

## RADIO TEST REPORT

For

Shenzhen Wesion Technology Co., Ltd.

VIM3

Test Model: VIM3 Basic

Additional model: Please refer to page 6

Prepared for	:	Shenzhen Wesion Technology Co., Ltd.
Address	:	A#511, Mingyou Purchasing Center, Baoyuan Rd., Xixiang St., Bao'an Dis., Shenzhen, China.
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Date of receipt of test sample	:	March 27, 2020
Number of tested samples	:	1
Serial number	:	Prototype
Date of Test	:	March 27, 2020 ~ April 08, 2020
Date of Report	:	April 17, 2020

**RADIO TEST REPORT****MIC Notice No.88 Appendix No. 43**

Second-Generation Low-Power Data Communication System/Wireless LAN System

**Report Reference No.** ..... : **LCS200319044AEC**

Date of Issue ..... : April 17, 2020

**Testing Laboratory Name**..... : **Shenzhen LCS Compliance Testing Laboratory Ltd.**

Address ..... : Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao' an District, Shenzhen, Guangdong, China.

Testing Location/ Procedure ..... : Full application of Harmonised standards ☒  
Partial application of Harmonised standards ☐  
Other standard testing method ☐**Applicant's Name**..... : **Shenzhen Wesion Technology Co., Ltd.**

Address ..... : A#511, Mingyou Purchasing Center, Baoyuan Rd., Xixiang St., Bao'an Dis., Shenzhen, China.

**Test Specification**

Standard..... : MIC Notice No.88 Appendix No.43

Test Report Form No. .... : LCSEMC-1.0

TRF Originator ..... : Shenzhen LCS Compliance Testing Laboratory Ltd.

Master TRF ..... : Dated 2011-03

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**Test Item Description.** ..... : **VIM3**

Trade Mark..... : Khadas

Test Model ..... : VIM3 Basic

Ratings ..... : Input: 5V=3A, 9V=2.67A, 12V=2A

Result ..... : Positive

**Compiled by:**

Jayden Zhuo

Jayden Zhuo/ File administrators

**Supervised by:**

Jin Wang

Jin Wang/ Technique principal

**Approved by:**

Gavin Liang/ Manager

## RADIO -- TEST REPORT

Test Report No. : LCS200319044AEC

April 17, 2020

Date of issue

Type / Model..... : VIM3 Basic

EUT..... : VIM3

**Applicant..... : Shenzhen Wesion Technology Co., Ltd.**Address..... : A#511, Mingyou Purchasing Center, Baoyuan Rd., Xixiang St.,  
Bao'an Dis., Shenzhen, China.

Telephone..... : /

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**Manufacturer..... : Shenzhen Wesion Technology Co., Ltd.**Address..... : A#511, Mingyou Purchasing Center, Baoyuan Rd., Xixiang St.,  
Bao'an Dis., Shenzhen, China.

Telephone..... : /

Fax..... : /

**Factory..... : /**

Address..... : /

Telephone..... : /

Fax..... : /

**Test Result****Positive**

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

## Revision History

Revision	Issue Date	Revisions	Revised By
000	April 17, 2020	Initial Issue	Gavin Liang



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# 1. GENERAL INFORMATION

## 1.1. Description of Device (EUT)

EUT	: VIM3
Test Model	: VIM3 Basic
Additional Model No:	: VIM3 Pro, VIM3L
Model Declaration:	: PCB board, structure and internal of these model(s) are the same, : So no additional models were tested
Hardware Version	: V12
Software Version	: Android 9.0
Power Supply	: Input: 5V=3A, 9V=2.67A, 12V=2A

### Bluetooth

Frequency Range	2402-2480MHz for Bluetooth (79 channels for Bluetooth V5.0(BDR/EDR) : 40 channels for Bluetooth V5.0(BT LE) Channel Frequency=2402+(K-1), K=1, 2, 3 .....79 Channel Frequency=2402+2(K-1), K=1, 2, 3 .....40
Declared Antenna Power	: Bluetooth V5.0(BDR/EDR): 0.03mW/MHz : Bluetooth V5.0(BT LE): 0.7mW
Modulation Technology	: Bluetooth V5.0(BDR/EDR): GFSK, $\pi/4$ -DQPSK, 8-DPSK : Bluetooth V5.0(BT LE): GFSK
Data Rate	: Bluetooth V5.0(BDR/EDR): 1/2/3Mbps : Bluetooth V5.0(BT LE): 2Mbps
Antenna Description	: FPC Antenna, 2.00dBi

### WIFI(2.4G Band)

Frequency Range	: 2412-2472MHz
Channel Spacing	: 5MHz
Channel Number	: 2412-2472MHz: : 13 channels for 20MHz bandwidth(2412~2472MHz) IEEE 802.11b: 1.5mW/MHz
Declared Antenna Power	: IEEE 802.11g: 1.5mW/MHz IEEE 802.11n HT20: 4.5mW/MHz
Modulation Type	: IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK); : IEEE 802.11g/n: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11b: 11/5.5/2/1Mbps.
Data Rate	: IEEE 802.11g: 54/48/36/24/18/12/9/6Mbps. IEEE 802.11n HT20: 65.0/58.5/52.0/39.0/26.0/19.5/13.0/6.5Mbps
Antenna Description	: ANT 0: FPC Antenna, 2.00dBi : ANT 1: FPC Antenna, 2.00dBi

### WIFI(5.2G Band)

Frequency Range	: 5180-5240MHz 4 channels for 20MHz bandwidth(5180~5240MHz)
Channel Number	: 2 channels for 40MHz bandwidth(5190~5230MHz) 1 channels for 80MHz bandwidth(5210MHz) IEEE 802.11a: 2.0mW/MHz
Declared Antenna Power	: IEEE 802.11n HT20: 2.0mW/MHz IEEE 802.11n HT40: 1.0mW/MHz

	IEEE 802.11ac VHT20: 2.0mW/MHz
	IEEE 802.11ac VHT40: 1.0mW/MHz
	IEEE 802.11ac VHT80: 1.0mW/MHz
Modulation Type	: IEEE 802.11a/n/ac: OFDM (64QAM, 16QAM, QPSK, BPSK)
Antenna Description	: ANT 0: FPC Antenna, 2.00dBi
	: ANT 1: FPC Antenna, 2.00dBi

## 1.2. Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	Certificate
--	--	--	--	--

## 1.3. External I/O Cable

I/O Port Description	Quantity	Cable
HDMI Port	1	USB Cable: 1m, unshielded
Type C Port	1	USB Cable: 1m, unshielded
USB Cable	2	USB Cable: 0.8m, unshielded

## 1.4. Description of Test Facility

FCC Registration Number. is 254912.  
 Industry Canada Registration Number. is 9642A-1.  
 ESMD Registration Number. is ARCB0108.  
 UL Registration Number. is 100571-492.  
 TUV SUD Registration Number. is SCN1081.  
 TUV RH Registration Number. is UA 50296516-001  
 NVLAP Registration Code is 600167-0

## 1.5. Test Conditions

Temperature Range	:	21-25℃
Humidity Range	:	45-85%
Pressure Range	:	86-106kPa

## 1.6. Frequency of Channels

IEEE 802.11b HT20

Frequency Band	Channel No.	Frequency(MHz)	Channel No.	Frequency(MHz)
2412~2472MHz	1	2412	8	2447
	2	2417	9	2452
	3	2422	10	2457
	4	2427	11	2462
	5	2432	12	2467
	6	2437	13	2472
	7	2442	-	-

## IEEE 802.11g/n HT20

Frequency Band	Channel No.	Frequency(MHz)	Channel No.	Frequency(MHz)
2412~2472MHz	1	2412	8	2447
	2	2417	9	2452
	3	2422	10	2457
	4	2427	11	2462
	5	2432	12	2467
	6	2437	13	2472
	7	2442	--	--

## 2. TEST METHODOLOGY

### 2.1. EUT Exercise

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of MIC Notice No.88 Appendix No. 43.

### 2.2. Measurement Uncertainty

Test Item		MU	Remark
Bandwidth	:	$\pm 0.2E^{-6}$	/
Antenna Power	:	$\pm 0.33dB$	/
Frequency Tolerance	:	$\pm 0.3E^{-6}$	/
Conducted spurious emission	:	$\pm 0.13dB$	/
DC Power	:	$\pm 1\%$	/

(1). This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

### 2.3. Table for Parameters of Test Software Setting

During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Power Parameters:

Test Software Version	MpTool			
Frequency	2412MHz	2442MHz	2472MHz	2484MHz
802.11b (20MHz)	Default	Default	Default	N/A
802.11g (20MHz)	Default	Default	Default	N/A
802.11n (20MHz)	Default	Default	Default	N/A

\*\*\*Note: The output power level of the software has one option (default) only.

### 2.4. Description of Test Modes

Tested mode, channel, and data rate information				
Mode	Preliminary Test Data Rate (Mbps)	Final Test Data Rate (Mbps) (see Note)	Channel	Frequency (MHz)
802.11b	11/1	11	Low :CH1	2412
	11/1	11	Middle: CH7	2442
	11/1	11	High: CH13	2472
802.11g	54/6	6	Low :CH1	2412
	54/6	6	Middle: CH7	2442
	54/6	6	High: CH13	2472
802.11n HT20	65.0/6.5	6.5	Low :CH1	2412
	65.0/6.5	6.5	Middle: CH7	2442
	65.0/6.5	6.5	High: CH13	2472

Note: According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test.

**Antenna & Bandwidth**

Antenna	Chain 0 (ANT0)		Chain 1 (ANT1)		Simultaneously
Bandwidth Mode	20MHz	40MHz	20MHz	40MHz	/
IEEE 802.11b	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IEEE 802.11g	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IEEE 802.11n	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**2.5. Test Voltage****POWER SUPPLY VOLTAGE FLUCTUATION TEST**

Voltage Fluctuation Test	Normal Voltage	High Voltage +10% of Normal Voltage	Low Voltage -10% of Normal Voltage
Input To EUT	DC 12V	DC 13.2V	DC 10.8V
Output To RF Module	DC 12V	DC 12V	DC 12V
Voltage Variation (%)	--	--	--

**Note:**

As declared by the manufacturer, the IC FUSB302BMPX (PCB Bit Number: U26) regulates the DC power to be 12V and supply to the RF chip.

Voltage Variation (%)

= (Output high or Low Voltage - Output Normal Voltage)/ Output Normal Voltage\* 100

During the input supply voltage to the EUT from the external power source is varied by +/- 10%, if output voltage had been confirmed that the fluctuation of power supply to the RF circuit of EUT (excluding power source) is equal to or less than +/-1%. Exempt extremely high and low supply voltage condition test, EUT only operated in nominal voltage to test all regulations.

### **3. SYSTEM TEST CONFIGURATION**

#### **3.1. Justification**

The system was configured for testing in engineering mode.

#### **3.2. EUT Exercise Software**

N/A.

#### **3.3. Special Accessories**

N/A.

#### **3.4. Block Diagram/Schematics**

Please refer to the related document.

#### **3.5. Equipment Modifications**

Shenzhen LCS Compliance Testing Laboratory Ltd. has not done any modification on the EUT.

## 4. SUMMARY OF TEST RESULTS

MIC Notice No.88 Appendix No.43 Article 2 Paragraph 1 Item 19		
Clause	Description of Test (Transmitter Parameters)	Result
6	Antenna Power	PASS
6	Tolerances for Antenna Power	PASS
3	Frequency Tolerance	PASS
4	Transmission Rate	PASS
4	Occupied Frequency Bandwidth	PASS
4	Spread Bandwidth	PASS
5	Spurious Emissions	PASS
10	Transmission Antenna Gain (EIRP Antenna Power)	N/A
11	Transmission Radiated Angle Width (3dB Beam width)	N/A
12	Interference prevention function	PASS
8	Carrier Sensing function	N/A
Receiver Parameters		
7	Secondary Radiated Emissions	PASS
Note: (1) N/A is an abbreviation for Not Applicable. (2) N/T means this test item is not tested.		



## 5. TEST RESULT

### 5.1. Antenna Power

#### 5.1.1. Standard Applicable

Type	Limit
DTS	10mW
OFDM OBW<26MHz, DS	10mW/MHz
OFDM OBW 26-38MHz	5mW/MHz
Tolerance	+20%,-80%

Upper Limit of EIRP for Modulation Systems

Modulation System	Frequency Band used	Antenna power (Max.)	EIRP (max.)	
			Omnidirectional case	Directional case
DS, OFDM	2400~2483.5MHz	10mW/MHz	12.14 dBm/MHz	22.14 dBm/MHz
FH, DS-FH, FH-OFDM	2400~2483.5MHz	3mW/MHz	6.91 dBm/MHz	16.91 dBm/MHz
	Excluding 2427~2470.75MHz	10mW/MHz	12.14 dBm/MHz	22.14 dBm/MHz
Other than the above	2400~2483.5MHz	10mW	12.14 dBm	22.14 dBm

#### 5.1.2. Measuring Instruments

Please refer to section 6 of equipments list in this report.

#### 5.1.3. Test Procedures

- a. Set EUT work in test mode as described in clause 2.4.
- b. Connected the EUT's antenna port to the Spectrum Analyzer by suitable attenuator, set the Spectrum Analyzer as below:

Centre Frequency: The centre frequency of the channel under test.

Resolution BW: 1MHz.

Video BW: 1MHz.

Span: Wide enough to cover the complete power envelope of the signal of the EUT.

Trigger condition: Free run.

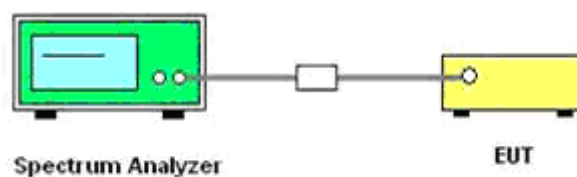
Sweep mode: Continuous sweeping.

Detector: Peak.

Trace Mode: Max Hold.

- c. When the trace is complete, find the peak value of the power envelope and record.

#### 5.1.4. Test Setup



## 5.1.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

## 5.1.6. Test Result

Temperature	22.5°C	Humidity	53.1%
Test Engineer	David Luo	Test Voltage	Normal Voltage

Result @ Chain 0						
Mode	CH	Declared Antenna Power	Result	Tolerance	Limit	Tolerance Limit
		mW/MHz	mW/MHz		mW/MHz	
802.11b	CH1	1.5	1.369	-8.73%	10	+20%,-80%
	CH7	1.5	1.339	-10.73%	10	+20%,-80%
	CH13	1.5	1.467	-2.21%	10	+20%,-80%
802.11g	CH1	1.5	1.339	-10.71%	10	+20%,-80%
	CH7	1.5	1.702	13.45%	10	+20%,-80%
	CH13	1.5	1.628	8.52%	10	+20%,-80%

Result @ Chain 1						
Mode	CH	Declared Antenna Power	Result	Tolerance	Limit	Tolerance Limit
		mW/MHz	mW/MHz		mW/MHz	
802.11b	CH1	1.5	1.353	-9.82%	10	+20%,-80%
	CH7	1.5	1.327	-11.51%	10	+20%,-80%
	CH13	1.5	1.469	-2.04%	10	+20%,-80%
802.11g	CH1	1.5	1.381	-7.94%	10	+20%,-80%
	CH7	1.5	1.573	4.85%	10	+20%,-80%
	CH13	1.5	1.675	11.66%	10	+20%,-80%

Result @ Chain 0+1								
Mode	CH	ANT 0	ANT 1	Result ANT 0+1	Declared Antenna Power	Tolerance	Limit	Tolerance Limit
		mW/MHz	mW/MHz	mW/MHz	mW/MHz		mW/MHz	
802.11n HT20	CH1	2.215	2.350	4.565	4.5	1.44%	10	+20%,-80%
	CH7	2.210	2.309	4.519	4.5	0.42%	10	+20%,-80%
	CH13	2.218	2.317	4.535	4.5	0.78%	10	+20%,-80%

## 5.2. Frequency Tolerance

### 5.2.1. Standard Applicable

Tolerance of frequency shall be  $\pm 50\text{ppm}$ .

### 5.2.2. Measuring Instruments

Please refer to section 6 of equipments list in this report.

### 5.2.3. Test Procedures

- a. Set EUT work in test mode as described in clause 2.4.
- b. Connected the EUT's antenna port to the Spectrum Analyzer by suitable attenuator, set the Spectrum Analyzer as below:

Centre Frequency: The centre frequency of the channel under test.

Resolution BW: 10 KHz.

Video BW: 10 KHz.

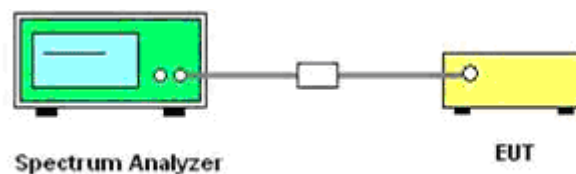
Span: 1MHz.

Detector: Peak.

Trace Mode: Max Hold.

- c. When the trace is complete, find the peak value of the power envelope and record.

### 5.2.4. Test Setup Layout



### 5.2.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

### 5.2.6. Test Result

Please refer to the following page.

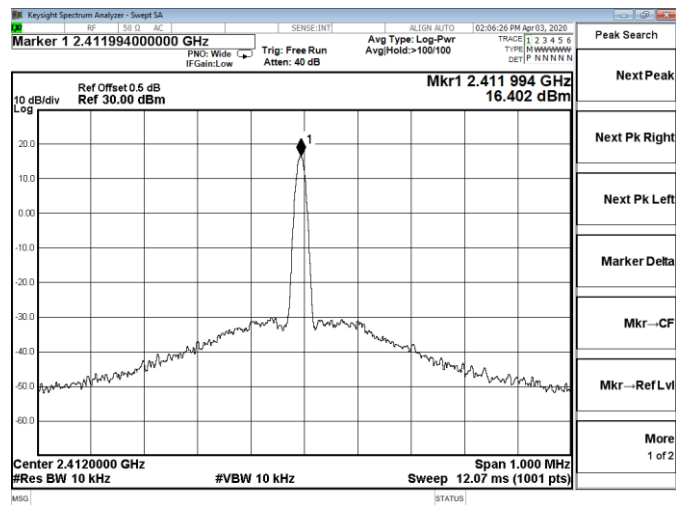
Temperature	22.5°C	Humidity	53.1%
Test Engineer	David Luo	Test Voltage	Normal Voltage

Result @ Chain 0					
Channel	Frequency	Measured MHz	Tolerance KHz	Result ppm	Limit ppm
1	2412	2411.994	-6	-2.49	±50
7	2442	2441.997	-3	-1.23	±50
13	2472	2471.993	-7	-2.83	±50

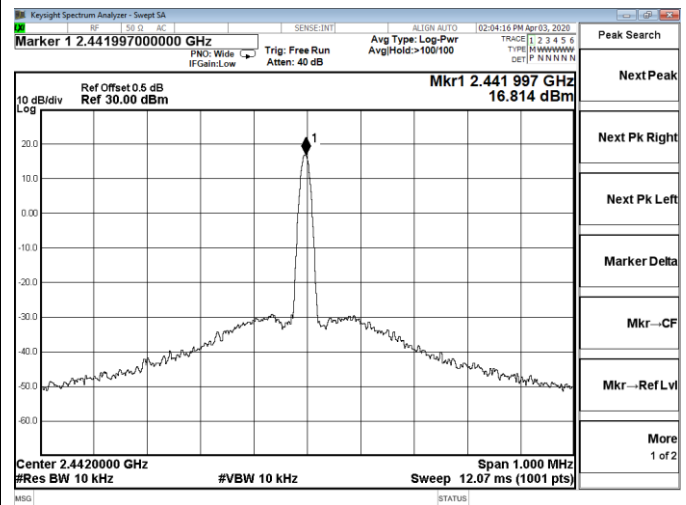
Result @ Chain 1					
Channel	Frequency	Measured MHz	Tolerance KHz	Result ppm	Limit ppm
1	2412	2411.993	-7	-2.90	±50
7	2442	2441.995	-5	-2.05	±50
13	2472	2471.992	-8	-3.24	±50

Note:

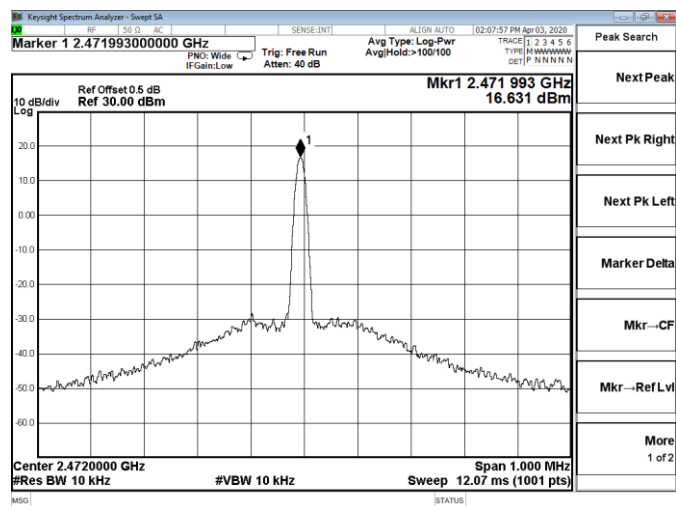
- 1). Test Result: Pass.
- 2). All test modes have been tested and we only record the worst result.

Test Plot of Frequency Error @ Chain 0  
Test Voltage: Normal Voltage

TX-2412MHz



TX-2442MHz

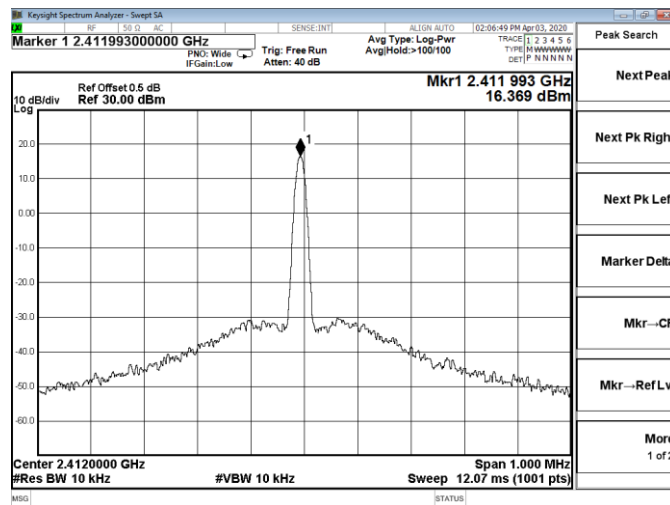


TX-2472MHz

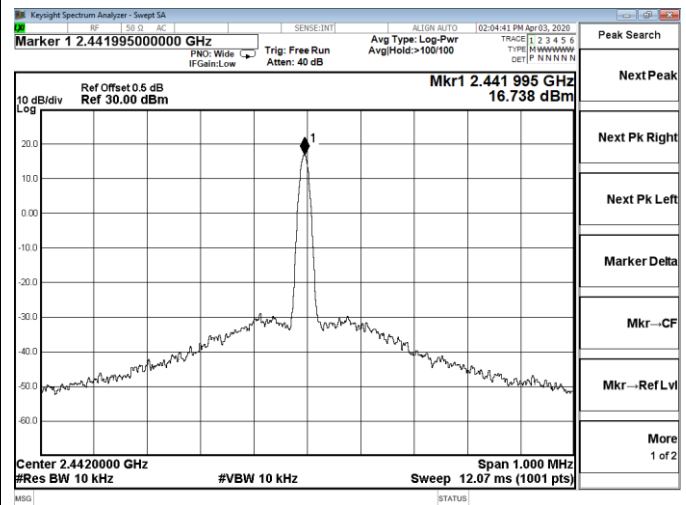
All test modes have been tested and we only record the worst result.

### Test Plot of Frequency Error @ Chain 1

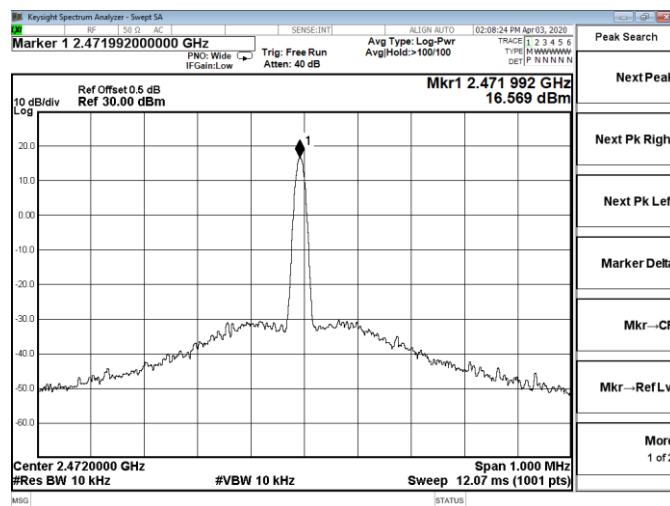
#### Test Voltage: Normal Voltage



TX-2412MHz



TX-2442MHz



TX-2472MHz

All test modes have been tested and we only record the worst result.

### 5.3. Occupied Frequency Bandwidth

#### 5.3.1. Standard Applicable

Permissible value for occupied bandwidth using the FH system, a hybrid system combining DS and FH systems, or a hybrid system combining FH and OFDM systems shall be 83.5 MHz or less, while necessary bandwidth (minimum occupied bandwidth sufficient to ensure information transmission of required quality at a required transmission rate for the system used under specified conditions for a given emission type) using a system other than any of the above shall be 26 MHz or less.

#### 5.3.2. Measuring Instruments

Please refer to section 6 of equipments list in this report.

#### 5.3.3. Test Procedures

- a. Set EUT work in test mode as described in clause 2.4.
- b. Connected the EUT's antenna port to the Spectrum Analyzer by suitable attenuator, set the Spectrum Analyzer as below:

Centre Frequency: The centre frequency of the channel under test.

RBW/VBW= 100 KHz/300KHz for WIFI.

Span: Wide enough to cover the complete power envelope of the signal of the EUT.

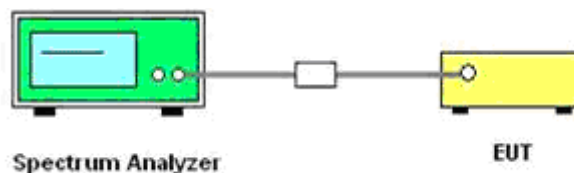
Sweep mode: Continuous sweeping.

Detector: Peak.

Trace Mode: Max Hold.

- c. When the trace is complete, measure the occupied bandwidth (99% bandwidth) with spectrum analyzer's bandwidth measure function.

#### 5.3.4. Test Setup Layout



#### 5.3.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

## 5.3.6. Test Result of 99% Spectrum Bandwidth

Temperature	22.5℃	Humidity	53.1%
Test Engineer	David Luo	Test Voltage	Normal Voltage

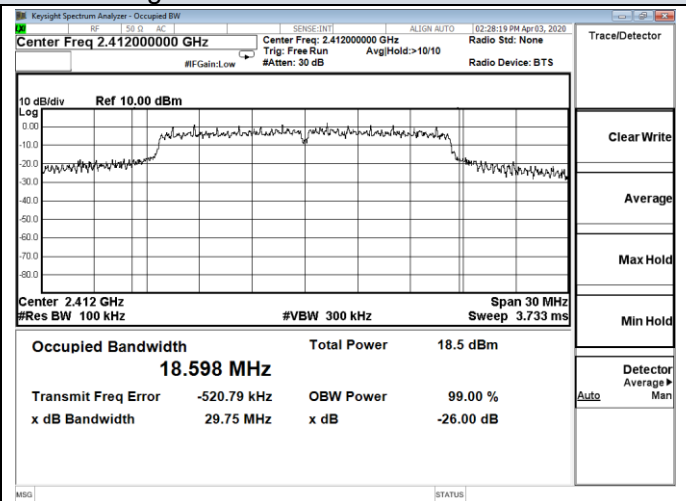
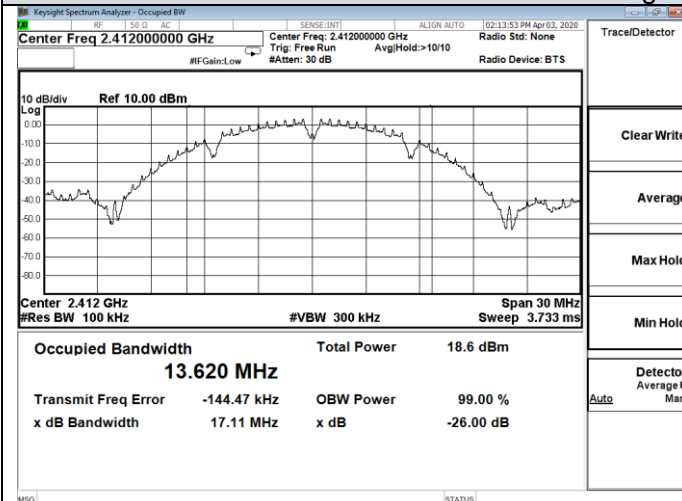
Result @ Chain 0			
Mode	CH	Result	Limit
		(MHz)	(MHz)
802.11b	CH1	13.620	26
	CH7	14.352	26
	CH13	13.674	26
802.11g	CH1	18.598	26
	CH7	18.433	26
	CH13	17.457	26
802.11n HT20	CH1	19.025	26
	CH7	19.124	26
	CH13	18.357	26

Result @ Chain 1			
Mode	CH	Result	Limit
		(MHz)	(MHz)
802.11b	CH1	13.628	26
	CH7	14.328	26
	CH13	13.735	26
802.11g	CH1	19.153	26
	CH7	18.535	26
	CH13	17.565	26
802.11n HT20	CH1	19.397	26
	CH7	19.100	26
	CH13	18.308	26

