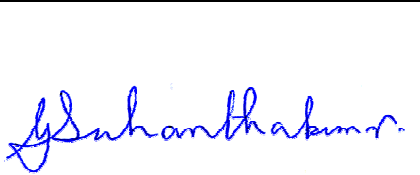
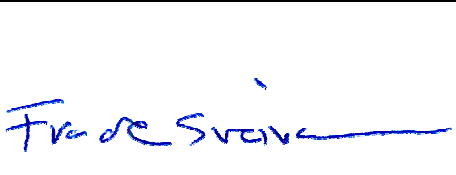


Test Report

Product	Gateway	
Name and address of the applicant	Develco Products Olof Palmes Alle 40, DK-82000 Århus N, Denmark	
Name and address of the manufacturer	Develco Products Olof Palmes Alle 40, DK-82000 Århus N, Denmark	
Model	MGW101	
Rating	5Vdc	
Trademark	Develco	
Serial number	Radiated sample: 0200000100001516 Conducted sample: 02000001000012EE	
Additional information	This product SquidLink contains four radio units: - Wi-Fi covered by this test report - Zigbee covered by test report 1-300209 - GSM module ,U-Blox (FCC ID: XPYSARAU280; IC: 8595A-SARAU280) - Z-Wave module, 902-928 MHz (FCC ID: D87-ZM5304-U; IC: 11263A-ZM5304)	
Tested according to	FCC Part 15.247 Digital Transmission Systems Industry Canada RSS-247, Issue 1 Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices	
Order number	300209	
Tested in period	2016.02.22 - 2016.03.17 and 2016.08.03	
Issue date	2016.08.03	
Name and address of the testing laboratory	 Instituttveien 6 Kjeller, Norway FCC No: 994405 IC OATS: 2040D-1 TEL: +47 22 96 03 30 FAX: +47 22 96 05 50	
 Prepared by [G.Suhanthakumar]  Approved by [Frode Sveinsen]		
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Template version: B

Nemko Norway

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1 INFORMATION

1.1 Test Item

Name :	SquidLink
FCC ID :	2AHNM-GC981709
Industry Canada ID :	21398-GC981709
Model/version :	MGW101
Serial number :	Radiated sample: 0200000100001516 Conducted sample: 02000001000012EE
Hardware identity and/or version:	4.0.x
Software identity and/or version :	1.2.x
Frequency Range :	2412 - 2462MHz
Number of Channels :	11
Channel separation:	20MHz
Type of Modulation :	IEEE 802.11b/g/n
User Frequency Adjustment :	N/A
Rated Output Power :	0.038W
Type of Power Supply :	5Vdc
Antenna Connector :	None (PCB antenna)
No of Antennas:	1
Antenna Diversity Supported :	N/A
Desktop Charger :	None

Description of Test Item

The Squid. Link Gateway from Develco Products are flexible platforms for connecting elements in your Smart Home system with a control unit. They support a wide range of communication protocols, with state-of-the art data encryption to keep your data streams safe and private. The gateways are based on a programmable Linux-platform and support Java and OSGI.

The gateway is modular and can handle many different wireless protocols at the same time. Supported protocols are i.a. ZigBee, Z-Wave, Wireless M-Bus, GPRS, ethernet, and WiFi.

Theory of Operation

The Smart Home application running on the Squid.link gateway handles the communication with the different devices installed in the home. The gateway can receive and transmit data messages to/from the devices in the network. All the radios are pr. default RX-On idle.

1.2 Normal test conditions

Temperature:	20 - 24 °C
Relative humidity:	20 - 50 %
Normal test voltage:	5Vdc

The values are the limit registered during the test period.

1.3 Test Engineer(s)

G.Suwanthakumar

1.4 Test Equipment

See list of test equipment in clause 5.

1.5 Description of modification for Modification Filing

Not applicable.

1.6 Family List Rational

Not Applicable.

1.7 Additional Comments

It was checked that power variations between 85% and 115% did not have any influence on the measurements.

All ports were populated during spurious emission measurements.

2 TEST REPORT SUMMARY

2.1 General

All measurements are traceable to national standards.

The tests were conducted for the purpose of demonstrating compliance with FCC CFR 47 Part 15, paragraph 15.247 and Industry Canada RSS-247 Issue 1.

Tests were performed in accordance with ANSI C63.4-2014 and ANSI C63.10-2013.

Radiated tests were performed in a semi-anechoic chamber at measuring distances of 1m, 3m and 10m.

A description of the test facility is on file with the FCC and Industry Canada.

☒ New Submission

☒ Production Unit

☐ Class II Permissive Change

☐ Pre-production Unit

DTS Equipment Code

☐ Family Listing



THIS TEST REPORT APPLIES ONLY TO THE ITEM(S) AND CONFIGURATIONS TESTED.

Deviations from, additions to, or exclusions from the test specifications are described in "Summary of Test Data".

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2.2 Test Summary

Name of test	FCC Part 15 reference	RSS-247 Issue 1, RSS-GEN Issue 4 reference	Result
Supply Voltage Variations	15.31(e)	6.11 (RSS-GEN)	Complies
Antenna Requirement	15.203	8.3 (RSS-GEN)	Complies ¹
Power Line Conducted Emission	15.107(a) 15.207(a)	8.8 (RSS-GEN)	Complies
Occupied Bandwidth	N/A	6.6 (RSS-GEN)	
Minimum 6 dB Bandwidth	15.247(a)(2)	5.2 (1) (RSS-247)	Complies
Peak Power Output	15.247(b)	5.4 (RSS-247)	Complies
Power Spectral Density	15.247(d)	5.2 (2) (RSS-247)	Complies
Spurious Emissions (Antenna Conducted)	15.247(c)	5.5 (RSS-247)	Complies ¹
Spurious Emissions (Radiated)	15.247(c) 15.109(a) 15.209(a)	5.5 (RSS-247) 6.13 (RSS-GEN) 8.9 (RSS-GEN)	Complies

¹ The tested equipment has integrated antenna only.

3 TEST RESULTS

3.1 Power Line Conducted Emissions

Para. No.: 15.207 (a)

Test Performed By: G.Suwanthakumar

Date of Test: 2016.03.10

Measurement procedure: ANSI C63.4-2014 using 50 μ H/50 ohms LISN.

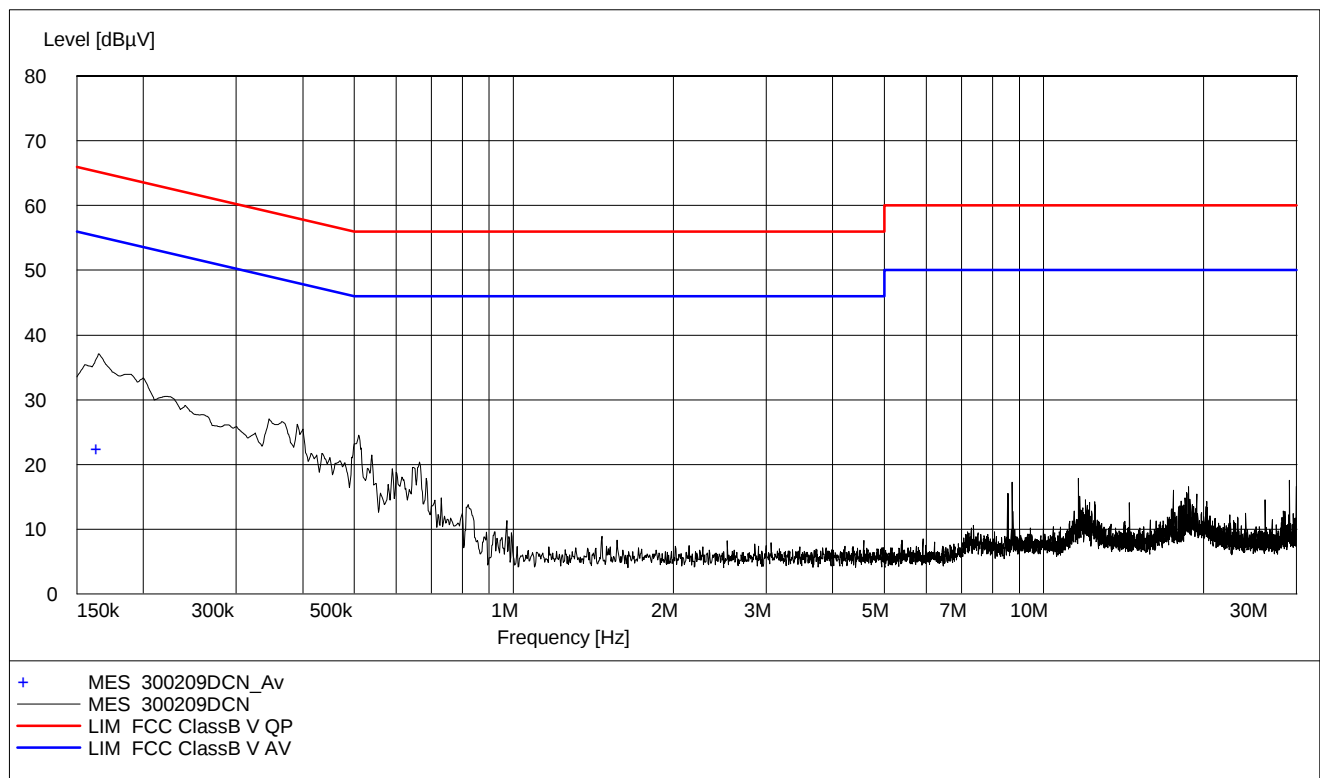
Test Results: Complies.

Measurement Data: See attached graph, (Peak detector).

Measured for 5Vdc using Farnell D001 (S/N :001701) power supply and
AC/DC adapter typeSMP007B050100

Input voltage to Farnell DC power supply & AC/Dc adapter: 120Vac/60Hz

Highest measured value (L1 and N):



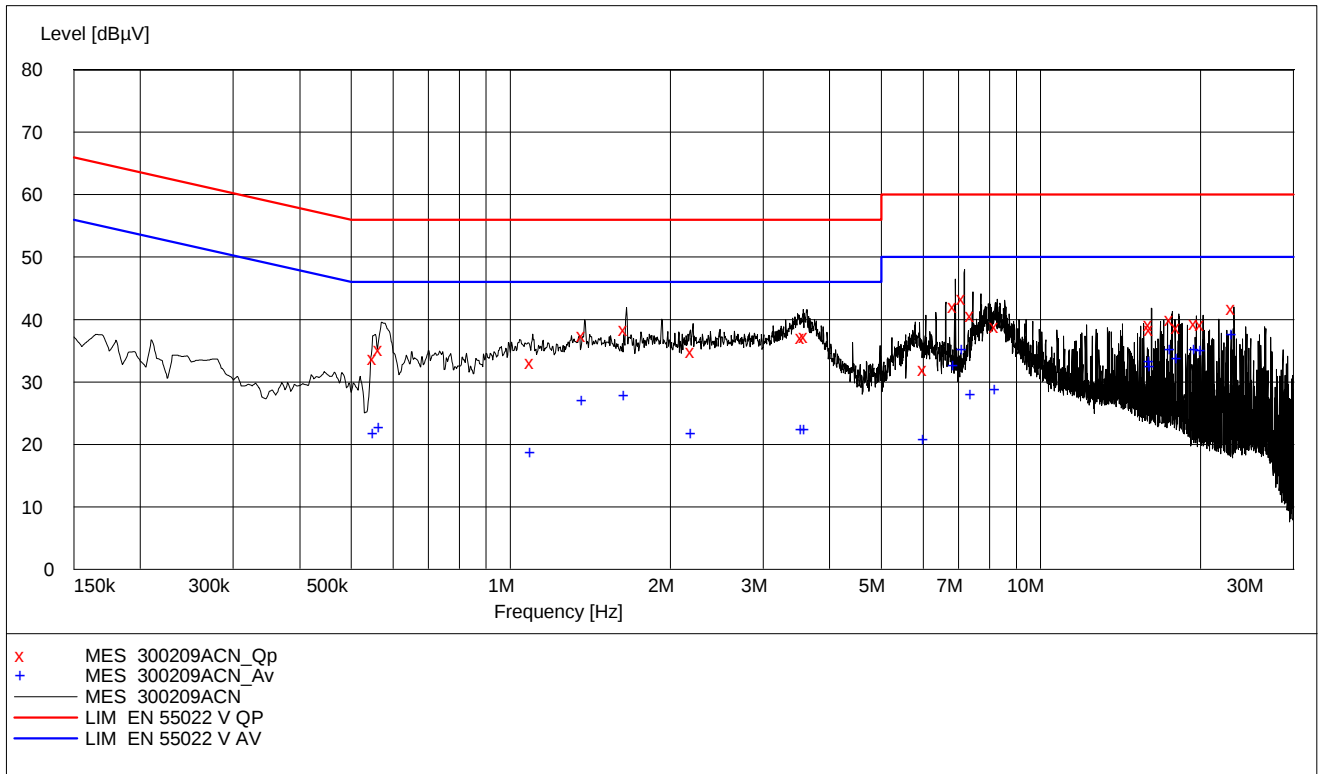
DC power 5Vdc- Regulated Power Supply: Farnell D001

QP detector:

Frequency [MHz]	Level [dBuV]	Af [dB]	Limit [dBuV]	Margin [dB]	Det	Position	Verdict [Pass/Fail]
-	-	-	-	-	QP	-	-

AV detector:

Frequency [MHz]	Level [dBuV]	Af [dB]	Limit [dBuV]	Margin [dB]	Det	Position	Verdict [Pass/Fail]
0.165000	22.30	10.70	55.20	32.90	AV	L1	Pass



AC/DC adaptor type: SMP007B050100

QP detector:

Frequency [MHz]	Level [dBuV]	Af [dB]	Limit [dBuV]	Margin [dB]	Det	Position	Verdict [Pass/Fail]
0.555000	33.80	10.20	56.00	22.20	QP	L1	Pass
0.570000	35.20	10.20	56.00	20.80	QP	N	Pass
1.100000	33.20	10.40	56.00	22.80	QP	L1	Pass
1.380000	37.50	10.40	56.00	18.50	QP	L1	Pass
1.655000	38.50	10.40	56.00	17.50	QP	L1	Pass
2.210000	34.90	10.40	56.00	21.10	QP	L1	Pass
3.570000	37.20	10.40	56.00	18.80	QP	N	Pass
3.615000	37.30	10.40	56.00	18.70	QP	N	Pass
6.070000	32.00	10.50	60.00	28.00	QP	L1	Pass
6.900000	42.20	10.60	60.00	17.80	QP	N	Pass
7.175000	43.40	10.60	60.00	16.60	QP	N	Pass
7.450000	40.70	10.60	60.00	19.30	QP	N	Pass
8.280000	38.90	10.60	60.00	21.10	QP	N	Pass
16.165000	39.20	10.80	60.00	20.80	QP	L1	Pass
16.225000	38.40	10.80	60.00	21.60	QP	N	Pass
17.695000	40.10	10.80	60.00	19.90	QP	L1	Pass
18.240000	38.80	10.80	60.00	21.20	QP	N	Pass
19.710000	39.50	10.80	60.00	20.50	QP	L1	Pass
20.260000	39.20	10.80	60.00	20.80	QP	L1	Pass
23.130000	41.80	11.00	60.00	18.20	QP	L1	Pass

AV detector:

Frequency [MHz]	Level [dBuV]	Af [dB]	Limit [dBuV]	Margin [dB]	Det	Position	Verdict [Pass/Fail]
0.555000	21.70	10.20	46.00	24.30	AV	L1	Pass
0.570000	22.80	10.20	46.00	23.20	AV	N	Pass
1.100000	18.70	10.40	46.00	27.30	AV	L1	Pass
1.380000	27.00	10.40	46.00	19.00	AV	L1	Pass
1.655000	27.80	10.40	46.00	18.20	AV	L1	Pass
2.210000	21.70	10.40	46.00	24.30	AV	L1	Pass
3.570000	22.50	10.40	46.00	23.50	AV	N	Pass
3.615000	22.50	10.40	46.00	23.50	AV	N	Pass
6.070000	20.80	10.50	50.00	29.20	AV	L1	Pass
6.900000	32.60	10.60	50.00	17.40	AV	N	Pass
7.175000	35.20	10.60	50.00	14.80	AV	N	Pass
7.450000	28.10	10.60	50.00	21.90	AV	N	Pass
8.280000	28.90	10.60	50.00	21.10	AV	N	Pass
16.165000	33.40	10.80	50.00	16.60	AV	L1	Pass
16.225000	32.50	10.80	50.00	17.50	AV	N	Pass
17.695000	35.30	10.80	50.00	14.70	AV	L1	Pass
18.240000	33.80	10.80	50.00	16.20	AV	N	Pass
19.710000	35.20	10.80	50.00	14.80	AV	L1	Pass
20.260000	35.10	10.80	50.00	14.90	AV	L1	Pass
23.130000	37.60	11.00	50.00	12.40	AV	L1	Pass

3.2 Occupied Bandwidth

Para. No.: 15.247 (a)(1)(iii)

Test Performed By: G.Suwanthakumar	Date of Test: 2016.02.23
------------------------------------	--------------------------

Test Results: Complies

Measurement Data:

Modulation type and bitrate	Occupied Bandwidth (99% BW) MHz		
	Ch 01, 2412 MHz	Ch 06, 2437 MHz	Ch 11, 2462 MHz
802.11b, 5.5 Mbps	15.23	-	-
802.11g, 9 Mbps	-	16.37	-
802.11n, 65 Mbps	-	-	18.19

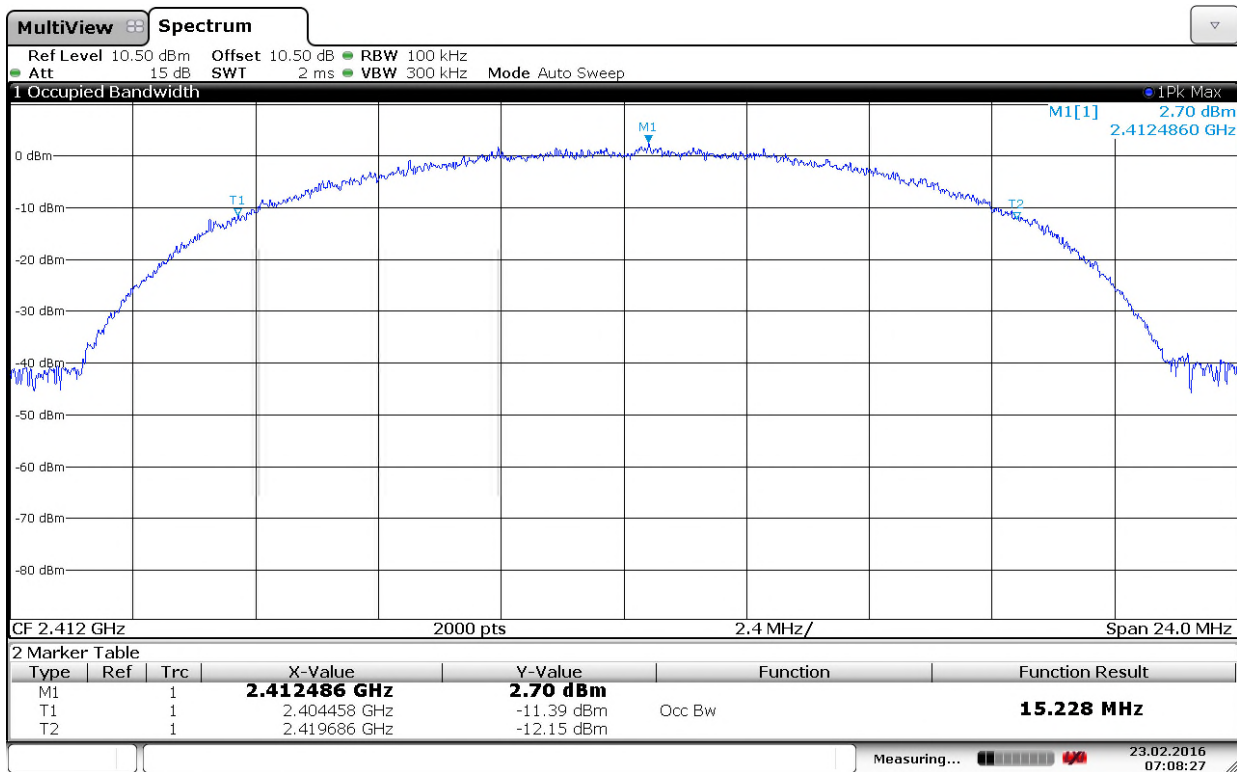
Occupied Bandwidth is reported for information only.

See attached graph.

Requirements:

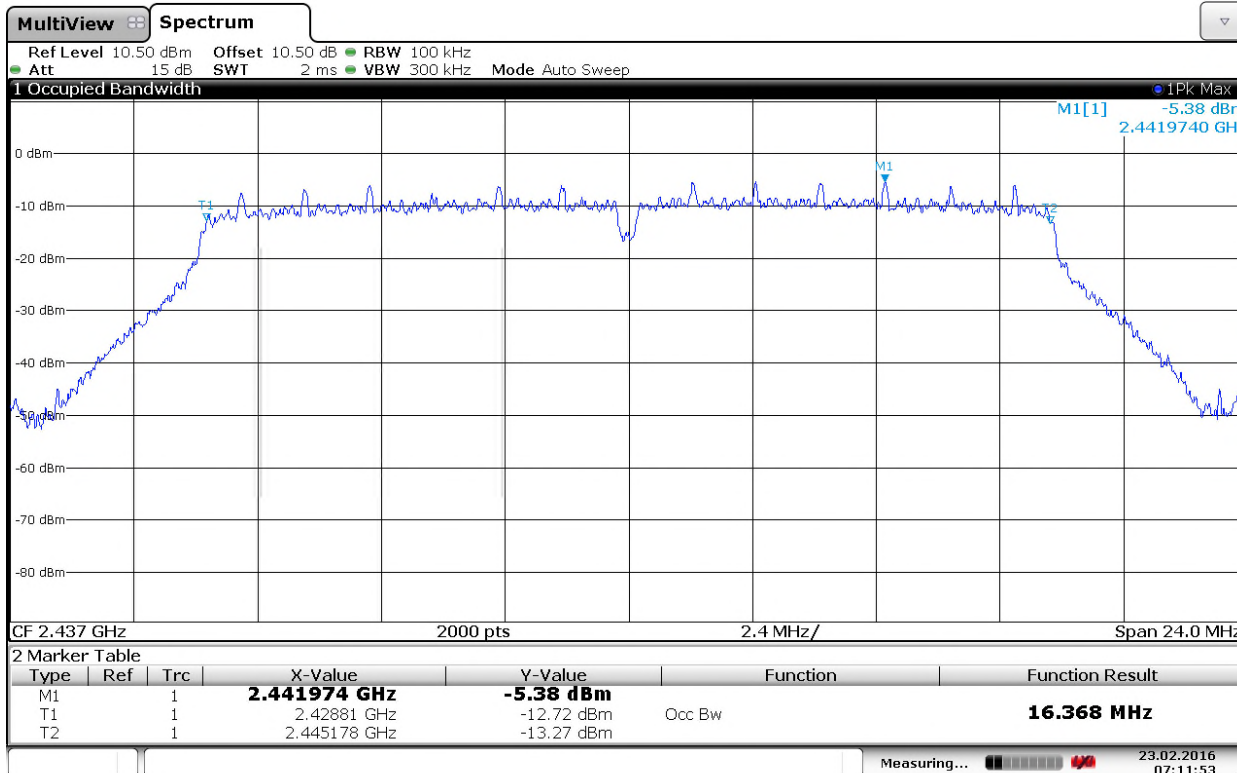
Frequency hopping systems in the 2400 - 2483.5 MHz band shall use at least 15 non-overlapping channels.
No requirements for bandwidth for this frequency band.

No requirements for Digital Transmission Systems.



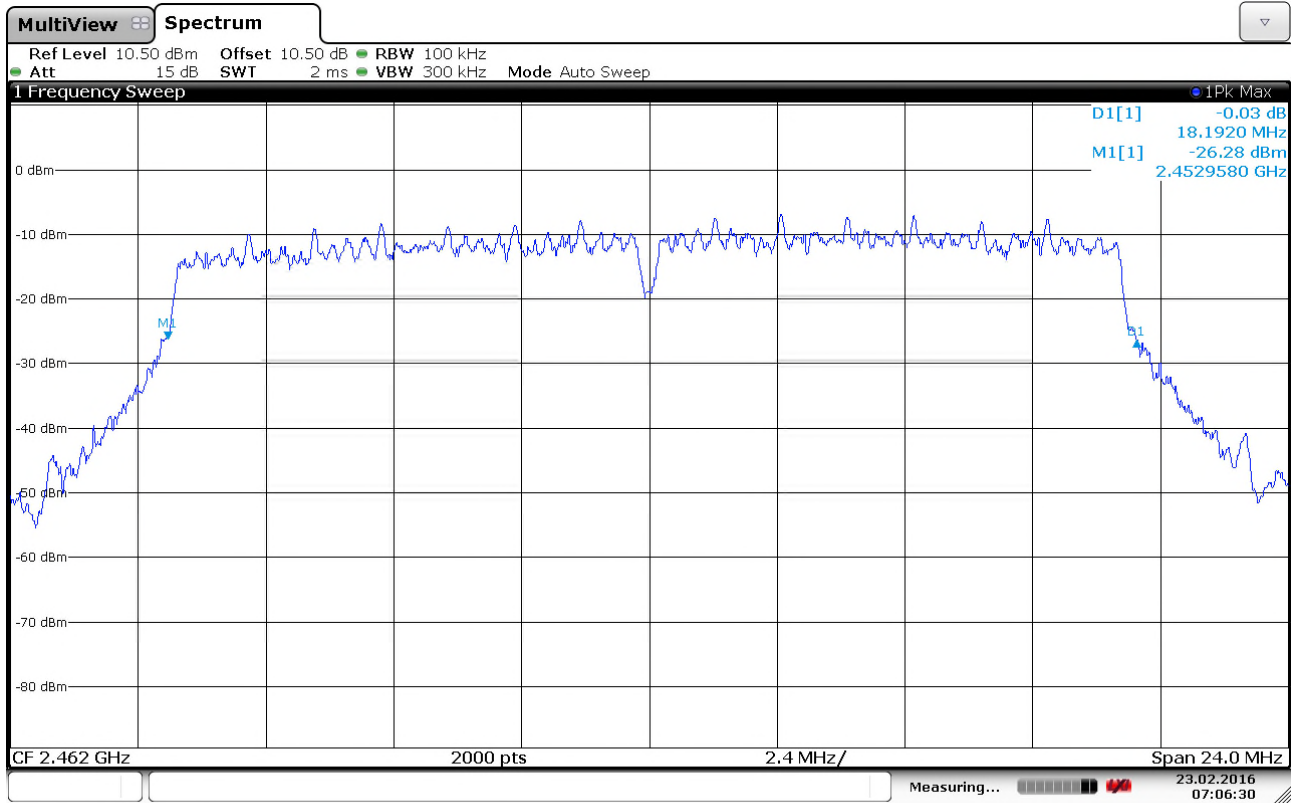
Date: 23.FEB.2016 07:08:27

Occupied Bandwidth, 2412 MHz, 802.11b, 5.5Mbps



Date: 23.FEB.2016 07:11:53

Occupied Bandwidth, 2437 MHz, 802.11g, 9Mbps



Date: 23.FEB.2016 07:06:31

Occupied Bandwidth, 2462 MHz, 802.11n, 65Mbps

3.3 Minimum 6 dB Bandwidth

Para. No.: 15.247 (a)(2)

Test Performed By: G.Suwanthakumar	Date of Test: 2016.02.23
------------------------------------	--------------------------

Test Results: Complies

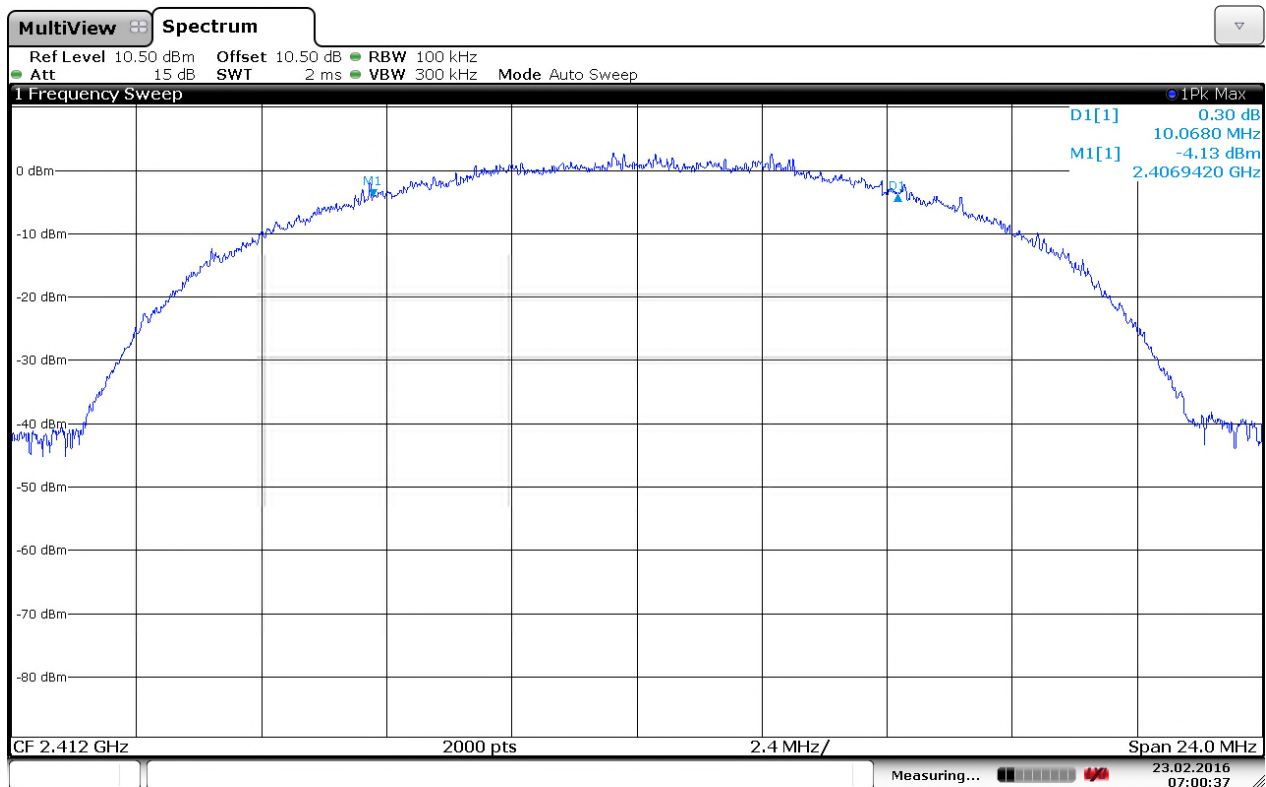
Measurement Data:

Modulation type and bitrate	Measured 6 dB Bandwidth (MHz)		
	Ch 1, 2412 MHz	Ch 6, 2437 MHz	Ch 11, 2462 MHz
802.11b, 5.5 Mbps	10.07	10.68	10.50
802.11g, 9 Mbps	16.32	16.31	16.31
802.11n, 65Mbps	17.60	17.58	17.64

Power supply variation within 85 % to 115% of nominal value has no influence on measured value.

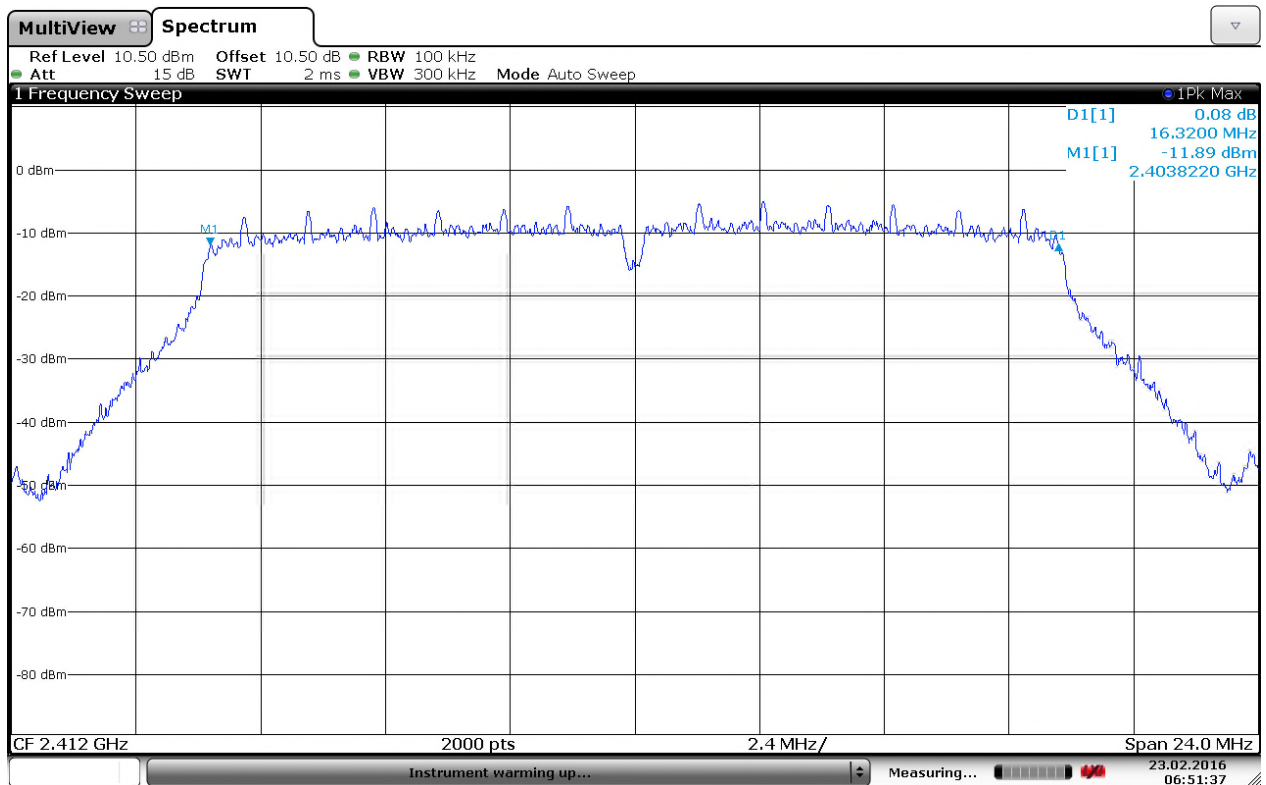
Requirements:

For Digital Transmission Systems in the 2400-2483.5 MHz band the minimum 6 dB bandwidth shall be at least 500 KHz.



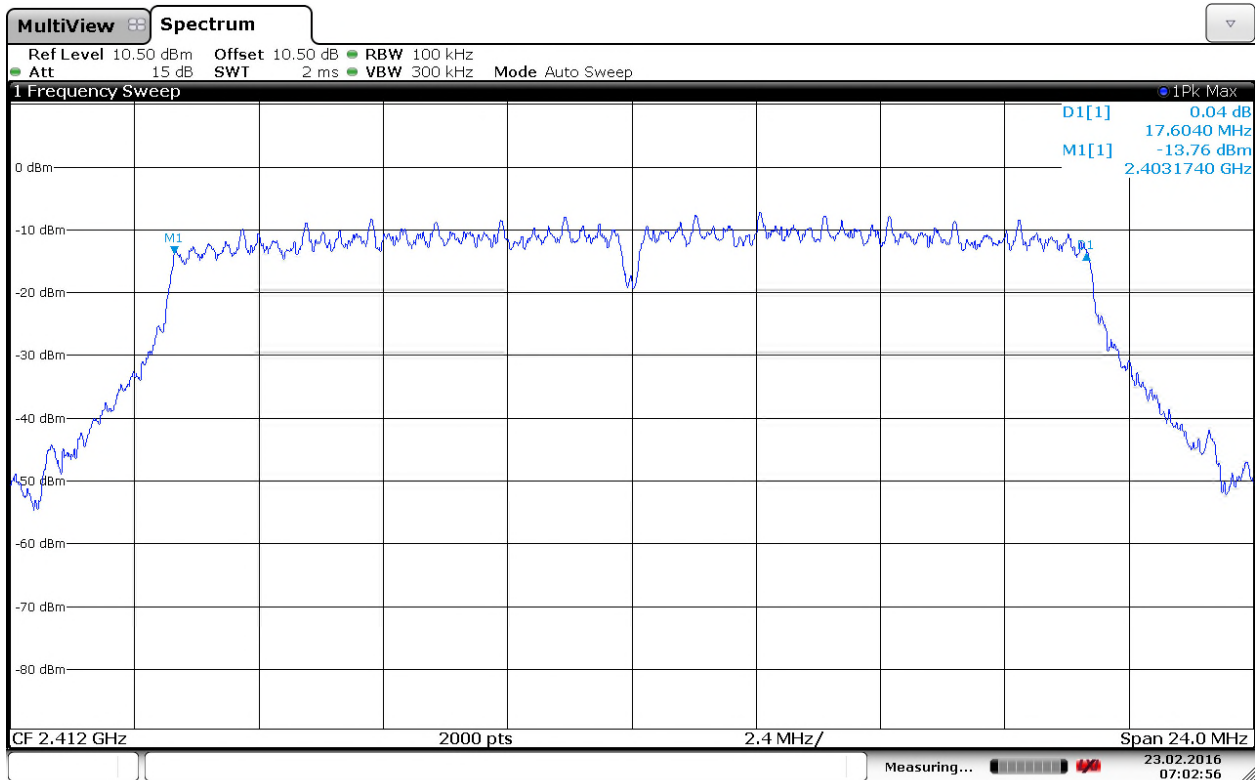
Date: 23.FEB.2016 07:00:38

6 dB Bandwidth, 2412 MHz, 802.11b, 5.5Mbps



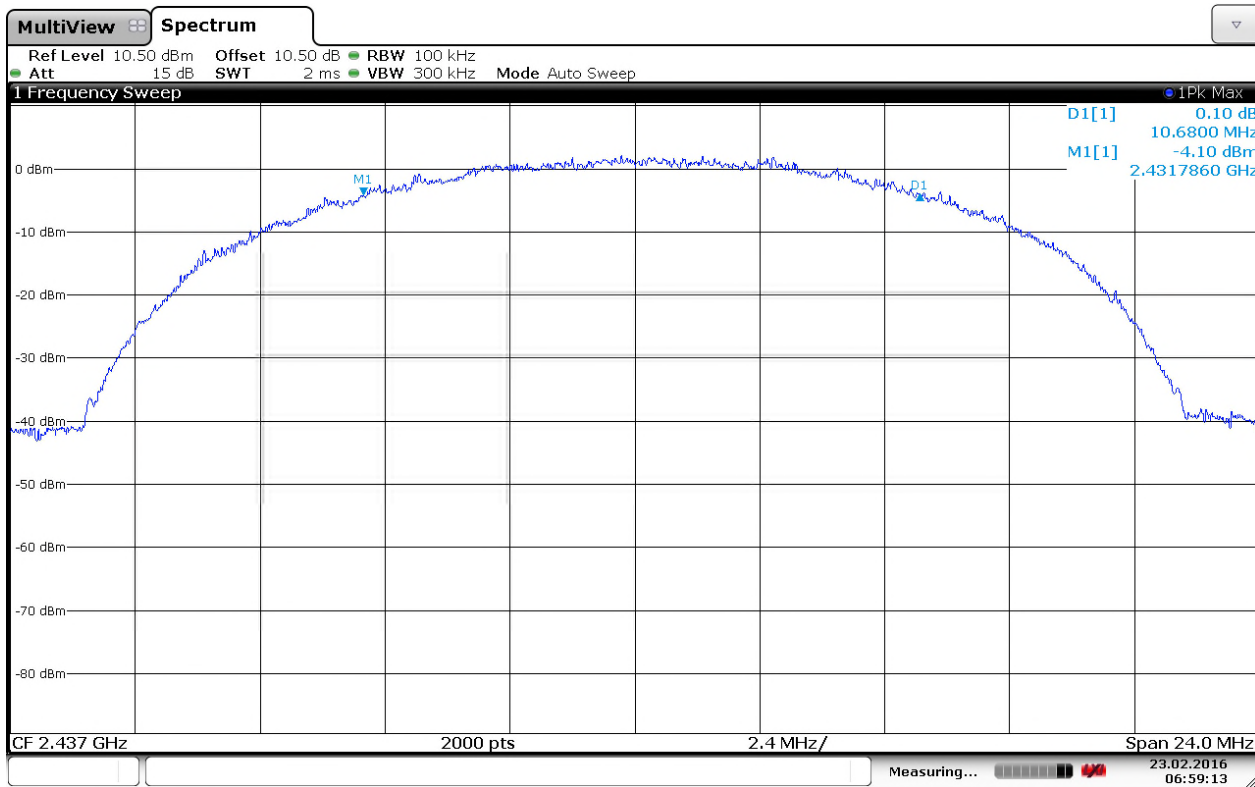
Date: 23.FEB.2016 06:51:37

6 dB Bandwidth, 2412 MHz, 802.11g, 9Mbps



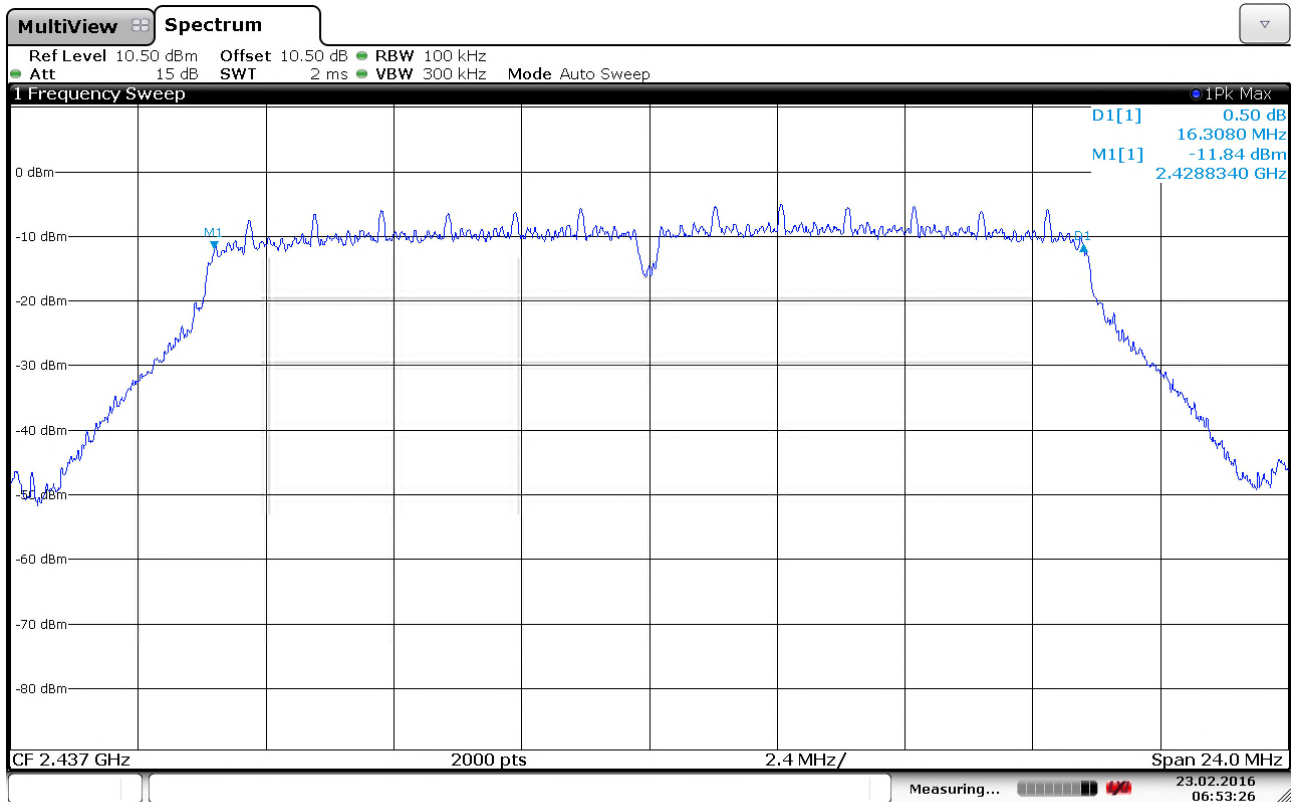
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6 dB Bandwidth, 2412 MHz, 802.11n, 65Mbps



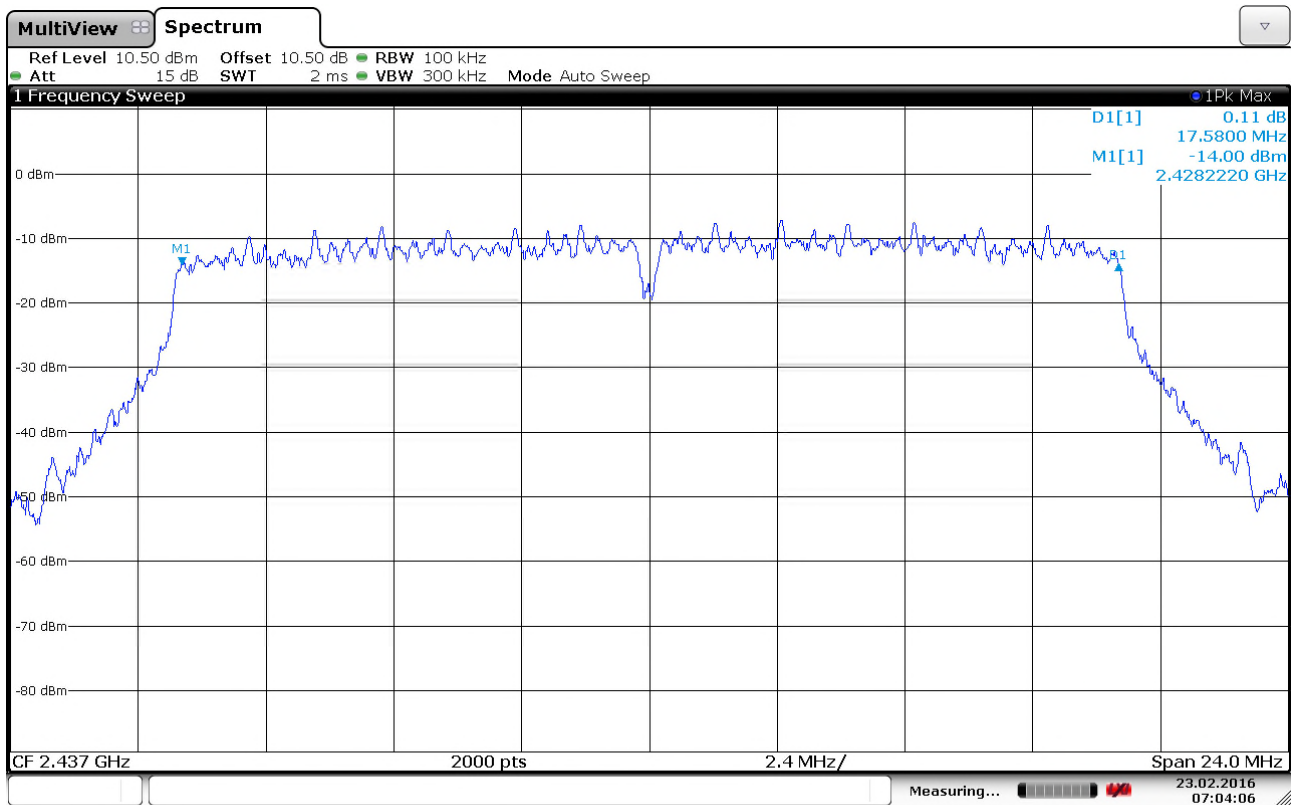
Date: 23.FEB.2016 06:59:14

6 dB Bandwidth, 2437 MHz, 802.11b, 5.5Mbps



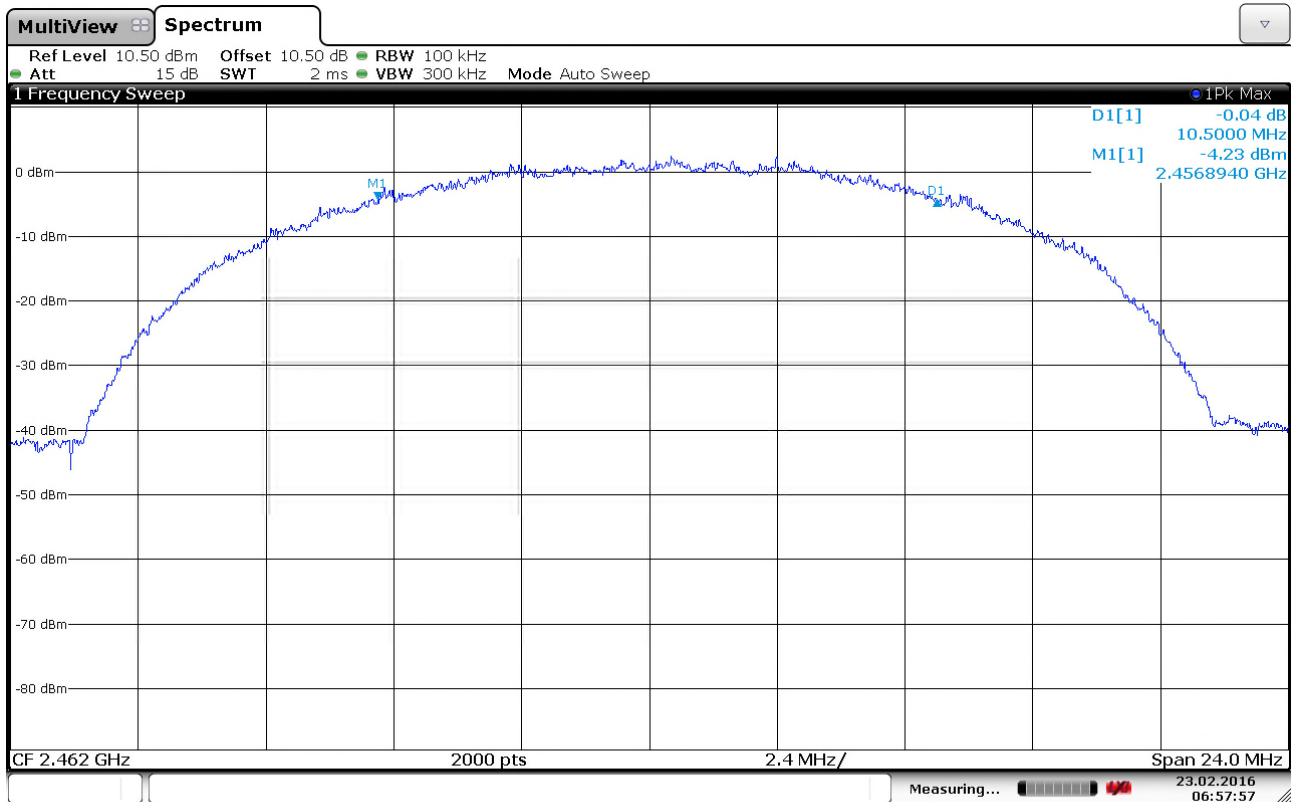
Date: 23.FEB.2016 06:53:26

6 dB Bandwidth, 2437 MHz, 802.11g, 9Mbps



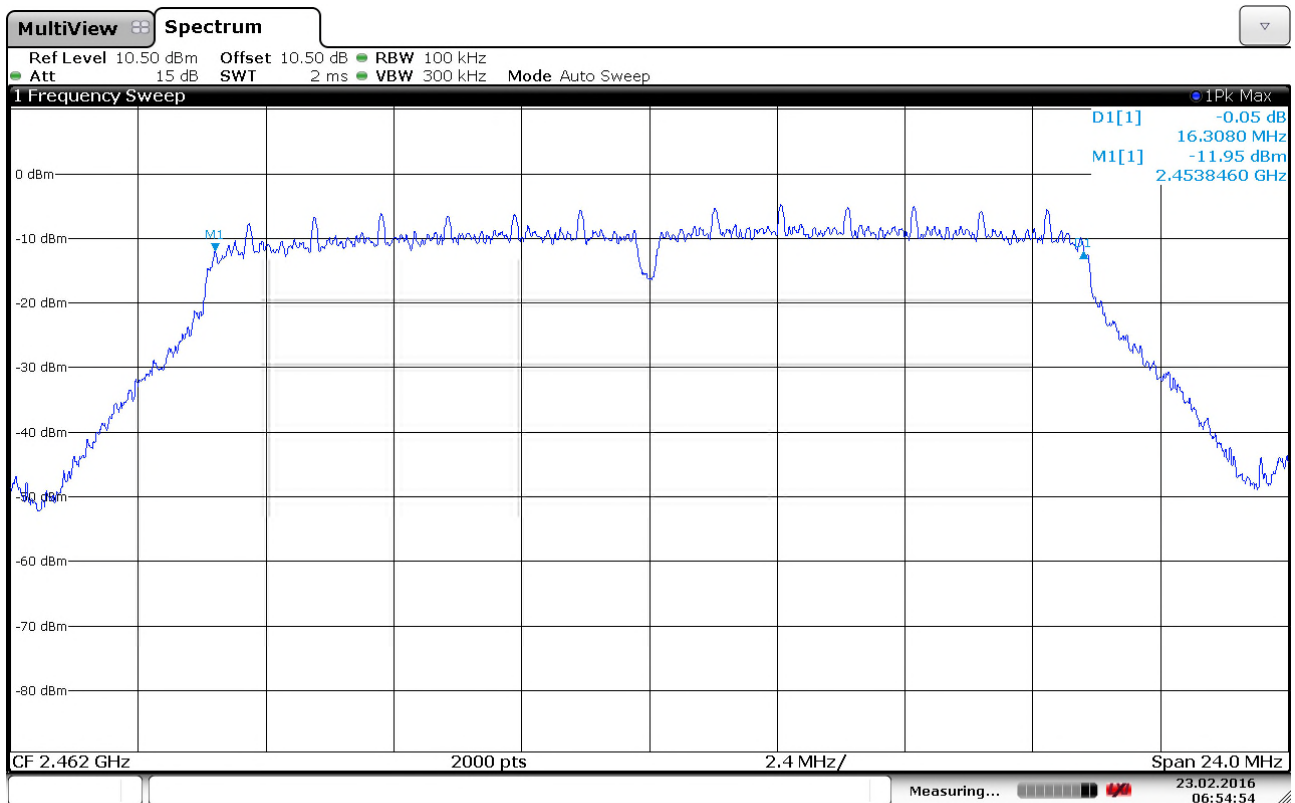
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6 dB Bandwidth, 2437 MHz, 802.11n, 65Mbps



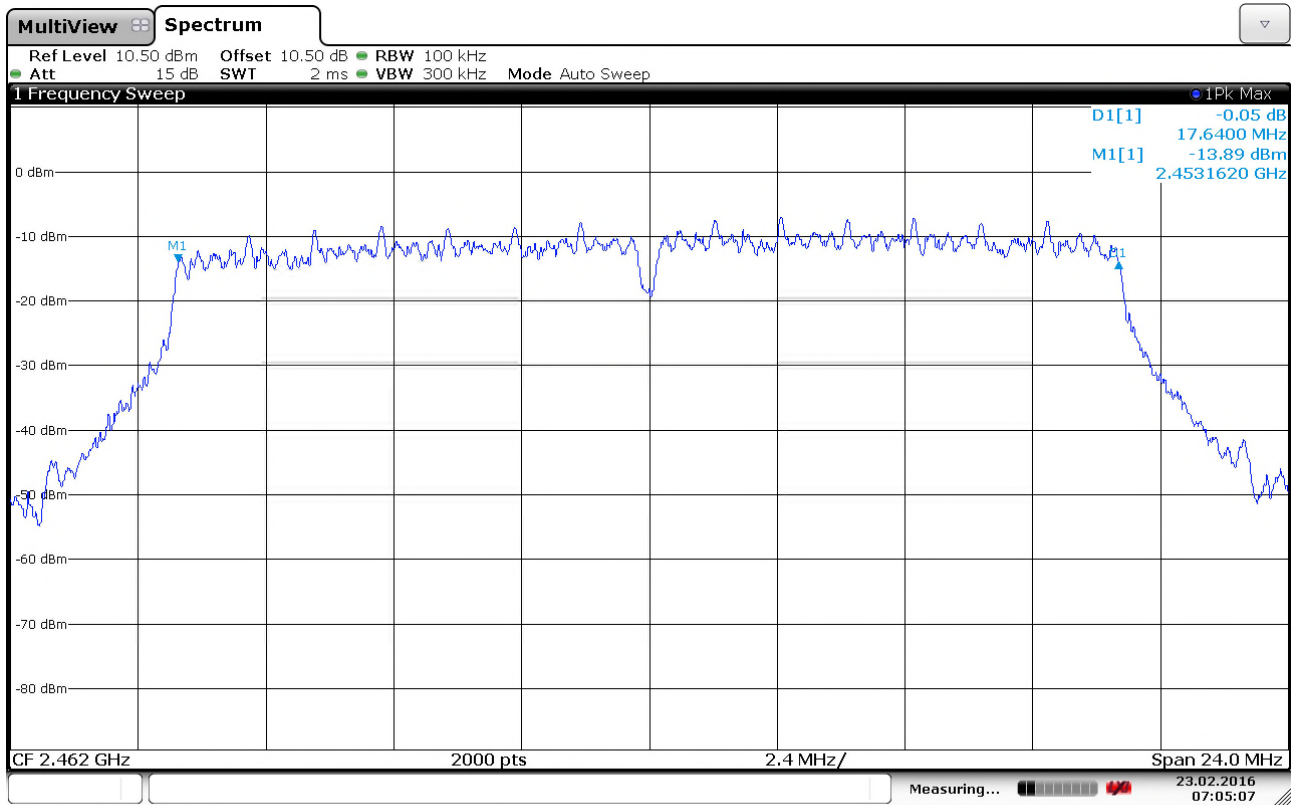
Date: 23.FEB.2016 06:57:57

6 dB Bandwidth, 2462 MHz, 802.11b, 5.5Mbps



Date: 23.FEB.2016 06:54:54

6 dB Bandwidth, 2462 MHz, 802.11g, 9Mbps



Date: 23.FEB.2016 07:05:07

6 dB Bandwidth, 2462 MHz, 802.11n, 65Mbps

3.4 Peak Power Output

Para. No.: 15.247 (b)

Test Performed By: G.Suwanthakumar	Date of Test: 2016.02.18 – 2016.03.17
------------------------------------	---------------------------------------

Test Results: Complies

Measurement Data:

Carrier Frequency	Maximum Conducted Output Power, Watts		
	802.11b, 5.5 Mbps	802.11g, 9 Mbps	802.11n, 65Mbps
2412 MHz	0.033	0.024	0.014
2437 MHz	0.038	0.024	0.015
2462 MHz	0.037	0.024	0.016

Carrier Frequency	Maximum EIRP, Watts		
	802.11b, 5.5 Mbps	802.11g, 9 Mbps	802.11n, 65Mbps
2412 MHz	0.011	0.0092	0.0084
2437 MHz	0.015	0.0054	0.0083
2462 MHz	0.019	0.0053	0.0026

Carrier Frequency	Maximum Antenna Gain, dBi		
	802.11b, 5.5 Mbps	802.11g, 9 Mbps	802.11n, 65Mbps
2412 MHz	-4.77	-4.16	-2.21
2437 MHz	-4.04	-6.48	-2.27
2462 MHz	-2.89	-6.56	-7.89

Antenna gain = $10 \cdot \log(\text{EIRP} / \text{Conducted power})$ dBi

EIRP is calculated from measured field strength by the formulas in KDB 412172 D01 Determining ERP and EIRP v01.

