



# FCC RADIO TEST REPORT

**FCC ID** : 2AGOZ-H38W  
**Equipment** : Portal Go  
**Brand Name** : FACEBOOK  
**Model Name** : TN49KC  
**Applicant** : Facebook Technologies, LLC  
1 Hacker Way, Menlo Park, CA 94025, USA  
**Standard** : FCC Part 15 Subpart C §15.247

The product was received on May 04, 2021 and testing was started from May 05, 2021 and completed on Aug. 19, 2021. We, Sporton International Inc. EMC & Wireless Communications Laboratory, 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.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Louis Wu

**Sporton International Inc. EMC & Wireless Communications Laboratory**

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)



## Table of Contents

<b>History of this test report.....</b>	<b>3</b>
<b>Summary of Test Result.....</b>	<b>4</b>
<b>1 General Description .....</b>	<b>5</b>
1.1 Product Feature of Equipment Under Test.....	5
1.2 Modification of EUT .....	5
1.3 Testing Location .....	6
1.4 Applicable Standards.....	6
<b>2 Test Configuration of Equipment Under Test .....</b>	<b>7</b>
2.1 Carrier Frequency and Channel .....	7
2.2 Test Mode.....	7
2.3 Connection Diagram of Test System.....	8
2.4 Support Unit used in test configuration and system .....	8
2.5 EUT Operation Test Setup .....	9
2.6 Measurement Results Explanation Example.....	9
<b>3 Test Result .....</b>	<b>10</b>
3.1 6dB and 99% Bandwidth Measurement .....	10
3.2 Output Power Measurement.....	12
3.3 Power Spectral Density Measurement .....	13
3.4 Conducted Band Edges and Spurious Emission Measurement .....	15
3.5 Radiated Band Edges and Spurious Emission Measurement .....	34
3.6 AC Conducted Emission Measurement.....	39
3.7 Antenna Requirements .....	41
<b>4 List of Measuring Equipment.....</b>	<b>42</b>
<b>5 Uncertainty of Evaluation .....</b>	<b>44</b>
<b>Appendix A. Conducted Test Results</b>	
<b>Appendix B. AC Conducted Emission Test Result</b>	
<b>Appendix C. Radiated Spurious Emission</b>	
<b>Appendix D. Radiated Spurious Emission Plots</b>	
<b>Appendix E. Duty Cycle Plots</b>	
<b>Appendix F. Setup Photographs</b>	





## Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.247(a)(2)	6dB Bandwidth	Pass	-
3.1	2.1049	99% Occupied Bandwidth	Reporting only	-
3.2	15.247(b)	Power Output Measurement	Pass	-
3.3	15.247(e)	Power Spectral Density	Pass	-
3.4	15.247(d)	Conducted Band Edges	Pass	-
		Conducted Spurious Emission	Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	Pass	Under limit 1.19 dB at 2390.000 MHz
3.6	15.207	AC Conducted Emission	Pass	Under limit 13.80 dB at 0.501 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	Pass	-

**Declaration of Conformity:**

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

**Comments and Explanations:**

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

**Reviewed by: Danny Lee**

**Report Producer: Vivian Hsu**



# 1 General Description

## 1.1 Product Feature of Equipment Under Test

Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n and Wi-Fi 5GHz 802.11a/n/ac.

Product Specification subjective to this standard	
Antenna Type	WLAN: <Main>: Monopole Antenna <Aux.>: PIFA Antenna Bluetooth: PIFA Antenna

Antenna information		
2400 MHz ~ 2483.5 MHz	Peak Gain (dBi)	Main: 3.69 Aux.: 2.96

**Remark:** The above EUT's information was declared by manufacturer. Please refer to Comments and Explanations in report summary.

## 1.2 Modification of EUT

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



### 1.3 Testing Location

<b>Test Site</b>	Sporton International Inc. EMC & Wireless Communications Laboratory
<b>Test Site Location</b>	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
<b>Test Site No.</b>	<b>Sporton Site No.</b> TH02-HY, CO05-HY

**Note:** The test site complies with ANSI C63.4 2014 requirement.

<b>Test Site</b>	Sporton International Inc. Wensan Laboratory
<b>Test Site Location</b>	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
<b>Test Site No.</b>	<b>Sporton Site No.</b> 03CH11-HY (TAF Code: 3786)
<b>Remark</b>	The Radiated Spurious Emissions test item subcontracted to Sporton International Inc. Wensan Laboratory

**Note:** The test site complies with ANSI C63.4 2014 requirement.

FCC designation No.: TW1190 and TW3786

### 1.4 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 v05r02
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01.
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ♦ 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. The TAF code is not including all the FCC KDB listed without accreditation.
3. 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

- a. 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: conduction emission (150 kHz to 30 MHz), radiation 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 (Z plane) were recorded in this report.
  
- b. AC power line Conducted Emission was tested under maximum output power.

### 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 modes are considering the modulation and worse data rates as below table.

#### MIMO Antenna

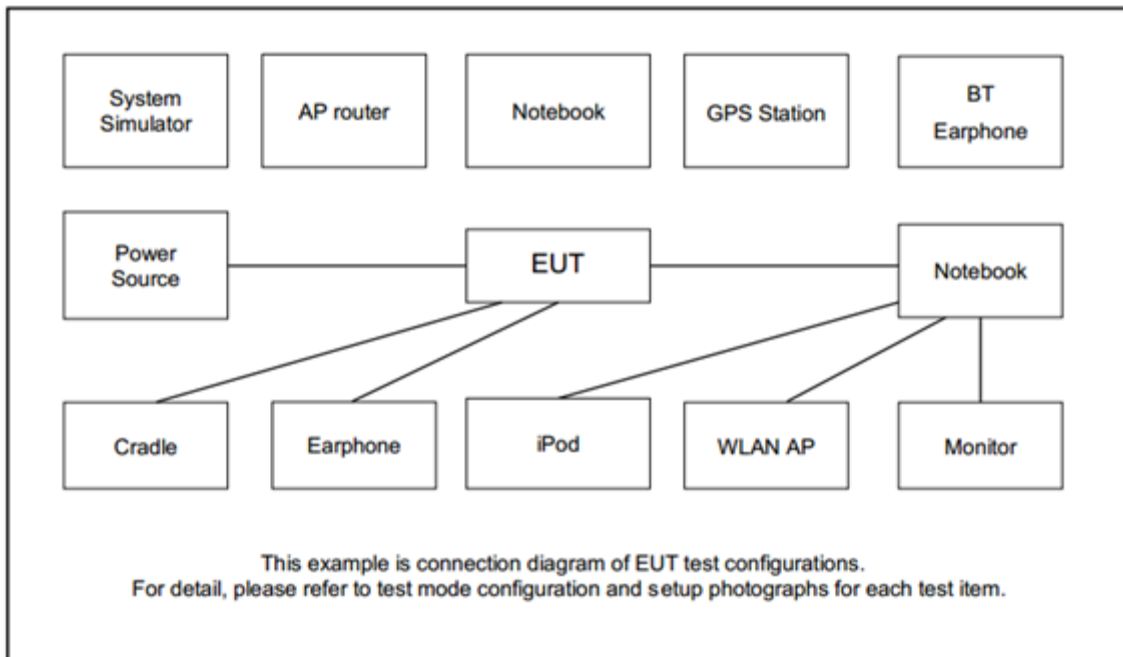
Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0

Test Cases	
AC Conducted Emission	Mode 1 :WLAN (2.4GHz) Link + Bluetooth Link + H-Pattern + Docking (Charging from AC Adapter)

Ch. #	2400-2483.5 MHz		
	802.11b	802.11g	802.11n HT20
Low	01	01	01
Middle	06	06	06
High	11	11	11

**Remark:** For radiation spurious emission, the final modulation and the worst data rate was reference the max RF conducted power.

### 2.3 Connection Diagram of Test System



### 2.4 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
2.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8 m
3.	Notebook	DELL	Latitude 3400	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m





## 2.5 EUT Operation Test Setup

The RF test items, utility “QRCT Ver.4.0.00113” was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

## 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 and attenuator factor 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 and attenuator factor.

*Offset = RF cable loss + attenuator factor.*

Following shows an offset computation example with cable loss 4.2 dB and 10 dB attenuator.

$$\begin{aligned} \text{Offset}(dB) &= \text{RF cable loss}(dB) + \text{attenuator factor}(dB). \\ &= 4.2 + 10 = 14.2 \text{ (dB)} \end{aligned}$$

### 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

See list of measuring equipment of this test report.

##### 3.1.3 Test Procedures

1. The testing follows the ANSI C63.10 Section 6.9.3 (OBW) and 11.8.1 (6dB BW).
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 the maximum power setting and enable the EUT to 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) is set 1-5% of the emission bandwidth and set the Video bandwidth (VBW)  $\geq 3 * RBW$ .
6. Measure and record the results in the test report.

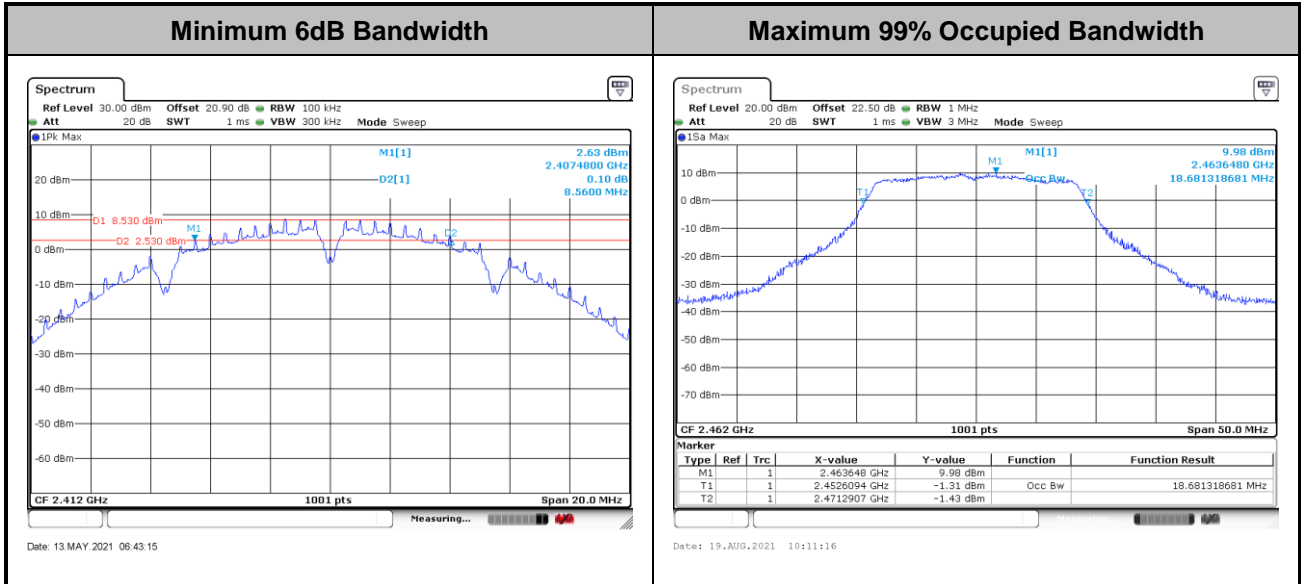
##### 3.1.4 Test Setup





### 3.1.5 Test Result of 6dB 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 2400-2483.5 MHz, the limit for output power is 30 dBm. If transmitting antenna with directional gain greater than 6 dBi is 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 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

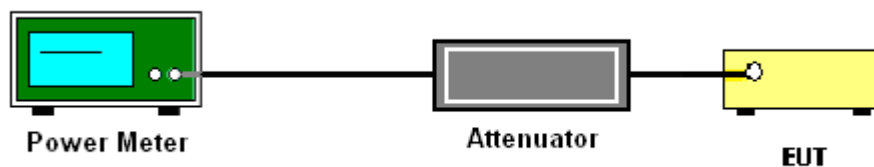
### 3.2.2 Measuring Instruments

See list of measuring equipment of this test report.

### 3.2.3 Test Procedures

1. For Average Power, the testing follows ANSI C63.10 Section 11.9.2.3.2 Method AVGPM-G
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 the maximum power setting and enable the EUT to transmit continuously.
4. Measure the conducted output power and record the results in the test report.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

### 3.2.4 Test Setup



### 3.2.5 Test Result of Average Output Power

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 8 dBm in any 3 kHz band at any time interval of continuous transmission.

#### **3.3.2 Measuring Instruments**

See list of measuring equipment of this test report.

#### **3.3.3 Test Procedures**

1. The testing follows the ANSI C63.10 Section 11.10.2 Method PKPSD.
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 the maximum power setting and enable the EUT to 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.
7. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

If measurements performed using method (2) plus  $10 \log(N)$  exceeds the emission limit, the test should choose method (1) before declaring that the device fails the emission limit.

Method (1): Measure and sum the spectra across the outputs.

The total final Power Spectral Density is from a device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points, the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

Method (2): Measure and add  $10 \log(N)$  dB, where N is the number of outputs. (N=2)



## 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.

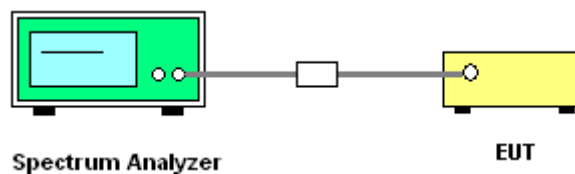
### 3.4.2 Measuring Instruments

See list of measuring equipment of this test report.

### 3.4.3 Test Procedures

1. The testing follows the ANSI C63.10 Section 11.11.3 Emission level measurement.
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 the maximum power setting and enable the EUT to 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 per 15.247(d).
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





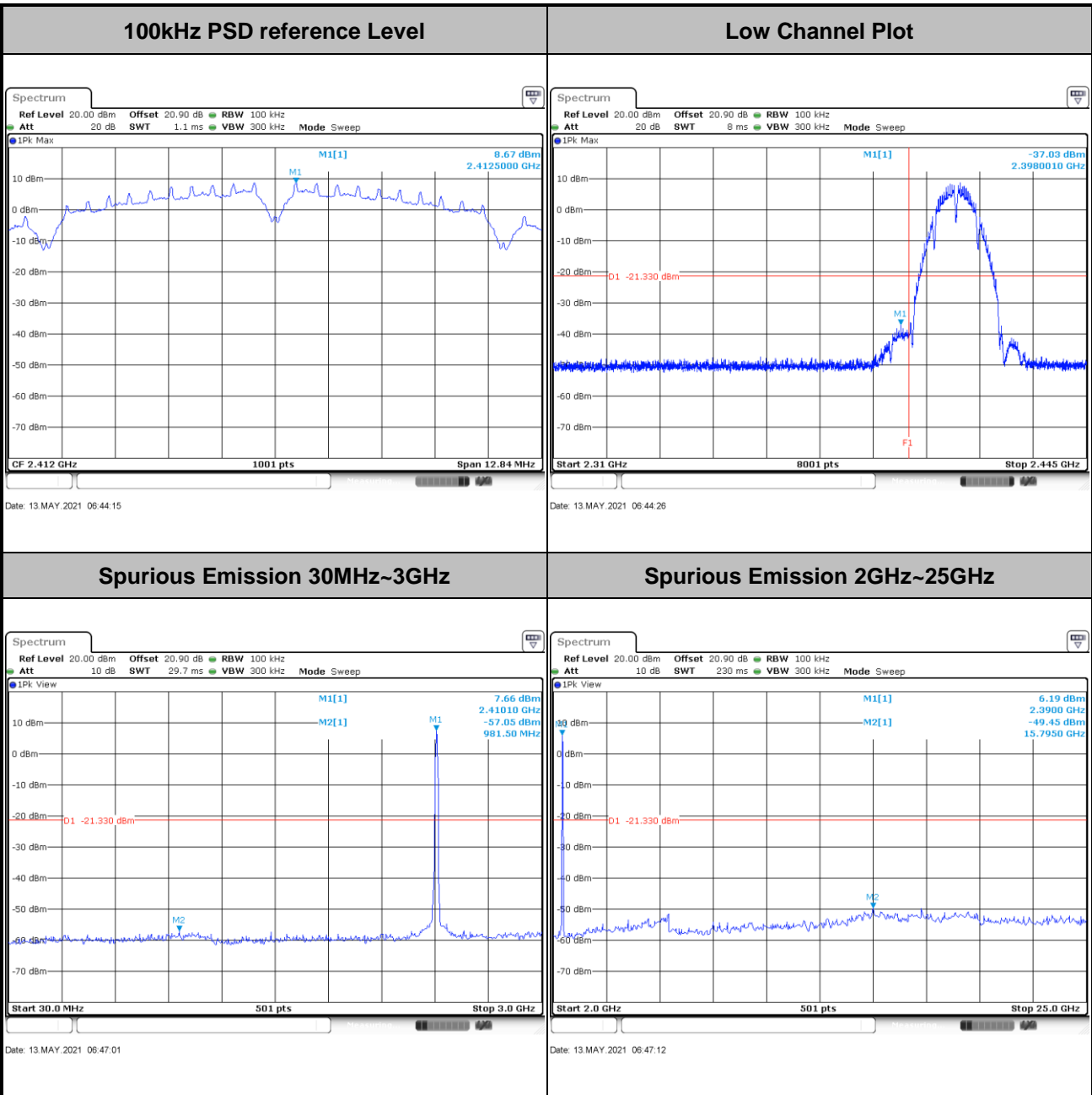
### 3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Test Engineer : Luffy Lin	Temperature :	23.7~24°C
	Relative Humidity :	51~54%

Remark: For Conducted Test Items, Ant. 1 means Aux. Antenna and Ant. 2 means Main Antenna.

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

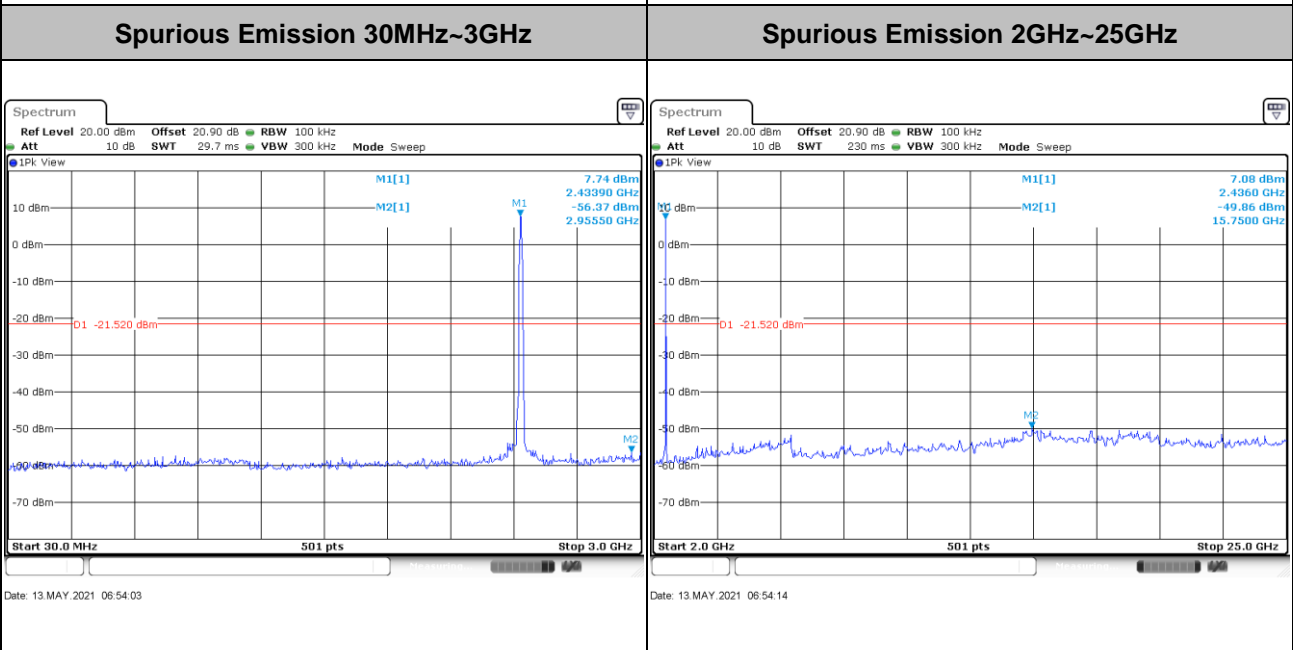
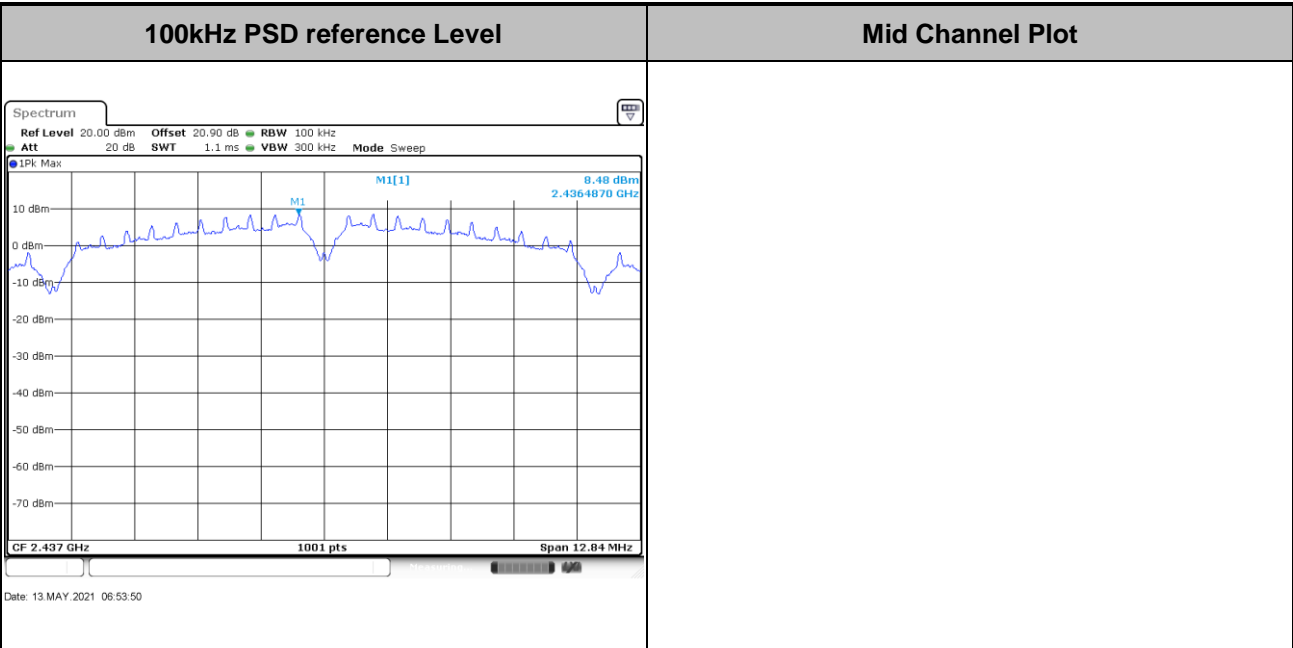
Test Mode :	802.11b	Test Channel :	01
-------------	---------	----------------	----





