FCC/IC- TEST REPORT

Report Number	:	**68.950.15.170.01**	Date of Issue:	November 5, 2015
Model	:	**JioPay 3850**		
Product Type	:	POS		
Applicant	:	KanhaTech Solutions Pvt Ltd		
Address	:	No 74, Prestige Feroze Building, 4th Floor, Cunningham road, Bangalore		
Production Facility	:	KanhaTech Solutions Pvt Ltd		
Address	:	No 74, Prestige Feroze Building, 4th Floor, Cunningham road, Bangalore		
Test Result	:	■ **Positive** ☐ **Negative**		
Total pages	:	49		

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1 Table of Contents

1 Table of Contents 2
2 Details about the Test Laboratory 3
3 Description of the Equipment under Test 4
4 Summary of Test Standards 5
5 Summary of Test Results 6
6 General Remarks 7
7 Test Setups 8
8 Systems test configuration 9
9 Technical Requirement 10
9.1 Conducted Emission 10
9.2 Conducted peak output power 13
9.3 6dB Bandwidth 20
9.4 Power spectral density 27
9.5 Spurious RF conducted emissions 28
9.6 Band edge 41
9.7 Spurious radiated emissions for transmitter 46
10 Test Equipment List 48
11 System Measurement Uncertainty 49

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2 Details about the Test Laboratory

Details about the Test Laboratory
Test Site 1

Company name:	TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District, Shenzhen City, 518052, P. R. China
FCC Registration Number:	502708
IC Registration No:	10320A-1
Telephone:	86 755 8828 6998
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3 Description of the Equipment under Test

Description of the Equipment Under Test

Product:	POS
Model no.:	JioPay 3850
Brand Name:	JioPay
FCC ID:	2AFXJ-JIOPAY3850
Options and accessories:	NIL
Rating:	DC 3.7V by Li-ion Battery or 5VDC,2.0A (Charged by an external power adapter Adapter input:100-240VAC, 50/60Hz, 0.5A Adapter output:5.0V, 2.0A)
RF Transmission Frequency:	2412-2462MHz for 802.11b/g/n-HT20 2422-2452MHz for 802.11n-HT40
No. of Operated Channel:	11
Modulation:	OFDM, DSSS
Antenna Type:	Integral Antenna
Antenna Gain:	1.6dBi
Description of the EUT:	The Equipment Under Test (EUT) is a POS with WIFI function which operated at 2.4GHz

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4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2014 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

All the test methods were according to KDB558074 D01 DTS Meas Guidance v03r03 and ANSI C63.10 (2014).

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5 Summary of Test Results

Technical Requirements						
FCC Part 15 Subpart C						
Test Condition		Pages	Test Site	Test Result		
				Pass	Fail	N/A
§15.207	Conducted emission AC power port	10	Site 1	☒	☐	☐
§15.247 (b) (1)	Conducted peak output power	13	Site 1	☒	☐	☐
§15.247(a)(1)	20dB bandwidth	---	---	☐	☐	☒
§15.247(a)(1)	Carrier frequency separation	---	---	☐	☐	☒
§15.247(a)(1)(iii)	Number of hopping frequencies	---	---	☐	☐	☒
§15.247(a)(1)(iii)	Dwell Time	---	---	☐	☐	☒
§15.247(a)(2)	6dB Bandwidth	20	Site 1	☒	☐	☐
§15.247(e)	Power spectral density	27	Site 1	☒	☐	☐
§15.247(d)	Spurious RF conducted emissions	28	Site 1	☒	☐	☐
§15.247(d)	Band edge	41	Site 1	☒	☐	☐
§15.247(d) & §15.209	Spurious radiated emissions for transmitter	46	Site 1	☒	☐	☐
§15.203	Antenna requirement	See note 1		☒	☐	☐

Remark 1: N/A – Not Applicable.
Note 1: The EUT uses an internal antenna, which gain is 1.6dBi. According to §15.203 and RSSGEN 8.3, it is considered sufficiently to comply with the provisions of this section.

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6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2AFXJ-JIOPAY3850 complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C Rules.

SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

☐ - **Not** Performed

The Equipment under Test

■ - **Fulfills** the general approval requirements.

☐ - **Does not** fulfill the general approval requirements.

Sample Received Date: August 11, 2015

Testing Start Date: August 12, 2015

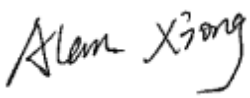
Testing End Date: August 25, 2015

- TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch -

Reviewed by:

John Zhi
EMC Project Manager

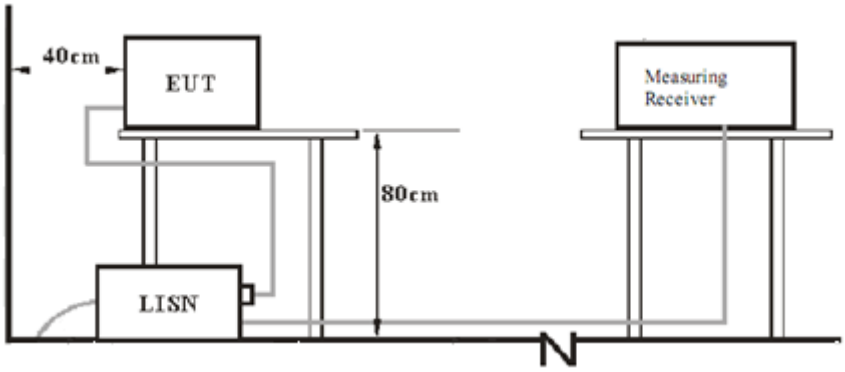
Prepared by:



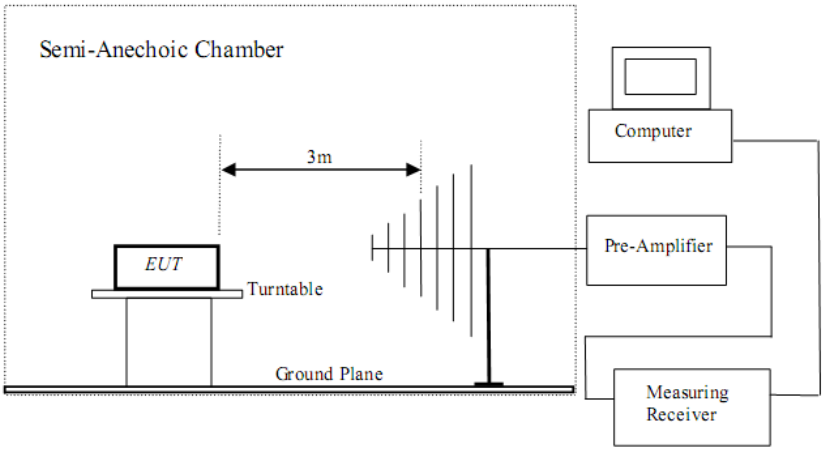
Alan Xiong
EMC Project Engineer

7 Test Setups

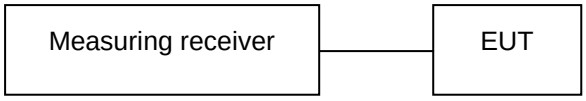
7.1 AC Power Line Conducted Emission test setups



7.1 Radiated test setups



7.2 Conducted RF test setups



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8 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
Notebook	Lenovo	X220	---

The system was configured to non-hopping mode.
Non-hopping mode: The system was configured to operate at a signal channel transmitting. The test software allows the configuration and operation at the worst-case duty and the highest transmit power

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9 Technical Requirement

9.1 Conducted Emission

Test Method

1. The EUT was placed on a table, which is 0.8m above ground plane
2. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance
4. A EMI test receiver is used to test the emissions from both sides of AC line

Limit

According to §15.207, conducted emissions limit as below:

Frequency MHz	QP Limit dBµV	AV Limit dBµV
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Decreasing linearly with logarithm of the frequency

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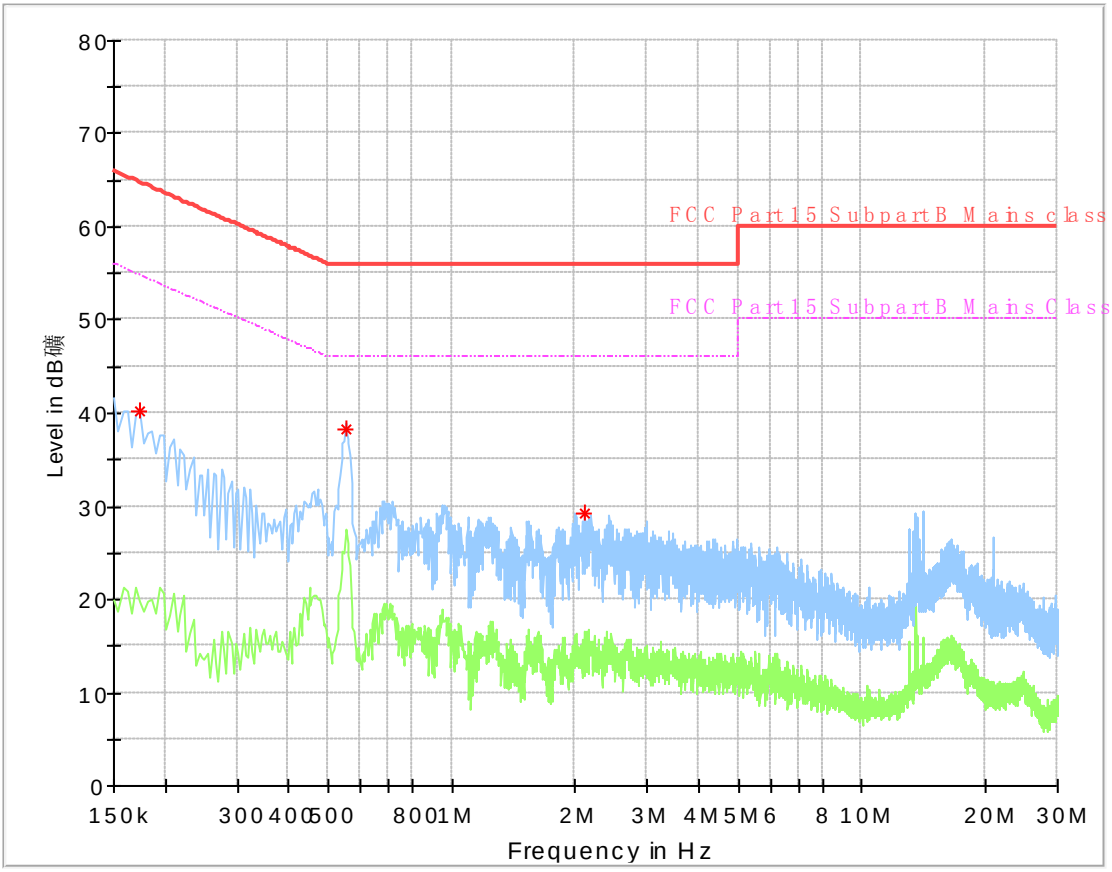
Conducted Emission

Product Type	:	POS
M/N	:	JioPay3850
Operating Condition	:	Charging and Transmitting
Test Specification	:	Line
Comment	:	AC 120V/60Hz



Frequency (MHz)	MaxPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.174000	40.19	64.77	24.58	L1	9.6
0.554000	38.29	56.00	17.71	L1	10.1
2.106000	29.23	56.00	26.77	L1	9.8

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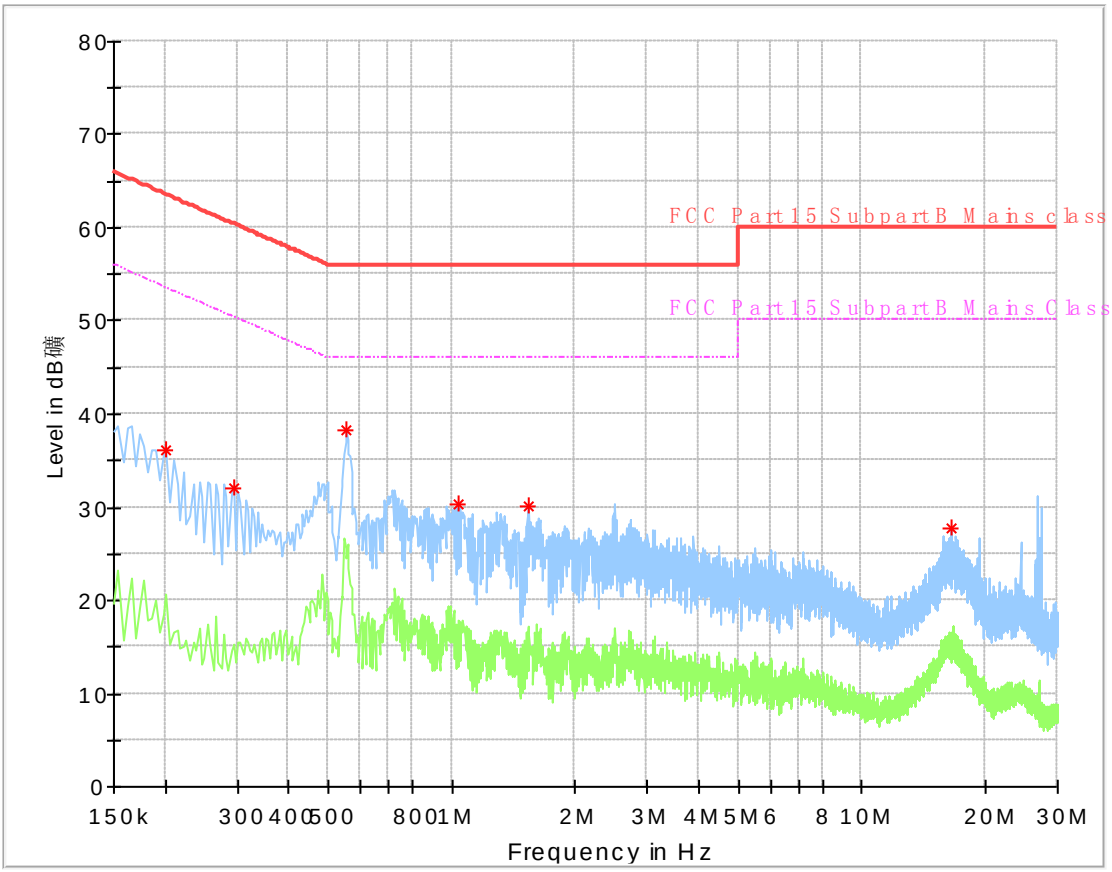
Conducted Emission

Product Type	:	POS
M/N	:	JioPay3850
Operating Condition	:	Charging and Transmitting
Test Specification	:	Neutral
Comment	:	AC 120V/60Hz



Frequency (MHz)	MaxPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.202000	36.05	63.53	27.48	N	9.8
0.294000	31.97	60.41	28.44	N	10.1
0.554000	38.21	56.00	17.79	N	10.0
1.034000	30.23	56.00	25.77	N	9.8
1.546000	30.16	56.00	25.84	N	9.8
16.558000	27.81	60.00	32.19	N	10.0

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9.2 Conducted peak output power

Test Method

1. Use the following spectrum analyzer settings:
   RBW > the 6 dB bandwidth of the emission being measured, VBW≥3RBW, Span≥3RBW
   Sweep = auto, Detector function = peak, Trace = max hold.
2. Add a correction factor to the display.
3. Use a power meter to measure the conducted peak output power.

