TEST REPORT

Report Number: 102982605MIN-005A
Project Number: G102982605

Testing performed on the
R1
(Electronic Wall Mounted Access Control Reader, Wi-Fi)
FCC ID: 2AK5B-R1
IC: 22134-R1

to
47 CFR Part 15.247:2017
RSS-247, Issue 2, 2017
RSS-Gen, Issue 4, 2014
47 CFR, Part 15:2017, §15.107 and §15.109, Class / ICES-003, Issue 6:2016

For
Latchable Inc.

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

Test Authorized by:
Latchable Inc.
450 West 33rd Street-12th Floor
New York, NY 10001 USA

Prepared by: _____
Uri Spector

Reviewed by: _____ Date of issue: May 2, 2017
Norman Shpilsher

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1.0 GENERAL DESCRIPTION

Model:	R1
Type of EUT:	Electronic Wall Mounted Access Control Reader, Wi-Fi
Serial Number:	2
FCC ID:	2AK5B-R1
IC:	22134-R1
Related Submittal(s) Grants:	This is composite device with the same ID under different section of FCC and ISED regulations.
Company:	Latchable Inc.
Customer:	Mr. Jim Griszbacher
Address:	450 West 33rd Street-12th Floor New York, NY 10001 USA
Phone:	(609) 922-3739
e-mail:	jim@latchaccess.com
Test Standards:	☒ 47 CFR, Part 15:2017, §15.247 ☒ RSS–247, Issue 2, 2017 ☒ RSS-Gen, Issue 4, 2014 ☒ 47 CFR, Part 15:2017, §15.107 and §15.109, Class B test method: ANSI C63.4-2014 ☒ ICES-003, Issue 6:2016
Type of radio:	☒ Stand -alone ☐ Module ☐ Hybrid
Date Sample Submitted:	April, 24, 2017
Test Work Started:	April, 24, 2017
Test Work Completed:	April 28, 2017
Test Sample Conditions:	☐ Damaged ☐Poor (Usable) ☒ Good

1.1 Product Description; Test Facility

Product Description:	2.4 GHz Wi-Fi Transceiver
Transmitter Type:	☐ FHSS ☒ Digital Modulation ☒ Wi-Fi ☐ Bluetooth
Permitted Band of Operation:	2400 to 2483.5MHz
Operating Frequency Band(s):	2412 to 2472MHz
Number of Channels:	13
Modulation:	802.11b/g/n / CCK/OFDM/MCS7
Emission Designator:	17M7W7D
Antenna(s) Info:	Type: Chip antenna Gain: 1.9dBi
Antenna Installation:	☐ User ☐ Professional ☒ Factory
Transmitter power configuration:	☒ External power source ☒ 120VAC via SL Power ME10A1203B01 AC Adapter ☐ Other:
Special Test Arrangement:	None
Test Facility Accreditation:	A2LA (Certificate No. 1427.01)
Test Methodology:	Measurements performed according to the procedures in ANSI C63.10-2013 and FCC KDB 558074 D01 DTS Meas Guidance v04 April 5, 2017

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 (Channel 1), middle channel (Channel 7), and upper channel (Channel 13) for each type of modulation 802.11 b, g, and n (CCK/11Mbps, OFDM/54Mbps, MCS7). The software used: ST-Link V2 with settings: power level – 0 (maximum); packets number – continuous; packets size – 1400 (maximum)

Cables:

No.	Type	Length	Designation	Note
1	Ethernet cable	24cm	Unshielded CAT5	
2	Multi-conductor I/O cable	26cm	Unshielded, with DC power input, relay contacts, RS-485 communications interface, and additional inputs for peripheral devices	

Support equipment/Services:

No.	Item	Description
1	Apple Macbook Pro	Local PC (used for purpose of testing and set transmitter)
	AC wall adapter	SL Power ME10A1203B01 AC/DC Adapter
2	R & S RF Generator SMR20	RF Generator (to activate a receiver portion for FCC 15.109 testing)

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 radiated emissions above 1GHz has been determined to be:
±6.4 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: The Radio was tested in worse available configuration- the maximum transfer bit rate for each 802.11 modulation technique specification:
802.11b / 11Mbps / CCK modulation
802.11g / 54Mbps / OFDM modulation
802.11n / 65Mbps / MCS7 modulation

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-247 5.2	6dB emissions bandwidth of the digital modulation	Pass
15.247(b), (c) / RSS-247 5.4	Maximum peak output power	Pass
15.247/(e) / RSS-247 5.2	Power spectral density	Pass
15.247(d) / RSS-247 5.5	Antenna conducted spurious emissions	Pass
15.247(d) / RSS-247 5.5	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
9.85	10.05	10.09	500	**Pass**
RBW: **VBW:**	☒ 100kHz ☒ 300KHz			

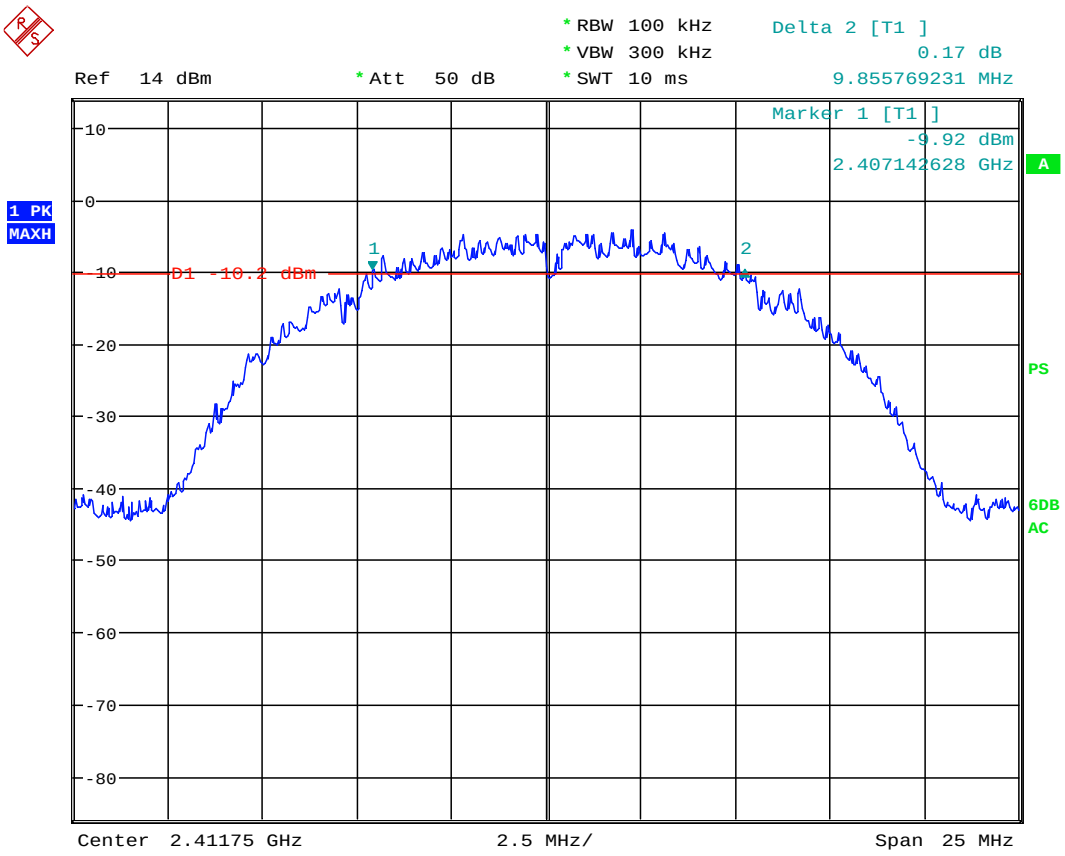
802.11g

Low Frequency Channel MHz	Middle Frequency Channel MHz	Upper Frequency Channel MHz	Minimum Bandwidth kHz	Result
16.46	16.42	16.44	500	**Pass**
RBW: **VBW:**	☒ 100kHz ☒ 300KHz			

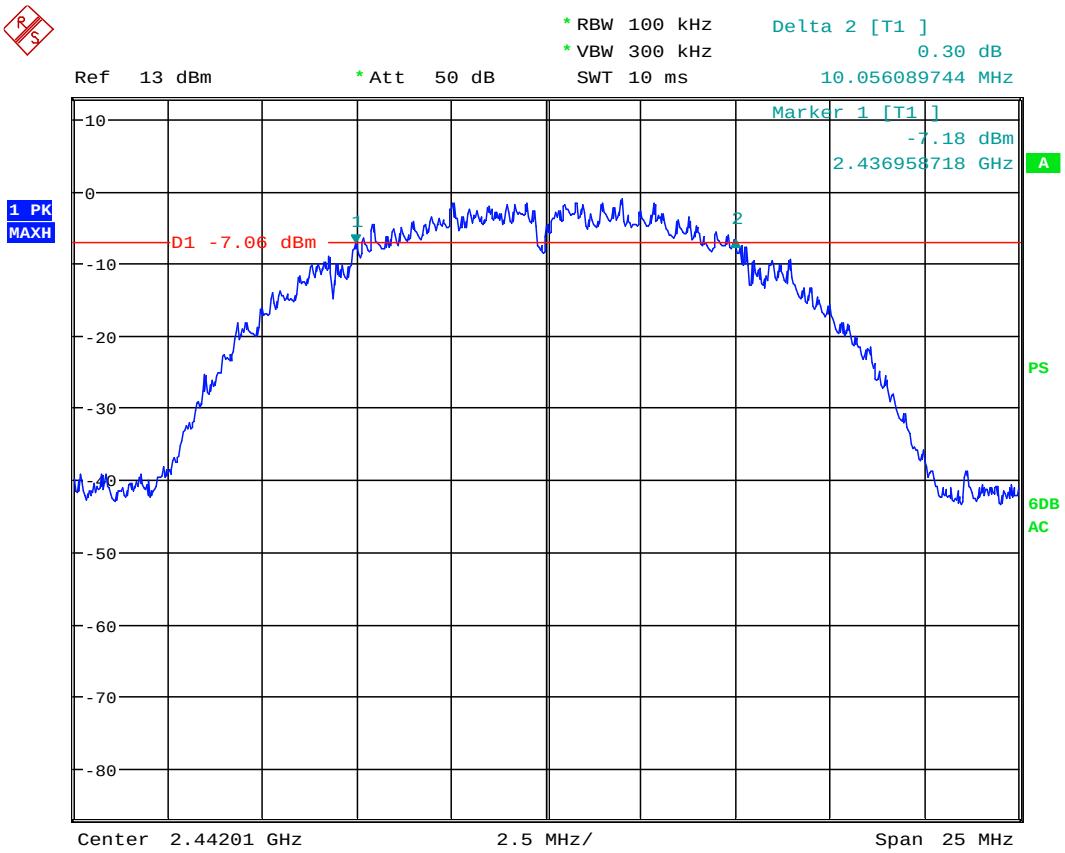
802.11n

Low Frequency Channel MHz	Middle Frequency Channel MHz	Upper Frequency Channel MHz	Minimum Bandwidth kHz	Result
17.69	17.70	17.62	500	**Pass**
RBW: **VBW:**	☒ 100kHz ☒ 300KHz			

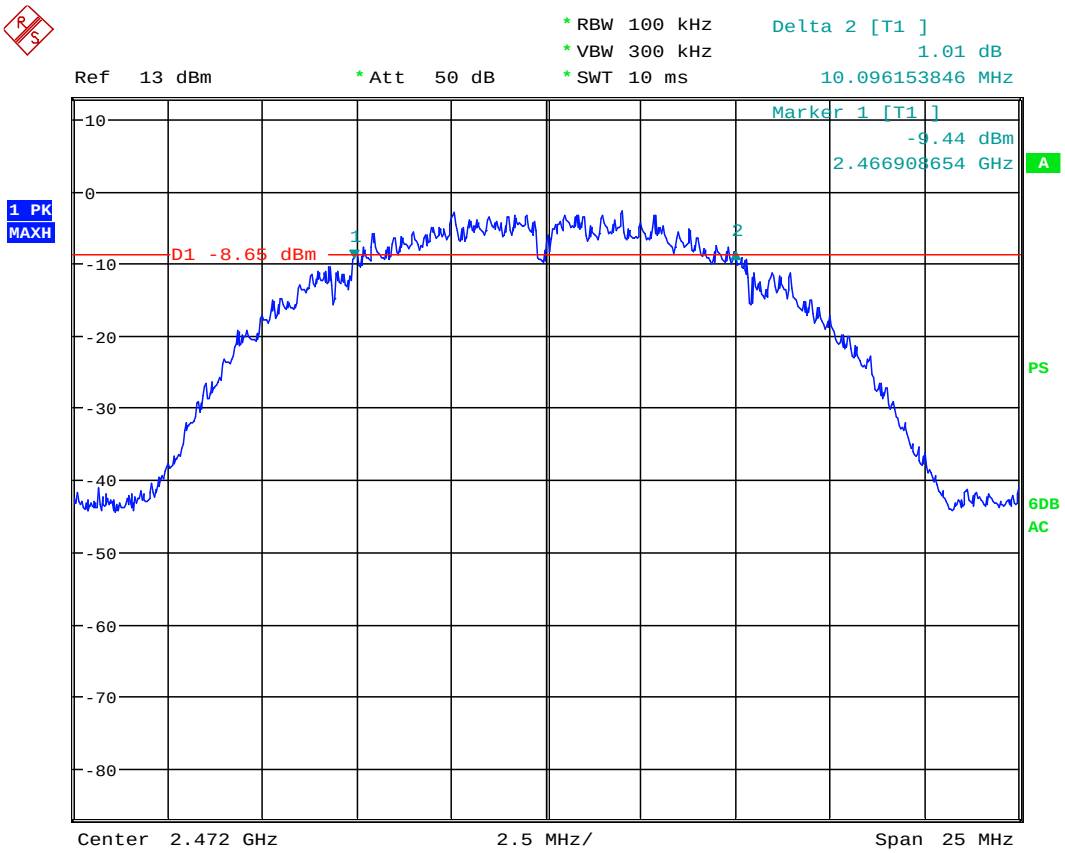
Notes: N/A



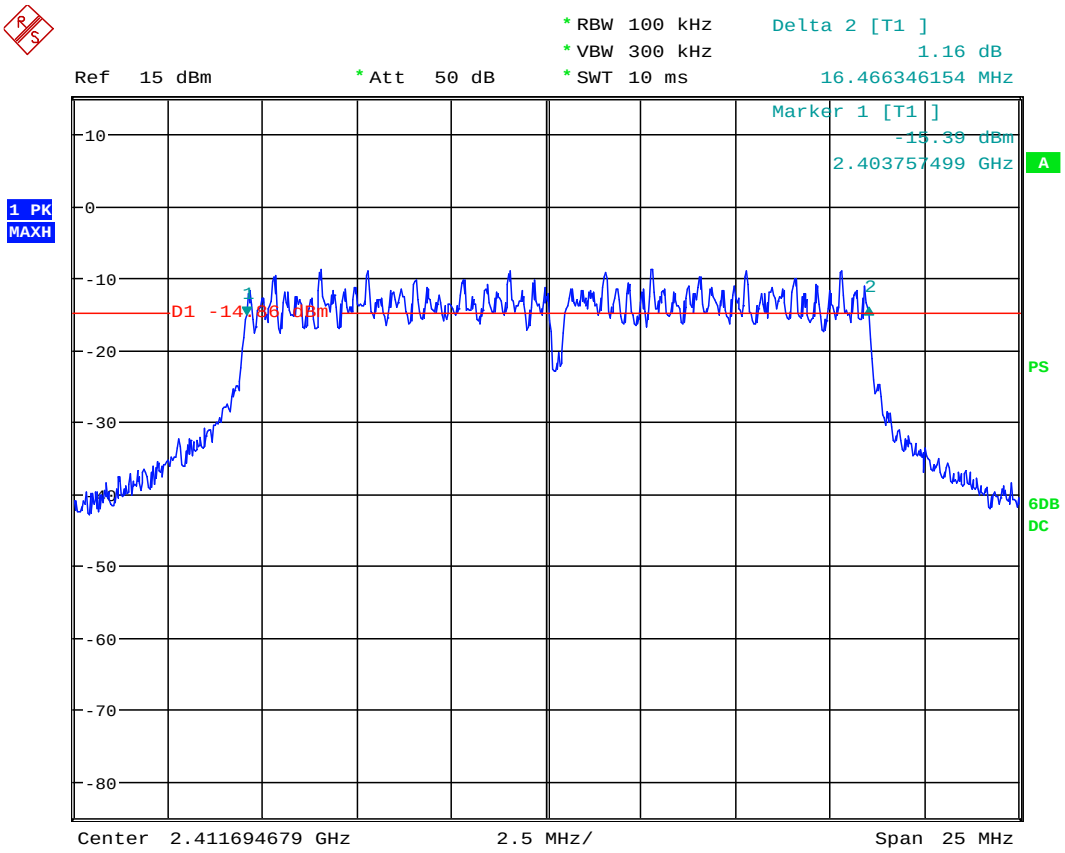
Graph 3.1.1
801.11b, low channel



Graph 3.1.2
801.11b, middle channel



Graph 3.1.3
801.11b, upper channel



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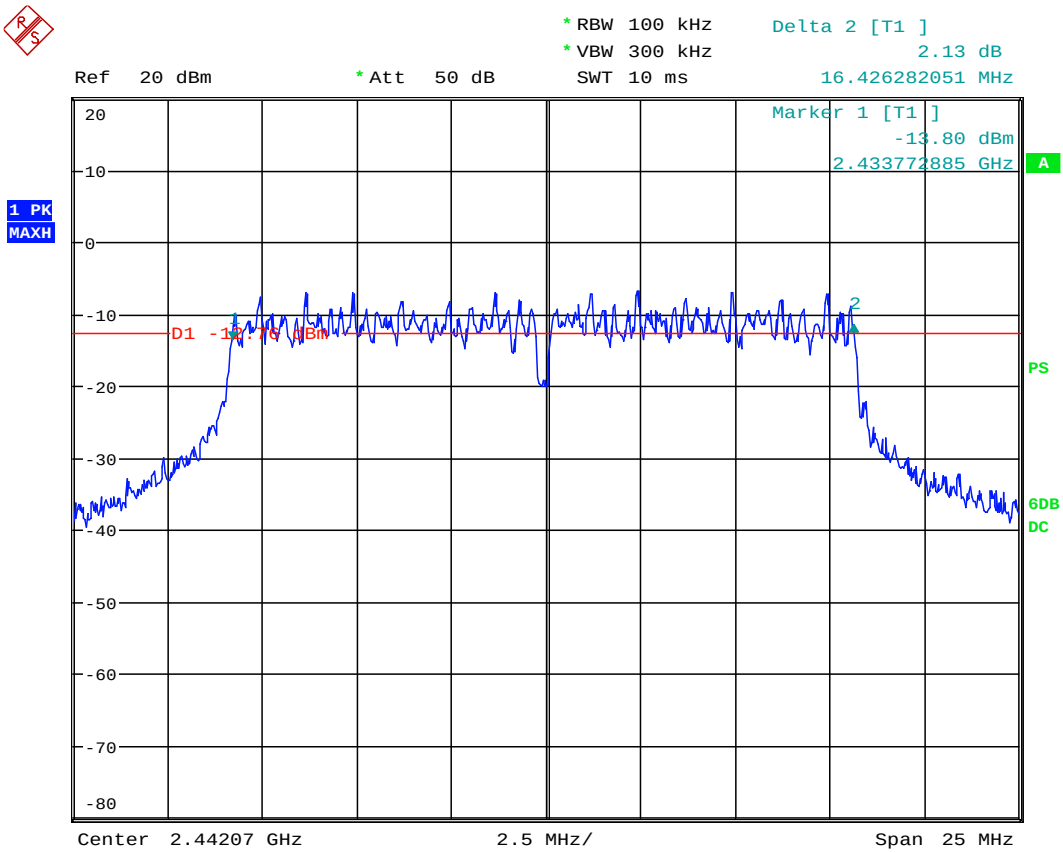
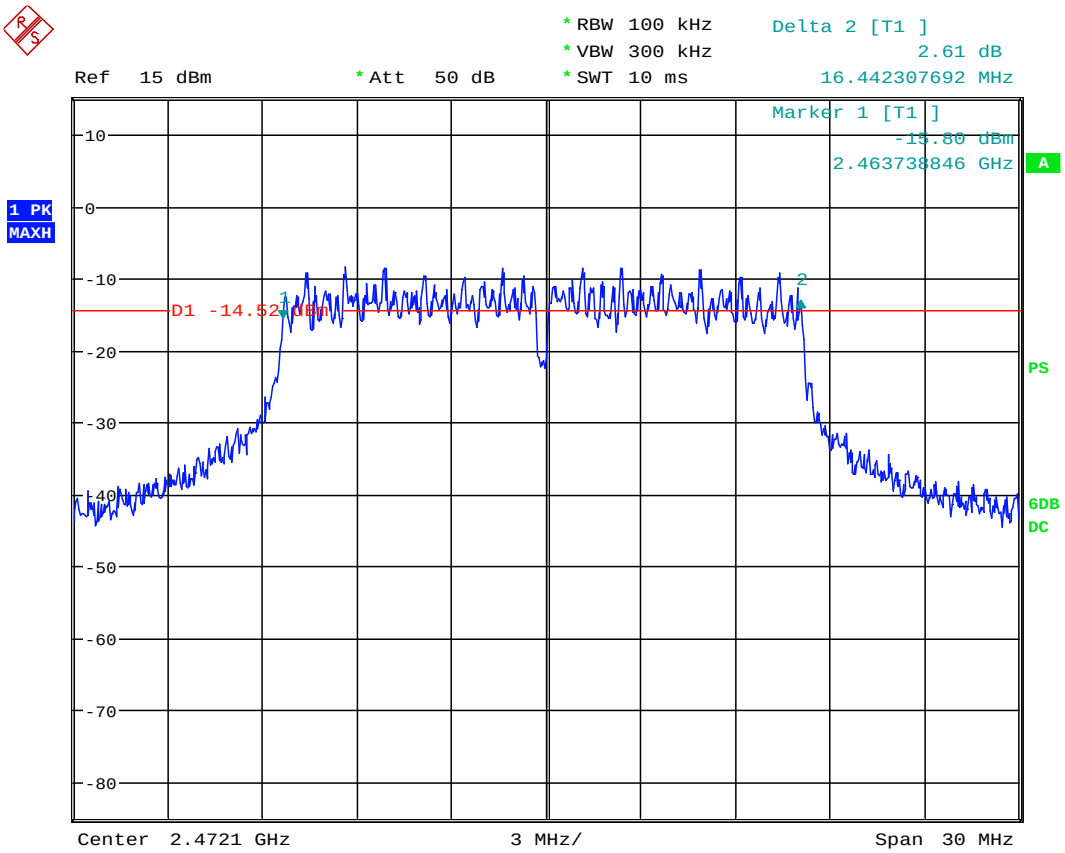
Graph 3.1.4
801.11g, low channel



Graph 3.1.5
801.11g, middle channel



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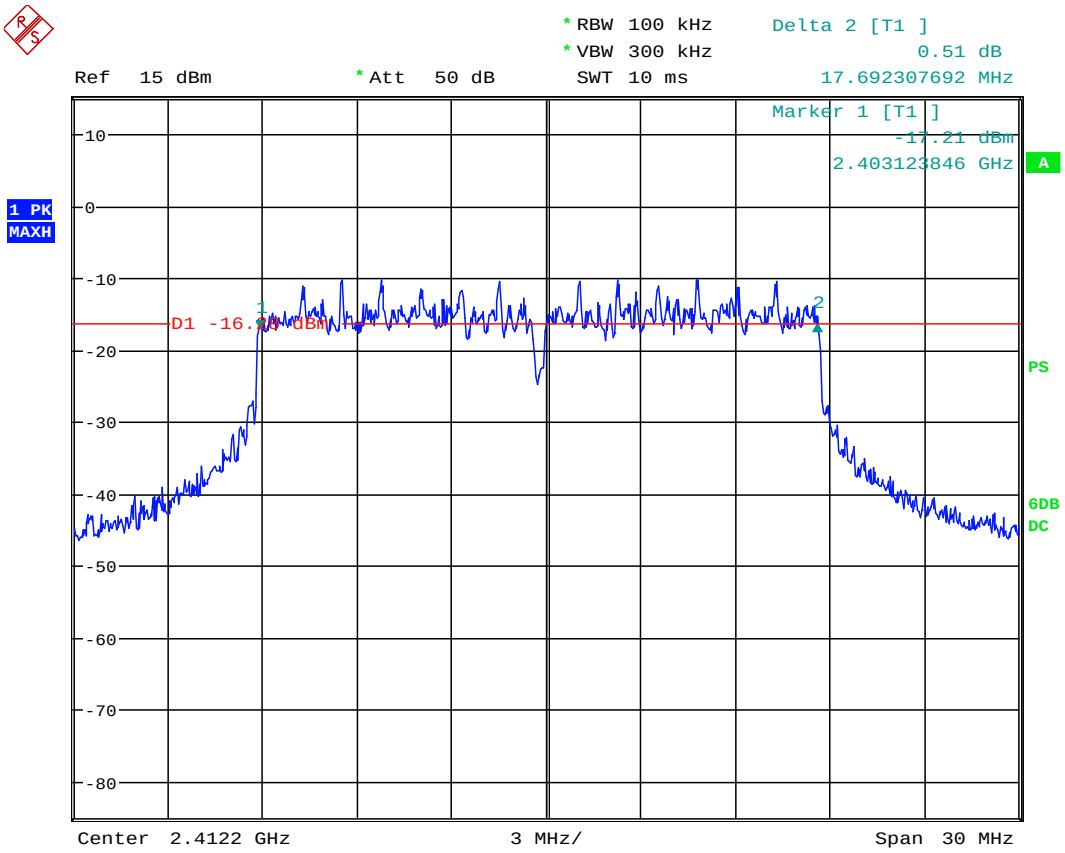
Graph 3.1.6
801.11g, upper channel



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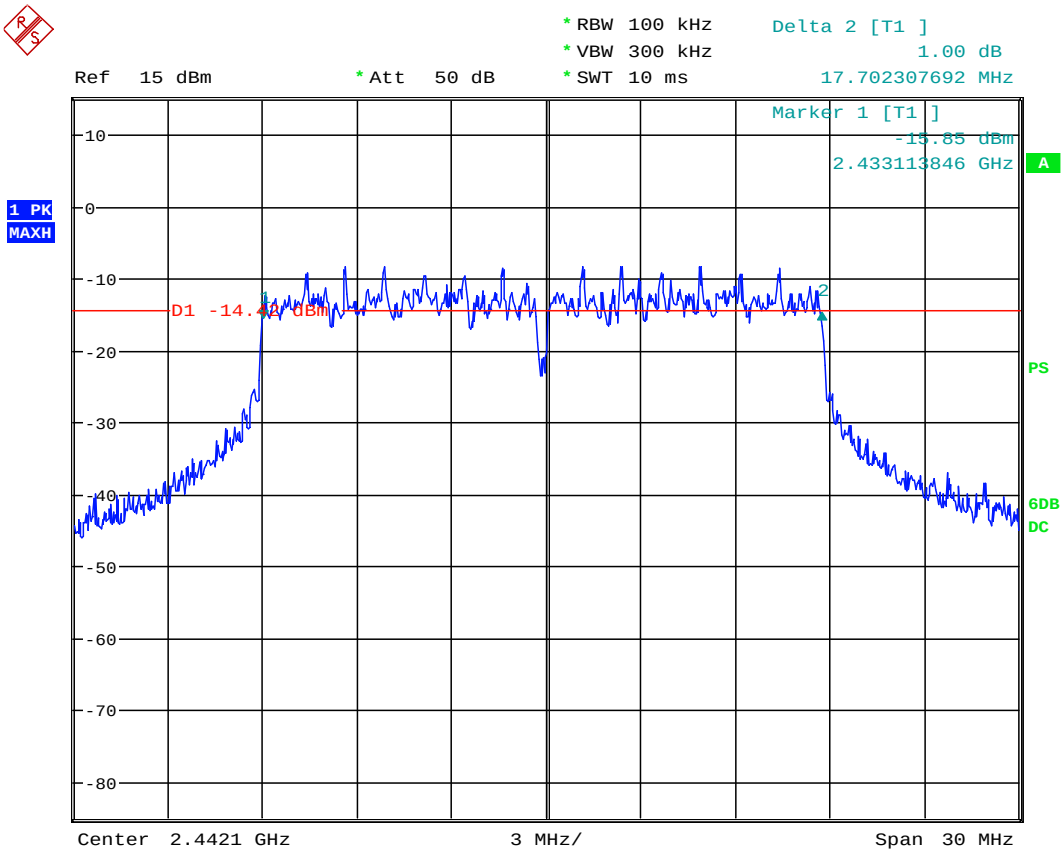
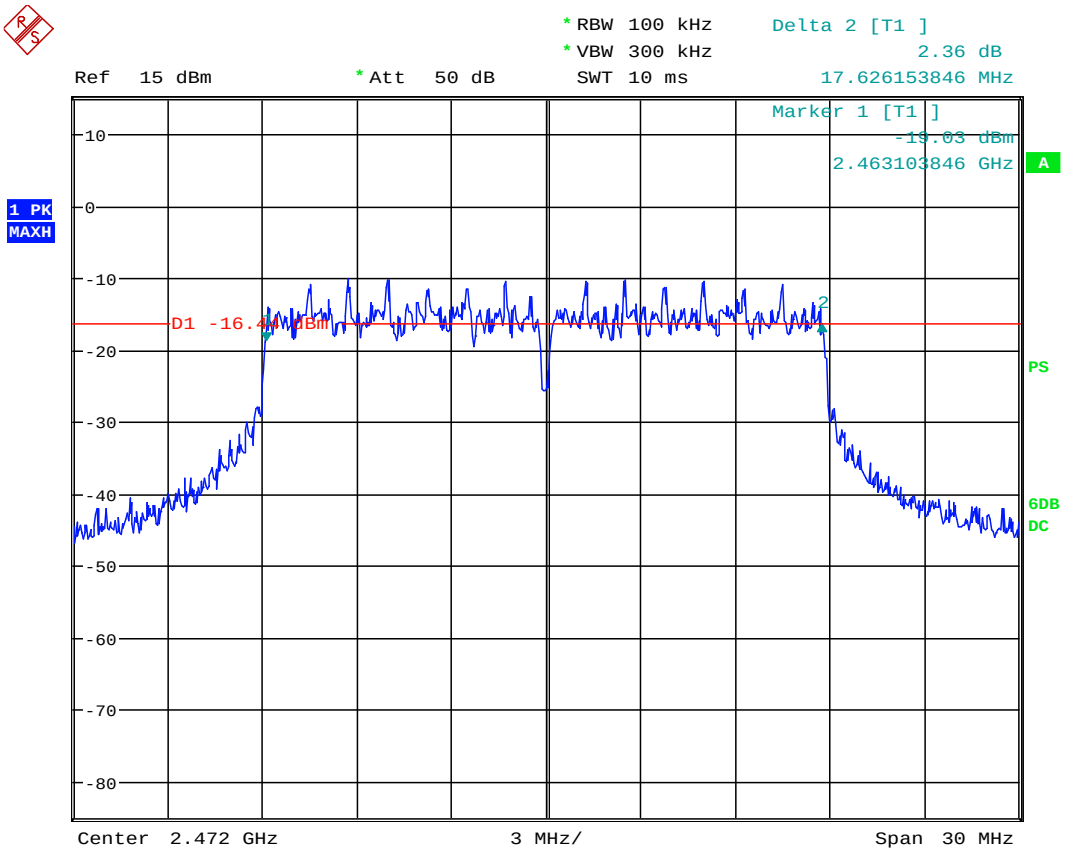
Graph 3.1.7
801.11n, low channel



Graph 3.1.8
801.11n, middle channel



Date: 25.APR.2017 10:37:28

Graph 3.1.9
801.11n, upper channel

3.2 Occupied bandwidth (OBW) (99%)

802.11b

Low Frequency Channel MHz	Middle Frequency Channel MHz	Upper Frequency Channel MHz	Minimum 6dB Bandwidth kHz	Result
14.46	14.40	14.47	500	**Pass**
RBW: **VBW:**	☒ 100kHz ☒ 300KHz			

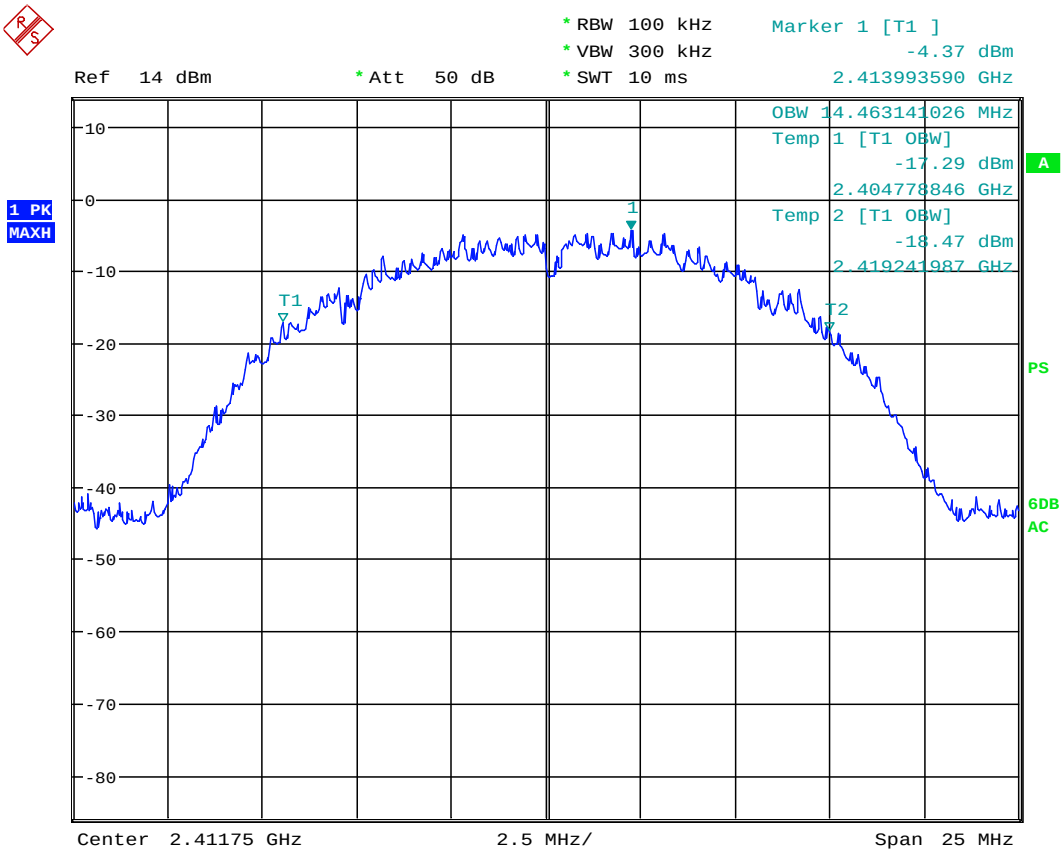
802.11g

Low Frequency Channel MHz	Middle Frequency Channel MHz	Upper Frequency Channel MHz	Minimum 6dB Bandwidth kHz	Result
16.45	16.47	16.50	500	**Pass**
RBW: **VBW:**	☒ 100kHz ☒ 300KHz			

802.11n

Low Frequency Channel MHz	Middle Frequency Channel MHz	Upper Frequency Channel MHz	Minimum 6dB Bandwidth kHz	Result
17.64	17.67	17.64	500	**Pass**
RBW: **VBW:**	☒ 100kHz ☒ 300KHz			

Notes: N/A



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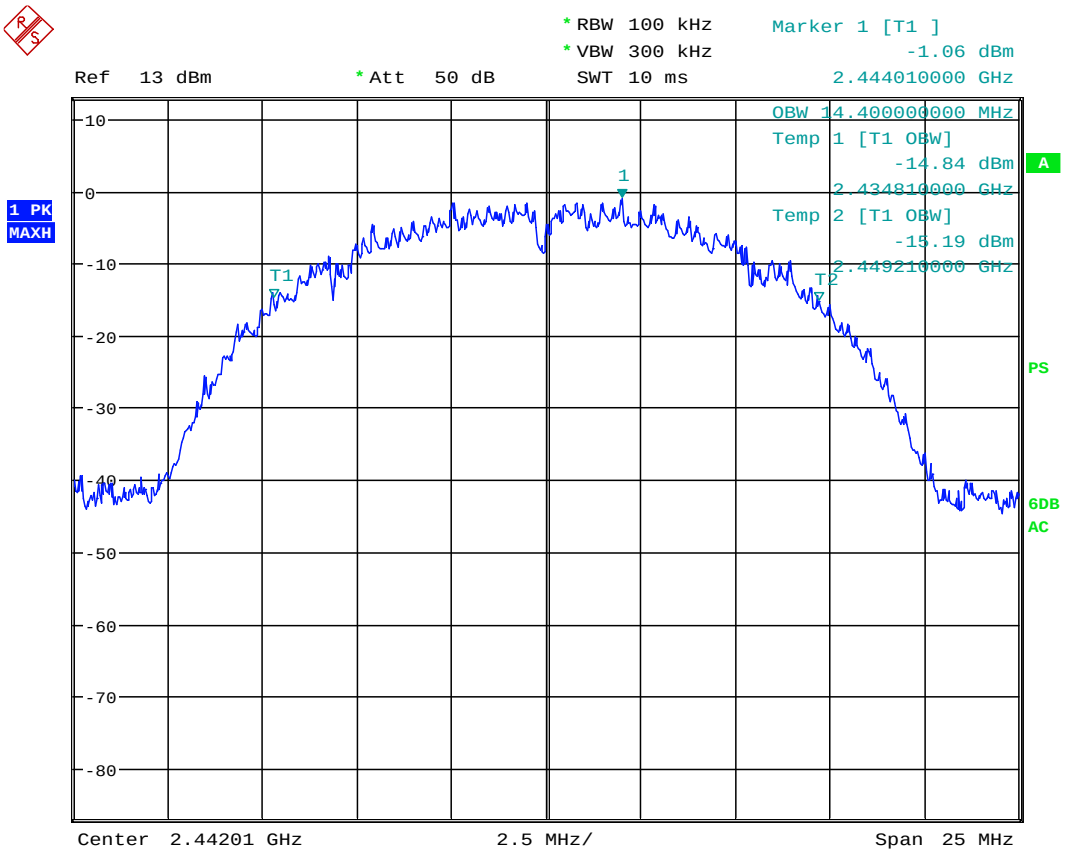
Graph 3.2.1
801.11b, low channel



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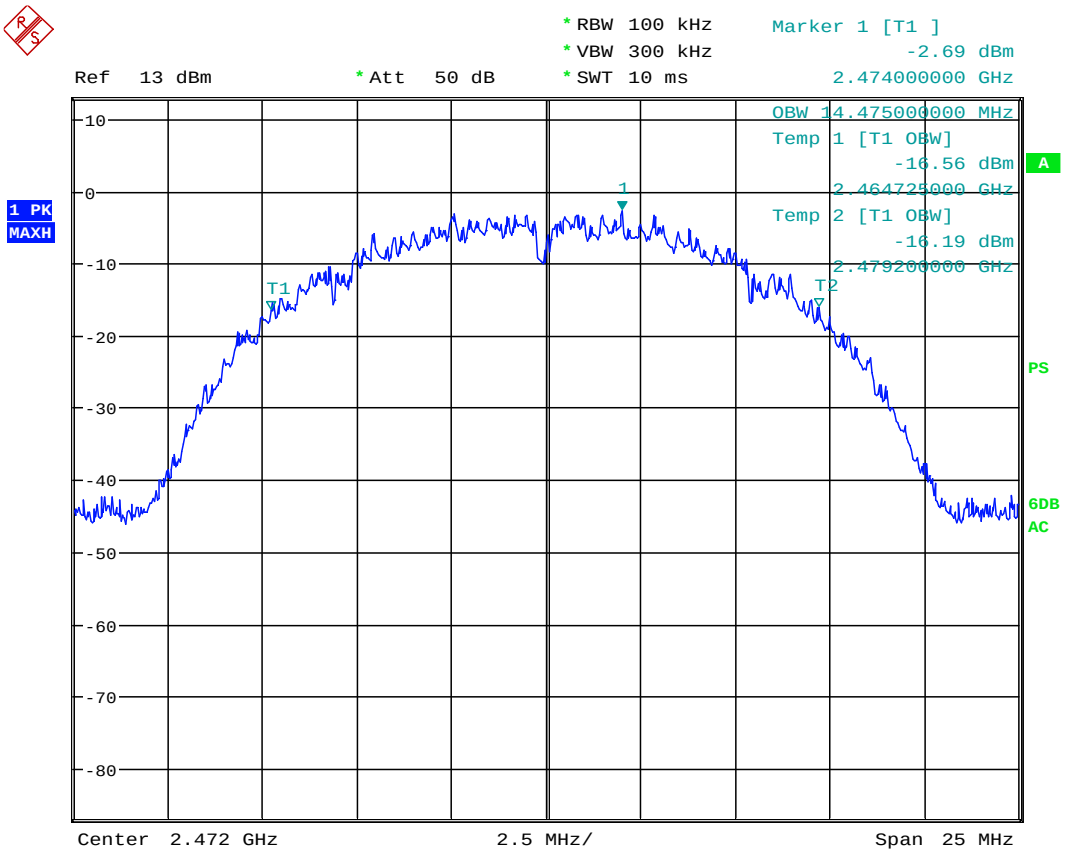
Graph 3.2.2
801.11b, middle channel



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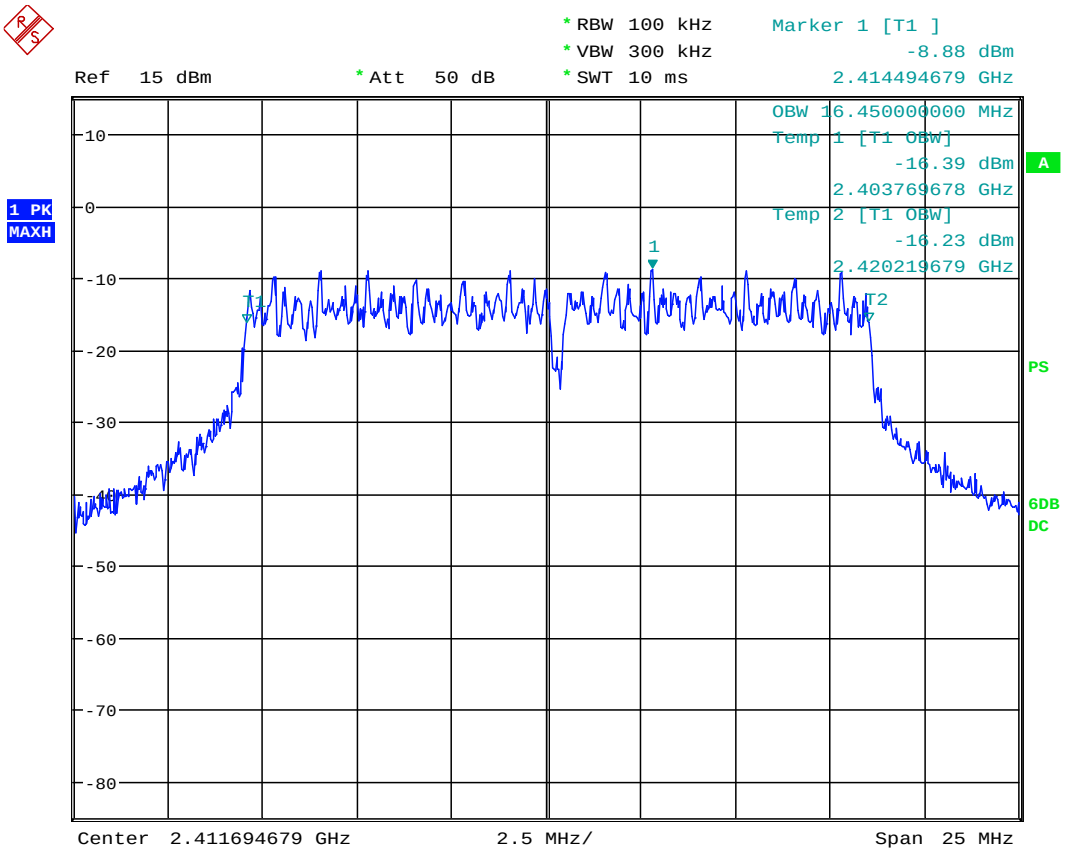
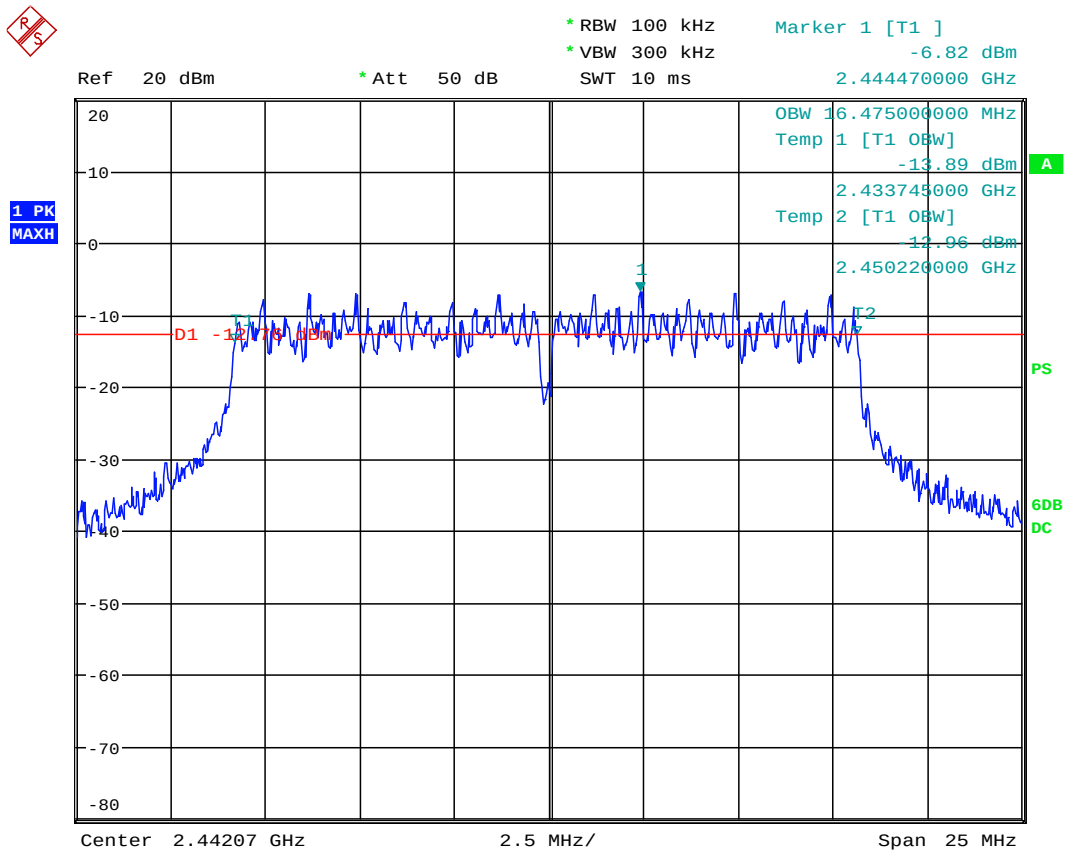
Graph 3.2.3
801.11b, upper channel