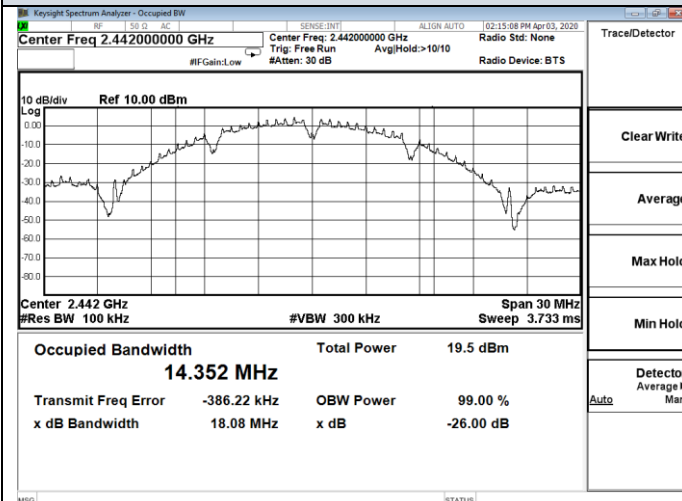


### Test Plot of Occupied Frequency Bandwidth @ Chain 0

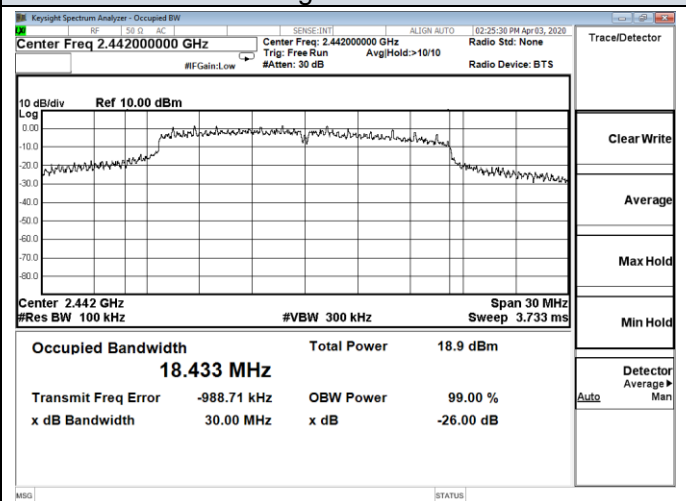
#### Test Voltage: Normal Voltage



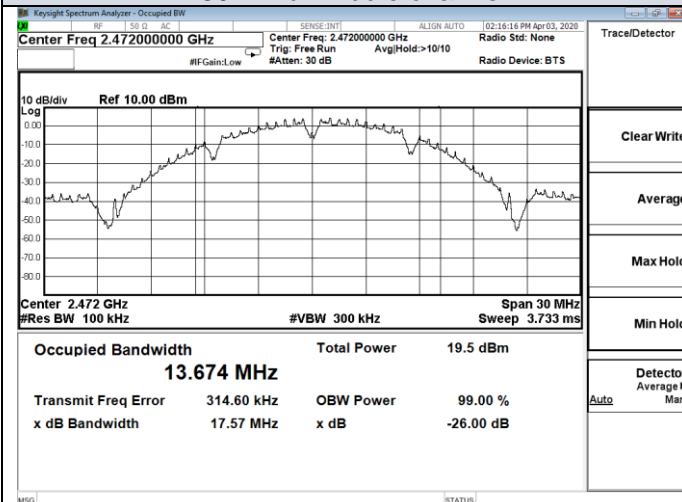
#### 802.11b-Low channel



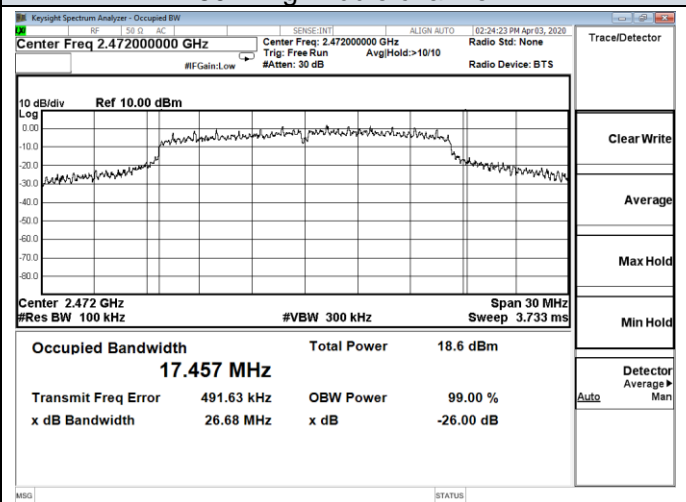
#### 802.11g-Low channel



#### 802.11b- Middle channel



#### 802.11g-Middle channel

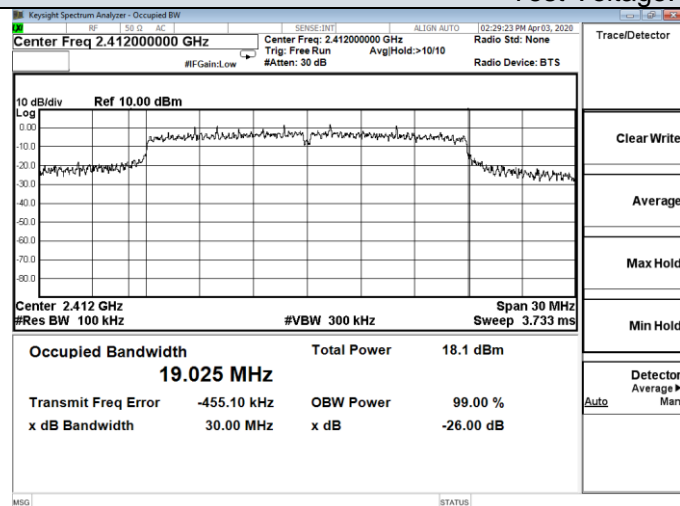


#### 802.11b- High channel

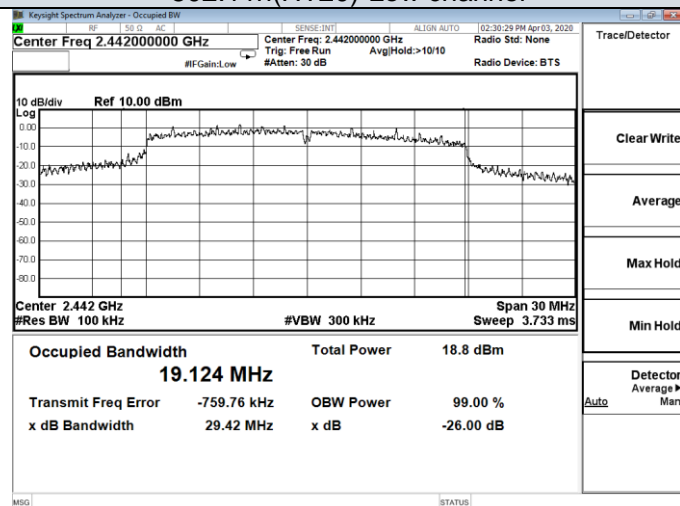
#### 802.11g-High channel

## Test Plot of Occupied Frequency Bandwidth @ Chain 0

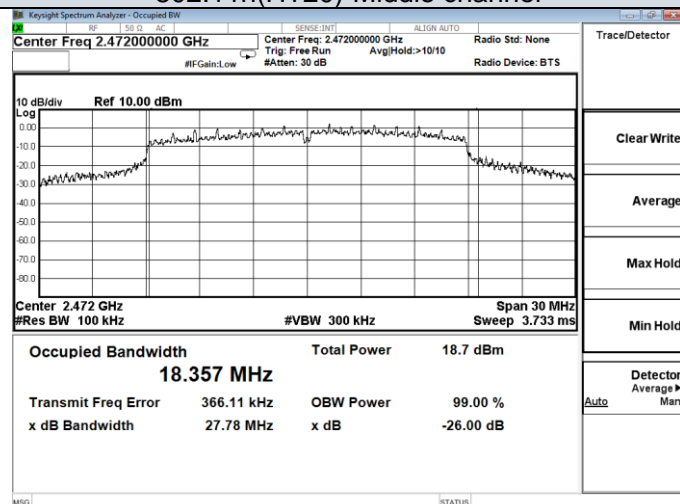
Test Voltage: Normal Voltage



## 802.11n(HT20)-Low channel



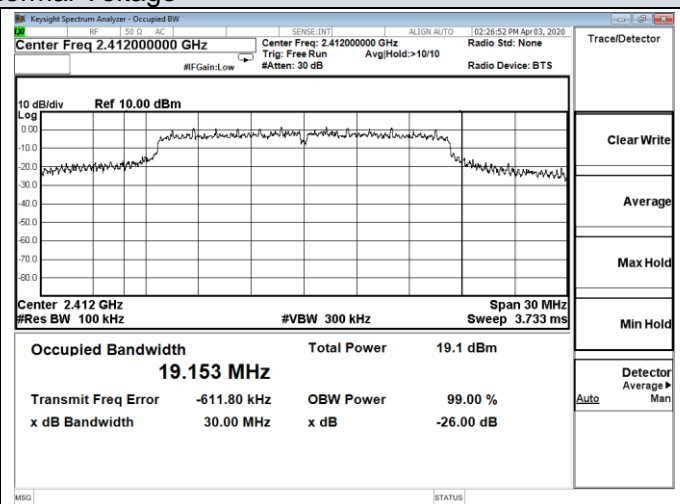
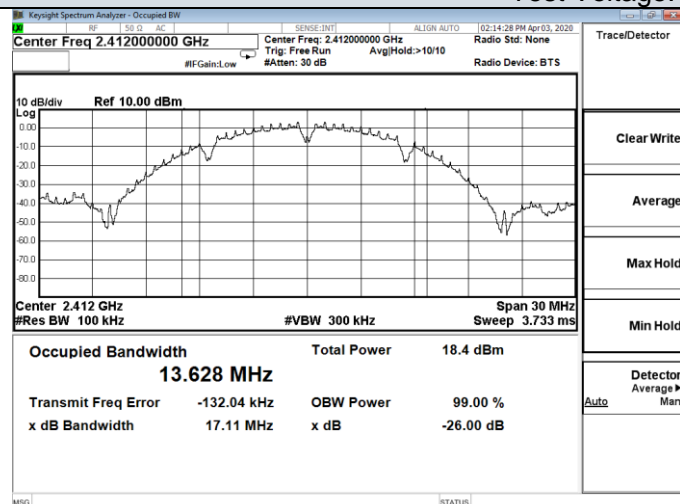
## 802.11n(HT20)-Middle channel



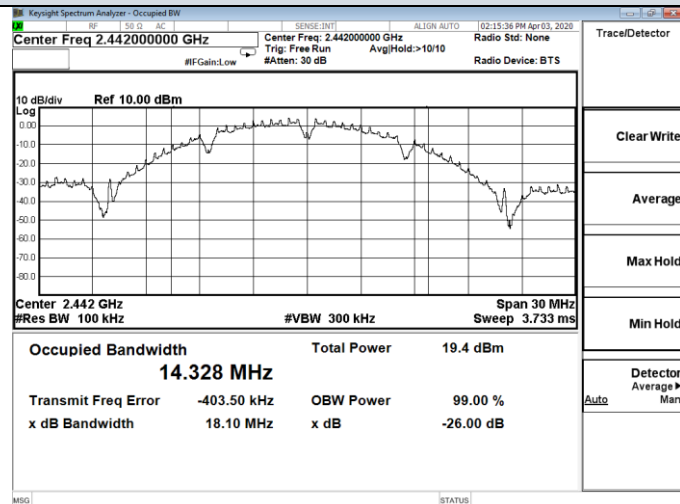
## 802.11n(HT20)-High channel

### Test Plot of Occupied Frequency Bandwidth @ Chain 1

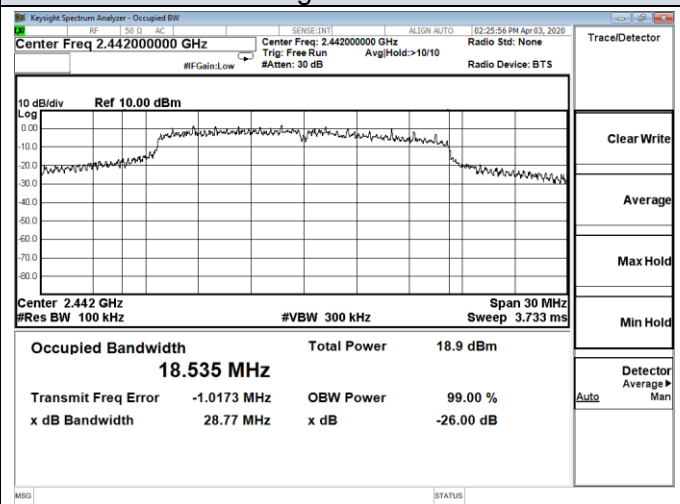
#### Test Voltage: Normal Voltage



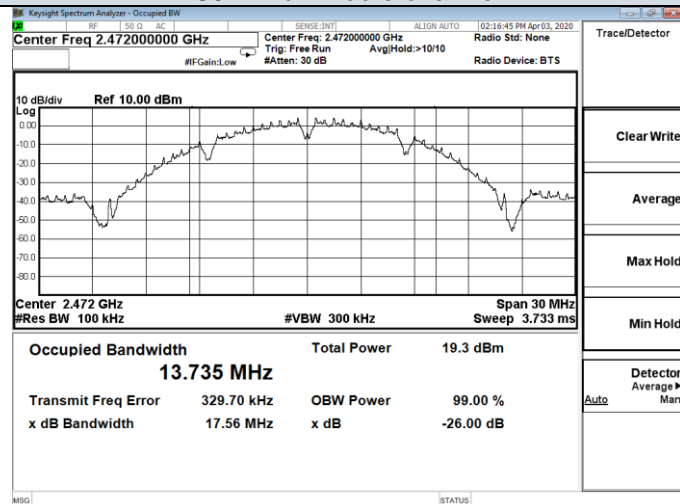
#### 802.11b-Low channel



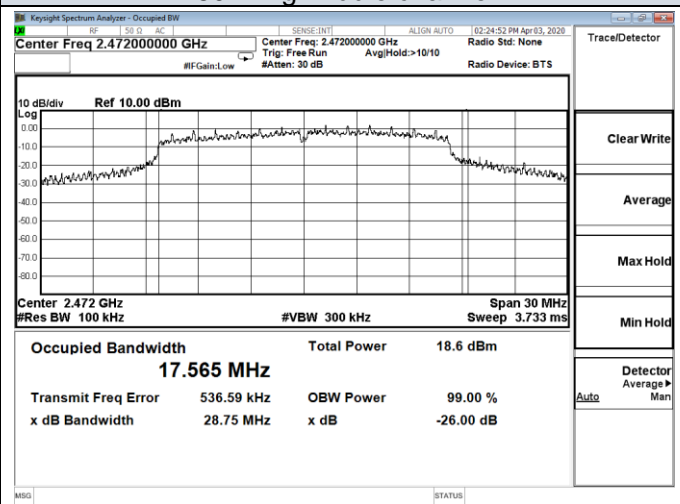
#### 802.11g-Low channel



#### 802.11b- Middle channel



#### 802.11g-Middle channel

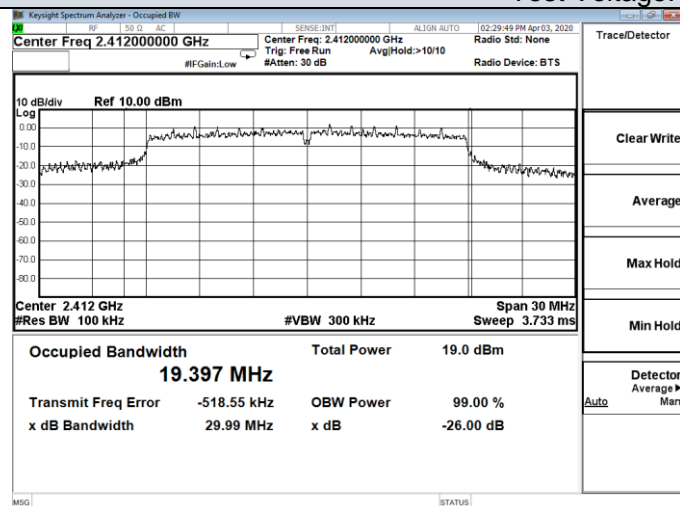


#### 802.11b- High channel

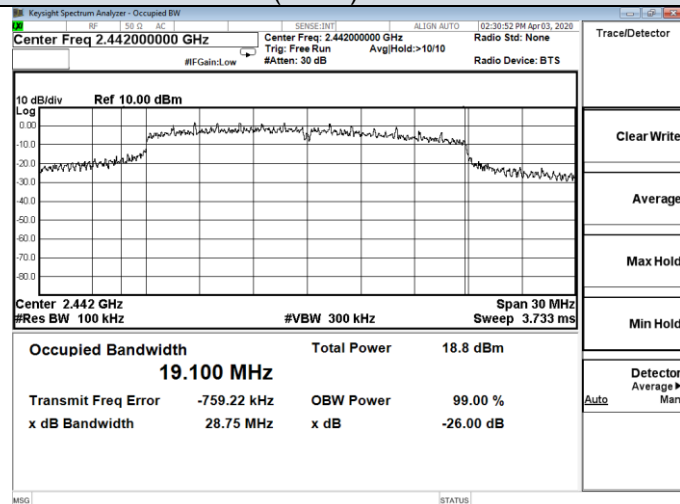
#### 802.11g-High channel

## Test Plot of Occupied Frequency Bandwidth @ Chain 1

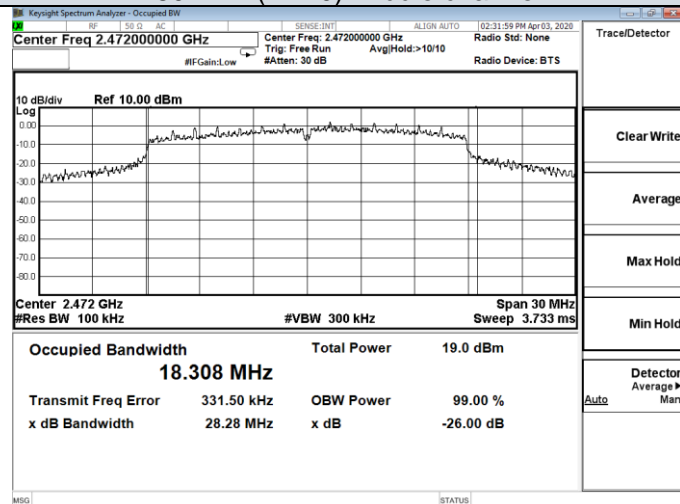
Test Voltage: Normal Voltage



## 802.11n(HT20)-Low channel



## 802.11n(HT20)-Middle channel



## 802.11n(HT20)-High channel

## 5.4. Spread Bandwidth

### 5.4.1. Standard Applicable

In spread spectrum systems, spread bandwidth (which refers to a frequency bandwidth with an upper limit and lower limit such that each of the mean powers radiated above the upper frequency limit and below the lower frequency limit is equal to 5 % of the total mean power radiated; this also applies hereafter) shall be 500 kHz or more.

### 5.4.2. Measuring Instruments

Please refer to section 6 of equipments list in this report.

### 5.4.3. Test Procedures

- a. Set EUT work in test mode as described in clause 2.4.
- b. Connected the EUT's antenna port to the Spectrum Analyzer by suitable attenuator, set the Spectrum Analyzer as below:

Centre Frequency: The centre frequency of the channel under test.

RBW/VBW= 100 KHz/300KHz for WIFI.

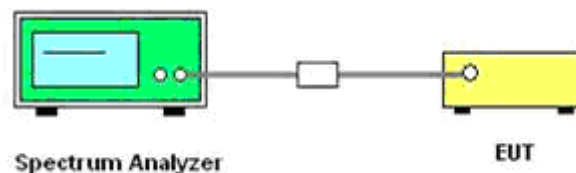
Span: Wide enough to cover the complete power envelope of the signal of the EUT.

Detector: Peak.

Trace Mode: Max Hold.

- c. When the trace is complete, measure the occupied bandwidth (90% bandwidth) with spectrum analyzer's bandwidth measure function.

### 5.4.4. Test Setup Layout



### 5.4.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

## 5.4.6. Test Result of 90% Occupied Bandwidth.

Temperature	22.5℃	Humidity	53.1%
Test Engineer	David Luo	Test Voltage	Normal Voltage

Result @ Chain 0					
Mode	CH	Result	Limit	Spread factor	Limit
		(MHz)	(MHz)		
802.11b	CH1	8.9467	>0.5	6.51	≥5
	CH7	8.9416	>0.5	6.50	≥5
	CH13	8.6838	>0.5	6.32	≥5

Result @ Chain 1					
Mode	CH	Result	Limit	Spread factor	Limit
		(MHz)	(MHz)		
802.11b	CH1	8.9350	>0.5	6.50	≥5
	CH7	8.9392	>0.5	6.50	≥5
	CH13	8.6672	>0.5	6.30	≥5

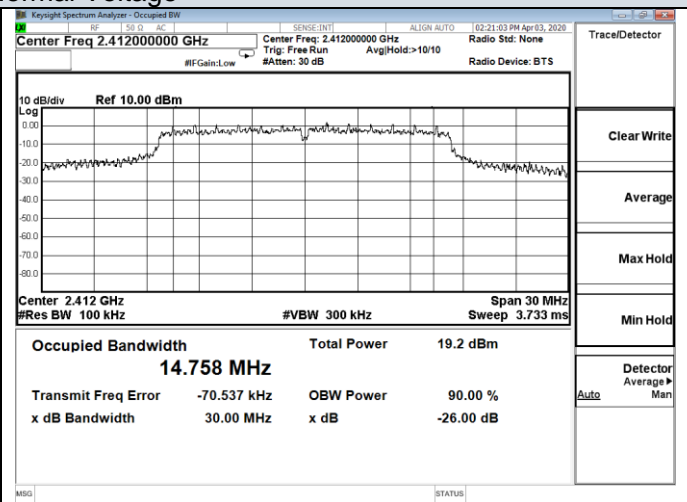
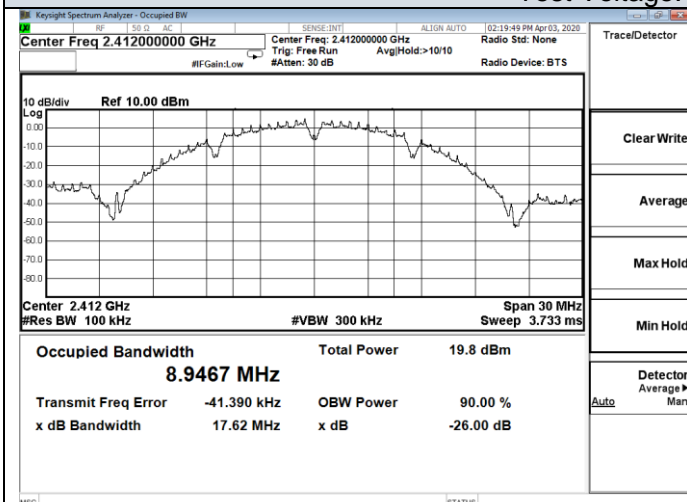
Note: Spread Factor = Spread Bandwidth / TR  
(TR = 1.375 for 802.11b)

Result @ Chain 0			
Mode	CH	Result	Limit
		(MHz)	(MHz)
802.11g	CH1	14.758	>0.5
	CH7	13.903	>0.5
	CH13	13.896	>0.5
802.11n HT20	CH1	15.517	>0.5
	CH7	14.674	>0.5
	CH13	14.562	>0.5

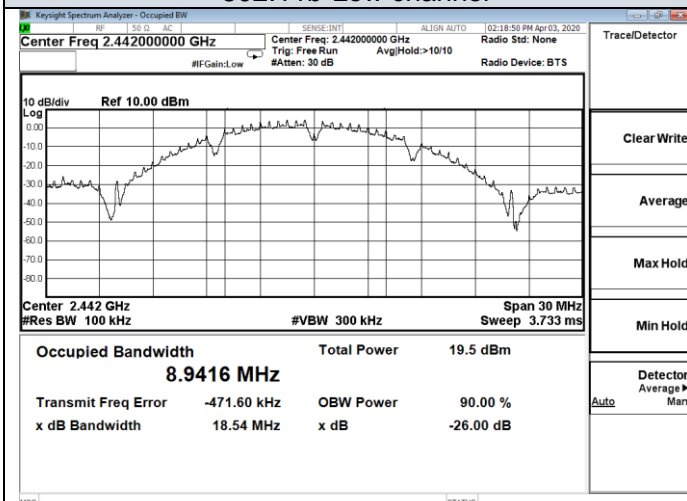
Result @ Chain 1			
Mode	CH	Result	Limit
		(MHz)	(MHz)
802.11g	CH1	14.795	>0.5
	CH7	13.971	>0.5
	CH13	13.941	>0.5
802.11n HT20	CH1	15.542	>0.5
	CH7	14.709	>0.5
	CH13	14.689	>0.5

## Test Plot of Spread Bandwidth @ Chain 0

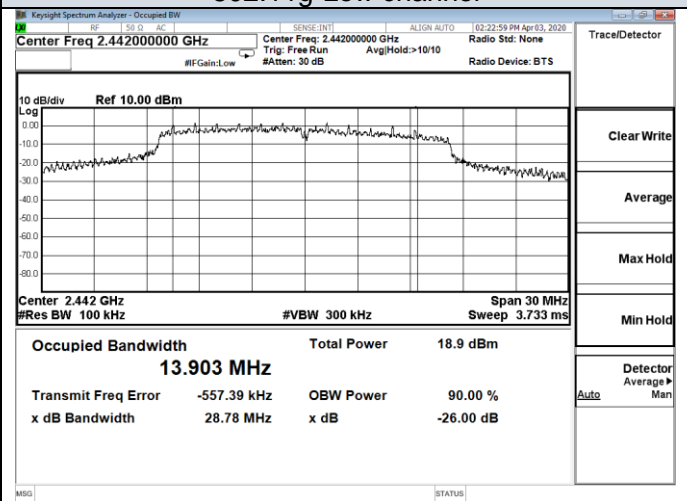
Test Voltage: Normal Voltage



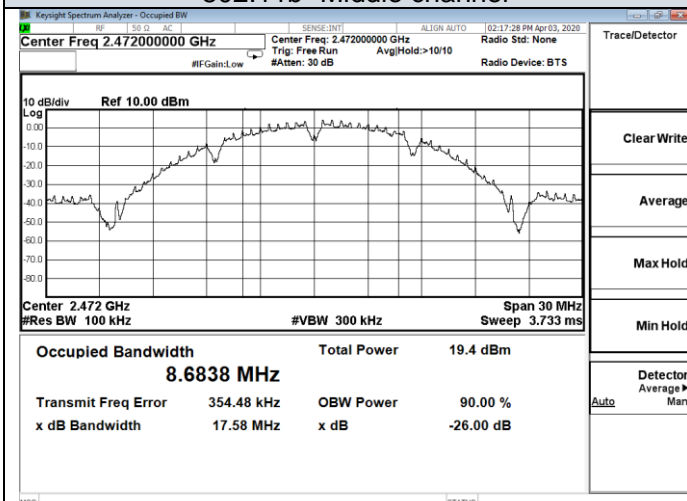
## 802.11b-Low channel



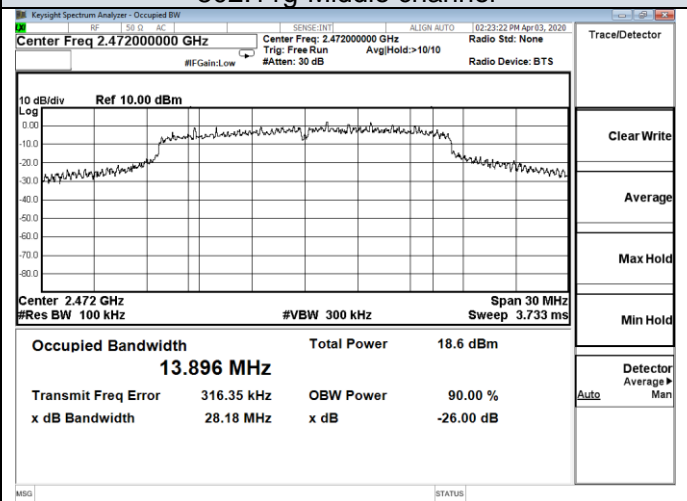
## 802.11g-Low channel



## 802.11b- Middle channel



## 802.11g-Middle channel



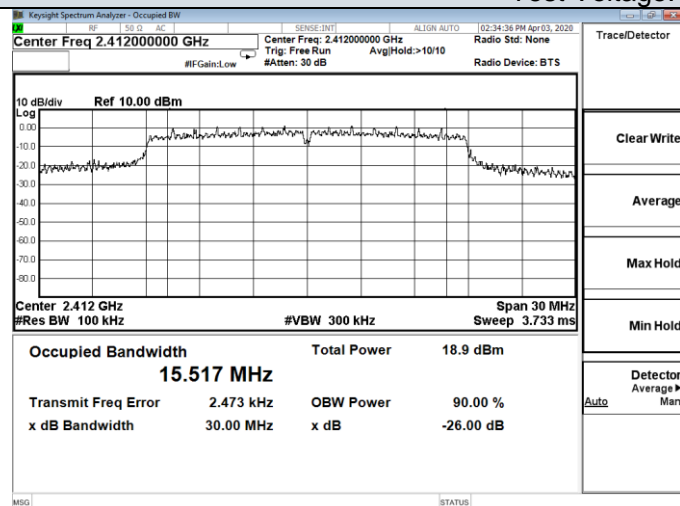
## 802.11b- High channel

## 802.11g-High channel

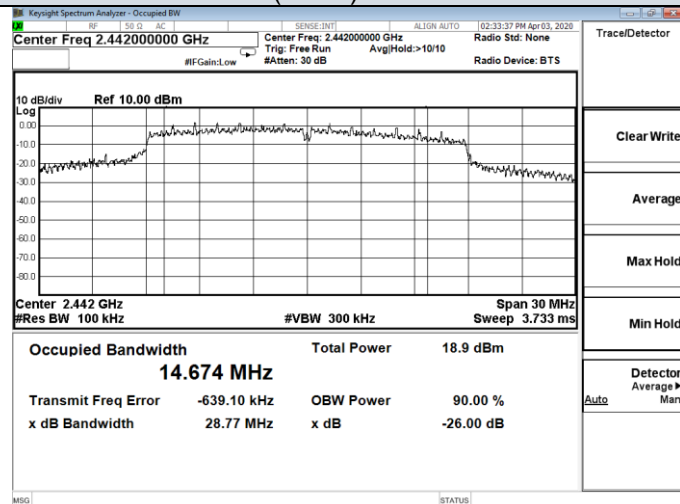


## Test Plot of Spread Bandwidth @ Chain 0

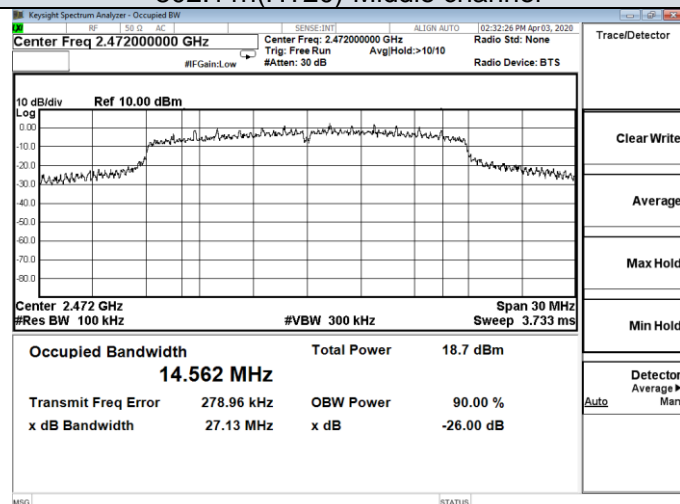
Test Voltage: Normal Voltage



## 802.11n(HT20)-Low channel



## 802.11n(HT20)-Middle channel

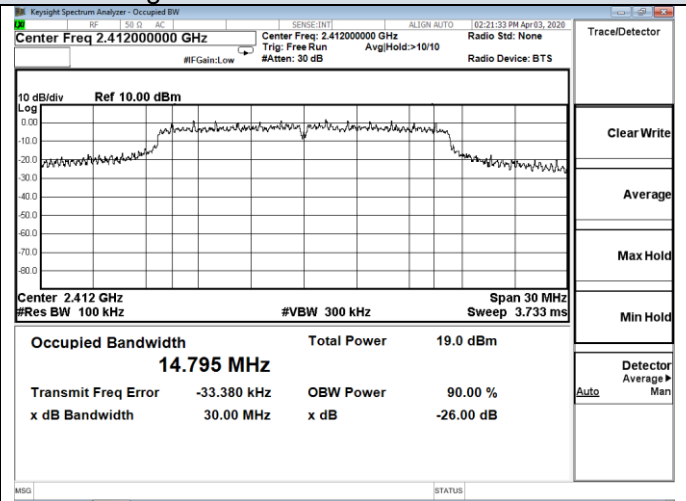
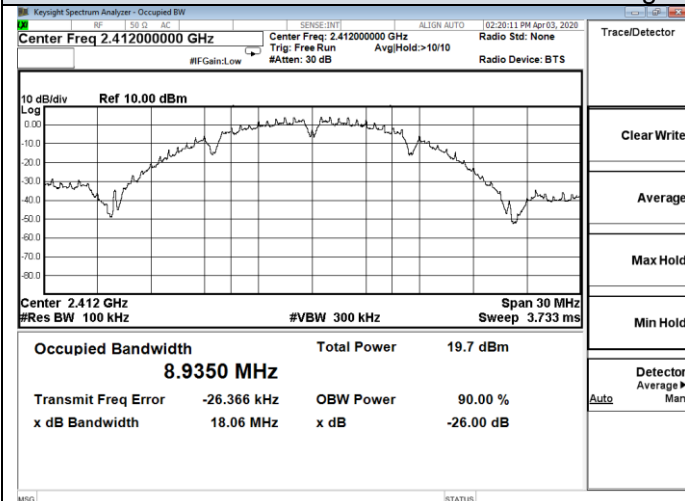


