Report No. 339941-1

Test Report

Product	Digital Video Codec with WLAN and Bluetooth
Name and address of the applicant	Cisco Systems, Inc. 170 West Tasman Drive San Jose, CA 95134, USA
Name and address of the manufacturer	Cisco Systems, Inc. 170 West Tasman Drive San Jose, CA 95134, USA
Model	TTC6-13
Rating	Mains (100-240V 50/60 Hz)
Trademark	Cisco
Serial number	/
Additional information	Bluetooth, WLAN 2x2 802.11a/b/g/n/ac
Tested according to	**FCC Part 15.247** Digital Transmission Systems **Industry Canada RSS-247, Issue 2** Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
Order number	339941
Tested in period	2018.05.04 to 2018.06.08
Issue date	2018.06.25
Name and address of the testing laboratory	Nemko Instituttveien 6 Kjeller, Norway SITE NUMBER: FCC: NO0001 IC: 2040D-1 ilac-MRA NORWEGIAN ACCREDITATION TEST 033 **An accredited technical test executed under the Norwegian accreditation scheme**

Prepared by [Frode Sveinsen]	Approved by [G.Suhanthakumar]

Template version: C

CONTENTS

1 INFORMATION

1.1 Test Item

Name	Cisco
Model/version	TTC6-13
FCC ID	LDK06131817
Industry Canada ID	2461N-06131817
Serial number	/
Hardware identity and/or version	Rev. C
Software identity and/or version	CE 9.3.0
Frequency Range	2412 – 2472 MHz
Number of Channels	11
Operating Modes	802.11b 802.11g 802.11n (HT20) (HT40 mode is disabled)
Type of Modulation	Digital (DSSS, OFDM)
Rated Output Power	802.11b: 0.060 W (Conducted) 802.11g: 0.045 W (Conducted) 802.11n: 0.051 W (Conducted)
Antenna Connector	External Antennas, RP-SMA connector
Number of Antennas	2
Antenna Diversity Supported	Yes
Smart Antennas System	MIMO
Power Supply	Mains (Integral Power Supply)

Description of Test Item

The EUT is a digital video conference system with WiFi and Bluetooth transceivers. The WiFi and Bluetooth transceivers are contained in a module from NVIDIA with single modular certification (FCC ID: VOB-P3310), however the antennas used in this EUT are not certified.

1.2 Normal test condition

Temperature:	22.2 – 23.6 °C
Relative humidity:	30 - 37 %
Normal test voltage:	120 V AC

The values are the limit registered during the test period.

1.3 Test Engineer(s)

Frode Sveinsen
Thomas Danglé (Power Line Conducted Test)

1.4 Description of modification for Modification Filing

Not applicable.

1.5 Family List Rational

Not Applicable.

1.6 Antenna Requirement

Is the antenna detachable? ☒ Yes ☐ No

If detachable, is the antenna connector non-standard? ☒ Yes ☐ No

Type of antenna connector: RP-SMA

Ref. FCC §15.203

1.7 Worst-Case Configuration and Mode

Radiated Emissions and Power Line Conducted Emissions were performed with the EUT set to transmit at the channel with the highest output power as worst-case scenario. HT40 mode has been disabled in this EUT.

The worst case data rates were:

802.11b mode: 1 Mbps
802.11g mode 6 Mbps
802.11n HT20 mode: MCS0

1.8 On Time and Duty Cycle Factors

Mode	On Time Burst (ms)	Period (msec)	Duty Cycle (linear)	Duty Cycle Correction (dB)
802.11b	8.580	8.685	0.987	0.00
802.11g	1.425	1.527	0.933	0.30
802.11n HT20 CDD	1.332	1.437	0.926	0.33

The results above are from UL report no. 15U21878-E3V2

1.9 Power Levels

Channel	802.11b	802.11g	802.11n (HT20)
1	16.5	13.5	12.5
2	16.5	15.5	12.5
3	16.5	15.5	12.5
4	16.5	15.5	12.5
5	16.5	15.5	12.5
6	16.5	15.5	12.5
7	16.5	15.5	12.5
8	16.5	15.5	12.5
9	16.5	15.5	12.5
10	16.5	13.5	12.5
11	16.5	11.5	10.5
12	13.5	7.5	7.5
13	9.0	4.0	4.0

All Power Levels are the same as those used by Nvidia during module certification.

1.10 Antenna Gain

The EUT has two identical whip antennas that are connected at the back of the codec by RP-SMA connectors.
The values below are the antenna gain values provided by the manufacturer:

Frequency (MHz)	Max Antenna Gain (dBi)
2400	4.37
2410	4.30
2420	4.31
2440	4.25
2450	4.40
2460	4.41
2470	4.50
2480	4.58

1.11 Comments

This report covers only limited radiated tests to show compliance with the new antenna in this EUT. All other radio tests for 2.4 GHz WLAN are covered by UL reports no. 11526345-E3V2.

All ports were populated during spurious emission measurements.

2 TEST REPORT SUMMARY

2.1 General

All measurements are tracable to national standards.

The tests were performed for demonstrating compliance with FCC CFR 47 Part 15, paragraph 15.247 and Industry Canada RSS-247 Issue 2.

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 3m and 10m.

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

☒ New Submission
☐ Class II Permissive Change
DTS Equipment Code

☒ Production Unit
☐ Pre-production Unit
☐ 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”.

2.2 Test Summary

Name of test	FCC Part 15 reference	RSS-247 Issue 2, RSS-GEN Issue 5 reference	Result
Supply Voltage Variations	15.31(e)	N/A	Complies[1]
Antenna Requirement	15.203	6.8 (RSS-GEN)	Complies
AC Power Line Conducted Emission	15.107(a) 15.207(a)	8.8 (RSS-GEN)	Complies
Occupied Bandwidth	N/A	6.7 (RSS-GEN)	Complies[1]
Minimum 6 dB Bandwidth	15.247(a)(2)	5.2 (1) (RSS-247)	Complies[1]
Peak Power Output	15.247(b)	5.4 (RSS-247)	Complies
Power Spectral Density	15.247(d)	5.2 (2) (RSS-247)	Complies[1]
Spurious Emissions (Antenna Conducted)	15.247(c)	5.5 (RSS-247)	Complies[1]
Spurious Emissions (Radiated)	15.247(c) 15.109(a) 15.209(a)	5.5 (RSS-247) 6.13 (RSS-GEN) 8.9 (RSS-GEN)	Complies

[1] Covered by UL Test Report no. 15U21878-E3V2 (FCC ID: VOB-P3310)

3 TEST RESULTS

3.1 Power Line Conducted Emissions

FCC Part 15.207 (a)

ISED RSS-GEN Issue 5, Clause 8.8

Measurement procedure: **ANSI C63.4-2014 using 50 µH/50 ohms LISN.**

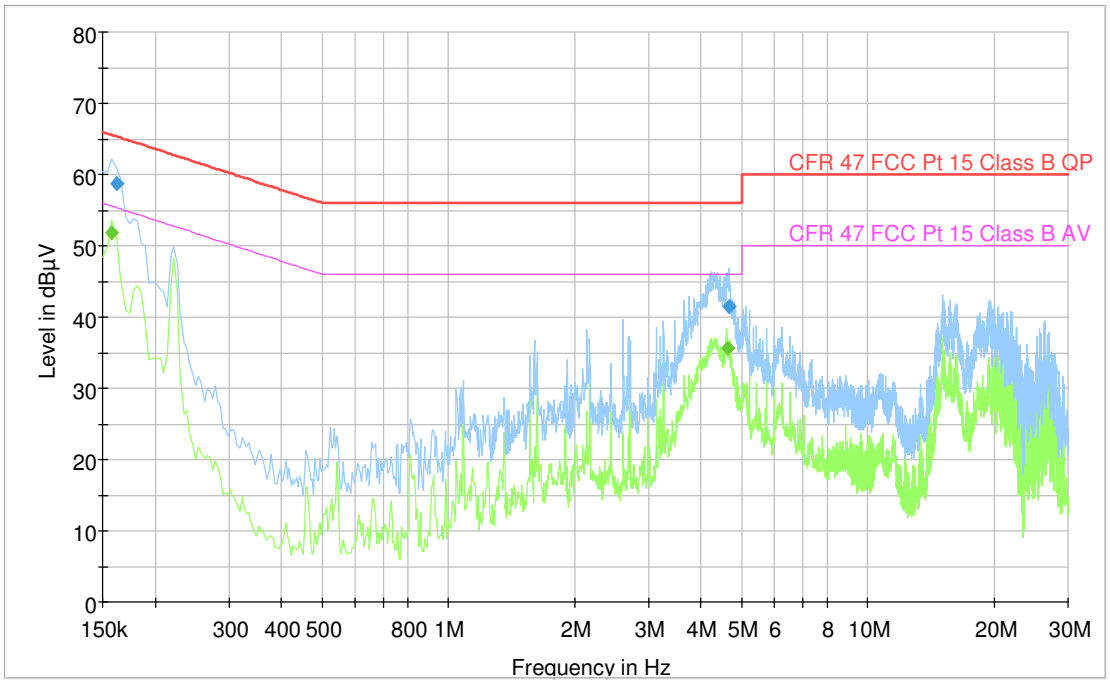
Test Results: **Complies.**

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

Highest measured value (L1 and N):

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.158	---	51.85	55.57	3.72	1000	9	L1	OFF	9.7
0.162	58.73	---	65.36	6.63	1000	9	L1	OFF	9.7
4.624	---	35.60	46.00	10.40	1000	9	L1	OFF	9.7
4.652	41.37	---	56.00	14.63	1000	9	L1	OFF	9.7

Full Spectrum



120V 60Hz

3.2 Radiated Emissions, Restricted Band Edges

Para. No.: 15.247 (c)

ISED RSS-247 Issue 2, RSS-GEN Issue 5

Test Results: Complies

Measurement Data:

Detector: Peak

Measuring distance: 3m

EUT Heigth: 1.5m, ground plane covered by absorbers

Tested with all all connections active

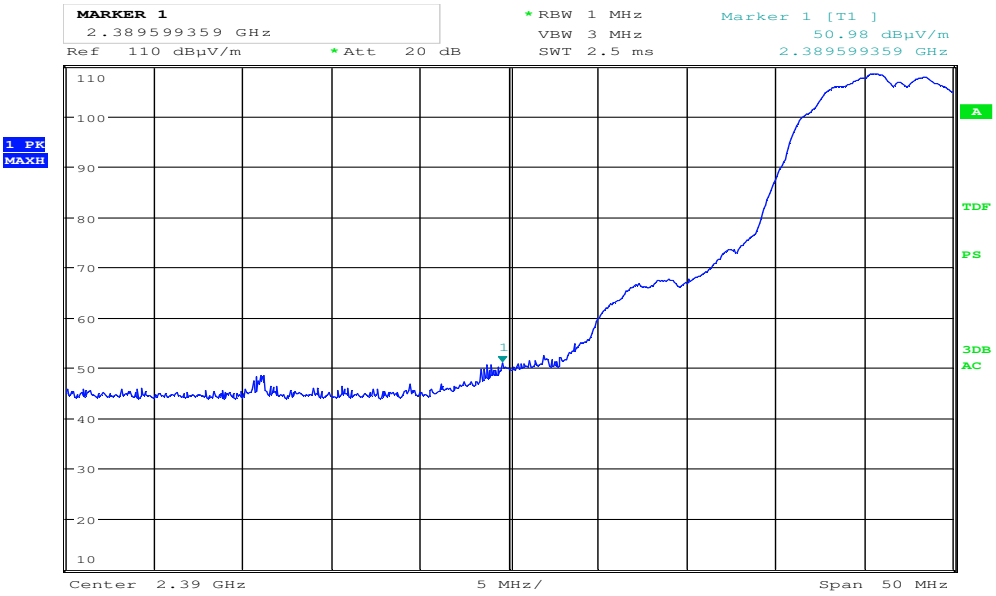
Band Edge Emissions						
Carrier Modulation	**Carrier Freq MHz**	**Measured Freq MHz**	**Measured value Peak dBµV/m @3m**	**Measured value AV dBµV/m @3m**	**Limit (dBµV/m)**	**Verdict**
802.11b	**2412**	**2390**	**51.0**	**42.7**	**74/54**	**Complies**
802.11g	**2412**	**2390**	**65.0**	**51.4**	**74/54**	**Complies**
802.11n	**2412**	**2390**	**72.7**	**51.9**	**74/54**	**Complies**
802.11g	**2417**	**2390**	**57.3**	**48.2**	**74/54**	**Complies**
802.11g	**2452**	**2483.5**	**58.0**	**46.8**	**74/54**	**Complies**
802.11g	**2457**	**2483.5**	**57.9**	**47.0**	**74/54**	**Complies**
802.11n	**2457**	**2483.5**	**66.6**	**40.9**	**74/54**	**Complies**
802.11b	**2462**	**2483.5**	**54.4**	**45.5**	**74/54**	**Complies**
802.11g	**2462**	**2483.5**	**64.1**	**51.6**	**74/54**	**Complies**
802.11n	**2462**	**2483.5**	**67.6**	**42.4**	**74/54**	**Complies**
802.11b	**2467**	**2483.5**	**53.1**	**46.4**	**74/54**	**Complies**
802.11g	**2467**	**2483.5**	**64.1**	**46.7**	**74/54**	**Complies**
802.11n	**2467**	**2483.5**	**68.7**	**38.9**	**74/54**	**Complies**
802.11b	**2472**	**2483.5**	**53.7**	**43.1**	**74/54**	**Complies**
802.11g	**2472**	**2483.5**	**46.0**	**38.1**	**74/54**	**Complies**
802.11n	**2472**	**2483.5**	**45.2**	**34.6**	**74/54**	**Complies**

Values above are the maximum values for each modulation type.

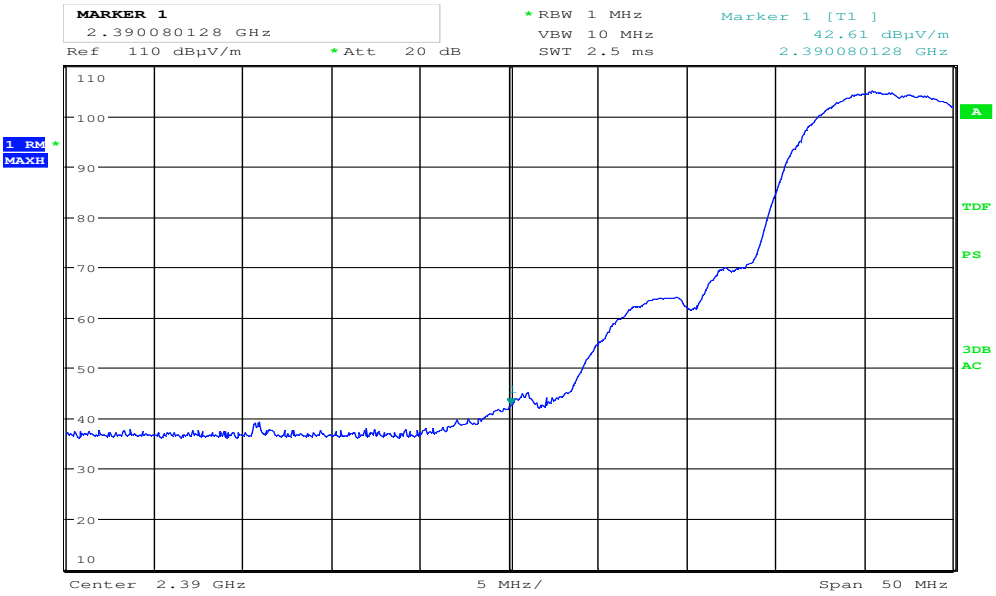
Average detector values were measured with RMS Detector and Max Hold or Trace Averaging over 1000 sweeps.

Average detector values where trace averaging was used have been corrected for duty cycle.

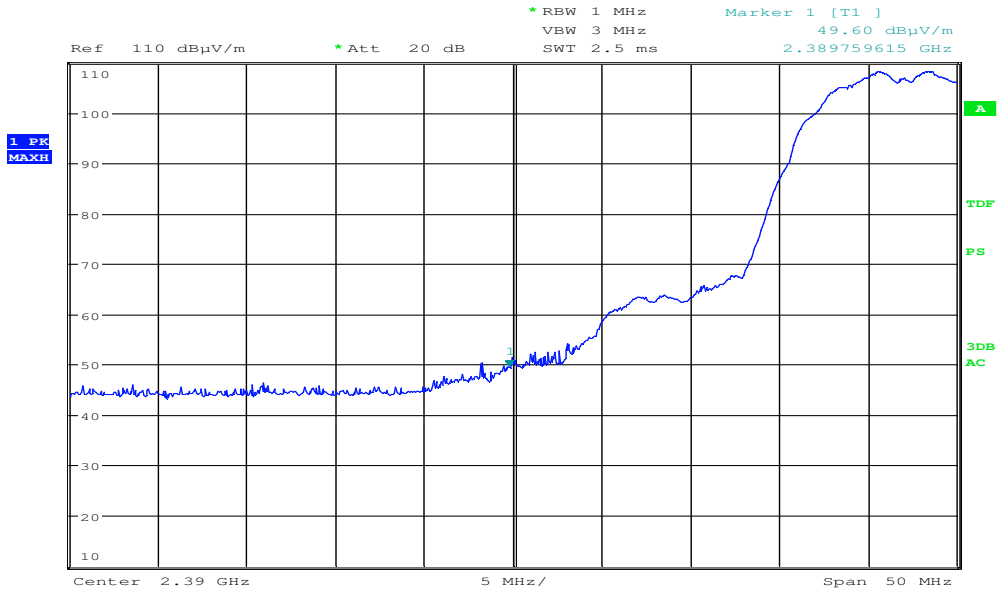
See attached plots



Lower Band Edge, Peak, 2412 MHz, 802.11b, 1Mb, (Max: Ant 0, VP)



Lower Band Edge, Average, 2412 MHz, 802.11b, 1Mb, (Max: Ant 0, VP)



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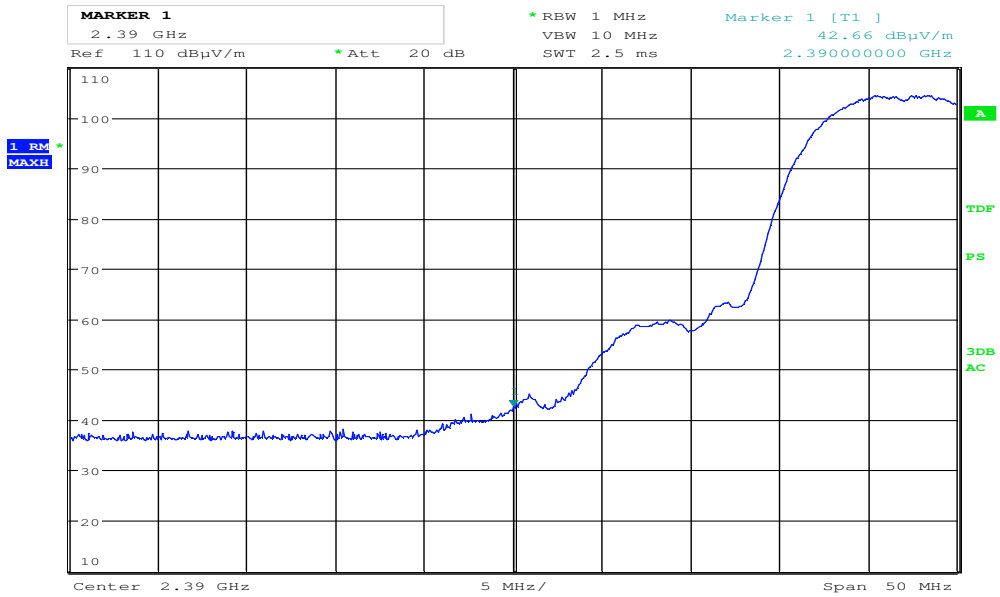

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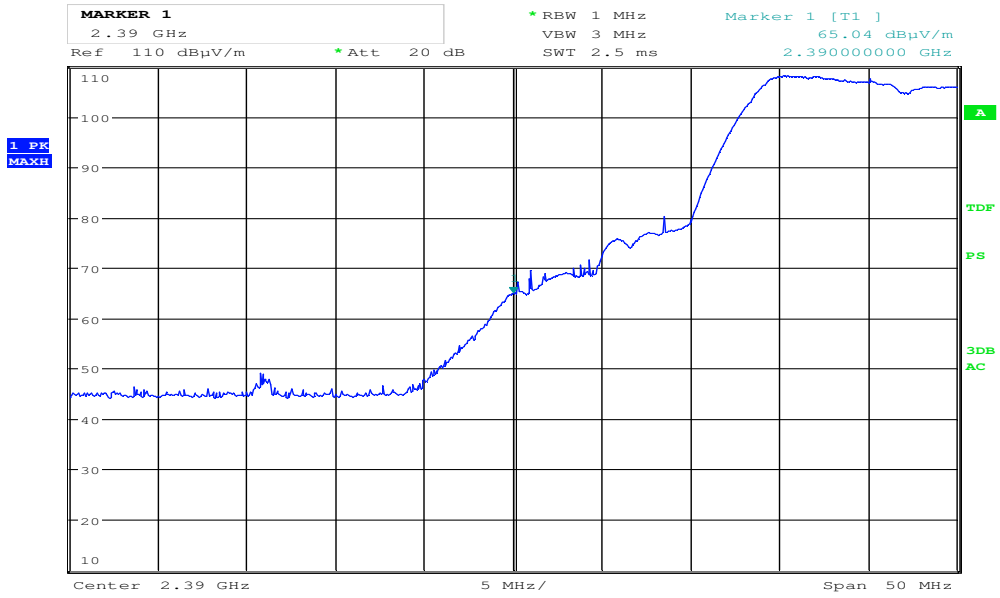

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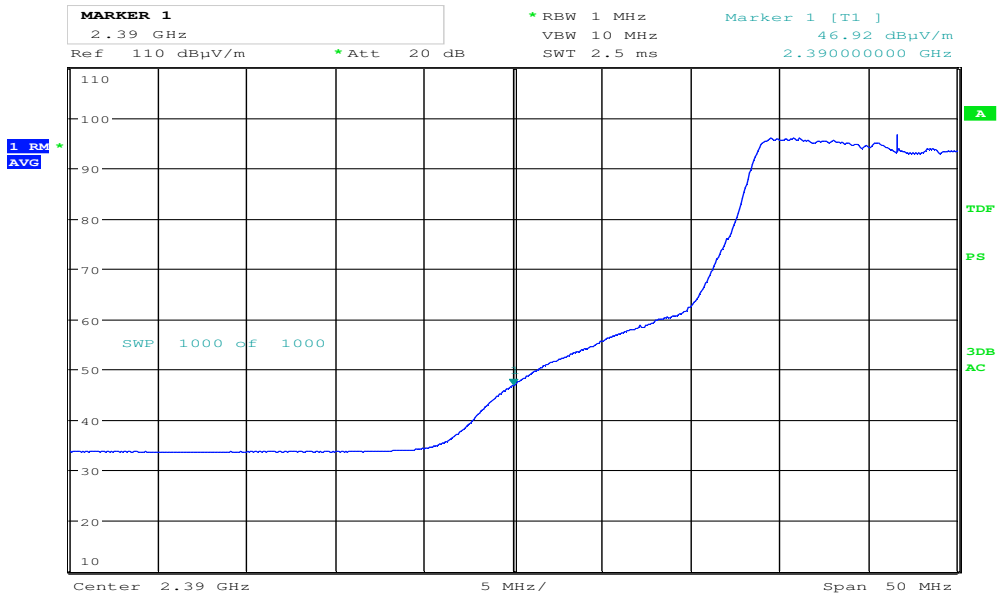

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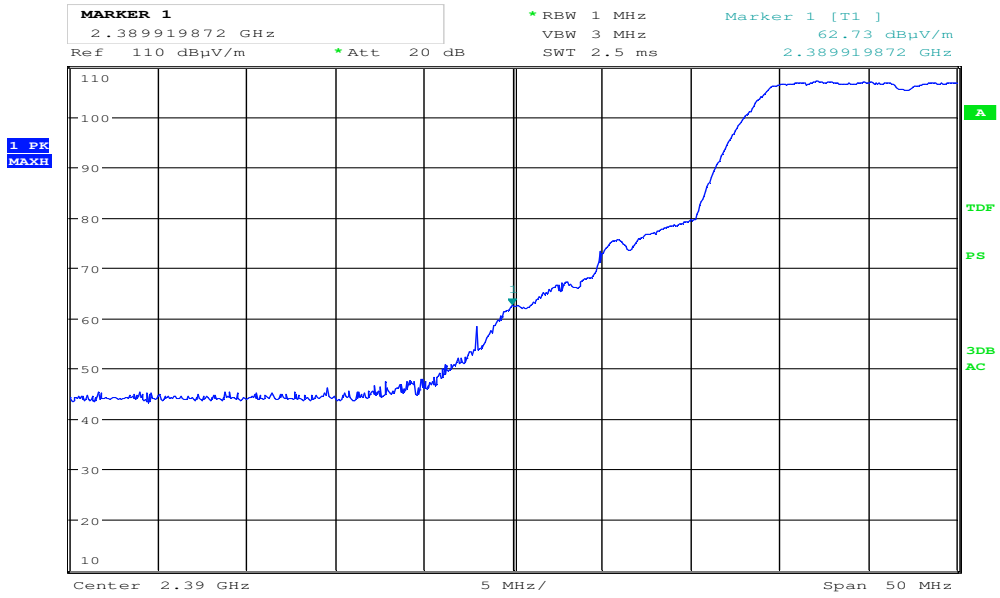
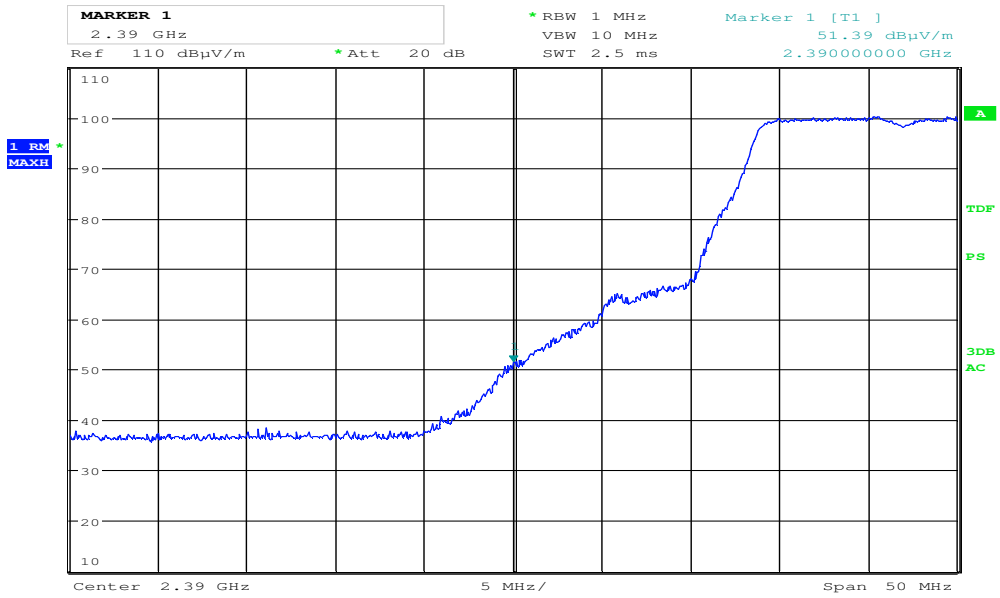
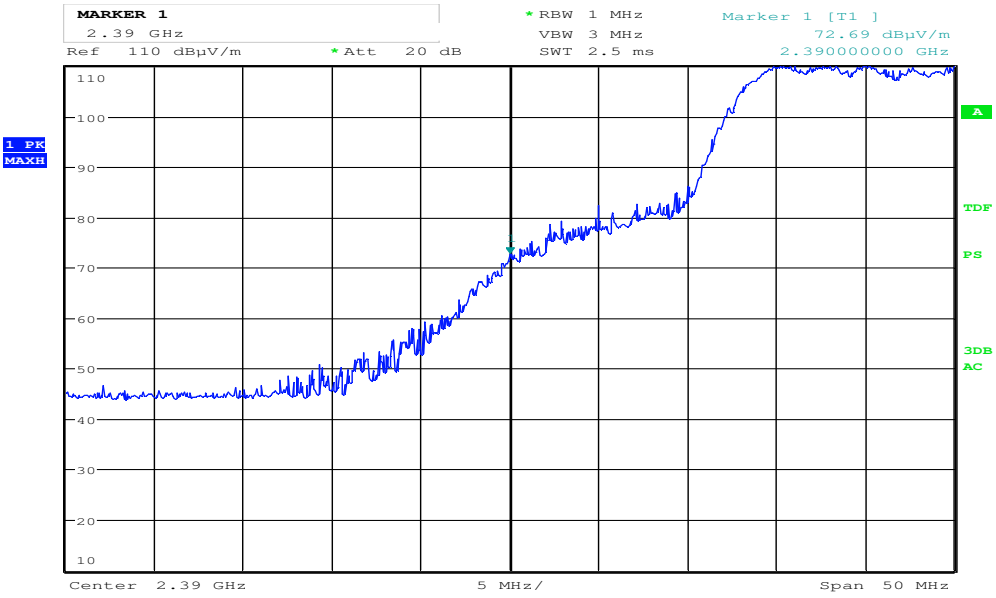


