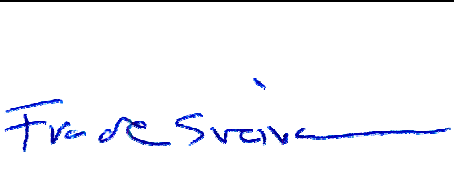


## Test Report

<b>Product</b>	Gateway	
<b>Name and address of the applicant</b>	Develco Products Olof Palmes Alle 40, DK-82000 Århus N, Denmark	
<b>Name and address of the manufacturer</b>	Develco Products Olof Palmes Alle 40, DK-82000 Århus N, Denmark	
<b>Model</b>	MGW101	
<b>Rating</b>	5Vdc	
<b>Trademark</b>	Develco	
<b>Serial number</b>	Radiated sample: 0200000100001516 Conducted sample: 02000001000012EE	
<b>Additional information</b>	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)	
<b>Tested according to</b>	<b>FCC Part 15.247</b> Digital Transmission Systems <b>Industry Canada RSS-247, Issue 1</b> Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices	
<b>Order number</b>	300209	
<b>Tested in period</b>	2016.02.22 - 2016.03.17 and 2016.08.03	
<b>Issue date</b>	2016.08.03	
<b>Name and address of the testing laboratory</b>	 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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ENTERPRISE NUMBER NO974404532

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# 1 INFORMATION

## 1.1 Test Item

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

<sup>1</sup> 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.Suhanthakumar	Date of Test: 2016.03.10
------------------------------------	--------------------------

Measurement procedure: ANSI C63.4-2014 using 50  $\mu$ H/50 ohms LISN.

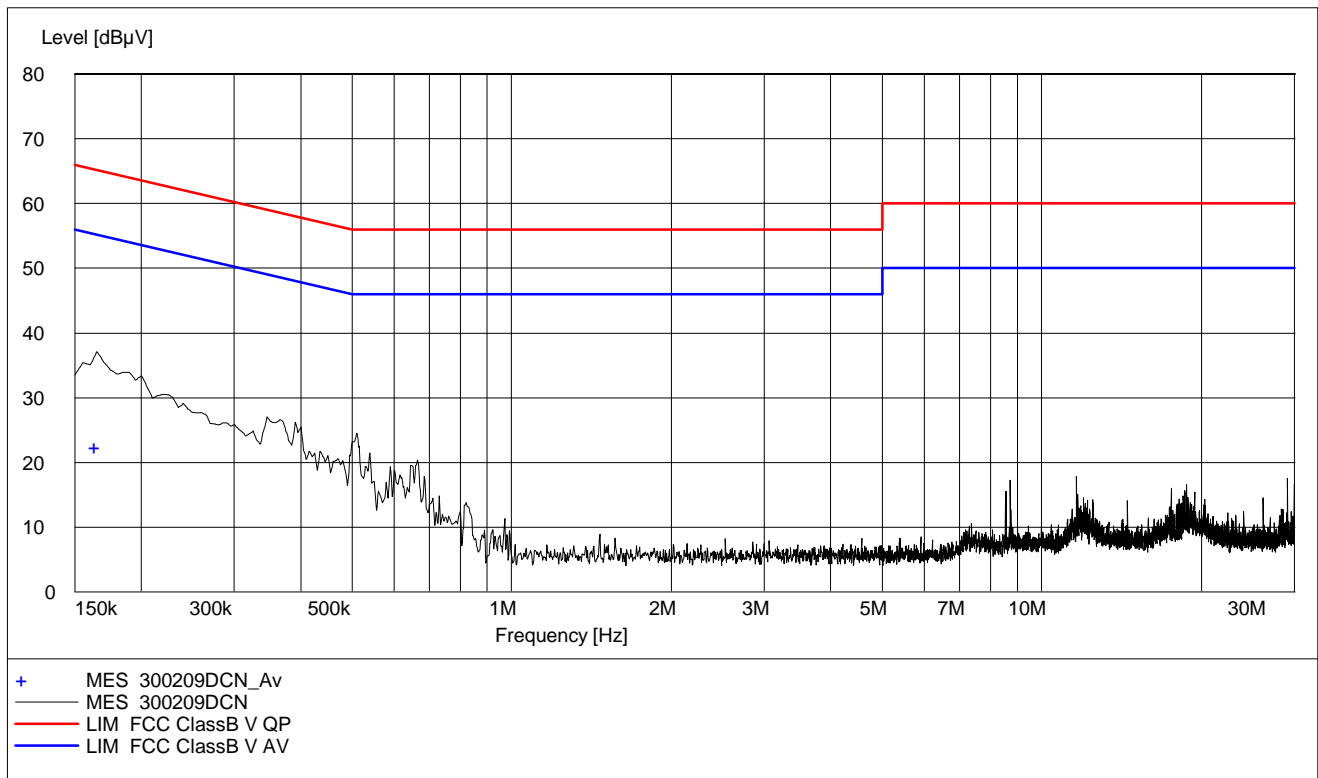
Test Results: Complies.

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

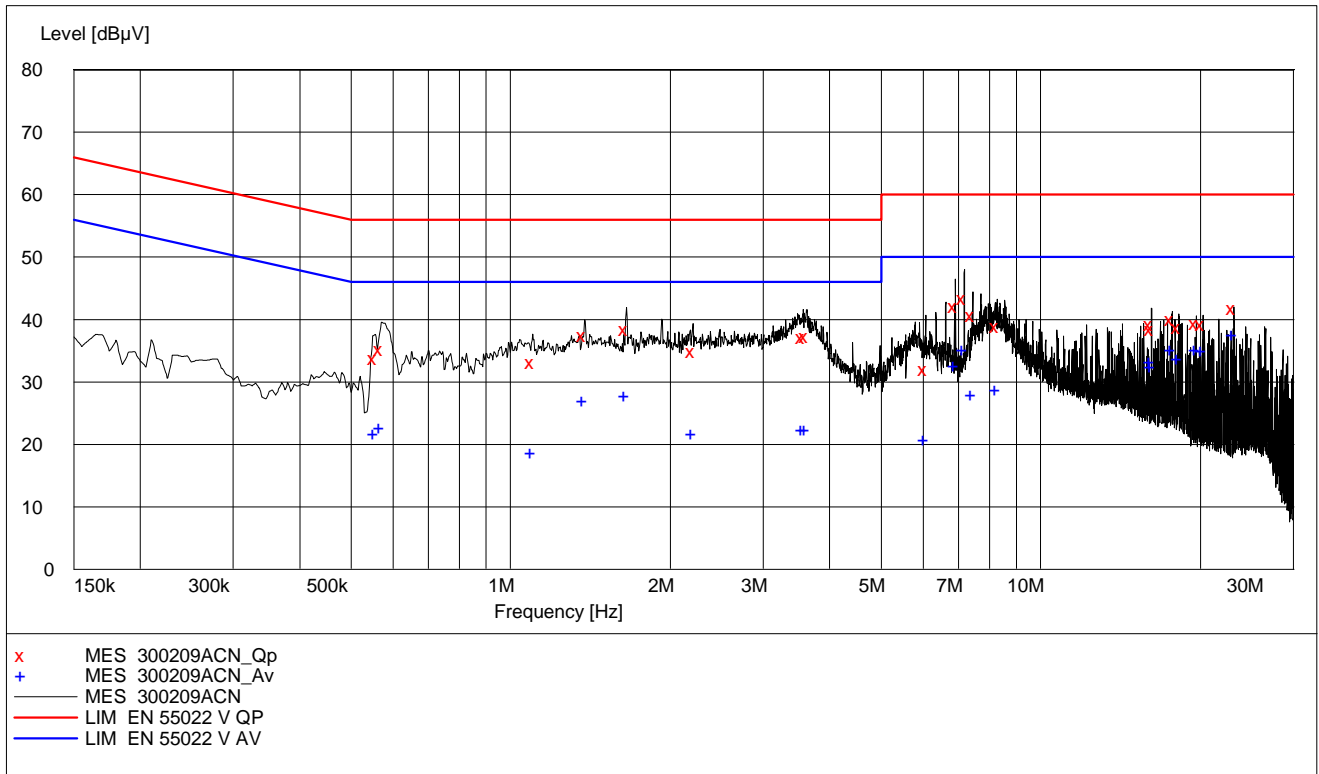
QP detector:

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.Suhandhakumar	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

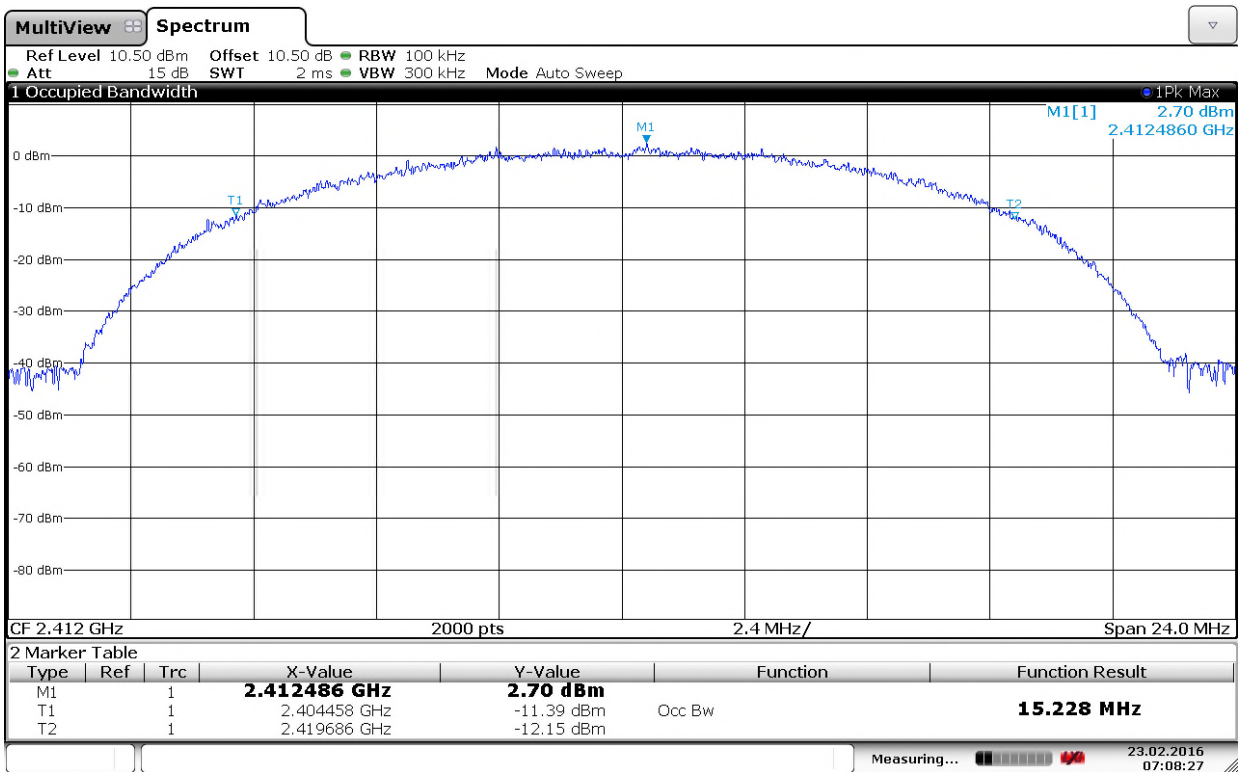
Occupied Bandwidth is reported for information only.

See attached graph.

**Requirements:**

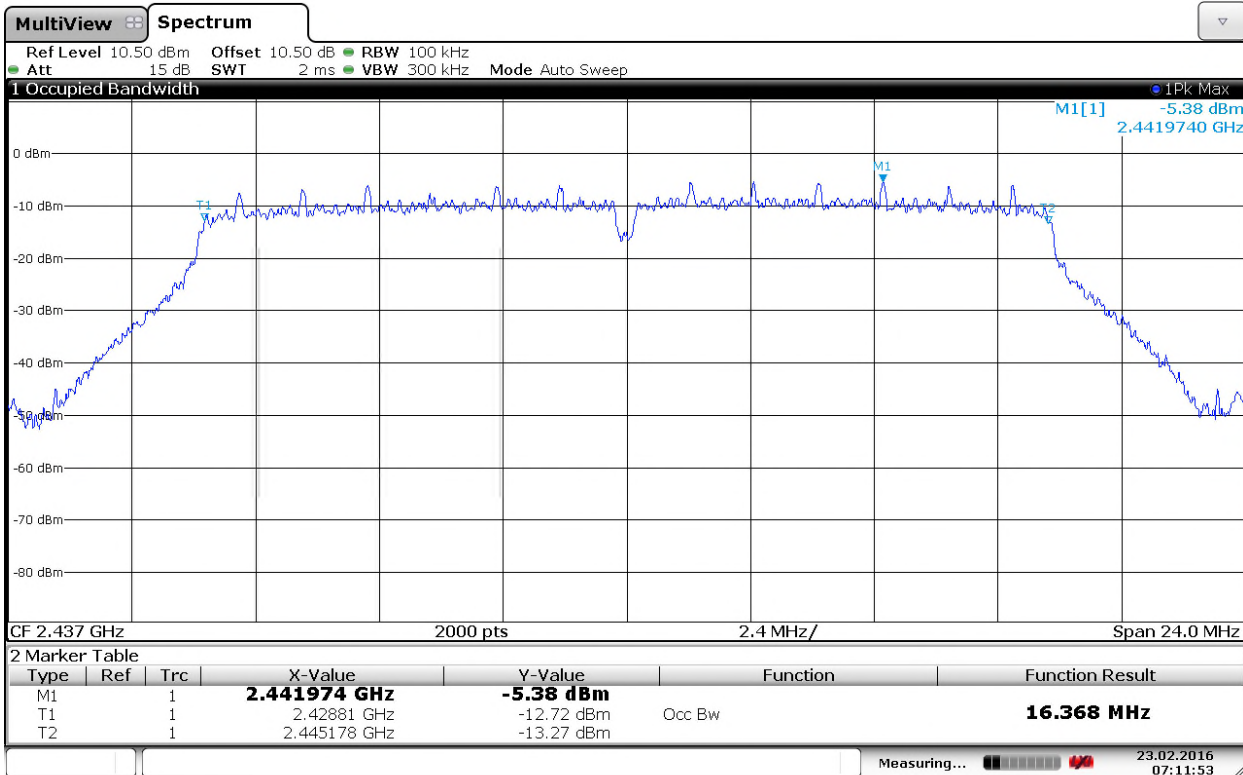
Frequency hopping systems in the 2400 - 2483.5 MHz band shall use at least 15 non-overlapping channels.  
 No requirements for bandwidth for this frequency band.

No requirements for Digital Transmission Systems.



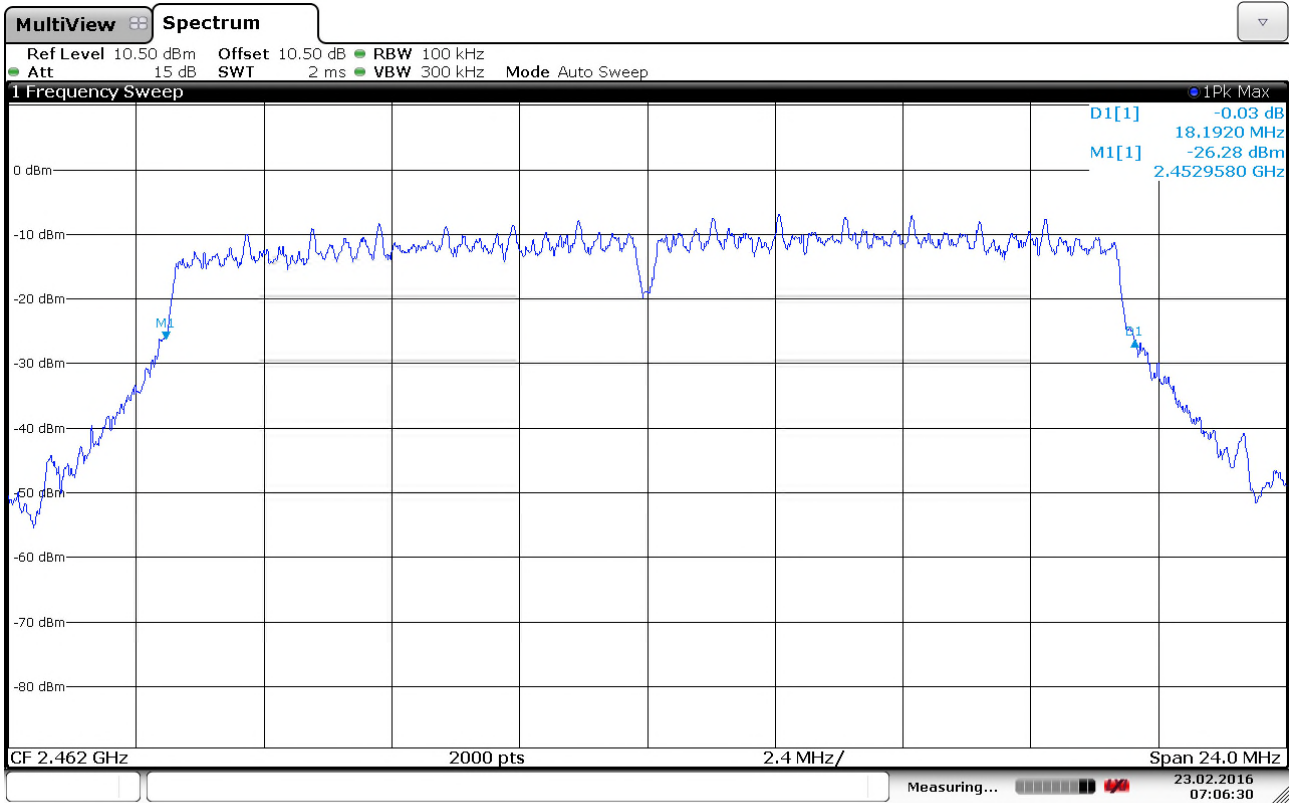
Date: 23.FEB.2016 07:08:27

### 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

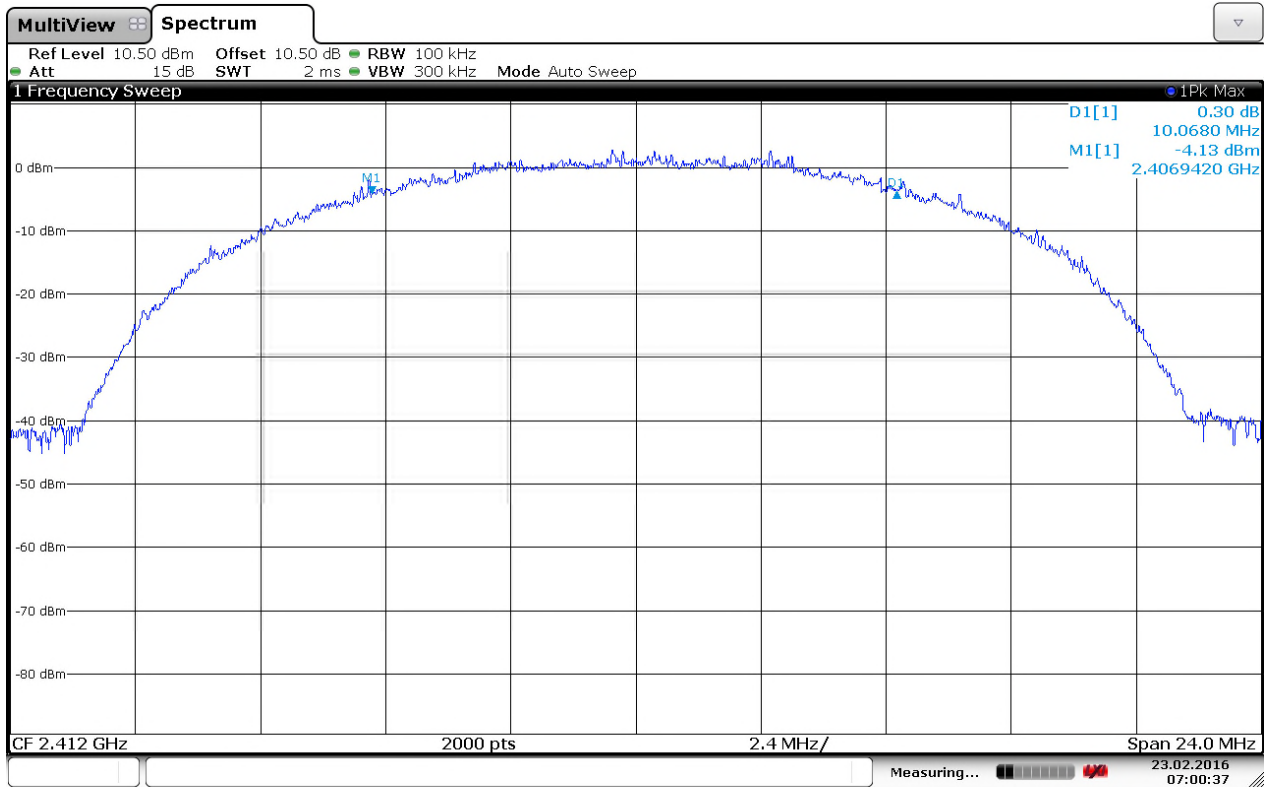
#### Measurement Data:

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.

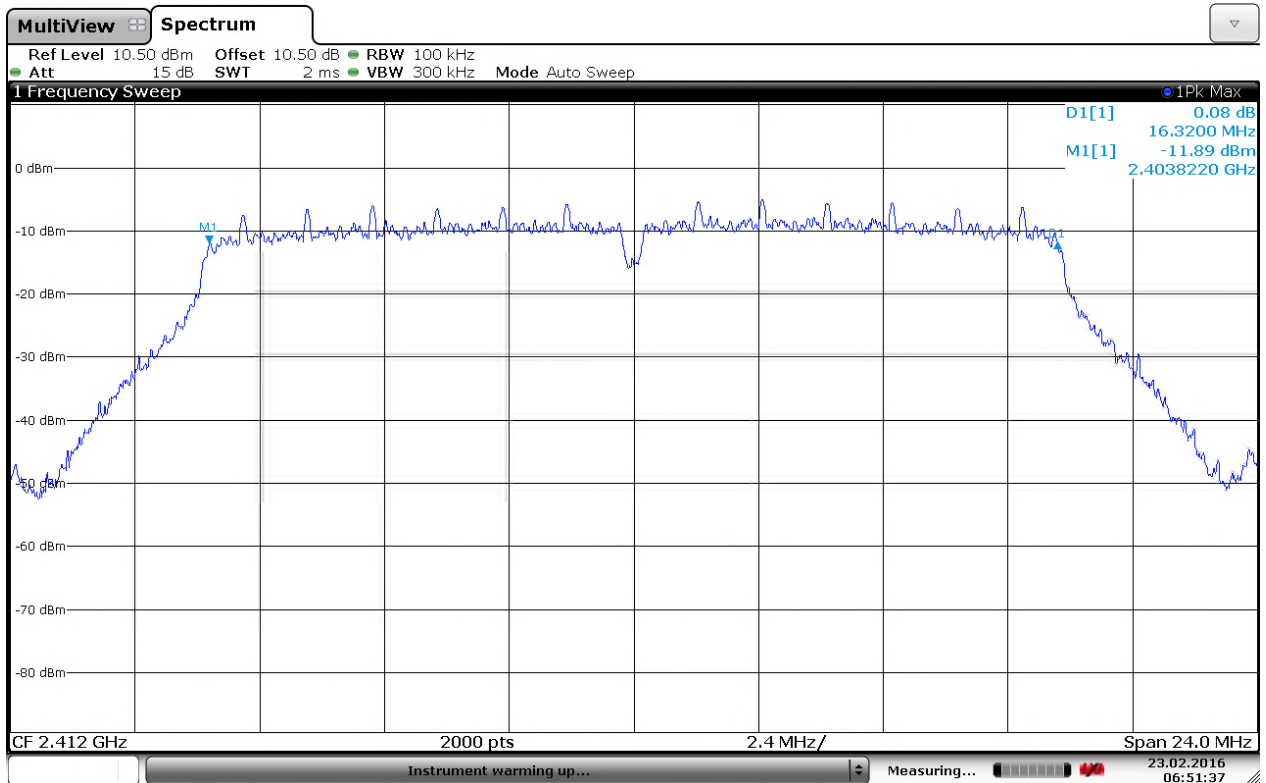
#### Requirements:

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

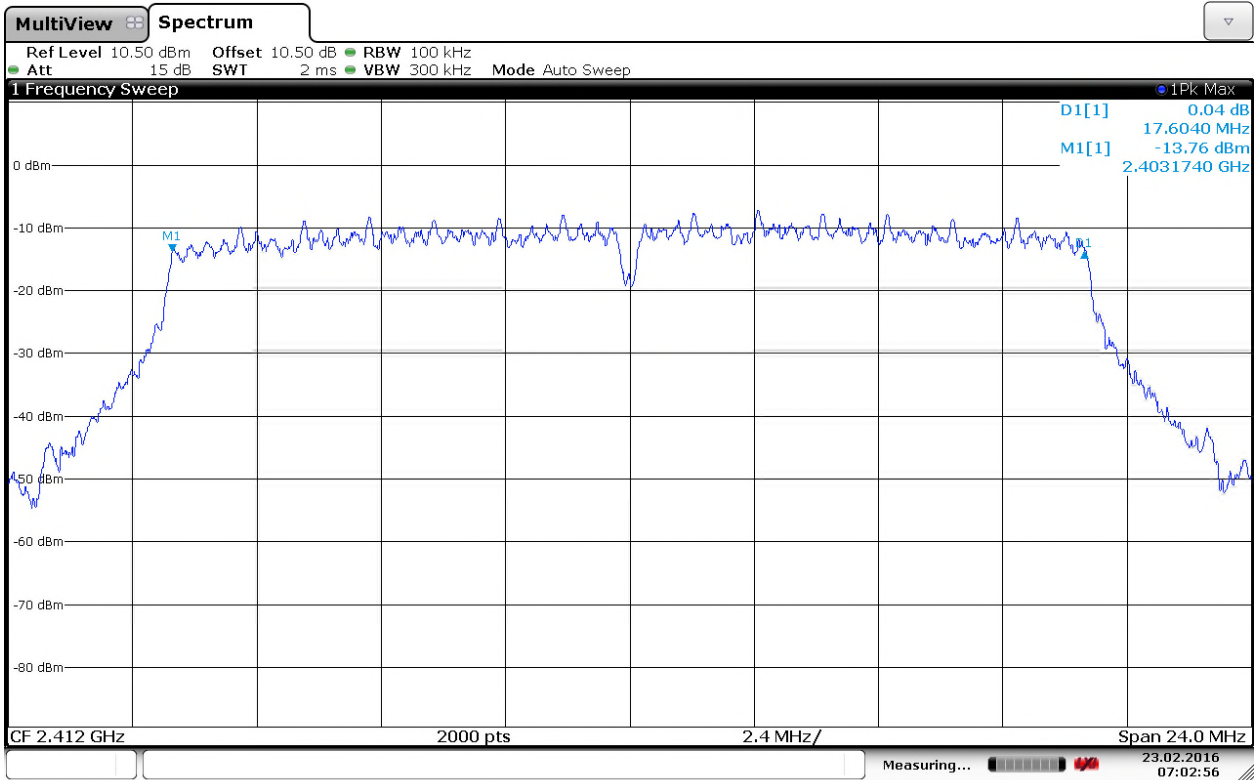
### 6 dB Bandwidth, 2412 MHz, 802.11b, 5.5Mbps



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

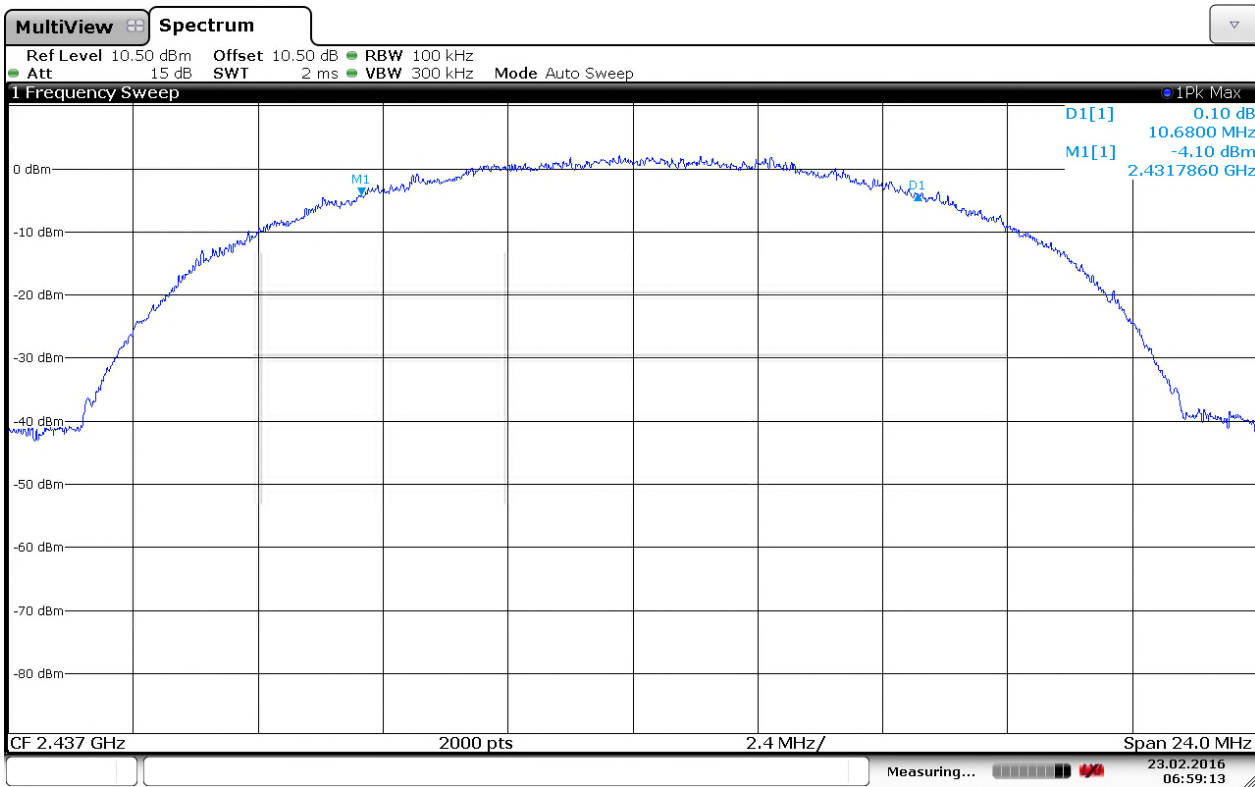
### 6 dB Bandwidth, 2412 MHz, 802.11g, 9Mbps





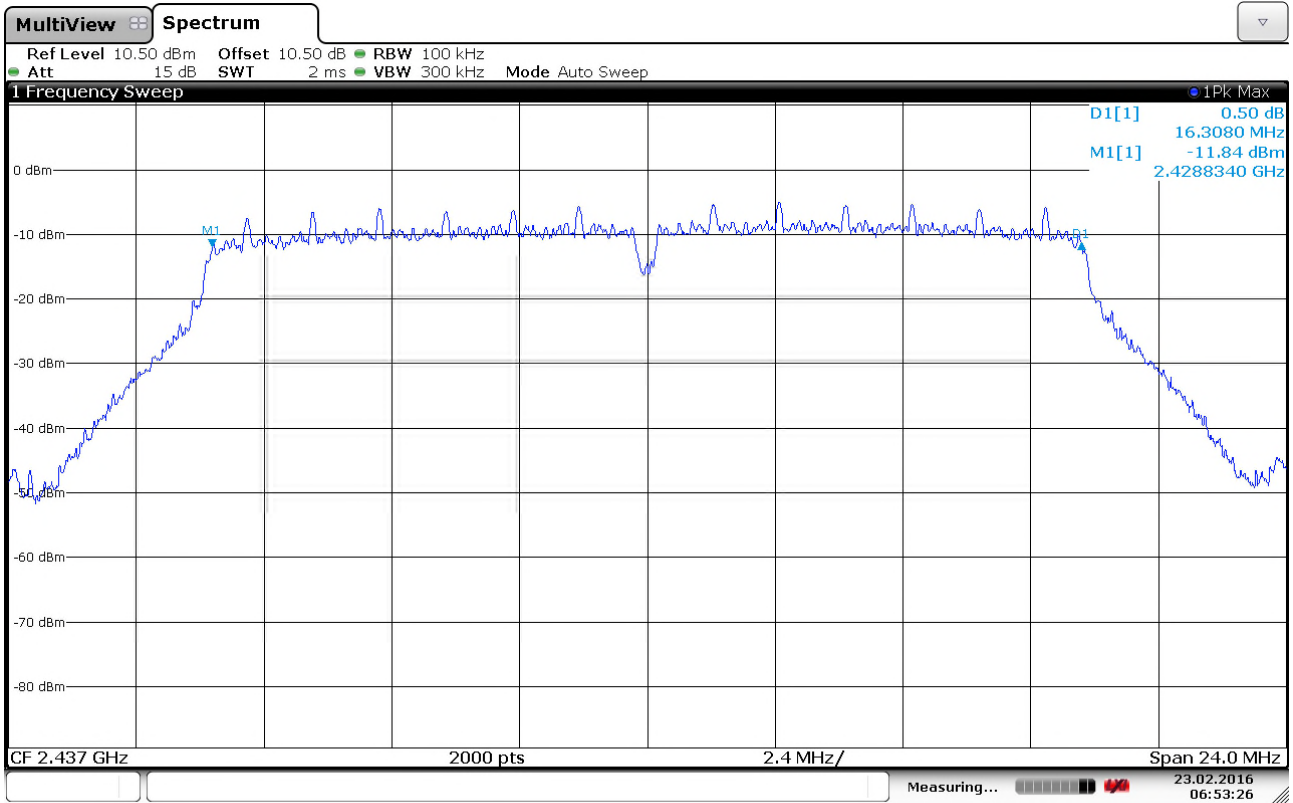
Date: 23.FEB.2016 07:02:56

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



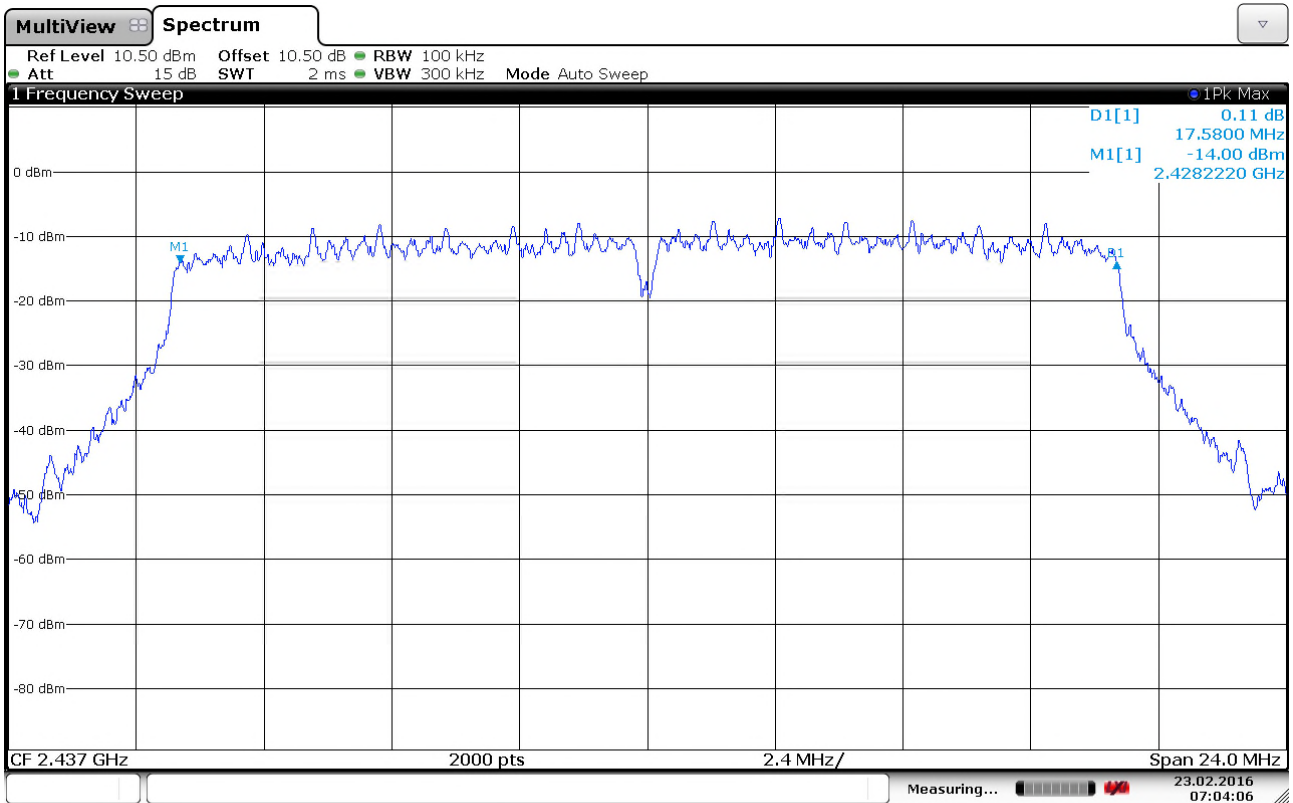
Date: 23.FEB.2016 06:59:14

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



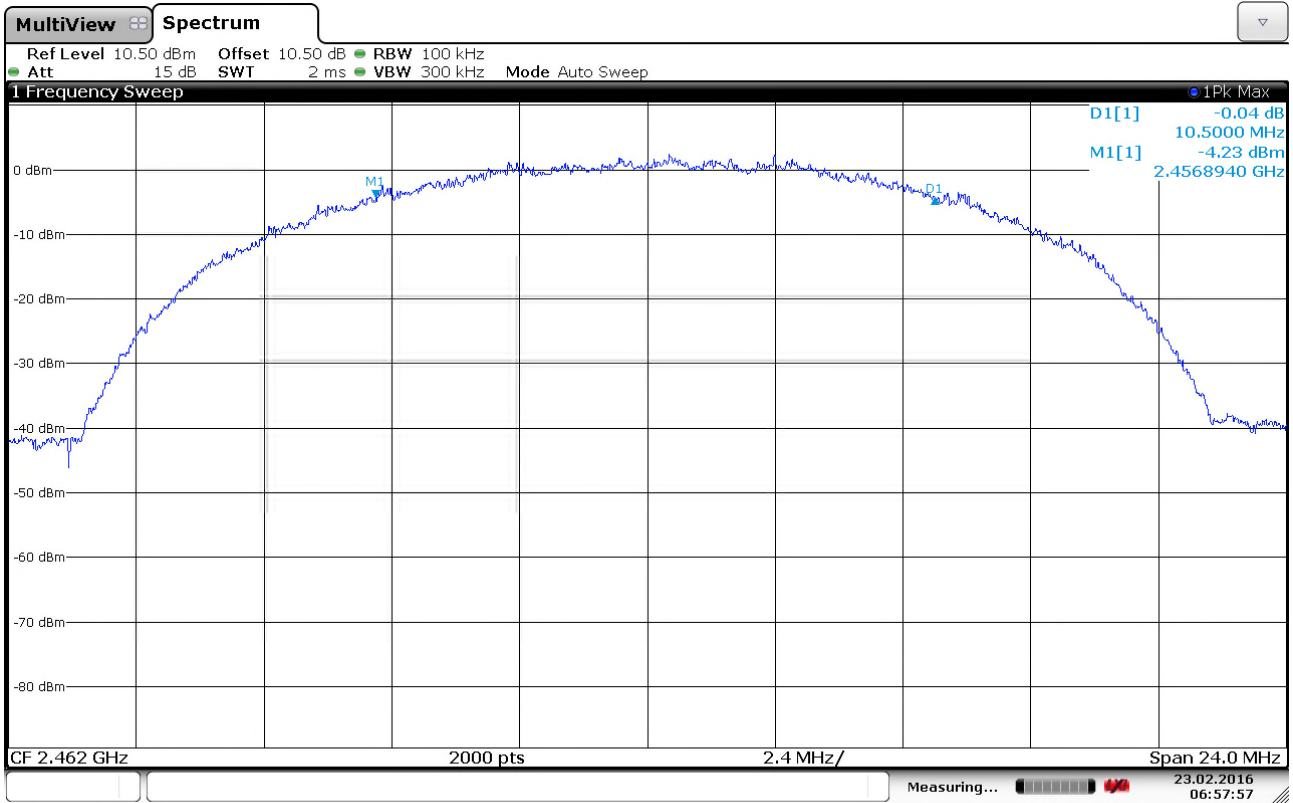
Date: 23.FEB.2016 06:53:26

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



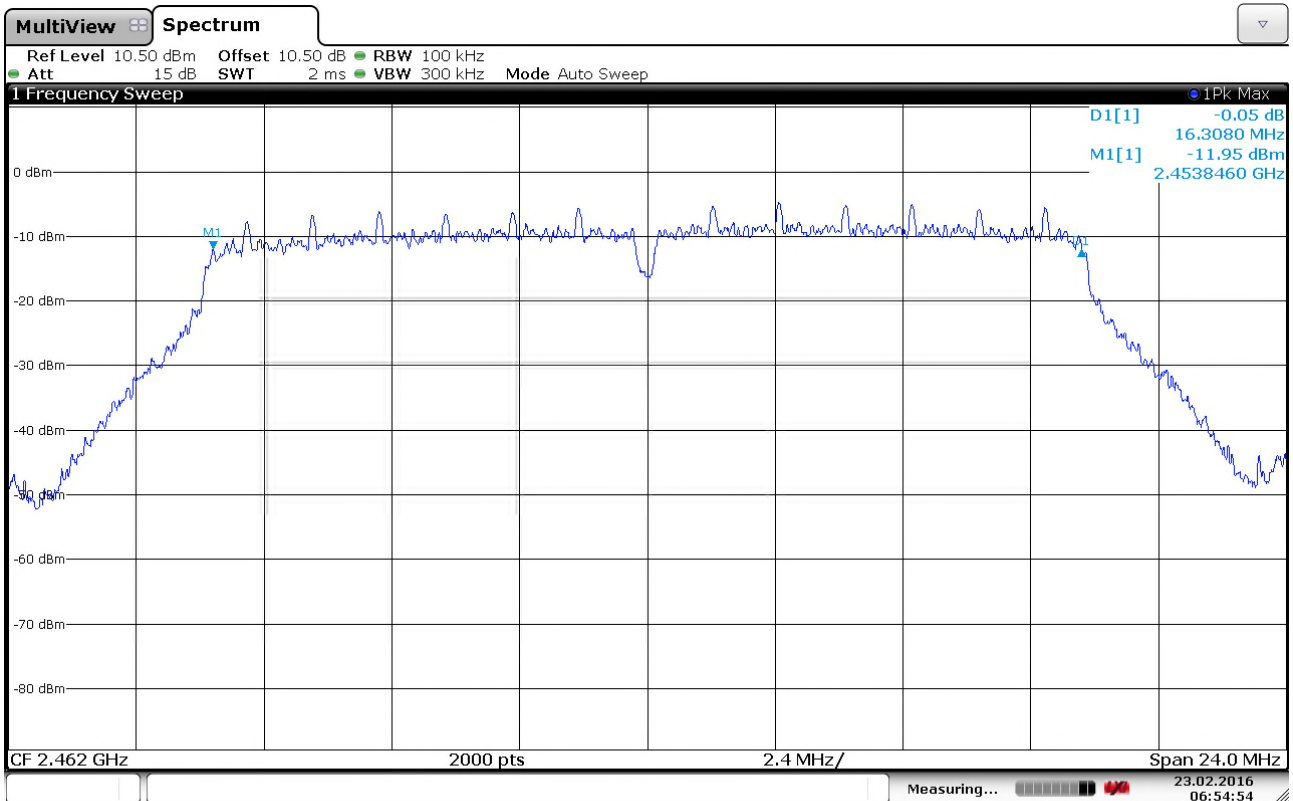
Date: 23.FEB.2016 07:04:06

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



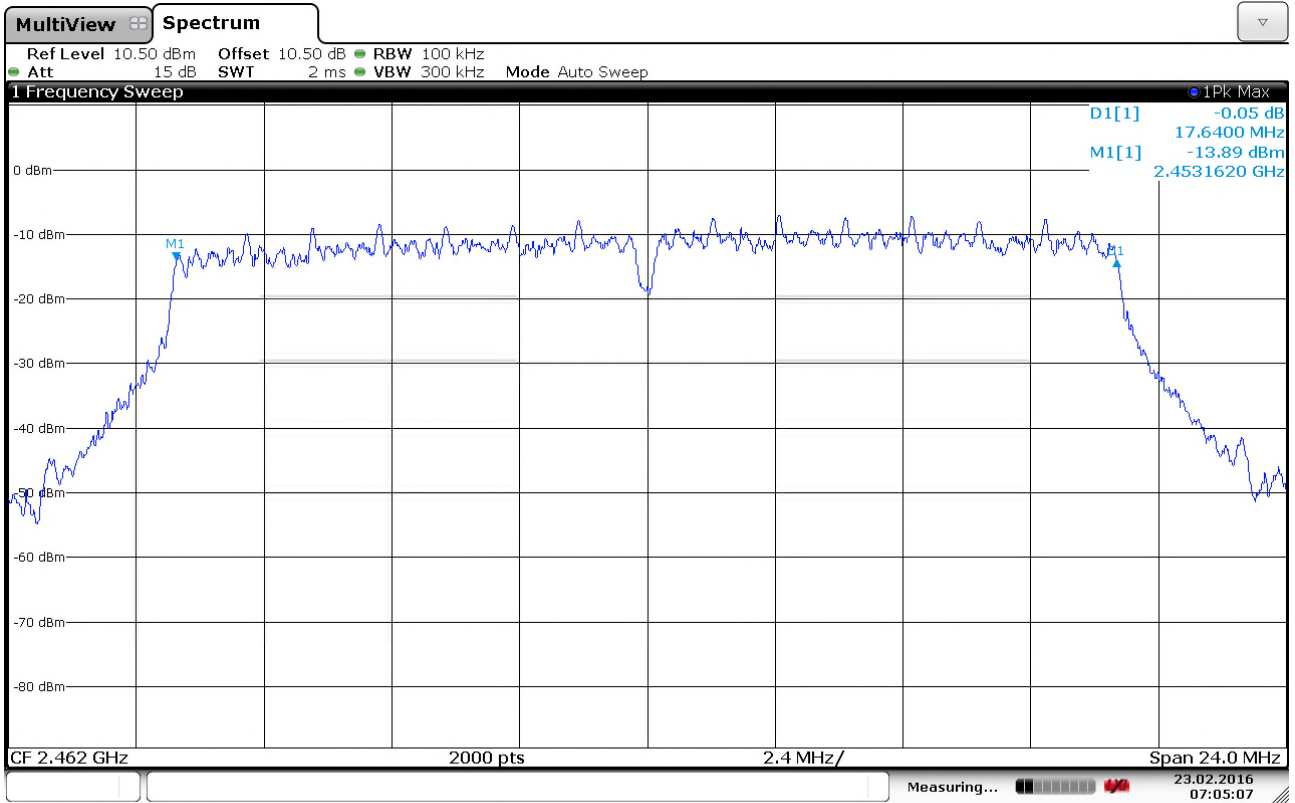
Date: 23.FEB.2016 06:57:57

**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\*log(EIRP/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

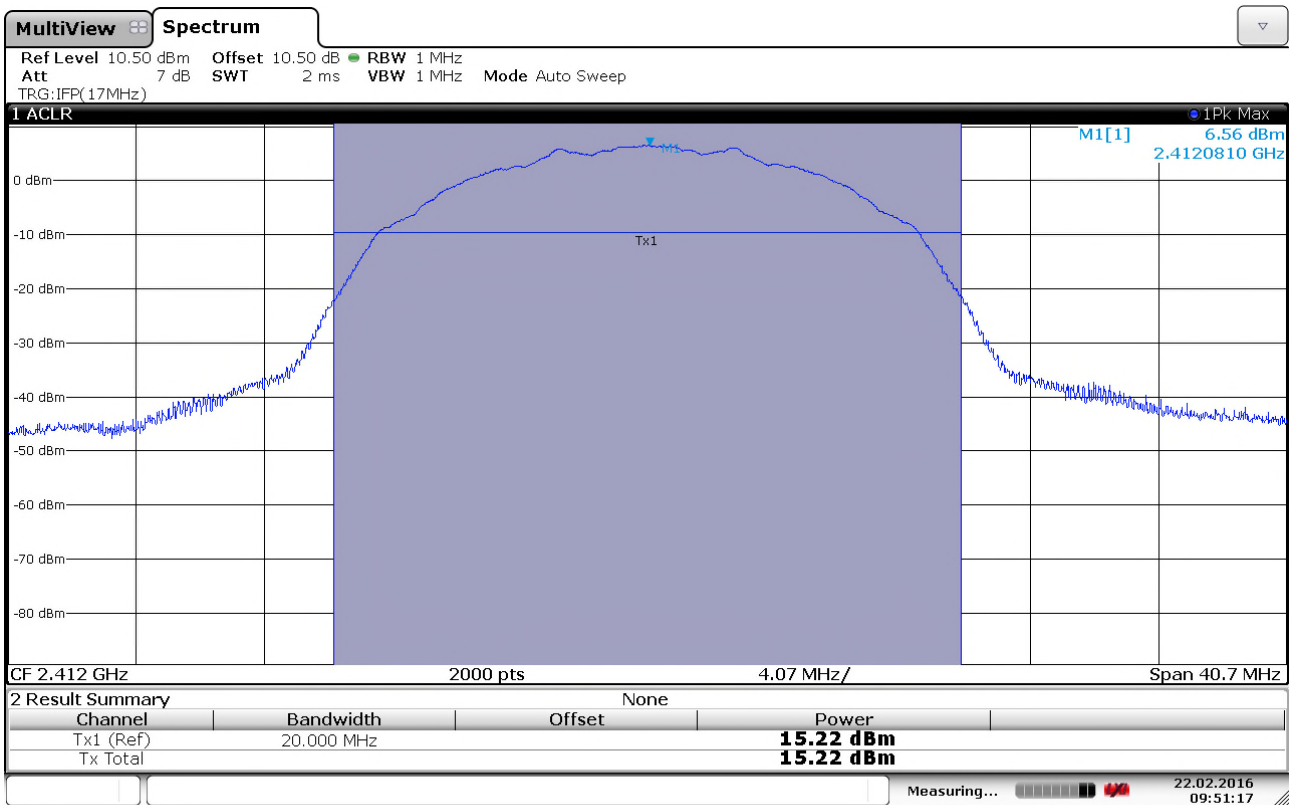
Type of antenna connector: N/A

Requirements:

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

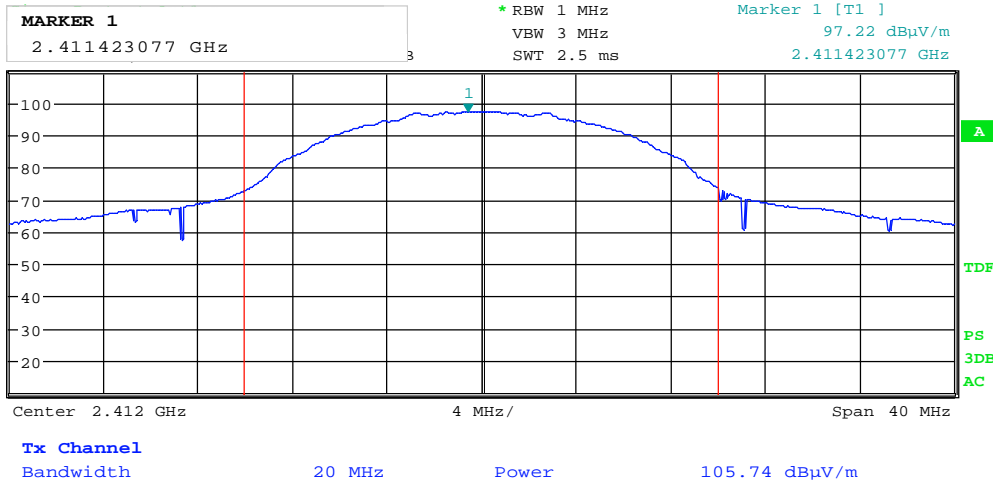
For Digital Transmission Systems in the 2400 - 2483.5 MHz band: 1 Watt

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.