The maximum field strength is obtained in XY plane and Vertical polarization.

See attached plots

Detachable antenna?

☐ Yes ☒ No

If detachable, is the antenna connector non-standard?

☐ Yes ☐ No

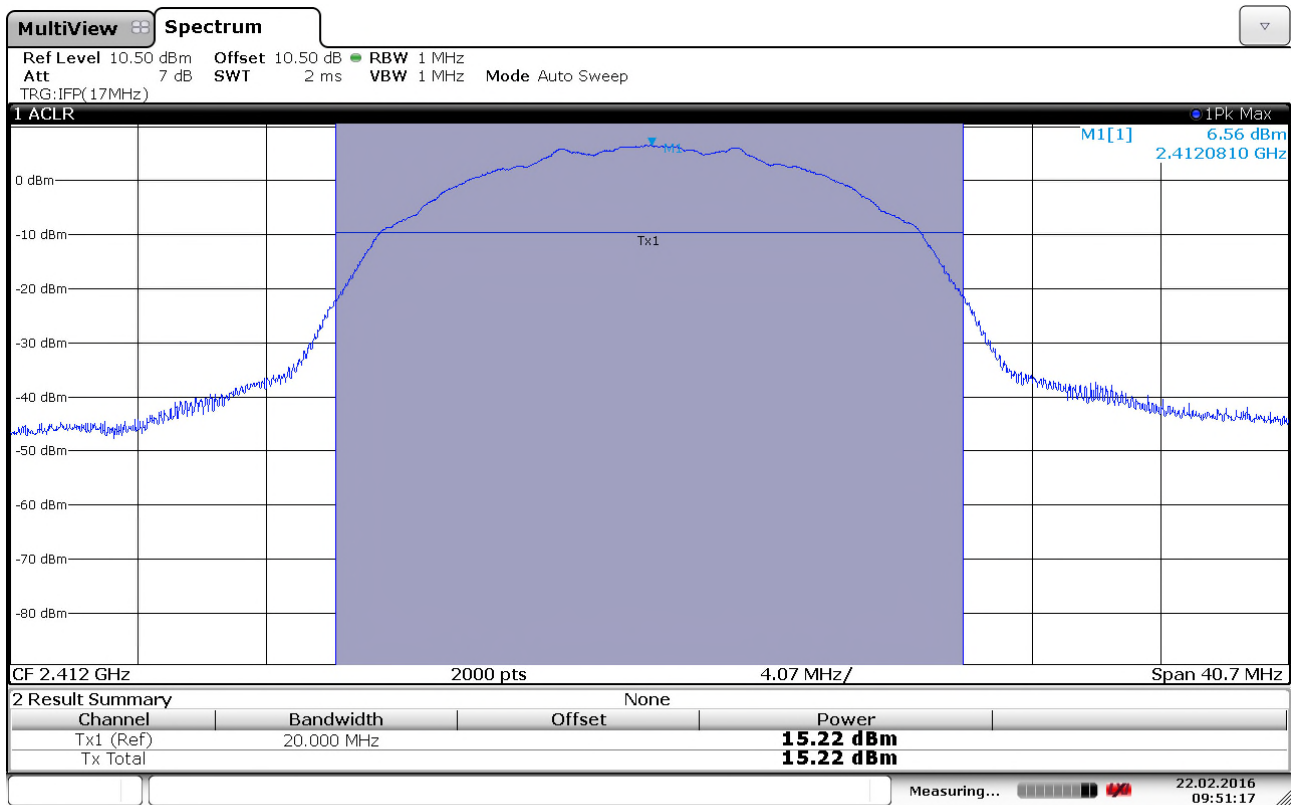
Type of antenna connector: N/A

Requirements:

The maximum peak output power shall not exceed the following limits:

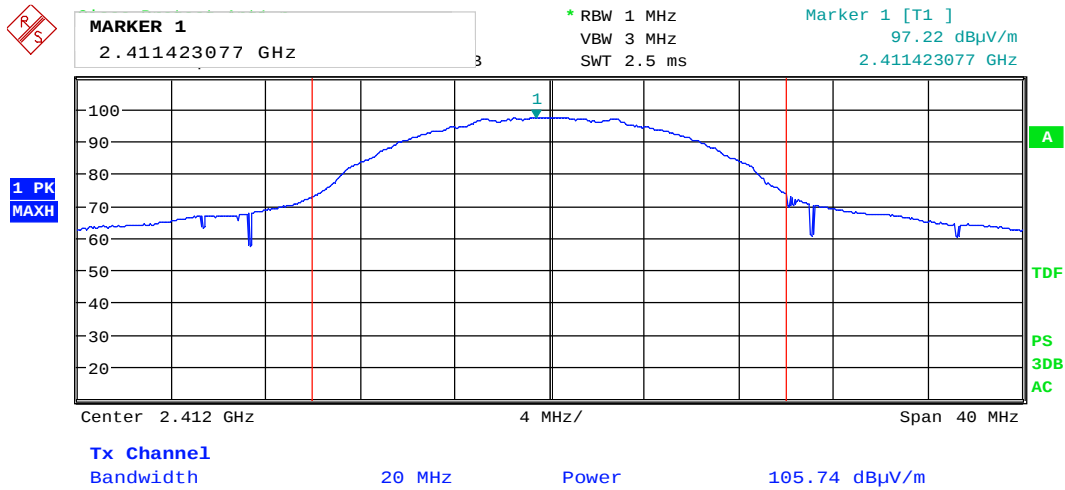
For Digital Transmission Systems in the 2400 - 2483.5 MHz band: 1 Watt

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power from the intentional radiator shall be reduced below the stated value above by the amount in dB that the directional gain of the antenna exceeds 6 dBi.



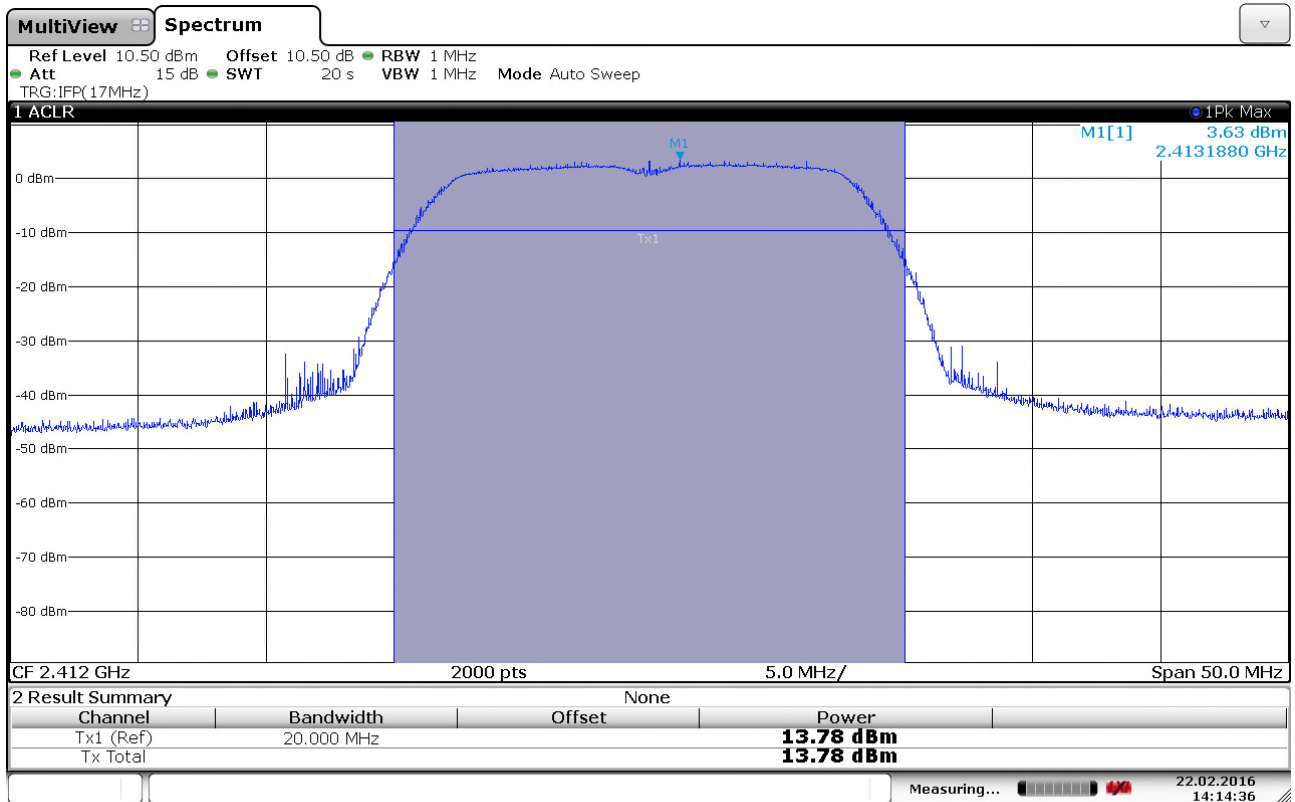
Date: 22.FEB.2016 09:51:17

Conducted Output Power, 2412 MHz, 802.11b, 5.5Mbps



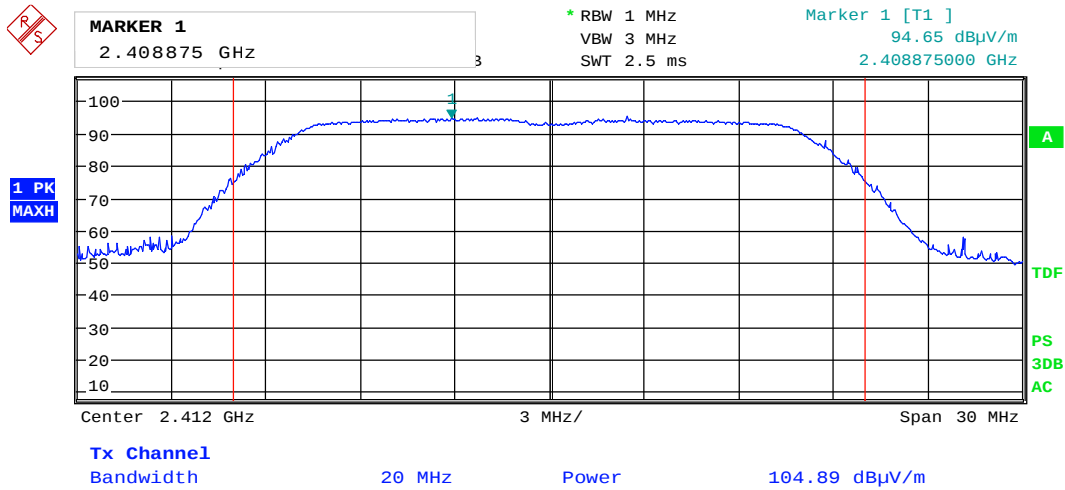
Date: 18.FEB.2016 11:08:32

Radiated Output Power, 2412 MHz, 802.11b, 5.5Mbps (Max: VP)



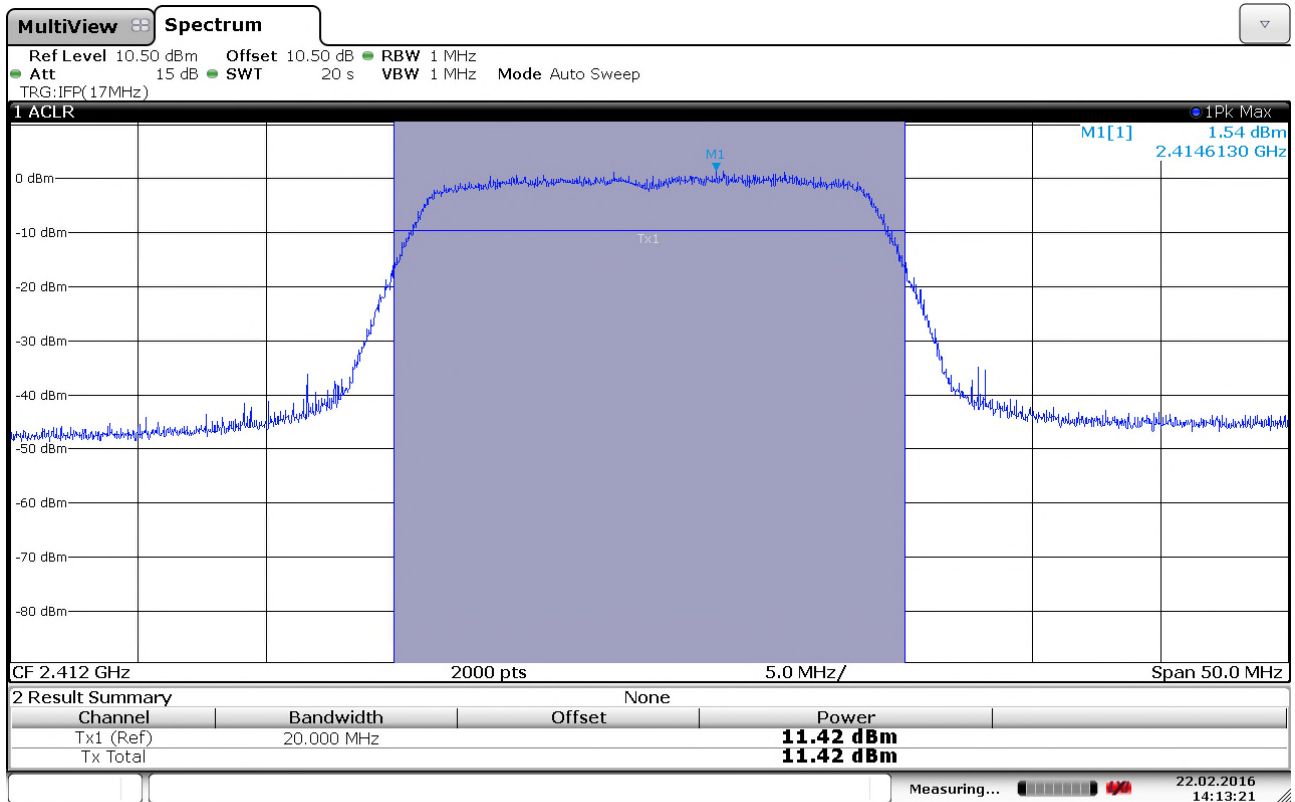
Date: 22.FEB.2016 14:14:36

Conducted Output Power, 2412 MHz, 802.11g, 9Mbps



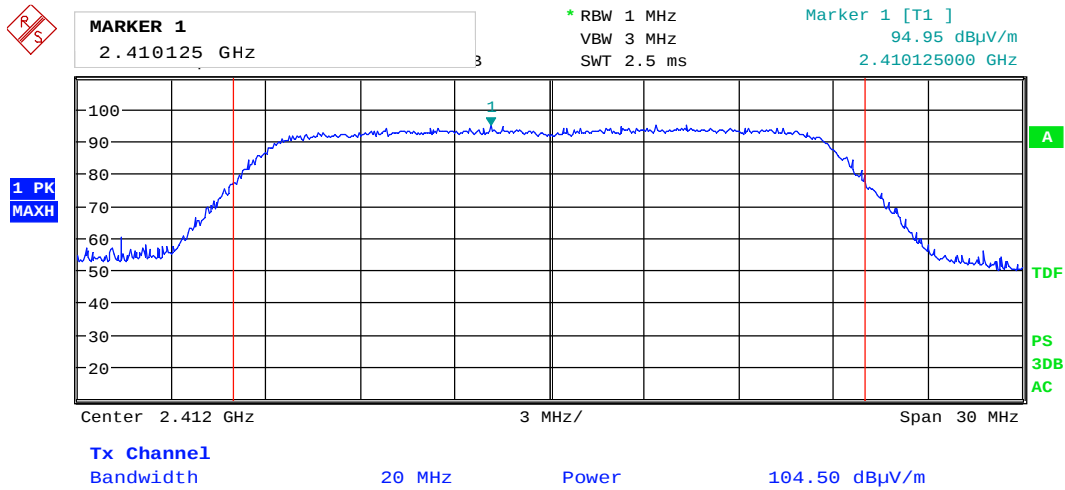
Date: 3.MAR.2016 11:18:26

Radiated Output Power, 2412 MHz, 802.11g, 9Mbps (Max: VP)



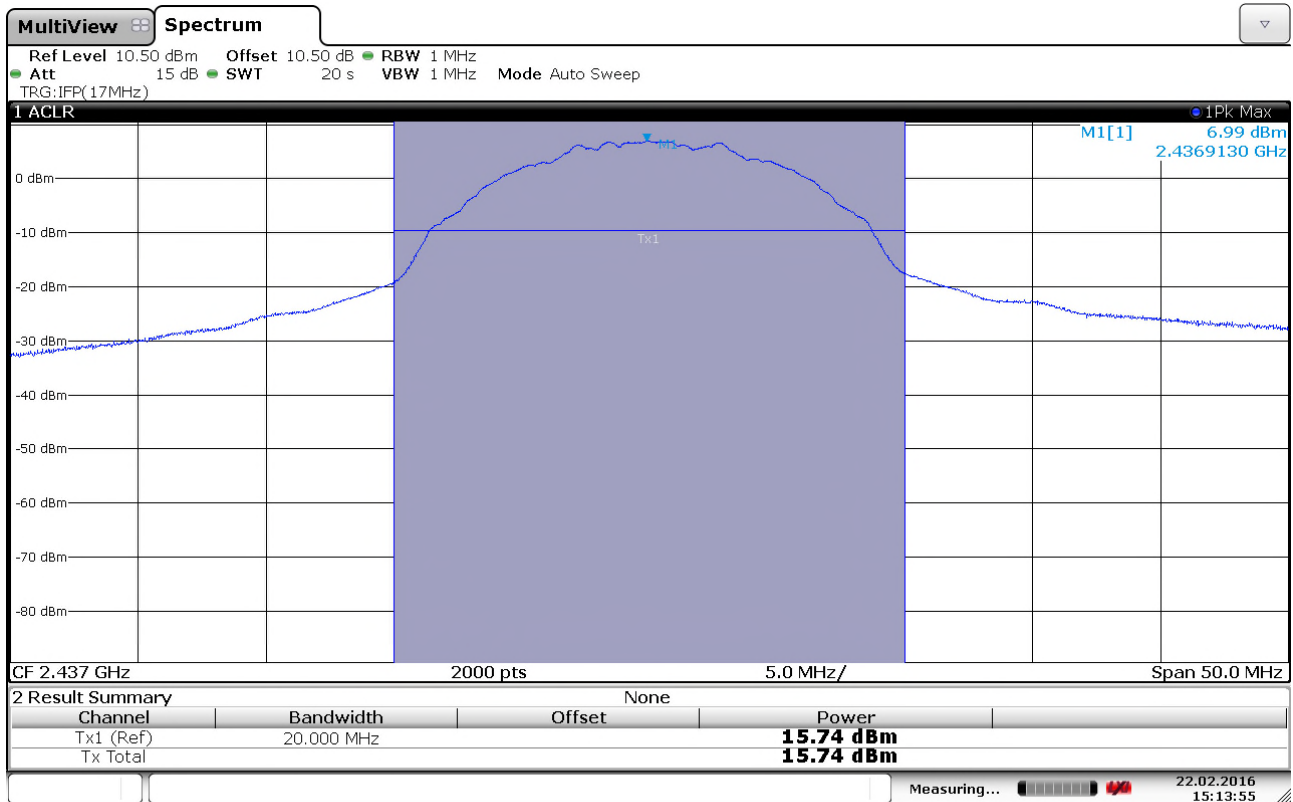
Date: 22.FEB.2016 14:13:22

Conducted Output Power, 2412 MHz, 802.11n, 65Mbps



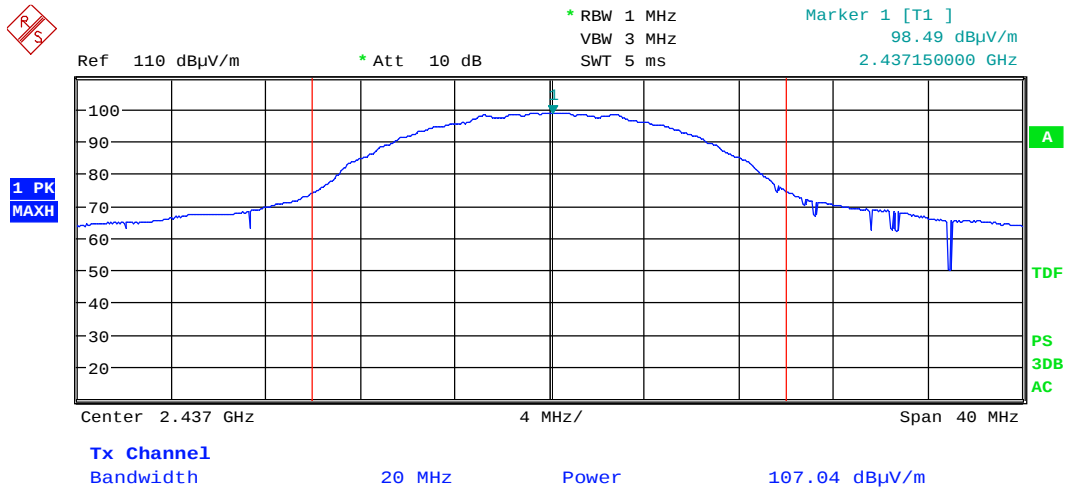
Date: 3.MAR.2016 08:52:19

Radiated Output Power, 2412 MHz, 802.11n, 65Mbps (Max: VP)



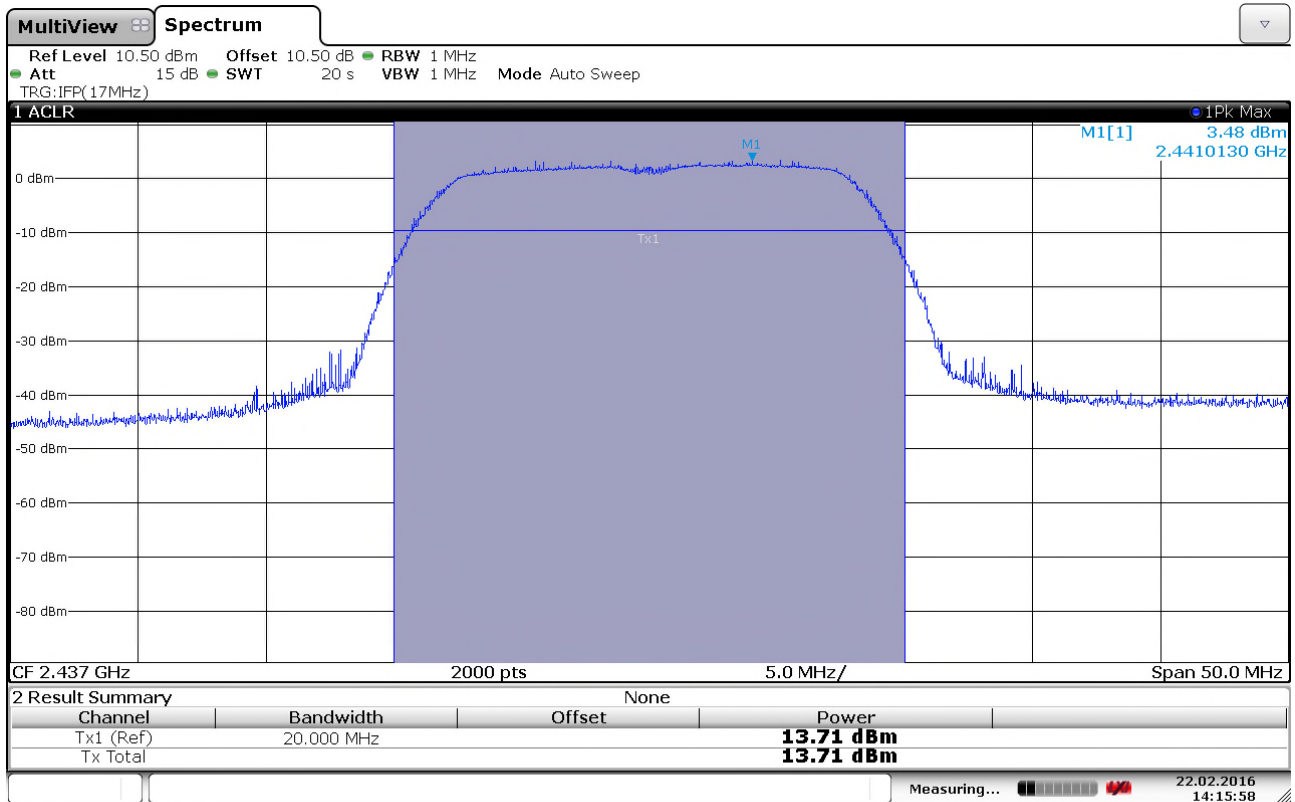
Date: 22.FEB.2016 15:13:55

Conducted Output Power, 2437 MHz, 802.11b, 5.5Mbps



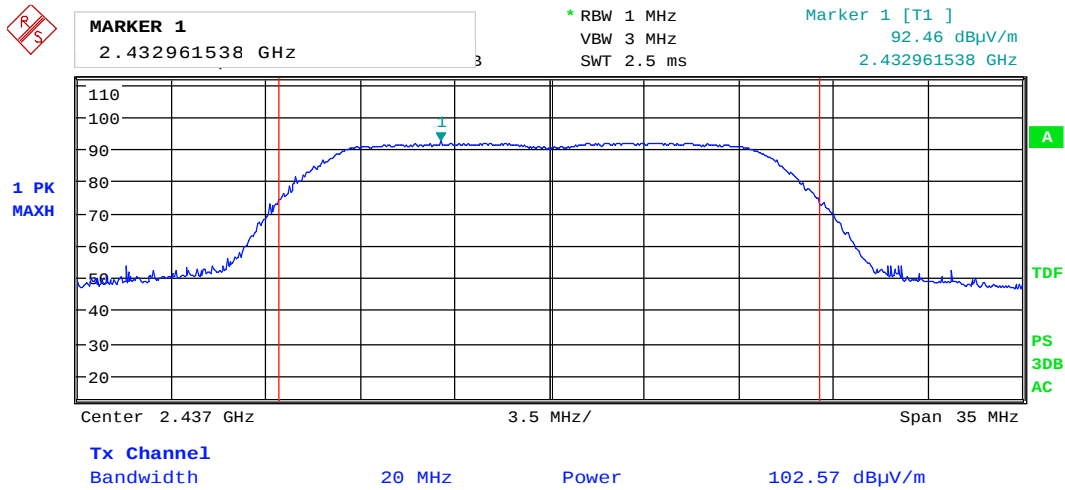
Date: 19.FEB.2016 07:42:40

Radiated Output Power, 2437 MHz, 802.11b, 5.5Mbps (Max: VP)



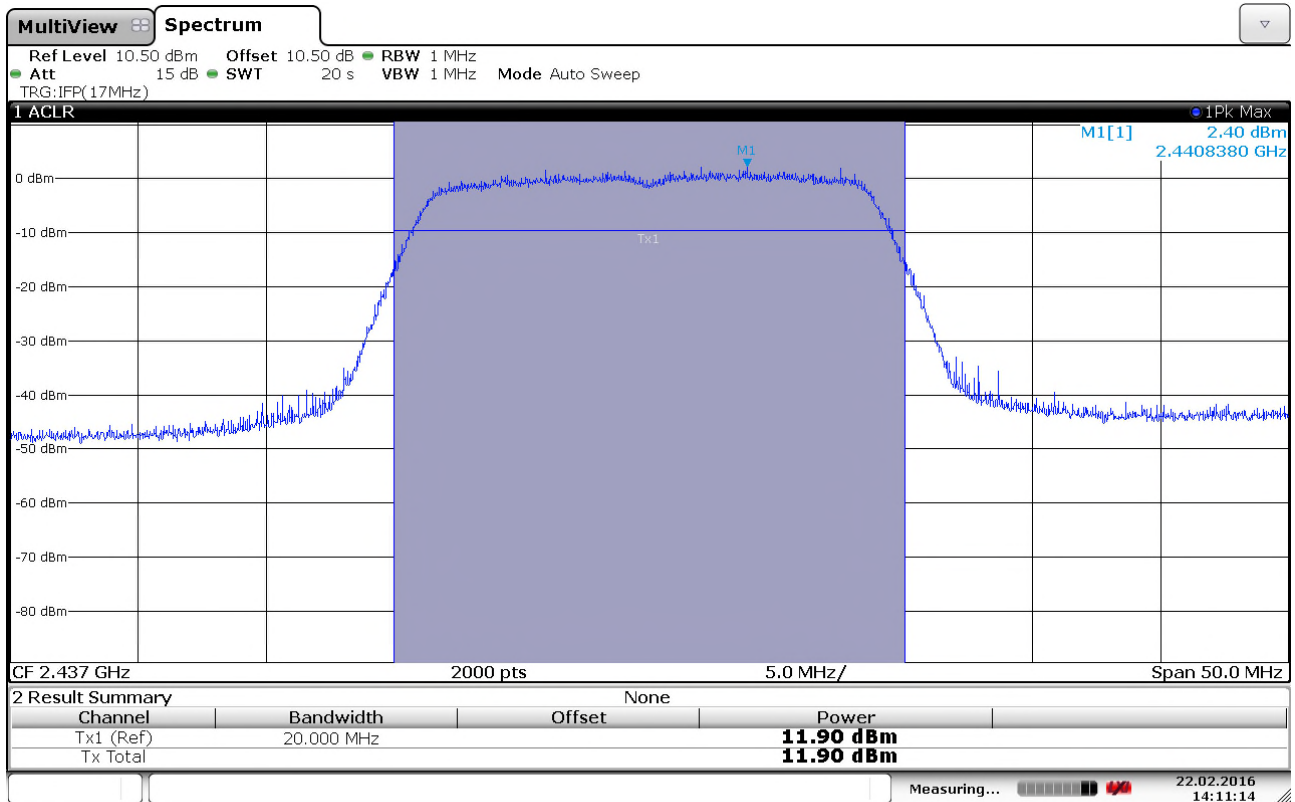
Date: 22.FEB.2016 14:15:58

Conducted Output Power, 2437 MHz, 802.11g, 9Mbps



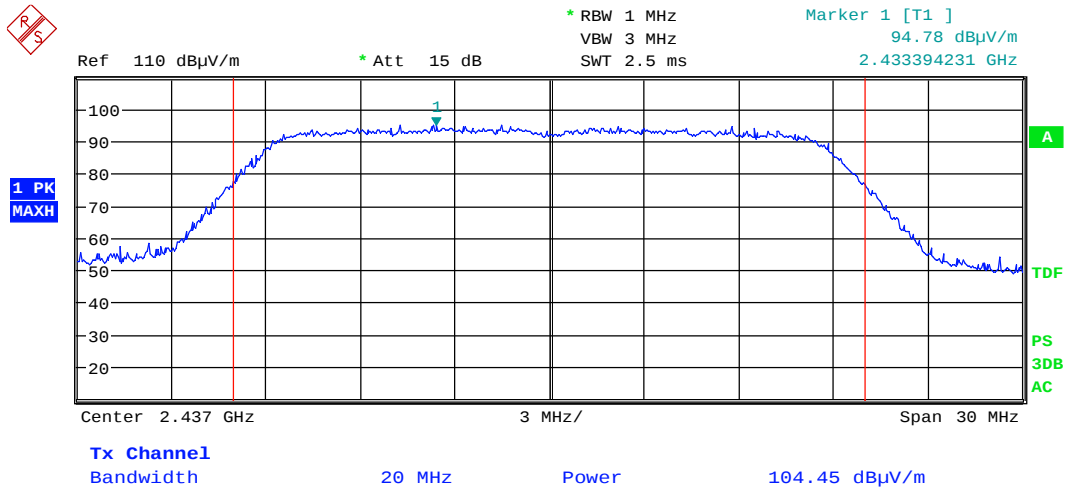
Date: 17.MAR.2016 08:23:38

Radiated Output Power, 2437 MHz, 802.11g, 9Mbps (Max: VP)



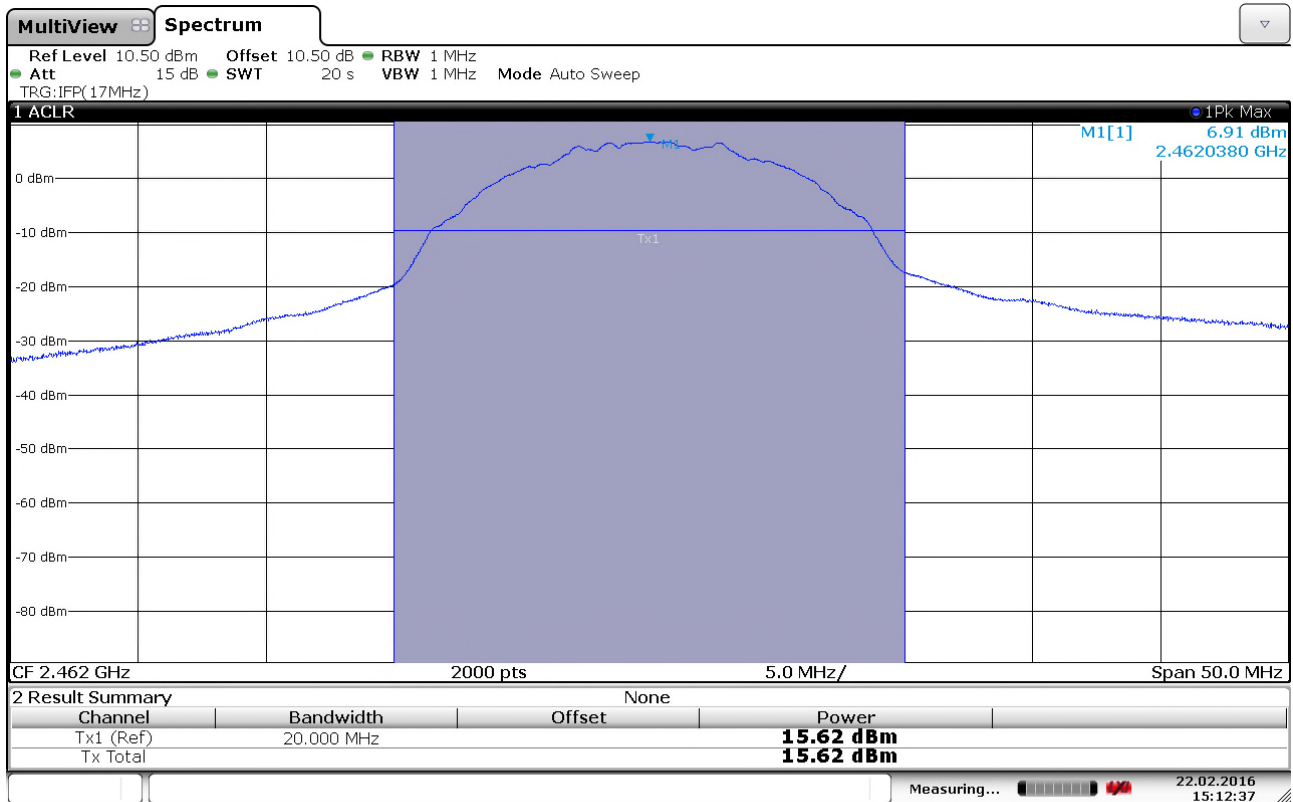
Date: 22.FEB.2016 14:11:14

Conducted Output Power, 2437 MHz, 802.11n, 65Mbps



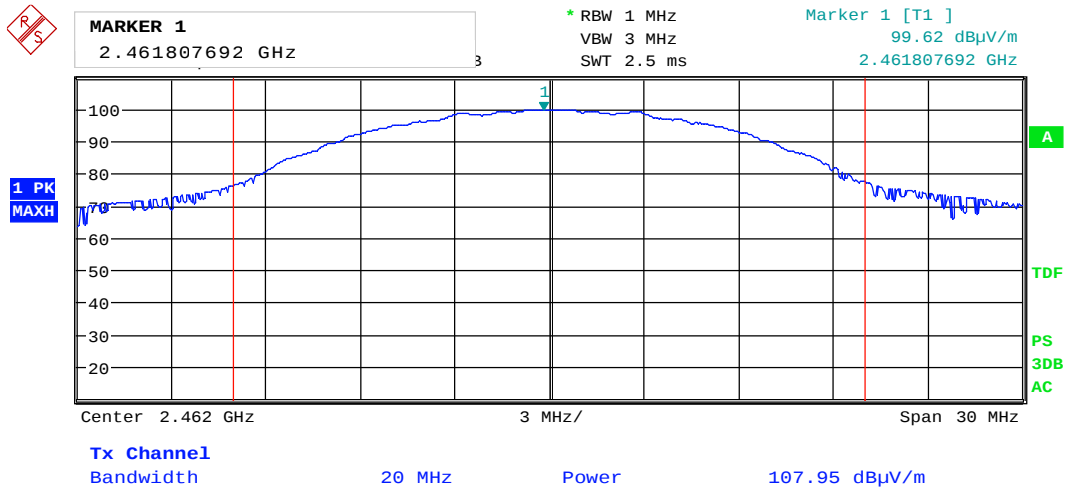
Date: 3.MAR.2016 08:26:27

Radiated Output Power, 2437 MHz, 802.11n, 65Mbps (Max: VP)



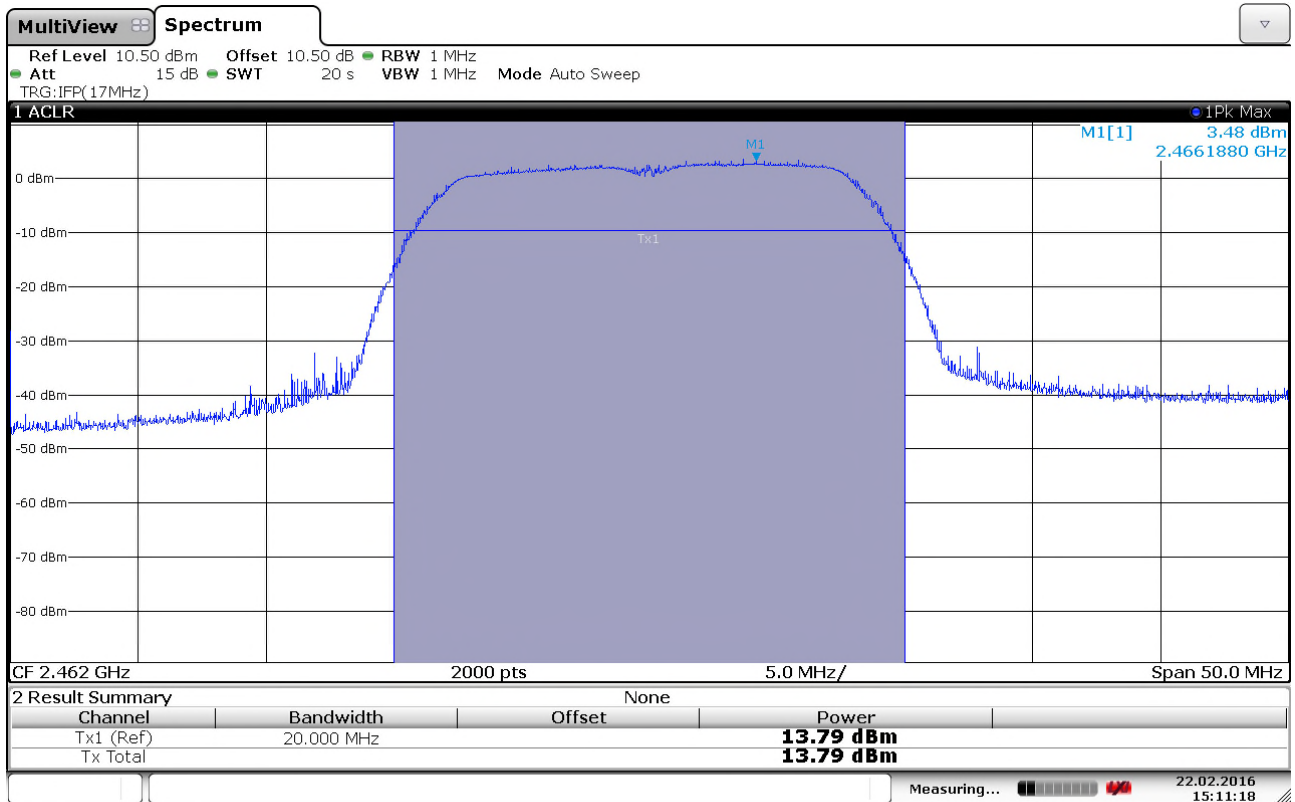
Date: 22.FEB.2016 15:12:37

Conducted Output Power, 2462 MHz, 802.11b, 5.5Mbps



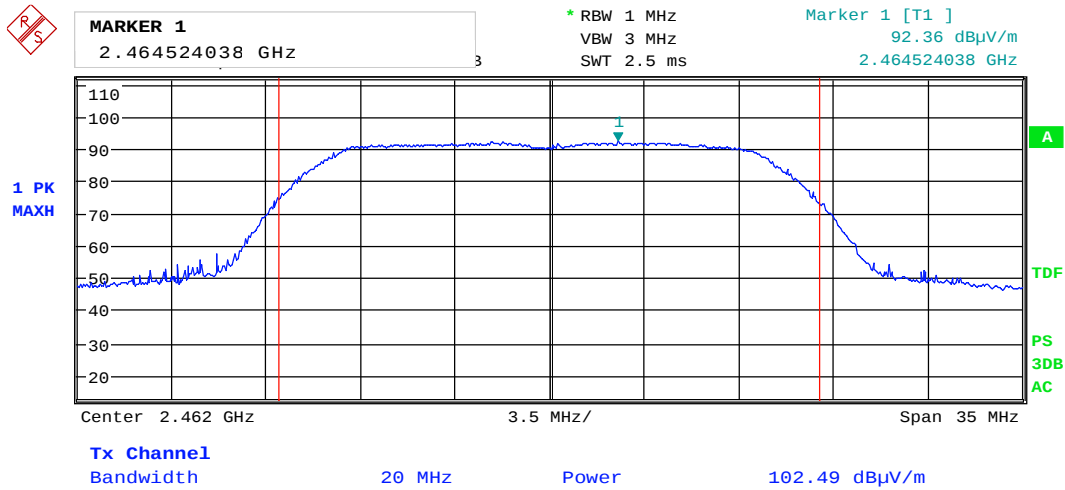
Date: 18.FEB.2016 15:59:41

Radiated Output Power, 2462 MHz, 802.11b, 5.5Mbps (Max:VP)



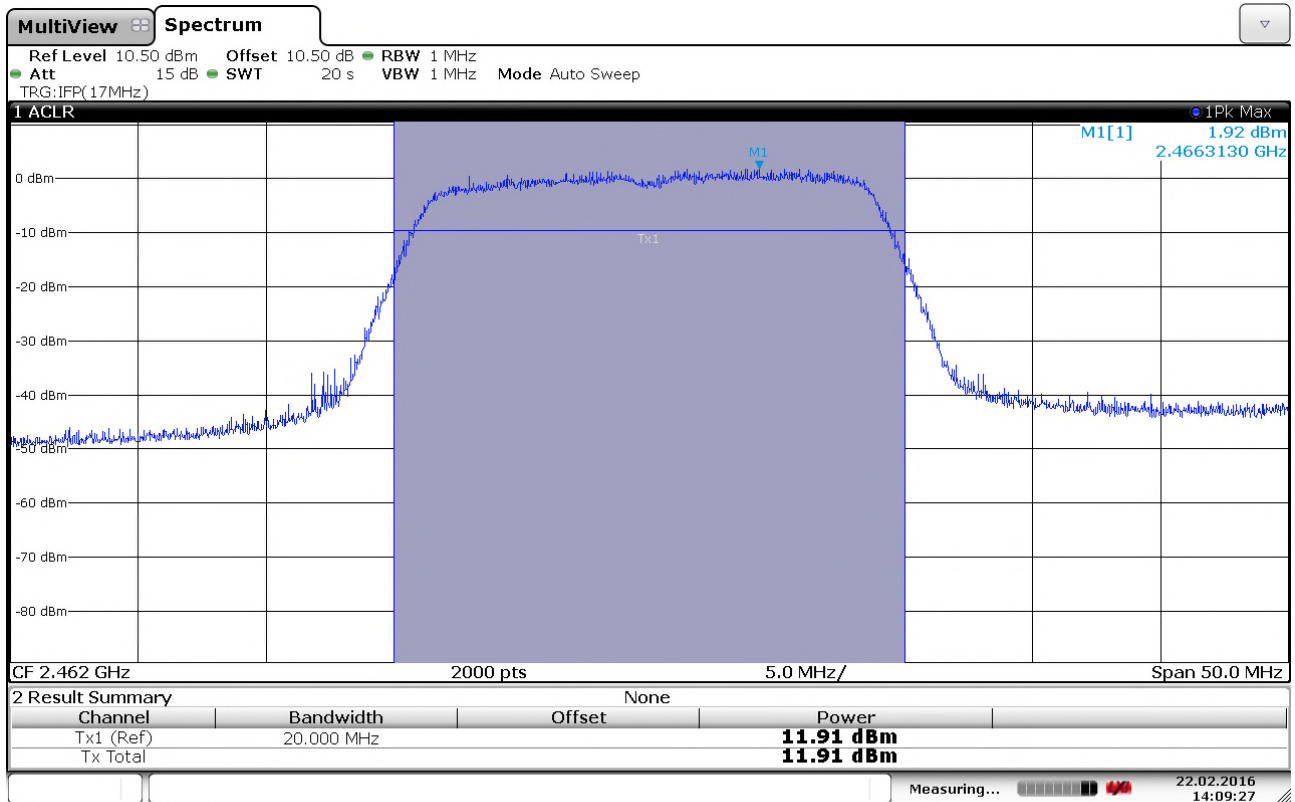
Date: 22.FEB.2016 15:11:18

Conducted Output Power, 2462 MHz, 802.11g, 9Mbps



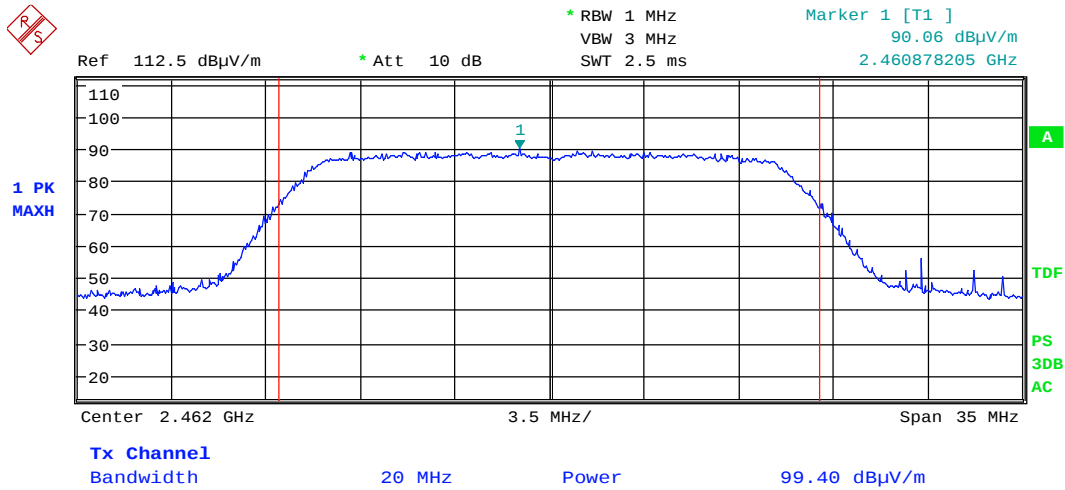
Date: 17.MAR.2016 08:31:56

Radiated Output Power, 2462 MHz, 802.11g, 9Mbps (Max:VP)



Date: 22.FEB.2016 14:09:27

Conducted Output Power, 2462 MHz, 802.11n, 65Mbps



Date: 17.MAR.2016 08:41:04

Radiated Output Power, 2462 MHz, 802.11n, 65Mbps (Max: VP)

3.5 Spurious Emissions (Radiated)

Para. No.: 15.247 (c)

Test Performed By: G.Suwanthakumar	Date of Test: 2016.03.03
------------------------------------	--------------------------

Test Results: Complies

Measurement Data:

Peak Detector:

Modulation and Bitrate	Measured field strength (dB μ V/m)		Limit	Margin	
	2390 MHz	2483.5 MHz	dB	dB	
802.11b, 5.5 Mbps	61.1	54.8	74	12.9	19.2
802.11g, 9 Mbps	47.7	44.6	74	26.3	29.4
802.11n, 65Mbps	50.2	45.6	74	23.8	28.4

Average Detector:

Modulation and Bitrate	Measured field strength (dB μ V/m)		Limit	Margin	
	2390 MHz	2483.5 MHz	dB	dB	
802.11b, 5.5 Mbps	48.3	52.6	54	5.7	1.4
802.11g, 9 Mbps	44.5	44.3	54	9.5	9.7
802.11n, 65Mbps	53.9	51.5	54	0.1	2.5

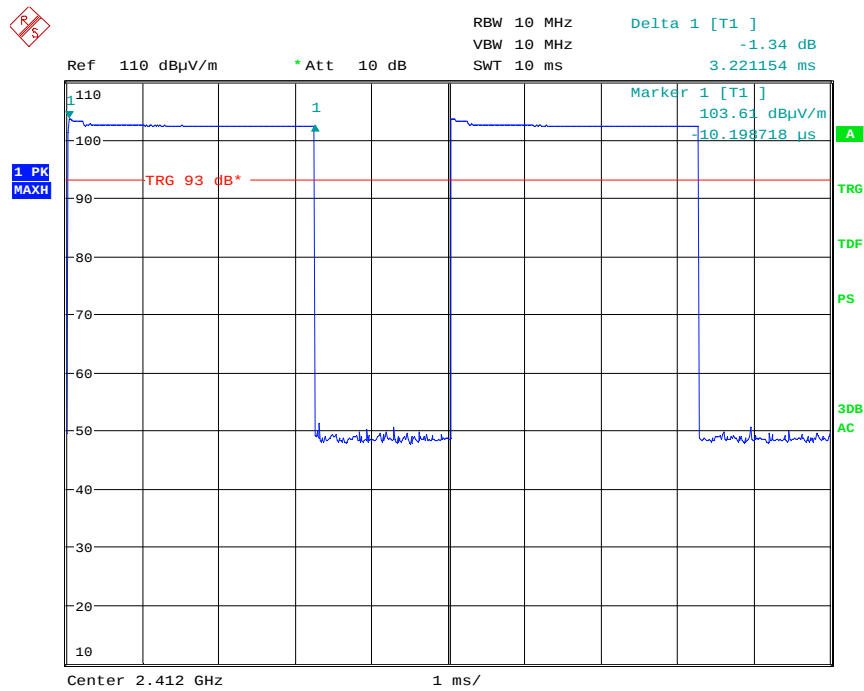
Duty cycle:

	Duty cycle (x) %	Duty cycle correction (dB)
802.11b, 5.5Mbps	64.02	1.93
802.11g, 9Mbps	95.32	0.20
802.11n, 65Mbps	5.74	12.4

Duty cycle: $10\log(1/x)$

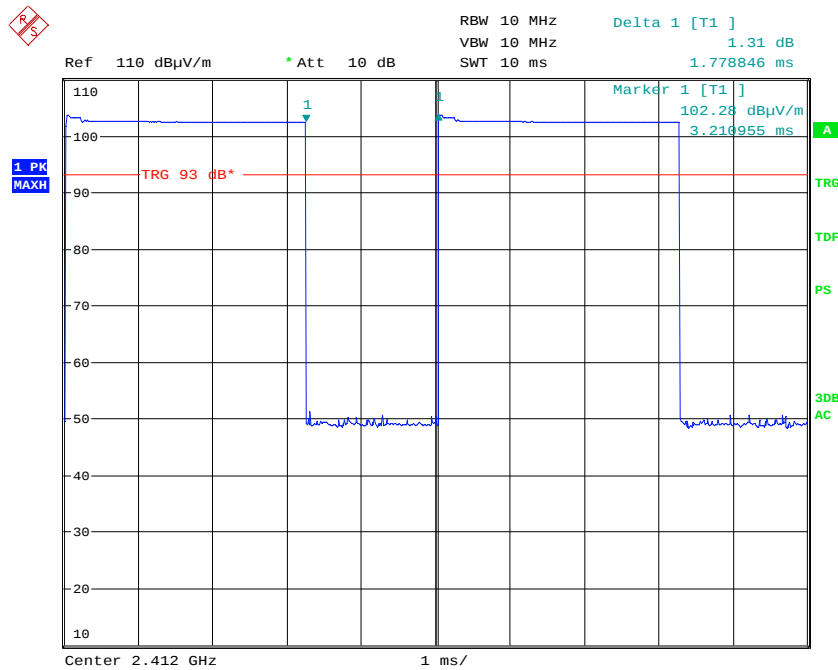
Average values are measured with RMS Detector and corrected for Duty Cycle.

