

## FCC/IC- TEST REPORT

Report Number : **68.950.17.052.01** Date of Issue: March 14, 2017

Model : LED-EMH02DE2

Product Type : Control integrated into Luminaires

Applicant : Minwa Electronics Co., Ltd

Address : 22 Floor, Far East Finance Centre, 16 Harcourt Road, Admiralty,  
Hong Kong

Production Facility : Minwa China (Huizhou) Electronics Co., Ltd

Address : Huizhou Industrial Park, Minwa (Dalian) Industrial Park, RuHu  
Town, HuiCheng District, Huizhou City, 516169 P.R China.

Test Result :  **Positive**  **Negative**

Total pages including  
Appendices : 46

*TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch is a subcontractor to TÜV SÜD Product Service GmbH according to the principles outlined in ISO 17025.*

*TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch reports apply only to the specific samples tested under stated test conditions. Construction of the actual test samples has been documented. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. The manufacturer/importer is responsible to the Competent Authorities in Europe for any modifications made to the production units which result in non-compliance to the relevant regulations. TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch issued reports.*

*This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval.*



# 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 and 99% Occupied Bandwidth ..... 18
  - 9.4 Power spectral density ..... 23
  - 9.5 Spurious RF conducted emissions..... 28
  - 9.6 Band edge ..... 38
  - 9.7 Spurious radiated emissions for transmitter ..... 42
- 10 Test Equipment List..... 45
- 11 System Measurement Uncertainty ..... 46



## 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 No.: 502708

IC Registration No: 10320A-1

Telephone: 86 755 8828 6998  
Fax: 86 755 828 5299

### 3 Description of the Equipment under Test

#### Description of the Equipment Under Test

Product:	Control integrated into Luminaires
Model no.:	LED-EMH02DE2
FCC ID:	TKQEMH02DE2
IC:	20361-EMH0DE2
Options and accessories:	NIL
Rating:	AC 120V 60Hz 25W
RF Transmission Frequency:	2412MHz -2462MHz
No. of Operated Channel:	11
Modulation:	CCK DSSS, OFDM
Antenna Type:	Integral Antenna
Description of the EUT:	The Equipment Under Test (EUT) is a Control integrated into Luminaires which supports 2.4G WLAN Transmitter and Receiver functions.

## 4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2016 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators
RSS-Gen Issue 4 November 2014	General Requirements for the Certification of Radio Apparatus
RSS-247 Issue 2 February 2017	RSS-247— Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

All the test methods were according to KDB558074 D01 DTS Meas Guidance v03r02 and ANSI C63.10 (2013).

## 5 Summary of Test Results

Technical Requirements							
FCC Part 15 Subpart C, RSS-Gen, RSS-247							
Test Condition			Pages	Test Site	Test Result		
					Pass	Fail	N/A
§15.207	RSS-Gen A8.8	Conducted emission AC power port	10	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247 (b) (3)	RSS-247 5.4(d)	Conducted peak output power	13	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(a)(1)	RSS-247 5.1(a) & RSS-Gen 6.6	20dB bandwidth	---	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
§15.247(a)(1)	RSS-247 5.1(b)	Carrier frequency separation	---	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
§15.247(a)(1)(iii)	RSS-247 5.1(d)	Number of hopping frequencies	---	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
§15.247(a)(1)(iii)	RSS-247 5.1(e)	Dwell Time	---	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
§15.247(a)(2)	RSS-247 5.2(a)	6dB bandwidth and 99% Occupied Bandwidth	18	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(e)	RSS-247 5.2(b)	Power spectral density	23	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(d)	RSS-247 5.5	Spurious RF conducted emissions	28	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(d)	RSS-247 5.5	Band edge	38	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(d) & §15.209	RSS-247 5.5 & RSS-Gen 6.13	Spurious radiated emissions for transmitter	42	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.203	RSS-Gen 8.3	Antenna requirement	See note 1		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Remark 1: N/A – Not Applicable.

Note 1: The EUT uses a patch antenna, which gain is 0dBi. In accordance to §15.203 and RSS-Gen 8.3 , It is considered sufficiently to comply with the provisions of this section.

## 6 General Remarks

### Remarks

This submittal(s) (test report) is intended for FCC ID: TKQEMH02DE2, IC:20361-EMH0DE2 complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C Rules and RSS-210.

### 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: February 16, 2017

Testing Start Date: February 16, 2017

Testing End Date: March 14, 2017

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

Reviewed by:



John Zhi  
EMC Project Manager

Prepared by:

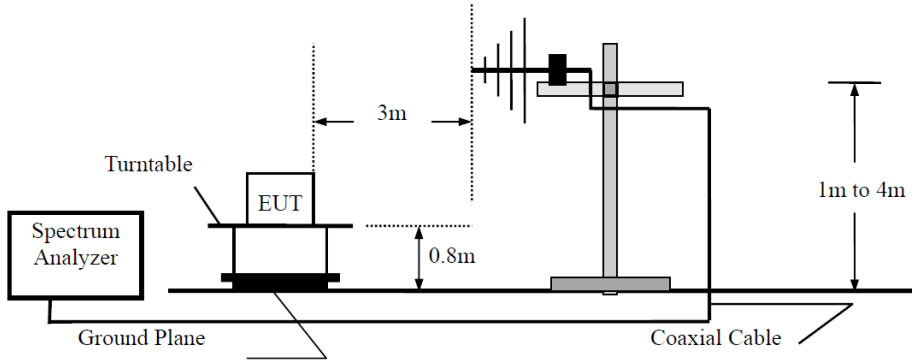


Leon Zhang  
EMC Project Engineer

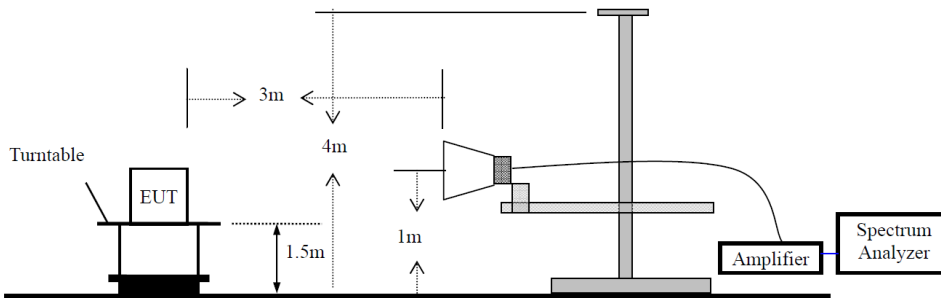
## 7 Test Setups

### 7.1 Radiated test setups

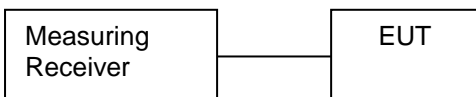
#### Below 1GHz



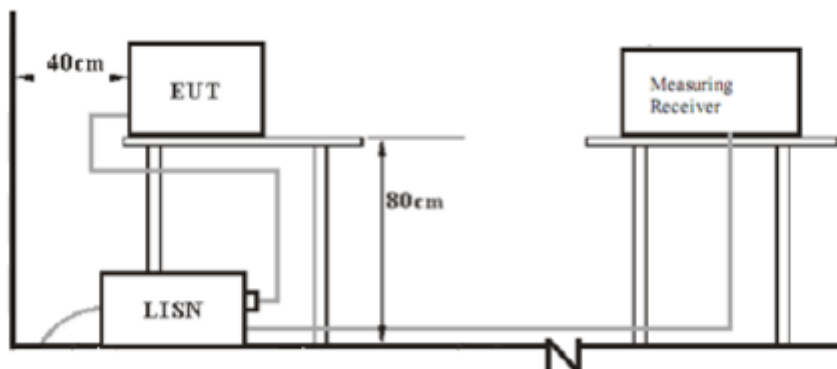
#### Above 1GHz



### 7.2 Conducted RF test setups



### 7.3 AC Power Line Conducted Emission test setups







## 8 Systems test configuration

Auxiliary Equipment Used during Test:

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

## 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

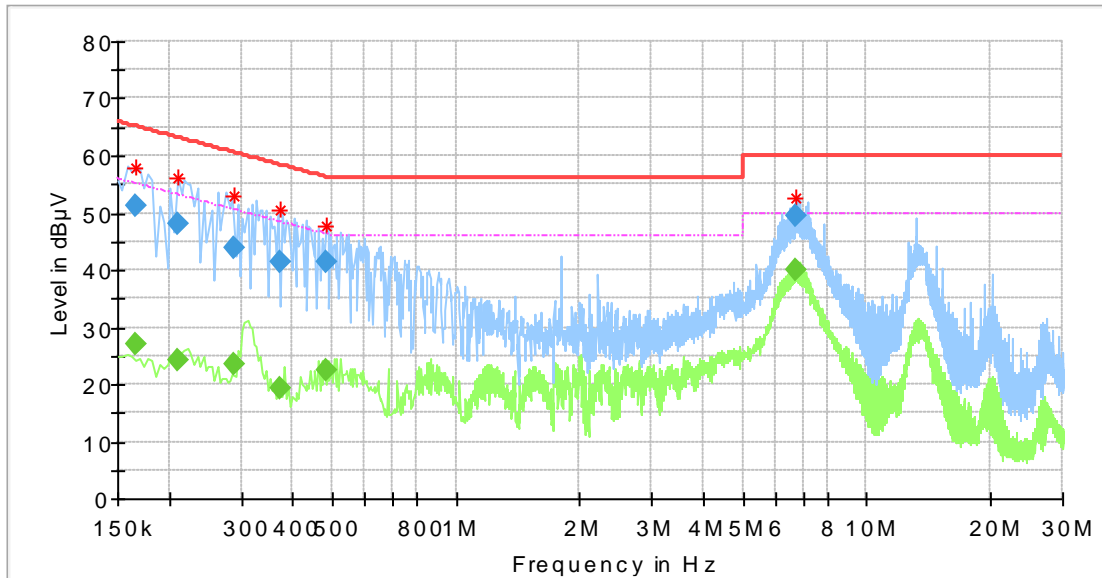
#### Limit

Frequency MHz	QP Limit dB $\mu$ V	AV Limit dB $\mu$ V
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

“\*”Decreasing linear

## Conducted Emission

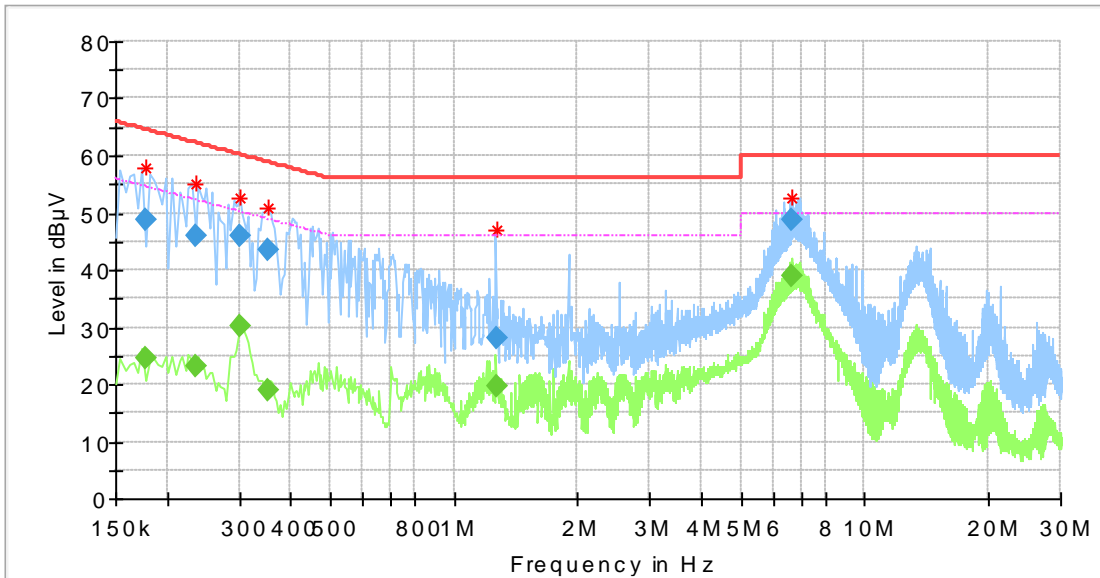
Product Type : Control integrated into Luminaires  
 M/N : LED-EMH02DE2  
 Operating Condition : Normal working& TX  
 Test Specification : Live  
 Comment : AC 120V/60Hz



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.165500	---	26.98	55.18	28.20	L1	9.7
0.165500	51.07	---	65.18	14.11	L1	9.7
0.209500	---	24.23	53.23	29.00	L1	9.7
0.209500	47.98	---	63.23	15.25	L1	9.7
0.289500	---	23.68	50.54	26.86	L1	9.7
0.289500	43.91	---	60.54	16.63	L1	9.7
0.373500	---	19.27	48.42	29.15	L1	9.7
0.373500	41.45	---	58.42	16.97	L1	9.7
0.481500	---	22.42	46.31	23.89	L1	9.7
0.481500	41.27	---	56.31	15.04	L1	9.7
6.709500	---	40.07	50.00	9.93	L1	9.9
6.709500	49.62	---	60.00	10.38	L1	9.9

## Conducted Emission

Product Type : Control integrated into Luminaires  
 M/N : LED-EMH02DE2  
 Operating Condition : Normal working& TX  
 Test Specification : Neutral  
 Comment : AC 120V/60Hz



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.177500	---	24.41	54.60	30.19	N	9.6
0.177500	48.68	---	64.60	15.92	N	9.6
0.234500	---	23.26	52.29	29.03	N	9.6
0.234500	45.84	---	62.29	16.45	N	9.6
0.301500	---	30.31	50.20	19.89	N	9.7
0.301500	46.04	---	60.20	14.16	N	9.7
0.353500	---	18.91	48.88	29.97	N	9.7
0.353500	43.36	---	58.88	15.52	N	9.7
1.265500	---	19.50	46.00	26.50	N	9.7
1.265500	28.22	---	56.00	27.78	N	9.7
6.674500	---	38.80	50.00	11.20	N	9.9
6.674500	48.86	---	60.00	11.14	N	9.9