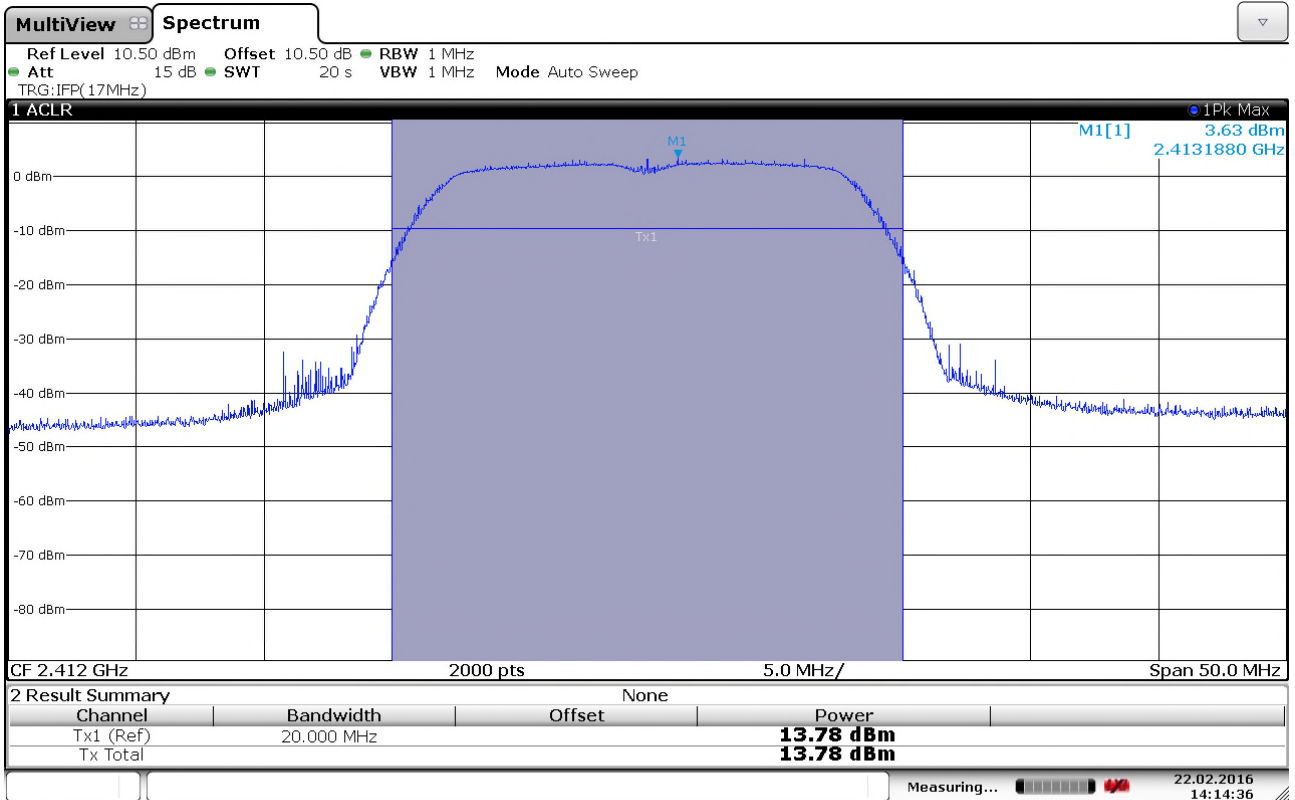
Date: 22.FEB.2016 09:51:17

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



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

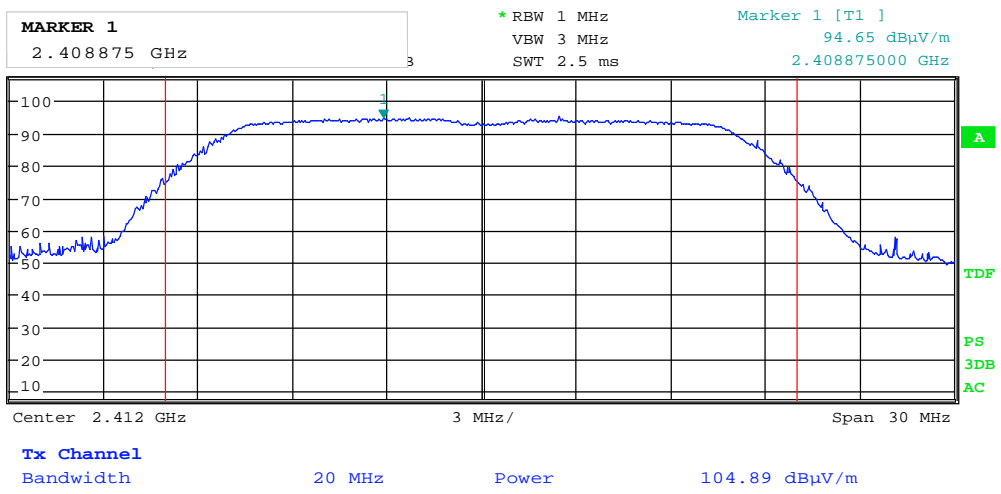
**Radiated Output Power, 2412 MHz, 802.11b, 5.5Mbps (Max: VP)**



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

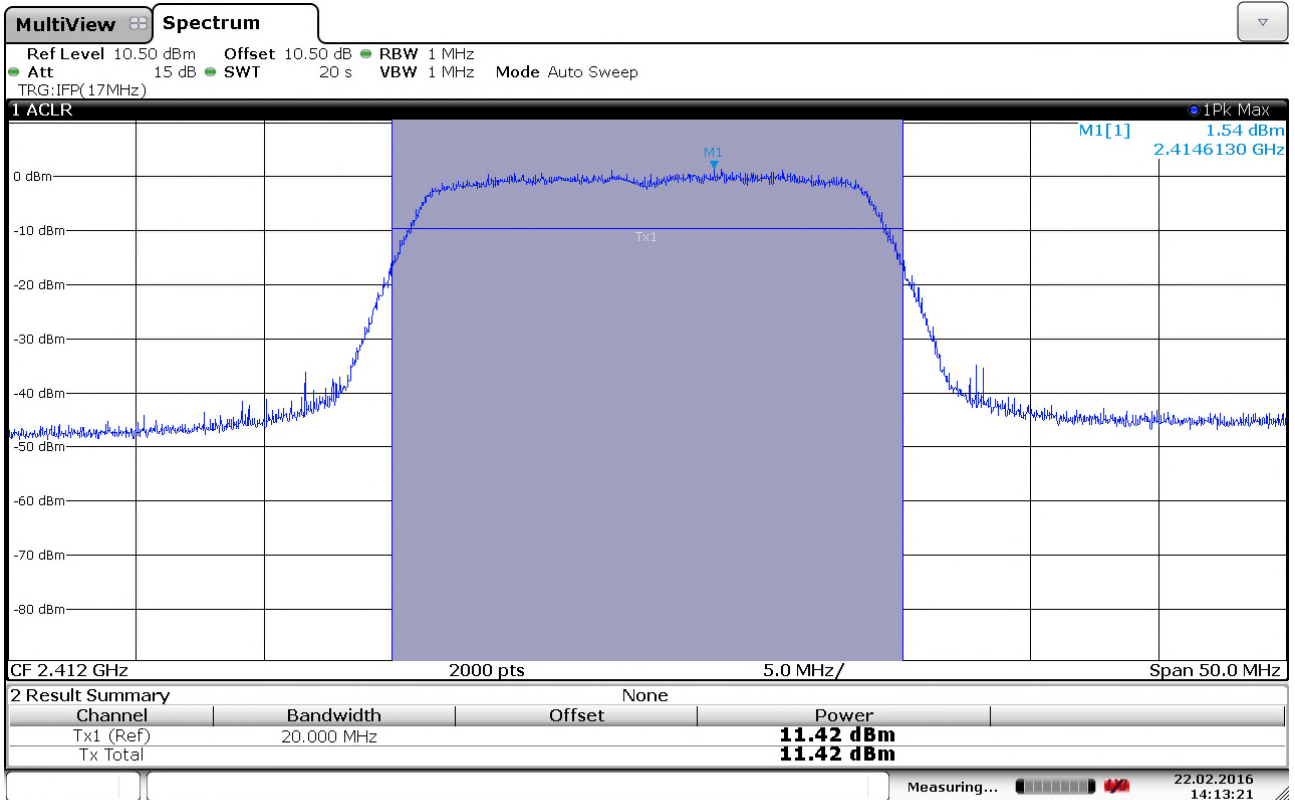
**Conducted Output Power, 2412 MHz, 802.11g, 9Mbps**





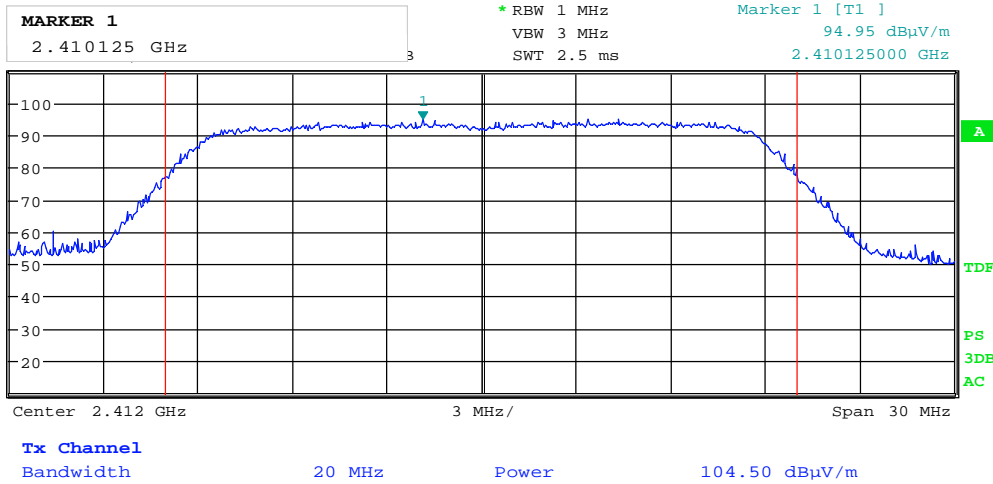
Date: 3.MAR.2016 11:18:26

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



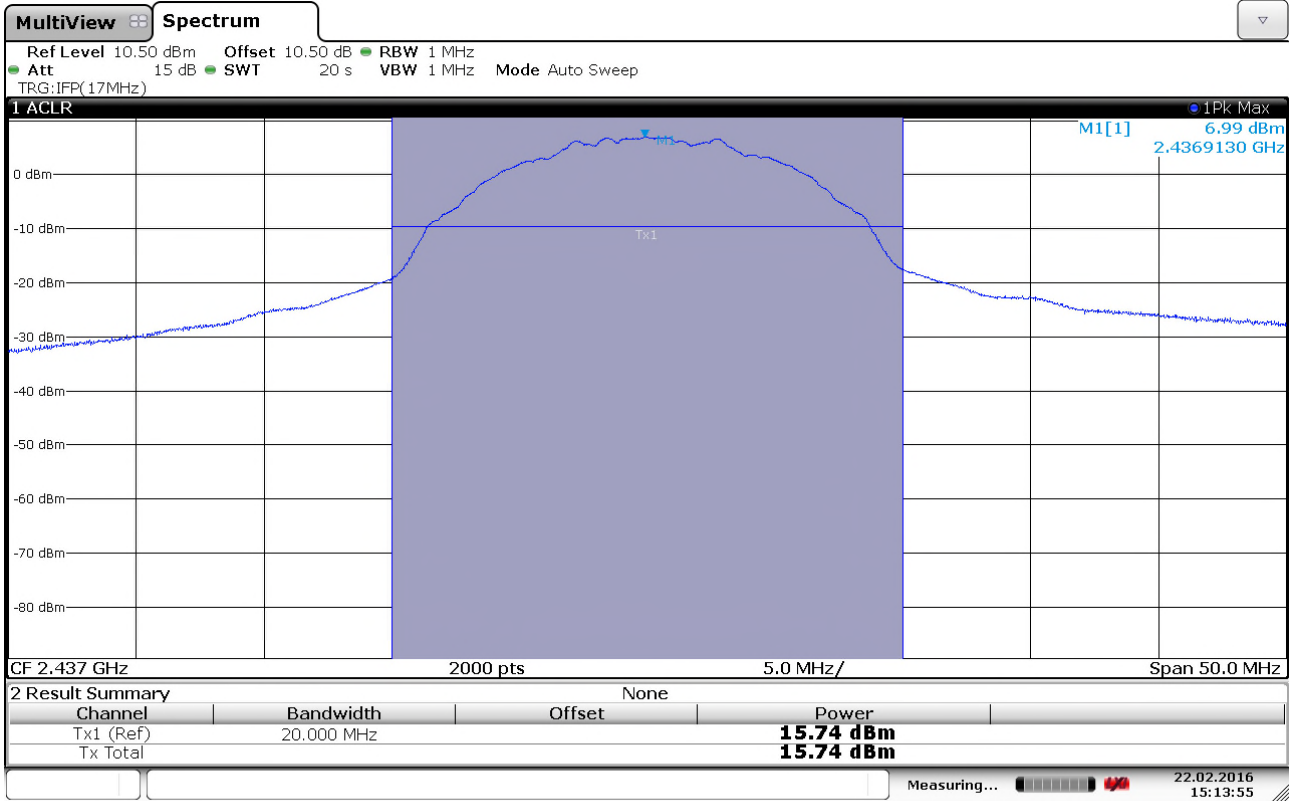
Date: 22.FEB.2016 14:13:22

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



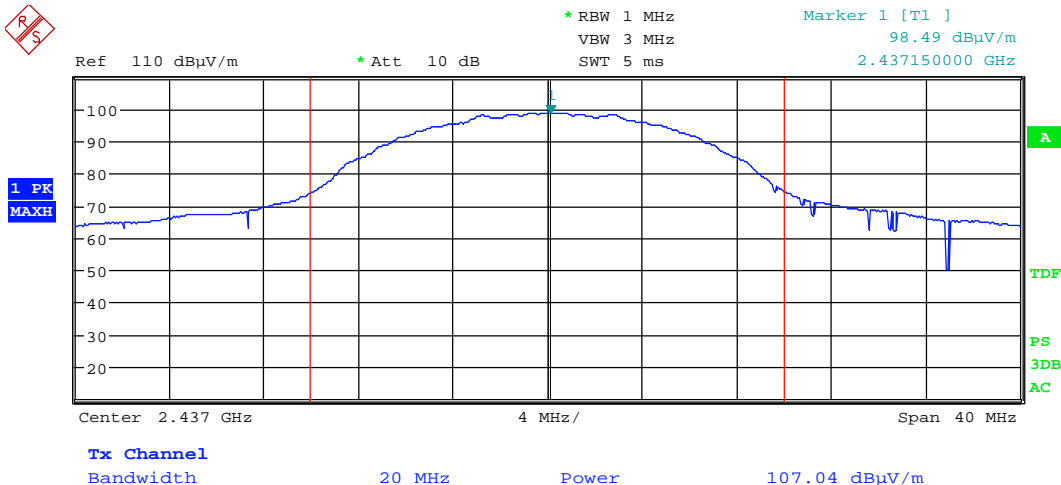
Date: 3.MAR.2016 08:52:19

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



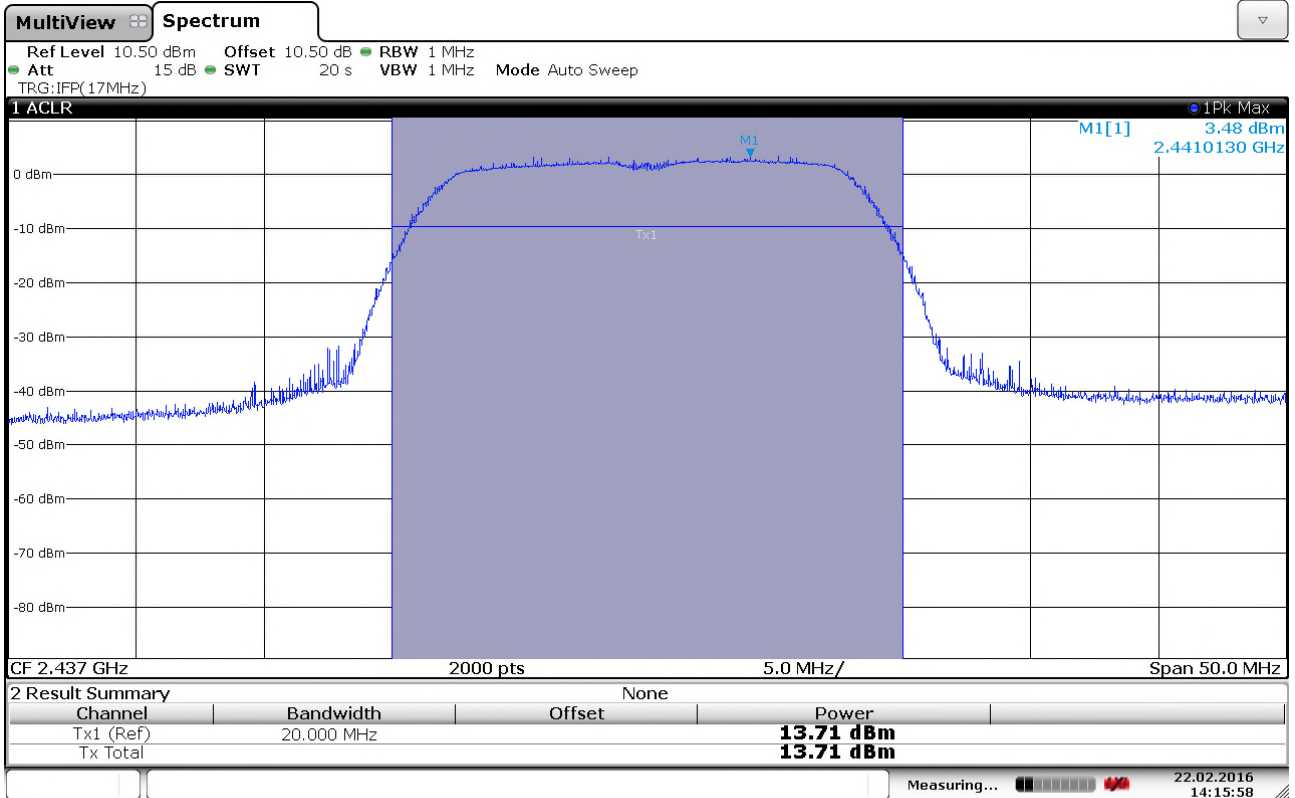
Date: 22.FEB.2016 15:13:55

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



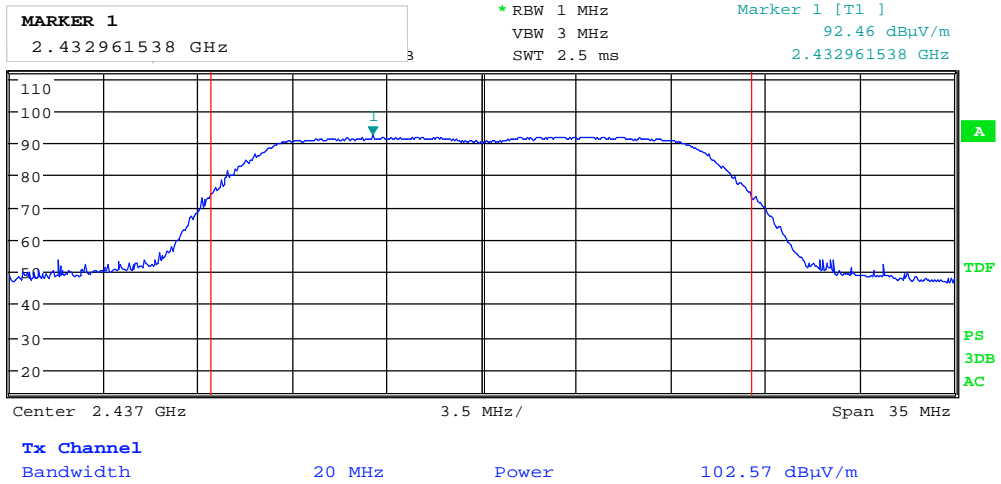
Date: 19.FEB.2016 07:42:40

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



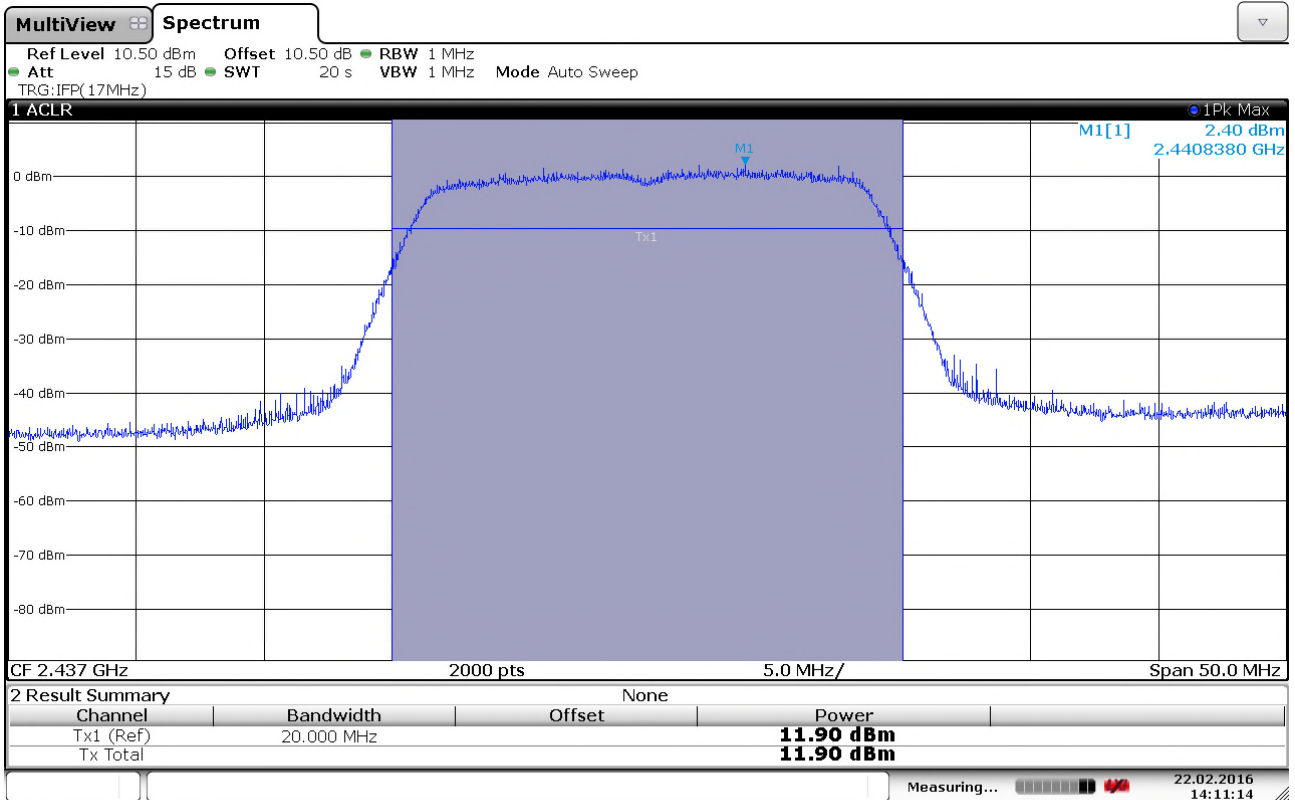
Date: 22.FEB.2016 14:15:58

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



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

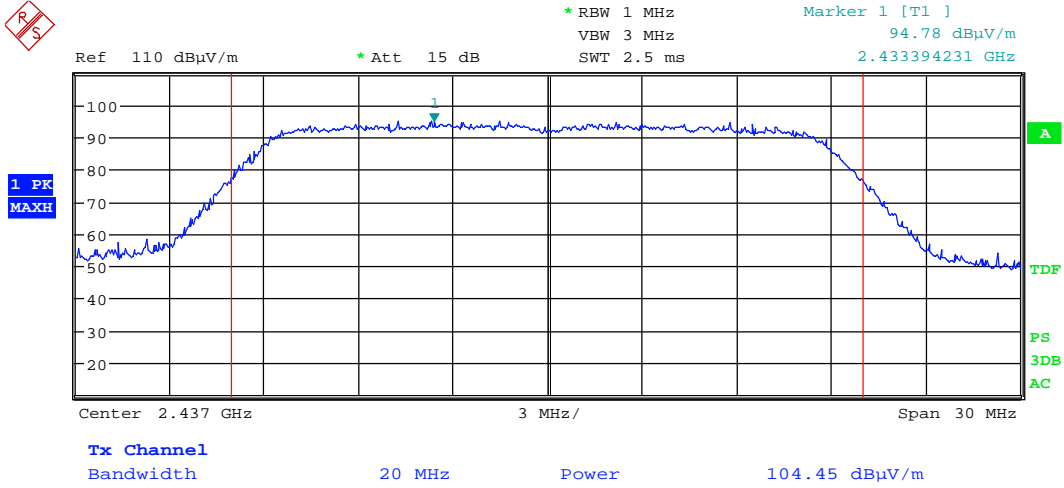
**Radiated Output Power, 2437 MHz, 802.11g, 9Mbps (Max: VP)**



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

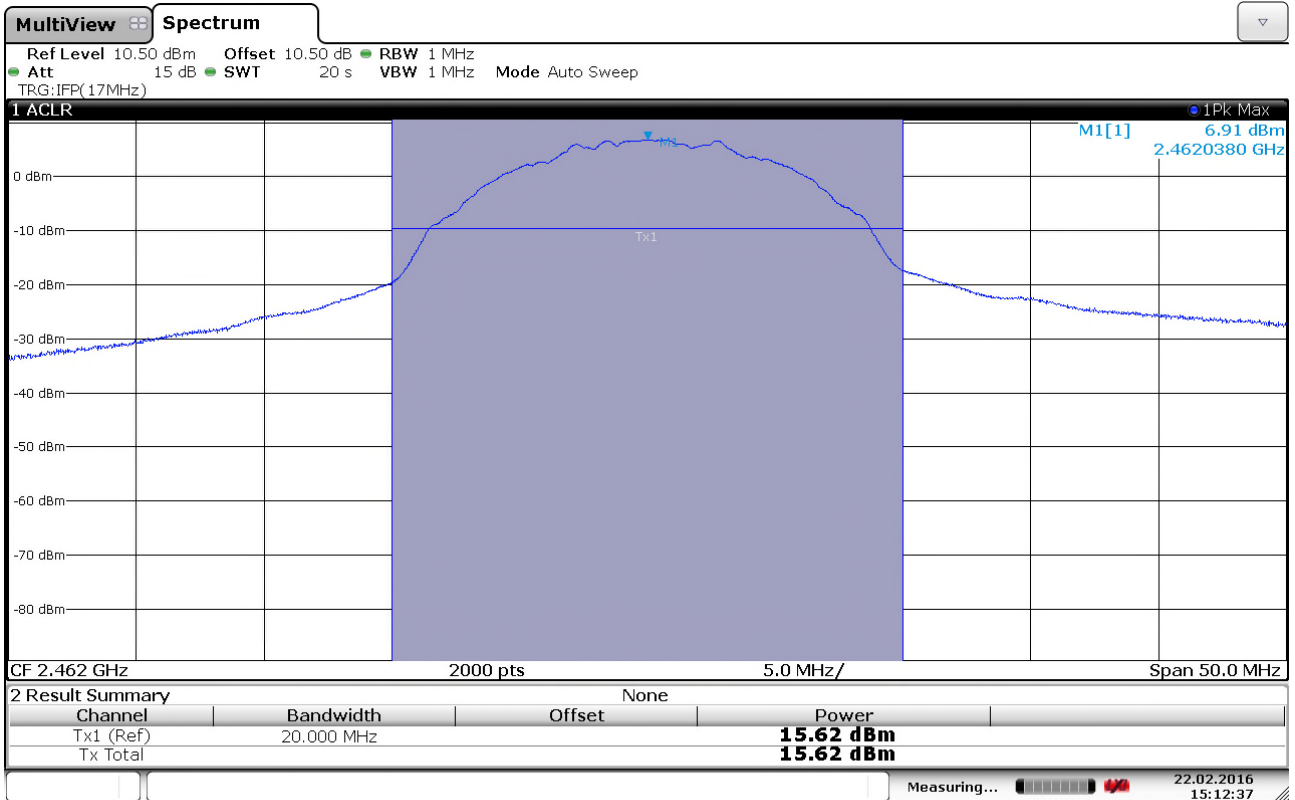
**Conducted Output Power, 2437 MHz, 802.11n, 65Mbps**





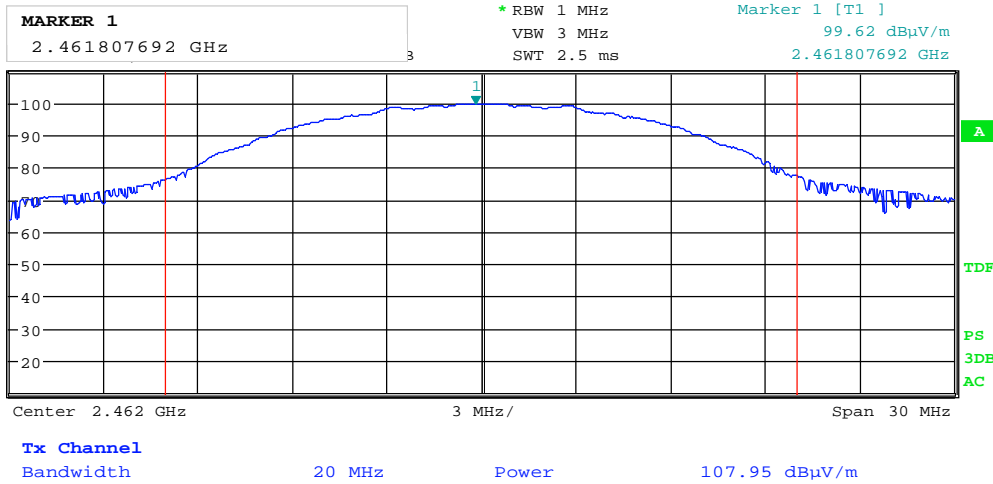
Date: 3.MAR.2016 08:26:27

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



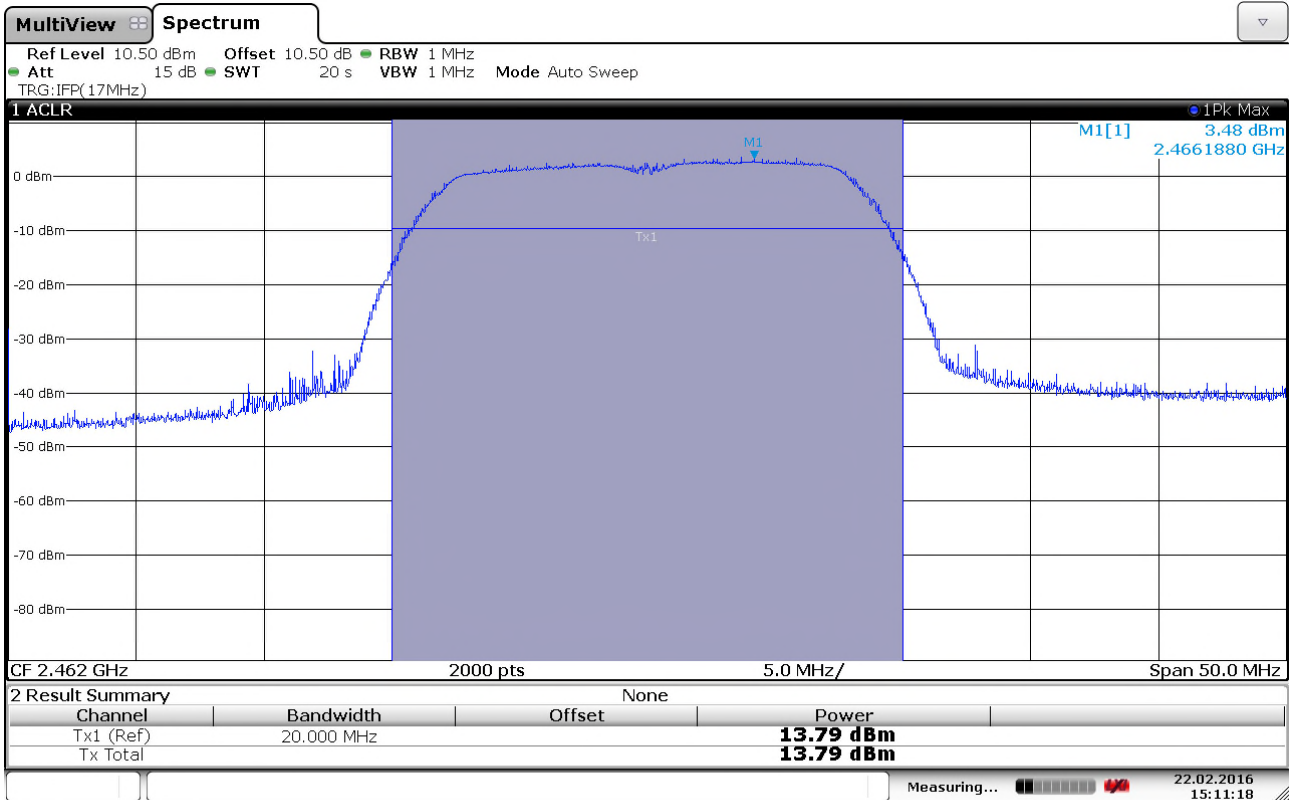
Date: 22.FEB.2016 15:12:37

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



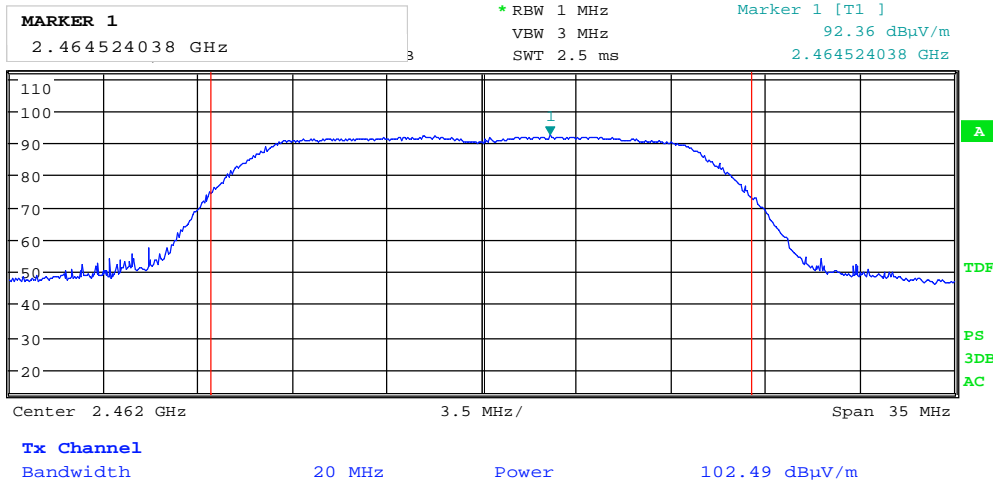
Date: 18.FEB.2016 15:59:41

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



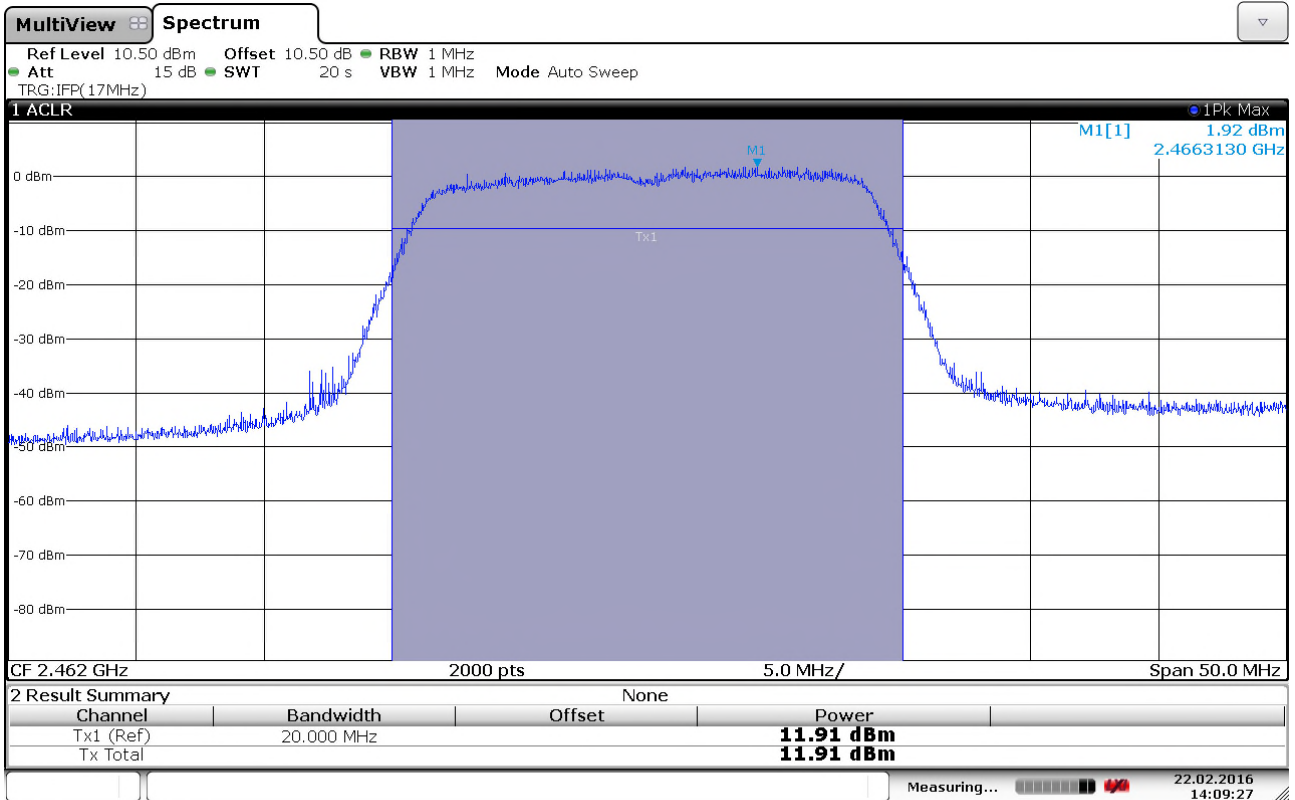
Date: 22.FEB.2016 15:11:18

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



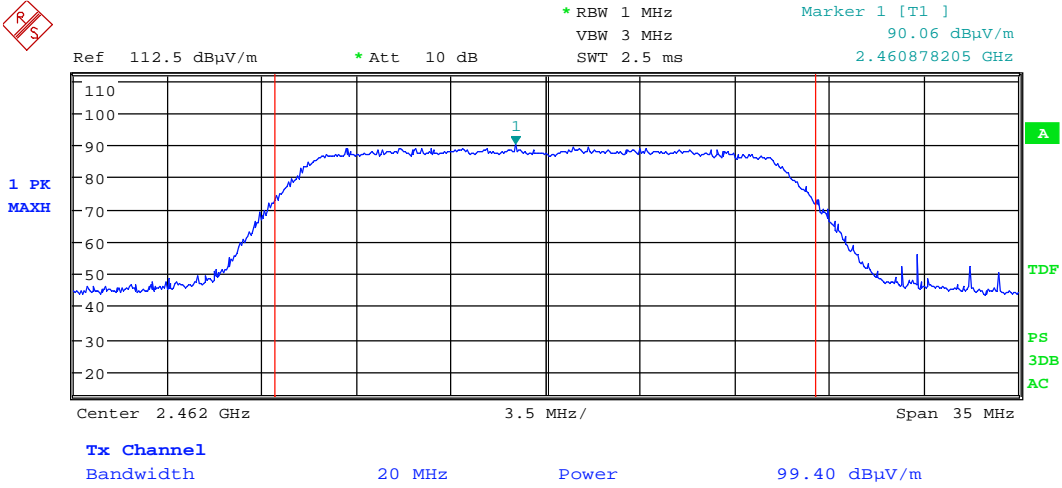
Date: 17.MAR.2016 08:31:56

**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 $\mu$ V/m)		Limit dB	Margin dB	
	2390 MHz	2483.5 MHz			
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 $\mu$ V/m)		Limit dB	Margin dB	
	2390 MHz	2483.5 MHz			
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:

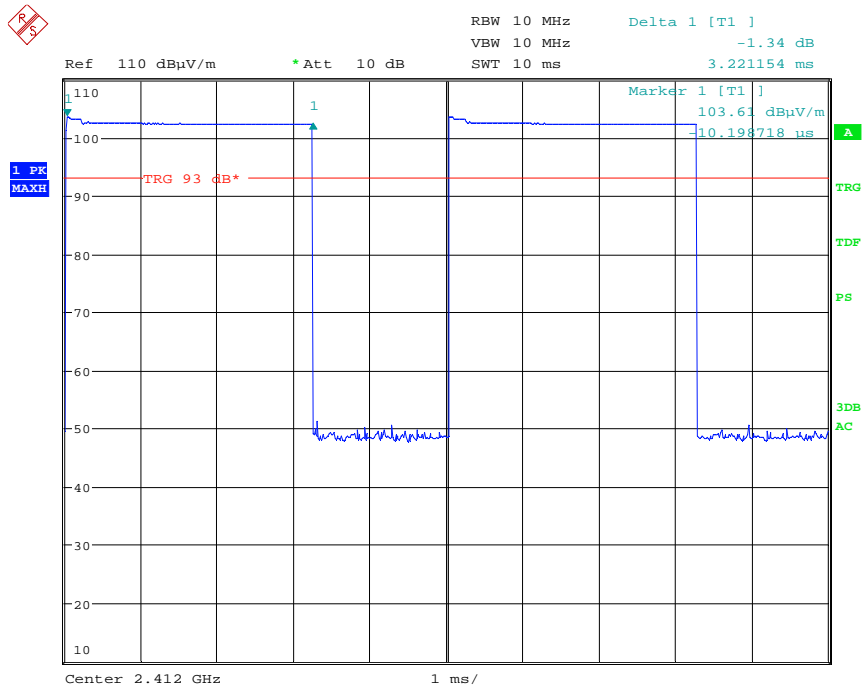
	Duty cycle (x) %	Duty cycle correction (dB)
802.11b, 5.5Mbps	64.02	1.93
802.11g, 9Mbps	95.32	0.20
802.11n, 65Mbps	5.74	12.4

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

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

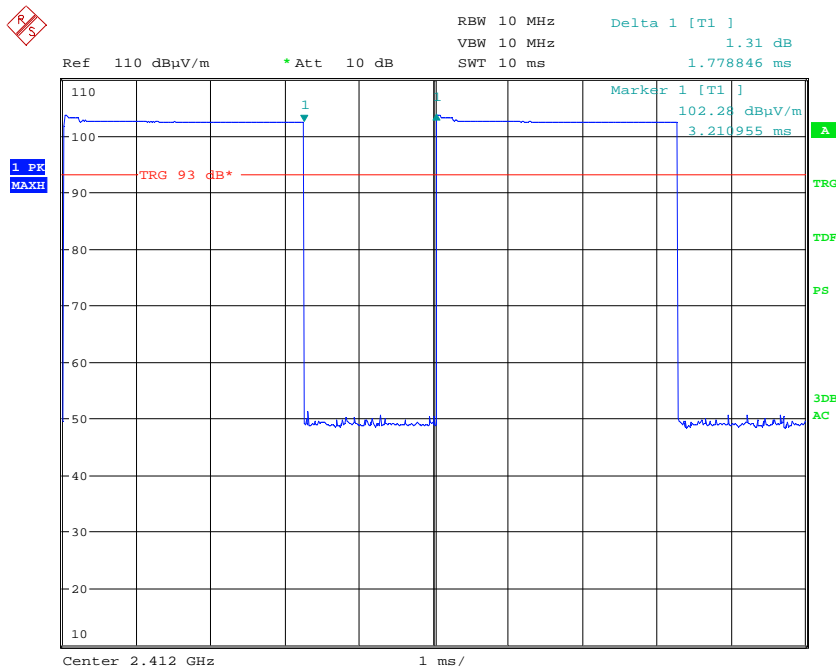
See attached plots





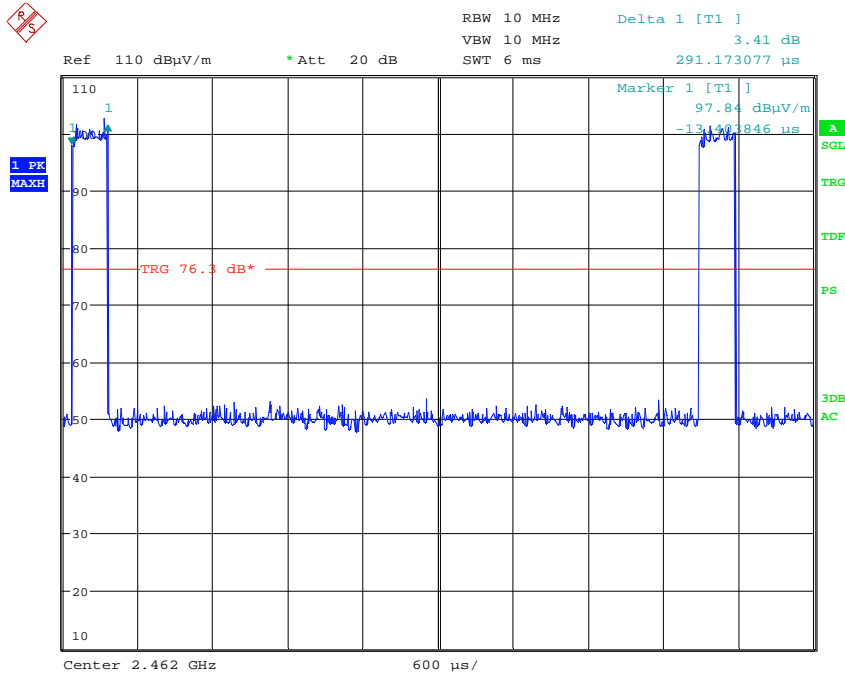
Date: 18.FEB.2016 11:22:09

ON time – 11b , 5.5Mbps



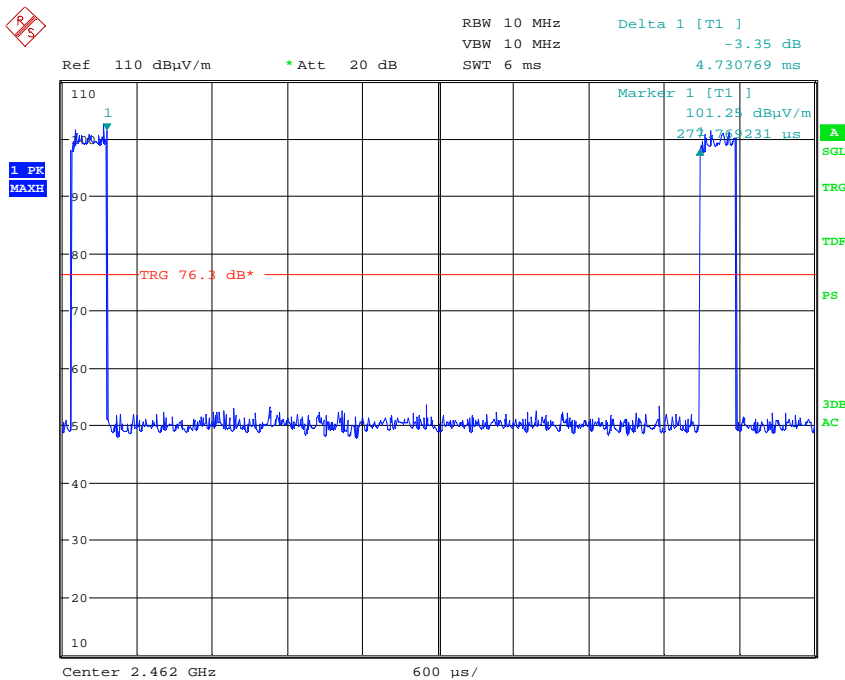
Date: 18.FEB.2016 11:22:36

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

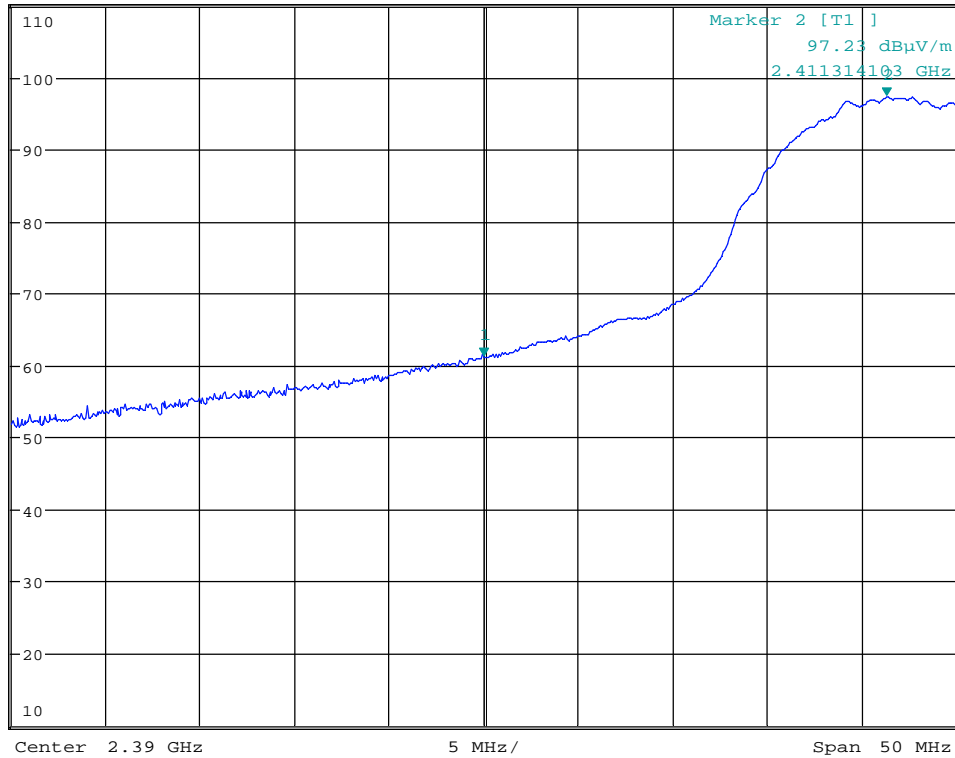


**MARKER 1**  
 2.39 GHz  
 Ref 110 dBµV/m \* Att 10 dB

\* RBW 1 MHz  
 VBW 3 MHz  
 SWT 2.5 ms

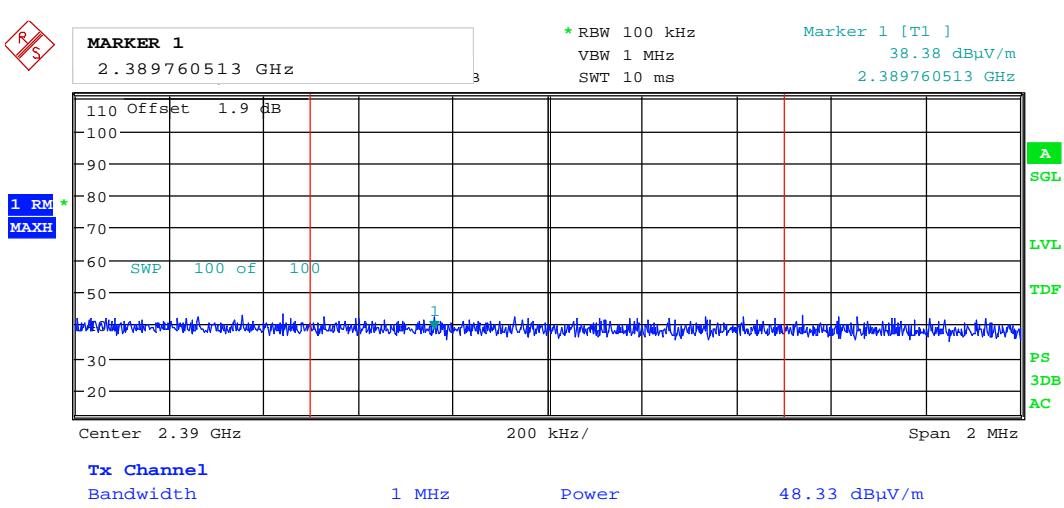
Marker 1 [T1 ]  
 61.09 dBµV/m  
 2.390000000 GHz

