

Test Report

Product	UPCS Handset with WLAN and Bluetooth		
Name and address of the applicant	Panasonic Corporation of North America		
Name and address of the manufacturer	Panasonic System Networks Co., Ltd. 1-62, 4-chome, Minoshima, Hakata-ku Fukuoka 812-8531, Japan		
Model	KX-PRXA10		
Rating	3.7V DC (Li-Ion Secondary Battery)		
Trademark	Panasonic		
Serial number	/		
Additional information	IEEE 802.11b/g/n (HT20 and HT40)		
Tested according to	FCC Part 15.247 Frequency Hopping Transmitters / Digital Transmission Systems Industry Canada RSS-210, Issue 8 Low Power Licence-Exempt Radiocommunications Devices		
Order number	247284		
Tested in period	2013.11.05 to 2013.11.18 and 2013.12.02 to 2013.12.04 and 2013.12.20		
Issue date	2013.12.20		
Name and address of the testing laboratory	 FCC No: 994405 IC OATS: 2040D-1 TEL: (+47) 22 96 03 30 FAX: (+47) 22 96 05 50 Instituttveien 6 Kjeller, Norway		
 Prepared by [G.Suhanthakumar]  Approved by [Frode Sveinsen]			
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1 INFORMATION

1.1 Test Item

Name :	Panasonic
FCC ID :	ACJ96NKX-PRXA10
Industry Canada ID :	216A-KXPRXA10
Model/version :	KX-PRXA10
Serial number :	/
Hardware identity and/or version:	KX-PRXA10xxR-UM
Software identity and/or version :	US_SW2316
Frequency Range :	2412 – 2462 MHz (802.11b/g/n HT20) 2422 – 2452 MHz (802.11n HT40)
Number of Channels :	11 or 7
Operating Modes :	IEEE 802.11 b/g/n (HT20 and HT40)
Type of Modulation :	Digital (DSSS, OFDM)
User Frequency Adjustment :	None
Conducted Output Power :	129 mW (Peak)
Type of Power Supply :	Secondary Battery (3.7V Li-Ion)
Desktop Charger :	Desktop Charger PNLC1049 with AC Adaptor PNLV226
Antenna Connector :	None (Integral)
Number of Antennas :	1
Antenna Diversity Supported :	No

Description of Test Item

The EUT is a digital cordless phone integrated with WLAN, UPCS and Bluetooth. This report covers only the WLAN part, UPCS and Bluetooth parts are covered by separate test reports. The WLAN part operates in the 2.4GHz frequency band only and uses 802.11b/g/n (HT20 and HT40) modulation. The WLAN mode is for connection to a WLAN router or access point only and can not be used with the associated UPCS base station.

Exposure Evaluation

The EUT is a portable device and is designed to be held to ear when used. A test reports with the measured SAR values for this configurations is submitted with the application.

1.2 Test Environment

1.2.1 Normal test condition

Temperature:	20.8 – 23.3 °C
Relative humidity:	23 - 43 %
Normal test voltage:	3.7 V DC (secondary battery)

The values are the limit registered during the test period.

1.3 Test Engineer(s)

G.Suhandhakumar

1.4 Test Equipment

See list of test equipment in clause 6.

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-210 Issue 8.

Radiated tests were conducted in accordance with ANSI C63.4-2003 and KDB 558074 D01 DTS Measurement Guidance v03r01. The radiated tests were made in a semi-anechoic chamber at measuring distances of 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-210 Issue 8 reference	Result
Supply Voltage Variations	15.31(e)	8 (RSS-GEN)	Complies
Number of Operating Frequencies	15.31(m)	A8.1	Complies
Antenna Requirement	15.203	7.1.4 (RSS-GEN)	Complies
Power Line Conducted Emission	15.107(a) 15.207(a)	7.2.2 (RSS-GEN)	Complies
Channel Separation	15.247(a)(1)	A8.1	N/A
Pseudorandom Hopping Algorithm	15.247(a)(1)	A8.1	N/A
Time of Occupancy	15.247(a)(1)(iii)	A8.1	N/A
Occupied Bandwidth	N/A	A8.1	No requirement
Minimum 6 dB Bandwidth	15.247(a)(2)	A8.2	Complies
Peak Power Output	15.247(b)	A8.4	Complies
Power Spectral Density	15.247(d)	A8.2	Complies
Spurious Emissions (Antenna Conducted)	15.247(c)	A8.5	Complies ¹
Spurious Emissions (Radiated)	15.247(c) 15.109(a) 15.209(a)	A8.5	Complies

¹ The tested equipment has integrated antennas only.

2.3 Description of modification for Modification Filing

Not applicable.

2.4 Comments

All ports were populated during spurious emission measurements.

2.5 Family List Rational

Not Applicable.

3 TEST RESULTS

3.1 Power Line Conducted Emissions

Para. No.: 15.207 (a)

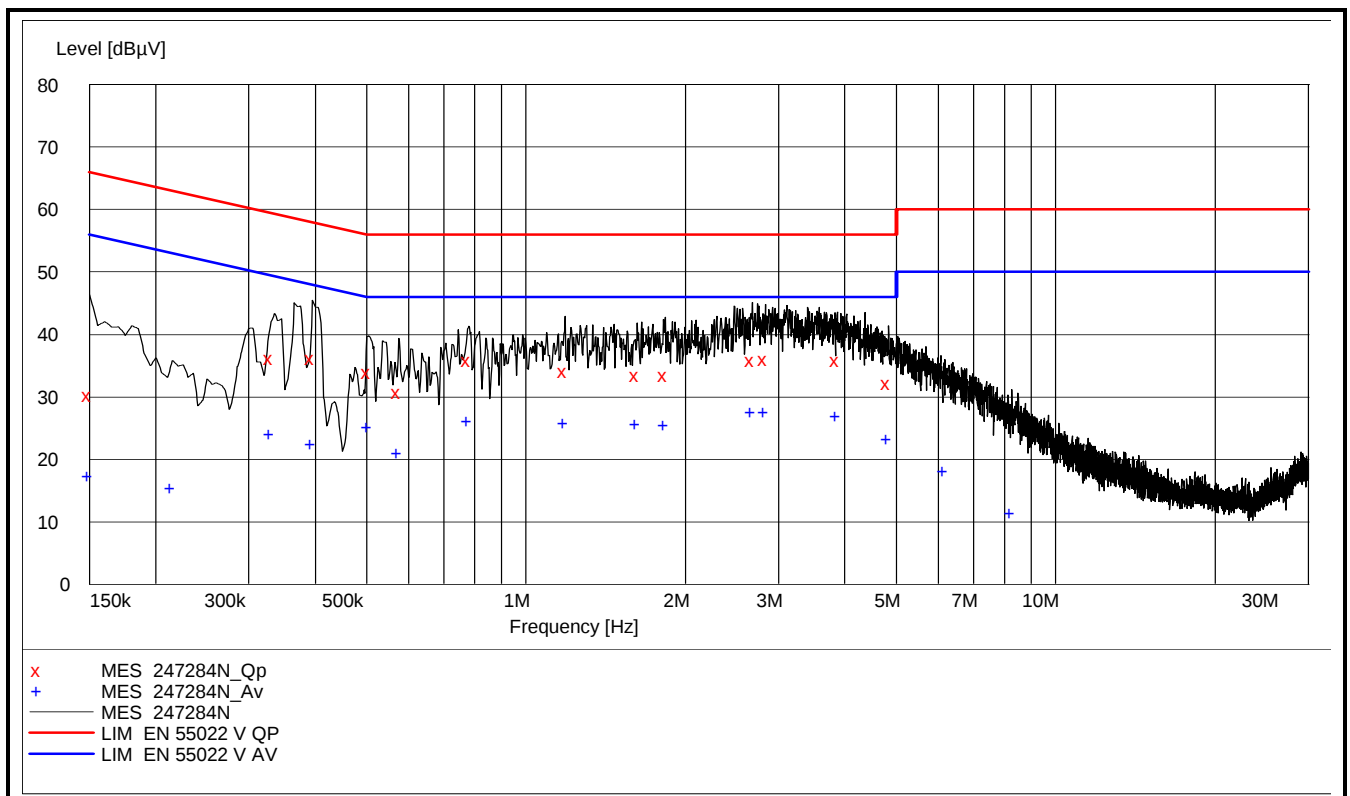
Test Performed By: G.Suwanthakumar	Date of Test: 12. Nov 2013
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Measurement procedure: ANSI C63.4-2009 using 50 μ H/50 ohms LISN.

Test Results: Complies

Measurement Data for battery charger cradle: See attached graph, (Peak detector).

Charger PNLC109 with Power Adaptor PNLV226, 120V 60Hz



Frequency [MHz]	Level [dBuV]	Af [dB]	Limit [dBuV]	Margin [dB]	Det	Position	Verdict [Pass/Fail]
0.150000	30.40	10.10	66.00	35.60	QP	N	Pass
0.330000	36.30	10.20	59.50	23.20	QP	L1	Pass
0.395000	36.30	10.20	58.00	21.70	QP	L1	Pass
0.505000	33.90	10.20	56.00	22.10	QP	L1	Pass
0.575000	30.70	10.20	56.00	25.30	QP	L1	Pass
0.780000	35.80	10.20	56.00	20.20	QP	L1	Pass
1.185000	34.10	10.20	56.00	21.90	QP	L1	Pass
1.620000	33.60	10.30	56.00	22.40	QP	L1	Pass
1.830000	33.50	10.20	56.00	22.50	QP	L1	Pass
2.675000	35.90	10.30	56.00	20.10	QP	L1	Pass
2.830000	36.00	10.30	56.00	20.00	QP	L1	Pass
3.870000	35.80	10.30	56.00	20.20	QP	L1	Pass
4.835000	32.20	10.40	56.00	23.80	QP	L1	Pass
0.150000	17.40	10.10	56.00	38.60	AV	N	Pass
0.215000	15.40	10.10	53.00	37.60	AV	N	Pass
0.330000	24.00	10.20	49.50	25.50	AV	L1	Pass
0.395000	22.50	10.20	48.00	25.50	AV	L1	Pass
0.505000	25.20	10.20	46.00	20.80	AV	L1	Pass
0.575000	21.00	10.20	46.00	25.00	AV	L1	Pass
0.780000	26.10	10.20	46.00	19.90	AV	L1	Pass
1.185000	25.90	10.20	46.00	20.10	AV	L1	Pass
1.620000	25.70	10.30	46.00	20.30	AV	L1	Pass
1.830000	25.50	10.20	46.00	20.50	AV	L1	Pass
2.675000	27.60	10.30	46.00	18.40	AV	L1	Pass
2.830000	27.60	10.30	46.00	18.40	AV	L1	Pass
3.870000	26.90	10.30	46.00	19.10	AV	L1	Pass
4.835000	23.30	10.40	46.00	22.70	AV	L1	Pass
6.185000	18.10	10.50	50.00	31.90	AV	L1	Pass
8.255000	11.30	10.60	50.00	38.70	AV	N	Pass

3.2 Occupied Bandwidth (99% BW)

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

Test Performed By: G.Suhandhakumar	Date of Test: 12.Nov 2013
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Test Results: Complies

Measurement Data: 11 RF channels in use

Modulation type and bitrate	Occupied Bandwidth / 99% BW (MHz)
	Ch 06, 2437 MHz
802.11b, 1 Mbps	14.1
802.11b, 11 Mbps	13.9
802.11g, 6 Mbps	16.6
802.11g, 54 Mbps	16.5
802.11n, MCS0, 20MHz BW	17.7
802.11n, MCS7, 20MHz BW	17.7
802.11n, MCS0, 40MHz BW	35.9
802.11n, MCS7, 40MHz BW	35.9

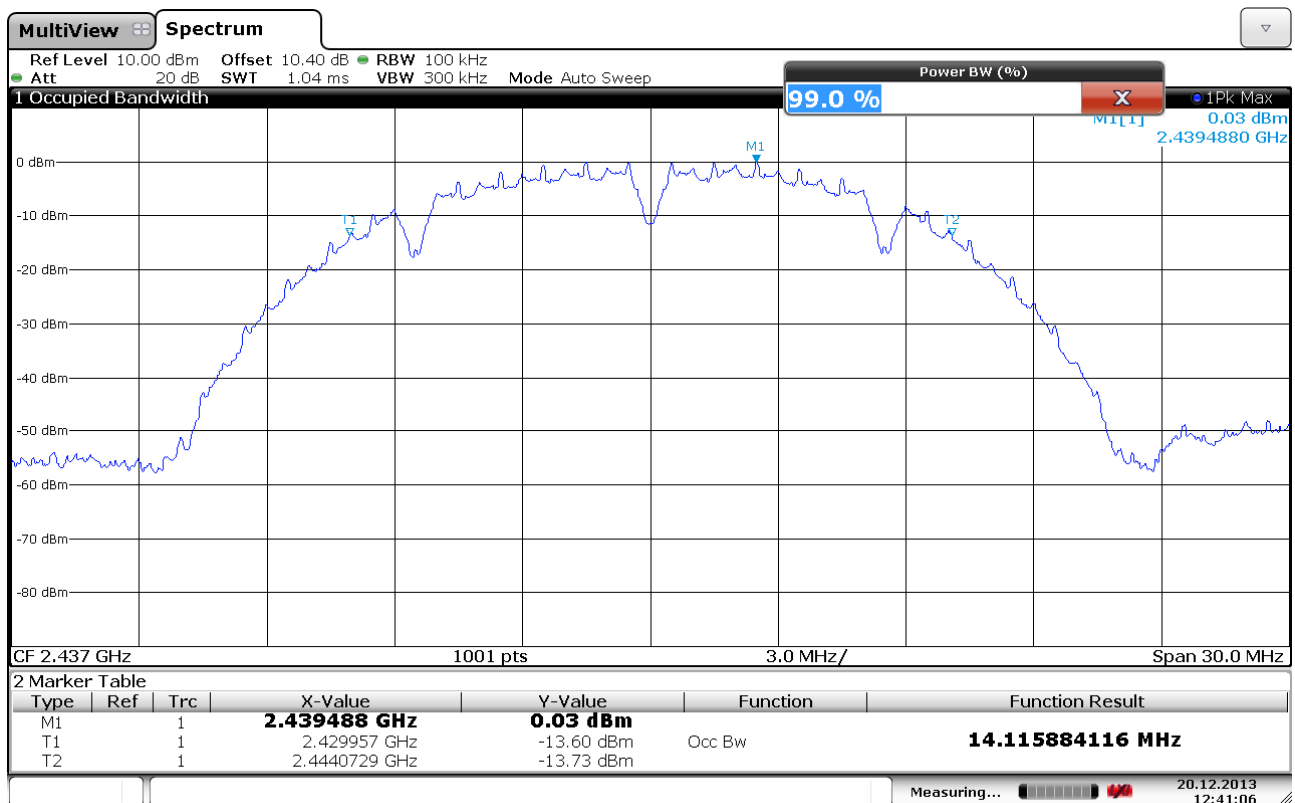
Occupied Bandwidth (99% BW) is reported for information only.

See attached graph.

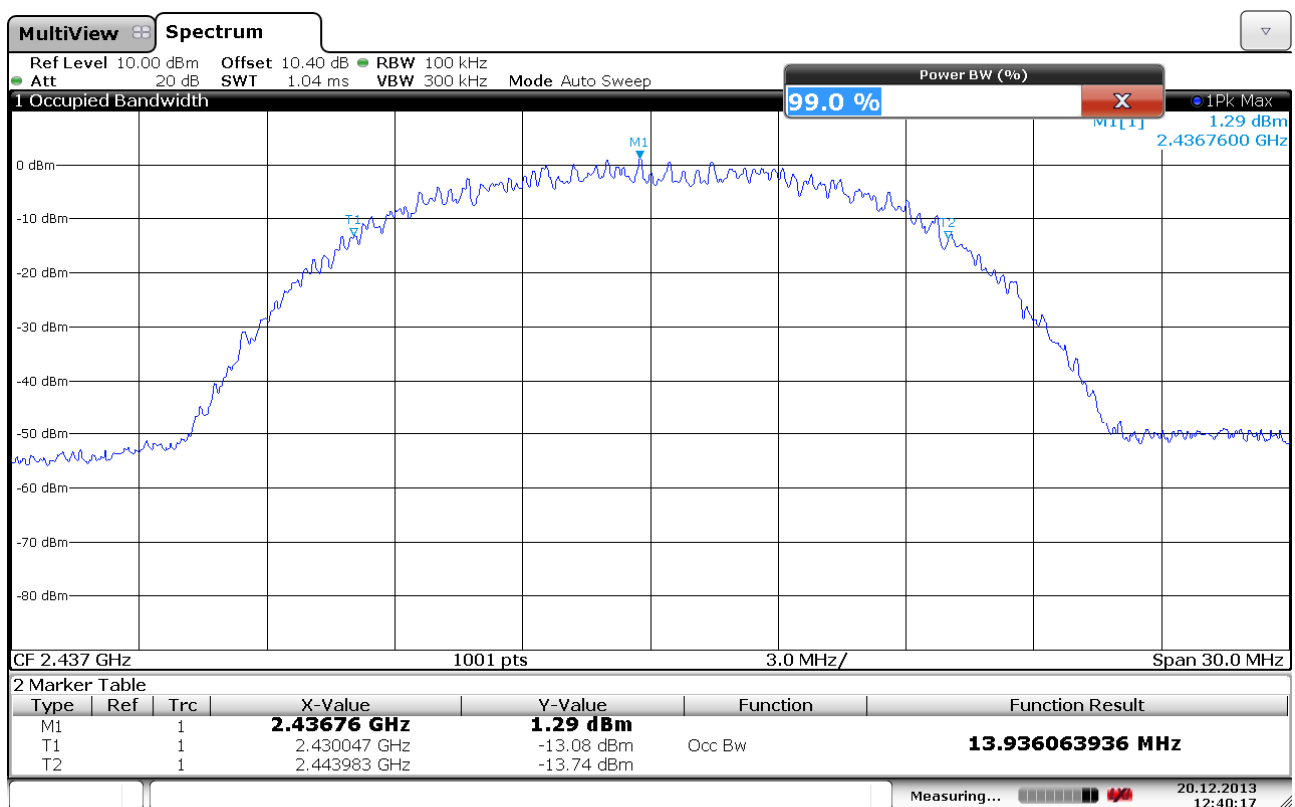
Requirements:

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.

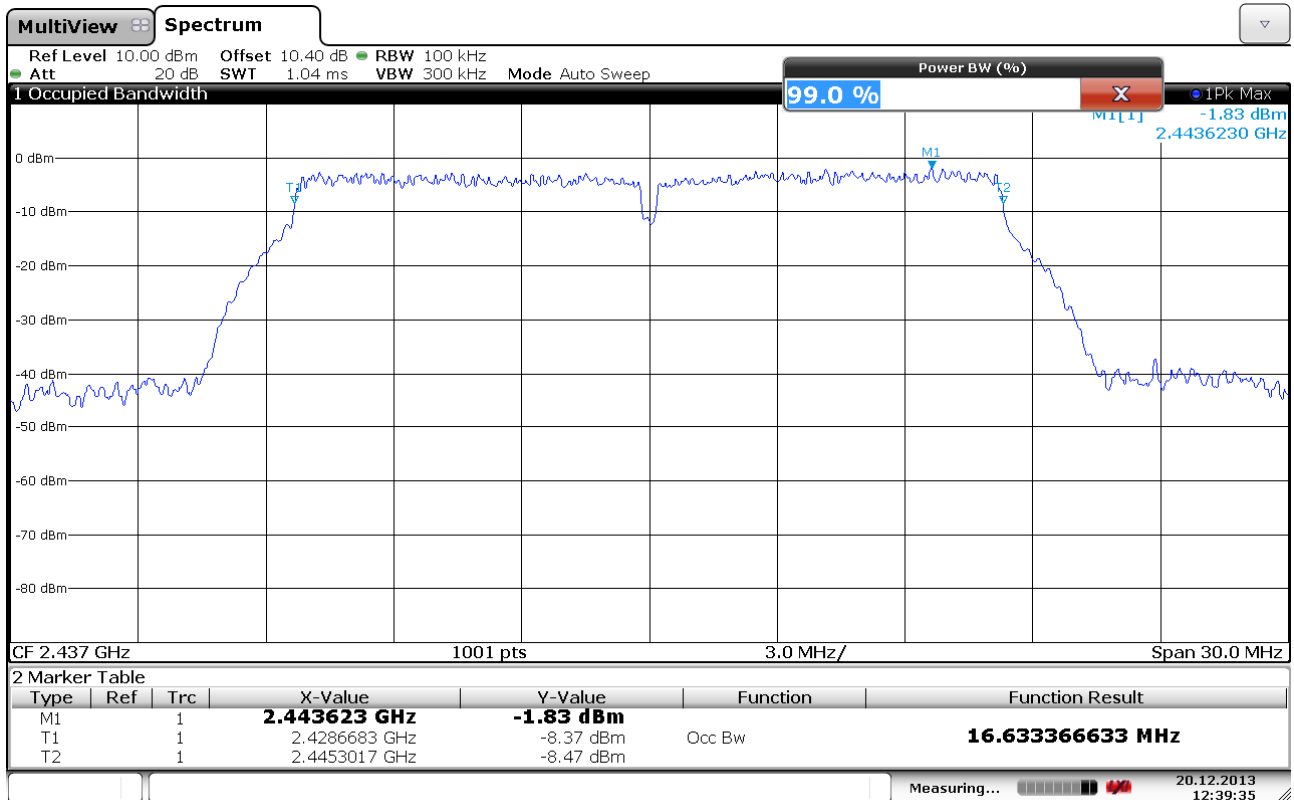
No requirements for Digital Transmission Systems.



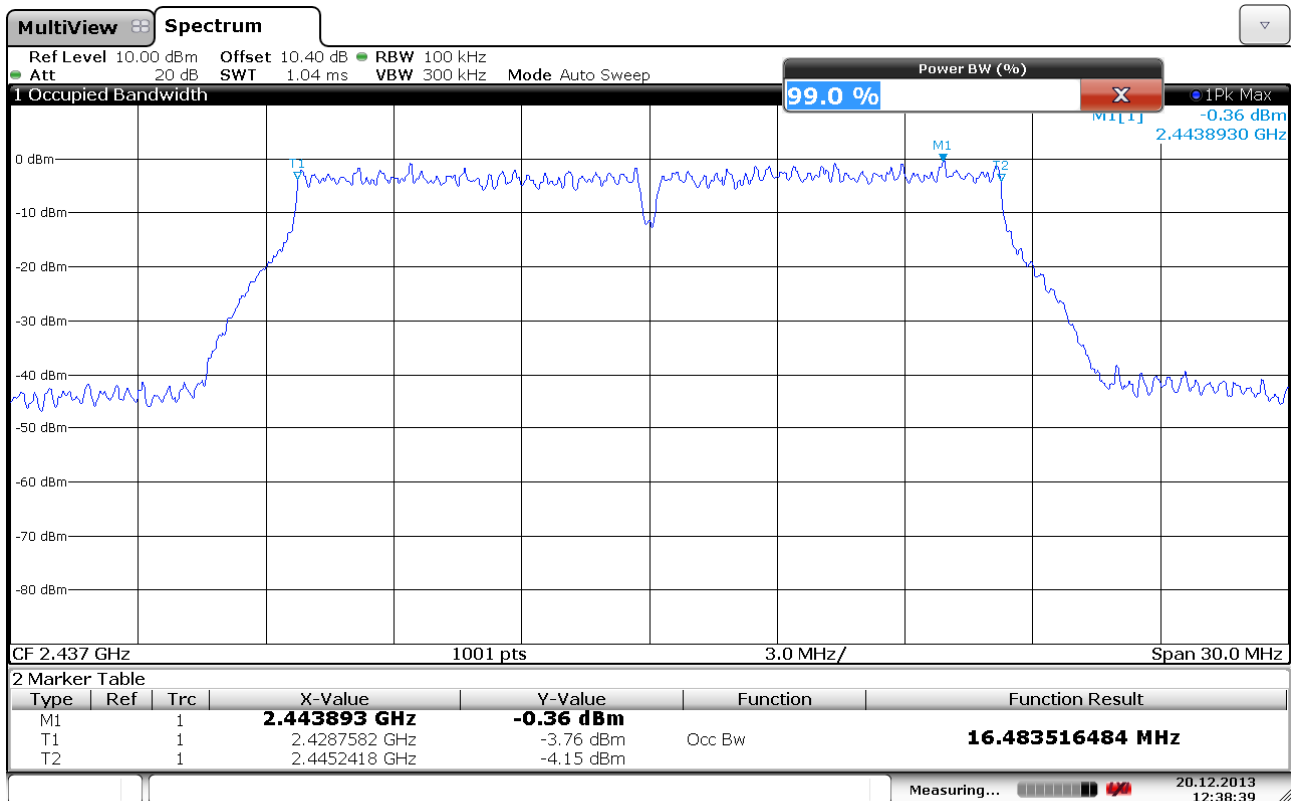
Occupied Bandwidth, 2437 MHz, 802.11b, 1Mbps



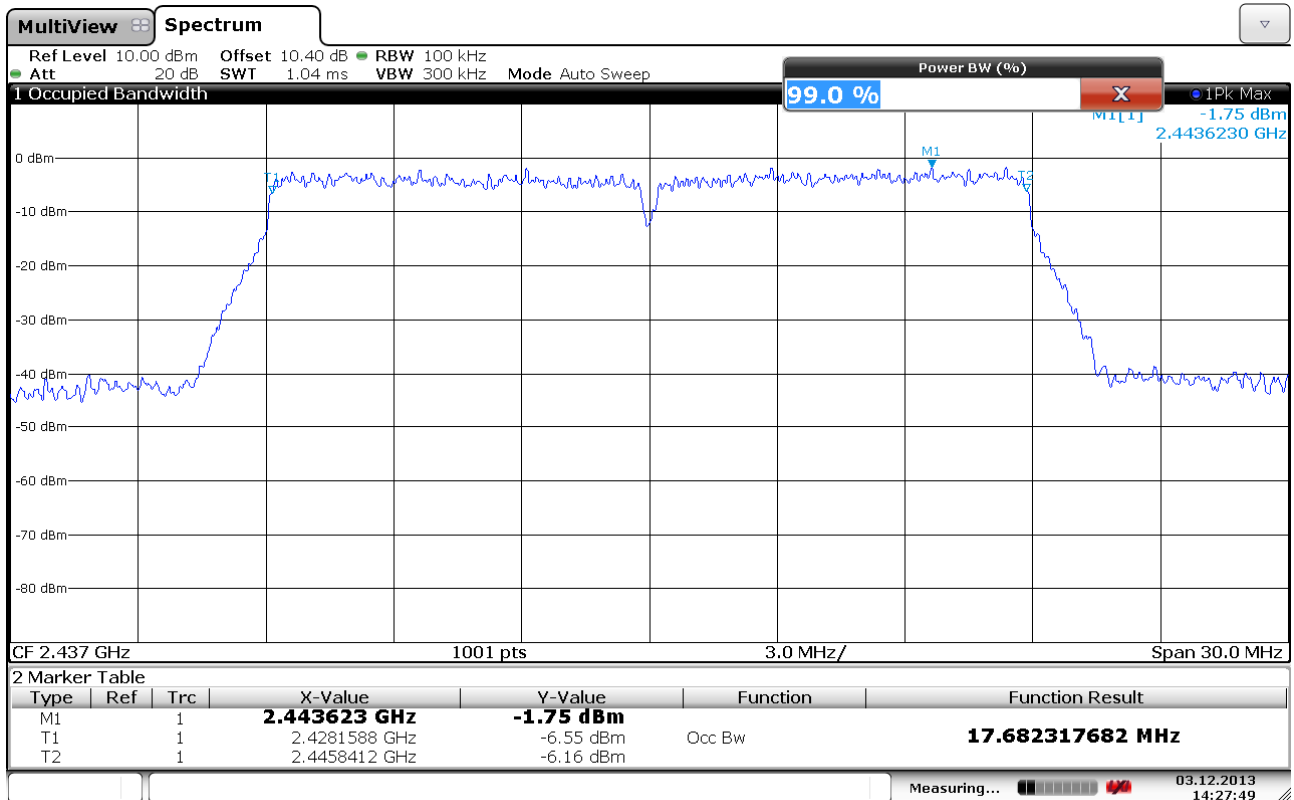
Occupied Bandwidth, 2437 MHz, 802.11b, 11Mbps



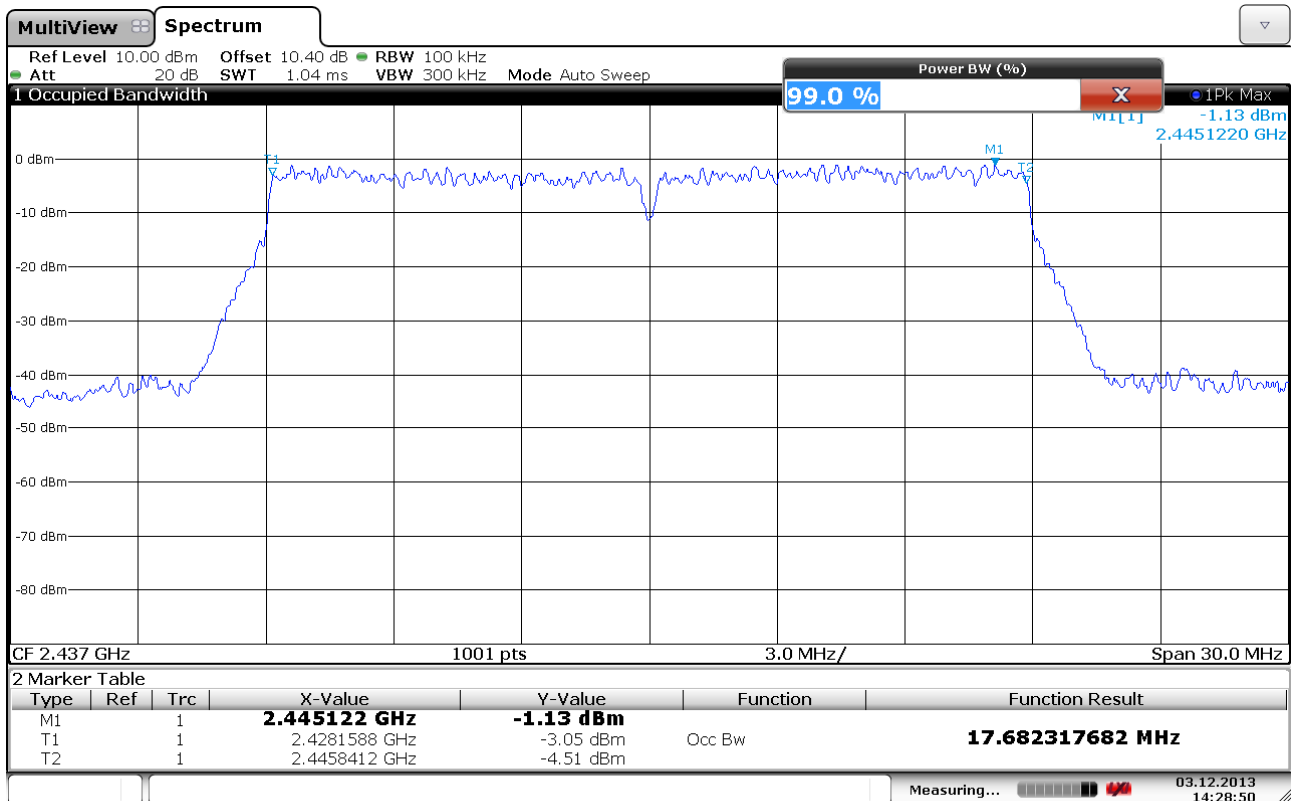
Occupied Bandwidth, 2437 MHz, 802.11g, 6Mbps



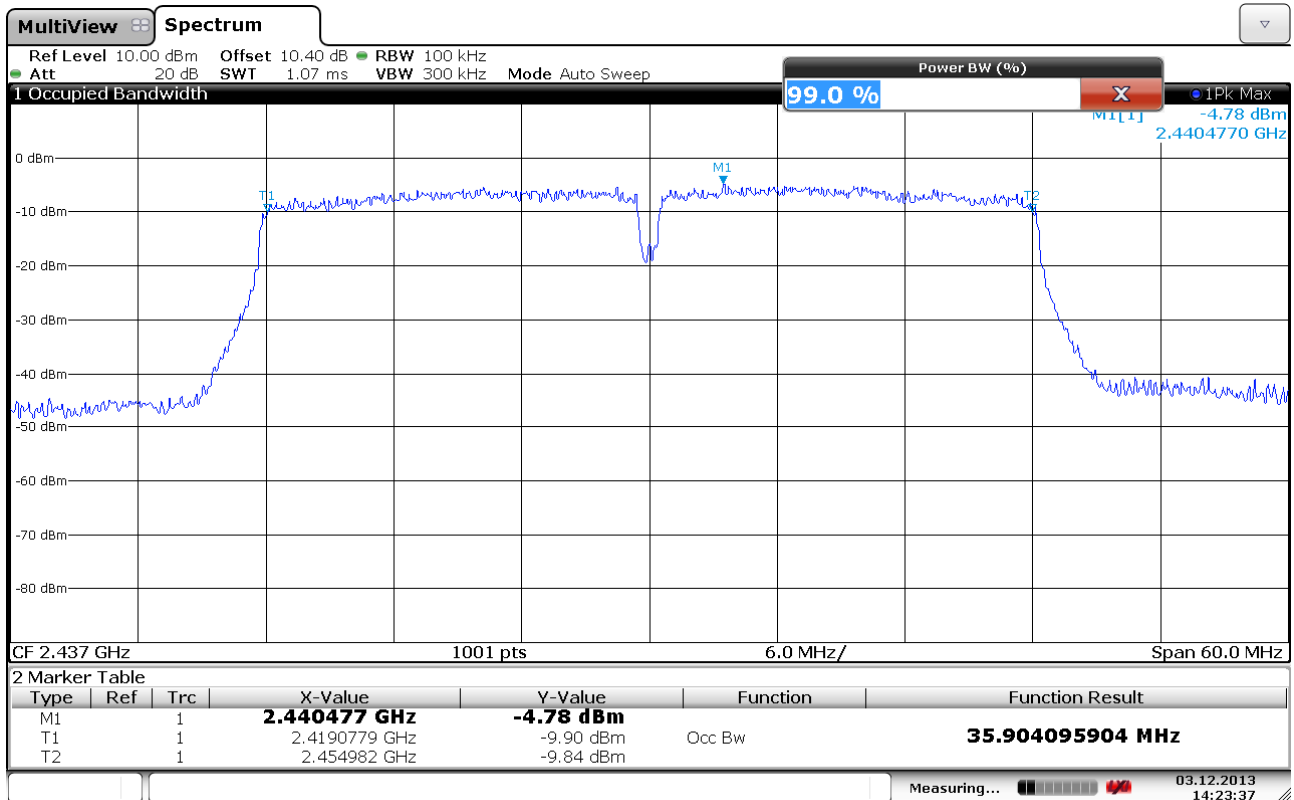
Occupied Bandwidth, 2437 MHz, 802.11g, 54Mbps



