TEST REPORT

Report Number: 101039189MIN-001B
Project Number: G101039189

Testing performed on the
AdvisorOne
AVO-BTWI, WiFi

FCC ID: B4Z-958F-BTWI
Industry Canada ID: 1175C-958FBTWI

to
47 CFR Part 15. 247:2010
RSS- 210, Issue 8, 2010
RSS-Gen, Issue 3, 2010
47 CFR, Part 15:2010, §15.107 and §15.109, Class / ICES-003, Issue 5:2012

For
UTC Fire & Security Americas Corporation, Inc.

Test Performed by:	Test Authorized by:
Intertek Testing Services NA, Inc.	UTC Fire & Security Americas Corporation, Inc.
7250 Hudson Blvd., Suite 100	1275 Red Fox Road
Oakdale, MN 55128 USA	Arden Hills, MN 55112 USA

Prepared by: _____ Date: May 3, 2013
Uri Spector

Reviewed by: _____ Date: May 3, 2013
Simon Khazon

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1.0 GENERAL DESCRIPTION

Model:	AdvisorOne
Type of EUT:	Security Alarm
FCC ID:	B4Z-958F-BTWI
Industry Canada ID:	1175C-958FBTWI
Related Submittal(s) Grants:	None
Company:	UTC Fire & Security Americas Corporation, Inc.
Customer:	Mr. Kevin Flanders
Address:	1275 Red Fox Road Arden Hills, MN 55112 USA
Phone:	(651) 773-4663
Fax:	(651) 779-4884
e-mail:	kevin.flanders@fs.utc.com
Test Standards:	☒ 47 CFR, Part 15:2010, §15.247 ☒ RSS–210, Issue 8, 2010 ☒ RSS-Gen, Issue 3, 2010 ☒ 47 CFR, Part 15:2010, §15.107 and §15.109, Class B ☒ ICES-003, Issue 5:2012 ☐ Other
Type of radio:	☒ Stand -alone ☐ Module ☐ Hybrid
Date Sample Submitted:	February 28, 2013
Test Work Started:	February 28, 2013
Test Work Completed:	April 30, 2013
Test Sample Conditions:	☐ Damaged ☐Poor (Usable) ☒ Good

1.1 Product Description; Test Facility

Product Description:	AVO-BTWI, WiFi
Board Revision:	55-958
Transmitter Type:	☐ FHSS ☐ Digital Modulation ☒ WiFi ☐ Blue Tooth
Operating Frequency Range(s):	From 2412.0 to 2462.0 MHz
Number of Channels:	11
Modulation:	802.11b-DSSS 802.11g-OFDM 802.11n-OFDM
Emission Designator:	802.11b-DSSS: 10M1GXW 802.11g-OFDM: 16M3GXW 802.11n-OFDM: 17M8GXW
Antenna(s) Info:	High Efficiency loop antenna Gain: 2.5dBi
Antenna Installation:	☐ User ☐ Professional ☒ Factory
Transmitter power configuration:	☐ Internal battery ☒ External power source ☒ 120VAC ☐ 230VAC ☐ 400VAC ☐ VDC ☐ Other: Amp. ☐ 50Hz ☒ 60Hz
Test Facility Accreditation:	A2LA (Certificate No. 1427.01)
Test Methodology:	Measurements performed according to the procedures in ANSI C63.10-2009 and FCC 558074 D01 DTS Measurement Guidance

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

Cables:

No.	Type	Length	Designation	Note
1	RJ45, not shielded	<100ft	Ethernet WAN cable	
2	RJ45, not shielded	<100ft	Ethernet LAN cable	
3	RJ45, not shielded	>100ft	Home telephone connection cable	
4	2-wire not shielded DC power	6ft	Battery Connection	
5	2-wire not shielded DC power	>100ft	Telephone bell	
6	Zones 1, 2, 3, 4,5	>100ft	Superbus	
7	External antenna cable	<6ft	319.5MHz receive antenna	
8	External antenna cable	<6ft	GSM-GPRS antenna	

Support equipment/Services:

No.	Item	Description
1	None	

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(a) / RSS-210 A8.2	6dB emissions bandwidth of the digital modulation	Pass
15.247(b), (c) / RSS-210 A8.4	Maximum peak output power	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 6dB Emission bandwidth (EBW) of the digital modulation

802.11b

Low Frequency Channel MHz	Middle Frequency Channel MHz	Upper Frequency Channel MHz	Minimum Bandwidth kHz	Result
10.14	10.12	10.08	500	**Pass**
RBW: **VBW:**	☒ 300kHz ☒ 1MHz			

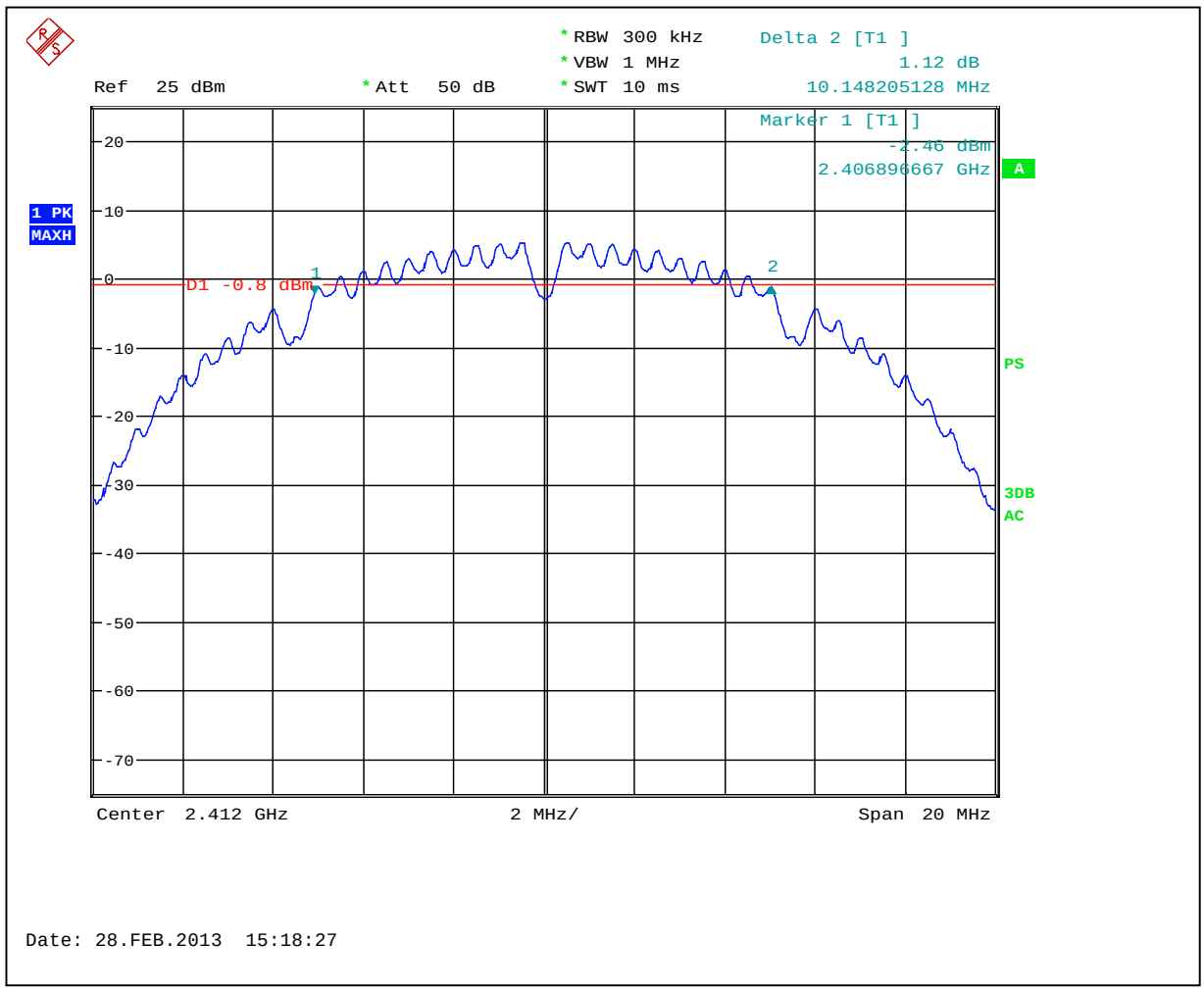
802.11g

Low Frequency Channel MHz	Middle Frequency Channel MHz	Upper Frequency Channel MHz	Minimum Bandwidth kHz	Result
16.25	16.22	16.10	500	**Pass**
RBW: **VBW:**	☒ 500kHz ☒ 3MHz			

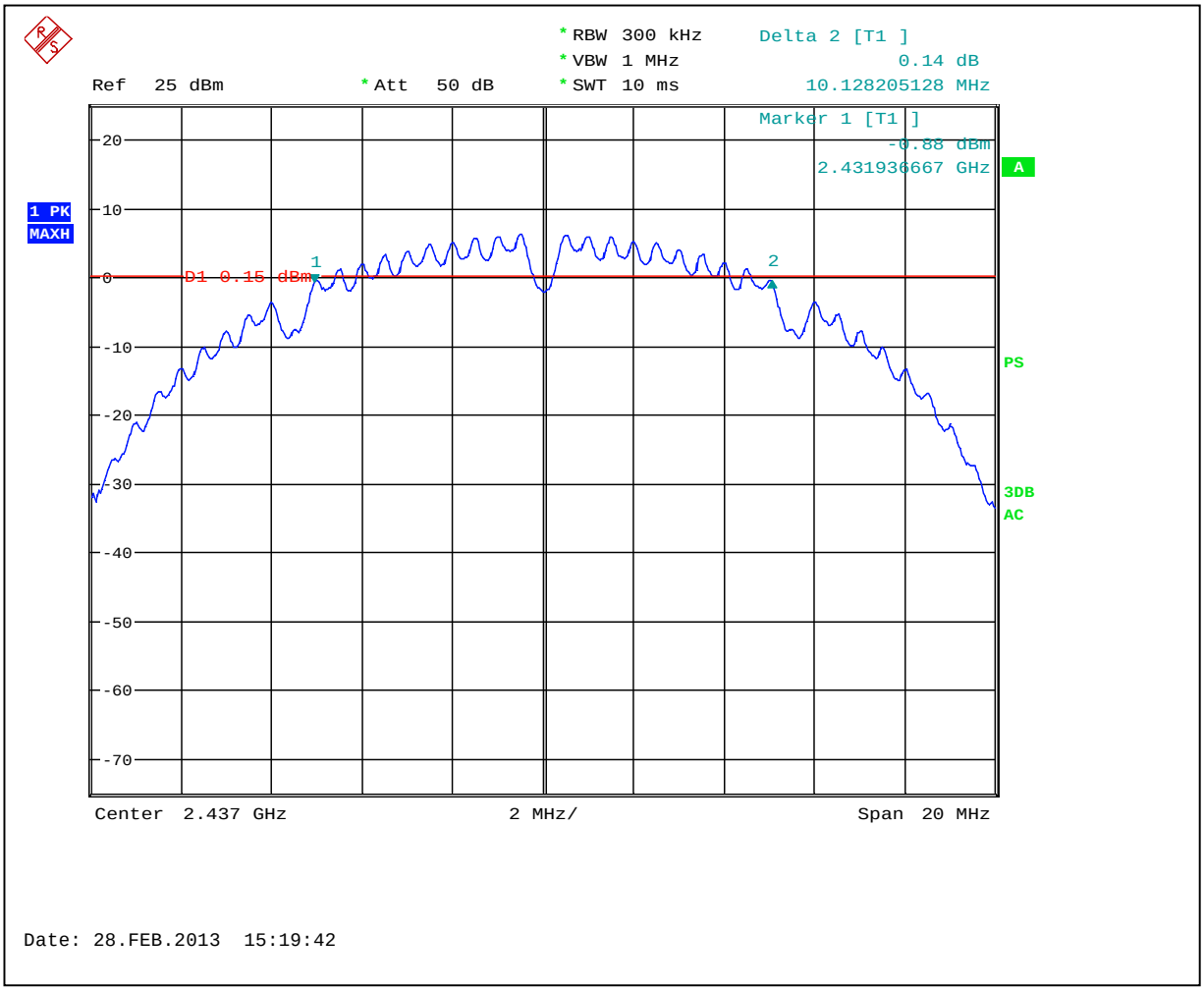
802.11n

Low Frequency Channel MHz	Middle Frequency Channel MHz	Upper Frequency Channel MHz	Minimum Bandwidth kHz	Result
17.40	17.39	17.76	500	**Pass**
RBW: **VBW:**	☒ 500kHz ☒ 3MHz			

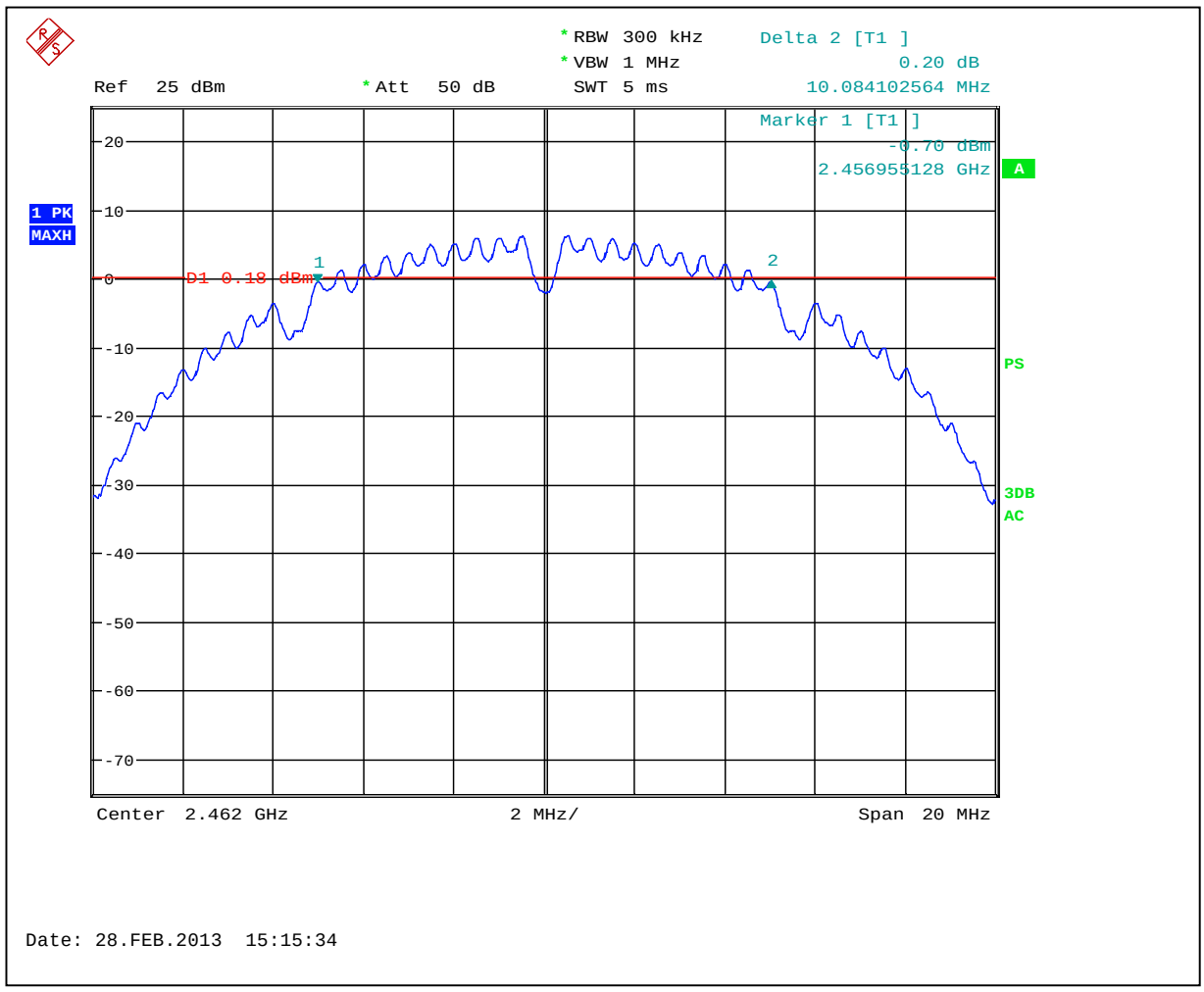
Notes: Graphs 3.1.1, 3.1.2, 3.1.3 for 802.11b
Graphs 3.1.4, 3.1.5, 3.1.6 for 802.11g
Graphs 3.1.7, 3.1.8, 3.1.9 for 802.11n


*RBW 300 kHz
*VBW 1 MHz
*SWT 10 ms
Delta 2 [T1]
1.12 dB
10.148205128 MHz
Ref 25 dBm
*Att 50 dB
Marker 1 [T1]
-2.46 dBm
2.406896667 GHz
A
1 PK
MAXH
D1 -0.8 dBm
PS
3DB
AC
Center 2.412 GHz
2 MHz/
Span 20 MHz
Date: 28.FEB.2013 15:18:27

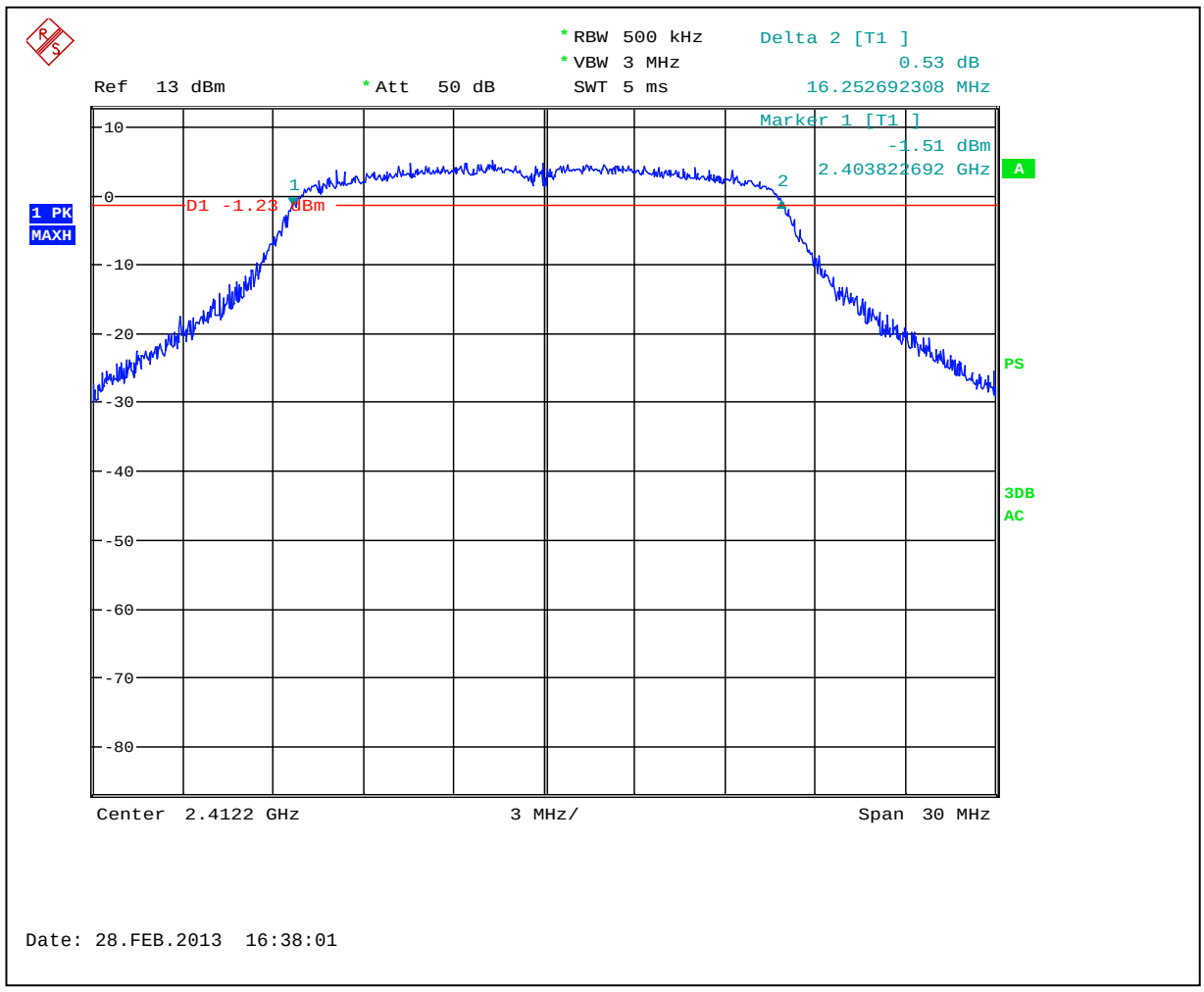
Graph 3.1.1


RBW 300 kHz
VBW 1 MHz
SWT 10 ms
Delta 2 [T1]
0.14 dB
10.128205128 MHz
Ref 25 dBm
Att 50 dB
Marker 1 [T1]
-0.88 dBm
2.431936667 GHz
A
1 PK
MAXH
D1 0.15 dBm
PS
3DB
AC
Center 2.437 GHz
2 MHz/
Span 20 MHz
Date: 28.FEB.2013 15:19:42

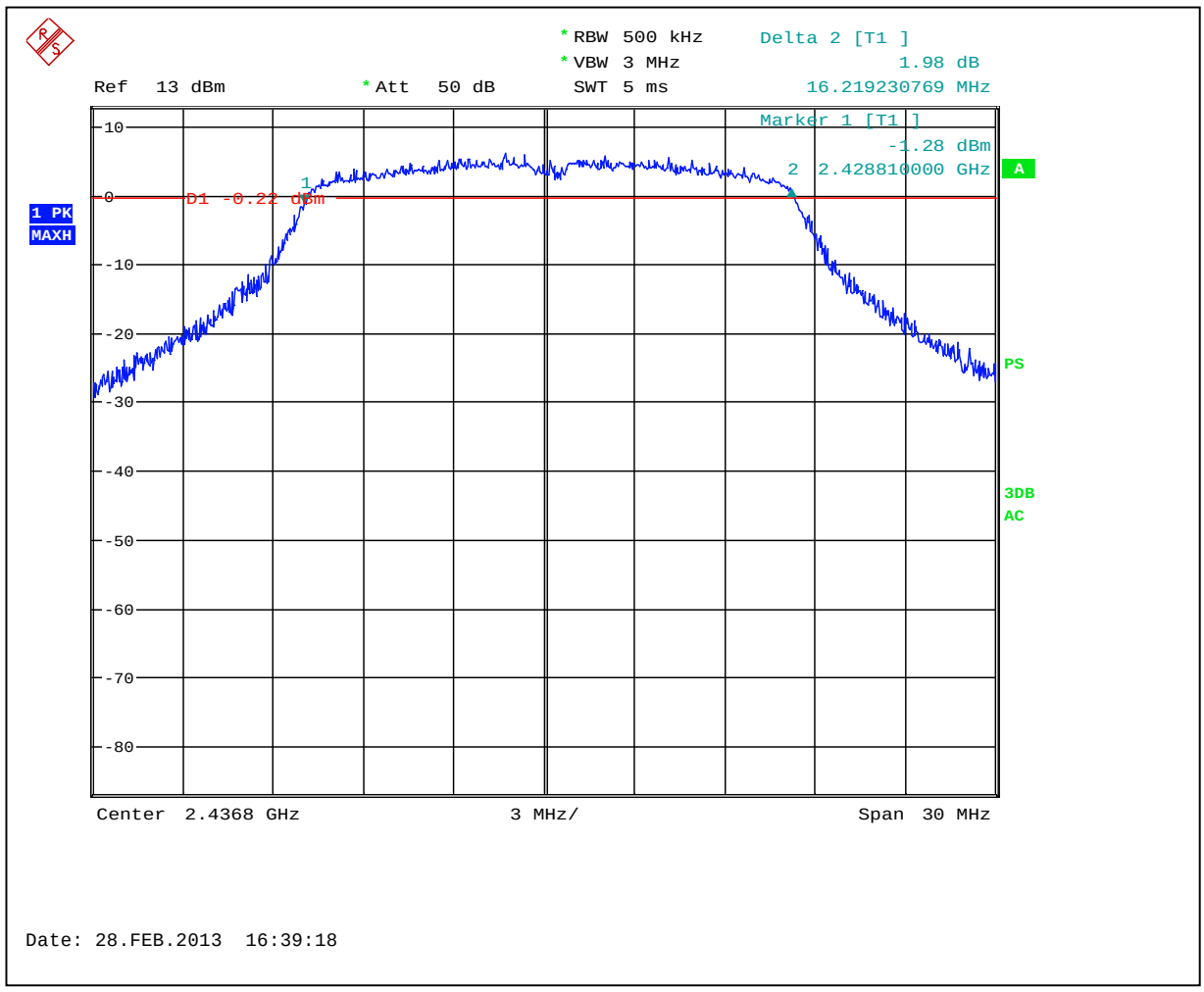
Graph 3.1.2


*RBW 300 kHz
*VBW 1 MHz
SWT 5 ms
Delta 2 [T1]
0.20 dB
10.084102564 MHz
Ref 25 dBm
*Att 50 dB
Marker 1 [T1]
-0.70 dBm
2.456955128 GHz
A
1 PK
MAXH
D1 0.18 dBm
1
2
PS
3DB
AC
Center 2.462 GHz
2 MHz/
Span 20 MHz
Date: 28.FEB.2013 15:15:34

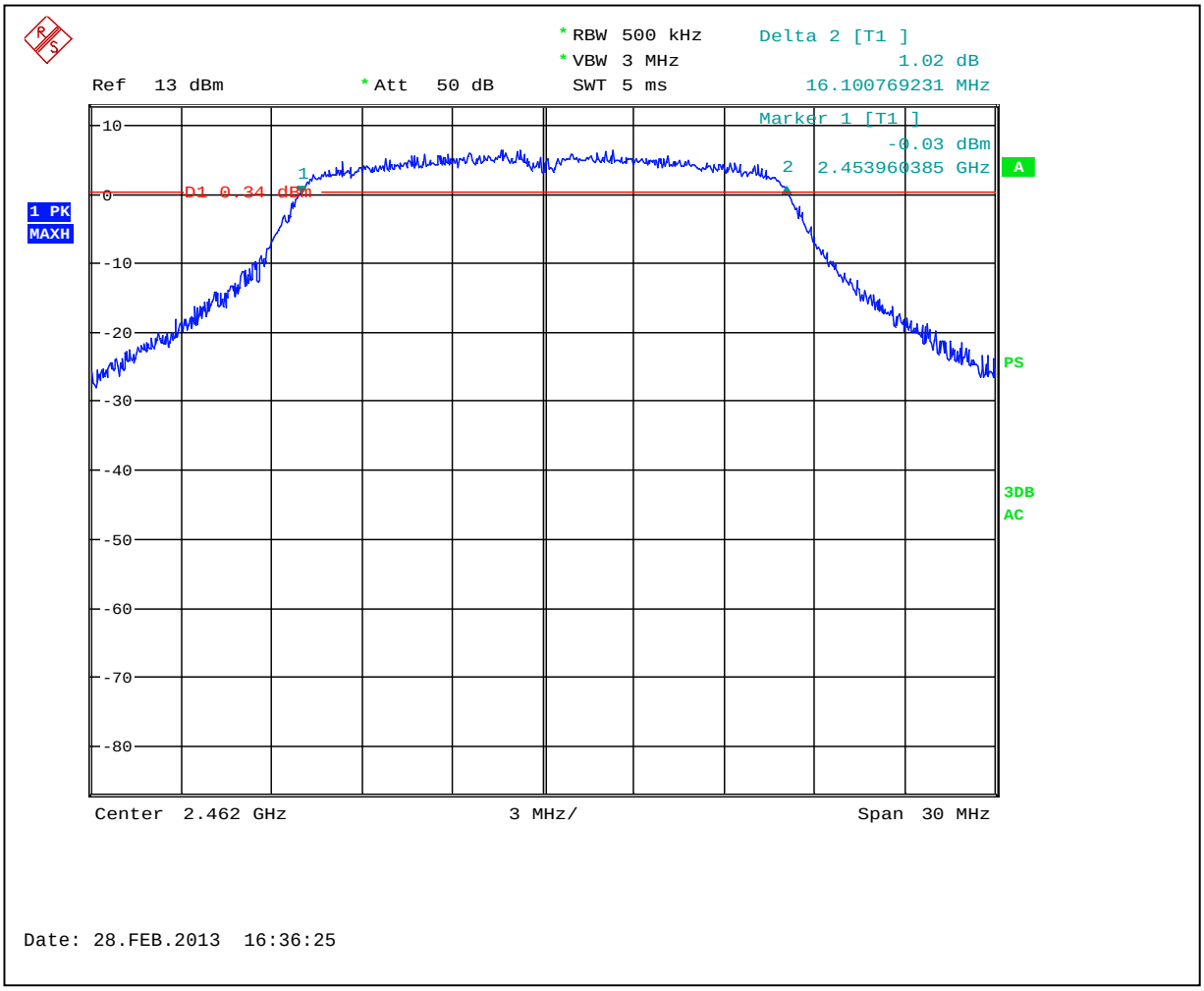
Graph 3.1.3


*RBW 500 kHz
*VBW 3 MHz
Ref 13 dBm
*Att 50 dB
SWT 5 ms
Delta 2 [T1]
0.53 dB
16.252692308 MHz
Marker 1 [T1]
-1.51 dBm
2.403822692 GHz
A
1 PK
MAXH
D1 -1.23 dBm
PS
3DB
AC
Center 2.4122 GHz
3 MHz/
Span 30 MHz
Date: 28.FEB.2013 16:38:01

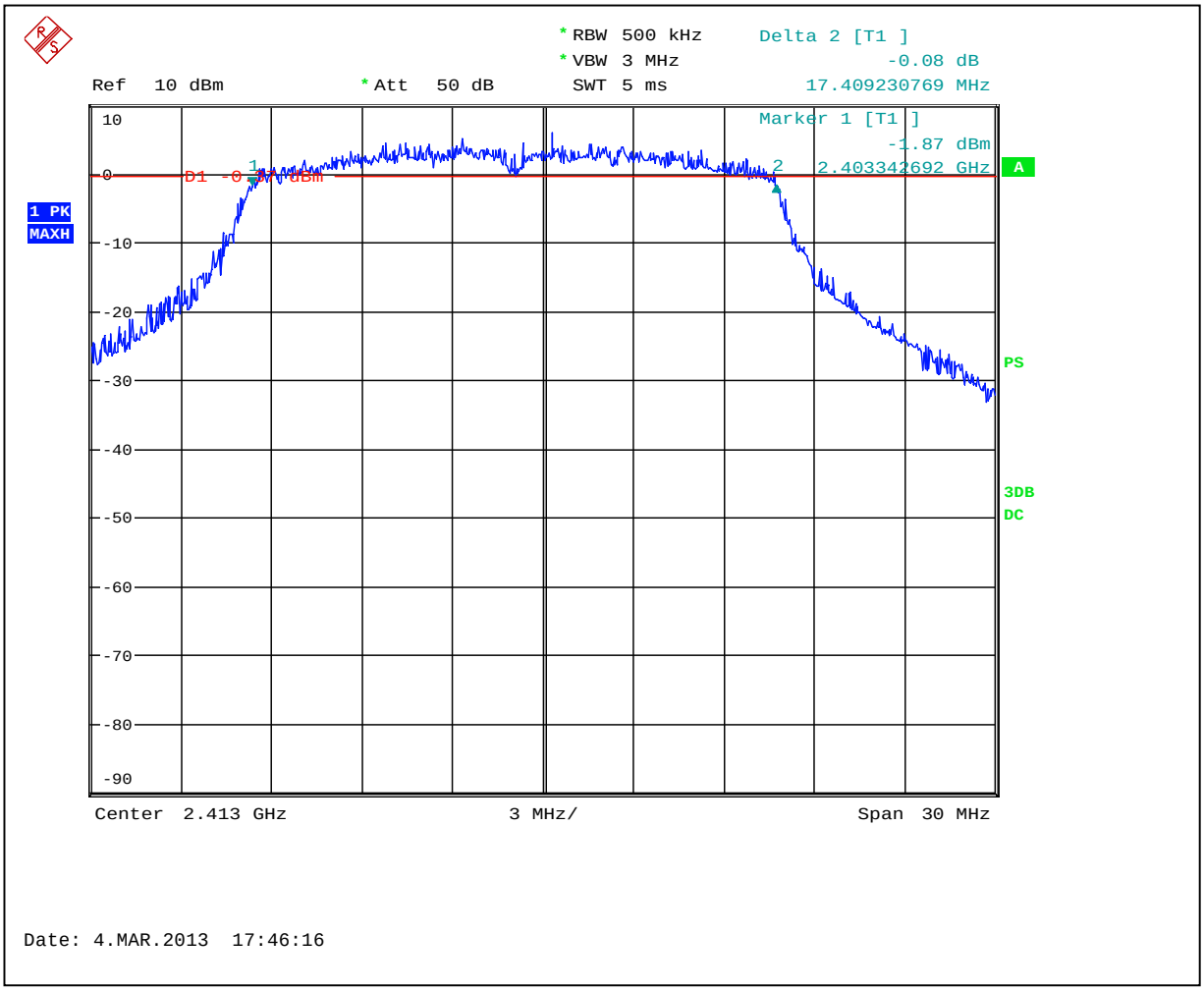
Graph 3.1.4


RBW 500 kHz
VBW 3 MHz
Ref 13 dBm
Att 50 dB
SWT 5 ms
Delta 2 [T1]
1.98 dB
16.219230769 MHz
Marker 1 [T1]
-1.28 dBm
2 2.428810000 GHz
D1 -0.22 dBm
1 PK
MAXH
A
PS
3DB
AC
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.4368 GHz
3 MHz/
Span 30 MHz
Date: 28.FEB.2013 16:39:18

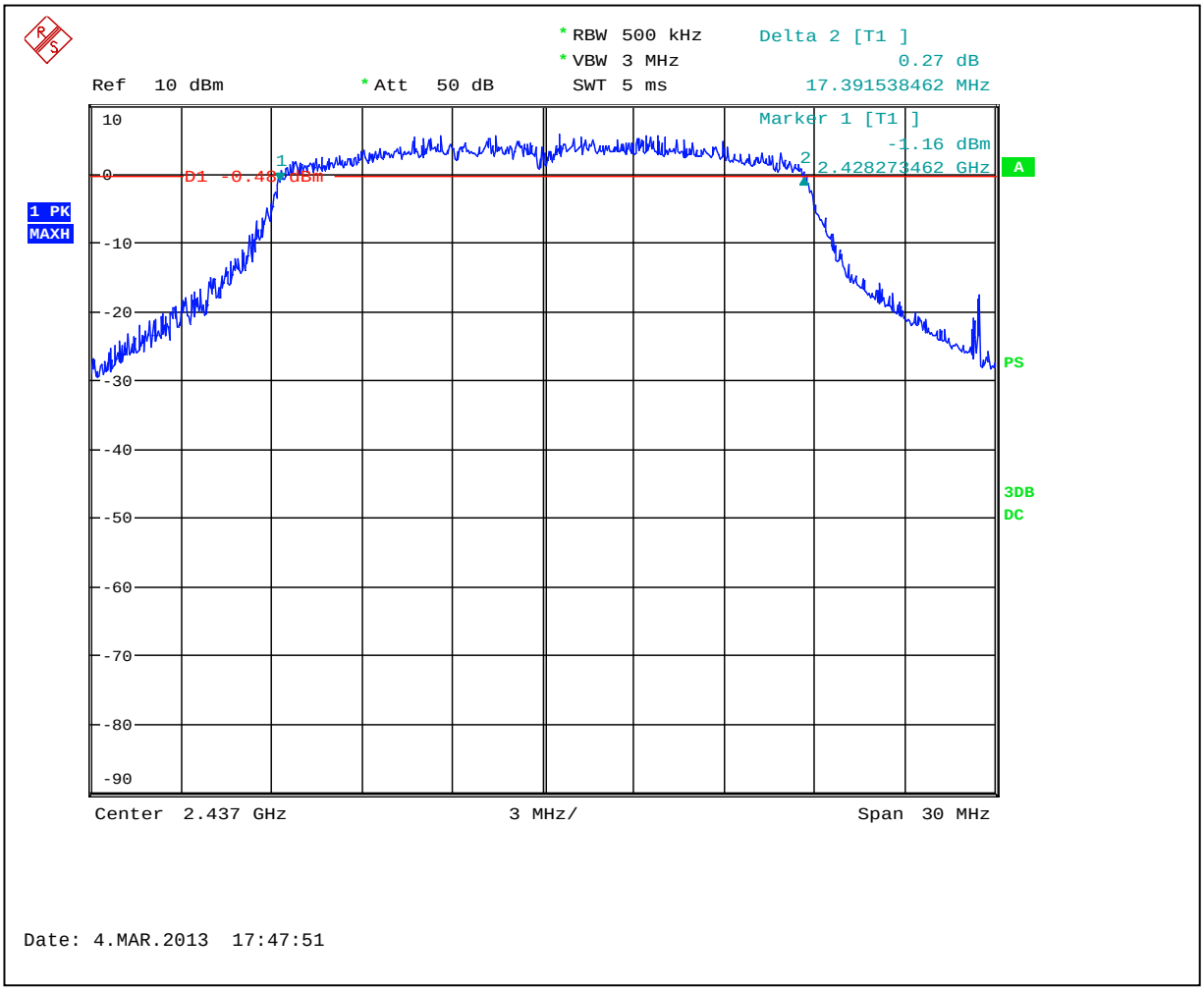
Graph 3.1.5


RBW 500 kHz
VBW 3 MHz
SWT 5 ms
Delta 2 [T1]
1.02 dB
16.100769231 MHz
Ref 13 dBm
Att 50 dB
Marker 1 [T1]
-0.03 dBm
2 2.453960385 GHz
D1 0.34 dBm
1 PK
MAXH
A
PS
3DB
AC
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.462 GHz
3 MHz/
Span 30 MHz
Date: 28.FEB.2013 16:36:25

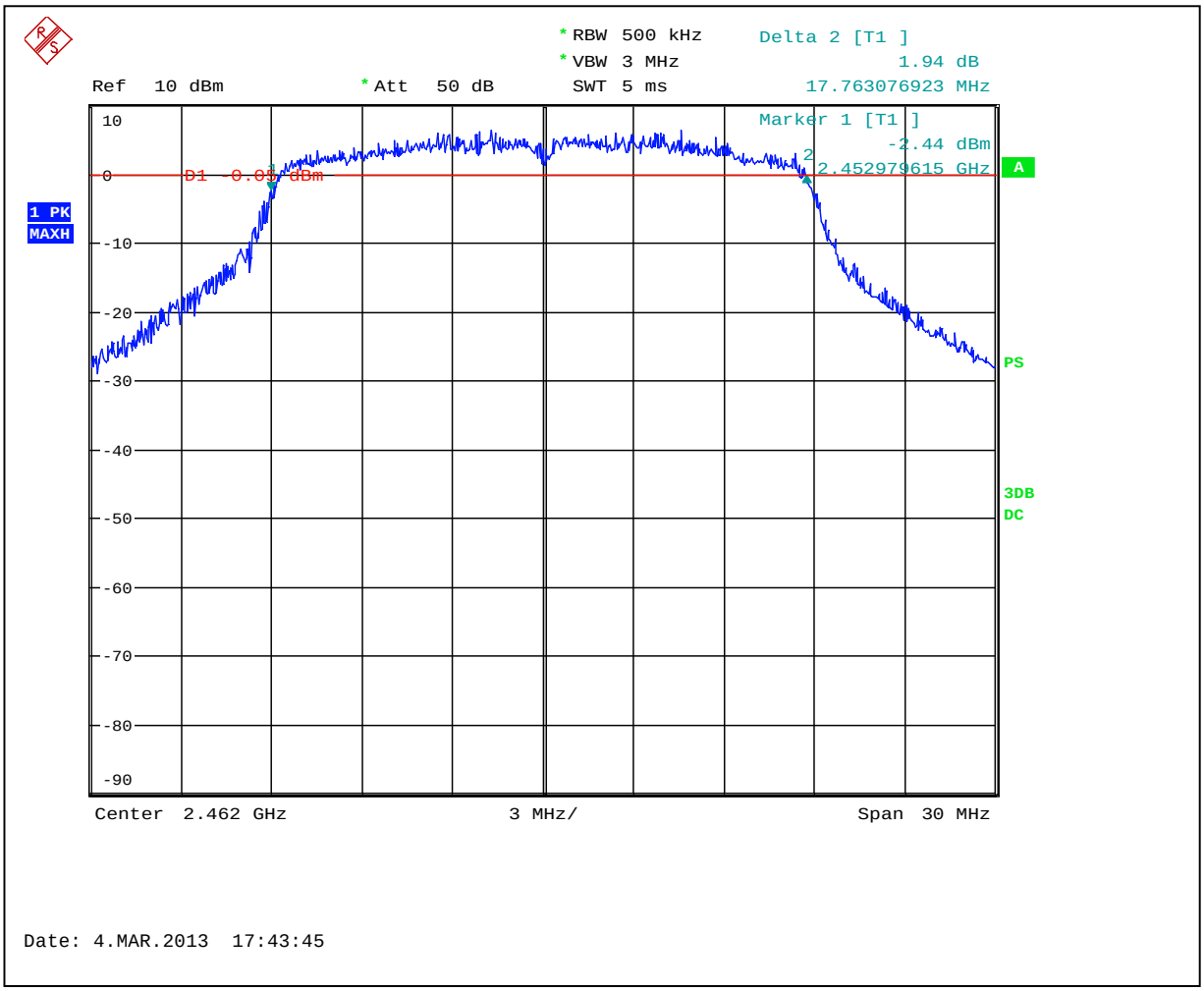
Graph 3.1.6


RBW 500 kHz
VBW 3 MHz
SWT 5 ms
Delta 2 [T1]
-0.08 dB
17.409230769 MHz
Ref 10 dBm
Att 50 dB
Marker 1 [T1]
-1.87 dBm
2.403342692 GHz
D1 -0.08 dBm
1 PK
MAXH
A
PS
3DB
DC
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.413 GHz
3 MHz/
Span 30 MHz
Date: 4.MAR.2013 17:46:16

Graph 3.1.7


*RBW 500 kHz
*VBW 3 MHz
SWT 5 ms
Delta 2 [T1]
0.27 dB
17.391538462 MHz
Ref 10 dBm
*Att 50 dB
Marker 1 [T1]
-1.16 dBm
2.428273462 GHz
D1 -0.40 dBm
1 PK
MAXH
A
PS
3DB
DC
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.437 GHz
3 MHz/
Span 30 MHz
Date: 4.MAR.2013 17:47:51

Graph 3.1.8


RBW 500 kHz
VBW 3 MHz
SWT 5 ms
Delta 2 [T1]
1.94 dB
17.763076923 MHz
Ref 10 dBm
Att 50 dB
Marker 1 [T1]
-2.44 dBm
2.452979615 GHz
D1 -0.03 dBm
1 PK
MAXH
A
PS
3DB
DC
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.462 GHz
3 MHz/
Span 30 MHz
Date: 4.MAR.2013 17:43:45

Graph 3.1.9

3.2 Maximum peak output power

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test result: **Pass**

Max. Margin: 8.3dB below the limits

802.11b

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**
2412.4	16.3	1.3	17.9	30	0	-12.1
Middle Frequency MHz						
2436.8	16.8	1.3	18.1	30	0	-11.9
Upper Frequency MHz						
2462.0	17.3	1.3	18.6	30	0	-11.4
RBW: **VBW:**	☐ 1MHz ☐ 3MHz ☒ 10MHz ☐ 1MHz ☐ 3MHz ☒ 10MHz					
Antenna Gain:	☒ < 6dBi ☐ >6dBi and = dBi, Output power reduction = dB					

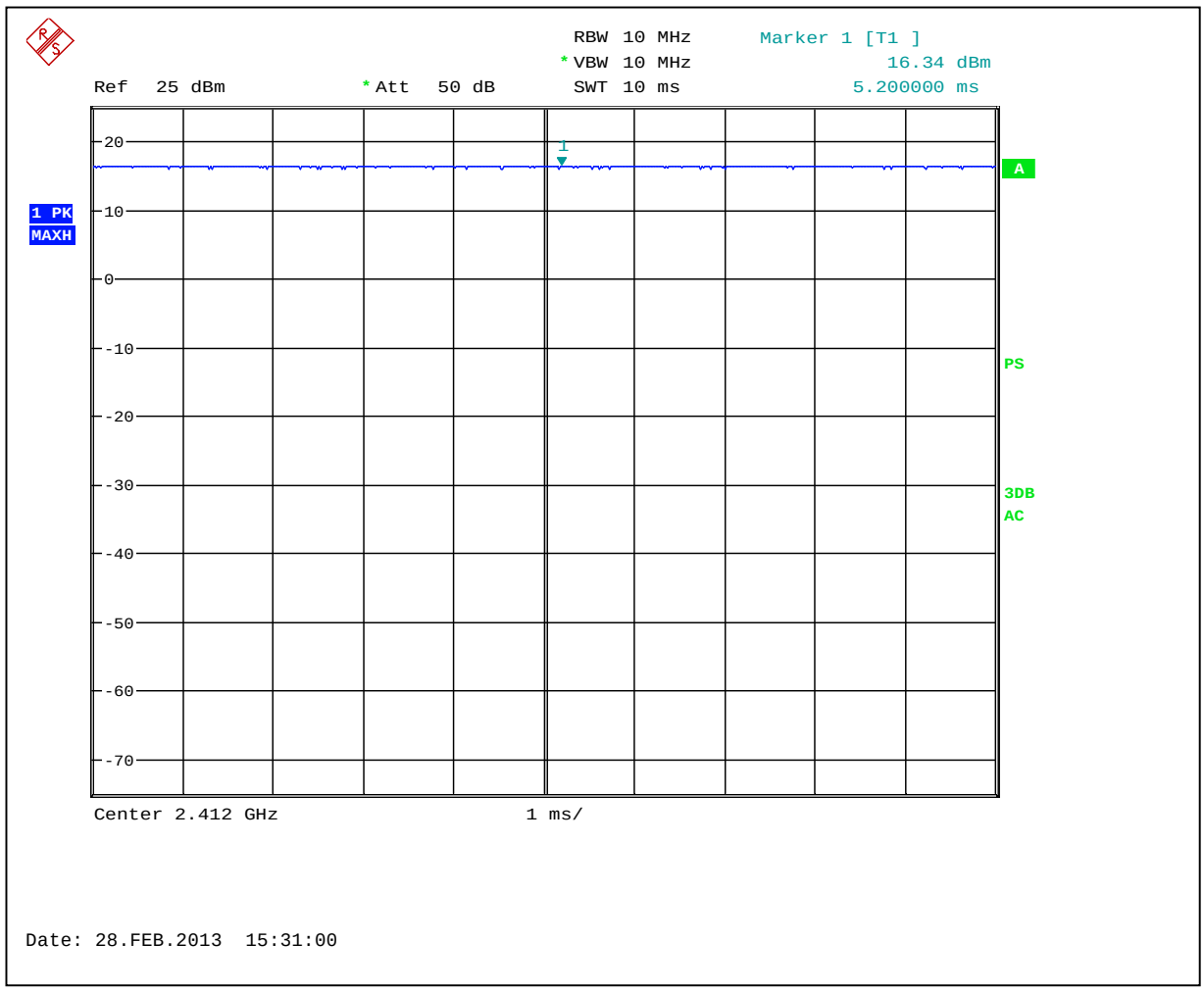
802.11g

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**
2412.4	19.4	1.3	20.7	30	0	-9.3
Middle Frequency MHz						
2436.8	19.9	1.3	21.2	30	0	-8.8
Upper Frequency MHz						
2462.0	20.4	1.3	21.7	30	0	-8.3
RBW: **VBW:**	☐ 1MHz ☐ 3MHz ☒ 10MHz ☐ 1MHz ☐ 3MHz ☒ 10MHz					
Antenna Gain:	☒ < 6dBi ☐ >6dBi and = dBi, Output power reduction = dB					

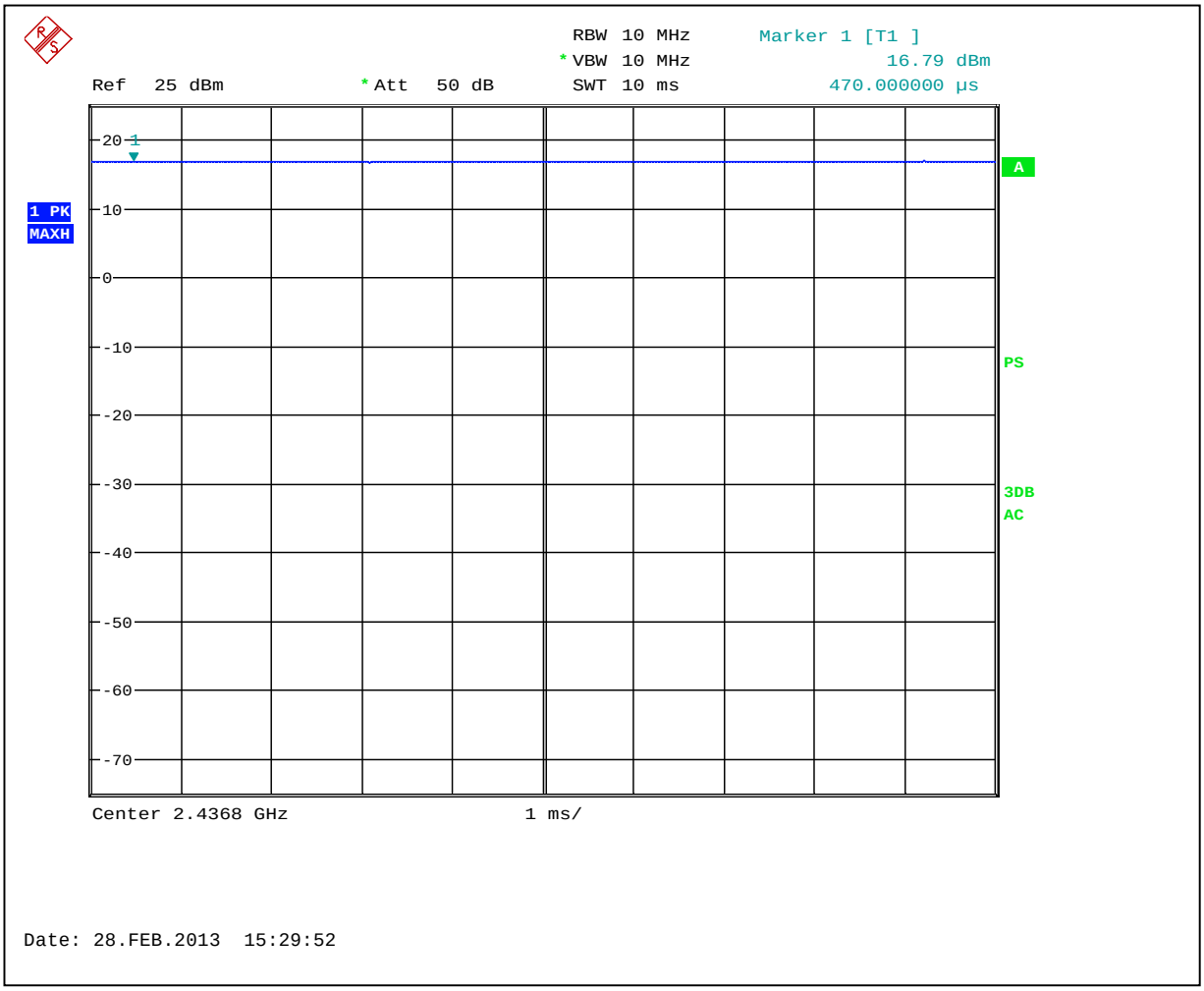
802.11n

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**
2412.4	17.7	1.3	19.0	30	0	-11.0
Middle Frequency MHz						
2436.8	18.2	1.3	19.5	30	0	-10.5
Upper Frequency MHz						
2462.0	18.5	1.3	19.8	30	0	-10.2
RBW:	☐ 1MHz	☐ 3MHz	☒ 10MHz			
VBW:	☐ 1MHz	☐ 3MHz	☒ 10MHz			
Antenna Gain:	☒ < 6dBi	☐ >6dBi and =		dBi, Output power reduction =		dB

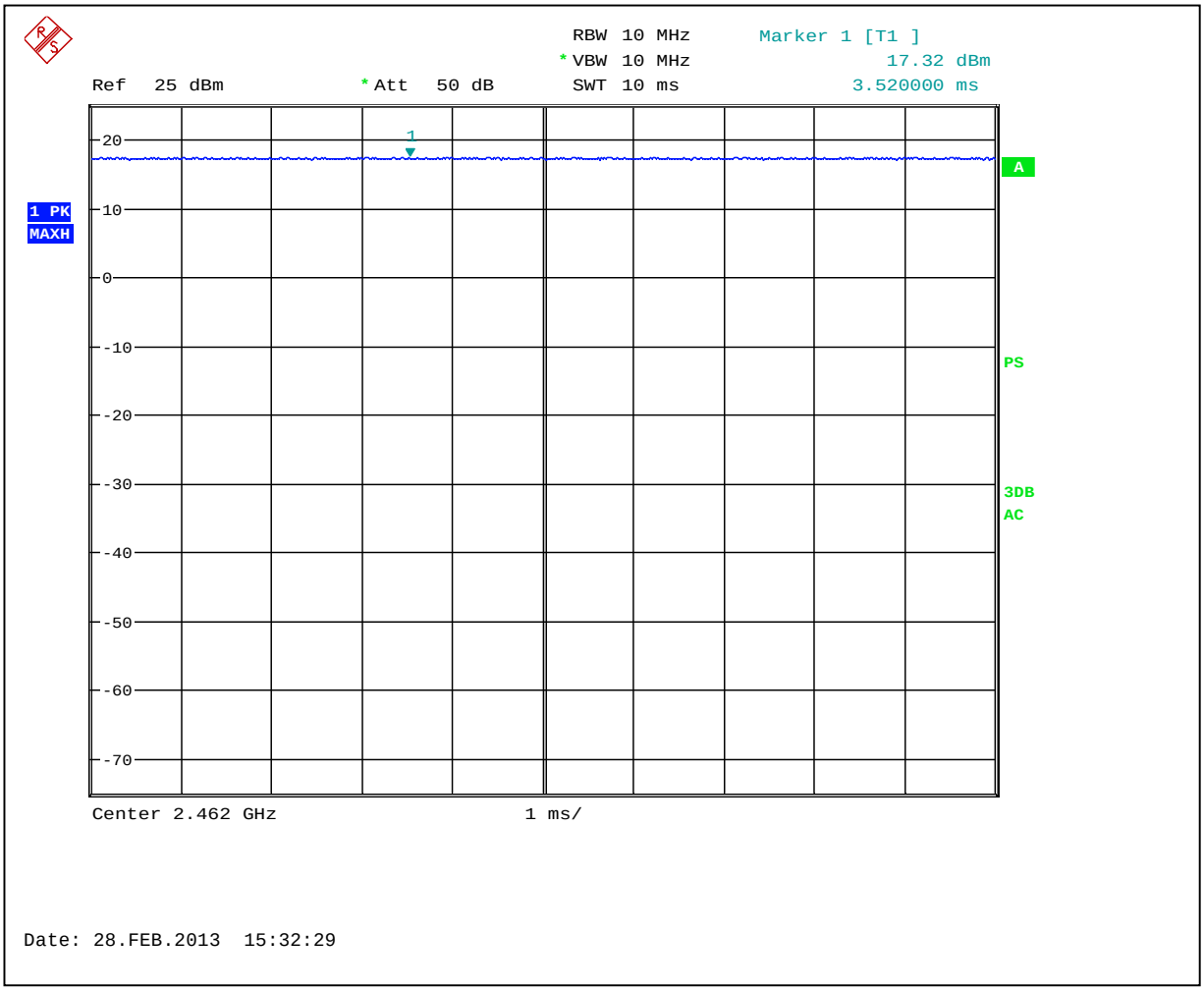
Notes: The maximum peak conducted output power limit is 1 W, or 30dBm
Graphs 3.2.1, 3.2.2, 3.2.3 for 802.11b show the conducted output power
Graphs 3.2.4, 3.2.5, 3.2.6 for 802.11g show the conducted output power
Graphs 3.2.7, 3.2.8, 3.2.9 for 802.11n show the conducted output power