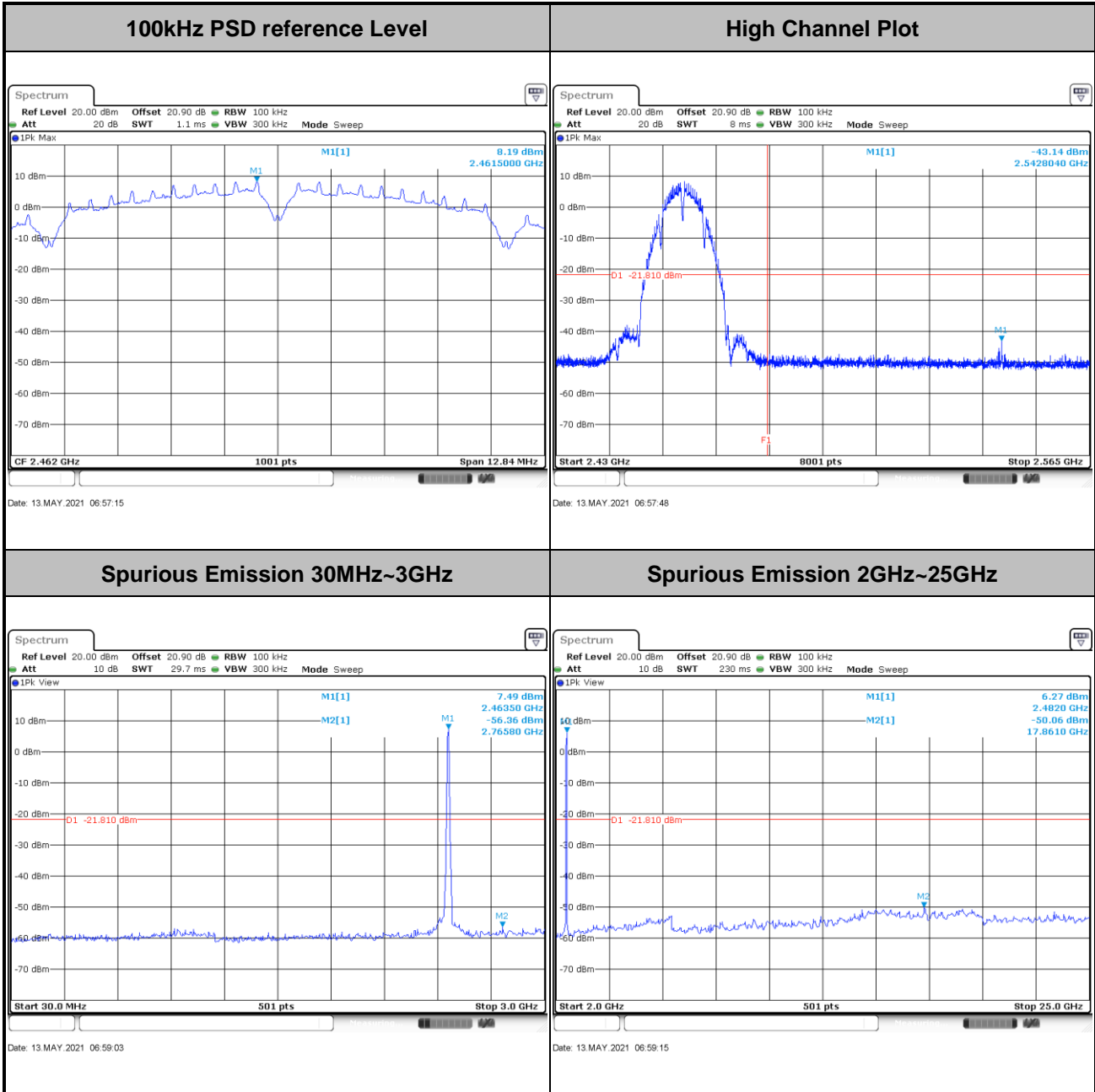


Test Mode :	802.11b	Test Channel :	06
-------------	---------	----------------	----



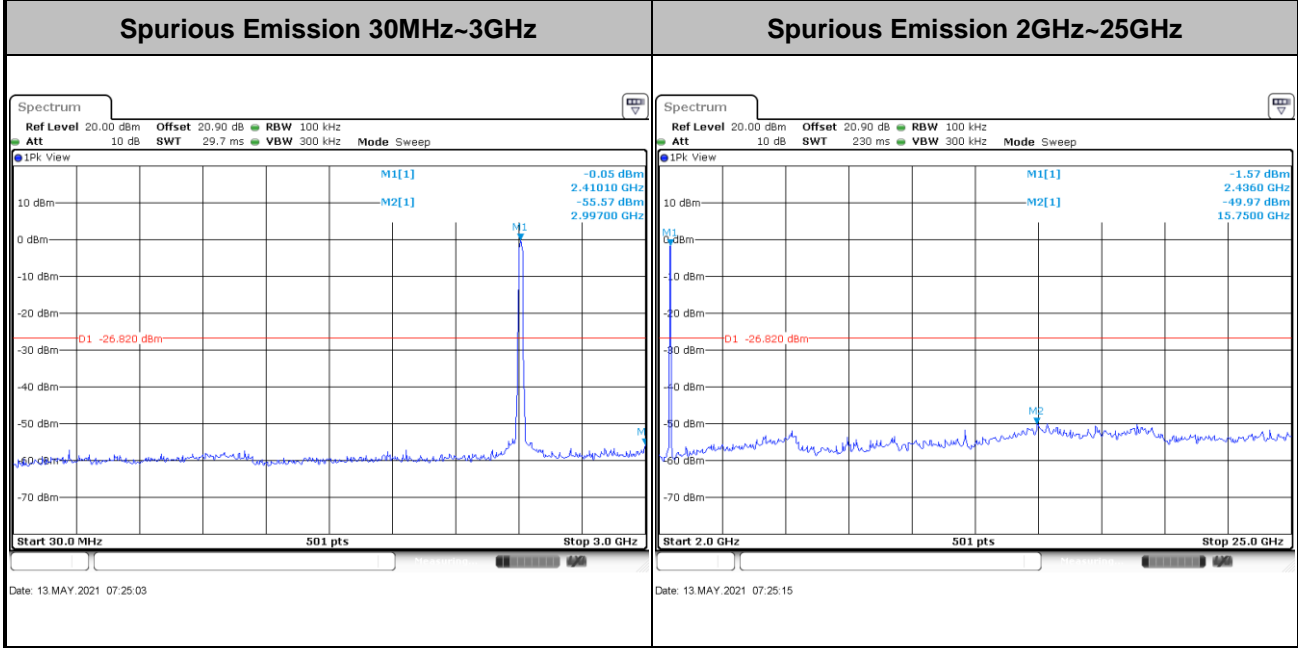
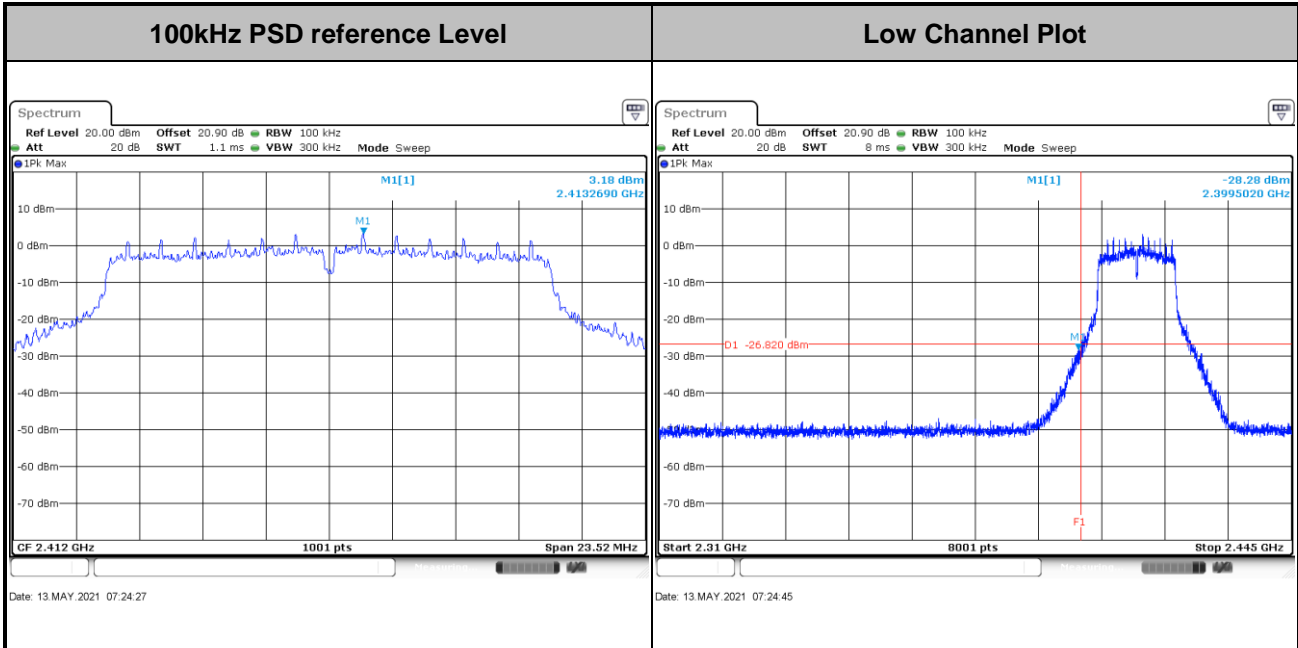


Test Mode :	802.11b	Test Channel :	11
-------------	---------	----------------	----



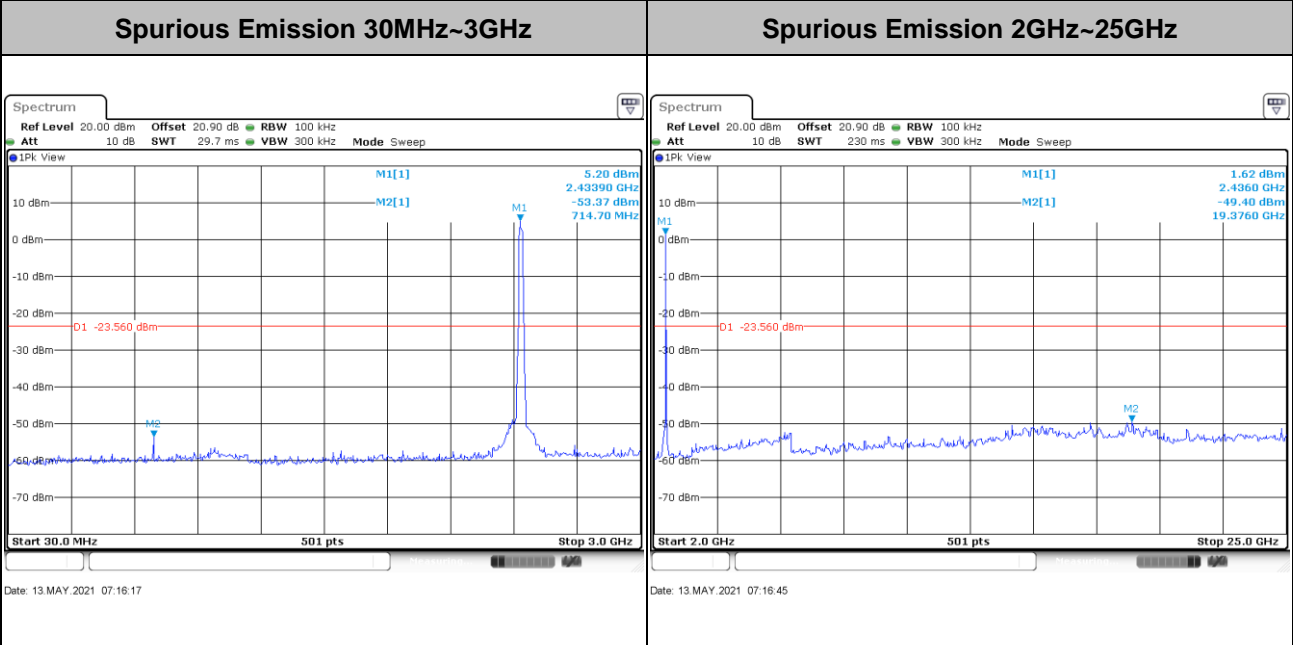
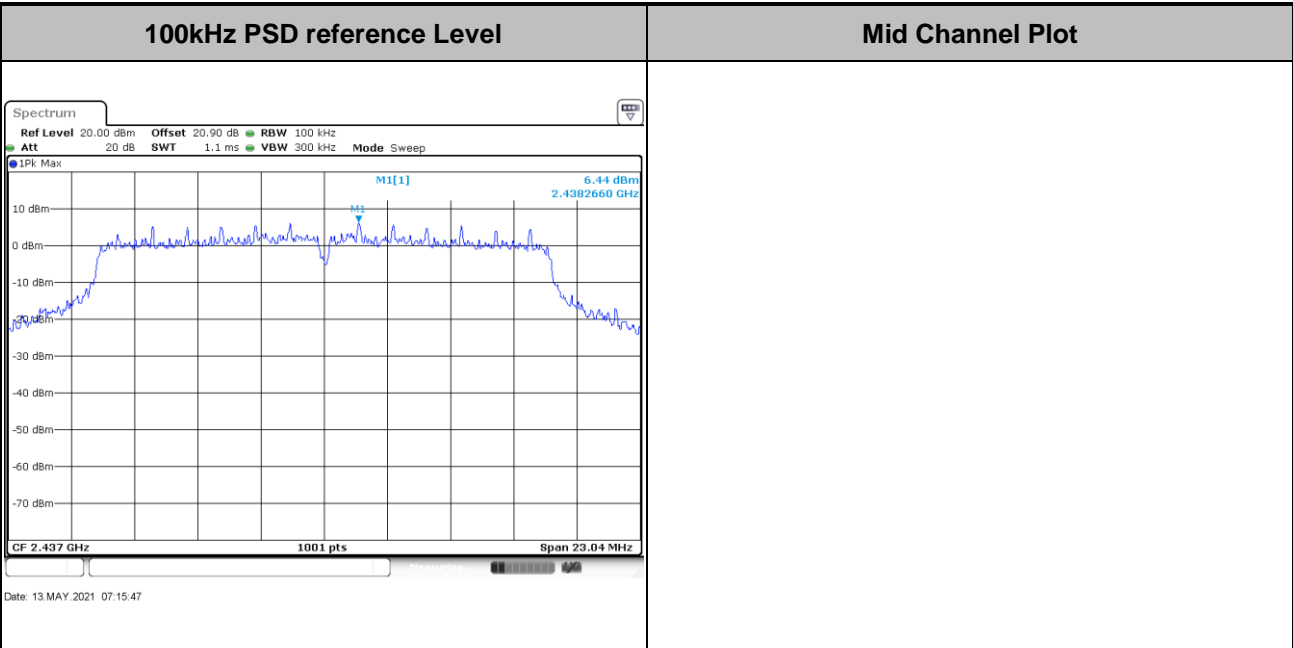


Test Mode :	802.11g	Test Channel :	01
-------------	---------	----------------	----



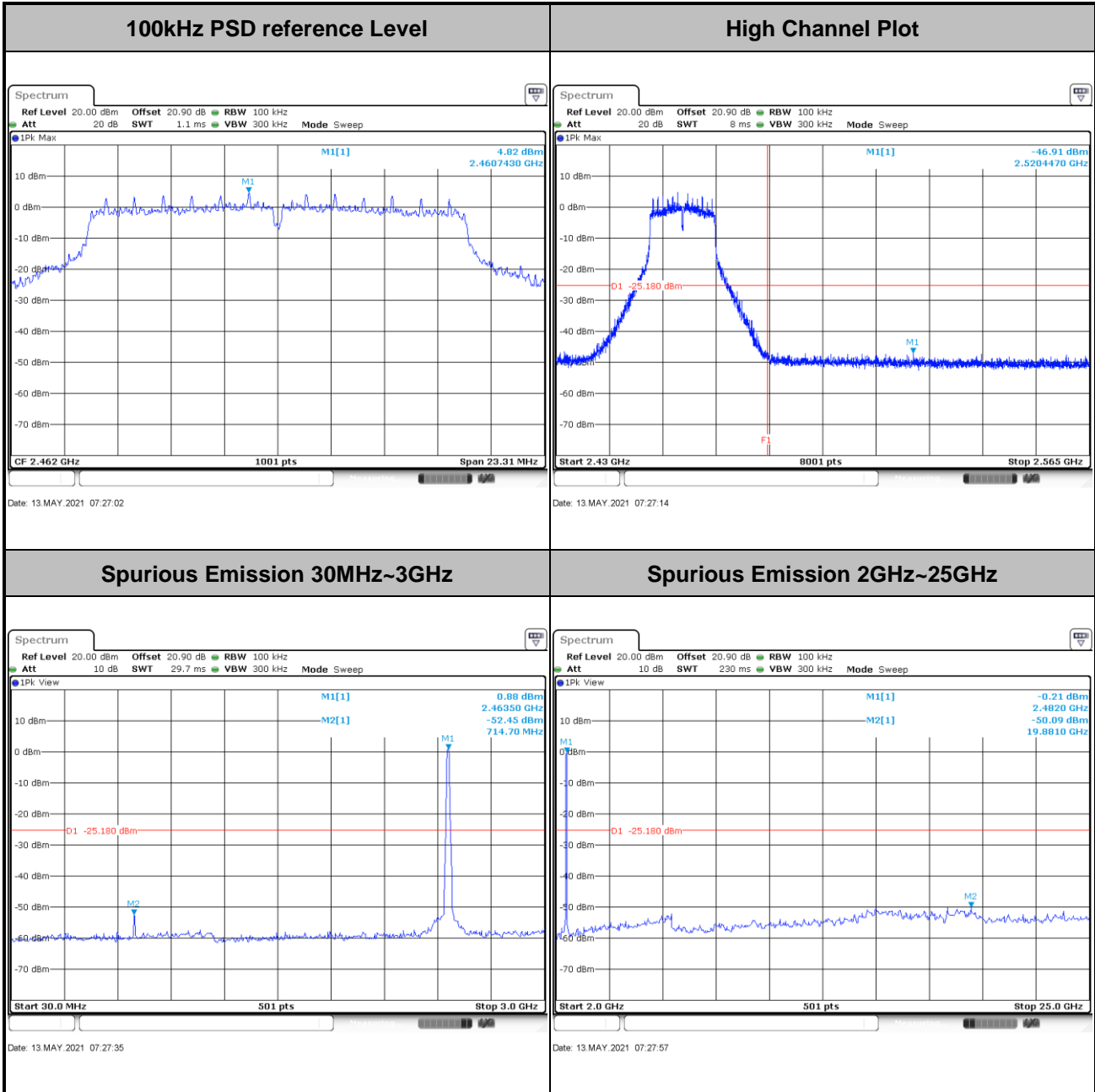


Test Mode :	802.11g	Test Channel :	06
-------------	---------	----------------	----