Lower Band Edge, Peak, 2412 MHz, 802.11g, 6Mb, (Max: Ant 1, VP)



Lower Band Edge, Average, 2412 MHz, 802.11g, 6Mb, (Max: Ant 1, VP)



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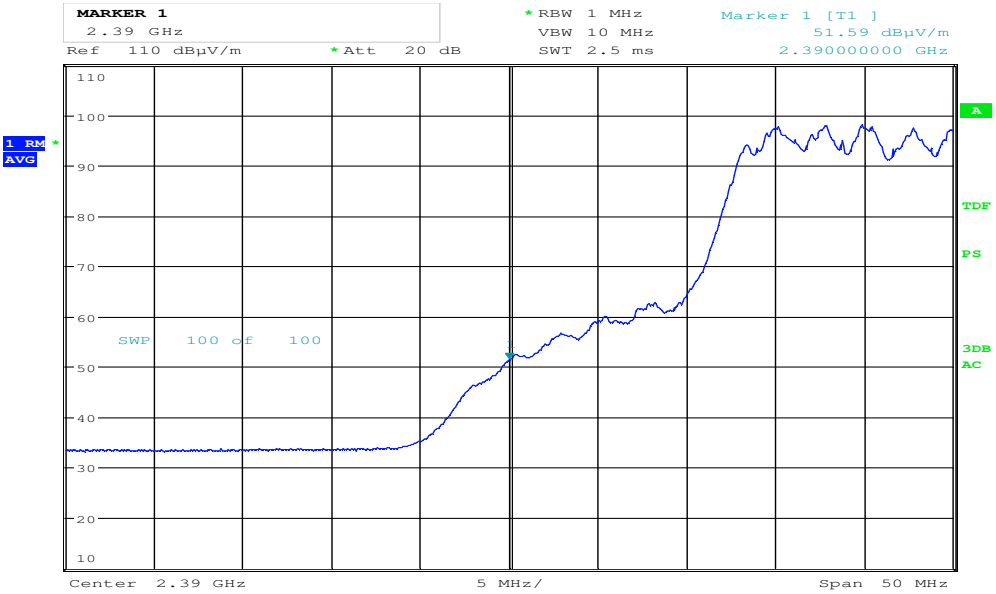

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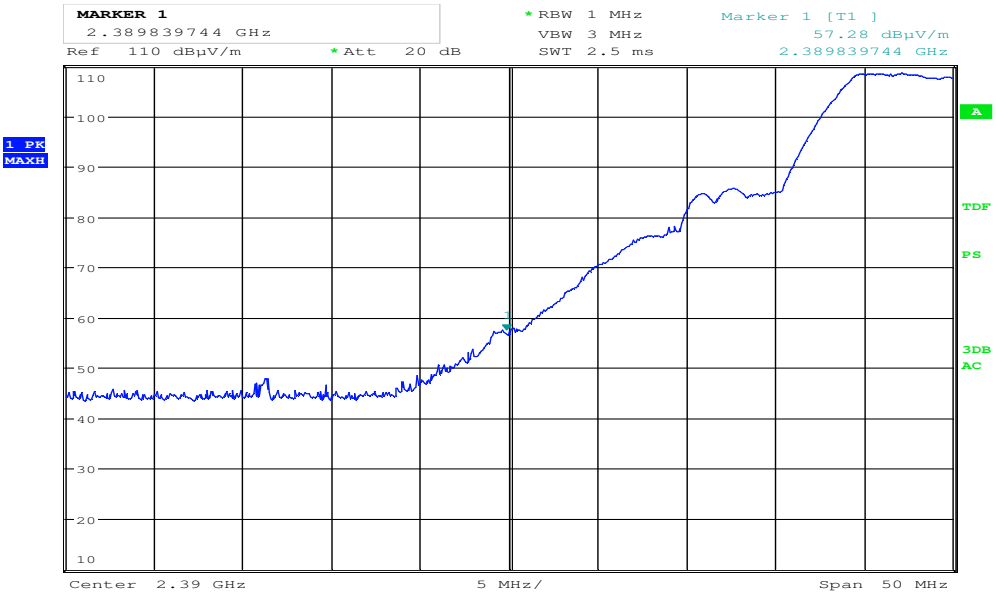

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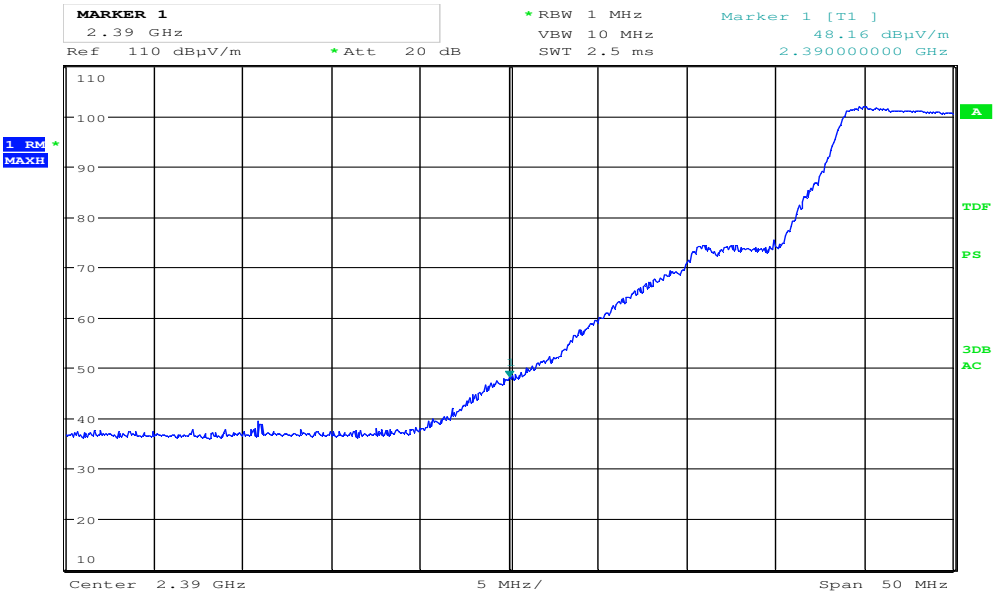

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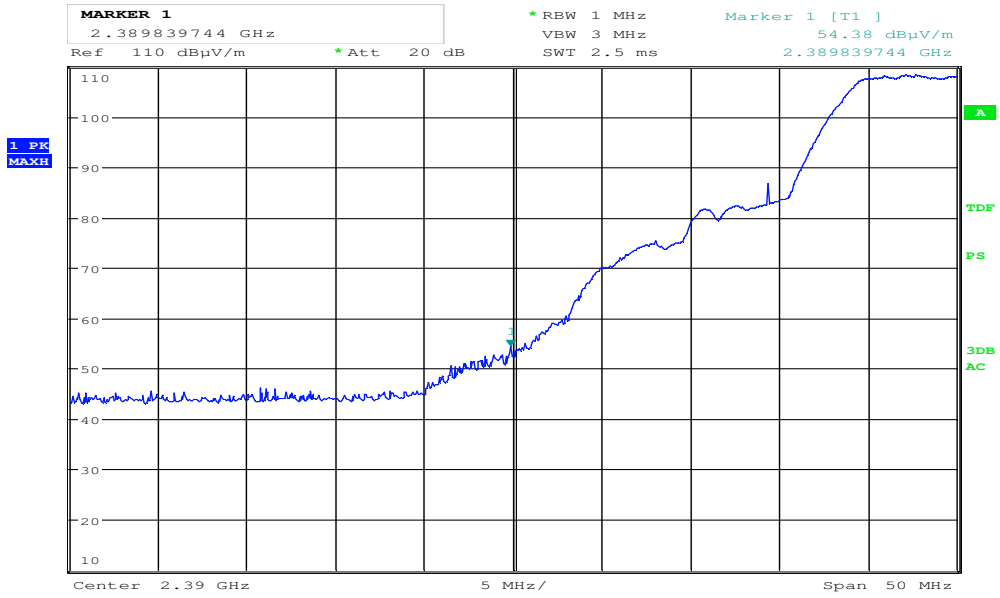

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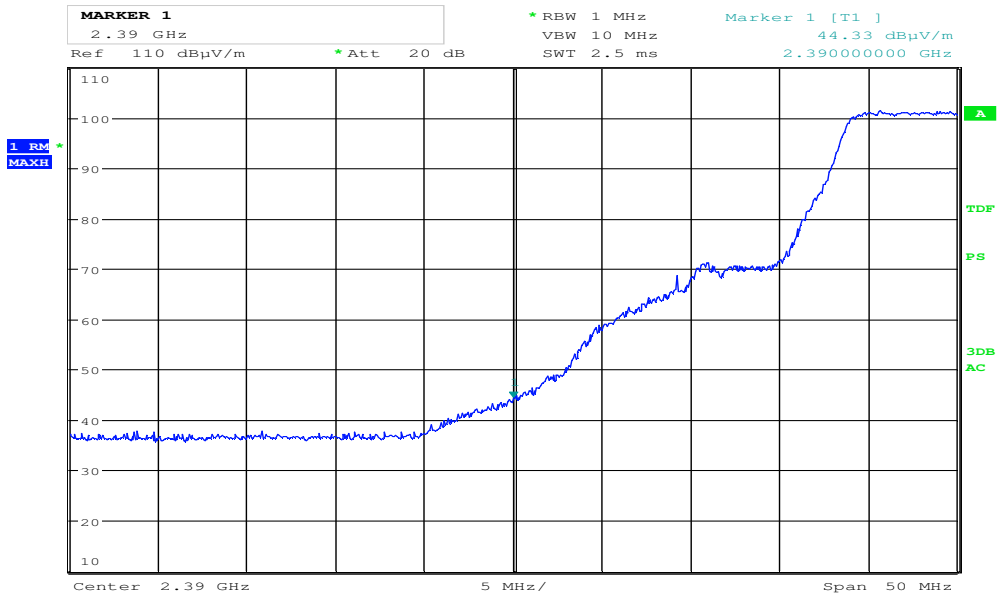

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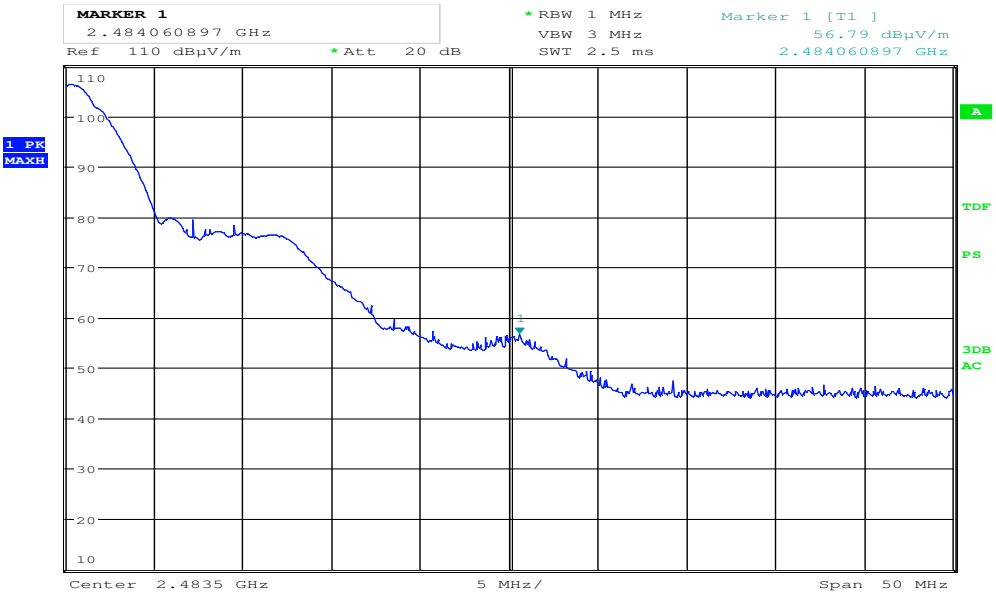

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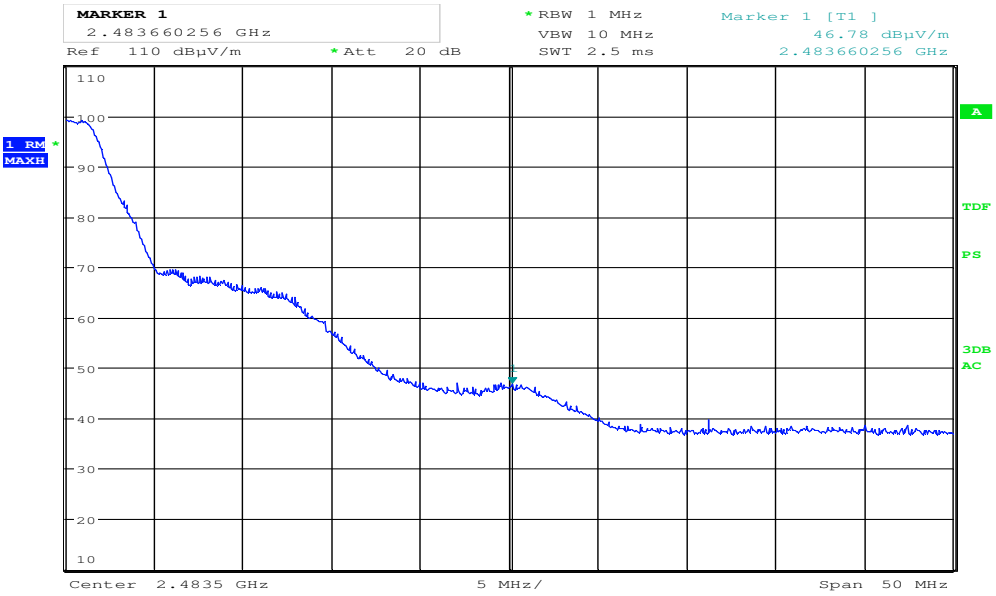

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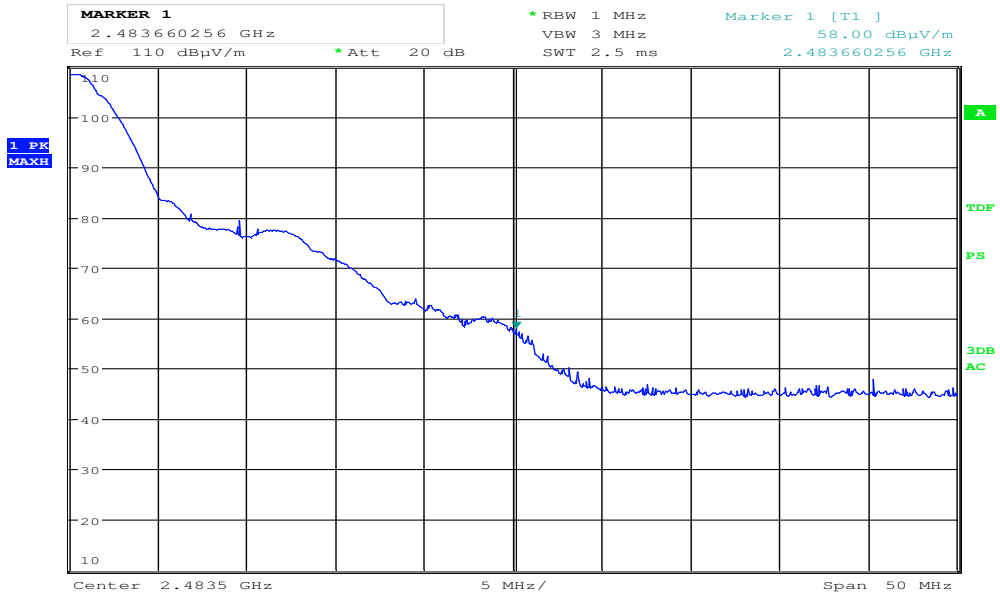

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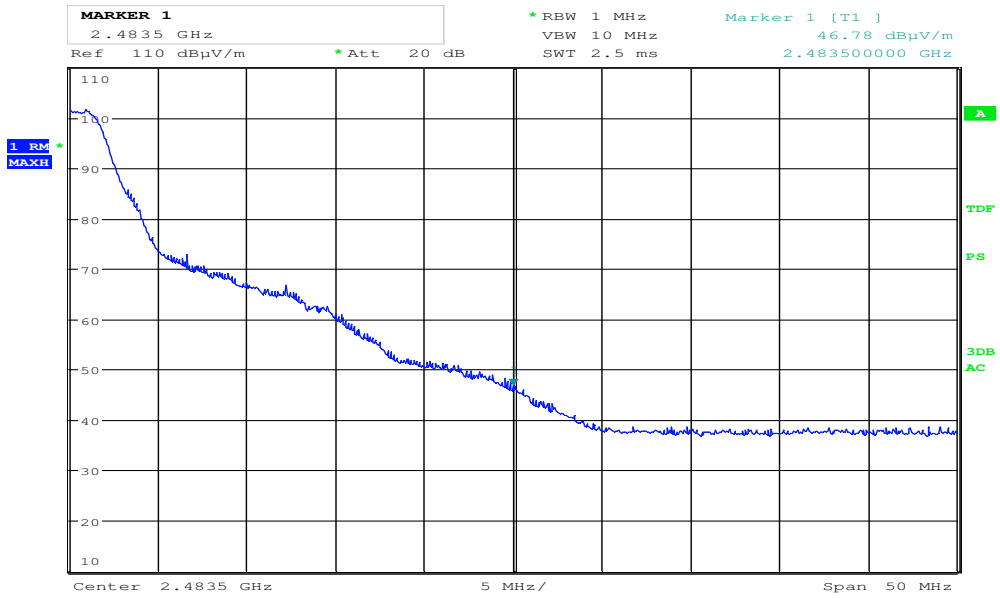

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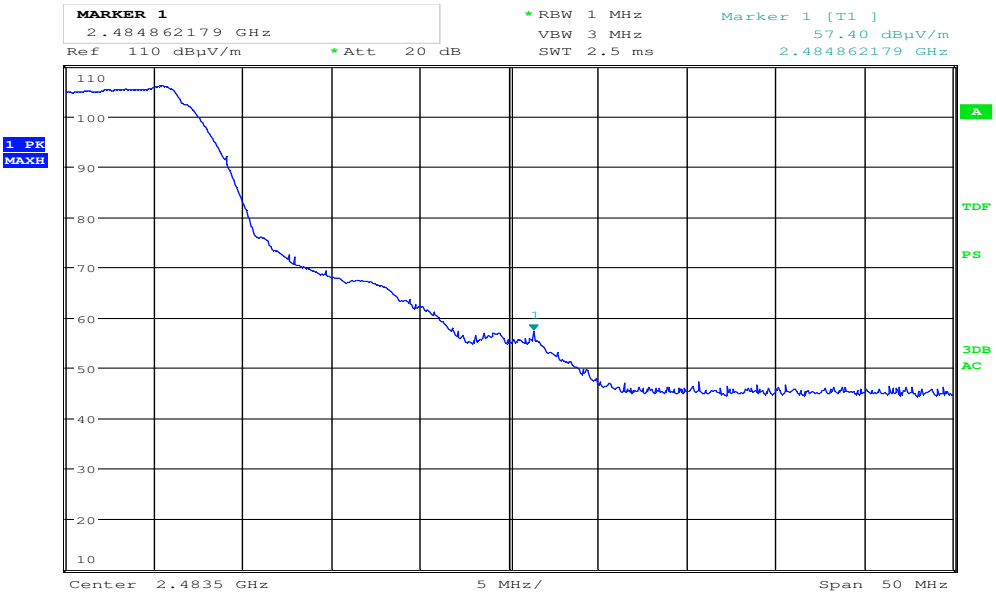

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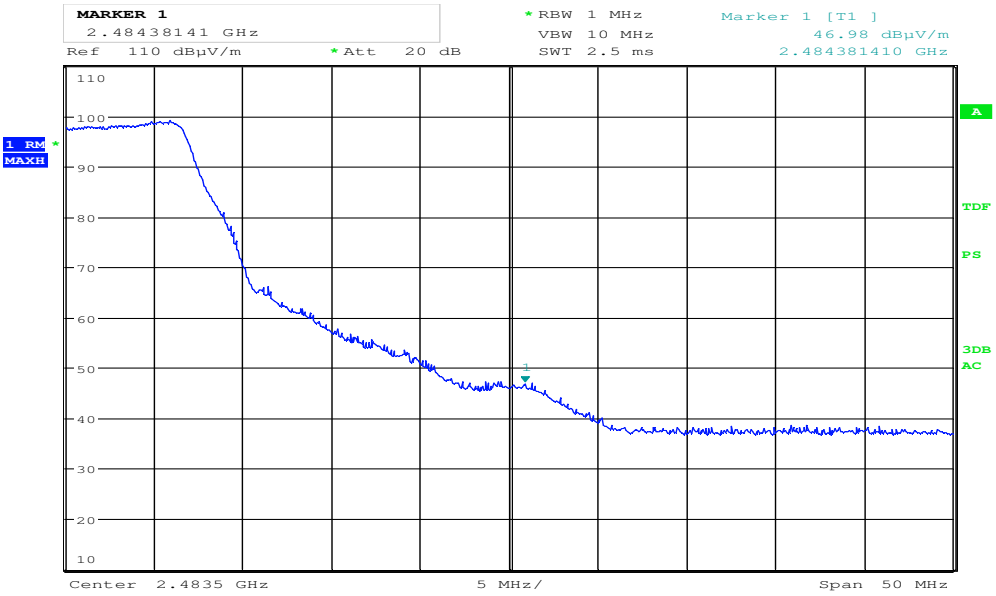

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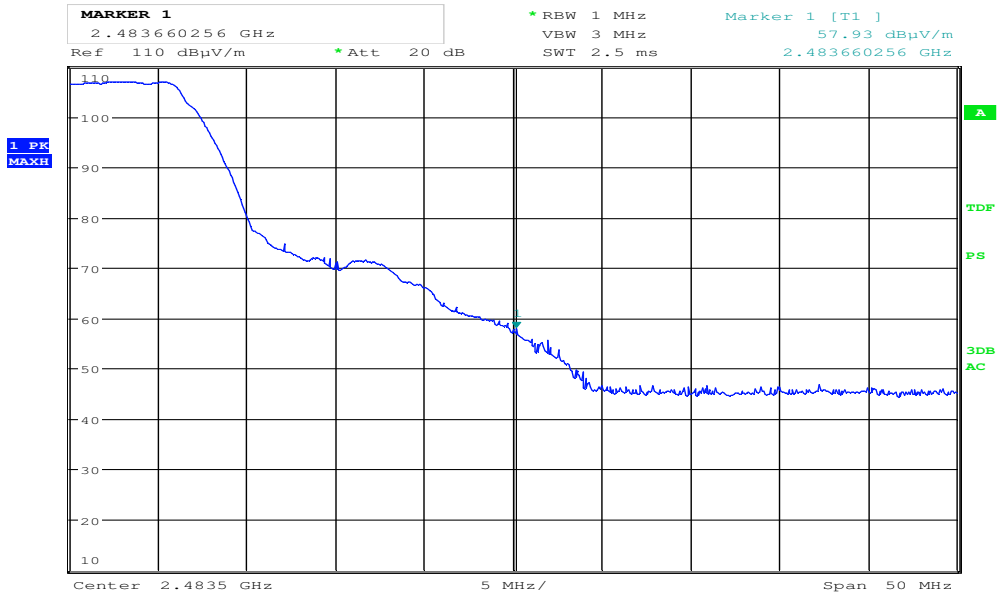
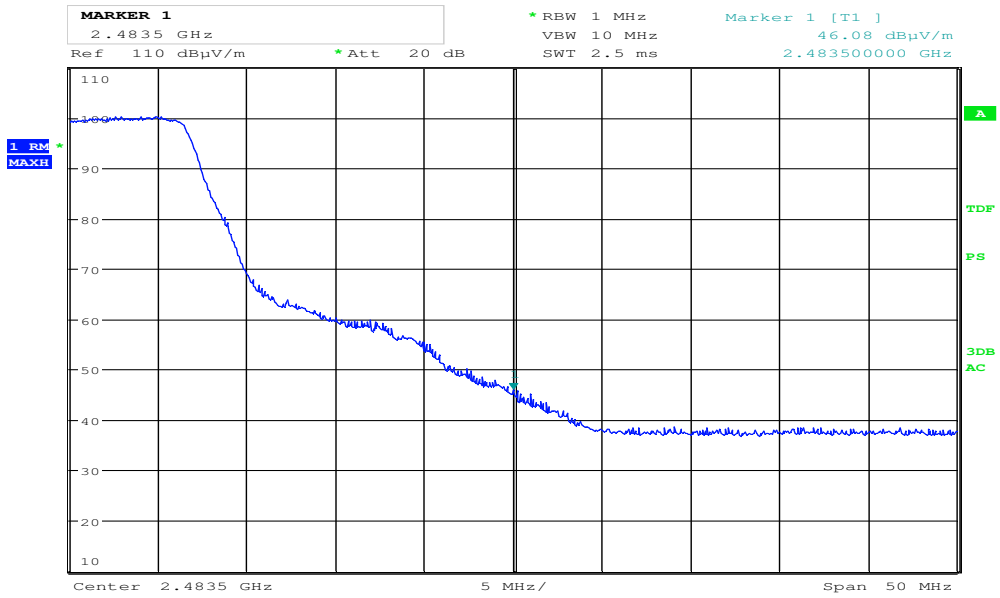
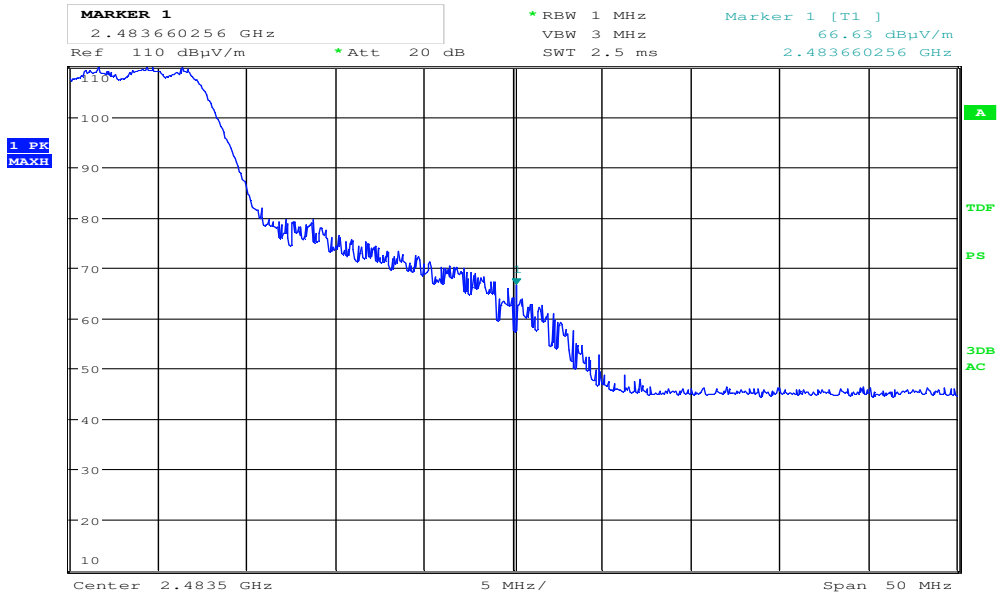


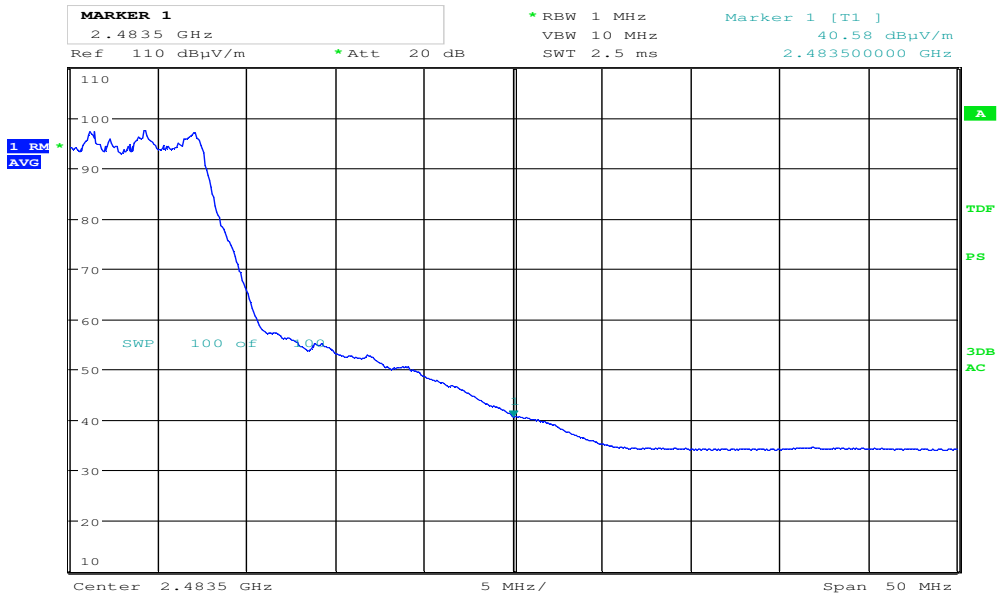
Upper Band Edge, Peak, 2457 MHz, 802.11g, 6Mb, (Max: Ant 1, VP)