Graph 3.2.4
801.11g, low channel



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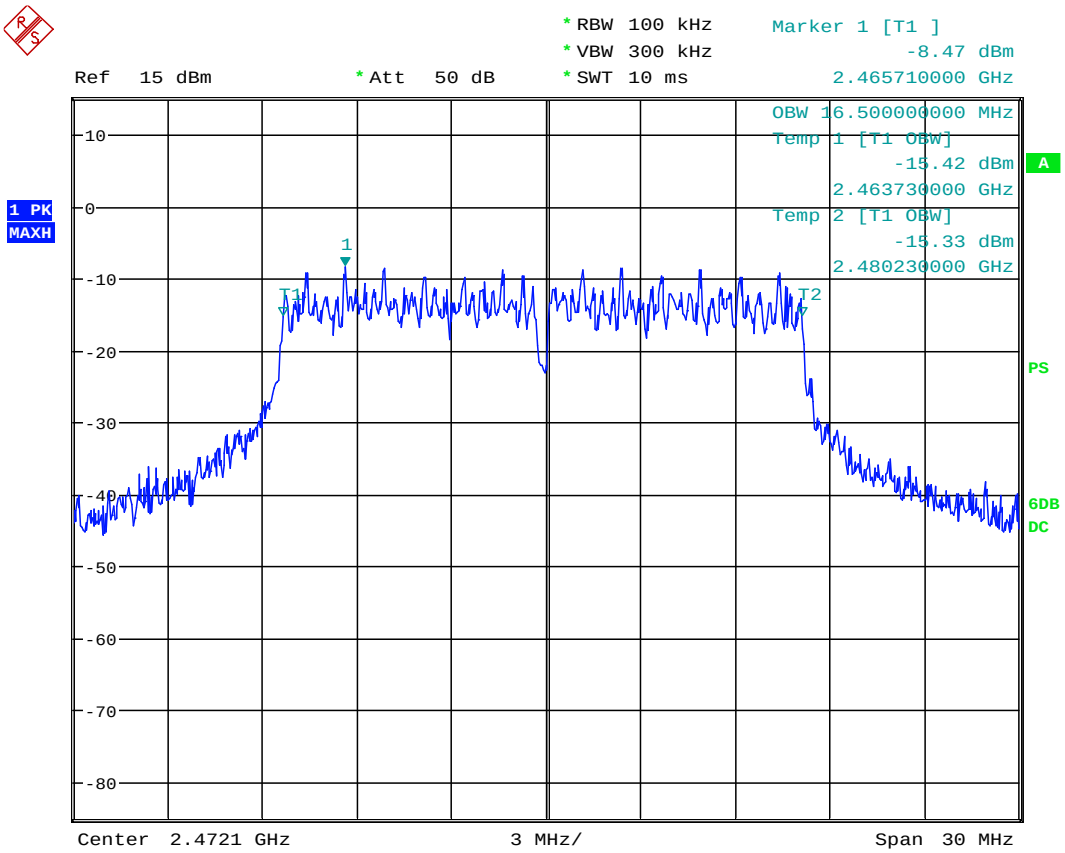
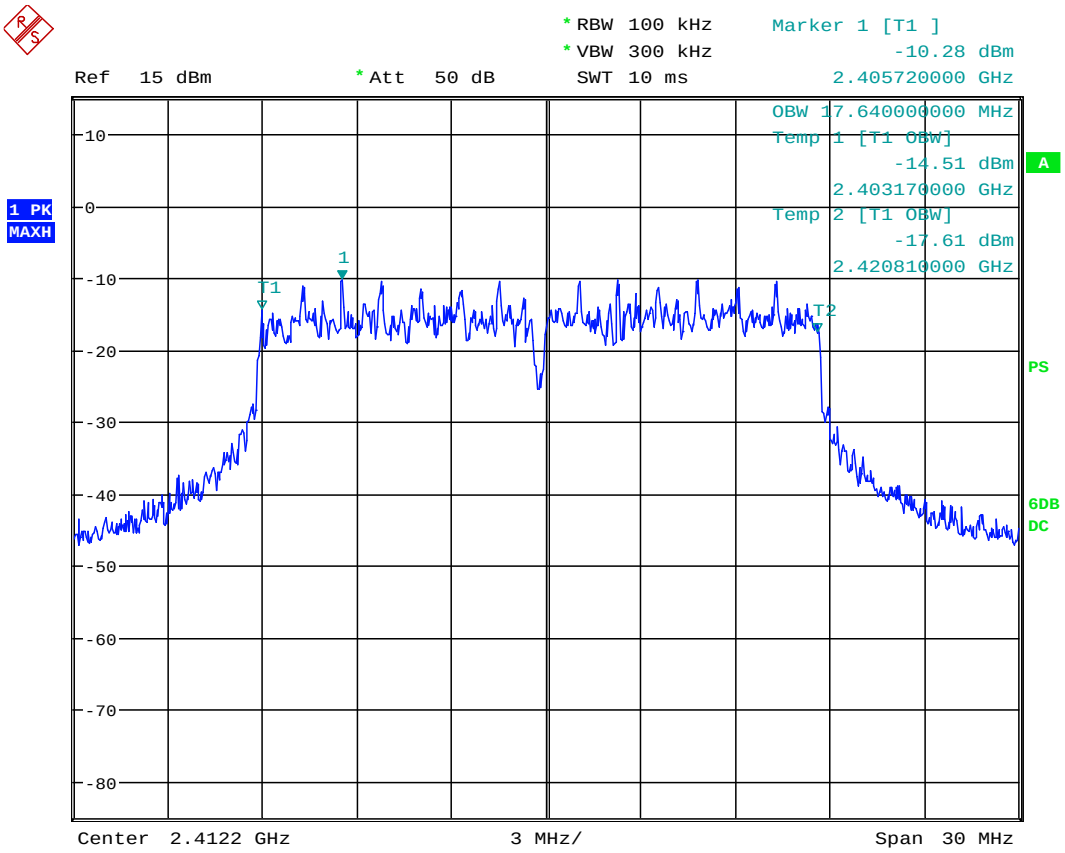
Graph 3.2.5
801.11g, middle channel



Graph 3.2.6
801.11g, upper channel



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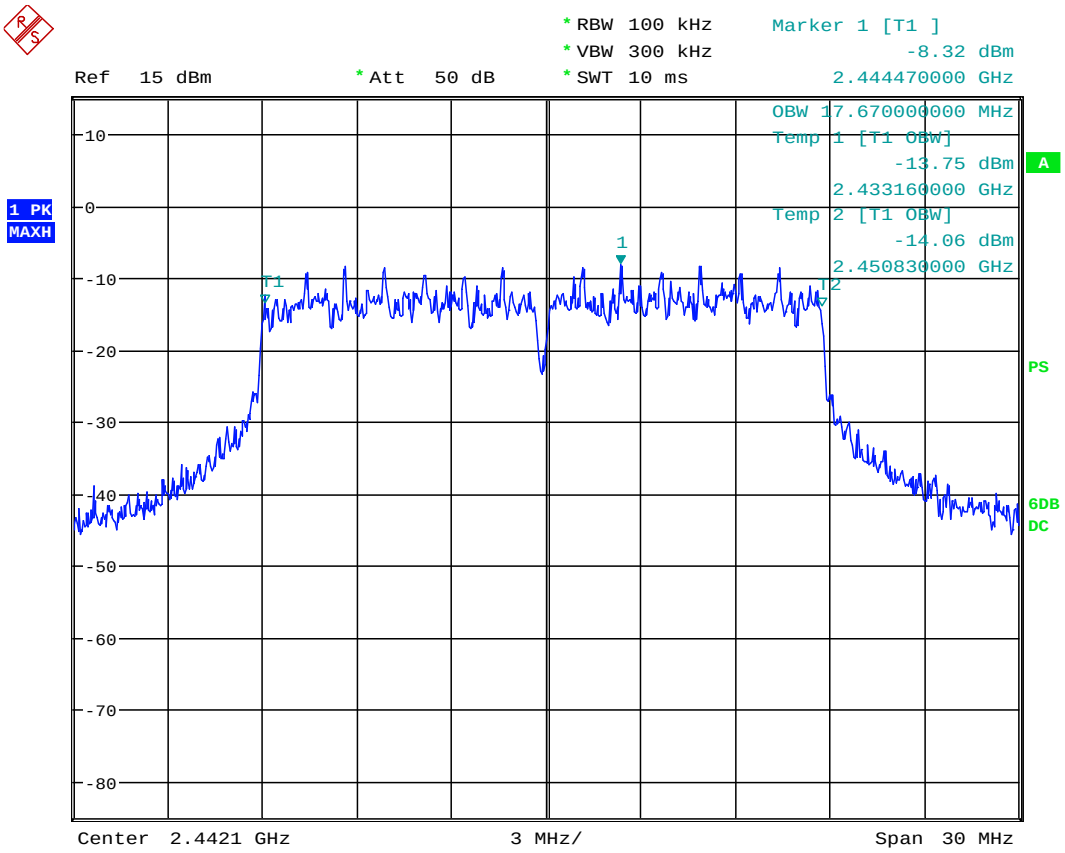
Graph 3.2.7
801.11n, low channel



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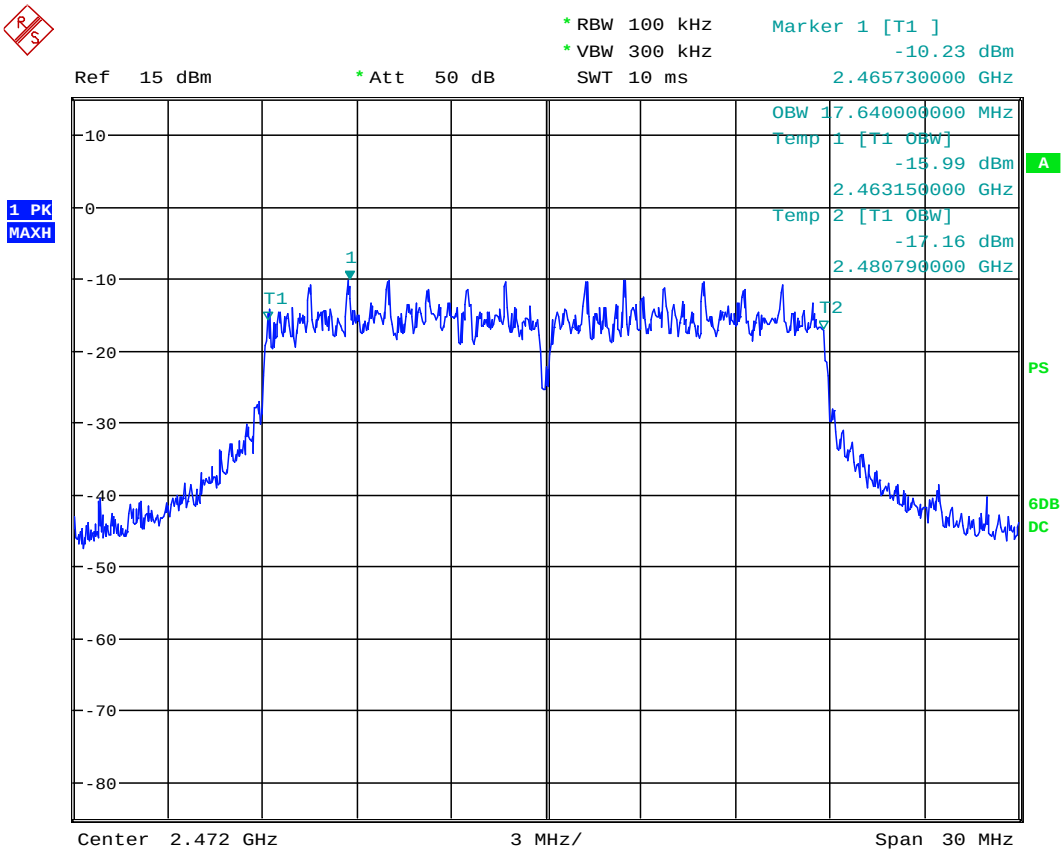
Graph 3.2.8
801.11n, middle channel



Date: 25.APR.2017 10:38:25

Graph 3.2.9
801.11n, upper channel

3.3 Conducted Average output power

Test result: **Pass**

Max. Conducted Power: 12.21dBm = 16.66mW = 0.0166W

Min. Conducted Power: 2.07dBm = 1.61mW = 0.00161W

Max. ERP Power: 12.21dBm + 1.9dBi = 14.11dBm = 25.76mW = 0.02576W

Min. ERP Power: 1.57dBm + 1.9dBi = 3.97dBm = 2.49mW = 0.00249W

Min. Margin: 17.8dB below the limits

Note: Conducted Average Power was performed according to FCC KDB 558074 D01 DTS Meas Guidance v04 April 5, 2017. Section 9.2.2.3 Method AVGSA-1 using Gate Trigger with the following Gate Length: for 802.11b is 1.22 ms, for 802.11g is 215 μs, for 802.11n is 183 μs.

802.11b

Power Output:	**Conducted Average**					
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**
2411.6	8.49	0.5	8.99	30	0	-21.1
Middle Frequency MHz						
2442.1	11.71	0.5	12.21	30	0	-17.8
Upper Frequency MHz						
2472.0	10.47	0.5	10.97	30	0	-19.0
RBW:	☐ 1MHz	☐ 3MHz	☒ 300KHz			
VBW:	☒ 1MHz	☐ 3MHz	☐ 10MHz			
Antenna Gain:	☒ < 6dBi	☐ >6dBi and =	dBi, Output power reduction =	dB		

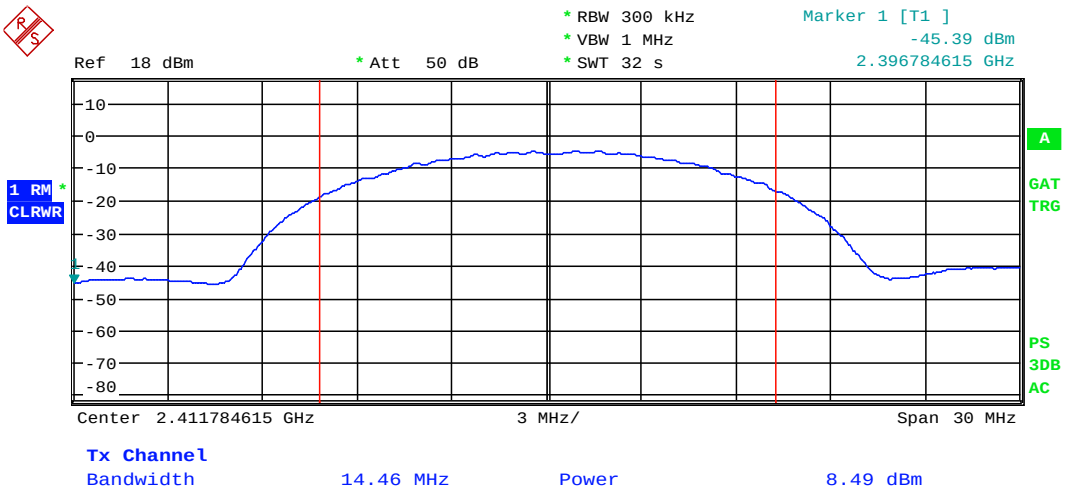
802.11g

Power Output:	Conducted Average					
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**
2408.3	3.57	0.5	4.07	30	0	-25.9
Middle Frequency MHz						
2446.4	6.92	0.5	7.42	30	0	-22.8
Upper Frequency MHz						
2475.7	5.94	0.5	6.44	30	0	-23.6
RBW:	☐ 1MHz	☐ 3MHz	☒ 300KHz			
VBW:	☒ 1MHz	☐ 3MHz	☐ 10MHz			
Antenna Gain:	☒ < 6dBi	☐ >6dBi and =		dBi, Output power reduction =		dB

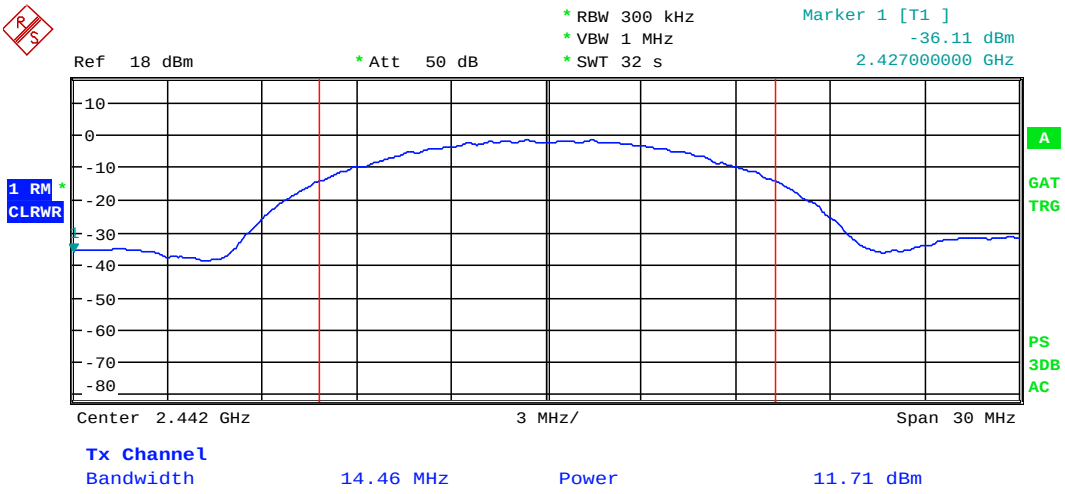
802.11n

Power Output:	Conducted Average					
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	1.57	0.5	2.07	30	0	-27.9
Middle Frequency MHz						
2442.0	4.92	0.5	5.42	30	0	-24.6
Upper Frequency MHz						
2472.0	3.41	0.5	3.91	30	0	-26.1
RBW:	☐ 1MHz	☐ 3MHz	☒ 300KHz			
VBW:	☒ 1MHz	☐ 3MHz	☐ 10MHz			
Antenna Gain:	☒ < 6dBi	☐ >6dBi and =		dBi, Output power reduction =		dB

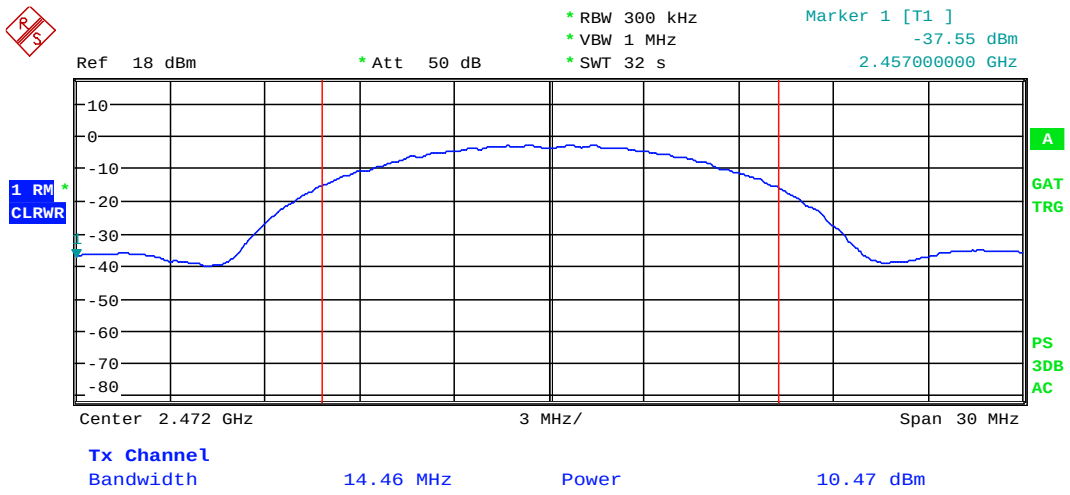
Notes: The maximum peak conducted output power limit is 1 W, or 30dBm
Graphs 3.3.1, 3.3.2, 3.3.3 show the conducted output power for 802.11b
Graphs 3.3.4, 3.3.5, 3.3.6 show the conducted output power for 802.11g
Graphs 3.3.7, 3.3.8, 3.3.9 show the conducted output power for 802.11n



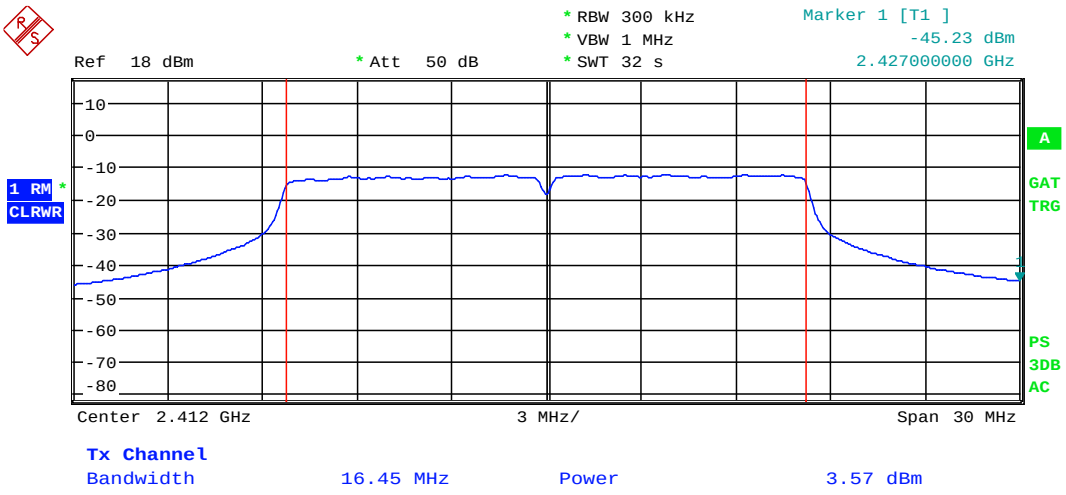
Graph 3.3.1



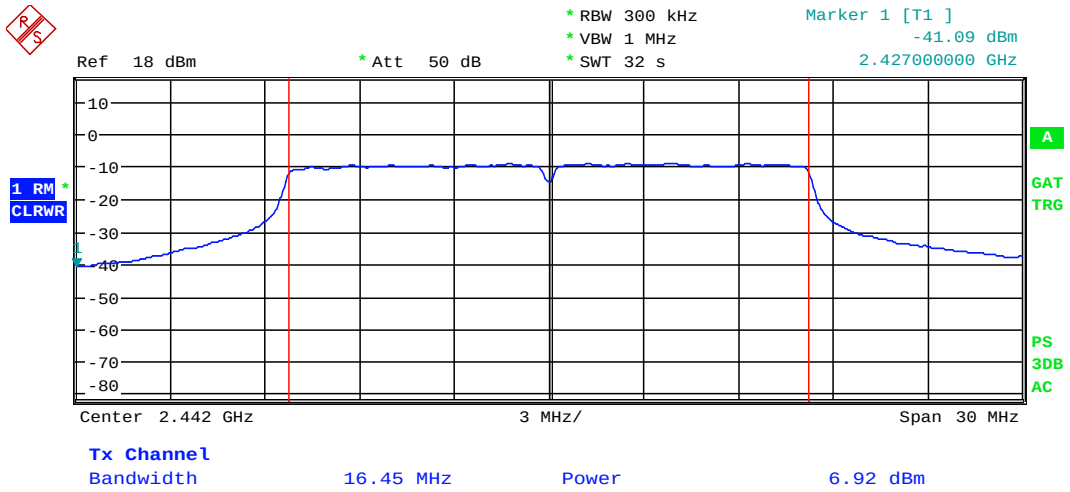
Graph 3.3.2



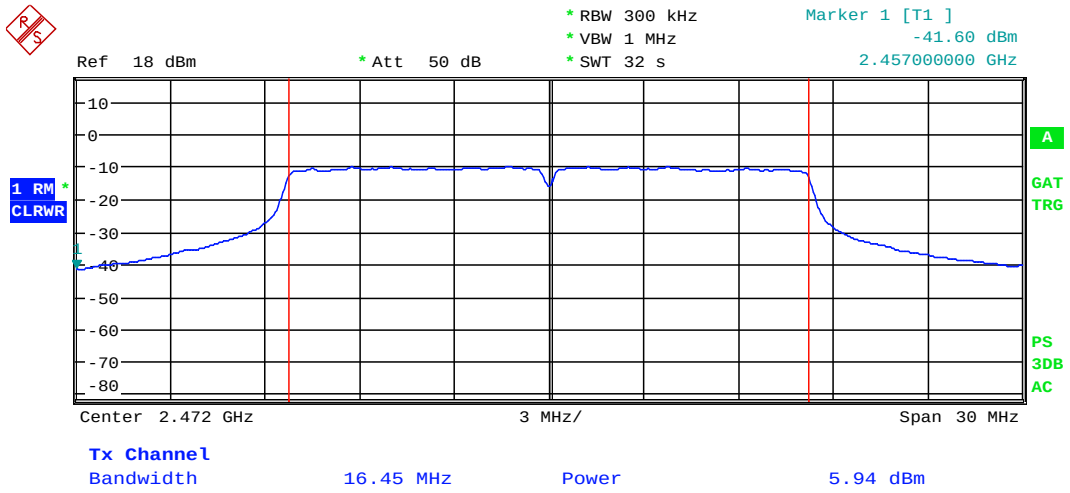
Graph 3.3.3



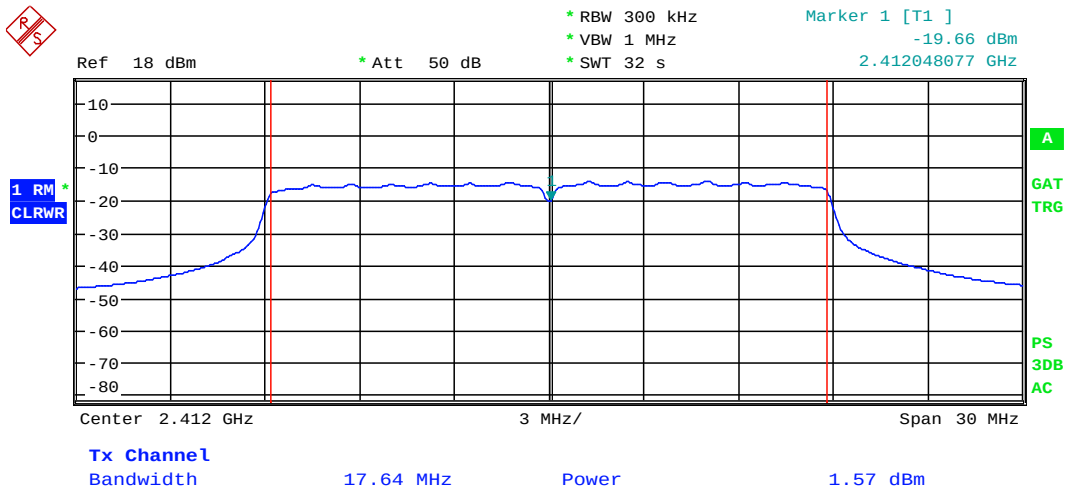
Graph 3.3.4



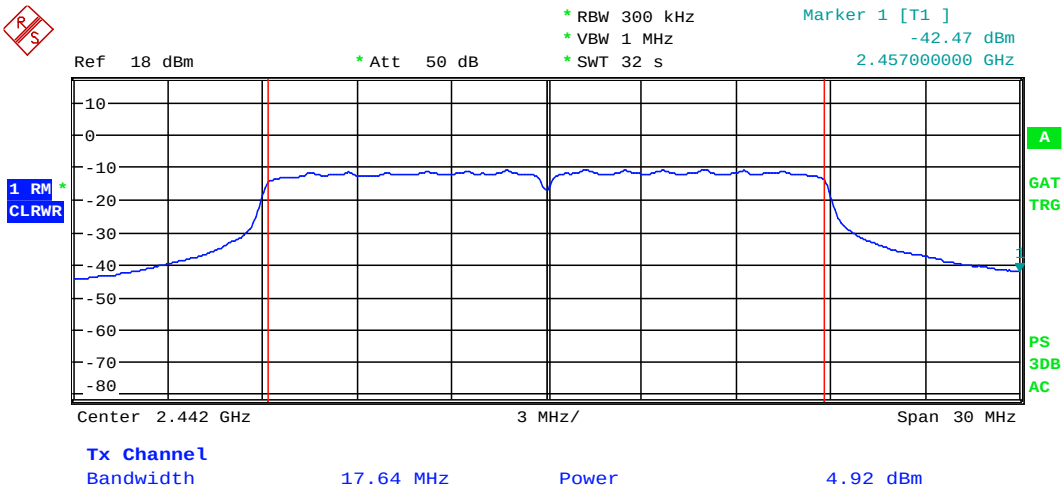
Graph 3.3.5



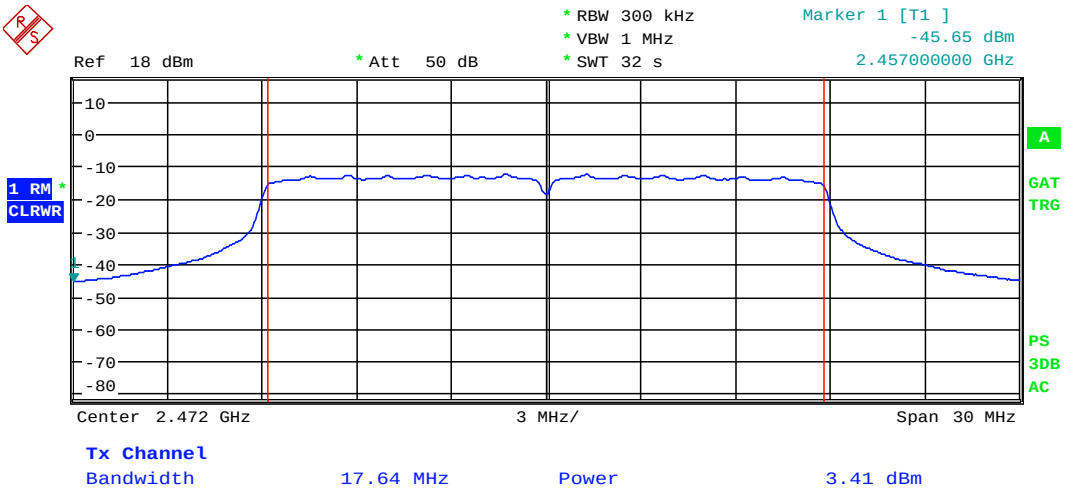
Graph 3.3.6



Graph 3.3.7



Graph 3.3.8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VBW 1 MHz
SWT 32 s
Marker 1 [T1]
-45.65 dBm
2.457000000 GHz
Ref 18 dBm
Att 50 dB
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1 RM
CLRWR
A
GAT
TRG
PS
3DB
AC
Center 2.472 GHz
3 MHz/
Span 30 MHz
Tx Channel
Bandwidth
17.64 MHz
Power
3.41 dBm

Graph 3.3.9

3.4 Power spectral density

Test result: **Pass**

Max. Margin: 22.3dB below the limits

Notes: Average Power Spectral Density was used.
Measurements were performed for each modulation at low, middle and upper channels

802.11b

Power Output:	☒ Conducted Average		☐ Radiated		
	Measured Density dBm	**Power Density at Antenna dBm**	**Calculated Power Spectral Density (dBm) at RBW 3kHz**	**Limit dBm**	**Margin dB**
Low Frequency Channel	-16.7	-16.2	0	8	-24.2
Middle Frequency Channel	-14.8	-14.3	0	8	-22.3
Upper Frequency Channel	-15.0	-14.5	0	8	-22.5
Analyzer Settings:	☒ RBW=3KHz ☒ VBW=10KHz ☒ Span=30MHz ☒ Sweep=20.5sec				
Antenna Gain:	☒ < 6dBi and = 1.9dBi ☐ >6dBi and = dBi, limit reduction = dB				

Notes: The Power Spectral Density at Antenna was calculated adding the cable loss of 0.5dB from the measured density value.

Graphs 3.4.1, 3.4.2, 3.4.3 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	-30.9	-30.4	0	8	-38.4
Upper Frequency Channel	-31.4	-30.9	0	8	-22.9
Analyzer Settings:	☒ RBW=30KHz ☒ VBW=10KHz ☒ Span=30MHz ☒ Sweep=20.5sec				
Antenna Gain:	☒ < 6dBi and = 1.9dBi ☐ >6dBi and = dBi, limit reduction = dB				

Notes: The Power Spectral Density at Antenna was calculated adding the cable loss of 0.5dB from the measured density value.

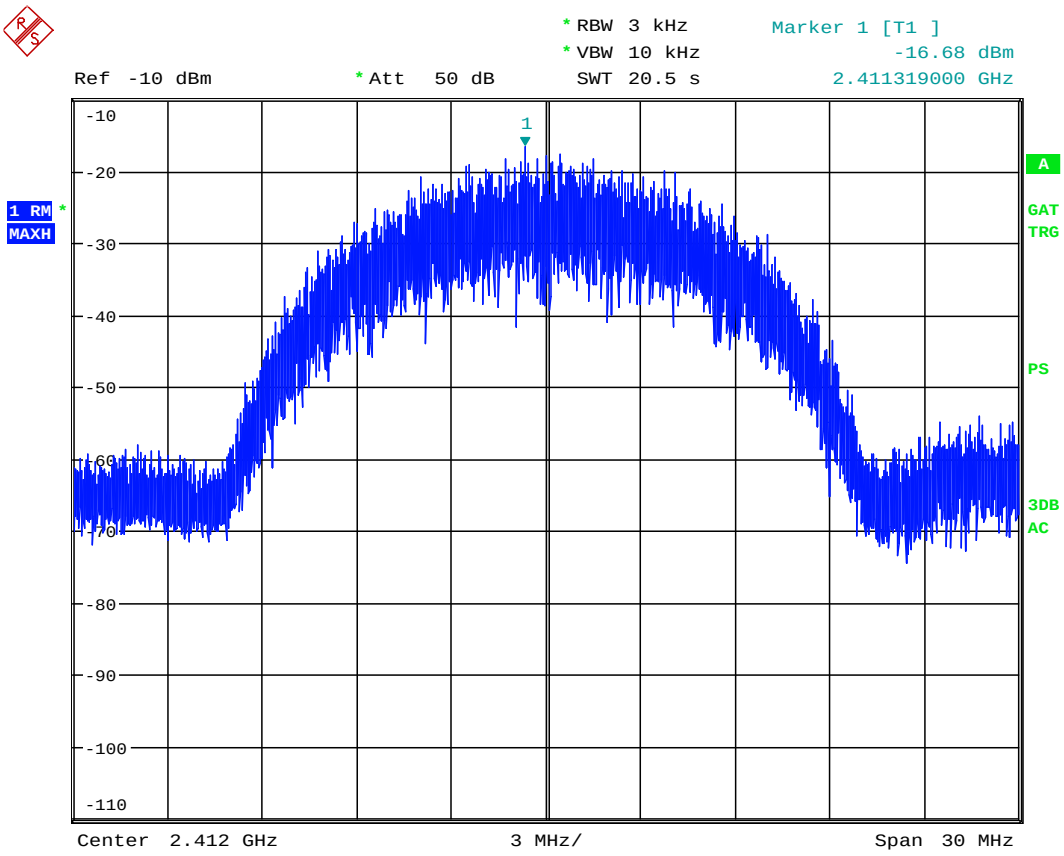
Graphs 3.4.4, 3.4.5 for 802.11g

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	-30.4	-29.9	0	8	-37.9
Middle Frequency Channel	-28.4	-27.9	0	8	-35.9
Upper Frequency Channel	-29.4	-28.9	0	8	-36.9
Analyzer Settings:	☒ RBW=3KHz ☒ VBW=10KHz ☒ Span=30MHz ☒ Sweep=20.5sec				
Antenna Gain:	☒ < 6dBi and = 1.9dBi ☐ >6dBi and = dBi, limit reduction = dB				

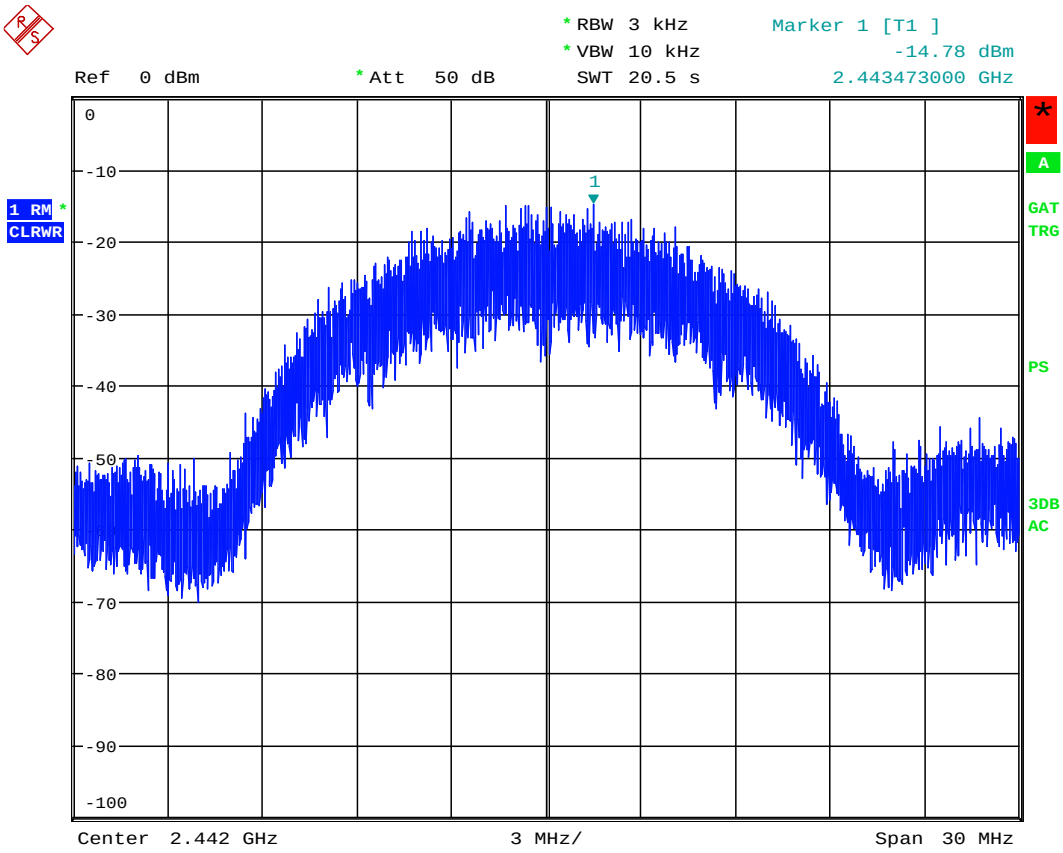
Notes: The Power Spectral Density at Antenna was calculated adding the cable loss of 0.5dB from the measured density value.

Graphs 3.4.6, 3.4.7, 3.4.8 for 802.11n

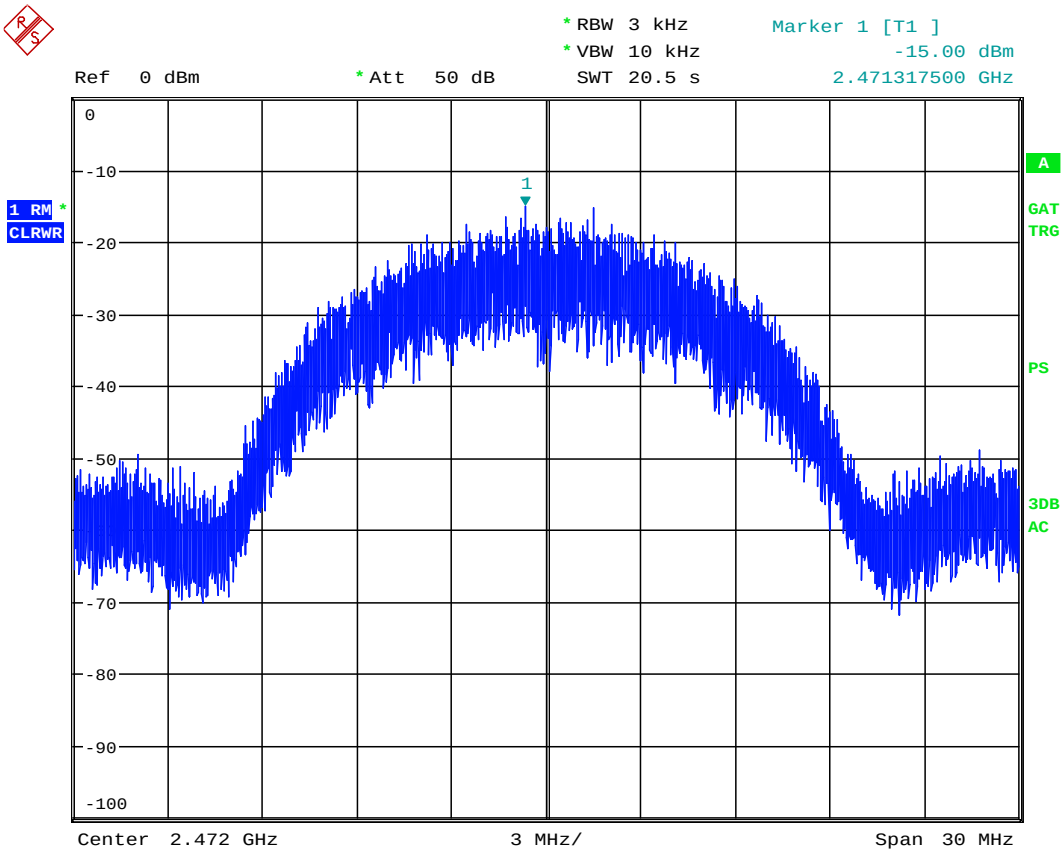


Date: 27.APR.2017 12:34:57

Graph 3.4.1

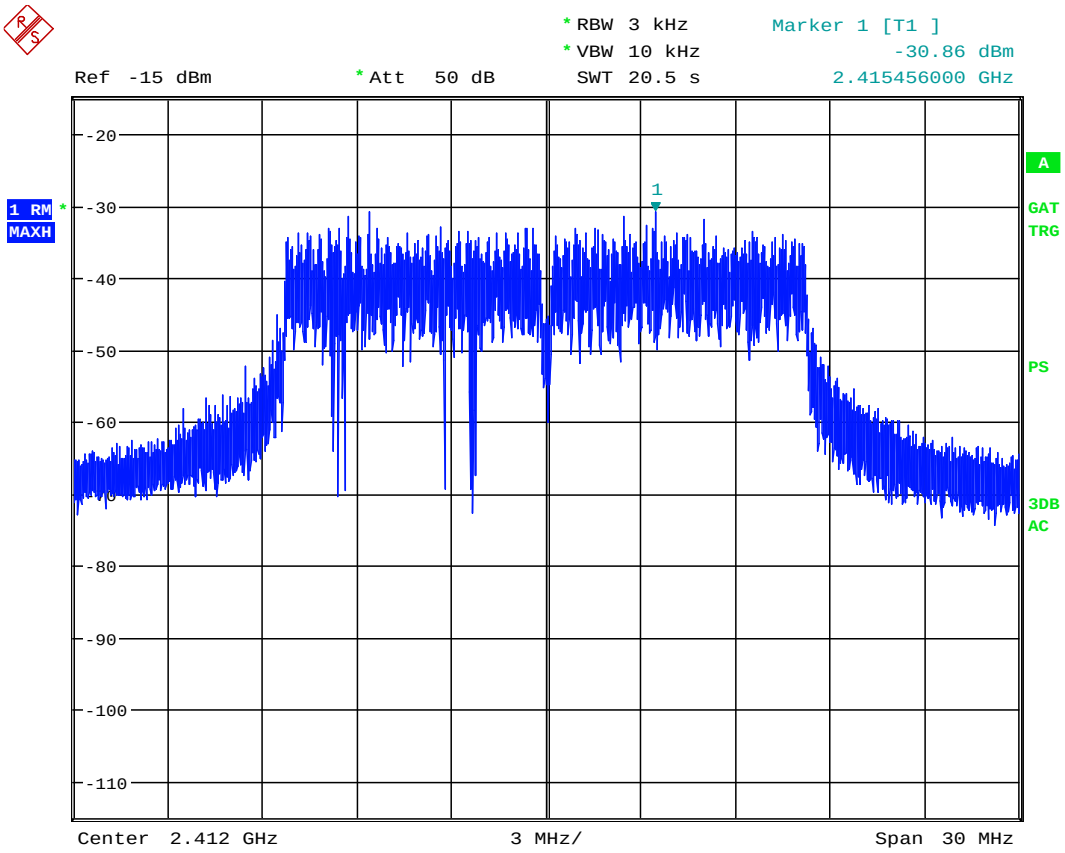

*RBW 3 kHz
*VBW 10 kHz
SWT 20.5 s
Marker 1 [T1]
-14.78 dBm
2.443473000 GHz
Ref 0 dBm
*Att 50 dB
1 RM *
CLRWR
GAT
TRG
PS
3DB
AC
0
-10
-20
-30
-40
-50
-70
-80
-90
-100
Center 2.442 GHz
3 MHz/
Span 30 MHz
Date: 27.APR.2017 12:37:35

Graph 3.4.2



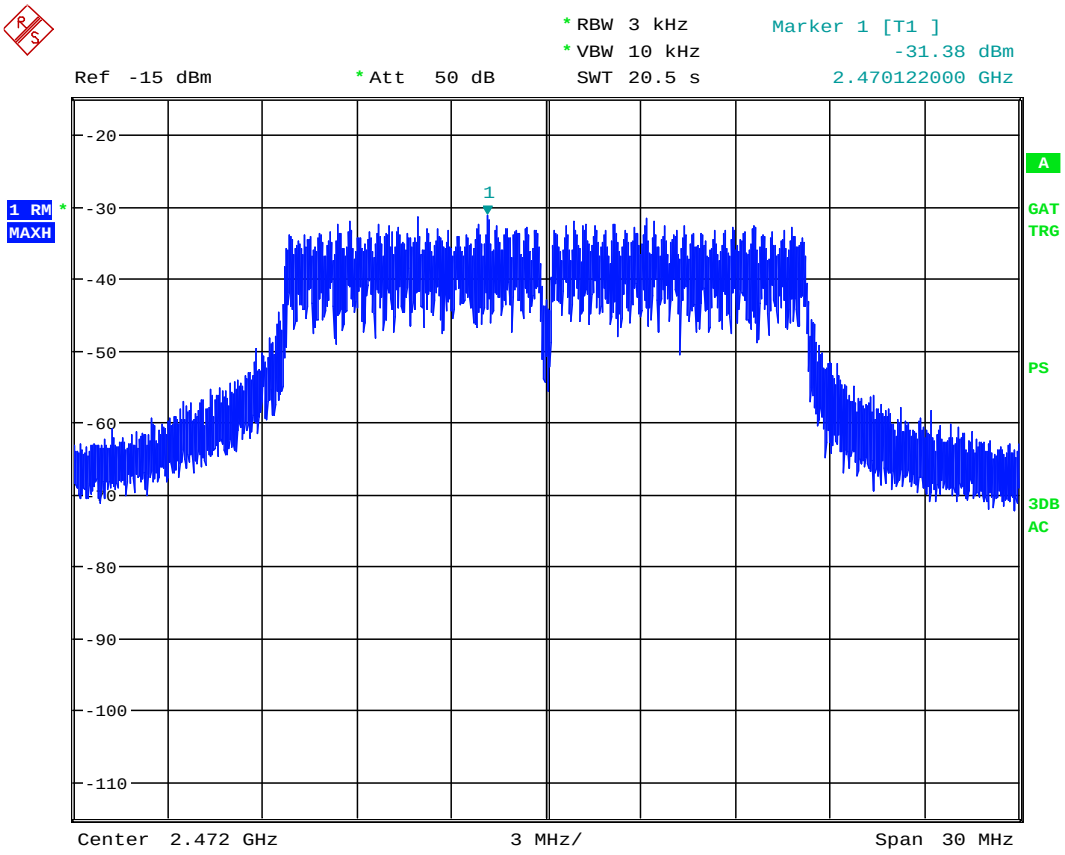
Date: 27.APR.2017 12:38:34

Graph 3.4.3



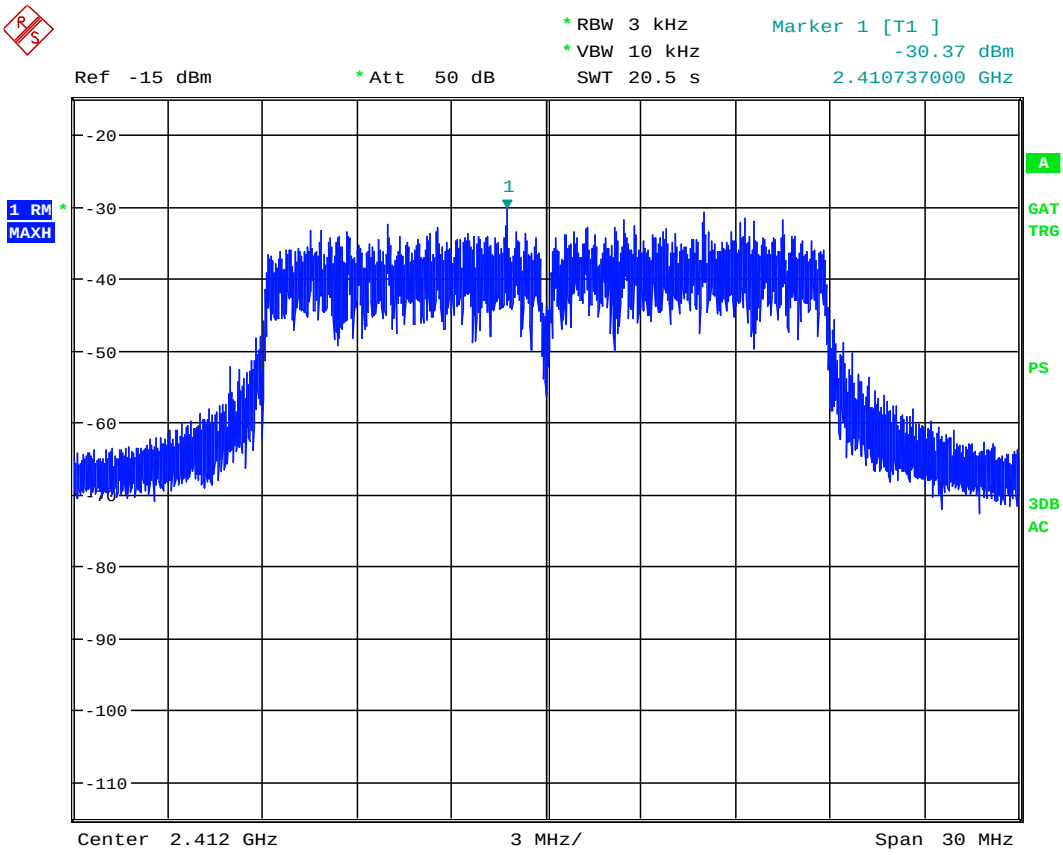
Date: 27.APR.2017 12:32:16

Graph 3.4.4



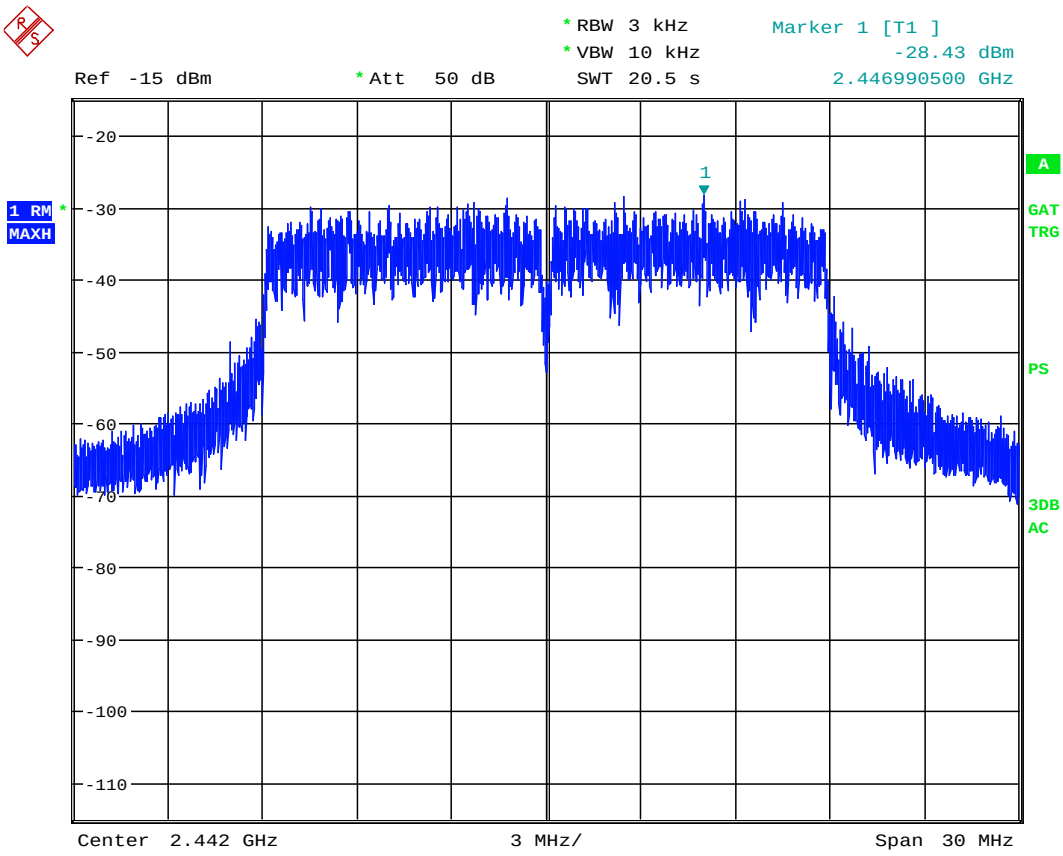
Date: 27.APR.2017 12:28:45

Graph 3.4.5



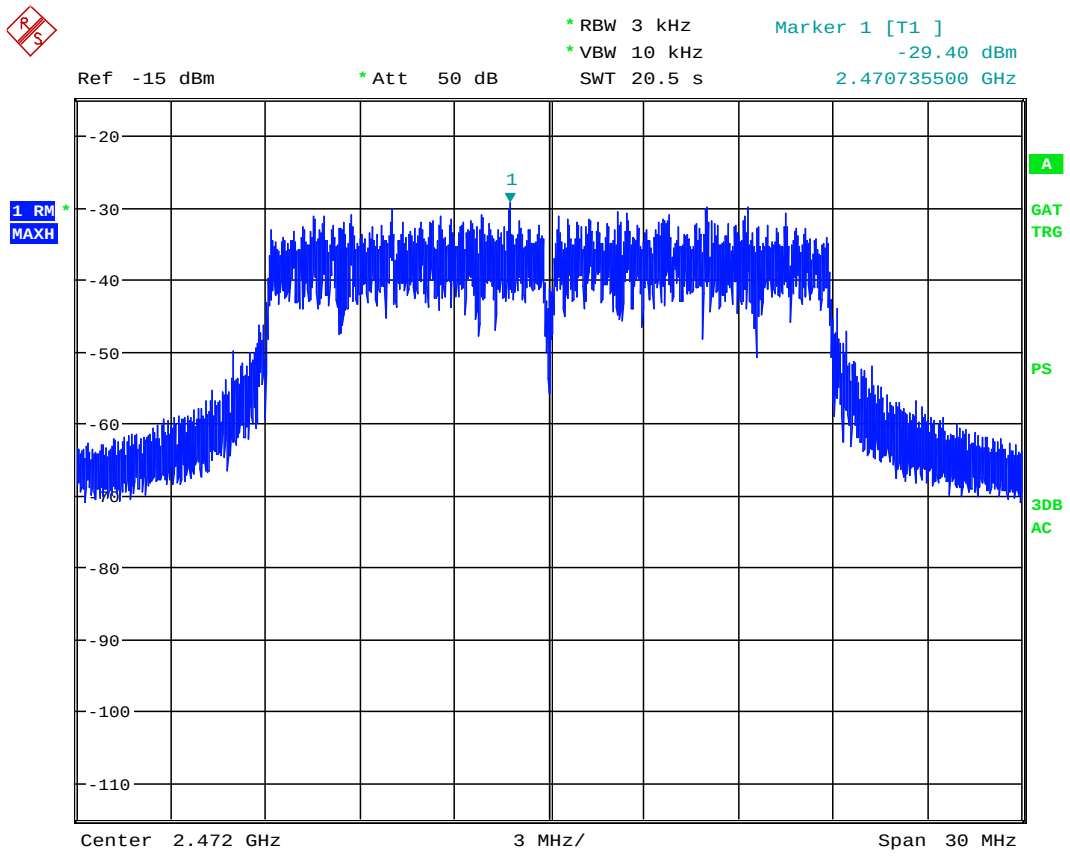
Date: 27.APR.2017 12:19:55

Graph 3.4.6



Date: 27.APR.2017 12:23:19

Graph 3.4.7



Date: 27.APR.2017 12:26:42

Graph 3.4.8

3.5 Antenna conducted spurious emissions

802.11b

	Minimum Measured Attenuation dB	Minimum Allowed Attenuation dB	Margin dB
Low Frequency Channel	-46.8	-20	-26.8
Middle Frequency Channel	-45.6	-20	-25.6
Upper Frequency Channel	-47.6	-20	-27.6
Analyzer Settings:	☒ RBW=100kHz; VBW=300kHz		
Minimum Allowed Attenuation:	☒ 20dB ☐ 30dB (for digital systems with conducted power measured using RMS averaging over a time interval)		

