TEST REPORT

Report Number: 100339494MIN-001
Project Number: G10033949

Testing performed on the
50760X31
FCC ID: Y86-50760X31
Industry Canada ID: 6766C-50760X31

to
47 CFR Part 15. 247:2009
RSS- 210, Issue 8, 2010
RSS-Gen, Issue 3, 2010
47 CFR, Part 15:2009, §15.107 and §15.109, Class B
ICES-003, Issue 4:2004

For
Cooper Power Systems
Cannon Technologies

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

Test Authorized by:
Cooper Power Systems
Cannon Technologies
505 Hwy 169 North
Minneapolis, MN 55427, USA

Prepared by: Richard Blonigen Date: March 30, 2011

Reviewed by: Norman Shpilsher Date: March 30, 2011

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1.0 GENERAL DESCRIPTION

Model:	50760X31
Type of EUT:	Thermostat Communication Module
FCC ID:	Y86-50760X31
Industry Canada ID:	6766C-50760X31
Related Submittal(s) Grants:	None
Company:	Cooper Power Systems Cannon Technologies
Customer:	Mr. Nathan Brandt
Address:	505 Hwy 169 North Minneapolis, MN 55427, USA
Phone:	(763) 543-7770
Fax:	(763) 595-7776
e-mail:	Nathan.Brandt@CooperIndustries.com
Test Standards:	☒ 47 CFR, Part 15:2009, §15.247 ☒ RSS–210, Issue 8, 20010 ☒ RSS-Gen, Issue 3, 2010 ☒ 47 CFR, Part 15:2009, §15.107 and §15.109, Class B ☒ ICES-003, Issue 4:2004 ☐ Other
Type of radio:	☐ Stand -alone ☐ Module ☐ Hybrid
Date Sample Submitted:	February 23, 2011
Test Work Started:	February 23, 2011
Test Work Completed:	February 28, 2011
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 ☐ WiFi ☐ Blue Tooth
Operating Frequency Range(s):	2400-2483.5MHz
Number of Channels:	15
Modulation:	O-QPSK
Emission Designator:	1M86G1D
Antenna(s) Info:	Integral Antenna
Antenna Installation:	☐ User ☐ Professional ☒ Factory
Transmitter power configuration:	☐ Internal battery ☒ External power source ☐ 120VAC ☐ 230VAC ☐ 400VAC ☒ 3.3 VDC from host device Amp. ☐ 50Hz ☐ 60Hz
Special Test Arrangement:	None
Test Facility Accreditation:	A2LA (Certificate No. 1427.01)
Test Methodology:	Measurements performed according to the procedures in ANSI C63.4-2003 and FCC DTS Measurement Guide

Notes: During testing the EUT was powered from DC Power Supply

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	2-wire shielded	>3m	DC Power	
2				

Support equipment/Services:

No.	Item	Description
1	TPS-4000 Dual Tracking Power Supply	DC Power Source
2	HP NC 6000	Laptop Computer

General notes: Temporary SMA connector was connected to antenna when taking conducted measurements

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(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
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
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 Maximum peak output power

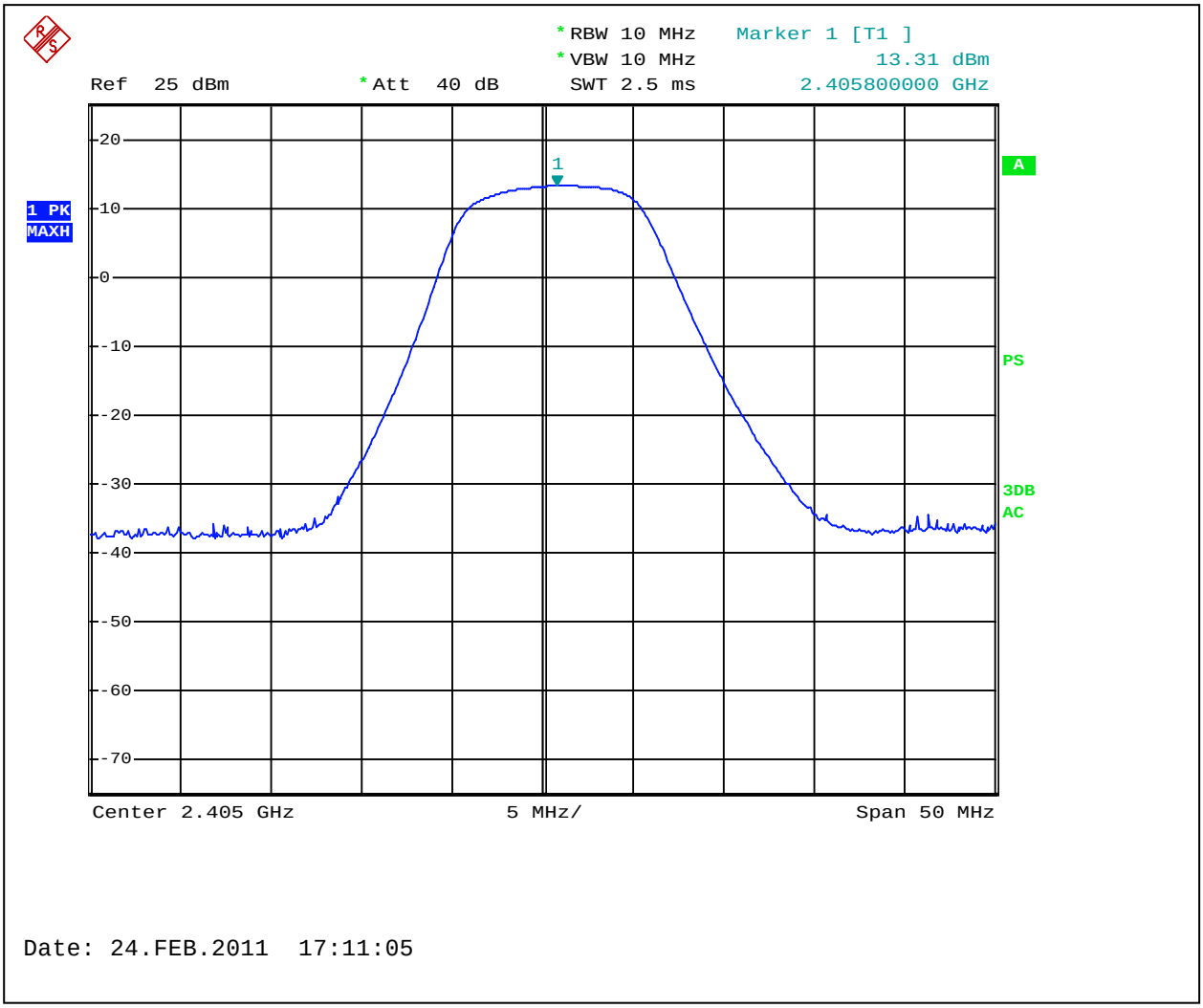
Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test result: **Pass**

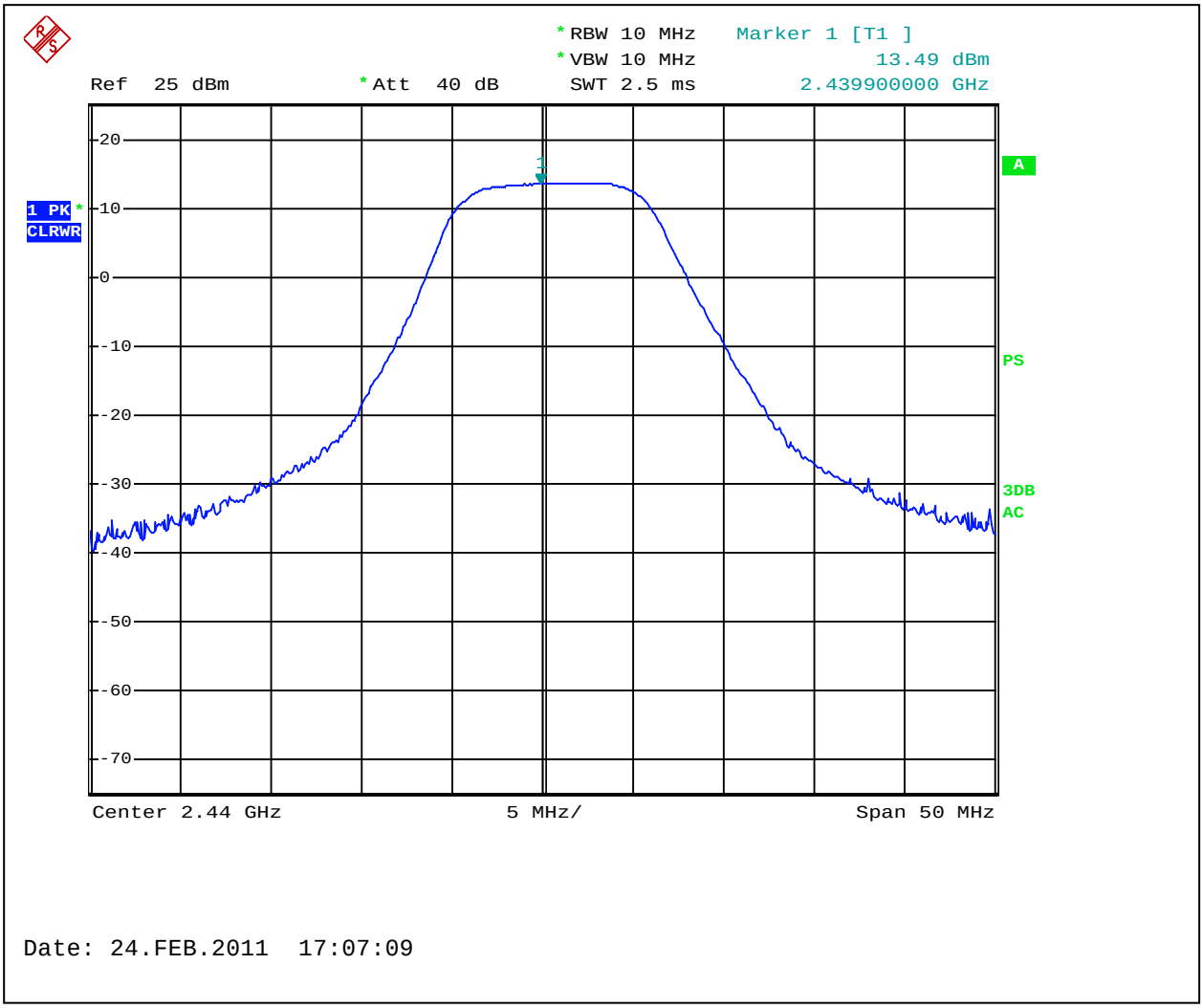
Max. Margin: 16.23 dB below the limits

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**
	13.31	0.25	13.56	30	0	-16.44
Middle Frequency MHz						
	13.49	0.25	13.74	30	0	-16.26
Upper Frequency MHz						
	13.52	0.25	13.77	30	0	-16.23
RBW:	☐ 1MHz ☐ 3MHz ☒ 10MHz					
VBW:	☐ 1MHz ☐ 3MHz ☒ 10MHz					
Antenna Gain:	☒ < 6dBi ☐ >6dBi and = dBi, Output power reduction = dB					

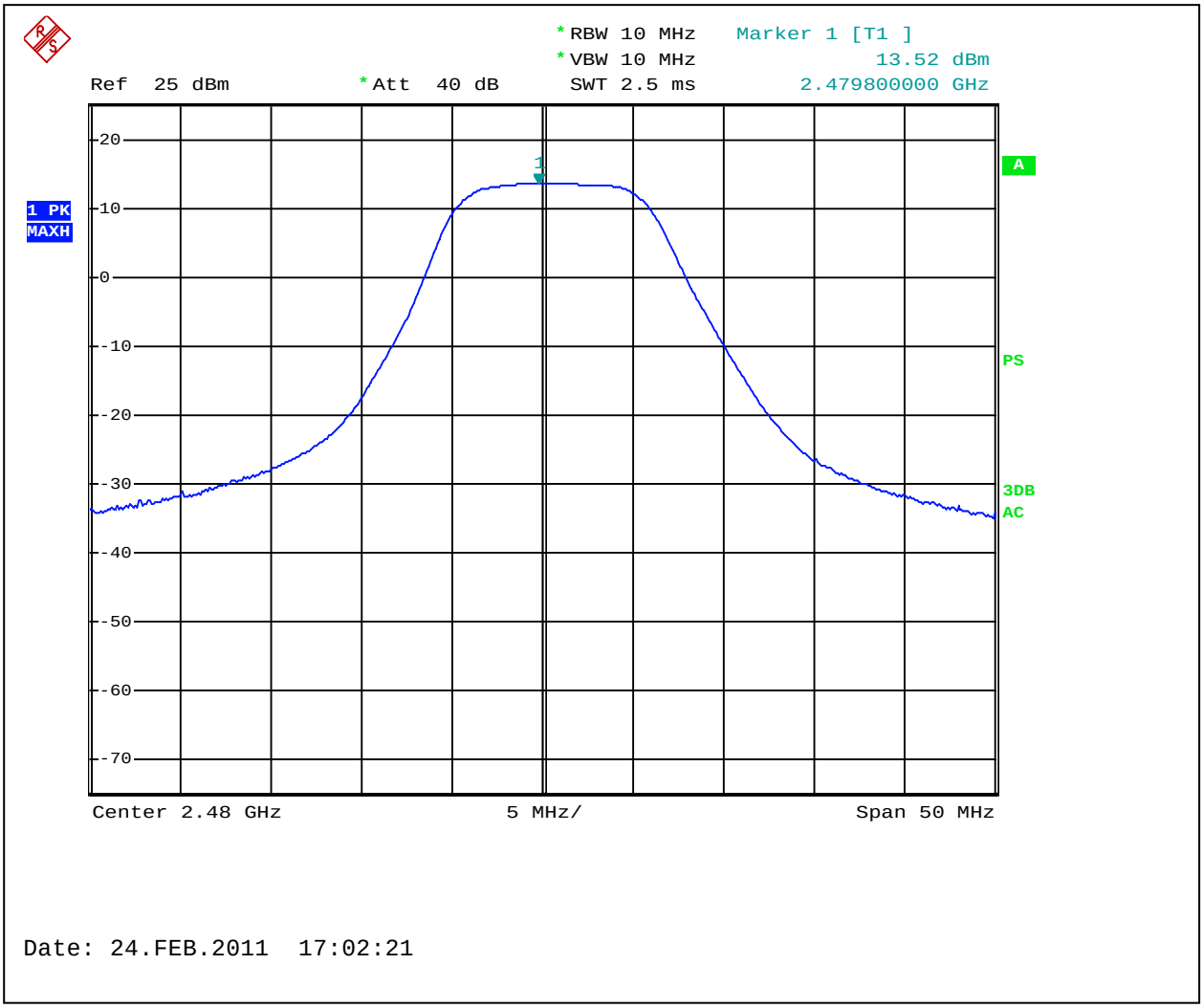
Notes: The maximum peak conducted output power limit is 1 W, or 30dBm
Graphs 3.1.1 to 3.1.3 show the conducted output power


*RBW 10 MHz
*VBW 10 MHz
Marker 1 [T1]
13.31 dBm
2.405800000 GHz
Ref 25 dBm
*Att 40 dB
SWT 2.5 ms
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.405 GHz
5 MHz/
Span 50 MHz
Date: 24.FEB.2011 17:11:05

Graph 3.1.1


*RBW 10 MHz
*VBW 10 MHz
Marker 1 [T1]
13.49 dBm
2.439900000 GHz
Ref 25 dBm
*Att 40 dB
SWT 2.5 ms
1 PK
CLRWR
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.44 GHz
5 MHz/
Span 50 MHz
Date: 24.FEB.2011 17:07:09