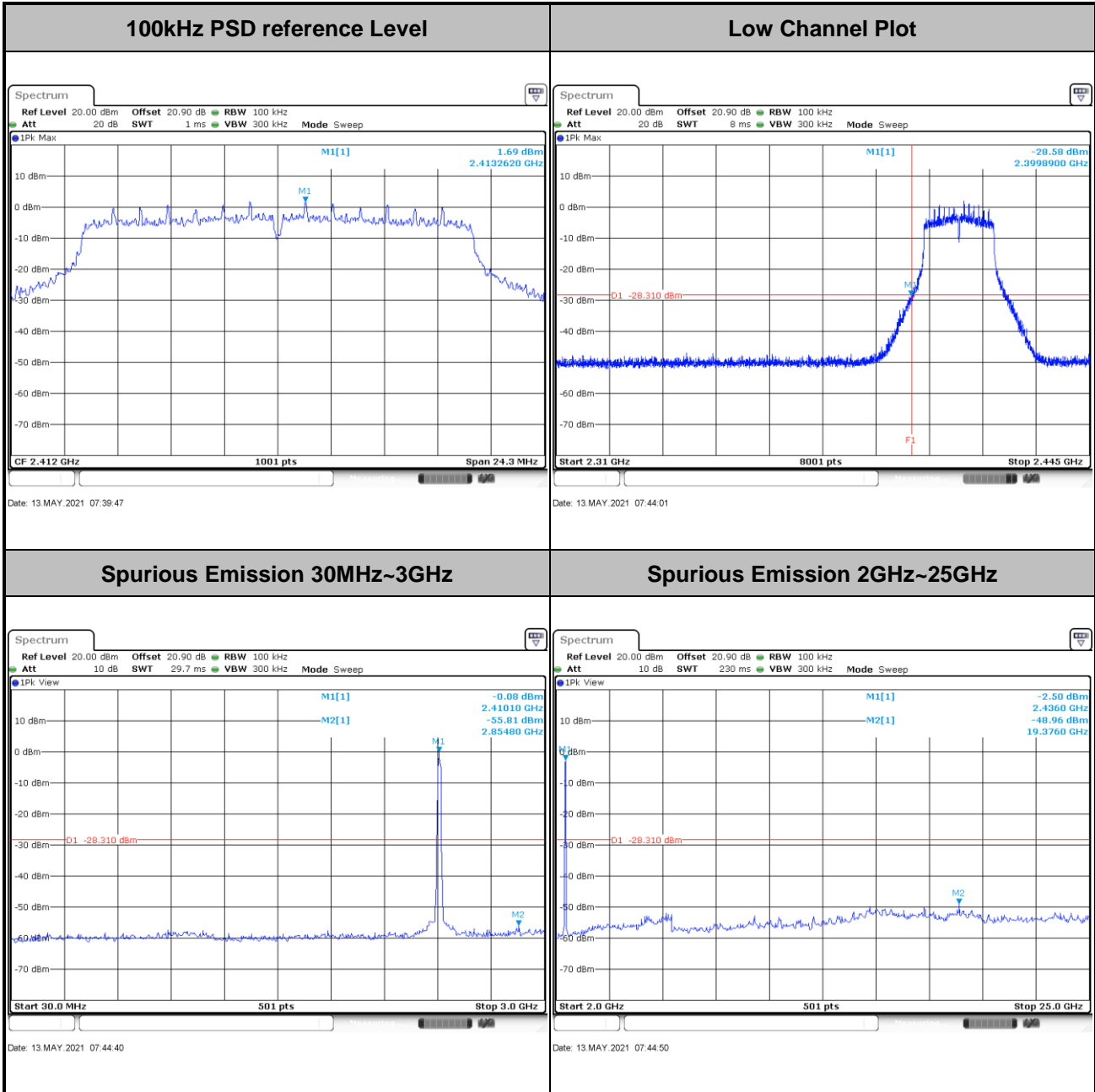


Test Mode :	802.11g	Test Channel :	11
-------------	---------	----------------	----



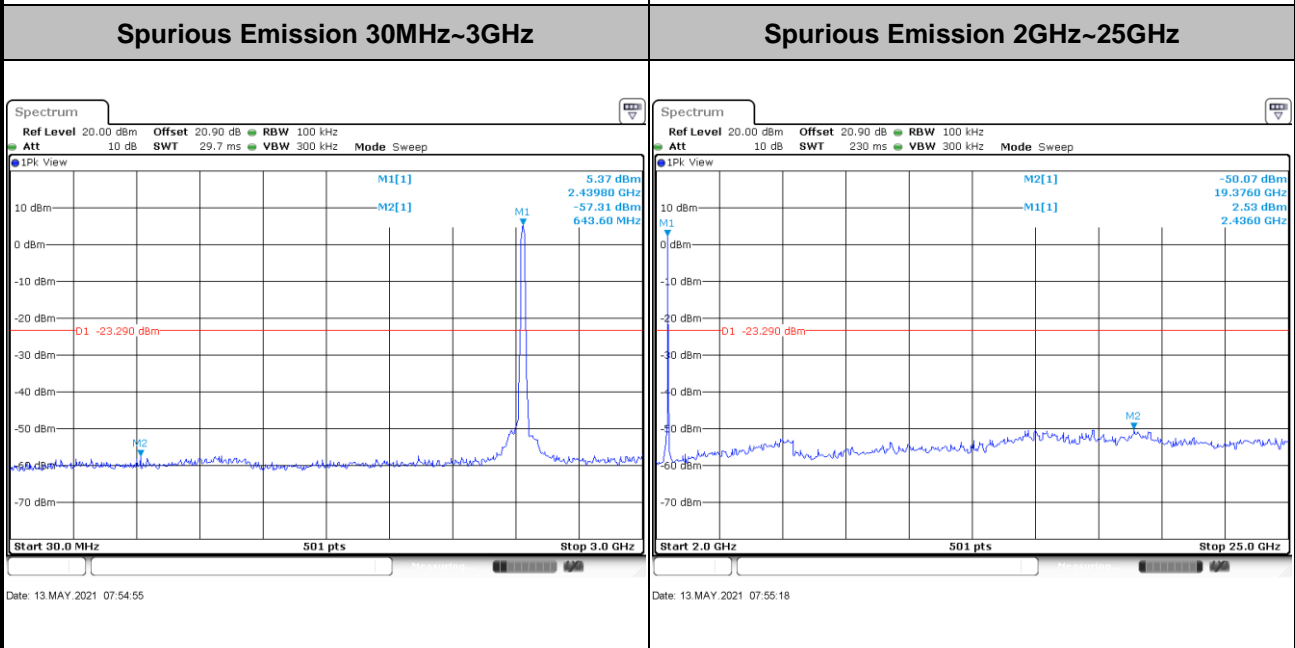
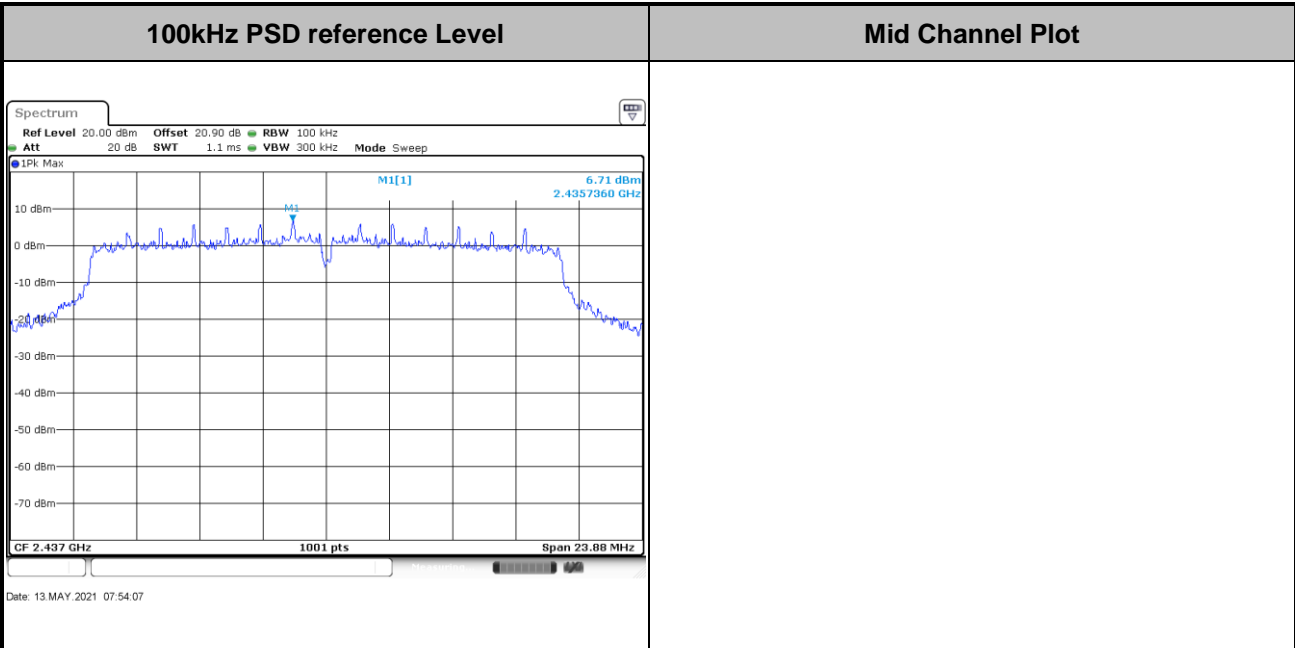


Test Mode :	802.11n HT20	Test Channel :	01
-------------	--------------	----------------	----



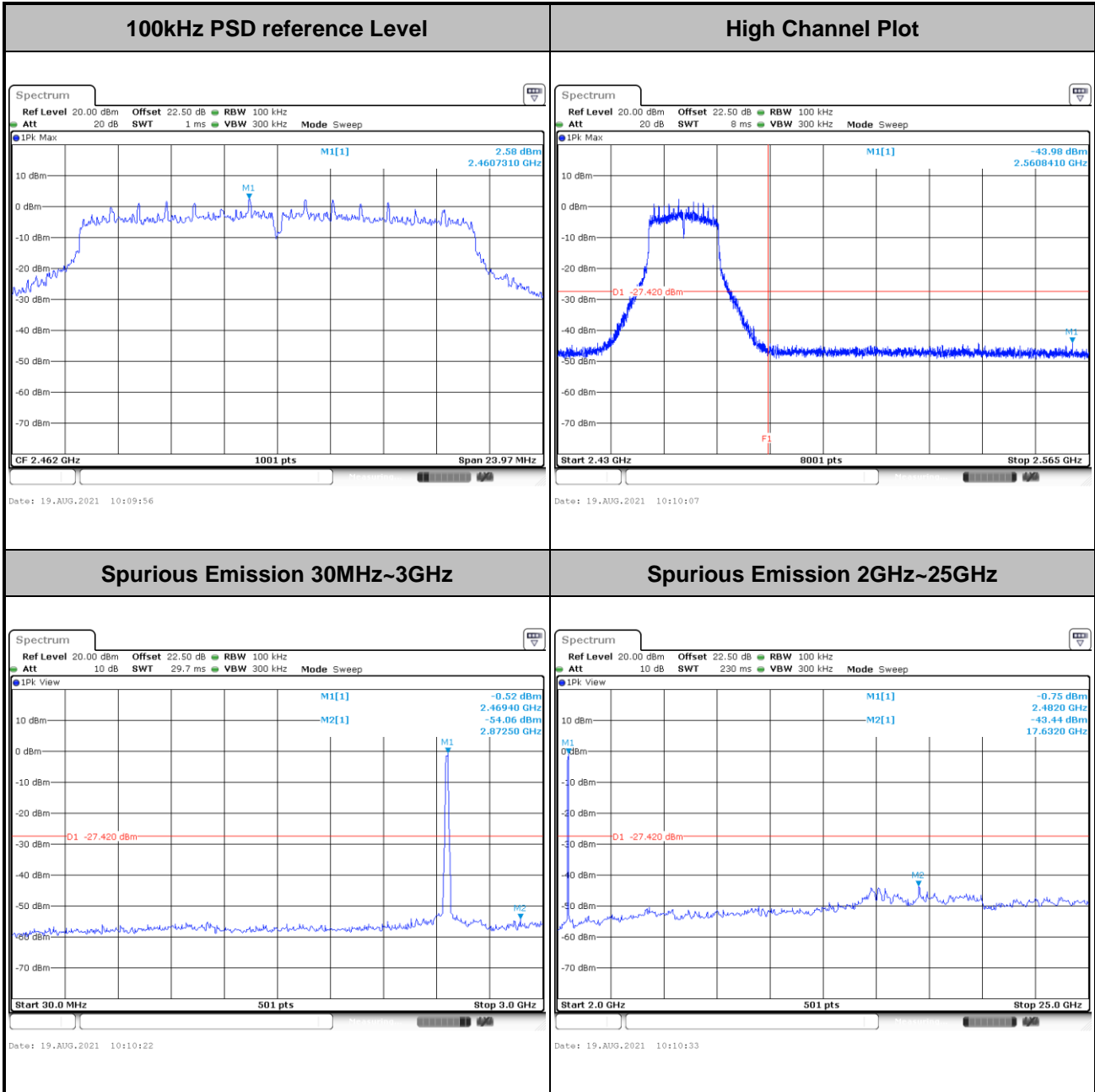


Test Mode :	802.11n HT20	Test Channel :	06
-------------	--------------	----------------	----





Test Mode :	802.11n HT20	Test Channel :	11
-------------	--------------	----------------	----

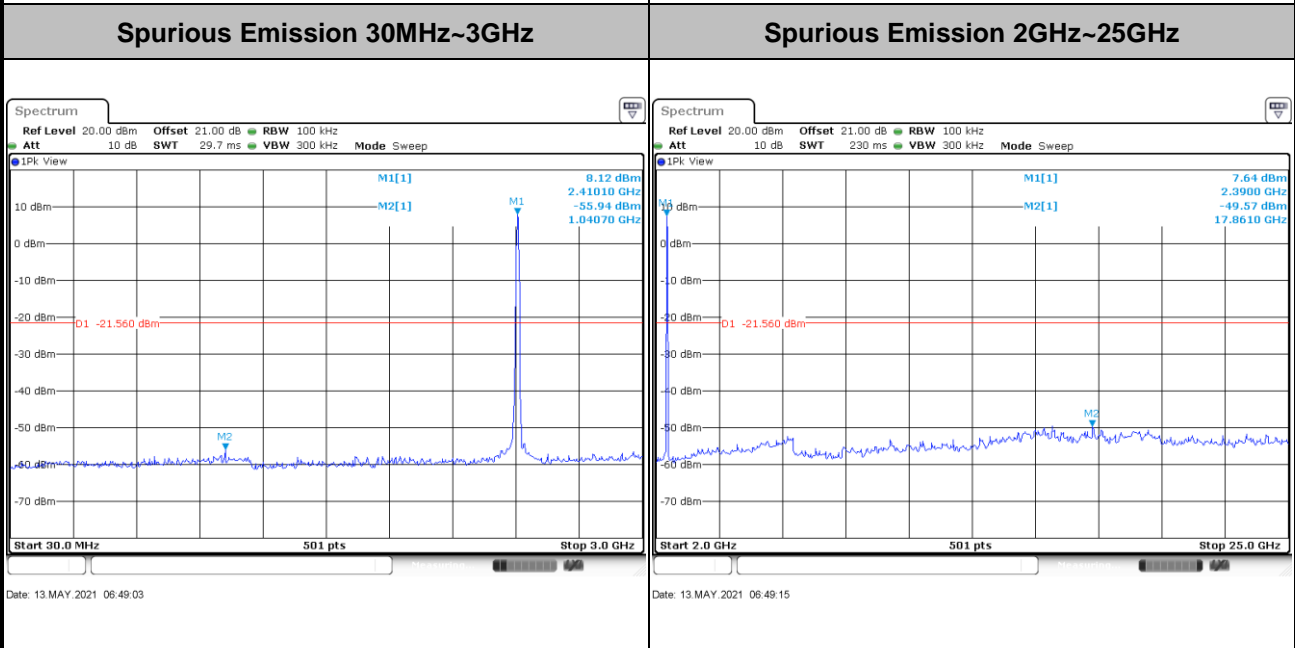
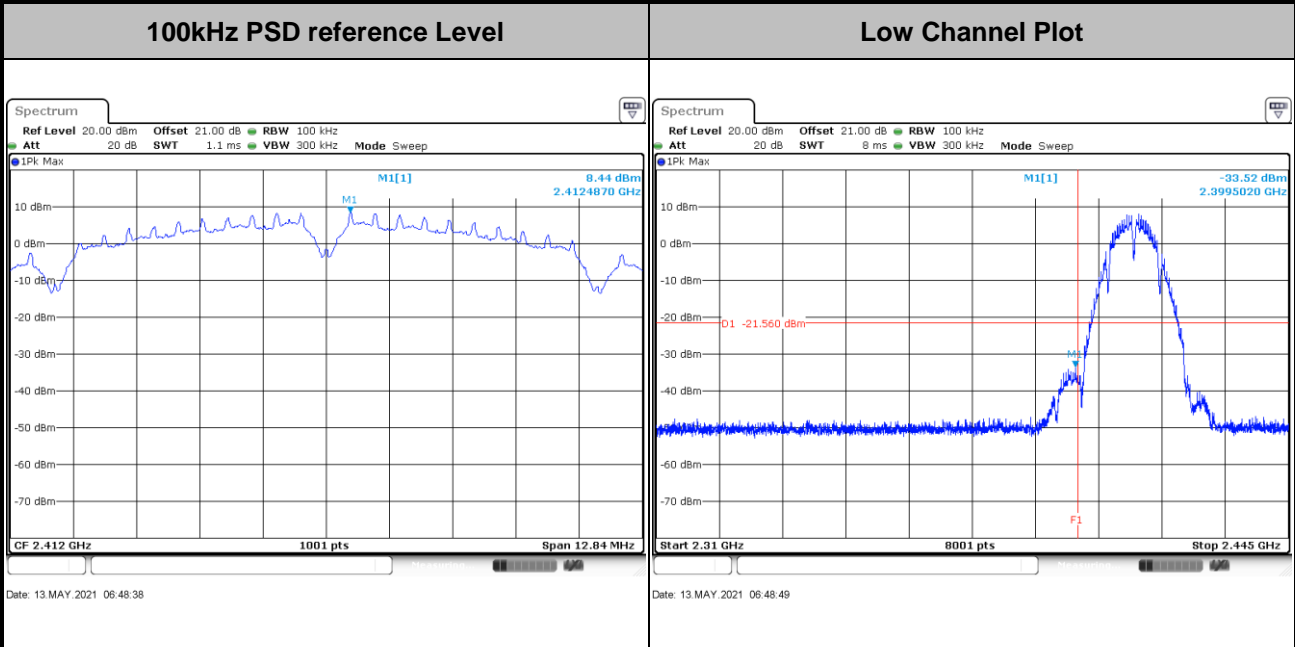






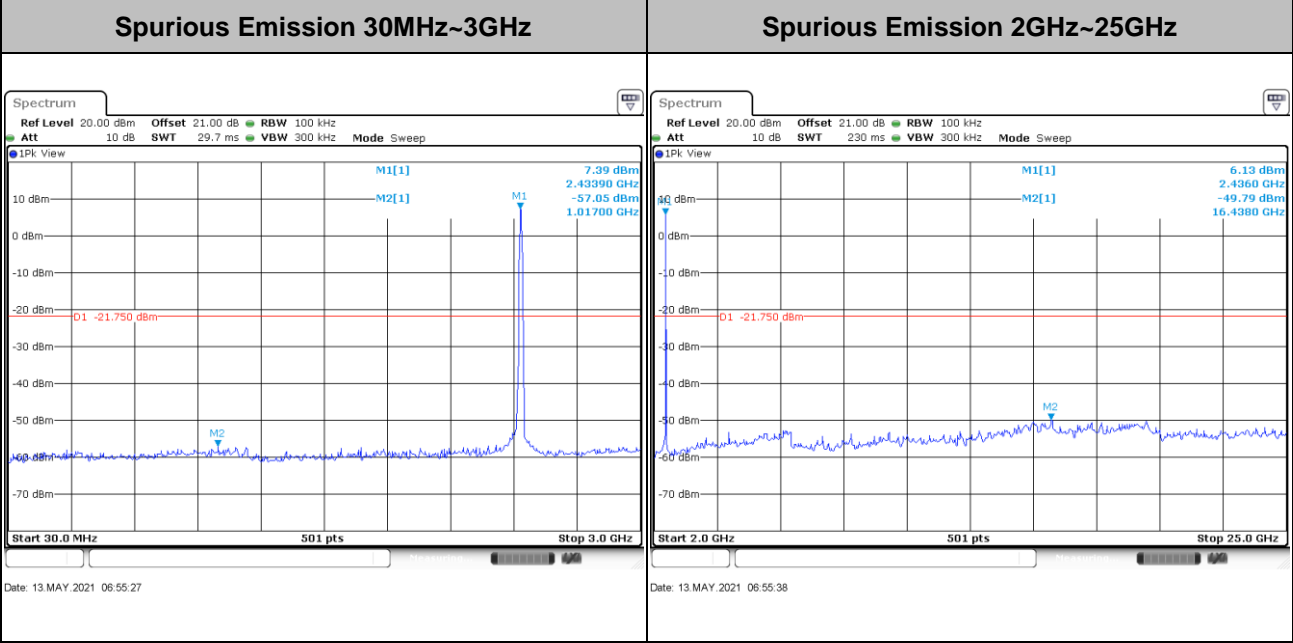
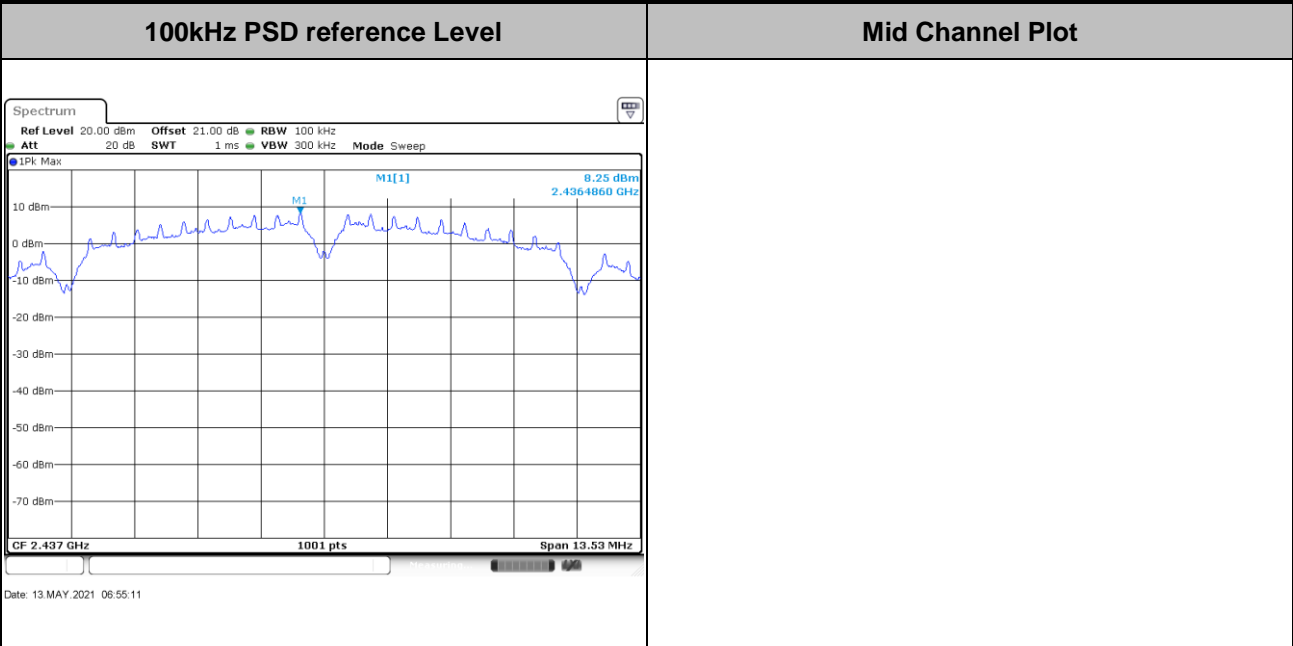
Number of TX = 2, Ant. 2 (Measured)