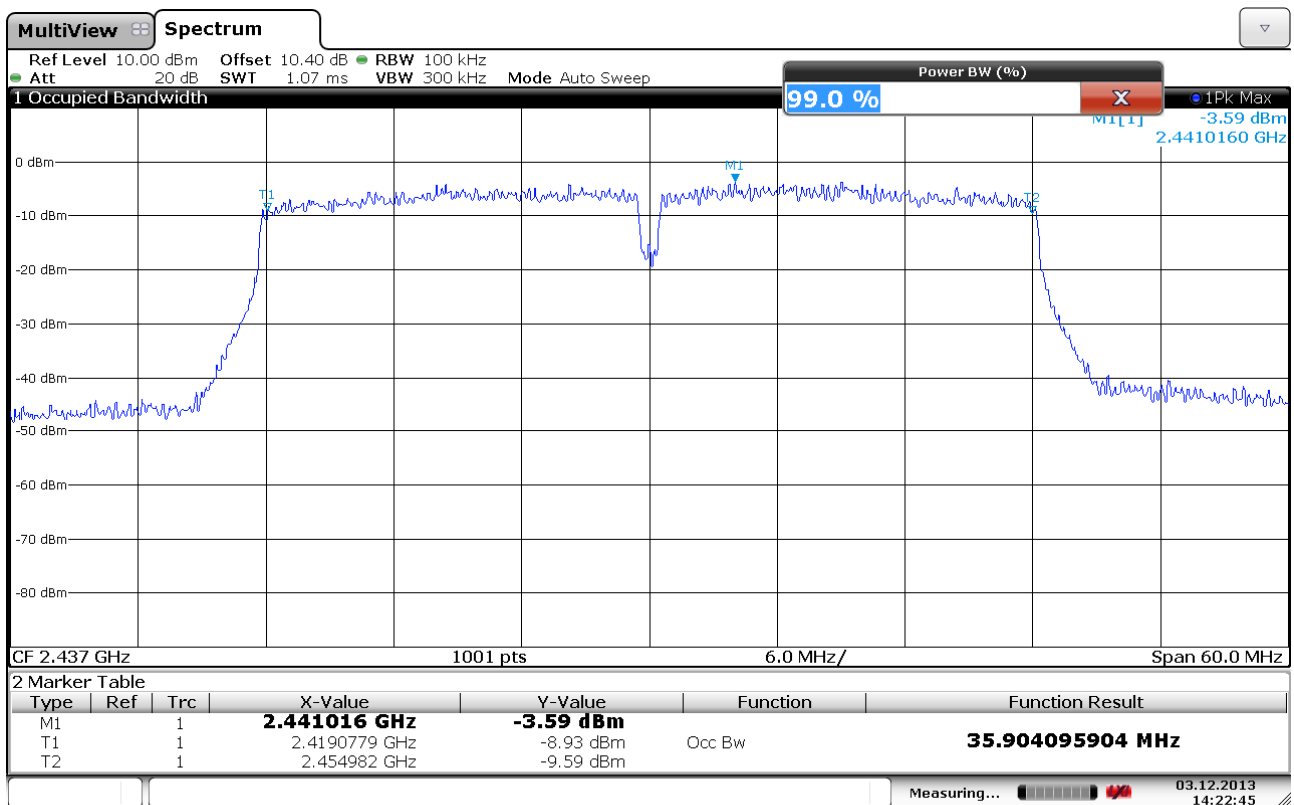
Occupied Bandwidth, 2437 MHz, 802.11n, MCS0, 20MHz BW



Occupied Bandwidth, 2437 MHz, 802.11n, MCS7, 20MHz BW



Occupied Bandwidth, 2437 MHz, 802.11n, MCS0, 40MHz BW



Occupied Bandwidth, 2437 MHz, 802.11n, MCS7, 40MHz BW

3.3 Minimum 6 dB Bandwidth (DTS Bandwidth)

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

Test Performed By: G.Suwanthakumar	Date of Test: 12.Nov 2013
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Test Results: Complies

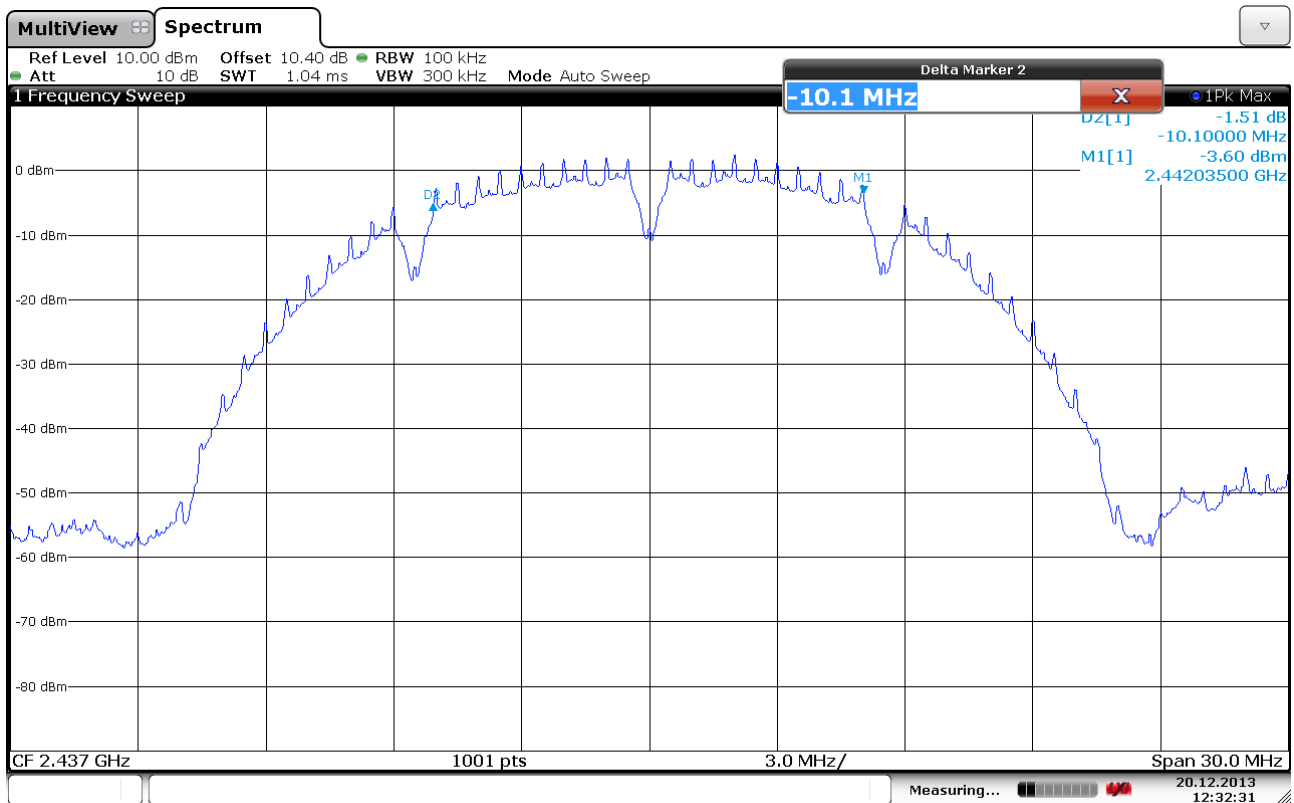
Measurement Data:

Modulation type and bitrate	Measured DTS Bandwidth (MHz)
	Ch 6, 2437 MHz
802.11b, 1 Mbps	10.1
802.11b, 11 Mbps	10.7
802.11g, 6 Mbps	16.6
802.11g, 54 Mbps	16.6
802.11n, MCS0, 20MHz BW	17.9
802.11n, MCS7, 20MHz BW	17.9
802.11n, MCS0, 40MHz BW	36.4
802.11n, MCS7, 40MHz BW	36.5

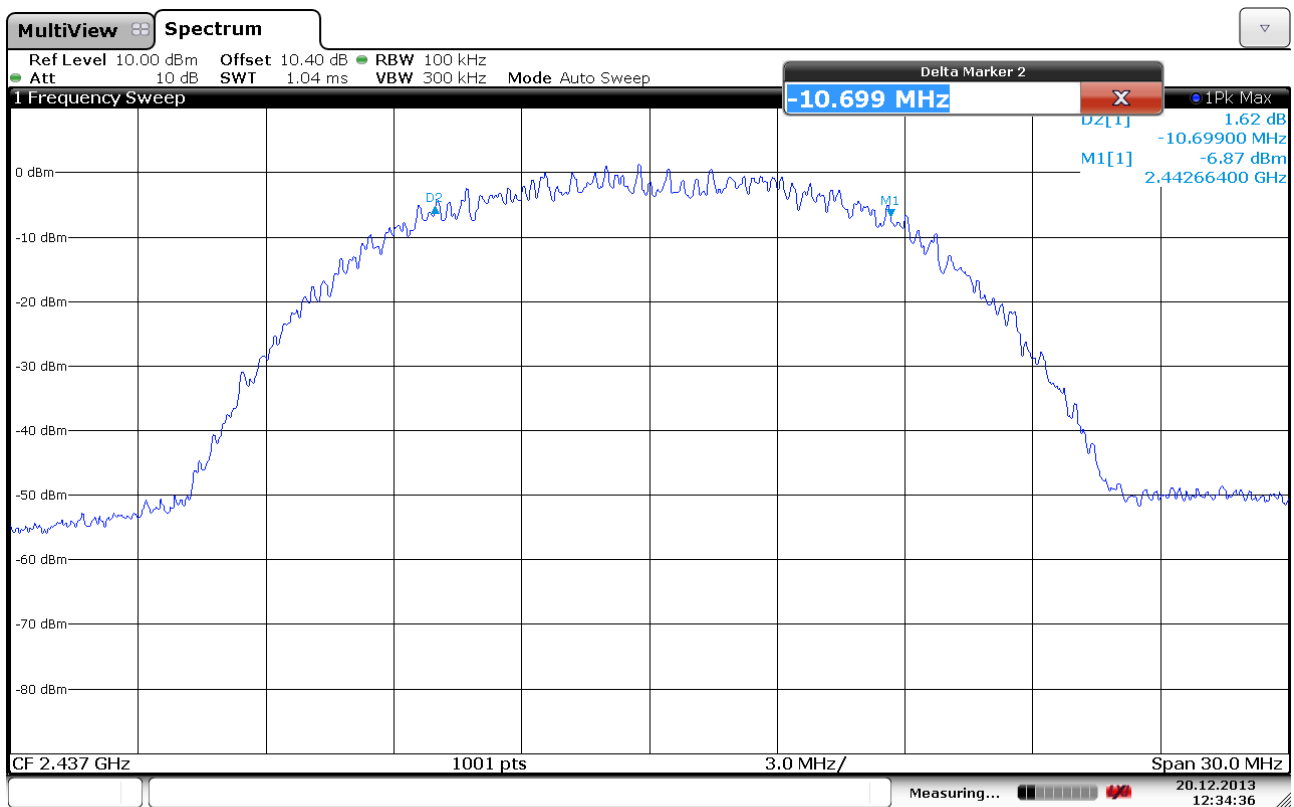
Tested according to KDB 558074 D01 DTS Meas Guidance v03r01, Section 8.1

Requirements:

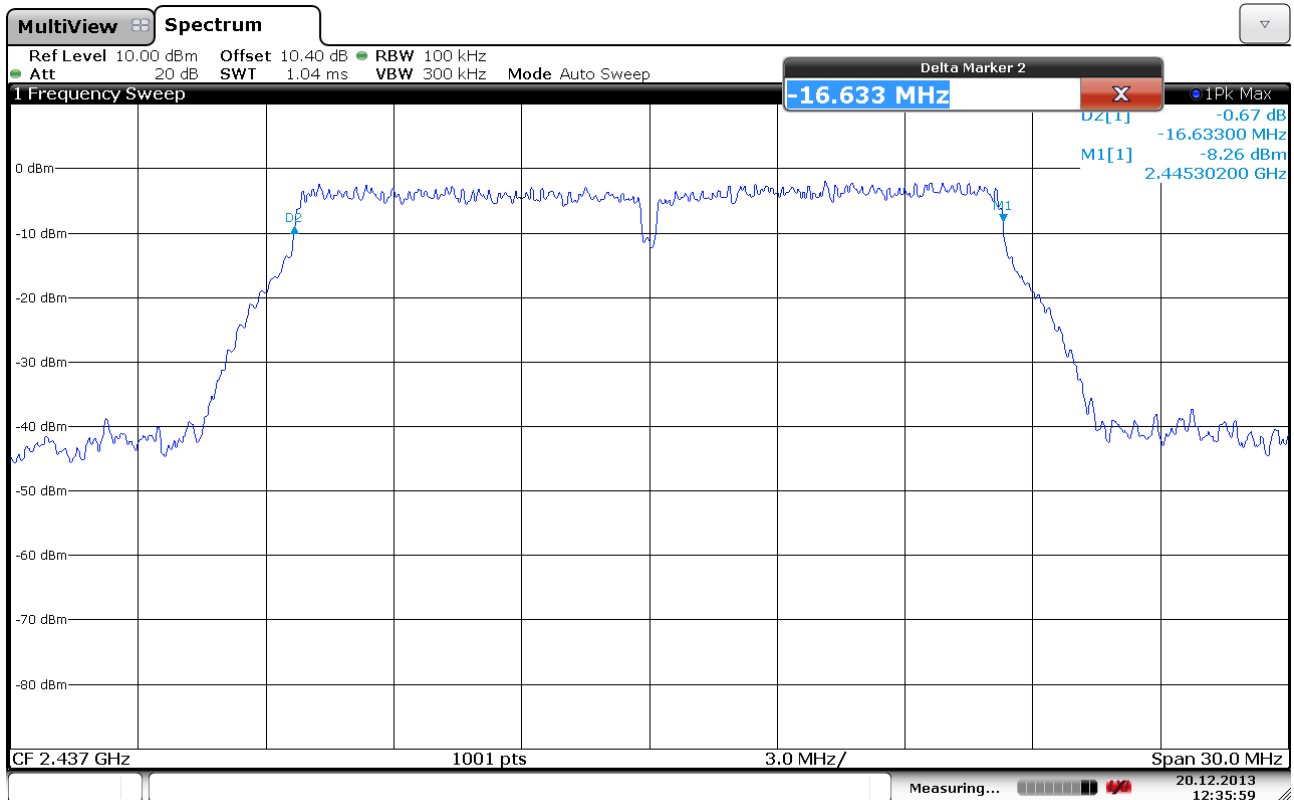
For Digital Transmission Systems in the 2400-2483.5 MHz band the minimum 6 dB bandwidth shall be at least 500 KHz.



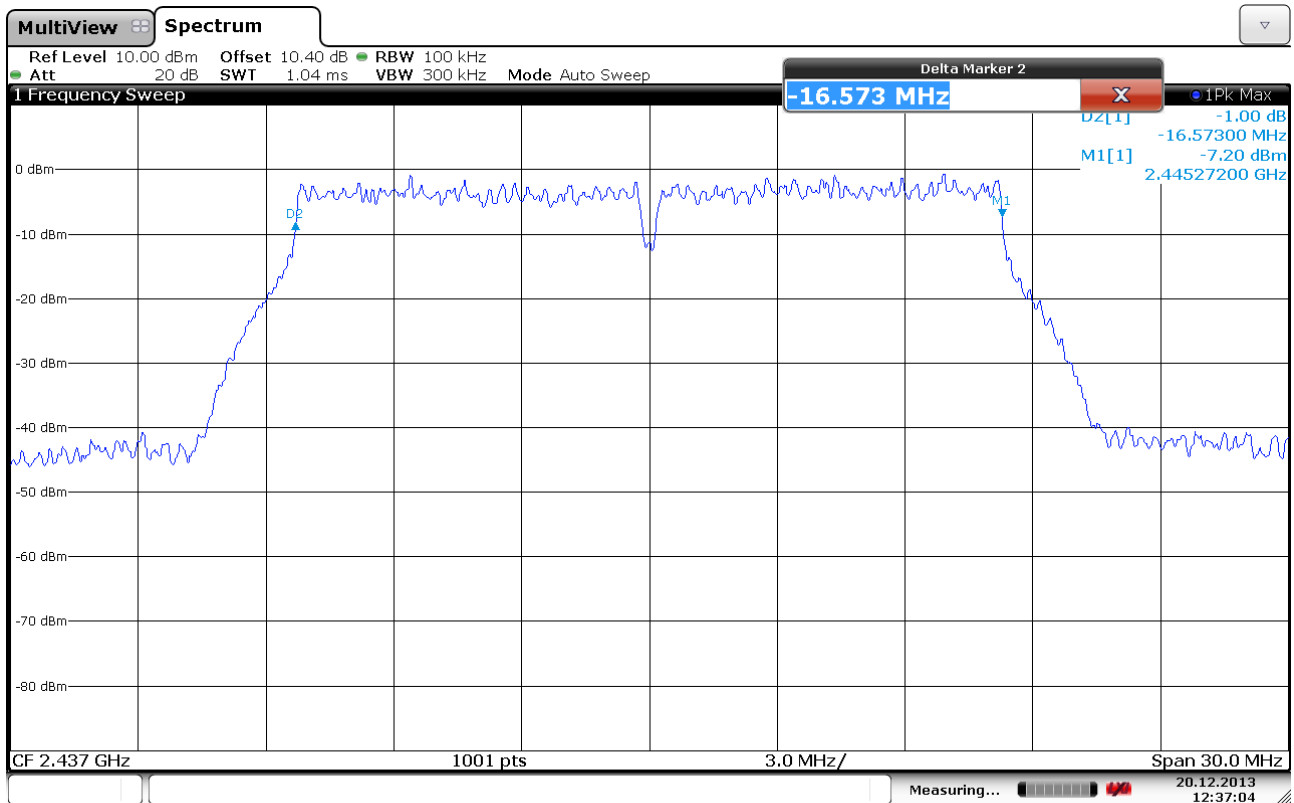
6 dB Bandwidth, 2437 MHz, 802.11b, 1Mbps



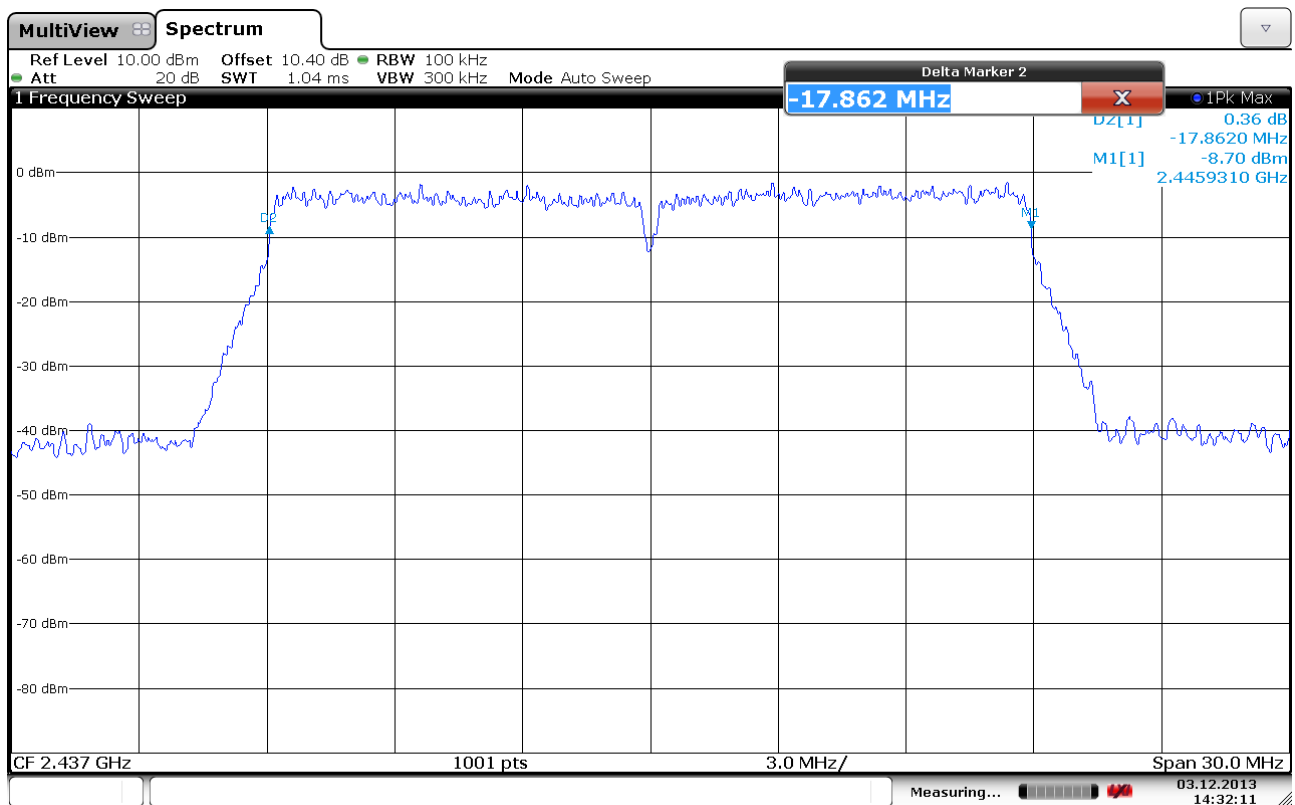
6 dB Bandwidth, 2437 MHz, 802.11b, 11Mbps



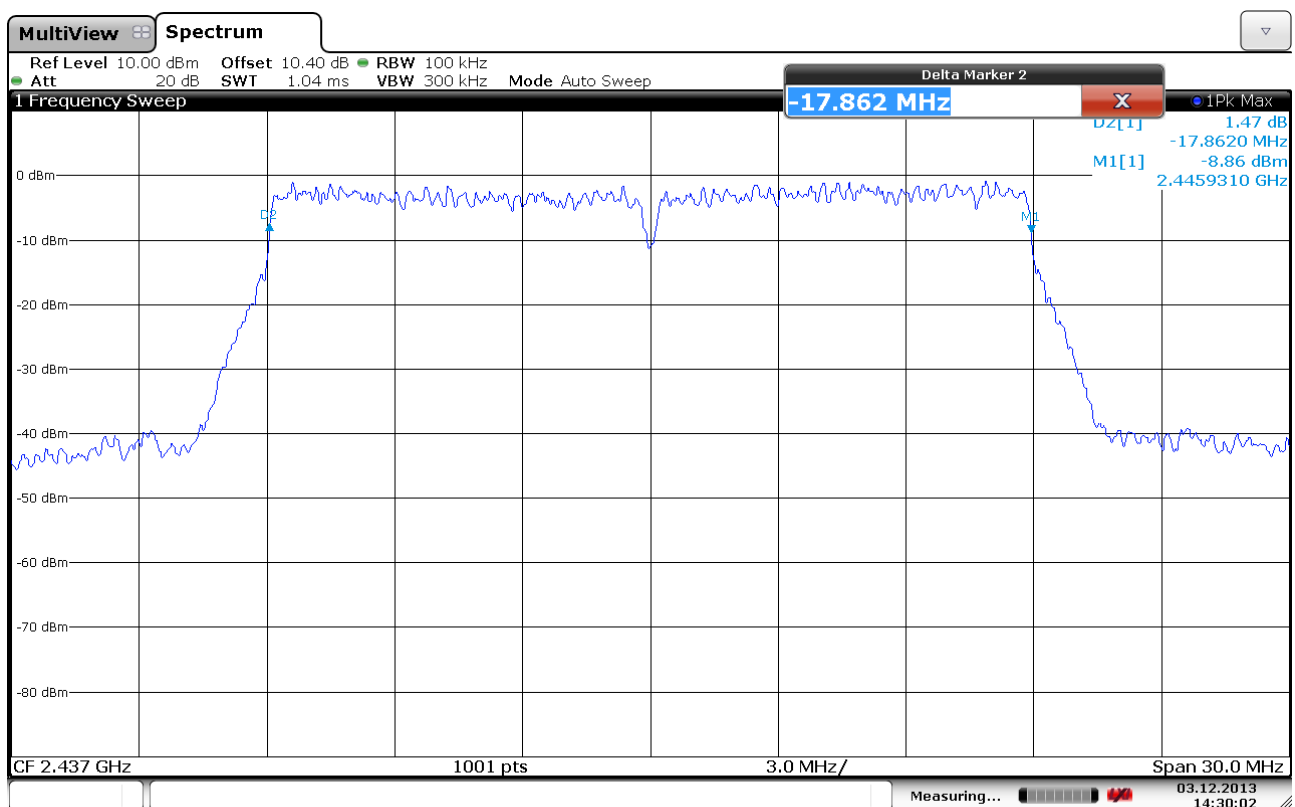
6 dB Bandwidth, 2437 MHz, 802.11g, 6Mbps



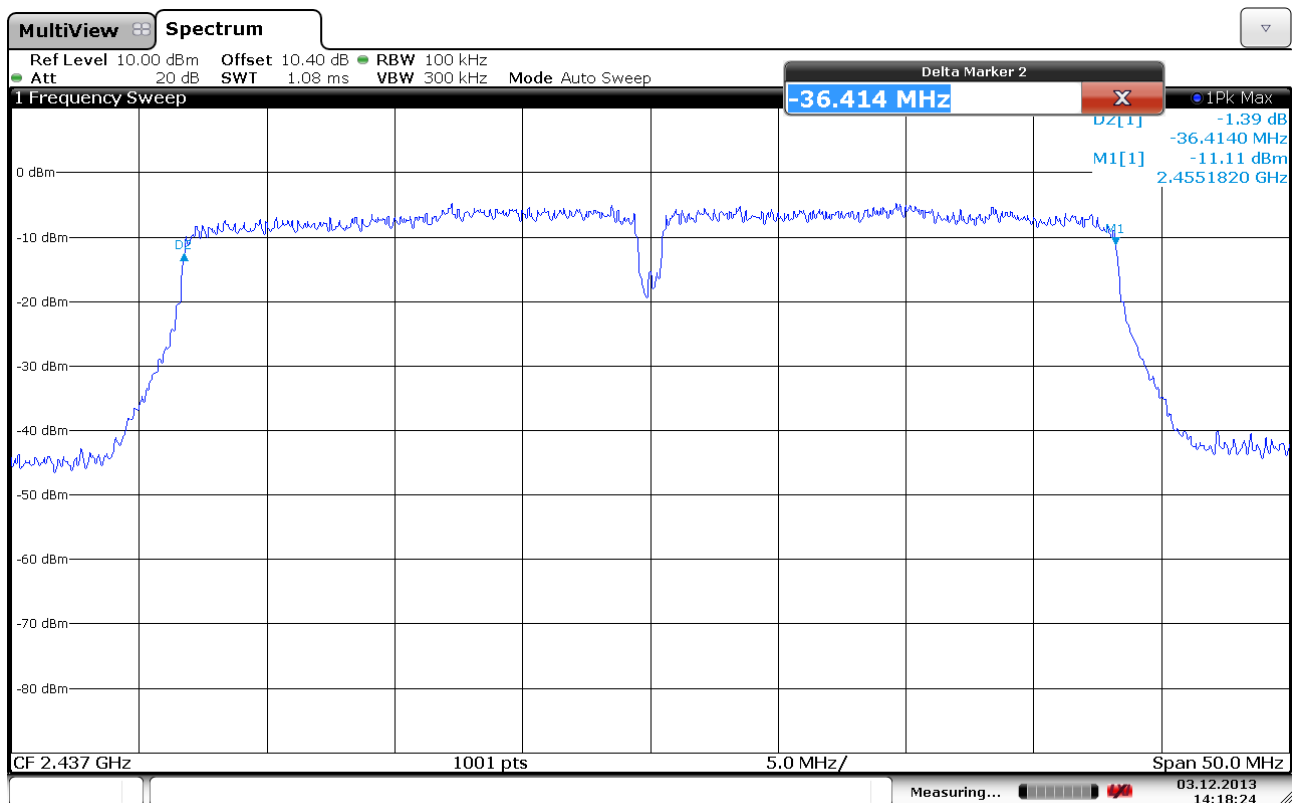
6 dB Bandwidth, 2437 MHz, 802.11g, 54Mbps



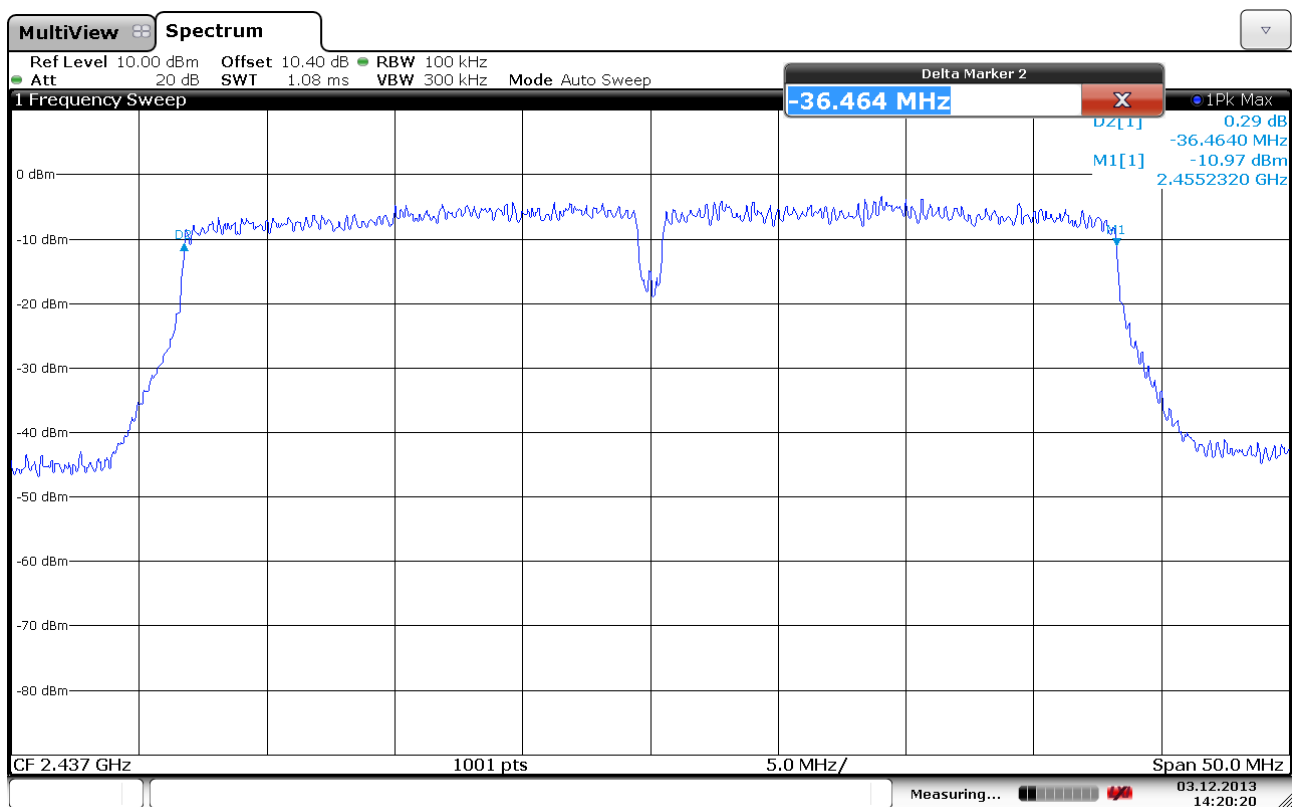
6 dB Bandwidth, 2437 MHz, 802.11n, MCS0, 20MHz BW



6 dB Bandwidth, 2437 MHz, 802.11n, MCS7, 20MHz BW



6 dB Bandwidth, 2437 MHz, 802.11n, MCS0, 40MHz BW



6 dB Bandwidth, 2437 MHz, 802.11n, MCS7, 40MHz BW

3.4 Average Output Power (RMS)

AVERAGE OUTPUT POWER FOR IEEE 802.11 b [dBm]						
Mode	Freq. [MHz]	CH	Data Rate [Mbit/s]			
			1	2	5.5	11
b	2412	1	11.5	11.5	11.5	11.5
	2437	6	11.5	11.5	11.5	11.5
	2462	11	8.1	8.1	8.1	8.1

Table 1: Conducted output power values for b-mode

AVERAGE OUTPUT POWER FOR IEEE 802.11 g [dBm]										
Mode	Frequency [MHz]	CH	Data Rate [Mbit/s]							
			6	9	12	18	24	36	48	54
g	2412	1	12.7	12.7	12.7	12.7	12.7	12.6	12.7	12.7
	2437	6	12.9	12.8	12.8	12.9	12.8	12.7	12.6	12.8
	2462	11	8.7	8.7	8.7	8.8	8.6	8.8	8.8	8.8

Table 2: Conducted output power values for g-mode

AVERAGE OUTPUT POWER FOR IEEE 802.11 n [dBm]										
Mode	Frequency [MHz]	CH	Data Rate [Mbit/s]							
			MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
n (20 MHz)	2412	1	12.7	12.7	12.8	12.7	12.7	12.7	12.7	12.7
	2437	6	12.7	12.6	12.7	12.7	12.8	12.8	12.8	12.8
	2462	11	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6
n (40 MHz)	2422	3	12.1	12.1	12.1	12	12.1	12.0	12.1	12.0
	2437	6	12.7	12.7	12.7	12.7	12.7	12.7	12.9	12.6
	2452	9	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4

Table 3: Conducted output power values for n-mode

Output Power values above are measured RMS with a R&S NRP-Z81 Wideband Power Sensor with the EUT transmitting at 100% Duty Cycle. The values are reported only for consistency with the SAR report.

3.5 Tune-Up Information

Maximum Transmit Output Power [dBm]			
Band	2.45 GHz range		
	b-mode	g-mode	n-mode
IEEE 802.11	12.0	13.0	13.0

Table 4: Maximum transmit output power values

3.6 Peak Power Output

Para. No.: 15.247 (b)

Test Results: Complies

Measurement Data:

Carrier Frequency	Maximum Conducted Output Power, dBm			
	802.11b, 11 Mbps	802.11g, 54 Mbps	802.11n, MCS7, 20MHz BW	802.11n, MCS7, 40MHz BW
2412 MHz	17.5	19.6	20.4	20.2 ¹
2437 MHz	18.4	20.7	20.4	20.0 ¹
2462 MHz	13.5	16.9	16.6	16.4 ¹

Carrier Frequency	Maximum EIRP, dBm			
	802.11b, 11 Mbps	802.11g, 54 Mbps	802.11n, MCS7, 20MHz BW	802.11n, MCS7, 40MHz BW
2412 MHz	16.6	21.1	20.9	20.7 ^{1,2}
2437 MHz	19.9	20.5	19.7	19.3 ^{1,2}
2462 MHz	10.0	12.5	10.9	10.9 ^{1,2}

Carrier Frequency	Maximum Antenna Gain, dBi			
	802.11b, 11 Mbps	802.11g, 54 Mbps	802.11n, MCS7, 20MHz BW	802.11n, MCS7, 40MHz BW
2412 MHz	-0.9	1.5	0.5	0.5 ^{1,2}
2437 MHz	1.5	-0.2	-0.7	-0.7 ^{1,2}
2462 MHz	-3.5	-4.4	-5.7	-5.7 ^{1,2}

¹ Upper and Lower channel for 40MHz Mode are 2422 MHz and 2452 MHz respectively

² Antenna Gain values for 40MHz Mode are measured with 20MHz Mode

Tested according to KDB 558074 D01 DTS Meas Guidance v03r01, Section 9.1.1

EIRP is calculated according to KDB 558074 D01 DTS Meas Guidance v03r01, Section 12.2.2. (e)

The maximum field strength is obtained in XZ plane and Vertical polarization

See attached plots.

Detachable antenna?

☐ Yes

☒ No

If detachable, is the antenna connector non-standard?