Graph 3.1.2

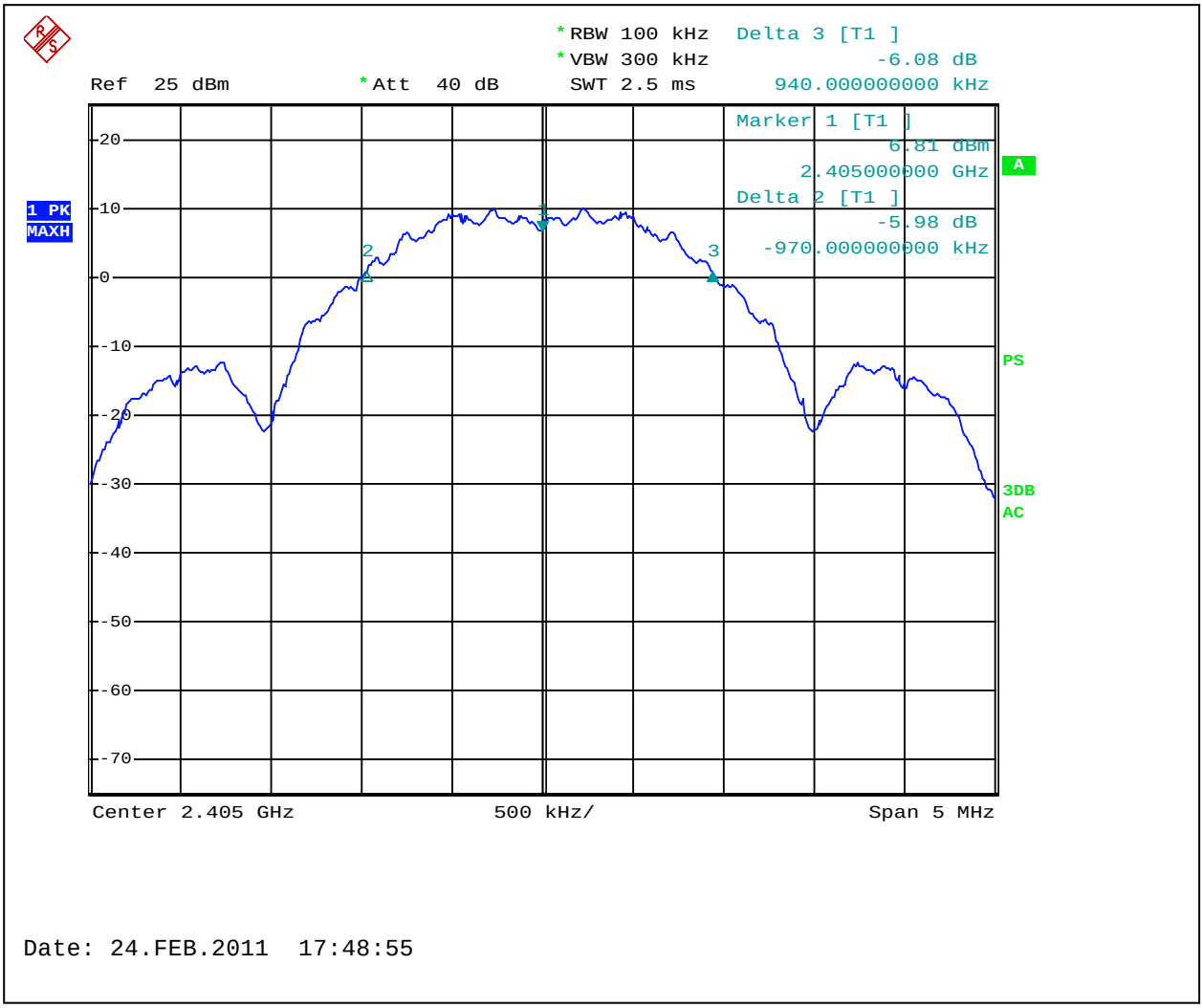

*RBW 10 MHz
*VBW 10 MHz
Marker 1 [T1]
13.52 dBm
Ref 25 dBm
*Att 40 dB
SWT 2.5 ms
2.479800000 GHz
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.48 GHz
5 MHz/
Span 50 MHz
Date: 24.FEB.2011 17:02:21

Graph 3.1.3

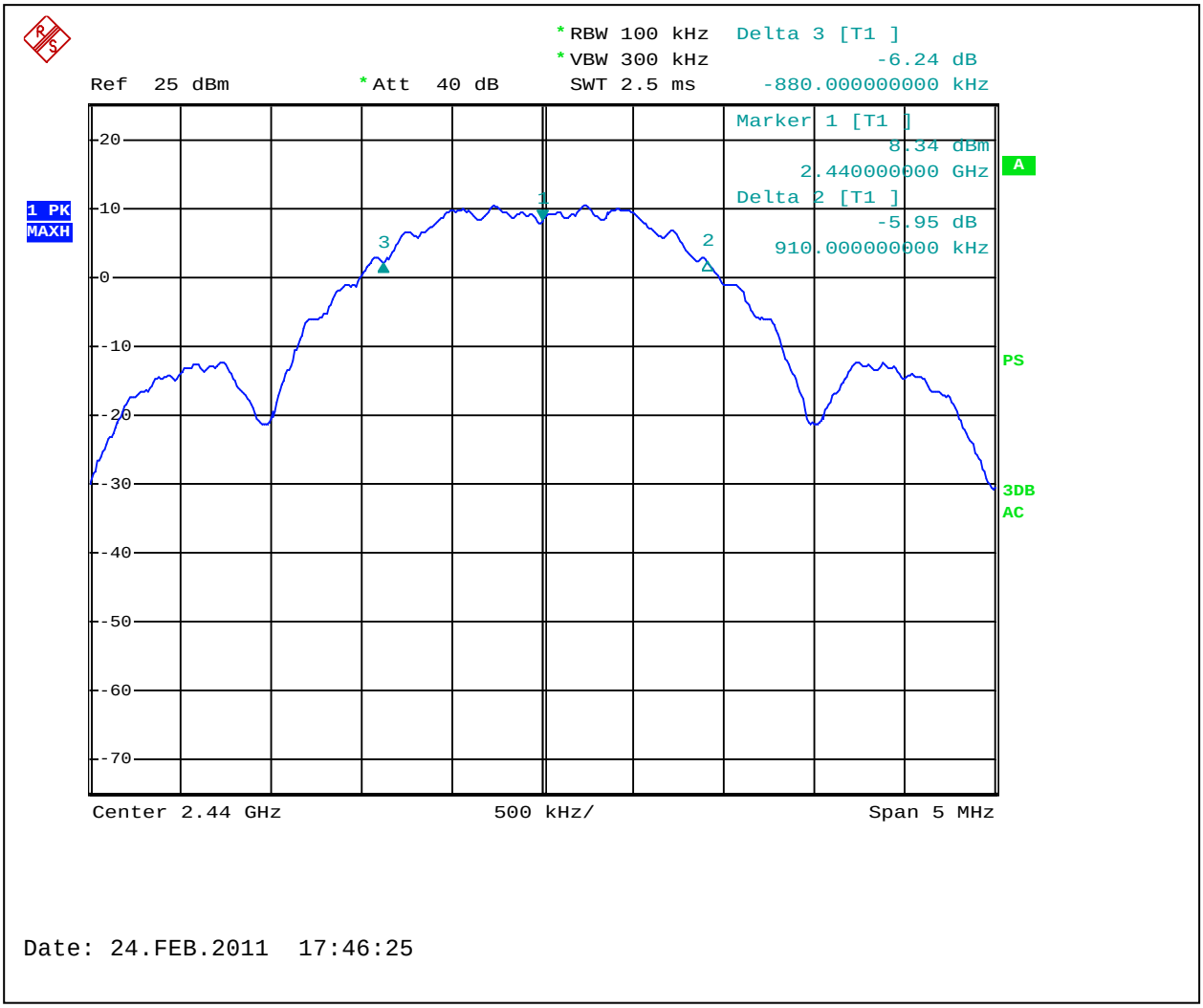
3.2 6dB bandwidth of the digital modulation

Low Frequency Channel kHz	Middle Frequency Channel kHz	Upper Frequency Channel kHz	Minimum Bandwidth kHz	Result
1910	1790	1860	500	**Pass**
RBW: **VBW:**	☒ 100kHz ☐ other kHz ☐ 100kHz ☒ 300kHz ☐ other kHz			

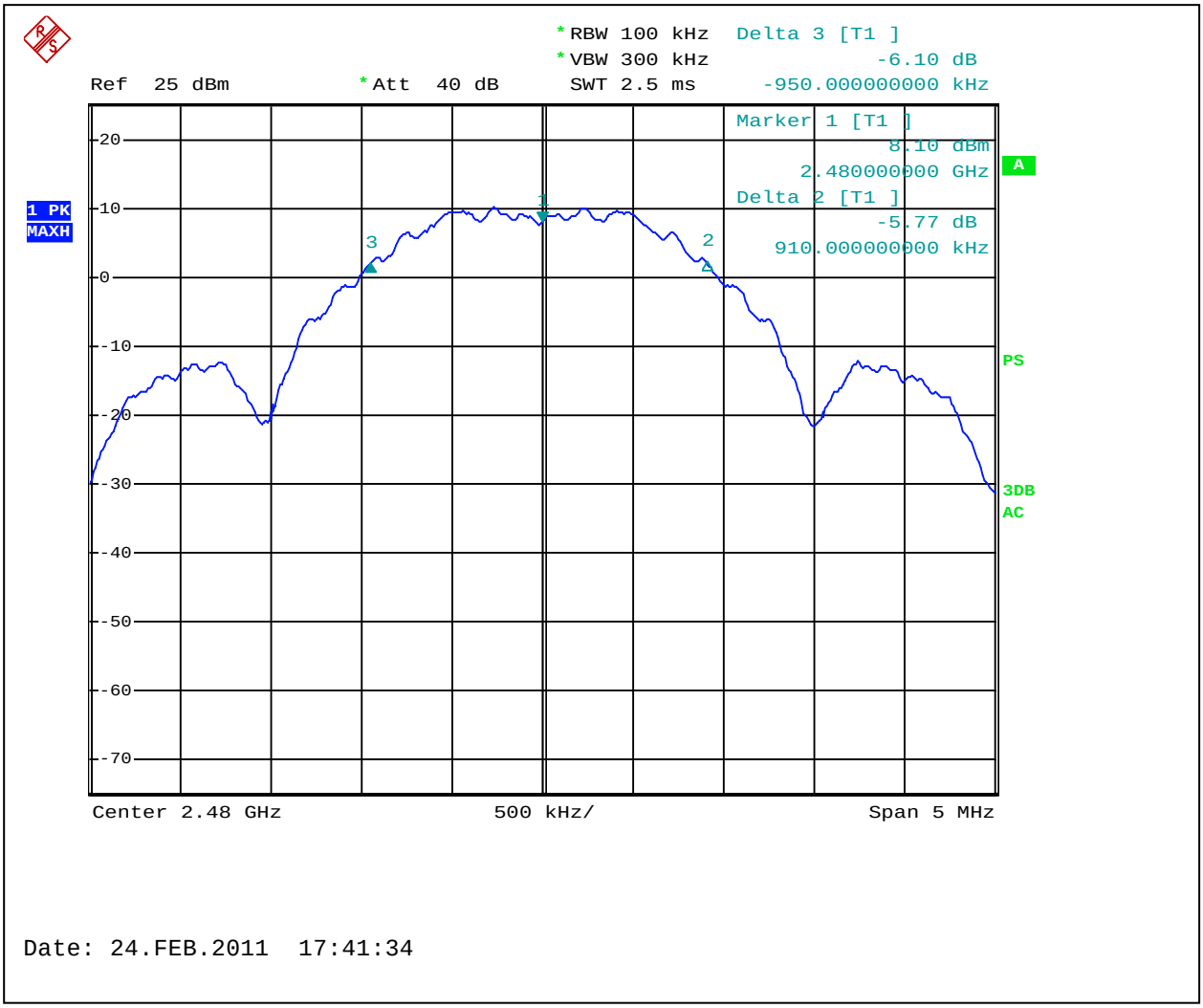
Notes: Graphs 3.2.1 to 3.2.3 show the 6dB bandwidth


*RBW 100 kHz
*VBW 300 kHz
SWT 2.5 ms
Delta 3 [T1]
-6.08 dB
940.000000000 kHz
Ref 25 dBm
*Att 40 dB
Marker 1 [T1]
6.81 dBm
2.405000000 GHz
Delta 2 [T1]
-5.98 dB
-970.000000000 kHz
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.405 GHz
500 kHz/
Span 5 MHz
Date: 24.FEB.2011 17:48:55

Graph 3.2.1


*RBW 100 kHz
*VBW 300 kHz
Ref 25 dBm
*Att 40 dB
SWT 2.5 ms
Delta 3 [T1]
-6.24 dB
-880.000000000 kHz
Marker 1 [T1]
8.34 dBm
2.440000000 GHz
Delta 2 [T1]
-5.95 dB
910.000000000 kHz
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.44 GHz
500 kHz/
Span 5 MHz
Date: 24.FEB.2011 17:46:25

Graph 3.2.2

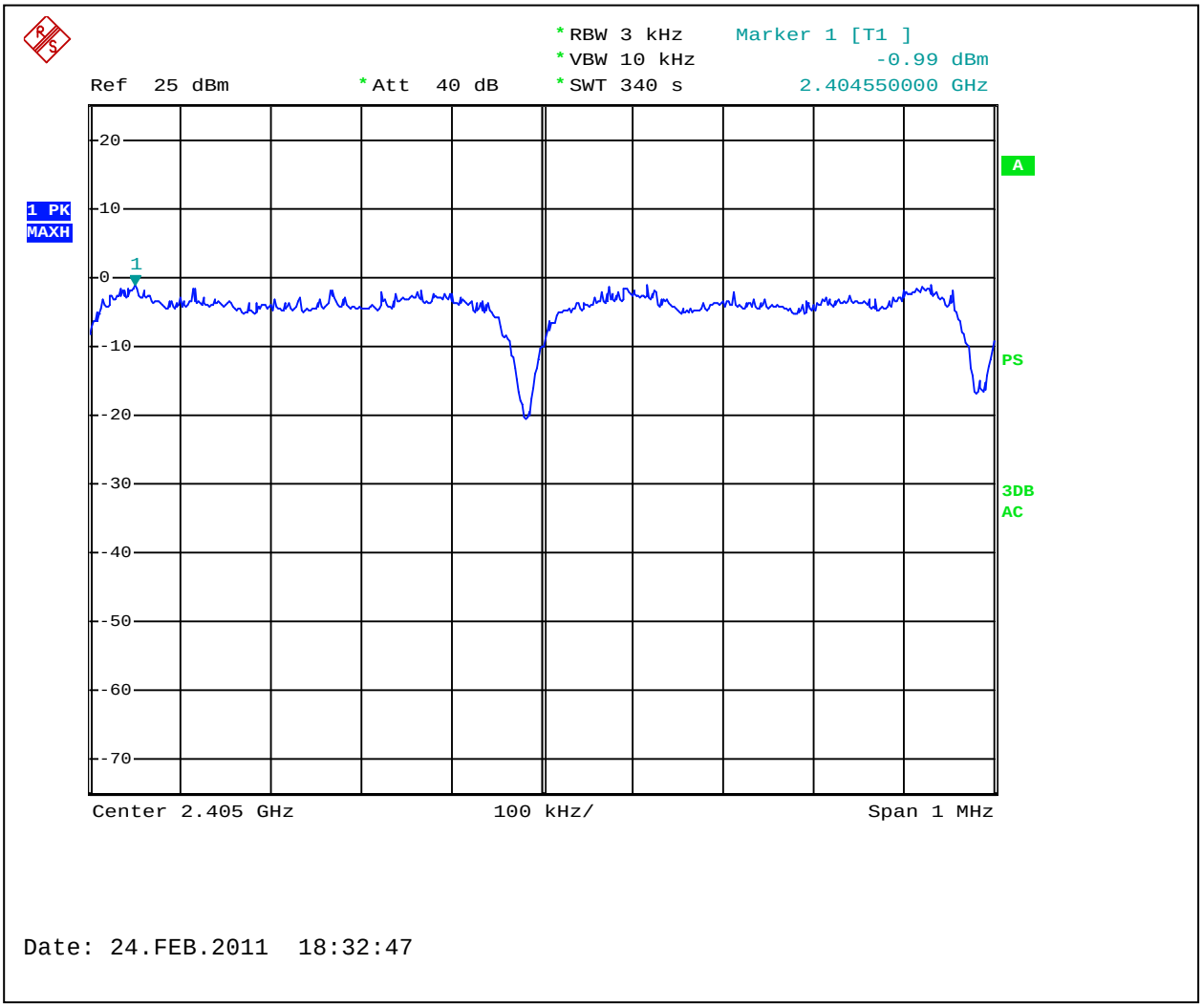

*RBW 100 kHz
*VBW 300 kHz
SWT 2.5 ms
Delta 3 [T1]
-6.10 dB
-950.000000000 kHz
Ref 25 dBm
*Att 40 dB
Marker 1 [T1]
8.10 dBm
2.480000000 GHz
Delta 2 [T1]
-5.77 dB
910.000000000 kHz
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.48 GHz
500 kHz/
Span 5 MHz
Date: 24.FEB.2011 17:41:34

