



TEST REPORT

Report Number: 100077996MIN-003

Project Number: G100077996

**Testing performed on the
Simon iXT ver. 4.3 TT Wi-Fi**

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

**to
47 CFR Part 15. 247:2009
RSS- 210, Issue 7, 2007**

**For
GE Security Inc.**

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

Test Authorized by:
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Arden Hills, MN 55112

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Date: March 26, 2010

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Date: March 26, 2010

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1.0 GENERAL DESCRIPTION

Model:	Simon iXT ver. 4.3 TT , Wi-Fi
Type of EUT:	Security Alarm
Serial Number:	N/A
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 Arden Hills, MN 55112
Phone:	(877) 699-6787
Fax:	(651) 779-4884
e-mail:	Rene.Christian@ge.com
Test Standards:	☒ 47 CFR, Part 15:2009, §15.247 ☒ RSS-210, Issue 7, 2007 ☒ RSS-Gen, Issue 2, 2007 ☐ 47 CFR, Part 15:2008, §15.107 and §15.109, Class ☐ 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:	Wi-Fi
Transmitter Type:	☐ FHSS ☐ Digital Modulation ☒ WiFi ☐ Blue Tooth
Operating Frequency Range(s):	Range 1. From 2400 to 2483.5 MHz
Number of Channels:	11
Modulation:	OFDM (802.11g) 54Mbps DSSS-CCK (802.11b) 11Mbps
Emission Designator:	OFDM-10M48X7D DSSS-CCK-16M48G1D
Antenna(s) Info:	Antenna Type: transmit/receive antenna, PCB trace connected with coax cable and receive inverted Pifa antenna connected with coax cable. Gain: 2dBi
Power settings:	1. dBm 2. dBm 3. dBm
Antenna Installation:	☐ User ☐ Professional ☒ Factory
Transmitter power configuration:	☐ Internal battery ☒ External power source ☒ 120VAC ☐ 230VAC ☐ 400VAC ☐ VDC ☐ Other: 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 and FCC Public Notice DA 00-705

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 transmitting with 11Mbps rate and 54Mbps rate. Test was performed at low channel (1), middle channel (6), and upper channel (1)

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	HP Laptop computer	
2		

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:** -20 to +50 ° C

☐ **Supply voltage:** 85% to +115%

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
15.247(b), (c) / RSS-210 A8.4	Maximum peak output power	Pass
15.247(a) / RSS-210 A8.2	6dB bandwidth of the digital modulation system	Pass
15.247(e) / RSS-210 A8.2	Power spectral density	Pass
15.247(d) / RSS-210 A8.5	Antenna conducted spurious emissions	Pass
15.247(d) / RSS-210 A8.5	Radiated spurious emissions	Pass
15.247(i) / RSS- Gen 5.5	RF Exposure Compliance	Pass
15.207 / RSS-Gen 7.2.2	Transmitter Power Line conducted emissions	Pass

3.0 TEST CONDITIONS AND RESULTS

3.1 Maximum peak output power

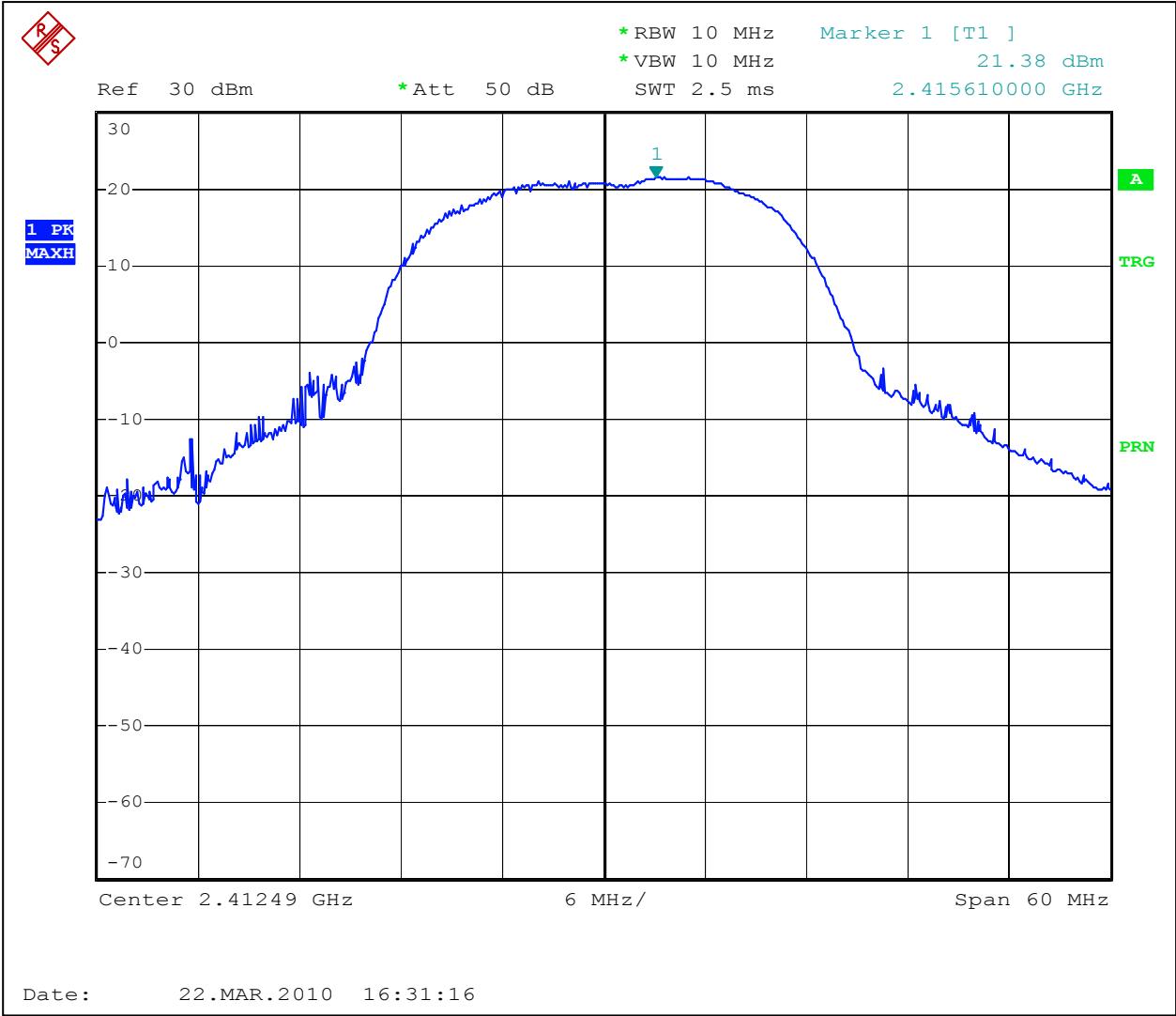
Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test result: **Pass**

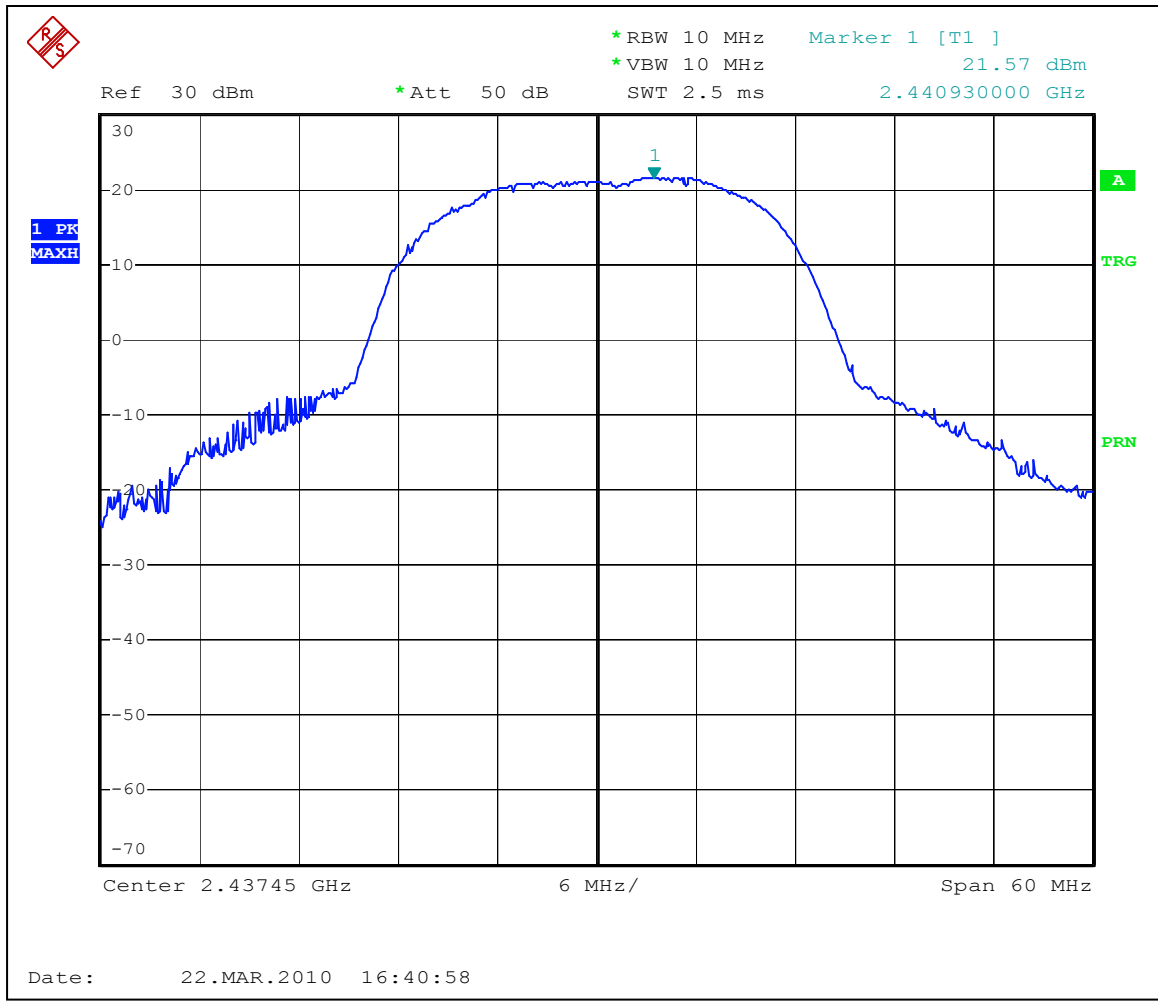
Max. Margin: dB below the limits

Power Output:	Conducted 54Mbps rate					
Frequency Range:	☐ 902-928MHz ☒ 2400-2483.5MHz ☐ 5725-5850MHz					
Low Frequency MHz	Measured power dBm	Attenuation dB	Power at Antenna dBm	Limit dBm	Limit Reduction dB	Margin dB
2412.49	21.38	2.0	23.38	30	0	-6.62
Middle Frequency MHz						
	21.57	2.0	23.57	30	0	-6.43
Upper Frequency MHz						
	18.97	2.0	21.97	30	0	-8.03
RBW:	☐ 1MHz ☐ 3MHz ☒ 10MHz					
VBW:	☐ 1MHz ☐ 3MHz ☒ 10MHz					
Antenna Gain:	☒ < 6dBi ☐ >6dBi and = dBi, Output power reduction = dB					

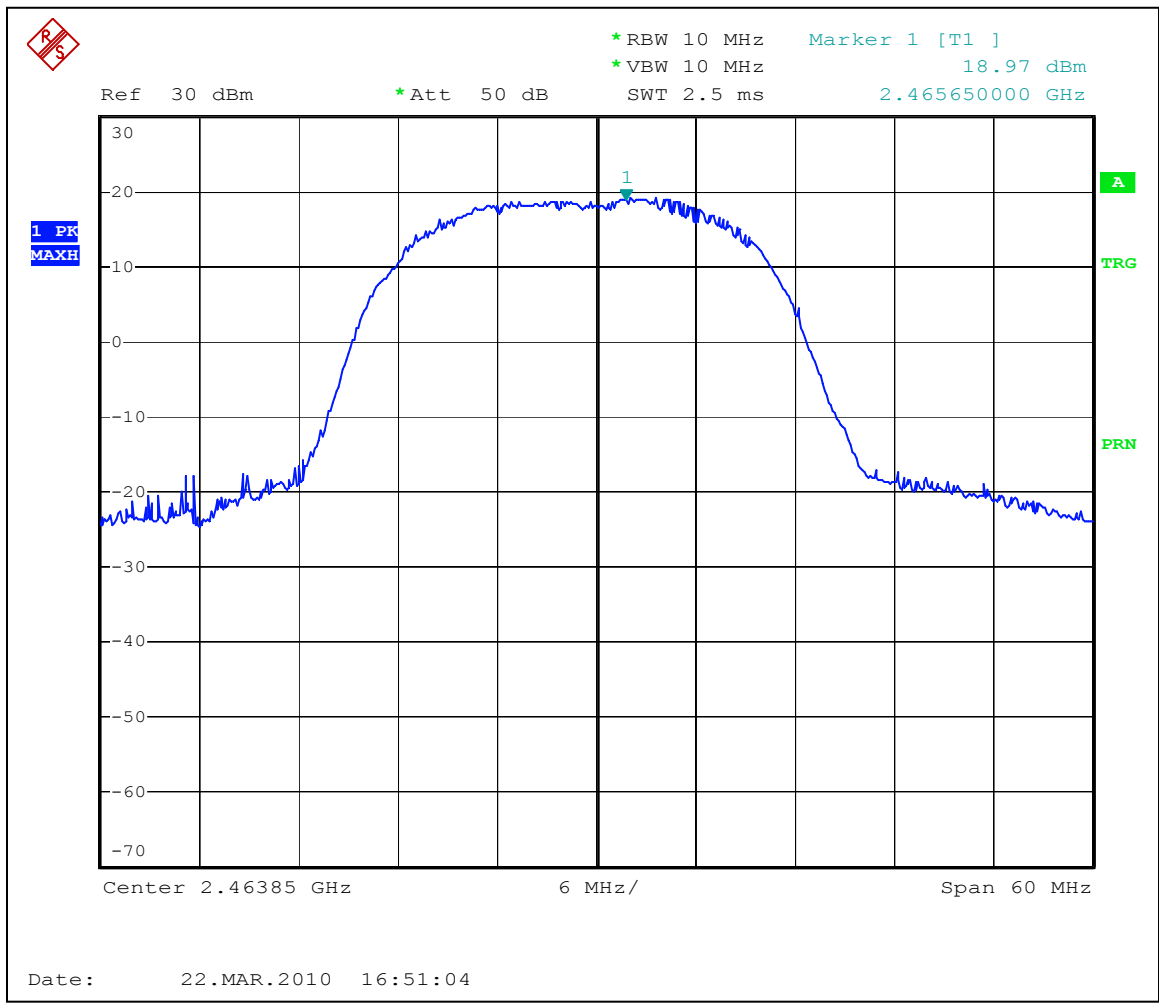
Notes:



