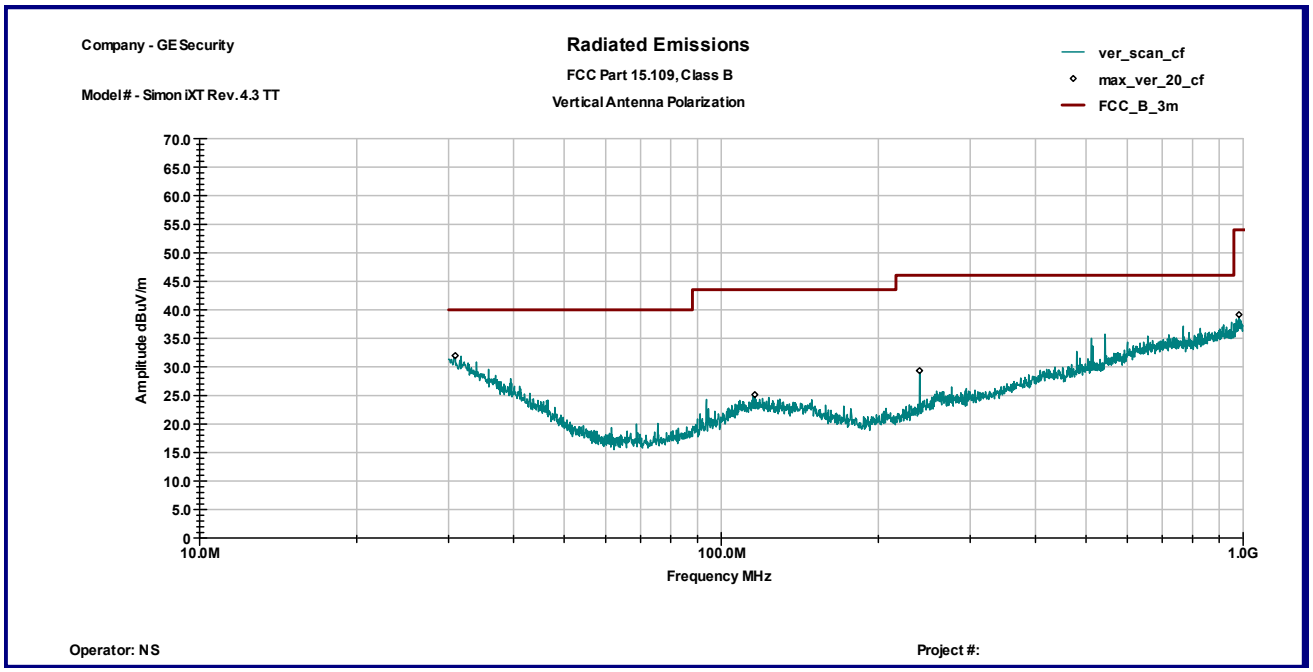
**Max. Emissions margin:** 8.1 dB below the limits

**Notes:** The Radiated Emissions test was performed in the Anechoic chamber at 3m measurement distance (see Table 3.8.1 and Graphs 3.8.1- and 3.8.4). No radiated emissions were detected above 1GHz (see Graphs 3.8.3, 3.8.4).