Graph 3.2.3

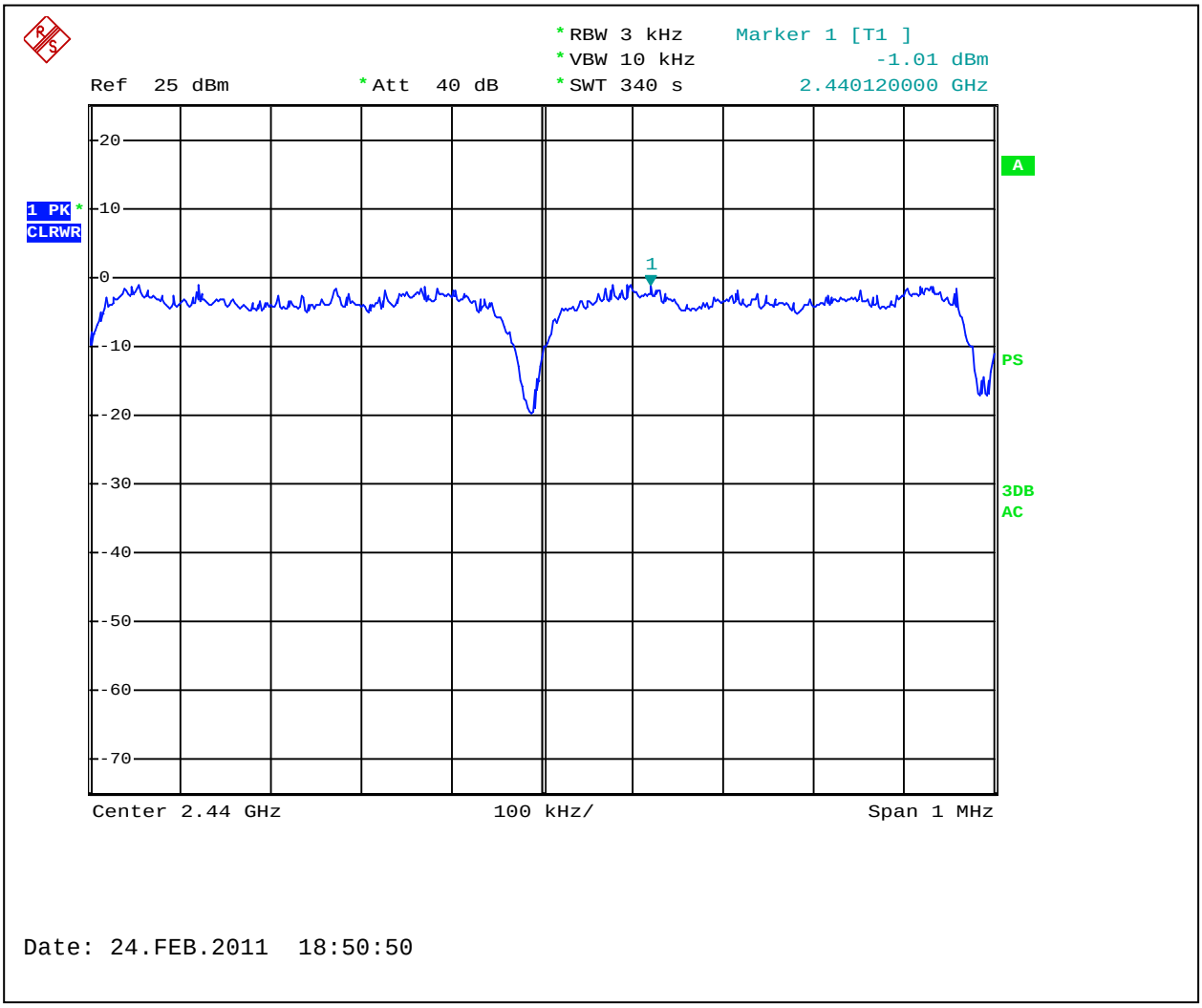
3.3 Power spectral density

Power Output:	☒ Conducted ☐ Radiated			
	Measured Density dBm	**Power Spectral Density dBm**	**Limit dBm**	**Margin dB**
Low Frequency Channel	-0.99	-0.74	8	-8.74
Middle Frequency Channel	-1.01	-0.76	8	-8.76
Upper Frequency Channel	-1.20	-0.95	8	-8.95
Analyzer Settings:	☒ RBW=3KHz ☒ VBW=10KHz ☒ Span=1MHz ☒ Sweep=340sec			
Antenna Gain:	☒ < 6dBi and = -1.0 dBi ☐ >6dBi and = dBi, limit reduction = dB			

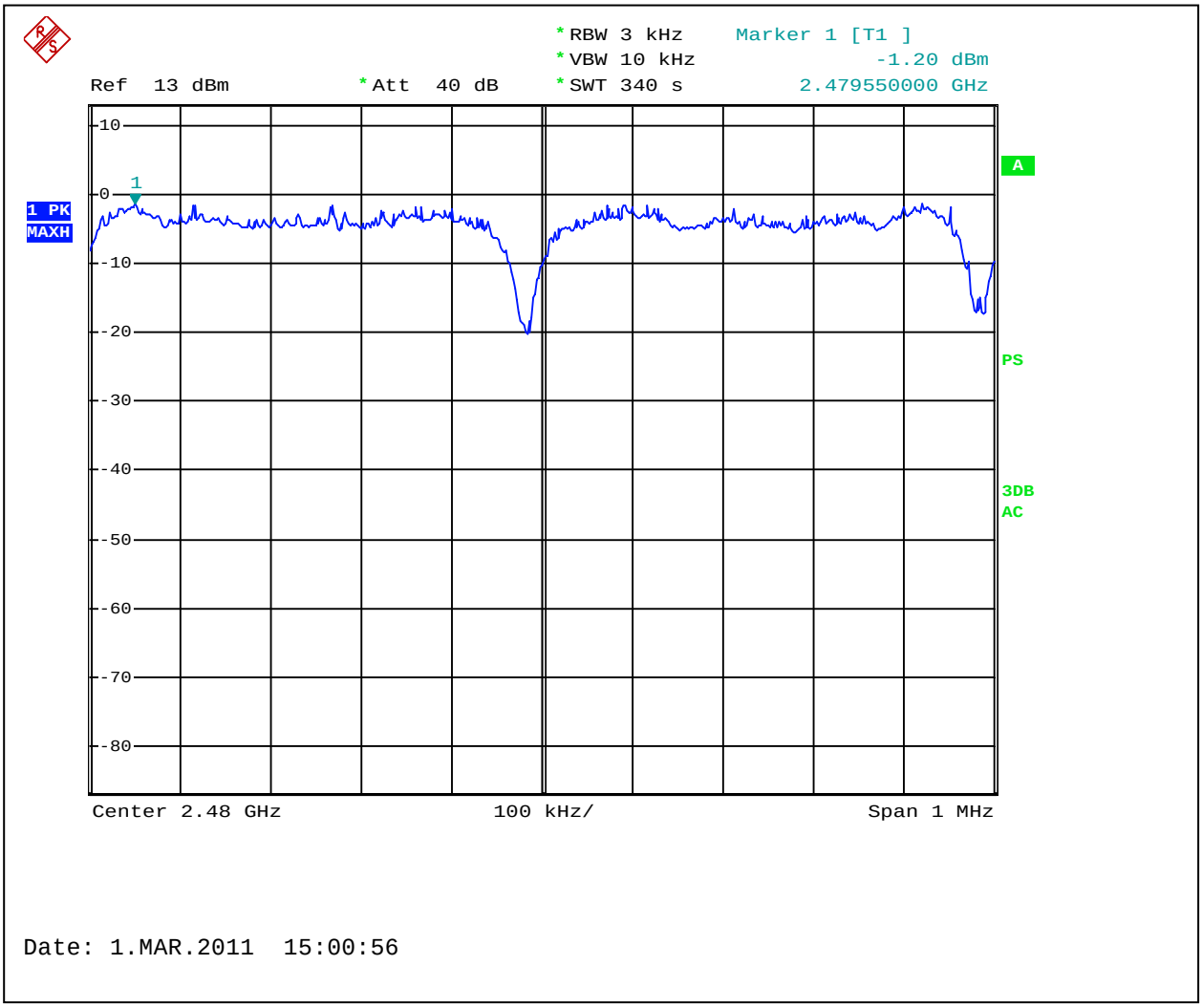
Notes: The Power Spectral Density was calculated adding the cable loss of 0.25 dB from the measured density value.


*RBW 3 kHz
*VBW 10 kHz
*SWT 340 s
Marker 1 [T1]
-0.99 dBm
2.404550000 GHz
Ref 25 dBm
*Att 40 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.405 GHz
100 kHz/
Span 1 MHz
Date: 24.FEB.2011 18:32:47

Graph 3.3.1


*RBW 3 kHz
*VBW 10 kHz
*SWT 340 s
Marker 1 [T1]
-1.01 dBm
2.440120000 GHz
Ref 25 dBm
*Att 40 dB
1 PK
CLRWR
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.44 GHz
100 kHz/
Span 1 MHz
Date: 24.FEB.2011 18:50:50

Graph 3.3.2

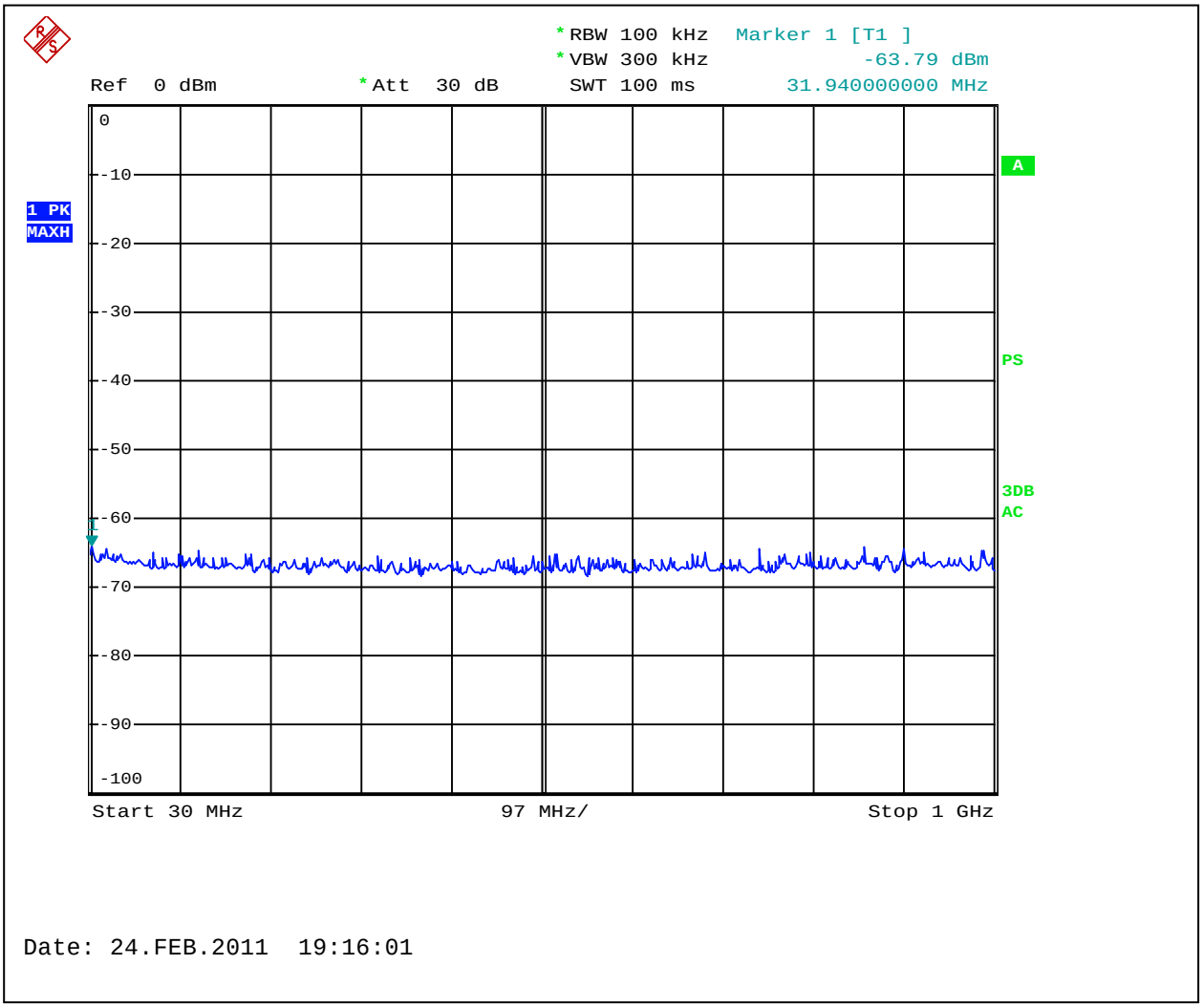

*RBW 3 kHz
*VBW 10 kHz
*SWT 340 s
Marker 1 [T1]
-1.20 dBm
2.479550000 GHz
Ref 13 dBm
*Att 40 dB
1 PK
MAXH
A
PS
3DB
AC
Center 2.48 GHz
100 kHz/
Span 1 MHz
Date: 1.MAR.2011 15:00:56

Graph 3.3.3

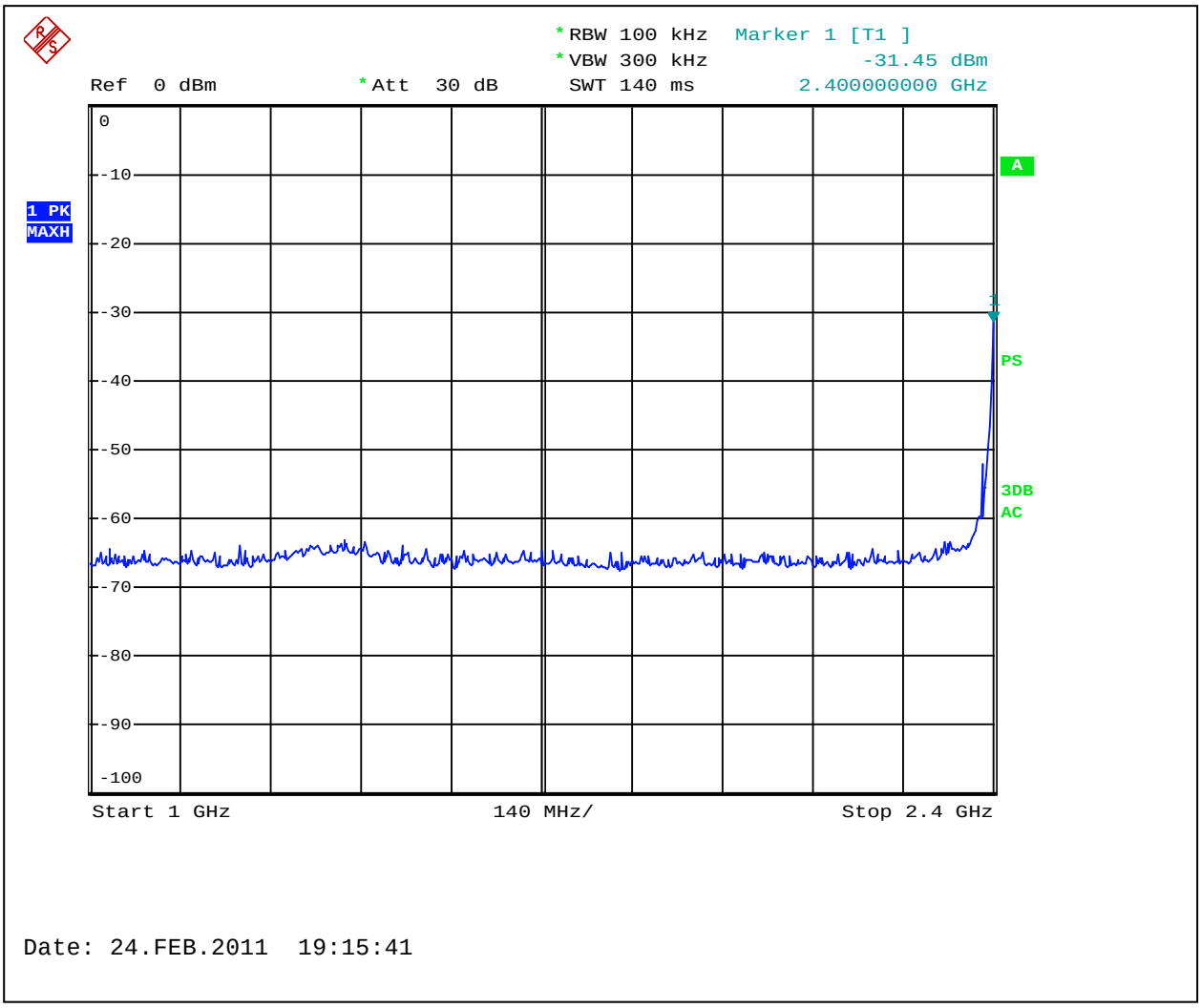
3.4 Antenna conducted spurious emissions

	Minimum Measured Attenuation dB	Minimum Allowed Attenuation dB	Margin dB
Low Frequency Channel	44.76	20	-24.76
Middle Frequency Channel	58.39	20	-38.39
Upper Frequency Channel	57.31	20	-37.31
Analyzer Settings:	☒ RBW=100KHz		
Minimum Allowed Attenuation:	☒ 20dB ☐ 30dB (for digital systems with conducted power measured using RMS averaging over a time interval)		