☐ Yes

☐ No

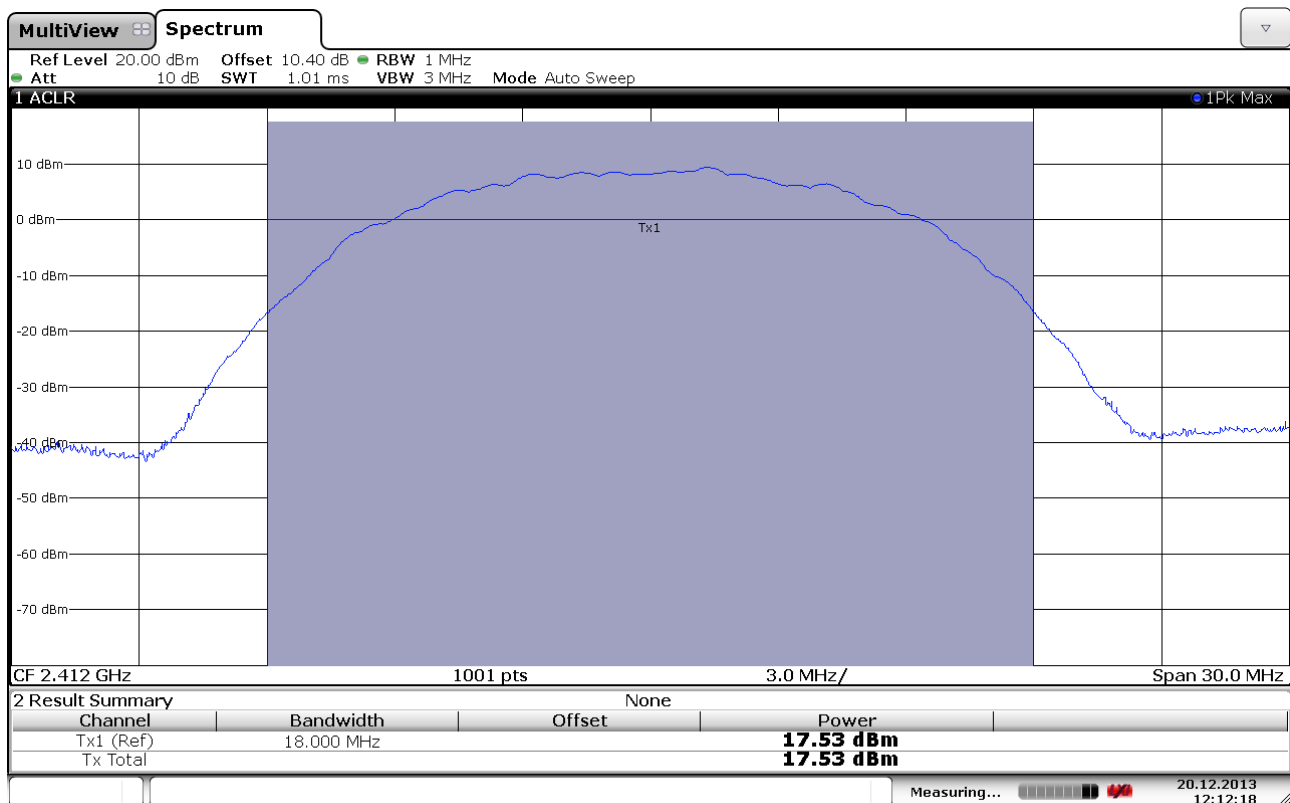
Type of antenna connector: N/A

Requirements:

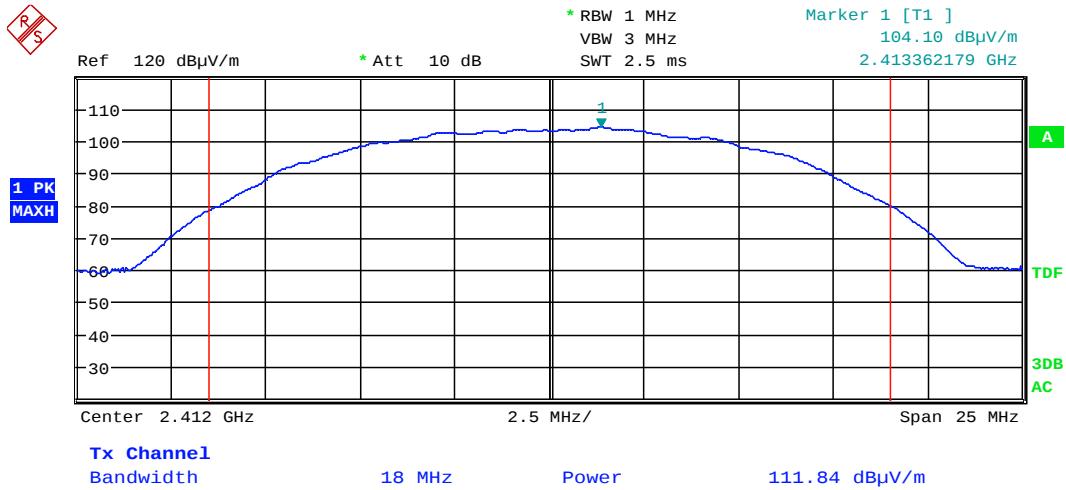
The maximum peak output power shall not exceed the following limits:

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.

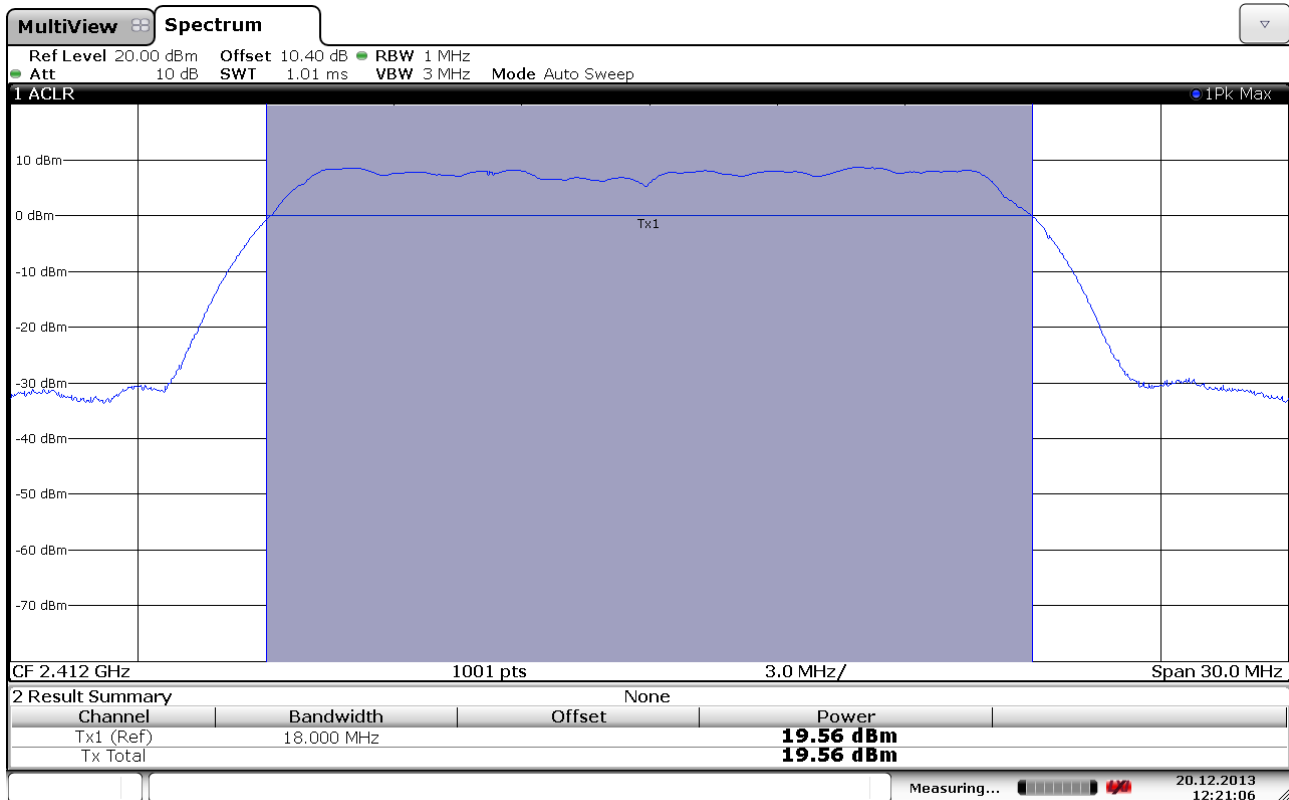


Conducted Output Power, 2412 MHz, 802.11b, 11Mbps

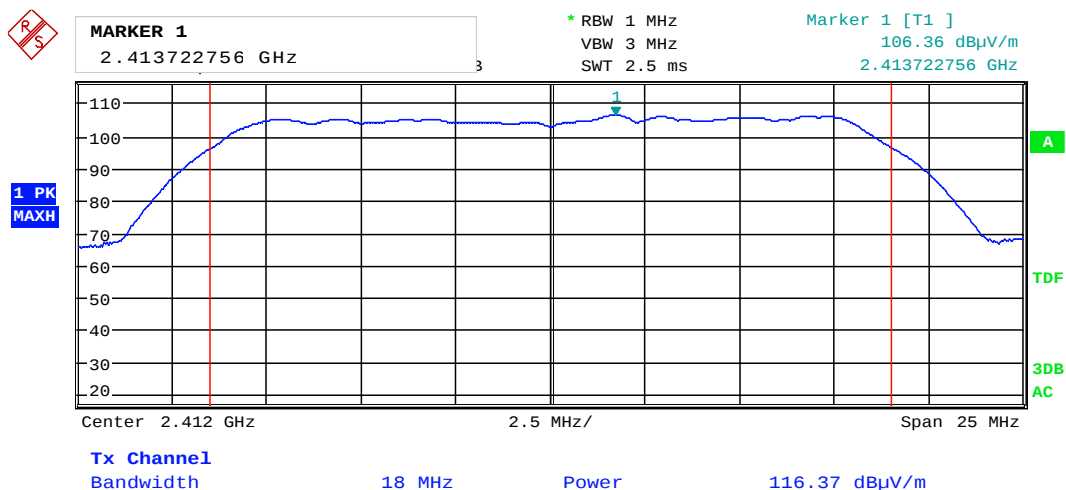


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Radiated Output Power, 2412 MHz, 802.11b, 11Mbps (Max: VP)

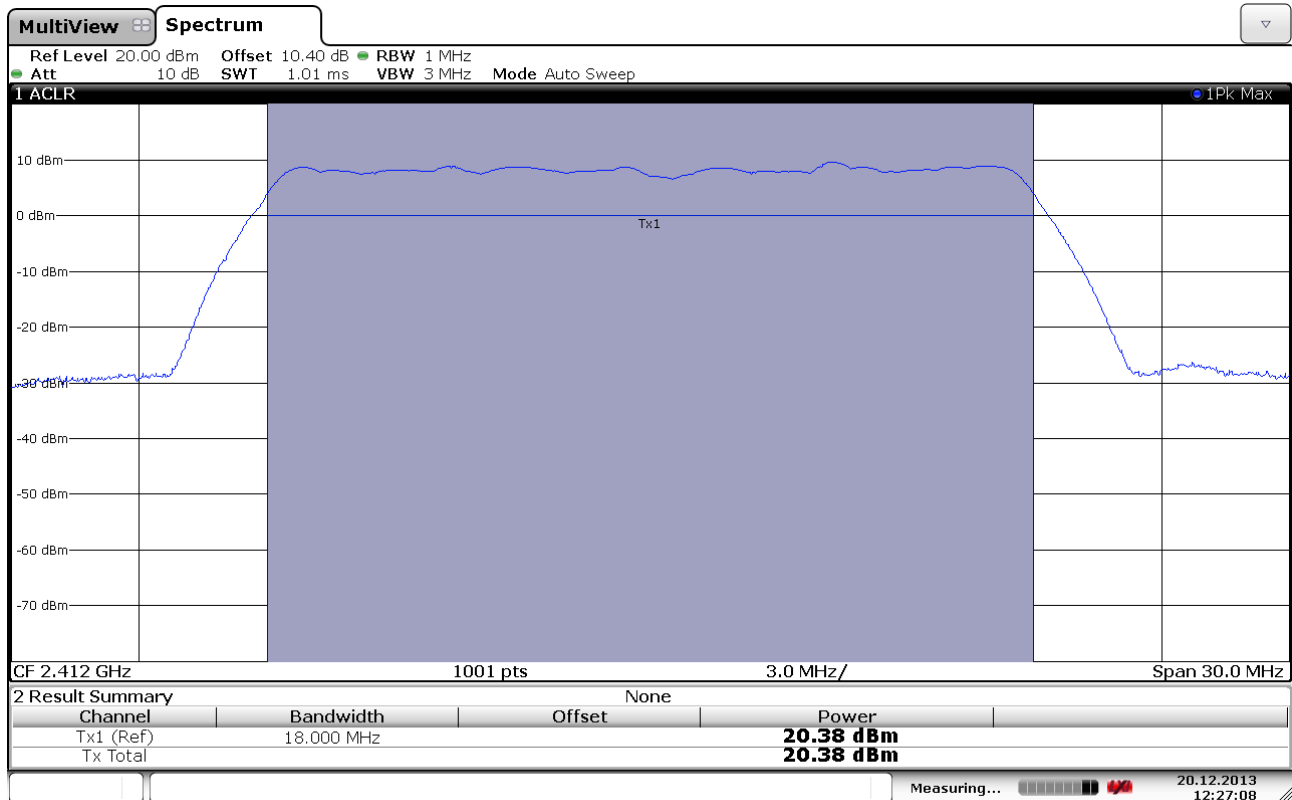


Conducted Output Power, 2412 MHz, 802.11g, 54Mbps

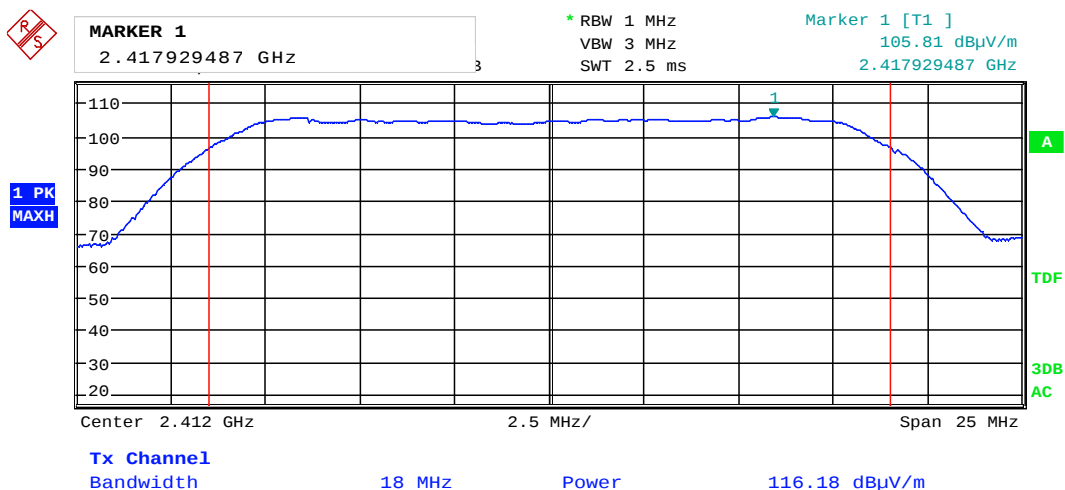


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Radiated Output Power, 2412 MHz, 802.11g, 54Mbps (Max: VP)

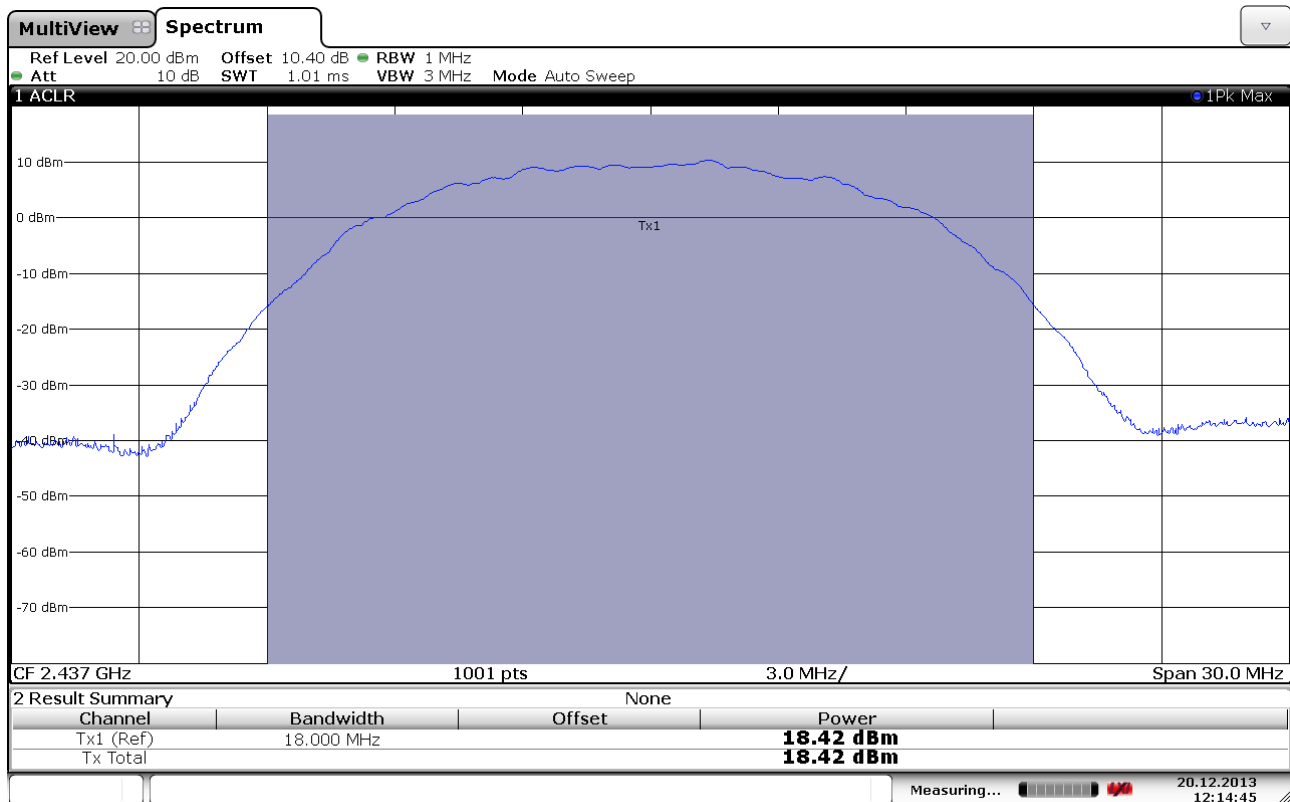


Conducted Output Power, 2412 MHz, 802.11n, MCS7

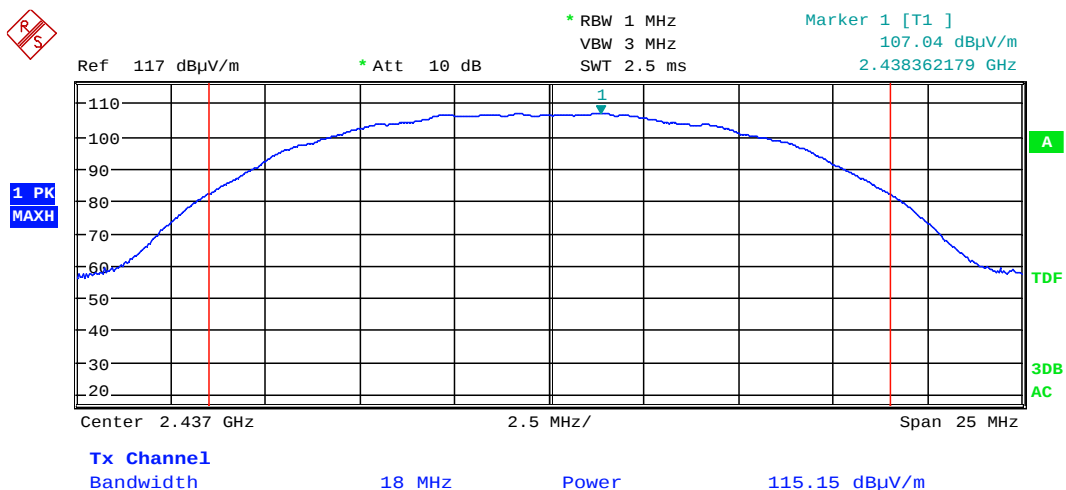


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Radiated Output Power, 2412 MHz, 802.11n, MCS7 (Max: VP)

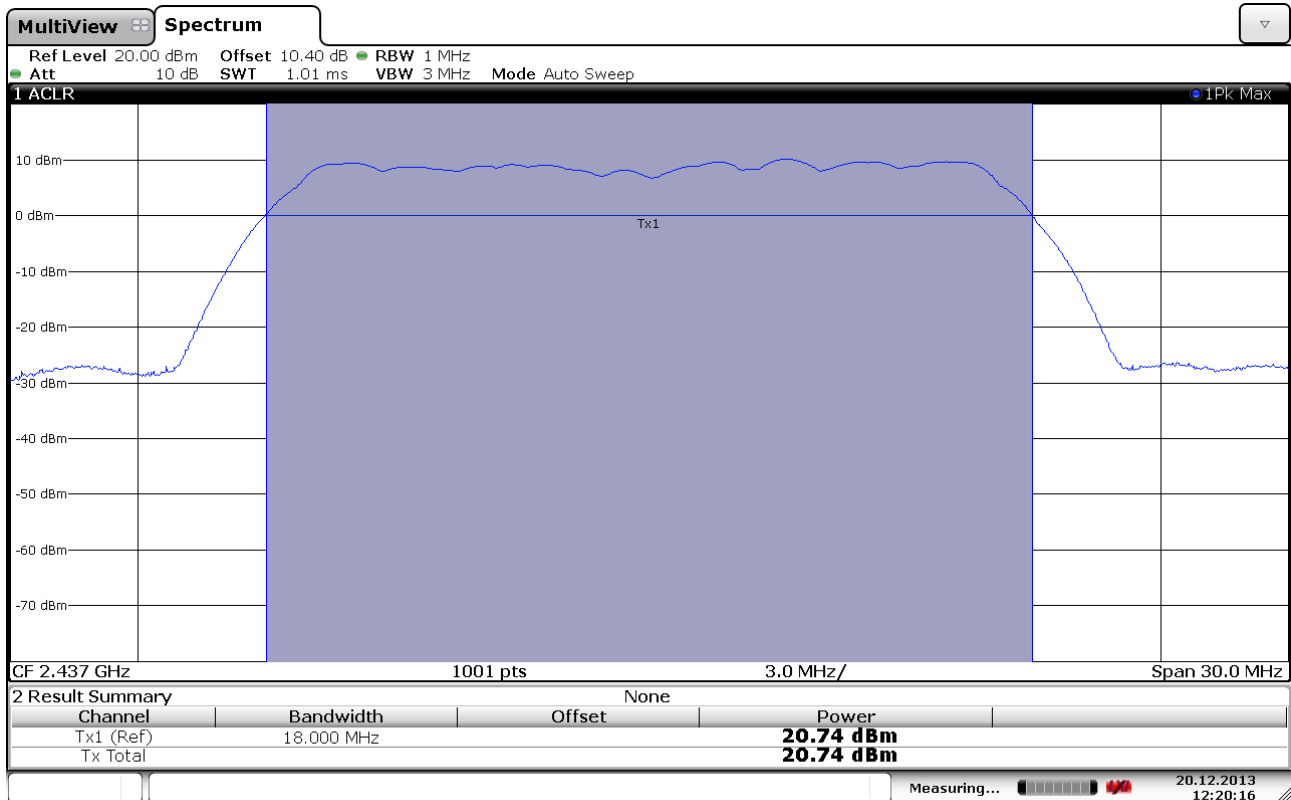


Conducted Output Power, 2437 MHz, 802.11b, 11Mbps

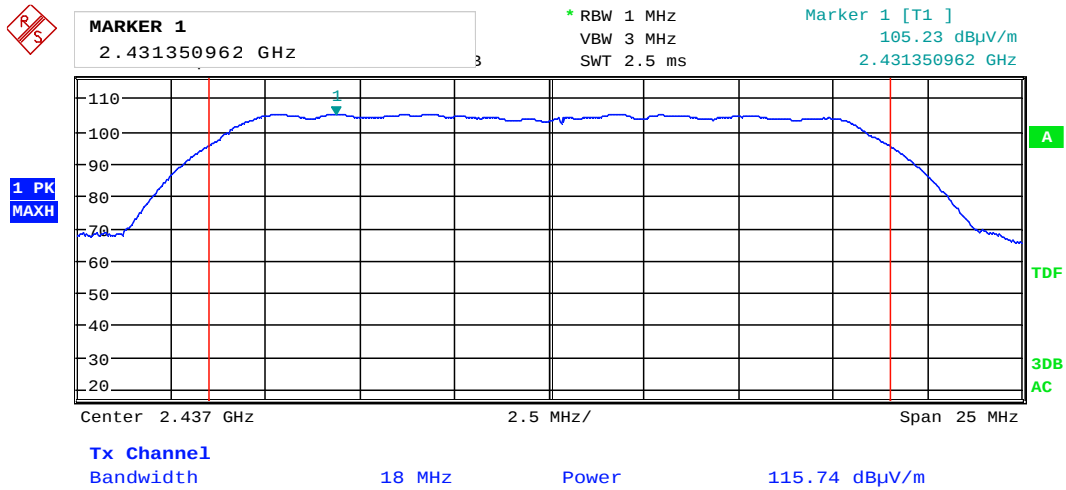


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Radiated Output Power, 2437 MHz, 802.11b, 11Mbps (Max: VP)

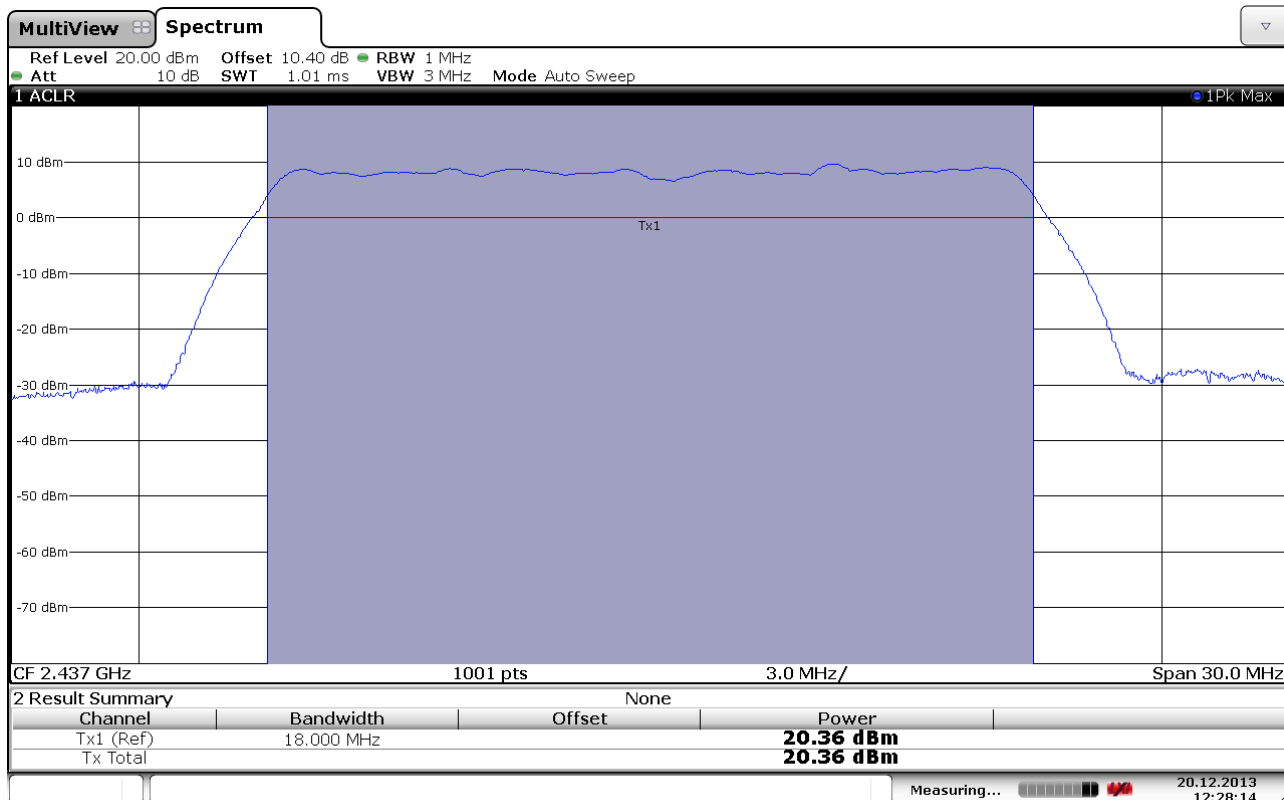


Conducted Output Power, 2437 MHz, 802.11g, 54Mbps

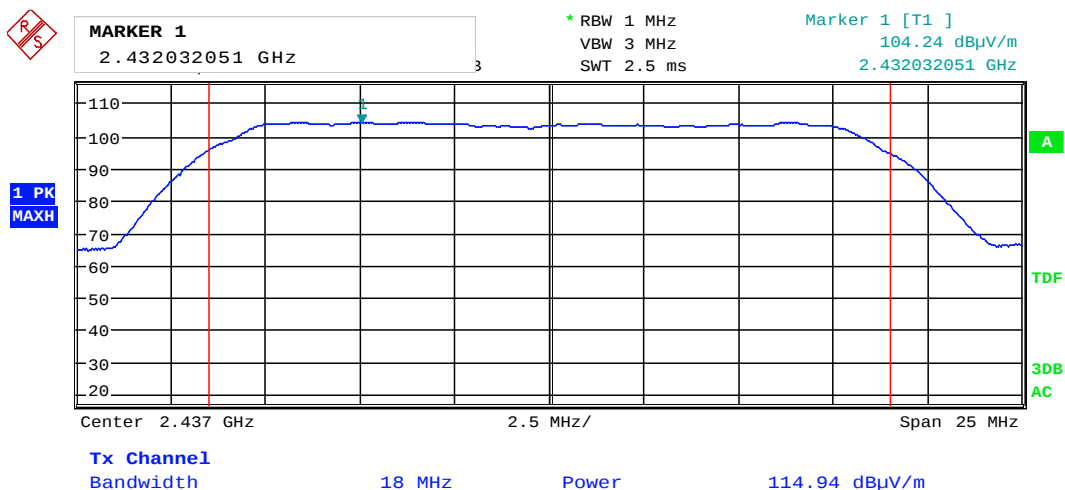


Date: 5.NOV.2013 10:10:27

Radiated Output Power, 2437 MHz, 802.11g, 54Mbps (Max: VP)

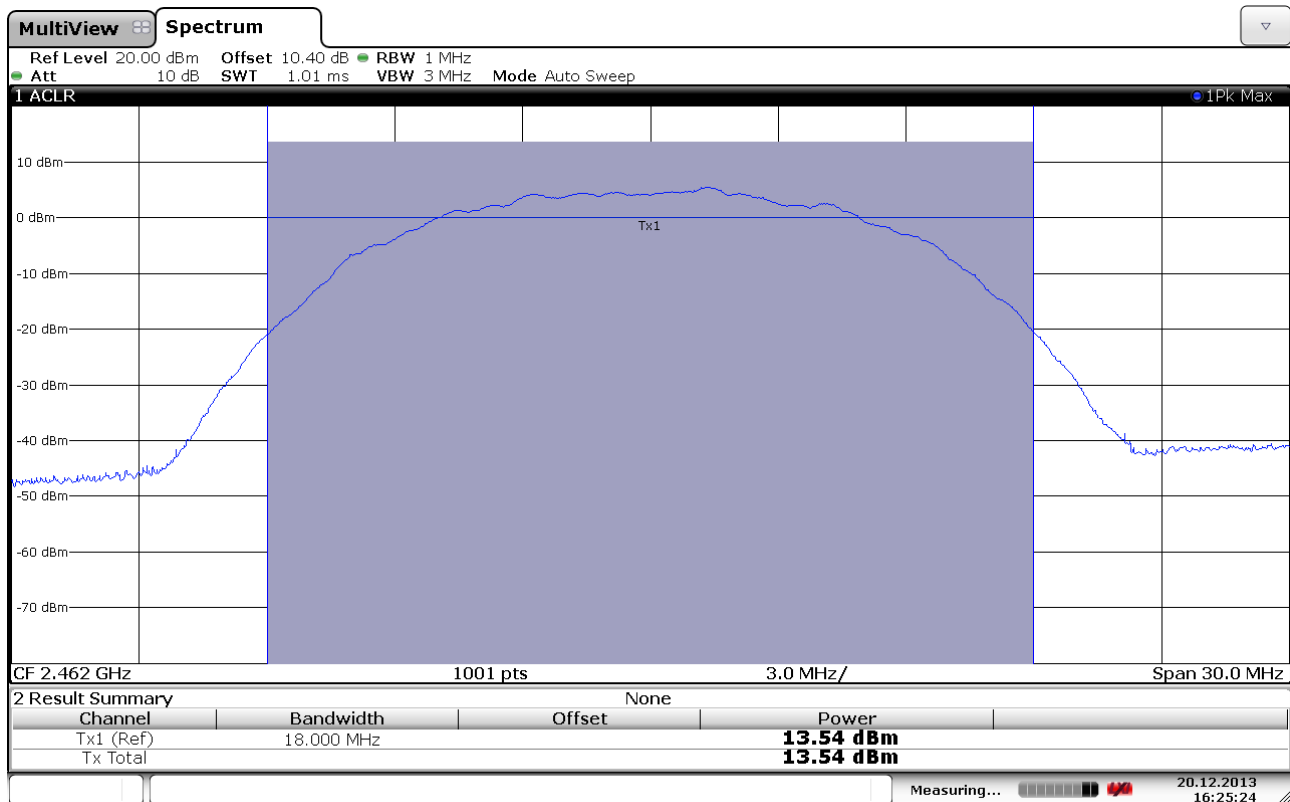


Conducted Output Power, 2437 MHz, 802.11n, MCS7

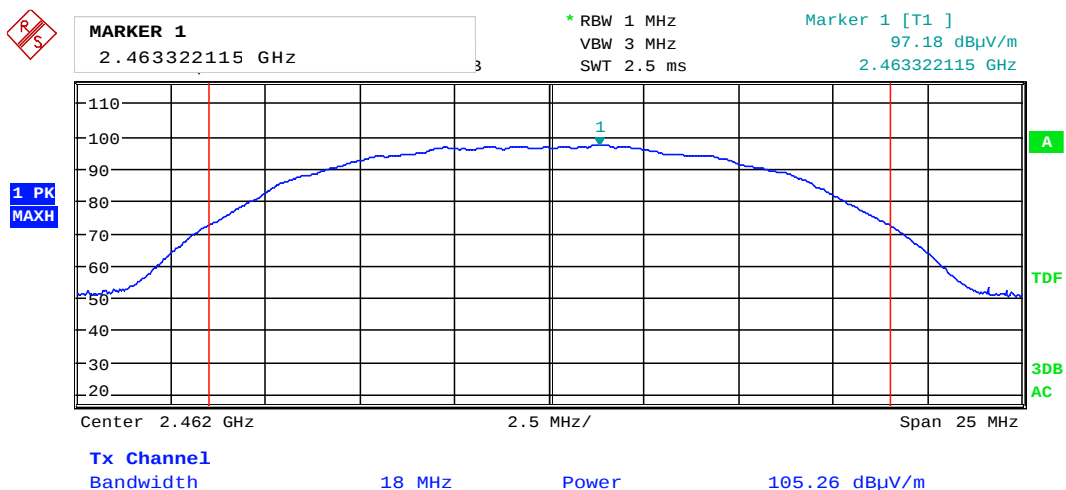


Date: 5.NOV.2013 10:14:22

Radiated Output Power, 2437 MHz, 802.11n, MCS7 (Max: VP)

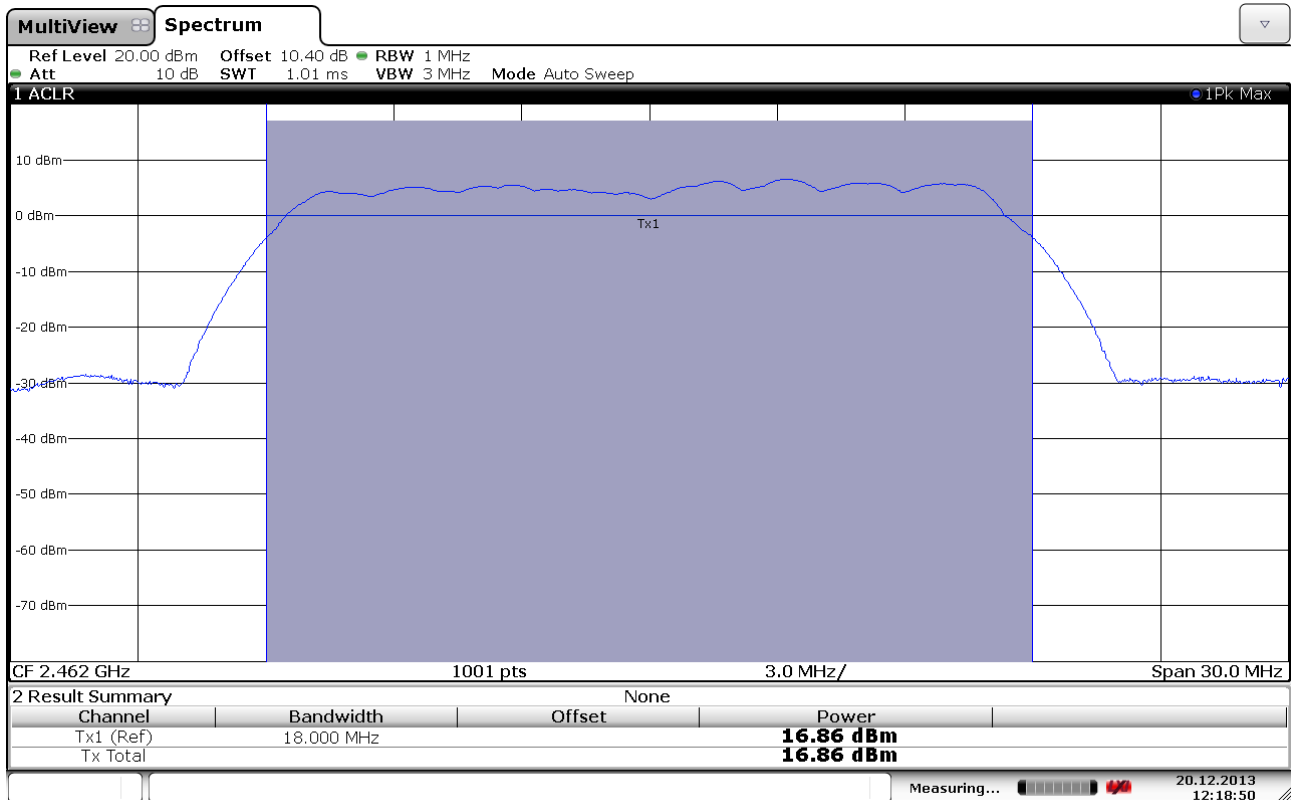


Conducted Output Power, 2462 MHz, 802.11b, 11Mbps

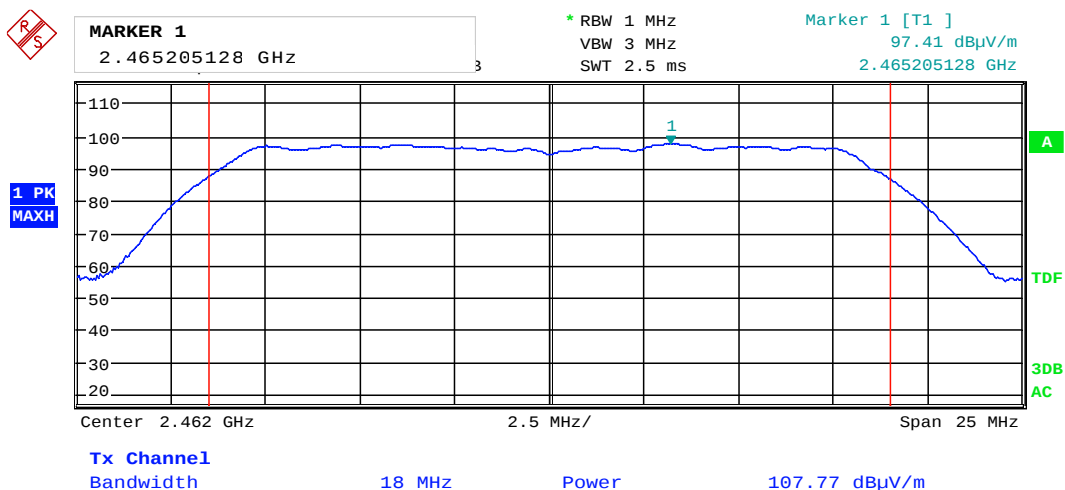


Date: 5.NOV.2013 10:34:23

Radiated Output Power, 2462 MHz, 802.11b, 11Mbps (Max: VP)