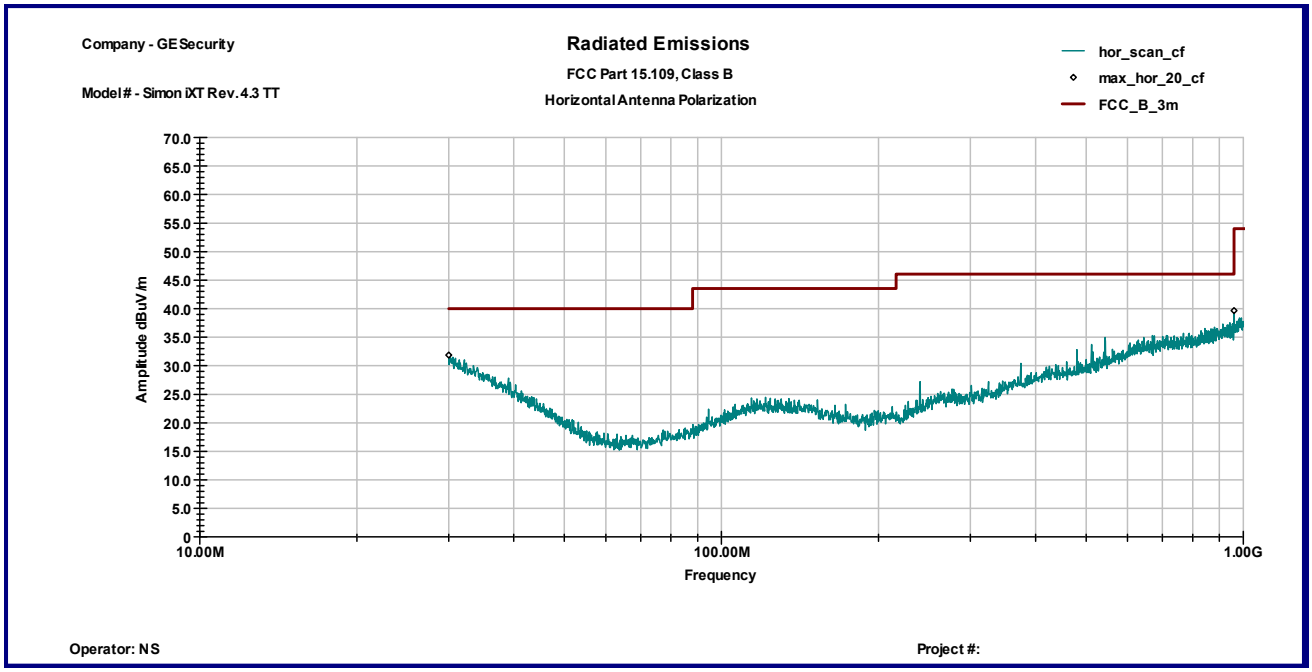
| | | |
|---|---|---|
| **Date:** | March 26, 2010 | **Result:** **Pass** |
| **Standard:** | FCC Part 15.109, Class B | |
| **Tested by:** | Norman Shpilsher | |
| **Test Point:** | Enclosure | |
| **Operation mode:** | Standby Mode | |
| **Note:** | | |

**Table 3.8.1**

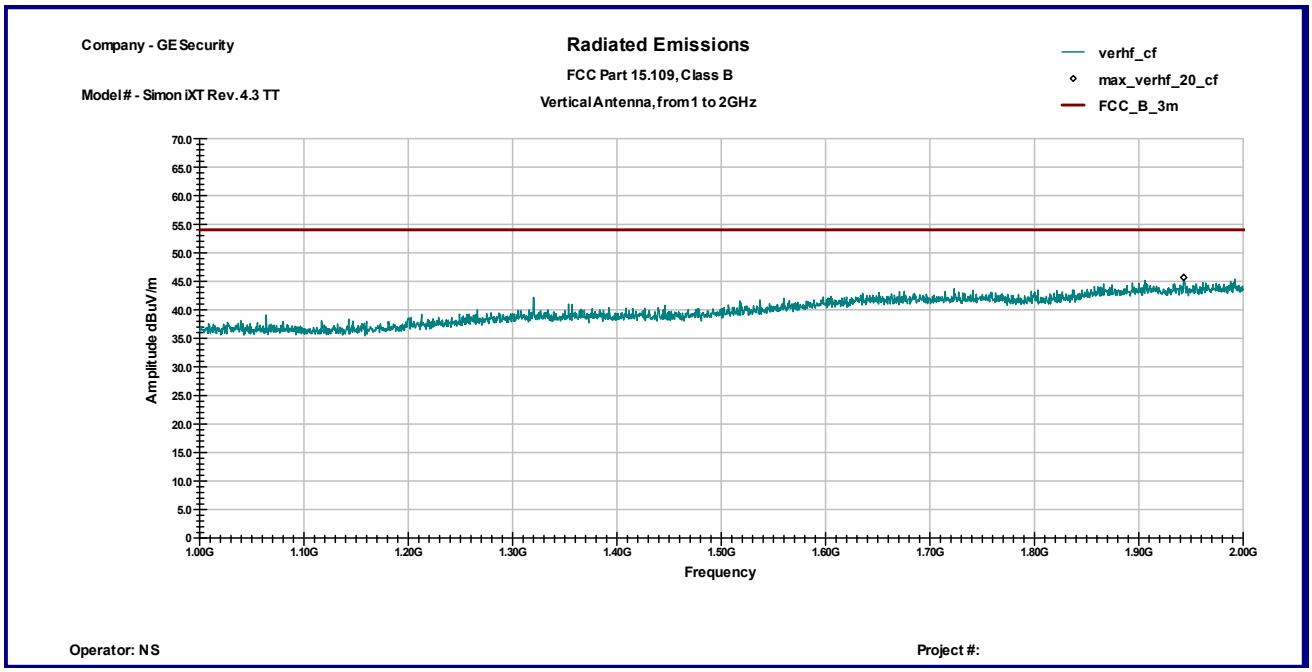
| Frequency | Ant. Polarity | Peak Reading dBµV | Ant.Factor dB1/m | Total at 3m dBµV/m | QP Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 30.9 MHz | V | 11.7 | 20.3 | 31.9 | 40.0 | -8.1 |
| 115.97 MHz | V | 11.3 | 13.8 | 25.1 | 43.5 | -18.4 |
| 239.88 MHz | V | 15.8 | 13.6 | 29.4 | 46.0 | -16.7 |
| | | | | | | |
| 30.0 MHz | H | 11.1 | 20.8 | 31.8 | 40.0 | -8.2 |
| 960.39 MHz | H | 14.3 | 25.4 | 39.6 | 54.0 | -14.3 |
| | | | | | | |