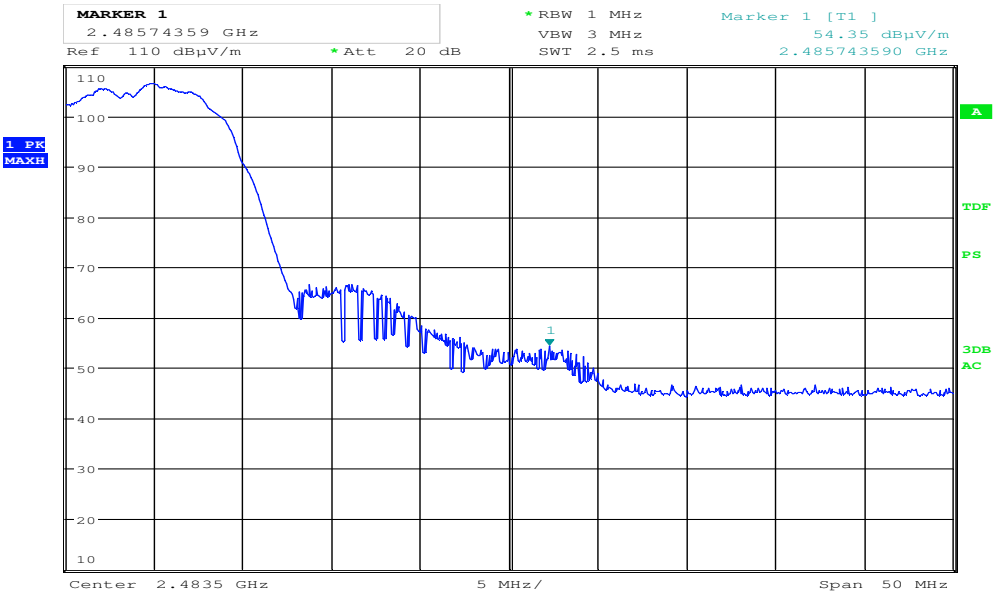
Upper Band Edge, Average, 2457 MHz, 802.11g, 6Mb, (Max: Ant 1, VP)



Upper Band Edge, Peak, 2457 MHz, 802.11n, MCS0, MIMO (Max: VP)



Upper Band Edge, Average, 2457 MHz, 802.11n, MCS0, MIMO (Max: VP)



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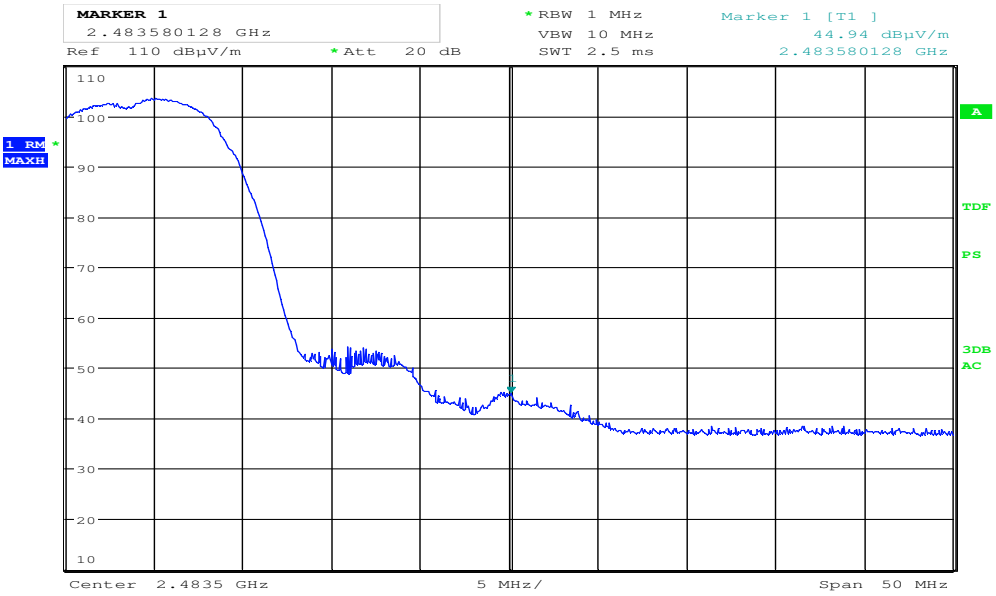

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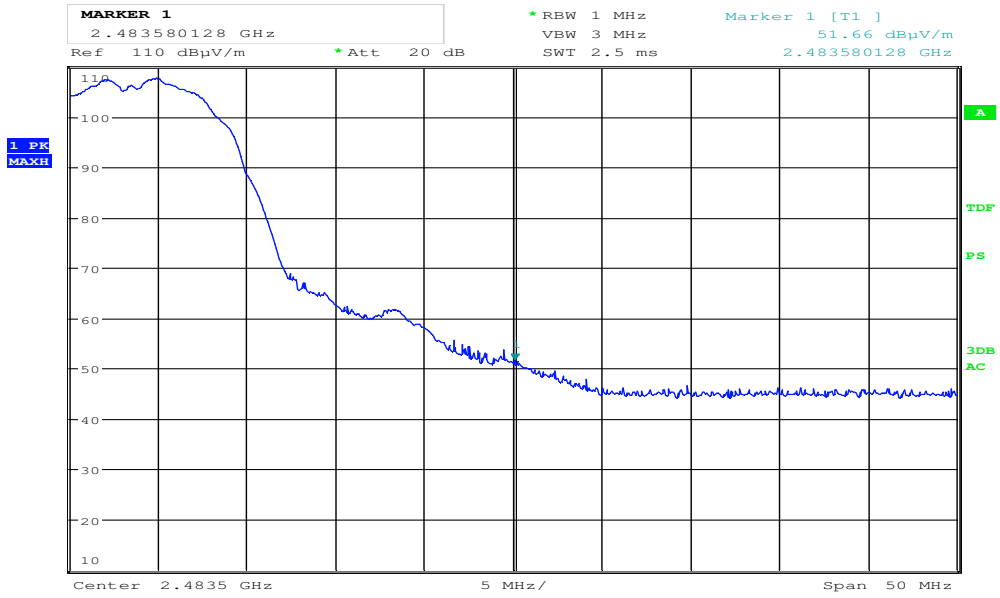
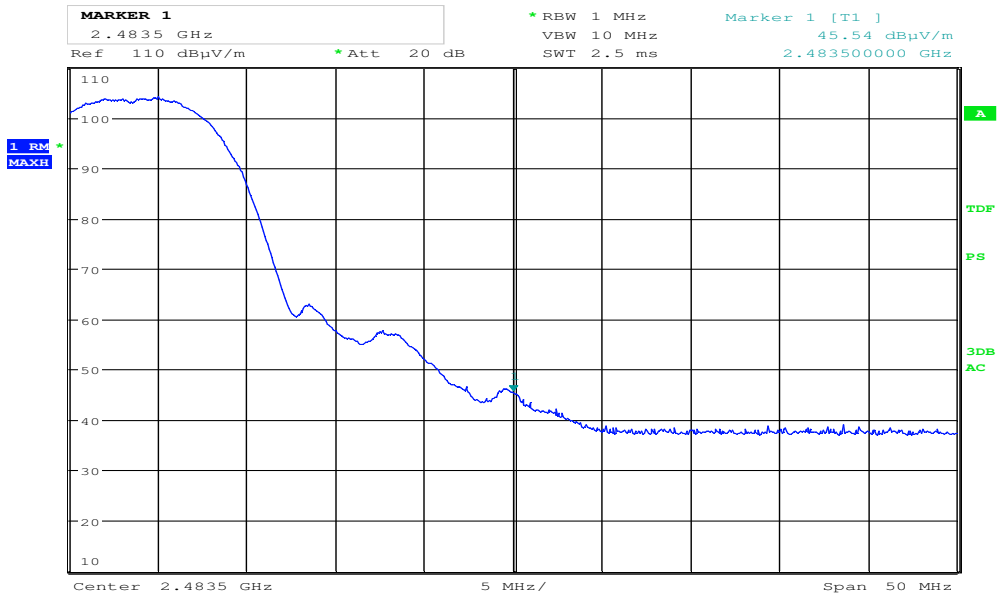
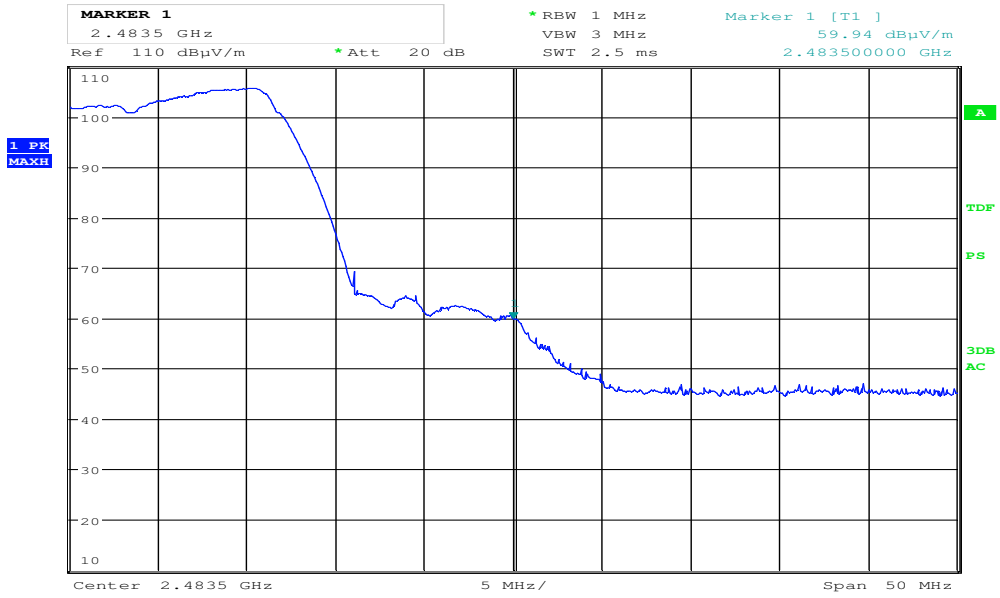


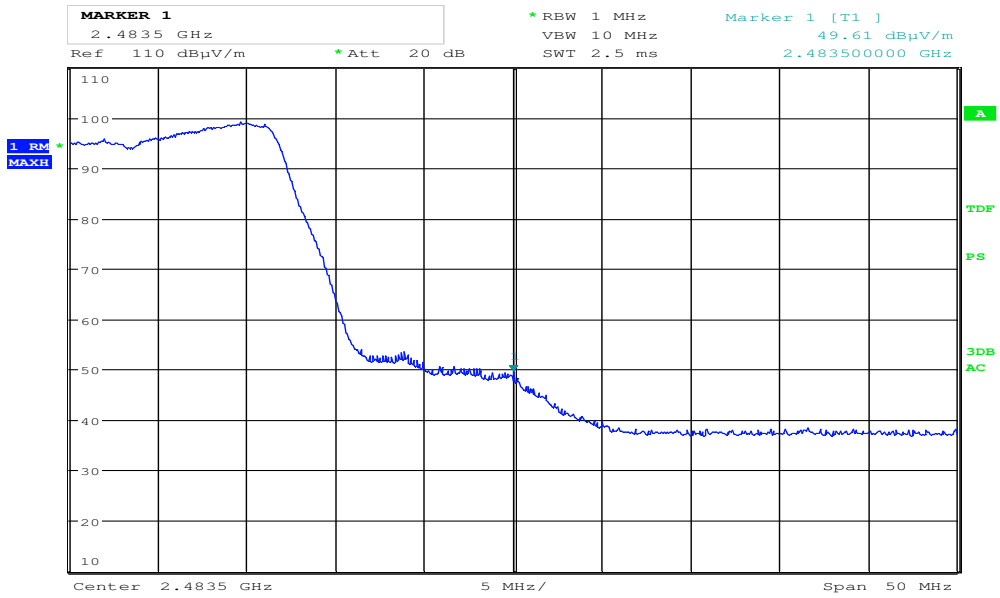
Upper Band Edge, Peak, 2462 MHz, 802.11b, 1Mb, (Max: Ant 1, VP)



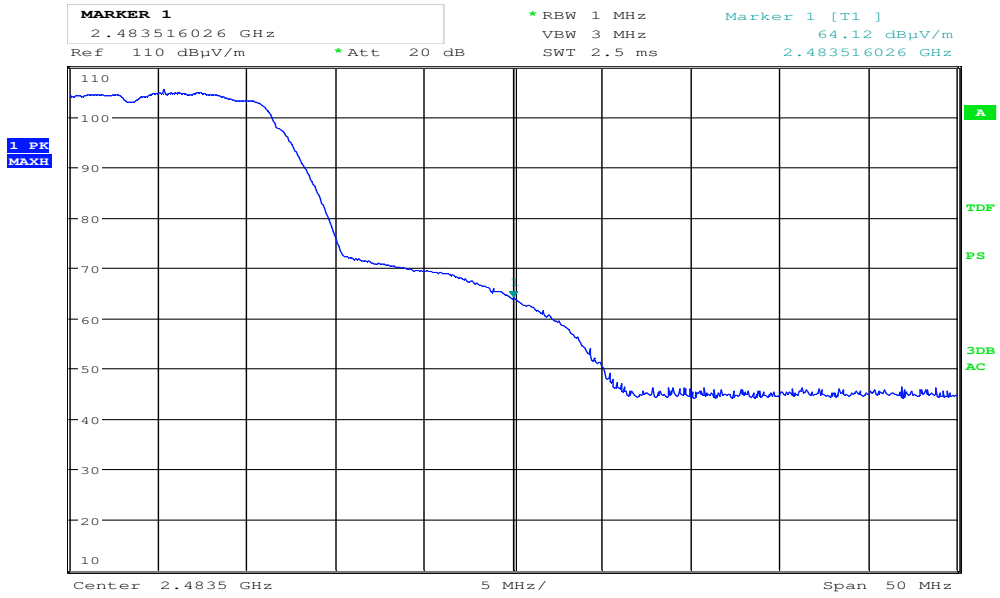
Upper Band Edge, Average, 2462 MHz, 802.11b, 1Mb, (Max: Ant 1, VP)



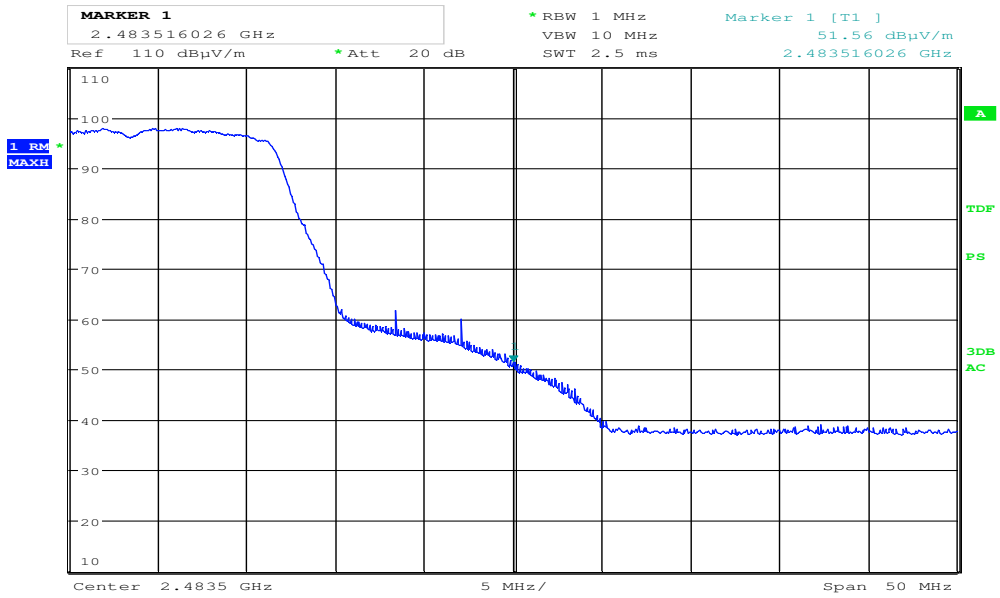
Upper Band Edge, Peak, 2462 MHz, 802.11g, 6Mb, (Max: Ant 0, VP)



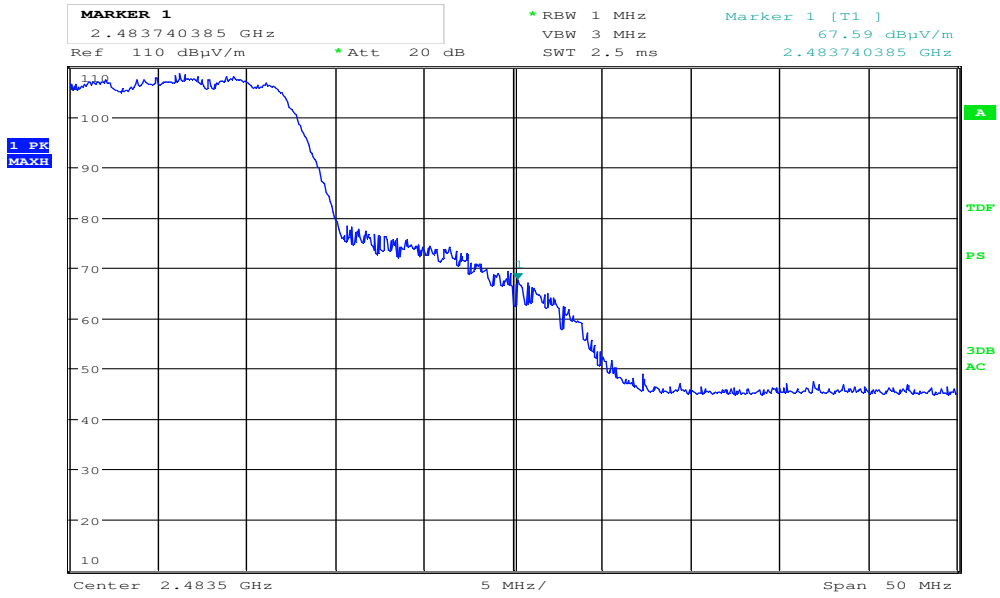
Upper Band Edge, Average, 2462 MHz, 802.11g, 6Mb, (Max: Ant 0, VP)



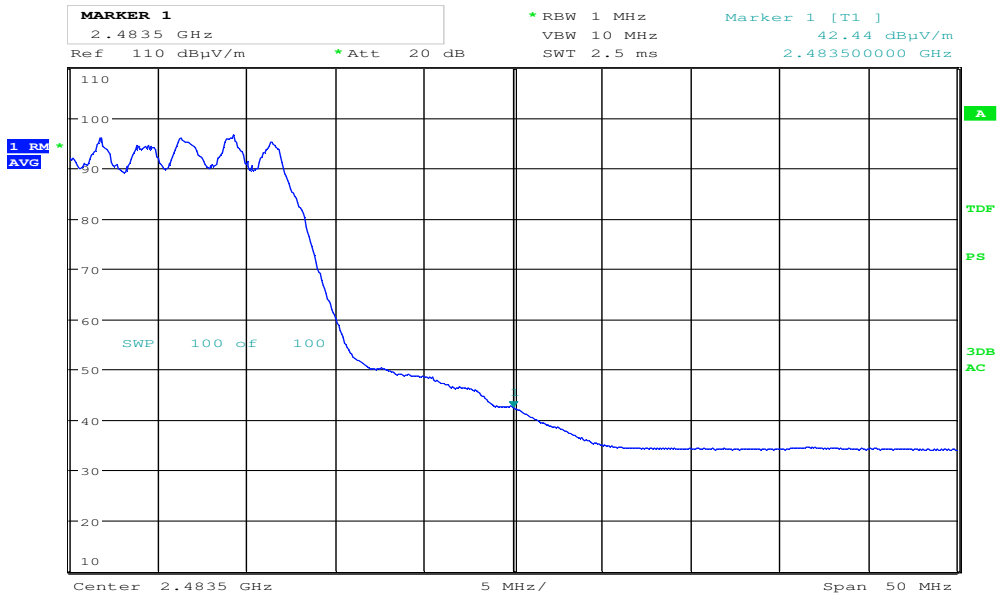
Upper Band Edge, Peak, 2462 MHz, 802.11g, 6Mb, (Max: Ant 1, VP)



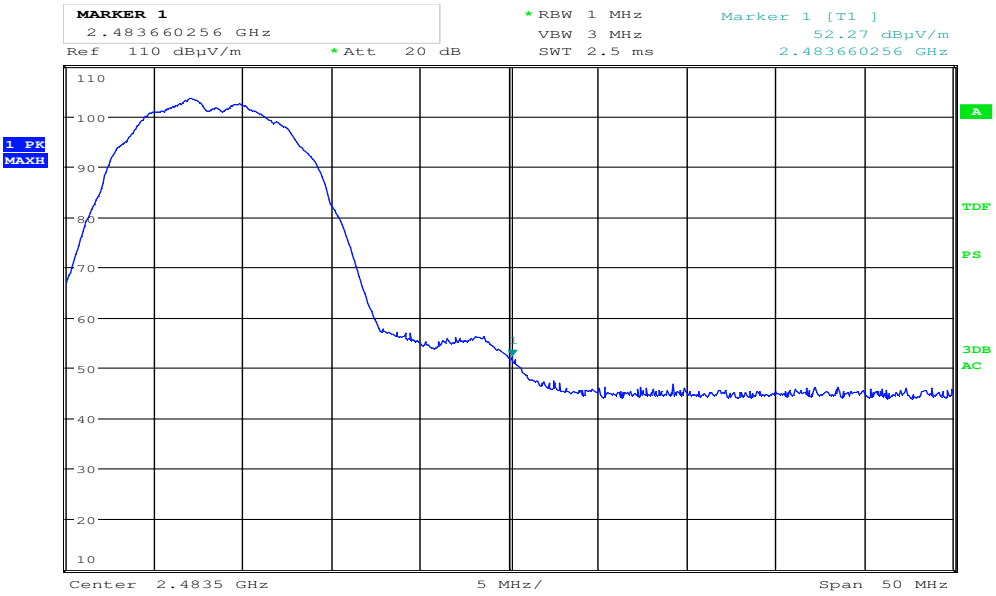
Upper Band Edge, Average, 2462 MHz, 802.11g, 6Mb, (Max: Ant 1, VP)



Upper Band Edge, Peak, 2462 MHz, 802.11n, MCS0, MIMO (Max: VP)

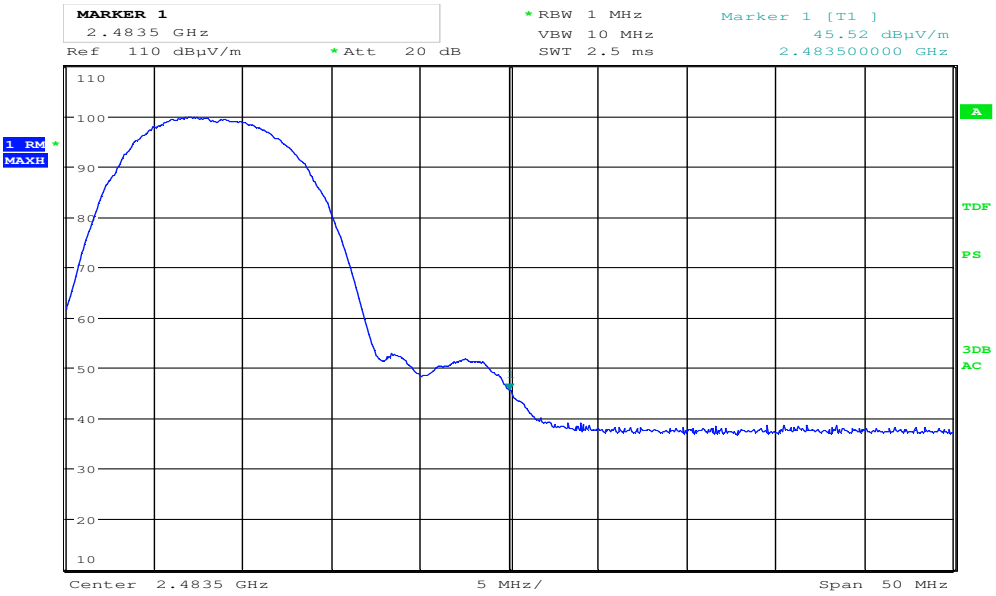


Upper Band Edge, Average, 2462 MHz, 802.11n, MCS0, MIMO (Max: VP)



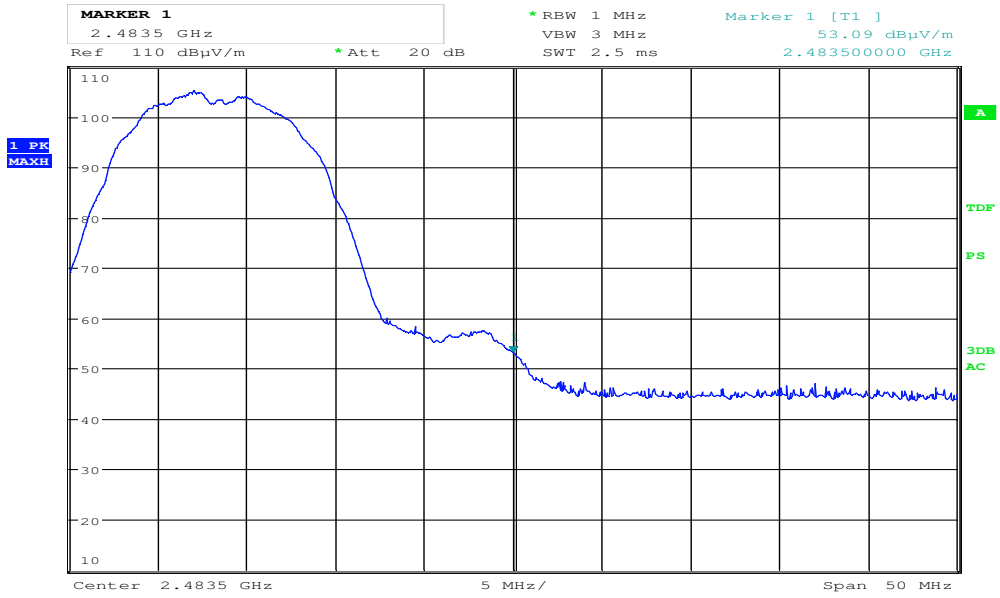
Date: 4.MAY.2018 15:48:08

Upper Band Edge, Peak, 2467 MHz, 802.11b, 1Mb, (Max: Ant 0, VP)

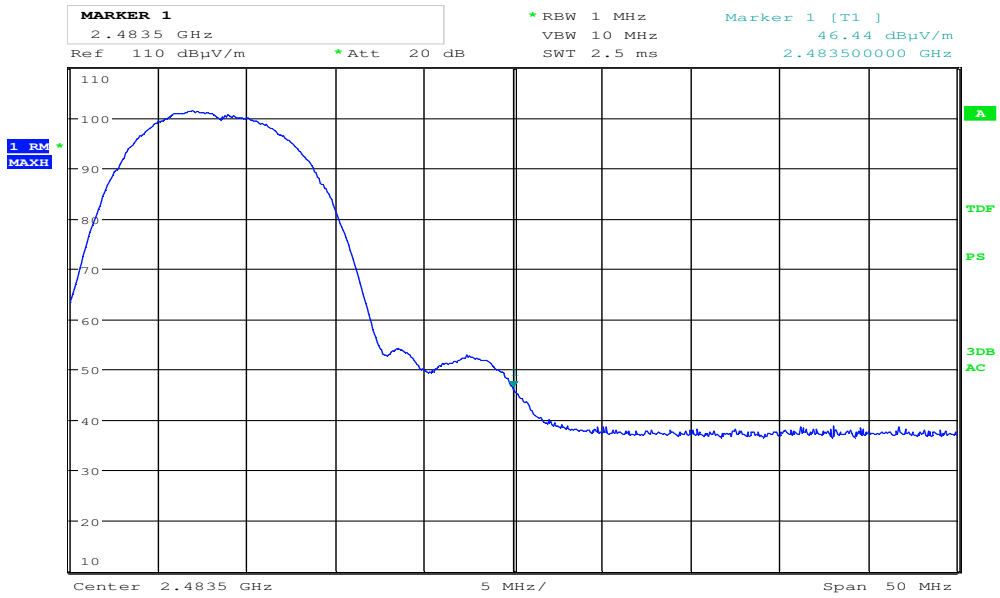


Date: 4.MAY.2018 15:49:11

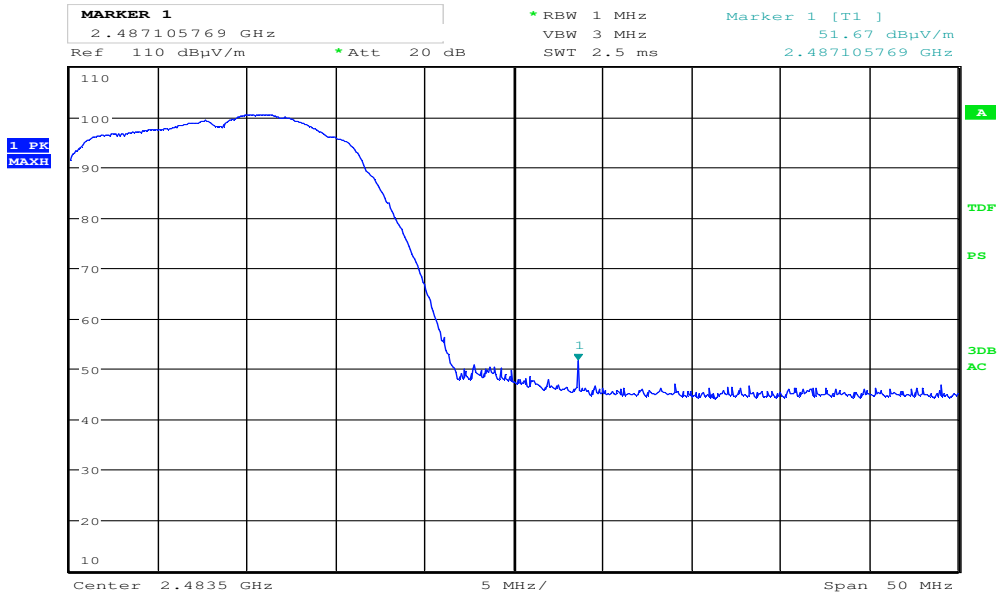
Upper Band Edge, Average, 2467 MHz, 802.11b, 1Mb, (Max: Ant 0, VP)