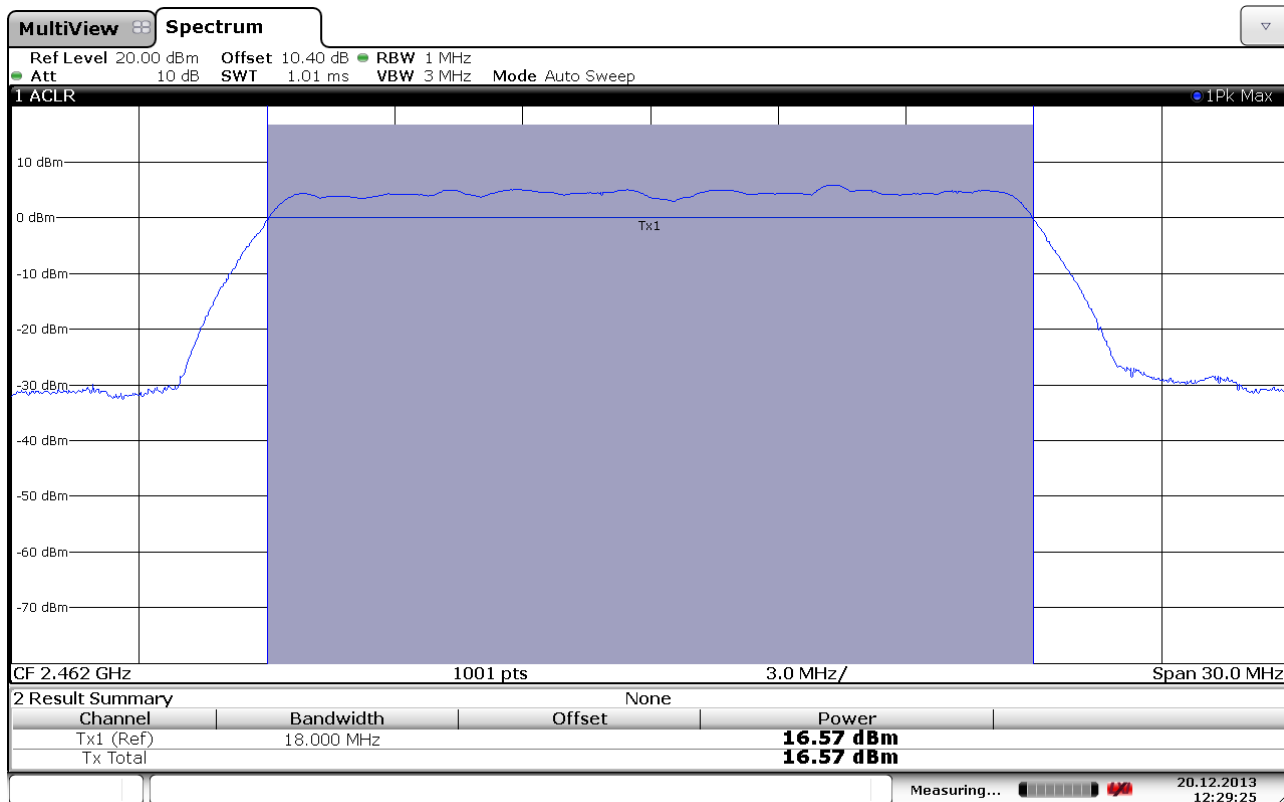


Conducted Output Power, 2462 MHz, 802.11g, 54Mbps

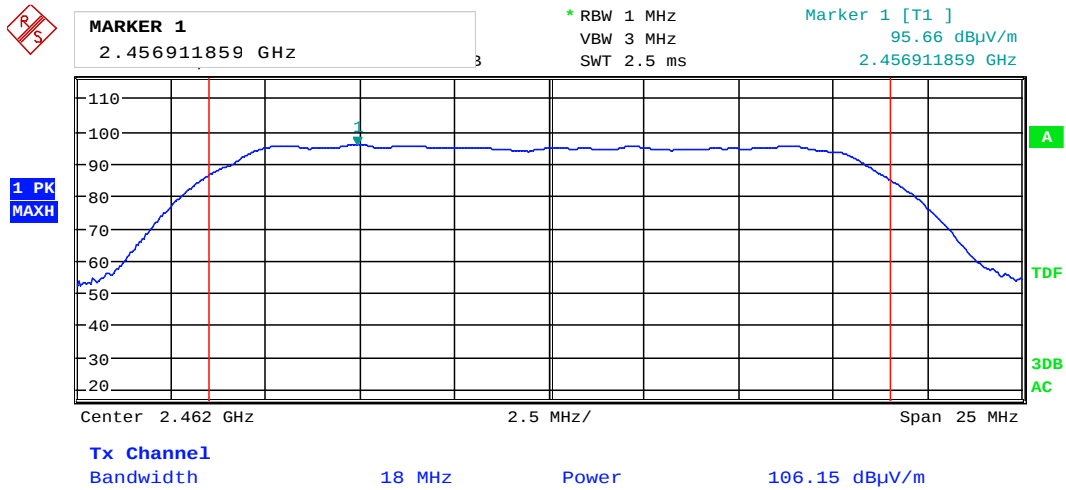


Date: 5.NOV.2013 10:32:04

Radiated Output Power, 2462 MHz, 802.11g, 54Mbps (Max: VP)

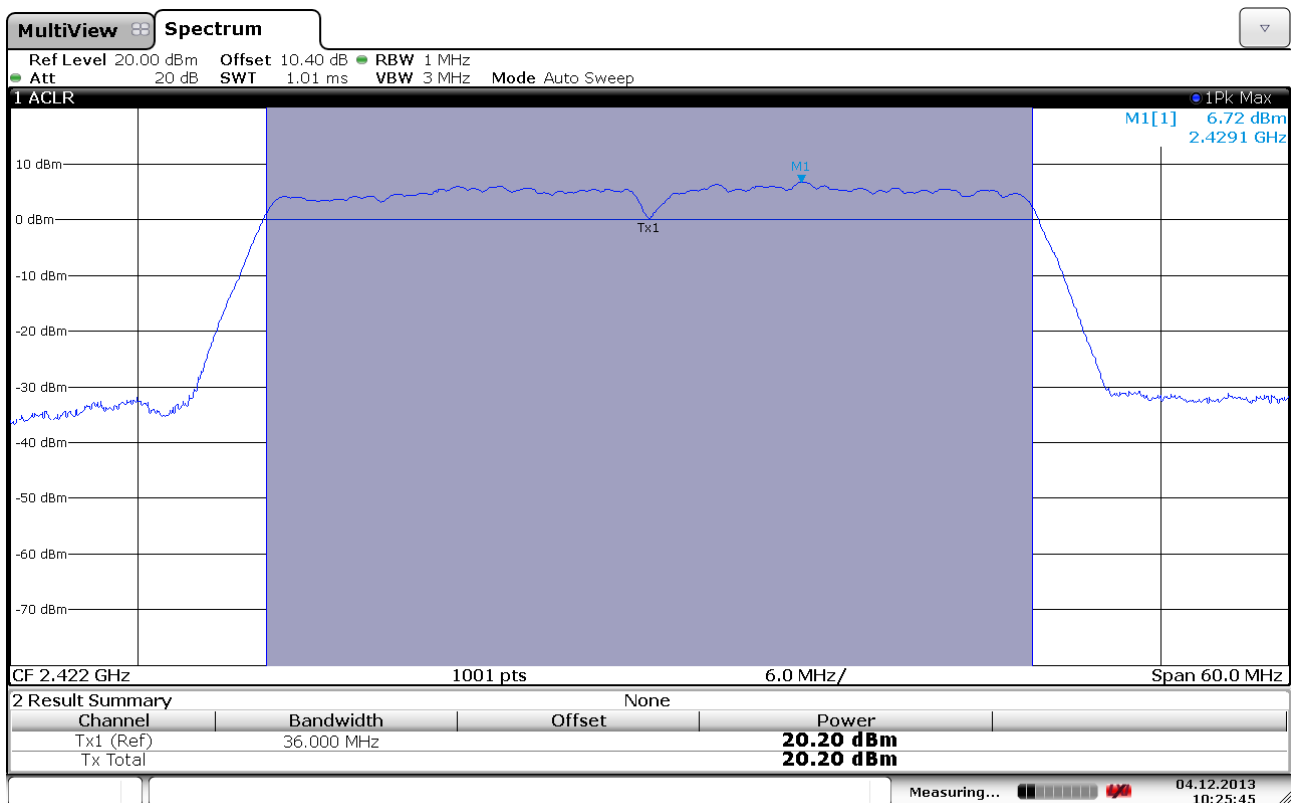


Conducted Output Power, 2462 MHz, 802.11n, MCS7

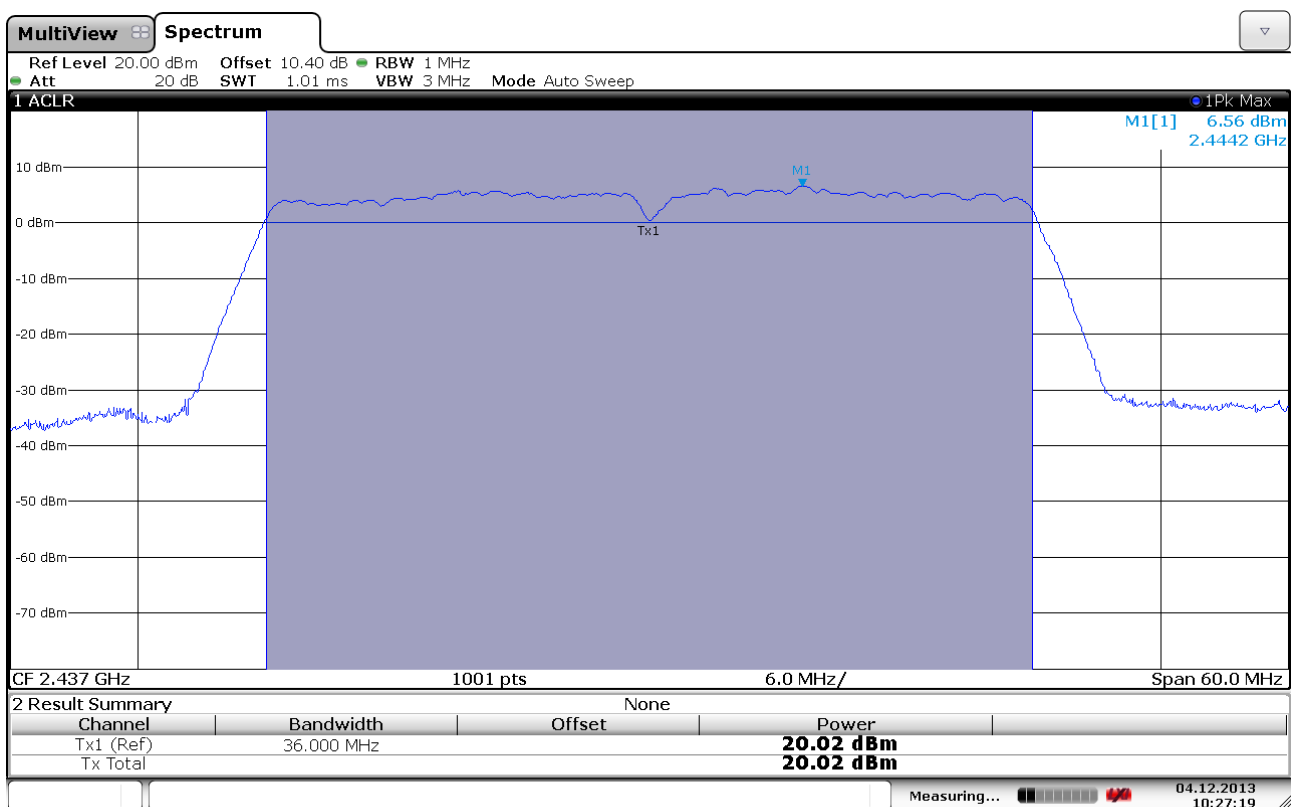


Date: 5.NOV.2013 10:21:28

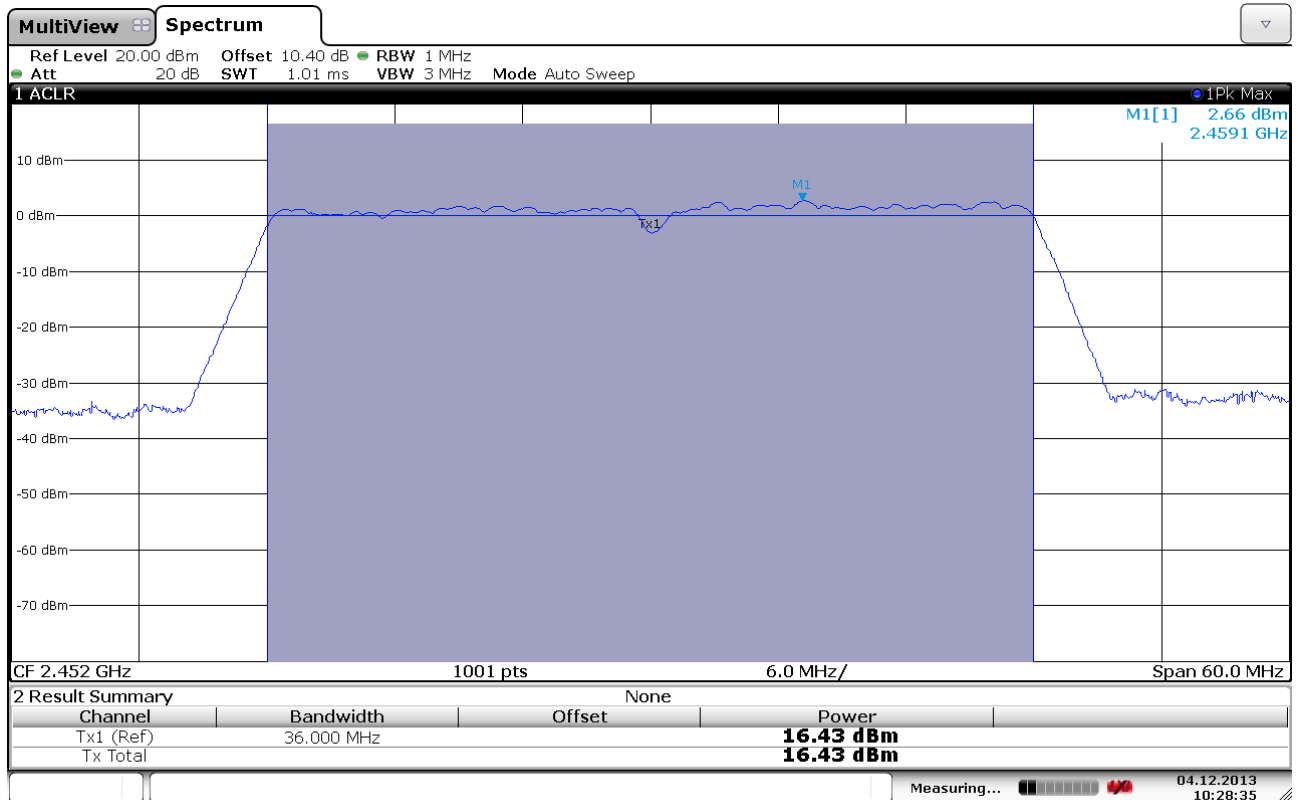
Radiated Output Power, 2462 MHz, 802.11n, MCS7 (Max: VP)



Conducted Output Power, 2422 MHz, 802.11n, MCS7, 40MHz BW



Conducted Output Power, 2437 MHz, 802.11n, MCS7, 40MHz BW



Conducted Output Power, 2452 MHz, 802.11n, MCS7, 40MHz BW

3.7 Spurious Emissions (Radiated)

Para. No.: 15.247 (c)

Test Performed By: G.Suhanthakumar	Date of Test: 05. Nov 2013
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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, 11Mbps	46.1	43.3	74	27.9	30.7
802.11g, 54Mbps	57.2	48.8	74	16.8	25.2
802.11n, MCS7, 20MHz BW	56.7	48.5	74	17.3	25.5
802.11n, MCS7, 40MHz BW	55.0	59.3	74	19.0	14.7

Average Detector:

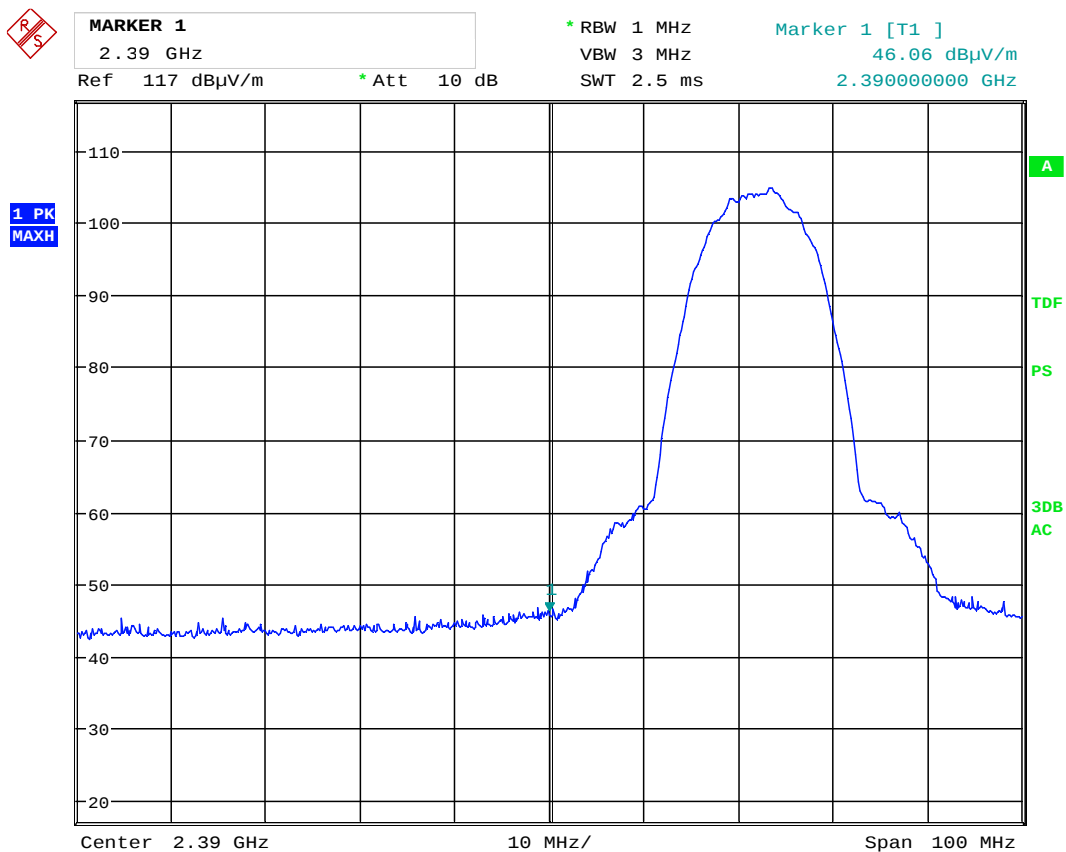
Modulation and Bitrate	Measured field strength (dB μ V/m)		Limit	Margin	
	2390 MHz	2483.5 MHz	dB	dB	
802.11b, 11Mbps	36.6	35.9	54	17.4	18.1
802.11g, 54Mbps	50.5	39.7	54	3.5	14.3
802.11n, MCS7, 20MHz BW	49.1	40.6	54	4.9	13.4
802.11n, MCS7, 40MHz BW	48.5	47.7	54	5.5	6.3

Tested according to KDB 558074 D01 DTS Measurement Guidance v03r01, Section 13.1 & 13.3.2

Duty Cycle was 100% during all tests.

Measurements with 802.11n and 40MHz BW were only performed Conducted, values above are calculated using the method from KDB 558074 D01 v03r01, clause 12.2.2. Reported value for Upper Band Edge is the highest of the two measurements.

See attached plots.



Date: 5.NOV.2013 09:09:11

Lower Band Edge, Radiated, Peak, 2412 MHz, 802.11b, 11Mbps

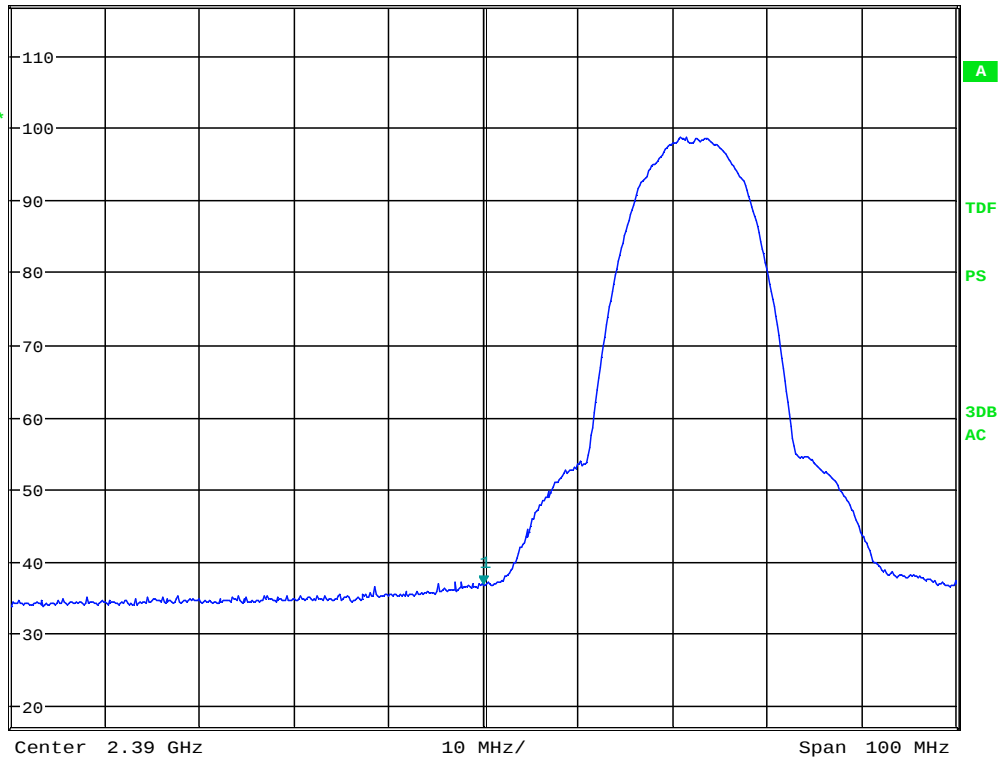


* RBW 1 MHz
VBW 10 MHz
SWT 2.5 ms
Marker 1 [T1]
36.55 dBμV/m
2.390000000 GHz

Ref 117 dBμV/m

* Att 10 dB

1 RM
MAXH

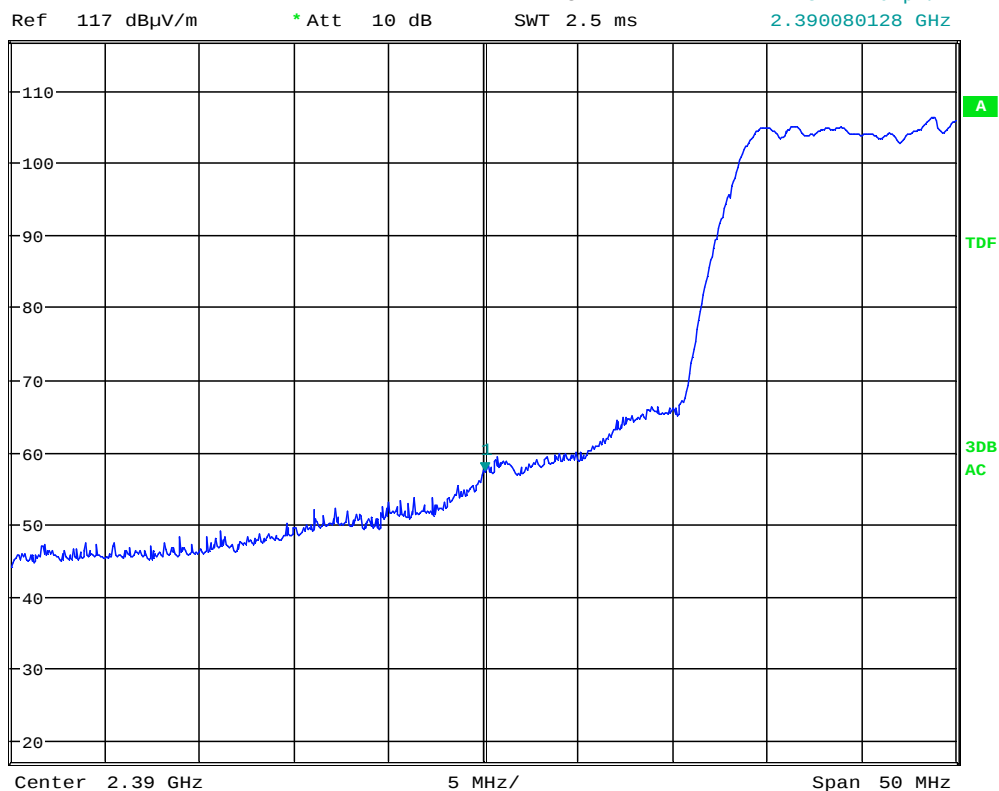


Date: 5.NOV.2013 09:10:20

Lower Band Edge, Radiated, Average, 2412 MHz, 802.11b, 11Mbps



* RBW 1 MHz
VBW 3 MHz
SWT 2.5 ms
Marker 1 [T1]
57.17 dBμV/m
2.390080128 GHz



Date: 5.NOV.2013 09:39:22

Lower Band Edge, Radiated, Peak, 2412 MHz, 802.11g, 54Mbps



MARKER 1

2.390080128 GHz

Ref 117 dBμV/m

* Att 10 dB

* RBW 1 MHz

VBW 10 MHz

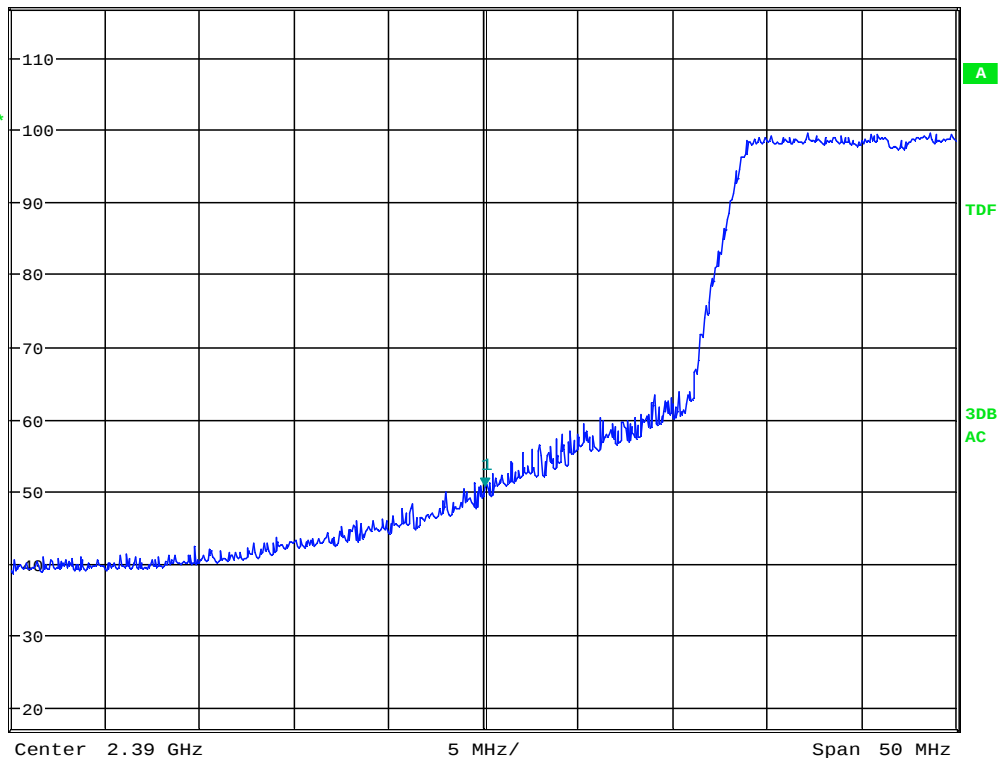
SWT 2.5 ms

Marker 1 [T1]

50.45 dBμV/m

2.390080128 GHz

1 RM
MAXH



Date: 5.NOV.2013 09:34:11

Lower Band Edge, Radiated, Average, 2412 MHz, 802.11g, 54Mbps

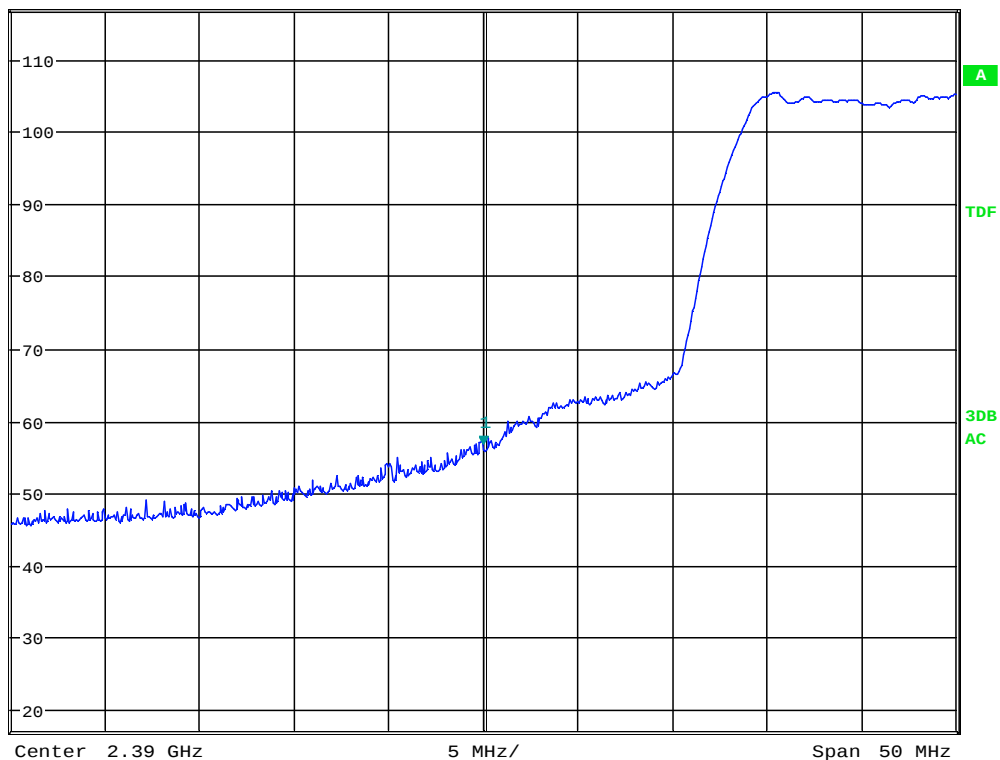


MARKER 1
2.39 GHz
Ref 117 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 2.5 ms