802.11g

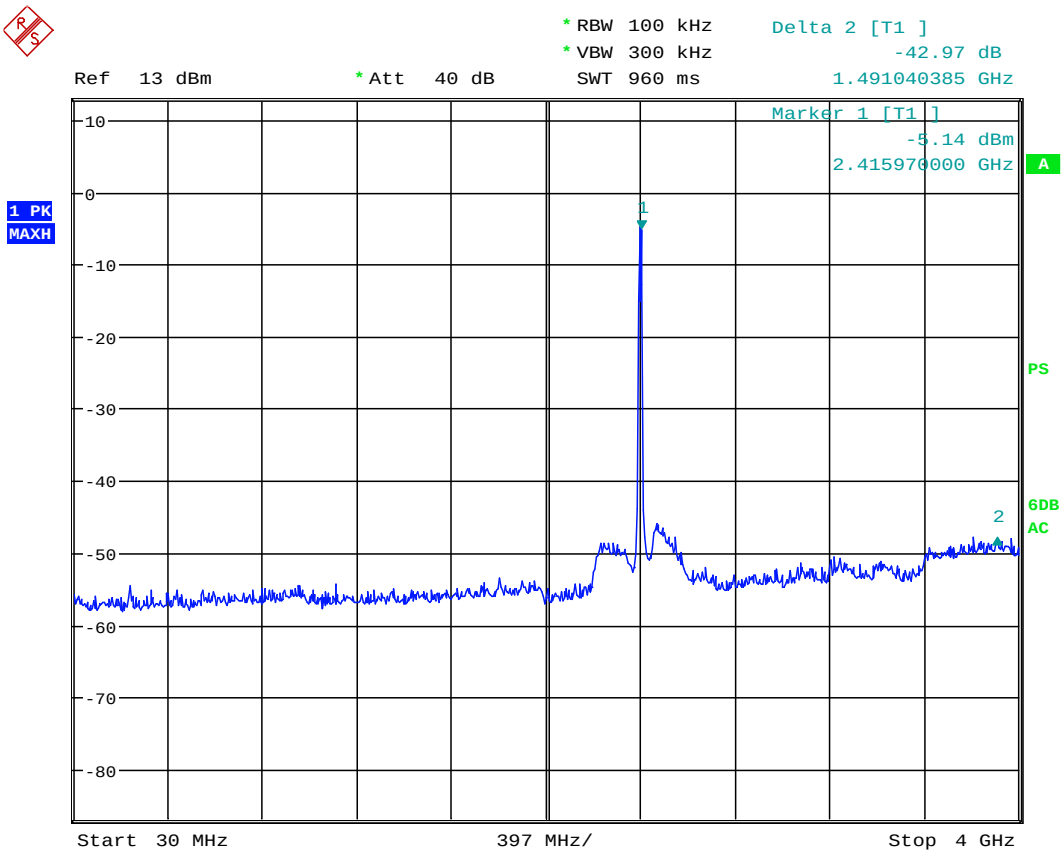
	Minimum Measured Attenuation dB	Minimum Allowed Attenuation dB	Margin dB
Low Frequency Channel	-39.7	-20	-19.7
Middle Frequency Channel	-42.3	-20	-22.3
Upper Frequency Channel	-41.3	-20	-21.3
Analyzer Settings:	☒ RBW=100kHz; VBW=300kHz		
Minimum Allowed Attenuation:	☒ 20dB ☐ 30dB (for digital systems 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	-37.7	-20	-17.7
Middle Frequency Channel	-40.5	-20	-20.5
Upper Frequency Channel	-35.9	-20	-15.9
Analyzer Settings:	☒ RBW=100kHz; VBW=300kHz		
Minimum Allowed Attenuation:	☒ 20dB ☐ 30dB (for digital systems with conducted power measured using RMS averaging over a time interval)		

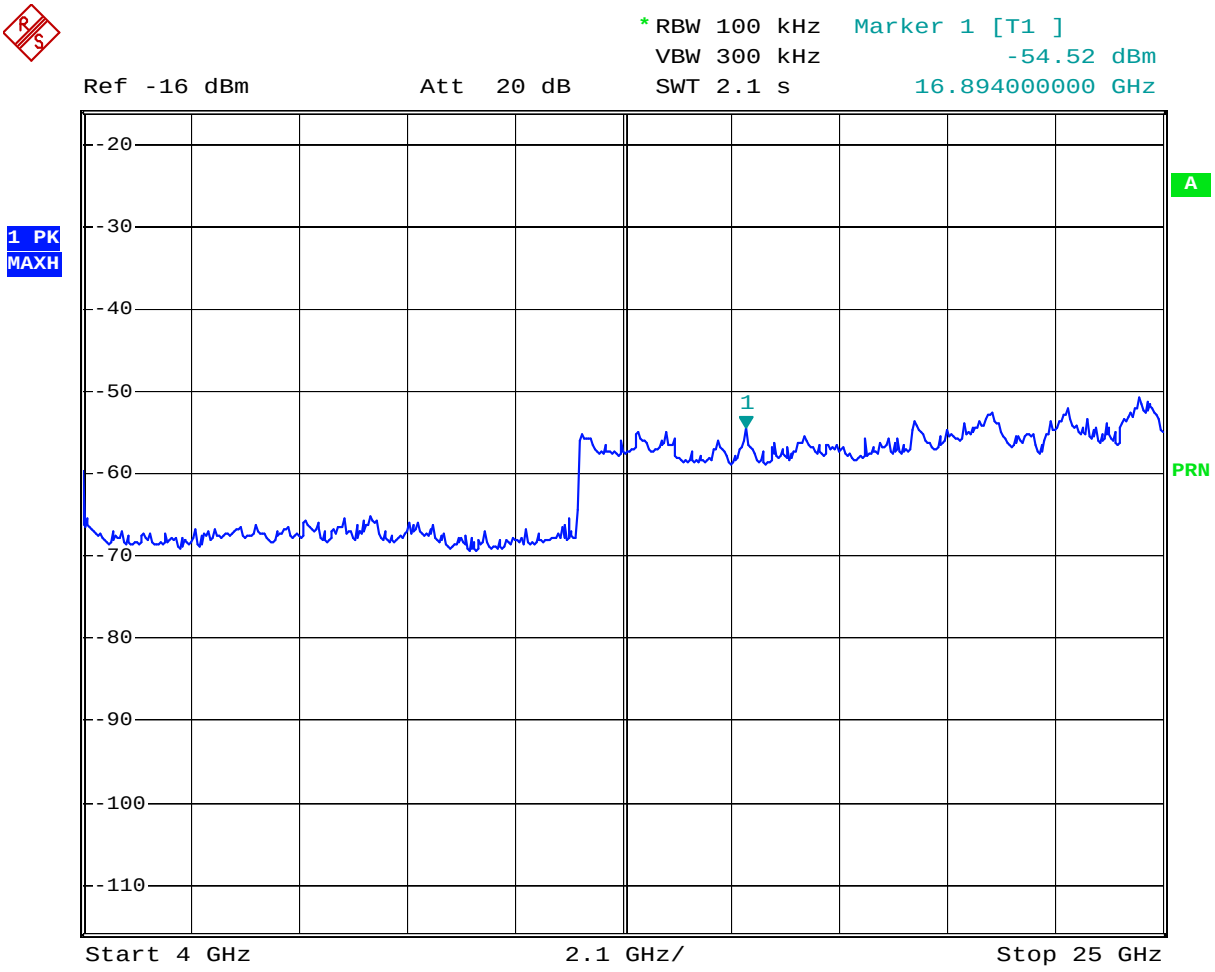
Notes:

Graphs 3.5.1 - 3.5.6 show antenna conducted spurious emissions for 802.11b
Graphs 3.5.7 - 3.5.12 show antenna conducted spurious emissions for 802.11g
Graphs 3.5.13 - 3.5.18 show antenna conducted spurious emissions for 802.11n
Graph 3.5.19 and 3.5.20 show band edge compliance for 802.11b
Graph 3.5.21, and 3.5.22 show band edge compliance for 802.11g
Graph 3.5.23, and 3.5.24 show band edge compliance for 802.11n



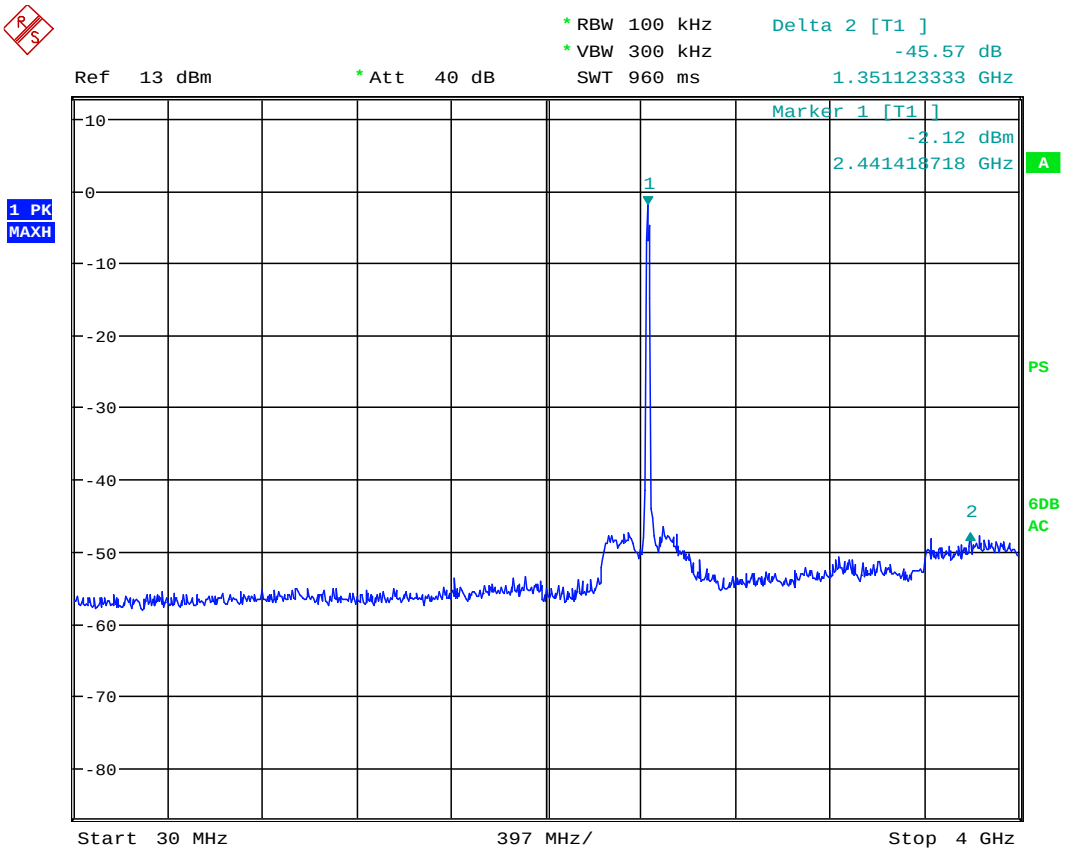
Date: 24.APR.2017 13:58:54

Graph 3.5.1

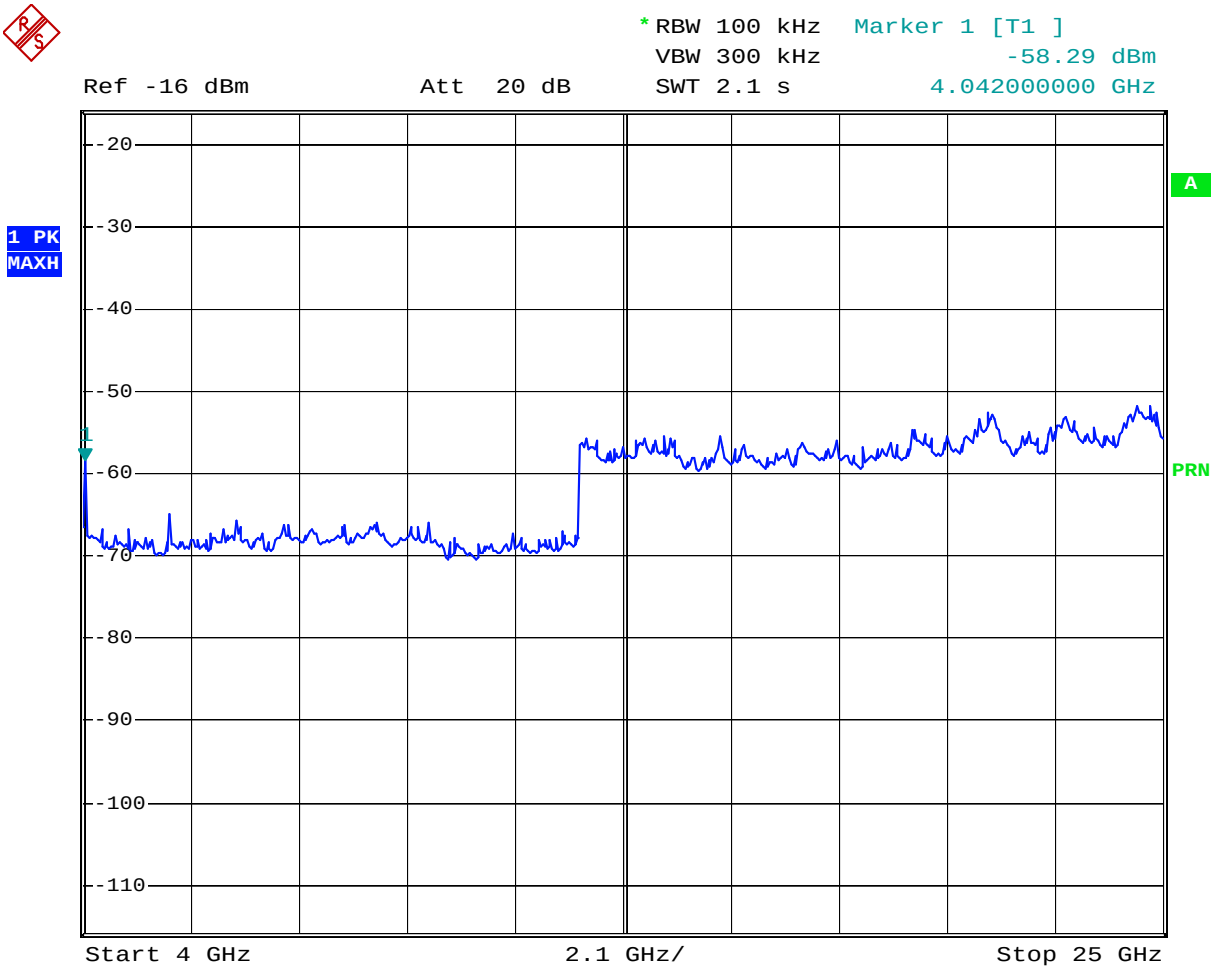


Date: 2.MAR.2000 05:32:09

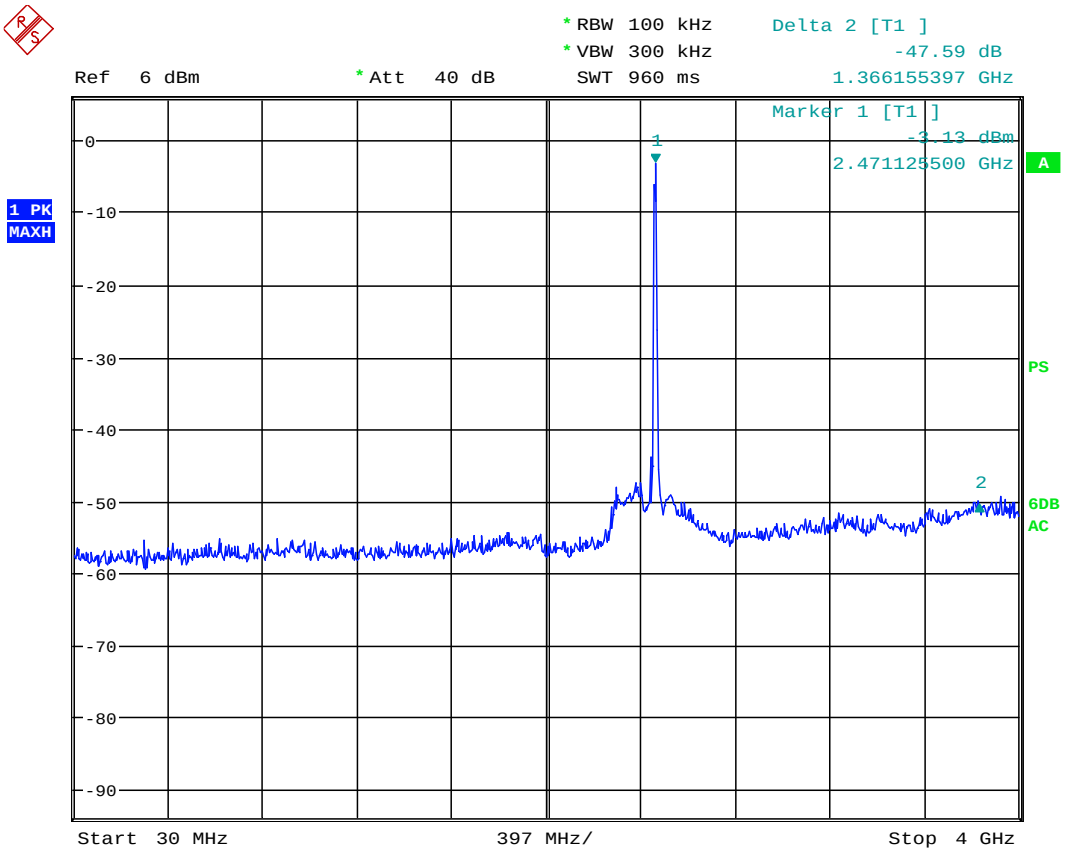
Graph 3.5.2


*RBW 100 kHz
*VBW 300 kHz
SWT 960 ms
Delta 2 [T1]
-45.57 dB
1.351123333 GHz
Ref 13 dBm
*Att 40 dB
Marker 1 [T1]
-2.12 dBm
2.441418718 GHz
1 PK
MAXH
A
PS
6DB
AC
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 30 MHz
397 MHz/
Stop 4 GHz
Date: 24.APR.2017 14:20:34

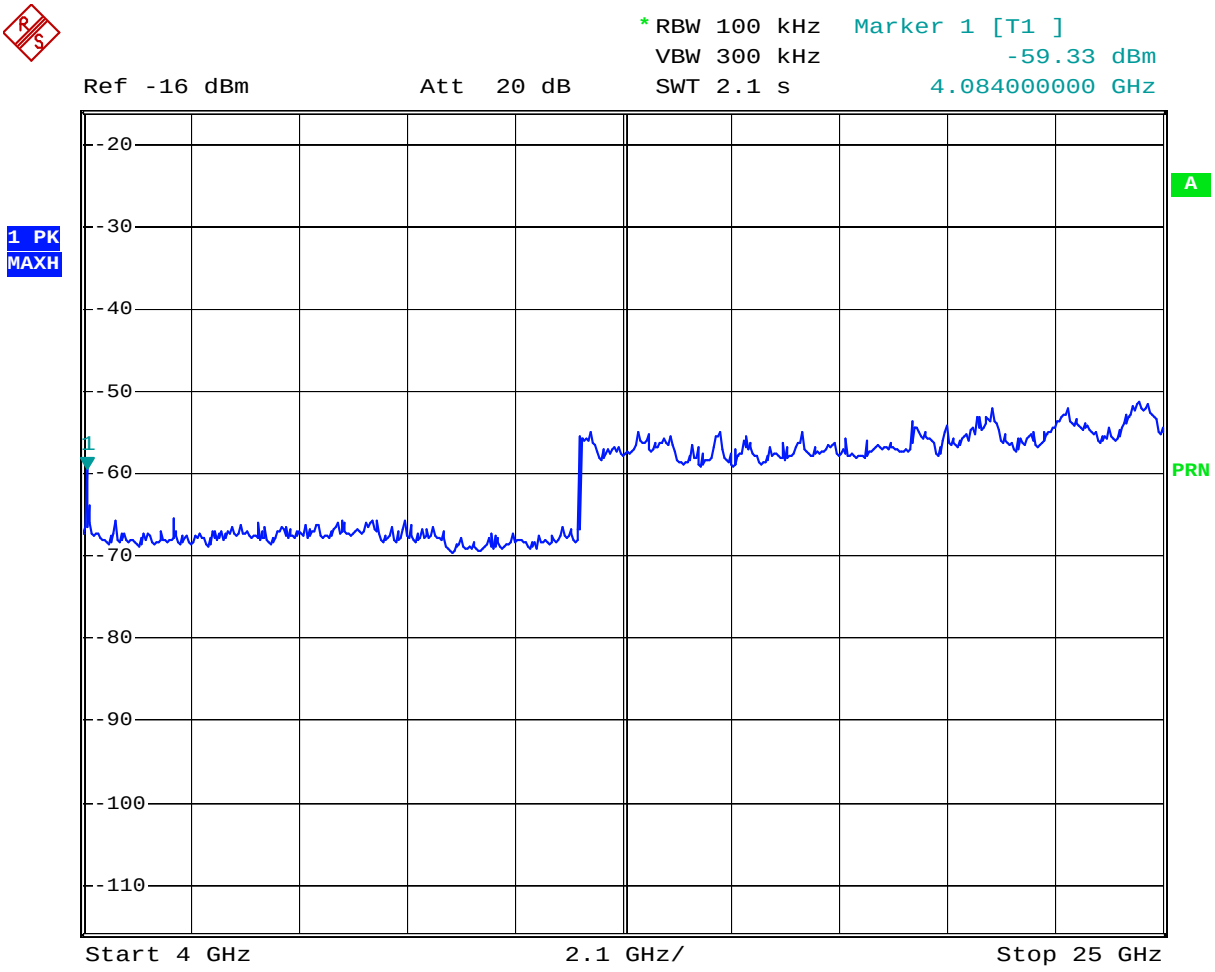
Graph 3.5.3


*RBW 100 kHz
VBW 300 kHz
SWT 2.1 s
Marker 1 [T1]
-58.29 dBm
4.042000000 GHz
Ref -16 dBm
Att 20 dB
1 PK
MAXH
A
PRN
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
Start 4 GHz
2.1 GHz/
Stop 25 GHz
Date: 2.MAR.2000 07:08:39

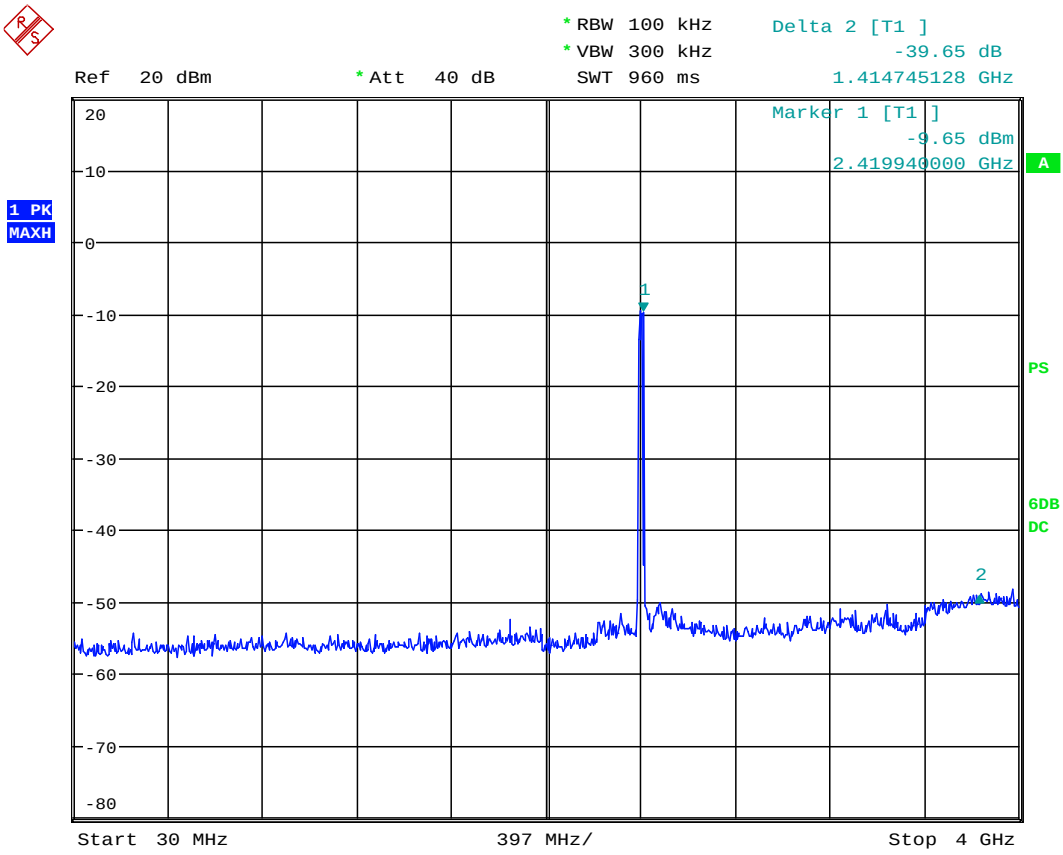
Graph 3.5.4


RBW 100 kHz
VBW 300 kHz
SWT 960 ms
Delta 2 [T1]
-47.59 dB
1.366155397 GHz
Ref 6 dBm
Att 40 dB
Marker 1 [T1]
-3.13 dBm
2.471125500 GHz
1 PK
MAXH
A
PS
6DB
AC
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Start 30 MHz
397 MHz/
Stop 4 GHz
Date: 24.APR.2017 15:32:30

Graph 3.5.5

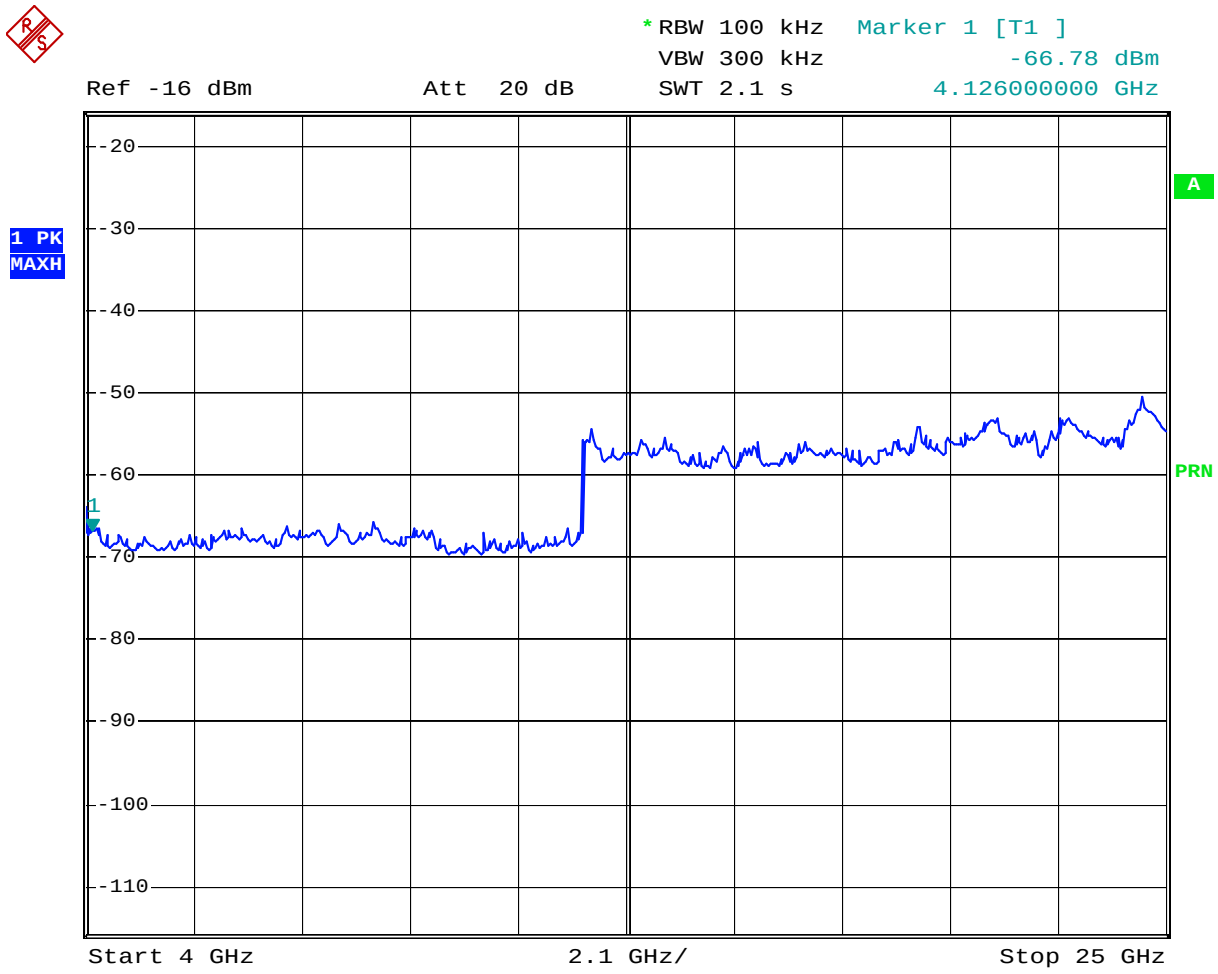

*RBW 100 kHz
VBW 300 kHz
SWT 2.1 s
Marker 1 [T1]
-59.33 dBm
4.084000000 GHz
Ref -16 dBm
Att 20 dB
1 PK
MAXH
A
PRN
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
Start 4 GHz
2.1 GHz/
Stop 25 GHz
Date: 2.MAR.2000 07:06:36

Graph 3.5.6

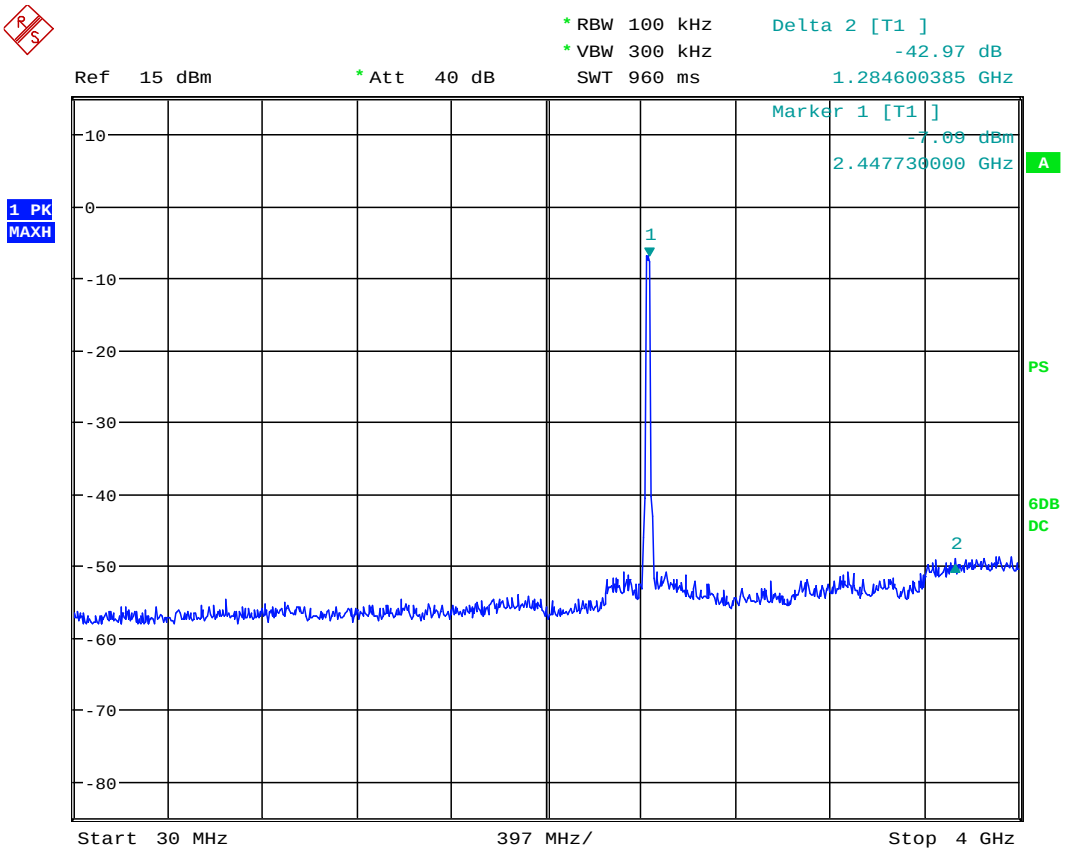


Date: 25.APR.2017 09:02:18

Graph 3.5.7

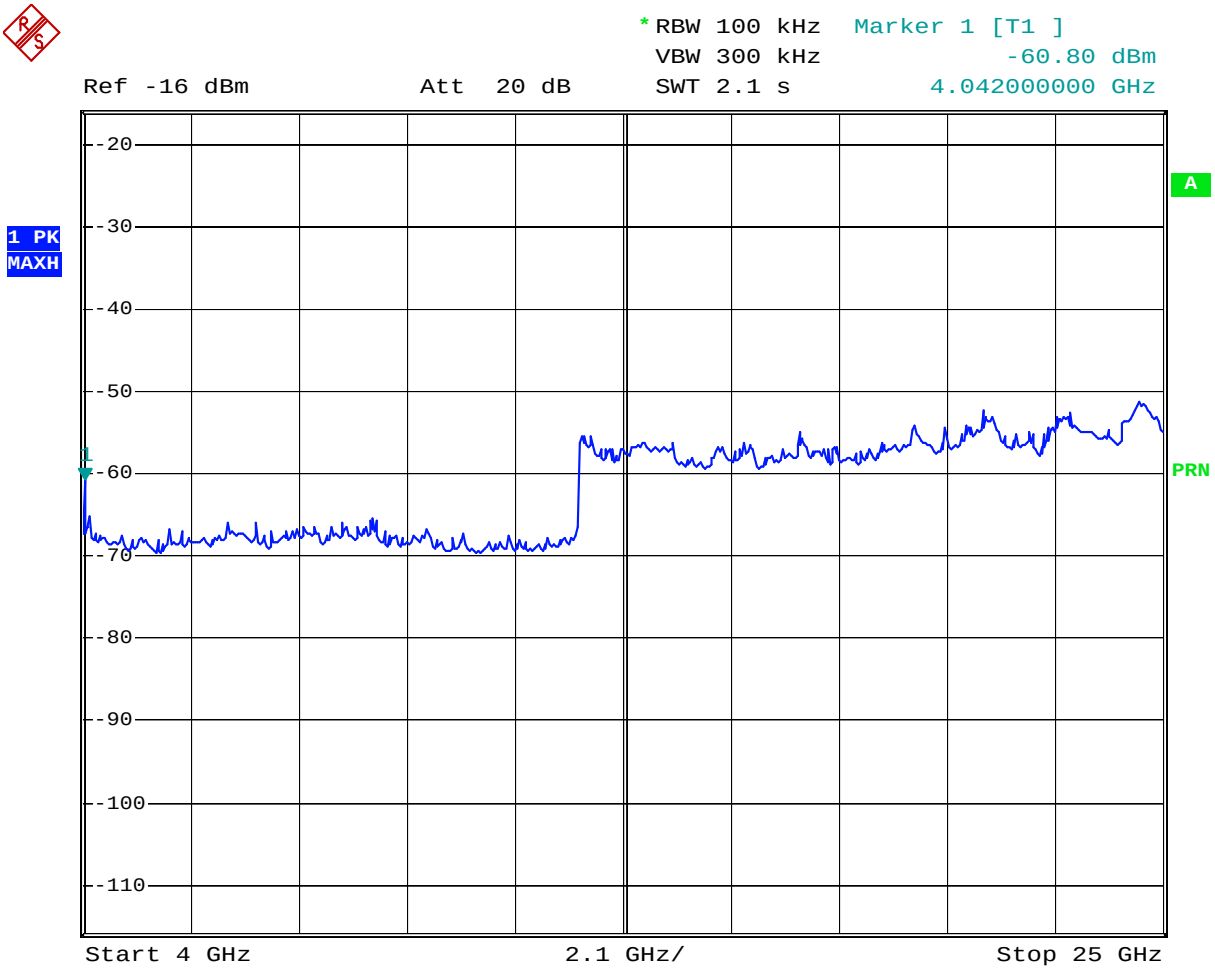

*RBW 100 kHz
VBW 300 kHz
SWT 2.1 s
Marker 1 [T1]
-66.78 dBm
4.126000000 GHz
Ref -16 dBm
Att 20 dB
1 PK
MAXH
A
PRN
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
Start 4 GHz
2.1 GHz/
Stop 25 GHz
Date: 3.MAR.2000 00:32:22

Graph 3.5.8

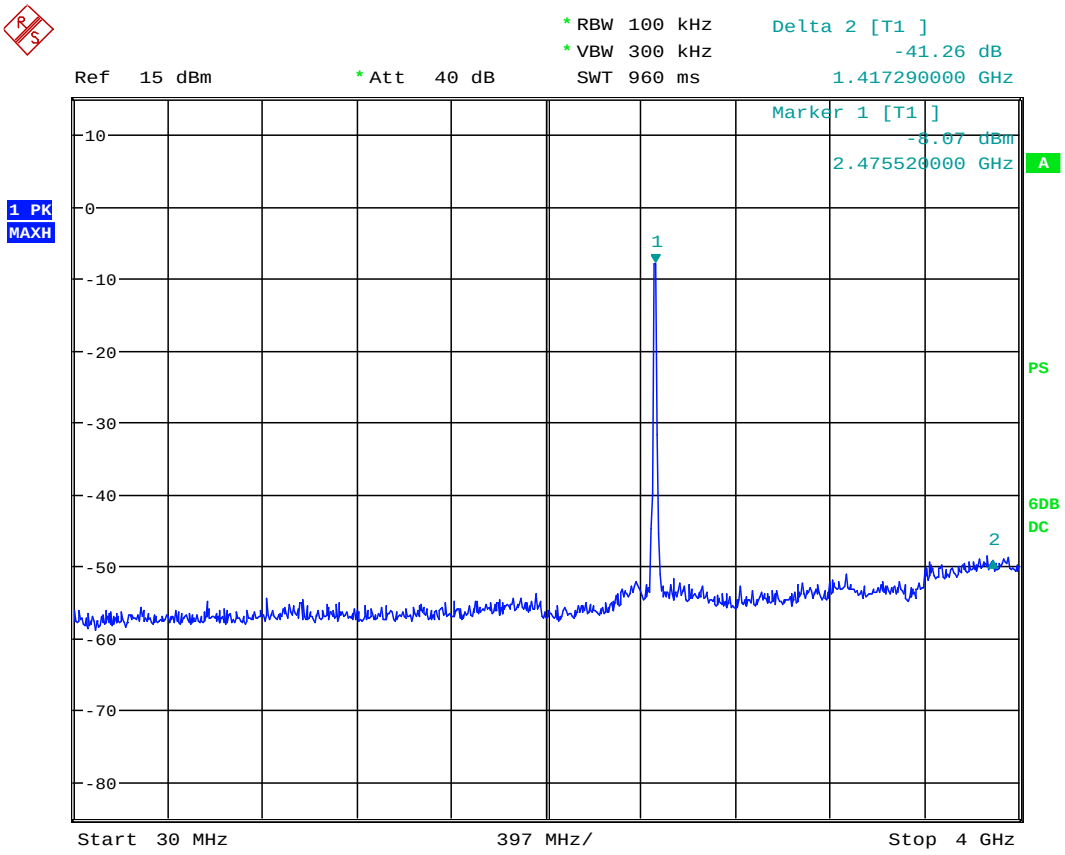


Date: 25.APR.2017 09:17:46

Graph 3.5.9

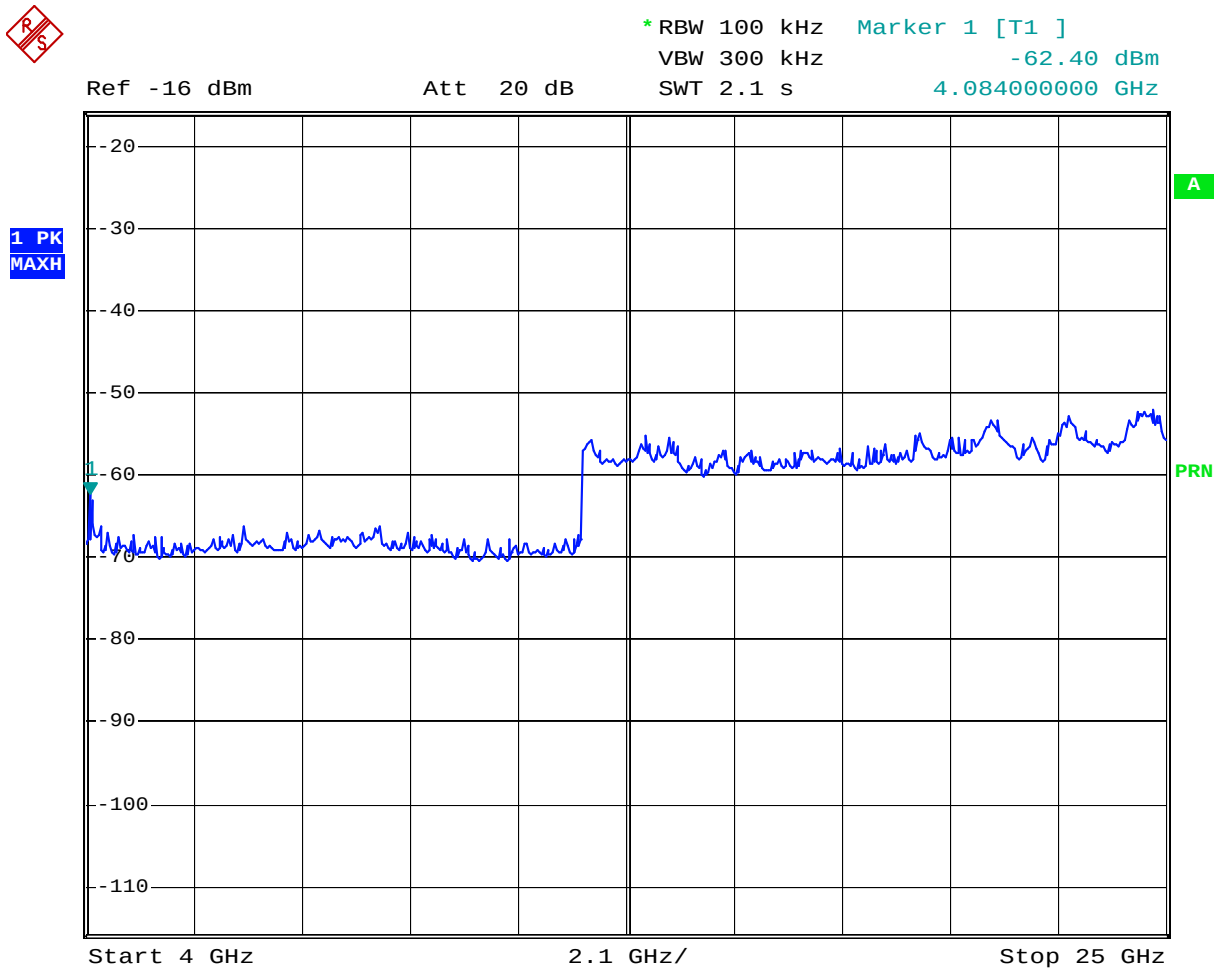

*RBW 100 kHz
VBW 300 kHz
SWT 2.1 s
Marker 1 [T1]
-60.80 dBm
4.042000000 GHz
Ref -16 dBm
Att 20 dB
1 PK
MAXH
A
PRN
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
Start 4 GHz
2.1 GHz/
Stop 25 GHz
Date: 3.MAR.2000 00:37:19