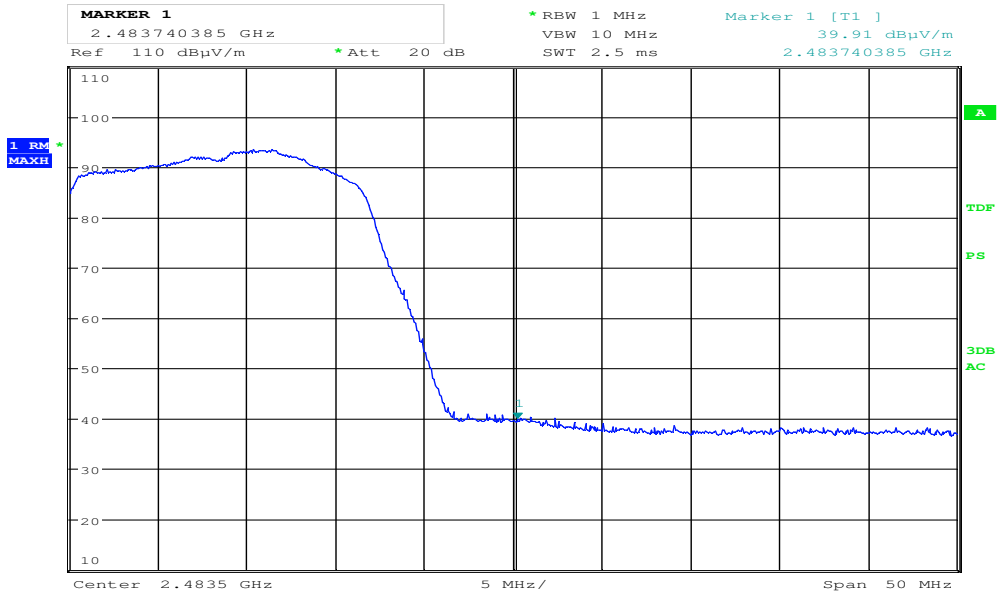
Upper Band Edge, Peak, 2467 MHz, 802.11b, 1Mb, (Max: Ant 1, VP)



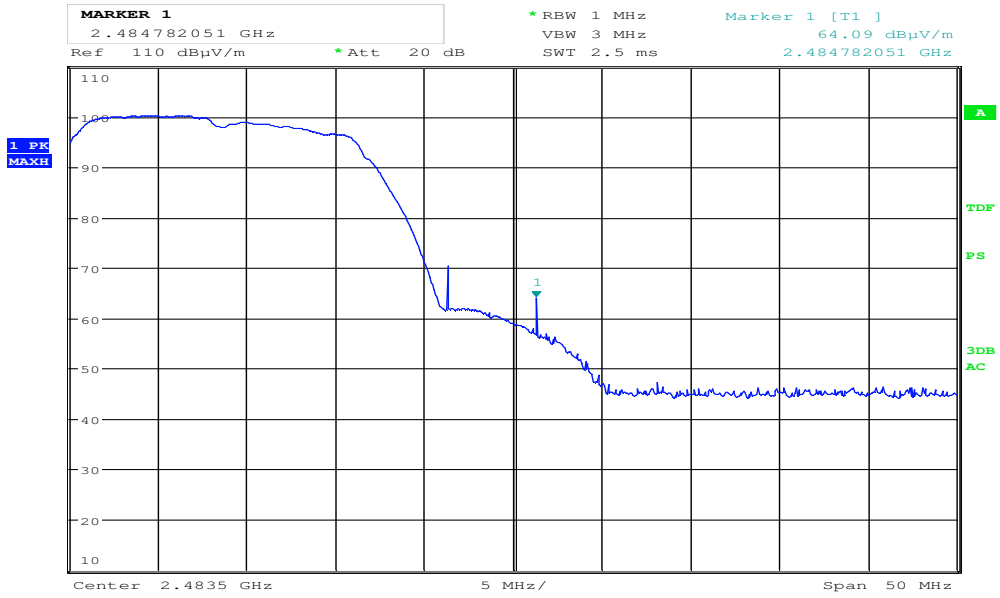
Upper Band Edge, Average, 2467 MHz, 802.11b, 1Mb, (Max: Ant 1, VP)



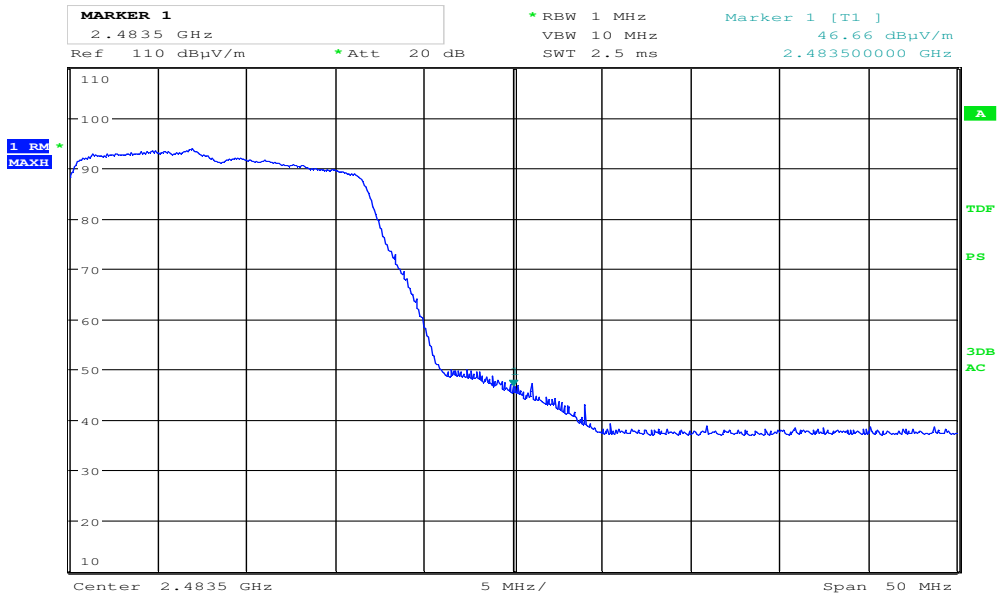
Upper Band Edge, Peak, 2467 MHz, 802.11g, 6Mb, (Max: Ant 0, VP)



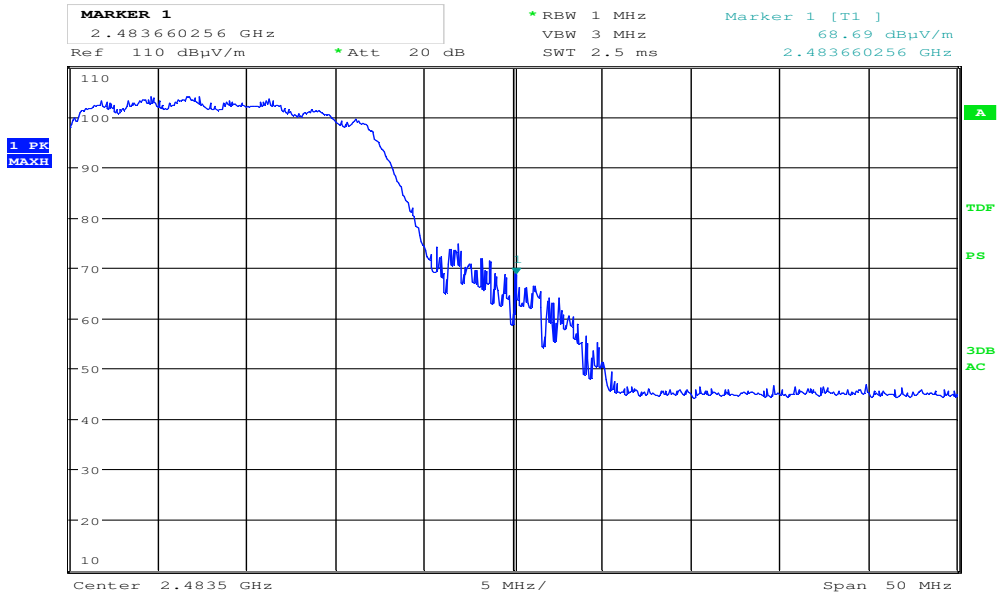
Upper Band Edge, Average, 2467 MHz, 802.11g, 6Mb, (Max: Ant 0, VP)



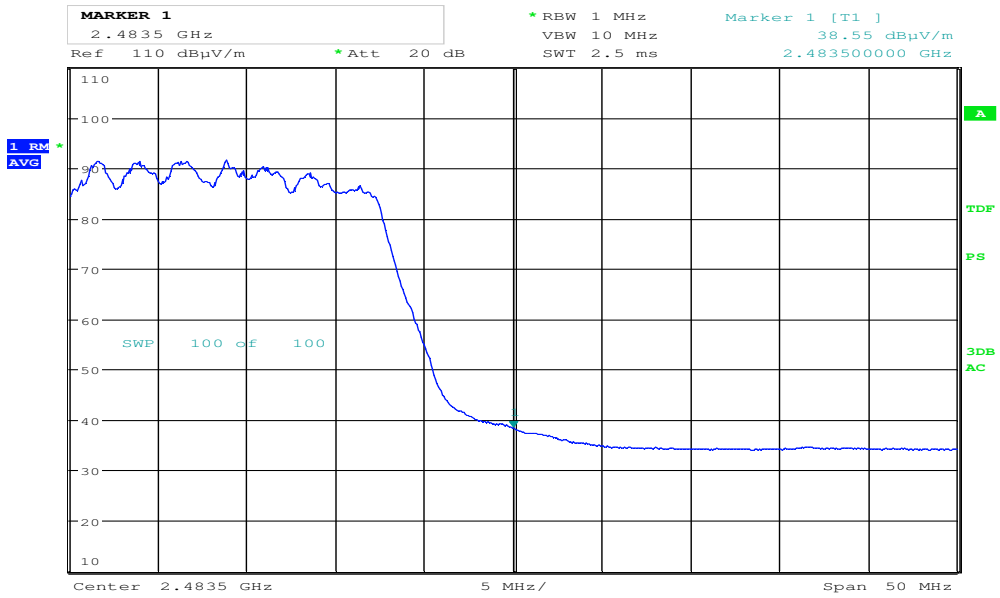
Upper Band Edge, Peak, 2467 MHz, 802.11g, 6Mb, (Max: Ant 1, VP)



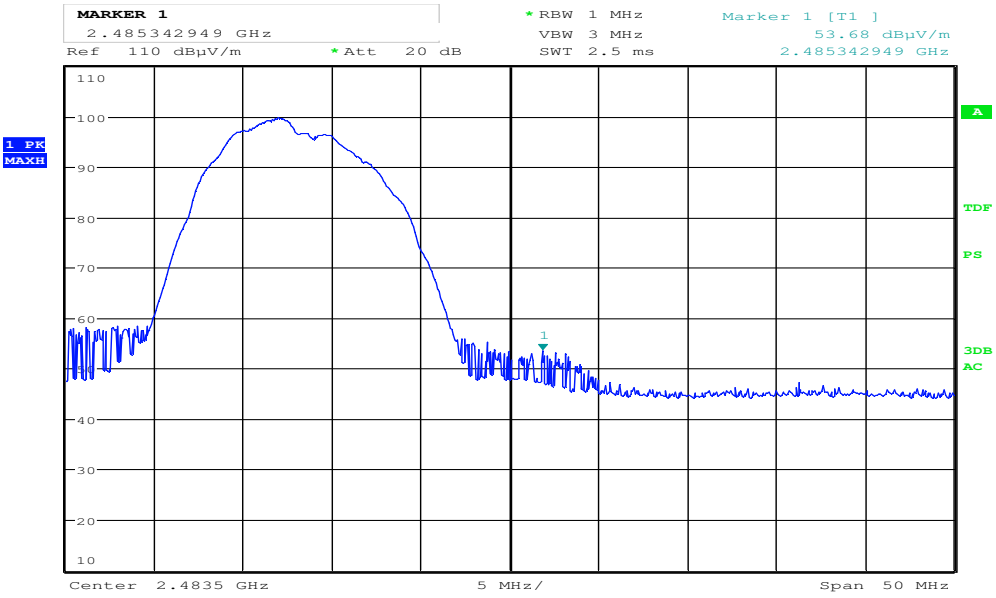
Upper Band Edge, Average, 2467 MHz, 802.11g, 6Mb, (Max: Ant 1, VP)



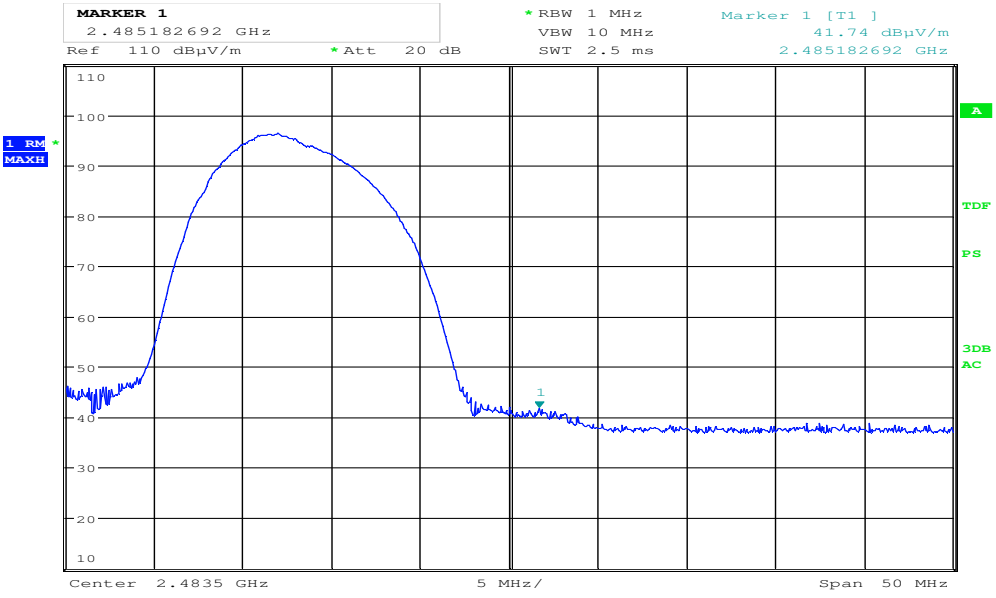
Upper Band Edge, Peak, 2467 MHz, 802.11n, MCS0, MIMO (Max: VP)



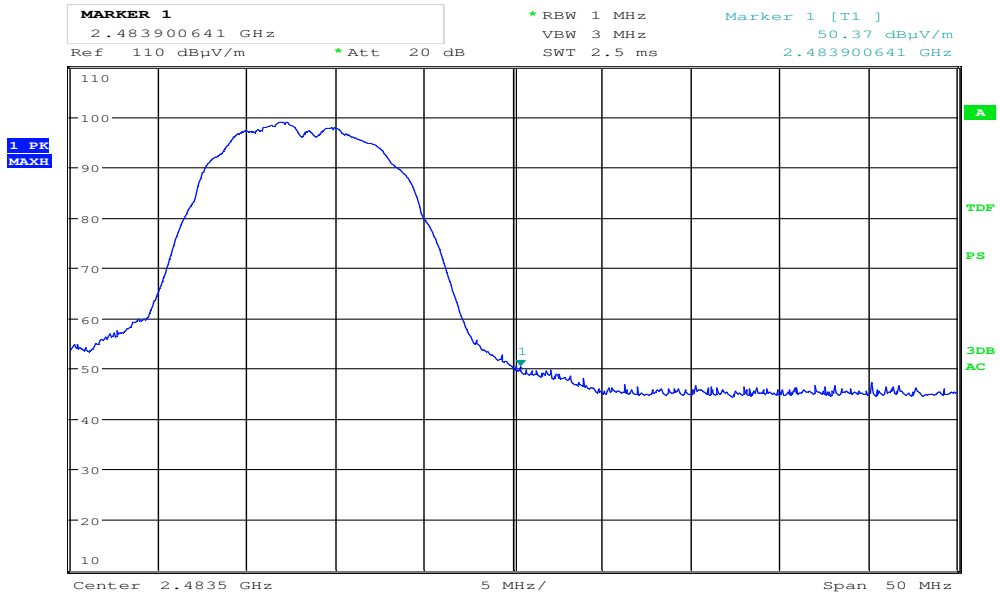
Upper Band Edge, Average, 2467 MHz, 802.11n, MCS0, MIMO (Max: VP)



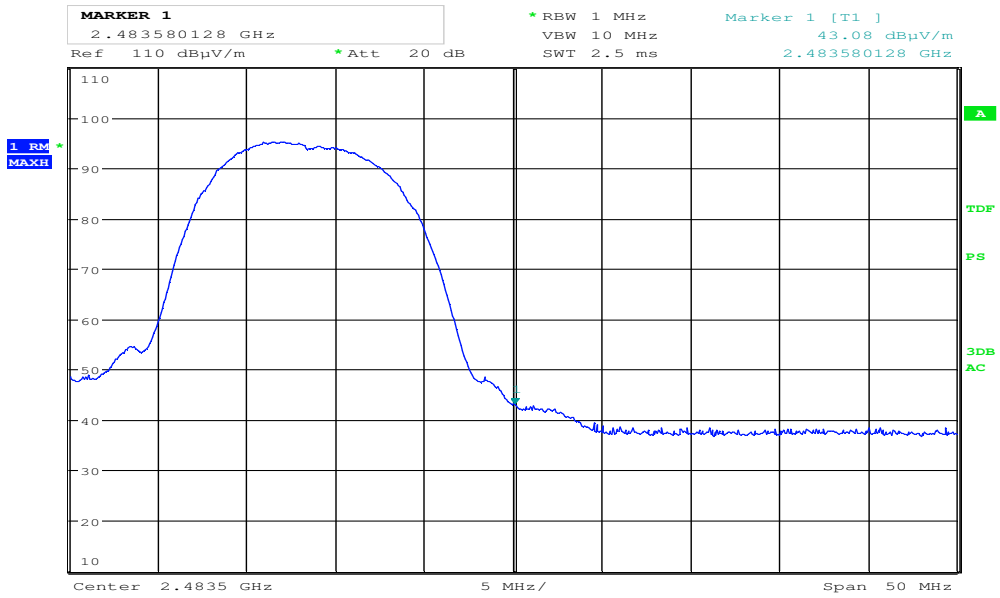
Upper Band Edge, Peak, 2472 MHz, 802.11b, 1Mb, (Max: Ant 0, VP)



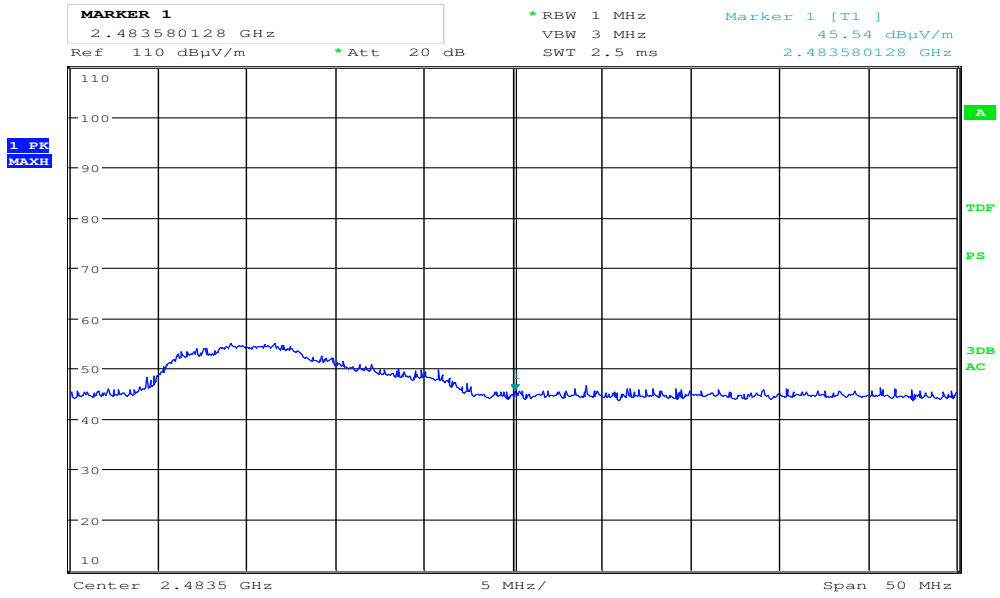
Upper Band Edge, Average, 2472 MHz, 802.11b, 1Mb, (Max: Ant 0, VP)



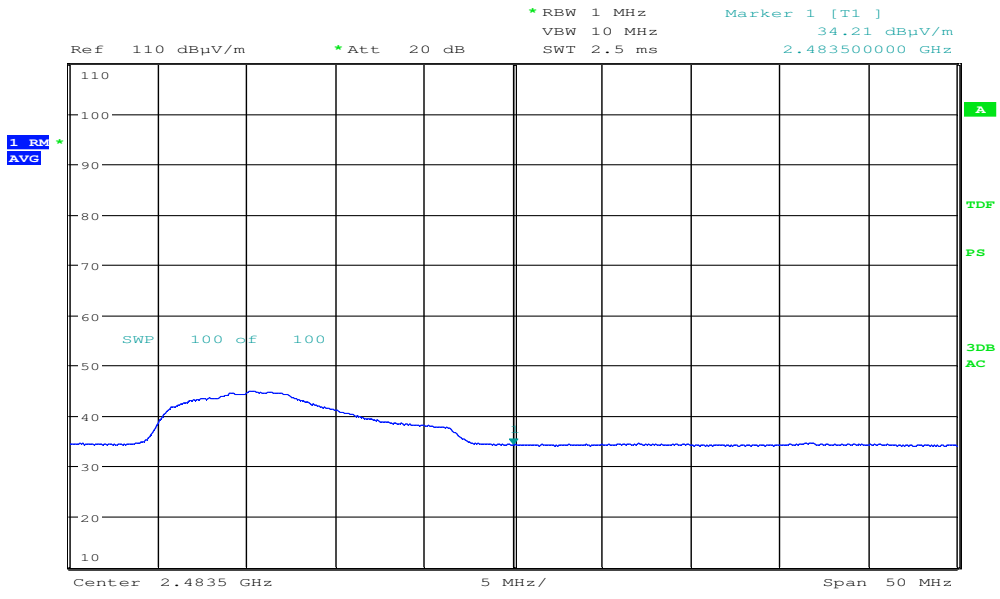
Upper Band Edge, Peak, 2472 MHz, 802.11b, 1Mb, (Max: Ant 1, VP)



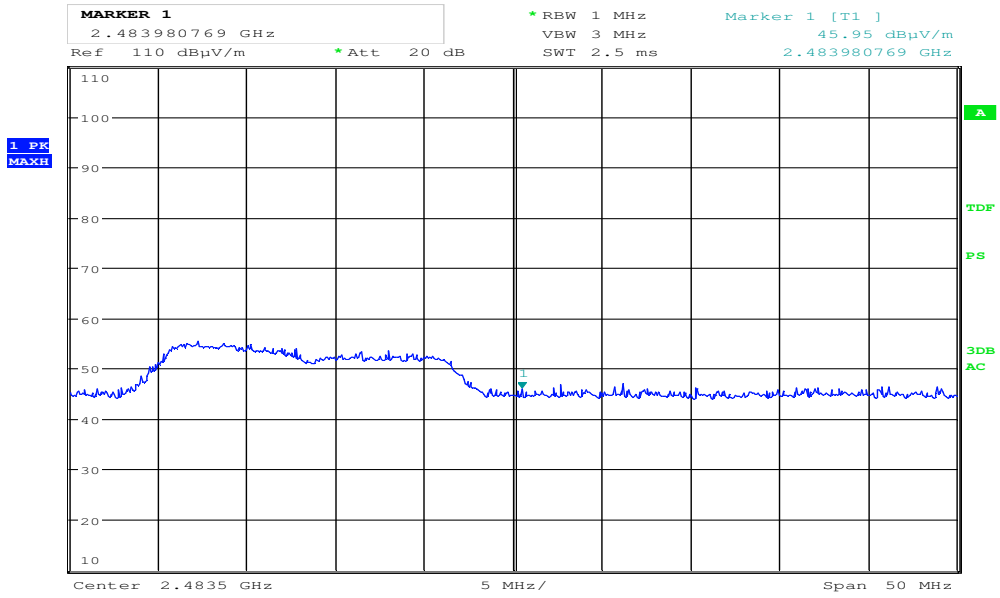
Upper Band Edge, Average, 2472 MHz, 802.11b, 1Mb, (Max: Ant 1, VP)



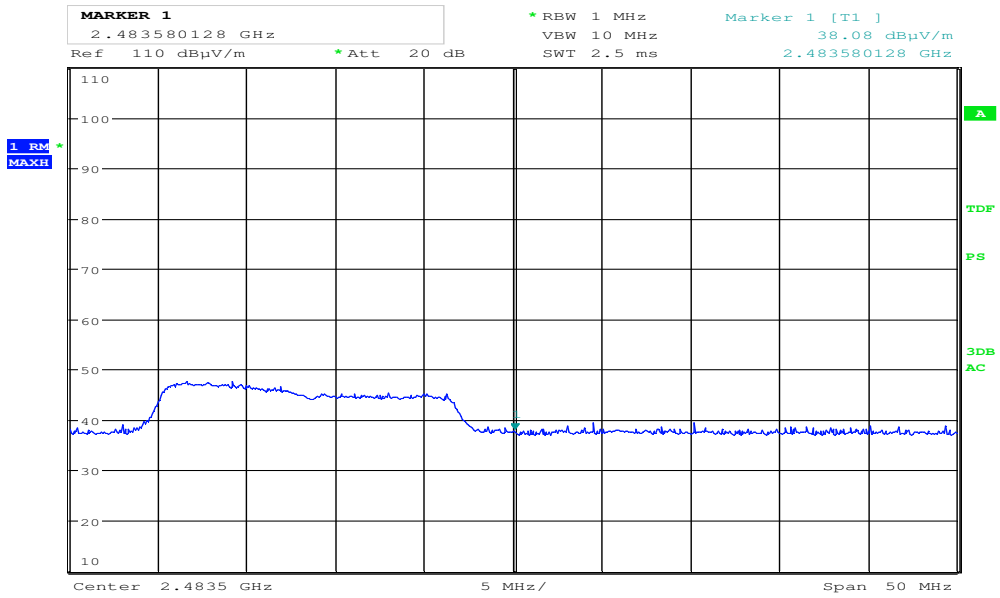
Upper Band Edge, Peak, 2472 MHz, 802.11g, 6Mb, (Max: Ant 0, VP)



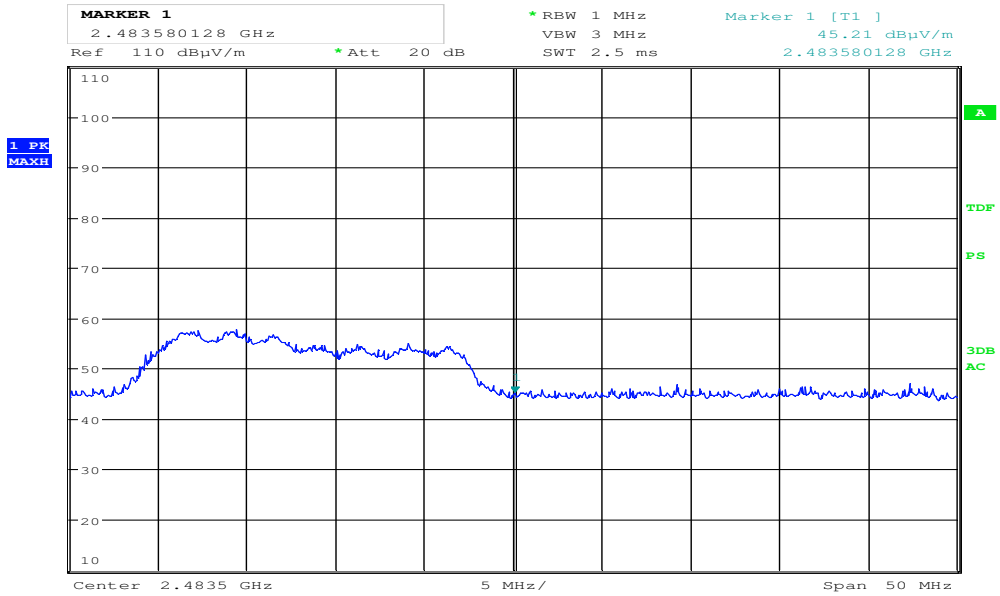
Upper Band Edge, Average, 2472 MHz, 802.11g, 6Mb, (Max: Ant 0, VP)



