



# FCC RF Test Report

**APPLICANT** : Lenovo (Shanghai) Electronics Technology Co., Ltd.  
**EQUIPMENT** : Tablet PC  
**BRAND NAME** : Lenovo  
**MODEL NAME** : Lenovo Miix 630-12Q35; 81F1  
**FCC ID** : O57MIIX630  
**STANDARD** : FCC Part 15 Subpart C §15.247  
**CLASSIFICATION** : (DTS) Digital Transmission System

The product was received on Dec. 12, 2017 and testing was completed on Mar. 13, 2018. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

This report contains data that were produced under subcontract by Laboratory SPORTON INTERNATIONAL INC.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Kunshan) Inc., the test report shall not be reproduced except in full.



Approved by: James Huang / Manager

**Sporton International (Kunshan) Inc.**

**No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335  
China**



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### SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.1	-	99% Bandwidth	-	Pass	-
3.2	15.247(b)	Power Output Measurement	≤ 30dBm	Pass	-
3.3	15.247(e)	Power Spectral Density	≤ 8dBm/3kHz	Pass	-
3.4	15.247(d)	Conducted Band Edges	≤ 20dBc	Pass	-
		Conducted Spurious Emission		Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 0.13 dB at 2483.680 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 11.33 dB at 0.177 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-



# 1 General Description

## 1.1 Applicant

Lenovo (Shanghai) Electronics Technology Co., Ltd.

NO.68 BUILDING, 199 FENJU RD, China (Shanghai) Pilot Free Trade Zone, 200131, CHINA

## 1.2 Manufacturer

Lenovo PC HK Limited

23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong

## 1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Tablet PC
Brand Name	Lenovo
Model Name	Lenovo Miix 630-12Q35; 81F1
FCC ID	O57MIIX630
EUT supports Radios application	WCDMA/HSPA/DC-HSDPA/HSPA+ (16QAM uplink is not supported)/LTE WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth v3.0+EDR/ Bluetooth v4.0 LE/ Bluetooth v4.1 LE/ Bluetooth v 4.2 LE
HW Version	81835_1_14
SW Version	16299.192 windows 10S
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.



### 1.4 Product Specification of Equipment Under Test

Standards-related Product Specification										
<b>Tx/Rx Channel Frequency Range</b>	2412 MHz ~ 2462 MHz									
<b>Maximum (Peak) Output Power to antenna</b>	<p><b>&lt;Ant. 1&gt;</b>            802.11b : 19.58 dBm (0.0908 W)            802.11g : 23.11 dBm (0.2046 W)            802.11n HT20 : 22.71 dBm (0.1866 W)            802.11n HT40 : 18.41 dBm (0.0693 W)</p> <p><b>&lt;Ant. 2&gt;</b>            802.11b : 19.07 dBm (0.0807 W)            802.11g : 23.05 dBm (0.2018 W)            802.11n HT20 : 21.30 dBm (0.1349 W)            802.11n HT40 : 14.41 dBm (0.0276 W)</p> <p><b>MIMO &lt;Ant. 1 + 2&gt;</b>            802.11n HT20 : 25.07 dBm (0.3214 W)            802.11n HT40 : 19.87 dBm (0.0971 W)</p>									
<b>Antenna Type / Gain</b>	<p><b>Ant. 1:</b> Monopole Antenna with gain -0.80 dBi  <b>Ant. 2:</b> Monopole Antenna with gain 0.20 dBi</p>									
<b>Type of Modulation</b>	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)									
<b>Antenna Function Description</b>	<table border="1"> <thead> <tr> <th></th> <th>Ant. 1</th> <th>Ant. 2</th> </tr> </thead> <tbody> <tr> <td>802.11 b/g/n SISO</td> <td>V</td> <td>V</td> </tr> <tr> <td>802.11 n MIMO</td> <td>V</td> <td>V</td> </tr> </tbody> </table>		Ant. 1	Ant. 2	802.11 b/g/n SISO	V	V	802.11 n MIMO	V	V
	Ant. 1	Ant. 2								
802.11 b/g/n SISO	V	V								
802.11 n MIMO	V	V								

**Note:**

1. MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.
2. For 802.11n mode, the whole test is assessed on MIMO mode due to the higher conducted power.

### 1.5 Modification of EUT

No modifications are made to the EUT during all test items.



### 1.6 Testing Location

Sporton International (Kunshan) Inc. is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600155-0) and the FCC designation No is CN5013.

<b>Test Site</b>	Sporton International (Kunshan) Inc.		
<b>Test Site Location</b>	No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335 China TEL : +86-512-57900158 FAX : +86-512-57900958		
<b>Test Site No.</b>	<b>Sporton Site No.</b>		<b>FCC Test Firm Registration No.</b>
	TH01-KS	CO01-KS	630927

SPORTON INTERNATIONAL INC. is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW0007 under the FCC-recognized accredited testing laboratories by Mutual Recognition Agreement (MRA) in FCC Test.

<b>Test Site</b>	SPORTON INTERNATIONAL INC.		
<b>Test Site Location</b>	No.58, Aly. 75, Ln. 564 Wenhua 3rd Rd. Guishan Dist. TEL: +886-3-327-3456 FAX: +886-3-328-4978		
<b>Test Site No.</b>	<b>Sporton Site No.</b>		<b>FCC Test Firm Registration No.</b>
	03CH07-HY		214511

**Note:**

1. The test site complies with ANSI C63.4 2014 requirement.
2. Test data subcontracted: radiated spurious emissions for section 3.5 of this report.



## 1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04
- ♦ ANSI C63.10-2013

### **Remark:**

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



## 2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 kHz to 30 MHz) and radiated emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases were recorded in this report.

### 2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437	-	-



## 2.2 Test Mode

Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates as below table.

### Single Antenna (Ant.1)

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps

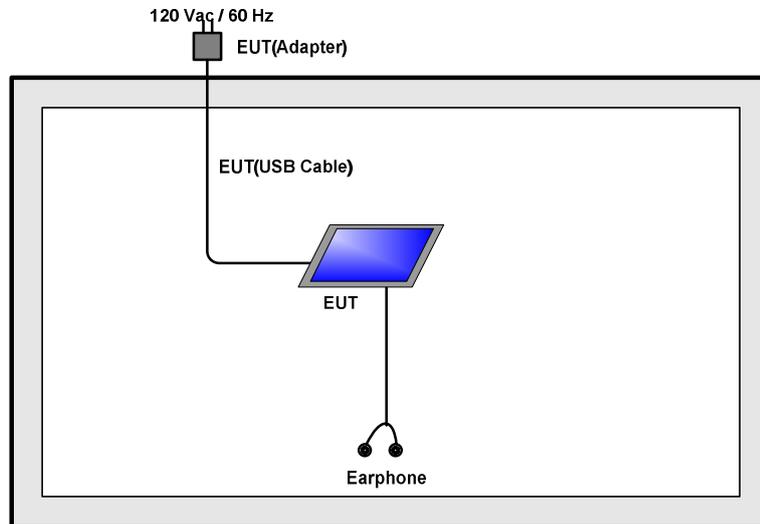
### MIMO Antenna (Ant.1+2)

Modulation	Data Rate
802.11n HT20	MCS0
802.11n HT40	MCS0

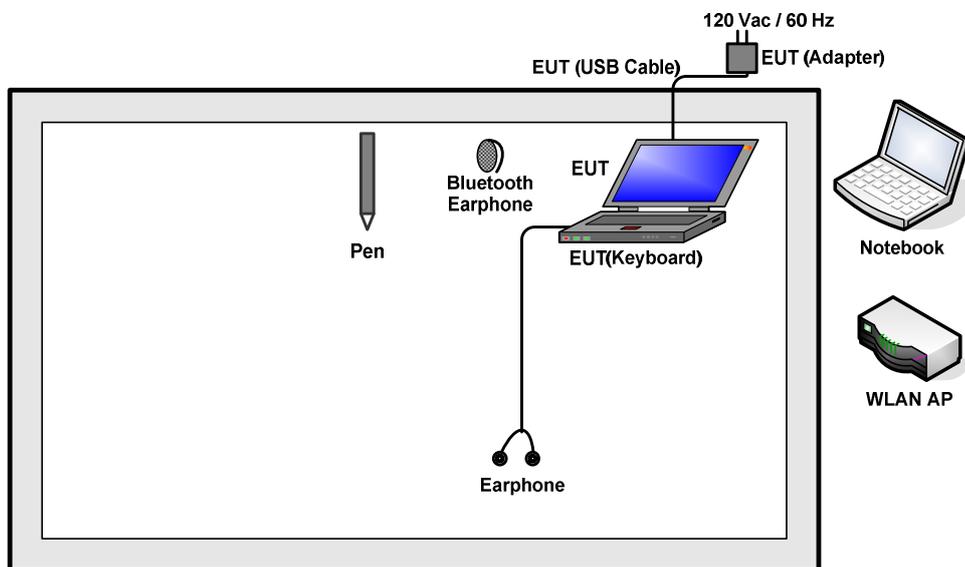
Test Cases	
<b>AC Conducted Emission</b>	Mode 1: Bluetooth Link + WLAN Link (2.4G) + Camera Front + SD Card Data Copy + Earphone + Keyboard + Play H Plane + Pen + USB Cable (Charging from Adapter 1 With Type C)
<b>Remark:</b>	
1. For Radiated TCs, The tests were performed with Adapter, Earphone and USB Cable.	

## 2.3 Connection Diagram of Test System

### <WLAN Tx Mode>



### <AC Conducted Emission Mode>



## 2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	D-Link	DIR-855	KA2DIR855A2	N/A	Unshielded, 1.8m
2.	Notebook	Lenovo	E41	N/A	N/A	Unshielded, 1.5m
3.	Bluetooth Earphone	Lenovo	LBH308	NA	N/A	N/A
4.	SD Card	Kingston	8GB	N/A	N/A	N/A
5.	Earphone	Lenovo	P121	N/A	N/A	Unshielded, 1.2m

## 2.5 EUT Operation Test Setup

For WLAN function, the engineering test program was provided and enabled to make EUT continuous transmit/receive.

For AC power line conducted emissions, the EUT was set to WLAN link with the WLAN AP under large package sizes transmission.

## 2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

The spectrum analyzer offset is derived from RF cable loss.

$Offset = RF\ cable\ loss.$

Following shows an offset computation example with cable loss 5.8 dB.

$$\begin{aligned} Offset(dB) &= RF\ cable\ loss(dB). \\ &= 5.8\ (dB) \end{aligned}$$

### 3 Test Result

#### 3.1 6dB and 99% Bandwidth Measurement

##### 3.1.1 Limit of 6dB and 99% Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

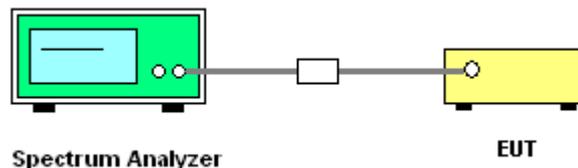
##### 3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

##### 3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v04.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) = 1MHz and set the Video bandwidth (VBW) = 3MHz.
6. Measure and record the results in the test report.

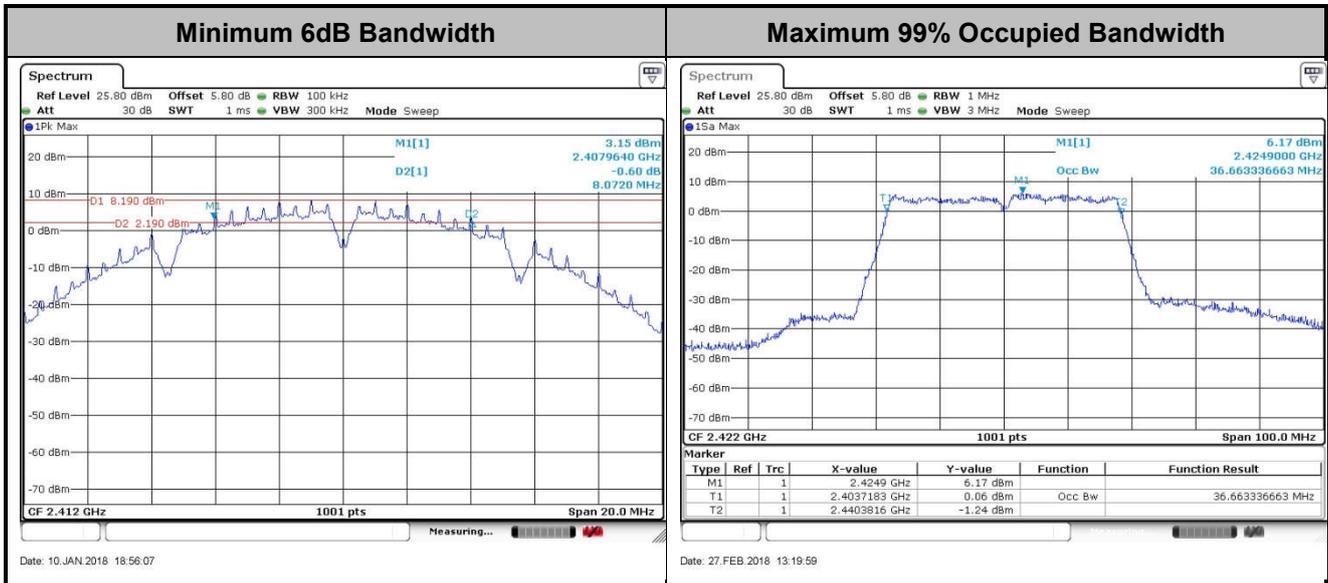
##### 3.1.4 Test Setup





### 3.1.5 Test Result of 6dB Occupied Bandwidth and 99% Occupied Bandwidth

Please refer to Appendix A.



Note : The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

## 3.2 Output Power Measurement

### 3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna of directional gain greater than 6dBi are used the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

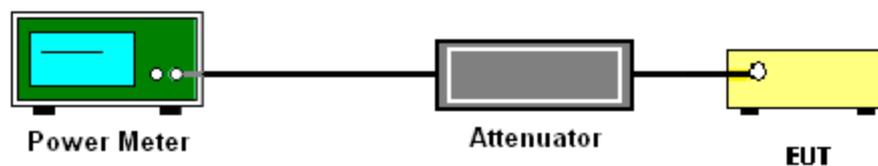
### 3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 3.2.3 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v04 section 9.1.2 PKPM1 Peak power meter method.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

### 3.2.4 Test Setup





### **3.2.5 Test Result of Peak Output Power**

Please refer to Appendix A.

### **3.2.6 Test Result of Average output Power (Reporting Only)**

Please refer to Appendix A.

### 3.3 Power Spectral Density Measurement

#### 3.3.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

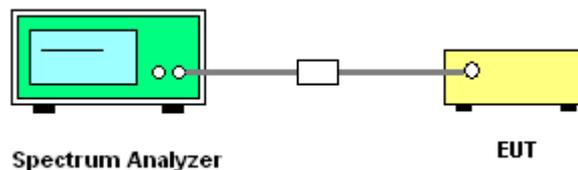
#### 3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

#### 3.3.3 Test Procedures

1. The testing follows Measurement Procedure 10.2 Method PKPSD of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
6. Measure and record the results in the test report.

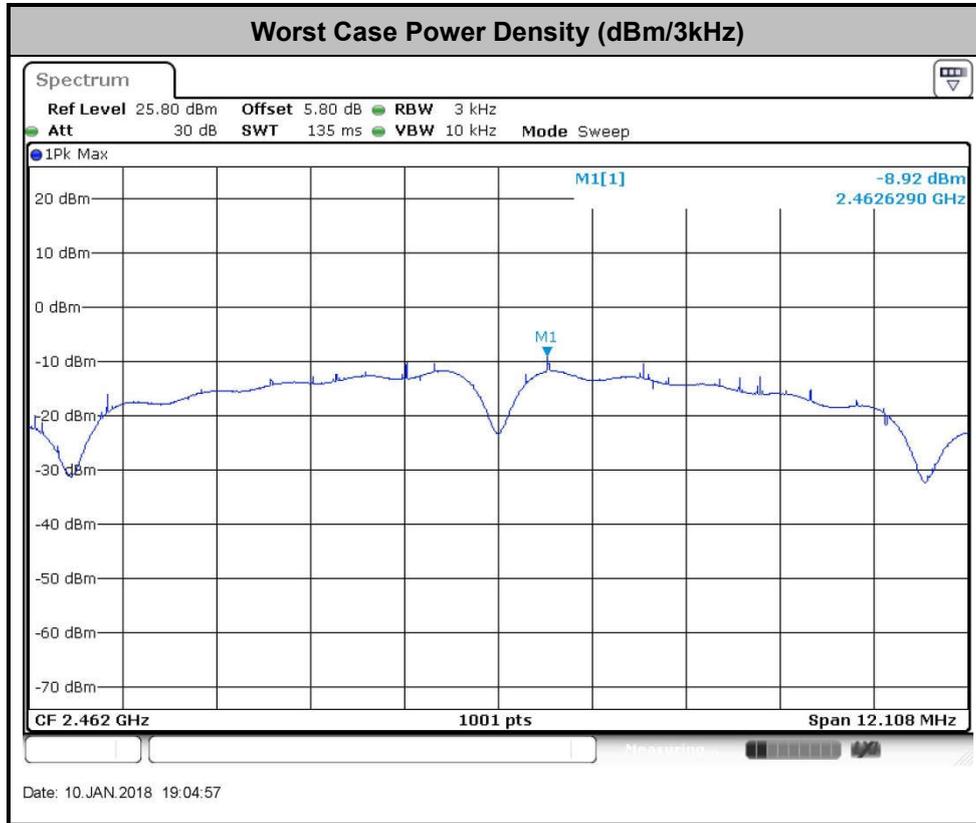
#### 3.3.4 Test Setup





### 3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.



## 3.4 Conducted Band Edges and Spurious Emission Measurement

### 3.4.1 Limit of Conducted Band Edges and Spurious Emission Measurement

In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement.