Graph 3.1.1



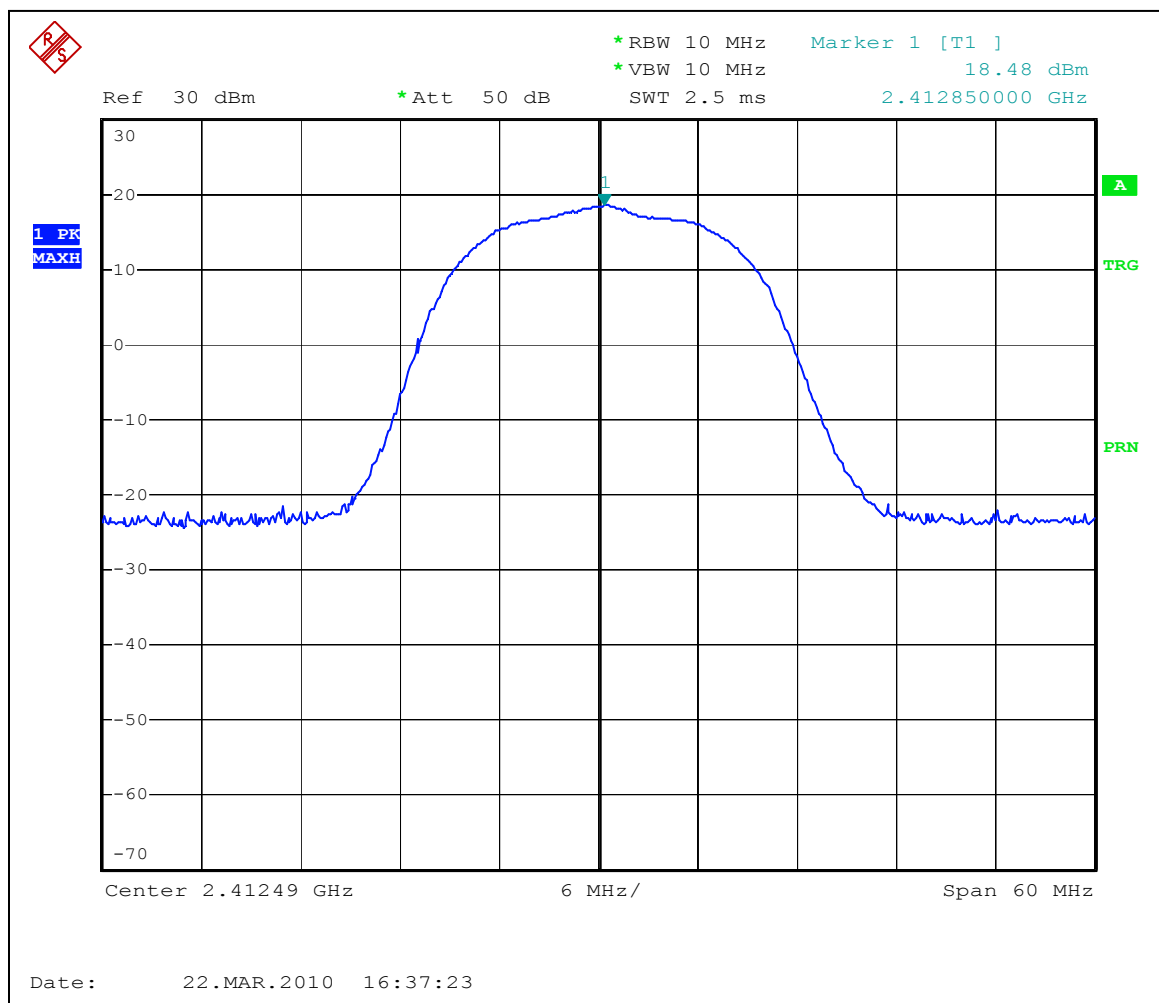
Graph 3.1.2



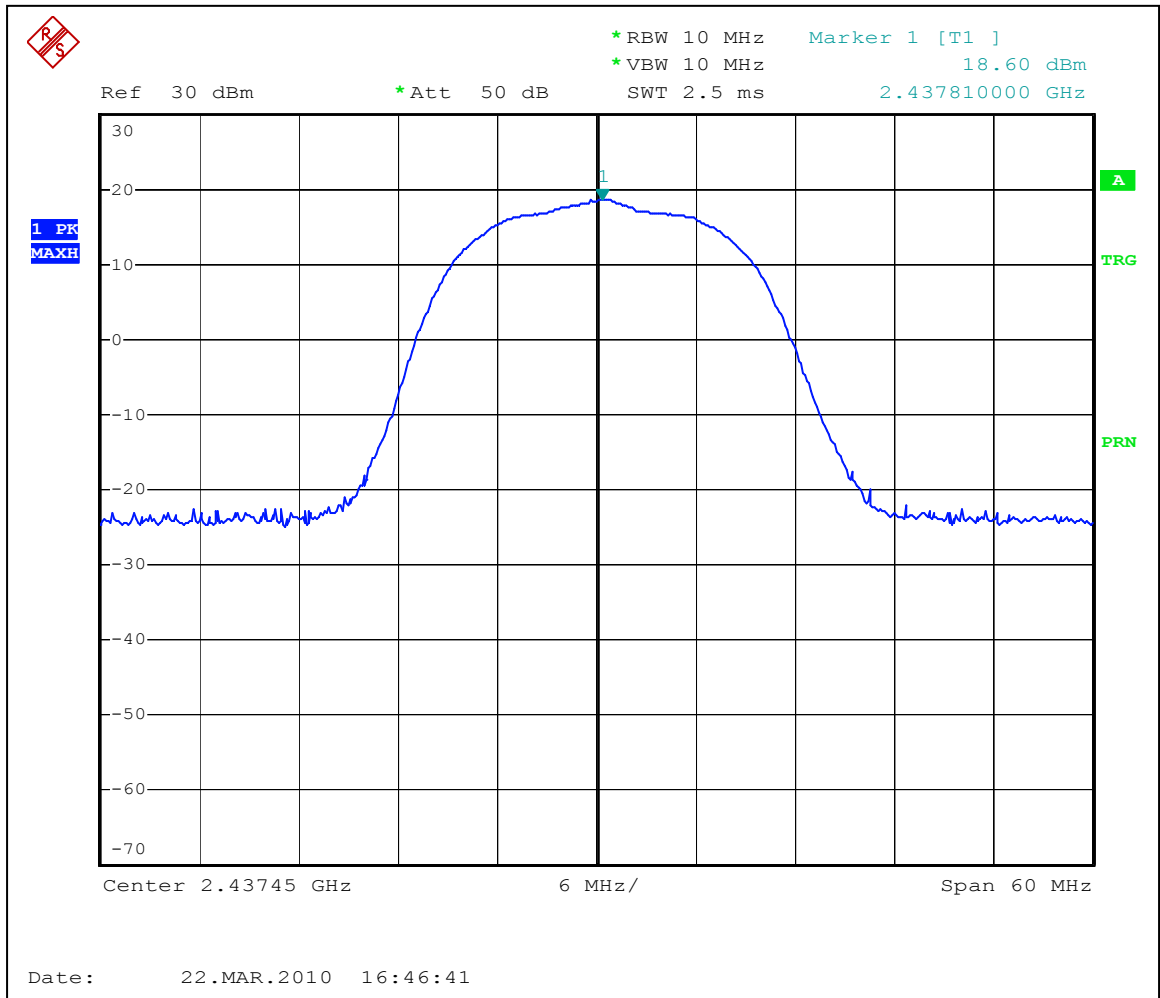
Graph 3.1.3

Power Output:	Conducted 11Mbps rate					
Frequency Range:	☐ 902-928MHz ☒ 2400-2483.5MHz ☐ 5725-5850MHz					
Low Frequency MHz	Measured power dBm	Attenuation dB	Power at Antenna dBm	Limit dBm	Limit Reduction dB	Margin dB
2412.49	18.48	2.0	20.48	30	0	-9.52
Middle Frequency MHz						
	18.6	2.0	20.6	30	0	-9.40
Upper Frequency MHz						
	18.51	2.0	20.51	30	0	-9.49
RBW:	☐ 1MHz ☐ 3MHz ☒ 10MHz					
VBW:	☐ 1MHz ☐ 3MHz ☒ 10MHz					
Antenna Gain:	☒ < 6dBi ☐ >6dBi and = dBi, Output power reduction = dB					

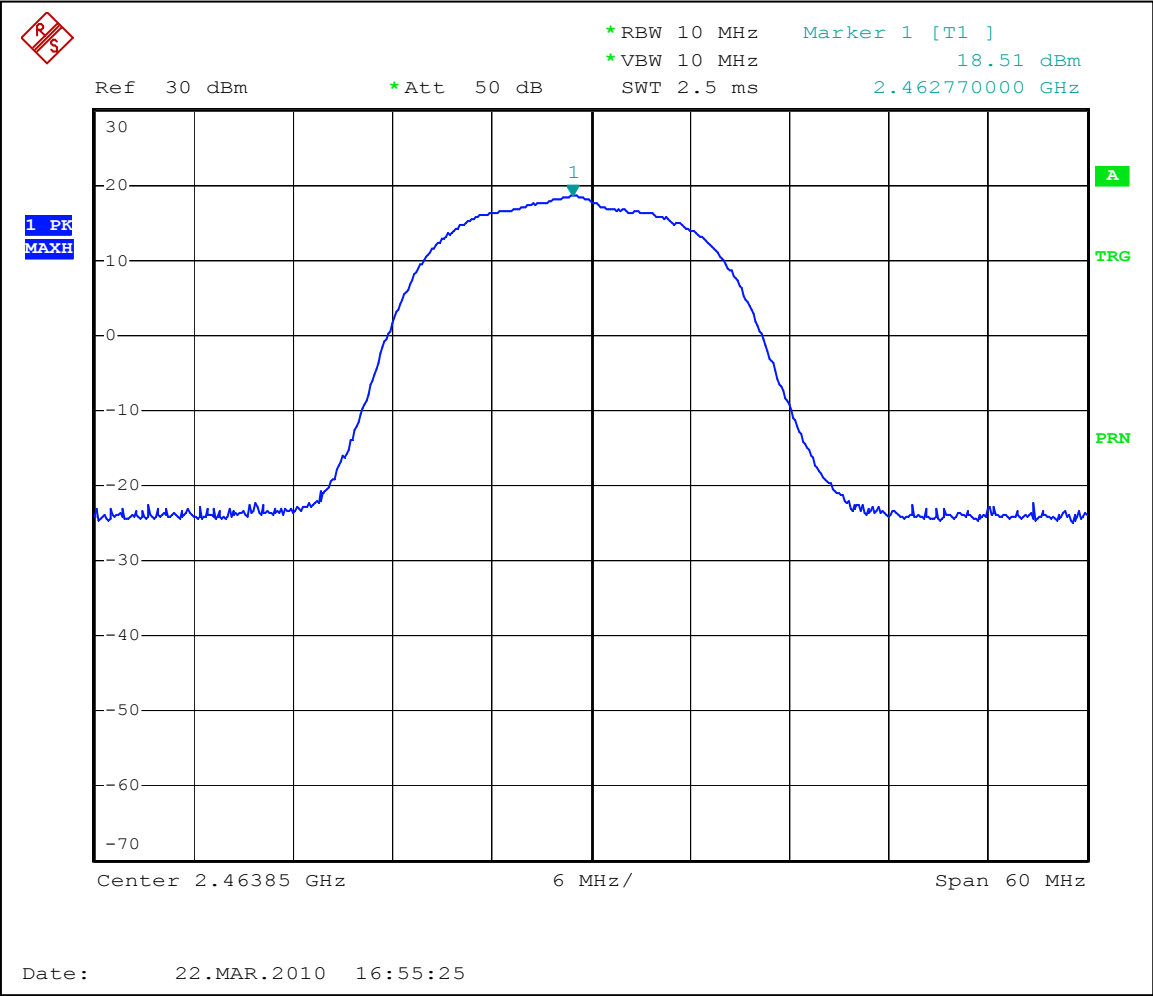
Notes:



Graph 3.1.4



Graph 3.1.5



Graph 3.1.6

3.2 6dB bandwidth of the digital modulation

54Mbps rate

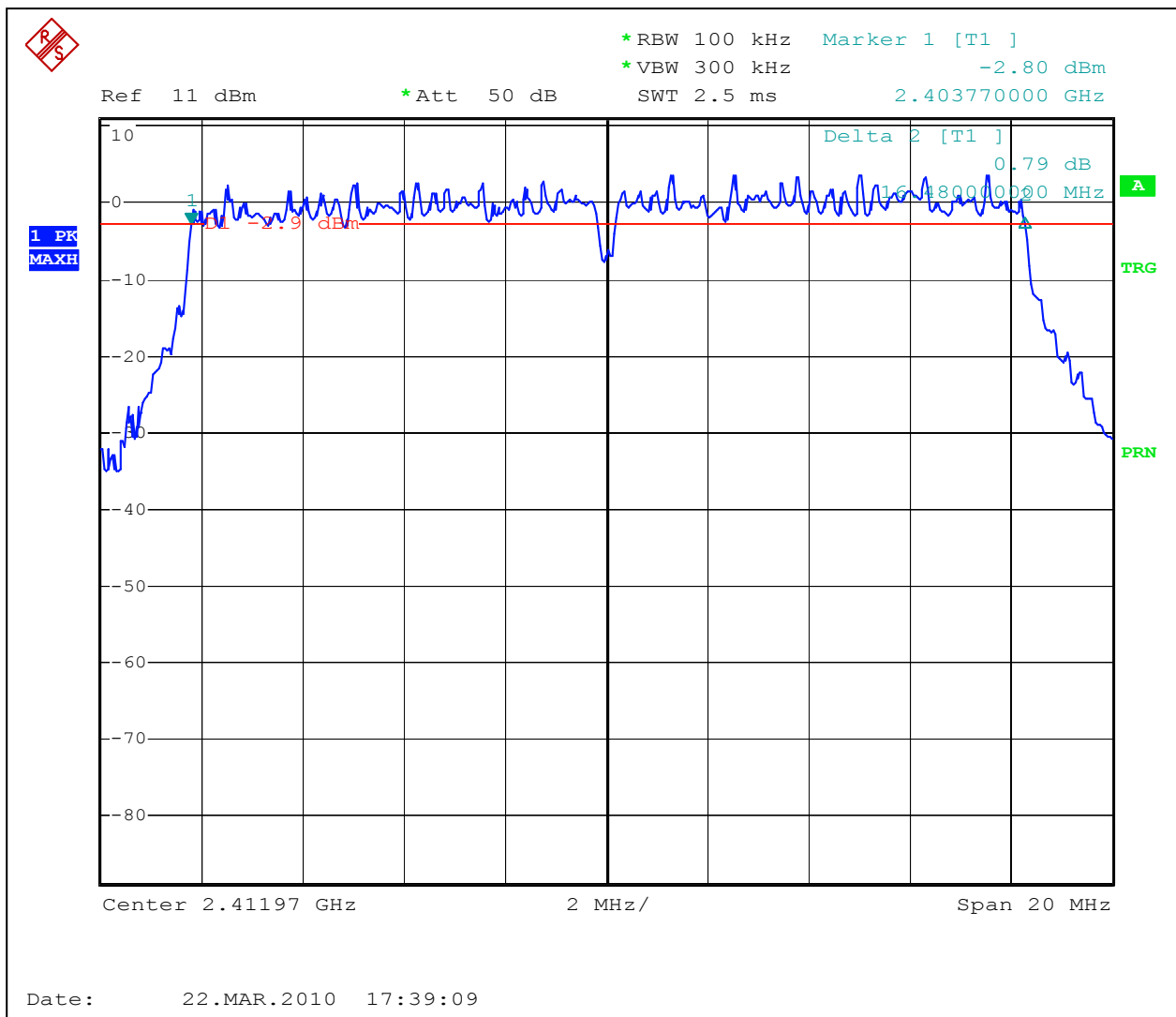
Low Frequency Channel MHz	Middle Frequency Channel MHz	Upper Frequency Channel MHz	Minimum Bandwidth kHz	Result
16.48	16.20	16.48	500	Pass
RBW: ☒ 100kHz ☐ other kHz VBW: ☐ 100kHz ☒ 300kHz ☐ other kHz				

Notes: For 54Mbit/s rate see Graphs 3.2.1-3.2.3

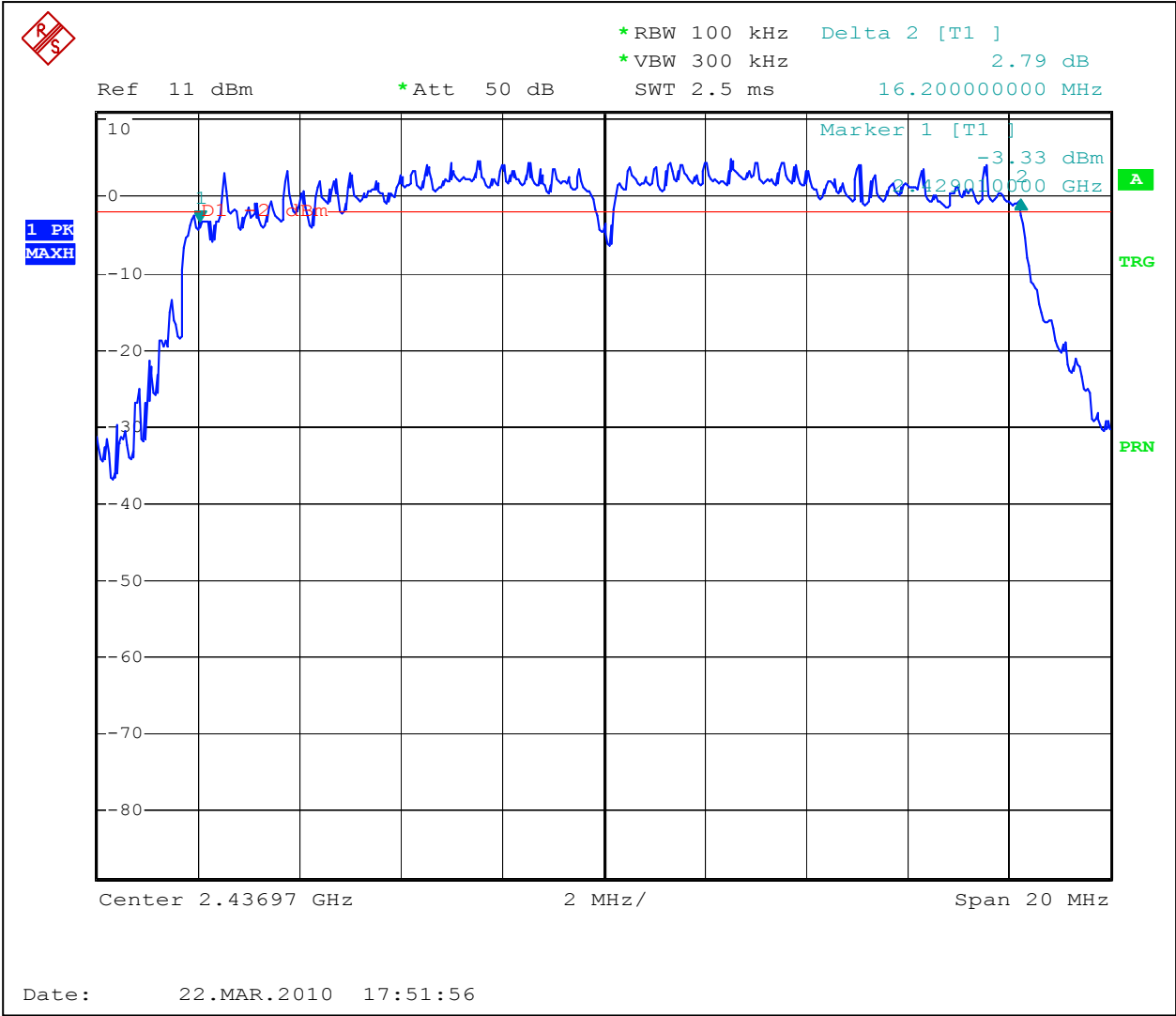
11Mbps rate

Low Frequency Channel MHz	Middle Frequency Channel MHz	Upper Frequency Channel MHz	Minimum Bandwidth kHz	Result
10.40	10.12	10.48	500	Pass
RBW: ☒ 100kHz ☐ other kHz VBW: ☐ 100kHz ☒ 300kHz ☐ other kHz				