Upper Band Edge, Peak, 2472 MHz, 802.11g, 6Mb, (Max: Ant 1, VP)

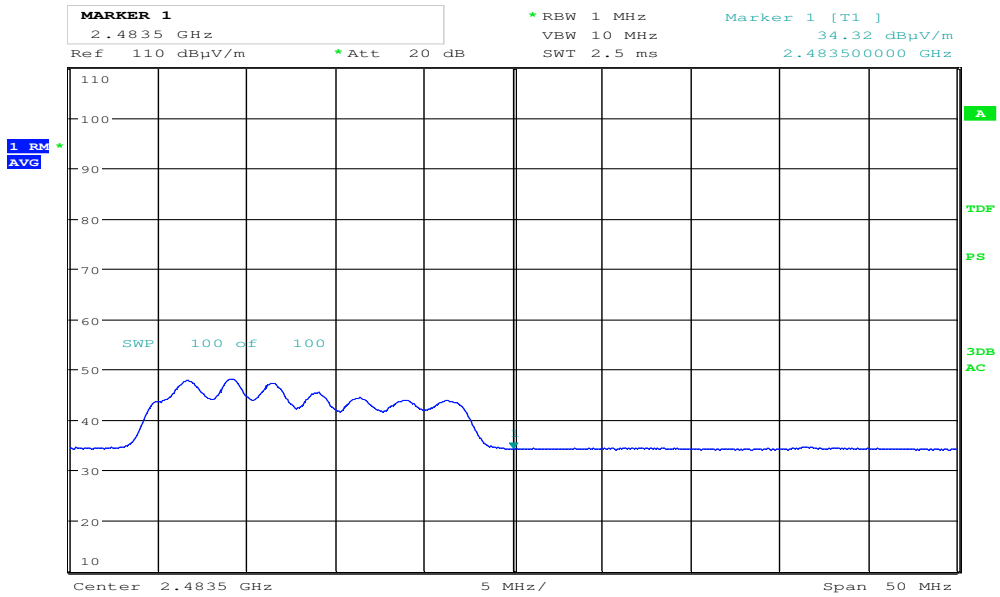


Upper Band Edge, Average, 2472 MHz, 802.11g, 6Mb, (Max: Ant 1, VP)



Date: 4.MAY.2018 15:06:27

Upper Band Edge, Peak, 2472 MHz, 802.11n, MCS0, MIMO (Max: VP)



Date: 4.MAY.2018 15:07:13

Upper Band Edge, Average, 2472 MHz, 802.11n, MCS0, MIMO (Max: VP)

3.3 Radiated Emissions, 30 – 1000 MHz

FCC 15.205, 15.209

ISED RSS-GEN Issue 5, Clause 8.9

Test Results: Complies

Measurement Data:

Detector: Quasi-Peak

Measuring distance: 3m

EUT Heigth: 0.8m at 1GHz and below, Conducting ground plane

Tested with all all connections active

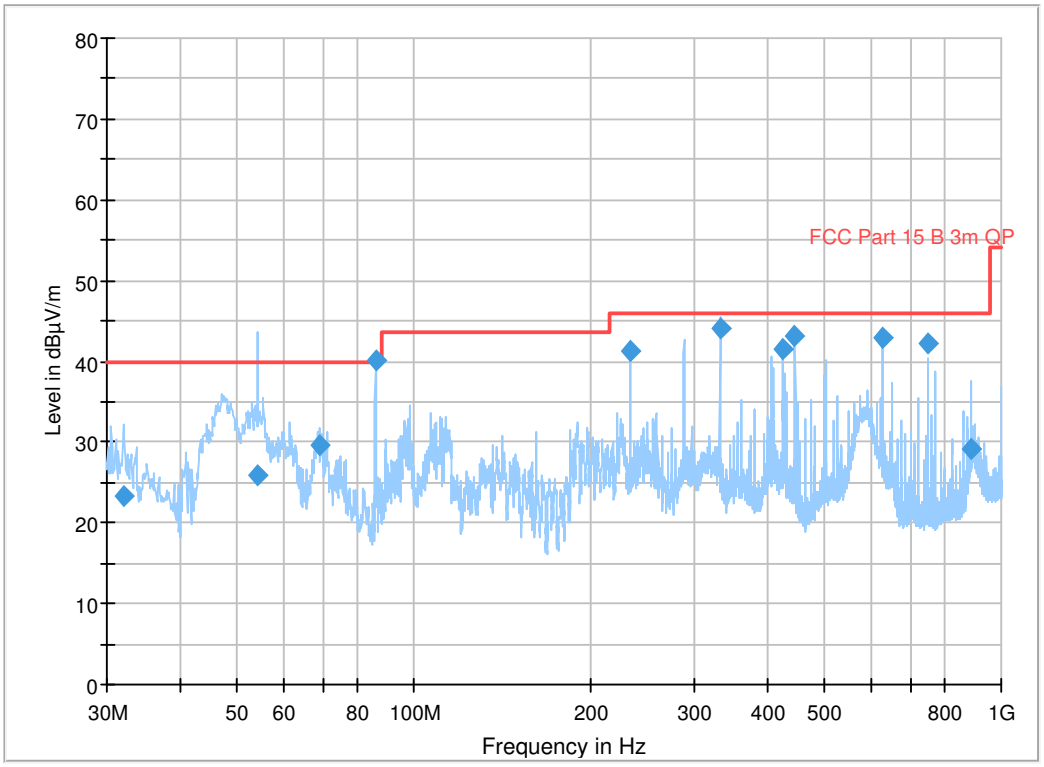
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
32.103550	23.27	40.00	16.73	1000.0	120.000	99.0	V	45.0	-12.3
53.988250	25.87	40.00	14.13	1000.0	120.000	101.0	V	175.0	-22.6
69.108750	29.59	40.00	10.41	1000.0	120.000	300.0	V	210.0	-24.1
86.015650	40.15	40.00	-0.15	1000.0	120.000	162.0	V	121.0	-23.0
233.470950	41.25	46.00	4.75	1000.0	120.000	151.0	H	102.0	-19.1
331.773950	44.16	46.00	1.84	1000.0	120.000	99.0	H	236.0	-16.1
425.000300	41.58	46.00	4.42	1000.0	120.000	106.0	V	110.0	-13.6
445.497550	43.21	46.00	2.79	1000.0	120.000	123.0	V	129.0	-13.1
626.684500	42.89	46.00	3.11	1000.0	120.000	173.0	V	166.0	-10.3
749.563750	42.24	46.00	3.76	1000.0	120.000	124.0	H	160.0	-7.9
890.994950	29.05	46.00	16.95	1000.0	120.000	205.0	V	83.0	-5.7

See attached plots.

Requirements/Limit

FCC	Part 15.209 @ frequencies defined in §15.205	
ISED	RSS-GEN Issue 5, clause 8.9 @ frequencies defined in clause 8.10	
	Radiated emission limit @3 meters	
Frequency (MHz)	Quasi Peak (µV/m)	Quasi Peak (dBµV/m)
30 – 88	100	40.0
88 – 216	150	43.5
216 – 960	200	46.0
Above 960	500	54.0

Full Spectrum



Radiated Emissions, 30 -1000MHz

3.4 Radiated Emissions, 1-25 GHz

FCC 15.205, 15.209

ISED RSS-GEN Issue 5, Clause 8.9

Test Results: Complies

Measurement Data:

Measuring distance: 3m (1 – 18 GHz)
1m (18 – 26 GHz)

EUT Heigth: 1.5m for all frequencies above 1 GHz

Radiated Emissions in Restricted Bands						
Carrier Modulation	**Carrier Freq MHz**	**Measured Freq MHz**	**Measured value Peak dBµV/m @3m**	**Measured value AV dBµV/m @3m**	**Limit (dBµV/m)**	**Verdict**
Any	**Any**	**1633.5**	**49.7**	**28.4**	**74/54**	**Complies**
Any	**Any**	**2079**	**47.9**	**34.0**	**74/54**	**Complies**
Any	**Any**	**2227.6**	**52.6**	**40.2**	**74/54**	**Complies**
Any	**Any**	**4870**	**<54**	**37.1**	**74/54**	**Complies**

* Not an emission from the radio

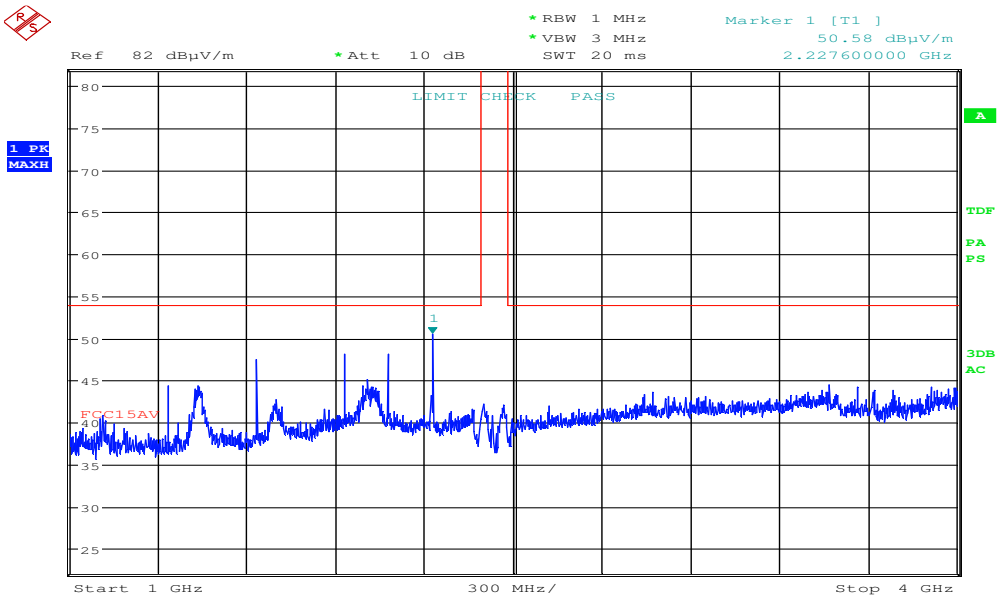
Only harmonics that fall in the restricted bands (ref. §15.205) have been checked.

Antenna factor, amplifier gain and cable loss are included in Spectrum Analyzer “Transducer factor”.

See attached plots.

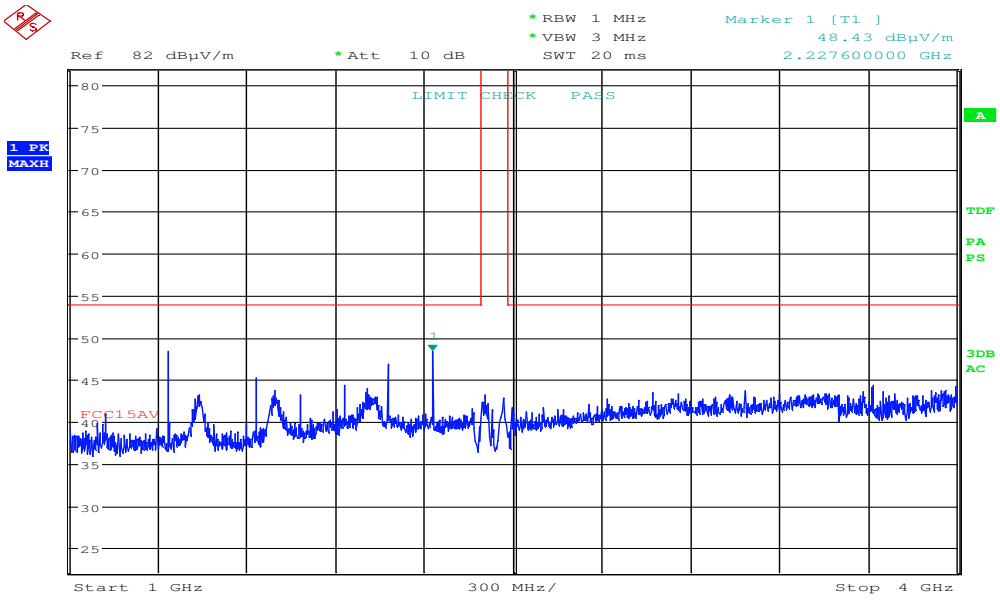
Requirements/Limit

FCC	**Part 15.209 @ frequencies defined in §15.205**	
ISED	**RSS-GEN Issue 5, clause 8.9 @ frequencies defined in clause 8.10**	
	Radiated emission limit @3 meters	
Frequency (MHz)	**AV (dBµV/m)**	**Peak (dBµV/m)**
Above 1 GHz	**54.0**	**74.0**