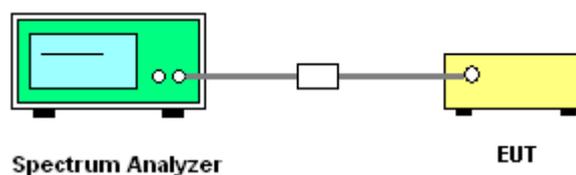
### 3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 3.4.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

### 3.4.4 Test Setup

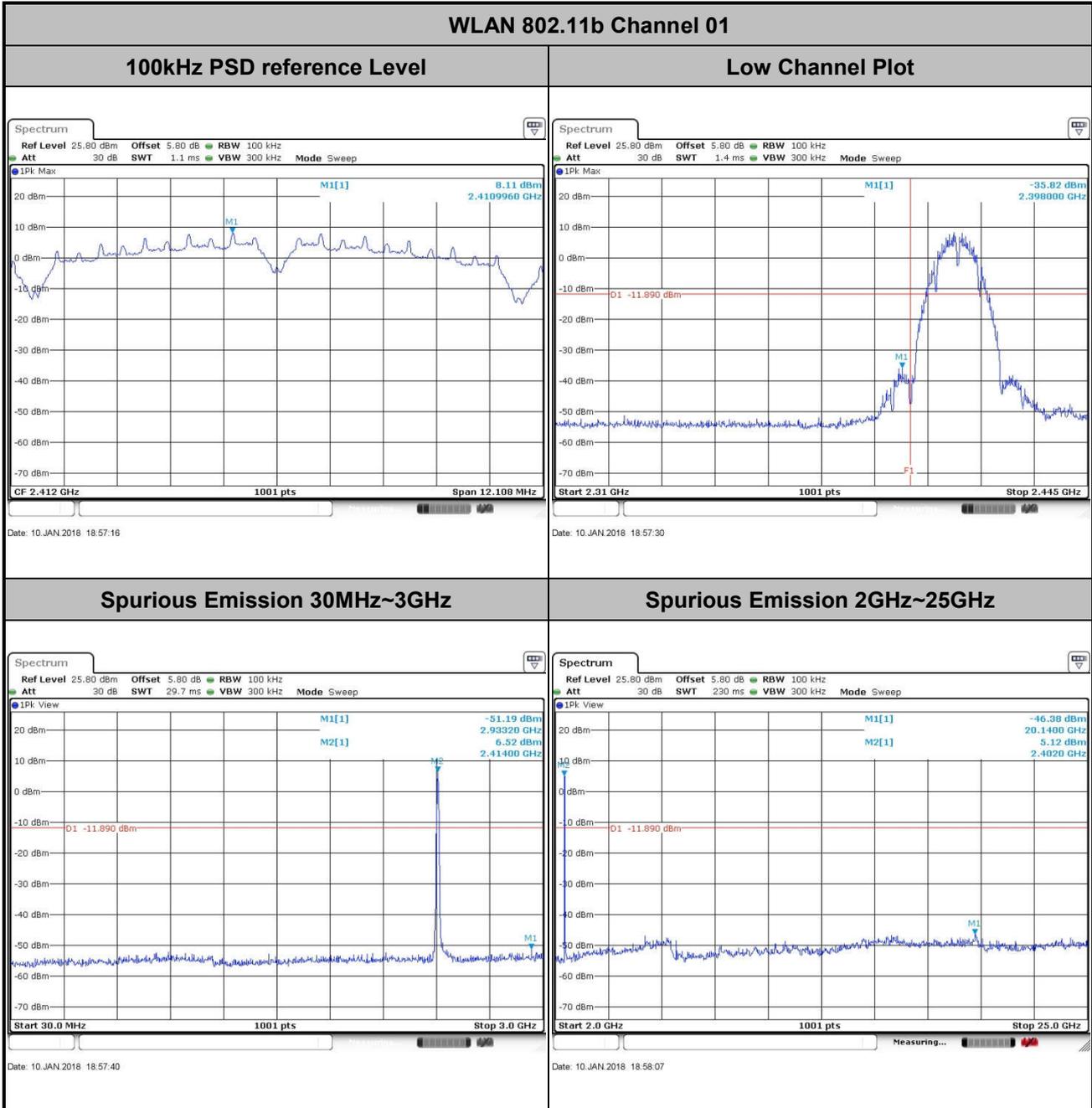




### 3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Number of TX = 1, Ant. 1 (Measured)

Number of TX :	1	Ant. :	1
Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~55%
Test Channel :	01	Test Engineer :	Silent Hai

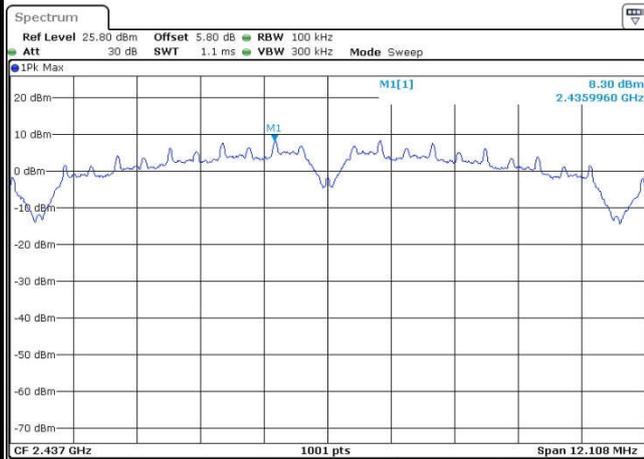




Number of TX :	1	Ant. :	1
Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~55%
Test Channel :	06	Test Engineer :	Silent Hai

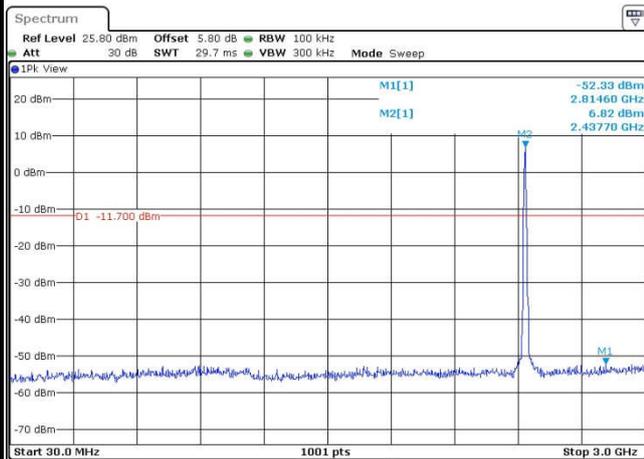
WLAN 802.11b Channel 06

100kHz PSD reference Level



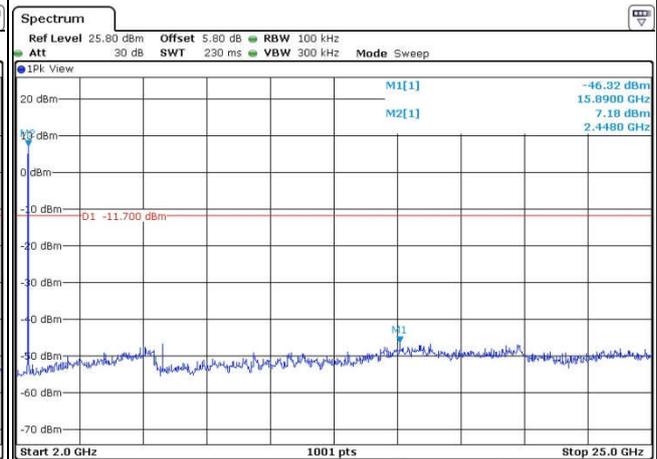
Date: 10.JAN.2018 19:00:44

Spurious Emission 30MHz~3GHz



Date: 10.JAN.2018 19:01:06

Spurious Emission 2GHz~25GHz



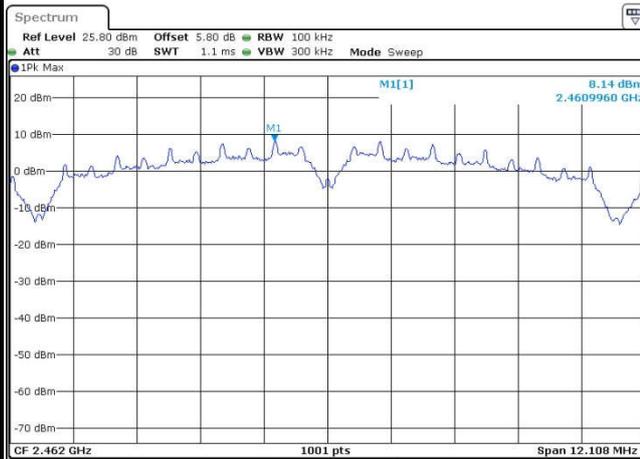
Date: 10.JAN.2018 19:01:19



Number of TX :	1	Ant. :	1
Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~55%
Test Channel :	11	Test Engineer :	Silent Hai

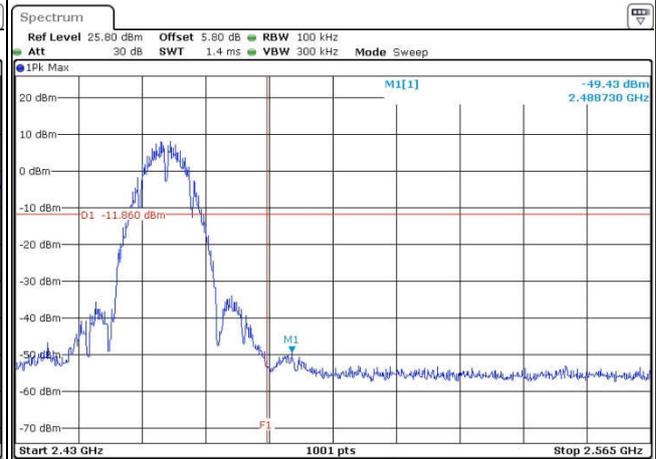
WLAN 802.11b Channel 11

100kHz PSD reference Level



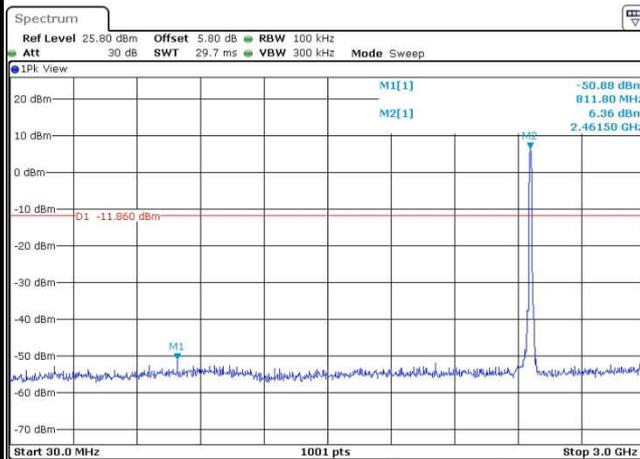
Date: 10.JAN.2018 19:05:09

High Channel Plot



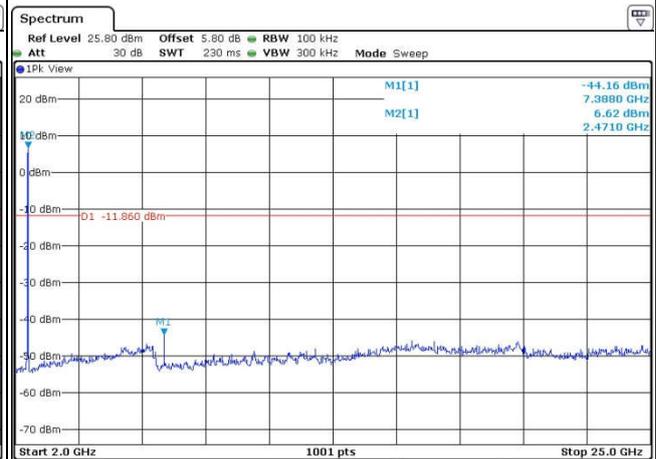
Date: 10.JAN.2018 19:05:48

Spurious Emission 30MHz~3GHz



Date: 10.JAN.2018 19:06:05

Spurious Emission 2GHz~25GHz



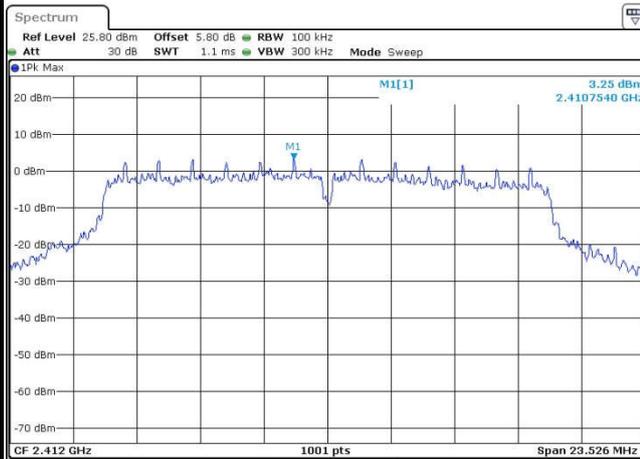
Date: 10.JAN.2018 19:06:52



Number of TX :	1	Ant. :	1
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~55%
Test Channel :	01	Test Engineer :	Silent Hai

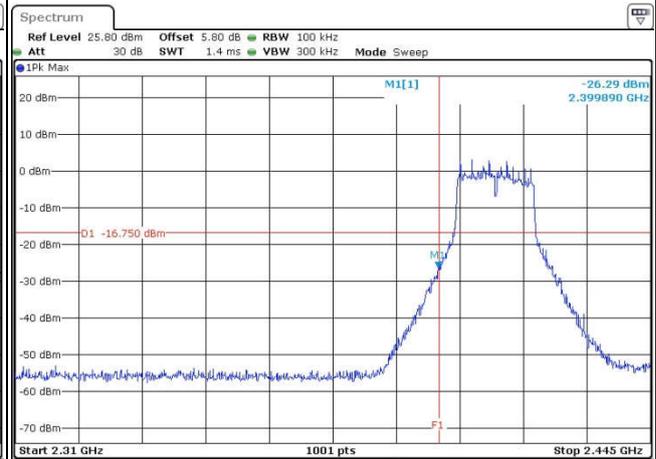
WLAN 802.11g Channel 01

100kHz PSD reference Level



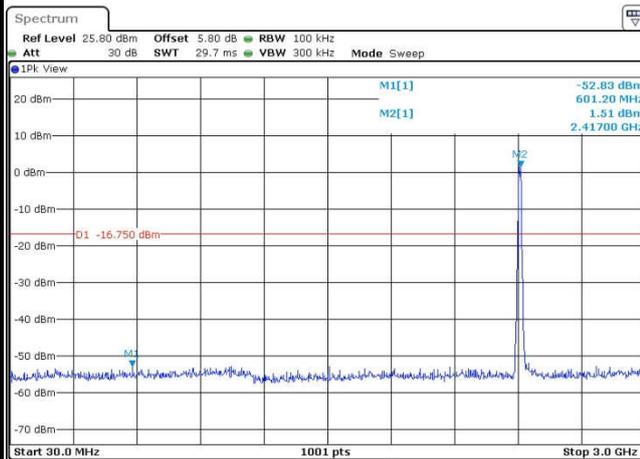
Date: 27.FEB.2018 12:42:45

Low Channel Plot



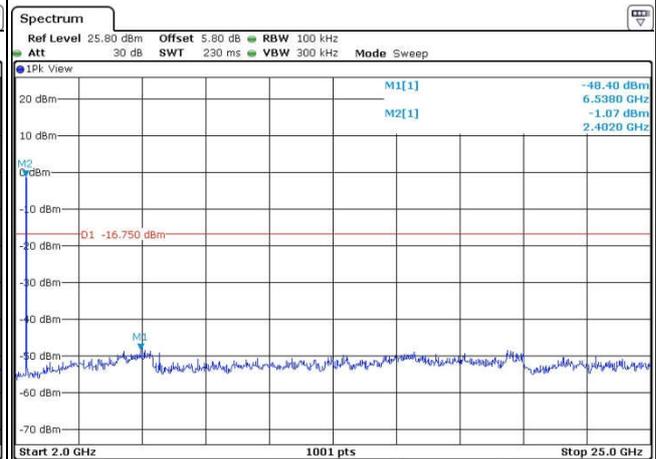
Date: 27.FEB.2018 12:43:34

Spurious Emission 30MHz~3GHz



Date: 27.FEB.2018 12:45:05

Spurious Emission 2GHz~25GHz



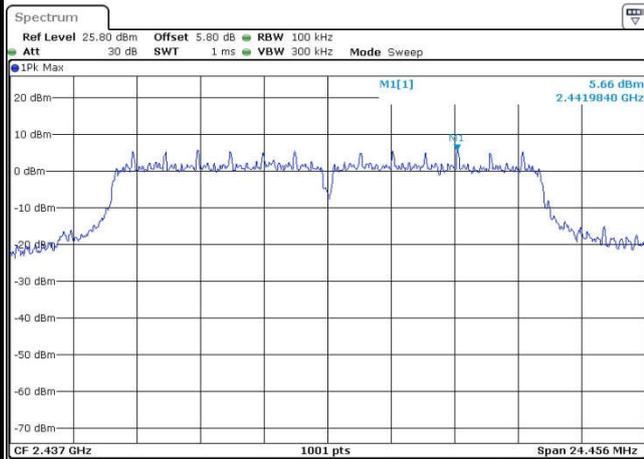
Date: 27.FEB.2018 12:45:46



Number of TX :	1	Ant. :	1
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~55%
Test Channel :	06	Test Engineer :	Silent Hai