See attached plots



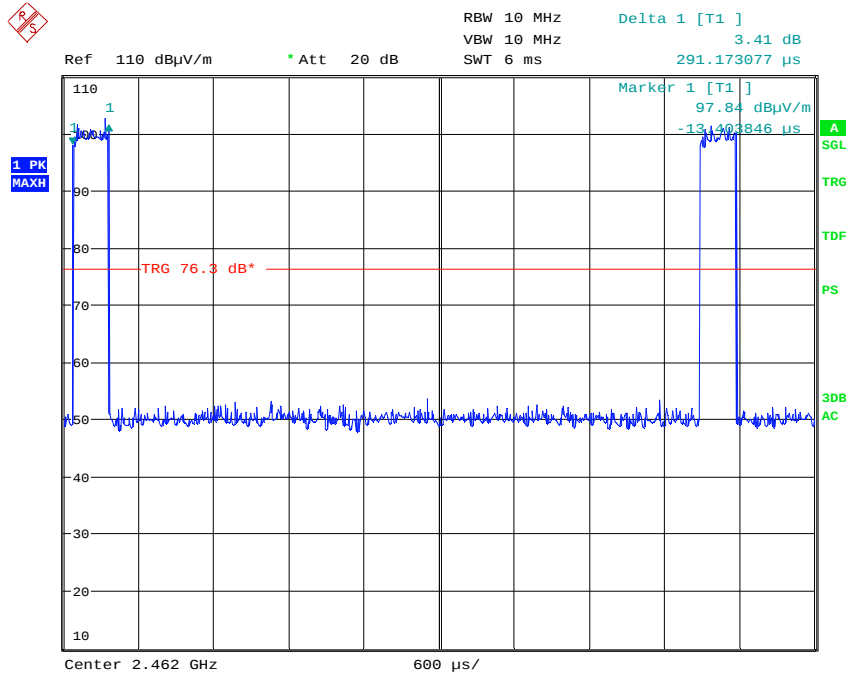
Date: 18.FEB.2016 11:22:09

ON time – 11b , 5.5Mbps



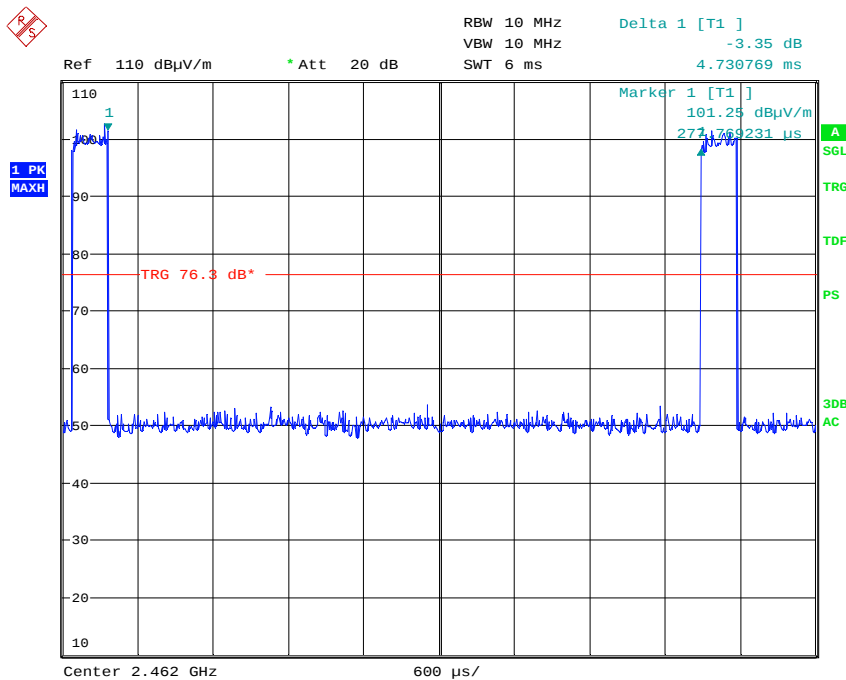
Date: 18.FEB.2016 11:22:36

OFF time – 11b , 5.5Mbps



Date: 19.FEB.2016 08:07:27

ON time- 11n, 65Mbps



Date: 19.FEB.2016 08:08:22

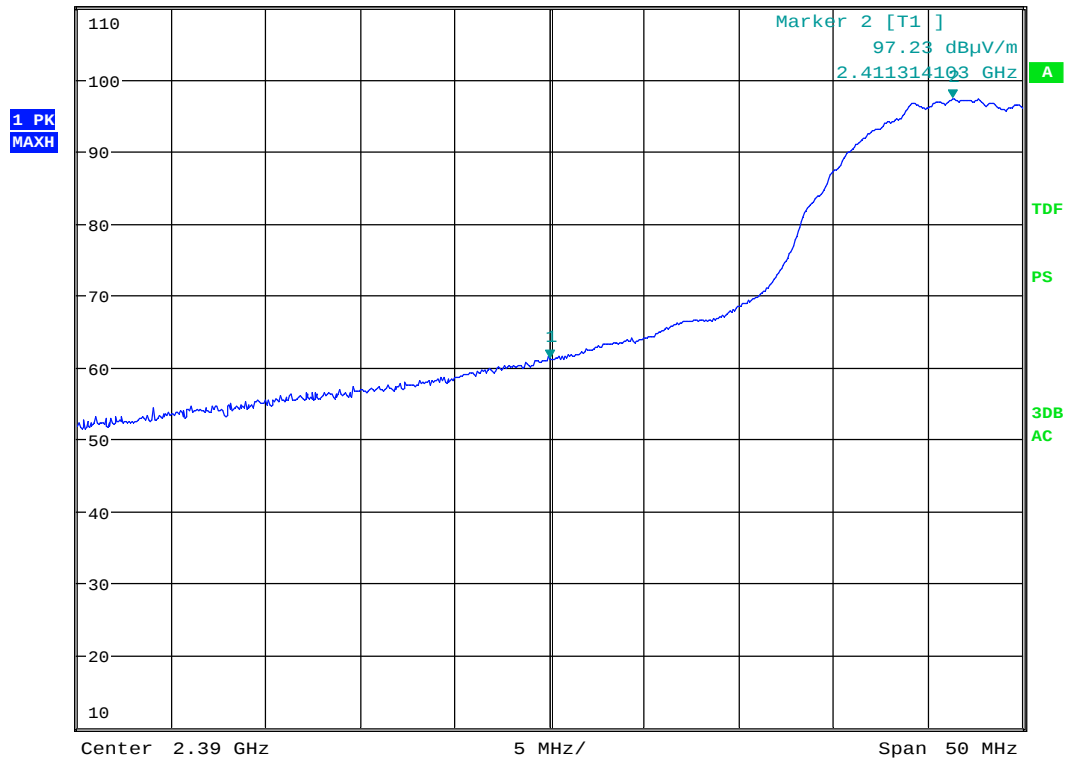
OFF time- 11n, 65Mbps



MARKER 1
2.39 GHz
Ref 110 dBμV/m * Att 10 dB

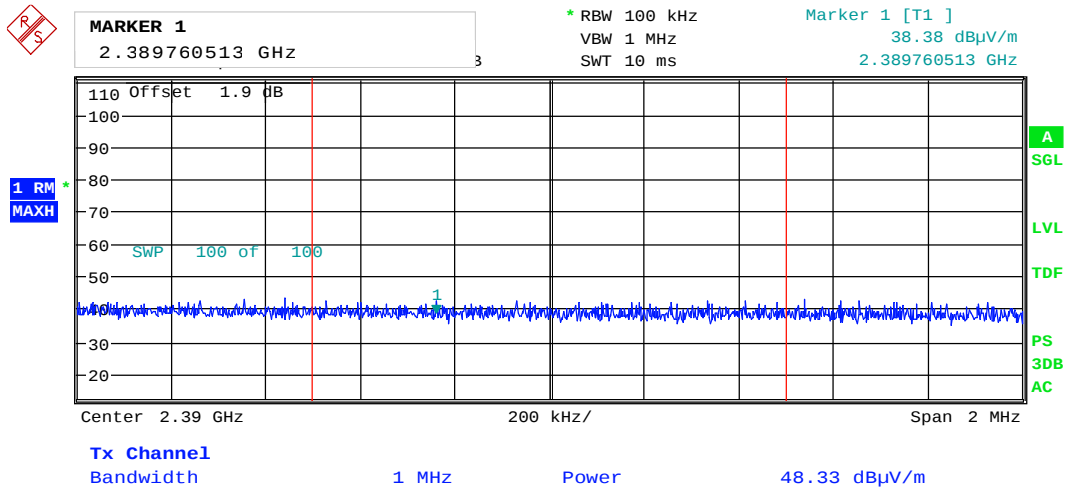
* RBW 1 MHz
VBW 3 MHz
SWT 2.5 ms

Marker 1 [T1]
61.09 dBμV/m
2.390000000 GHz



Date: 18.FEB.2016 11:15:55

Band Edge, Lower, Peak, 2412 MHz, 802.11b, 5.5Mbps



Date: 18.FEB.2016 12:49:05

Band Edge, Lower, Average, 2412 MHz, 802.11b, 5.5Mbps

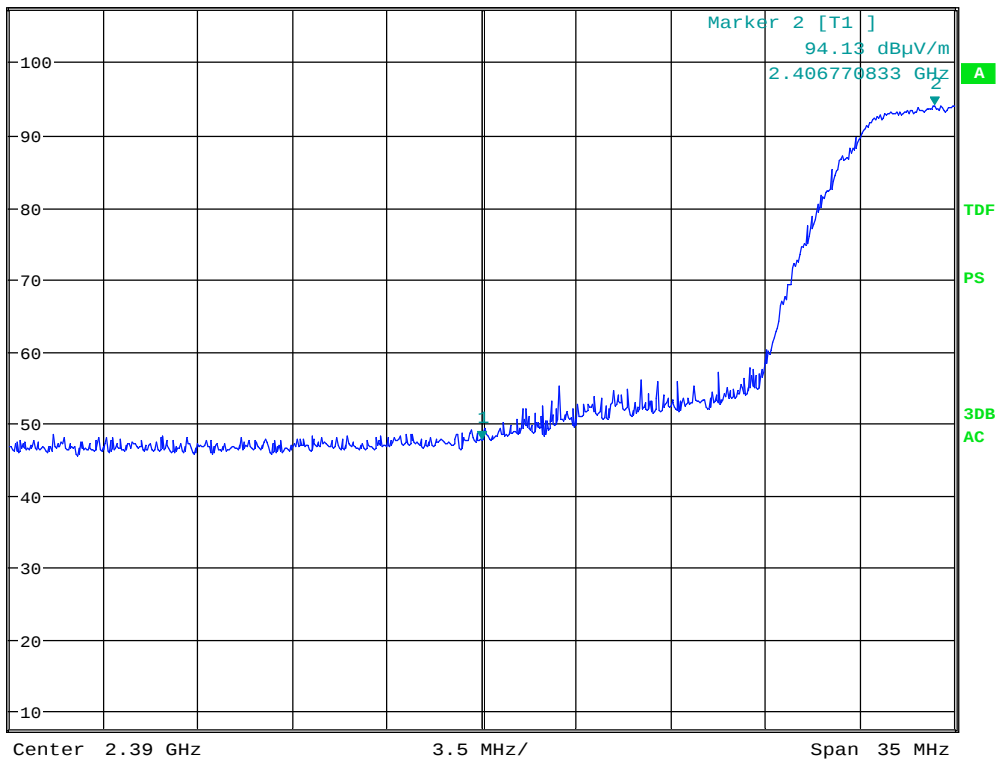


MARKER 1
2.39 GHz
Ref 107.6 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 2.5 ms

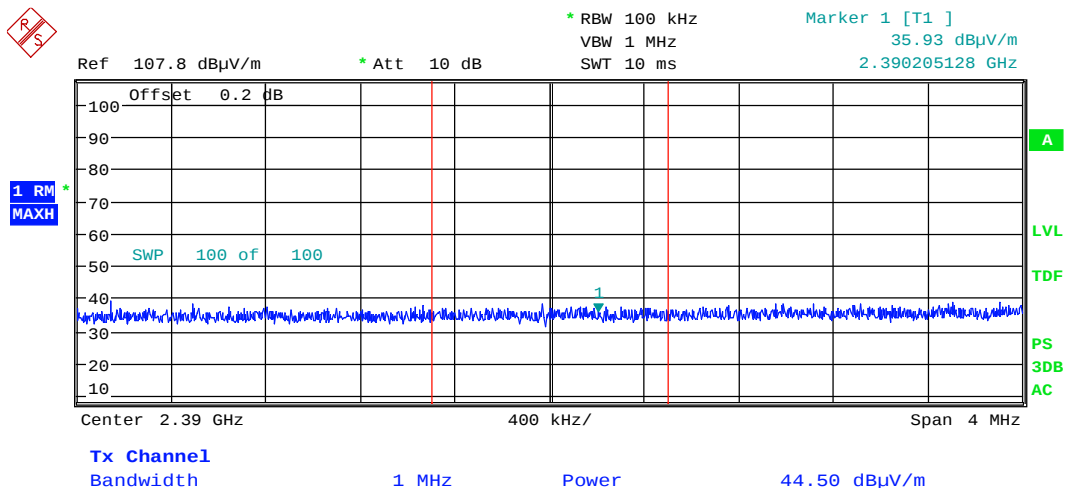
Marker 1 [T1]
47.66 dBμV/m
2.390000000 GHz

1 PK
MAXH



Date: 3.MAR.2016 11:19:06

Band Edge, Lower, Peak, 2412 MHz, 802.11g, 9Mbps



Date: 3.MAR.2016 11:54:15

Band Edge, Lower, Average, 2412 MHz, 802.11g, 9Mbps

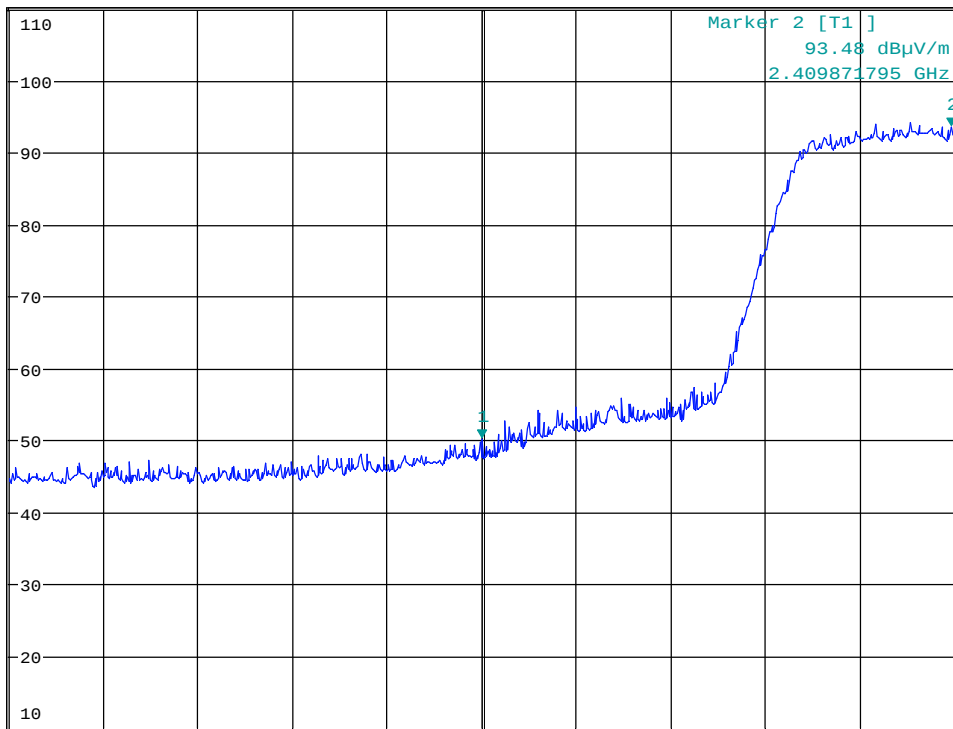


MARKER 1
2.39 GHz
Ref 110 dBμV/m * Att 15 dB

* RBW 1 MHz
VBW 3 MHz
SWT 2.5 ms

Marker 1 [T1]
50.17 dBμV/m
2.390000000 GHz

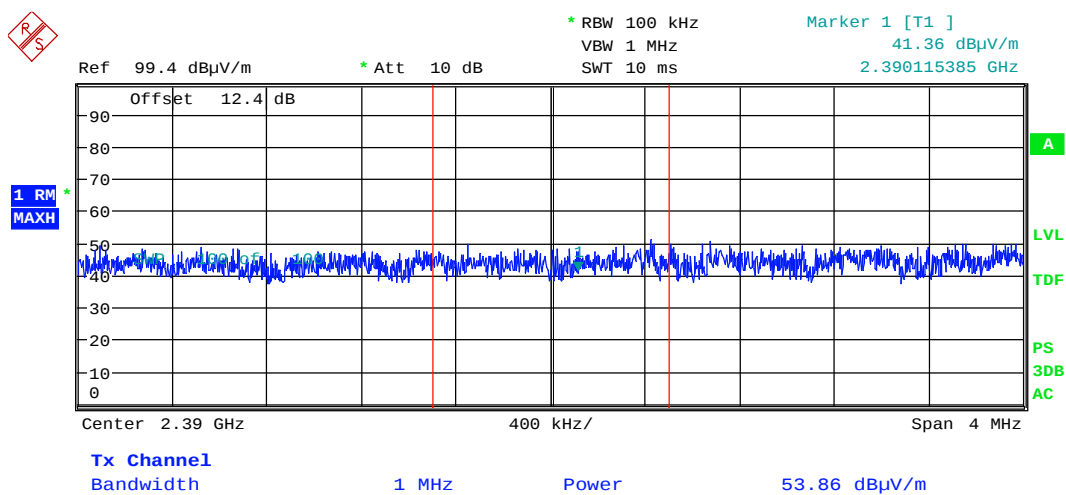
1 PK
MAXH



Center 2.39 GHz 4 MHz/ Span 40 MHz

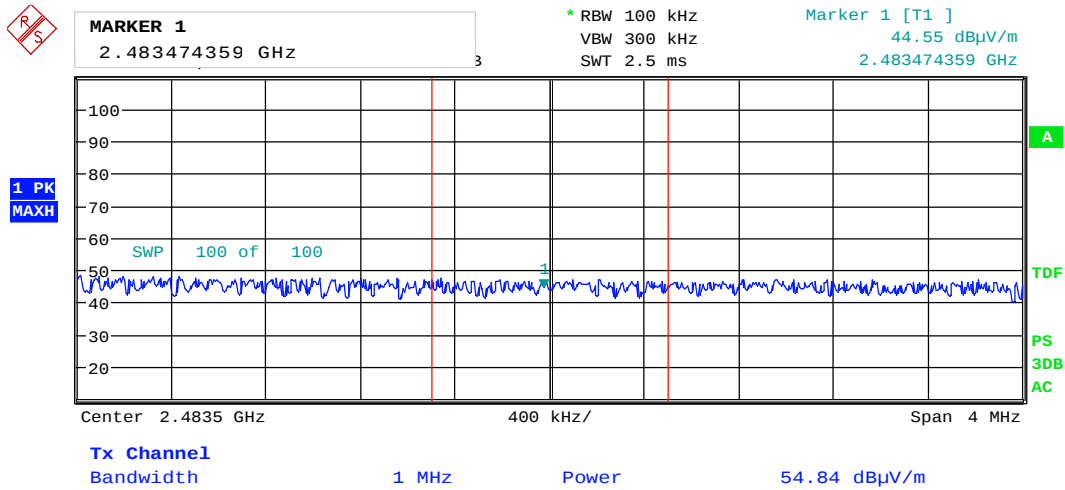
Date: 3.MAR.2016 09:28:23

Band Edge, Lower, Peak, 2412 MHz, 802.11n, 65Mbps



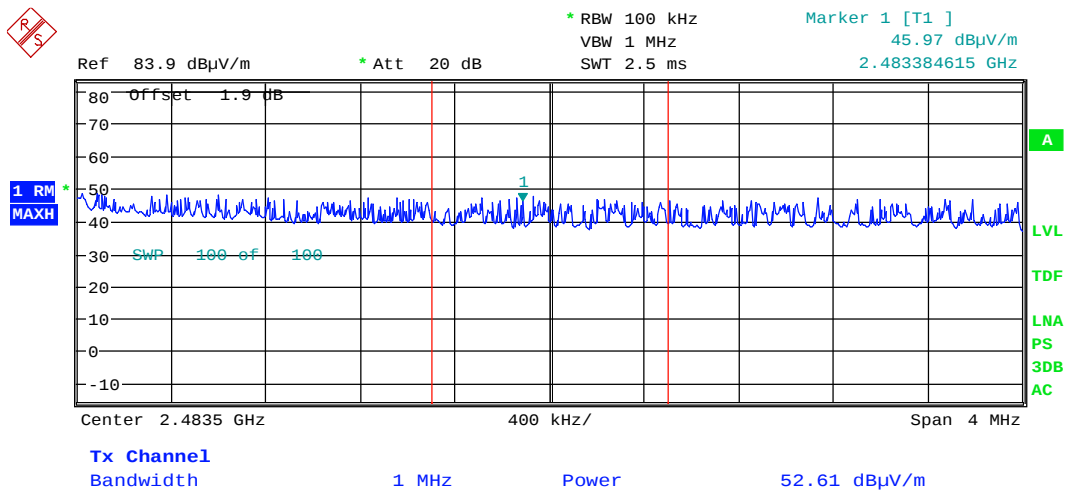
Date: 3.MAR.2016 09:34:15

Band Edge, Lower, Average, 2412 MHz, 802.11n, 65Mbps



Date: 18.FEB.2016 16:03:32

Band Edge, Upper, Peak, 2462 MHz, 802.11b, 5.5Mbps



Date: 18.FEB.2016 16:07:05

Band Edge, Upper, Average, 2462 MHz, 802.11b, 5.5Mbps

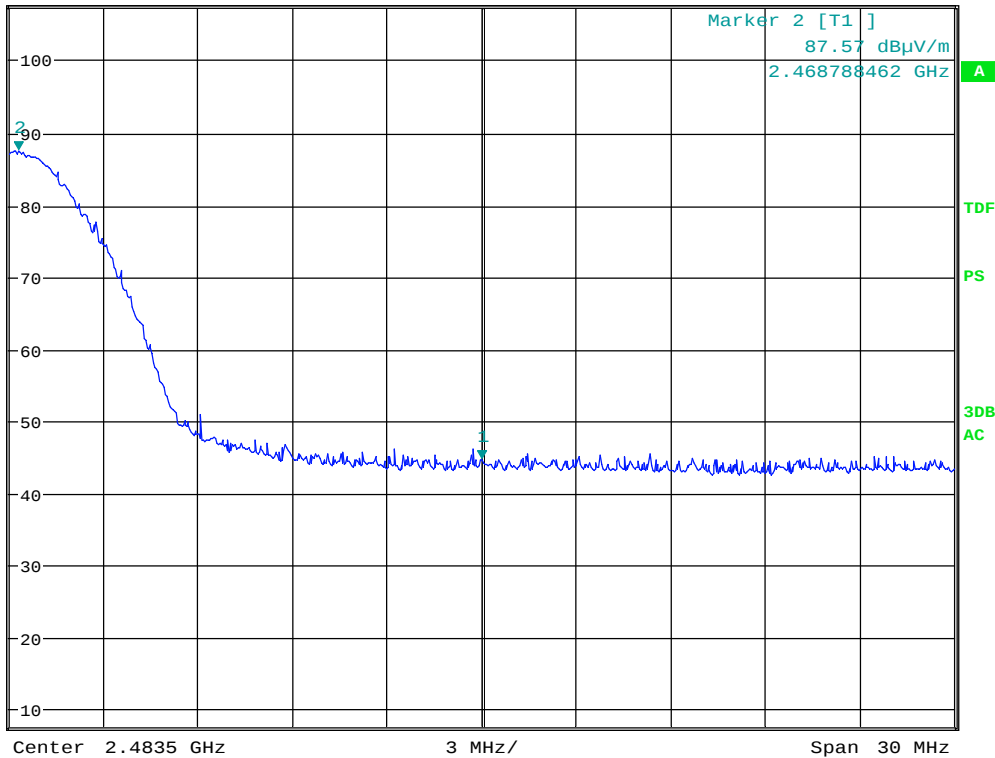


MARKER 1
2.4835 GHz
Ref 107.6 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 2.5 ms

Marker 1 [T1]
44.66 dBμV/m
2.483500000 GHz

1 PK
MAXH

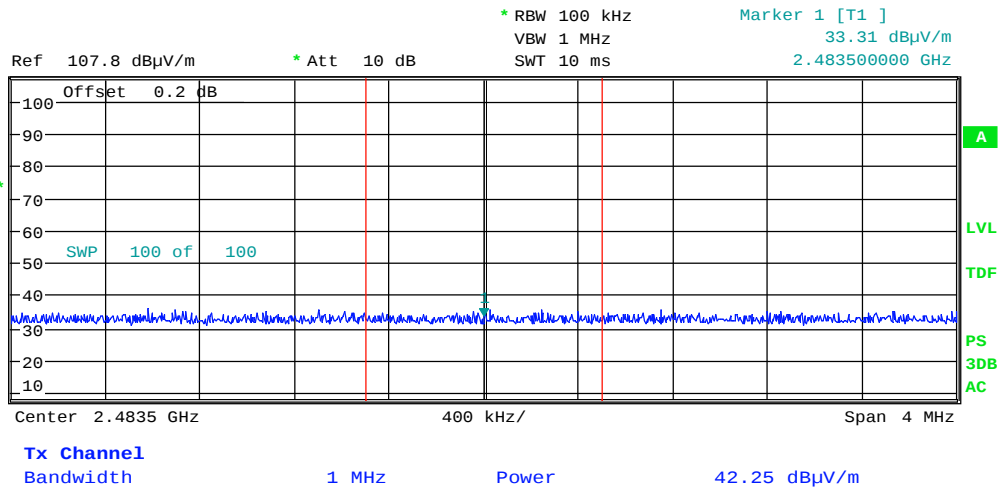


Date: 3.MAR.2016 11:05:48

Band Edge, Upper, Peak, 2462 MHz, 802.11g, 9Mbps



1 RM
MAXH



Date: 3.MAR.2016 11:04:38

Band Edge, Upper, Average, 2462 MHz, 802.11g, 9Mbps

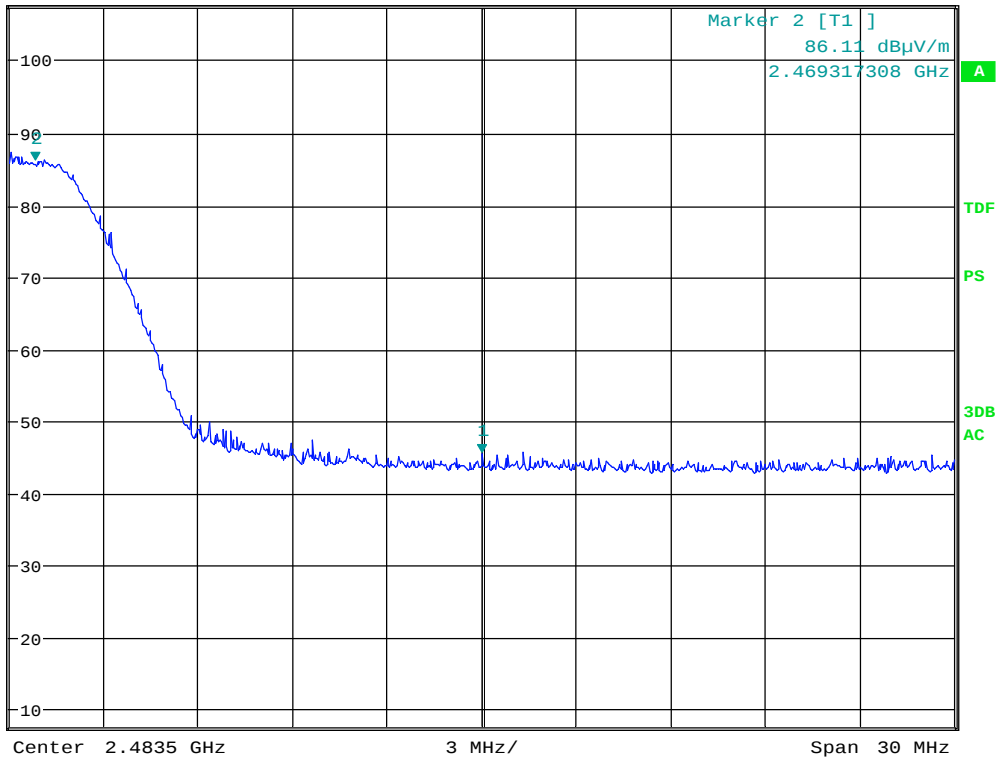


MARKER 1
2.4835 GHz
Ref 107.6 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 2.5 ms

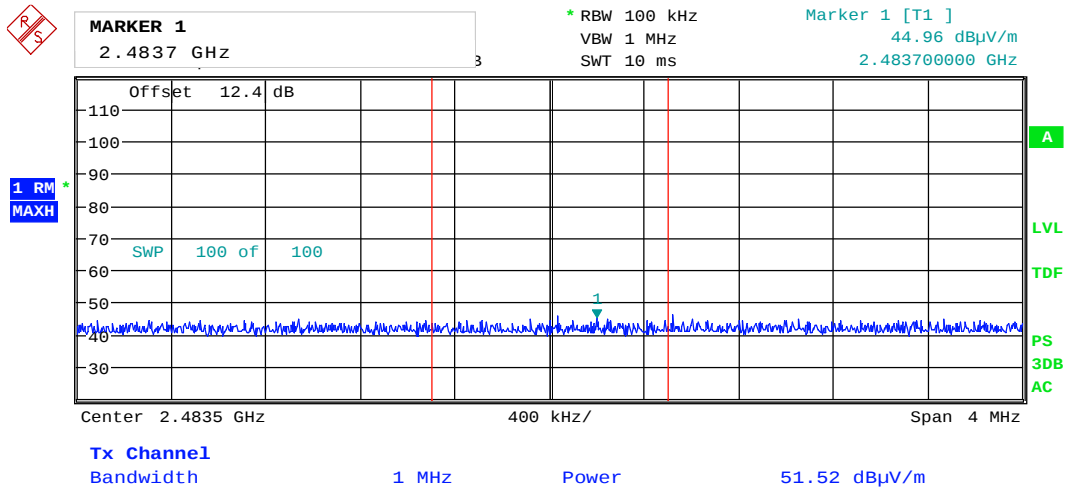
Marker 1 [T1]
45.59 dBμV/m
2.483500000 GHz

1 PK
MAXH



Date: 3.MAR.2016 10:53:29

Band Edge, Upper, Peak, 2462 MHz, 802.11n, 65Mbps



Date: 3.MAR.2016 10:41:42

Band Edge, Upper, Average, 2462 MHz, 802.11n, 65Mbps

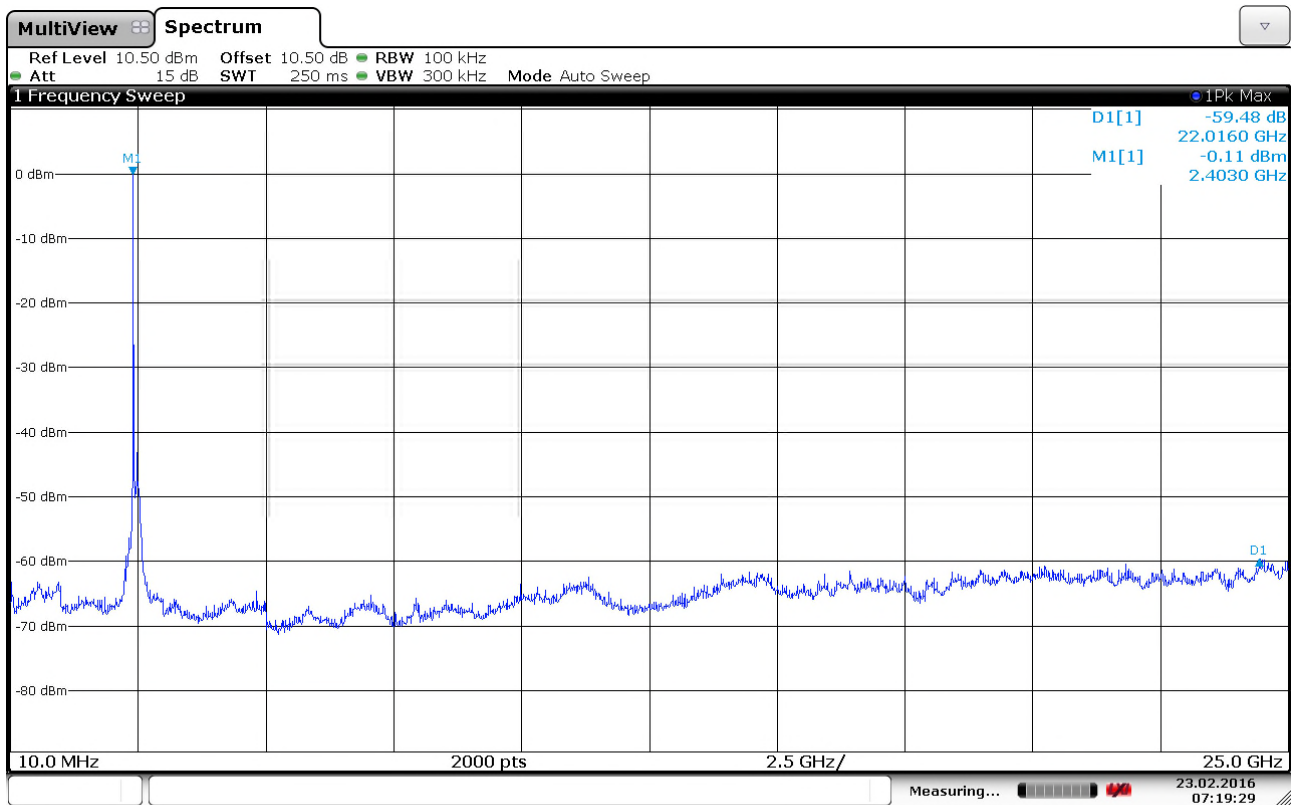
RF conducted power to 25 GHz see attached graph.

Maximum RF level outside operating band:

RF ch 2412 MHz: >30 dB/C, margin >30 dB

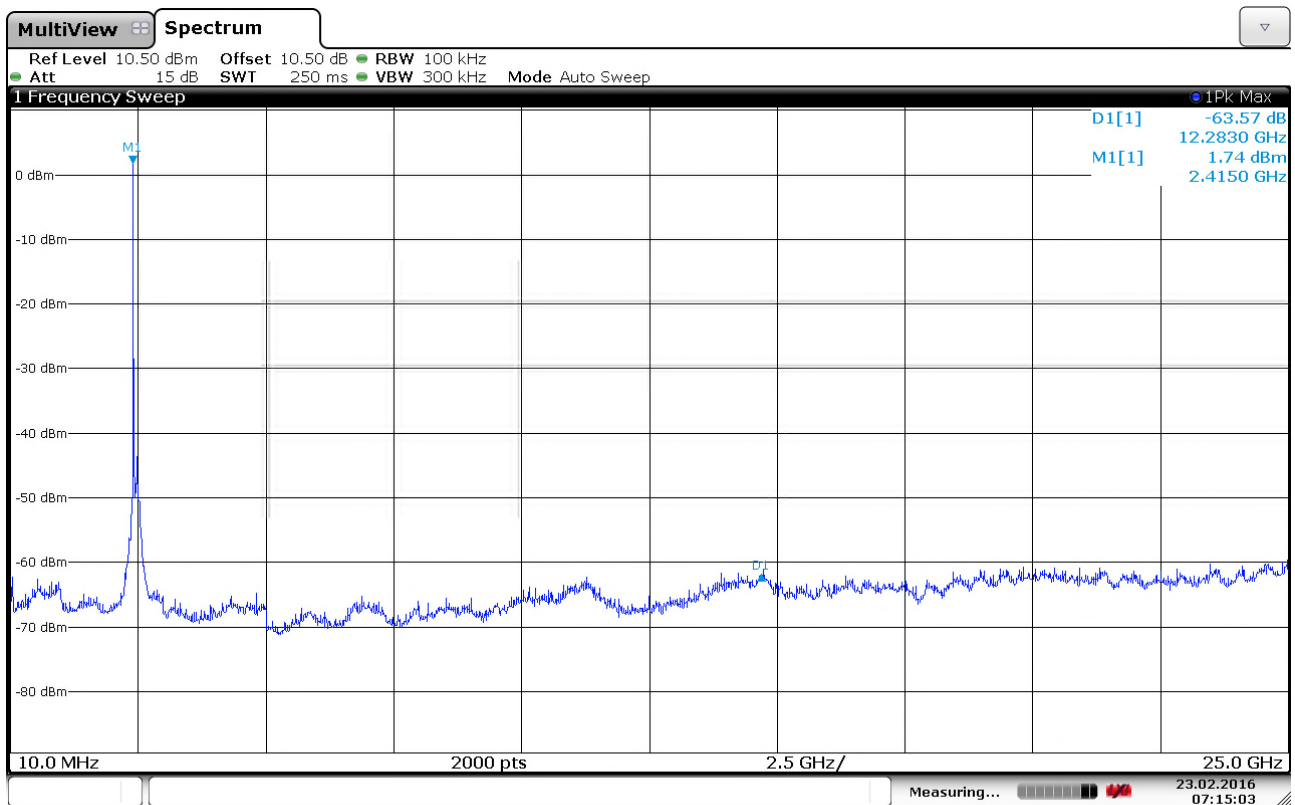
RF ch 2437 MHz: > 30 dB/C, margin >30 dB