Graph 3.5.10

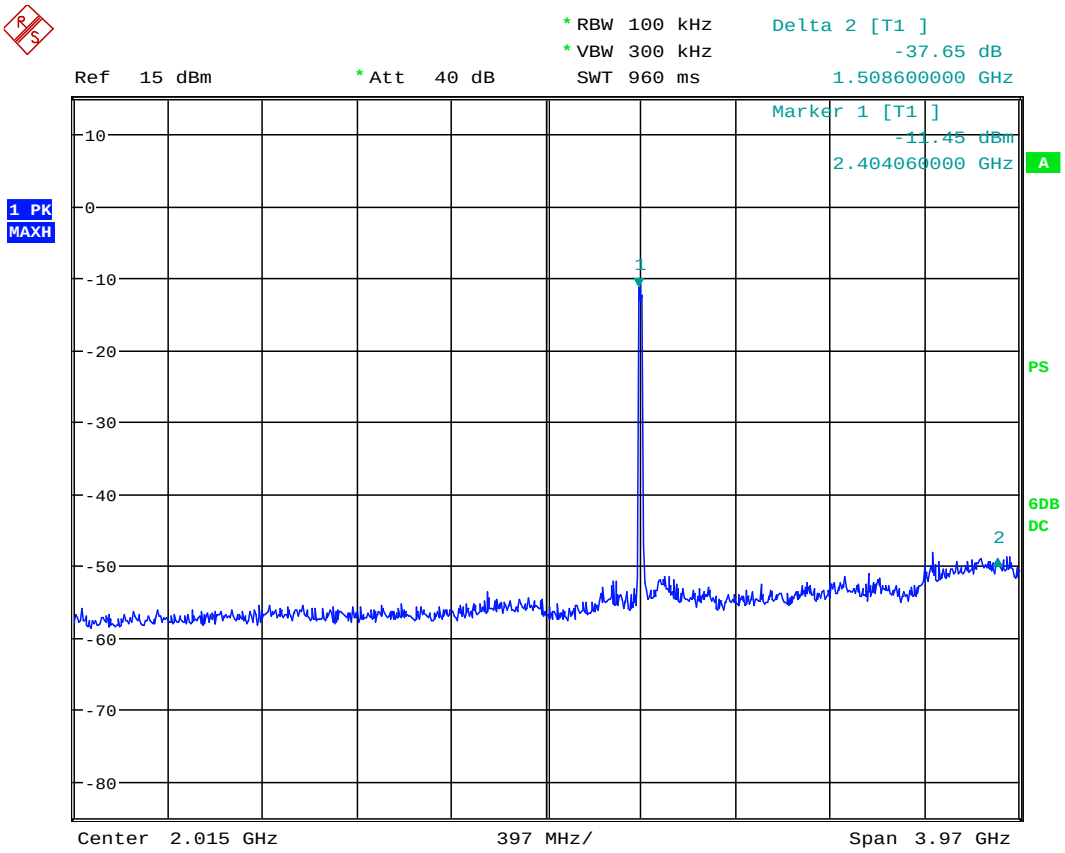


Date: 25.APR.2017 09:38:16

Graph 3.5.11

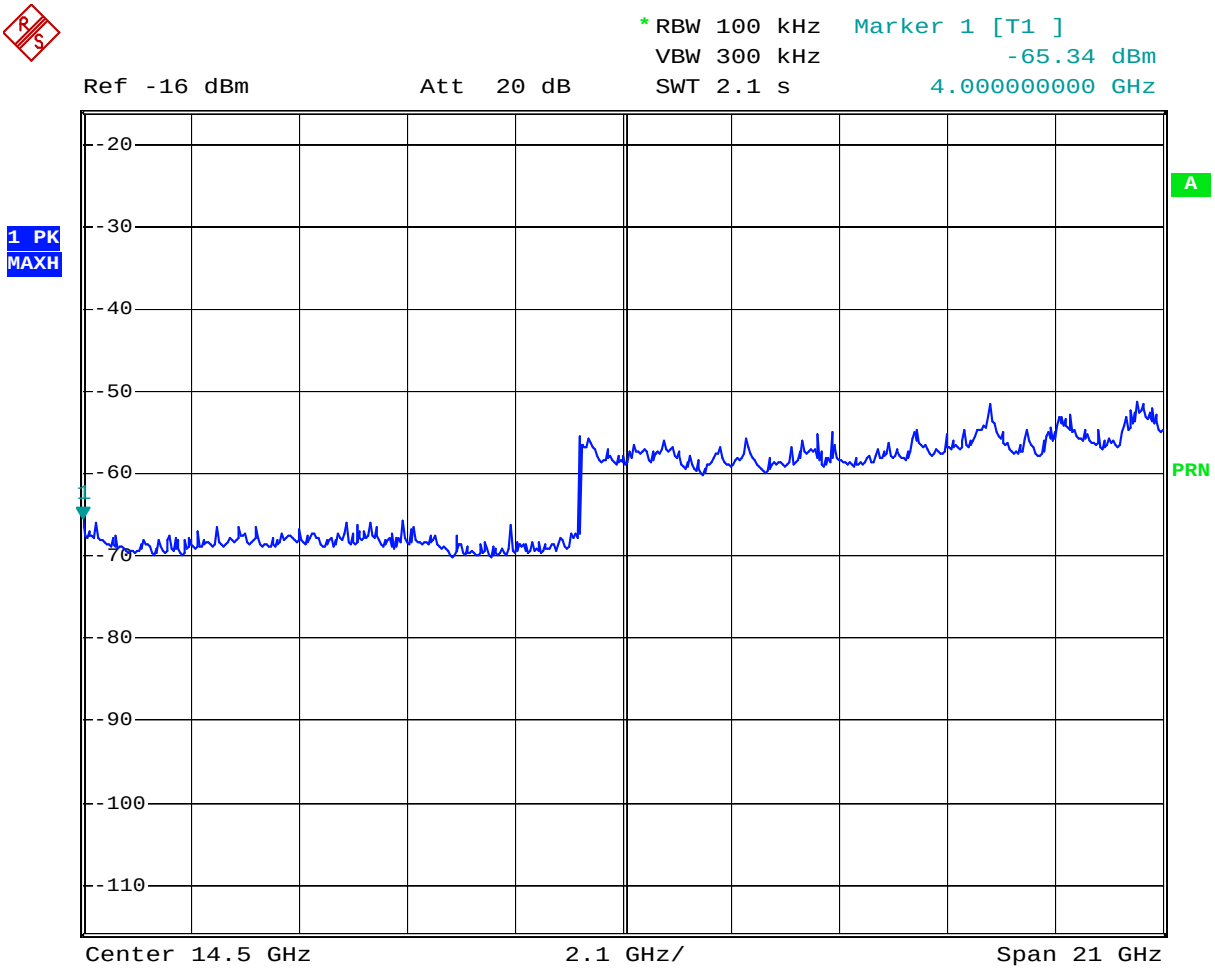

*RBW 100 kHz
VBW 300 kHz
SWT 2.1 s
Marker 1 [T1]
-62.40 dBm
4.084000000 GHz
Ref -16 dBm
Att 20 dB
1 PK
MAXH
A
PRN
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
Start 4 GHz
2.1 GHz/
Stop 25 GHz
Date: 3.MAR.2000 01:06:27

Graph 3.5.12

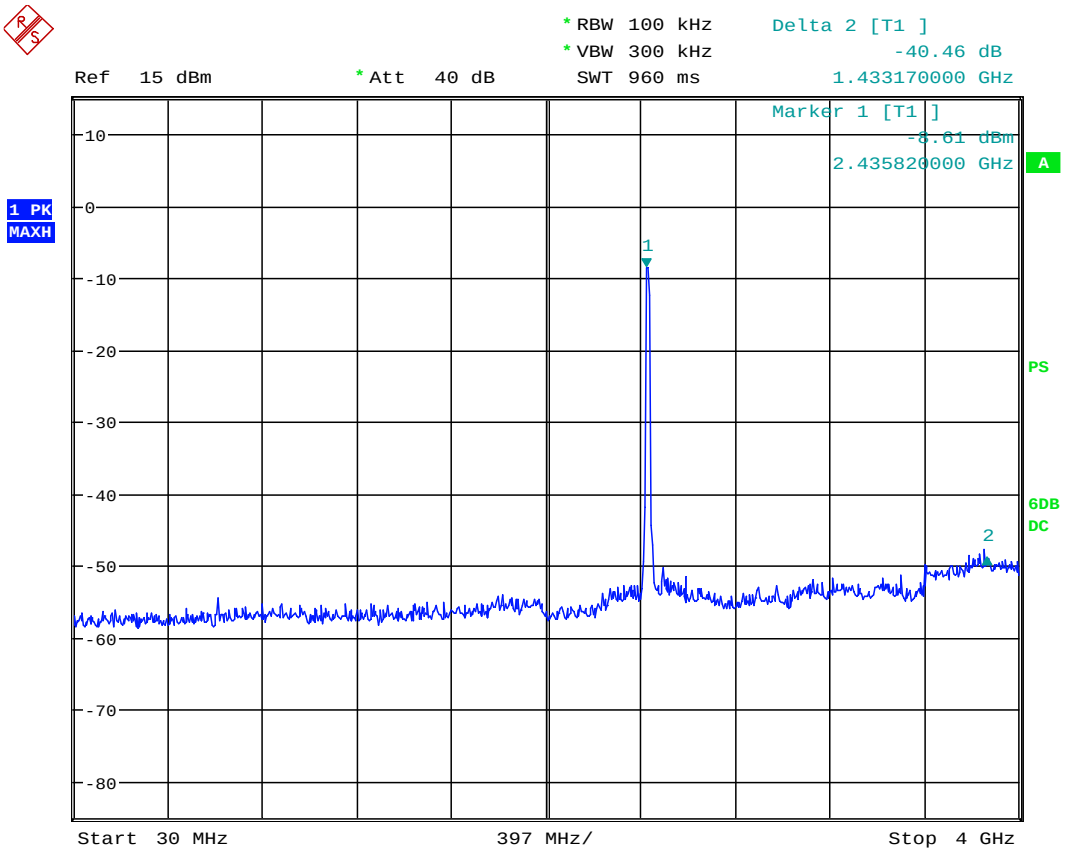


Date: 25.APR.2017 10:00:29

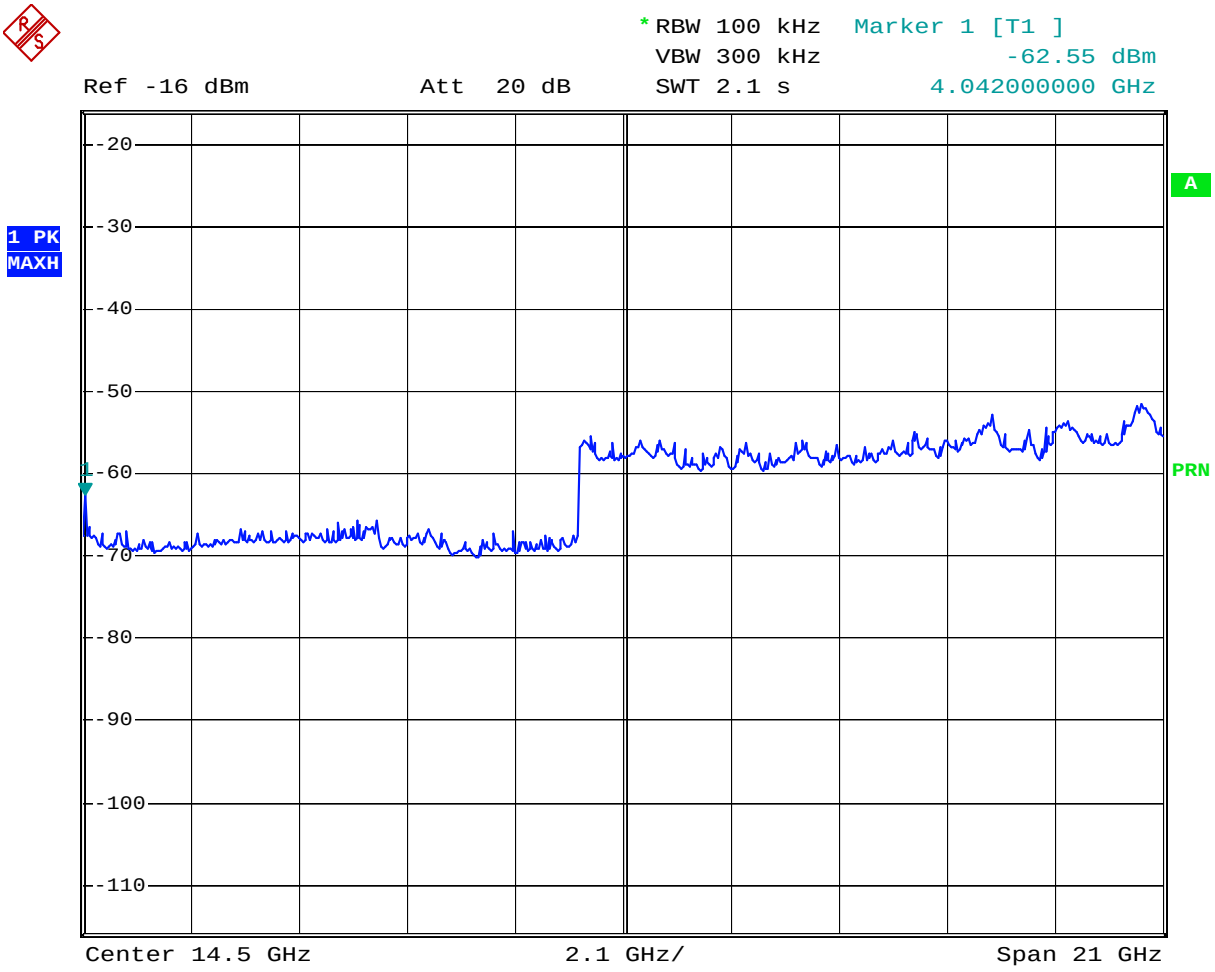
Graph 3.5.13


*RBW 100 kHz
Marker 1 [T1]
VBW 300 kHz
-65.34 dBm
Ref -16 dBm
Att 20 dB
SWT 2.1 s
4.000000000 GHz
1 PK
MAXH
A
PRN
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
Center 14.5 GHz
2.1 GHz/
Span 21 GHz
Date: 3.MAR.2000 01:29:10

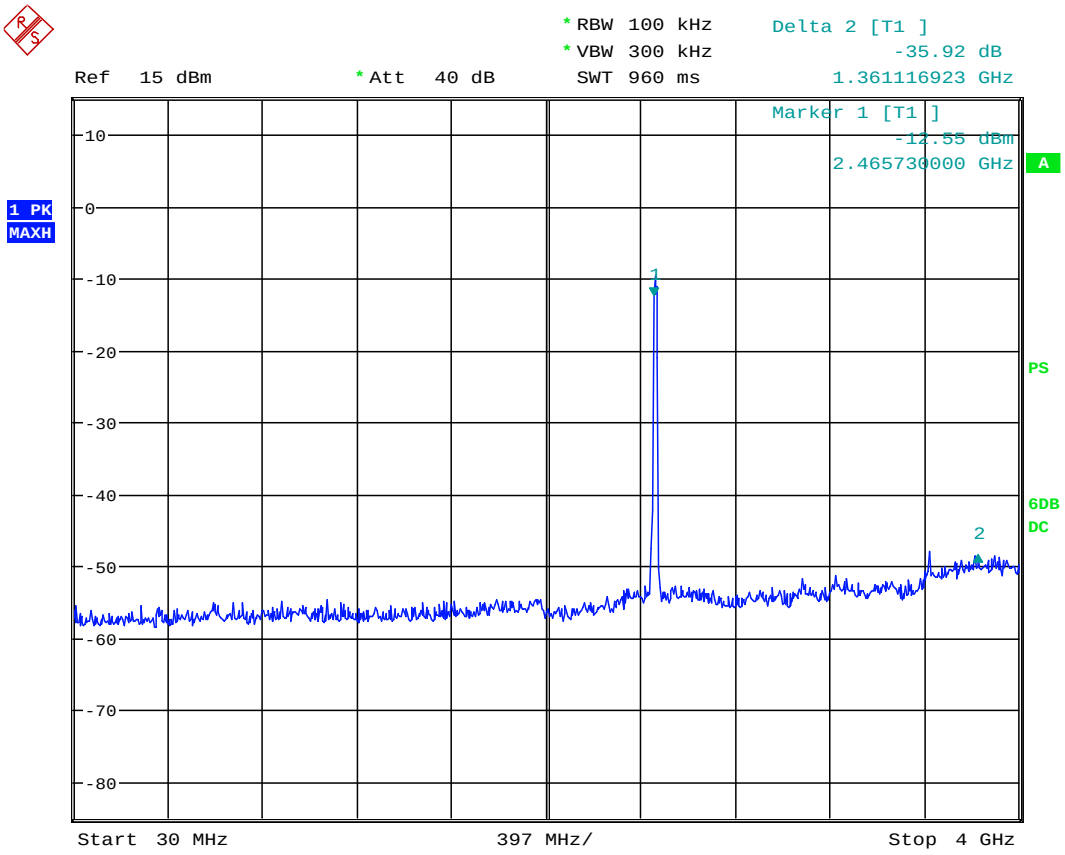
Graph 3.5.14


*RBW 100 kHz
*VBW 300 kHz
SWT 960 ms
Delta 2 [T1]
-40.46 dB
1.433170000 GHz
Ref 15 dBm
*Att 40 dB
Marker 1 [T1]
-8.61 dBm
2.435820000 GHz
1 PK
MAXH
A
PS
6DB
DC
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 30 MHz
397 MHz/
Stop 4 GHz
Date: 25.APR.2017 10:24:47

Graph 3.5.15

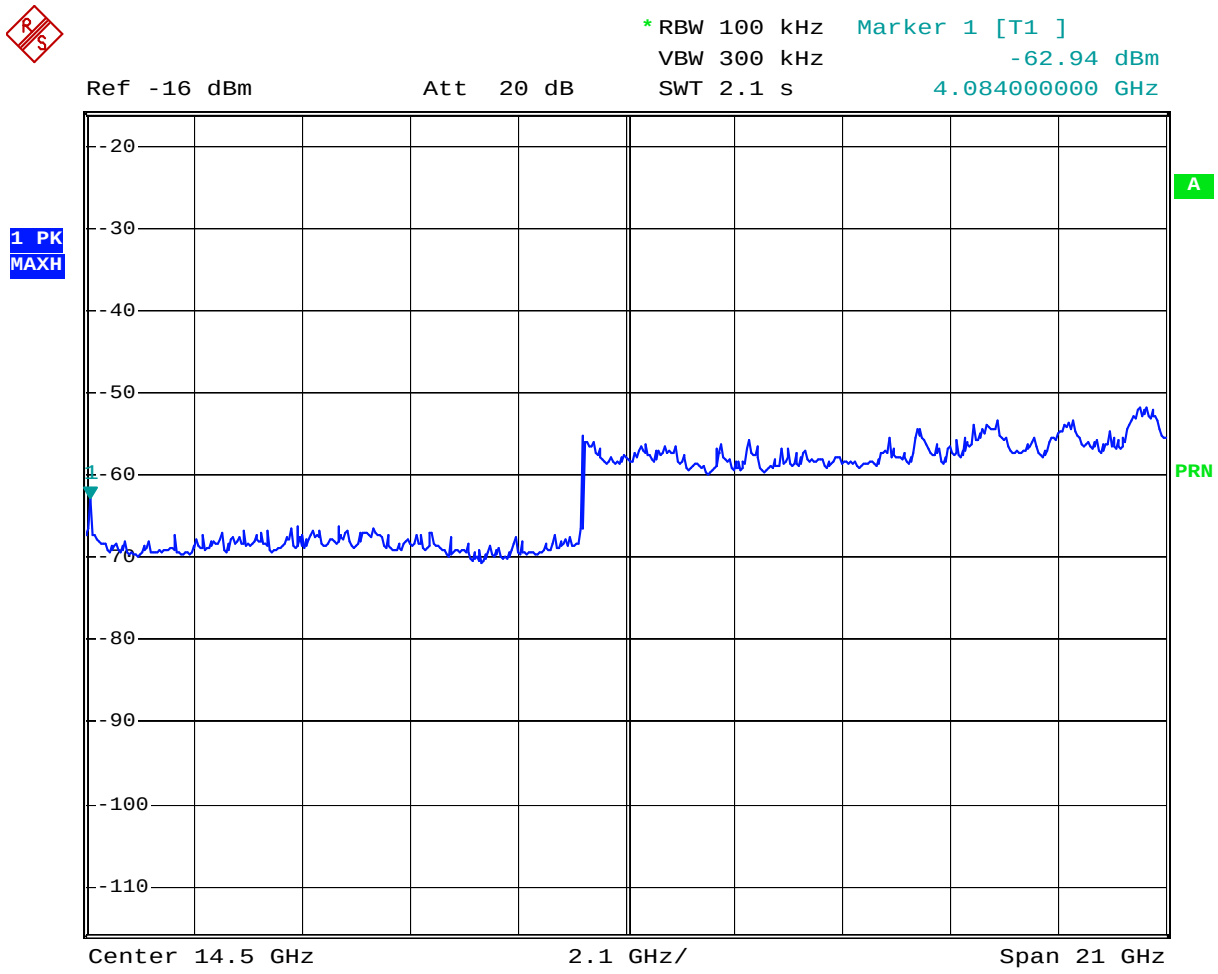

*RBW 100 kHz
VBW 300 kHz
SWT 2.1 s
Marker 1 [T1]
-62.55 dBm
4.042000000 GHz
Ref -16 dBm
Att 20 dB
1 PK
MAXH
A
PRN
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
Center 14.5 GHz
2.1 GHz/
Span 21 GHz
Date: 3.MAR.2000 01:53:29

Graph 3.5.16

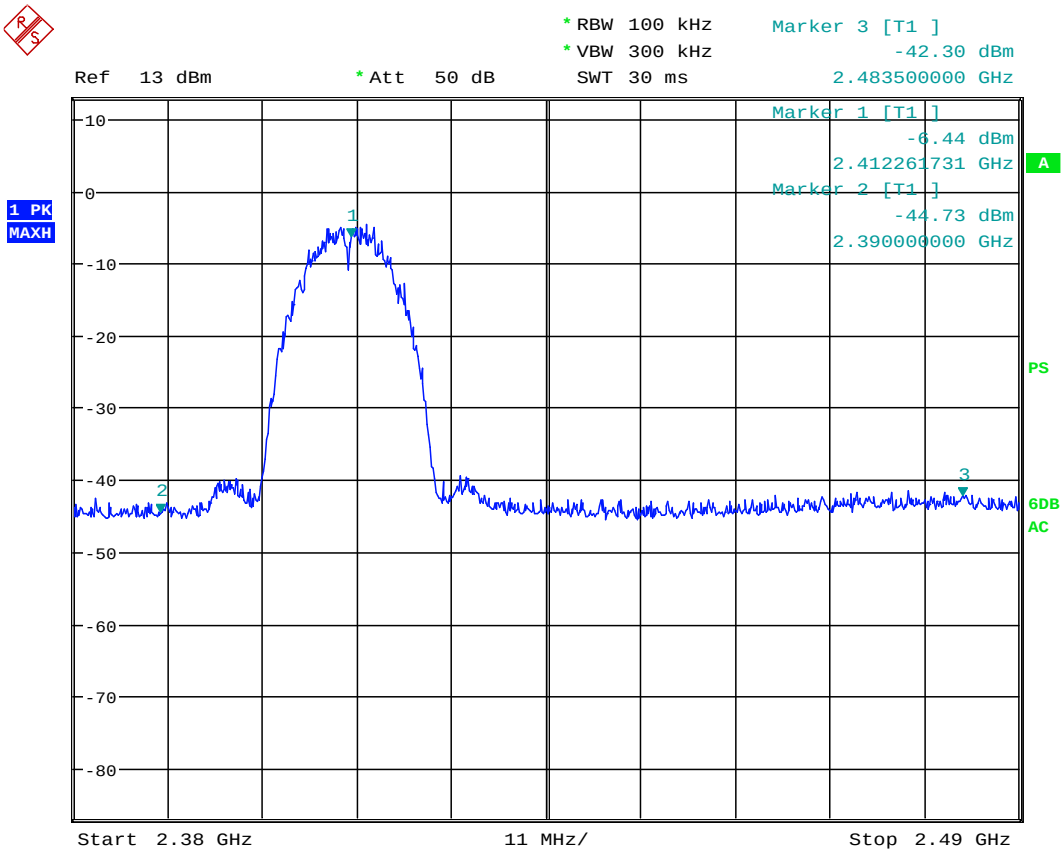


Date: 25.APR.2017 10:39:54

Graph 3.5.17

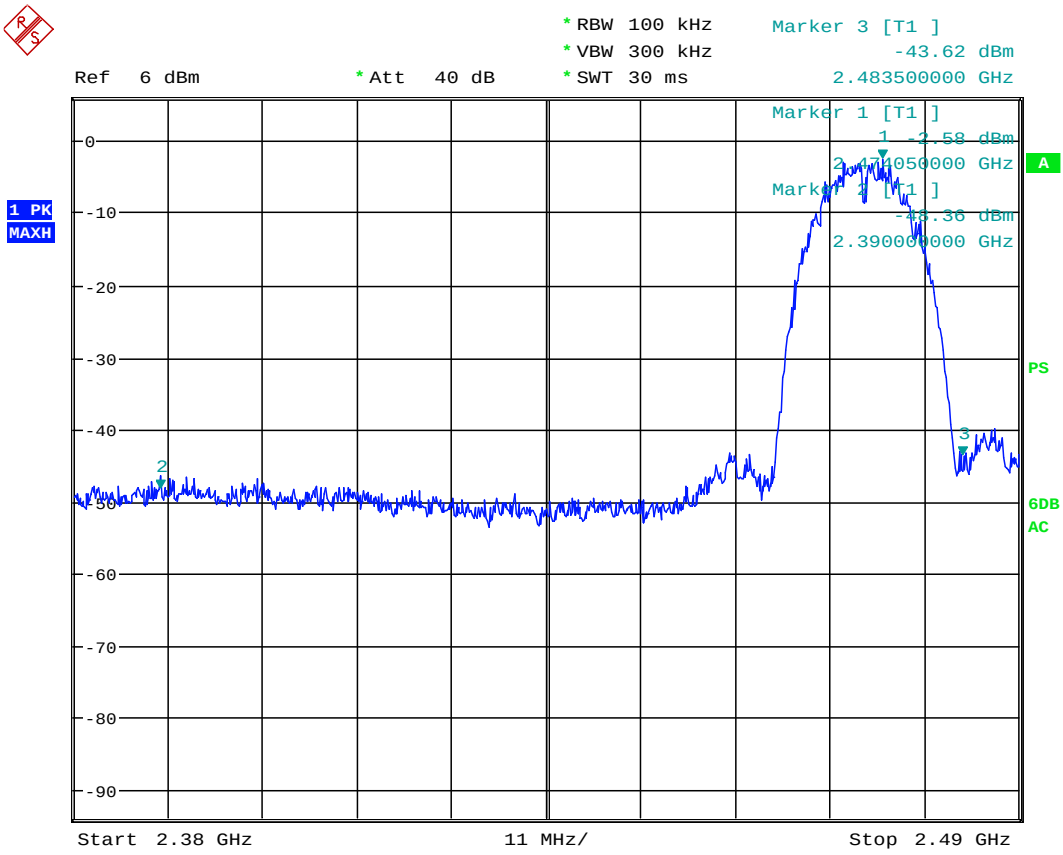

*RBW 100 kHz
Marker 1 [T1]
VBW 300 kHz
-62.94 dBm
Ref -16 dBm
Att 20 dB
SWT 2.1 s
4.084000000 GHz
1 PK
MAXH
A
PRN
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
Center 14.5 GHz
2.1 GHz/
Span 21 GHz
Date: 3.MAR.2000 02:08:20

Graph 3.5.18



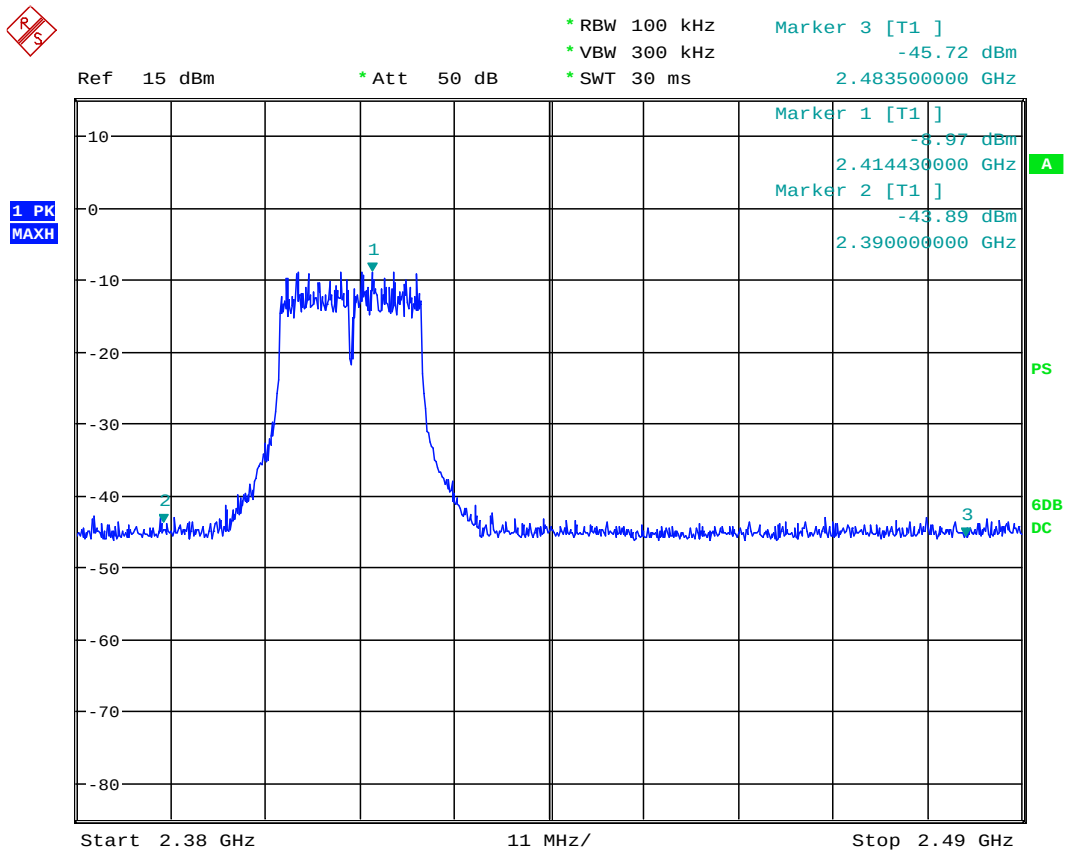
Date: 24.APR.2017 13:52:38

Graph 3.5.19



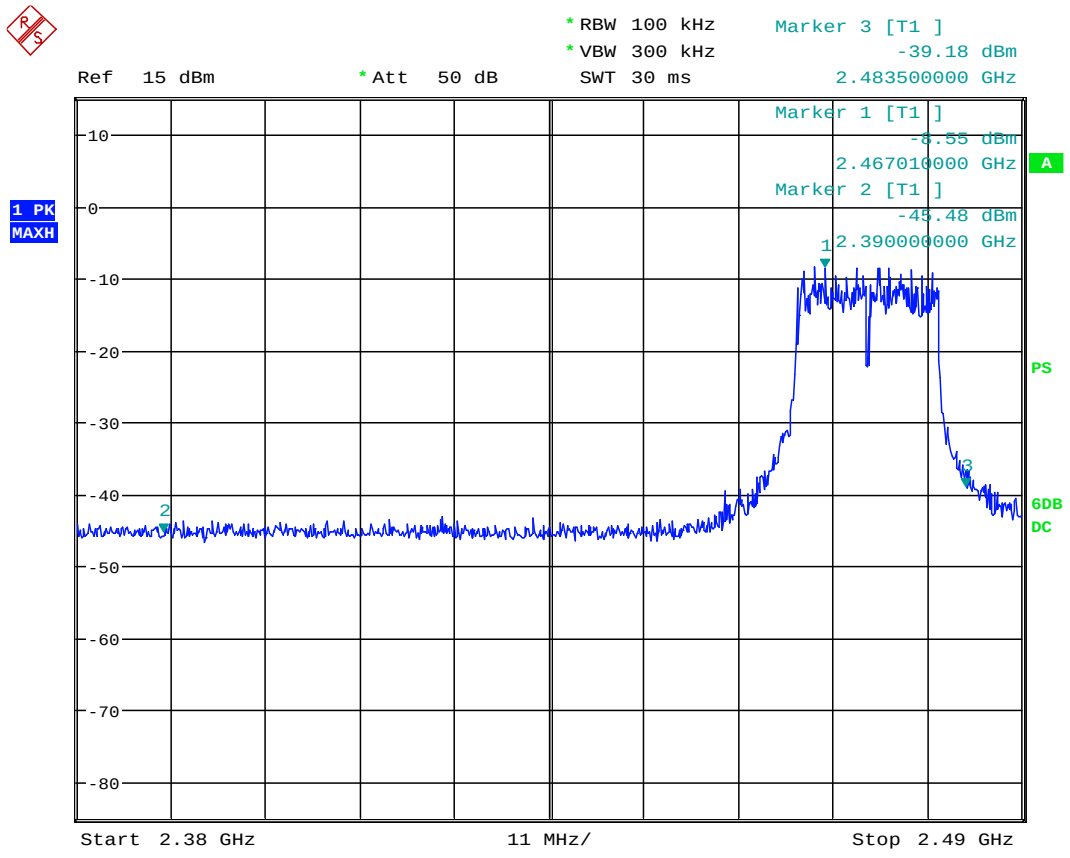
Date: 24.APR.2017 15:36:34

Graph 3.5.20



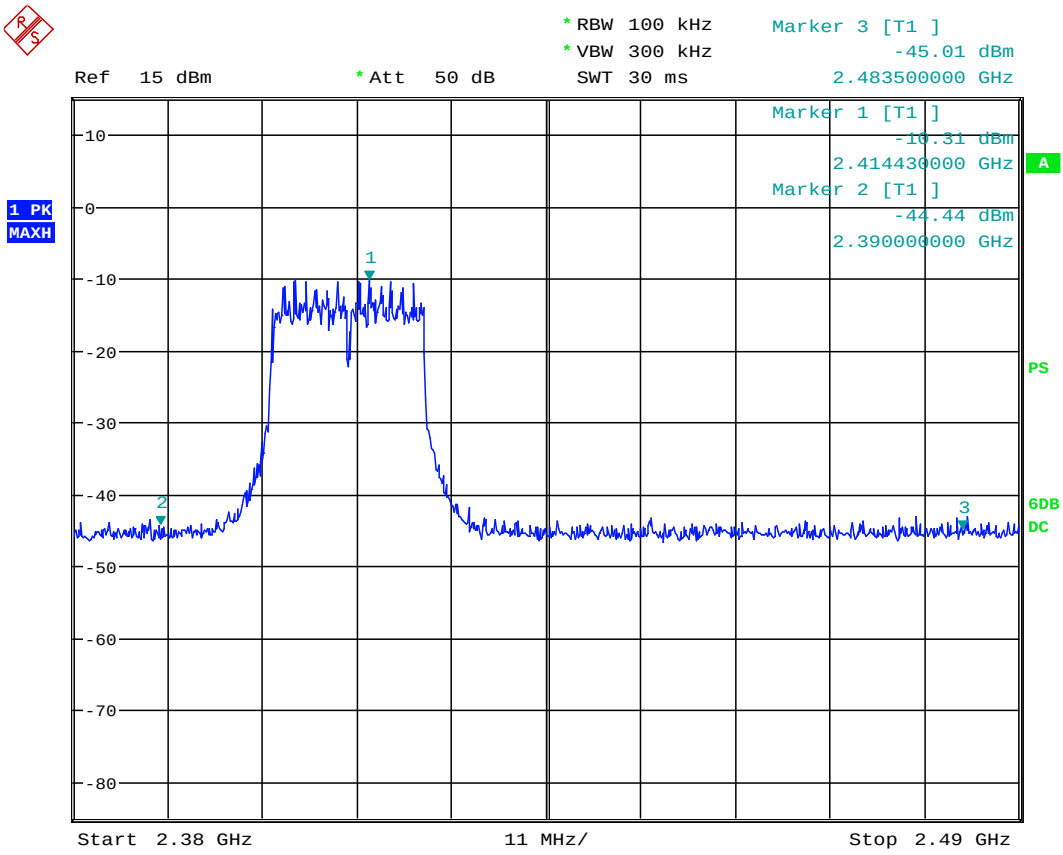
Date: 25.APR.2017 08:44:09

Graph 3.5.21



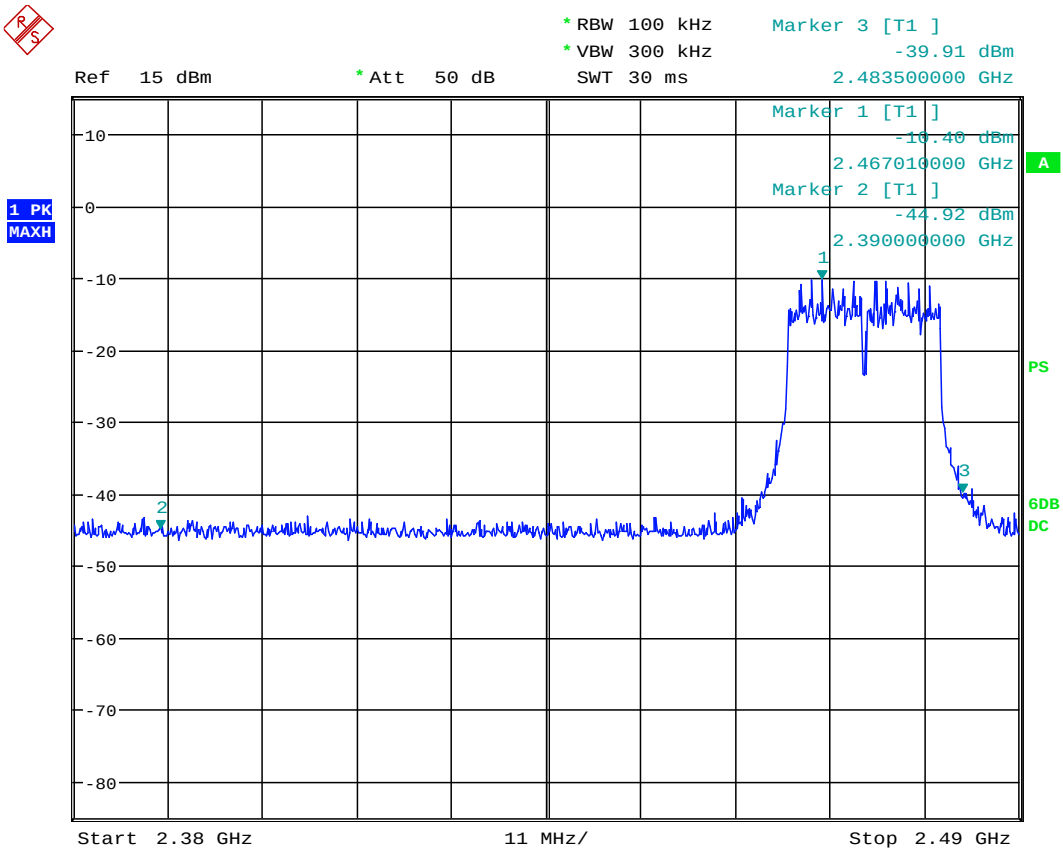
Date: 25.APR.2017 09:36:28

Graph 3.5.22



Date: 25.APR.2017 09:58:34

Graph 3.5.23



Date: 25.APR.2017 10:43:19

Graph 3.5.24

3.6 Radiated spurious emissions

Test location:	☐ OATS	☒ Anechoic Chamber ☐ Other
Test distance:	☐ 10m	☒ 3m
Test result:		**Pass**
Max. Margin:		6.4dB below the limits (spurious emissions other than band edge) 2.1dB below the limits (band edge emissions)

Notes: Spurious Radiated Emissions testing was performed in the Anechoic Chamber at 3m distance (see Tables 3.6.1 to 3.6.3 and Graphs 3.6.1 to 3.6.7).
Measurements were performed for each modulation at low, middle and upper channels.
Data shown for the EUT position with the highest emissions level.
All measurements were taken using a Peak detector; all readings were below the quasi-peak/average limits; therefore no quasi-peak or average readings were taken.

Band edge Radiated Emissions readings was performed in the Anechoic Chamber at 3m distance - see Tables 3.6.4; measurements were taken using a Peak detector; where taken peak readings were above the average limits, average value readings were taken.

Date:	April 26 – April 28, 2017	**Result: Pass**
Tested by:	Uri Spector	
Standard:	FCC part 15.247 / 15.209	
Test Point:	Enclosure	
Operation mode:	See page 5	
Environmental Conditions:	24°C; 43%(RH); 97.5kPa	
Equipment Verification:	☒	
Note:	802.11b; frequency range 30MHz – 25GHz	

Table 3.6.1

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
Channel 1							
30.831 MHz	V	8.2	21.0	0.0	29.2	40.0	-10.9
57.256 MHz	V	15.3	11.1	0.0	26.4	40.0	-13.6
123.5 MHz	V	12.5	17.5	0.0	30.1	43.5	-13.5
30.935 MHz	H	10.6	22.8	0.0	33.5	40.0	-6.5
102.91 MHz	H	13.5	15.7	0.0	29.2	43.5	-14.3
250.17 MHz	H	14.0	17.2	0.0	31.1	46.0	-14.9
6.4315 GHz	V	36.9	39.2	38.7	37.4	54.0	-16.6
4.8233 GHz	H	40.2	37.0	39.2	38.0	54.0	-16.0
19.297 GHz	H	40.8	53.8	48.5	46.0	54.0	-8.0
Channel 7							
31.905 MHz	V	10.7	20.2	0.0	30.9	40.0	-9.1
44.477 MHz	V	14.8	13.7	0.0	28.5	40.0	-11.5
45.758 MHz	V	15.9	13.3	0.0	29.1	40.0	-10.9
55.94 MHz	V	17.5	11.1	0.0	28.7	40.0	-11.4
134.55 MHz	V	12.8	17.2	0.0	29.9	43.5	-13.6
30.762 MHz	H	7.8	22.9	0.0	30.8	40.0	-9.2
125.89 MHz	H	12.6	16.6	0.0	29.2	43.5	-14.3
250.17 MHz	H	15.6	17.2	0.0	32.7	46.0	-13.3
4.8832 GHz	V	41.4	37.1	39.1	39.4	54.0	-14.7
6.5139 GHz	V	32.6	39.2	38.6	33.2	54.0	-20.8
7.3269 GHz	V	32.0	41.7	38.1	35.5	54.0	-18.5
4.8832 GHz	H	33.8	37.0	39.1	31.7	54.0	-22.3
19.54 GHz	H	41.6	54.2	48.3	47.6	54.0	-6.4
Channel 13							
31.316 MHz	V	11.7	20.6	0.0	32.3	40.0	-7.7
43.299 MHz	V	15.7	14.3	0.0	29.9	40.0	-10.1
48.217 MHz	V	16.3	12.5	0.0	28.9	40.0	-11.1
54.174 MHz	V	19.2	11.3	0.0	30.5	40.0	-9.5
119.4 MHz	V	12.7	17.5	0.0	30.2	43.5	-13.3
32.286 MHz	H	9.6	22.0	0.0	31.7	40.0	-8.3
61.274 MHz	H	12.3	10.0	0.0	22.3	40.0	-17.7
117.98 MHz	H	12.1	16.6	0.0	28.6	43.5	-14.9
250.01 MHz	H	13.6	17.1	0.0	30.7	46.0	-15.3
4.116 GHz	V	46.2	36.3	39.8	42.6	54.0	-11.4
6.5908 GHz	V	34.6	39.4	38.6	35.4	54.0	-18.6
4.1198 GHz	H	44.9	36.3	39.8	41.4	54.0	-12.6
19.778 GHz	H	36.5	54.6	48.2	42.9	54.0	-11.1

Date:	April 26 – April 28, 2017	**Result: Pass**
Tested by:	Uri Spector	
Standard:	FCC part 15.247 / 15.209	
Test Point:	Enclosure	
Operation mode:	See page 5	
Environmental Conditions:	24°C; 43%(RH); 97.5kPa	
Equipment Verification:	☒	
Note:	802.11g; frequency range 30MHz – 25GHz	

Table 3.6.2

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
Channel 1							
30.416 MHz	V	7.6	21.3	0.0	28.8	40.0	-11.2
58.053 MHz	V	13.1	11.1	0.0	24.2	40.0	-15.8
132.98 MHz	V	12.8	17.2	0.0	30.0	43.5	-13.6
31.316 MHz	H	9.5	22.6	0.0	32.1	40.0	-7.9
128.65 MHz	H	12.5	16.6	0.0	29.0	43.5	-14.5
250.17 MHz	H	14.5	17.2	0.0	31.7	46.0	-14.3
4.0262 GHz	V	40.3	36.5	39.9	36.9	54.0	-17.1
6.4315 GHz	V	36.1	39.2	38.7	36.6	54.0	-17.4
19.297 GHz	V	37.9	53.7	48.5	43.0	54.0	-11.0
19.297 GHz	H	37.1	53.8	48.5	42.3	54.0	-11.7
31.558 MHz	V	8.5	20.4	0.0	29.0	40.0	-11.0
53.724 MHz	V	14.4	11.4	0.0	25.8	40.0	-14.3
57.845 MHz	V	14.7	11.1	0.0	25.7	40.0	-14.3
125.97 MHz	V	11.9	17.5	0.0	29.4	43.5	-14.2
30.693 MHz	H	8.6	23.0	0.0	31.6	40.0	-8.5
133.2 MHz	H	11.7	16.4	0.0	28.1	43.5	-15.4
4.0748 GHz	V	43.3	36.4	39.9	39.8	54.0	-14.2
4.0711 GHz	H	38.2	36.4	39.9	34.7	54.0	-19.3
6.5139 GHz	H	33.6	39.2	38.6	34.1	54.0	-19.9
Channel 13							
31.628 MHz	V	11.1	20.4	0.0	31.5	40.0	-8.6
44.373 MHz	V	15.2	13.8	0.0	29.0	40.0	-11.0
53.031 MHz	V	17.4	11.5	0.0	28.9	40.0	-11.1
126.64 MHz	V	12.9	17.4	0.0	30.3	43.5	-13.2
270.26 MHz	V	12.2	17.7	0.0	29.9	46.0	-16.2
31.593 MHz	H	9.5	22.4	0.0	31.9	40.0	-8.1
113.88 MHz	H	13.1	16.5	0.0	29.5	43.5	-14.0
4.1123 GHz	V	41.4	36.3	39.8	37.8	54.0	-16.2
6.5908 GHz	V	33.3	39.4	38.6	34.1	54.0	-19.9
4.1235 GHz	H	38.4	36.3	39.8	34.9	54.0	-19.1

Date:	April 26 – April 28, 2017	**Result: Pass**
Tested by:	Uri Spector	
Standard:	FCC part 15.247 / 15.209	
Test Point:	Enclosure	
Operation mode:	See page 5	
Environmental Conditions:	24°C; 43%(RH); 97.5kPa	
Equipment Verification:	☒	
Note:	802.11n; frequency range 30MHz – 25GHz	

