TEST REPORT

Report Number: 3164030MIN-001
Project Number: 3164030

Testing performed on the
RM2510
FCC ID: LW2RM2510
Industry Canada ID: 2731A-RM2510

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

For
Rosemount, Inc.

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

Test Authorized by:
Rosemount, Inc.
8200 Market Blvd.
Chanhassen, MN 55317

Prepared by: _____ Date: October 17, 2008
Uri Spector

Reviewed by: _____ Date: October 17, 2008
Norman Shpilsher

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4.0 TEST EQUIPMENT ***47***

1.0 GENERAL DESCRIPTION

Model:	RM2510
Type of EUT:	2.4GHz Wireless HART Radio Module
Serial Number:	N/A
FCC ID:	LW2RM2510
Industry Canada ID:	2731A-RM2510
Related Submittal(s) Grants:	None
Company:	Rosemount, Inc.
Customer:	Mr. Merritt Pulkrabek
Address:	8200 Market Blvd., Mail Stop PH03 Chanhassen, MN 55317
Phone:	(952) 949-5193
Fax:	(952) 949-7626
Test Standards:	☒ FCC Part 15.247 ☒ RSS–210, Issue 7, 2007 ☒ RSS-Gen, Issue 2, 2007 ☒ 47 CFR, Part 15:2005, §15.107 and §15.109, Class B ☐ Other
Type of radio:	☐ Stand -alone ☒ Module ☐ Hybrid
Test Work Started-Completed:	December 5 – December 12, 2007
Test Work Started-Completed:	October 15 – October 17, 2008
Test Sample Conditions:	☐ Damaged ☐Poor (Usable) ☒ Good

1.1 Product Description; Test Facility

Product Description:	2.4 – 2.4835GHz Transceiver
Transmitter Type:	☐ FHSS ☒ Digital Modulation (DSSS) ☐ WiFi ☐ Blue Tooth
Operating Frequency Range(s):	From 2400 to 2483.5 MHz
Number of Channels:	15 (from channel 0 to 14)
Modulation:	QPSK
Antenna(s) Info:	Antenna 1: Omni directional Gain: 2 dBi Connector Type: SM Antenna 2: Omni directional Gain: 4.5dBi Connector Type: SM
Power settings:	8 dBm
Antenna Installation:	☐ User ☐ Professional ☒ Factory
Transmitter power configuration:	☐ Internal battery ☒ External power source ☐ 120VAC ☐ 230VAC ☐ 400VAC ☒ 3 VDC ☐ Other: Amp. ☐ 50Hz ☐ 60Hz
Test Methodology:	Emission measurements were performed according to the procedures in ANSI C63.4-2003 and FCC Public Notice DA 00-705: March 30, 2000. All field strength radiated emissions measurements were performed in the semi-anechoic chamber, and for each scan, the procedure for maximizing emissions in were followed. All field strength radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application
Special Test Arrangement:	None
Test Facility:	The test site facility used to collect the radiated and conducted measurement data is located at 7250 Hudson Blvd., Suite 100, Oakdale, Minnesota. This test facility has been accredited by A2LA (Certificate No. 1427.01)
Justification:	None

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	Test was performed at low channel, middle channel, and upper channel
2	

Cables:

No.	Type	Length	Designation	Note
1	RF cable, 0.25dB loss at 2.4GHz	12”	Measurements at the antenna terminal	
2				

Support equipment/Services:

No.	Item	Description
1	DUST 1107A Board	Interface PCB
2	MS Hyper Terminal	Software for control the EUT operation mode

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 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(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: None

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-210A8.2	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
15.207/RSS-Gen 7.2.2	Transmitter Power Line conducted emissions	N/A
15.109/ICES-003	Receiver/digital device radiated emissions	Pass
15.107/ ICES-003	Digital device conducted emissions	N/A

Note: Testing was performed to demonstrate compliance of the EUT with the above requirements, with additional antenna of 4.5dBi to be used with the EUT.

Original testing was performed in December, 2007 and Report: 3139349MIN-003 was issued. Test results for the EUT with antenna of 4.5dBi is shown in this report.

3.0 TEST CONDITIONS AND RESULTS

3.1 Maximum peak output power

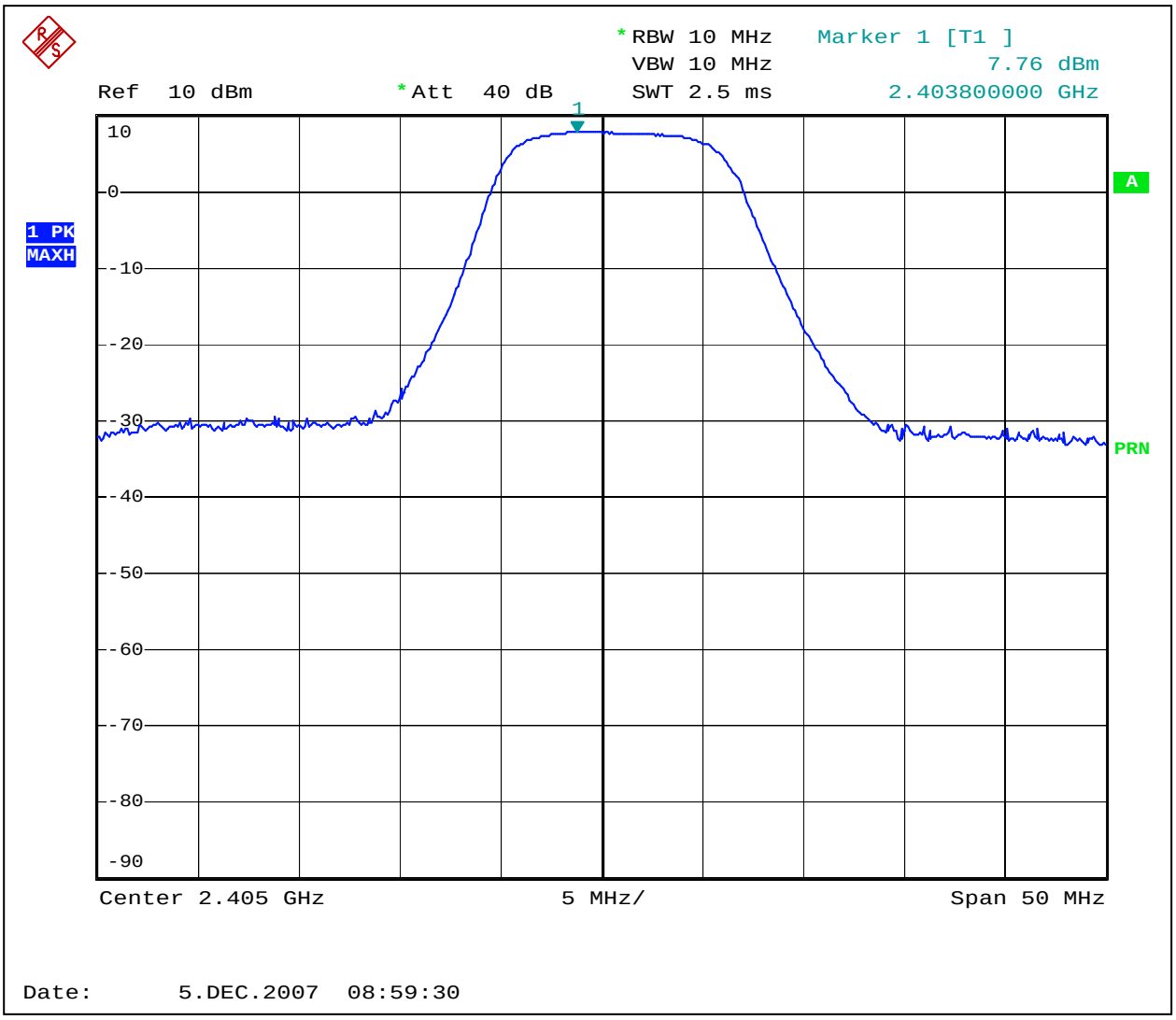
Test location: ☐ OATS ☐ Anechoic Chamber ☒ Other

Test result: **Pass**

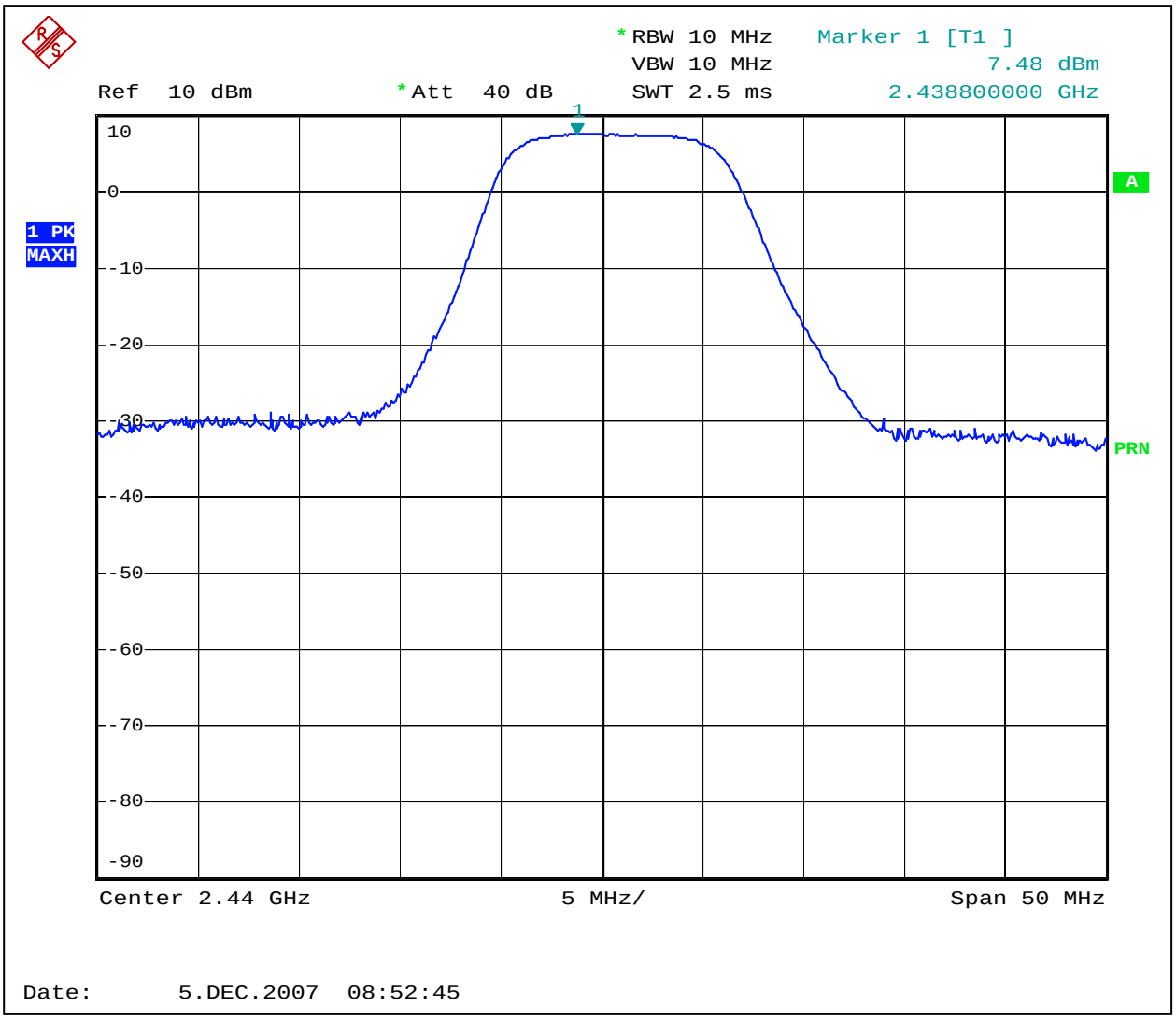
Max. Margin: 22 dB below the limits

Power Output:	**Conducted**					
Frequency Range:	☐ 902-928MHz ☒ 2400-2483.5MHz ☐ 5725-5850MHz					
Low Frequency MHz	**Measured power dBm**	**Attenuaton dB**	**Power at Antenna dBm**	**Limit dBm**	**Limit Reduction dB**	**Margin dB**
2404	7.76	0.25	8.01	30	0	-21.99
Middle Frequency MHz						
2439	7.48	0.25	7.73	30	0	-22.27
Upper Frequency MHz						
2475	7.12	0.25	7.37	30	0	-22.63
RBW:	☐ 1MHz ☐ 3MHz ☒ 10MHz					
VBW:	☐ 1MHz ☐ 3MHz ☒ 10MHz					
Antenna Gain:	☒ < 6dBi ☐ >6dBi and = dBi, Output power reduction = dB					

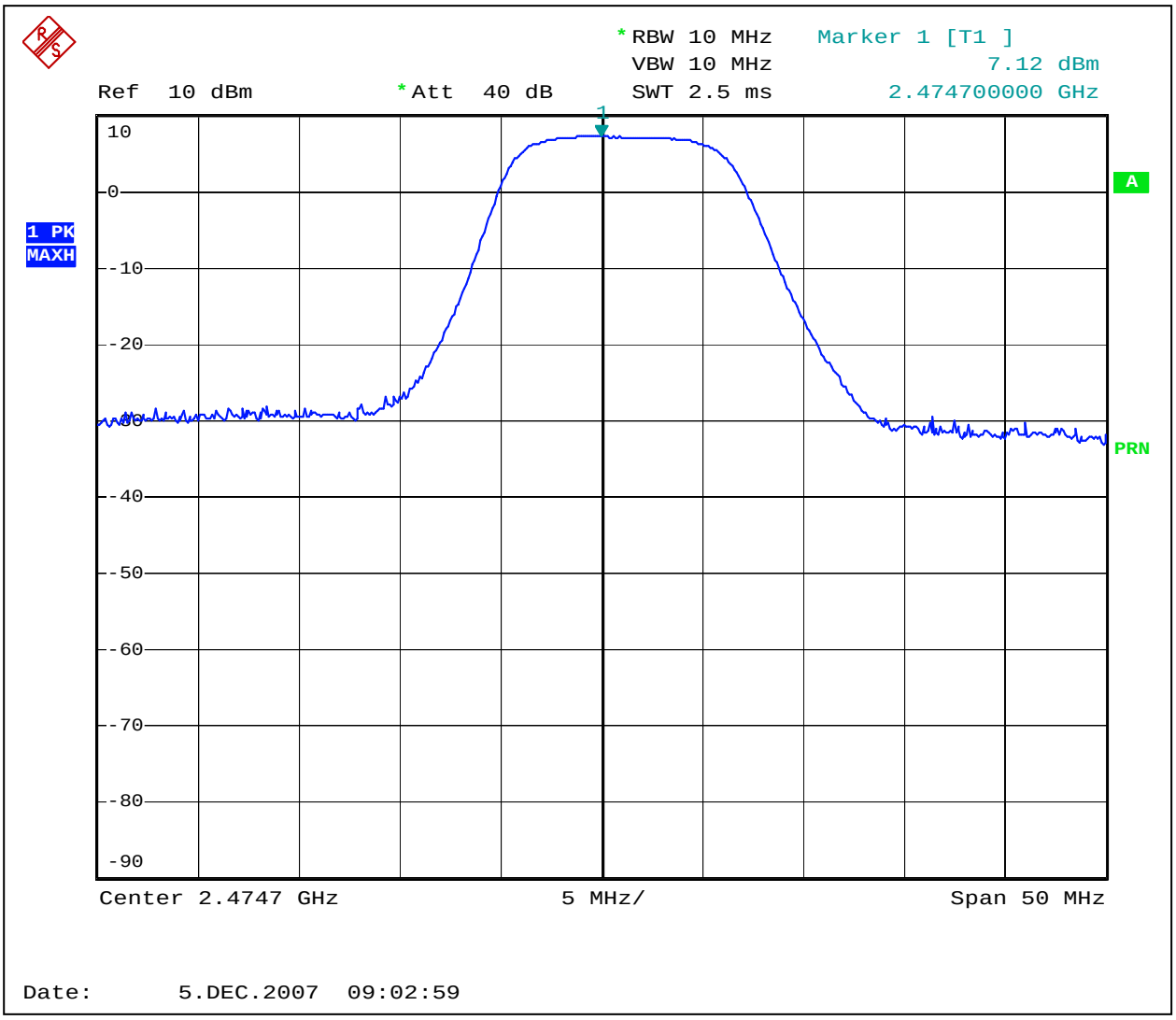
Notes: The maximum peak conducted output power limit is 1 W, or 30dBm
Graphs 3.1.1 to 3.1.3 show the conducted output power


*RBW 10 MHz
VBW 10 MHz
SWT 2.5 ms
Marker 1 [T1]
7.76 dBm
2.403800000 GHz
Ref 10 dBm
*Att 40 dB
1 PK
MAXH
A
PRN
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.405 GHz
5 MHz/
Span 50 MHz
Date: 5.DEC.2007 08:59:30

Graph 3.1.1


*RBW 10 MHz
VBW 10 MHz
SWT 2.5 ms
Marker 1 [T1]
7.48 dBm
2.438800000 GHz
Ref 10 dBm
*Att 40 dB
1 PK
MAXH
A
PRN
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.44 GHz
5 MHz/
Span 50 MHz
Date: 5.DEC.2007 08:52:45