RBW 10 MHz
*VBW 10 MHz
SWT 10 ms
Marker 1 [T1]
16.34 dBm
5.200000 ms
Ref 25 dBm
*Att 50 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.412 GHz
1 ms/
Date: 28.FEB.2013 15:31:00

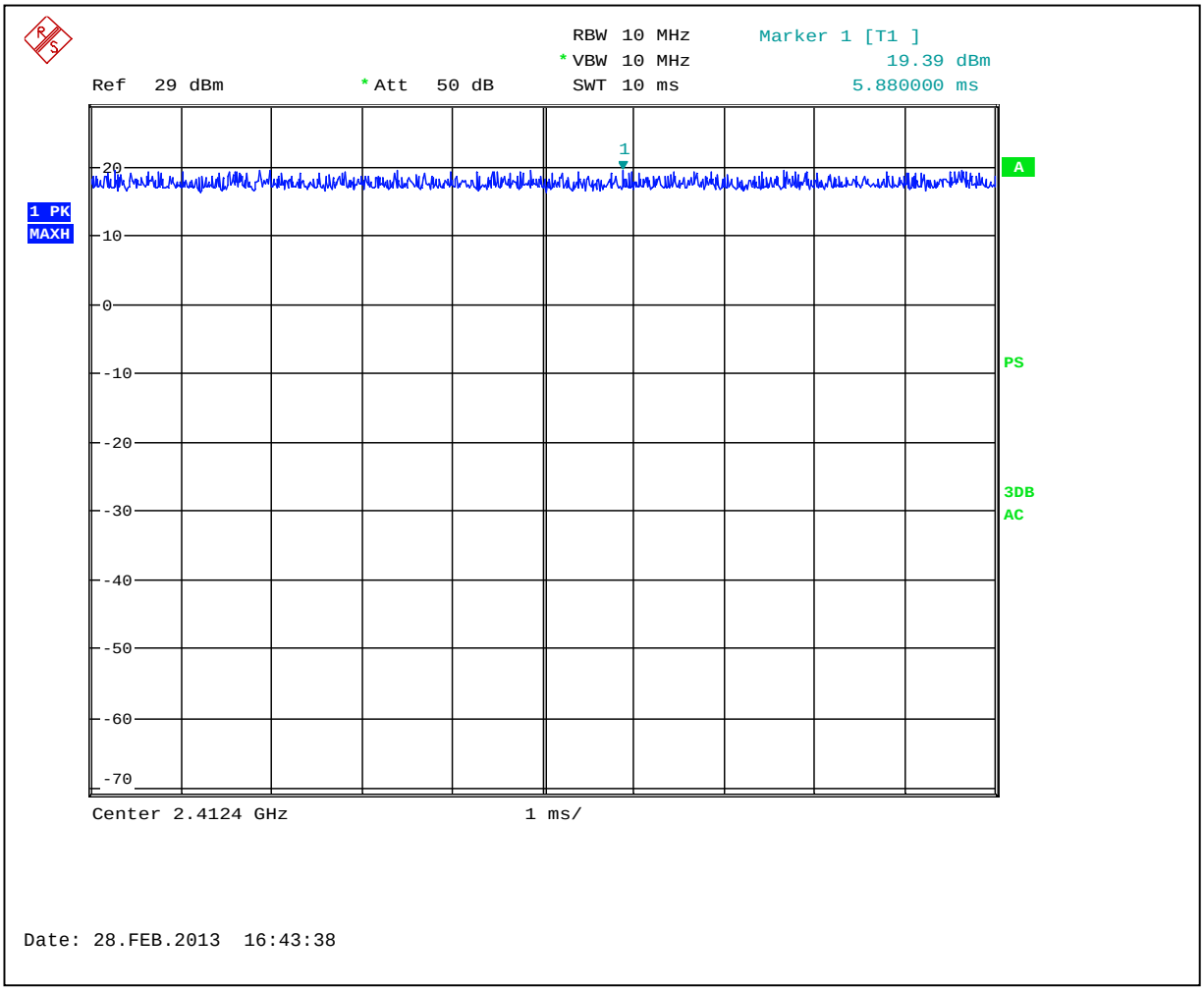
Graph 3.2.1


RBW 10 MHz
Marker 1 [T1]
*VBW 10 MHz
16.79 dBm
Ref 25 dBm
*Att 50 dB
SWT 10 ms
470.000000 µs
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.4368 GHz
1 ms/
Date: 28.FEB.2013 15:29:52

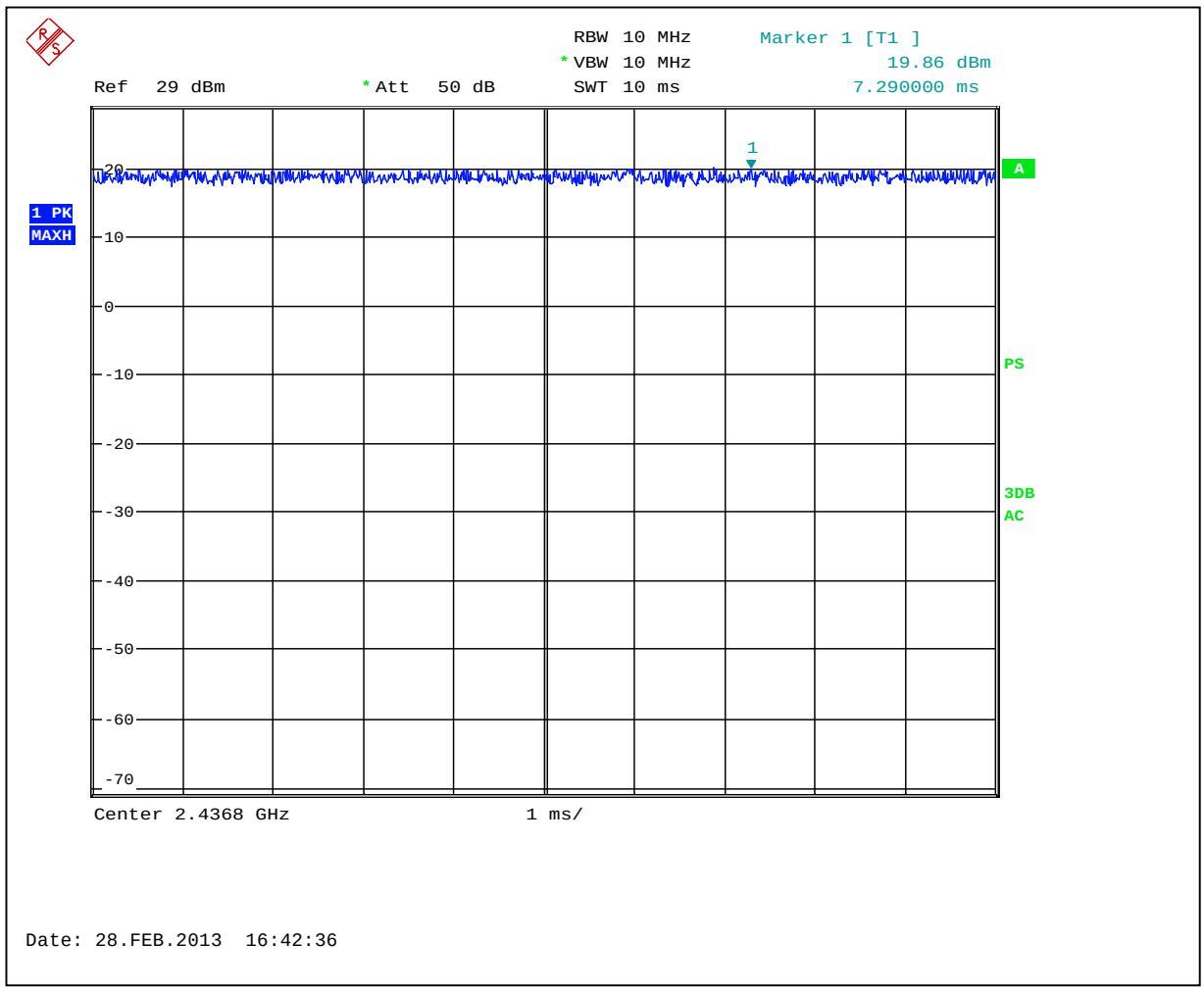
Graph 3.2.2


RBW 10 MHz
*VBW 10 MHz
SWT 10 ms
Marker 1 [T1]
17.32 dBm
3.520000 ms
Ref 25 dBm
*Att 50 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.462 GHz
1 ms/
Date: 28.FEB.2013 15:32:29

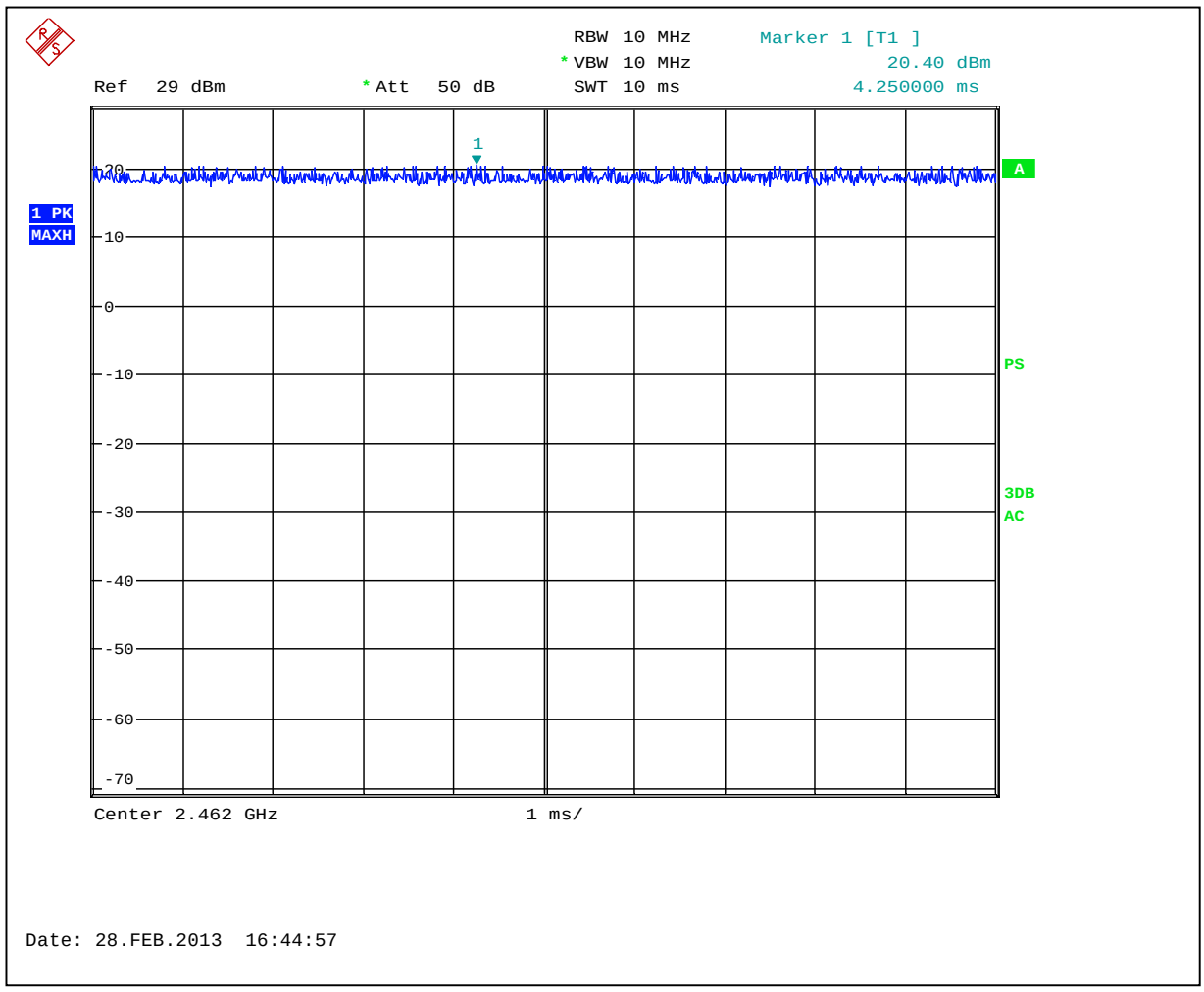
Graph 3.2.3


RBW 10 MHz
*VBW 10 MHz
SWT 10 ms
Marker 1 [T1]
19.39 dBm
5.880000 ms
Ref 29 dBm
*Att 50 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.4124 GHz
1 ms/
Date: 28.FEB.2013 16:43:38

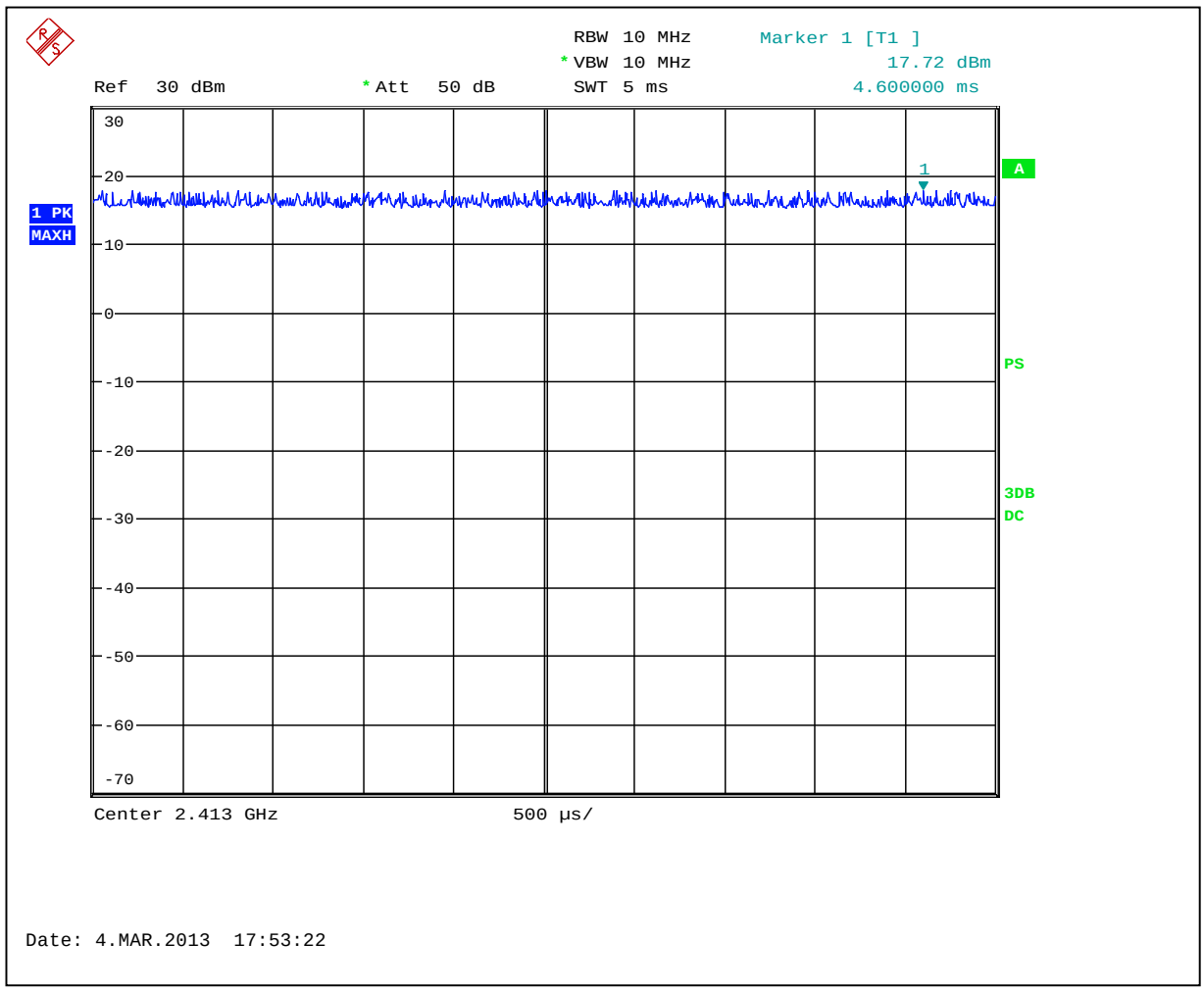
Graph 3.2.4


RBW 10 MHz
*VBW 10 MHz
SWT 10 ms
Marker 1 [T1]
19.86 dBm
7.290000 ms
Ref 29 dBm
*Att 50 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.4368 GHz
1 ms/
Date: 28.FEB.2013 16:42:36

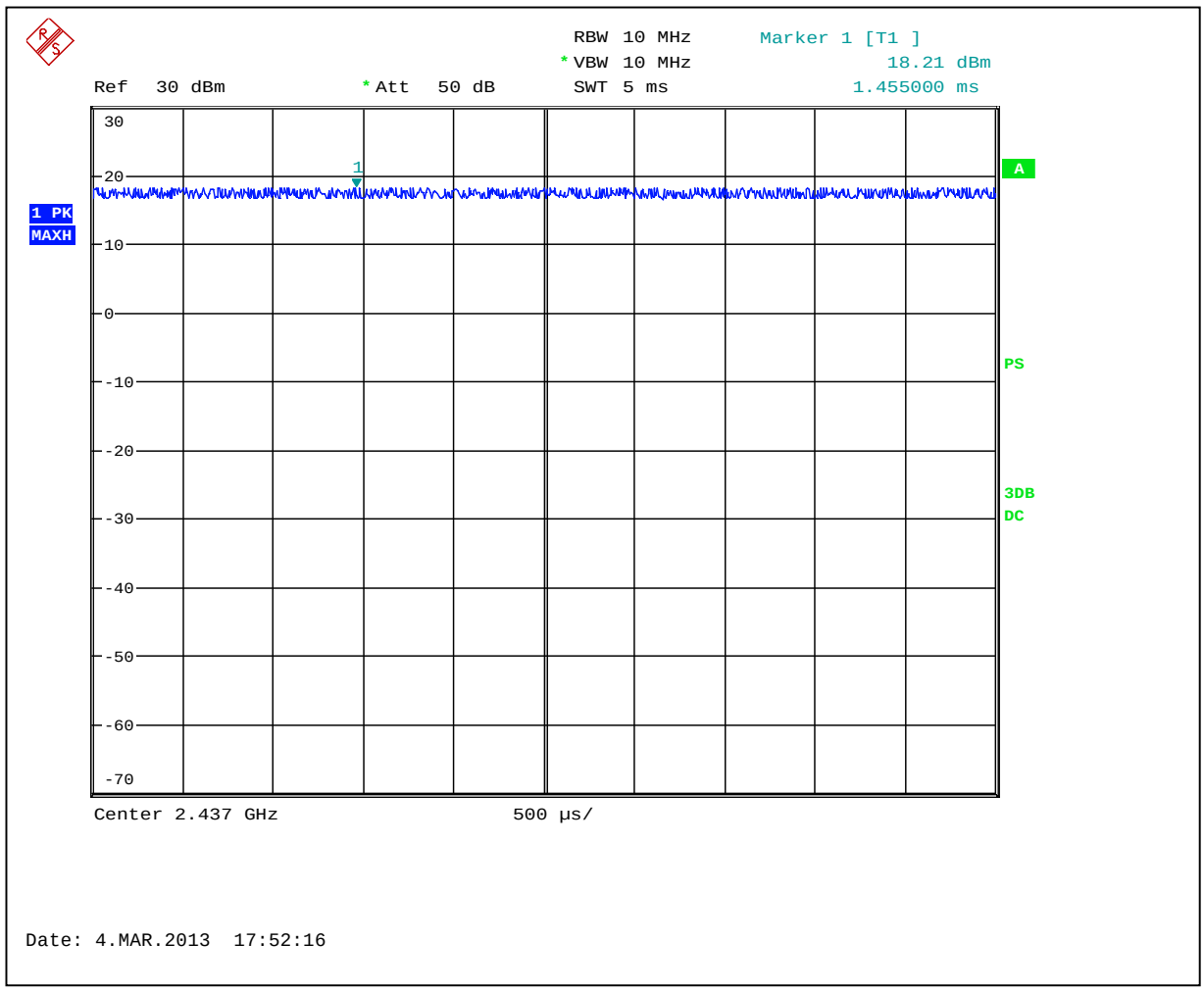
Graph 3.2.5


RBW 10 MHz
VBW 10 MHz
SWT 10 ms
Marker 1 [T1]
20.40 dBm
4.250000 ms
Ref 29 dBm
Att 50 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.462 GHz
1 ms/
Date: 28.FEB.2013 16:44:57

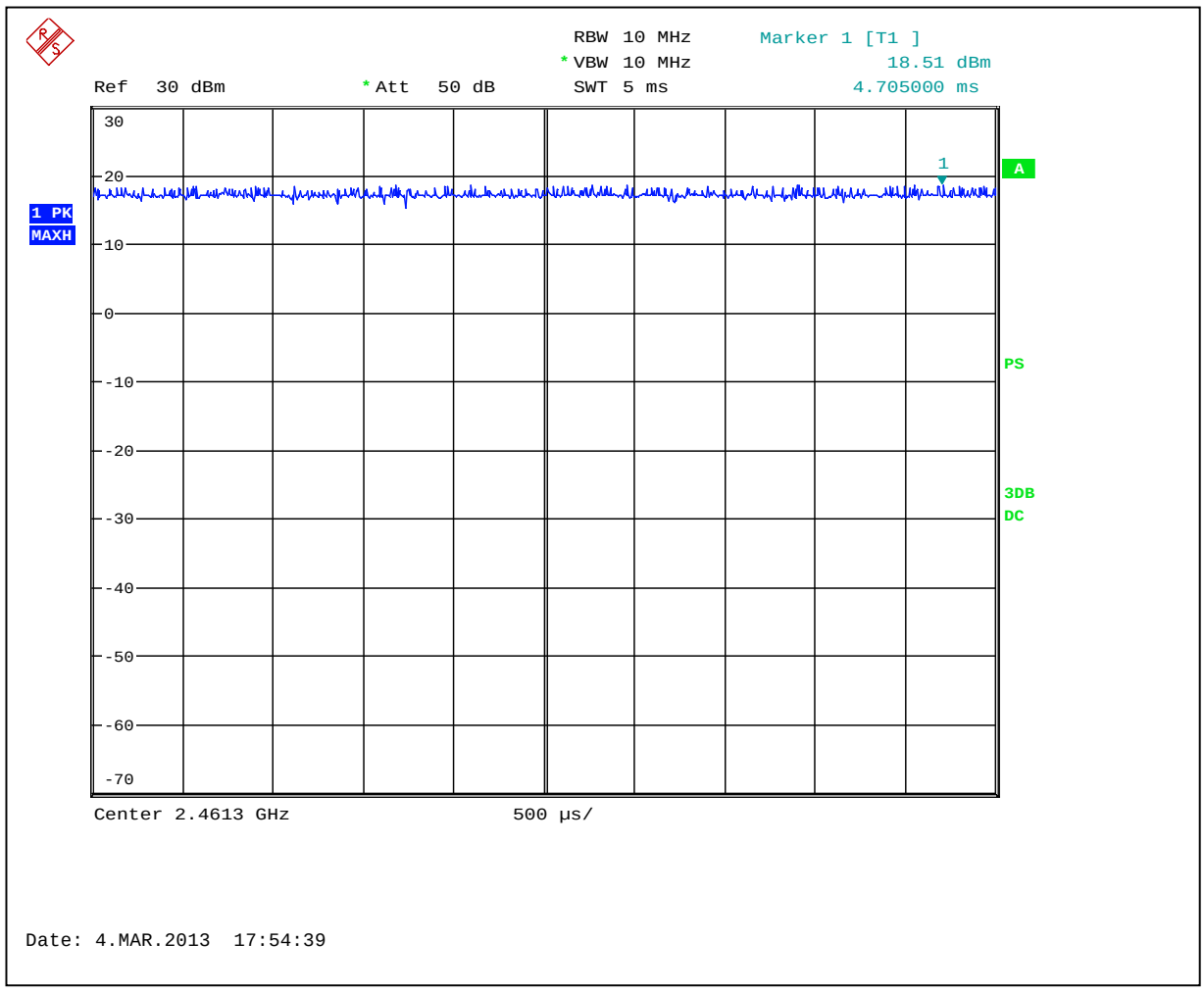
Graph 3.2.6


RBW 10 MHz
*VBW 10 MHz
SWT 5 ms
Marker 1 [T1]
17.72 dBm
4.600000 ms
Ref 30 dBm
*Att 50 dB
1 PK
MAXH
A
PS
3DB
DC
Center 2.413 GHz
500 µs/
Date: 4.MAR.2013 17:53:22

Graph 3.2.7


RBW 10 MHz
VBW 10 MHz
SWT 5 ms
Marker 1 [T1]
18.21 dBm
1.455000 ms
Ref 30 dBm
Att 50 dB
1 PK
MAXH
A
PS
3DB
DC
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.437 GHz
500 µs/
Date: 4.MAR.2013 17:52:16

Graph 3.2.8


RBW 10 MHz
VBW 10 MHz
SWT 5 ms
Marker 1 [T1]
18.51 dBm
4.705000 ms
Ref 30 dBm
Att 50 dB
1 PK
MAXH
A
PS
3DB
DC
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.4613 GHz
500 µs/
Date: 4.MAR.2013 17:54:39

Graph 3.2.9

3.3 Power spectral density

802.11b

Power Output:	☒ Conducted ☐ Radiated				
	Measured Density dBm	**Power Density at Antenna dBm**	**Calculated Power Spectral Density (dBm) at RBW 3kHz**	**Limit dBm**	**Margin dB**
Low Frequency Channel	4.4	5.7	-9.3	8	-17.3
Middle Frequency Channel	5.0	6.3	-8.7	8	-16.7
Upper Frequency Channel	5.2	6.5	-8.5	8	-16.5
Analyzer Settings:	☒ RBW=100KHz ☒ VBW=300KHz ☒ Span=15MHz ☒ Sweep=Auto				
Antenna Gain:	☒ < 6dBi and = 2.5dBi ☐ >6dBi and = ___ dBi, limit reduction = ___ dB				

Notes: The Power Spectral Density at Antenna was calculated adding the cable loss and attenuator of 1.3dB from the measured density value.
The final value of the Power Spectral Density was calculated from the Power Density at Antenna by applying a bandwidth correction factor (BWCF)=-15.2dB

Graphs 3.3.1, 3.3.2, 3.3.3 for 802.11b

802.11g

Power Output:	☒ Conducted ☐ Radiated				
	Measured Density dBm	**Power Density at Antenna dBm**	**Calculated Power Spectral Density (dBm) at RBW 3kHz**	**Limit dBm**	**Margin dB**
Low Frequency Channel	0.3	1.6	-13.4	8	-21.4
Middle Frequency Channel	1.0	2.3	-12.9	8	-20.9
Upper Frequency Channel	1.3	2.6	-12.6	8	-20.6
Analyzer Settings:	☒ RBW=100KHz ☒ VBW=300KHz ☒ Span=20MHz ☒ Sweep=Auto				
Antenna Gain:	☒ < 6dBi and = 2.5dBi ☐ >6dBi and = dBi, limit reduction = dB				

Notes: The Power Spectral Density at Antenna was calculated adding the cable loss and attenuator of 1.3dB from the measured density value.
The final value of the Power Spectral Density was calculated from the Power Density at Antenna by applying a bandwidth correction factor (BWCF)=-15.2dB

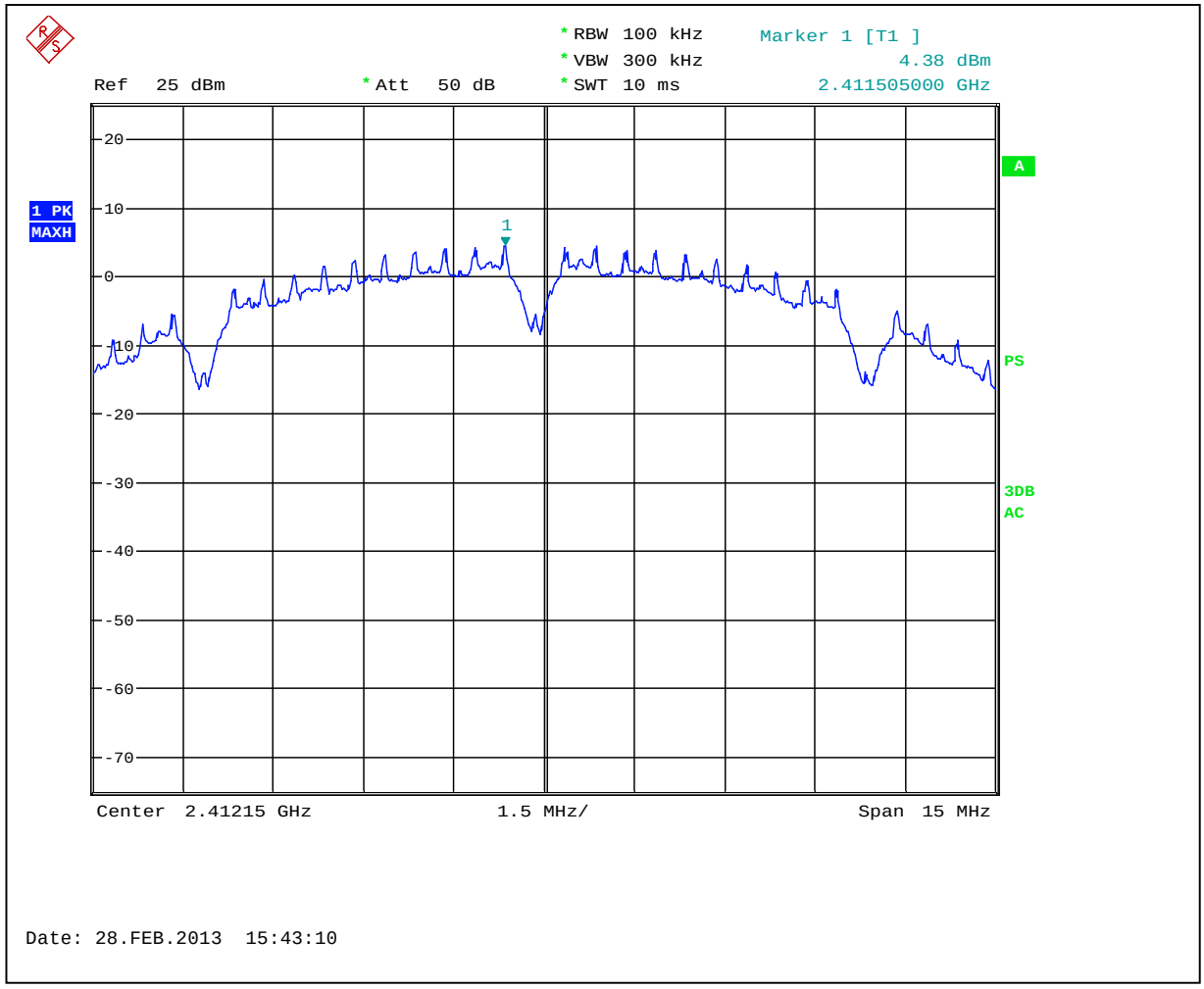
Graphs 3.3.4, 3.3.5, 3.3.6 for 802.11g

802.11n

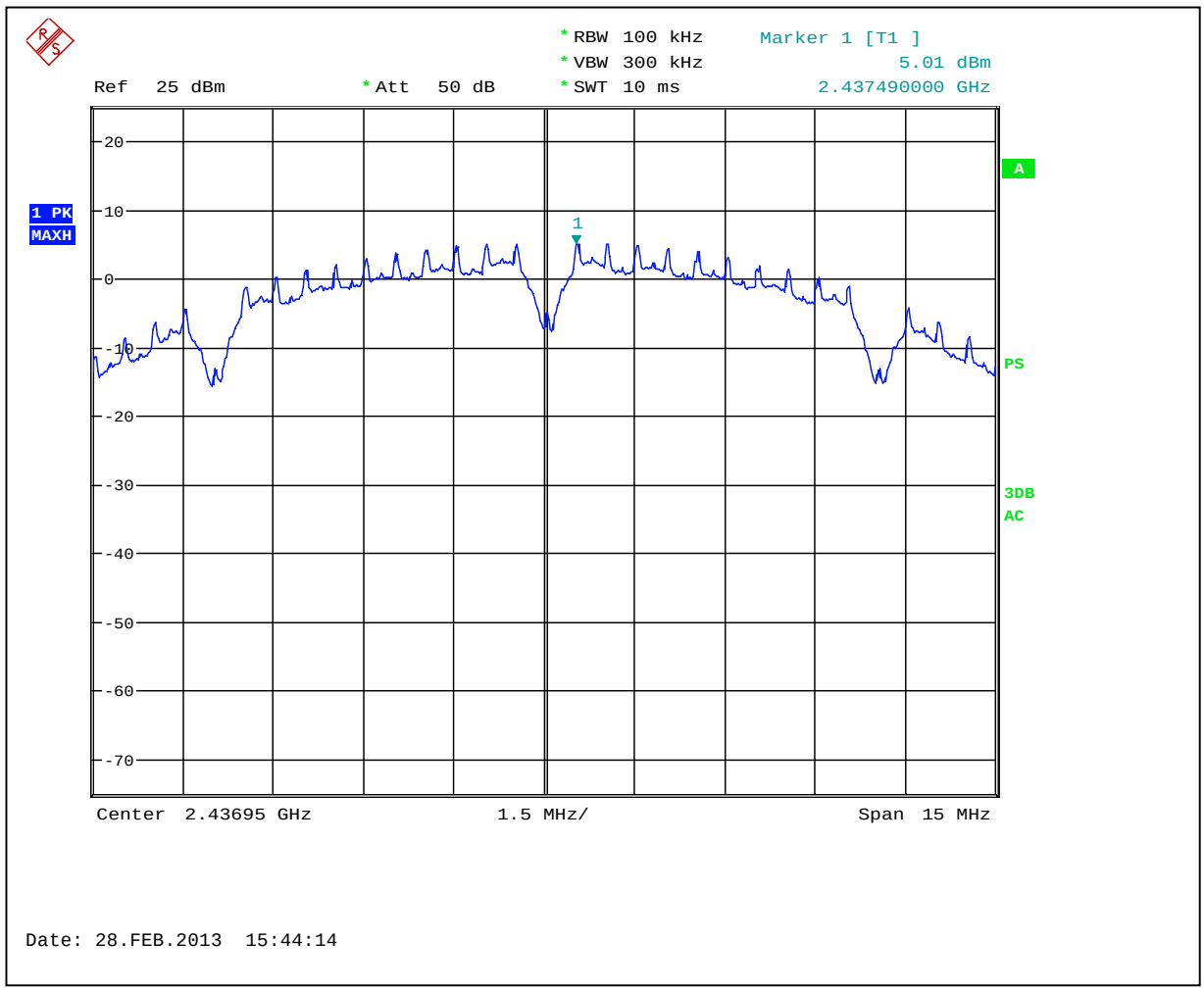
Power Output:	☒ Conducted ☐ Radiated				
	Measured Density dBm	**Power Density at Antenna dBm**	**Calculated Power Spectral Density (dBm) at RBW 3kHz**	**Limit dBm**	**Margin dB**
Low Frequency Channel	0.0	1.3	-13.9	8	-21.9
Middle Frequency Channel	1.0	2.3	-12.9	8	-20.9
Upper Frequency Channel	0.9	2.2	-13.0	8	-21.0
Analyzer Settings:	☒ RBW=100KHz ☒ VBW=300KHz ☒ Span=25MHz ☒ Sweep=Auto				
Antenna Gain:	☒ < 6dBi and = 2.5dBi ☐ >6dBi and = dBi, limit reduction = dB				

Notes: The Power Spectral Density at Antenna was calculated adding the cable loss and attenuator of 1.3dB from the measured density value.
The final value of the Power Spectral Density was calculated from the Power Density at Antenna by applying a bandwidth correction factor (BWCF)=-15.2dB

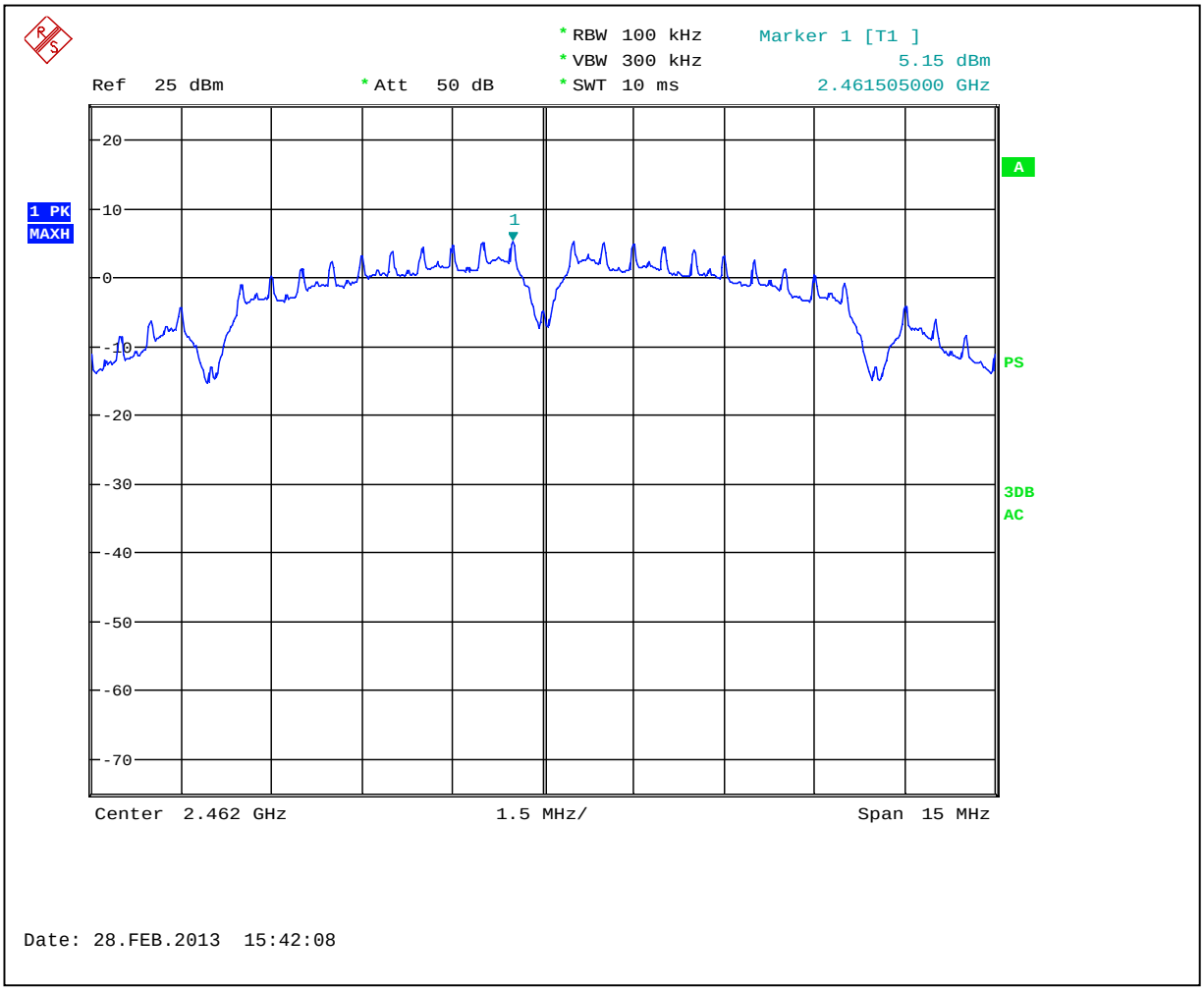
Graphs 3.3.7, 3.3.8, 3.3.9 for 802.11n


*RBW 100 kHz
*VBW 300 kHz
*SWT 10 ms
Marker 1 [T1]
4.38 dBm
2.411505000 GHz
Ref 25 dBm
*Att 50 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
1
Center 2.41215 GHz
1.5 MHz/
Span 15 MHz
Date: 28.FEB.2013 15:43:10

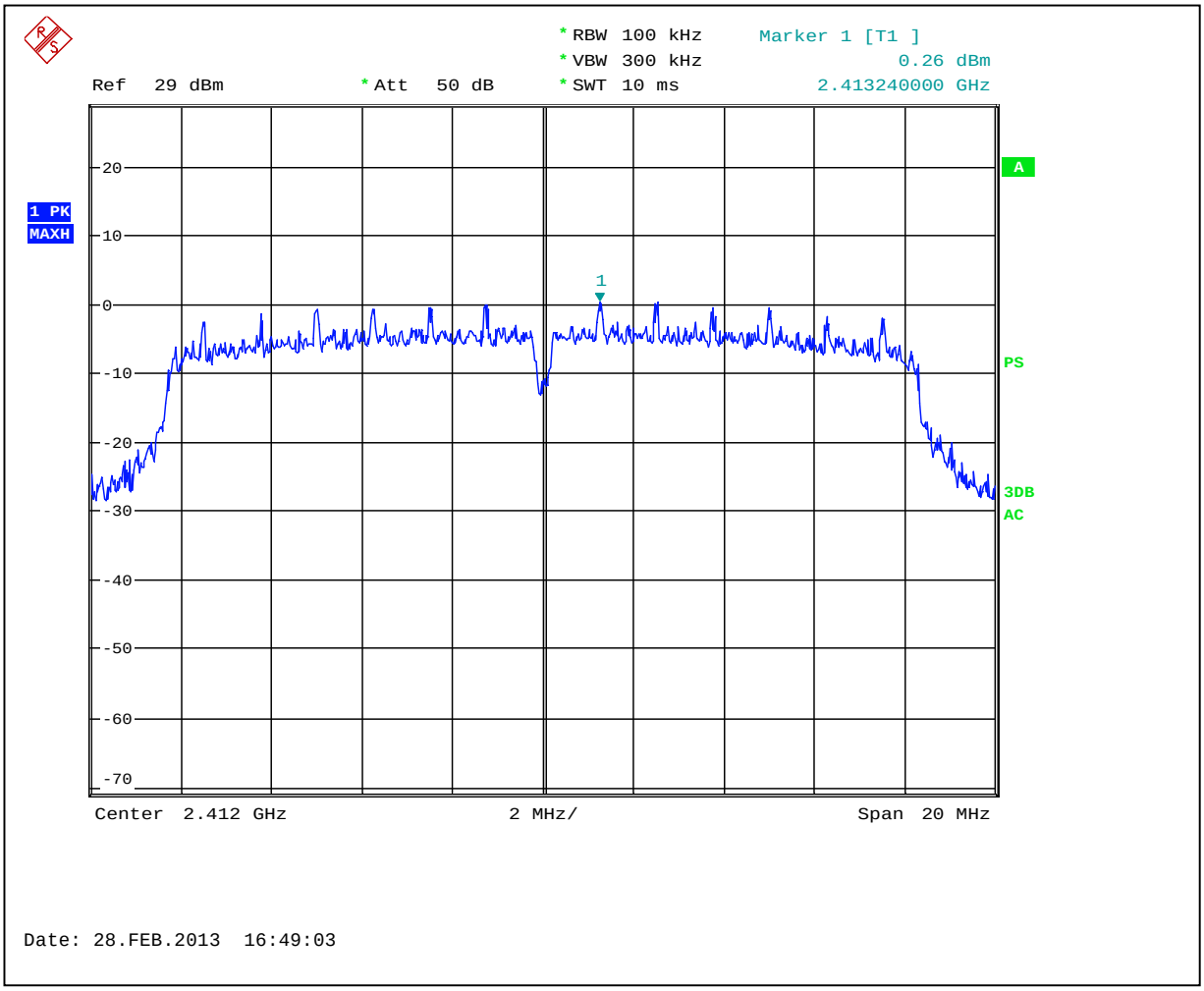
Graph 3.3.1


*RBW 100 kHz
*VBW 300 kHz
*SWT 10 ms
Marker 1 [T1]
5.01 dBm
2.437490000 GHz
Ref 25 dBm
*Att 50 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.43695 GHz
1.5 MHz/
Span 15 MHz
Date: 28.FEB.2013 15:44:14

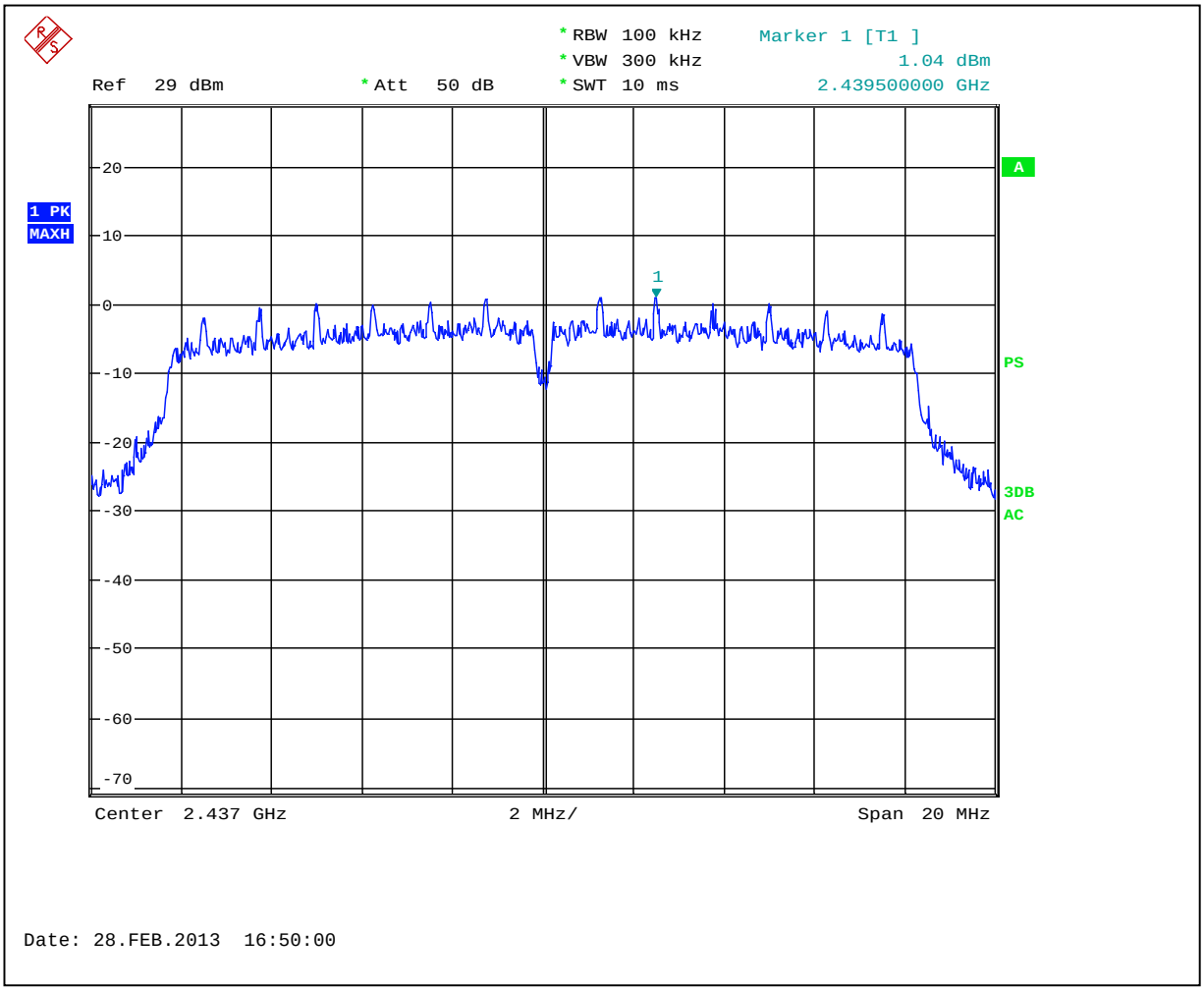
Graph 3.3.2


*RBW 100 kHz
*VBW 300 kHz
*SWT 10 ms
Marker 1 [T1]
5.15 dBm
2.461505000 GHz
Ref 25 dBm
*Att 50 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.462 GHz
1.5 MHz/
Span 15 MHz
Date: 28.FEB.2013 15:42:08

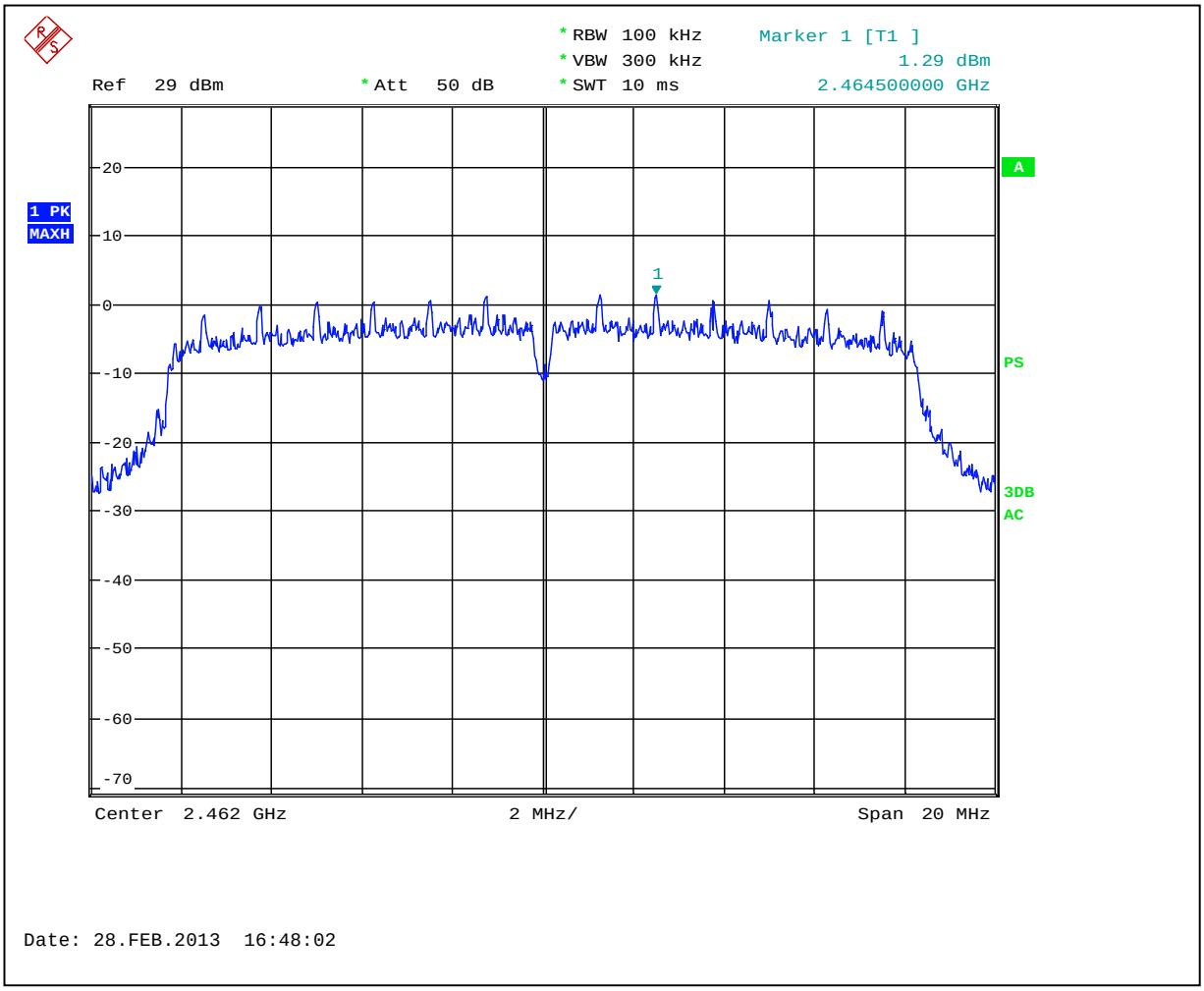
Graph 3.3.3


*RBW 100 kHz
*VBW 300 kHz
*SWT 10 ms
Marker 1 [T1]
0.26 dBm
2.413240000 GHz
Ref 29 dBm
*Att 50 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
1
Center 2.412 GHz
2 MHz/
Span 20 MHz
Date: 28.FEB.2013 16:49:03

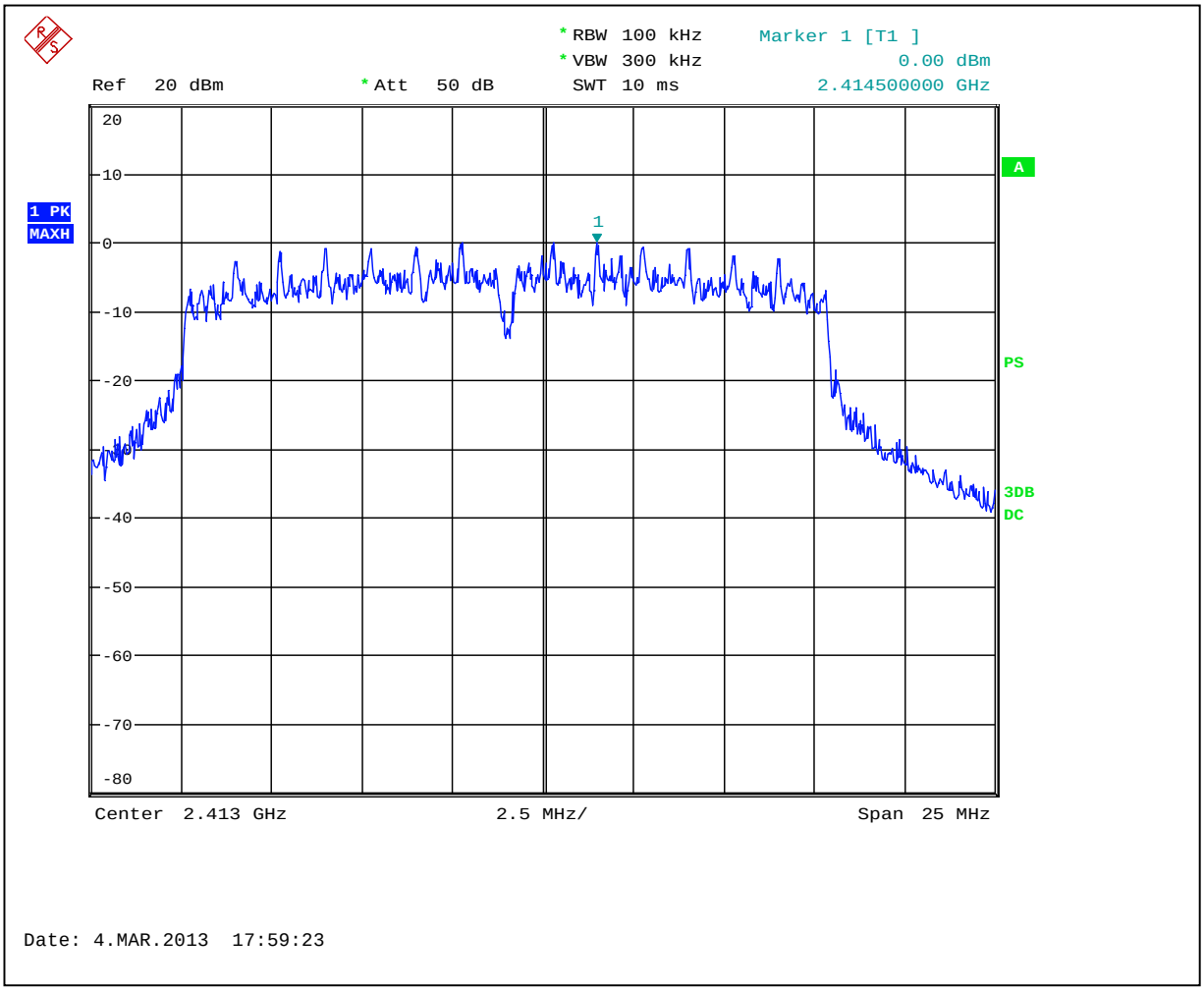
Graph 3.3.4


*RBW 100 kHz
*VBW 300 kHz
*SWT 10 ms
Marker 1 [T1]
1.04 dBm
2.439500000 GHz
Ref 29 dBm
*Att 50 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
1
Center 2.437 GHz
2 MHz/
Span 20 MHz
Date: 28.FEB.2013 16:50:00