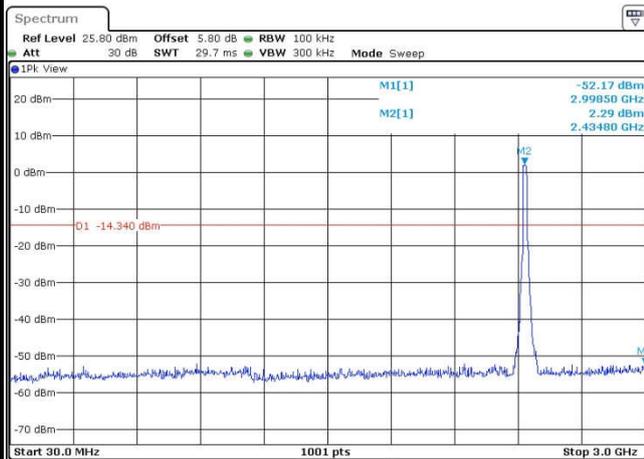
WLAN 802.11g Channel 06

100kHz PSD reference Level



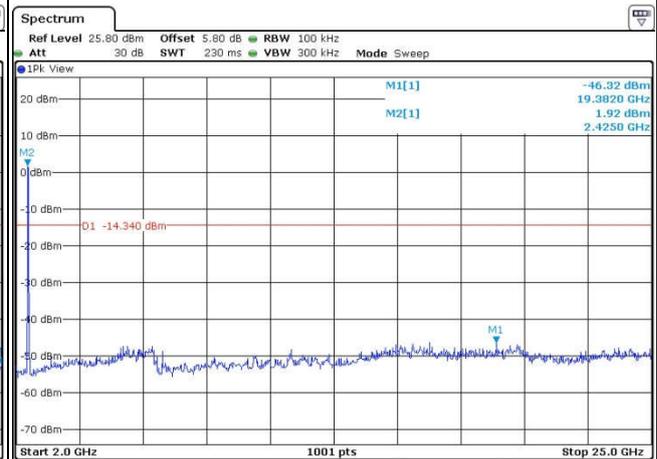
Date: 10.JAN.2018 19:14:48

Spurious Emission 30MHz~3GHz



Date: 10.JAN.2018 19:14:59

Spurious Emission 2GHz~25GHz



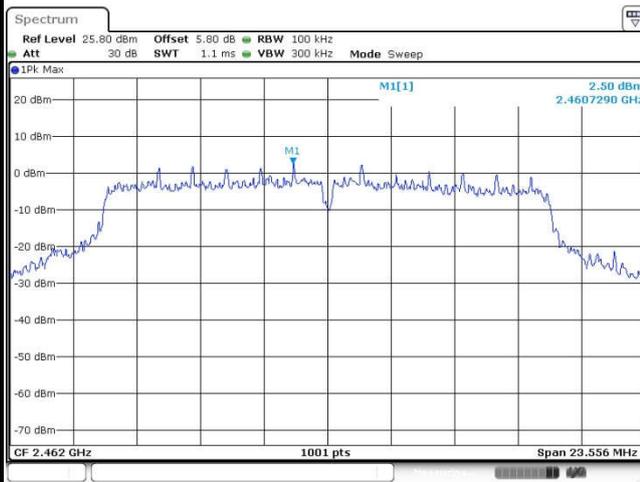
Date: 10.JAN.2018 19:15:30



Number of TX :	1	Ant. :	1
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~55%
Test Channel :	11	Test Engineer :	Silent Hai

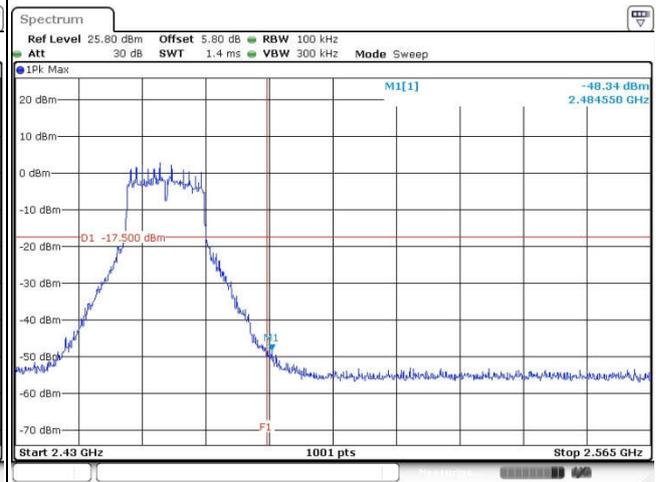
WLAN 802.11g Channel 11

100kHz PSD reference Level



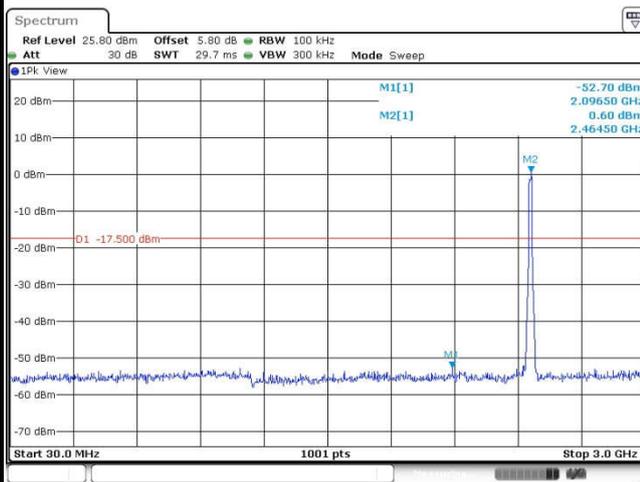
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High Channel Plot



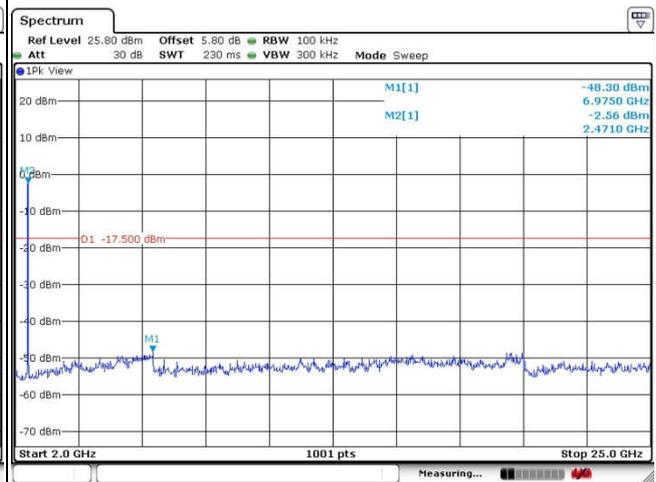
Date: 27.FEB.2018 12:50:40

Spurious Emission 30MHz~3GHz



Date: 27.FEB.2018 12:51:04

Spurious Emission 2GHz~25GHz



Date: 27.FEB.2018 12:51:29

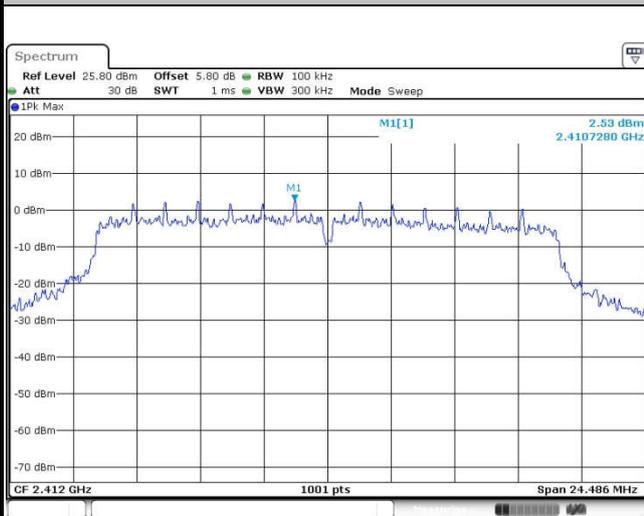


Number of TX = 2, Ant. 1 (Measured)

Number of TX :	2	Ant. :	1
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~55%
Test Channel :	01	Test Engineer :	Silent Hai

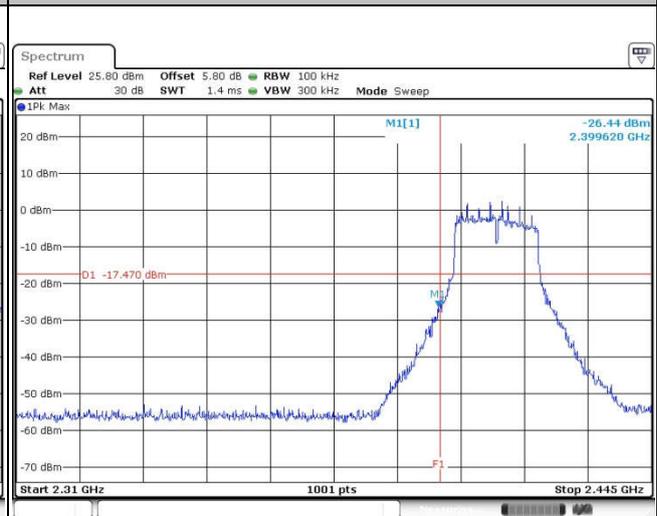
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



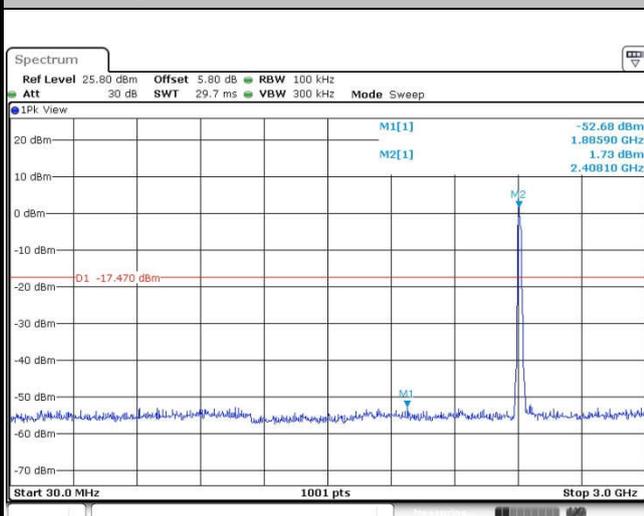
Date: 27.FEB.2018 12:58:03

Low Channel Plot



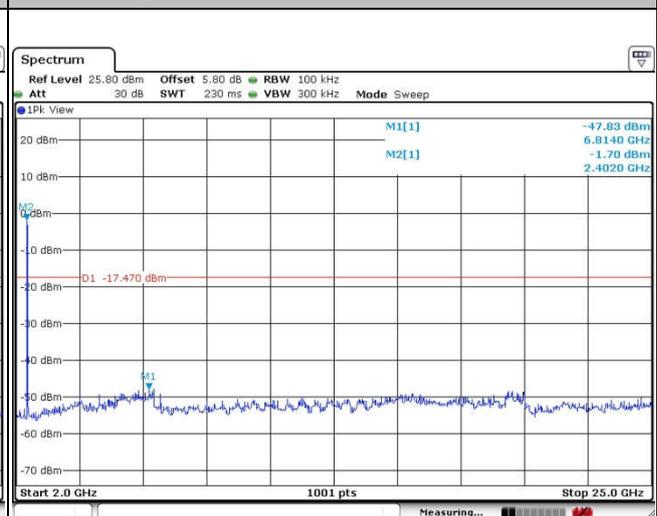
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Spurious Emission 30MHz~3GHz



Date: 27.FEB.2018 12:58:51

Spurious Emission 2GHz~25GHz



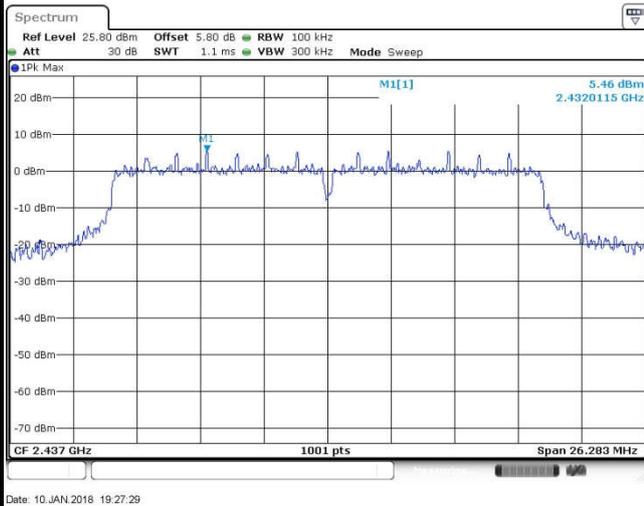
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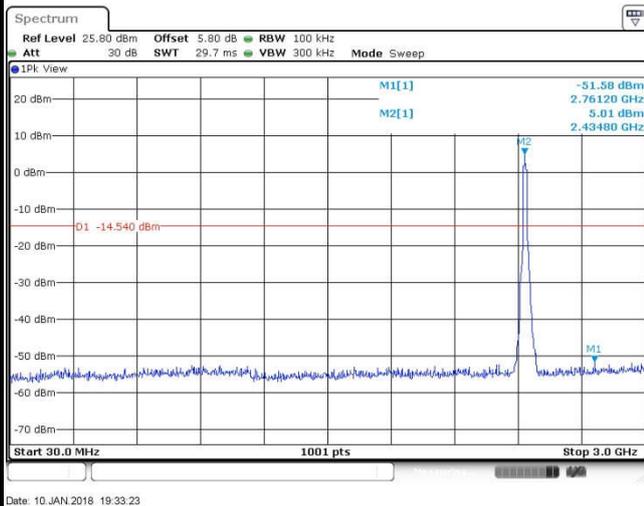
Number of TX :	2	Ant. :	1
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~55%
Test Channel :	06	Test Engineer :	Silent Hai

WLAN 802.11n HT20 Channel 06

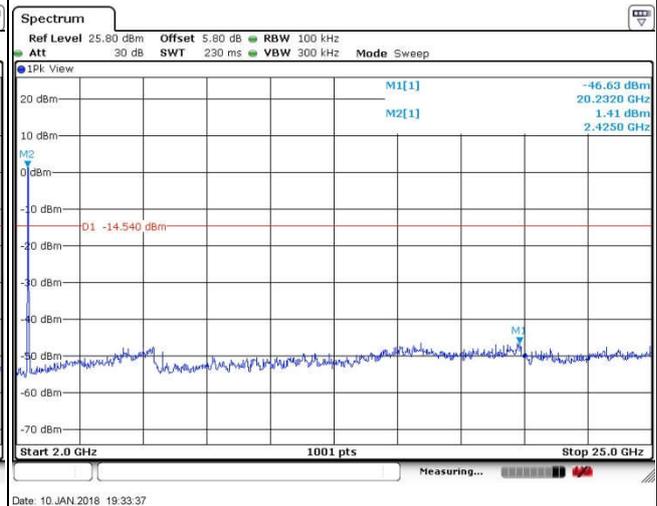
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz

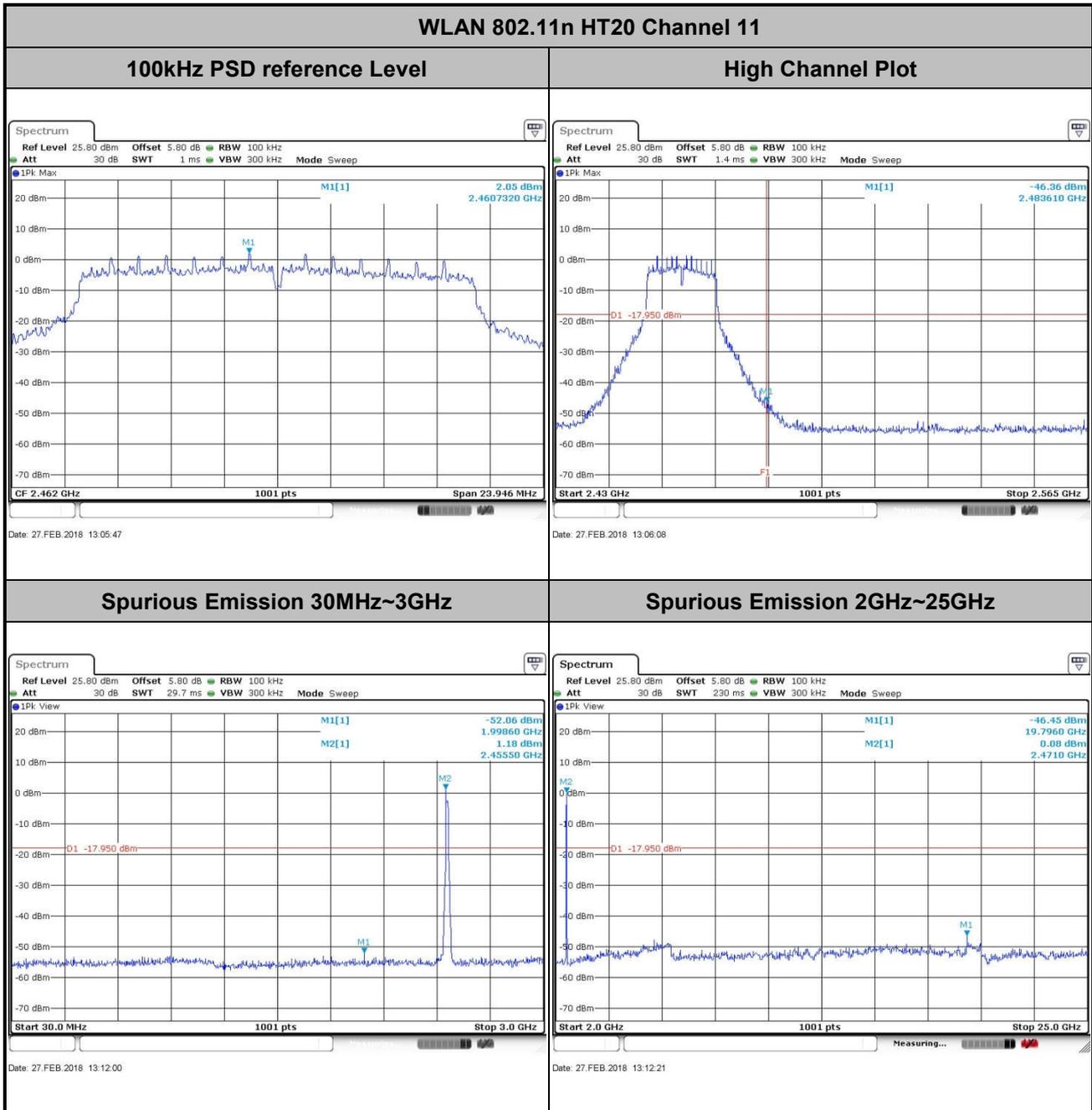


Spurious Emission 2GHz~25GHz





Number of TX :	2	Ant. :	1
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~55%
Test Channel :	11	Test Engineer :	Silent Hai