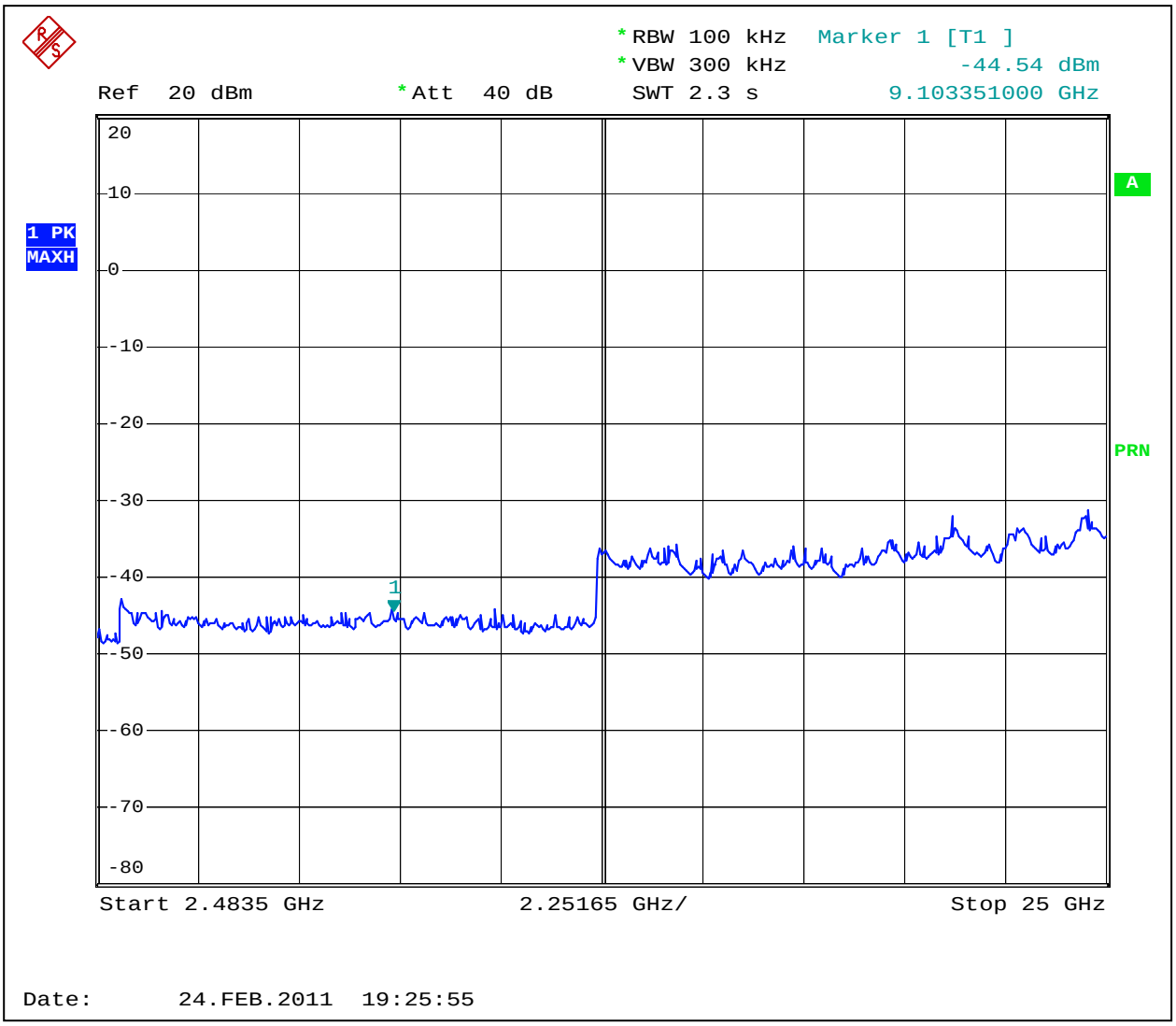
Notes: Test was performed in frequency range from 30MHz to 25GHz
Graphs 3.4.1 to 3.4.3 show the Antenna Conducted Spurious Emissions for low channel
Graphs 3.4.4 to 3.4.6 show the Antenna Conducted Spurious Emissions for mid channel
Graphs 3.4.7 to 3.4.9 show the Antenna Conducted Spurious Emissions for high channel
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]
-63.79 dBm
31.940000000 MHz
Ref 0 dBm
*Att 30 dB
1 PK
MAXH
A
PS
3DB
AC
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 24.FEB.2011 19:16:01

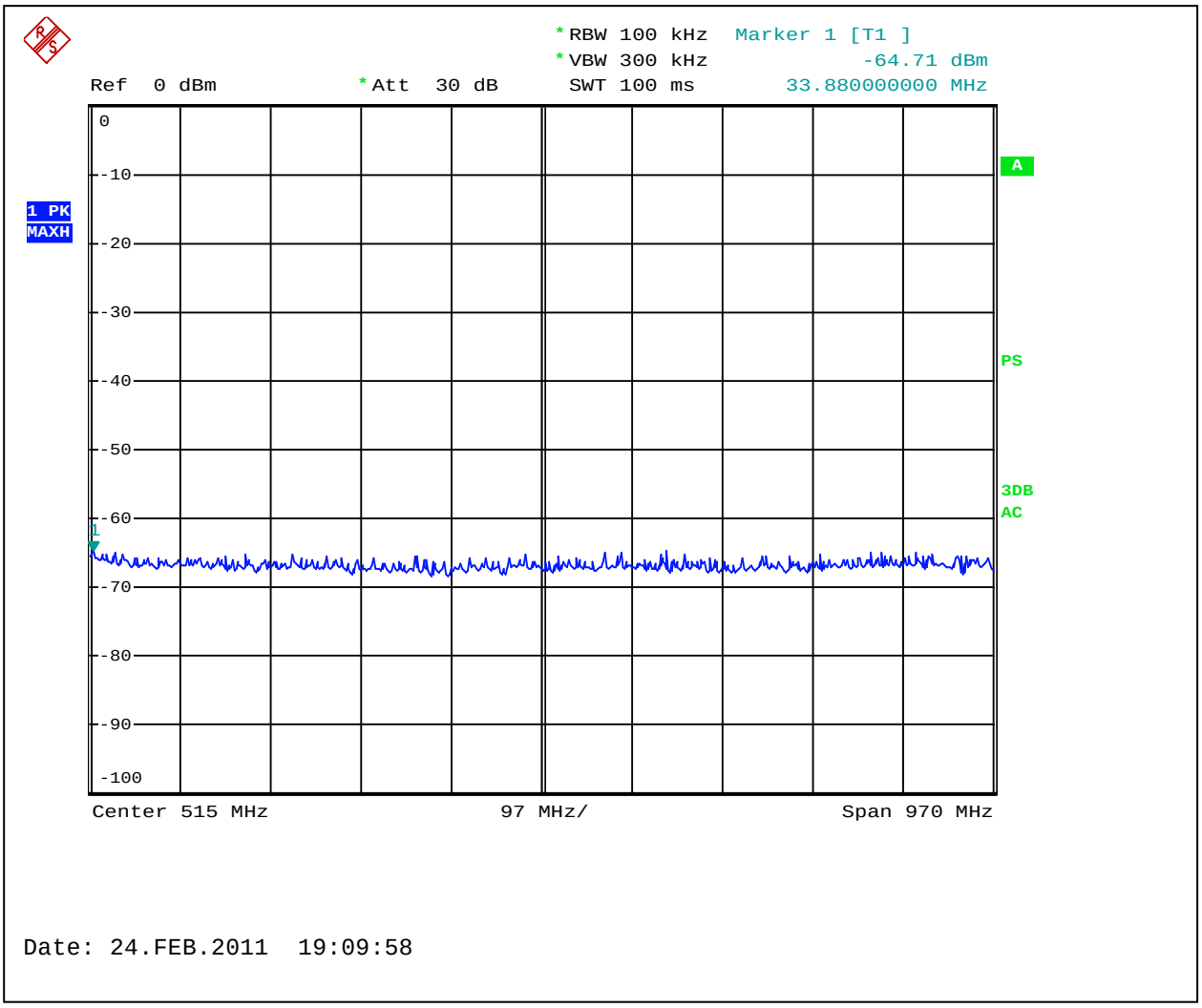
Graph 3.4.1


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-31.45 dBm
Ref 0 dBm
*Att 30 dB
SWT 140 ms
2.400000000 GHz
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
1 PK
MAXH
A
1
PS
3DB
AC
Start 1 GHz
140 MHz/
Stop 2.4 GHz
Date: 24.FEB.2011 19:15:41

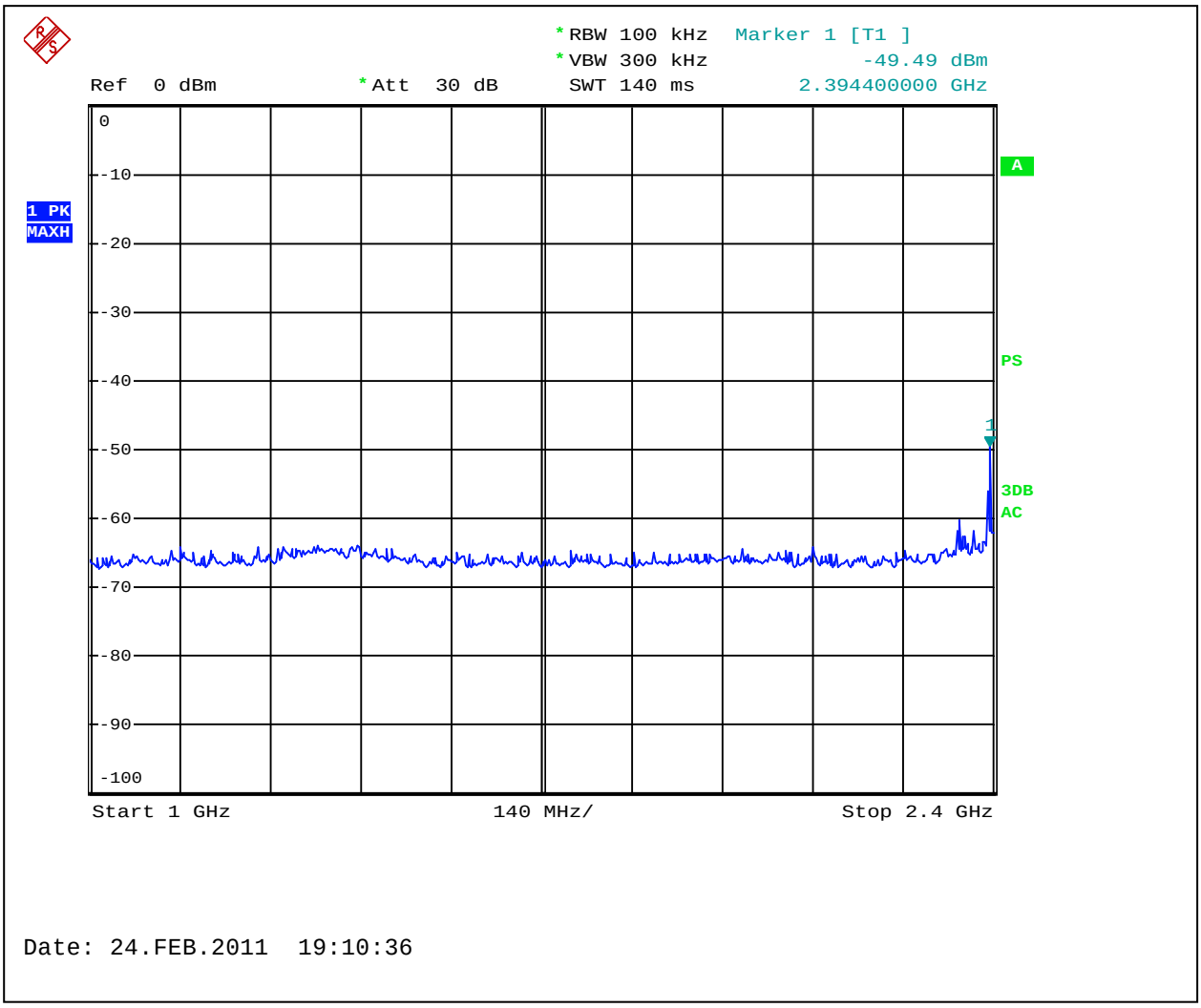
Graph 3.4.2


*RBW 100 kHz
*VBW 300 kHz
Ref 20 dBm
*Att 40 dB
SWT 2.3 s
Marker 1 [T1]
-44.54 dBm
9.103351000 GHz
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 2.4835 GHz
2.25165 GHz/
Stop 25 GHz
Date: 24.FEB.2011 19:25:55

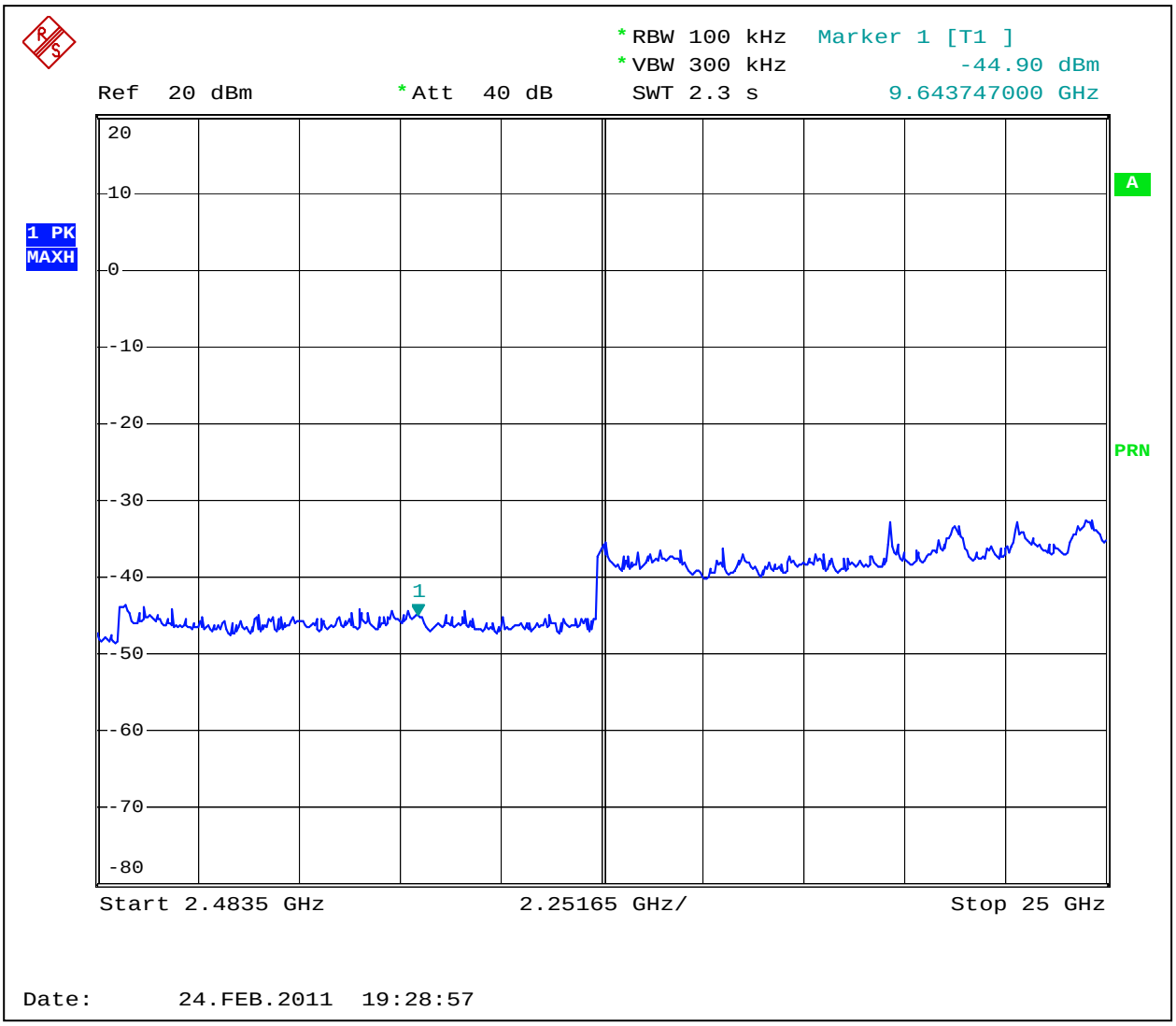
Graph 3.4.3


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-64.71 dBm
Ref 0 dBm
*Att 30 dB
SWT 100 ms
33.880000000 MHz
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
1 PK
MAXH
A
PS
3DB
AC
Center 515 MHz
97 MHz/
Span 970 MHz
Date: 24.FEB.2011 19:09:58

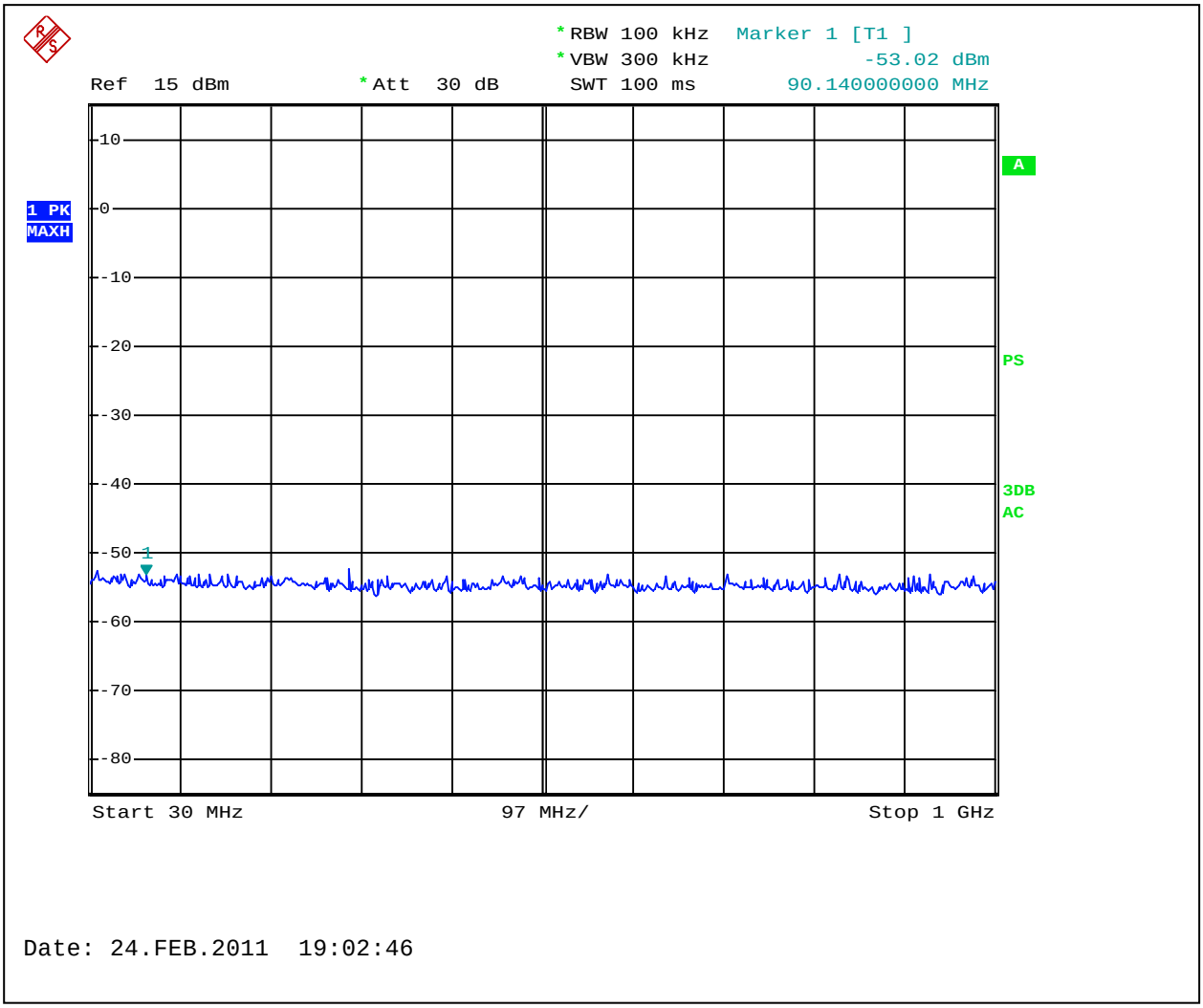
Graph 3.4.4


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-49.49 dBm
Ref 0 dBm
*Att 30 dB
SWT 140 ms
2.394400000 GHz
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
1 PK
MAXH
A
PS
1
3DB
AC
Start 1 GHz
140 MHz/
Stop 2.4 GHz
Date: 24.FEB.2011 19:10:36