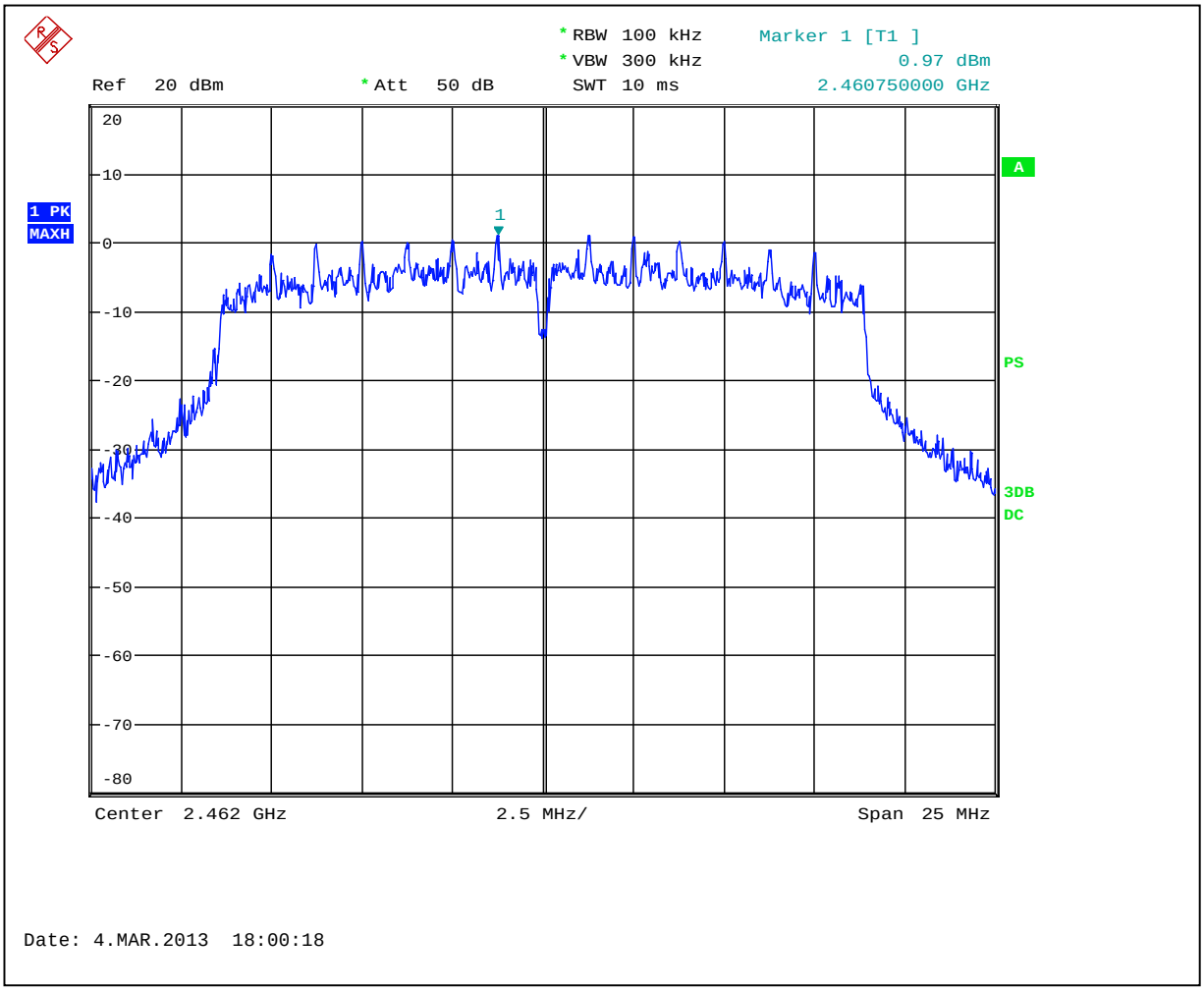
Graph 3.3.5


*RBW 100 kHz
*VBW 300 kHz
*SWT 10 ms
Marker 1 [T1]
1.29 dBm
2.464500000 GHz
Ref 29 dBm
*Att 50 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.462 GHz
2 MHz/
Span 20 MHz
Date: 28.FEB.2013 16:48:02

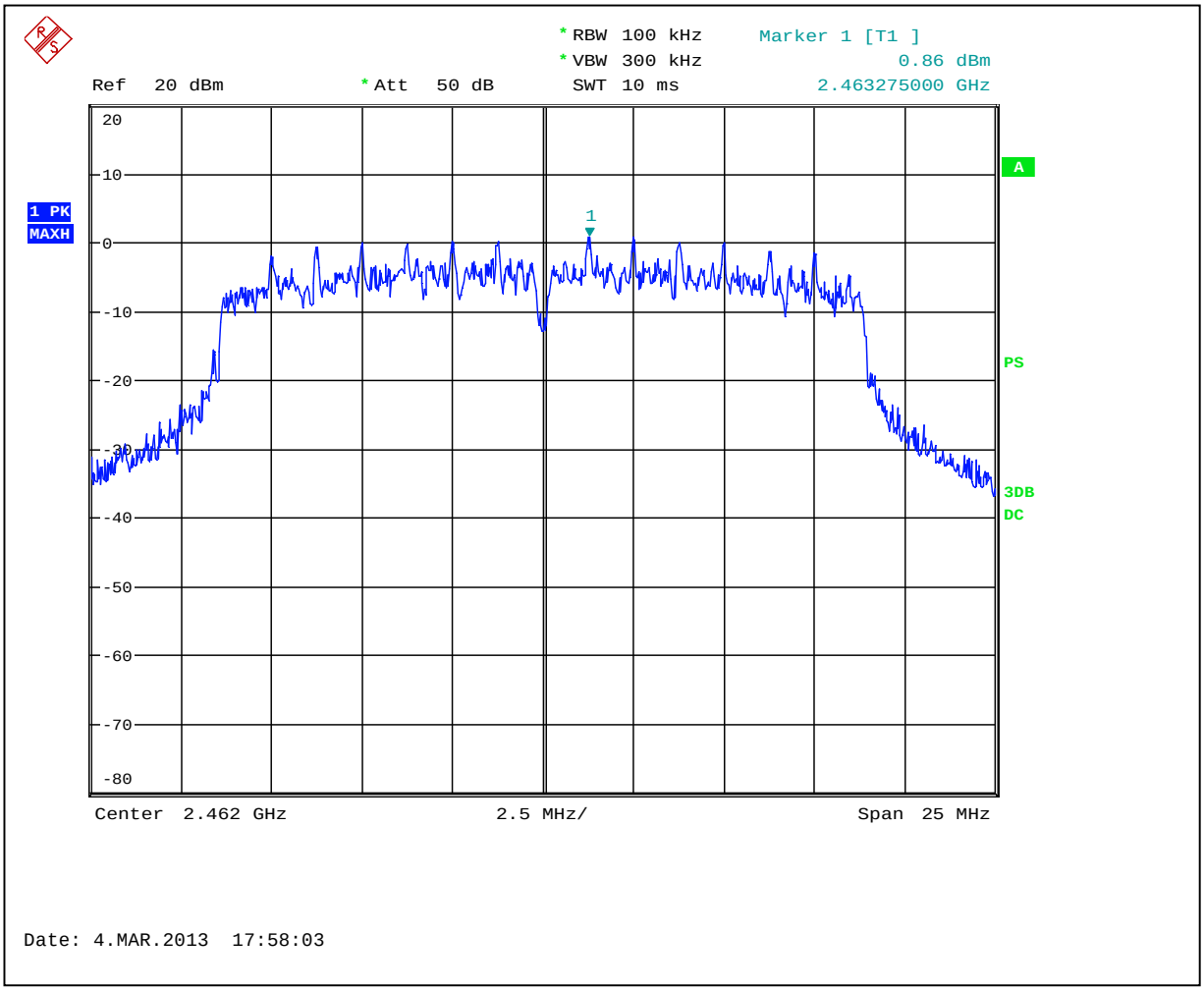
Graph 3.3.6


*RBW 100 kHz
*VBW 300 kHz
Marker 1 [T1]
0.00 dBm
2.414500000 GHz
Ref 20 dBm
*Att 50 dB
SWT 10 ms
1 PK
MAXH
A
PS
3DB
DC
20
10
0
-10
-20
-40
-50
-60
-70
-80
Center 2.413 GHz
2.5 MHz/
Span 25 MHz
Date: 4.MAR.2013 17:59:23

Graph 3.3.7


*RBW 100 kHz
*VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
0.97 dBm
2.460750000 GHz
Ref 20 dBm
*Att 50 dB
1 PK
MAXH
A
PS
3DB
DC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.462 GHz
2.5 MHz/
Span 25 MHz
Date: 4.MAR.2013 18:00:18

Graph 3.3.8


*RBW 100 kHz
*VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
0.86 dBm
2.463275000 GHz
Ref 20 dBm
*Att 50 dB
1 PK
MAXH
A
PS
3DB
DC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.462 GHz
2.5 MHz/
Span 25 MHz
Date: 4.MAR.2013 17:58:03

Graph 3.3.9

3.4 Antenna conducted spurious emissions

802.11b

	Minimum Measured Attenuation dB	Minimum Allowed Attenuation dB	Margin dB
Low Frequency Channel	48.0	20	-28.0
Middle Frequency Channel	47.4	20	-27.4
Upper Frequency Channel	47.1	20	-27.1
Analyzer Settings:	☒ RBW=100KHz		
Minimum Allowed Attenuation:	☒ 20dB ☐ 30dB (for digital systems with conducted power measured using RMS averaging over a time interval)		

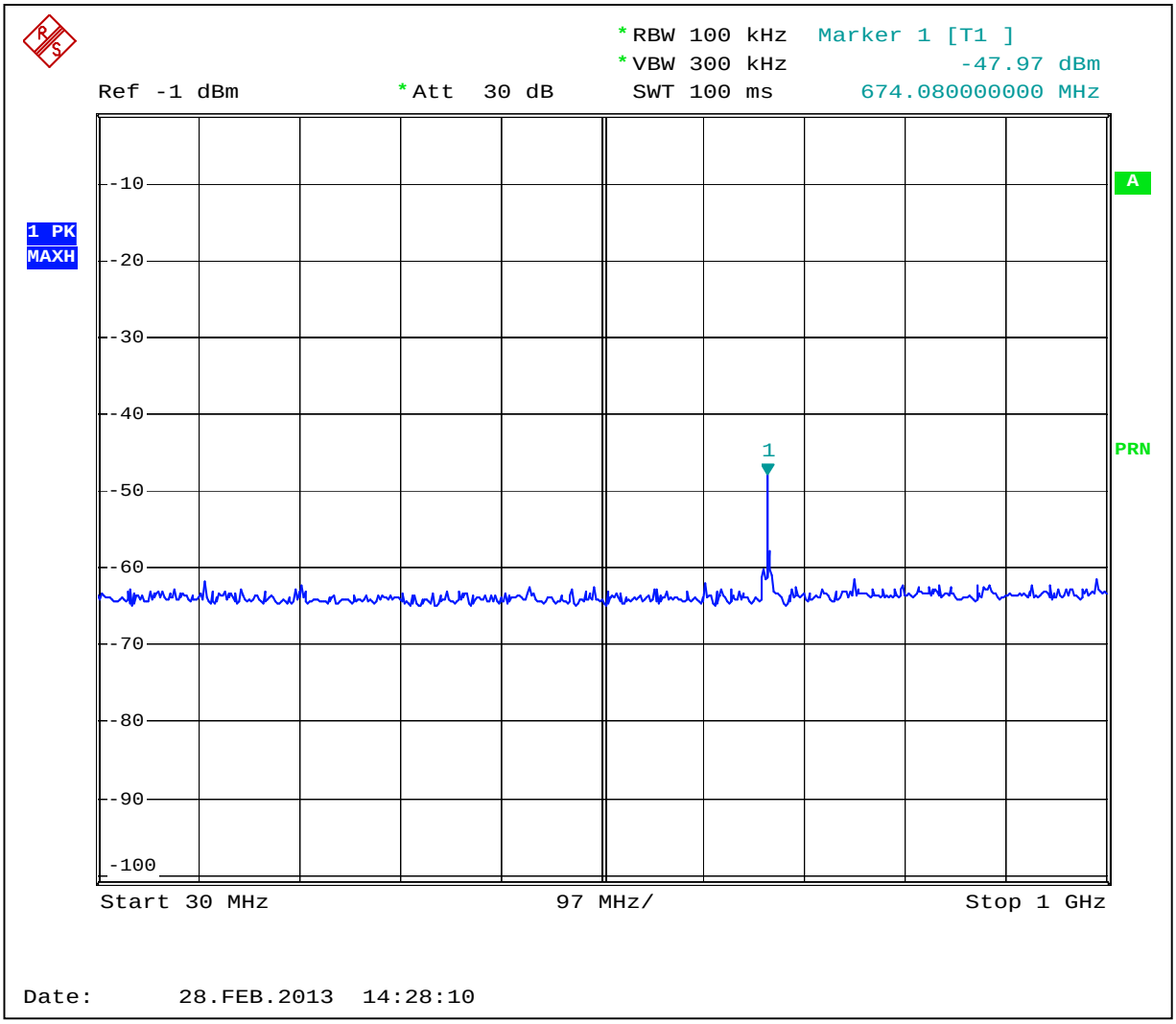
802.11g

	Minimum Measured Attenuation dB	Minimum Allowed Attenuation dB	Margin dB
Low Frequency Channel	53.0	20	-33.0
Middle Frequency Channel	53.8	20	-33.8
Upper Frequency Channel	54.7	20	-34.7
Analyzer Settings:	☒ RBW=100KHz		
Minimum Allowed Attenuation:	☒ 20dB ☐ 30dB (for digital systems with conducted power measured using RMS averaging over a time interval)		

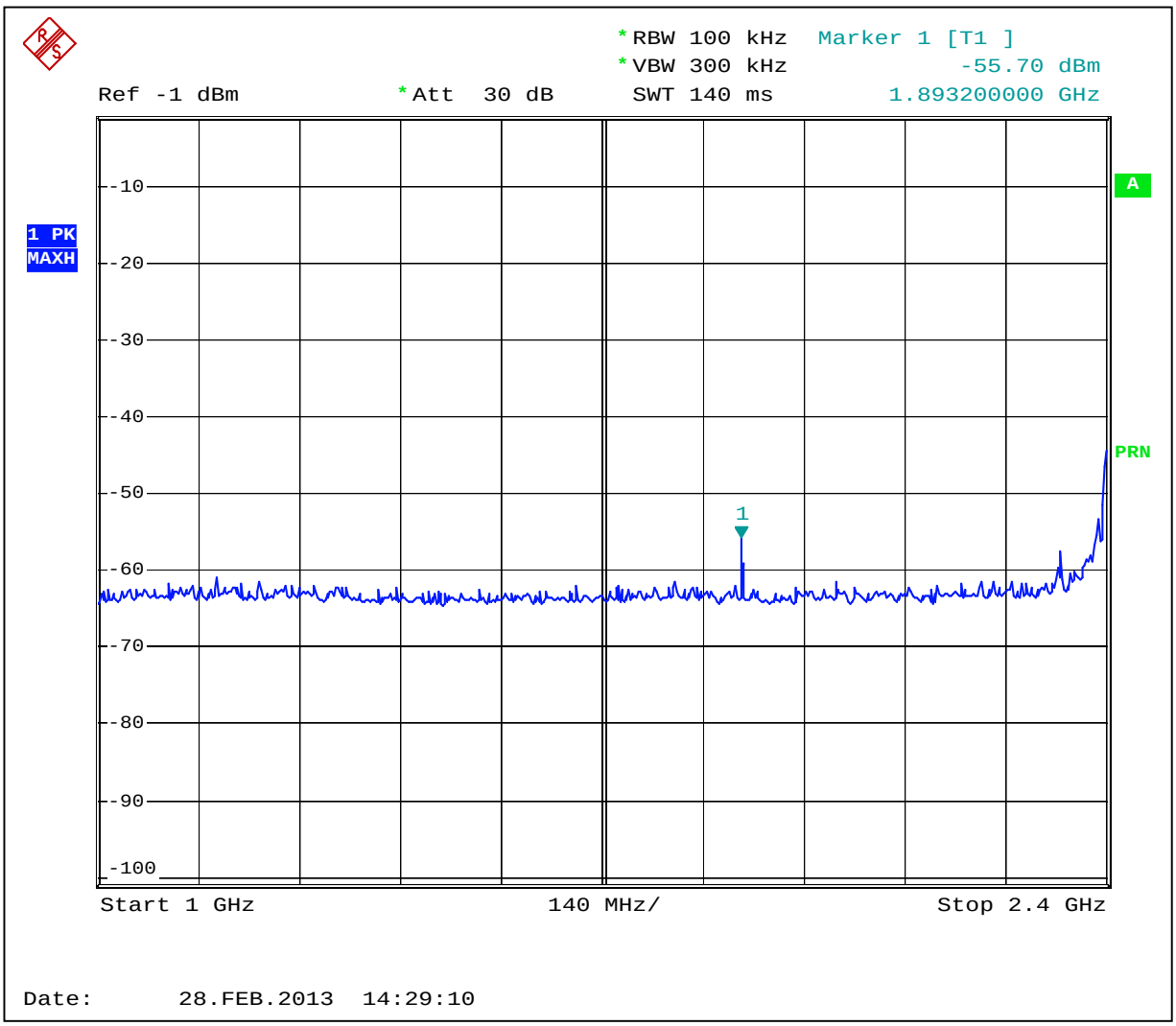
802.11n

	Minimum Measured Attenuation dB	Minimum Allowed Attenuation dB	Margin dB
Low Frequency Channel	53.9	20	-33.9
Middle Frequency Channel	53.1	20	-33.1
Upper Frequency Channel	52.7	20	-32.7
Analyzer Settings:	☒ RBW=100KHz		
Minimum Allowed Attenuation:	☒ 20dB ☐ 30dB (for digital systems with conducted power measured using RMS averaging over a time interval)		

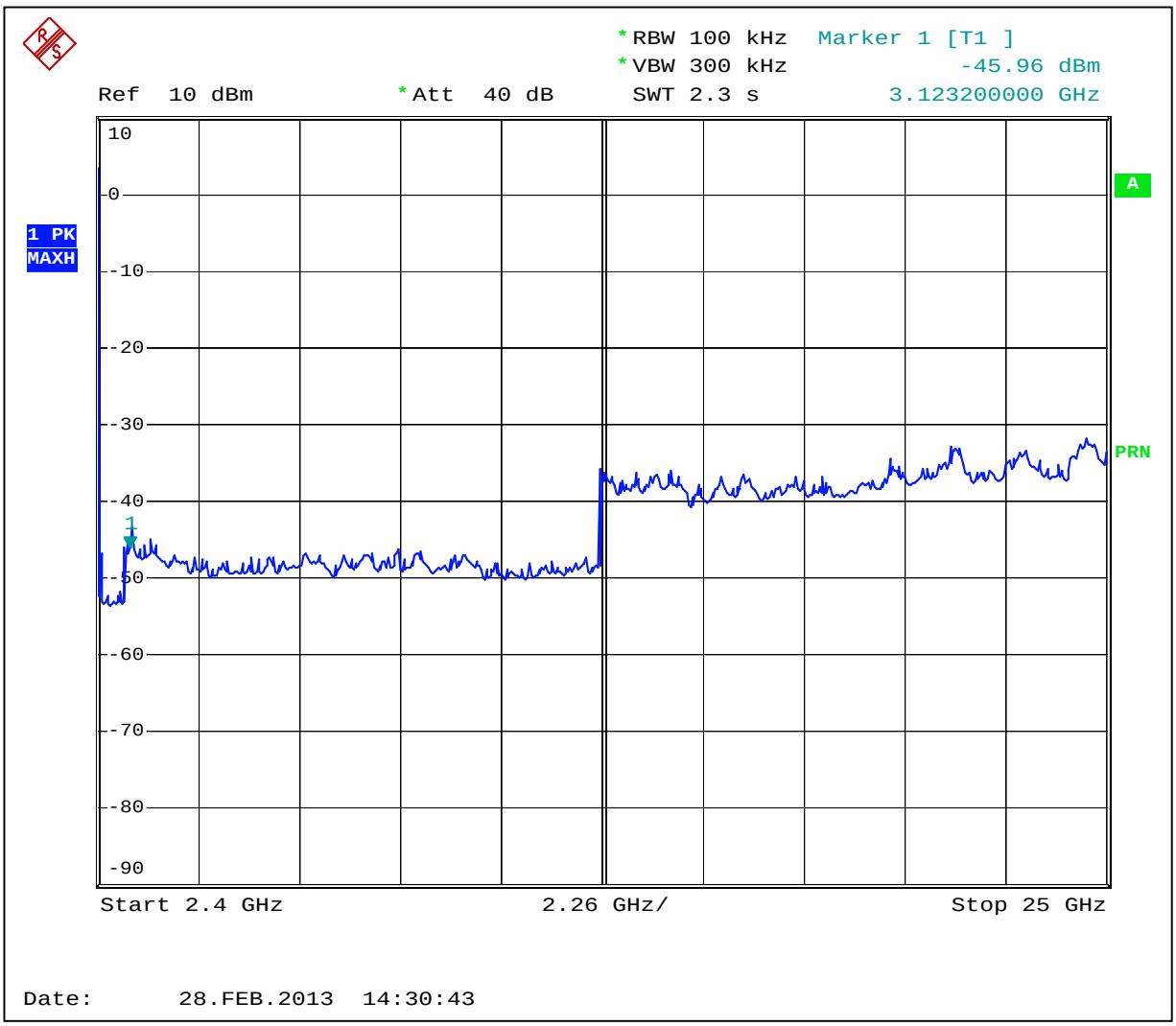
Notes: Graphs 3.4.1- 3.4.9 for 802.11b show antenna conducted spurious emissions
Graphs 3.4.10- 3.4.18 for 802.11g show antenna conducted spurious emissions
Graphs 3.4.19-3.4.27 for 802.11n show antenna conducted spurious emissions
Graph 3.4.28, and 3.4.29 show band edge compliance for 802.11b
Graph 3.4.30, and 3.4.31 show band edge compliance for 802.11g
Graph 3.4.32, and 3.4.33 show band edge compliance for 802.11n


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-47.97 dBm
Ref -1 dBm
*Att 30 dB
SWT 100 ms
674.080000000 MHz
1 PK
MAXH
A
PRN
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
1
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 28.FEB.2013 14:28:10

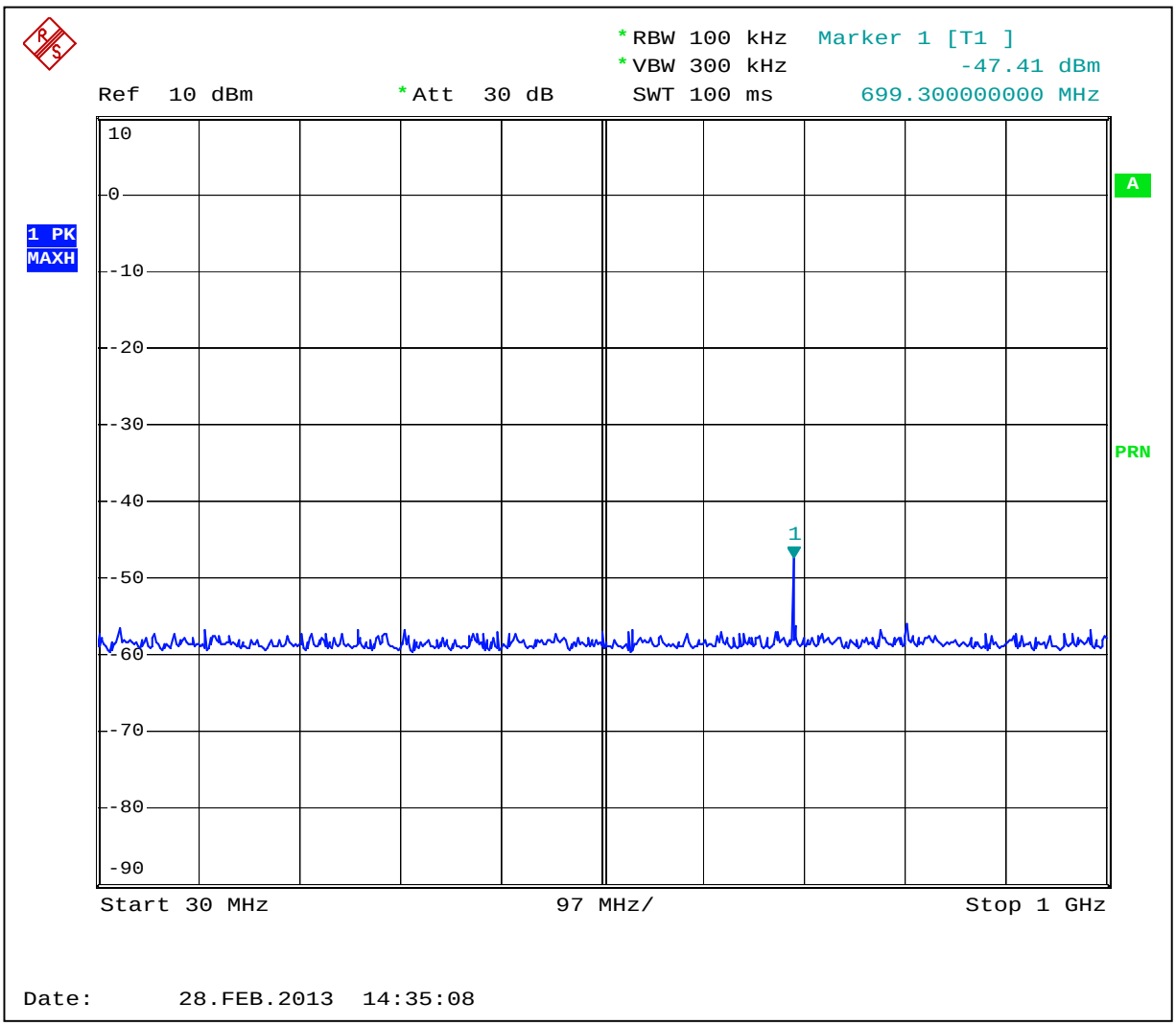
Graph 3.4.1


*RBW 100 kHz
*VBW 300 kHz
Marker 1 [T1]
-55.70 dBm
1.893200000 GHz
Ref -1 dBm
*Att 30 dB
SWT 140 ms
1 PK
MAXH
A
PRN
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
1
Start 1 GHz
140 MHz/
Stop 2.4 GHz
Date: 28.FEB.2013 14:29:10

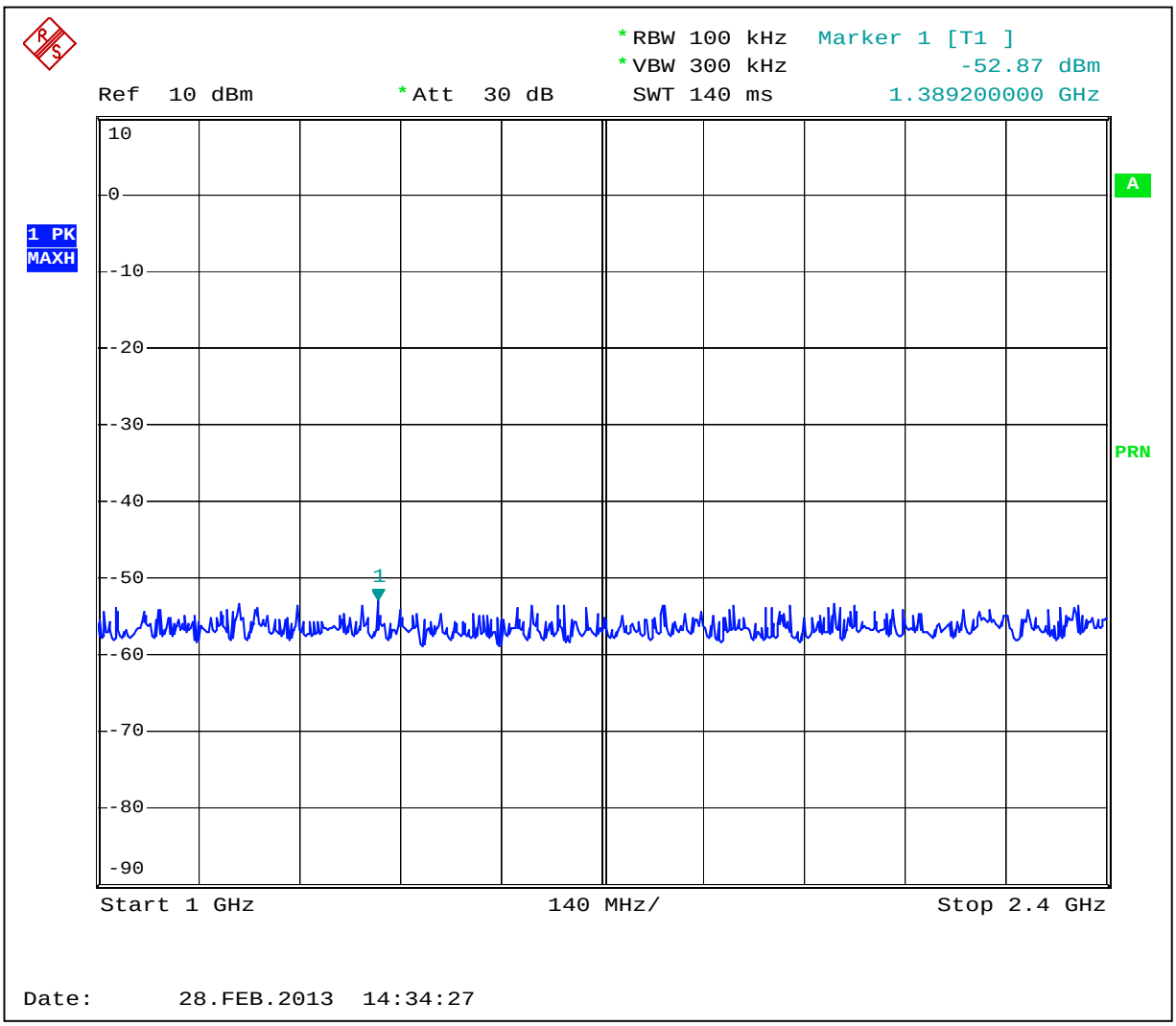
Graph 3.4.2


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-45.96 dBm
Ref 10 dBm
*Att 40 dB
SWT 2.3 s
3.123200000 GHz
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1 PK
MAXH
A
PRN
1
Start 2.4 GHz
2.26 GHz/
Stop 25 GHz
Date: 28.FEB.2013 14:30:43

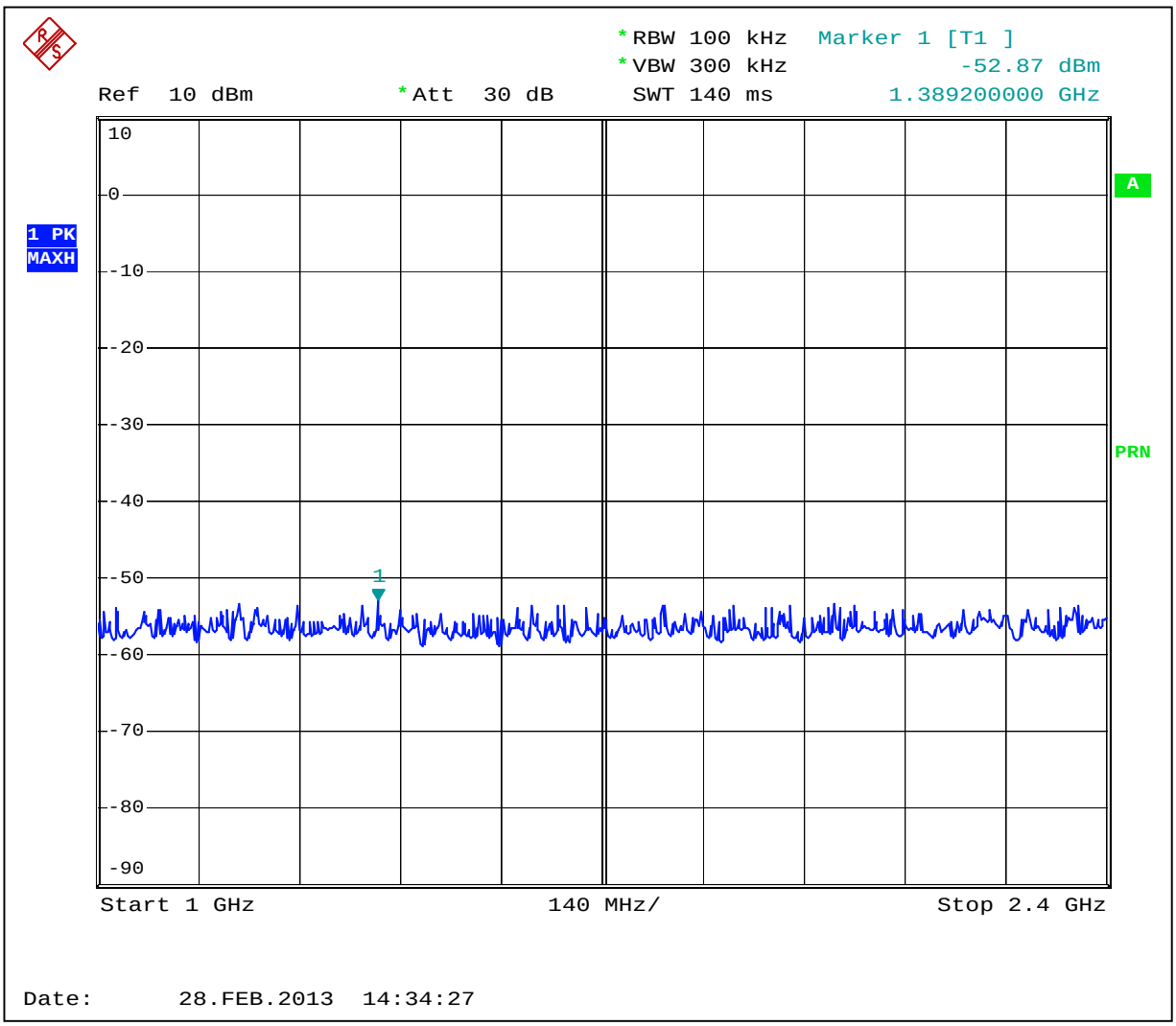
Graph 3.4.3


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-47.41 dBm
Ref 10 dBm
*Att 30 dB
SWT 100 ms
699.300000000 MHz
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1 PK
MAXH
A
PRN
1
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 28.FEB.2013 14:35:08

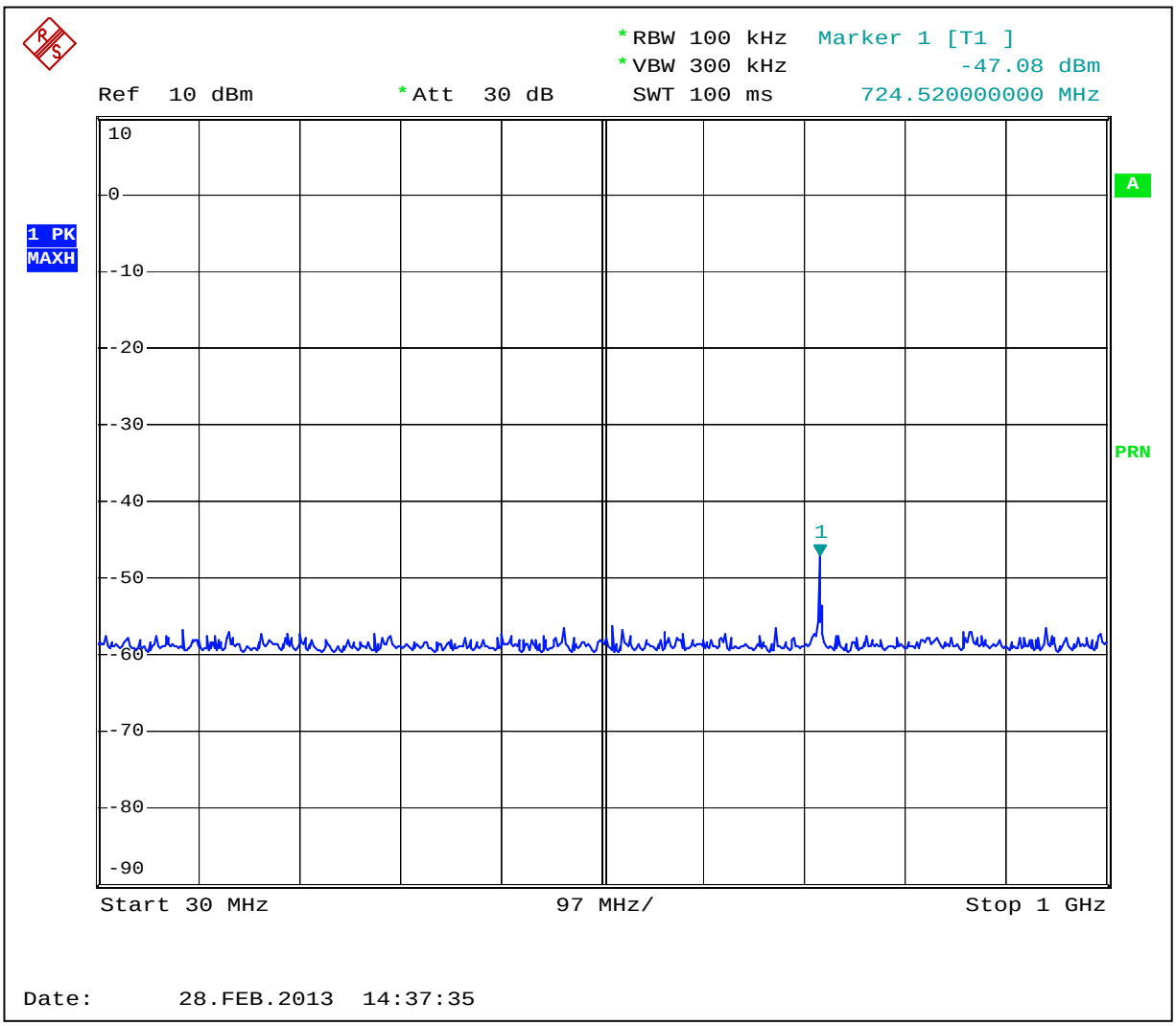
Graph 3.4.4


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-52.87 dBm
Ref 10 dBm
*Att 30 dB
SWT 140 ms
1.389200000 GHz
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1 PK
MAXH
A
PRN
1
Start 1 GHz
140 MHz/
Stop 2.4 GHz
Date: 28.FEB.2013 14:34:27

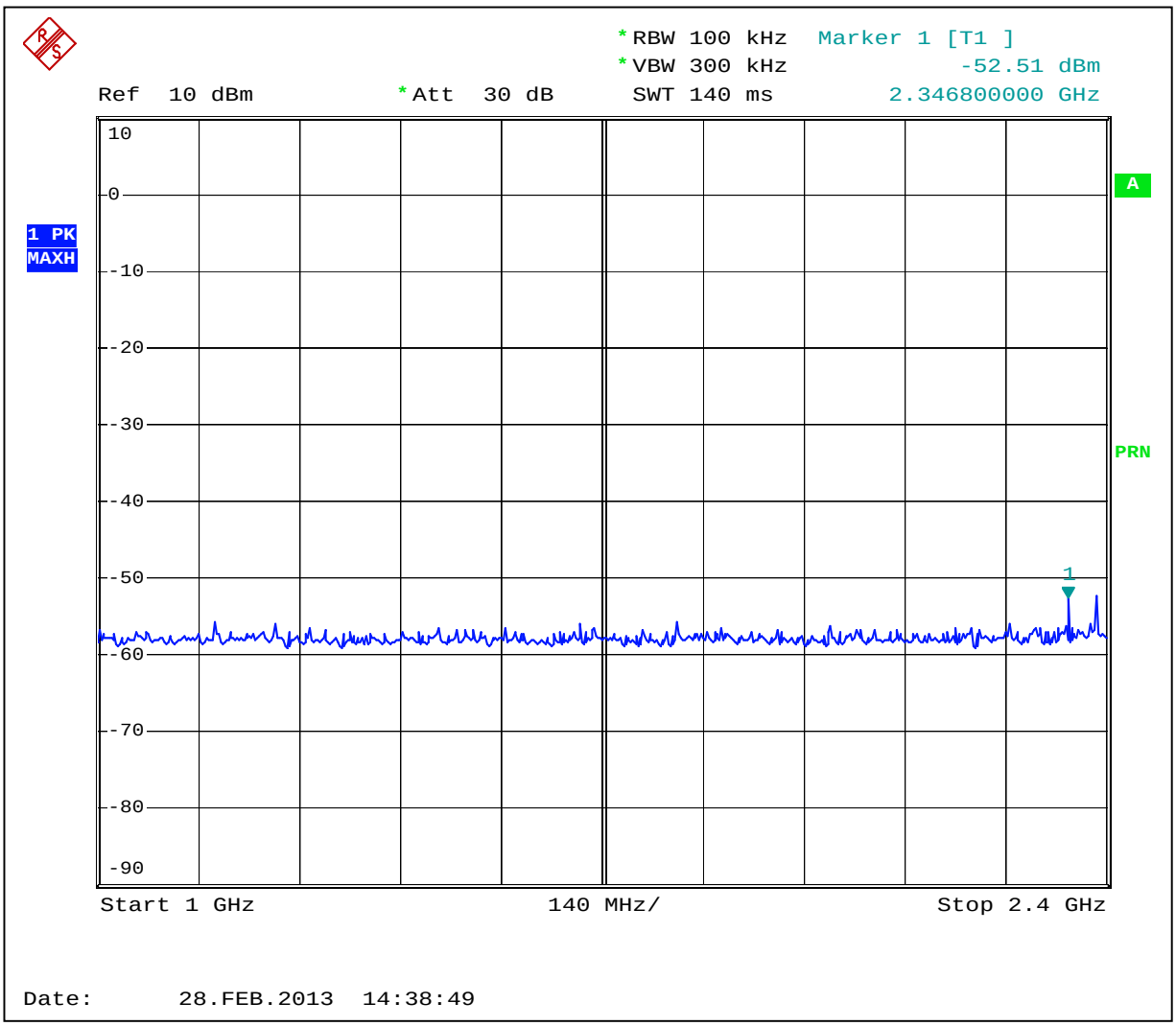
Graph 3.4.5


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-52.87 dBm
Ref 10 dBm
*Att 30 dB
SWT 140 ms
1.389200000 GHz
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1 PK
MAXH
A
PRN
1
Start 1 GHz
140 MHz/
Stop 2.4 GHz
Date: 28.FEB.2013 14:34:27

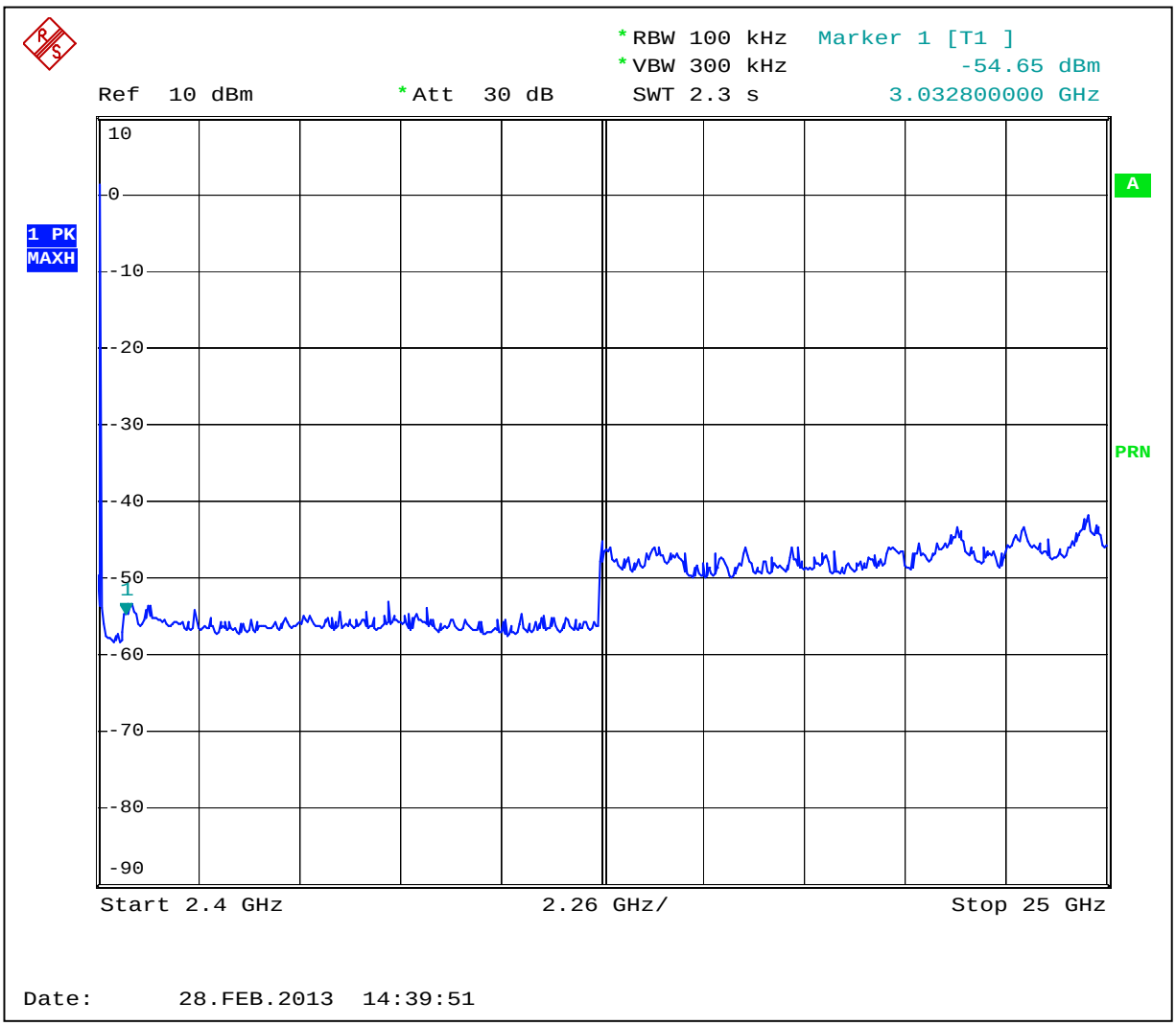
Graph 3.4.6


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-47.08 dBm
Ref 10 dBm
*Att 30 dB
SWT 100 ms
724.520000000 MHz
1 PK
MAXH
A
PRN
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 28.FEB.2013 14:37:35

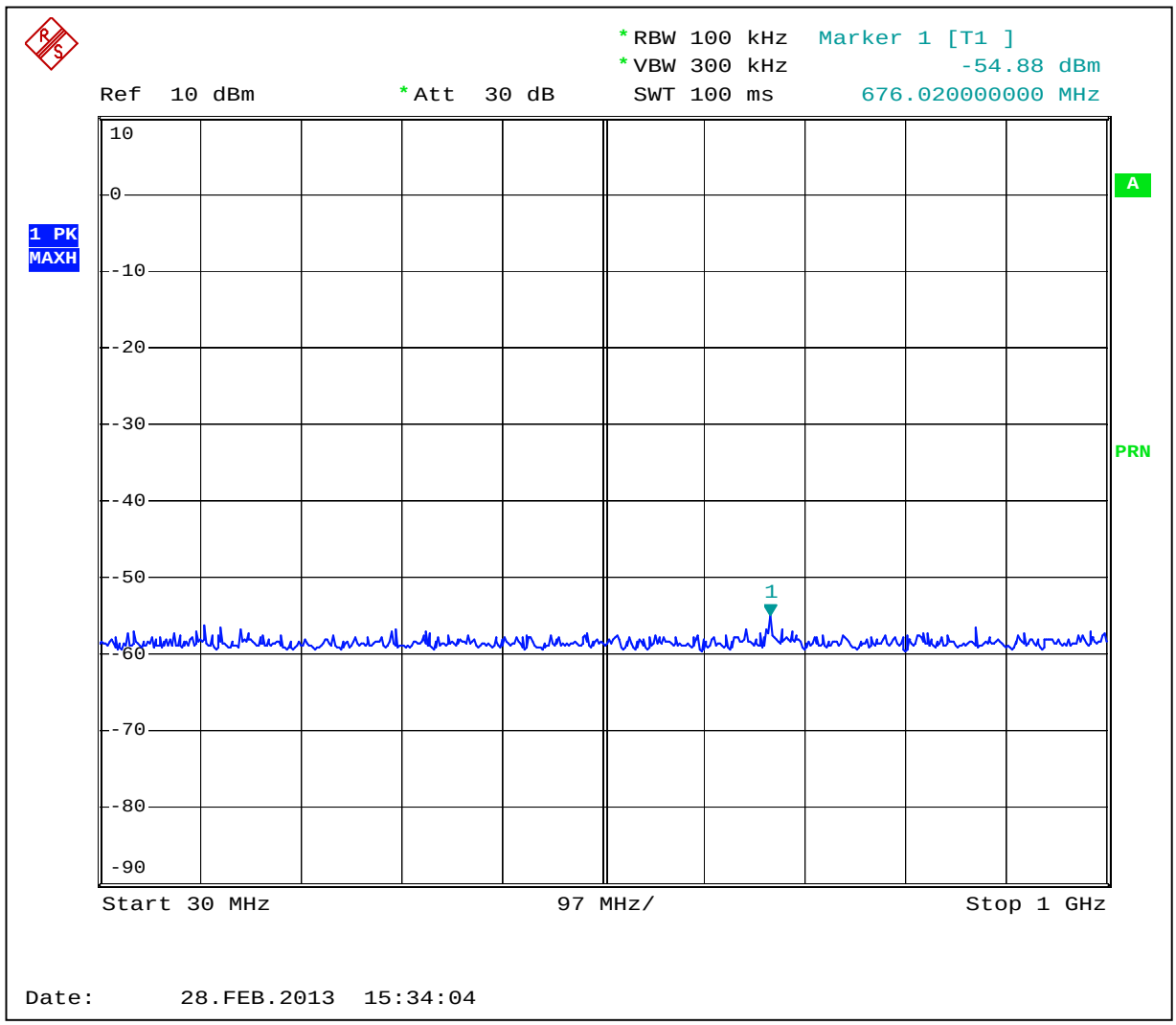
Graph 3.4.7


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-52.51 dBm
Ref 10 dBm
*Att 30 dB
SWT 140 ms
2.346800000 GHz
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1 PK
MAXH
A
PRN
1
Start 1 GHz
140 MHz/
Stop 2.4 GHz
Date: 28.FEB.2013 14:38:49

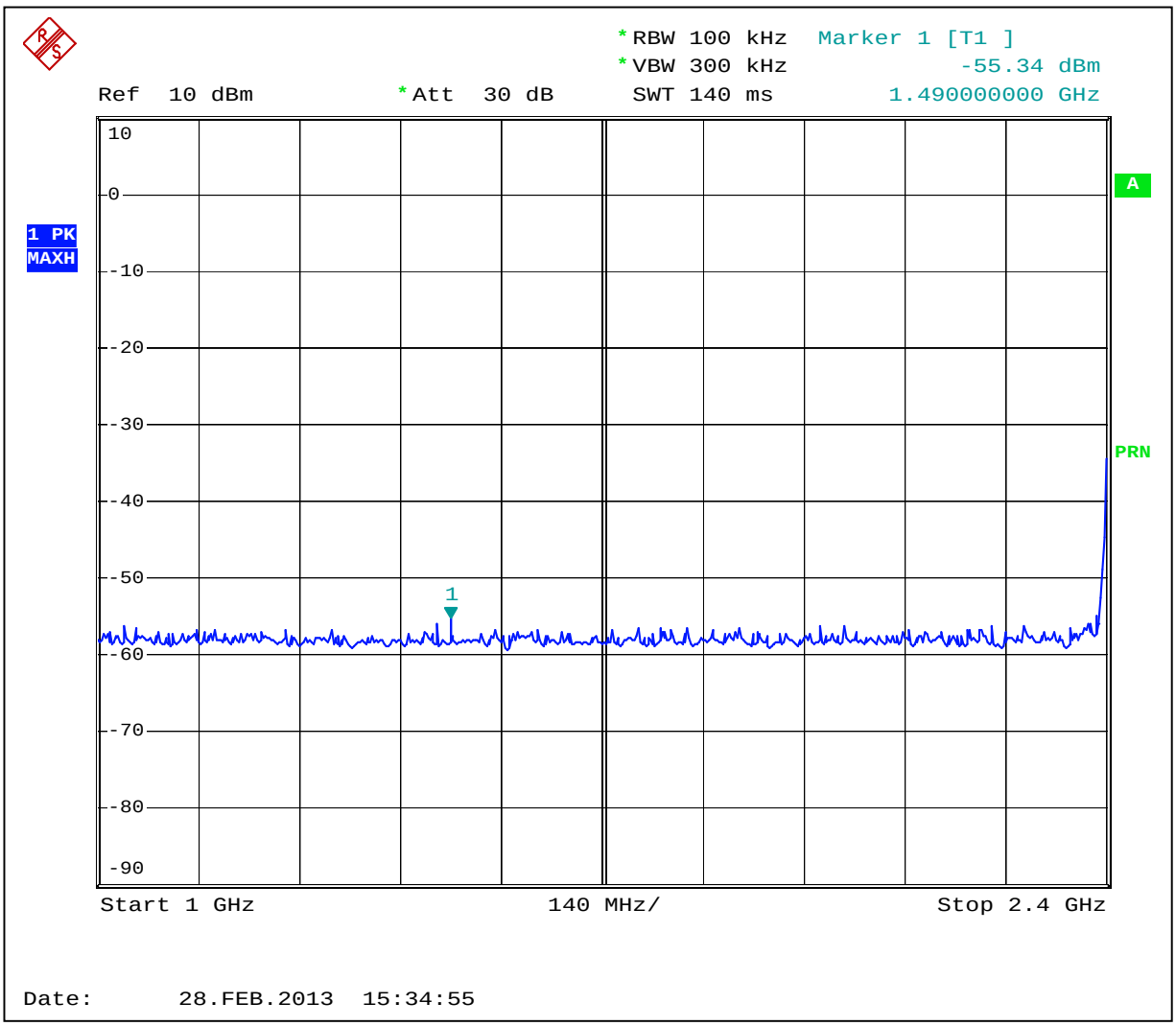
Graph 3.4.8


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-54.65 dBm
Ref 10 dBm
*Att 30 dB
SWT 2.3 s
3.032800000 GHz
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1 PK
MAXH
A
PRN
1
Start 2.4 GHz
2.26 GHz/
Stop 25 GHz
Date: 28.FEB.2013 14:39:51