Limits

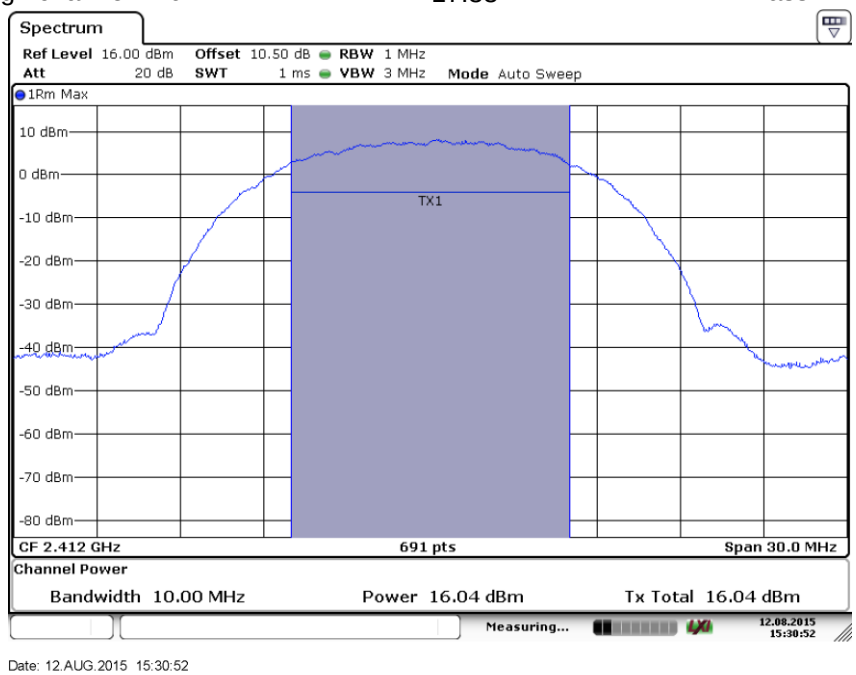
According to §15.247 (b) (1), conducted peak output power limit as below:

Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	≤1	≤30

Test result as below table

802.11B

Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2412MHz	16.04	Pass
Middle channel 2437MHz	17.28	Pass
High channel 2462MHz	17.33	Pass



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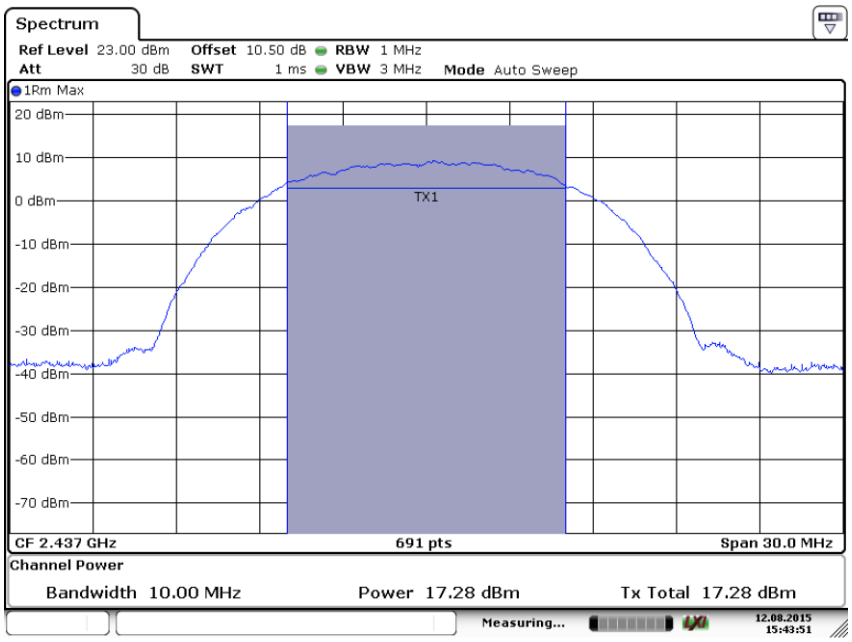

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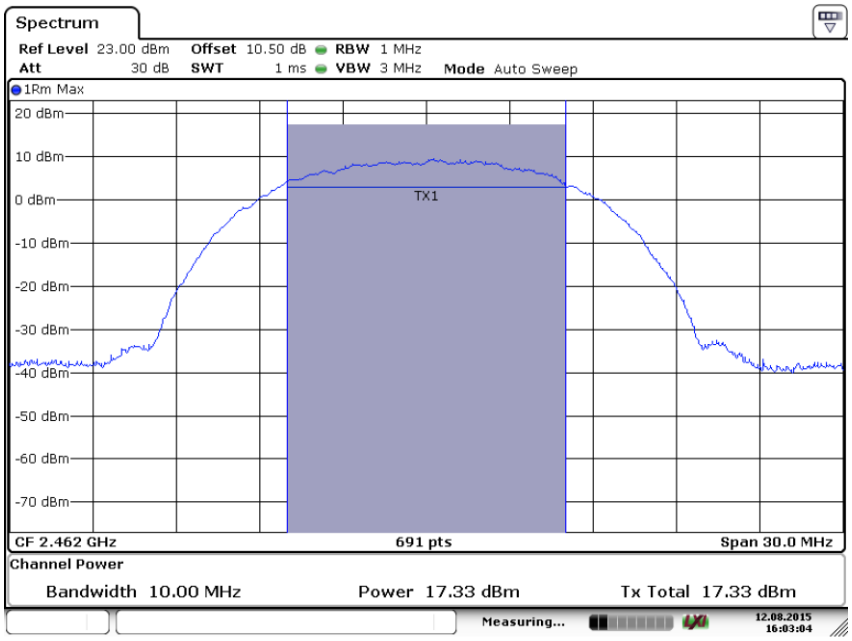

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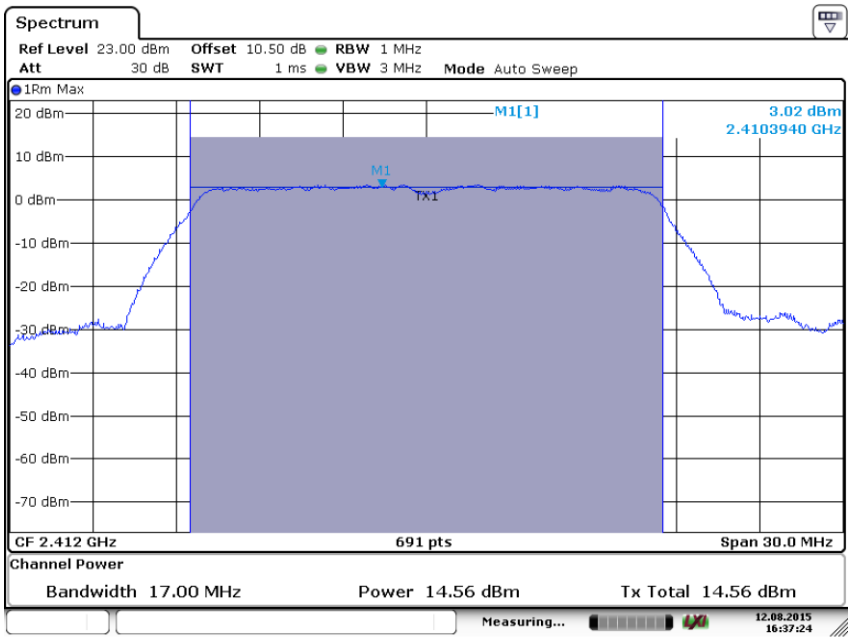
802.11G

Frequency	Conducted Peak Output Power	Result
MHz	**dBm**	
Low channel 2412MHz	14.56	Pass
Middle channel 2437MHz	12.25	Pass
High channel 2462MHz	15.15	Pass



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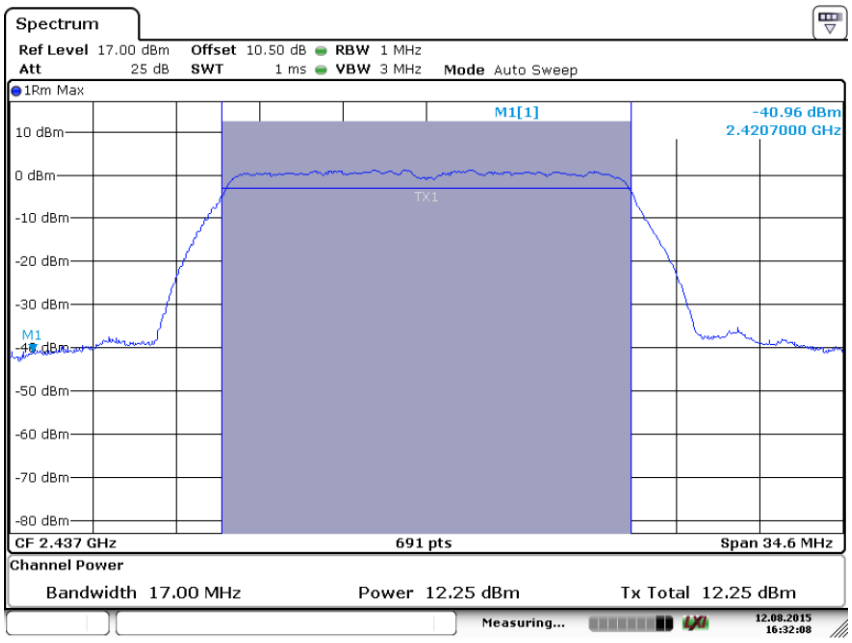

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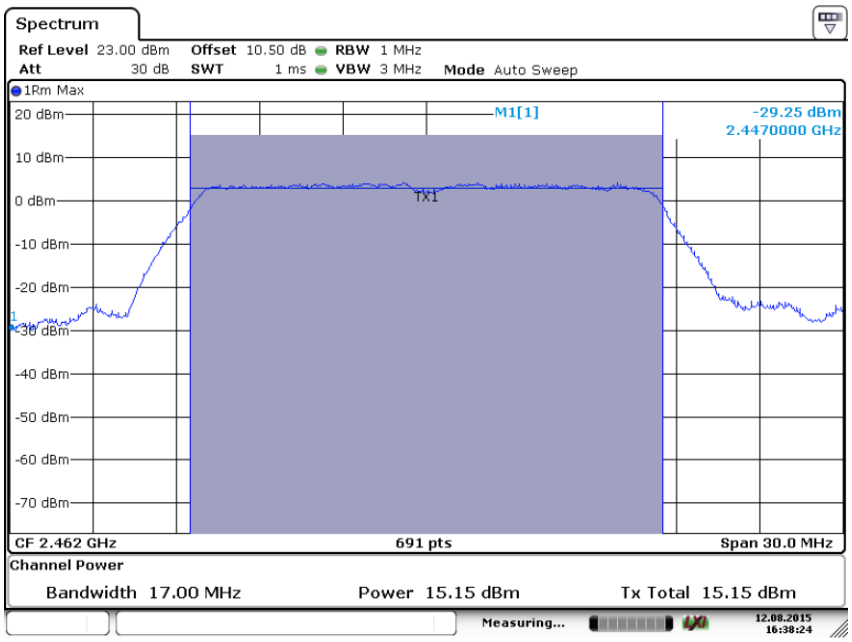

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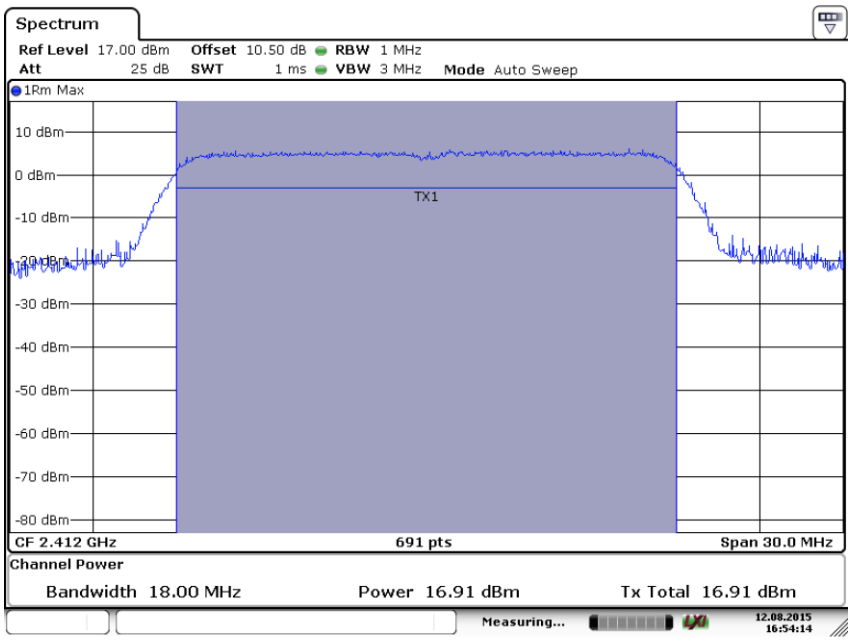
802.11N20

Frequency	Conducted Peak Output Power	Result
MHz	**dBm**	
Low channel 2412MHz	16.91	Pass
Middle channel 2437MHz	17.60	Pass
High channel 2462MHz	17.65	Pass



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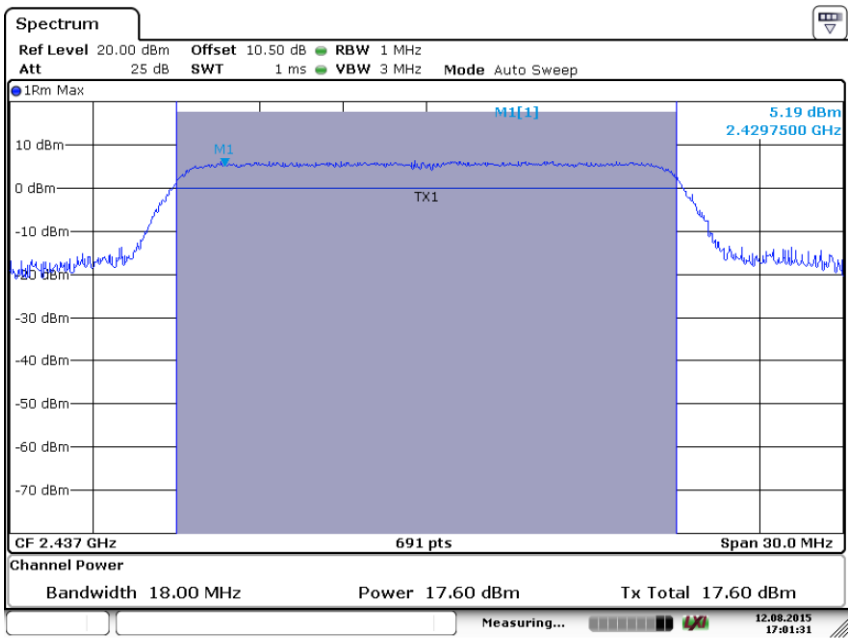