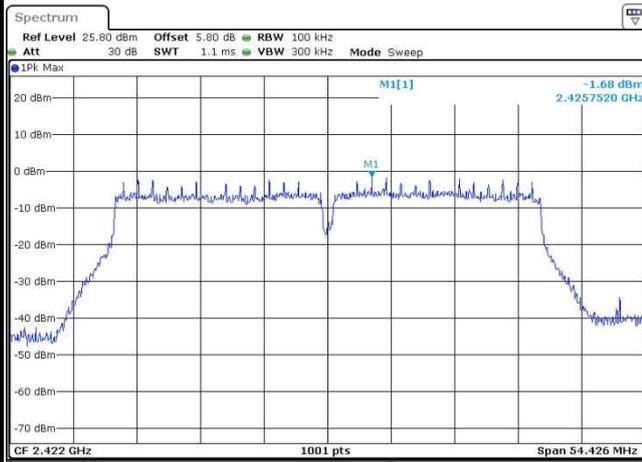




Number of TX :	2	Ant. :	1
Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~55%
Test Channel :	03	Test Engineer :	Silent Hai

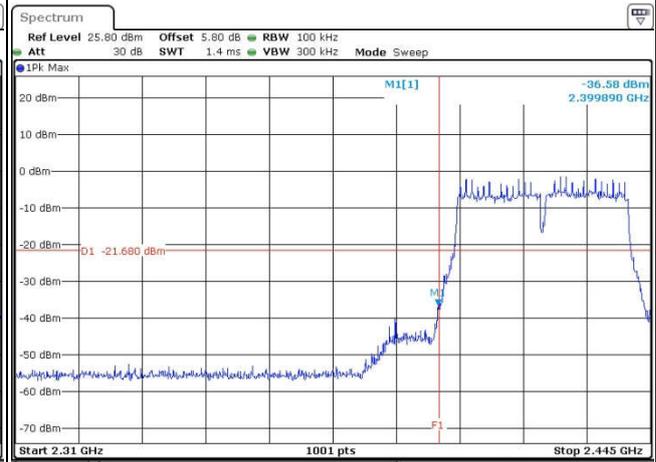
WLAN 802.11n HT40 Channel 03

100kHz PSD reference Level



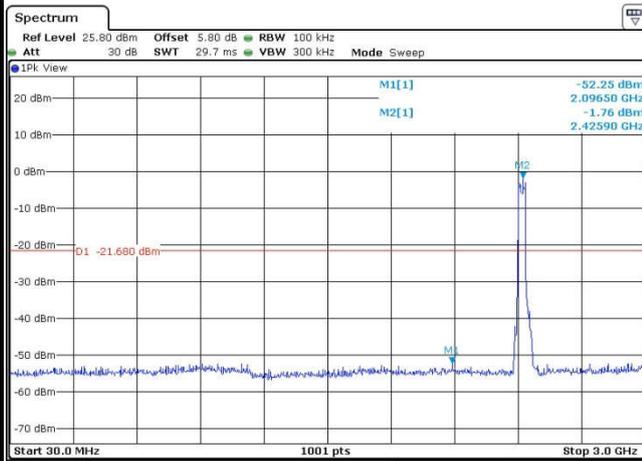
Date: 27.FEB.2018 13:18:20

Low Channel Plot



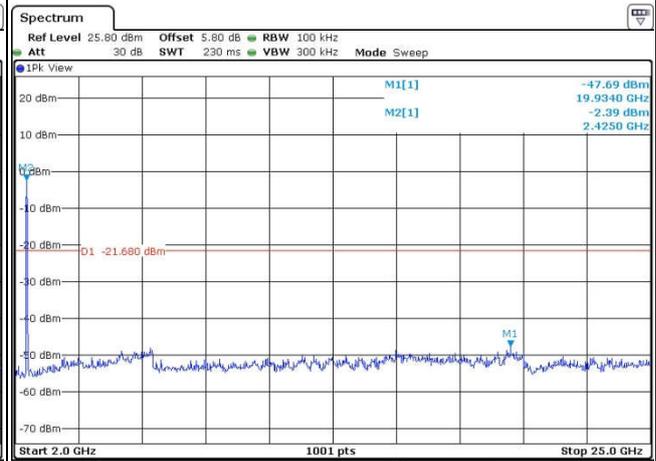
Date: 27.FEB.2018 13:18:30

Spurious Emission 30MHz~3GHz



Date: 27.FEB.2018 13:22:25

Spurious Emission 2GHz~25GHz



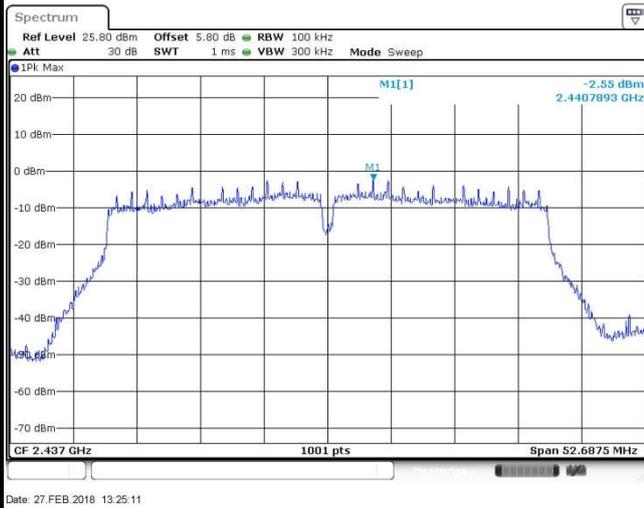
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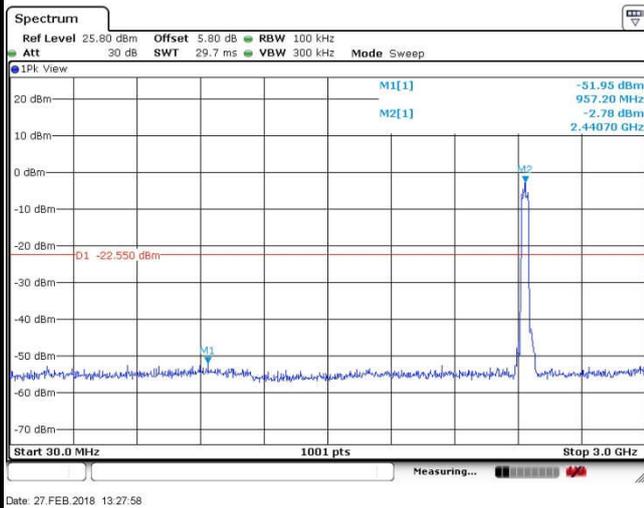
Number of TX :	2	Ant. :	1
Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~55%
Test Channel :	06	Test Engineer :	Silent Hai

WLAN 802.11n HT40 Channel 06

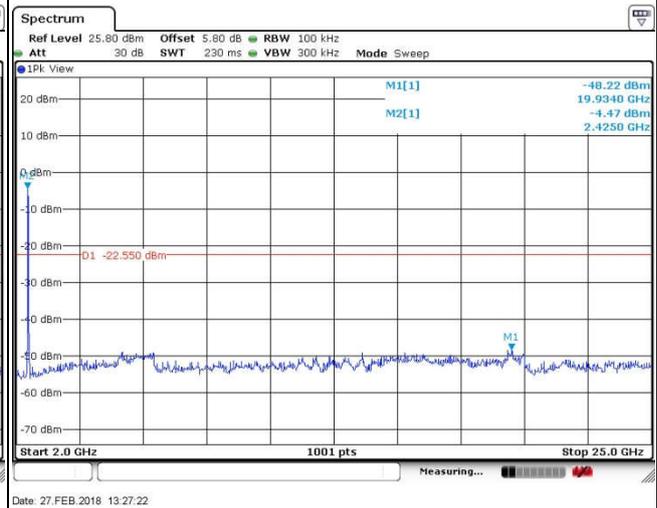
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz

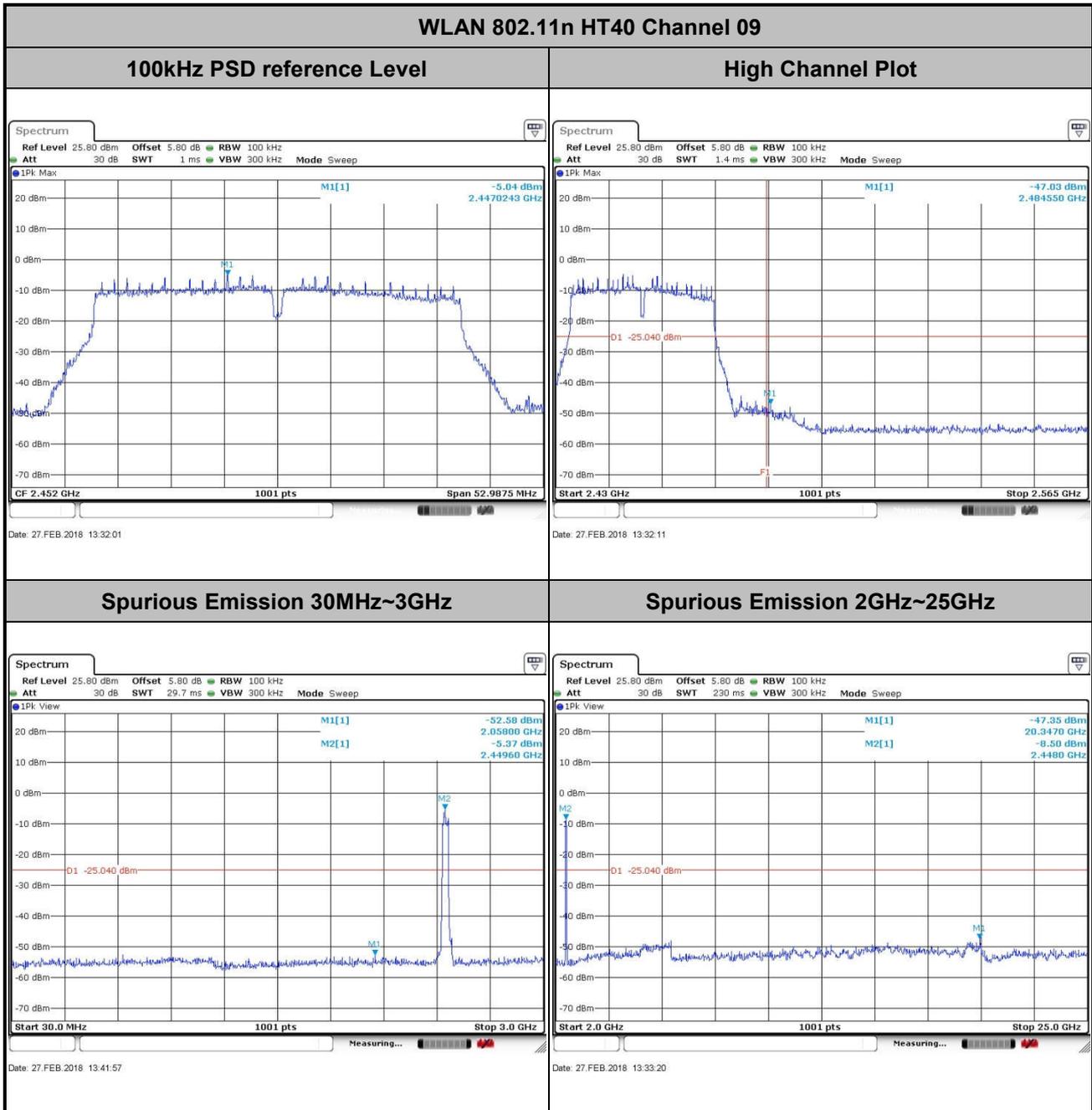


Spurious Emission 2GHz~25GHz





Number of TX :	2	Ant. :	1
Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~55%
Test Channel :	09	Test Engineer :	Silent Hai



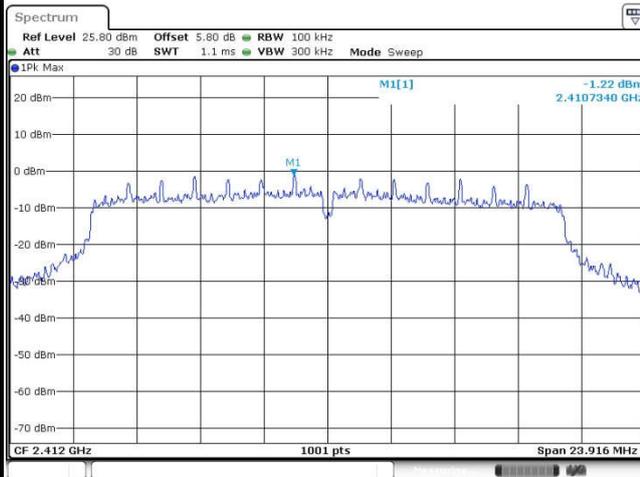


Number of TX = 2, Ant. 2 (Measured)

Number of TX :	2	Ant. :	2
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~55%
Test Channel :	01	Test Engineer :	Silent Hai

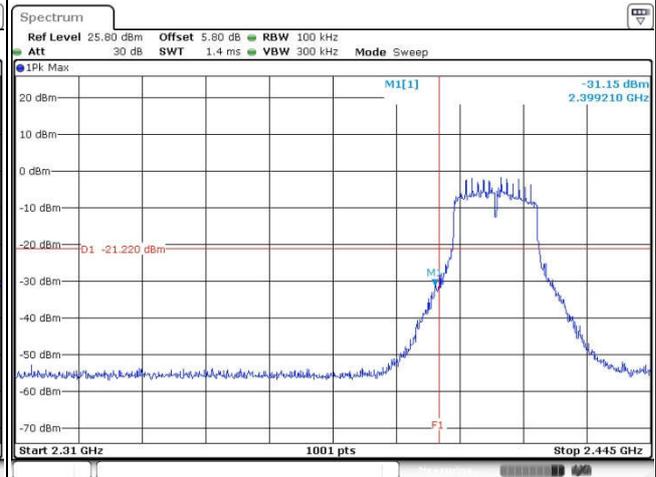
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



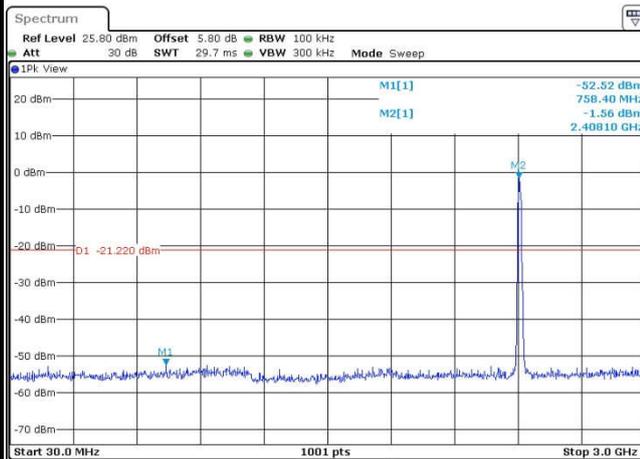
Date: 27.FEB.2018 14:07:31

Low Channel Plot



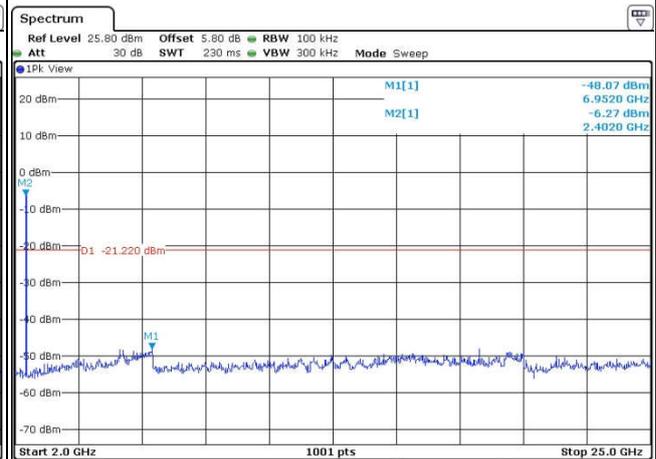
Date: 27.FEB.2018 14:07:41

Spurious Emission 30MHz~3GHz



Date: 27.FEB.2018 14:07:54

Spurious Emission 2GHz~25GHz



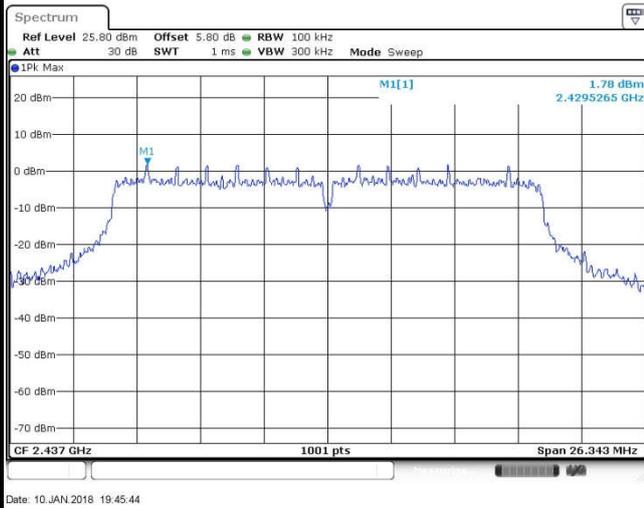
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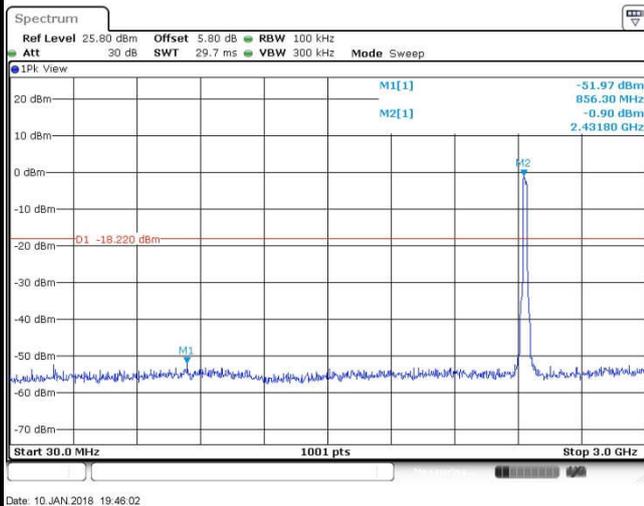
Number of TX :	2	Ant. :	2
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~55%
Test Channel :	06	Test Engineer :	Silent Hai