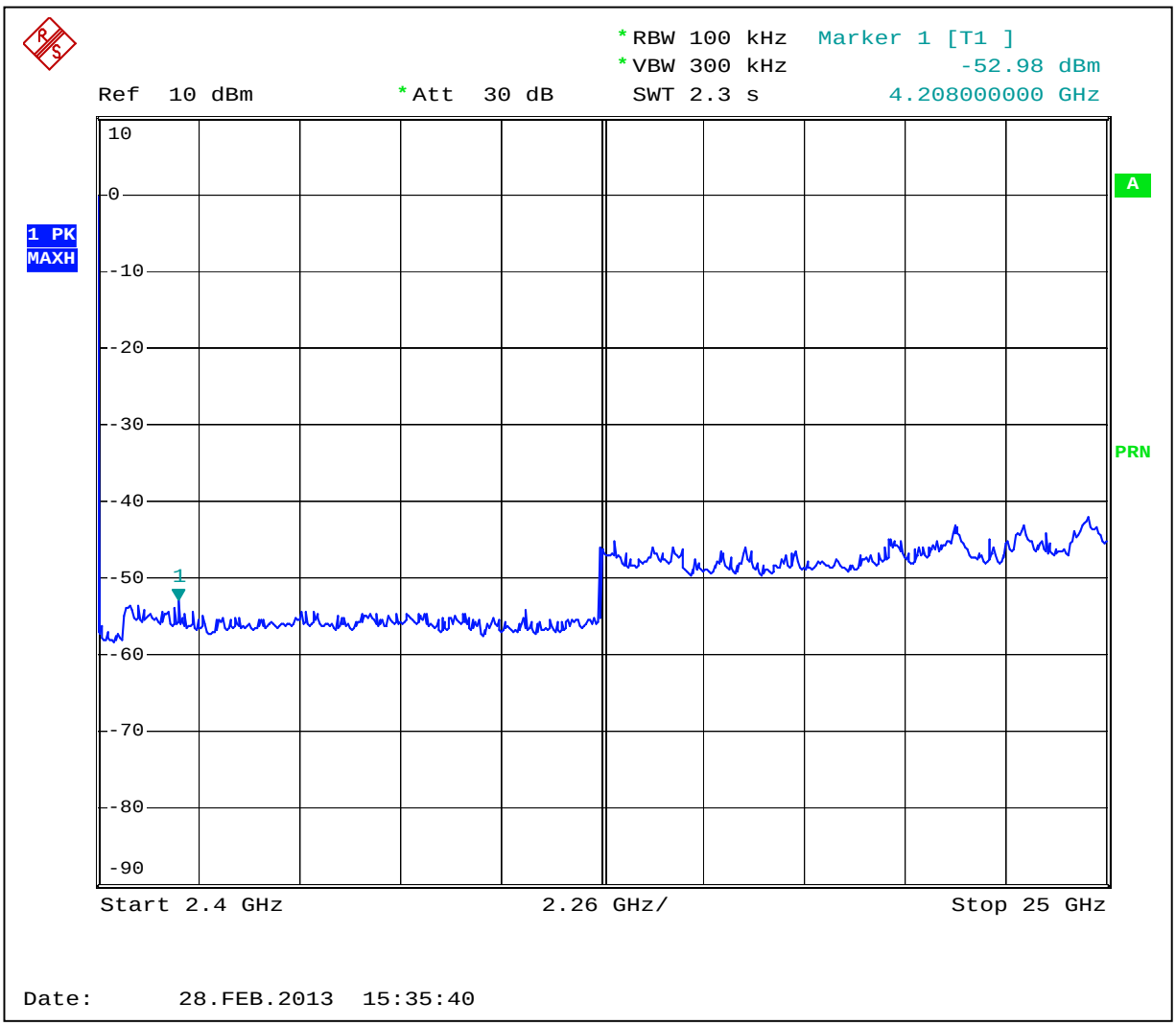
Graph 3.4.9


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-54.88 dBm
Ref 10 dBm
*Att 30 dB
SWT 100 ms
676.020000000 MHz
1 PK
MAXH
A
PRN
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 28.FEB.2013 15:34:04

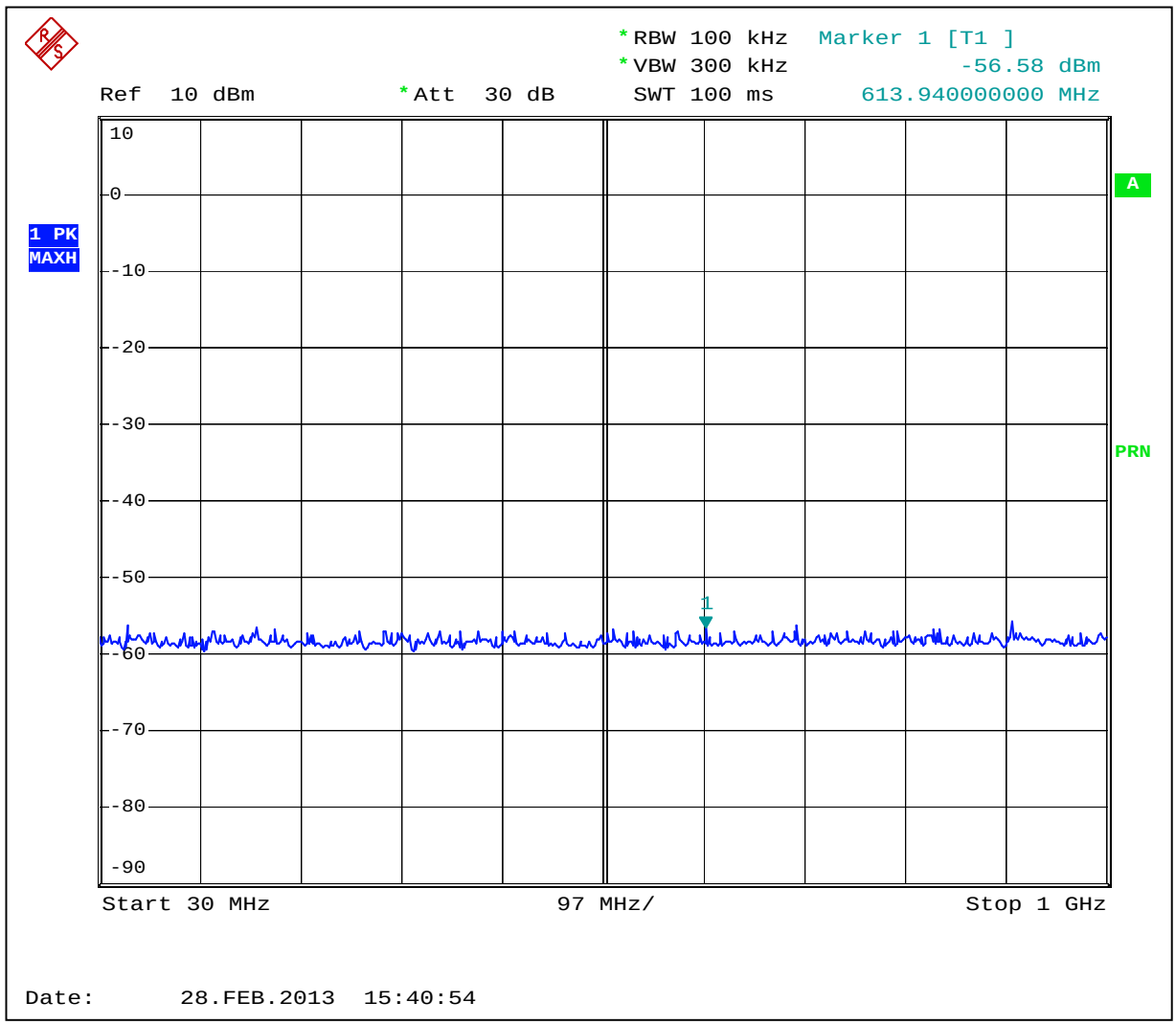
Graph 3.4.10


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-55.34 dBm
Ref 10 dBm
*Att 30 dB
SWT 140 ms
1.490000000 GHz
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1 PK
MAXH
A
PRN
1
Start 1 GHz
140 MHz/
Stop 2.4 GHz
Date: 28.FEB.2013 15:34:55

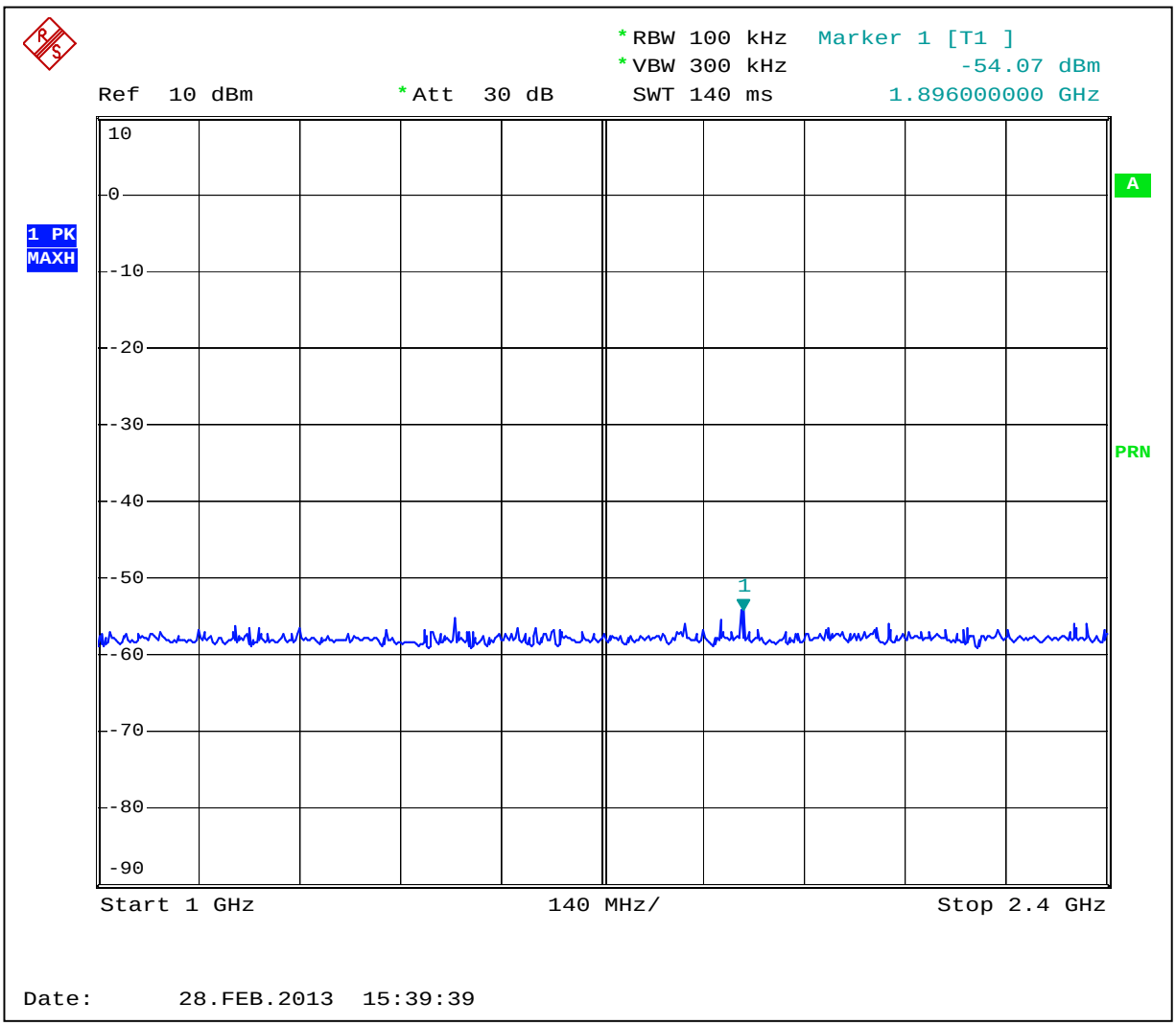
Graph 3.4.11


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-52.98 dBm
Ref 10 dBm
*Att 30 dB
SWT 2.3 s
4.208000000 GHz
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1 PK
MAXH
A
PRN
1
Start 2.4 GHz
2.26 GHz/
Stop 25 GHz
Date: 28.FEB.2013 15:35:40

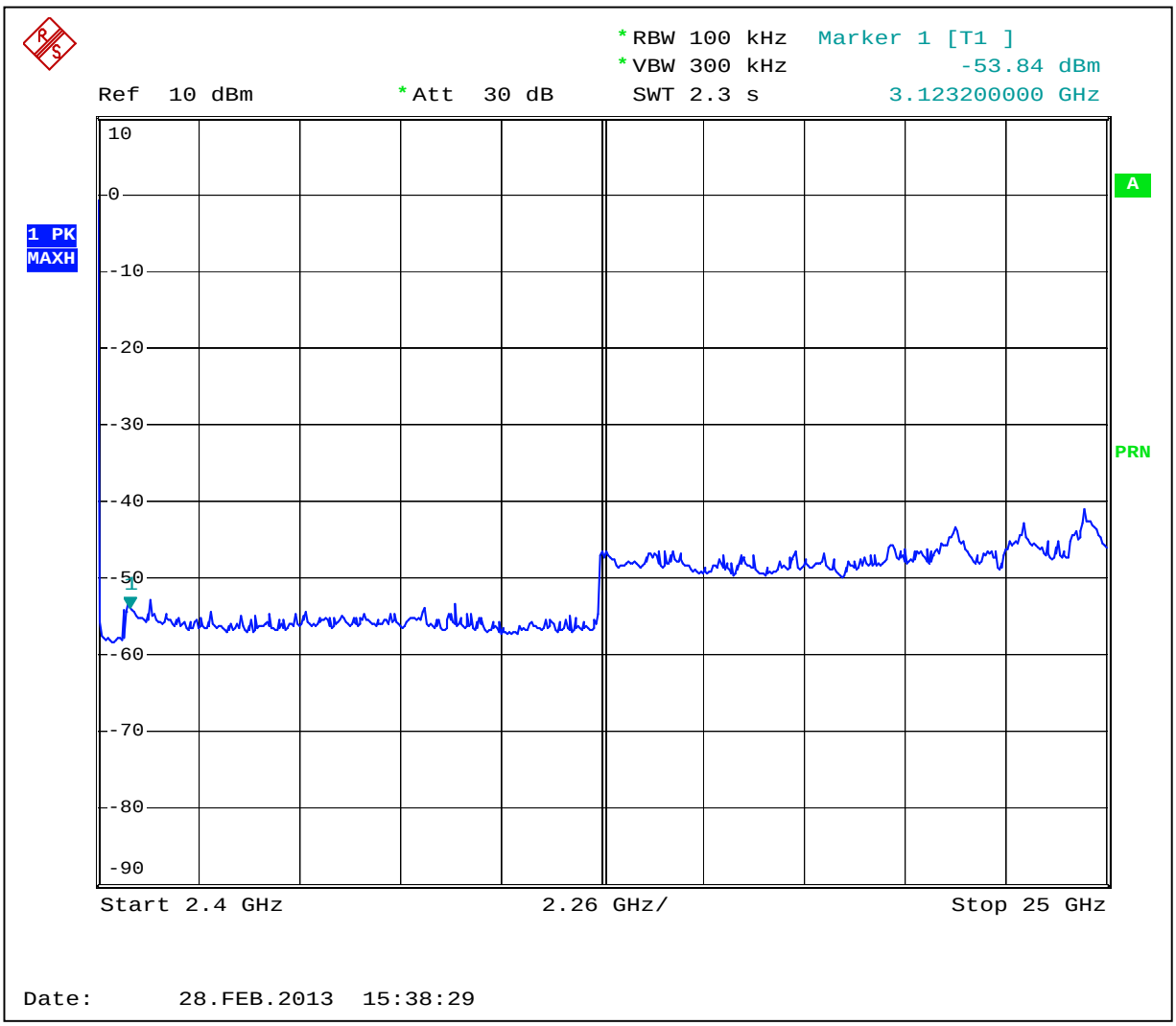
Graph 3.4.12


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-56.58 dBm
Ref 10 dBm
*Att 30 dB
SWT 100 ms
613.940000000 MHz
1 PK
MAXH
A
PRN
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 28.FEB.2013 15:40:54

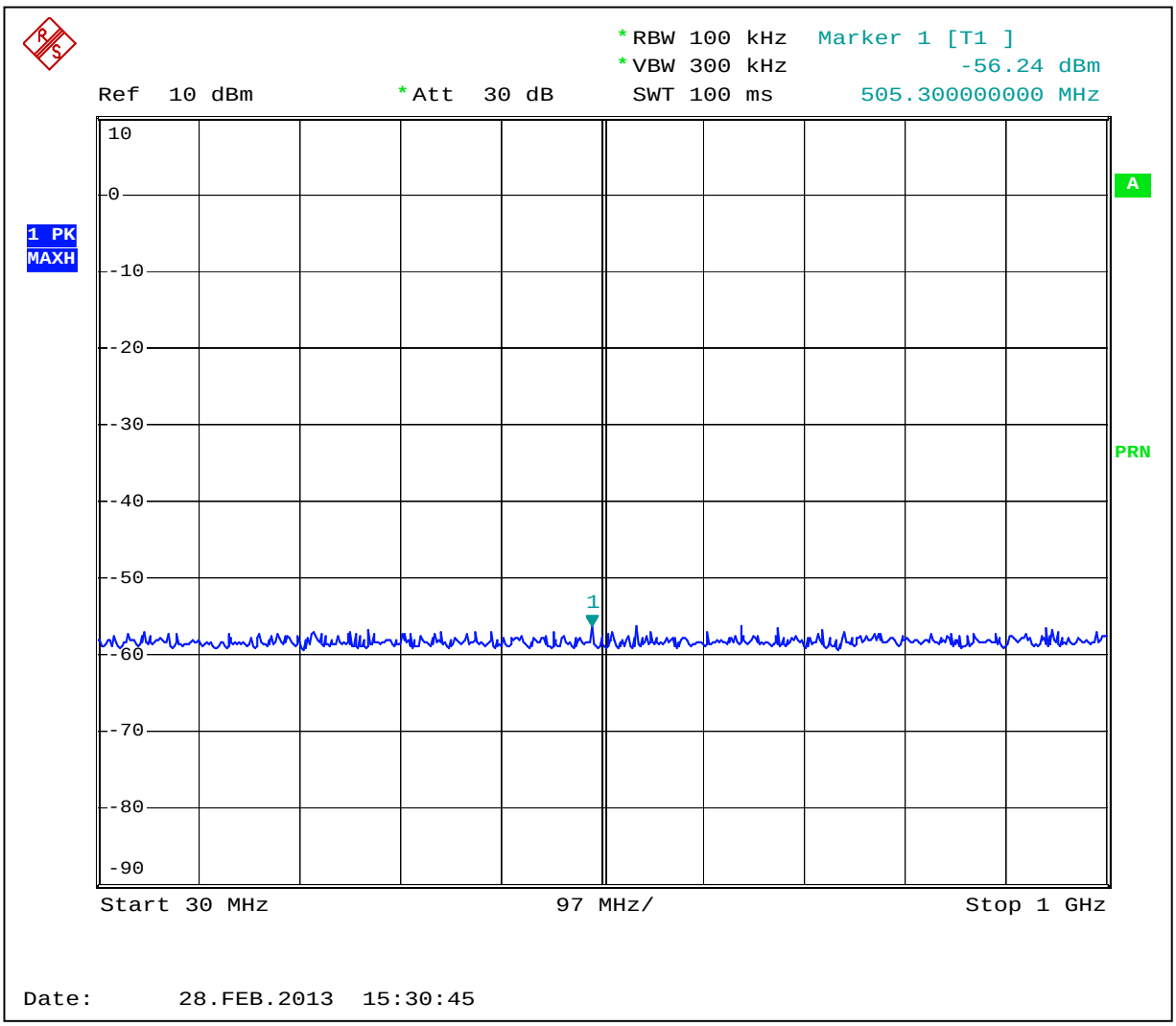
Graph 3.4.13


*RBW 100 kHz
*VBW 300 kHz
SWT 140 ms
Marker 1 [T1]
-54.07 dBm
1.896000000 GHz
Ref 10 dBm
*Att 30 dB
1 PK
MAXH
A
PRN
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1
Start 1 GHz
140 MHz/
Stop 2.4 GHz
Date: 28.FEB.2013 15:39:39

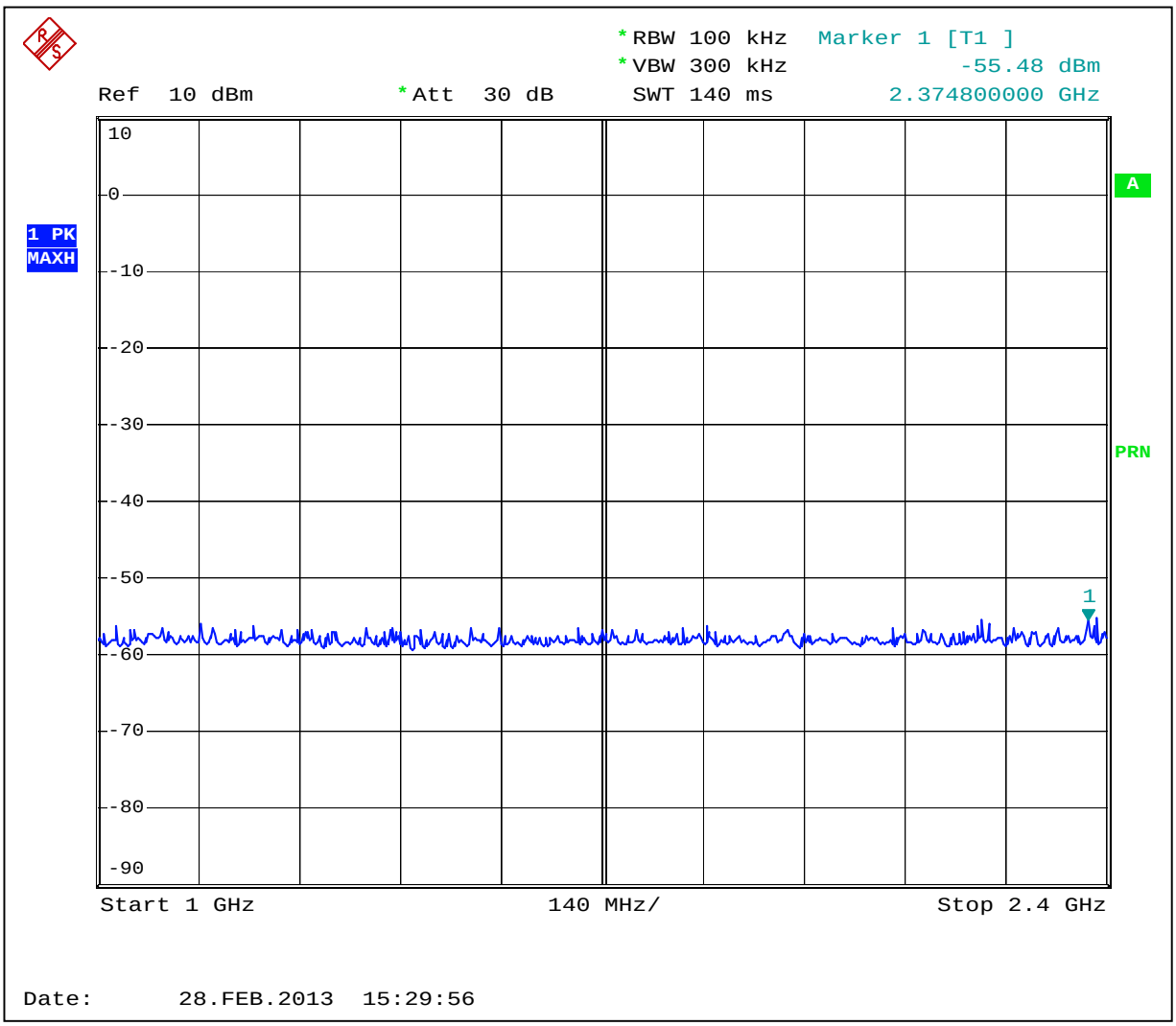
Graph 3.4.14


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-53.84 dBm
Ref 10 dBm
*Att 30 dB
SWT 2.3 s
3.123200000 GHz
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1 PK
MAXH
A
PRN
Start 2.4 GHz
2.26 GHz/
Stop 25 GHz
Date: 28.FEB.2013 15:38:29

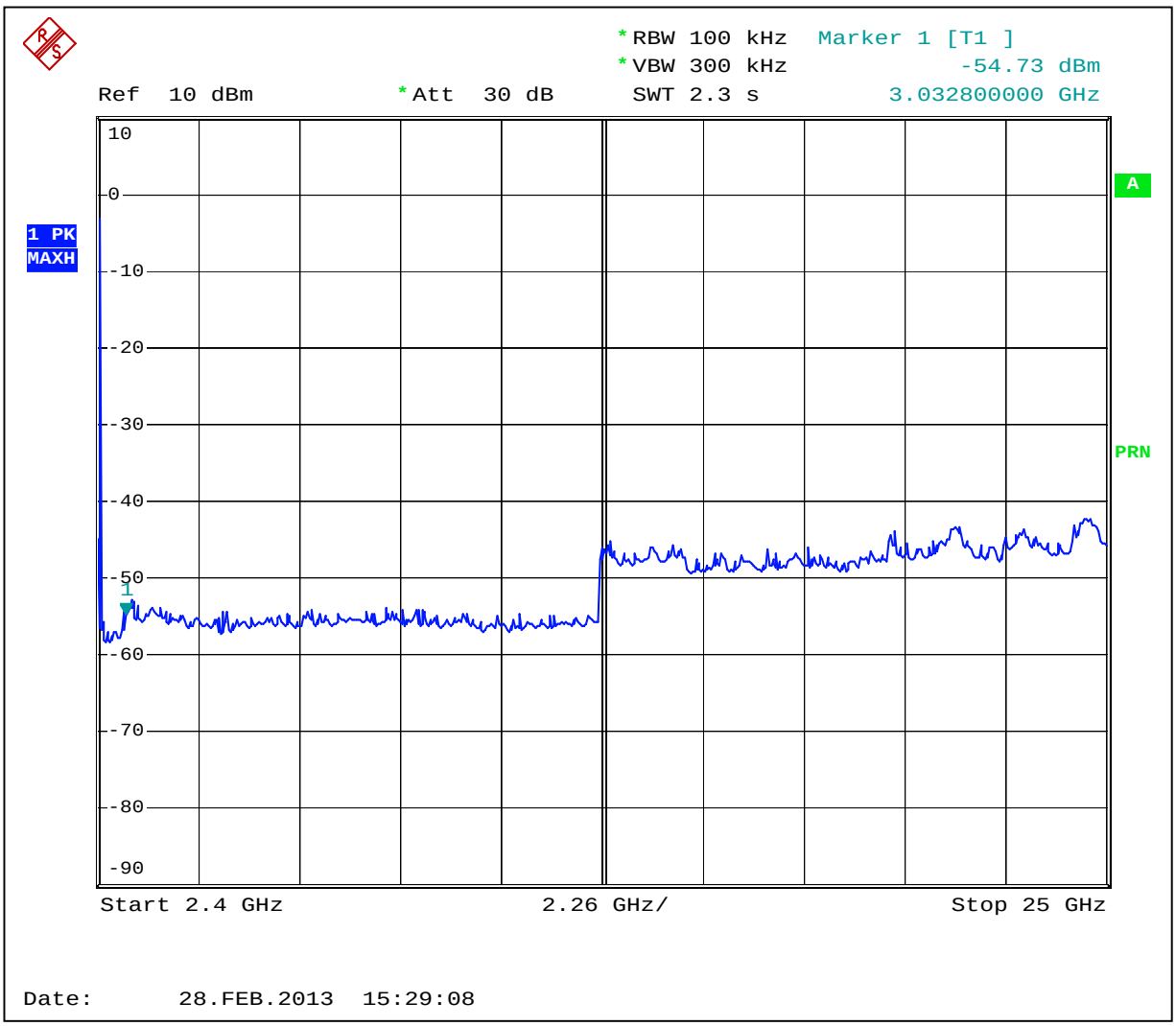
Graph 3.4.15


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-56.24 dBm
Ref 10 dBm
*Att 30 dB
SWT 100 ms
505.300000000 MHz
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1 PK
MAXH
A
PRN
1
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 28.FEB.2013 15:30:45

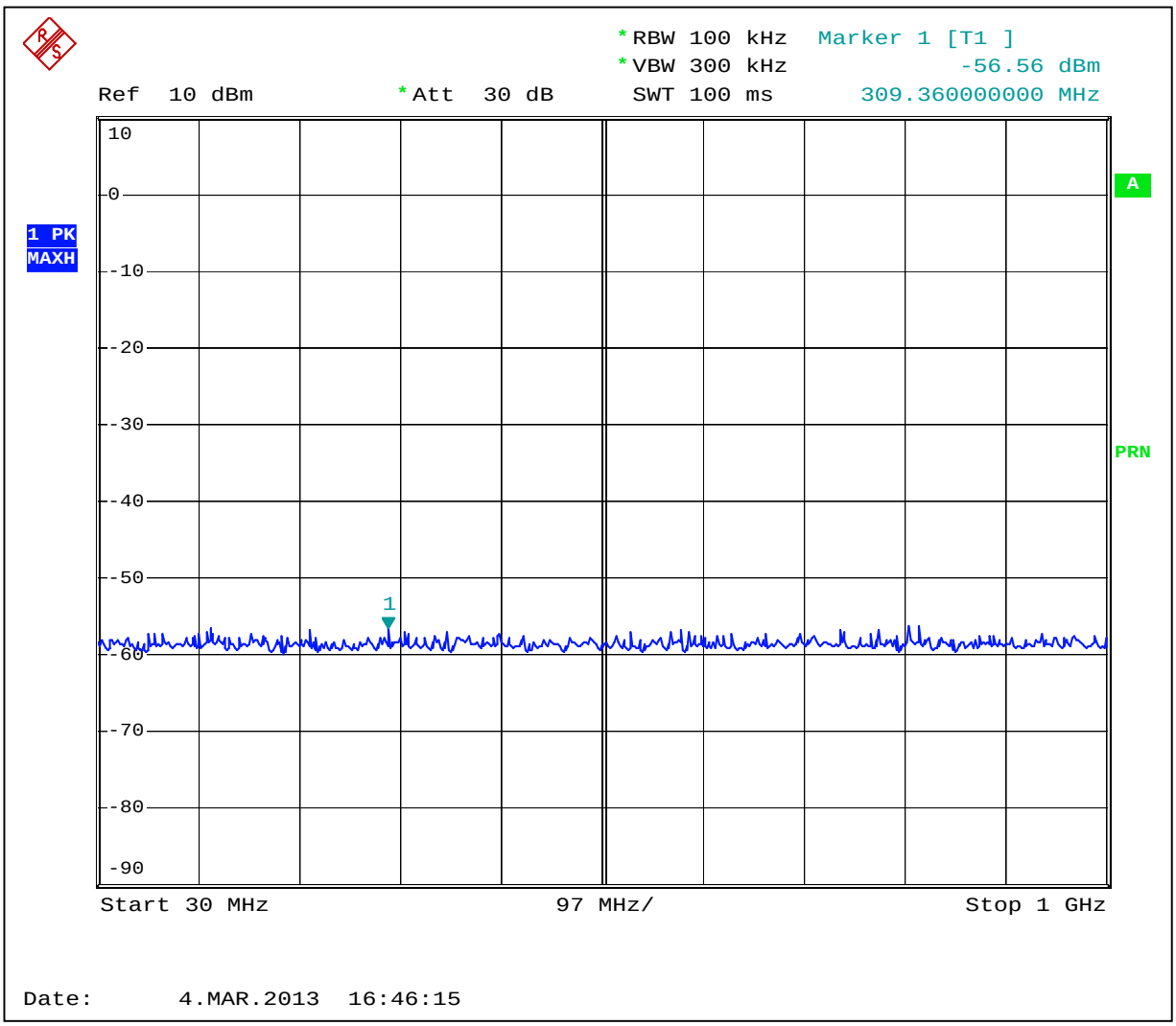
Graph 3.4.16


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-55.48 dBm
Ref 10 dBm
*Att 30 dB
SWT 140 ms
2.374800000 GHz
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1 PK
MAXH
A
PRN
1
Start 1 GHz
140 MHz/
Stop 2.4 GHz
Date: 28.FEB.2013 15:29:56

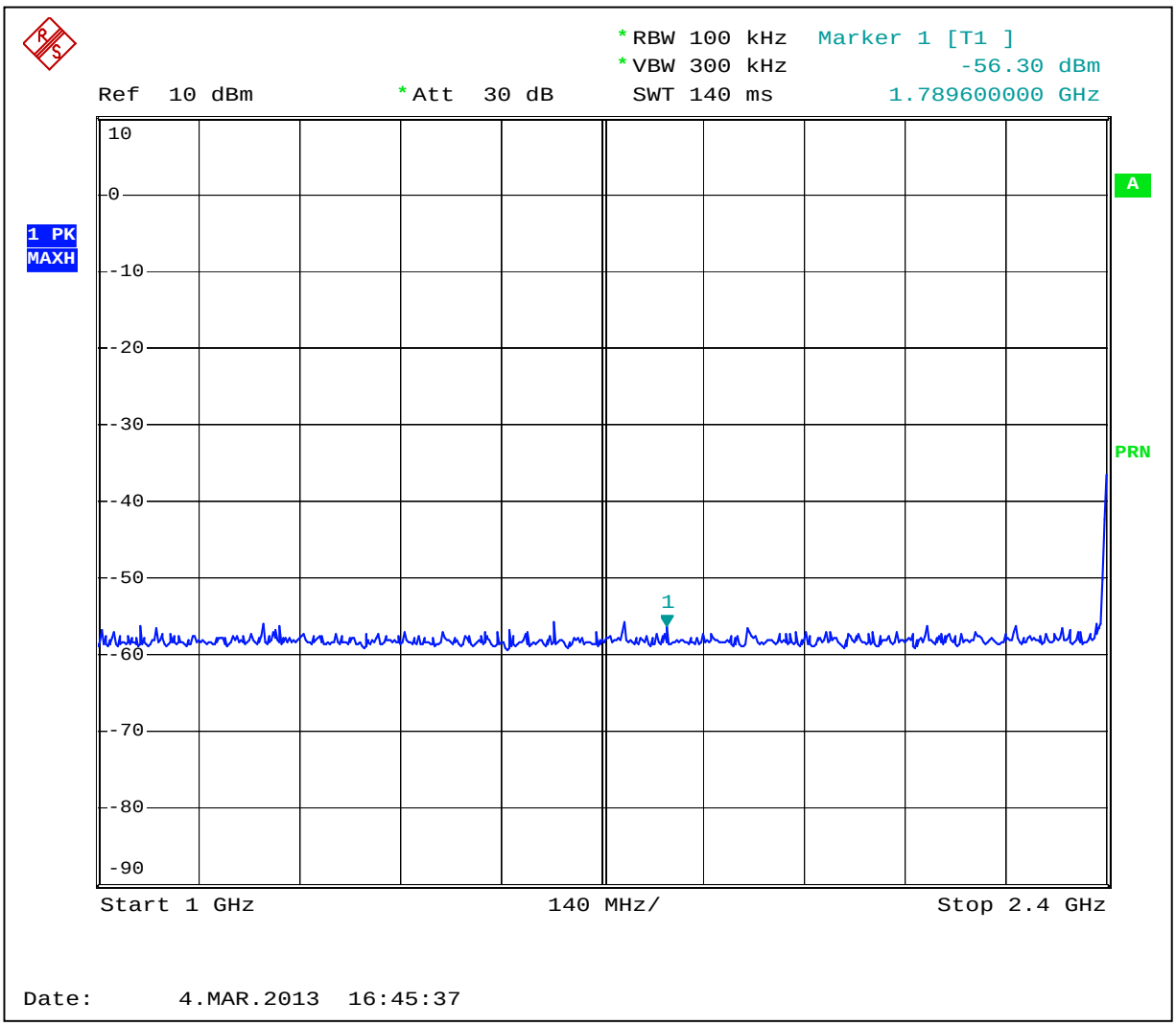
Graph 3.4.17


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-54.73 dBm
Ref 10 dBm
*Att 30 dB
SWT 2.3 s
3.032800000 GHz
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1 PK
MAXH
A
PRN
1
Start 2.4 GHz
2.26 GHz/
Stop 25 GHz
Date: 28.FEB.2013 15:29:08

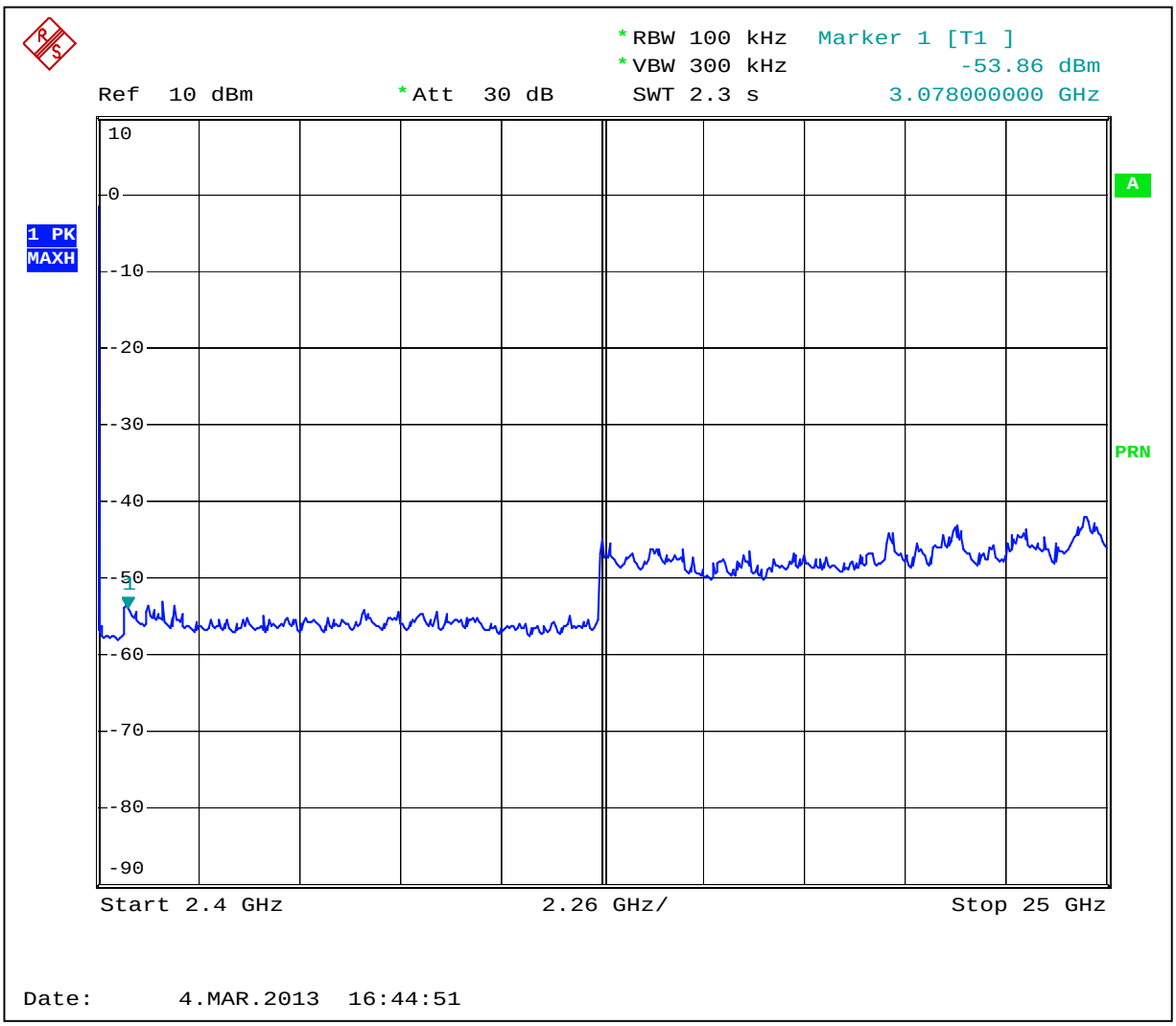
Graph 3.4.18


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-56.56 dBm
Ref 10 dBm
*Att 30 dB
SWT 100 ms
309.360000000 MHz
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1 PK
MAXH
A
PRN
1
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 4.MAR.2013 16:46:15

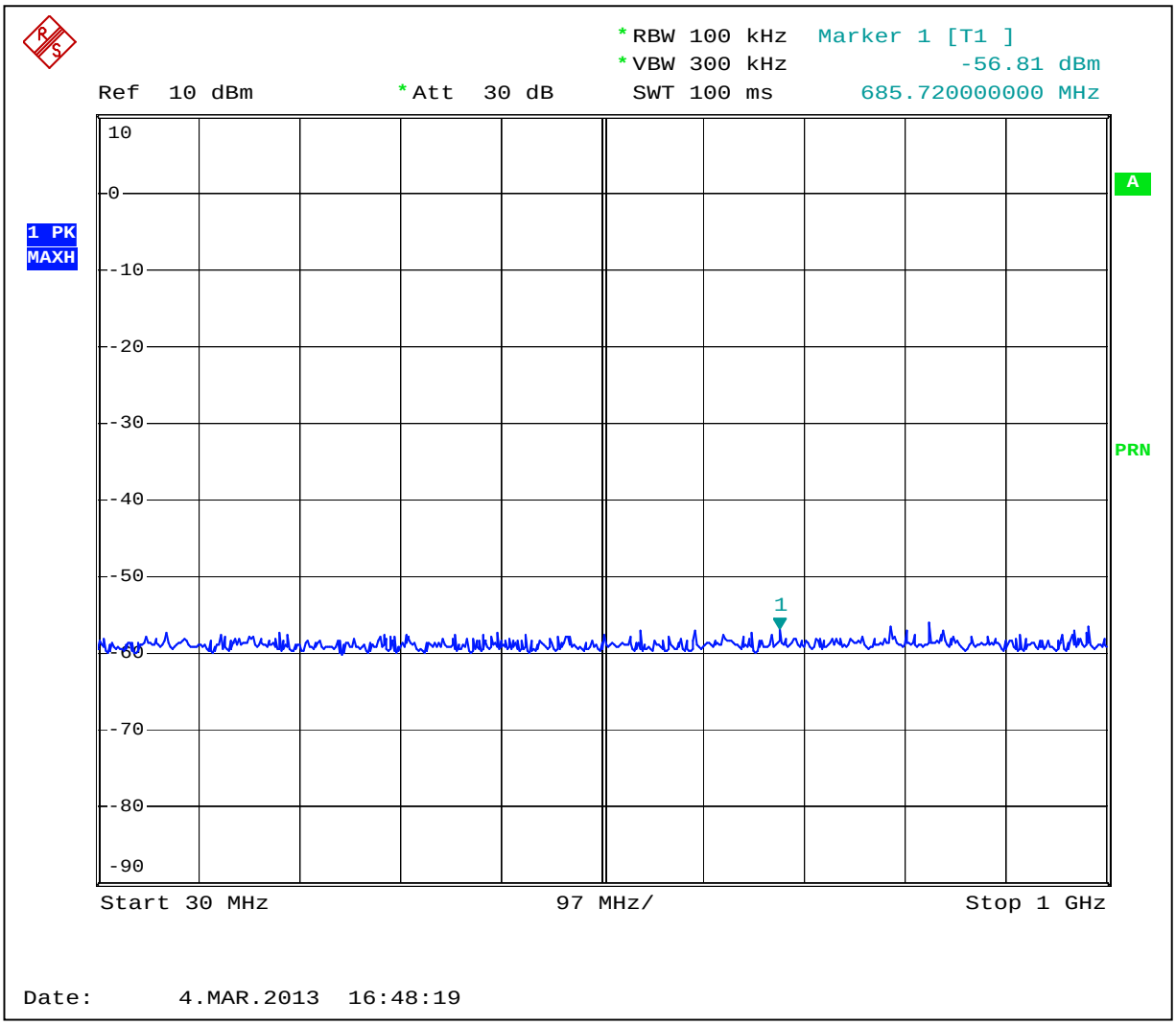
Graph 3.4.19


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-56.30 dBm
Ref 10 dBm
*Att 30 dB
SWT 140 ms
1.789600000 GHz
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1 PK
MAXH
A
PRN
1
Start 1 GHz
140 MHz/
Stop 2.4 GHz
Date: 4.MAR.2013 16:45:37

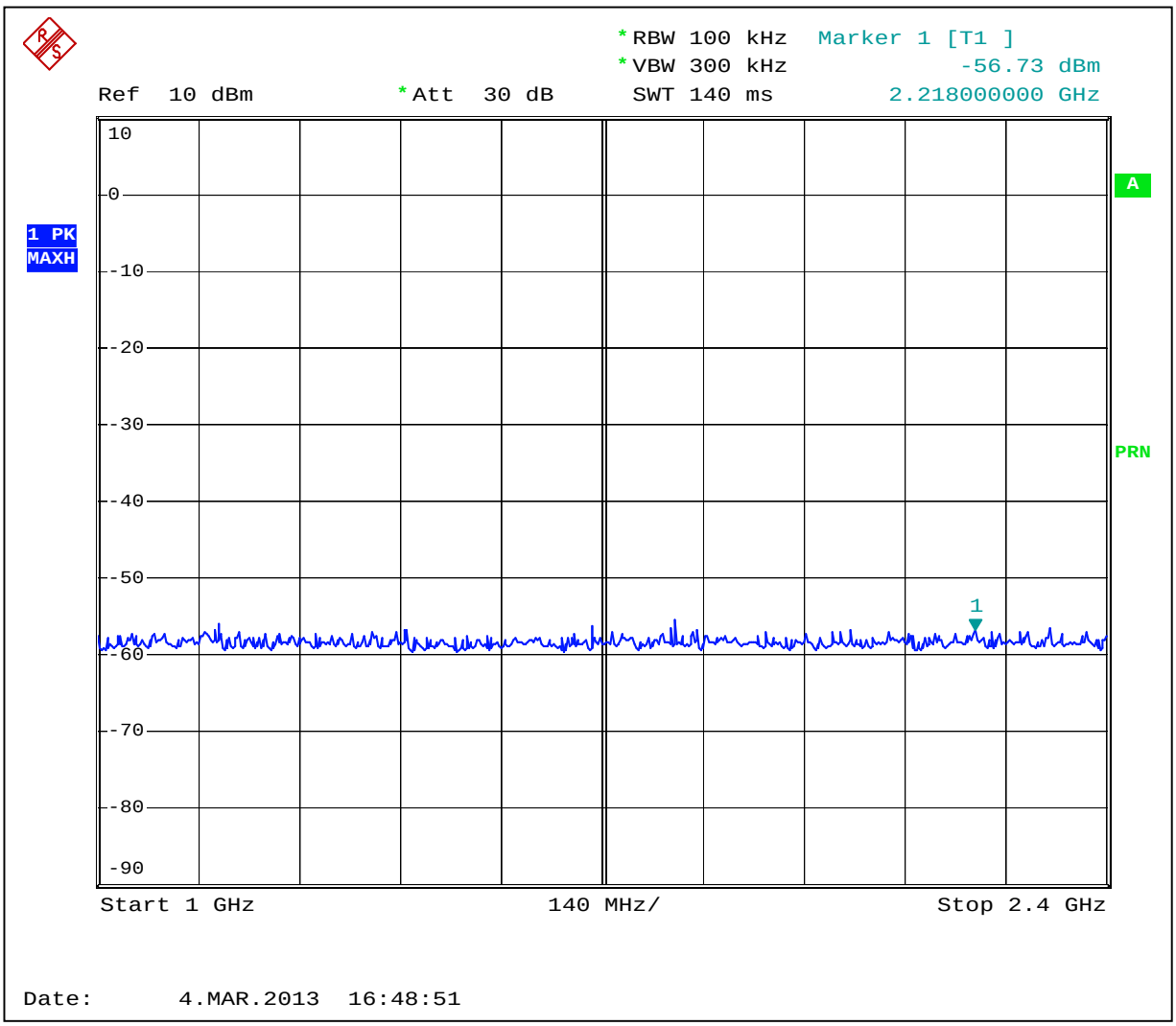
Graph 3.4.20


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-53.86 dBm
Ref 10 dBm
*Att 30 dB
SWT 2.3 s
3.078000000 GHz
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1 PK
MAXH
A
PRN
Start 2.4 GHz
2.26 GHz/
Stop 25 GHz
Date: 4.MAR.2013 16:44:51

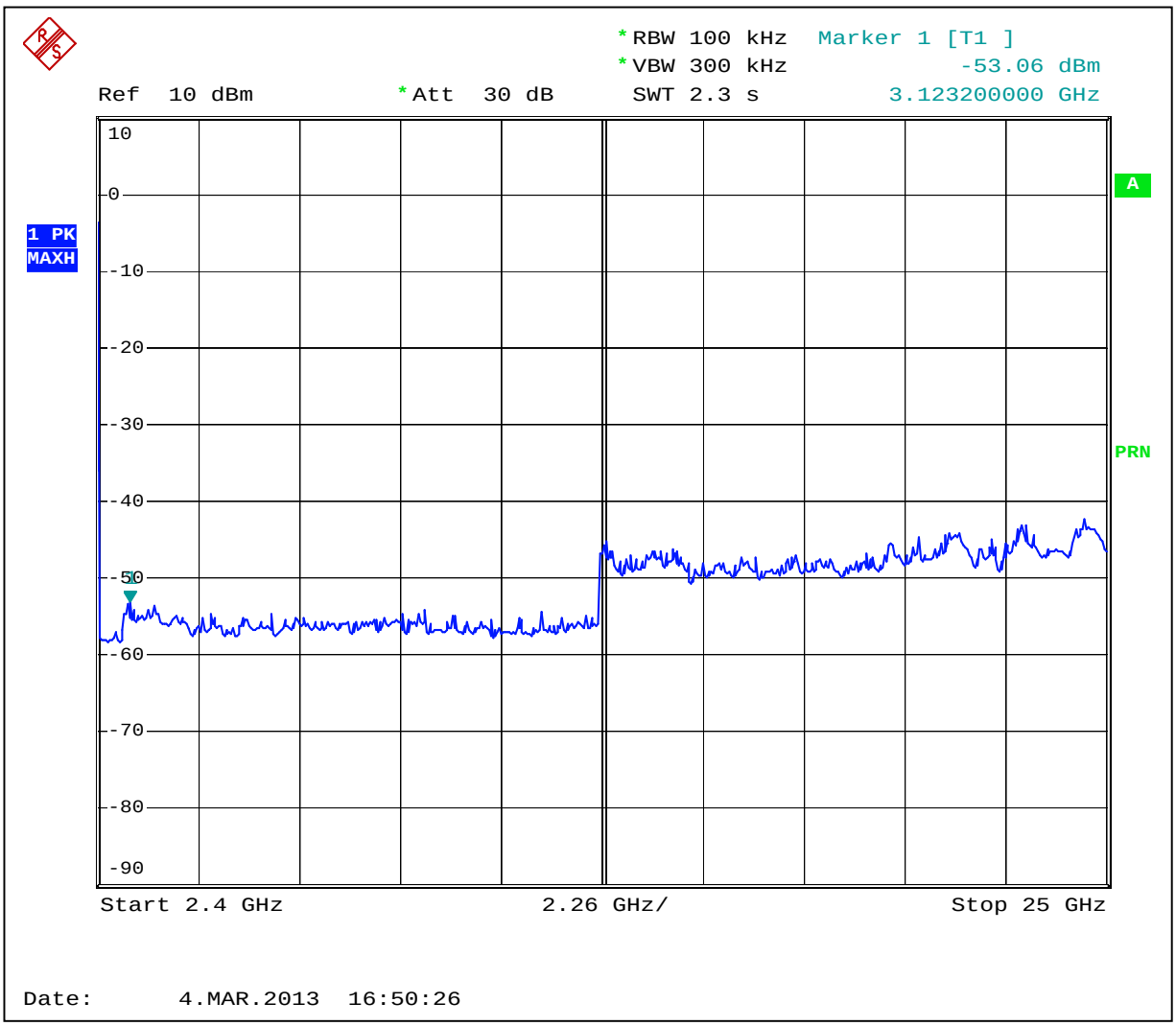
Graph 3.4.21


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-56.81 dBm
Ref 10 dBm
*Att 30 dB
SWT 100 ms
685.720000000 MHz
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1 PK
MAXH
A
PRN
1
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 4.MAR.2013 16:48:19

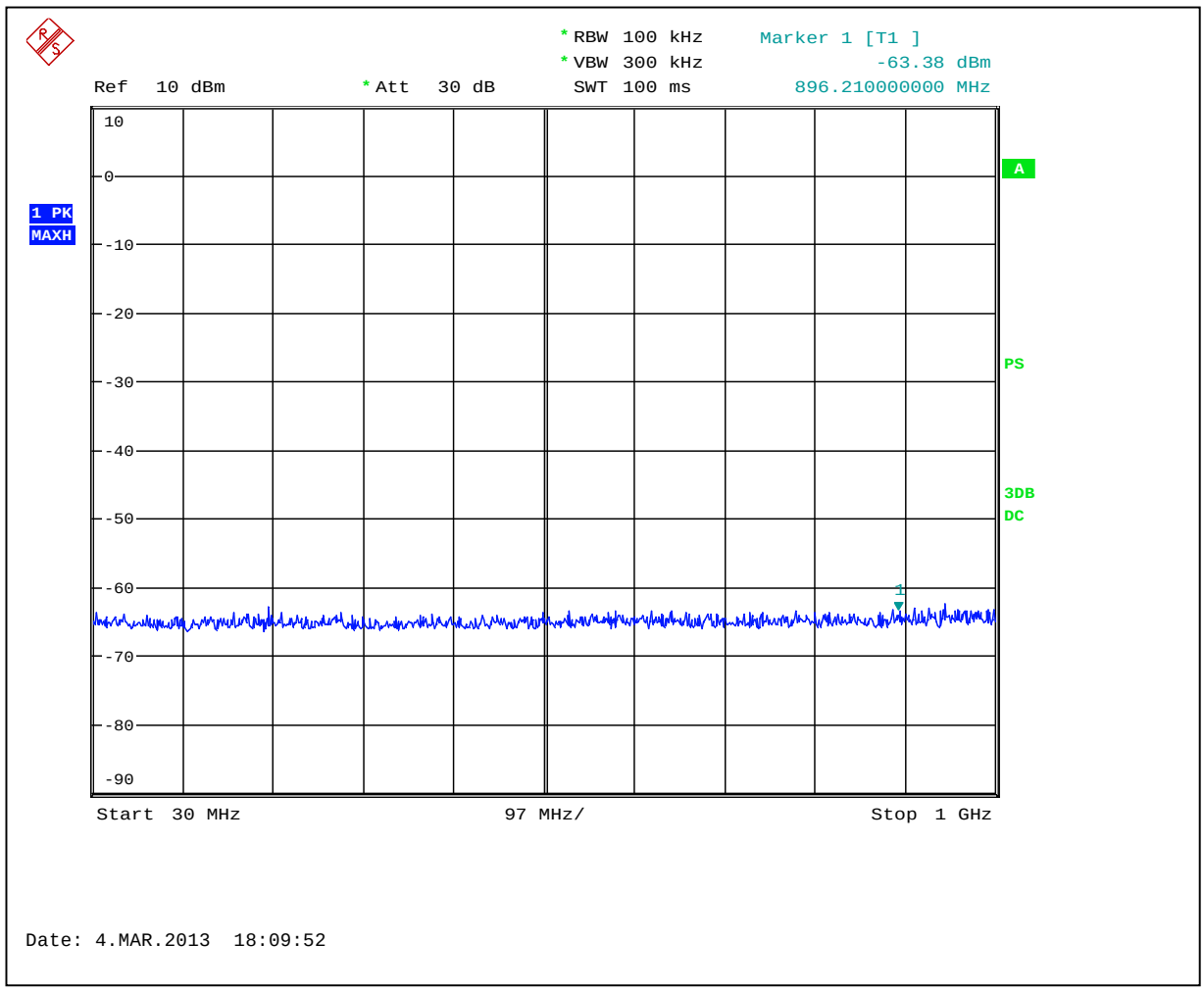
Graph 3.4.22


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-56.73 dBm
Ref 10 dBm
*Att 30 dB
SWT 140 ms
2.218000000 GHz
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1 PK
MAXH
A
PRN
1
Start 1 GHz
140 MHz/
Stop 2.4 GHz
Date: 4.MAR.2013 16:48:51