## 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. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power.

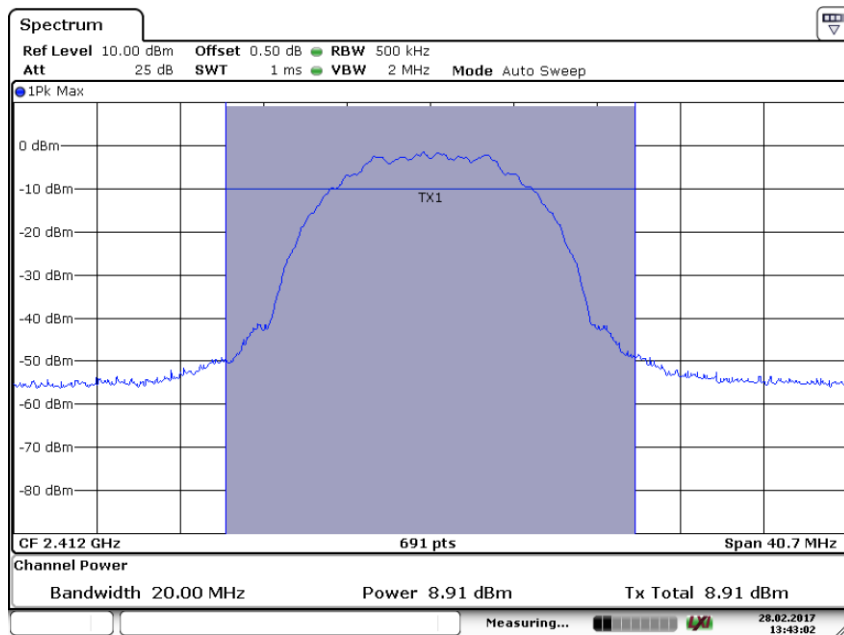
### Limits

Frequency Range MHz	Limit W	Limit dBm
2412MHz-2462MHz	≤1	≤30

Test result as below table

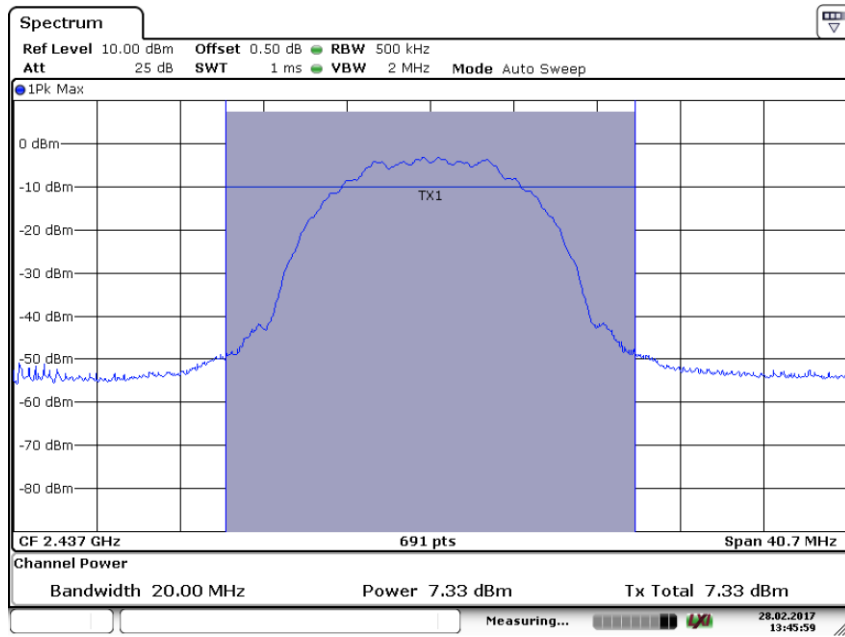
802.11b

Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2412MHz	8.91	Pass
Middle channel 2437MHz	7.33	Pass
High channel 2462MHz	6.35	Pass



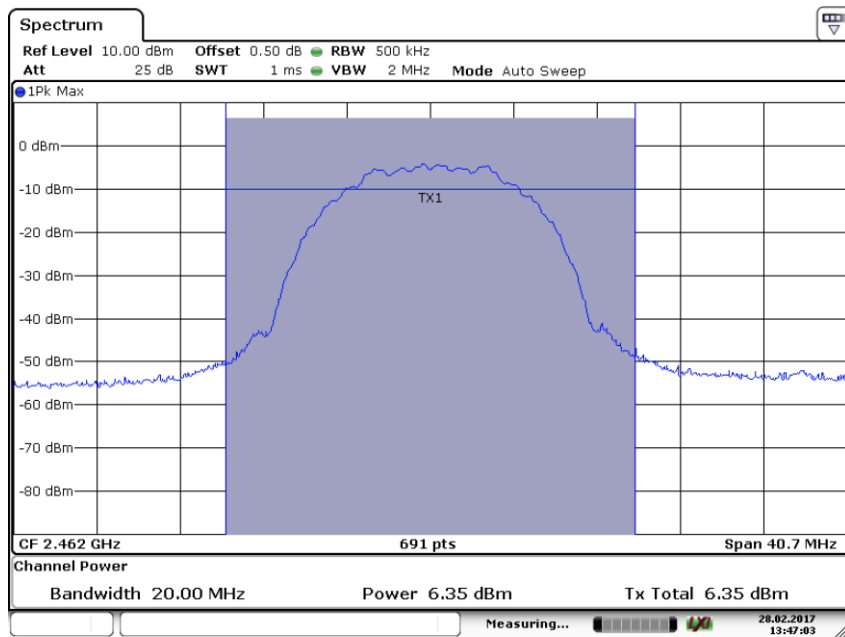
Date: 28.FEB.2017 13:43:02

2412MHz



Date: 28.FEB.2017 13:45:59

2437MHz

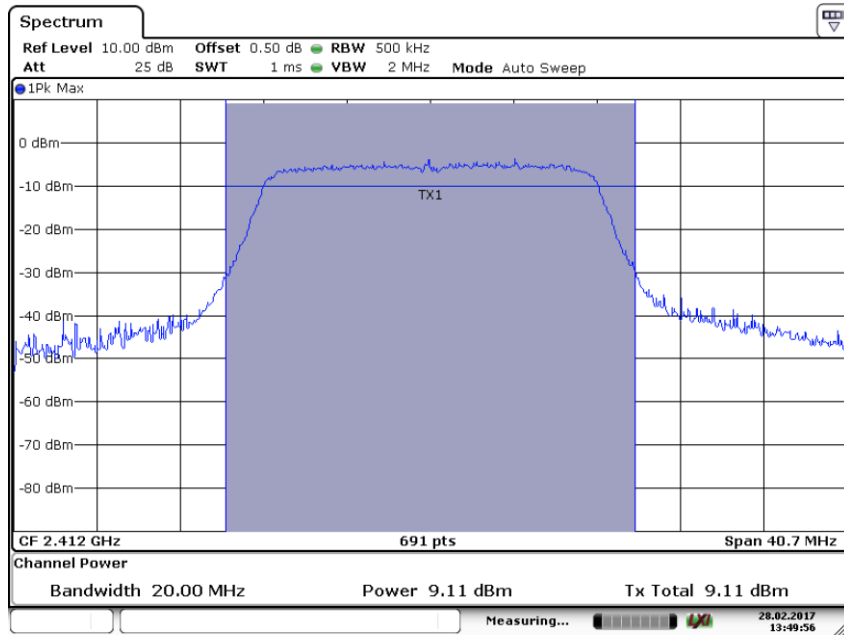


Date: 28.FEB.2017 13:47:03

2462MHz

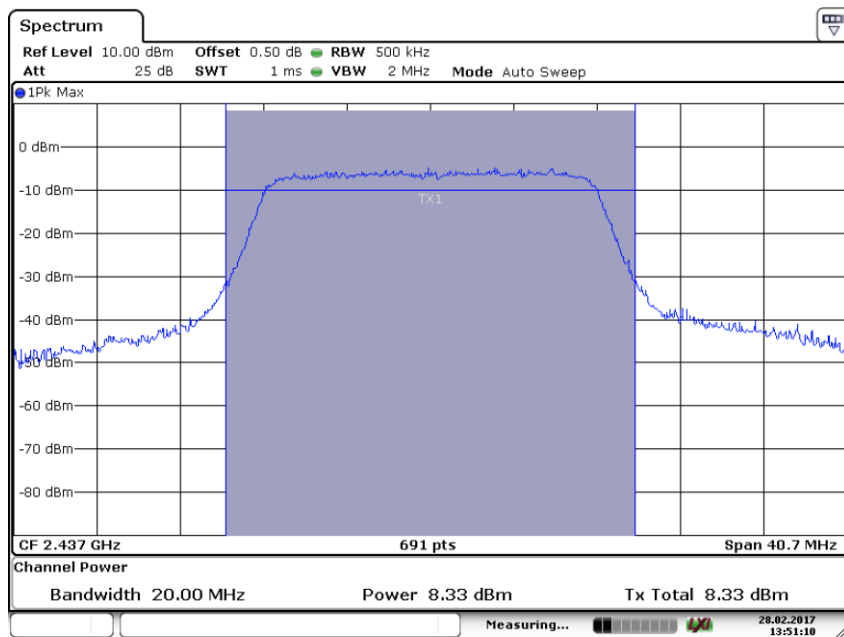
802.11g

Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2412MHz	9.11	Pass
Middle channel 2437MHz	8.33	Pass
High channel 2462MHz	7.38	Pass



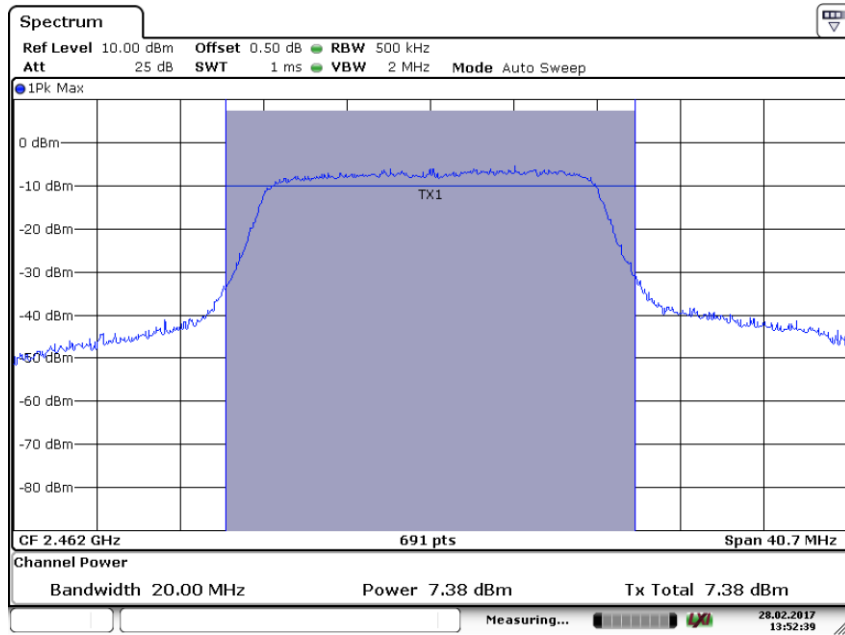
Date: 28.FEB.2017 13:49:56

2412MHz



Date: 28.FEB.2017 13:51:10

2437MHz

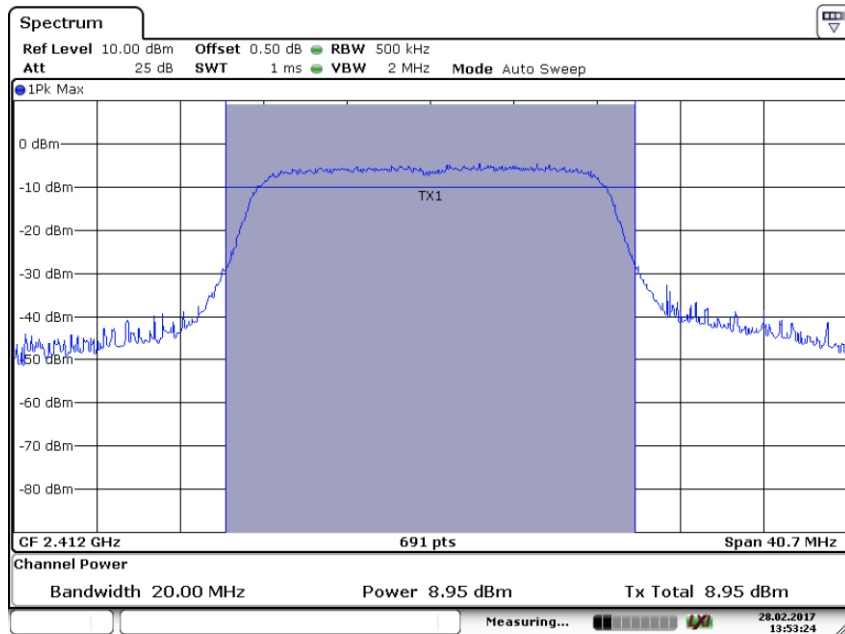


Date: 28.FEB.2017 13:52:39

2462MHz

802.11n20

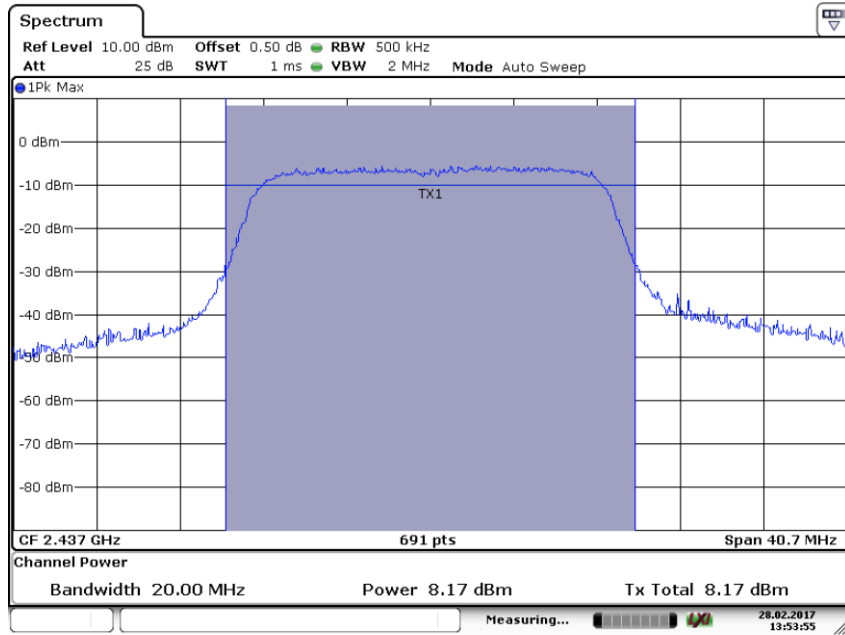
Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2412MHz	8.95	Pass
Middle channel 2437MHz	8.17	Pass
High channel 2462MHz	7.11	Pass