Marker 1 [T1]
56.67 dBμV/m
2.390000000 GHz

1 PK
MAXH



Date: 5.NOV.2013 09:50:03

Lower Band Edge, Radiated, Peak, 2412 MHz, 802.11n, MCS7, 20MHz BW



* RBW 1 MHz
VBW 10 MHz
SWT 2.5 ms
Marker 1 [T1]
49.13 dBμV/m
2.390000000 GHz

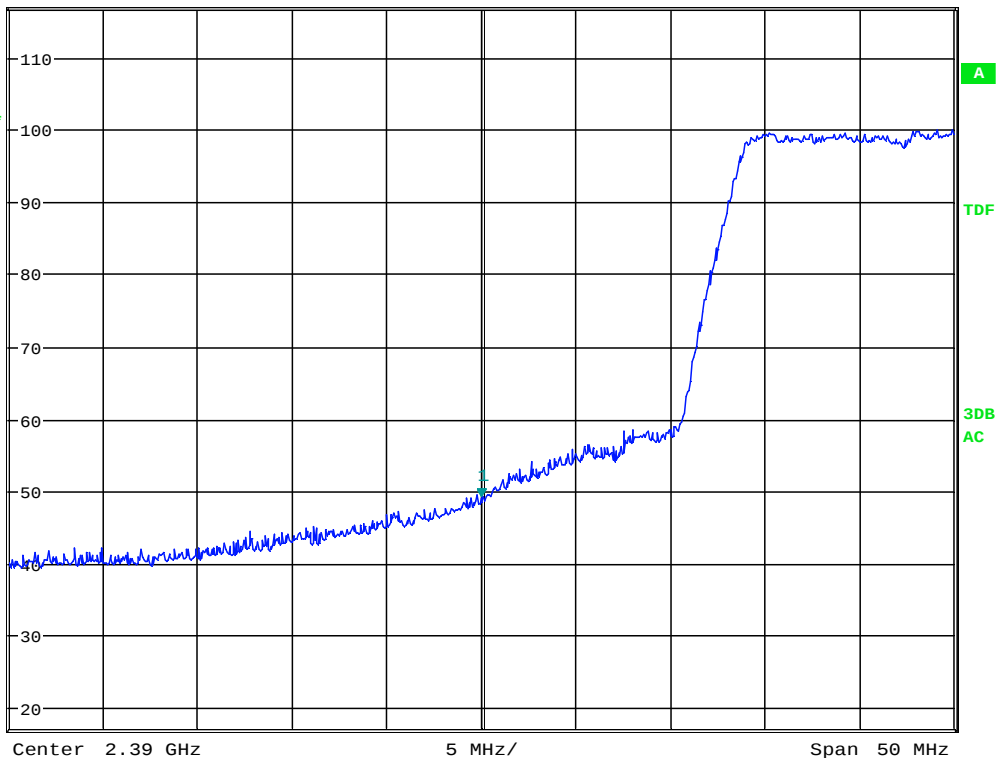
Ref 117 dBμV/m

* Att 10 dB

SWT 2.5 ms

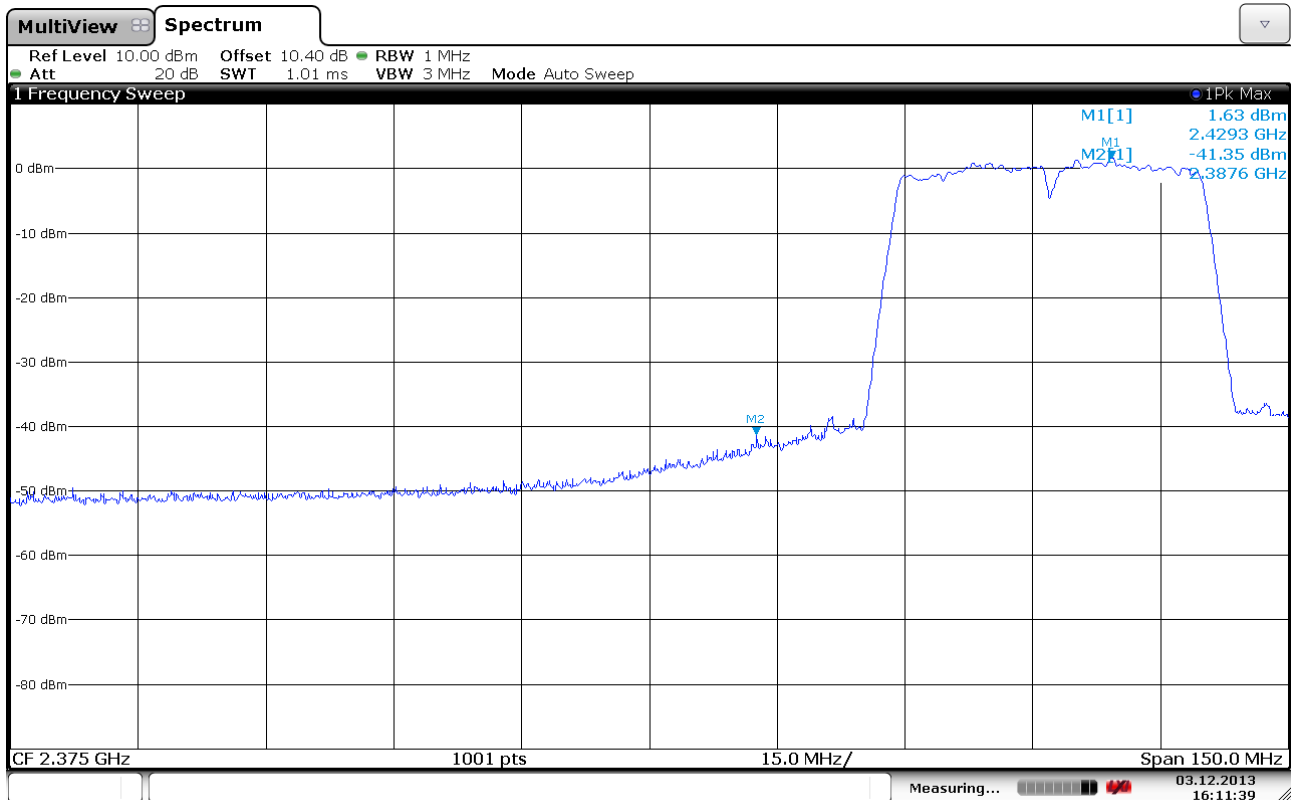
2.390000000 GHz

1 RM
MAXH



Date: 5.NOV.2013 09:50:40

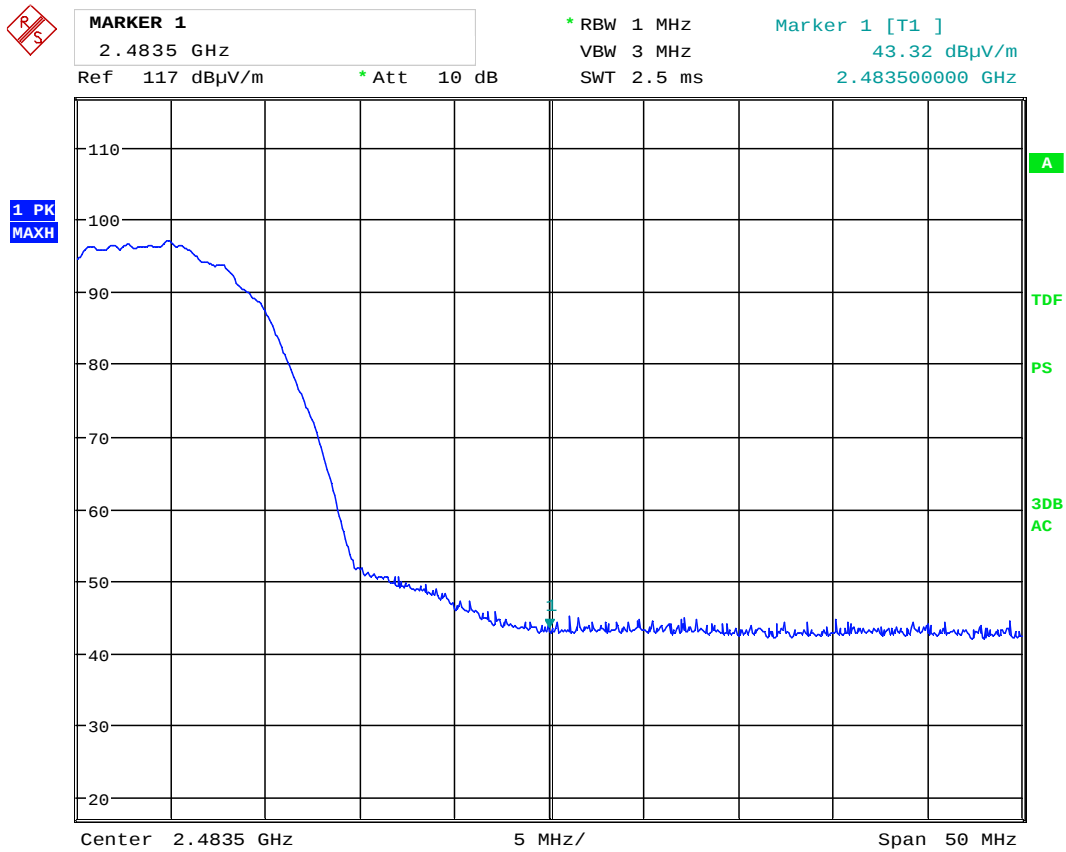
Lower Band Edge, Radiated, Average, 2412 MHz, 802.11n, MCS7, 20MHz BW



Lower Band Edge, Conducted, Peak, 2422 MHz, 802.11n, MCS7, 40MHz BW



Lower Band Edge, Conducted, Average, 2422 MHz, 802.11n, MCS7, 40MHz BW

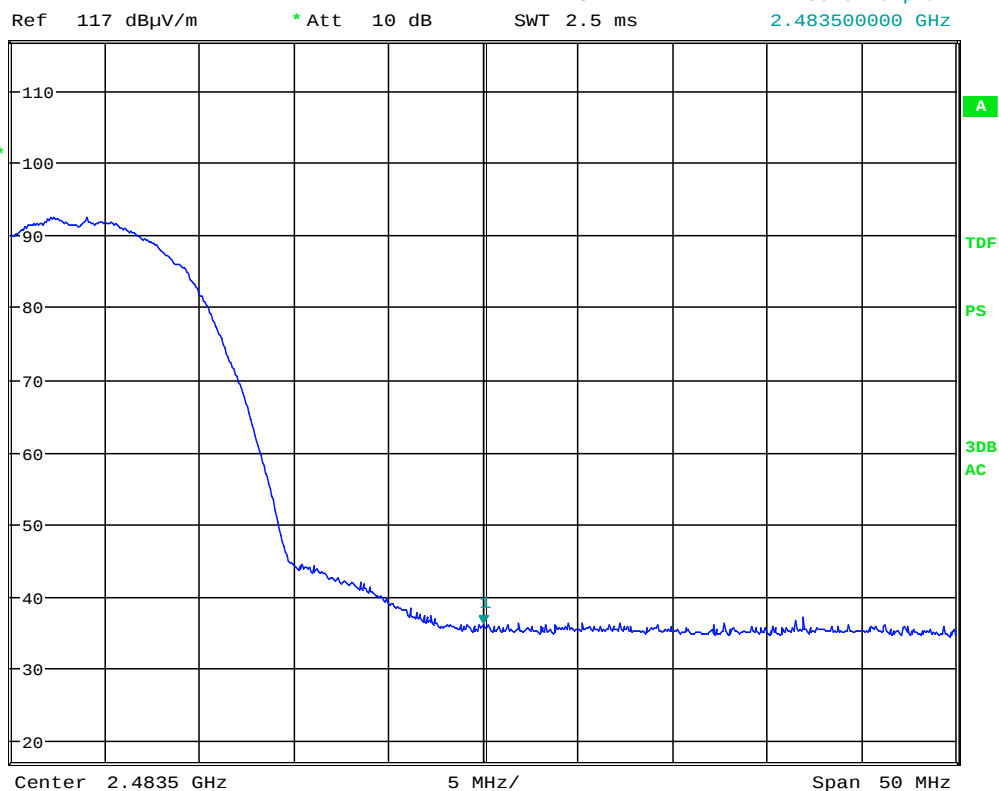


Date: 5.NOV.2013 10:36:11

Upper Band Edge, Radiated, Peak, 2462 MHz, 802.11b, 11Mbps



* RBW 1 MHz
VBW 10 MHz
SWT 2.5 ms
Marker 1 [T1]
35.91 dBμV/m
2.483500000 GHz

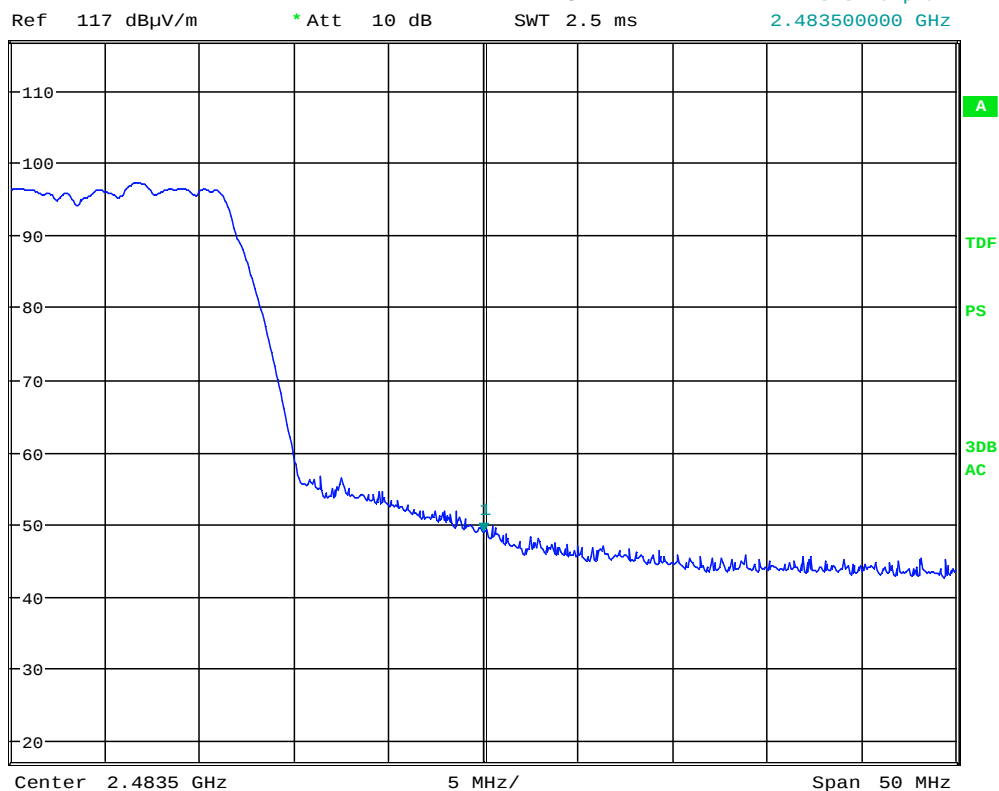


Date: 5.NOV.2013 10:36:58

Upper Band Edge, Radiated, Average, 2462 MHz, 802.11b, 11Mbps



* RBW 1 MHz Marker 1 [T1]
VBW 3 MHz 48.81 dBμV/m
SWT 2.5 ms 2.483500000 GHz

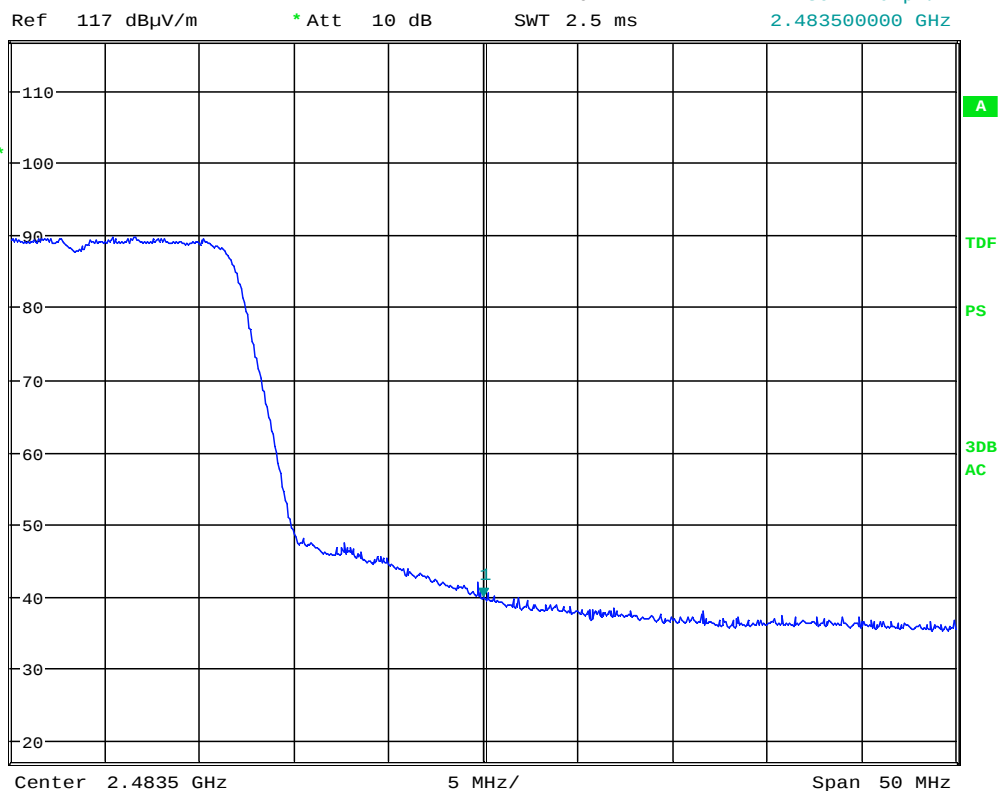


Date: 5.NOV.2013 10:26:00

Upper Band Edge, Radiated, Peak, 2462 MHz, 802.11g, 54Mbps



* RBW 1 MHz
VBW 10 MHz
SWT 2.5 ms
Marker 1 [T1]
39.74 dBμV/m
2.483500000 GHz



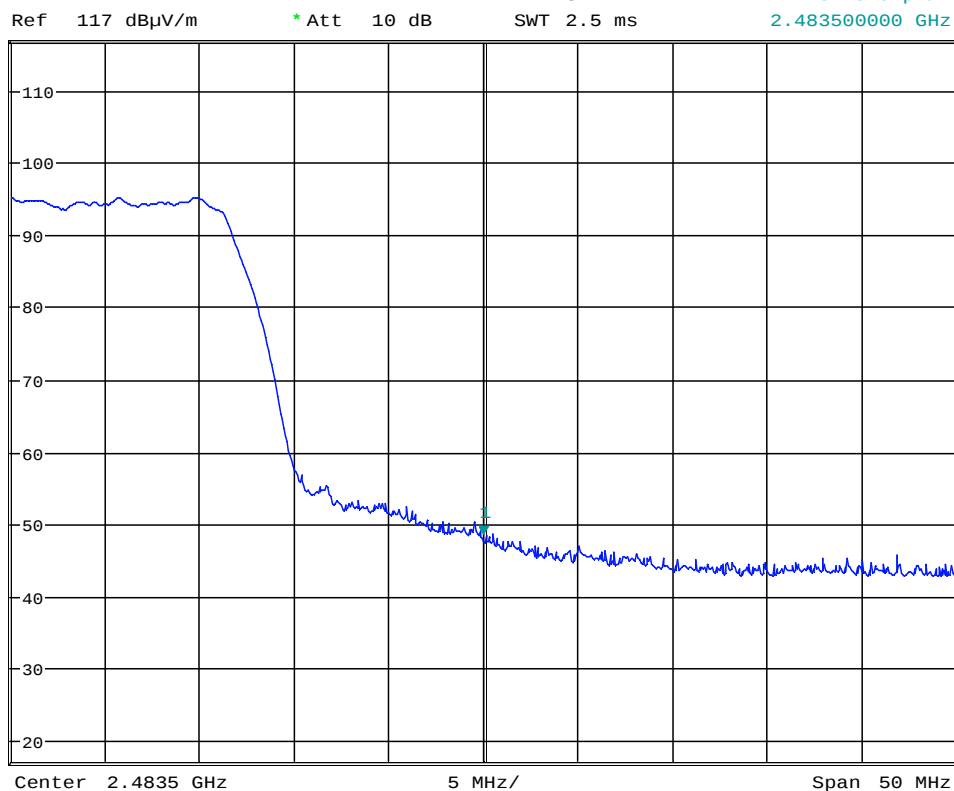
Date: 5.NOV.2013 10:25:27

Upper Band Edge, Radiated, Average, 2462 MHz, 802.11g, 54Mbps



* RBW 1 MHz
VBW 3 MHz
SWT 2.5 ms

Marker 1 [T1]
48.49 dB μ V/m
2.483500000 GHz



Date: 5.NOV.2013 10:22:11

Upper Band Edge, Radiated, Peak, 2462 MHz, 802.11n, MCS7



* RBW 1 MHz
VBW 10 MHz
SWT 2.5 ms
Marker 1 [T1]
40.58 dBμV/m
2.483500000 GHz

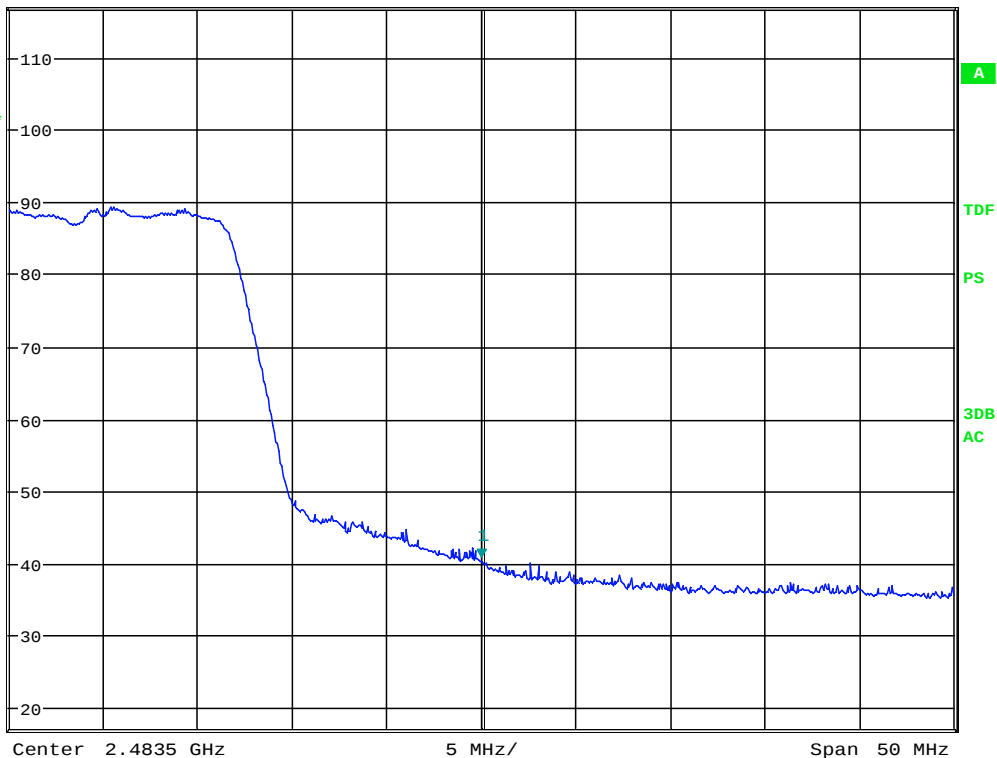
Ref 117 dBμV/m

* Att 10 dB

SWT 2.5 ms

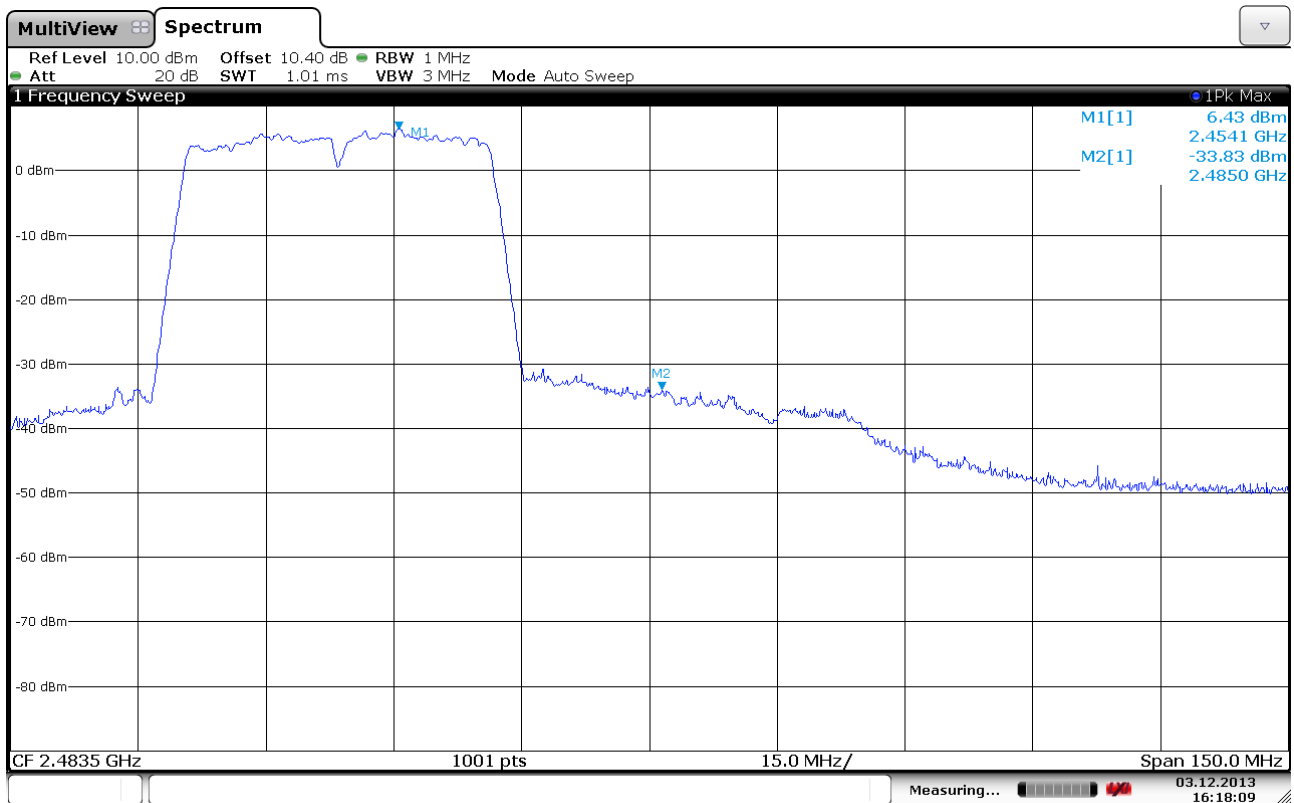
2.483500000 GHz

1 RM
MAXH

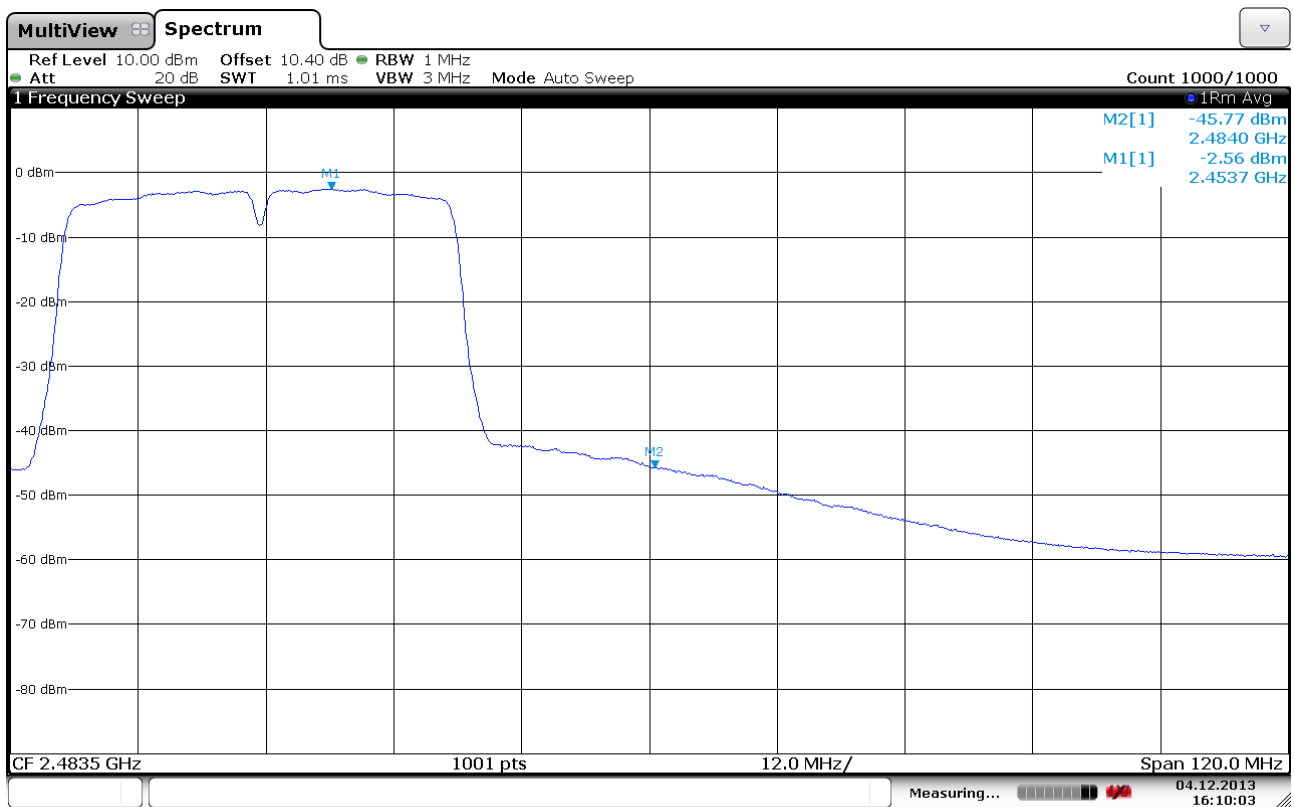


Date: 5.NOV.2013 10:23:18

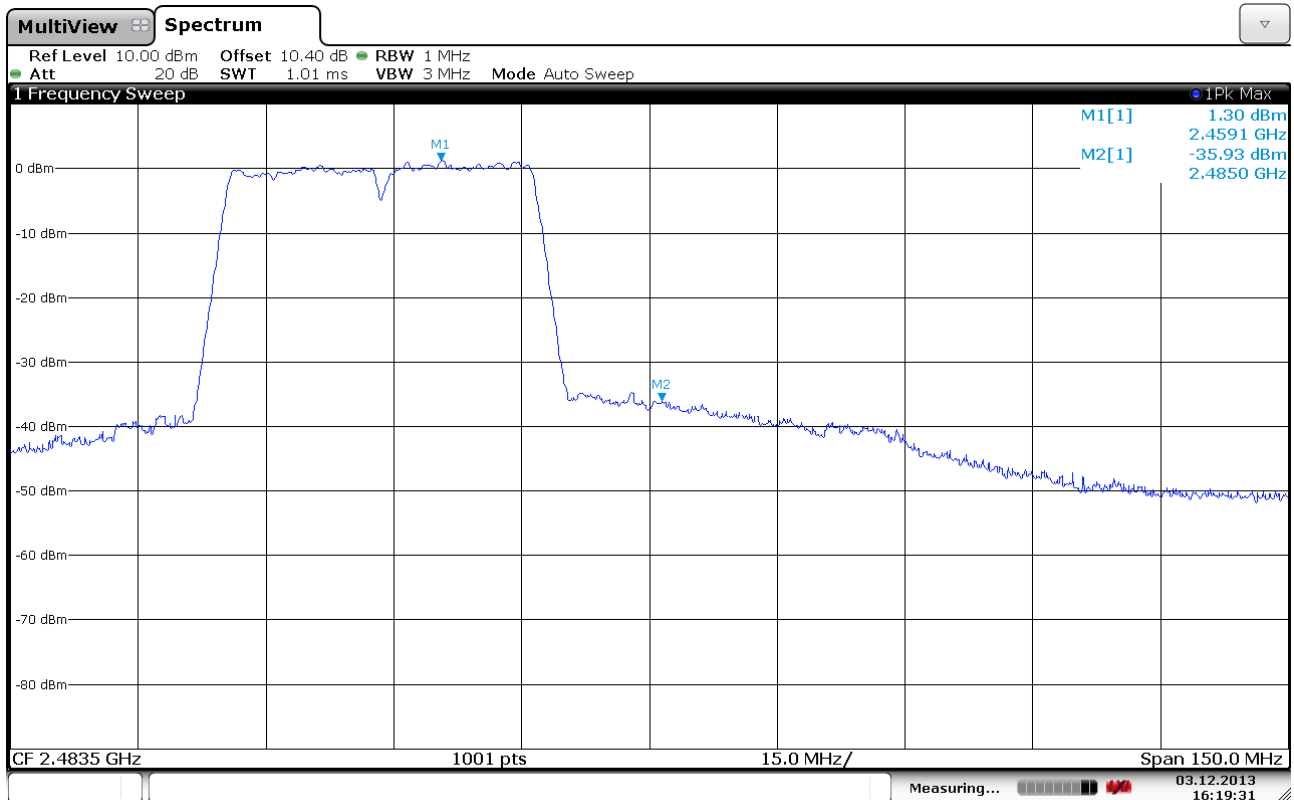
Upper Band Edge, Radiated, Average, 2462 MHz, 802.11n, MCS7



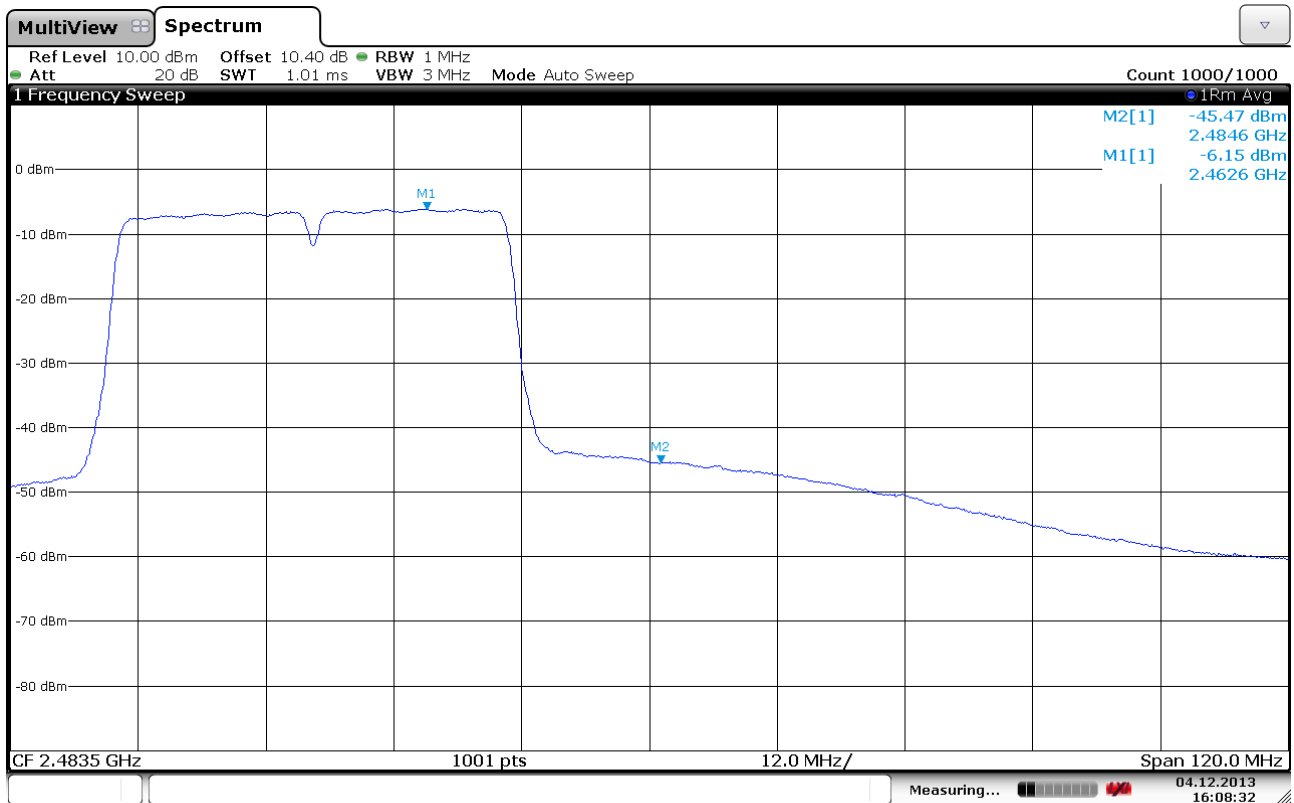
Upper Band Edge, Conducted, Peak, 2447 MHz, 802.11n, MCS7, 40MHz BW



Upper Band Edge, Conducted, Average, 2447 MHz, 802.11n, MCS7, 40MHz BW



Upper Band Edge, Conducted, Peak, 2452 MHz, 802.11n, MCS7, 40MHz BW



Upper Band Edge, Conducted, Average, 2452 MHz, 802.11n, MCS7, 40MHz BW

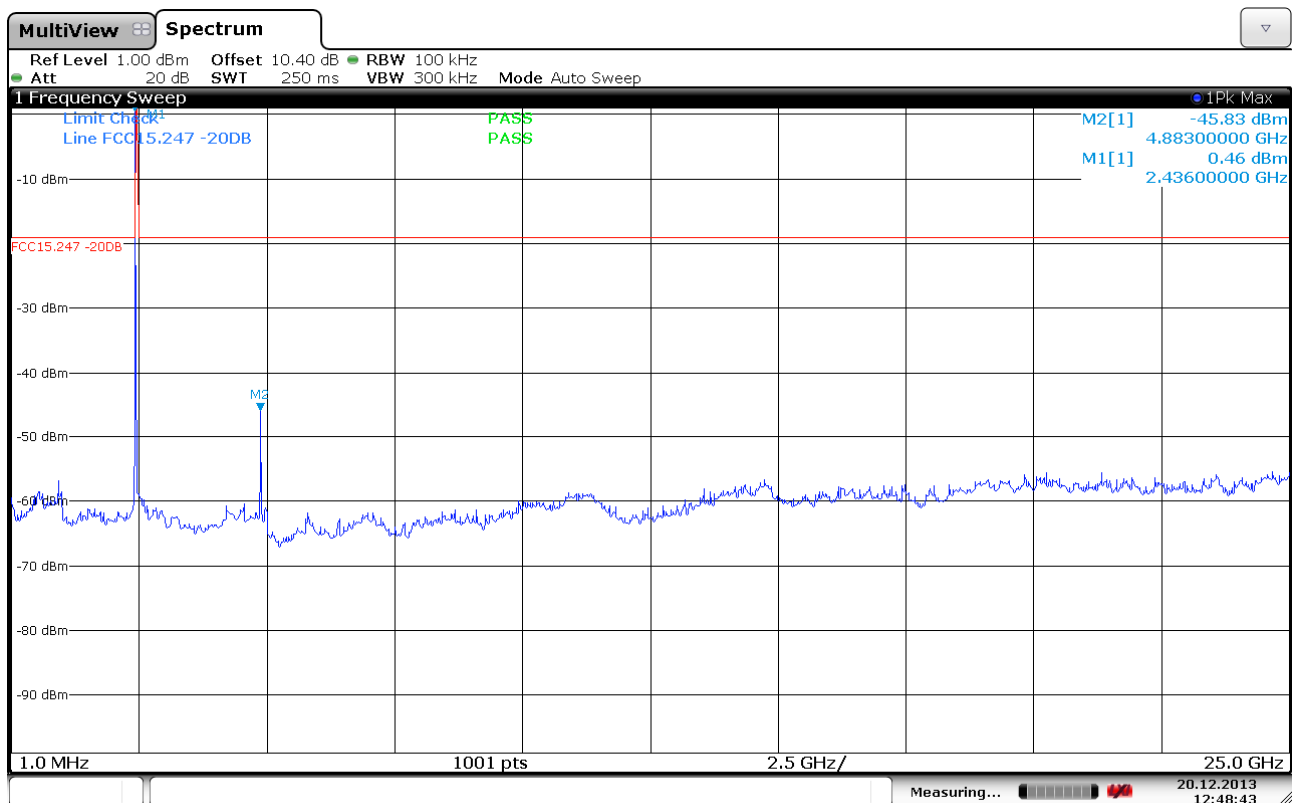
RF conducted power to 25 GHz see attached plots.