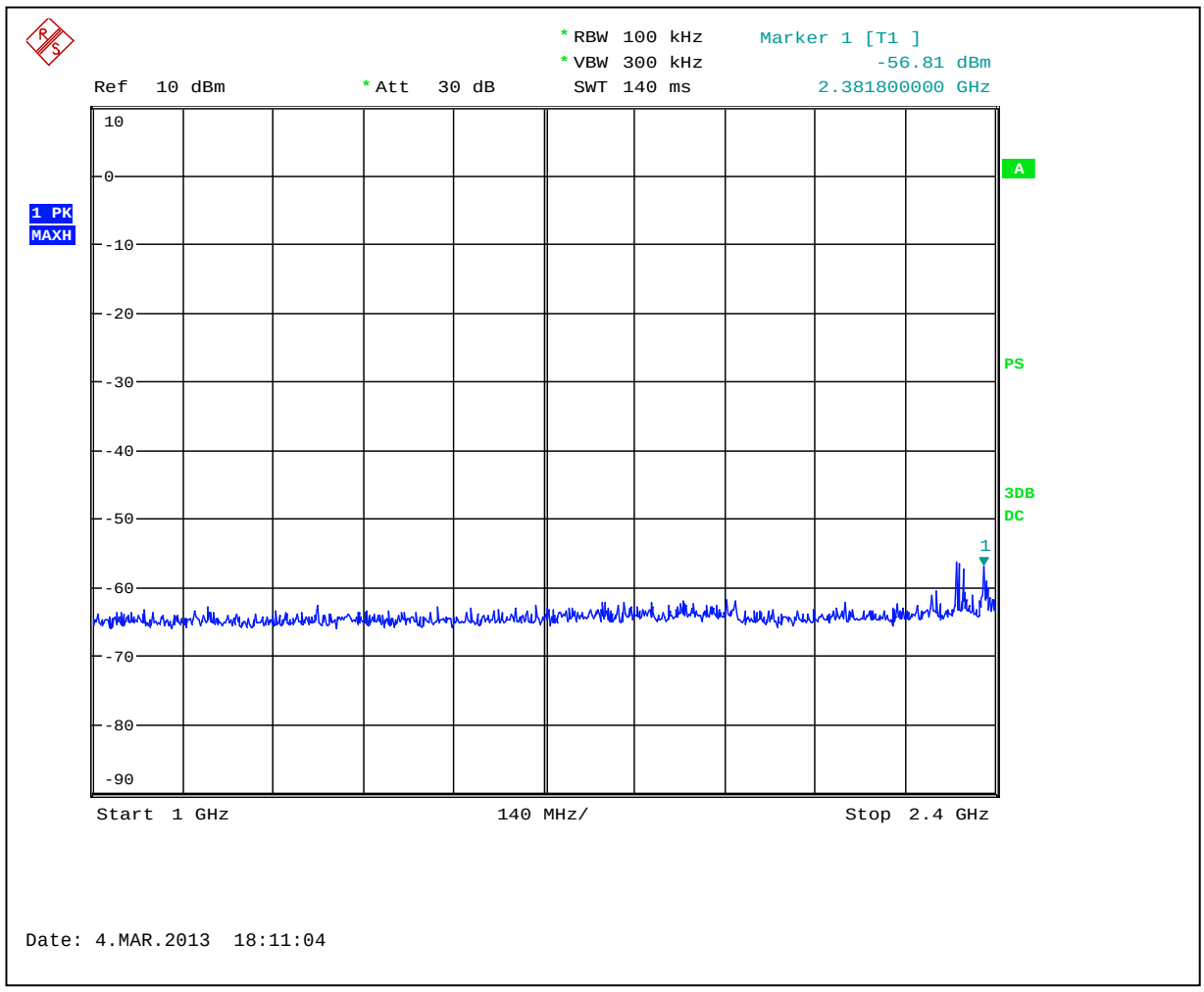
Graph 3.4.23


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-53.06 dBm
Ref 10 dBm
*Att 30 dB
SWT 2.3 s
3.123200000 GHz
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1 PK
MAXH
A
PRN
Start 2.4 GHz
2.26 GHz/
Stop 25 GHz
Date: 4.MAR.2013 16:50:26

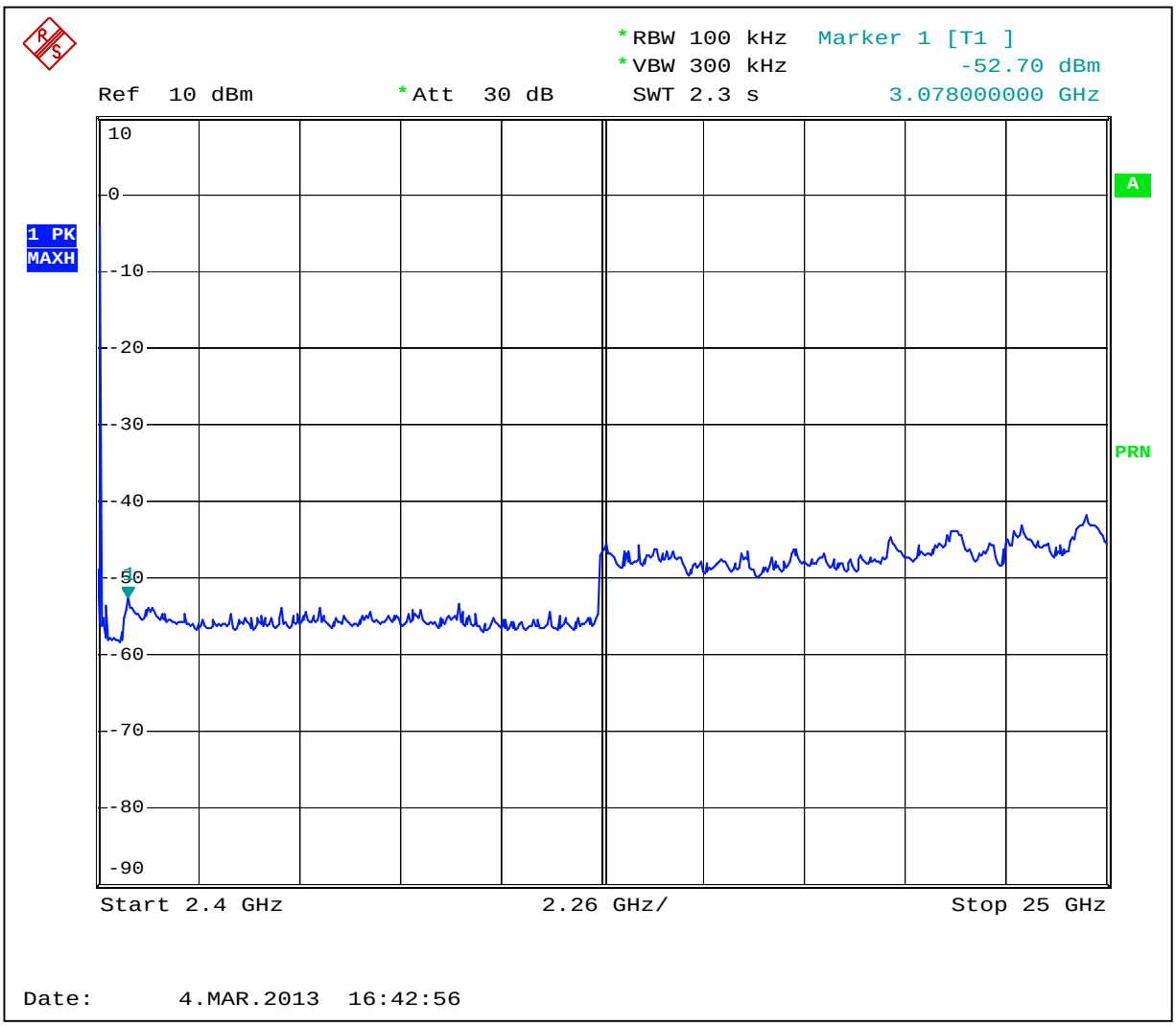
Graph 3.4.24


*RBW 100 kHz
*VBW 300 kHz
SWT 100 ms
Marker 1 [T1]
-63.38 dBm
896.210000000 MHz
Ref 10 dBm
*Att 30 dB
1 PK
MAXH
A
PS
3DB
DC
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 4.MAR.2013 18:09:52

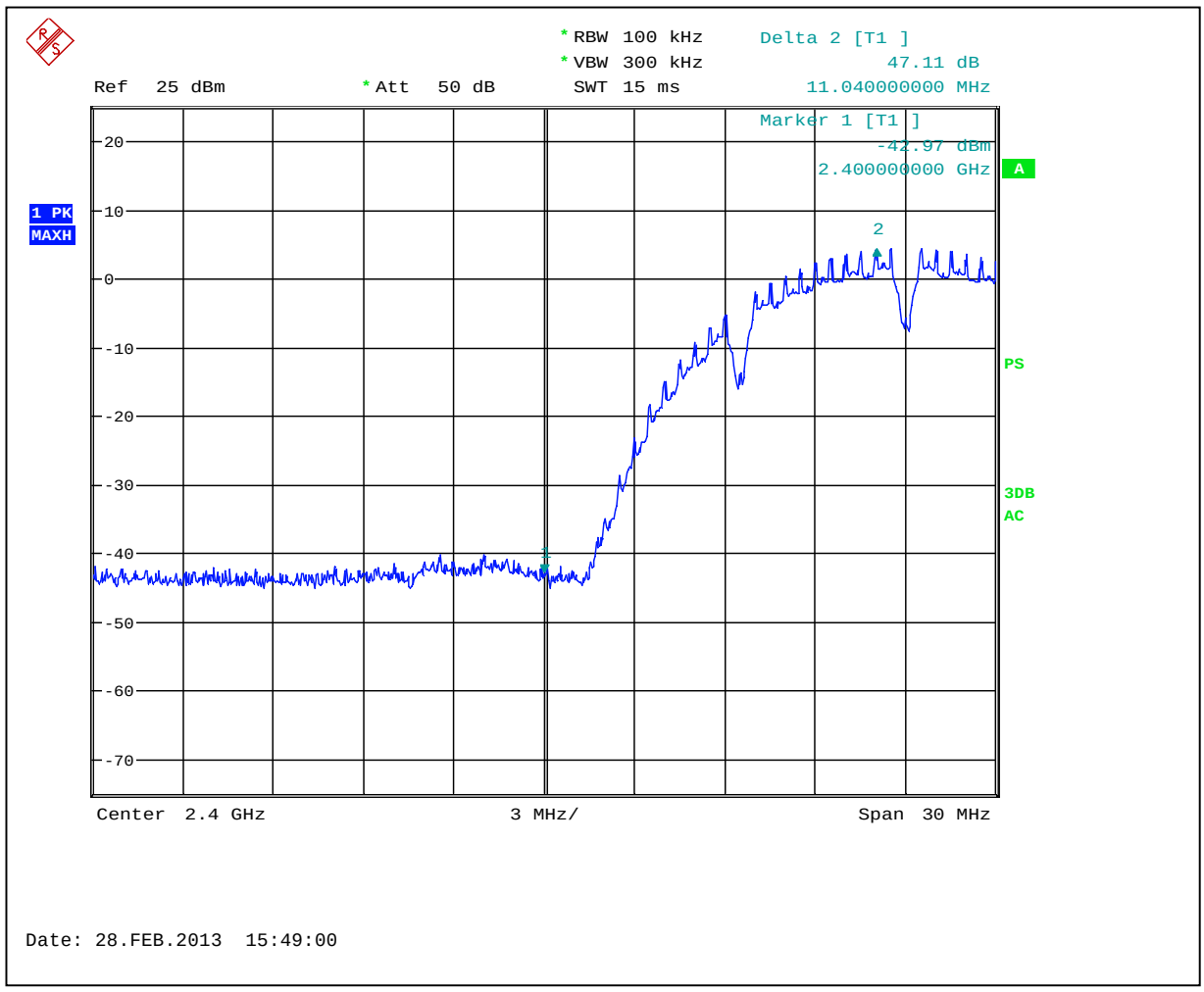
Graph 3.4.25


*RBW 100 kHz
*VBW 300 kHz
Marker 1 [T1]
-56.81 dBm
Ref 10 dBm
*Att 30 dB
SWT 140 ms
2.381800000 GHz
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1 PK
MAXH
A
PS
3DB
DC
1
Start 1 GHz
140 MHz/
Stop 2.4 GHz
Date: 4.MAR.2013 18:11:04

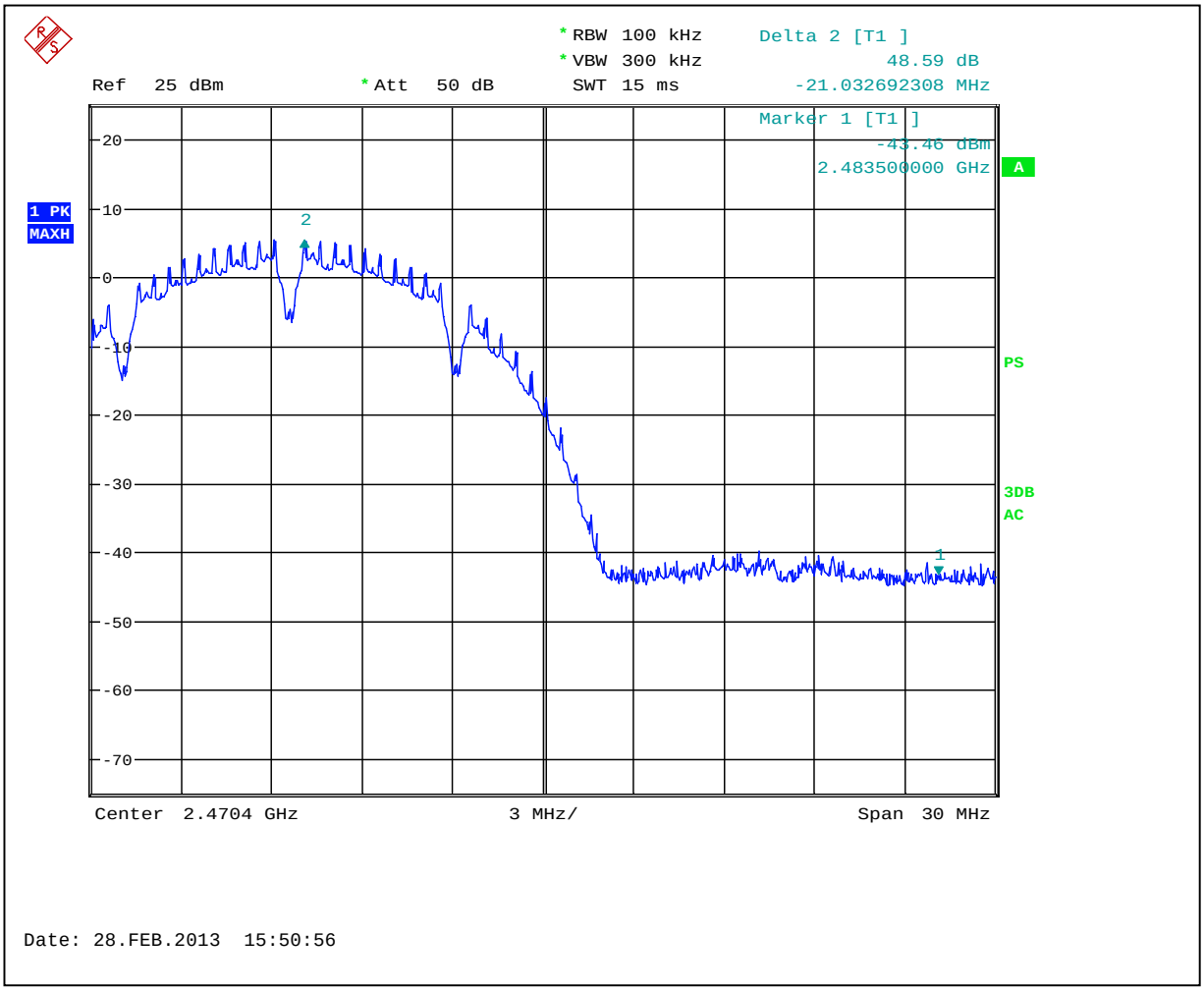
Graph 3.4.26


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-52.70 dBm
Ref 10 dBm
*Att 30 dB
SWT 2.3 s
3.078000000 GHz
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1 PK
MAXH
A
PRN
Start 2.4 GHz
2.26 GHz/
Stop 25 GHz
Date: 4.MAR.2013 16:42:56

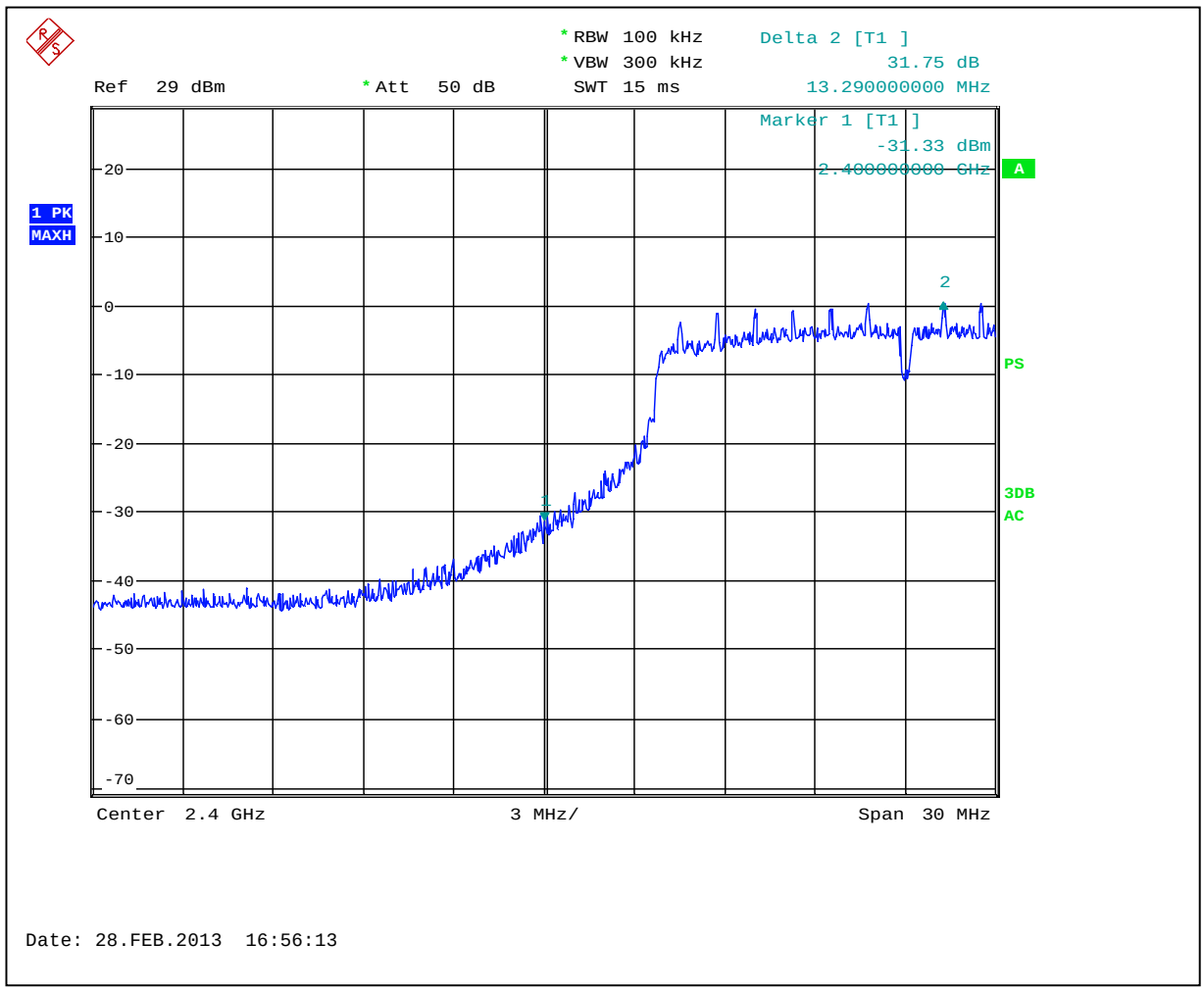
Graph 3.4.27


*RBW 100 kHz
*VBW 300 kHz
Ref 25 dBm
*Att 50 dB
SWT 15 ms
Delta 2 [T1]
47.11 dB
11.040000000 MHz
Marker 1 [T1]
-42.97 dBm
2.400000000 GHz
A
1 PK
MAXH
2
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.4 GHz
3 MHz/
Span 30 MHz
Date: 28.FEB.2013 15:49:00

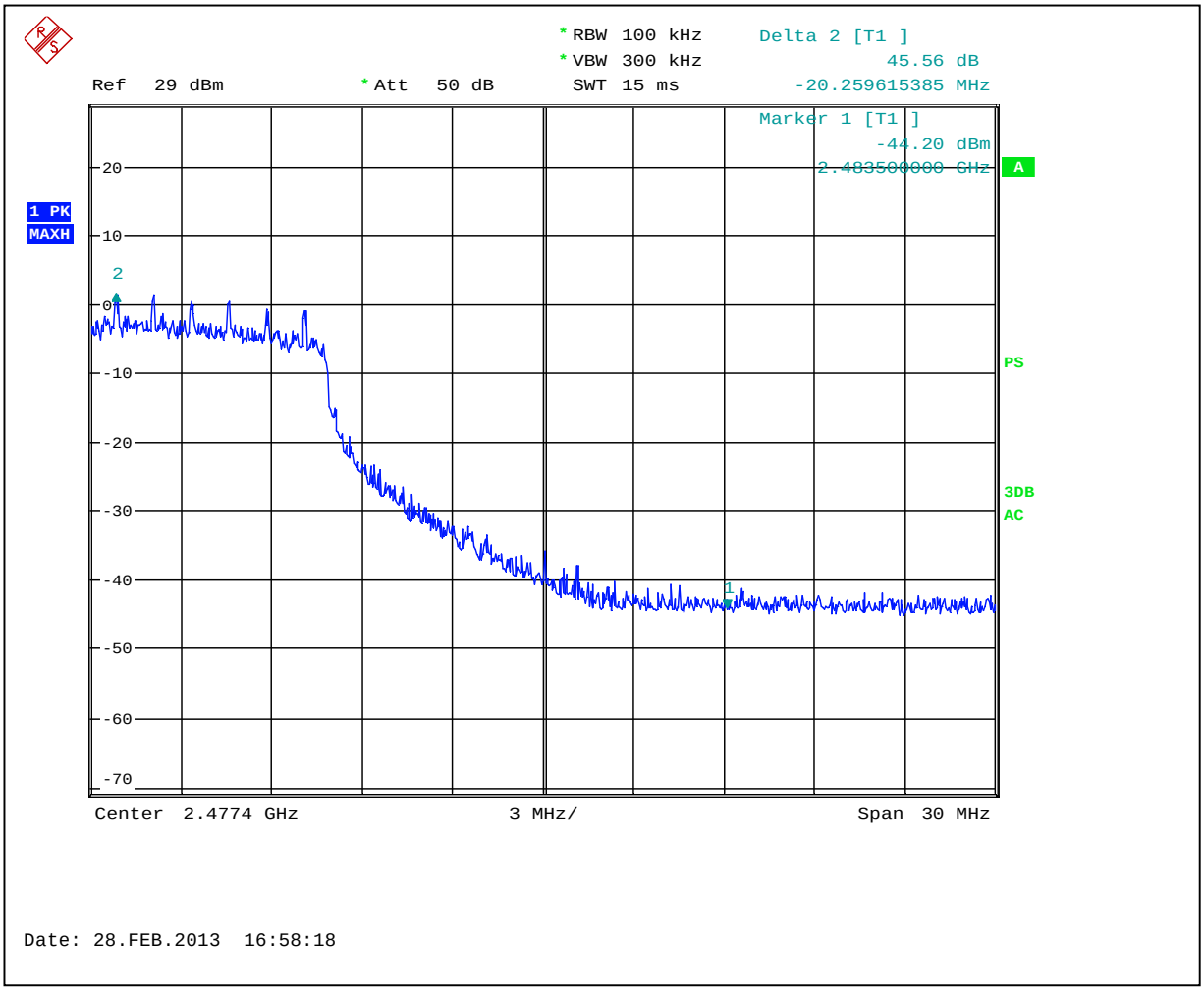
Graph 3.4.28


*RBW 100 kHz
*VBW 300 kHz
Ref 25 dBm
*Att 50 dB
SWT 15 ms
Delta 2 [T1]
48.59 dB
-21.032692308 MHz
Marker 1 [T1]
-43.46 dBm
2.483500000 GHz
A
1 PK
MAXH
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.4704 GHz
3 MHz/
Span 30 MHz
Date: 28.FEB.2013 15:50:56

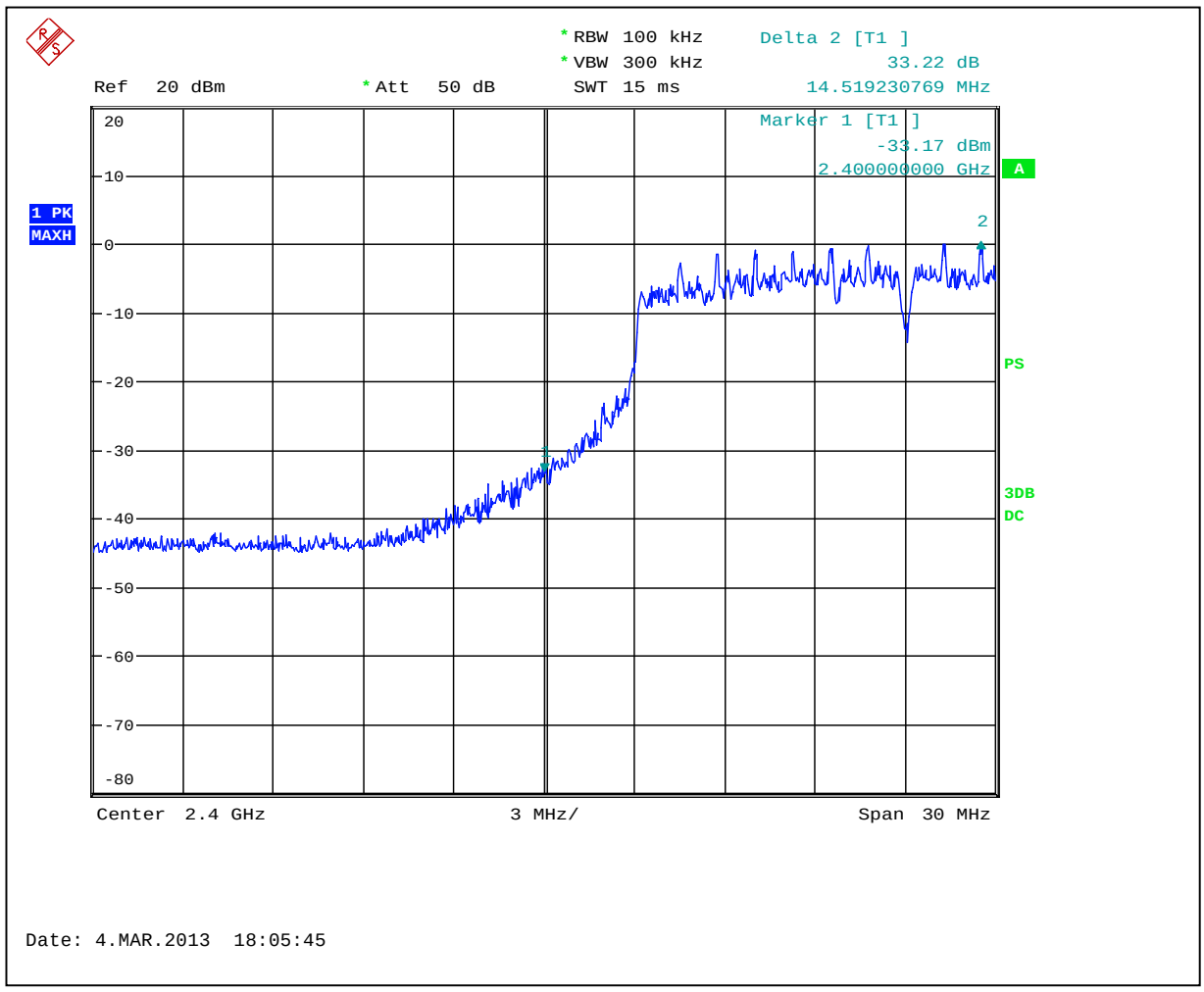
Graph 3.4.29


*RBW 100 kHz
*VBW 300 kHz
Ref 29 dBm
*Att 50 dB
SWT 15 ms
Delta 2 [T1]
31.75 dB
13.290000000 MHz
Marker 1 [T1]
-31.33 dBm
2.400000000 GHz
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.4 GHz
3 MHz/
Span 30 MHz
Date: 28.FEB.2013 16:56:13

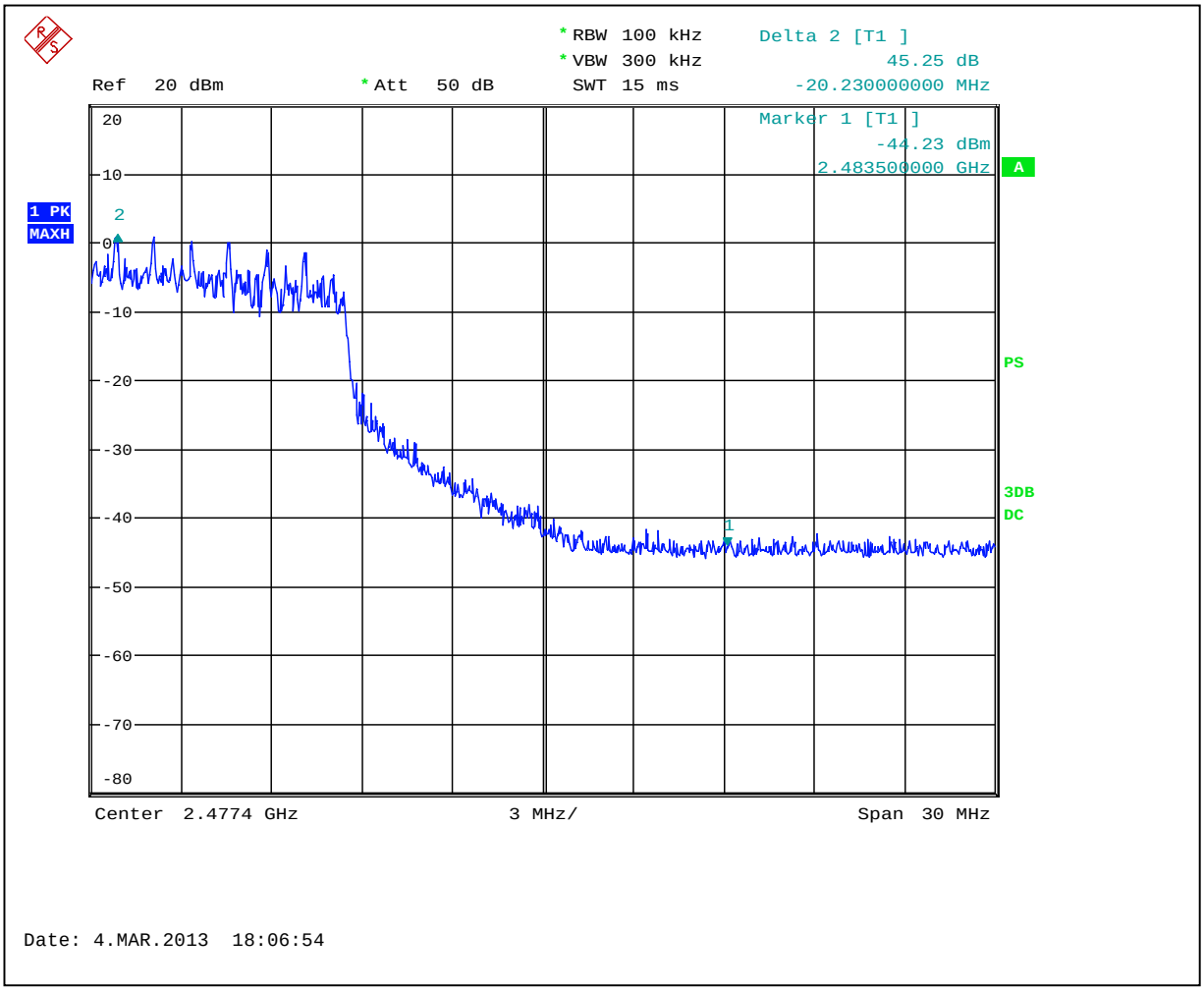
Graph 3.4.30


*RBW 100 kHz
*VBW 300 kHz
Ref 29 dBm
*Att 50 dB
SWT 15 ms
Delta 2 [T1]
45.56 dB
-20.259615385 MHz
Marker 1 [T1]
-44.20 dBm
2.483500000 GHz
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.4774 GHz
3 MHz/
Span 30 MHz
Date: 28.FEB.2013 16:58:18

Graph 3.4.31


RBW 100 kHz
VBW 300 kHz
Ref 20 dBm
Att 50 dB
SWT 15 ms
Delta 2 [T1]
33.22 dB
14.519230769 MHz
Marker 1 [T1]
-33.17 dBm
2.400000000 GHz
A
1 PK
MAXH
2
PS
3DB
DC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.4 GHz
3 MHz/
Span 30 MHz
Date: 4.MAR.2013 18:05:45

Graph 3.4.32


*RBW 100 kHz
*VBW 300 kHz
Ref 20 dBm
*Att 50 dB
SWT 15 ms
Delta 2 [T1]
45.25 dB
-20.230000000 MHz
Marker 1 [T1]
-44.23 dBm
2.483500000 GHz
A
1 PK
MAXH
PS
3DB
DC
Center 2.4774 GHz
3 MHz/
Span 30 MHz
Date: 4.MAR.2013 18:06:54

Graph 3.4.33

3.5 Radiated spurious emissions

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test result: **Pass**

Max. Margin: 5.7dB below the limits

Date:	March 18-April 22, 2013	**Result:** **Pass**
Standard:	FCC part 15.247(d)	
Tested by:	Uri Spector	
Test Point:	Enclosure	
Operation mode:	See Page 5	
Note:	802.11b. Spurious Radiated Emissions not related with transmitter operation and fundamental frequencies were excluded from the table.	

Table 3.5.1

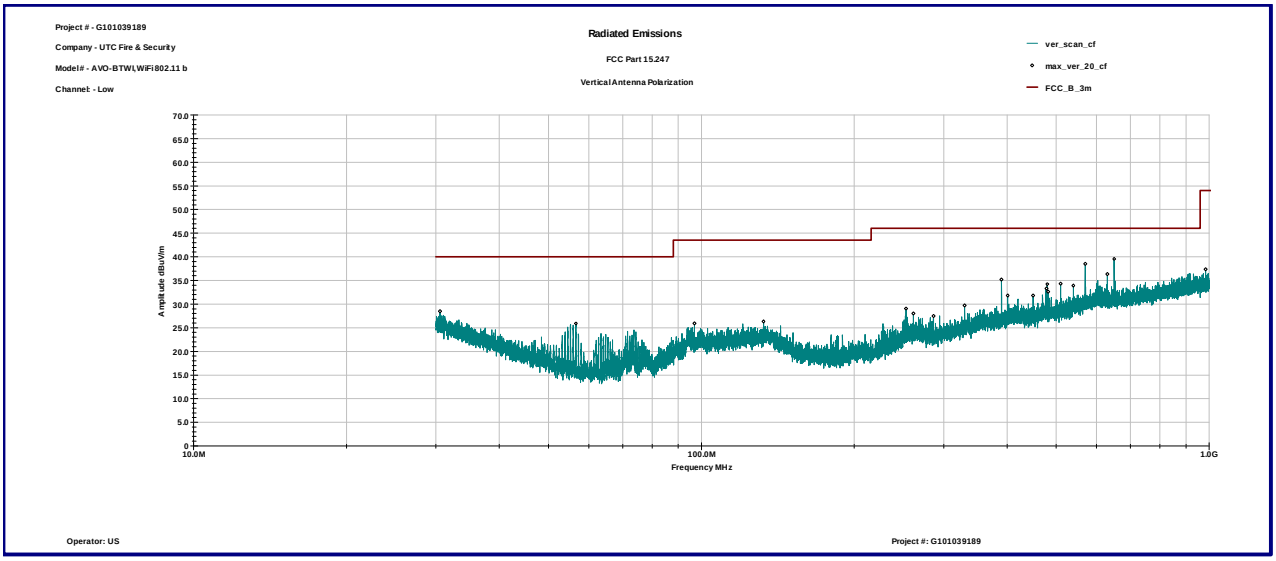
Frequency MHz	Antenna Polarity	Peak Reading dBµV	Total C.F. dB1/m	Pre-Amp. Gain (dB)	Total at 3m dBµV/m	Limit dBµV/m	Margin dB
Low							
9.648 GHz	H	40.1	43.8	37.1	46.8	54.0	-7.2
Middle							
9.752 GHz	H	39.1	44.0	37.1	46.0	54.0	-8.0

Date:	March 18-April 22, 2013	**Result:** **Pass**
Standard:	FCC part 15.247(d)	
Tested by:	Uri Spector	
Test Point:	Enclosure	
Operation mode:	See Page 5	
Note:	802.11g. Spurious Radiated Emissions not related with transmitter operation and fundamental frequencies were excluded from the table. No Spurious Radiated Emissions related with transmitter operation were detected.	

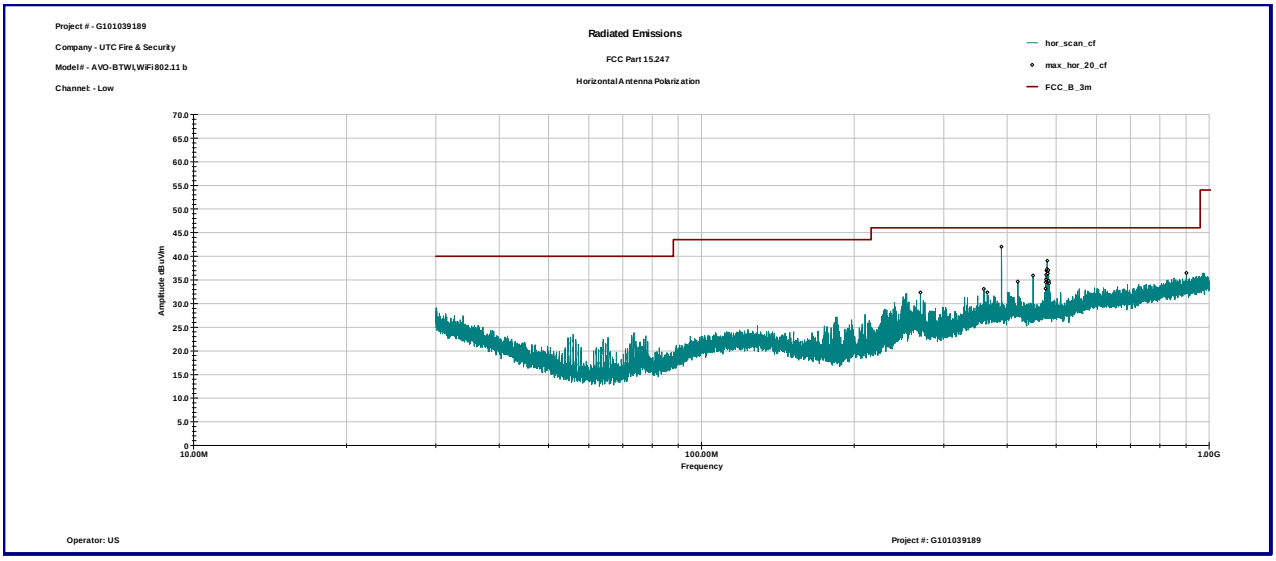
Date:	March 18-April 22, 2013	**Result:** **Pass**
Standard:	FCC part 15.247(d)	
Tested by:	Uri Spector	
Test Point:	Enclosure	
Operation mode:	See Page 5	
Note:	802.11n. Spurious Radiated Emissions not related with transmitter operation and fundamental frequencies were excluded from the table.	

Table 3.5.2

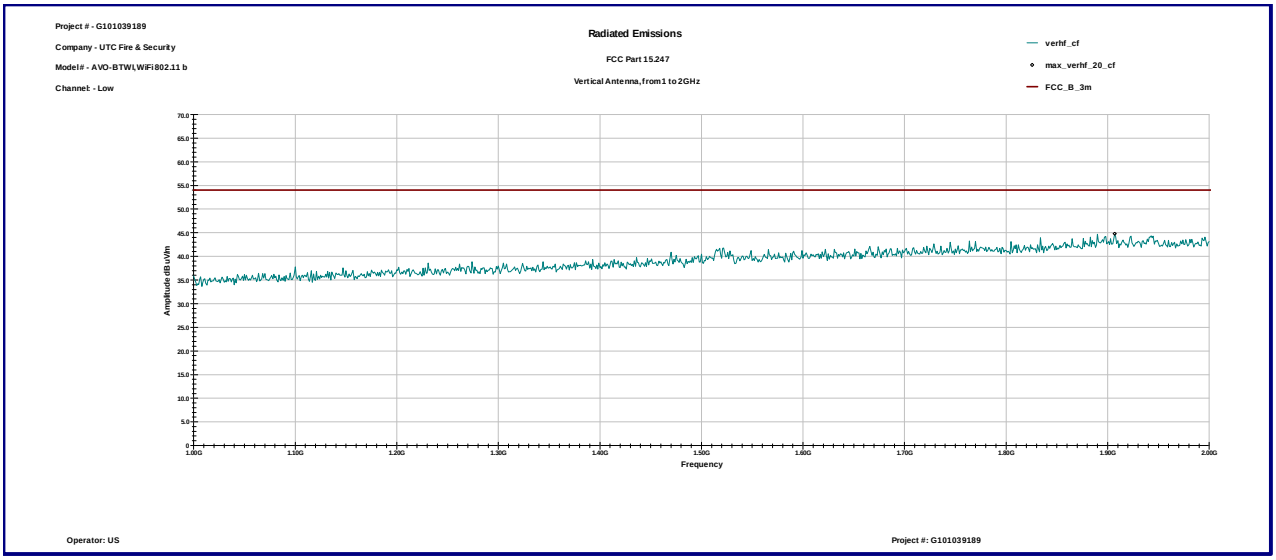
Frequency MHz	Antenna Polarity	Peak Reading dBµV	Total C.F. dB1/m	Pre-Amp. Gain (dB)	Total at 3m dBµV/m	Limit dBµV/m	Margin dB
Middle							
9.752 GHz	H	41.4	44.0	37.1	48.3	54.0	-5.7



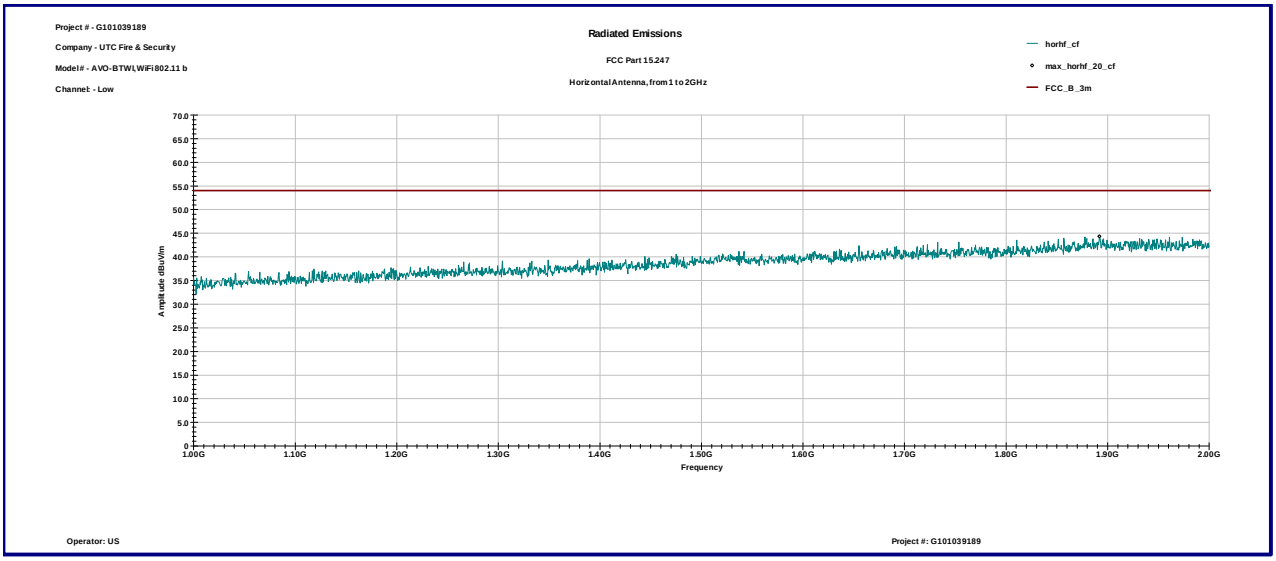
Graph 3.5.1



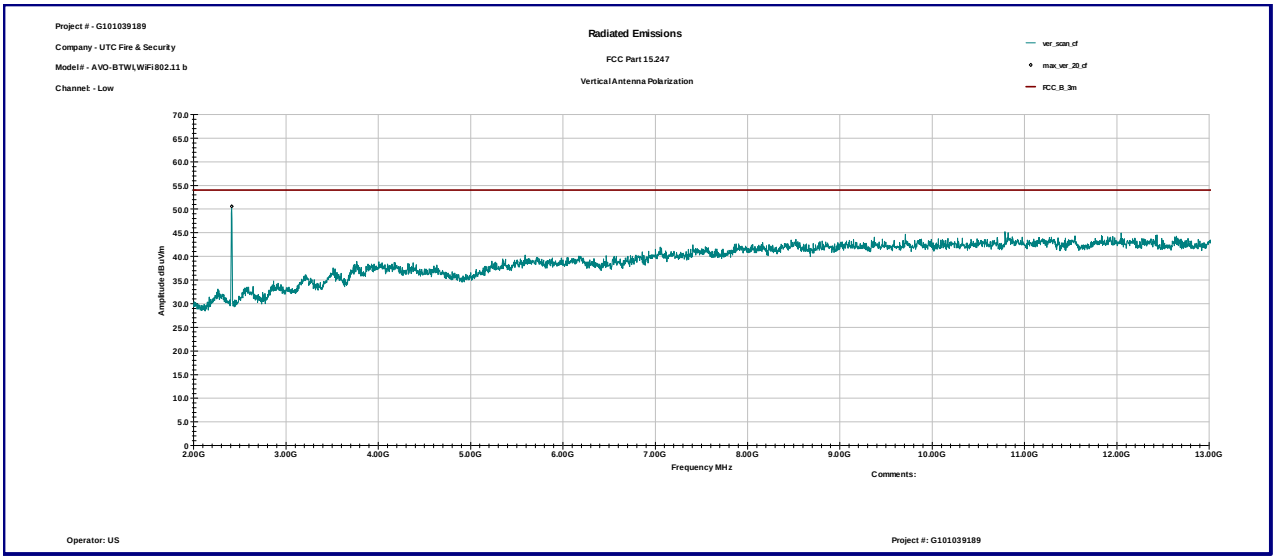
Graph 3.5.2



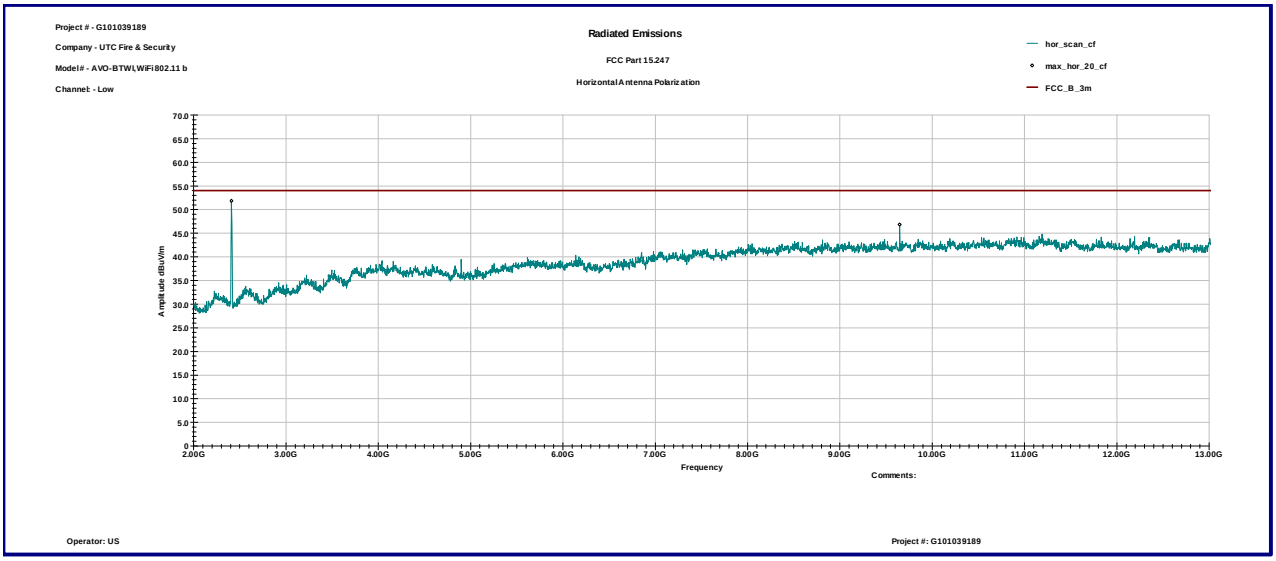
Graph 3.5.3



Graph 3.5.4



Graph 3.5.5



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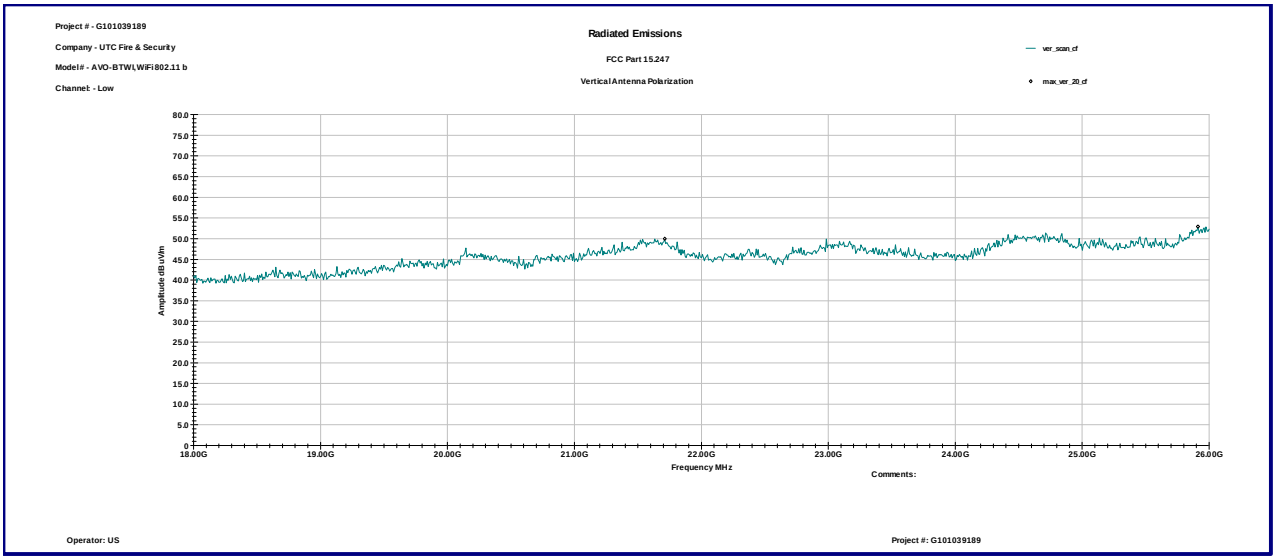

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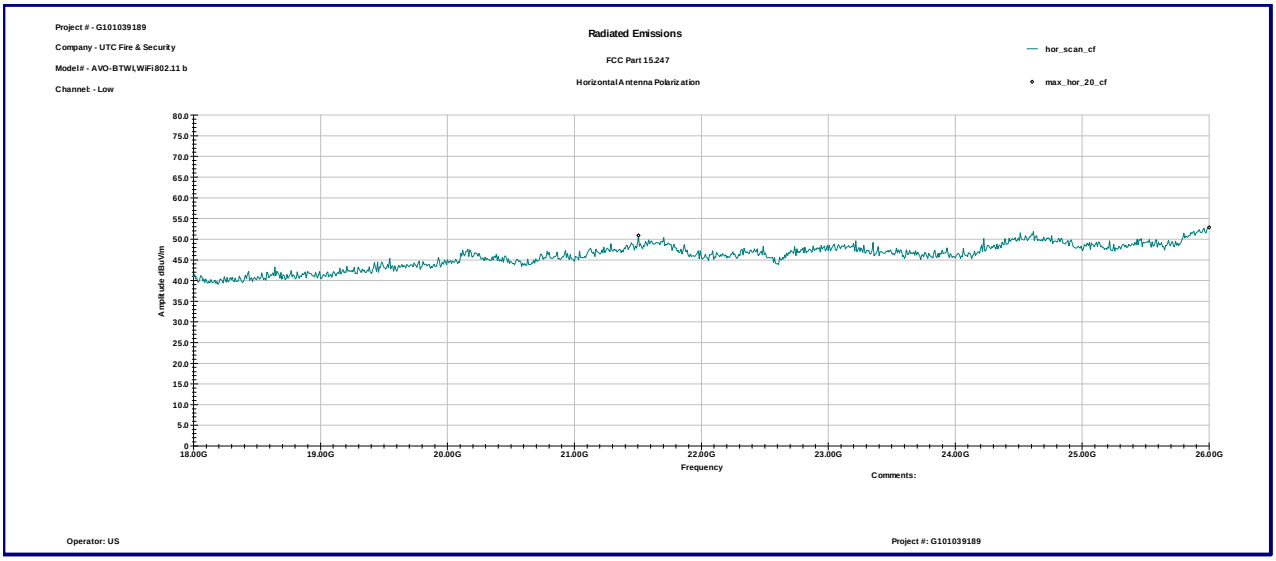

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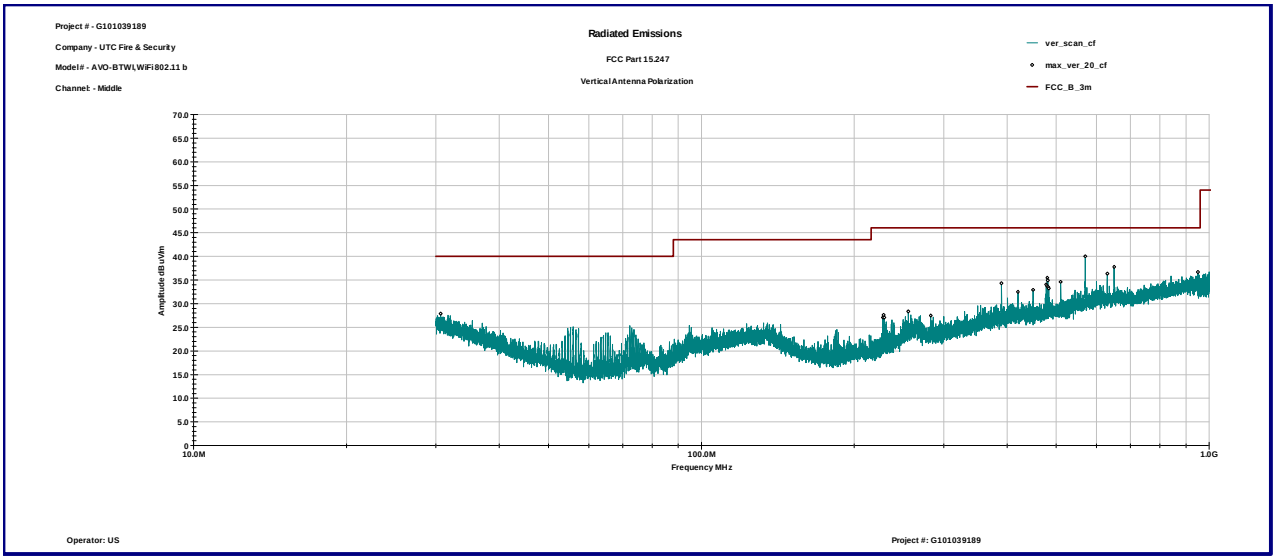

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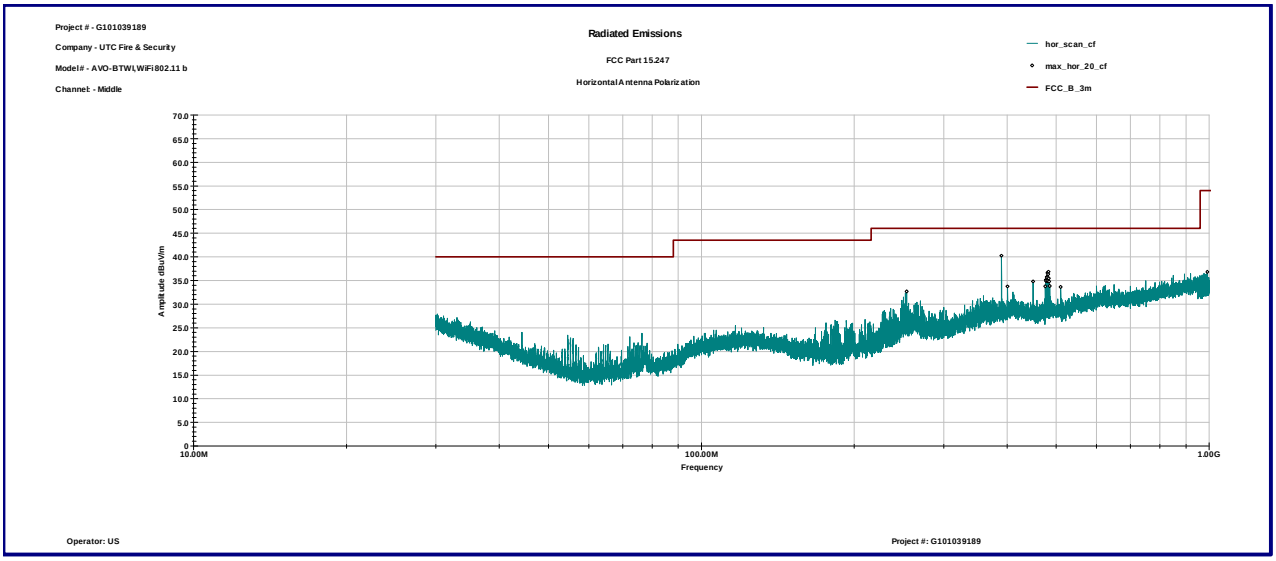