Date: 28.FEB.2017 13:53:25

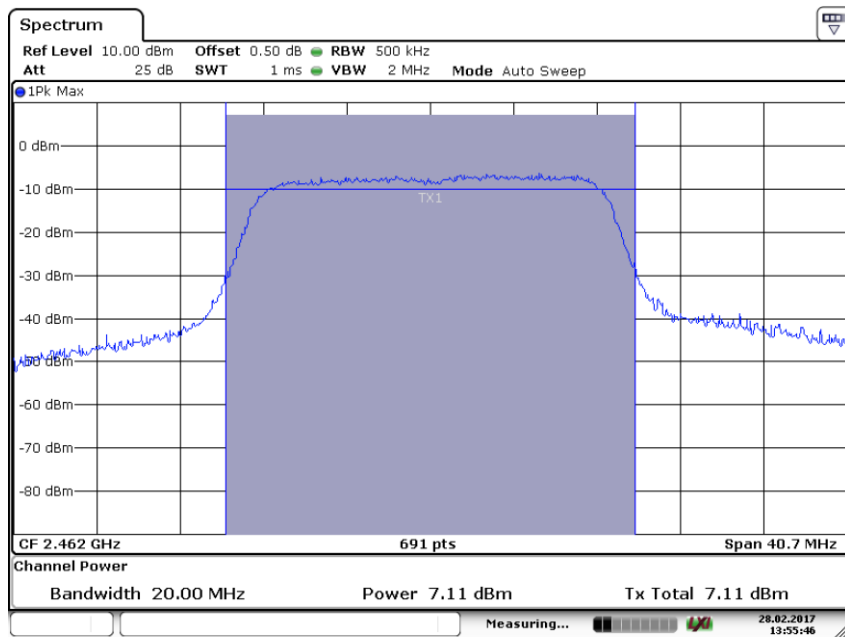
2412MHz





Date: 28.FEB.2017 13:53:55

2437MHz



Date: 28.FEB.2017 13:55:47

2462MHz

### 9.3 6dB bandwidth and 99% Occupied 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]**

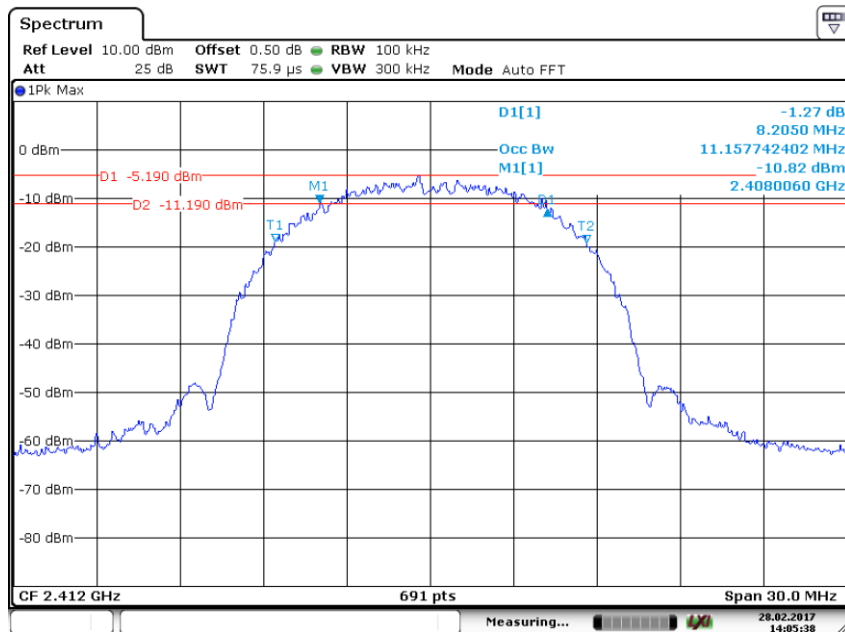
\_\_\_\_\_

≥500

**Test result**

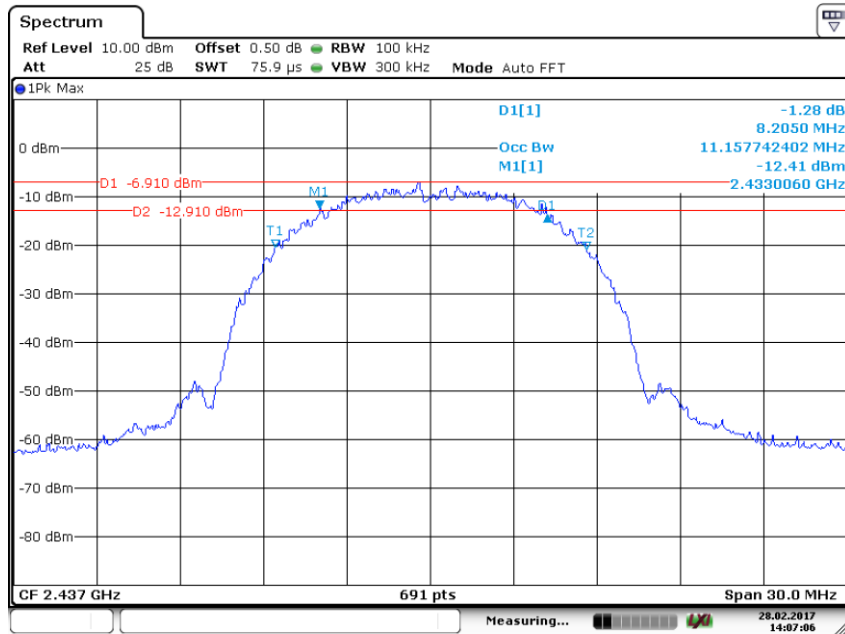
**802.11b**

Frequency MHz	6dB bandwidth MHz	99% Bandwidth MHz	Result
Low channel 2412MHz	8.205	11.158	Pass
Middle channel 2437MHz	8.205	11.158	Pass
High channel 2462MHz	7.511	11.158	Pass



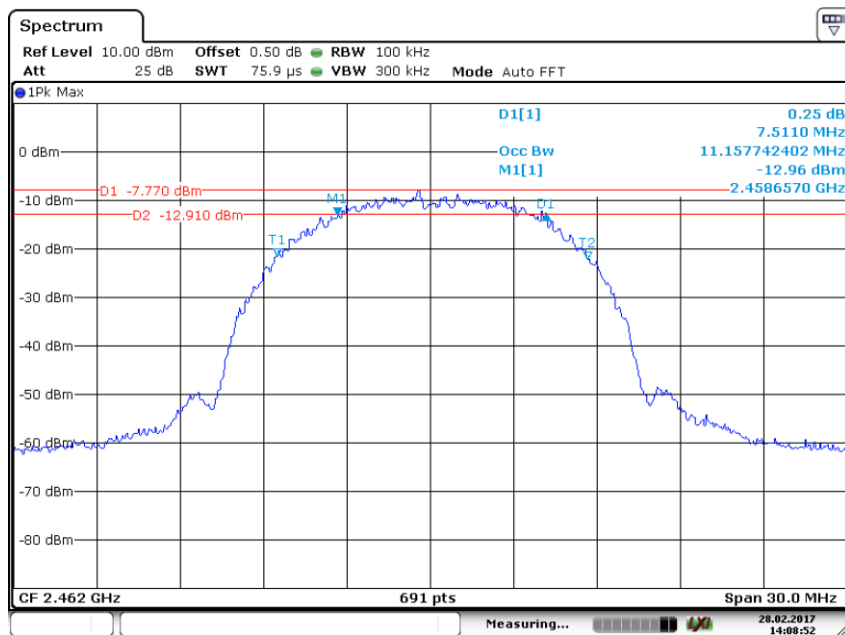
Date: 28.FEB.2017 14:05:37

2412MHz



Date: 28.FEB.2017 14:07:06

2437MHz

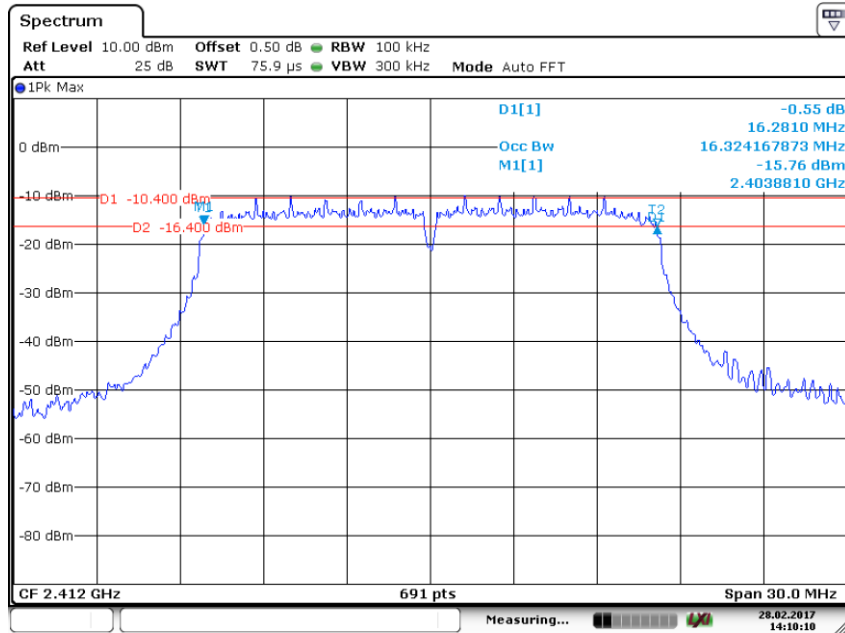


Date: 28.FEB.2017 14:08:53

2462MHz

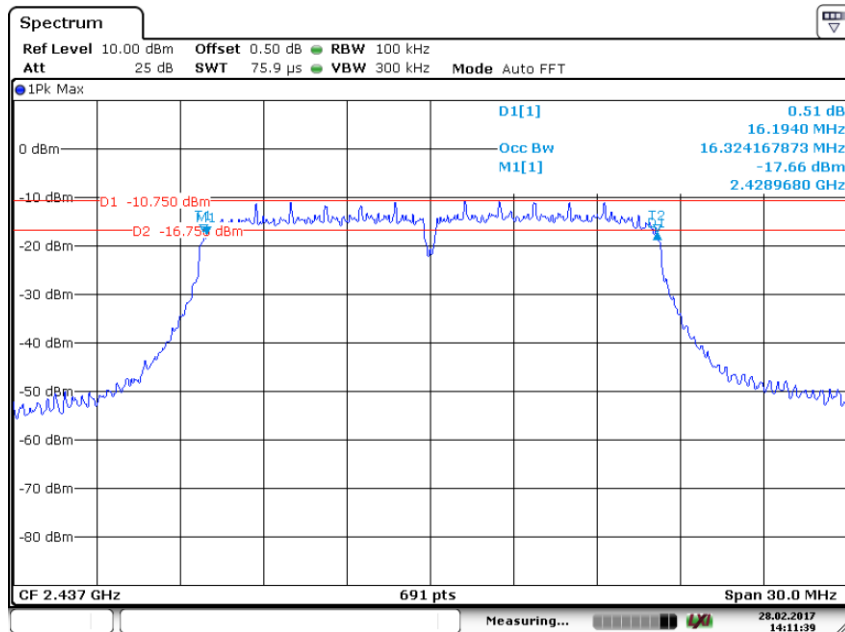
802.11g

Frequency MHz	6dB bandwidth MHz	99% Bandwidth MHz	Result
Low channel 2412MHz	16.281	16.324	Pass
Middle channel 2437MHz	16.194	16.324	Pass
High channel 2462MHz	16.064	16.281	Pass