RF ch 2462MHz: > 30dB/C, margin >30 dB



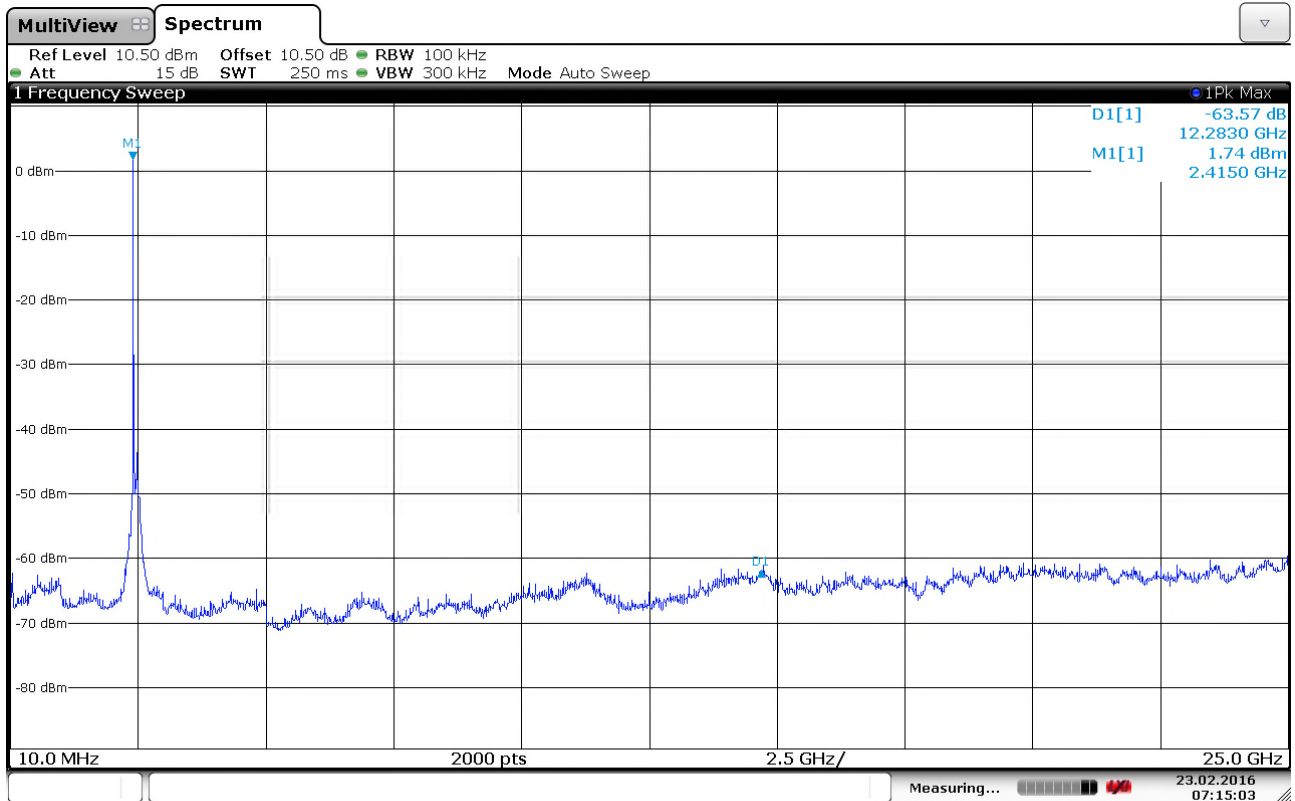
Date: 23.FEB.2016 07:19:29

Conducted Emissions 10 MHz – 25 GHz, 2412 MHz, 802.11b, 5.5Mbps



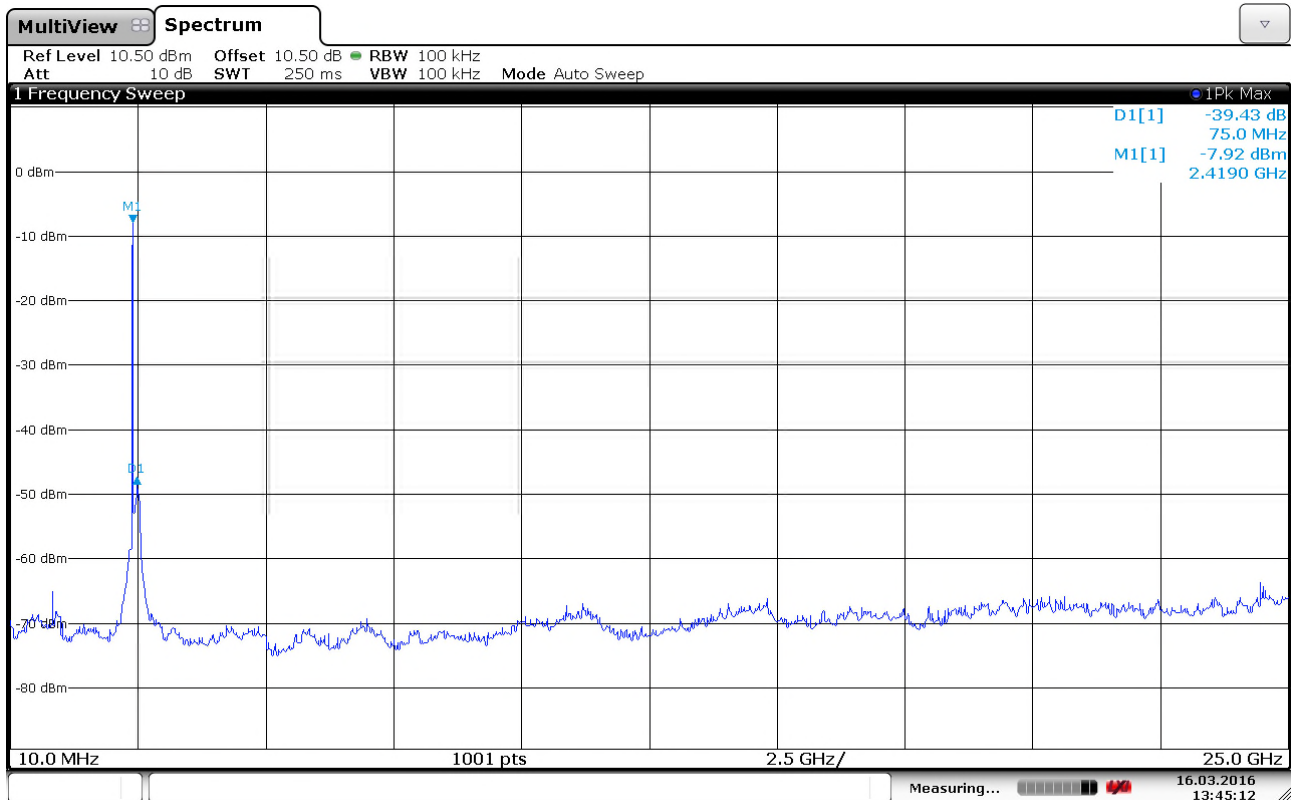
Date: 23.FEB.2016 07:15:03

Conducted Emissions 10 MHz – 25 GHz, 2437 MHz, 802.11b, 5.5Mbps

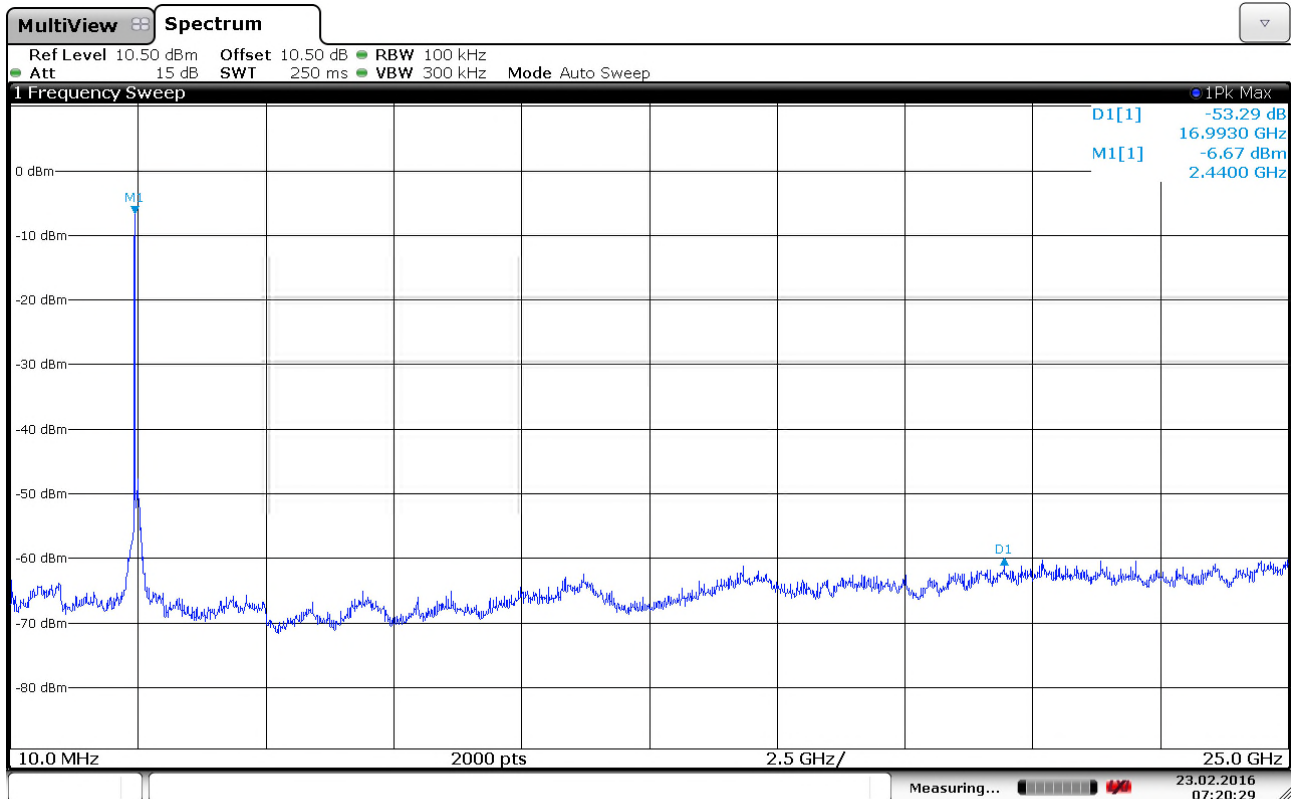


Date: 23.FEB.2016 07:15:03

Conducted Emissions 10 MHz – 25 GHz, 2462 MHz, 802.11b, 5.5Mbps

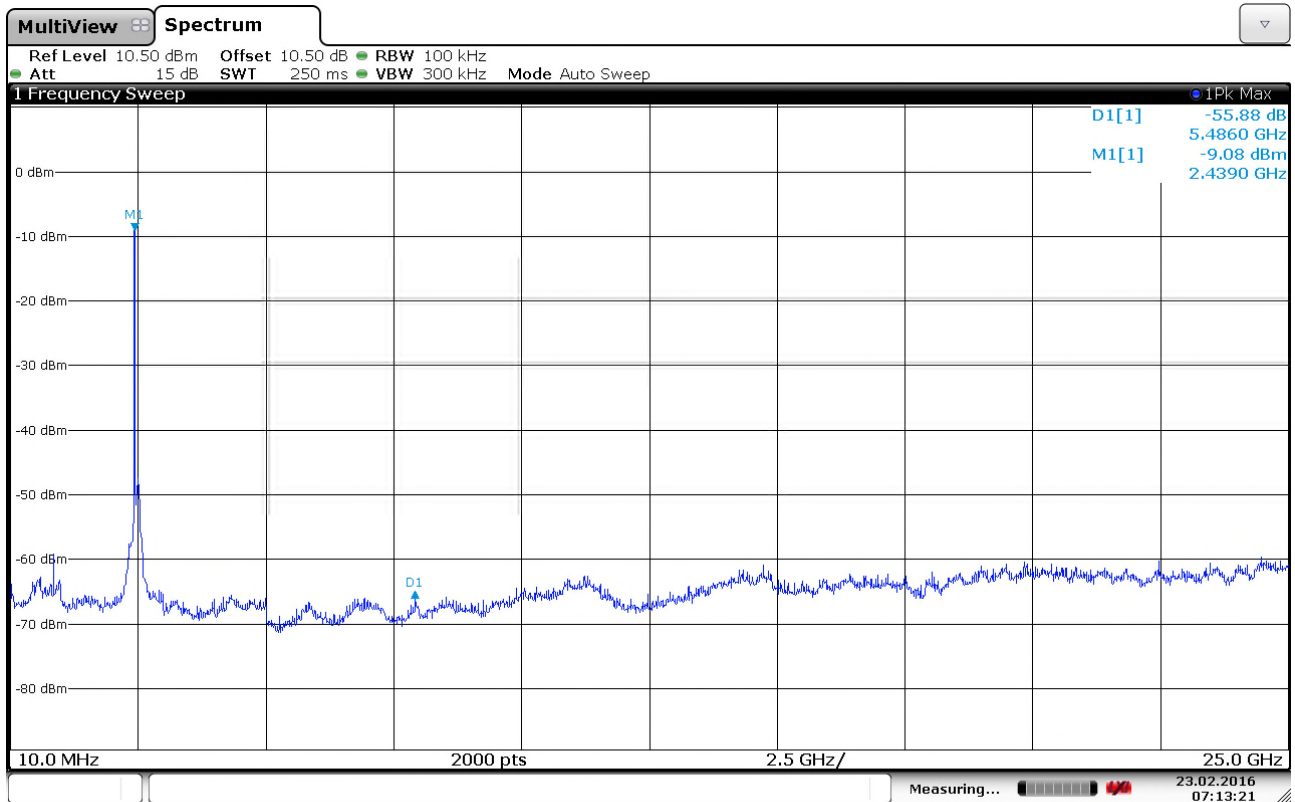


Conducted Emissions 10 MHz – 25 GHz, 2412 MHz, 802.11g, 9Mbps



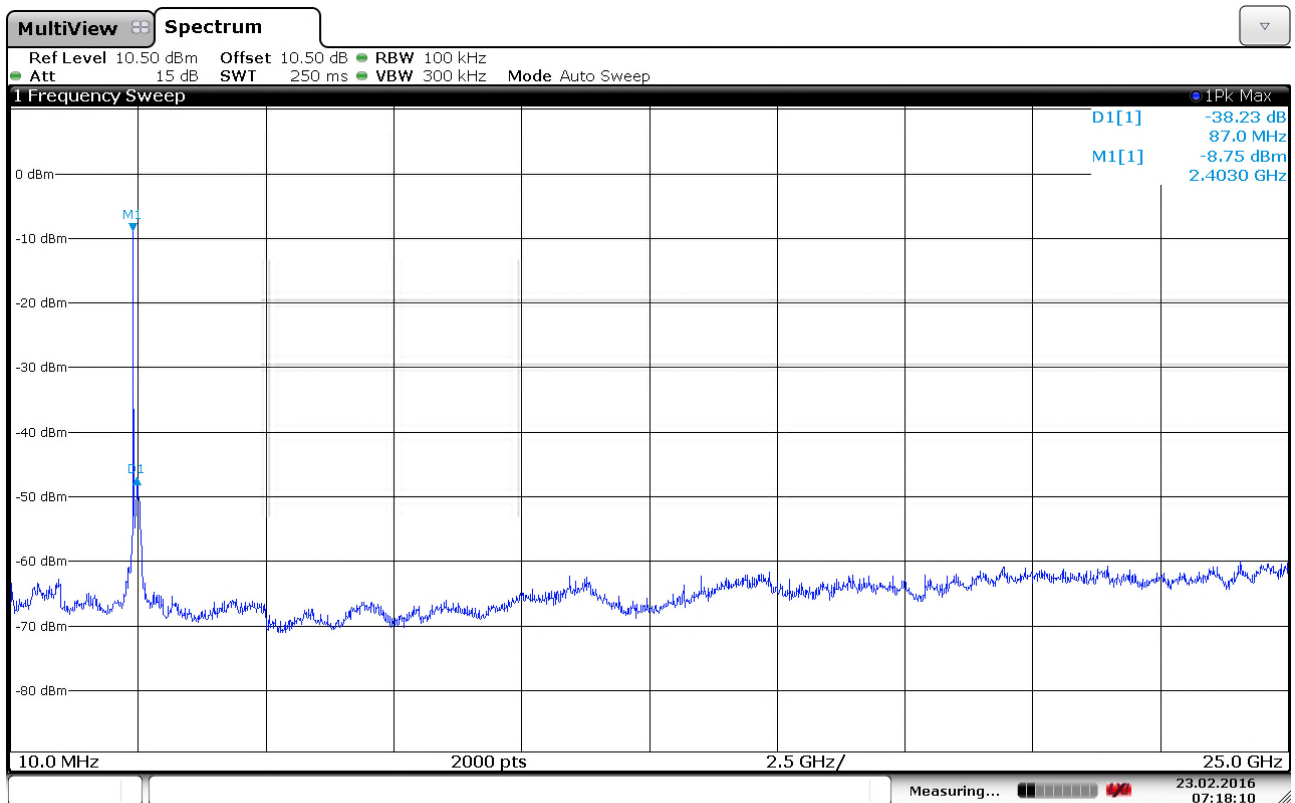
Date: 23.FEB.2016 07:20:29

Conducted Emissions 10 MHz – 25 GHz, 2437 MHz, 802.11g, 9Mbps



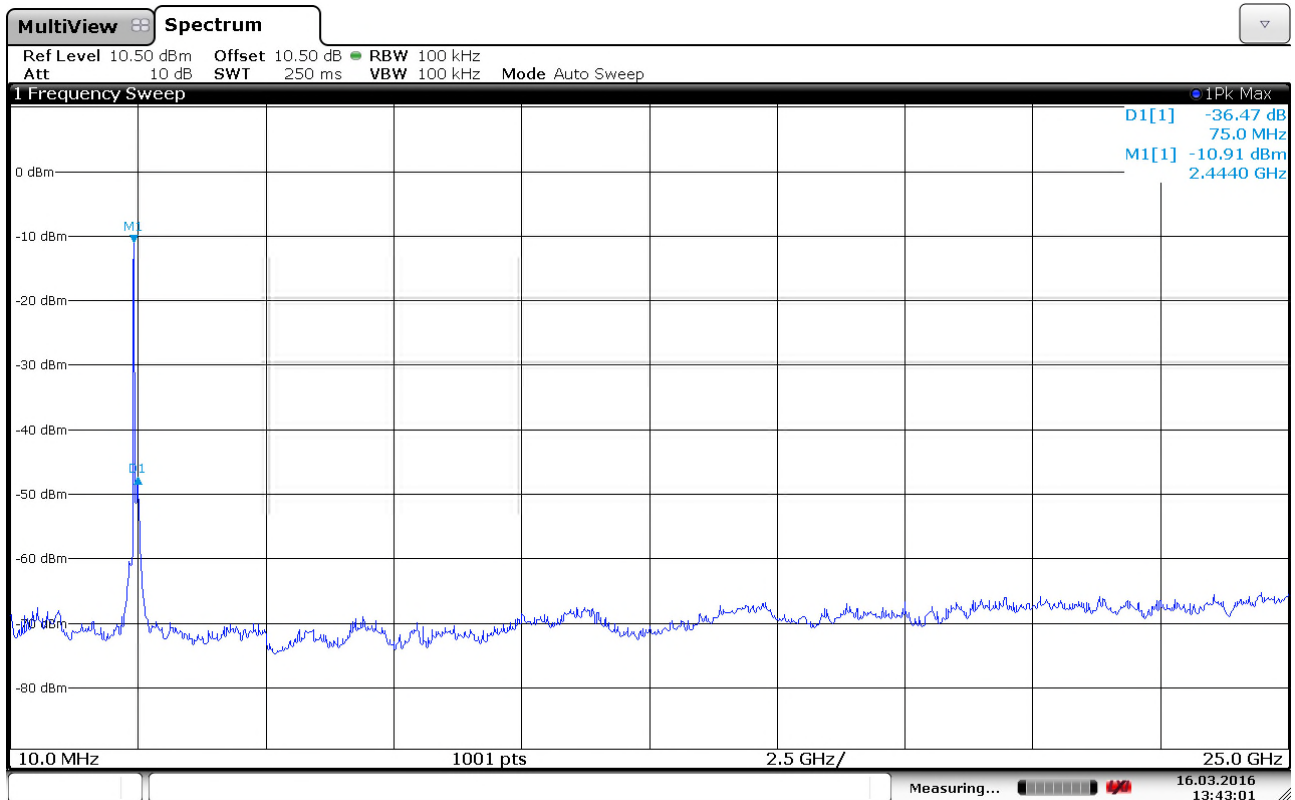
Date: 23.FEB.2016 07:13:21

Conducted Emissions 10 MHz – 25 GHz, 2462 MHz, 802.11g, 9Mbps

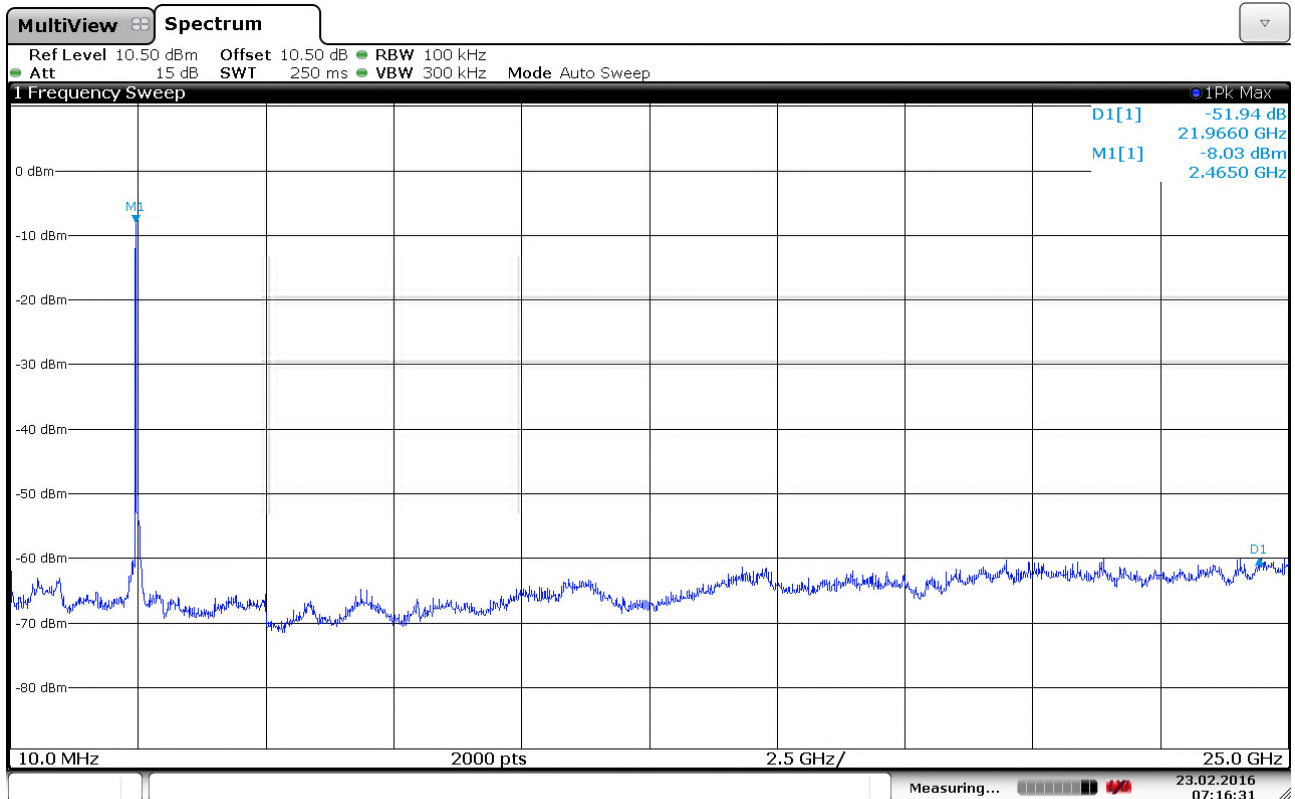


Date: 23.FEB.2016 07:18:10

Conducted Emissions 10 MHz – 25 GHz, 2412 MHz, 802.11n, 65Mbps



Conducted Emissions 10 MHz – 25 GHz, 2437 MHz, 802.11n, 65Mbps

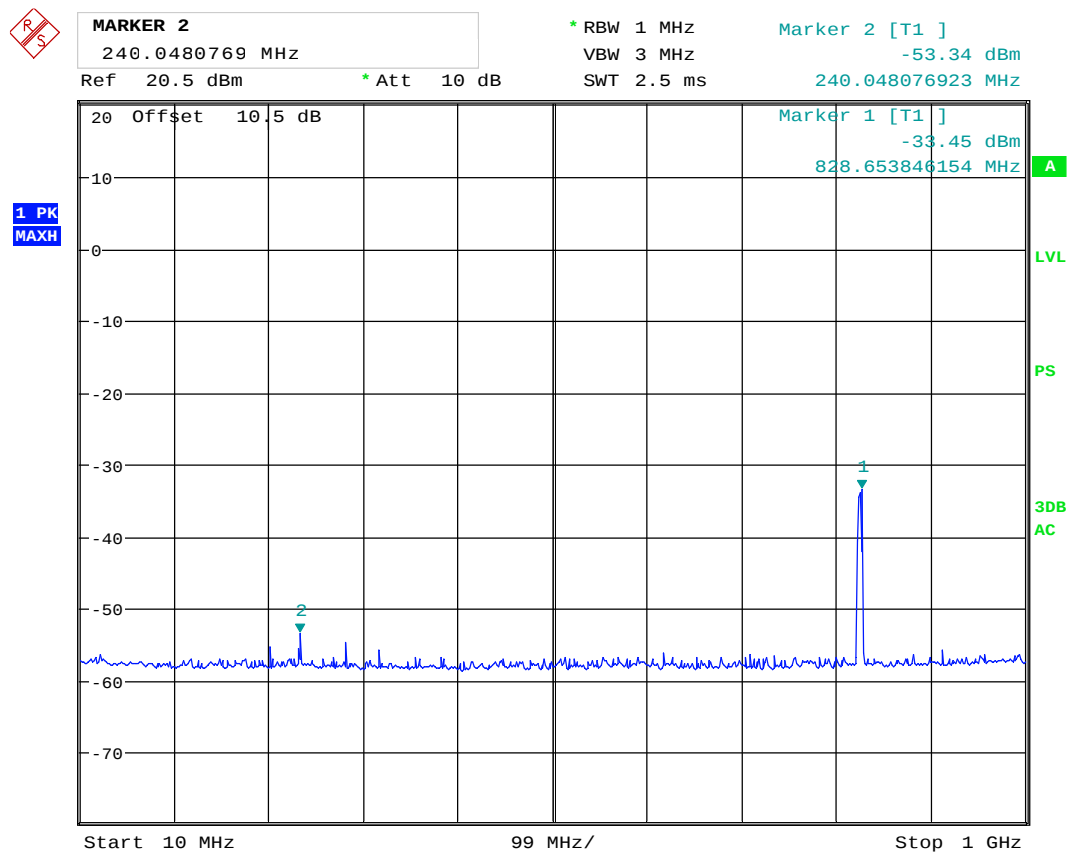


Date: 23.FEB.2016 07:16:30

Conducted Emissions 10 MHz – 25 GHz, 2462 MHz, 802.11n, 65Mbps

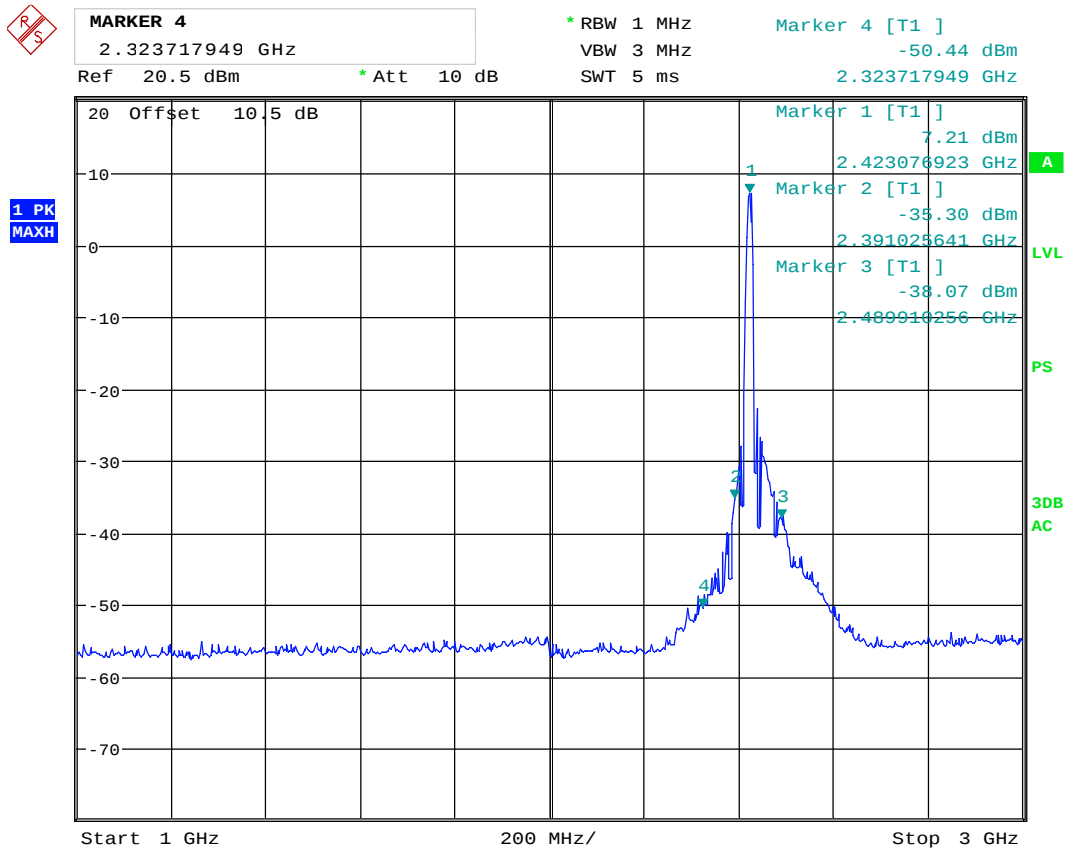
CONDUCTED EMISSIONS WITH ALL RADIO'S ON AND ACTIVE

All spurious in the restricted band is below 50 dB from the carrier.



Date: 3.AUG.2016 19:05:40

Conducted Emissions 10 MHz – 1 GHz, on wi-fi RF port



Date: 3.AUG.2016 19:04:45

Conducted Emissions 1 - 3 GHz, on wi-fi RF port



MARKER 1

4.833333333 GHz

Ref 20.5 dBm

* Att 10 dB

* RBW 1 MHz

VBW 3 MHz

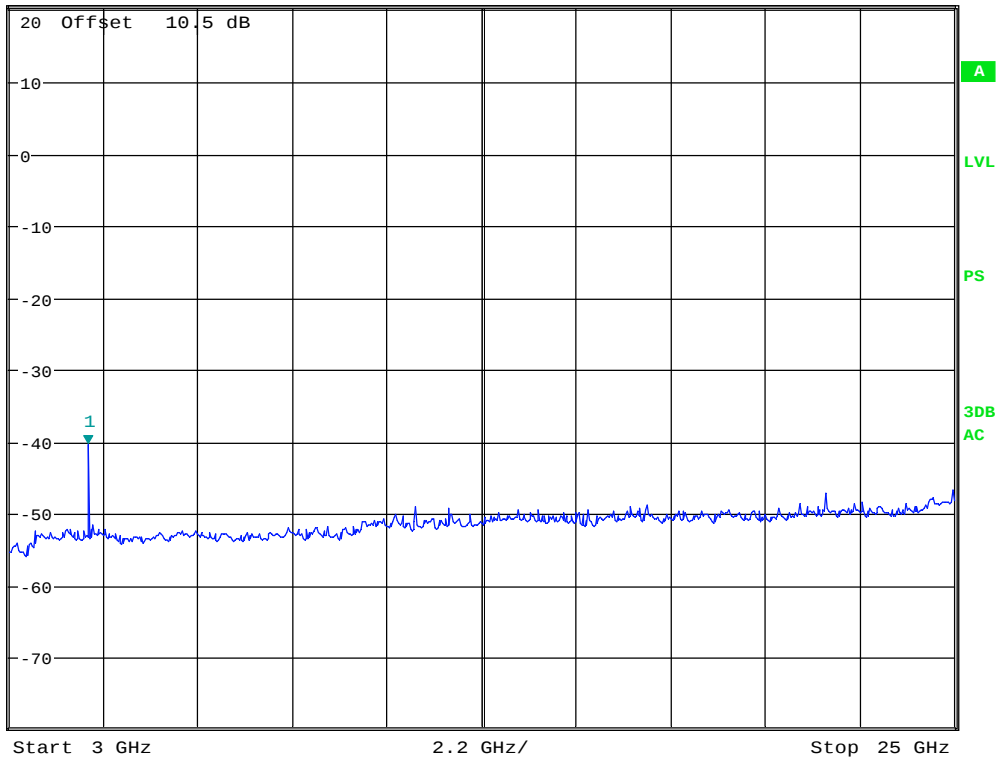
SWT 130 ms

Marker 1 [T1]

-40.36 dBm

4.833333333 GHz

1 PK
MAXH



Date: 3.AUG.2016 19:06:57

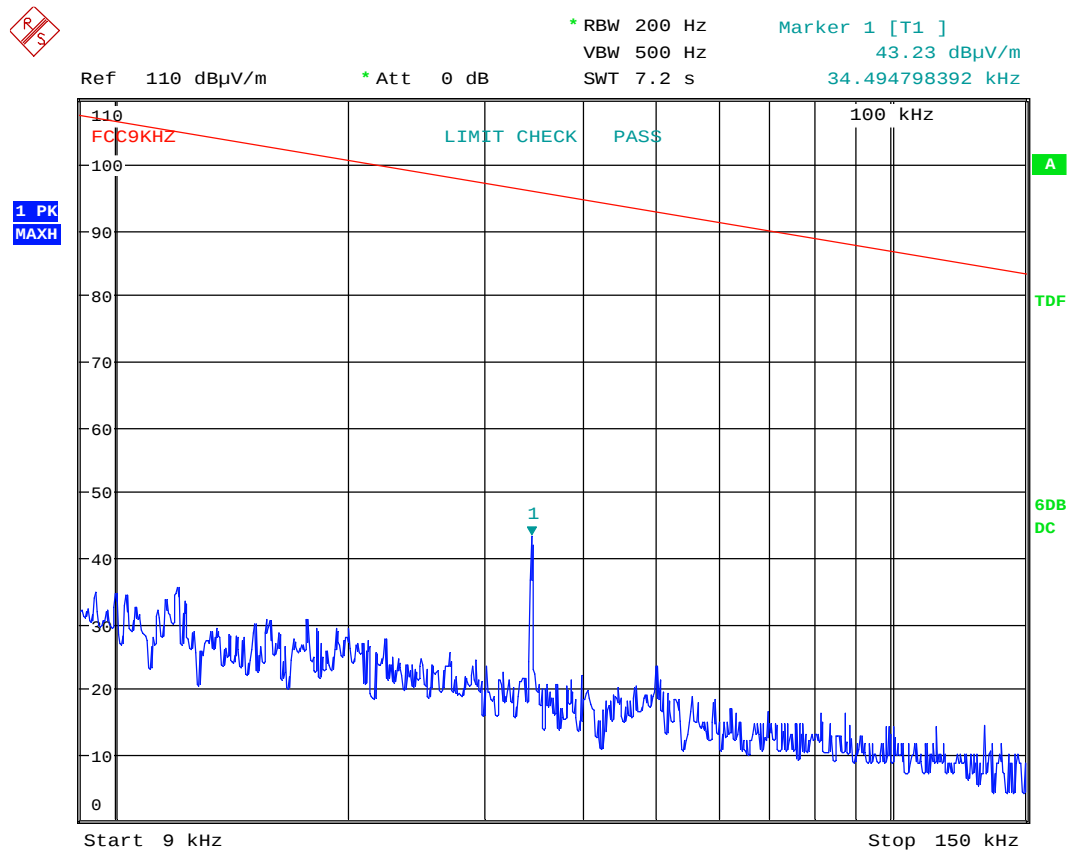
Conducted Emissions 3 - 25GHz, on wi-fi RF port

Radiated emissions 9 kHz-30 MHz.

Measuring distance 10 m, measured with Peak detector.

No component detected, see attached graph.

Limit is converted to 10 m using 40 dB/decade according to 15.31 (f) (2).



Date: 10.MAR.2016 08:30:29

9kHz – 150kHz

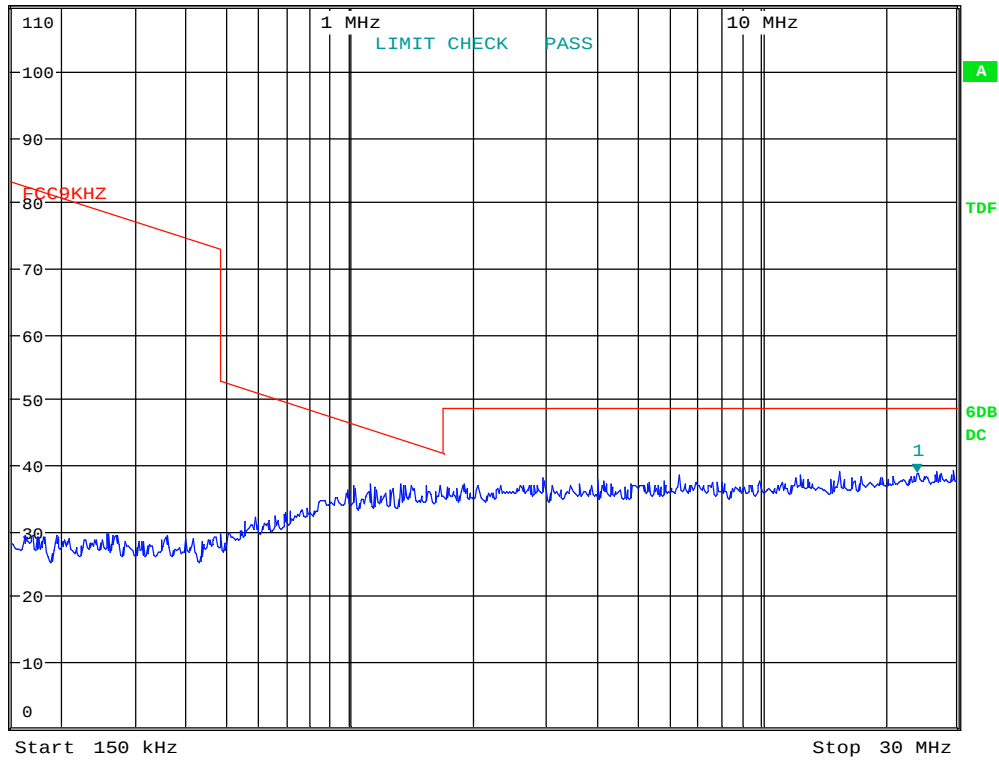


MARKER 1
24.05719591 MHz
Ref 110 dBμV/m * Att 0 dB

* RBW 9 kHz
VBW 30 kHz
SWT 740 ms

Marker 1 [T1]
38.68 dBμV/m
24.057195910 MHz

1 PK
MAXH



Date: 10.MAR.2016 08:31:52

150KHz – 30MHz

Radiated emission 30 – 1000 MHz.

Detector: Quasi-Peak

Measuring distance 3m.

Frequency	Operational condition	Detector	Field strength	Measuring distance	Limit FCC15.209	Margin
MHz			dB μ V/m	metres	dB μ V/m	dB
66.23	TX on	QP	39.83	3	40.0	0.17
98.38	TX on	QP	42.36	3	43.5	1.17
104.67	TX on	QP	38.38	3	43.5	5.12

The maximum is obtained at Vertical polarization

See attached graphs.



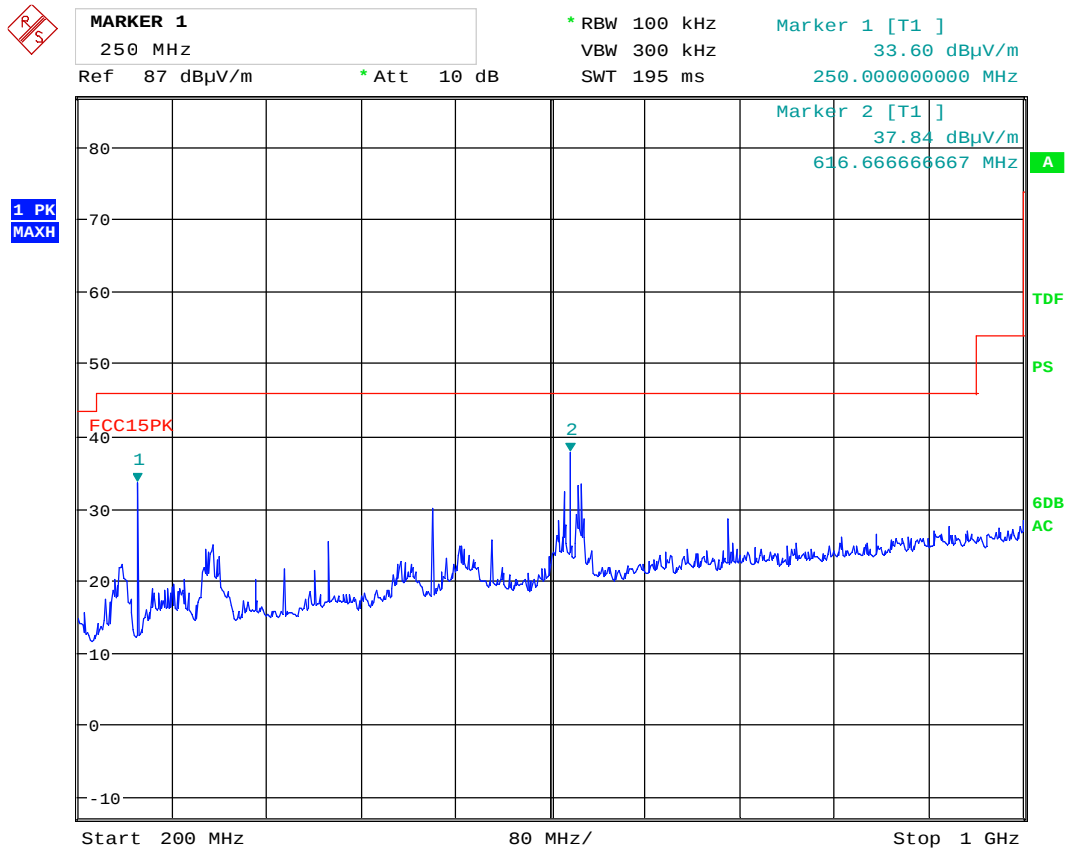
Date: 10.MAR.2016 07:15:23

Radiated Emissions, 30 – 200 MHz, VP , @3m, PK scan



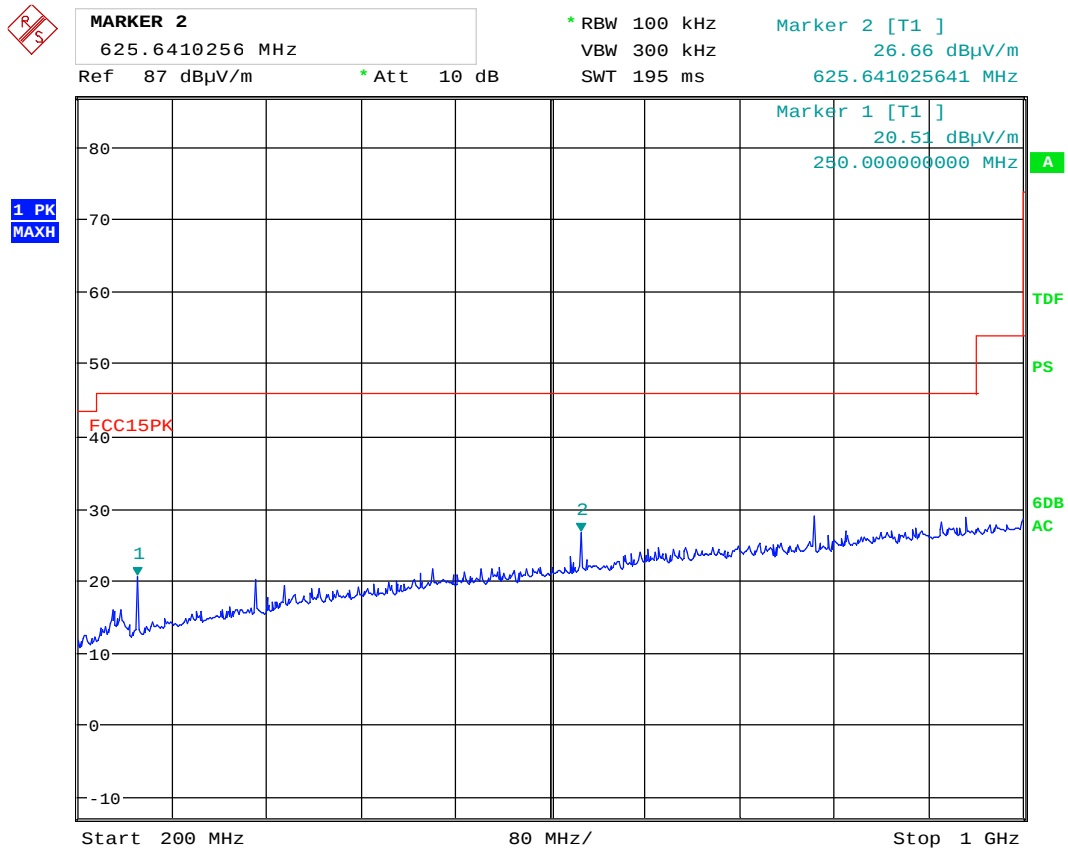
Date: 10.MAR.2016 07:17:38

Radiated Emissions, 30 – 200 MHz, HP , @3m, PK scan



Date: 10.MAR.2016 07:28:29

Radiated Emissions, 200 - 1000 MHz, VP , @3m, PK scan



Date: 10.MAR.2016 07:39:09

Radiated Emissions, 200 - 1000MHz, HP , @3m, PK scan

Radiated Emissions, 1-25 GHz

Measuring distance: 3m (1 – 8.5 GHz)
1m (8.5 – 18 GHz)

A pre-scan was performed above 18 GHz and no spurious emissions were detected.

Peak Detector:

Frequency	RF channel	Modulation type	Dist. corr. factor	Field strength, Peak Detector	Duty cycle corr. factor	Limit	Margin
GHz	L,M,H	Mbps	dB	dB μ V/m	dB	dB μ V/m	dB
4.824	L	5.5	0	55.90	0	74	18.1
4.874	M	5.5	0	53.71	0	74	20.3
4.924	H	5.5	0	53.48	0	74	20.5
9.648	L	9	0	40.82	0	74	33.2
-	M	9	*	None detected	0	74	-
9.848	H	9	*	40.57	0	74	33.4
9.648	L	65	*	41.74	0	74	32.3
-	M	65	*	None detected	0	74	-
9.848	H	65	*	41.43	0	74	32.6
Other freqs	L,M,H	all	0	None detected	0	74	-

*Distance correction of -9.5 dB for 1m is included in the plots

Average Detector:

Frequency	RF channel	Modulation type	Dist. corr. factor	Field strength, Average Detector	Duty cycle corr. factor	Limit	Margin
GHz	L,M,H	Mbps	dB	dB μ V/m	dB	dB μ V/m	dB
4.824	L	5.5	0	53.94	0	54	0.06
4.874	M	5.5	0	51.75	0	54	2.25
4.924	H	5.5	0	51.63	0	54	2.37
9.648	L	9	0	35.85	0	54	18.15
-	M	9	*	None detected	0	54	-
9.848	H	9	*	36.27	0	54	17.73
9.648	L	65	*	48.70	0	54	5.30
-	M	65	*	None detected	0	54	-
9.848	H	65	*	48.98	0	54	5.02
Other freqs	L,M,H	all	0	None detected	0	54	-

* Distance correction of -9.5 dB for 1m and duty cycle correction is included in the plots

Antenna factor, amplifier gain and cable loss are included in spectrum analyzer "Transducer factor".

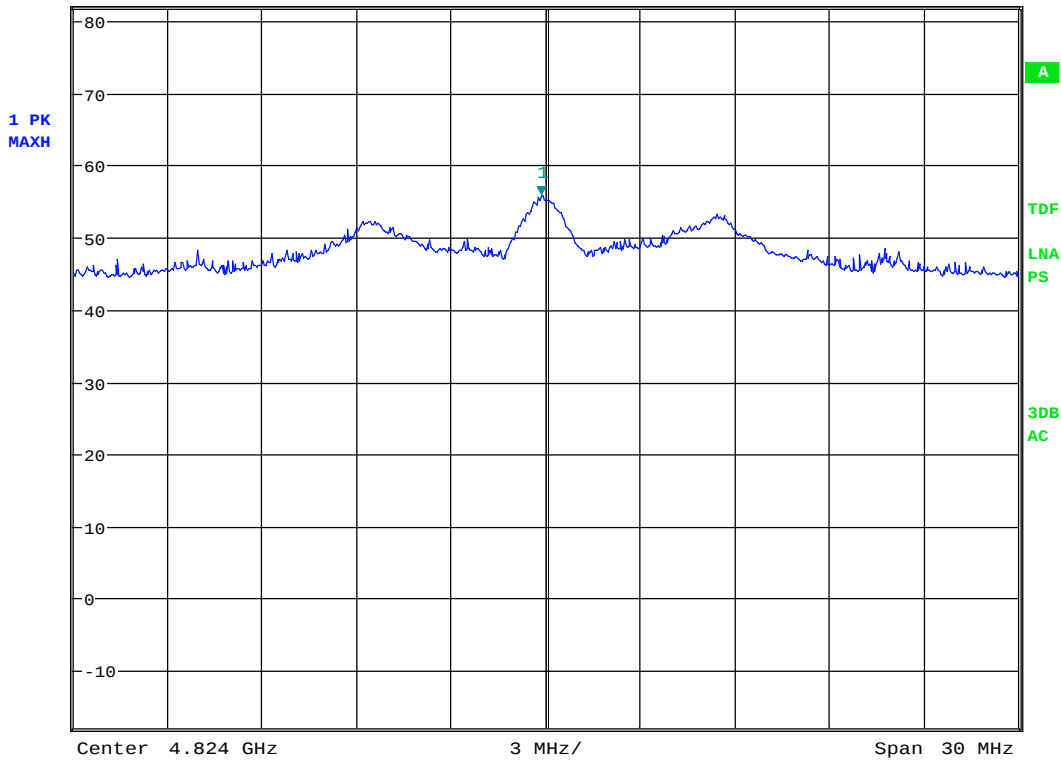
See plots.



MARKER 1
4.823855769 GHz
Ref 82 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 20 ms

Marker 1 [T1]
55.90 dBμV/m
4.823855769 GHz



Date: 18.FEB.2016 13:39:20

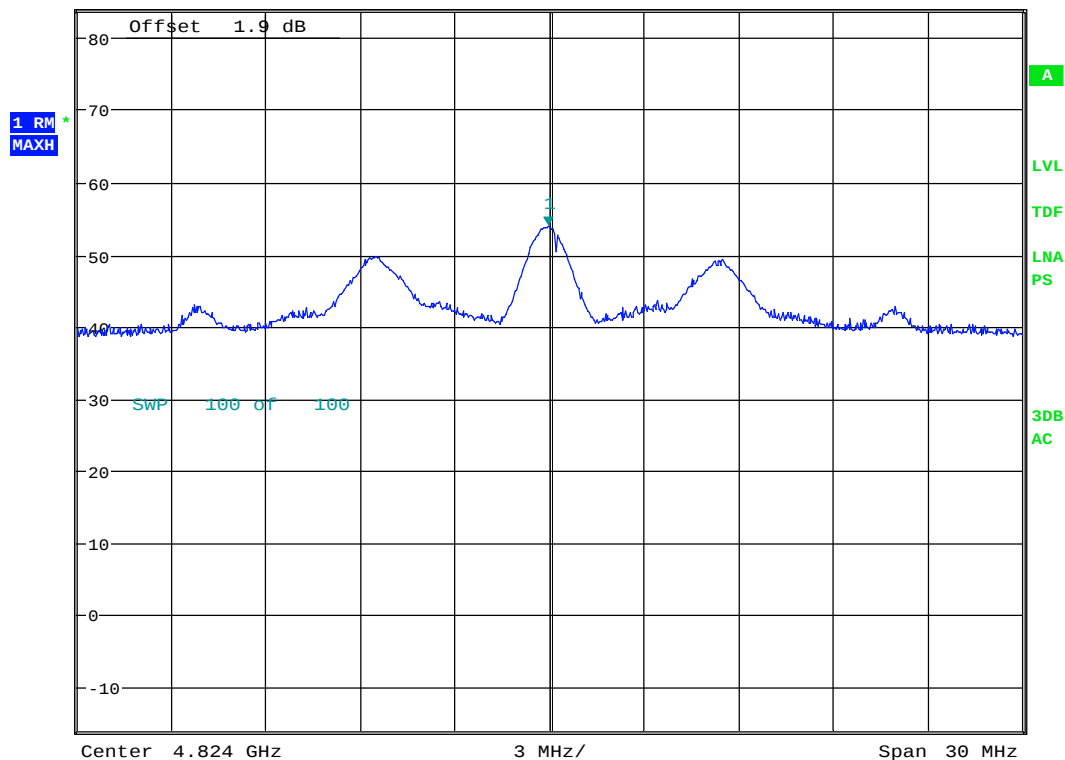
2nd har , PK detector, 2412MHz, HP, 802.11b, 5.5Mbps



MARKER 1
4.82394375 GHz
Ref 83.9 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 10 MHz
SWT 20 ms

Marker 1 [T1]
53.94 dBμV/m
4.823943750 GHz



Date: 18.FEB.2016 13:48:30

2nd har , RMS detector, 2412MHz, HP, 802.11b, 5.5Mbps

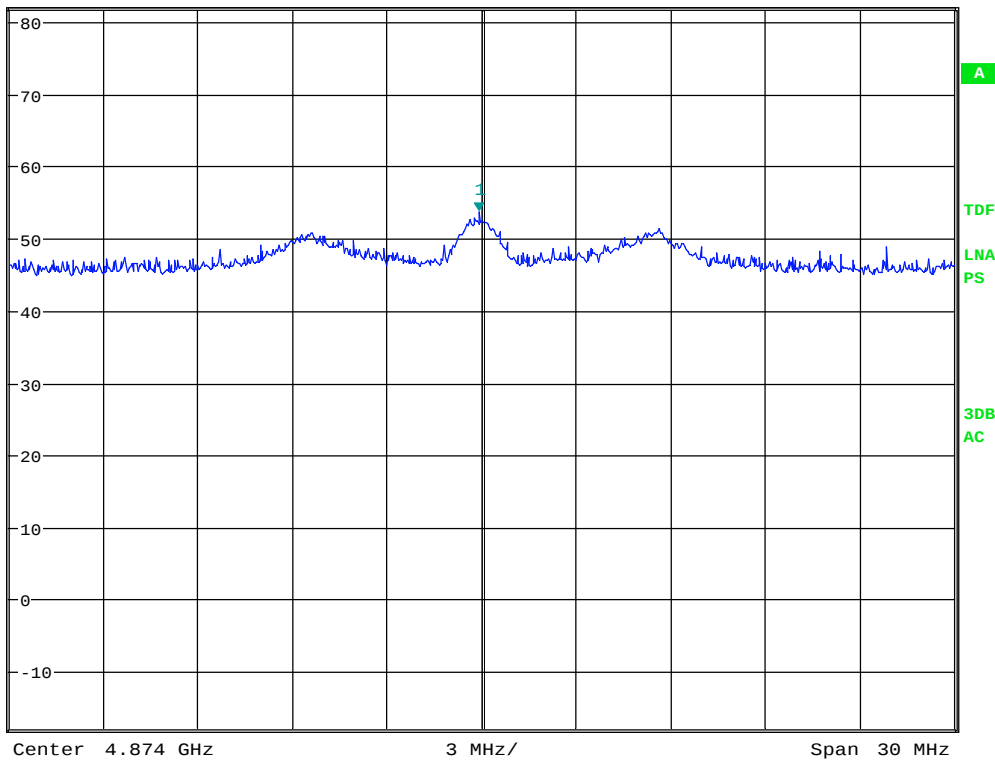


MARKER 1
4.873925 GHz
Ref 82 dBμV/m * Att 20 dB

* RBW 1 MHz
VBW 3 MHz
SWT 20 ms

Marker 1 [T1]
53.71 dBμV/m
4.873925000 GHz

1 PK
MAXH



Date: 19.FEB.2016 07:56:26

2nd har , PK detector, 2437MHz, HP, 802.11b, 5.5Mbps



MARKER 1

4.873784 GHz

Ref 83.9 dBμV/m

* Att 20 dB

* RBW 1 MHz

VBW 10 MHz

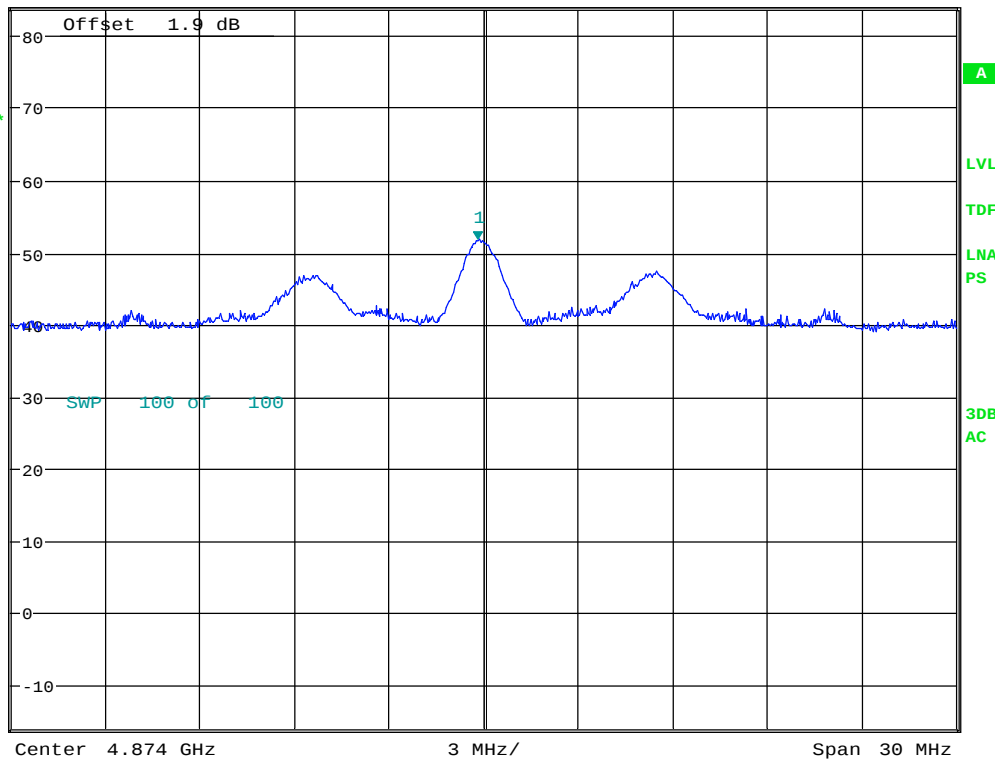
SWT 20 ms

Marker 1 [T1]

51.75 dBμV/m

4.873784000 GHz

1 RM
MAXH



Date: 19.FEB.2016 07:57:23

2nd har , RMS detector, 2437MHz, HP, 802.11b, 5.5Mbps



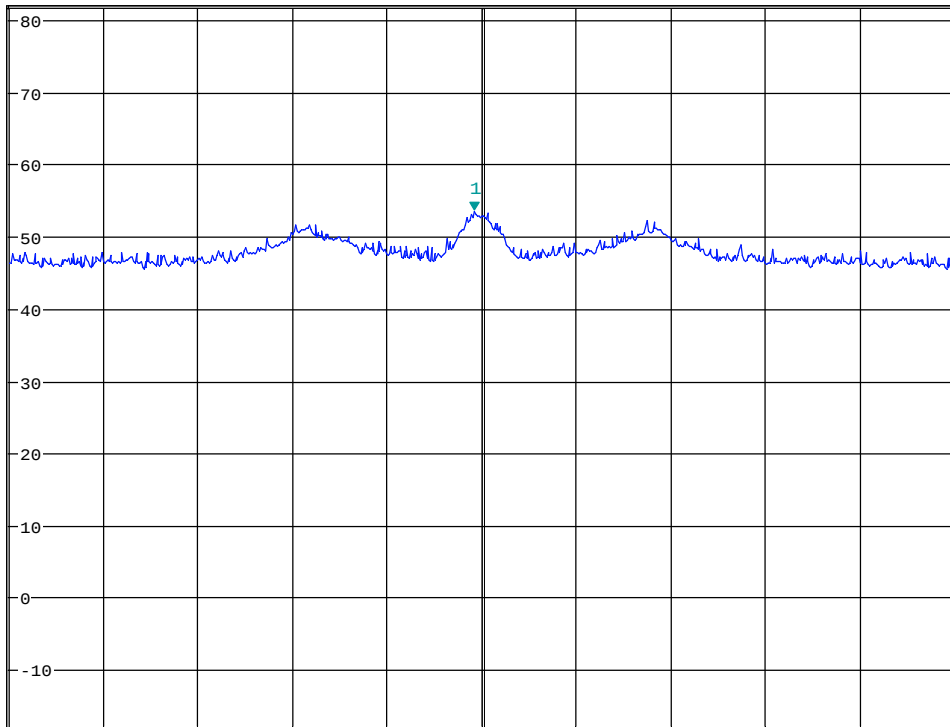
MARKER 1
4.923759615 GHz

* RBW 1 MHz
VBW 3 MHz
SWT 20 ms

Marker 1 [T1]
53.48 dBμV/m
4.923759615 GHz

Ref 82 dBμV/m * Att 20 dB

1 PK
MAXH



Center 4.924 GHz

3 MHz/

Span 30 MHz

Date: 19.FEB.2016 07:10:59

2nd har , PK detector, 2462MHz, HP, 802.11b, 5.5Mbps

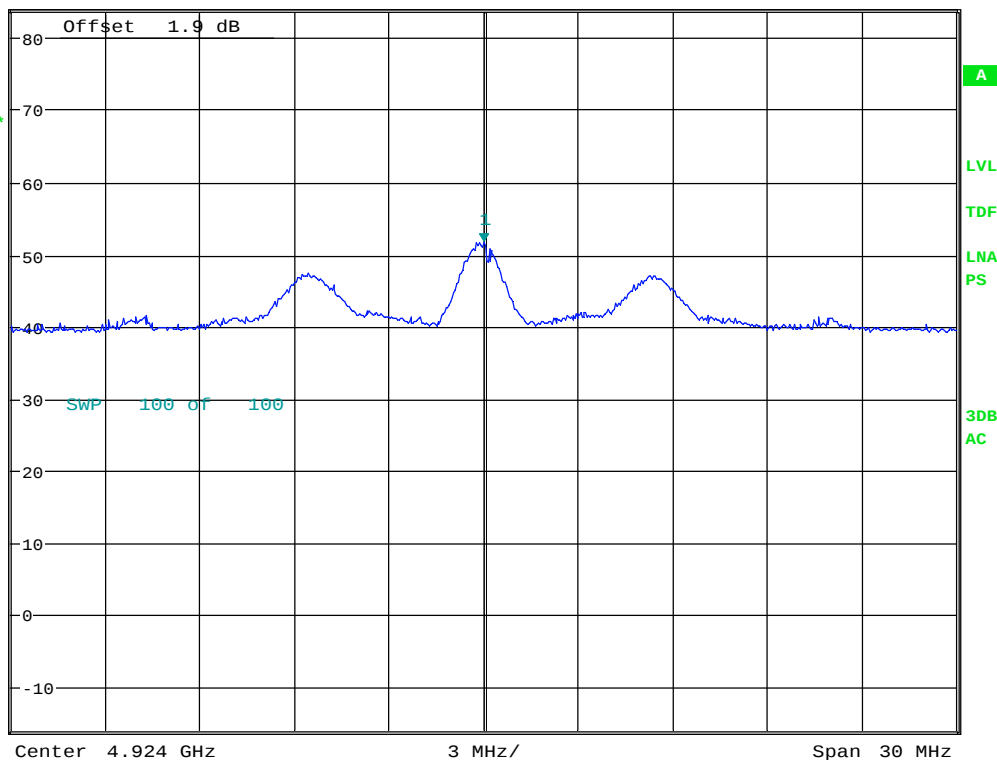


MARKER 1
4.924 GHz
Ref 83.9 dBμV/m * Att 20 dB

* RBW 1 MHz
VBW 10 MHz
SWT 20 ms

Marker 1 [T1]
51.63 dBμV/m
4.924000000 GHz

1 RM
MAXH



Date: 19.FEB.2016 07:12:53

2nd har , RMS detector, 2462MHz, HP, 802.11b, 5.5Mbps

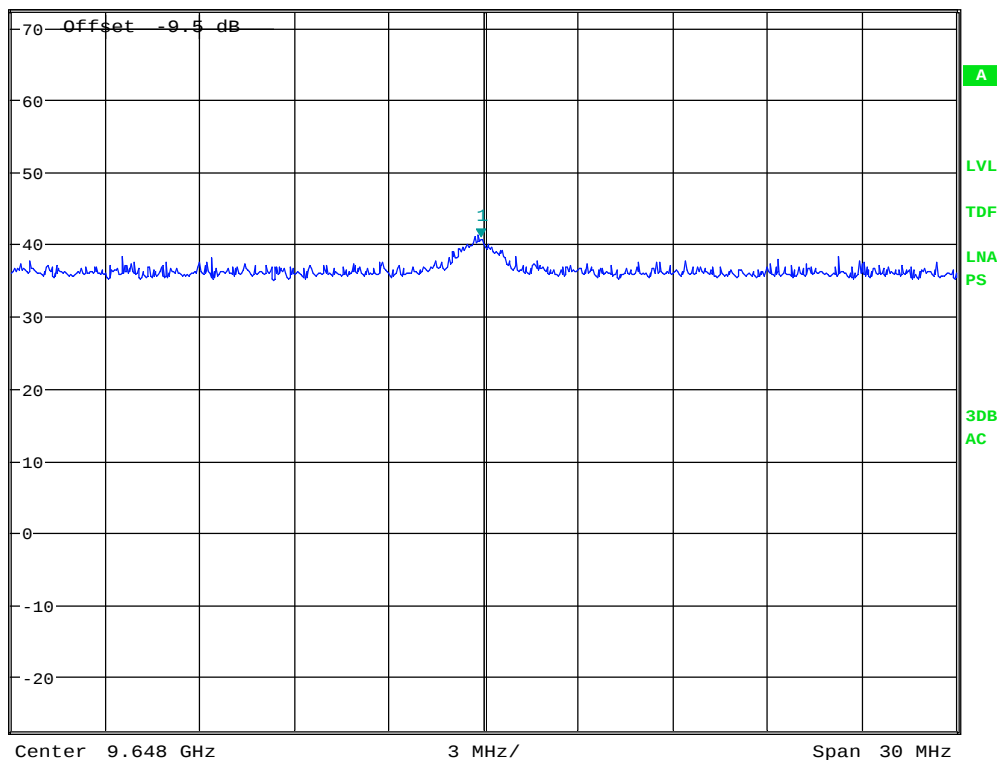


MARKER 1
9.647903846 GHz
Ref 72.5 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 20 ms

Marker 1 [T1]
40.82 dBμV/m
9.647903846 GHz

1 PK
MAXH



Date: 3.MAR.2016 13:56:20

4th har , PK detector, 2412MHz, VP, 802.11g, 9Mbps @1m



MARKER 1

9.64776 GHz

Ref 72.7 dBμV/m * Att 10 dB

* RBW 1 MHz

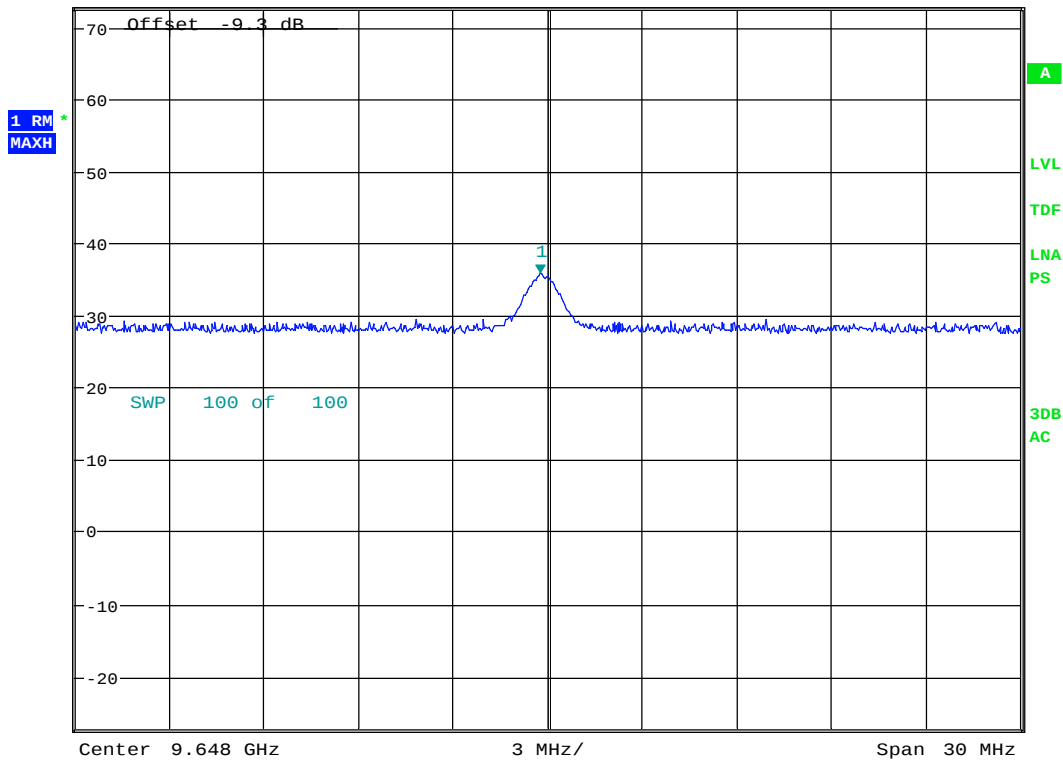
VBW 10 MHz

SWT 20 ms

Marker 1 [T1]

35.85 dBμV/m

9.647760000 GHz



Date: 3.MAR.2016 13:55:32

4th har , RMS detector, 2412MHz, VP, 802.11g, 9Mbps @1m

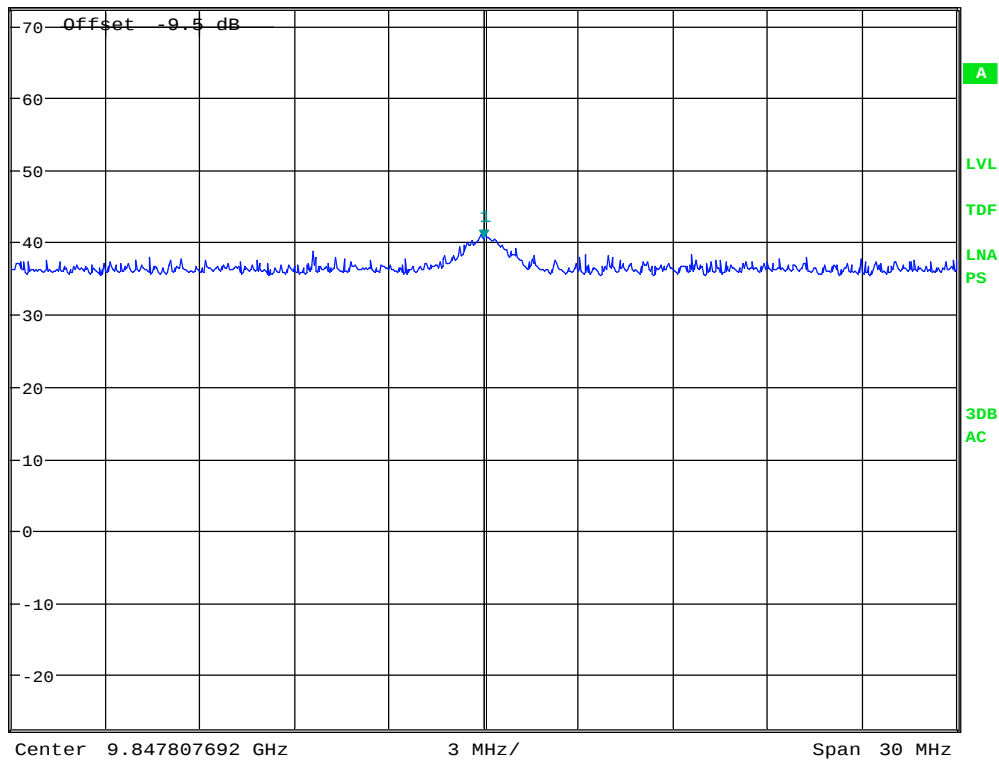


MARKER 1
9.847807692 GHz
Ref 72.5 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 20 ms

Marker 1 [T1]
40.57 dBμV/m
9.847807692 GHz

1 PK
MAXH



Date: 3.MAR.2016 13:52:43

4th har , PK detector, 2462MHz, VP, 802.11g, 9Mbps @1m



MARKER 1

9.847807692 GHz

Ref 72.7 dBμV/m * Att 10 dB

* RBW 1 MHz

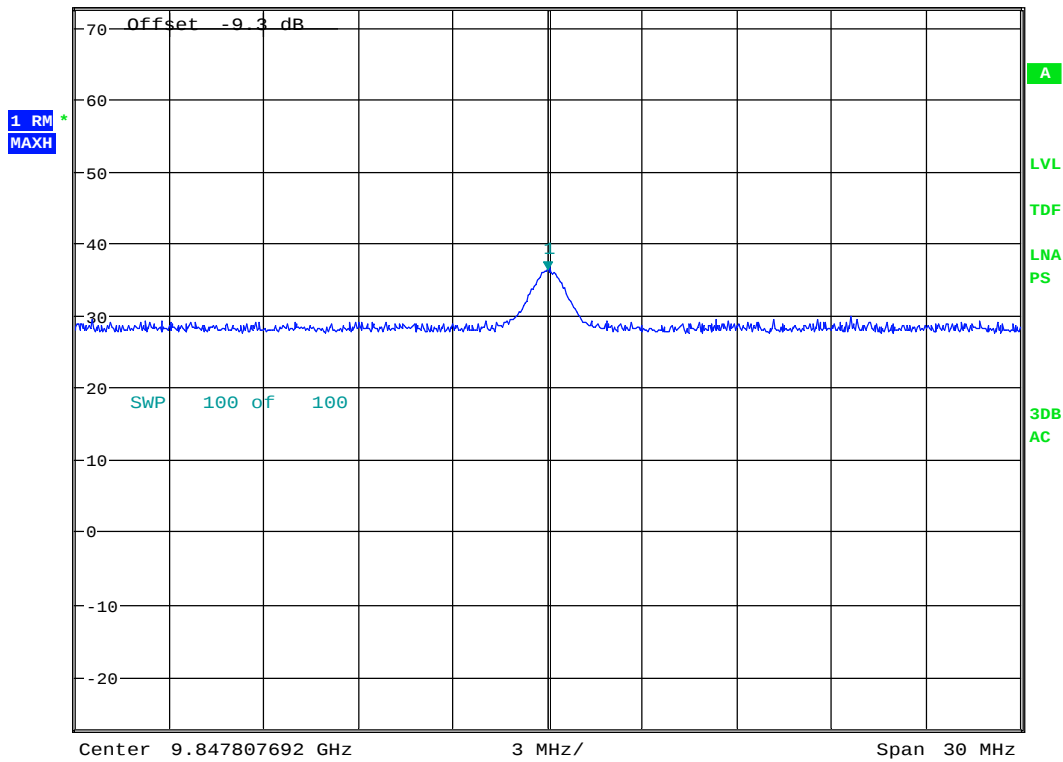
VBW 10 MHz

SWT 20 ms

Marker 1 [T1]