1 PK  
 MAXH



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

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

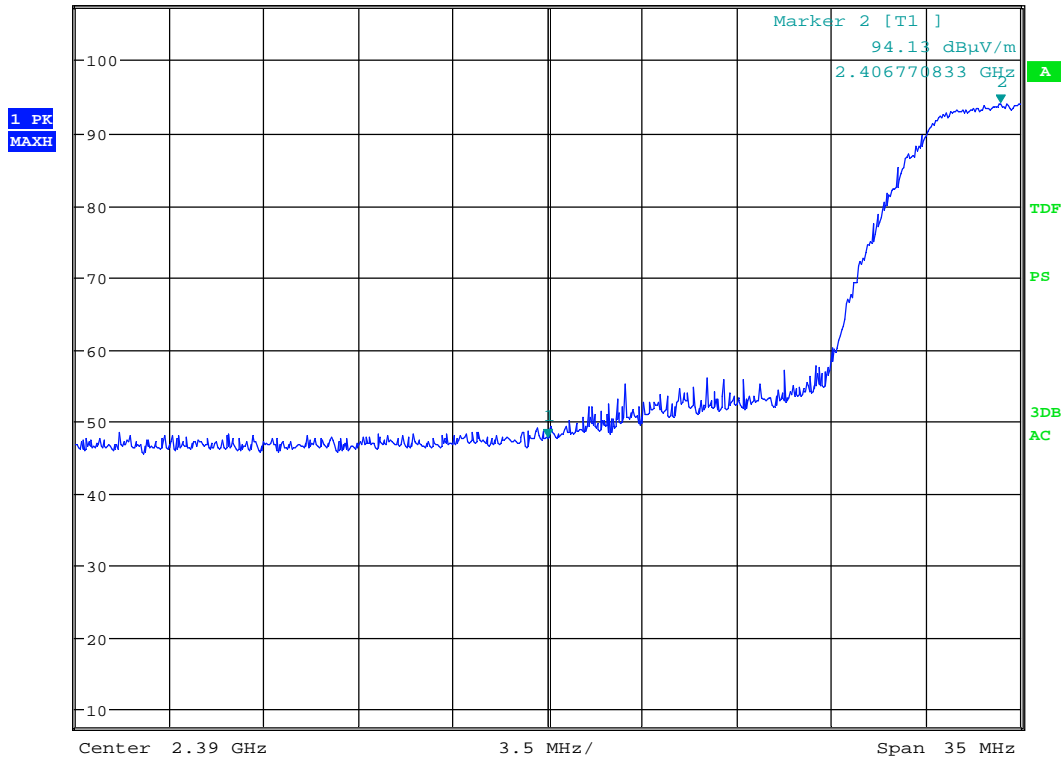


Date: 18.FEB.2016 12:49:05

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

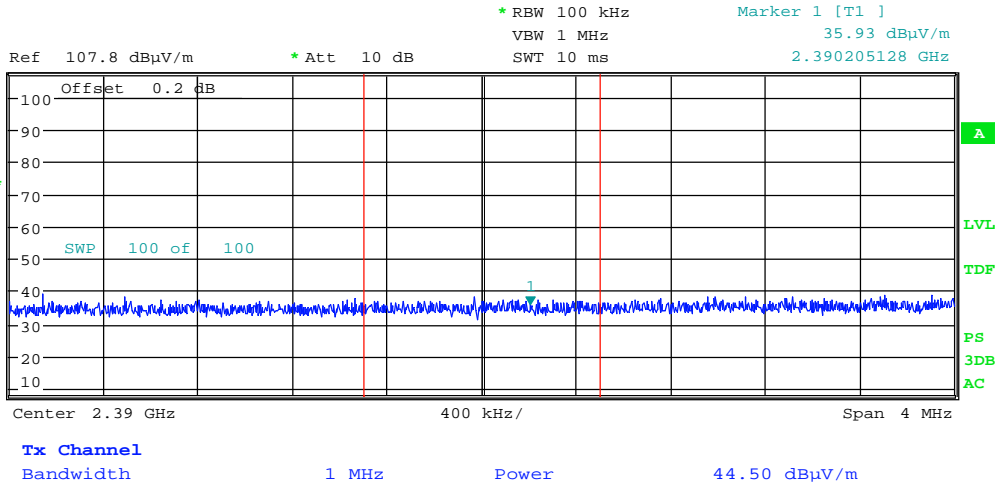


<b>MARKER 1</b>	* RBW 1 MHz	Marker 1 [T1 ]
2.39 GHz	VBW 3 MHz	47.66 dBµV/m
Ref 107.6 dBµV/m	SWT 2.5 ms	2.390000000 GHz
* Att 10 dB		



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**

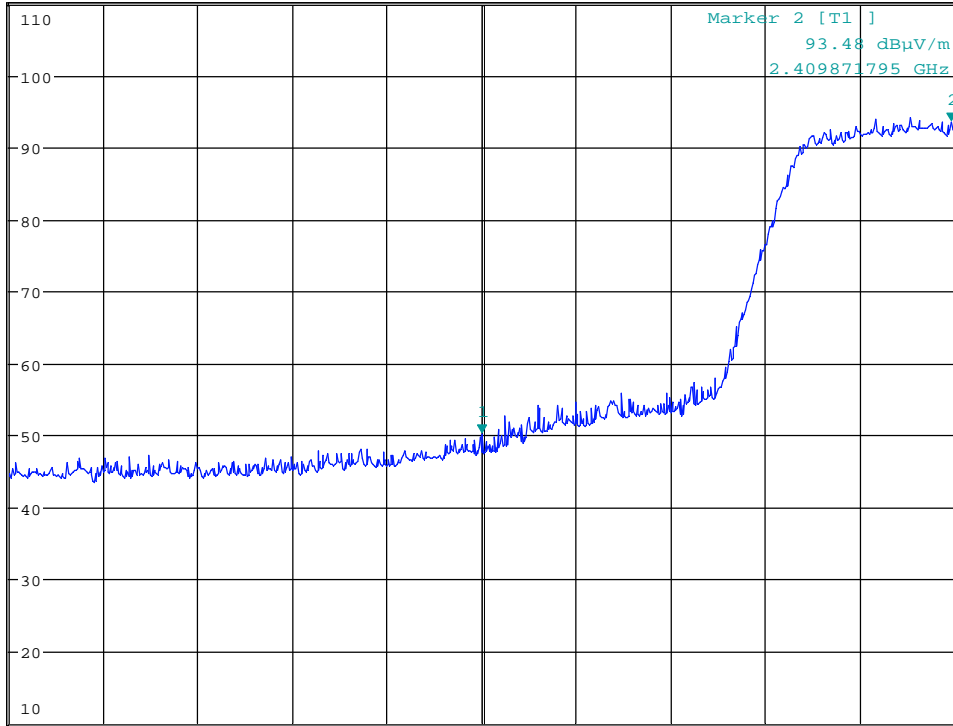


**MARKER 1**  
 2.39 GHz  
 Ref 110 dBuV/m \* Att 15 dB

\* RBW 1 MHz  
 VBW 3 MHz  
 SWT 2.5 ms

Marker 1 [T1 ]  
 50.17 dBuV/m  
 2.390000000 GHz

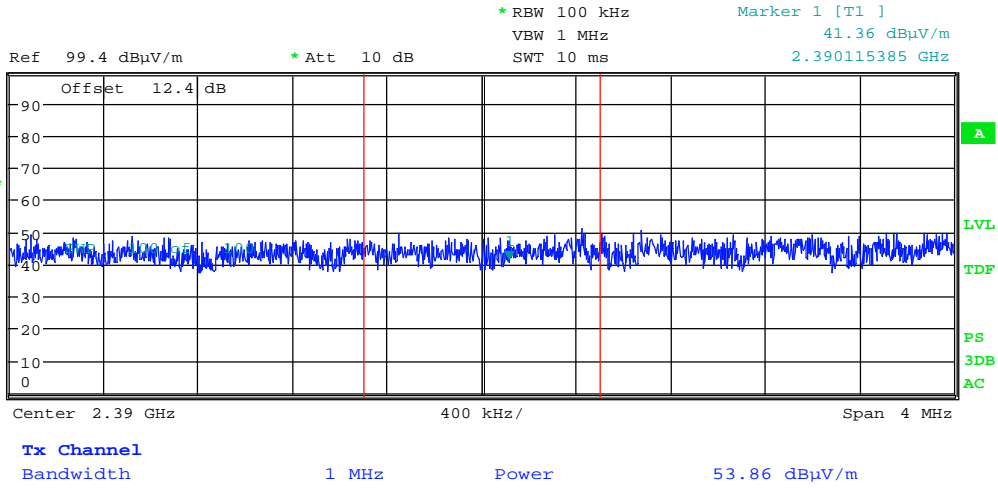
1 PK  
 MAXH



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**



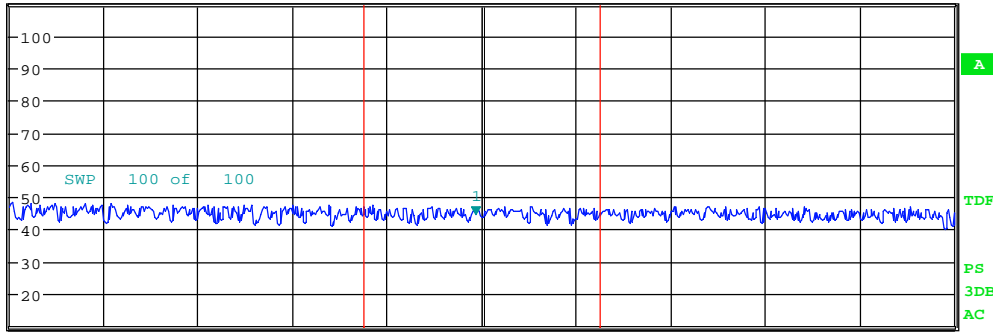


MARKER 1  
 2.483474359 GHz

\* RBW 100 kHz  
 VBW 300 kHz  
 SWT 2.5 ms

Marker 1 [T1 ]  
 44.55 dBµV/m  
 2.483474359 GHz

1 PK  
 MAXH



Center 2.4835 GHz      400 kHz/      Span 4 MHz

Tx Channel  
 Bandwidth 1 MHz      Power 54.84 dBµV/m

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

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

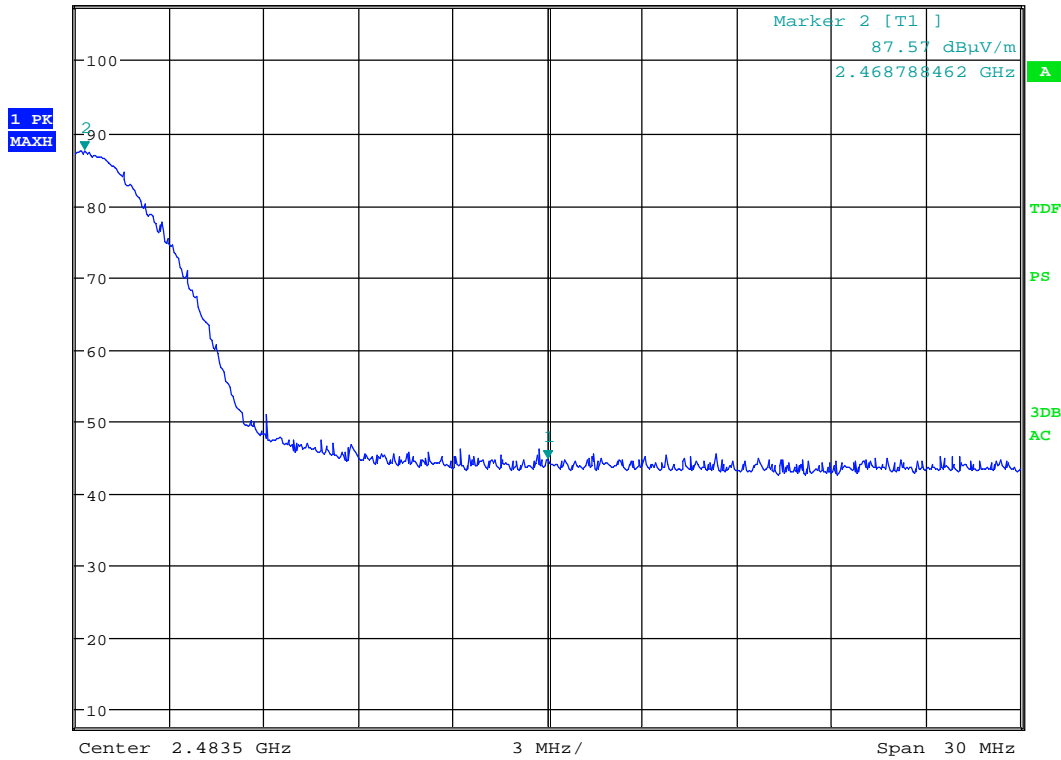


Date: 18.FEB.2016 16:07:05

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

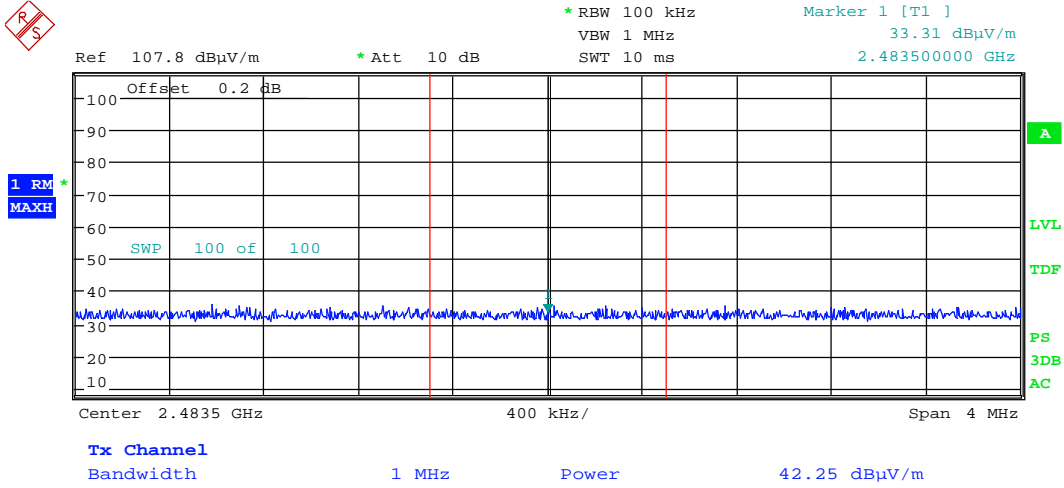


<b>MARKER 1</b>	* RBW 1 MHz	Marker 1 [T1 ]
2.4835 GHz	VBW 3 MHz	44.66 dBµV/m
Ref 107.6 dBµV/m	SWT 2.5 ms	2.483500000 GHz
* Att 10 dB		



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

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

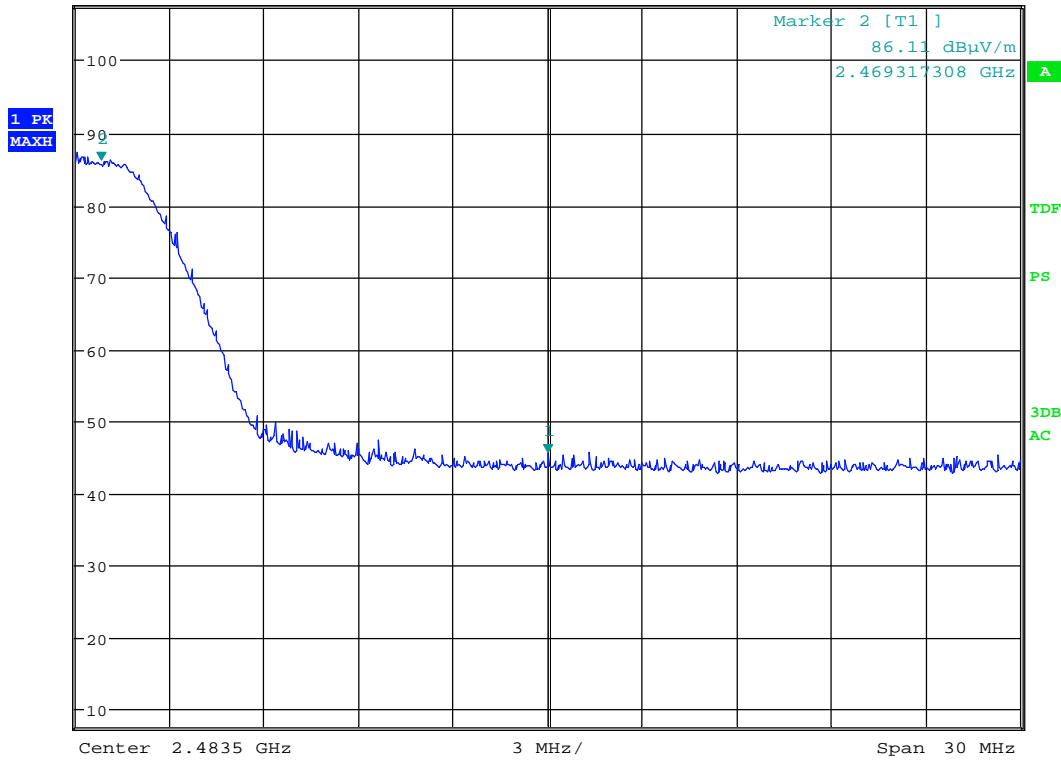


Date: 3.MAR.2016 11:04:38

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



<b>MARKER 1</b>	* RBW 1 MHz	Marker 1 [T1 ]
2.4835 GHz	VBW 3 MHz	45.59 dBµV/m
Ref 107.6 dBµV/m	SWT 2.5 ms	2.483500000 GHz
* Att 10 dB		



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

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



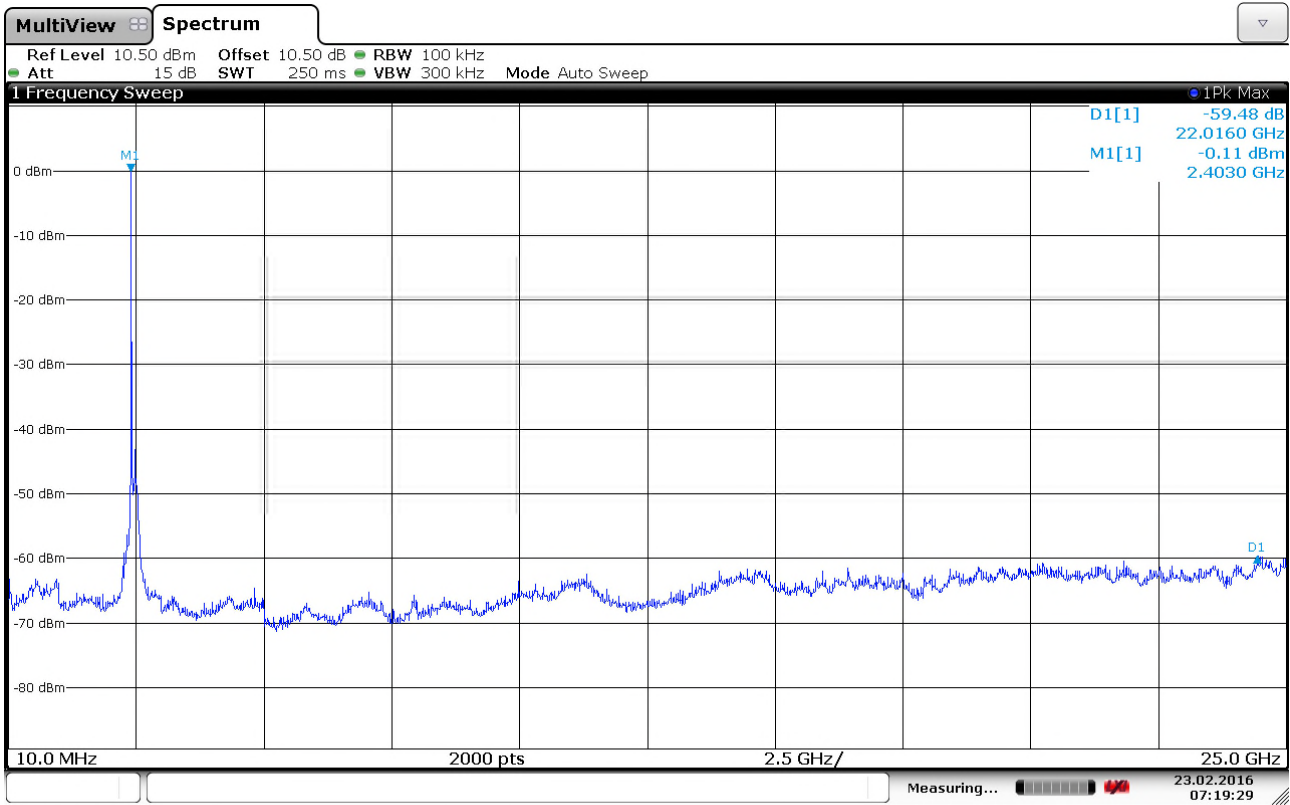
**RF conducted power** to 25 GHz see attached graph.

Maximum RF level outside operating band:

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

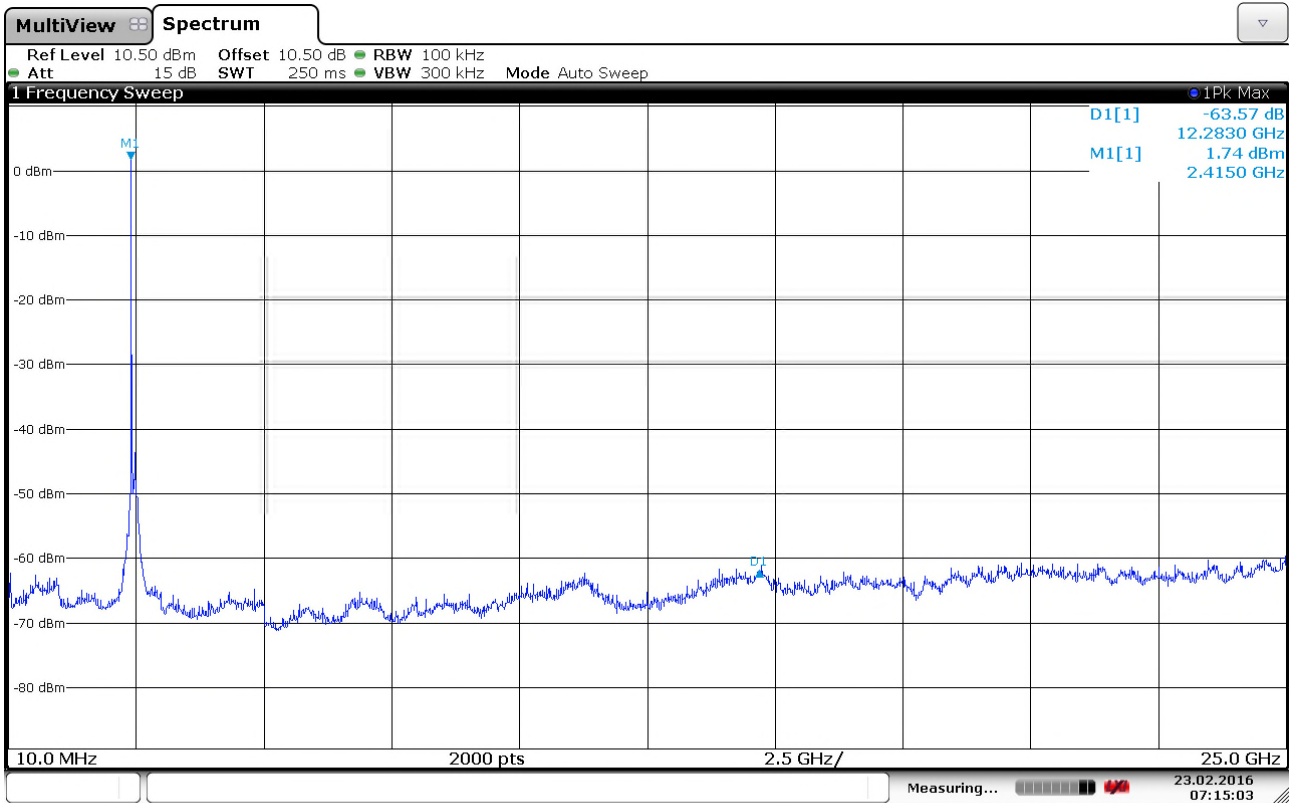
RF ch 2437 MHz:> 30 dB/C, margin >30 dB

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



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

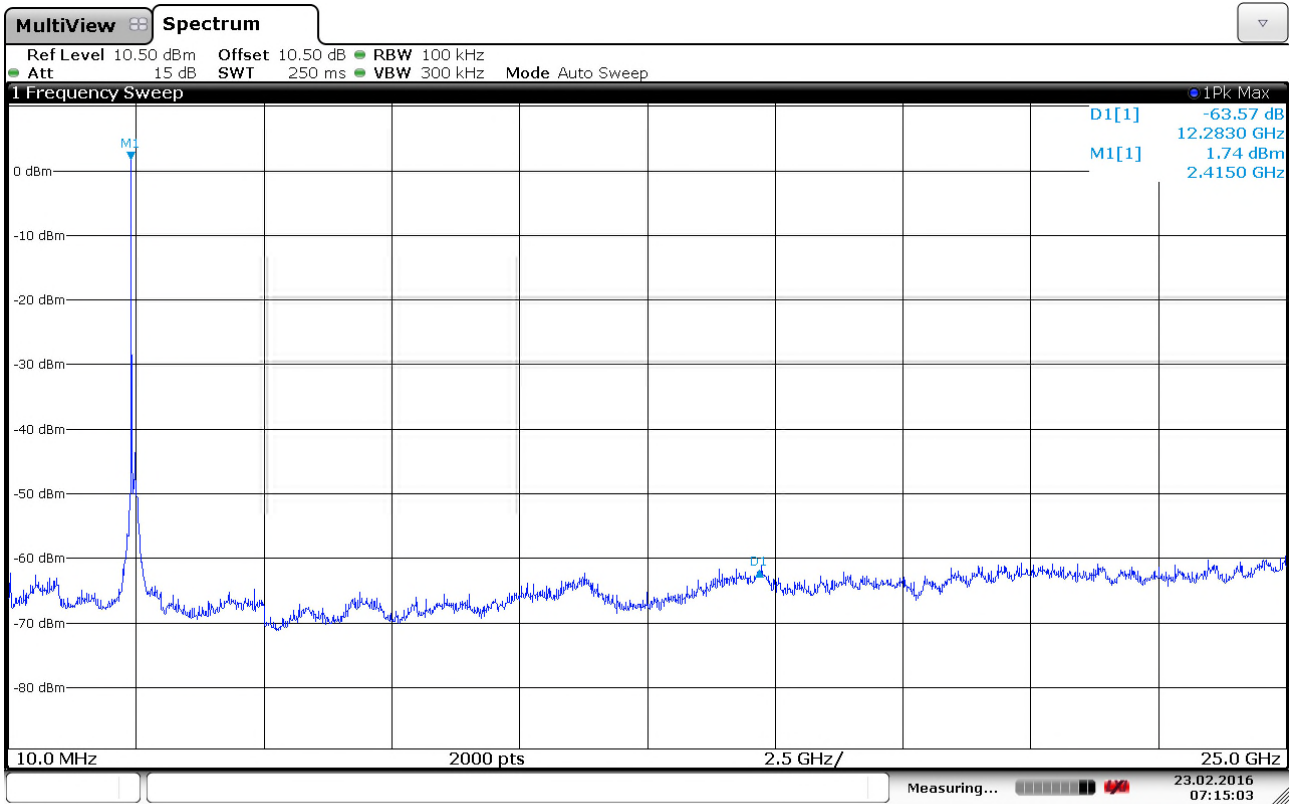
### Conducted Emissions 10 MHz – 25 GHz, 2412 MHz, 802.11b, 5.5Mbps



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

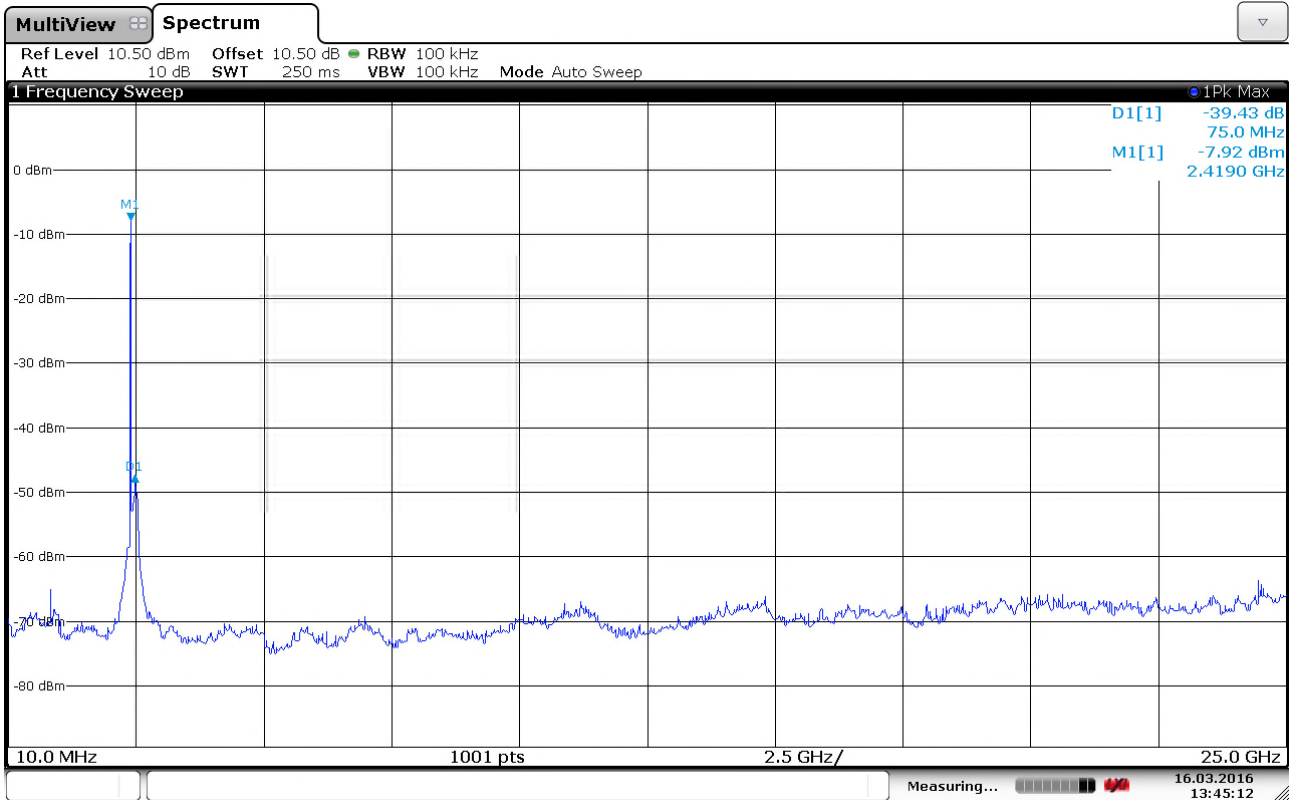


**Conducted Emissions 10 MHz – 25 GHz, 2437 MHz, 802.11b, 5.5Mbps**

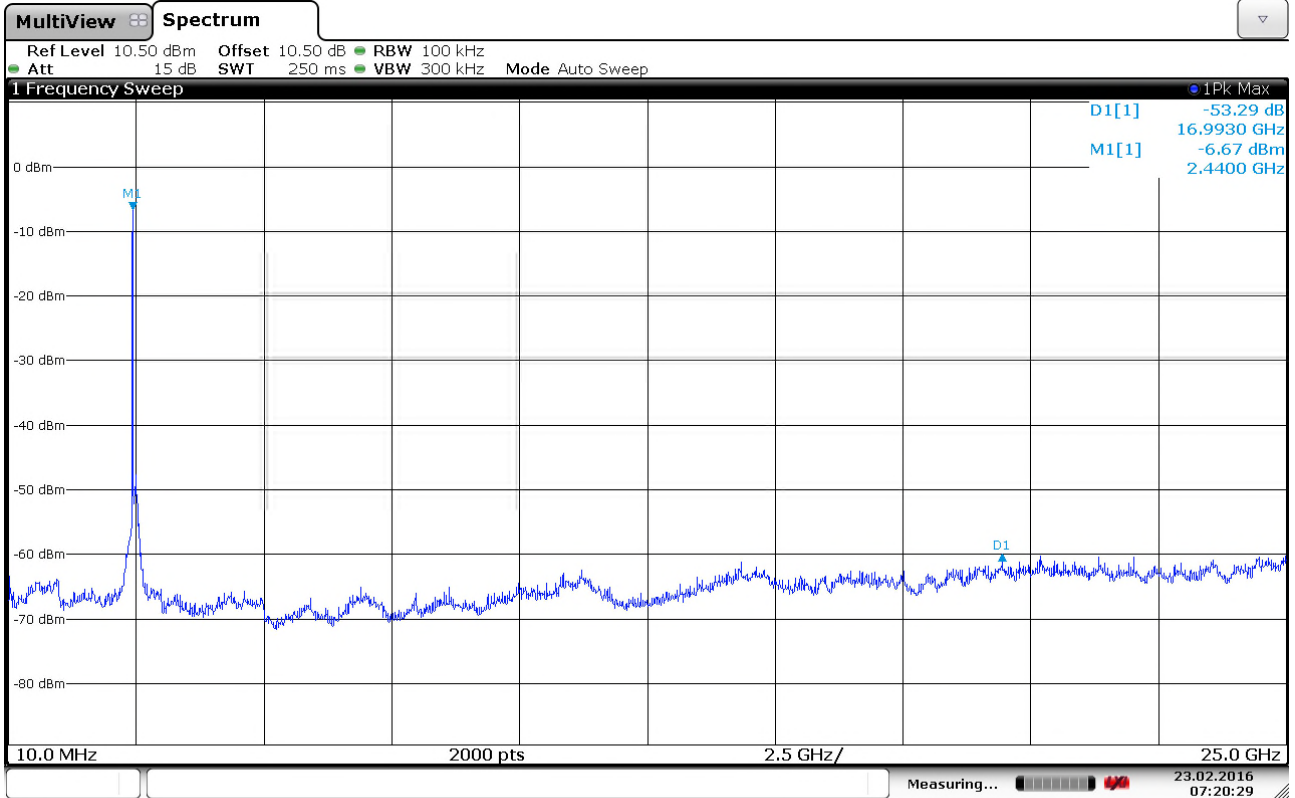


Date: 23.FEB.2016 07:15:03

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

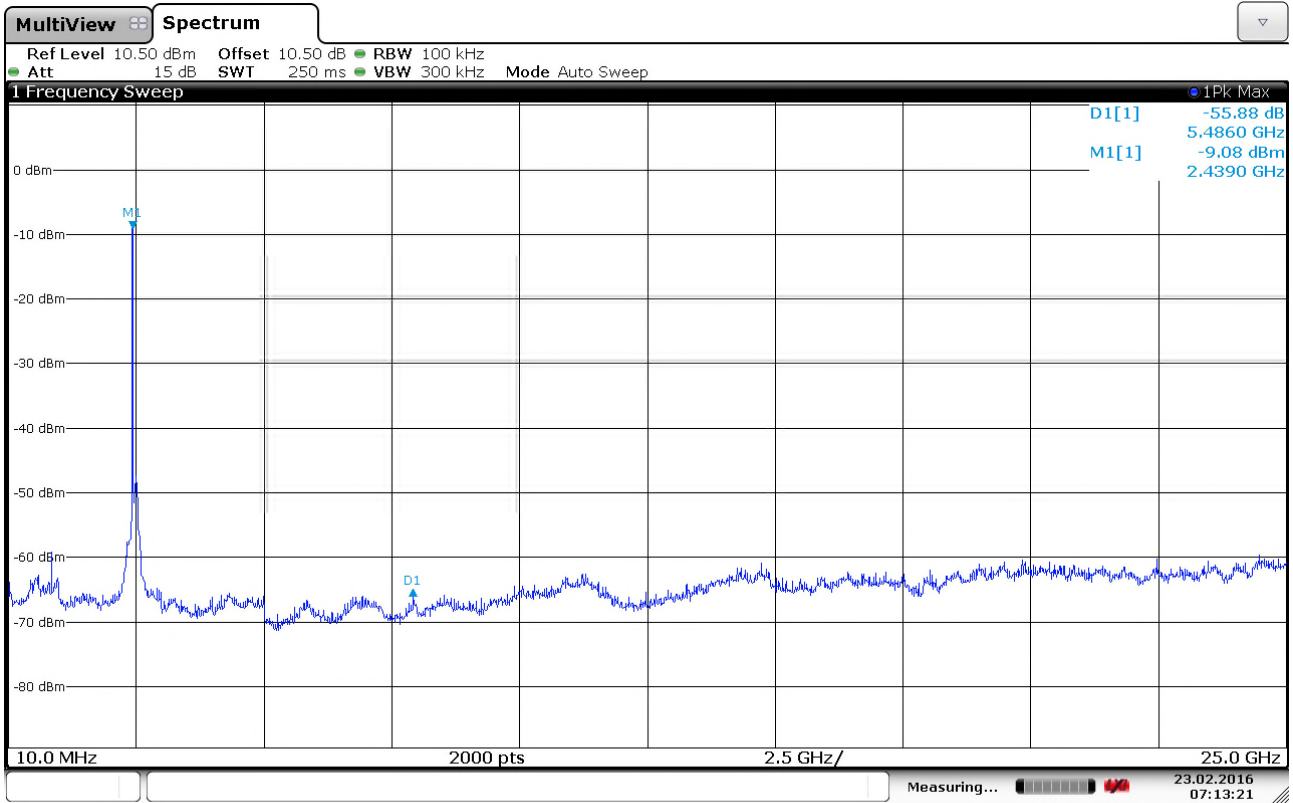


**Conducted Emissions 10 MHz – 25 GHz, 2412 MHz, 802.11g, 9Mbps**



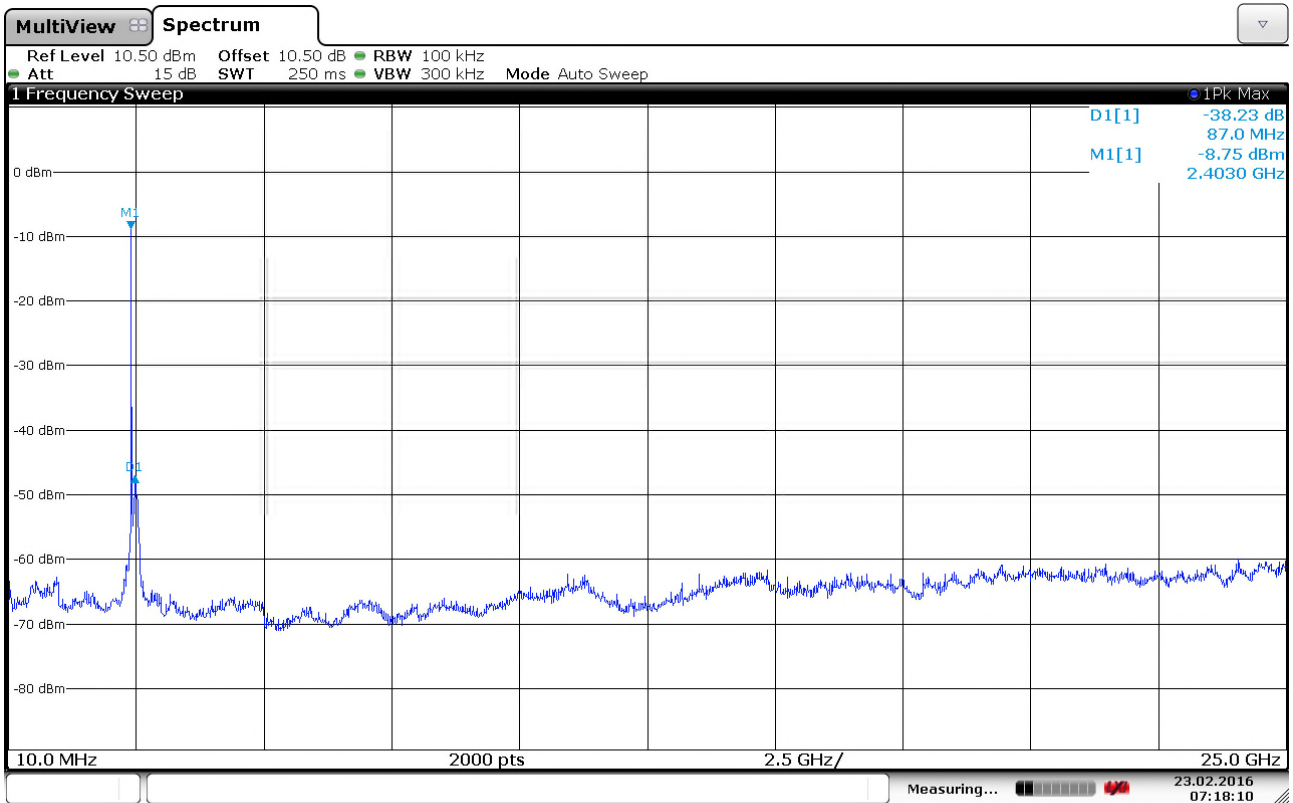
Date: 23.FEB.2016 07:20:29

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



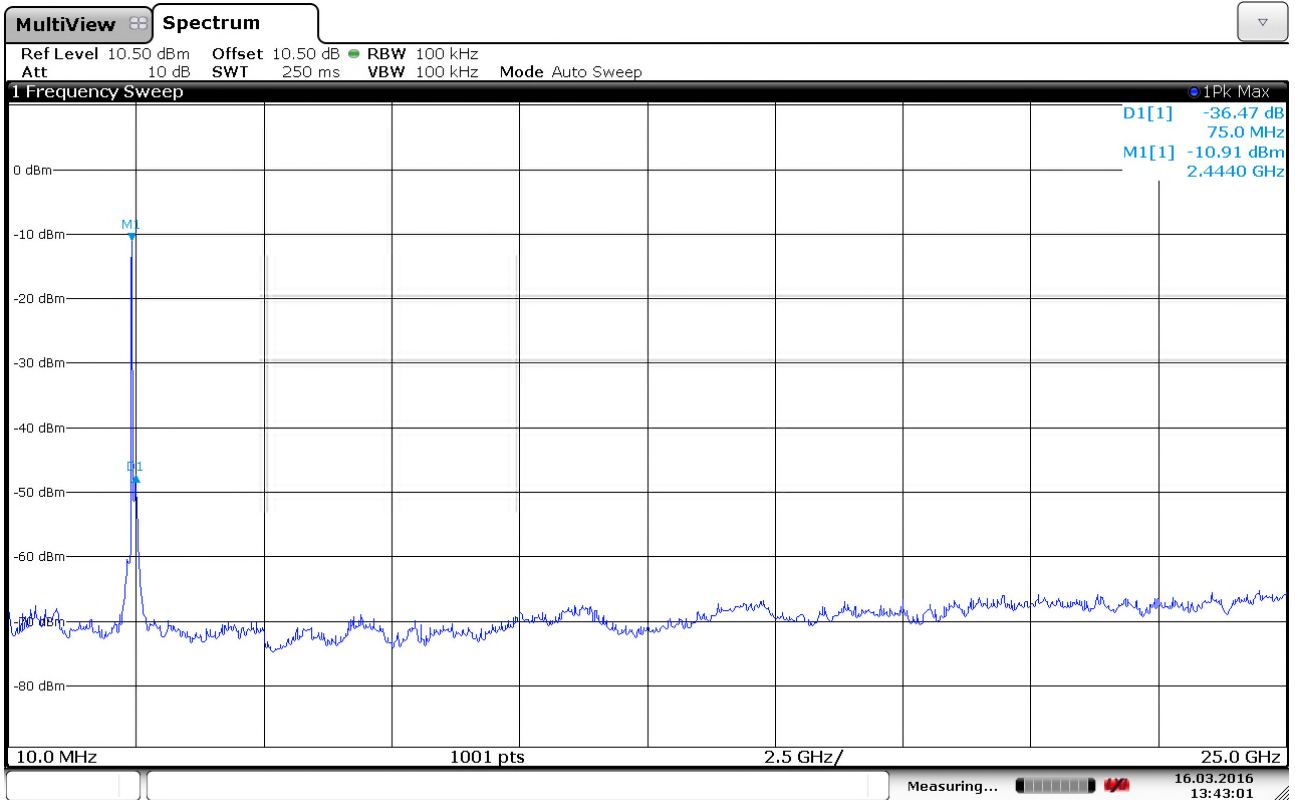
Date: 23.FEB.2016 07:13:21

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

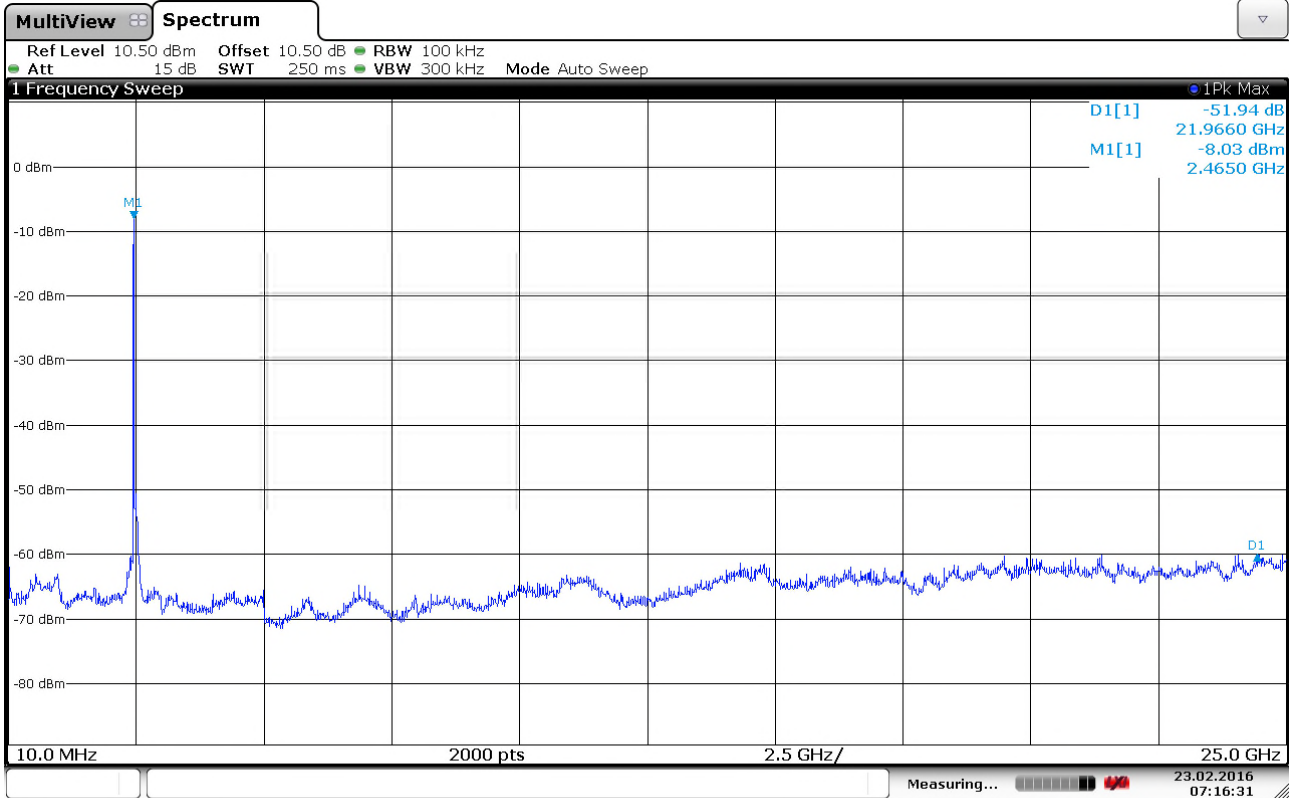


Date: 23.FEB.2016 07:18:10

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



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

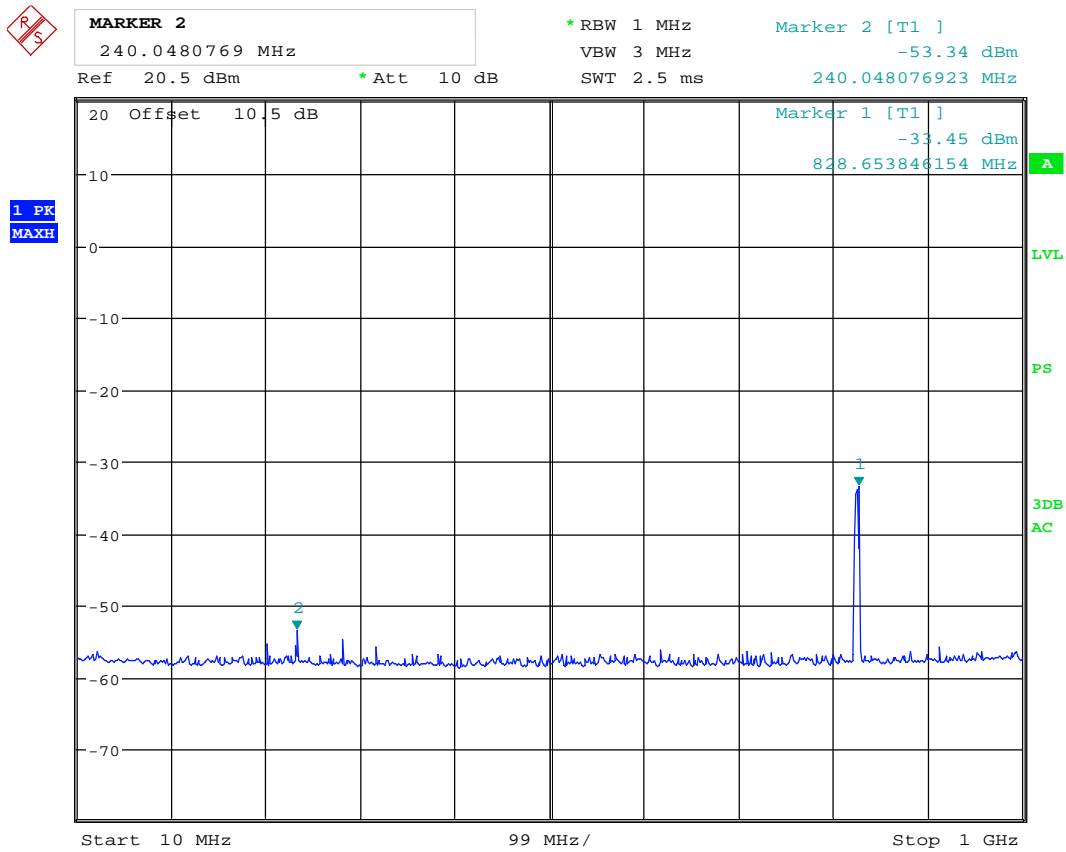


Date: 23.FEB.2016 07:16:30

**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.



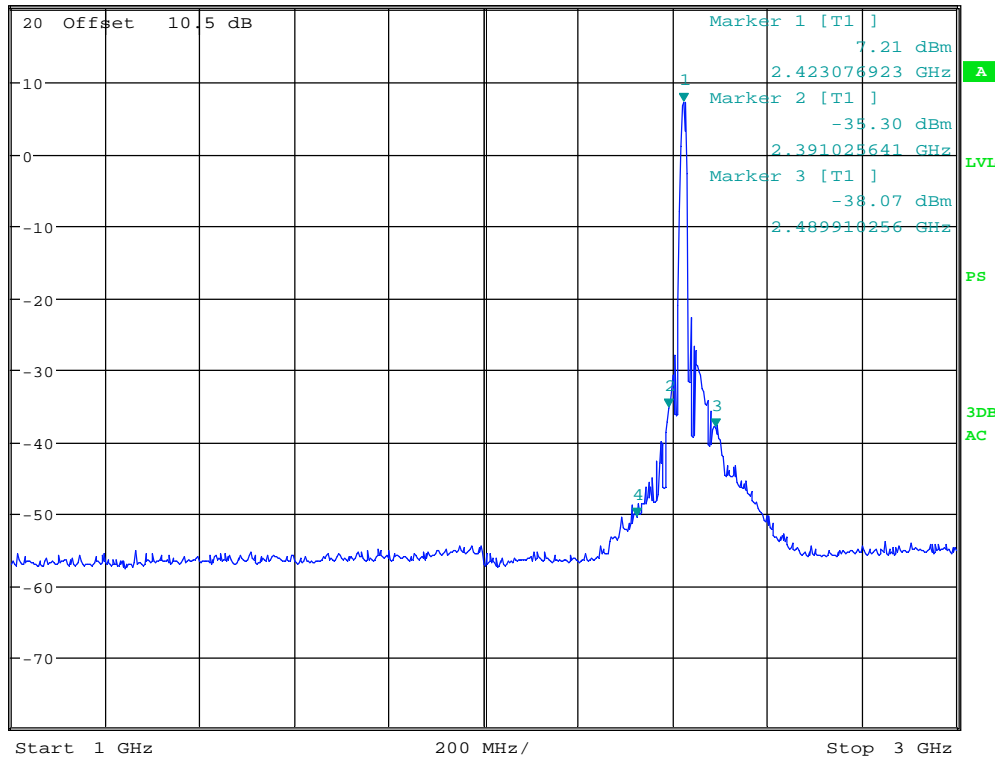
Date: 3.AUG.2016 19:05:40

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



**MARKER 4**  
 2.323717949 GHz  
 Ref 20.5 dBm \* Att 10 dB  
 \* RBW 1 MHz Marker 4 [T1 ]  
 VBW 3 MHz -50.44 dBm  
 SWT 5 ms 2.323717949 GHz