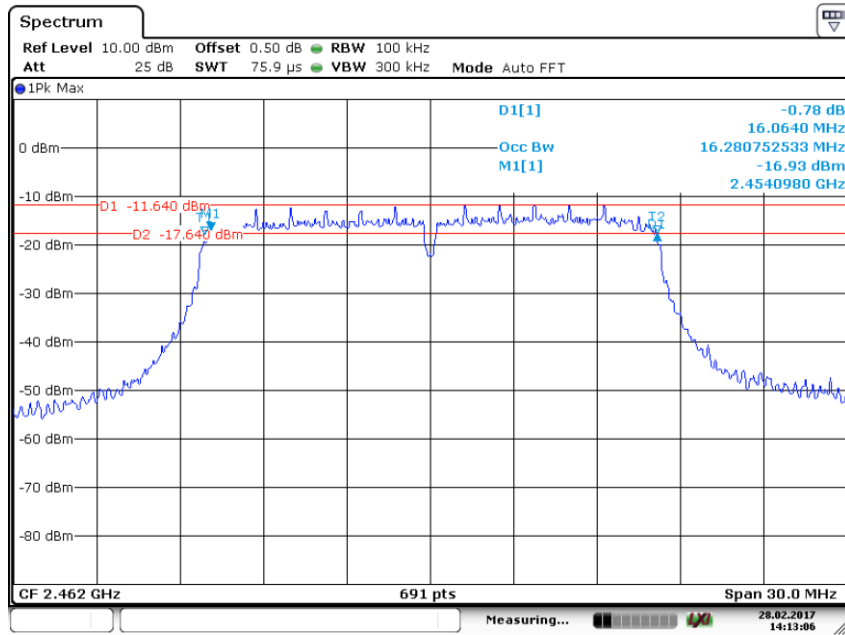
Date: 28.FEB.2017 14:10:11

2412MHz



Date: 28.FEB.2017 14:11:38

2437MHz

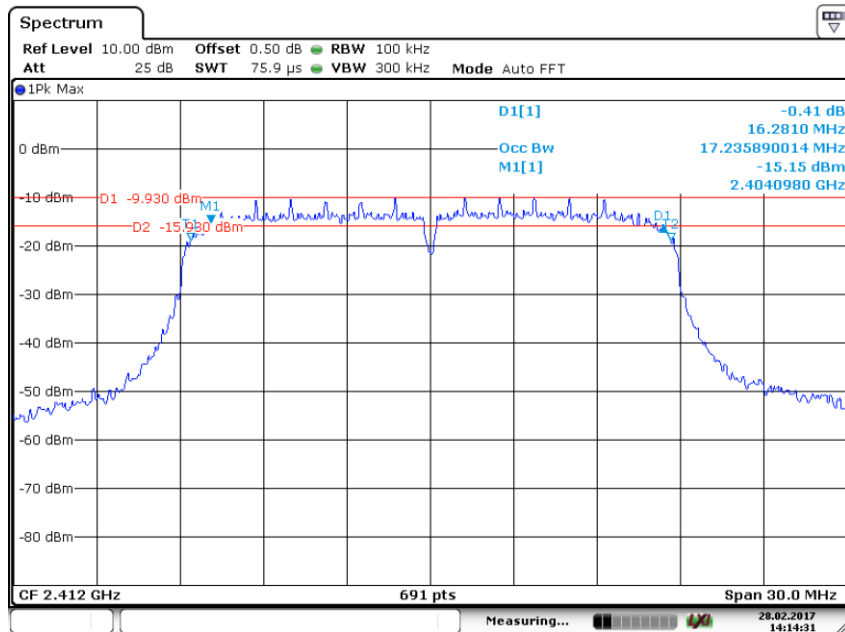


Date: 28.FEB.2017 14:13:06

2462MHz

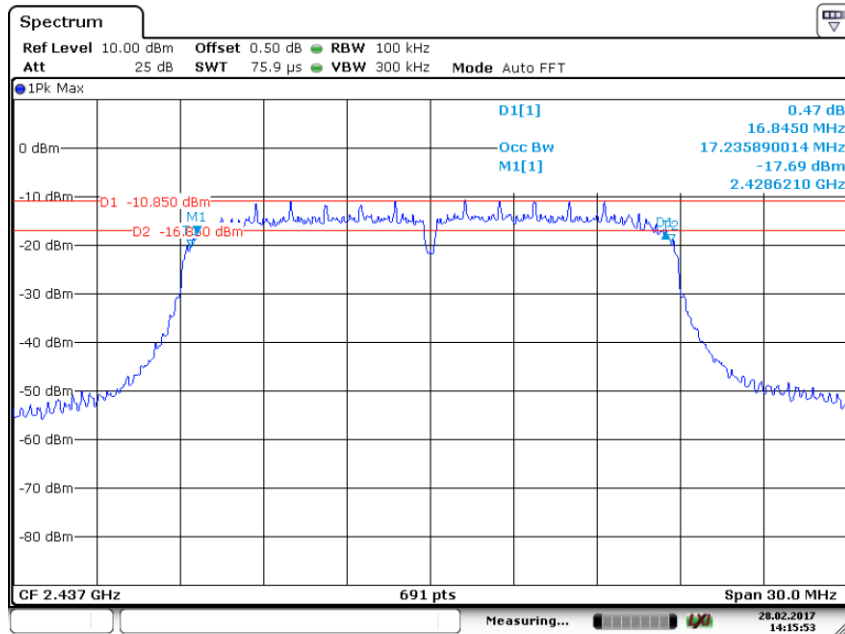
802.11n20

Frequency MHz	6dB bandwidth MHz	99% Bandwidth MHz	Result
Low channel 2412MHz	16.281	17.236	Pass
Middle channel 2437MHz	16.845	17.236	Pass
High channel 2462MHz	16.498	17.279	Pass



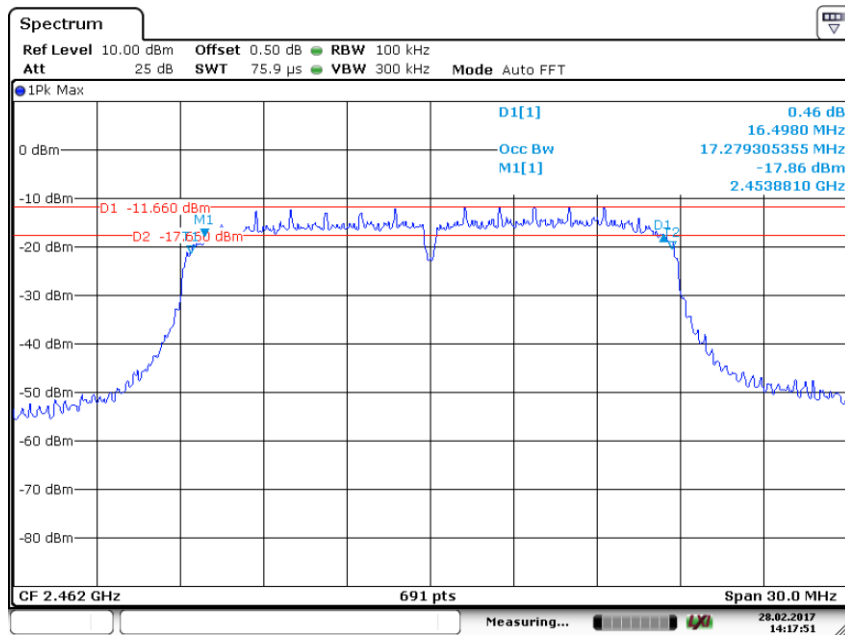
Date: 28.FEB.2017 14:14:31

2412MHz



Date: 28.FEB.2017 14:15:53

2437MHz



Date: 28.FEB.2017 14:17:51

2462MHz

## 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

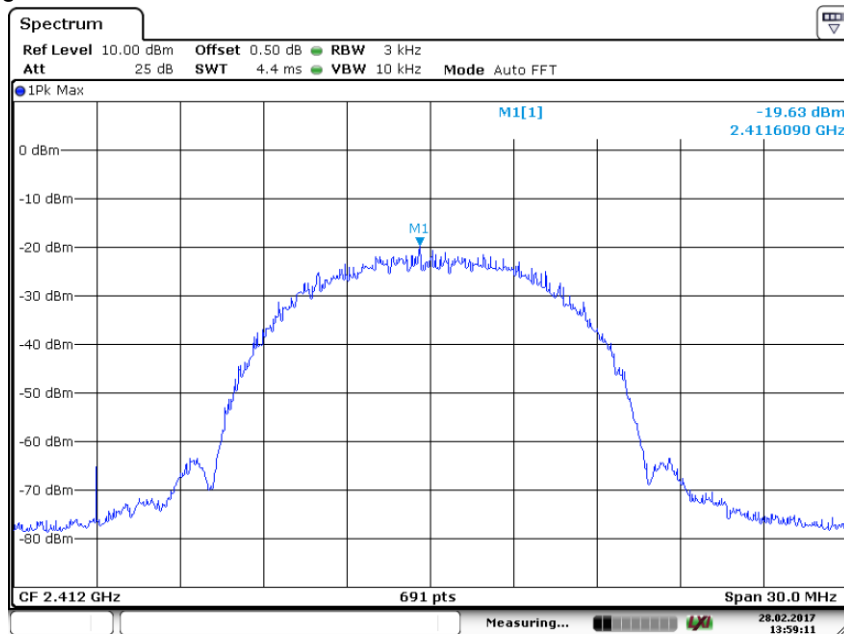
Limit [dBm]

≤8

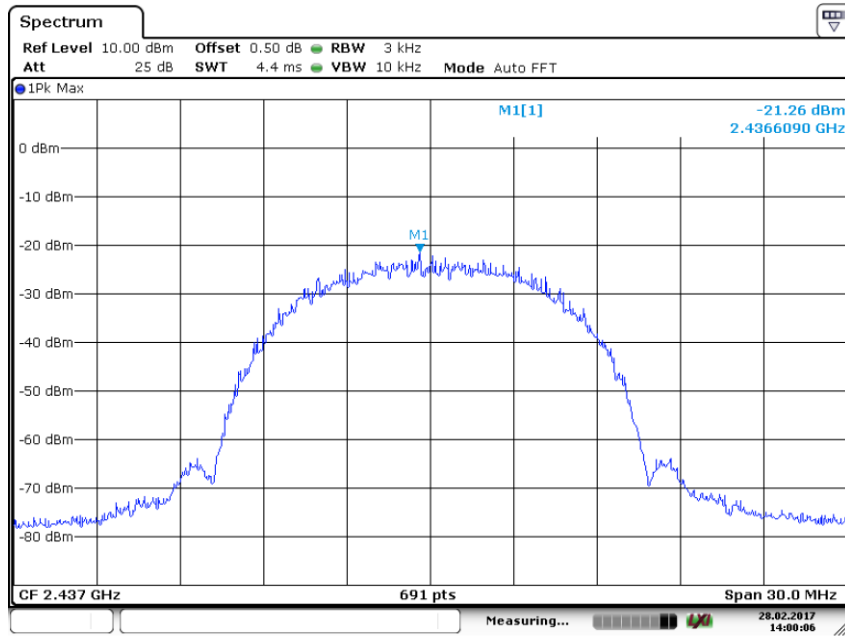
### Test result

802.11b

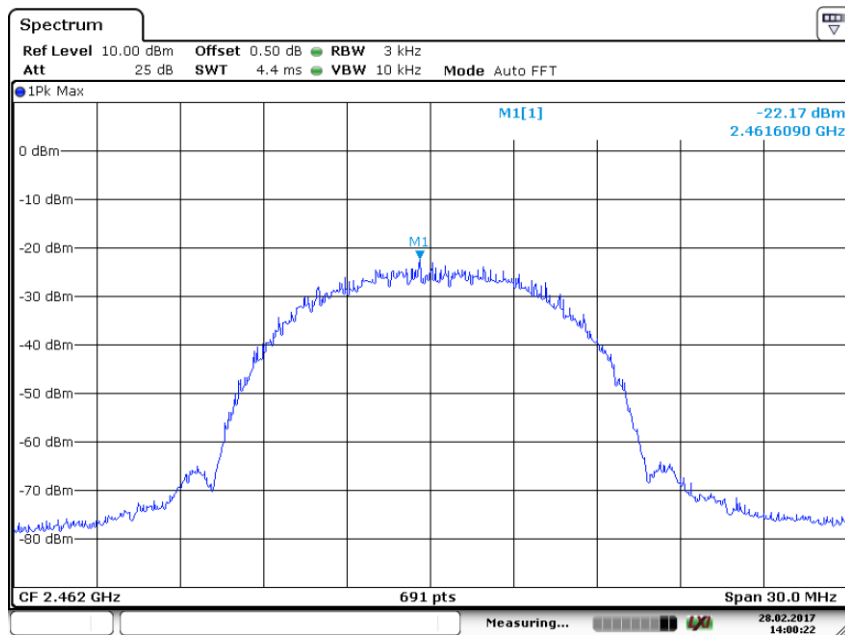
Frequency MHz	Power spectral density dBm	Result
Low channel 2412MHz	-19.63	Pass
Middle channel 2437MHz	-21.26	Pass
High channel 2462MHz	-22.17	Pass