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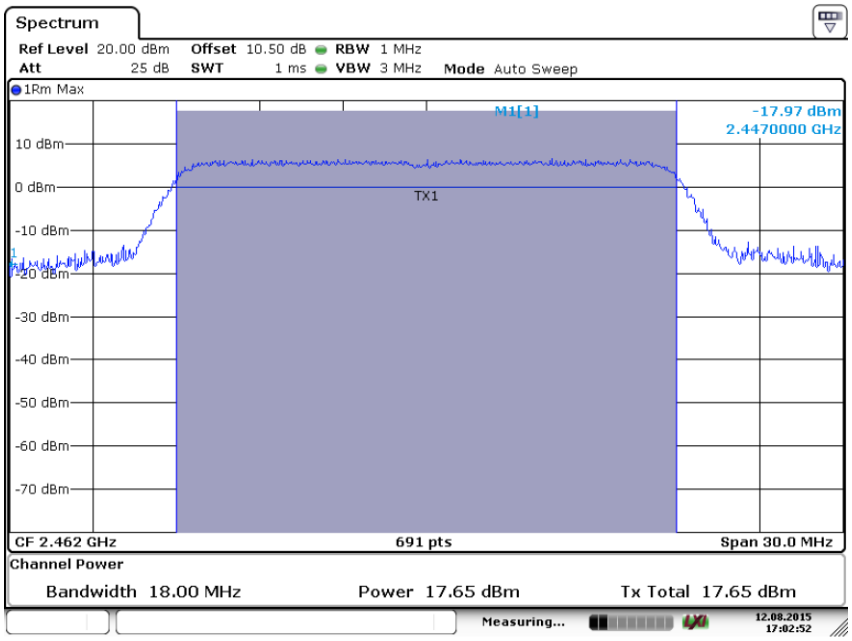

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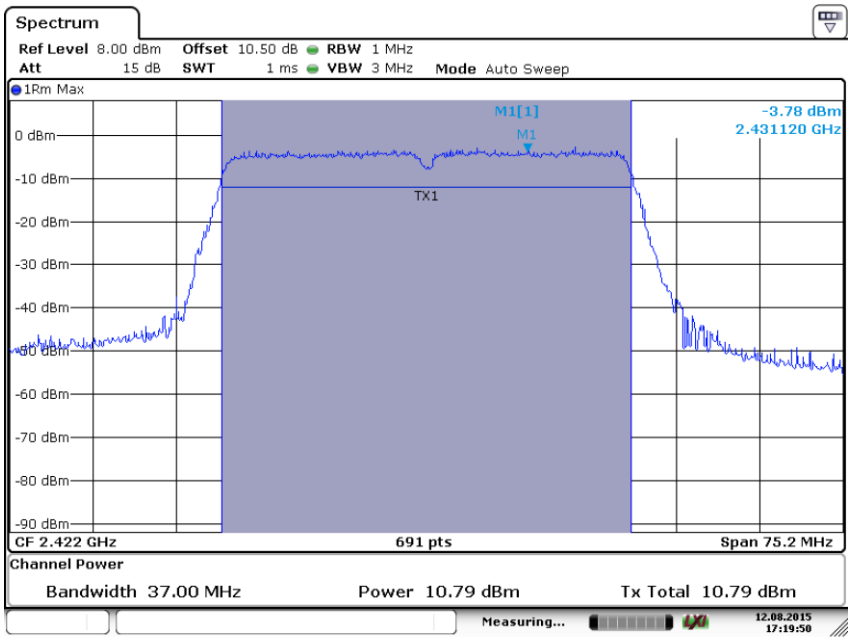
802.11N40

Frequency	Conducted Peak Output Power	Result
MHz	**dBm**	
Low channel 2422MHz	10.79	Pass
Middle channel 2437MHz	11.23	Pass
High channel 2452MHz	11.25	Pass



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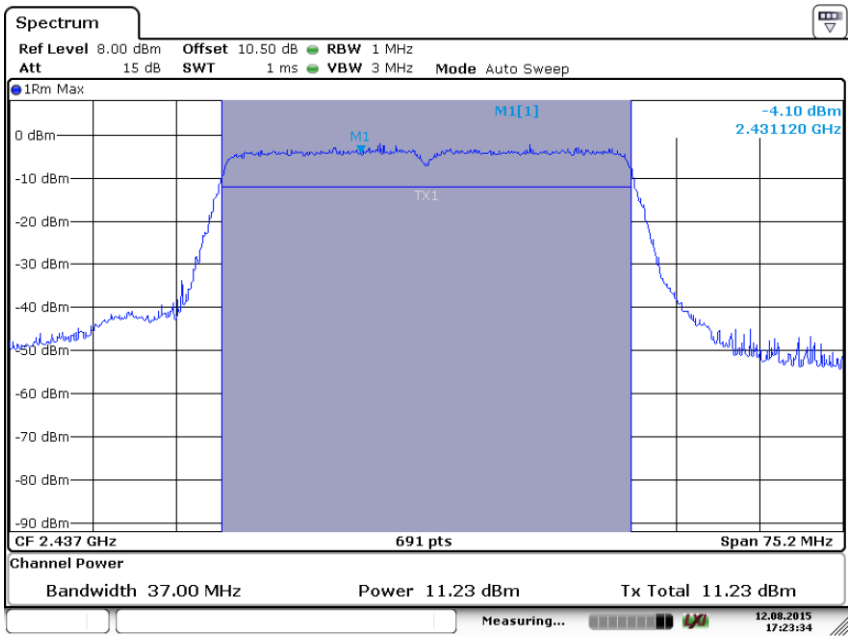

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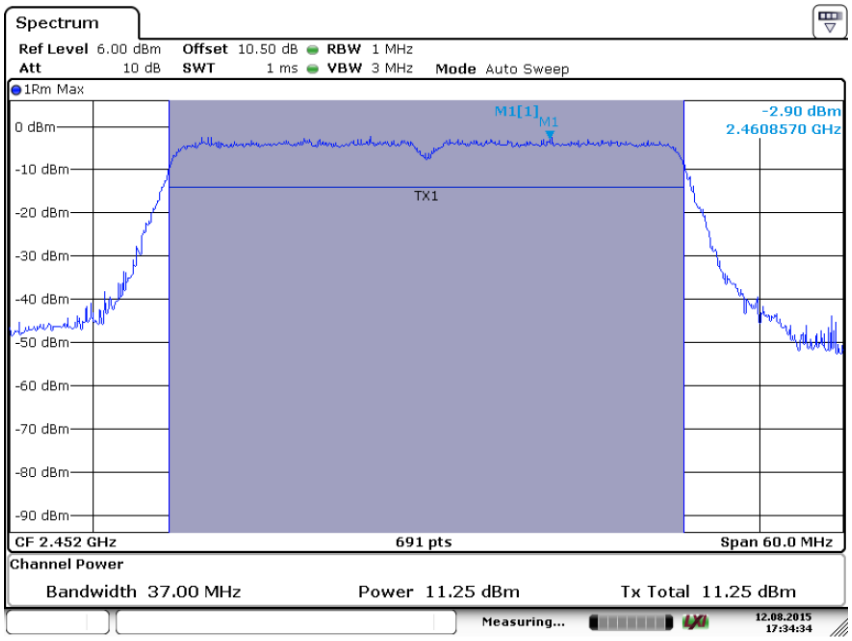

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9.3 6dB Bandwidth

Test Method

1. Use the following spectrum analyzer settings:
   RBW=100K, VBW≥3RBW, Sweep = auto, Detector function = peak, Trace = max hold
2. Use the automatic bandwidth measurement capability of an instrument, may be employed using the X dB bandwidth mode with X set to 6 dB, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.
3. Allow the trace to stabilize, record the X dB Bandwidth value.

Limit

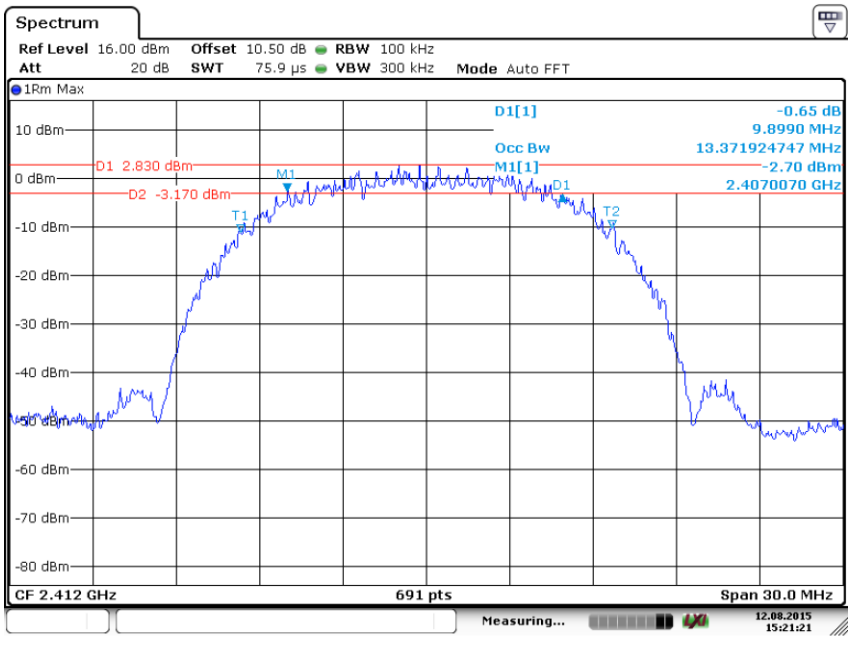
Limit [kHz]
≥500

Test result

802.11B

Frequency MHz	6dB bandwidth MHz	Result
Low channel 2412MHz	9.899	Pass
Middle channel 2437MHz	9.899	Pass
High channel 2462MHz	10.333	Pass

2412MHz



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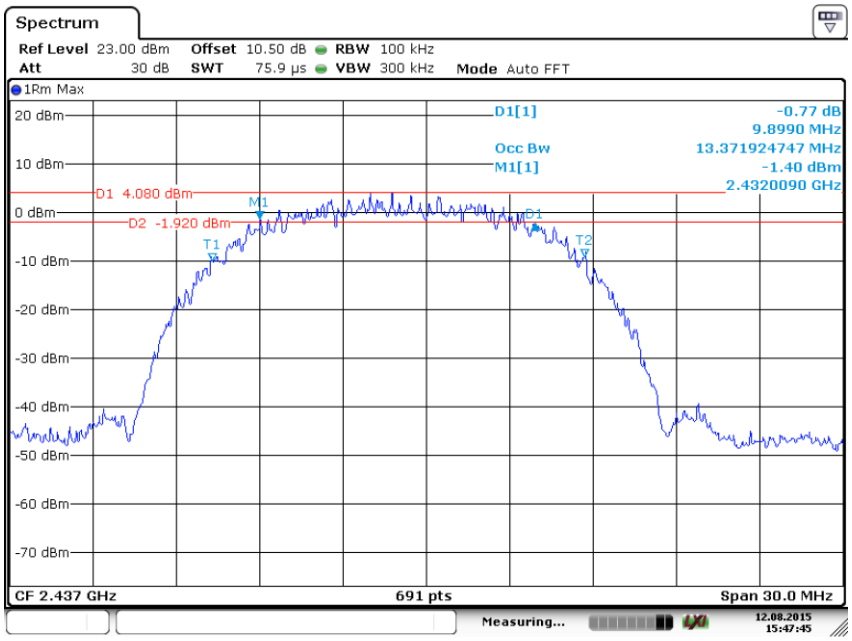
2437MHz



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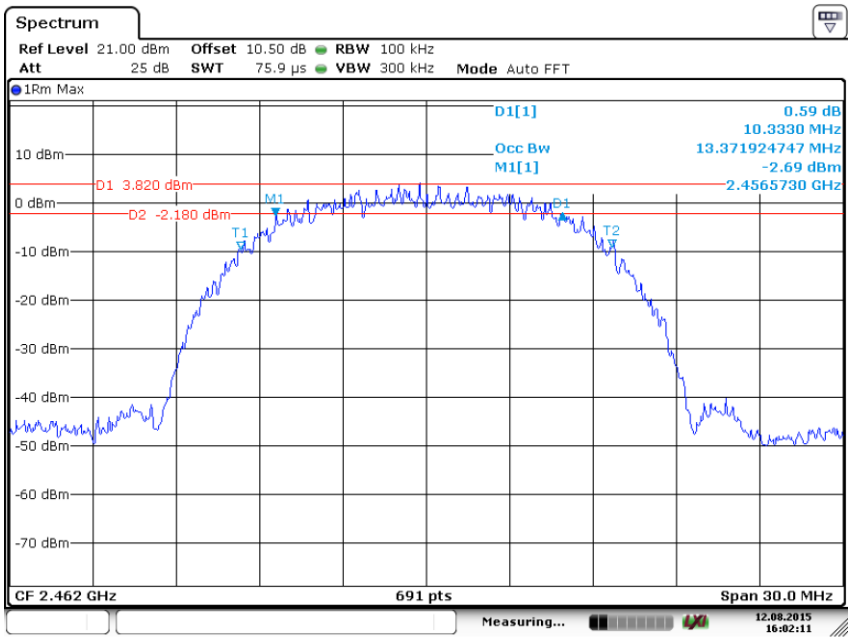
2462MHz



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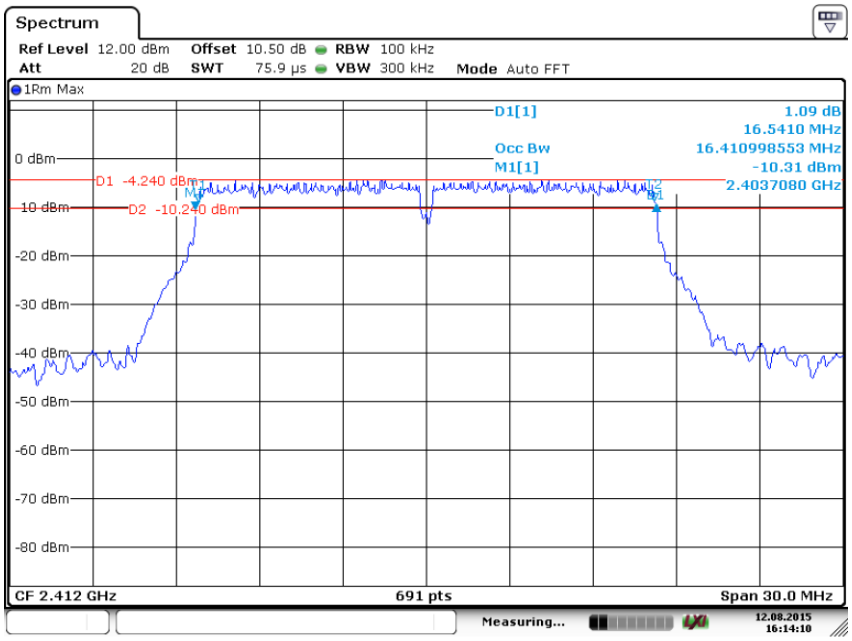
802.11G

Frequency MHz	6dB bandwidth MHz	Result
Low channel 2412MHz	16.541	Pass
Middle channel 2437MHz	16.524	Pass
High channel 2462MHz	16.541	Pass