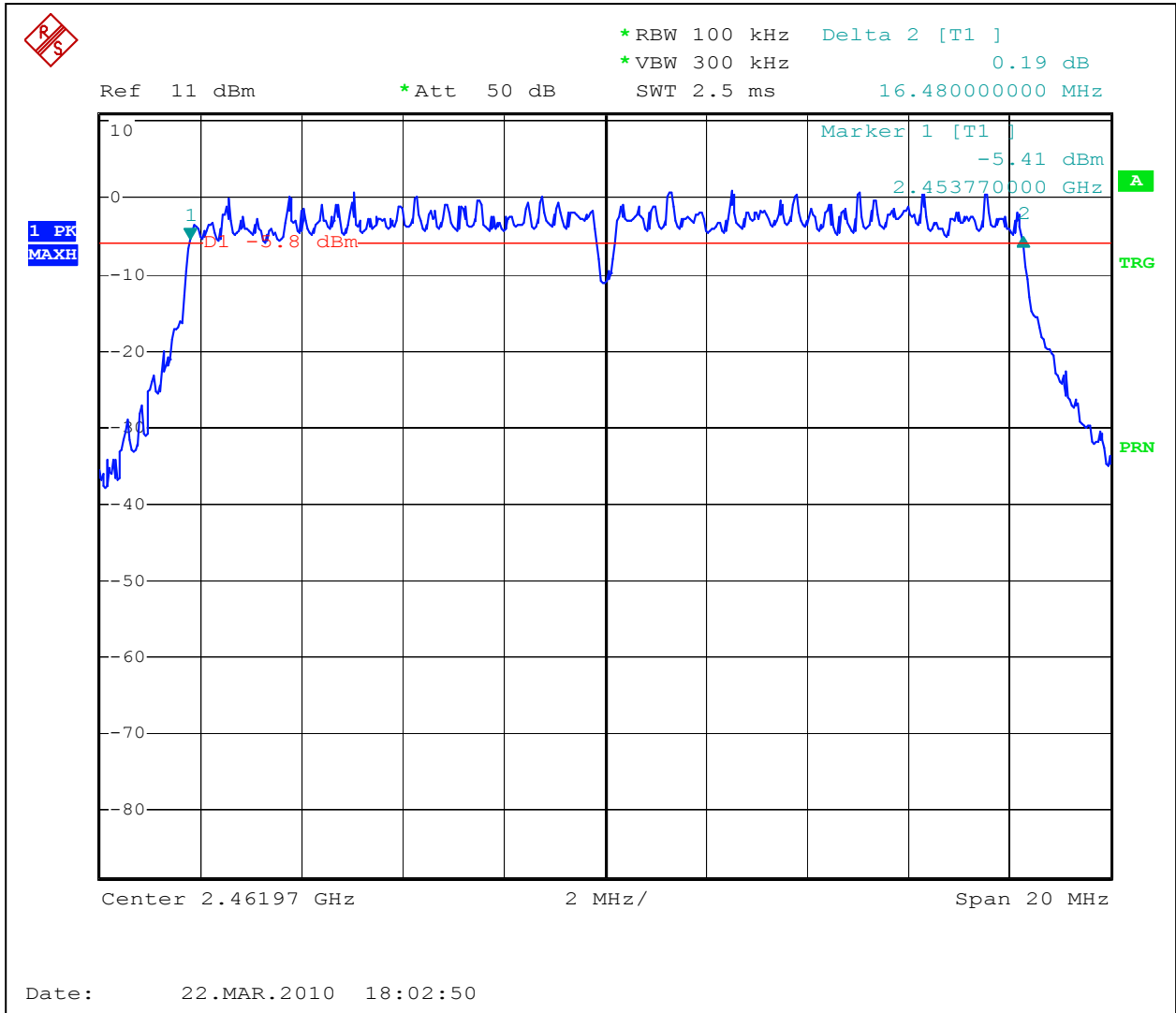
Notes: For 11Mbit/s rate see Graphs 3.2.4-3.2.6



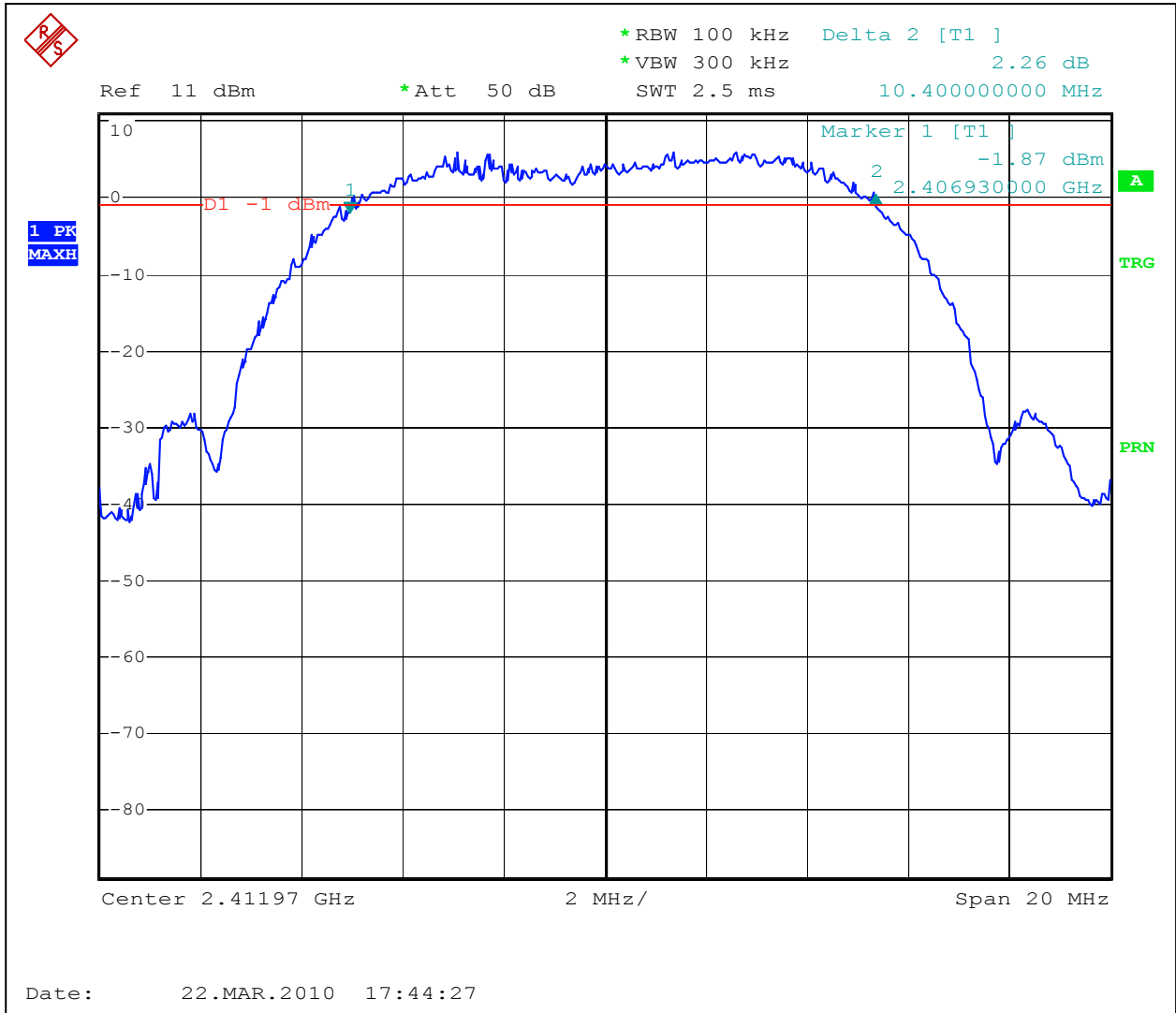
Graph 3.2.1



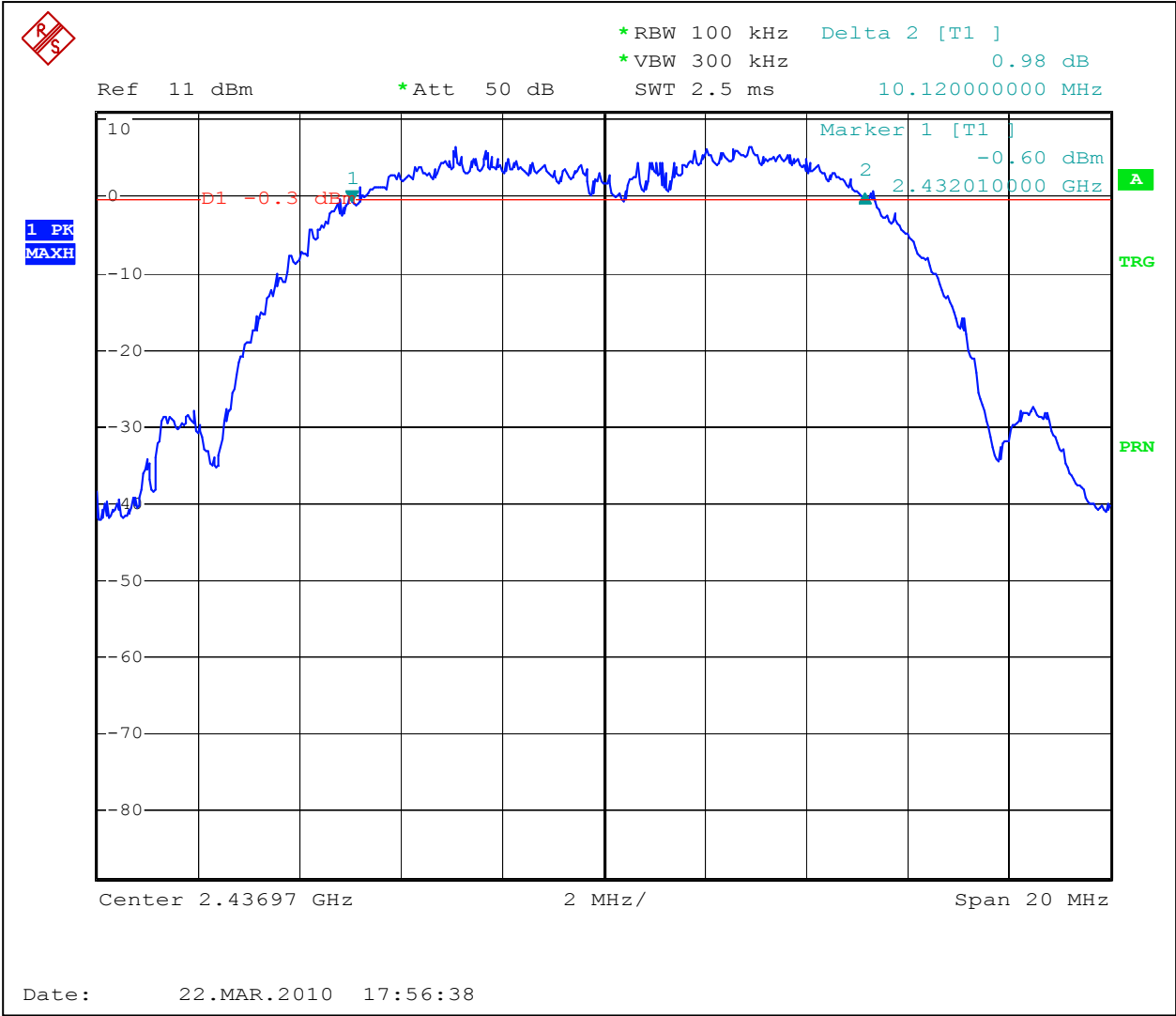
Graph 3.2.2



Graph 3.2.3



Graph 3.2.4



Graph 3.2.5

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3.3 Power spectral density

54Mbps rate

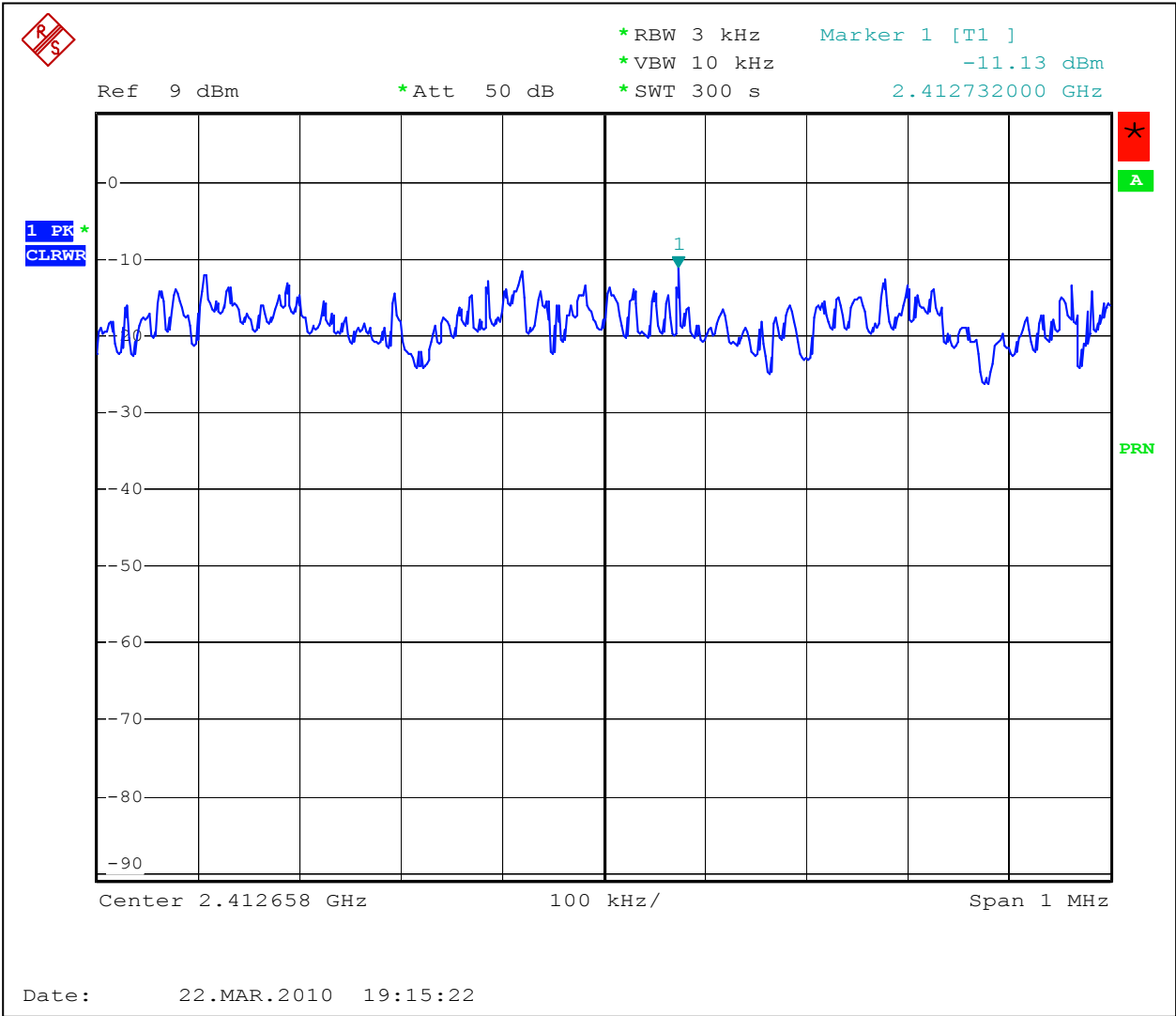
Power Output:	☒ Conducted ☐ Radiated			
	Measured Density dBm	Power Spectral Density dBm	Limit dBm	Margin dB
Low Frequency Channel	-11.13		8	
Middle Frequency Channel	-10.43		8	
Upper Frequency Channel	-12.93		8	
Analyzer Settings:	☒ RBW=3KHz ☒ VBW=10KHz ☒ Span=1MHz ☒ Sweep=300sec			
Antenna Gain:	☒ < 6dBi and = dBi ☐ >6dBi and = dBi, limit reduction = dB			

Notes: The Power Spectral Density was calculated adding the cable/attenuator loss of 0.25 dB from the measured density value.
 Graphs 3.3.1 to 3.3.3 show the Power Spectral Density

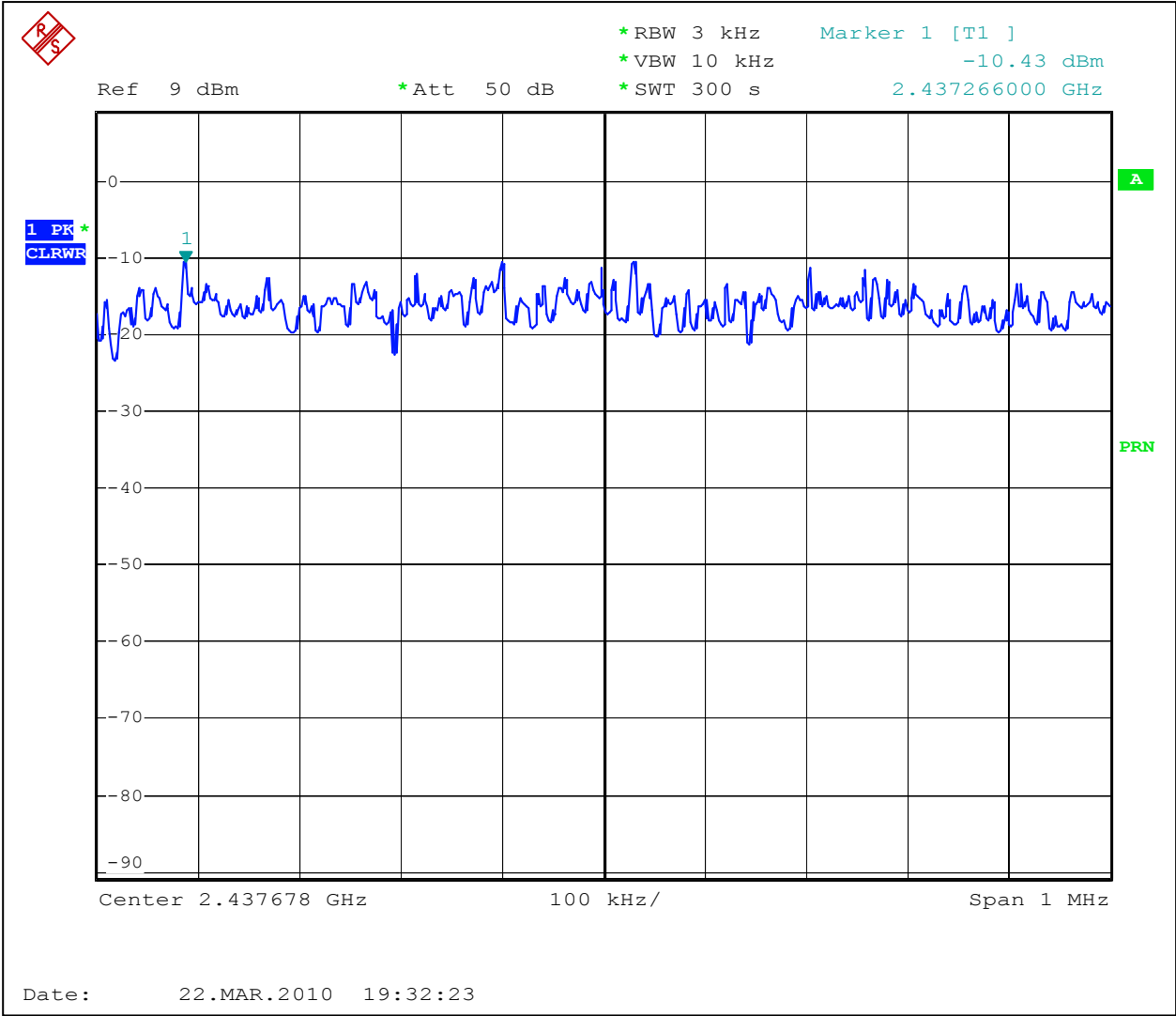
11Mbps rate

Power Output:	☒ Conducted ☐ Radiated			
	Measured Density dBm	Power Spectral Density dBm	Limit dBm	Margin dB
Low Frequency Channel			8	
Middle Frequency Channel			8	
Upper Frequency Channel			8	
Analyzer Settings:	☒ RBW=3KHz ☒ VBW=10KHz ☒ Span=1MHz ☒ Sweep=300sec			
Antenna Gain:	☒ < 6dBi and = dBi ☐ >6dBi and = dBi, limit reduction = dB			