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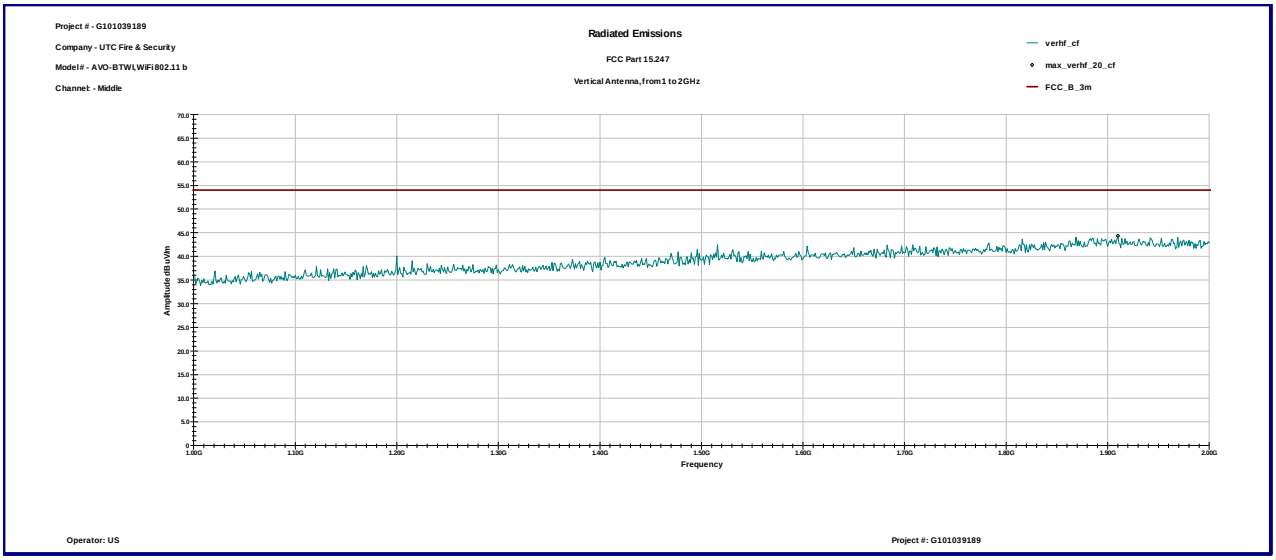

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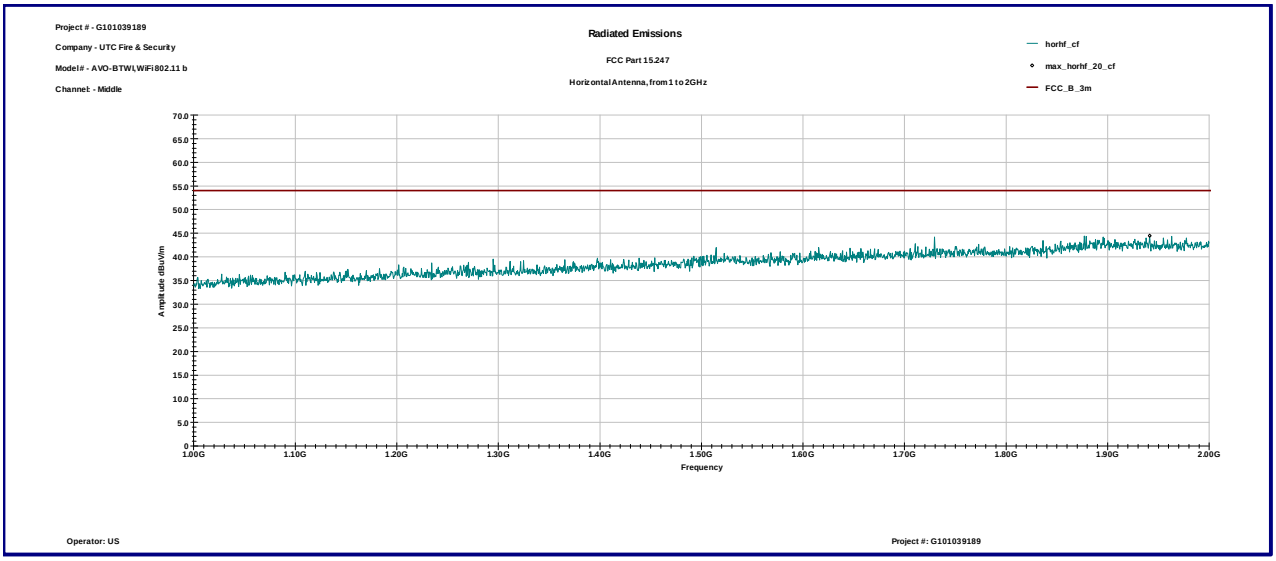

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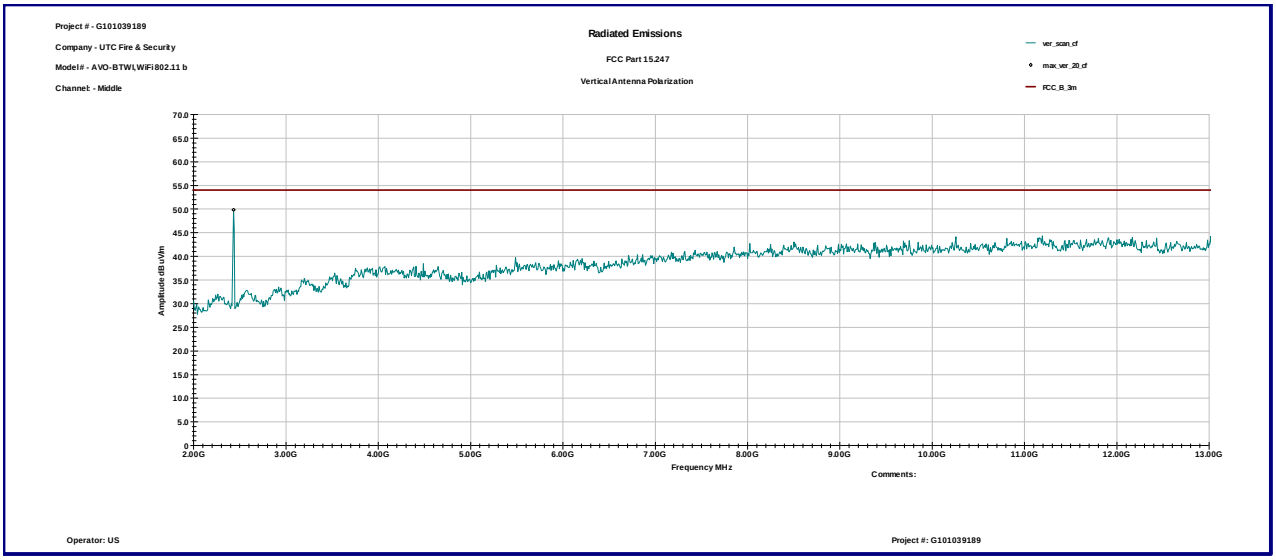

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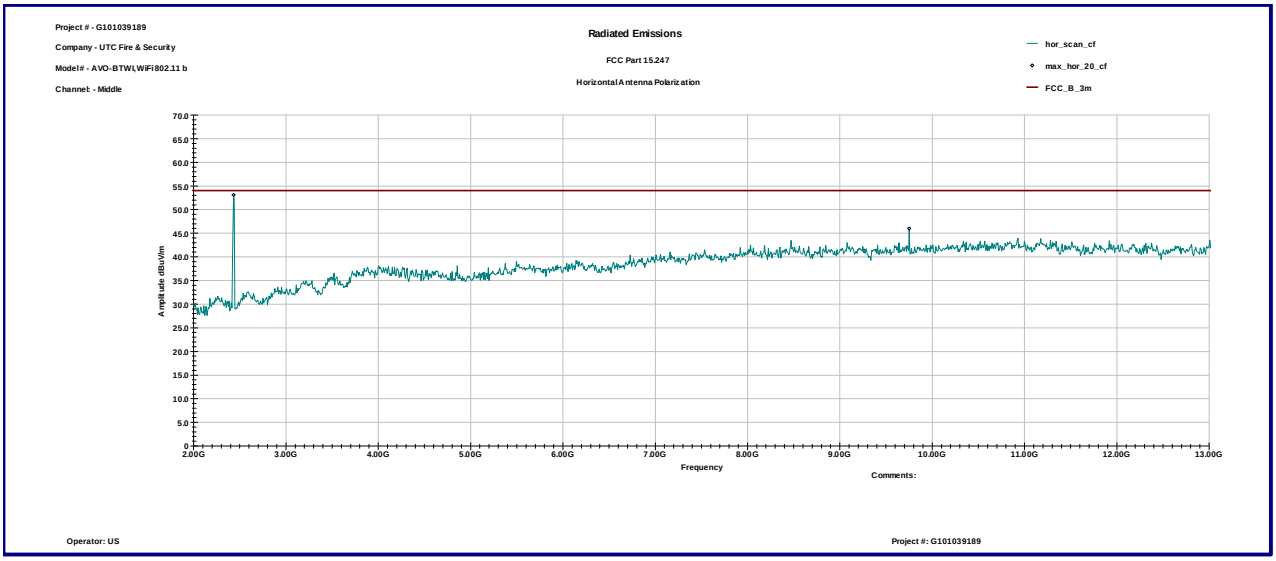

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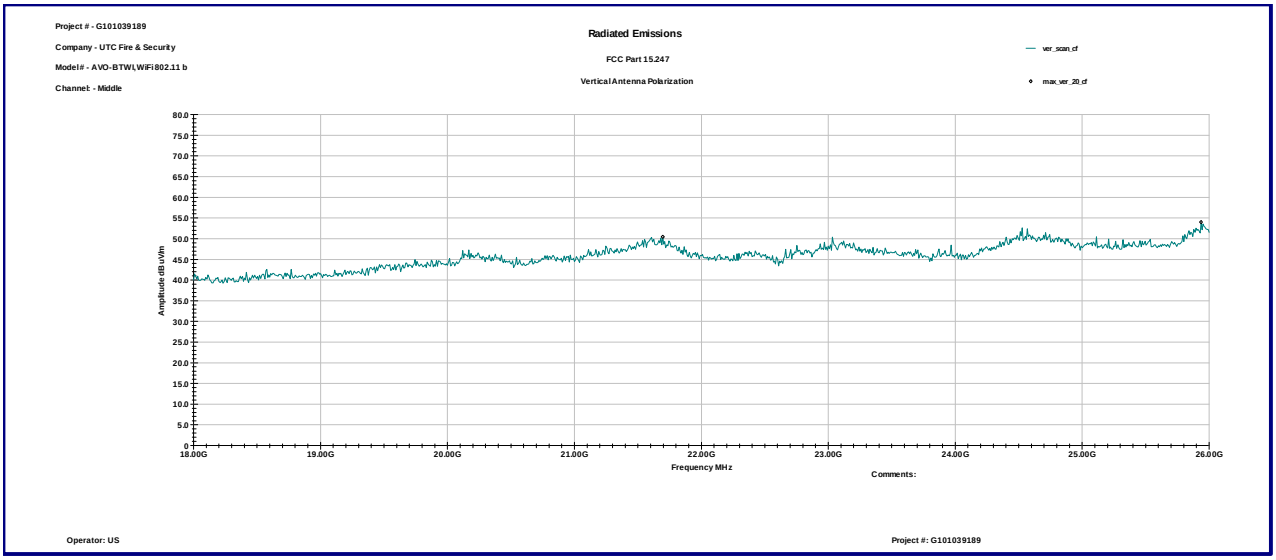

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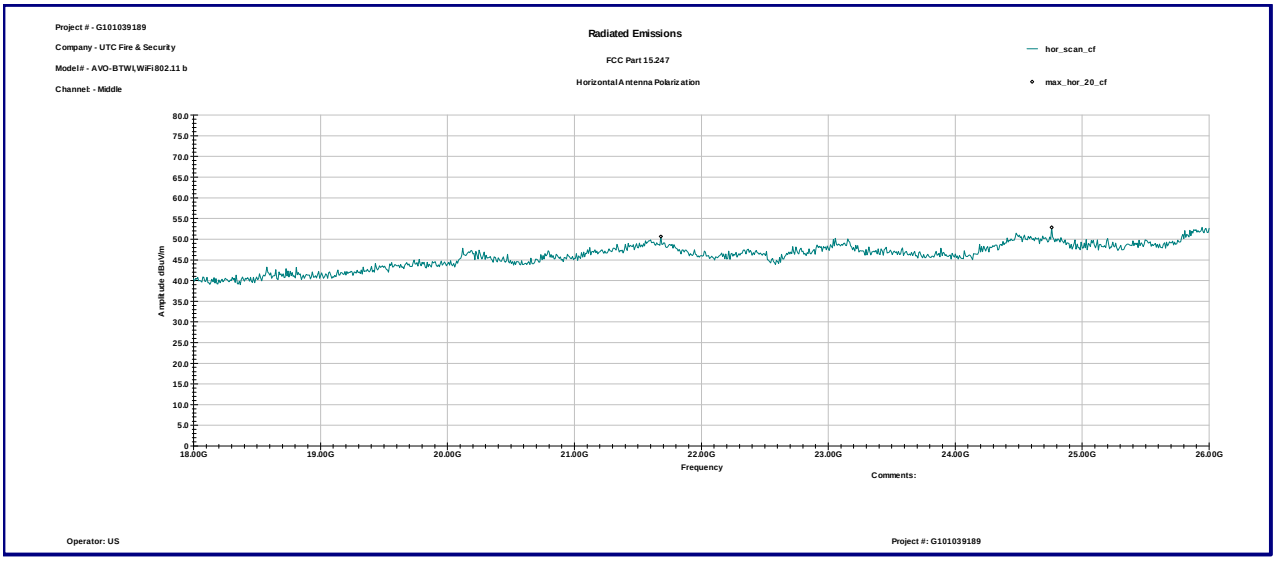

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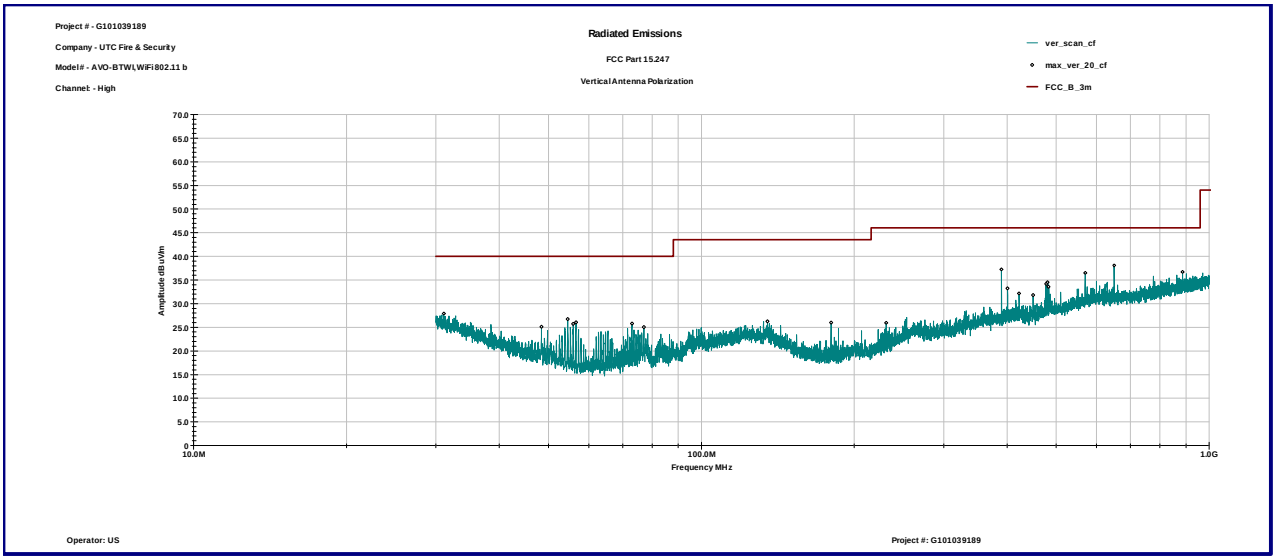

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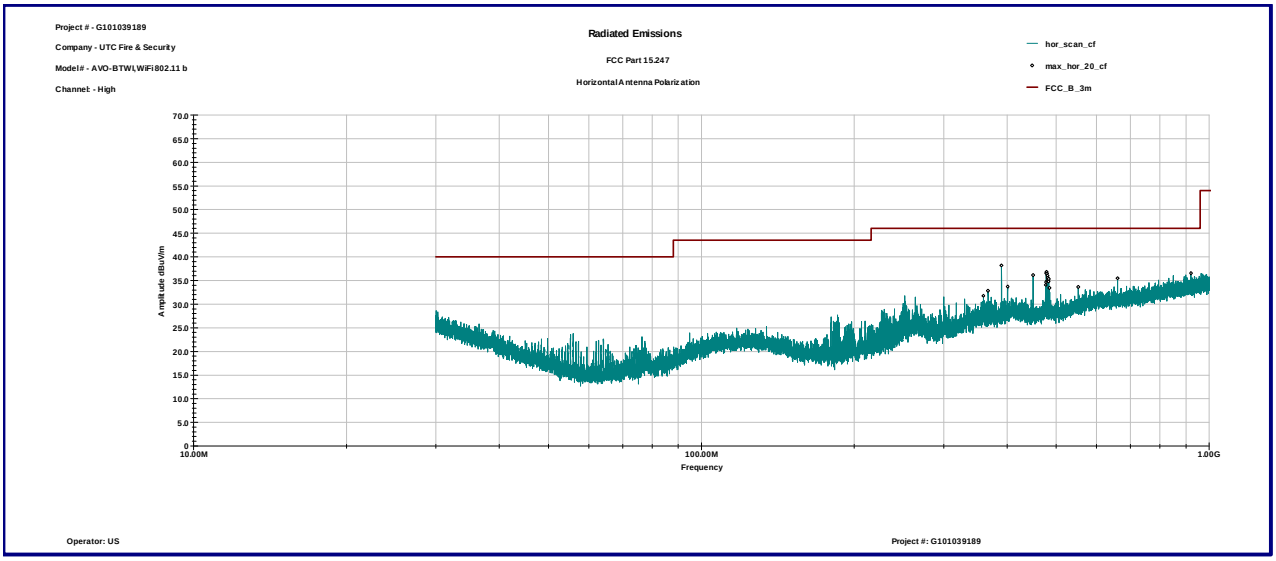

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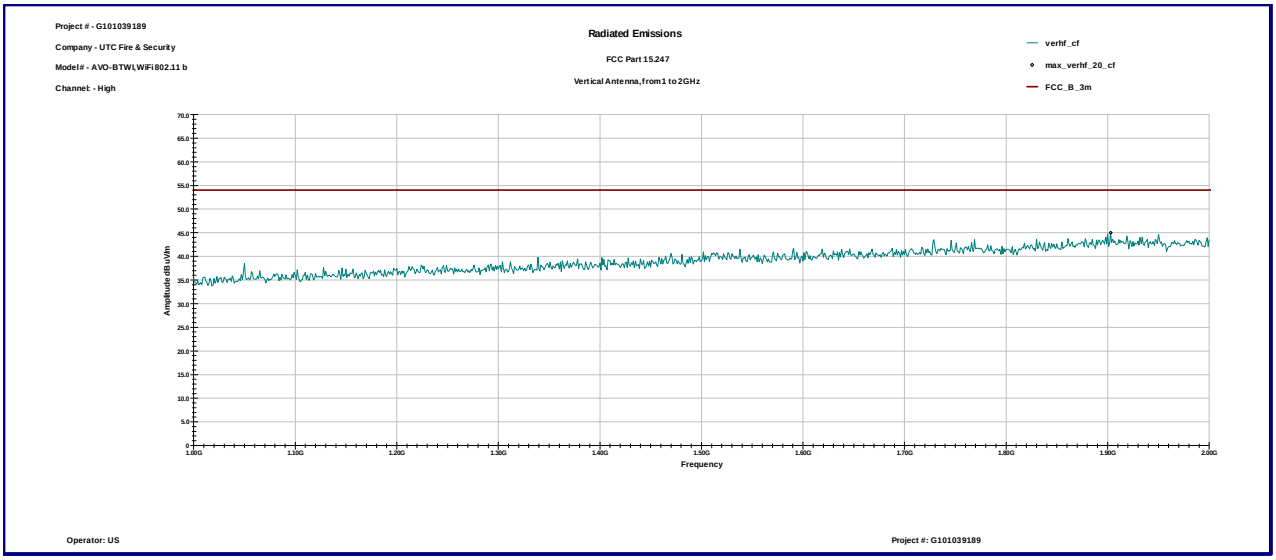

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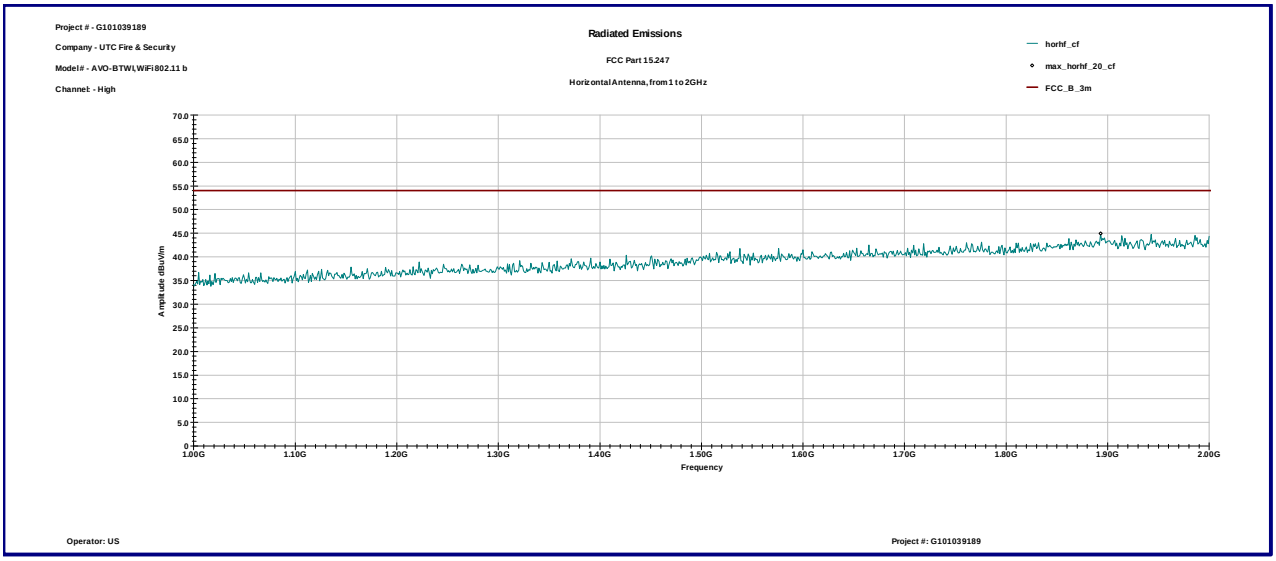

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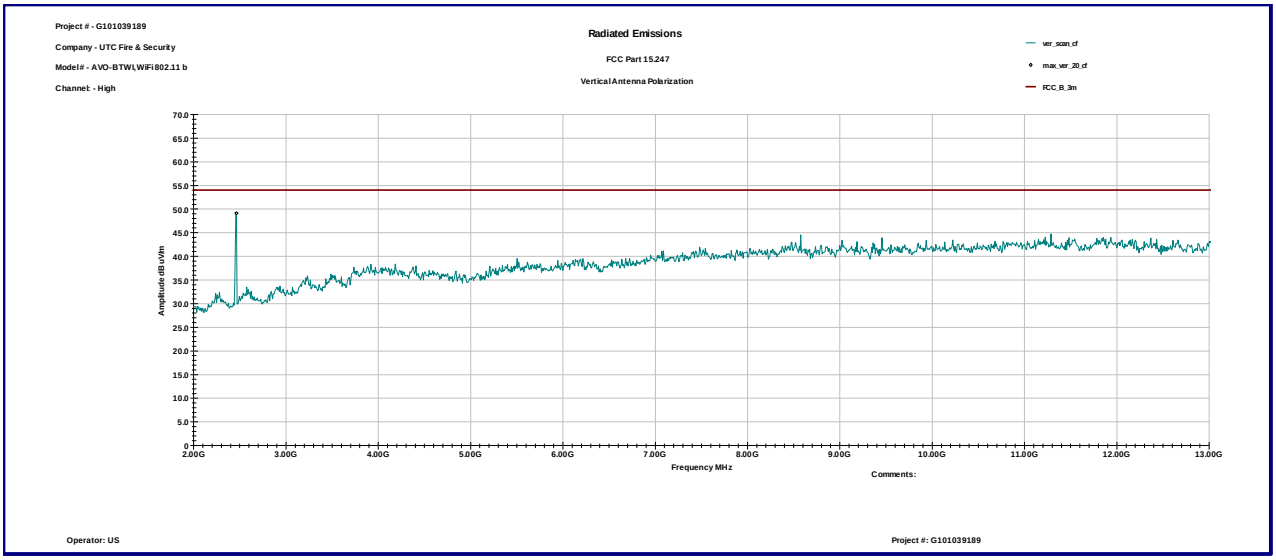

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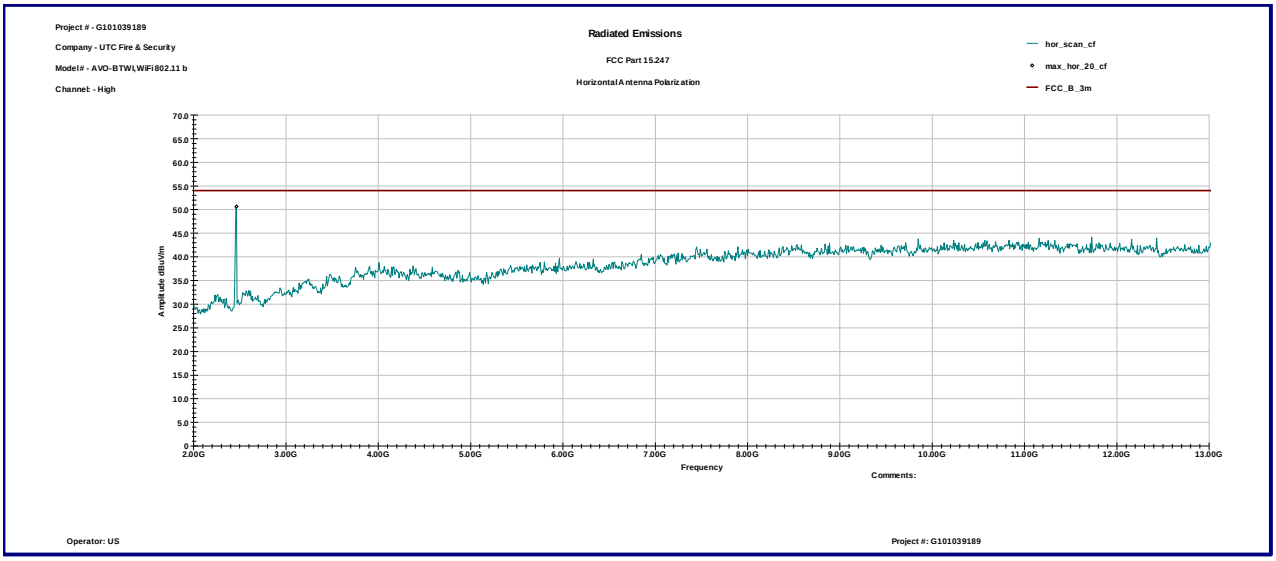

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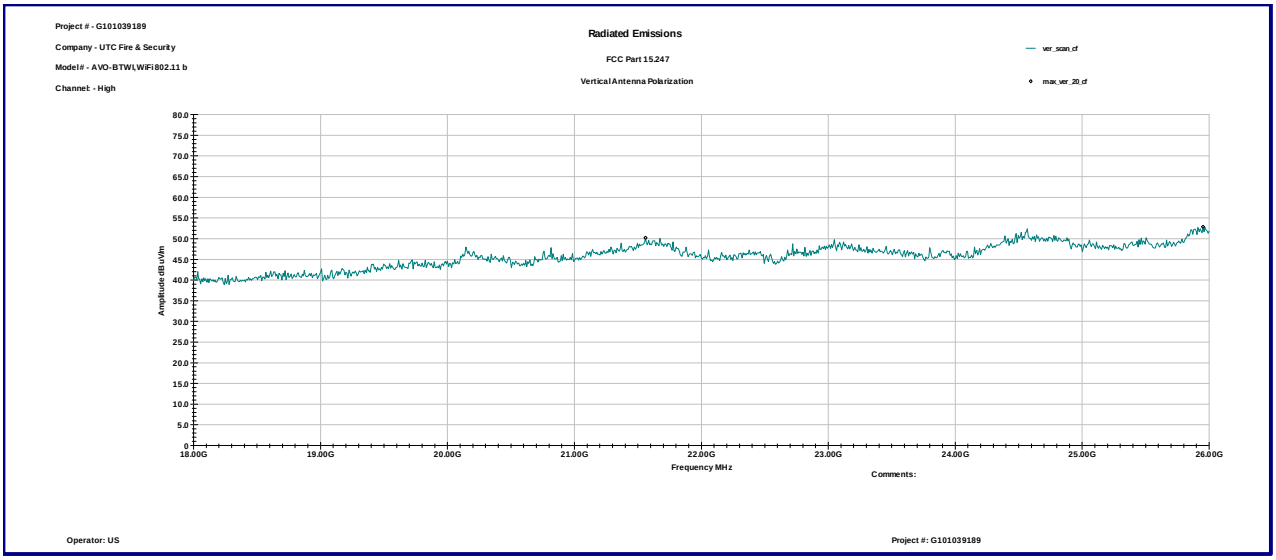

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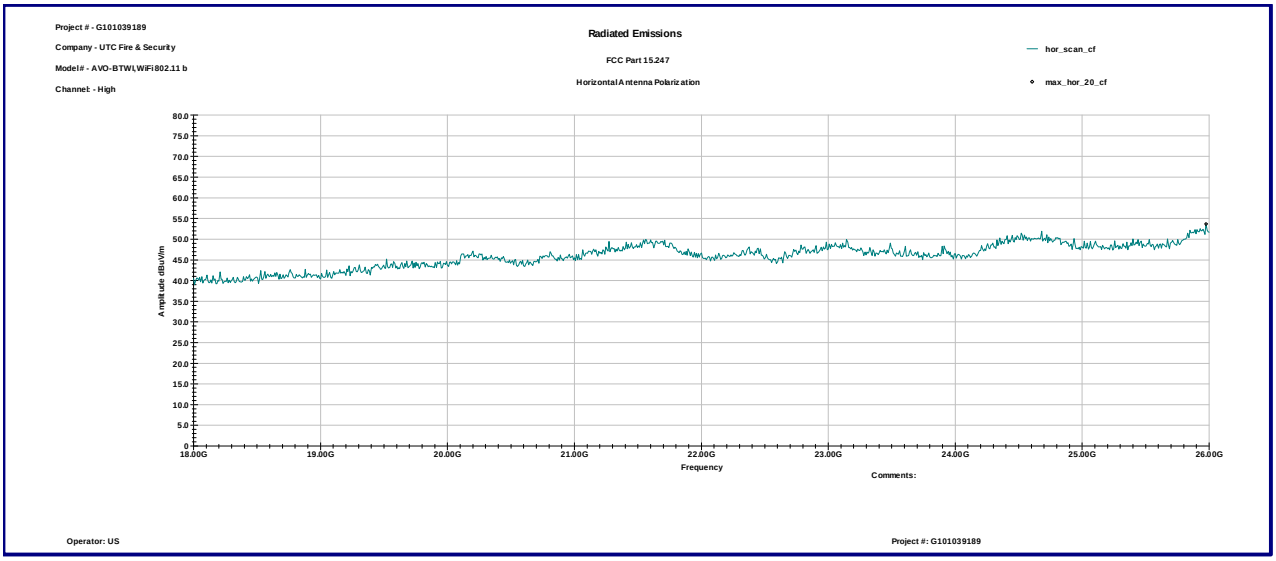

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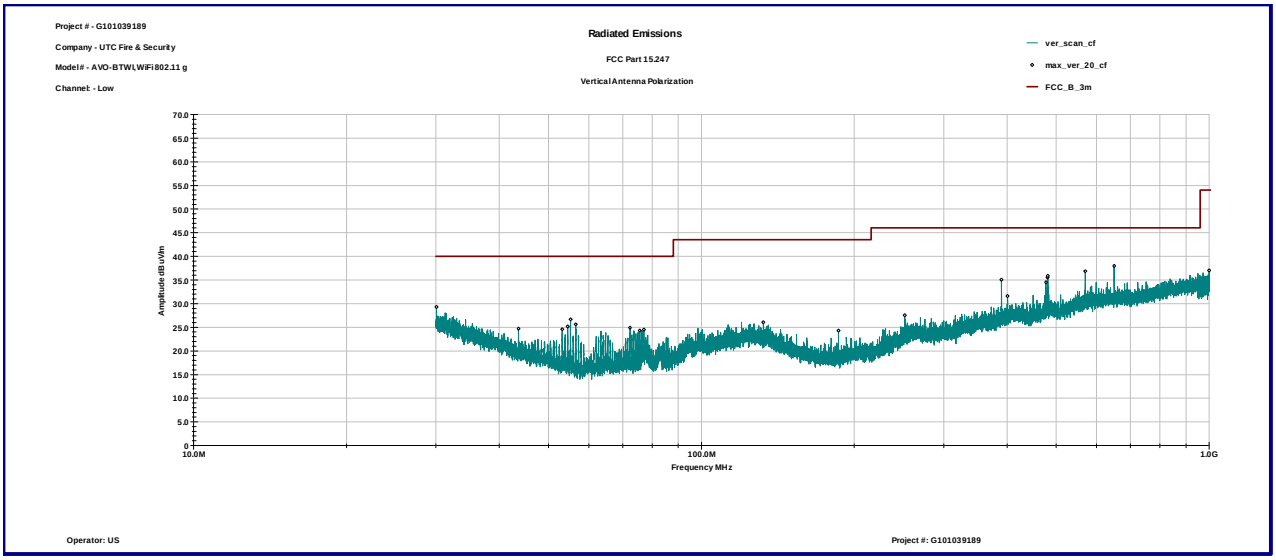

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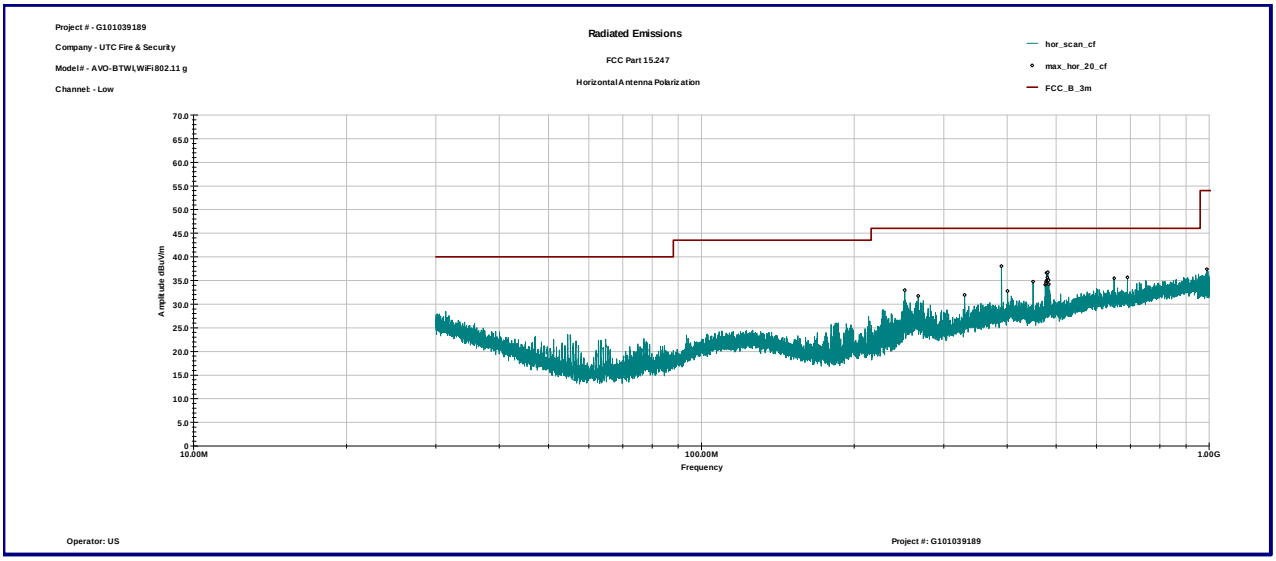

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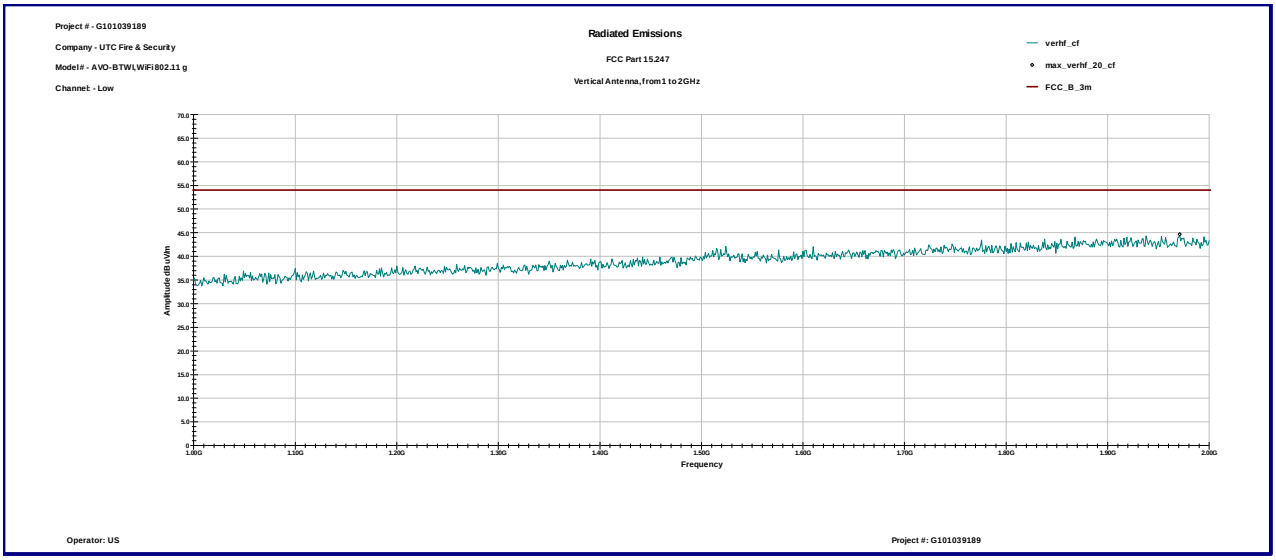

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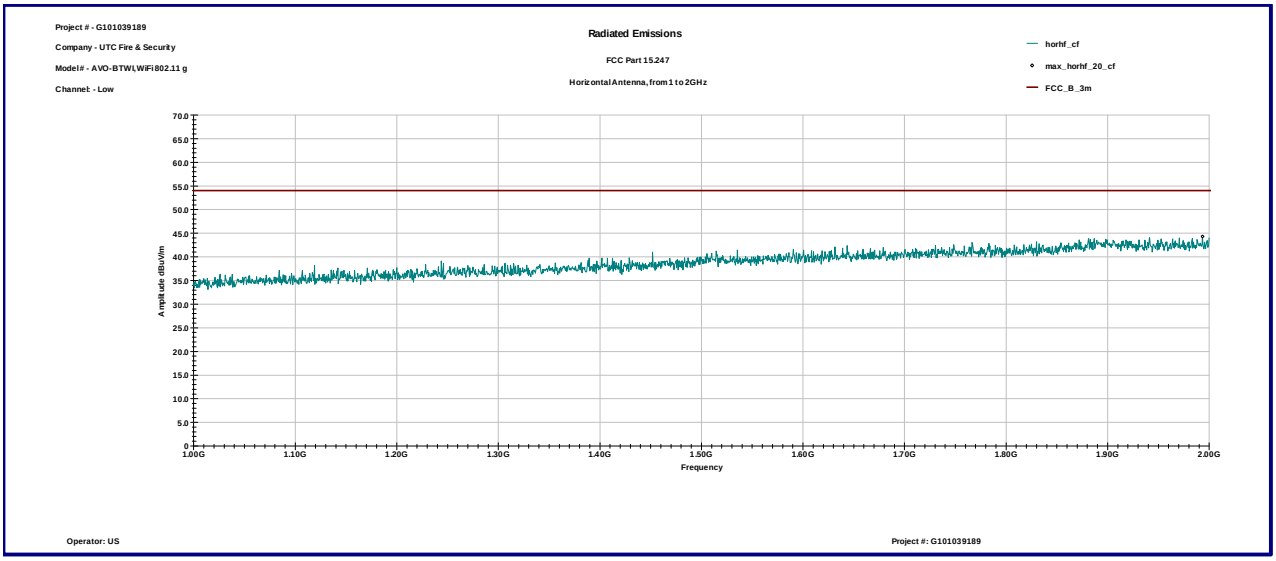

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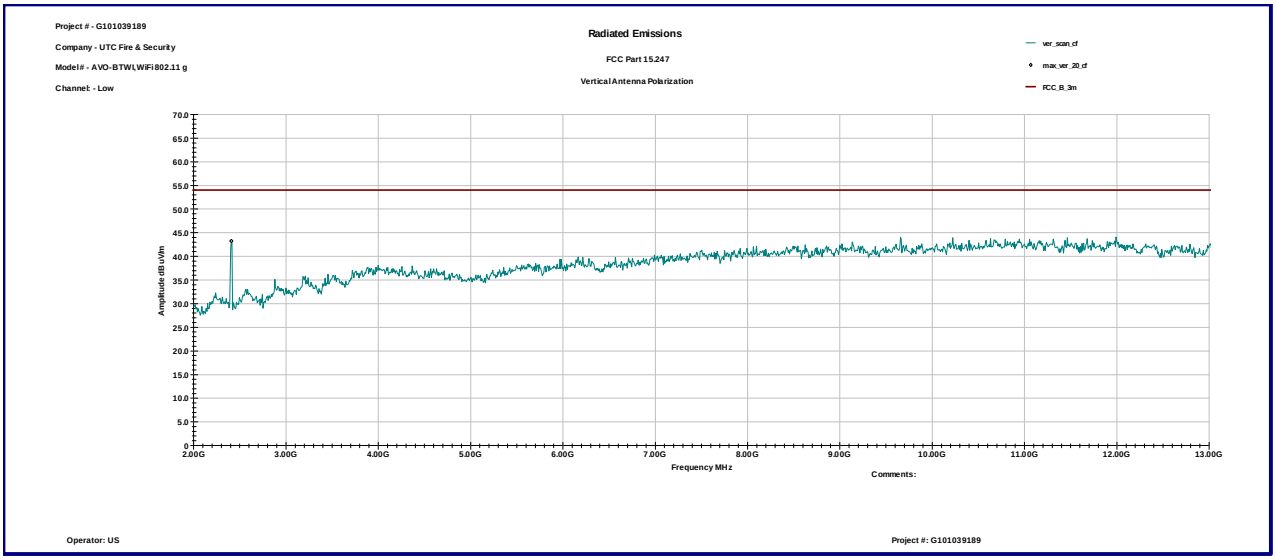

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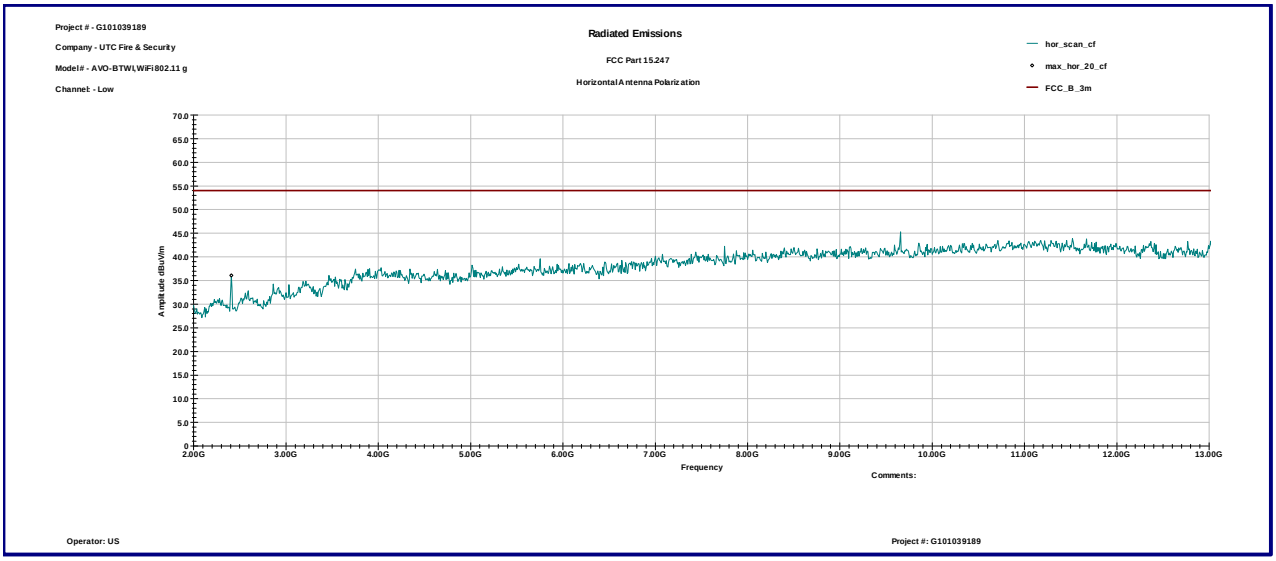

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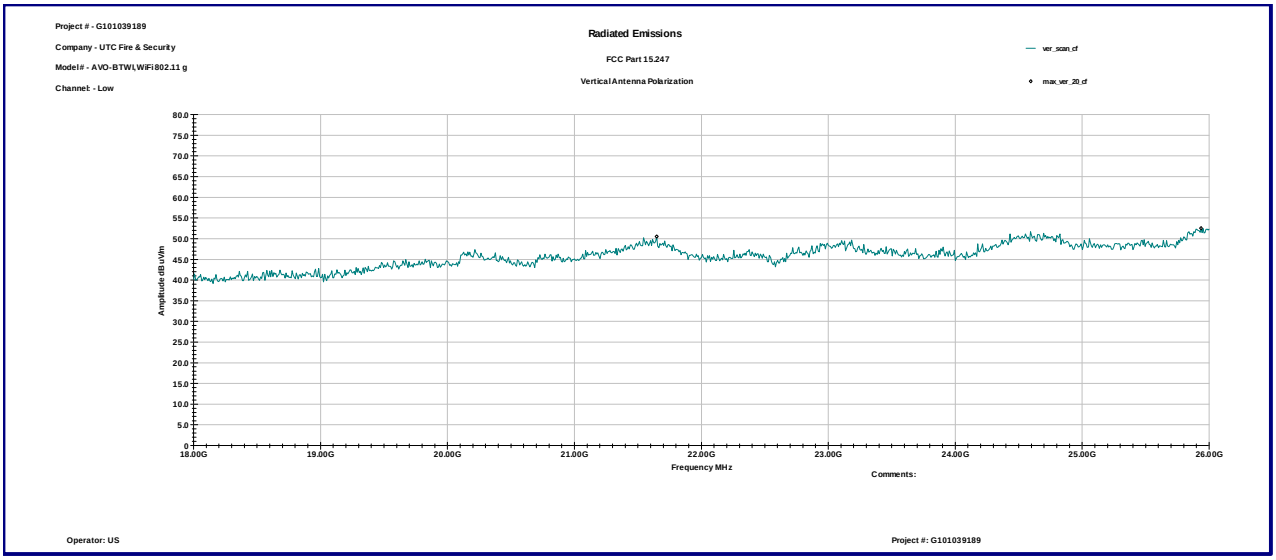

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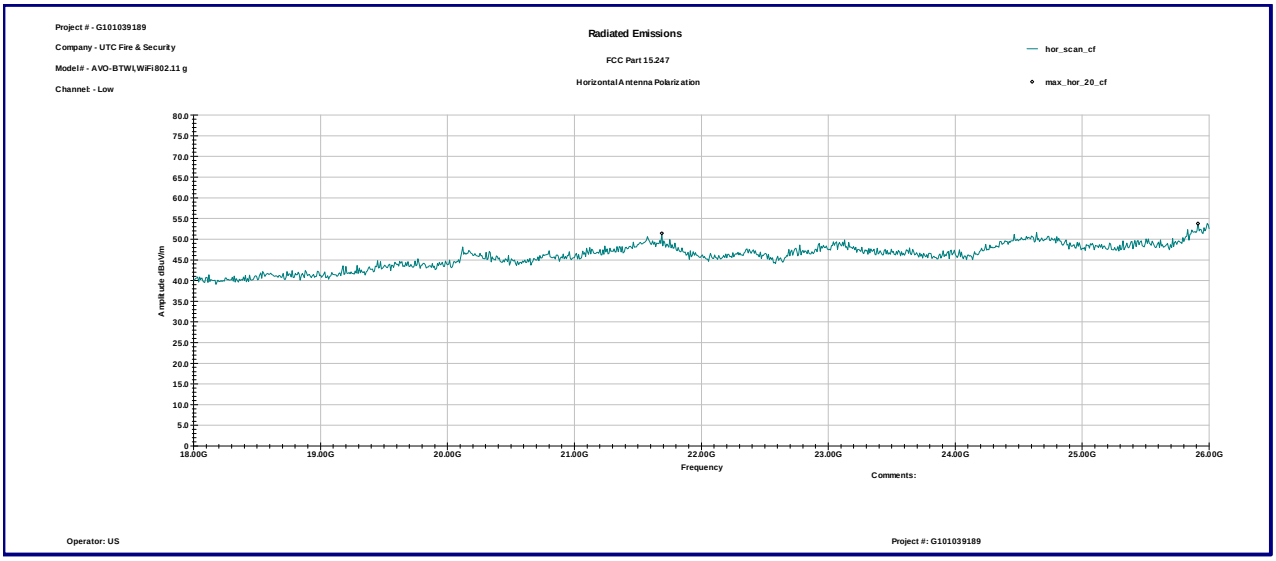

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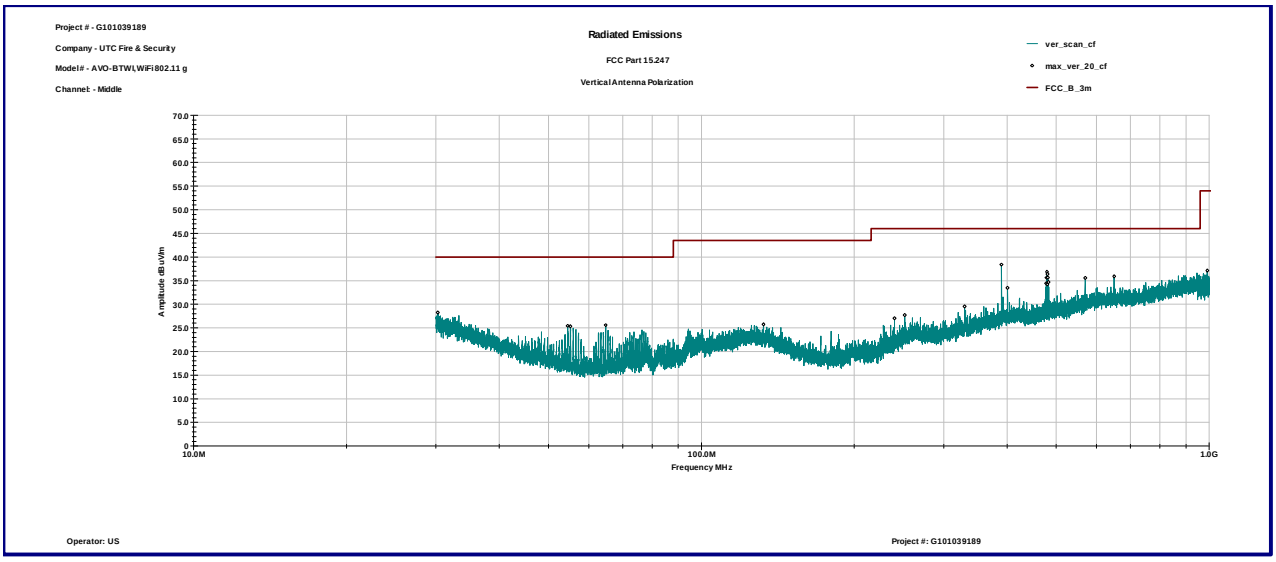

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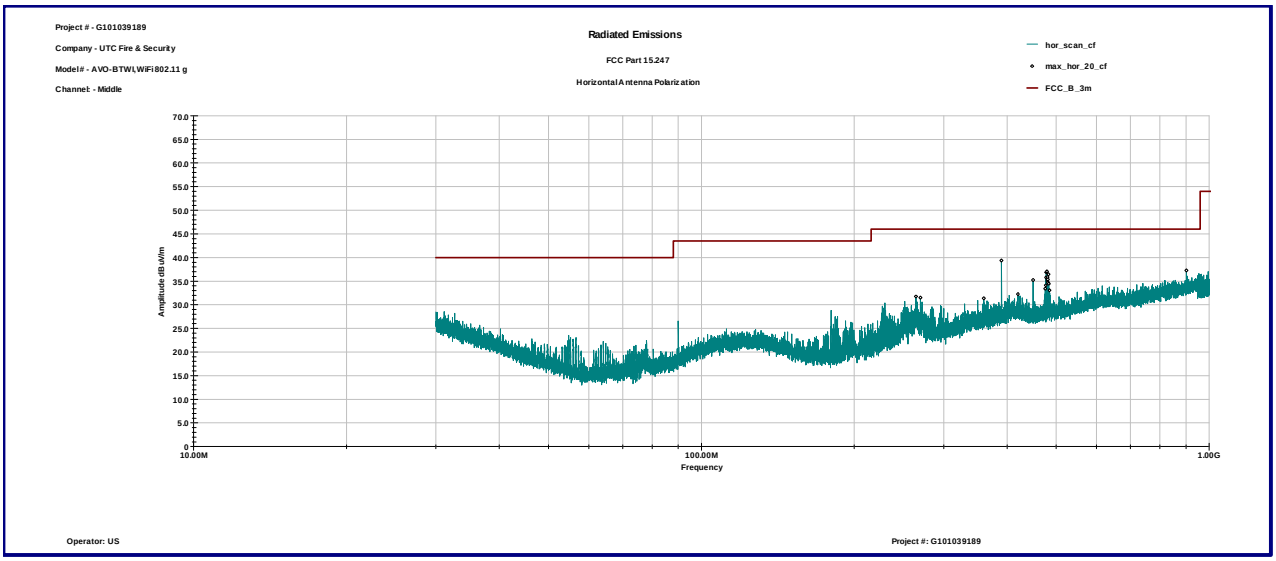