WLAN 802.11n HT20 Channel 06

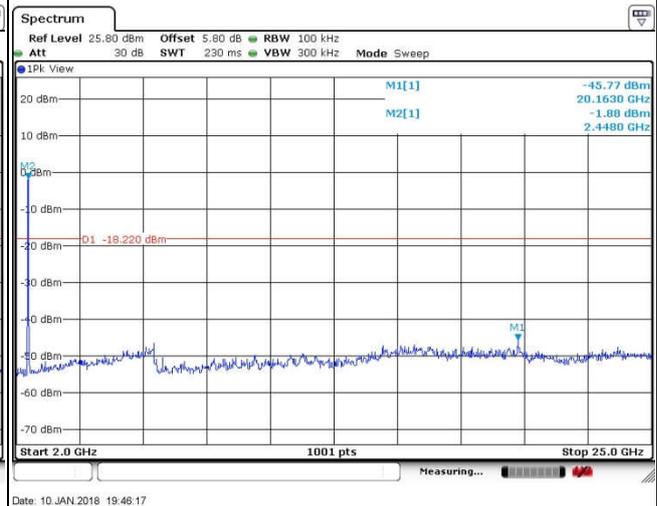
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz

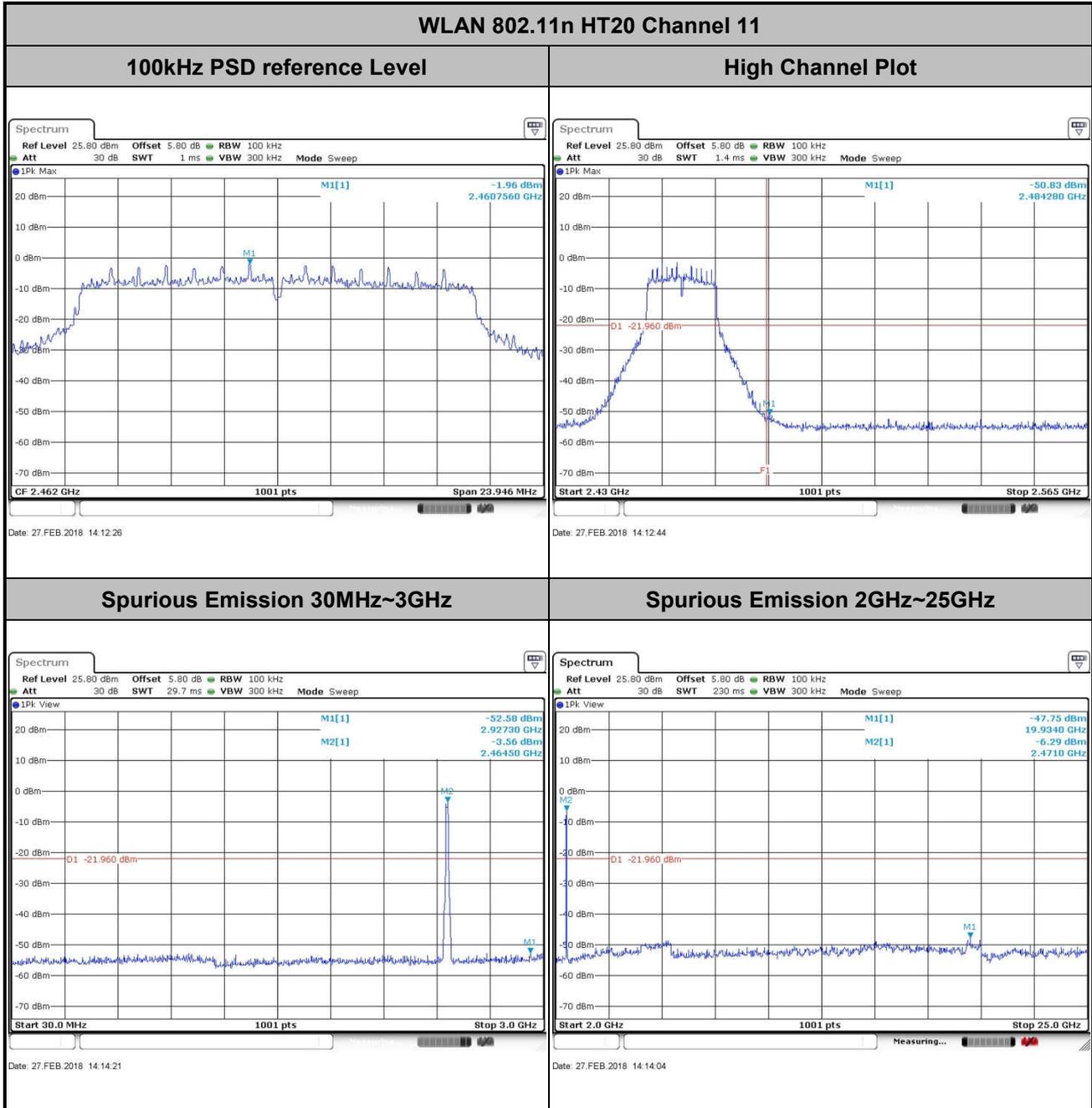


Spurious Emission 2GHz~25GHz





Number of TX :	2	Ant. :	2
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~55%
Test Channel :	11	Test Engineer :	Silent Hai

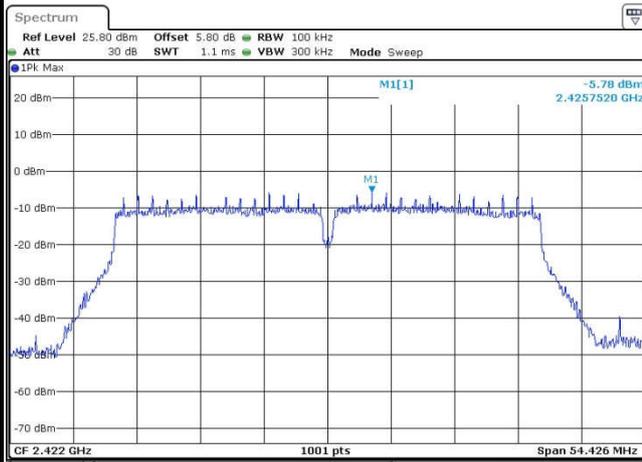




Number of TX :	2	Ant. :	2
Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~55%
Test Channel :	03	Test Engineer :	Silent Hai

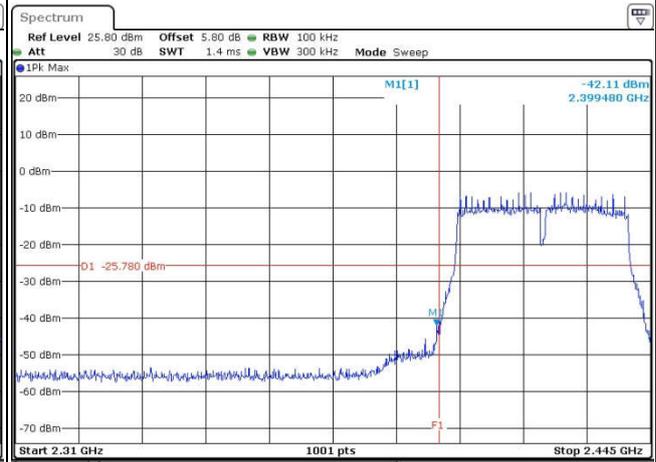
WLAN 802.11n HT40 Channel 03

100kHz PSD reference Level



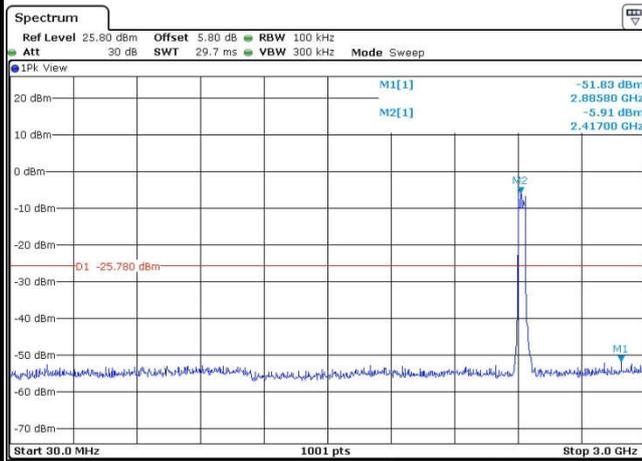
Date: 27.FEB.2018 14:01:47

Low Channel Plot



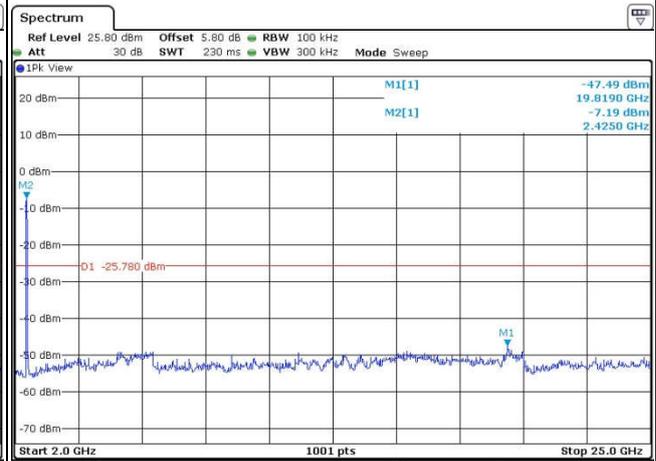
Date: 27.FEB.2018 14:02:09

Spurious Emission 30MHz~3GHz



Date: 27.FEB.2018 14:03:36

Spurious Emission 2GHz~25GHz



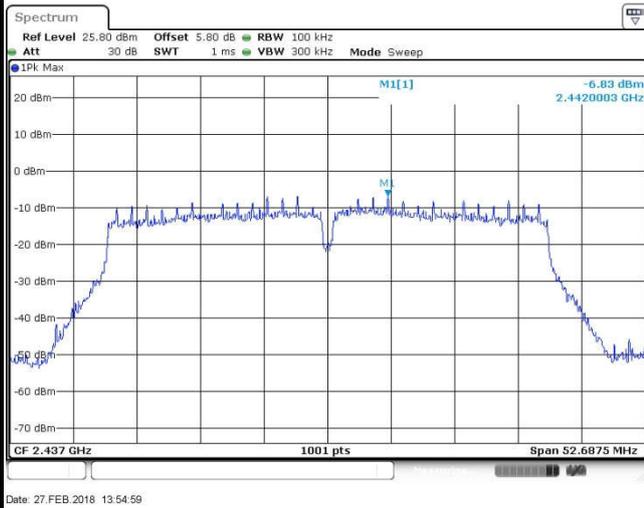
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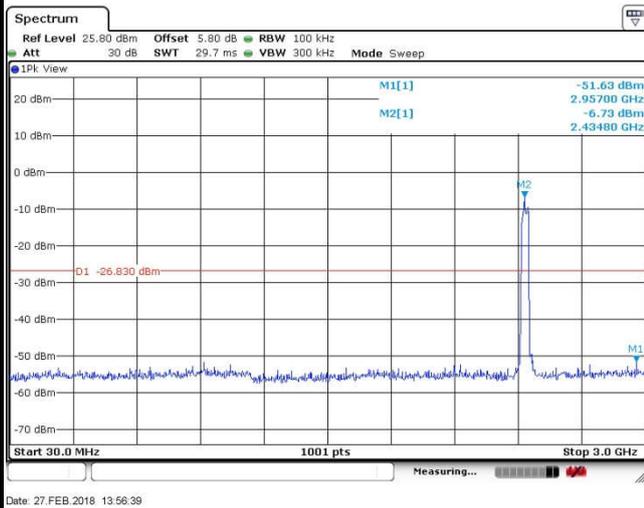
Number of TX :	2	Ant. :	2
Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~55%
Test Channel :	06	Test Engineer :	Silent Hai

WLAN 802.11n HT40 Channel 06

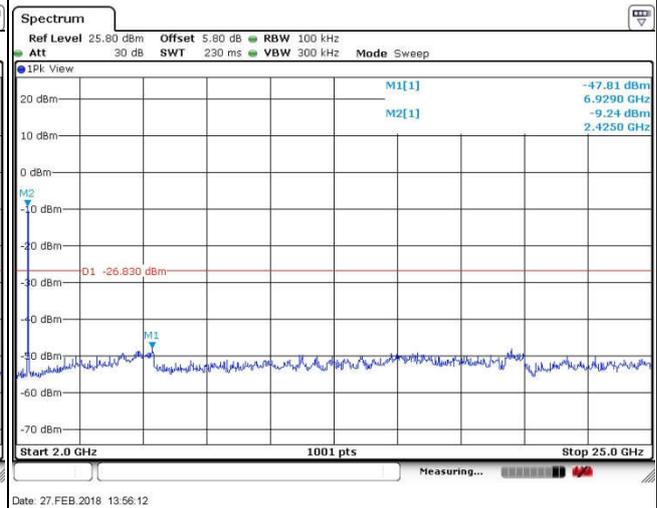
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

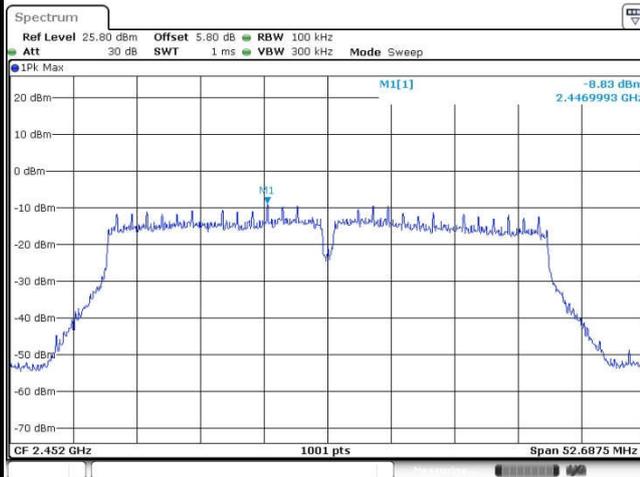




Number of TX :	2	Ant. :	2
Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~55%
Test Channel :	09	Test Engineer :	Silent Hai

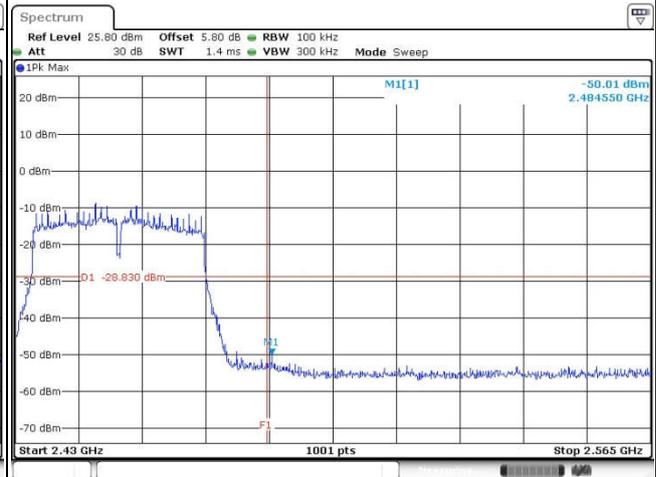
WLAN 802.11n HT40 Channel 09

100kHz PSD reference Level



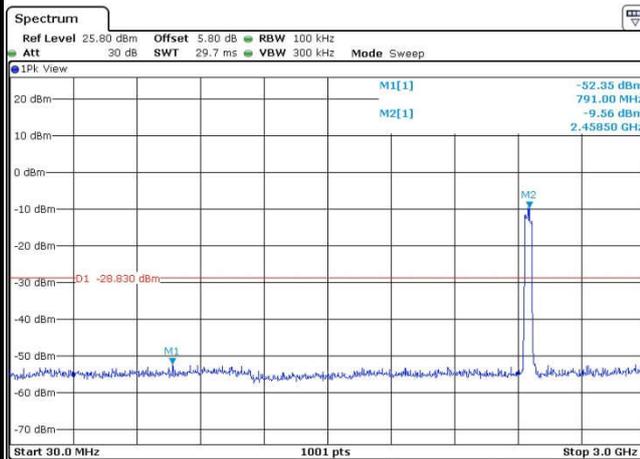
Date: 27.FEB.2018 13:49:44

High Channel Plot



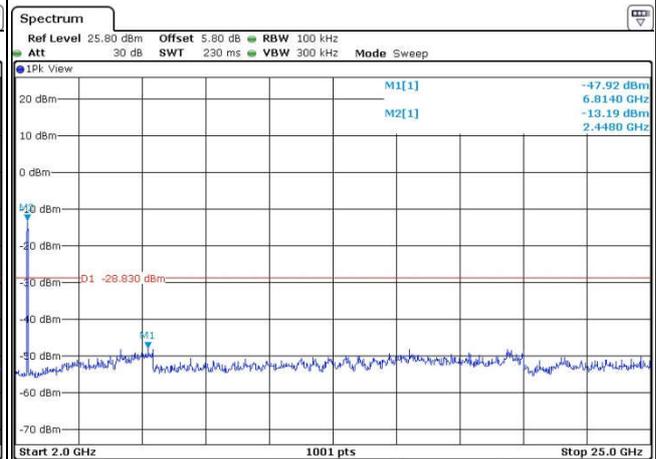
Date: 27.FEB.2018 13:49:58

Spurious Emission 30MHz~3GHz



Date: 27.FEB.2018 13:51:19

Spurious Emission 2GHz~25GHz



Date: 27.FEB.2018 13:50:41



### 3.5 Radiated Band Edges and Spurious Emission Measurement

#### 3.5.1 Limit of Radiated band edge and Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

#### 3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.



### **3.5.3 Test Procedures**

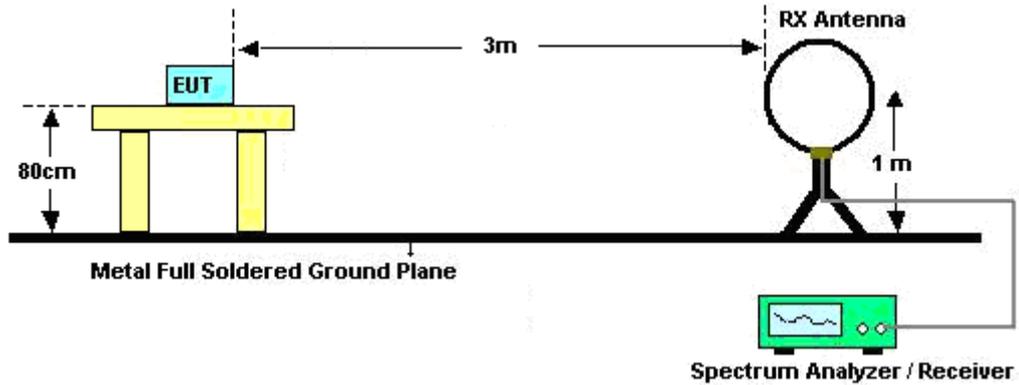
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Set RBW=100 kHz for  $f < 1$  GHz; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold;
  - (3) Set RBW = 1 MHz, VBW= 3MHz for  $f \geq 1$  GHz for peak measurement.