Date: 28.FEB.2017 13:59:11



Date: 28.FEB.2017 14:00:06

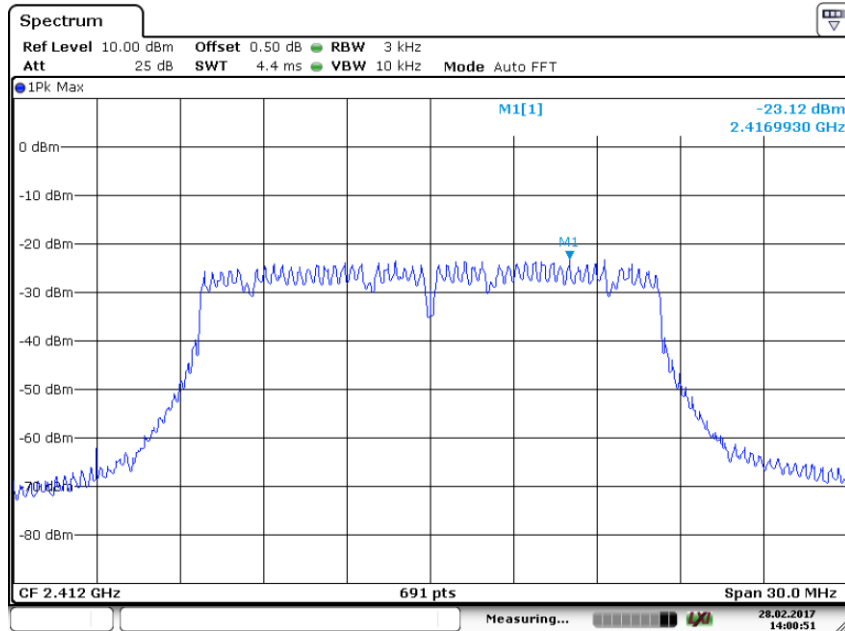


Date: 28.FEB.2017 14:00:23

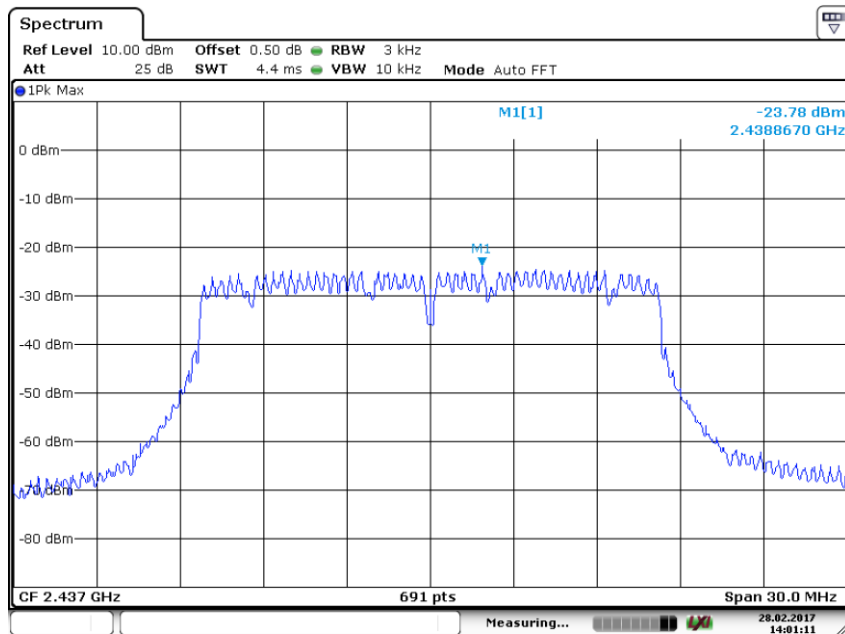


802.11g

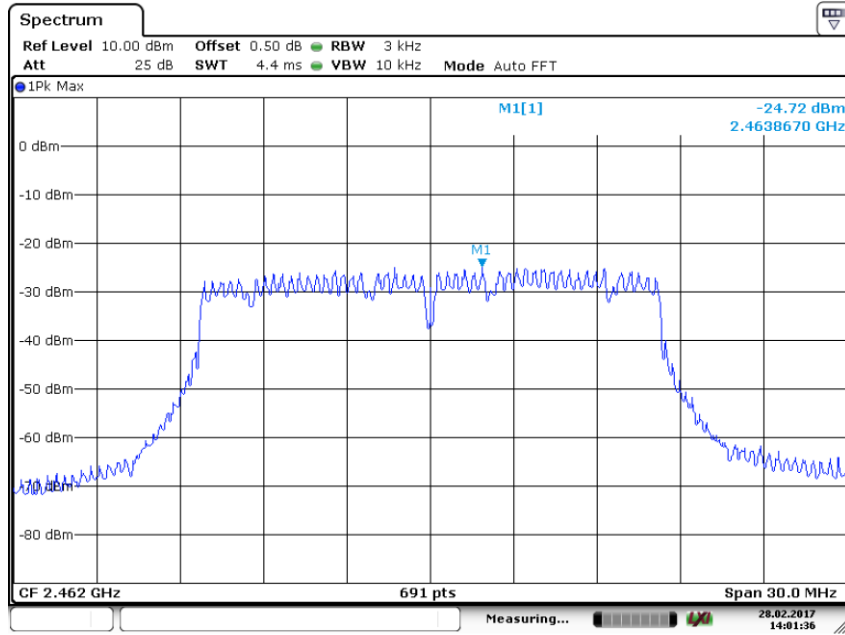
Frequency MHz	Power spectral density dBm	Result
Low channel 2412MHz	-23.12	Pass
Middle channel 2437MHz	-23.78	Pass
High channel 2462MHz	-24.72	Pass



Date: 28.FEB.2017 14:00:50



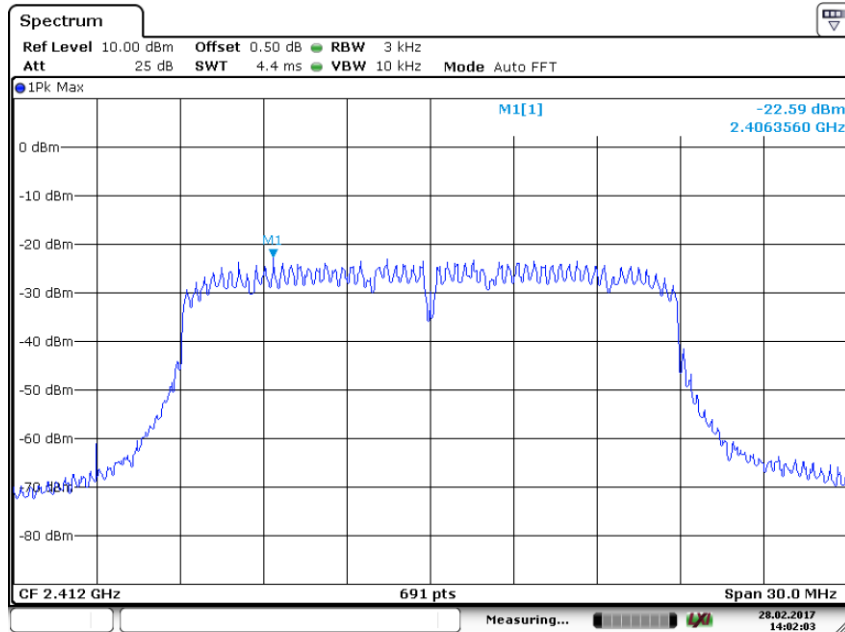
Date: 28.FEB.2017 14:01:11



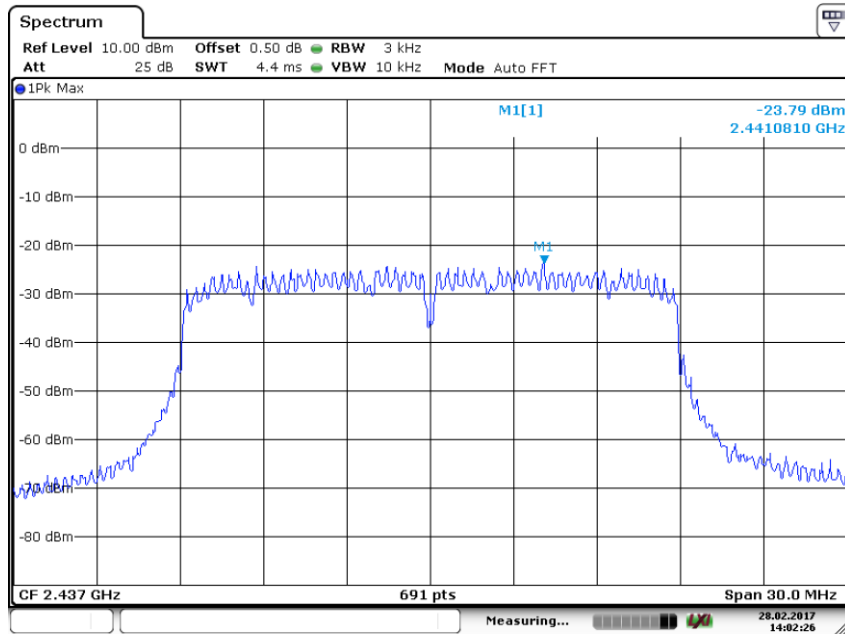
Date: 28.FEB.2017 14:01:36

802.11n20

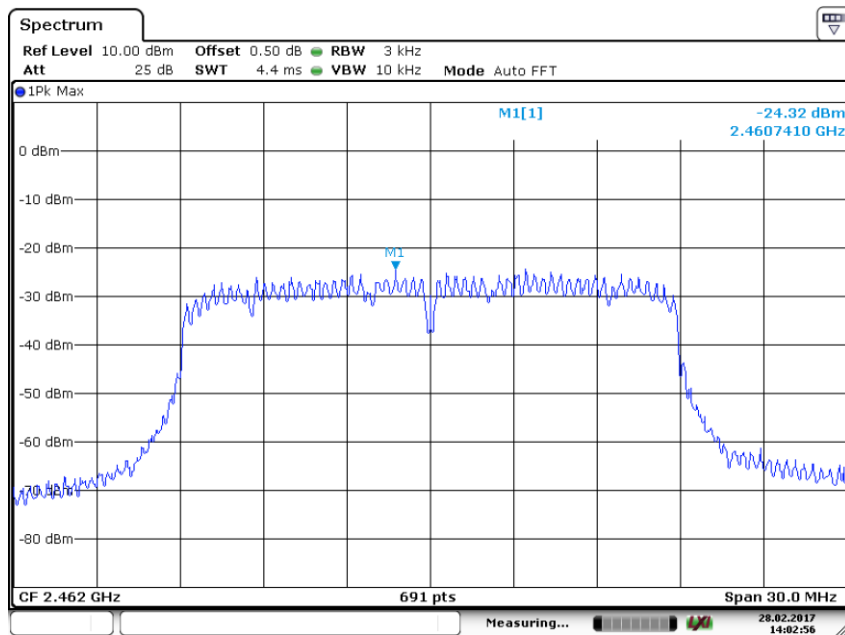
Frequency MHz	Power spectral density dBm	Result
Low channel 2412MHz	-22.59	Pass
Middle channel 2437MHz	-23.79	Pass
High channel 2462MHz	-24.32	Pass



Date: 28.FEB.2017 14:02:03



Date: 28.FEB.2017 14:02:26



Date: 28.FEB.2017 14:02:56

## 9.5 Spurious RF conducted emissions

### Test Method

1. Establish a reference level by using the following procedure:
  - a. Set RBW=100 kHz. VBW $\geq$ 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.