1 PK  
 MAXH

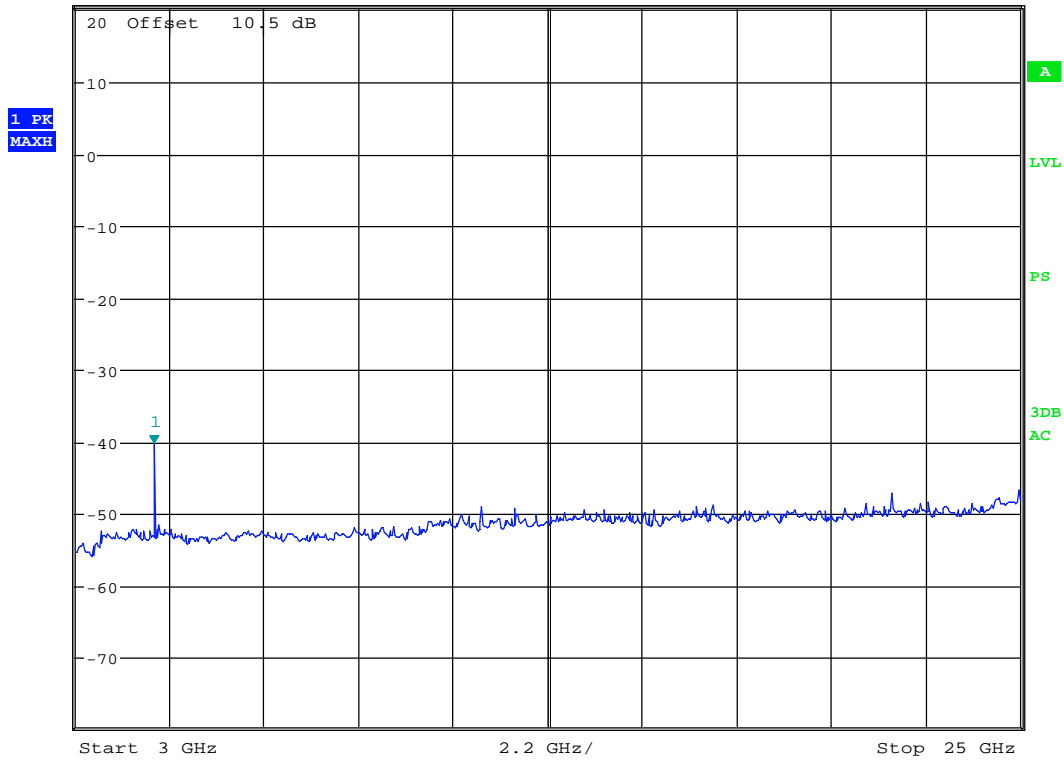


Date: 3.AUG.2016 19:04:45

**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 Marker 1 [T1 ]  
 VBW 3 MHz -40.36 dBm  
 SWT 130 ms 4.833333333 GHz



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

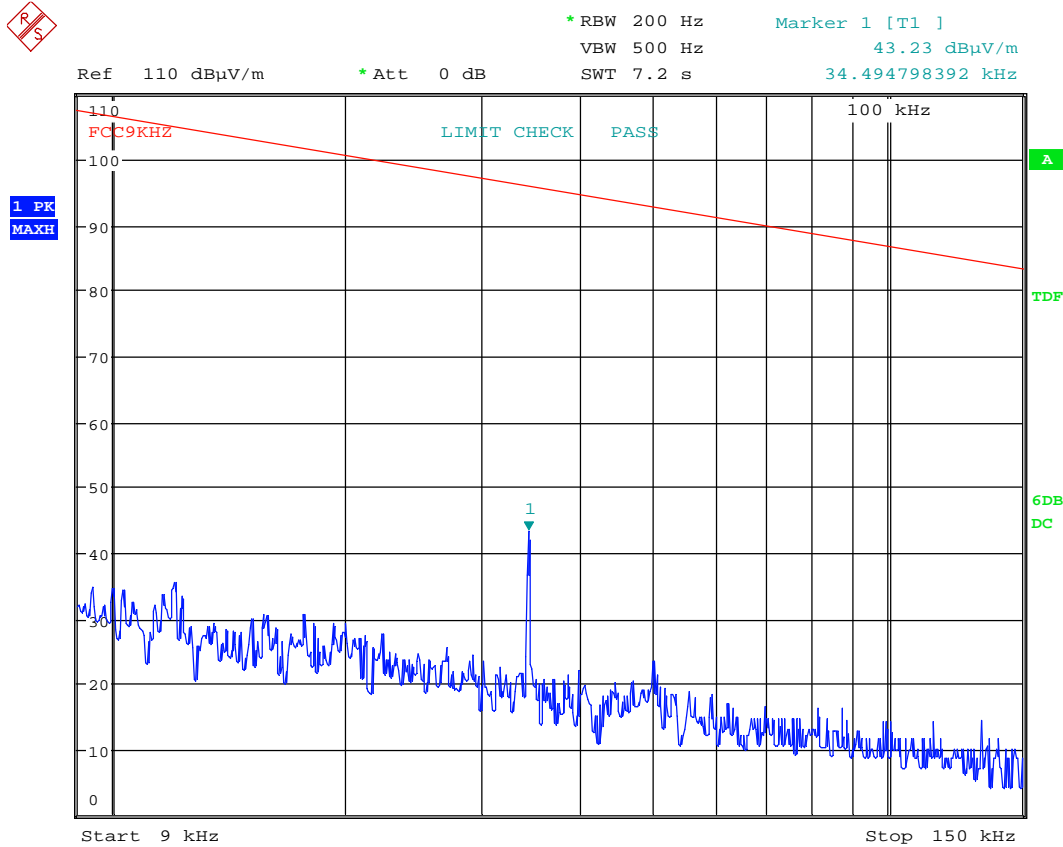
**Conducted Emissions 3 - 25GHz, on wi-fi RF port**

**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).



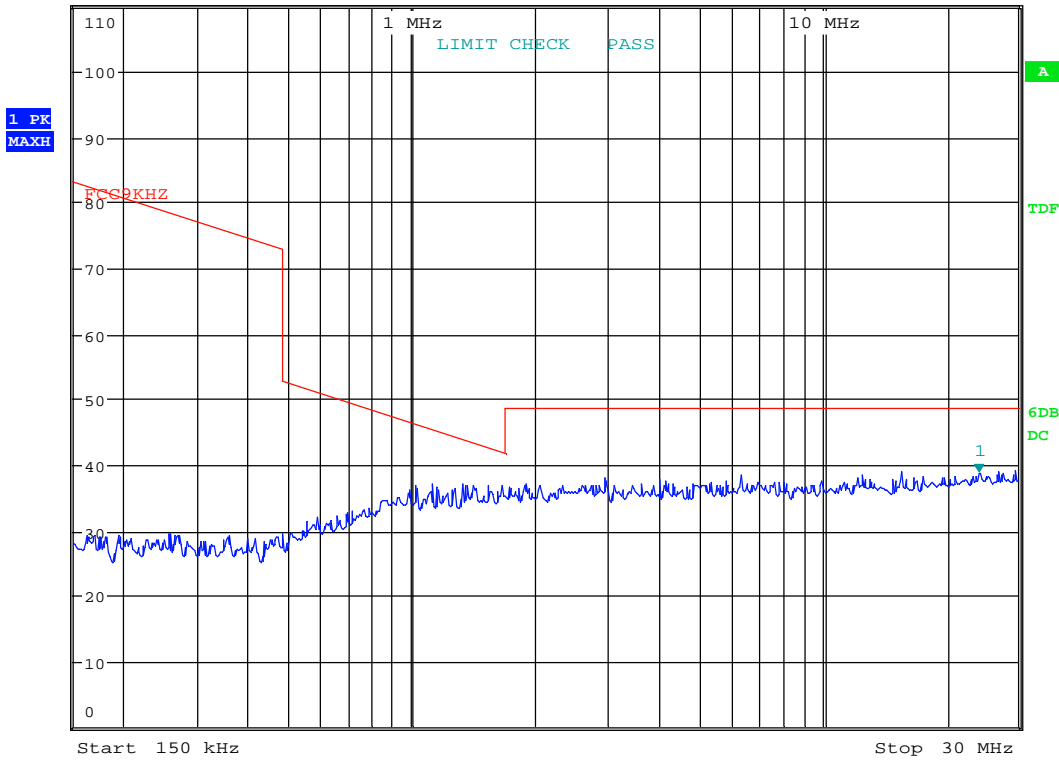
Date: 10.MAR.2016 08:30:29

9kHz – 150kHz





**MARKER 1**  
 24.05719591 MHz  
 Ref 110 dBuV/m \* Att 0 dB \* RBW 9 kHz Marker 1 [T1 ]  
 VBW 30 kHz 38.68 dBuV/m  
 SWT 740 ms 24.057195910 MHz



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

150KHz – 30MHz

**Radiated emission 30 – 1000 MHz.**

Detector: Quasi-Peak

Measuring distance 3m.

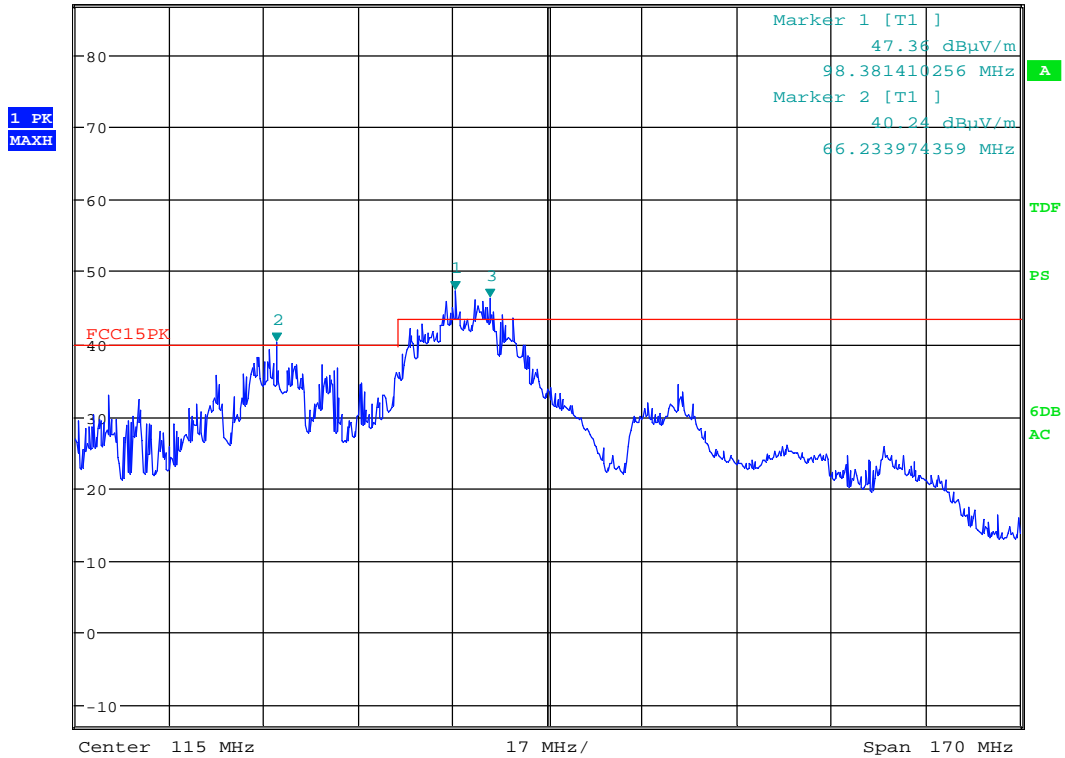
Frequency	Operational condition	Detector	Field strength	Measuring distance	Limit FCC15.209	Margin
MHz			dB $\mu$ V/m	metres	dB $\mu$ V/m	dB
66.23	TX on	QP	39.83	3	40.0	0.17
98.38	TX on	QP	42.36	3	43.5	1.17
104.67	TX on	QP	38.38	3	43.5	5.12

The maximum is obtained at Vertical polarization

See attached graphs.



Ref 87 dB $\mu$ V/m      \*Att 10 dB      \*RBW 100 kHz      Marker 3 [T1 ]  
 VBW 300 kHz      46.45 dB $\mu$ V/m  
 SWT 45 ms      104.647435897 MHz

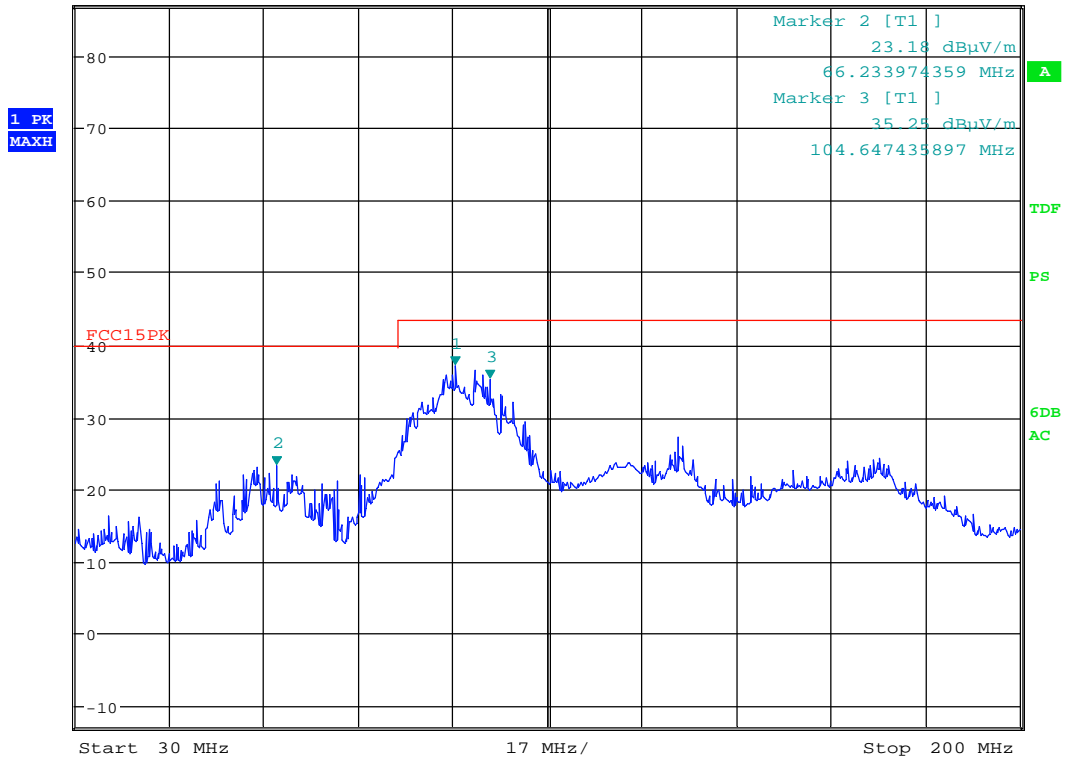


Date: 10.MAR.2016 07:15:23

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



Ref 87 dB $\mu$ V/m      \*Att 10 dB      \*RBW 100 kHz      Marker 1 [T1 ]  
 VBW 300 kHz      37.13 dB $\mu$ V/m  
 SWT 45 ms      98.381410256 MHz



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

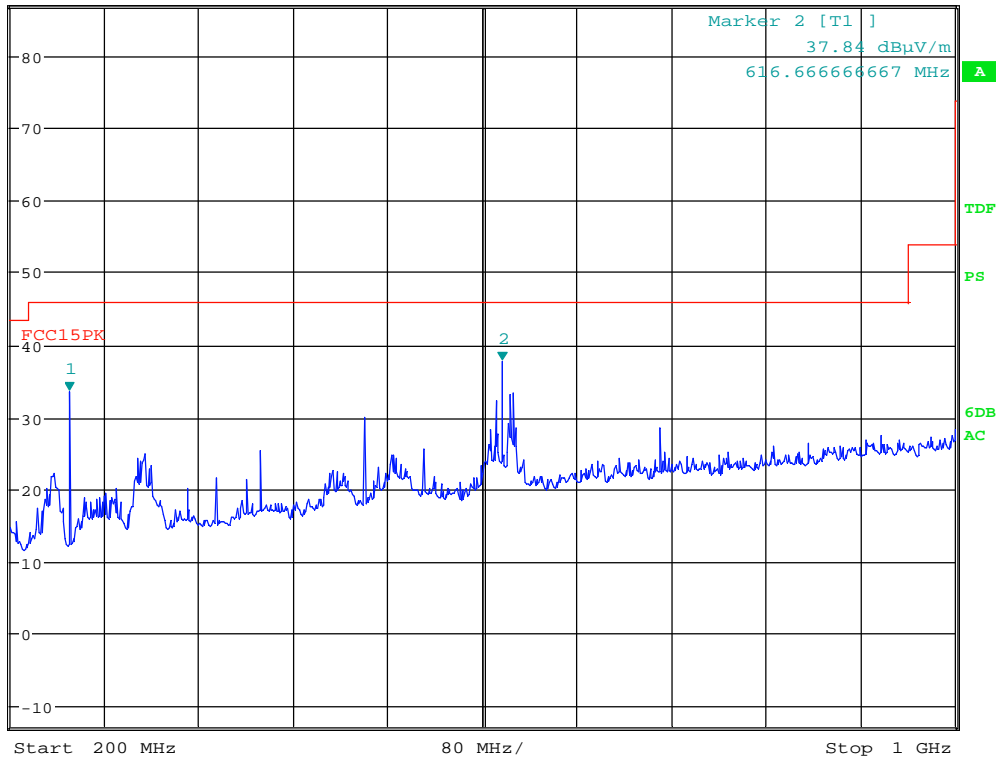
**Radiated Emissions, 30 – 200 MHz, HP , @3m, PK scan**



**MARKER 1**  
 250 MHz  
 Ref 87 dB $\mu$ V/m \* Att 10 dB

\* RBW 100 kHz Marker 1 [T1 ]  
 VBW 300 kHz 33.60 dB $\mu$ V/m  
 SWT 195 ms 250.00000000 MHz

1 PK  
 MAXH



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

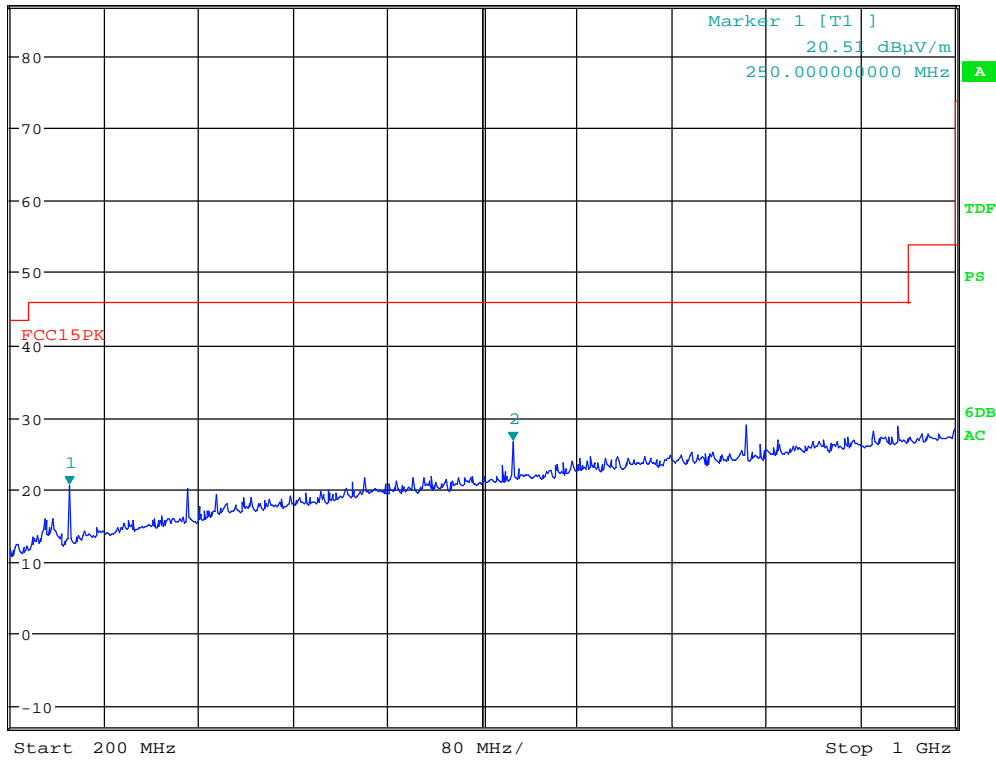
**Radiated Emissions, 200 - 1000 MHz, VP , @3m, PK scan**



**MARKER 2**  
 625.6410256 MHz  
 Ref 87 dBµV/m \*Att 10 dB

\*RBW 100 kHz Marker 2 [T1 ]  
 VBW 300 kHz 26.66 dBµV/m  
 SWT 195 ms 625.641025641 MHz

1 PK  
 MAXH



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 $\mu$ V/m	dB	dB $\mu$ 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 $\mu$ V/m	dB	dB $\mu$ 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".

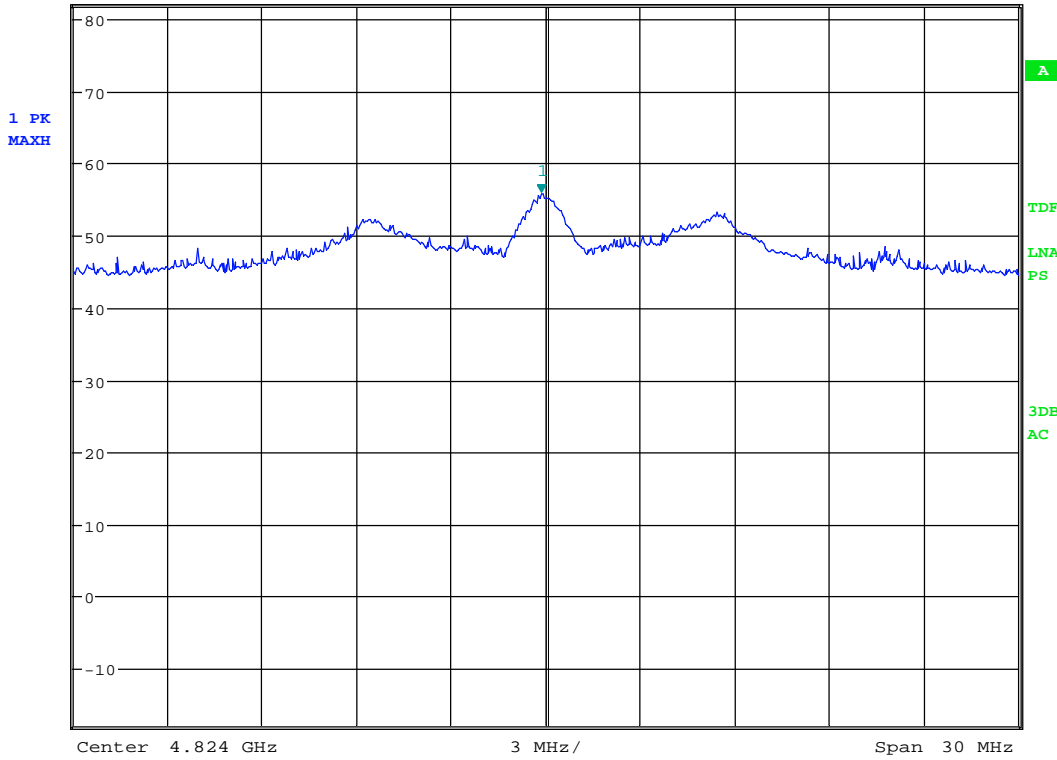
See plots.



**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



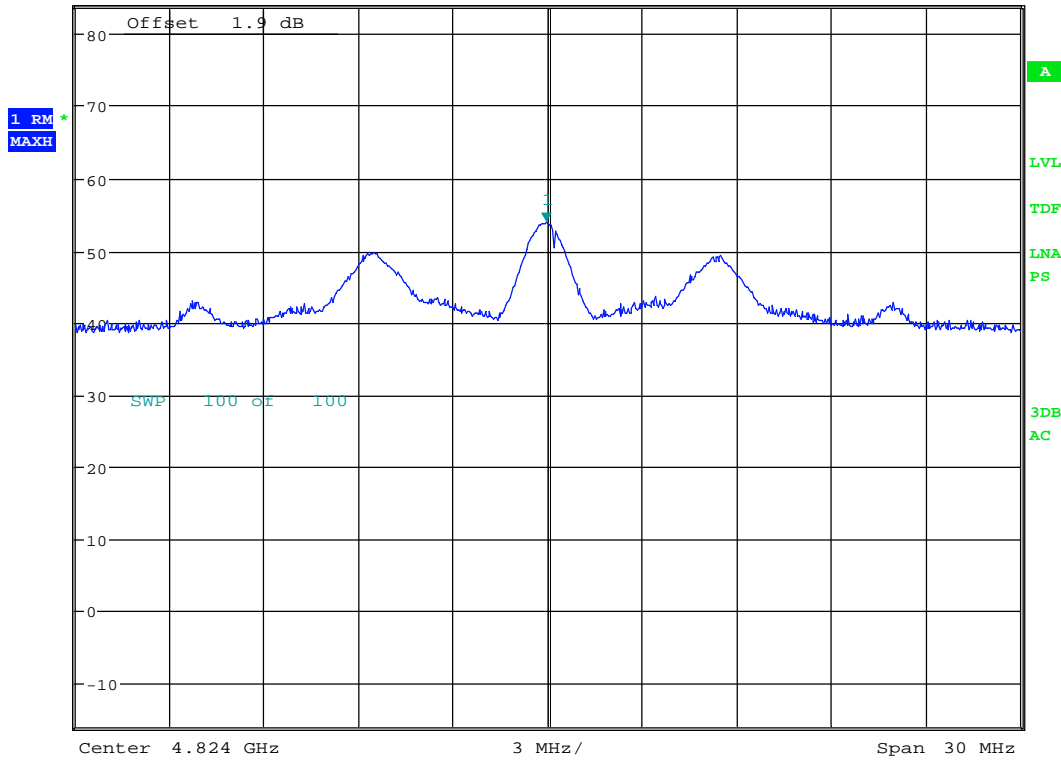
Date: 18.FEB.2016 13:39:20

**2<sup>nd</sup> har , PK detector, 2412MHz, HP, 802.11b, 5.5Mbps**





<b>MARKER 1</b>	* RBW 1 MHz	Marker 1 [T1 ]
4.82394375 GHz	VBW 10 MHz	53.94 dBµV/m
Ref 83.9 dBµV/m	* Att 10 dB	SWT 20 ms
		4.823943750 GHz

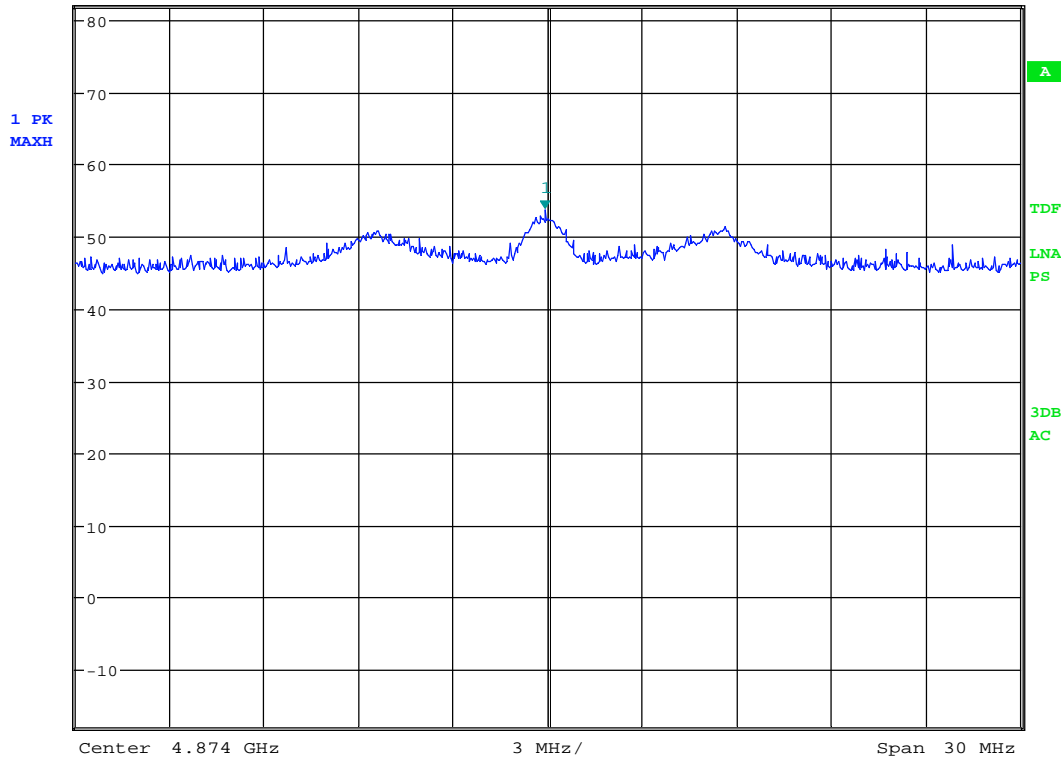


Date: 18.FEB.2016 13:48:30

**2<sup>nd</sup> har , RMS detector, 2412MHz, HP, 802.11b, 5.5Mbps**



<b>MARKER 1</b>	* RBW 1 MHz	Marker 1 [T1 ]
4.873925 GHz	VBW 3 MHz	53.71 dBµV/m
Ref 82 dBµV/m	* Att 20 dB	SWT 20 ms
		4.873925000 GHz

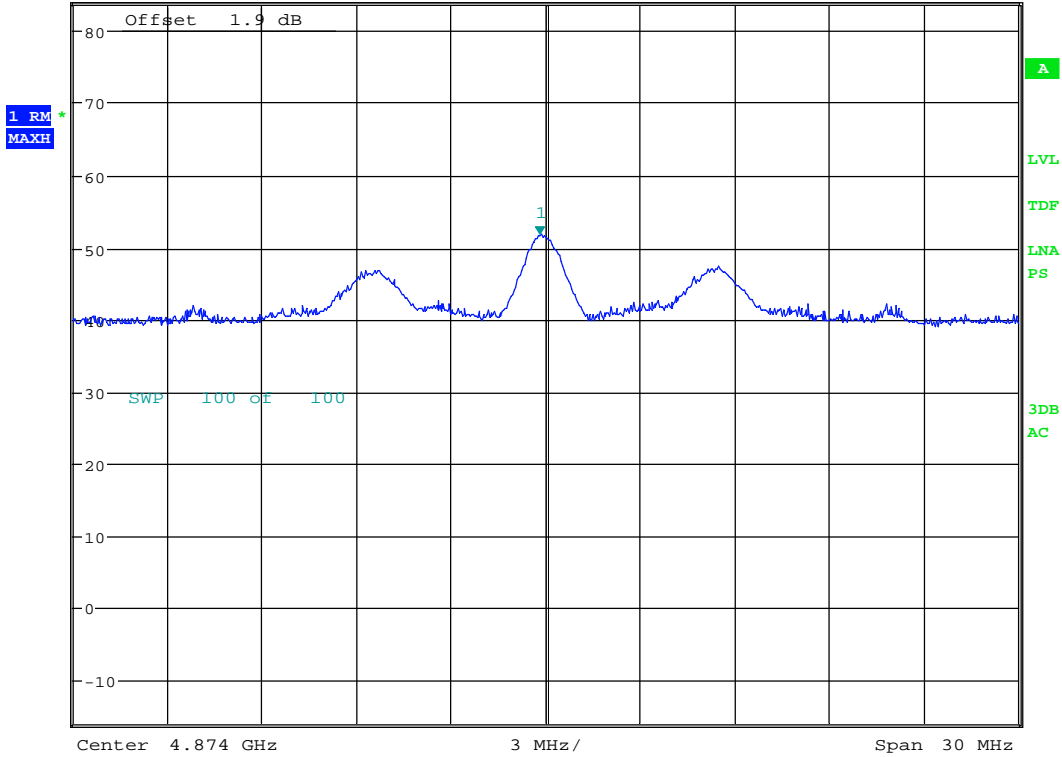


Date: 19.FEB.2016 07:56:26

**2<sup>nd</sup> har , PK detector, 2437MHz, HP, 802.11b, 5.5Mbps**



<b>MARKER 1</b>	* RBW 1 MHz	Marker 1 [T1]
4.873784 GHz	VBW 10 MHz	51.75 dBµV/m
Ref 83.9 dBµV/m	* Att 20 dB	SWT 20 ms
		4.873784000 GHz

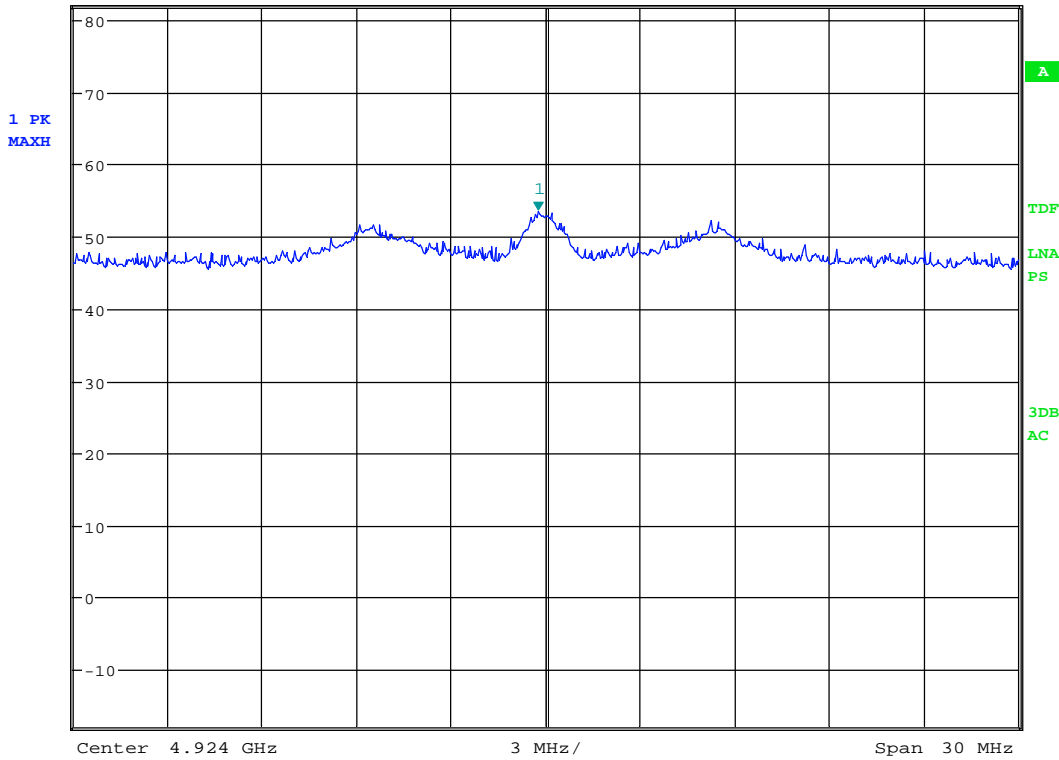


Date: 19.FEB.2016 07:57:23

**2<sup>nd</sup> har , RMS detector, 2437MHz, HP, 802.11b, 5.5Mbps**



<b>MARKER 1</b>	* RBW 1 MHz	Marker 1 [T1 ]
4.923759615 GHz	VBW 3 MHz	53.48 dBµV/m
Ref 82 dBµV/m	* Att 20 dB	SWT 20 ms
		4.923759615 GHz

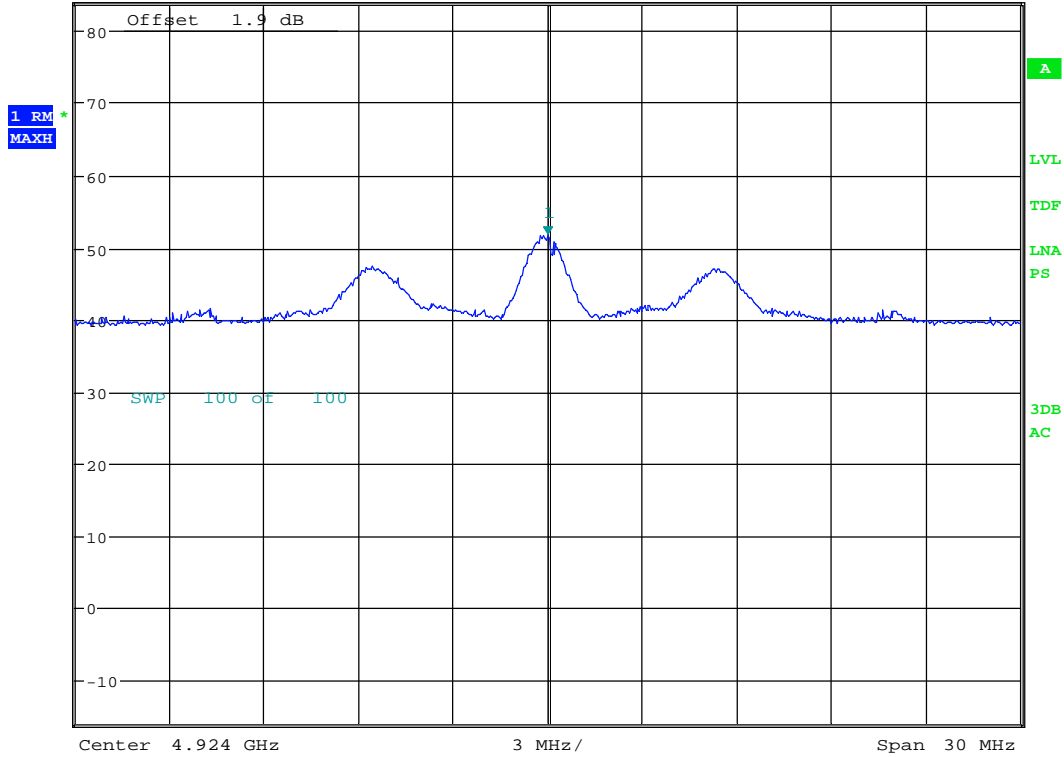


Date: 19.FEB.2016 07:10:59

**2<sup>nd</sup> 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  
 4.92400000 GHz

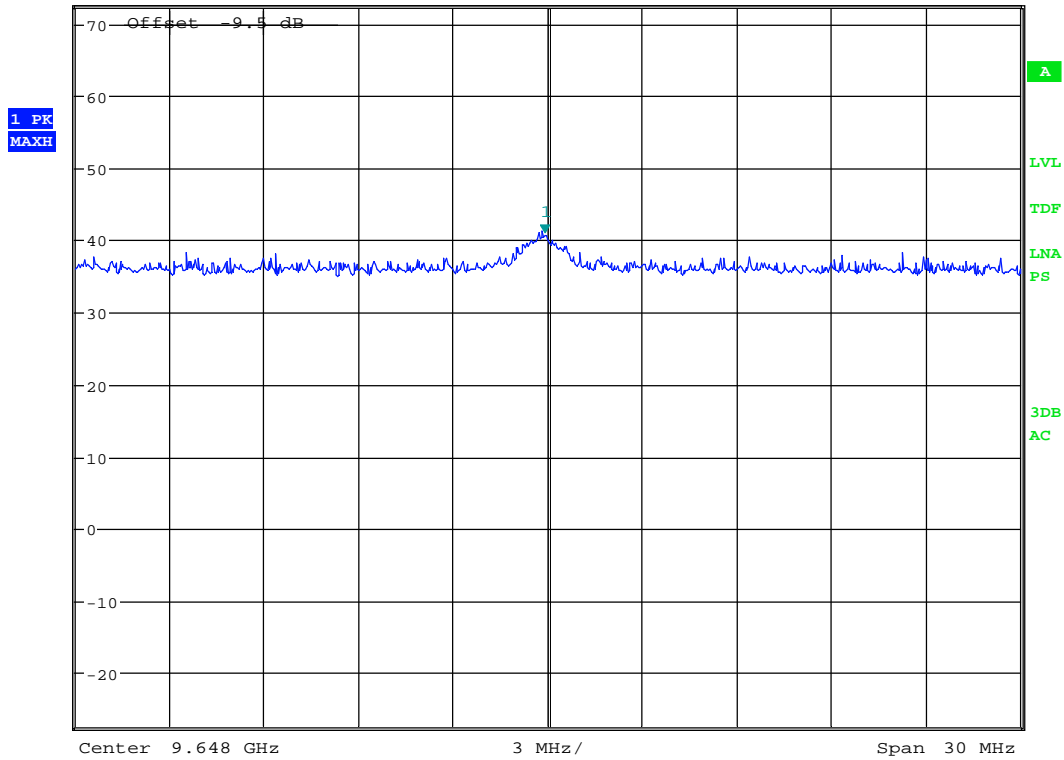


Date: 19.FEB.2016 07:12:53

**2<sup>nd</sup> har , RMS detector, 2462MHz, HP, 802.11b, 5.5Mbps**



<b>MARKER 1</b>	* RBW 1 MHz	Marker 1 [T1]
9.647903846 GHz	VBW 3 MHz	40.82 dBµV/m
Ref 72.5 dBµV/m	* Att 10 dB	SWT 20 ms
		9.647903846 GHz

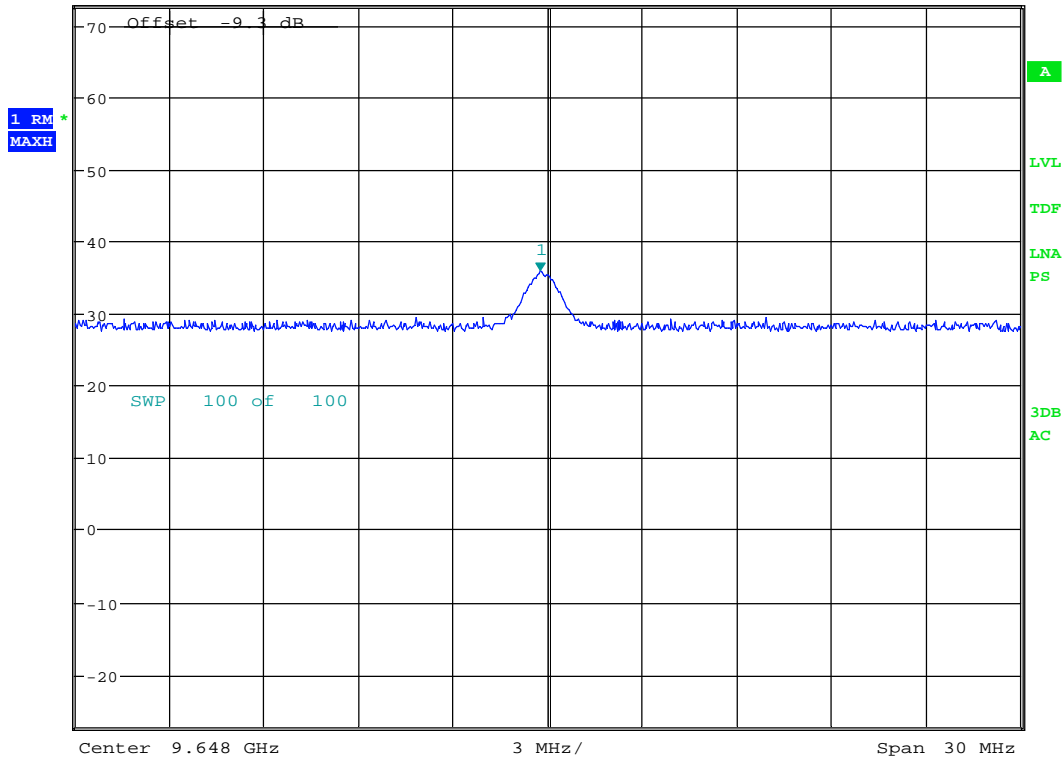


Date: 3.MAR.2016 13:56:20

4<sup>th</sup> 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

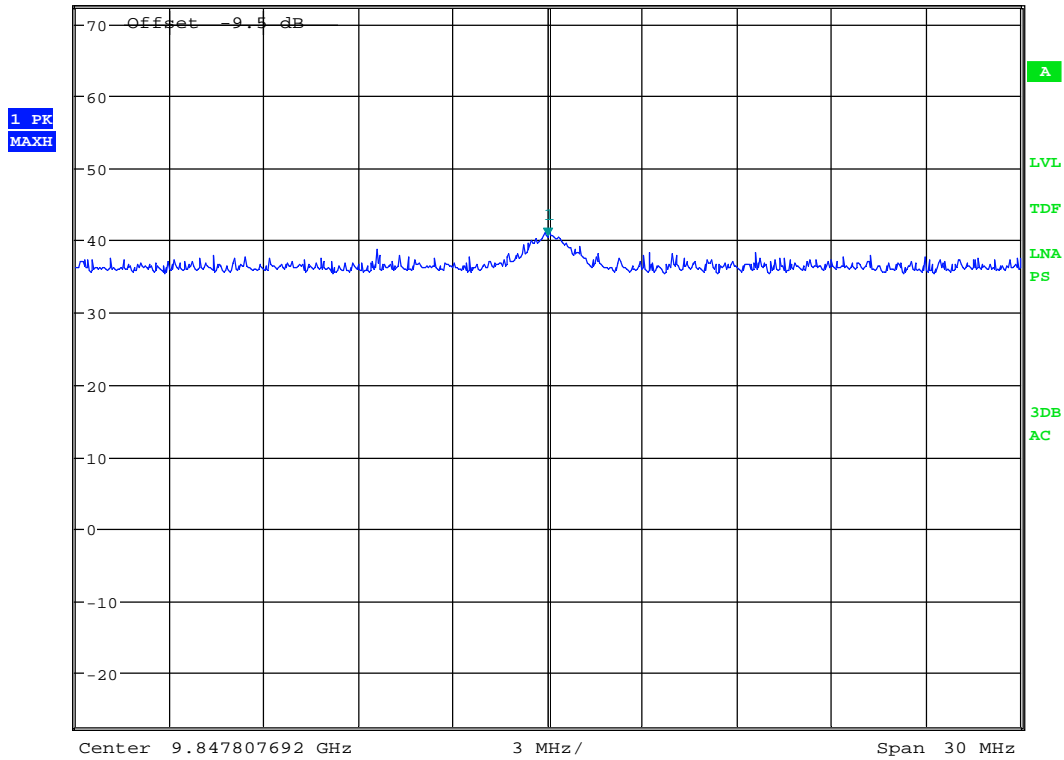


Date: 3.MAR.2016 13:55:32

**4<sup>th</sup> har , RMS detector, 2412MHz, VP, 802.11g, 9Mbps @1m**



<b>MARKER 1</b>	* RBW 1 MHz	Marker 1 [T1 ]
9.847807692 GHz	VBW 3 MHz	40.57 dBµV/m
Ref 72.5 dBµV/m	* Att 10 dB	SWT 20 ms
		9.847807692 GHz