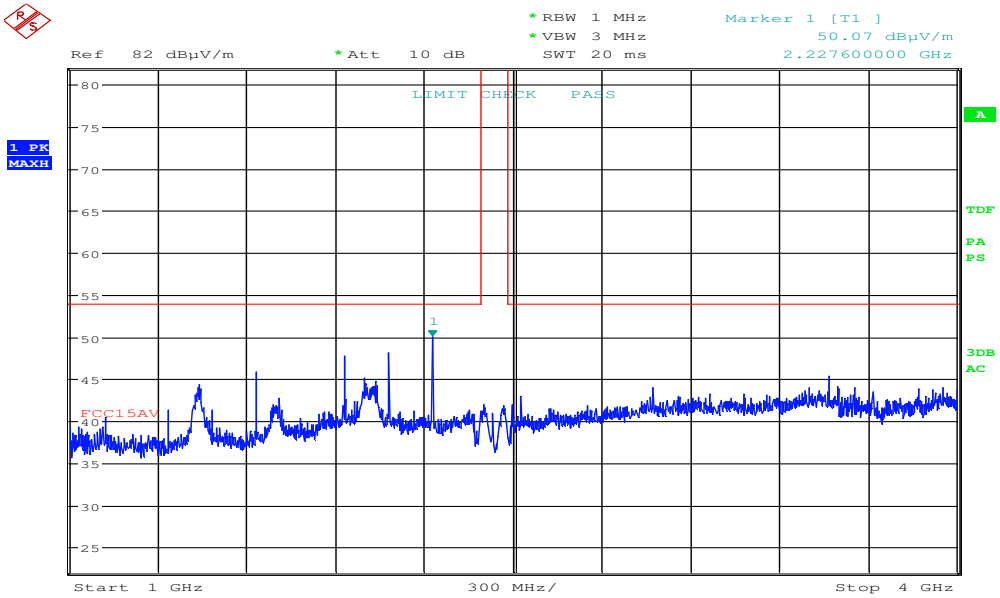
Date: 15.MAY.2018 17:01:36

Radiated Emissions, 1000 -4000 MHz, 2412 MHz, 802.11b, 1Mb, Ant0, HP



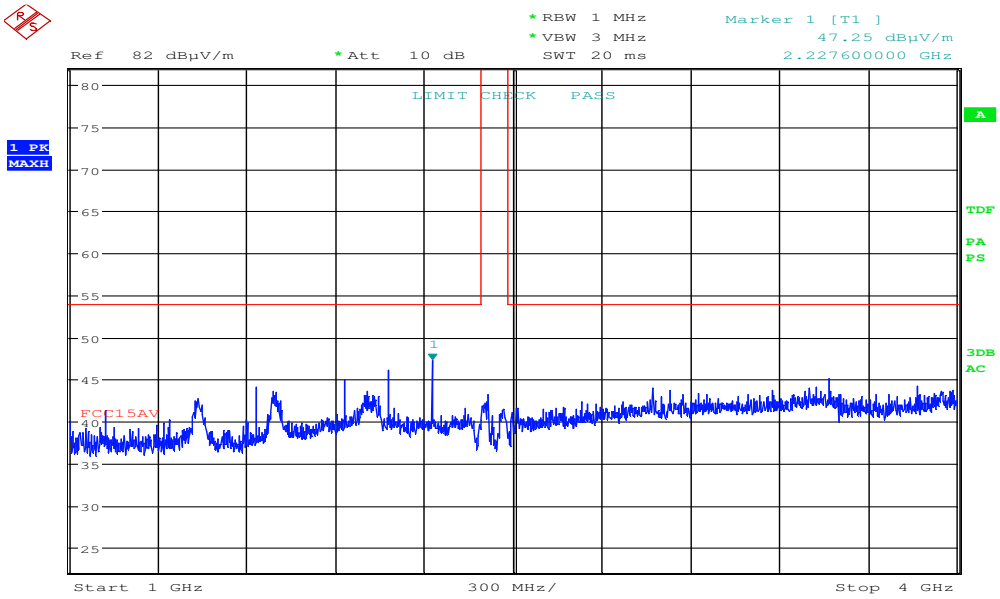
Date: 15.MAY.2018 16:59:31

Radiated Emissions, 1000 -4000 MHz, 2412 MHz, 802.11b, 1Mb, Ant0, VP



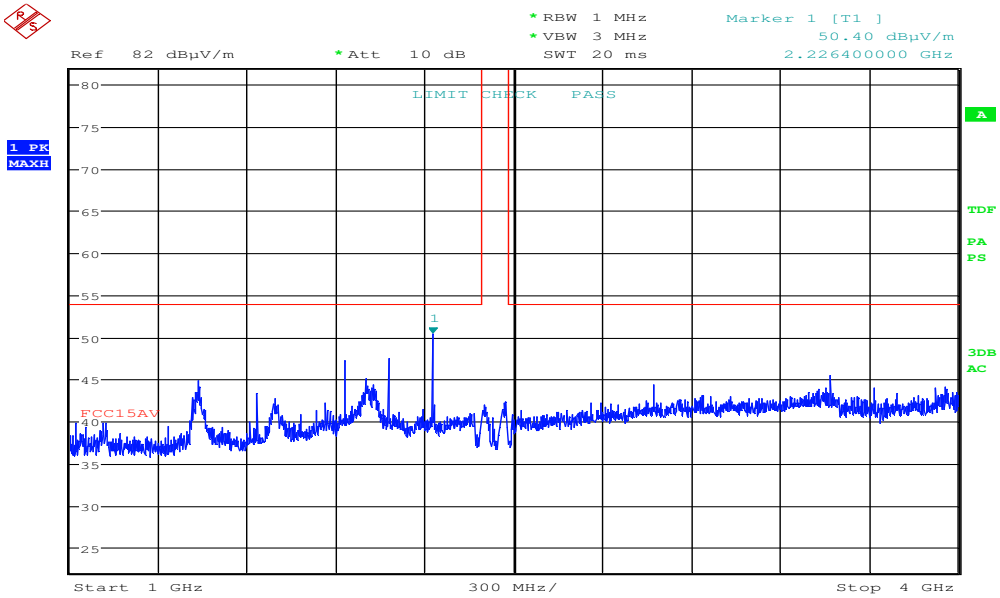
Date: 15.MAY.2018 17:19:15

Radiated Emissions, 1000 -4000 MHz, 2412 MHz, 802.11b, 1Mb, Ant1, HP



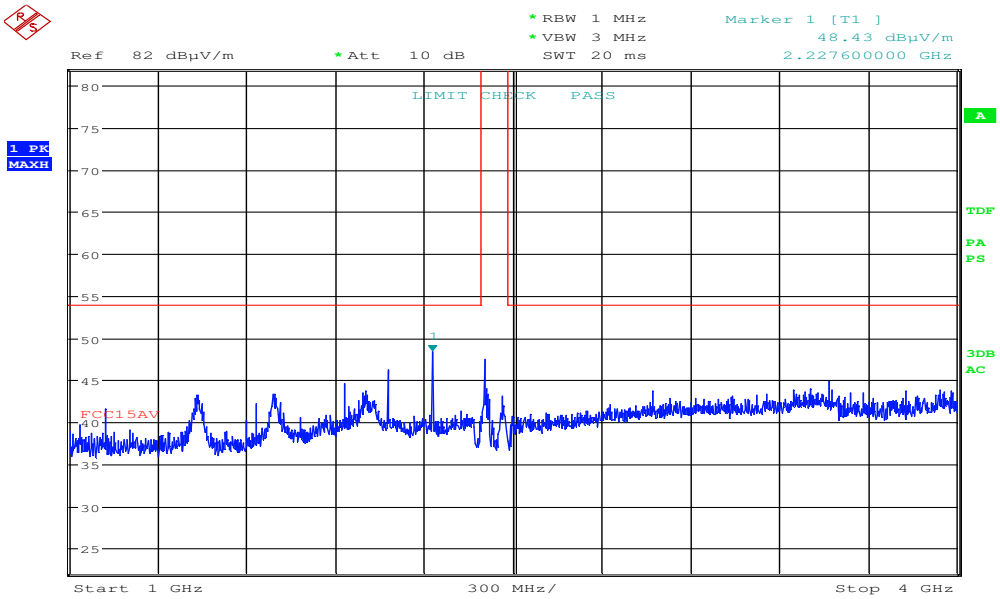
Date: 15.MAY.2018 17:17:10

Radiated Emissions, 1000 -4000 MHz, 2412 MHz, 802.11b, 1Mb, Ant1, VP



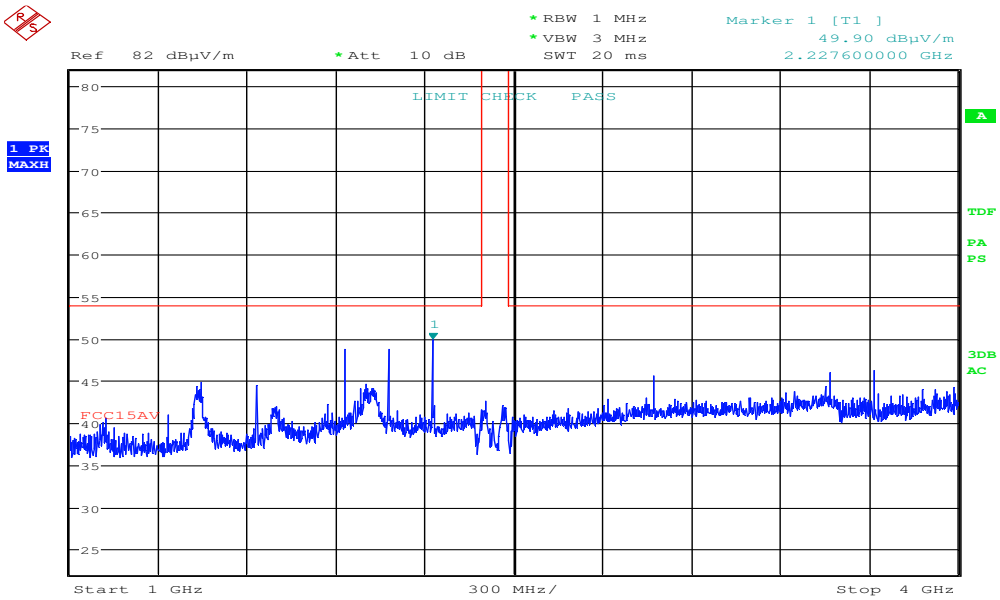
Date: 15.MAY.2018 19:34:41

Radiated Emissions, 1000 -4000 MHz, 2412 MHz, 802.11n, MCS0, MIMO, HP



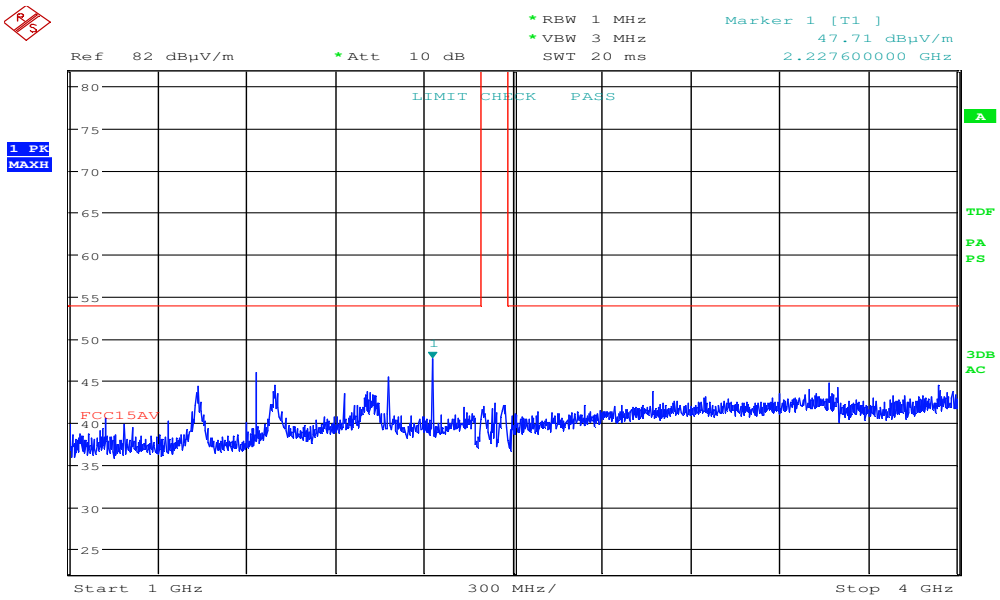
Date: 15.MAY.2018 19:32:38

Radiated Emissions, 1000 -4000 MHz, 2412 MHz, 802.11n, MCS0, MIMO, VP



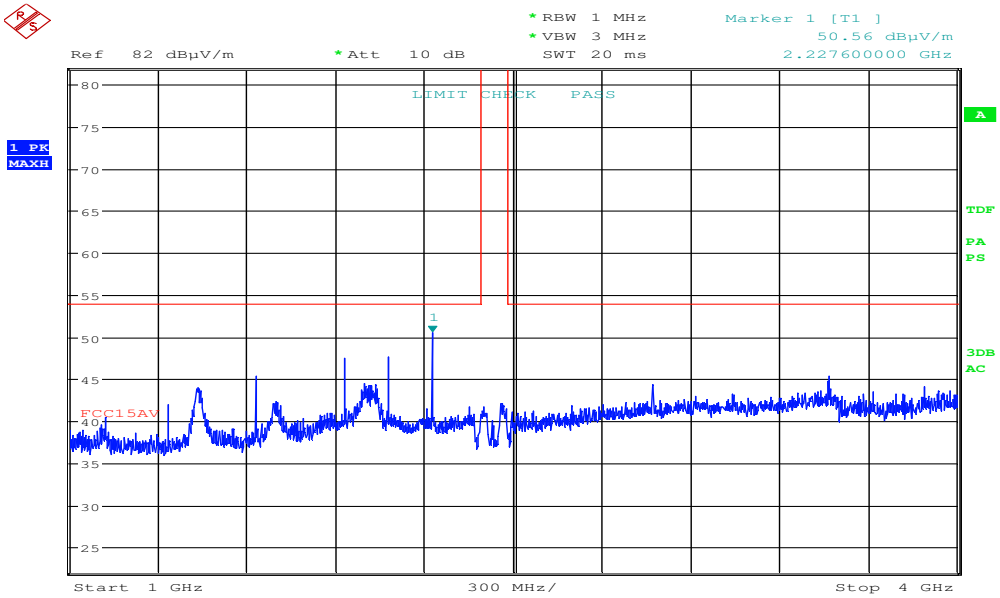
Date: 15.MAY.2018 17:25:28

Radiated Emissions, 1000 -4000 MHz, 2437 MHz, 802.11b, 1Mb, Ant0, HP



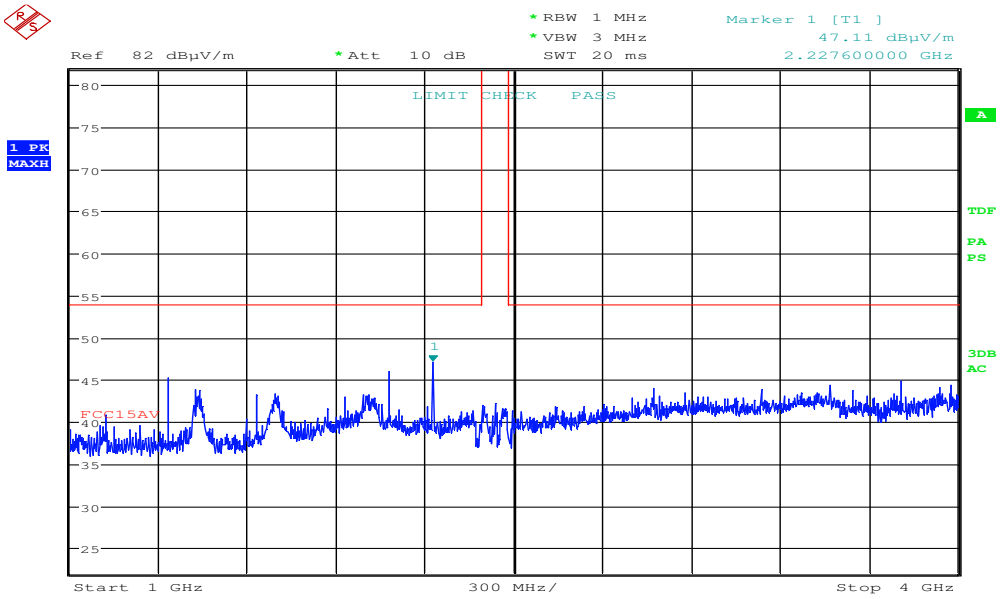
Date: 15.MAY.2018 17:23:22

Radiated Emissions, 1000 -4000 MHz, 2437 MHz, 802.11b, 1Mb, Ant0, VP



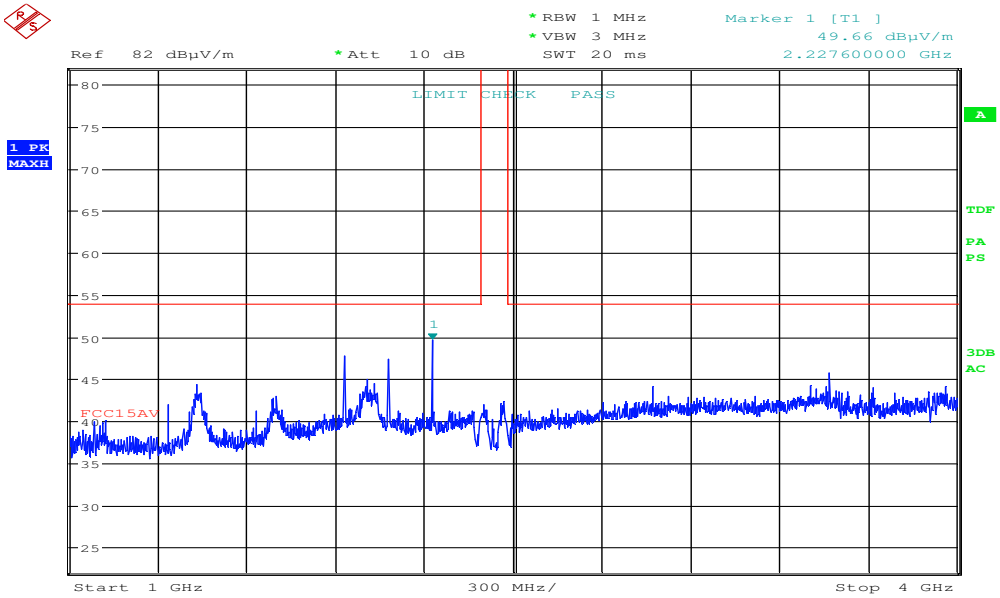
Date: 15.MAY.2018 17:30:43

Radiated Emissions, 1000 -4000 MHz, 2437 MHz, 802.11b, 1Mb, Ant1, HP



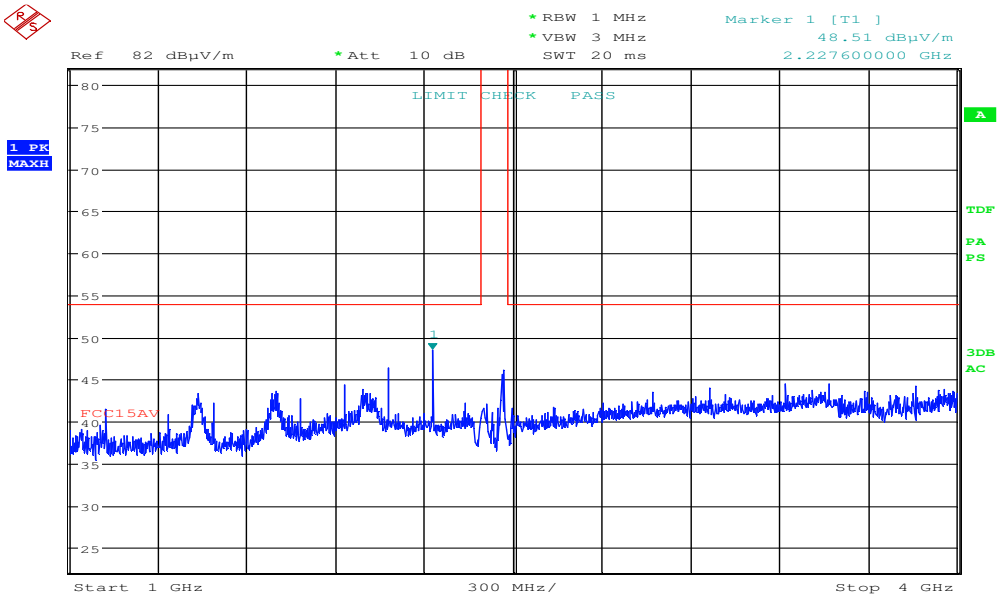
Date: 15.MAY.2018 17:28:38

Radiated Emissions, 1000 -4000 MHz, 2437 MHz, 802.11b, 1Mb, Ant1, VP



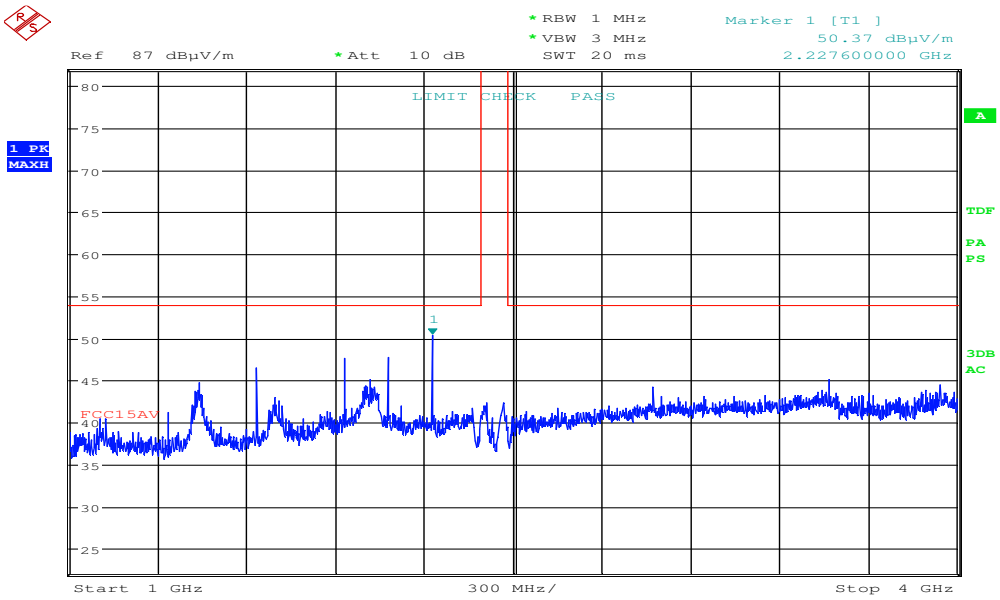
Date: 15.MAY.2018 19:41:04

Radiated Emissions, 1000 -4000 MHz, 2457 MHz, 802.11n, MCS0, MIMO, HP



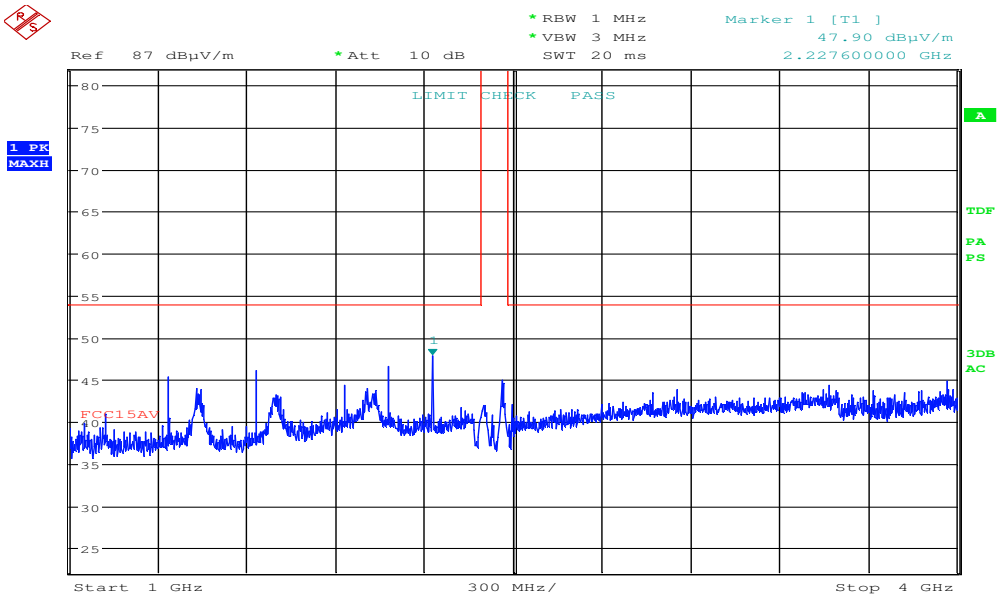
Date: 15.MAY.2018 19:38:59

Radiated Emissions, 1000 -4000 MHz, 2457 MHz, 802.11n, MCS0, MIMO, VP



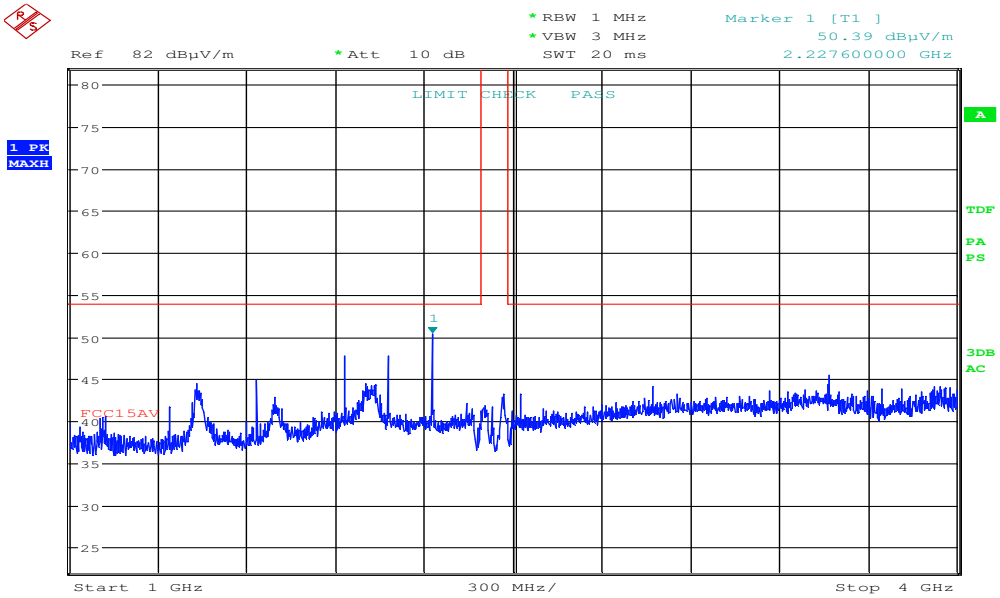
Date: 15.MAY.2018 17:07:02

Radiated Emissions, 1000 -4000 MHz, 2462 MHz, 802.11b, 1Mb, Ant0, HP



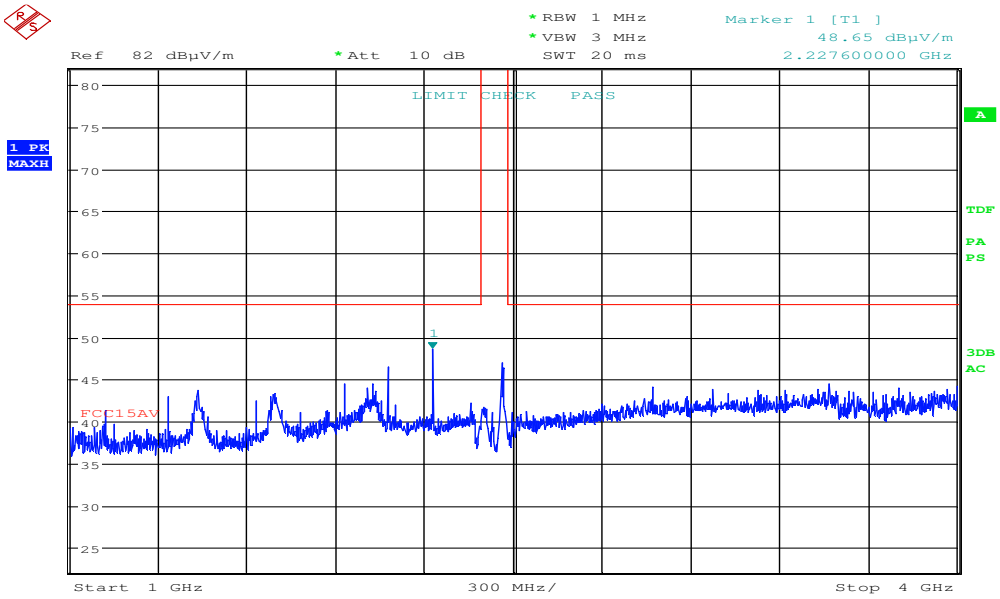
Date: 15.MAY.2018 17:04:57

Radiated Emissions, 1000 -4000 MHz, 2462 MHz, 802.11b, 1Mb, Ant0, VP



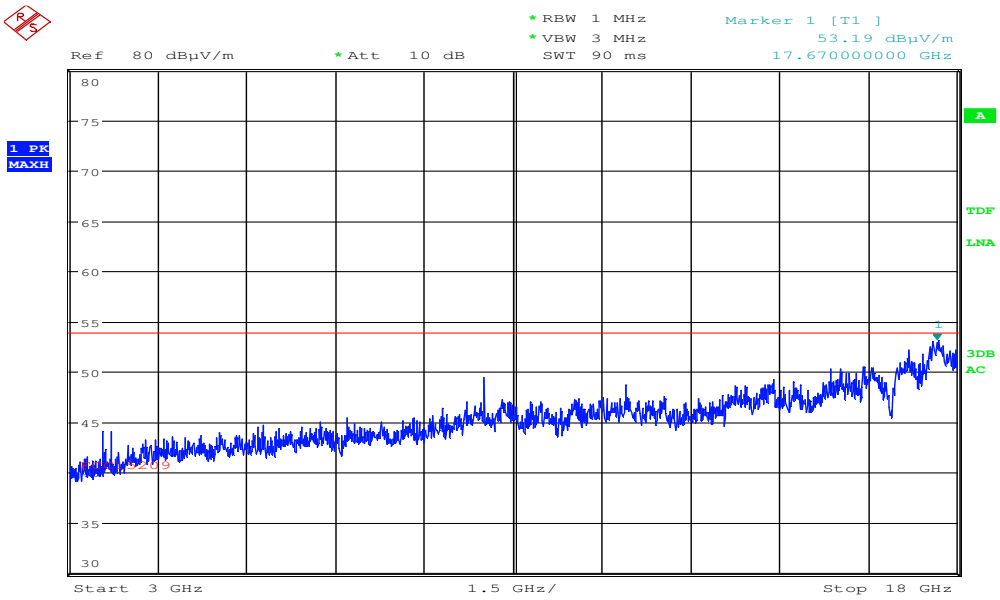
Date: 15.MAY.2018 17:12:57

Radiated Emissions, 1000 -4000 MHz, 2462 MHz, 802.11b, 1Mb, Ant1, HP



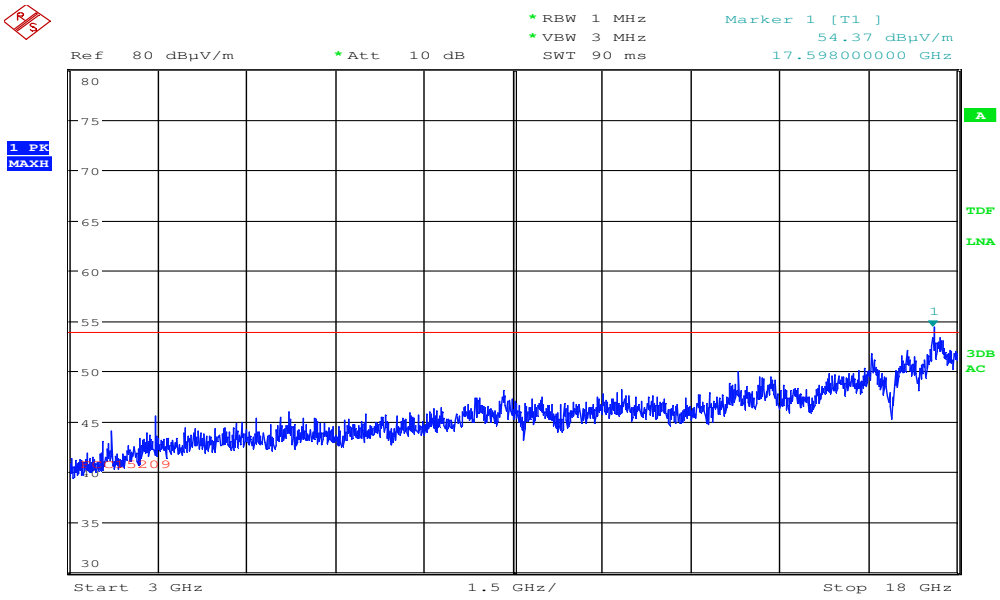
Date: 15.MAY.2018 17:10:52

Radiated Emissions, 1000 -4000 MHz, 2462 MHz, 802.11b, 1Mb, Ant1, VP



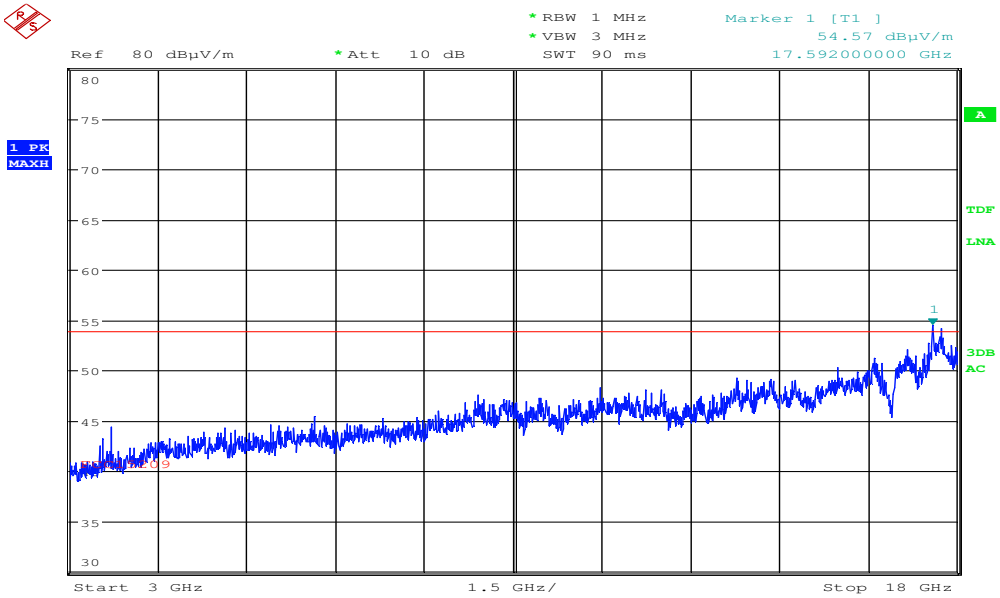
Date: 24.MAY.2018 09:40:45

Radiated Emissions, 3000 -18000 MHz, 2412 MHz, 802.11b, 1Mbps, Ant0, HP



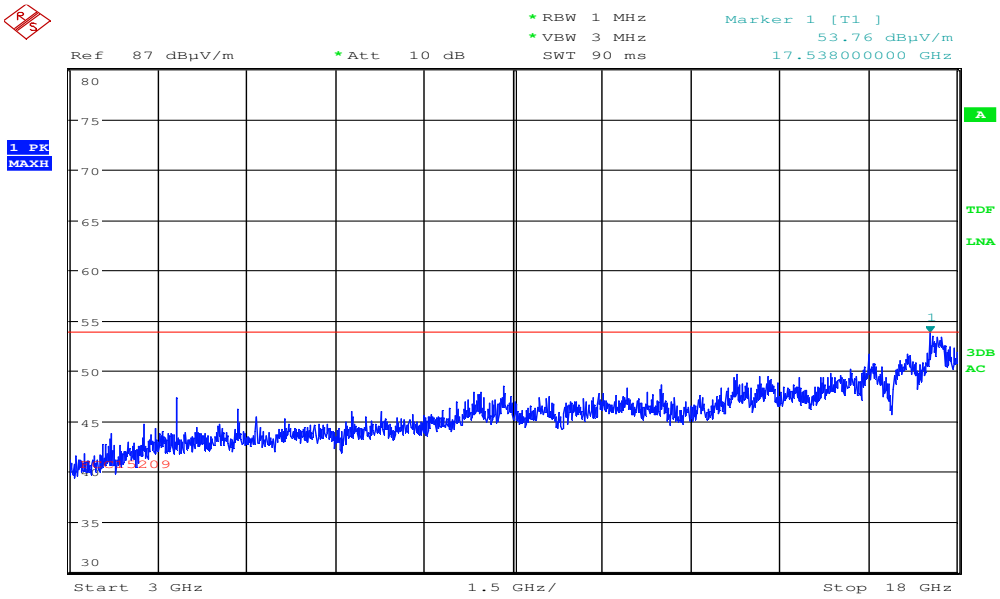
Date: 24.MAY.2018 09:21:05

Radiated Emissions, 3000 -18000 MHz, 2412 MHz, 802.11b, 1Mbps, Ant0, VP



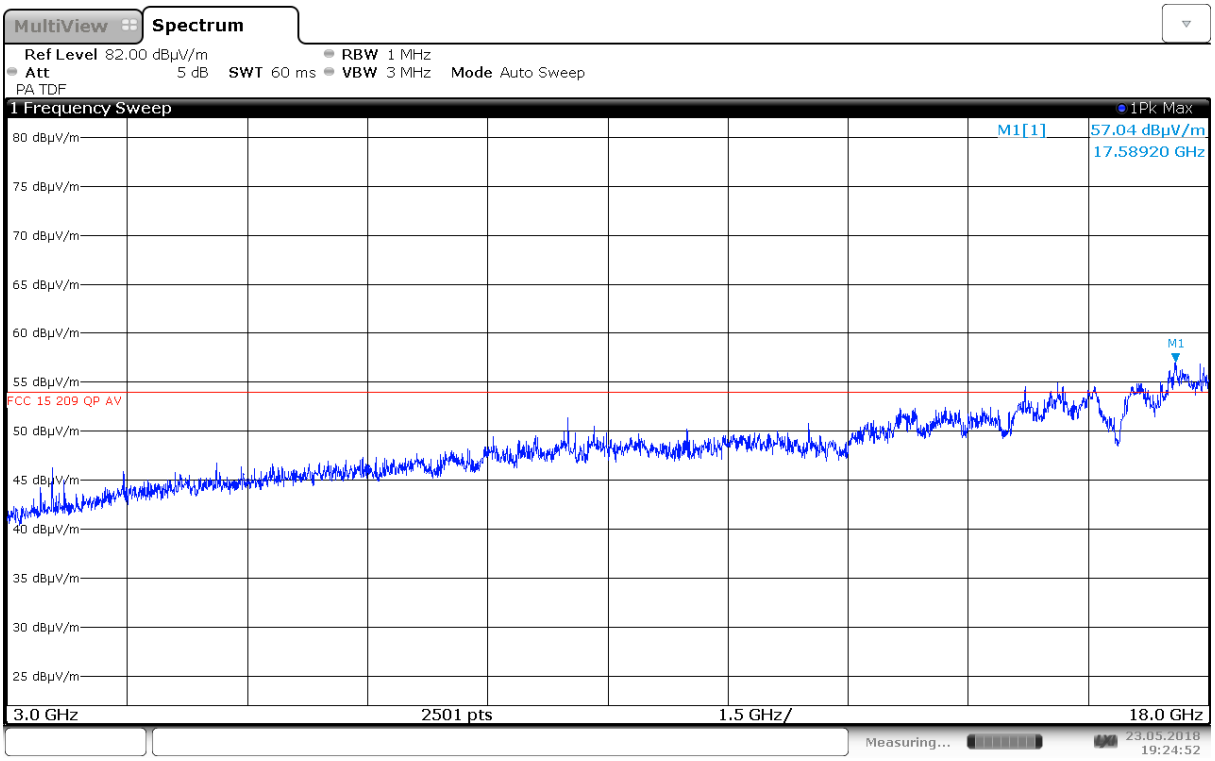
Date: 24.MAY.2018 09:43:20

Radiated Emissions, 3000 -18000 MHz, 2412 MHz, 802.11b, 1Mbps, Ant1, HP

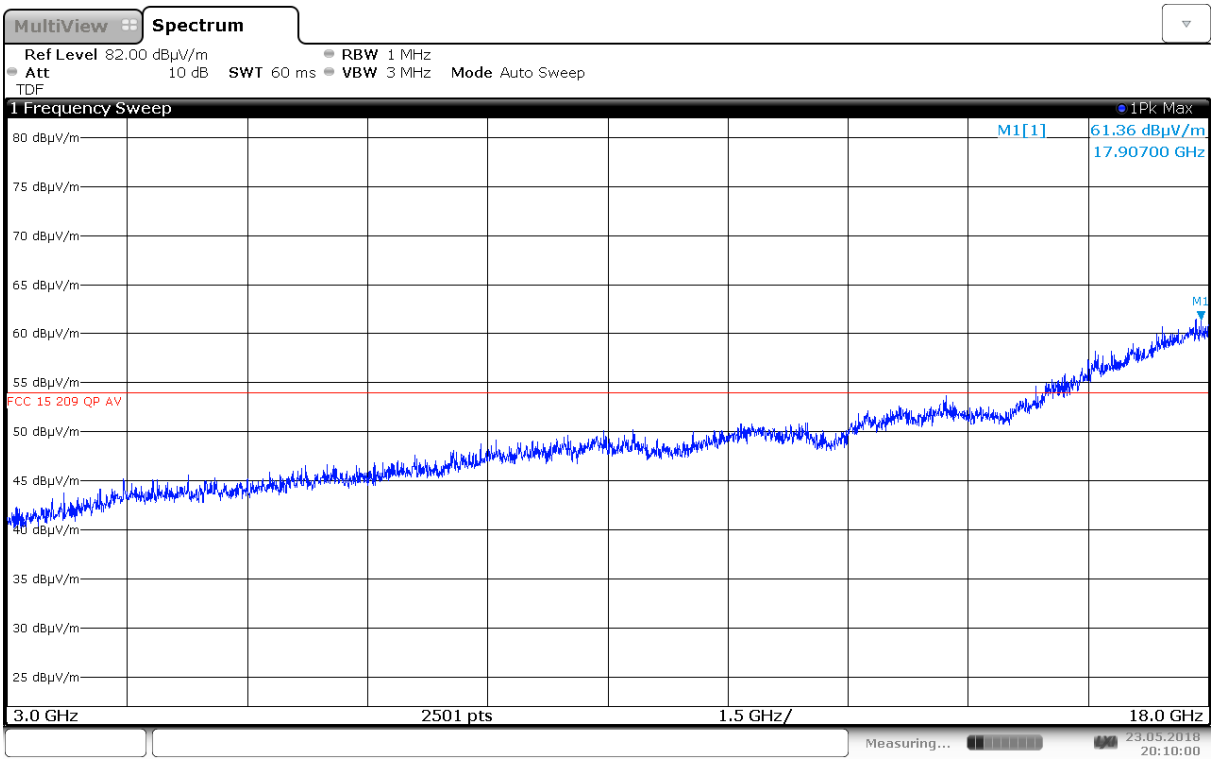


Date: 24.MAY.2018 09:23:24

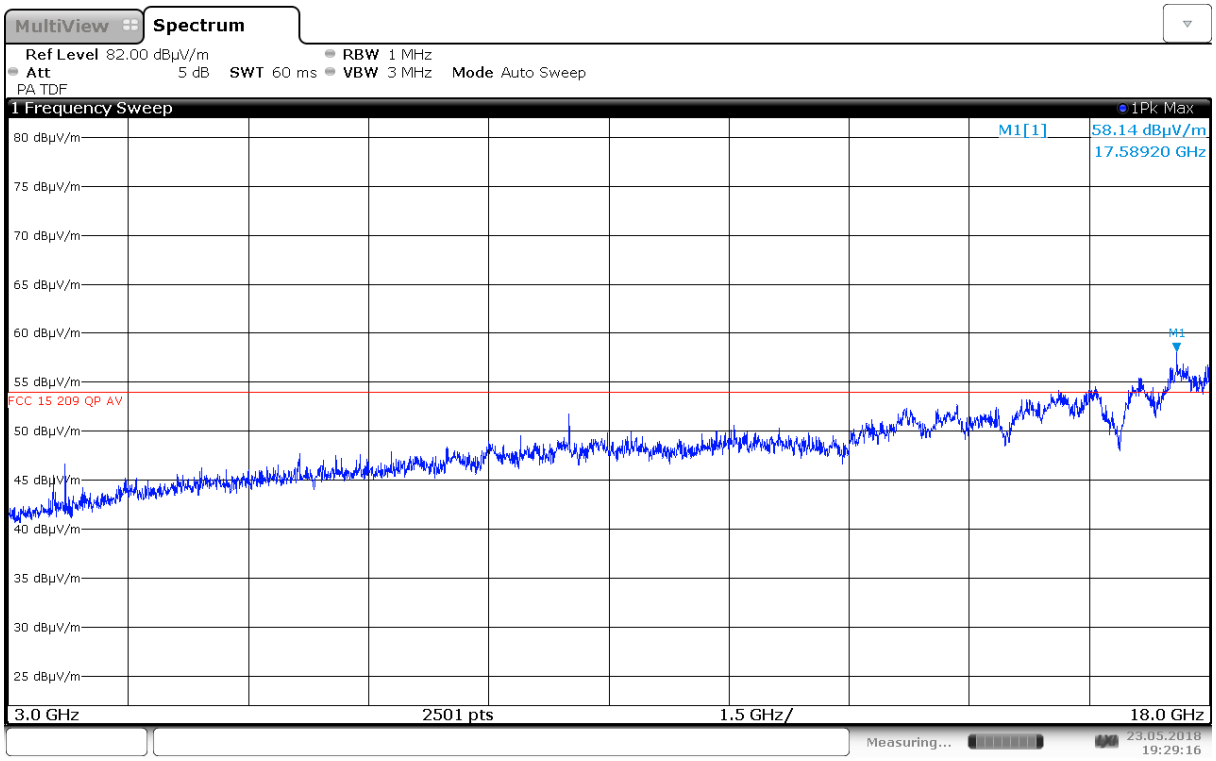
Radiated Emissions, 3000 -18000 MHz, 2412 MHz, 802.11b, 1Mbps, Ant1, VP