2412MHz



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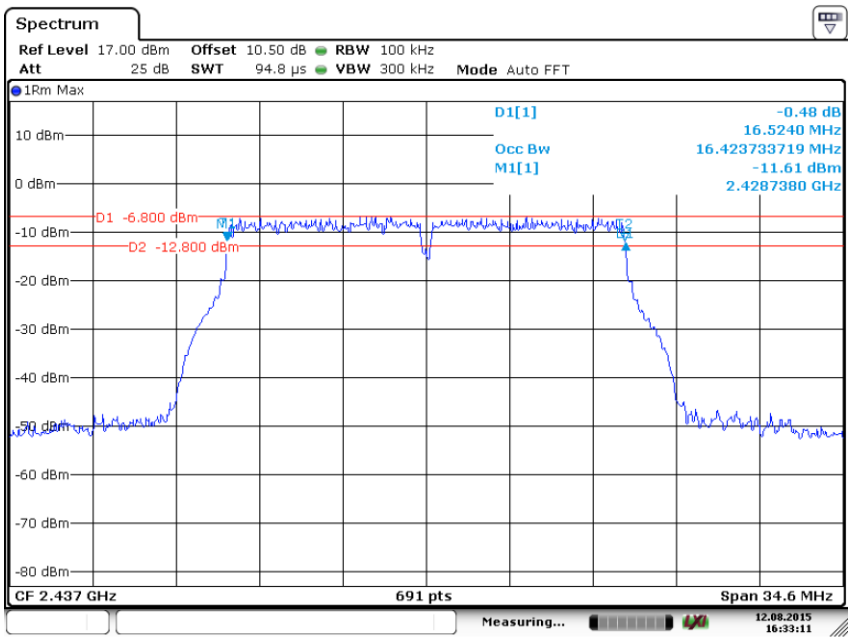
2437MHz



Date: 12.AUG.2015 16:33:11

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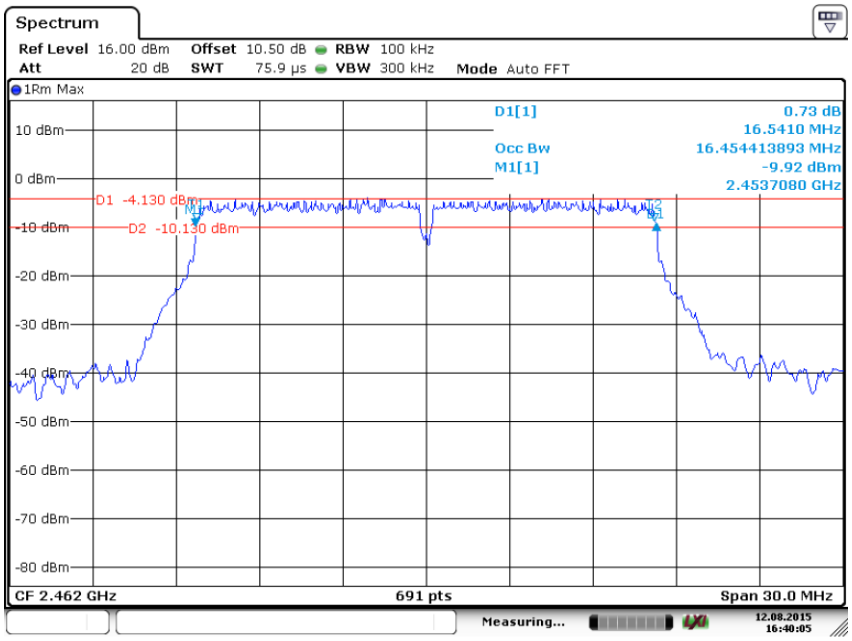
2462MHz

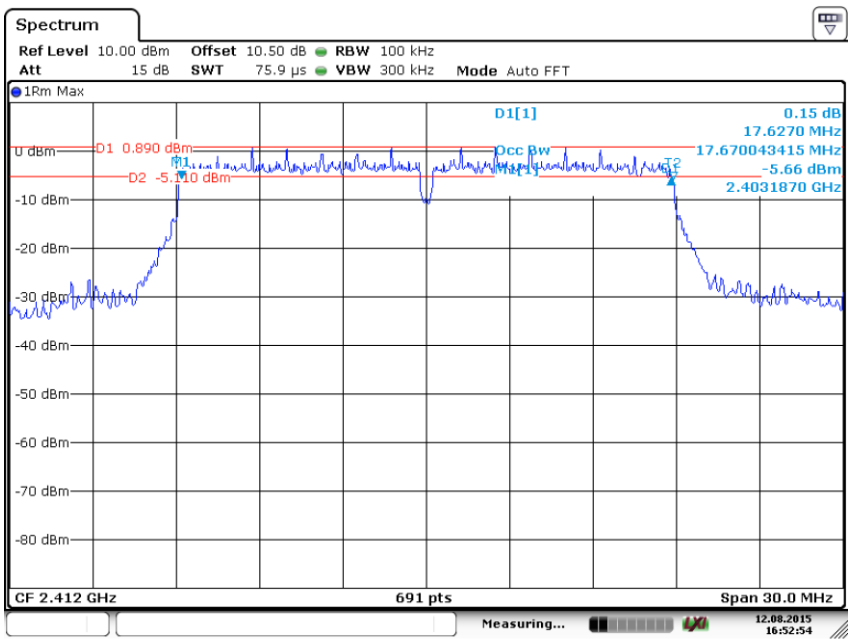


Date: 12.AUG.2015 16:40:06

802.11N20

Frequency MHz	6dB bandwidth MHz	Result
Low channel 2412MHz	17.627	Pass
Middle channel 2437MHz	17.627	Pass
High channel 2462MHz	17.627	Pass

2412MHz



Date: 12.AUG.2015 16:52:54

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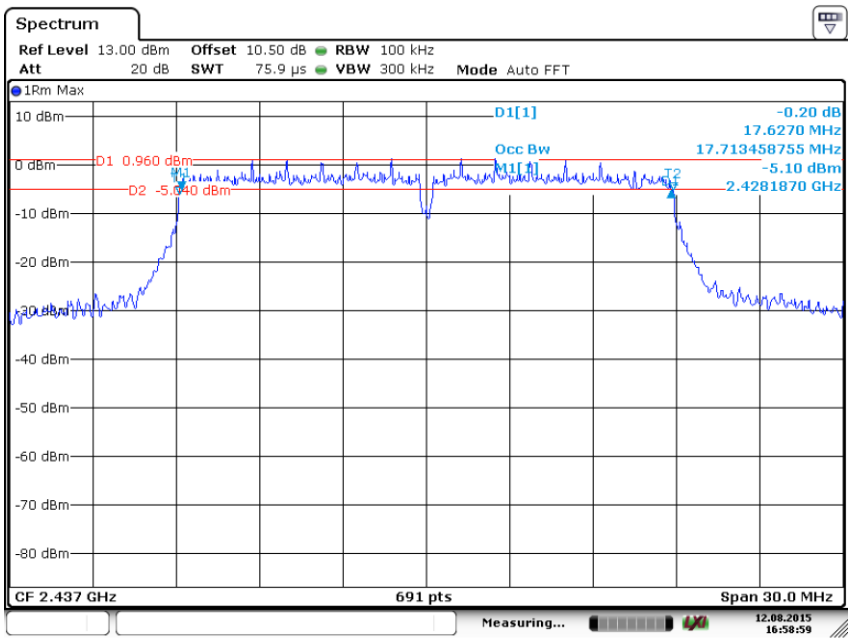
2437MHz



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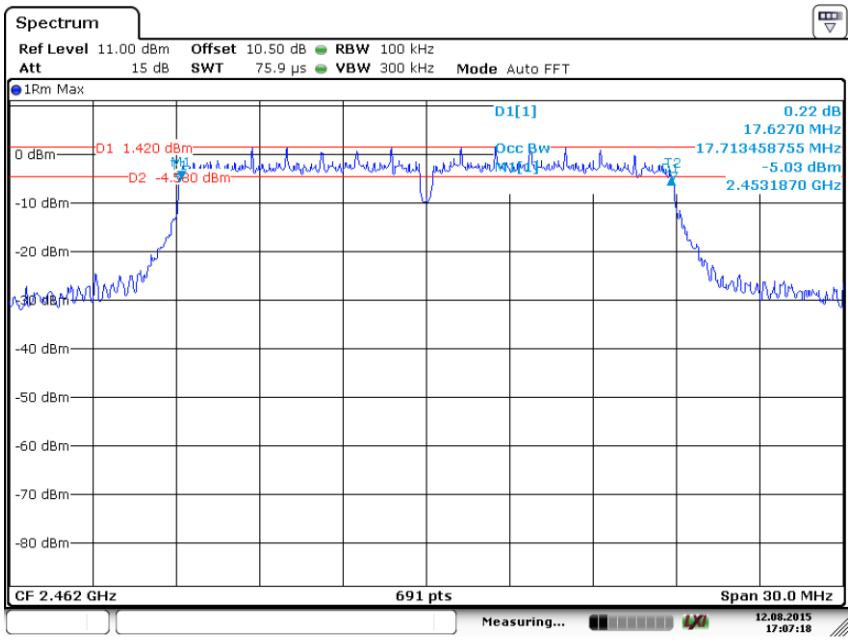
2462MHz



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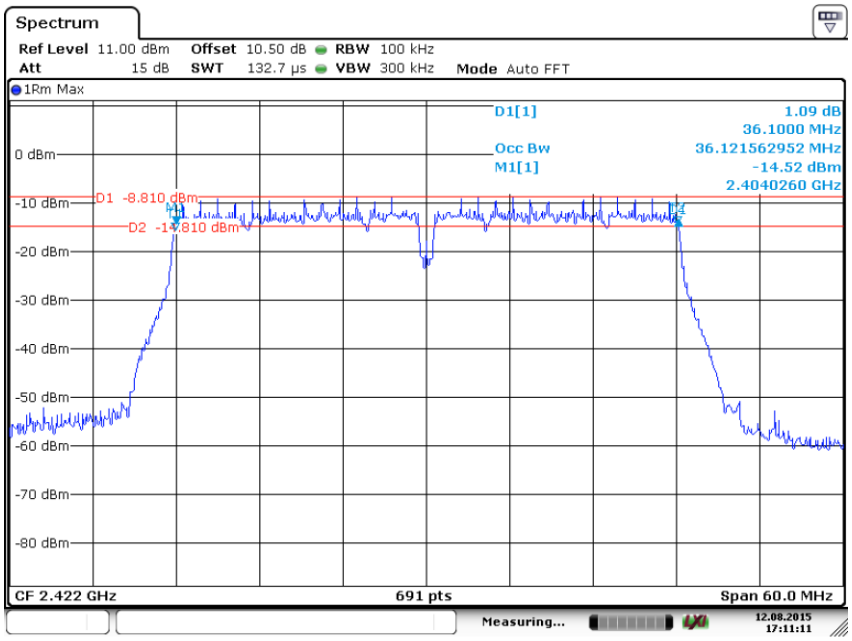
802.11N40

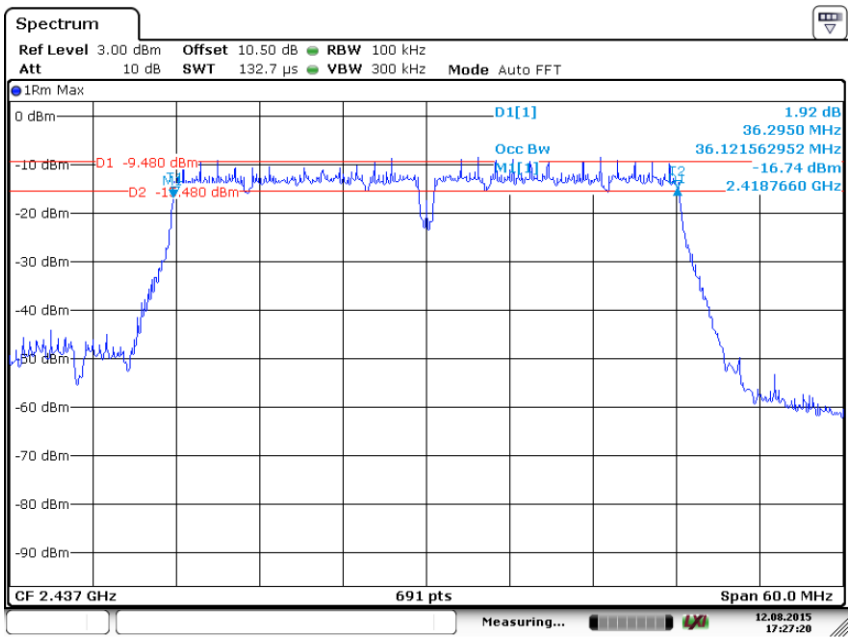
Frequency MHz	6dB bandwidth MHz	Result
Low channel 2422MHz	36.100	Pass
Middle channel 2437MHz	36.295	Pass
High channel 2452MHz	36.143	Pass

2422MHz



Date: 12.AUG.2015 17:11:10

2437MHz



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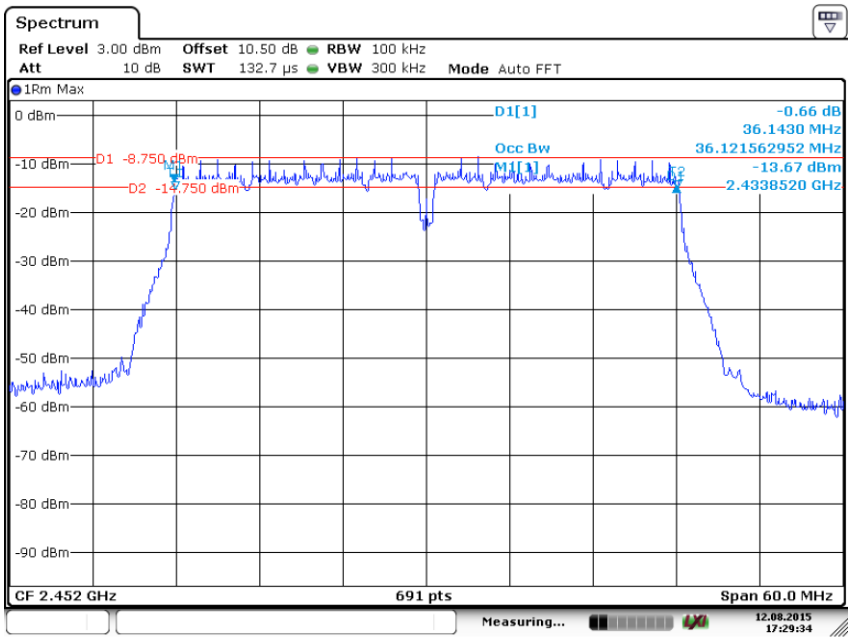
2462MHz



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9.4 Power spectral density

Test Method

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance:

1. Set analyzer center frequency to DTS channel center frequency. RBW=3kHz,VBW≥3RBW,Span=1.5 times DTS bandwidth, Detector=Peak, Sweep=auto, Trace= max hold.
2. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
3. Repeat above procedures until other frequencies measured were completed.

Limit

Limit [dBm]
≤8

Test result

802.11 B

Frequency	Power spectral density	Result
MHz	**dBm**	
Low channel 2412MHz	-18.25	Pass
Middle channel 2437MHz	-17.25	Pass
High channel 2462MHz	-17.26	Pass

802.11 G

Frequency	Power spectral density	Result
MHz	**dBm**	
Low channel 2412MHz	-22.65	Pass
Middle channel 2437MHz	-25.48	Pass
High channel 2462MHz	-22.59	Pass

802.11 N20

Frequency	Power spectral density	Result
MHz	**dBm**	
Low channel 2412MHz	-19.28	Pass
Middle channel 2437MHz	-18.77	Pass
High channel 2462MHz	-19.07	Pass

802.11 N40

Frequency	Power spectral density	Result
MHz	**dBm**	
Low channel 2422MHz	-30.67	Pass
Middle channel 2437MHz	-30.75	Pass
High channel 2452MHz	-30.39	Pass

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9.5 Spurious RF conducted emissions

Test Method

1. Establish a reference level by using the following procedure:
   a. Set RBW=100 kHz. VBW≥3RBW. Detector =peak, Sweep time = auto couple, Trace mode = max hold.
   b. Allow trace to fully stabilize, use the peak marker function to determine the maximum PSD level.
2. Use the maximum PSD level to establish the reference level.
   a. Set the center frequency and span to encompass frequency range to be measured.
   b. Use the peak marker function to determine the maximum amplitude level. Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements, report the three highest emissions relative to the limit.
3. Repeat above procedures until other frequencies measured were completed.

Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20

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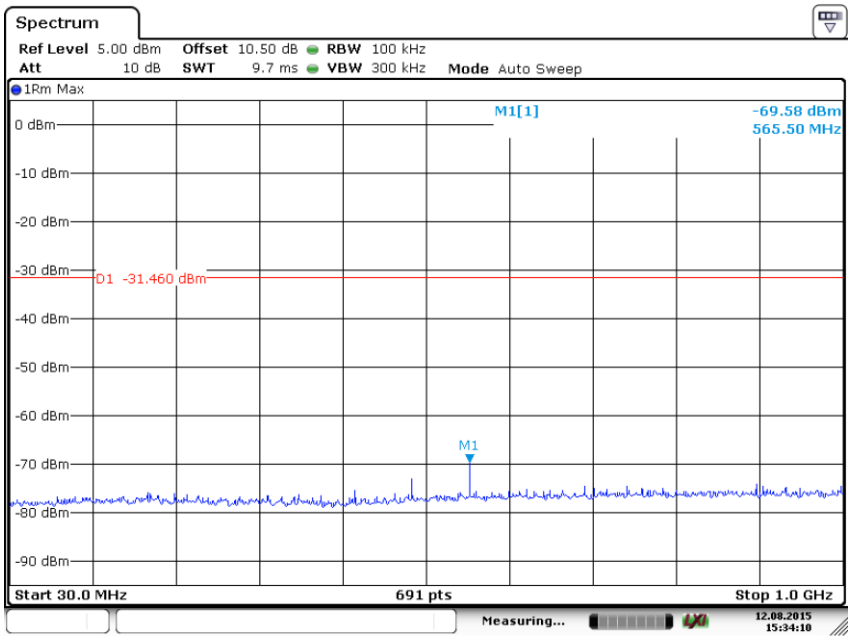
Test result
802.11 B

2412MHz



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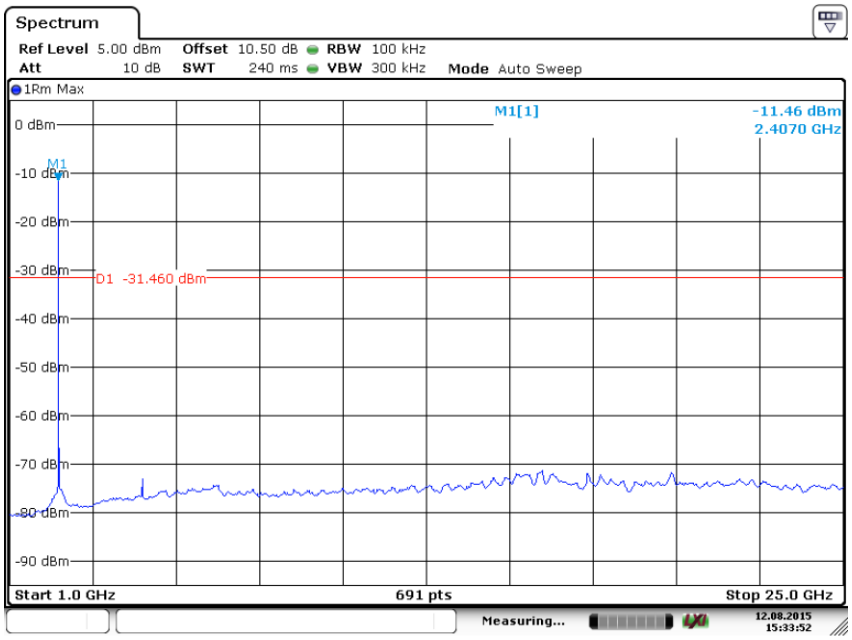

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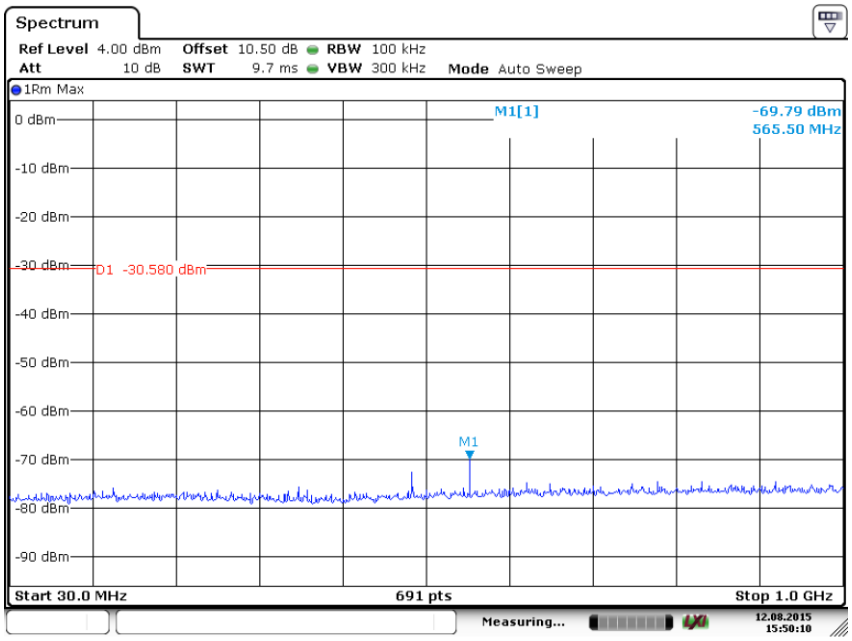
2437MHz



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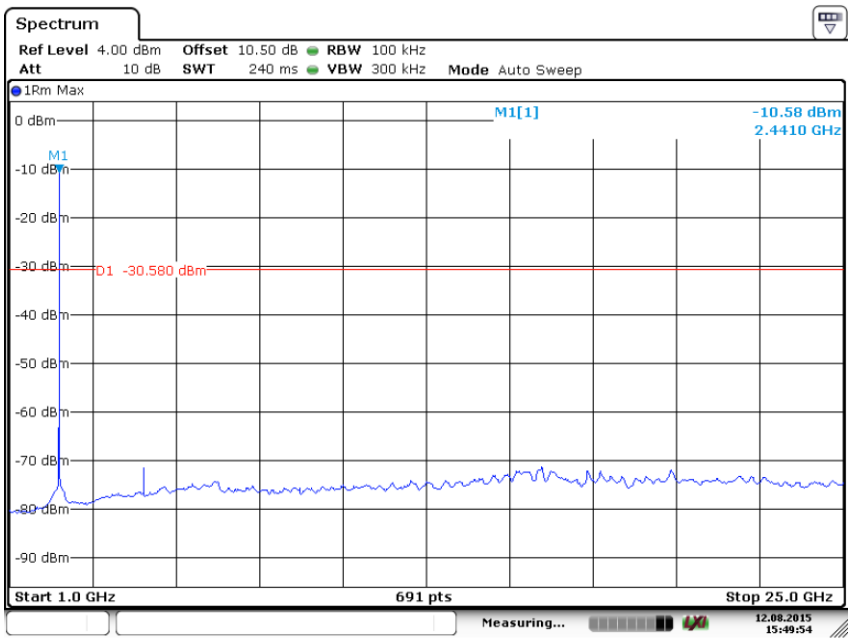

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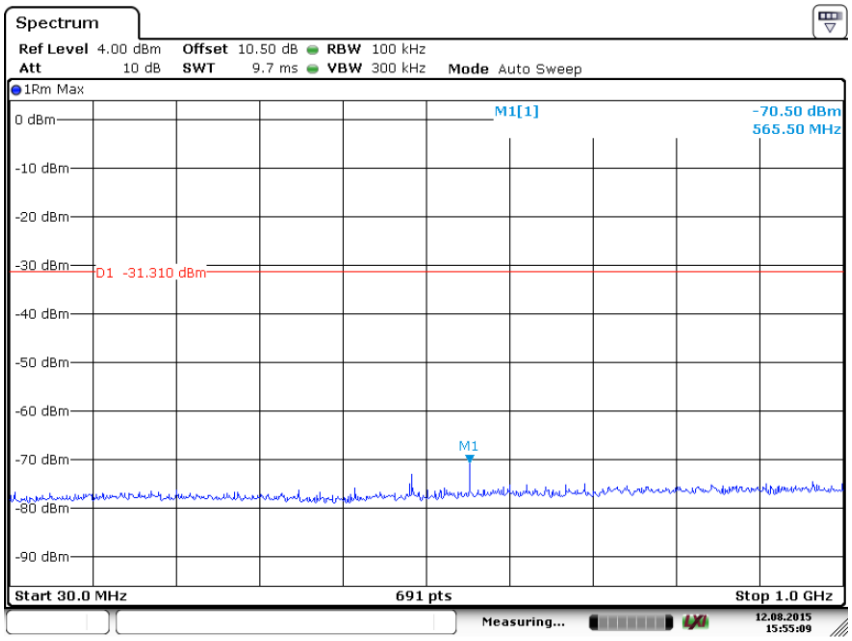
2462MHz



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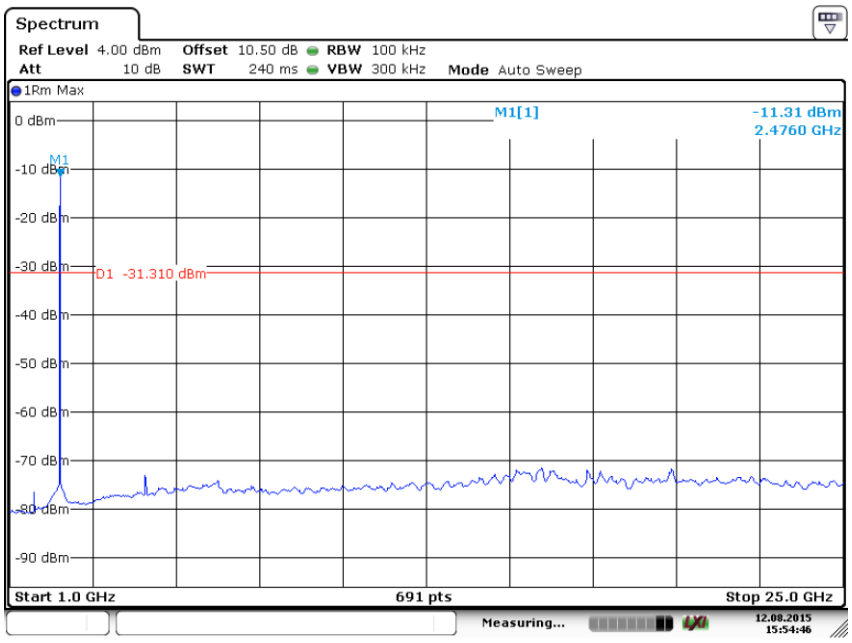

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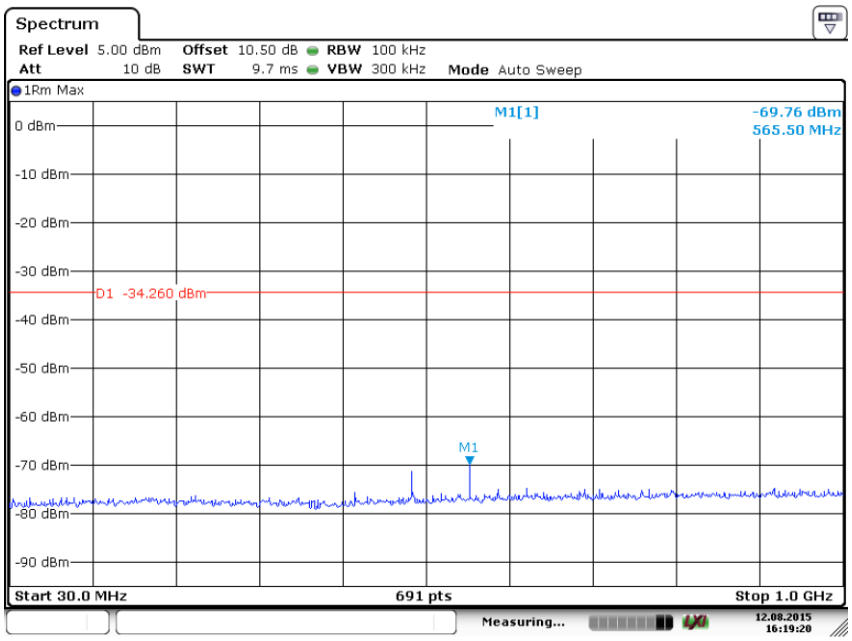
802.11 G

2412MHz



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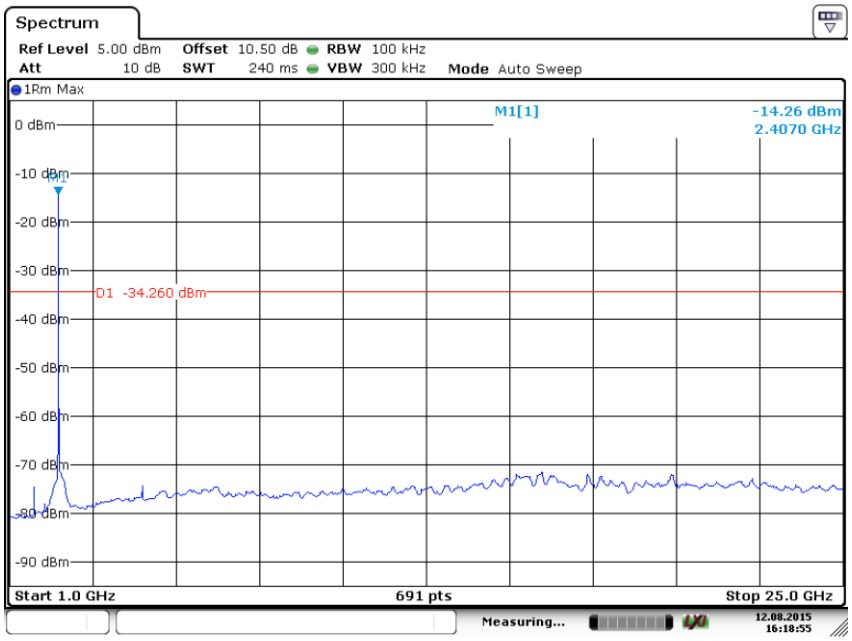

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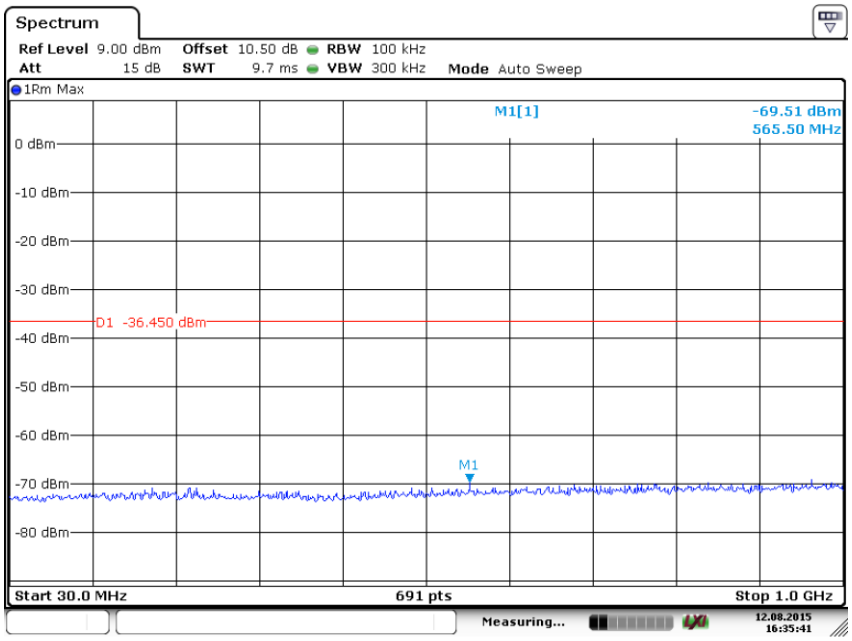
2437MHz