36.27 dBμV/m

9.847807692 GHz



Date: 3.MAR.2016 13:53:53

4th har , RMS detector, 2462MHz, VP, 802.11g, 9Mbps @1m

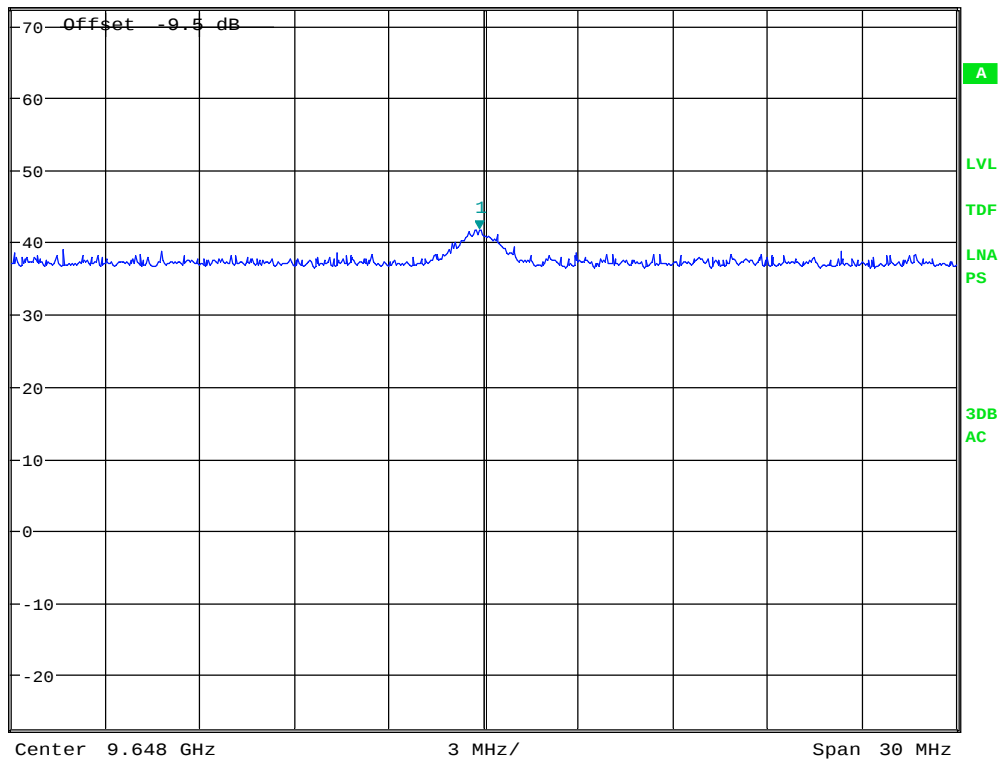


MARKER 1
9.647855769 GHz
Ref 87 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 20 ms

Marker 1 [T1]
41.74 dBμV/m
9.647855769 GHz

1 PK
MAXH



Date: 3.MAR.2016 13:44:14

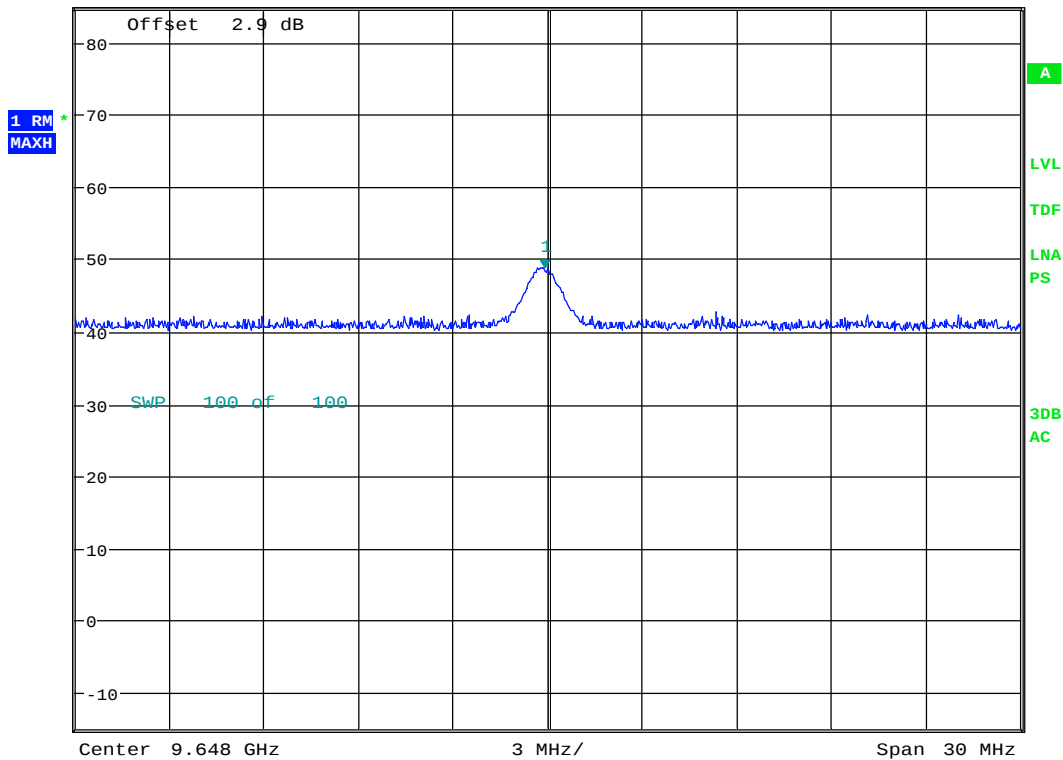
4th har , PK detector, 2412MHz, VP, 802.11n, 65Mbps @1m



MARKER 1
9.647925 GHz
Ref 84.9 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 10 MHz
SWT 20 ms

Marker 1 [T1]
48.70 dBμV/m
9.647925000 GHz



Date: 3.MAR.2016 13:46:10

4th har , RMS detector, 2412MHz, VP, 802.11n, 65Mbps @1m

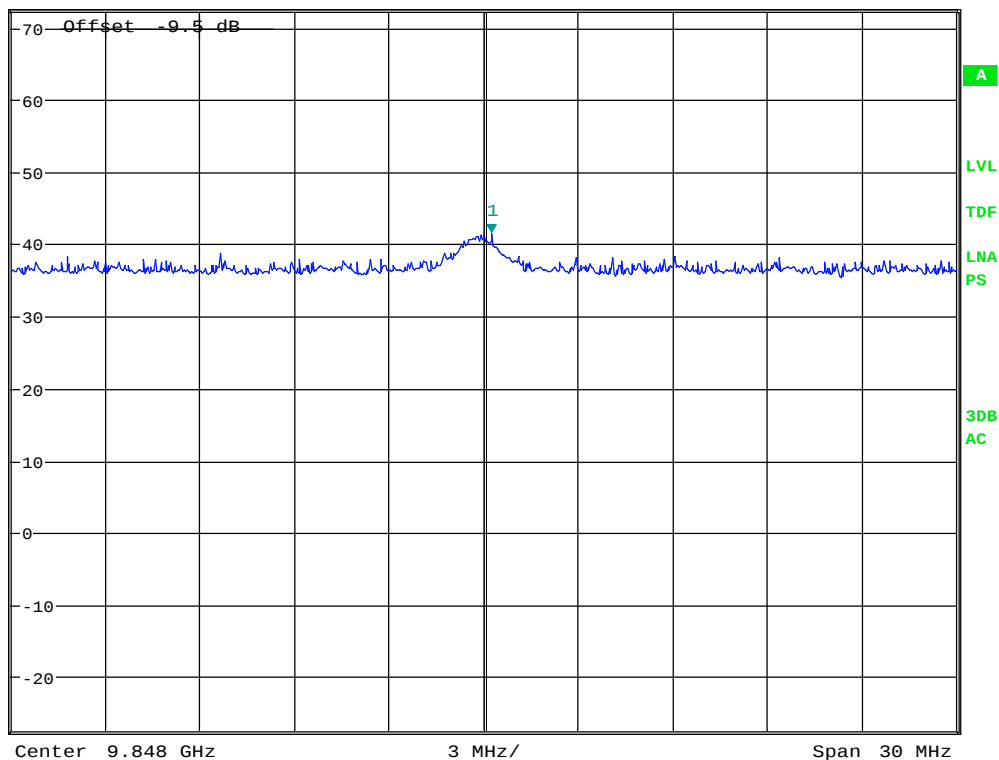


MARKER 1
9.848240385 GHz
Ref 72.5 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 20 ms

Marker 1 [T1]
41.43 dBμV/m
9.848240385 GHz

1 PK
MAXH



Date: 3.MAR.2016 13:49:35

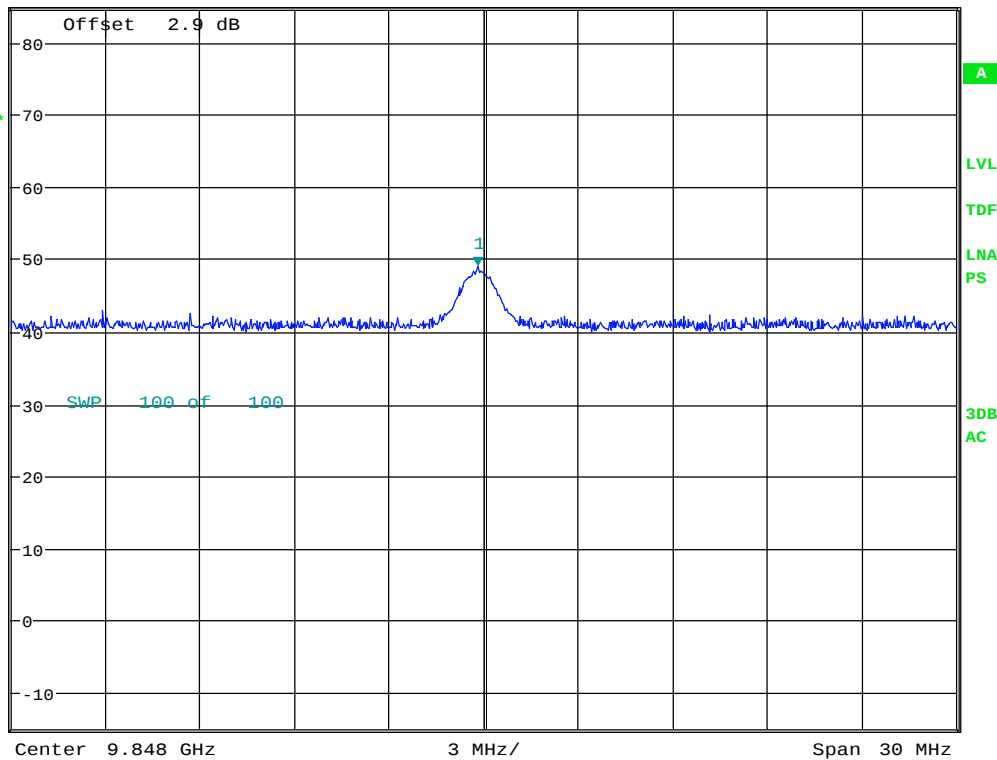
4th har , PK detector, 2462MHz, VP, 802.11n, 65Mbps @1m



MARKER 1
9.84779375 GHz
Ref 84.9 dBμV/m * Att 10 dB

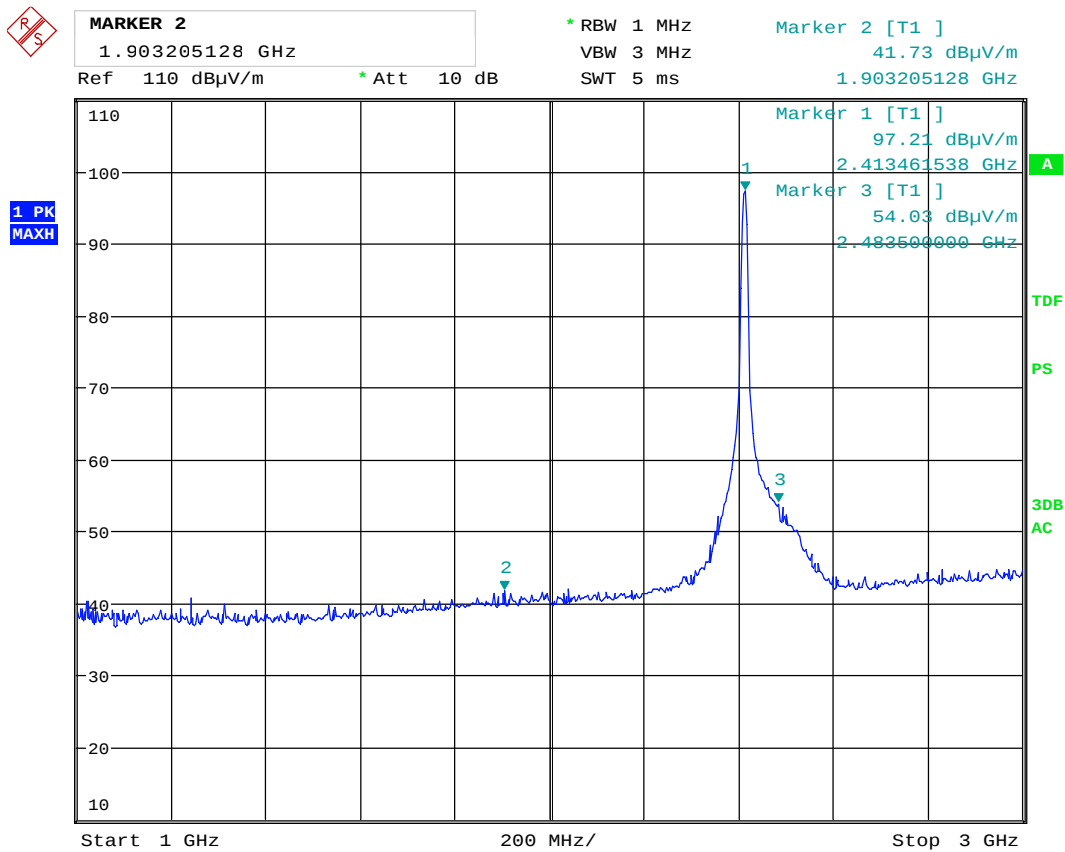
* RBW 1 MHz
VBW 10 MHz
SWT 20 ms
Marker 1 [T1]
48.98 dBμV/m
9.847793750 GHz

1 RM
MAXH



Date: 3.MAR.2016 13:48:55

4th har , RMS detector, 2462MHz, VP, 802.11n, 65Mbps @1m



Date: 18.FEB.2016 11:17:59

Radiated Emissions, 2412 MHz, 1 - 3GHz, VP, 802.11b, 5.5Mbps

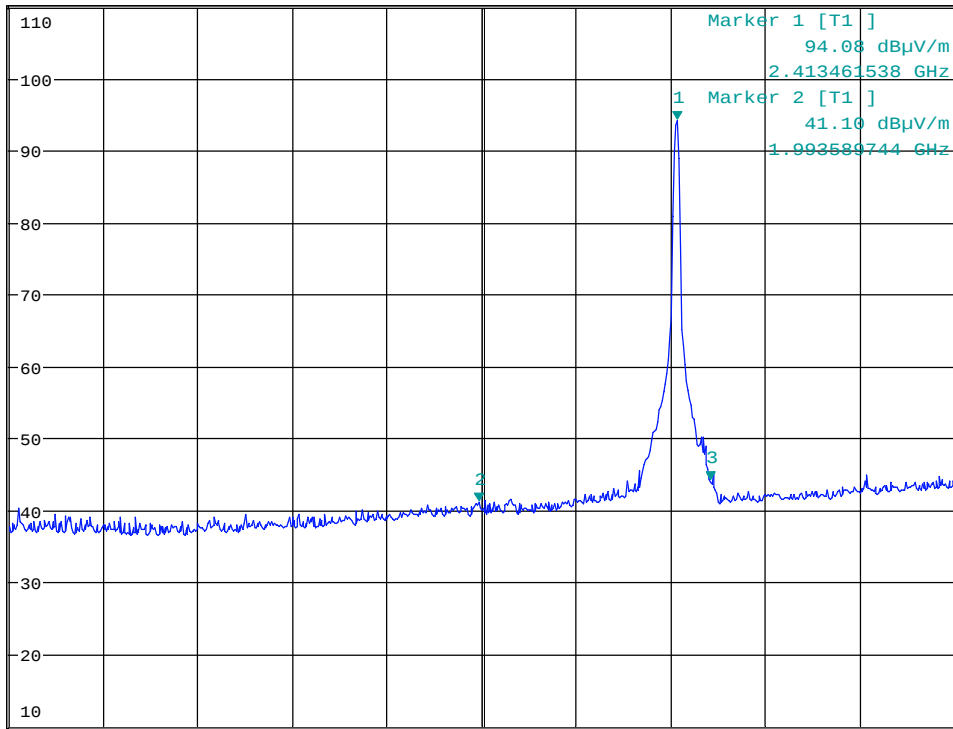


MARKER 3
2.4835 GHz
Ref 110 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 5 ms

Marker 3 [T1]
44.21 dBμV/m
2.483500000 GHz

1 PK
MAXH



Start 1 GHz 200 MHz/ Stop 3 GHz

Date: 18.FEB.2016 12:55:23

Radiated Emissions, 2412MHz, 1 - 3GHz, HP, 802.11b, 5.5Mbps

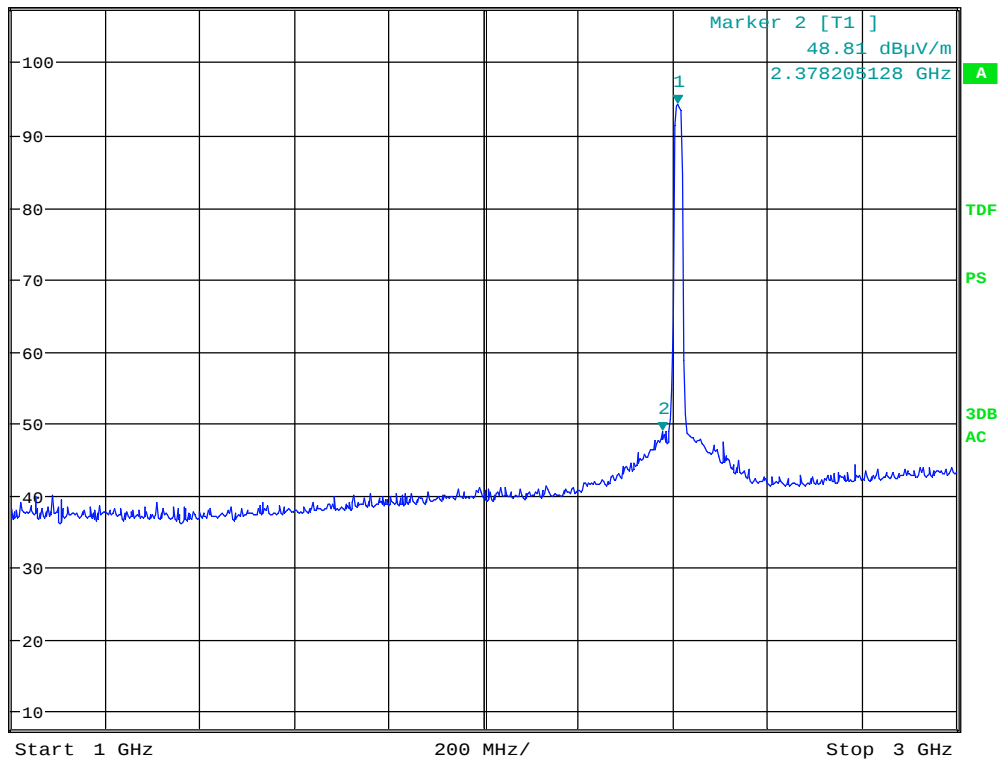


MARKER 1
2.41025641 GHz
Ref 107.6 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 5 ms

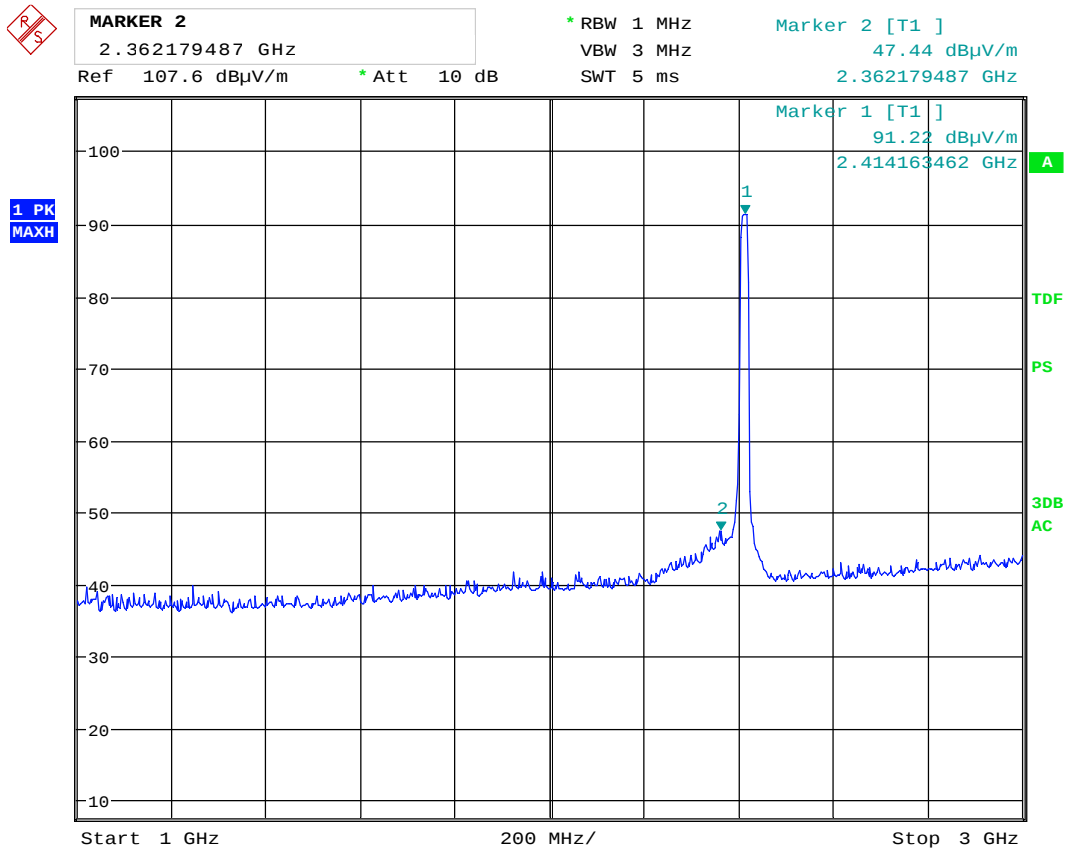
Marker 1 [T1]
94.30 dBμV/m
2.410256410 GHz

1 PK
MAXH



Date: 3.MAR.2016 11:19:52

Radiated Emissions, 2412MHz, 1 - 3GHz, VP, 802.11g, 9Mbps



Date: 3.MAR.2016 11:57:28

Radiated Emissions, 2412MHz, 1 - 3GHz, HP, 802.11g, 9Mbps



MARKER 1

2.407051282 GHz

Ref 110 dBμV/m

* Att 15 dB

* RBW 1 MHz

VBW 3 MHz

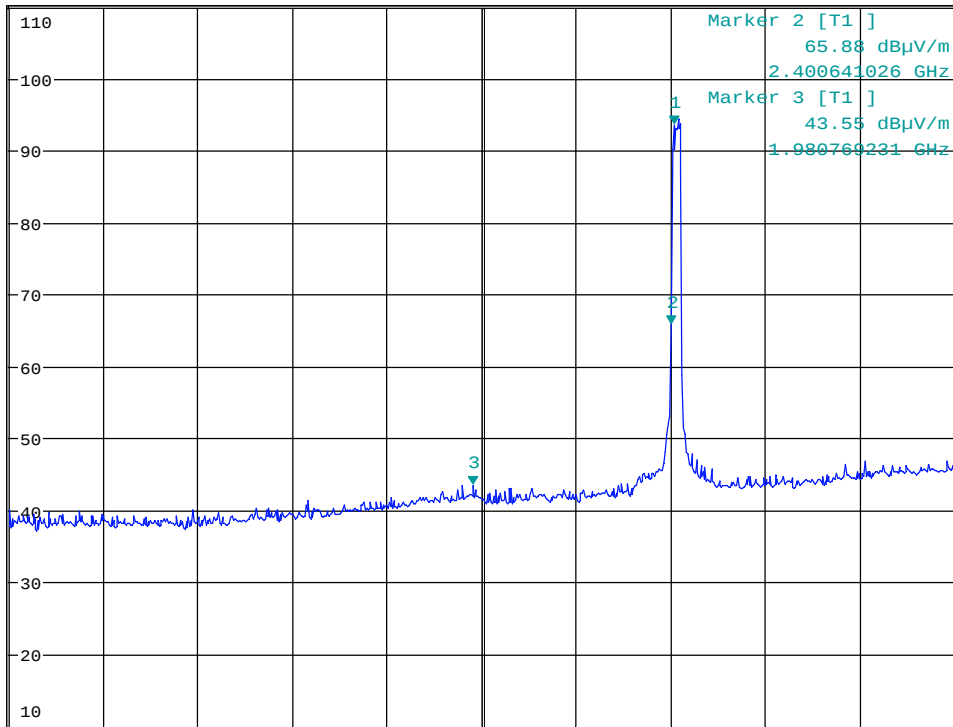
SWT 5 ms

Marker 1 [T1]

93.56 dBμV/m

2.407051282 GHz

1 PK
MAXH



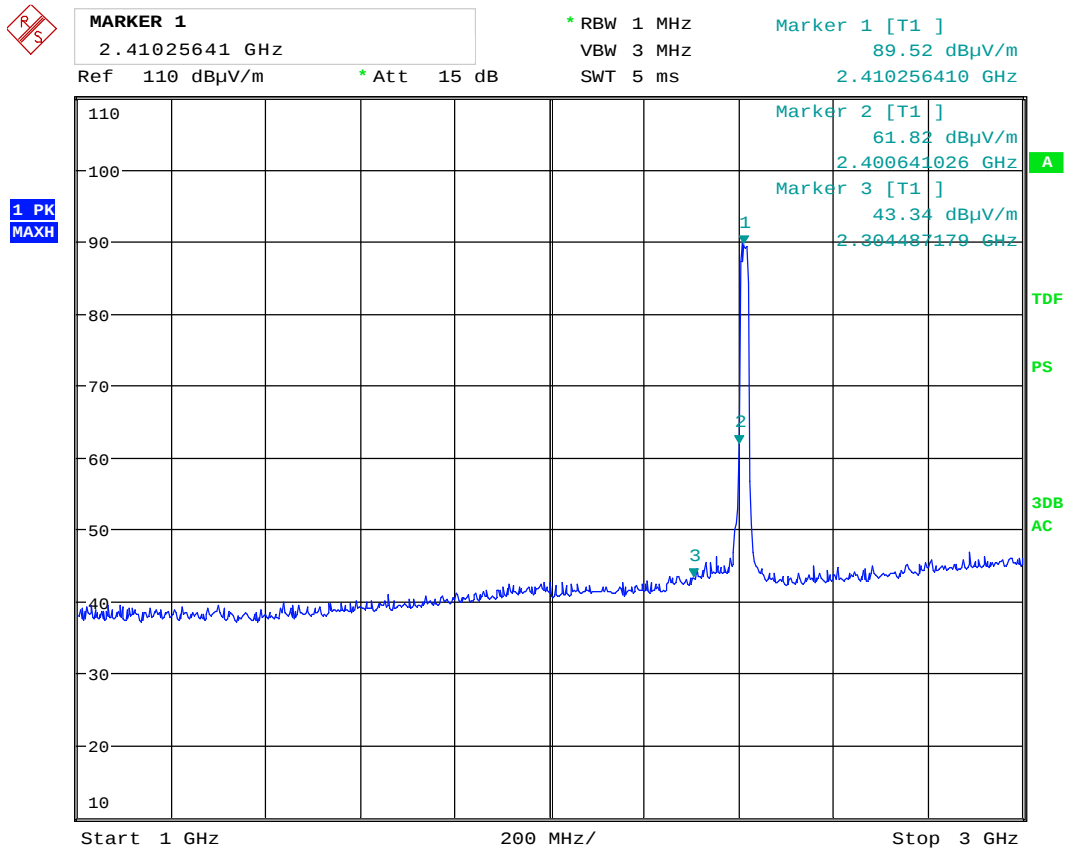
Start 1 GHz

200 MHz/

Stop 3 GHz

Date: 3.MAR.2016 08:56:24

Radiated Emissions, 2412MHz, 1 - 3GHz, VP, 802.11n, 65Mbps



Date: 3.MAR.2016 08:54:46

Radiated Emissions, 2412MHz, 1 - 3GHz, HP, 802.11n, 65Mbps



MARKER 3

2.508782051 GHz

Ref 110 dBμV/m

* Att 10 dB

* RBW 1 MHz

VBW 3 MHz

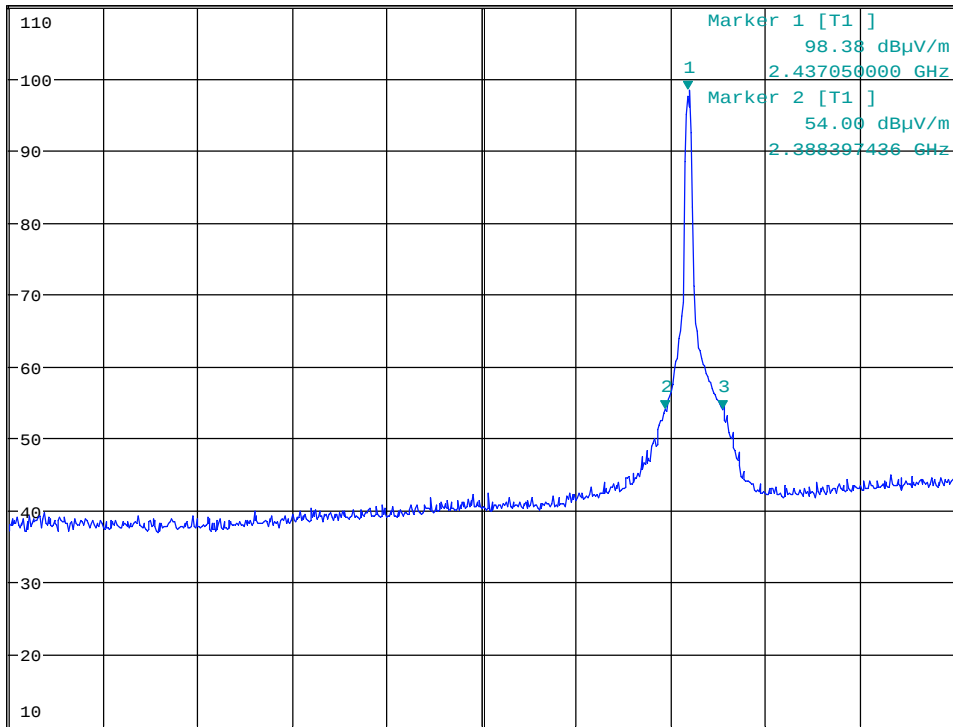
SWT 5 ms

Marker 3 [T1]

53.98 dBμV/m

2.508782051 GHz

1 PK
MAXH



Start 1 GHz

200 MHz/

Stop 3 GHz

Date: 19.FEB.2016 07:50:40

Radiated Emissions, 2437MHz, 1 - 3GHz, VP, 802.11b, 5.5Mbps



MARKER 3

2.563269231 GHz

Ref 110 dBμV/m

* Att 10 dB

* RBW 1 MHz

VBW 3 MHz

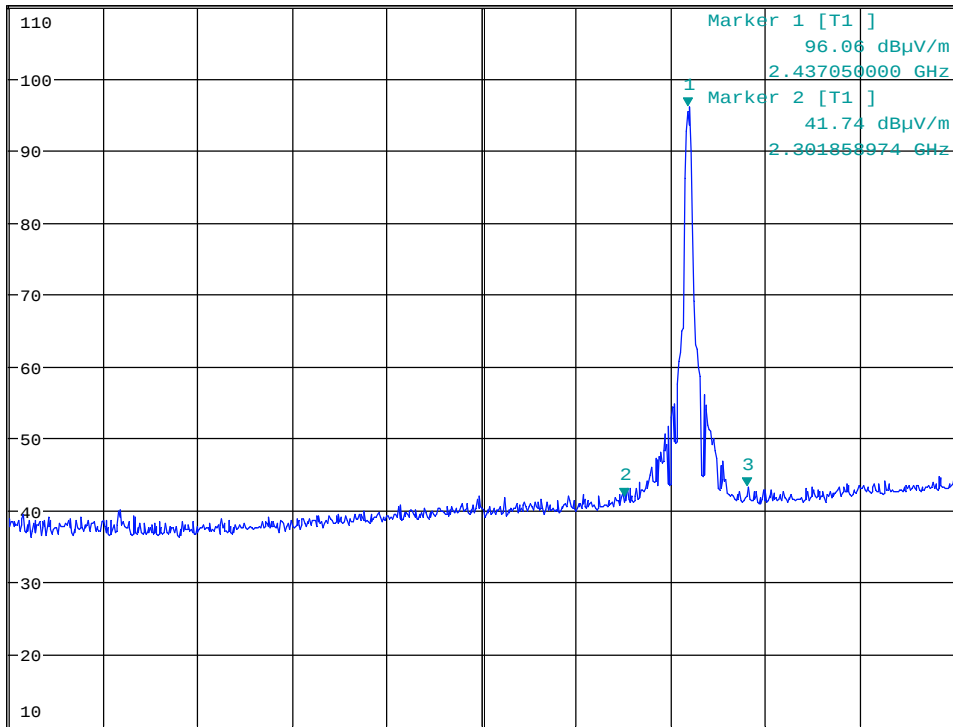
SWT 5 ms

Marker 3 [T1]

43.22 dBμV/m

2.563269231 GHz

1 PK
MAXH



Start 1 GHz

200 MHz/

Stop 3 GHz

Date: 19.FEB.2016 07:47:15

Radiated Emissions, 2437MHz, 1 - 3GHz, HP, 802.11b, 5.5Mbps



MARKER 1

2.435897436 GHz

Ref 100 dBμV/m

* Att 10 dB

* RBW 1 MHz

VBW 3 MHz

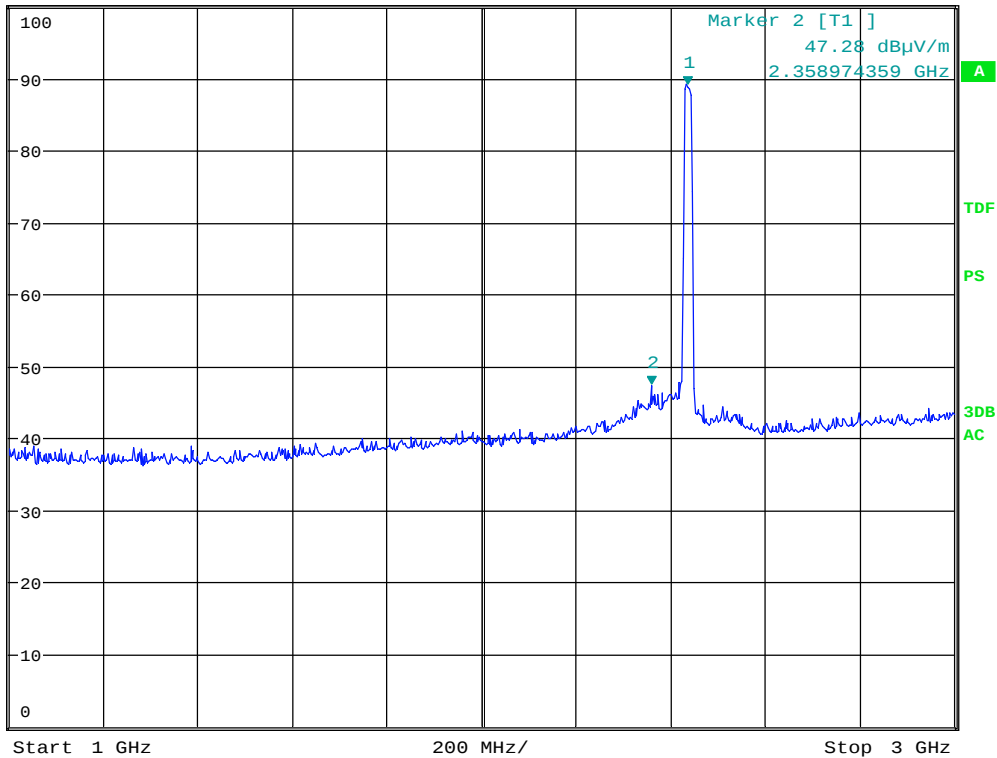
SWT 5 ms

Marker 1 [T1]

89.03 dBμV/m

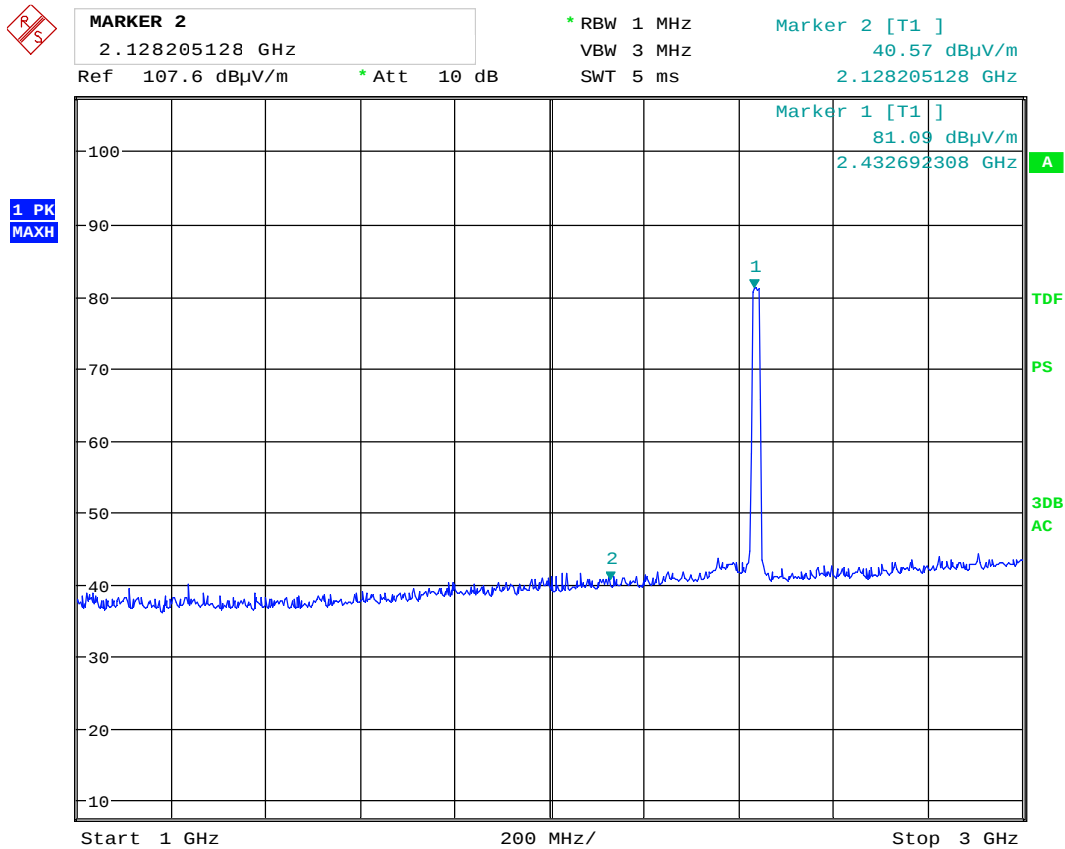
2.435897436 GHz

1 PK
MAXH



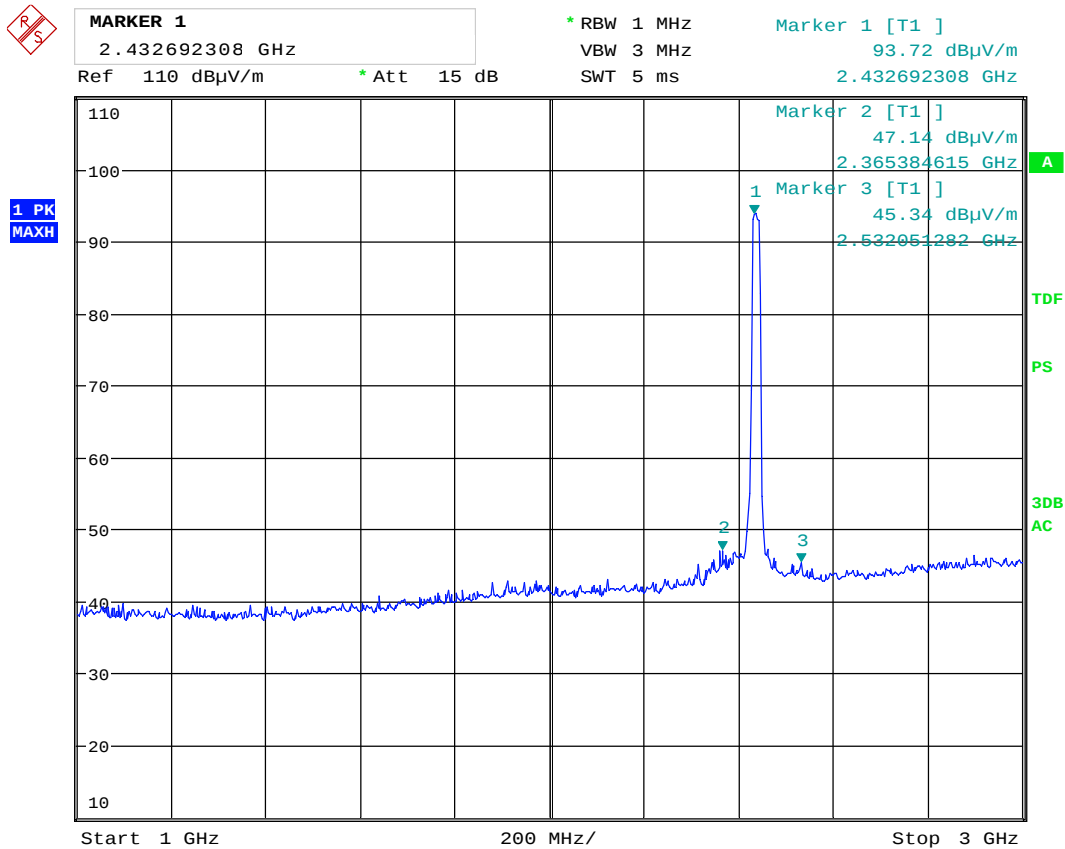
Date: 3.MAR.2016 12:26:30

Radiated Emissions, 2437MHz, 1 - 3GHz, VP, 802.11g, 9Mbps



Date: 3.MAR.2016 12:24:41

Radiated Emissions, 2437MHz, 1 - 3GHz, HP, 802.11g, 9Mbps



Date: 3.MAR.2016 08:29:22

Radiated Emissions, 2437MHz, 1 - 3GHz, VP, 802.11n, 65Mbps



MARKER 1

2.431326923 GHz

Ref 110 dBμV/m

* Att 15 dB

* RBW 1 MHz

VBW 3 MHz

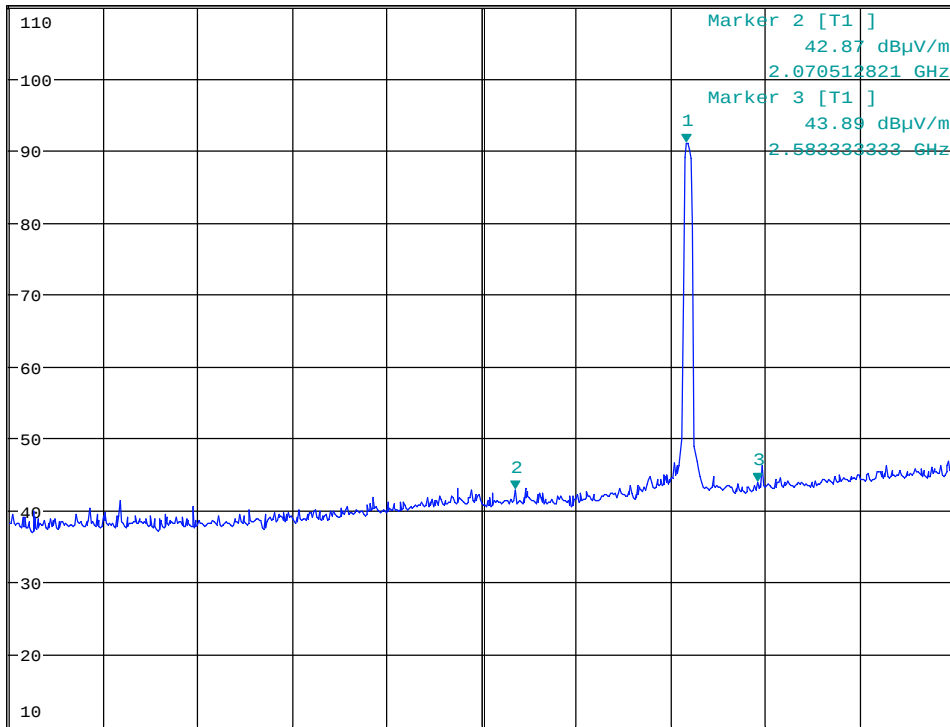
SWT 5 ms

Marker 1 [T1]

91.08 dBμV/m

2.431326923 GHz

1 PK
MAXH



Start 1 GHz

200 MHz/

Stop 3 GHz

Date: 3.MAR.2016 08:28:10

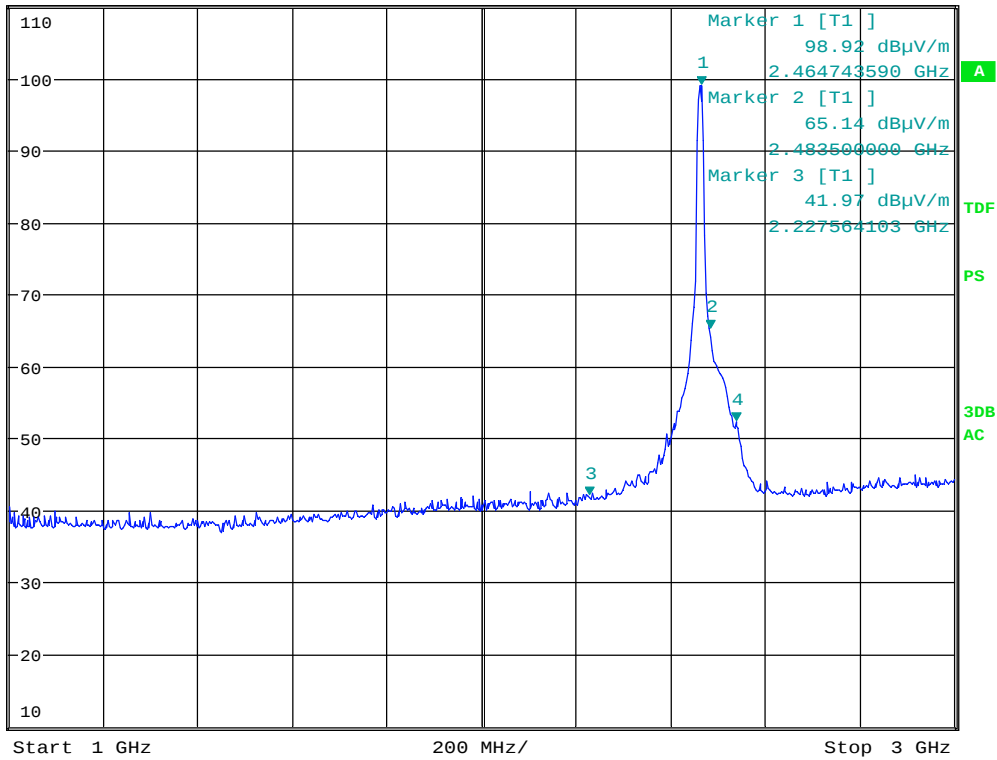
Radiated Emissions, 2437MHz, 1 - 3GHz, HP, 802.11n, 65Mbps



MARKER 4
2.538461538 GHz
Ref 110 dBμV/m * Att 10 dB

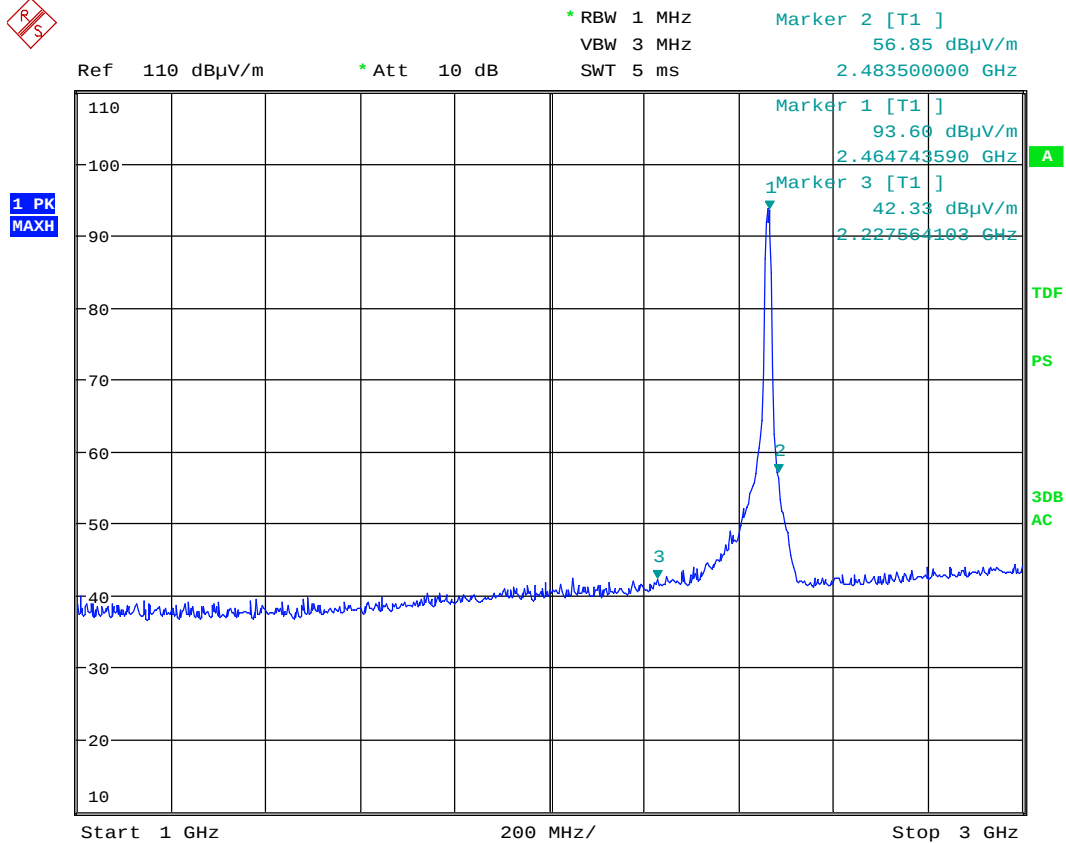
* RBW 1 MHz Marker 4 [T1]
VBW 3 MHz 52.38 dBμV/m
SWT 5 ms 2.538461538 GHz

1 PK
MAXH



Date: 19.FEB.2016 06:57:36

Radiated Emissions, 2462MHz, 1 - 3GHz, VP, 802.11b, 5.5Mbps



Date: 19.FEB.2016 06:55:46

Radiated Emissions, 2462MHz, 1 - 3GHz, HP, 802.11b, 5.5Mbps

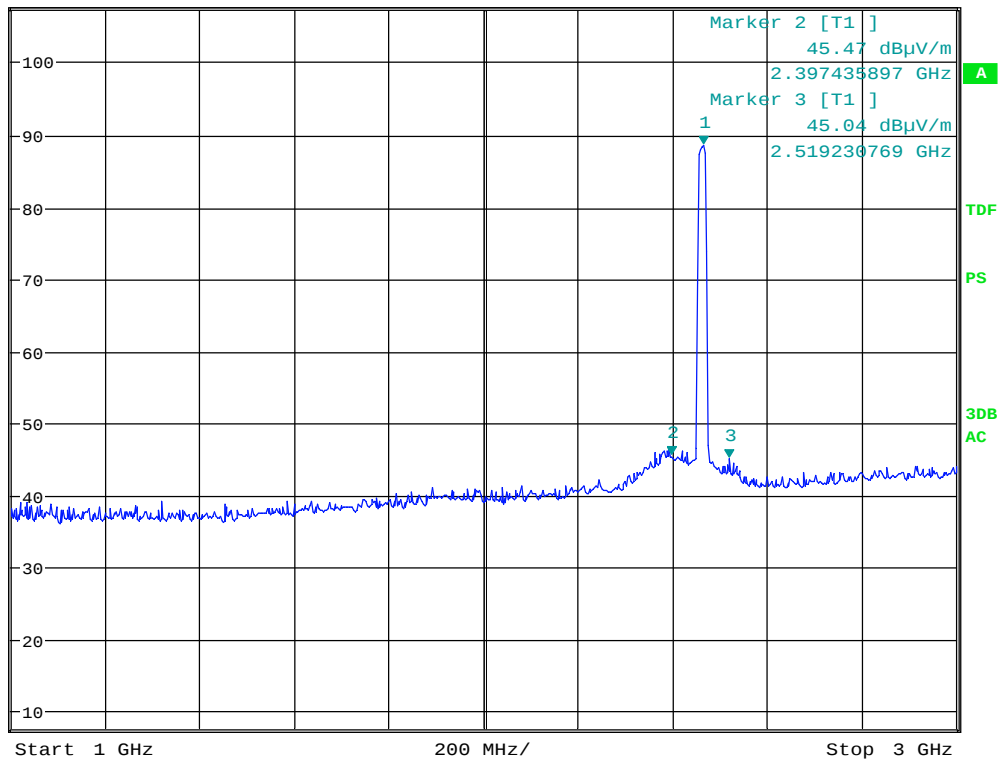


MARKER 1
2.46474359 GHz
Ref 107.6 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 5 ms

Marker 1 [T1]
88.49 dBμV/m
2.464743590 GHz

1 PK
MAXH



Date: 3.MAR.2016 11:06:34

Radiated Emissions, 2462MHz, 1 - 3GHz, VP, 802.11g, 9Mbps

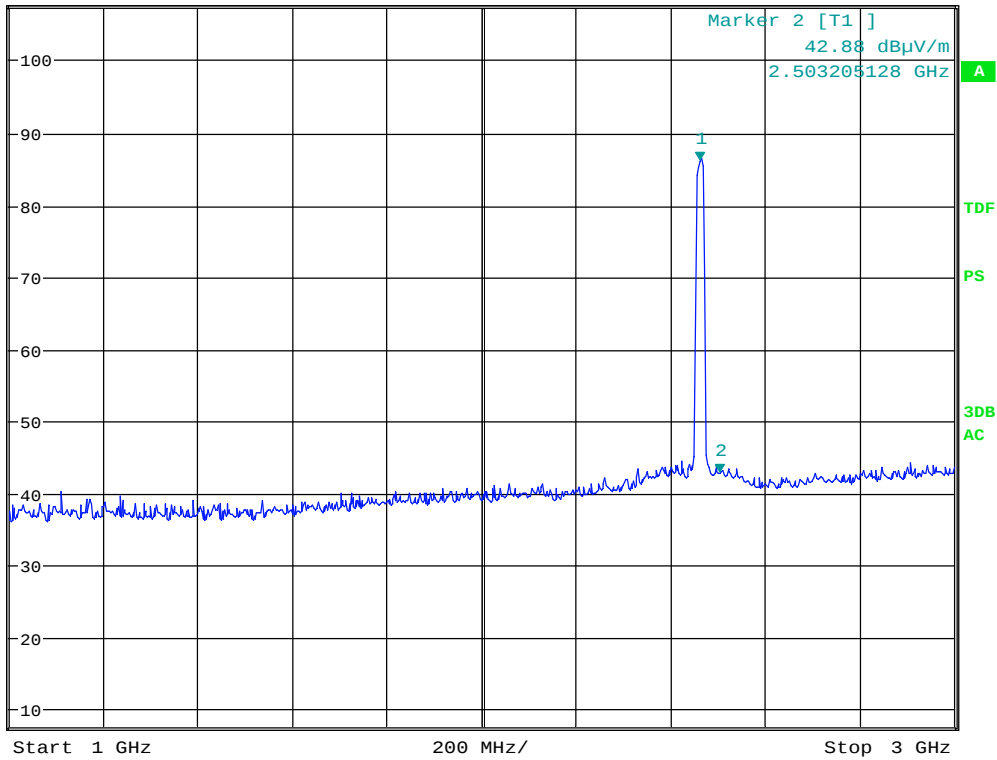


MARKER 1
2.461086538 GHz
Ref 107.6 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 5 ms