For average measurement:

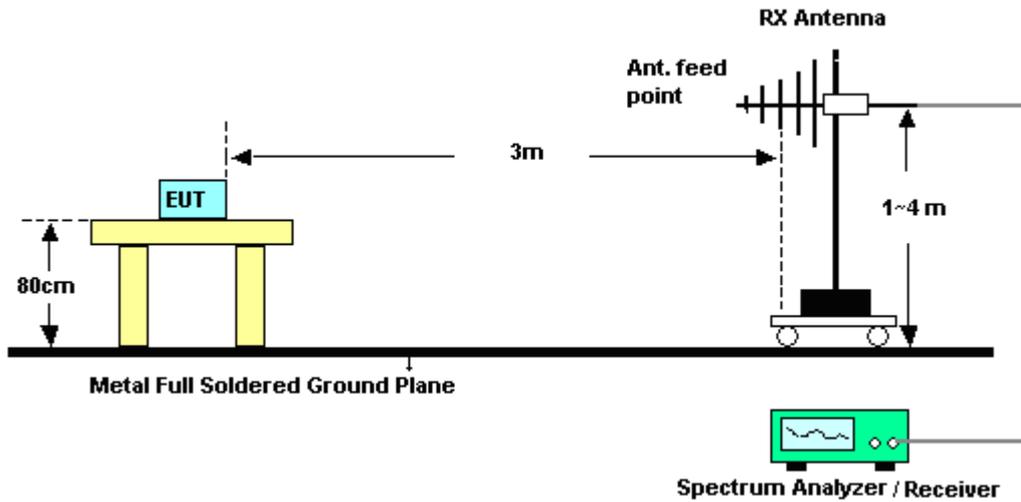
    - VBW = 10 Hz, when duty cycle is no less than 98 percent.
    - VBW  $\geq 1/T$ , when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

### 3.5.4 Test Setup

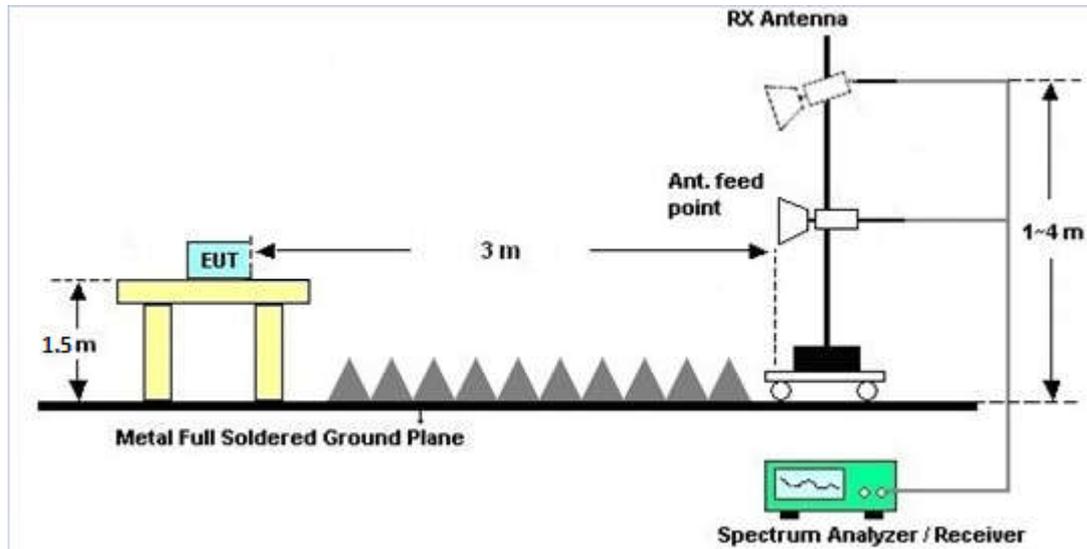
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



### 3.5.5 Test Results of Radiated Spurious Emissions (9kHz ~ 30MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

### 3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix B.

### 3.5.7 Duty Cycle

Please refer to Appendix C.

### 3.5.8 Test Result of Radiated Spurious Emission (30MHz ~ 10<sup>th</sup> Harmonic)

Please refer to Appendix B.



### 3.6 AC Conducted Emission Measurement

#### 3.6.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

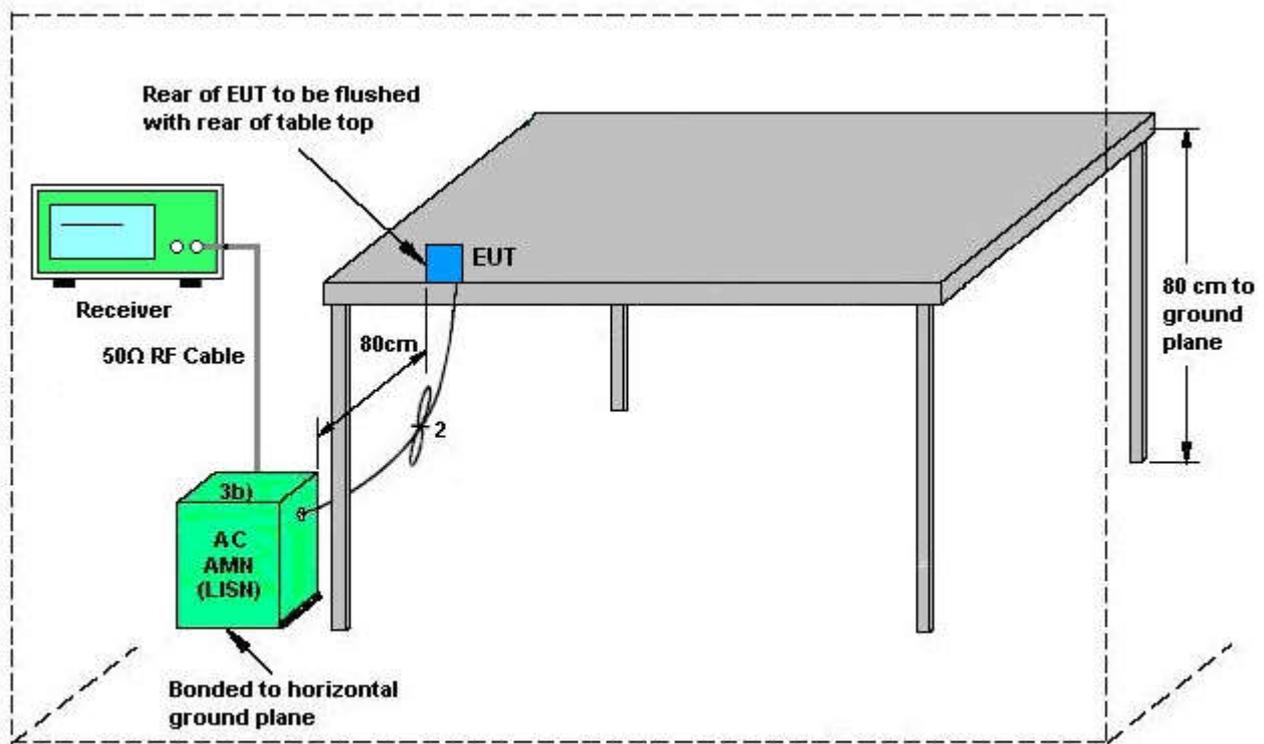
#### 3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

#### 3.6.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF bandwidth = 9kHz) with Maximum Hold Mode.

### 3.6.4 Test Setup

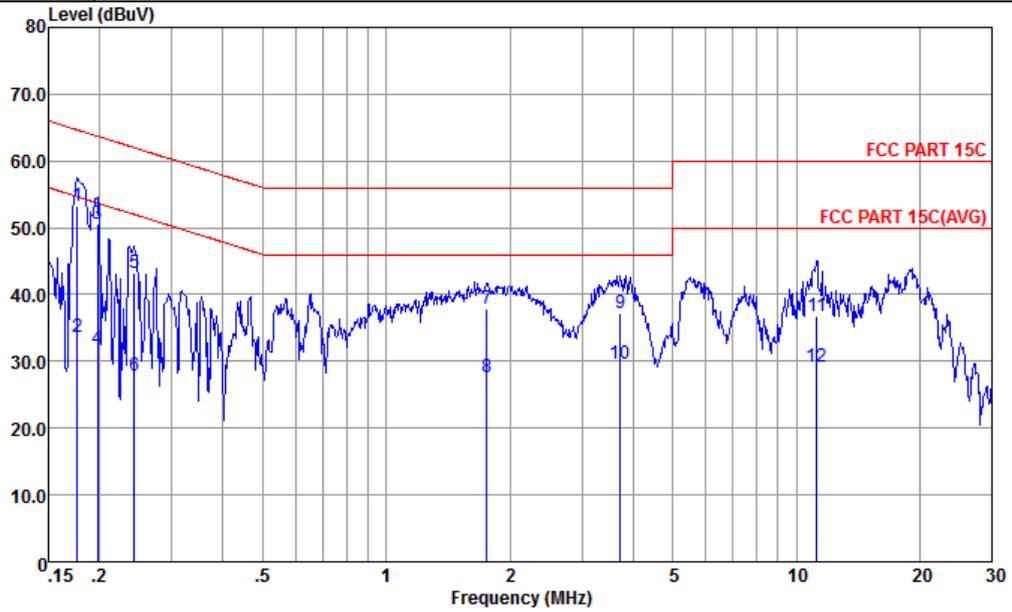


AMN = Artificial mains network (LISN)  
AE = Associated equipment  
EUT = Equipment under test  
ISN = Impedance stabilization network



3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	22~24°C
Test Engineer :	Amos Zhang	Relative Humidity :	41~44%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	Bluetooth Link + WLAN Link (2.4G) + Camera Front + SD Card Data Copy + Earphone + Keyboard + Play H Plane + Pen + USB Cable (Charging from Adapter 1 With Type C)		

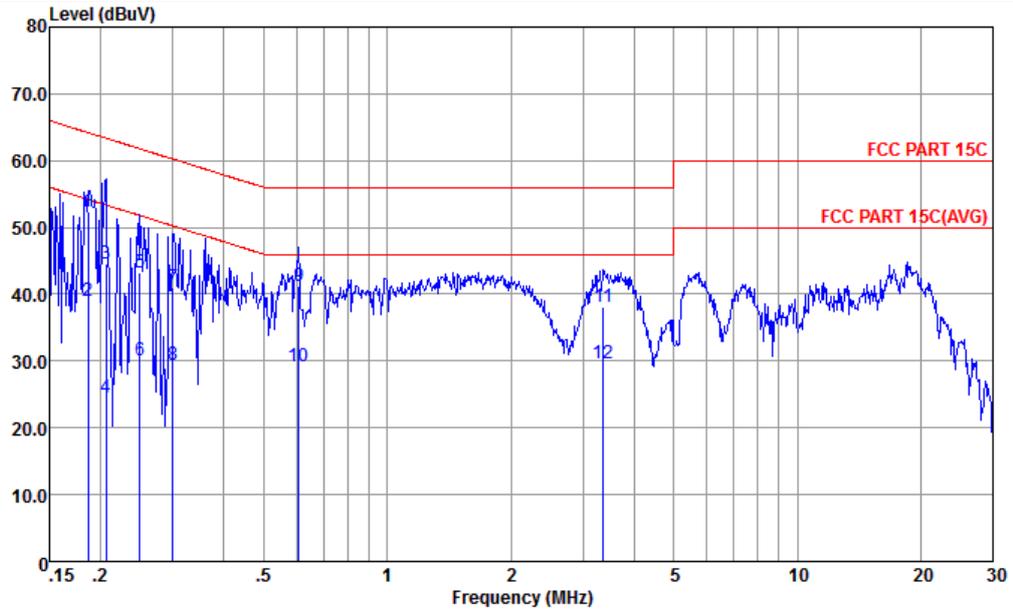


Site : CO01-KS  
 Condition : FCC PART 15C LISN-L-171013-060103 LINE

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 *	0.177	53.31	-11.33	64.64	42.60	0.18	10.53	QP
2	0.177	33.61	-21.03	54.64	22.90	0.18	10.53	Average
3	0.198	50.56	-13.15	63.71	39.90	0.20	10.46	QP
4	0.198	31.86	-21.85	53.71	21.20	0.20	10.46	Average
5	0.243	43.25	-18.75	62.00	32.60	0.21	10.44	QP
6	0.243	27.85	-24.15	52.00	17.20	0.21	10.44	Average
7	1.762	37.97	-18.03	56.00	27.50	0.28	10.19	QP
8	1.762	27.67	-18.33	46.00	17.20	0.28	10.19	Average
9	3.720	37.31	-18.69	56.00	26.80	0.34	10.17	QP
10	3.720	29.71	-16.29	46.00	19.20	0.34	10.17	Average
11	11.198	36.88	-23.12	60.00	26.21	0.32	10.35	QP
12	11.198	29.28	-20.72	50.00	18.61	0.32	10.35	Average



Test Mode :	Mode 1	Temperature :	22~24°C
Test Engineer :	Amos Zhang	Relative Humidity :	41~44%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Bluetooth Link + WLAN Link (2.4G) + Camera Front + SD Card Data Copy + Earphone + Keyboard + Play H Plane + Pen + USB Cable (Charging from Adapter 1 With Type C)		



Site : CO01-KS  
 Condition : FCC PART 15C LISN-N-171013-060103 NEUTRAL

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 *	0.186	52.28	-11.92	64.20	41.50	0.28	10.50	QP
2	0.186	38.98	-15.22	54.20	28.20	0.28	10.50	Average
3	0.206	44.63	-18.73	63.36	33.90	0.28	10.45	QP
4	0.206	24.53	-28.83	53.36	13.80	0.28	10.45	Average
5	0.249	43.22	-18.56	61.78	32.50	0.28	10.44	QP
6	0.249	30.02	-21.76	51.78	19.30	0.28	10.44	Average
7	0.300	40.91	-19.33	60.24	30.20	0.28	10.43	QP
8	0.300	29.31	-20.93	50.24	18.60	0.28	10.43	Average
9	0.608	41.12	-14.88	56.00	30.60	0.30	10.22	QP
10	0.608	29.12	-16.88	46.00	18.60	0.30	10.22	Average
11	3.364	38.01	-17.99	56.00	27.50	0.33	10.18	QP
12	3.364	29.71	-16.29	46.00	19.20	0.33	10.18	Average



## **3.7 Antenna Requirements**

### **3.7.1 Standard Applicable**

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

### **3.7.2 Antenna Anti-Replacement Construction**

An embedded-in antenna design is used.