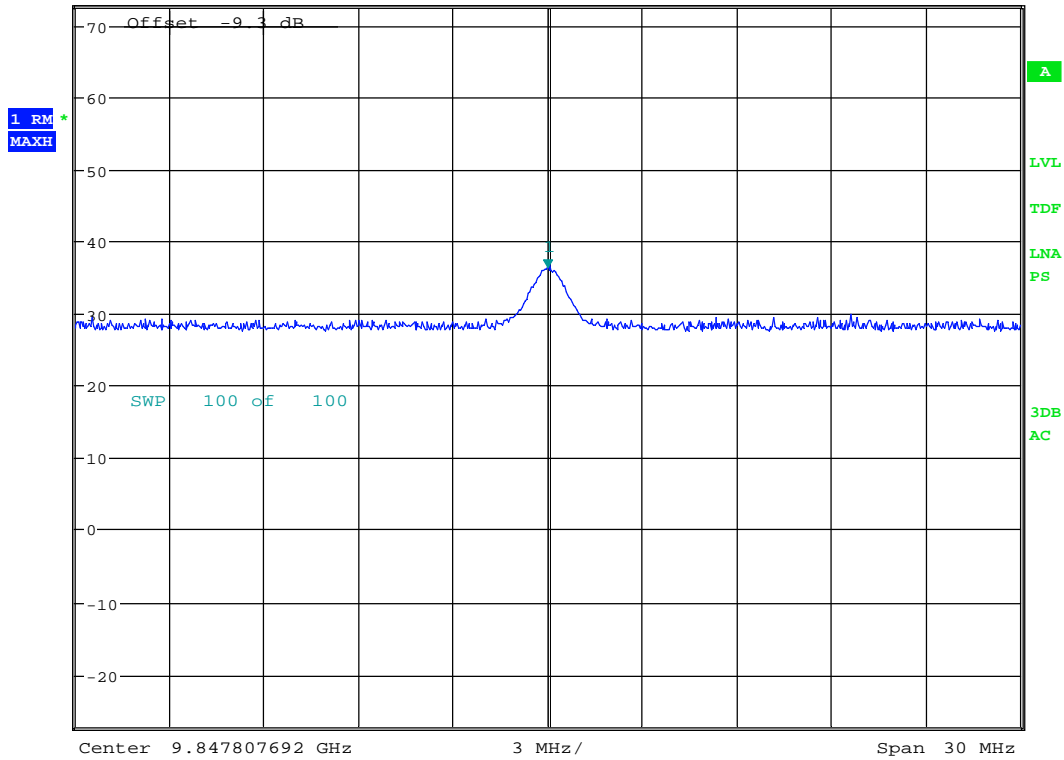
Date: 3.MAR.2016 13:52:43

4<sup>th</sup> 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

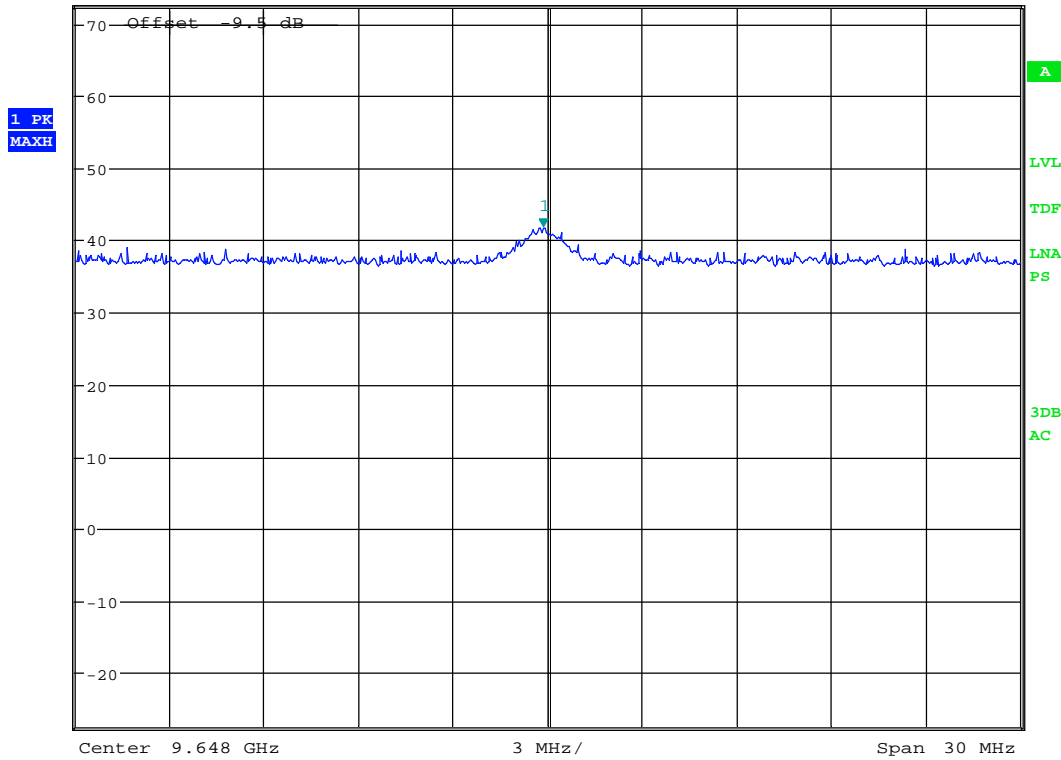


Date: 3.MAR.2016 13:53:53

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



<b>MARKER 1</b>	* RBW 1 MHz	Marker 1 [T1 ]
9.647855769 GHz	VBW 3 MHz	41.74 dBµV/m
Ref 87 dBµV/m	* Att 10 dB	SWT 20 ms
		9.647855769 GHz



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

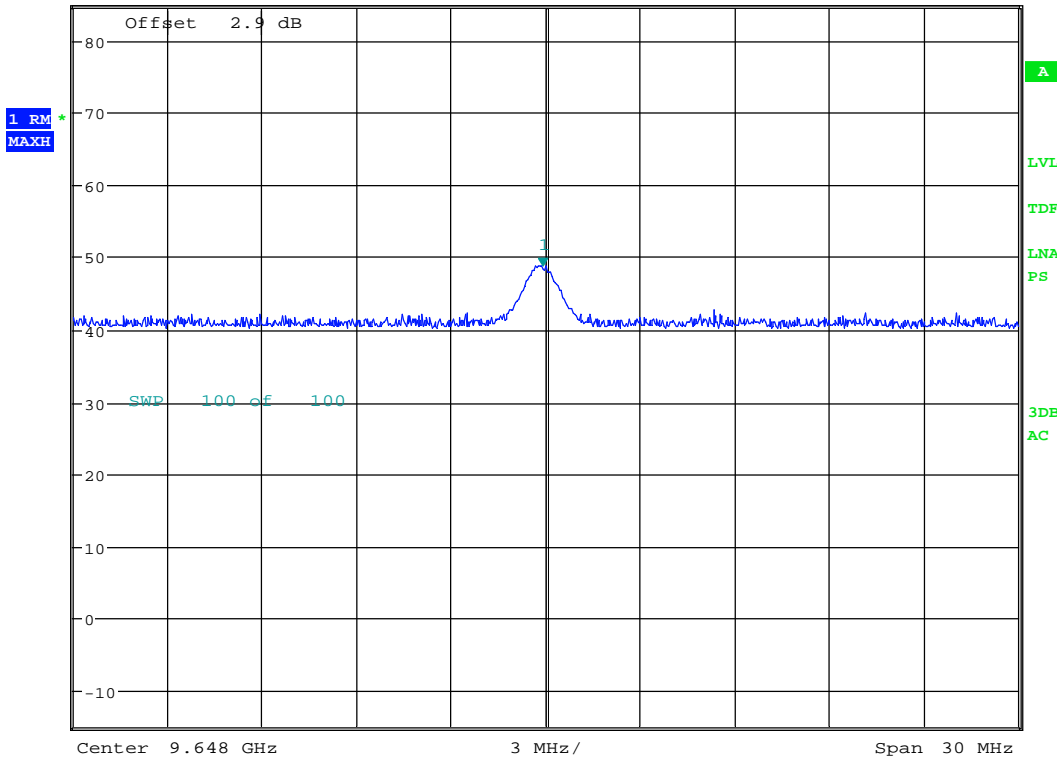
4<sup>th</sup> har , PK detector, 2412MHz, VP, 802.11n, 65Mbps @1m



**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

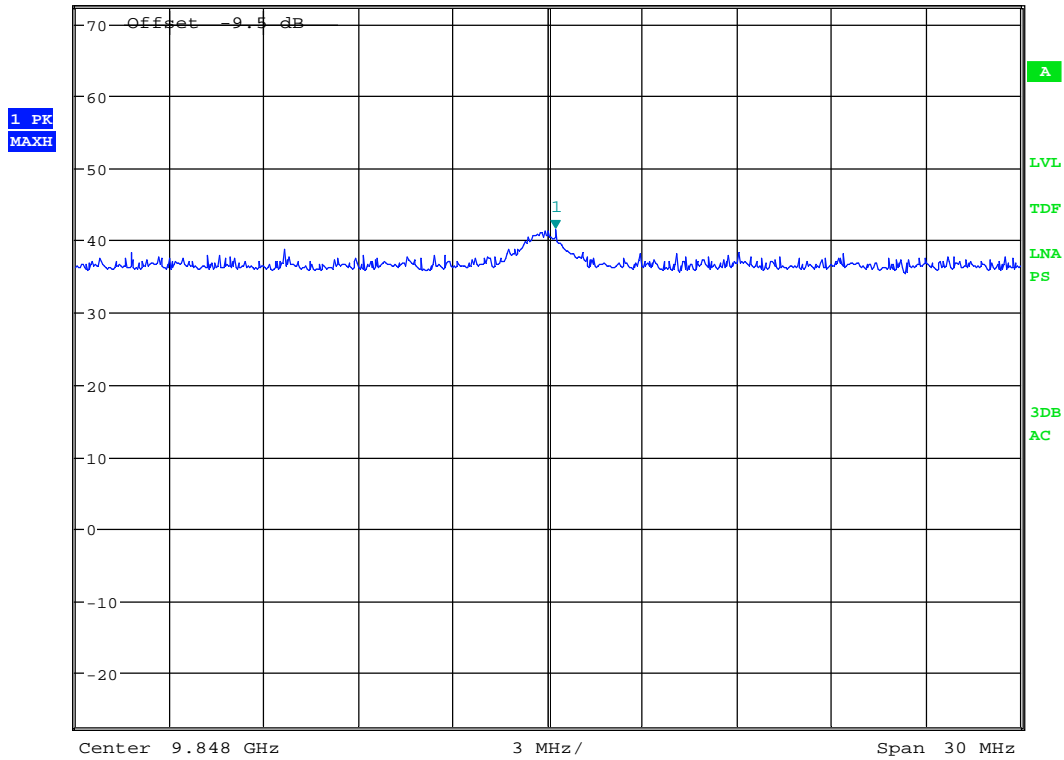


Date: 3.MAR.2016 13:46:10

**4<sup>th</sup> har , RMS detector, 2412MHz, VP, 802.11n, 65Mbps @1m**



<b>MARKER 1</b>	* RBW 1 MHz	Marker 1 [T1 ]
9.848240385 GHz	VBW 3 MHz	41.43 dBµV/m
Ref 72.5 dBµV/m	* Att 10 dB	SWT 20 ms
		9.848240385 GHz

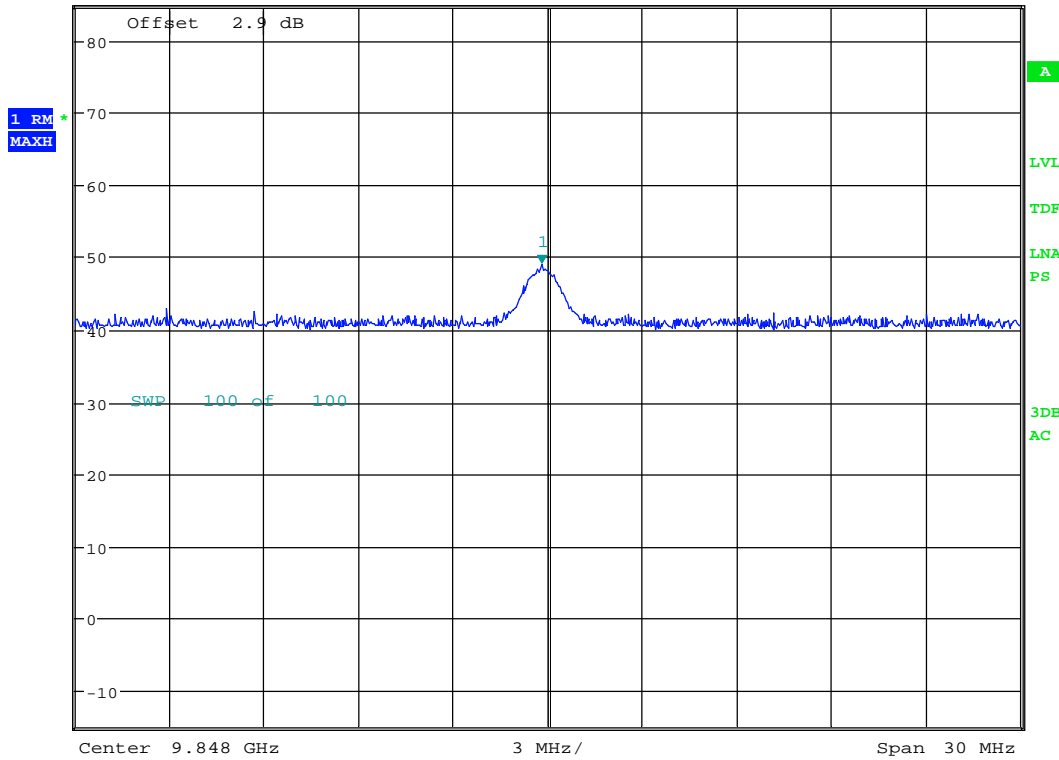


Date: 3.MAR.2016 13:49:35

4<sup>th</sup> 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



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

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

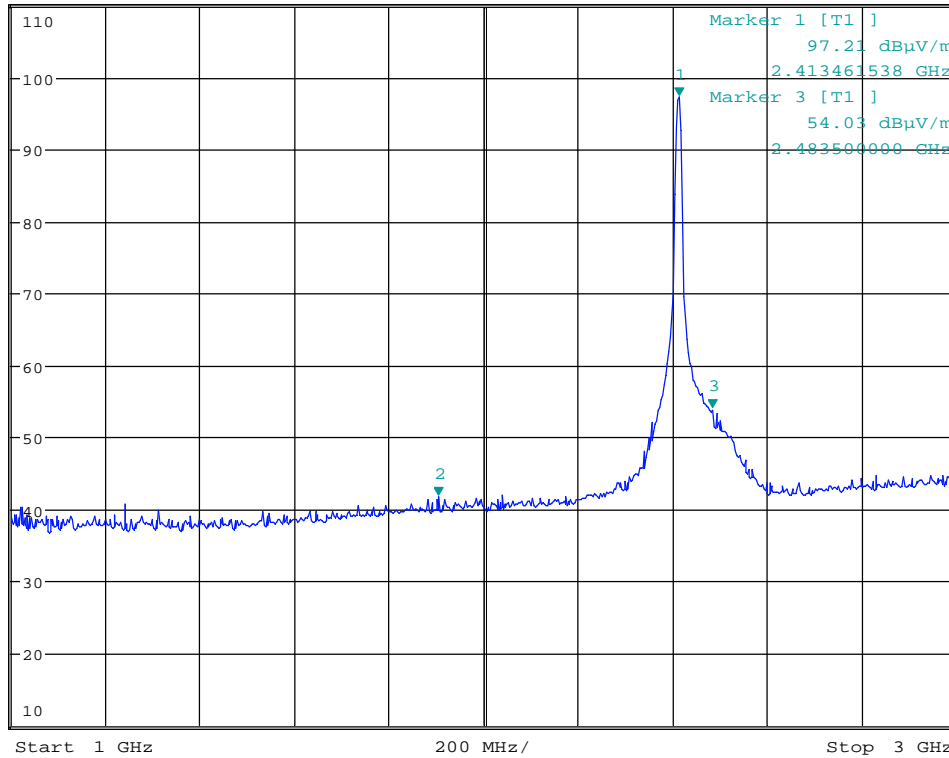


**MARKER 2**  
 1.903205128 GHz  
 Ref 110 dBuV/m \* Att 10 dB

\* RBW 1 MHz  
 VBW 3 MHz  
 SWT 5 ms

Marker 2 [T1 ]  
 41.73 dBuV/m  
 1.903205128 GHz

1 PK  
 MAXH

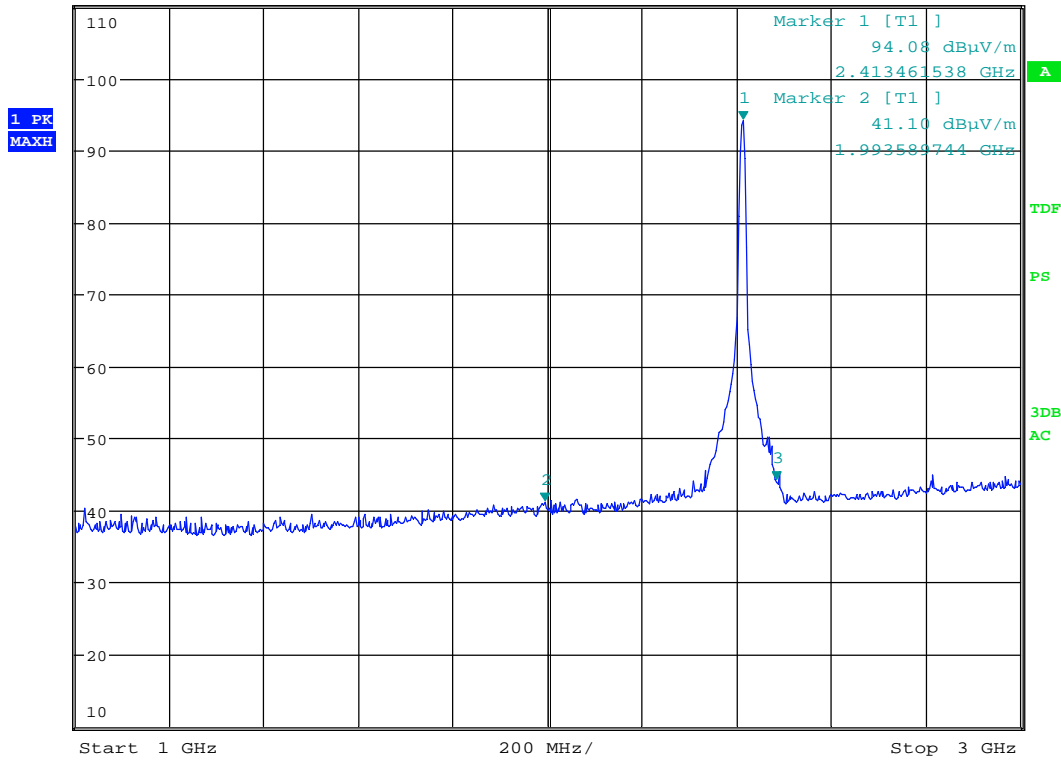


Date: 18.FEB.2016 11:17:59

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



<b>MARKER 3</b>	*RBW 1 MHz	Marker 3 [T1 ]
2.4835 GHz	VBW 3 MHz	44.21 dBuV/m
Ref 110 dBuV/m	SWT 5 ms	2.483500000 GHz
*Att 10 dB		

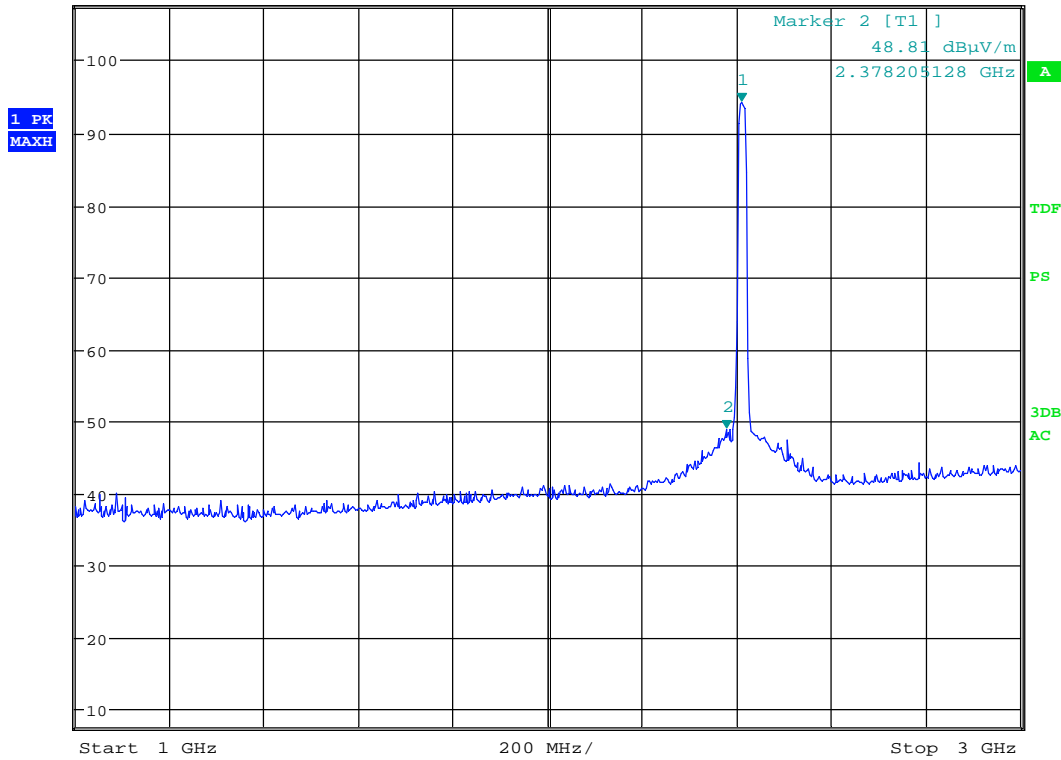


Date: 18.FEB.2016 12:55:23

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



<b>MARKER 1</b>	* RBW 1 MHz	Marker 1 [T1 ]
2.41025641 GHz	VBW 3 MHz	94.30 dBµV/m
Ref 107.6 dBµV/m	* Att 10 dB	2.410256410 GHz
	SWT 5 ms	



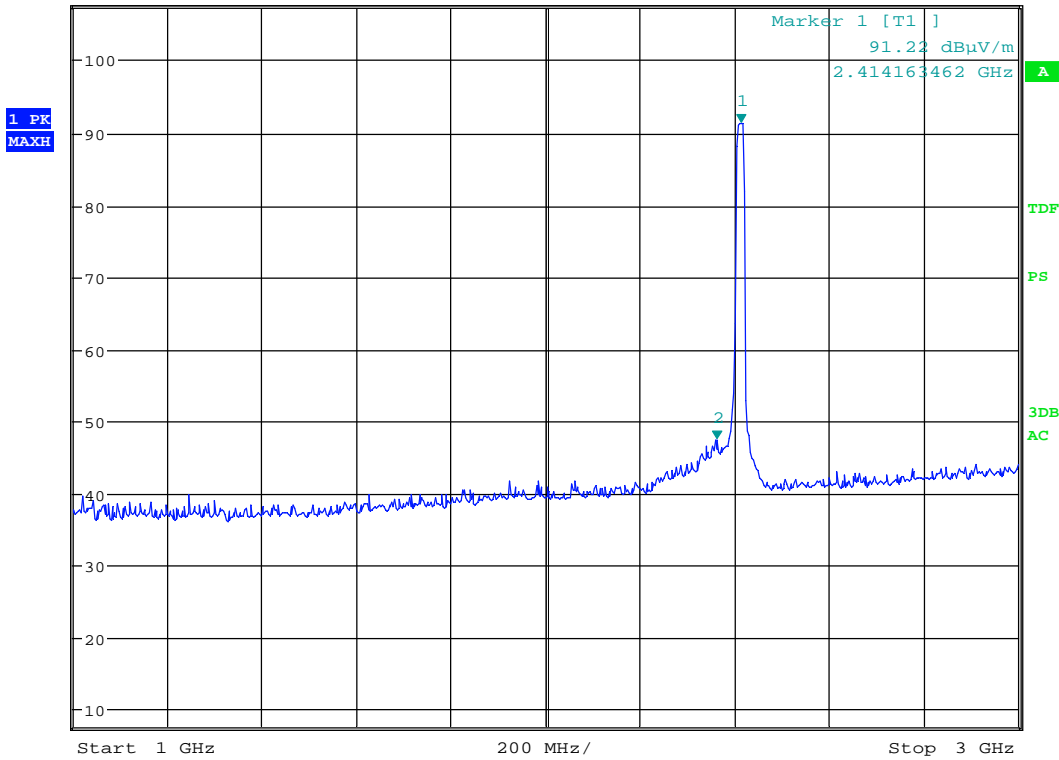
Date: 3.MAR.2016 11:19:52

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





<b>MARKER 2</b>	*RBW 1 MHz	Marker 2 [T1 ]
2.362179487 GHz	VBW 3 MHz	47.44 dBuV/m
Ref 107.6 dBuV/m *Att 10 dB	SWT 5 ms	2.362179487 GHz

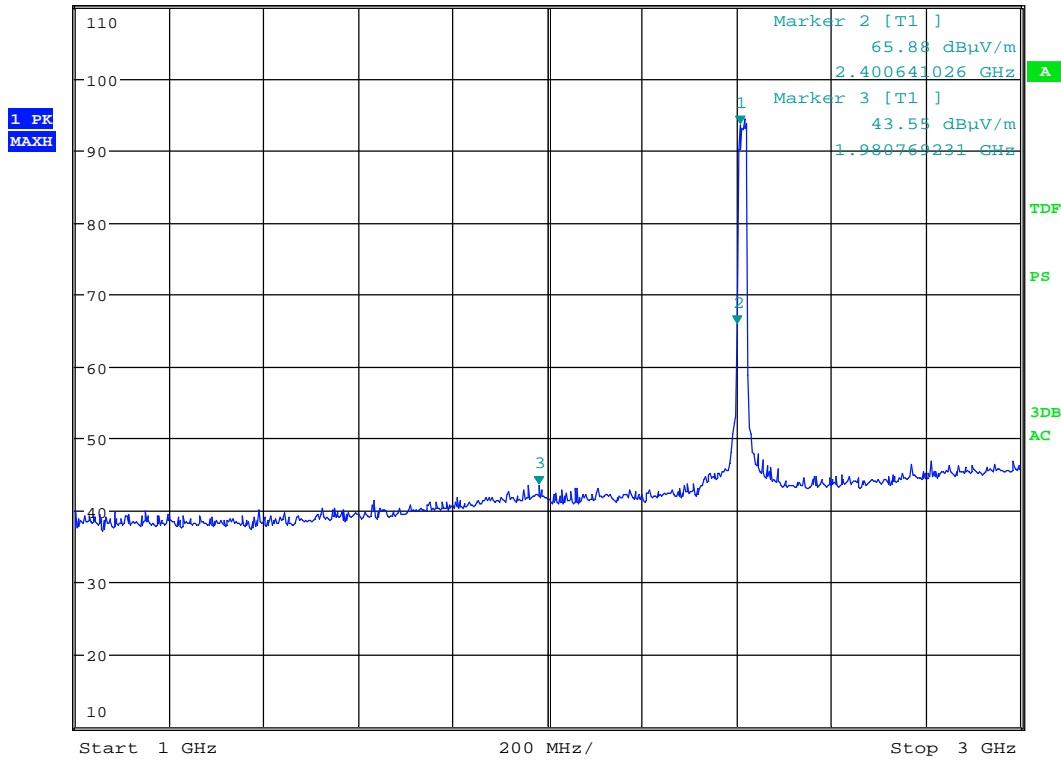


Date: 3.MAR.2016 11:57:28

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



<b>MARKER 1</b>	* RBW 1 MHz	Marker 1 [T1 ]
2.407051282 GHz	VBW 3 MHz	93.56 dBuV/m
Ref 110 dBuV/m	SWT 5 ms	2.407051282 GHz
* Att 15 dB		

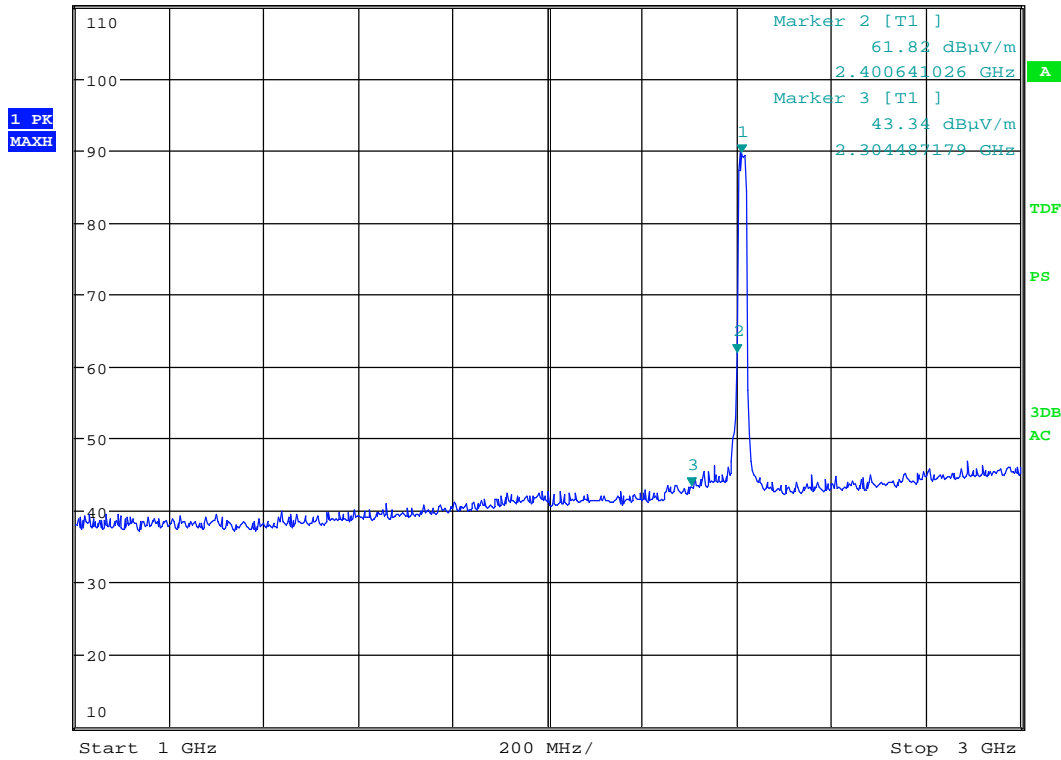


Date: 3.MAR.2016 08:56:24

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



**MARKER 1**  
 2.41025641 GHz  
 Ref 110 dBuV/m \* Att 15 dB  
 \* RBW 1 MHz Marker 1 [T1 ]  
 VBW 3 MHz 89.52 dBuV/m  
 SWT 5 ms 2.410256410 GHz



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

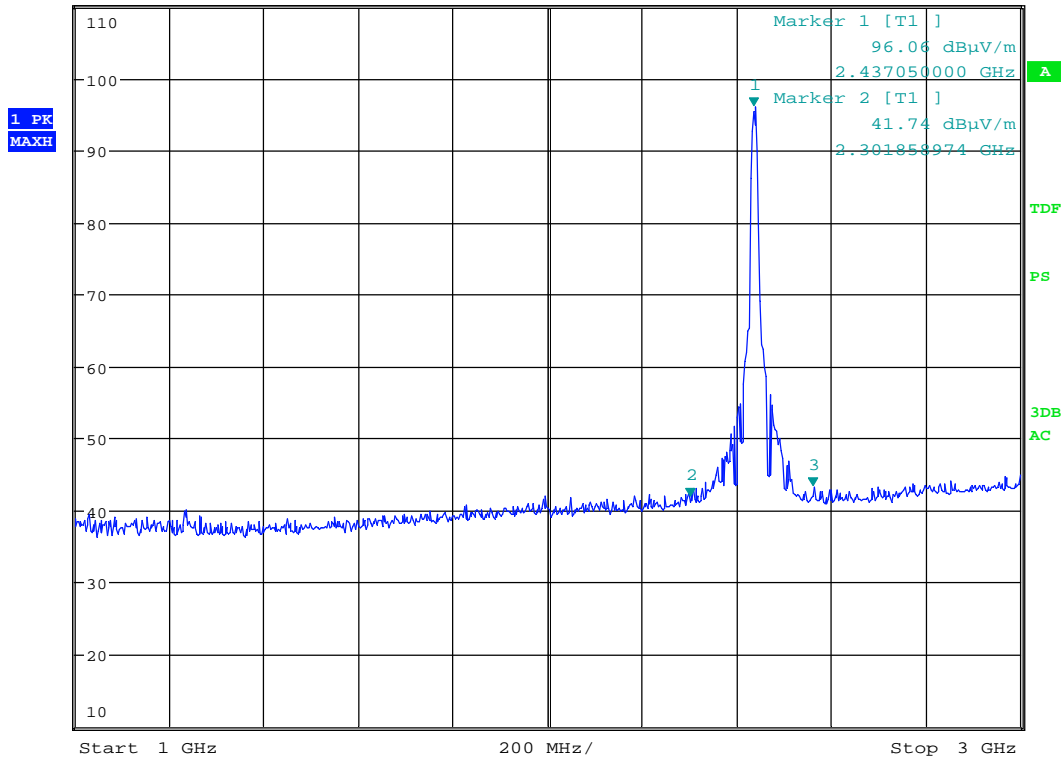
**Radiated Emissions, 2412MHz, 1 - 3GHz, HP, 802.11n, 65Mbps**





**MARKER 3**  
 2.563269231 GHz  
 Ref 110 dBuV/m \* Att 10 dB

\* RBW 1 MHz Marker 3 [T1 ]  
 VBW 3 MHz 43.22 dBuV/m  
 SWT 5 ms 2.563269231 GHz

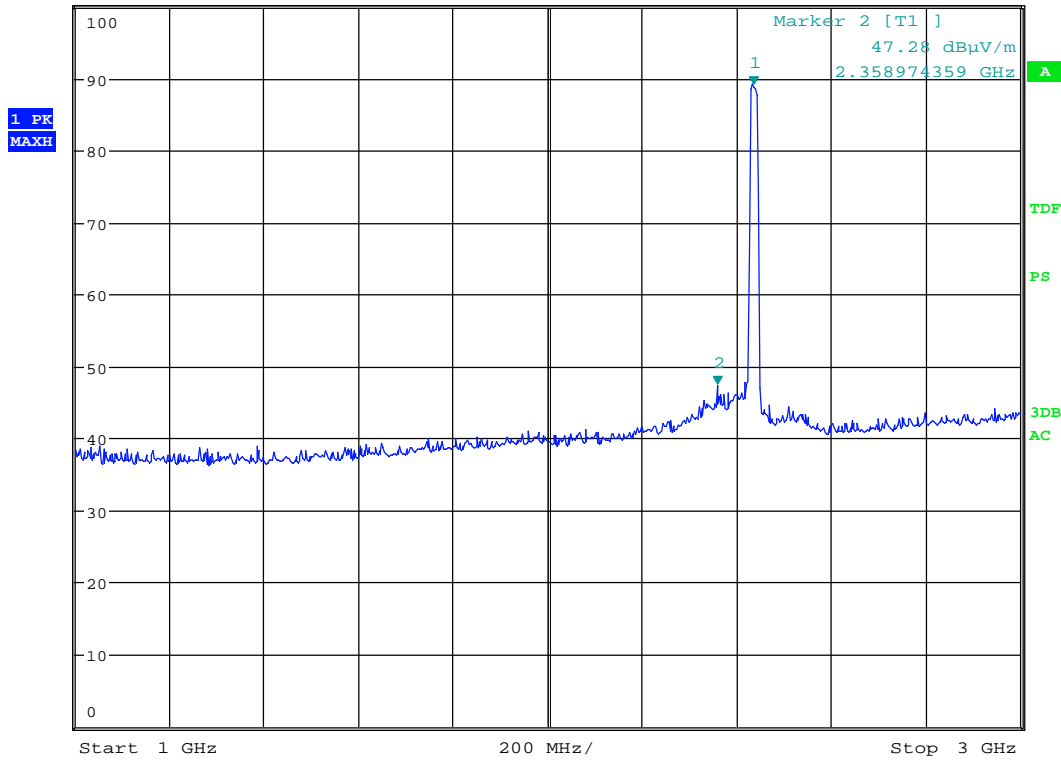


Date: 19.FEB.2016 07:47:15

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



**MARKER 1**  
 2.435897436 GHz  
 Ref 100 dBuV/m \* Att 10 dB  
 \* RBW 1 MHz Marker 1 [T1 ]  
 VBW 3 MHz 89.03 dBuV/m  
 SWT 5 ms 2.435897436 GHz

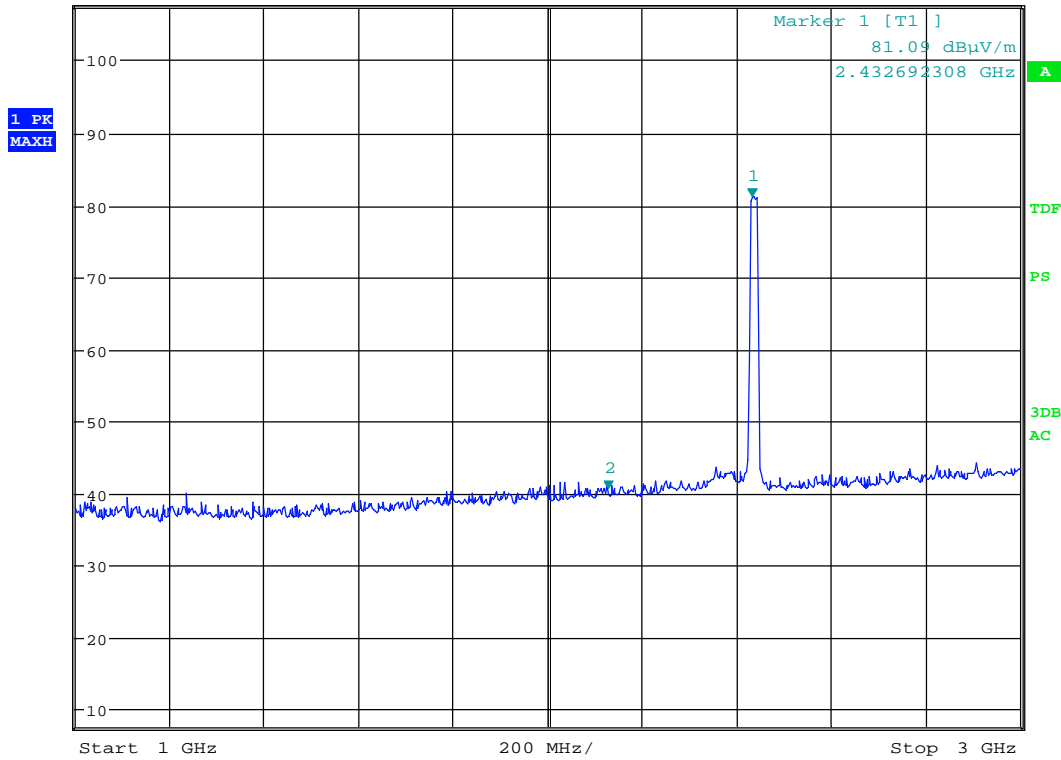


Date: 3.MAR.2016 12:26:30

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



<b>MARKER 2</b>	* RBW 1 MHz	Marker 2 [T1 ]
2.128205128 GHz	VBW 3 MHz	40.57 dBuV/m
Ref 107.6 dBuV/m * Att 10 dB	SWT 5 ms	2.128205128 GHz



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

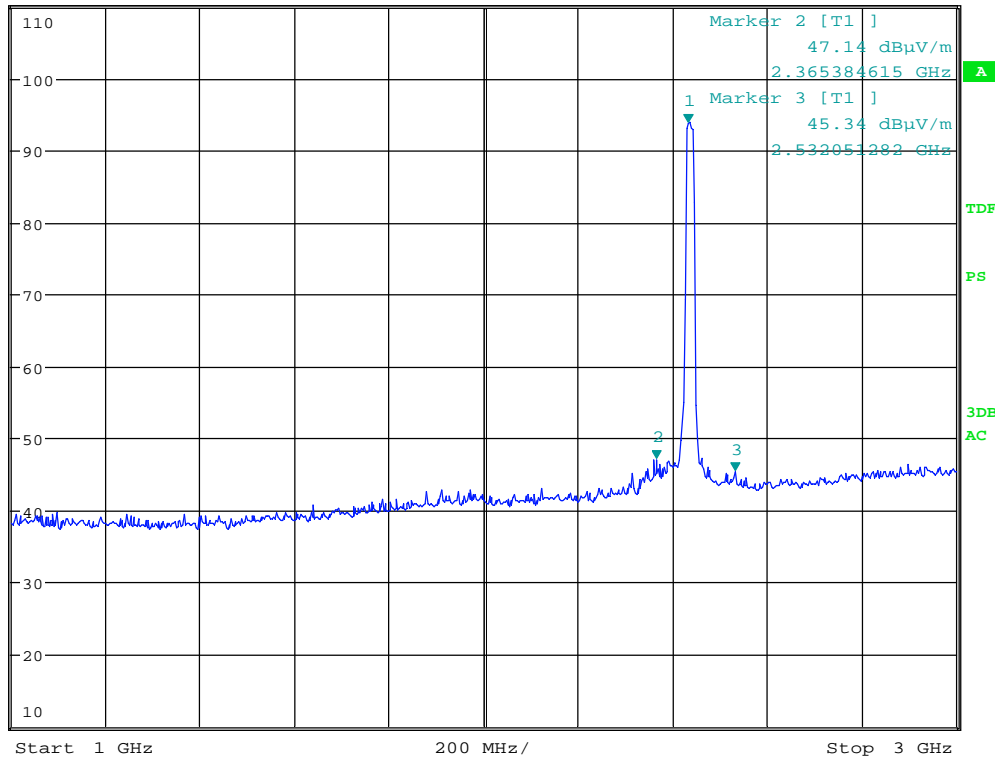
**Radiated Emissions, 2437MHz, 1 - 3GHz, HP, 802.11g, 9Mbps**



**MARKER 1**  
 2.432692308 GHz  
 Ref 110 dBuV/m \* Att 15 dB

\* RBW 1 MHz Marker 1 [T1 ]  
 VBW 3 MHz 93.72 dBuV/m  
 SWT 5 ms 2.432692308 GHz

1 PK  
 MAXH



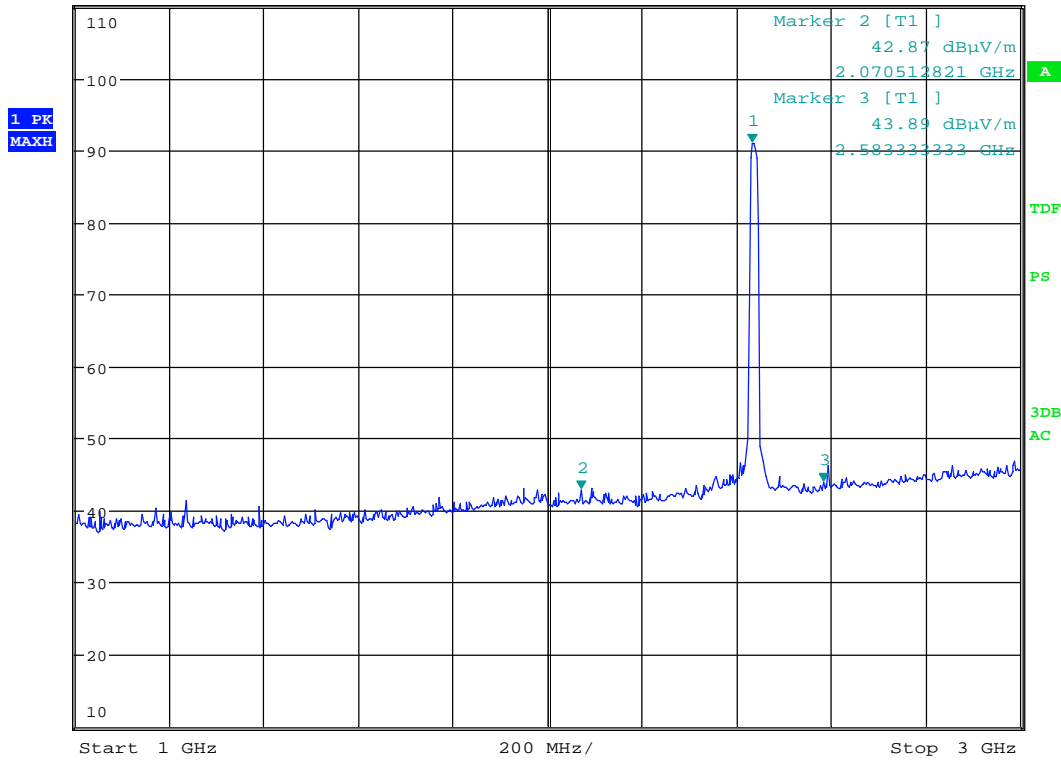
Date: 3.MAR.2016 08:29:22

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





<b>MARKER 1</b>	* RBW 1 MHz	Marker 1 [T1 ]
2.431326923 GHz	VBW 3 MHz	91.08 dBuV/m
Ref 110 dBuV/m	SWT 5 ms	2.431326923 GHz
* Att 15 dB		

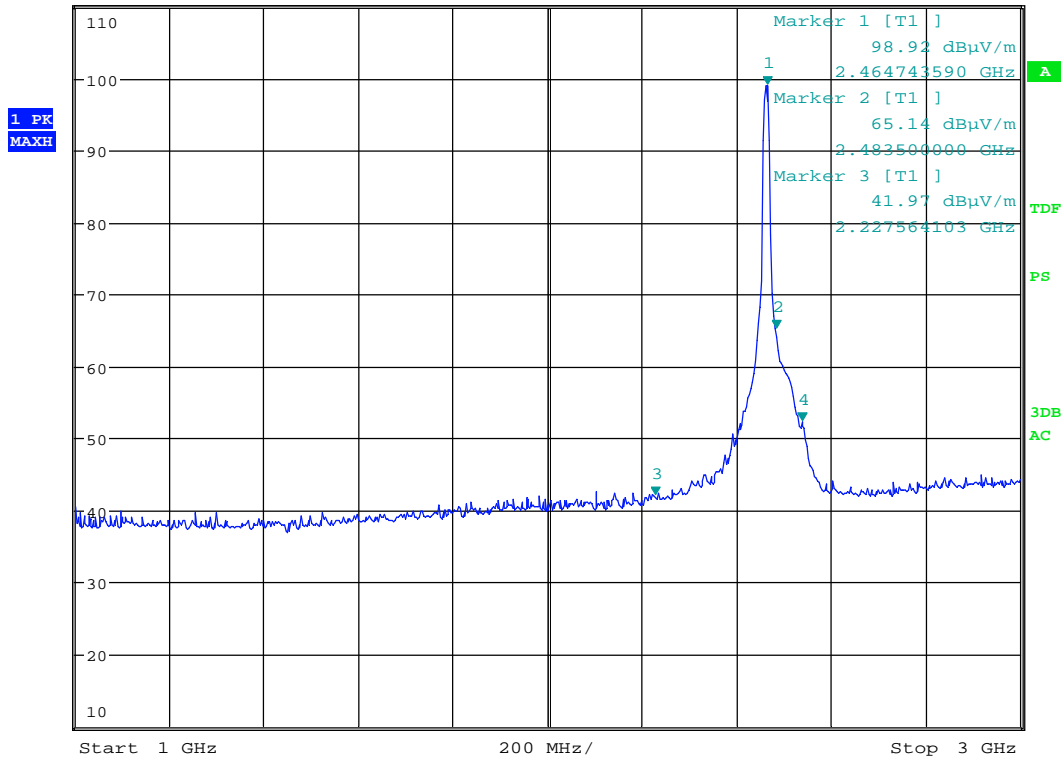


Date: 3.MAR.2016 08:28:10

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



**MARKER 4**  
 2.538461538 GHz  
 Ref 110 dBuV/m \* Att 10 dB  
 \* RBW 1 MHz Marker 4 [T1 ]  
 VBW 3 MHz 52.38 dBuV/m  
 SWT 5 ms 2.538461538 GHz

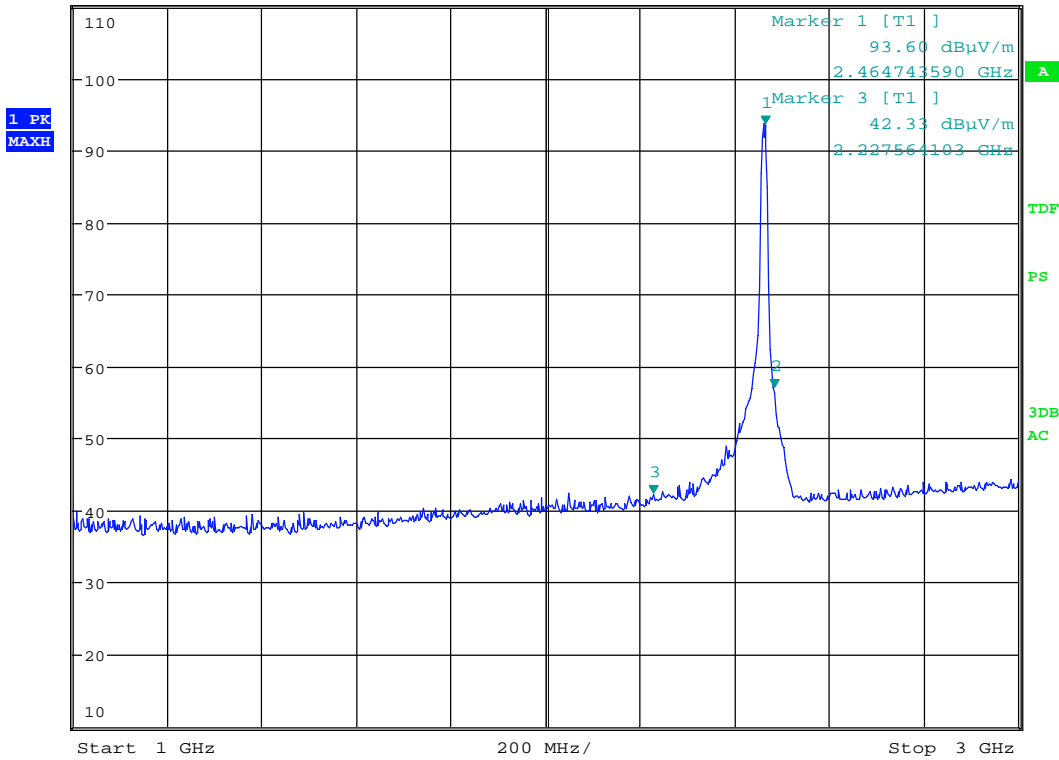


Date: 19.FEB.2016 06:57:36

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



Ref 110 dBuV/m      \* Att 10 dB      \* RBW 1 MHz      Marker 2 [T1 ]  
 VBW 3 MHz      56.85 dBuV/m  
 SWT 5 ms      2.483500000 GHz



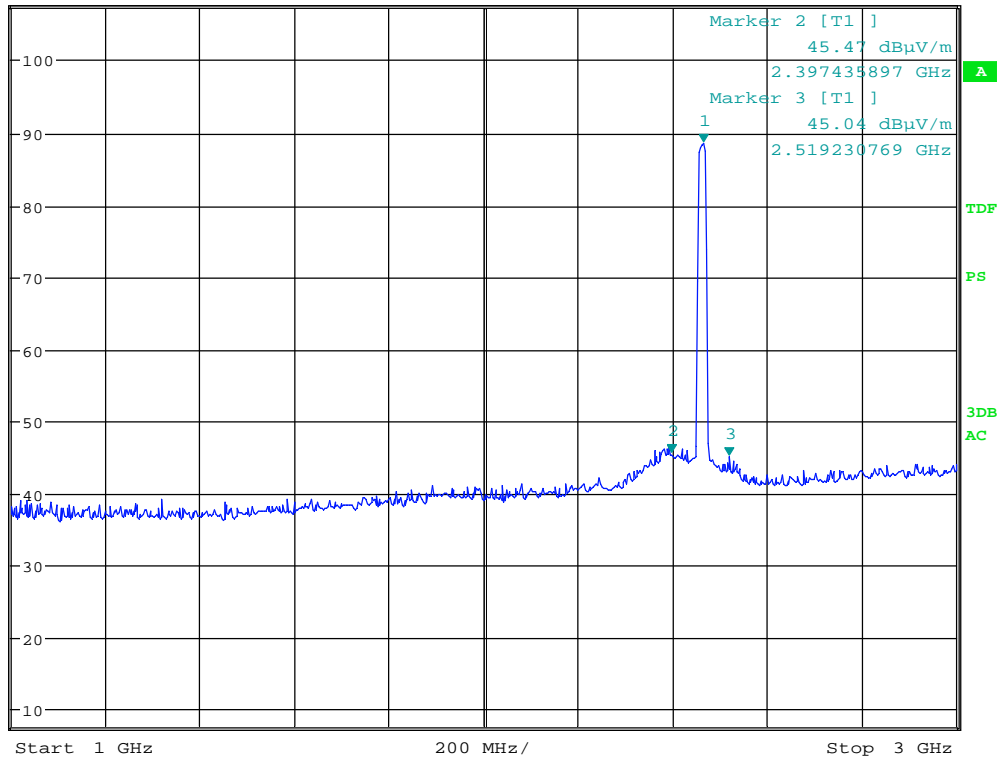
Date: 19.FEB.2016 06:55:46

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



<b>MARKER 1</b>	* RBW 1 MHz	Marker 1 [T1 ]
2.46474359 GHz	VBW 3 MHz	88.49 dBuV/m
Ref 107.6 dBuV/m	SWT 5 ms	2.464743590 GHz
* Att 10 dB		