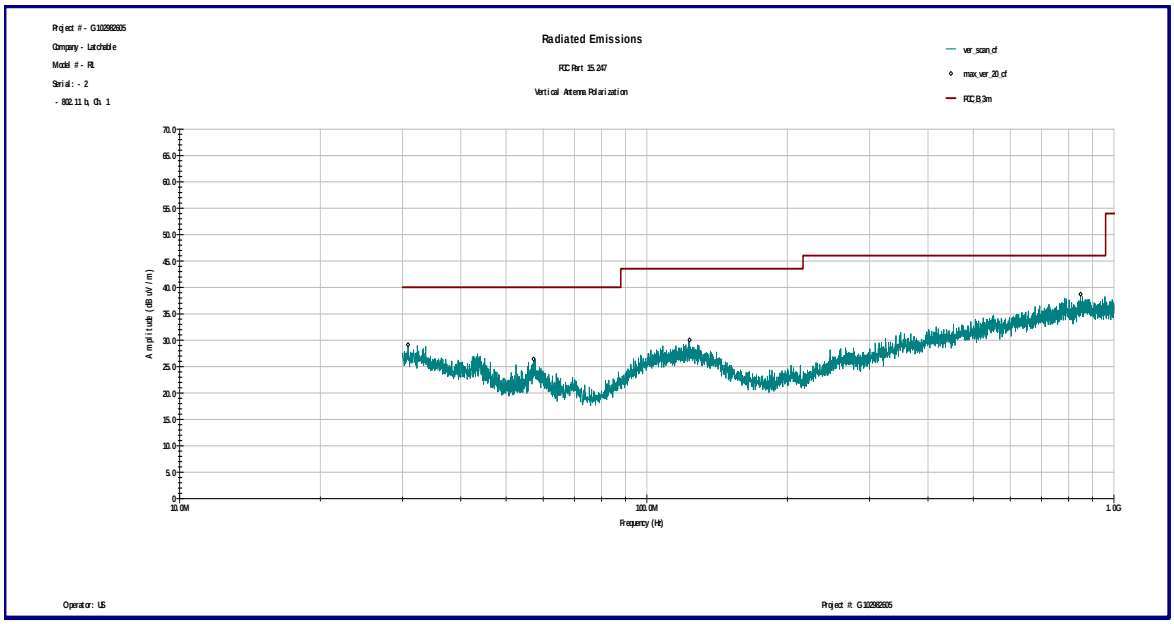
Table 3.6.3

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
Channel 1							
30.797 MHz	V	10.5	21.0	0.0	31.5	40.0	-8.5
43.576 MHz	V	14.8	14.1	0.0	28.9	40.0	-11.1
53.793 MHz	V	19.0	11.3	0.0	30.3	40.0	-9.7
61.966 MHz	H	15.0	10.7	0.0	25.6	40.0	-14.4
114.62 MHz	H	12.9	17.3	0.0	30.2	43.5	-13.3
30.381 MHz	H	7.0	23.2	0.0	30.2	40.0	-9.8
121.94 MHz	H	11.8	16.6	38.7	28.4	43.5	-15.1
4.0225 GHz	V	39.7	36.5	39.9	36.3	54.0	-17.7
6.4315 GHz	V	37.7	39.2	38.7	38.3	54.0	-15.7
4.0225 GHz	H	36.6	36.5	39.9	33.2	54.0	-20.8
Channel 7							
31.766 MHz	V	9.9	20.3	0.0	30.2	40.0	-9.9
42.78 MHz	V	13.4	14.5	0.0	27.9	40.0	-12.1
55.94 MHz	V	18.5	11.1	0.0	29.7	40.0	-10.4
130.22 MHz	V	12.7	17.2	0.0	29.9	43.5	-13.6
33.013 MHz	H	8.7	21.6	0.0	30.3	40.0	-9.7
122.83 MHz	H	11.6	16.6	0.0	28.2	43.5	-15.3
4.0599 GHz	V	40.1	36.4	39.9	36.7	54.0	-17.3
6.5139 GHz	V	36.0	39.2	38.6	36.6	54.0	-17.4
4.0748 GHz	H	40.0	36.4	39.9	36.6	54.0	-17.4
6.5139 GHz	H	34.7	39.2	38.6	35.3	54.0	-18.7
19.54 GHz	H	37.8	54.2	48.3	43.7	54.0	-10.3
Channel 13							
30.139 MHz	V	7.6	21.5	0.0	29.1	40.0	-10.9
54.486 MHz	V	14.3	11.2	0.0	25.5	40.0	-14.5
127.83 MHz	V	11.5	17.4	0.0	28.9	43.5	-14.6
30.242 MHz	H	7.3	23.2	0.0	30.5	40.0	-9.5
125.44 MHz	H	12.2	16.6	0.0	28.8	43.5	-14.8
4.1123 GHz	V	40.6	36.3	39.8	37.1	54.0	-16.9
6.5908 GHz	V	33.8	39.4	38.6	34.6	54.0	-19.4
4.1272 GHz	H	37.2	36.3	39.8	33.7	54.0	-20.3
6.5908 GHz	H	33.7	39.4	38.6	34.5	54.0	-19.5

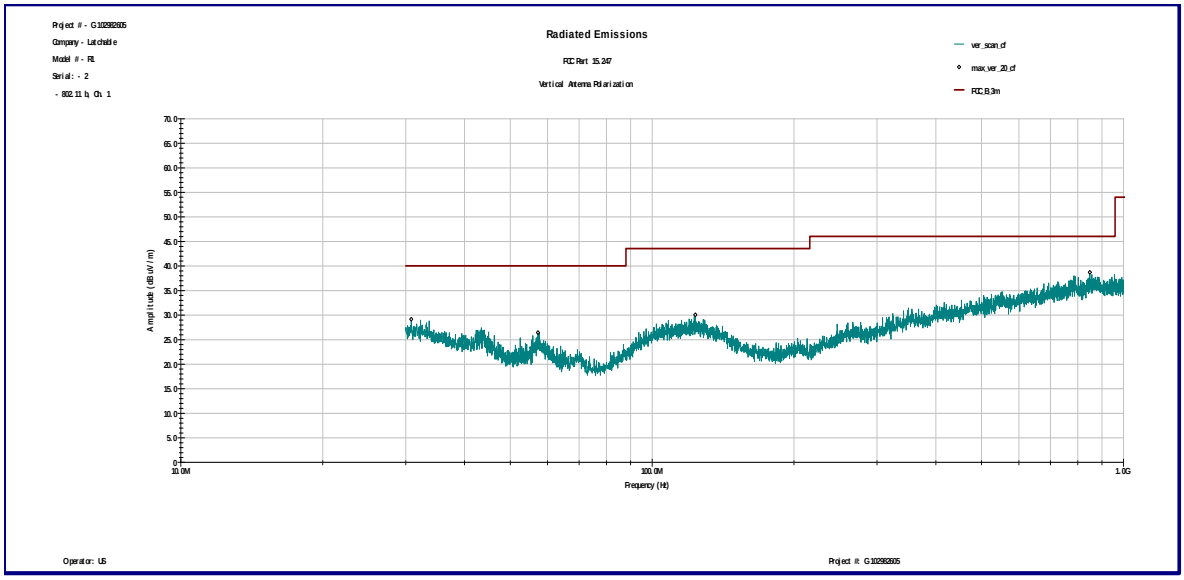
Date:	April 26 – April 28, 2017	**Result: Pass**
Tested by:	Uri Spector	
Standard:	FCC part 15.247 / 15.209	
Test Point:	Enclosure	
Operation mode:	See page 5	
Environmental Conditions:	24°C; 43%(RH); 97.5kPa	
Equipment Verification:	☒	
Note:	Band edge compliance	

Table 3.6.4

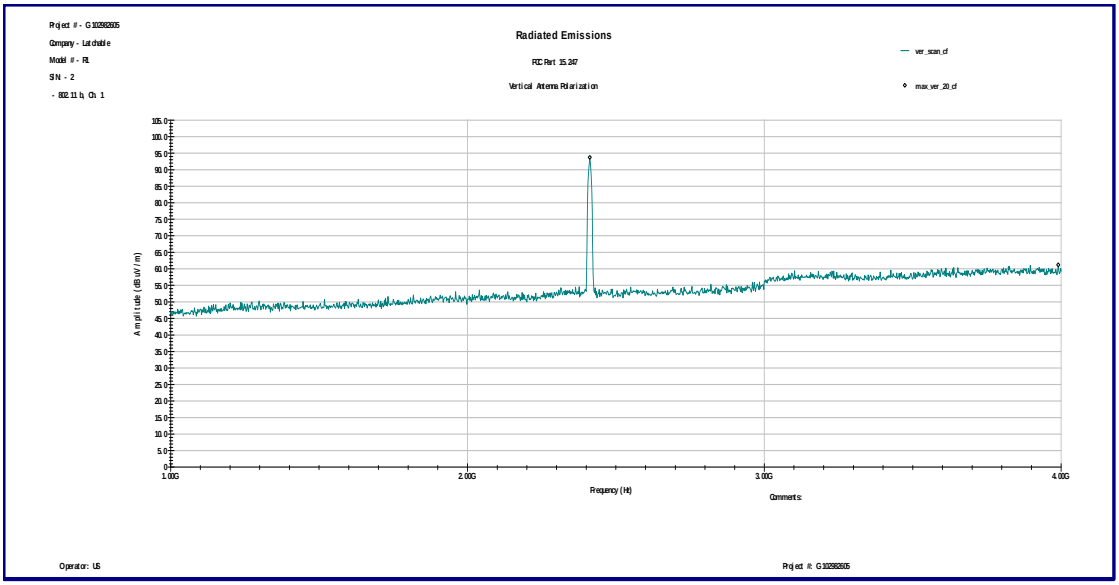
Frequency	Antenna		Ant. CF	Cable loss	Pre-amp	Reading	Total @ 3m	Limit	Margin	Comments
MHz	Polarity	Hts(cm)	dB1/m	dB	Gain (dB)	dBµV	dBµV/m	dBµV/m	dB	
					801.11b					
					Ch. 1					
2390.00	V	182	28.1	2.9	0.0	14.6	45.6	54.0	-8.4	Peak
2390.00	H	157	28.1	2.9	0.0	12.1	43.1	54.0	-10.9	Peak
					Ch. 13					
2483.50	V	193	28.4	2.9	0.0	12.1	43.4	54.0	-10.6	Peak
2483.50	H	171	28.4	2.9	0.0	9.9	41.2	54.0	-12.8	Peak
					801.11g					
					Ch. 1					
2390.00	V	190	28.1	2.9	0.0	17.7	48.7	54.0	-5.3	Peak
2390.00	H	198	28.1	2.9	0.0	9.5	40.5	54.0	-13.5	Peak
					Ch. 13					
2483.50	V	221	28.4	2.9	0.0	20.6	51.9	54.0	-2.1	Peak
2483.50	H	253	28.4	2.9	0.0	16.7	48.0	54.0	-6.0	Peak
					801.11n					
					Ch. 1					
2390.00	V	179	28.1	2.9	0.0	15.4	46.4	54.0	-7.6	Peak
2390.00	H	144	28.1	2.9	0.0	9.6	40.6	54.0	-13.4	Peak
					Ch. 13					
2483.50	V	110	28.4	2.9	0.0	20.1	51.4	54.0	-2.6	Peak
2483.50	H	256	28.4	2.9	0.0	15.3	46.6	54.0	-7.4	Peak