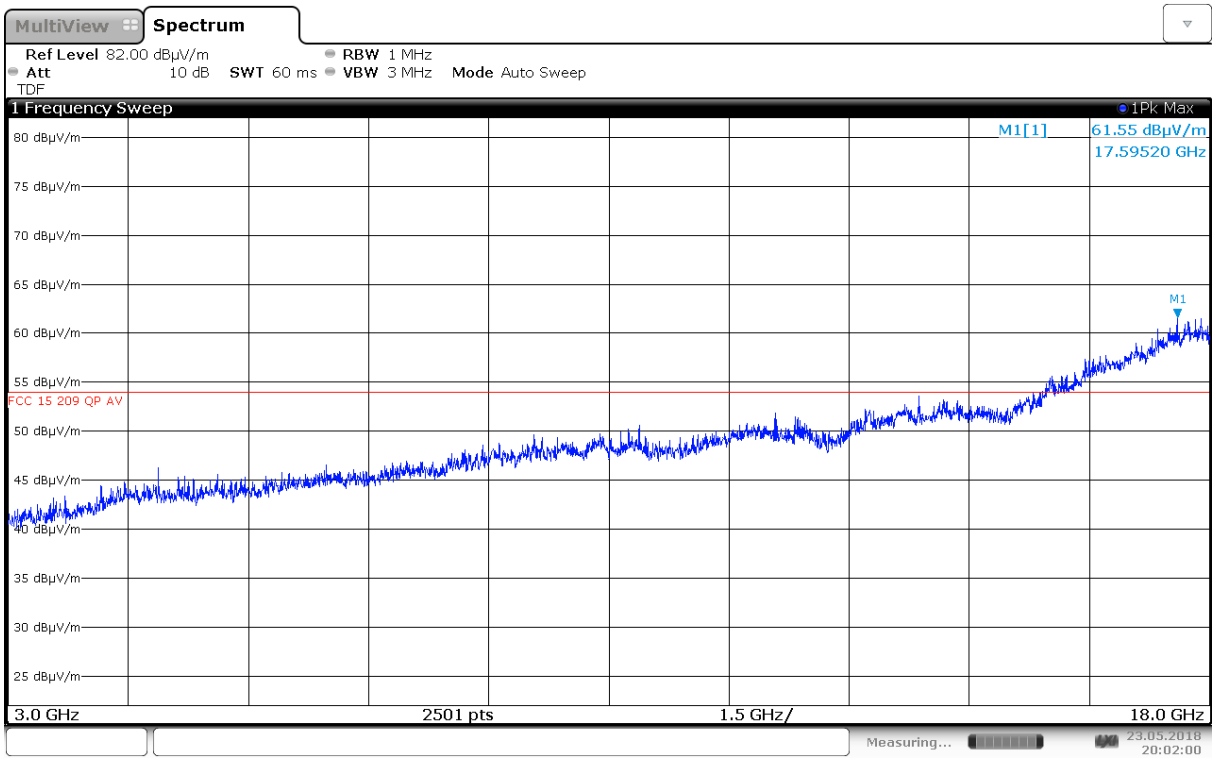
Radiated Emissions, 3000 -18000 MHz, 2437 MHz, 802.11b, 1Mbps, Ant0, HP



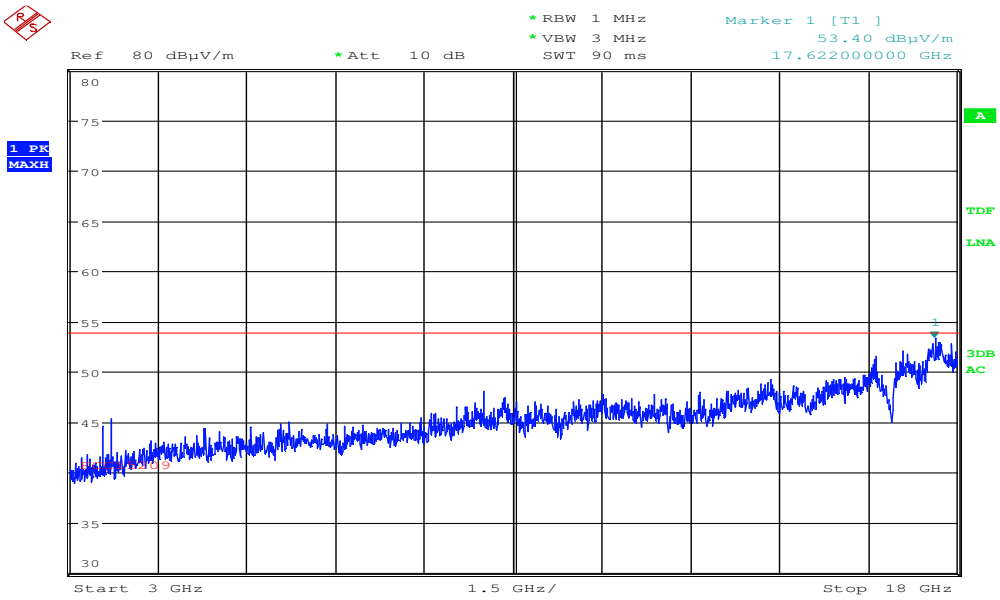
Radiated Emissions, 3000 -18000 MHz, 2437 MHz, 802.11b, 1Mbps, Ant0, VP



Radiated Emissions, 3000 -18000 MHz, 2437 MHz, 802.11b, 1Mbps, Ant1, HP

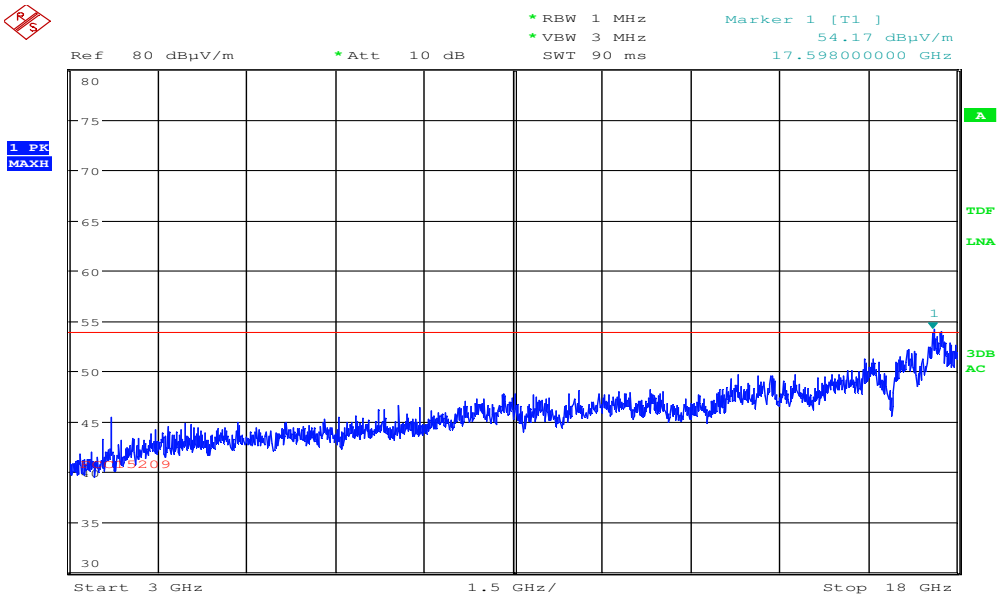


Radiated Emissions, 3000 -18000 MHz, 2437 MHz, 802.11b, 1Mbps, Ant1, VP



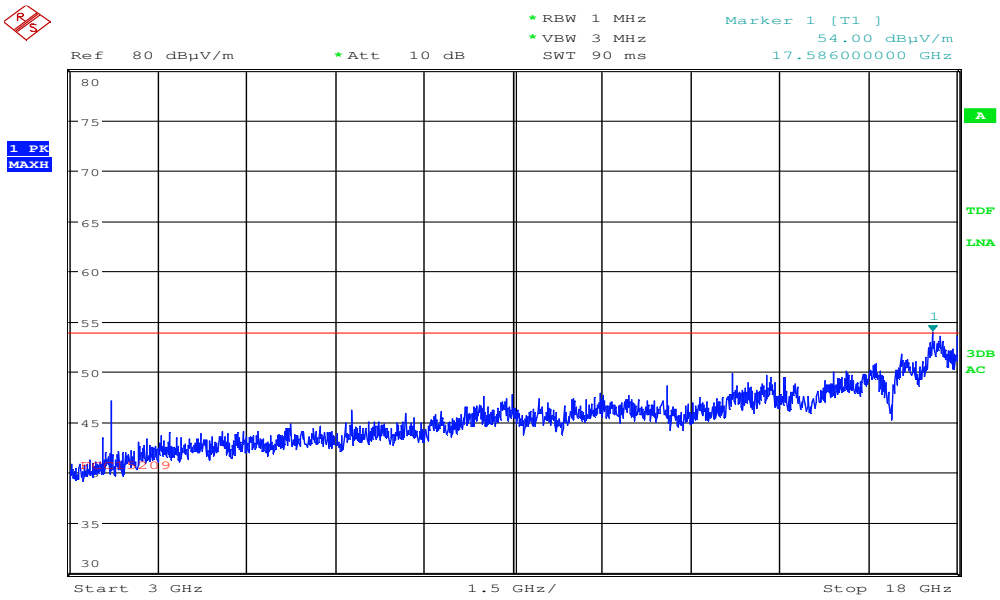
Date: 24.MAY.2018 09:36:32

Radiated Emissions, 3000 -18000 MHz, 2437 MHz, 802.11n, MCS0, MIMO, HP



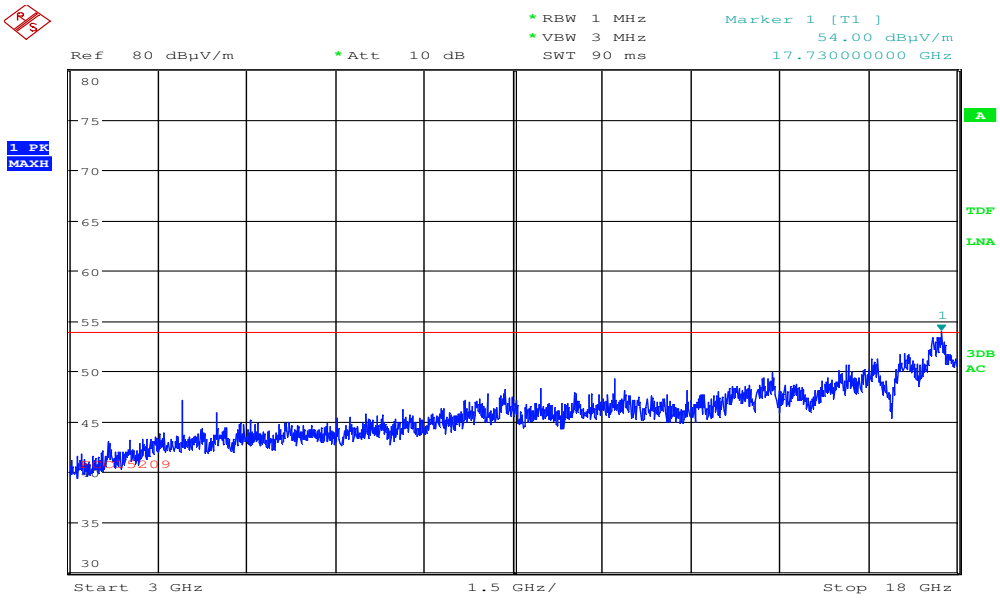
Date: 24.MAY.2018 09:32:43

Radiated Emissions, 3000 -18000 MHz, 2437 MHz, 802.11n, MCS0, MIMO, VP



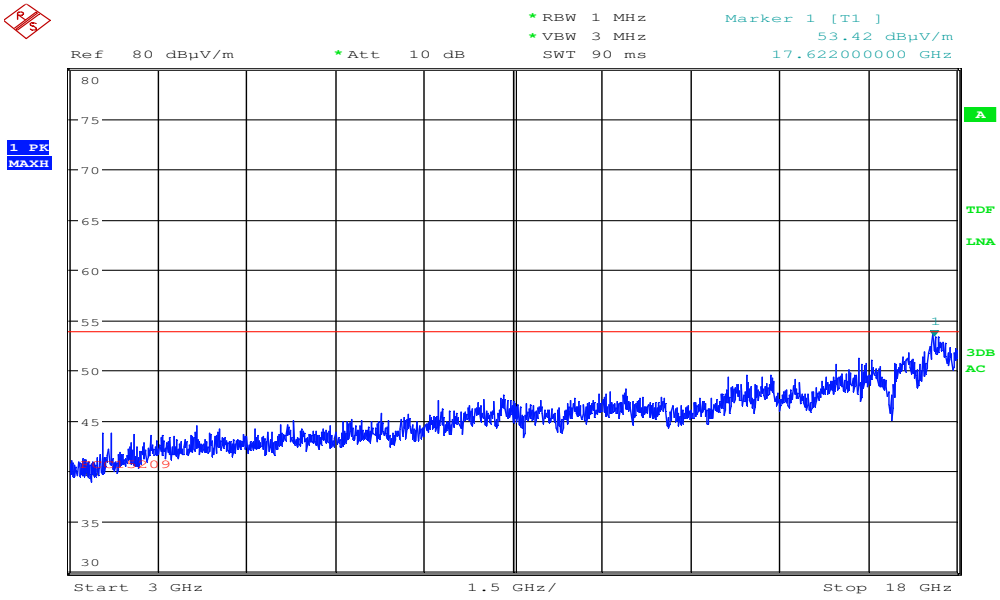
Date: 24.MAY.2018 09:47:24

Radiated Emissions, 3000 -18000 MHz, 2462 MHz, 802.11b, 1Mbps, Ant0, HP



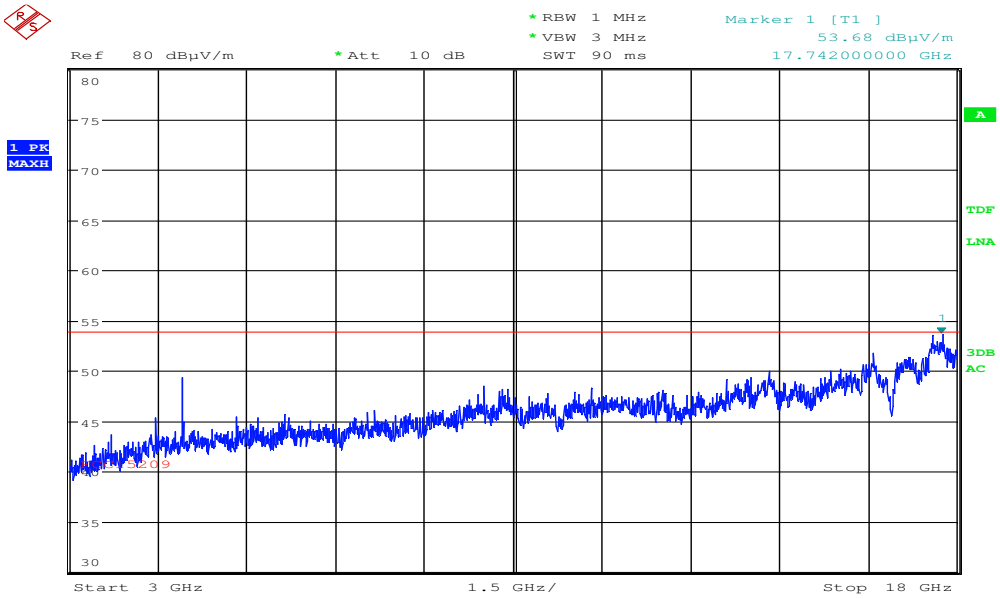
Date: 24.MAY.2018 09:26:34

Radiated Emissions, 3000 -18000 MHz, 2462 MHz, 802.11b, 1Mbps, Ant0, VP



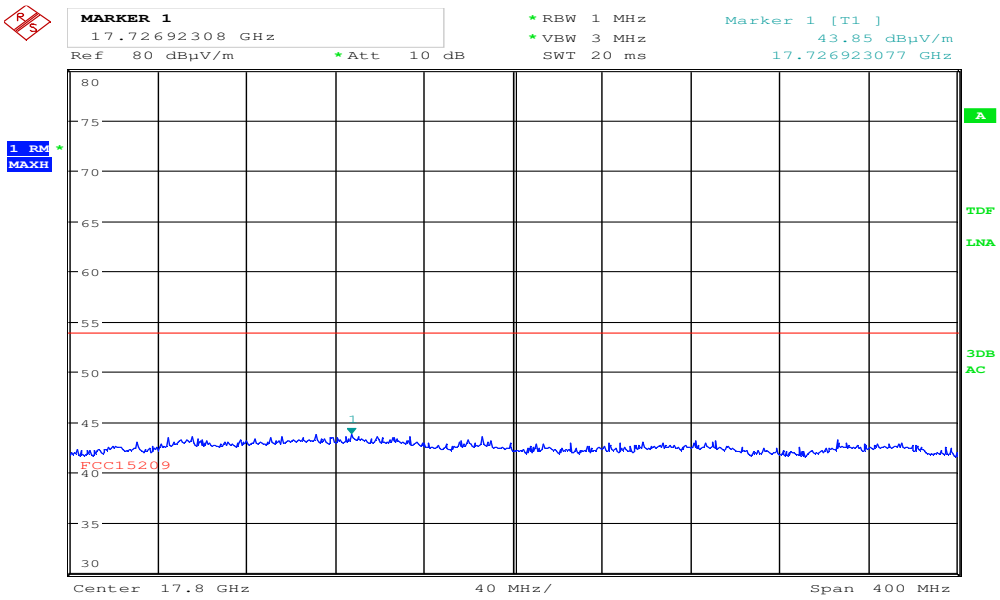
Date: 24.MAY.2018 09:49:34

Radiated Emissions, 3000 -18000 MHz, 2462 MHz, 802.11b, 1Mbps, Ant1, HP



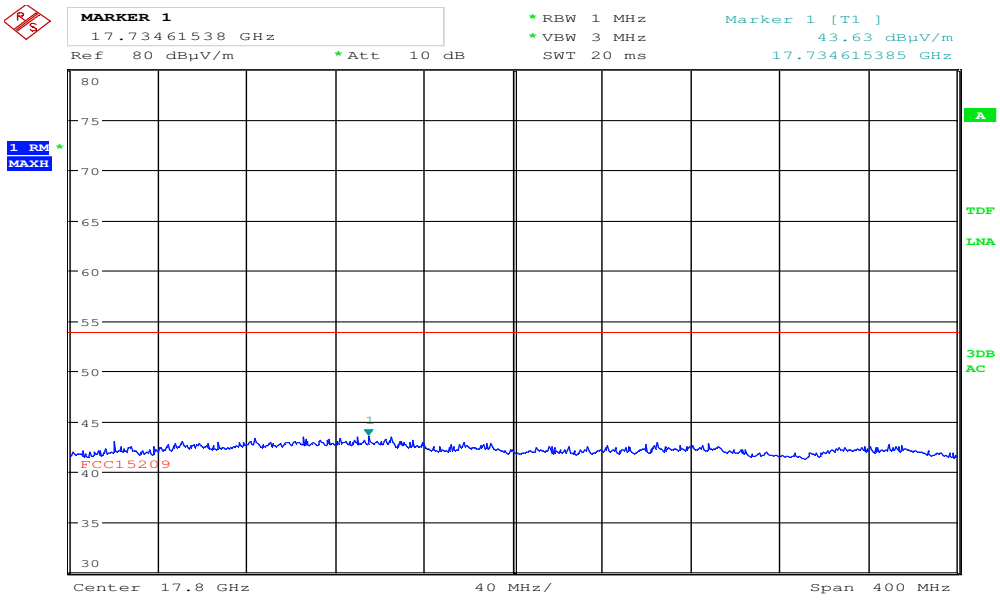
Date: 24.MAY.2018 09:29:09

Radiated Emissions, 3000 -18000 MHz, 2462 MHz, 802.11b, 1Mbps, Ant1, VP



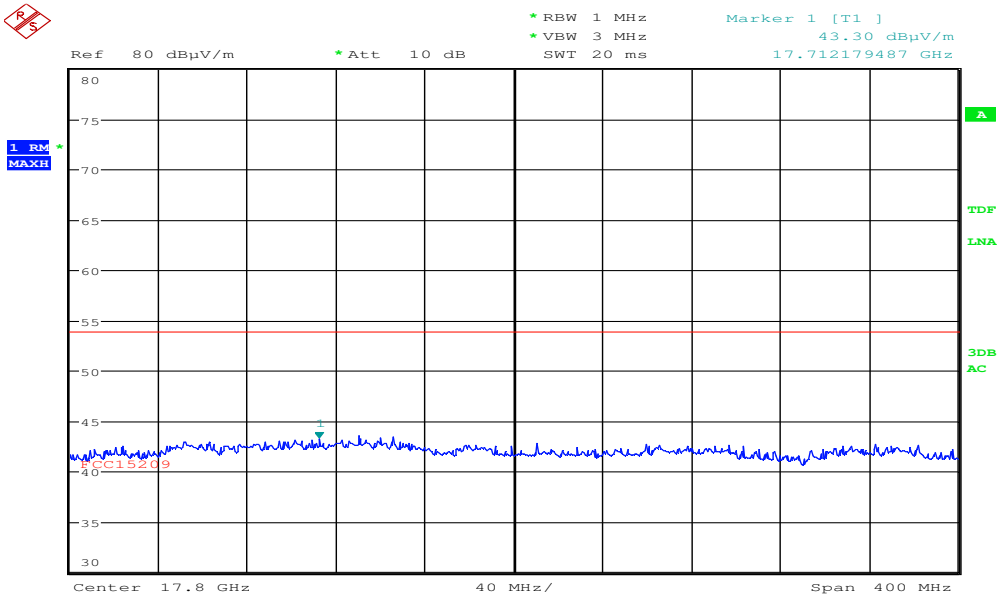
Date: 24.MAY.2018 09:55:45

Radiated Emissions, 17600 -18000 MHz, 2437 MHz, 802.11n, MCS0, MIMO, HP, RMS



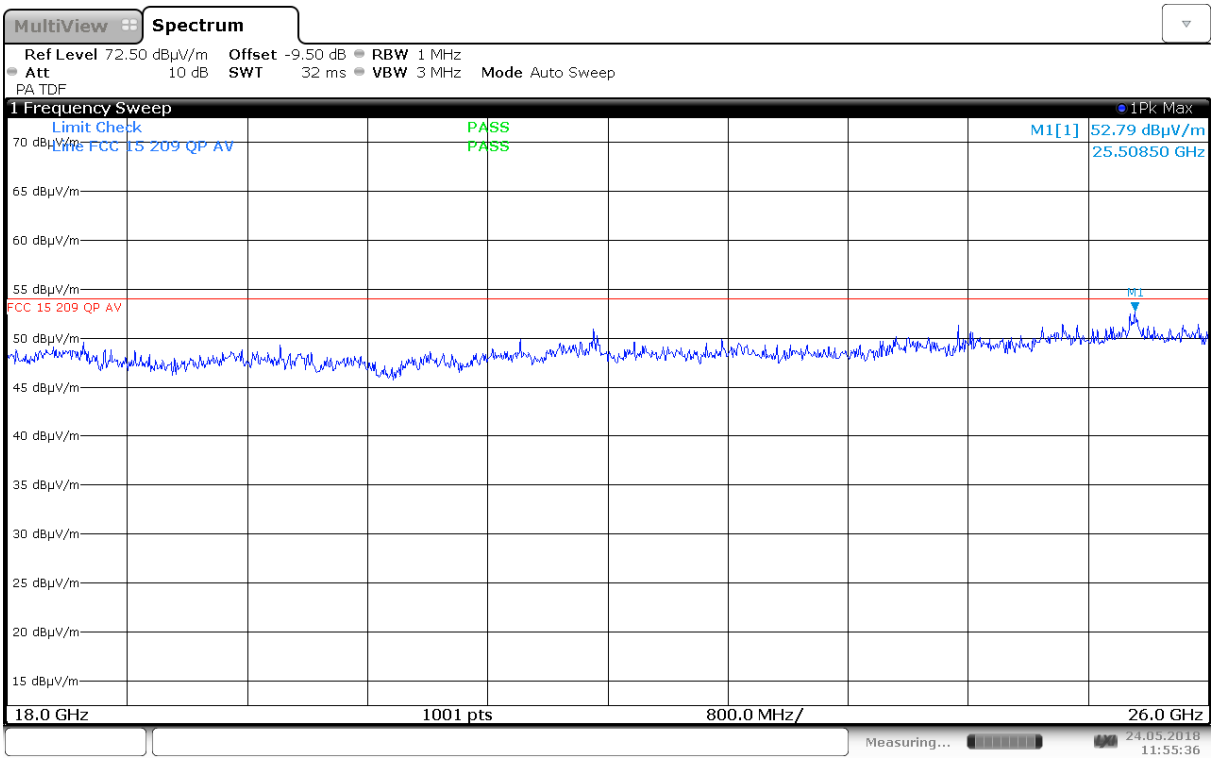
Date: 24.MAY.2018 09:59:46

Radiated Emissions, 17600 -18000 MHz, 2437 MHz, 802.11n, MCS0, MIMO, VP, RMS

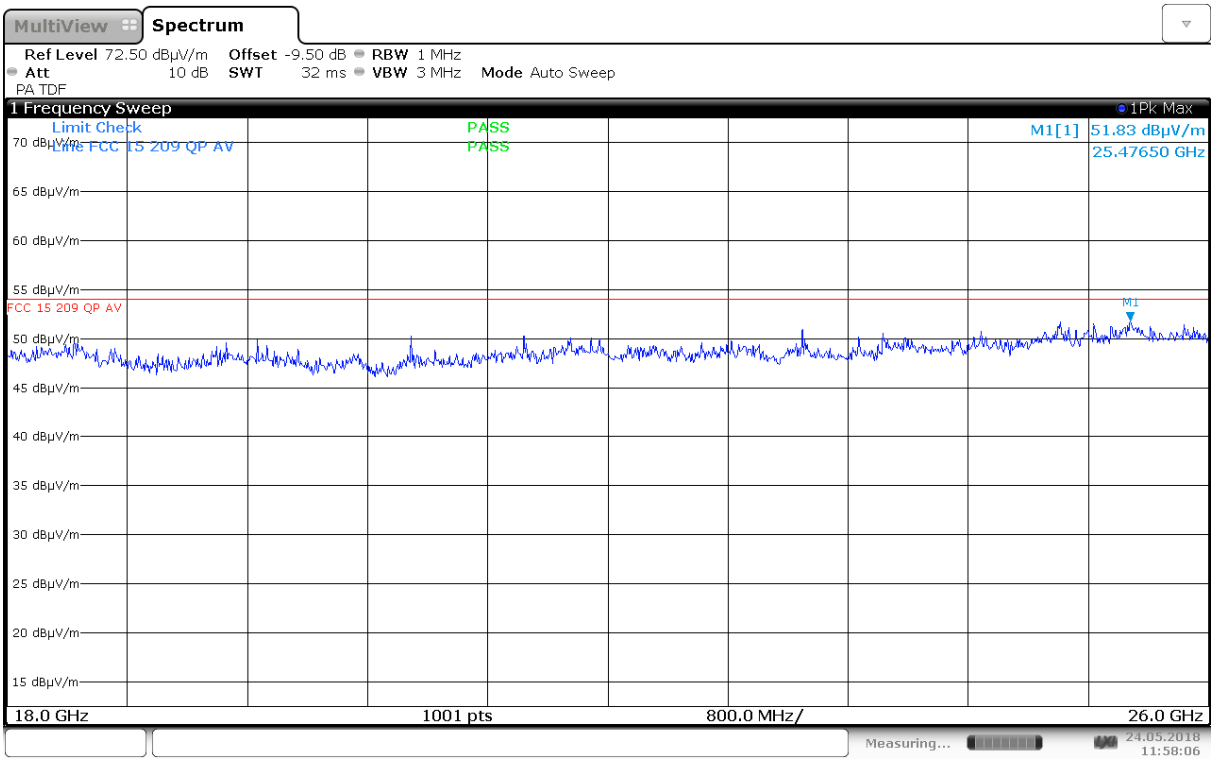


Date: 24.MAY.2018 09:53:53

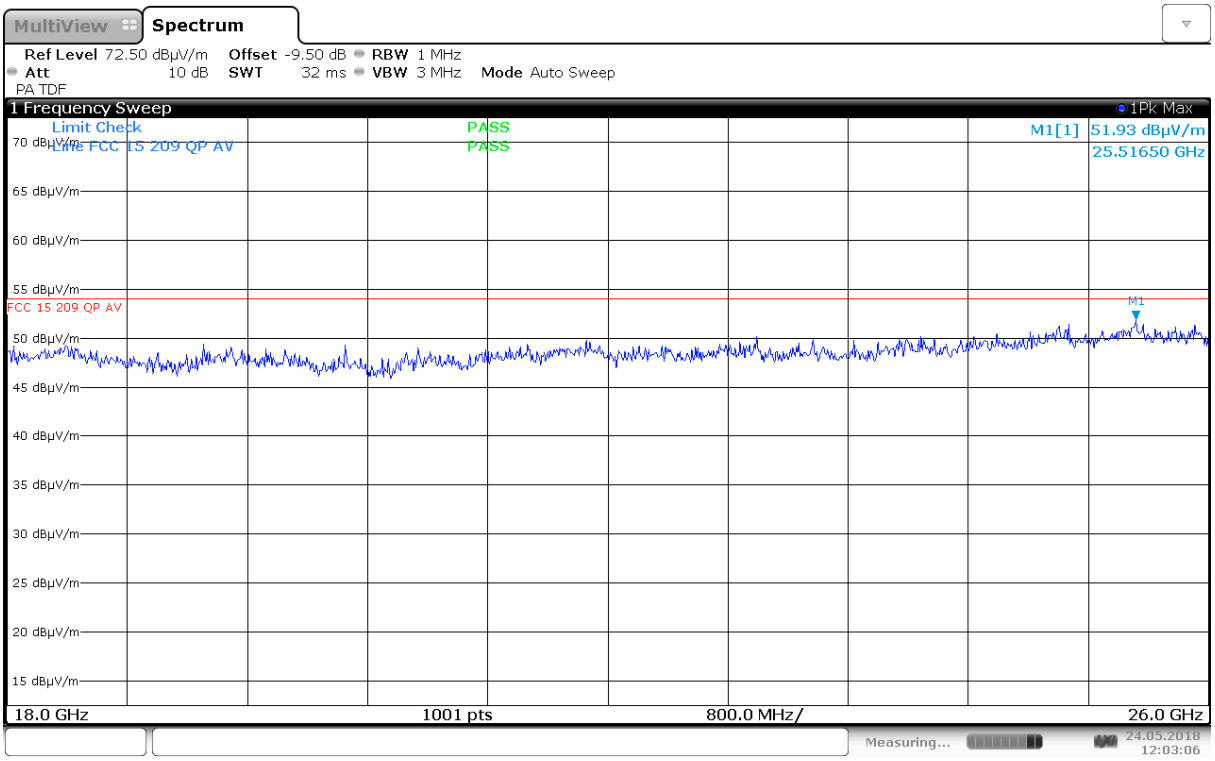
Radiated Emissions, 17600 -18000 MHz, 2462 MHz, 802.11b, 1Mbps, Ant1, VP/HP, RMS