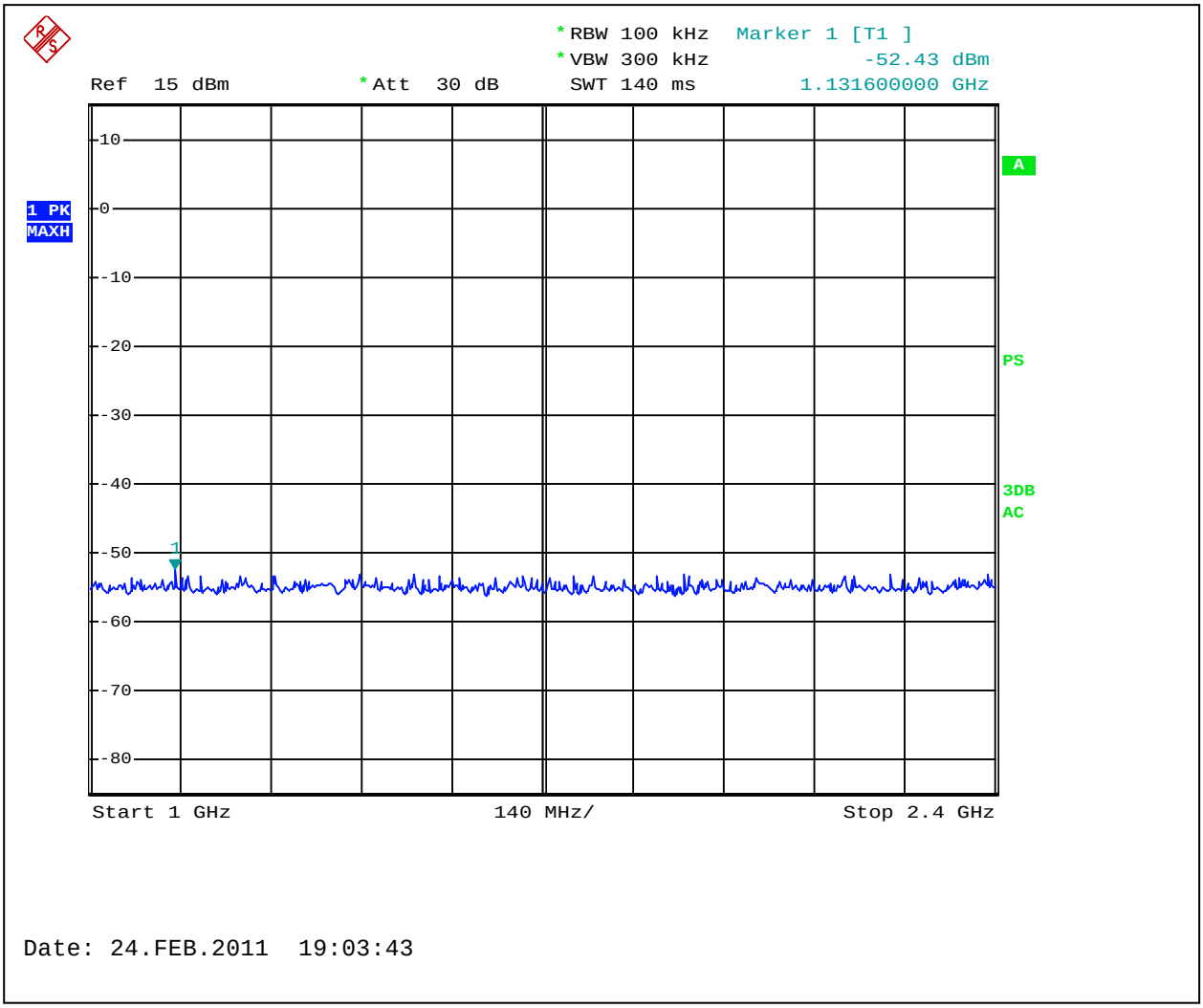
Graph 3.4.5


*RBW 100 kHz
*VBW 300 kHz
Ref 20 dBm
*Att 40 dB
SWT 2.3 s
Marker 1 [T1]
-44.90 dBm
9.643747000 GHz
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 2.4835 GHz
2.25165 GHz/
Stop 25 GHz
Date: 24.FEB.2011 19:28:57

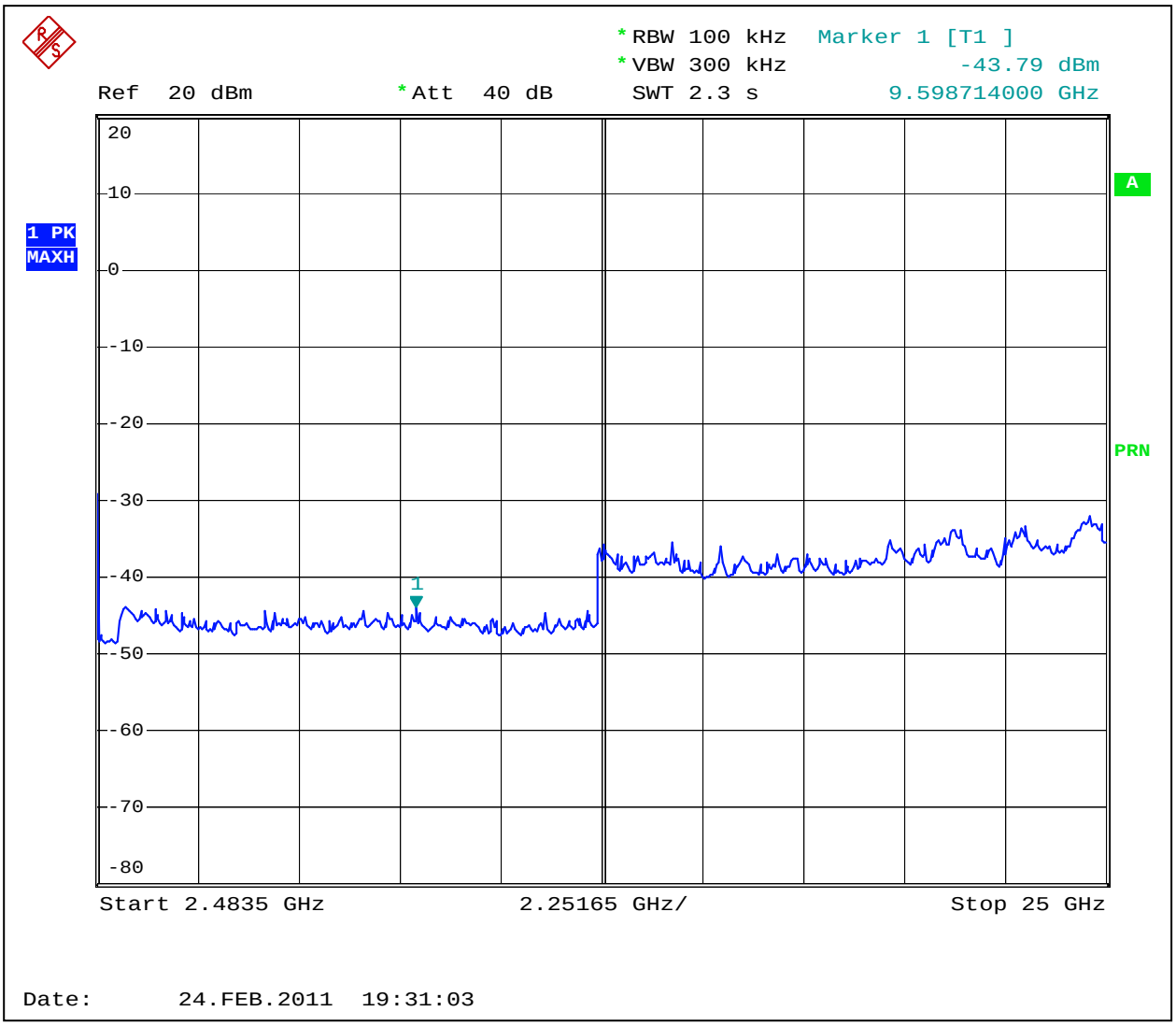
Graph 3.4.6


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-53.02 dBm
Ref 15 dBm
*Att 30 dB
SWT 100 ms
90.140000000 MHz
1 PK
MAXH
A
PS
3DB
AC
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 24.FEB.2011 19:02:46

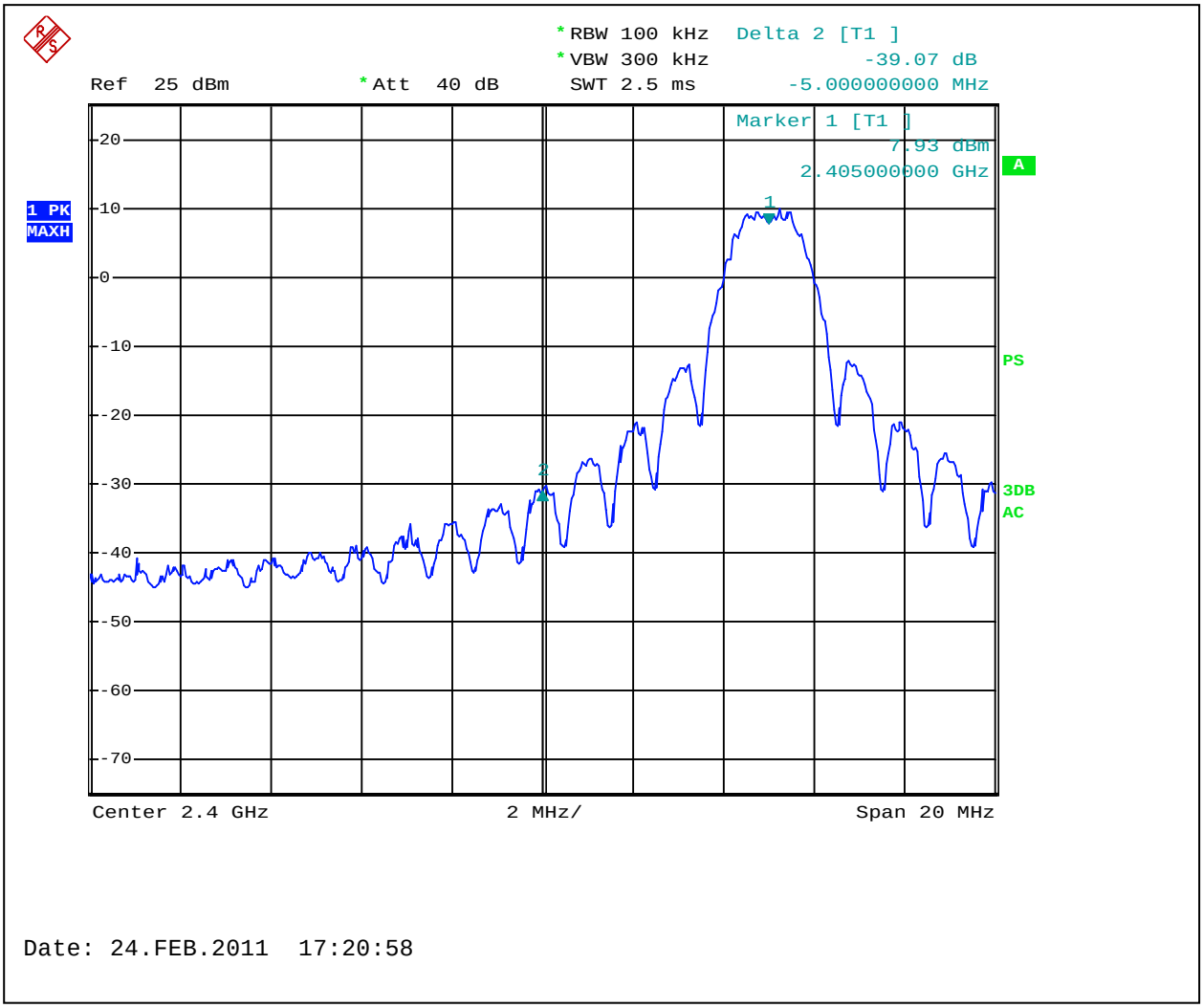
Graph 3.4.7


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-52.43 dBm
Ref 15 dBm
*Att 30 dB
SWT 140 ms
1.131600000 GHz
1 PK
MAXH
A
PS
3DB
AC
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 1 GHz
140 MHz/
Stop 2.4 GHz
Date: 24.FEB.2011 19:03:43

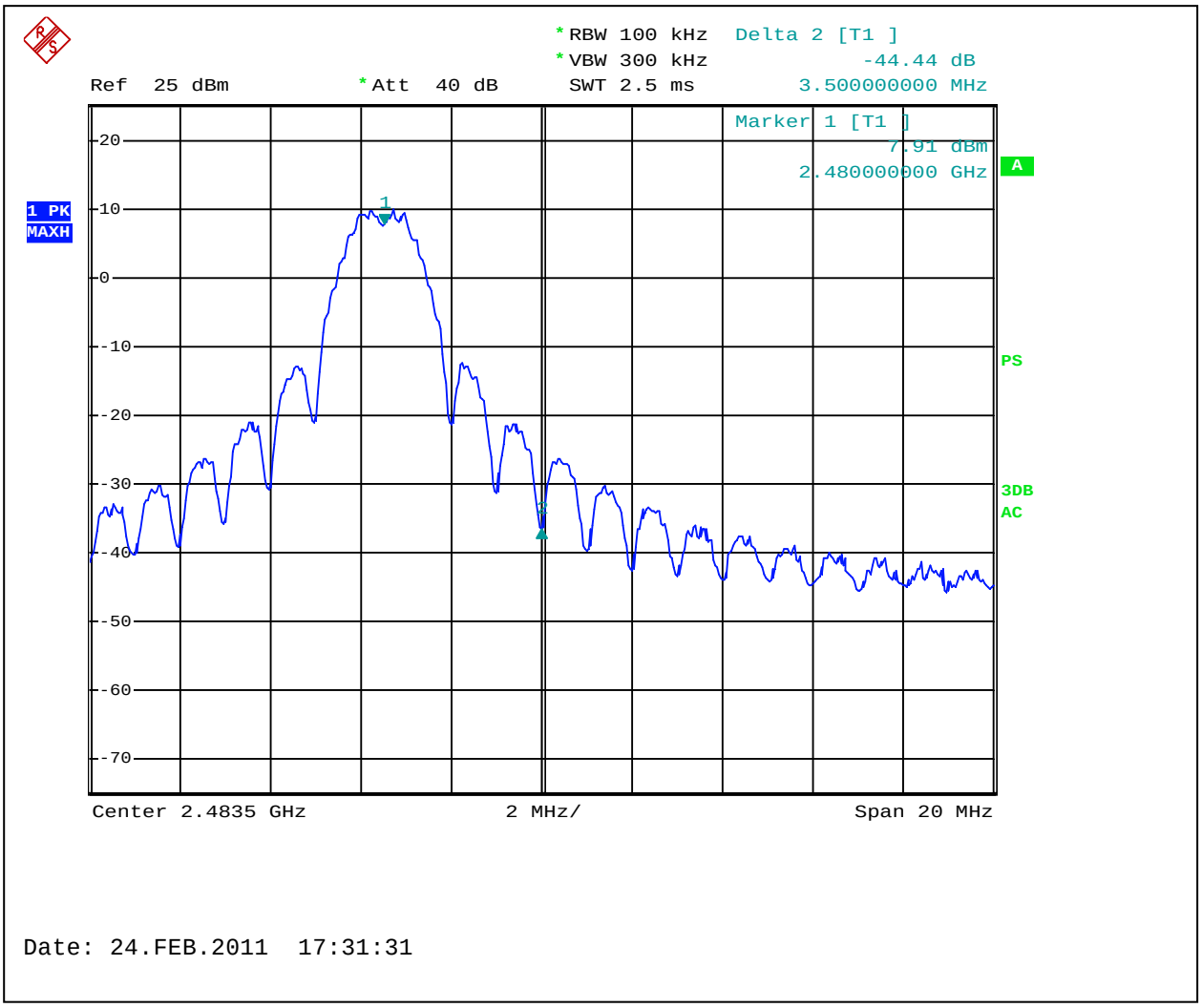
Graph 3.4.8


*RBW 100 kHz
*VBW 300 kHz
Ref 20 dBm
*Att 40 dB
SWT 2.3 s
Marker 1 [T1]
-43.79 dBm
9.598714000 GHz
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 2.4835 GHz
2.25165 GHz/
Stop 25 GHz
Date: 24.FEB.2011 19:31:03