Test Mode :	802.11b	Test Channel :	01
-------------	---------	----------------	----



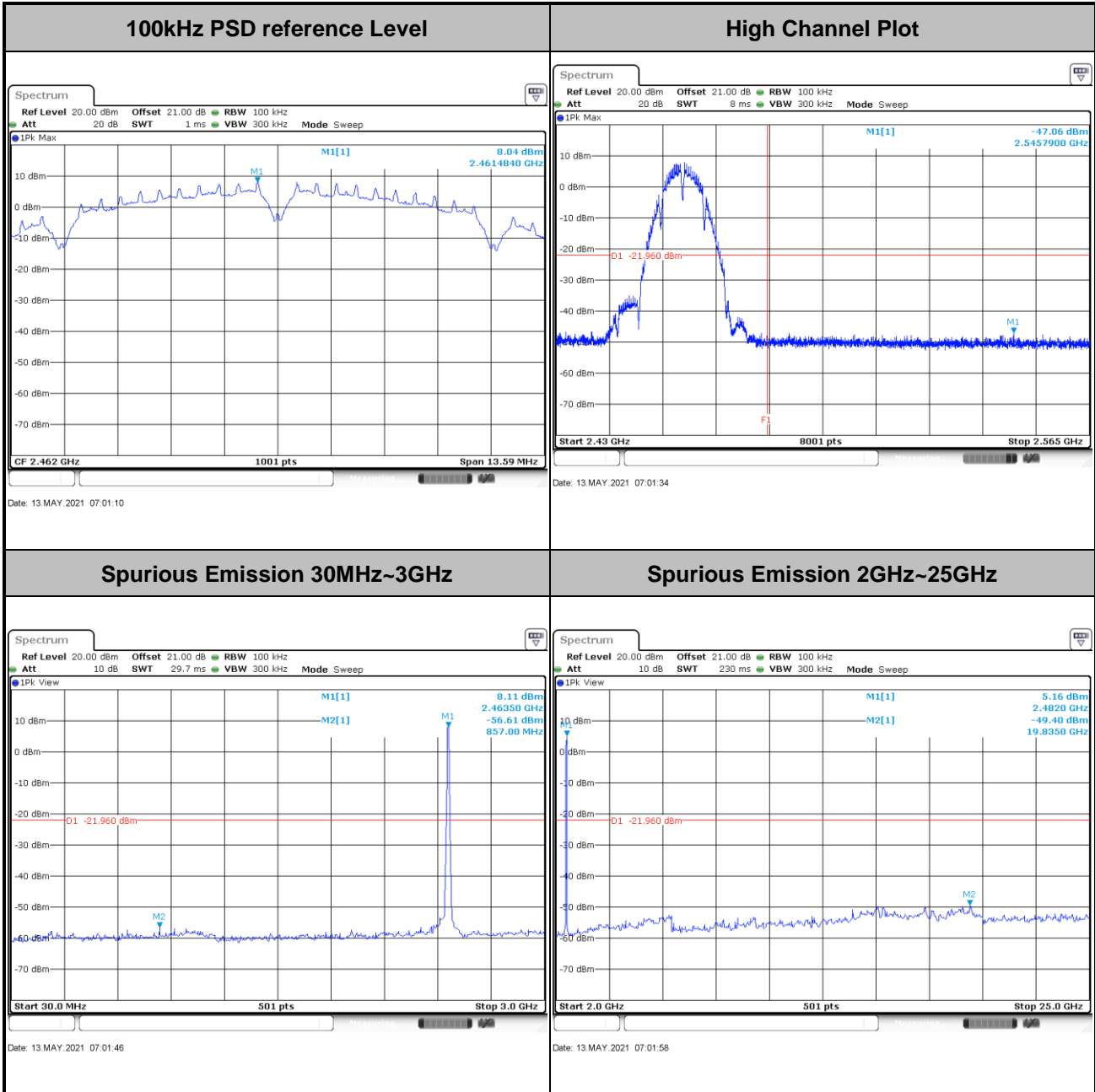


Test Mode :	802.11b	Test Channel :	06
-------------	---------	----------------	----



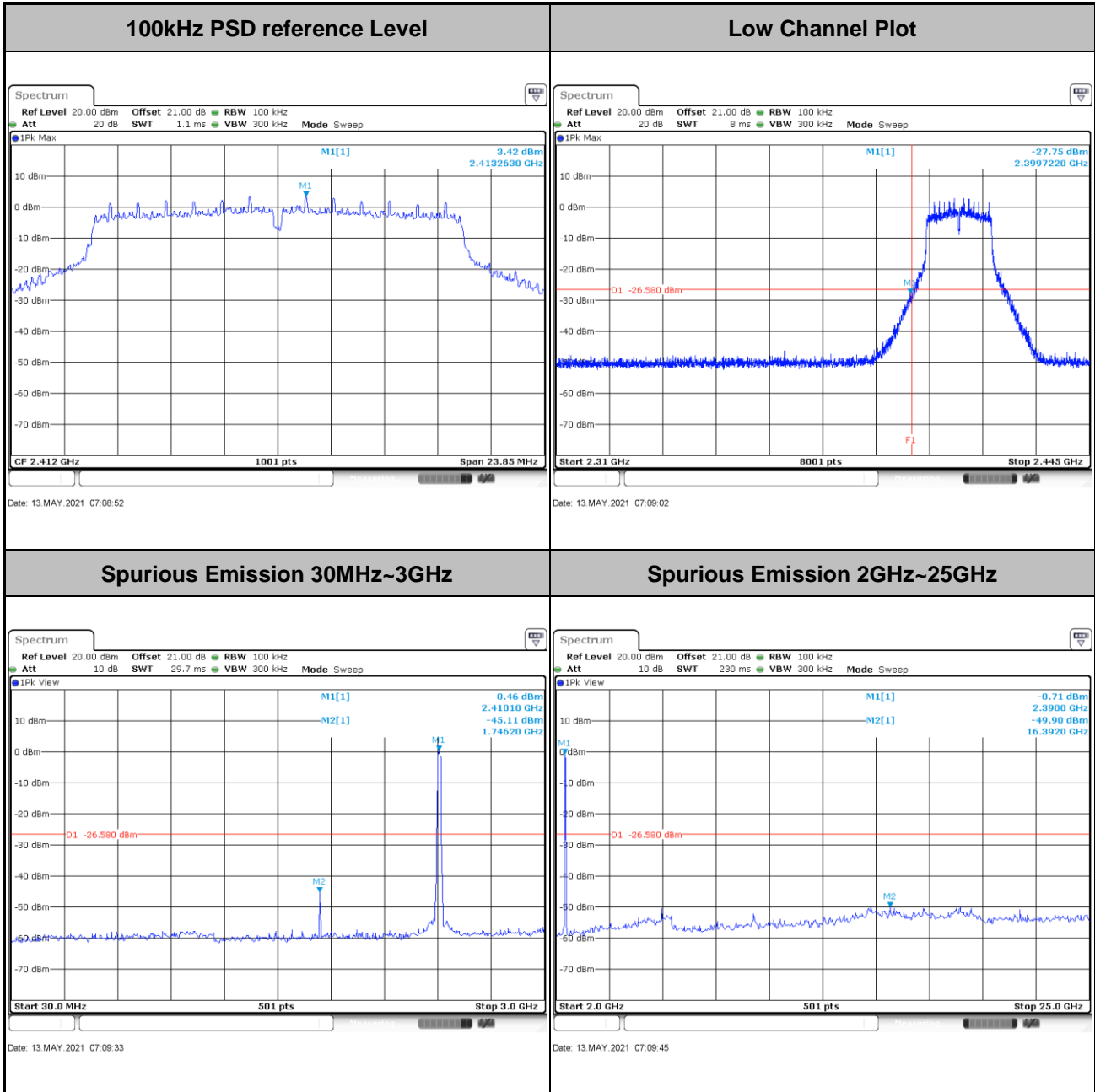


Test Mode :	802.11b	Test Channel :	11
-------------	---------	----------------	----



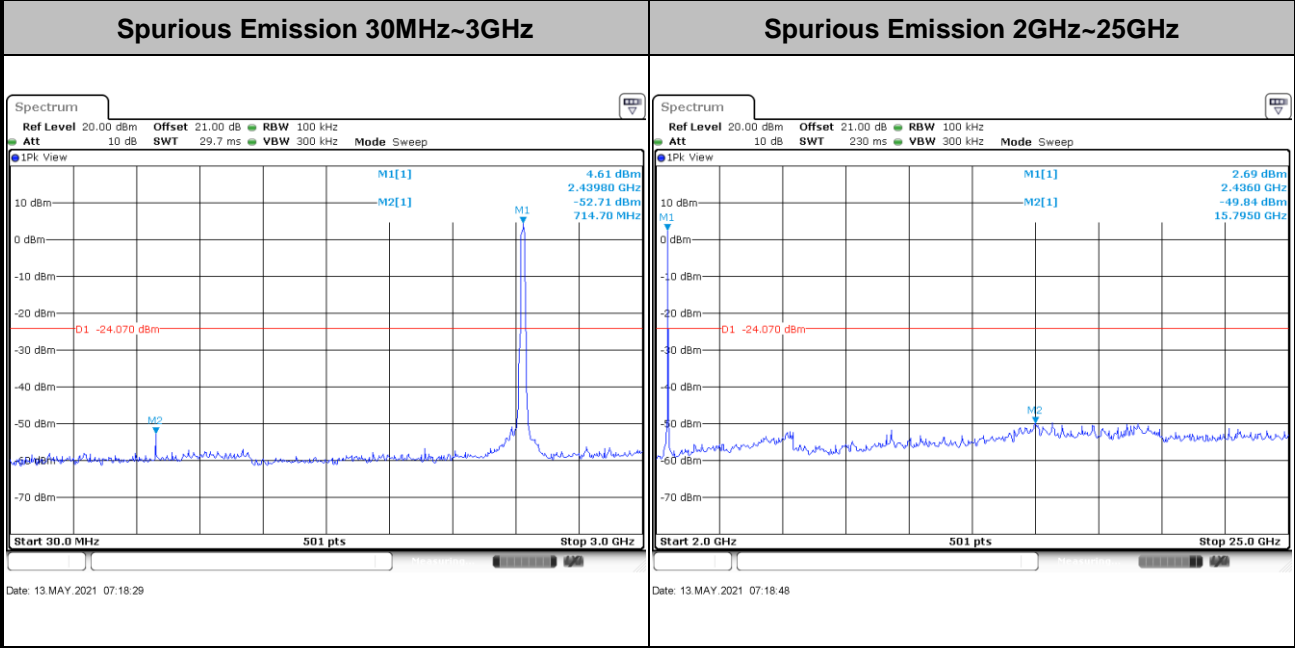
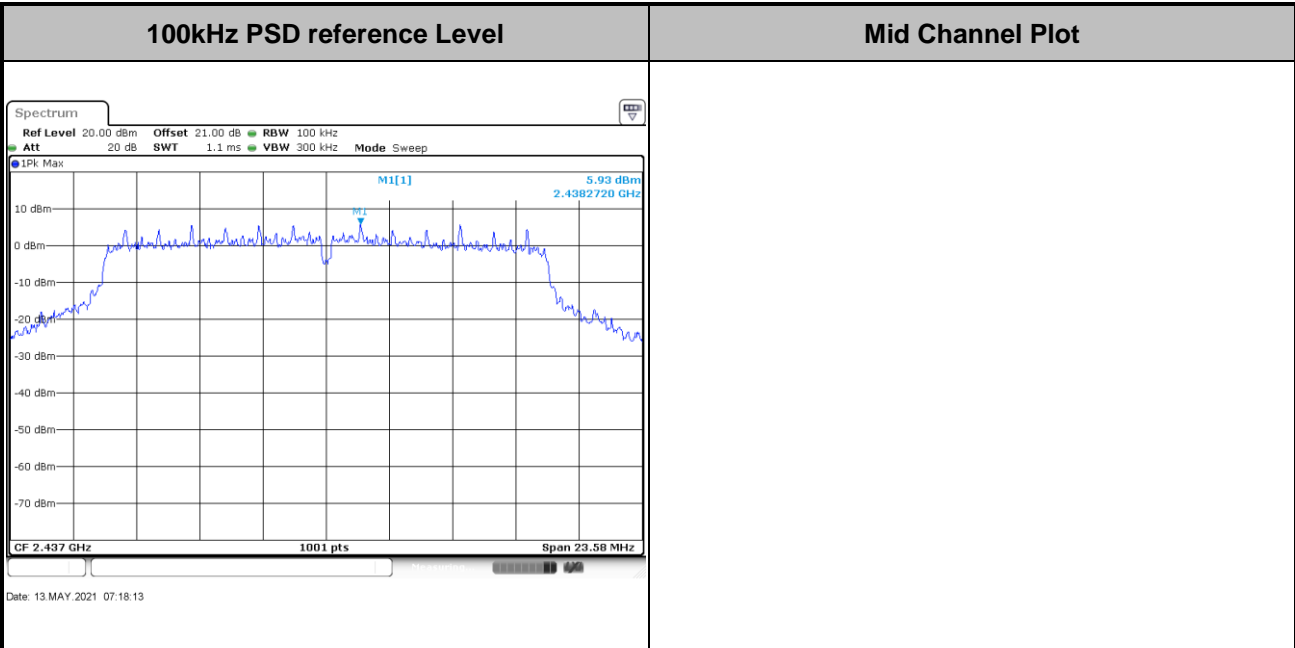


Test Mode :	802.11g	Test Channel :	01
-------------	---------	----------------	----



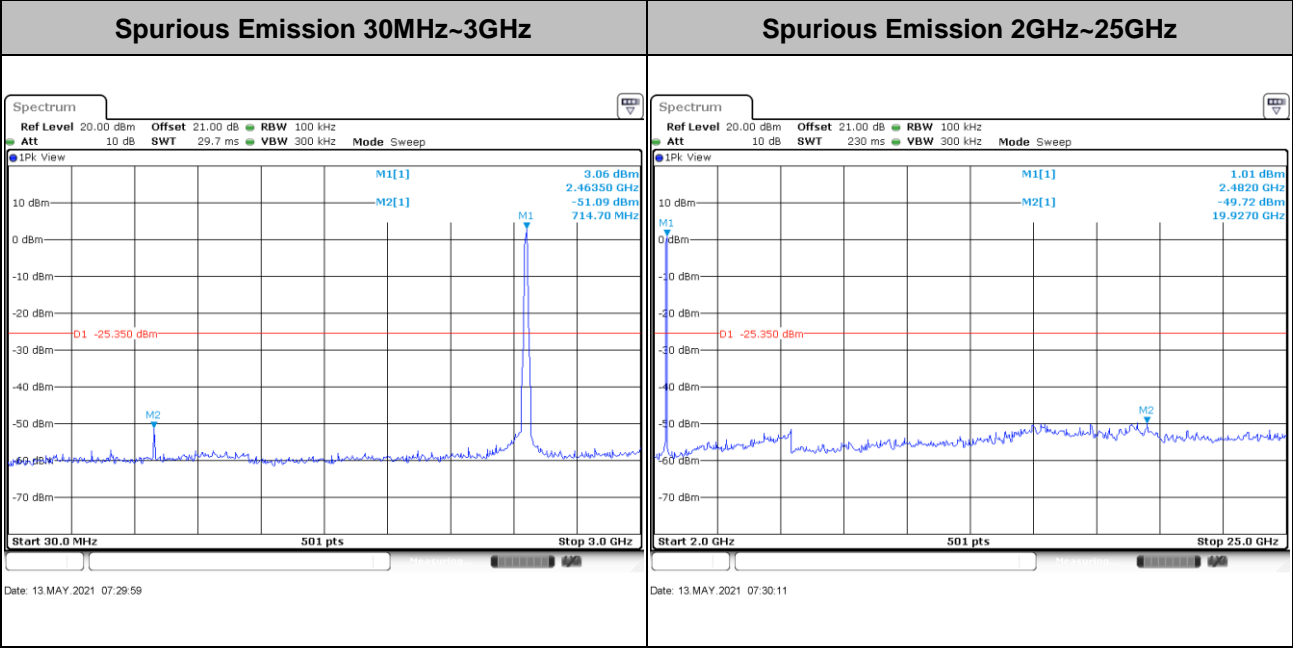
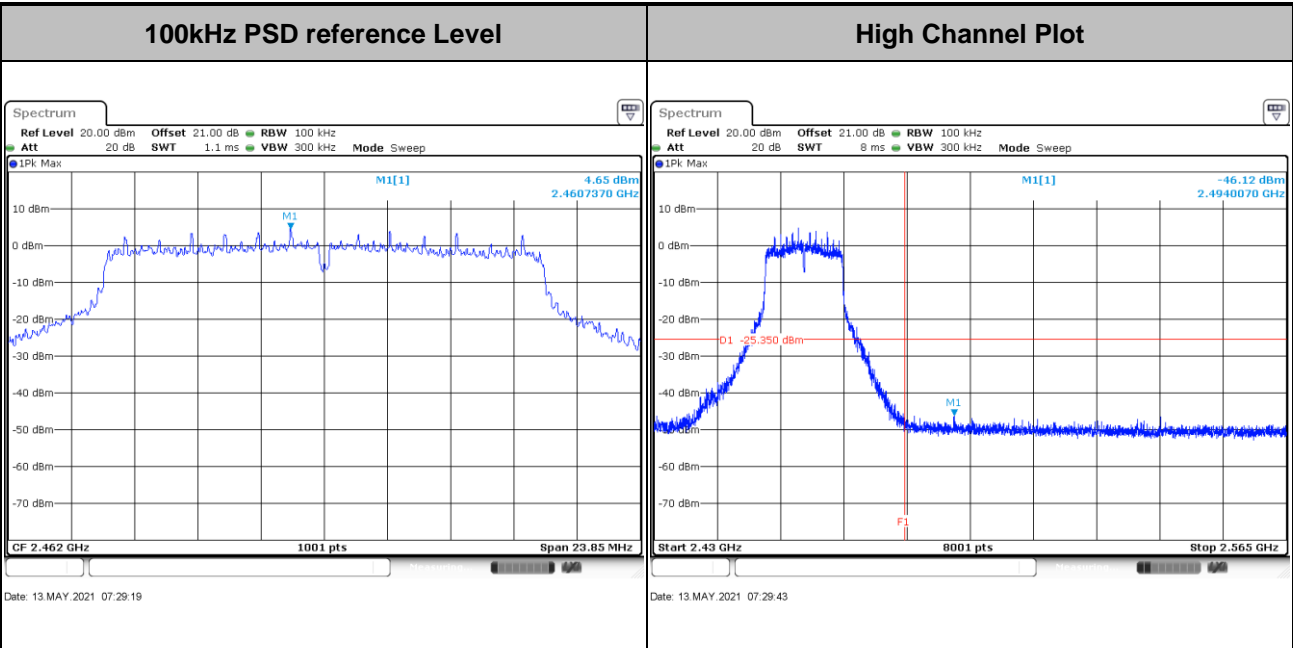


Test Mode :	802.11g	Test Channel :	06
-------------	---------	----------------	----