### **3.7.3 Antenna Gain**

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



## 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Aug. 08, 2017	Jan. 10, 2018	Aug. 07, 2018	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 19, 2017	Jan. 10, 2018	Jan. 19, 2018	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 19, 2017	Jan. 10, 2018	Jan. 19, 2018	Conducted (TH01-KS)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Nov. 10, 2017	Jan. 16, 2018~ Mar. 06, 2018	Nov. 09, 2019	Radiation (03CH07-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800 N1D01N-06	35419&03	30MHz to 1GHz	Dec. 18, 2017	Jan. 16, 2018~ Mar. 06, 2018	Dec. 17, 2018	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 23, 2017	Jan. 16, 2018~ Mar. 06, 2018	Aug. 22, 2018	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170 251	18GHz- 40GHz	Nov. 10, 2017	Jan. 16, 2018~ Mar. 06, 2018	Nov. 09, 2018	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz-1GHz	Mar. 14, 2017	Jan. 16, 2018~ Mar. 06, 2018	Mar. 13, 2018	Radiation (03CH07-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1590075	1GHz ~ 18GHz	Apr. 25, 2017	Jan. 16, 2018~ Mar. 06, 2018	Apr. 24, 2018	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A023 62	1GHz~ 26.5GHz	Oct. 30, 2017	Jan. 16, 2018~ Mar. 06, 2018	Oct. 29, 2018	Radiation (03CH07-HY)
Amplifier	MITEQ	TTA1840-35- HG	1871923	18GHz~40GHz, VSWR : 2.5:1 max	Jul. 18, 2017	Jan. 16, 2018~ Mar. 06, 2018	Jul. 17, 2018	Radiation (03CH07-HY)
EMI Test Receiver	Agilent	N9038A(MXE )	MY532900 53	20Hz to 26.5GHz	Jan. 16, 2018	Jan. 16, 2018~ Mar. 06, 2018	Jan. 15, 2019	Radiation (03CH07-HY)
Spectrum Analyzer	Agilent	N9010A	MY534701 18	10Hz~44GHz	Apr. 17, 2017	Jan. 16, 2018~ Mar. 06, 2018	Apr. 16, 2018	Radiation (03CH07-HY)
Controller	ChainTek	Chaintek 3000	N/A	Control Turn table	N/A	Jan. 16, 2018~ Mar. 06, 2018	N/A	Radiation (03CH07-HY)
Controller	Max-Full	MF7802	MF780208 368	Control Ant Mast	N/A	Jan. 16, 2018~ Mar. 06, 2018	N/A	Radiation (03CH07-HY)
Antenna Mast	Max-Full	MFA520BS	N/A	1m~4m	N/A	Jan. 16, 2018~ Mar. 06, 2018	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	N/A	Jan. 16, 2018~ Mar. 06, 2018	N/A	Radiation (03CH07-HY)
Software	Audix	E3 6.2009-8- 24	RK-00104 2	N/A	N/A	Jan. 16, 2018~ Mar. 06, 2018	N/A	Radiation (03CH07-HY)
EMI Receiver	R&S	ESC17	100768	9kHz~7GHz;	Apr. 20, 2017	Feb. 01, 2018	Apr. 19, 2018	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 13, 2017	Feb. 01, 2018	Oct. 12, 2018	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 13, 2017	Feb. 01, 2018	Oct. 12, 2018	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP00000 0811	AC 0V~300V, 45Hz~1000Hz	Oct. 12, 2017	Feb. 01, 2018	Oct. 11, 2018	Conduction (CO01-KS)

NCR: No Calibration Required



## 5 Uncertainty of Evaluation

### Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.3dB
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### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.7dB
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### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.5dB
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### Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.2dB
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## **Appendix A. Conducted Test Results**

Test Engineer:	Silent Hai	Temperature:	21~25	°C
Test Date:	2018/1/10~2018/2/27	Relative Humidity:	51~55	%

**TEST RESULTS DATA**  
**6dB and 99% Occupied Bandwidth**

2.4GHz Band										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)		6dB BW (MHz)		6dB BW Limit (MHz)	Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2		
11b	1Mbps	1	1	2412	14.14		8.07		0.50	Pass
11b	1Mbps	1	6	2437	14.09		8.07		0.50	Pass
11b	1Mbps	1	11	2462	14.14		8.07		0.50	Pass
11g	6Mbps	1	1	2412	17.63		15.68		0.50	Pass
11g	6Mbps	1	2	2417	17.98		15.92		0.50	Pass
11g	6Mbps	1	6	2437	19.23		16.30		0.50	Pass
11g	6Mbps	1	10	2457	17.68		15.90		0.50	Pass
11g	6Mbps	1	11	2462	17.63		15.70		0.50	Pass
HT20	MCS0	2	1	2412	18.83	18.68	16.32	15.94	0.50	Pass
HT20	MCS0	2	2	2417	19.08	18.93	17.28	17.26	0.50	Pass
HT20	MCS0	2	6	2437	21.08	19.43	17.52	17.56	0.50	Pass
HT20	MCS0	2	10	2457	18.88	18.73	16.30	15.70	0.50	Pass
HT20	MCS0	2	11	2462	18.78	18.88	15.96	15.96	0.50	Pass
HT40	MCS0	2	3	2422	36.66	36.46	36.28	36.28	0.50	Pass
HT40	MCS0	2	6	2437	36.36	36.36	35.13	35.13	0.50	Pass
HT40	MCS0	2	9	2452	36.46	36.36	35.33	35.13	0.50	Pass

**TEST RESULTS DATA**  
**Peak Output Power**

2.4GHz Band																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	1	1	2412	19.58	19.07		30.00	30.00	-0.80	0.20	18.78	19.27	36.00	36.00	Pass
11b	1Mbps	1	6	2437	19.48	18.87		30.00	30.00	-0.80	0.20	18.68	19.07	36.00	36.00	Pass
11b	1Mbps	1	11	2462	19.39	18.88		30.00	30.00	-0.80	0.20	18.59	19.08	36.00	36.00	Pass
11g	6Mbps	1	1	2412	18.32	23.01		30.00	30.00	-0.80	0.20	17.52	23.21	36.00	36.00	Pass
11g	6Mbps	1	2	2417	20.88	21.58		30.00	30.00	-0.80	0.20	20.08	21.78	36.00	36.00	Pass
11g	6Mbps	1	6	2437	23.11	23.05		30.00	30.00	-0.80	0.20	22.31	23.25	36.00	36.00	Pass
11g	6Mbps	1	10	2457	21.15	21.74		30.00	30.00	-0.80	0.20	20.35	21.94	36.00	36.00	Pass
11g	6Mbps	1	11	2462	17.09	22.95		30.00	30.00	-0.80	0.20	16.29	23.15	36.00	36.00	Pass
HT20	MCS0	2	1	2412	17.72	13.92	19.23	30.00		0.20		19.43		36.00		Pass
HT20	MCS0	2	2	2417	20.52	19.01	22.84	30.00		0.20		23.04		36.00		Pass
HT20	MCS0	2	6	2437	22.71	21.30	25.07	30.00		0.20		25.27		36.00		Pass
HT20	MCS0	2	10	2457	20.90	19.55	23.29	30.00		0.20		23.49		36.00		Pass
HT20	MCS0	2	11	2462	16.77	13.06	18.31	30.00		0.20		18.51		36.00		Pass
HT40	MCS0	2	3	2422	18.41	14.41	19.87	30.00		0.20		20.07		36.00		Pass
HT40	MCS0	2	6	2437	16.82	12.79	18.27	30.00		0.20		18.47		36.00		Pass
HT40	MCS0	2	9	2452	14.25	10.27	15.71	30.00		0.20		15.91		36.00		Pass

Note: Measured power (dBm) has offset with cable loss.

**TEST RESULTS DATA**  
**Average Output Power**

2.4GHz Band									
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)		
					Ant 1	Ant 2	Ant 1	Ant 2	SUM
11b	1Mbps	1	1	2412	0.00	0.00	16.96	16.86	
11b	1Mbps	1	6	2437	0.00	0.00	16.89	16.76	
11b	1Mbps	1	11	2462	0.00	0.00	16.82	16.85	
11g	6Mbps	1	1	2412	0.22	0.22	13.47	16.78	
11g	6Mbps	1	2	2417	0.22	0.22	15.83	16.53	
11g	6Mbps	1	6	2437	0.22	0.22	16.91	16.82	
11g	6Mbps	1	10	2457	0.22	0.22	16.18	16.76	
11g	6Mbps	1	11	2462	0.22	0.22	12.57	16.80	
HT20	MCS0	2	1	2412	0.24	0.24	12.61	9.12	14.22
HT20	MCS0	2	2	2417	0.24	0.24	15.46	12.99	17.41
HT20	MCS0	2	6	2437	0.24	0.24	16.42	13.34	18.16
HT20	MCS0	2	10	2457	0.24	0.24	15.75	13.18	17.66
HT20	MCS0	2	11	2462	0.24	0.24	12.12	8.50	13.69
HT40	MCS0	2	3	2422	0.47	0.44	12.11	8.36	13.64
HT40	MCS0	2	6	2437	0.47	0.44	10.71	6.72	12.17
HT40	MCS0	2	9	2452	0.47	0.44	8.31	4.37	9.78

Note: Measured power (dBm) has offset with cable loss.

**TEST RESULTS DATA**  
**Peak Power Spectral Density**

2.4GHz Band												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)			DG (dBi)		Peak PSD Limit (dBm/3kHz)		Pass/Fail
					Ant 1	Ant 2	Worse + 3.01	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	1	1	2412	-9.08		-	-0.80	0.20	8.00	8.00	Pass
11b	1Mbps	1	6	2437	-9.05			-0.80	0.20	8.00	8.00	Pass
11b	1Mbps	1	11	2462	-8.92			-0.80	0.20	8.00	8.00	Pass
11g	6Mbps	1	1	2412	-13.22			-0.80	0.20	8.00	8.00	Pass
11g	6Mbps	1	2	2417	-10.57			-0.80	0.20	8.00	8.00	Pass
11g	6Mbps	1	6	2437	-9.15			-0.80	0.20	8.00	8.00	Pass
11g	6Mbps	1	10	2457	-10.06			-0.80	0.20	8.00	8.00	Pass
11g	6Mbps	1	11	2462	-13.92			-0.80	0.20	8.00	8.00	Pass
HT20	MCS0	2	1	2412	-14.37	-17.33	-11.36	2.72		8.00		Pass
HT20	MCS0	2	2	2417	-9.26	-13.32	-6.25	2.72		8.00		Pass
HT20	MCS0	2	6	2437	-10.07	-14.78	-7.06	2.72		8.00		Pass
HT20	MCS0	2	10	2457	-10.09	-11.75	-7.08	2.72		8.00		Pass
HT20	MCS0	2	11	2462	-15.08	-18.52	-12.07	2.72		8.00		Pass
HT40	MCS0	2	3	2422	-17.79	-21.38	-14.78	2.72		8.00		Pass
HT40	MCS0	2	6	2437	-18.51	-21.72	-15.50	2.72		8.00		Pass
HT40	MCS0	2	9	2452	-21.23	-26.09	-18.22	2.72		8.00		Pass

Measured power density (dBm) has offset with cable loss.



## Appendix B. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	(P/A)	(H/V)
802.11b CH 01 2412MHz		2335.095	55.2	-18.8	74	40.12	31.83	8.28	35.02	345	357	P	H
		2387.28	45.44	-8.56	54	30.3	31.95	8.24	35.04	345	357	A	H
	*	2412	107.14	-	-	91.97	31.99	8.24	35.05	345	357	P	H
	*	2412	104.18	-	-	89.01	31.99	8.24	35.05	345	357	A	H
		2386.965	56.31	-17.69	74	41.17	31.95	8.24	35.04	315	250	P	V
		2387.28	46.11	-7.89	54	30.97	31.95	8.24	35.04	315	250	A	V
	*	2412	108.41	-	-	93.24	31.99	8.24	35.05	315	250	P	V
	*	2412	105.27	-	-	90.1	31.99	8.24	35.05	315	250	A	V
802.11b CH 06 2437MHz		2389.94	56.23	-17.77	74	41.1	31.95	8.24	35.05	349	357	P	H
		2389.8	44.8	-9.2	54	29.67	31.95	8.24	35.05	349	357	A	H
	*	2437	107.76	-	-	92.48	32.08	8.27	35.06	349	357	P	H
	*	2437	104.62	-	-	89.34	32.08	8.27	35.06	349	357	A	H
		2485.72	56.01	-17.99	74	40.63	32.16	8.3	35.07	349	357	P	H
		2484.46	44.82	-9.18	54	29.44	32.16	8.3	35.07	349	357	A	H
		2387.28	55.15	-18.85	74	40.01	31.95	8.24	35.04	354	248	P	V
		2389.8	45.05	-8.95	54	29.92	31.95	8.24	35.05	354	248	A	V
	*	2437	109.15	-	-	93.87	32.08	8.27	35.06	354	248	P	V
	*	2437	106.02	-	-	90.74	32.08	8.27	35.06	354	248	A	V
		2487.75	55.93	-18.07	74	40.51	32.2	8.3	35.07	354	248	P	V
	2483.62	44.86	-9.14	54	29.48	32.16	8.3	35.07	354	248	A	V	



802.11b CH 11 2462MHz	*	2462	108.74	-	-	93.39	32.12	8.3	35.06	100	0	P	H
	*	2462	105.64	-	-	90.29	32.12	8.3	35.06	100	0	A	H
		2486.04	56.78	-17.22	74	41.4	32.16	8.3	35.07	100	0	P	H
		2487.4	46.68	-7.32	54	31.3	32.16	8.3	35.07	100	0	A	H
	*	2462	109.36	-	-	94.01	32.12	8.3	35.06	400	247	P	V
	*	2462	106.26	-	-	90.91	32.12	8.3	35.06	400	247	A	V
		2487.2	55.34	-18.66	74	39.96	32.16	8.3	35.07	400	247	P	V
		2487.16	45.47	-8.53	54	30.09	32.16	8.3	35.07	400	247	A	V
Remark	<ol style="list-style-type: none"> <li>No other spurious found.</li> <li>All results are PASS against Peak and Average limit line.</li> </ol>												



2.4GHz 2400~2483.5MHz
WIFI 802.11b (Harmonic @ 3m)

Table with 14 columns: WIFI Ant. 1, Note, Frequency (MHz), Level (dBµV/m), Over Limit (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Cable Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include data for 802.11b CH 01 (2412MHz), 802.11b CH 06 (2437MHz), and 802.11b CH 11 (2462MHz). A Remark section at the bottom states: '1. No other spurious found. 2. All results are PASS against Peak and Average limit line.'



**2.4GHz 2400~2483.5MHz  
WIFI 802.11g (Band Edge @ 3m)**

WIFI Ant. 1	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11g CH 01 2412MHz		2389.695	61.79	-12.21	74	46.65	31.95	8.24	35.04	343	358	P	H
		2390	50.09	-3.91	54	34.96	31.95	8.24	35.05	343	358	A	H
	*	2412	104.87	-	-	89.7	31.99	8.24	35.05	343	358	P	H
	*	2412	97.22	-	-	82.05	31.99	8.24	35.05	343	358	A	H
		2389.38	65.89	-8.11	74	50.75	31.95	8.24	35.04	318	252	P	V
		2390	53.12	-0.88	54	37.99	31.95	8.24	35.05	318	252	A	V
	*	2412	105.63	-	-	90.46	31.99	8.24	35.05	318	252	P	V
	*	2412	97.88	-	-	82.71	31.99	8.24	35.05	318	252	A	V
802.11g CH 02 2417MHz		2389.66	64.64	-9.36	74	50.3	31.95	7.44	35.04	100	310	P	H
		2389.94	53.24	-0.76	54	38.91	31.95	7.44	35.05	100	310	A	H
	*	2417	109.28	-	-	94.92	31.99	7.44	35.06	100	310	P	H
	*	2417	101.71	-	-	87.35	31.99	7.44	35.06	100	310	A	H
		2389.8	62.62	-11.38	74	48.29	31.95	7.44	35.05	314	230	P	V
		2389.8	51.74	-2.26	54	37.41	31.95	7.44	35.05	314	230	A	V
	*	2417	108.55	-	-	94.19	31.99	7.44	35.06	314	230	P	V
	*	2417	100.89	-	-	86.53	31.99	7.44	35.06	314	230	A	V
802.11g CH 06 2437MHz		2389.8	56.73	-17.27	74	41.6	31.95	8.24	35.05	347	357	P	H
		2389.38	46.34	-7.66	54	31.2	31.95	8.24	35.04	347	357	A	H
	*	2437	109.13	-	-	93.85	32.08	8.27	35.06	347	357	P	H
	*	2437	101.83	-	-	86.55	32.08	8.27	35.06	347	357	A	H
		2496.85	57.68	-16.32	74	42.27	32.2	8.3	35.08	347	357	P	H
		2484.18	46.27	-7.73	54	30.89	32.16	8.3	35.07	347	357	A	H
		2385.18	55.71	-18.29	74	40.61	31.91	8.24	35.04	399	258	P	V
		2388.96	46.74	-7.26	54	31.6	31.95	8.24	35.04	399	258	A	V
	*	2437	109.22	-	-	93.94	32.08	8.27	35.06	399	258	P	V
	*	2437	101.36	-	-	86.08	32.08	8.27	35.06	399	258	A	V
		2489.99	55.68	-18.32	74	40.26	32.2	8.3	35.07	399	258	P	V
		2485.23	45.68	-8.32	54	30.3	32.16	8.3	35.07	399	258	A	V



<b>802.11g</b> <b>CH 10</b> <b>2457MHz</b>	*	2457	107.02	-	-	92.47	32.12	7.5	35.06	100	4	P	H
	*	2457	99.44	-	-	84.89	32.12	7.5	35.06	100	4	A	H
		2485	65.19	-8.81	74	50.55	32.16	7.56	35.07	100	4	P	H
		2483.5	53.52	-0.48	54	38.88	32.16	7.56	35.07	100	4	A	H
	*	2457	107.76	-	-	93.21	32.12	7.5	35.06	348	213	P	V
	*	2457	100.31	-	-	85.76	32.12	7.5	35.06	348	213	A	V
		2484.4	63.58	-10.42	74	48.94	32.16	7.56	35.07	348	213	P	V
		2483.56	51.79	-2.21	54	37.15	32.16	7.56	35.07	348	213	A	V
<b>802.11g</b> <b>CH 11</b> <b>2462MHz</b>	*	2462	106.15	-	-	90.8	32.12	8.3	35.06	100	0	P	H
	*	2462	98.48	-	-	83.13	32.12	8.3	35.06	100	0	A	H
		2483.8	66.23	-7.77	74	50.85	32.16	8.3	35.07	100	0	P	H
		2483.52	53.72	-0.28	54	38.34	32.16	8.3	35.07	100	0	A	H
	*	2462	106.77	-	-	91.42	32.12	8.3	35.06	400	246	P	V
	*	2462	99.17	-	-	83.82	32.12	8.3	35.06	400	246	A	V
		2483.6	64	-10	74	48.62	32.16	8.3	35.07	400	246	P	V
		2483.52	51.12	-2.88	54	35.74	32.16	8.3	35.07	400	246	A	V
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



**2.4GHz 2400~2483.5MHz  
WIFI 802.11g (Harmonic @ 3m)**

WIFI Ant. 1	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		4824	41.7	-32.3	74	54.35	34.23	11.93	59.38	100	0	P	H
		4824	41.14	-32.86	74	53.79	34.23	11.93	59.38	100	0	P	V
802.11g CH 02 2417MHz		4834	40.99	-33.01	74	54.99	34.23	10.55	59.35	100	0	P	H
		7251	41.98	-32.02	74	50.71	35.74	13.1	58.01	100	0	P	H
		4834	40.53	-33.47	74	54.53	34.23	10.55	59.35	100	0	P	V
802.11g CH 06 2437MHz		7251	42.08	-31.92	74	50.81	35.74	13.1	58.01	100	0	P	V
		4874	40.86	-33.14	74	53.47	34.22	11.9	59.29	100	0	P	H
		7311	42.24	-31.76	74	49.22	35.71	14.94	58.05	100	0	P	H
		4874	40.22	-33.78	74	52.83	34.22	11.9	59.29	100	0	P	V
802.11g CH 10 2457MHz		7311	42.62	-31.38	74	49.6	35.71	14.94	58.05	100	0	P	V
		4914	40.94	-33.06	74	54.74	34.22	10.66	59.24	100	0	P	H
		7371	41.65	-32.35	74	50.44	35.67	13.24	58.1	100	0	P	H
		4914	41.26	-32.74	74	55.06	34.22	10.66	59.24	100	0	P	V
802.11g CH 11 2462MHz		7371	42.36	-31.64	74	51.15	35.67	13.24	58.1	100	0	P	V
		4924	40.81	-33.19	74	53.38	34.21	11.87	59.21	100	0	P	H
		7386	42.52	-31.48	74	49.5	35.66	15.08	58.12	100	0	P	H
		4924	40.81	-33.19	74	53.38	34.21	11.87	59.21	100	0	P	V
802.11g CH 11 2462MHz		7386	42.47	-31.53	74	49.45	35.66	15.08	58.12	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