1 PK  
MAXH

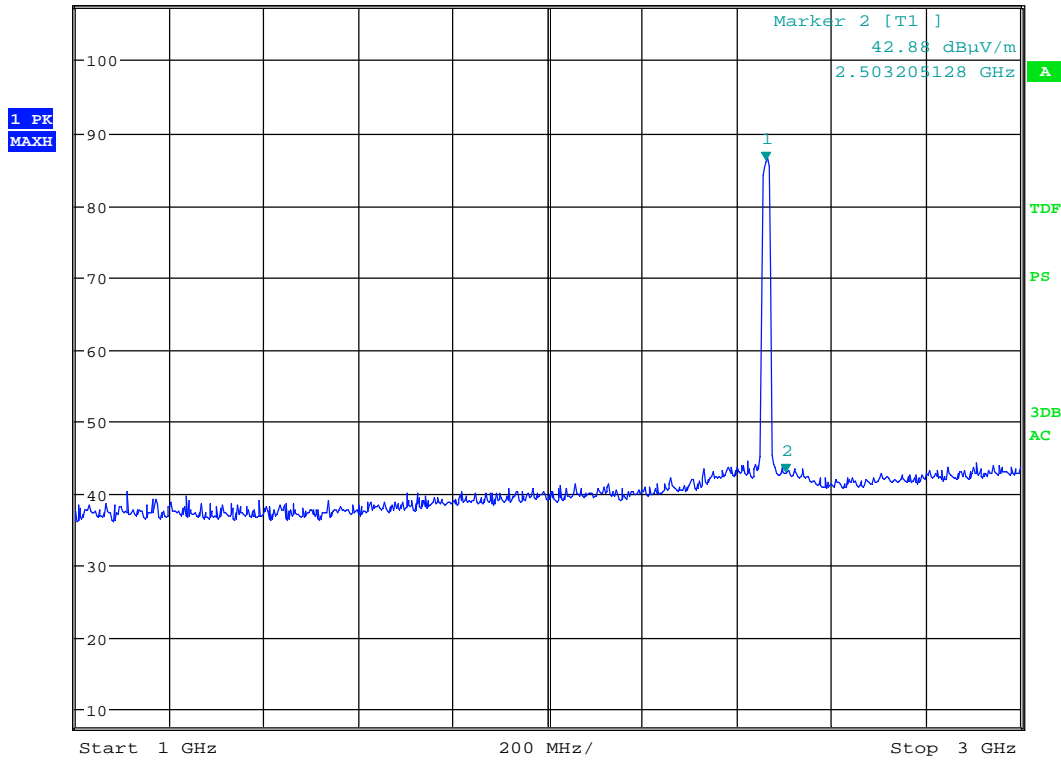


Date: 3.MAR.2016 11:06:34

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



<b>MARKER 1</b>	* RBW 1 MHz	Marker 1 [T1 ]
2.461086538 GHz	VBW 3 MHz	85.98 dBµV/m
Ref 107.6 dBµV/m	SWT 5 ms	2.461086538 GHz
* Att 10 dB		



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

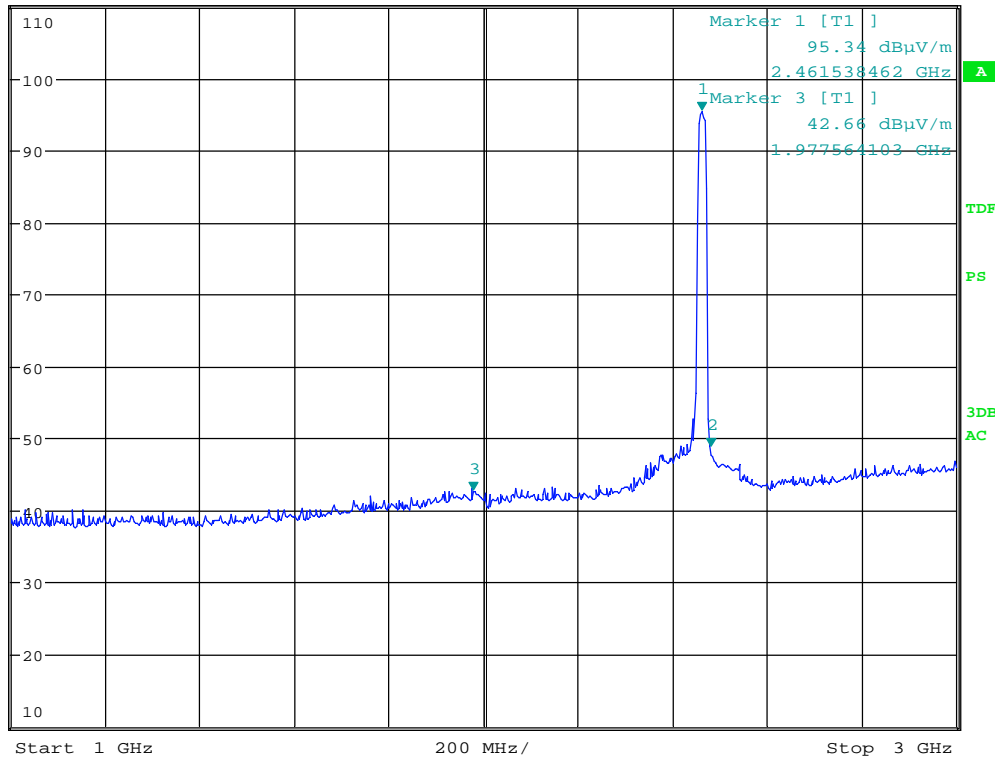
**Radiated Emissions, 2462MHz, 1 - 3GHz, HP, 802.11g, 9Mbps**



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

\* RBW 1 MHz Marker 2 [T1 ]  
 VBW 3 MHz 48.71 dBuV/m  
 SWT 5 ms 2.480769231 GHz

1 PK  
 MAXH

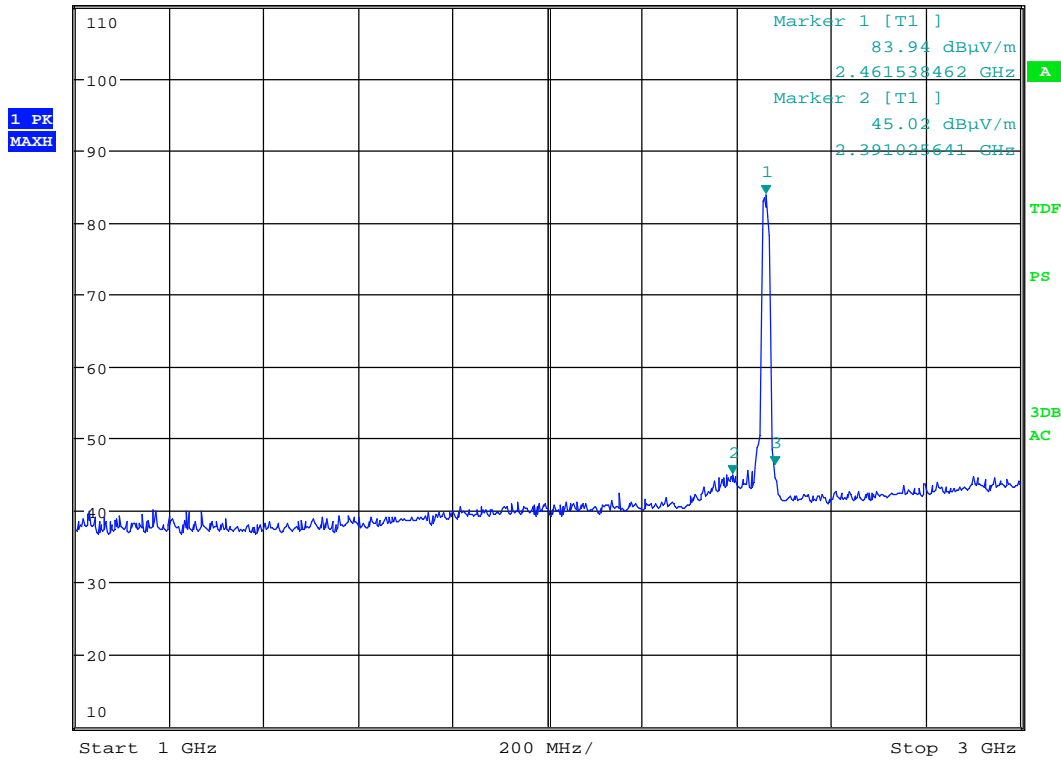


Date: 3.MAR.2016 07:51:48

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



**MARKER 3**  
 2.480769231 GHz  
 Ref 110 dBuV/m \* Att 10 dB  
 \* RBW 1 MHz Marker 3 [T1 ]  
 VBW 3 MHz 46.32 dBuV/m  
 SWT 5 ms 2.480769231 GHz

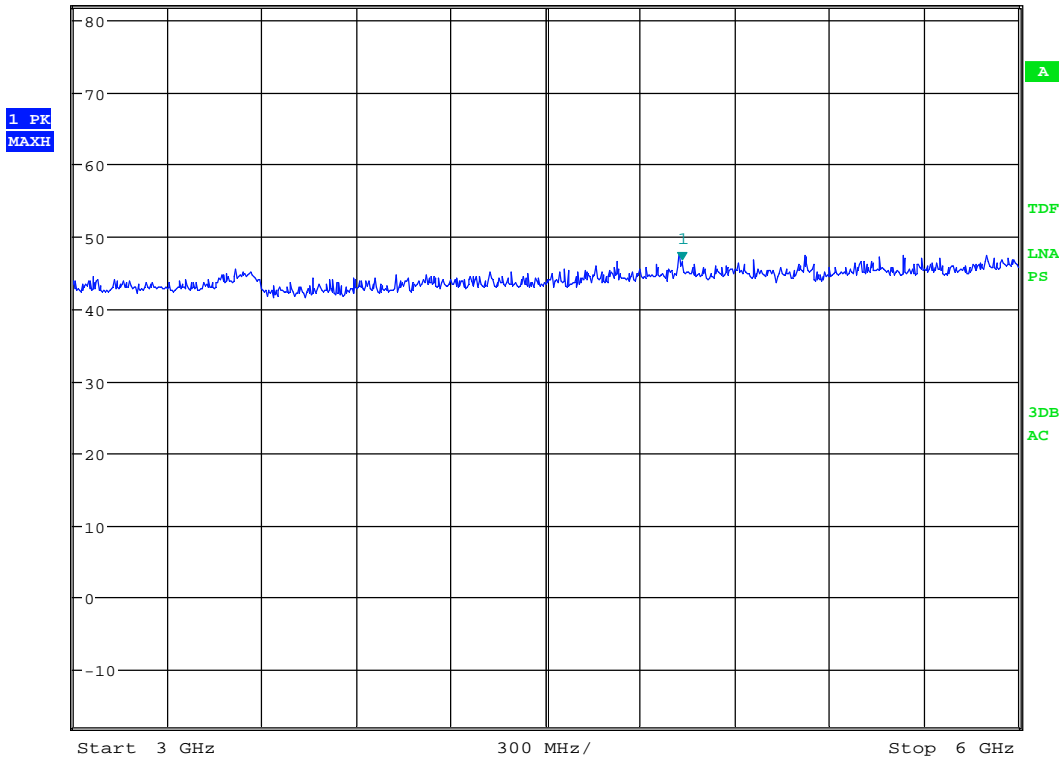


Date: 3.MAR.2016 08:01:30

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



\* RBW 1 MHz      Marker 1 [T1 ]  
 VBW 3 MHz      46.70 dBμV/m  
 Ref 82 dBμV/m    \* Att 10 dB      SWT 20 ms      4.931250000 GHz



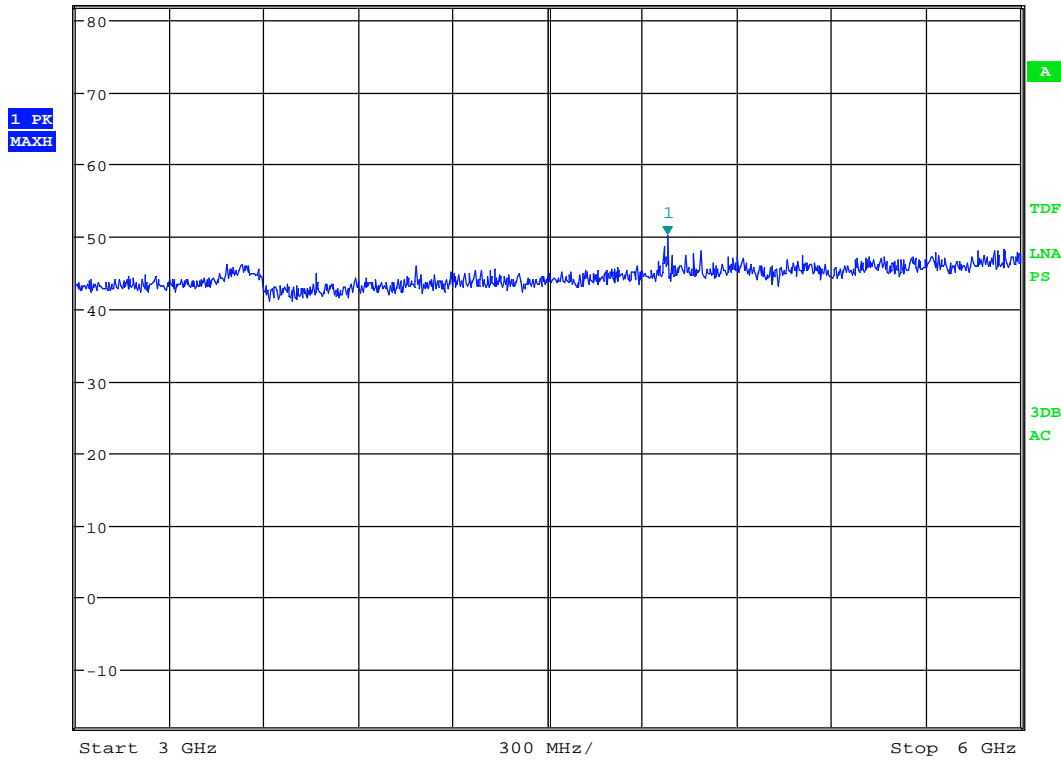
Date: 19.FEB.2016 07:16:11

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





**MARKER 1**  
4.8792 GHz  
Ref 82 dB $\mu$ V/m \* Att 20 dB \* RBW 1 MHz VBW 3 MHz SWT 20 ms  
Marker 1 [T1 ]  
50.09 dB $\mu$ V/m  
4.87920000 GHz

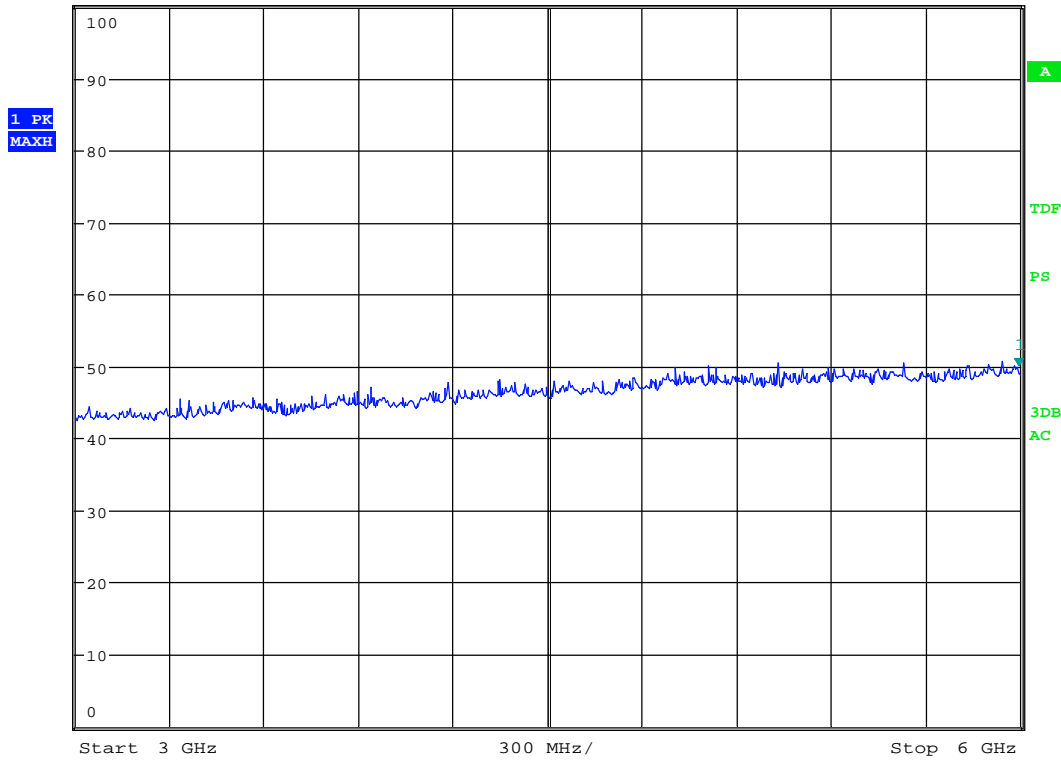


Date: 19.FEB.2016 07:58:22

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



<b>MARKER 1</b>	*RBW 1 MHz	Marker 1 [T1]
5.995192308 GHz	VBW 3 MHz	49.96 dBµV/m
Ref 100 dBµV/m	*Att 10 dB	SWT 20 ms
		5.995192308 GHz

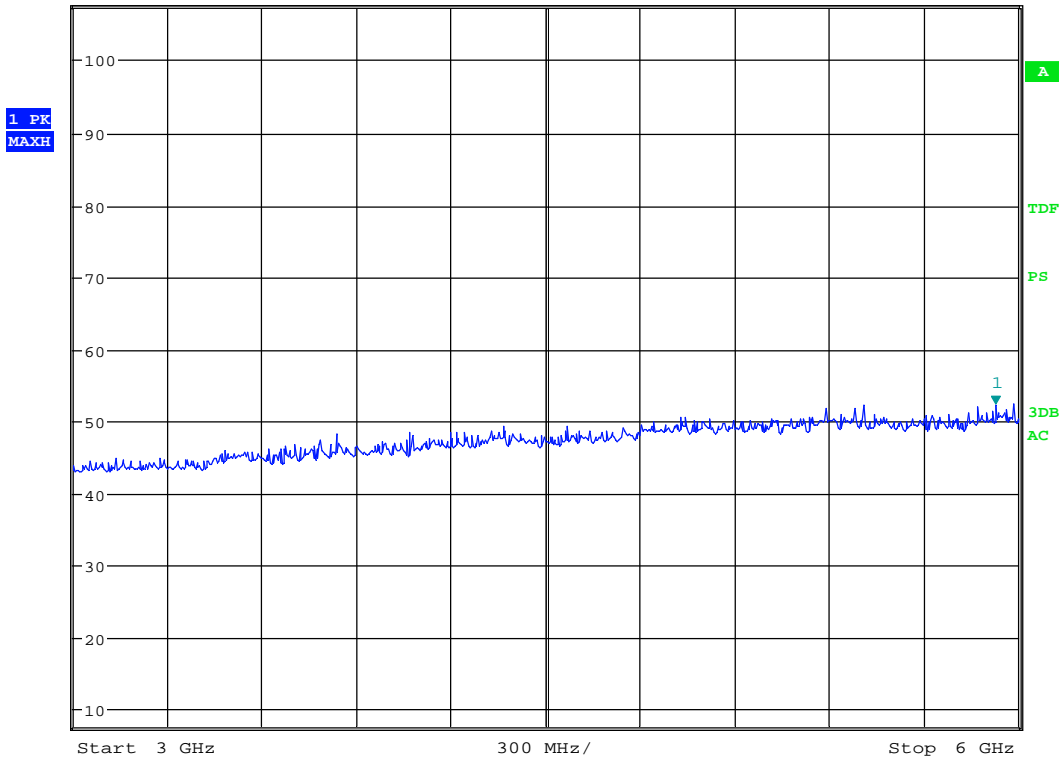


Date: 3.MAR.2016 12:33:52

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



<b>MARKER 1</b>	* RBW 1 MHz	Marker 1 [T1 ]
5.927884615 GHz	VBW 3 MHz	52.21 dBµV/m
Ref 107.6 dBµV/m * Att 10 dB	SWT 20 ms	5.927884615 GHz

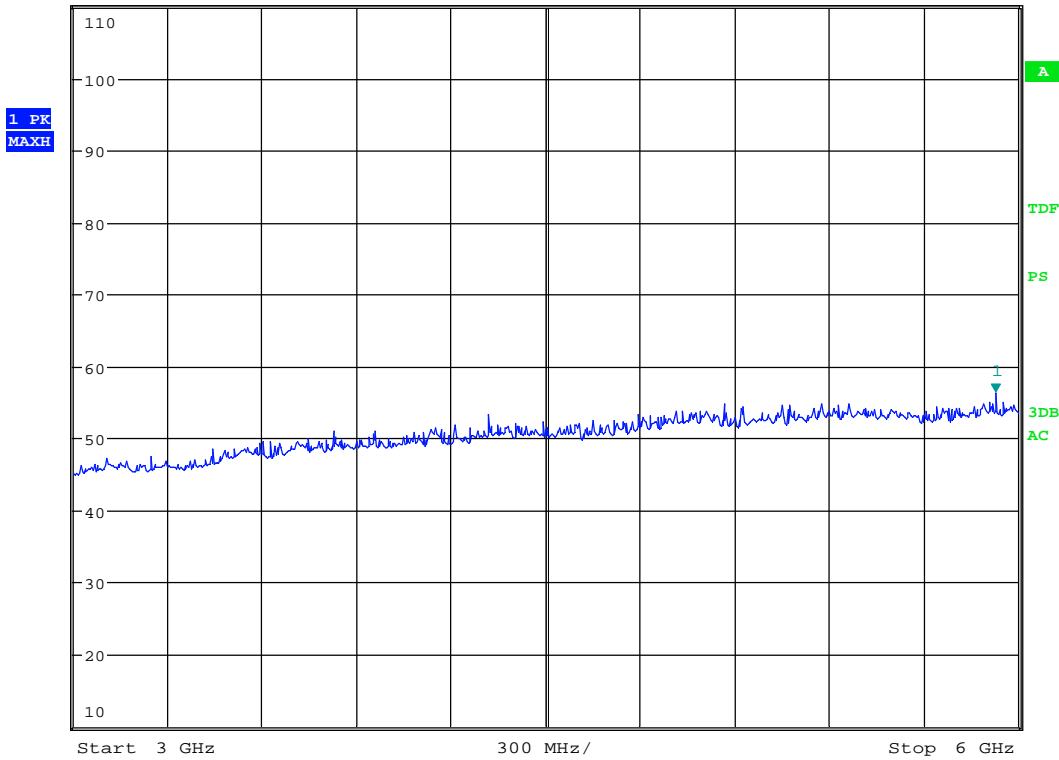


Date: 3.MAR.2016 11:58:04

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



**MARKER 1**  
 5.927884615 GHz  
 Ref 110 dBuV/m \* Att 15 dB \* RBW 1 MHz Marker 1 [T1 ]  
 VBW 3 MHz 56.28 dBuV/m  
 SWT 20 ms 5.927884615 GHz



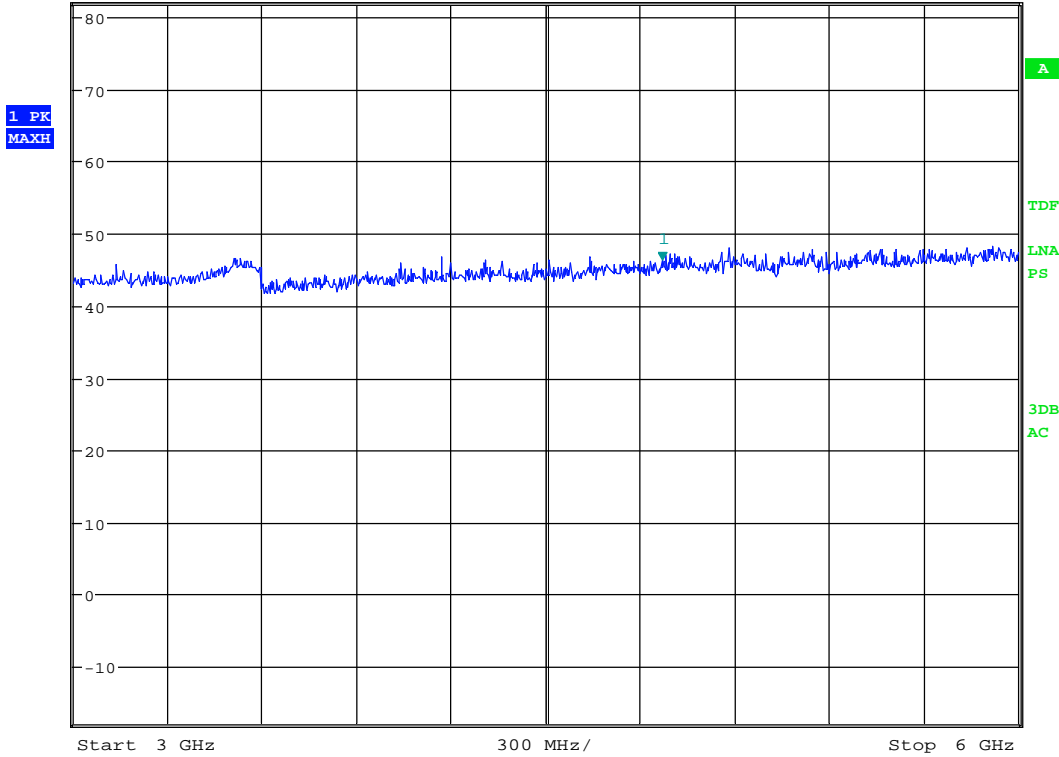
Date: 3.MAR.2016 09:24:20

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





\* RBW 1 MHz      Marker 1 [T1 ]  
 VBW 3 MHz      46.22 dBμV/m  
 Ref 82 dBμV/m    \* Att 20 dB      SWT 20 ms      4.870000000 GHz



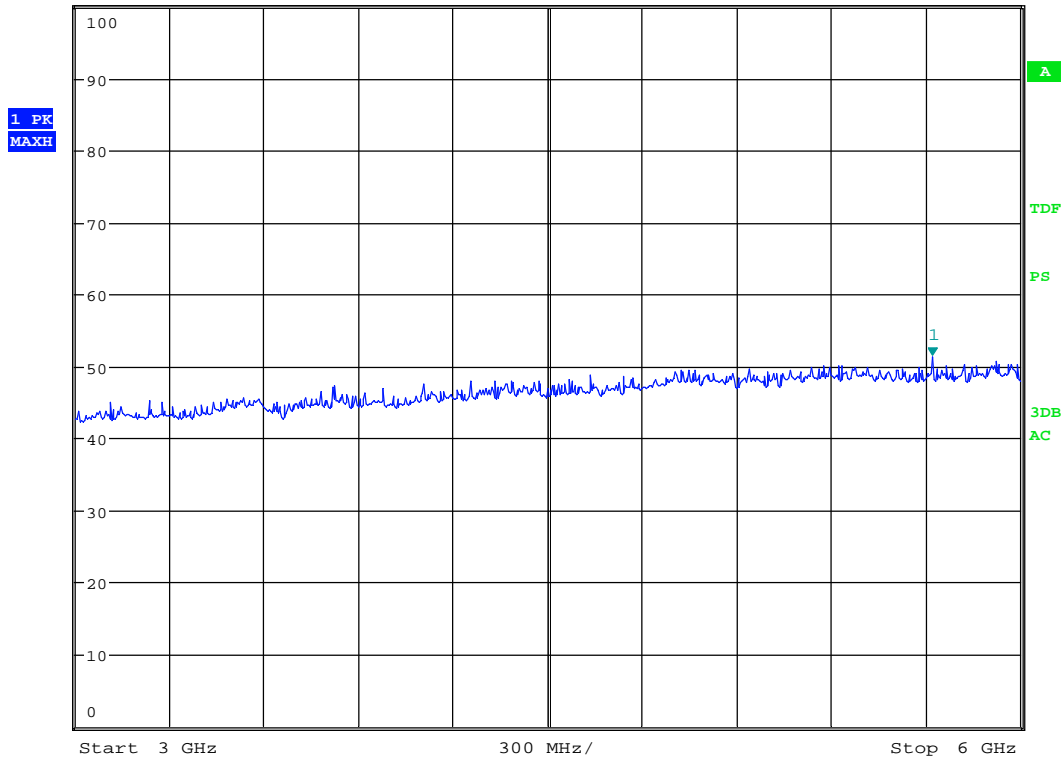
Date: 19.FEB.2016 08:01:25

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





<b>MARKER 1</b>	* RBW 1 MHz	Marker 1 [T1]
5.721153846 GHz	VBW 3 MHz	51.40 dBµV/m
Ref 100 dBµV/m	SWT 20 ms	5.721153846 GHz
* Att 10 dB		



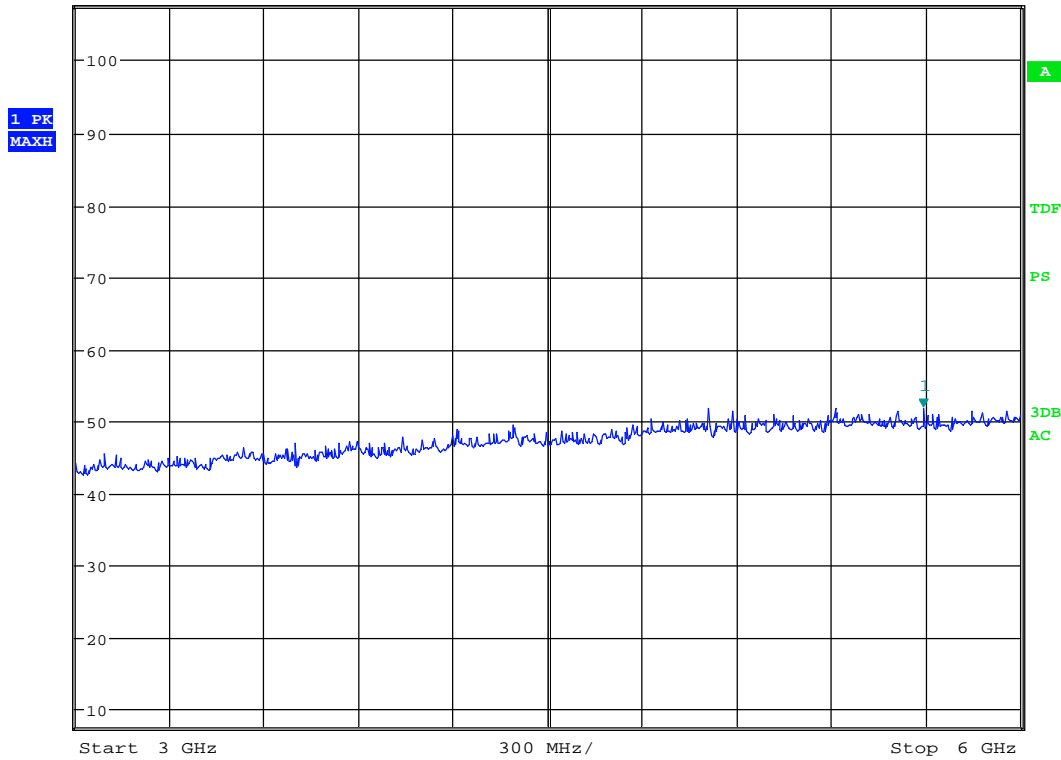
Date: 3.MAR.2016 12:28:24

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





<b>MARKER 1</b>	* RBW 1 MHz	Marker 1 [T1]
5.692307692 GHz	VBW 3 MHz	51.72 dBμV/m
Ref 107.6 dBμV/m * Att 10 dB	SWT 20 ms	5.692307692 GHz

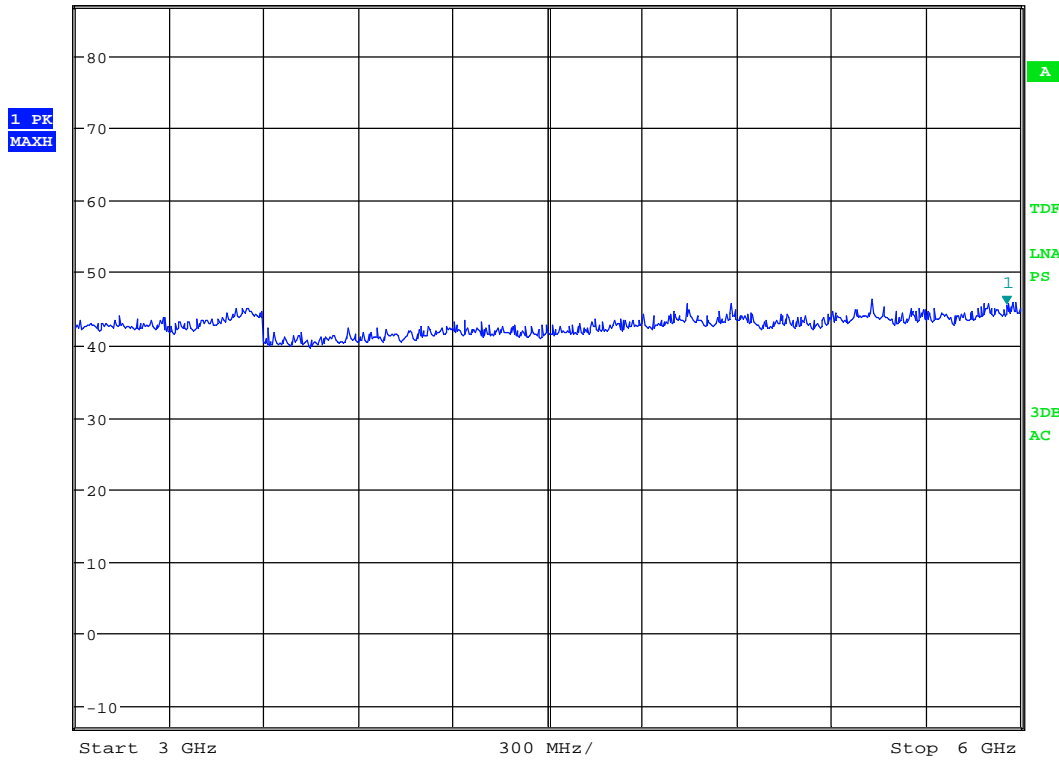


Date: 3.MAR.2016 12:25:14

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



<b>MARKER 1</b>	* RBW 1 MHz	Marker 1 [T1]
5.956730769 GHz	VBW 3 MHz	45.48 dBµV/m
Ref 87 dBµV/m	SWT 20 ms	5.956730769 GHz
* Att 15 dB		

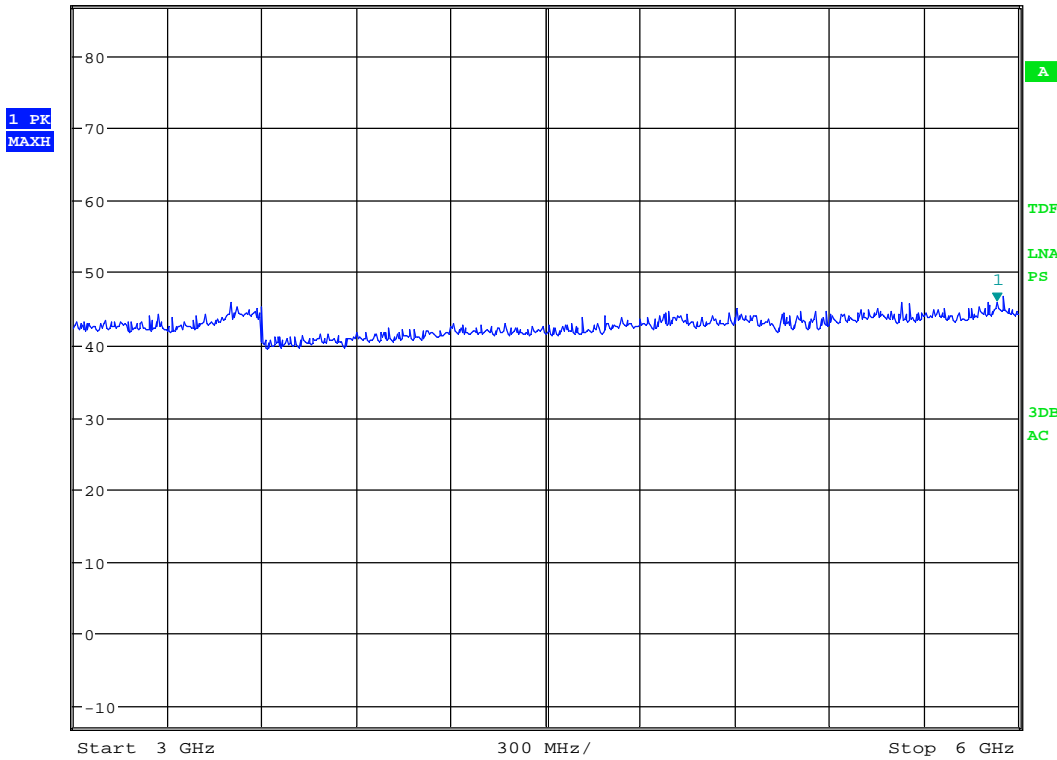


Date: 3.MAR.2016 08:41:00

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



<b>MARKER 1</b>	* RBW 1 MHz	Marker 1 [T1 ]
5.932692308 GHz	VBW 3 MHz	45.84 dBµV/m
Ref 87 dBµV/m	SWT 20 ms	5.932692308 GHz
* Att 15 dB		

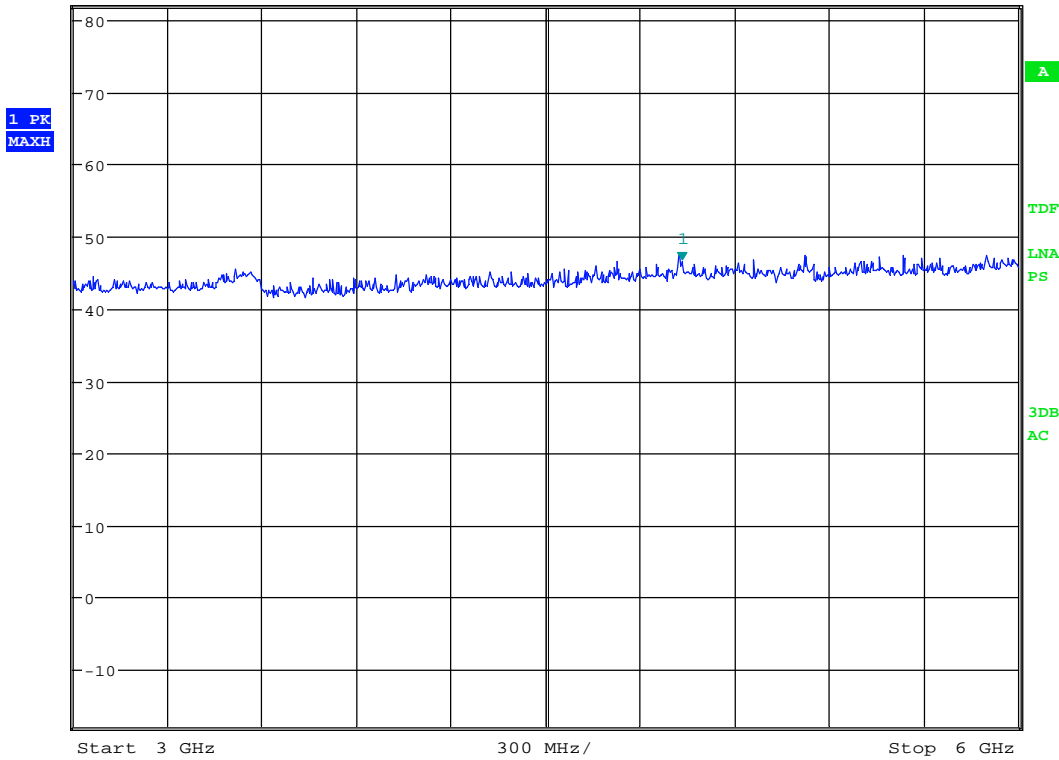


Date: 3.MAR.2016 08:42:07

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



\* RBW 1 MHz      Marker 1 [T1 ]  
 VBW 3 MHz      46.70 dBµV/m  
 Ref 82 dBµV/m    \* Att 10 dB      SWT 20 ms      4.931250000 GHz

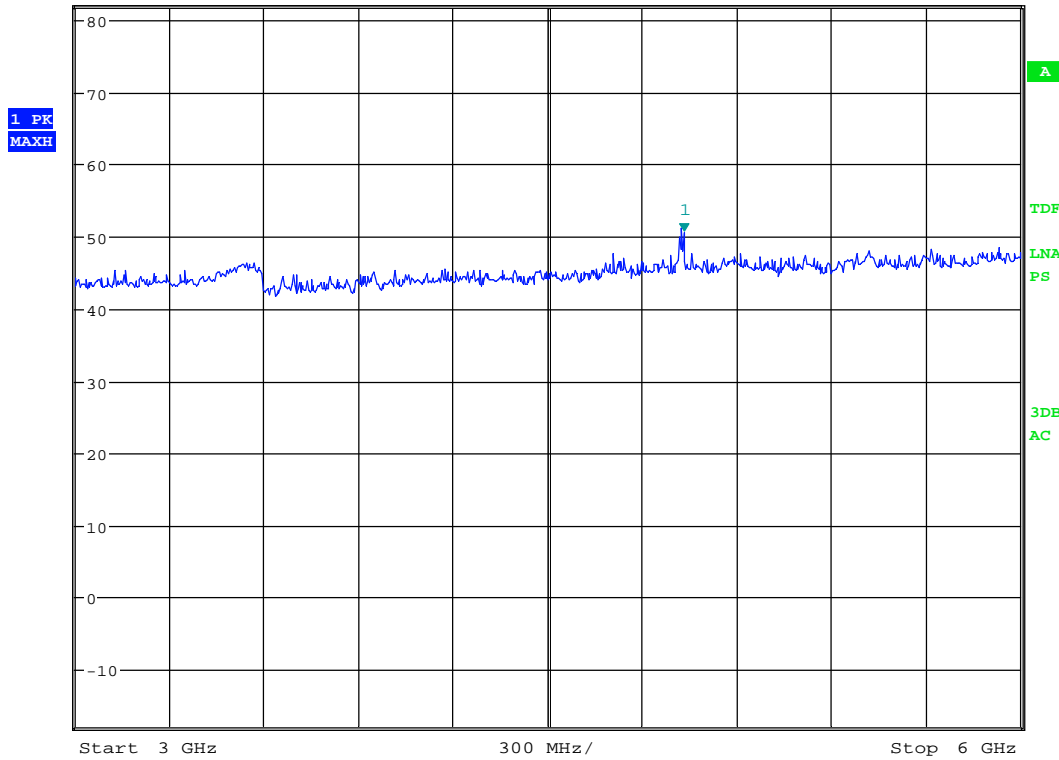


Date: 19.FEB.2016 07:16:11

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



<b>MARKER 1</b>	* RBW 1 MHz	Marker 1 [T1 ]
4.93125 GHz	VBW 3 MHz	50.68 dBμV/m
Ref 82 dBμV/m	SWT 20 ms	4.931250000 GHz
* Att 20 dB		



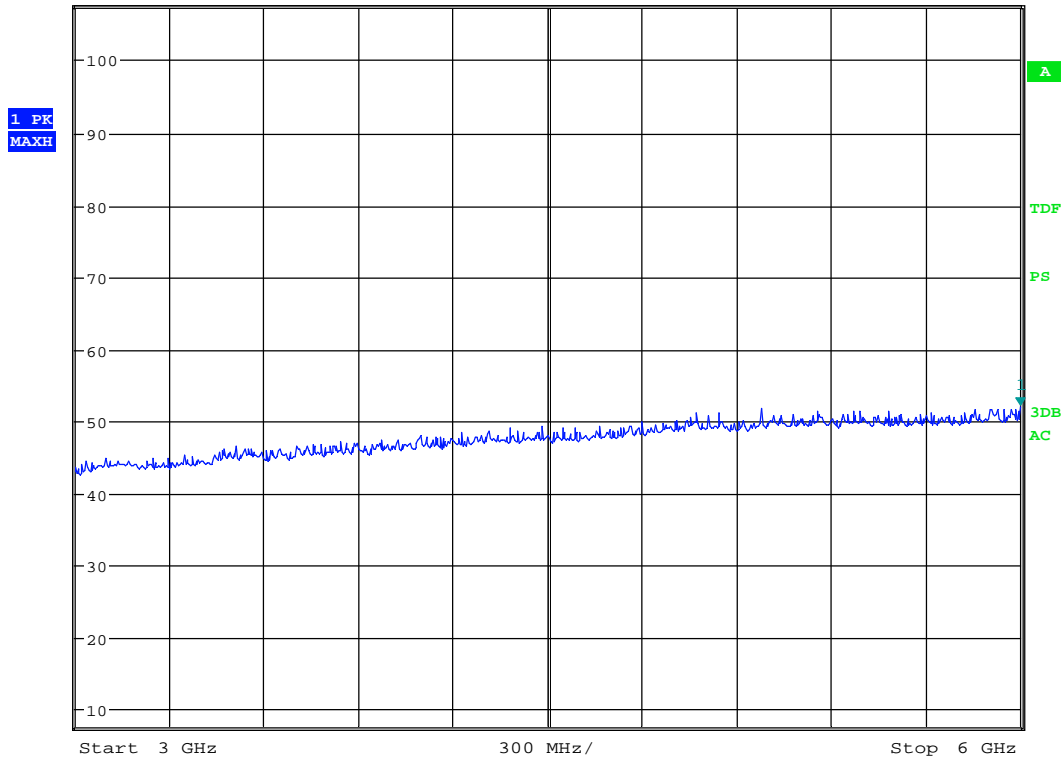
Date: 19.FEB.2016 07:14:11

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





**MARKER 1**  
 6 GHz  
 Ref 107.6 dBµV/m \* Att 10 dB  
 \* RBW 1 MHz Marker 1 [T1 ]  
 VBW 3 MHz 52.05 dBµV/m  
 SWT 20 ms 6.000000000 GHz

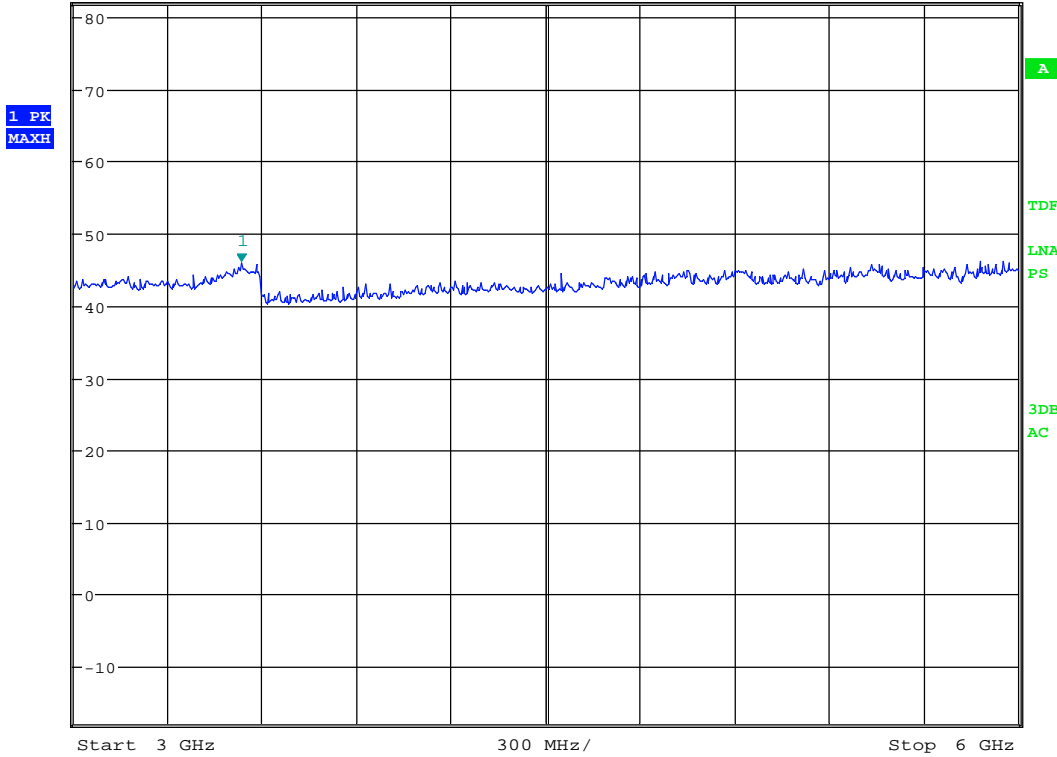


Date: 3.MAR.2016 11:10:44

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



<b>MARKER 1</b>	*RBW 1 MHz	Marker 1 [T1 ]
3.533653846 GHz	VBW 3 MHz	45.91 dBµV/m
Ref 82 dBµV/m	*Att 10 dB	3.533653846 GHz
	SWT 20 ms	



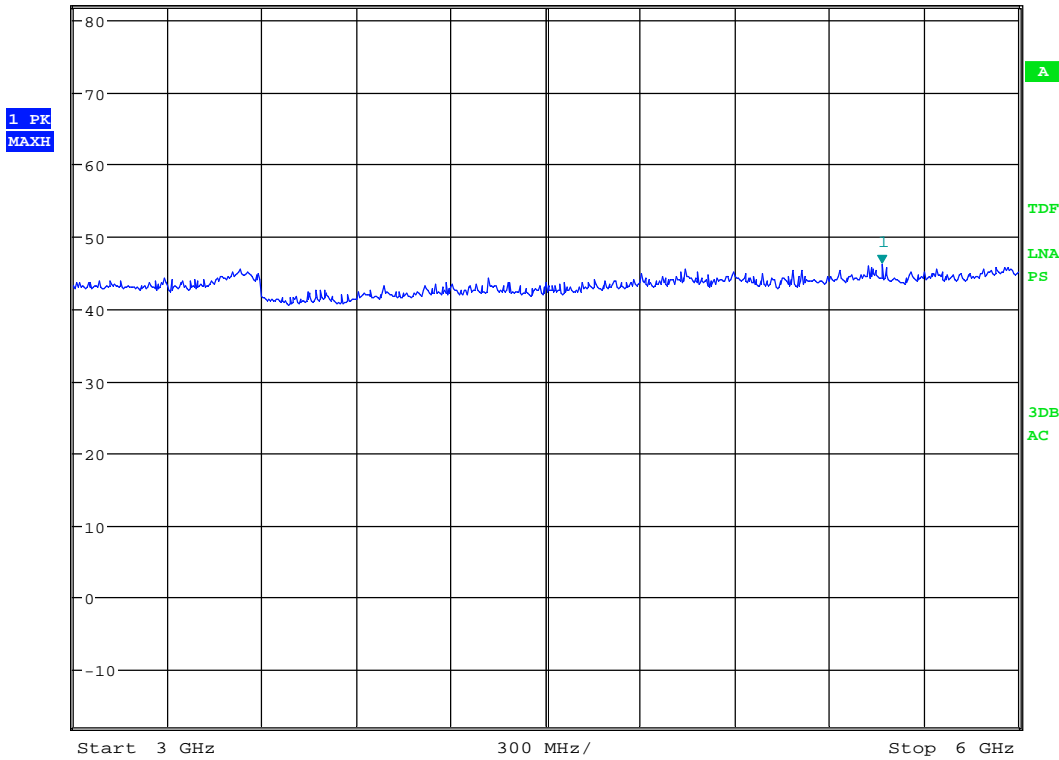
Date: 3.MAR.2016 08:16:53

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





<b>MARKER 1</b>	* RBW 1 MHz	Marker 1 [T1]
5.567307692 GHz	VBW 3 MHz	46.26 dBµV/m
Ref 82 dBµV/m	SWT 20 ms	5.567307692 GHz
* Att 10 dB		