Graph 3.4.9


*RBW 100 kHz
*VBW 300 kHz
Ref 25 dBm
*Att 40 dB
SWT 2.5 ms
Delta 2 [T1]
-39.07 dB
-5.000000000 MHz
Marker 1 [T1]
7.93 dBm
2.405000000 GHz
A
1 PK
MAXH
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.4 GHz
2 MHz/
Span 20 MHz
Date: 24.FEB.2011 17:20:58

Graph 3.4.10


*RBW 100 kHz
*VBW 300 kHz
SWT 2.5 ms
Delta 2 [T1]
-44.44 dB
3.500000000 MHz
Ref 25 dBm
*Att 40 dB
Marker 1 [T1]
7.91 dBm
2.480000000 GHz
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.4835 GHz
2 MHz/
Span 20 MHz
Date: 24.FEB.2011 17:31:31

Graph 3.4.11

3.5 Radiated spurious emissions

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

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

Test result: **Pass**

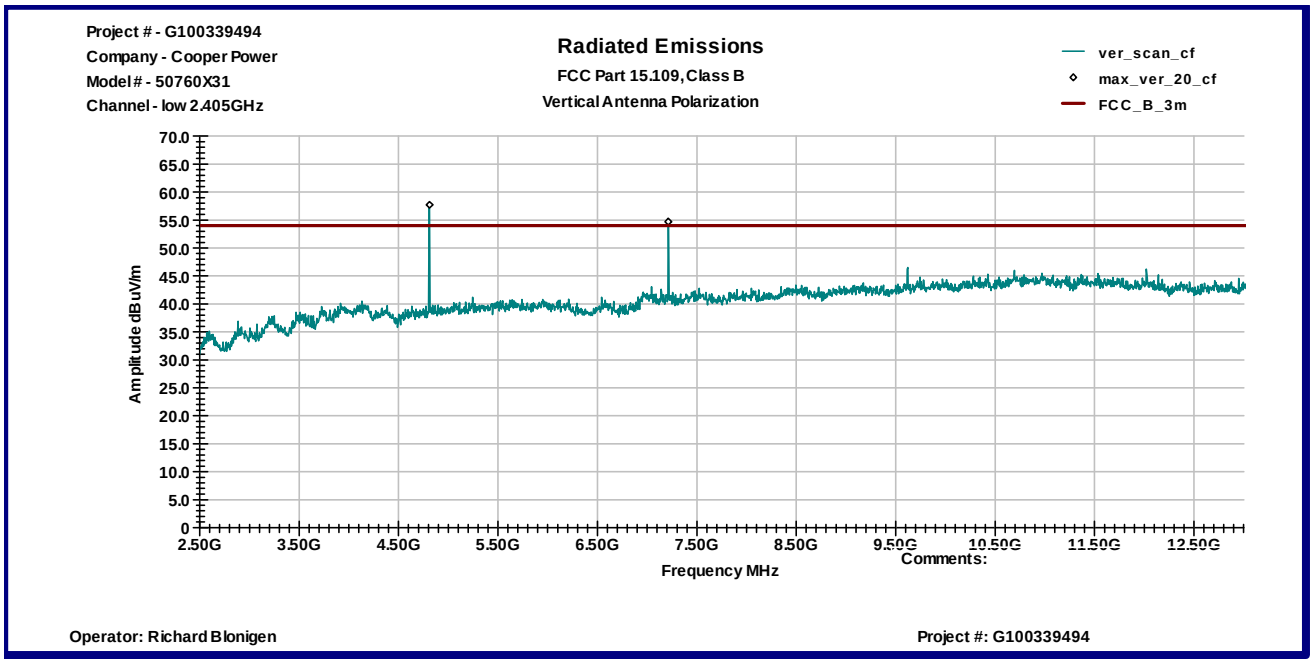
Max. Margin: 0.9 dB below the limits

Notes: No emissions were detected above ambient above 5th harmonic

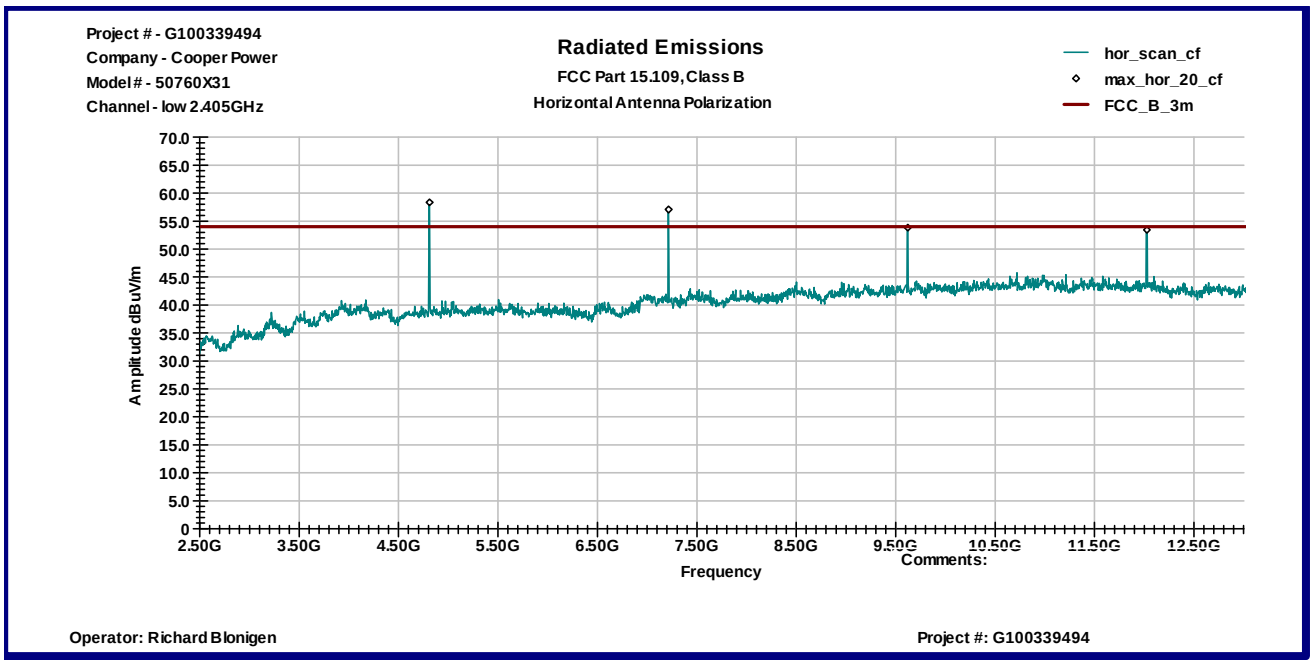
Date:	February 28, 2011	**Result: Pass**
Standard:	FCC part 15.247(d)	
Tested by:	Richard Blonigen	
Test Point:	Enclosure	
Operation mode:	See Page 5	
Note:	None	

Table 3.5.1

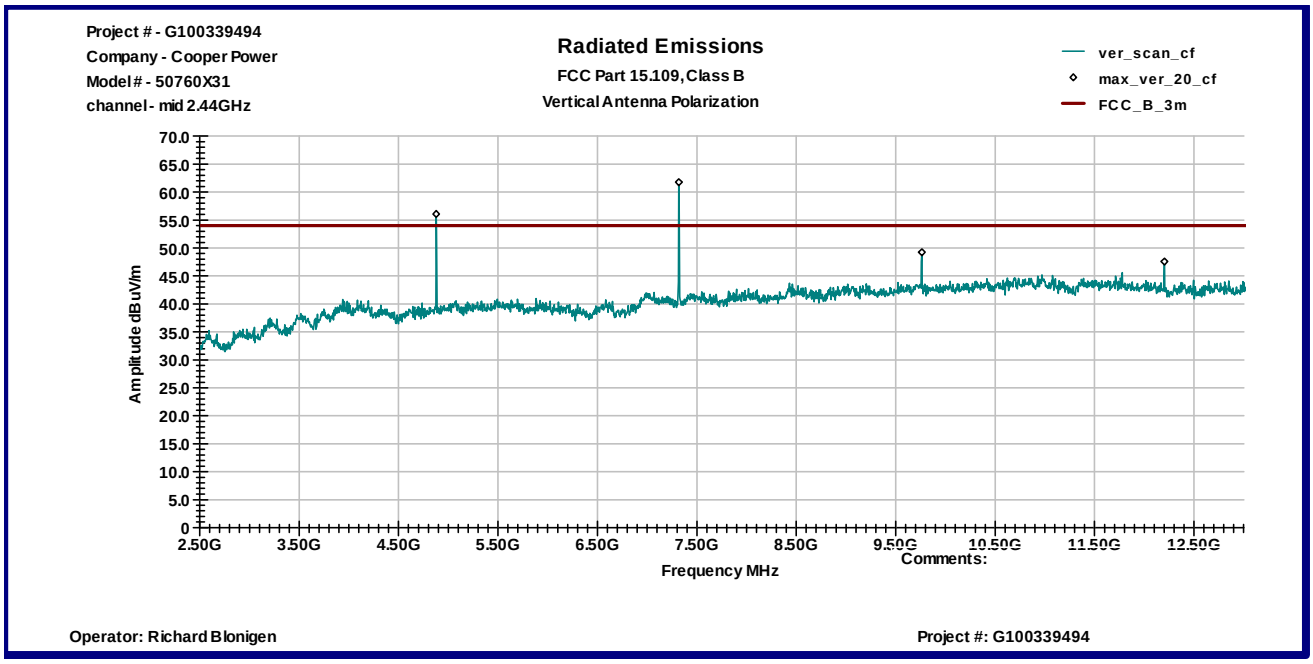
Frequency MHz	Antenna Polarity	Antenna Hts(cm)	Ant. CF dB1/m	Cable loss dB	Pre-amp Gain (dB)	Reading dBµV	Total @ 3m dBµV/m	Limit dBµV/m	Margin dB	Comments
Low Channel 2.405GHz										
4810.00	V	183	32.7	4.9	36.7	46.7	47.7	54.0	-6.3	
7215.00	V	135	35.7	6.2	36.7	38.8	44.0	54.0	-10.0	
9620.00	V	183	38.0	7.0	35.4	36.2	45.8	54.0	-8.2	
4810.00	V	173	32.7	4.9	36.7	47.2	48.2	54.0	-5.8	
7215.00	V	132	35.7	6.2	36.7	41.6	46.8	54.0	-7.2	
9620.00	V	179	38.0	7.0	35.4	35.2	44.8	54.0	-9.2	
12025.00	V	158	39.4	7.4	35.5	32.4	43.6	54.0	-10.3	
14430.00	V	153	41.8	7.6	37.8	32.8	44.4	54.0	-9.6	
Mid Channel 2.44GHz										
4880.00	V	164	32.9	4.9	36.6	45.5	46.7	54.0	-7.3	
7320.00	V	133	36.0	6.2	36.6	45.5	51.1	54.0	-2.9	
9762.00	V	146	38.3	7.0	35.3	29.3	39.2	54.0	-14.8	
12200.00	V	204	39.2	7.5	35.7	27.0	38.0	54.0	-16.0	
4880.00	H	176	32.9	4.9	36.6	45.6	46.8	54.0	-7.2	
7320.00	H	130	36.0	6.2	36.6	47.2	52.8	54.0	-1.2	
9762.00	H	189	38.3	7.0	35.3	36.9	46.8	54.0	-7.2	
12200.00	H	157	39.2	7.5	35.7	33.4	44.4	54.0	-9.6	
High Channel 2.475GHz										
4949.00	V	159	33.0	5.0	36.6	42.5	43.9	54.0	-10.1	
7426.00	V	174	36.2	6.3	36.5	47.1	53.1	54.0	-0.9	
9902.00	V	137	38.5	7.0	35.2	28.2	38.5	54.0	-15.5	
12372.50	V	214	39.1	7.6	35.9	28.0	38.8	54.0	-15.2	
4949.00	H	156	33.0	5.0	36.6	40.3	41.7	54.0	-12.3	
7426.00	H	173	36.2	6.3	36.5	46.9	52.9	54.0	-1.1	
9902.00	H	151	38.5	7.0	35.2	37.4	47.7	54.0	-6.3	
12372.50	H	148	39.1	7.6	35.9	32.5	43.3	54.0	-10.7	