Graph 3.1.2

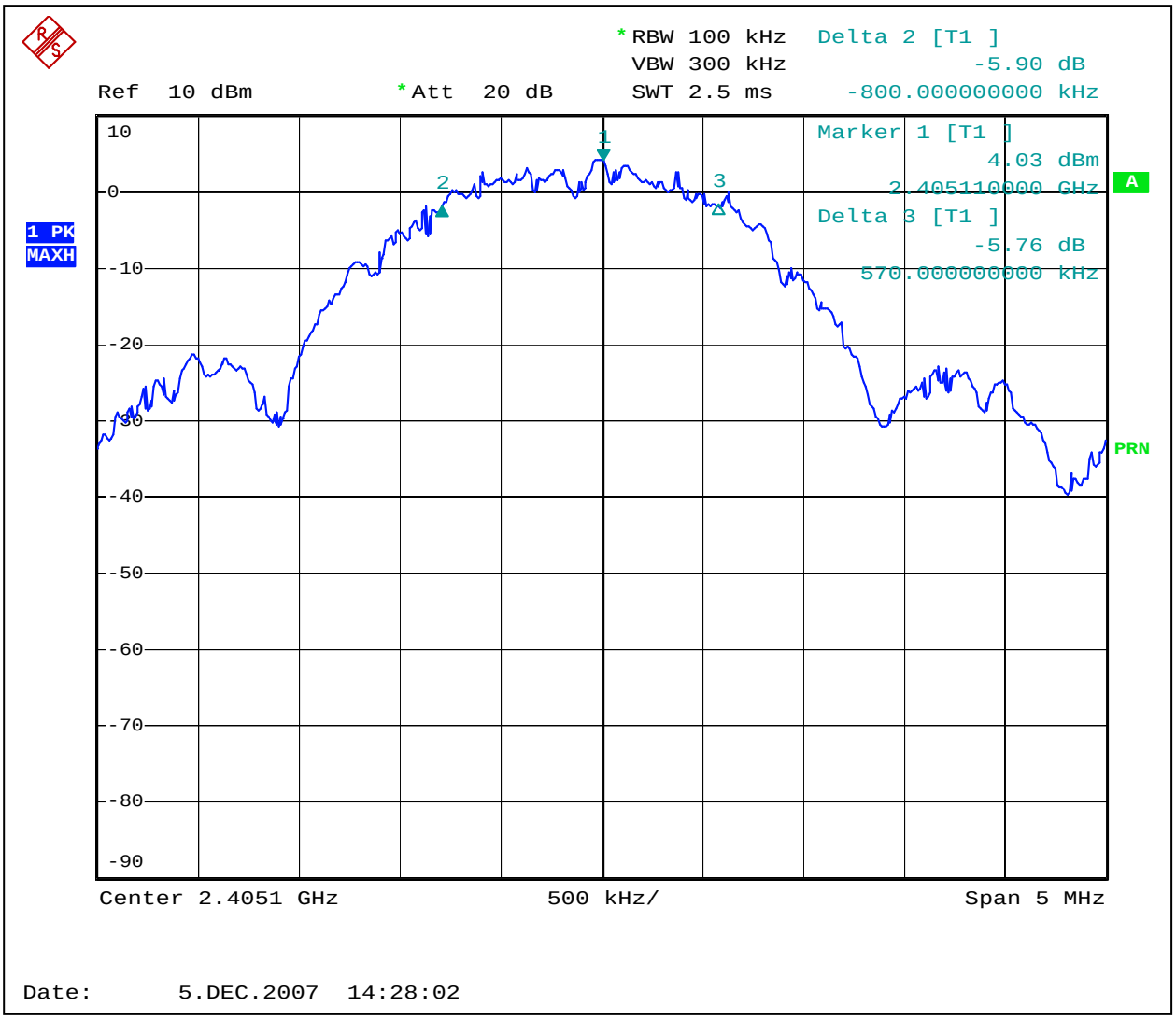

*RBW 10 MHz
VBW 10 MHz
SWT 2.5 ms
Marker 1 [T1]
7.12 dBm
2.474700000 GHz
Ref 10 dBm
*Att 40 dB
1 PK
MAXH
A
PRN
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.4747 GHz
5 MHz/
Span 50 MHz
Date: 5.DEC.2007 09:02:59

Graph 3.1.3

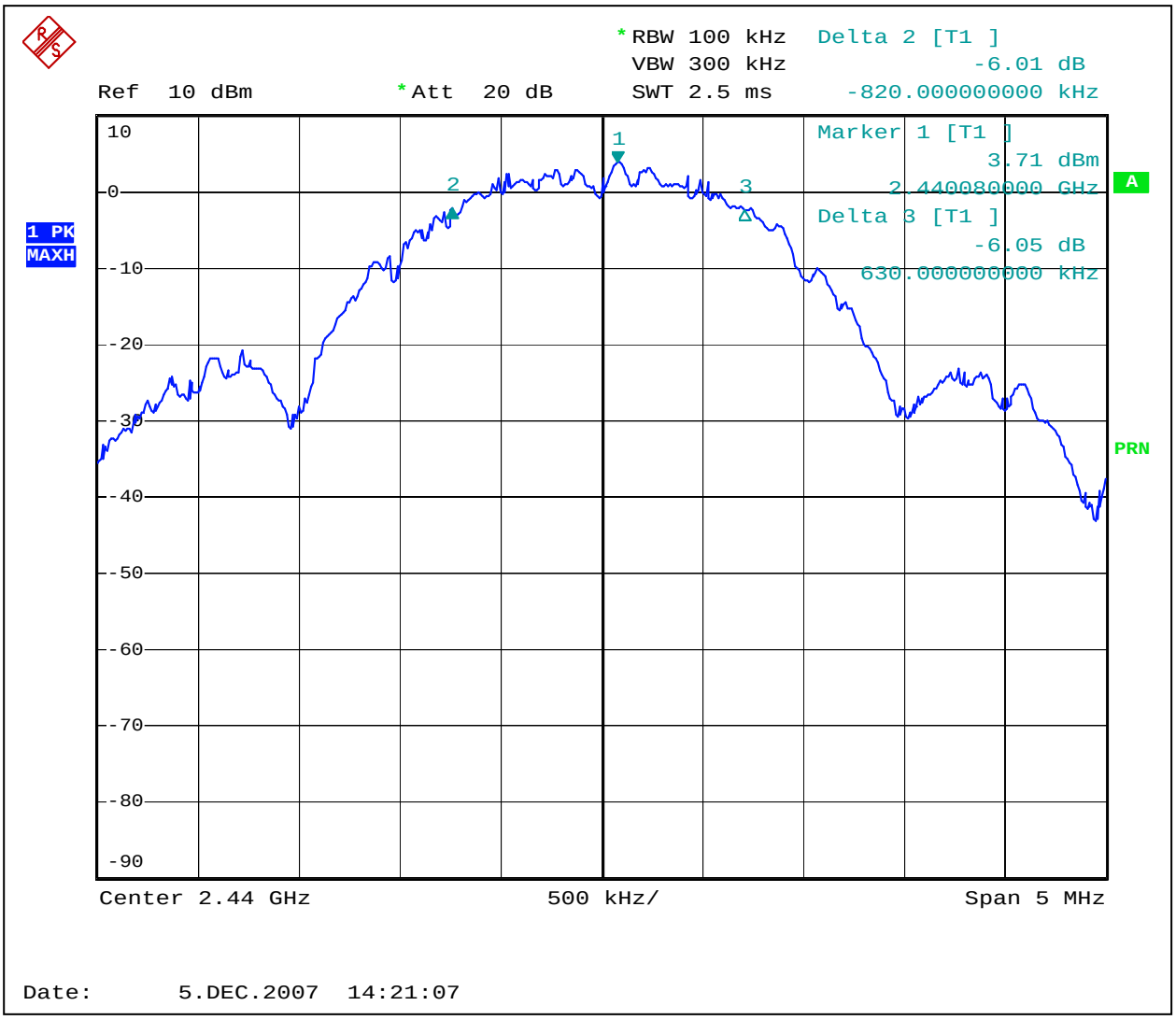
3.2 6dB bandwidth of the digital modulation

Low Frequency Channel kHz	Middle Frequency Channel kHz	Upper Frequency Channel kHz	Minimum Allowed Bandwidth kHz	Result
1370	1450	1560	500	**Pass**

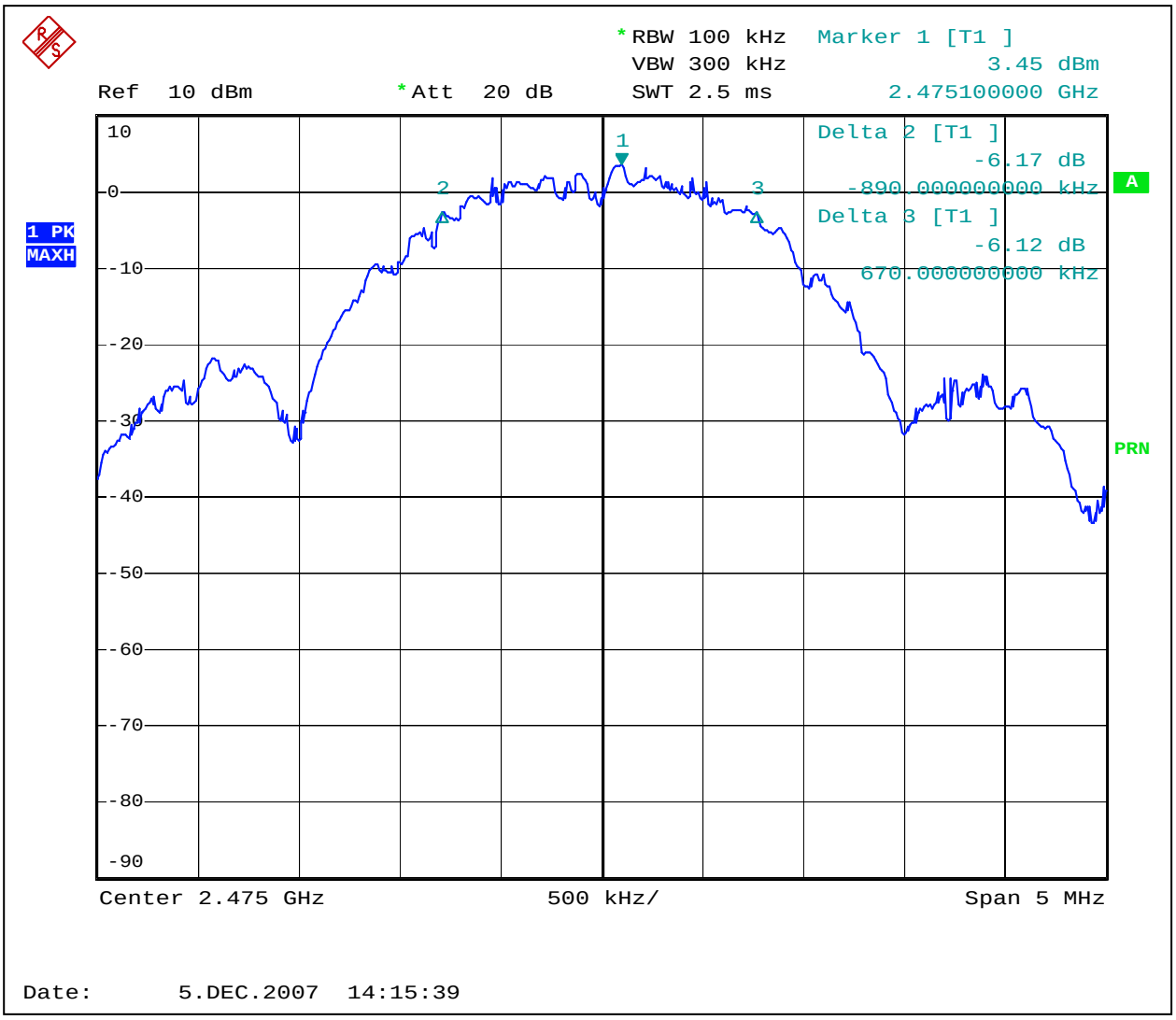
Notes: Graphs 3.2.1 to 3.2.3 show the 6dB bandwidth


*RBW 100 kHz
VBW 300 kHz
SWT 2.5 ms
Delta 2 [T1]
-5.90 dB
-800.000000000 kHz
Ref 10 dBm
*Att 20 dB
Marker 1 [T1]
4.03 dBm
2.405110000 GHz
Delta 3 [T1]
-5.76 dB
570.000000000 kHz
1 PK
MAXH
A
PRN
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.4051 GHz
500 kHz/
Span 5 MHz
Date: 5.DEC.2007 14:28:02

Graph 3.2.1


*RBW 100 kHz
VBW 300 kHz
SWT 2.5 ms
Delta 2 [T1]
-6.01 dB
-820.000000000 kHz
Ref 10 dBm
*Att 20 dB
Marker 1 [T1]
3.71 dBm
2.440080000 GHz
Delta 3 [T1]
-6.05 dB
630.000000000 kHz
1 PK
MAXH
A
PRN
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.44 GHz
500 kHz/
Span 5 MHz
Date: 5.DEC.2007 14:21:07

Graph 3.2.2

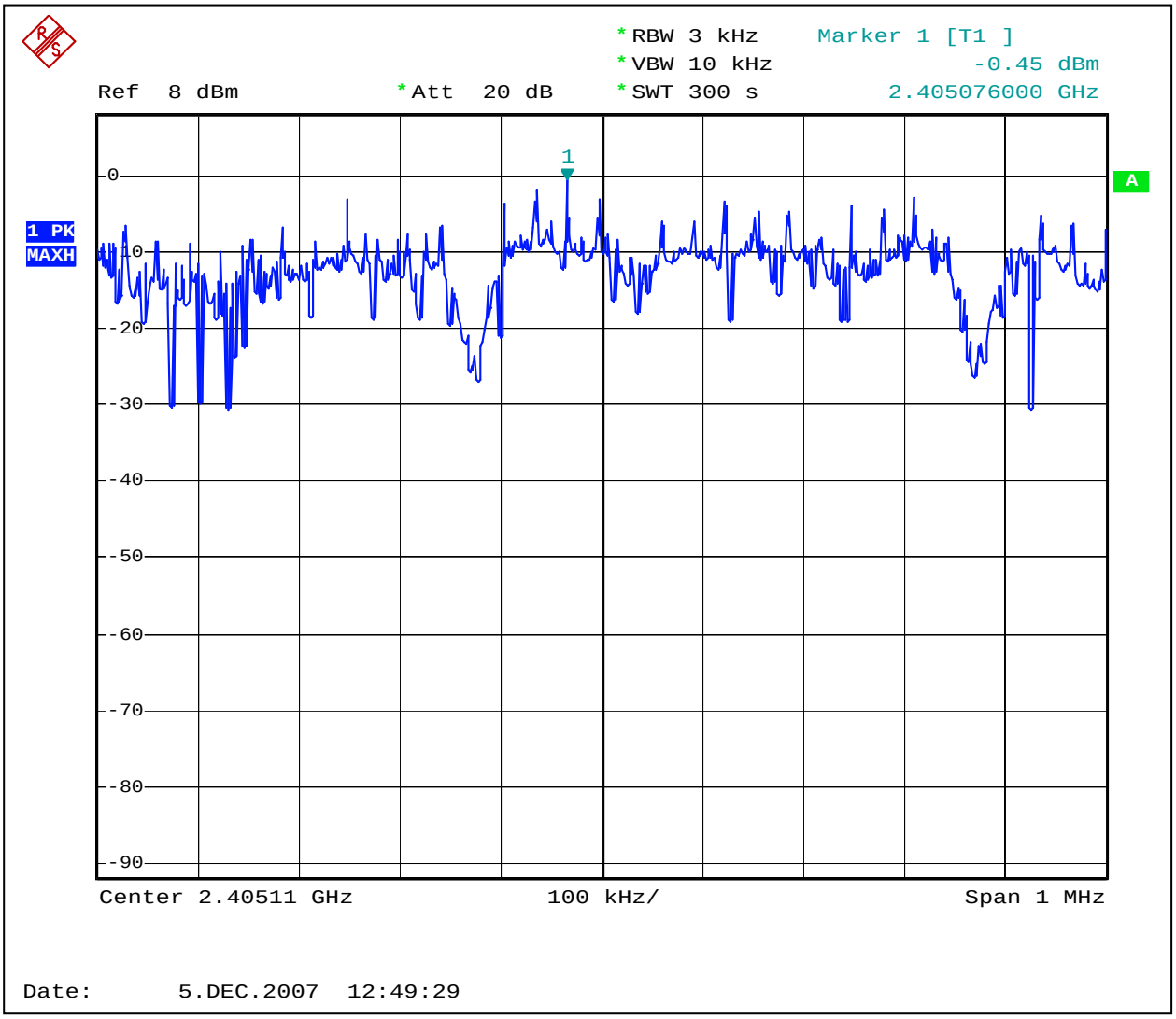

*RBW 100 kHz
VBW 300 kHz
SWT 2.5 ms
Marker 1 [T1]
3.45 dBm
2.475100000 GHz
Ref 10 dBm
*Att 20 dB
Delta 2 [T1]
-6.17 dB
-890.000000000 kHz
Delta 3 [T1]
-6.12 dB
670.000000000 kHz
1 PK
MAXH
A
PRN
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.475 GHz
500 kHz/
Span 5 MHz
Date: 5.DEC.2007 14:15:39