Maximum RF level outside operating band:

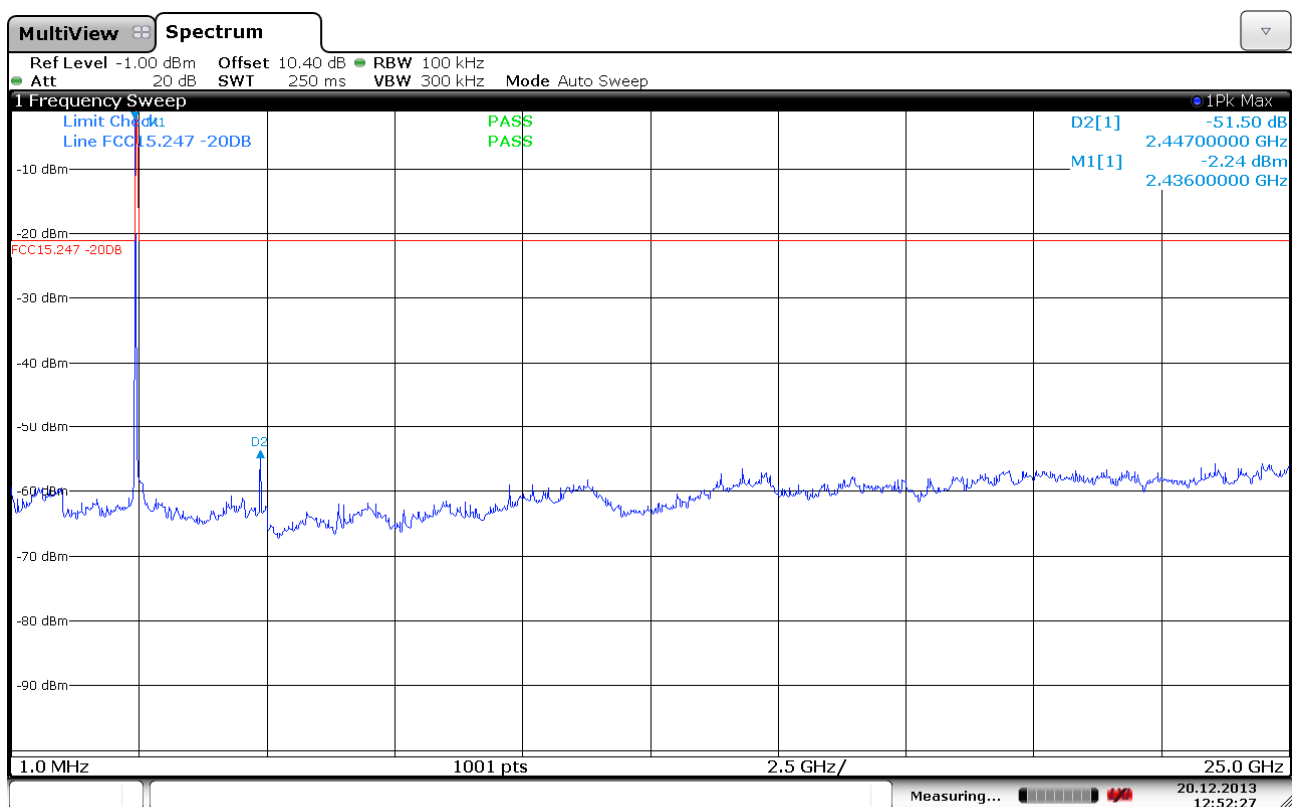
RF ch 1: >40 dB/C, margin >20 dB

RF ch 6: >40 dB/C, margin >20 dB

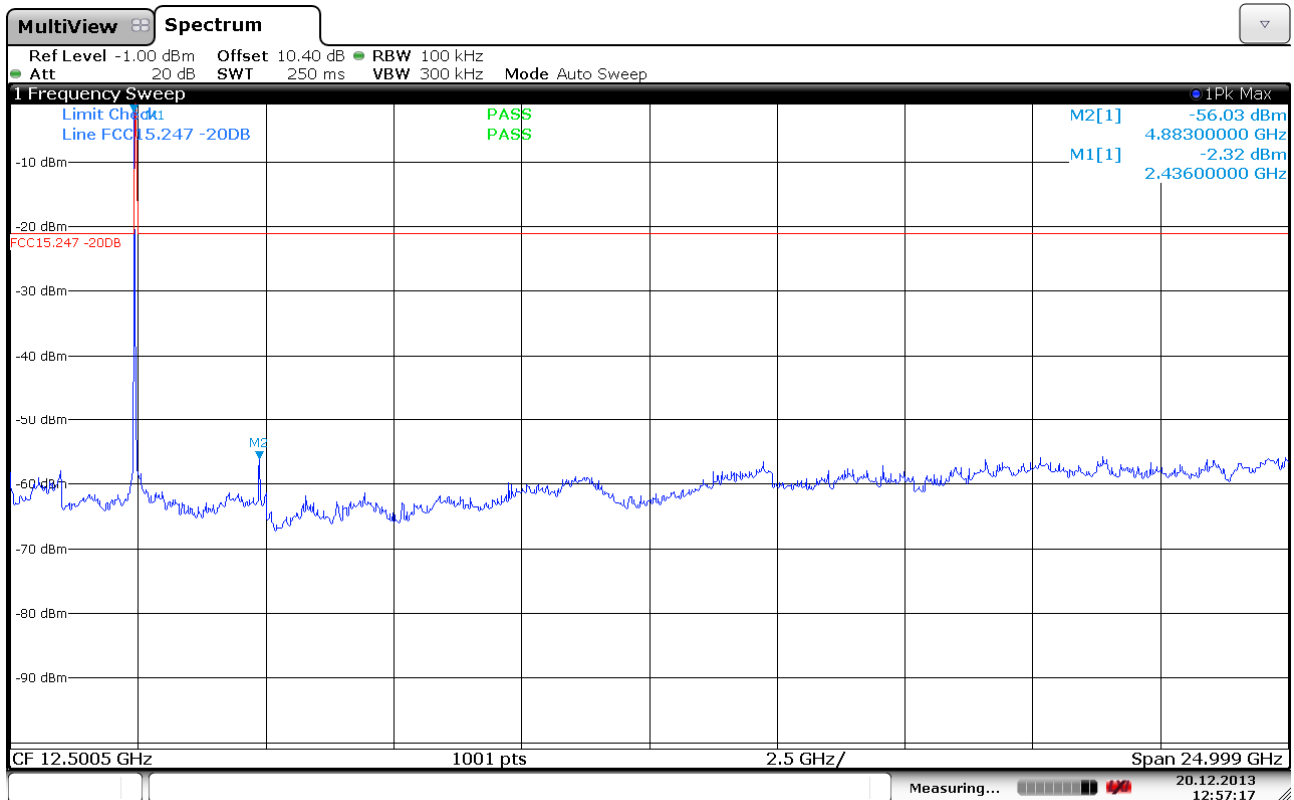
RF ch 11: >31 dB/C, margin >20 dB



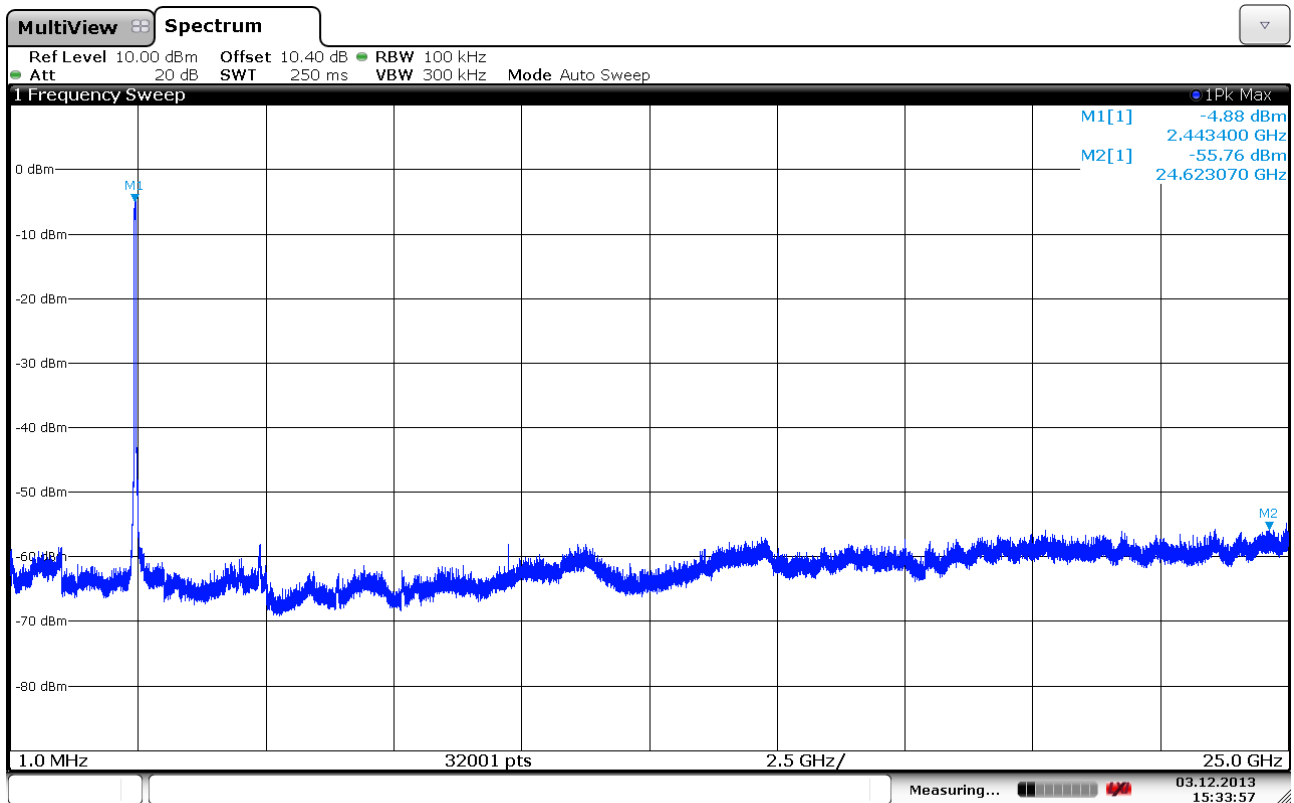
Conducted Emissions 1 MHz – 25 GHz, 2437 MHz, 802.11b, 1Mbps



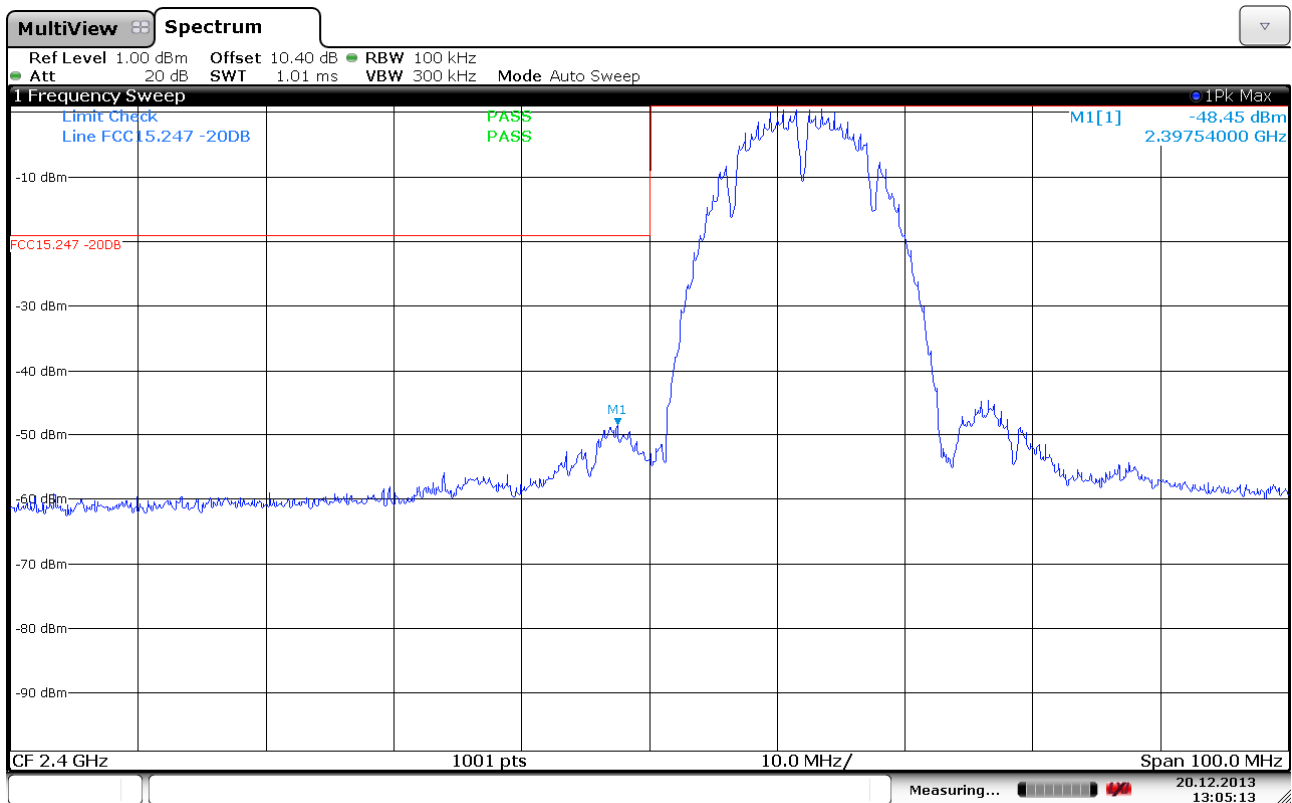
Conducted Emissions 1 MHz – 25 GHz, 2437 MHz, 802.11g, 6Mbps



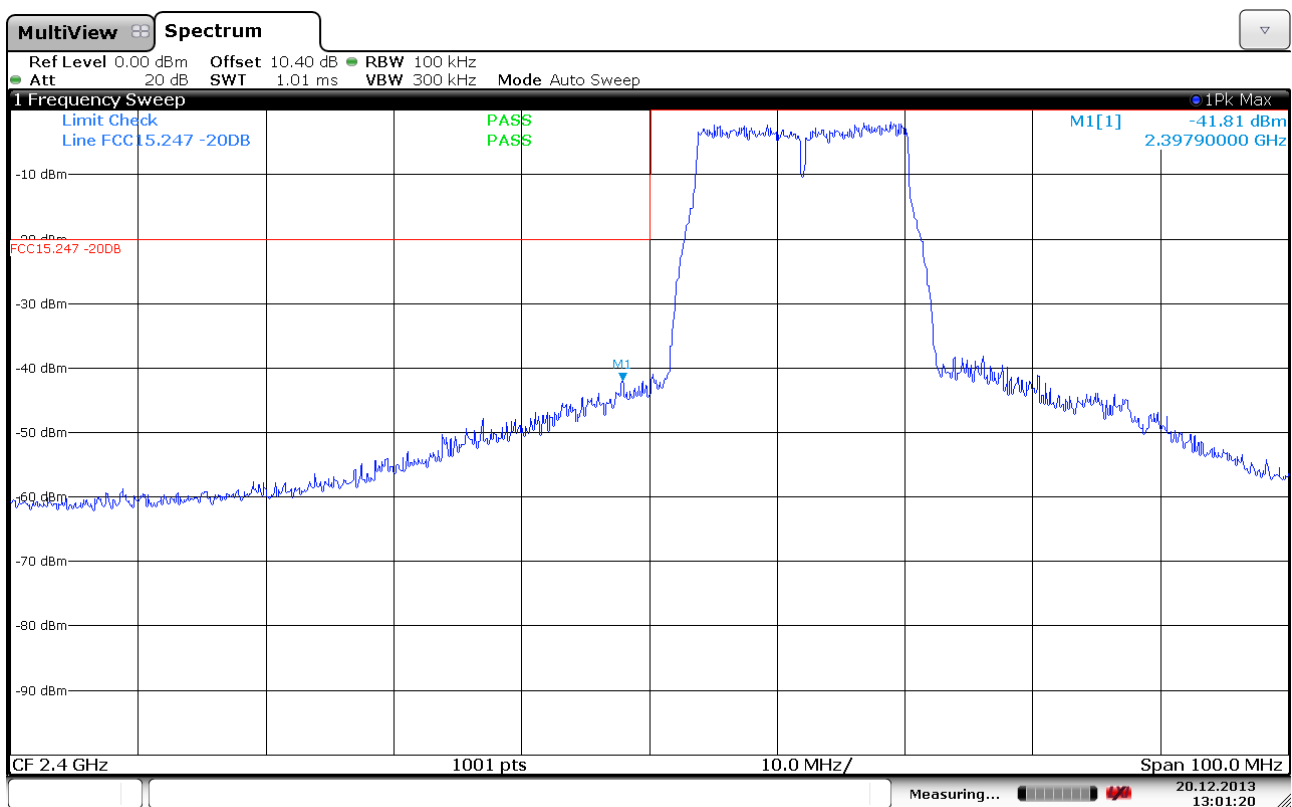
Conducted Emissions 1 MHz – 25 GHz, 2437 MHz, 802.11n, MCS0, 20MHz BW



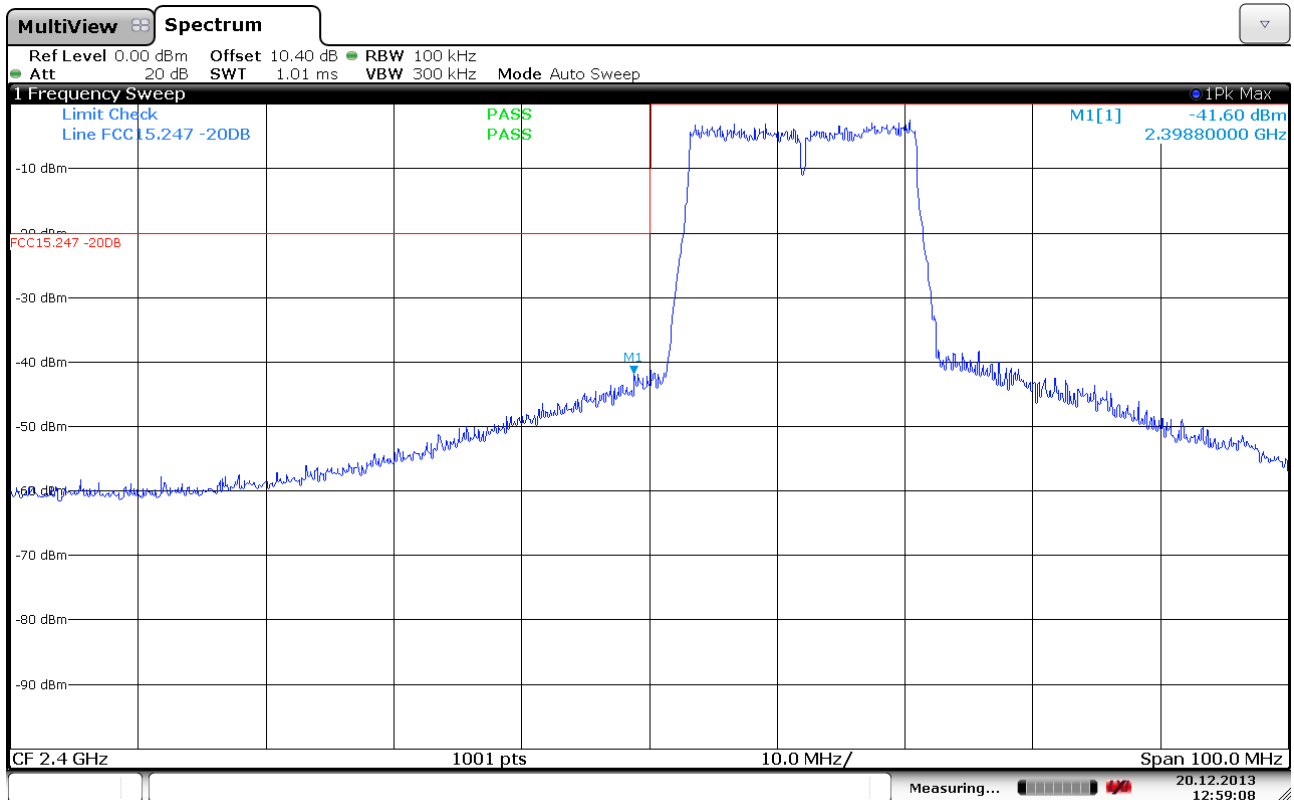
Conducted Emissions 1 MHz – 25 GHz, 2437 MHz, 802.11n, MCS7, 40MHz BW



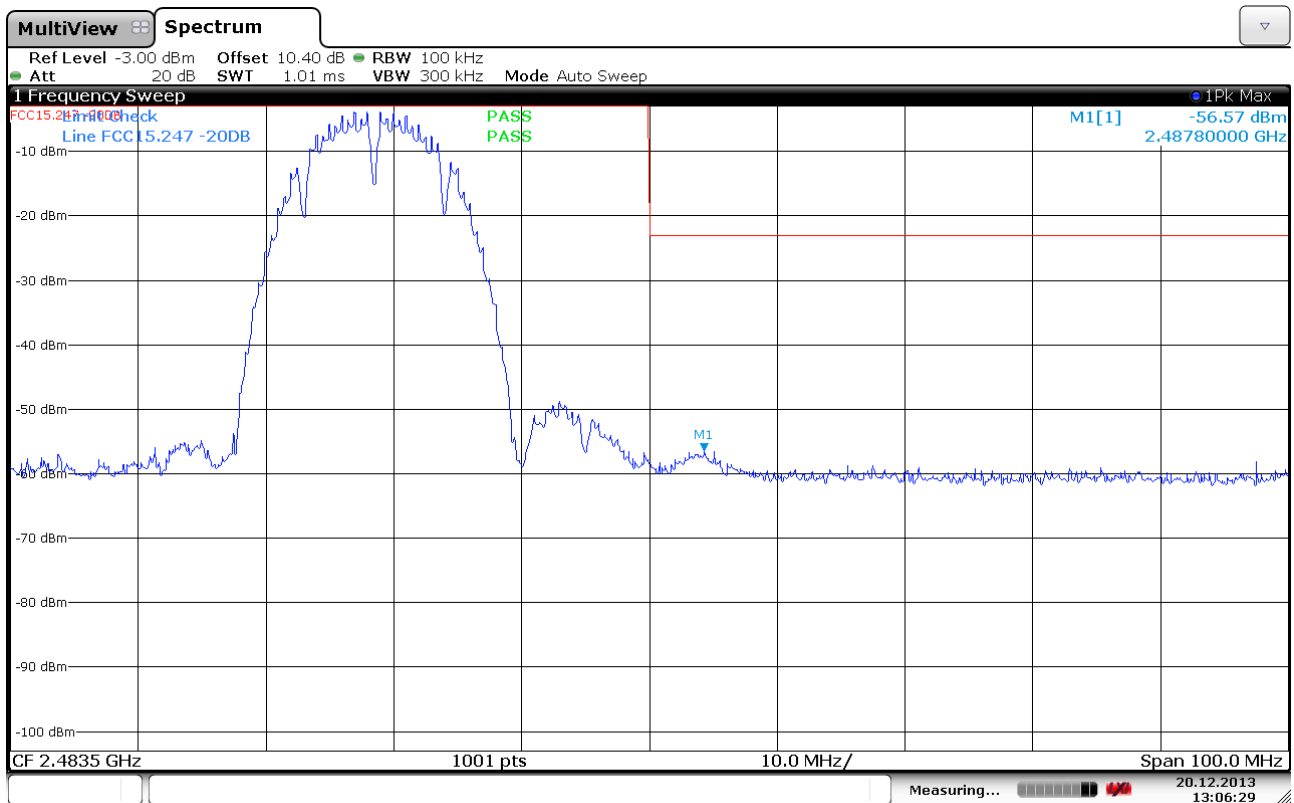
Lower Band Edge , Conducted, 2412 MHz, 802.11b, 1Mbps



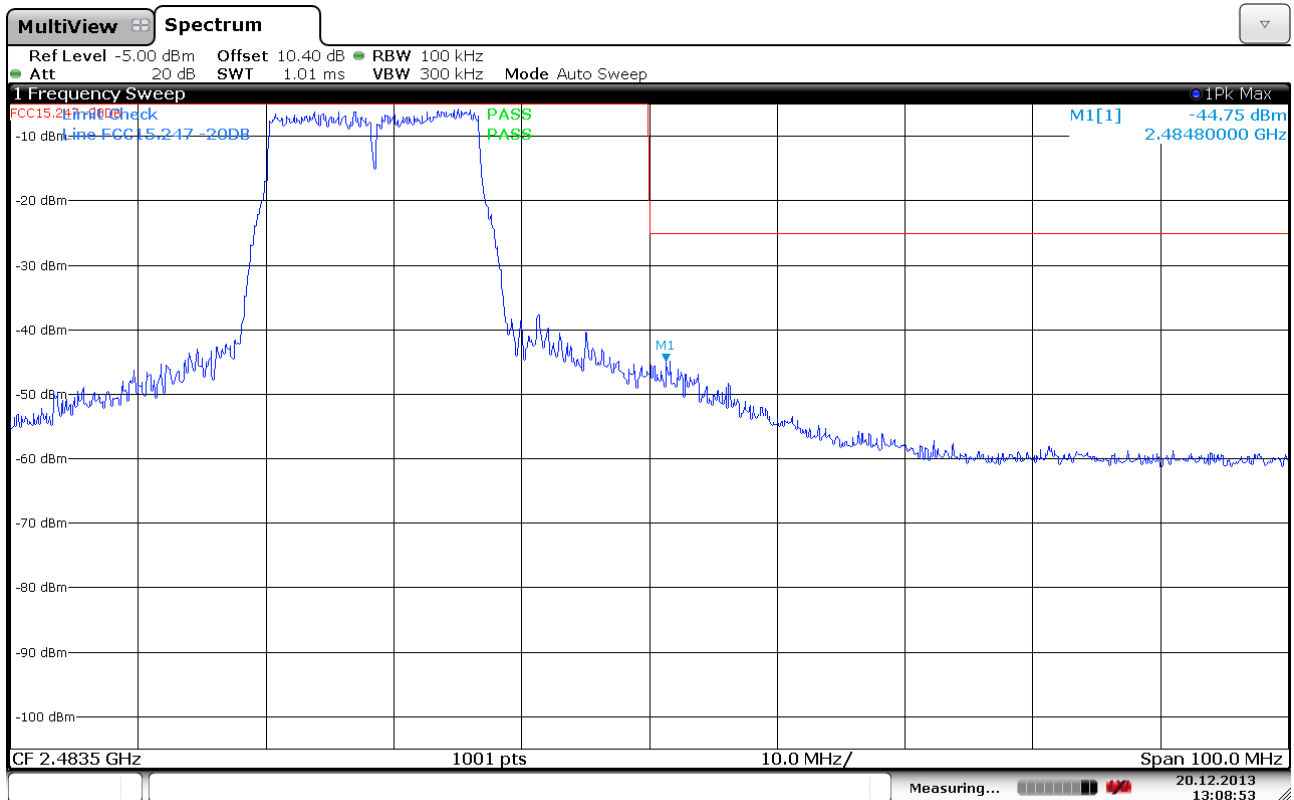
Lower Band Edge , Conducted, 2412 MHz, 802.11g, 6Mbps



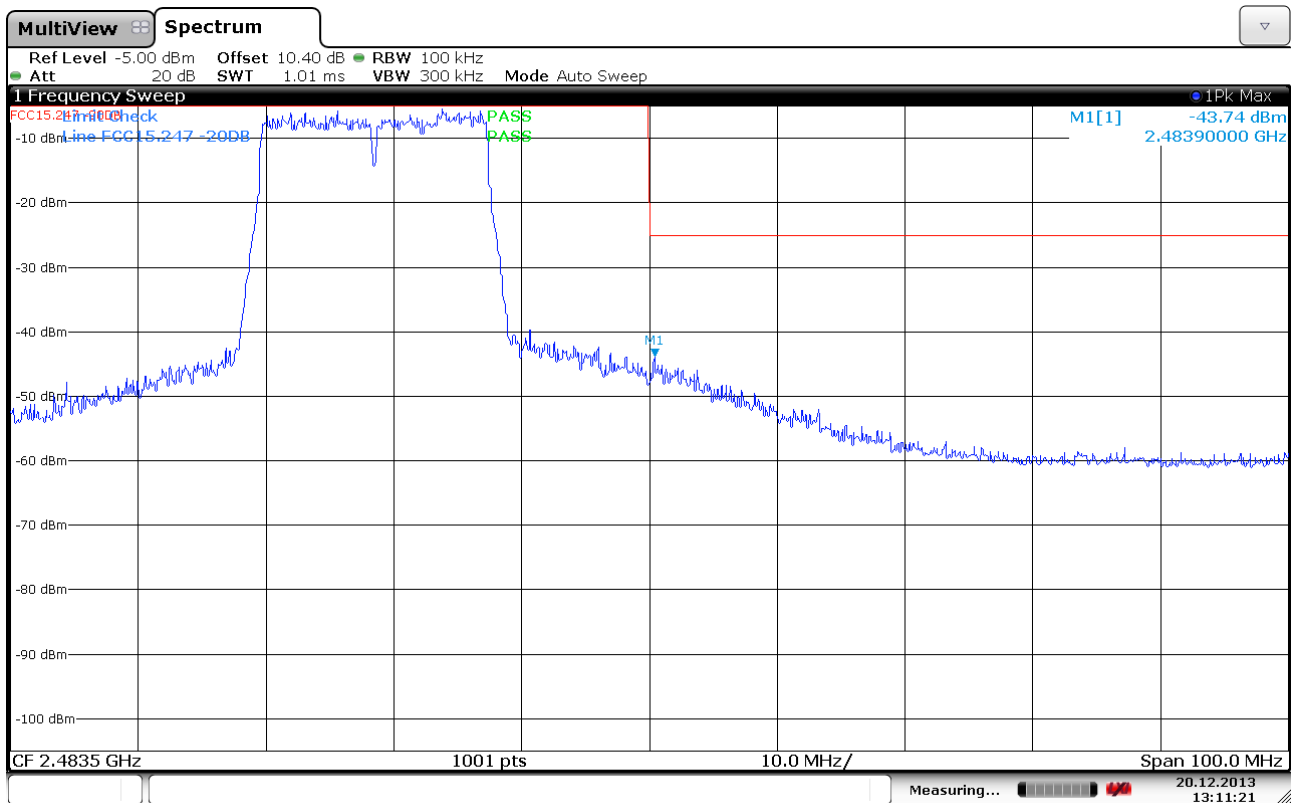
Lower Band Edge , Conducted, 2412 MHz, 802.11n, MCS0, 20MHz BW



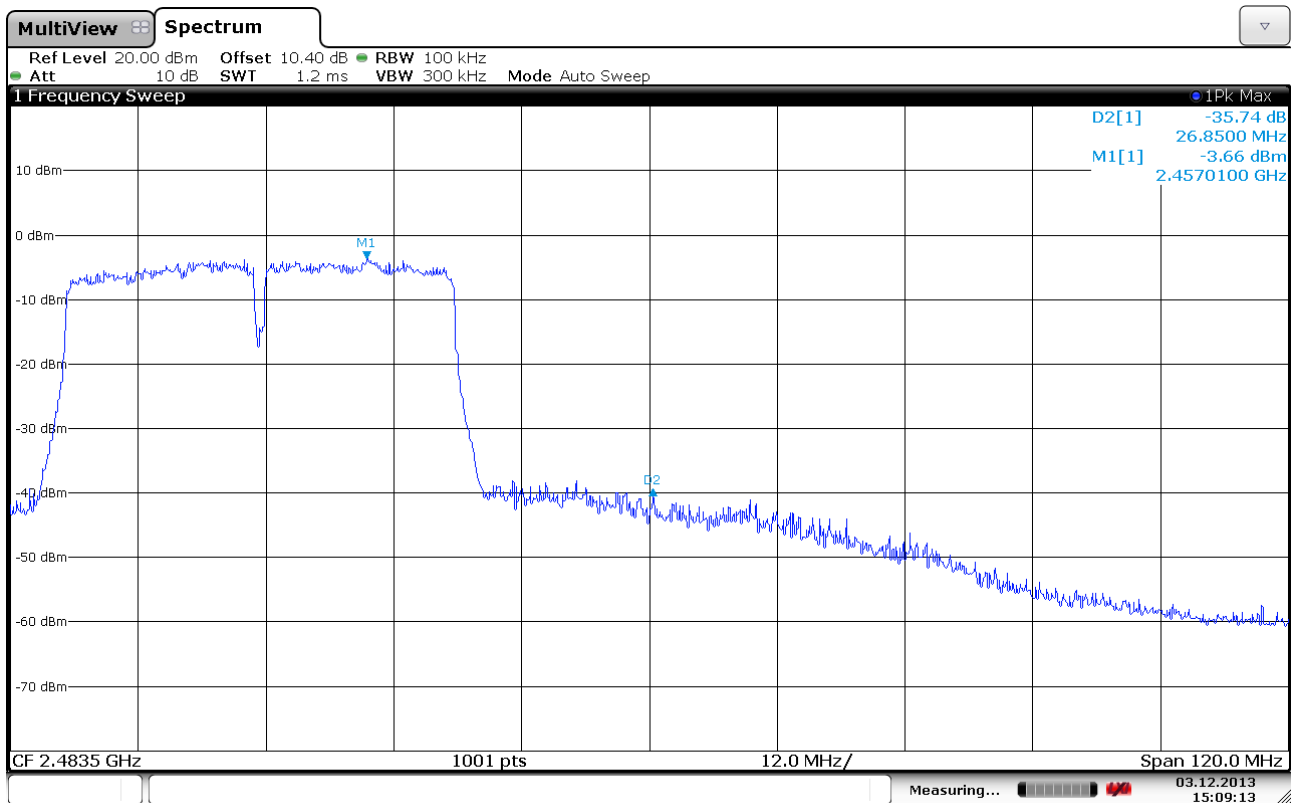
Upper Band Edge, Conducted, 2462 MHz, 802.11b, 1Mbps



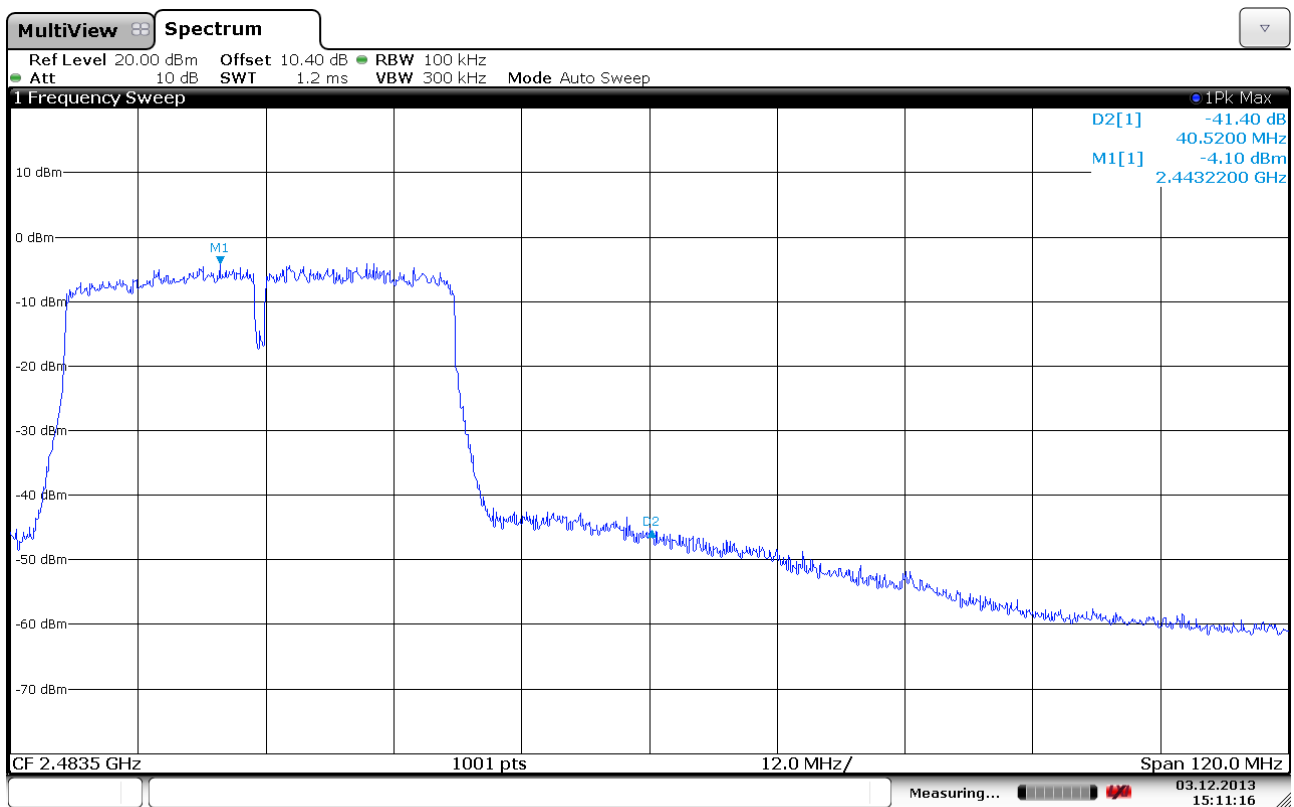
Upper Band Edge, Conducted, 2462 MHz, 802.11g, 6Mbps