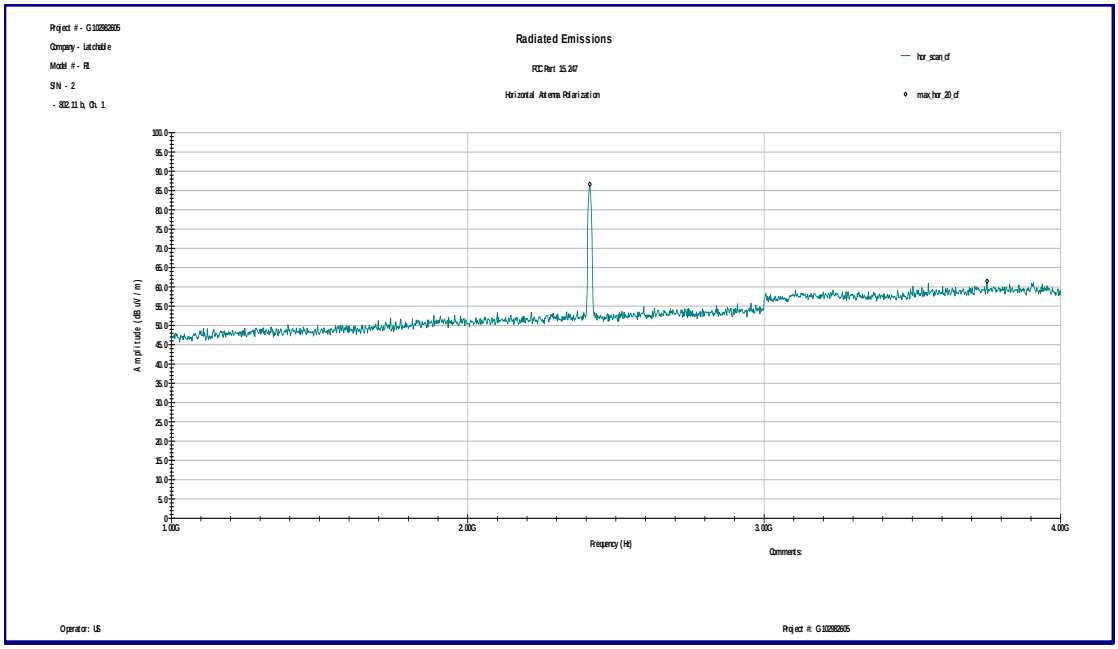
Graph 3.6.1



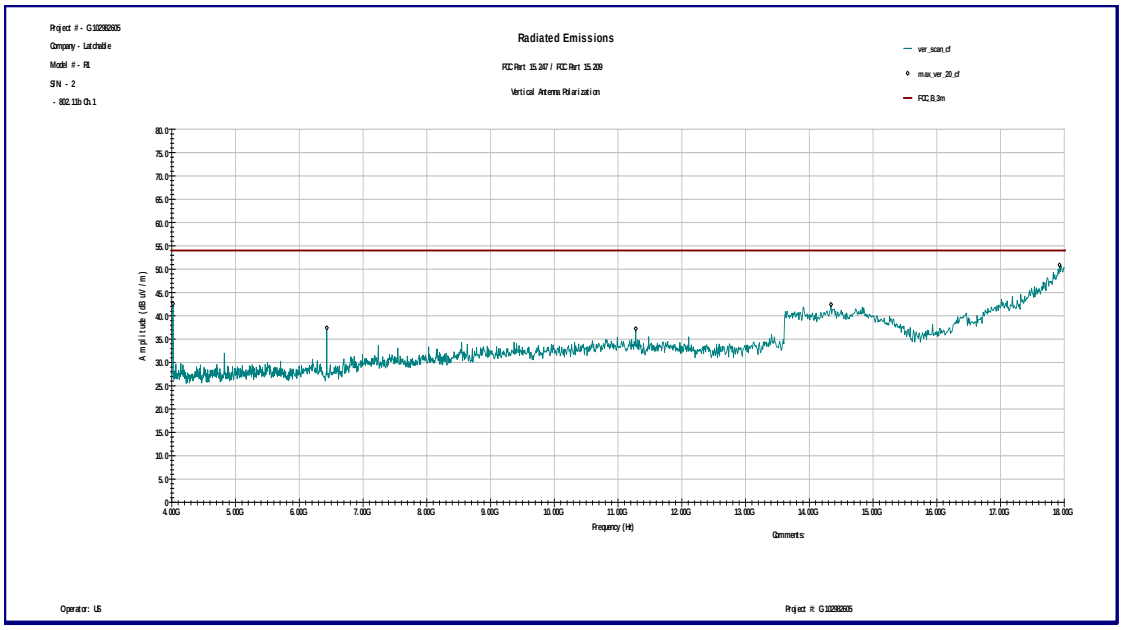
Graph 3.6.2



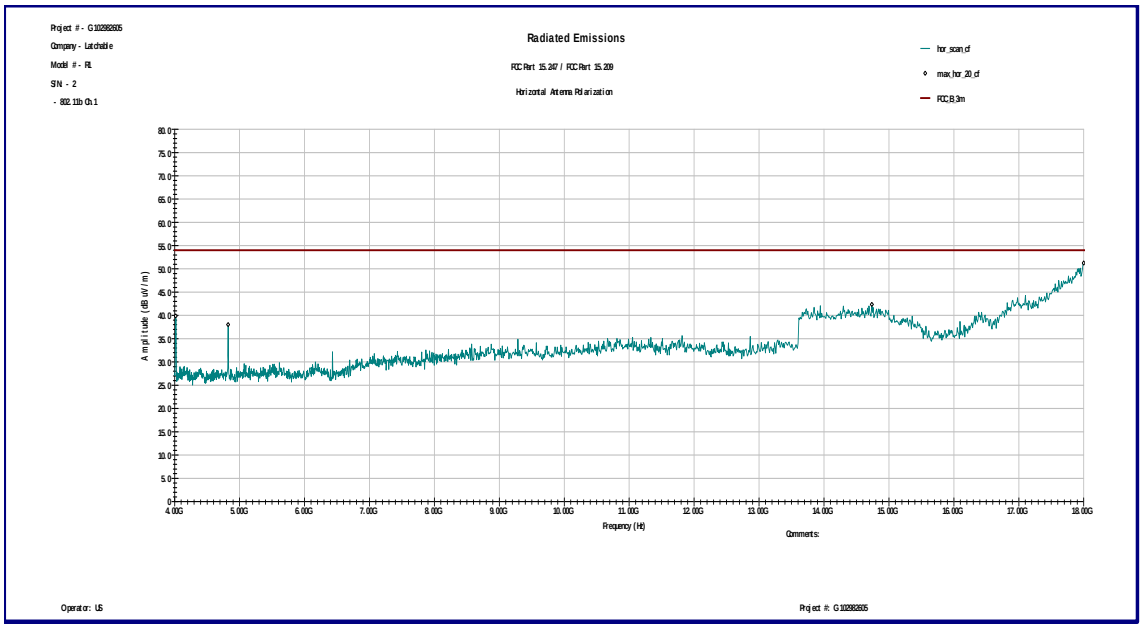
Graph 3.6.3



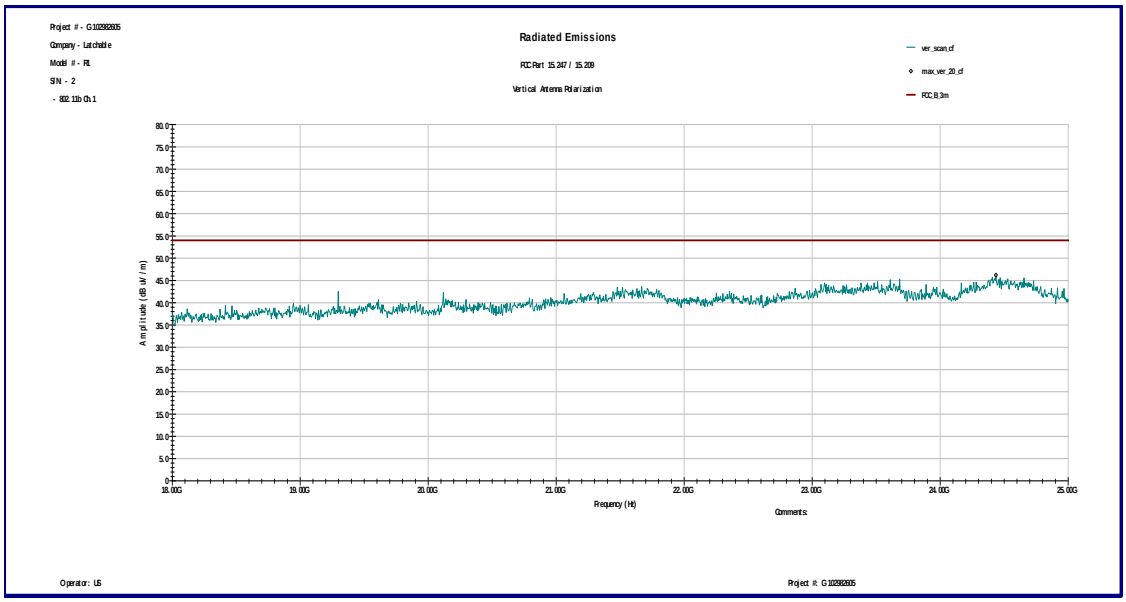
Graph 3.6.4



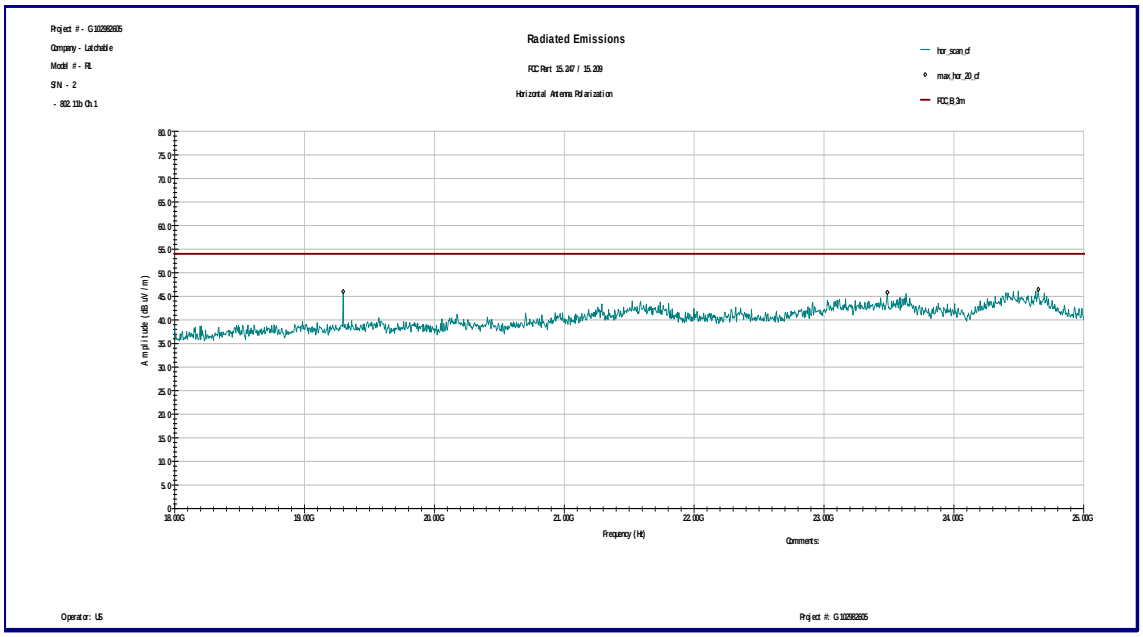
Graph 3.6.5



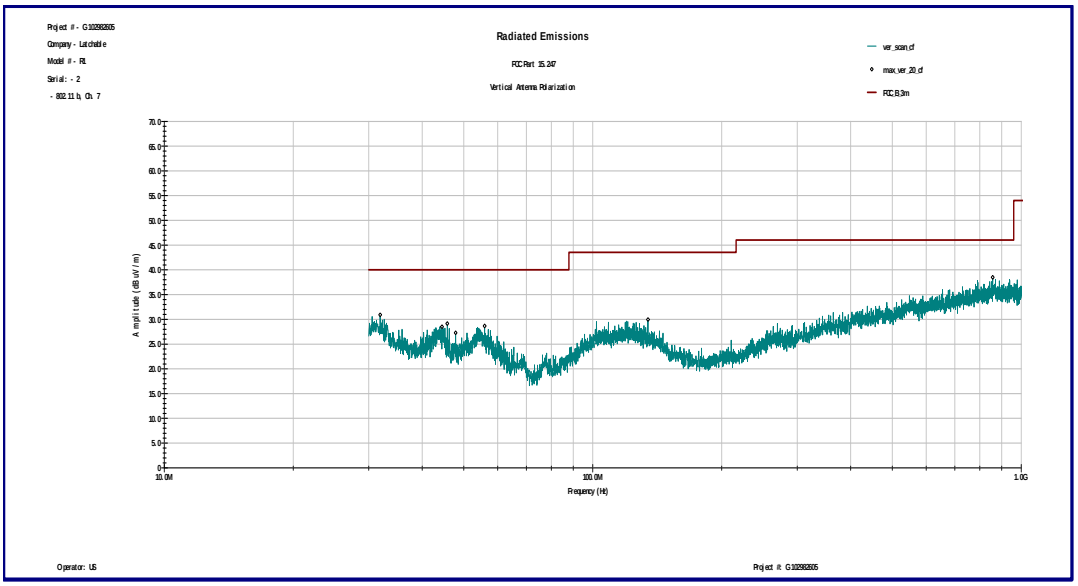
Graph 3.6.6



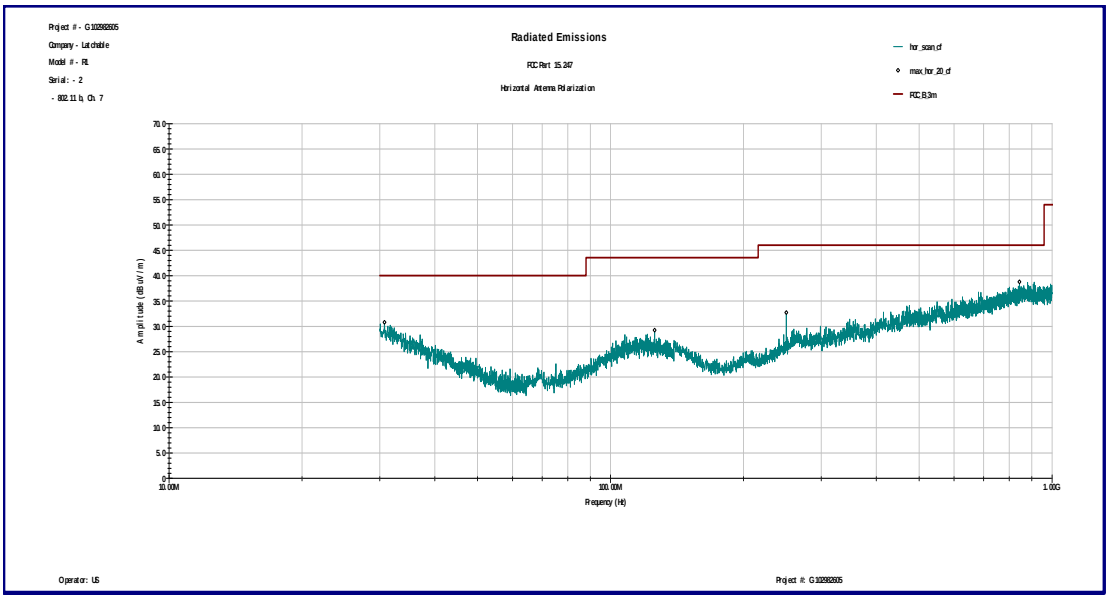
Graph 3.6.7



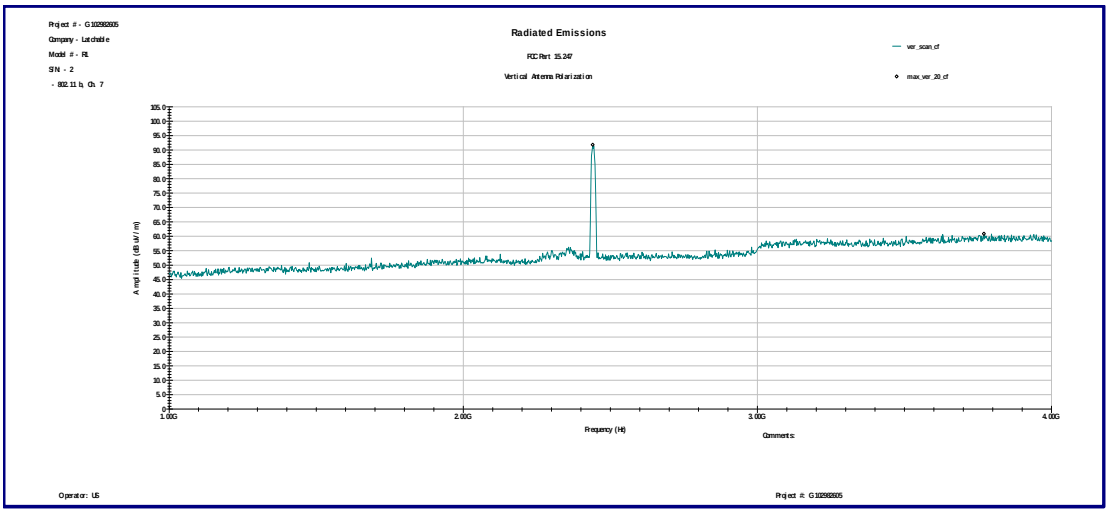
Graph 3.6.8



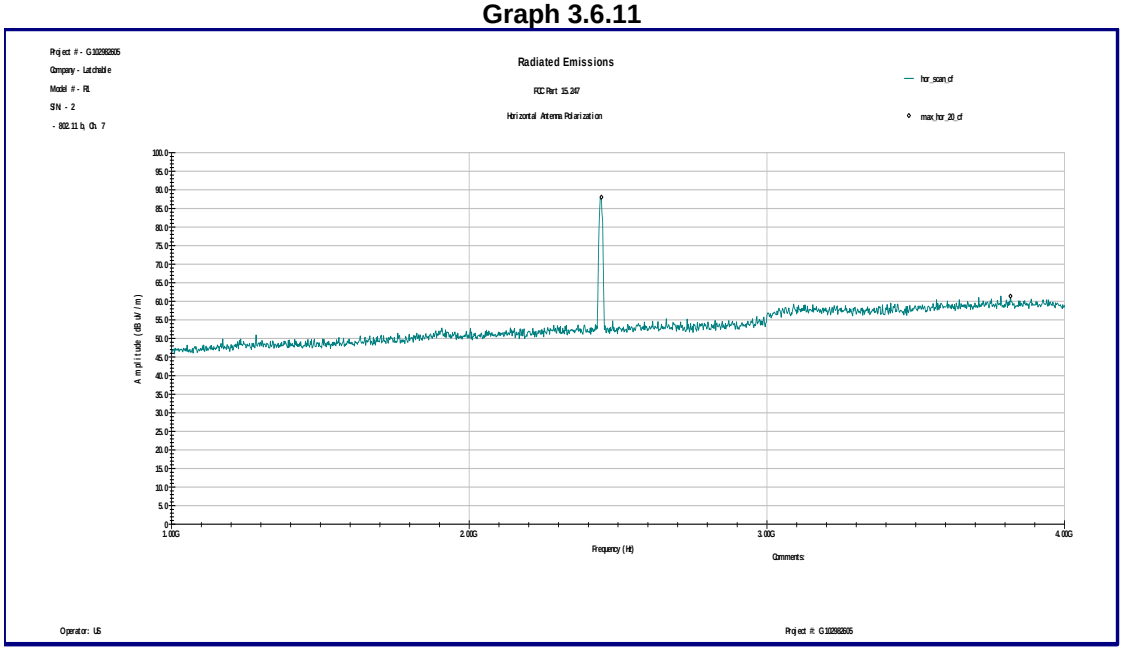
Graph 3.6.9



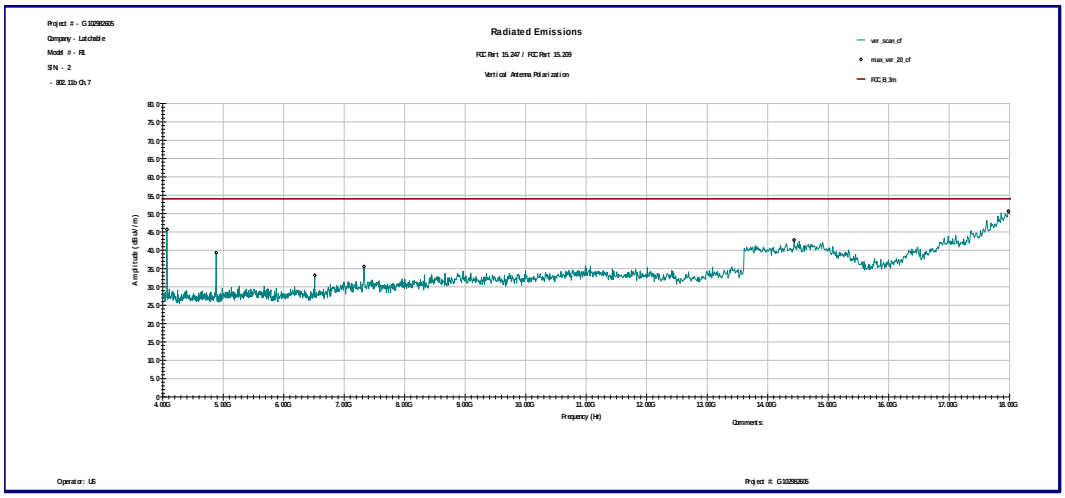
Graph 3.6.10



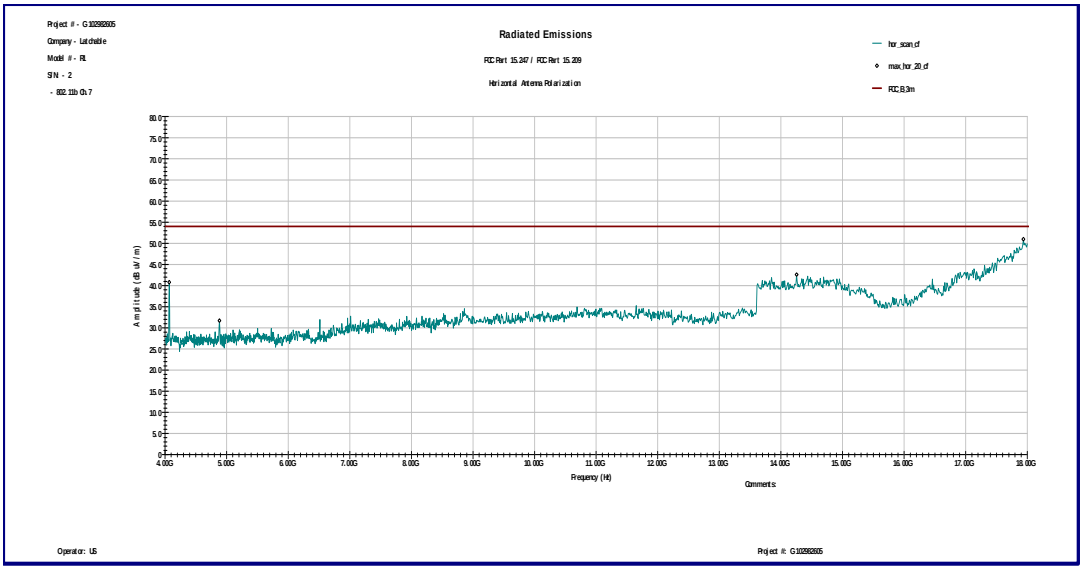
Graph 3.6.11



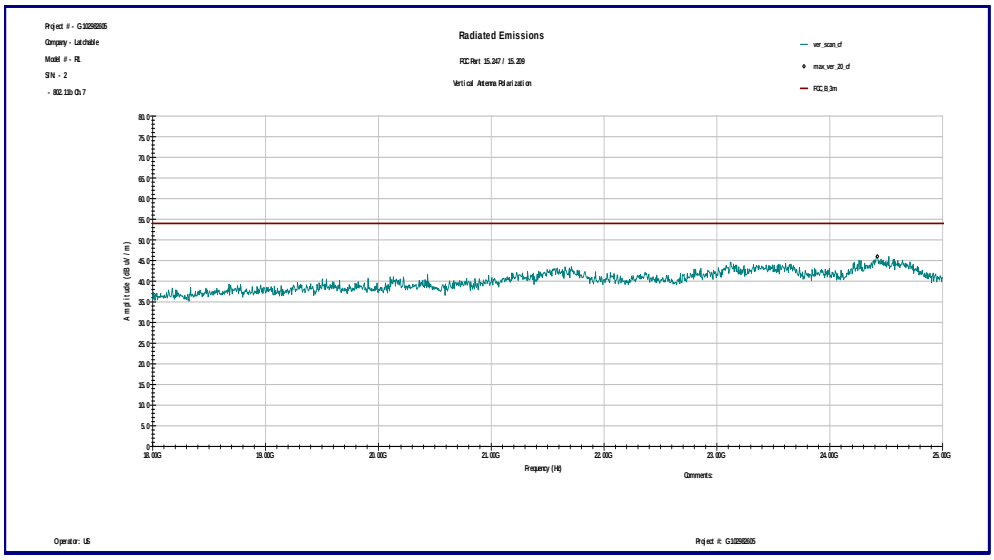
Graph 3.6.12



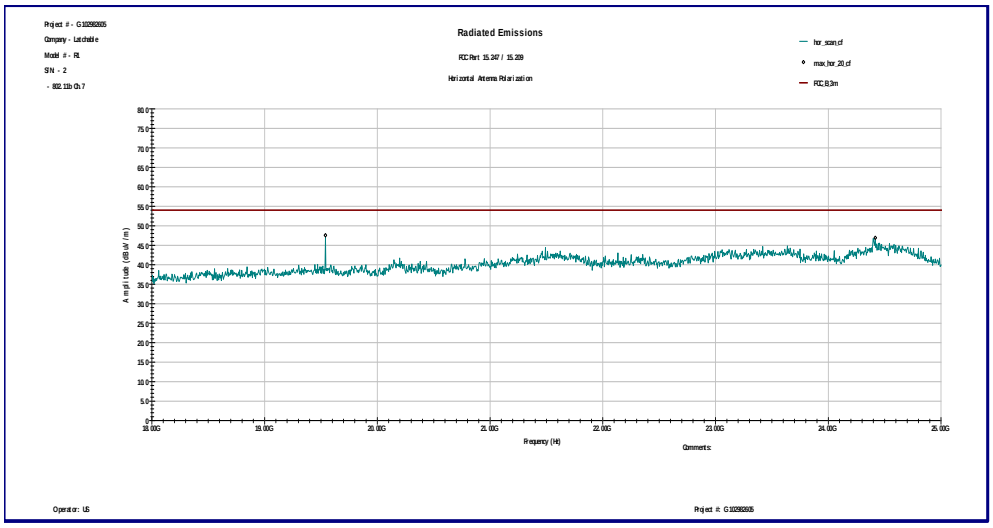
Graph 3.6.13



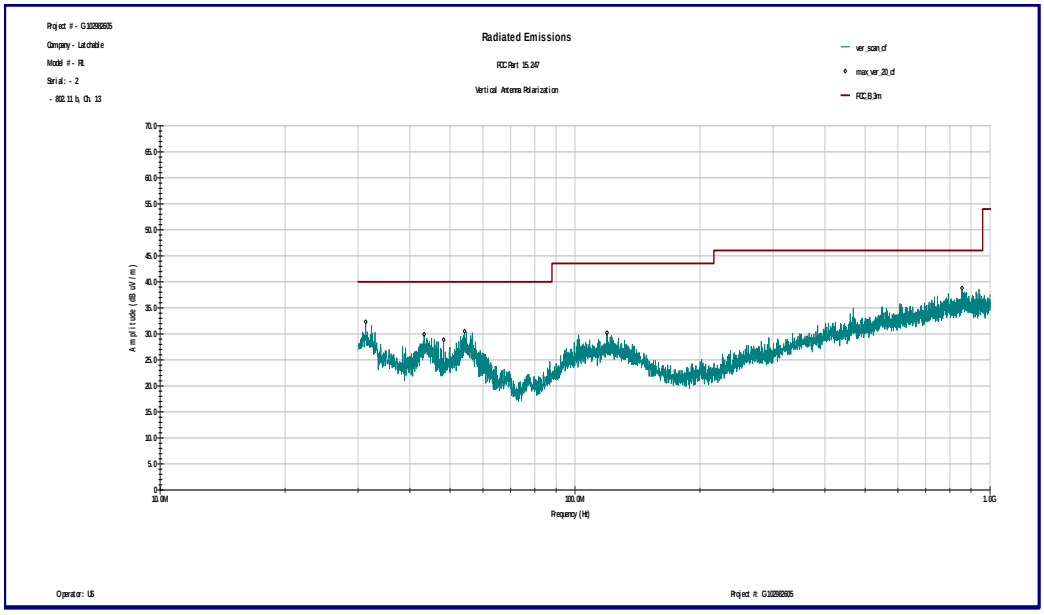
Graph 3.6.14



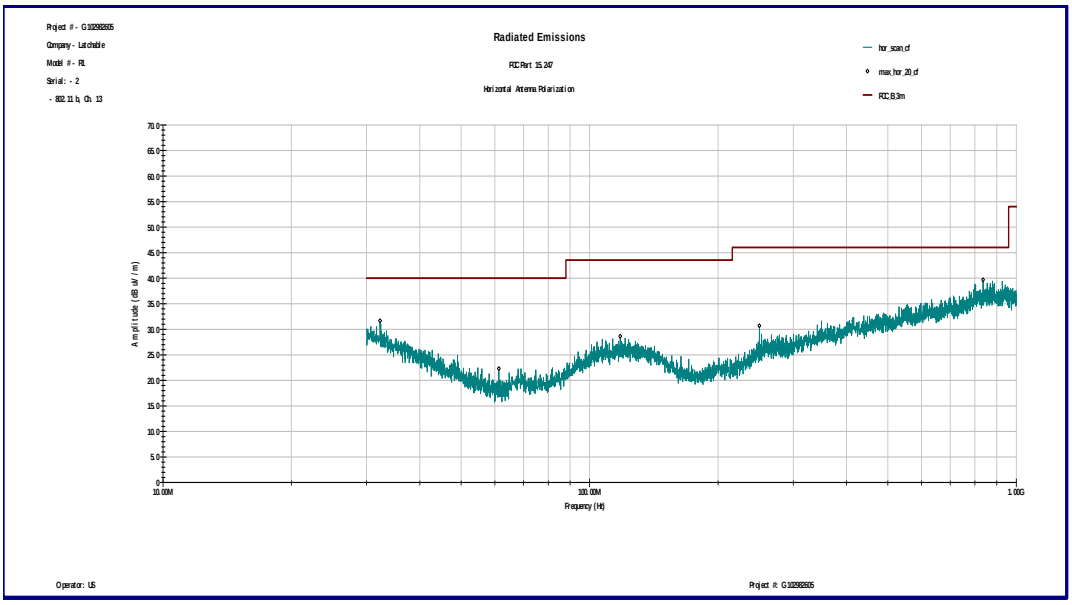
Graph 3.6.15



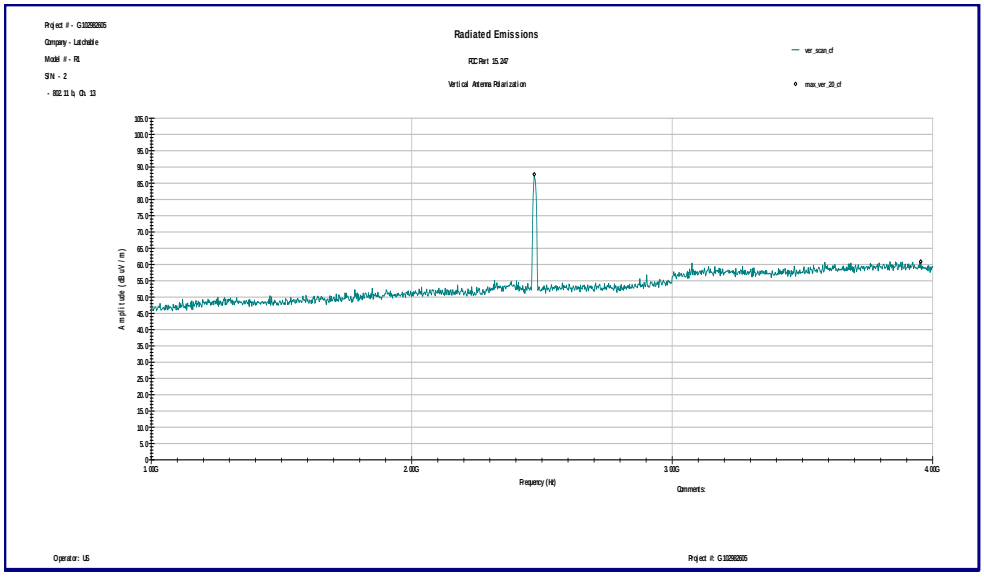
Graph 3.6.16



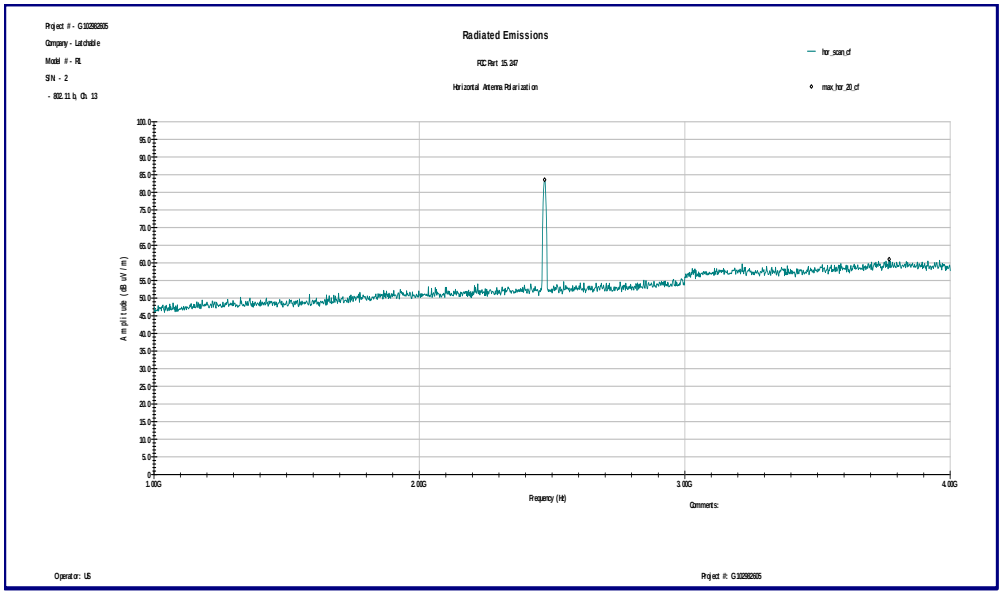
Graph 3.6.17



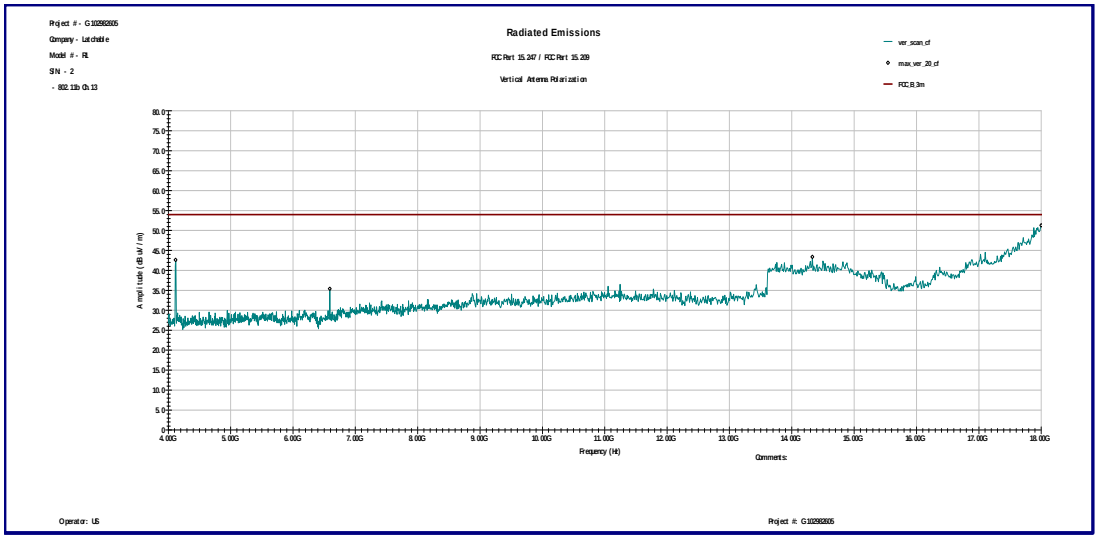
Graph 3.6.18



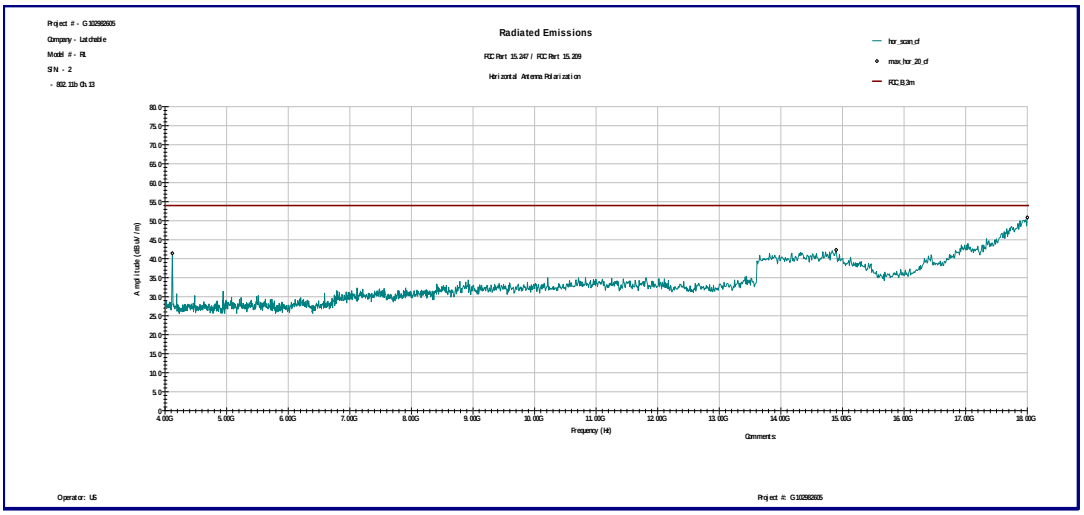
Graph 3.6.19



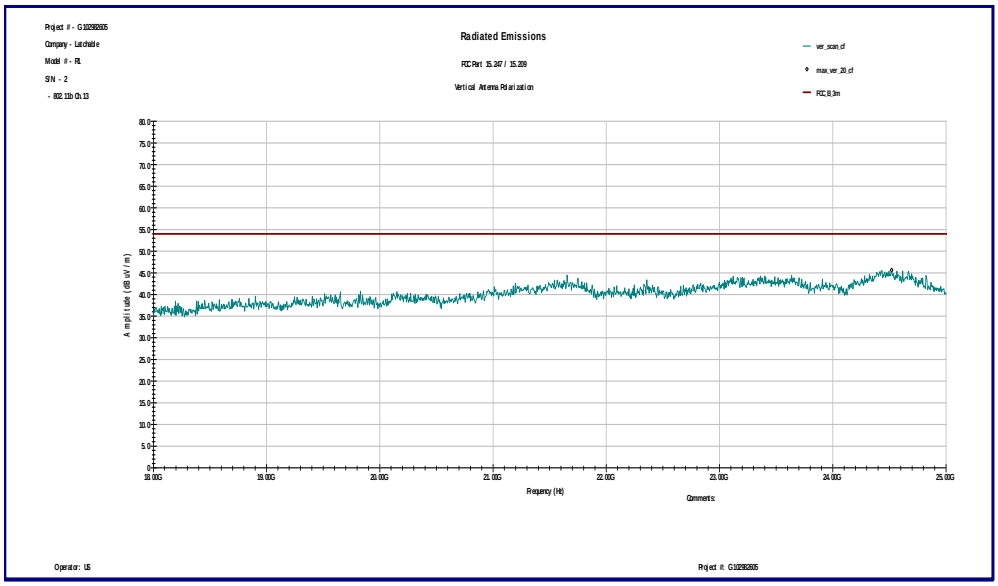
Graph 3.6.20



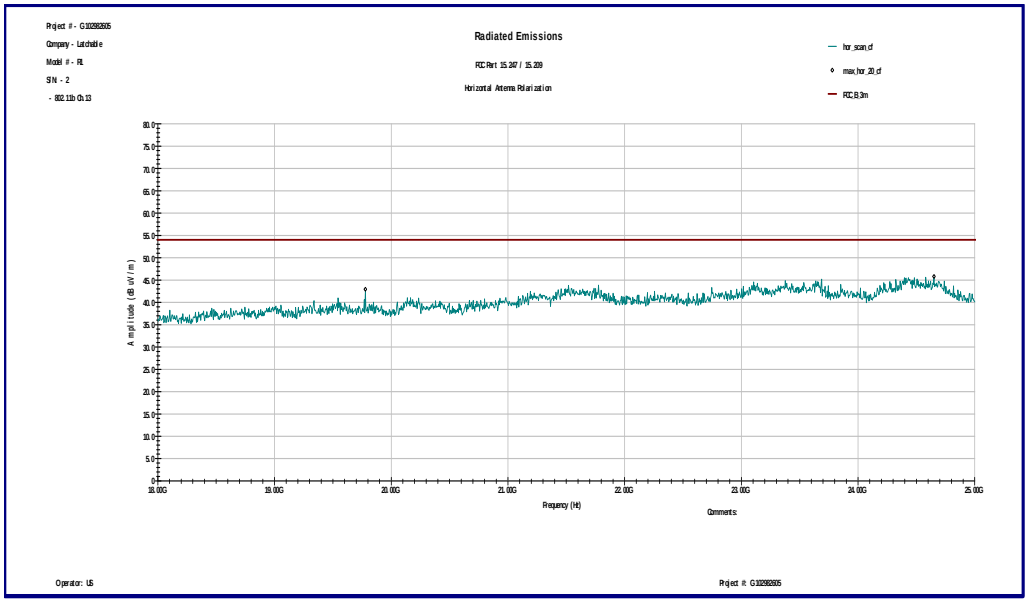
Graph 3.6.21



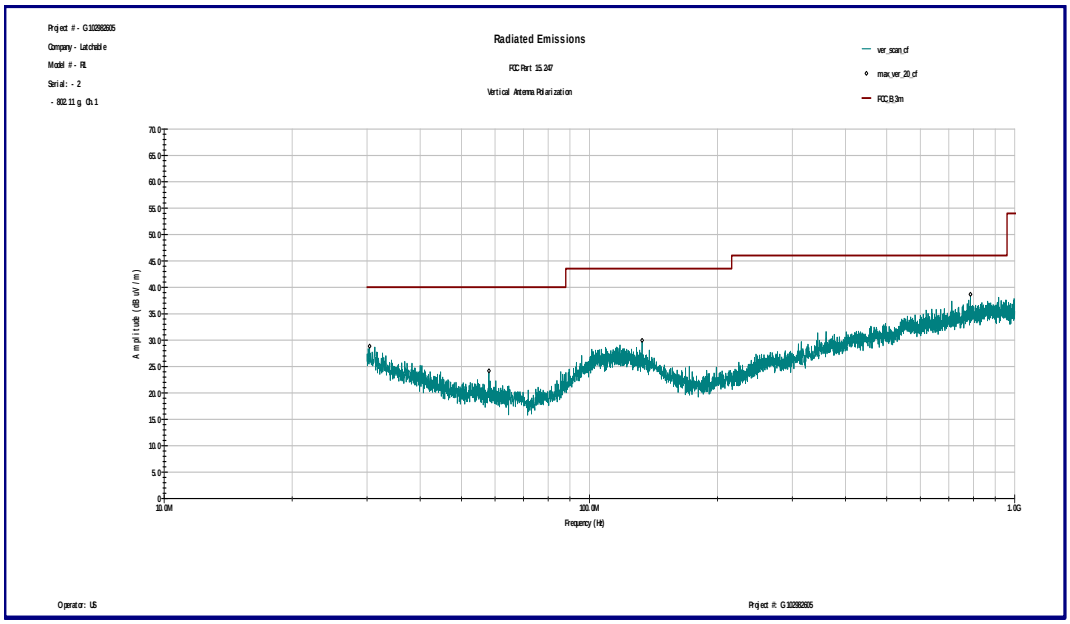
Graph 3.6.22



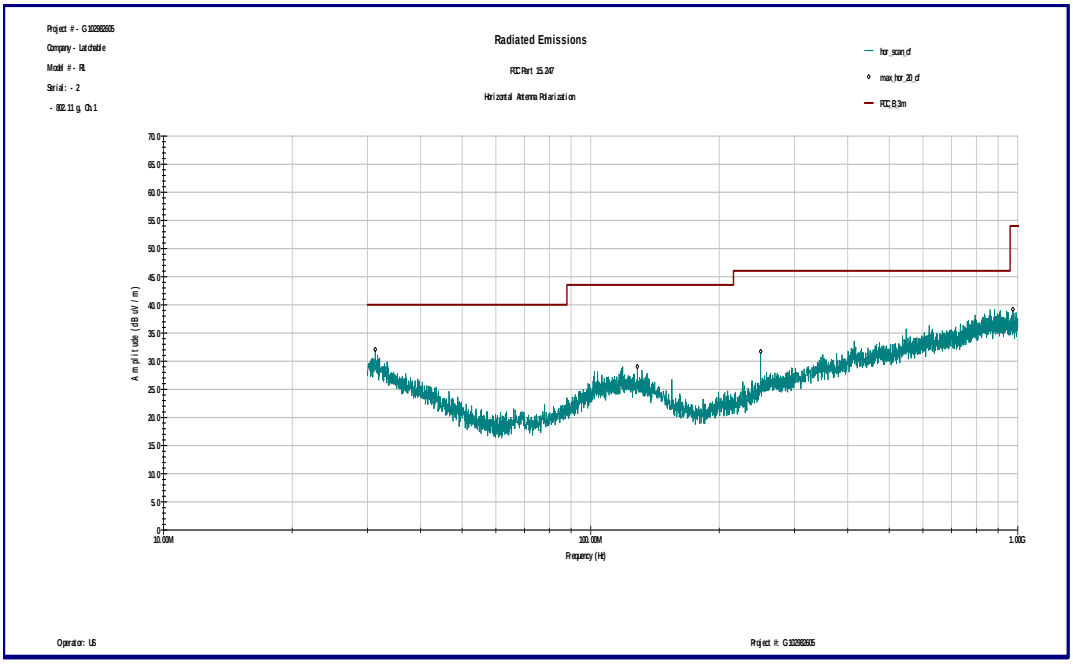
Graph 3.6.23



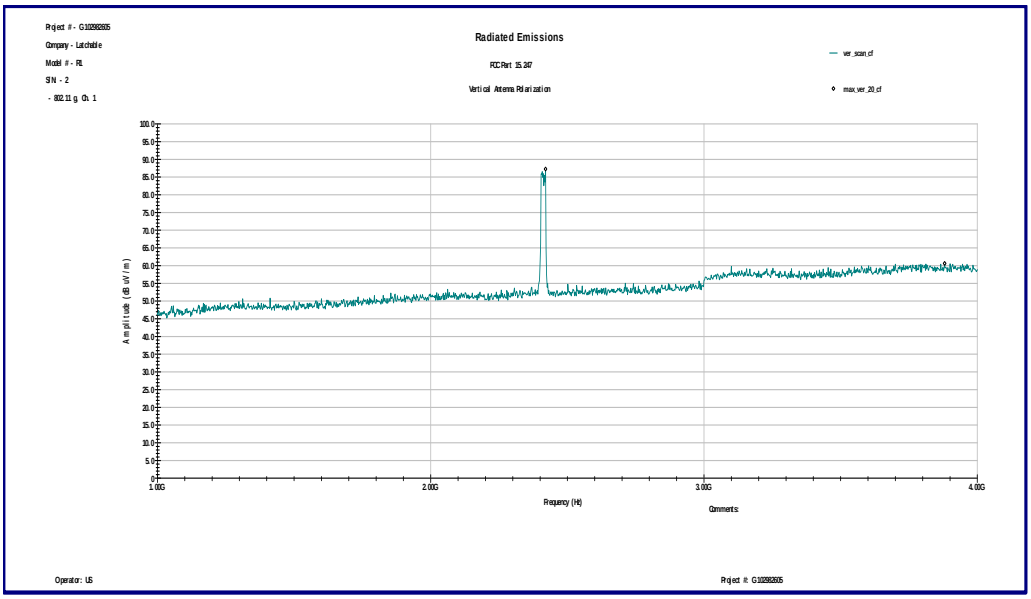
Graph 3.6.24



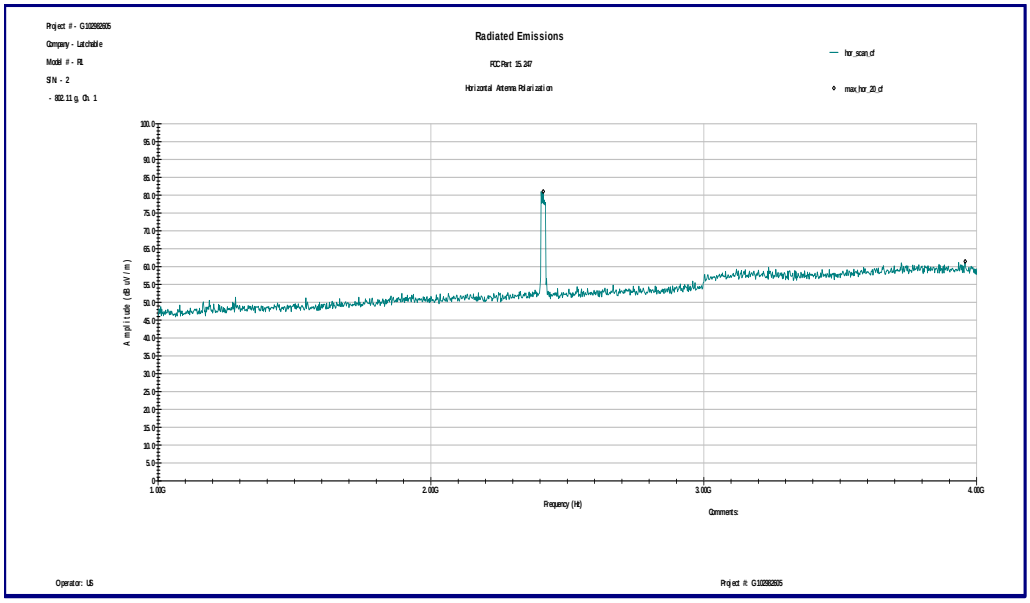
Graph 3.6.25



Graph 3.6.26



Graph 3.6.27



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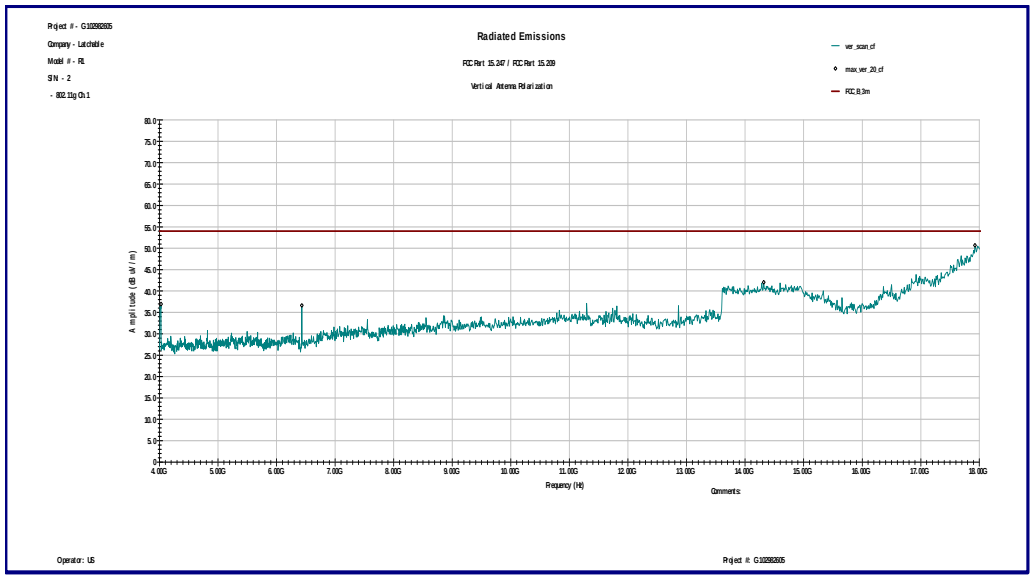

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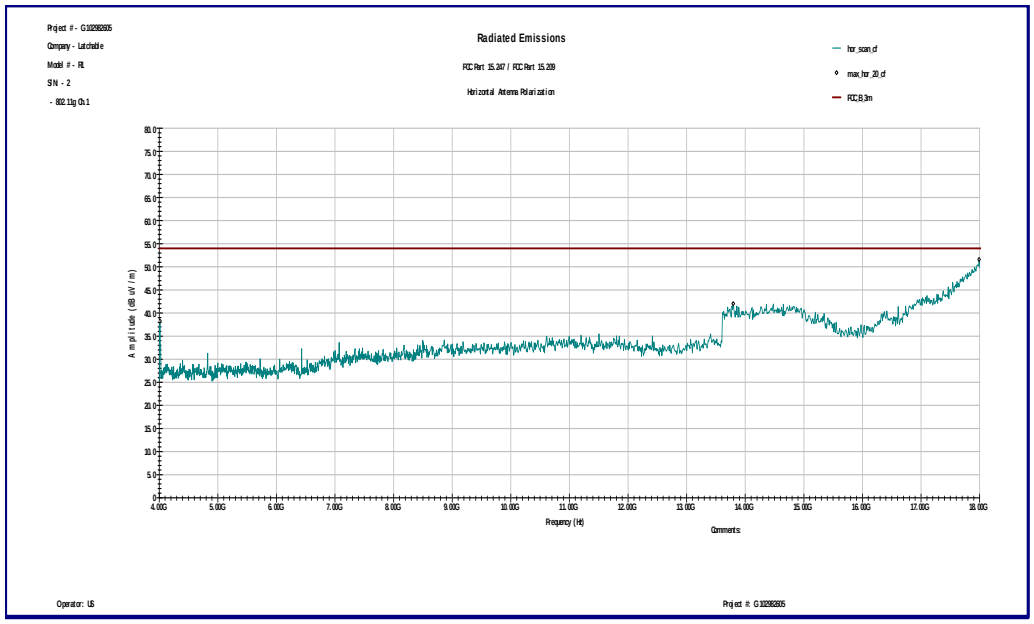

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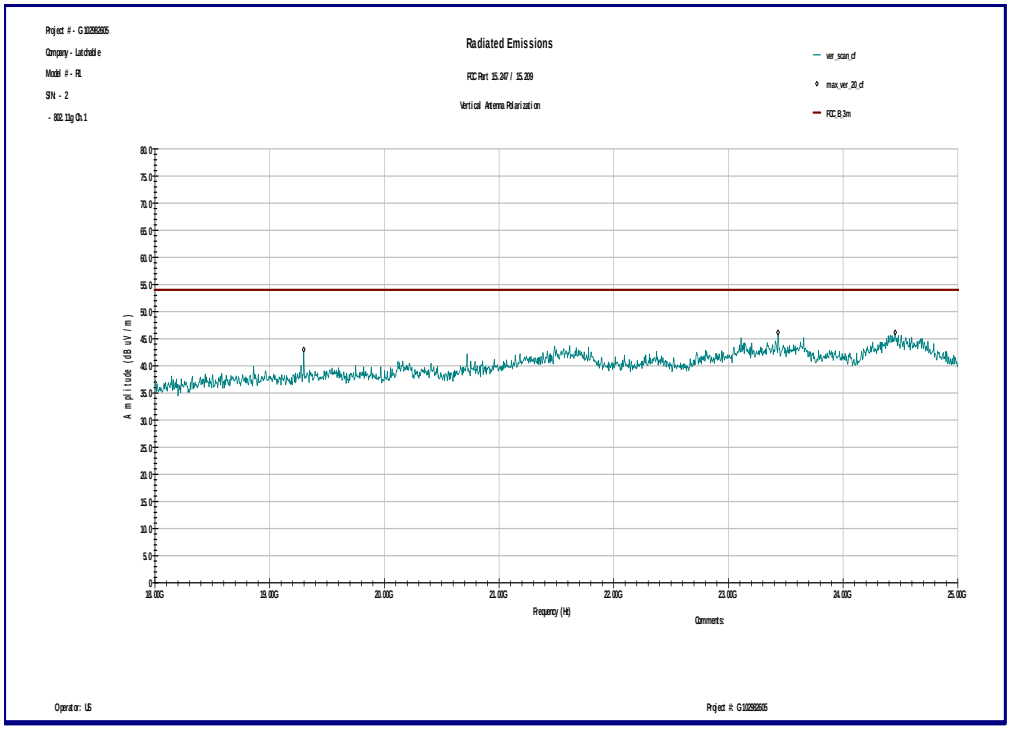

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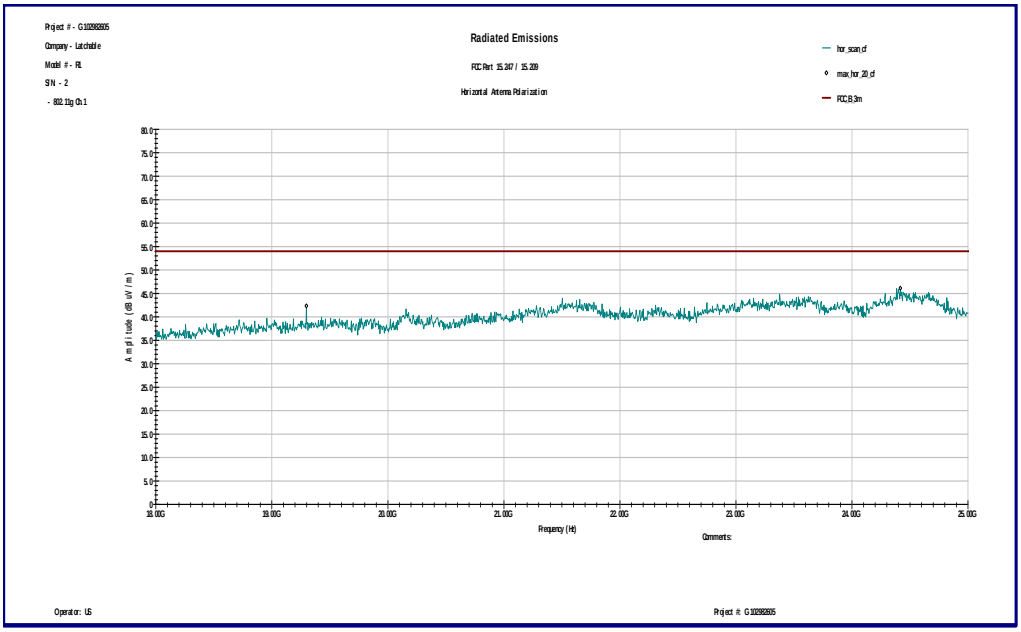

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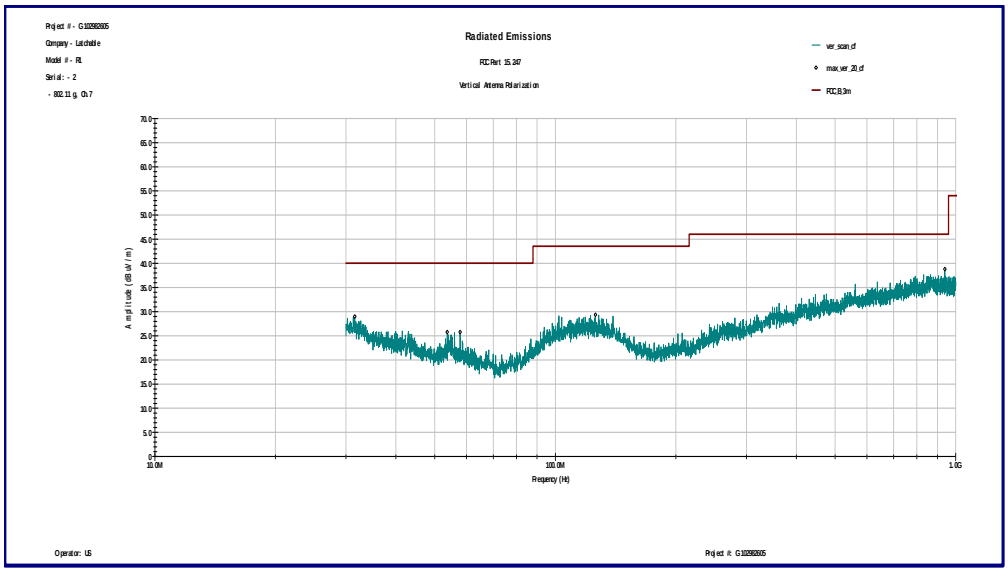

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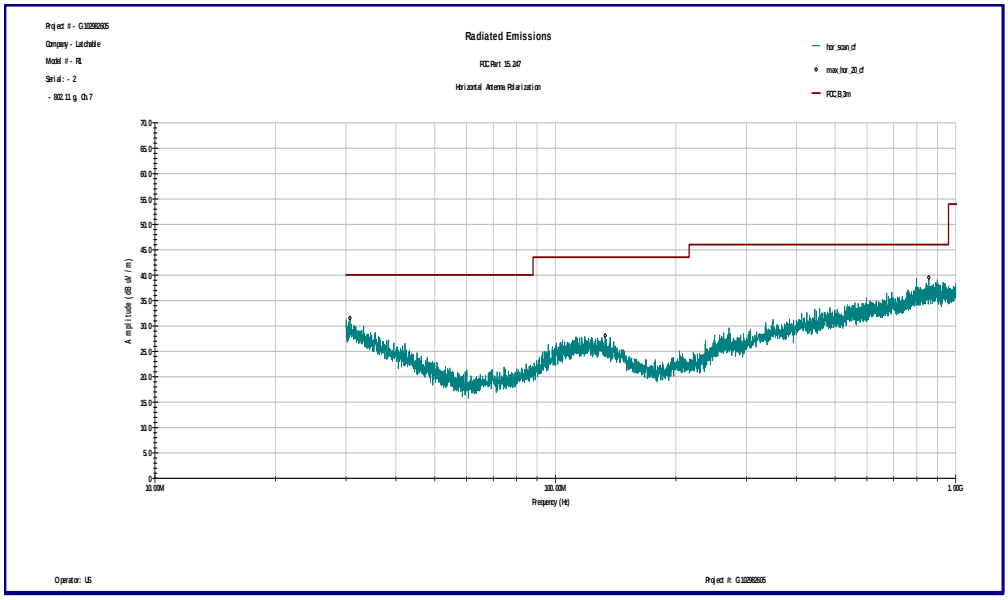

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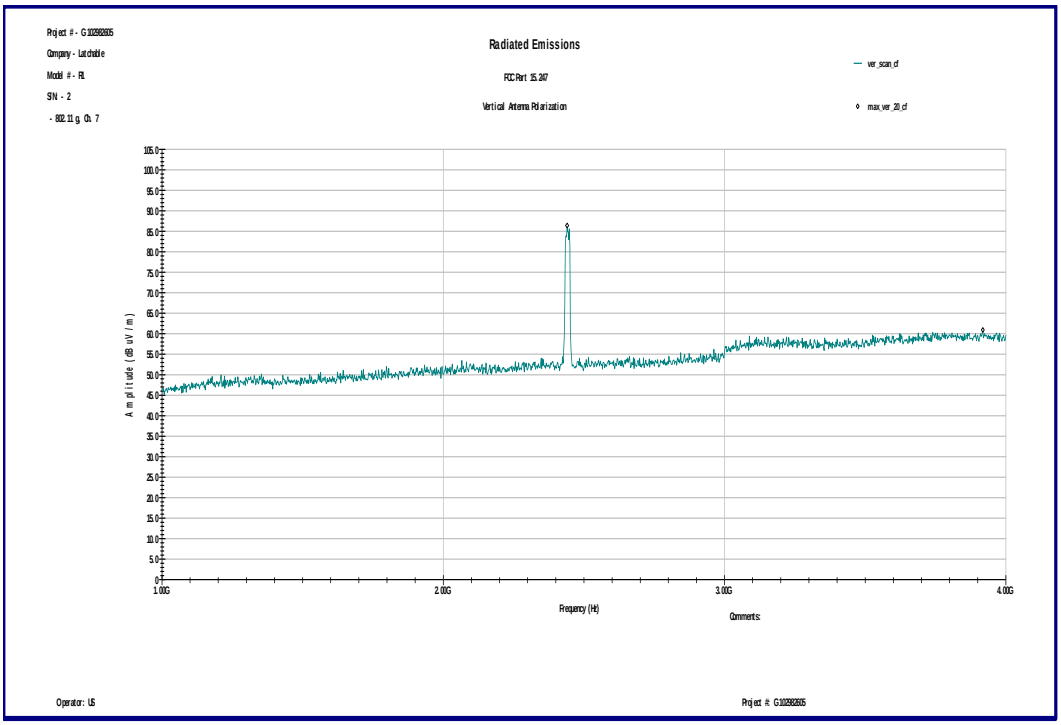

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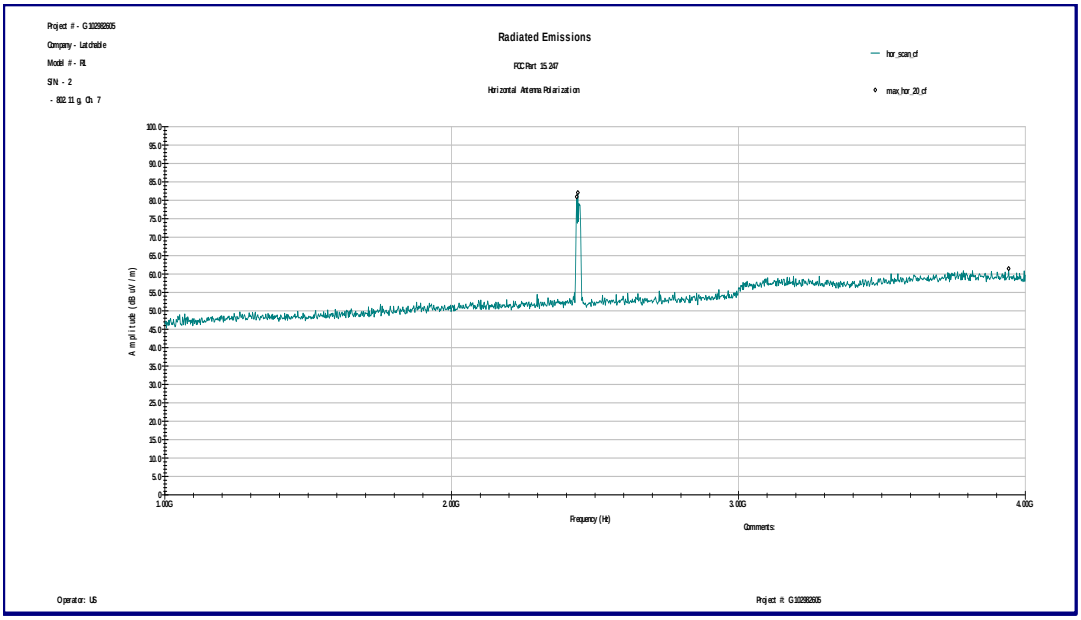

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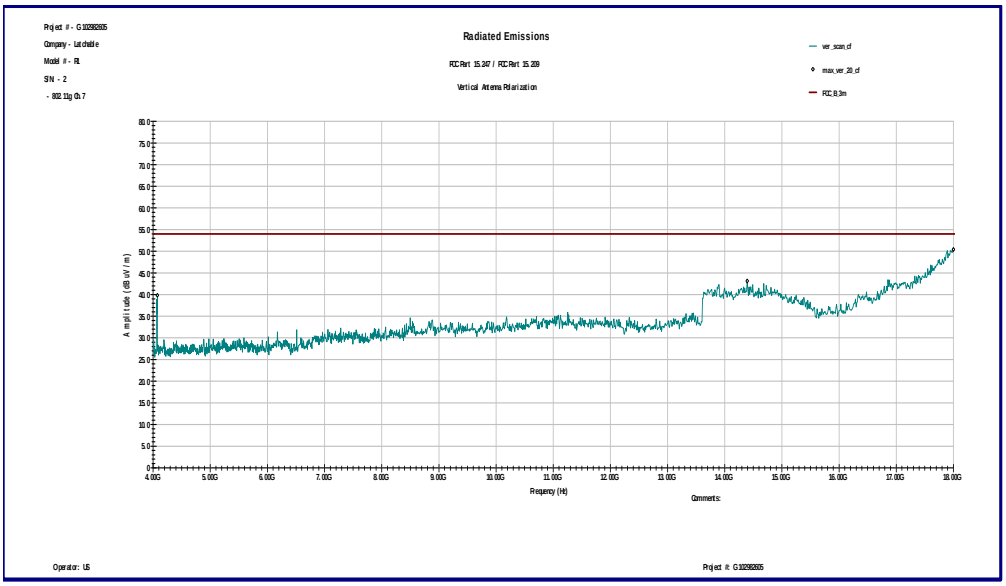

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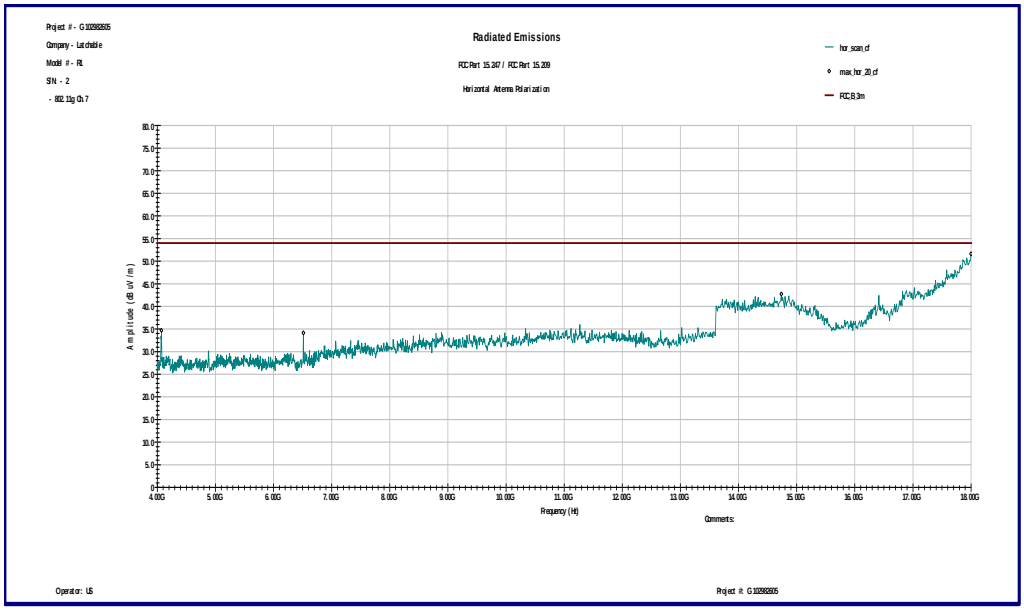

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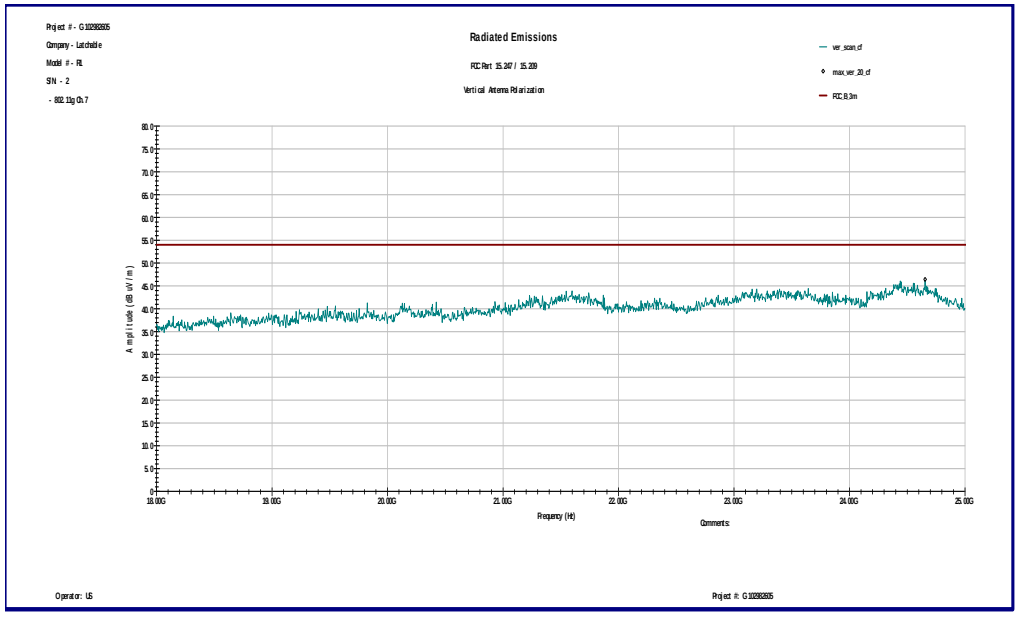

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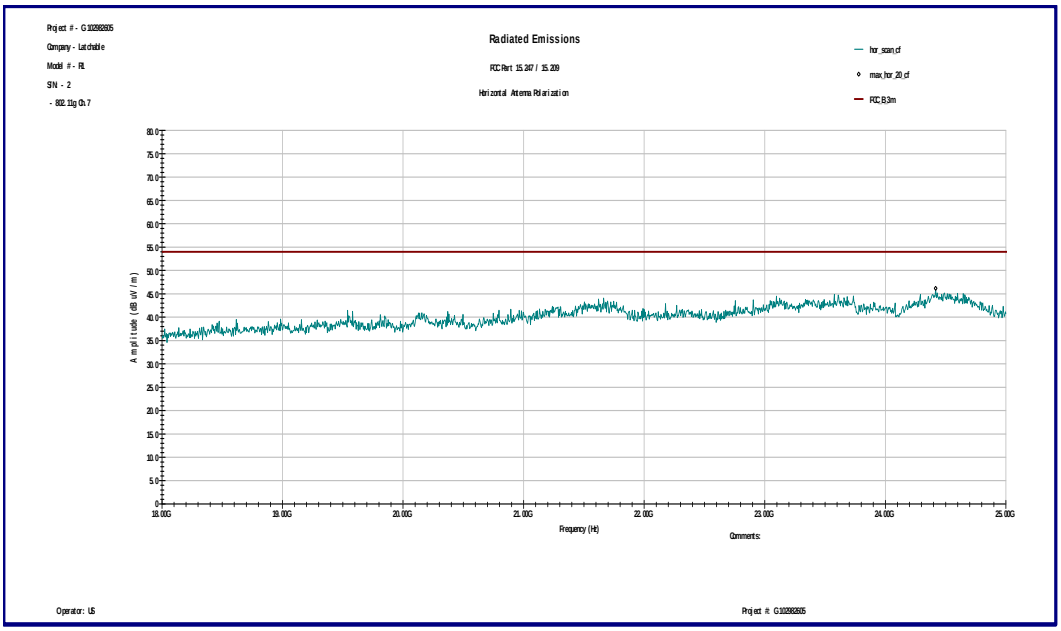
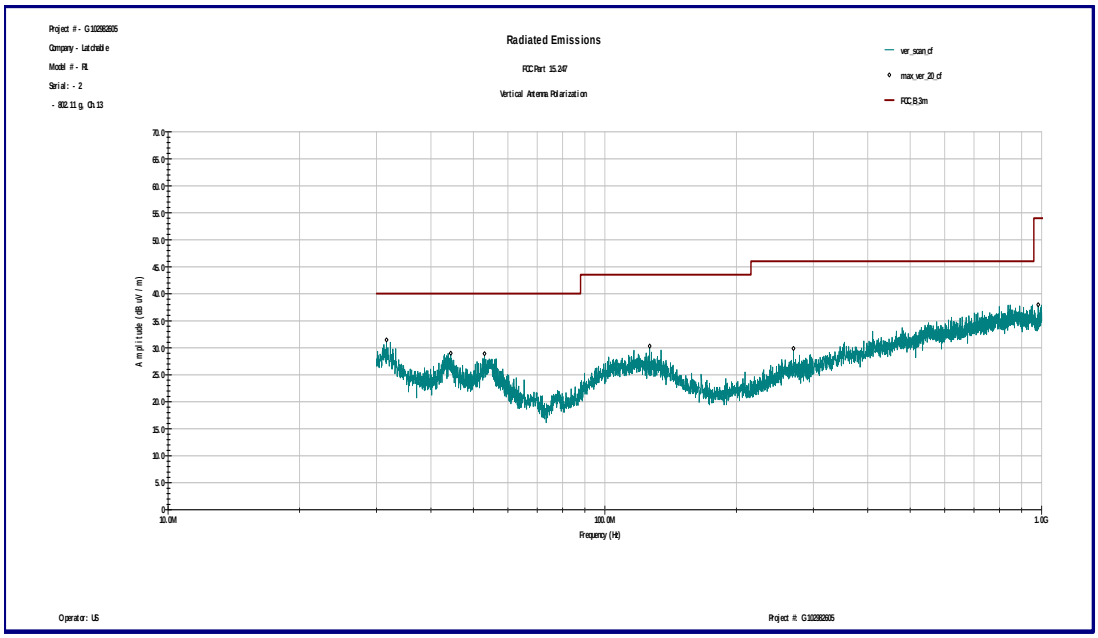
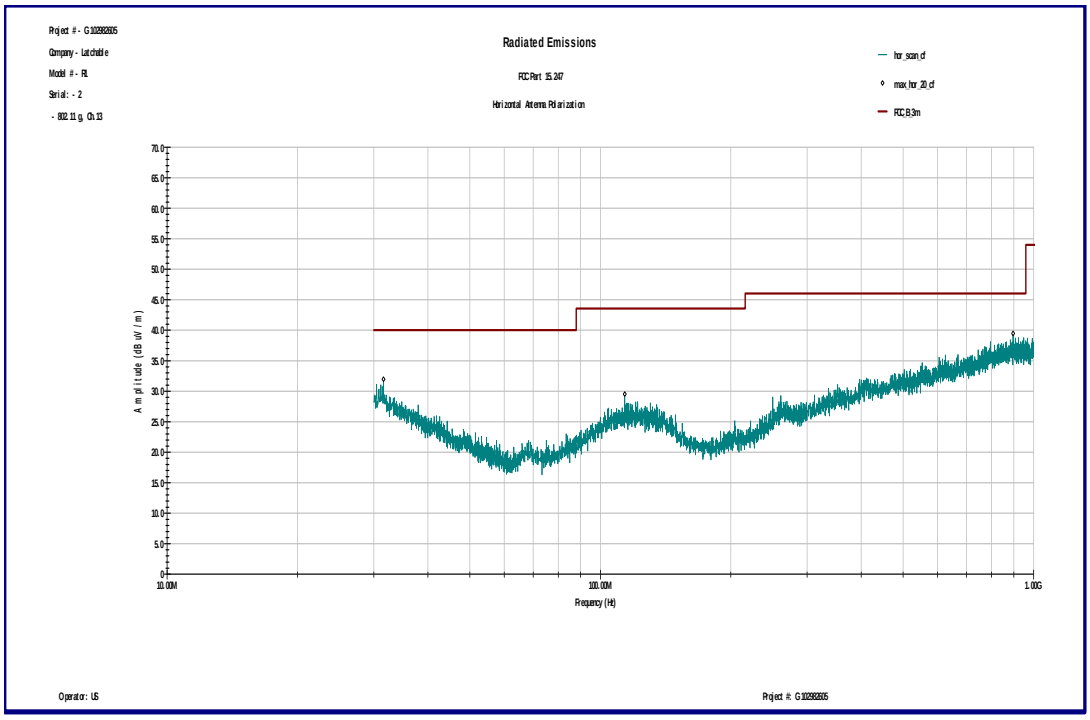