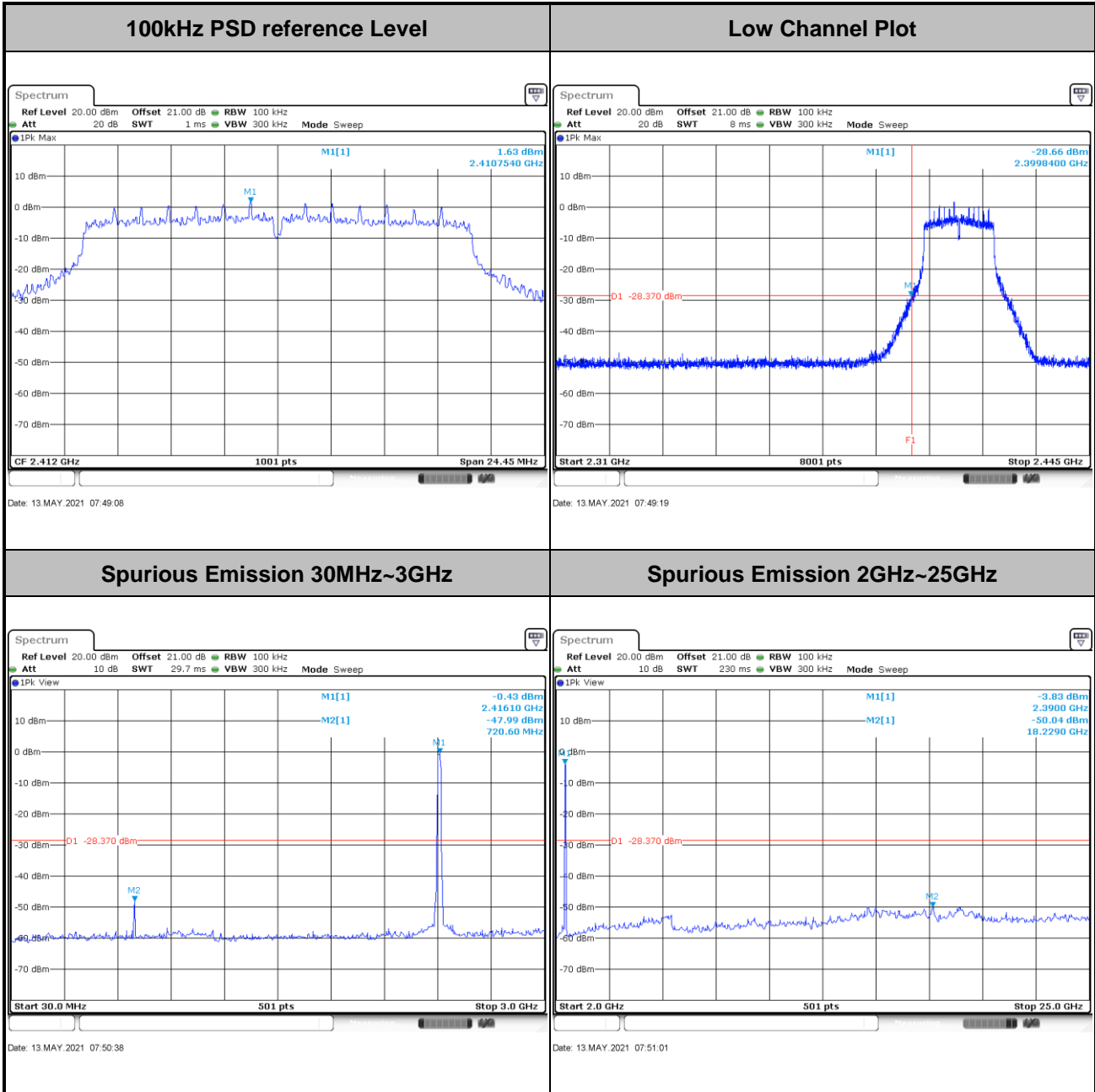


Test Mode :	802.11g	Test Channel :	11
-------------	---------	----------------	----



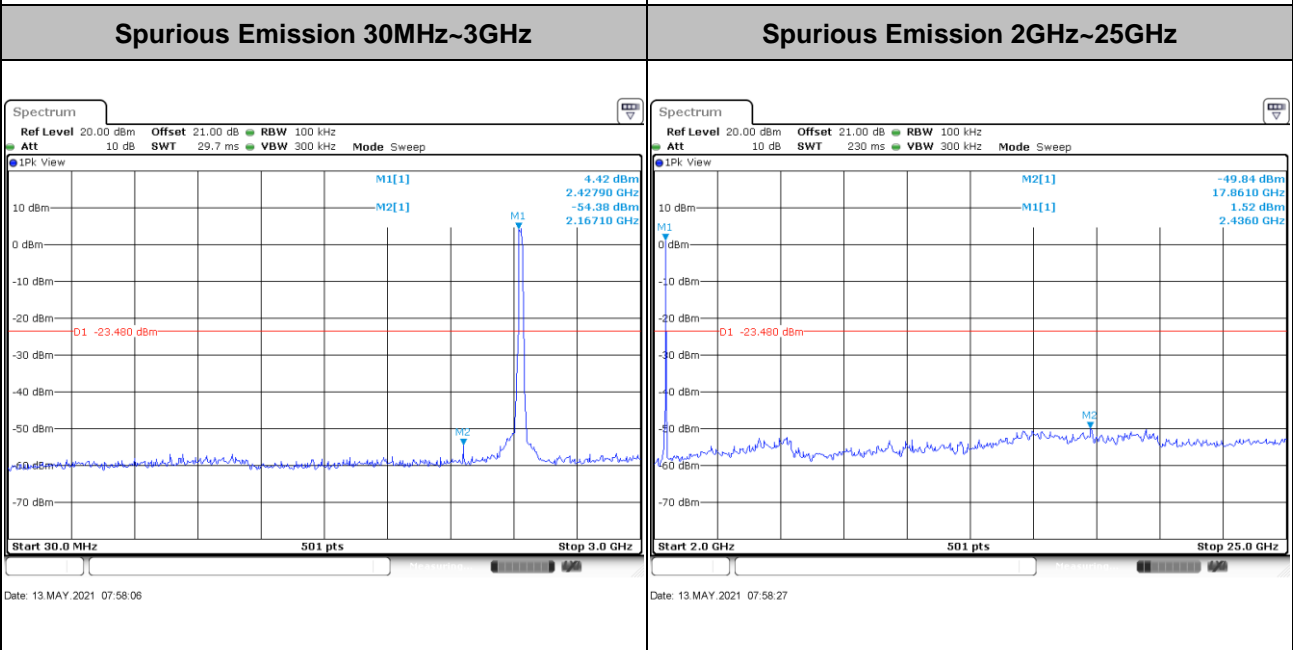
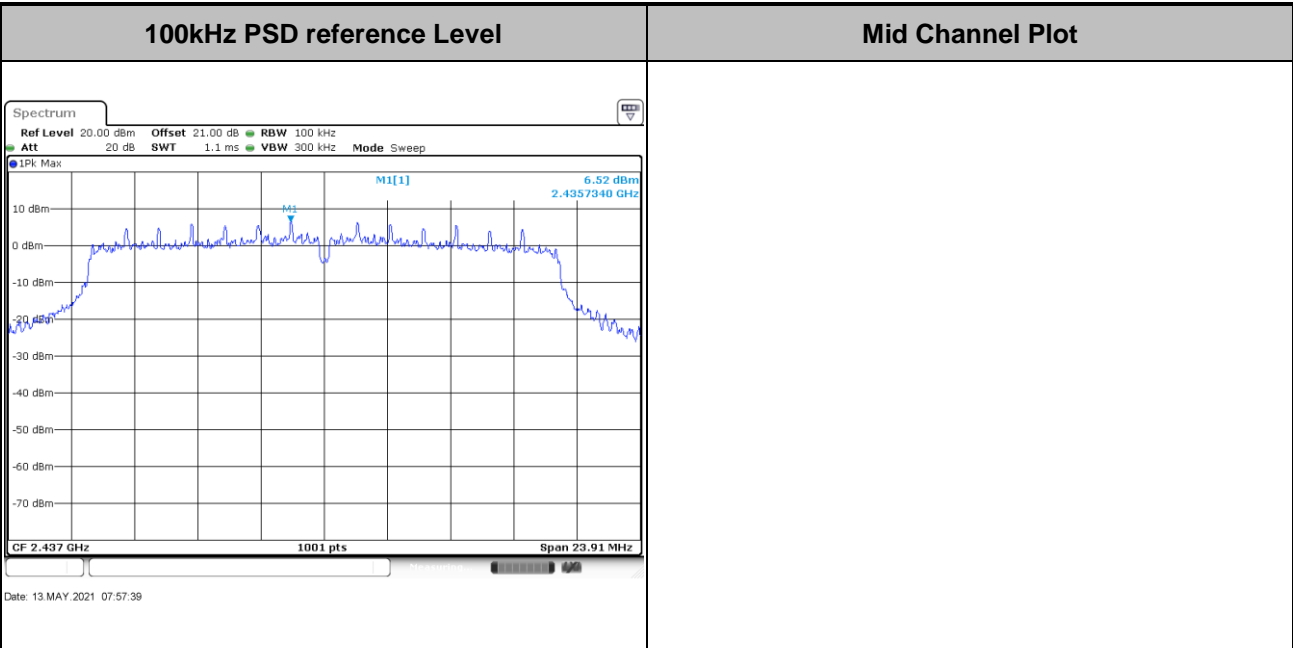


Test Mode :	802.11n HT20	Test Channel :	01
-------------	--------------	----------------	----





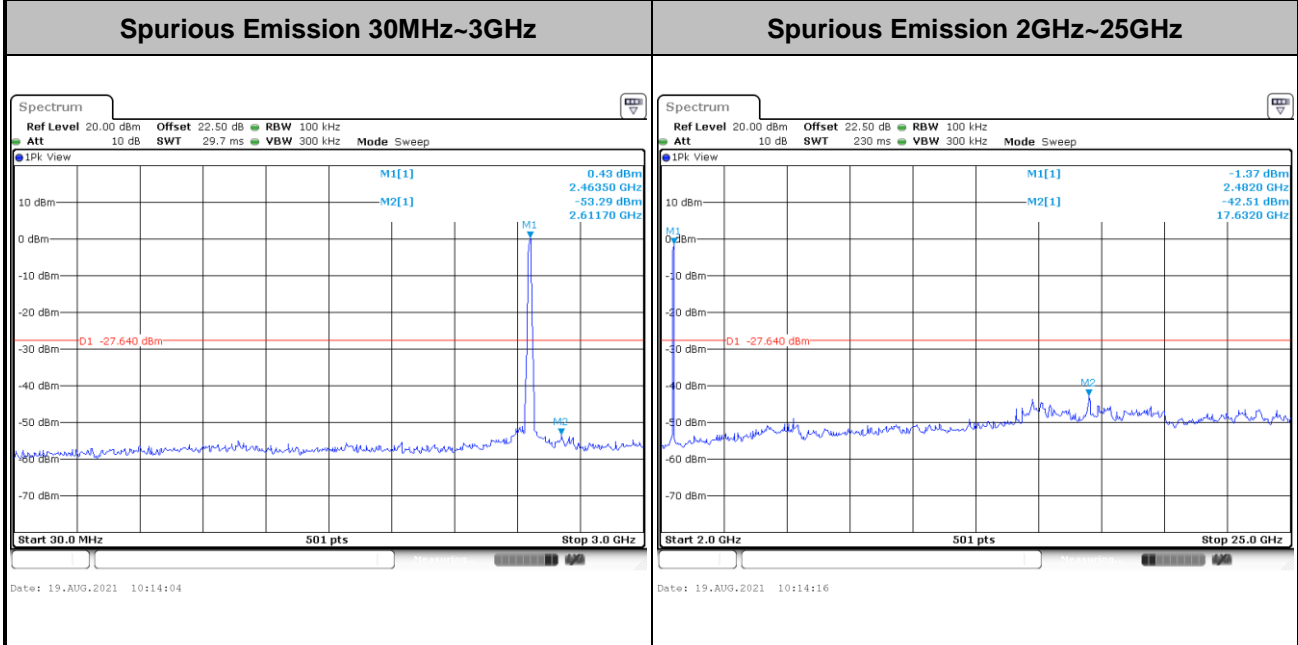
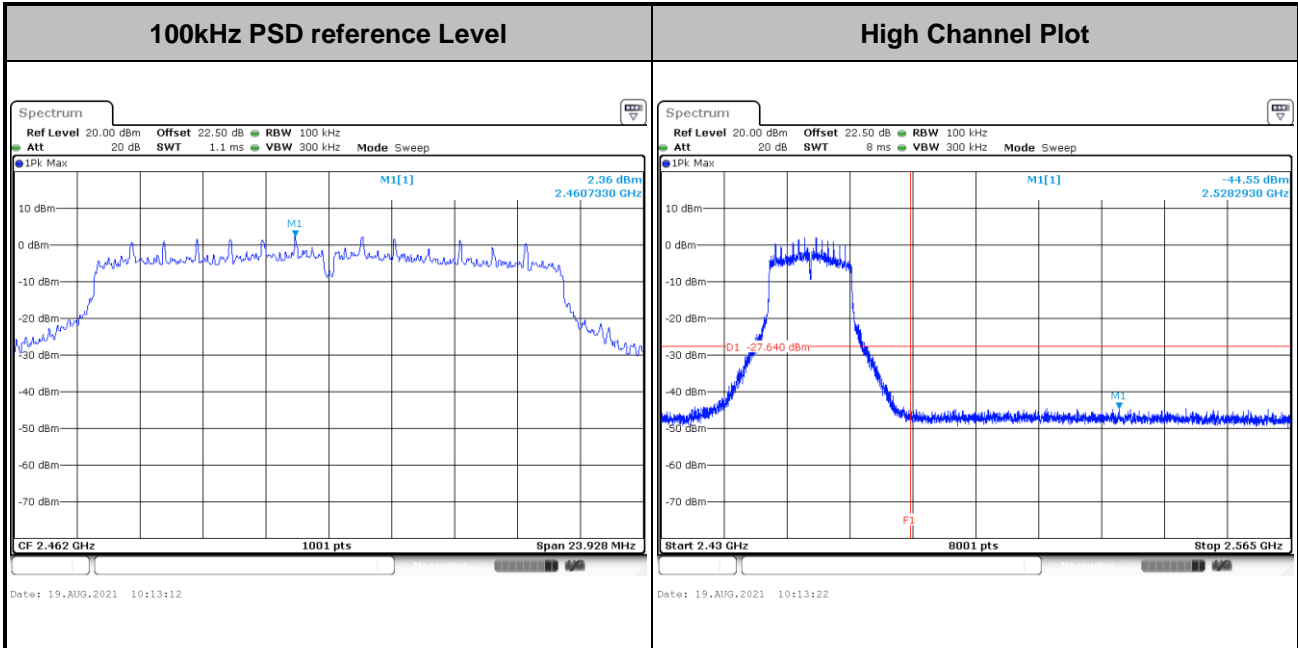
Test Mode :	802.11n HT20	Test Channel :	06
-------------	--------------	----------------	----







Test Mode :	802.11n HT20	Test Channel :	11
-------------	--------------	----------------	----





### 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

See list of measuring equipment of this test report.

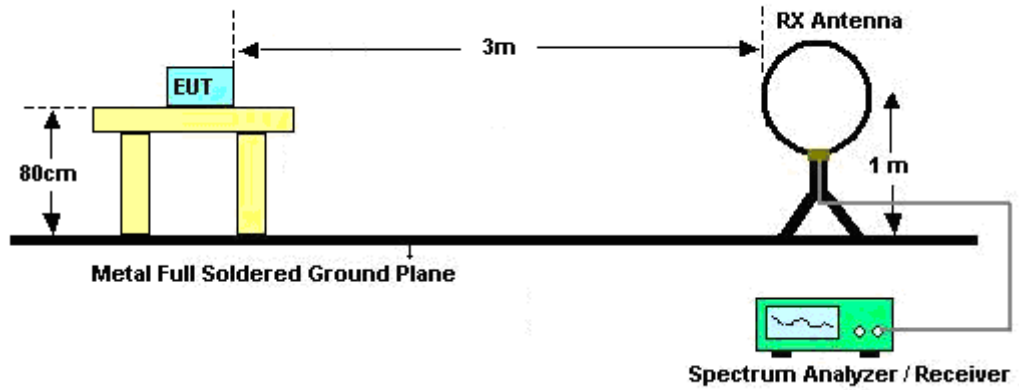


### 3.5.3 Test Procedures

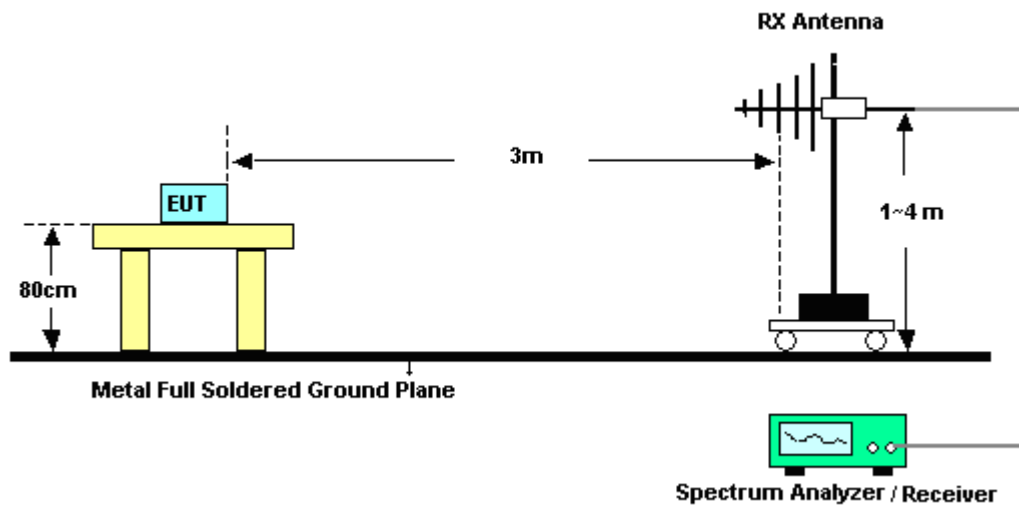
1. The testing follows the ANSI C63.10 Section 11.12.1 Radiated emission measurements.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz 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 testing below 1 GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1 GHz, the emission level of the EUT in peak mode was 20 dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
8. 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= 3 MHz 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

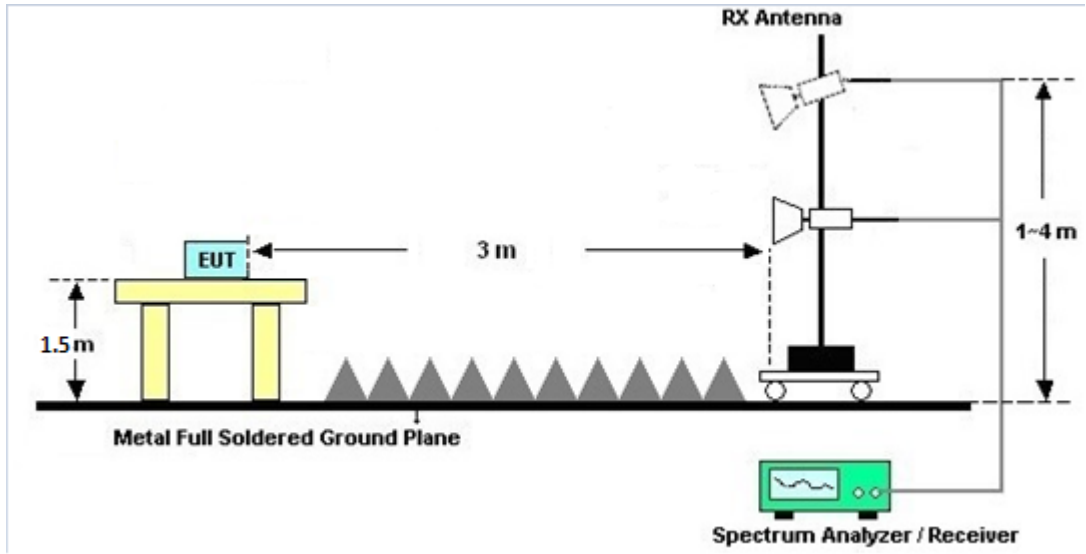
For radiated emissions below 30MHz



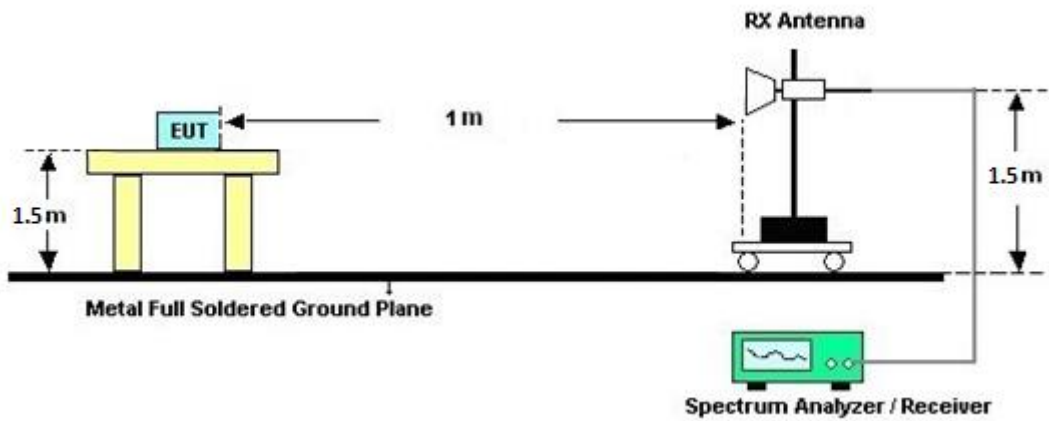
For radiated emissions from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz





### **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.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

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

Please refer to Appendix C and D.

### **3.5.7 Duty Cycle**

Please refer to Appendix E.

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

Please refer to Appendix C and D.



### 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 (dB $\mu$ V)	
	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

See list of measuring equipment 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 shall 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



### 3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix B.





### 3.7 Antenna Requirements

#### 3.7.1 Standard Applicable

If directional gain of transmitting Antennas is greater than 6 dBi, the power shall be reduced by the same level in dB comparing to gain minus 6 dBi. 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

<CDD Modes >

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain =  $G_{ANT}$  + Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain =  $10 \log(N_{ANT}/N_{SS}=1)$  dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for  $N_{ANT} \leq 4$ .

Directional gain may be calculated by using the formulas applicable to equal gain antennas with  $G_{ANT}$  set equal to the gain of the antenna having the highest gain;

The EUT supports CDD mode.

For power, the directional gain  $G_{ANT}$  is set equal to the antenna having the highest gain, i.e., F)2)f)i).

For PSD, the directional gain calculation is following F)2)f)ii) of KDB 662911 D01 v02r01.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain "DG" is calculated as following table.