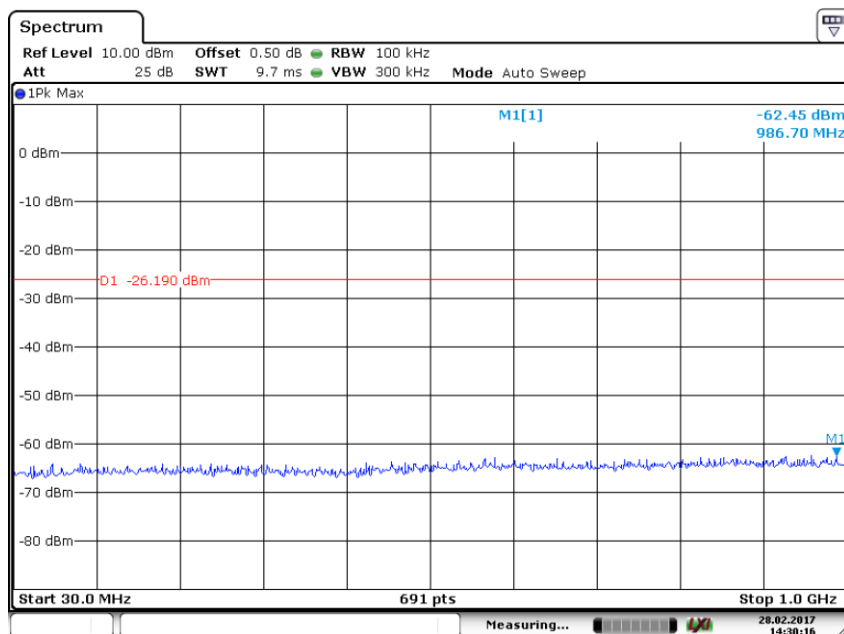
### Limit

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

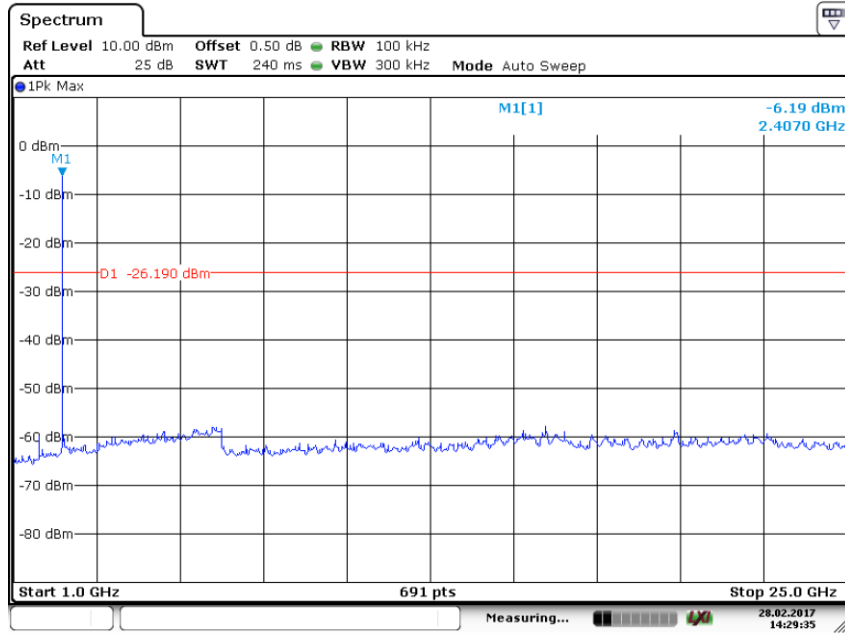
## Spurious RF conducted emissions

802.11b

2412MHz

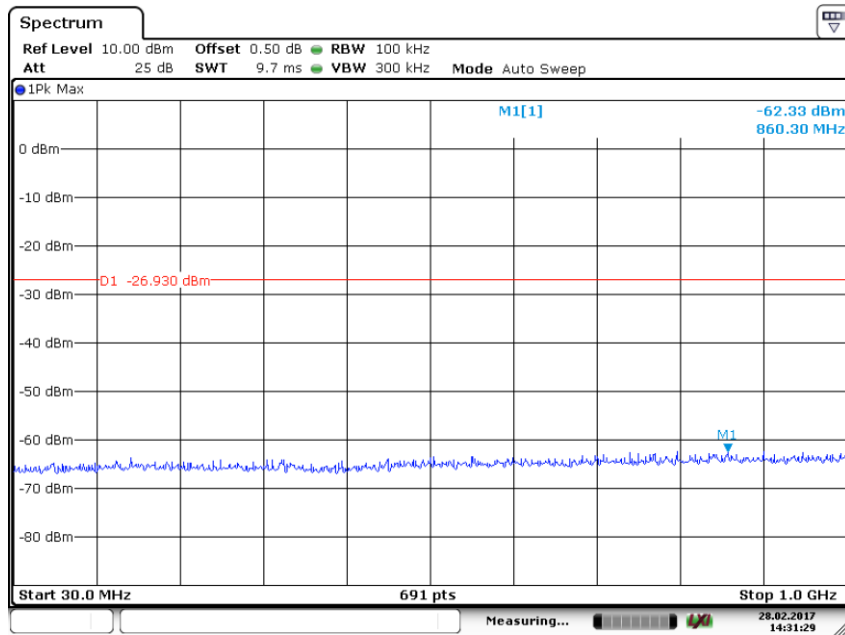


Date: 28.FEB.2017 14:30:17

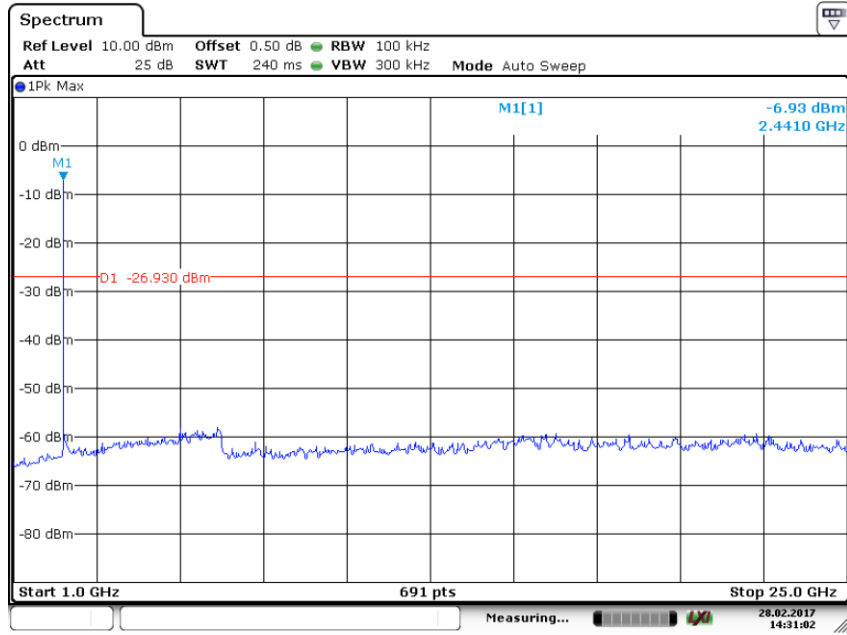


Date: 28.FEB.2017 14:29:35

### 2437MHz

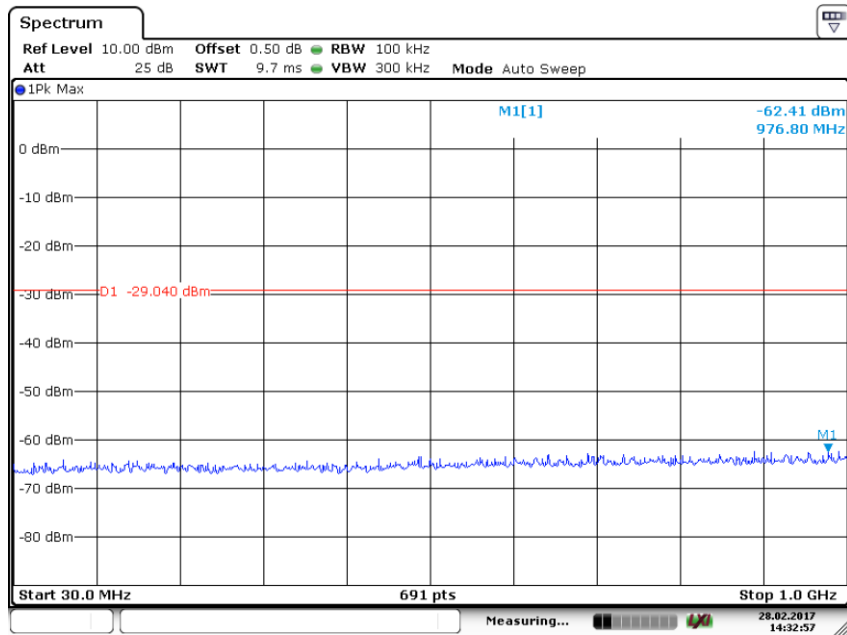


Date: 28.FEB.2017 14:31:29

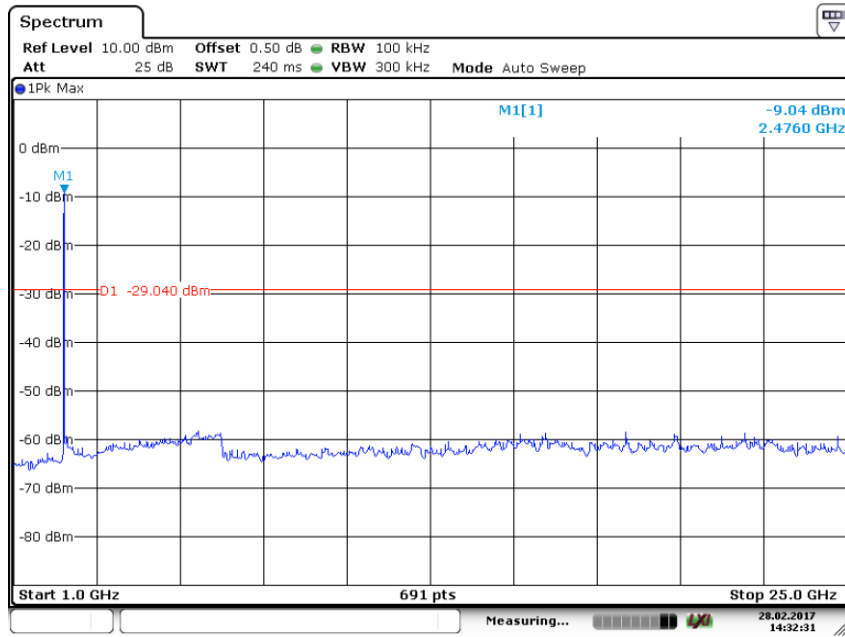


Date: 28.FEB.2017 14:31:02

### 2462MHz



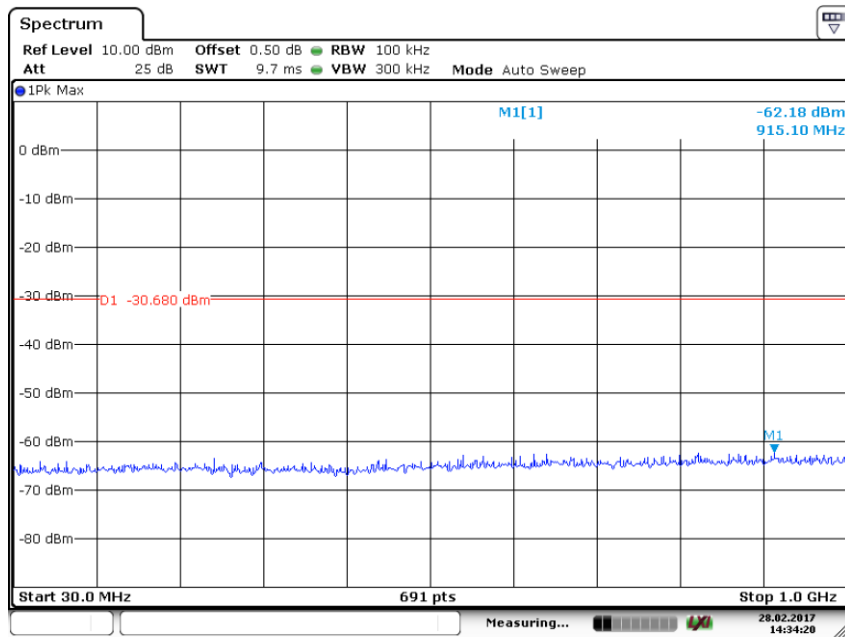
Date: 28.FEB.2017 14:32:57



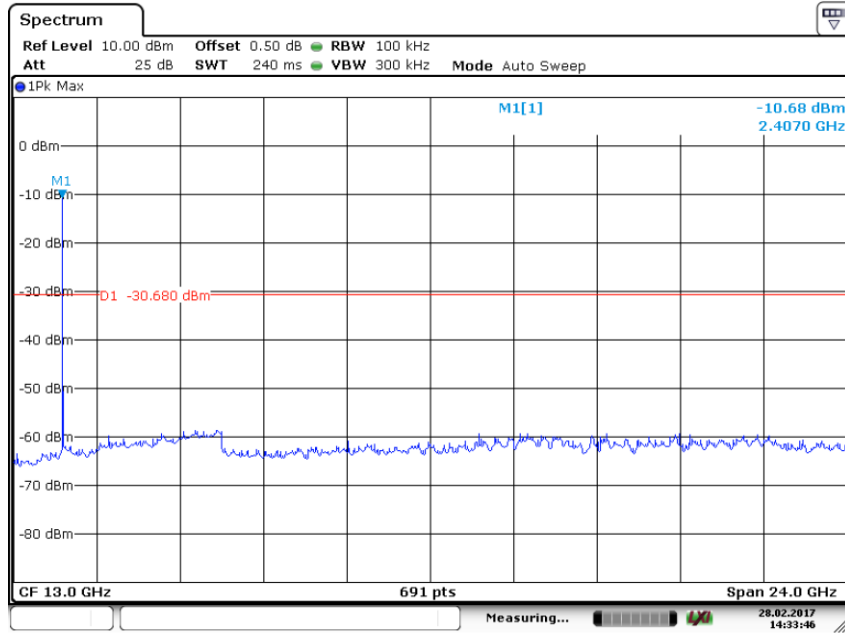
Date: 28.FEB.2017 14:32:31

802.11g

2412MHz

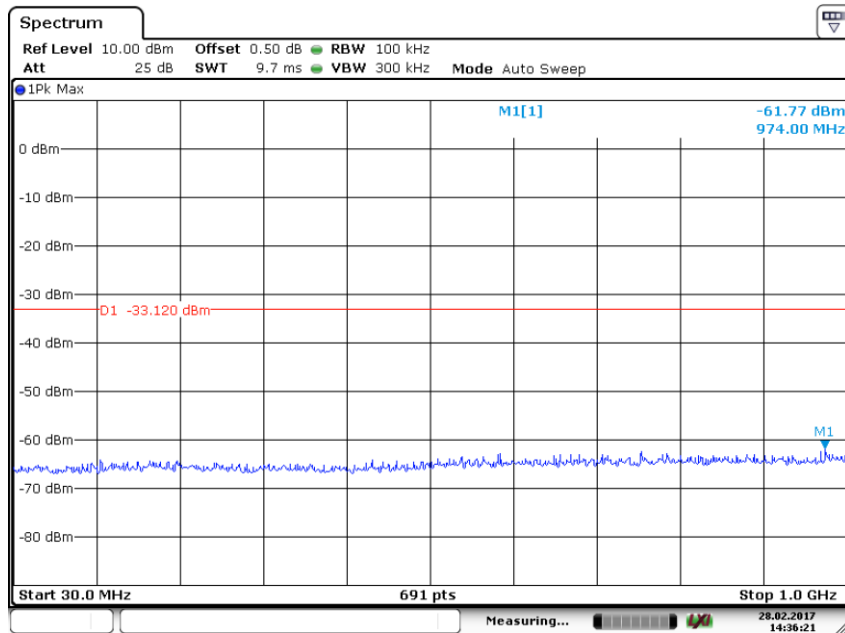


Date: 28.FEB.2017 14:34:20



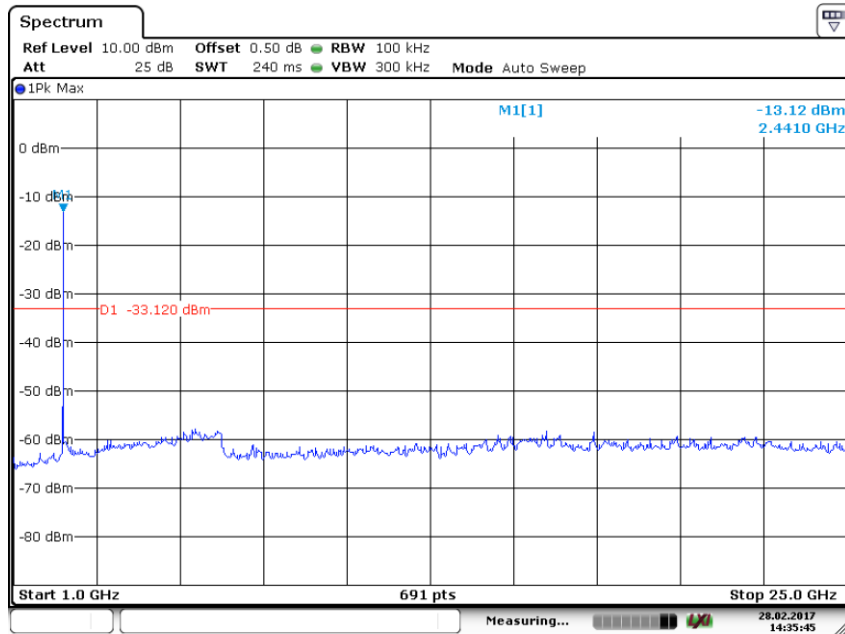
Date: 28.FEB.2017 14:33:46

### 2437MHz



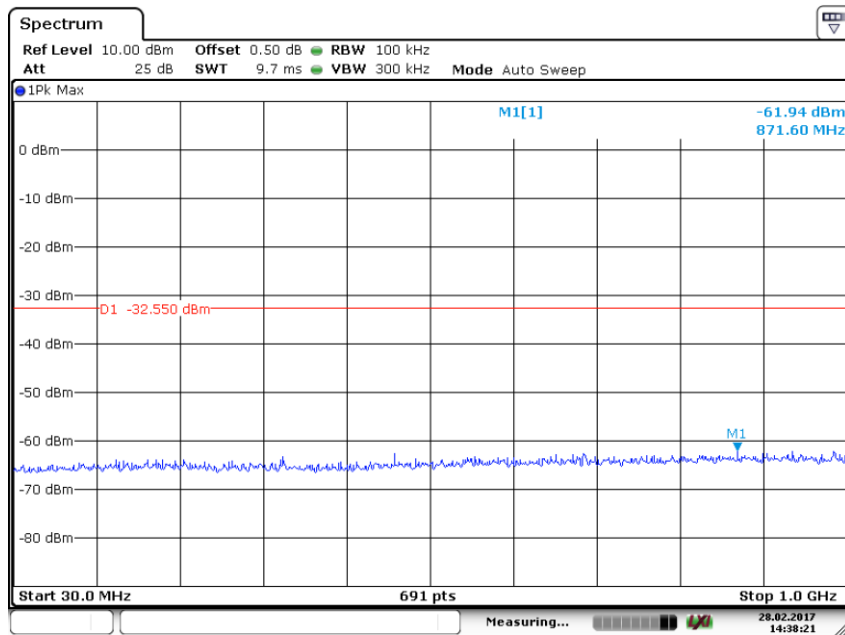
Date: 28.FEB.2017 14:36:21



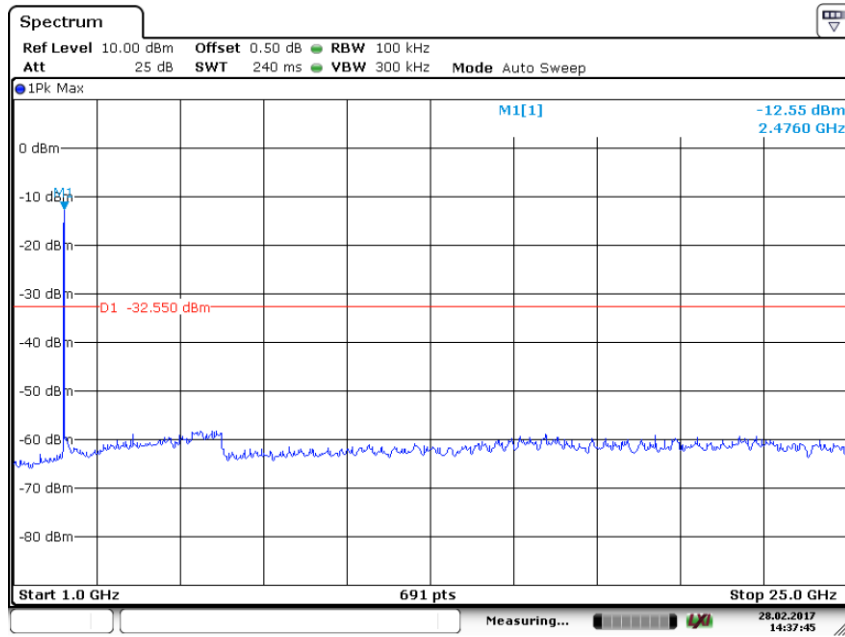


Date: 28.FEB.2017 14:35:45