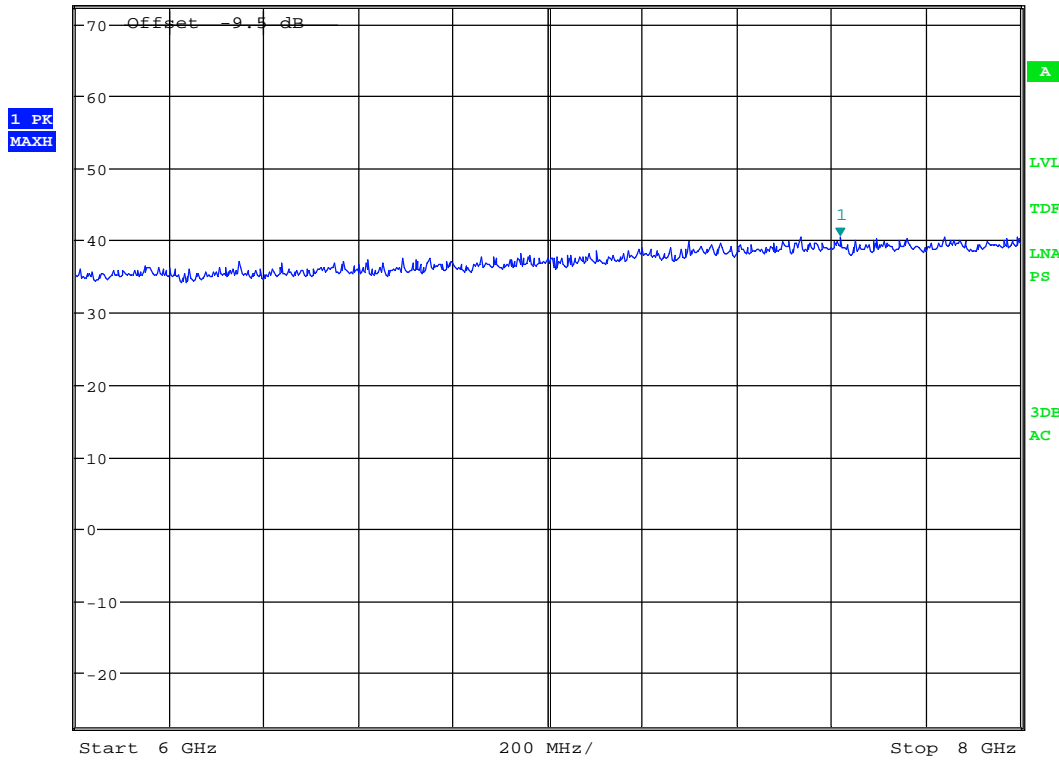


Date: 3.MAR.2016 08:14:06

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



**MARKER 1**  
 7.618589744 GHz  
 Ref 72.5 dB $\mu$ V/m \* Att 10 dB \* RBW 1 MHz VBW 3 MHz SWT 20 ms  
 Marker 1 [T1 ] 40.48 dB $\mu$ V/m  
 7.618589744 GHz

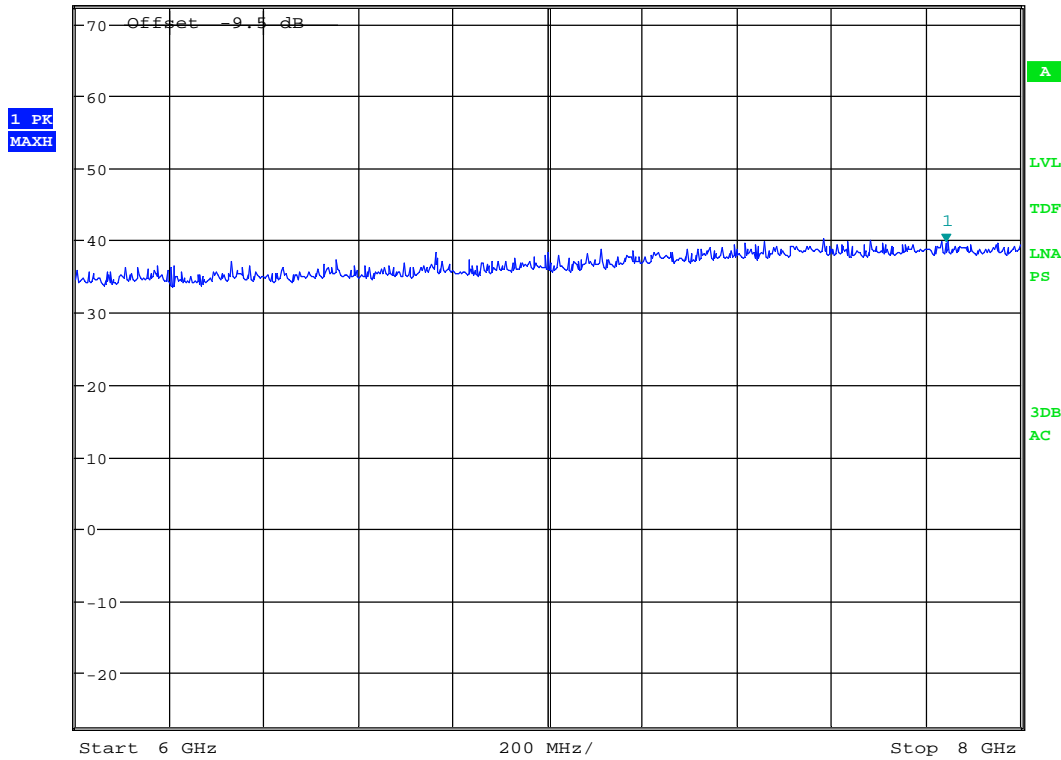


Date: 3.MAR.2016 13:01:13

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



<b>MARKER 1</b>	*RBW 1 MHz	Marker 1 [T1 ]
7.842948718 GHz	VBW 3 MHz	39.60 dBµV/m
Ref 72.5 dBµV/m	SWT 20 ms	7.842948718 GHz
*Att 10 dB		



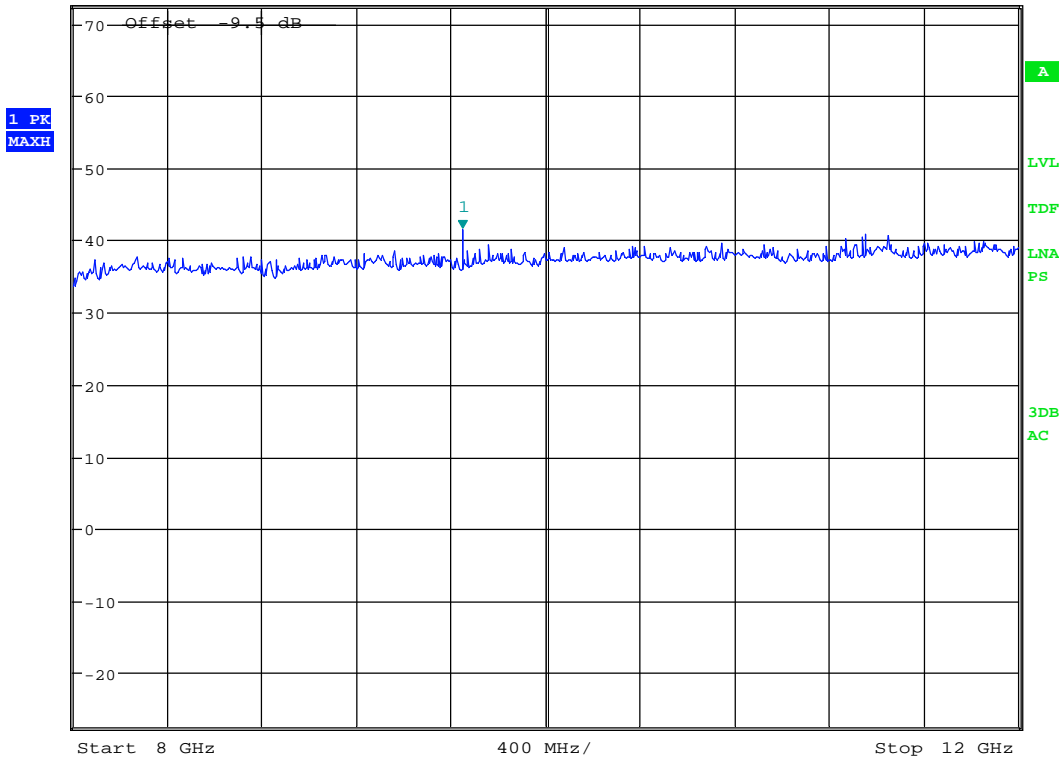
Date: 3.MAR.2016 13:02:33

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



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

Ref 72.5 dBµV/m      \*Att 10 dB

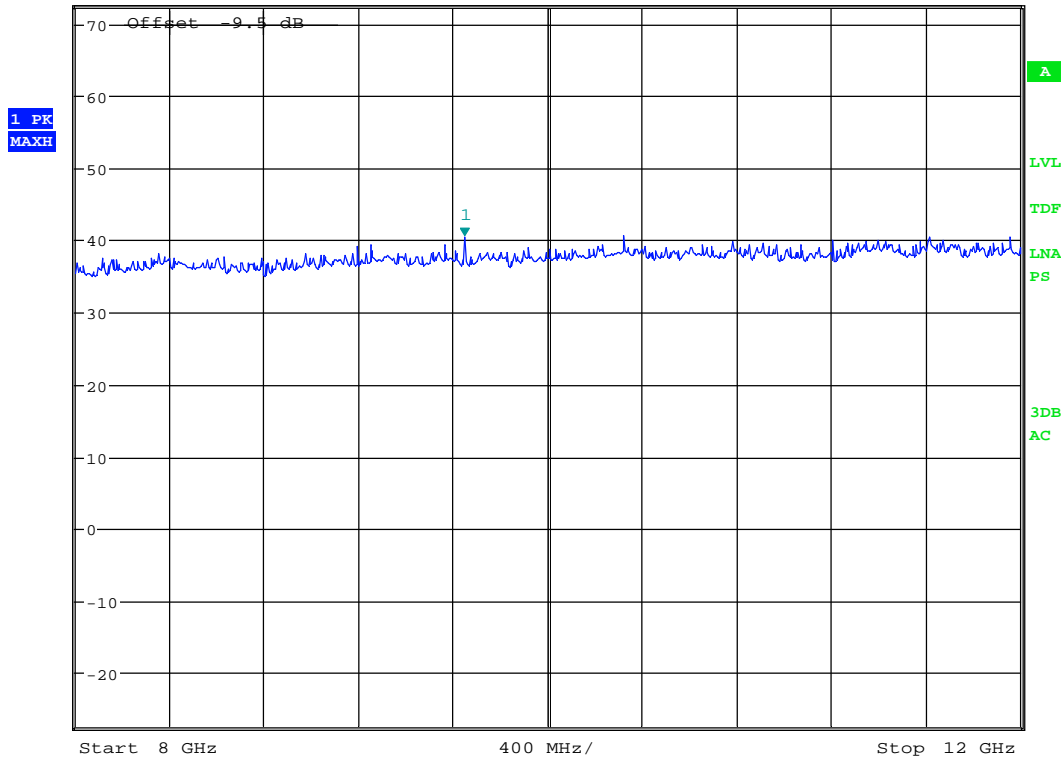


Date: 3.MAR.2016 13:56:45

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



**MARKER 1**  
 9.647435897 GHz  
 Ref 72.5 dB $\mu$ V/m \* Att 10 dB  
 \* RBW 1 MHz Marker 1 [T1 ]  
 VBW 3 MHz 40.39 dB $\mu$ V/m  
 SWT 25 ms 9.647435897 GHz

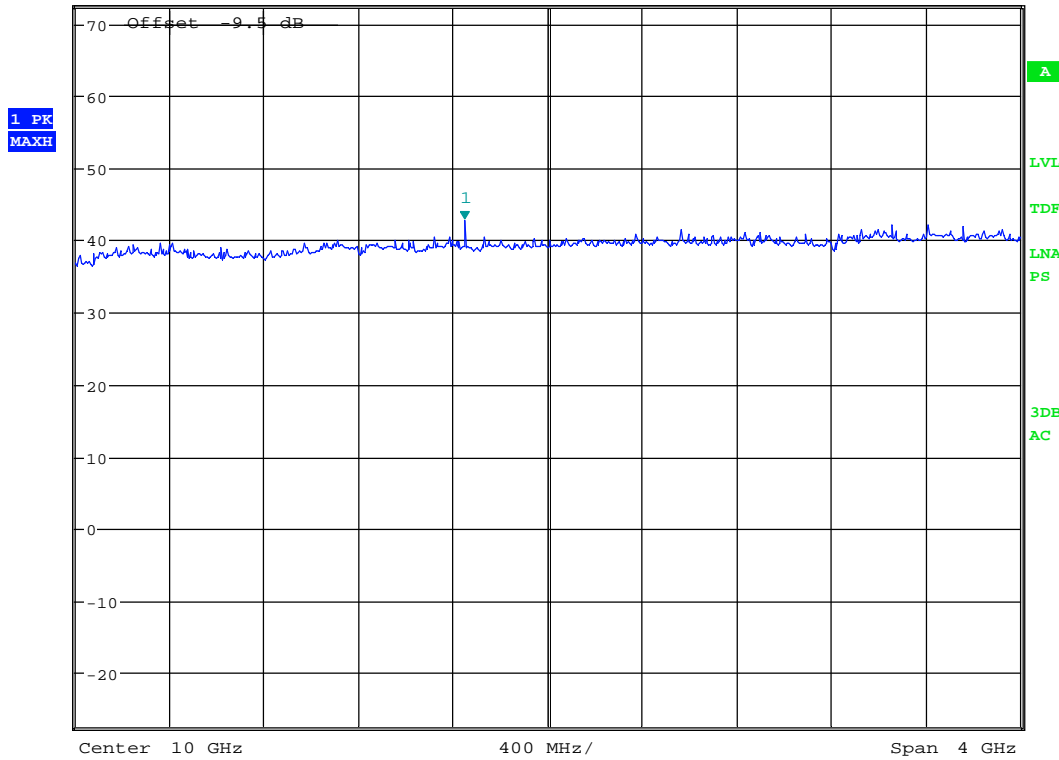


Date: 3.MAR.2016 13:57:12

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



**MARKER 1**  
 9.647435897 GHz  
 Ref 87 dBµV/m \* Att 10 dB  
 \* RBW 1 MHz Marker 1 [T1 ]  
 VBW 3 MHz 42.81 dBµV/m  
 SWT 25 ms 9.647435897 GHz

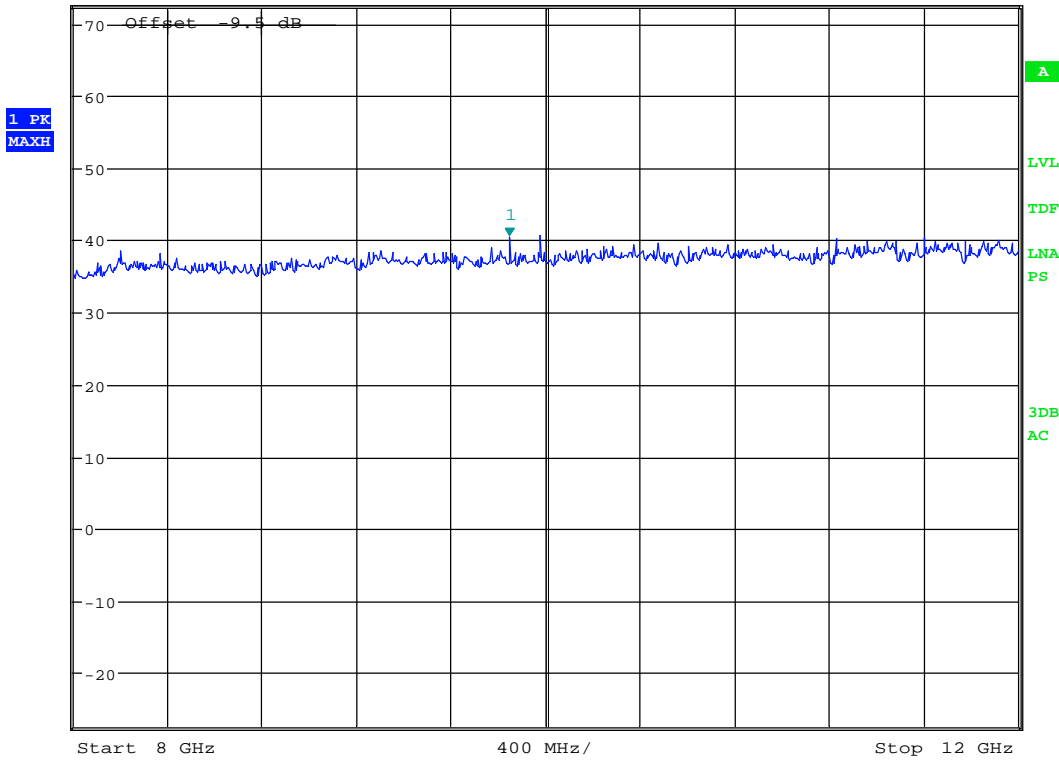


Date: 3.MAR.2016 13:41:28

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



\*RBW 1 MHz      Marker 1 [T1 ]  
 VBW 3 MHz      40.39 dBµV/m  
 Ref 72.5 dBµV/m    \*Att 10 dB      SWT 25 ms      9.848240385 GHz

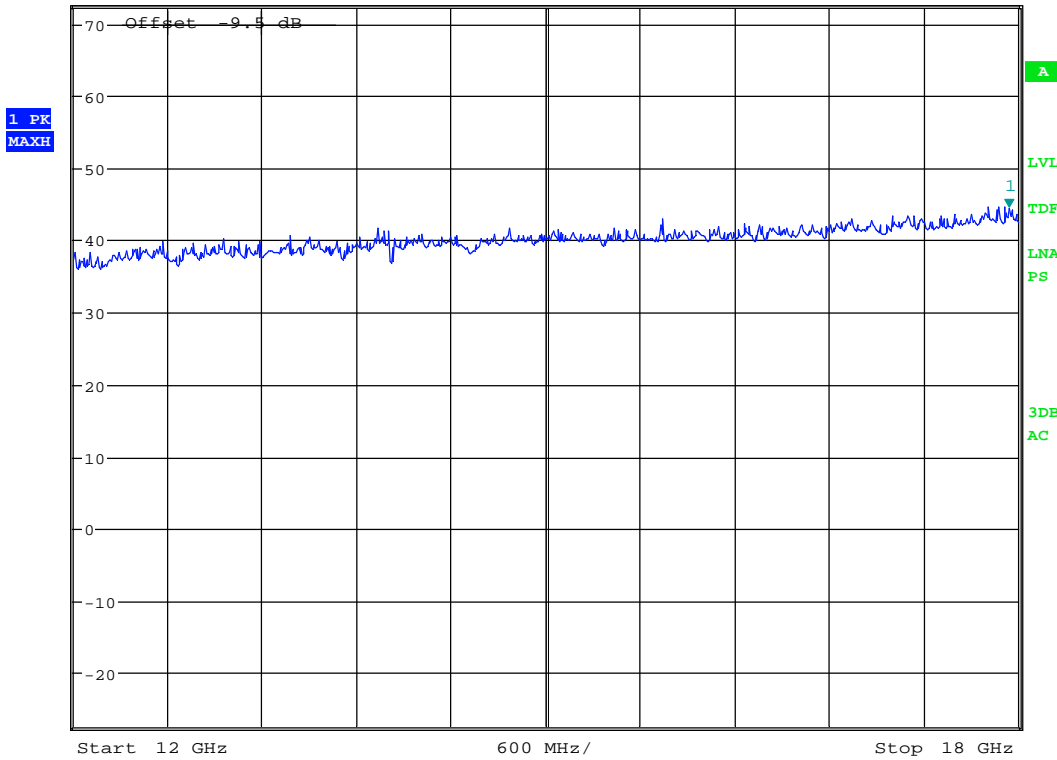


Date: 3.MAR.2016 13:50:28

**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



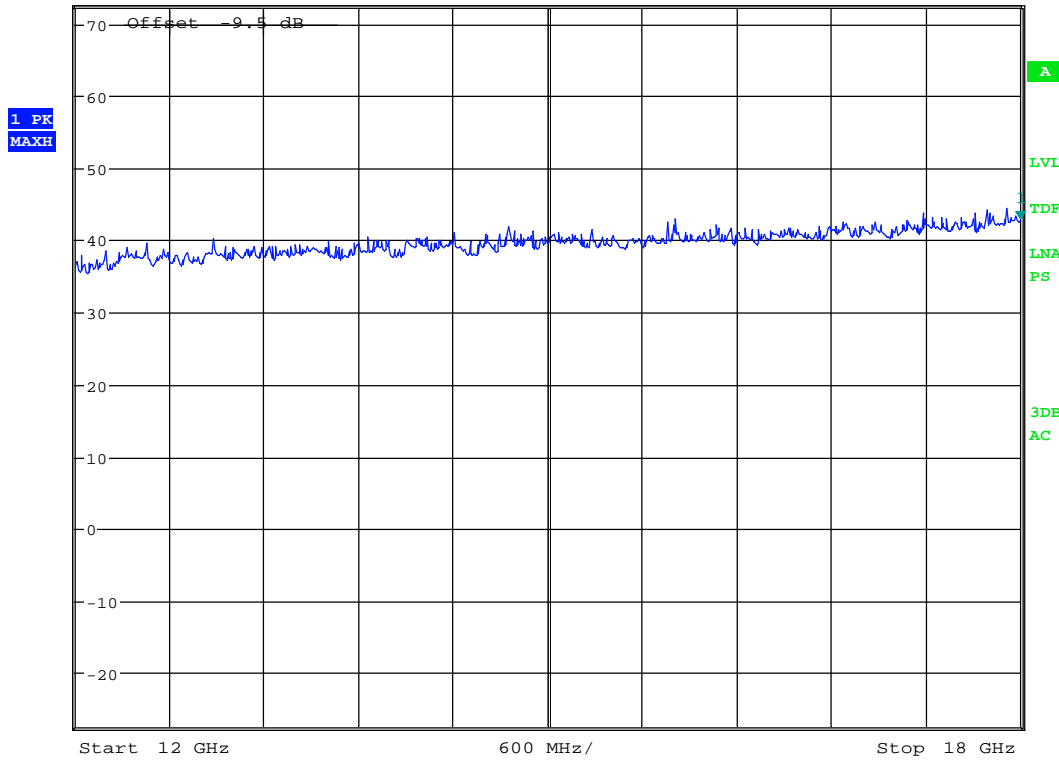
Date: 3.MAR.2016 14:07:44

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





**MARKER 1**  
 18 GHz  
 Ref 72.5 dB $\mu$ V/m \* Att 10 dB \* RBW 1 MHz Marker 1 [T1 ]  
 VBW 3 MHz 42.69 dB $\mu$ V/m  
 SWT 35 ms 18.00000000 GHz

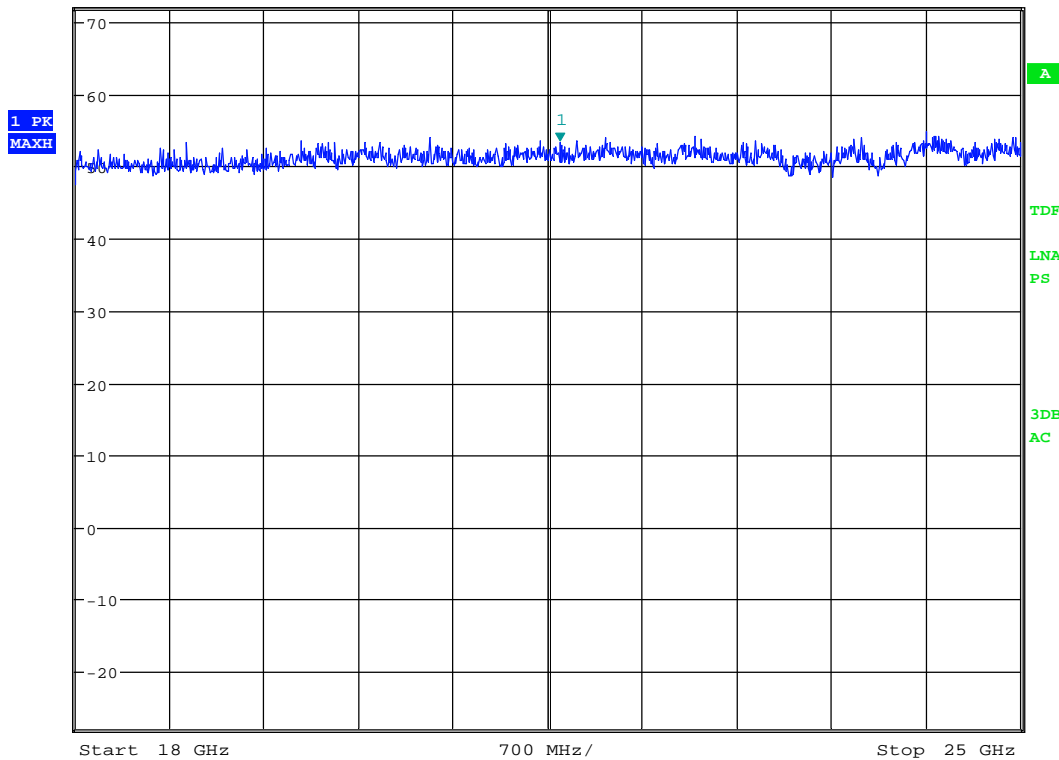


Date: 3.MAR.2016 14:08:12

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



\* RBW 1 MHz      Marker 1 [T1 ]  
 VBW 3 MHz      53.48 dBµV/m  
 SWT 45 ms      21.591875000 GHz  
 Ref 72 dBµV/m      \* Att 0 dB



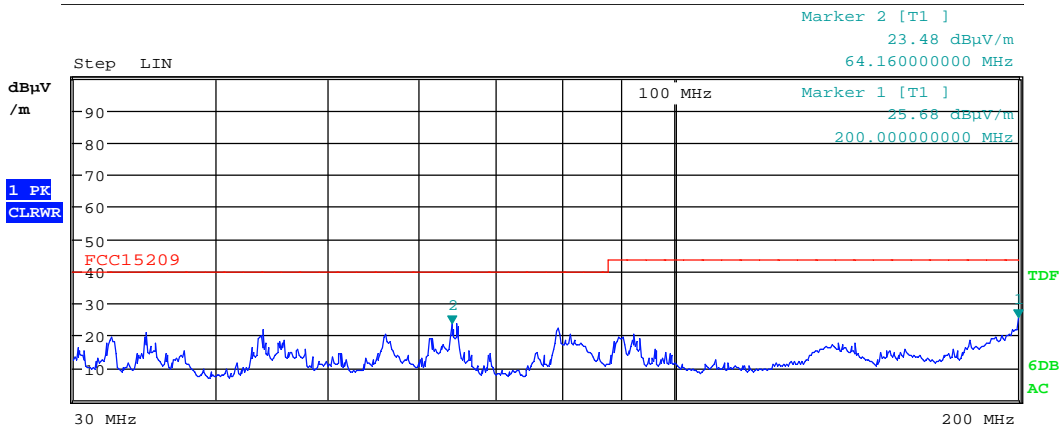
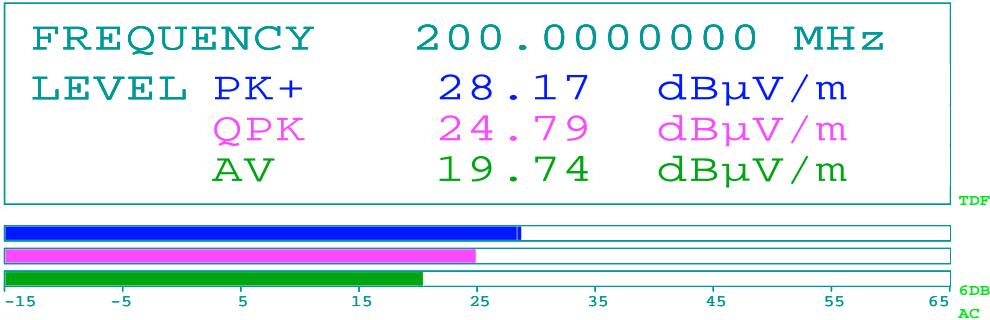
Date: 10.MAR.2016 12:12:11

**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

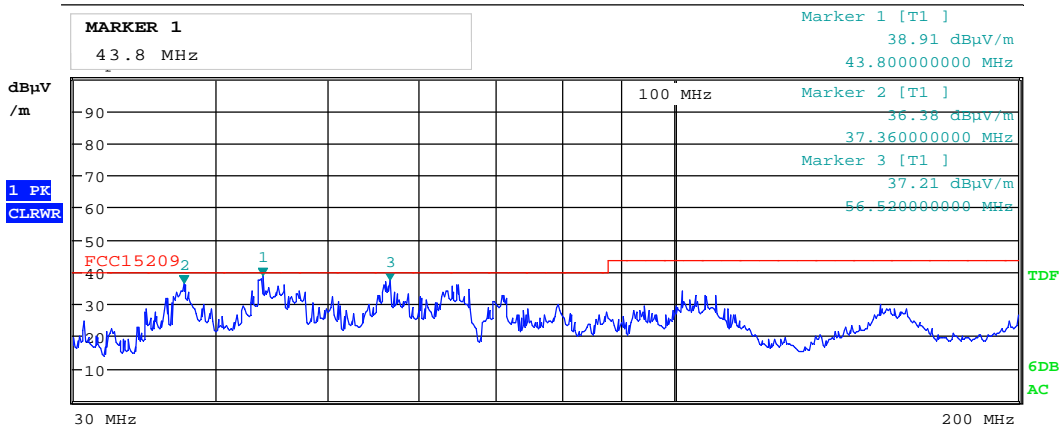
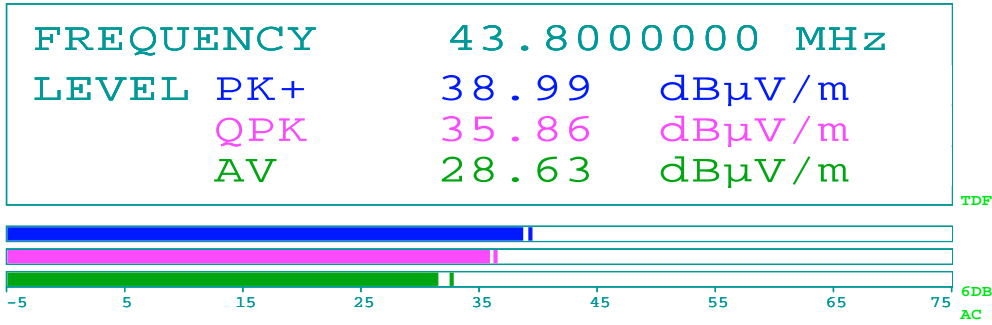


Date: 3.AUG.2016 14:08:19

**Radiated emissions HP, 30 – 200MHz**



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

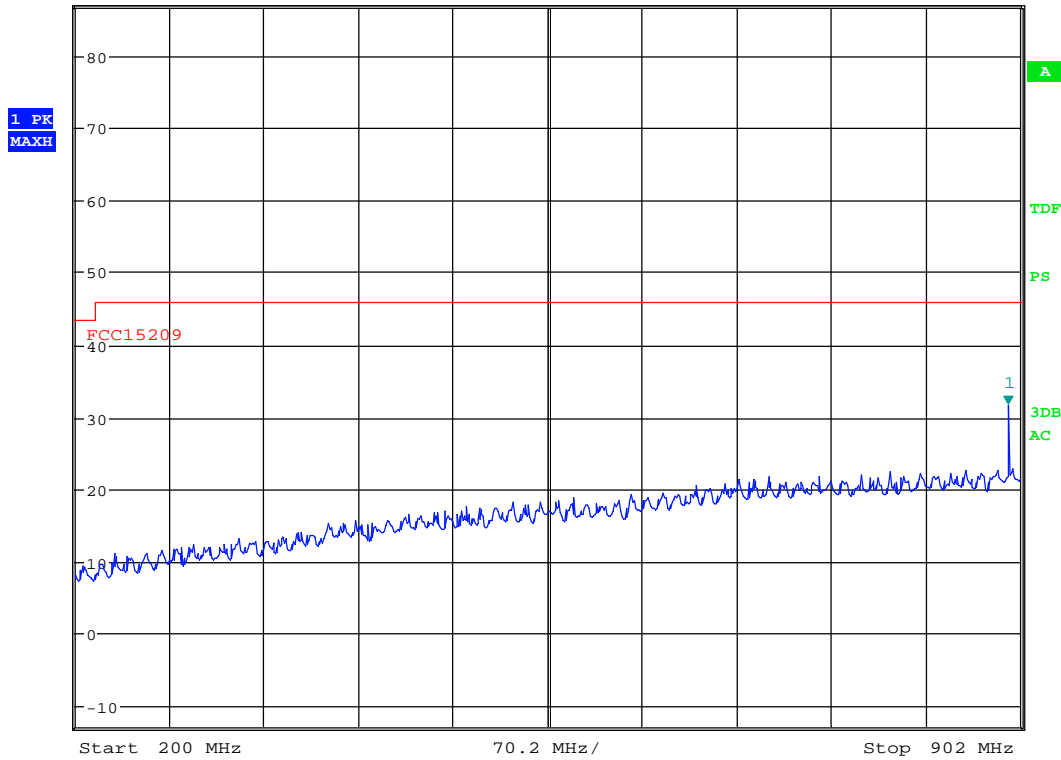


Date: 3.AUG.2016 13:53:43

**Radiated emissions VP, 30 – 200MHz**



<b>MARKER 1</b>	*RBW 100 kHz	Marker 1 [T1 ]
893 MHz	VBW 300 kHz	31.69 dBµV/m
Ref 87 dBµV/m	*Att 10 dB	SWT 75 ms
		893.00000000 MHz

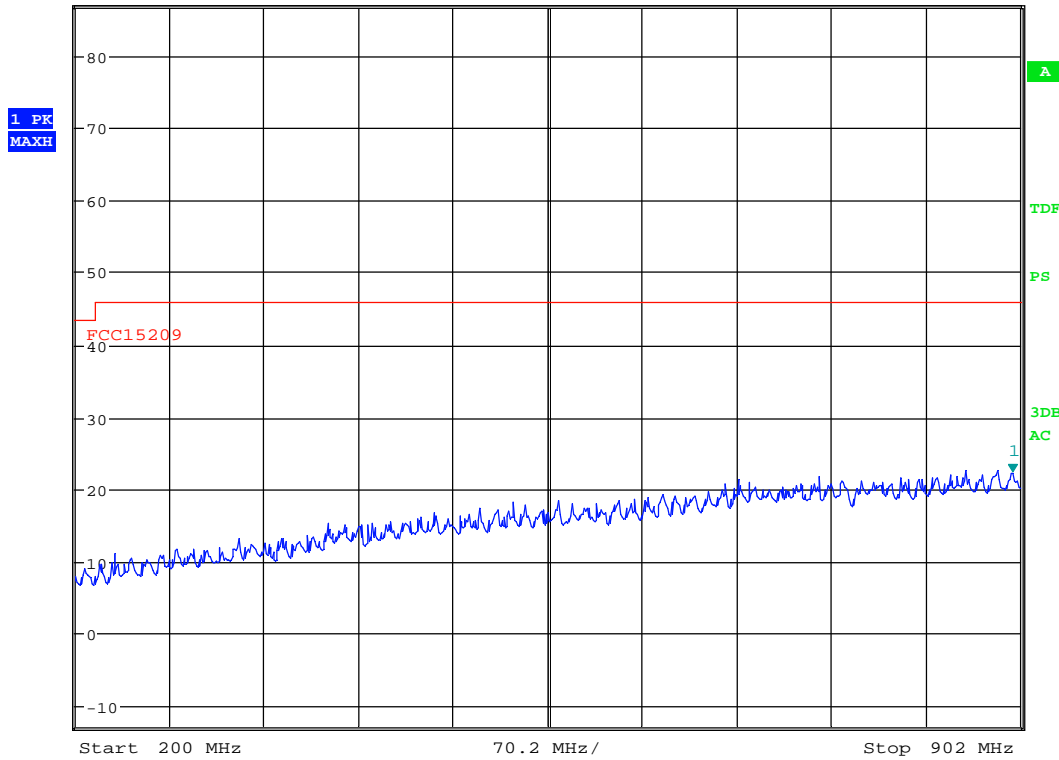


Date: 3.AUG.2016 19:46:45

**Radiated emissions HP,200 - 902MHz**



<b>MARKER 1</b>	*RBW 100 kHz	Marker 1 [T1 ]
896.375 MHz	VBW 300 kHz	22.12 dBµV/m
Ref 87 dBµV/m	SWT 75 ms	896.37500000 MHz
*Att 10 dB		



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

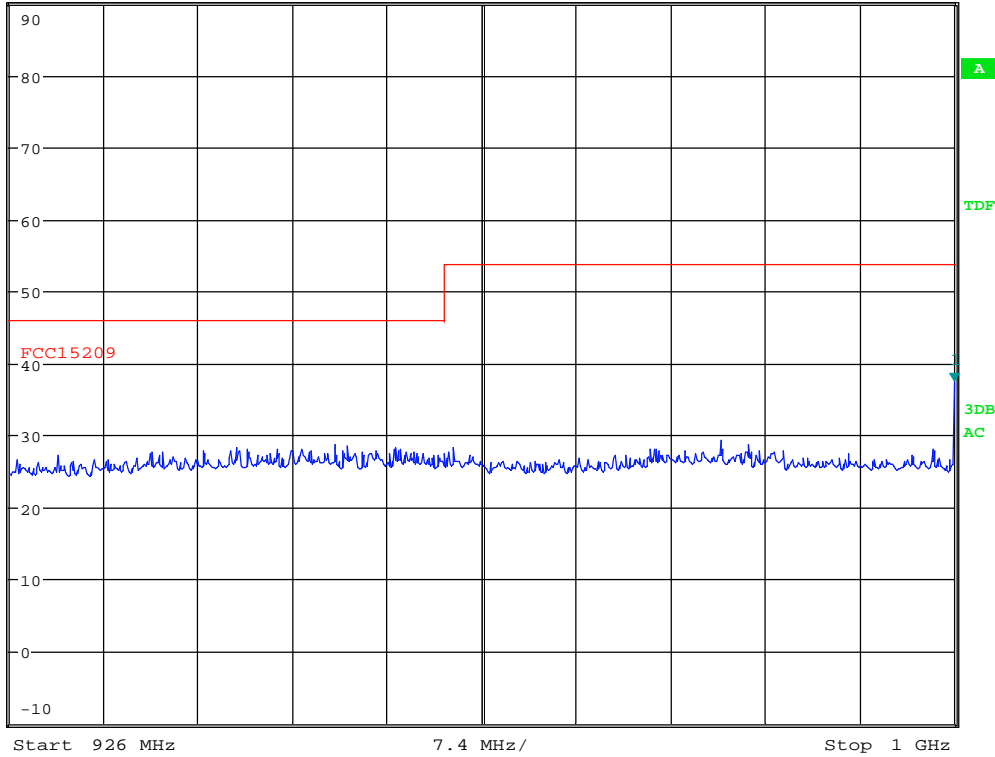
**Radiated emissions VP, 200 - 902MHz**



\*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

1 PK  
 MAXH



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

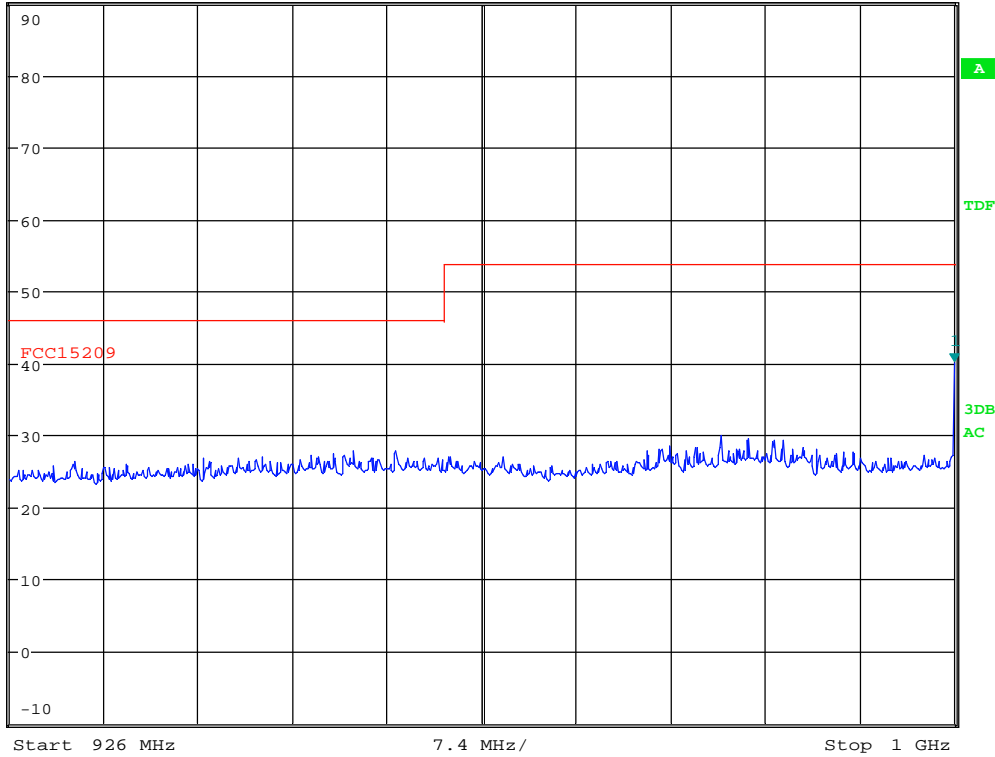
**Radiated emissions HP, 926 - 1000MHz**



\*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

1 PK  
MAXH



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

**Radiated emissions VP, 926 - 1000MHz**

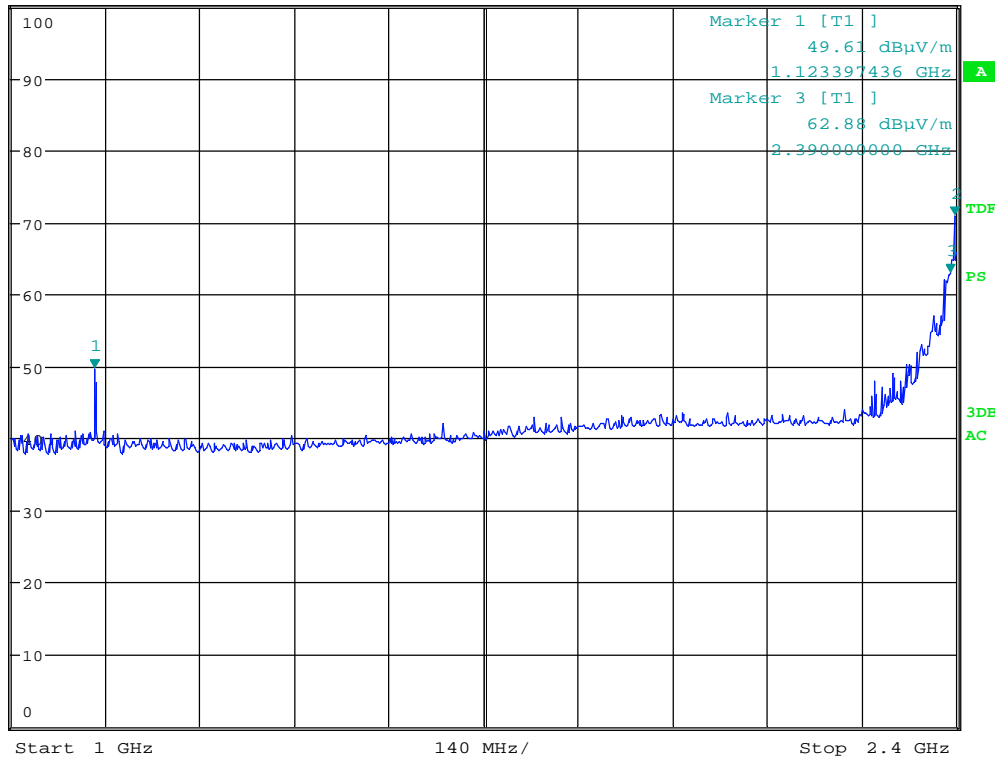




**MARKER 2**  
 2.39775641 GHz  
 Ref 100 dBuV/m \* Att 15 dB

\* RBW 1 MHz Marker 2 [T1 ]  
 VBW 3 MHz 70.85 dBuV/m  
 SWT 5 ms 2.397756410 GHz

1 PK  
 MAXH



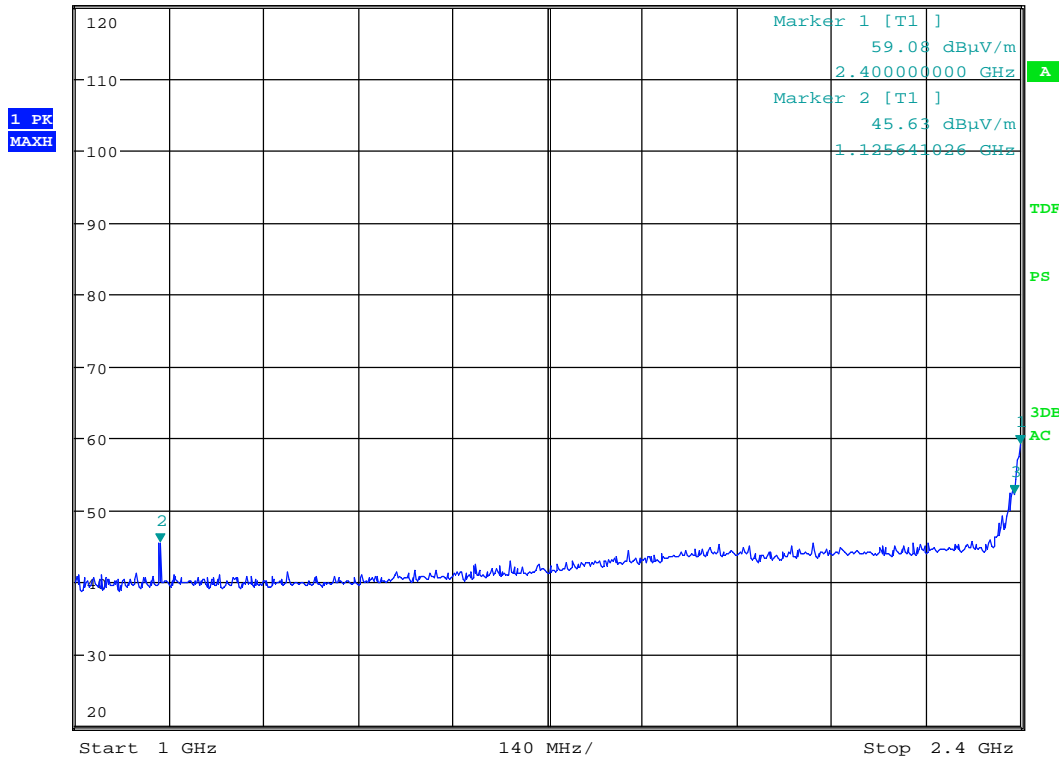
Date: 3.AUG.2016 17:42:46

**Radiated emissions HP, 1 - 2.4GHz, PK scan**



**MARKER 3**  
 2.39 GHz  
 Ref 120 dBuV/m \* Att 15 dB

\* RBW 1 MHz Marker 3 [T1 ]  
 VBW 3 MHz 52.27 dBuV/m  
 SWT 5 ms 2.390000000 GHz

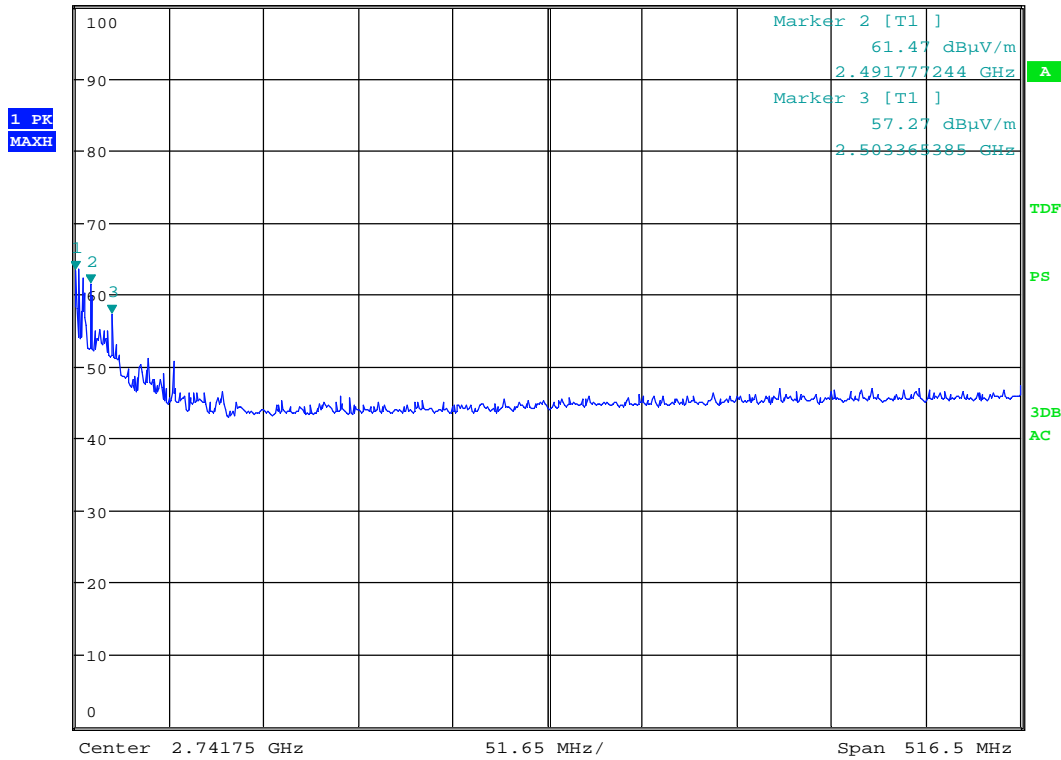


Date: 3.AUG.2016 17:26:13

**Radiated emissions VP, 1 - 2.4GHz, PK scan**



**MARKER 1**  
 2.4835 GHz  
 Ref 100 dBuV/m \* Att 15 dB  
 \* RBW 1 MHz Marker 1 [T1 ]  
 VBW 3 MHz 63.31 dBuV/m  
 SWT 2.5 ms 2.48350000 GHz