Graph 3.2.3

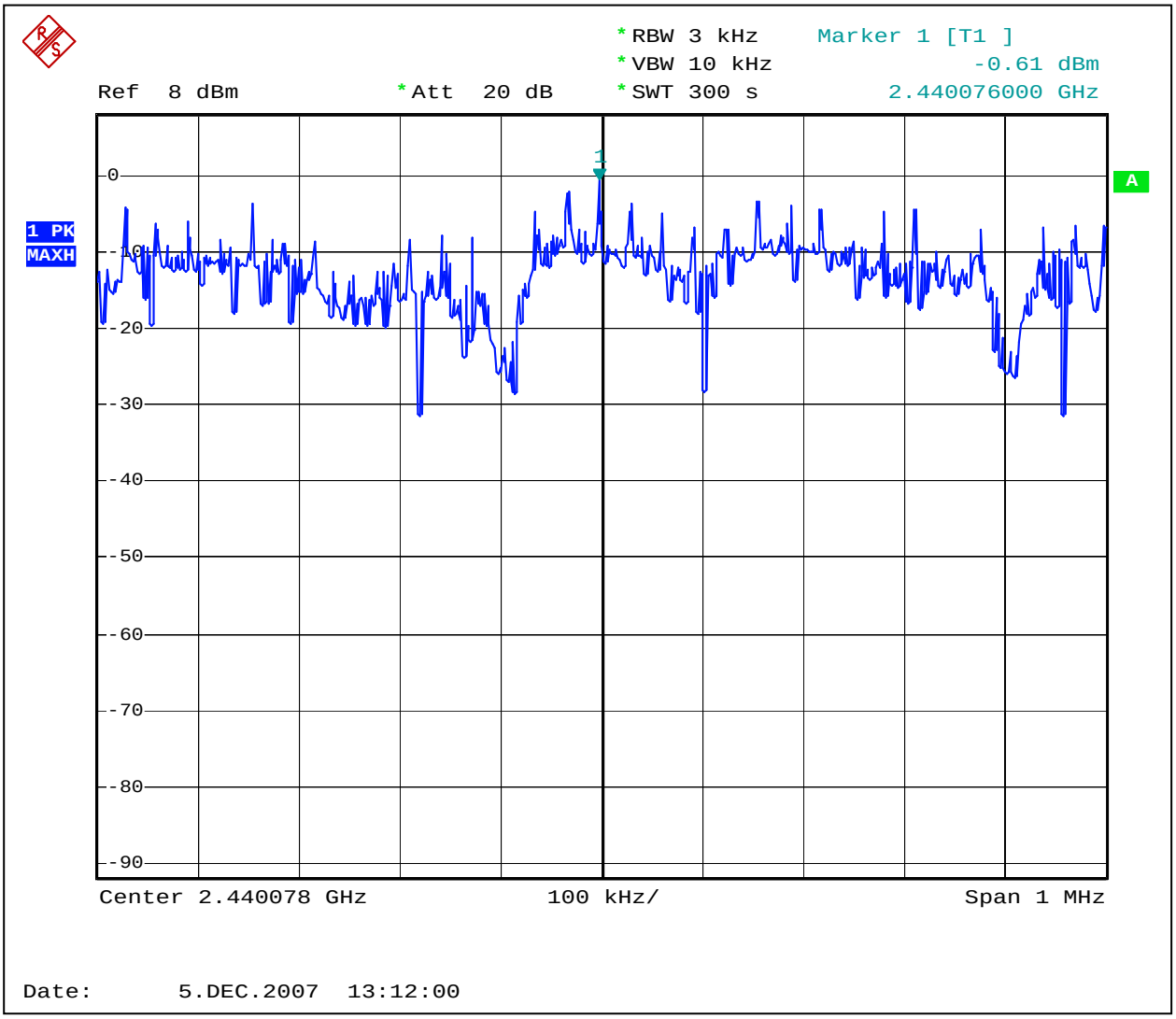
3.3 Power spectral density

Power Output:	☒ Conducted ☐ Radiated			
	Measured Density dBm	**Power Spectral Density dBm**	**Limit dBm**	**Margin dB**
Low Frequency Channel	-0.45	-0.2	8	-8.2
Middle Frequency Channel	-0.61	-0.4	8	-8.4
Upper Frequency Channel	-0.88	-0.6	8	-8.6
Analyzer Settings:	☒ RBW=3KHz ☒ VBW=10KHz ☒ Span=1MHz ☒ Sweep=300sec			
Antenna Gain:	☒ < 6dBi and = 2 dBi; 4.5dBi ☐ >6dBi and = dBi, limit reduction = dB			

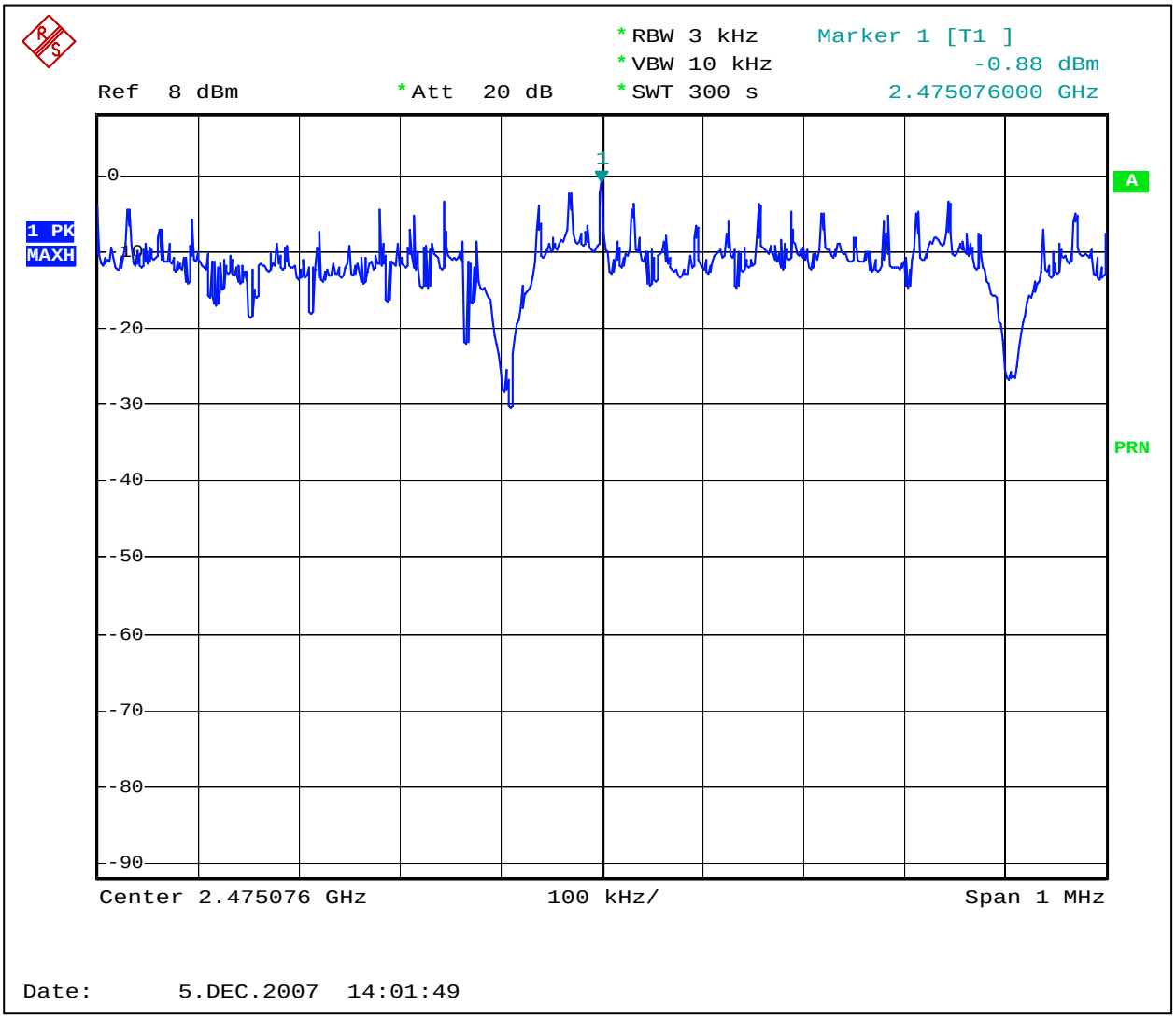
Notes: The Power Spectral Density was calculated adding the cable/attenuator loss of 0.25 dB from the measured density value.
Graphs 3.3.1 to 3.3.3 show the Power Spectral Density


*RBW 3 kHz
*VBW 10 kHz
*SWT 300 s
Marker 1 [T1]
-0.45 dBm
2.405076000 GHz
Ref 8 dBm
*Att 20 dB
1 PK
MAXH
A
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.40511 GHz
100 kHz/
Span 1 MHz
Date: 5.DEC.2007 12:49:29

Graph 3.3.1


*RBW 3 kHz
*VBW 10 kHz
*SWT 300 s
Marker 1 [T1]
-0.61 dBm
2.440076000 GHz
Ref 8 dBm
*Att 20 dB
1 PK
MAXH
A
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.440078 GHz
100 kHz/
Span 1 MHz
Date: 5.DEC.2007 13:12:00

Graph 3.3.2

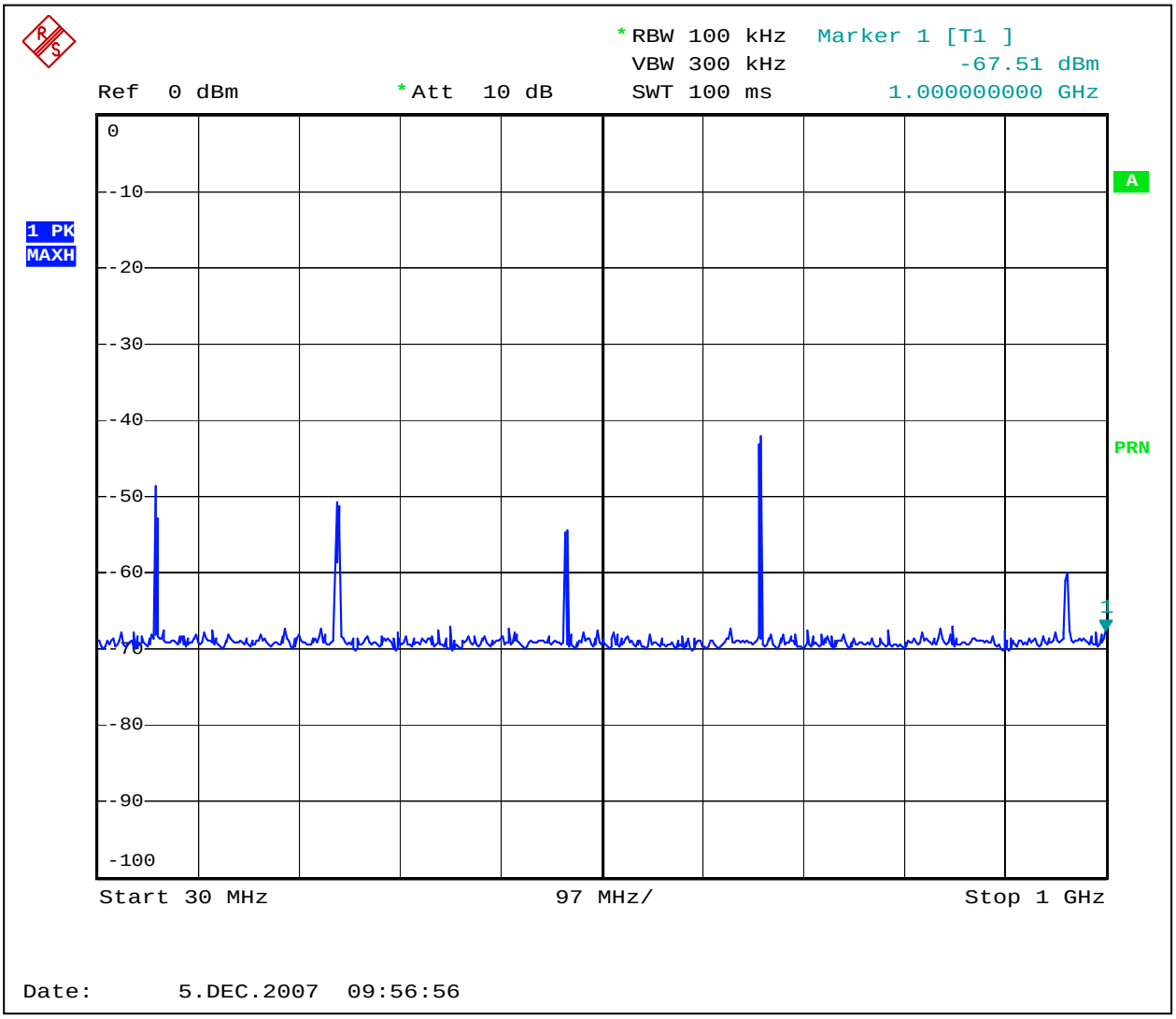

*RBW 3 kHz
*VBW 10 kHz
*SWT 300 s
Marker 1 [T1]
-0.88 dBm
2.475076000 GHz
Ref 8 dBm
*Att 20 dB
1 PK
MAXH
A
PRN
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.475076 GHz
100 kHz/
Span 1 MHz
Date: 5.DEC.2007 14:01:49

Graph 3.3.3

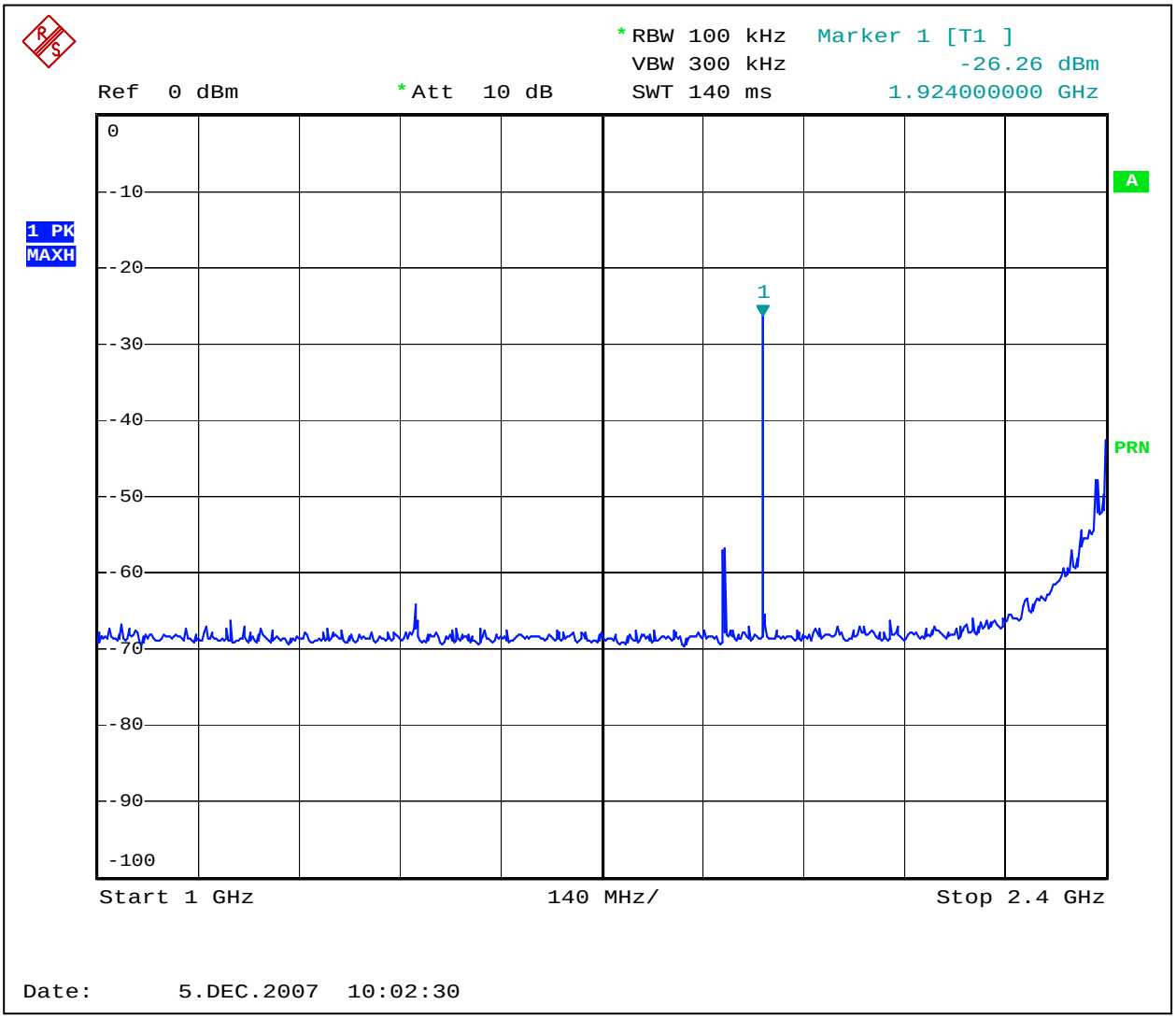
3.4 Antenna conducted spurious emissions

	Minimum Measured Attenuation dB	Minimum Allowed Attenuation dB	Margin dB
Low Frequency Channel	34.0	20	-14.0
Middle Frequency Channel	34.2	20	-14.2
Upper Frequency Channel	45.1	20	-25.1
Analyzer Settings:	☒ RBW=100KHz		
Minimum Allowed Attenuation:	☒ 20dB ☐ 30dB (for digital systems with conducted power measured using RMS averaging over a time interval)		