### 2462MHz



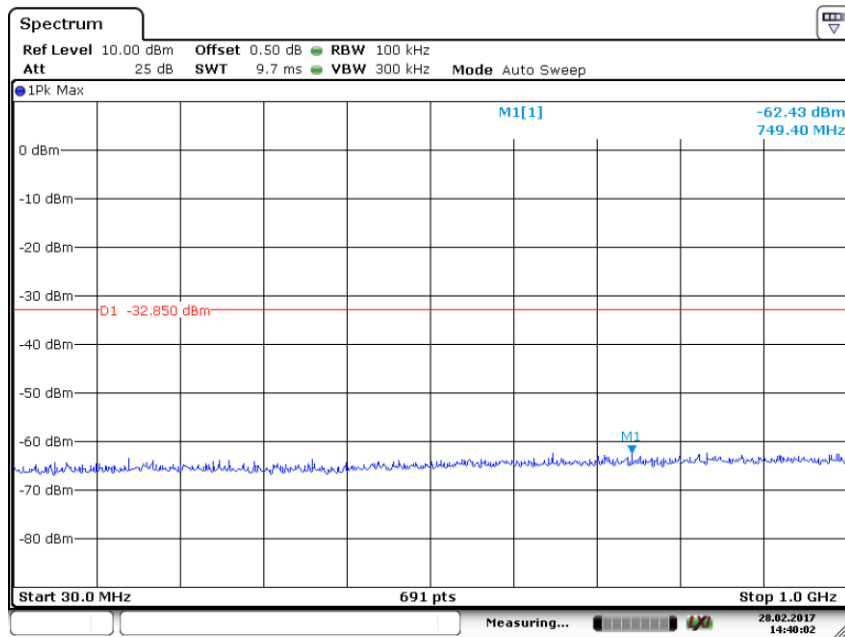
Date: 28.FEB.2017 14:38:21



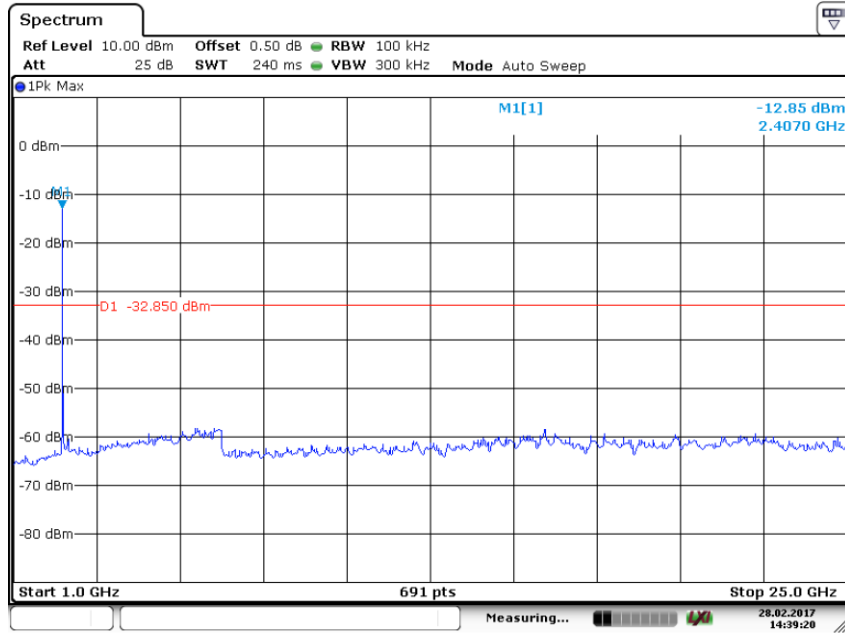
Date: 28.FEB.2017 14:37:45

802.11n20

2412MHz

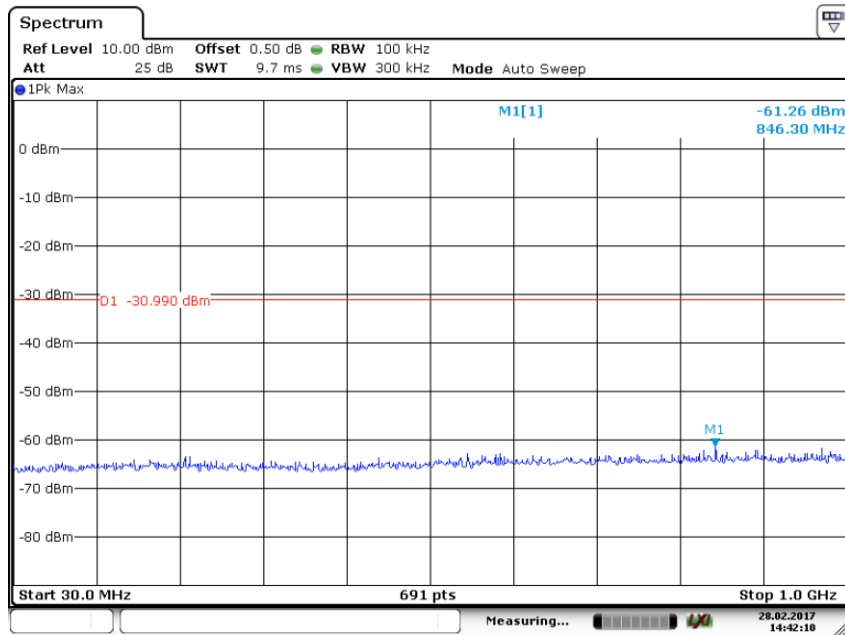


Date: 28.FEB.2017 14:40:02

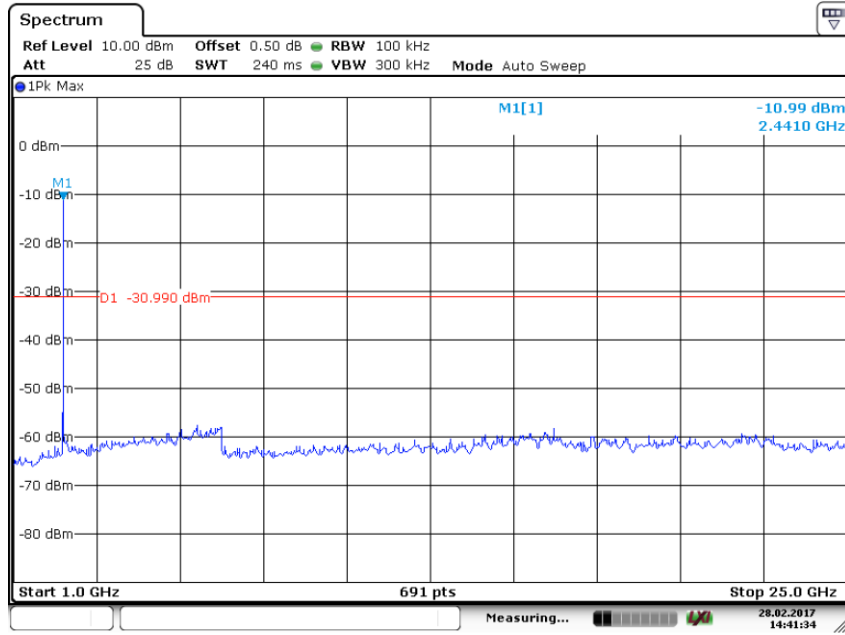


Date: 28.FEB.2017 14:39:19

### 2437MHz

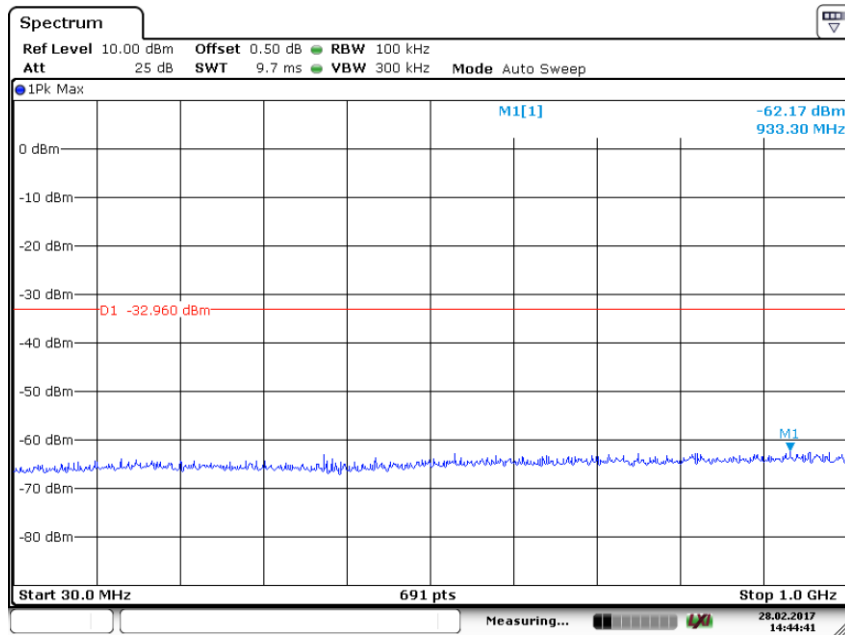


Date: 28.FEB.2017 14:42:10

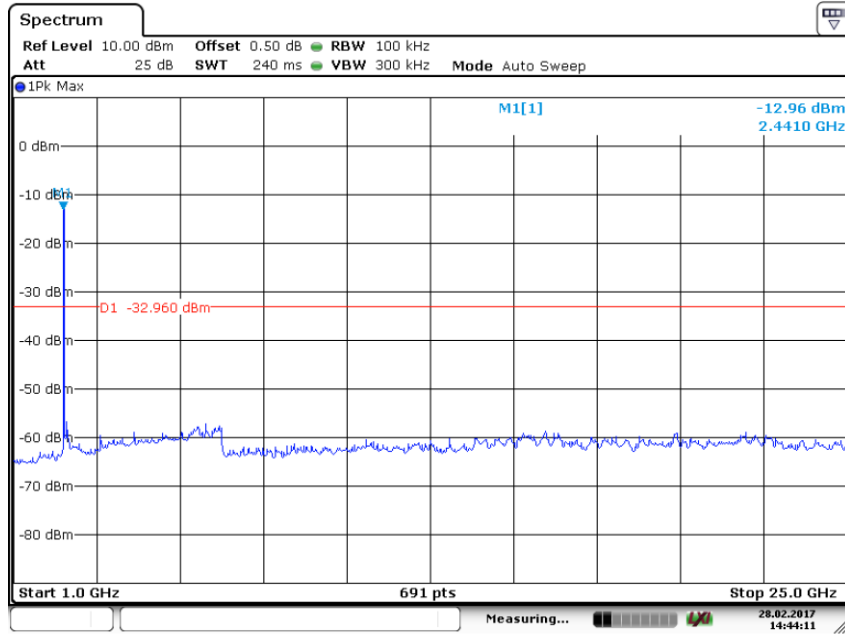


Date: 28.FEB.2017 14:41:35

### 2462MHz



Date: 28.FEB.2017 14:44:41



Date: 28.FEB.2017 14:44:10

## 9.6 Band edge

### Test Method

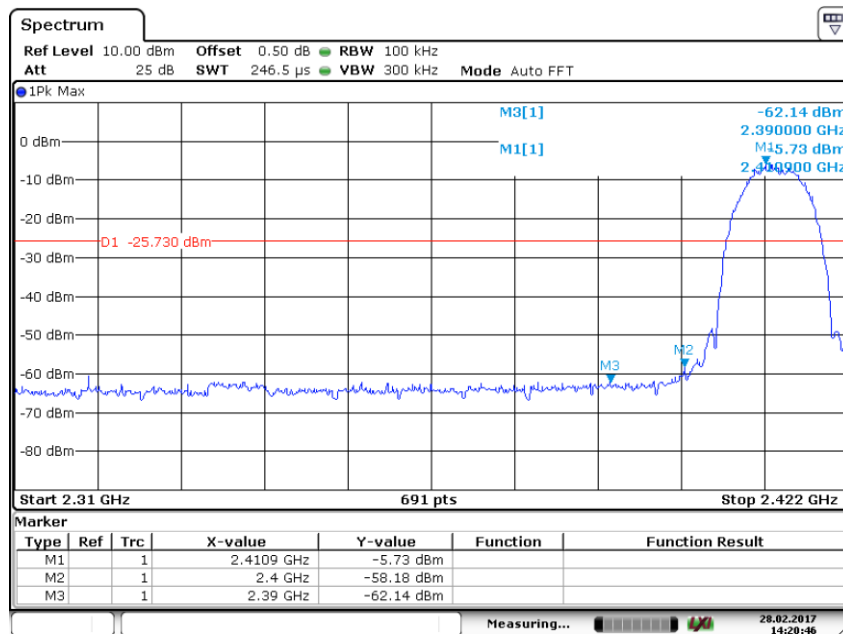
- 1 Use the following spectrum analyzer settings:  
Span = wide enough to capture the peak level of the in-band emission and all spurious  
RBW = 100 kHz, VBW ≥ RBW, Sweep = auto, Detector function = peak, Trace = max hold.
- 2 Allow the trace to stabilize, use the peak and delta measurement to record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