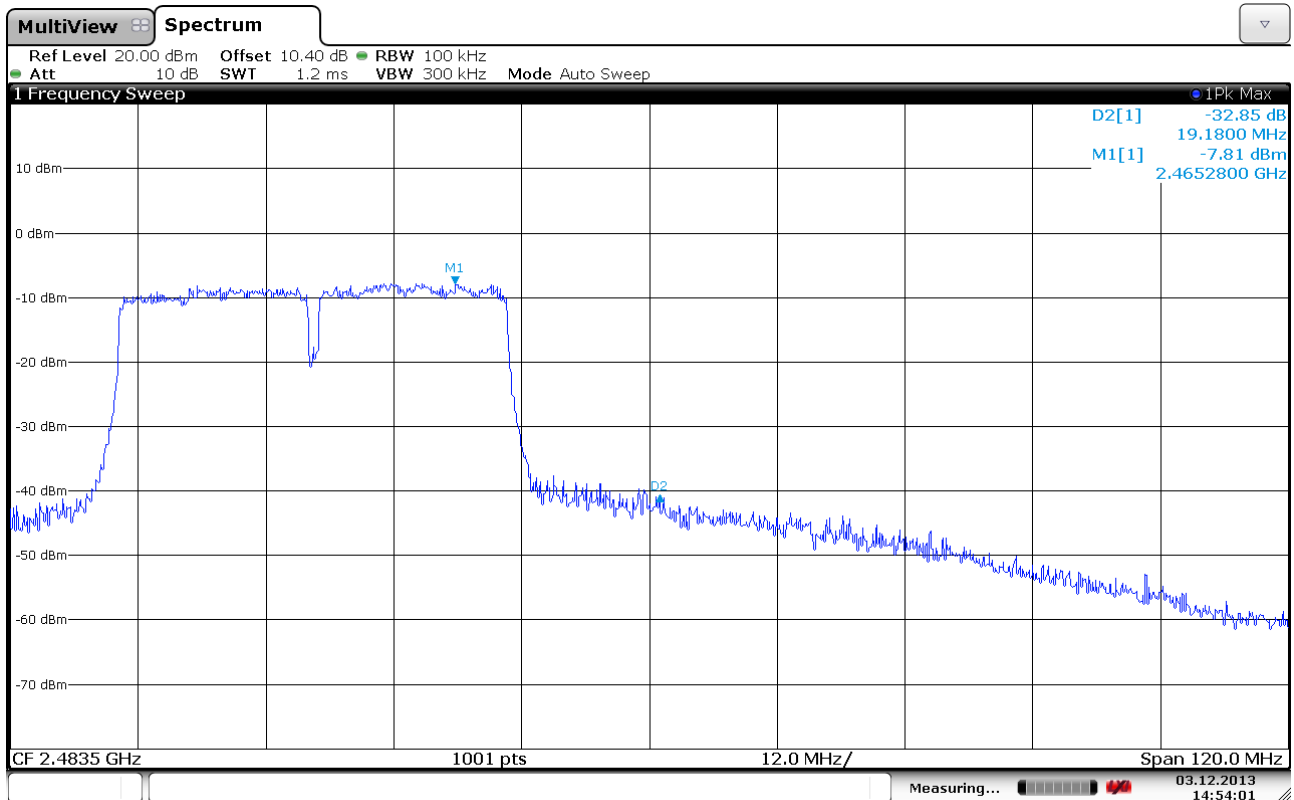
Upper Band Edge, Conducted, 2462 MHz, 802.11n, MCS0, 20MHz BW



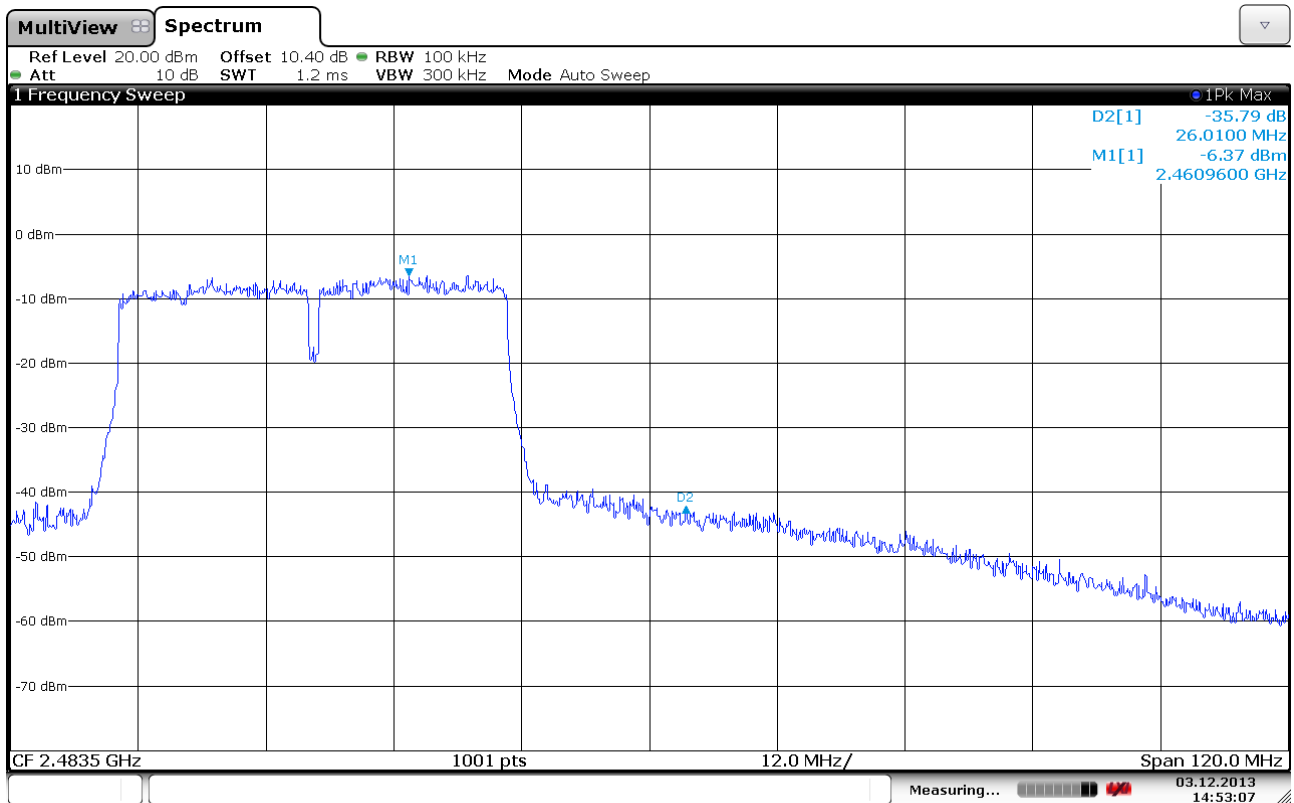
Upper Band Edge, Conducted, 2447 MHz, 802.11n, MCS0, 40MHz BW



Upper Band Edge, Conducted, 2447 MHz, 802.11n, MCS7, 40MHz BW



Upper Band Edge, Conducted, 2452 MHz, 802.11n, MCS0, 40MHz BW



Upper Band Edge, Conducted, 2452 MHz, 802.11n, MCS7, 40MHz BW

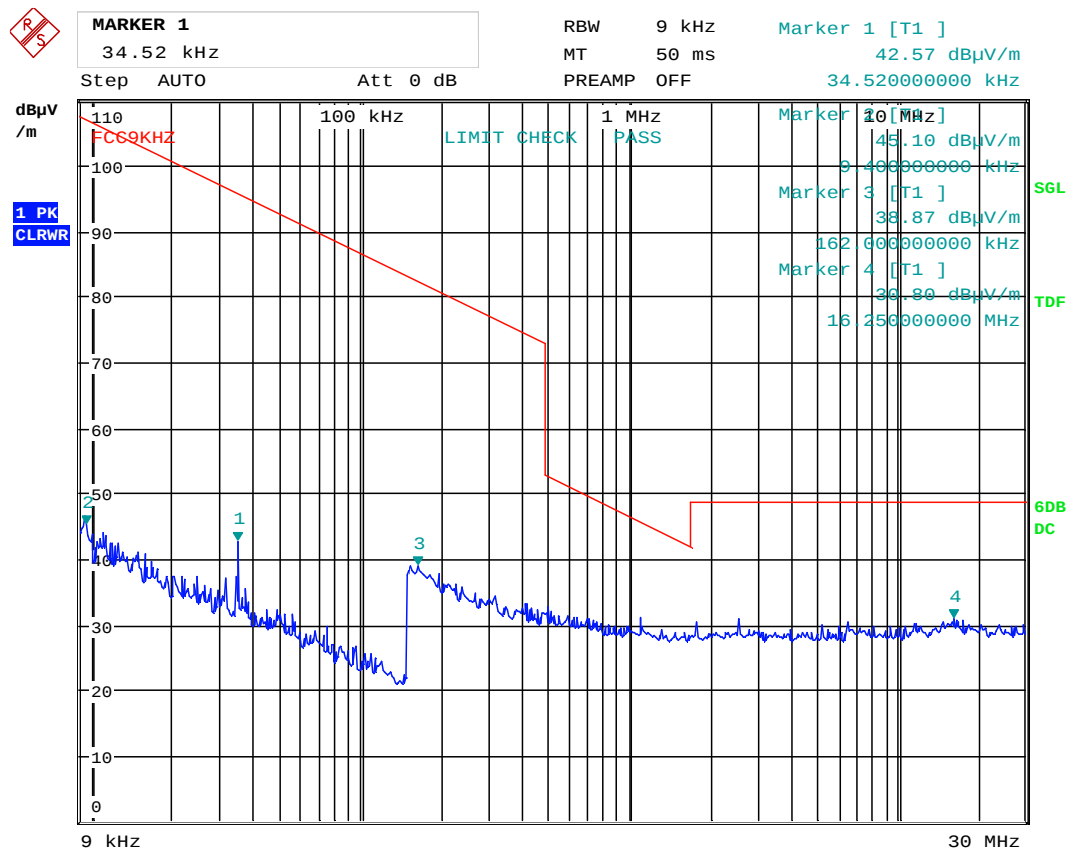
Radiated emissions 10 kHz-30 MHz.

Measuring distance 10 m, measured with Peak detector.

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

Frequency	Operational condition	Field strength	Measuring distance	Limit	Margin
				FCC15.209	
		dB μ V/m	metres	dB μ V/m	dB
34.5 kHz	TX on	42.57	10	96	53.43

See plot.



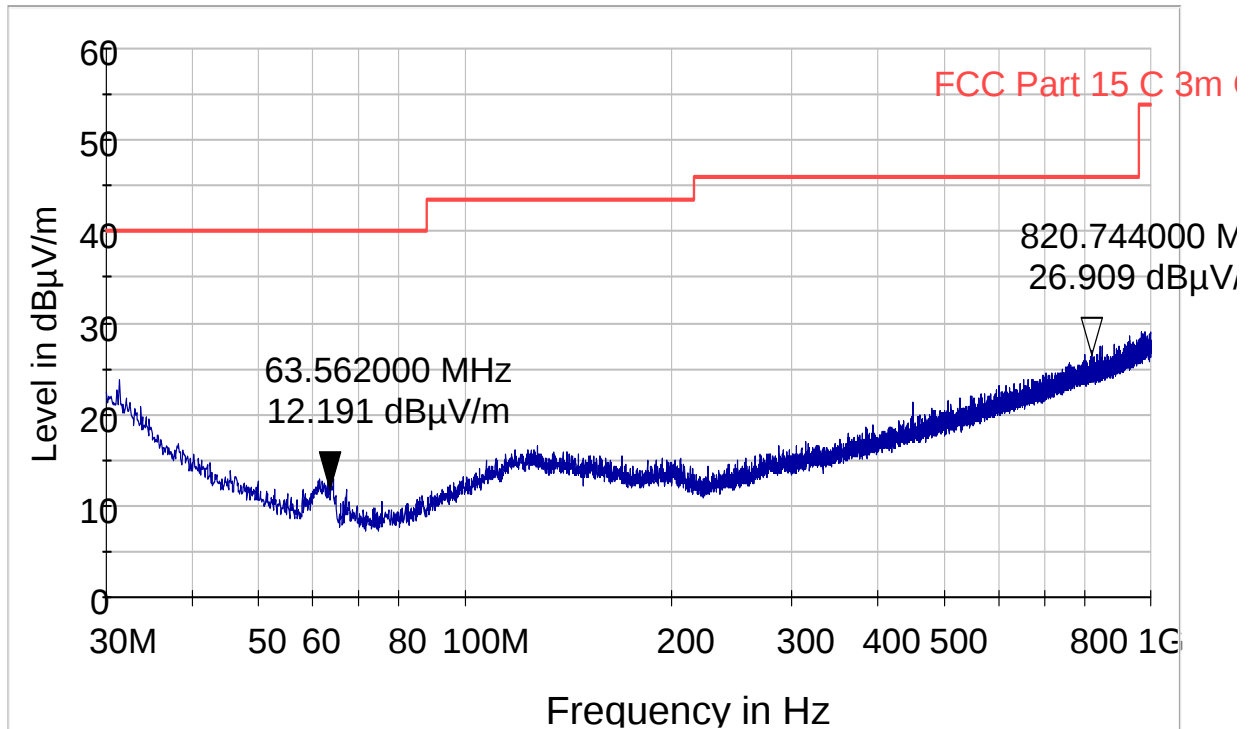
Date: 5.NOV.2013 13:42:41

Radiated emission 30 – 1000 MHz.

Detector: Quasi-Peak

Measuring distance 3 m.

All values are below the limit even when measured with Peak Detector, RBW=100kHz, VBW=300kHz.



Radiated Emissions, 30 -1000MHz, VP and HP @3m

Radiated Emissions, 1-25 GHz

Measuring distance: 3m (1 – 8.5 GHz)
1m (8.5 – 25 GHz)

Peak Detector:

Frequency	RF channel	Field strength, Peak Detector, 3m,1m	Limit	Margin
GHz	all	dB μ V/m	dB μ V/m	dB
All freqs	-	None detected	74	-

AV Detector:

Frequency	RF channel	Field strength, Peak Detector, 3m,1m	Limit	Margin
GHz	all	dB μ V/m	dB μ V/m	dB
All freqs	-	None detected	54	-

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

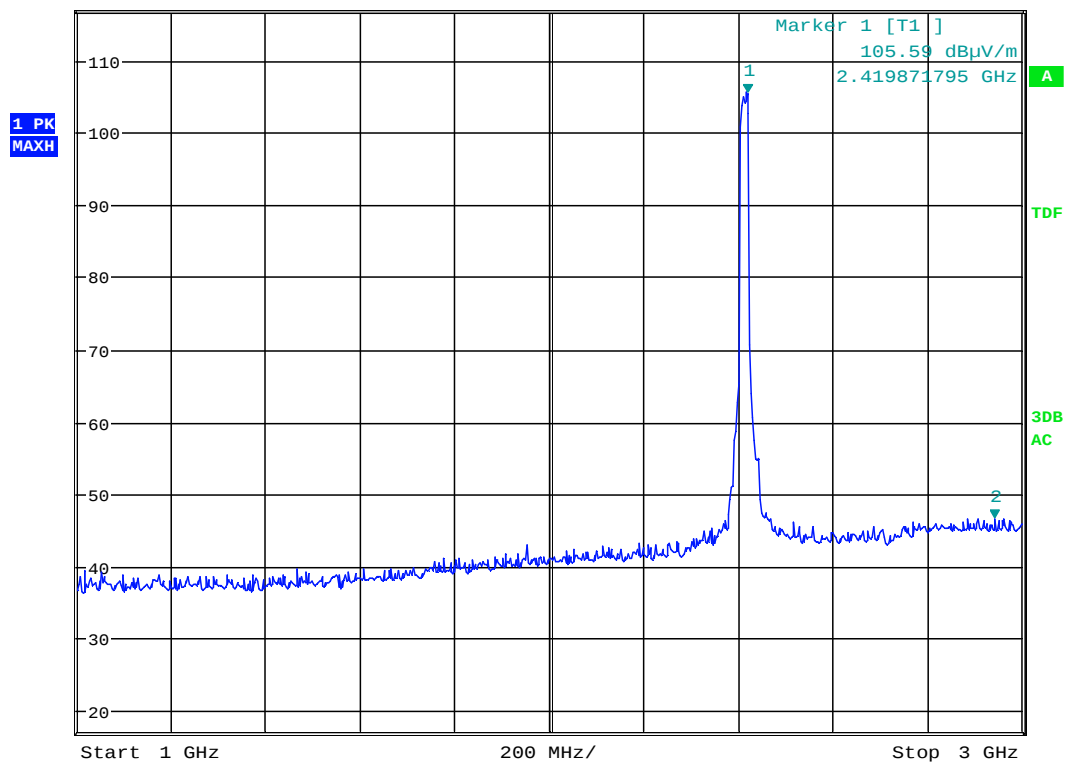
See plots.



MARKER 2
2.942307692 GHz
Ref 117 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 5 ms

Marker 2 [T1]
46.41 dBμV/m
2.942307692 GHz



Date: 5.NOV.2013 09:39:52

Radiated Emissions, 1000 -3000 MHz, VP, 802.11g, 54Mbps

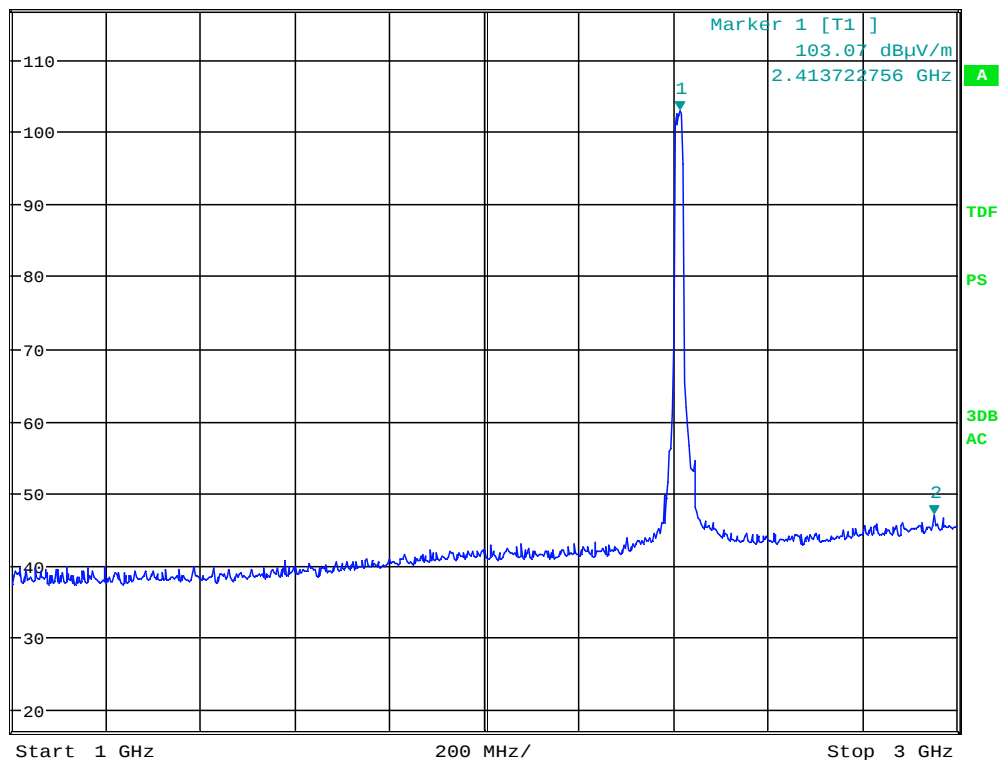


MARKER 2
2.951923077 GHz
Ref 117 dBμV/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 5 ms

Marker 2 [T1]
46.84 dBμV/m
2.951923077 GHz

1 PK
MAXH



Date: 5.NOV.2013 09:43:31

Radiated Emissions, 1000 -3000 MHz, HP, 802.11g, 54Mbps



MARKER 1

8.473557692 GHz

Ref 87 dBμV/m

* Att 10 dB

* RBW 1 MHz

VBW 3 MHz

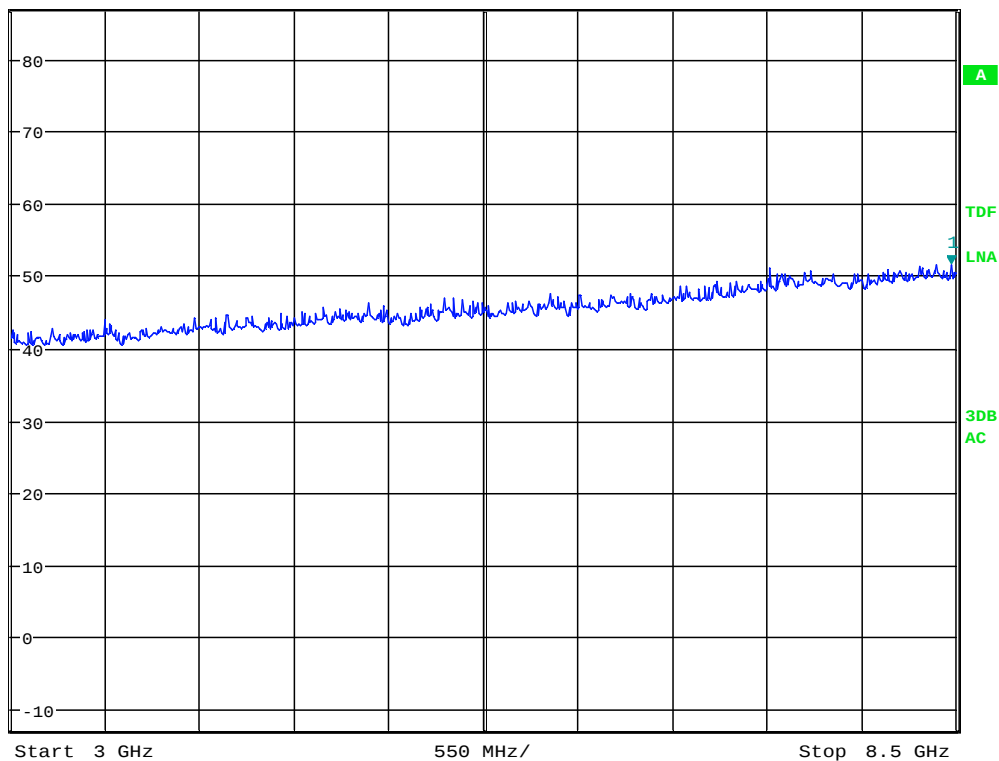
SWT 35 ms

Marker 1 [T1]

51.68 dBμV/m

8.473557692 GHz

1 PK
MAXH



Date: 5.NOV.2013 12:09:16

Radiated Emissions, 3000 -8500 MHz, VP, 802.11g, 54Mbps

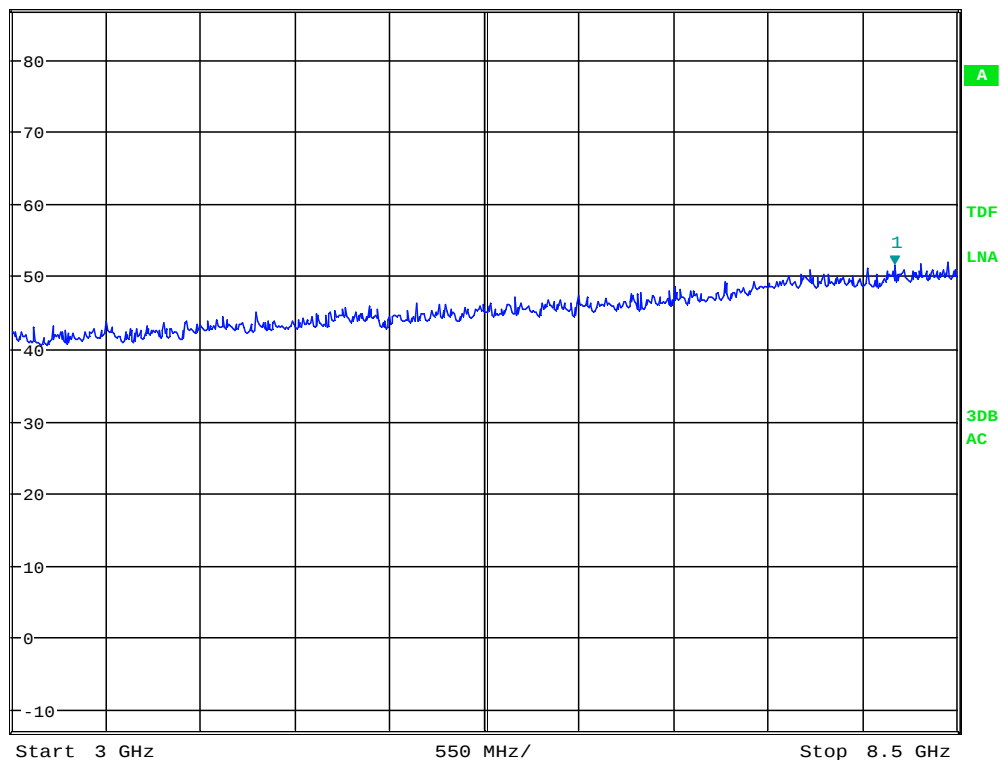


MARKER 1
8.138621795 GHz
Ref 87 dB μ V/m * Att 10 dB

* RBW 1 MHz
VBW 3 MHz
SWT 35 ms

Marker 1 [T1]
51.68 dB μ V/m
8.138621795 GHz

1 PK
MAXH



Date: 5.NOV.2013 12:10:01

Radiated Emissions, 3000 -8500 MHz, VP, 802.11g, 54Mbps



MARKER 1

11.64663462 GHz

Ref 72.5 dBμV

* Att 10 dB

* RBW 1 MHz

VBW 3 MHz

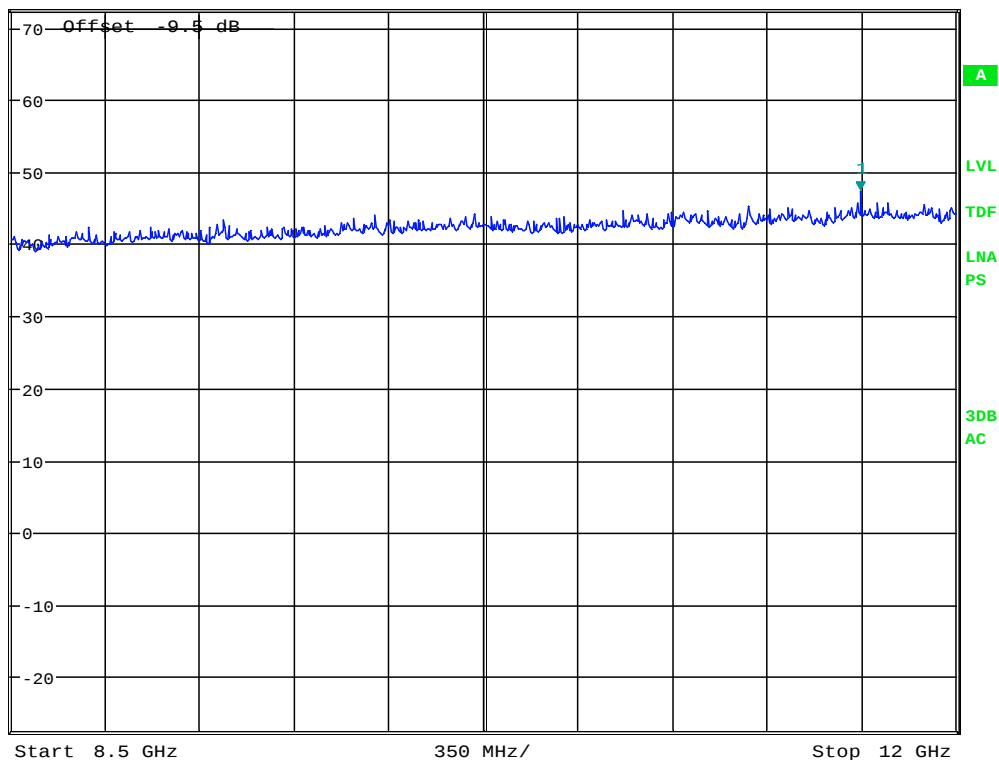
SWT 25 ms

Marker 1 [T1]

47.30 dBμV

11.646634615 GHz

1 PK
MAXH



Date: 5.NOV.2013 12:19:47

Radiated Emissions, 8.5 - 12GHz, VP, 802.11g, 54Mbps, @1m



MARKER 1

11.70272436 GHz

Ref 72.5 dBμV

* Att 10 dB

* RBW 1 MHz

VBW 3 MHz

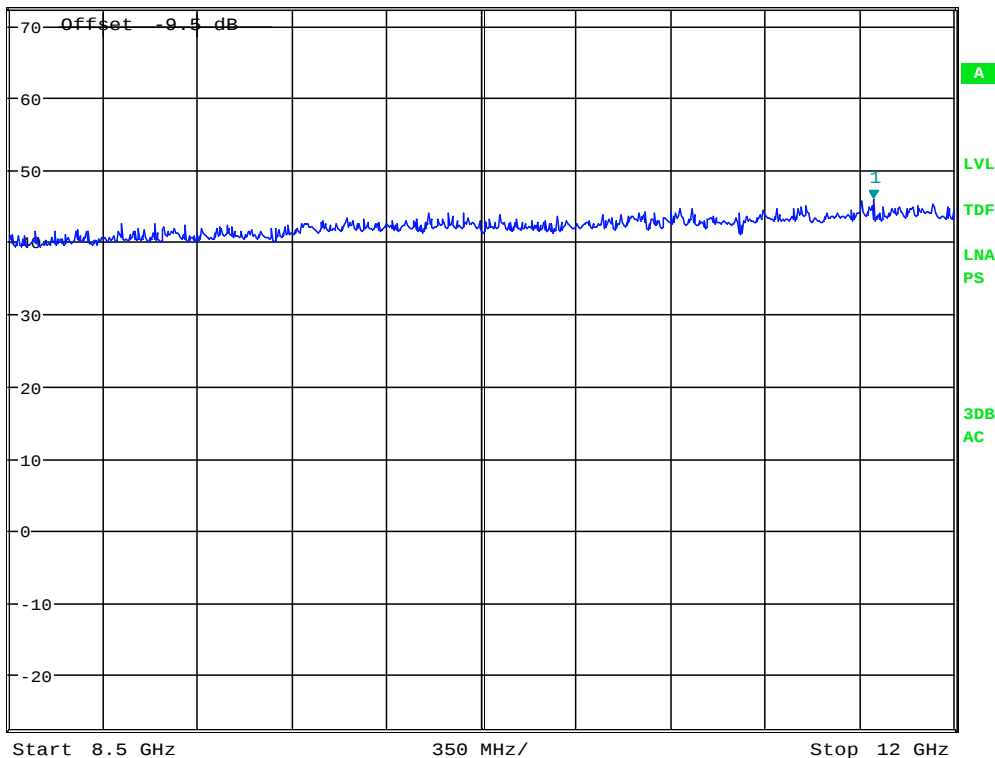
SWT 25 ms

Marker 1 [T1]

45.99 dBμV

11.702724359 GHz

1 PK
MAXH



Date: 5.NOV.2013 12:20:42

Radiated Emissions, 8.5 - 12GHz, HP, 802.11g, 54Mbps, @1m



MARKER 1

17.80769231 GHz

Ref 72.5 dBμV

* Att 10 dB

* RBW 1 MHz

VBW 3 MHz

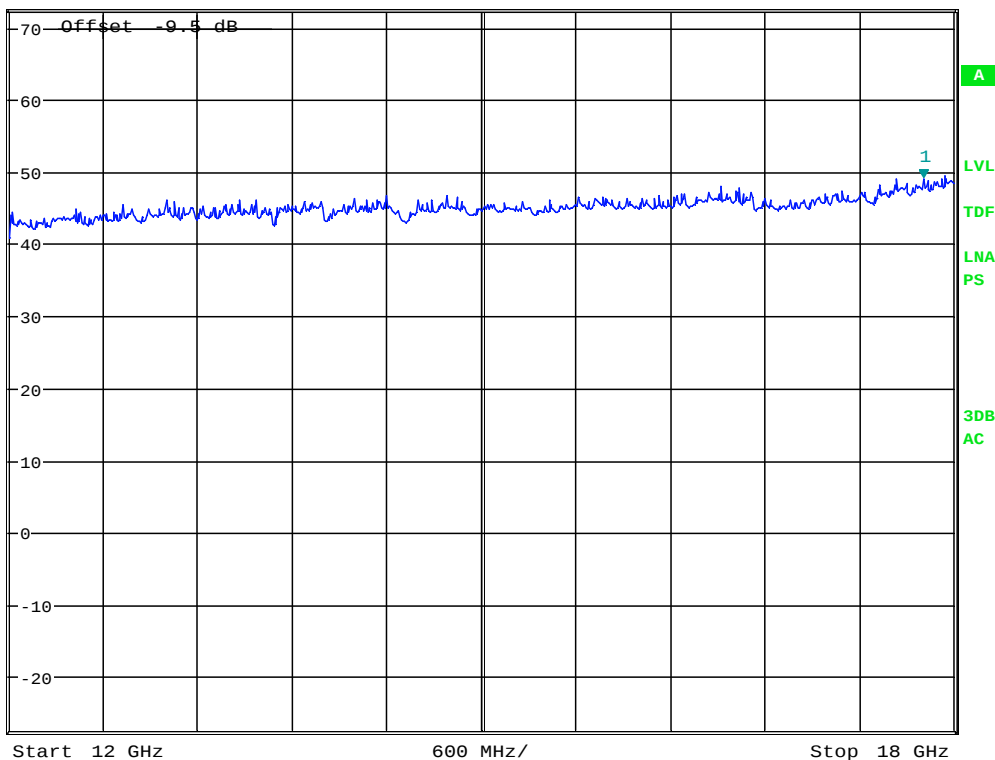
SWT 35 ms

Marker 1 [T1]