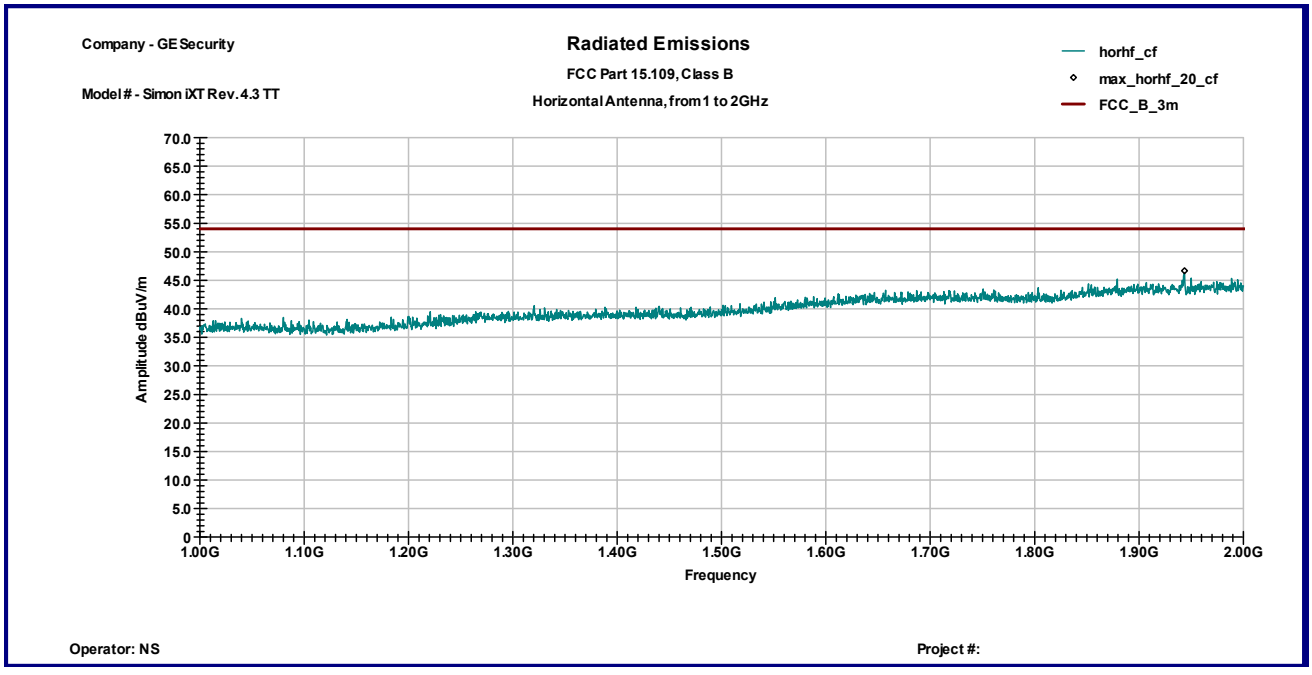

**Graph 3.8.1**




**Graph 3.8.2**




**Graph 3.8.3**




**Graph 3.8.4**

### 3.10 AC Power line conducted emissions, FCC Part 15.107

**Test location:** ☐ OATS ☒ Anechoic Chamber ☐ Other

**Test result:** **Pass**

**Frequency range:** 0.15MHz-30MHz

**Max. Emissions margin:** 13.9 dB below the limits

Notes: None

| | | |
|---|---|---|
| **Date:** | March 26, 2010 | **Result:** **Pass** |
| **Standard:** | FCC 15.107, Class B | |
| **Tested by:** | Norman Shpilsher | |
| **Test Point:** | Power Line | |
| **Operation mode:** | Standby Mode | |
| **Note:** | | |