## 802.11n(HT20)-High channel

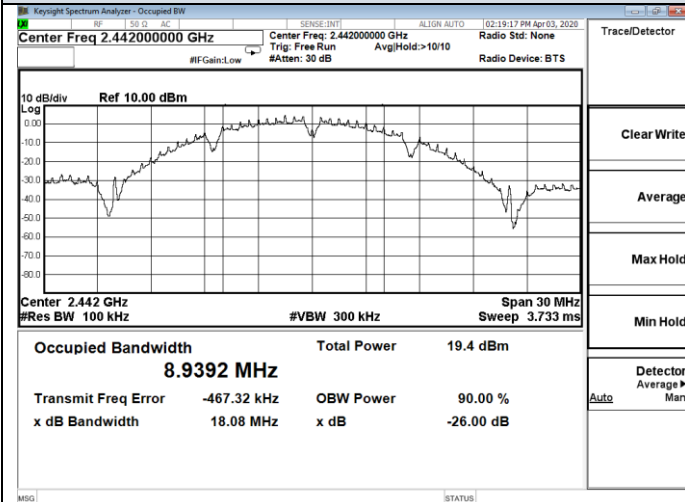


### Test Plot of Spread Bandwidth @ Chain 1

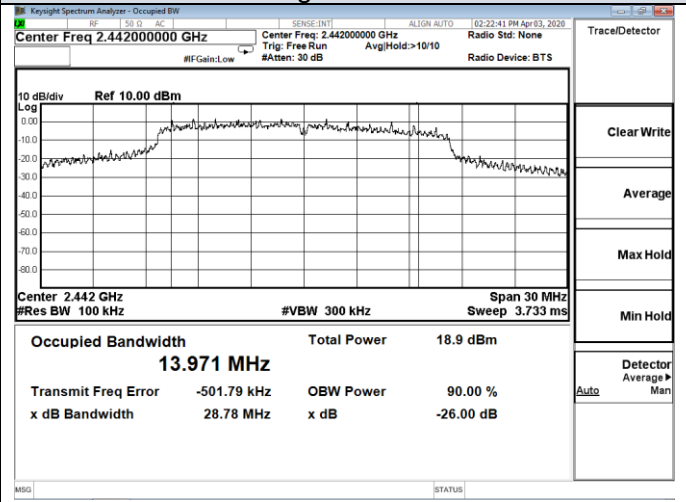
#### Test Voltage: Normal Voltage



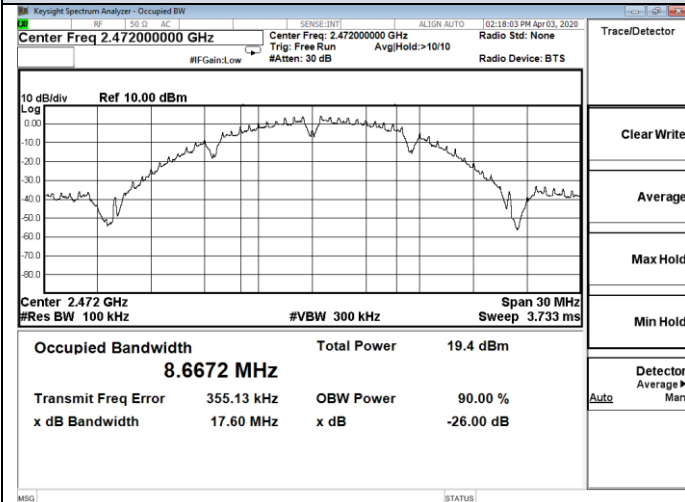
#### 802.11b-Low channel



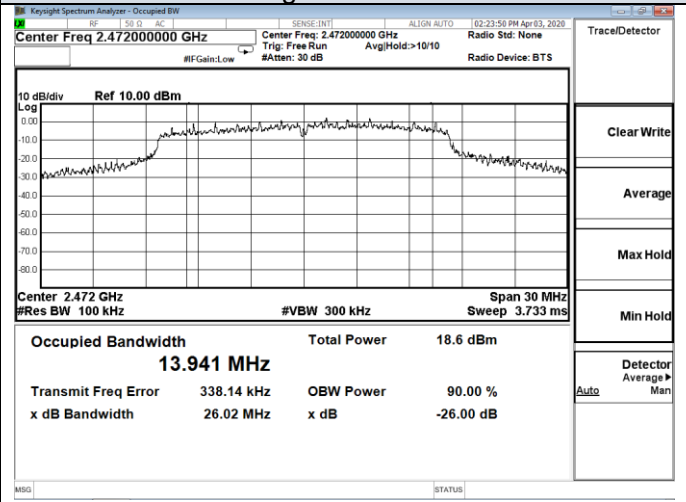
#### 802.11g-Low channel



#### 802.11b-Middle channel



#### 802.11g-Middle channel

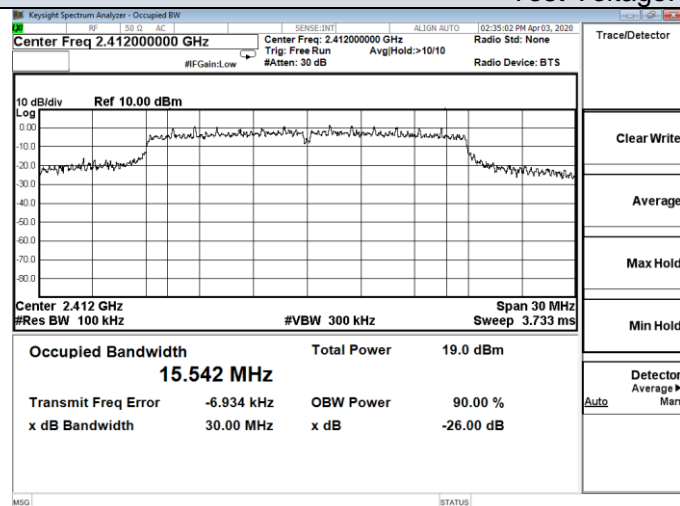


#### 802.11b-High channel

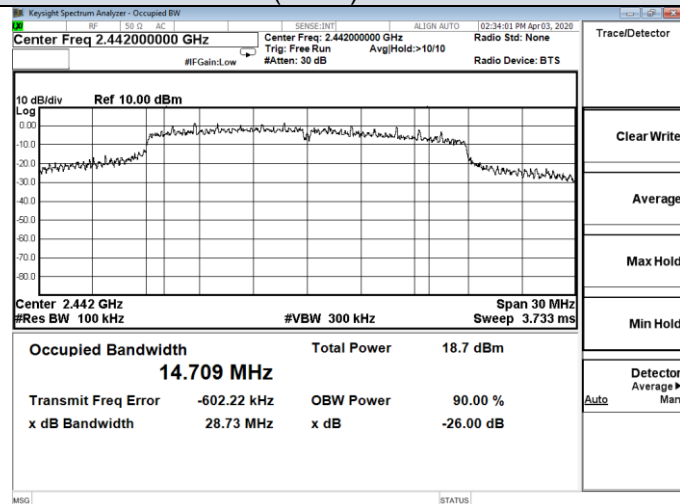
#### 802.11g-High channel

## Test Plot of Spread Bandwidth @ Chain 1

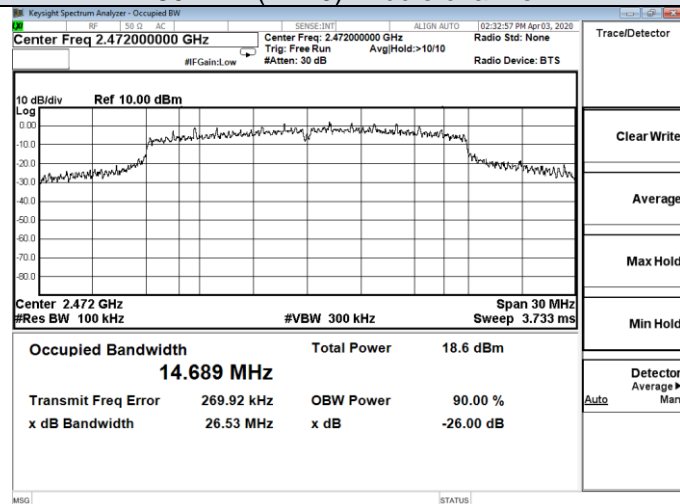
Test Voltage: Normal Voltage



## 802.11n(HT20)-Low channel



## 802.11n(HT20)-Middle channel



## 802.11n(HT20)-High channel

## 5.5. Transmitter Spurious Emissions (conducted)

### 5.5.1. Standard Applicable

Permissible mean power of spurious emission of each frequency supplied to a feeder, that is, mean power of spurious emission in the 1 MHz bandwidth at frequency  $f$  other than frequency band used shall be as follows:

#### STD-T66

- |   |                           |
|---|---------------------------|
| a. $2,387\text{MHz} \leq f \leq 2,400\text{MHz}$ and $2,483.5\text{MHz} < f \leq 2,496.5\text{MHz}$ | 25 $\mu\text{W}$ or less  |
| b. $2,387\text{MHz} > f$ and $2,496.5\text{MHz} < f$  | 2.5 $\mu\text{W}$ or less |

#### STD-T33

- |   |                           |
|---|---------------------------|
| a. $2,458\text{MHz} \leq f \leq 2,471\text{MHz}$ and $2,497\text{MHz} < f \leq 2,510\text{MHz}$ | 25 $\mu\text{W}$ or less  |
| b. $2,458\text{MHz} > f$ and $2,510\text{MHz} < f$  | 2.5 $\mu\text{W}$ or less |

### 5.5.2. Measuring Instruments

Please refer to section 6 of equipments list in this report.

### 5.5.3. Test Procedures

- Set EUT work in test mode as described in clause 2.4.
- Connected the EUT's antenna port to the Spectrum Analyzer by suitable attenuator, set the Spectrum Analyzer as below:

Below 1GHz: RBW/VBW= 100KHz / 100KHz

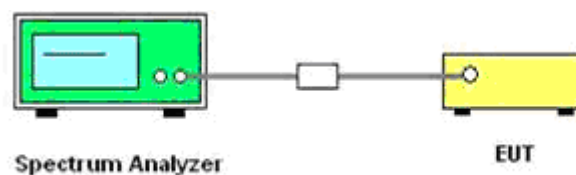
Above 1GHz: RBW/VBW= 1MHz / 1MHz.

Detector: Peak.

Trace Mode: Max Hold.

- All the emissions from 30MHz to 13GHz were measured and record.

### 5.5.4. Test Setup Layout



### 5.5.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

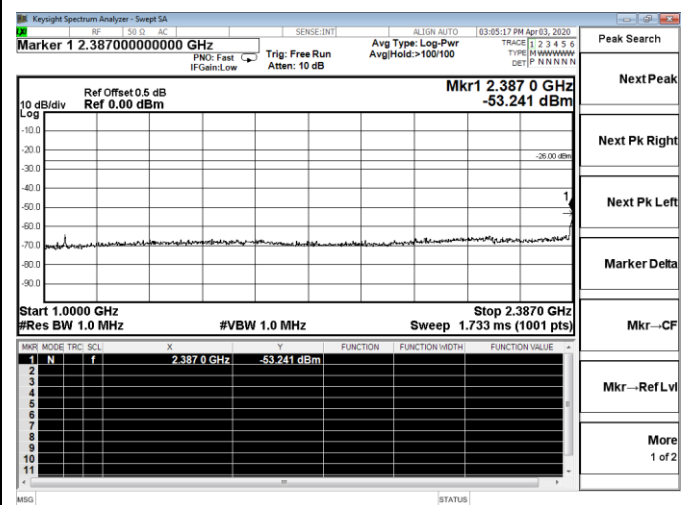
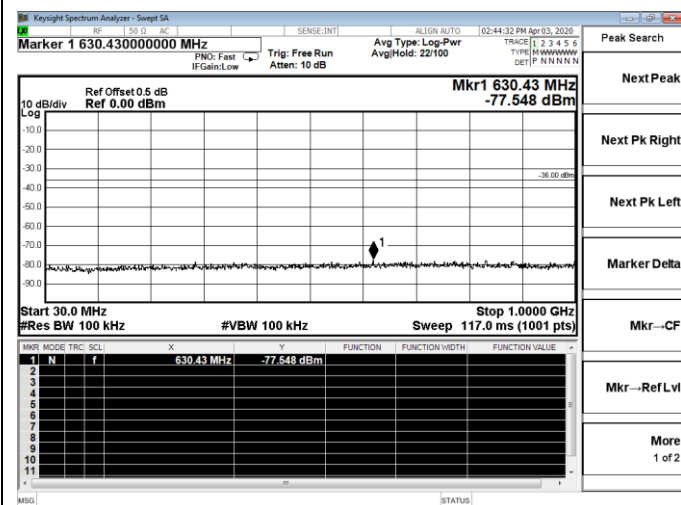
### 5.5.6. Test Results

Please refer to the following page.

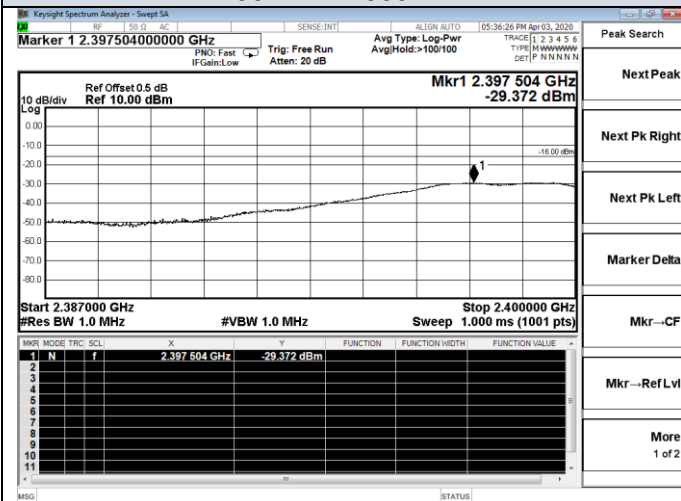
Temperature	22.5°C	Humidity	53.1%
Test Engineer	David Luo	Test Voltage	Normal Voltage

### Test Result @ Chain 0

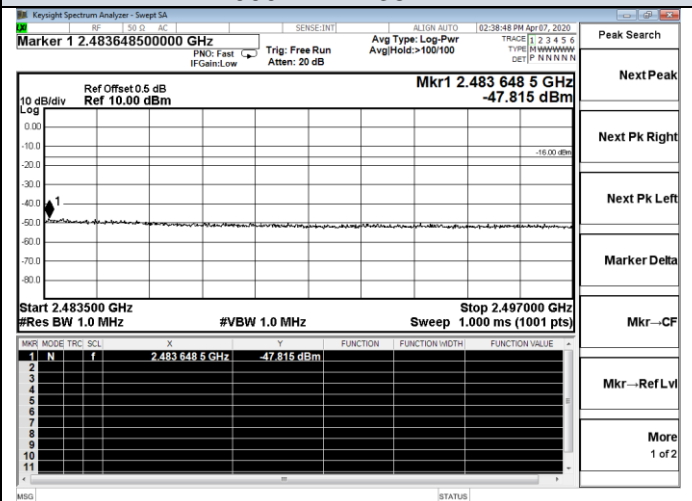
#### Test Plots of 802.11b Channel 1



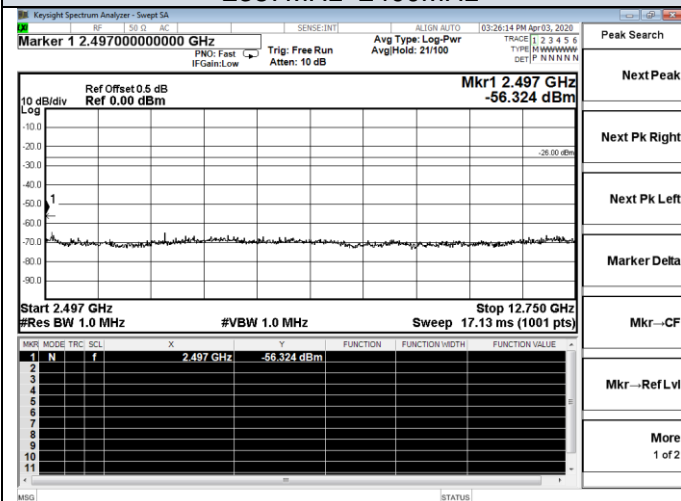
## 30 MHz~1000MHz



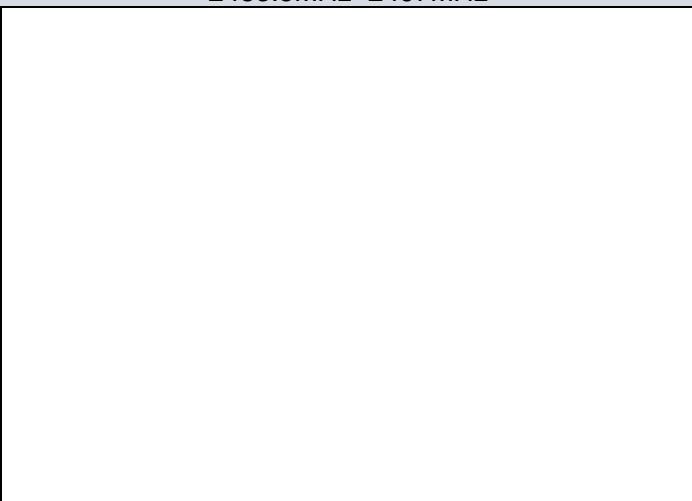
## 1000 MHz~2387MHz



## 2387MHz~2400MHz

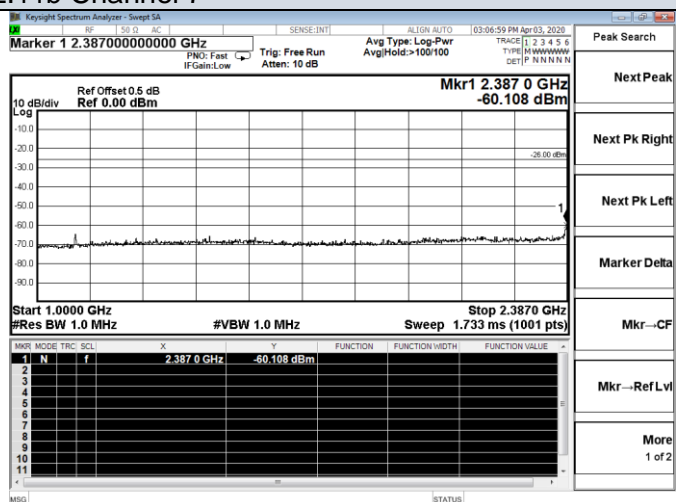


## 2483.5MHz~2497MHz

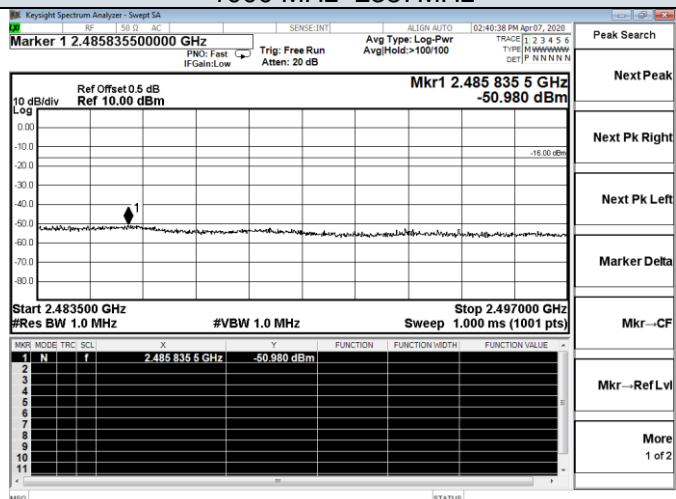


## 2497MHz~12750MHz

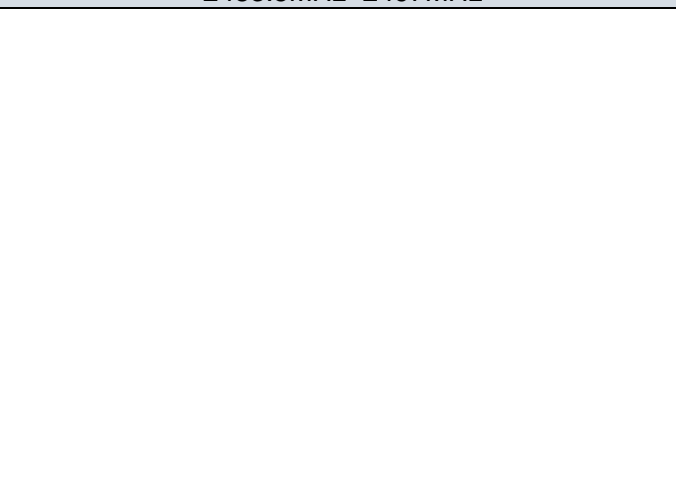
## Test Plots of 802.11b Channel 7



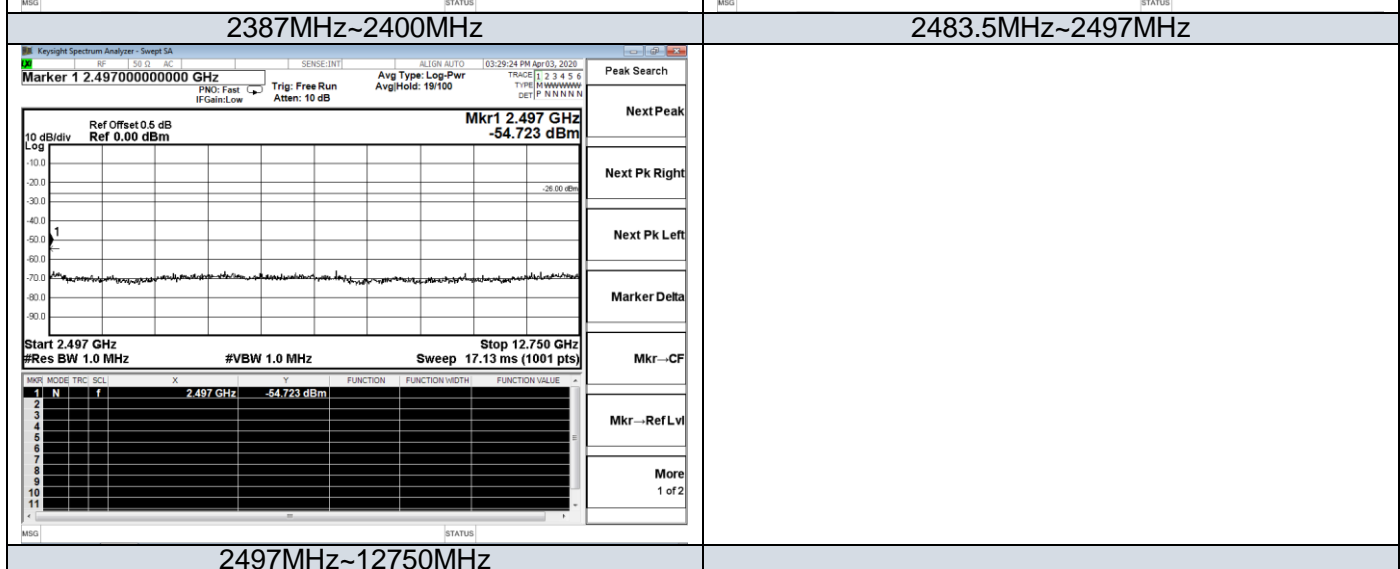
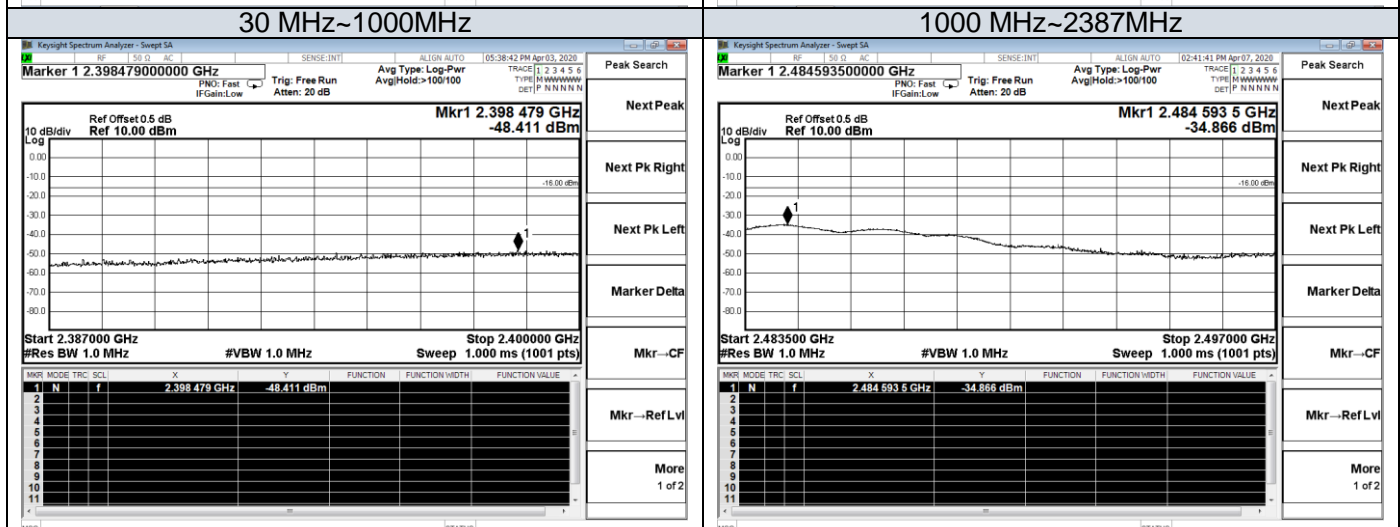
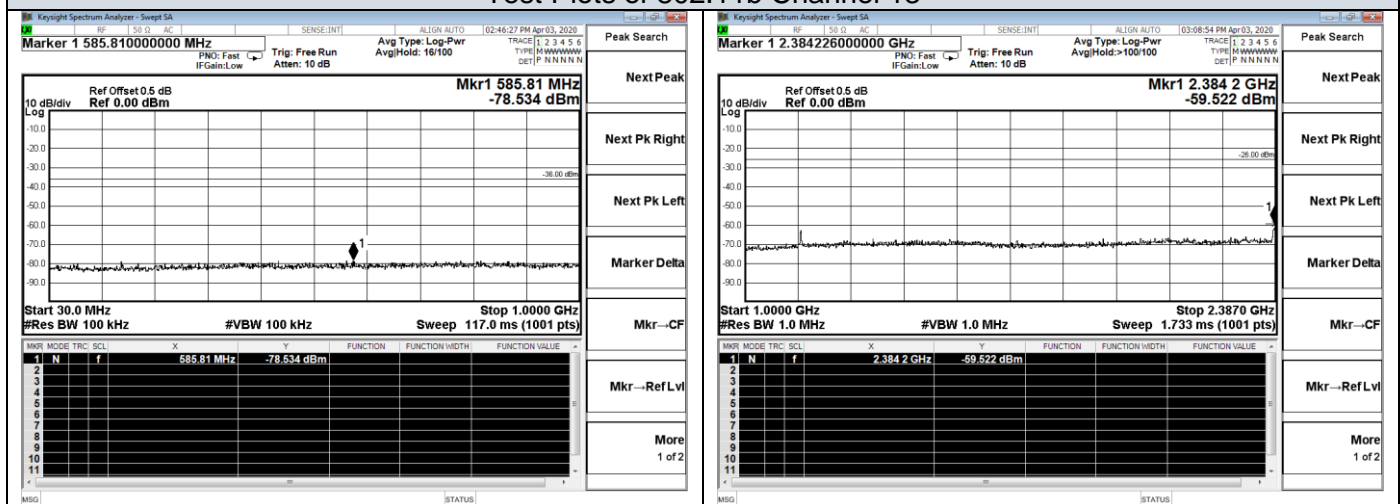
1000 MHz~2387MHz



2483.5MHz~2497MHz

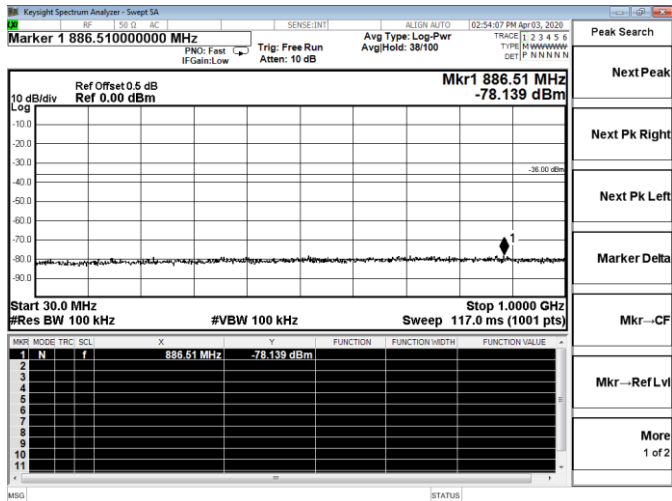


2483.5MHz~2497MHz

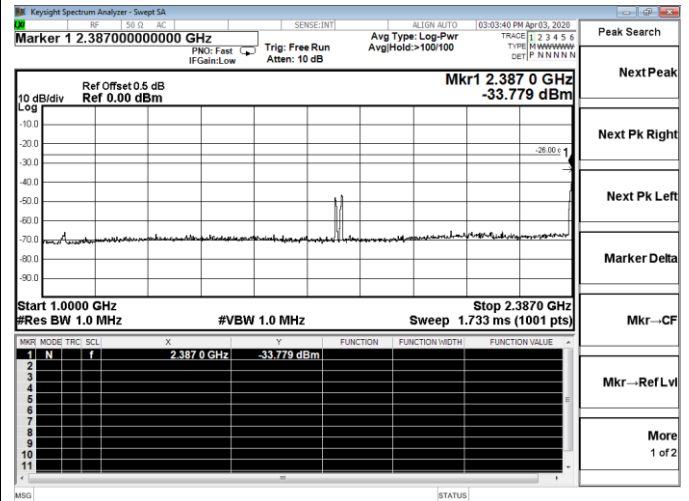
Test Result @ Chain 0  
Test Plots of 802.11b Channel 13

## Test Result @ Chain 0

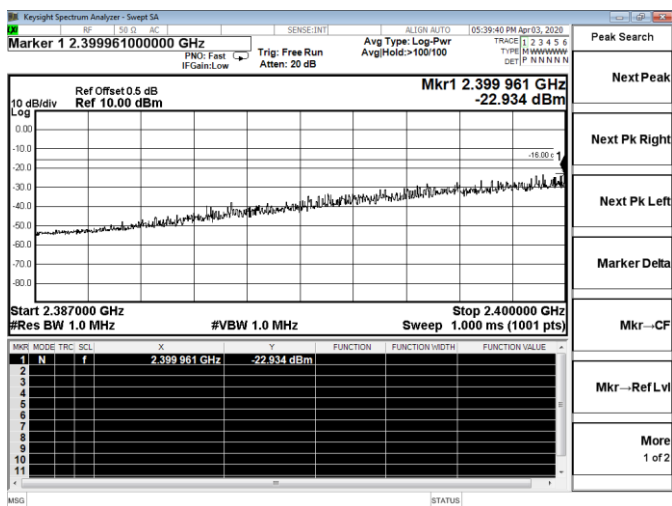
### Test Plots of 802.11g Channel 1



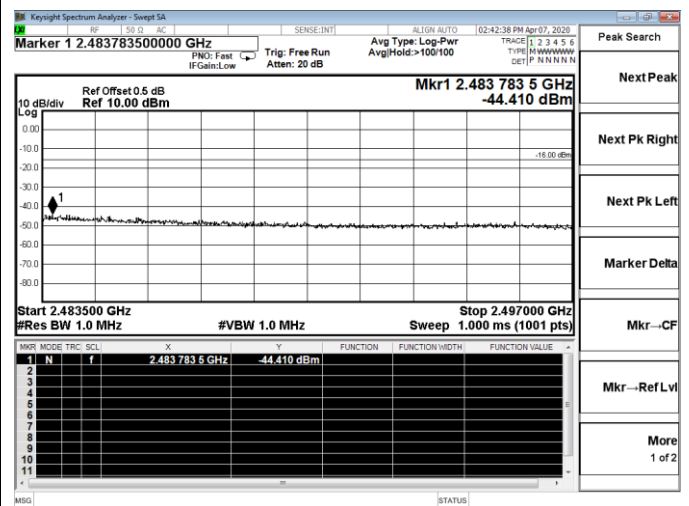
30 MHz~1000MHz



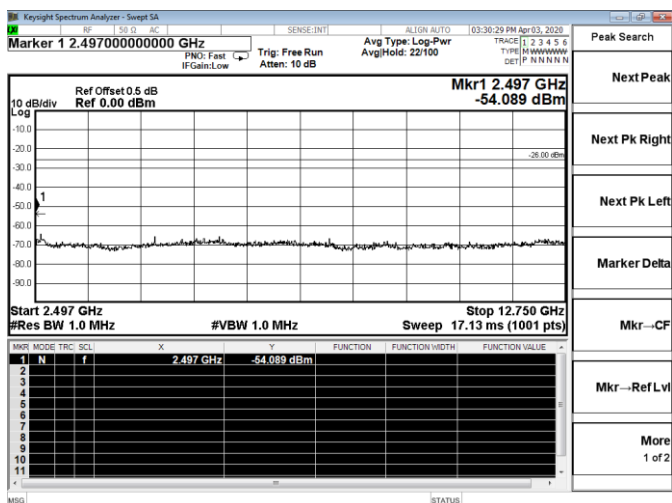
1000 MHz~2387MHz



2387MHz~2400MHz

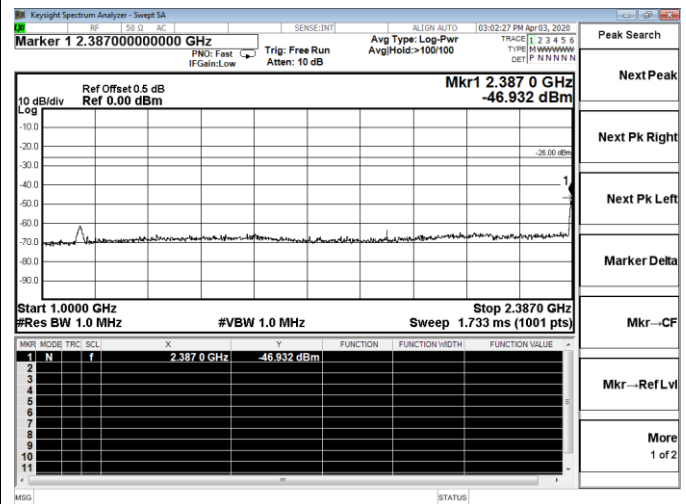
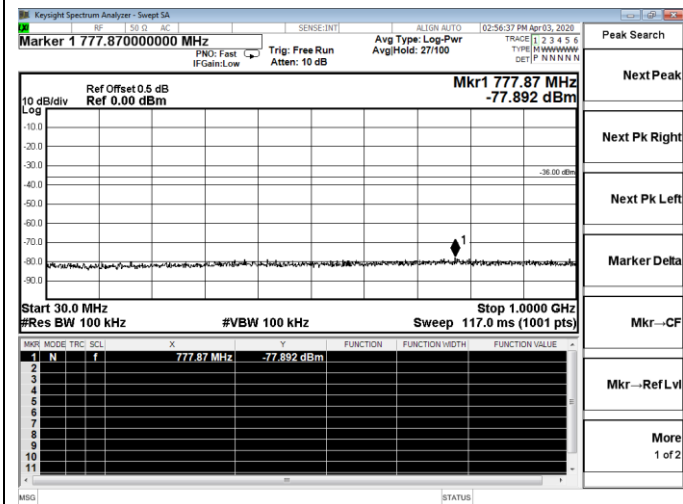