<CDD Modes>						
			DG	DG	Power	PSD
	Ant. 1	Ant. 2	for	for	Limit	Limit
	(dBi)	(dBi)	Power	PSD	Reduction	Reduction
			(dBi)	(dBi)	(dB)	(dB)
2.4 GHz	3.69	2.96	3.69	6.34	0.00	0.34

$Power\ Limit\ Reduction = DG(Power) - 6dBi, (min = 0)$

$PSD\ Limit\ Reduction = DG(PSD) - 6dBi, (min = 0)$



## 4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	TECEPEL	TR-32	HE17XB24 68	N/A	Mar. 09, 2021	May 05, 2021~ Aug. 19, 2021	Mar. 08, 2022	Conducted (TH02-HY)
Power Sensor	DARE	RPR3006W	16I00054S NO12	10MHz~6GHz	Dec. 16, 2020	May 05, 2021~ Aug. 19, 2021	Dec. 15, 2021	Conducted (TH02-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101566	10Hz ~ 40GHz	Jul. 22, 2020	May 05, 2021 Jun. 03, 2021	Jul. 21, 2021	Conducted (TH02-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101565	10Hz ~ 40GHz	Nov. 13, 2020	Aug. 19, 2021	Nov. 12, 2021	Conducted (TH02-HY)
Switch Box & RF Cable	Burgeon	ETF058	EC130048 4	N/A	Nov. 19, 2020	May 05, 2021~ Aug. 19, 2021	Nov. 18, 2021	Conducted (TH02-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Jan. 04, 2021	May 07, 2021~ Aug. 18, 2021	Jan. 03, 2022	Radiation (03CH11-HY)
Bilog Antenna	TESEQ	CBL 6111D & N-6-06	35414 & AT-N0602	30MHz~1GHz	Oct. 11, 2020	May 07, 2021~ Aug. 18, 2021	Oct. 10, 2021	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-132 6	1GHz ~ 18GHz	Nov. 03, 2020	May 07, 2021~ Aug. 18, 2021	Nov. 02, 2021	Radiation (03CH11-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA9170	00994	18GHz~40GHz	Nov. 19, 2020	May 07, 2021~ Aug. 18, 2021	Nov. 18, 2021	Radiation (03CH11-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Dec. 02, 2020	May 07, 2021~ Aug. 18, 2021	Dec. 01, 2021	Radiation (03CH11-HY)
Preamplifier	EMEC	EM1G18G	060812	1GHz~18GHz	Oct. 27, 2020	May 07, 2021~ Aug. 18, 2021	Oct. 26, 2021	Radiation (03CH11-HY)
Preamplifier	Keysight	83017A	MY532700 80	1GHz~26.5GHz	Nov. 12, 2020	May 07, 2021~ Aug. 18, 2021	Nov. 11, 2021	Radiation (03CH11-HY)
Preamplifier	EMEC	EM18G40G	060801	18GHz~40GHz	Jun. 15, 2020	May 07, 2021~ Jun. 13, 2021	Jun. 14, 2021	Radiation (03CH11-HY)
Preamplifier	EMEC	EM18G40G	060801	18GHz~40GHz	Jun. 22, 2021	Jun. 22, 2021~ Aug. 18, 2021	Jun. 21, 2022	Radiation (03CH11-HY)
Spectrum Analyzer	Keysight	N9010A	MY542004 86	10Hz~44GHz	Oct. 23, 2020	May 07, 2021~ Aug. 18, 2021	Oct. 22, 2021	Radiation (03CH11-HY)
Antenna Mast	EMEC	AM-BS-4500- B	N/A	1~4m	N/A	May 07, 2021~ Aug. 18, 2021	N/A	Radiation (03CH11-HY)
Turn Table	EMEC	TT 2000	N/A	0~360 Degree	N/A	May 07, 2021~ Aug. 18, 2021	N/A	Radiation (03CH11-HY)
Software	Audix	E3 6.2009-8-24	RK-00105 3	N/A	N/A	May 07, 2021~ Aug. 18, 2021	N/A	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4 PE	9kHz-30MHz	Mar. 11, 2021	May 07, 2021~ Aug. 18, 2021	Mar. 10, 2022	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2859/2	30MHz-40GHz	Mar. 11, 2021	May 07, 2021~ Aug. 18, 2021	Mar. 10, 2022	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4 PE	30M-18G	Mar. 11, 2021	May 07, 2021~ Aug. 18, 2021	Mar. 10, 2022	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY4274/2	30MHz-40GHz	Mar. 11, 2021	May 07, 2021~ Aug. 18, 2021	Mar. 10, 2022	Radiation (03CH11-HY)



Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Filter	Wainwright	WLK4-1000-1 530-8000-40S S	SN11	1.53G Low Pass	Sep. 14, 2020	May 07, 2021~ Aug. 18, 2021	Sep. 13, 2021	Radiation (03CH11-HY)
Filter	Wainwright	WHKX12-270 0-3000-18000 -60SS	SN3	3GHz High Pass Filter	Sep. 14, 2020	May 07, 2021~ Aug. 18, 2021	Sep. 13, 2021	Radiation (03CH11-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	May 05, 2021	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Nov. 30, 2020	May 05, 2021	Nov. 29, 2021	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Nov. 16, 2020	May 05, 2021	Nov. 15, 2021	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	May 05, 2021	N/A	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Feb. 25, 2021	May 05, 2021	Feb. 24, 2022	Conduction (CO05-HY)
LISN Cable	MVE	RG-400	260260	N/A	Dec. 31, 2020	May 05, 2021	Dec. 30, 2021	Conduction (CO05-HY)



## 5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.3
---	-----

### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	4.7
---	-----

### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.2
---	-----

### Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.1
---	-----

## Appendix A. Test Result of Conducted Test Items

Test Engineer:	Luffy Lin	Temperature:	23.7~24	°C
Test Date:	2021/05/05~2021/08/19	Relative Humidity:	51~54	%

**Remark:** For Conducted Test Items, Ant. 1 means Aux. Antenna and Ant. 2 means Main Antenna.

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

2.4GHz Band MIMO										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)		6dB BW (MHz)		6dB BW Limit (MHz)	Pass/Fail
					Ant1	Ant2	Ant1	Ant2		
11b	1Mbps	2	1	2412	13.89	13.74	8.56	8.56	0.50	Pass
11b	1Mbps	2	6	2437	13.84	13.79	8.56	9.02	0.50	Pass
11b	1Mbps	2	11	2462	13.94	13.79	8.56	9.06	0.50	Pass
11g	6Mbps	2	1	2412	16.78	16.78	15.68	15.90	0.50	Pass
11g	6Mbps	2	6	2437	16.83	16.58	15.36	15.72	0.50	Pass
11g	6Mbps	2	11	2462	16.73	16.63	15.54	15.90	0.50	Pass
HT20	MCS0	2	1	2412	17.88	17.88	16.20	16.30	0.50	Pass
HT20	MCS0	2	6	2437	17.93	17.78	15.92	15.94	0.50	Pass
HT20	MCS0	2	11	2462	18.68	18.63	15.98	15.95	0.50	Pass

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

2.4GHz Band MIMO																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant1	Ant2	SUM	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2	
11b	1Mbps	2	1	2412	17.00	16.60	19.81	30.00		3.69		23.50		36.00		Pass
11b	1Mbps	2	6	2437	16.70	16.50	19.61	30.00		3.69		23.30		36.00		Pass
11b	1Mbps	2	11	2462	16.60	16.30	19.46	30.00		3.69		23.15		36.00		Pass
11g	6Mbps	2	1	2412	13.40	13.20	16.31	30.00		3.69		20.00		36.00		Pass
11g	6Mbps	2	6	2437	16.30	16.20	19.26	30.00		3.69		22.95		36.00		Pass
11g	6Mbps	2	11	2462	14.60	14.50	17.56	30.00		3.69		21.25		36.00		Pass
HT20	MCS0	2	1	2412	11.80	11.50	14.66	30.00		3.69		18.35		36.00		Pass
HT20	MCS0	2	6	2437	16.20	16.00	19.11	30.00		3.69		22.80		36.00		Pass
HT20	MCS0	2	11	2462	12.90	12.80	15.86	30.00		3.69		19.55		36.00		Pass

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

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

2.4GHz Band MIMO												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)			DG (dBi)		Peak PSD Limit (dBm/3kHz)		Pass/Fail
					Ant1	Ant2	Worse + 3.01	Ant1	Ant2	Ant1	Ant2	
11b	1Mbps	2	1	2412	-4.46	-4.74	-1.45	6.34		7.66		Pass
11b	1Mbps	2	6	2437	-5.78	-4.45	-1.44	6.34		7.66		Pass
11b	1Mbps	2	11	2462	-5.78	-4.87	-1.86	6.34		7.66		Pass
11g	6Mbps	2	1	2412	-11.40	-10.93	-7.92	6.34		7.66		Pass
11g	6Mbps	2	6	2437	-8.25	-9.06	-5.24	6.34		7.66		Pass
11g	6Mbps	2	11	2462	-9.30	-11.08	-6.29	6.34		7.66		Pass
HT20	MCS0	2	1	2412	-13.25	-13.11	-10.10	6.34		7.66		Pass
HT20	MCS0	2	6	2437	-8.34	-8.93	-5.33	6.34		7.66		Pass
HT20	MCS0	2	11	2462	-13.22	-13.19	-10.18	6.34		7.66		Pass

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





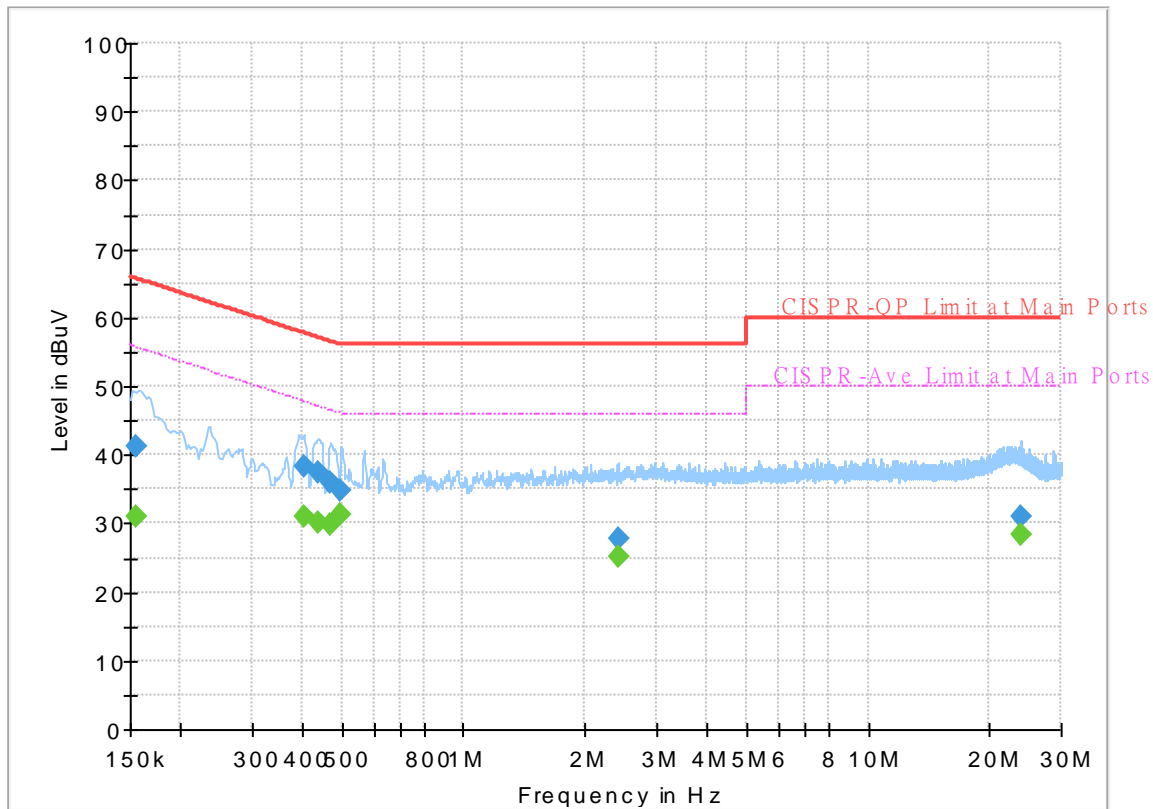
## Appendix B. AC Conducted Emission Test Results

<b>Test Engineer :</b>	Tom Lee and Howard Huang	<b>Temperature :</b>	23~26°C
		<b>Relative Humidity :</b>	40~50%

# EUT Information

Report NO : 131119-01  
 Test Mode : Mode 1  
 Test Voltage : 120Vac/60Hz  
 Phase : Line

Full Spectrum



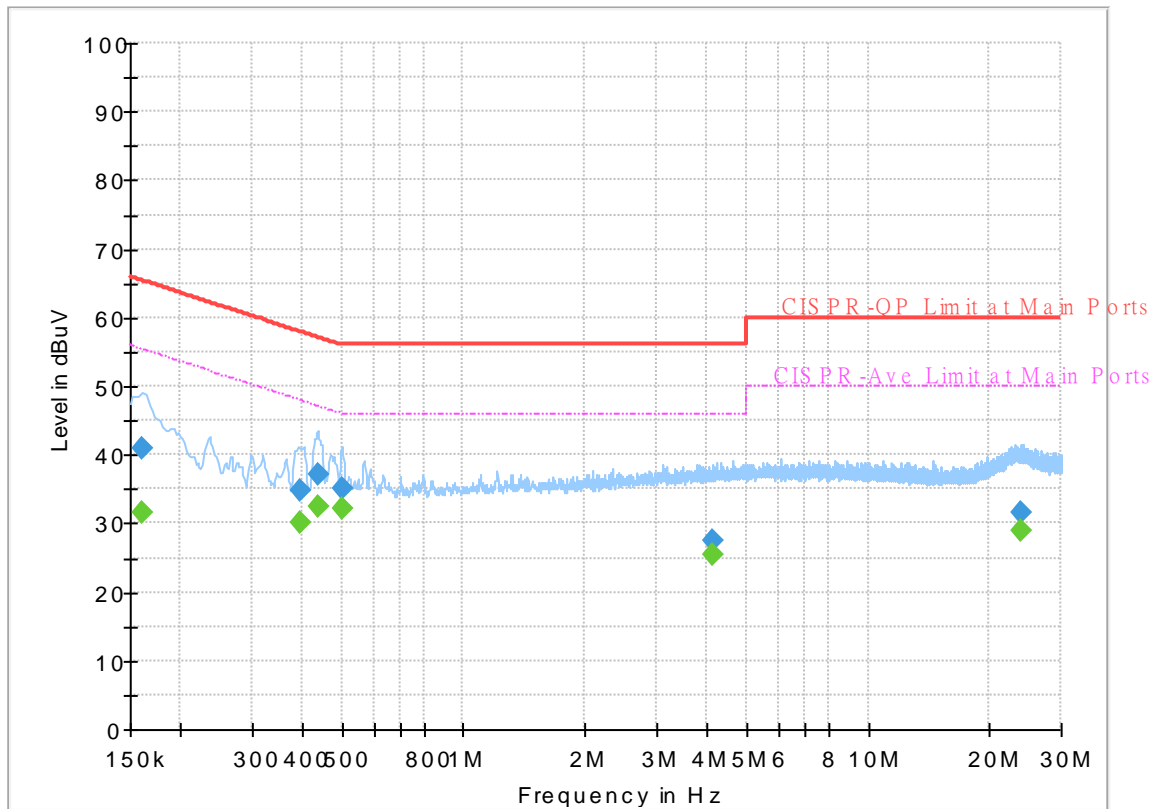
## Final\_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.154500	---	31.07	55.75	24.68	L1	OFF	19.5
0.154500	41.13	---	65.75	24.62	L1	OFF	19.5
0.402000	---	30.88	47.81	16.93	L1	OFF	19.5
0.402000	38.23	---	57.81	19.58	L1	OFF	19.5
0.440250	---	30.18	47.06	16.88	L1	OFF	19.6
0.440250	37.31	---	57.06	19.75	L1	OFF	19.6
0.469500	---	29.93	46.52	16.59	L1	OFF	19.6
0.469500	35.93	---	56.52	20.59	L1	OFF	19.6
0.498750	---	31.16	46.02	14.86	L1	OFF	19.7
0.498750	34.74	---	56.02	21.28	L1	OFF	19.7
2.406750	---	25.21	46.00	20.79	L1	OFF	20.0
2.406750	27.65	---	56.00	28.35	L1	OFF	20.0
23.860500	---	28.34	50.00	21.66	L1	OFF	20.5
23.860500	31.03	---	60.00	28.97	L1	OFF	20.5

## EUT Information

Report NO : 131119-01  
 Test Mode : Mode 1  
 Test Voltage : 120Vac/60Hz  
 Phase : Neutral

Full Spectrum



## Final\_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.161250	---	31.54	55.40	23.86	N	OFF	19.5
0.161250	40.85	---	65.40	24.55	N	OFF	19.5
0.395250	---	30.00	47.95	17.95	N	OFF	19.6
0.395250	34.74	---	57.95	23.21	N	OFF	19.6
0.435750	---	32.38	47.14	14.76	N	OFF	19.6
0.435750	37.09	---	57.14	20.05	N	OFF	19.6
0.501000	---	32.20	46.00	13.80	N	OFF	19.7
0.501000	35.20	---	56.00	20.80	N	OFF	19.7
4.123500	---	25.57	46.00	20.43	N	OFF	19.9
4.123500	27.35	---	56.00	28.65	N	OFF	19.9
23.905500	---	28.93	50.00	21.07	N	OFF	20.7
23.905500	31.63	---	60.00	28.37	N	OFF	20.7



### Appendix C. Radiated Spurious Emission

Test Engineer :	Harvey Guo, Bill Chang, Fu Chen and Troye Hsieh	Temperature :	18.3~25.7°C
		Relative Humidity :	58.2~70.8%

Remark: For Radiated Spurious Emission Test Items, Ant. 1 means Aux. Antenna and Ant. 2 means Main Antenna.

**2.4GHz 2400~2483.5MHz**

**WIFI 802.11b (Band Edge @ 3m)**

WIFI Ant.	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )	
802.11b CH 01 2412MHz		2389.275	59.71	-14.29	74	48.59	27.52	17.06	33.46	306	8	P	H	
		2387.28	51.45	-2.55	54	40.32	27.53	17.06	33.46	306	8	A	H	
	*	2412	117.07	-	-	105.92	27.5	17.09	33.44	306	8	P	H	
	*	2412	113.97	-	-	102.82	27.5	17.09	33.44	306	8	A	H	
													H	
													H	
			2387.07	57.17	-16.83	74	46.04	27.53	17.06	33.46	100	59	P	V
			2387.175	48.25	-5.75	54	37.12	27.53	17.06	33.46	100	59	A	V
	*		2412	113.86	-	-	102.71	27.5	17.09	33.44	100	59	P	V
	*		2412	110.72	-	-	99.57	27.5	17.09	33.44	100	59	A	V
													V	
													V	
802.11b CH 06 2437MHz		2387.28	56.19	-17.81	74	45.06	27.53	17.06	33.46	299	10	P	H	
		2389.52	46.8	-7.2	54	35.68	27.52	17.06	33.46	299	10	A	H	
	*	2437	118.63	-	-	107.43	27.5	17.13	33.43	299	10	P	H	
	*	2437	115.42	-	-	104.22	27.5	17.13	33.43	299	10	A	H	
			2484.08	55.96	-18.04	74	44.74	27.43	17.2	33.41	299	10	P	H
			2485.84	46.43	-7.57	54	35.21	27.43	17.2	33.41	299	10	A	H
			2390	55.53	-18.47	74	44.41	27.52	17.06	33.46	126	56	P	V
			2377.52	44.82	-9.18	54	33.69	27.54	17.05	33.46	126	56	A	V
	*		2437	113.87	-	-	102.67	27.5	17.13	33.43	126	56	P	V
	*		2437	110.65	-	-	99.45	27.5	17.13	33.43	126	56	A	V
			2486.4	54.8	-19.2	74	43.58	27.43	17.2	33.41	126	56	P	V
			2486.56	43.74	-10.26	54	32.52	27.43	17.2	33.41	126	56	A	V