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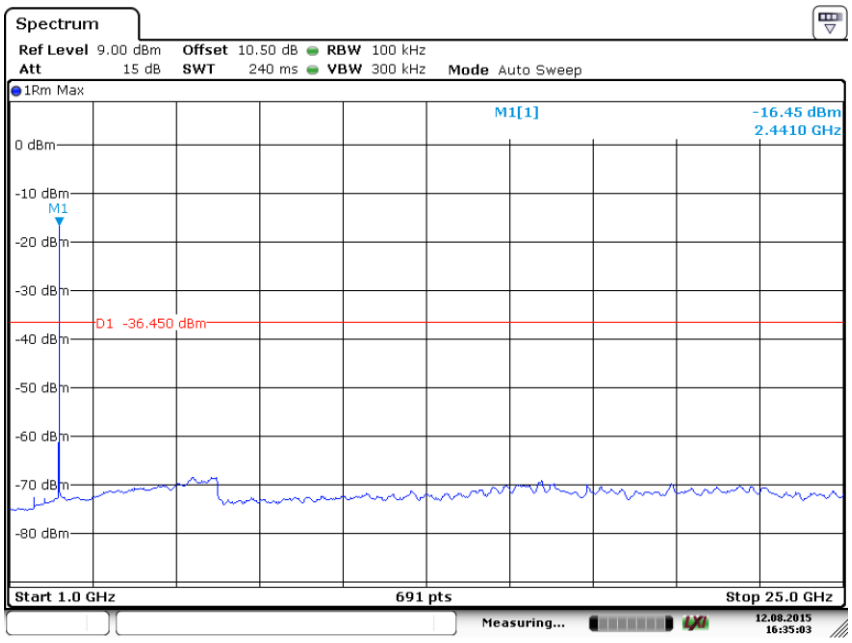

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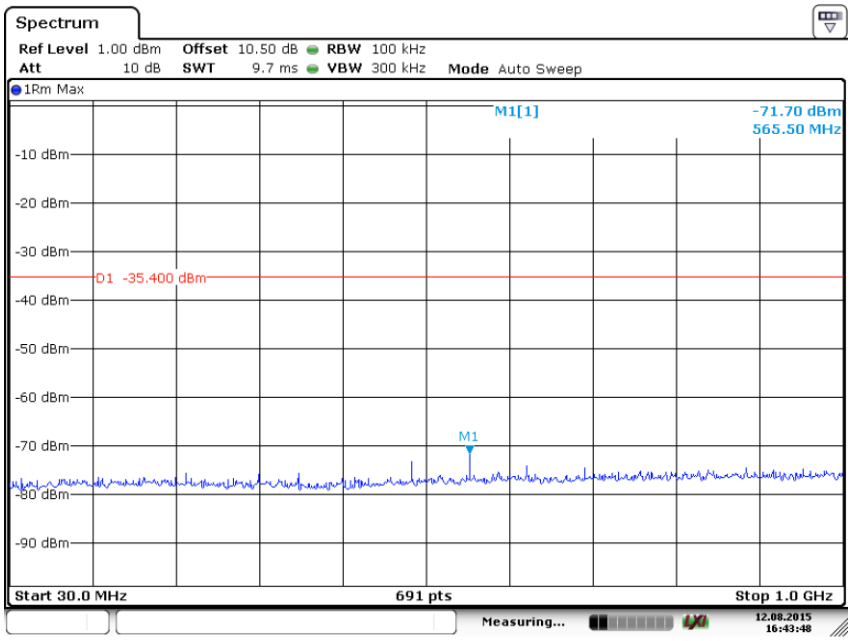
2462MHz



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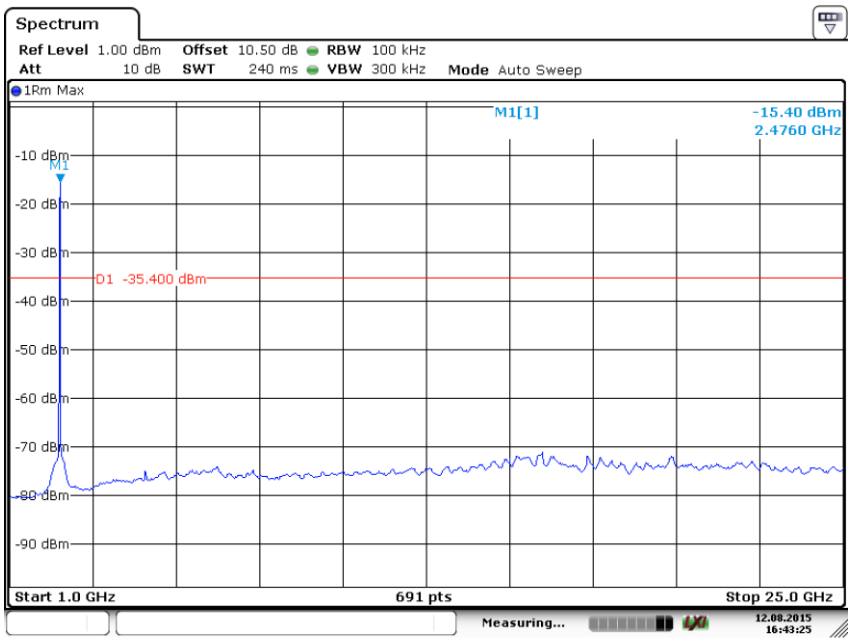

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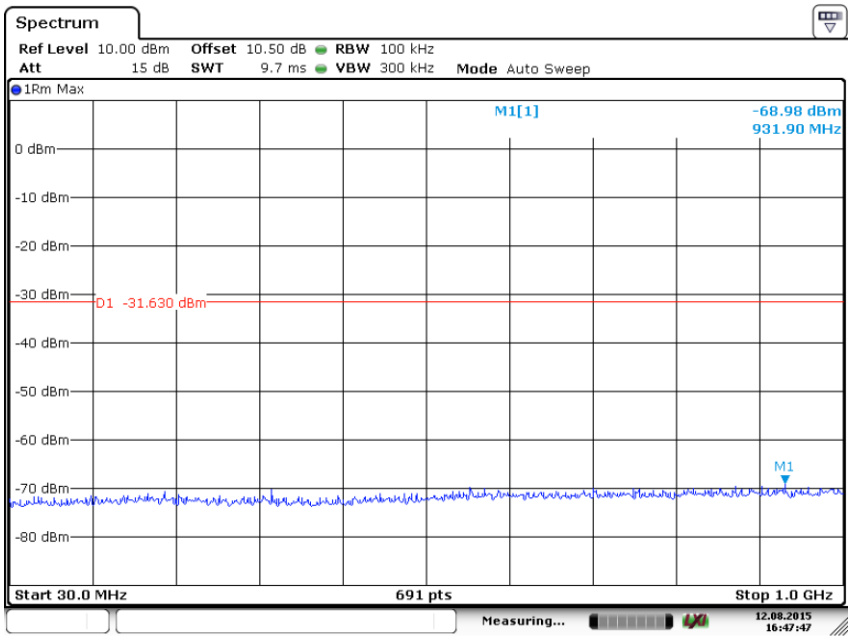
802.11 N20

2412MHz



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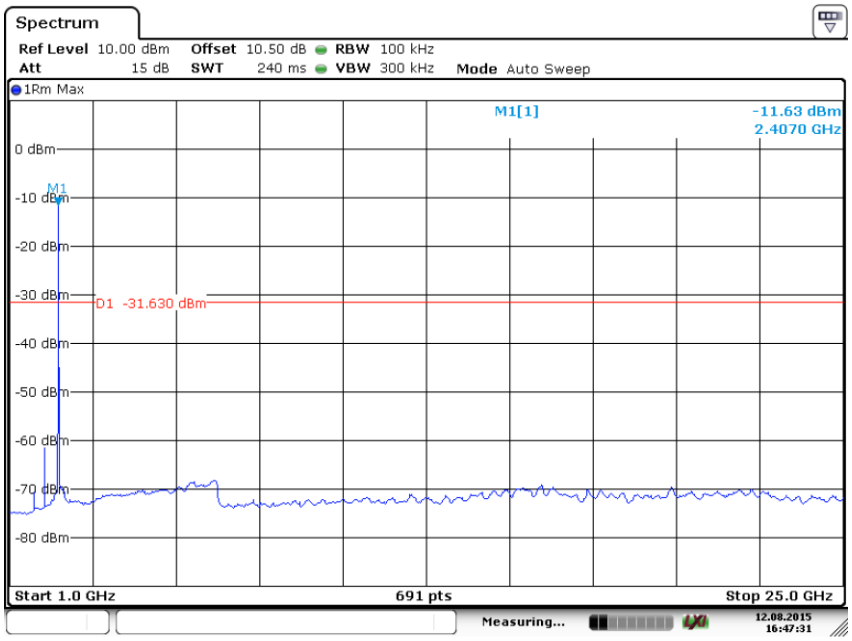

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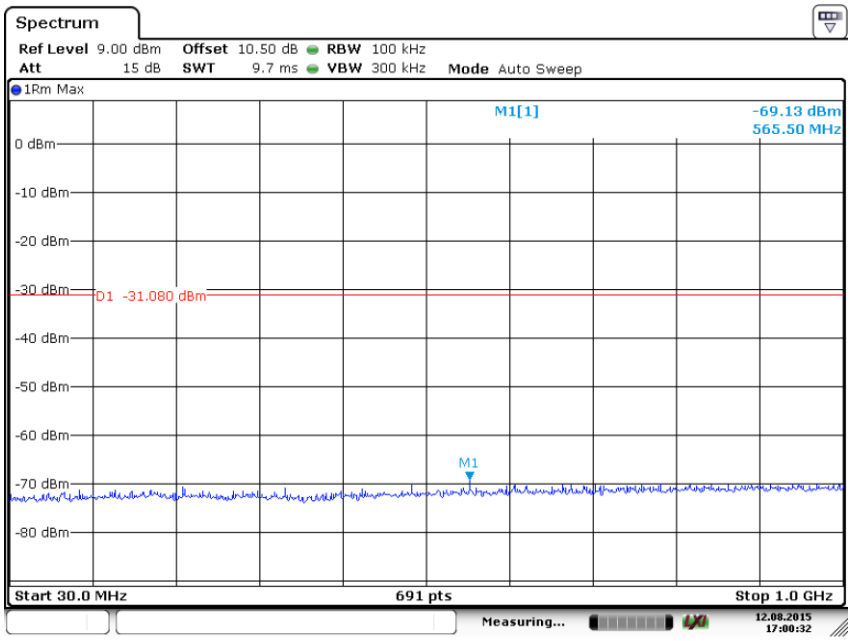
2437MHz



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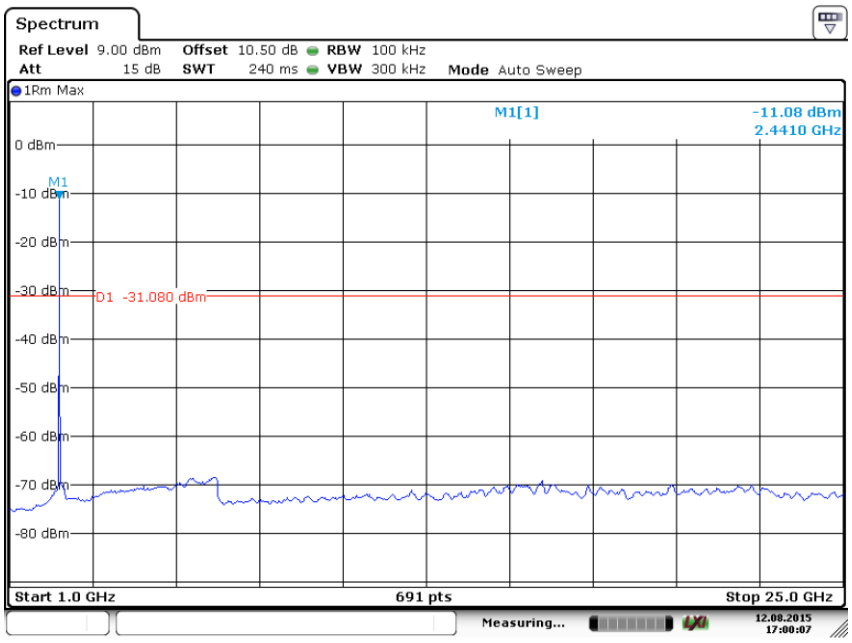

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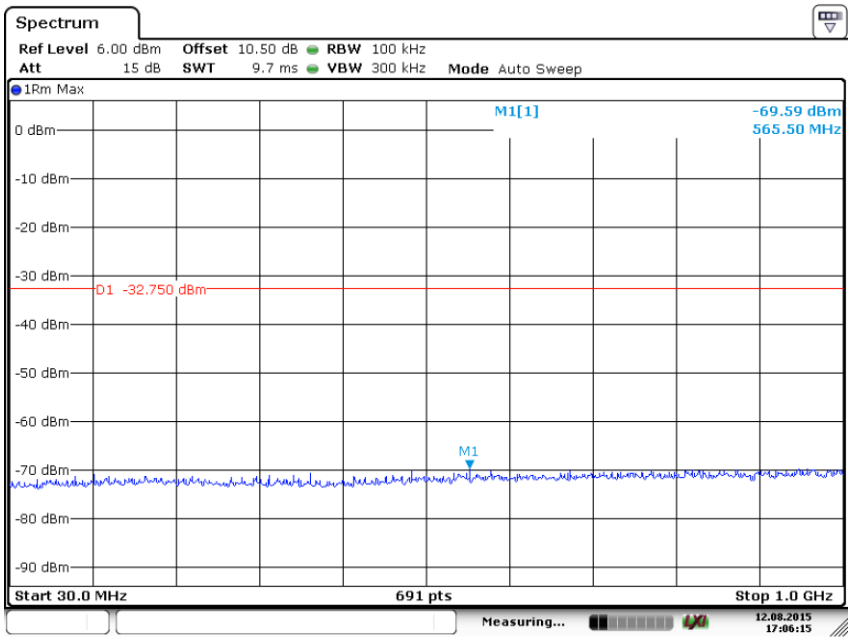
2462MHz