Marker 1 [T1]
85.98 dBμV/m
2.461086538 GHz

1 PK
MAXH



Date: 3.MAR.2016 11:09:55

Radiated Emissions, 2462MHz, 1 - 3GHz, HP, 802.11g, 9Mbps

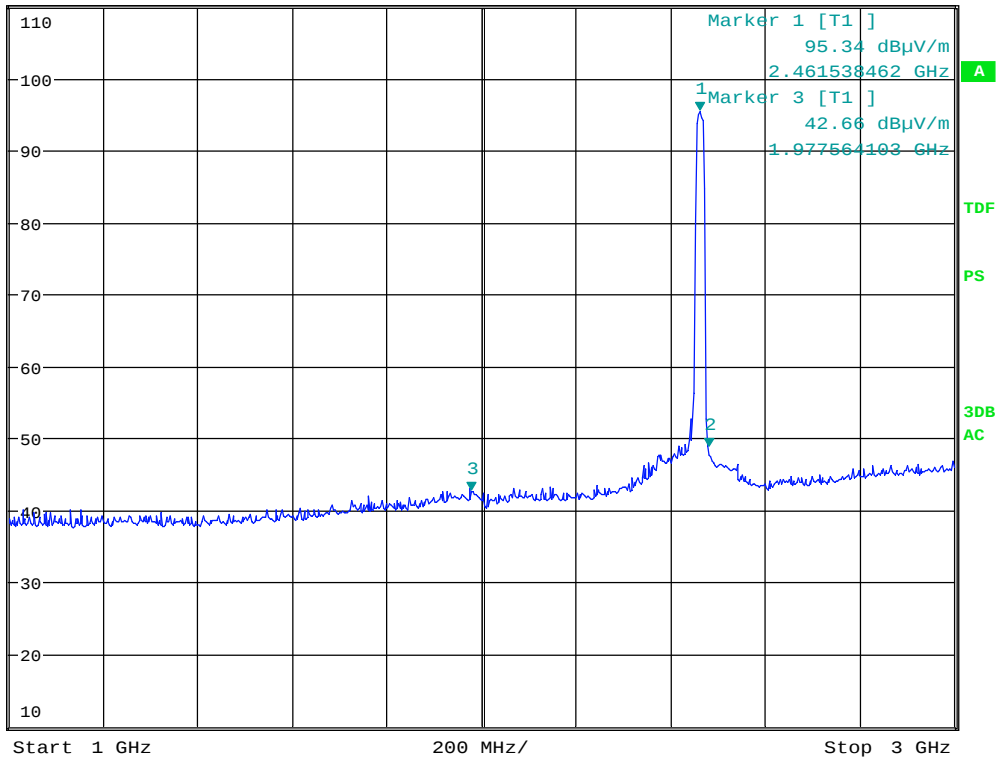


MARKER 2
2.480769231 GHz
Ref 110 dBμV/m * Att 15 dB

* RBW 1 MHz
VBW 3 MHz
SWT 5 ms

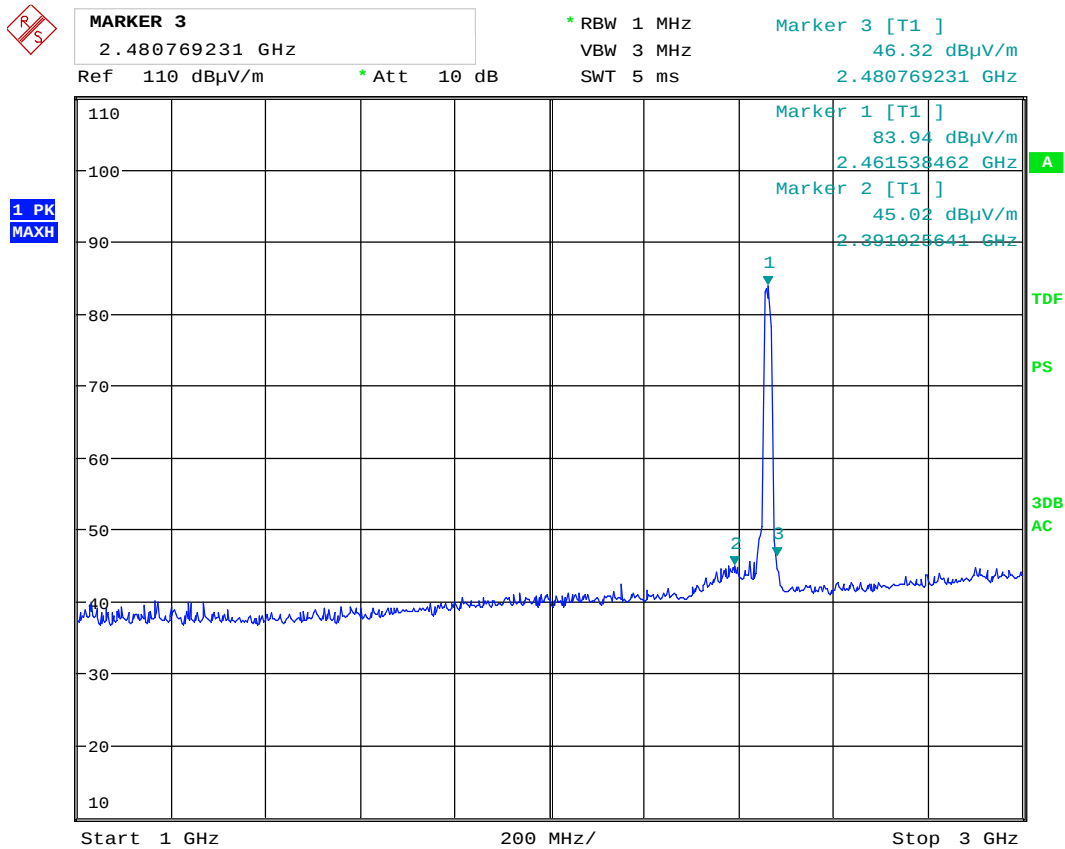
Marker 2 [T1]
48.71 dBμV/m
2.480769231 GHz

1 PK
MAXH



Date: 3.MAR.2016 07:51:48

Radiated Emissions, 2462MHz, 1 - 3GHz, VP, 802.11n, 65Mbps



Date: 3.MAR.2016 08:01:30

Radiated Emissions, 2462MHz, 1 - 3GHz, HP, 802.11n, 65Mbps



* RBW 1 MHz
VBW 3 MHz
SWT 20 ms
Marker 1 [T1]
46.70 dBμV/m
4.931250000 GHz

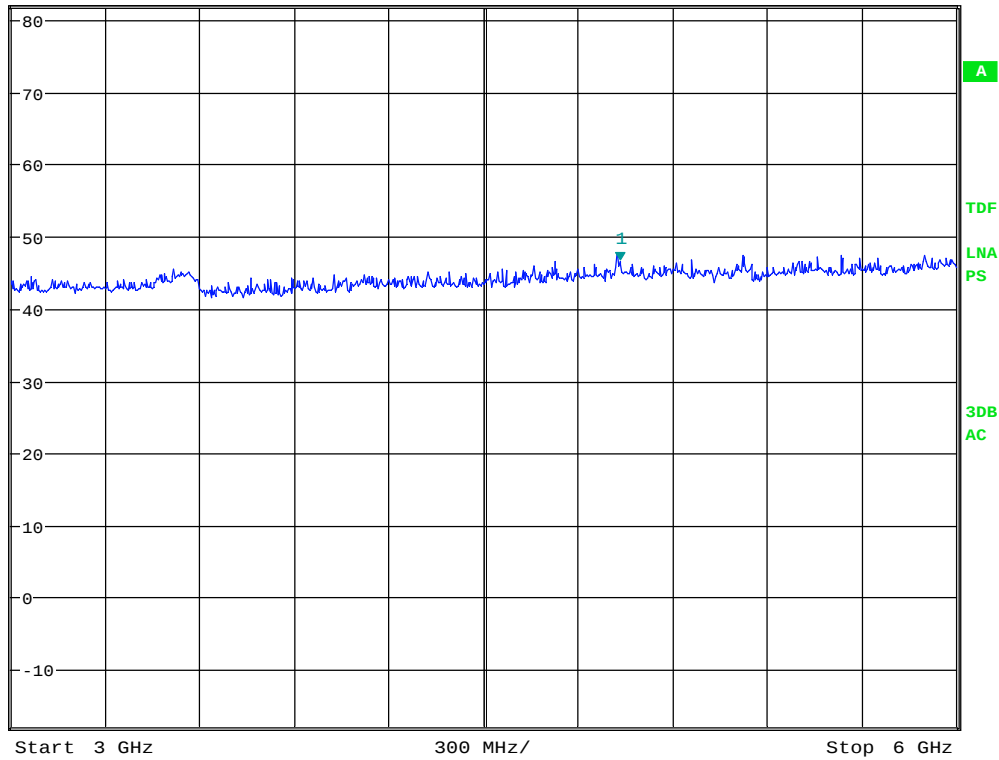
Ref 82 dBμV/m

* Att 10 dB

SWT 20 ms

4.931250000 GHz

1 PK
MAXH



Date: 19.FEB.2016 07:16:11

Radiated Emissions, 3 - 6GHz, 2412MHz, VP, 802.11b, 5.5Mbps

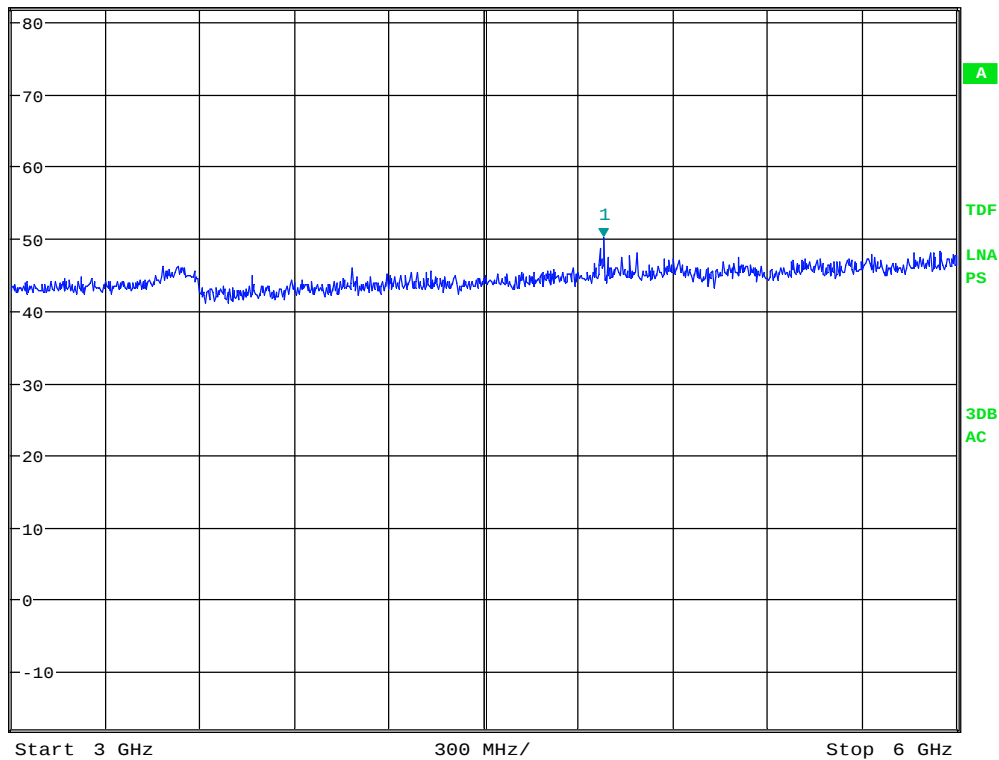


MARKER 1
4.8792 GHz
Ref 82 dBμV/m * Att 20 dB

* RBW 1 MHz
VBW 3 MHz
SWT 20 ms

Marker 1 [T1]
50.09 dBμV/m
4.879200000 GHz

1 PK
MAXH



Date: 19.FEB.2016 07:58:22

Radiated Emissions, 3 - 6GHz, 2412MHz, HP, 802.11b, 5.5Mbps



MARKER 1

5.995192308 GHz

Ref 100 dBμV/m

* Att 10 dB

* RBW 1 MHz

VBW 3 MHz

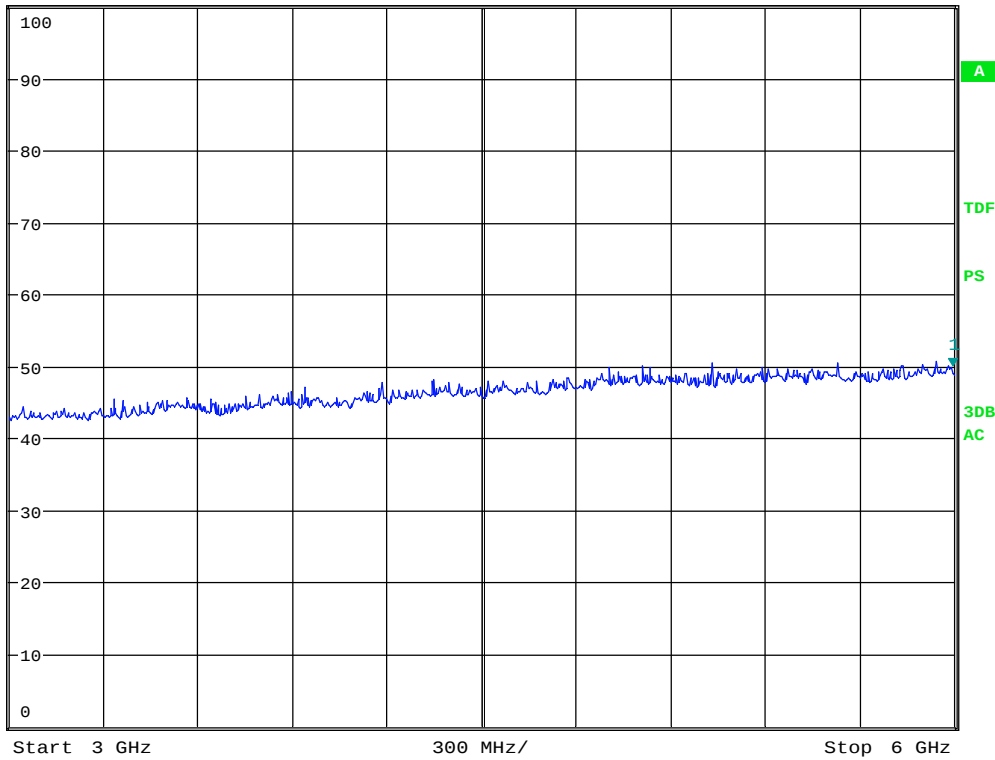
SWT 20 ms

Marker 1 [T1]

49.96 dBμV/m

5.995192308 GHz

1 PK
MAXH



Date: 3.MAR.2016 12:33:52

Radiated Emissions, 3 - 6GHz, 2412MHz, VP, 802.11g, 9Mbps

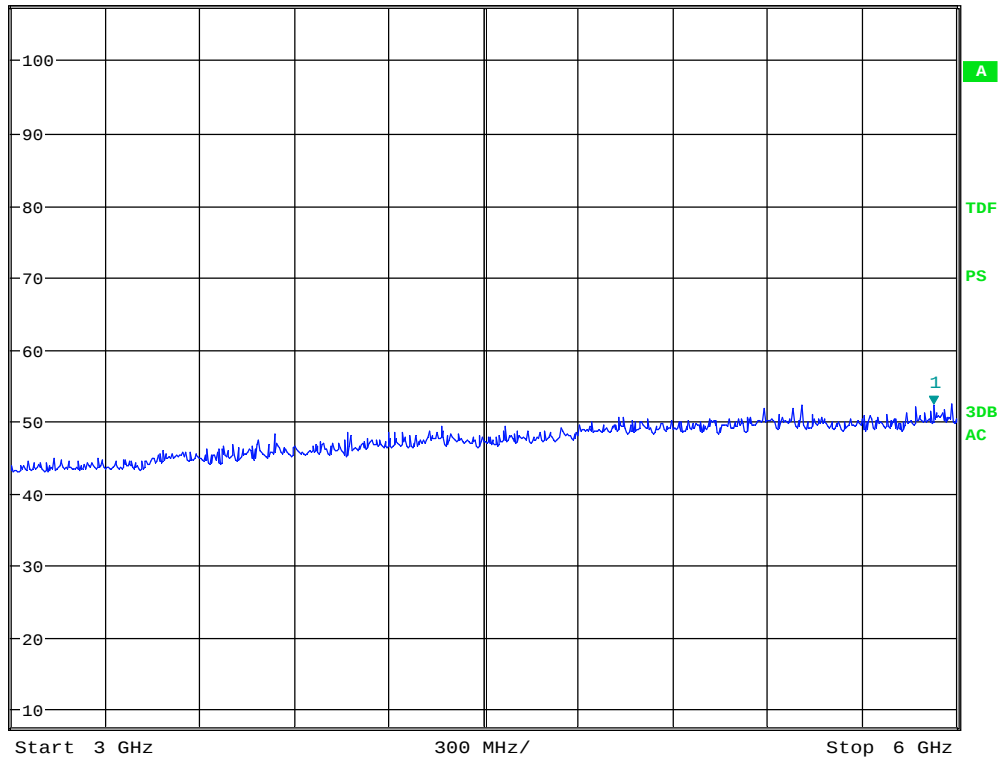


MARKER 1
5.927884615 GHz
Ref 107.6 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 20 ms

Marker 1 [T1]
52.21 dBμV/m
5.927884615 GHz

1 PK
MAXH



Date: 3.MAR.2016 11:58:04

Radiated Emissions, 3 - 6GHz, 2412MHz, HP, 802.11g, 9Mbps



MARKER 1

5.927884615 GHz

Ref 110 dBμV/m

* Att 15 dB

* RBW 1 MHz

VBW 3 MHz

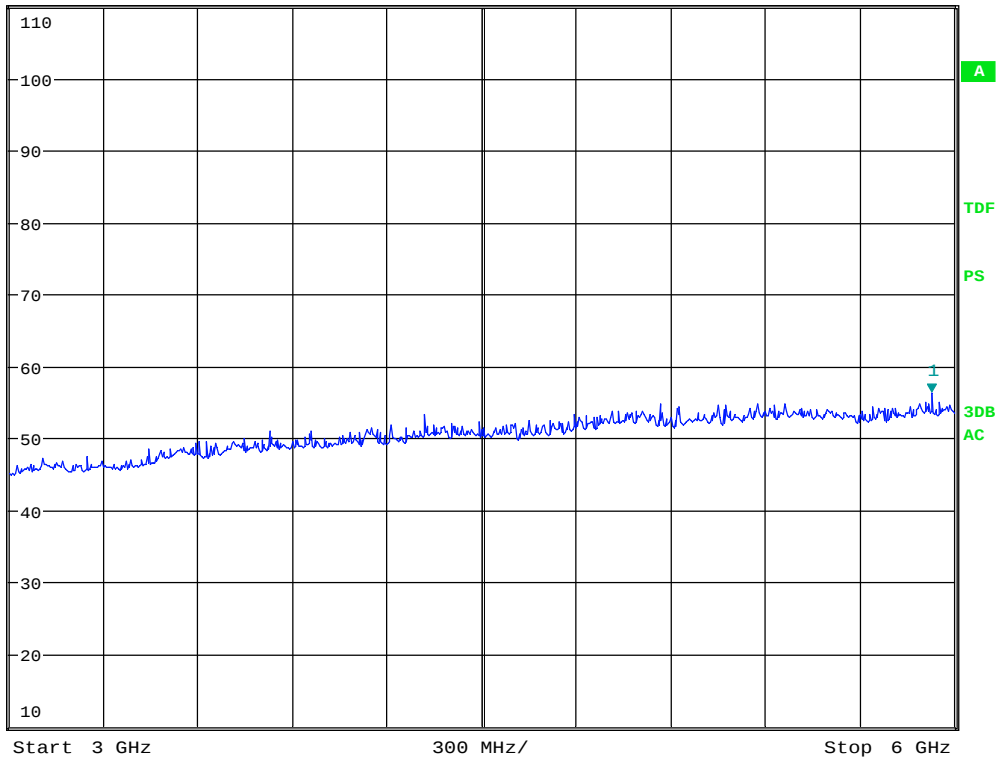
SWT 20 ms

Marker 1 [T1]

56.28 dBμV/m

5.927884615 GHz

1 PK
MAXH



Date: 3.MAR.2016 09:24:20

Radiated Emissions, 3 - 6GHz, 2412MHz, VP, 802.11n, 65Mbps



MARKER 1

5.668269231 GHz

Ref 110 dBμV/m

* Att 15 dB

* RBW 1 MHz

VBW 3 MHz

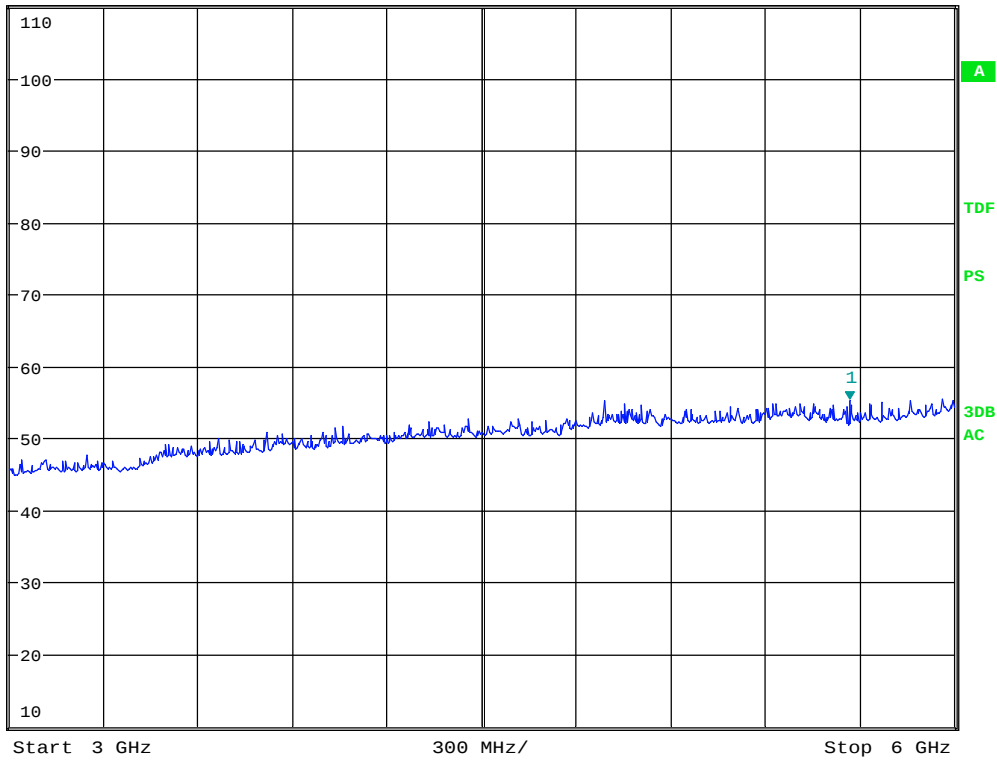
SWT 20 ms

Marker 1 [T1]

55.27 dBμV/m

5.668269231 GHz

1 PK
MAXH



Date: 3.MAR.2016 09:25:04

Radiated Emissions, 3 - 6GHz, 2412MHz, HP, 802.11n, 65Mbps

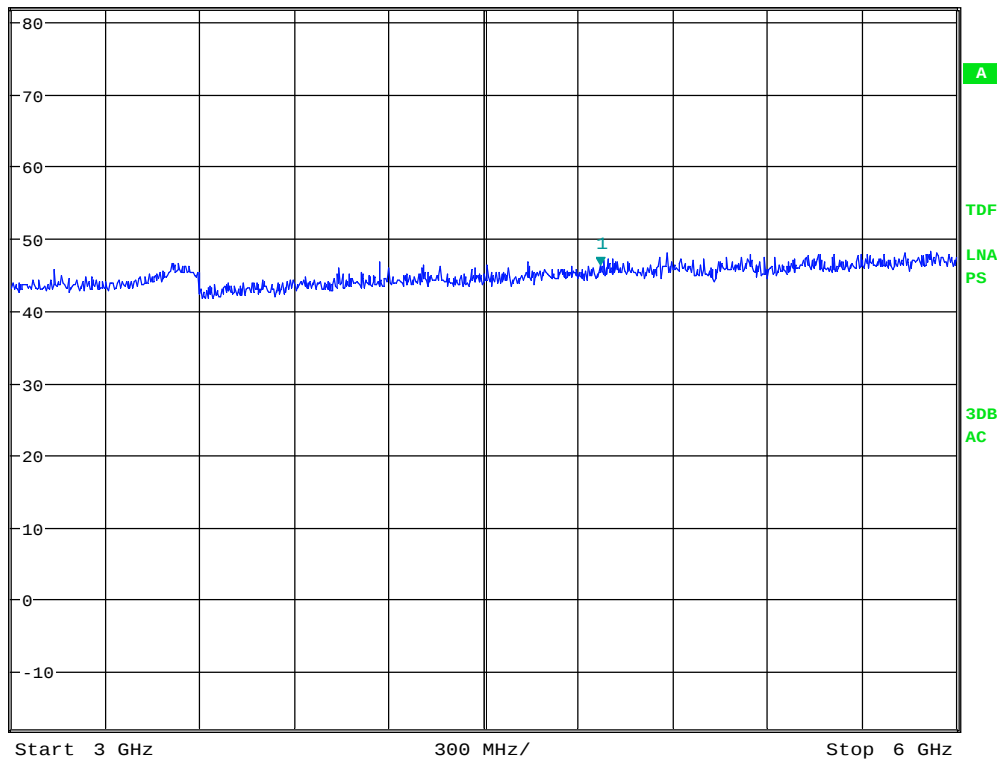


* RBW 1 MHz
VBW 3 MHz
SWT 20 ms
Marker 1 [T1]
46.22 dB μ V/m
4.870000000 GHz

Ref 82 dB μ V/m

* Att 20 dB

1 PK
MAXH



Date: 19.FEB.2016 08:01:25

Radiated Emissions, 3 - 6GHz, 2437MHz, VP, 802.11b, 5.5Mbps

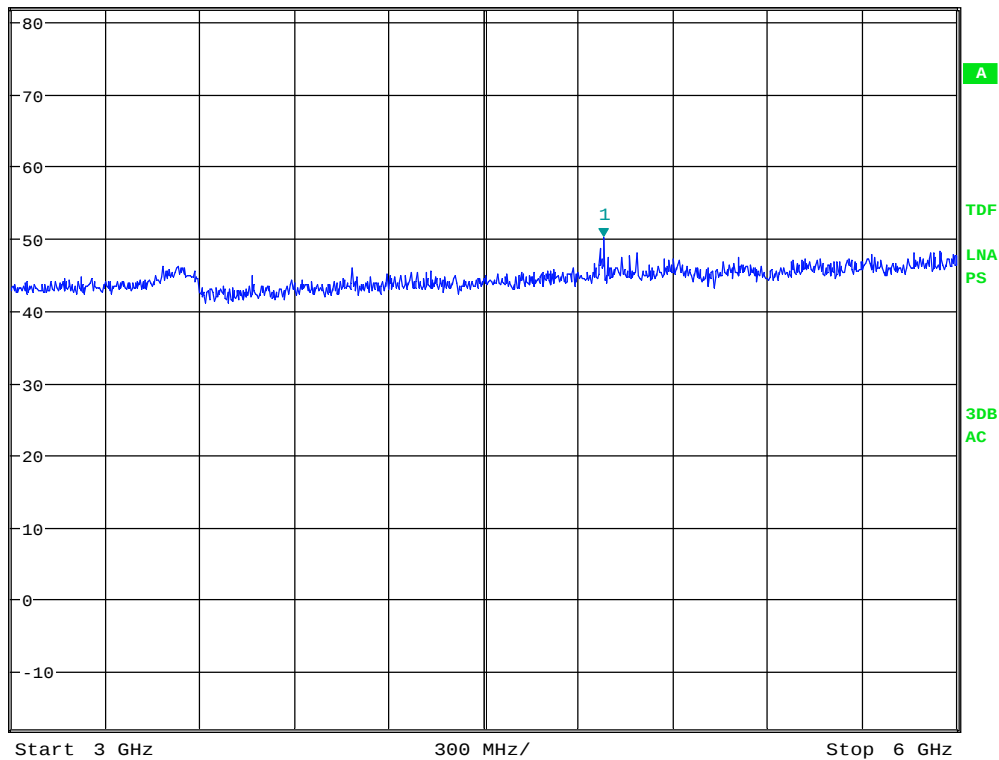


MARKER 1
4.8792 GHz
Ref 82 dBμV/m * Att 20 dB

* RBW 1 MHz
VBW 3 MHz
SWT 20 ms

Marker 1 [T1]
50.09 dBμV/m
4.879200000 GHz

1 PK
MAXH



Date: 19.FEB.2016 07:58:22

Radiated Emissions, 3 - 6GHz, 2437MHz, HP, 802.11b, 5.5Mbps



MARKER 1

5.721153846 GHz

Ref 100 dBμV/m

* Att 10 dB

* RBW 1 MHz

VBW 3 MHz

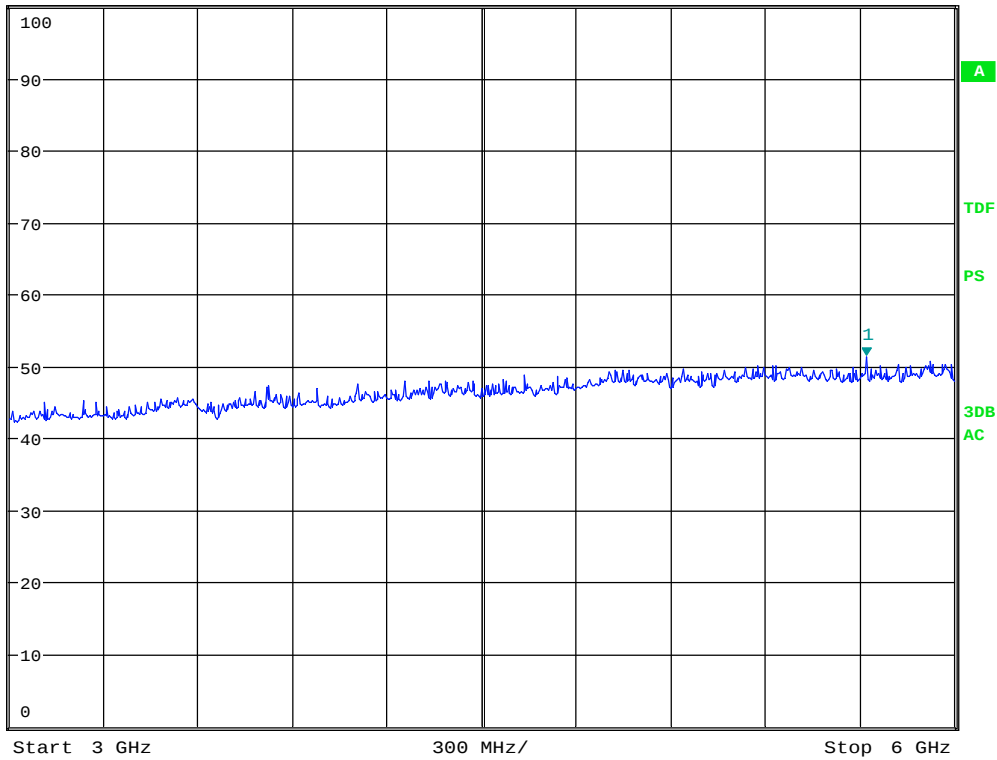
SWT 20 ms

Marker 1 [T1]

51.40 dBμV/m

5.721153846 GHz

1 PK
MAXH



Date: 3.MAR.2016 12:28:24

Radiated Emissions, 3 - 6GHz, 2437MHz, VP, 802.11g, 9Mbps

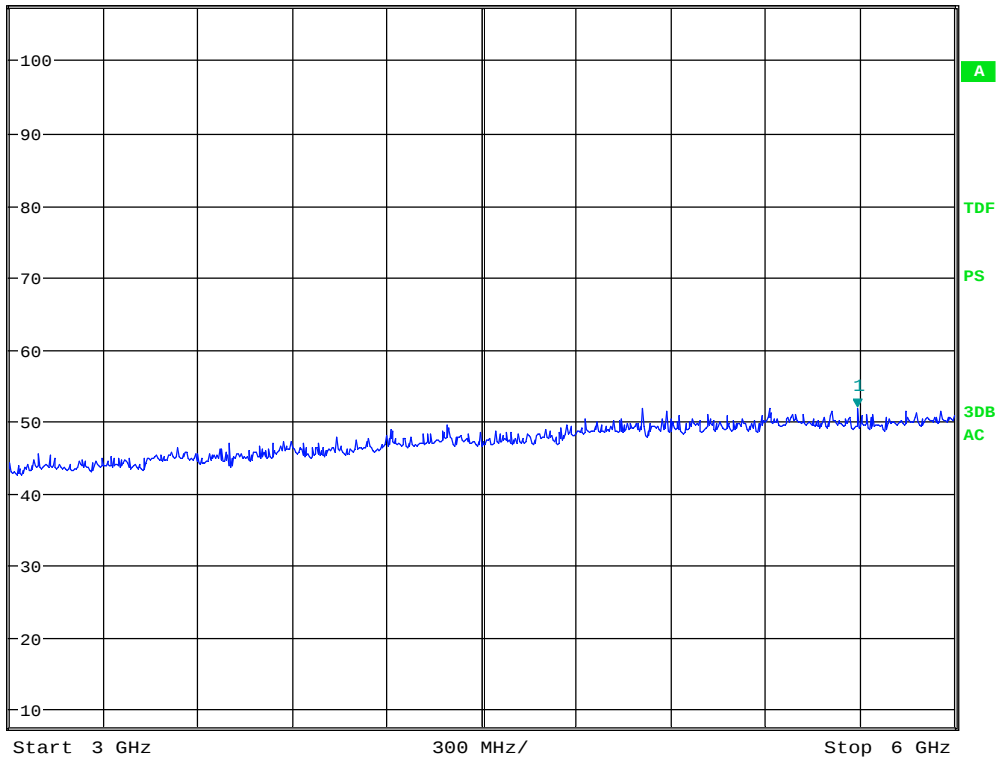


MARKER 1
5.692307692 GHz
Ref 107.6 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 20 ms

Marker 1 [T1]
51.72 dBμV/m
5.692307692 GHz

1 PK
MAXH



Date: 3.MAR.2016 12:25:14

Radiated Emissions, 3 - 6GHz, 2437MHz, HP, 802.11g, 9Mbps



MARKER 1

5.956730769 GHz

Ref 87 dB μ V/m

* Att 15 dB

* RBW 1 MHz

VBW 3 MHz

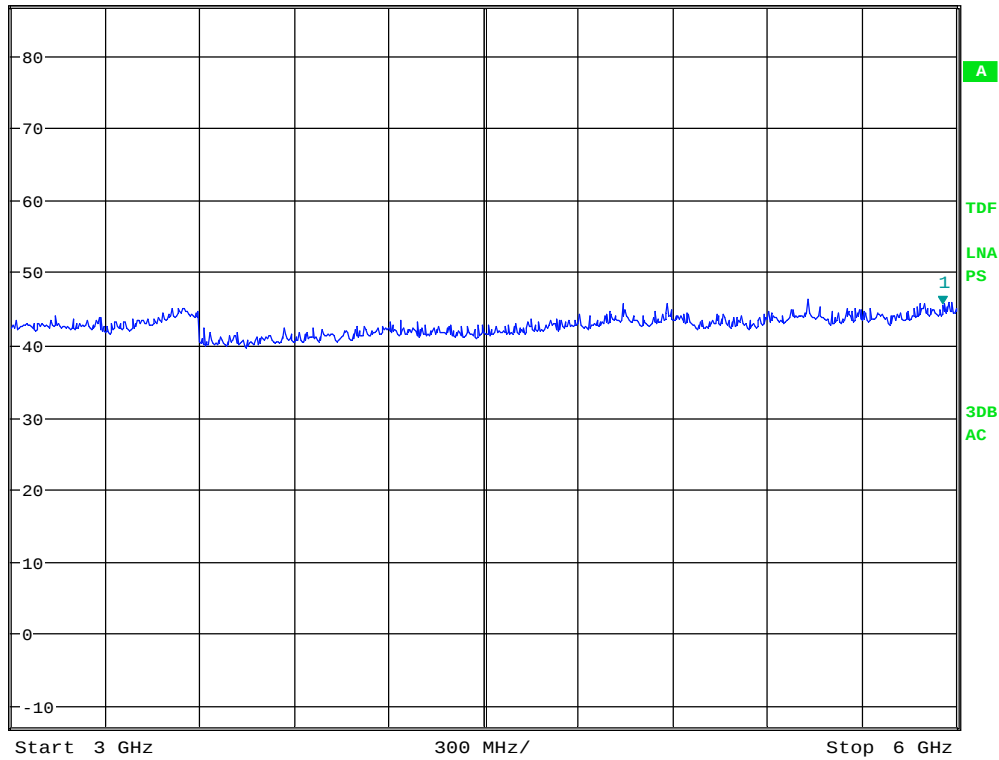
SWT 20 ms

Marker 1 [T1]

45.48 dB μ V/m

5.956730769 GHz

1 PK
MAXH



Date: 3.MAR.2016 08:41:00

Radiated Emissions, 3 - 6GHz, 2437MHz, VP, 802.11n, 65Mbps



MARKER 1

5.932692308 GHz

Ref 87 dBμV/m

* Att 15 dB

* RBW 1 MHz

VBW 3 MHz

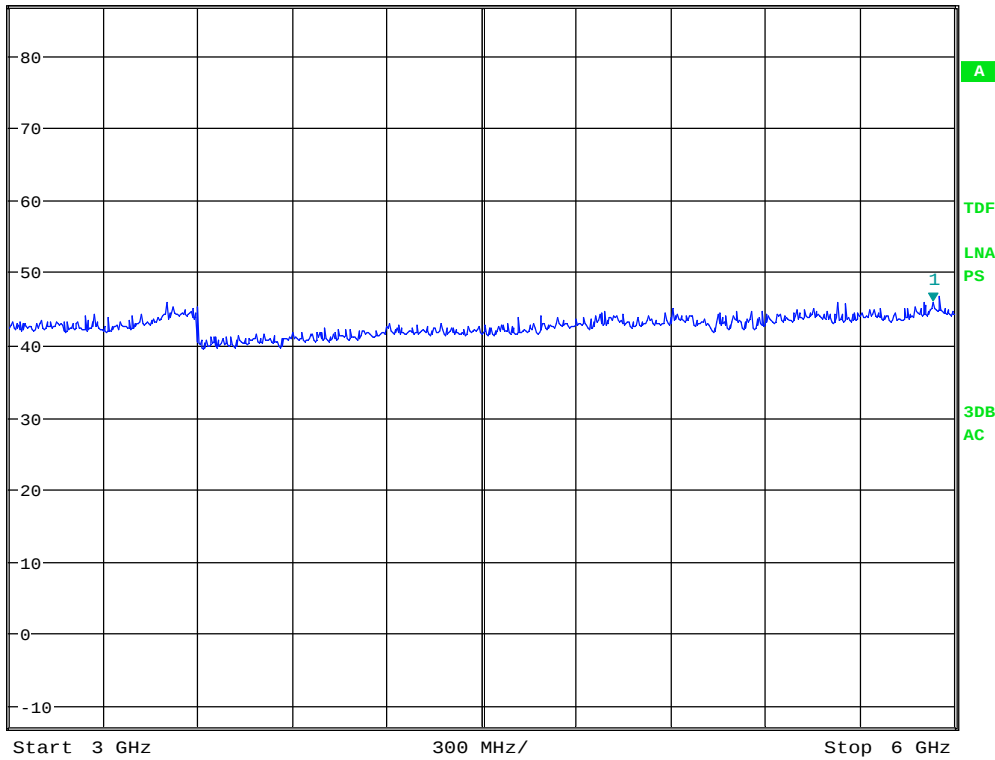
SWT 20 ms

Marker 1 [T1]

45.84 dBμV/m

5.932692308 GHz

1 PK
MAXH



Date: 3.MAR.2016 08:42:07

Radiated Emissions, 3 - 6GHz, 2437MHz, HP, 802.11n, 65Mbps



* RBW 1 MHz
VBW 3 MHz
SWT 20 ms
Marker 1 [T1]
46.70 dBμV/m
4.931250000 GHz

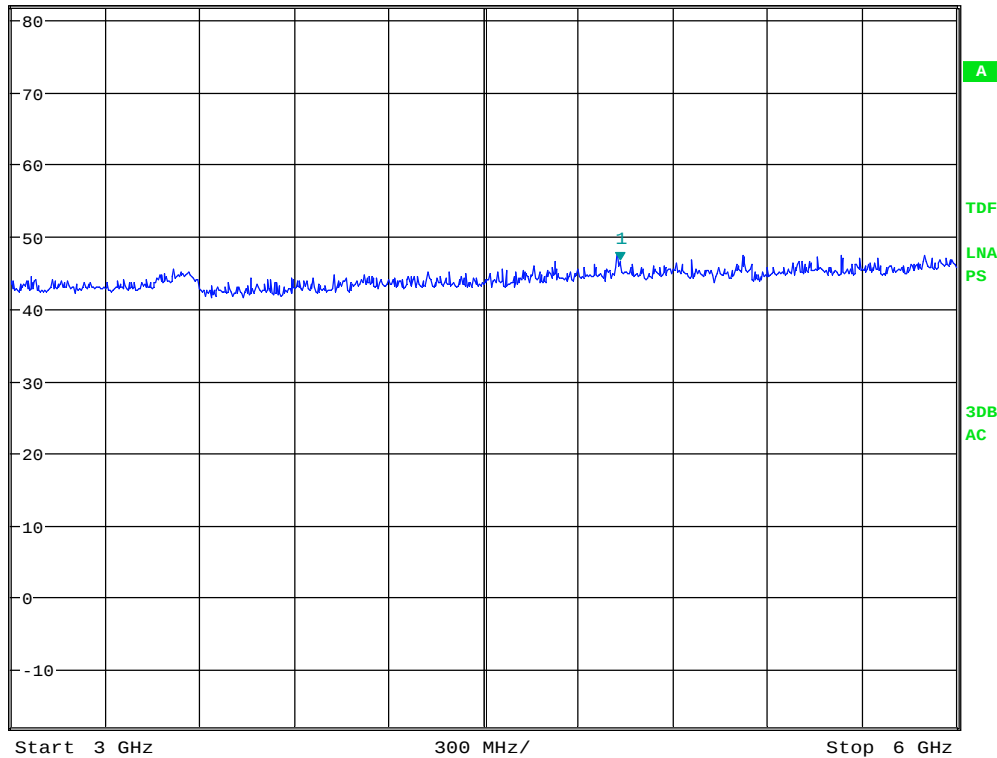
Ref 82 dBμV/m

* Att 10 dB

SWT 20 ms

4.931250000 GHz

1 PK
MAXH



Date: 19.FEB.2016 07:16:11

Radiated Emissions, 3 - 6GHz, 2462MHz, VP, 802.11b, 5.5Mbps

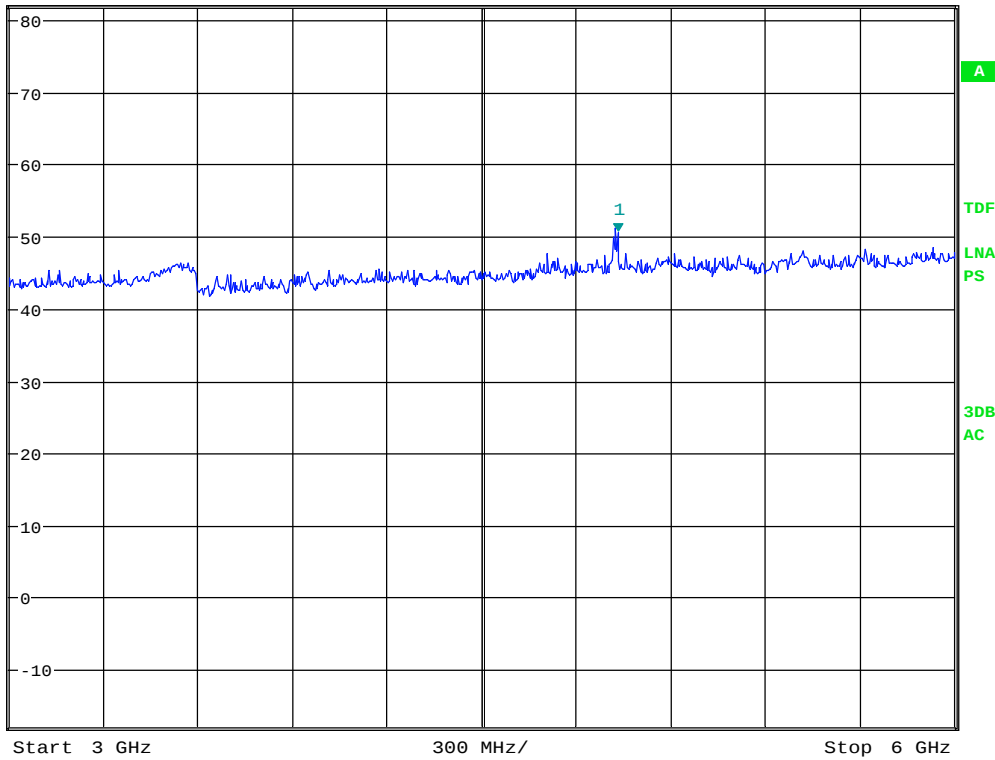


MARKER 1
4.93125 GHz
Ref 82 dBμV/m * Att 20 dB

* RBW 1 MHz
VBW 3 MHz
SWT 20 ms

Marker 1 [T1]
50.68 dBμV/m
4.931250000 GHz

1 PK
MAXH



Date: 19.FEB.2016 07:14:11

Radiated Emissions, 3 - 6GHz, 2462MHz, HP, 802.11b, 5.5Mbps



MARKER 1

5.591346154 GHz

Ref 107.6 dBμV/m * Att 10 dB

* RBW 1 MHz

VBW 3 MHz

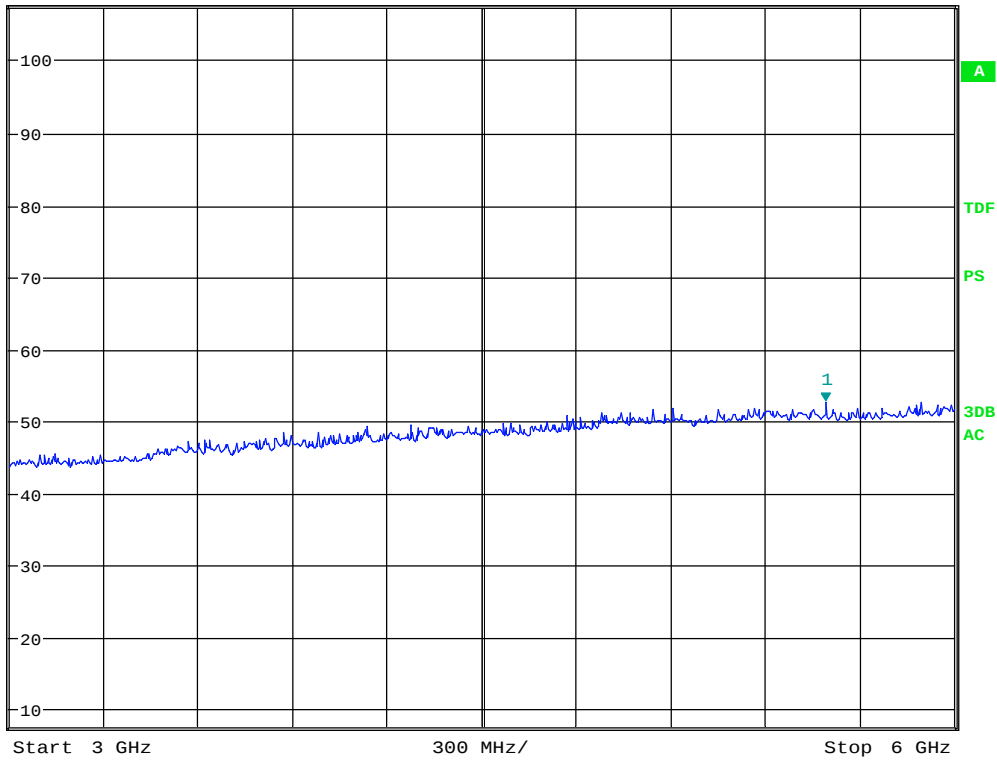
SWT 20 ms

Marker 1 [T1]

52.66 dBμV/m

5.591346154 GHz

1 PK
MAXH



Date: 3.MAR.2016 11:12:31

Radiated Emissions, 3 - 6GHz, 2462MHz, VP, 802.11g, 9Mbps

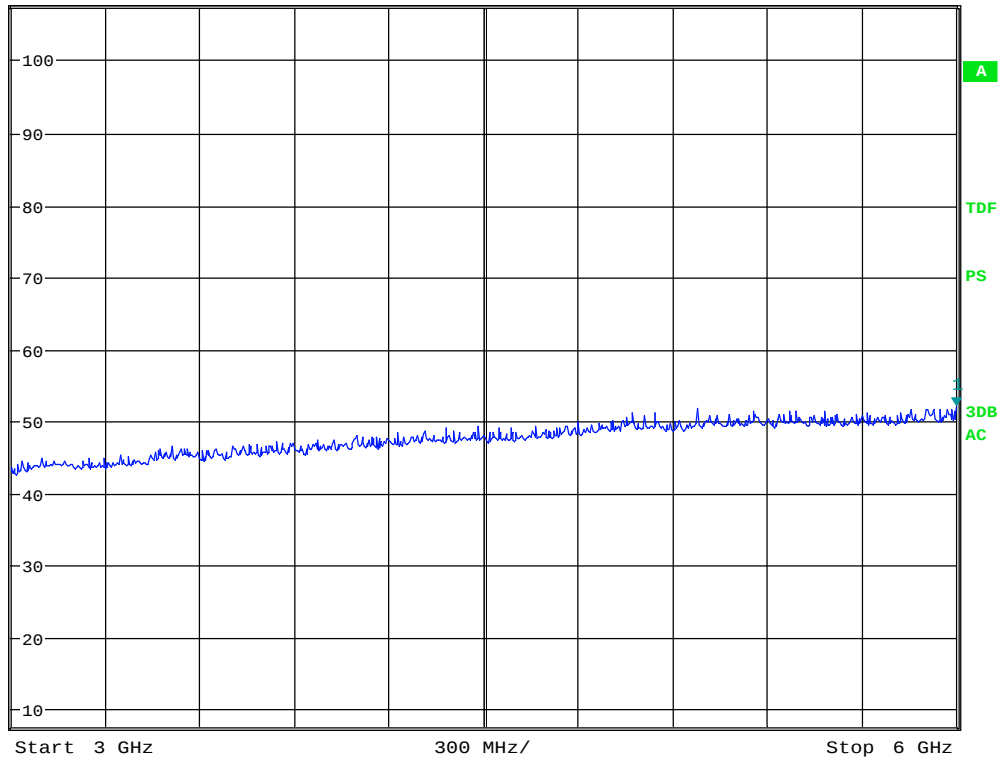


MARKER 1
6 GHz
Ref 107.6 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 20 ms

Marker 1 [T1]
52.05 dBμV/m
6.000000000 GHz

1 PK
MAXH



Date: 3.MAR.2016 11:10:44

Radiated Emissions, 3 - 6GHz, 2462MHz, HP, 802.11g, 9Mbps



MARKER 1

3.533653846 GHz

Ref 82 dBμV/m

* Att 10 dB

* RBW 1 MHz

VBW 3 MHz

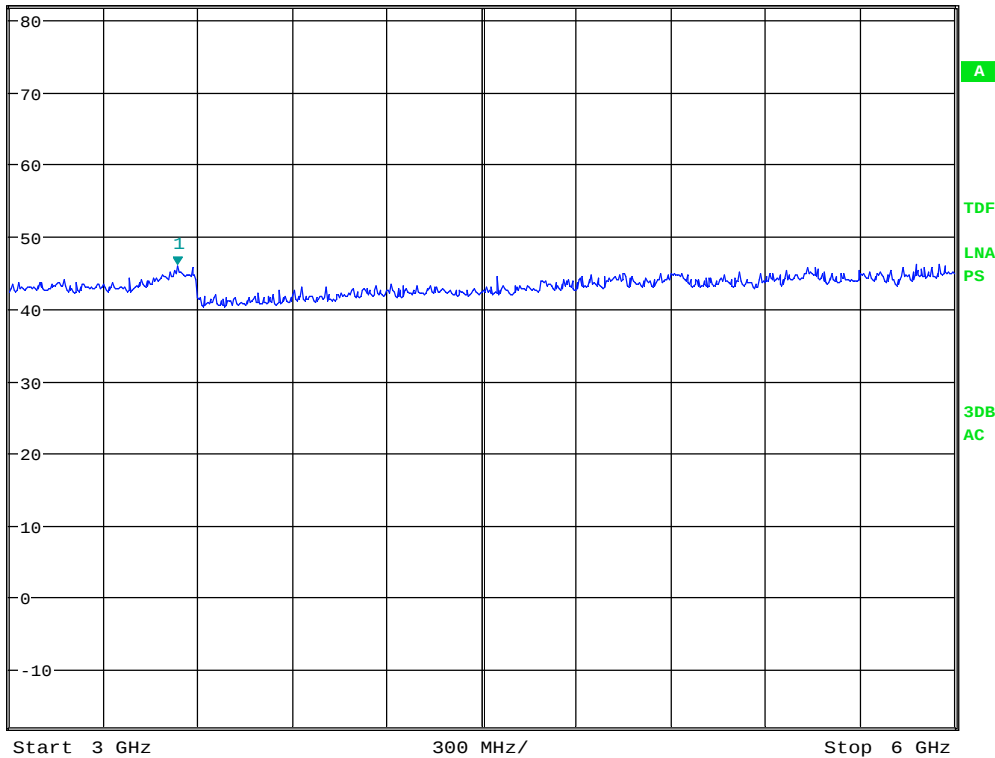
SWT 20 ms

Marker 1 [T1]