<b>802.11b CH 11 2462MHz</b>	*	2462	118.31	-	-	107.08	27.48	17.17	33.42	332	11	P	H
	*	2462	115.35	-	-	104.12	27.48	17.17	33.42	332	11	A	H
		2487.24	58.77	-15.23	74	47.54	27.43	17.21	33.41	332	11	P	H
		2486.72	50.81	-3.19	54	39.59	27.43	17.2	33.41	332	11	A	H
													H
													H
	*	2462	112.74	-	-	101.51	27.48	17.17	33.42	138	357	P	V
	*	2462	109.49	-	-	98.26	27.48	17.17	33.42	138	357	A	V
		2483.52	56.08	-17.92	74	44.86	27.43	17.2	33.41	138	357	P	V
		2483.52	47.71	-6.29	54	36.49	27.43	17.2	33.41	138	357	A	V
													V
													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 802.11b (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 )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11b CH 01 2412MHz		4824	48.34	-25.66	74	72.28	31	11.22	66.16	100	0	P	H
		17970	58.61	-15.39	74	53.09	46.8	23.87	65.15	100	0	P	H
		17970	47.47	-6.53	54	41.95	46.8	23.87	65.15	100	0	A	H
													H
		4824	43.85	-30.15	74	67.79	31	11.22	66.16	100	0	P	V
		17970	58.48	-15.52	74	52.96	46.8	23.87	65.15	100	0	P	V
		17970	47.48	-6.52	54	41.96	46.8	23.87	65.15	100	0	A	V
802.11b CH 06 2437MHz		4874	48.94	-25.06	74	72.3	31.43	11.33	66.12	100	0	P	H
		7311	42.31	-31.69	74	58.19	36.4	13.44	65.72	100	0	P	H
		18000	58.51	-15.49	74	52.31	47.4	23.9	65.1	100	0	P	H
		18000	48.06	-5.94	54	41.86	47.4	23.9	65.1	100	0	A	H
		4874	46.28	-27.72	74	69.64	31.43	11.33	66.12	100	0	P	V
		7311	41.93	-32.07	74	57.81	36.4	13.44	65.72	100	0	P	V
		18000	58.52	-15.48	74	52.32	47.4	23.9	65.1	100	0	P	V
		18000	48.11	-5.89	54	41.91	47.4	23.9	65.1	100	0	A	V
802.11b CH 11 2462MHz		4924	48.74	-25.26	74	71.92	31.47	11.43	66.08	100	0	P	H
		7386	41.67	-32.33	74	57.49	36.4	13.54	65.76	100	0	P	H
		18000	59.31	-14.69	74	53.11	47.4	23.9	65.1	100	0	P	H
		18000	47.92	-6.08	54	41.72	47.4	23.9	65.1	100	0	A	H
		4924	46.59	-27.41	74	69.77	31.47	11.43	66.08	100	0	P	V
		7386	41.85	-32.15	74	57.67	36.4	13.54	65.76	100	0	P	V
		17955	57.88	-16.12	74	52.69	46.5	23.86	65.17	100	0	P	V
		17955	47.18	-6.82	54	41.99	46.5	23.86	65.17	100	0	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz  
WIFI 802.11g (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 )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )	
802.11g CH 01 2412MHz		2390	64.16	-9.84	74	53.04	27.52	17.06	33.46	306	8	P	H	
		2390	52.81	-1.19	54	41.69	27.52	17.06	33.46	306	8	A	H	
	*	2412	114.19	-	-	103.04	27.5	17.09	33.44	306	8	P	H	
	*	2412	106.56	-	-	95.41	27.5	17.09	33.44	306	8	A	H	
													H	
														H
			2389.8	57.33	-16.67	74	46.21	27.52	17.06	33.46	100	345	P	V
			2389.485	46.99	-7.01	54	35.87	27.52	17.06	33.46	100	345	A	V
	*		2412	108.36	-	-	97.21	27.5	17.09	33.44	100	345	P	V
	*		2412	100.39	-	-	89.24	27.5	17.09	33.44	100	345	A	V
														V
														V
802.11g CH 06 2437MHz		2389.52	60.17	-13.83	74	49.05	27.52	17.06	33.46	302	9	P	H	
		2390	49.38	-4.62	54	38.26	27.52	17.06	33.46	302	9	A	H	
	*	2437	118.61	-	-	107.41	27.5	17.13	33.43	302	9	P	H	
	*	2437	111.26	-	-	100.06	27.5	17.13	33.43	302	9	A	H	
			2489.04	57.63	-16.37	74	46.41	27.42	17.21	33.41	302	9	P	H
			2483.52	47.61	-6.39	54	36.39	27.43	17.2	33.41	302	9	A	H
			2386.32	58.03	-15.97	74	46.9	27.53	17.06	33.46	100	14	P	V
			2389.84	47.41	-6.59	54	36.29	27.52	17.06	33.46	100	14	A	V
	*		2437	113.74	-	-	102.54	27.5	17.13	33.43	100	14	P	V
	*		2437	105.97	-	-	94.77	27.5	17.13	33.43	100	14	A	V
			2484.48	55.51	-18.49	74	44.29	27.43	17.2	33.41	100	14	P	V
			2483.84	45.52	-8.48	54	34.3	27.43	17.2	33.41	100	14	A	V



<b>802.11g CH 11 2462MHz</b>	*	2462	115.41	-	-	104.18	27.48	17.17	33.42	293	25	P	H
	*	2462	108.35	-	-	97.12	27.48	17.17	33.42	293	25	A	H
		2483.72	63.82	-10.18	74	52.6	27.43	17.2	33.41	293	25	P	H
		2483.52	51.68	-2.32	54	40.46	27.43	17.2	33.41	293	25	A	H
													H
													H
	*	2462	109.72	-	-	98.49	27.48	17.17	33.42	100	14	P	V
	*	2462	102.28	-	-	91.05	27.48	17.17	33.42	100	14	A	V
		2483.8	58.26	-15.74	74	47.04	27.43	17.2	33.41	100	14	P	V
		2483.52	46.15	-7.85	54	34.93	27.43	17.2	33.41	100	14	A	V
													V
													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+2	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11g CH 01 2412MHz		4824	38.83	-35.17	74	62.77	31	11.22	66.16	100	0	P	H
		17985	58.22	-15.78	74	52.35	47.1	23.89	65.12	100	0	P	H
		17985	47.72	-6.28	54	41.85	47.1	23.89	65.12	100	0	A	H
													H
		4824	40.03	-33.97	74	63.97	31	11.22	66.16	100	0	P	V
		17940	58.78	-15.22	74	53.93	46.2	23.84	65.19	100	0	P	V
		17940	46.58	-7.42	54	41.73	46.2	23.84	65.19	100	0	A	V
802.11g CH 06 2437MHz		4874	43.75	-30.25	74	67.11	31.43	11.33	66.12	100	0	P	H
		7311	41.22	-32.78	74	57.1	36.4	13.44	65.72	100	0	P	H
		18000	59.13	-14.87	74	52.93	47.4	23.9	65.1	100	0	P	H
		18000	47.89	-6.11	54	41.69	47.4	23.9	65.1	100	0	A	H
		4874	40.87	-33.13	74	64.23	31.43	11.33	66.12	100	0	P	V
		7311	41.55	-32.45	74	57.43	36.4	13.44	65.72	100	0	P	V
		17970	58.15	-15.85	74	52.63	46.8	23.87	65.15	100	0	P	V
		17970	47.45	-6.55	54	41.93	46.8	23.87	65.15	100	0	A	V
802.11g CH 11 2462MHz		4924	40.49	-33.51	74	63.67	31.47	11.43	66.08	100	0	P	H
		7386	40.96	-33.04	74	56.78	36.4	13.54	65.76	100	0	P	H
		17940	58.28	-15.72	74	53.43	46.2	23.84	65.19	100	0	P	H
		17940	46.76	-7.24	54	41.91	46.2	23.84	65.19	100	0	A	H
		4924	40.22	-33.78	74	63.4	31.47	11.43	66.08	100	0	P	V
		7386	41.54	-32.46	74	57.36	36.4	13.54	65.76	100	0	P	V
		17970	58.64	-15.36	74	53.12	46.8	23.87	65.15	100	0	P	V
		17970	47.45	-6.55	54	41.93	46.8	23.87	65.15	100	0	A	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 )	Path 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	63.62	-10.38	74	52.5	27.52	17.06	33.46	306	7	P	H	
		2390	52.21	-1.79	54	41.09	27.52	17.06	33.46	306	7	A	H	
	*	2412	111.75	-	-	100.6	27.5	17.09	33.44	306	7	P	H	
	*	2412	104.1	-	-	92.95	27.5	17.09	33.44	306	7	A	H	
													H	
														H
			2367.855	54.04	-19.96	74	42.91	27.56	17.04	33.47	102	345	P	V
			2390	43.92	-10.08	54	32.8	27.52	17.06	33.46	102	345	A	V
		*	2412	105.85	-	-	94.7	27.5	17.09	33.44	102	345	P	V
		*	2412	97.63	-	-	86.48	27.5	17.09	33.44	102	345	A	V
													V	
													V	
802.11n HT20 CH 06 2437MHz		2387.6	59.51	-14.49	74	48.39	27.52	17.06	33.46	299	8	P	H	
		2390	49.28	-4.72	54	38.16	27.52	17.06	33.46	299	8	A	H	
		*	2437	118.84	-	-	107.64	27.5	17.13	33.43	299	8	P	H
		*	2437	110.87	-	-	99.67	27.5	17.13	33.43	299	8	A	H
			2487.52	58.06	-15.94	74	46.84	27.42	17.21	33.41	299	8	P	H
			2483.52	47.92	-6.08	54	36.7	27.43	17.2	33.41	299	8	A	H
			2389.52	57.76	-16.24	74	46.64	27.52	17.06	33.46	100	16	P	V
			2390	47.36	-6.64	54	36.24	27.52	17.06	33.46	100	16	A	V
		*	2437	114.47	-	-	103.27	27.5	17.13	33.43	100	16	P	V
		*	2437	105.57	-	-	94.37	27.5	17.13	33.43	100	16	A	V
		2484.16	55.9	-18.1	74	44.68	27.43	17.2	33.41	100	16	P	V	
		2483.52	45.62	-8.38	54	34.4	27.43	17.2	33.41	100	16	A	V	



<b>802.11n</b> <b>HT20</b> <b>CH 11</b> <b>2462MHz</b>	*	2462	113.32	-	-	102.09	27.48	7.24	33.42	159	326	P	H
	*	2462	105.33	-	-	94.1	27.48	7.24	33.42	159	326	A	H
		2483.52	61.36	-12.64	74	50.14	27.43	7.27	33.41	159	326	P	H
		2483.52	49.23	-4.77	54	38.01	27.43	7.27	33.41	159	326	A	H
	*	2462	108.65			97.42	27.48	7.24	33.42	400	290	P	V
	*	2462	100.9			89.67	27.48	7.24	33.42	400	290	A	V
		2483.6	57.67	-16.33	74	46.45	27.43	7.27	33.41	400	290	P	V
		2483.52	47.05	-6.95	54	35.83	27.43	7.27	33.41	400	290	A	V
													V
													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 )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )	
802.11n HT20 CH 01 2412MHz		4824	38.24	-35.76	74	62.18	31	11.22	66.16	100	0	P	H	
		17985	58.09	-15.91	74	52.22	47.1	23.89	65.12	100	0	P	H	
		17985	47.78	-6.22	54	41.91	47.1	23.89	65.12	100	0	A	H	
													H	
			4824	38.72	-35.28	74	62.66	31	11.22	66.16	100	0	P	V
			17985	58.18	-15.82	74	52.31	47.1	23.89	65.12	100	0	P	V
			17985	47.48	-6.52	54	41.61	47.1	23.89	65.12	100	0	A	V
802.11n HT20 CH 06 2437MHz		4874	42.99	-31.01	74	66.35	31.43	11.33	66.12	100	0	P	H	
		7311	41.96	-32.04	74	57.84	36.4	13.44	65.72	100	0	P	H	
		17955	57.64	-16.36	74	52.45	46.5	23.86	65.17	100	0	P	H	
		17955	47.11	-6.89	54	41.92	46.5	23.86	65.17	100	0	A	H	
			4874	41.47	-32.53	74	64.83	31.43	11.33	66.12	100	0	P	V
			7311	43.14	-30.86	74	59.02	36.4	13.44	65.72	100	0	P	V
			17940	58.72	-15.28	74	53.87	46.2	23.84	65.19	100	0	P	V
802.11n HT20 CH 11 2462MHz		17940	46.53	-7.47	54	41.68	46.2	23.84	65.19	100	0	A	V	
		4924	41.61	-32.39	74	64.79	31.47	11.43	66.08	100	0	P	H	
		7386	40.86	-33.14	74	56.68	36.4	13.54	65.76	100	0	P	H	
		17940	58.72	-15.28	74	53.87	46.2	23.84	65.19	100	0	P	H	
		17940	46.79	-7.21	54	41.94	46.2	23.84	65.19	100	0	A	H	
			4924	40.65	-33.35	74	63.83	31.47	11.43	66.08	100	0	P	V
			7386	41.15	-32.85	74	56.97	36.4	13.54	65.76	100	0	P	V
Remark		18000	58.43	-15.57	74	52.23	47.4	23.9	65.1	100	0	P	V	
		18000	47.9	-6.1	54	41.7	47.4	23.9	65.1	100	0	A	V	

1. No other spurious found.  
2. All results are PASS against Peak and Average limit line.



Emission above 18GHz  
2.4GHz WIFI 802.11g (SHF)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	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 802.11g SHF		24930	38.26	-35.74	74	54.89	39.14	-2.81	52.96	150	0	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
			18749	38.48	-35.52	74	59.16	38.2	-3.63	55.25	150	0	P
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against limit line.												



Emission below 1GHz  
2.4GHz WIFI 802.11g (LF)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	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 802.11g LF		30	20.09	-19.91	40	27.68	24.06	0.79	32.44	-	-	P	H	
		98.87	15.27	-28.23	43.5	30.46	15.79	1.52	32.5	-	-	P	H	
		161.92	19.19	-24.31	43.5	33.5	16.24	1.97	32.52	-	-	P	H	
		749.74	28.95	-17.05	46	28.83	28.01	4.11	32	-	-	P	H	
		786.6	29.22	-16.78	46	28.51	28.2	4.22	31.71	-	-	P	H	
		876.81	31.57	-14.43	46	29.16	29.21	4.49	31.29	100	0	P	H	
														H
														H
														H
														H
														H
														H
			34.85	22.04	-17.96	40	31.73	21.88	0.9	32.47	-	-	P	V
			78.5	23	-17	40	41.17	12.99	1.36	32.52	-	-	P	V
			161.92	27.26	-16.24	43.5	41.57	16.24	1.97	32.52	-	-	P	V
			720.64	28.69	-17.31	46	29.8	27.1	4.02	32.23	-	-	P	V
			796.3	29.31	-16.69	46	28.41	28.29	4.24	31.63	-	-	P	V
			890.39	30.22	-15.78	46	27.77	29.16	4.53	31.24	100	0	P	V
														V
														V
													V	
													V	
													V	
													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	Path	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 )
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

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) =  
Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
3. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

**For Peak Limit @ 2390MHz:**

1. 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)
2. Over Limit(dB)  
= Level(dBμV/m) – Limit Line(dBμV/m)  
= 55.45(dBμV/m) – 74(dBμV/m)  
= -18.55(dB)

**For Average Limit @ 2390MHz:**

1. 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)
2. 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 D. Radiated Spurious Emission Plots

Test Engineer :	Harvey Guo, Bill Chang, Fu Chen and Troye Hsieh	Temperature :	18.3~25.7°C
		Relative Humidity :	58.2~70.8%

Remark: For Radiated Spurious Emission Plots Test Items, Ant. 1 means Aux. Antenna and Ant. 2 means Main Antenna.

### Note symbol

-L	Low channel location
-R	High channel location



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

Table with 4 quadrants showing spectral analysis results for Peak and Avg. measurements in Horizontal and Fundamental orientations. Each quadrant contains a graph of Level (dBuV/m) vs Frequency (MHz) and associated test parameters.



WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz	
1+2	Vertical	Fundamental
Peak	<p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF_1326 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF_1326 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	<p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 91200-HF_1326 VERTICAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	<p>Site : 03CH11-HY Condition : AVG_54 3m HORN 91200-HF_1326 VERTICAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>

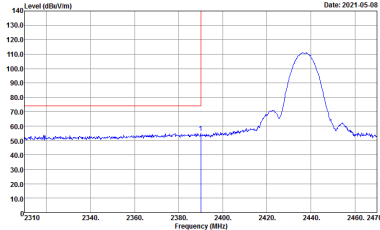
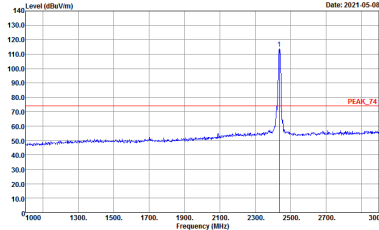
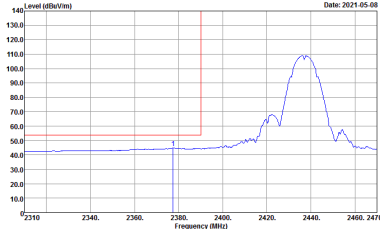
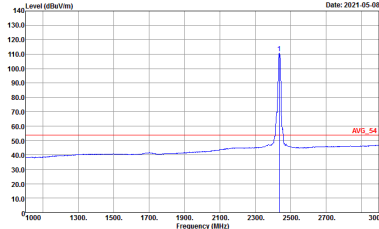


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - L	
1+2	Horizontal	Fundamental
Peak	<p>Date: 2021-05-08</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF_1326 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Date: 2021-05-08</p> <p>Site : 03CH11-HY Condition : PEAK_F4 3m HORN 91200-HF_1326 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	<p>Date: 2021-05-08</p> <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 91200-HF_1326 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	<p>Date: 2021-05-08</p> <p>Site : 03CH11-HY Condition : AVG_F4 3m HORN 91200-HF_1326 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>

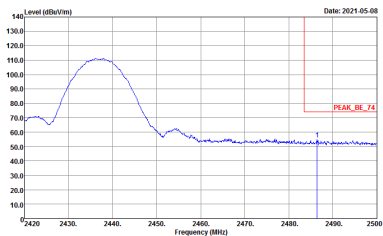
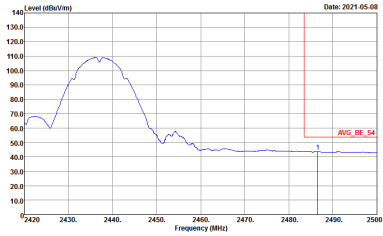


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - R	
1+2	Horizontal	Fundamental
Peak	<p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF_1326 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWF:Auto</p>	Left blank
Avg.	<p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 91200-HF_1326 HORIZONTAL : RBW:1000.000kHz VBW:0.010kHz SWF:Auto</p>	Left blank

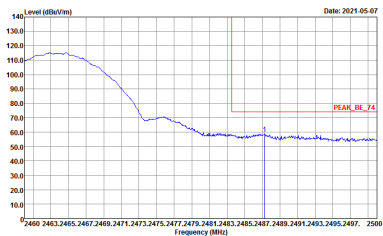
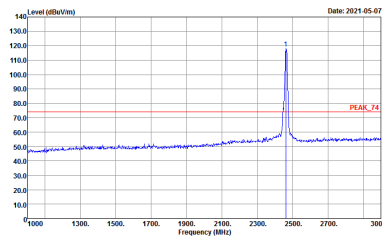
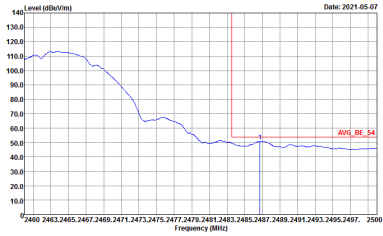
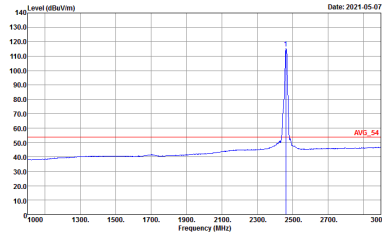


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - L	
1+2	Vertical	Fundamental
Peak	 <p>Date: 2021-05-08</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Date: 2021-05-08</p> <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Date: 2021-05-08</p> <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 91200-HF_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Date: 2021-05-08</p> <p>Site : 03CH11-HY Condition : AVG_54 3m HORN 91200-HF_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>



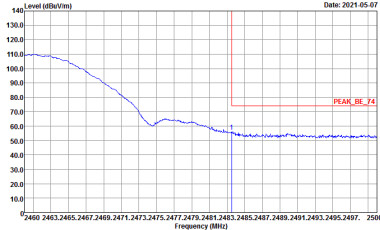
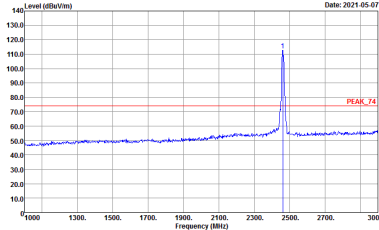
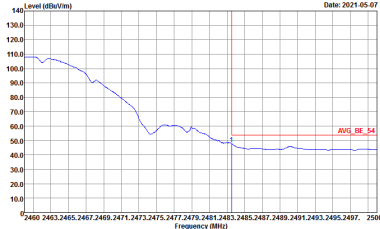
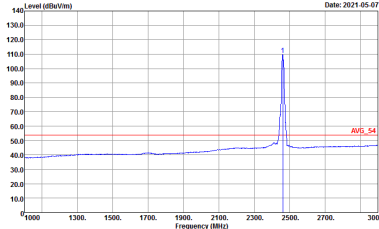
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - R	
1+2	Vertical	Fundamental
Peak	 <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	Left blank
Avg.	 <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 91200-HF_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	Left blank



WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz	
1+2	Horizontal	Fundamental
Peak	 <p>Date: 2021-05-07</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Date: 2021-05-07</p> <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Date: 2021-05-07</p> <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 91200-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Date: 2021-05-07</p> <p>Site : 03CH11-HY Condition : AVG_54 3m HORN 91200-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>





WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz	
1+2	Vertical	Fundamental
Peak	 <p>Date: 2021-05-07</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Date: 2021-05-07</p> <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Date: 2021-05-07</p> <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 91200-HF_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Date: 2021-05-07</p> <p>Site : 03CH11-HY Condition : AVG_54 3m HORN 91200-HF_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>



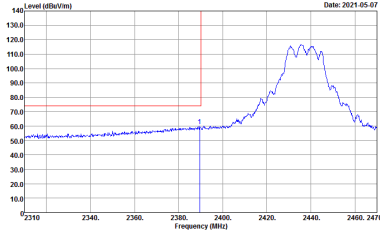
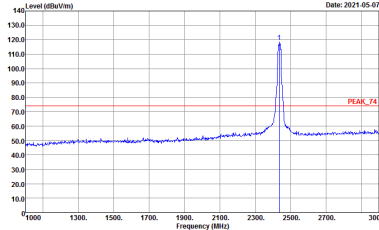
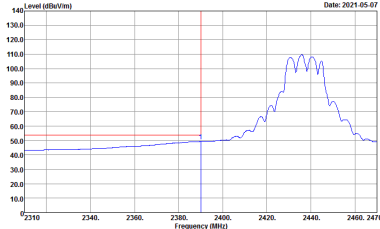
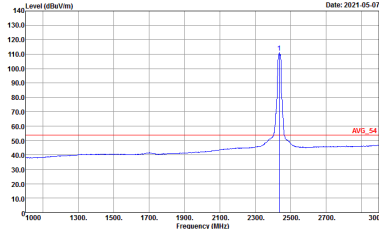
**2.4GHz 2400~2483.5MHz**  
**WIFI 802.11g (Band Edge @ 3m)**