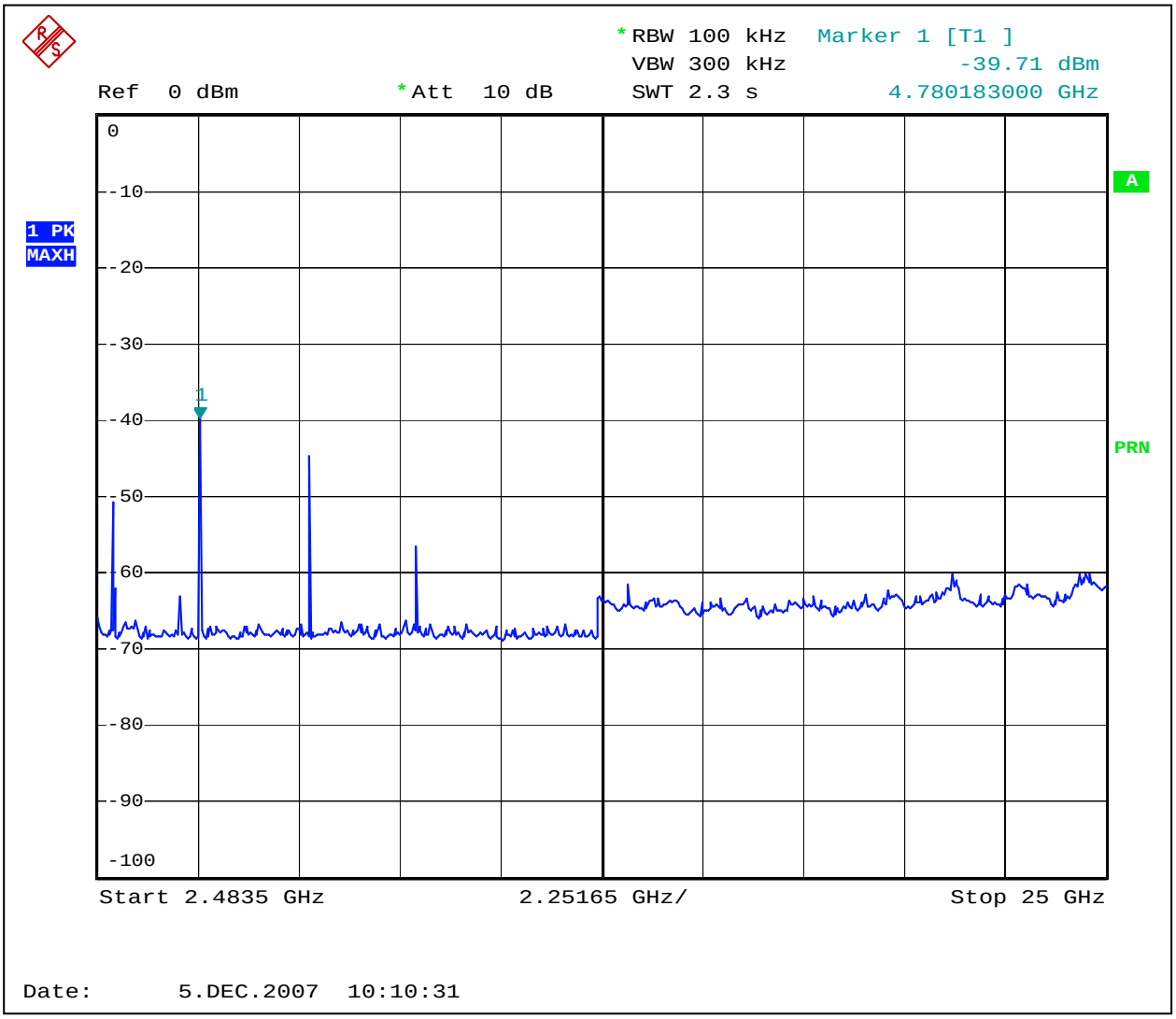
Notes: Test was performed in frequency range from 30MHz to 25GHz
Graphs 3.4.1 to 3.4.3 show the Antenna Conducted Spurious Emissions for channel 0
Graphs 3.4.4 to 3.4.6 show the Antenna Conducted Spurious Emissions for channel 7
Graphs 3.4.7 to 3.4.9 show the Antenna Conducted Spurious Emissions for channel 14
Graph 3.4.10 shows band edge compliance at 2400MHz
Graph 3.4.11 shows band edge compliance at 2483.5MHz


*RBW 100 kHz
VBW 300 kHz
SWT 100 ms
Marker 1 [T1]
-67.51 dBm
1.000000000 GHz
Ref 0 dBm
*Att 10 dB
1 PK
MAXH
A
PRN
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 5.DEC.2007 09:56:56

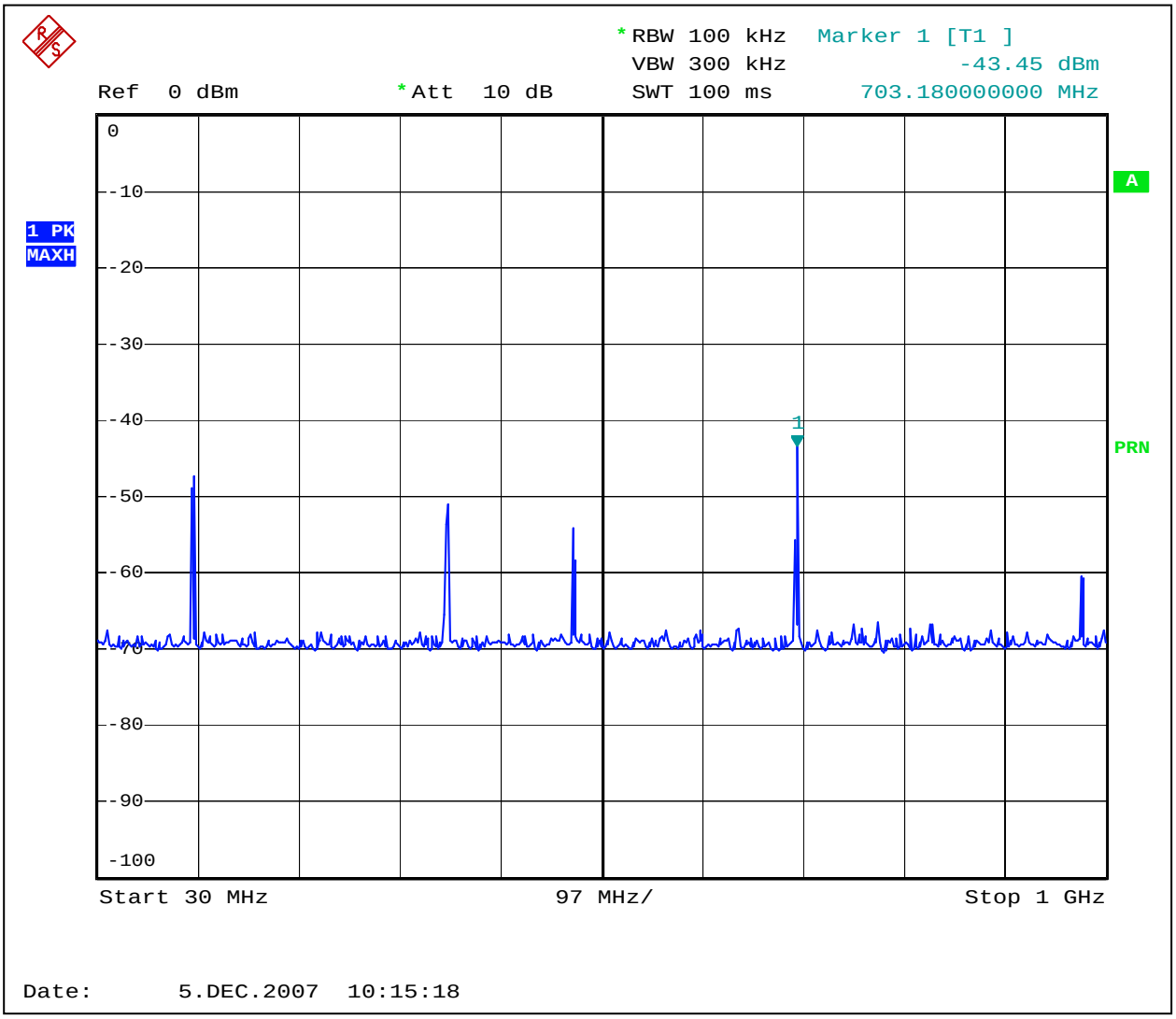
Graph 3.4.1


*RBW 100 kHz
VBW 300 kHz
SWT 140 ms
Marker 1 [T1]
-26.26 dBm
1.924000000 GHz
Ref 0 dBm
*Att 10 dB
1 PK
MAXH
A
PRN
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
1
Start 1 GHz
140 MHz/
Stop 2.4 GHz
Date: 5.DEC.2007 10:02:30

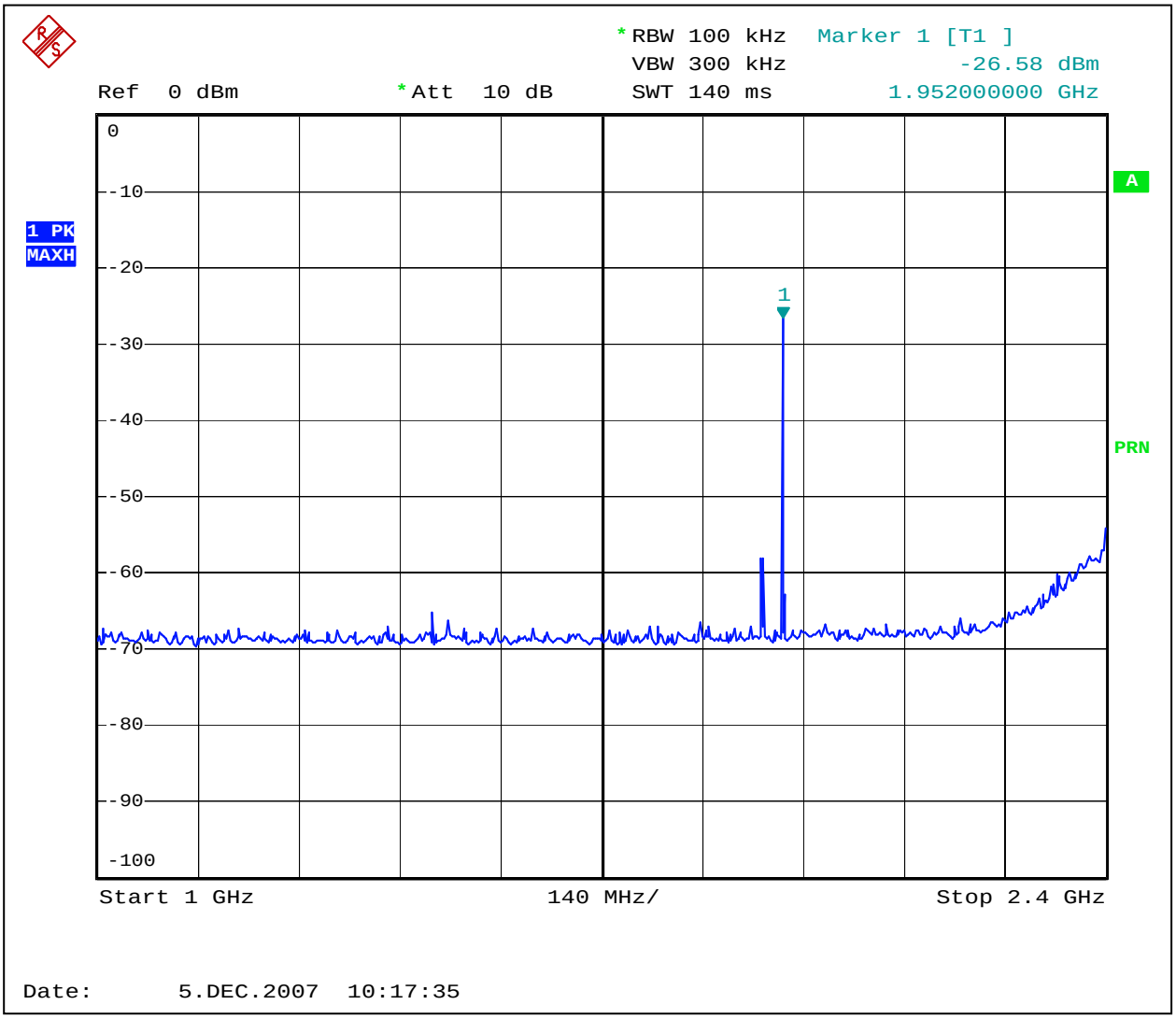
Graph 3.4.2


*RBW 100 kHz
VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-39.71 dBm
4.780183000 GHz
Ref 0 dBm
*Att 10 dB
1 PK
MAXH
A
PRN
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
Start 2.4835 GHz
2.25165 GHz/
Stop 25 GHz
Date: 5.DEC.2007 10:10:31

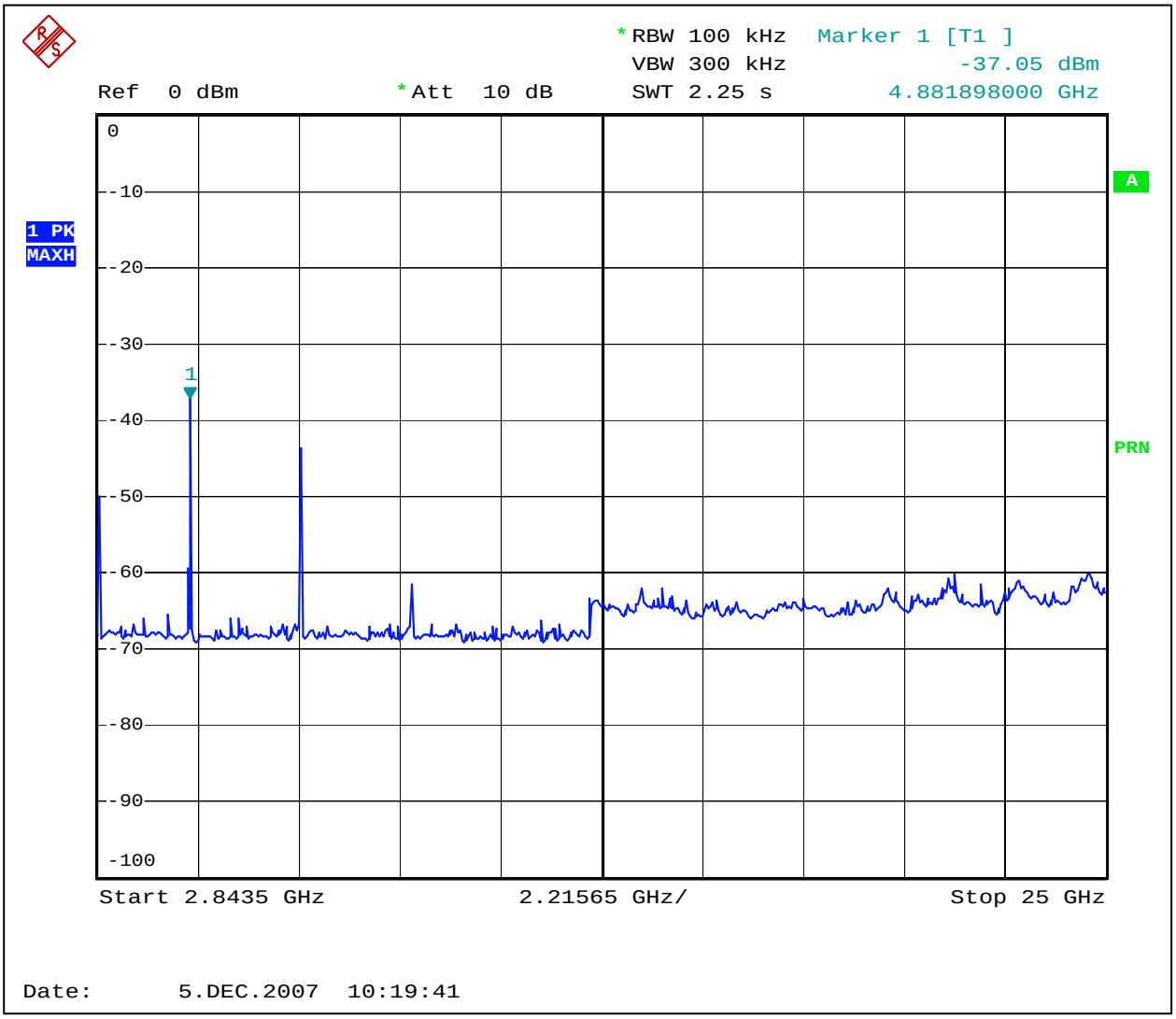
Graph 3.4.3


*RBW 100 kHz
VBW 300 kHz
SWT 100 ms
Marker 1 [T1]
-43.45 dBm
703.180000000 MHz
Ref 0 dBm
*Att 10 dB
1 PK
MAXH
A
PRN
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 5.DEC.2007 10:15:18

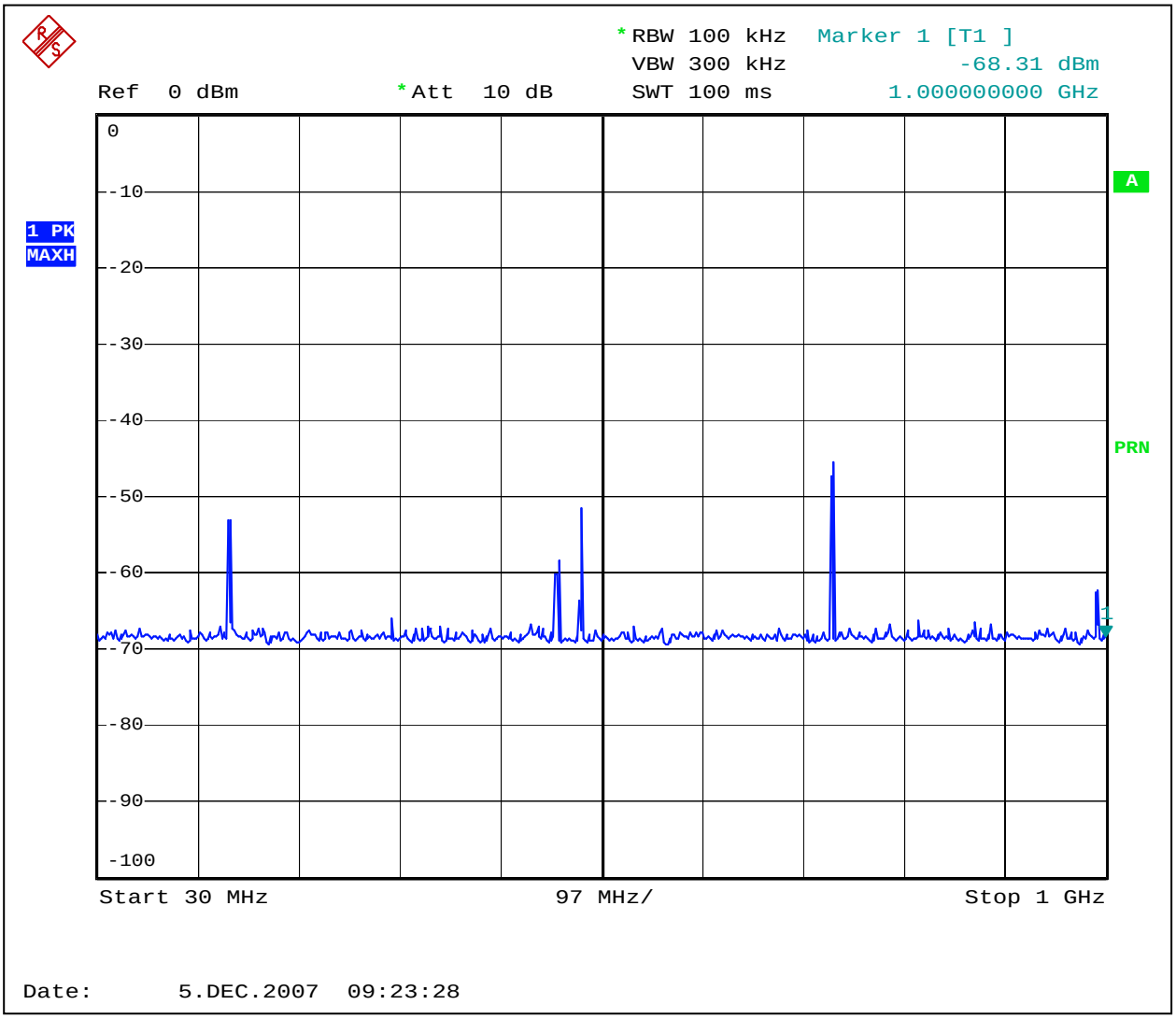
Graph 3.4.4


*RBW 100 kHz
VBW 300 kHz
SWT 140 ms
Marker 1 [T1]
-26.58 dBm
1.952000000 GHz
Ref 0 dBm
*Att 10 dB
1 PK
MAXH
A
PRN
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
Start 1 GHz
140 MHz/
Stop 2.4 GHz
Date: 5.DEC.2007 10:17:35