2483.5MHz~2497MHz

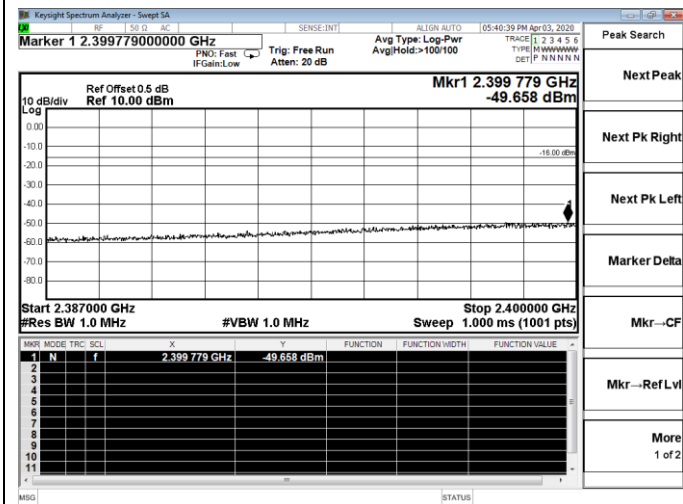


2497MHz~12750MHz

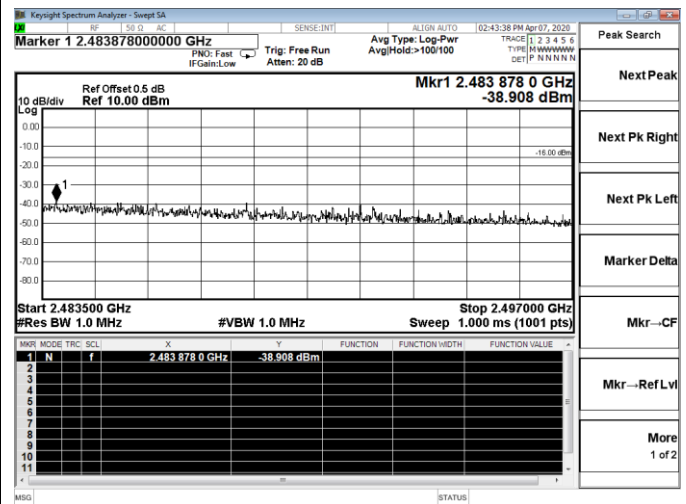


Test Result @ Chain 0  
Test Plots of 802.11g Channel 7

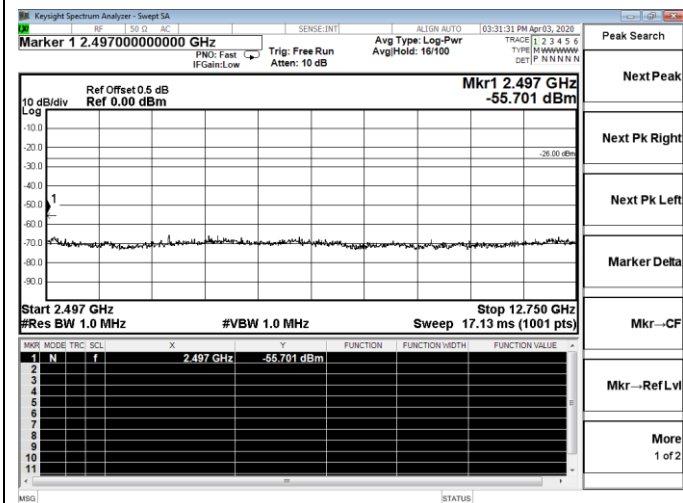
## 30 MHz~1000MHz



## 1000 MHz~2387MHz



## 2387MHz~2400MHz



## 2483.5MHz~2497MHz

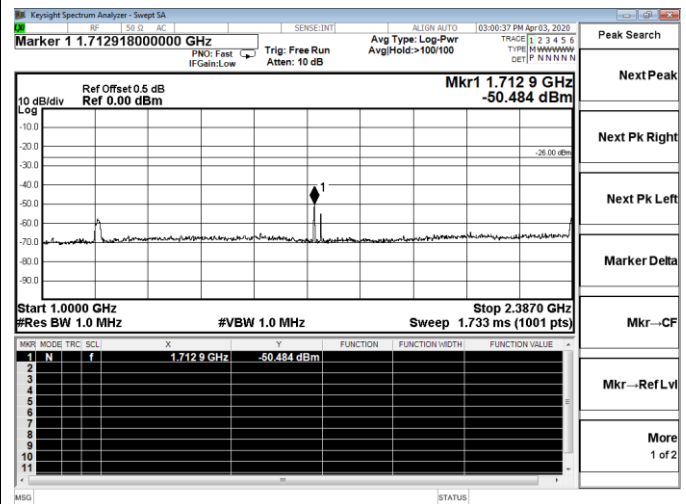
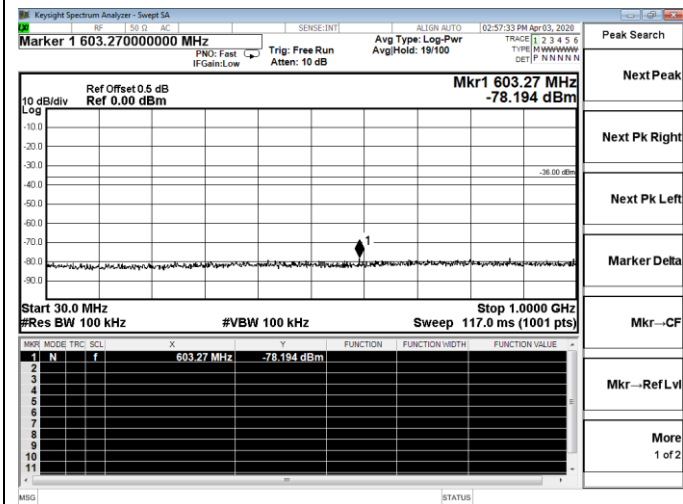


## 2497MHz~12750MHz



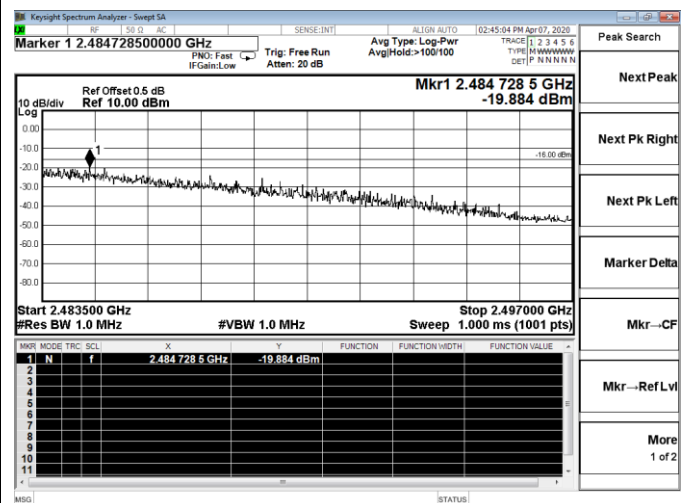
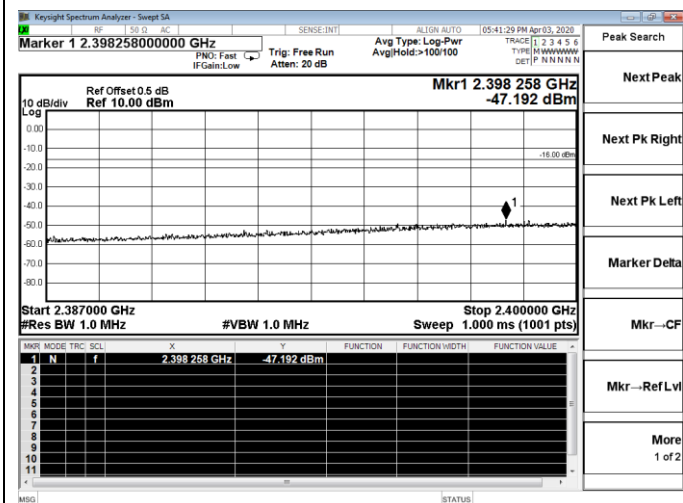
## Test Result @ Chain 0

### Test Plots of 802.11g Channel 13



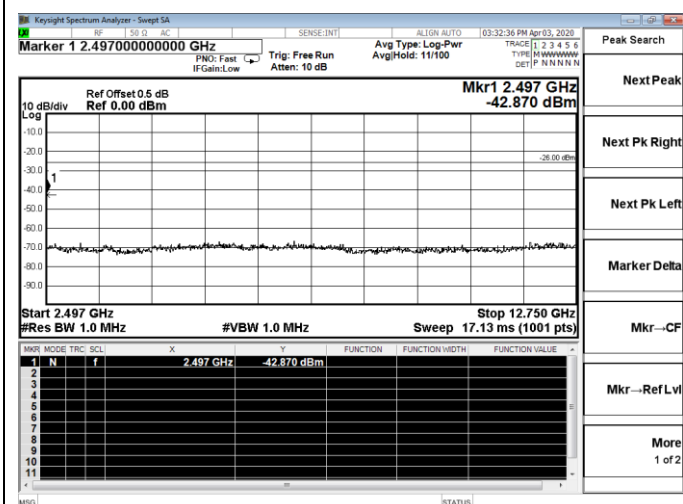
30 MHz~1000MHz

1000 MHz~2387MHz

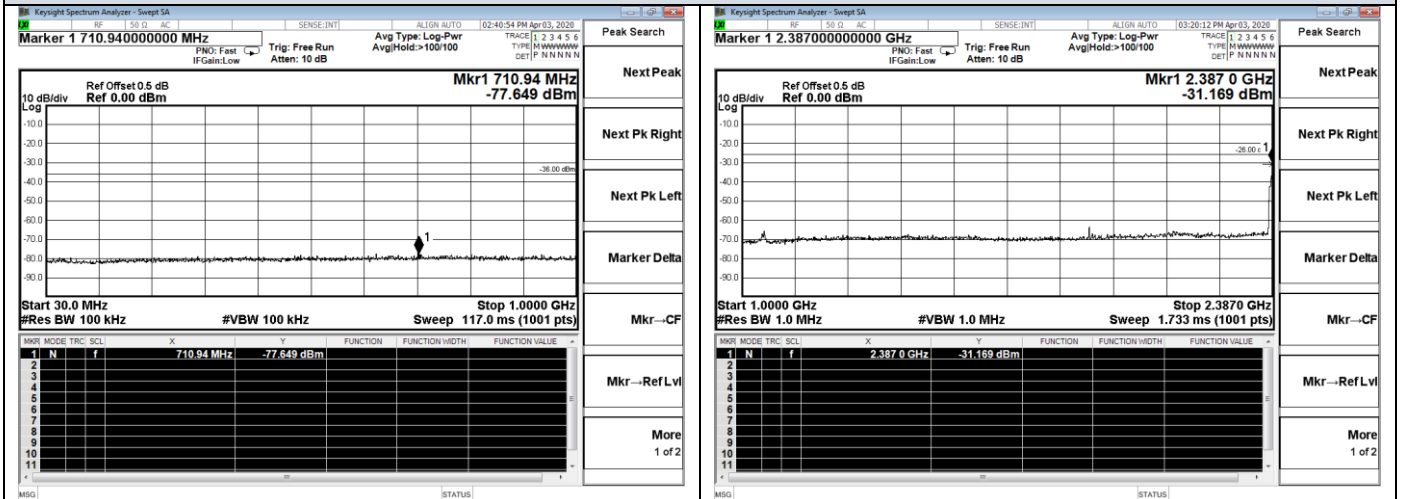


2387MHz~2400MHz

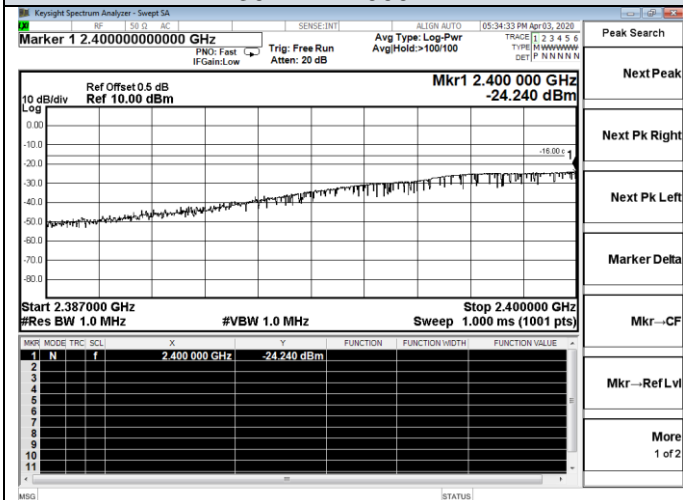
2483.5MHz~2497MHz



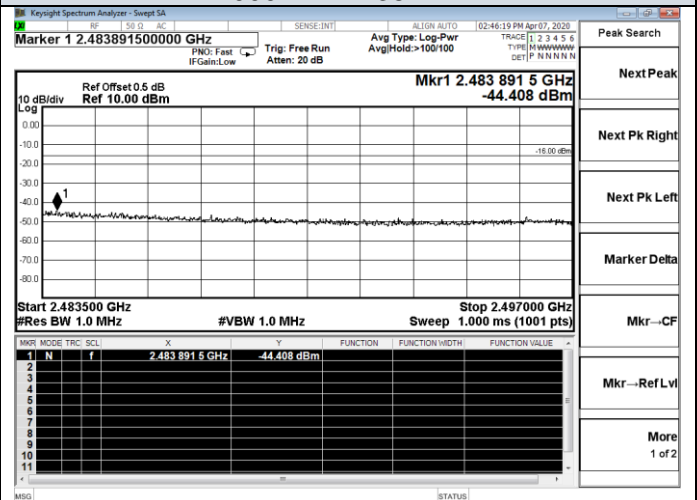
2497MHz~12750MHz

Test Result @ Chain 0  
Test Plots of 802.11n20 Channel 1

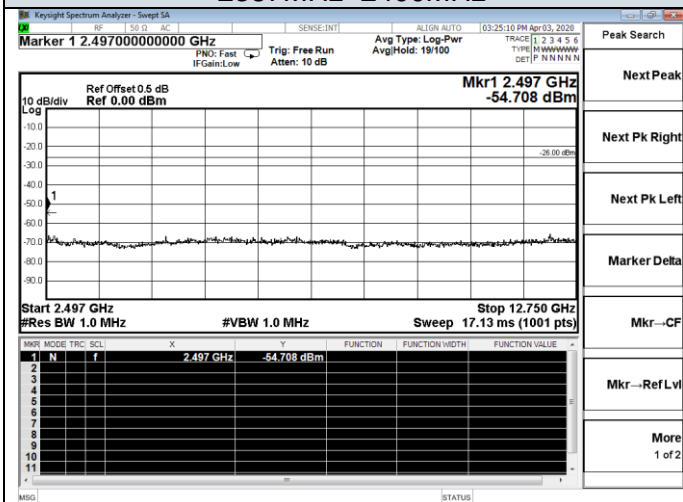
## 30 MHz~1000MHz



## 1000 MHz~2387MHz

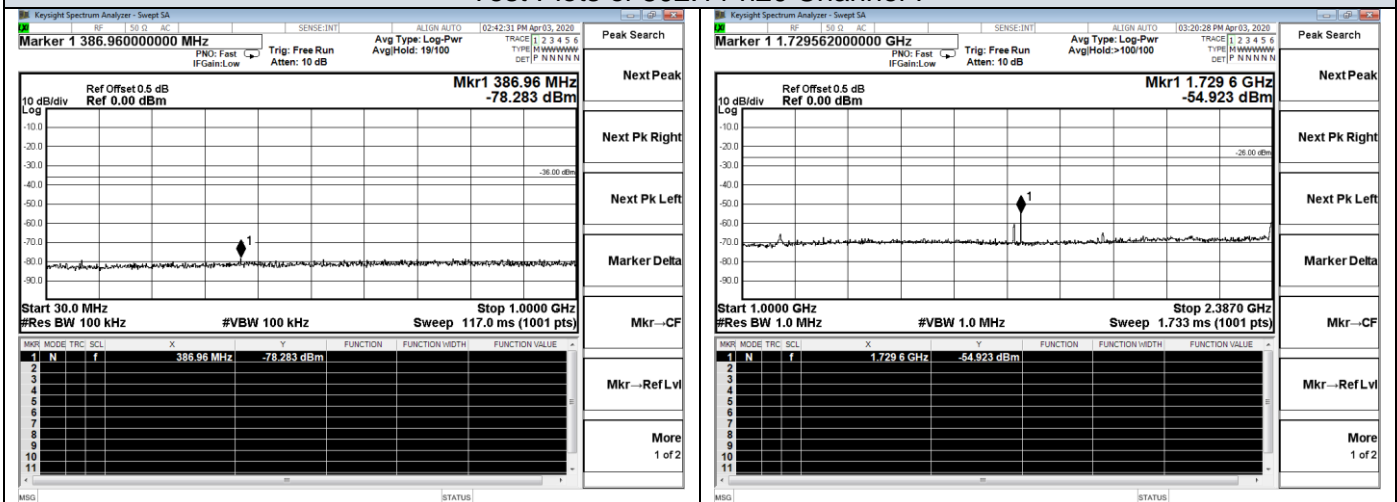


## 2387MHz~2400MHz



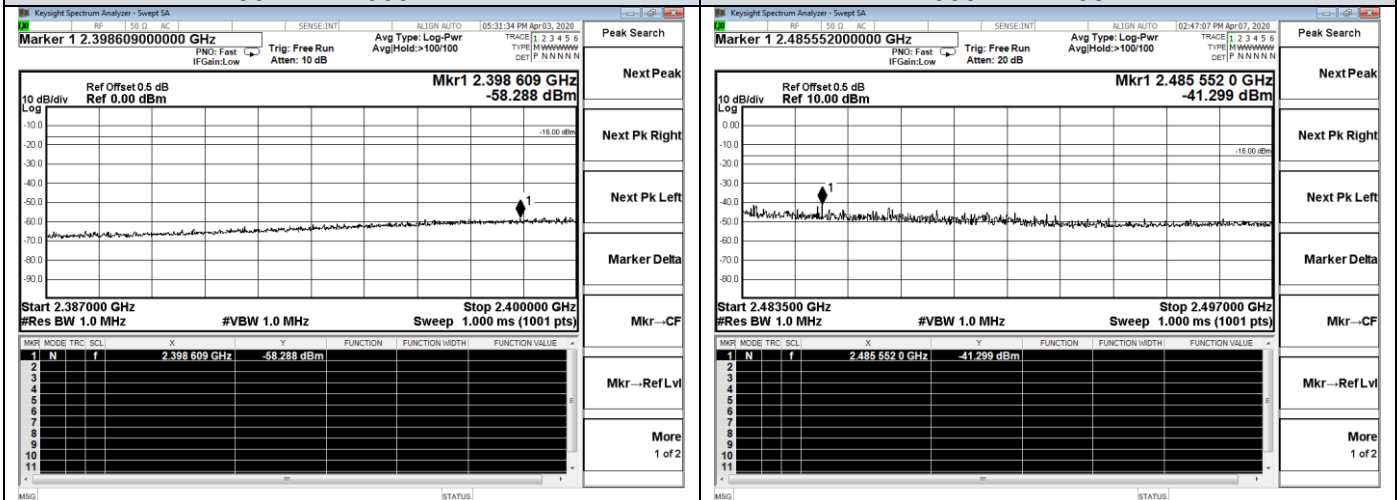
## 2483.5MHz~2497MHz

## 2497MHz~12750MHz

Test Result @ Chain 0  
Test Plots of 802.11 n20 Channel 7

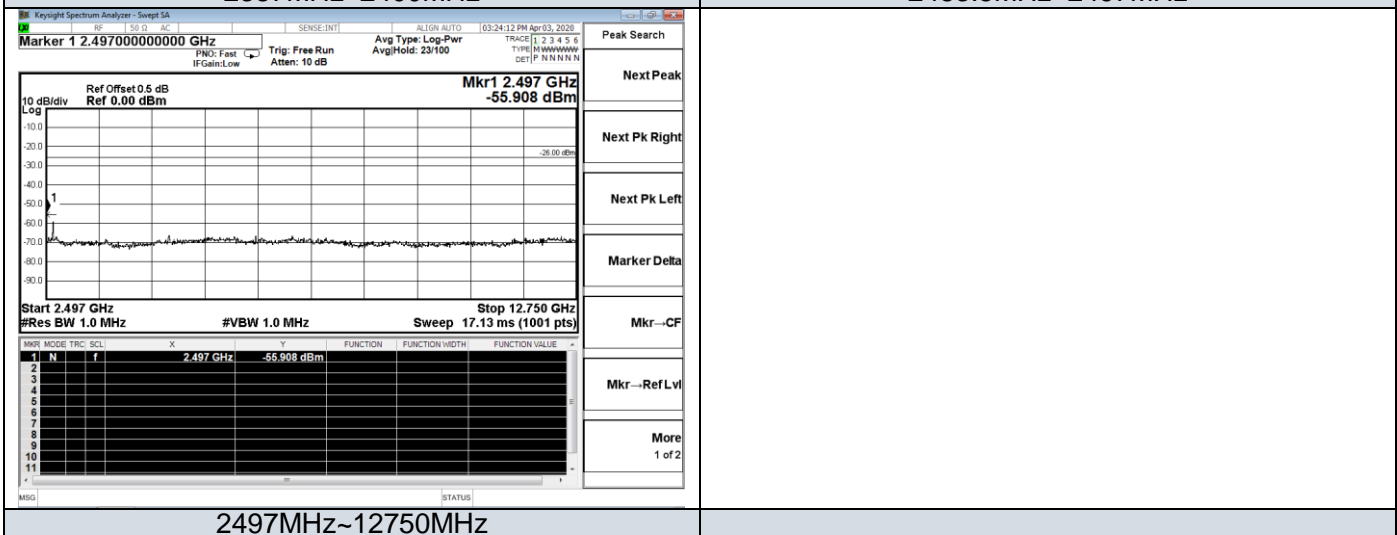
30 MHz~1000MHz

1000 MHz~2387MHz

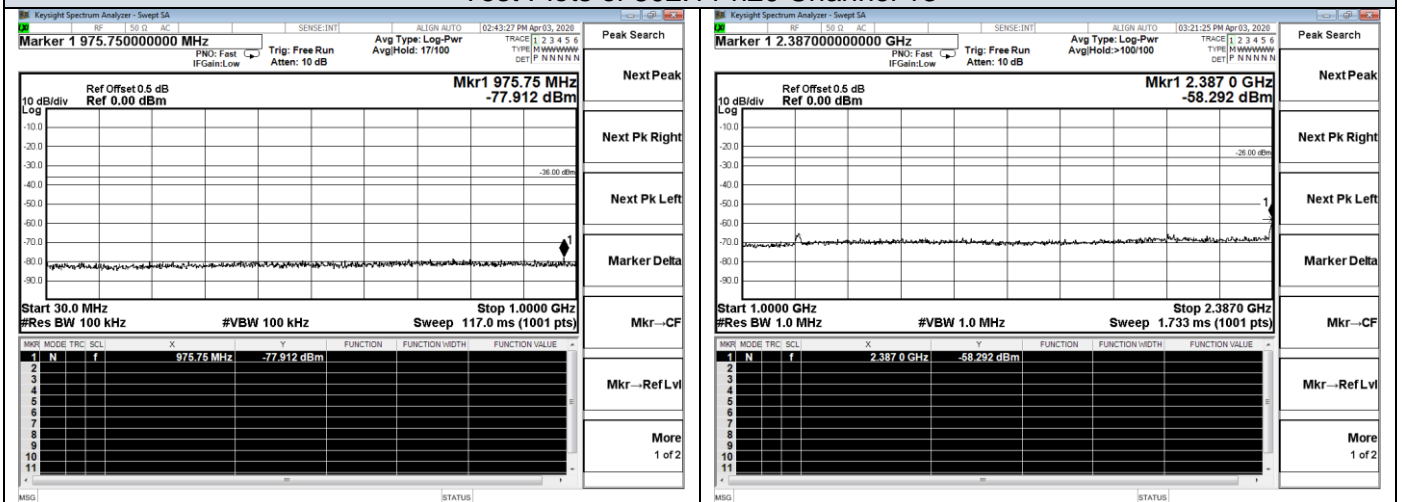


2387MHz~2400MHz

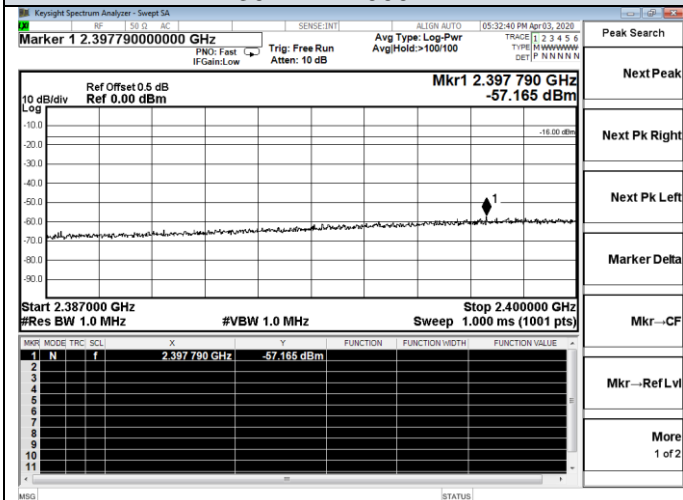
2483.5MHz~2497MHz



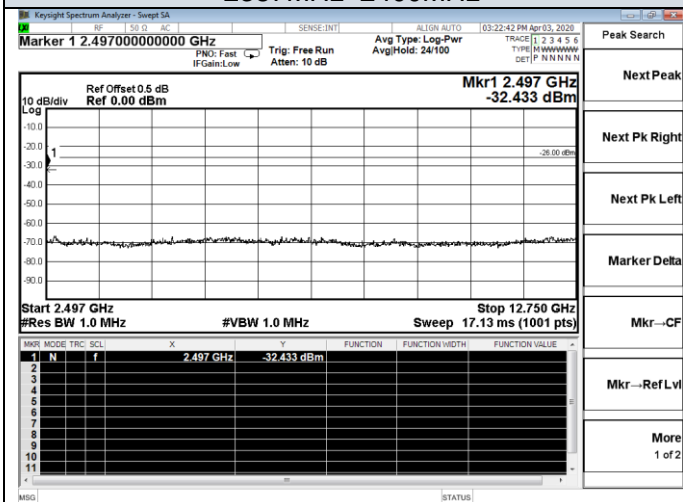
2497MHz~12750MHz

Test Result @ Chain 0  
Test Plots of 802.11 n20 Channel 13

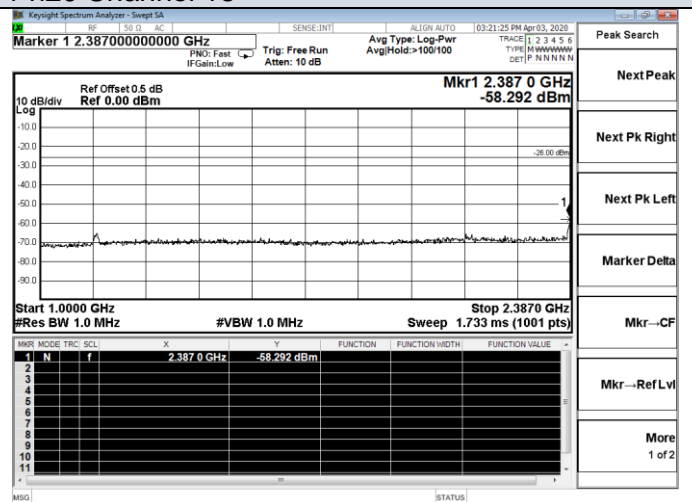
30 MHz~1000MHz



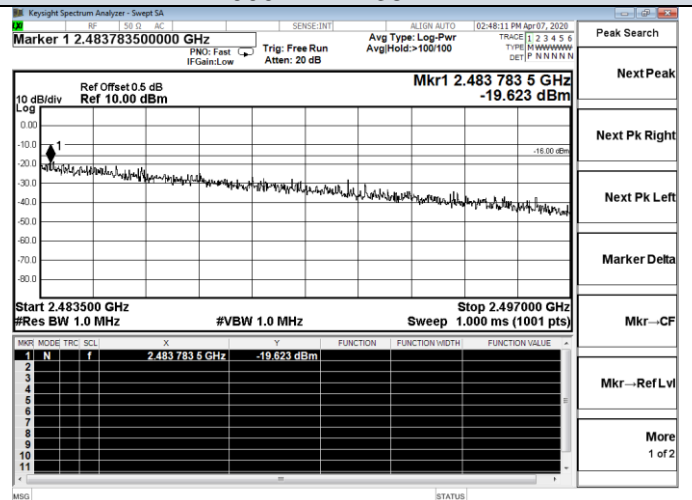
2387MHz~2400MHz



2497MHz~12750MHz



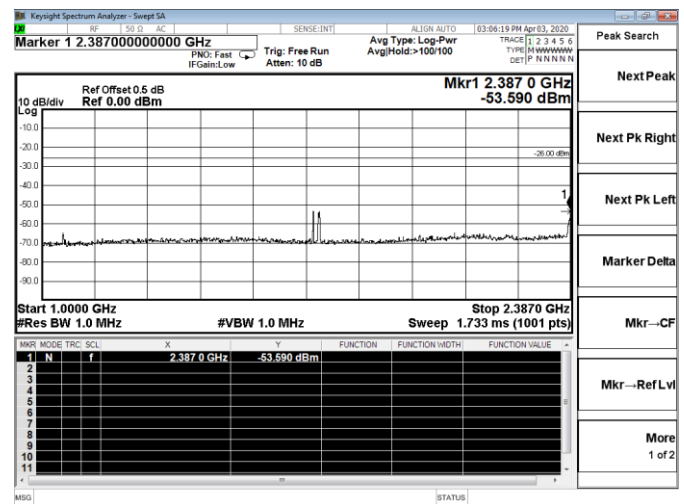
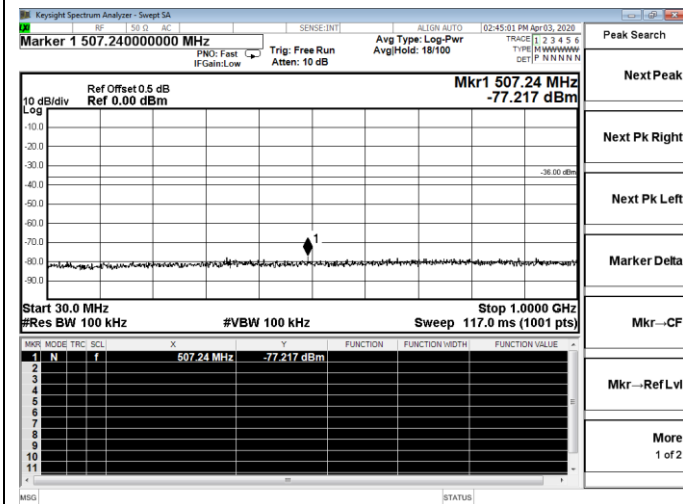
1000 MHz~2387MHz