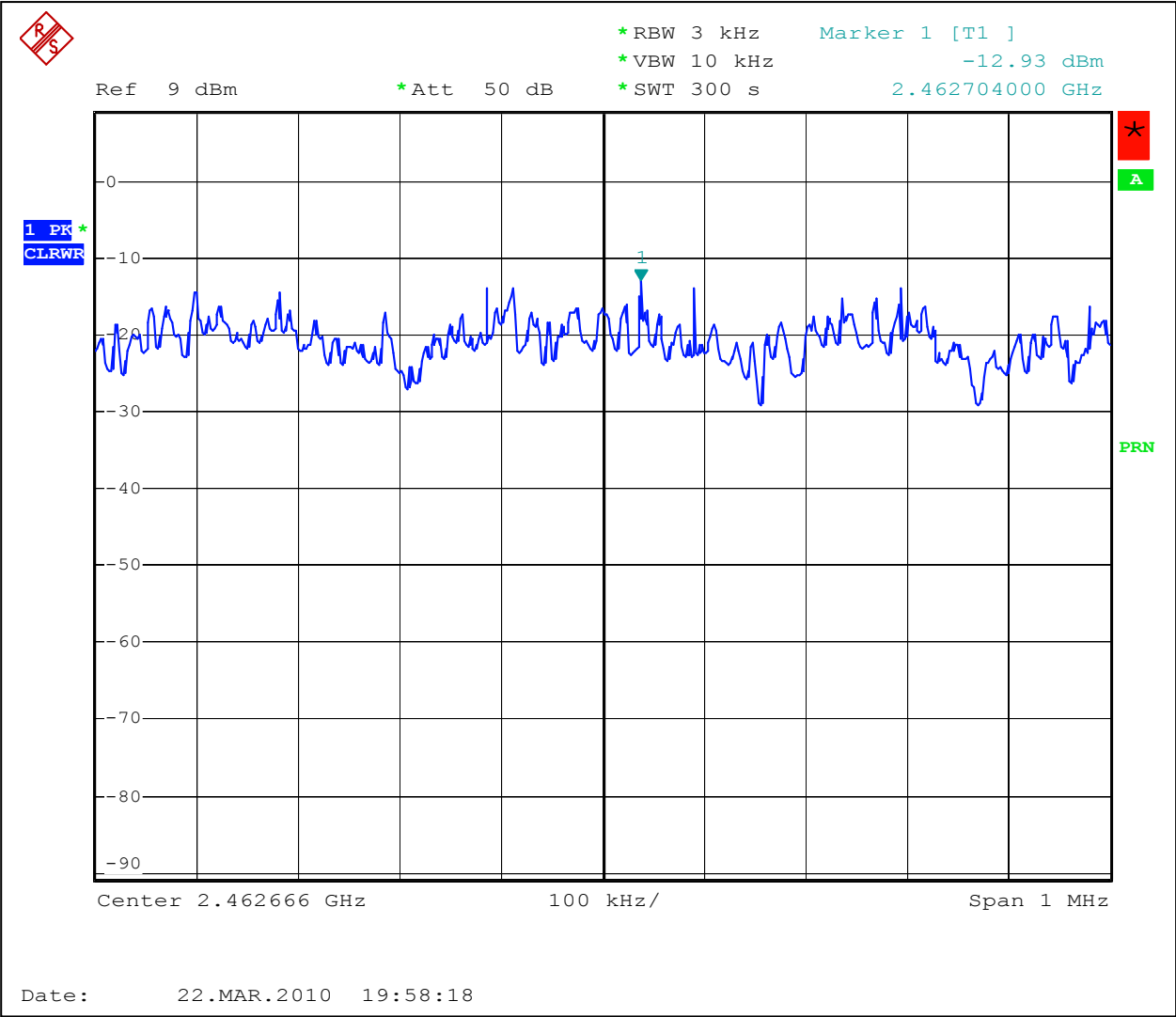
Notes: The Power Spectral Density was calculated adding the cable/attenuator loss of 0.25 dB from the measured density value.
 Graphs 3.3.4 to 3.3.6 show the Power Spectral Density



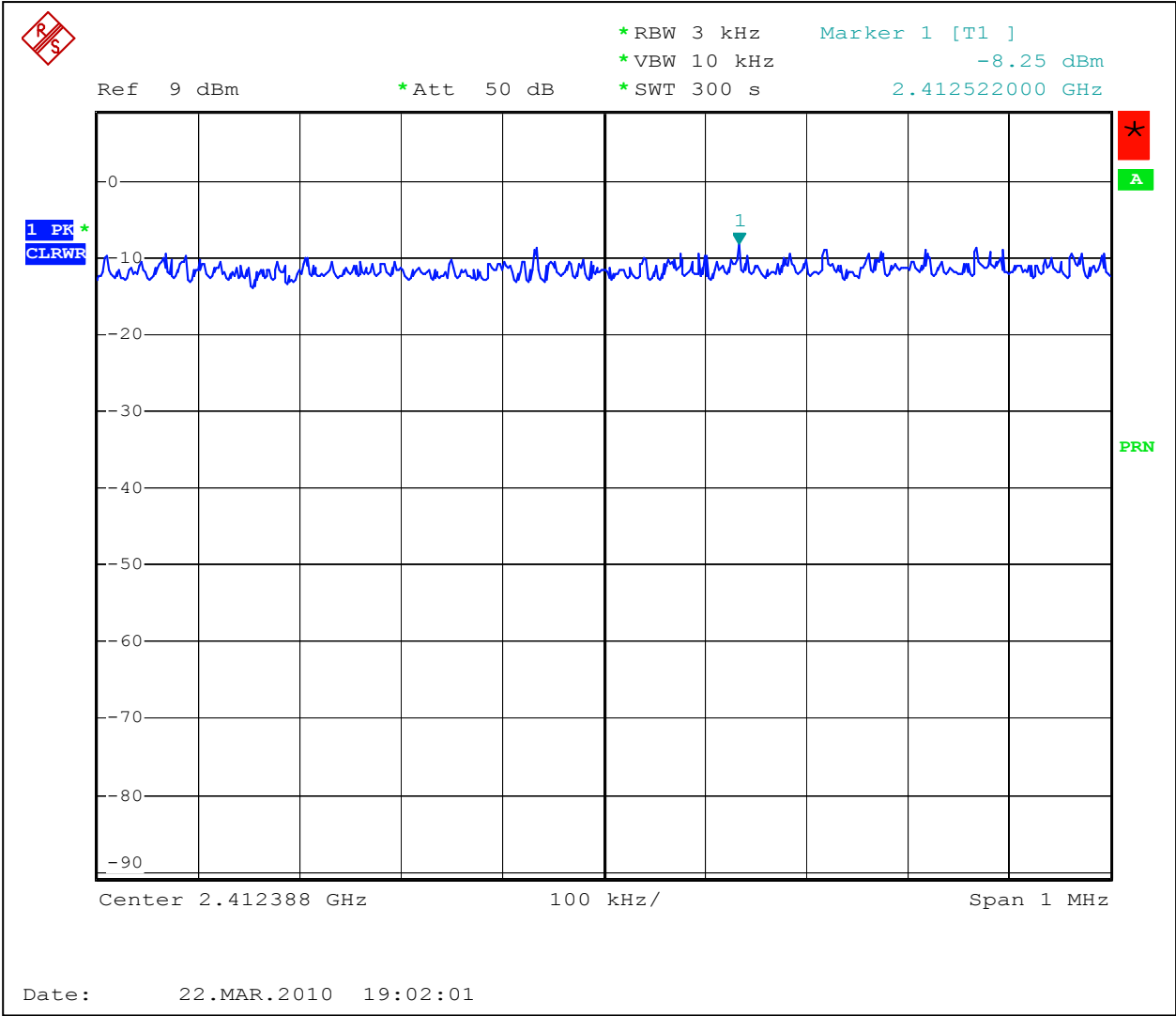
Graph 3.3.1



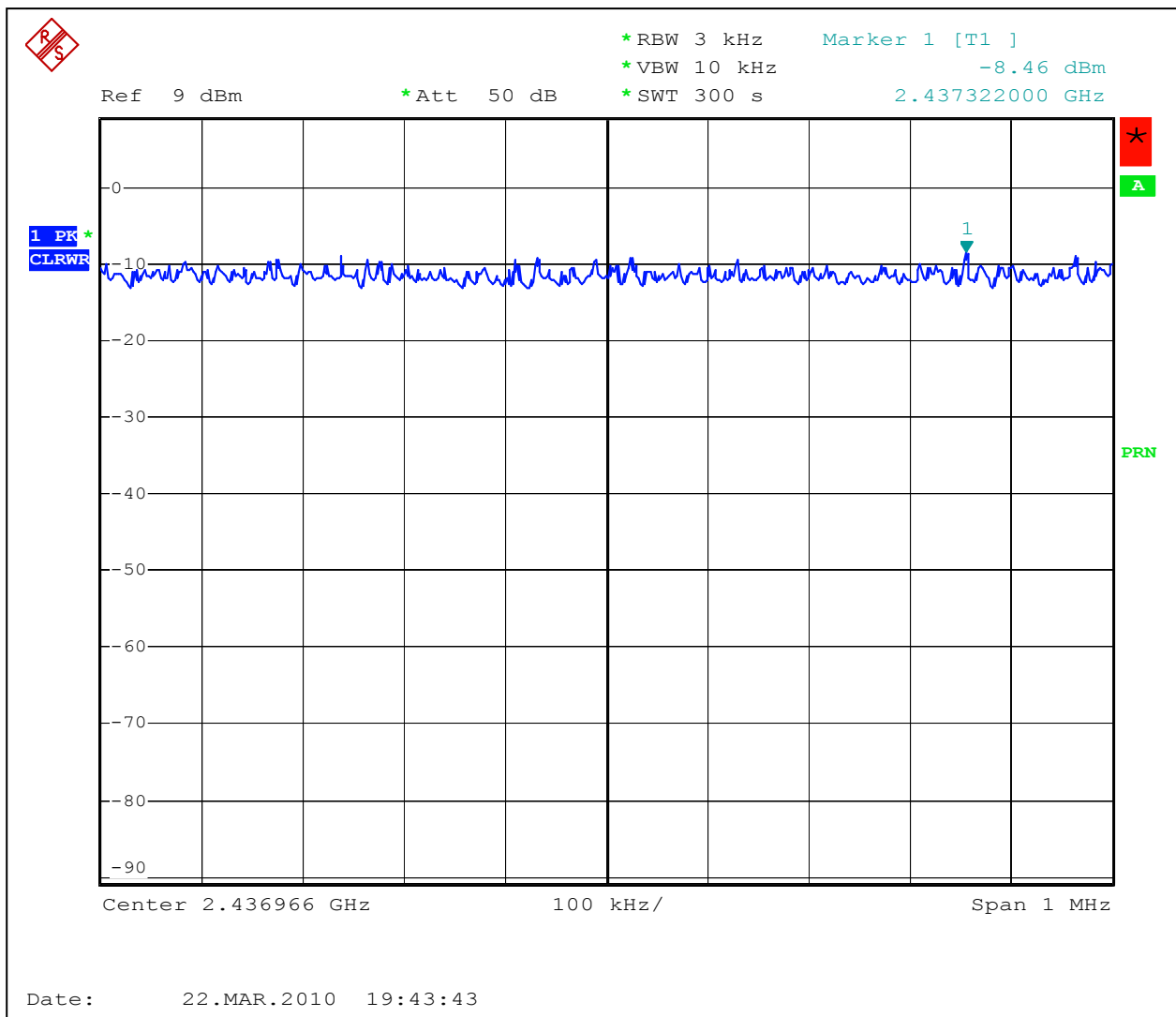
Graph 3.3.2



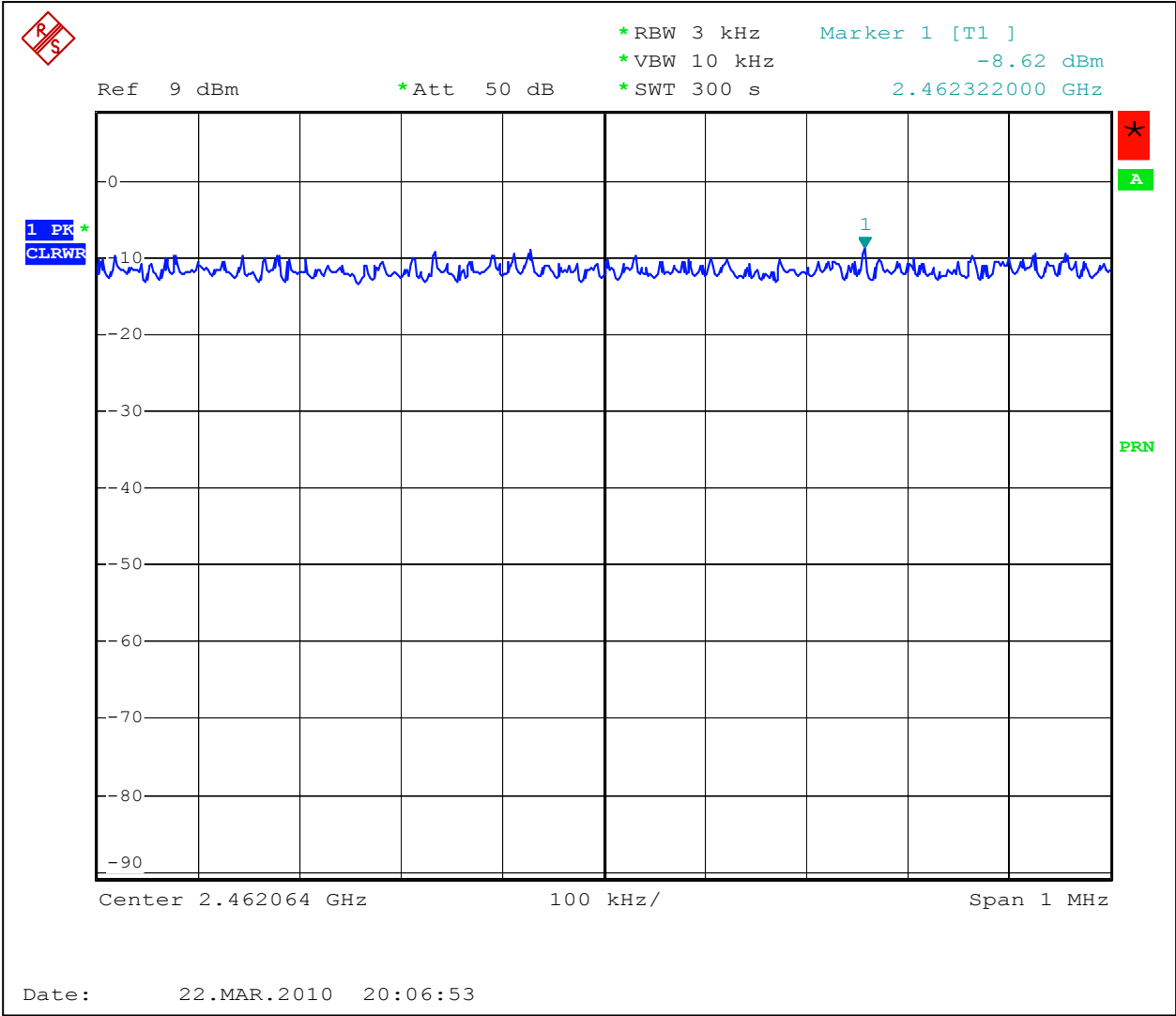
Graph 3.3.3



Graph 3.3.4



Graph 3.3.5



Graph 3.3.6

3.4 Antenna conducted spurious emissions

54Mbps rate

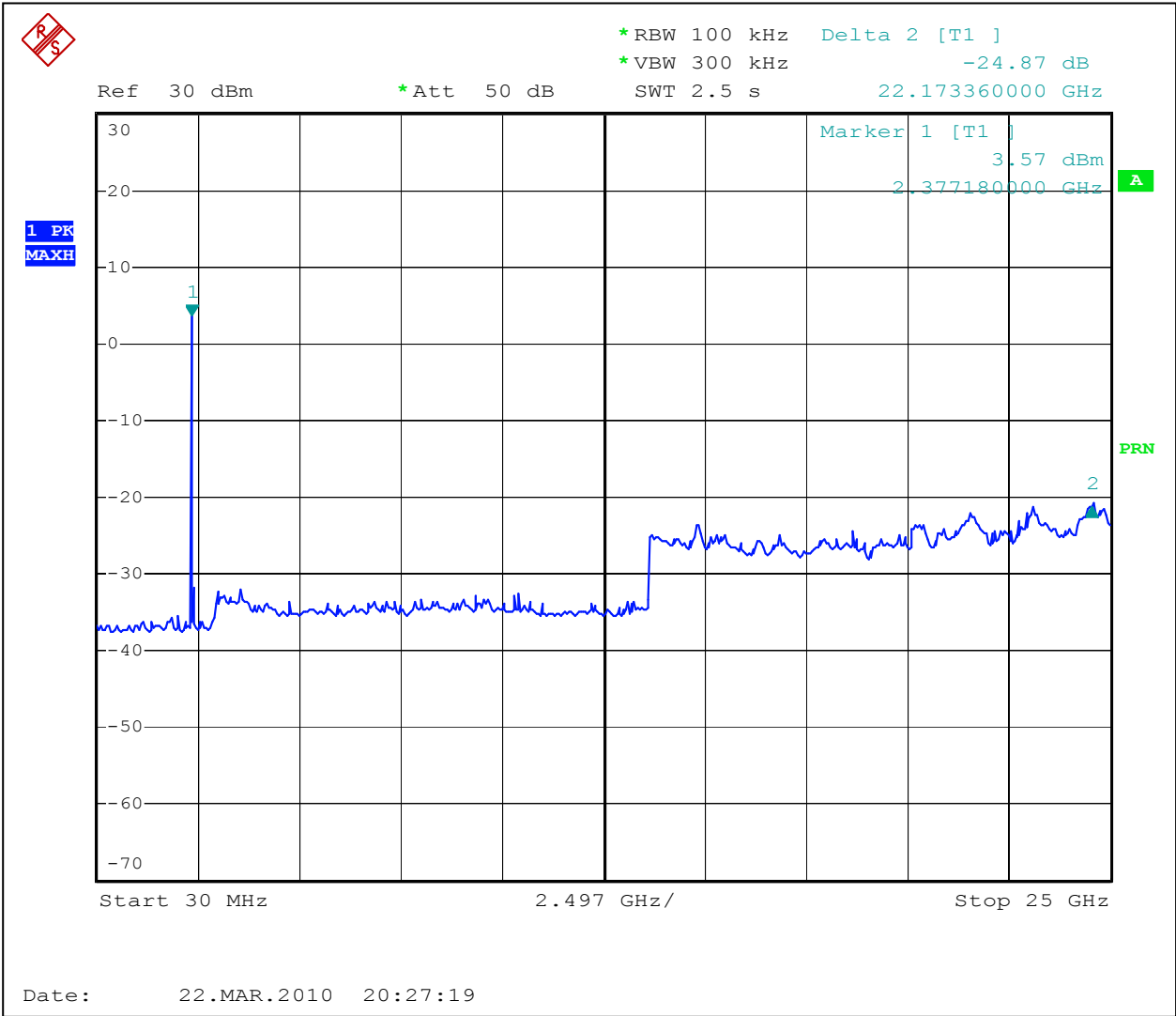
	Minimum Measured Attenuation dB	Minimum Allowed Attenuation dB	Margin dB
Low Frequency Channel	-24.87	20	-44.87
Middle Frequency Channel	-25.52	20	-45.52
Upper Frequency Channel	-21.48	20	-44.87
Analyzer Settings:	☒ RBW=100KHz		
Minimum Allowed Attenuation:	☒ 20dB ☐ 30dB (for digital systems with conducted power measured using RMS averaging over a time interval)		