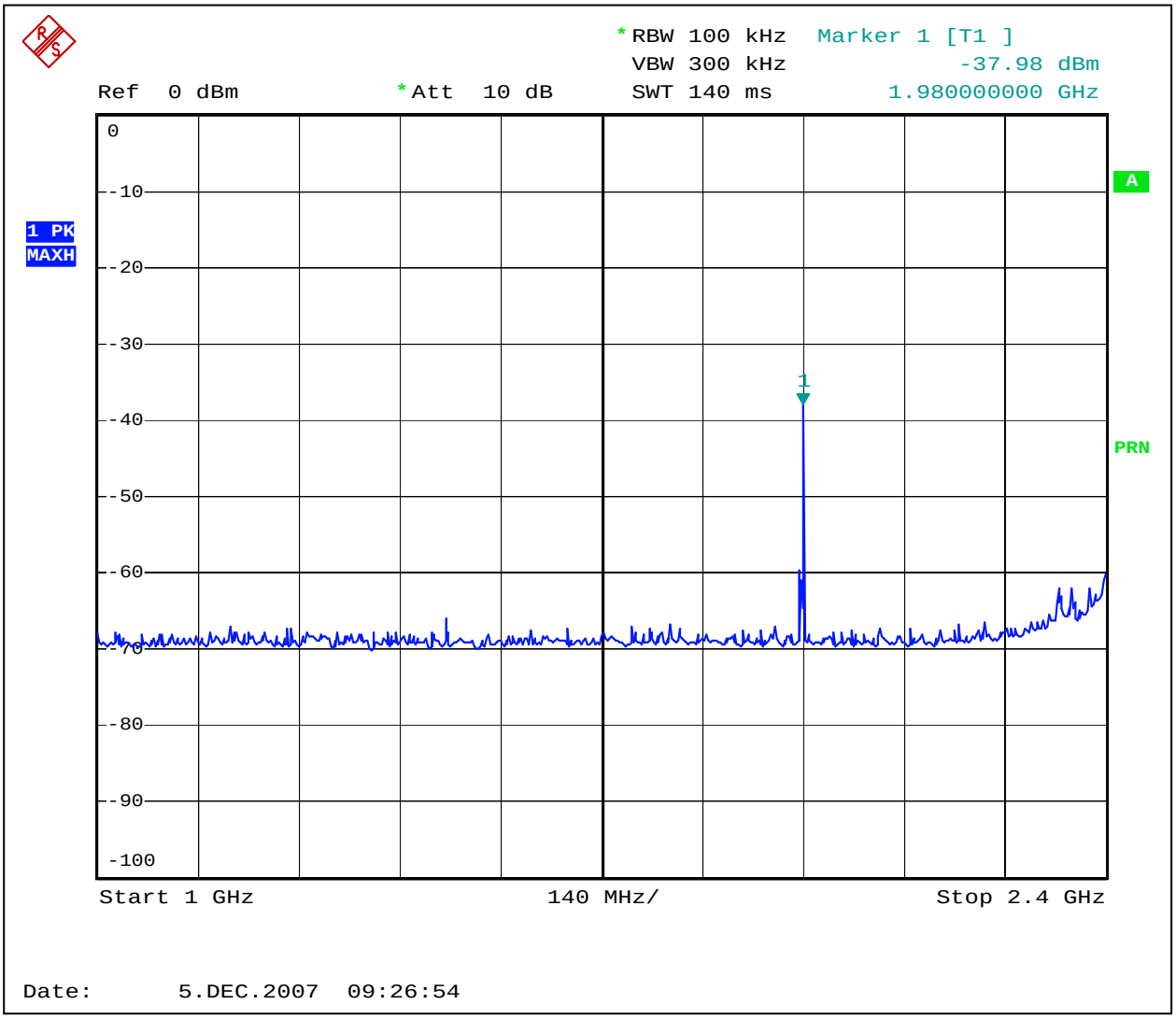
Graph 3.4.5


*RBW 100 kHz
VBW 300 kHz
SWT 2.25 s
Marker 1 [T1]
-37.05 dBm
4.881898000 GHz
Ref 0 dBm
*Att 10 dB
1 PK
MAXH
A
PRN
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
1
Start 2.8435 GHz
2.21565 GHz/
Stop 25 GHz
Date: 5.DEC.2007 10:19:41

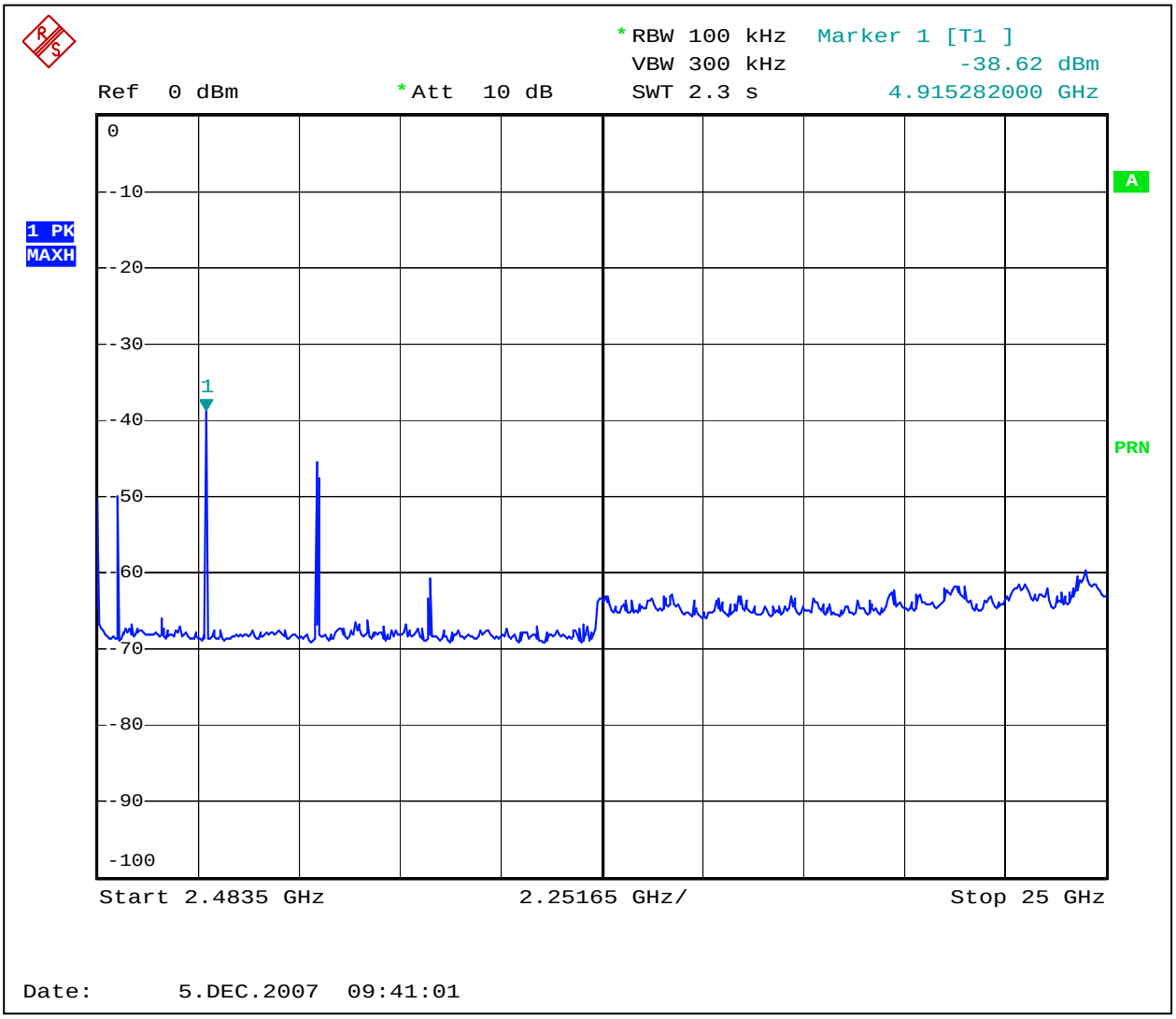
Graph 3.4.6


*RBW 100 kHz
VBW 300 kHz
SWT 100 ms
Marker 1 [T1]
-68.31 dBm
1.000000000 GHz
Ref 0 dBm
*Att 10 dB
1 PK
MAXH
A
PRN
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 5.DEC.2007 09:23:28

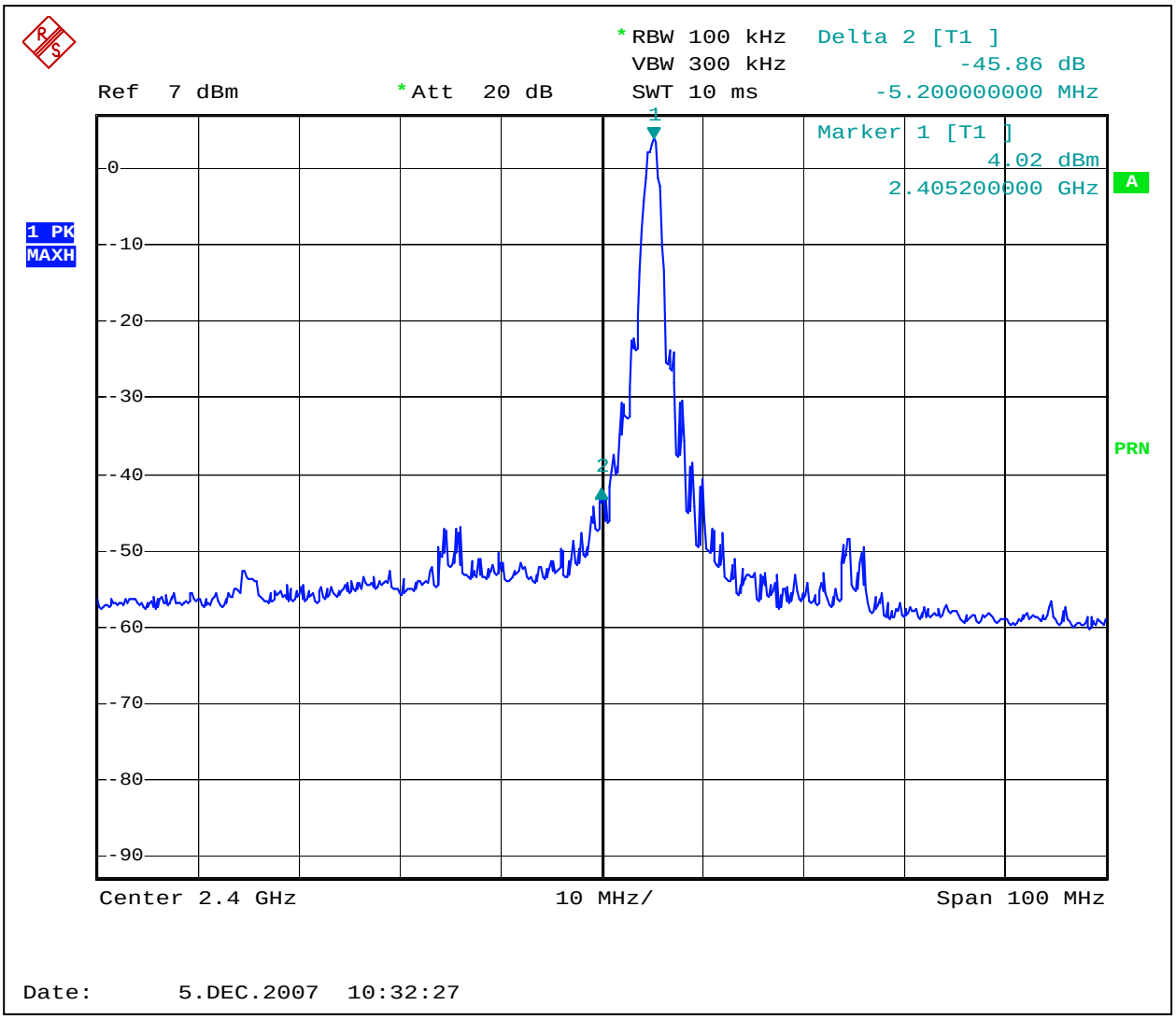
Graph 3.4.7


*RBW 100 kHz
VBW 300 kHz
SWT 140 ms
Marker 1 [T1]
-37.98 dBm
1.980000000 GHz
Ref 0 dBm
*Att 10 dB
1 PK
MAXH
A
PRN
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
Start 1 GHz
140 MHz/
Stop 2.4 GHz
Date: 5.DEC.2007 09:26:54

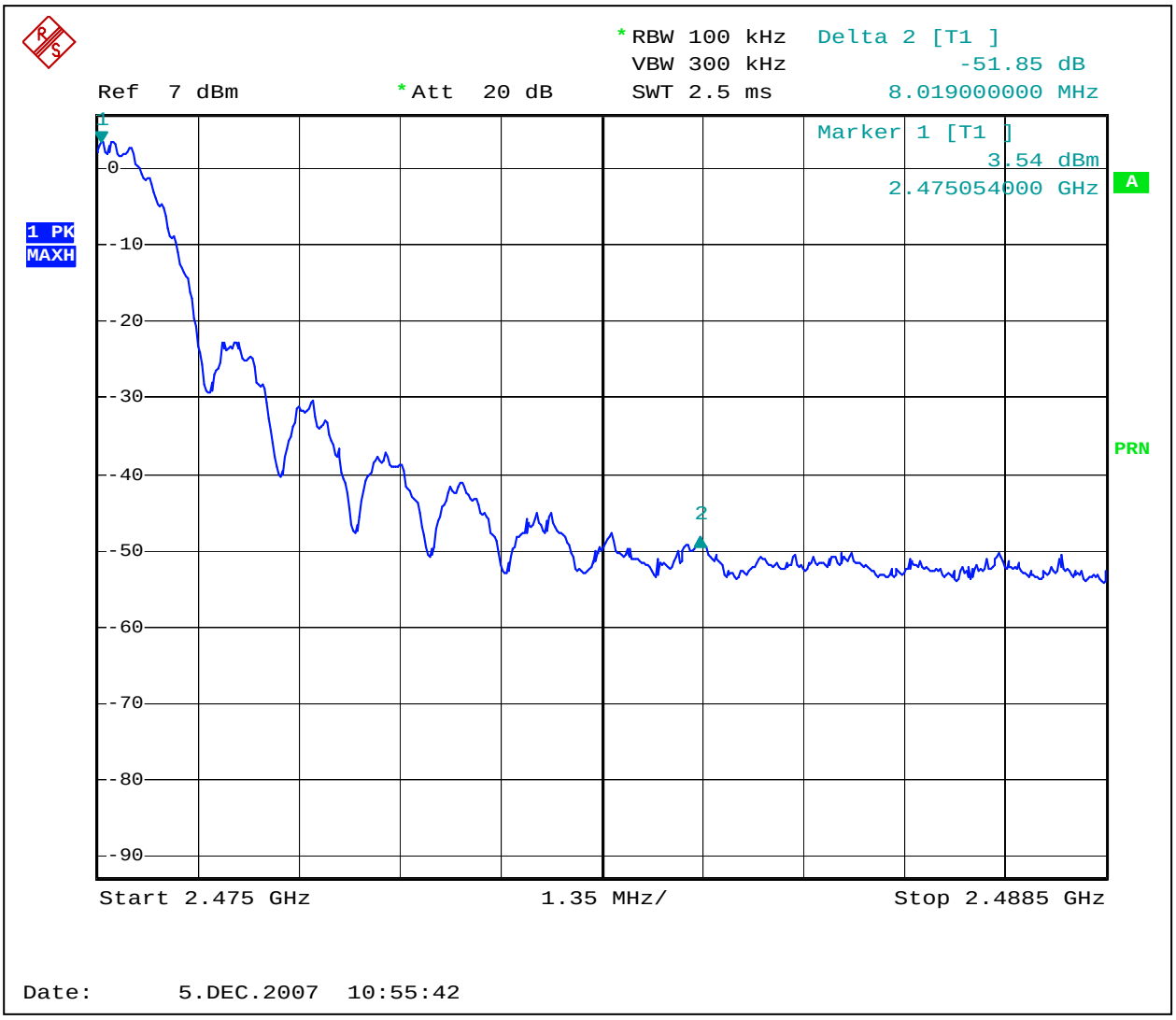
Graph 3.4.8


*RBW 100 kHz
VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-38.62 dBm
4.915282000 GHz
Ref 0 dBm
*Att 10 dB
1 PK
MAXH
A
PRN
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
Start 2.4835 GHz
2.25165 GHz/
Stop 25 GHz
Date: 5.DEC.2007 09:41:01

Graph 3.4.9


*RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Delta 2 [T1]
-45.86 dB
-5.200000000 MHz
Ref 7 dBm
*Att 20 dB
Marker 1 [T1]
4.02 dBm
2.405200000 GHz
1 PK
MAXH
A
PRN
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.4 GHz
10 MHz/
Span 100 MHz
Date: 5.DEC.2007 10:32:27

Graph 3.4.10


*RBW 100 kHz
VBW 300 kHz
SWT 2.5 ms
Delta 2 [T1]
-51.85 dB
8.019000000 MHz
Ref 7 dBm
*Att 20 dB
Marker 1 [T1]
3.54 dBm
2.475054000 GHz
1 PK
MAXH
A
PRN
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Start 2.475 GHz
1.35 MHz/
Stop 2.4885 GHz
Date: 5.DEC.2007 10:55:42

Graph 3.4.11

3.5 Radiated spurious emissions

Test location: ☐ OATS ☒ Anechoric Chamber

Test distance: ☐ 10 meters ☒ 3 meters

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

Test result: **Pass**

Max. Margin: 3.2 dB below the limits for measurements with antenna 2dBi
4.0 dB below the limits for measurements with antenna 4.5dBi

Note 1: Additional Radiated Spurious Emissions were performed for the EUT with antenna: 4.5dBi.