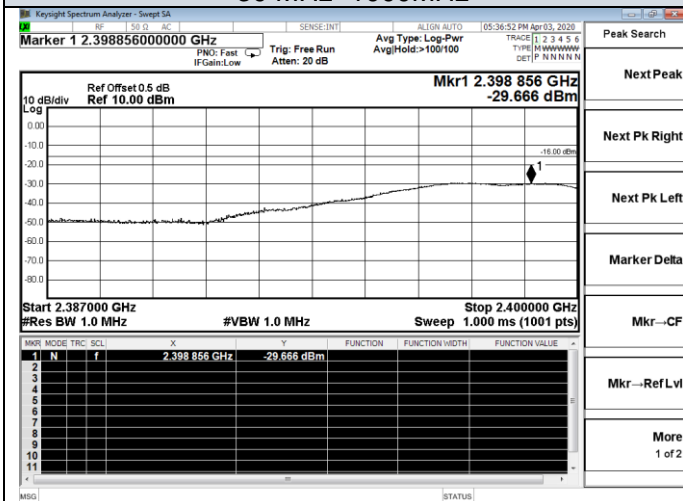
2483.5MHz~2497MHz

## Test Result @ Chain 1

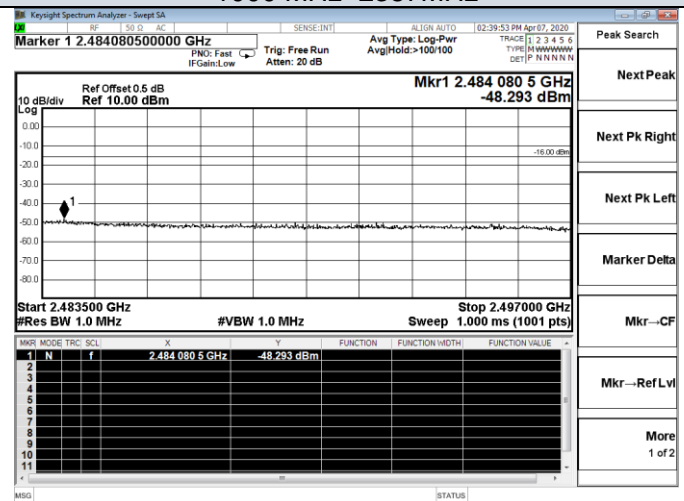
### Test Plots of 802.11b Channel 1



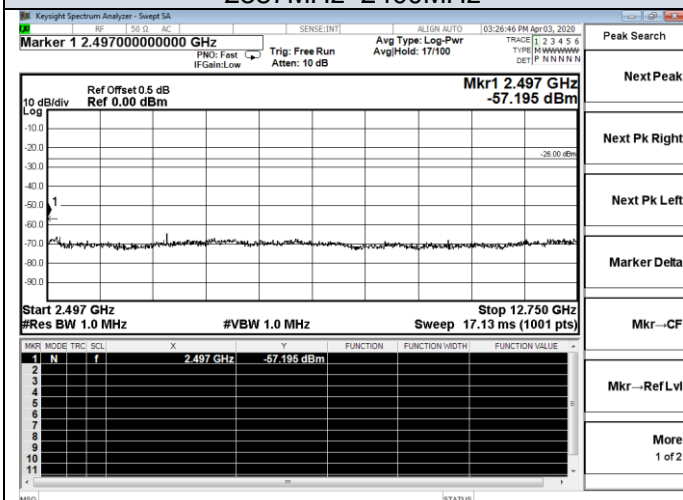
## 30 MHz~1000MHz



## 1000 MHz~2387MHz

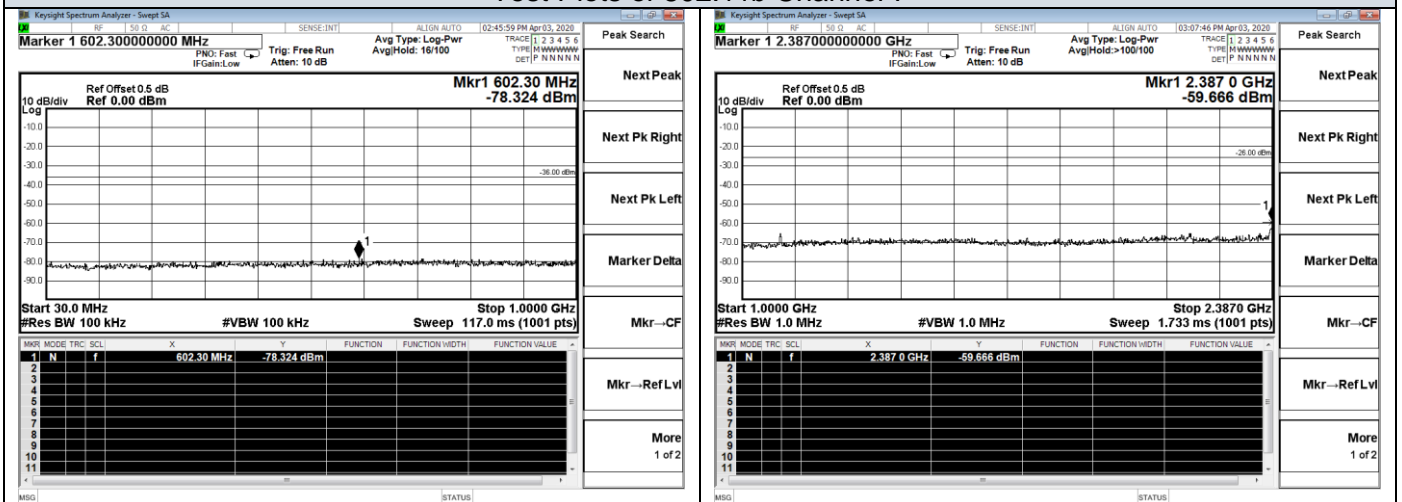


## 2387MHz~2400MHz



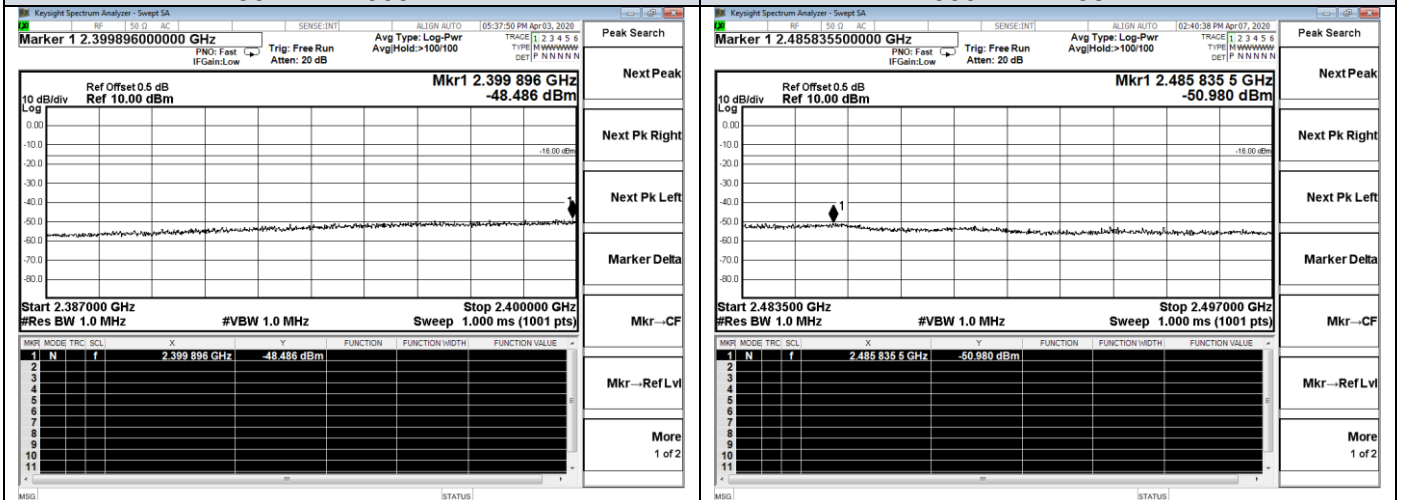
## 2483.5MHz~2497MHz

## 2497MHz~12750MHz

Test Result @ Chain 1  
Test Plots of 802.11b Channel 7

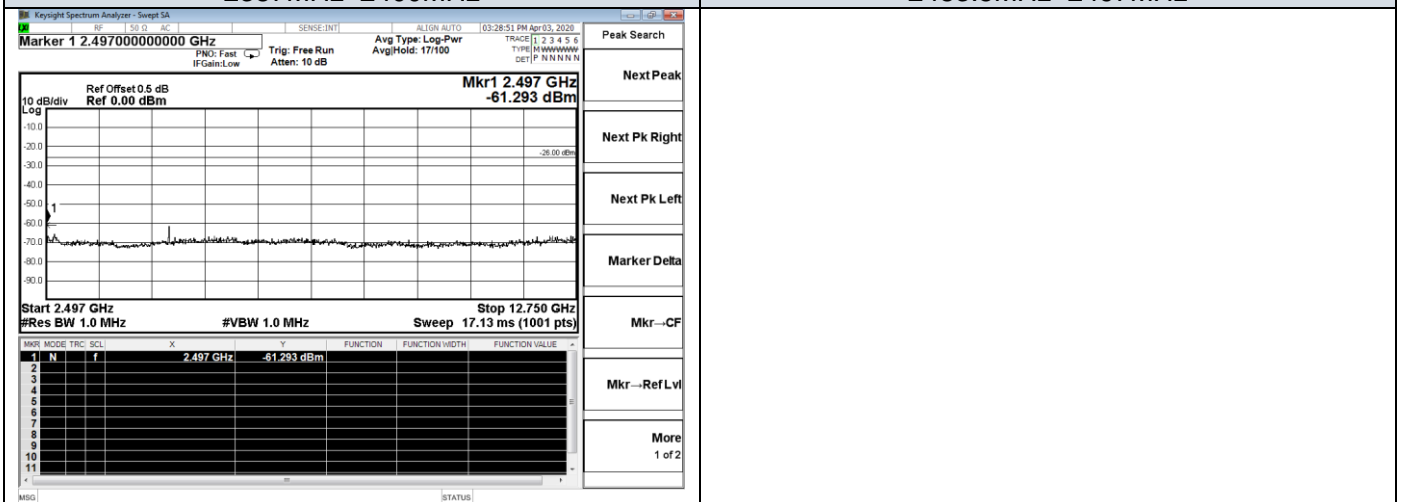
30 MHz~1000MHz

1000 MHz~2387MHz

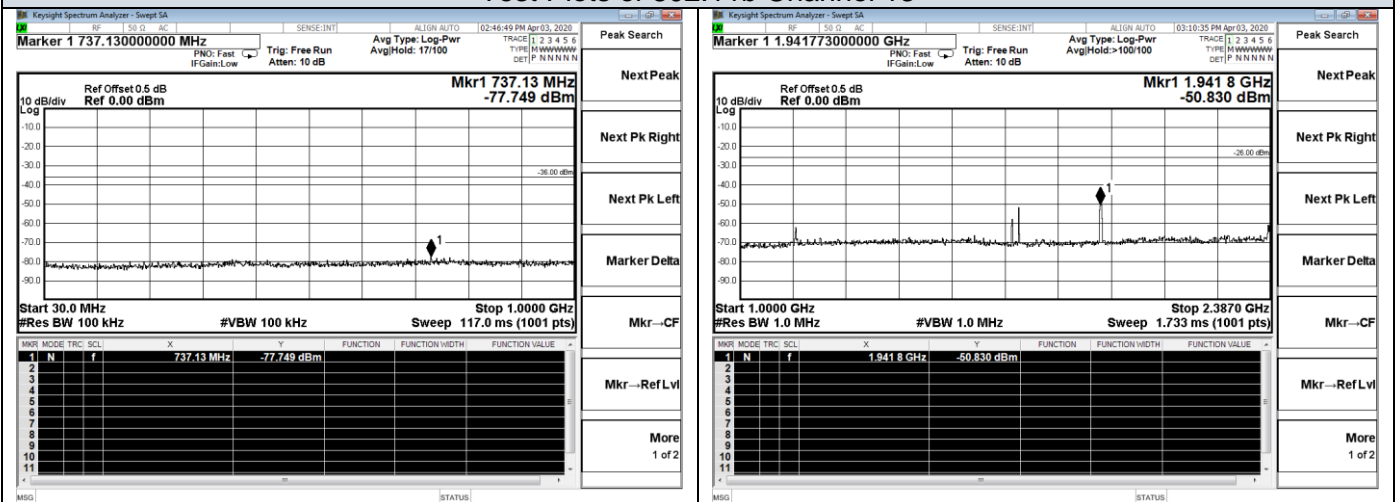


2387MHz~2400MHz

2483.5MHz~2497MHz

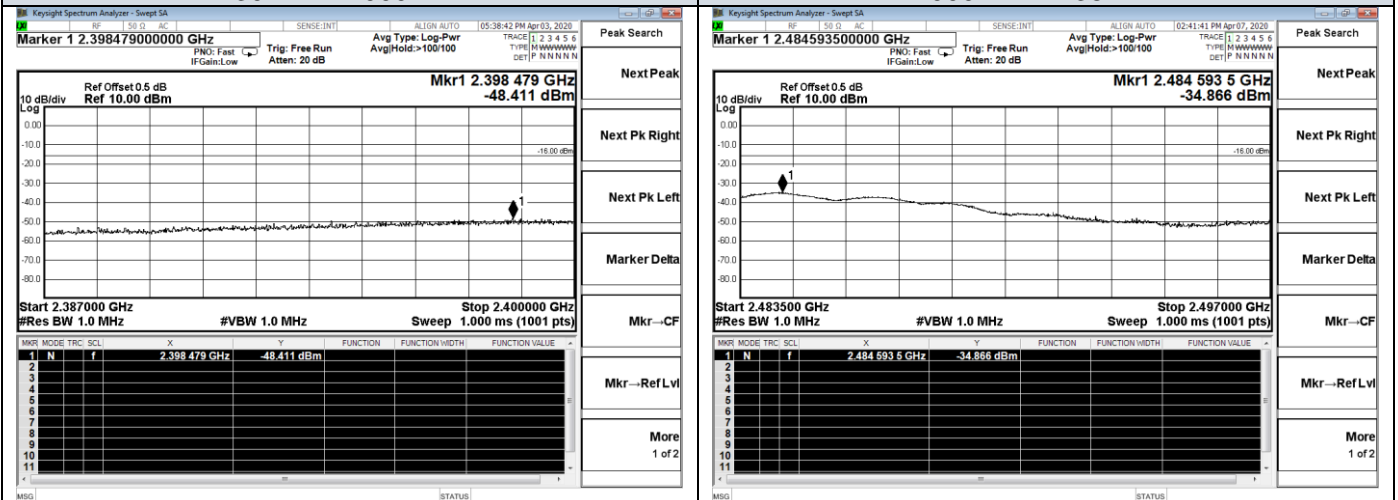


2497MHz~12750MHz

Test Result @ Chain 1  
Test Plots of 802.11b Channel 13

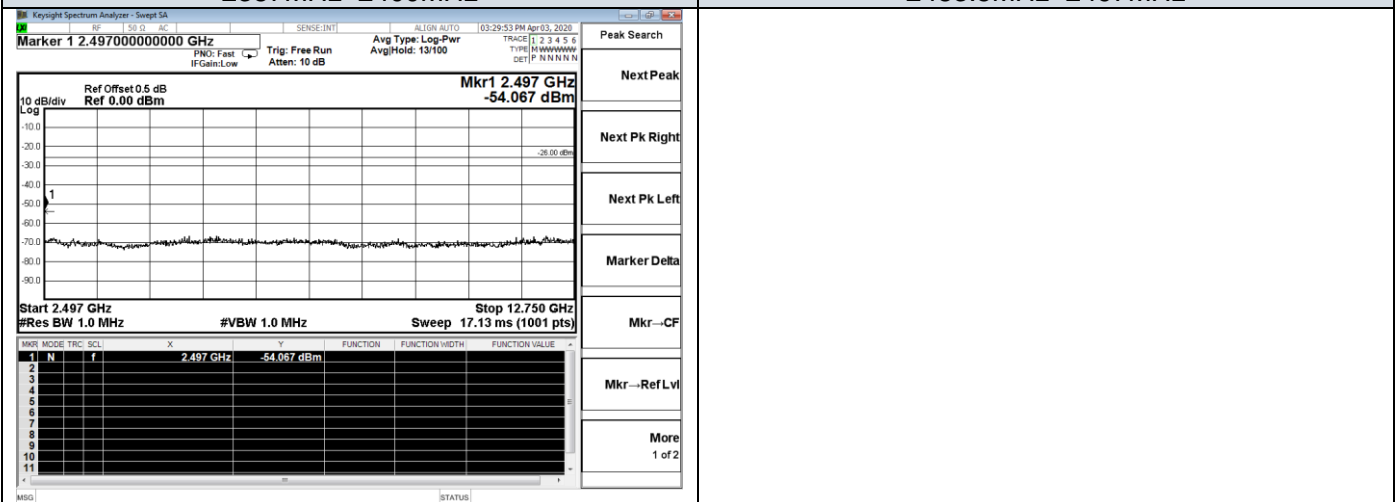
30 MHz~1000MHz

1000 MHz~2387MHz



2387MHz~2400MHz

2483.5MHz~2497MHz

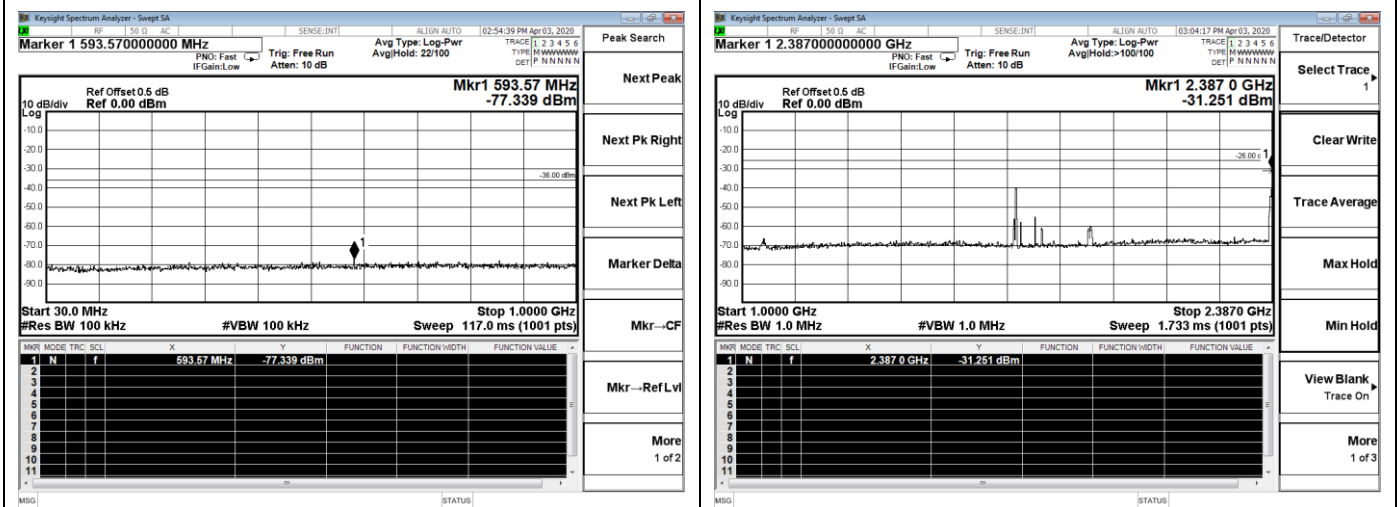


2497MHz~12750MHz



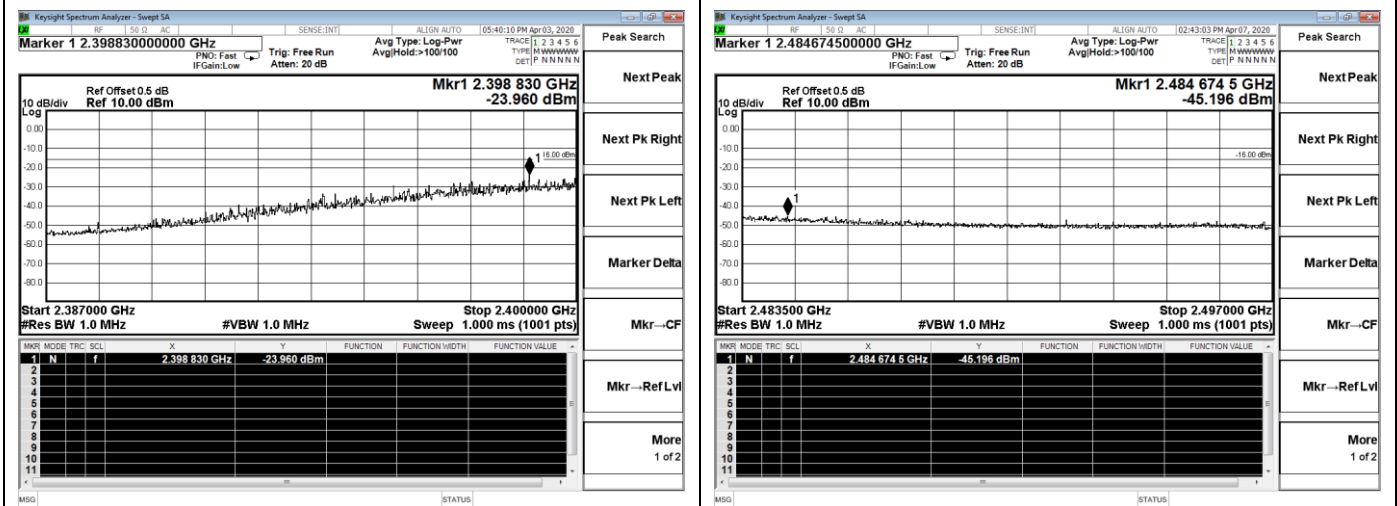
## Test Result @ Chain 1

### Test Plots of 802.11g Channel 1



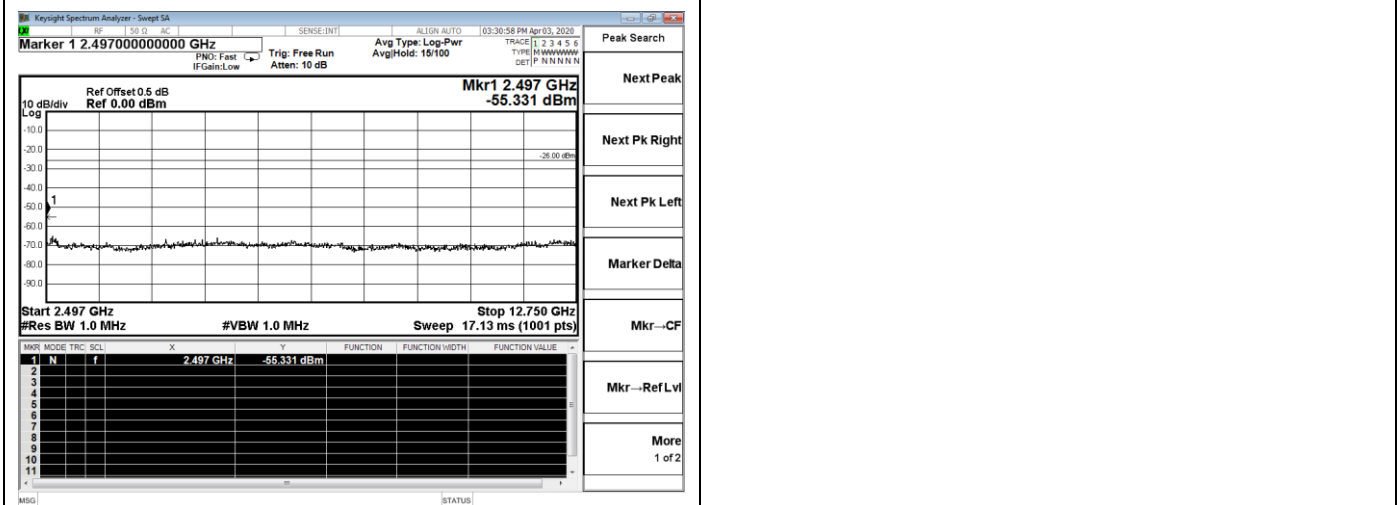
30 MHz~1000MHz

1000 MHz~2387MHz



2387MHz~2400MHz

2483.5MHz~2497MHz

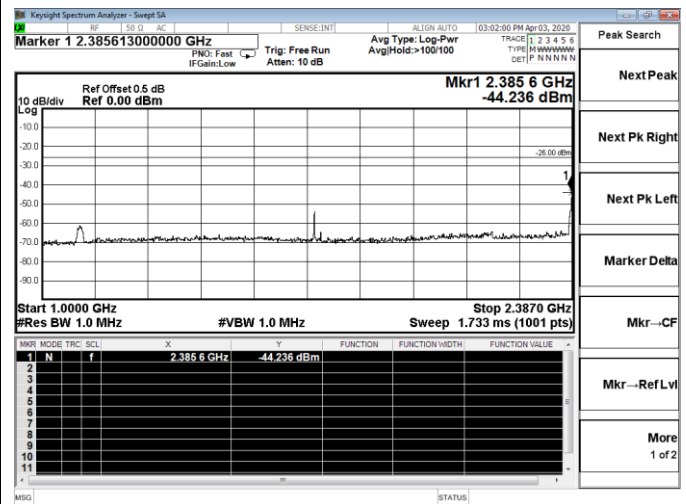
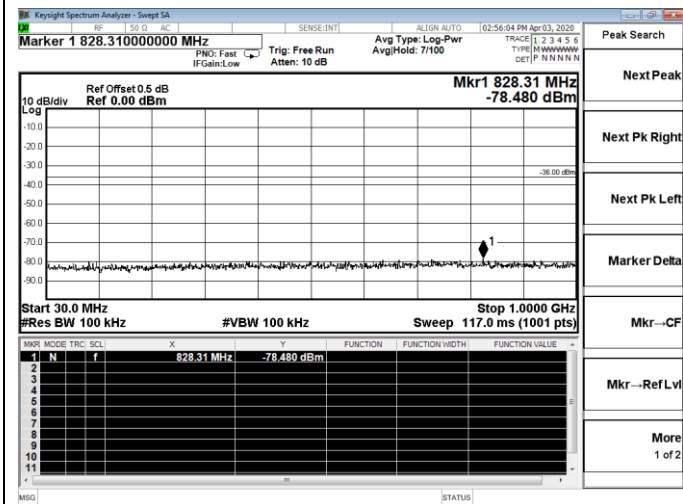


2497MHz~12750MHz

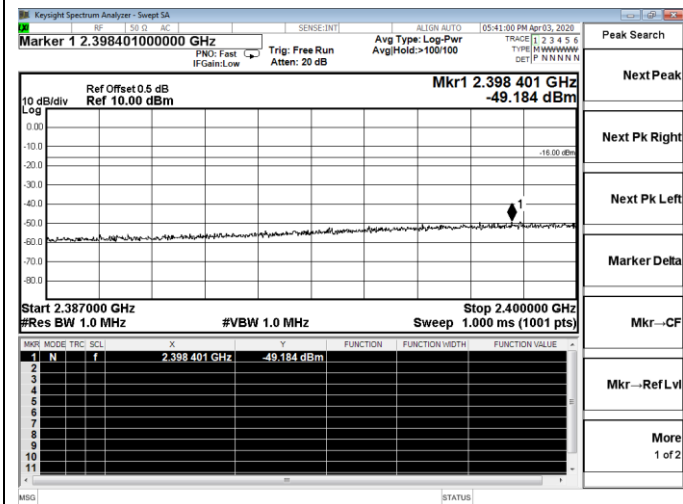


## Test Result @ Chain 1

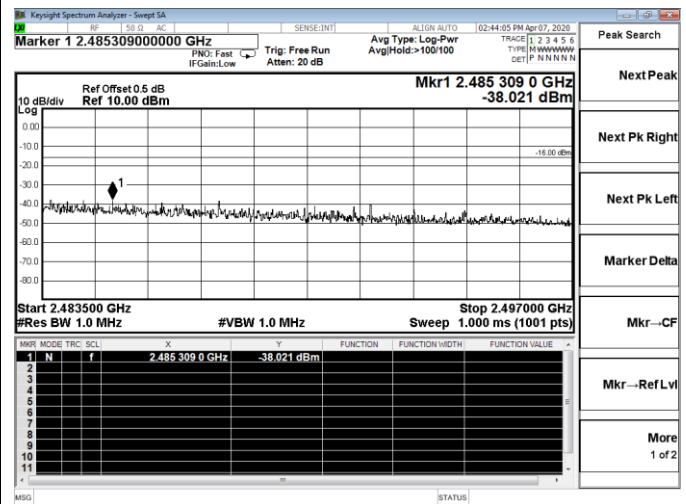
### Test Plots of 802.11g Channel 7



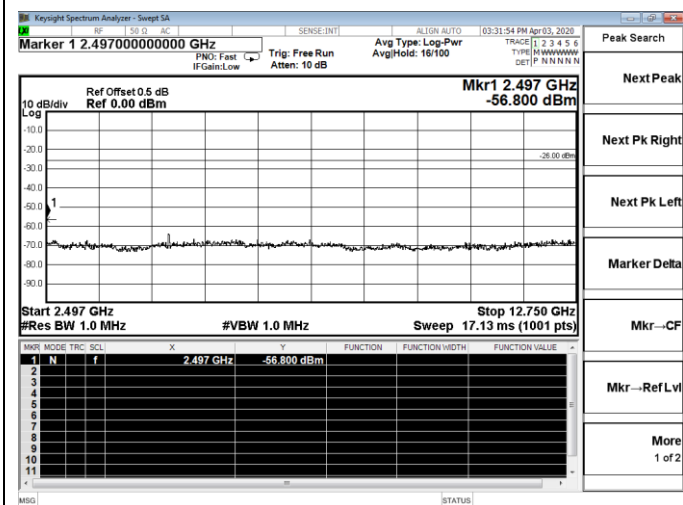
## 30 MHz~1000MHz



## 1000 MHz~2387MHz



## 2387MHz~2400MHz



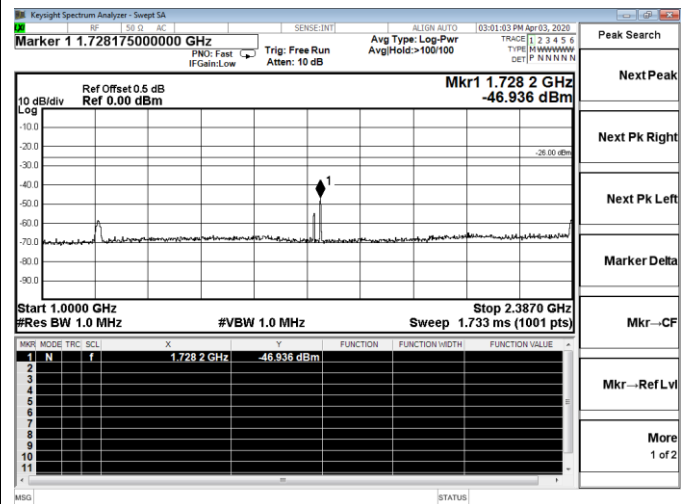
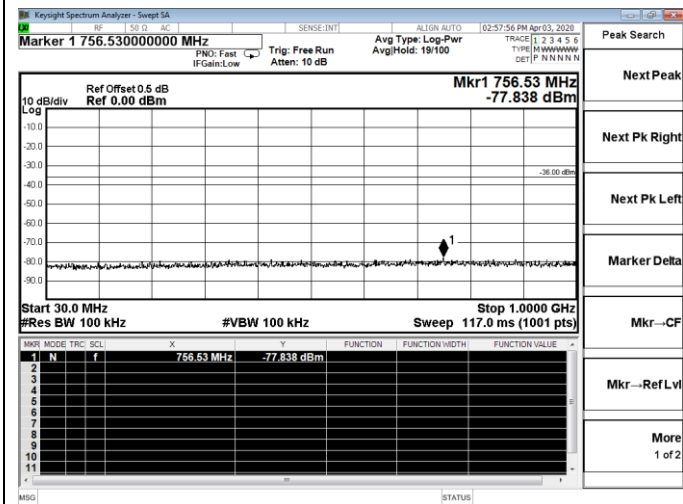
## 2483.5MHz~2497MHz