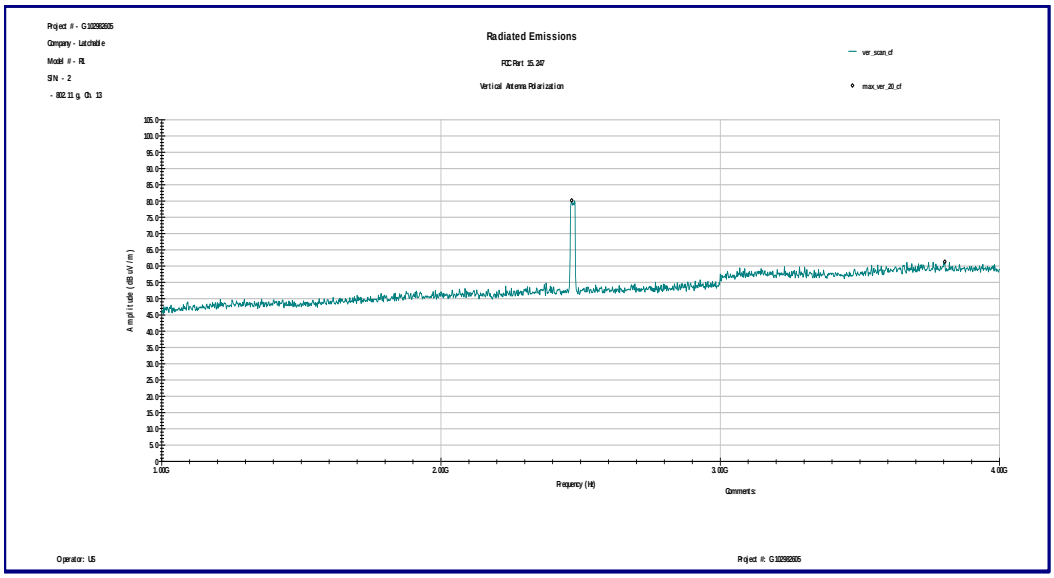
Graph 3.6.40



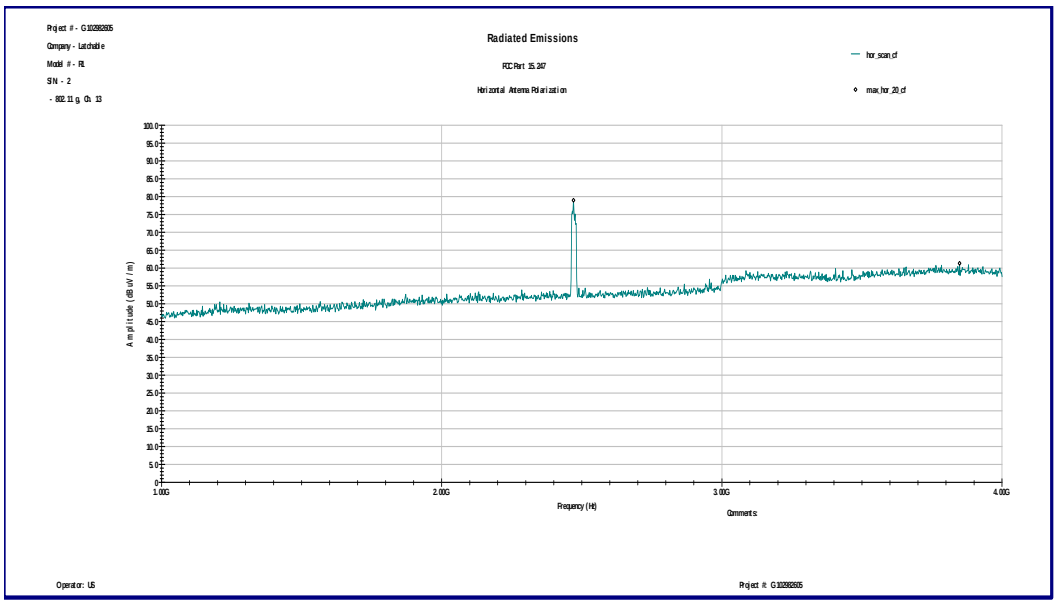
Graph 3.6.41



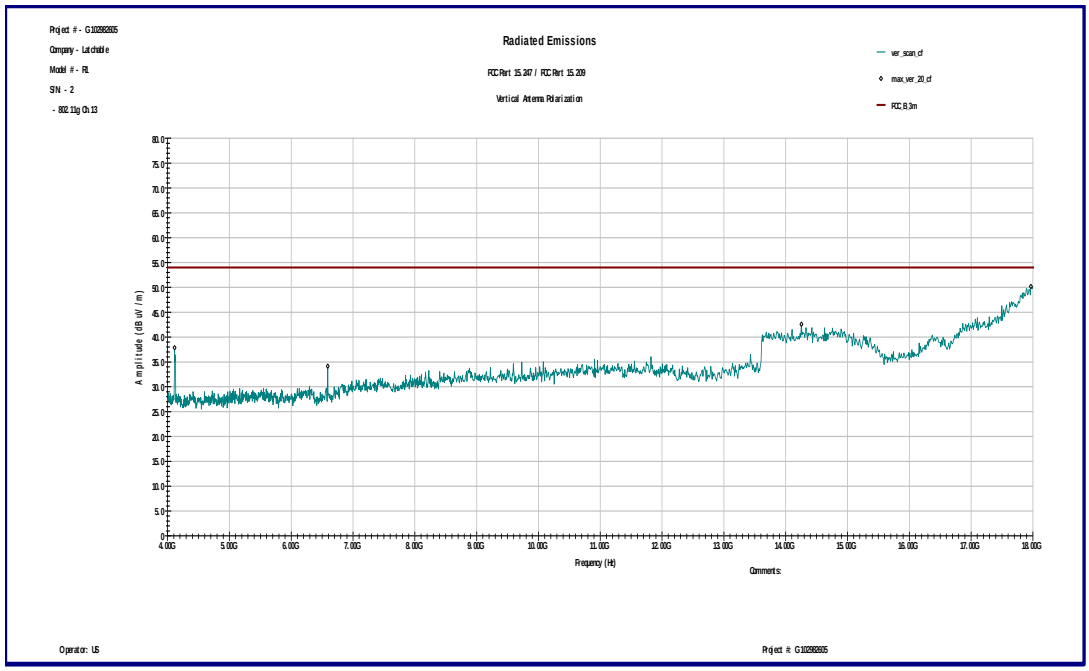
Graph 3.6.42



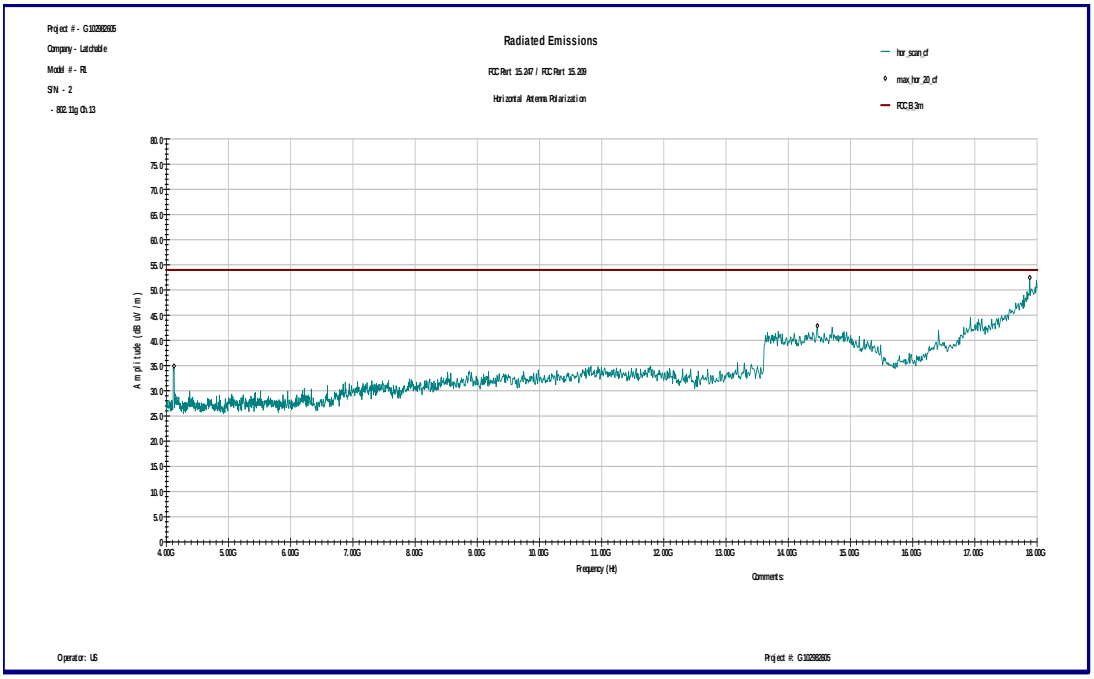
Graph 3.6.43



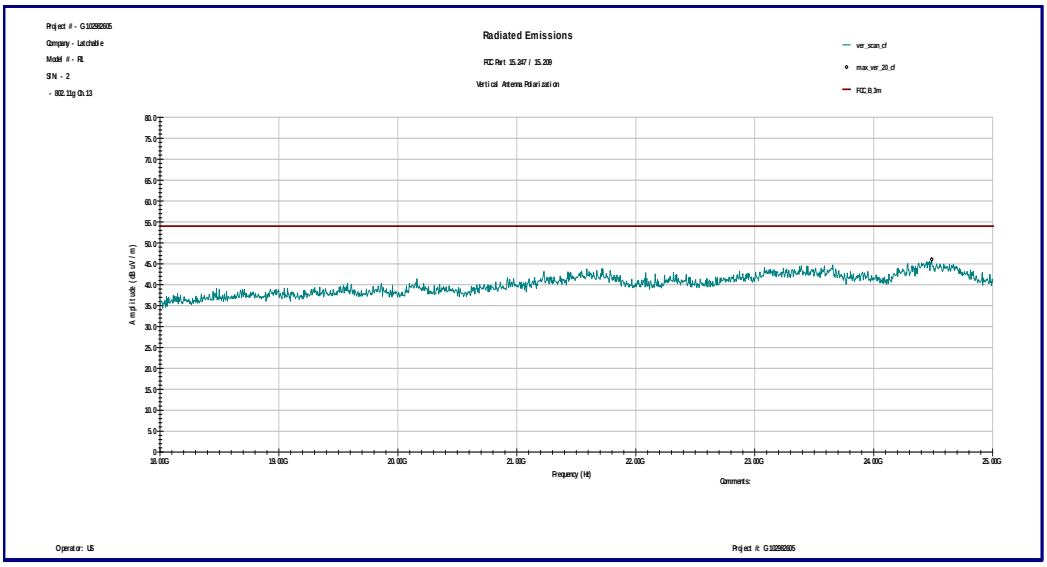
Graph 3.6.44



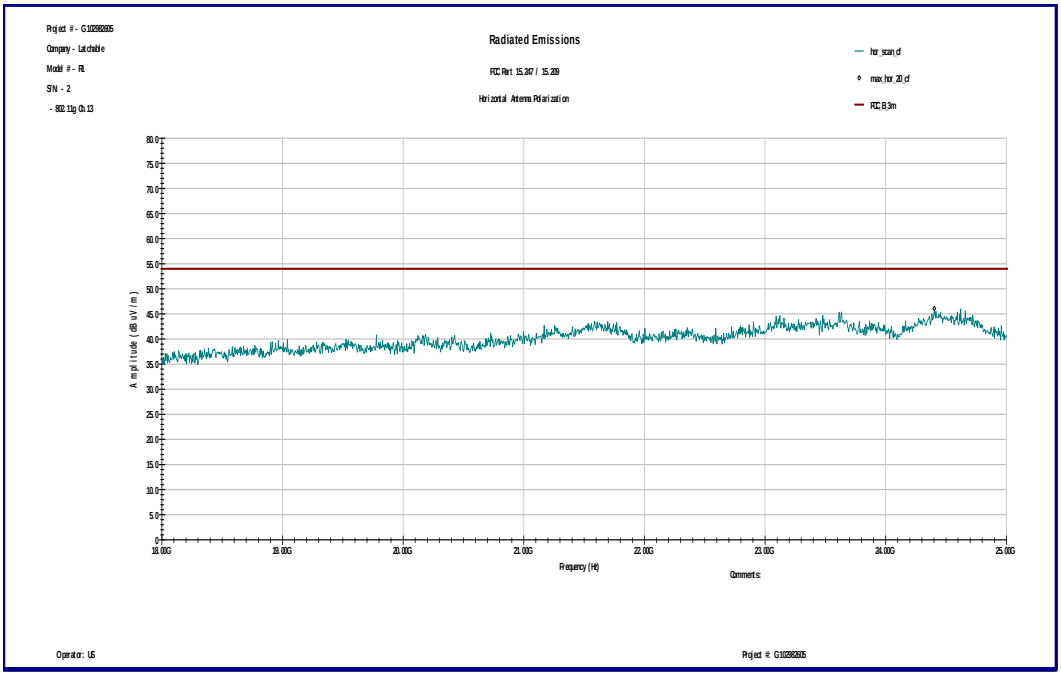
Graph 3.6.45



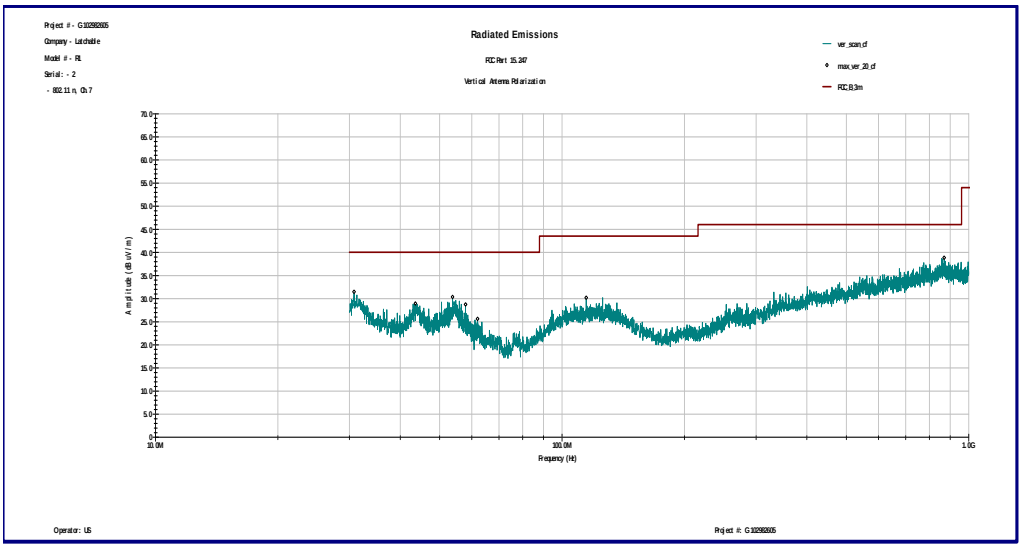
Graph 3.6.46



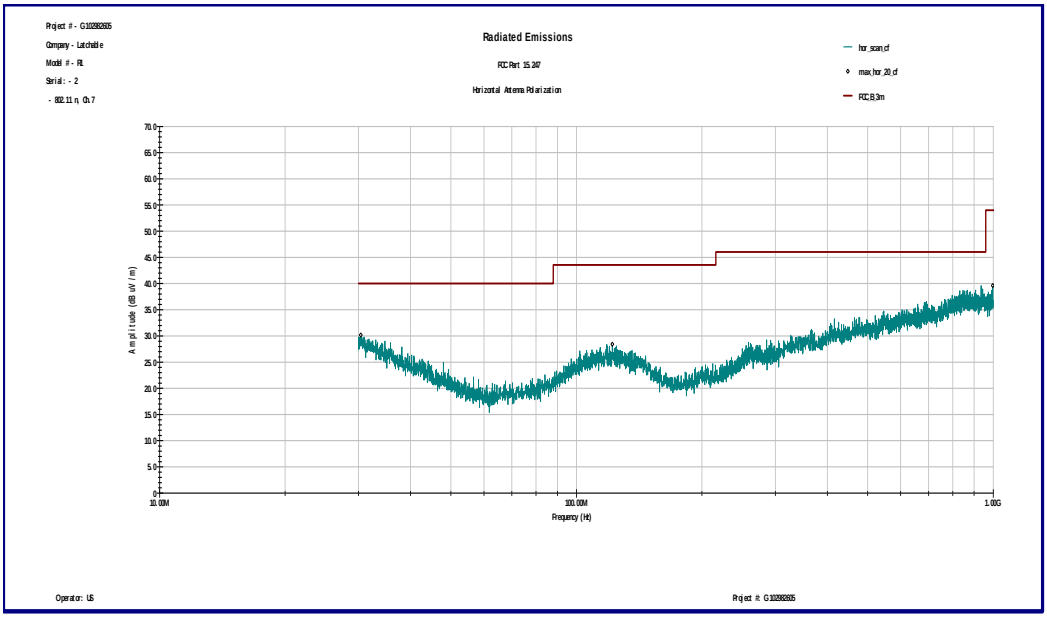
Graph 3.6.47



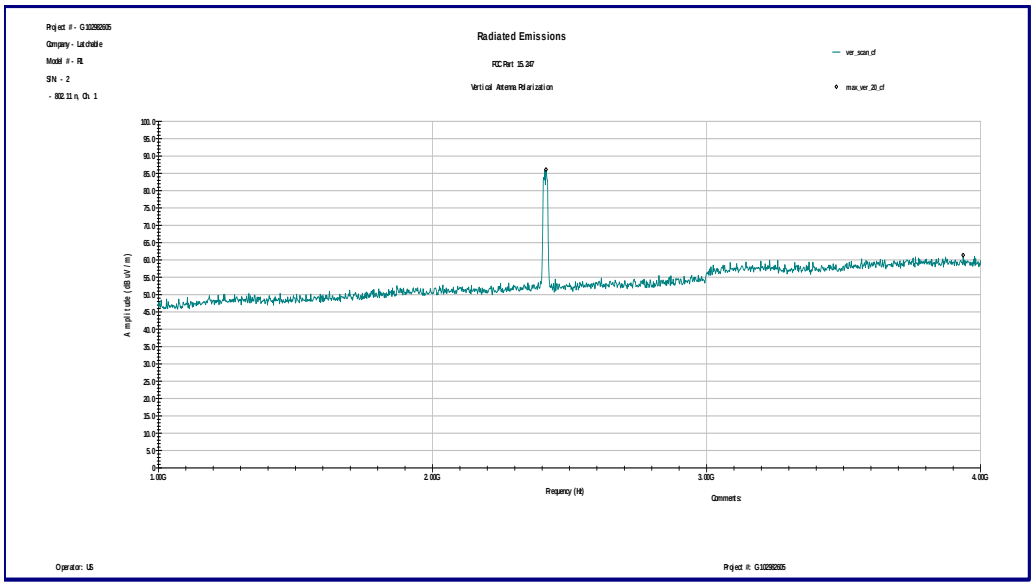
Graph 3.6.48



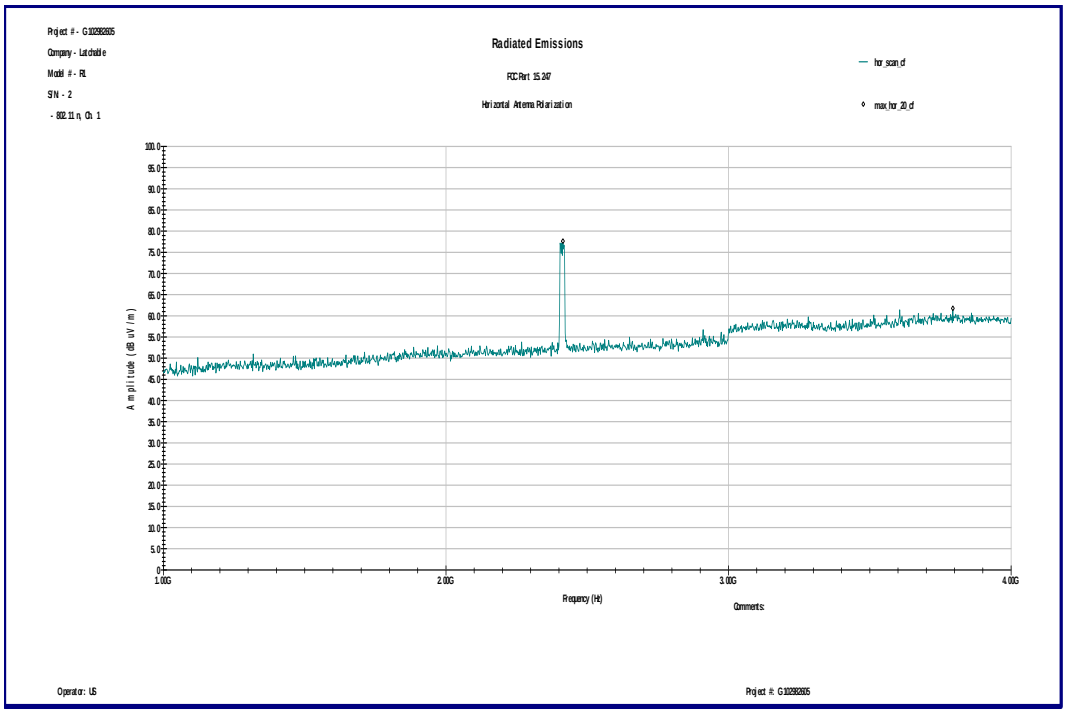
Graph 3.6.49



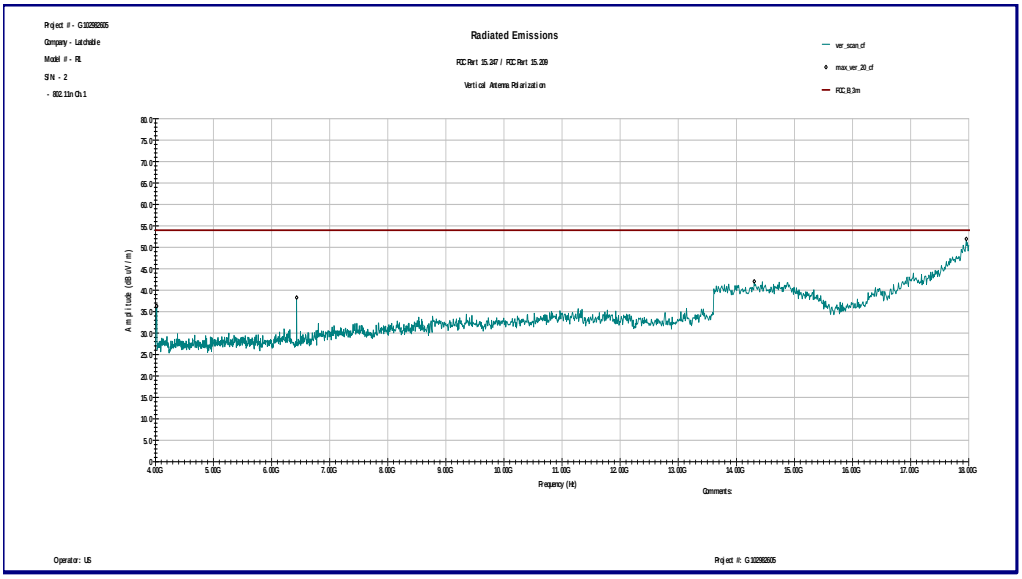
Graph 3.6.50



Graph 3.6.51



Graph 3.6.52



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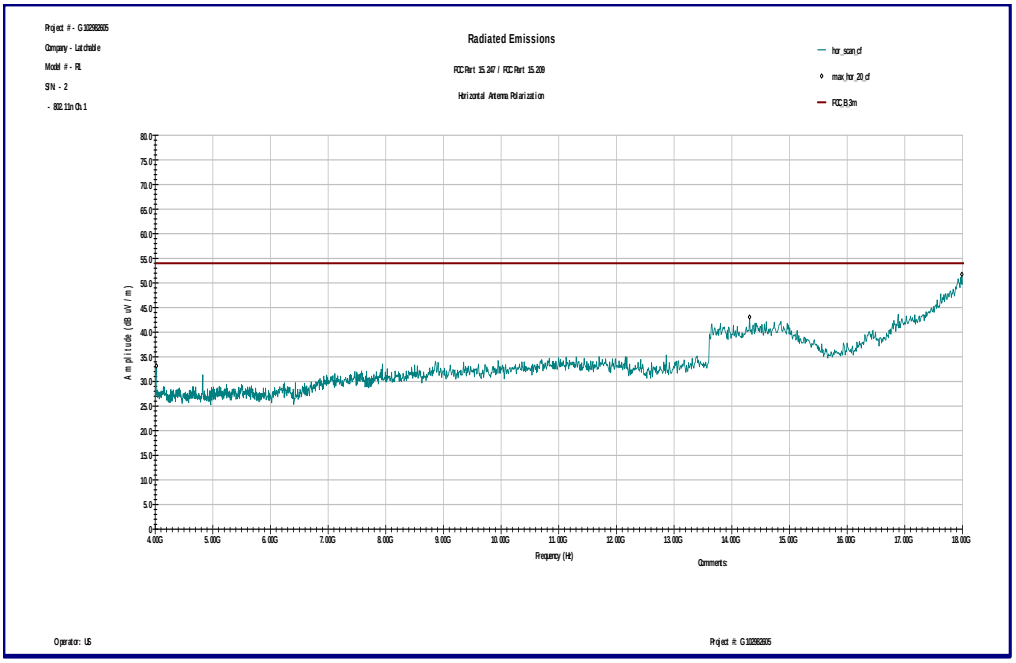
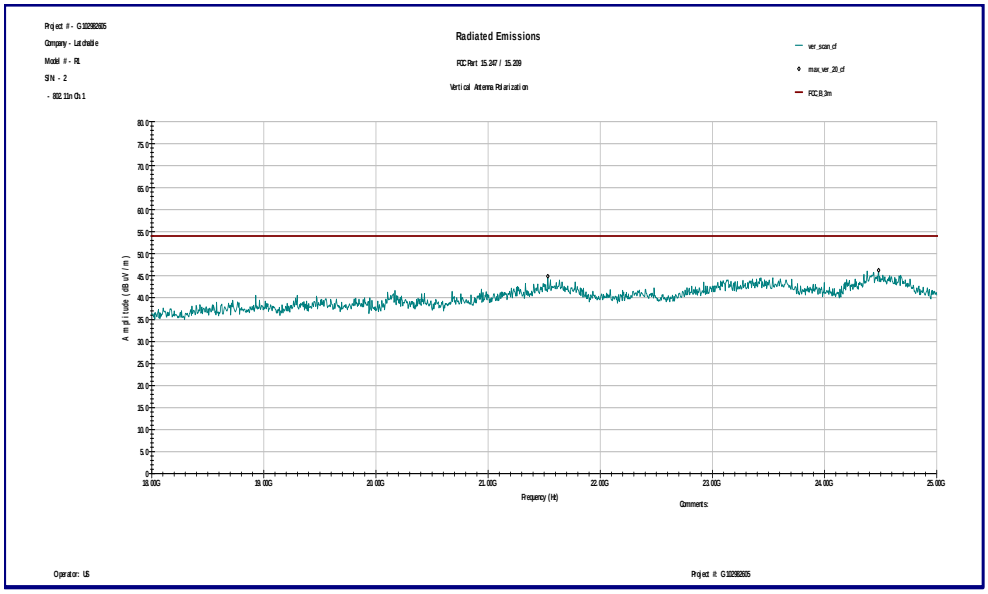
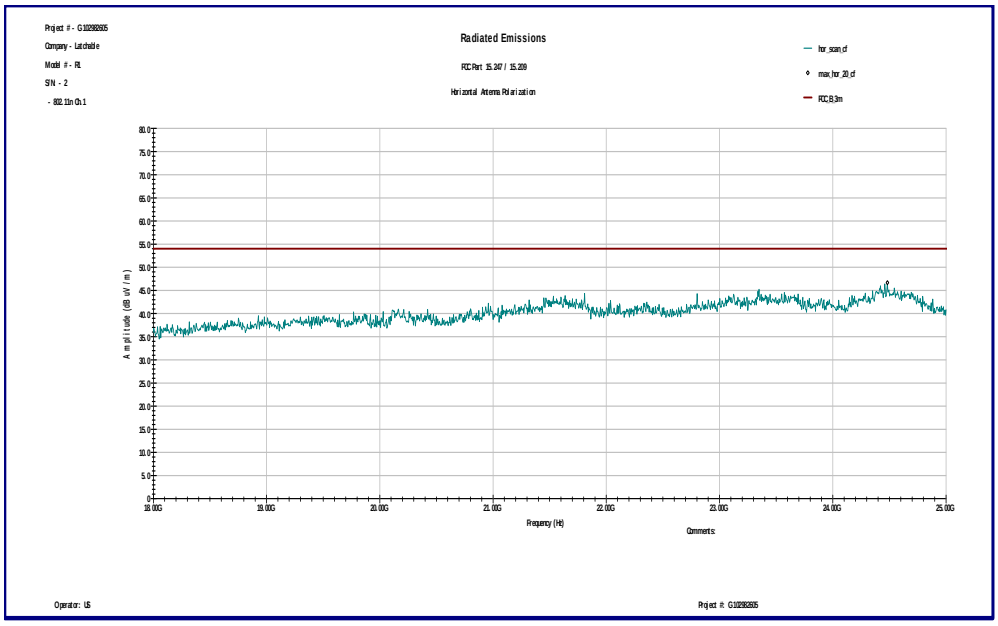


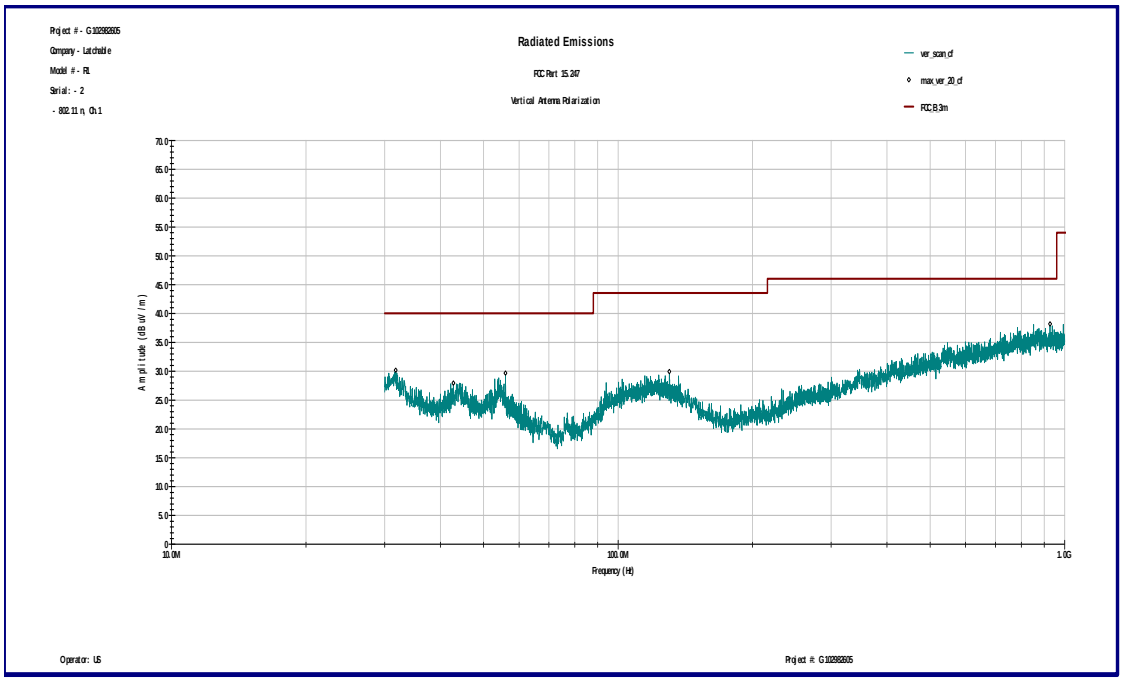
Graph 3.6.54



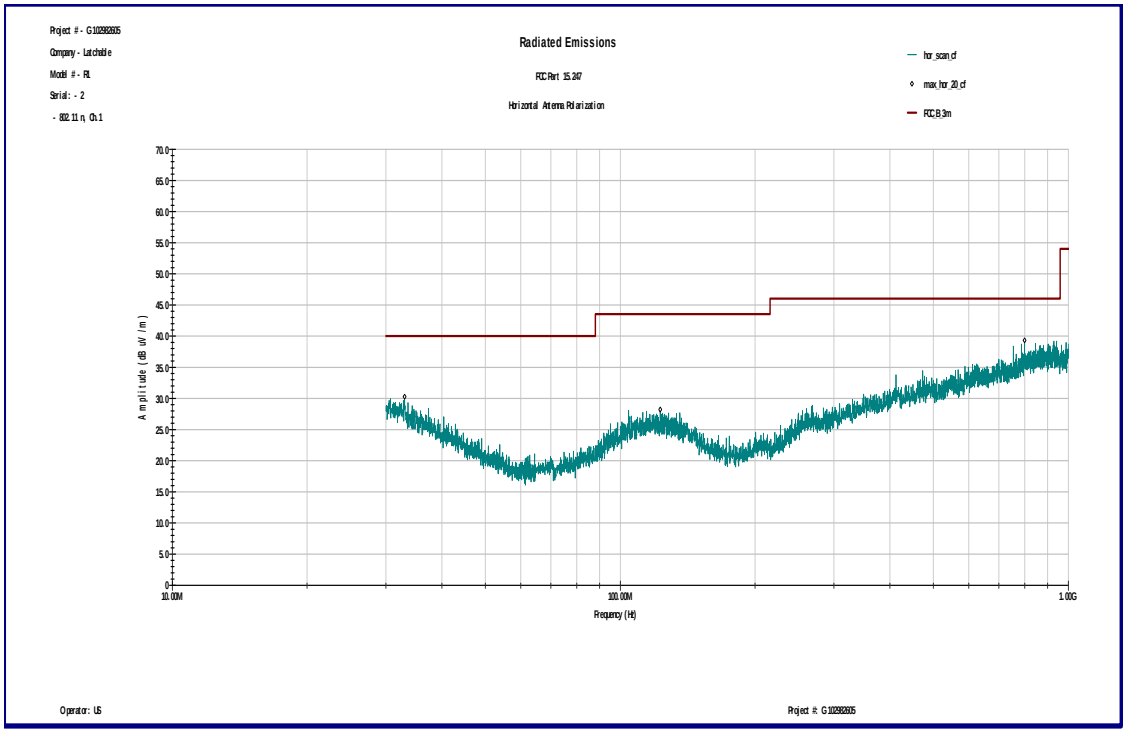
Graph 3.6.55



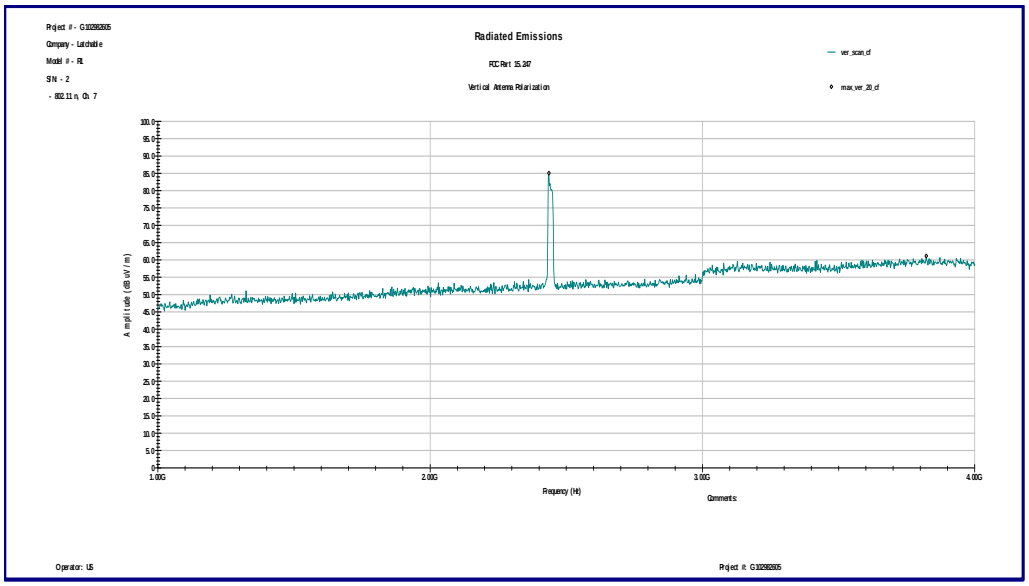
Graph 3.6.56



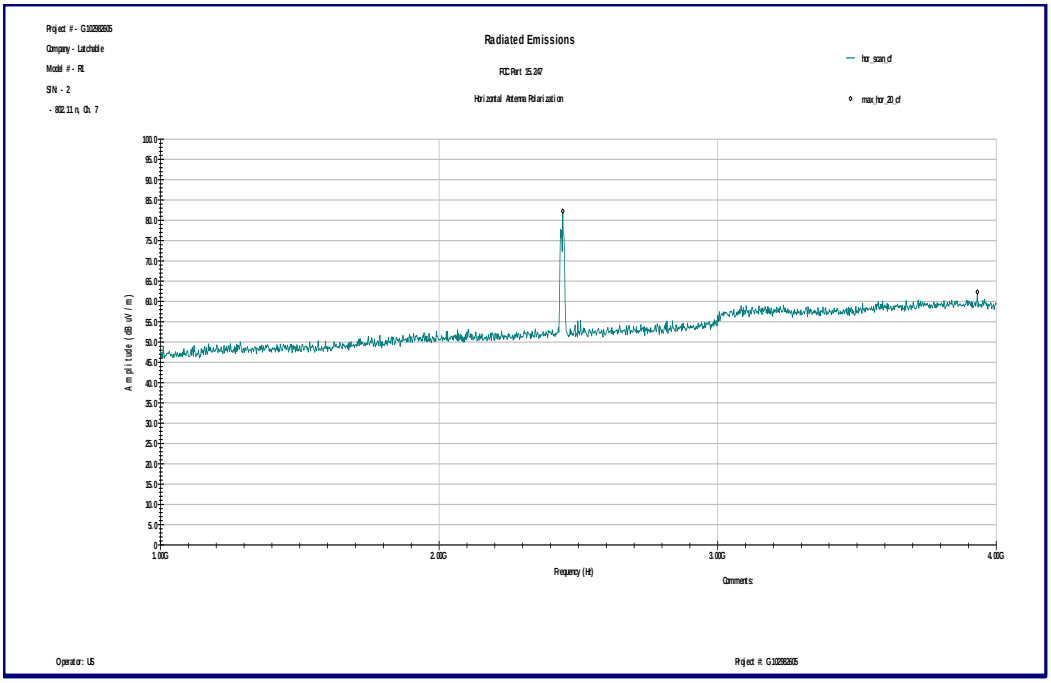
Graph 3.6.57



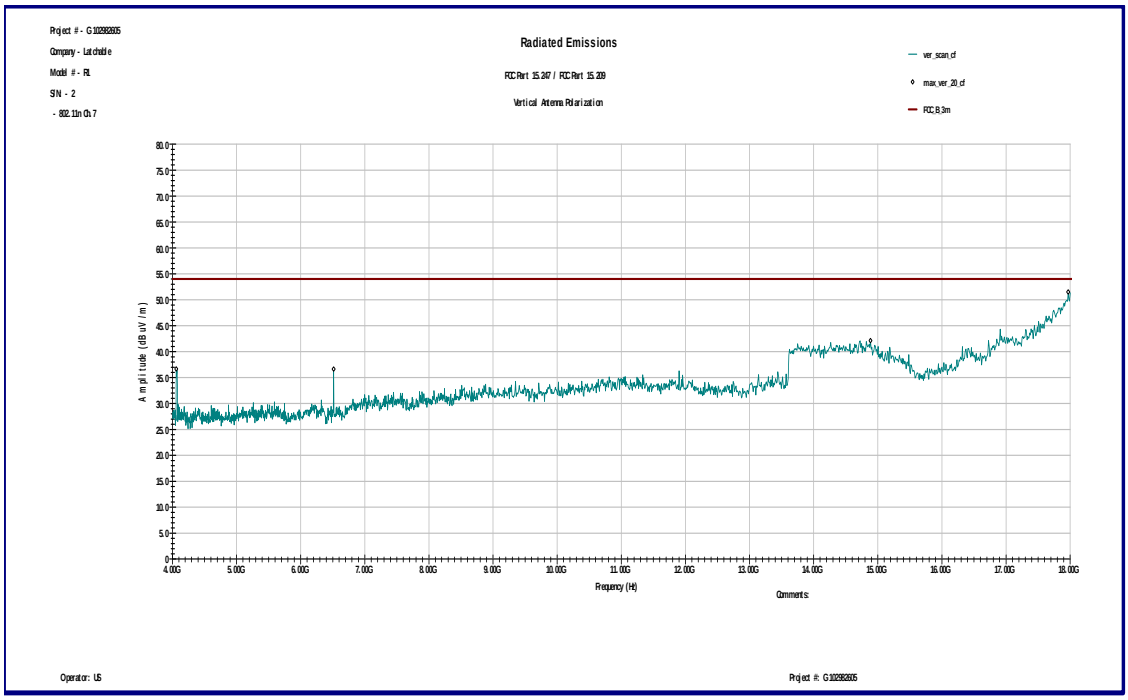
Graph 3.6.58



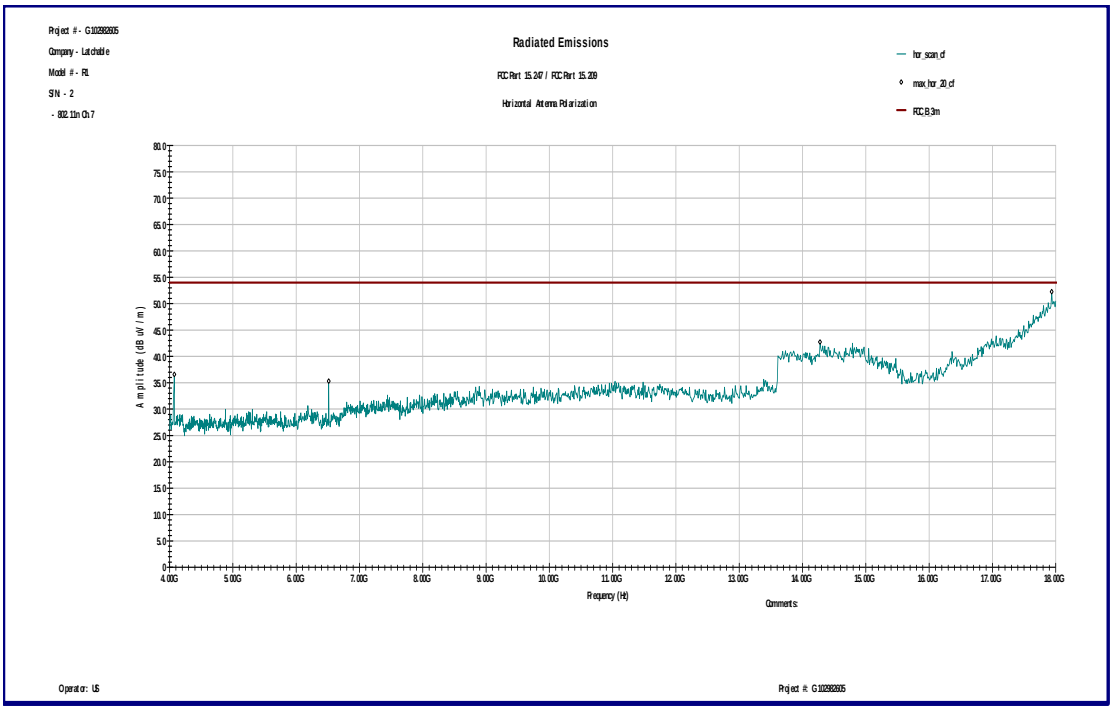
Graph 3.6.59



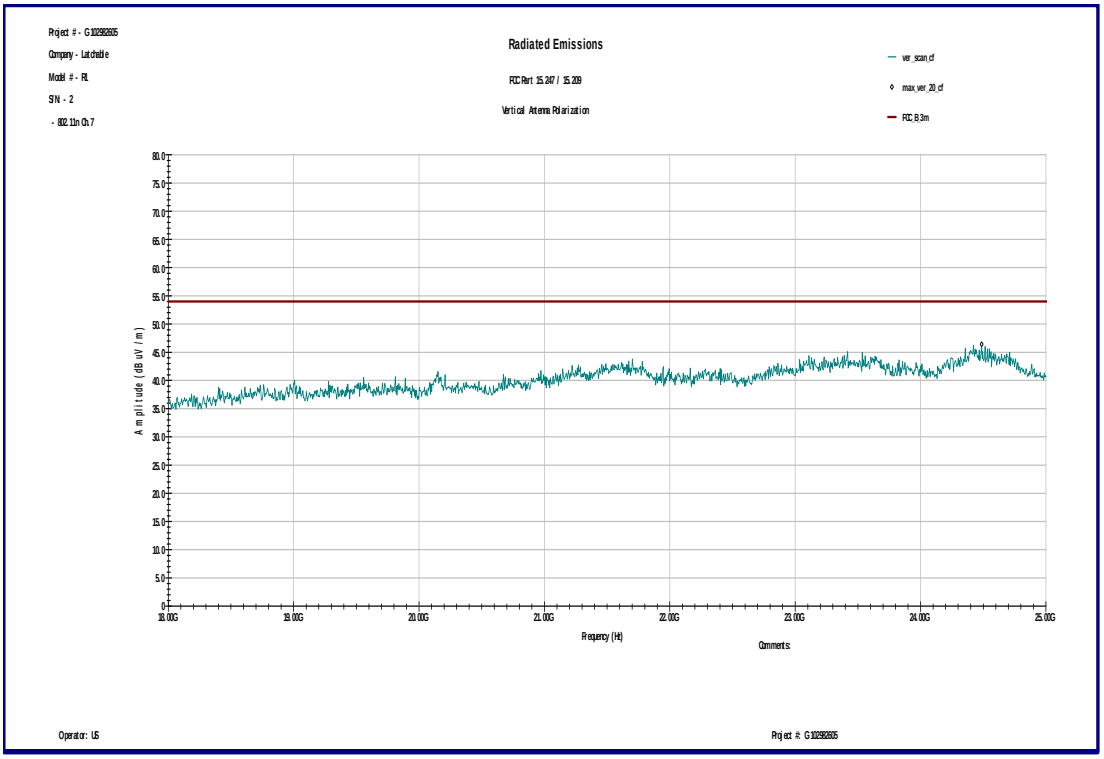
Graph 3.6.60



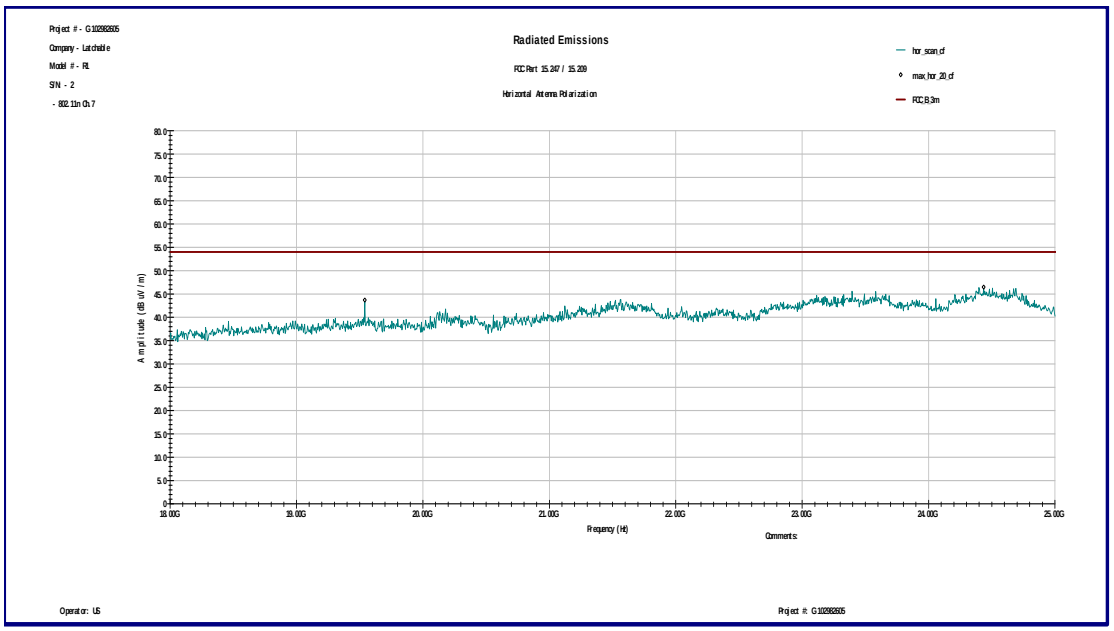
Graph 3.6.61



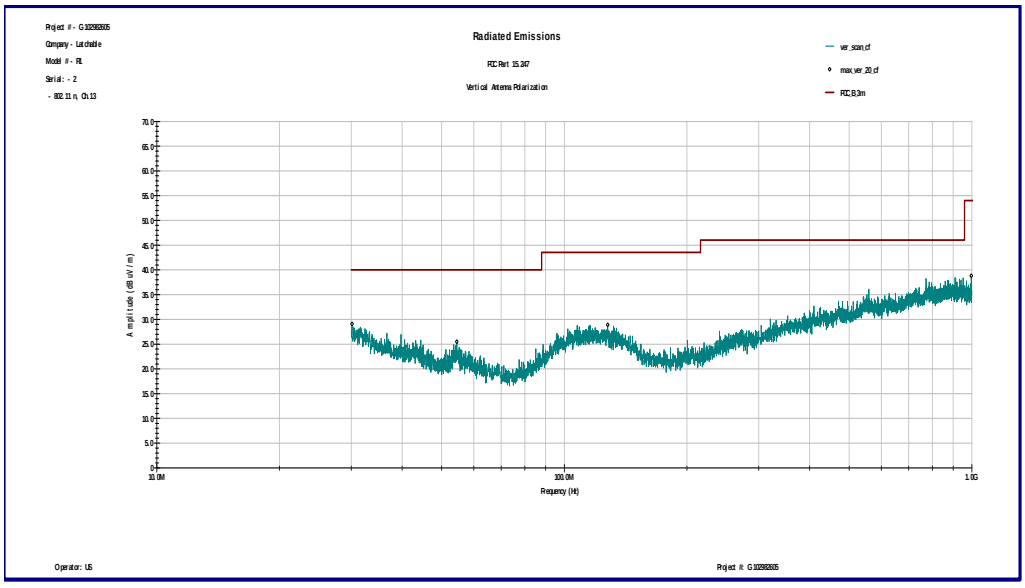
Graph 3.6.62



Graph 3.6.63



Graph 3.6.64



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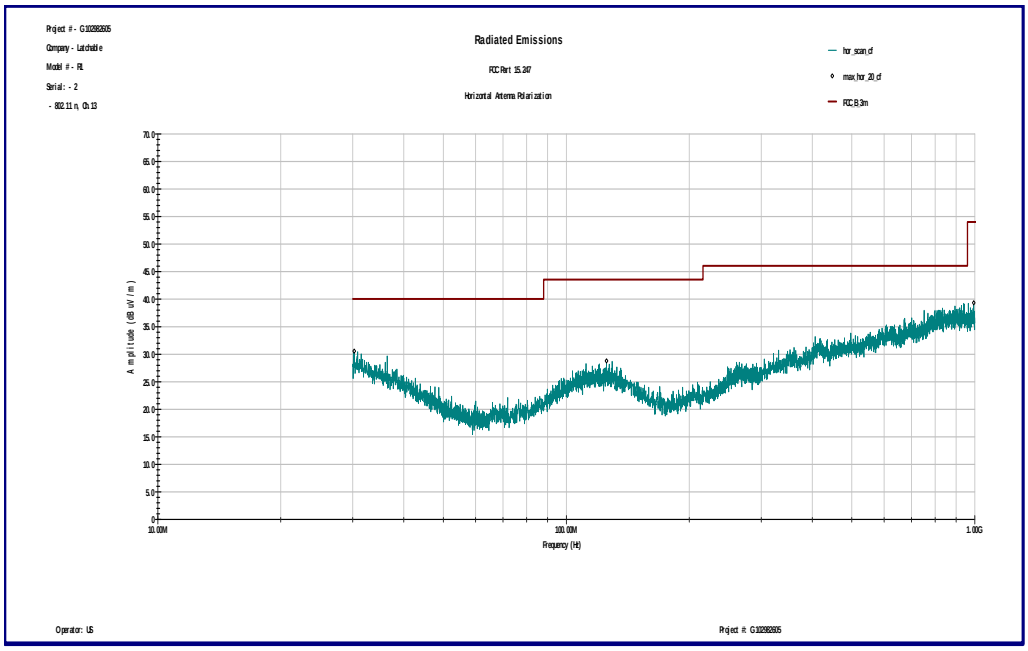

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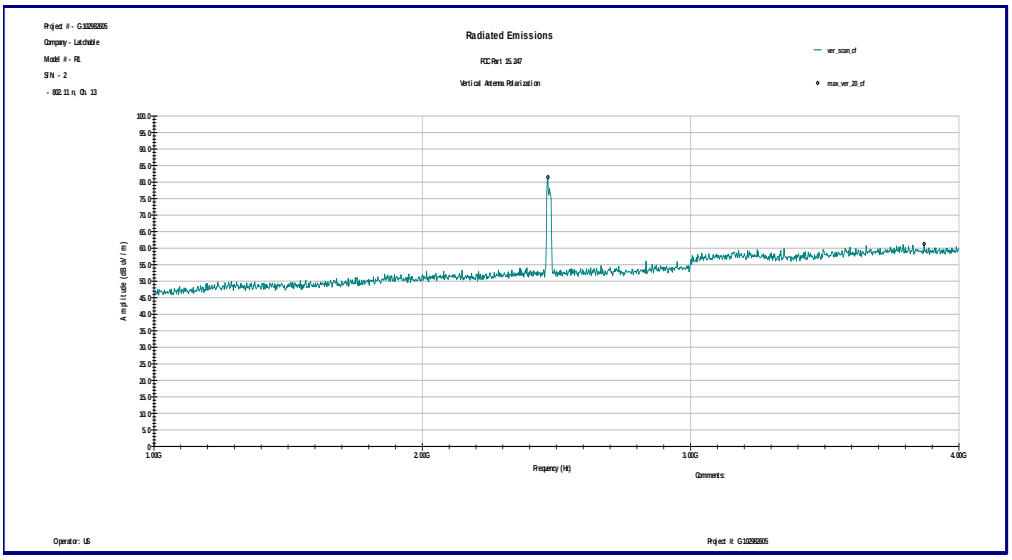
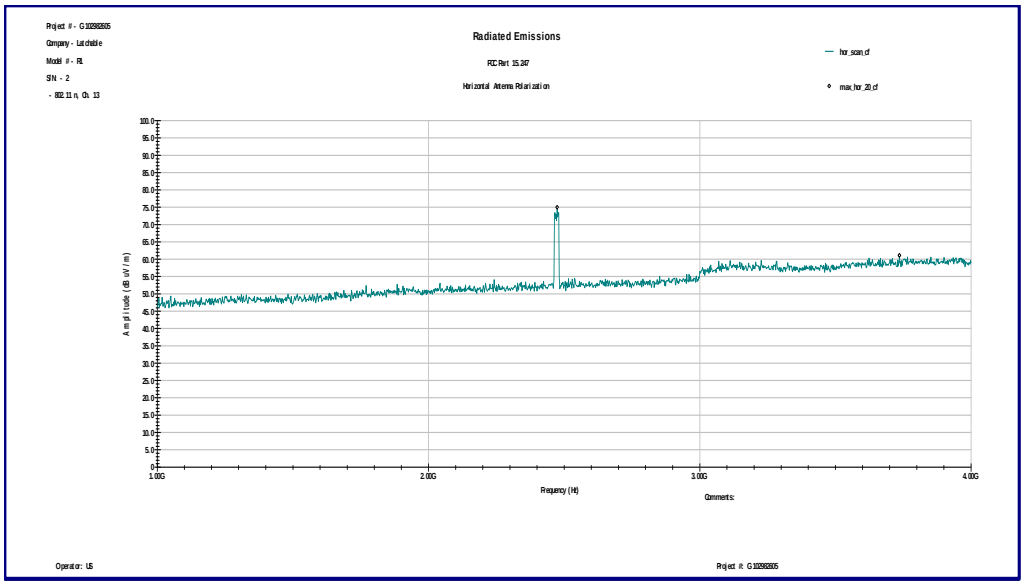
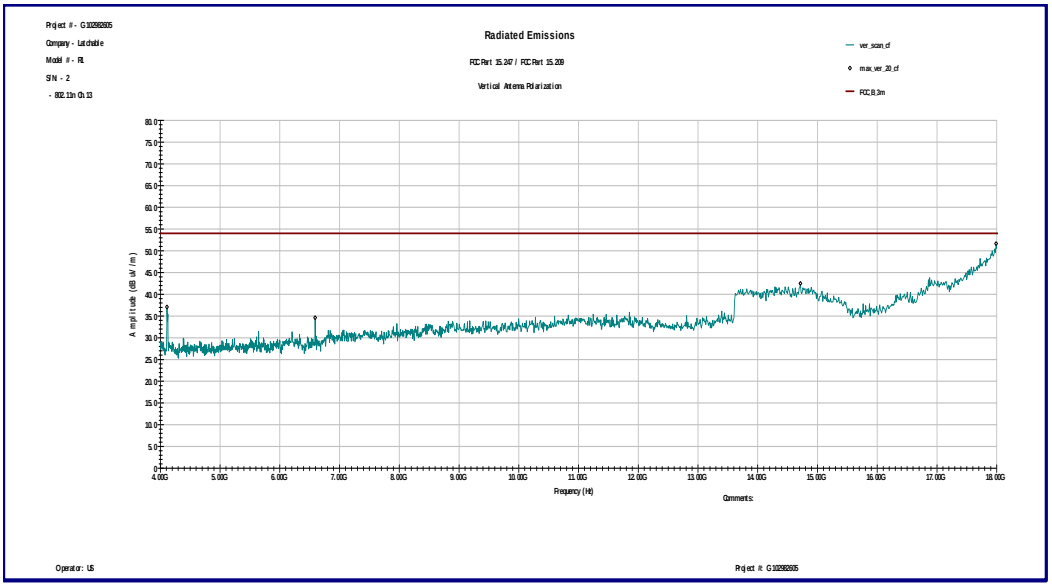


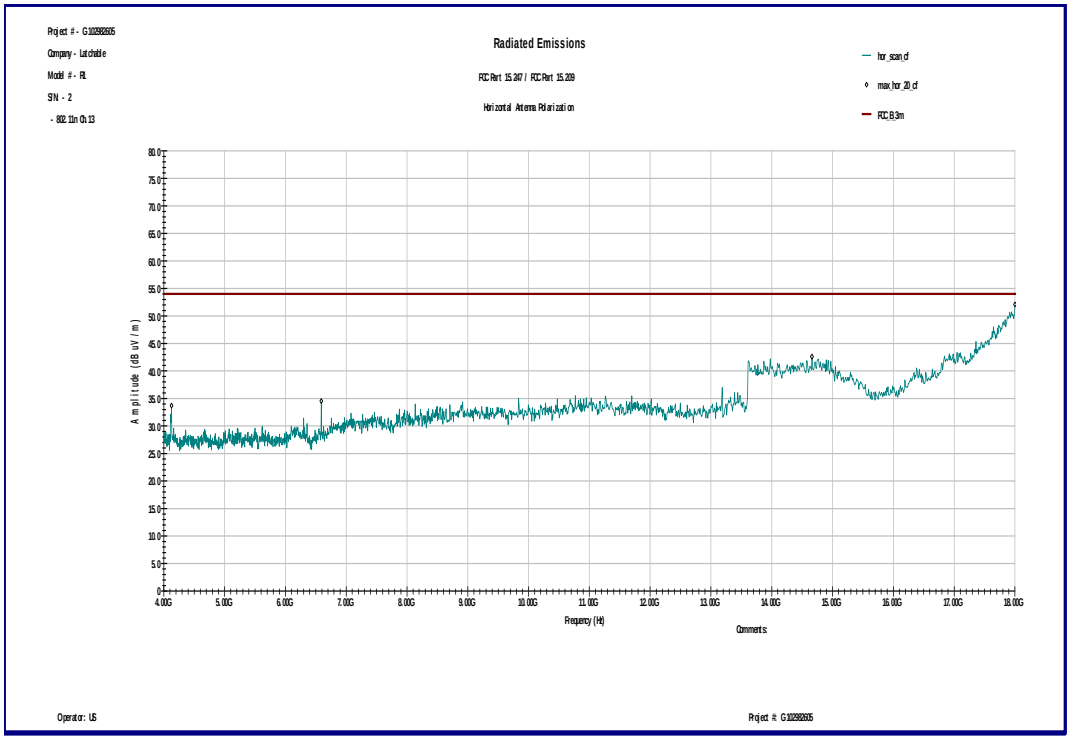
Graph 3.6.67



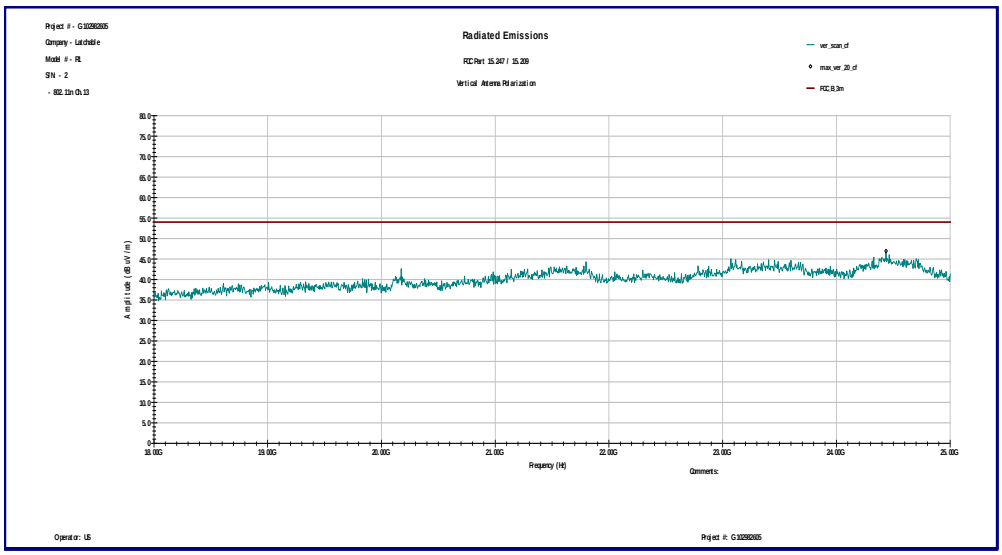
Graph 3.6.68



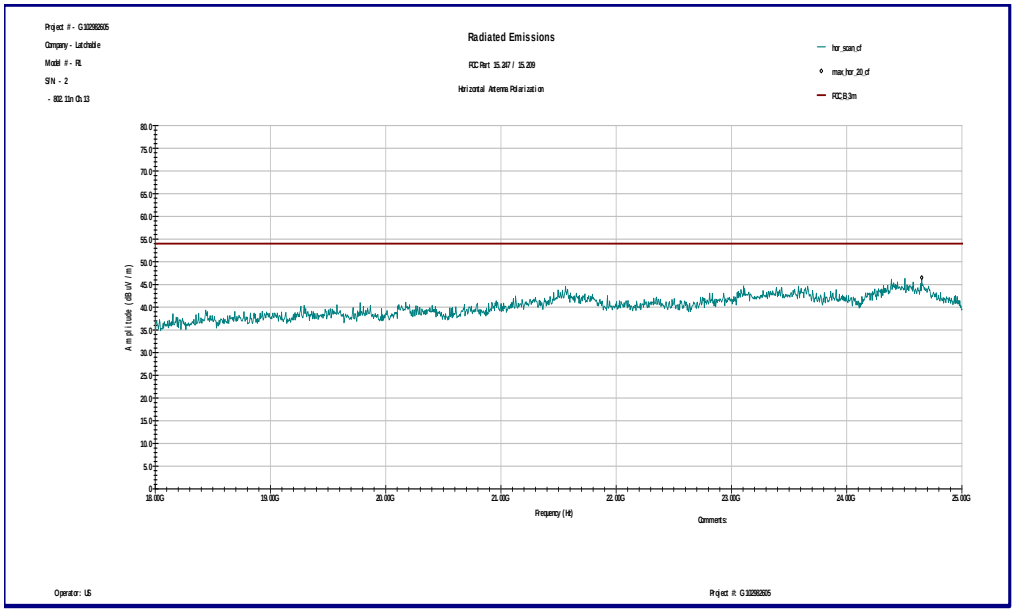
Graph 3.6.69



Graph 3.6.70



Graph 3.6.71



Graph 3.6.72

3.7 RF Exposure Compliance

The maximum measured antenna conducted average power, P is 12.2dBm.