Note 2: The table 3.5.1 shows the 2nd and 3rd harmonics in restricted band of operation per FCC 15.205 with antenna 2dBi. Graphs 3.5.1-3.5.6 show Radiated Spurious Emissions with antenna: 2dBi.
The table 3.5.2 shows the 2nd and 3rd harmonics in restricted band of operation per FCC 15.205 with antenna 4.5dBi. Graphs 3.5.7-3.5.12 show Radiated Spurious Emissions with antenna: 4.5dBi.
No emissions were detected above ambient at 5th and above harmonics.

Date:	December 10-11, 2007	**Result: Pass**
Standard:	FCC part 15.247(d)	
Tested by:	Norman Shpilsher	
Test Point:	Enclosure with Antenna	
Operation mode:	See Page 5	
Note:	Antenna: 2dBi	

Table 3.5.1

Frequency MHz	Antenna Polarity	Antenna Hts(cm)	Ant. CF dB1/m	Cable loss dB	Pre-amp Gain (dB)	Reading dBµV	Total @ 3m dBµV/m	Limit dBµV/m	Margin dB	Comments
				Channel 0						
4808.02	V	132	33.0	4.2	37.6	45.3	44.9	54.0	-9.0	
7213.52	V	116	35.9	5.4	36.9	41.7	46.0	54.0	-8.0	
				Channel 7						
4881.02	V	142	33.1	4.3	37.7	44.8	44.5	54.0	-9.4	
7321.56	V	108	36.1	5.4	36.8	46.1	50.8	54.0	-3.2	
				Channel 14						
4948.24	V	105	33.3	4.3	37.7	42.8	42.7	54.0	-11.3	
7426.48	V	105	36.3	5.5	36.7	38.1	43.2	54.0	-10.8	

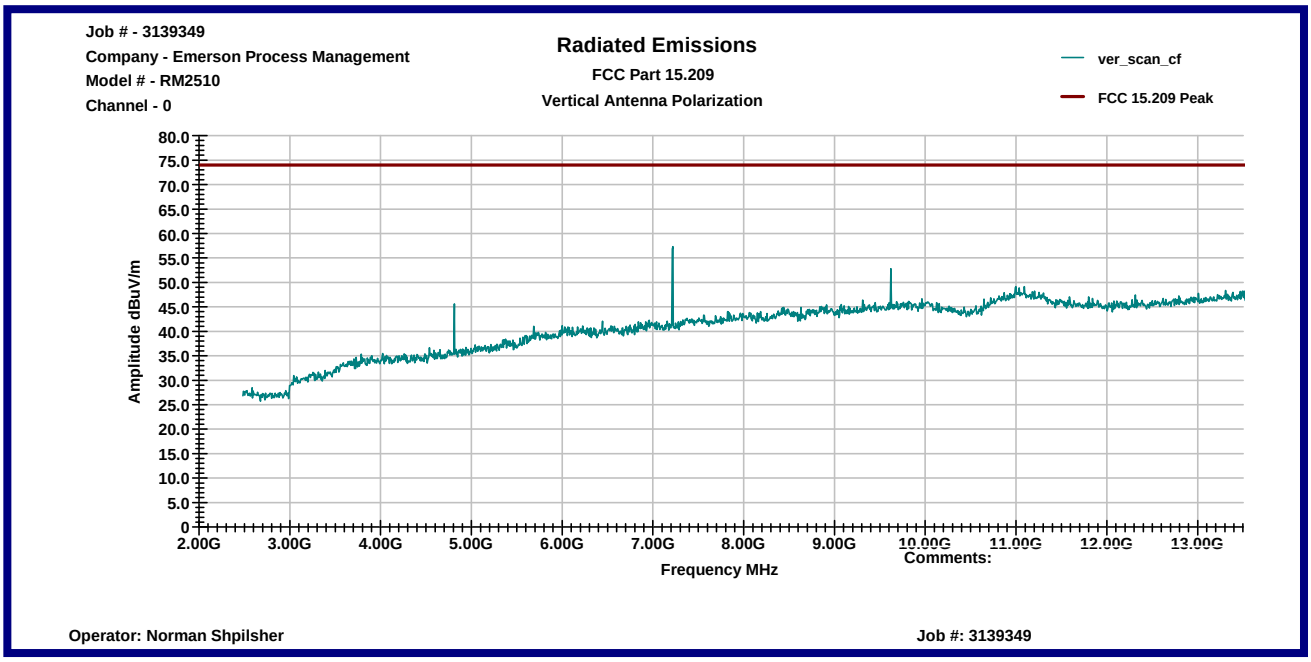
Note: The table shows the 2nd and 3rd harmonics in restricted band of operation per FCC 15.205
No emissions were detected above ambient at 5th and above harmonics
All measurements were taken using an Average Value (RBW 1MHz, VBW 10Hz)

Date:	October 16, 2008	**Result: Pass**
Standard:	FCC part 15.247(d)	
Tested by:	Uri Spector	
Test Point:	Enclosure with Antenna	
Operation mode:	See Page 5	
Note:	Antenna: 4.5dBi	

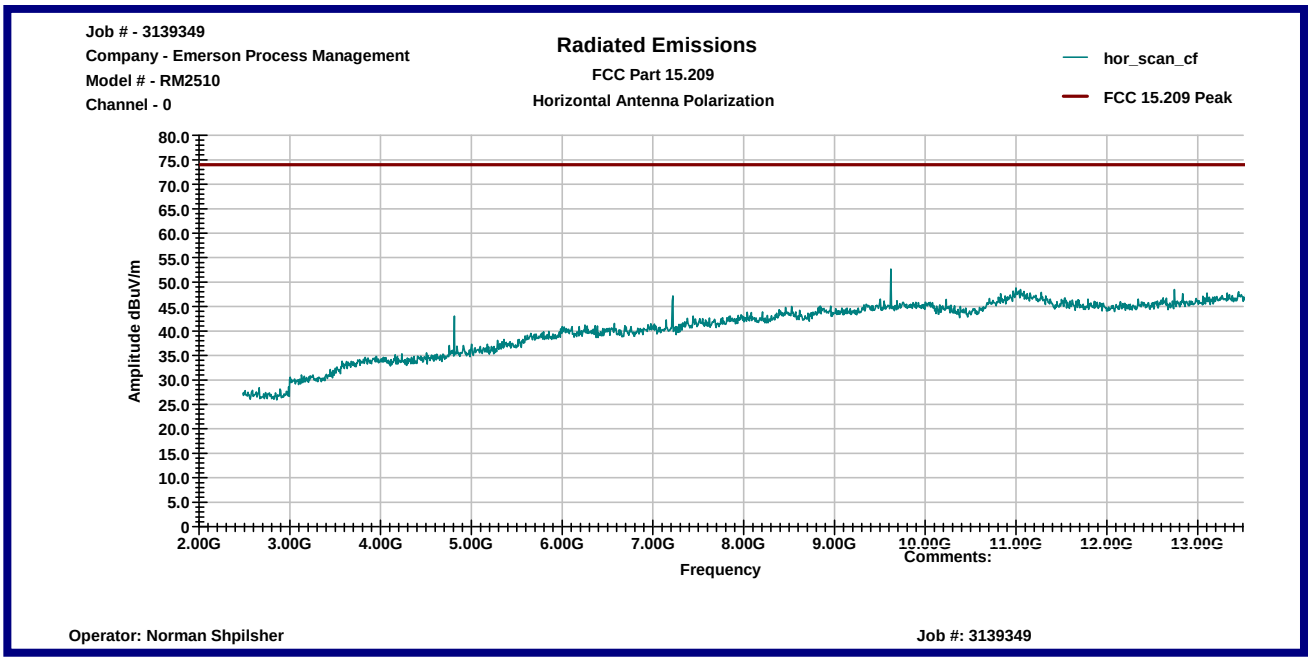
Table 3.5.2

Frequency MHz	Antenna Polarity	Antenna Hts(cm)	Ant. CF dB1/m	Cable loss dB	Pre-amp Gain (dB)	Reading dBµV	Total @ 3m dBµV/m	Limit dBµV/m	Margin dB	Comments
				Channel 0						
4810.90	V	107	33.0	6.3	39.8	42.6	42.1	54.0	-11.9	
7214.32	V	118	35.8	7.7	39.9	44.0	47.6	54.0	-6.4	
				Channel 7						
4880.80	V	112	33.1	6.4	39.5	46.5	46.5	54.0	-7.4	
7318.48	V	158	36.1	7.7	39.9	43.6	47.5	54.0	-6.5	
				Channel 14						
4949.96	V	184	33.2	6.5	39.7	50.0	50.0	54.0	-4.0	
7423.92	V	150	36.3	7.7	39.9	43.7	47.8	54.0	-6.2	

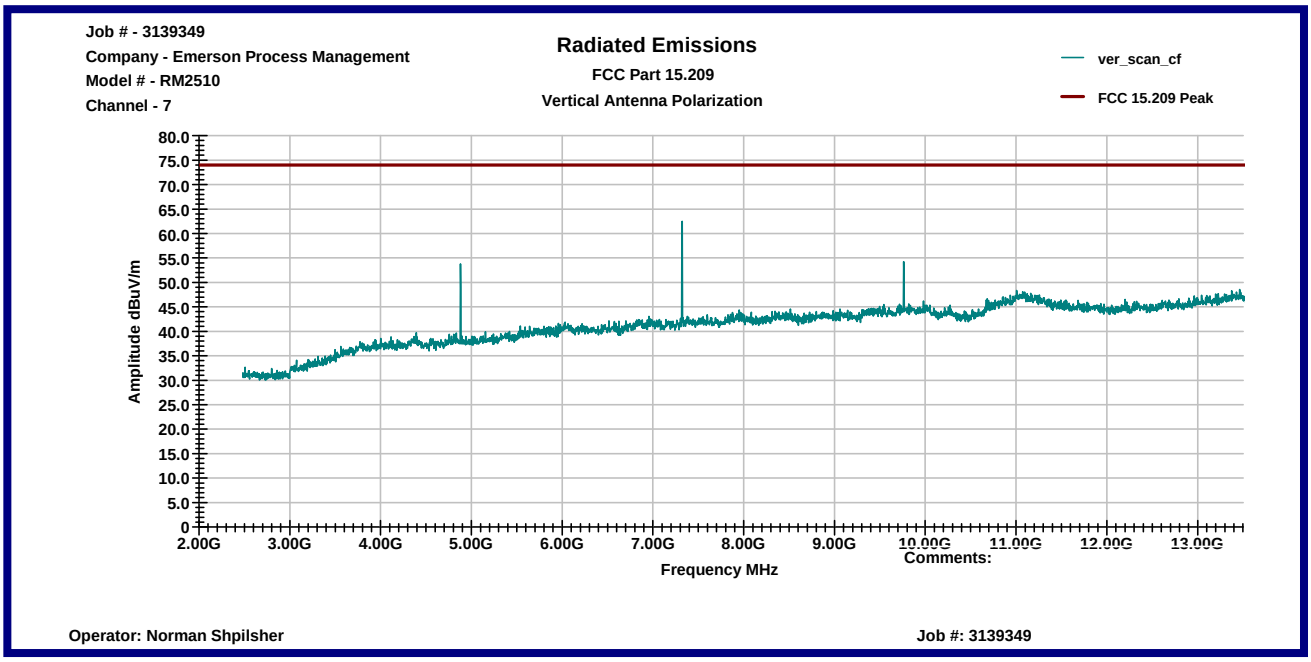
Note: The table shows the 2nd and 3rd harmonics in restricted band of operation per FCC 15.205
No emissions were detected above ambient at 5th and above harmonics
All measurements were taken using an Average Value (RBW 1MHz, VBW 10Hz)