**2.4GHz 2400~2483.5MHz  
WIFI 802.11n HT20 (Band Edge @ 3m)**

WIFI Ant. 1+2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11n HT20 CH 01 2412MHz		2389.905	68.6	-5.4	74	53.47	31.95	8.24	35.05	231	307	P	H
		2390	52.37	-1.63	54	37.24	31.95	8.24	35.05	231	307	A	H
	*	2412	106.98	-	-	91.81	31.99	8.24	35.05	231	307	P	H
	*	2412	99.35	-	-	84.18	31.99	8.24	35.05	231	307	A	H
		2389.8	69.04	-4.96	74	53.91	31.95	8.24	35.05	400	238	P	V
		2389.8	53.7	-0.3	54	38.57	31.95	8.24	35.05	400	238	A	V
	*	2412	107.36	-	-	92.19	31.99	8.24	35.05	400	238	P	V
	*	2412	99.88	-	-	84.71	31.99	8.24	35.05	400	238	A	V
802.11n HT20 CH 02 2417MHz		2388.82	64.19	-9.81	74	49.85	31.95	7.44	35.04	229	313	P	H
		2389.94	53.01	-0.99	54	38.68	31.95	7.44	35.05	229	313	A	H
	*	2417	111.14	-	-	96.78	31.99	7.44	35.06	229	313	P	H
	*	2417	103.57	-	-	89.21	31.99	7.44	35.06	229	313	A	H
		2389.94	61.49	-12.51	74	47.16	31.95	7.44	35.05	375	266	P	V
		2389.94	50.08	-3.92	54	35.75	31.95	7.44	35.05	375	266	A	V
	*	2417	110.26	-	-	95.9	31.99	7.44	35.06	375	266	P	V
	*	2417	102.82	-	-	88.46	31.99	7.44	35.06	375	266	A	V
802.11n HT20 CH 06 2437MHz		2388.96	58.41	-15.59	74	43.27	31.95	8.24	35.04	224	311	P	H
		2389.94	47.07	-6.93	54	31.94	31.95	8.24	35.05	224	311	A	H
	*	2437	111.49	-	-	96.21	32.08	8.27	35.06	224	311	P	H
	*	2437	103.63	-	-	88.35	32.08	8.27	35.06	224	311	A	H
		2484.6	58.73	-15.27	74	43.35	32.16	8.3	35.07	224	311	P	H
		2483.5	47.27	-6.73	54	31.89	32.16	8.3	35.07	224	311	A	H
		2382.66	56.23	-17.77	74	41.13	31.91	8.24	35.04	390	270	P	V
		2389.38	46.44	-7.56	54	31.3	31.95	8.24	35.04	390	270	A	V
	*	2437	110.6	-	-	95.32	32.08	8.27	35.06	390	270	P	V
	*	2437	103.01	-	-	87.73	32.08	8.27	35.06	390	270	A	V
		2484.53	58.78	-15.22	74	43.4	32.16	8.3	35.07	390	270	P	V
	2483.9	46.69	-7.31	54	31.31	32.16	8.3	35.07	390	270	A	V	



<b>802.11n</b> <b>HT20</b> <b>CH 10</b> <b>2457MHz</b>	*	2457	109.52	-	-	94.97	32.12	7.5	35.06	200	316	P	H
	*	2457	102.03	-	-	87.48	32.12	7.5	35.06	200	316	A	H
		2485.54	66.9	-7.1	74	52.26	32.16	7.56	35.07	200	316	P	H
		2483.86	53.23	-0.77	54	38.59	32.16	7.56	35.07	200	316	A	H
	*	2457	108.03	-	-	93.48	32.12	7.5	35.06	393	266	P	V
	*	2457	100.37	-	-	85.82	32.12	7.5	35.06	393	266	A	V
		2484.16	67	-7	74	52.36	32.16	7.56	35.07	393	266	P	V
		2483.74	53.35	-0.65	54	38.71	32.16	7.56	35.07	393	266	A	V
<b>802.11n</b> <b>HT20</b> <b>CH 11</b> <b>2462MHz</b>	*	2462	106.27	-	-	90.92	32.12	8.3	35.06	201	332	P	H
	*	2462	98.41	-	-	83.06	32.12	8.3	35.06	201	332	A	H
		2483.76	66.26	-7.74	74	50.88	32.16	8.3	35.07	201	332	P	H
		2483.52	53.84	-0.16	54	38.46	32.16	8.3	35.07	201	332	A	H
	*	2462	104.15	-	-	88.8	32.12	8.3	35.06	400	288	P	V
	*	2462	96.58	-	-	81.23	32.12	8.3	35.06	400	288	A	V
		2483.56	67.17	-6.83	74	51.79	32.16	8.3	35.07	400	288	P	V
		2483.68	53.87	-0.13	54	38.49	32.16	8.3	35.07	400	288	A	V
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



**2.4GHz 2400~2483.5MHz**  
**WIFI 802.11n HT20 (Harmonic @ 3m)**

WIFI Ant. 1+2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11n HT20 CH 01 2412MHz		4804	41.42	-32.58	74	54.04	34.24	11.96	59.4	100	0	P	H
		4804	41.45	-32.55	74	54.07	34.24	11.96	59.4	100	0	P	V
802.11n HT20 CH 02 2417MHz		4834	40.16	-33.84	74	54.16	34.23	10.55	59.35	100	0	P	H
		7251	41.64	-32.36	74	50.37	35.74	13.1	58.01	100	0	P	H
		4834	40.43	-33.57	74	54.43	34.23	10.55	59.35	100	0	P	V
		7251	41.51	-32.49	74	50.24	35.74	13.1	58.01	100	0	P	V
802.11n HT20 CH 06 2437MHz		4874	40.92	-33.08	74	53.53	34.22	11.9	59.29	100	0	P	H
		7311	42.8	-31.2	74	49.78	35.71	14.94	58.05	100	0	P	H
		4874	40.68	-33.32	74	53.29	34.22	11.9	59.29	100	0	P	V
		7311	45.09	-28.91	74	52.07	35.71	14.94	58.05	100	0	P	V
802.11n HT20 CH 10 2457MHz		4914	41.08	-32.92	74	54.88	34.22	10.66	59.24	100	0	P	H
		7371	42.38	-31.62	74	51.17	35.67	13.24	58.1	100	0	P	H
		4914	40.47	-33.53	74	54.27	34.22	10.66	59.24	100	0	P	V
		7371	41.46	-32.54	74	50.25	35.67	13.24	58.1	100	0	P	V
802.11n HT20 CH 11 2462MHz		4924	40.97	-33.03	74	53.54	34.21	11.87	59.21	100	0	P	H
		7386	42.08	-31.92	74	49.06	35.66	15.08	58.12	100	0	P	H
		4924	40.95	-33.05	74	53.52	34.21	11.87	59.21	100	0	P	V
		7386	43.58	-30.42	74	50.56	35.66	15.08	58.12	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



**2.4GHz 2400~2483.5MHz  
WIFI 802.11n HT40 (Band Edge @ 3m)**

WIFI Ant. 1+2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11n HT40 CH 03 2422MHz		2389.24	63.8	-10.2	74	48.66	31.95	8.24	35.04	200	298	P	H
		2389.24	53.71	-0.29	54	38.57	31.95	8.24	35.04	200	298	A	H
	*	2422	103.88	-	-	88.65	32.03	8.27	35.06	200	298	P	H
	*	2422	96.34	-	-	81.11	32.03	8.27	35.06	200	298	A	H
		2497.27	55.87	-18.13	74	40.46	32.2	8.3	35.08	200	298	P	H
		2488.59	46.58	-7.42	54	31.16	32.2	8.3	35.07	200	298	A	H
		2387.42	61.74	-12.26	74	46.6	31.95	8.24	35.04	387	274	P	V
		2387.28	50.3	-3.7	54	35.16	31.95	8.24	35.04	387	274	A	V
	*	2422	102.66	-	-	87.43	32.03	8.27	35.06	387	274	P	V
	*	2422	94.86	-	-	79.63	32.03	8.27	35.06	387	274	A	V
		2492.79	55.46	-18.54	74	40.05	32.2	8.3	35.08	387	274	P	V
		2489.43	46.3	-7.7	54	30.88	32.2	8.3	35.07	387	274	A	V
802.11n HT40 CH 06 2437MHz		2389.24	57.74	-16.26	74	42.6	31.95	8.24	35.04	201	312	P	H
		2389.24	48.58	-5.42	54	33.44	31.95	8.24	35.04	201	312	A	H
	*	2437	102.62	-	-	87.34	32.08	8.27	35.06	201	312	P	H
	*	2437	95.03	-	-	79.75	32.08	8.27	35.06	201	312	A	H
		2484.25	64.69	-9.31	74	49.31	32.16	8.3	35.07	201	312	P	H
		2483.55	53.84	-0.16	54	38.46	32.16	8.3	35.07	201	312	A	H
		2389.38	55.63	-18.37	74	40.49	31.95	8.24	35.04	381	278	P	V
		2389.38	46.81	-7.19	54	31.67	31.95	8.24	35.04	381	278	A	V
	*	2437	101.77	-	-	86.49	32.08	8.27	35.06	381	278	P	V
	*	2437	94.25	-	-	78.97	32.08	8.27	35.06	381	278	A	V
		2483.52	60.63	-13.37	74	45.99	32.16	7.56	35.07	381	278	P	V
		2483.69	50.98	-3.02	54	35.6	32.16	8.3	35.07	381	278	A	V



<b>802.11n</b>  <b>HT40</b>  <b>CH 09</b>  <b>2452MHz</b>		2385.74	55.01	-18.99	74	39.87	31.95	8.24	35.04	200	314	P	H
		2361.94	45.94	-8.06	54	30.85	31.87	8.26	35.03	200	314	A	H
	*	2452	101.15	-	-	85.87	32.08	8.27	35.06	200	314	P	H
	*	2452	93.66	-	-	78.38	32.08	8.27	35.06	200	314	A	H
		2488.66	62.55	-11.45	74	47.13	32.2	8.3	35.07	200	314	P	H
		2483.69	53.42	-0.58	54	38.04	32.16	8.3	35.07	200	314	A	H
		2358.02	55.28	-18.72	74	40.19	31.87	8.26	35.03	387	268	P	V
		2374.68	45.92	-8.08	54	30.8	31.91	8.26	35.04	387	268	A	V
	*	2452	98.61	-	-	83.33	32.08	8.27	35.06	387	268	P	V
	*	2452	91.33	-	-	76.05	32.08	8.27	35.06	387	268	A	V
		2484.46	58.97	-15.03	74	43.59	32.16	8.3	35.07	387	268	P	V
		2483.52	49.39	-4.61	54	34.01	32.16	8.3	35.07	387	268	A	V
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



**2.4GHz 2400~2483.5MHz**  
**WIFI 802.11n HT40 (Harmonic @ 3m)**

WIFI Ant. 1+2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11n		4844	40.59	-33.41	74	53.21	34.23	11.93	59.35	100	0	P	H
HT40		7266	43.29	-30.71	74	50.28	35.73	14.87	58.02	100	0	P	H
CH 03		4844	41.21	-32.79	74	53.83	34.23	11.93	59.35	100	0	P	V
2422MHz		7266	43.72	-30.28	74	50.71	35.73	14.87	58.02	100	0	P	V
802.11n		4874	41.48	-32.52	74	54.09	34.22	11.9	59.29	100	0	P	H
HT40		7311	43.18	-30.82	74	50.16	35.71	14.94	58.05	100	0	P	H
CH 06		4874	41.92	-32.08	74	54.53	34.22	11.9	59.29	100	0	P	V
2437MHz		7311	43.15	-30.85	74	50.13	35.71	14.94	58.05	100	0	P	V
802.11n		4904	40.22	-33.78	74	52.81	34.22	11.87	59.24	100	0	P	H
HT40		7356	42.06	-31.94	74	49.05	35.68	15.01	58.09	100	0	P	H
CH 09		4904	40.98	-33.02	74	53.57	34.22	11.87	59.24	100	0	P	V
2452MHz		7356	42.35	-31.65	74	49.34	35.68	15.01	58.09	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
2.4GHz 802.11n HT20 LF		94.8	26.28	-17.22	43.5	40.41	15.21	2.11	31.56	-	-	P	H
		159.6	30.75	-12.75	43.5	42.86	16.57	2.62	31.49	-	-	P	H
		177.42	33.83	-9.67	43.5	47.39	15.13	2.62	31.48	100	0	P	H
		331.5	28.82	-17.18	46	36.73	19.78	3.43	31.25	-	-	P	H
		474.3	29.81	-16.19	46	33.18	23.42	4.07	31.02	-	-	P	H
		846.7	33.89	-12.11	46	30.34	28.68	5.2	30.56	-	-	P	H
		32.43	30.97	-9.03	40	37.56	23.08	1.71	31.39	100	0	P	V
		94.8	25.91	-17.59	43.5	40.04	15.21	2.11	31.56	-	-	P	V
		175.53	27.43	-16.07	43.5	40.89	15.22	2.62	31.48	-	-	P	V
		828.5	32.8	-13.2	46	29.87	28.09	5.2	30.57	-	-	P	V
		869.8	34.28	-11.72	46	30.33	28.97	5.27	30.54	-	-	P	V
	934.9	34.64	-11.36	46	29.87	29.66	5.33	30.52	-	-	P	V	
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



**Note symbol**

*	<b>Fundamental Frequency</b> which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is <b>over limit</b> line.
P/A	<b>Peak</b> or <b>Average</b>
H/V	<b>Horizontal</b> or <b>Vertical</b>



A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

- Level(dBμV/m) =  
Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
- Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

**For Peak Limit @ 2390MHz:**

- Level(dBμV/m)  
= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)  
= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)  
= 55.45 (dBμV/m)
- Over Limit(dB)  
= Level(dBμV/m) – Limit Line(dBμV/m)  
= 55.45(dBμV/m) – 74(dBμV/m)  
= -18.55(dB)

**For Average Limit @ 2390MHz:**

- Level(dBμV/m)  
= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)  
= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)  
= 43.54 (dBμV/m)
- Over Limit(dB)  
= Level(dBμV/m) – Limit Line(dBμV/m)  
= 43.54(dBμV/m) – 54(dBμV/m)  
= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.



## Appendix C. Duty Cycle Plots

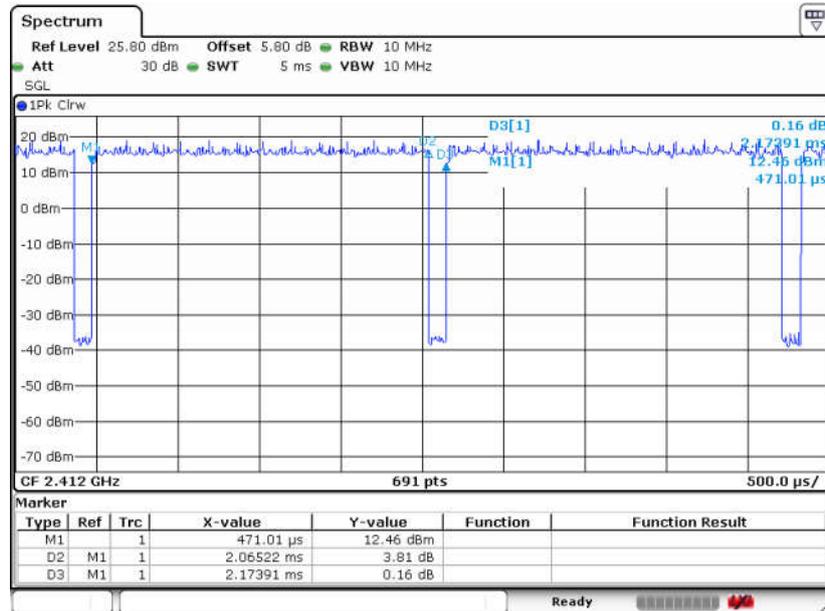
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	100	-	-	10Hz
802.11g	95.00	2.065	0.484	1kHz
802.11n HT20	94.66	1.928	0.519	1kHz
802.11n HT40	90.35	0.949	1.053	3kHz



802.11b

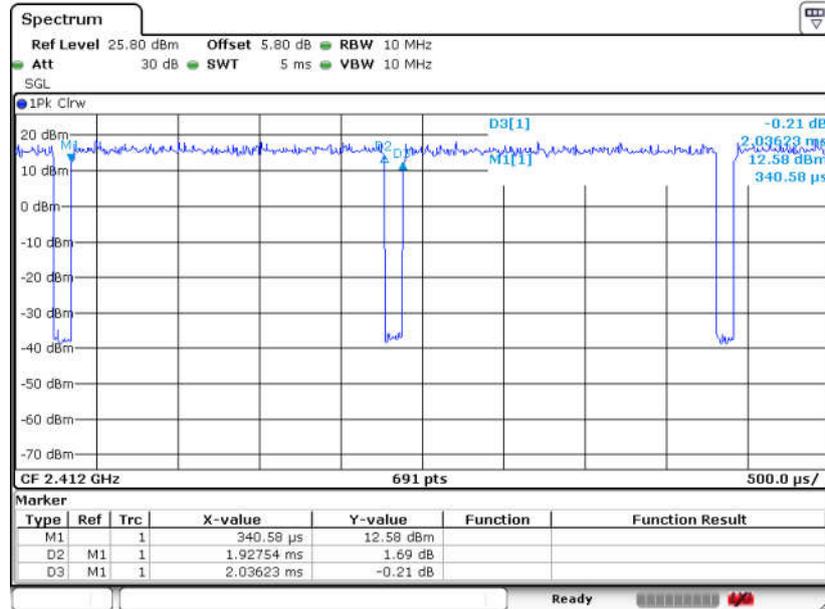


802.11g





802.11n HT20



802.11n HT40