Notes: Test was performed in frequency range from 30MHz to 25GHz
 Graph 3.4.1 shows the Antenna Conducted Spurious Emissions for channel 1
 Graphs 3.4.2 shows the Antenna Conducted Spurious Emissions for channel 6
 Graphs 3.4.3 shows the Antenna Conducted Spurious Emissions for channel 11
 Graph 3.4.7 shows band edge compliance at 2400MHz for 54Mbit/s rate
 Graph 3.4.8 shows band edge compliance at 2483.5MHz for 54Mbit/s rate

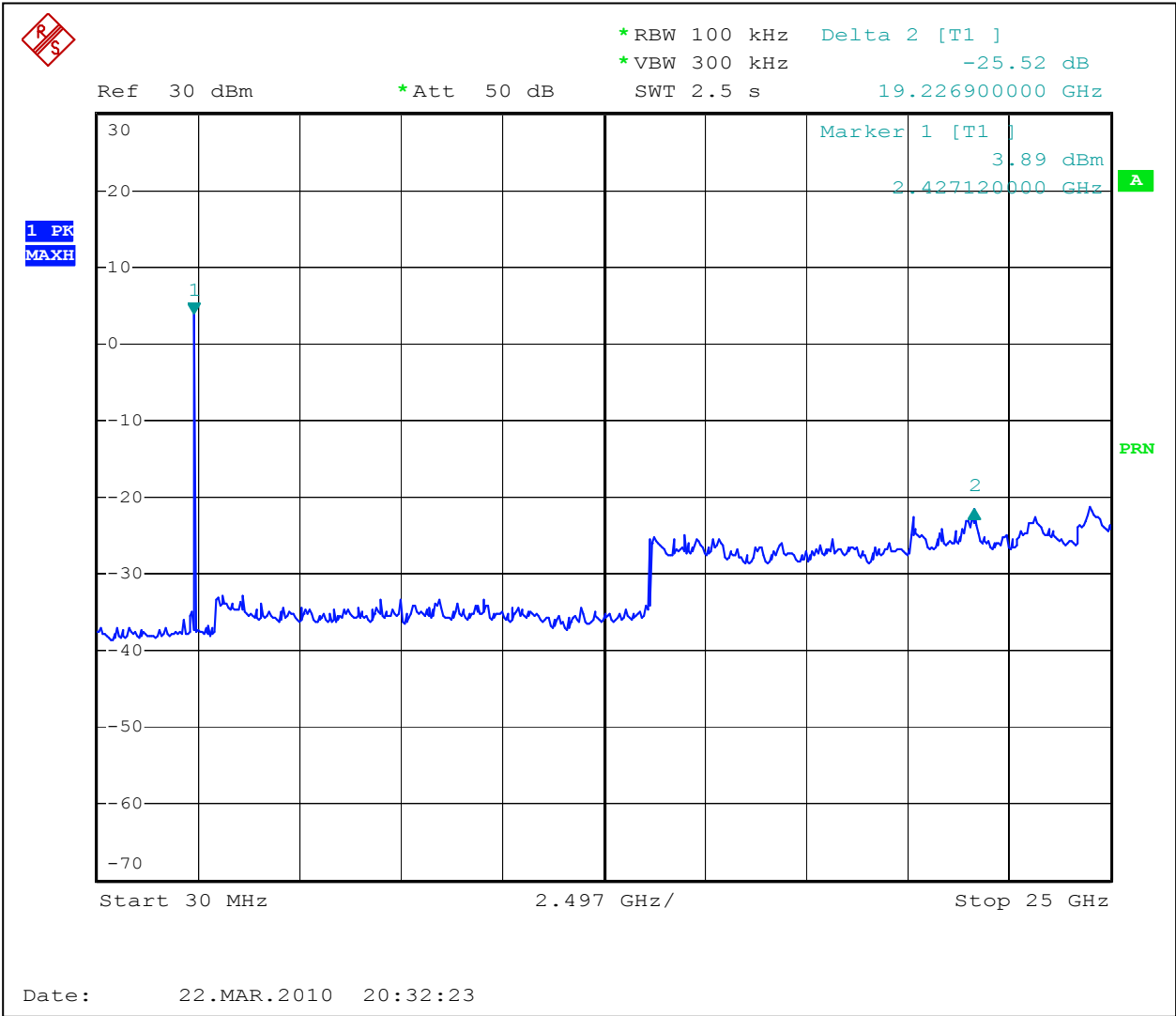
11Mbps rate

	Minimum Measured Attenuation dB	Minimum Allowed Attenuation dB	Margin dB
Low Frequency Channel	-27.24	20	-47.24
Middle Frequency Channel	-26.46	20	-46.46
Upper Frequency Channel	-25.29	20	-45.29
Analyzer Settings:	☒ RBW=100KHz		
Minimum Allowed Attenuation:	☒ 20dB ☐ 30dB (for digital systems with conducted power measured using RMS averaging over a time interval)		

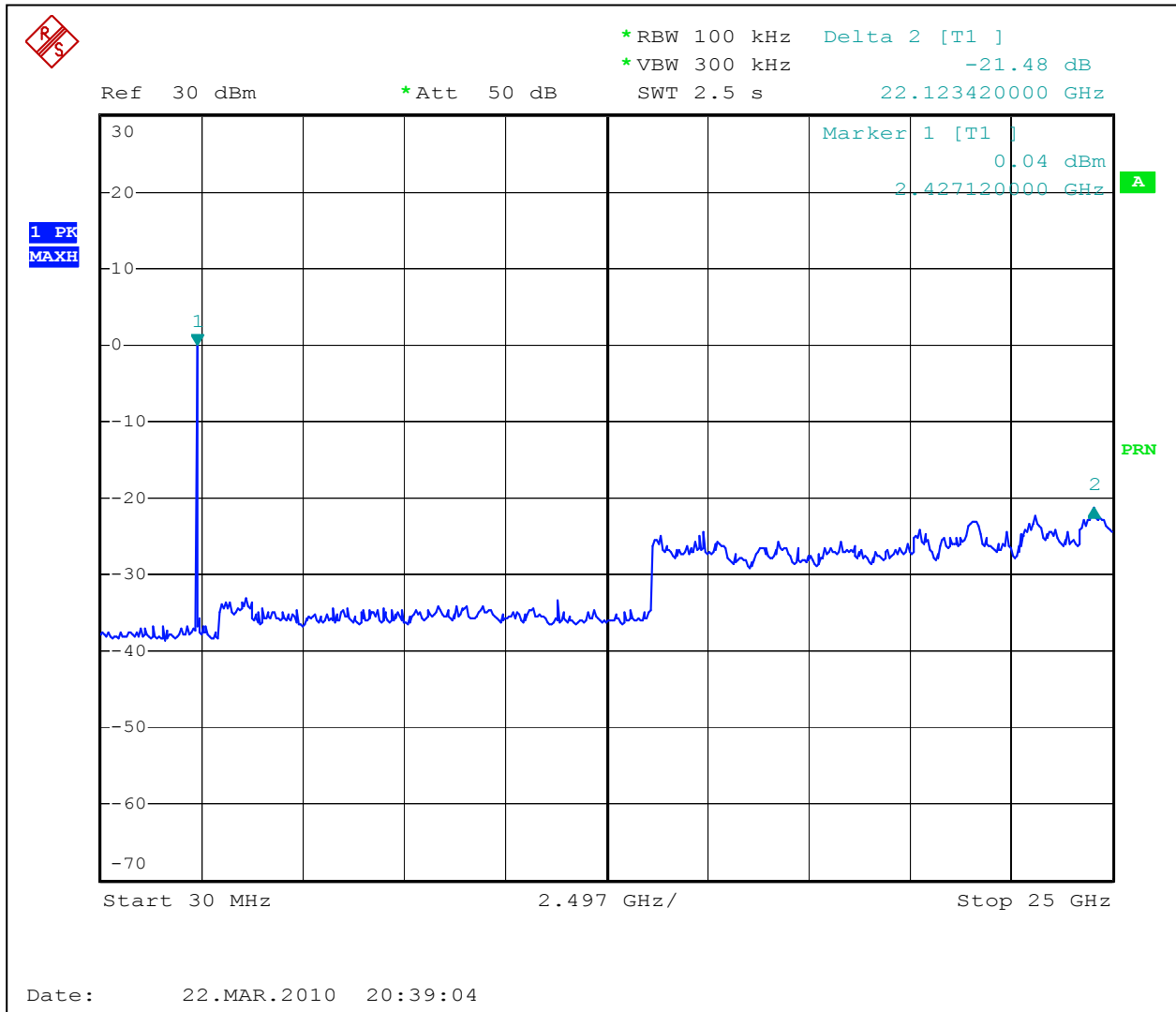
Notes: Test was performed in frequency range from 30MHz to 25GHz
 Graphs 3.4.4 shows the Antenna Conducted Spurious Emissions for channel 1
 Graphs 3.4.5 shows the Antenna Conducted Spurious Emissions for channel 6
 Graphs 3.4.6 shows the Antenna Conducted Spurious Emissions for channel 11
 Graph 3.4.9 shows band edge compliance at 2400MHz for 11Mbit/s rate
 Graph 3.4.10 shows band edge compliance at 2483.5MHz for 11Mbit/s rate