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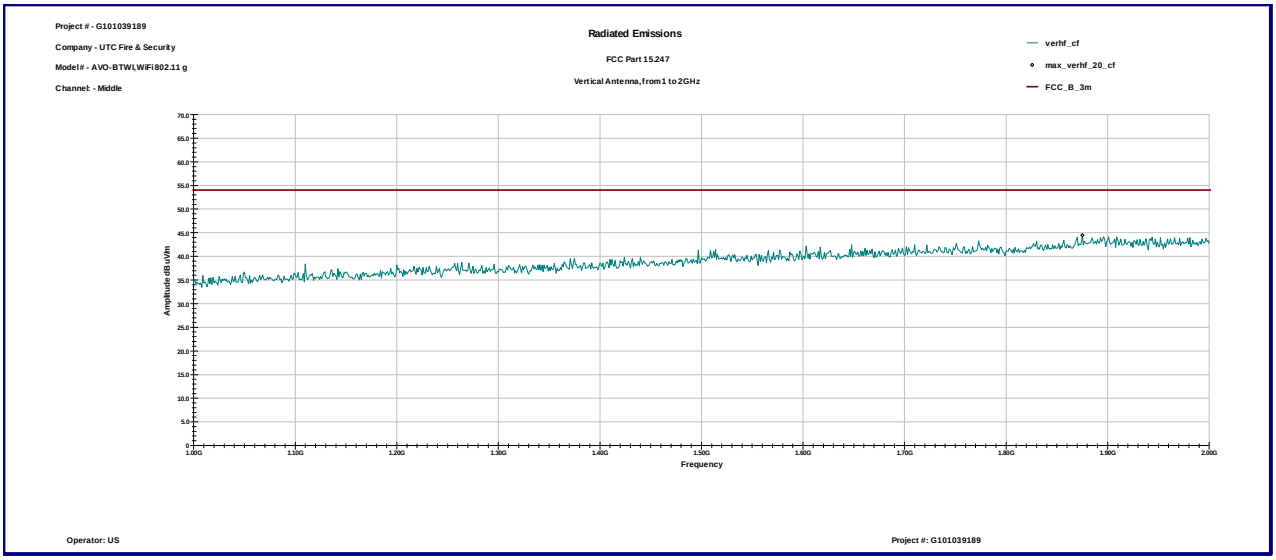

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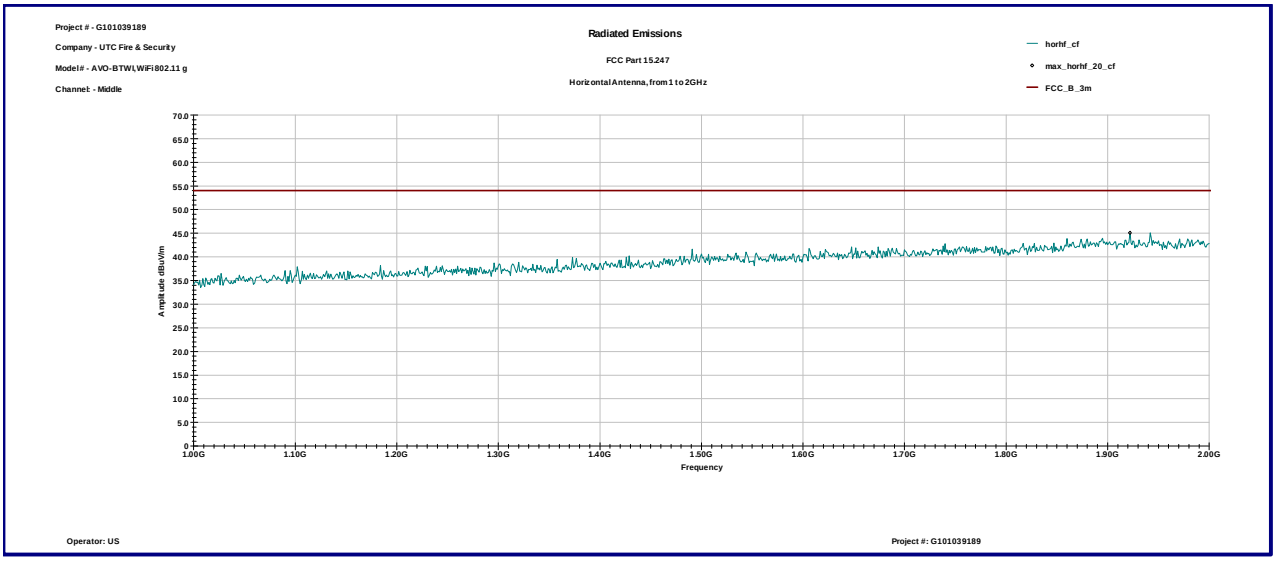

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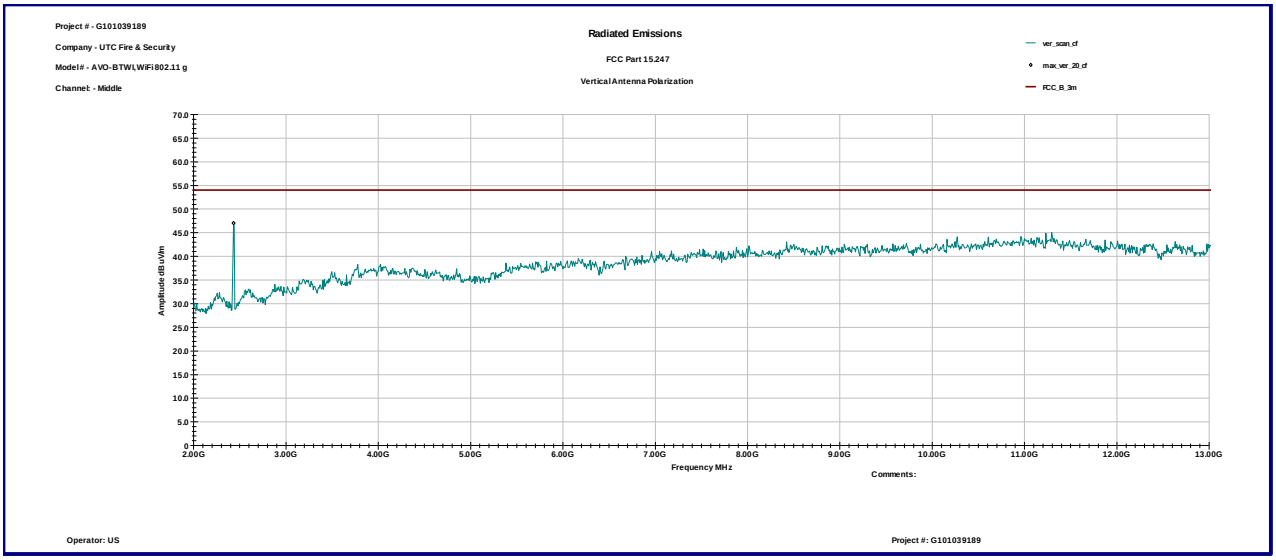

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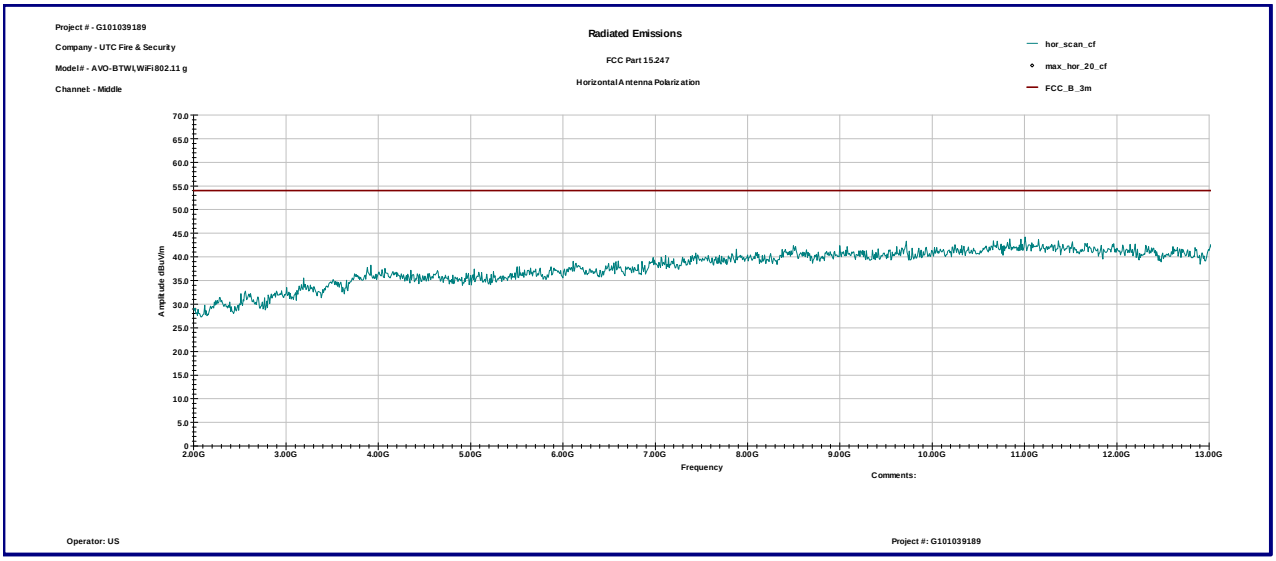

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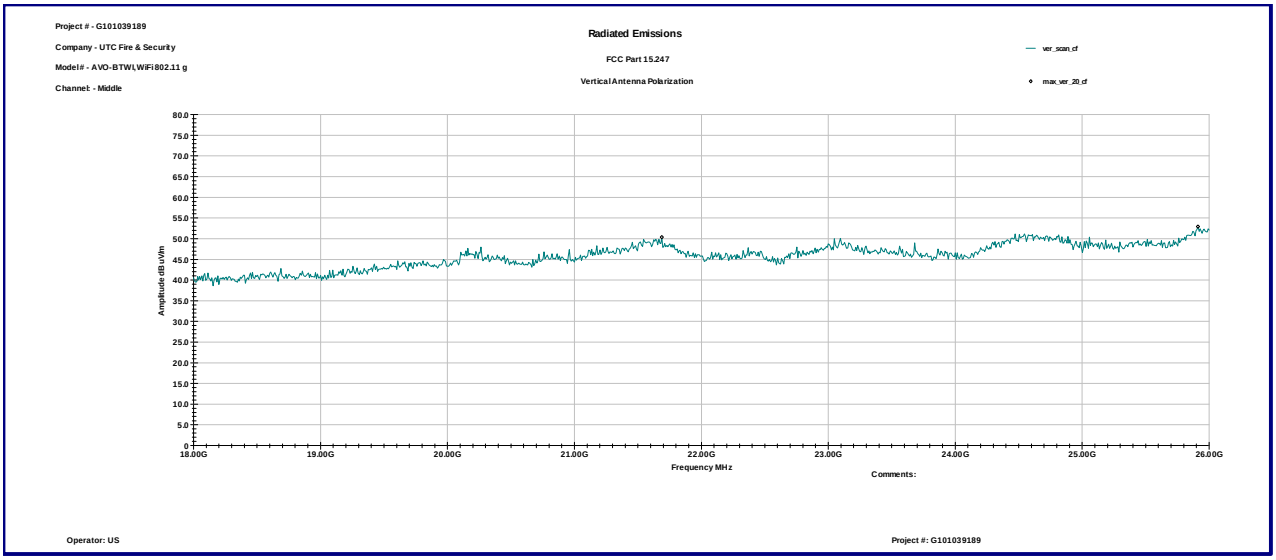

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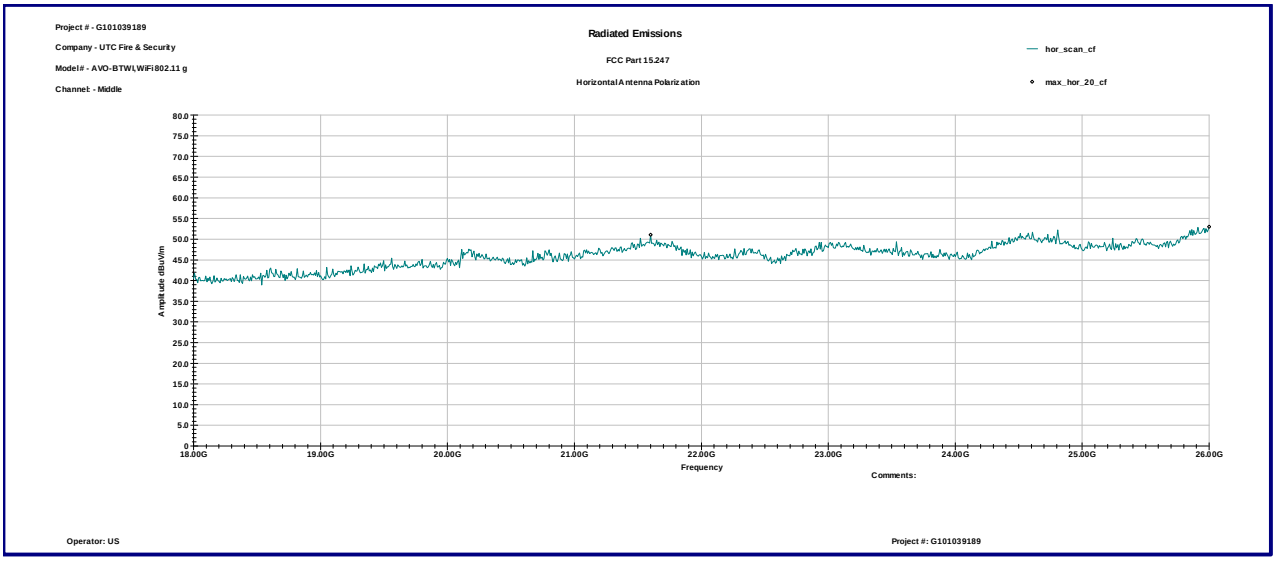

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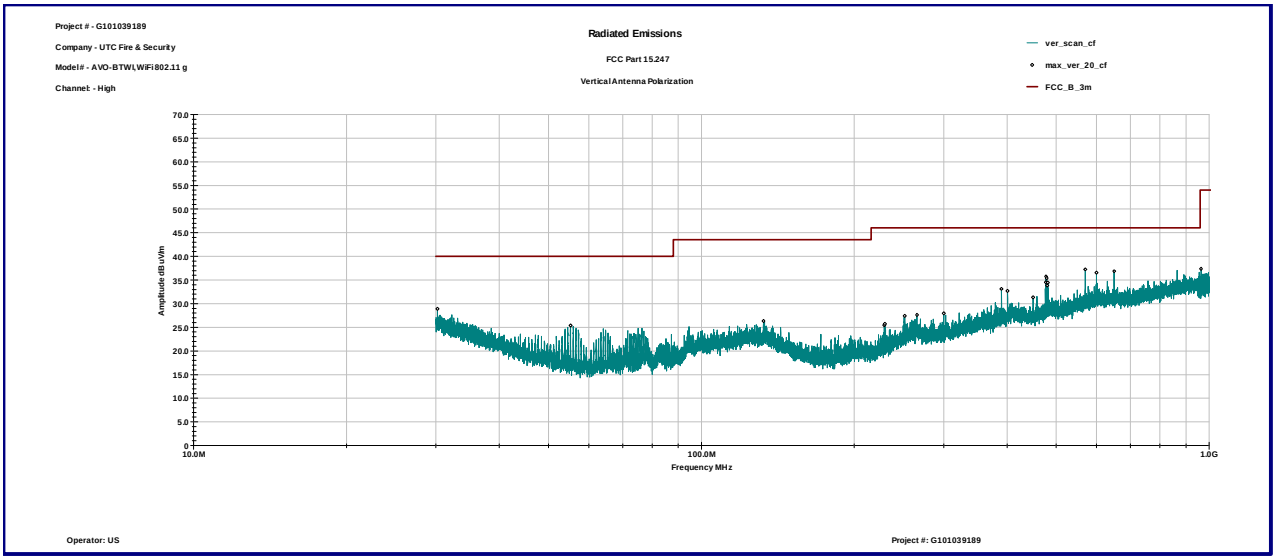

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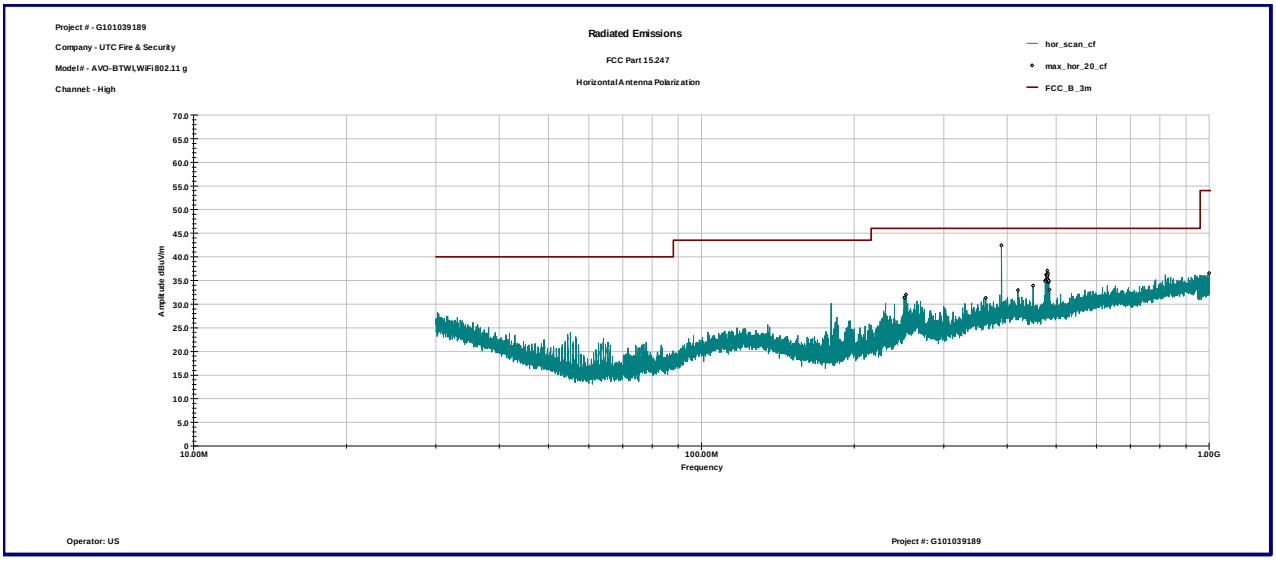

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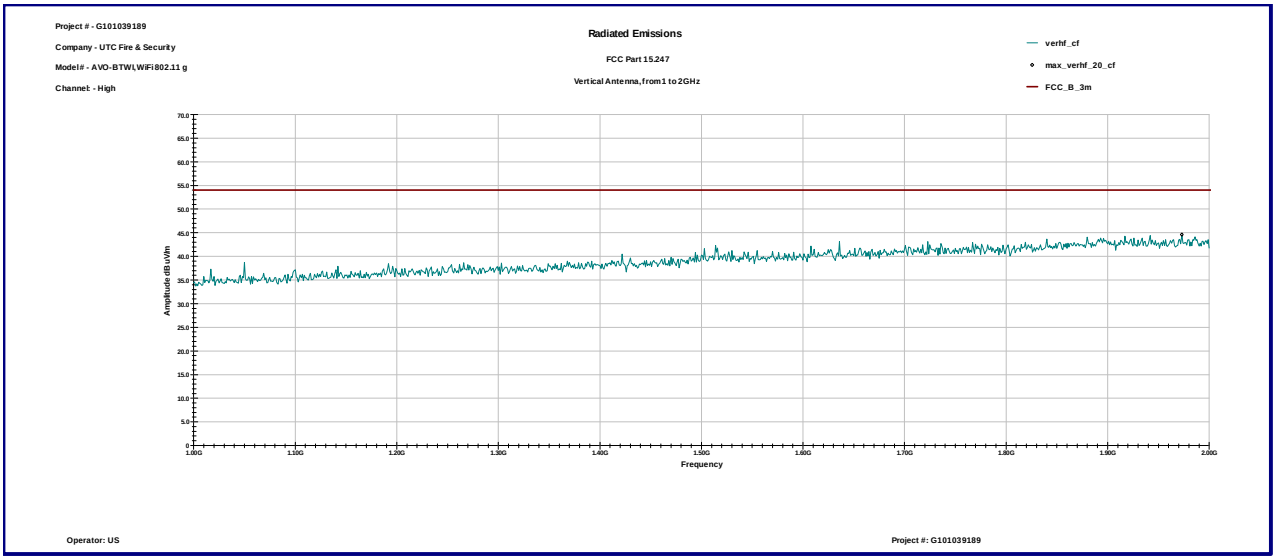

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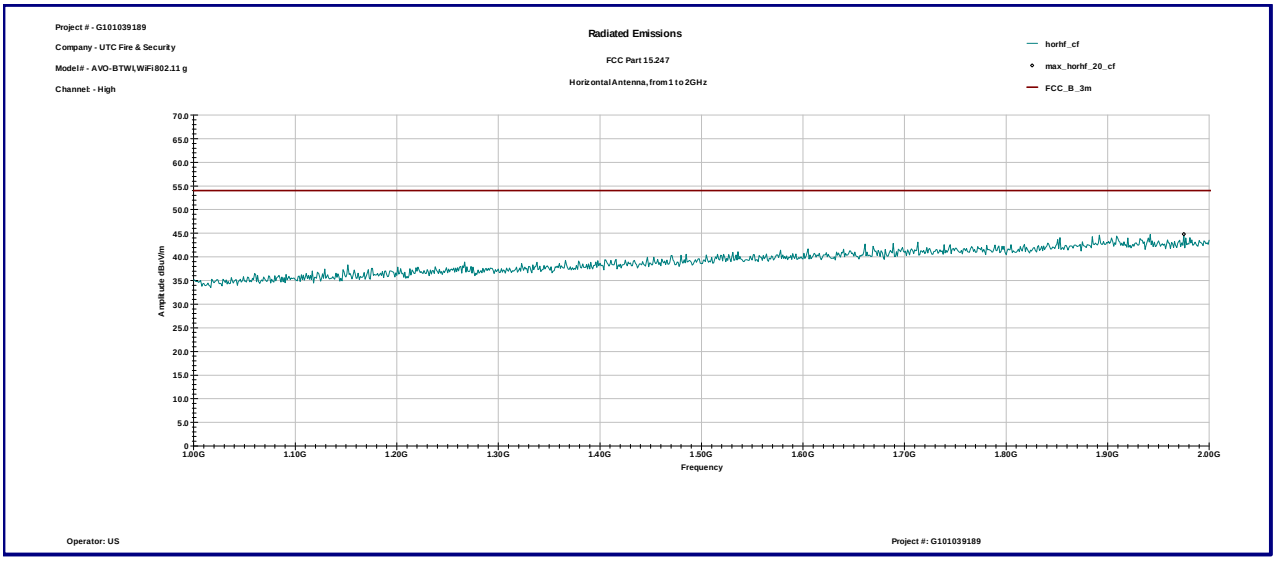

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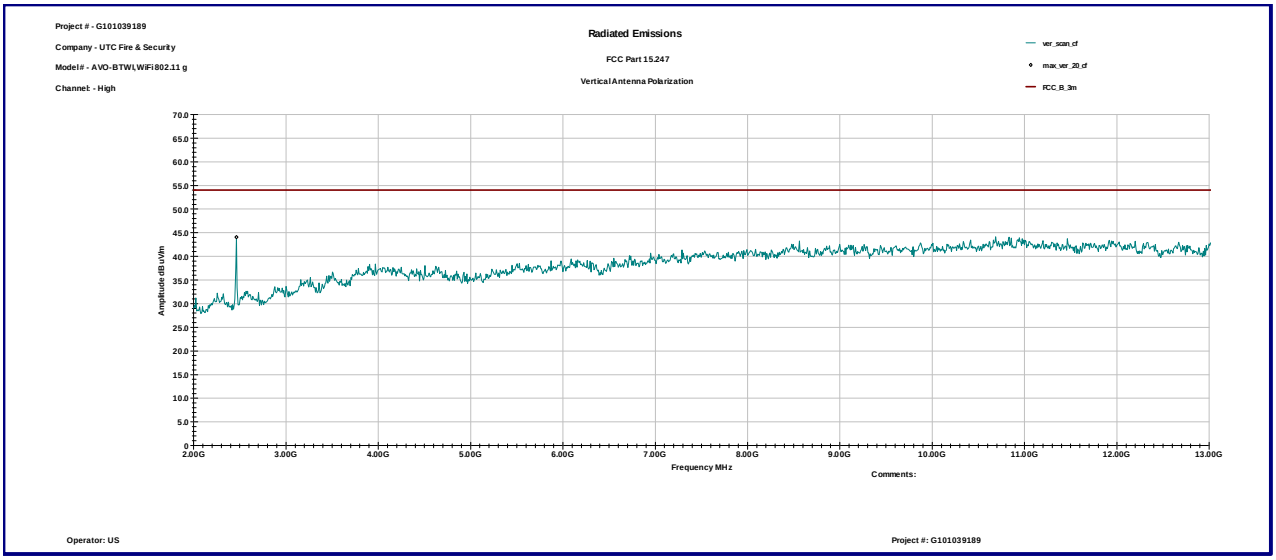

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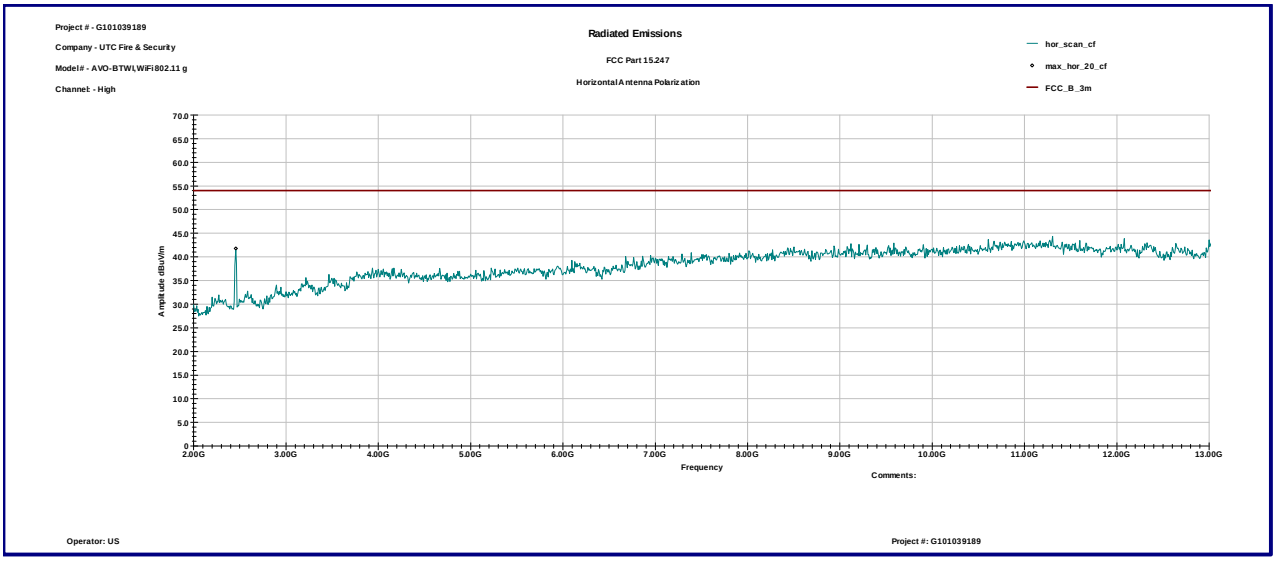

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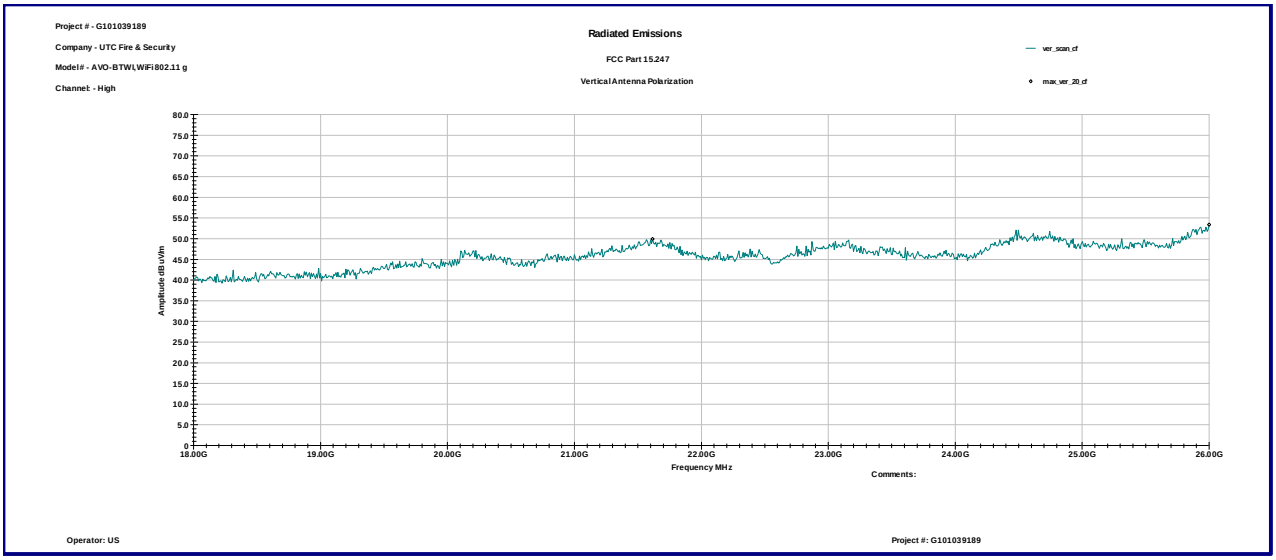

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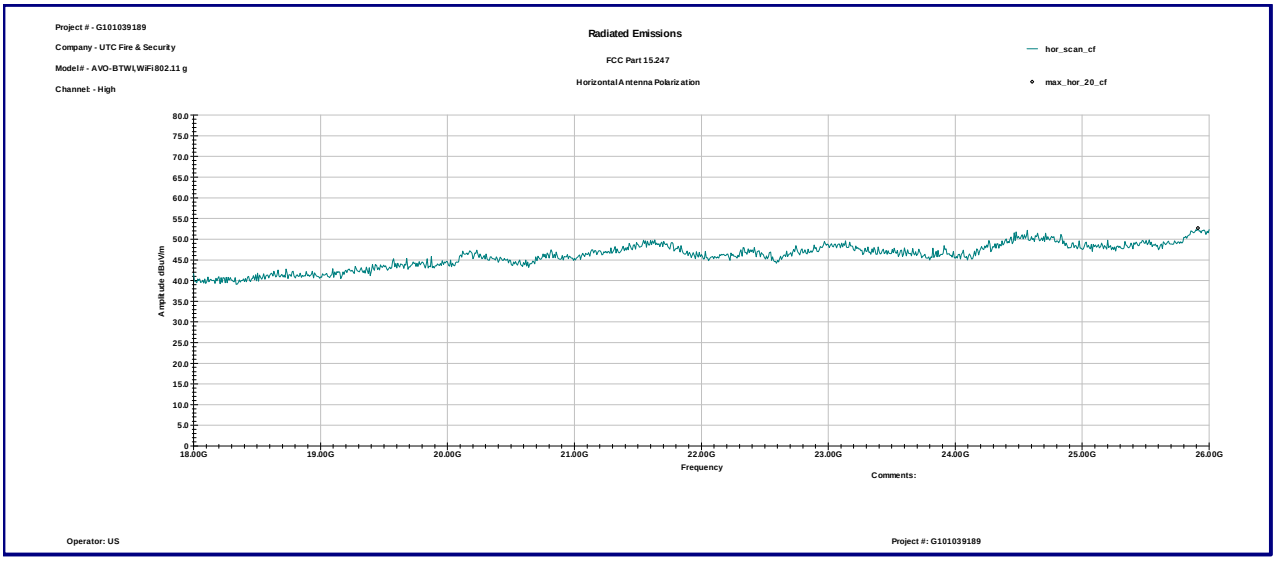

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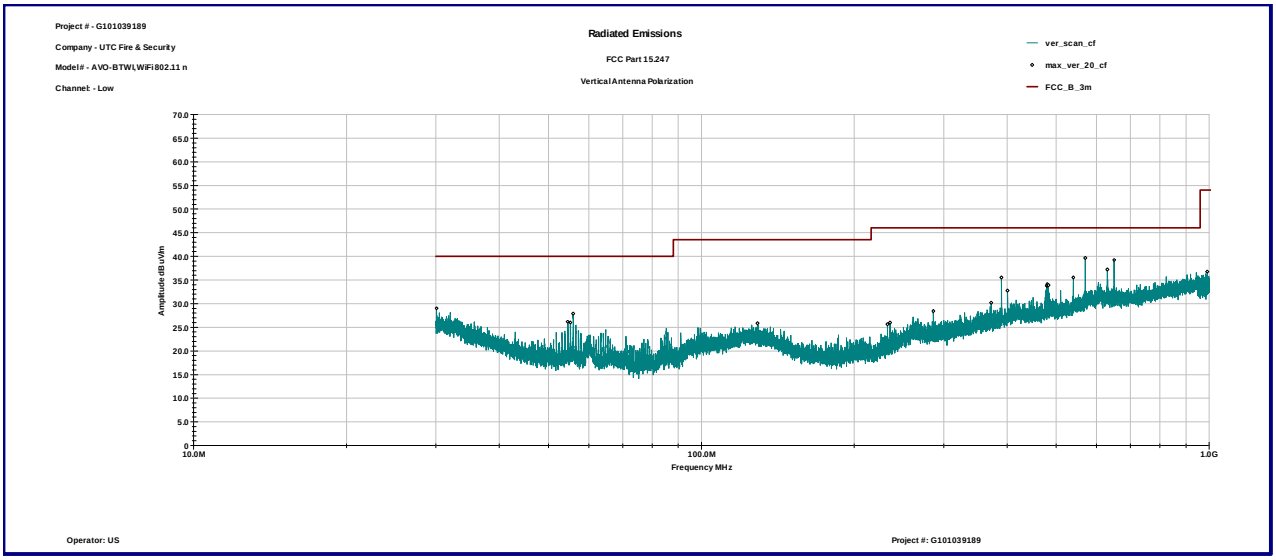

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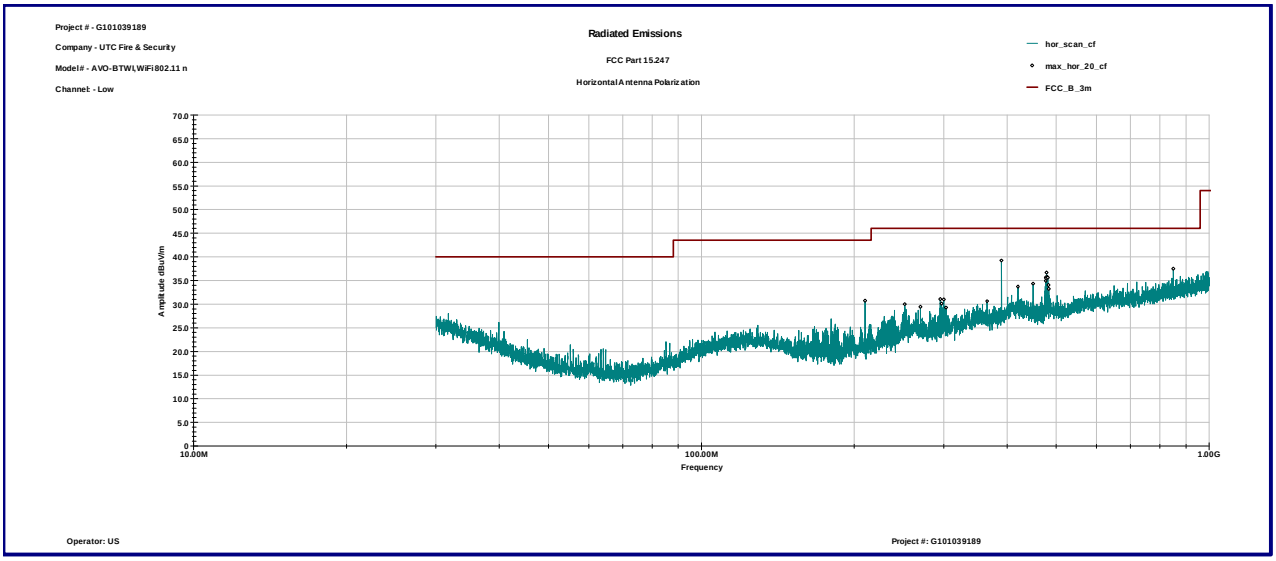

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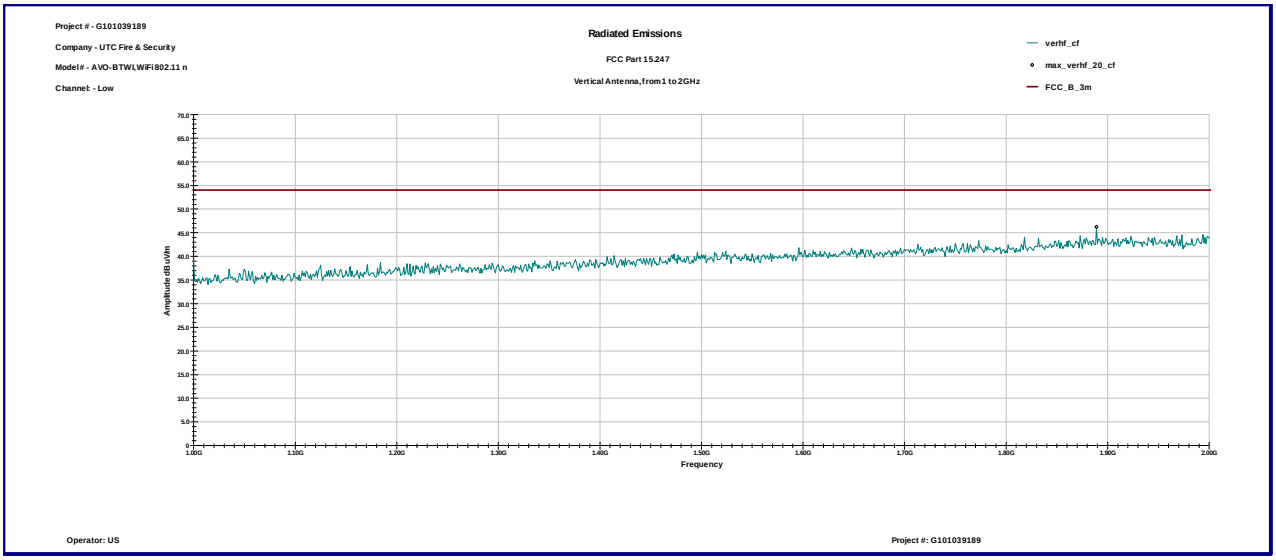

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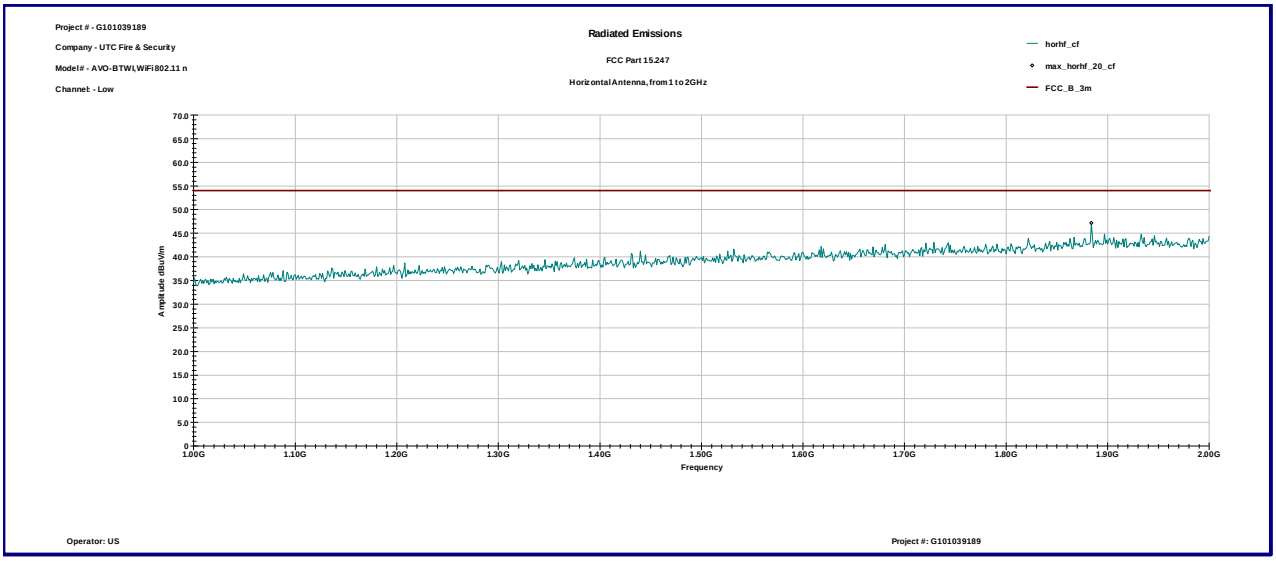

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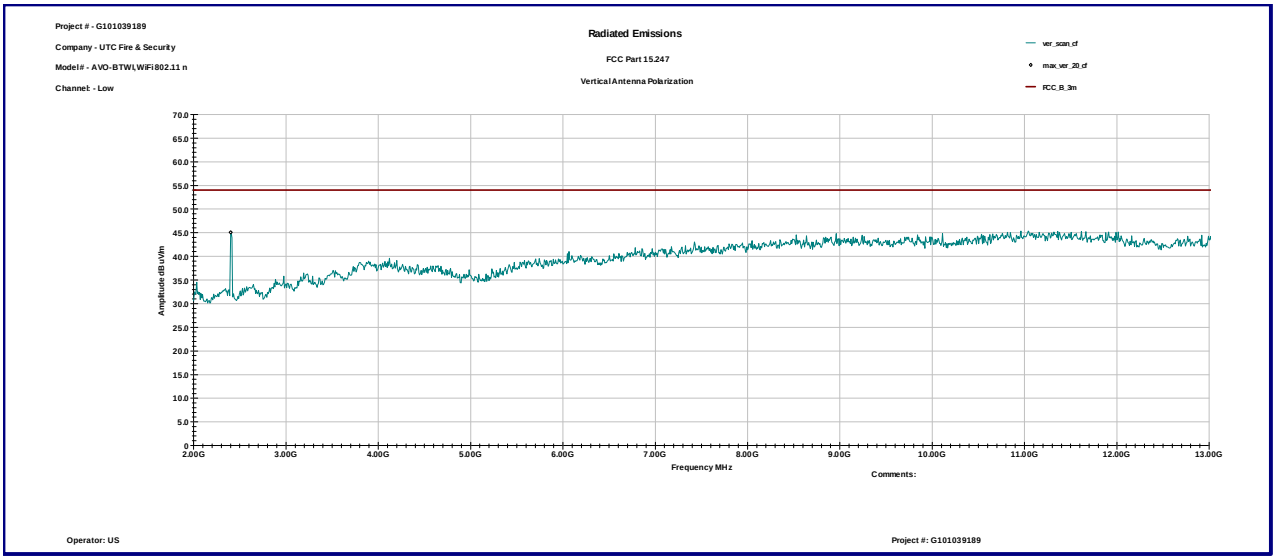

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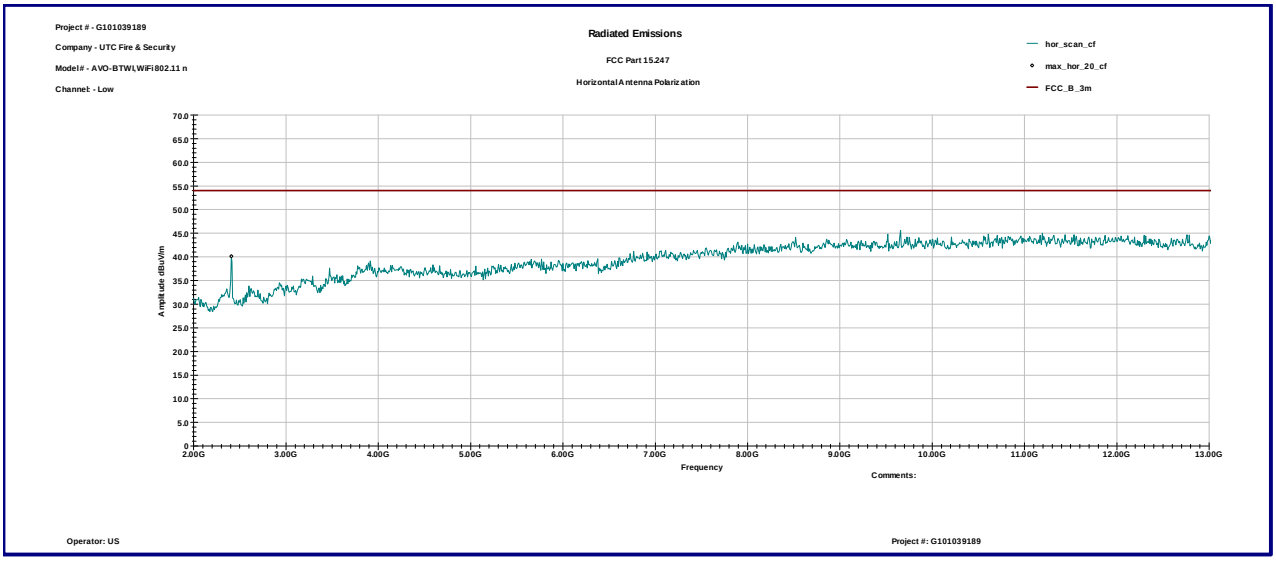

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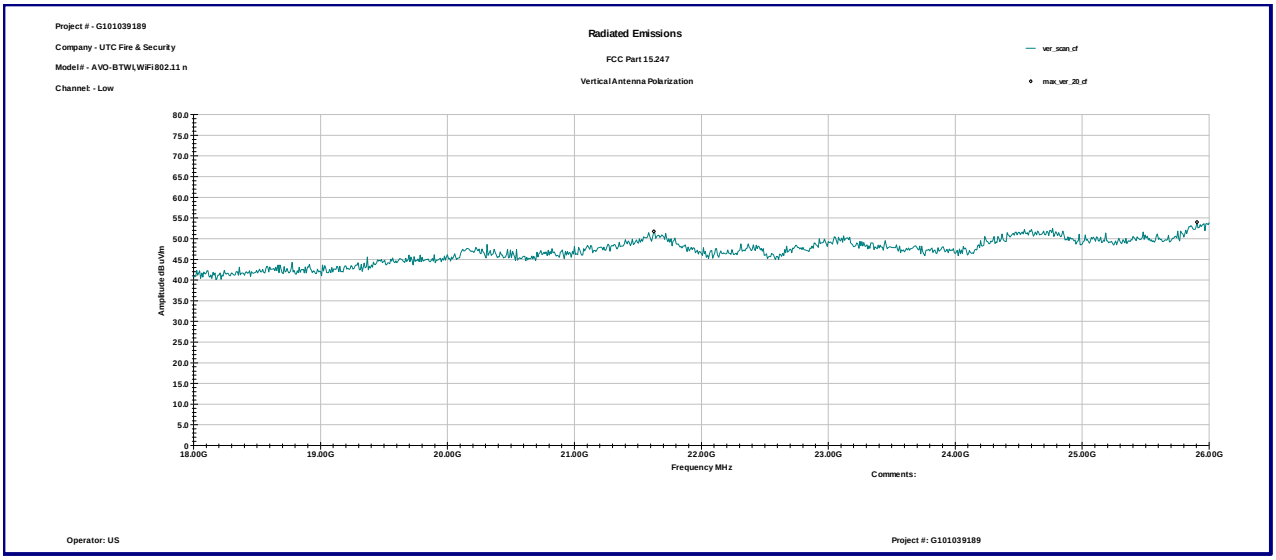

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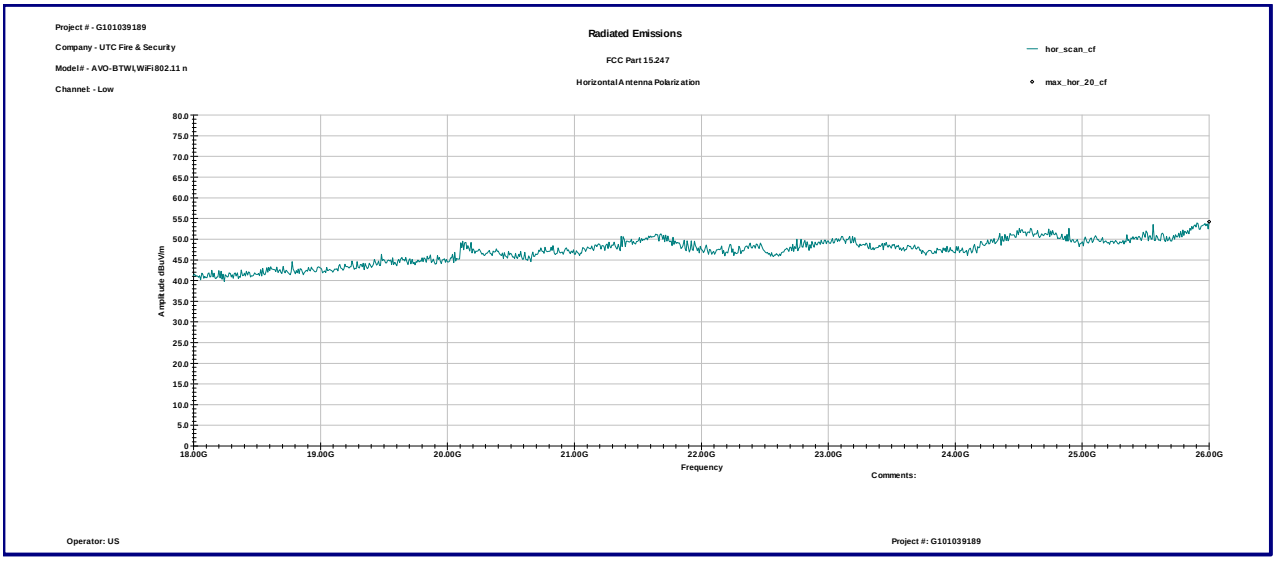

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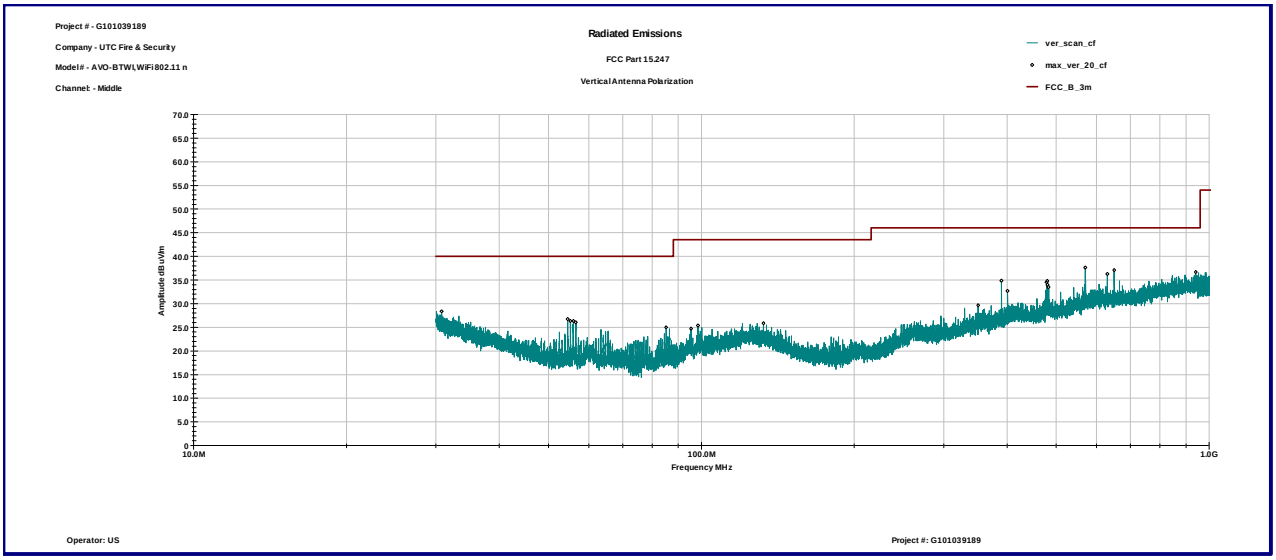
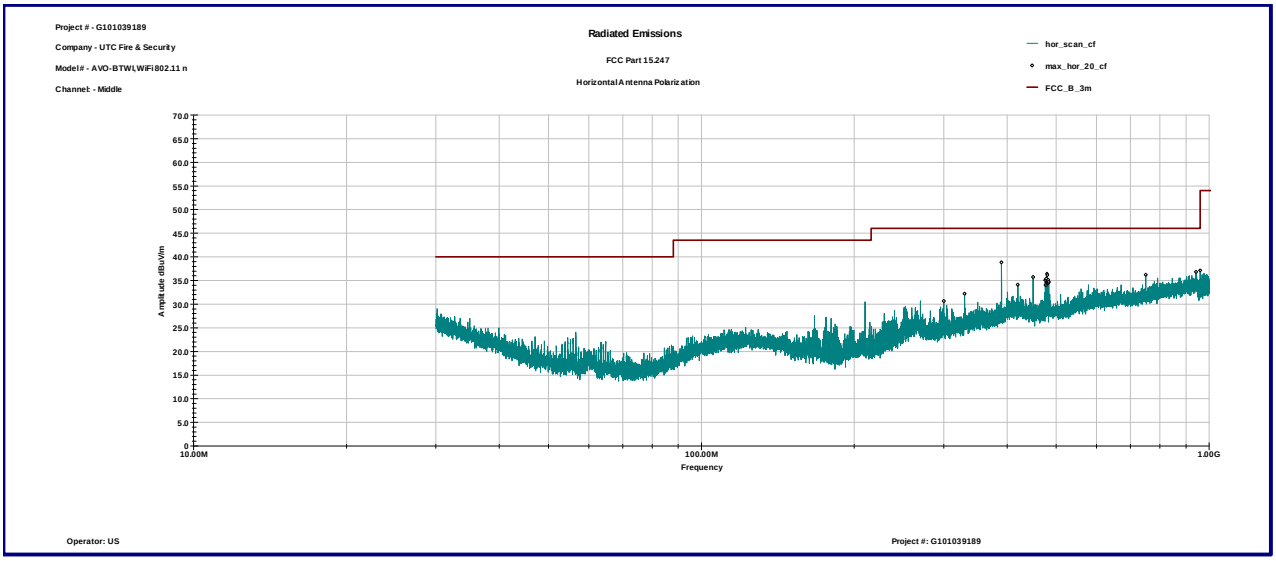
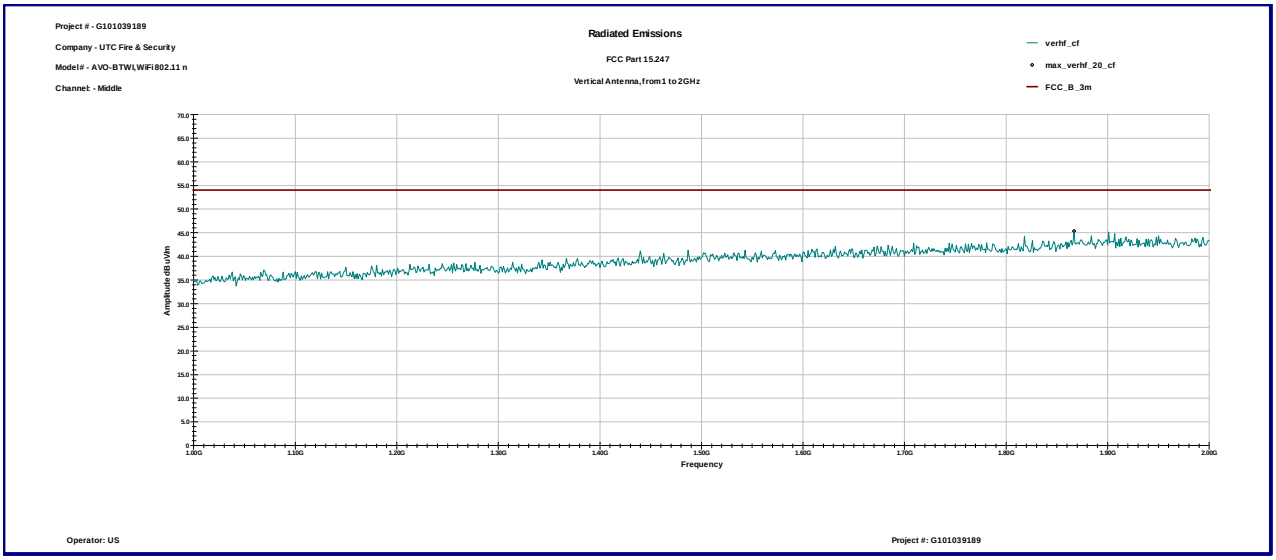