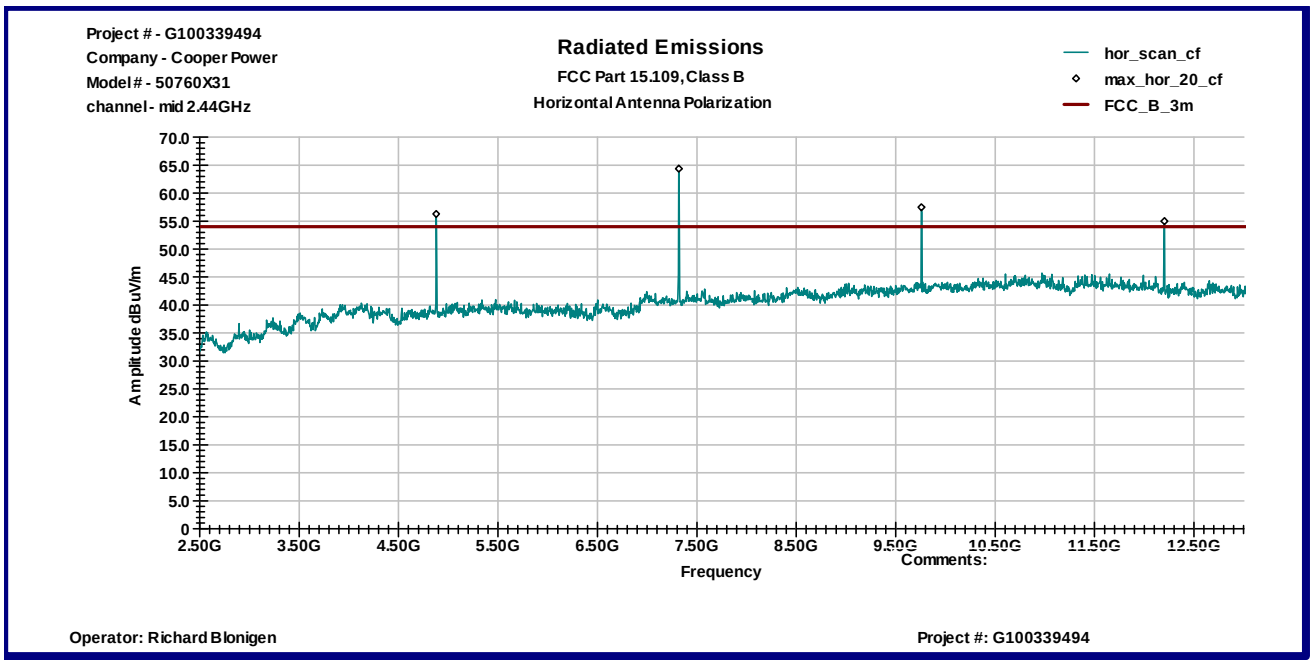
Graph 3.5.1



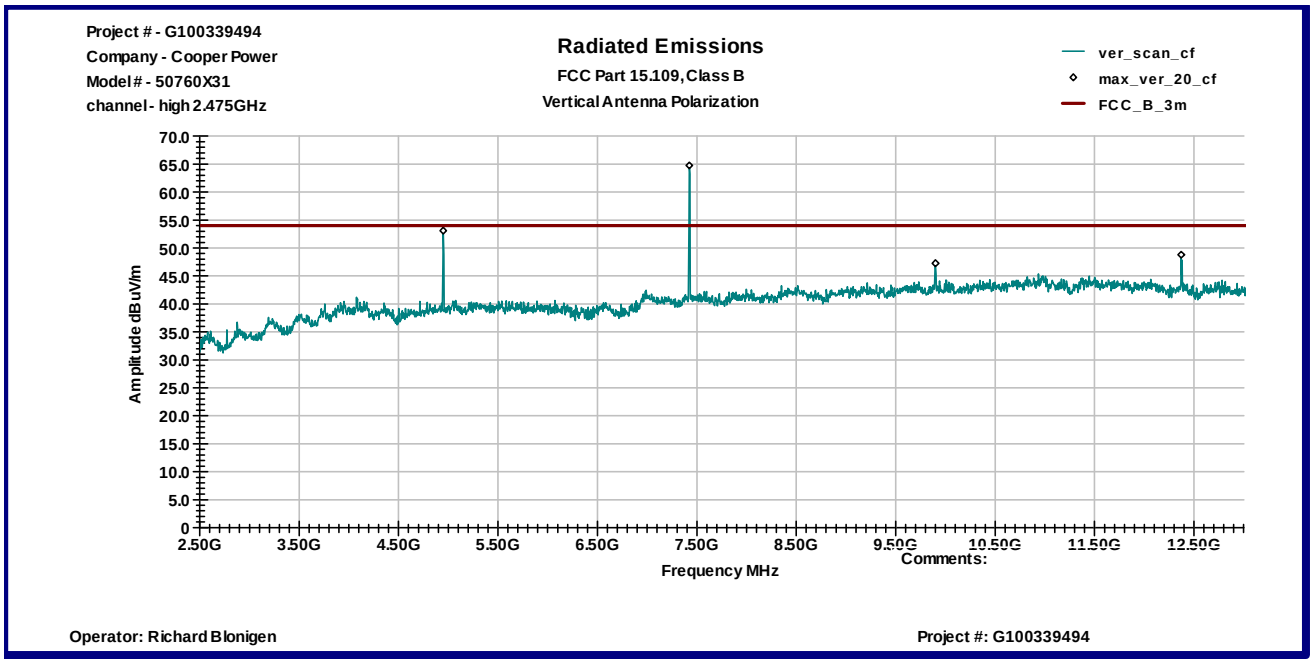
Graph 3.5.2



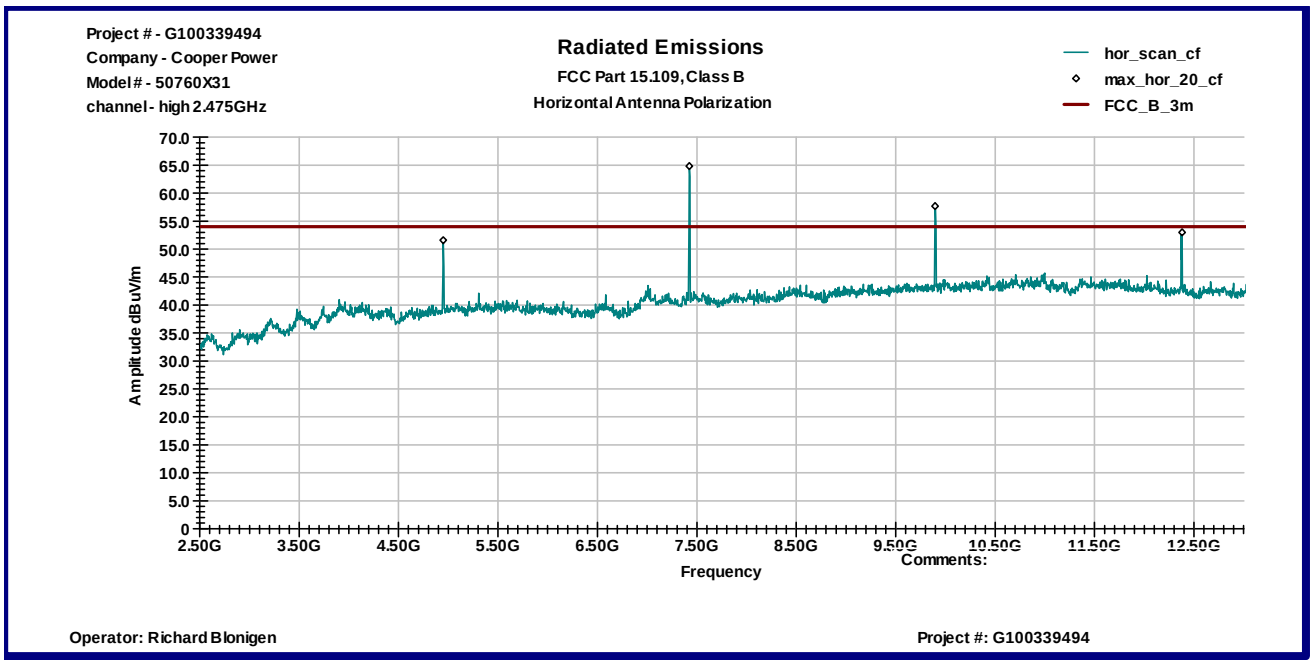
Graph 3.5.3



Graph 3.5.4



Graph 3.5.5



Graph 3.5.6

3.6 RF Exposure Compliance

The maximum measured antenna conducted power, P is 13.77 dBm

The antenna gain, G is -1.0 dBi

The maximum EIRP power = P + G
ERP = 13.77+ -1.0= 12.77dBm, or 0.019W

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

The Power Density, S is related to EIRP with the equation:
$S = EIRP / 4\pi D^2$, where D is the safe separation distance and = 20cm
$S = 19 / 4\pi 20^2$,
$S = 0.0038mW/cm^2$, or below the Maximum Permissible Exposure (MPE) of $1mW/cm^2$

3.7 Transmitter power line conducted emissions

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test result: **Pass**

Frequency range: 0.15MHz-30MHz

Max. Emissions margin: 17.8dB below the limits

Notes: None

Date:	February 23, 2011	**Result:** **Pass**
Standard:	FCC 15.207	
Tested by:	Ivaylo Nadarliyski	
Test Point:	Power Line	
Operation mode:	See Page 5	
Note:	None	

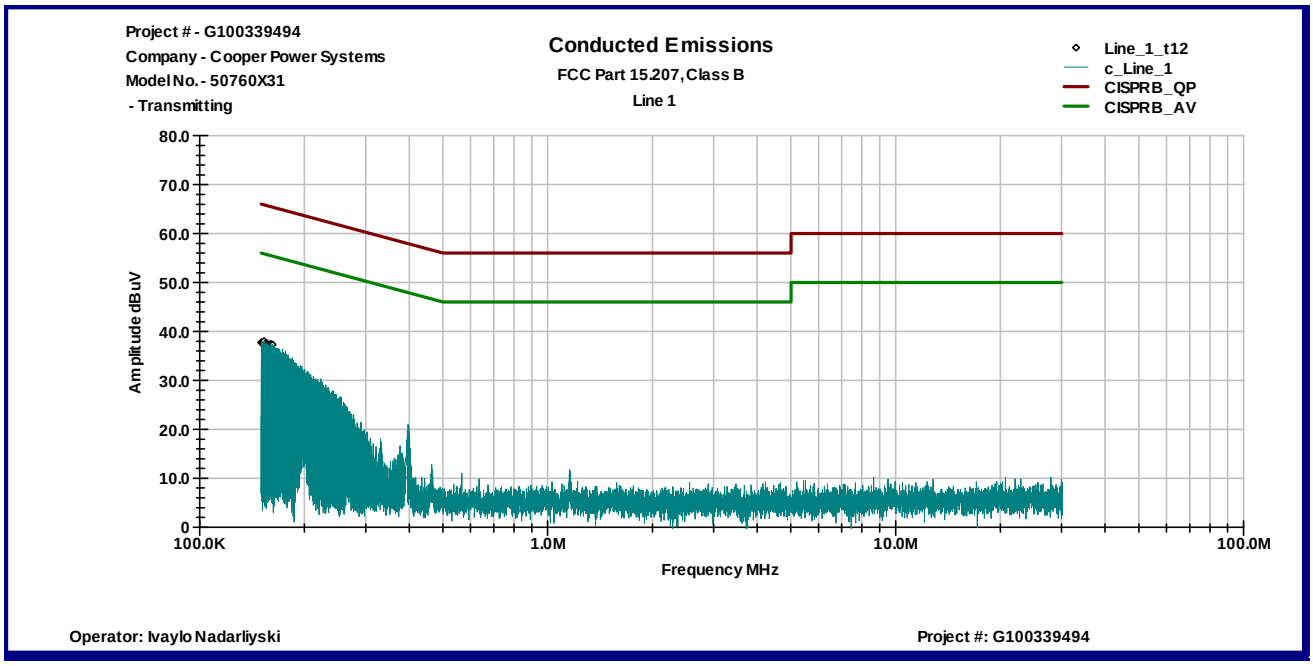
Table 3.7.1

Line 1

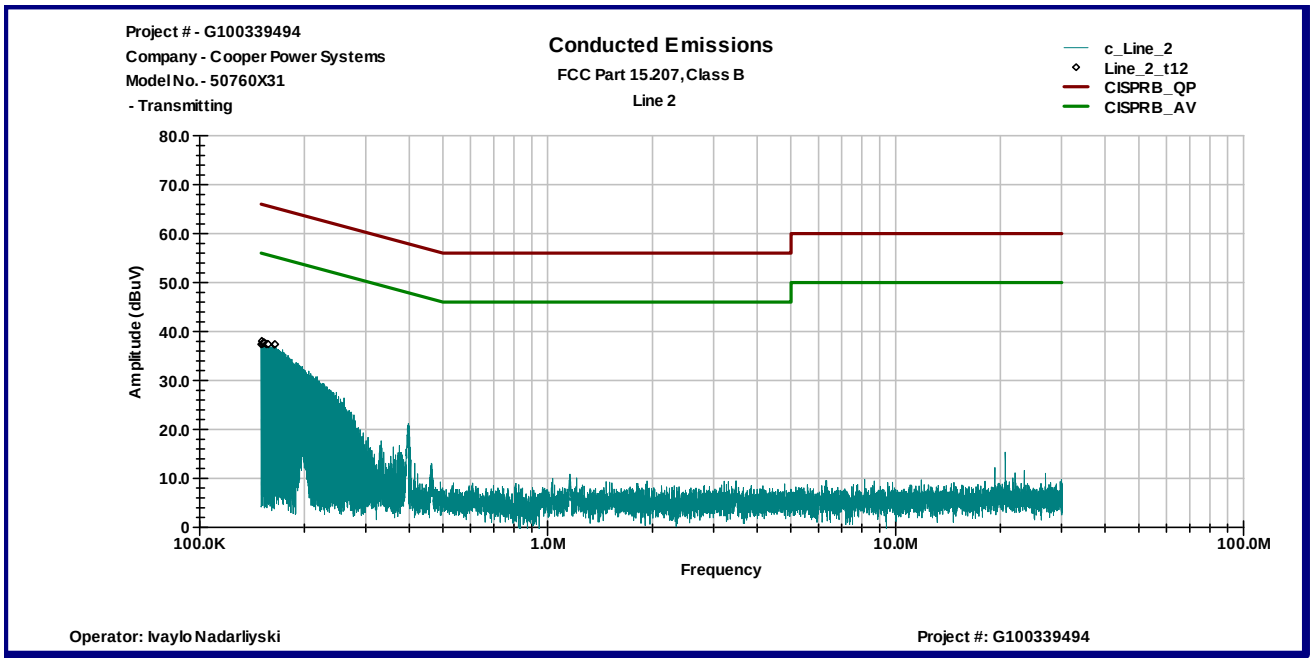
Frequency	Peak dBµV	QP Limit dBµV	AVG Limit dBµV	QP Margin dB	AVG Margin dB
150.31 KHz	37.8	66.0	56.0	-28.2	-18.2
150.93 KHz	37.7	66.0	56.0	-28.3	-18.3
151.55 KHz	37.5	65.9	55.9	-28.4	-18.4
152.25 KHz	37.5	65.9	55.9	-28.4	-18.4
152.87 KHz	38.0	65.8	55.8	-27.8	-17.8
153.5 KHz	37.4	65.8	55.8	-28.4	-18.4
154.19 KHz	37.4	65.8	55.8	-28.4	-18.4
155.52 KHz	37.5	65.7	55.7	-28.2	-18.2
156.14 KHz	37.5	65.7	55.7	-28.1	-18.1
156.76 KHz	37.3	65.6	55.6	-28.4	-18.4
160.02 KHz	37.4	65.5	55.5	-28.0	-18.0
161.96 KHz	37.3	65.4	55.4	-28.1	-18.1

Line 2

Frequency	Peak dBµV	QP Limit dBmV	AVG Limit dBmV	QP Margin dB	AVG Margin dB
150.23 KHz	37.4	66.0	56.0	-28.6	-18.6
150.85 KHz	38.1	66.0	56.0	-27.9	-17.9
151.48 KHz	37.5	65.9	55.9	-28.4	-18.4
152.17 KHz	37.6	65.9	55.9	-28.3	-18.3
152.8 KHz	37.8	65.9	55.9	-28.0	-18.0
153.42 KHz	37.7	65.8	55.8	-28.2	-18.2
155.36 KHz	37.4	65.7	55.7	-28.3	-18.3
156.06 KHz	37.5	65.7	55.7	-28.2	-18.2
156.68 KHz	37.4	65.6	55.6	-28.2	-18.2
157.38 KHz	37.4	65.6	55.6	-28.2	-18.2
163.83 KHz	37.3	65.3	55.3	-28.0	-18.0
164.53 KHz	37.4	65.2	55.2	-27.8	-17.8



Graph 3.7.1



Graph 3.7.2

3.8 Receiver/digital device radiated emissions

Test location: ☐ OATS ☒ Anechoic Chamber

Test distance: ☐ 10 meters ☒ 3 meters

Test result: **Pass**

Frequency range: 30MHz-12.5GHz

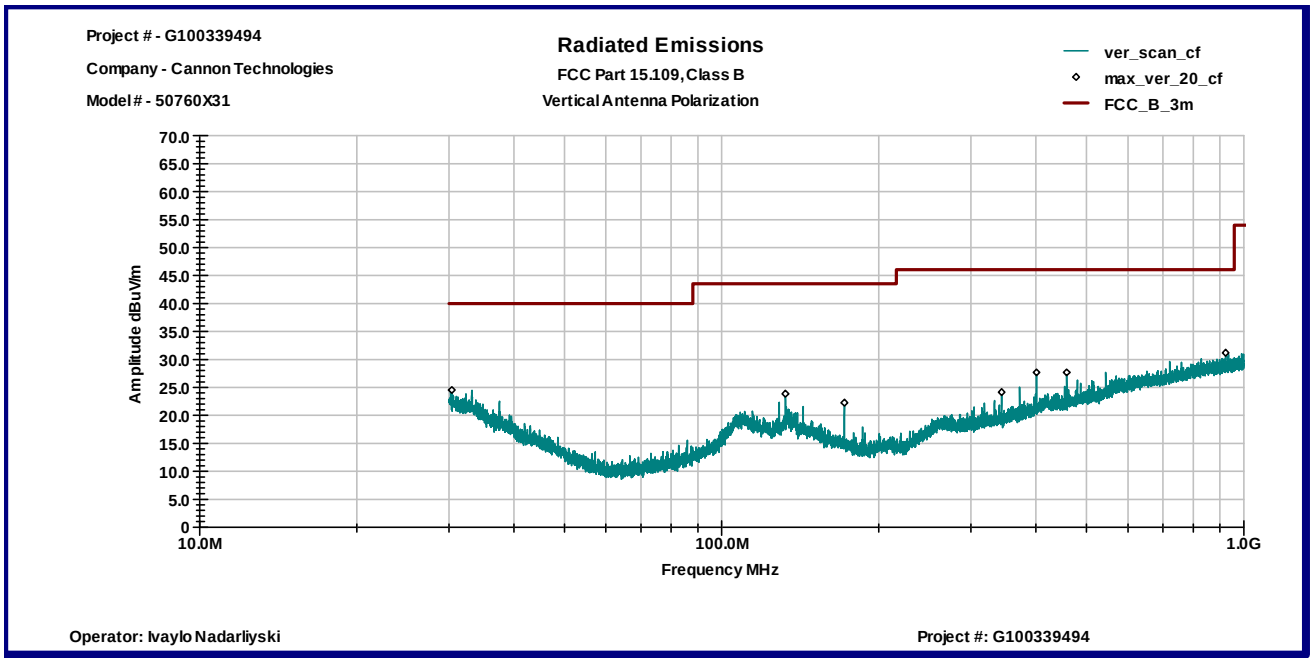
Max. Emissions margin: 14.8 dB below the limits

Notes: The Radiated Emissions test was performed in the Anechoic chamber at 3m measurement distance (see Table 3.11.1 and Graphs 3.11.1 - 3.11.4)