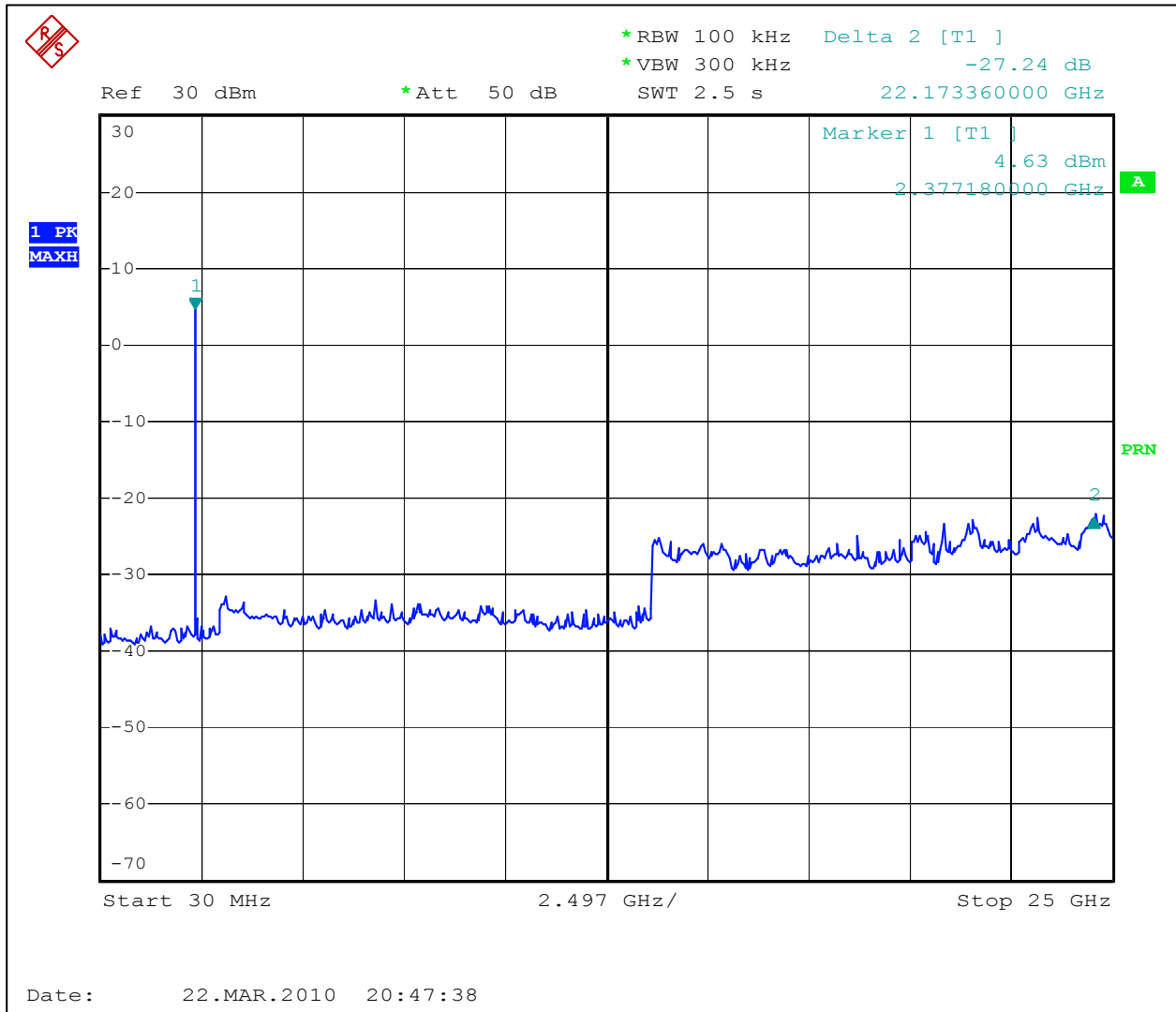
Graph 3.4.1



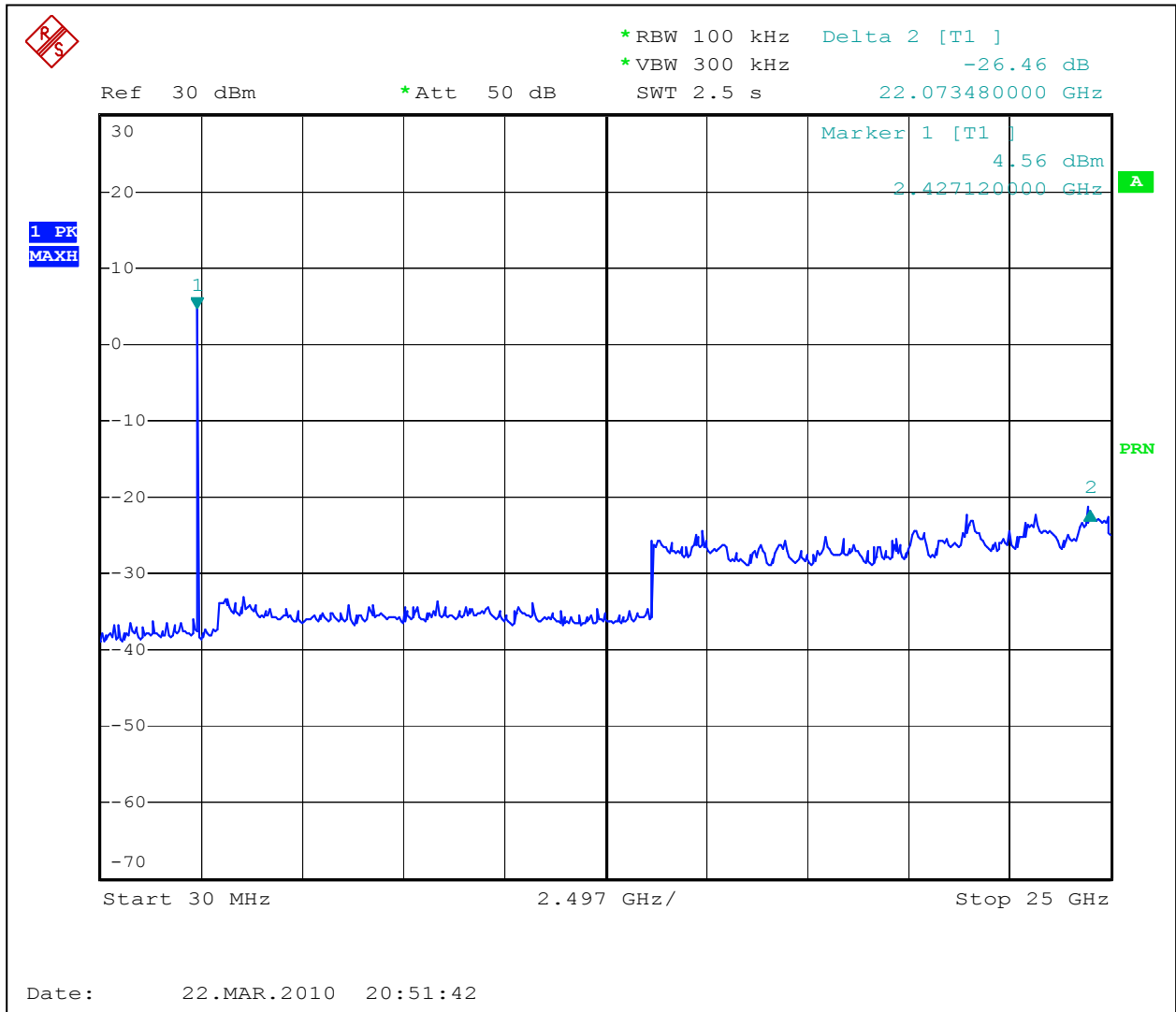
Graph 3.4.2



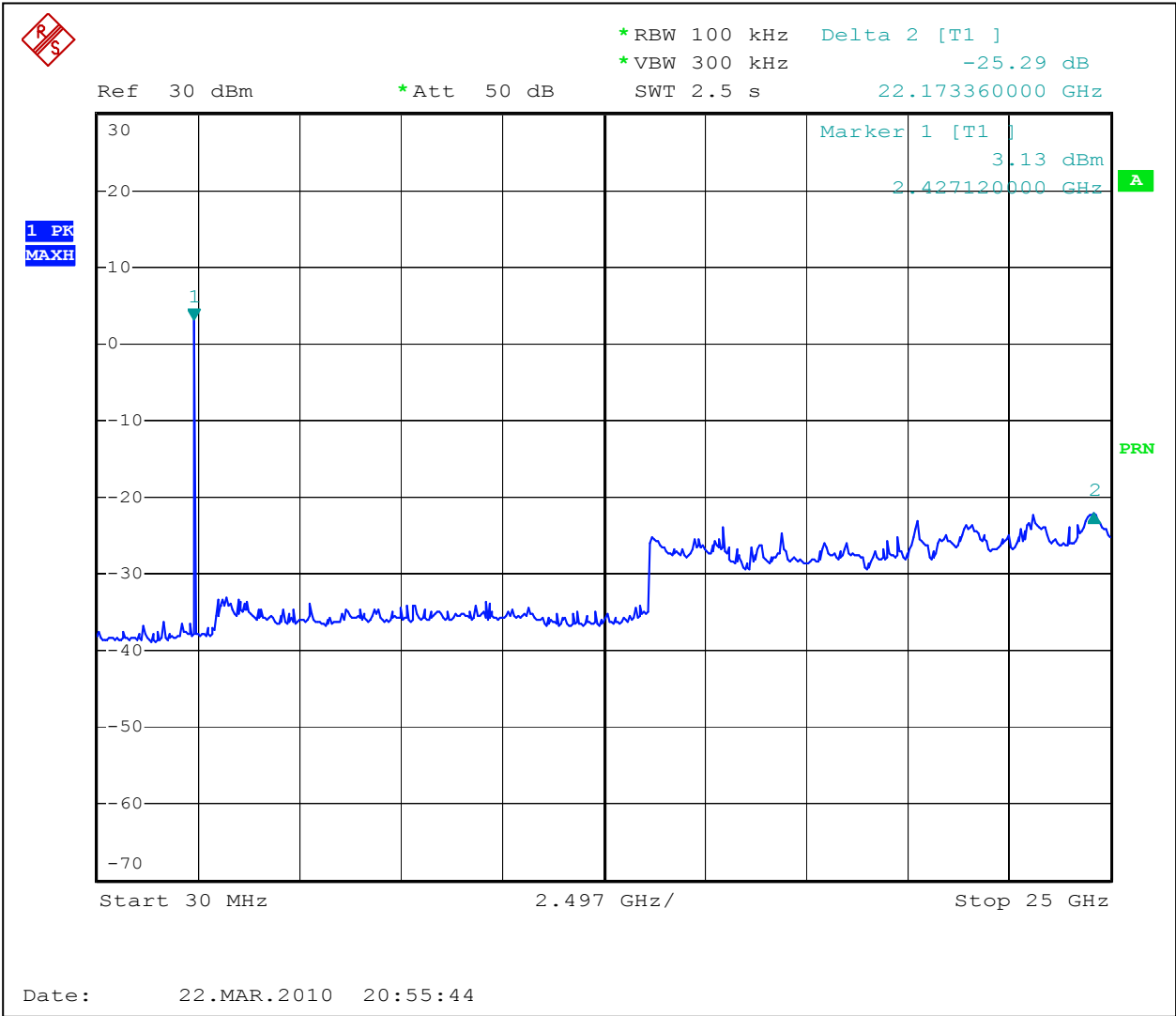
Graph 3.4.3



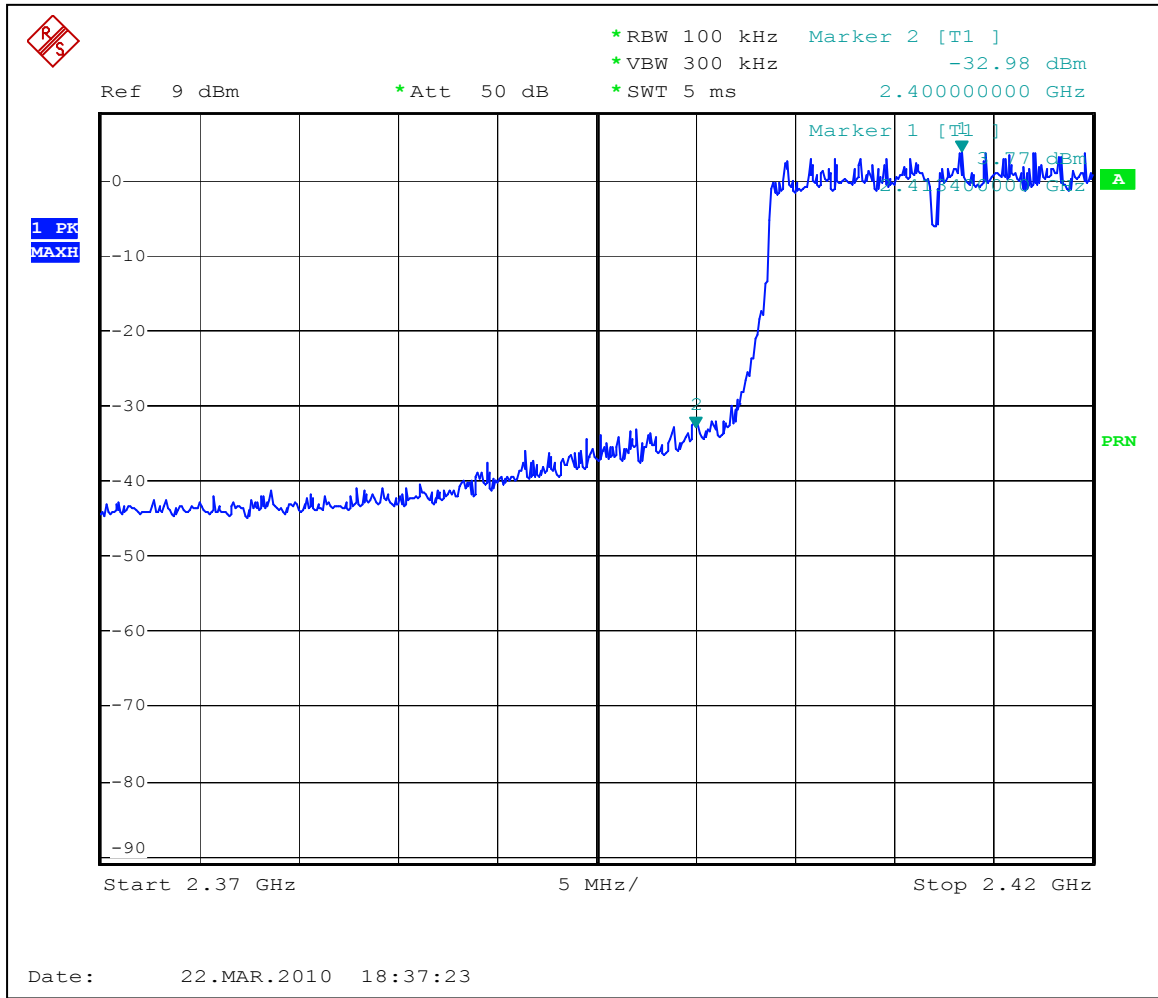
Graph 3.4.4



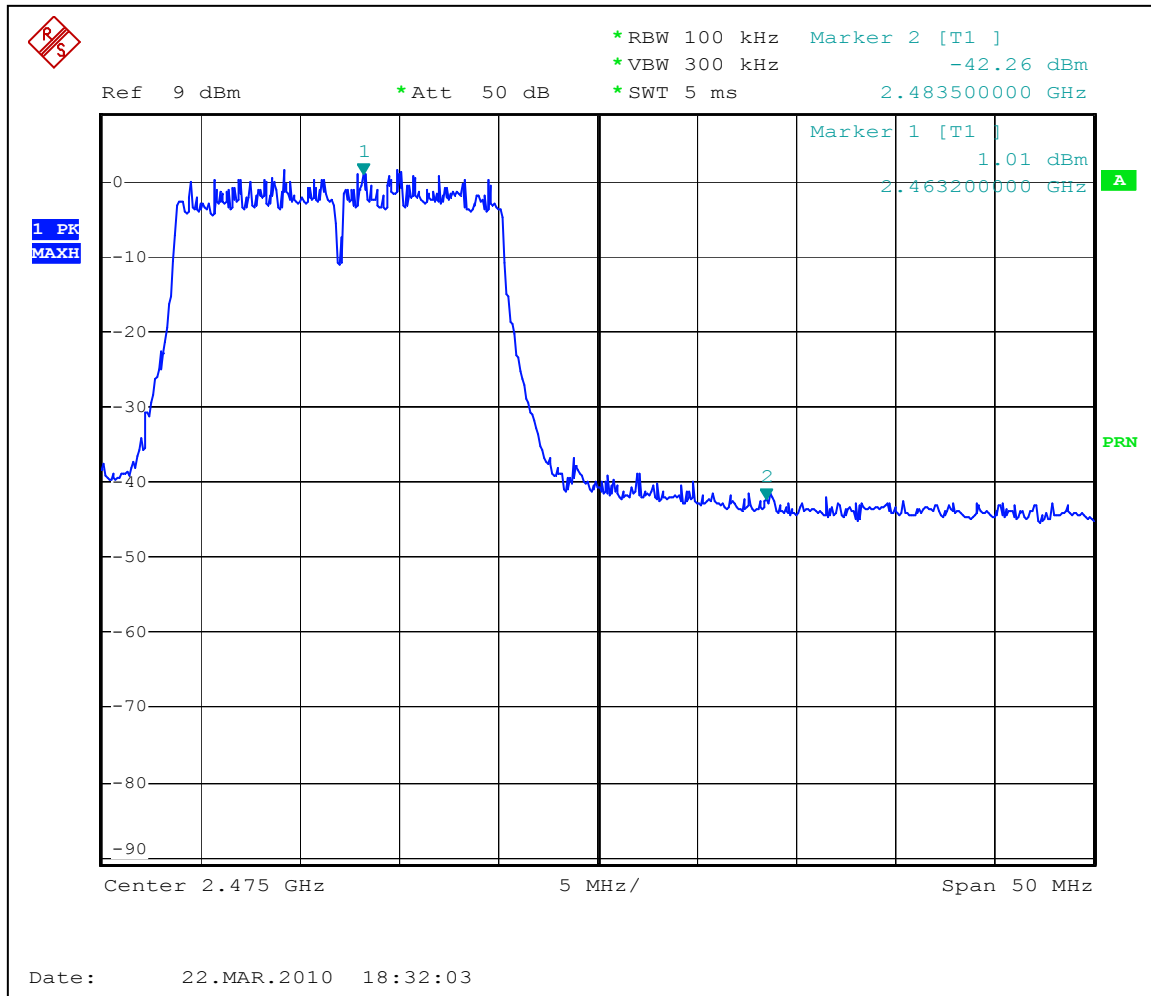
Graph 3.4.5



Graph 3.4.6

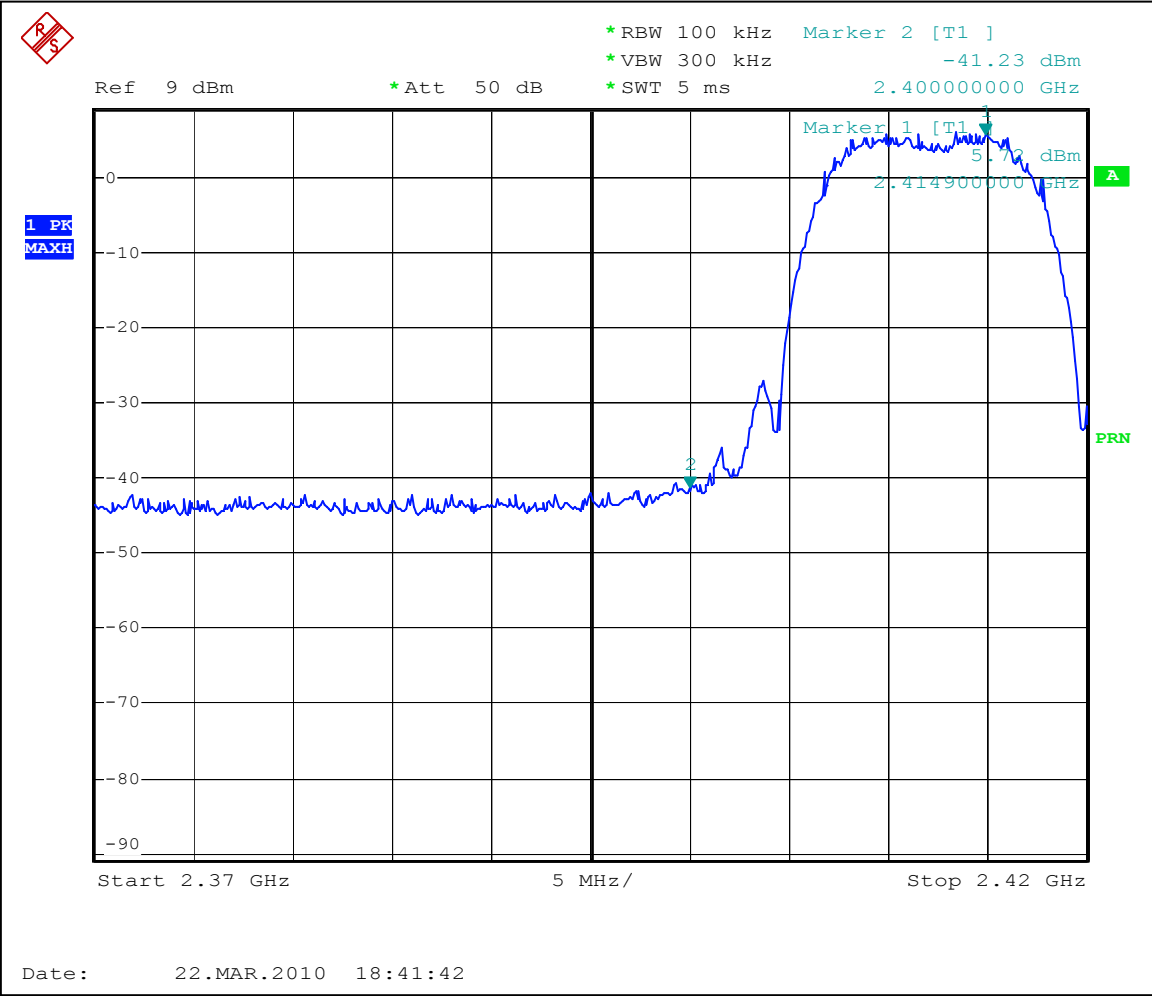


Graph 3.4.7

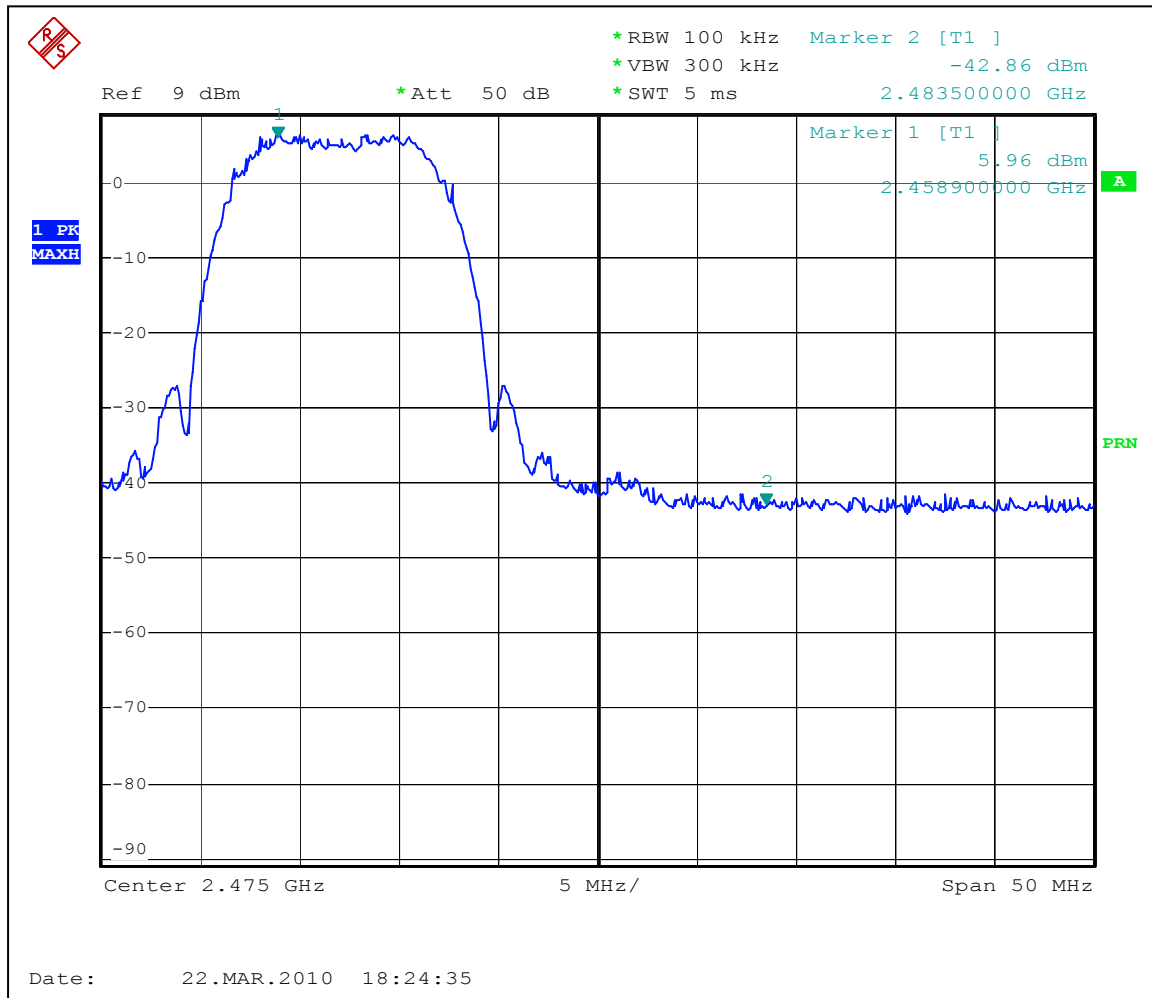


Graph 3.4.8





Graph 3.4.9



Graph 3.4.10



3.5 Radiated spurious emissions

Test location: ☐ OATS ☒ Anechoric Chamber

Test distance: ☐ 10 meters ☒ 3 meters

Frequency Range: 30MHz to 25GHz (10th Harmonic)