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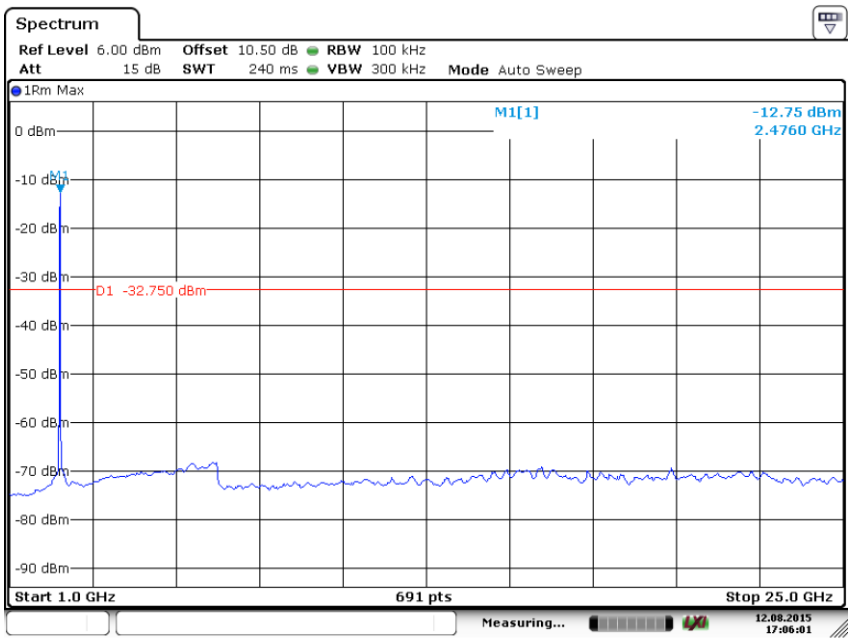

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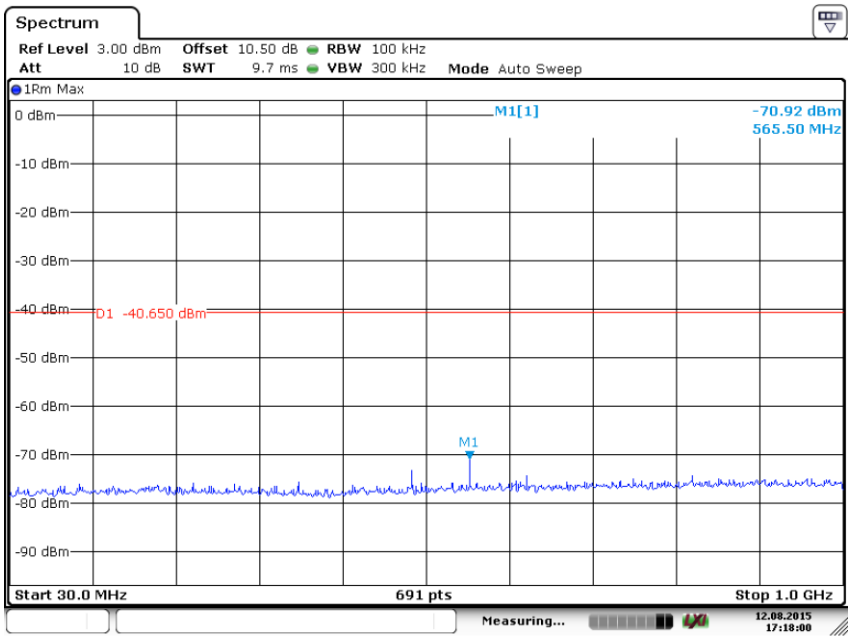
802.11 N40

2422MHz



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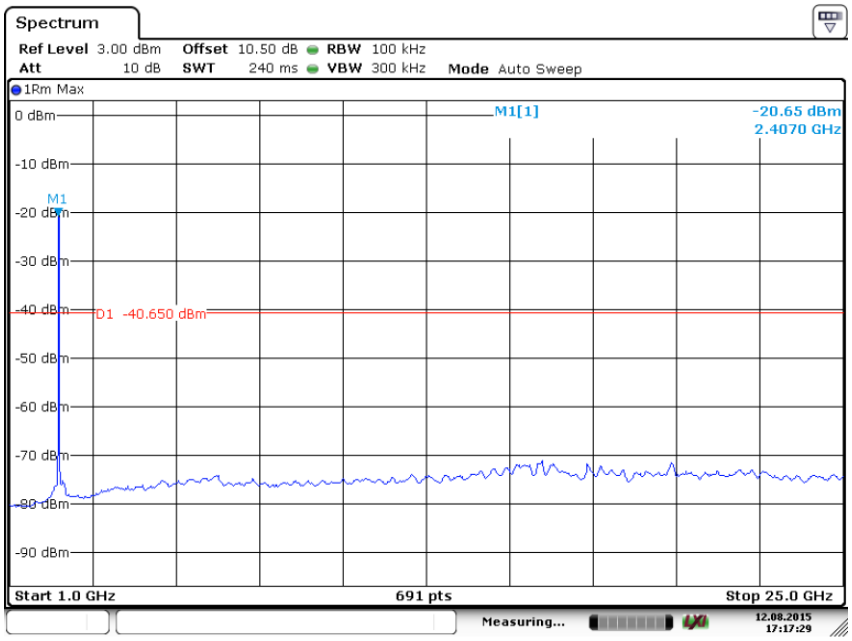

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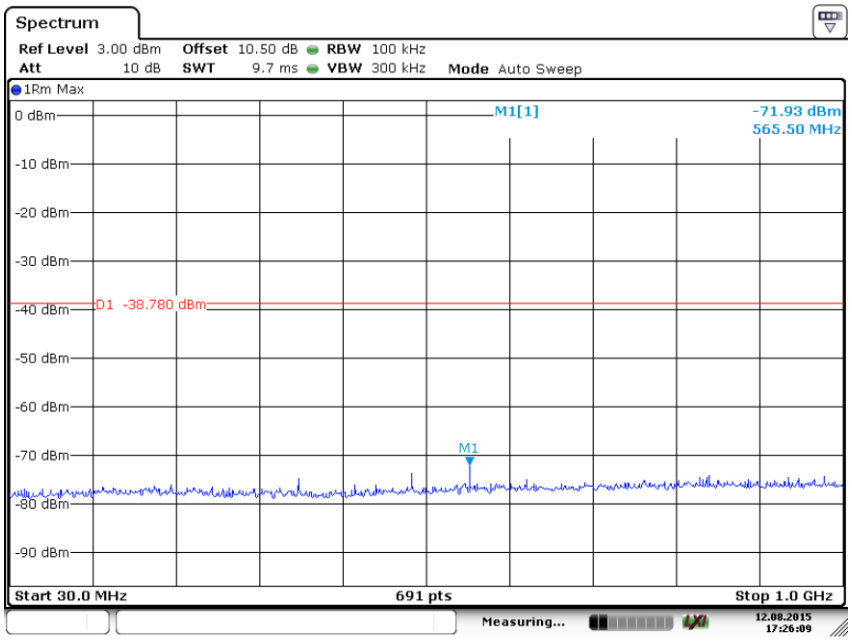
2437MHz



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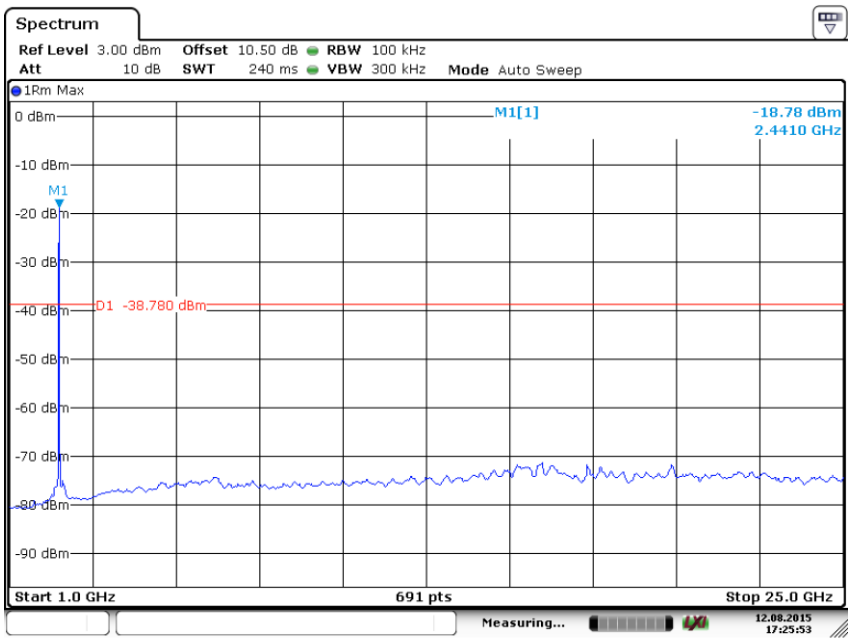

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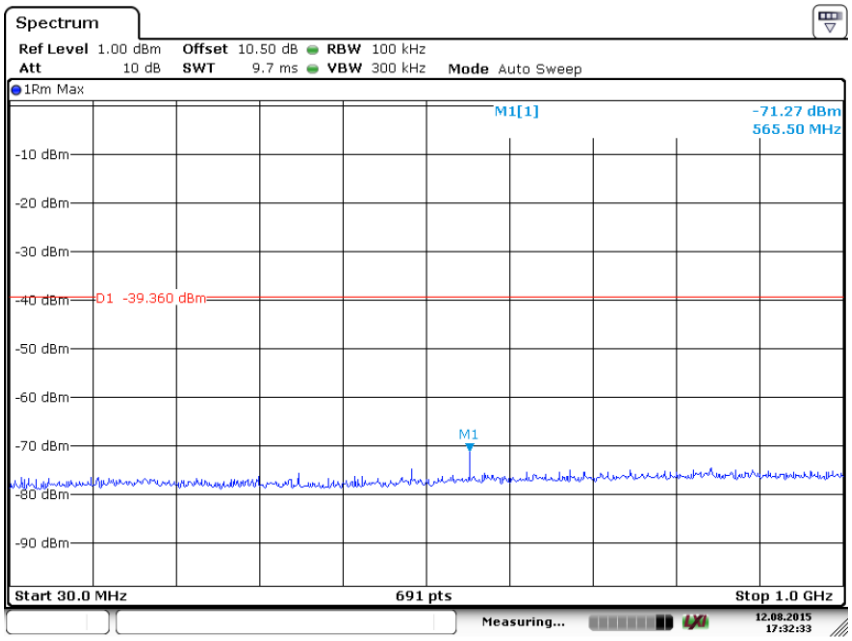
2452MHz



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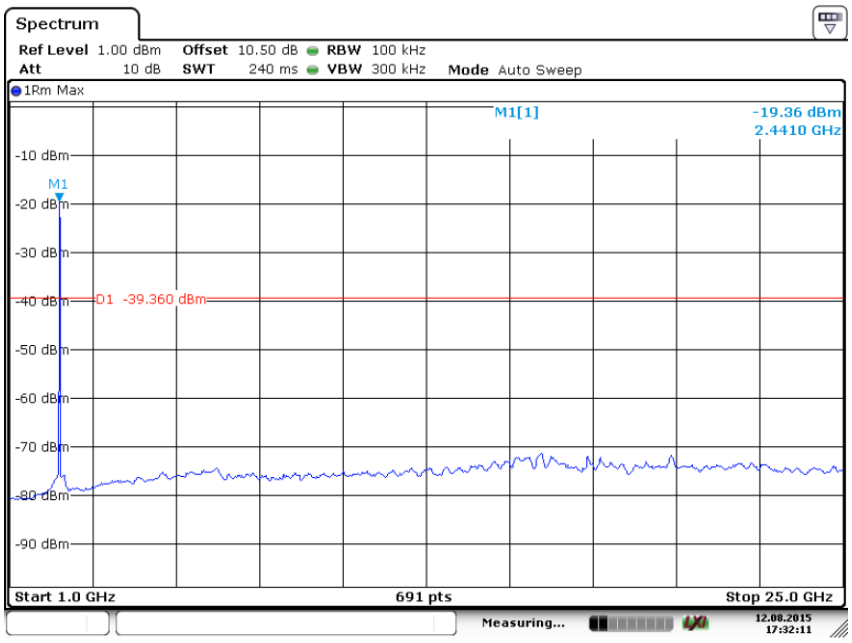

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9.6 Band edge

Test Method

1 Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz, VBW≥RBW, Sweep = auto, Detector function = peak, Trace = max hold.
2 Allow the trace to stabilize, use the peak and delta measurement to record the result.
3 The level displayed must comply with the limit specified in this Section.

Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20

Test result

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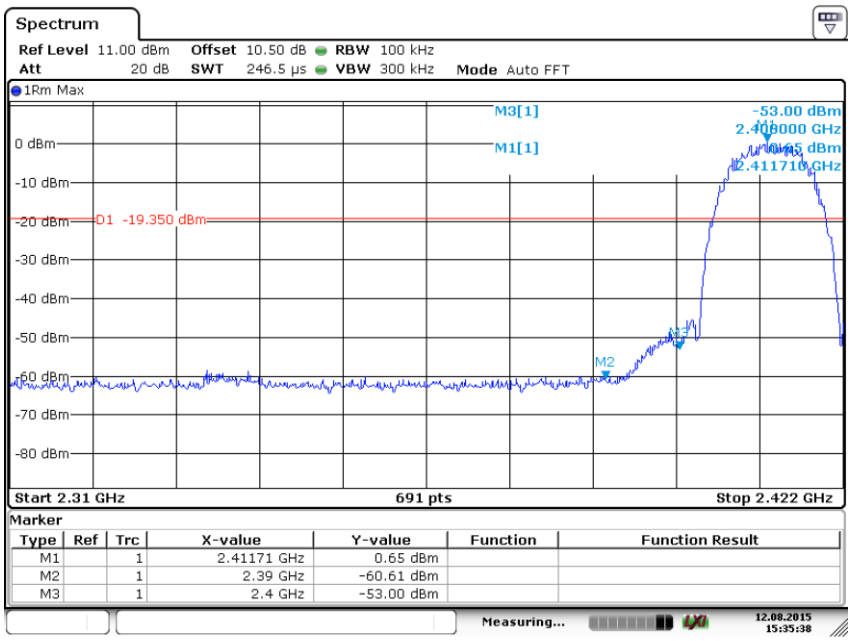
802.11 B



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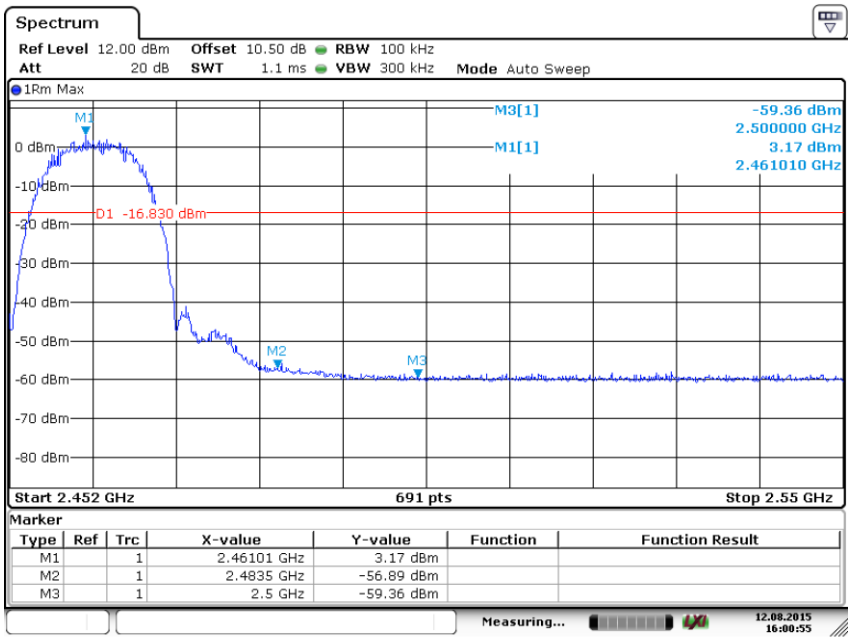