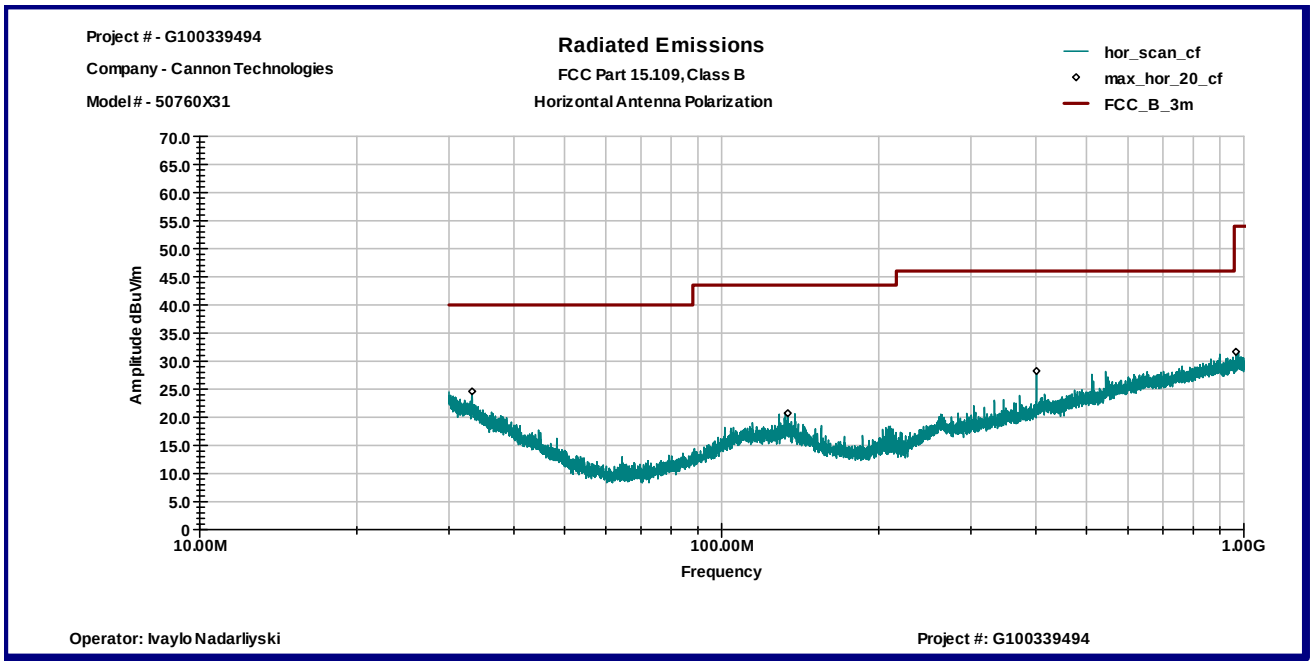
Date:	February 23, 2011	**Result:** **Pass**
Standard:	FCC Part 15.109, Class B	
Tested by:	Ivaylo Nadarliyski	
Test Point:	Enclosure	
Operation mode:	Standby	
Note:	None	

Table 3.8.1

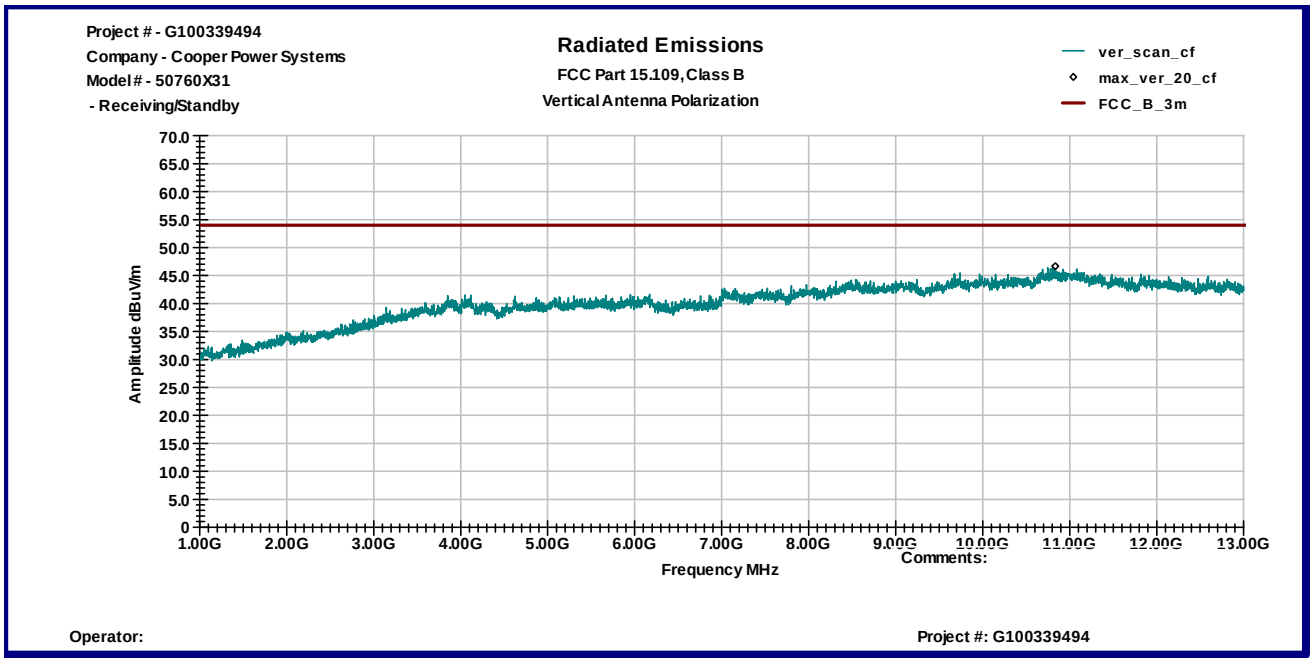
Frequency	Ant. Polarity	Peak Reading dBµV	Ant.Factor dB1/m	Total at 3m dBµV/m	QP Limit dBµV/m	Margin dB
30.391 MHz	V	4.4	20.1	24.5	40.0	-15.5
132.46 MHz	V	10.0	13.8	23.9	43.5	-19.7
171.81 MHz	V	10.8	11.4	22.3	43.5	-21.3
343.73 MHz	V	7.1	17.1	24.1	46.0	-21.9
400.86 MHz	V	8.6	19.0	27.7	46.0	-18.4
458.1 MHz	V	7.8	19.9	27.7	46.0	-18.4
923.13 MHz	V	5.6	25.6	31.2	46.0	-14.8
33.255 MHz	H	6.1	18.5	24.6	40.0	-15.4
133.79 MHz	H	7.0	13.7	20.7	43.5	-22.8
400.86 MHz	H	9.2	19.0	28.2	46.0	-17.8
966.22 MHz	H	5.7	26.0	31.6	54.0	-22.3



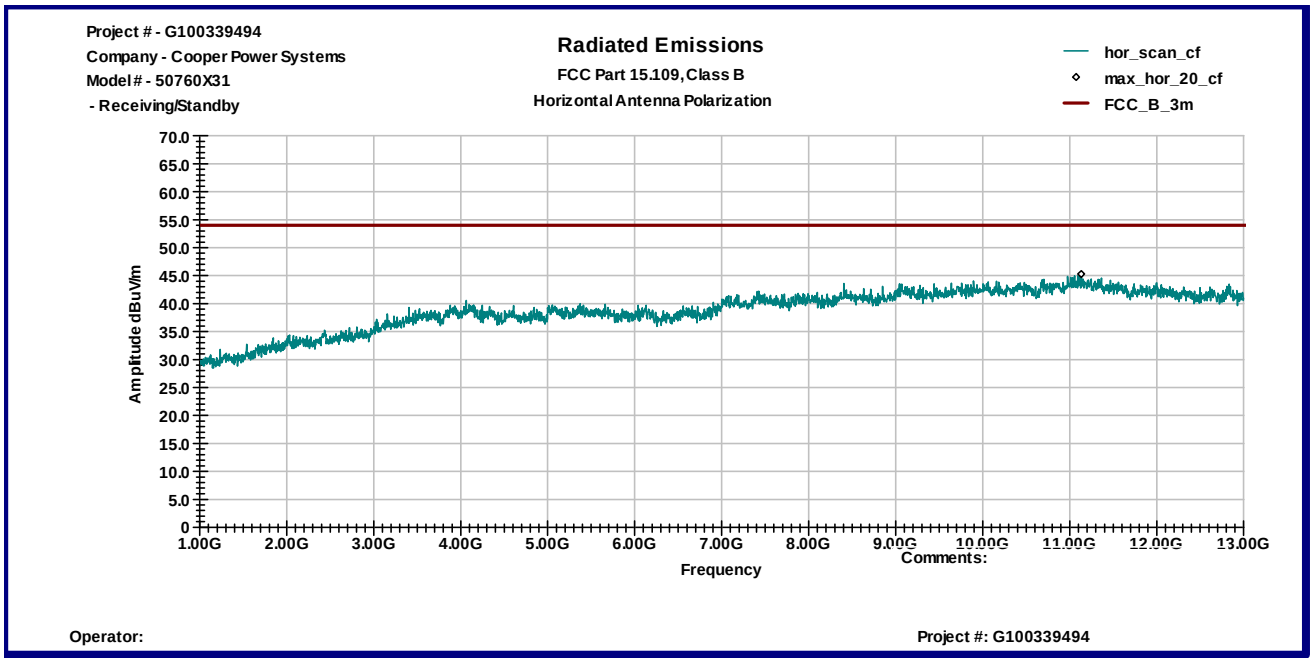
Graph 3.8.1



Graph 3.8.2



Graph 3.8.3



Graph 3.8.4

3.9 Digital device conducted emissions

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test result: **Pass**

Frequency range: 0.15MHz-30MHz

Max. Emissions margin: 19.0dB below the limits

Notes: None

Date:	February 23, 2011	**Result:** **Pass**
Standard:	FCC 15.107, Class B	
Tested by:	Ivaylo Nadarliyski	
Test Point:	Power Line	
Operation mode:	Standby	
Note:	None	

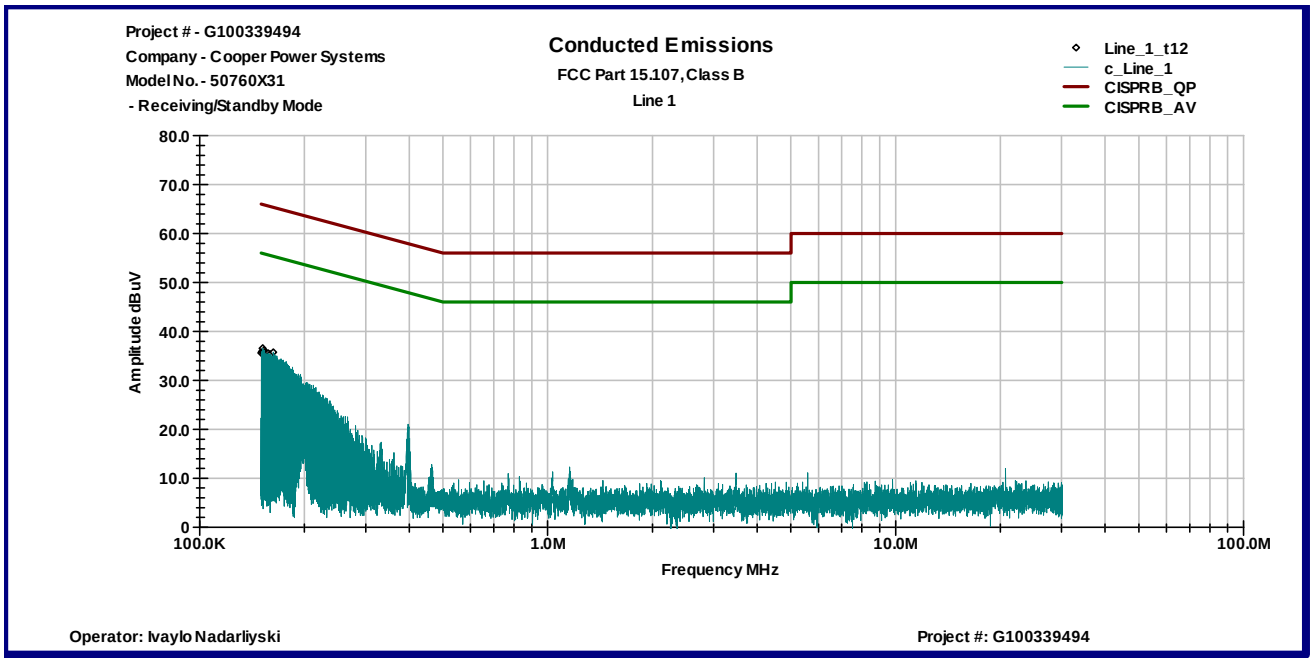
Table 3.9.1

Line 1

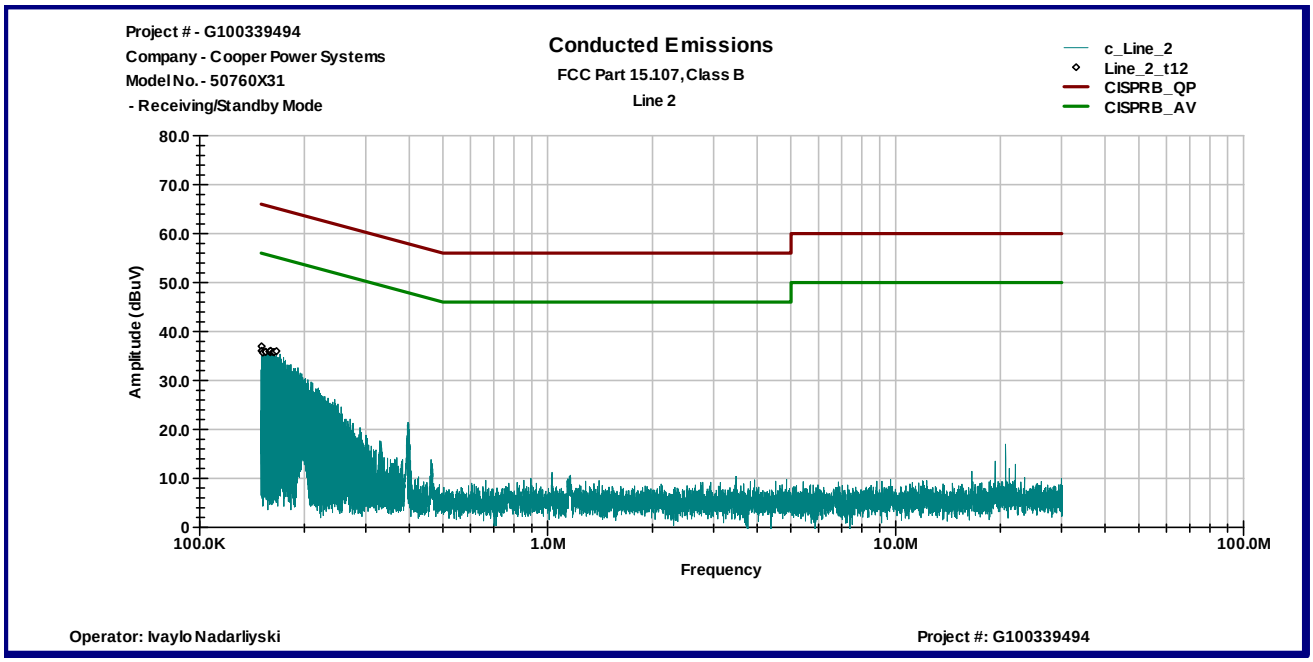
Frequency	Peak dBµV	QP Limit dBµV	AVG Limit dBµV	QP Margin dB	AVG Margin dB
150.31 KHz	35.6	66.0	56.0	-30.4	-20.4
150.93 KHz	35.9	66.0	56.0	-30.1	-20.1
151.63 KHz	36.5	65.9	55.9	-29.4	-19.4
152.25 KHz	35.7	65.9	55.9	-30.2	-20.2
152.95 KHz	36.1	65.8	55.8	-29.7	-19.7
153.57 KHz	35.7	65.8	55.8	-30.1	-20.1
154.89 KHz	35.4	65.7	55.7	-30.3	-20.3
155.52 KHz	35.3	65.7	55.7	-30.4	-20.4
157.46 KHz	35.5	65.6	55.6	-30.1	-20.1
158.78 KHz	35.3	65.5	55.5	-30.3	-20.3
160.1 KHz	35.3	65.5	55.5	-30.2	-20.2
162.66 KHz	35.7	65.3	55.3	-29.6	-19.6

Line 2

Frequency	Peak dBµV	QP Limit dBmV	AVG Limit dBmV	QP Margin dB	AVG Margin dB
150.47 KHz	37.0	66.0	56.0	-29.0	-19.0
150.7 KHz	36.1	66.0	56.0	-29.9	-19.9
151.79 KHz	35.7	65.9	55.9	-30.2	-20.2
154.43 KHz	35.8	65.8	55.8	-29.9	-19.9
154.66 KHz	35.8	65.8	55.8	-29.9	-19.9
158.54 KHz	35.9	65.5	55.5	-29.6	-19.6
159.63 KHz	35.8	65.5	55.5	-29.7	-19.7
159.87 KHz	36.1	65.5	55.5	-29.4	-19.4
162.43 KHz	35.8	65.3	55.3	-29.5	-19.5
163.52 KHz	35.7	65.3	55.3	-29.6	-19.6
163.75 KHz	35.8	65.3	55.3	-29.5	-19.5
166.08 KHz	36.0	65.2	55.2	-29.2	-19.2



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	12/07/2011	☒
Spectrum Analyzer	R & S	ESCI	100358	12909	07/12/2011	☒
Bicono-Log Antenna	Schaffner-Chase	CBL 6112 B	2468	14459	10/18/2011	☒
Horn Antenna	EMCO	3115	9507-4513	9936	04/13/2011	☒
Waveguide Horn Antenna	EMCO	3116	9904-2423	9705	10/04/2011	☒
LISN	Fischer Custom Communications	FCC-LISN-2 MOD.SD	316	9945	03/11/2011	☒
Pre-Amplifier	MITEQ	AMF-5D-00501800-28-13P	1122951	13475	10/06/2011	☒
Pre-Amplifier	MITEQ	AMF-6F-16002600-25-10P	1222383	MIN-0065	10/06/2011	☒
System	TILE! Instrument Control		Ver. 3.4.K.29	15259	VBU	☒
Power Supply	Topward Electrical Instruments	TPS-4000	962650	009784	VBU	☒

Test Setup Photos