Test result: **Pass**

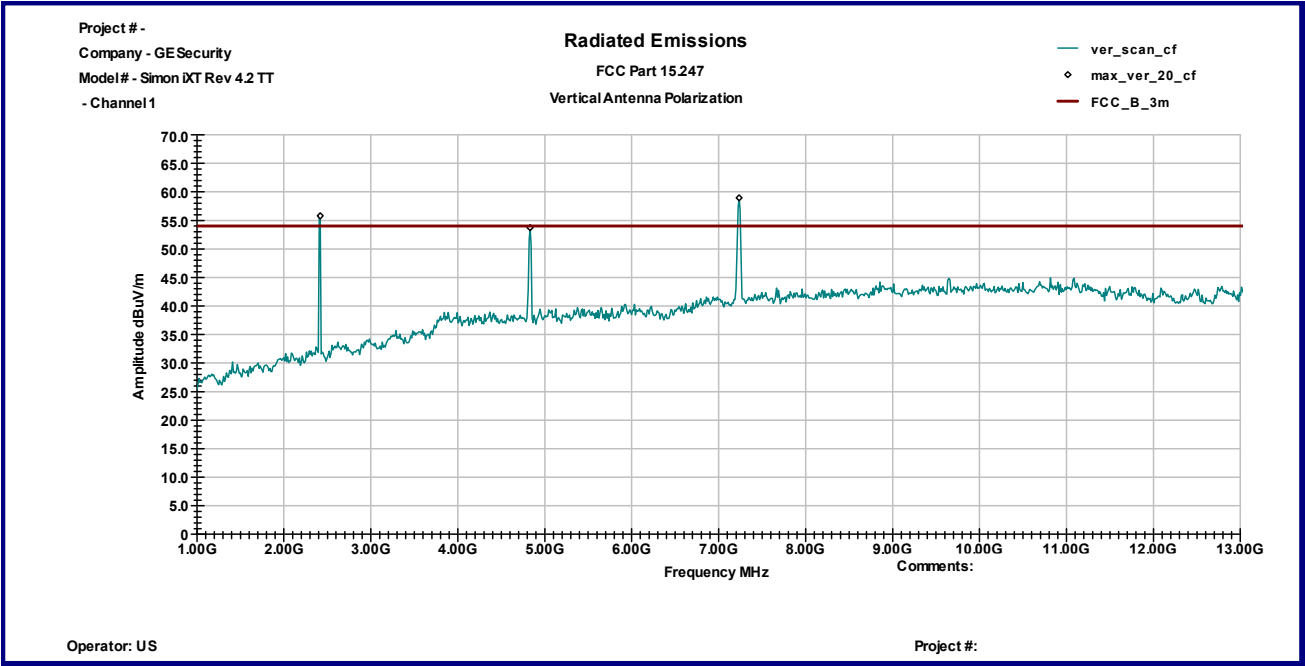
Max. Margin: 2.6dB below the limits

Notes: No emissions related to the transmitter were detected in the frequency range 30-1000MHz. The Table 3.5.1 and Graphs 3.5.1-3.5.12 show harmonics in restricted band of operation per FCC 15.205. Fundamental frequency was excluded from the table.
No emissions were detected above ambient above 5th harmonic.

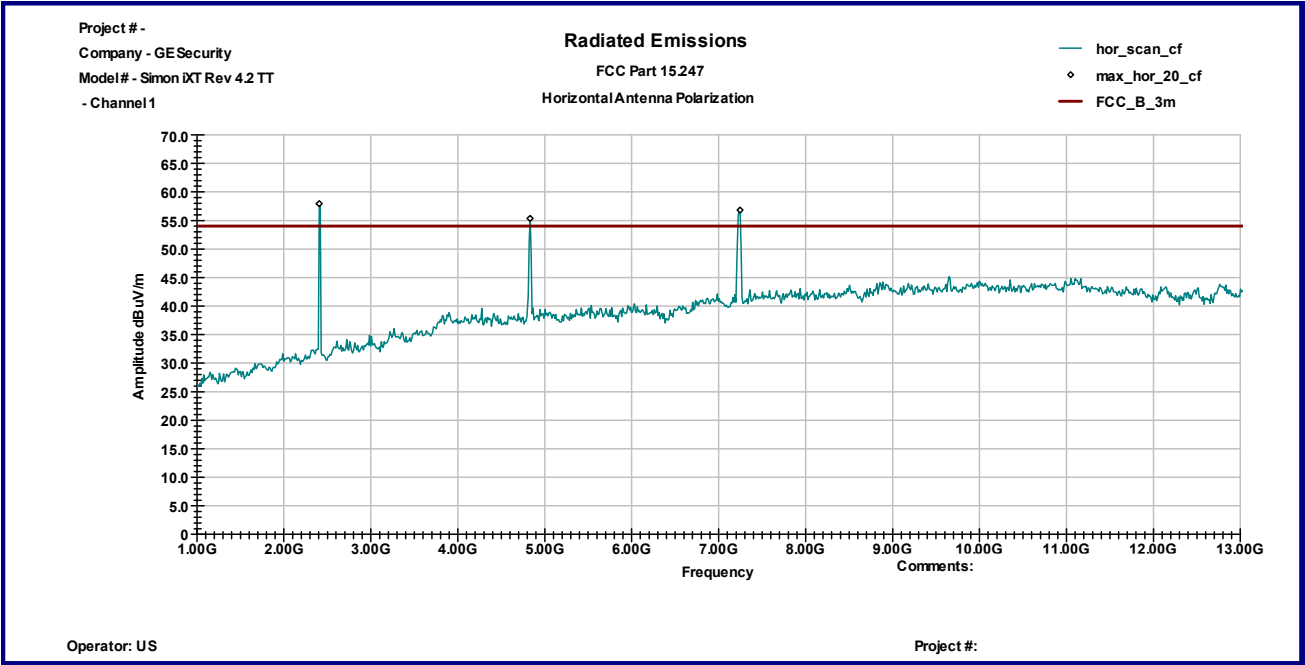
Date:	March 25, 2010	Result: Pass
Standard:	FCC part 15.247(d)	
Tested by:	Uri Spector	
Test Point:	Enclosure with antenna	
Operation mode:	See Page 5	
Note:		

Table 3.5.1

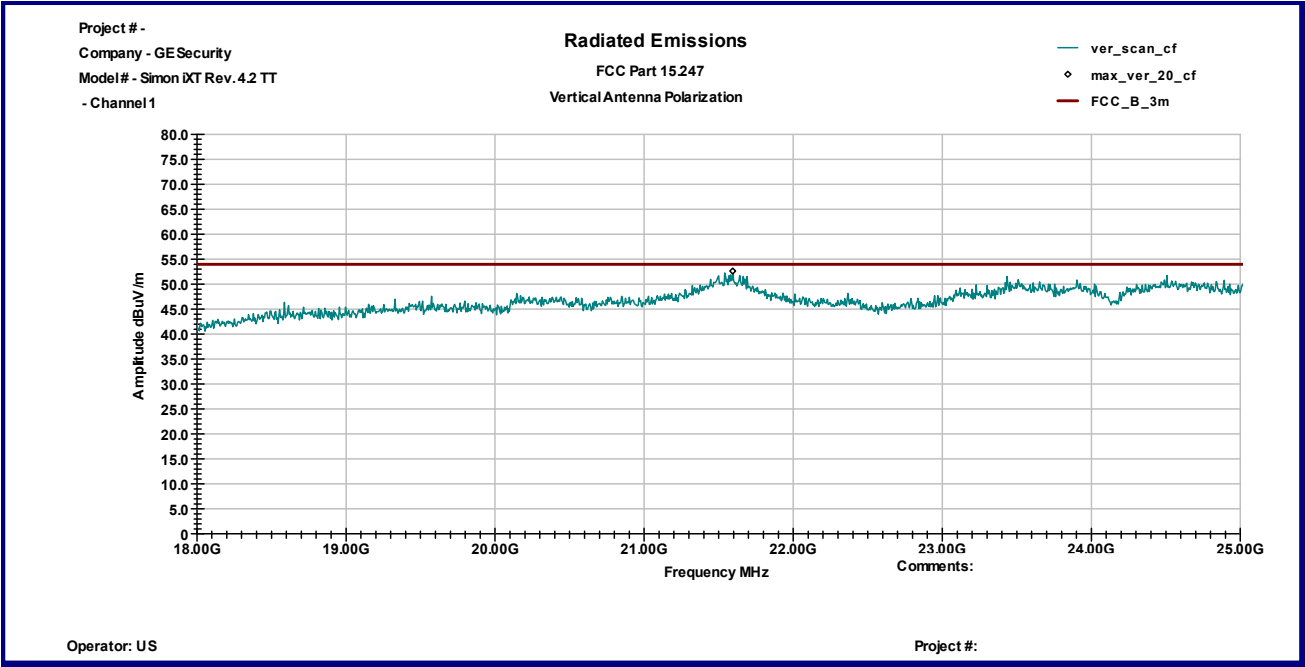
Frequency MHz	Antenna		Ant. CF dB1/m	Cable loss dB	Pre-amp Gain (dB)	Reading dBµV	Total @ 3m dBµV/m	Limit dBµV/m	Margin dB	Comments
	Polarity	Hts(cm)								
				Channel 1						
4825.30	V	160	32.6	4.9	41.8	41.2	36.9	54.0	-17.1	AVG
4825.30	H	170	32.6	4.9	41.8	42.4	38.1	54.0	-15.9	AVG
7233.00	V	120	35.5	6.2	41.3	40.9	41.2	54.0	-12.8	AVG
7233.00	H	111	35.5	6.2	41.3	41.4	41.7	54.0	-12.3	AVG
				Channel 6						
4877.40	V	146	32.7	4.9	41.8	40.3	36.2	54.0	-17.8	AVG
4877.40	H	131	32.7	4.9	41.8	41.3	37.2	54.0	-16.8	AVG
7307.00	V	122	35.6	6.2	41.2	40.2	40.8	54.0	-13.2	AVG
7307.00	H		35.6	6.2	41.2	41.2	41.8	54.0	-12.2	AVG
				Channel 11						
4924.80	V	124	32.7	5.0	41.7	51.7	47.7	54.0	-6.3	peak
4924.80	H	174	32.7	5.0	41.7	55.4	51.4	54.0	-2.6	peak
7321.50	V	194	35.6	6.2	41.2	37.7	38.4	54.0	-15.6	AVG
7388.00	H	132	35.7	6.3	41.1	37.2	38.1	54.0	-15.9	AVG