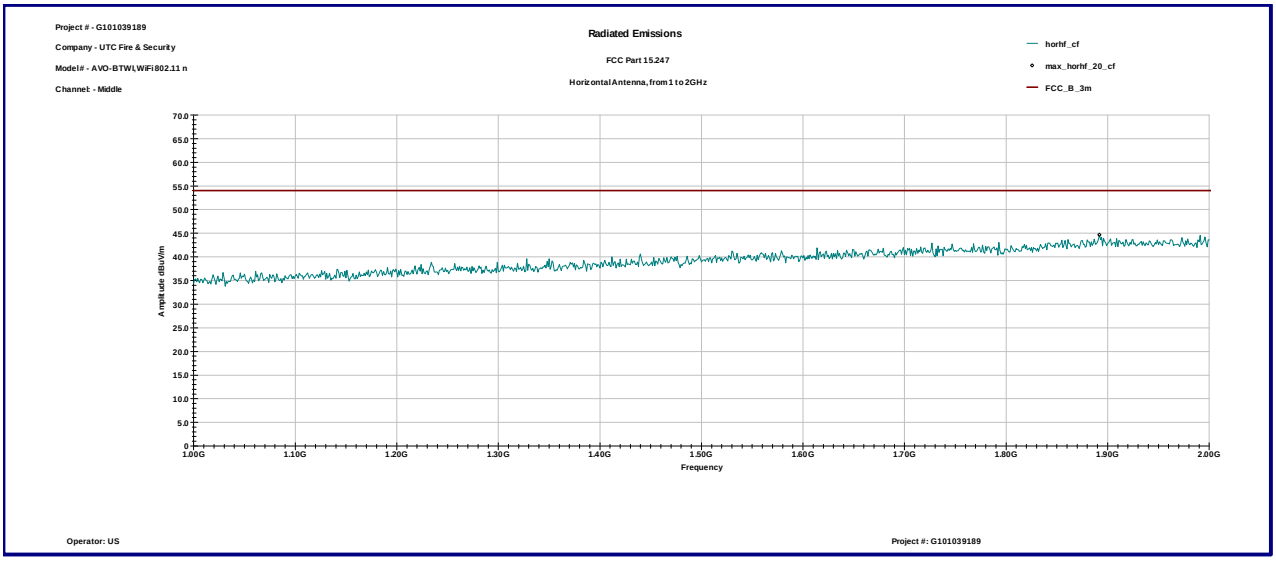
Graph 3.5.57



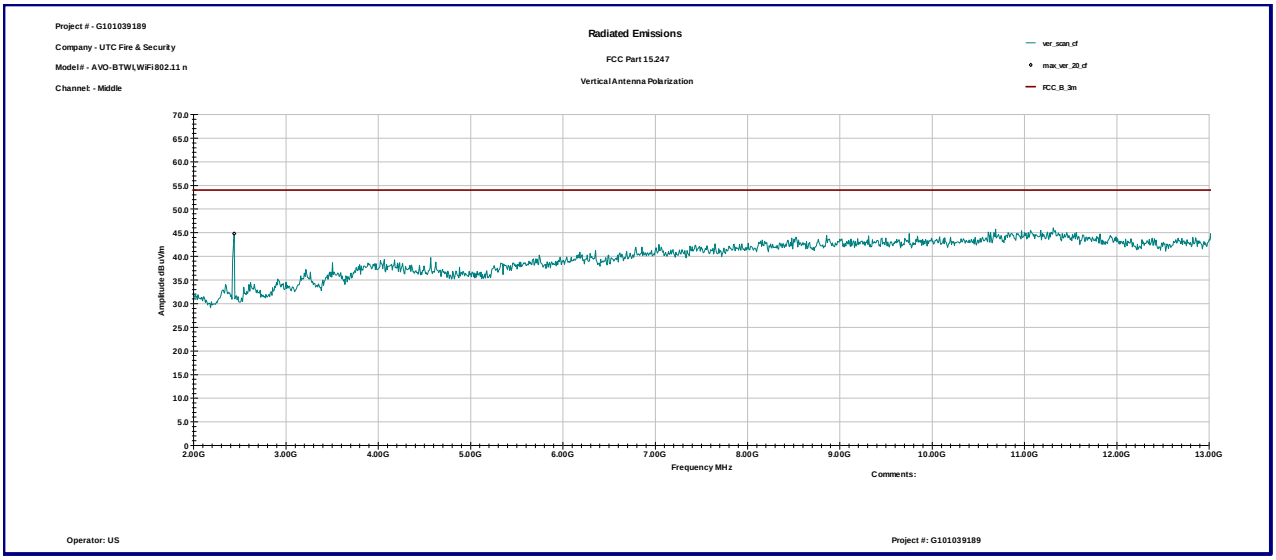
Graph 3.5.58



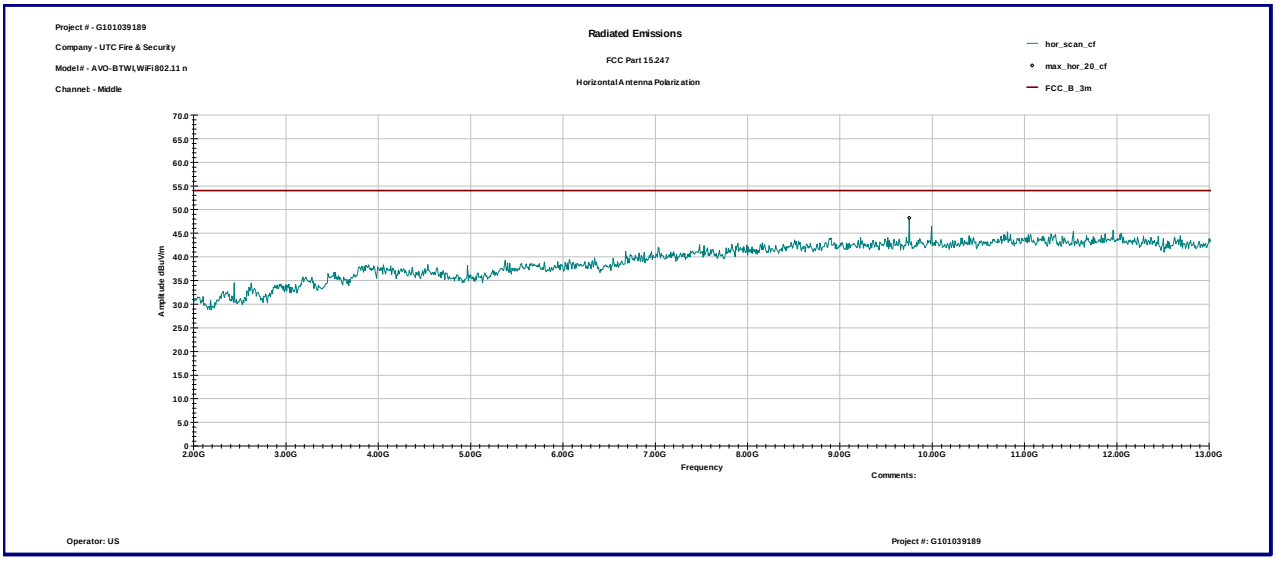
Graph 3.5.59



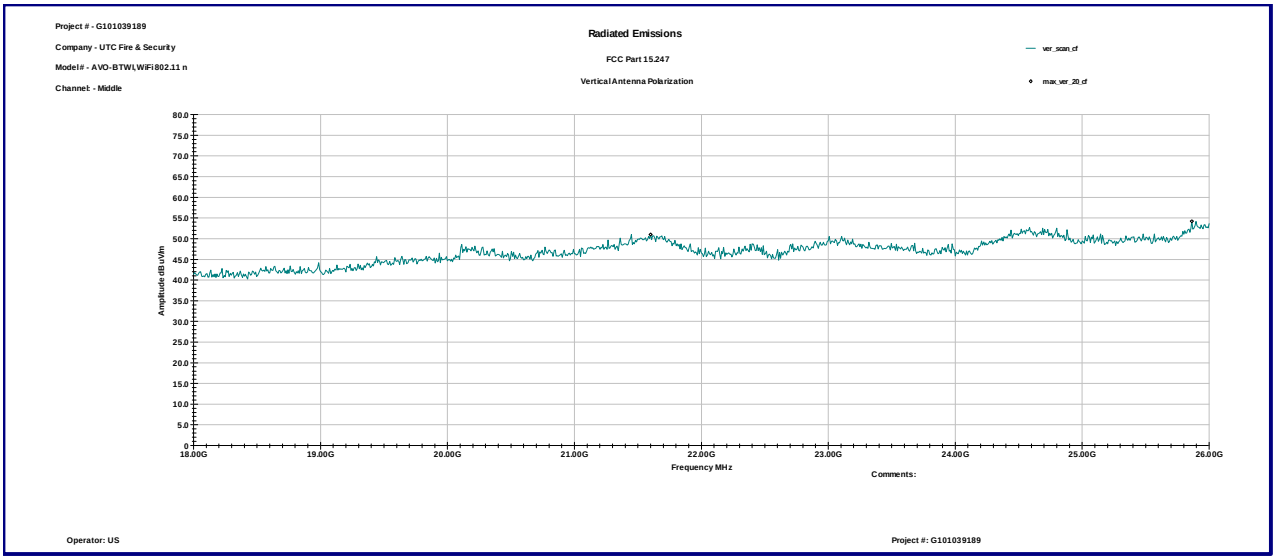
Graph 3.5.60



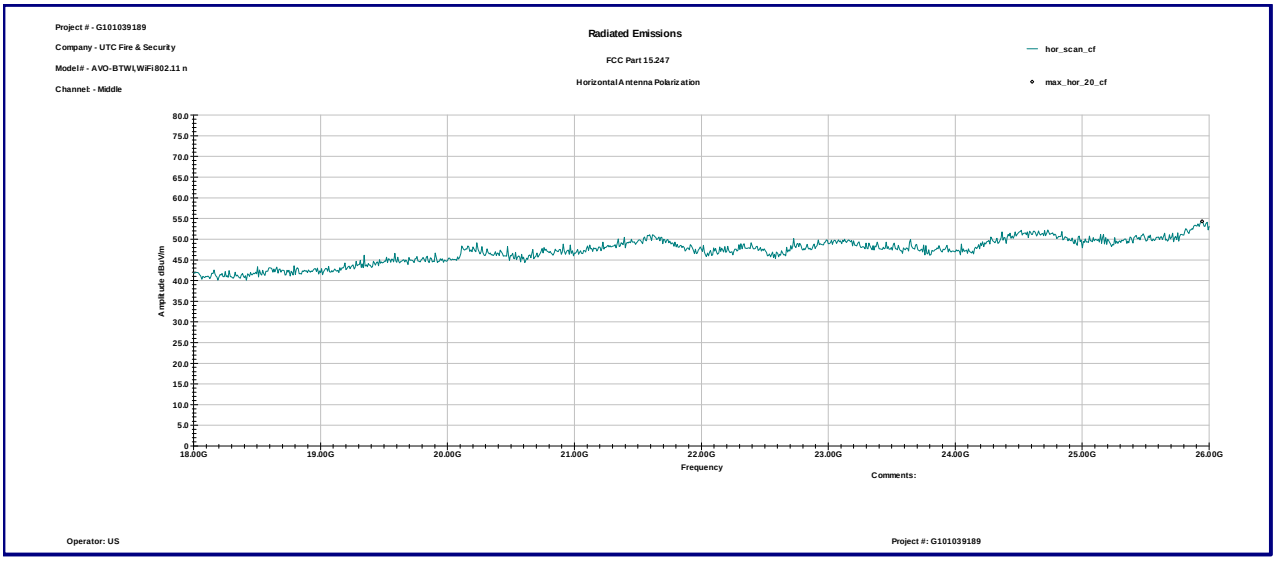
Graph 3.5.61



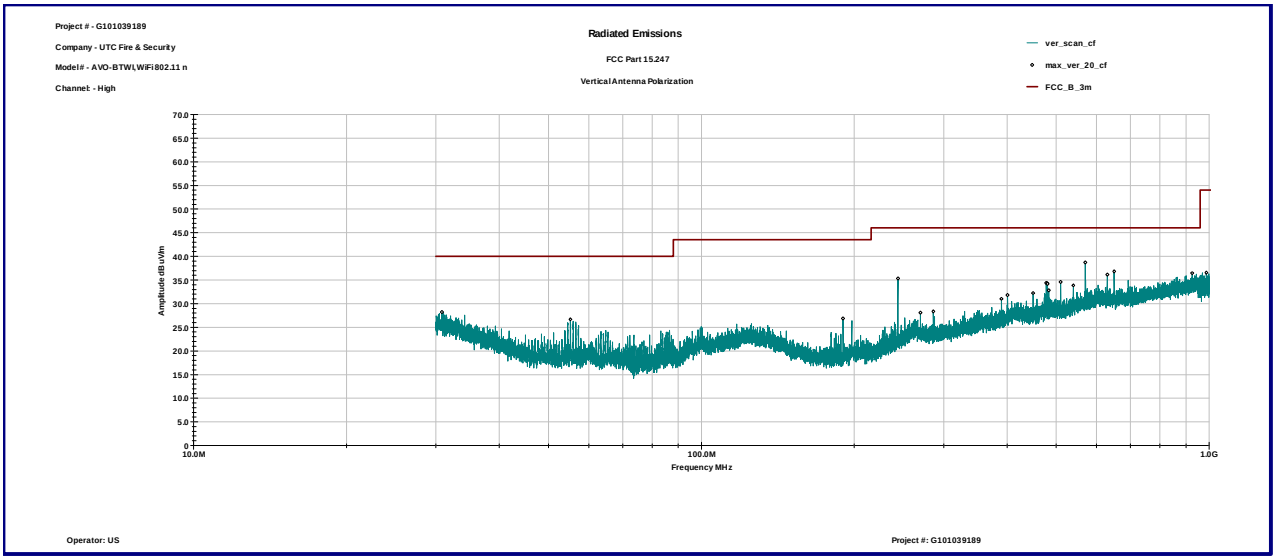
Graph 3.5.62



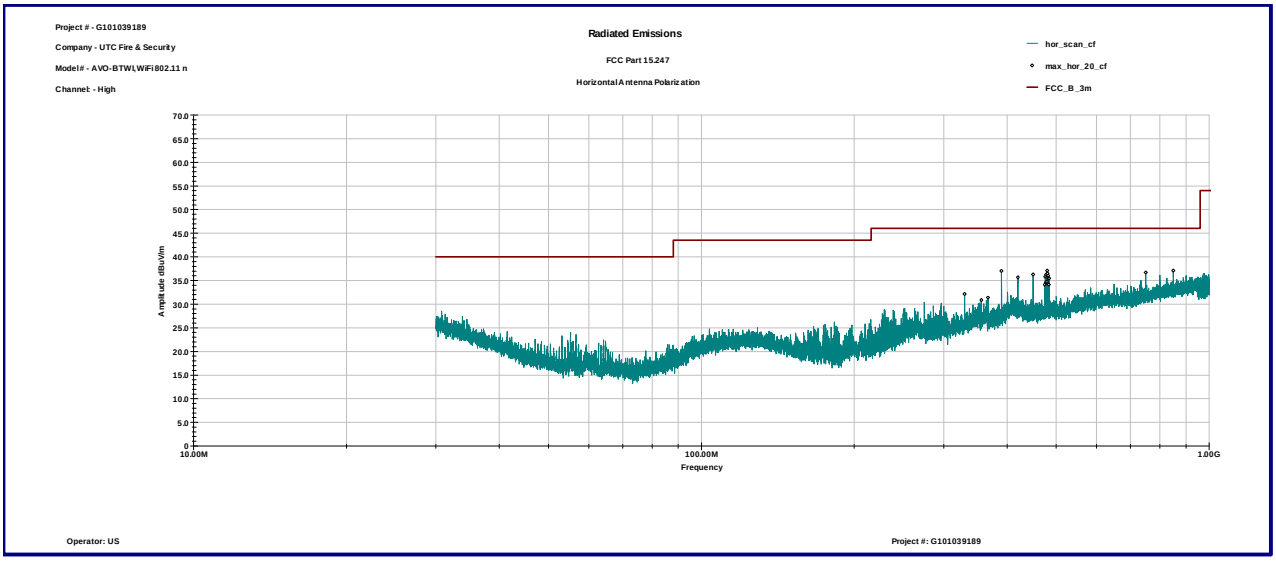
Graph 3.5.63



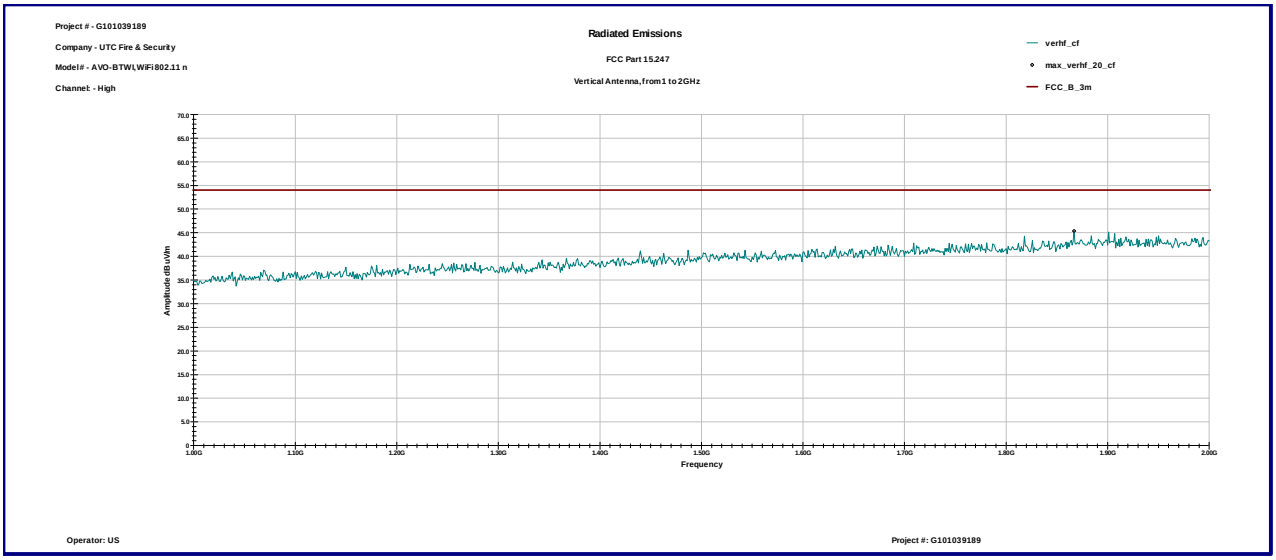
Graph 3.5.64



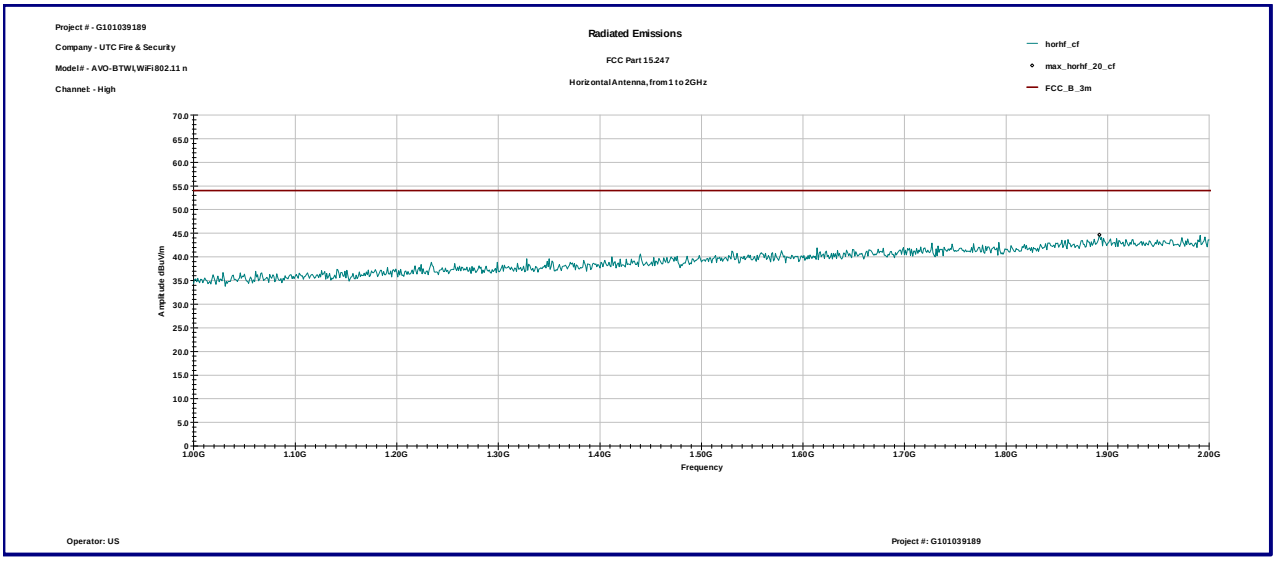
Graph 3.5.65



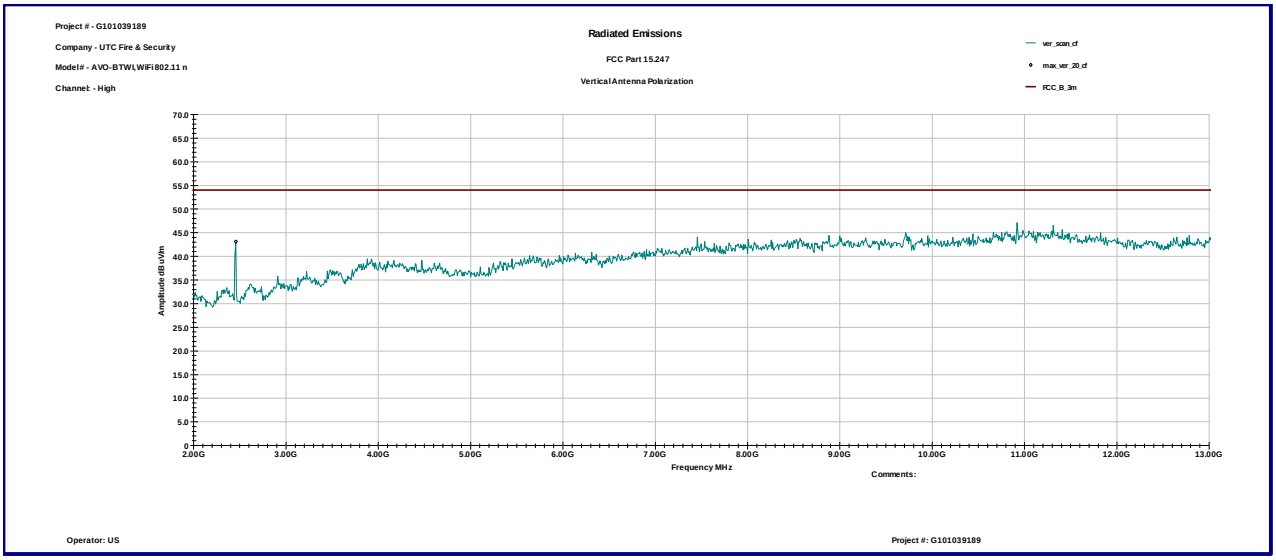
Graph 3.5.66



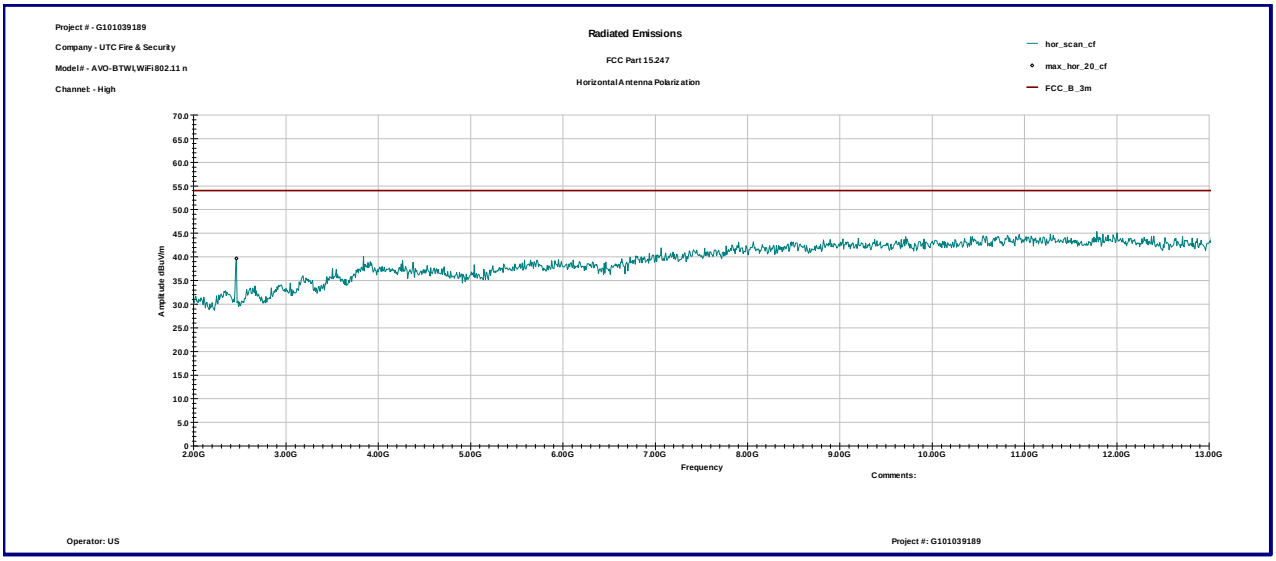
Graph 3.5.67



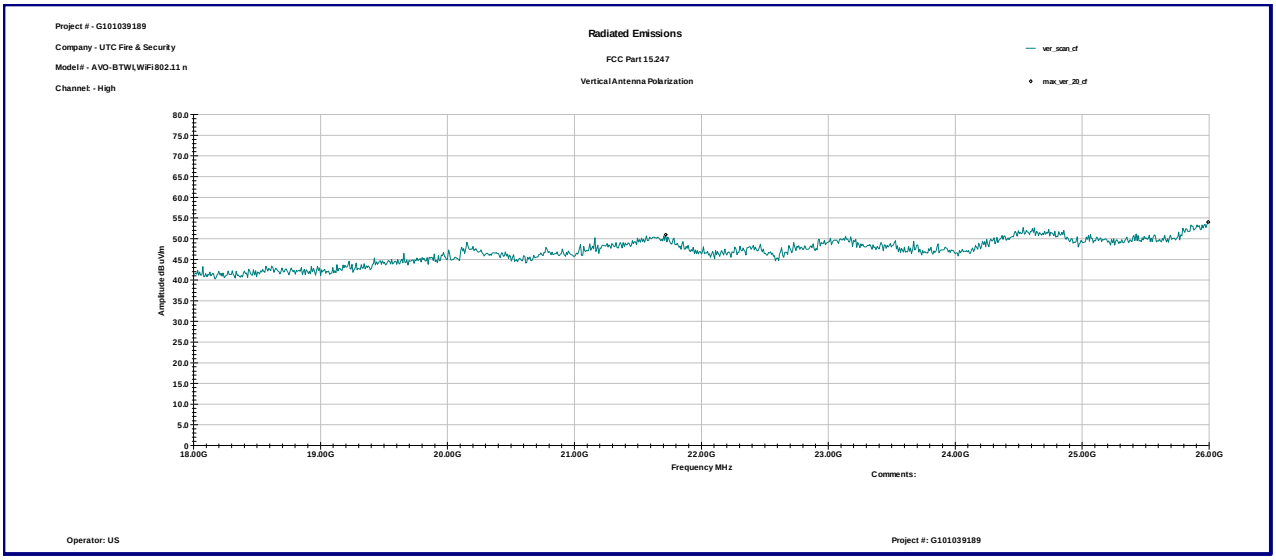
Graph 3.5.68



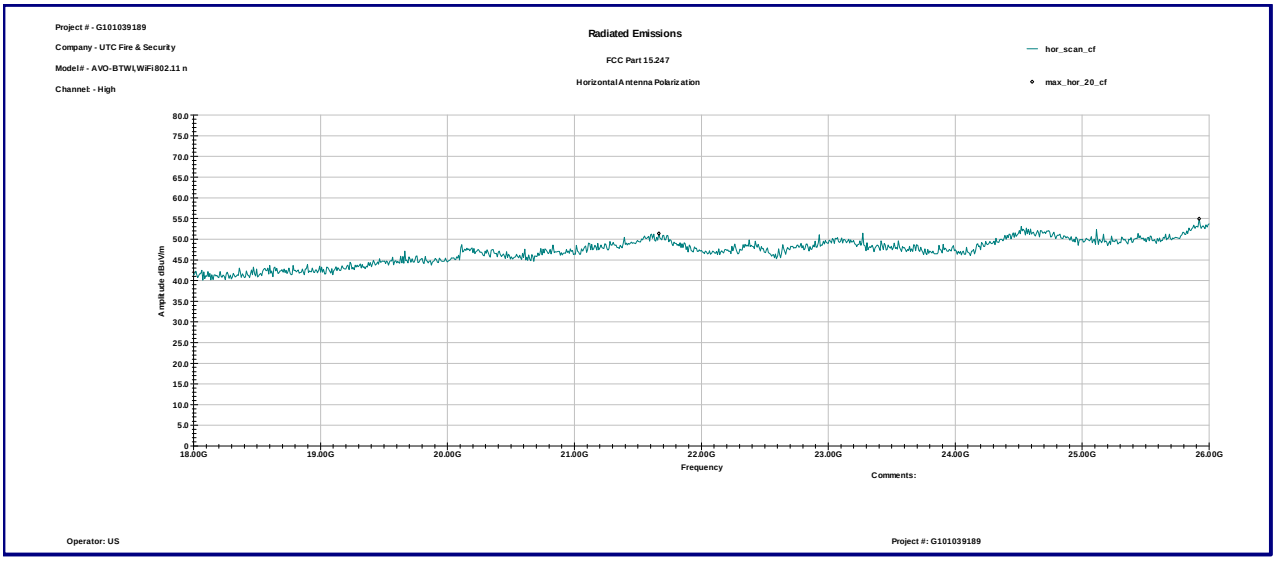
Graph 3.5.69



Graph 3.5.70



Graph 3.5.71



Graph 3.5.72

3.6 RF Exposure Compliance

The maximum measured antenna conducted power, P is 21.7dBm

The antenna gain, G is 2.5dBi

The maximum EIRP power = P + G
ERP = 21.7+ 2.5 = 24.2dBm, or 263mW

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

D = distance of 20cm

$S(mW/cm^2) = EIRP(mW) / 4\pi D^2$, or $S = 263 / (4\pi x400) = 0.052mW/cm^2$, that is < $1.0\ mW/cm^2$

3.7 Transmitter power line conducted emissions

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test result: **Pass**

Frequency range: 0.15MHz-30MHz

Max. Emissions margin: 2.9dB below the limits

Notes: None

Date:	April 30, 3013	**Result:**	**Pass**
Standard:	FCC 15.207		
Tested by:	Uri Spector		
Test Point:	Power Line		
Operation mode:	See Page 5		
Note:	None		

Table 3.7.1

Line 1

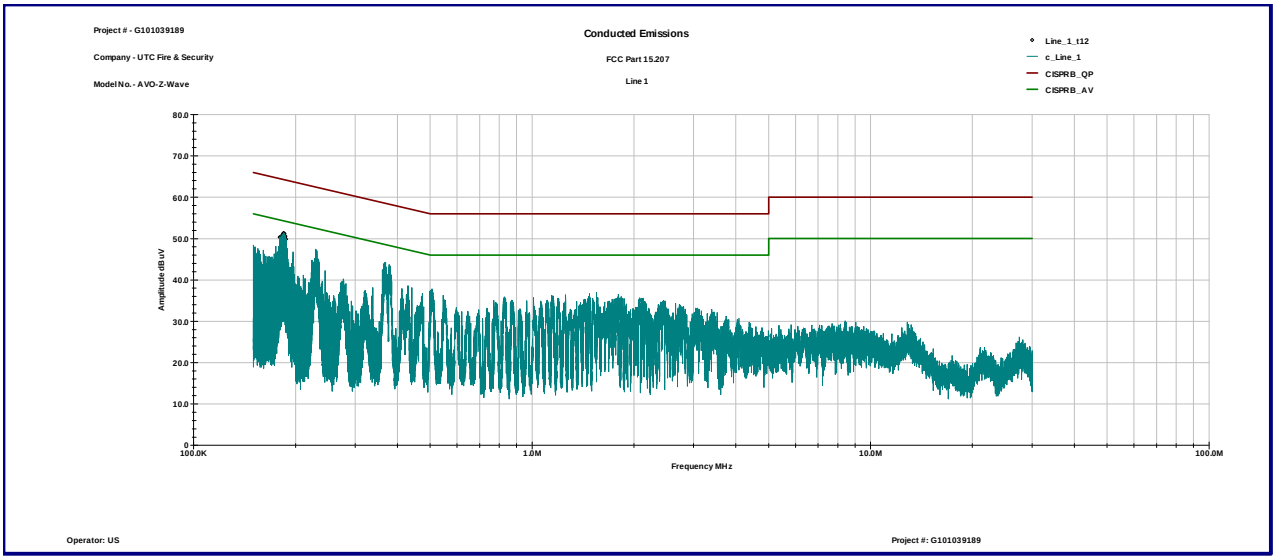
Frequency	Peak dBµV	QP Limit dBµV	AVG Limit dBµV	QP Margin dB	AVG Margin dB
179.52 KHz	50.3	64.5	54.5	-14.2	-4.2
182.82 KHz	51.0	64.4	54.4	-13.4	-3.4
184.18 KHz	51.3	64.3	54.3	-13.0	-3.0
230.79 KHz	47.1	62.4	52.4	-15.3	-5.3
368.72 KHz	44.2	58.6	48.6	-14.4	-4.4
1.797 MHz	36.5	56.0	46.0	-19.5	-9.5

Line 2

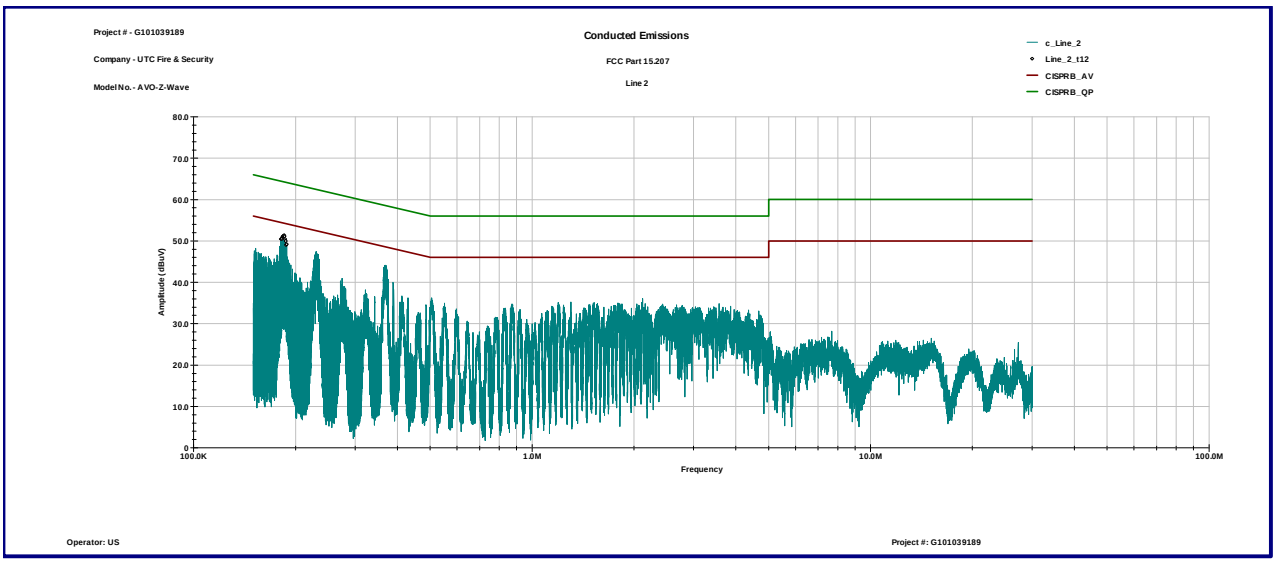
Frequency	Peak dBµV	QP Limit dBmV	AVG Limit dBmV	QP Margin dB	AVG Margin dB
180.95 KHz	50.5	64.4	54.4	-14.0	-4.0
184.92 KHz	51.4	64.3	54.3	-12.9	-2.9
229.90 KHz	47.4	62.4	52.4	-15.0	-5.0
370.3 KHz	43.9	58.3	48.3	-14.4	-4.4
504.40 KHz	36.2	56.0	46.0	-19.8	-9.8
1.301 MHz	35.2	56.0	46.0	-20.8	-10.8

Graph 3.7.1

Line 1



Line 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-13000MHz

Max. Emissions margin: 7.3dB 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 3.8.1and 3.8.2)

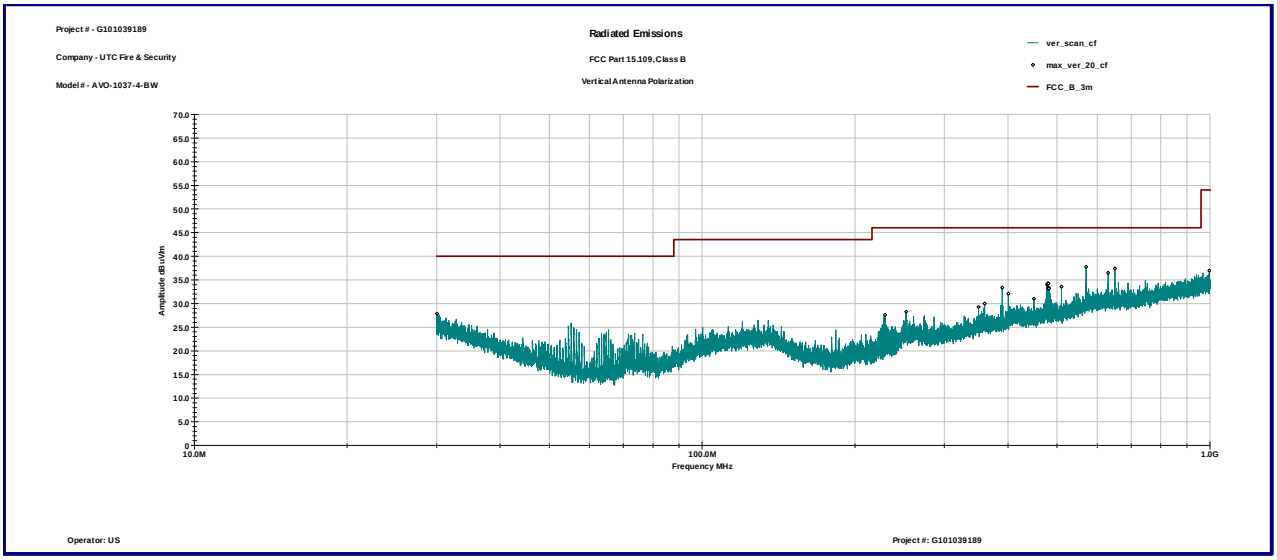
Date:	April 22, 2013	**Result:**	**Pass**
Standard:	FCC Part 15.109, Class B		
Tested by:	Uri Spector		
Test Point:	Enclosure		
Operation mode:	See page 5		
Note:	30MHz-5000MHz		

Table 3.8.1

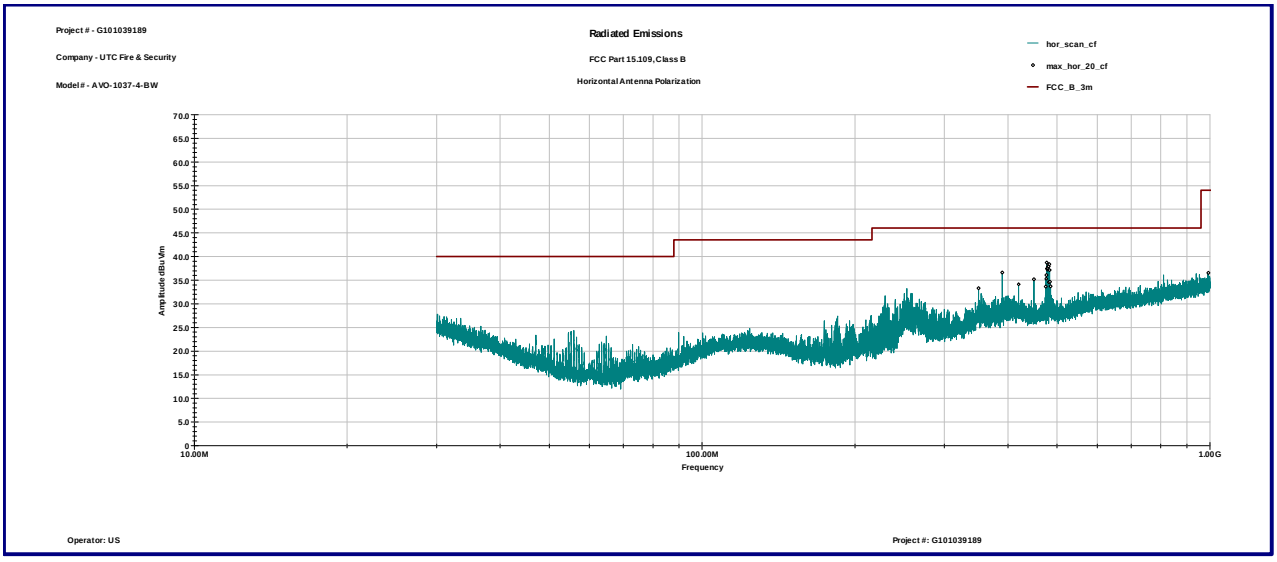
Frequency	Ant. Polarity	Peak Reading dBµV	Total C.F. dB1/m	Total at 3m dBµV/m	Limit dBµV/m	Margin dB
30.056 MHz	V	7.7	20.2	27.8	40.0	-12.2
229.09 MHz	V	14.8	12.8	27.6	46.0	-18.4
252.23 MHz	V	13.4	14.9	28.3	46.0	-17.8
350.09 MHz	V	11.8	17.5	29.3	46.0	-16.8
359.93 MHz	V	12.1	17.9	30.0	46.0	-16.0
390.01 MHz	V	15.0	18.4	33.4	46.0	-12.6
400.86 MHz	V	13.1	18.9	32.1	46.0	-14.0
450.03 MHz	V	11.5	19.5	31.0	46.0	-15.0
477.95 MHz	V	13.9	20.1	34.0	46.0	-12.0
478.59 MHz	V	13.9	20.1	34.0	46.0	-12.0
479.33 MHz	V	14.1	20.1	34.3	46.0	-11.8
510.01 MHz	V	13.2	20.4	33.6	46.0	-12.5
570.0 MHz	V	16.1	21.7	37.7	46.0	-8.3
629.95 MHz	V	14.0	22.5	36.5	46.0	-9.6
650.11 MHz	V	14.7	22.7	37.4	46.0	-8.6
390.01 MHz	H	18.2	18.4	36.6	46.0	-9.4
420.06 MHz	H	14.5	19.6	34.1	46.0	-11.9
477.31 MHz	H	18.6	20.1	38.7	46.0	-7.3
479.33 MHz	H	17.5	20.1	37.6	46.0	-8.5
480.71 MHz	H	18.2	20.1	38.3	46.0	-7.7
481.35 MHz	H	17.8	20.2	37.9	46.0	-8.1
482.73 MHz	H	18.2	20.2	38.4	46.0	-7.6
483.37 MHz	H	16.9	20.2	37.1	46.0	-8.9

Graph 3.8.1

Vertical antenna polarization

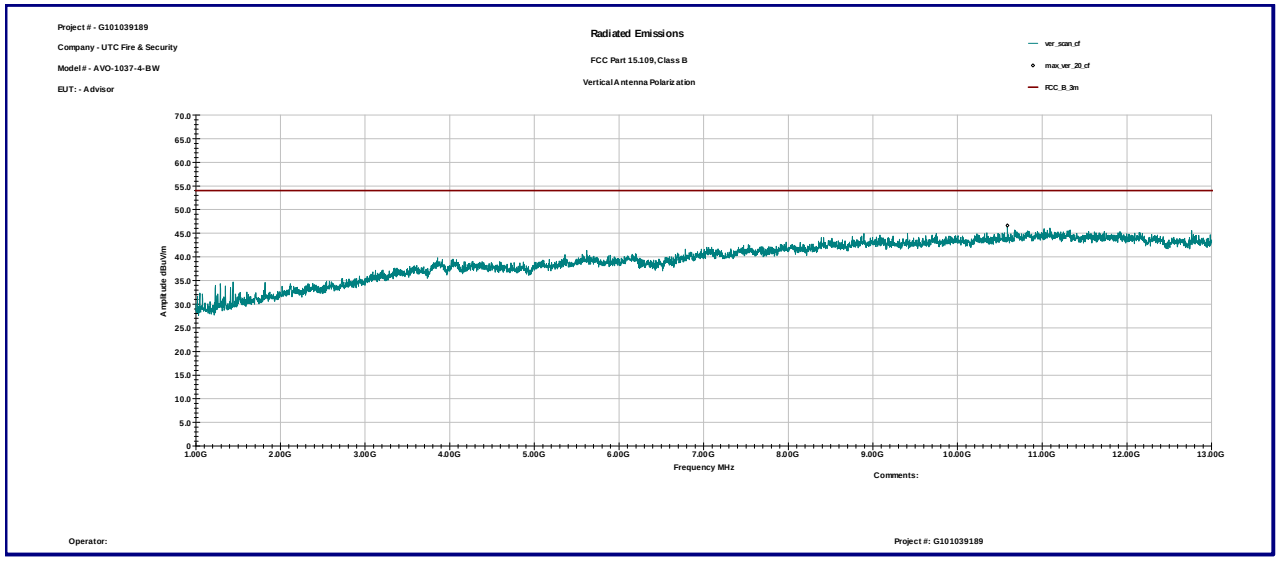


Horizontal antenna polarization

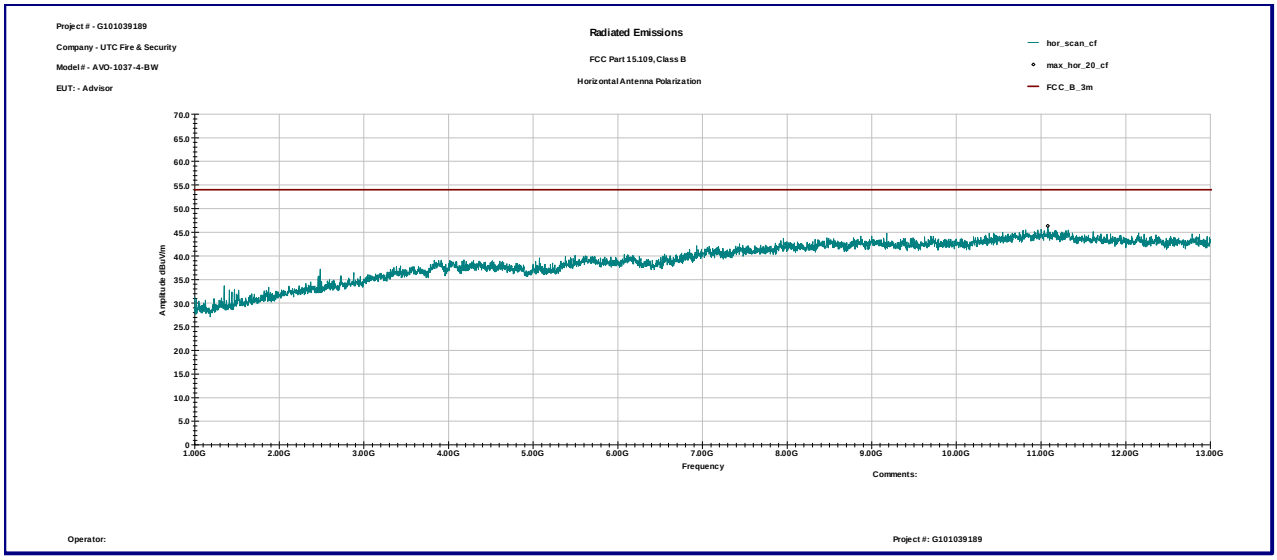


Graph 3.8.2

Vertical antenna polarization



Horizontal antenna polarization



3.9 Digital device conducted emissions

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test result: **Pass**

Frequency range: 0.15MHz-30MHz

Max. Emissions margin: 3.3dB below the limits

Notes: None

Date:	April 22, 2013	**Result:**	**Pass**
Standard:	FCC 15.107, Class B		
Tested by:	Uri Spector		
Test Point:	Power Line		
Operation mode:	See page 5		
Note:	None		

Table 3.9.1

Line 1

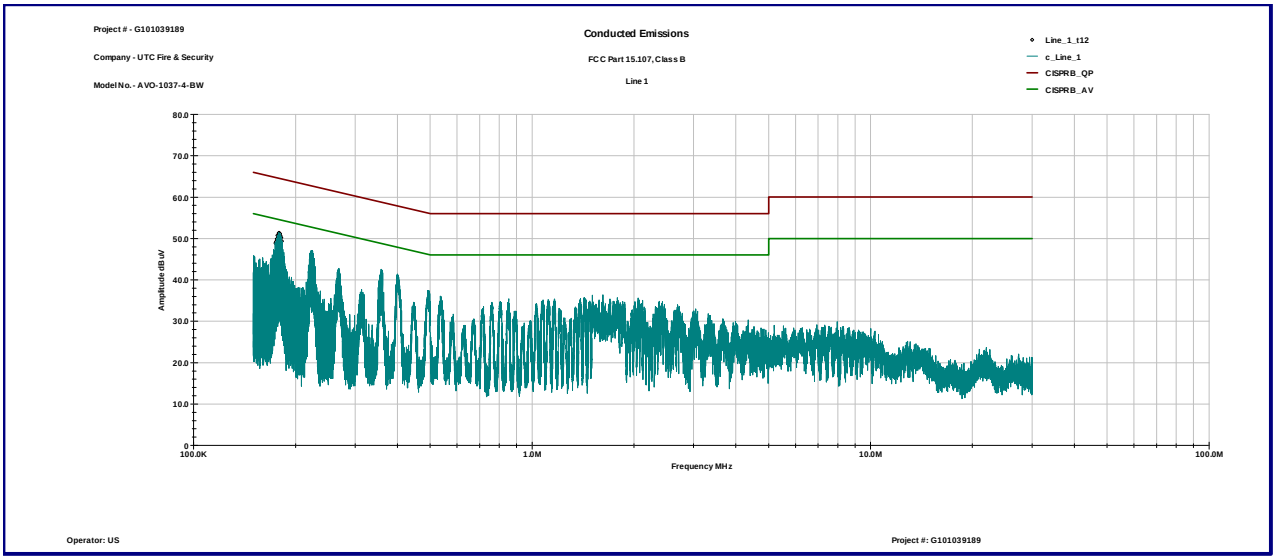
Frequency MHz	QP dBµV	AVG dBµV	Cable Loss dB	QP Lim dBµV	AVG Lim dBµV	QP Margin dB	AVG Margin dB
0.180	49.0	35.5	0.1	64.5	54.5	-15.4	-18.9
0.222	45.1	34.6	0.1	62.7	52.7	-17.5	-18.0
0.267	39.9	32.8	0.1	61.2	51.2	-21.2	-18.3
0.358	40.2	34.3	0.1	58.8	48.8	-18.4	-14.3
0.400	39.9	36.7	0.1	57.9	47.9	-17.8	-11.0
0.491	35.6	32.7	0.2	56.2	46.2	-20.4	-13.3

Line 2

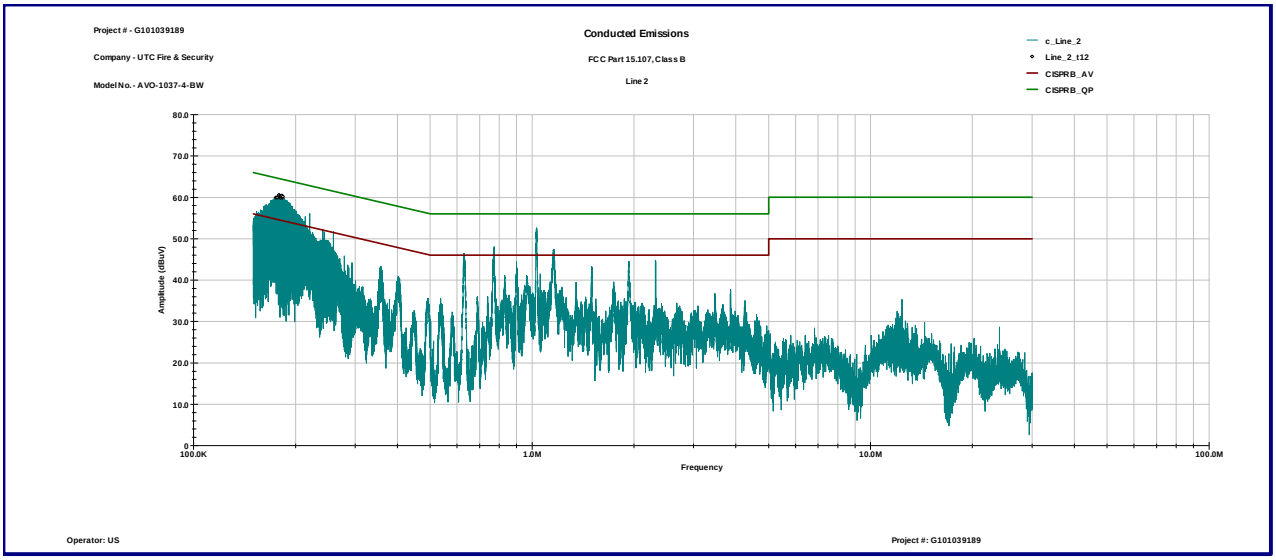
Frequency MHz	QP dBµV	AVG dBµV	Cable Loss dB	QP Lim dBµV	AVG Lim dBµV	QP Margin dB	AVG Margin dB
0.182	54.4	38.2	0.1	64.4	54.4	-9.9	-16.1
0.630	45.5	41.4	0.2	56.0	46.0	-10.3	-4.4
0.770	46.2	42.5	0.2	56.0	46.0	-9.6	-3.3
1.030	43.3	39.8	0.2	56.0	46.0	-12.5	-6.0
1.158	38.6	34.0	0.2	56.0	46.0	-17.2	-11.8
2.314	31.7	23.2	0.4	56.0	46.0	-23.9	-22.4

Graph 3.9.1

Line 1



Line 2



4.0 TEST EQUIPMENT

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO.	INTERTEK ID	CAL DUE	USED
Spectrum Analyzer	R & S	ESU	100398	25283	12/19/2013	☒
Spectrum Analyzer	R & S	FSP 40	100024	12559	11/29/2013	☒
Bicono-Log Antenna	Teseq	CBL6112D	32859	25289	08/09/2013	☒
Horn Antenna	EMCO	3115	9507-4513	9936	05/16/2013	☒
LISN	Fischer Custom Communications	FCC-LISN-2 MOD.SD	316	9945	07/17/2013	☒
Waveguide Horn Antenna	EMCO	3116	9904-2423	9705	11/07/2013	☒
Pre-Amplifier	MITEQ	AMF-6F-16002600-25-10P	1222383	MIN-0065	11/01/2013	☒
High Pass Filter	Reactel Inc.	7HS-4G-S12	0223	15274	VBU	☒
Pre-Amplifier	MITEQ	AMF-5D-00501800-28-13P	1122951	13475	11/01/2013	☒
System	Quantum Change	TILE! Instrument Control	Ver. 3.4.K.29	15259	VBU	☒