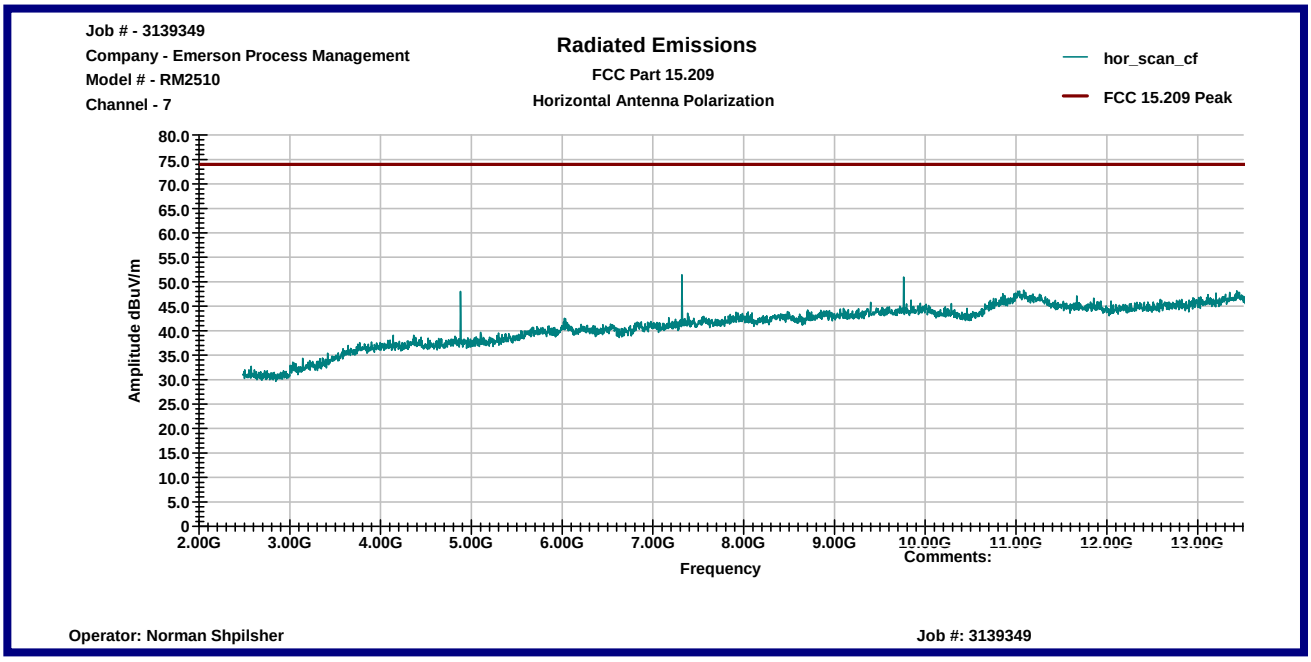
Graph 3.5.1



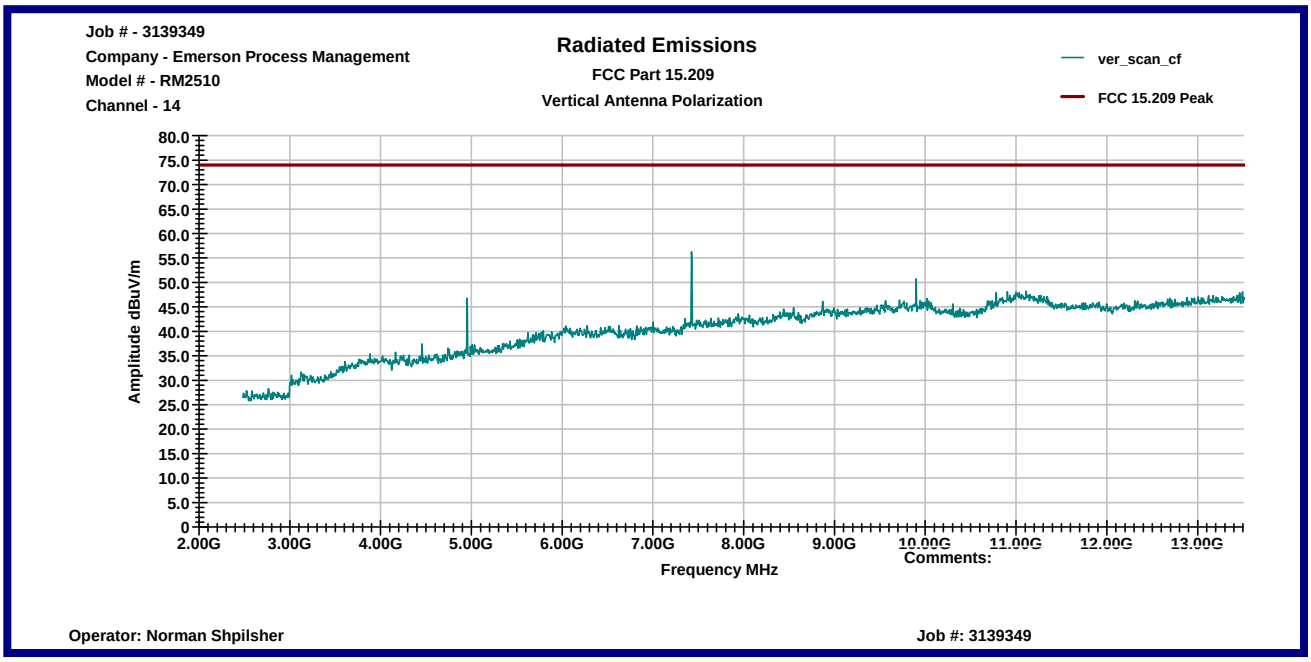
Graph 3.5.2



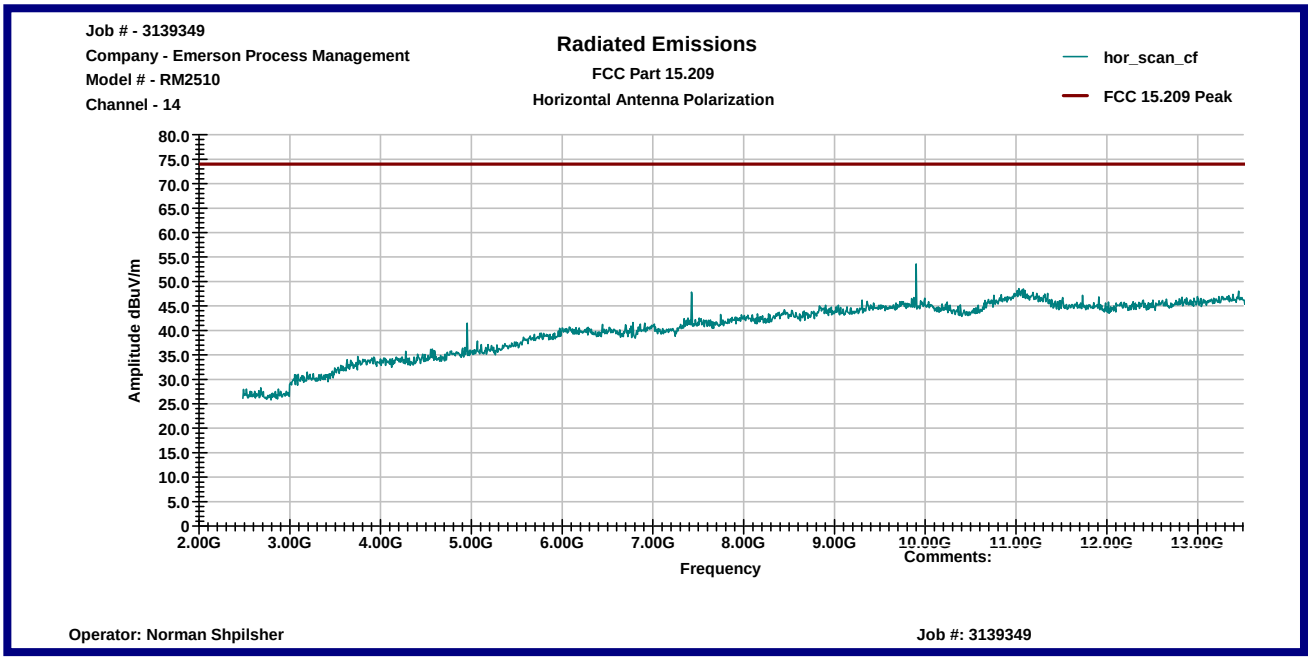
Graph 3.5.3



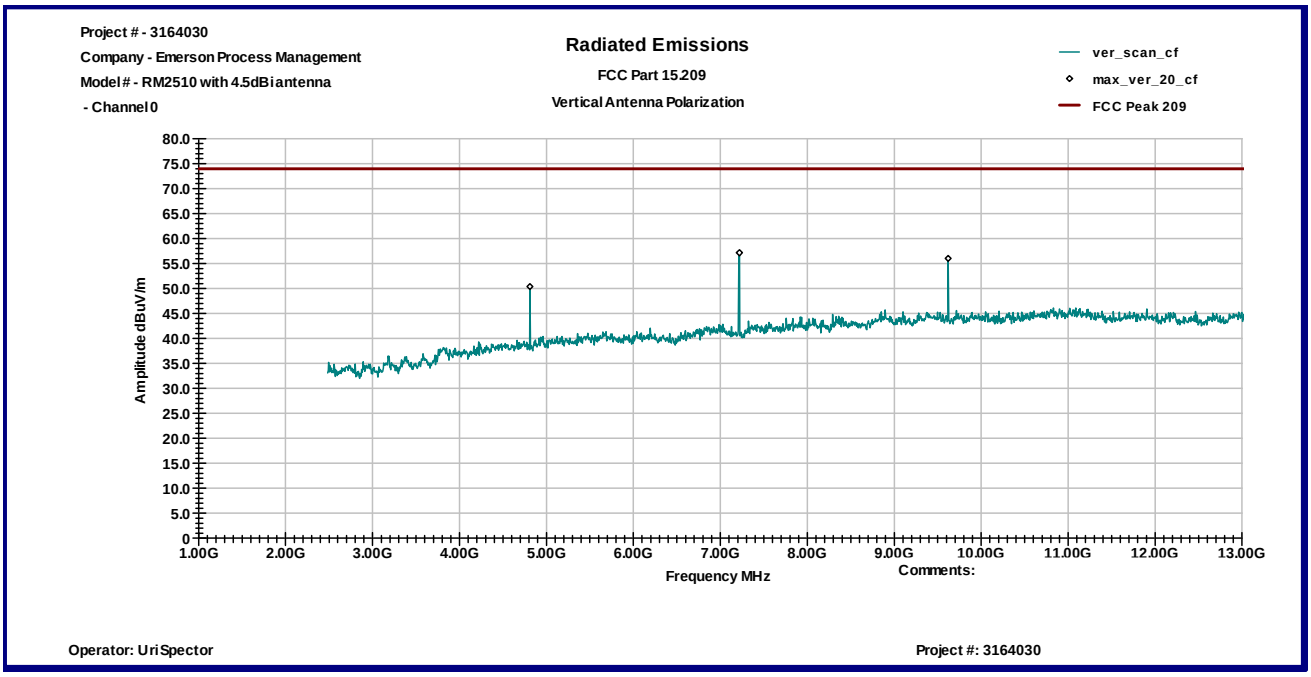
Graph 3.5.4



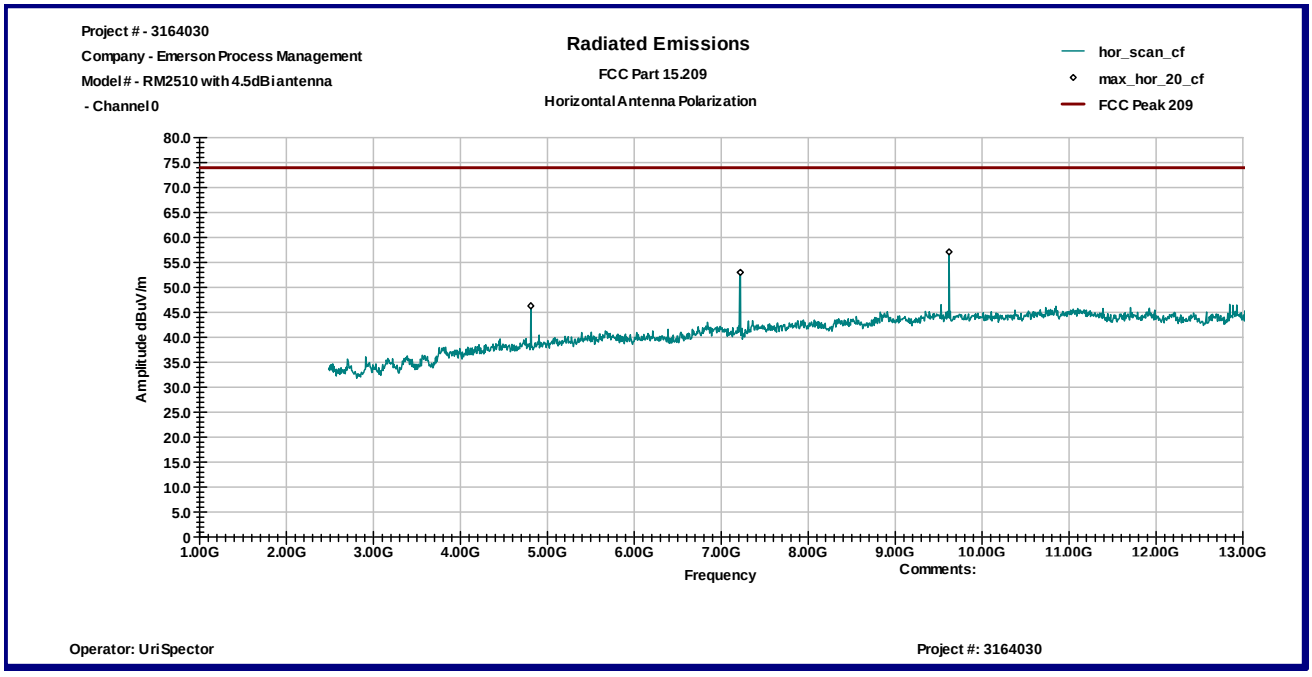
Graph 3.5.5



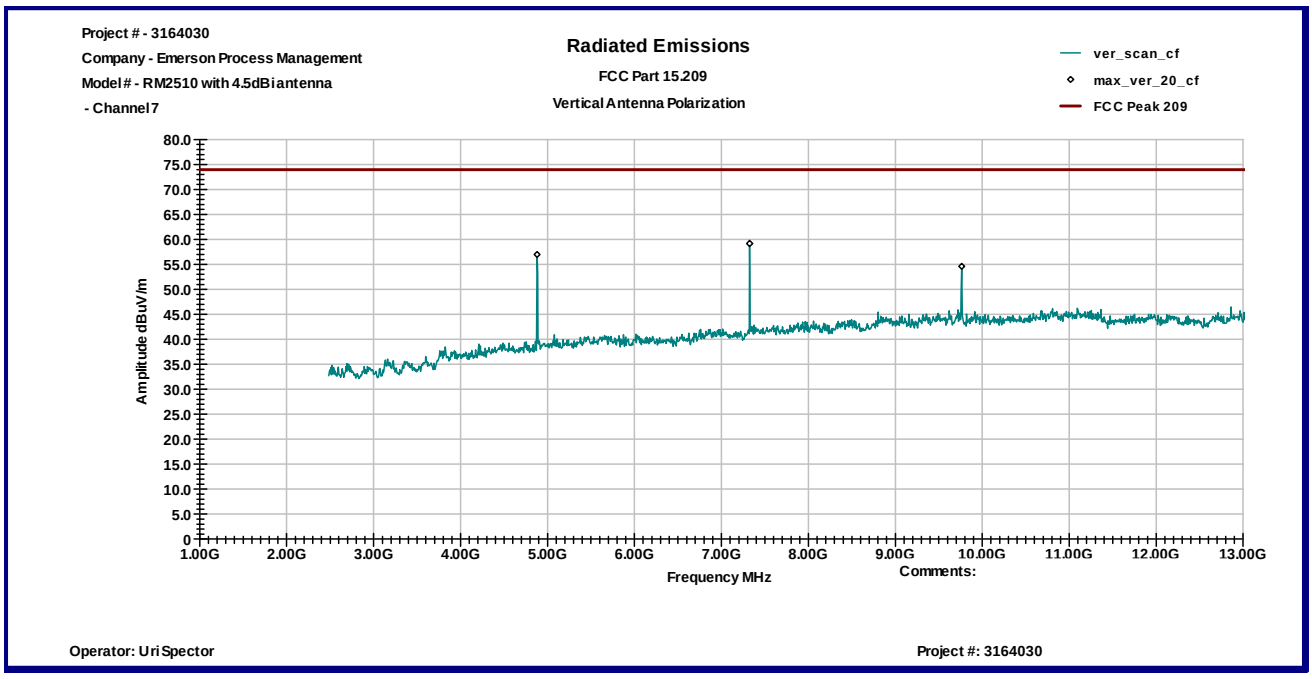
Graph 3.5.6



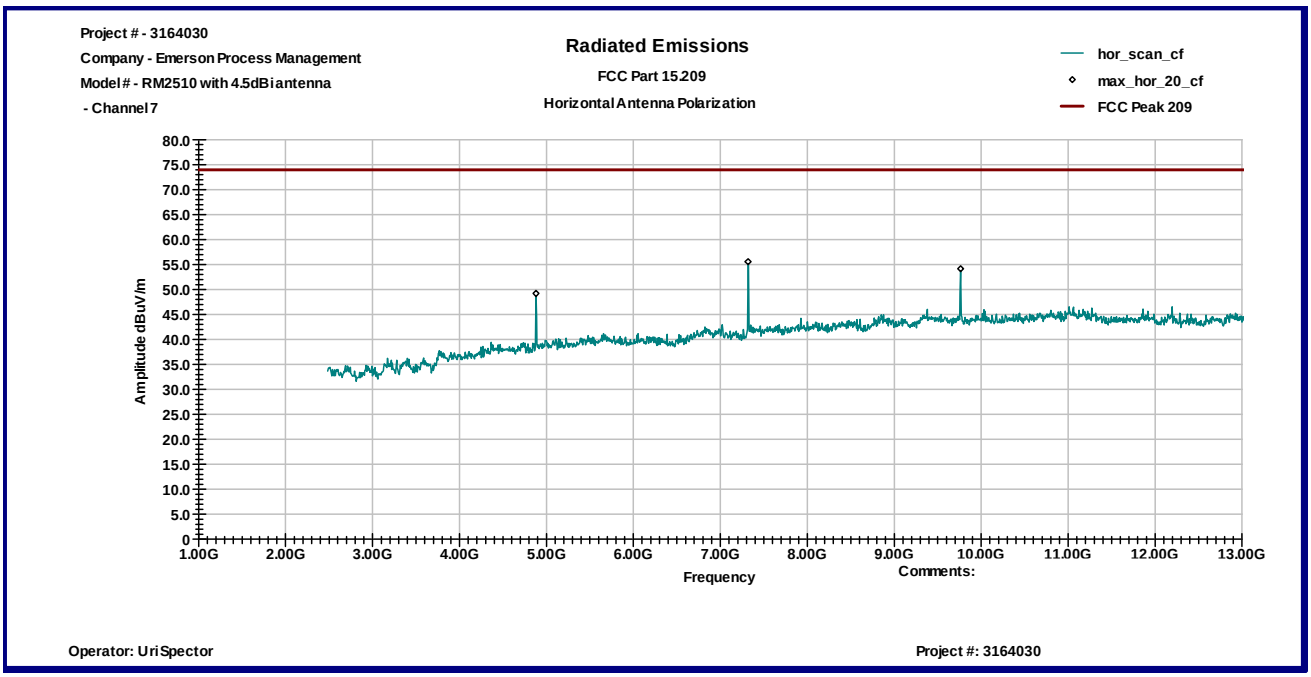
Graph 3.5.7



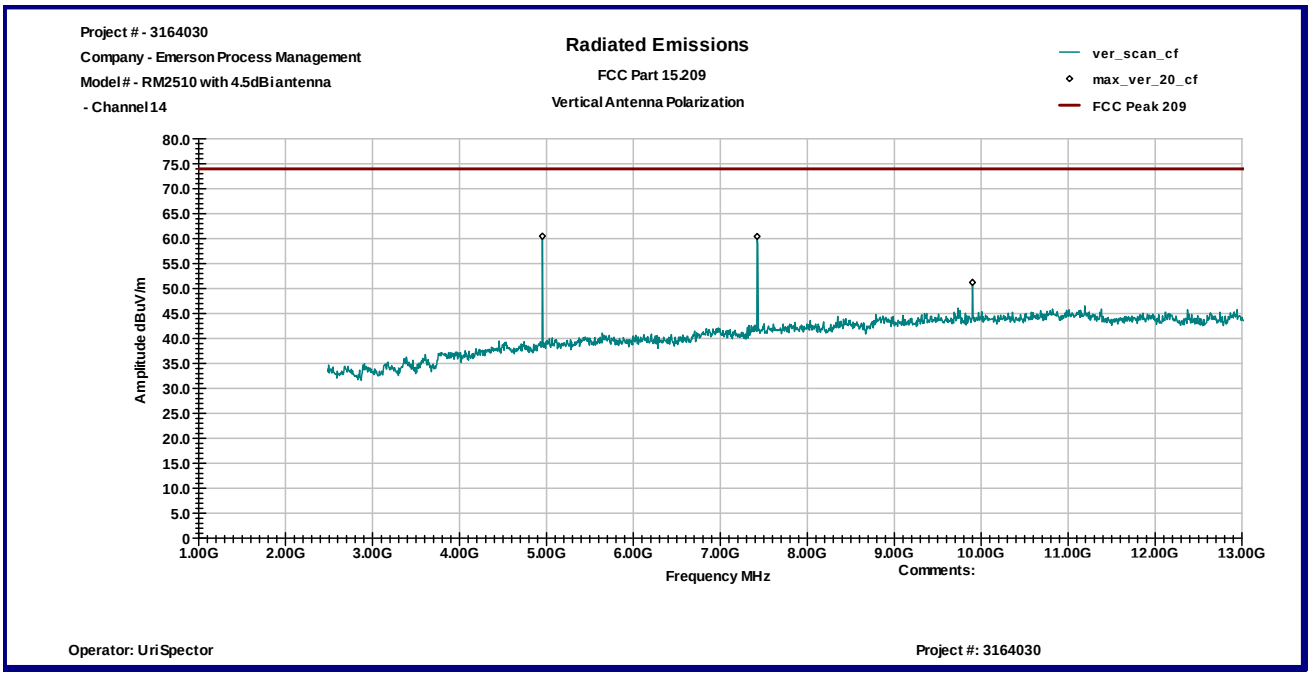
Graph 3.5.8



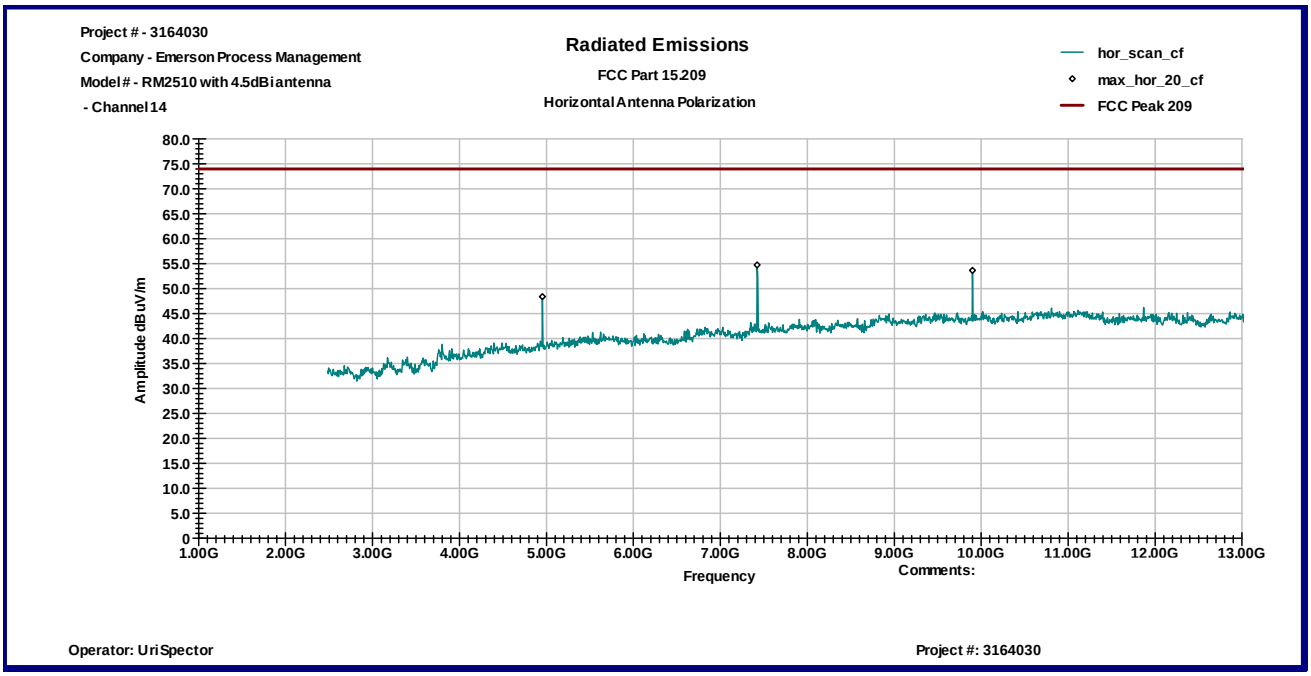
Graph 3.5.9



Graph 3.5.10



Graph 3.5.11



Graph 3.5.12

3.6 Transmitter power line conducted emissions

Test location: ☐ OATS ☐ Anechoic Chamber ☐ Other

Test result: **N/A**

Frequency range: 0.15MHz-30MHz

Max. Emissions margin: dB below the limits

Notes: It was determined from consideration of the electrical characteristics and usage of particular apparatus that Conducted Emissions testing is inappropriate and therefore unnecessary (as battery operated equipment).

3.7 Receiver/digital device radiated emissions

Test location: ☐ OATS ☒ Anechoric Chamber

Test distance: ☐ 10 meters ☒ 3 meters

Frequency Range: 30MHz to 12.5GHz (5th Harmonic)

Test result: **Pass**

Frequency range: 30MHz-12.5GHz

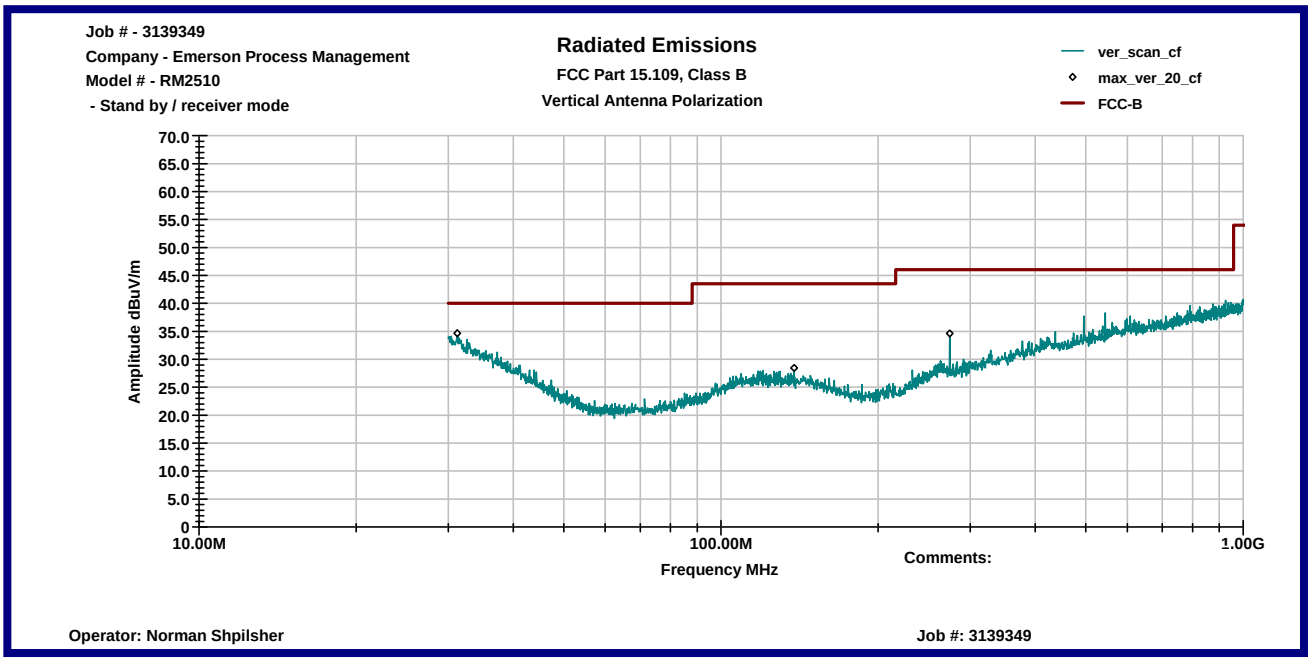
Max. Emissions margin: 3.2 dB below the limits

Notes: None

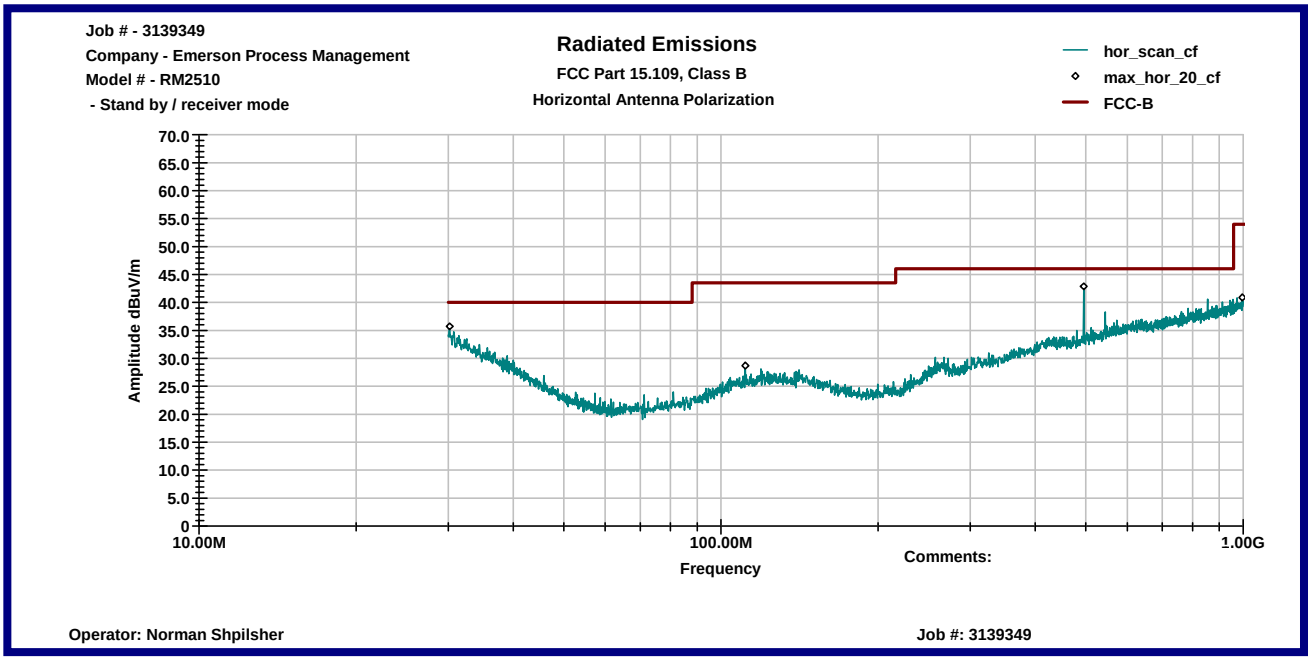
Date:	December 6, 2007	**Result:** **Pass**
Standard:	FCC Part 15.109, Class B	
Tested by:	Norman Shpilsher	
Test Point:	Enclosure	
Operation mode:	Stand by / receiving	
Note:		

Table 3.7.1

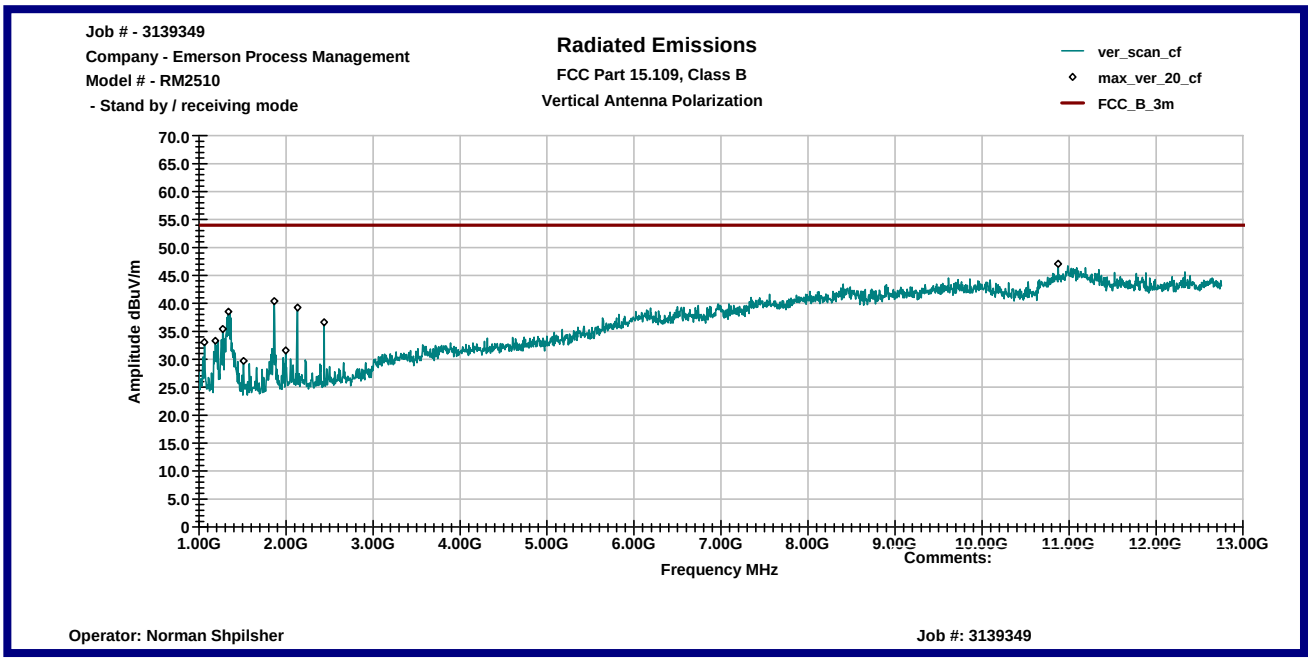
Frequency MHz	Antenna Polarity	Peak Reading dBµV	Total C.F. dB1/m	Pre-Amp. Gain (dB)	Total at 3m dBµV/m	QP Limit dBµV/m	Margin dB
31.247 MHz	V	14.8	19.9	0.0	34.6	40.0	-5.4
138.05 MHz	V	15.2	13.3	0.0	28.4	43.5	-15.1
274.28 MHz	V	19.4	15.2	0.0	34.6	46.0	-11.4
30.208 MHz	H	15.3	20.4	0.0	35.7	40.0	-4.3
111.34 MHz	H	15.5	13.2	0.0	28.7	43.5	-14.8
495.33 MHz	H	22.7	20.1	0.0	42.9	46.0	-3.2
997.17 MHz	H	15.0	25.9	0.0	40.9	54.0	-13.1