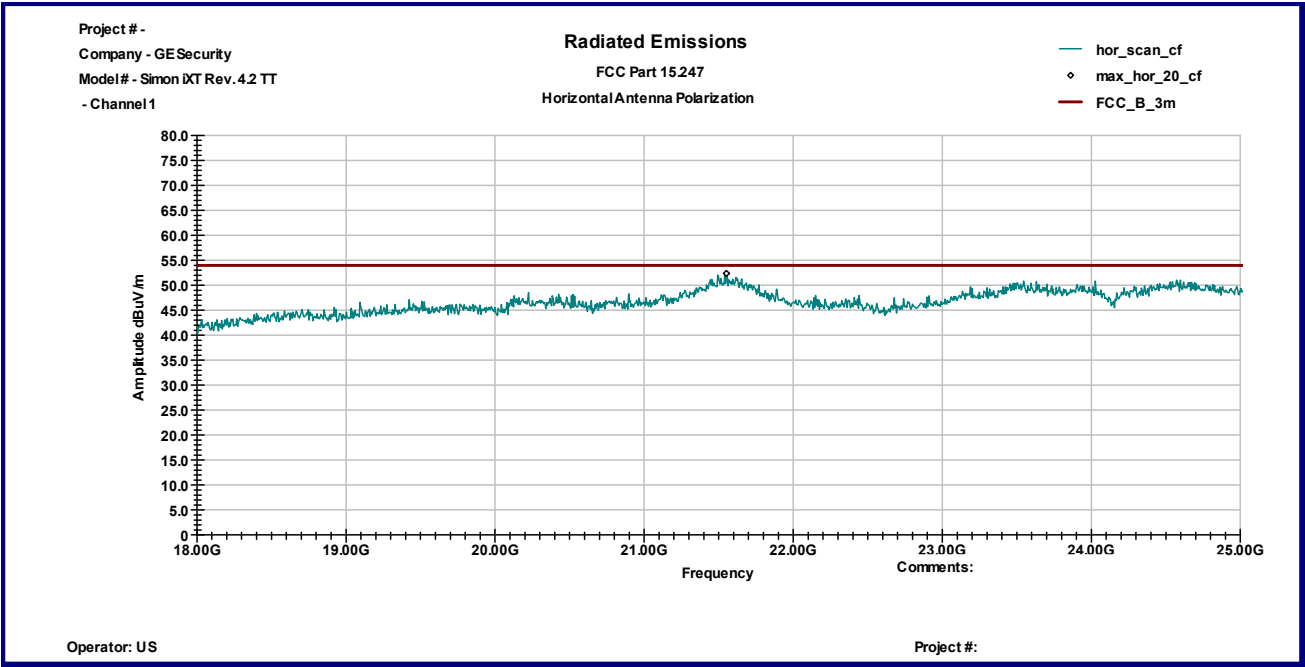
Graph 3.5.1



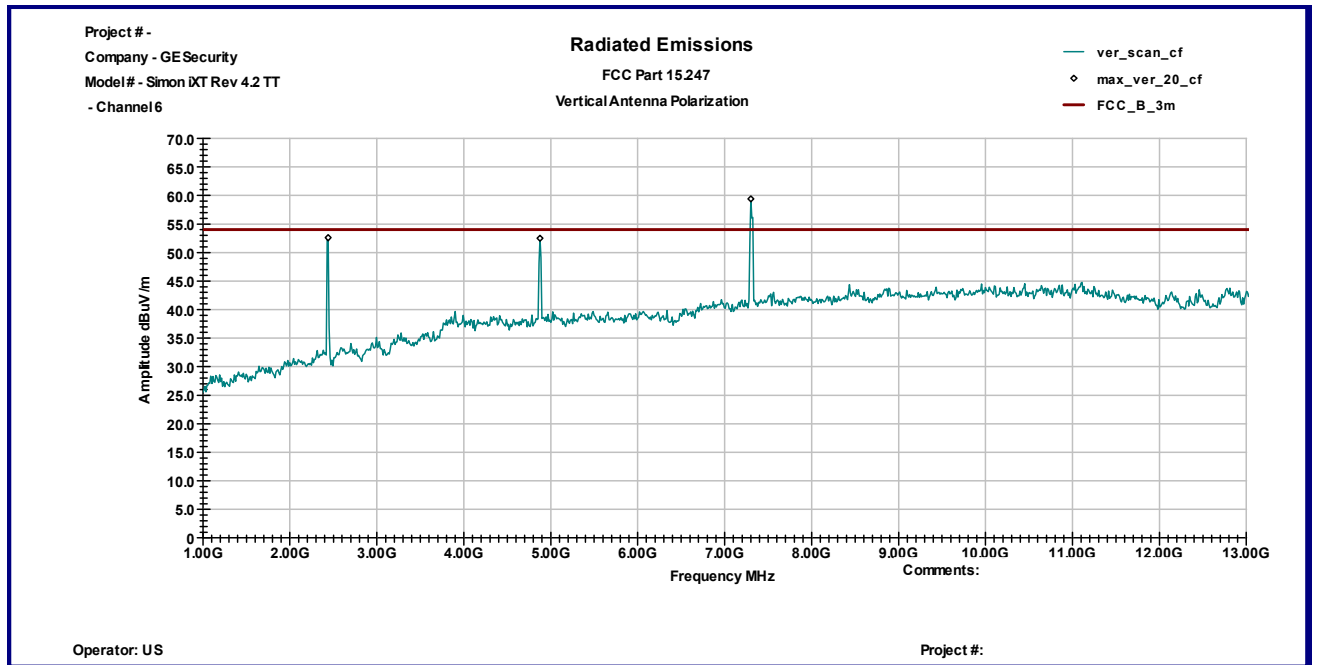
Graph 3.5.2



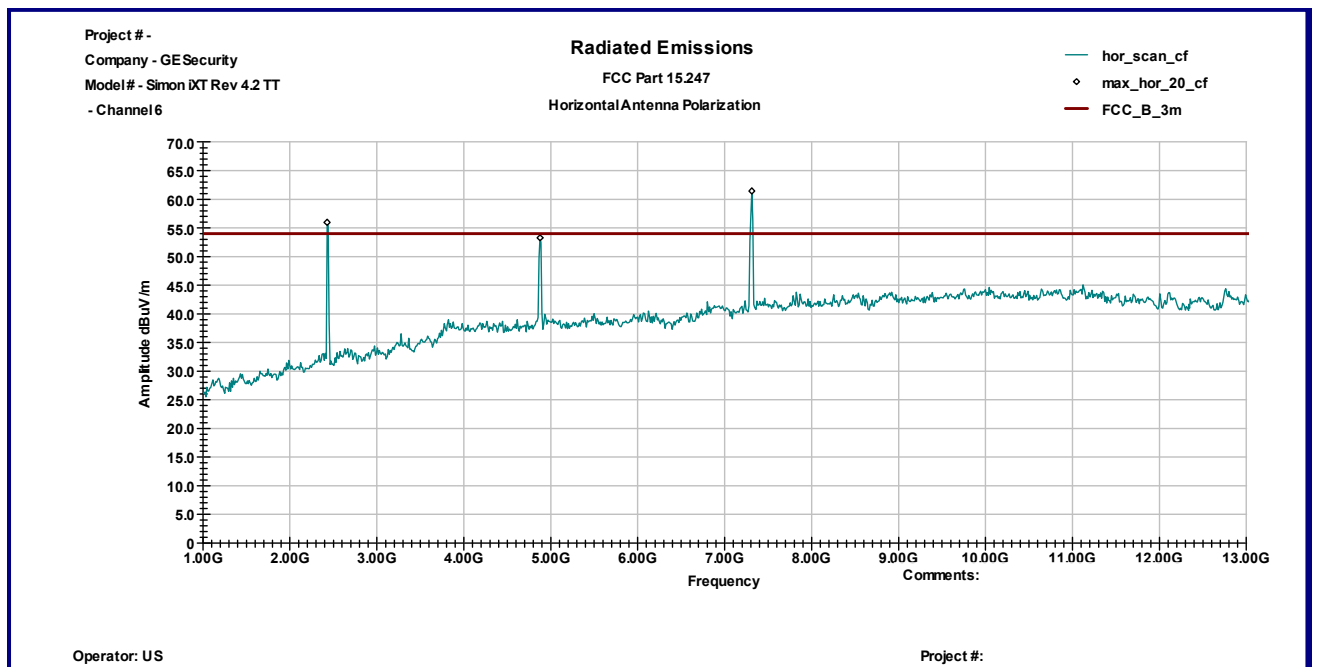
Graph 3.5.3



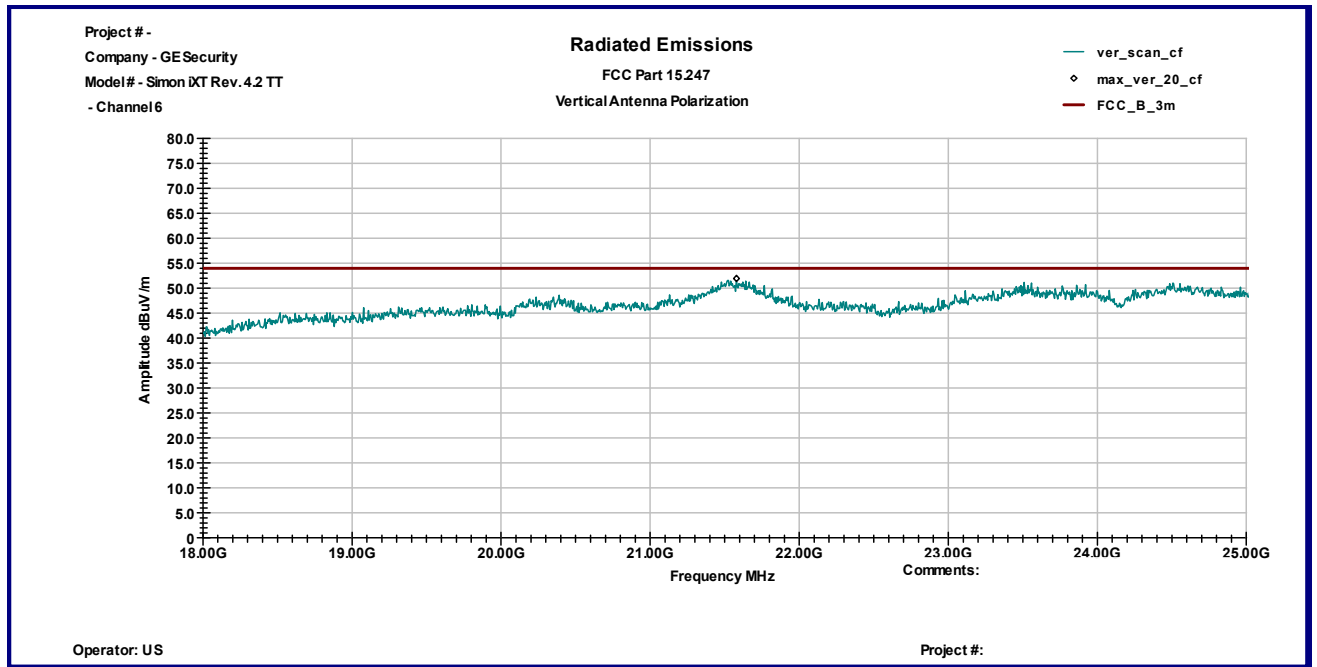
Graph 3.5.4



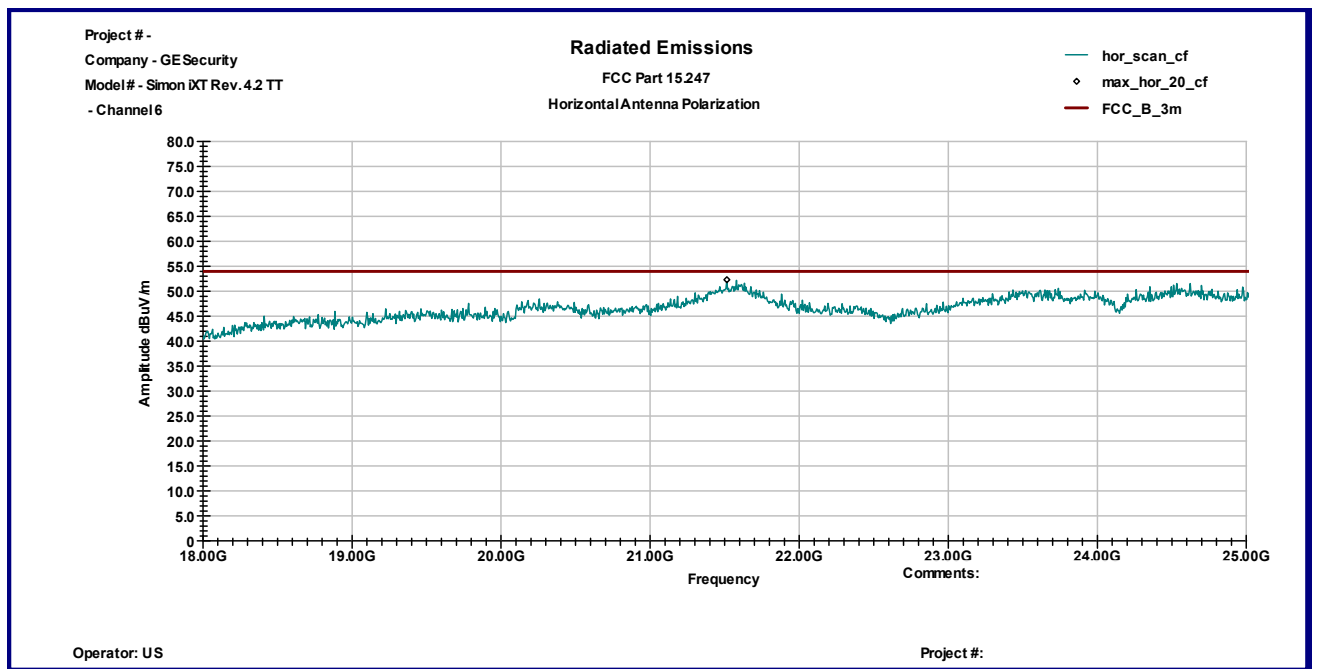
Graph 3.5.5



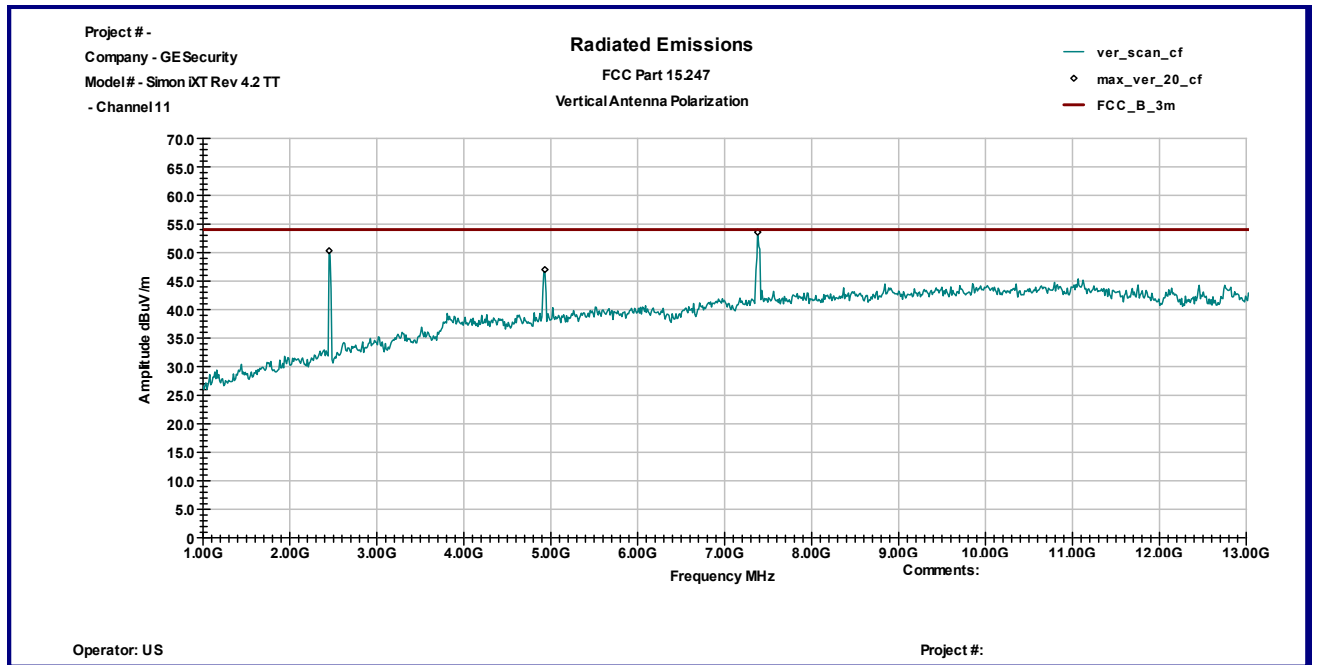
Graph 3.5.6



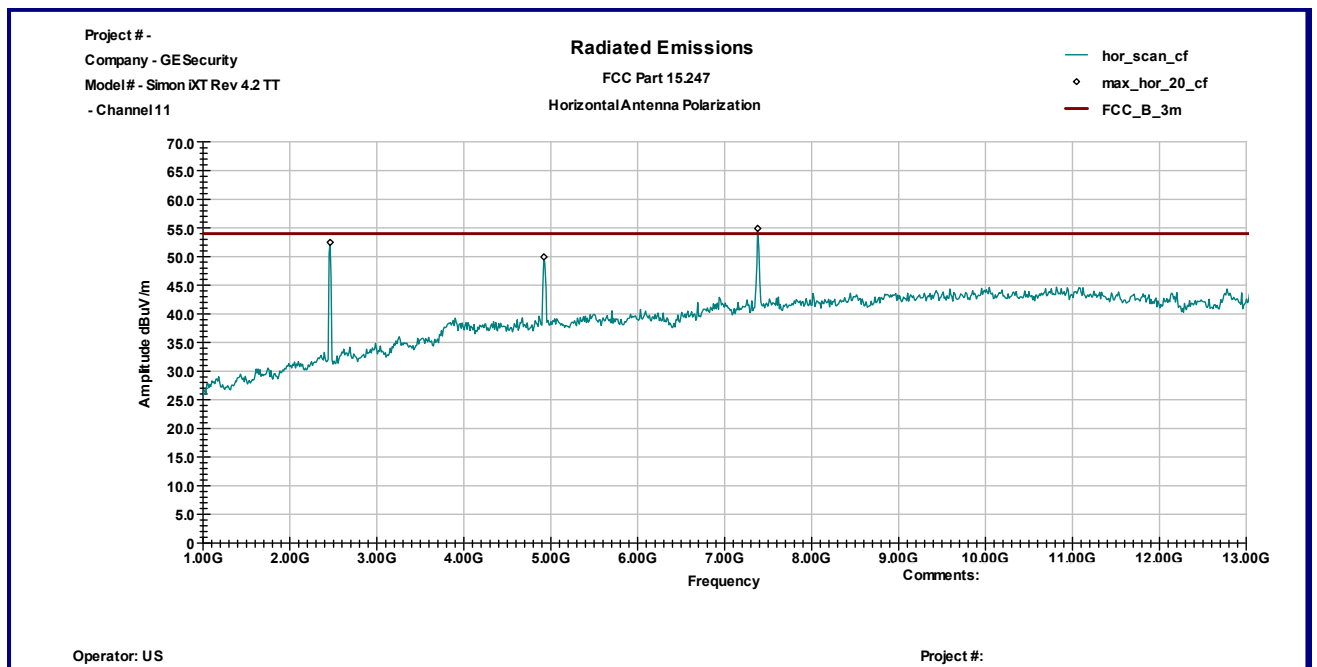
Graph 3.5.7



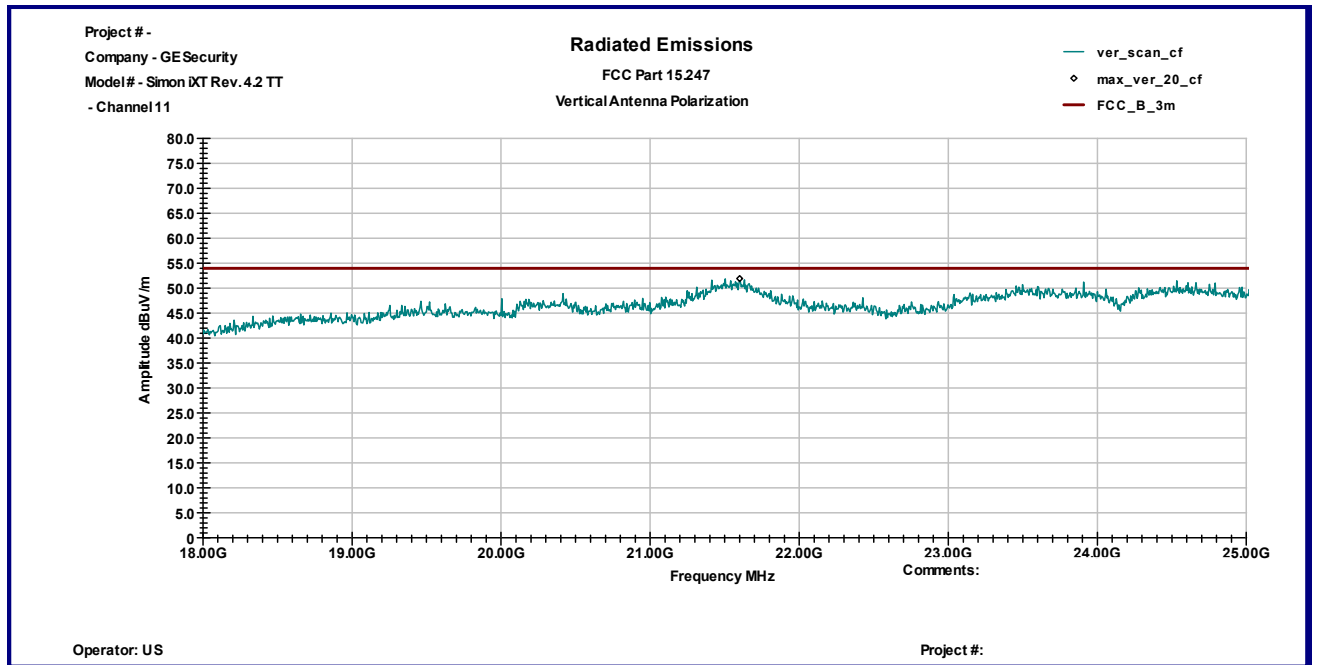
Graph 3.5.8



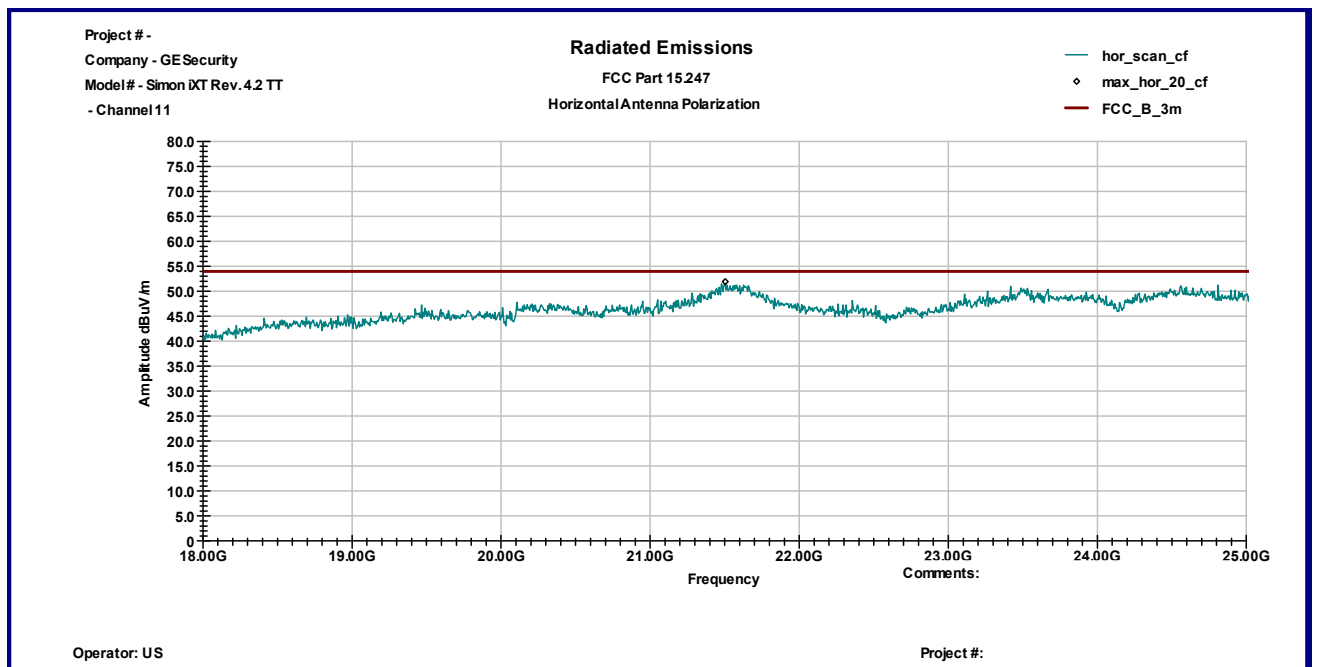
Graph 3.5.9



Graph 3.5.10



Graph 3.5.11



Graph 3.5.12

3.6 RF Exposure Compliance

The maximum measured antenna conducted power, P is 23.57dBm

The antenna gain, G is 2dBi

The maximum EIRP power = P + G

ERP = 23.57+ 2= 25.57dBm, or 0.36W

The limits for Maximum Permissible Exposure (MPE) for transmitter operating at 2.4Hz, MPE is $1\text{mW}/\text{cm}^2$, or $10\text{W}/\text{m}^2$

The Power Density is related to EIRP with the equation:

$S = \text{EIRP} / 4\pi D^2$, or $10 = 0.00457 / 4\pi D^2$,

The minimum safe separation distance, D = 5.35cm, which is below 20cm



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	6579	15580	04/03/2010	☒
LISN	Fischer Custom Communications	FCC-LISN-2 MOD.SD	316	9945	11/06/2010	☒
Pre-Amplifier	MITEQ	AMF-5D-00501800-28-13P	1402232	172081	08/07/2010	☒
System	TILE! Instrument Control		Ver. 3.4.K.29	15259	VBU	☒