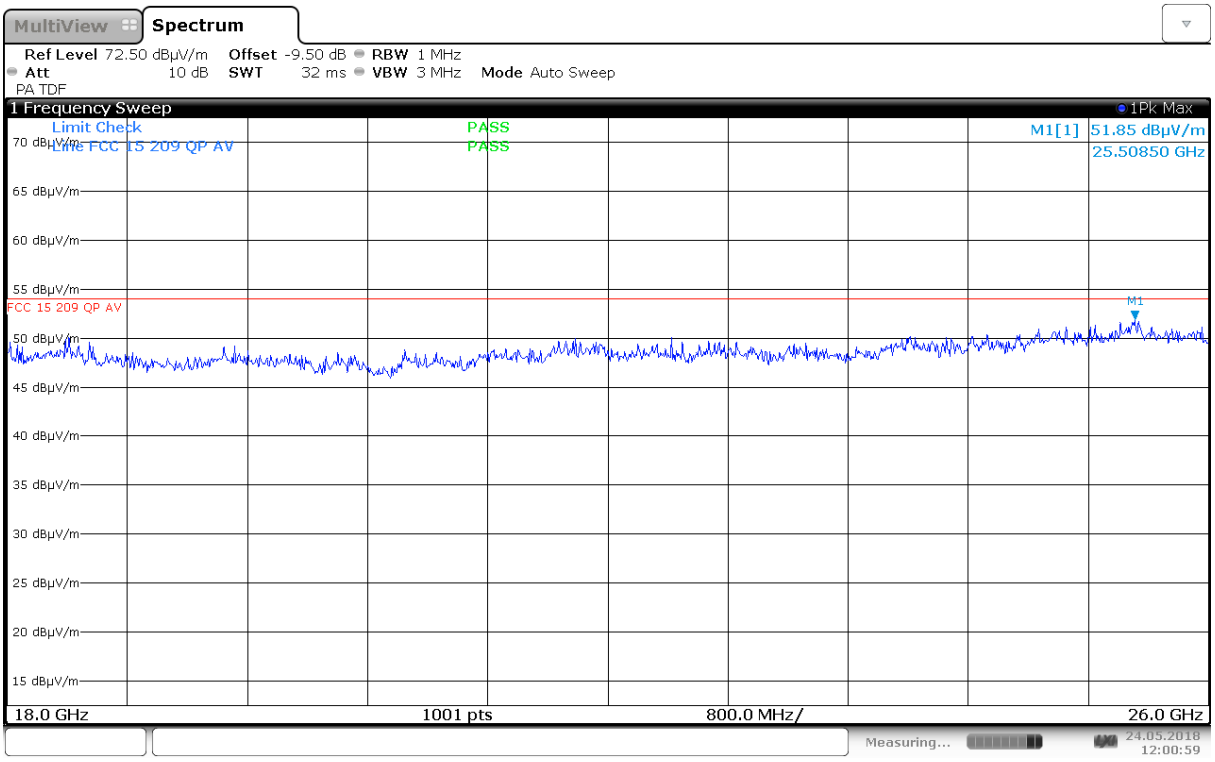
Radiated Emissions, 18000 -26000 MHz, 2437MHz, 802.11b, 1Mb, Ant0, HP, @1m



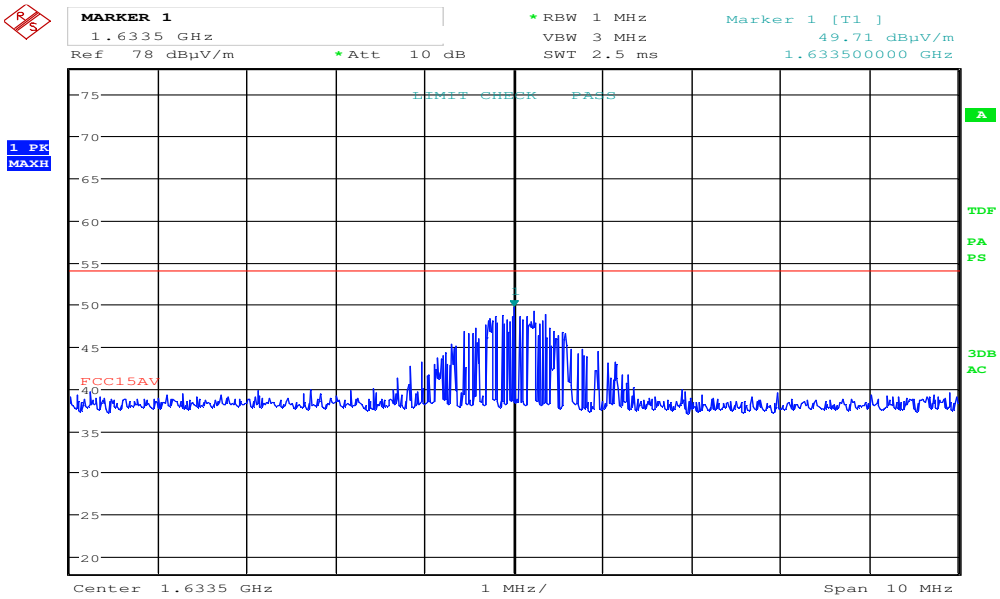
Radiated Emissions, 18000 -26000 MHz, 2437MHz, 802.11b, 1Mb, Ant0, VP, @1m



Radiated Emissions, 18000 -26000 MHz, 2437MHz, 802.11n, MCS0, MIMO, HP, @1m

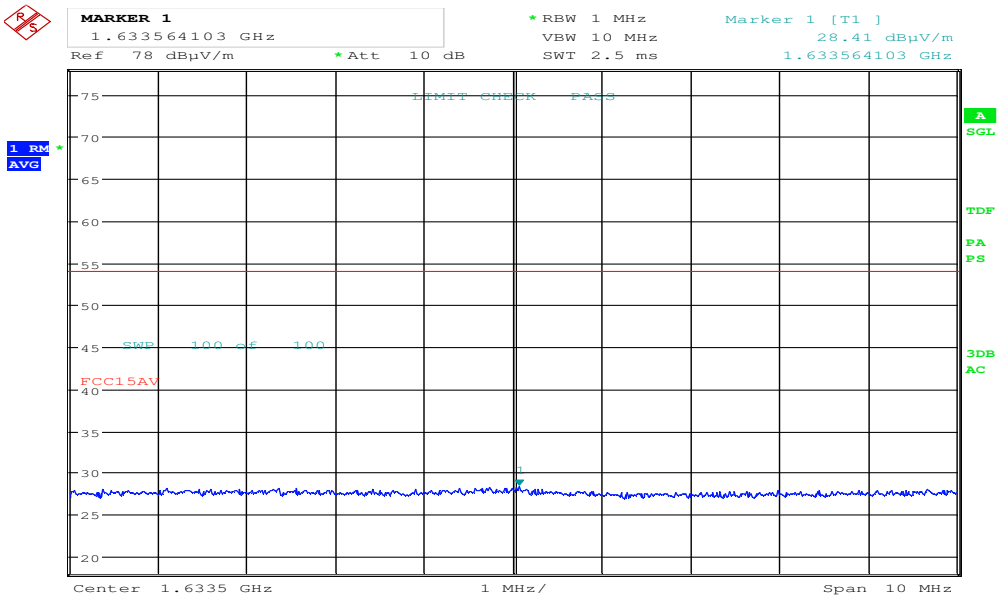


Radiated Emissions, 18000 -26000 MHz, 2437MHz, 802.11n, MCS0, MIMO, VP, @1m



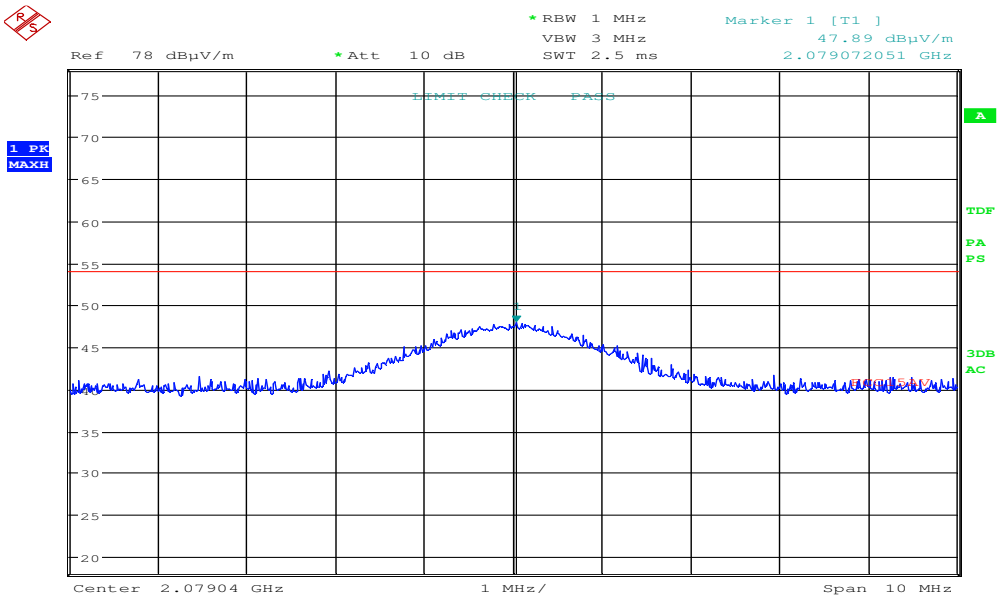
Date: 15.MAY.2018 18:36:23

Radiated Emissions Pk, 1633.5 MHz, (Max: HP)
(Same for all RF-modulations and frequencies)

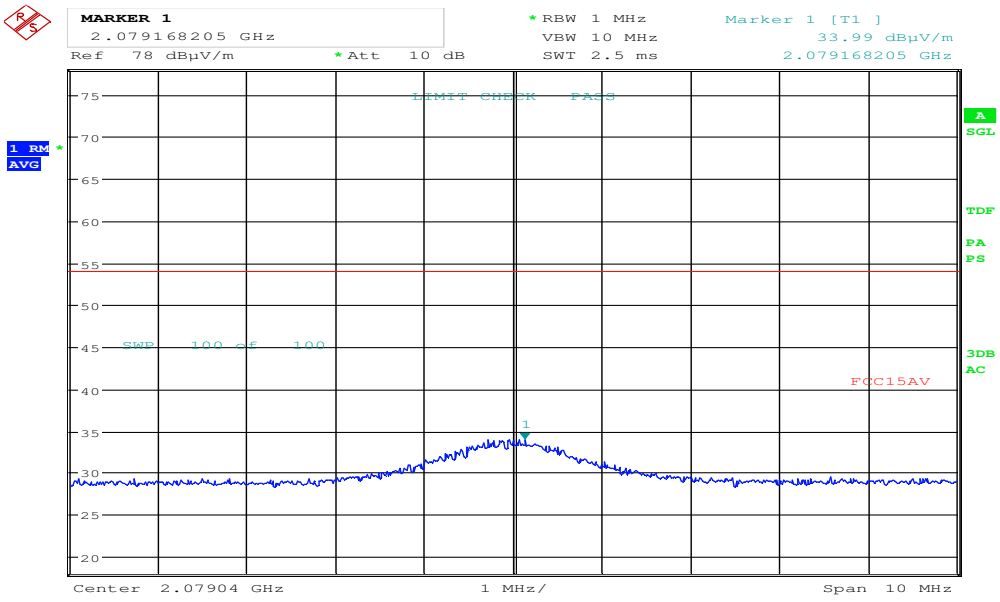


Date: 15.MAY.2018 18:37:26

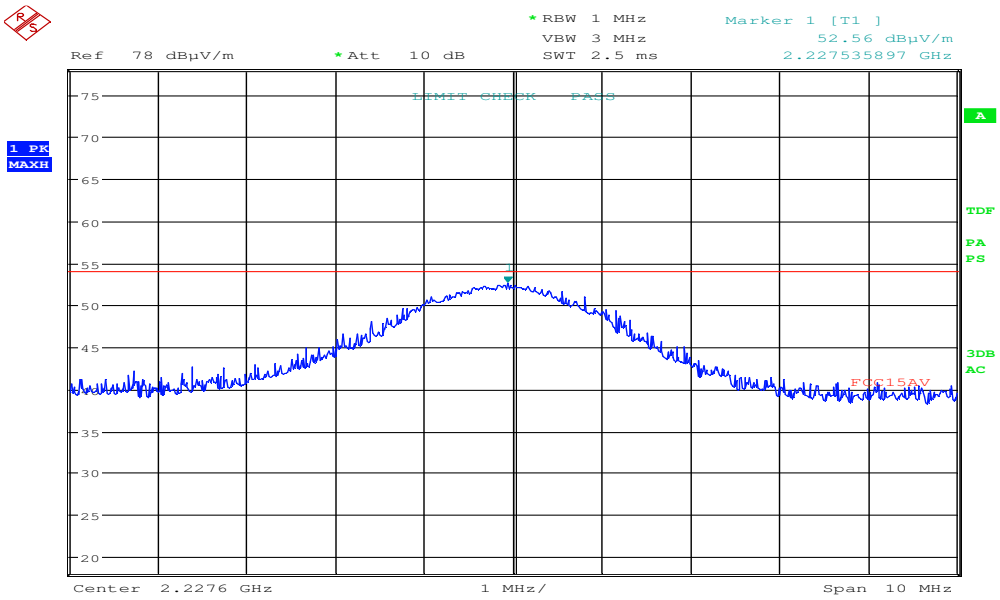
Radiated Emissions Av, 1633.5 MHz, (Max: HP)
(Same for all RF-modulations and frequencies)



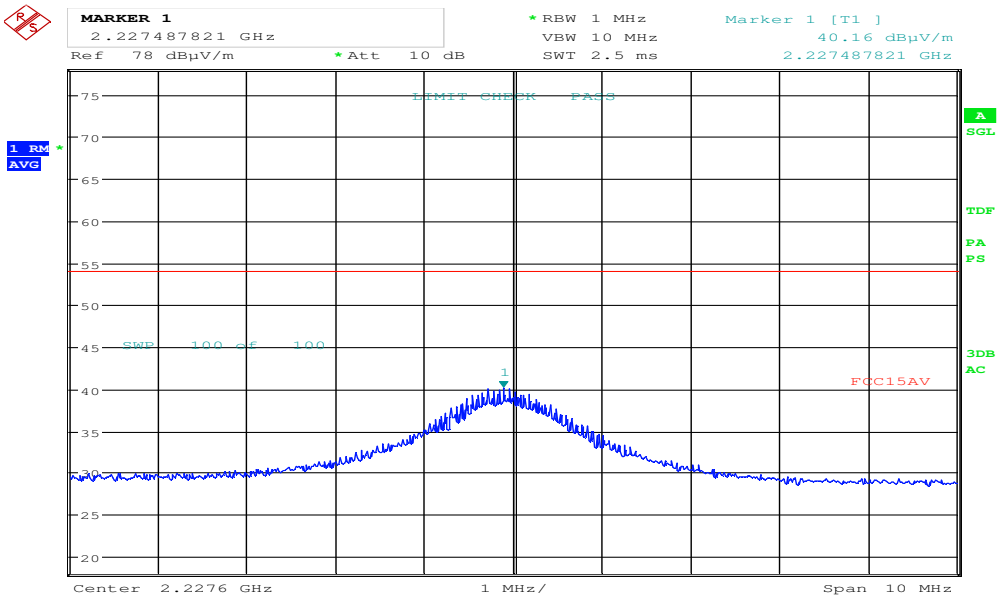
Radiated Emissions Pk, 2079 MHz, (Max: VP)
(Same for all RF-modulations and frequencies)



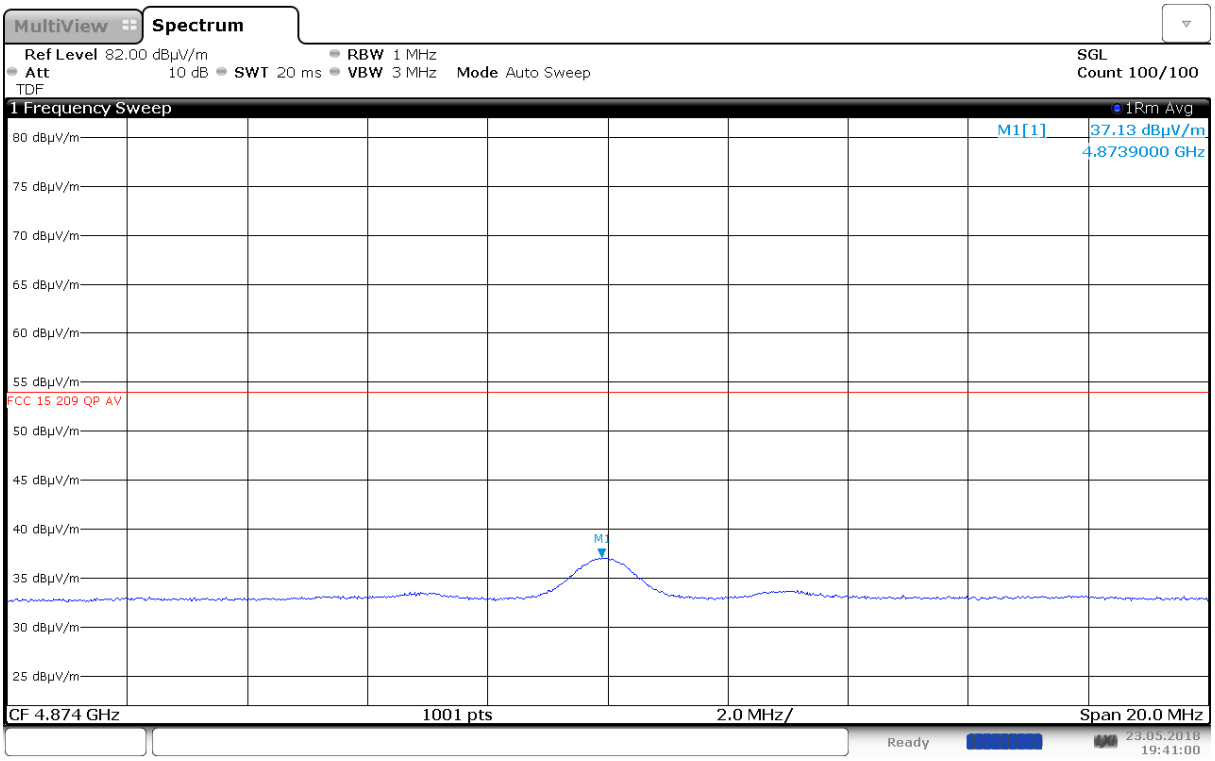
Radiated Emissions Av, 2079 MHz, (Max: VP)
(Same for all RF-modulations and frequencies)



Radiated Emissions Pk, 2227.6 MHz, (Max: HP)
(Same for all RF-modulations and frequencies)



Radiated Emissions Av, 2227.6 MHz, (Max: HP)
(Same for all RF-modulations and frequencies)



Radiated Emissions Av, 4.87 GHz, (Max: VP)
(Same for all RF-modulations and frequencies)

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.

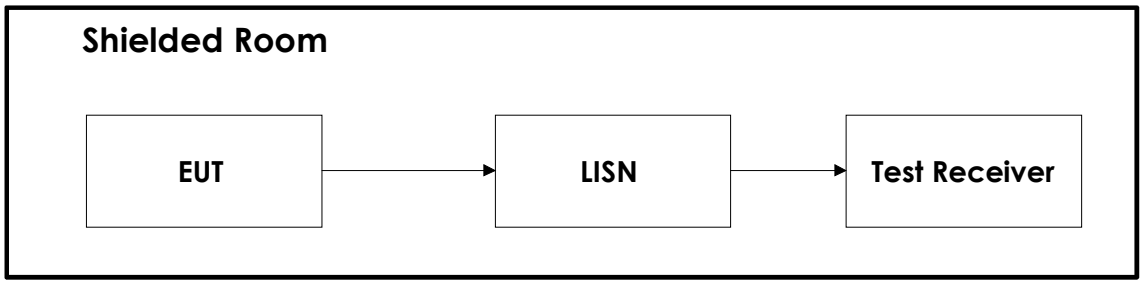
No.	Model	Description	Manufacturer	Asset no.	Cal. date	Cal. Due
1	FSW40	Spectrum Analyzer	Rohde & Schwarz	LR 1690	2018.01	2019.01
2	ESU40	Measuring Receiver	Rohde & Schwarz	LR 1639	2018.03	2019.03
3	6HC3000/18000	Highpass Filter	Trilithic	LR 1614	COU	
4	310	Preamplifier	Sonoma Instrument	LR 1686	2017.08	2018.08
5	317	Preamplifier	Sonoma Instrument	LR 1687	2017.08	2018.08
6	8449A	Pre-amplifier	Hewlett Packard	LR 1322	2017.08	2018.08
7	6812B	AC Power Source	Agilent	LR 1515	COU	
8	3115	Horn Antenna	EMCO	LR 1330	2016.10	2021.10
9	3117-PA	Horn Antenna with Preamp	EMCO	LR 1717	2017.12	2018.12
10	JB3	BiLog Antenna	Sunol	N-4525	2017.11	2020.11
11	638	Antenna Horn	Narda	LR 1480	2010.06	2020.06
12	ESCI3	Measuring receiver	Rohde & Schwarz	N-4259	2017.10	2018.10
13	ENV216	Two-Line V-Network	Rohde & Schwarz	LR 1665	2017.11	2019.11
14	Model 87 V	Multimeter	Fluke	N-4669	2016.10	2018.10

COU = Calibrate on use

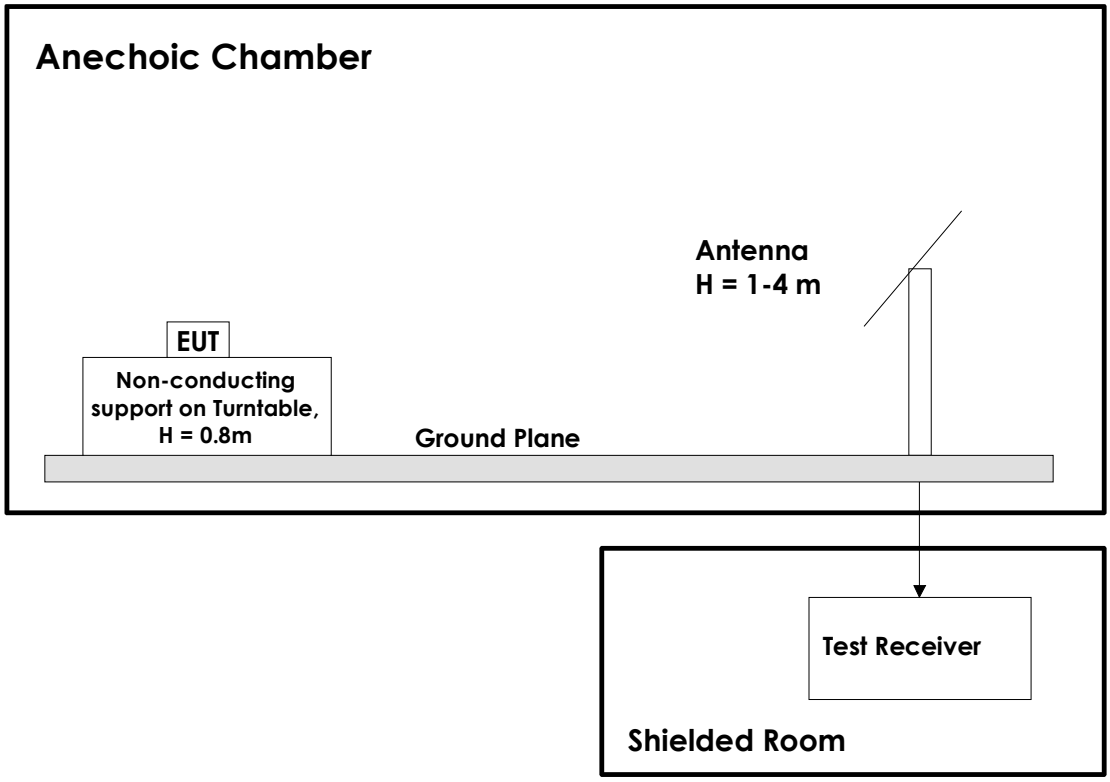
Test Software List			
Description	**Manufacturer**	**Model**	**Version**
EMC Software for Conducted tests	Rohde & Schwarz	EMC32	10.20.01
EMC Software for Radiated tests	Rohde & Schwarz	EMC32	10.20.01

6 BLOCK DIAGRAM

6.1 Power Line Conducted Emission



6.2 Test Site Radiated Emission



All tests below 1 GHz were performed at 3m with ground plane. The EUT was placed on the stand at 0.8m height.

Tests above 1 GHz were performed with the space between the EUT and the antenna covered by absorbers. The EUT was placed on a 1.5m high stand. Tests from 1 GHz to 18 GHz were performed @3m distance. Tests above 18 GHz were performed @1m distance.

The antenna was raised from 1 to 4m and the turntable rotated from 0 to 360 degrees to maximize any emissions found.

Revision history

Version	Date	Comment	Sign
1.0	2018.06.11	First edition	FS
1.1	2018.06.21	Corrrections to test setup description	FS
1.2	2018.06.25	Minor corrections	FS