45.91 dBμV/m

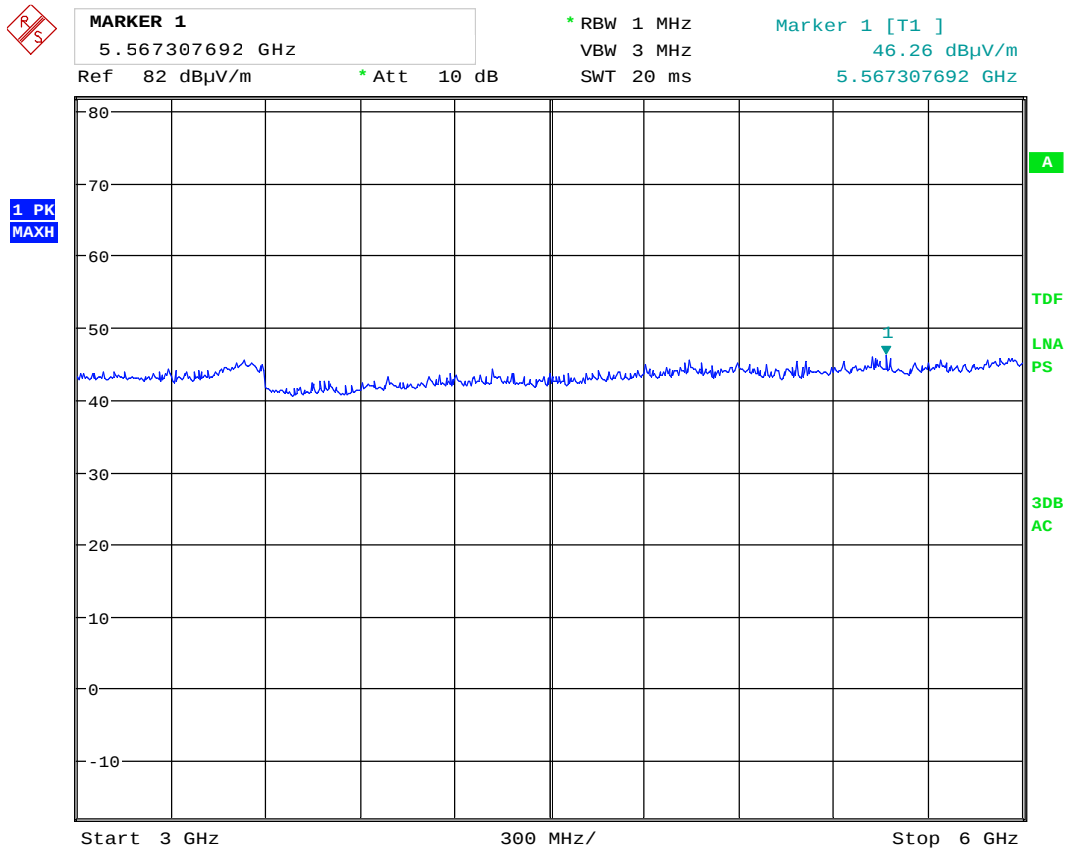
3.533653846 GHz

1 PK
MAXH



Date: 3.MAR.2016 08:16:53

Radiated Emissions, 3 - 6GHz, 2462MHz, VP, 802.11n, 65Mbps



Date: 3.MAR.2016 08:14:06

Radiated Emissions, 3 - 6GHz, 2462MHz, HP, 802.11n, 65Mbps



MARKER 1

7.618589744 GHz

Ref 72.5 dBμV/m * Att 10 dB

* RBW 1 MHz

VBW 3 MHz

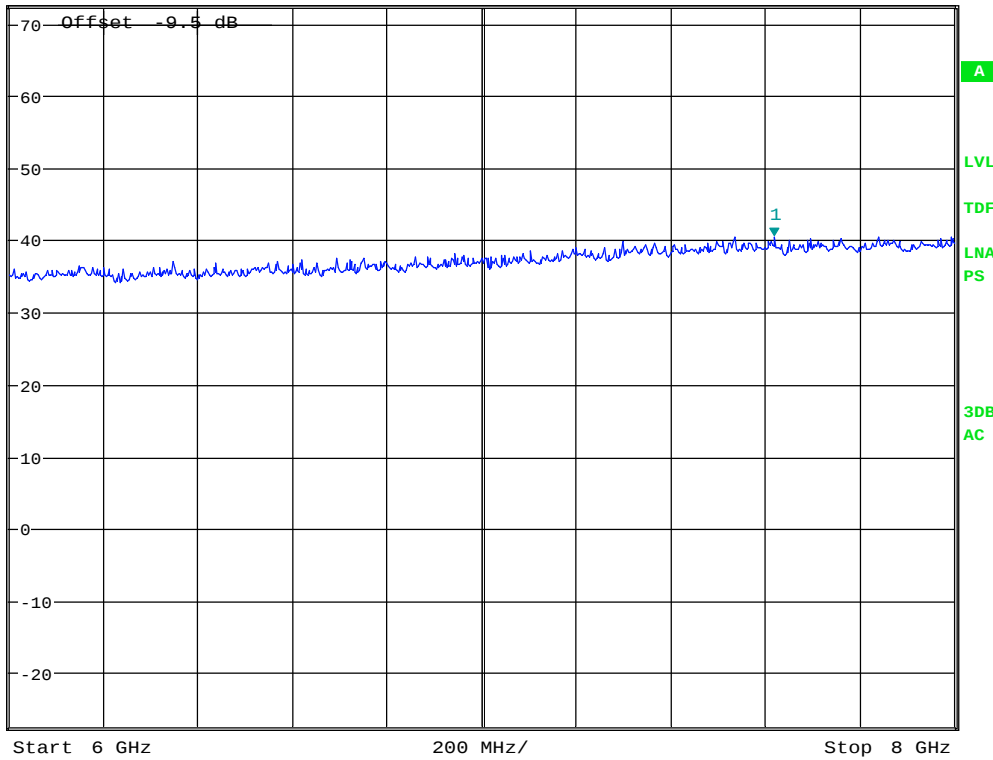
SWT 20 ms

Marker 1 [T1]

40.48 dBμV/m

7.618589744 GHz

1 PK
MAXH



Date: 3.MAR.2016 13:01:13

Radiated Emissions, 6 - 8GHz, VP, 802.11b,g,n @1m



MARKER 1

7.842948718 GHz

Ref 72.5 dBμV/m * Att 10 dB

* RBW 1 MHz

VBW 3 MHz

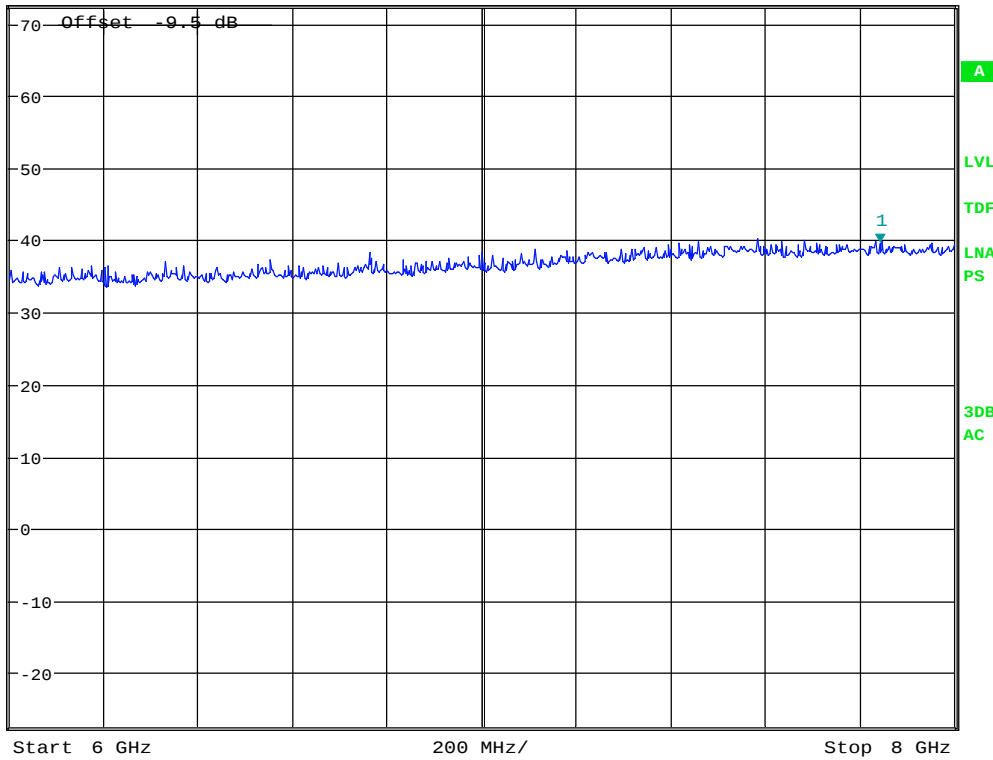
SWT 20 ms

Marker 1 [T1]

39.60 dBμV/m

7.842948718 GHz

1 PK
MAXH

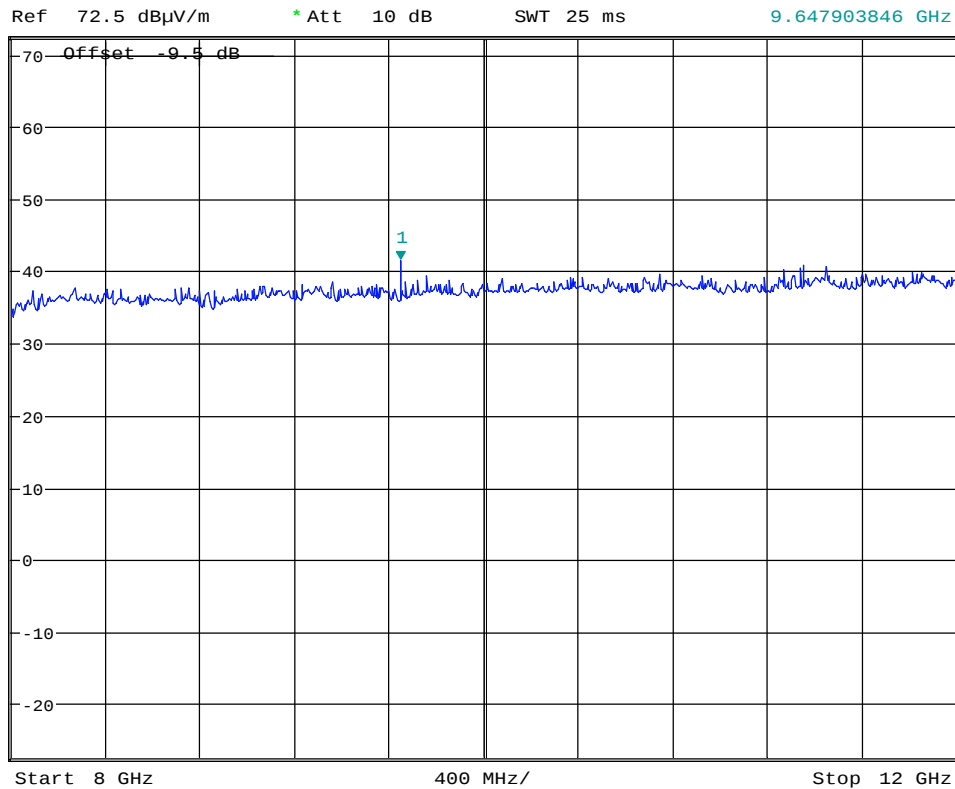


Date: 3.MAR.2016 13:02:33

Radiated Emissions, 6 - 8GHz, HP, 802.11b,g,n @1m



* RBW 1 MHz
VBW 3 MHz
SWT 25 ms
Marker 1 [T1]
41.49 dBμV/m
9.647903846 GHz



Date: 3.MAR.2016 13:56:45

Radiated Emissions, 8 - 12GHz, VP, 802.11g, 9Mbps @1m



MARKER 1

9.647435897 GHz

Ref 72.5 dBμV/m * Att 10 dB

* RBW 1 MHz

VBW 3 MHz

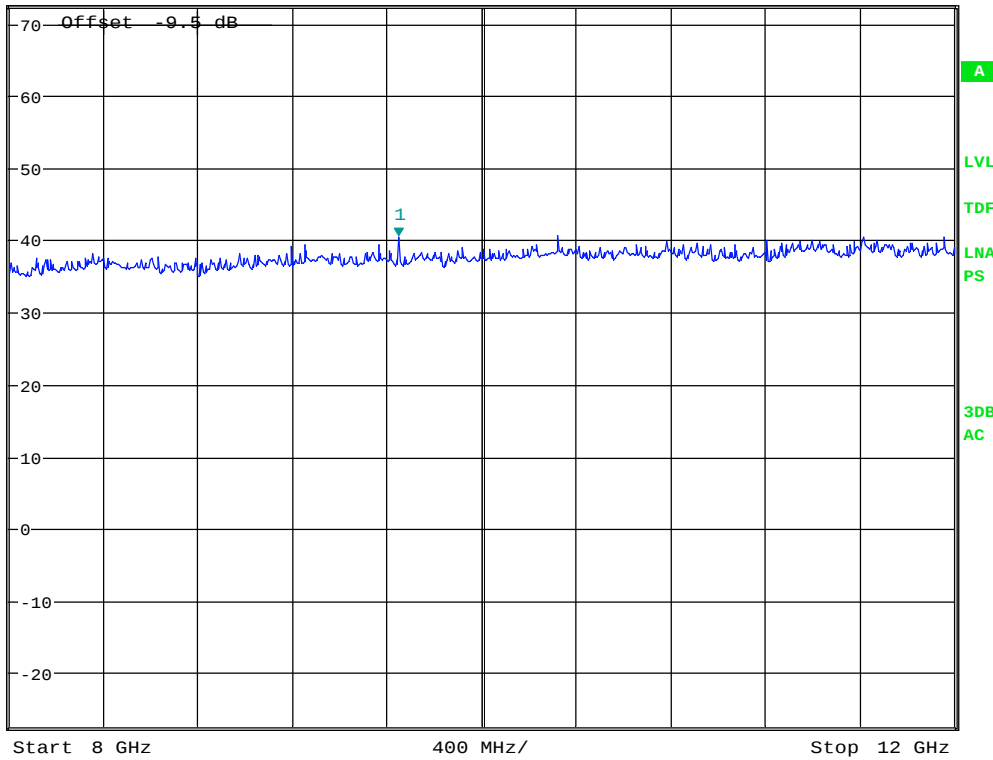
SWT 25 ms

Marker 1 [T1]

40.39 dBμV/m

9.647435897 GHz

1 PK
MAXH



Date: 3.MAR.2016 13:57:12

Radiated Emissions, 8 - 12GHz, HP, 802.11g, 9Mbps @1m

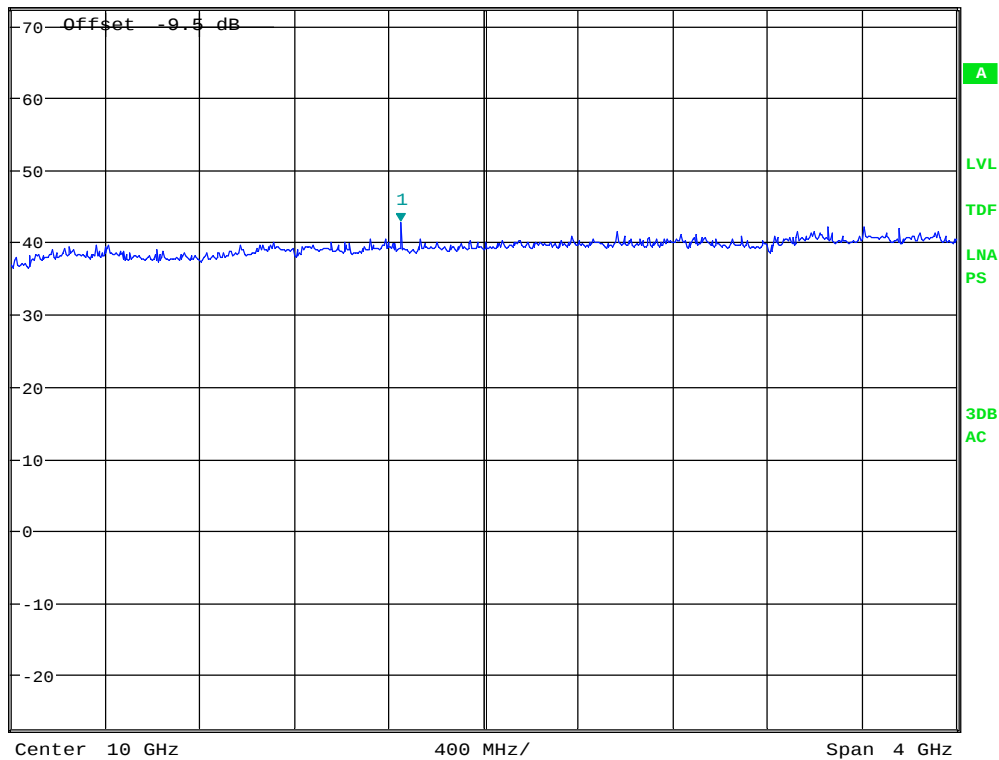


MARKER 1
9.647435897 GHz
Ref 87 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 25 ms

Marker 1 [T1]
42.81 dBμV/m
9.647435897 GHz

1 PK
MAXH

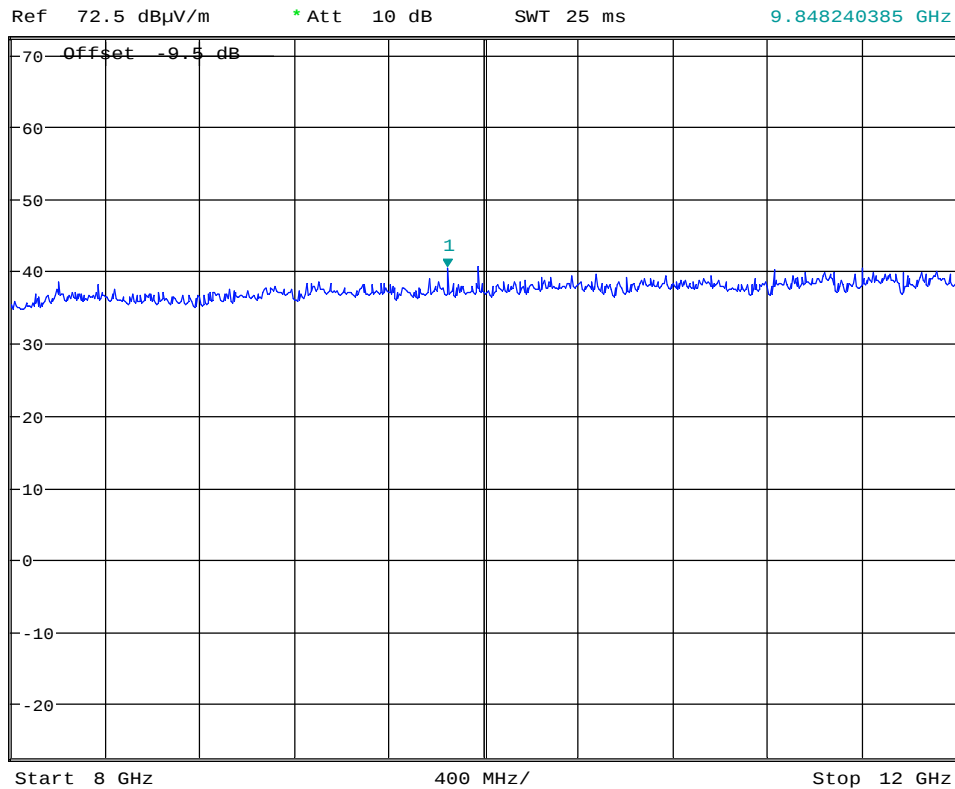


Date: 3.MAR.2016 13:41:28

Radiated Emissions, 8 - 12GHz, VP, 802.11n, 65Mbps @1m



* RBW 1 MHz
VBW 3 MHz
SWT 25 ms
Marker 1 [T1]
40.39 dBμV/m
9.848240385 GHz



Date: 3.MAR.2016 13:50:28

Radiated Emissions, 8 - 12GHz, HP, 802.11n, 65Mbps @1m



MARKER 1

17.94230769 GHz

Ref 72.5 dBμV/m * Att 10 dB

* RBW 1 MHz

VBW 3 MHz

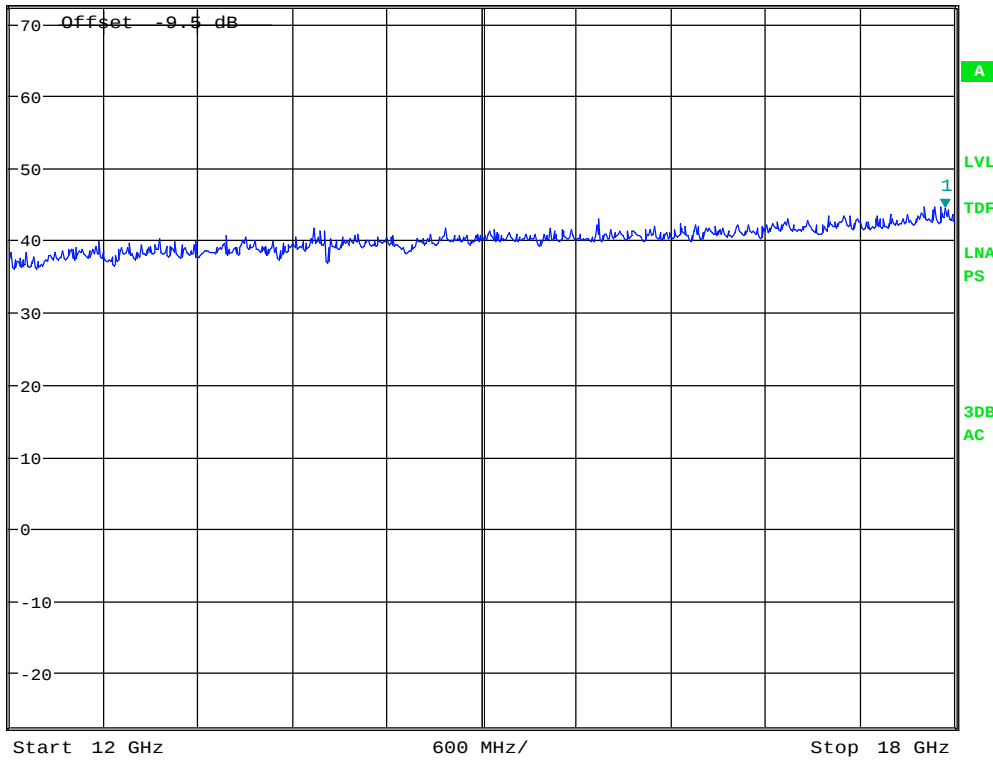
SWT 35 ms

Marker 1 [T1]

44.36 dBμV/m

17.942307692 GHz

1 PK
MAXH



Date: 3.MAR.2016 14:07:44

Radiated Emissions, 12 - 18GHz, VP, 802.11b,g,n

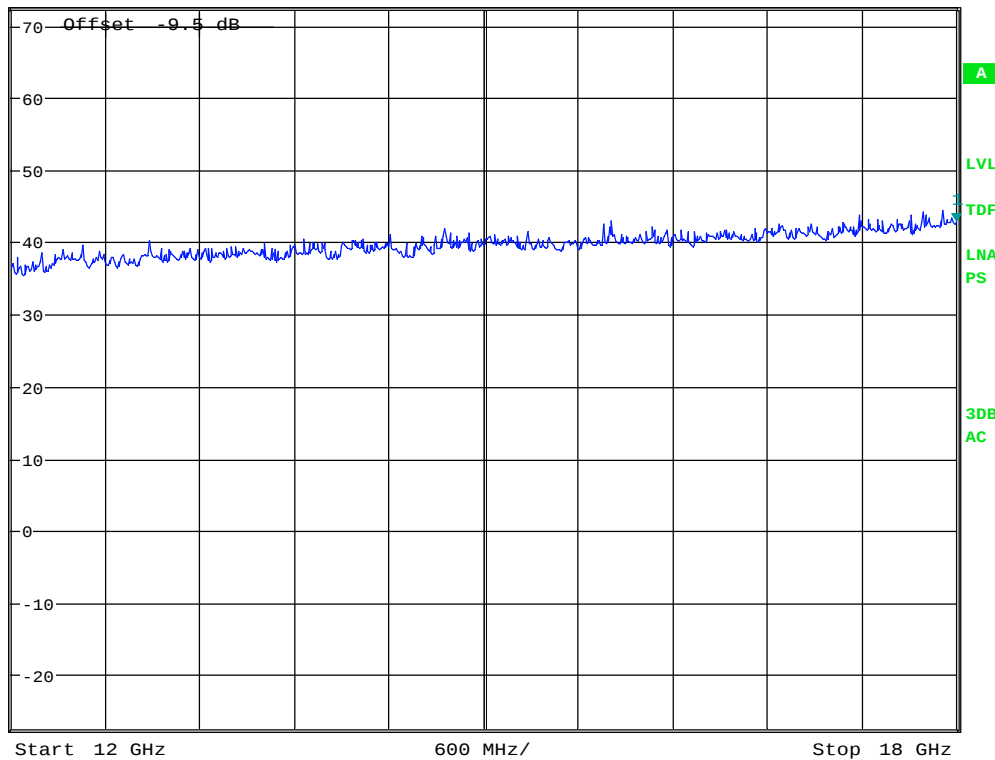


MARKER 1
18 GHz
Ref 72.5 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 35 ms

Marker 1 [T1]
42.69 dBμV/m
18.000000000 GHz

1 PK
MAXH



Date: 3.MAR.2016 14:08:12

Radiated Emissions, 12 - 18GHz, HP, 802.11b,g,n

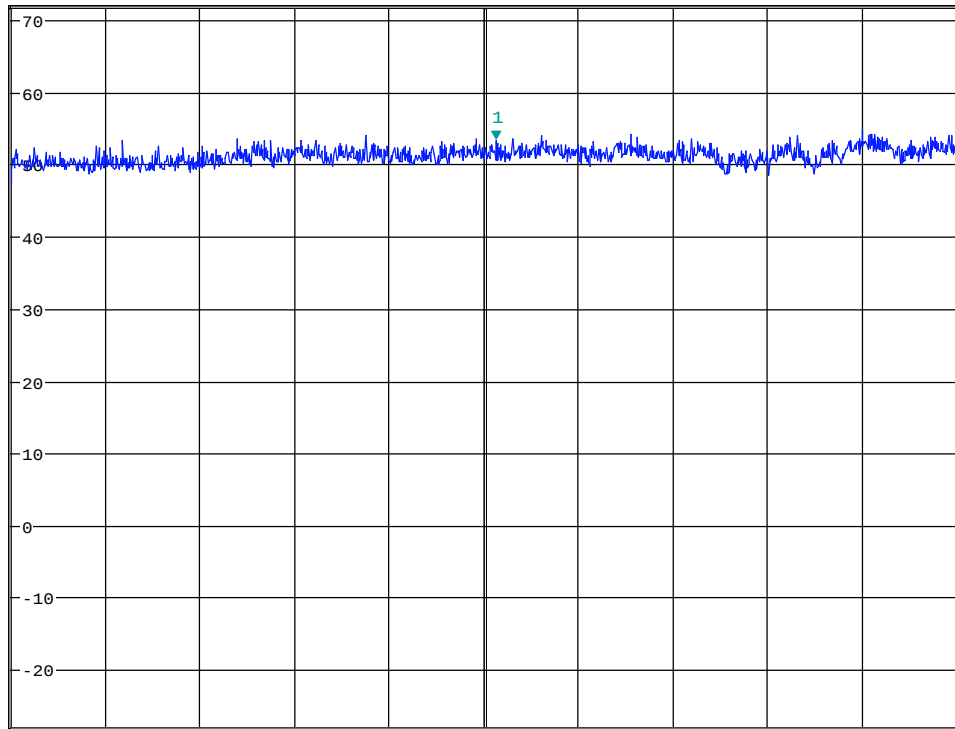


* RBW 1 MHz
VBW 3 MHz
SWT 45 ms
Marker 1 [T1]
53.48 dB μ V/m
21.591875000 GHz

Ref 72 dB μ V/m

* Att 0 dB

1 PK
MAXH



Start 18 GHz

700 MHz/

Stop 25 GHz

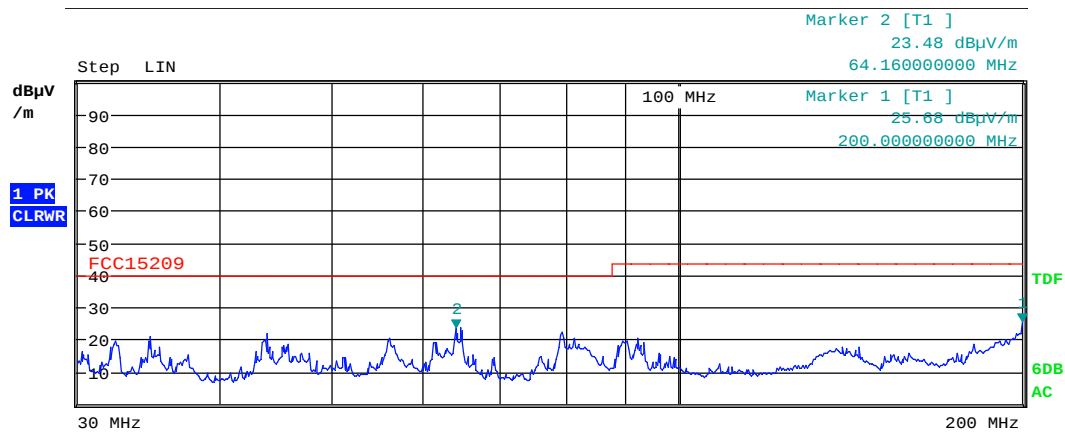
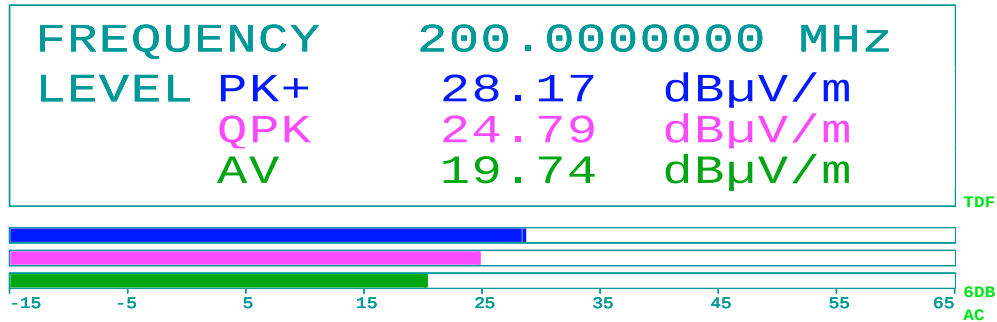
Date: 10.MAR.2016 12:12:11

Radiated Emissions, 18 - 25GHz, VP/HP, 802.11b,g,n prescan

RADIATED EMISSIONS WITH RADIO'S ACTIVE



Att 10 dB AUTO RBW 120 kHz
MT 1 s
PREAMP ON

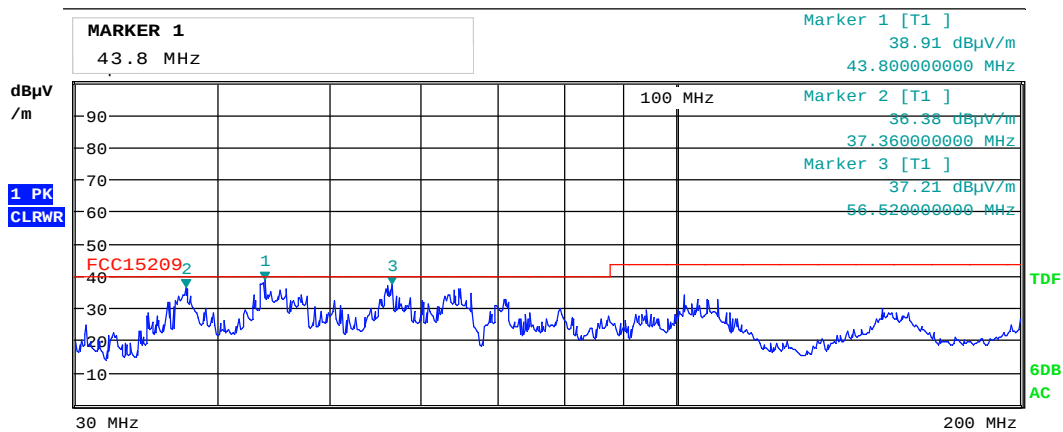
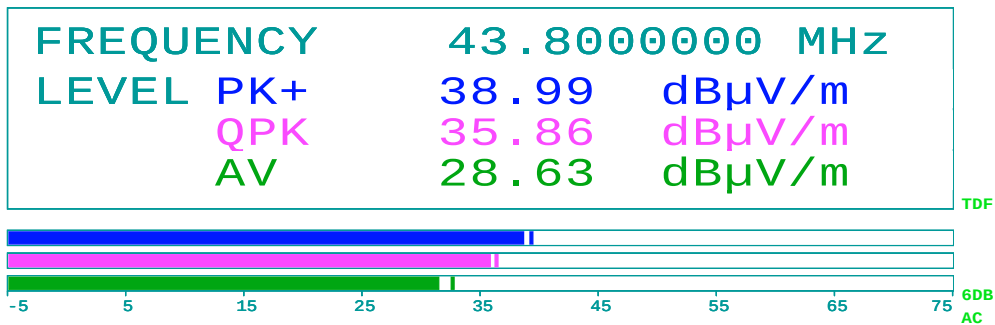


Date: 3.AUG.2016 14:08:19

Radiated emissions HP, 30 – 200MHz



RBW 120 kHz
MT 100 ms
Att 20 dB AUTO
PREAMP ON



Date: 3.AUG.2016 13:53:43

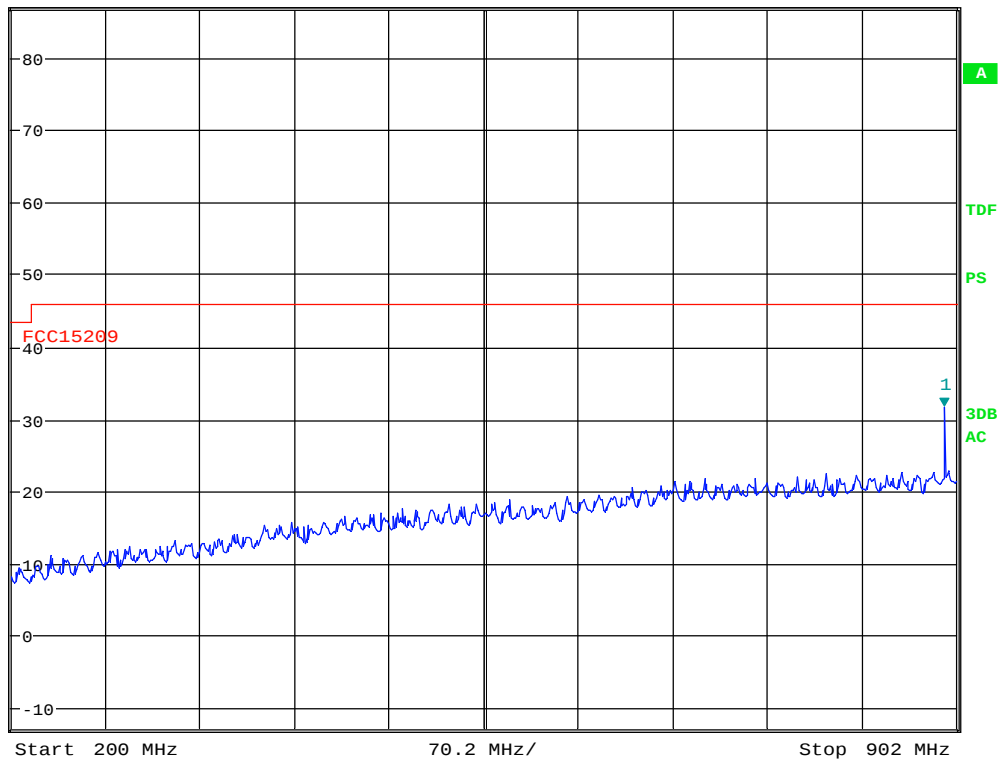
Radiated emissions VP, 30 – 200MHz



MARKER 1
893 MHz
Ref 87 dB μ V/m * Att 10 dB

* RBW 100 kHz Marker 1 [T1]
VBW 300 kHz 31.69 dB μ V/m
SWT 75 ms 893.000000000 MHz

1 PK
MAXH



Date: 3.AUG.2016 19:46:45

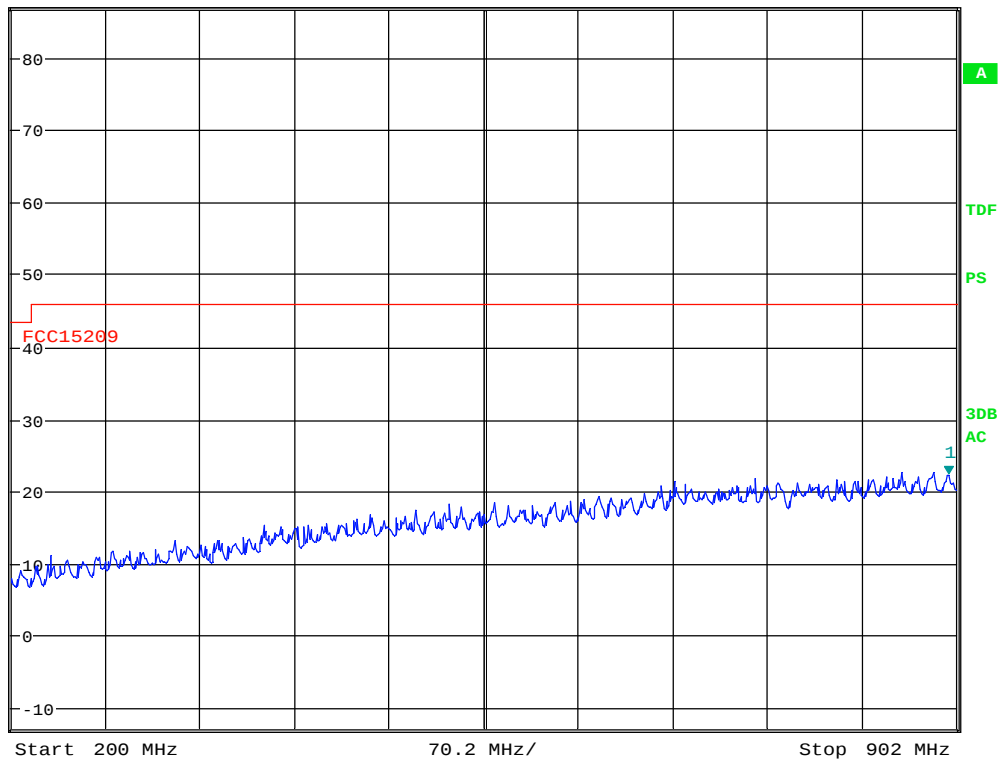
Radiated emissions HP,200 - 902MHz



MARKER 1
896.375 MHz
Ref 87 dBμV/m * Att 10 dB

* RBW 100 kHz Marker 1 [T1]
VBW 300 kHz 22.12 dBμV/m
SWT 75 ms 896.375000000 MHz

1 PK
MAXH



Date: 3.AUG.2016 19:46:12

Radiated emissions VP, 200 - 902MHz



* RBW 100 kHz Marker 1 [T1]
VBW 300 kHz 37.40 dBμV/m
SWT 10 ms 1.000000000 GHz

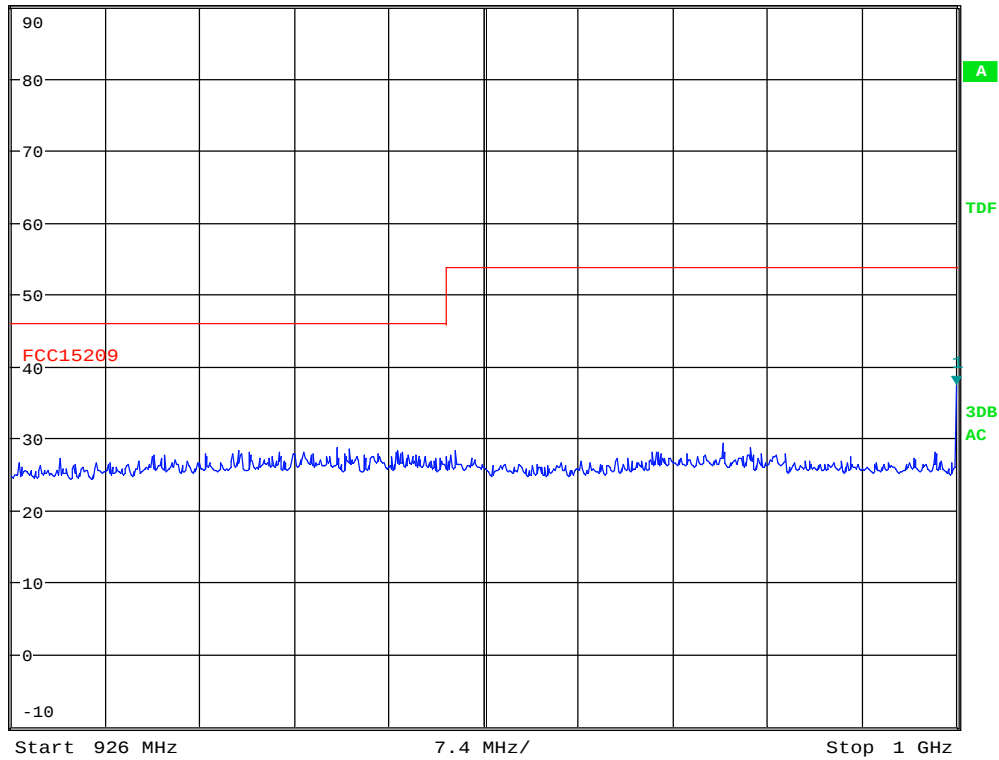
Ref 90 dBμV/m

* Att 15 dB

SWT 10 ms

1.000000000 GHz

1 PK
MAXH



Date: 3.AUG.2016 16:25:11

Radiated emissions HP, 926 - 1000MHz



* RBW 100 kHz Marker 1 [T1]
VBW 300 kHz 40.12 dBμV/m
SWT 10 ms 1.000000000 GHz

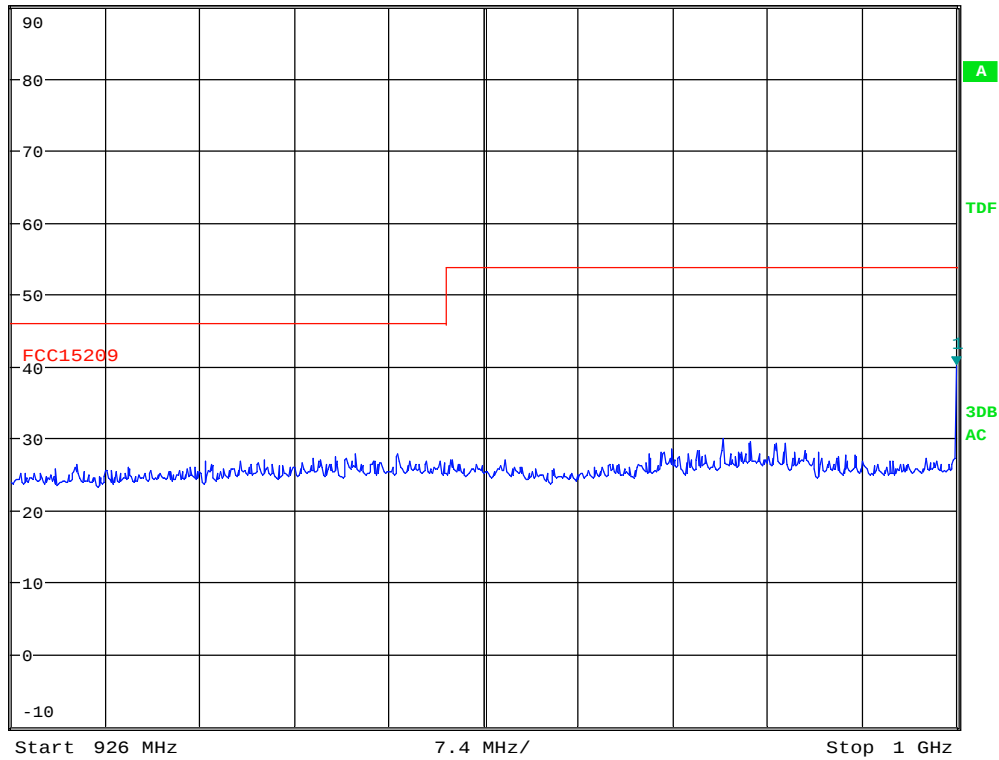
Ref 90 dBμV/m

* Att 15 dB

SWT 10 ms

1.000000000 GHz

1 PK
MAXH



Date: 3.AUG.2016 16:27:22

Radiated emissions VP, 926 - 1000MHz



MARKER 2

2.39775641 GHz

Ref 100 dBμV/m

* Att 15 dB

* RBW 1 MHz

VBW 3 MHz

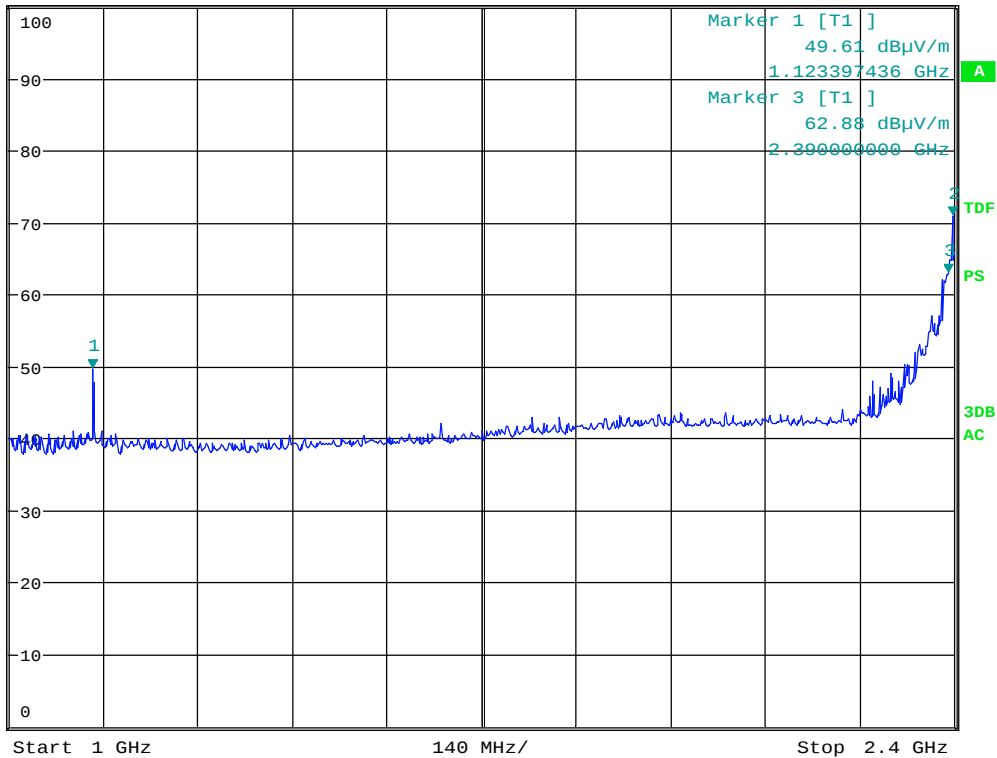
SWT 5 ms

Marker 2 [T1]

70.85 dBμV/m

2.397756410 GHz

1 PK
MAXH



Date: 3.AUG.2016 17:42:46

Radiated emissions HP, 1 - 2.4GHz, PK scan

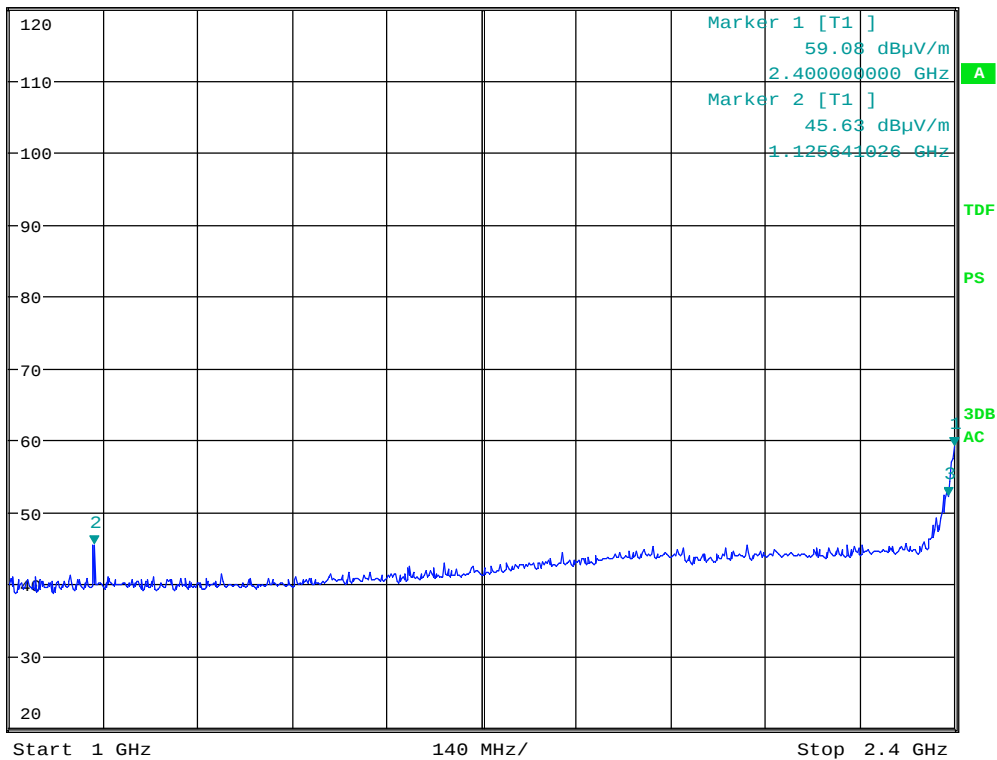


MARKER 3
2.39 GHz
Ref 120 dB μ V/m * Att 15 dB

* RBW 1 MHz
VBW 3 MHz
SWT 5 ms

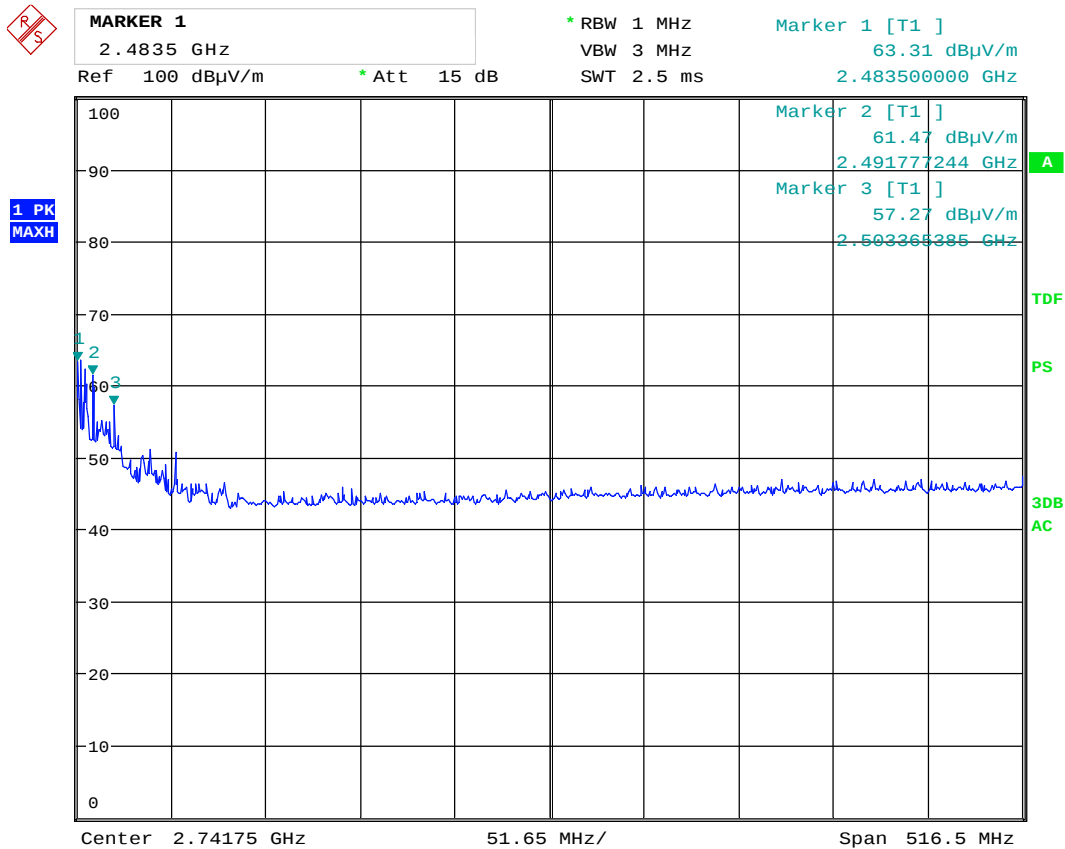
Marker 3 [T1]
52.27 dB μ V/m
2.390000000 GHz

1 PK
MAXH



Date: 3.AUG.2016 17:26:13

Radiated emissions VP, 1 - 2.4GHz, PK scan



Date: 3.AUG.2016 17:47:40

Radiated emissions HP, 2.4835 - 3GHz, PK scan

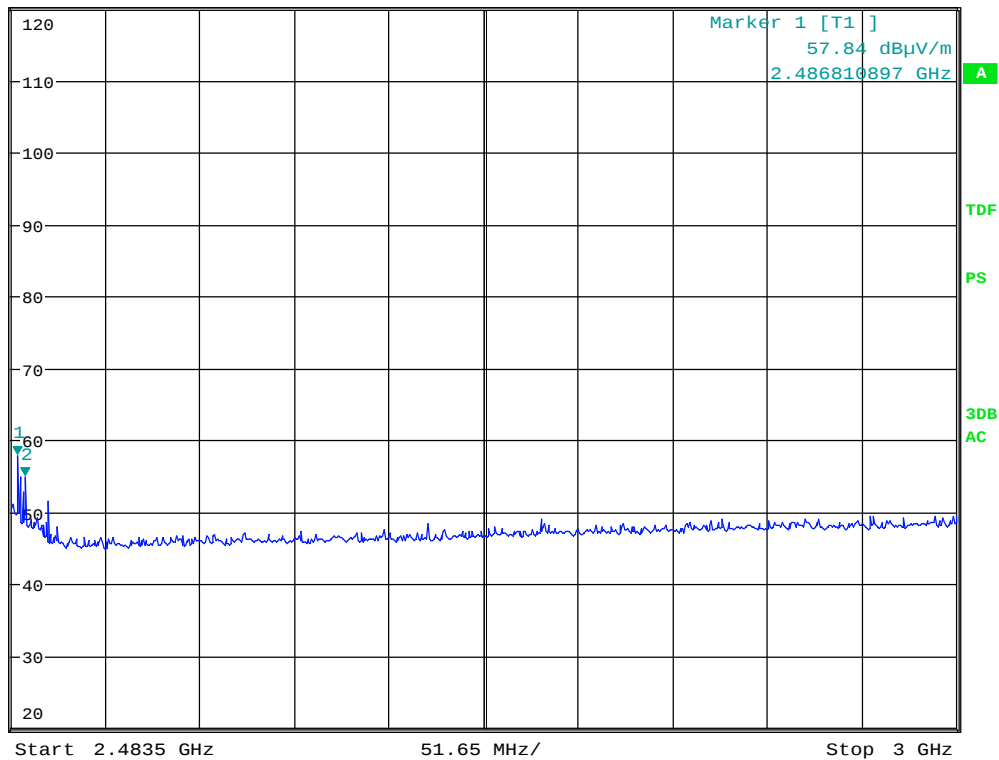


MARKER 2
2.490949519 GHz
Ref 120 dBμV/m * Att 15 dB

* RBW 1 MHz
VBW 3 MHz
SWT 2.5 ms

Marker 2 [T1]
54.96 dBμV/m
2.490949519 GHz

1 PK
MAXH



Date: 3.AUG.2016 17:28:11

Radiated emissions VP, 2.4835 - 3GHz, PK scan

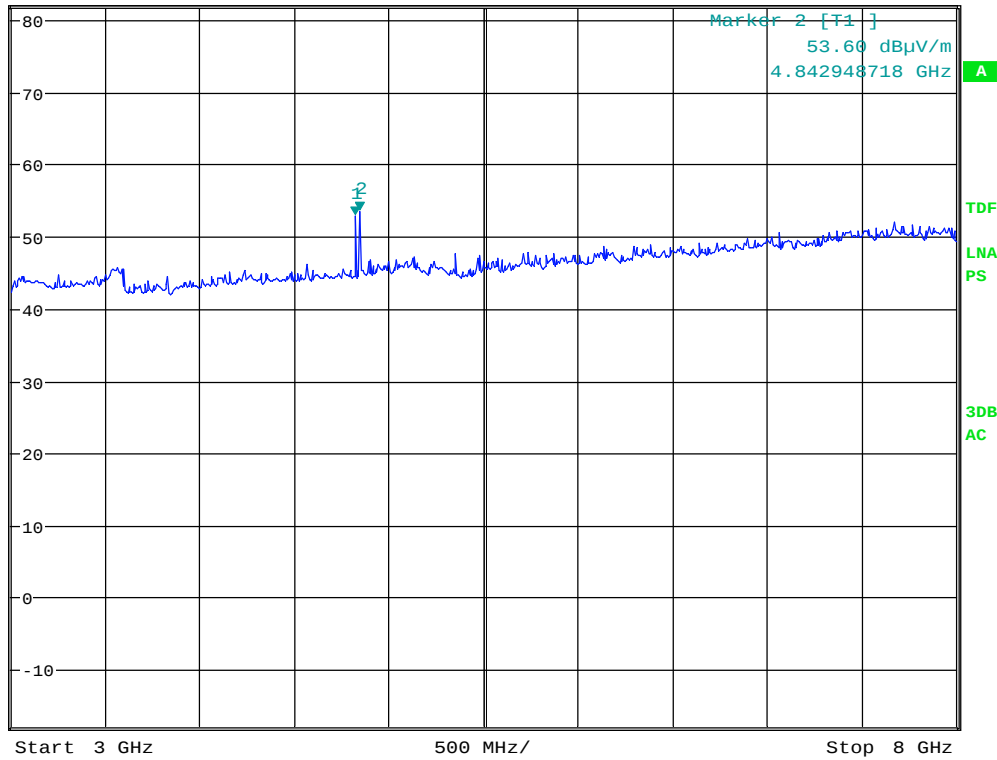


MARKER 1
4.818910256 GHz
Ref 82 dB μ V/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 30 ms