49.04 dBμV

17.807692308 GHz

1 PK
MAXH



Date: 5.NOV.2013 12:23:10

Radiated Emissions, 12 - 18GHz, VP, 802.11g, 54Mbps, @1m



MARKER 1

17.96153846 GHz

Ref 72.5 dBμV

* Att 10 dB

* RBW 1 MHz

VBW 3 MHz

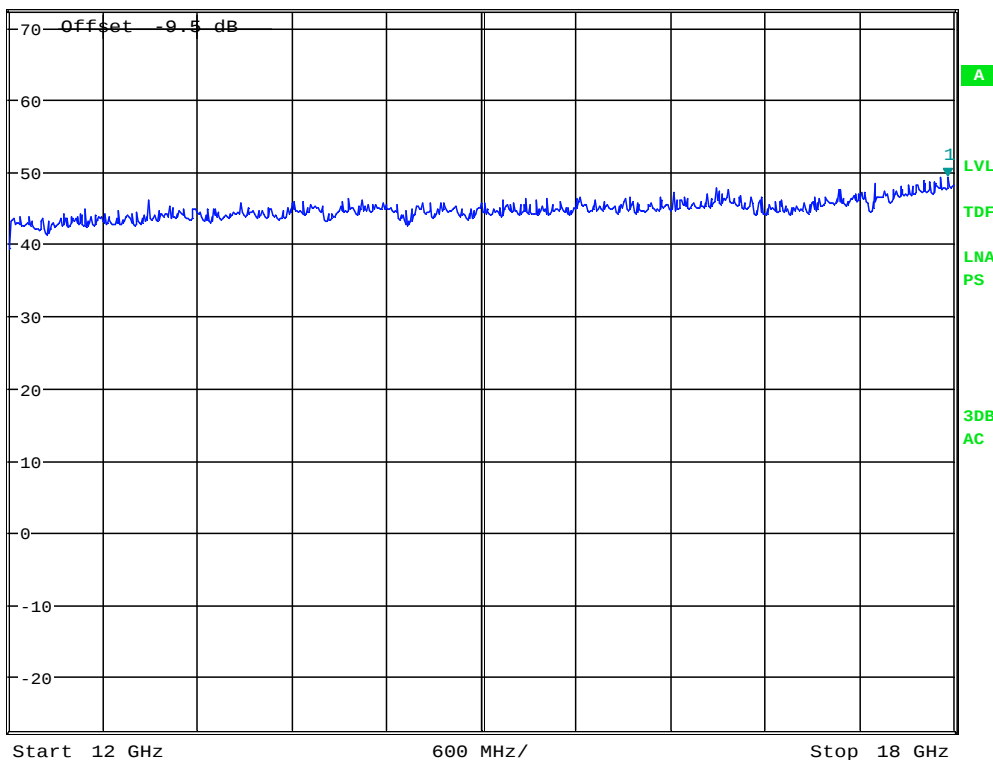
SWT 35 ms

Marker 1 [T1]

49.21 dBμV

17.961538462 GHz

1 PK
MAXH



Date: 5.NOV.2013 12:23:38

Radiated Emissions, 12 - 18GHz, HP, 802.11g, 54Mbps, @1m



MARKER 1

24.27083333 GHz

Ref 72.5 dBμV/m

* Att 10 dB

* RBW 1 MHz

VBW 3 MHz

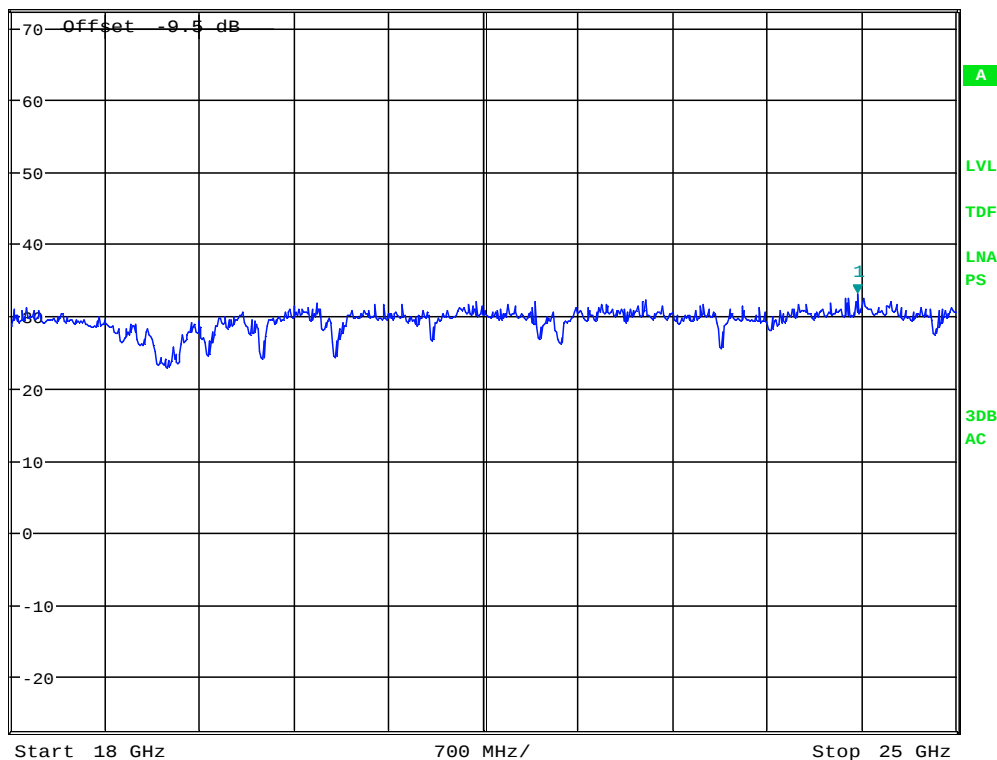
SWT 45 ms

Marker 1 [T1]

33.17 dBμV/m

24.27083333 GHz

1 PK
MAXH



Date: 5.NOV.2013 12:28:24

Pre-scan, 18 - 25GHz, 802.11g, 6Mbps

3.8 Power Spectral Density (PSD)

Para. No.: 15.247 (d)

Test Performed By: G.Suwanthakumar

Date of Test: 12.Nov 2013

Test Results: Passed

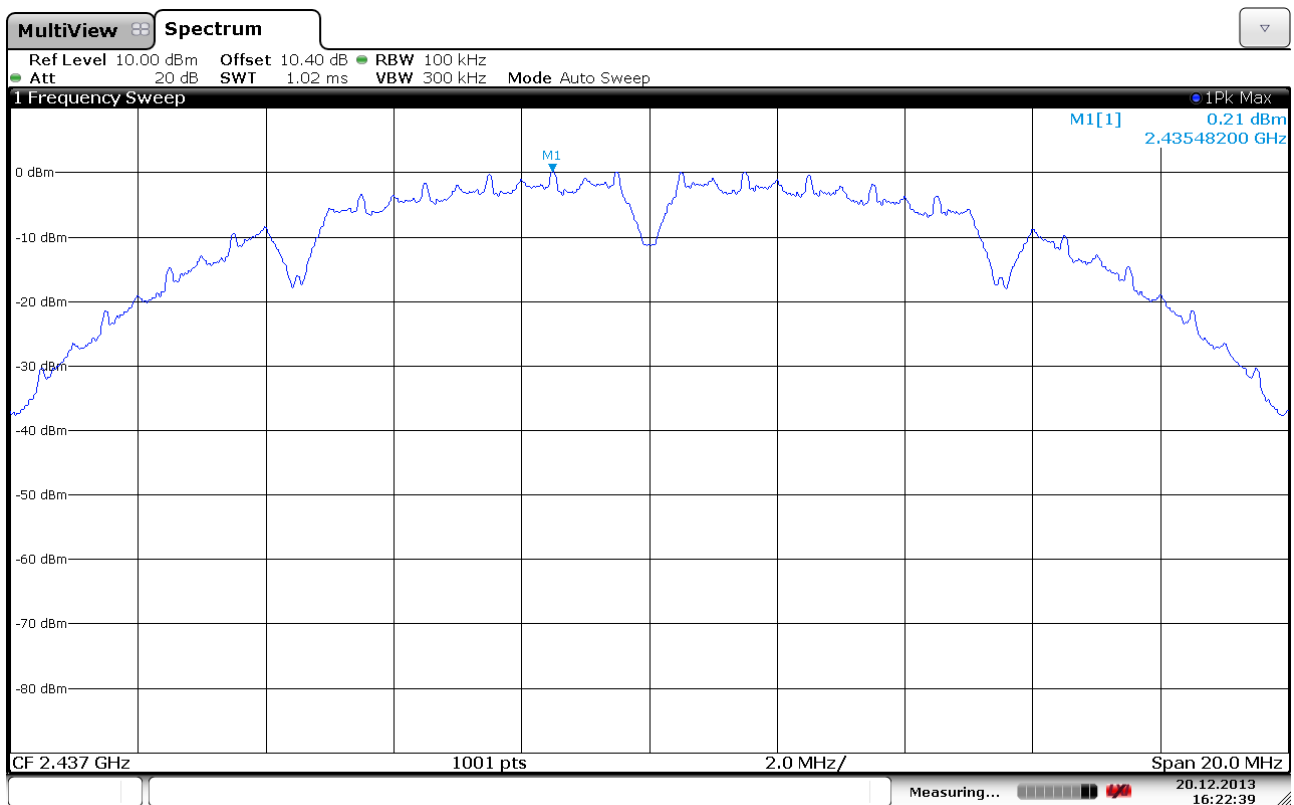
Measured and Calculated Data:

Carrier Frequency (MHz)	Power Spectral Density (dBm)			
	802.11b, 11Mbps	802.11g, 54Mbps	802.11n, MCS7, 20MHz BW	802.11n, MCS7, 40MHz BW
2437	1.6	-0.5	-1.0	-4.3

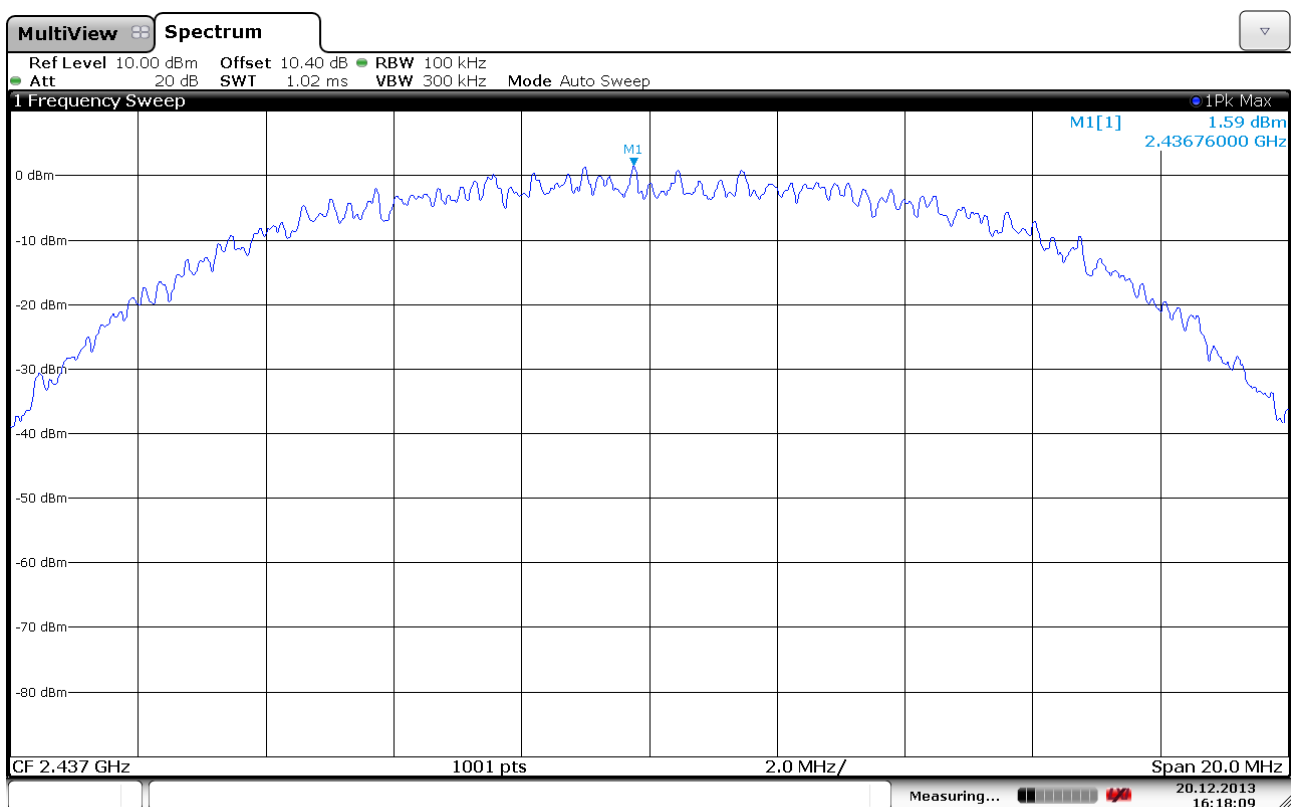
Tested according to KDB 558074 D01 DTS Meas Guidance v03r01, Section 10.2.

Requirements:

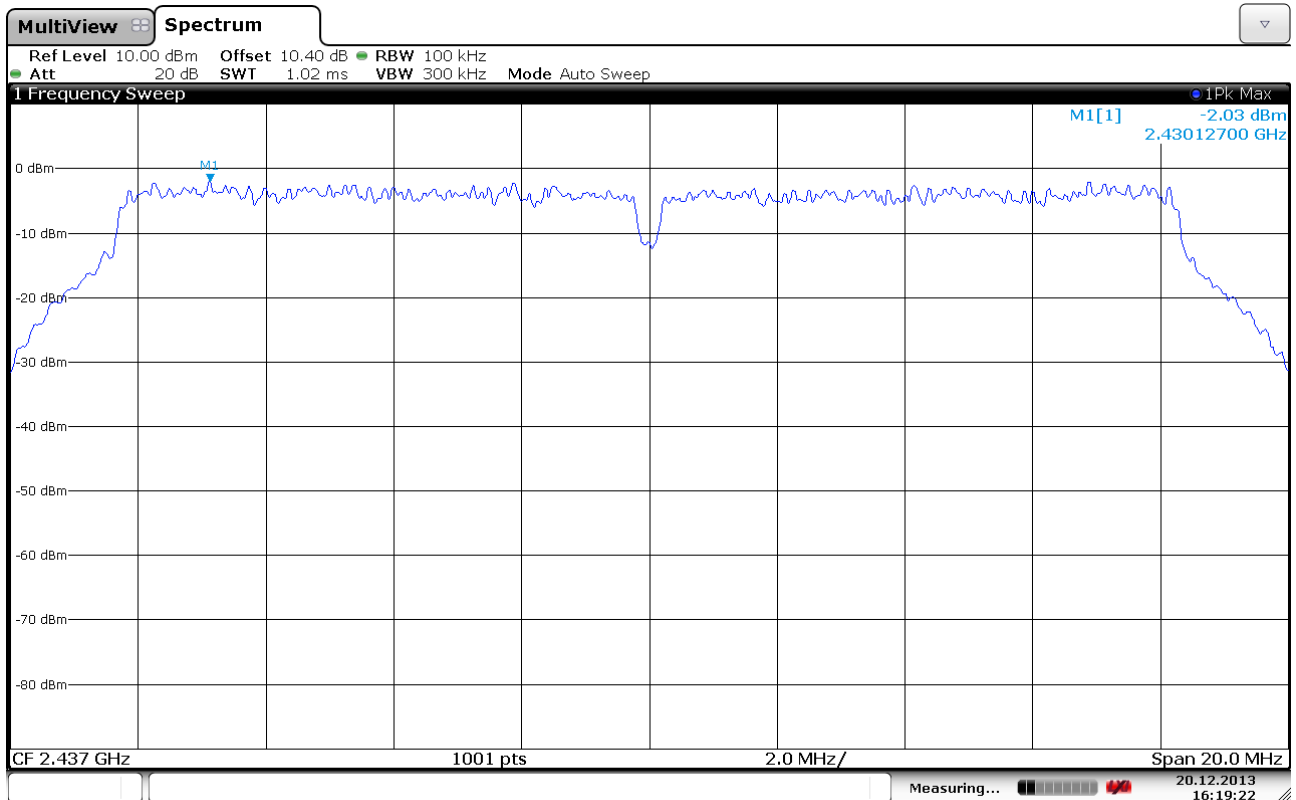
The Power Spectral Density of a Digital Transmission System shall be no greater than +8 dBm in any 3 kHz band



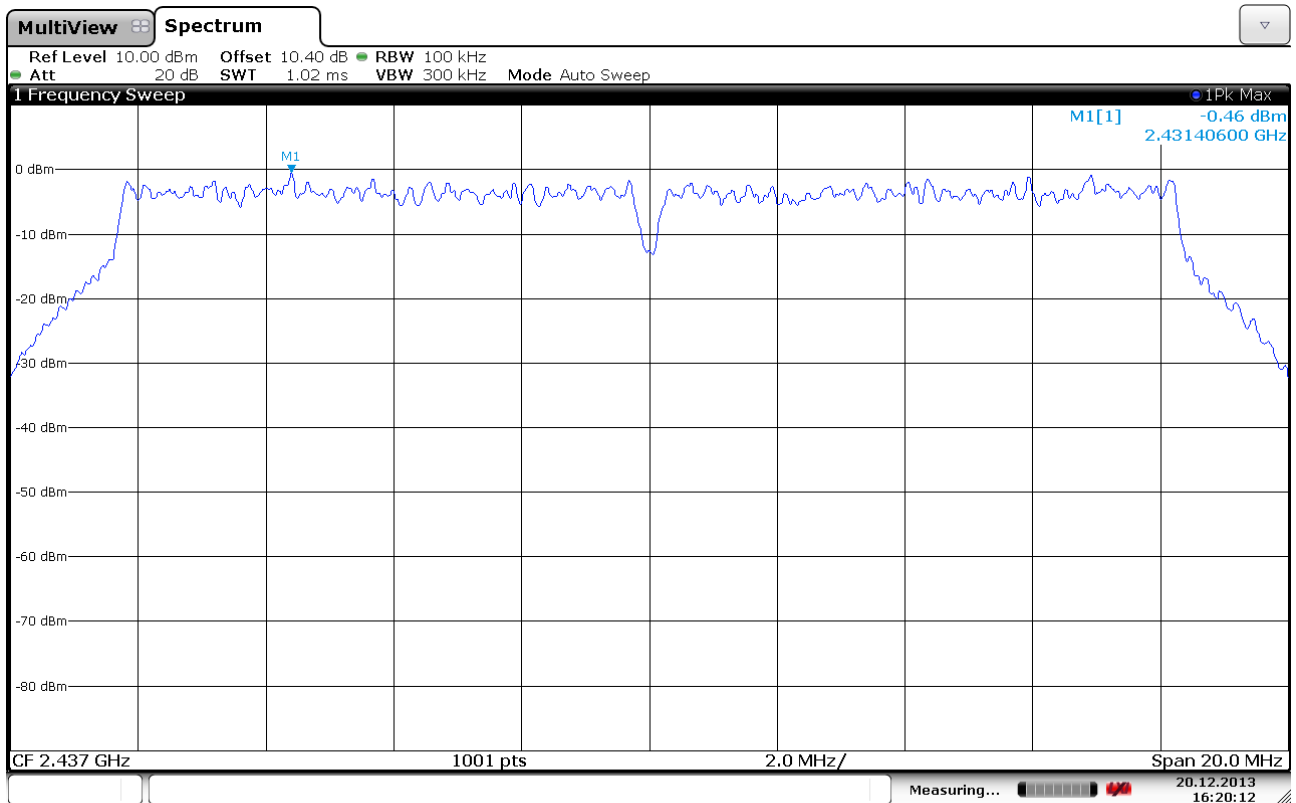
PSD, 2437 MHz, 802.11b, 1Mbps



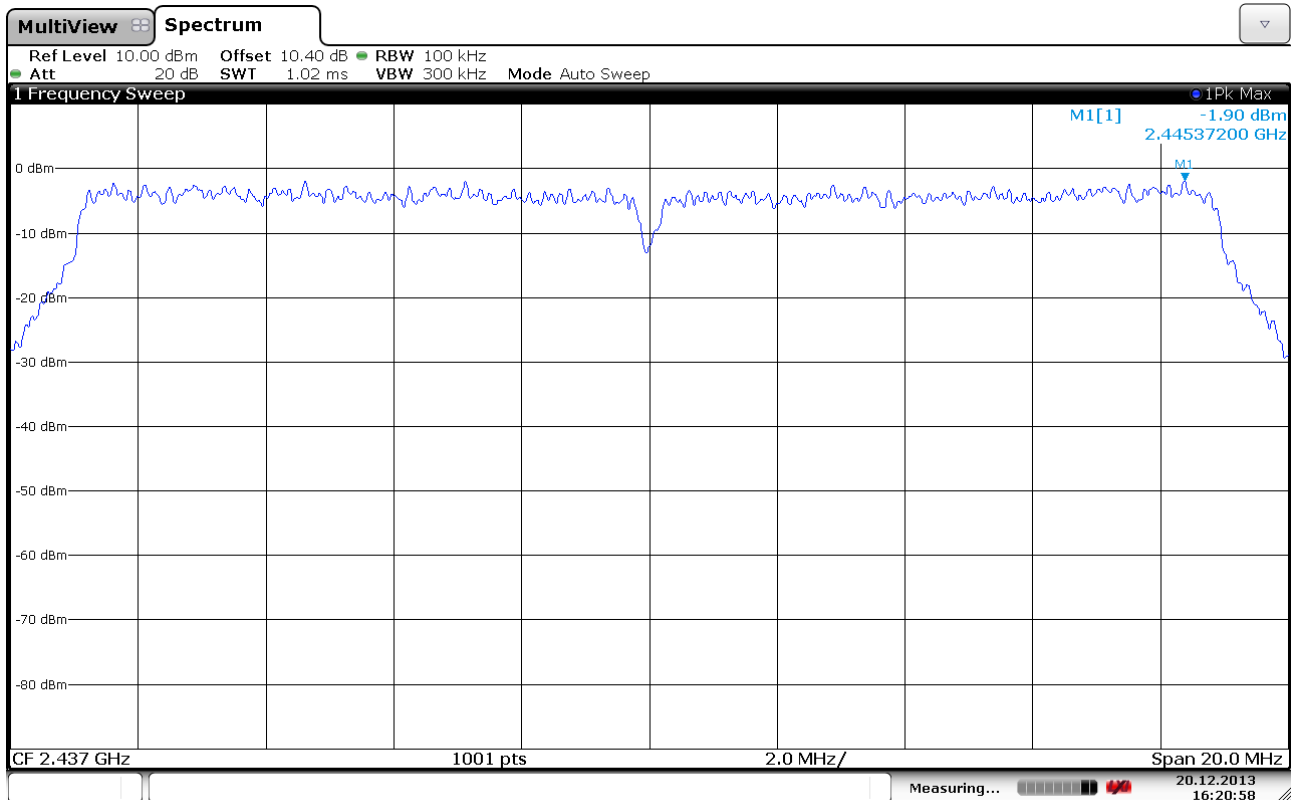
PSD, 2437 MHz, 802.11b, 11Mbps



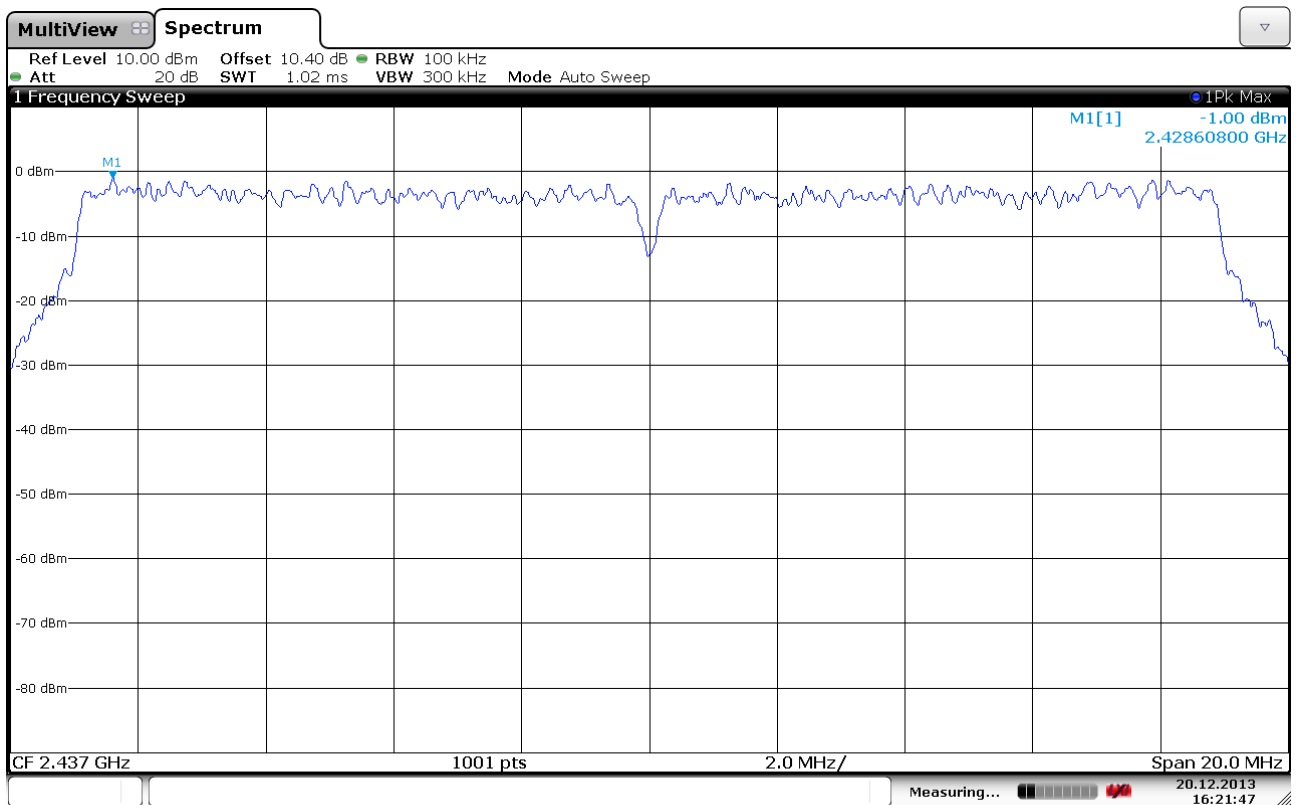
PSD, 2437 MHz, 802.11g, 6Mbps



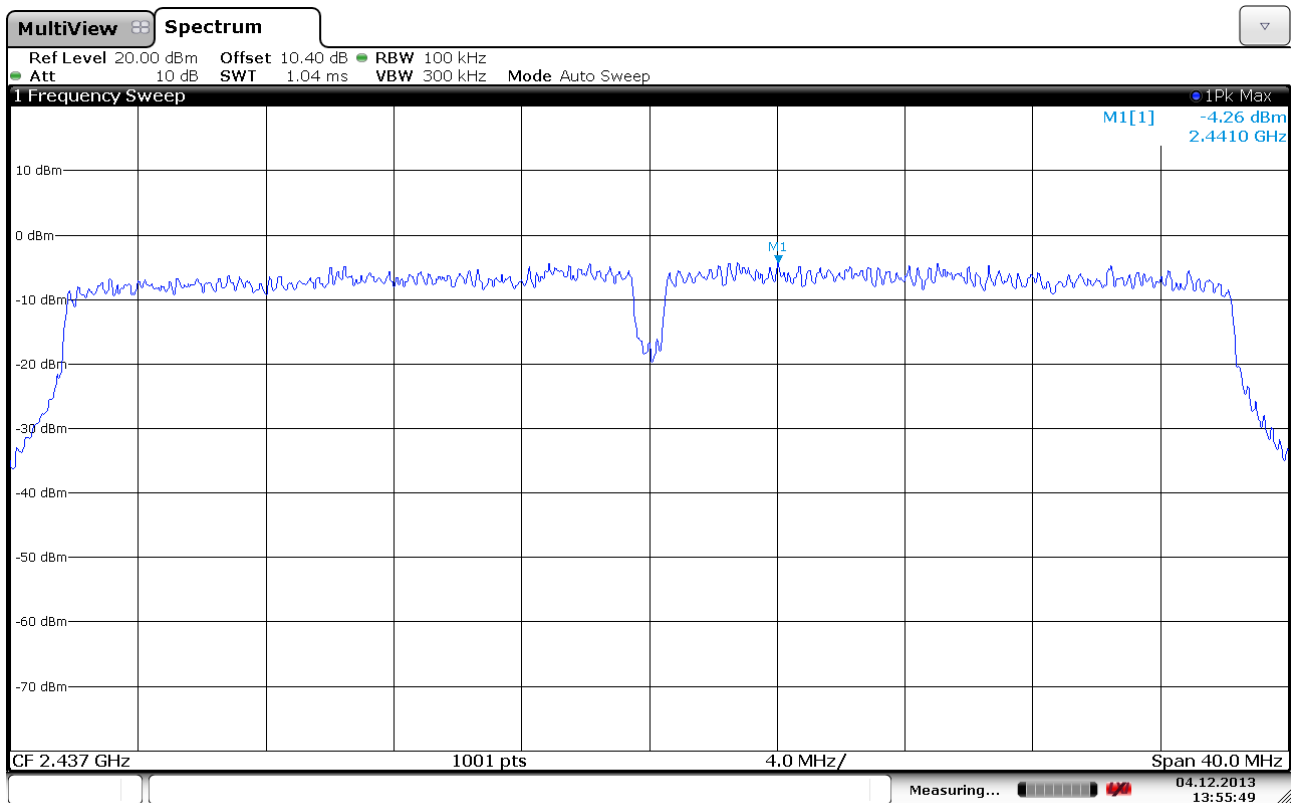
PSD, 2437 MHz, 802.11g, 54Mbps



PSD, 2437 MHz, 802.11n, MCS0, 20MHz BW



PSD, 2437 MHz, 802.11n, MCS7, 20MHz BW



PSD, 2437 MHz, 802.11n, MCS7, 40MHz BW

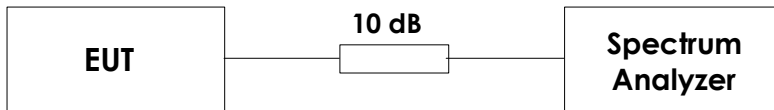
4 LIST OF TEST EQUIPMENT

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.	Model number	Description	Manufacturer	Ref. no.	Cal. date	Cal. Due
1	ESU40	Spectrum Analyzer	Rohde & Schwarz	LR 1639	2013.09.24	2014.09.24
2	4768-10	Attenuator	Narda	LR1647	2013.06	2014.06
3	ESHS10	EMI receiver	Rohde & Schwarz	N3528	2013.09.09	2014.09.09
4	ESH3-Z5	Two Line V-Network	Rohde & Schwarz	LR 1076	Cal b4 use	
5	80S	Signal Generator	Powertron	LT 502	Cal b4 use	
6	6812B	AC Power Source	Agilent	LR 1515	2013.10.28	2014.10.28
7	ESH3-Z2	Pulse Limiter	Rohde & Schwarz	LR 1074	2012.04.24	2014.04.24
8	ESCI	Measuring Receiver	Rohde & Schwarz	N-4259	2013.03.21	2015.03.21
9	JB3	BiLog Antenna	Sunol Sciences	N-4525	2011.09.07	2014.09.07
10	LNA6900	Preamplifier	Teseq	LR 1593	Cal b4 use	
11	3115	Horn Antenna	EMCO	LR 1330	2010.08.05	2015.08.05
12	8449B	Pre-amplifier	Hewlett Packard	LR 1322	2013.09	2014.09
13	HFH2-Z2	Loop Antenna	Rohde & Schwarz	LR 285	2010.11	2015.11
14	PM7320X	Antenna horn	Siverts lab	LR 103	2009.01.26	2014.01.26
15	DBF-520-20	Antenna horn	Systron Donner	LR 101	2009.01.26	2014.01.26
16	638	Antenna horn	Narda	LR 1480	2010.06.17	2015.06.17
18	Model 87 V	Multimeter	Fluke	LR 1599	2012.10.29	2014.10.29
19	6HC3000/18000	Highpass Filter	Trilithic	LR 1614	Cal b4 use	
20	FSW26	Spectrum Analyzer	Rohde & Schwarz	LR 1640	2013.08.30	2014.08.30
21	NRP-Z81	Wideband Power Sensor	Rohde & Schwarz	LR 1644	2013.04.05	2014.04.05

BLOCK DIAGRAM

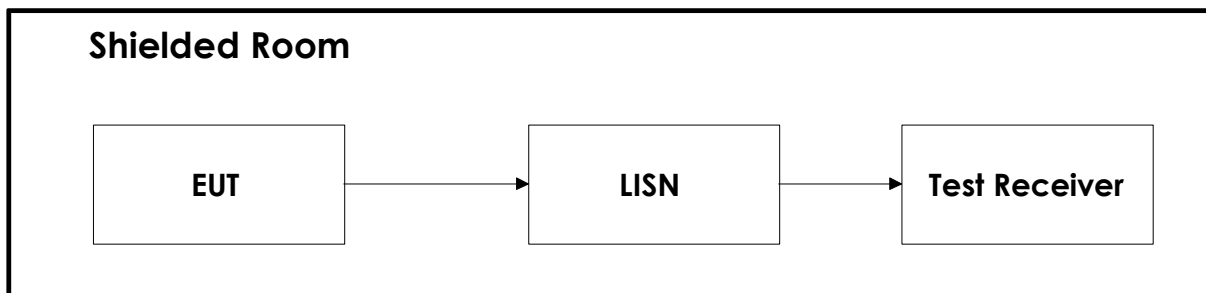
4.1 Conducted Tests



Test equipment included: 1, 2, 20, 21

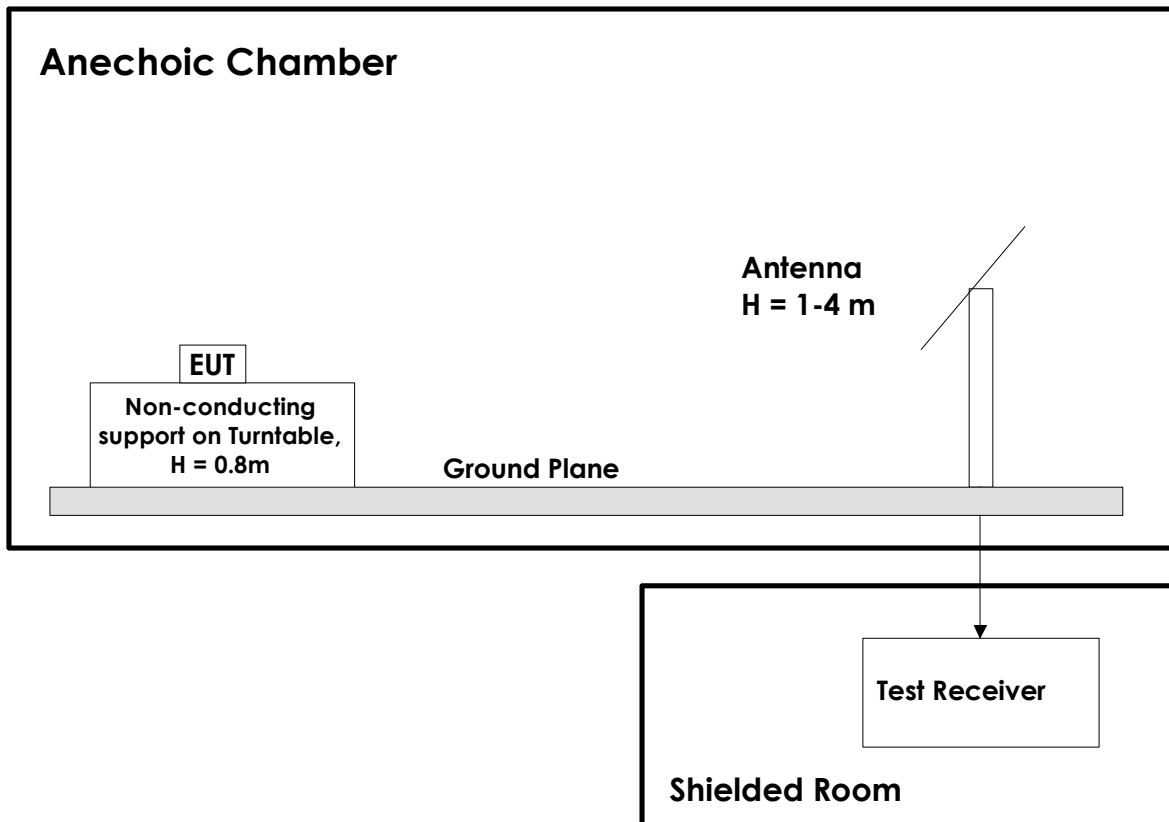
4.2 This setup is used for all measurements on 50 ohm antenna connector.

4.3 Power Line Conducted Emission



Test equipment: 3, 4, 6, 7, 18, 19

4.4 Test Site Radiated Emission



Test equipment: 1, 9, 10, 11, 12, 13, 14, 15, 16, 18

This test setup is used for all radiated emissions tests. For frequencies below 30 MHz the measuring distance is 10 m, for all other frequencies it is 3m or 1m. Emissions above 1 GHz were measured with a Spectrum Analyzer and Horn Antenna and with the preamplifier after the antenna. For measurements above 18 GHz the test receiver is moved inside the anechoic chamber and located next to the antenna to minimize the cable loss.