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH01 2412MHz	
1+2	Horizontal	Fundamental
<b>Peak</b>	<p>Site : 03CH11-HY            Condition : PEAK_BE_74 3m HORN 91200-HF_1326 HORIZONTAL            : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH11-HY            Condition : PEAK_74 3m HORN 91200-HF_1326 HORIZONTAL            : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
<b>Avg.</b>	<p>Site : 03CH11-HY            Condition : AVG_BE_54 3m HORN 91200-HF_1326 HORIZONTAL            : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	<p>Site : 03CH11-HY            Condition : AVG_54 3m HORN 91200-HF_1326 HORIZONTAL            : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>

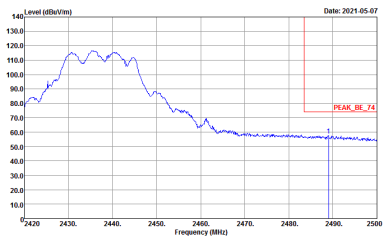
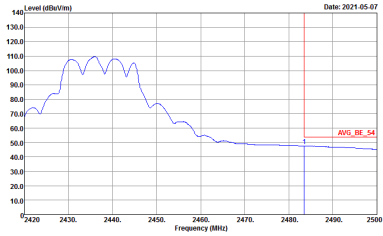


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH01 2412MHz	
1+2	Vertical	Fundamental
Peak	<p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	<p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	<p>Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D-HF_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>

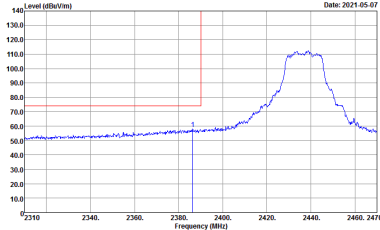
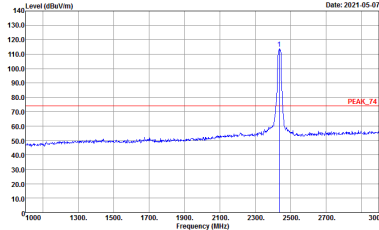
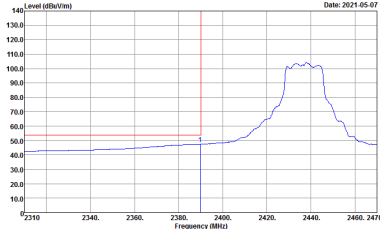
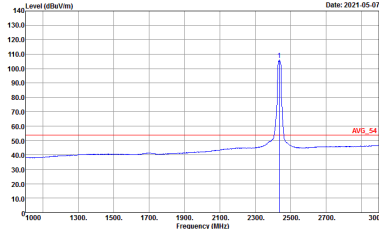


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - L	
1+2	Horizontal	Fundamental
Peak	 <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 91200-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Site : 03CH11-HY Condition : AVG_54 3m HORN 91200-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>



WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - R	
1+2	Horizontal	Fundamental
<p><b>Peak</b></p>	 <p>Date: 2021-05-07</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF_1326 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWF:Auto</p>	<p>Left blank</p>
<p><b>Avg.</b></p>	 <p>Date: 2021-05-07</p> <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 91200-HF_1326 HORIZONTAL : RBW:1000.000kHz VBW:0.010kHz SWF:Auto</p>	<p>Left blank</p>

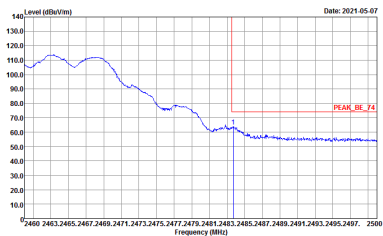
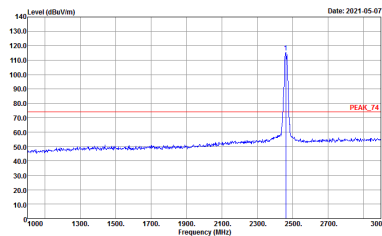
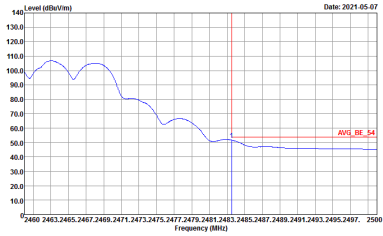
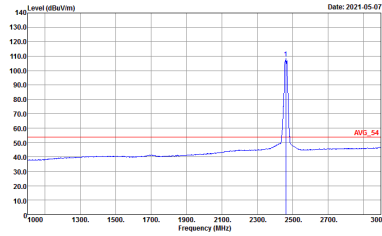


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - L	
1+2	Vertical	Fundamental
Peak	 <p>Date: 2021-05-07</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Date: 2021-05-07</p> <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Date: 2021-05-07</p> <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 91200-HF_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Date: 2021-05-07</p> <p>Site : 03CH11-HY Condition : AVG_54 3m HORN 91200-HF_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>



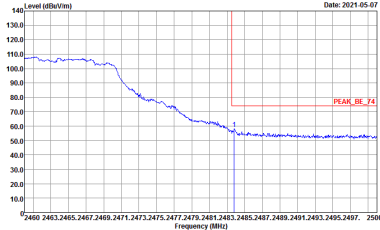
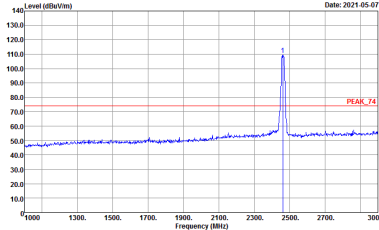
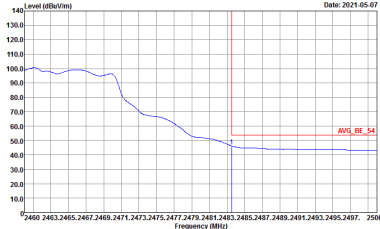
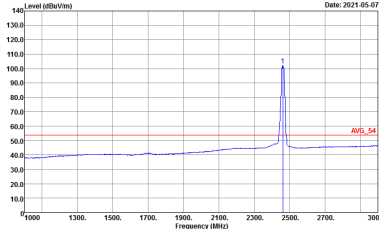
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - R	
1+2	Vertical	Fundamental
Peak	<p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF_1326 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	Left Blank
Avg.	<p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 91200-HF_1326 VERTICAL : RBW:1000.000kHz VBW:0.010kHz SWT:Auto</p>	Left Blank



WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz	
1+2	Horizontal	Fundamental
Peak	 <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 91200-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Site : 03CH11-HY Condition : AVG_54 3m HORN 91200-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>

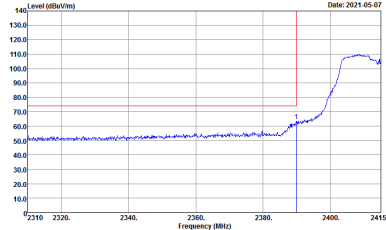
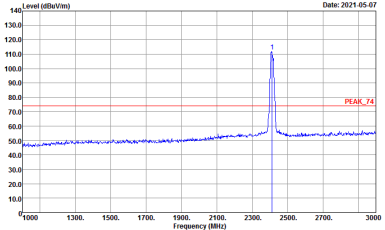
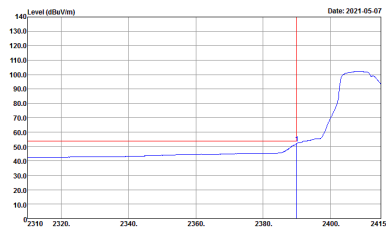
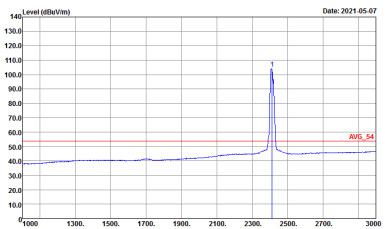




WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz	
1+2	Vertical	Fundamental
Peak	 <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 91200-HF_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Site : 03CH11-HY Condition : AVG_54 3m HORN 91200-HF_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>



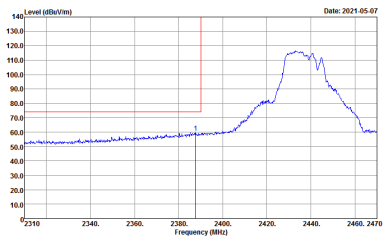
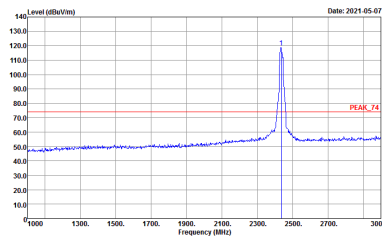
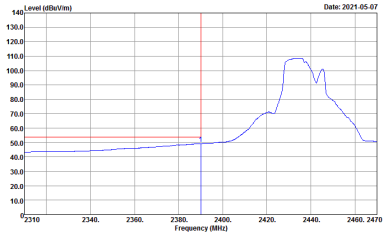
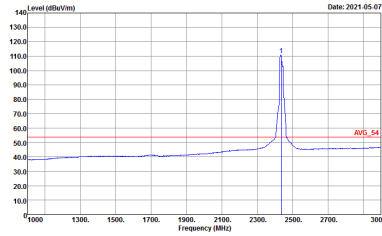
**2.4GHz 2400~2483.5MHz**  
**WIFI 802.11n HT20 (Band Edge @ 3m)**

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1+2	Horizontal	Fundamental
<b>Peak</b>	 <p>Site : 03CH11-HY            Condition : PEAK_BE_74 3m HORN 91200-HF_1326 HORIZONTAL            : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH11-HY            Condition : PEAK_74 3m HORN 91200-HF_1326 HORIZONTAL            : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
<b>Avg.</b>	 <p>Site : 03CH11-HY            Condition : AVG_BE_54 3m HORN 91200-HF_1326 HORIZONTAL            : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Site : 03CH11-HY            Condition : AVG_54 3m HORN 91200-HF_1326 HORIZONTAL            : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>



WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1+2	Vertical	Fundamental
Peak	<p>Date: 2021-05-07</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF_1326 VERTICAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	<p>Date: 2021-05-07</p> <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF_1326 VERTICAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>
Avg.	<p>Date: 2021-05-07</p> <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 91200-HF_1326 VERTICAL RBW:1000.000kHz VBW:0.010kHz SWT:Auto</p>	<p>Date: 2021-05-07</p> <p>Site : 03CH11-HY Condition : AVG_54 3m HORN 91200-HF_1326 VERTICAL RBW:1000.000kHz VBW:0.010kHz SWT:Auto</p>

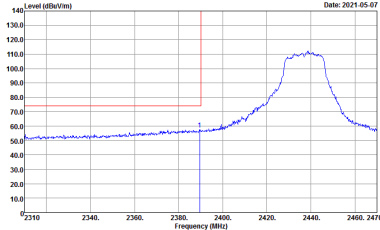
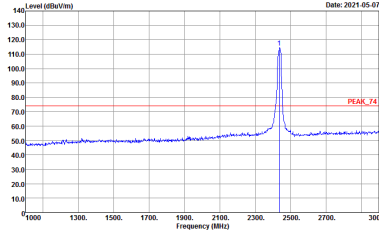
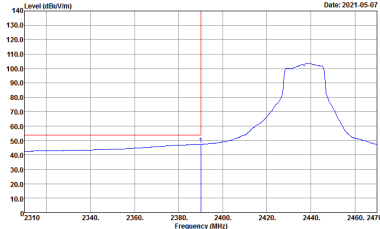
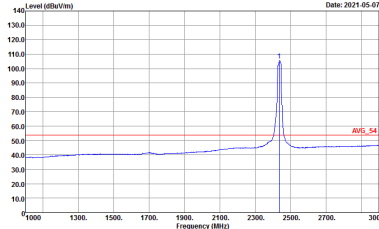


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - L	
1+2	Horizontal	Fundamental
Peak	 <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 91200-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Site : 03CH11-HY Condition : AVG_54 3m HORN 91200-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>



WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - R	
1+2	Horizontal	Fundamental
Peak	<p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF_1326 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	Left blank
Avg.	<p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 91200-HF_1326 HORIZONTAL : RBW:1000.000kHz VBW:0.010kHz SWT:Auto</p>	Left blank

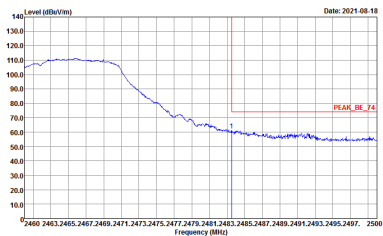
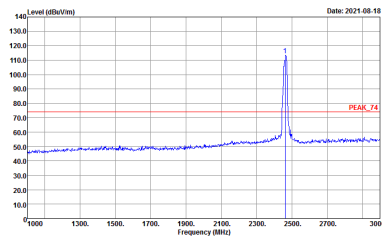
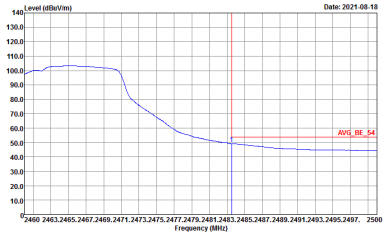
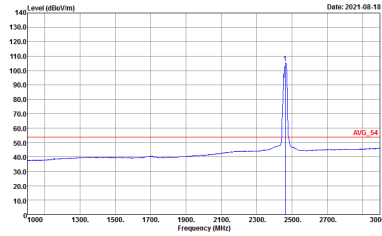


WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - L	
1+2	Vertical	Fundamental
Peak	 <p>Date: 2021-05-07</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF_1326 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Date: 2021-05-07</p> <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF_1326 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Date: 2021-05-07</p> <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF_1326 VERTICAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Date: 2021-05-07</p> <p>Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D-HF_1326 VERTICAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>



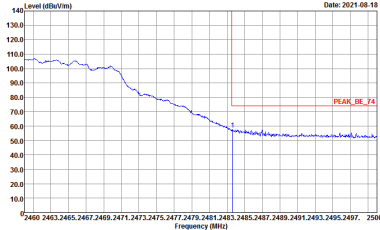
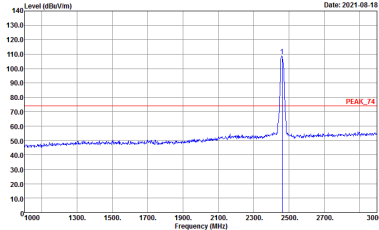
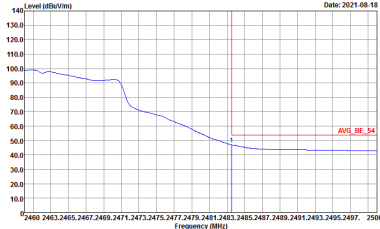
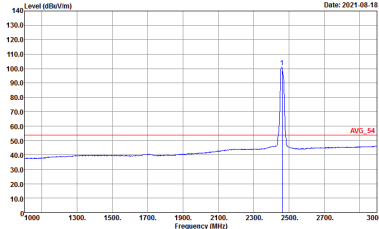
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - R	
1+2	Vertical	Fundamental
Peak	<p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	Left Blank
Avg.	<p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 91200-HF_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	Left Blank



WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1+2	Horizontal	Fundamental
Peak	 <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF_1326 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF_1326 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF_1326 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D-HF_1326 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>





WIFI	2.4GHz 2400~2483.5MHz Fundamental @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1+2	Vertical	Fundamental
Peak	 <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF_1326 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D-HF_1326 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>



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

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH01 2412MHz	
1+2	Horizontal	Vertical
Peak Avg.	<p>Site : 03CH11-HY          Condition : PEAK_74 3m HORN 91200-HF_1326 HORIZONTAL</p>	<p>Site : 03CH11-HY          Condition : PEAK_74 3m HORN 91200-HF_1326 VERTICAL</p>



<b>WIFI</b>	<b>2.4GHz 2400~2483.5MHz Harmonic @ 3m</b>	
<b>ANT</b>	<b>802.11b CH06 2437MHz</b>	
<b>1+2</b>	<b>Horizontal</b>	<b>Vertical</b>
<b>Peak</b> <b>Avg.</b>	<p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF_1326 HORIZONTAL</p>	<p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF_1326 VERTICAL</p>



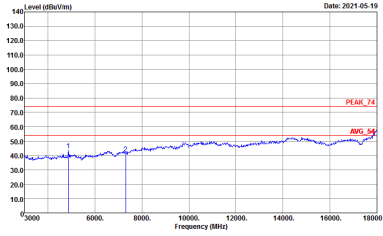
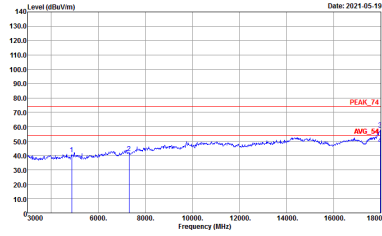
<b>WIFI</b>	<b>2.4GHz 2400~2483.5MHz Harmonic @ 3m</b>	
<b>ANT</b>	<b>802.11b CH11 2462MHz</b>	
<b>1+2</b>	<b>Horizontal</b>	<b>Vertical</b>
<b>Peak</b> <b>Avg.</b>	<p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF_1326 HORIZONTAL</p>	<p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF_1326 VERTICAL</p>



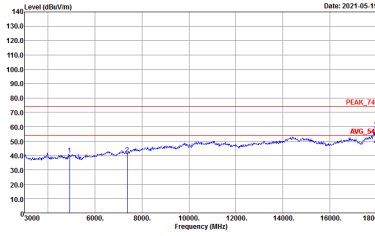
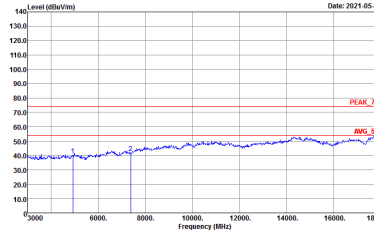
2.4GHz 2400~2483.5MHz  
WIFI 802.11g (Harmonic @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH01 2412MHz	
1+2	Horizontal	Vertical
Peak Avg.	<p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF_1326 HORIZONTAL</p>	<p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF_1326 VERTICAL</p>



WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH06 2437MHz	
1+2	Horizontal	Vertical
<p>Peak</p> <p>Avg.</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF_1326 HORIZONTAL</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF_1326 VERTICAL</p>



WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH11 2462MHz	
1+2	Horizontal	Vertical
<p>Peak</p> <p>Avg.</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF_1326 HORIZONTAL</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF_1326 VERTICAL</p>

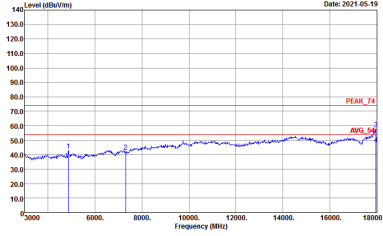
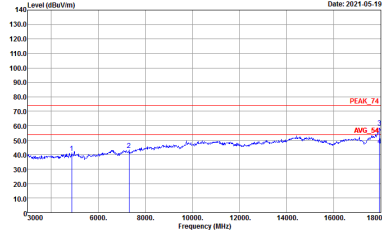


2.4GHz 2400~2483.5MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

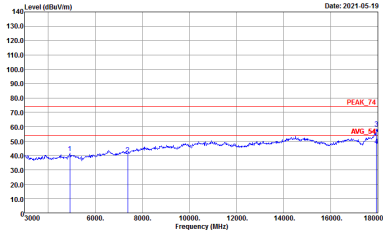
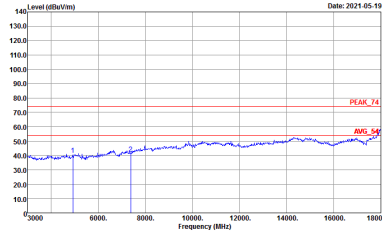
Table with 2 columns: Horizontal and Vertical. Each column contains a spectral plot showing Level (dBuV/m) vs Frequency (MHz) with Peak and Avg markers. Includes site and condition details for both orientations.





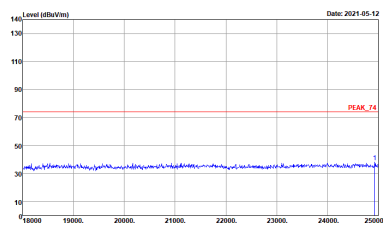
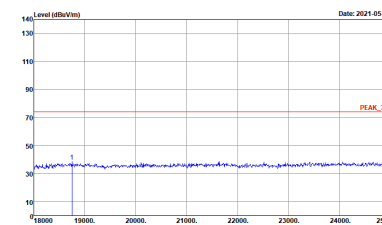
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH06 2437MHz	
1+2	Horizontal	Vertical
<p>Peak</p> <p>Avg.</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF_1326 HORIZONTAL</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF_1326 VERTICAL</p>



WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1+2	Horizontal	Vertical
<p>Peak</p> <p>Avg.</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF_1326 HORIZONTAL</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF_1326 VERTICAL</p>



Emission above 18GHz  
2.4GHz WIFI 802.11g (SHF)

WIFI	2.4GHz 2400~2483.5MHz	
ANT	802.11g SHF	
1+2	Horizontal	Vertical
QP / Peak		



Emission below 1GHz  
2.4GHz WIFI 802.11g (LF)

WIFI	2.4GHz 2400~2483.5MHz	
ANT	802.11g LF	
1+2	Horizontal	Vertical
QP / Peak	<p>Site : 03CH11-HY Condition : QP 3m BE-LOG 6111D-LF_ETC HORIZONTAL</p>	<p>Site : 03CH11-HY Condition : QP 3m BE-LOG 6111D-LF_ETC VERTICAL</p>



## Appendix E. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting	Duty Factor(dB)
1+2	802.11b	99.28	-	-	10Hz	0.03
1+2	802.11g	98.23	-	-	10Hz	0.08
1+2	2.4GHz 802.11n HT20	98.21	-	-	10Hz	0.08

### MIMO <Ant. 1+2>