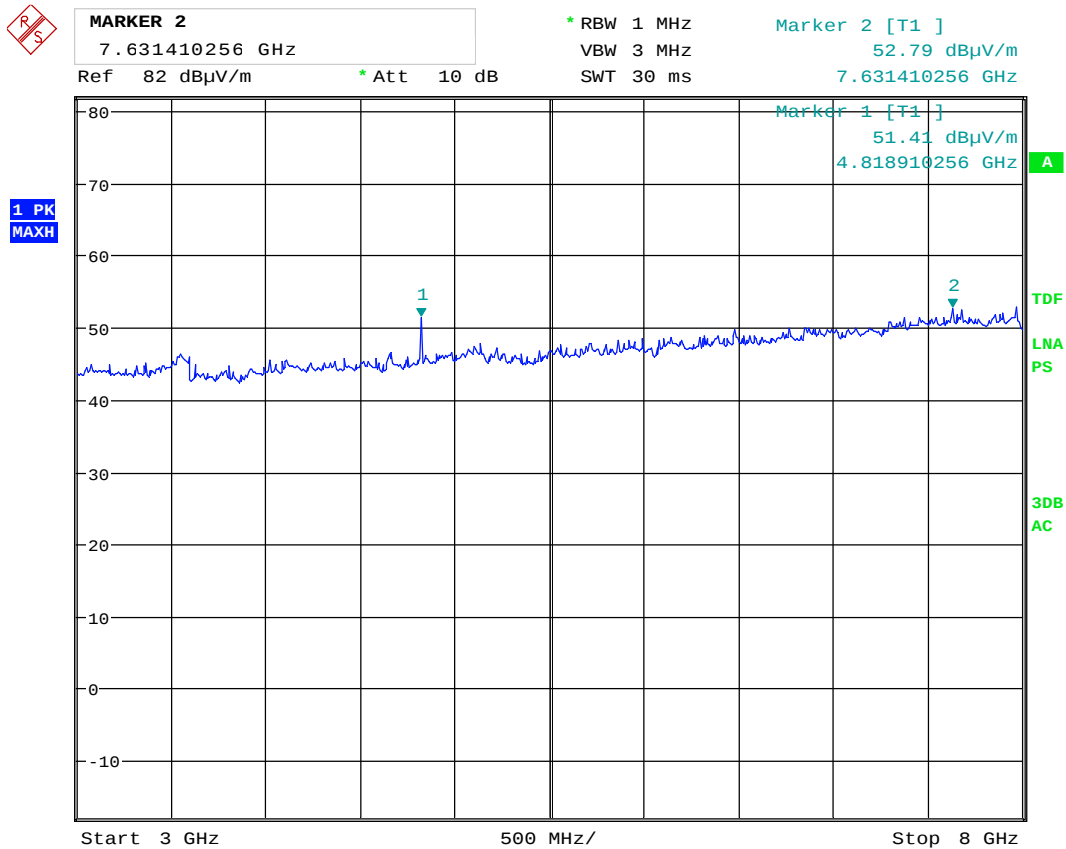
Marker 1 [T1]
52.94 dB μ V/m
4.818910256 GHz

1 PK
MAXH



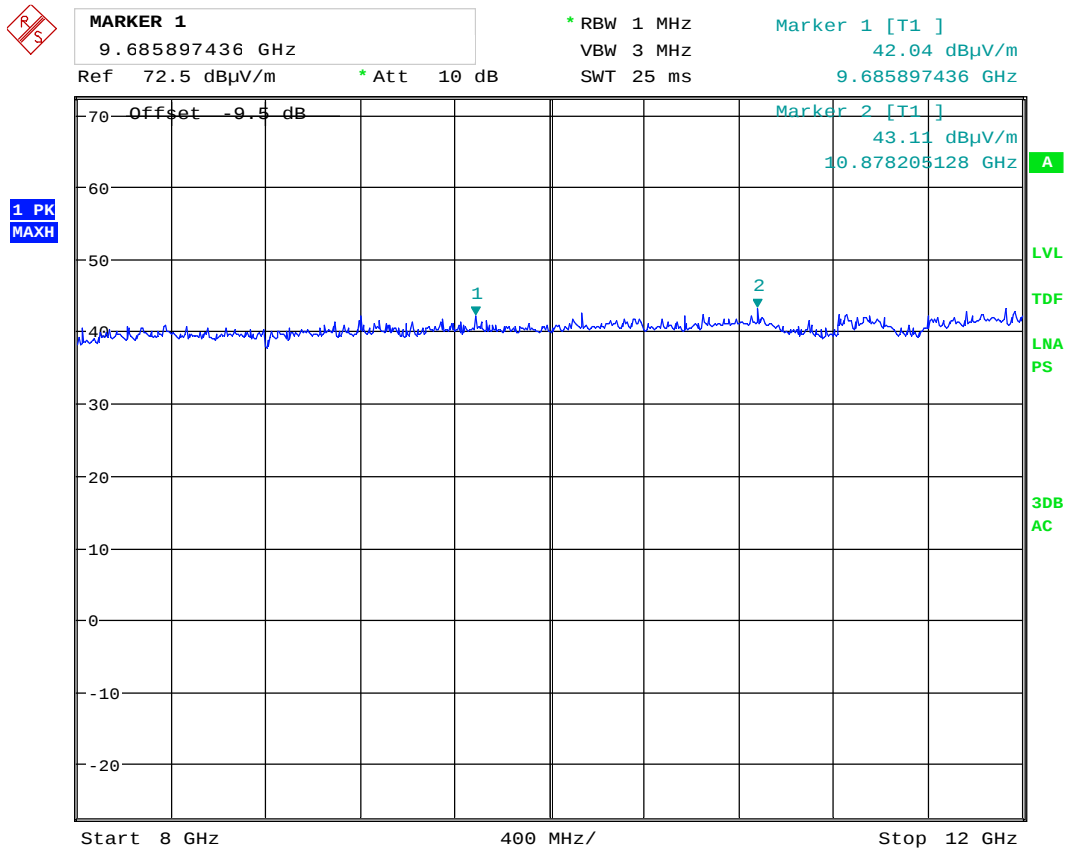
Date: 3.AUG.2016 17:37:19

Radiated emissions HP, 3 - 8GHz, PK scan



Date: 3.AUG.2016 17:35:58

Radiated emissions VP, 3 - 8GHz, PK scan



Date: 3.AUG.2016 17:58:20

Radiated emissions HP, 8 - 12GHz, PK scan at 1 m distance (distance correction is included in the plot)

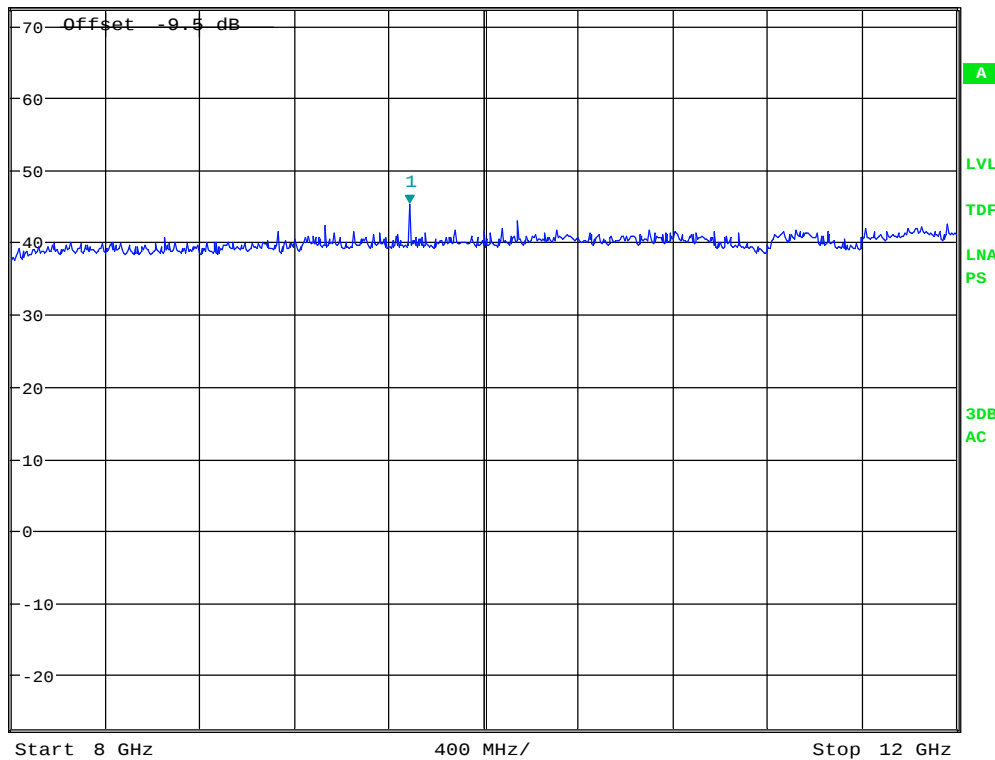


MARKER 1
9.685897436 GHz
Ref 72.5 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 25 ms

Marker 1 [T1]
45.32 dBμV/m
9.685897436 GHz

1 PK
MAXH



Date: 3.AUG.2016 17:56:38

Radiated emissions VP, 8 - 12GHz, PK scan at 1 m distance (distance correction is included in the plot)

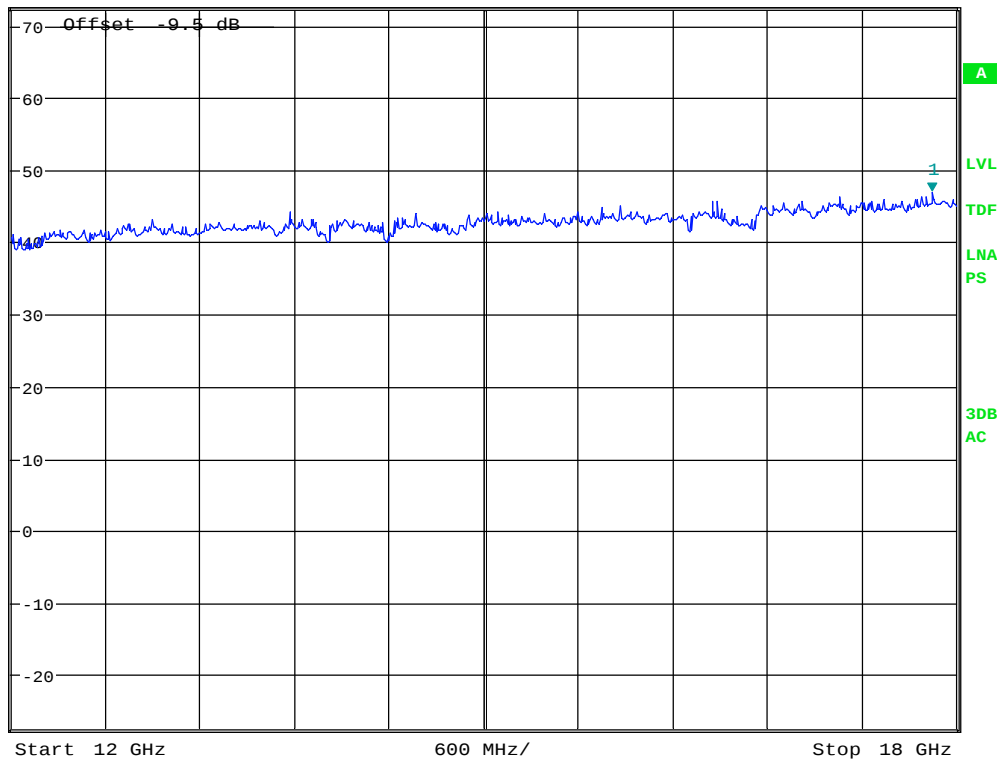


MARKER 1
17.84615385 GHz
Ref 72.5 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 35 ms

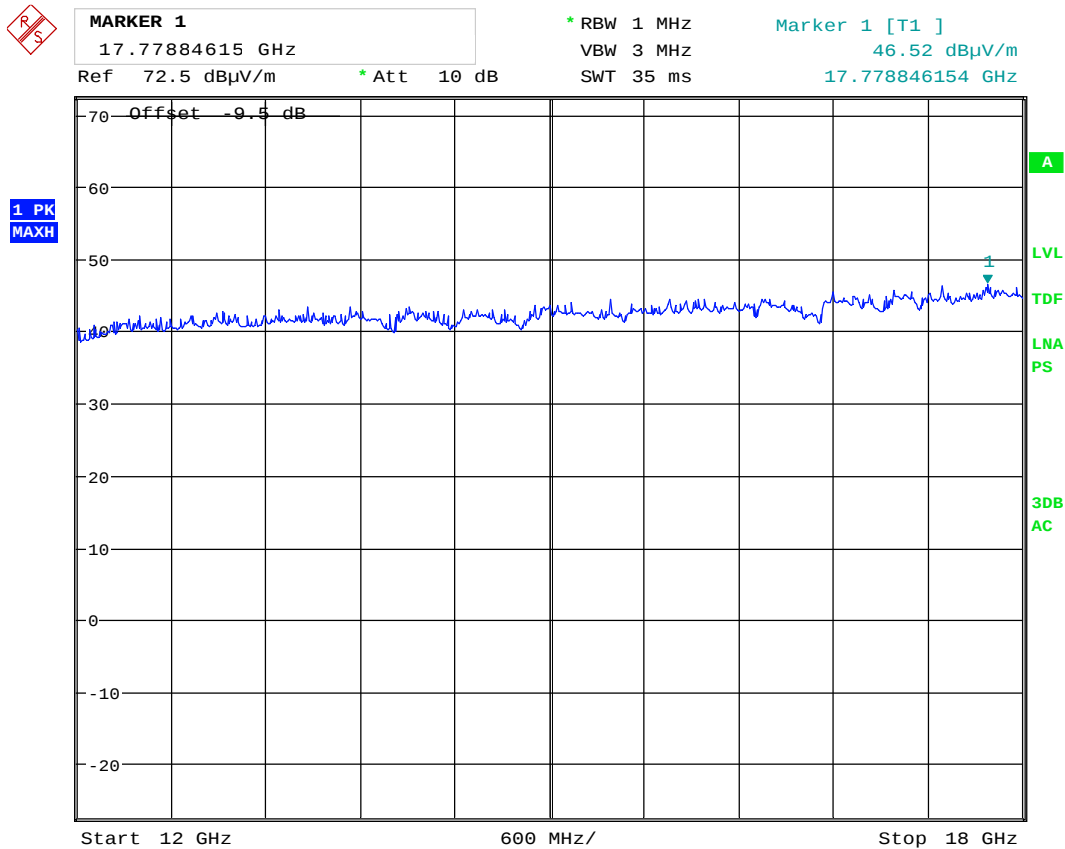
Marker 1 [T1]
46.91 dBμV/m
17.846153846 GHz

1 PK
MAXH



Date: 3.AUG.2016 18:01:41

Radiated emissions HP, 12 - 18GHz, PK scan at 1 m distance (distance correction is included in the plot)



Date: 3.AUG.2016 18:02:37

Radiated emissions VP, 12 - 18GHz, PK scan at 1 m distance (distance correction is included in the plot)

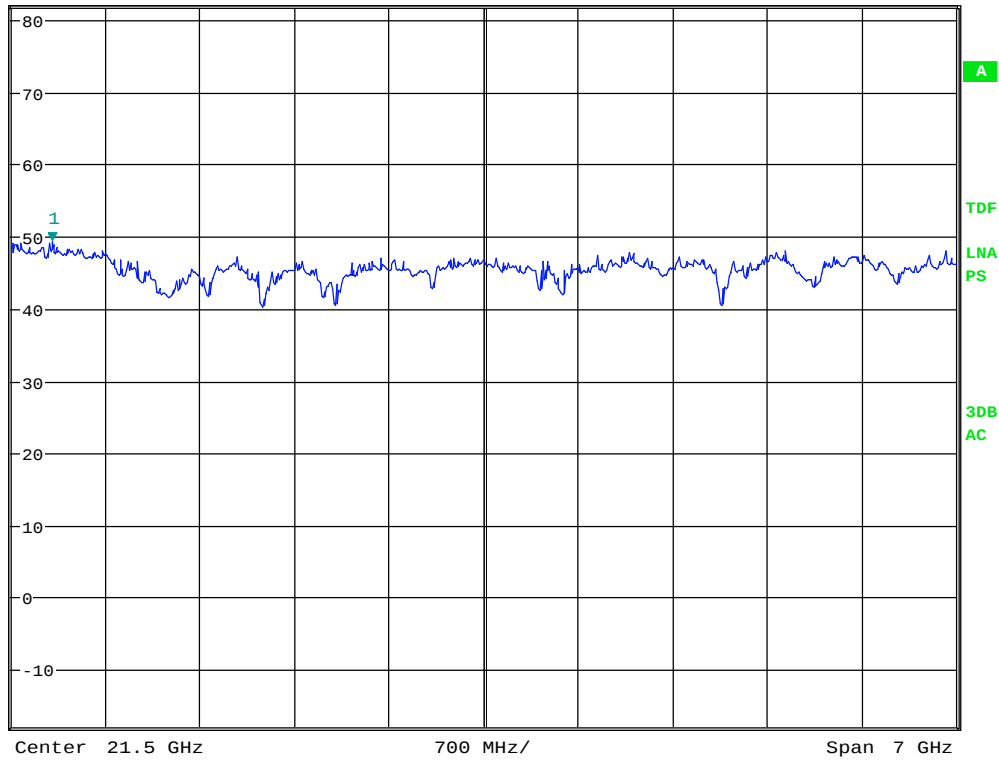


* RBW 1 MHz
VBW 3 MHz
SWT 45 ms
Marker 1 [T1]
49.35 dBμV/m
18.302884615 GHz

Ref 82 dBμV/m

* Att 10 dB

1 PK
MAXH



Date: 3.AUG.2016 18:04:27

Radiated emissions HP/VP, 8 - 12GHz, PK scan.

3.6 Power Spectral Density (PSD)

Para. No.: 15.247 (d)

Test Performed By: G.Suwanthakumar	Date of Test: 2016.02.22
------------------------------------	--------------------------

Test Results: Passed

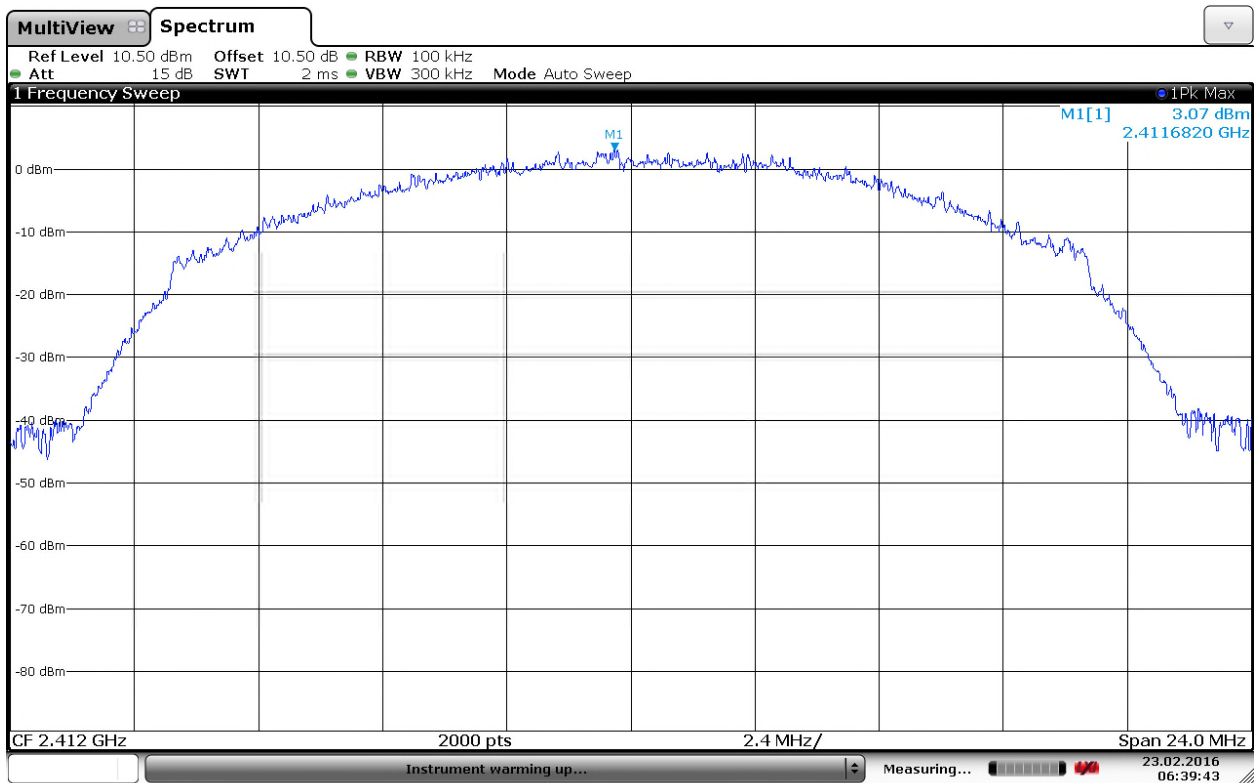
Measured and Calculated Data:

Carrier Frequency (MHz)	Power Spectral Density (dBm)		
	802.11b, 5.5 Mbps	802.11g, 9 Mbps	802.11n, 65Mbps
2412	-12.13	-20.19	-22.84
2437	-12.94	-20.17	-22.03
2462	-13.08	-19.76	-21.74

The measured values with 100kHz RBW are corrected by a Bandwidth Correction Factor of -15.2 dB.

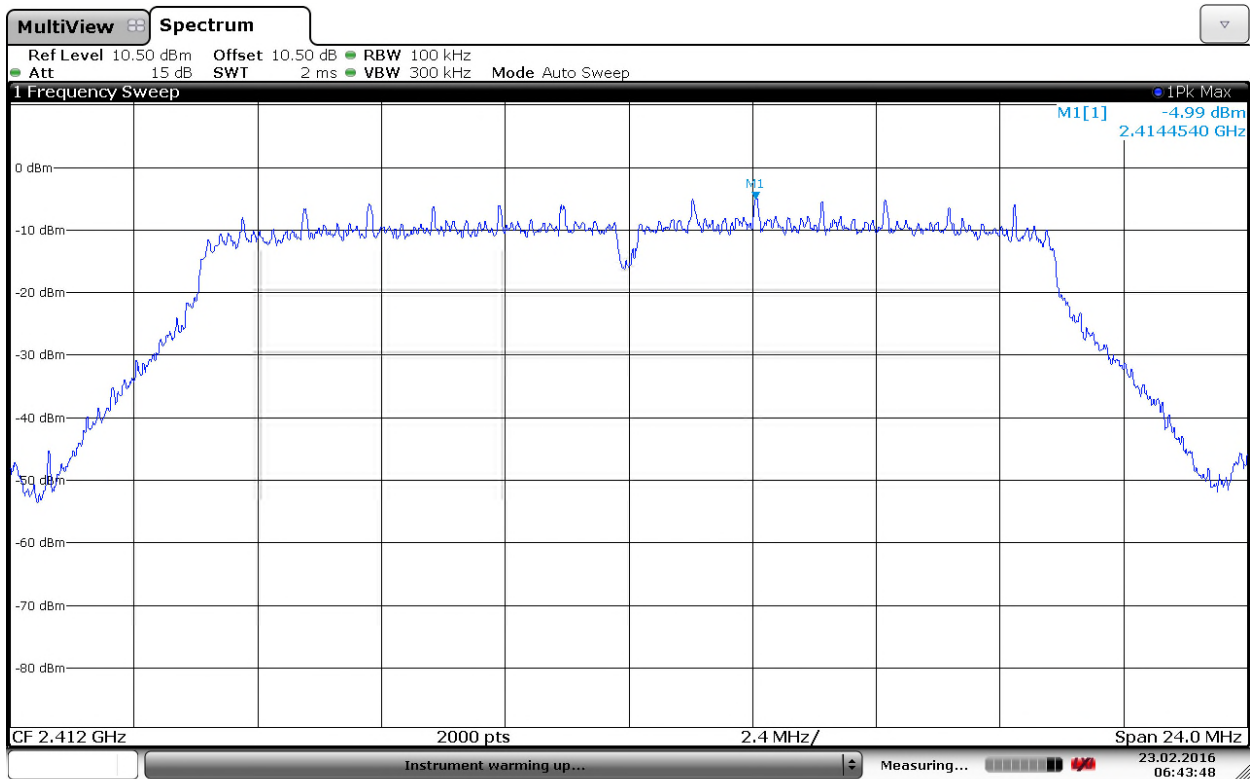
Requirements:

The Power Spectral Density of a Digital Transmission System shall be no greater than +8 dBm in any 3 kHz band



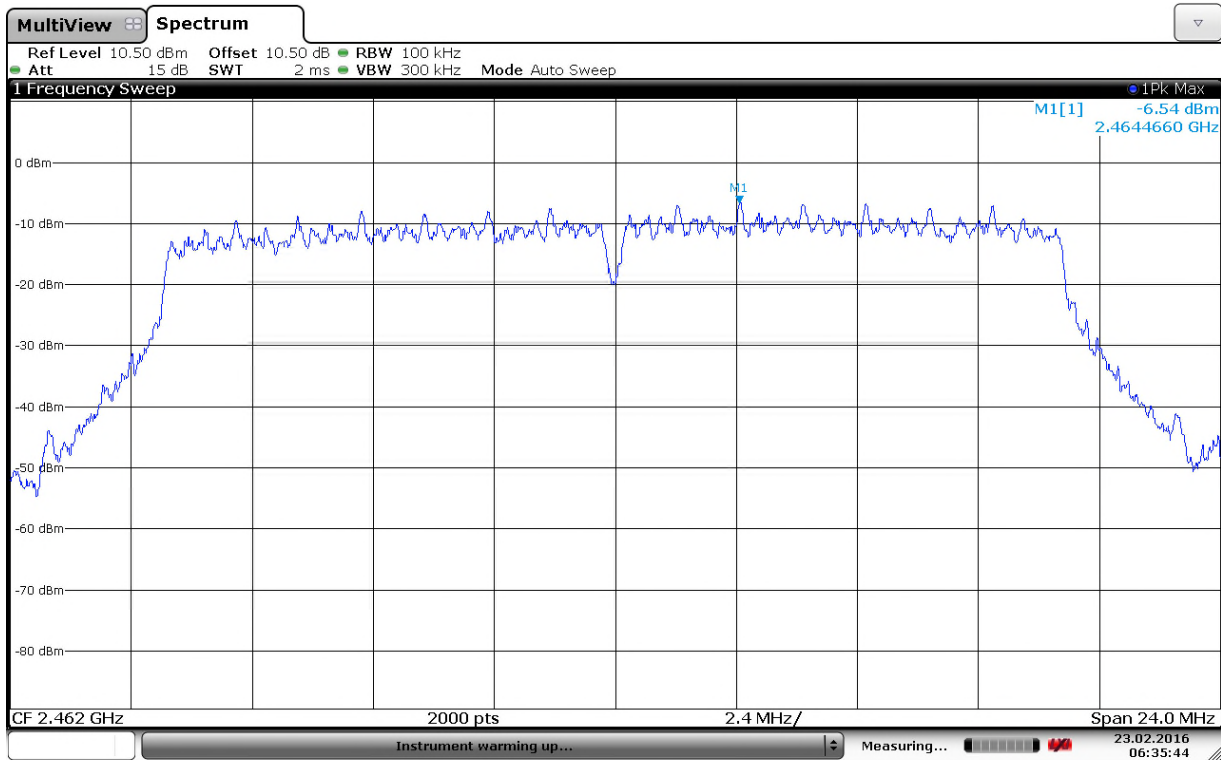
Date: 23.FEB.2016 06:39:43

PSD, 2412 MHz, 802.11b, 5.5 Mbps



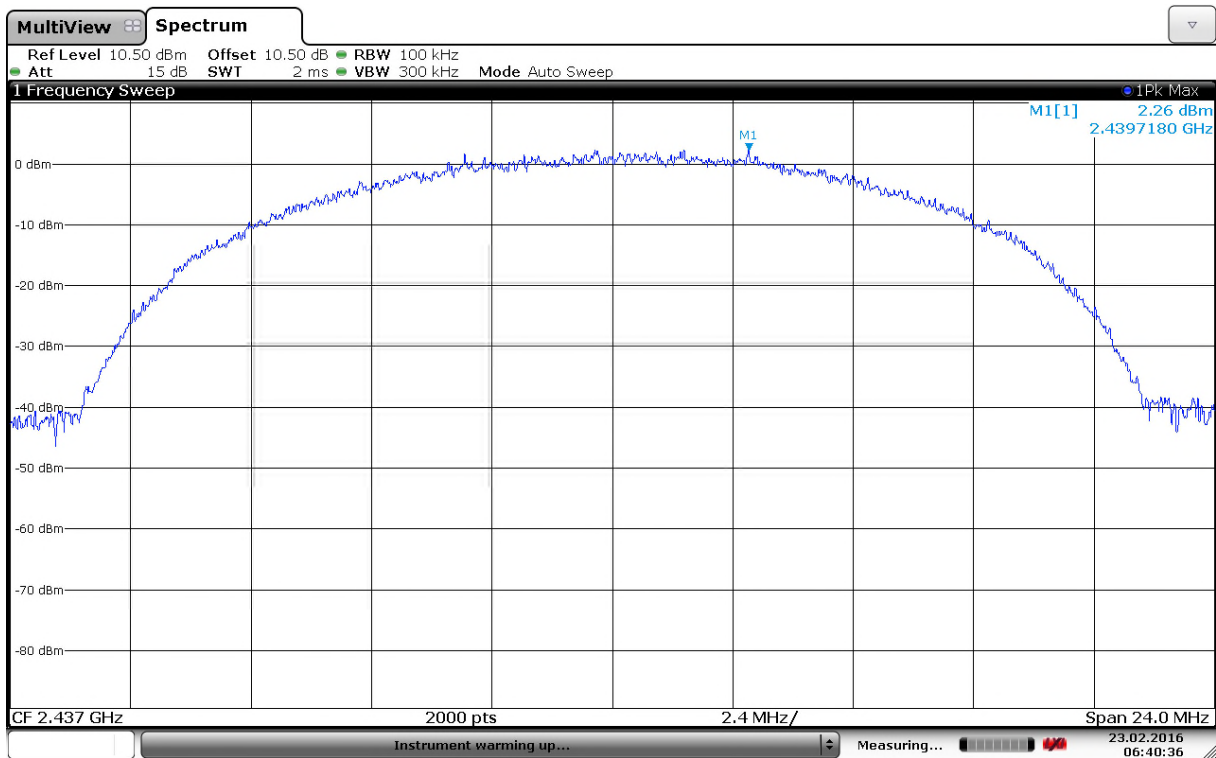
Date: 23.FEB.2016 06:43:48

PSD, 2412 MHz, 802.11g, 9 Mbps



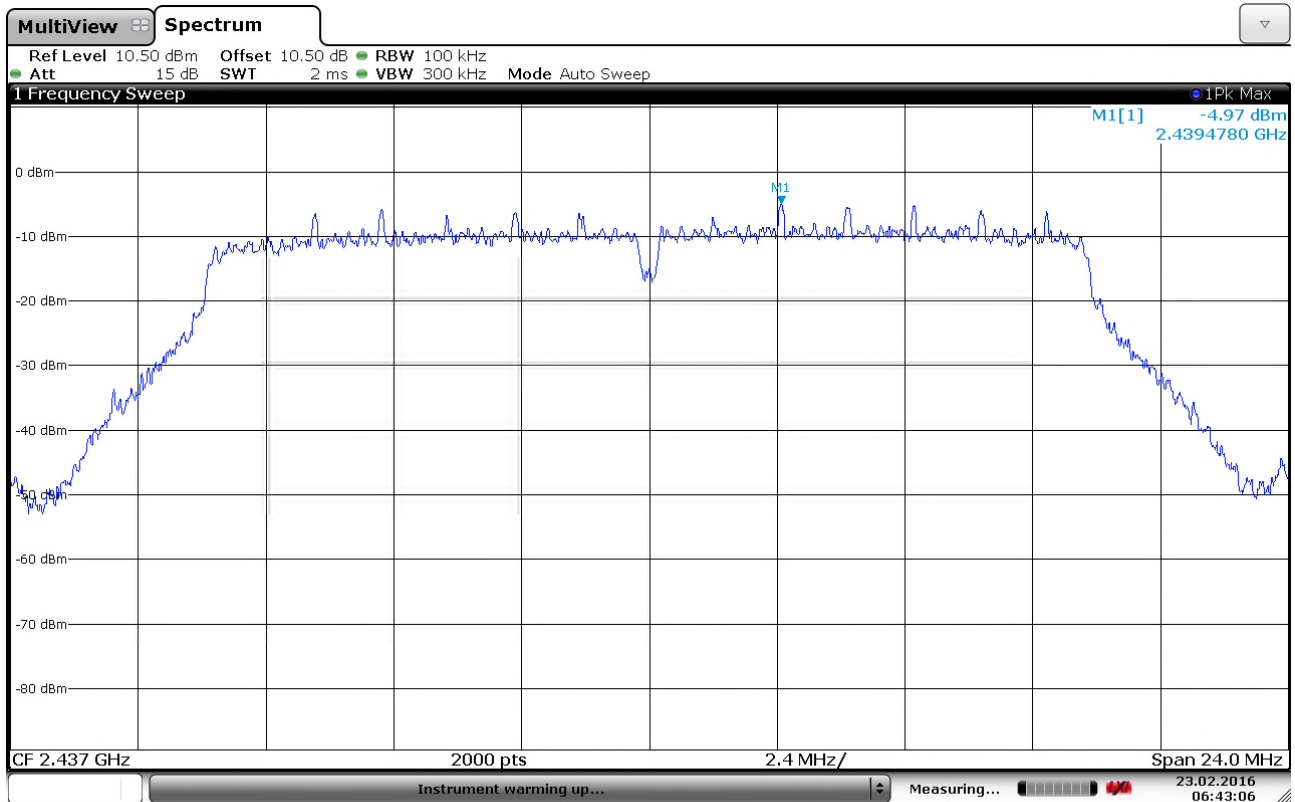
Date: 23.FEB.2016 06:35:44

PSD, 2412 MHz, 802.11n, 65Mbps



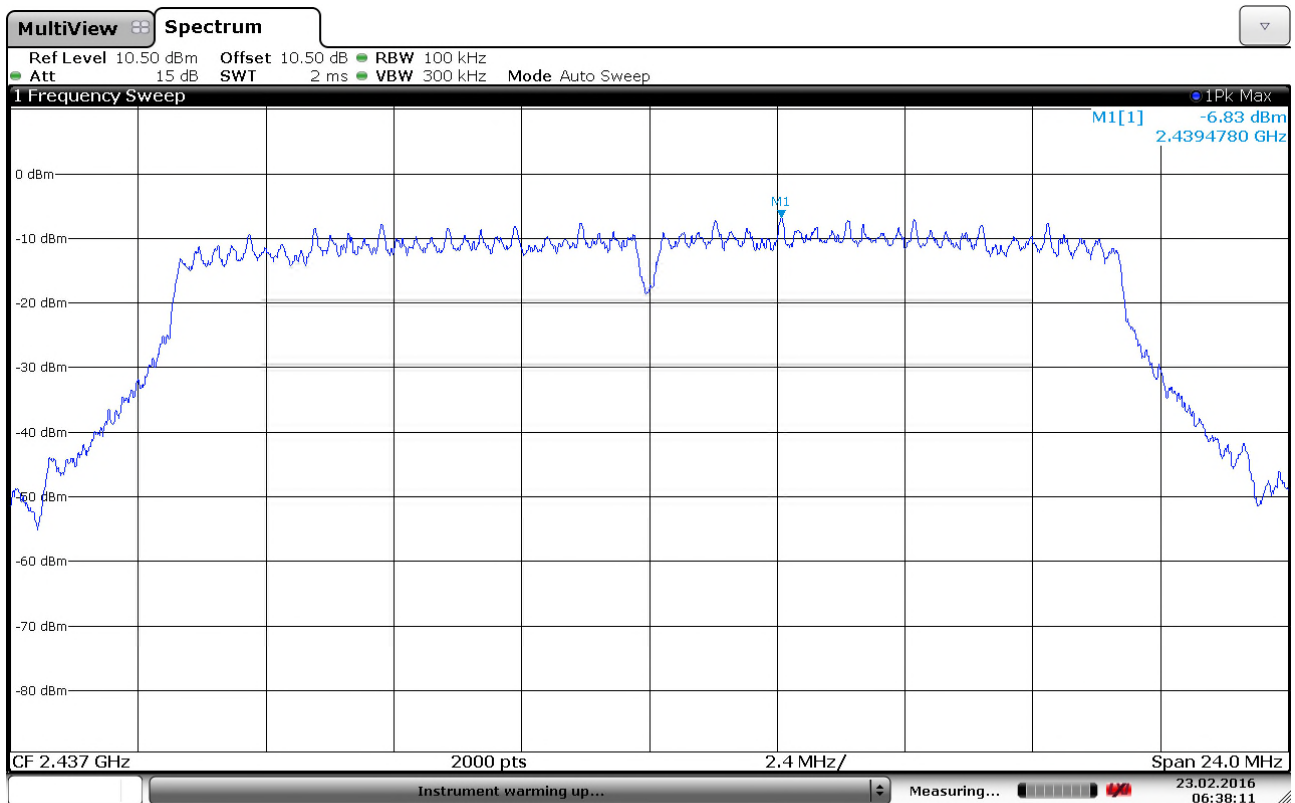
Date: 23.FEB.2016 06:40:36

PSD, 2437 MHz, 802.11b, 5.5 Mbps



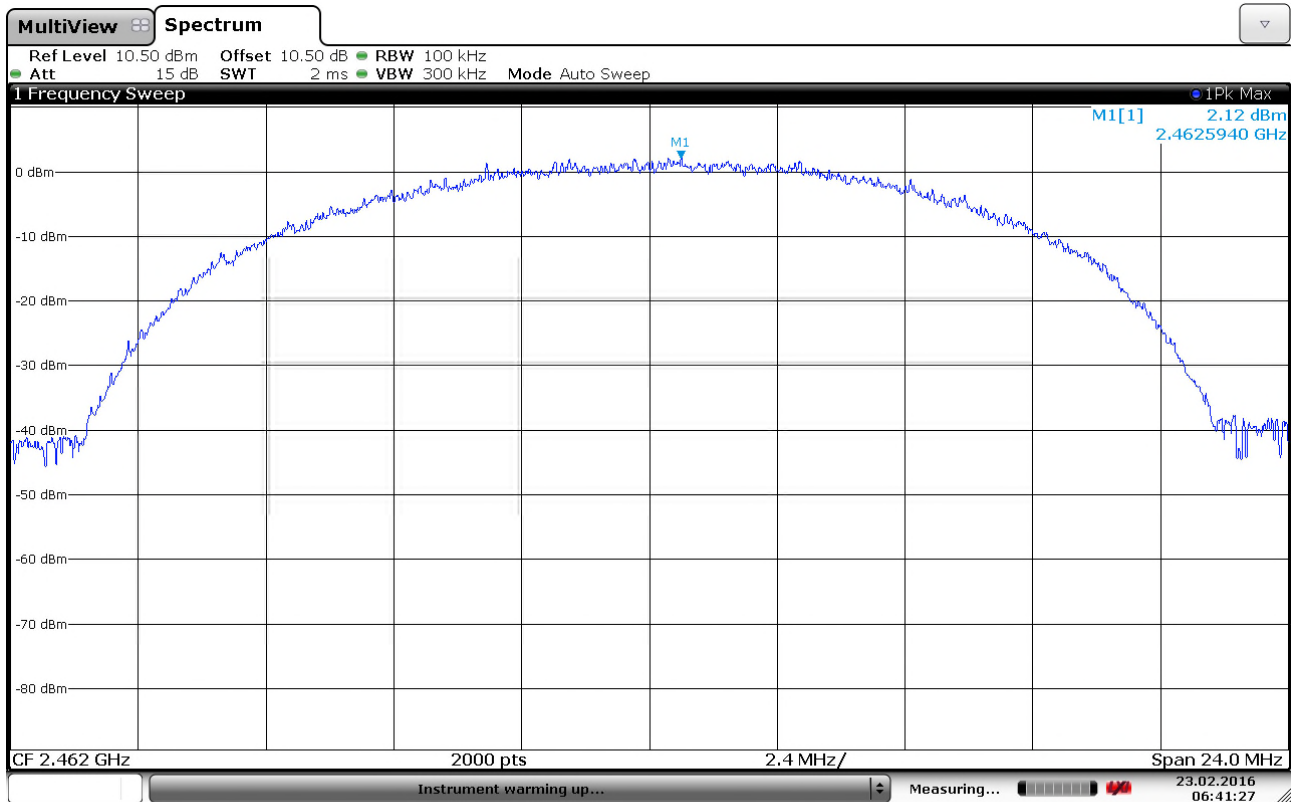
Date: 23.FEB.2016 06:43:06

PSD, 2437 MHz, 802.11g, 9 Mbps



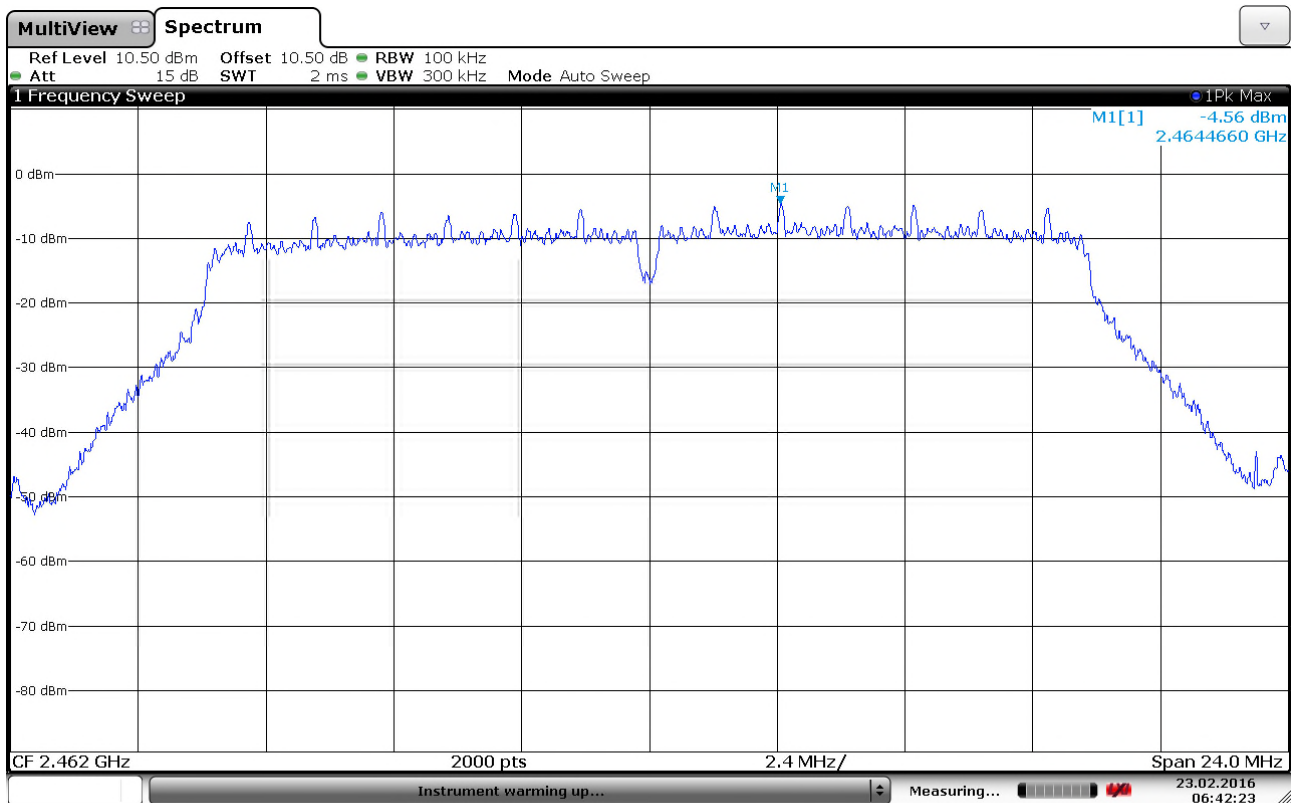
Date: 23.FEB.2016 06:38:10

PSD, 2437 MHz, 802.11n, 65 Mbps



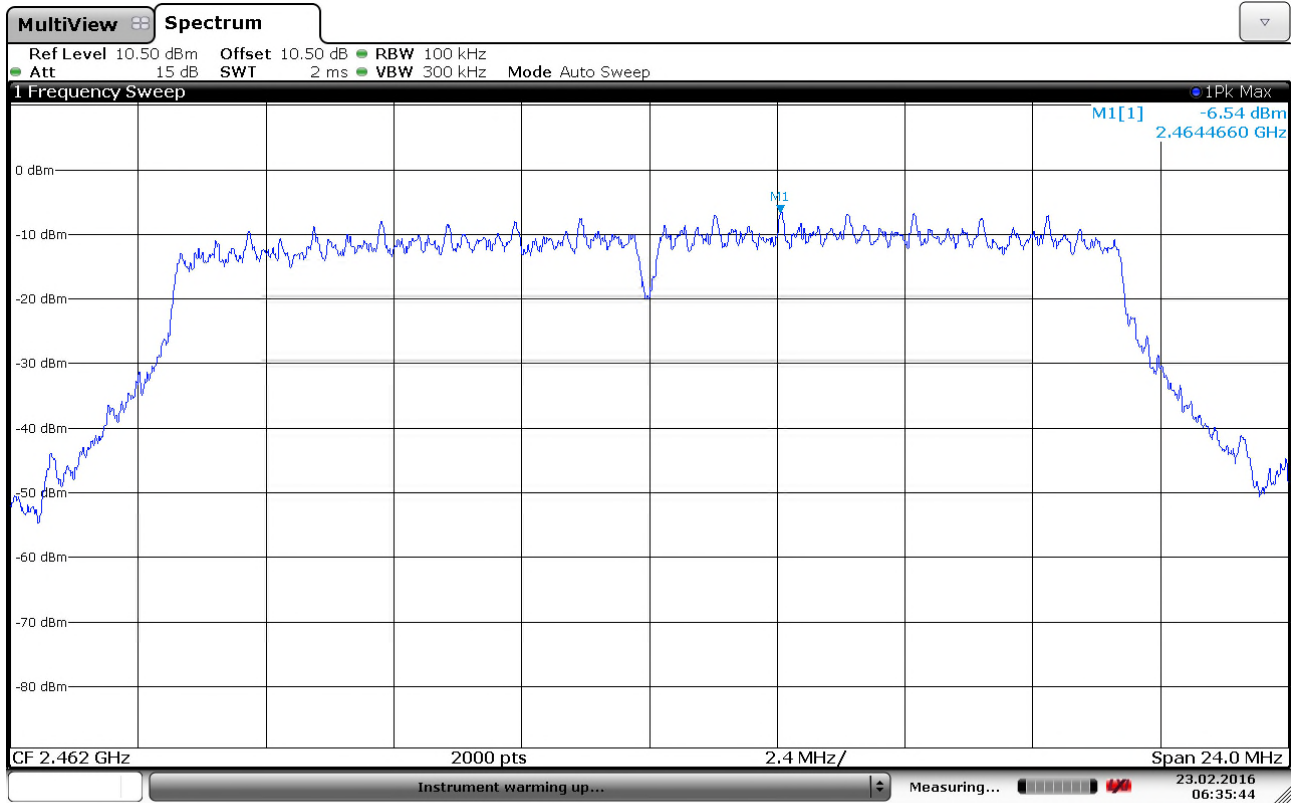
Date: 23.FEB.2016 06:41:26

PSD, 2462 MHz, 802.11b, 5.5 Mbps



Date: 23.FEB.2016 06:42:23

PSD, 2462 MHz, 802.11g, 9 Mbps



Date: 23.FEB.2016 06:35:44

PSD, 2462 MHz, 802.11n, 65 Mbps

4 Measurement Uncertainty

Measurement Uncertainty Values		
Test Item		Uncertainty
Output Power		±0.5 dB
Power Spectral Density		±0.5 dB
Out of Band Emissions, Conducted	< 3.6 GHz	±0.6 dB
	> 3.6 GHz	±0.9 dB
Spurious Emissions, Radiated	< 1 GHz	±2.5 dB
	> 1 GHz	±2.2 dB
Emission Bandwidth		±4 %
Power Line Conducted Emissions		+2.9 / -4.1 dB
Spectrum Mask Measurements	Frequency	±5 %
	Amplitude	±1.0 dB
Frequency Error		±0.6 ppm
Temperature Uncertainty		±1 °C

All uncertainty values are expanded standard uncertainty to give a confidence level of 95%, based on coverage factor k=2

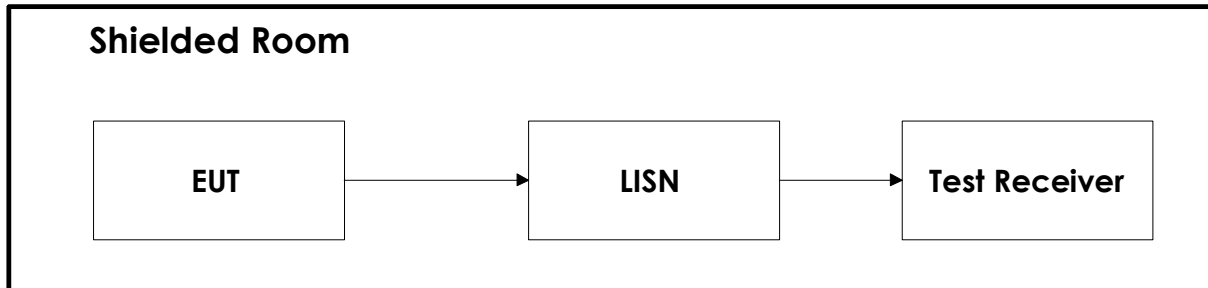
5 LIST OF TEST EQUIPMENT

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment and ancillaries are identified (numbered) by the Test Laboratory.

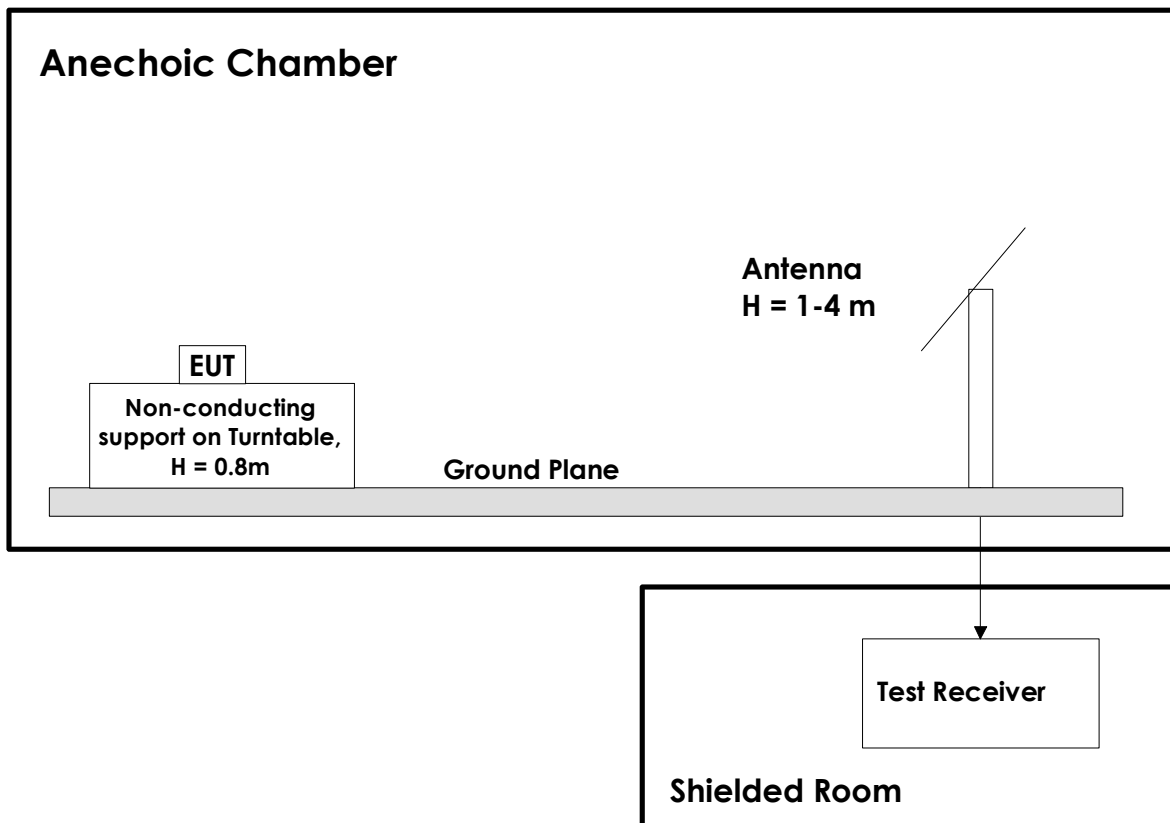
No.	Instrument/ ancillary	Type of instrument/ ancillary	Manufacturer	Ref. no.	Cal. Date	Cal. Due
1.	ESU40	EMI Receiver	Rohde & Schwarz	LR1639	2015.11	2016.11
2.	FSW26	Spectrum Analyzer	Rohde & Schwarz	LR 1640	2015.11	2016.11
3.	HFH2-Z2	Active Loop antenna	Rohde & Schwarz	LR1660	2014.10	2017.10
4.	3115	Antenna horn	EMCO	LR 1330	2010.08	2017.08
5.	HK116	Biconical Antenna	Rohde & Schwarz	LR 1260	2013.12	2016.12
6.	HL223	Log Periodic antenna	Rohde & Schwarz	LR 1261	2013.12	2016.12
7.	643	Antenna Horn	Narda	LR 093	10.2009	10.2019
8.	PM7320X	Antenna Horn	Sivers Lab	LR 102	10.2009	10.2019
9.	DBF-520-20	Antenna Horn	Systron Donner	LR 100	10.2009	10.2019
10	638	Antenna Horn	Narda	LR 1480	10.2009	10.2019
11	4768-10	Attenuator	Narda	LR 1356	Cal b4 use	
12	6HC3000/18000	Highpass Filter	Trilithic	LR 1614	Cal b4 use	
13	8449B	Pre-amplifier	Hewlett Packard	LR 1322	2015.09	2016.09
14	HP 10855A	Pre-amplifier	Hewlett Packard	LR 1445	2015.10	2016.10
15	Model 87 V	Multimeter	Fluke	LR 1597	2015.10	2016.10
16	6812B	Power source	Agilent	LR 1515	2015.12.02	2017.12.02
17	D001	DC power supply	Farnell	LT 5150	Cal b4 use	

6 BLOCK DIAGRAM

6.1 Power Line Conducted Emission



6.2 Test Site Radiated Emission



Revision history

Version	Date	Comment	Sign
1.0	2016.06.30	First test report	gns
2.0	2016.08.03	Spurious emissions with all radio active	gns