### Limit

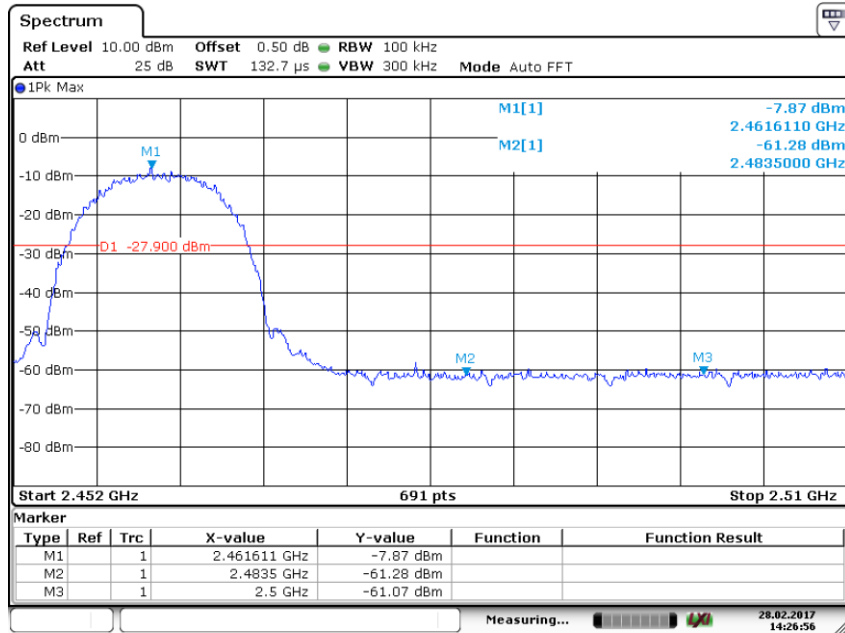
In any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a) and RSS-Gen8.10, must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)) and RSS-Gen.

### Test result

#### 802.11b

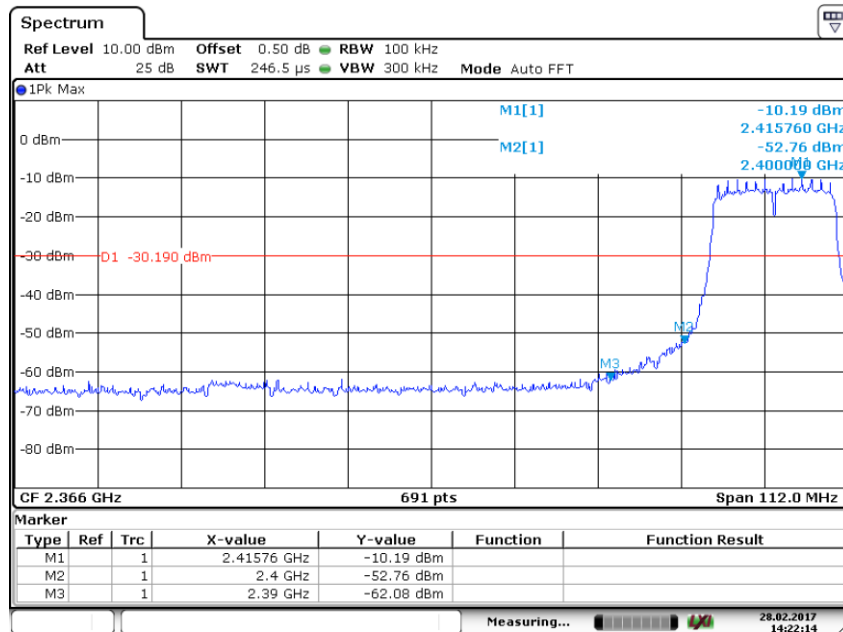


Date: 28.FEB.2017 14:20:47

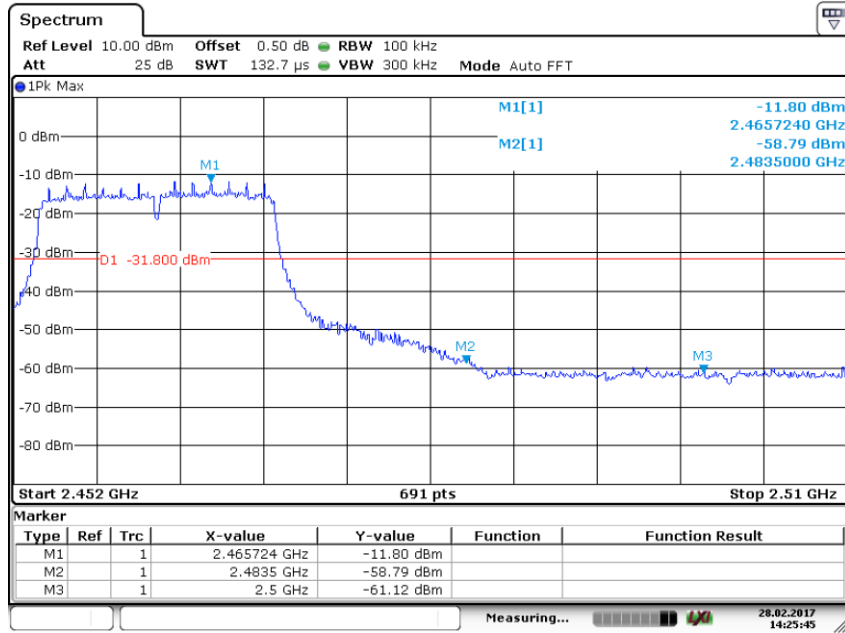


Date: 28.FEB.2017 14:26:56

**802.11g**

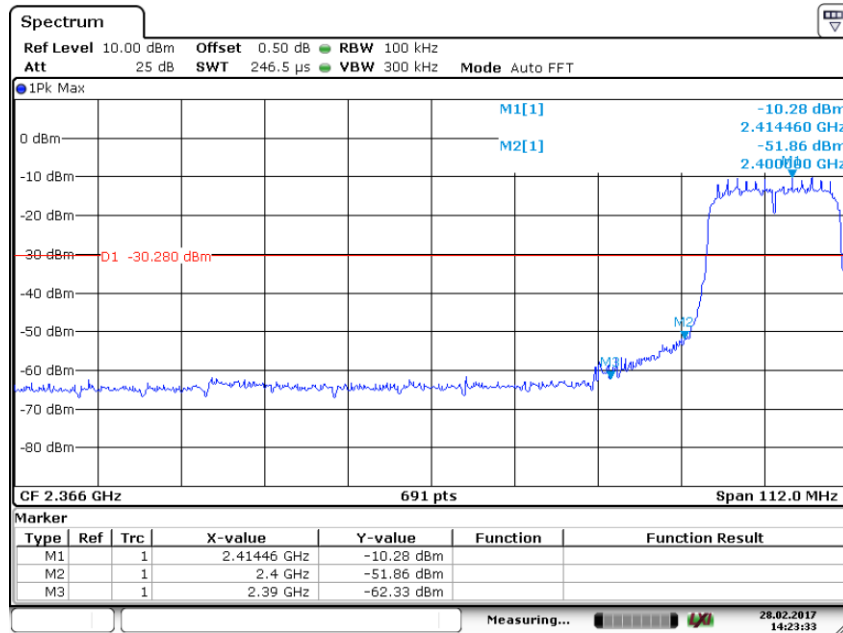


Date: 28.FEB.2017 14:22:14



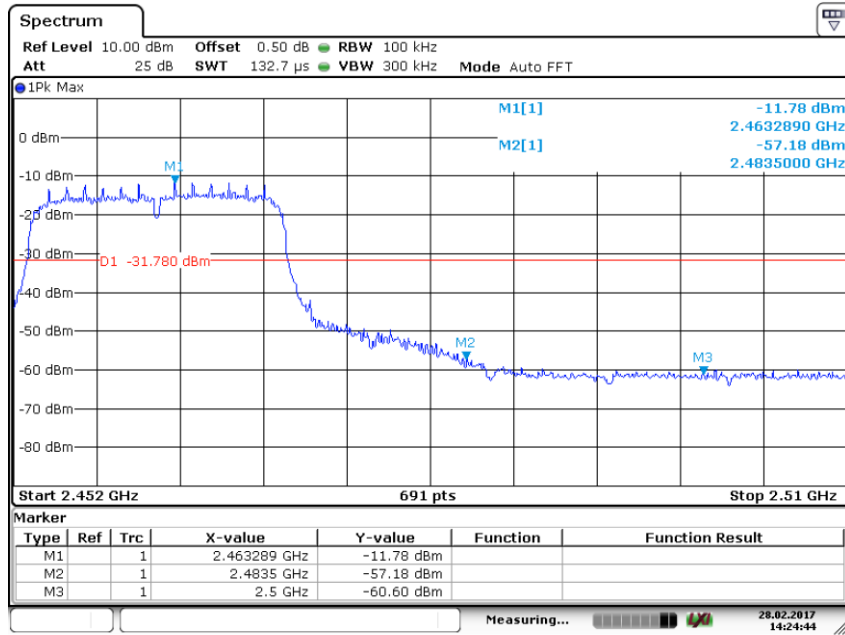
Date: 28.FEB.2017 14:25:45

**802.11n20**



Date: 28.FEB.2017 14:23:34





Date: 28.FEB.2017 14:24:45

## 9.7 Spurious radiated emissions for transmitter

### Test Method

- 1: The EUT was placed on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2: The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
- 3: The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 4: For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- 5: Use the following spectrum analyzer settings According to C63.10:  
For Above 1GHz  
Span = wide enough to capture the peak level of the in-band emission and all spurious  
RBW = 1MHz, VBW $\geq$ RBW for peak measurement and VBW = 10Hz for average measurement, Sweep = auto, Detector function = peak, Trace = max hold.  
For Below 1GHz  
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 $\geq$ RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

### Note:

- 1: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Quasi-peak detection (QP) at frequency below 1GHz.
- 2: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for peak detection (PK) at frequency above 1GHz.
- 3: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average ((duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ( $20\log(1/\text{duty cycle})$ ).
- 4: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.

### Limit

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 section 15.205, 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

## 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 is the WORST case for all Test Modes and Channels:

### 802.11b:

#### 2412MHz

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBμV/m	Detector	Margin dBμV/m	Result
320.030000	37.52	Horizontal	46.00	PK	8.48	Pass
58.830556	23.72	Vertical	40	PK	16.28	Pass
4818.281250	42.59	Horizontal	74.00	PK	31.41	Pass
4818.281250	40.27	Vertical	74.00	PK	33.73	Pass

#### 2437MHz

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBμV/m	Detector	Margin dBμV/m	Result
320.030000	37.52	Horizontal	46.00	PK	8.48	Pass
58.830556	23.72	Vertical	40	PK	16.28	Pass
4868.437500	43.18	Horizontal	74.00	PK	30.82	Pass
4879.218750	40.16	Vertical	74.00	PK	33.84	Pass

#### 2462MHz

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBμV/m	Detector	Margin dBμV/m	Result
320.030000	37.52	Horizontal	46.00	PK	8.48	Pass
58.830556	23.72	Vertical	40	PK	16.28	Pass
4919.062500	37.25	Horizontal	74.00	PK	36.75	Pass
4918.125000	37.85	Vertical	74.00	PK	36.15	Pass

#### Remark:

- (1) Data of measurement within 30-1000MHz 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.
- (2) "\*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.

## 10 Test Equipment List

### List of Test Instruments

	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
C	Signal Generator	Rohde & Schwarz	SMB100A	108272	2017-7-15
	Signal Analyzer	Rohde & Schwarz	FSV40	101030	2017-7-15
	Vector Signal Generator	Rohde & Schwarz	SMU 200A	105324	2017-7-15
	RF Switch Module	Rohde & Schwarz	OSP120/OS P-B157	101226/100851	2017-7-15
RE	EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	2017-7-15
	Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	2017-8-3
	Horn Antenna	Rohde & Schwarz	HF907	102294	2017-7-15
	Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2017-7-15
	3m Semi-anechoic chamber	TDK	9X6X6	----	2019-5-29

#### C - Conducted RF tests

- Conducted peak output power
- 6dB bandwidth and 99% Occupied Bandwidth
- Power spectral density\*
- Spurious RF conducted emissions
- Band edge

## 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
Radiation emission	U=4.32dB (30MHz-25GHz)
Output power test	0.94 dB
Power density test	2.10 dB
Bandwidth	$1 \times 10^{-9}$