1.3384 GHz	V	50.3	27.8	39.5	38.5	54.0	-15.5
1.8648 GHz	V	49.3	29.9	38.8	40.4	54.0	-13.6
2.1327 GHz	V	46.9	30.8	38.4	39.2	54.0	-14.7
2.4382 GHz	V	43.2	31.3	37.9	36.6	54.0	-17.4
10.875 GHz	V	34.8	47.3	35.1	47.1	54.0	-6.9
1.8601 GHz	H	44.2	29.8	38.8	35.2	54.0	-18.8
2.1327 GHz	H	38.5	30.8	38.4	30.9	54.0	-23.1
11.19 GHz	H	34.4	47.7	34.8	47.3	54.0	-6.7



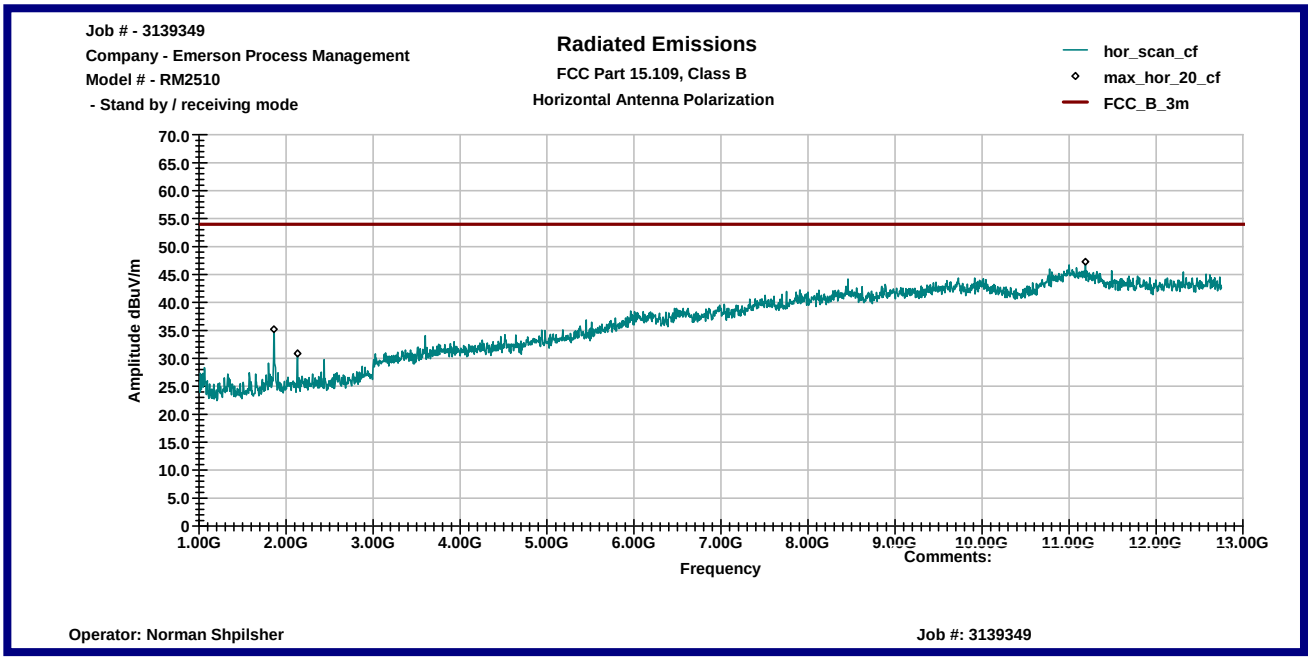
Graph 3.7.1



Graph 3.7.2



Graph 3.7.3



Graph 3.7.4

3.8 Digital device conducted emissions

Test location: ☐ OATS ☐ Anechoic Chamber ☐ Other

Test result: **N/A**

Frequency range: 0.15MHz-30MHz

Max. Emissions margin: dB below the limits

Notes: It was determined from consideration of the electrical characteristics and usage of particular apparatus that Conducted Emissions testing is inappropriate and therefore unnecessary (as battery operated equipment).

4.0 TEST EQUIPMENT

Test Equipment for testing performed in December, 2008

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO.	CAL DUE	USED
Spectrum Analyzer	R & S	FSP 40	100024	08/23/2008	☒
Spectrum Analyzer	R & S	ESCI	100358	04/27/2008	☒
Bicono-Log Antenna	Schaffner-Chase	CBL 6112 B	2468	07/30/2008	☒
Horn Antenna	EMCO	3115	9507-4513	01/09/2008	☒
Waveguide Horn Antenna	EMCO	3116	9904-2423	07/20/2008	☒
Pre-Amplifier	MITEQ	AMF-5D-00501800-28-13P	1122951	04/24/2008	☒
Pre-Amplifier	MITEQ	AMF-6F-16002600-25-10P	1222383	11/05/2008	☒
System	TILE! Instrument Control		Ver. 3.4.K.29	VBU	☒

Test Equipment for testing performed in October, 2008

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO.	CAL DUE	USED
Spectrum Analyzer	R & S	FSP 40	100024	08/22/2009	☒
Horn Antenna	EMCO	3115	9507-4513	02/13/2009	☒
Waveguide Horn Antenna	EMCO	3116	9904-2423	08/12/2009	☒
Pre-Amplifier	MITEQ	AMF-5D-00501800-28-13P	1122951	06/05/2009	☒
Pre-Amplifier	MITEQ	AMF-6F-16002600-25-10P	1222383	11/05/2008	☒
High Pass Filter	Reactel	FHS-4G-S12	0223	VBU	☒
System	TILE! Instrument Control		Ver. 3.4.K.29	VBU	☒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