Date: 12.AUG.2015 16:00:54

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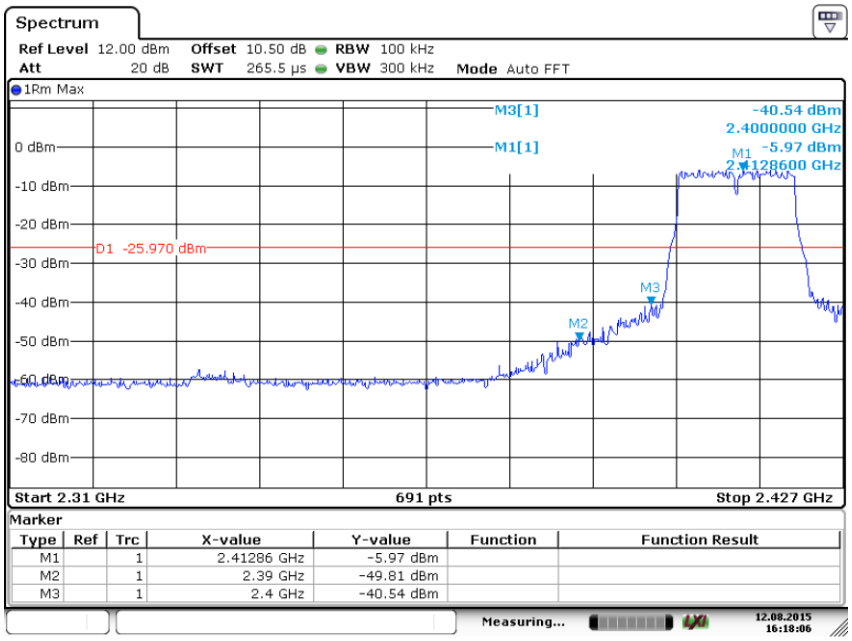
802.11 G



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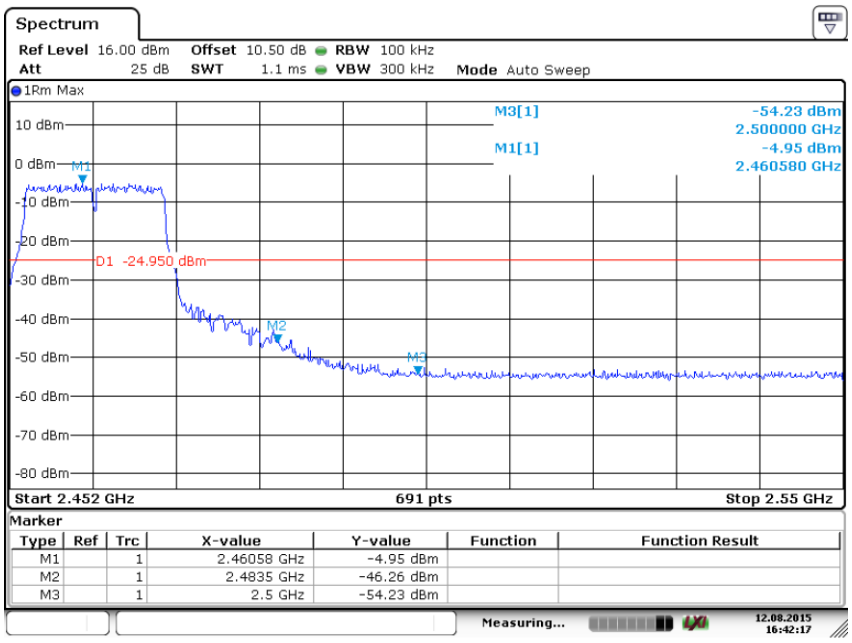

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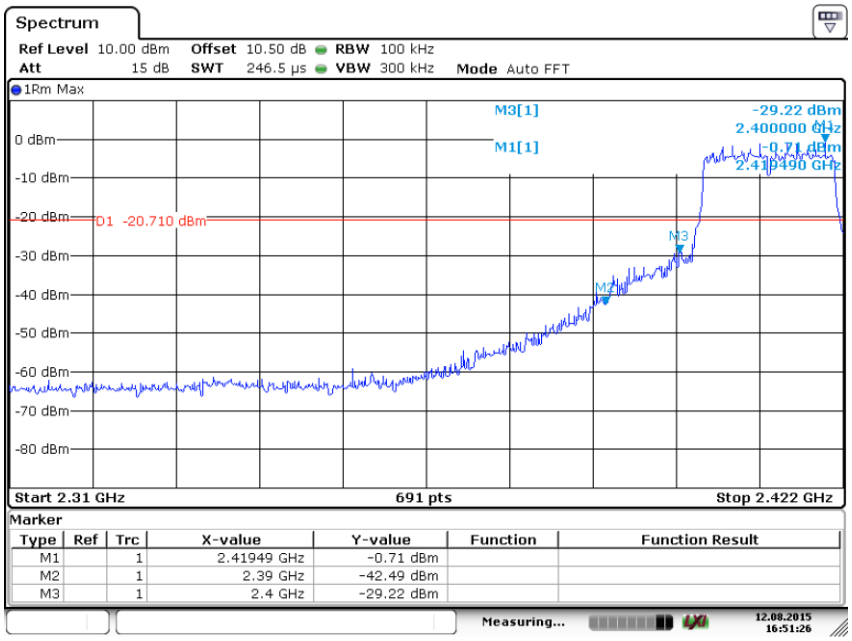
802.11 N20



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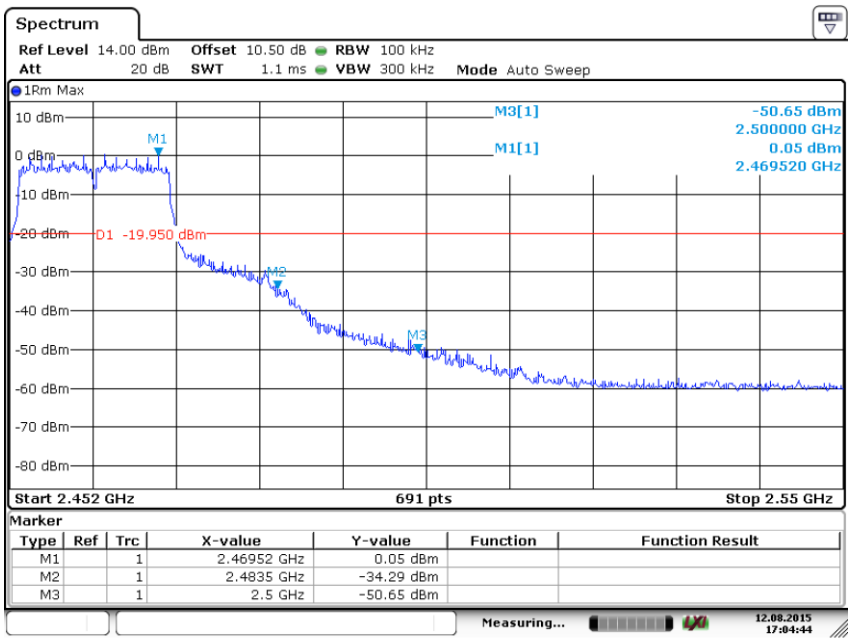

Date: 12.AUG.2015 17:04:44

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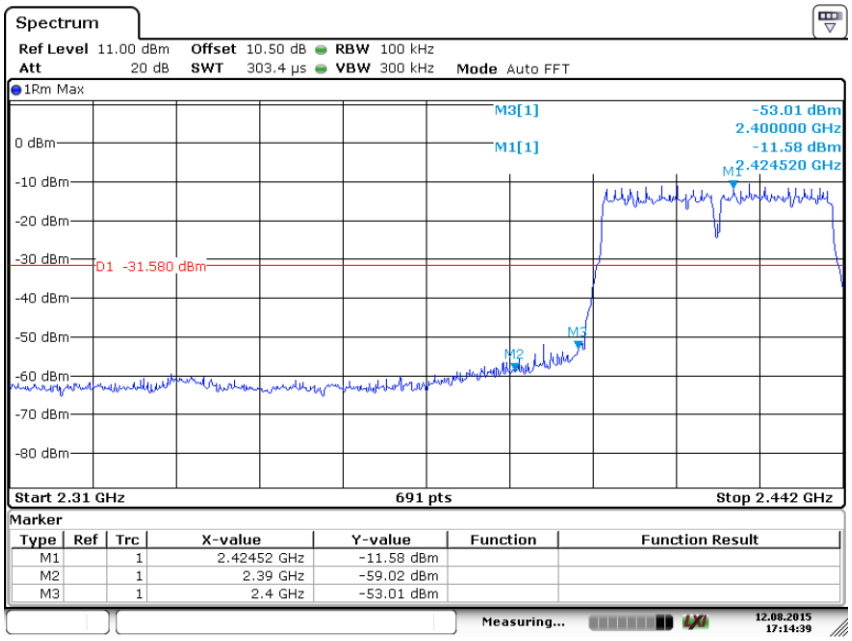
802.11 N40



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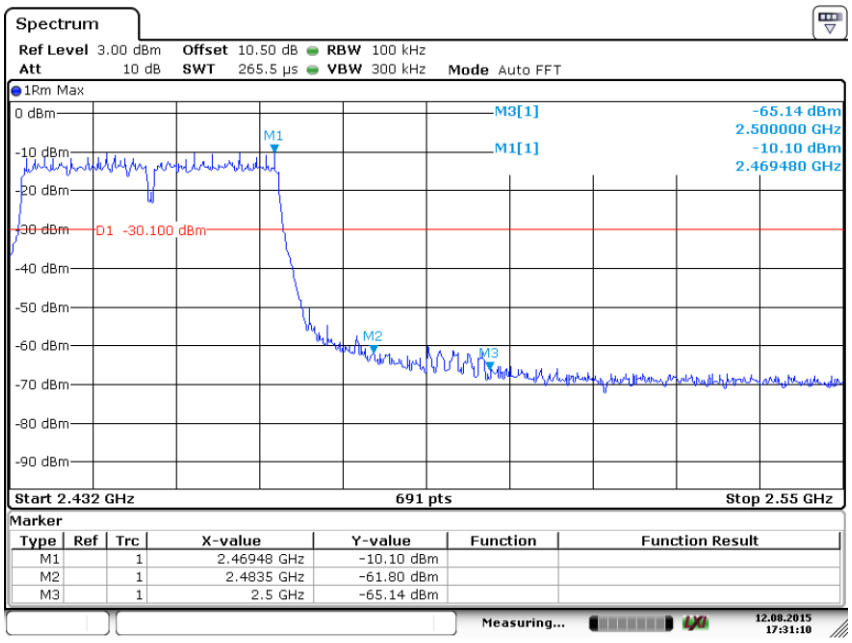

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9.7 Spurious radiated emissions for transmitter

Test Method

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
3. Use the following spectrum analyzer settings:
   Span = wide enough to fully capture the emission being measured, RBW = 1 MHz for f ≥ 1GHz, 100 kHz for f < 1 GHz, VBW ≥ RBW, Sweep = auto, Detector function = peak, Trace = max hold
4. Follow the guidelines in ANSI C63.4-1992 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc.
   The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the duty cycle per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from 20log(duty cycle/100 ms), in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

Limit

According to part 15.247(d), the radio emission outside the operating frequency band shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Radiated emissions which fall in the restricted bands, as defined in section15.205, must comply with the radiated emission limits specified in section 15.209.

Frequency MHz	Field Strength uV/m	Field Strength dBµV/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK

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Spurious radiated emissions for transmitter

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

Transmitting spurious emission test result as below:

802.11B Modulation 2412MHz Test Result

Frequency	Emission Level	Polarization	Limit	Margin	Detector	Result
MHz	dBuV/m		dBμV/m	dB		
121.54	30.26	Horizontal	43.5	4.49	QP	Pass
527.97	41.51	Horizontal	46.0	13.24	QP	Pass
50.92	36.57	Vertical	40.0	3.43	QP	Pass
34.06	32.25	Vertical	40.0	7.75	QP	Pass
36.97	33.69	Vertical	40.0	6.31	QP	Pass
55.04	34.28	Vertical	40.0	5.72	QP	Pass
*4824	53.31	Horizontal	74	20.69	PK	Pass
7236	52.00	Horizontal	74	22.00	PK	Pass
*4824	53.81	Vertical	74	20.19	PK	Pass
7236	53.99	Vertical	74	20.01	PK	Pass

802.11B Modulation 2437MHz Test Result

Frequency	Emission Level	Polarization	Limit	Margin	Detector	Result
MHz	dBuV/m		dBμV/m	dB		
*4874	53.27	Horizontal	74	20.73	PK	Pass
*7311	51.97	Horizontal	74	22.03	PK	Pass
*4874	53.70	Vertical	74	20.30	PK	Pass
*7311	51.15	Vertical	74	22.85	PK	Pass

802.11B Modulation 2462MHz Test Result

Frequency	Emission Level	Polarization	Limit	Margin	Detector	Result
MHz	dBuV/m		dBμV/m	dB		
*4924	52.42	Horizontal	74	21.58	PK	Pass
*7368	52.40	Horizontal	74	21.60	PK	Pass
*4924	51.39	Vertical	74	22.61	PK	Pass
*7368	51.23	Vertical	74	22.77	PK	Pass

Remark:

(1) QP Emission Level= Antenna Factor +Cable Loss + Reading
PK Emission Level= Antenna Factor +Cable Loss - Amp. factor + Reading
AV Emission Level= PK Emission Level+20log(dutycycle)

(2) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.

(3) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.

(4) We test all modes and only the worse case recorded in the report.

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10 Test Equipment List

List of Test Instruments

	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
CE	EMI Test Receiver	Rohde & Schwarz	ESR 3	101782	2016-7-24
	LISN	Rohde & Schwarz	ENV4200	100249	2016-7-24
	LISN	Rohde & Schwarz	ENV216	100326	2016-7-24
	ISN	Rohde & Schwarz	ENY81	100177	2016-7-24
	ISN	Rohde & Schwarz	ENY81-CA6	101664	2016-7-24
	High Voltage Probe	Rohde & Schwarz	TK9420(VT9420)	9420-58	2016-7-24
	RF Current Probe	Rohde & Schwarz	EZ-17	100816	2016-7-24
RE	Signal Analyzer	Rohde & Schwarz	FSV40	101031	2016-7-24
	Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	708	2016-7-31
	Horn Antenna	Rohde & Schwarz	HF907	102295	2016-7-24
	Wideband Horn Antenna	Q-PAR	QWH-SL-18-40-K-SG	12827	2017-10-21
	Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2016-7-24
	Pre-amplifier	Rohde & Schwarz	SCU 40A	100432	2016-7-24
	Fully Anechoic Chamber	TDK	8X4X4	--	2019-5-29
Conducted	Signal Analyzer	Rohde & Schwarz	FSV40	101030	2016-7-24

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11 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Conducted Emission 150kHz-30MHz (for test using AMN ENV216 or ENV4200)	3.50dB
Uncertainty for Radiated Emission in 3m chamber 30MHz-1000MHz	Horizontal: 4.83dB; Vertical: 4.91dB;
Uncertainty for Radiated Emission in 3m chamber 1000MHz-18000MHz	Horizontal: 4.89dB; Vertical: 4.88dB;
Uncertainty for Conducted RF test with TS 8997	Power level test involved: 2.04dB Frequency test involved:1.1×10^{-7}

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