## 2497MHz~12750MHz

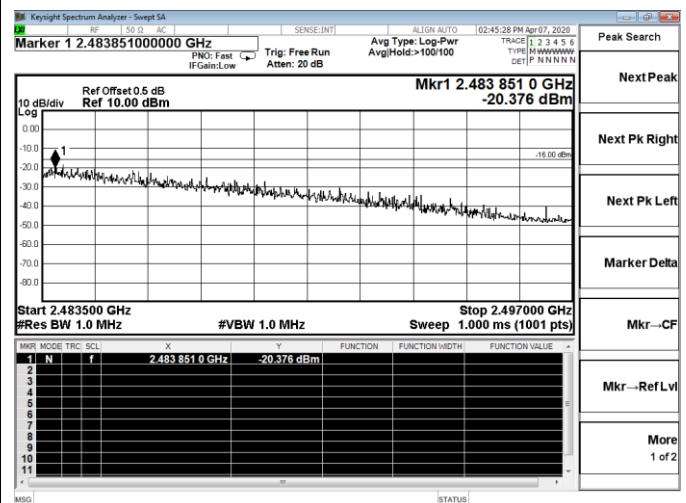
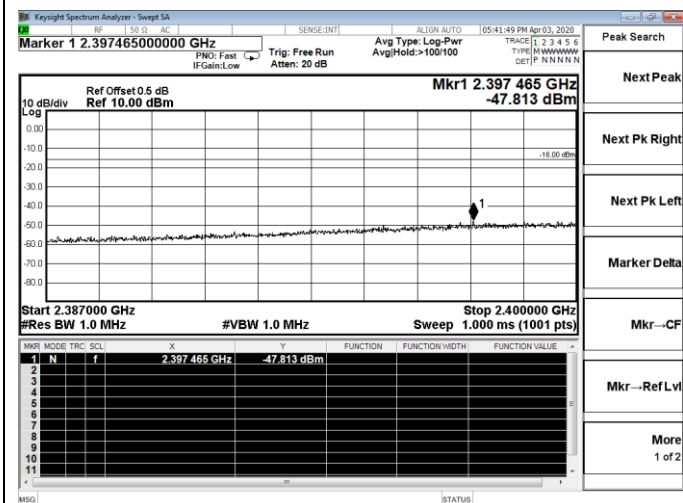
## Test Result @ Chain 1