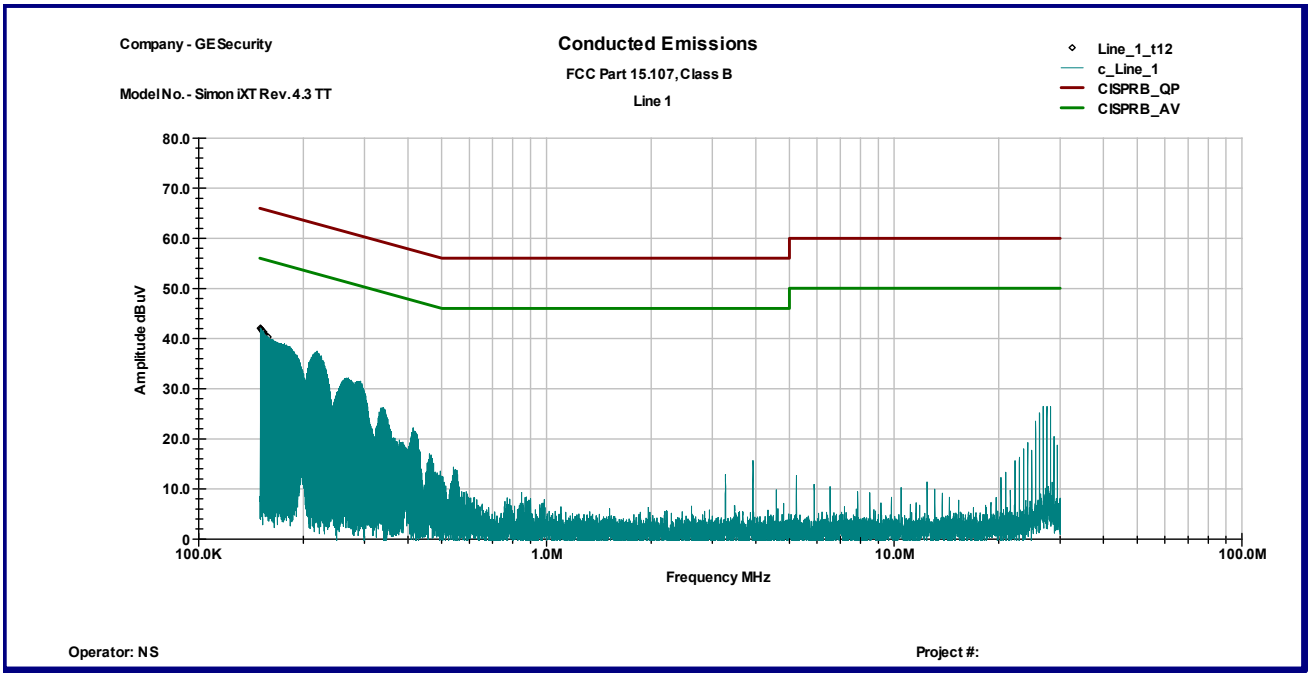
**Table 3.9.1**

**Line 1**

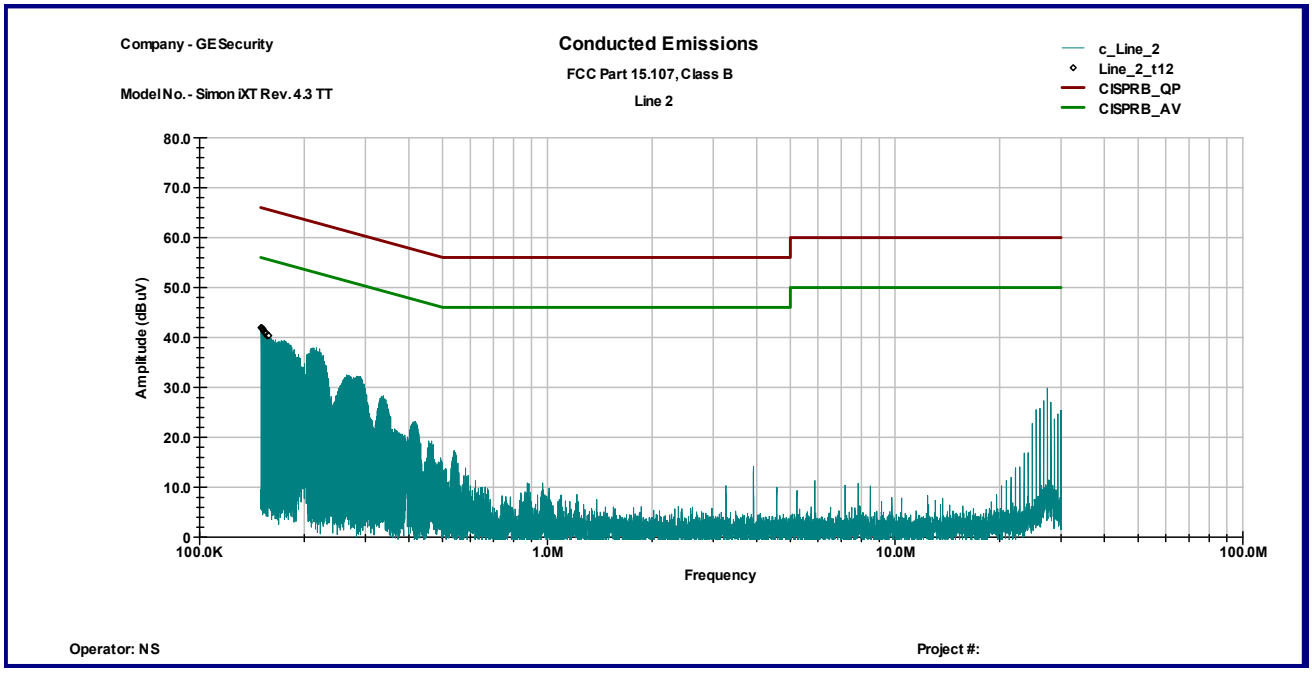
| Frequency | Peak dBµV | QP Limit dBµV | AVG Limit dBµV | QP Margin dB | AVG Margin dB |
|---|---|---|---|---|---|
| 150.54 KHz | 42.1 | 66.0 | 56.0 | -23.9 | -13.9 |
| 154.43 KHz | 40.9 | 65.8 | 55.8 | -24.9 | -14.9 |
| 157.77 KHz | 40.3 | 65.6 | 55.6 | -25.3 | -15.3 |
| 3.921 MHz | 15.2 | 56.0 | 46.0 | -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 3.9.1**




**Graph 3.9.2**

## 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 | ☒ |
| Spectrum Analyzer | R & S | ESCI | 100358 | 12909 | 05/18/2010 | ☒ |
| Bicono-Log Antenna | Schaffner-Chase | CBL 6112 B | 2468 | 14459 | 09/22/2010 | ☒ |
| Horn Antenna | EMCO | 3115 | 9507-4513 | 9936 | 03/30/2010 | ☒ |
| Horn Antenna | EMCO | 3115 | 6579 | 15580 | 04/03/2010 | ☒ |
| Signal Generator | R & S | SMR20 | 101469 | 25233 | 07/31/2010 | ☒ |
| Roberts Antenna | CDI | A100 | 00599 | 9965 | VBU | ☒ |
| LISN | Fischer Custom Communications | FCC-LISN-2 MOD.SD | 316 | 9945 | 11/06/2010 | ☒ |
| 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 | VBU | ☒ |