The antenna gain, G is 1.9dBi

The maximum EIRP power = P + G
ERP = 12.21 + 1.9= 14.11dBm, or 25.76mW or 0.02576W

The limits for Maximum Permissible Exposure (MPE) level of Transmitter Power Density at operating frequency is 1mW/cm^2

The Power Density, S in mW/cm^2 is related to EIRP in mW and Antenna Separation Distance, D in cm with the equation:

$S = 25.76 / 4\pi D^2$

If antenna Safe Separation Distance is 20cm,

S = 0.005124mW/cm^{2,} or below the Permissible Exposure (MPE) of 1mW/cm^2

3.8 Transmitter power line conducted emissions

Test result: **Pass**

Frequency range: 0.15MHz-30MHz

Max. Emissions margin: 11.0dB below the limits

Notes: Test was performed at the AC adapter.

Date:	April 27, 2017	**Result: Pass**
Tested by:	Uri Spector	
Standard:	FCC part 15.207	
Test Point:	Power Line	
Operation mode:	See page 5	
Environmental Conditions:	24°C; 43%(RH); 97.5kPa	
Equipment Verification:	☒	
Note:	None	

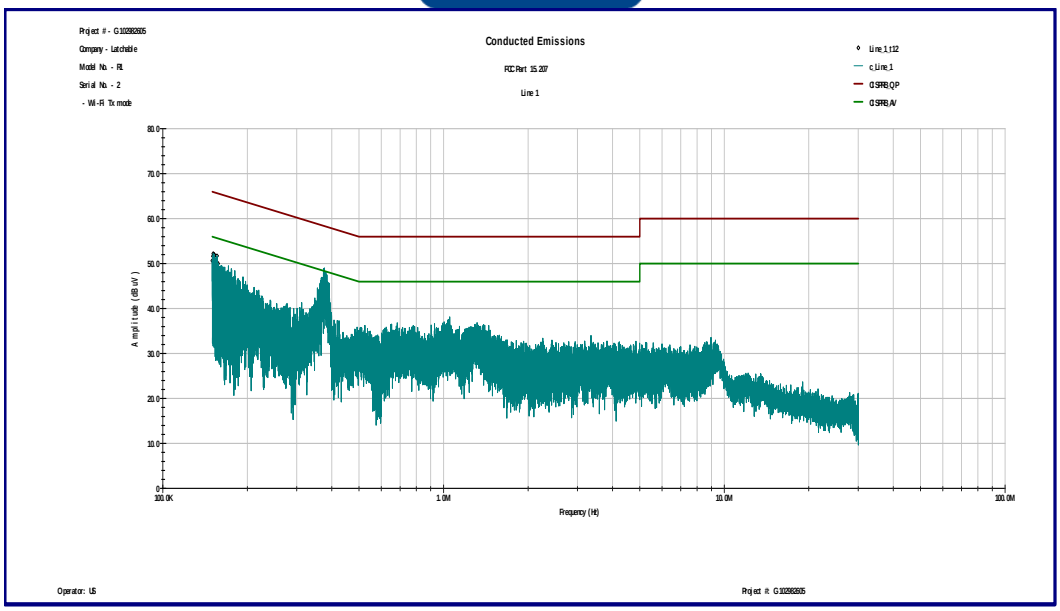
Table 3.8.1

Line 1

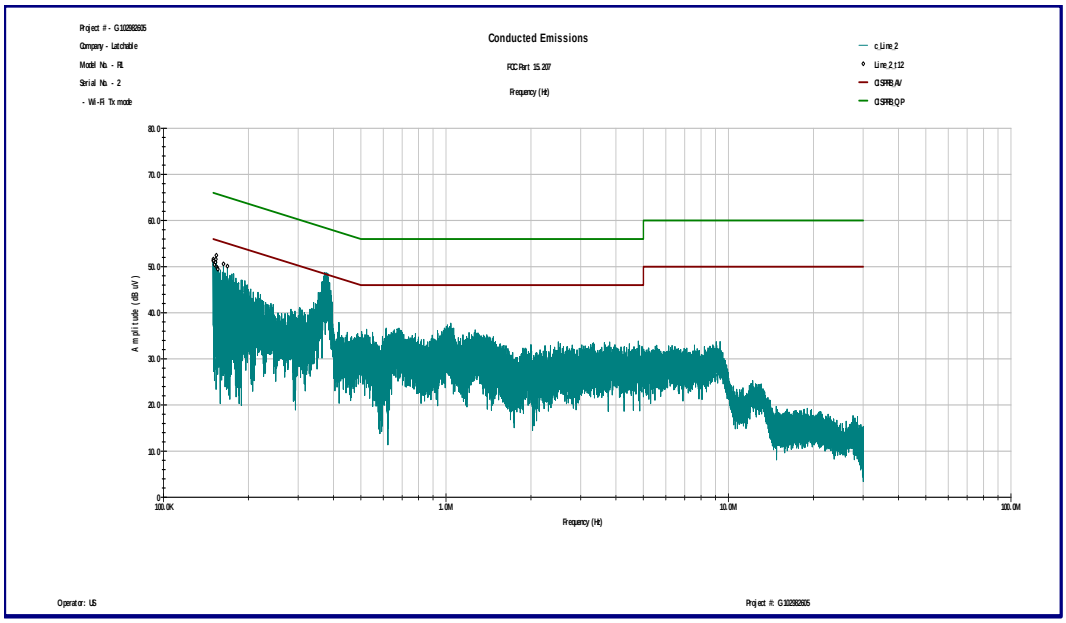
Frequency MHz	QP dBµV	AVG dBµV	Cable Loss dB	QP Lim dBµV	AVG Lim dBµV	QP Margin dB	AVG Margin dB
0.151	48.7	33.2	0.1	65.9	55.9	-17.2	-22.7
0.211	40.0	28.0	0.1	63.2	53.2	-23.1	-25.1
0.373	45.5	36.1	0.1	58.4	48.4	-12.8	-12.2
1.120	30.9	22.0	0.2	56.0	46.0	-24.9	-23.8
3.351	28.0	19.0	0.4	56.0	46.0	-27.6	-26.6
9.293	28.0	22.1	0.7	60.0	50.0	-31.3	-27.2

Line 2

Frequency MHz	QP dBµV	AVG dBµV	Cable Loss dB	QP Lim dBµV	AVG Lim dBµV	QP Margin dB	AVG Margin dB
0.153	47.2	33.0	0.1	65.8	55.8	-18.5	-22.7
0.220	40.0	30.2	0.1	62.8	52.8	-22.7	-22.5
0.377	46.0	37.2	0.1	58.3	48.3	-12.2	-11.0
1.041	30.2	20.1	0.2	56.0	46.0	-25.6	-25.7
3.351	29.0	20.2	0.4	56.0	46.0	-26.6	-25.4
9.339	28.6	22.5	0.7	60.0	50.0	-30.7	-26.8



Graph 3.8.1



Graph 3.8.2

3.9 Receiver/digital device radiated emissions

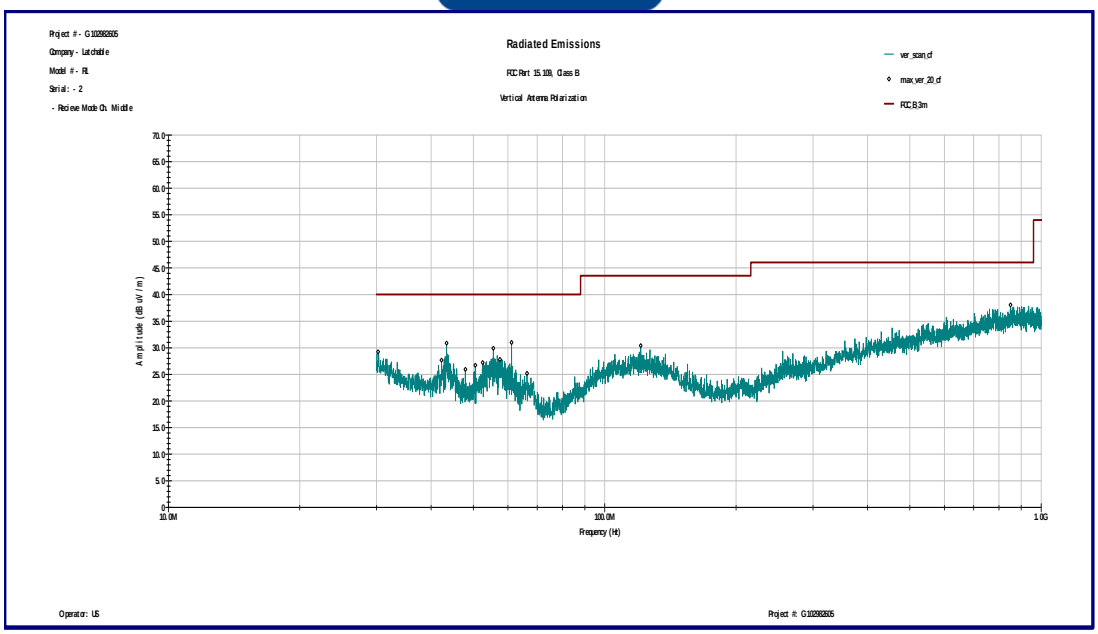
Test location:	☐ OATS ☒ Anechoic Chamber
Test distance:	☐ 10 meters ☒ 3 meters
Test result:	**Pass**
Frequency range:	30MHz-13000MHz
Max. Emissions margin:	9.7dB below the limits

Notes: The Radiated Emissions testing was performed in the Anechoic Chamber at 3m measurement distance (see Table 3.9.1 and Graphs 3.9.1 - 3.9.12)
Radiated Emissions from the RF Generator were excluded from the tables.

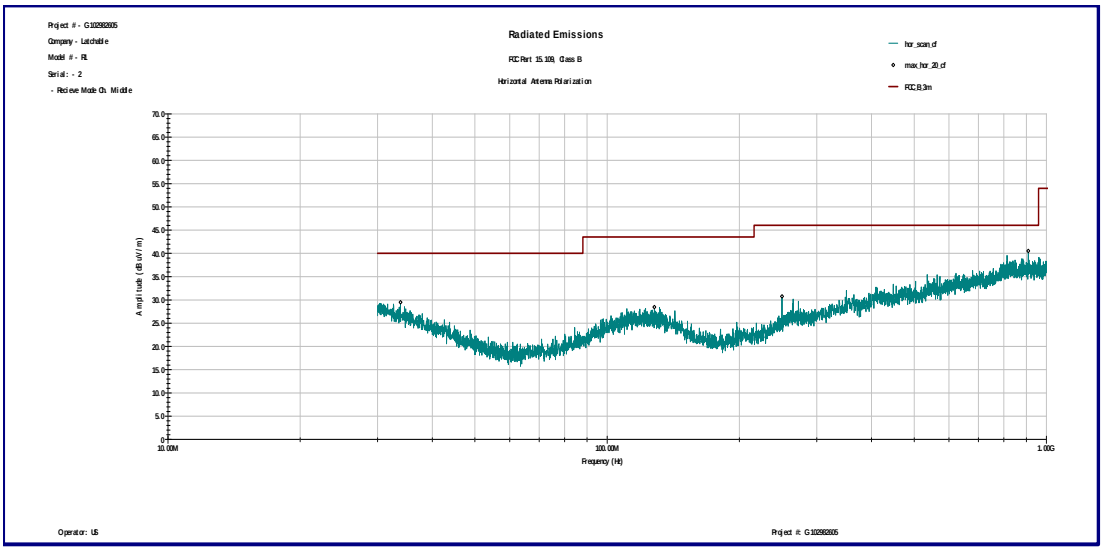
Date:	April 26 – April 28, 2017	**Result: Pass**
Tested by:	Uri Spector	
Standard:	FCC Part 15.109, Class B	
Test Point:	Enclosure	
Operation mode:	See page 5	
Environmental Conditions:	24°C; 43%(RH); 97.5kPa	
Equipment Verification:	☒	
Note:	None	

Table 3.9.1

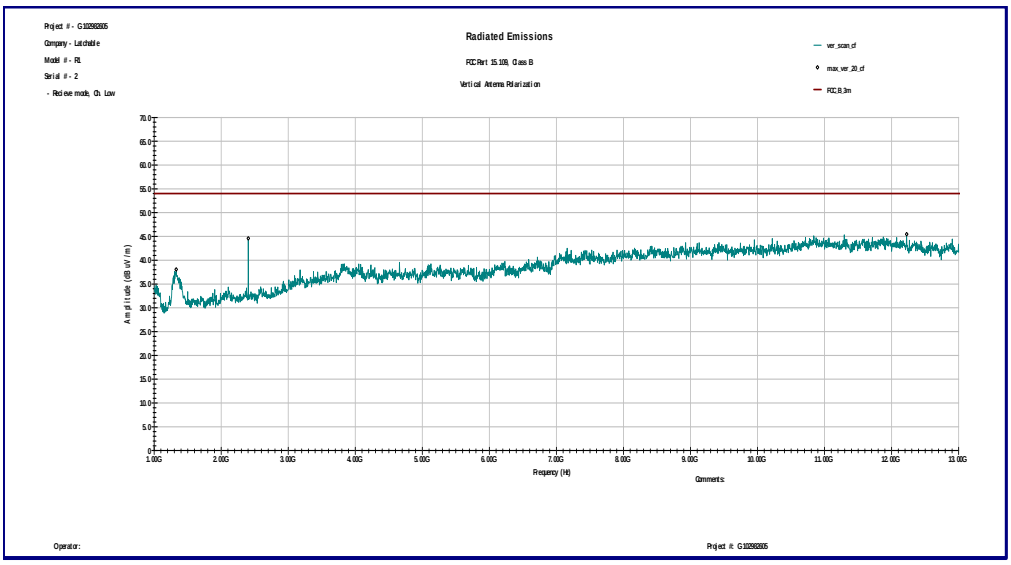
Frequency MHz	Antenna Polarity	Peak Reading dBµV	Total C.F. dB1/m	Pre-Amp. Gain (dB)	Total at 3m dBµV/m	Limit dBµV/m	Margin dB
Channel 1							
30.381 MHz	V	6.9	21.3	0.0	28.2	40.0	-11.8
43.784 MHz	V	15.0	14.0	0.0	29.0	40.0	-11.0
48.529 MHz	V	13.3	12.4	0.0	25.8	40.0	-14.2
53.031 MHz	V	18.3	11.5	0.0	29.8	40.0	-10.3
30.554 MHz	H	7.05	23.1	0.0	30.1	40.0	-9.9
34.814 MHz	H	9.74	20.5	0.0	30.3	40.0	-9.7
125.07 MHz	H	12.02	16.6	0.0	28.7	43.5	-14.9
250.17 MHz	H	13.09	17.2	0.0	30.2	46.0	-15.8
1.328 GHz	V	52.37	27.5	41.8	38.1	54.0	-15.9
1.012 GHz	H	54.16	26.0	42.0	38.1	54.0	-15.8
1.304 GHz	H	52.15	27.4	41.8	37.7	54.0	-16.3
Channel 7							
30.139 MHz	V	6.8	21.5	0.0	28.3	40.0	-11.7
43.68 MHz	V	15.4	14.1	0.0	29.5	40.0	-10.5
57.568 MHz	V	18.4	11.1	0.0	29.5	40.0	-10.5
127.68 MHz	V	11.8	17.4	0.0	29.1	43.5	-14.4
31.143 MHz	H	7.6	22.7	0.0	30.3	40.0	-9.7
131.64 MHz	H	11.8	16.5	0.0	28.3	43.5	-15.2
1.352 GHz	V	52.5	27.5	41.8	38.1	54.0	-15.8
1.02 GHz	H	52.7	26.0	42.0	36.7	54.0	-17.3
1.324 GHz	H	52.0	27.4	41.8	37.6	54.0	-16.4
Channel 13							
30.381 MHz	V	6.9	21.3	0.0	28.2	40.0	-11.8
53.031 MHz	V	18.3	11.5	0.0	29.8	40.0	-10.3
66.051 MHz	V	15.1	10.0	0.0	25.1	40.0	-14.9
84.257 MHz	V	12.9	11.9	0.0	24.7	40.0	-15.3
125.37 MHz	V	11.8	17.5	0.0	29.3	43.5	-14.3
30.554 MHz	H	12.3	10.0	0.0	30.1	40.0	-9.9
34.814 MHz	H	7.1	23.1	0.0	30.3	40.0	-9.7
125.07 MHz	H	9.7	20.5	0.0	28.7	43.5	-14.9
1.024 GHz	V	51.1	25.6	42.0	34.8	54.0	-19.2
1.3 GHz	V	52.8	27.5	41.8	38.5	54.0	-15.5
1.044 GHz	H	53.0	26.0	41.9	37.1	54.0	-16.9
1.292 GHz	H	52.3	27.3	41.8	37.8	54.0	-16.1



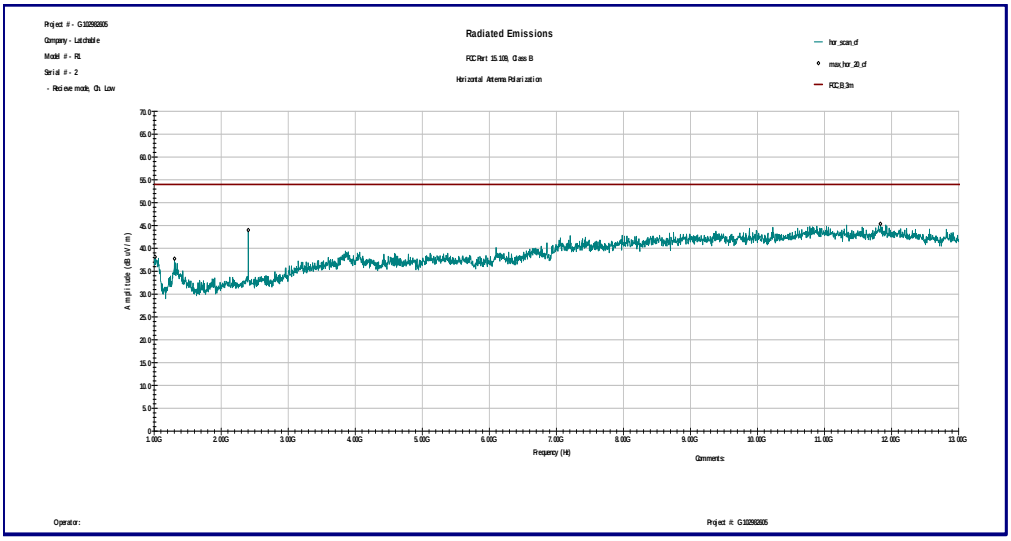
Graph 3.9.1



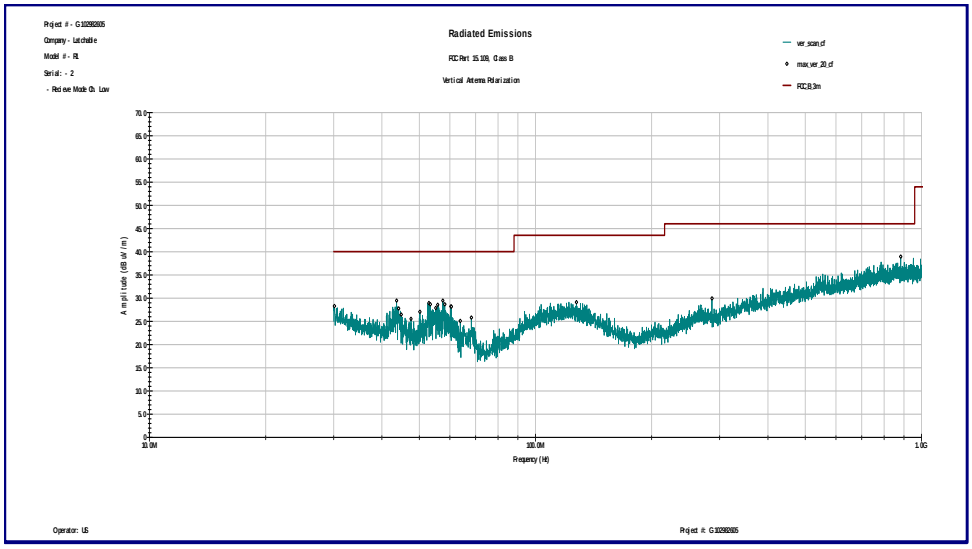
Graph 3.9.2



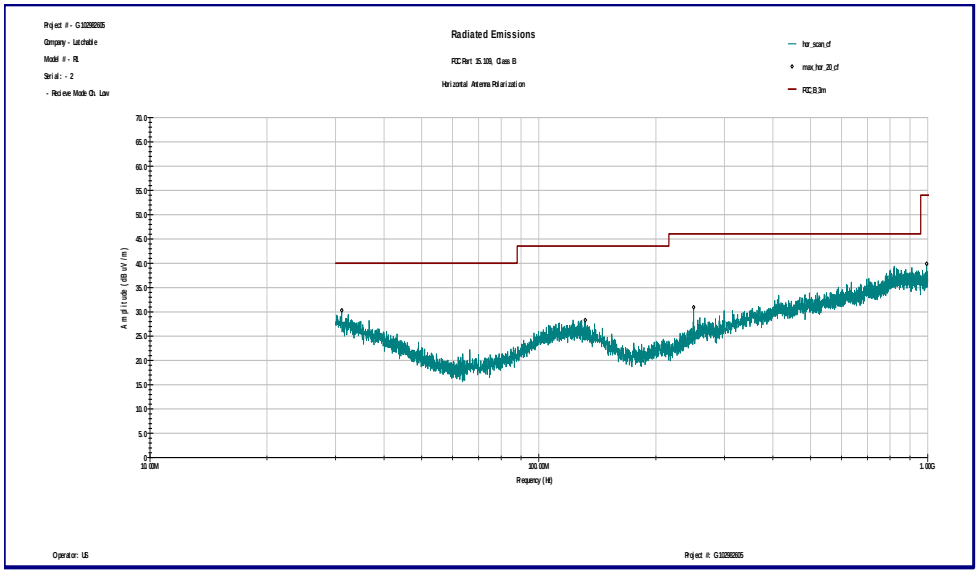
Graph 3.9.3



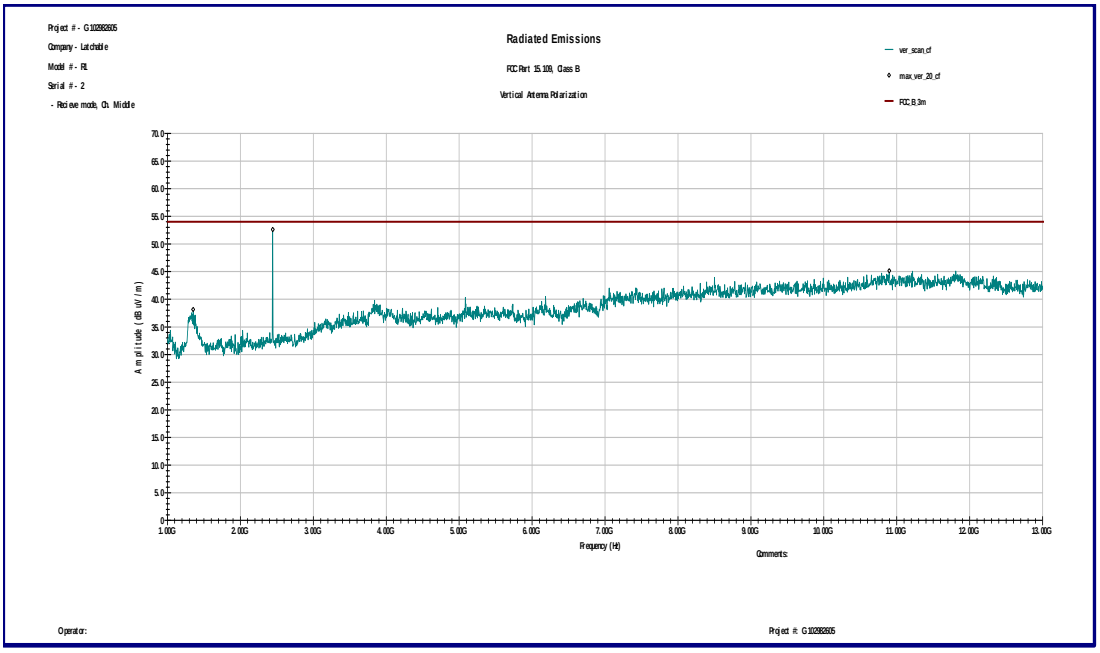
Graph 3.9.4



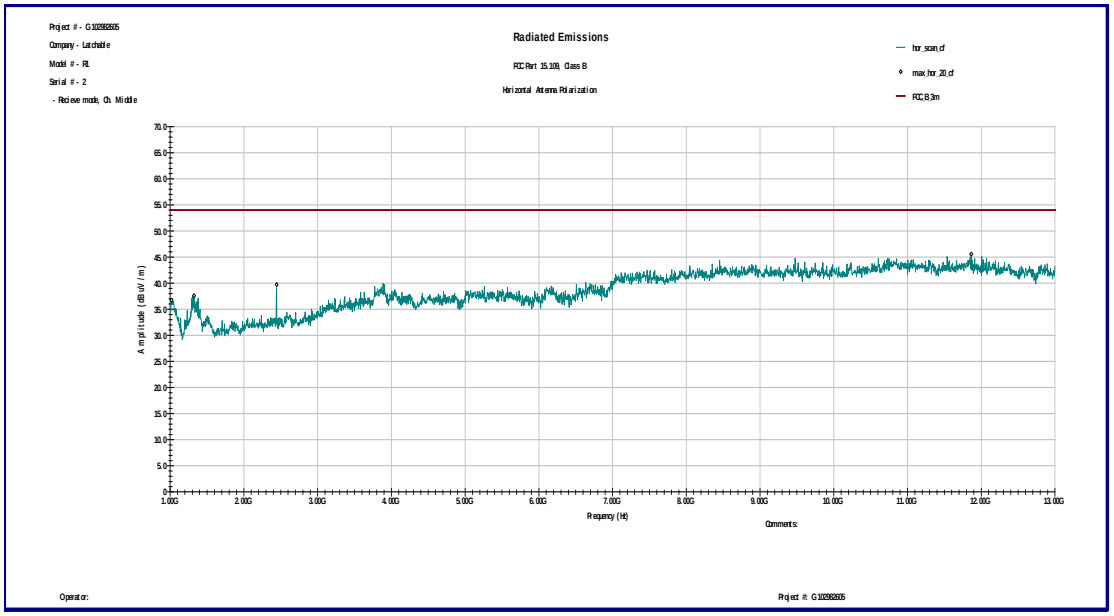
Graph 3.9.5



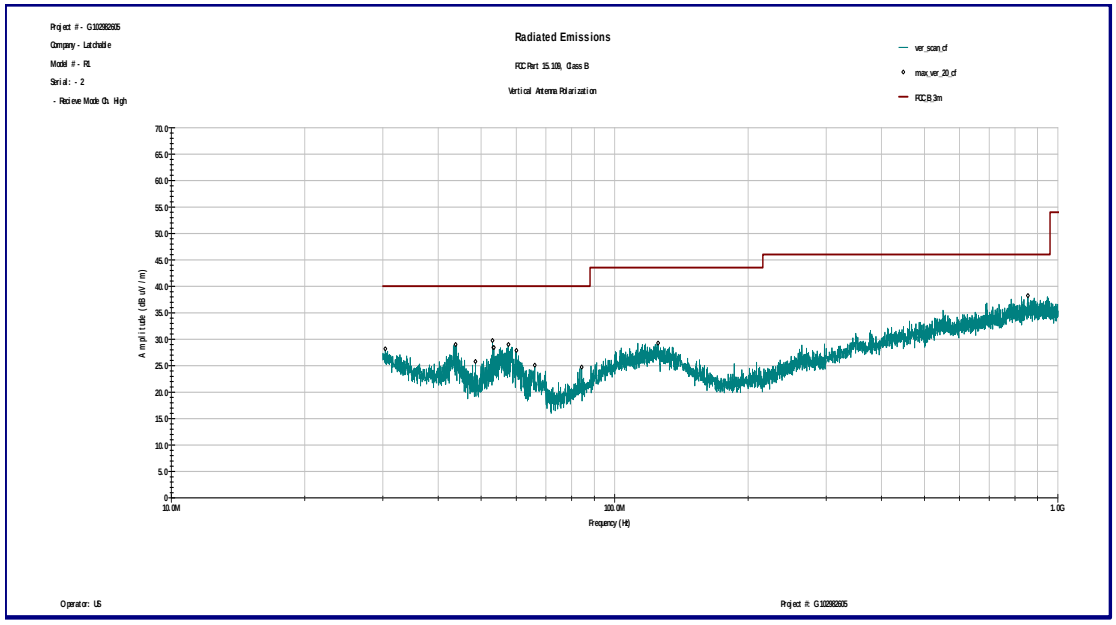
Graph 3.9.6



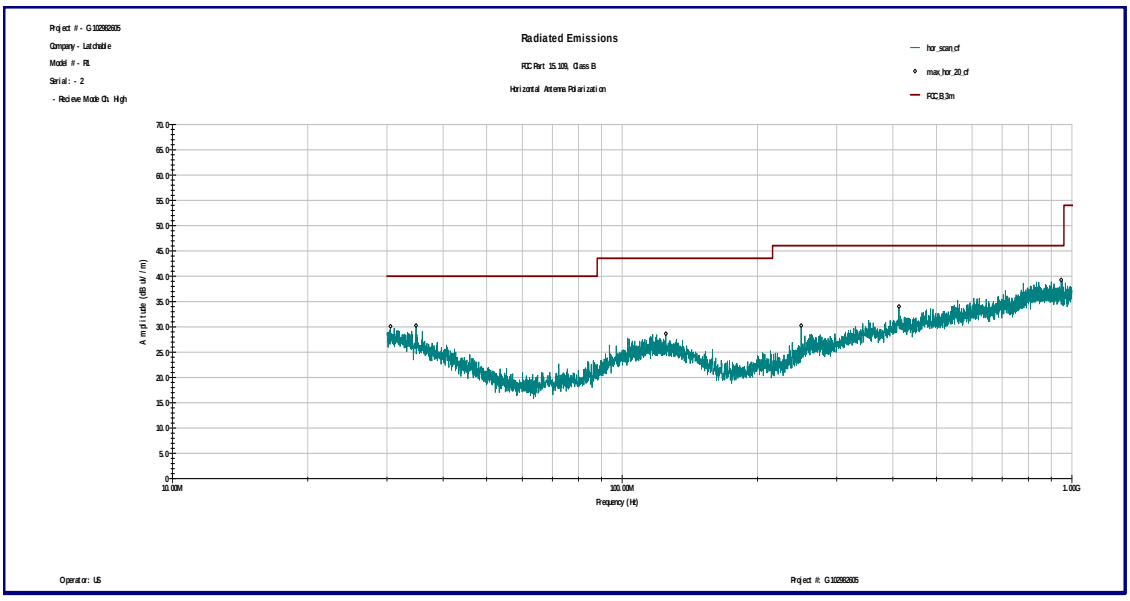
Graph 3.9.7



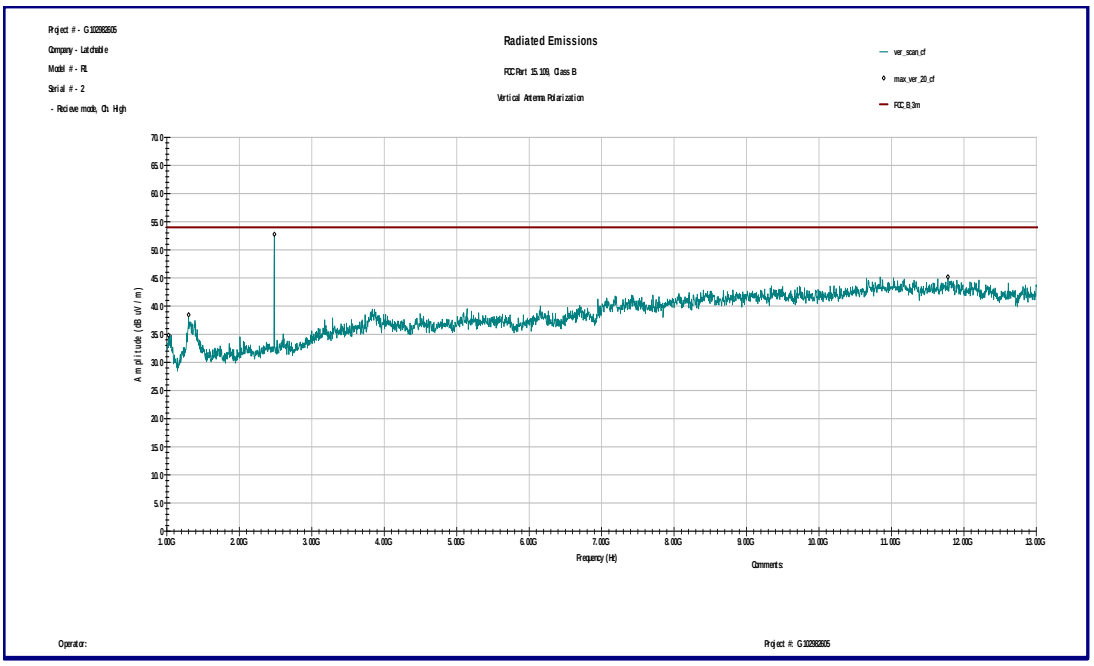
Graph 3.9.8



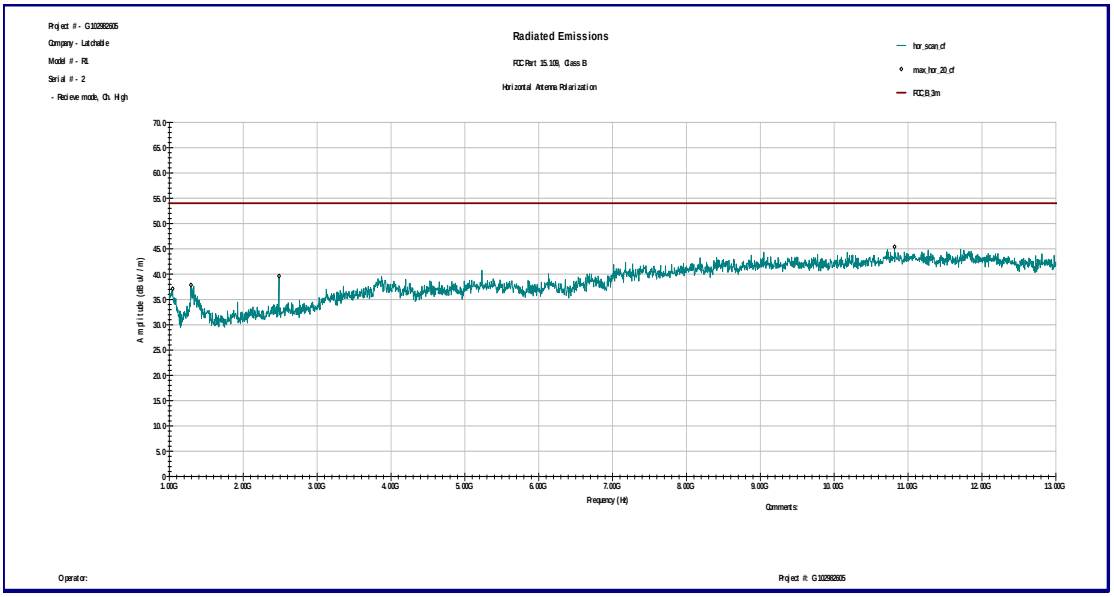
Graph 3.9.9



Graph 3.9.10



Graph 3.9.11



Graph 3.9.12

3.10 Digital device conducted emissions

Test result: **Pass**

Frequency range: 0.15MHz-30MHz

Max. Emissions margin: 6.6dB below the limits

Notes: Test was performed at the AC adapter.

Date:	April 3, 2017	**Result: Pass**
Tested by:	Uri Spector	
Standard:	FCC Part 15.107, Class B	
Test Point:	Line 1 and Line 2	
Operation mode:	See page 5	
Environmental Conditions:	24°C; 43%(RH); 97.5kPa	
Equipment Verification:	☒	
Note:	None	

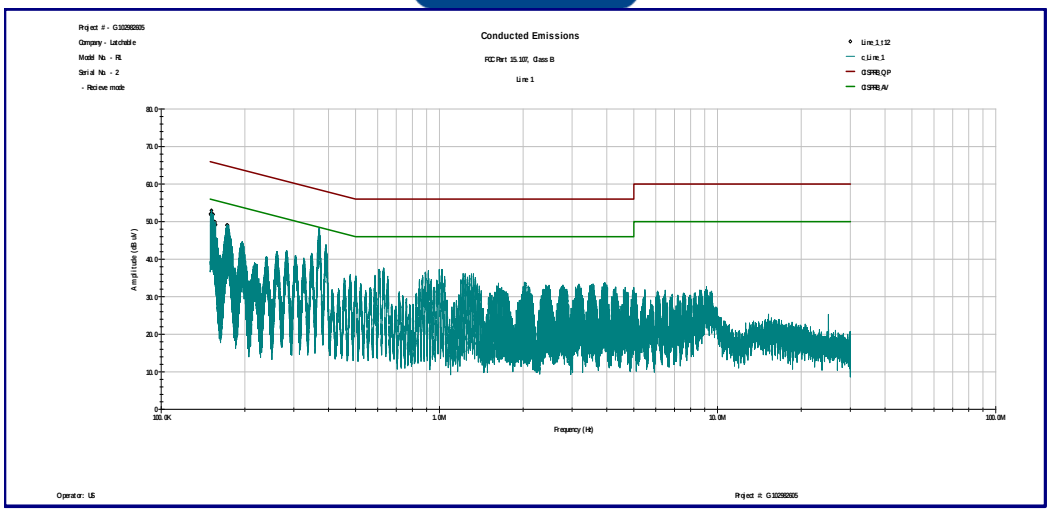
Table 3.10.1

Line 1

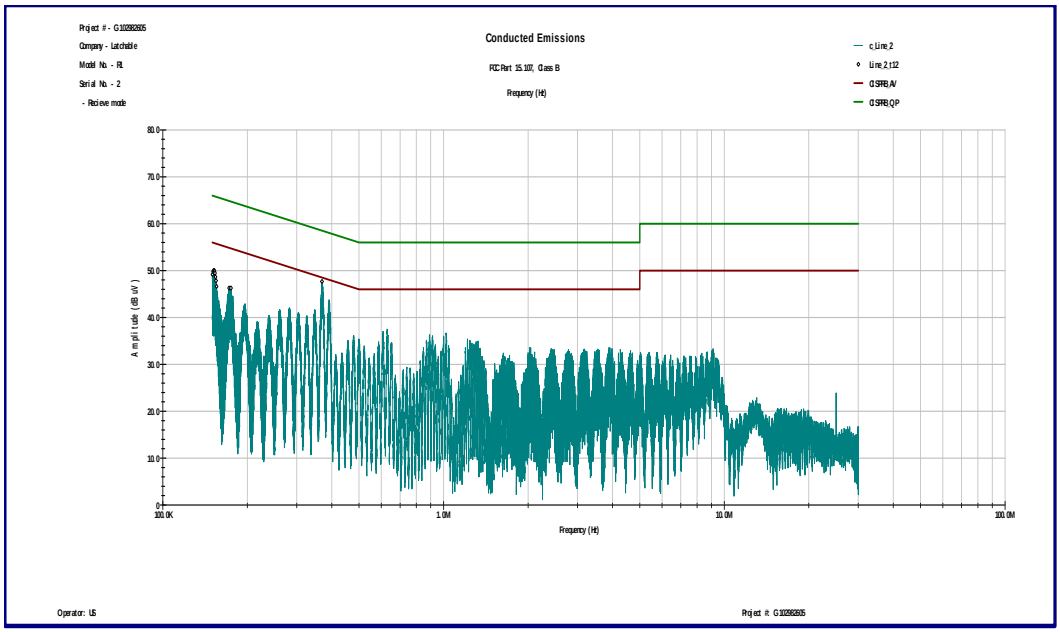
Frequency MHz	QP dBµV	AVG dBµV	Cable Loss dB	QP Lim dBµV	AVG Lim dBµV	QP Margin dB	AVG Margin dB
0.151	50.2	40.7	0.1	65.9	55.9	-15.7	-15.2
0.261	40.4	34.2	0.1	61.4	51.4	-20.9	-17.1
0.371	46.2	41.4	0.1	58.5	48.5	-12.1	-6.9
1.024	35.3	31.0	0.2	56.0	46.0	-20.5	-14.8
3.957	31.0	25.5	0.5	56.0	46.0	-24.5	-20.0
9.113	29.1	25.3	0.7	60.0	50.0	-30.2	-24.0

Line 2

Frequency MHz	QP dBµV	AVG dBµV	Cable Loss dB	QP Lim dBµV	AVG Lim dBµV	QP Margin dB	AVG Margin dB
0.152	48.8	40.5	0.1	65.9	55.9	-17.0	-15.3
0.261	40.3	35.6	0.1	61.4	51.4	-21.0	-15.7
0.367	45.8	41.8	0.1	58.6	48.6	-12.6	-6.6
1.021	35.4	31.2	0.2	56.0	46.0	-20.4	-14.6
3.889	31.0	28.3	0.5	56.0	46.0	-24.5	-17.2
9.110	30.5	27.8	0.7	60.0	50.0	-28.8	-21.5



Graph 3.10.1



Graph 3.10.2

4.0 TEST EQUIPMENT

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO.	INTERTEK ID	LAST CAL DATE	CAL DUE	USED
Spectrum Analyzer	R & S	FSP 40	100024	12559	01/26/2017	01/26/2018	☒
Spectrum Analyzer	R & S	ESU	100398	25283	03/21/2017	03/21/2018	☒
Bicono-Log Antenna	Teseq	CBL6112D	32859	25289	10/03/2016	10/03/2017	☒
Horn Antenna	EMCO	3115	9507-4513	9936	07/12/2016	07/12/2017	☒
Waveguide Horn Antenna	EMCO	3116	9904-2423	9705	12/09/2016	12/09/2017	☒
High Pass Filter	Reactel	7HS-4G-S12	0223	015274	VBU	VBU	☒
LISN	COM-Power	Li-215A	191970	172315	06/13/2016	06/13/2017	☒
Pre-Amplifier	MITEQ	AMF-5D-00501800-28-13P	1122951	13475	12/01/2016	12/01/2017	☒
Pre-Amplifier	MITEQ	AMF-6F-16002600-25-10P	1222383	MIN-0065	12/01/2016	12/01/2017	☒
System	Quantum Change	TILE! Instrument Control	Ver. 3.4.K.29	15259	VBU	VBU	☒

5.0 Revision History

REVISION LEVEL	DATE	REPORT NUMBER	PREPARED	REVIEWED	NOTES
0	05-02-2017	102982605MIN-005A	US	NS	Original Issue