### Test Plots of 802.11g Channel 13



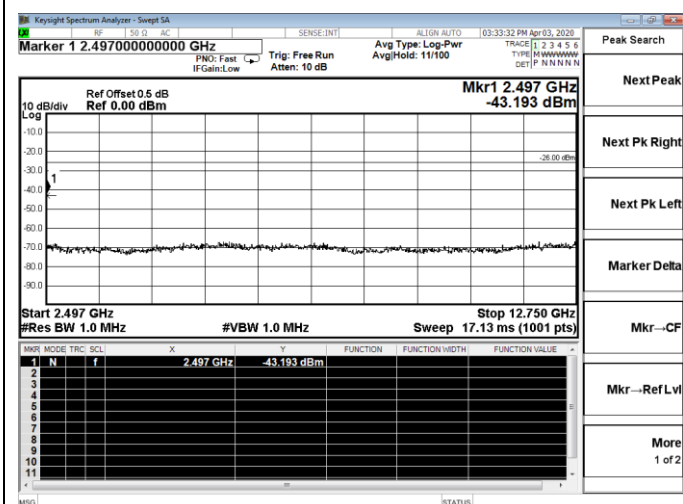
30 MHz~1000MHz

1000 MHz~2387MHz

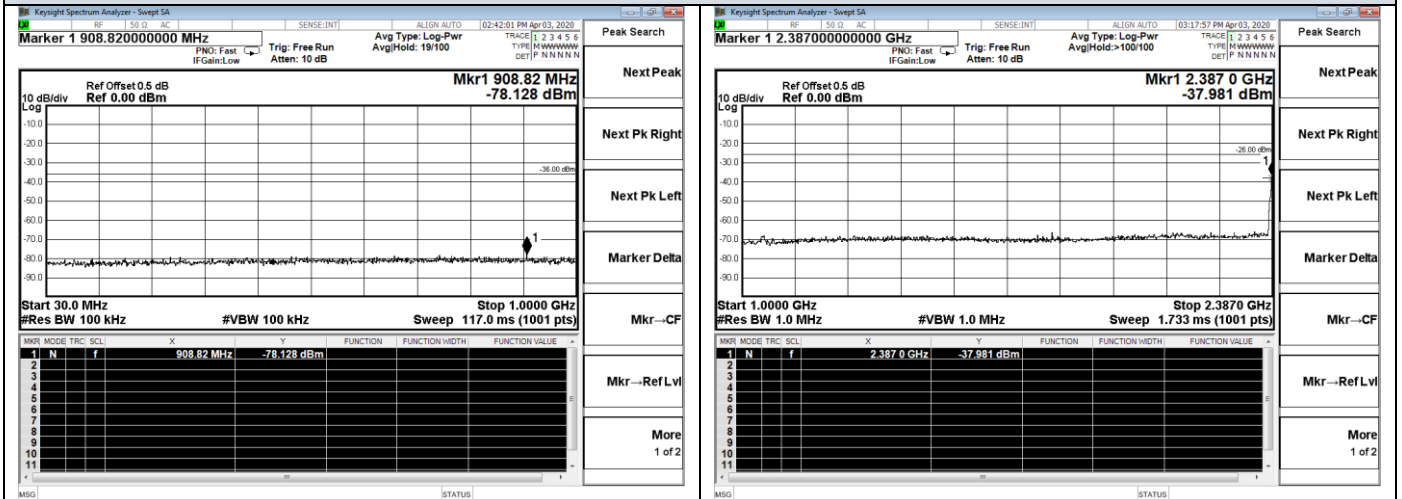


2387MHz~2400MHz

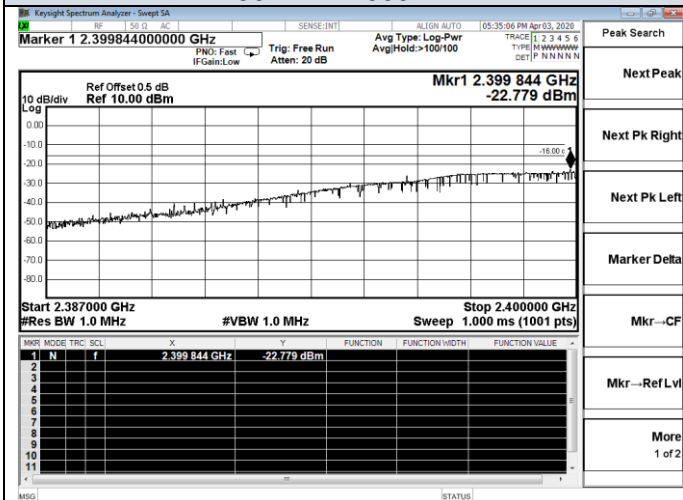
2483.5MHz~2497MHz



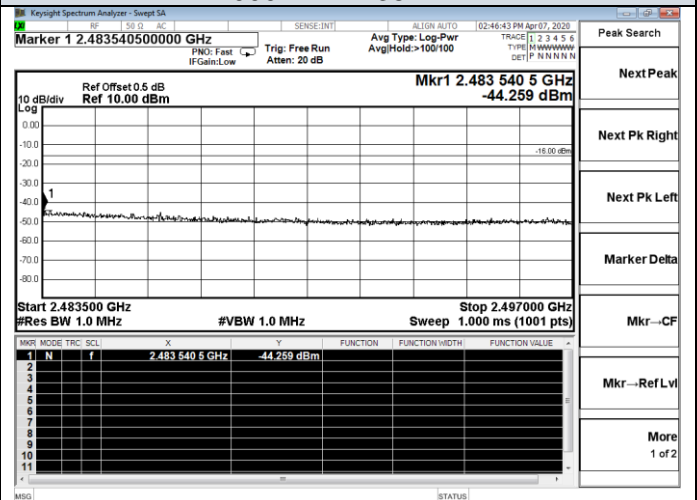
2497MHz~12750MHz

Test Result @ Chain 1  
Test Plots of 802.11n20 Channel 1

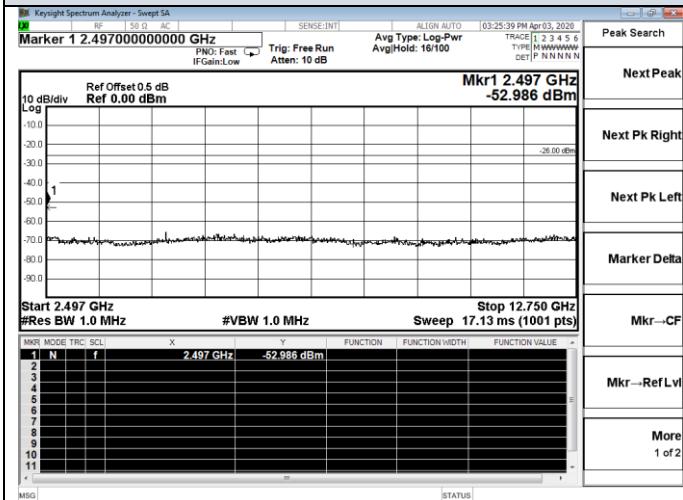
## 30 MHz~1000MHz



## 1000 MHz~2387MHz

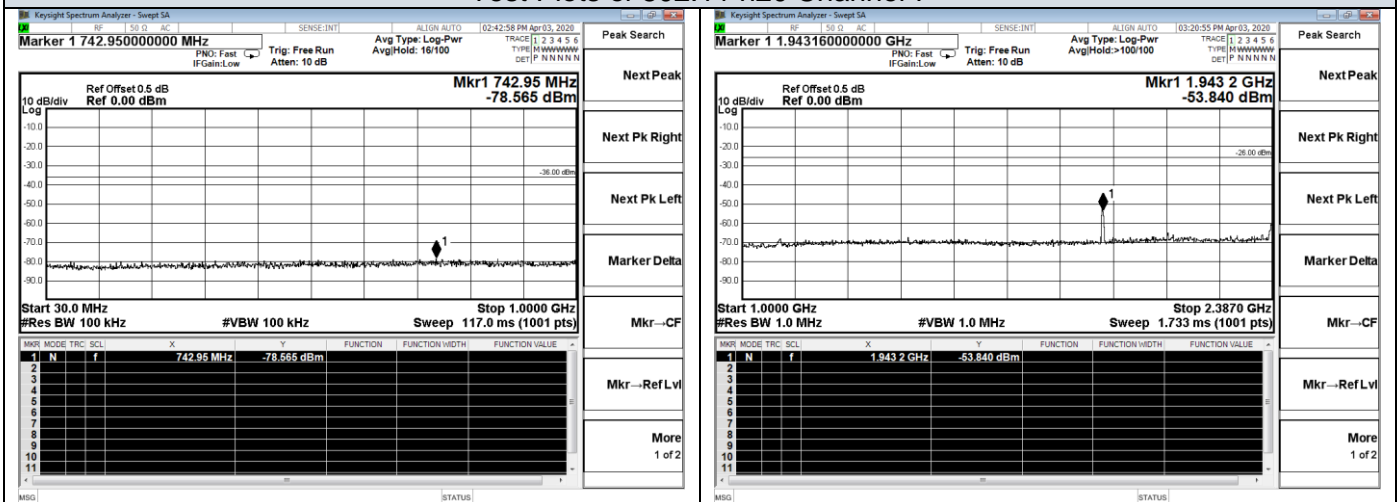


## 2387MHz~2400MHz



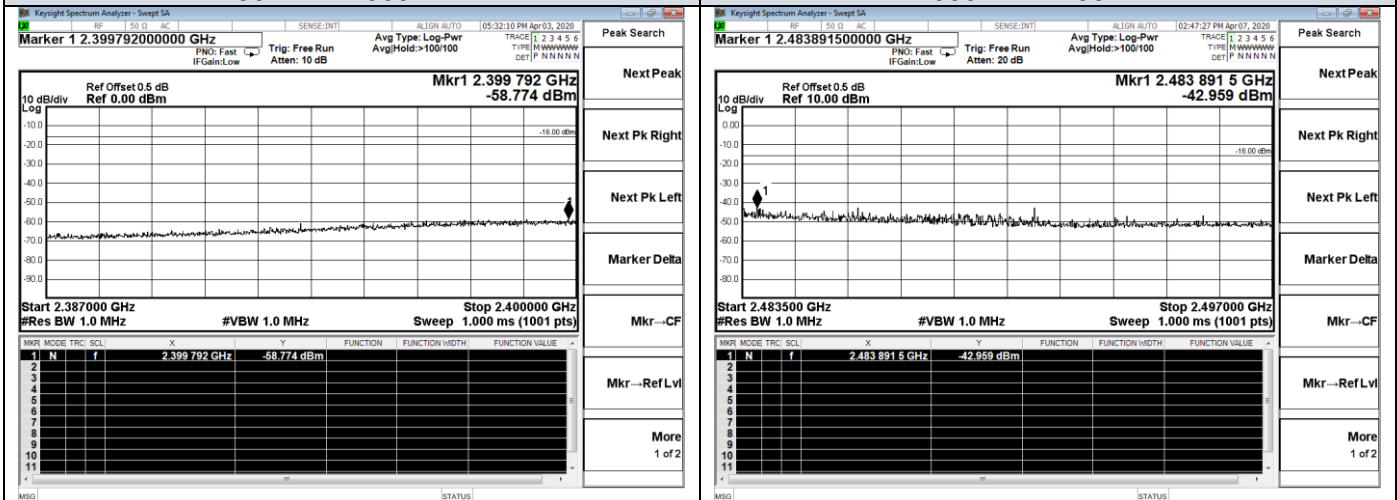
## 2483.5MHz~2497MHz

## 2497MHz~12750MHz

Test Result @ Chain 1  
Test Plots of 802.11 n20 Channel 7

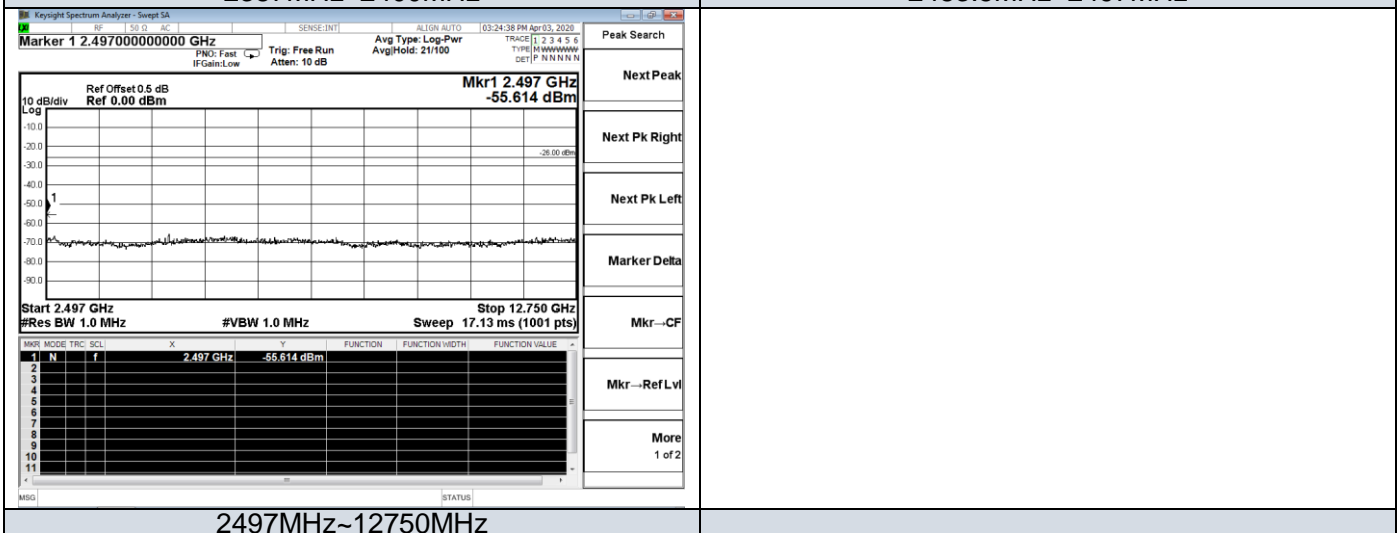
30 MHz~1000MHz

1000 MHz~2387MHz

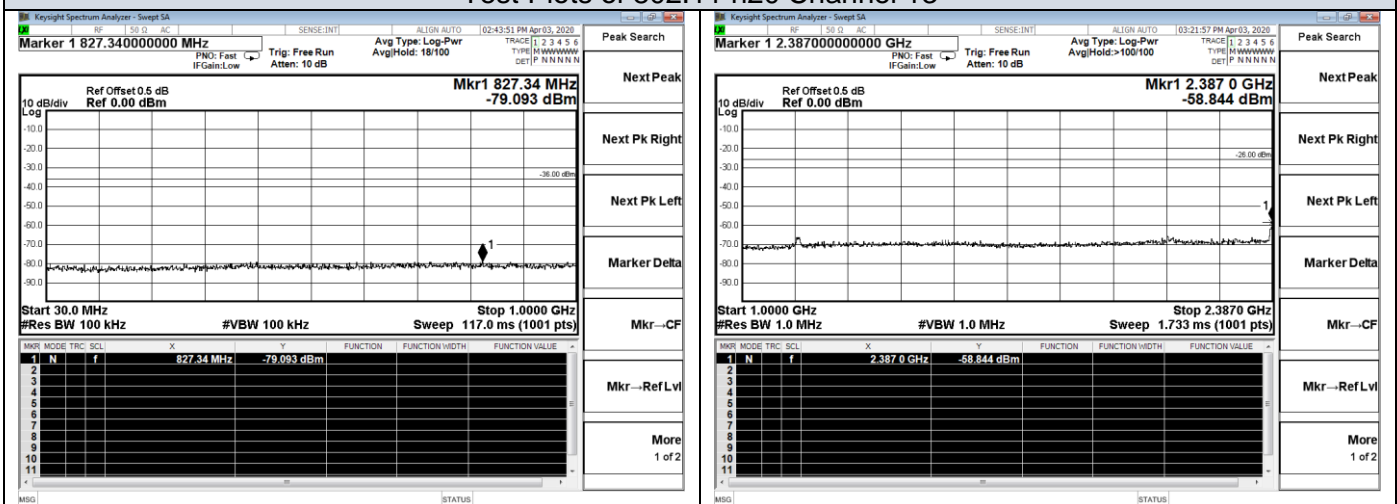


2387MHz~2400MHz

2483.5MHz~2497MHz

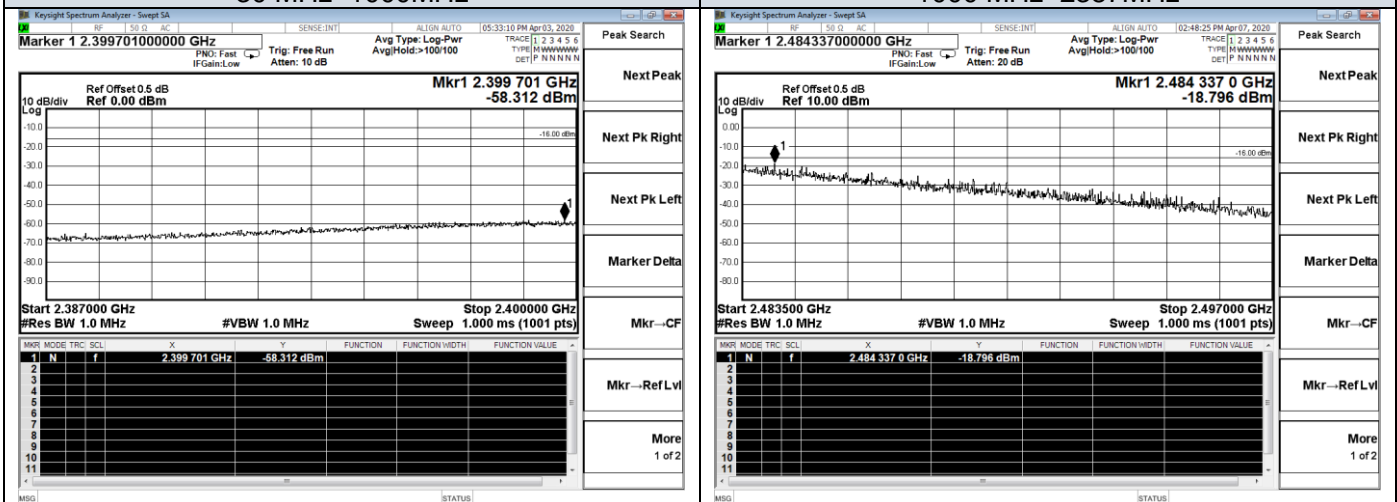


2497MHz~12750MHz

Test Result @ Chain 1  
Test Plots of 802.11 n20 Channel 13

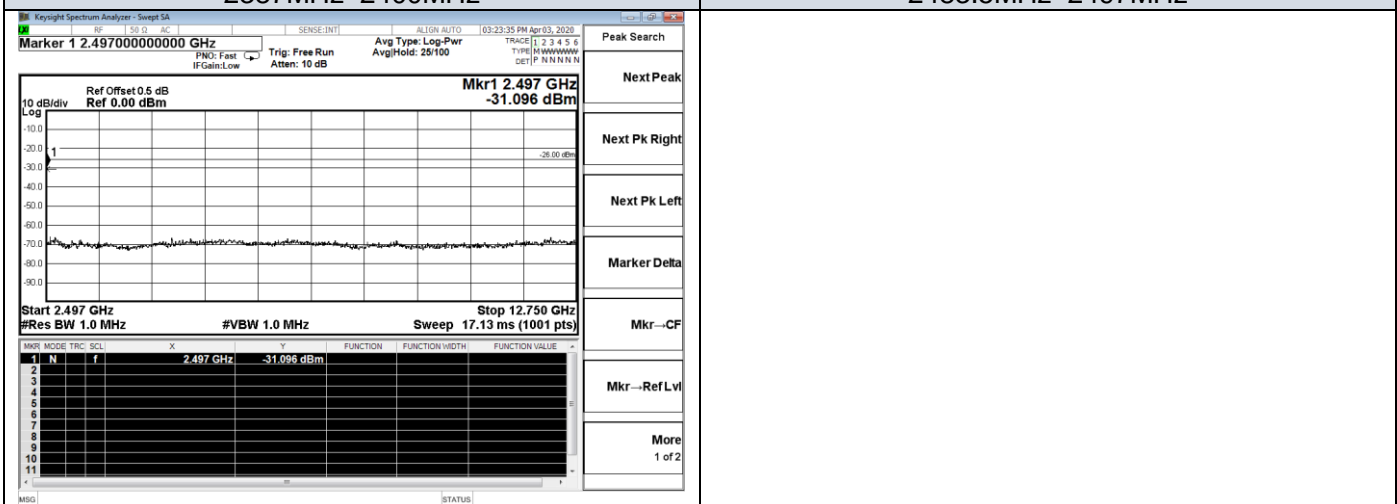
30 MHz~1000MHz

1000 MHz~2387MHz



2387MHz~2400MHz

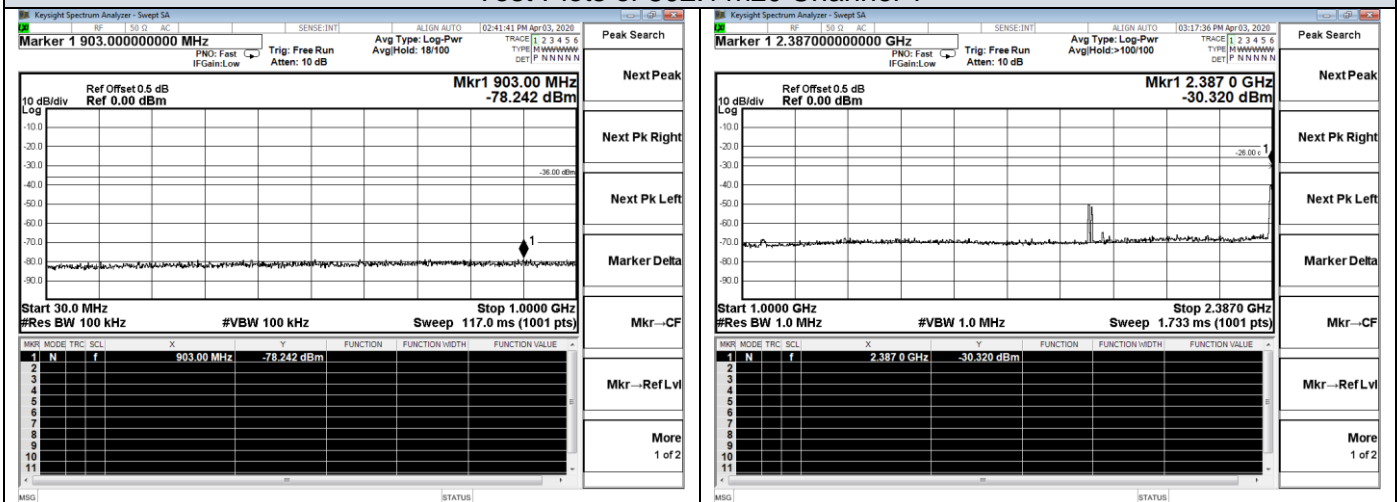
2483.5MHz~2497MHz



2497MHz~12750MHz

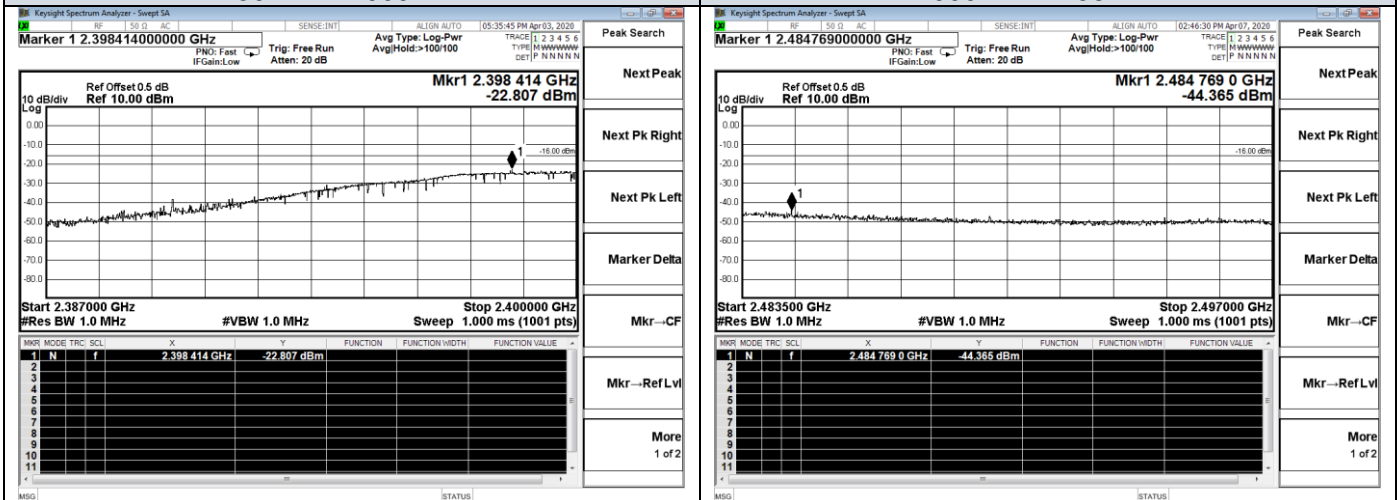
## Test Result @ Chain 0+1

### Test Plots of 802.11n20 Channel 1



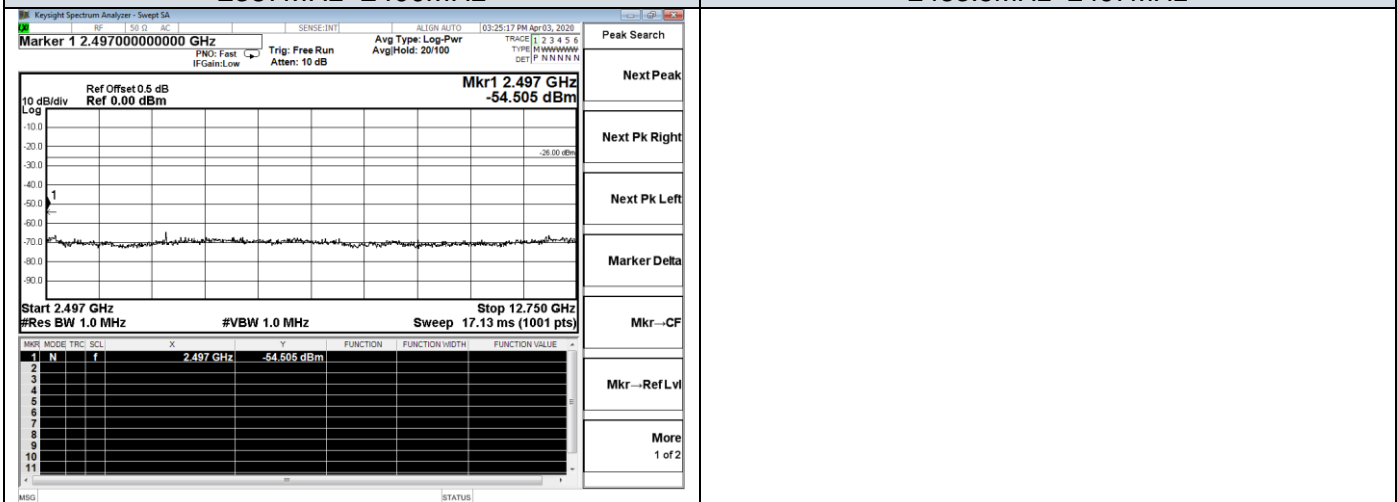
30 MHz~1000MHz

1000 MHz~2387MHz

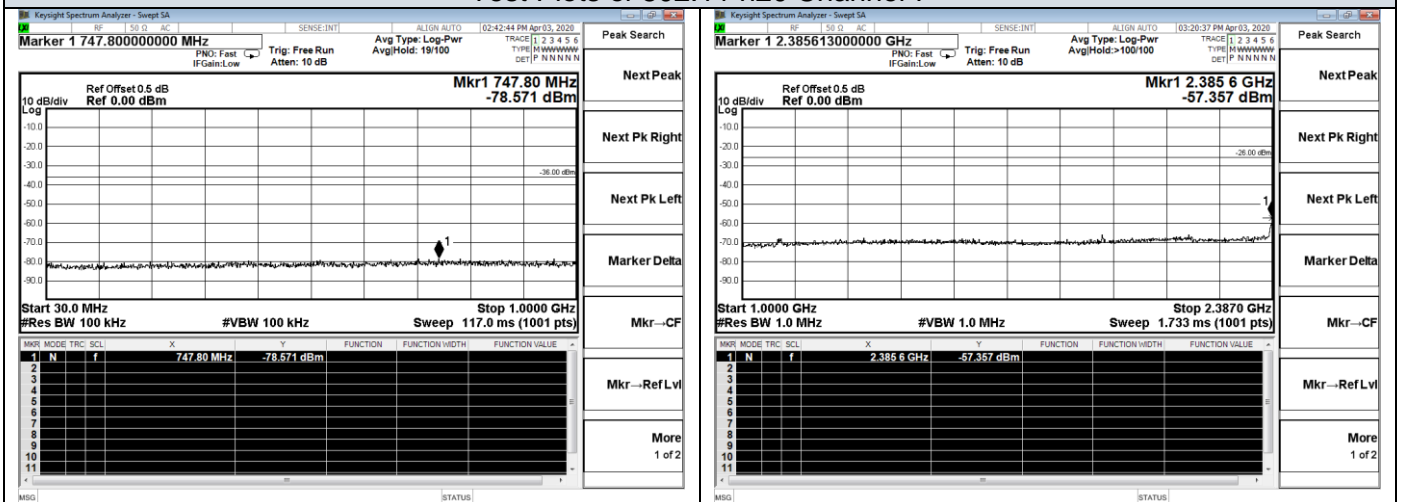


2387MHz~2400MHz

2483.5MHz~2497MHz

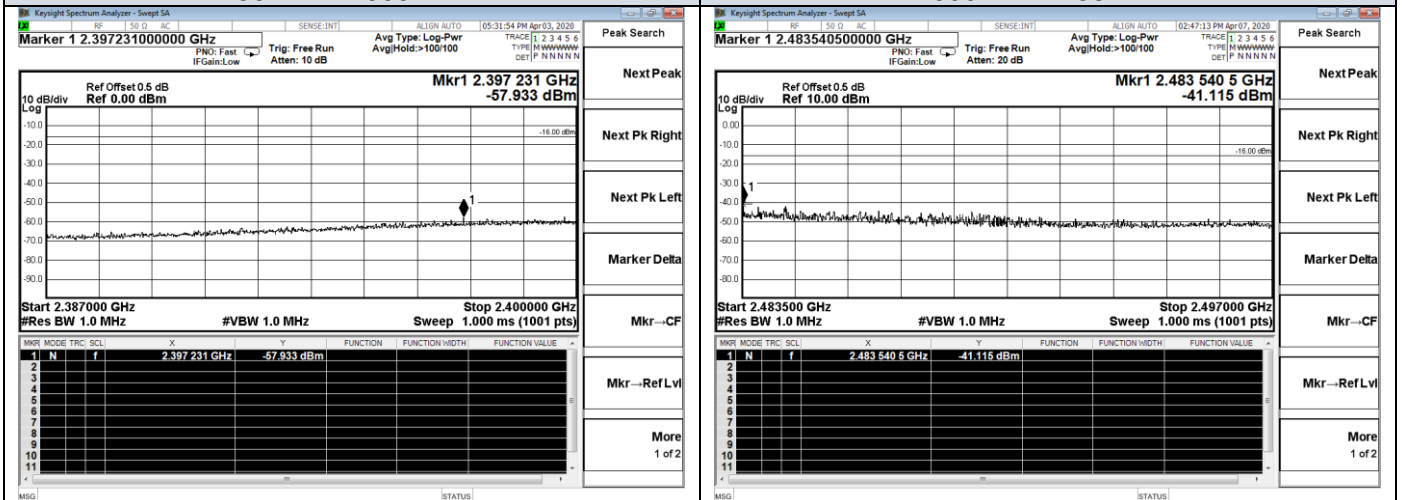


2497MHz~12750MHz

Test Result @ Chain 0+1  
Test Plots of 802.11 n20 Channel 7

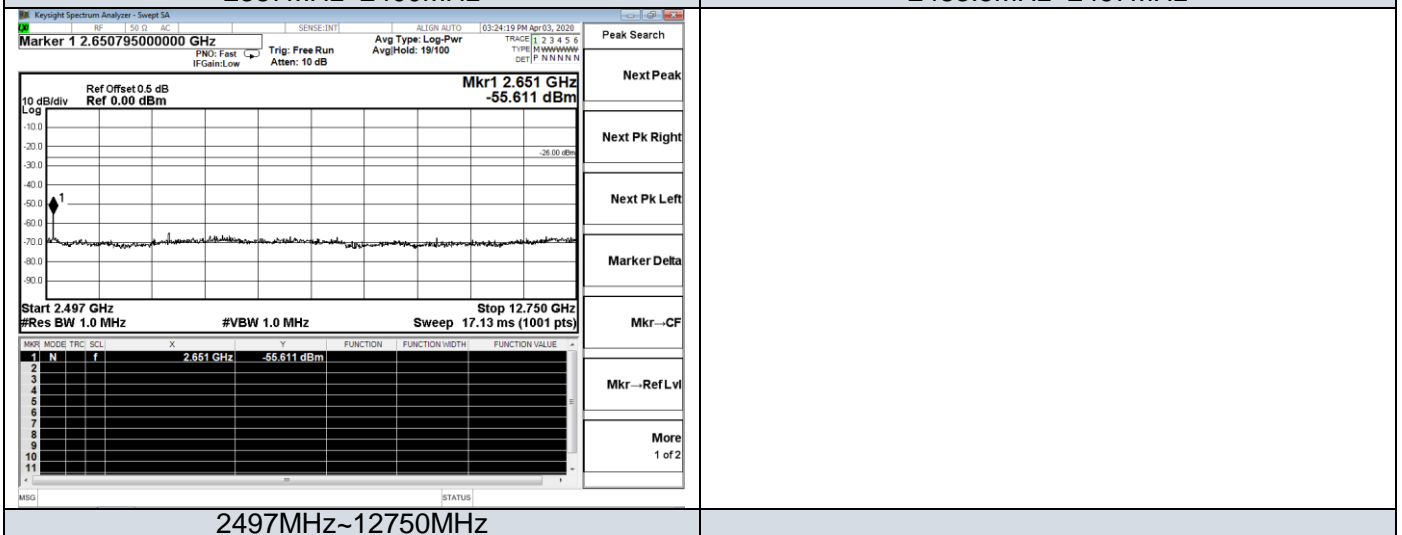
30 MHz~1000MHz

1000 MHz~2387MHz

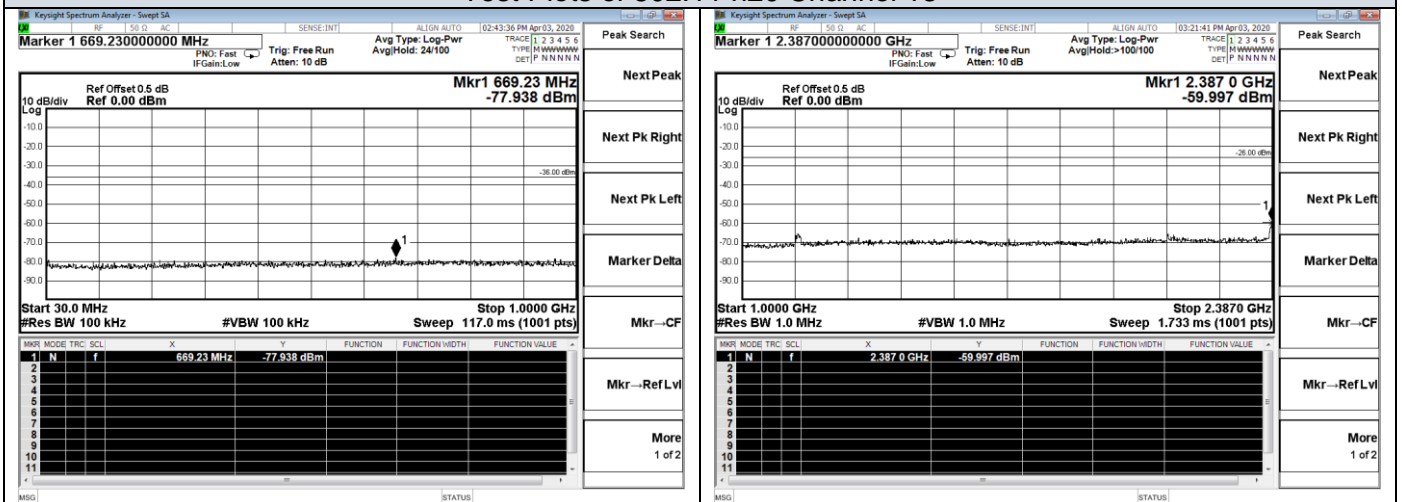


2387MHz~2400MHz

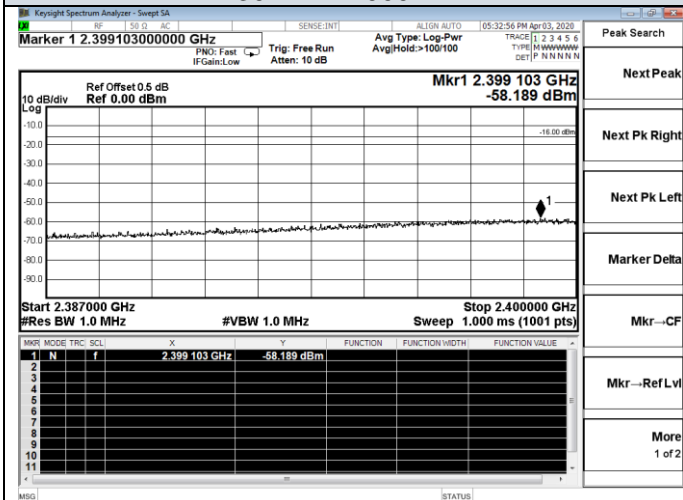
2483.5MHz~2497MHz



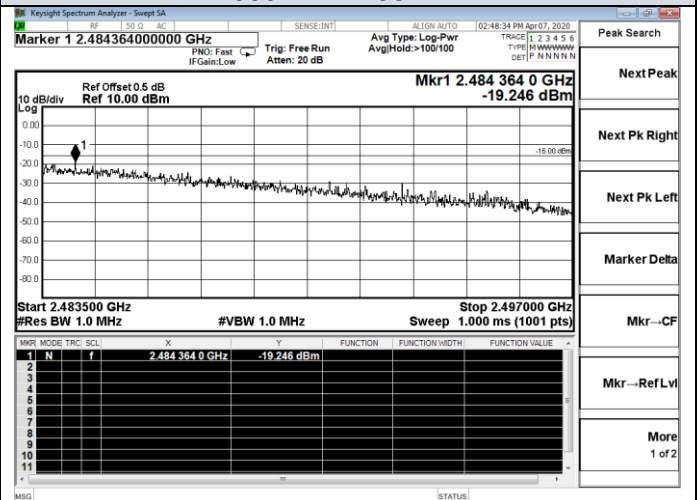
2497MHz~12750MHz

Test Result @ Chain 0+1  
Test Plots of 802.11 n20 Channel 13

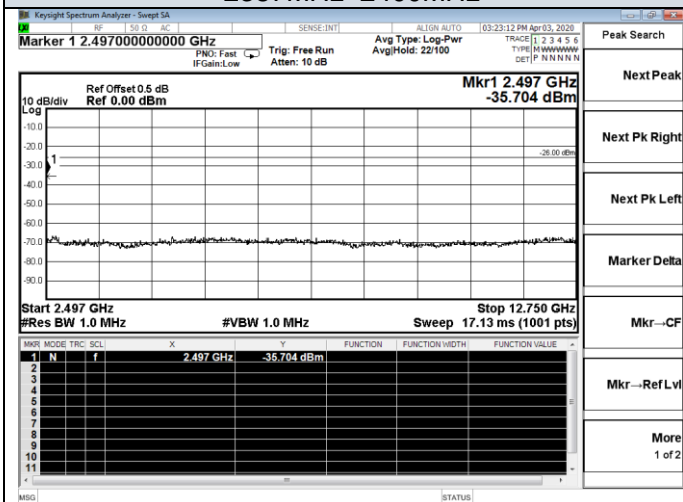
## 30 MHz~1000MHz



## 1000 MHz~2387MHz



## 2387MHz~2400MHz



## 2483.5MHz~2497MHz

## 2497MHz~12750MHz



## 5.6. Carrier sensing function

### 5.6.1. Standard Applicable

Item	Limits
Carrier Sense	Good – EUT stop RF transmission signal after carrier inject to EUT. (On $22.79 + Gr - 20 \cdot \log(f)$ [dBm] (Gr: dBi; f: MHz) or 100mV/m)

### 5.6.2. Measuring Instruments

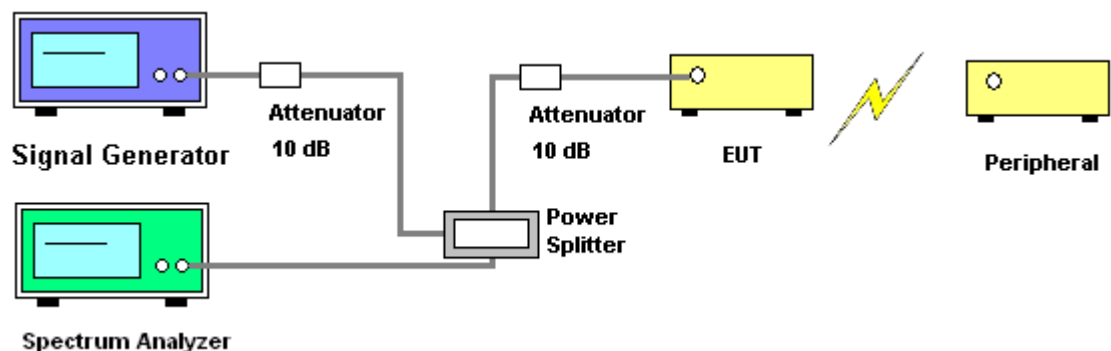
Please refer to section 6 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
RB/VB	1 MHz
Span	0 MHz
Sweep	Continuous
Detector	Peak
Trigger mode	Video

### 5.6.3. Test Procedures

1. SSG adjusted the frequency as same as the EUT transmitted signal and emitted the absence of modulation from SSG and power level is (On  $22.79 + Gr - 20 \cdot \log(f)$  [dBm] (Gr: dBi; f: MHz). Then turn off the RF signal of SSG.
2. EUT have transmitted the maximum modulation signal and fixed channelize.
3. Setting of SA is following as: RB: 1MHz / VB: 1MHz / SPAN: 50MHz / AT: 10dB / Ref: 0dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak.
4. SSG RF Signal On.
5. EUT shall be stop the transmitted any signal and SSG RF Signal Off. Then EUT will be continuous transmitted signal.

### 5.6.4. Test Setup Layout



### 5.6.5. EUT Operation during Test

The EUT was programmed to be in normal transmitting mode.

### 5.6.6. Test Result

N/A

## 5.7. Interference prevention function

### 5.7.1. Standard Applicable

Item	Limits
Identification code	$\geq$ 48 bits

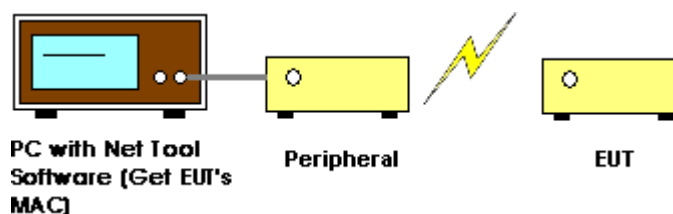
### 5.7.2. Measuring ID Code Software

PC with NetTool	Setting
MAC IP List	MAC Scan

### 5.7.3. Test Procedures

1. In the case that the EUT has the function of automatically transmitting the identification code: a. Transmit the predetermined identification codes from EUT. b. Check the transmitted identification codes with the demodulator.
2. In the case of receiving the identification code: a. Transmit the predetermined identification codes from the counterpart. b. Check if communication is normal. c. Transmit the other signals than predetermined ID codes from the counterpart. d. check if the EUT stops the transmission, or if it displays that identification codes are different from the predetermined ones.

### 5.7.4. Test Setup Layout



### 5.7.5. EUT Operation during Test

The EUT was programmed to be in normal transmitting mode.

### 5.7.6. Test Result

MAC Address: CD:36:D4:21:33:E1

Complies.

## 5.8. Secondary Radiated Emissions

### 5.8.1. Standard Applicable

The limit on secondary emissions radiated from the receiving equipment within which the function of other radio equipment will not be impaired shall be, in terms of the power of a dummy antenna circuit that has the same electrical constant as the receiving antenna, 4nW or less at a frequency below 1 GHz and 20 nW or less at a frequency of 1 GHz or higher as measured using the circuit

### 5.8.2. Measuring Instruments

Please refer to section 6 of equipments list in this report.

### 5.8.3. Test Procedures

- a. Set EUT work in test mode as described in clause 2.4.
- b. Connected the EUT's antenna port to the Spectrum Analyzer by suitable attenuator, set the Spectrum Analyzer as below:

Resolution BW: 100 KHz for frequency below 1GHz and

1MHz for frequency above 1GHz

Video BW: 100 KHz for frequency below 1GHz and

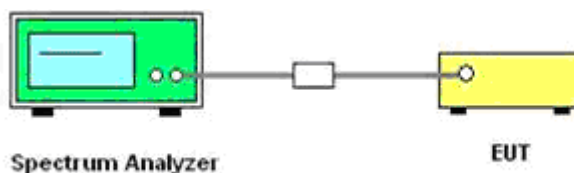
1MHz for frequency above 1GHz

Detector: Peak.

Trace Mode: Max Hold.

- c. All the emissions from 30MHz to 13GHz were measured and record.

### 5.8.4. Test Setup



### 5.8.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

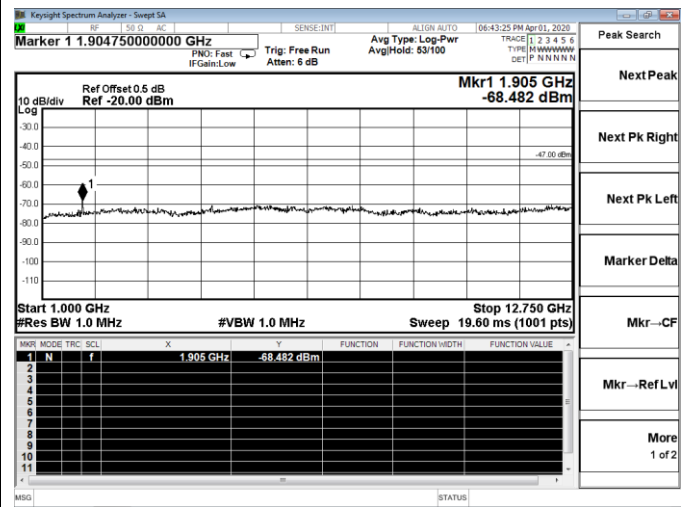
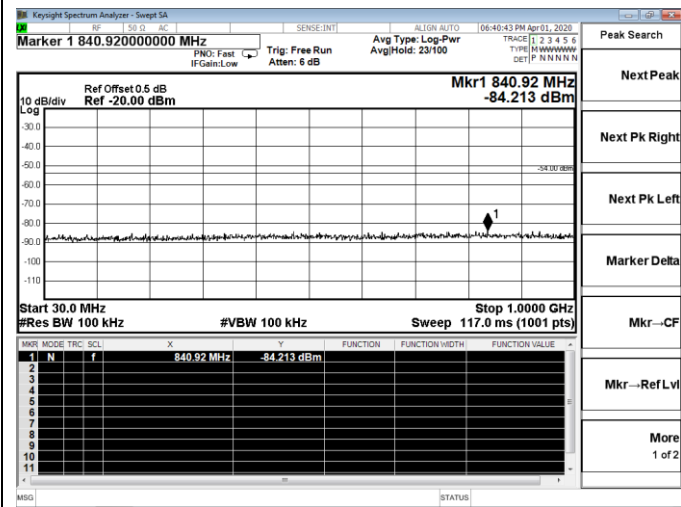
### 5.8.6. Test Results

Please refer to the following page.

Temperature	22.5℃	Humidity	53.1%
Test Engineer	David Luo	Test Voltage	Normal Voltage

## Test Result @ Chain 0

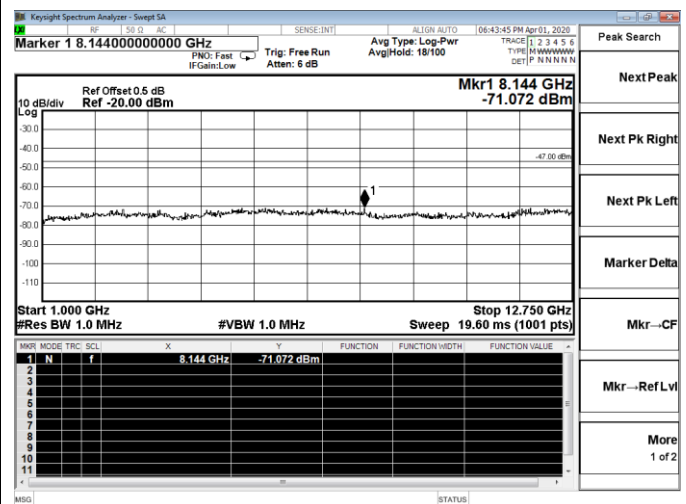
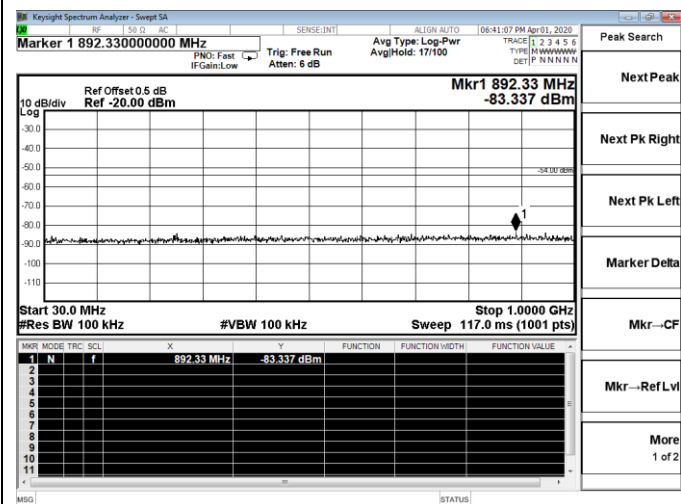
### Test Plots of 802.11b Channel 1



30 MHz~1000MHz

1000 MHz~12750MHz

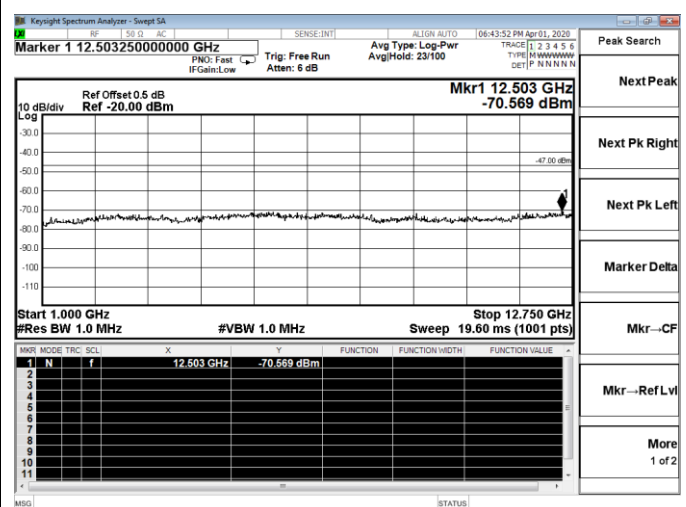
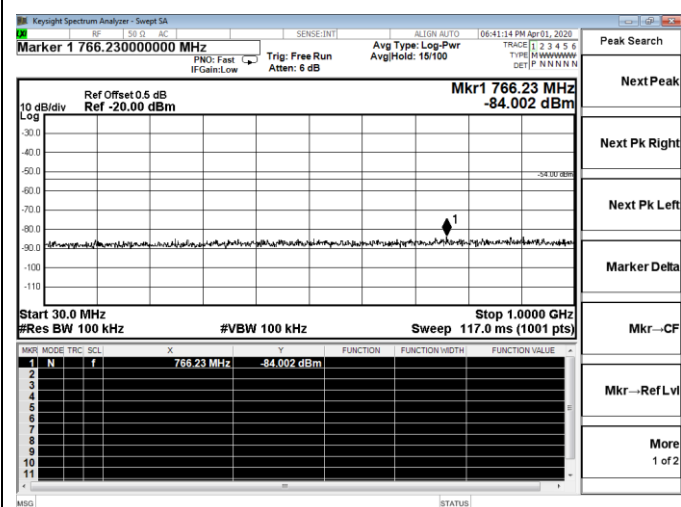
### Test Plots of 802.11g Channel 1



30 MHz~1000MHz

1000 MHz~12750MHz

### Test Plots of 802.11n(HT20) Channel 1

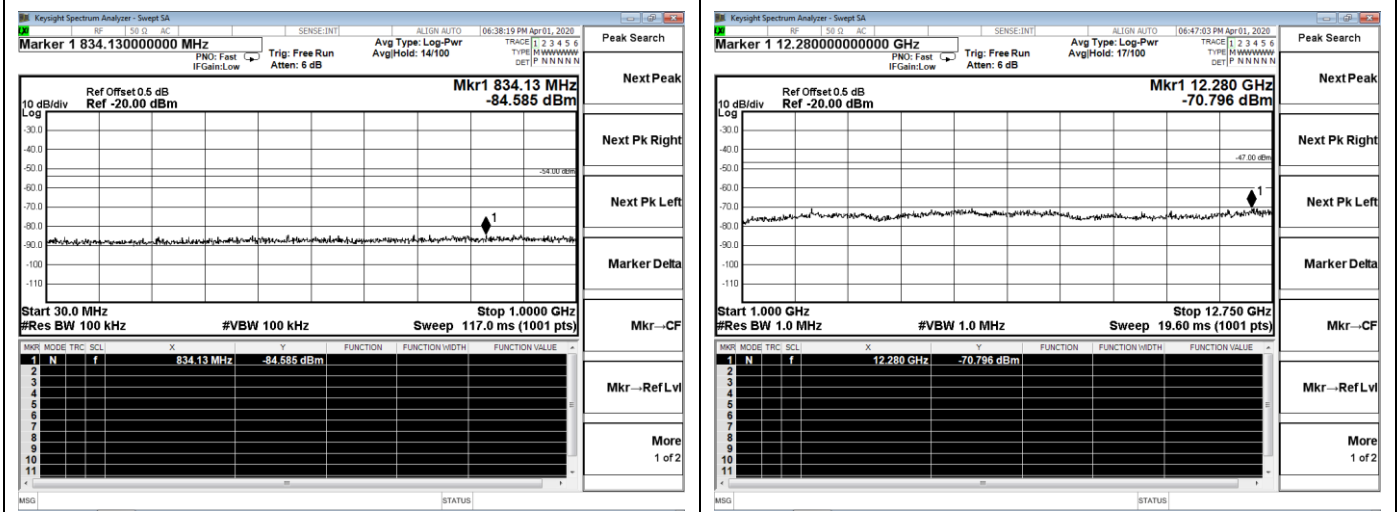


30 MHz~1000MHz

1000 MHz~12750MHz

## Test Result @ Chain 1

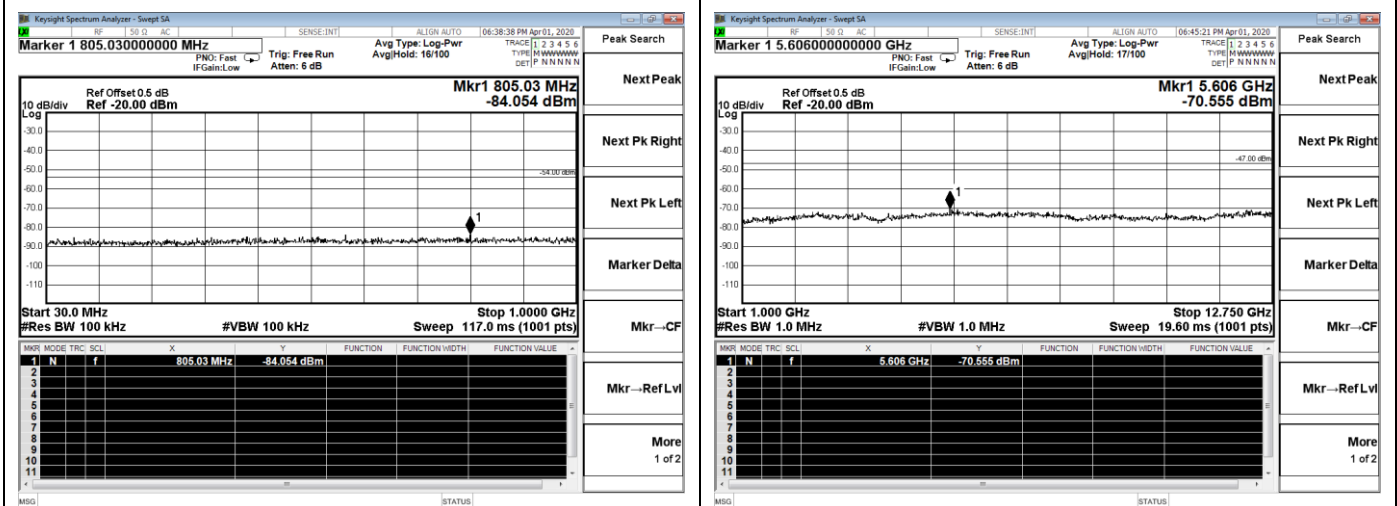
### Test Plots of 802.11b Channel 1



30 MHz~1000MHz

1000 MHz~12750MHz

### Test Plots of 802.11g Channel 1

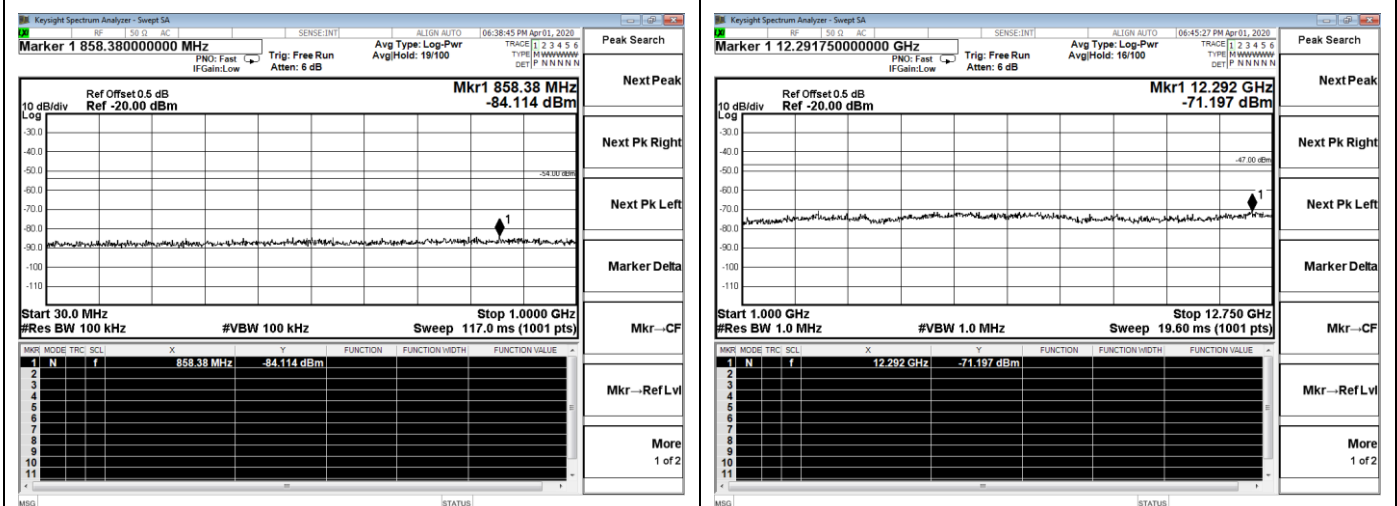


30 MHz~1000MHz

1000 MHz~12750MHz

## Test Result @ Chain 1

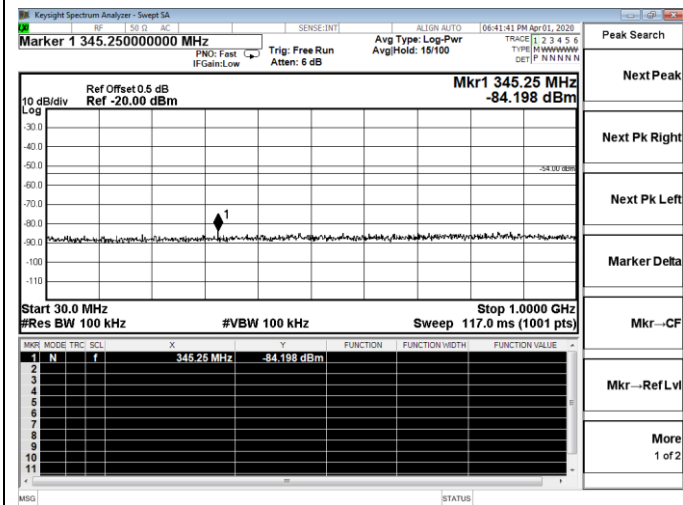
### Test Plots of 802.11n(HT20) Channel 1