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

**Radiated emissions HP, 2.4835 - 3GHz, PK scan**

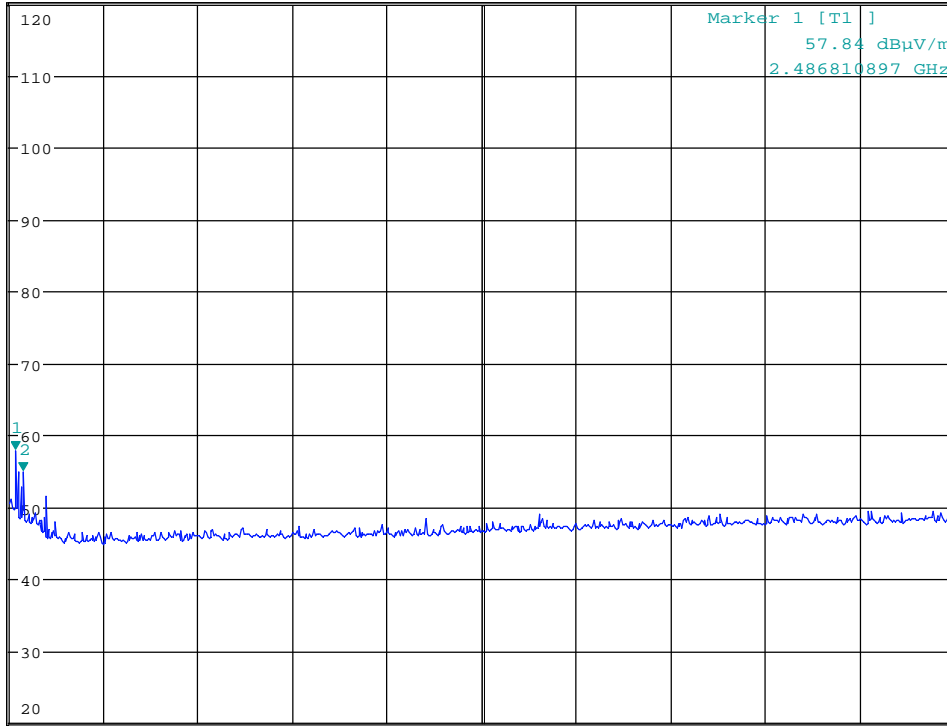


**MARKER 2**  
 2.490949519 GHz  
 Ref 120 dBuV/m \* Att 15 dB

\* RBW 1 MHz  
 VBW 3 MHz  
 SWT 2.5 ms

Marker 2 [T1 ]  
 54.96 dBuV/m  
 2.490949519 GHz

1 PK  
 MAXH



Start 2.4835 GHz 51.65 MHz/ Stop 3 GHz

A  
 TDF  
 PS  
 3DB  
 AC

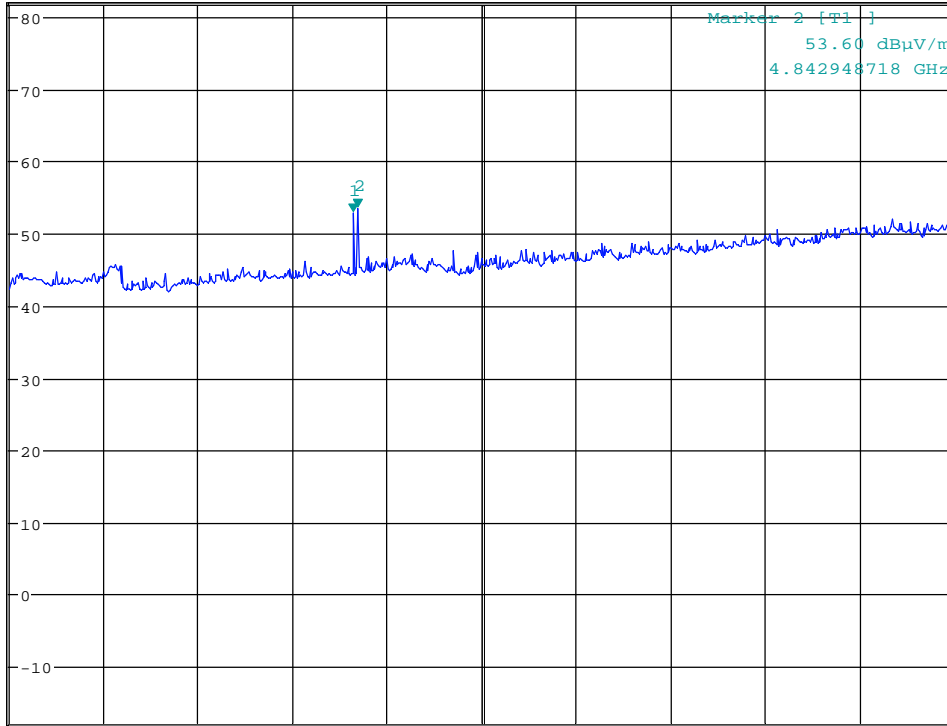
Date: 3.AUG.2016 17:28:11

**Radiated emissions VP, 2.4835 - 3GHz, PK scan**



**MARKER 1**  
 4.818910256 GHz  
 Ref 82 dBµV/m \* Att 10 dB \* RBW 1 MHz  
 VBW 3 MHz SWT 30 ms  
 Marker 1 [T1 ]  
 52.94 dBµV/m  
 4.818910256 GHz

1 PK  
MAXH



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

**Radiated emissions HP, 3 - 8GHz, PK scan**

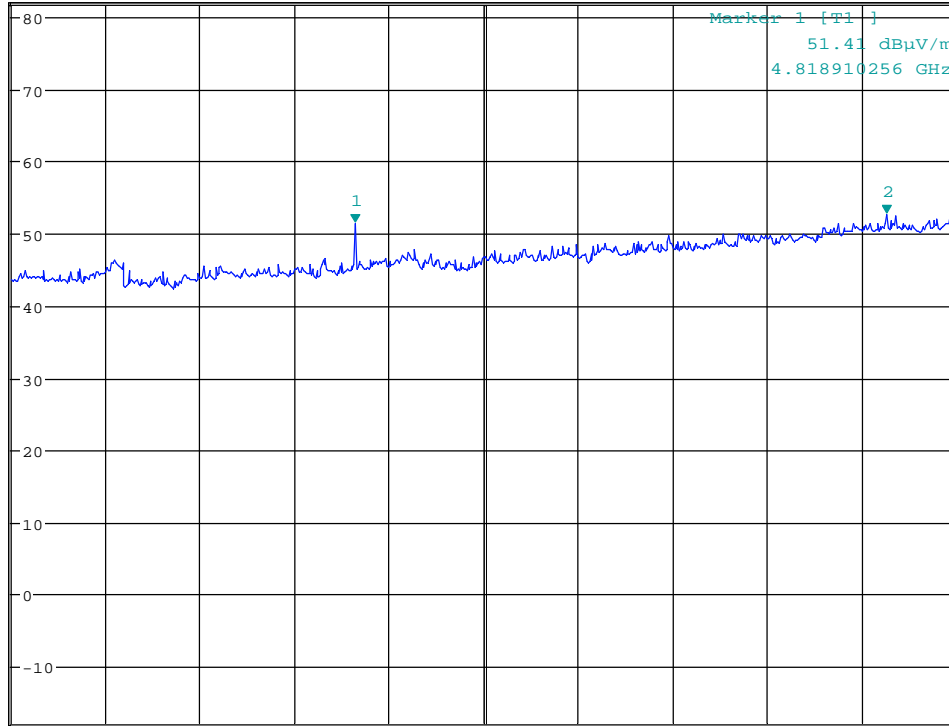


**MARKER 2**  
 7.631410256 GHz  
 Ref 82 dB $\mu$ V/m \* Att 10 dB

\* RBW 1 MHz  
 VBW 3 MHz  
 SWT 30 ms

Marker 2 [T1 ]  
 52.79 dB $\mu$ V/m  
 7.631410256 GHz

1 PK  
 MAXH



Start 3 GHz 500 MHz/ Stop 8 GHz

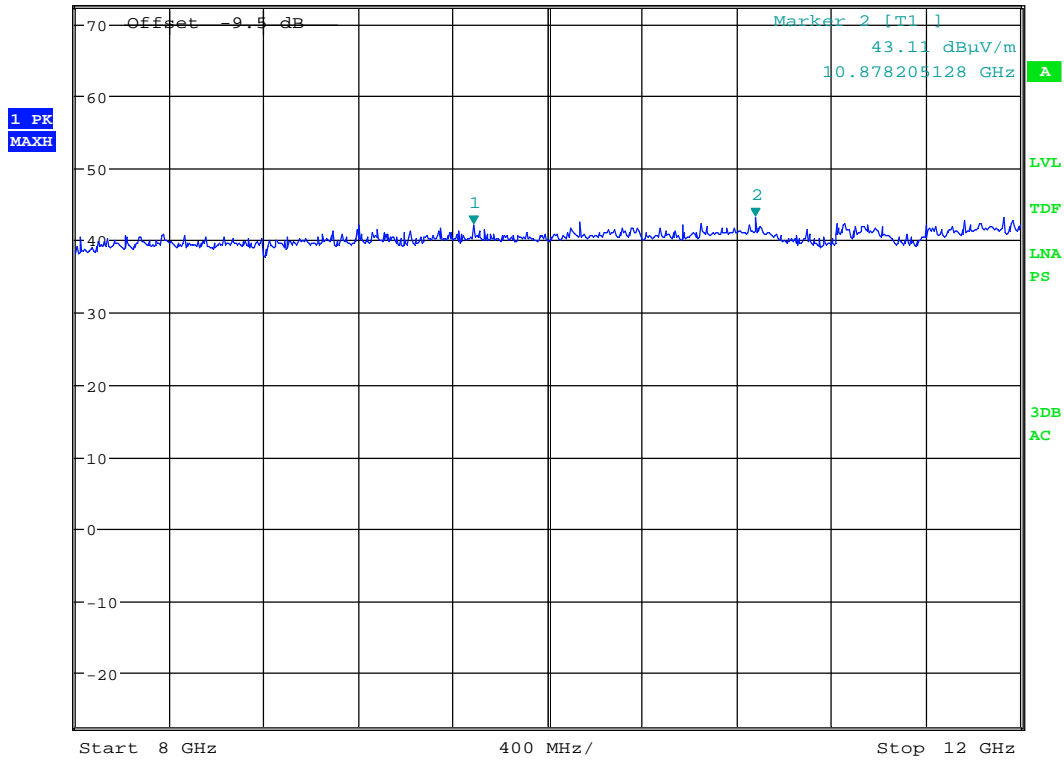
A  
 TDF  
 LNA  
 PS  
 3DB  
 AC

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

**Radiated emissions VP, 3 - 8GHz, PK scan**



**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 ]  
 42.04 dBµV/m  
 9.685897436 GHz

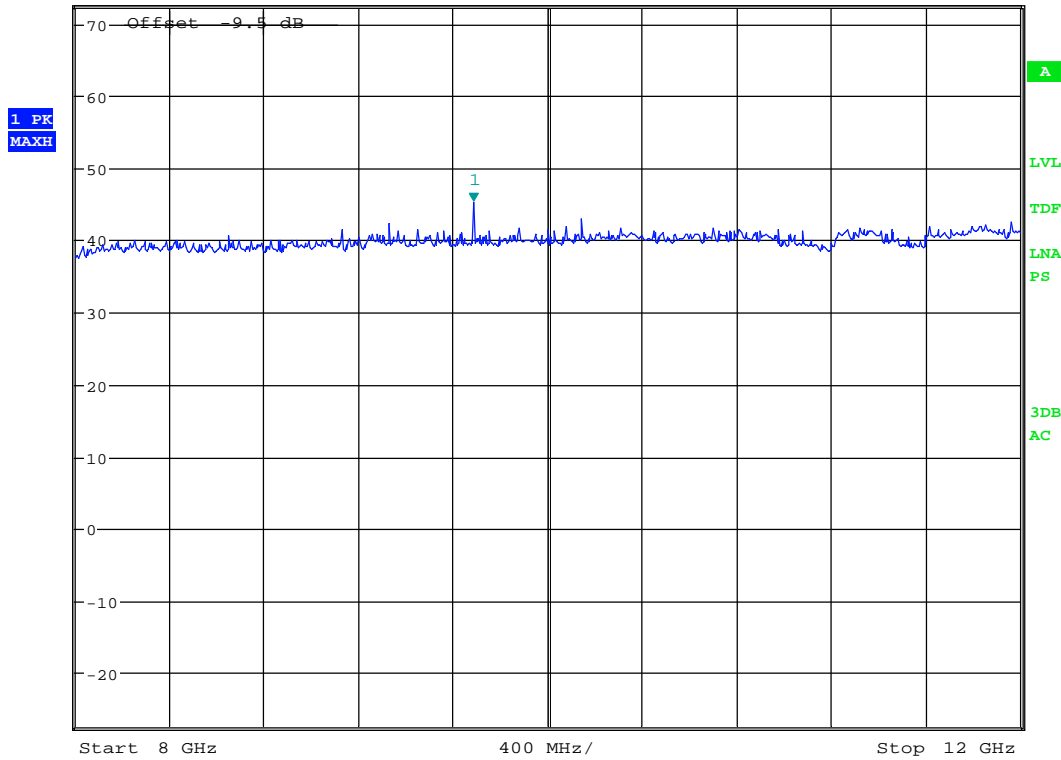


Date: 3.AUG.2016 17:58:20

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



<b>MARKER 1</b>	* RBW 1 MHz	Marker 1 [T1 ]
9.685897436 GHz	VBW 3 MHz	45.32 dBµV/m
Ref 72.5 dBµV/m	* Att 10 dB	SWT 25 ms
		9.685897436 GHz



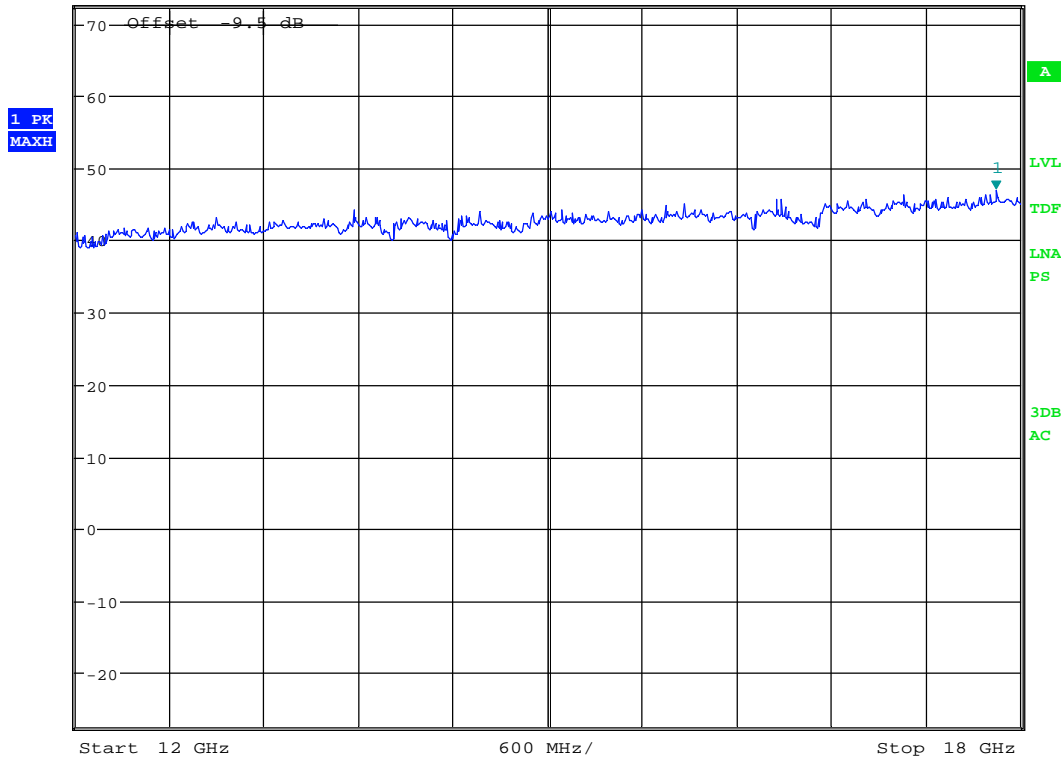
Date: 3.AUG.2016 17:56:38

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





<b>MARKER 1</b>	*RBW 1 MHz	Marker 1 [T1 ]
17.84615385 GHz	VBW 3 MHz	46.91 dBµV/m
Ref 72.5 dBµV/m	*Att 10 dB	SWT 35 ms
		17.846153846 GHz



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

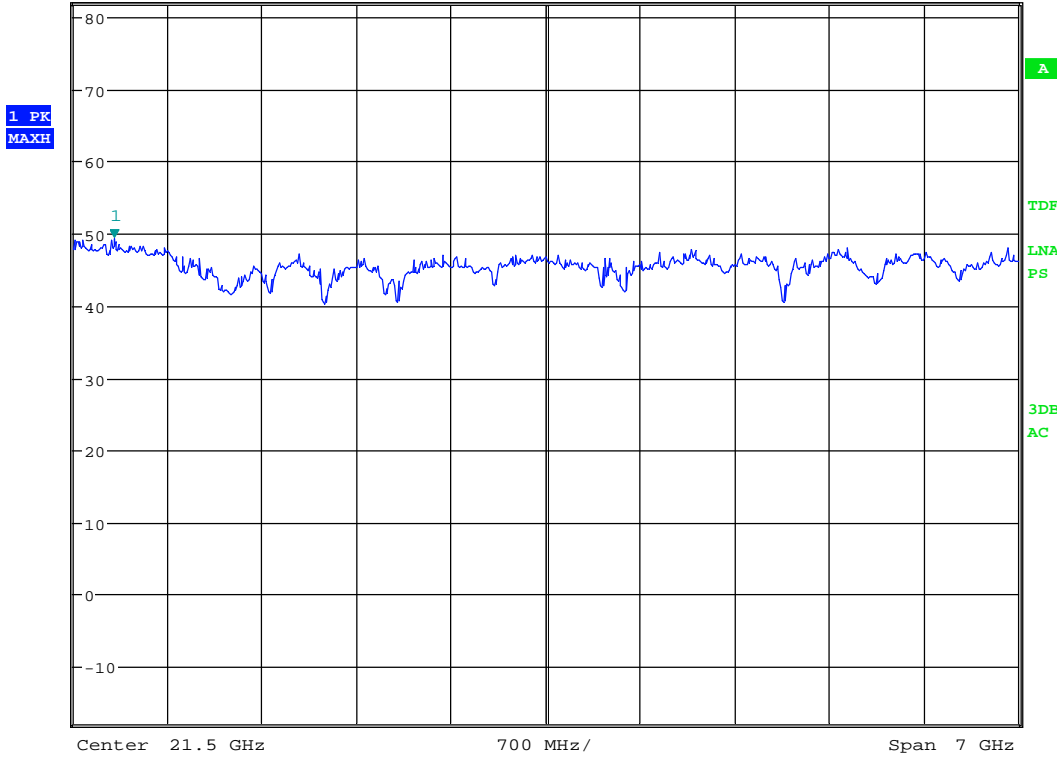
**Radiated emissions HP, 12 - 18GHz, PK scan at 1 m distance (distance correction is included in the plot)**





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

Ref 82 dBµV/m      \*Att 10 dB



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.Suhandhakumar	Date of Test: 2016.02.22
------------------------------------	--------------------------

Test Results: Passed

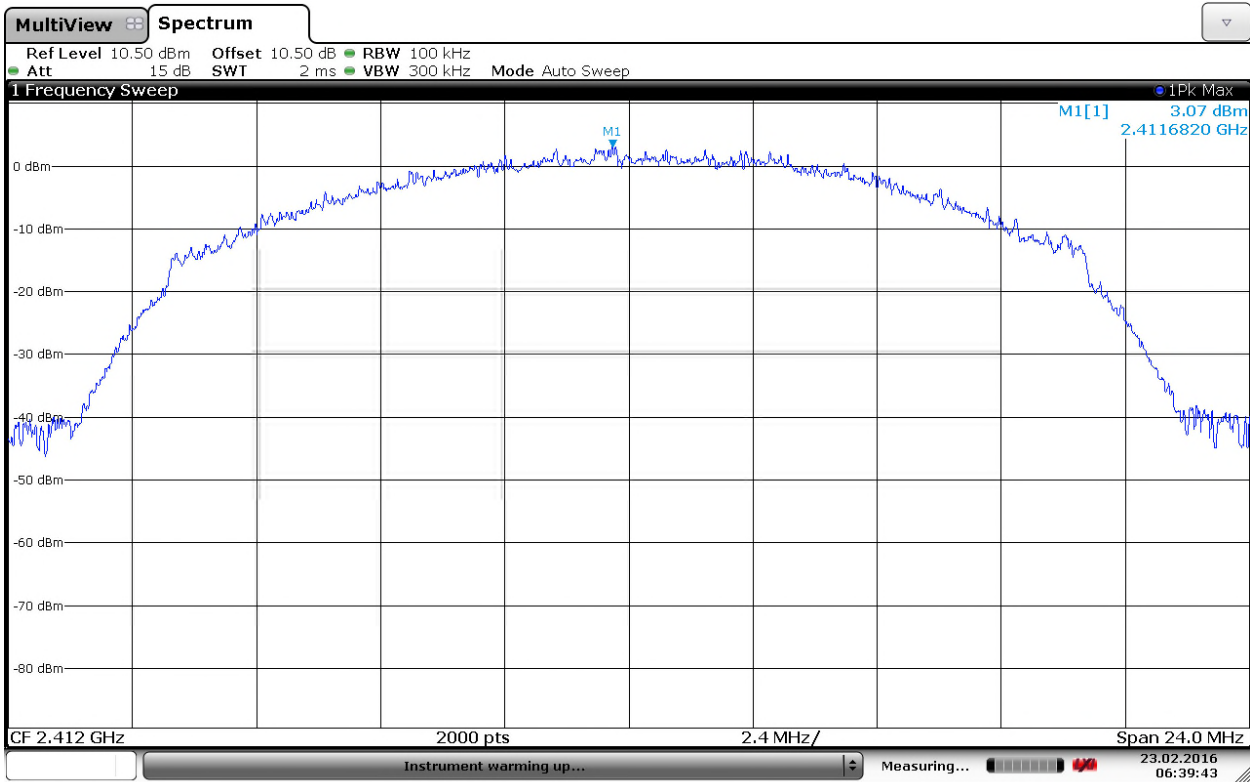
Measured and Calculated Data:

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.

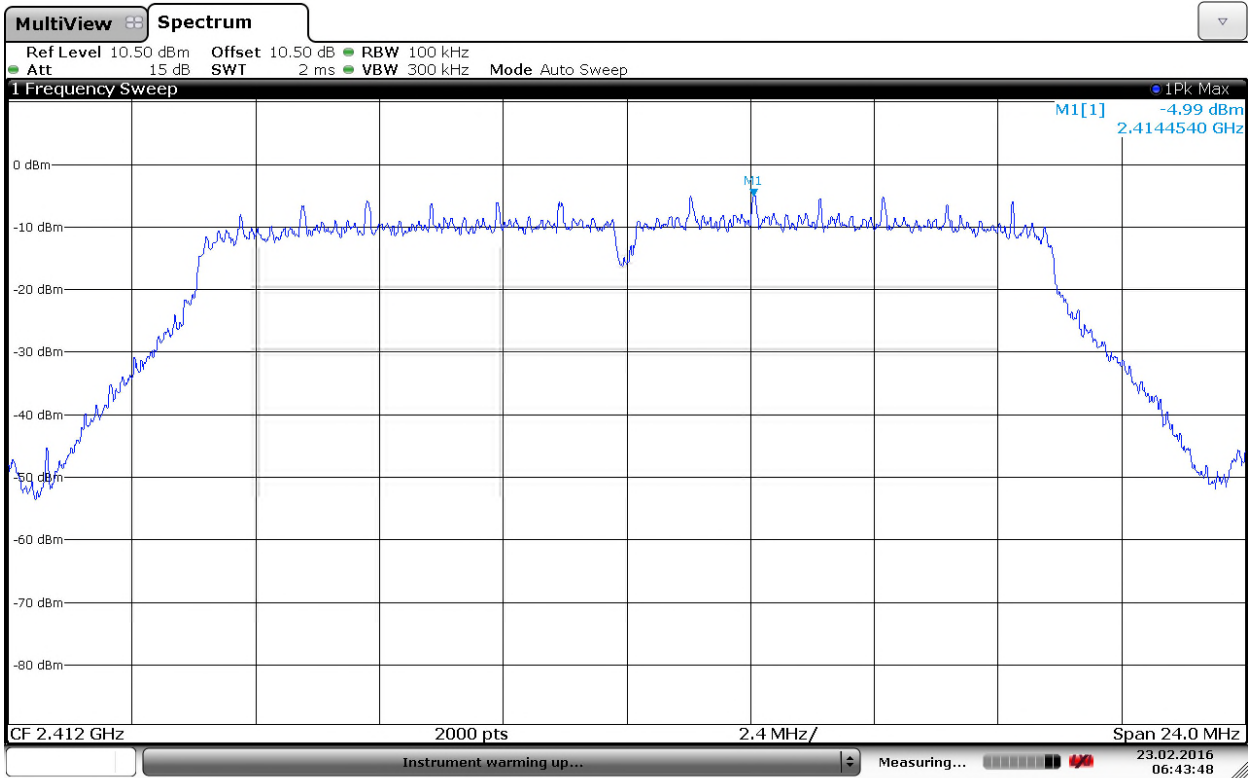
#### Requirements:

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



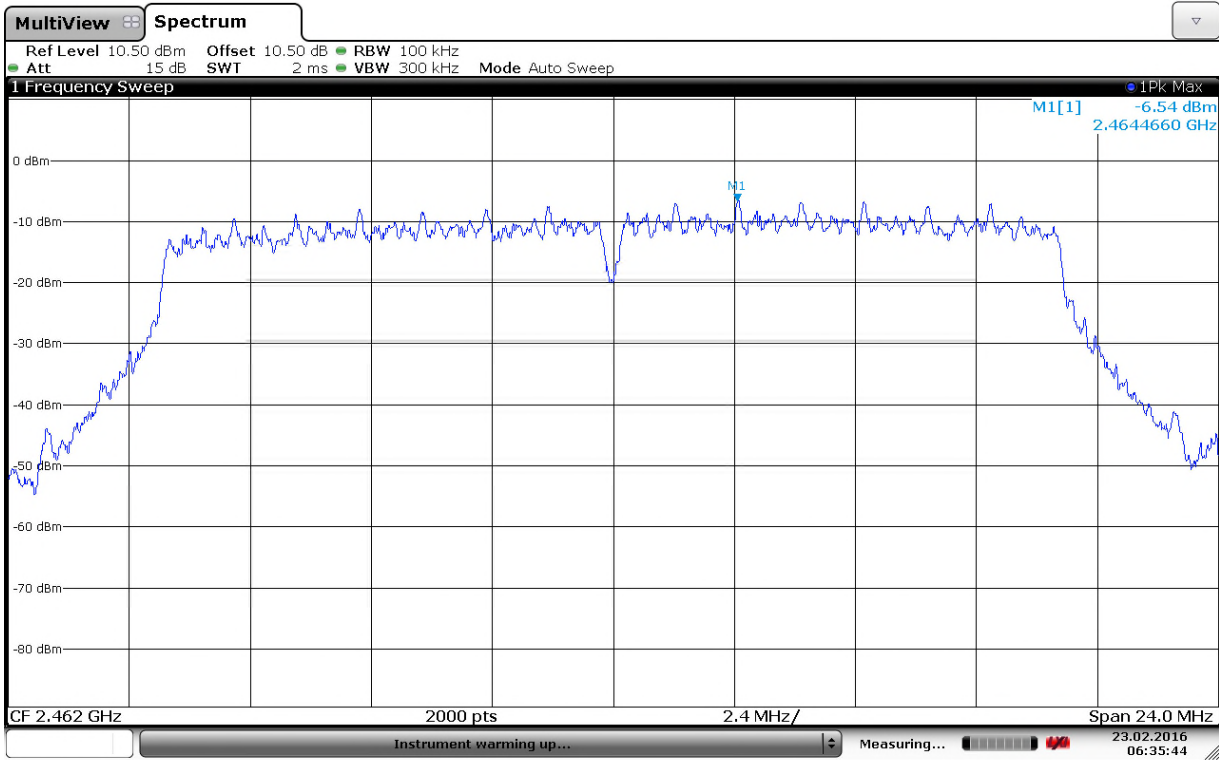
Date: 23.FEB.2016 06:39:43

**PSD, 2412 MHz, 802.11b, 5.5 Mbps**



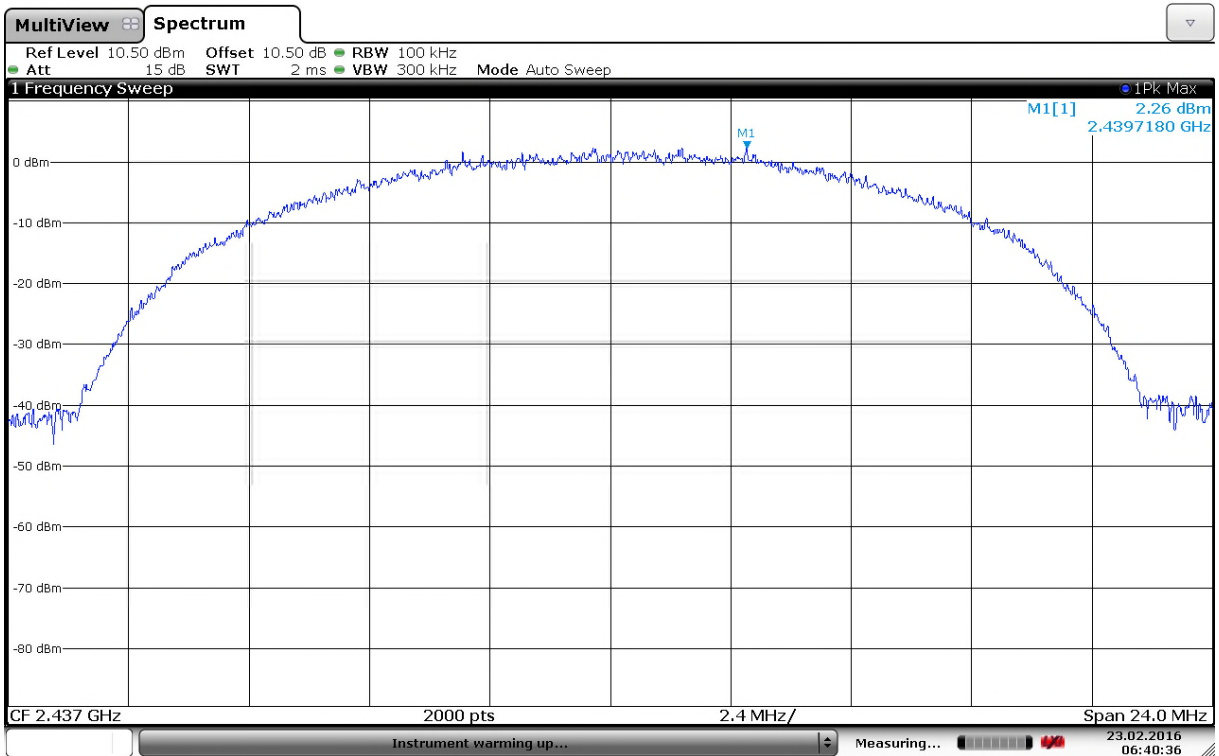
Date: 23.FEB.2016 06:43:48

**PSD, 2412 MHz, 802.11g, 9 Mbps**



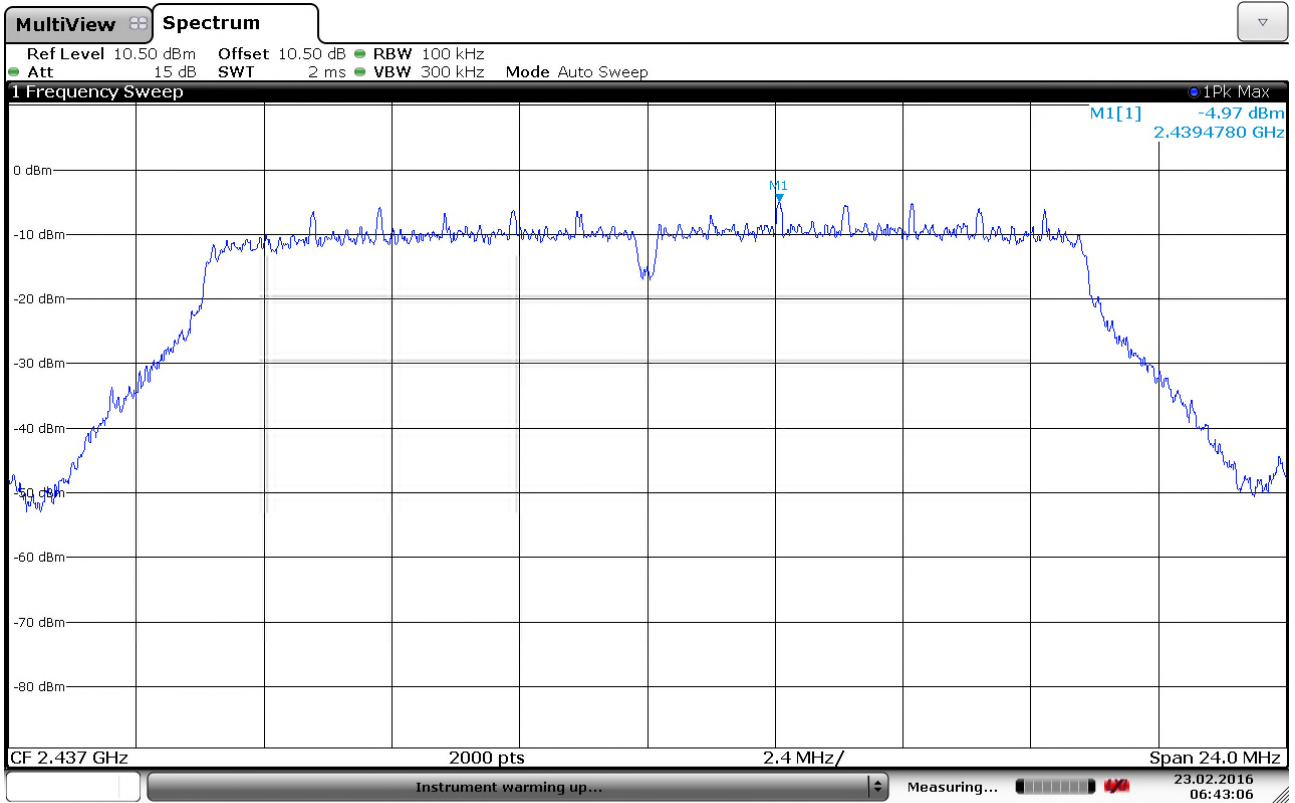
Date: 23.FEB.2016 06:35:44

**PSD, 2412 MHz, 802.11n, 65Mbps**



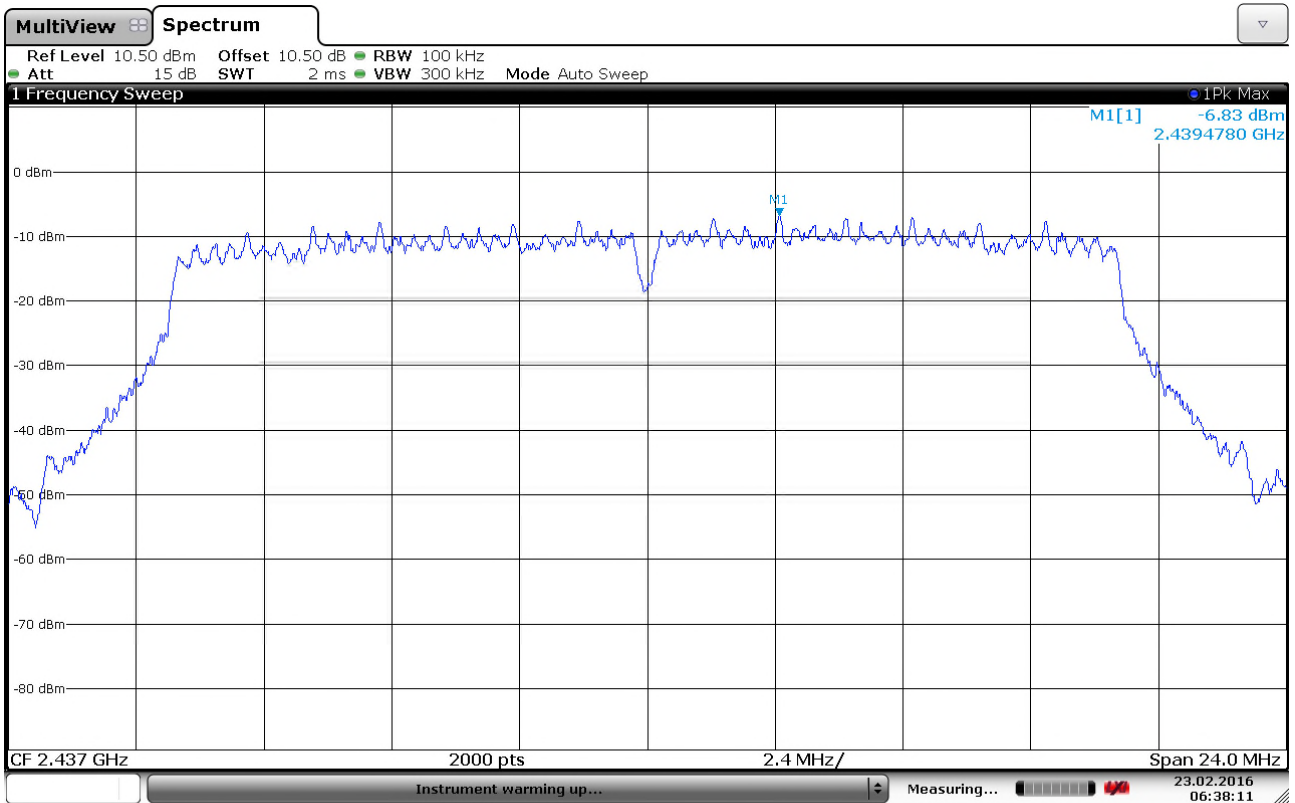
Date: 23.FEB.2016 06:40:36

**PSD, 2437 MHz, 802.11b, 5.5 Mbps**



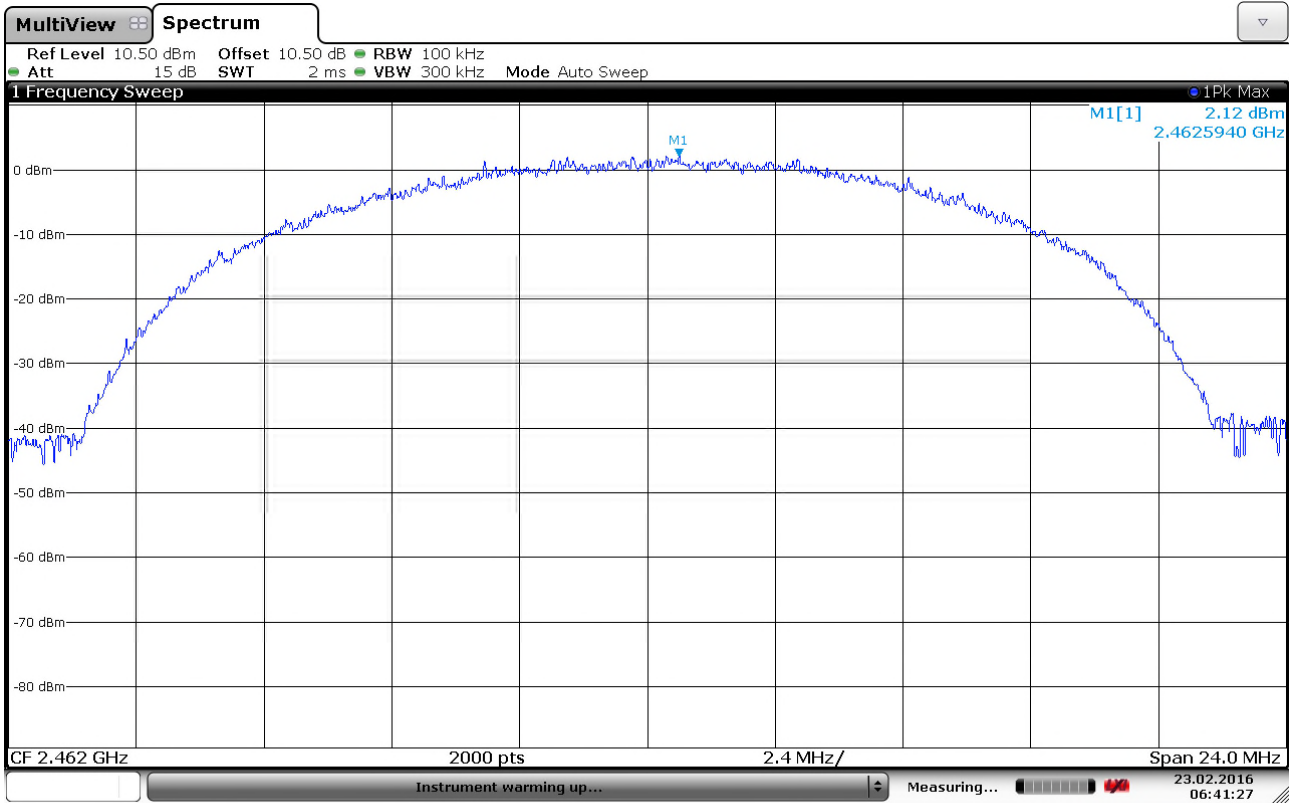
Date: 23.FEB.2016 06:43:06

**PSD, 2437 MHz, 802.11g, 9 Mbps**



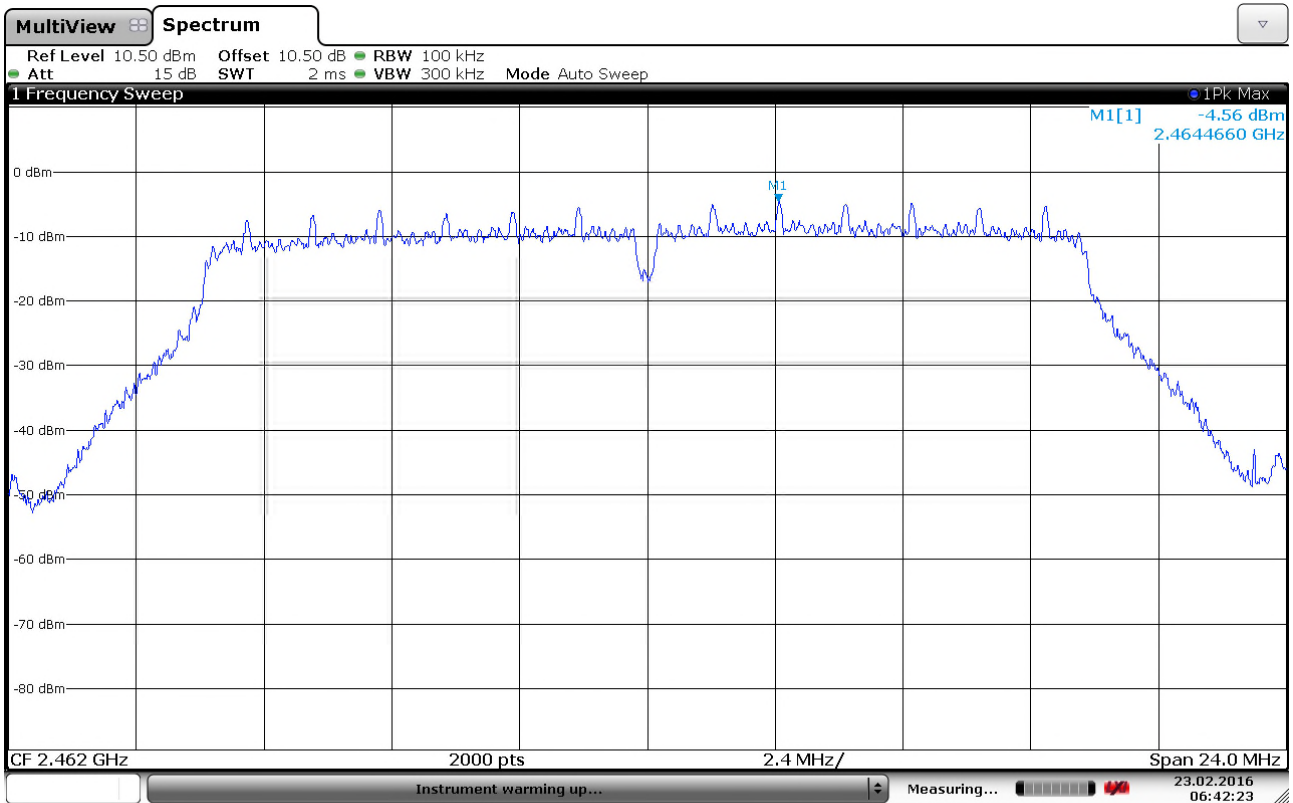
Date: 23.FEB.2016 06:38:10

**PSD, 2437 MHz, 802.11n, 65 Mbps**



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

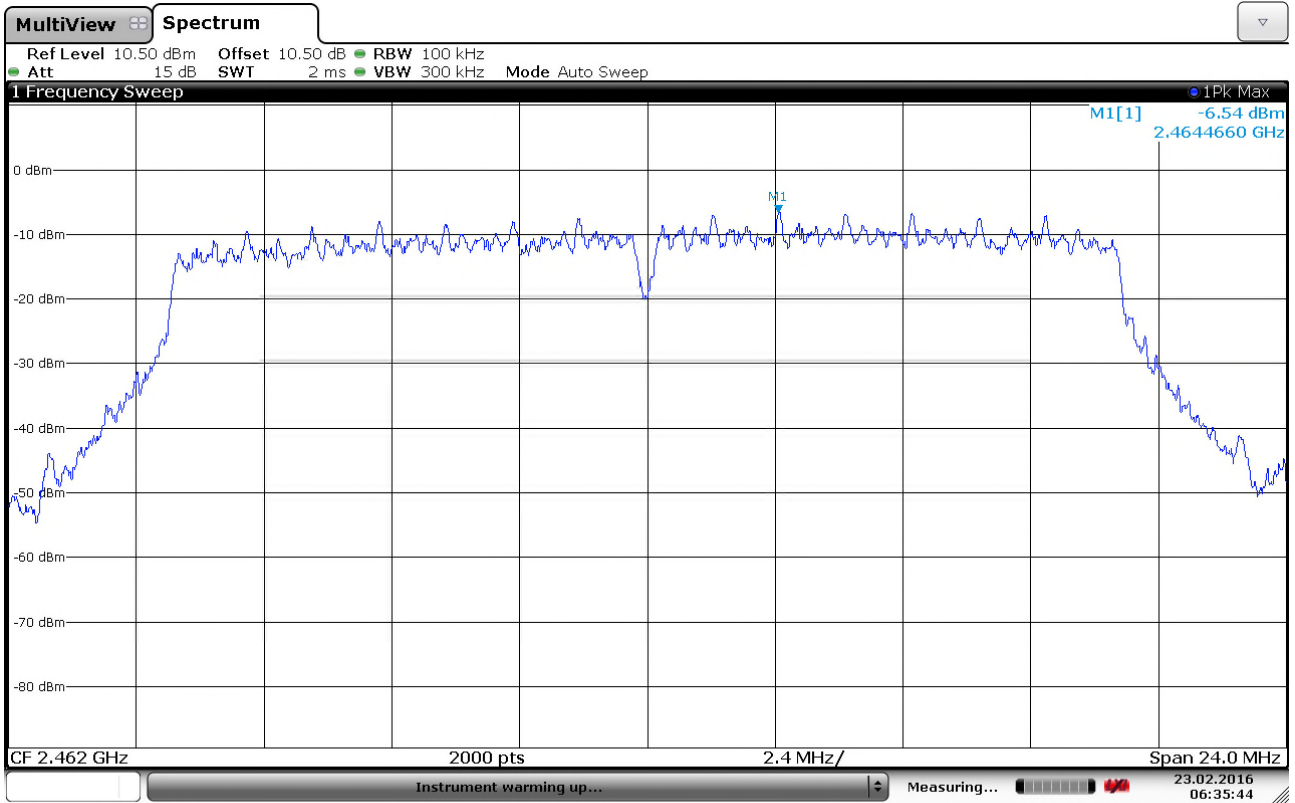
**PSD, 2462 MHz, 802.11b, 5.5 Mbps**



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

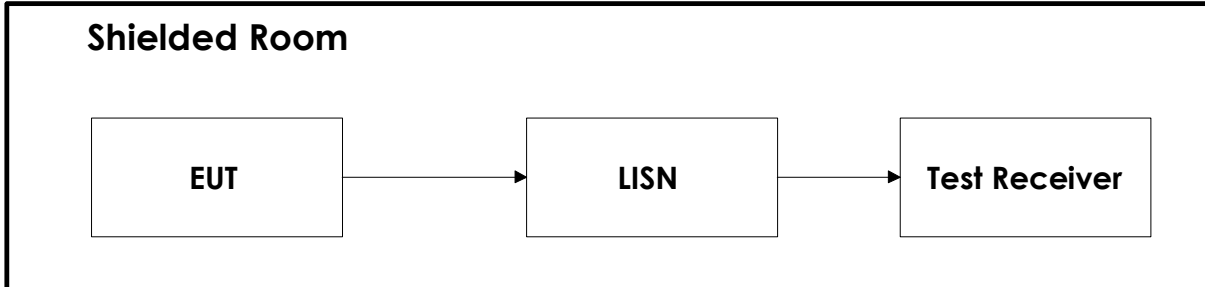
## 5 LIST OF TEST EQUIPMENT

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.

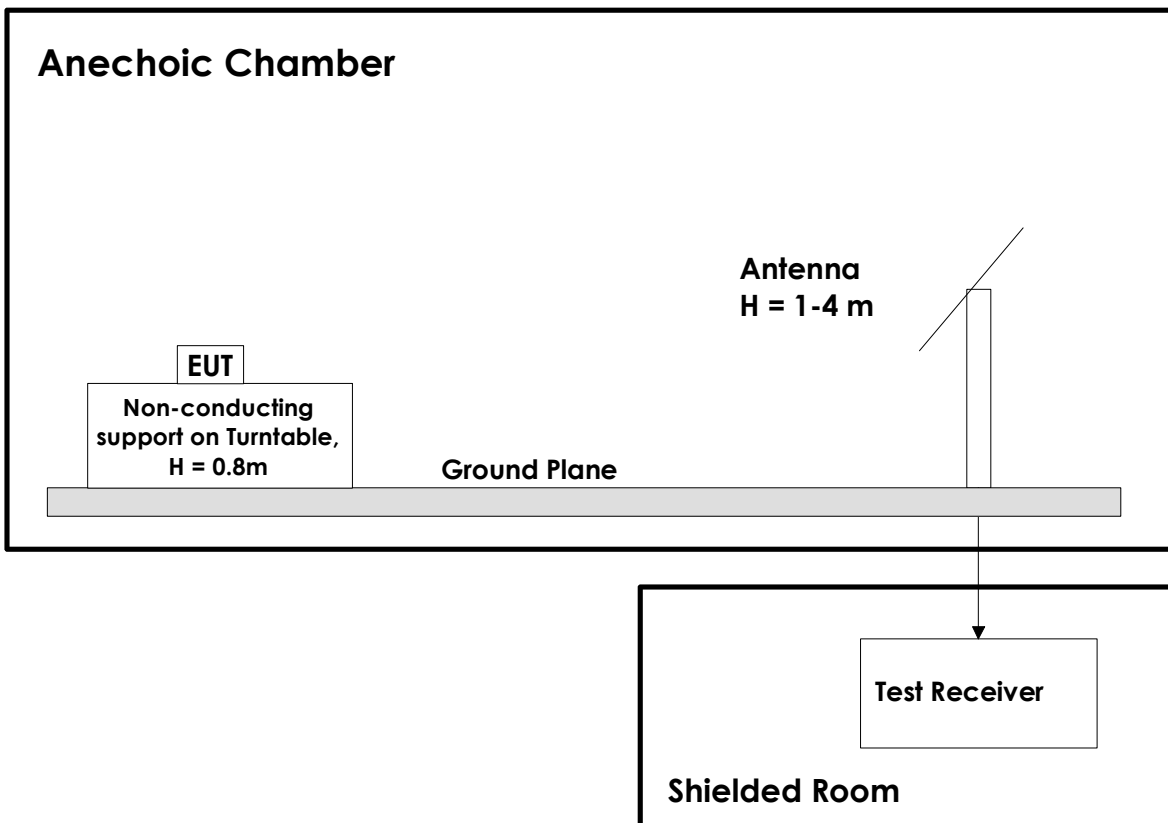
No.	Instrument/ ancillary	Type of instrument/ ancillary	Manufacturer	Ref. no.	Cal. Date	Cal. Due
1.	ESU40	EMI Receiver	Rohde & Schwarz	LR1639	2015.11	2016.11
2.	FSW26	Spectrum Analyzer	Rohde & Schwarz	LR 1640	2015.11	2016.11
3.	HFH2-Z2	Active Loop antenna	Rohde & Schwarz	LR1660	2014.10	2017.10
4.	3115	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