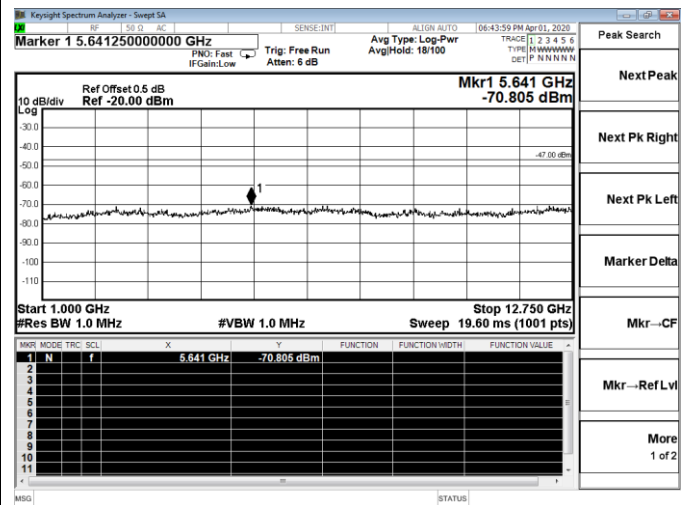
30 MHz~1000MHz

1000 MHz~12750MHz

Test Result @ Chain 0+1  
Test Plots of 802.11n(HT20) Channel 1



30 MHz~1000MHz



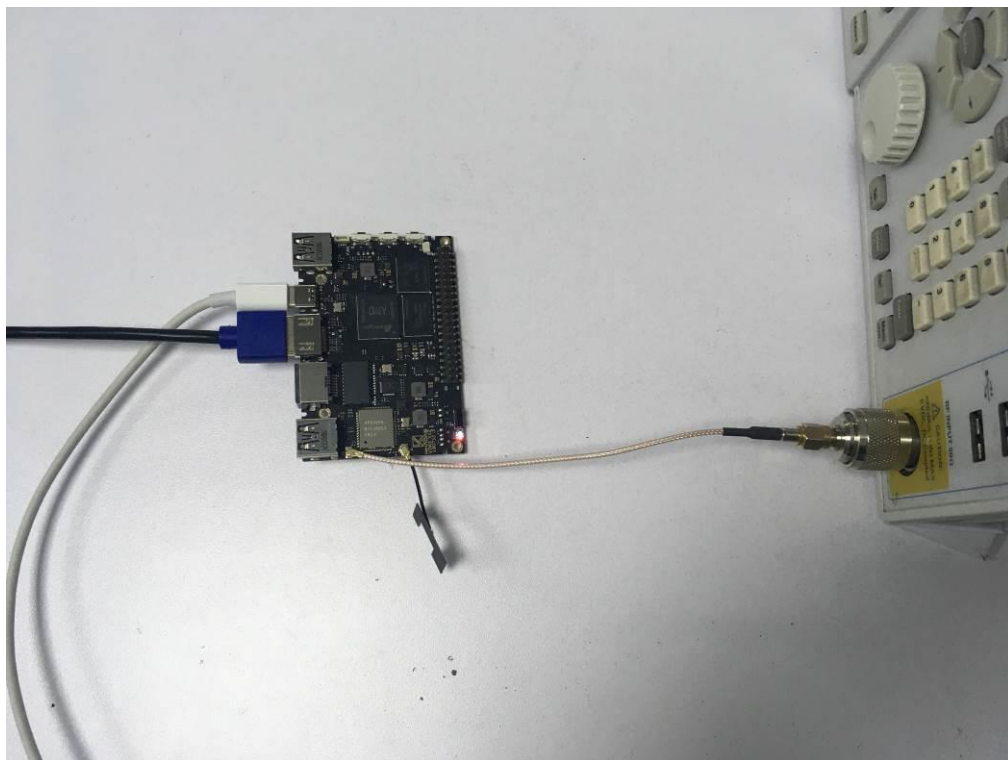
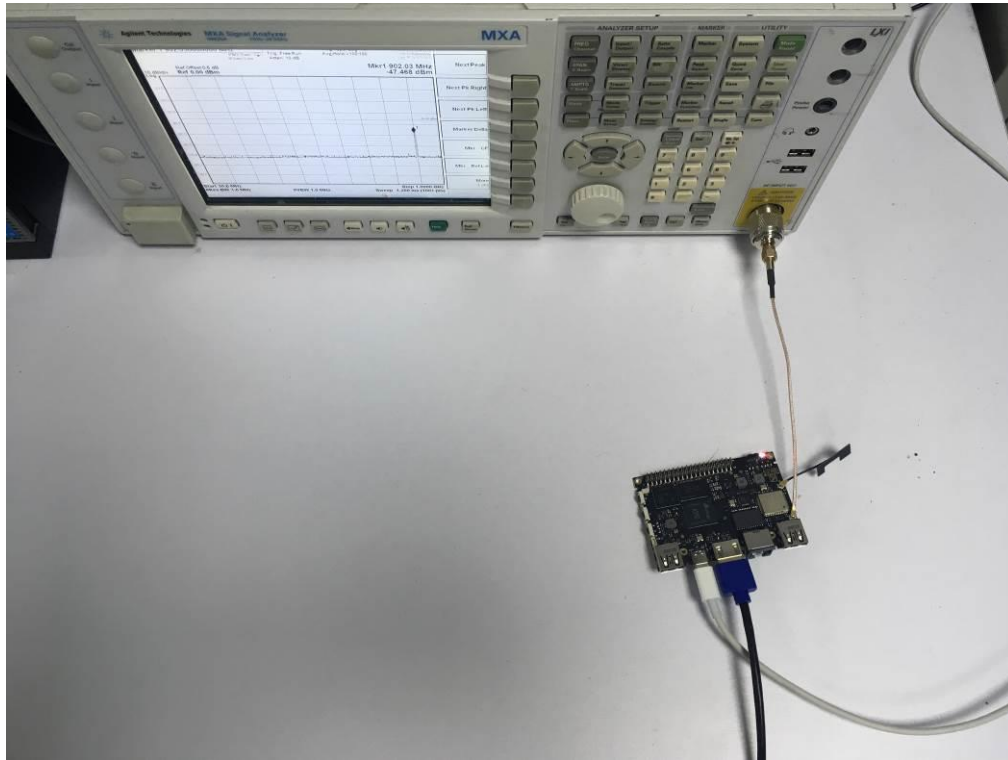
1000 MHz~12750MHz

## 6. LIST OF MEASURING EQUIPMENTS

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Power Meter	R&S	NRVS	100444	2019-06-11	2020-06-10
2	Power Sensor	R&S	NRV-Z81	100458	2019-06-11	2020-06-10
3	Power Sensor	R&S	NRV-Z32	10057	2019-06-11	2020-06-10
4	MXA Signal Analyzer	Agilent	N9020A	MY49100060	2019-11-22	2020-11-21
5	DC Power Supply	Agilent	E3642A	N/A	2019-11-14	2020-11-13

Note: All equipment is calibrated through CHINA CEPREI LABORATORY and GUANGZHOU LISAI CALIBRATION AND TEST CO., LTD.

## 7. TEST SETUP PHOTOGRAPHS



Note: The RF cable is 50 ohm.



## 8. EUT EXTERIOR PHOTOGRAPHS

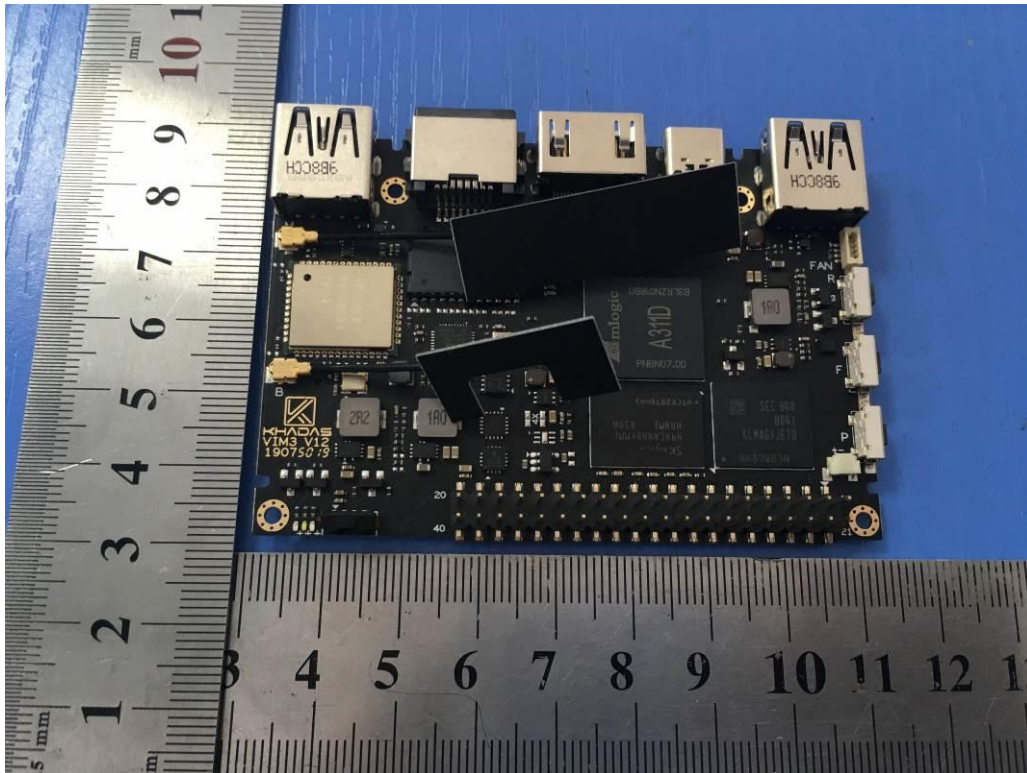


Fig. 1

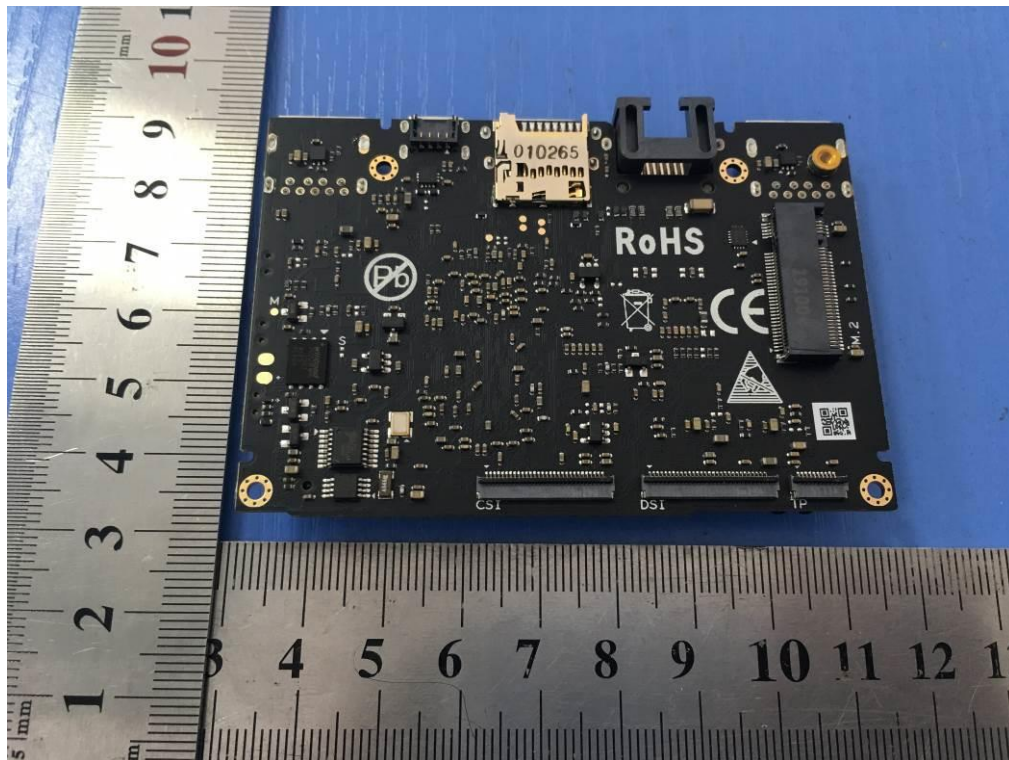


Fig. 2

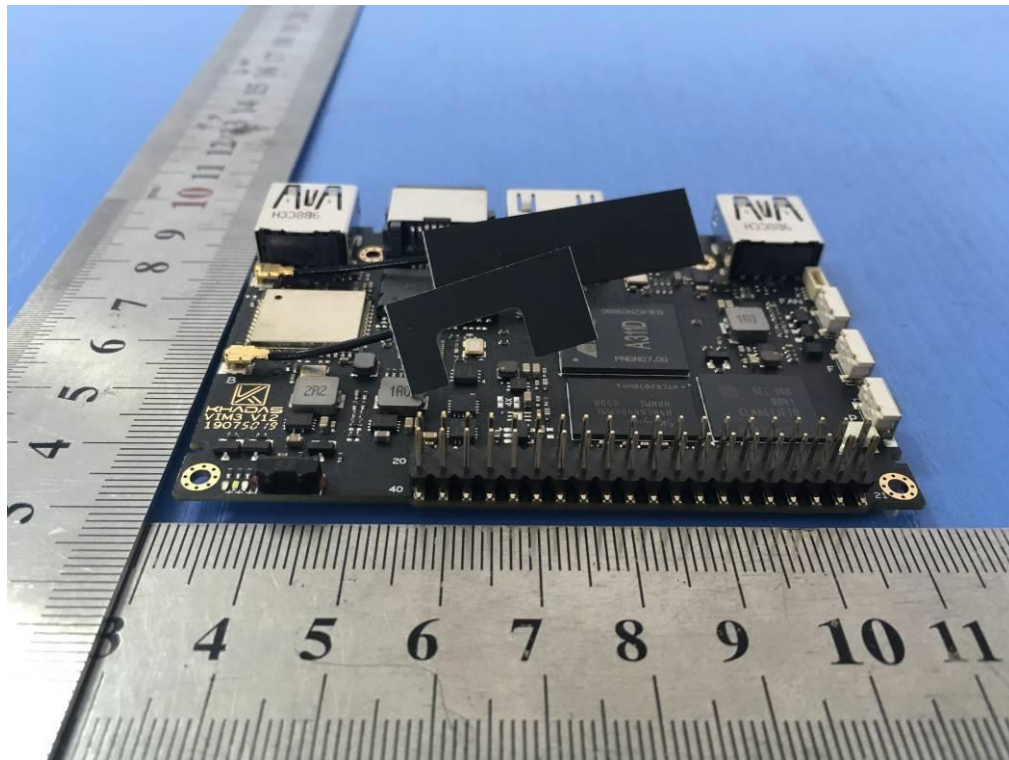


Fig. 3



Fig. 4



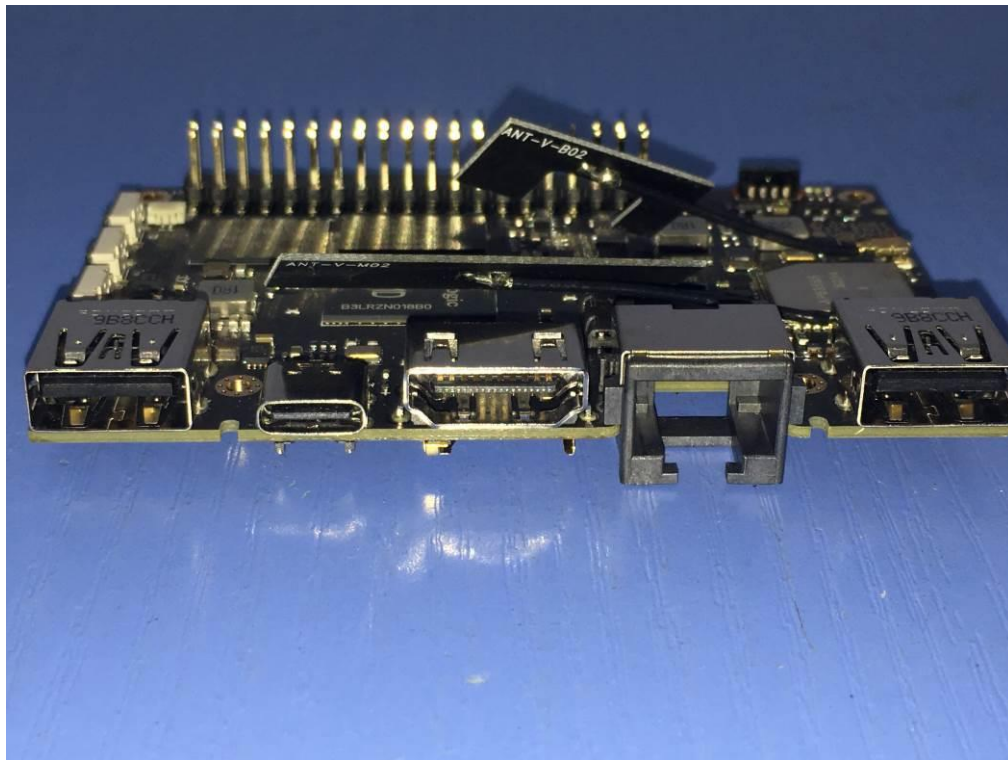


Fig. 5

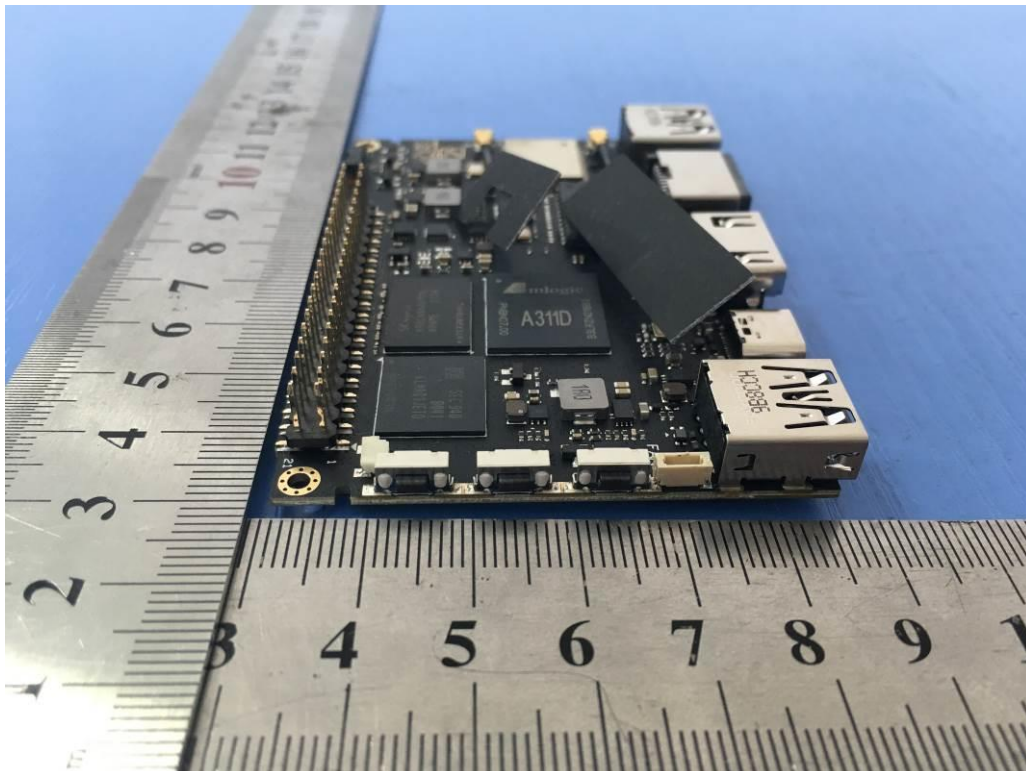


Fig. 6





## 9. EUT INTERIOR PHOTOGRAPHS

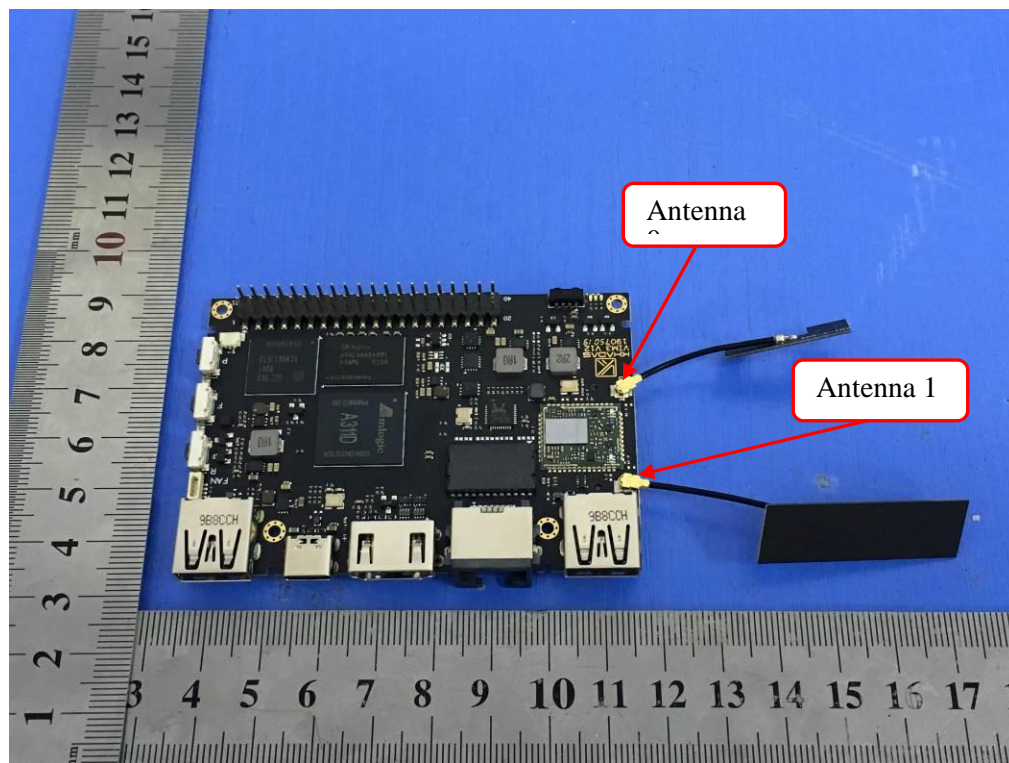


Fig.1

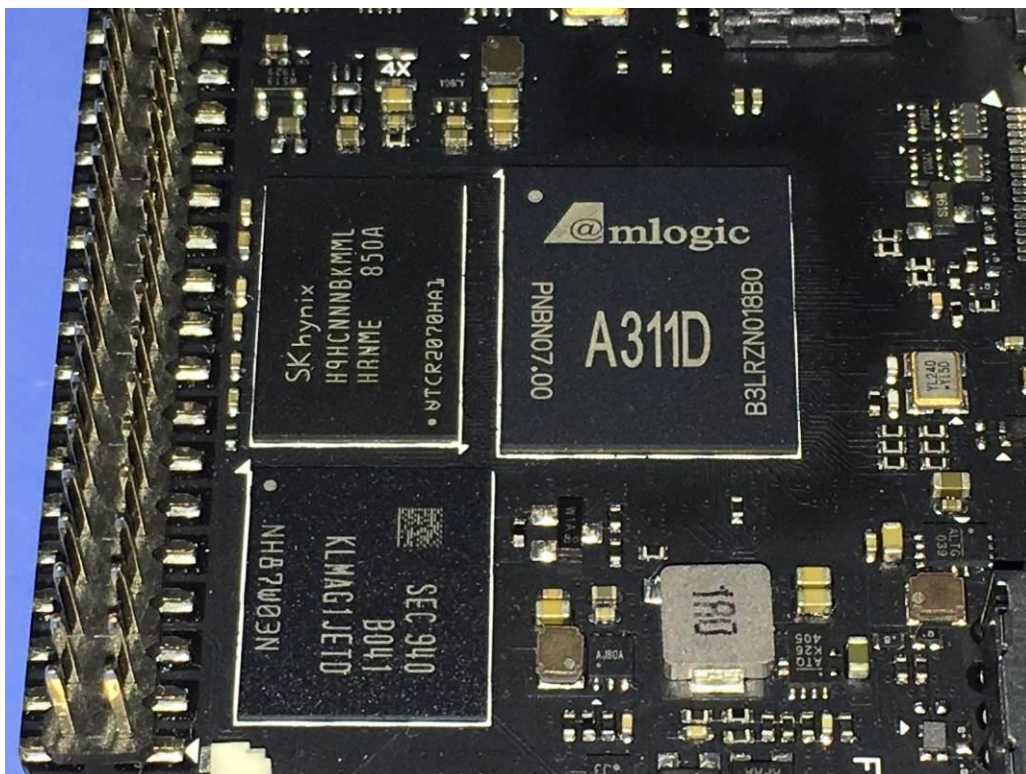


Fig.2

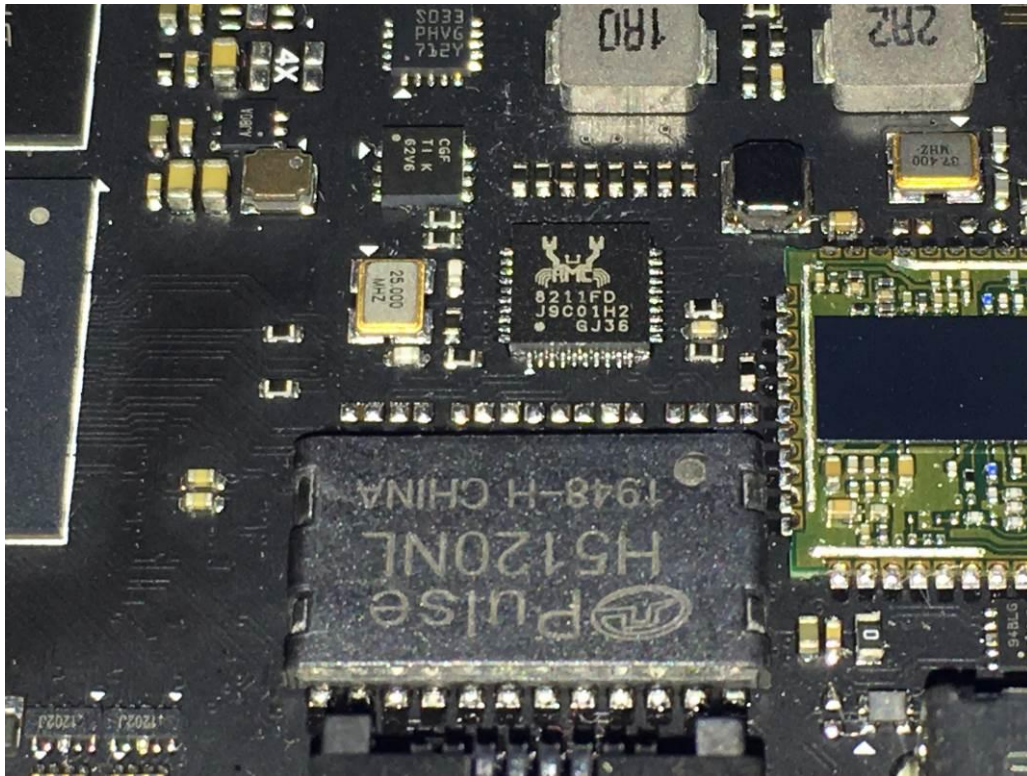


Fig.3

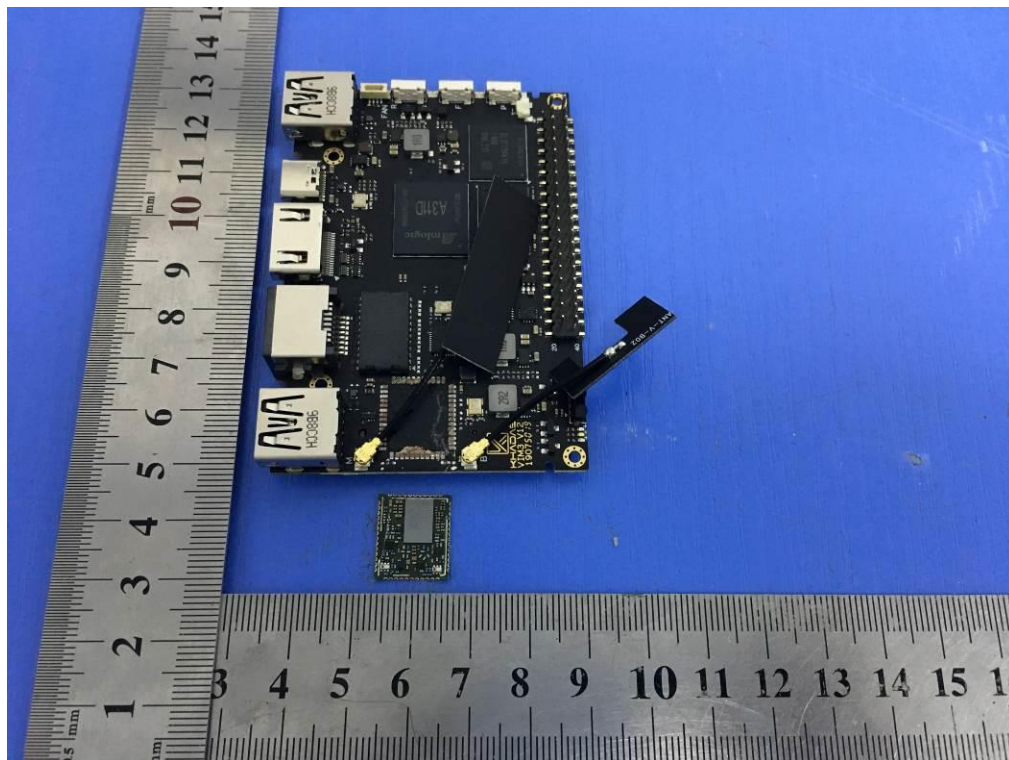


Fig.4



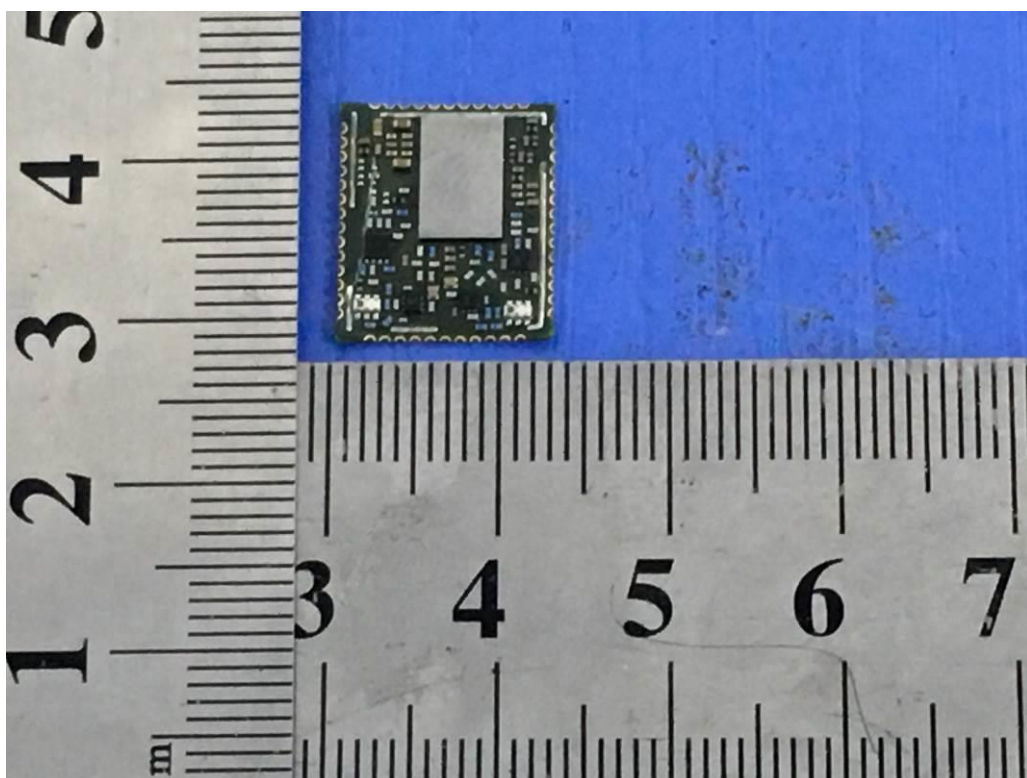


Fig.5

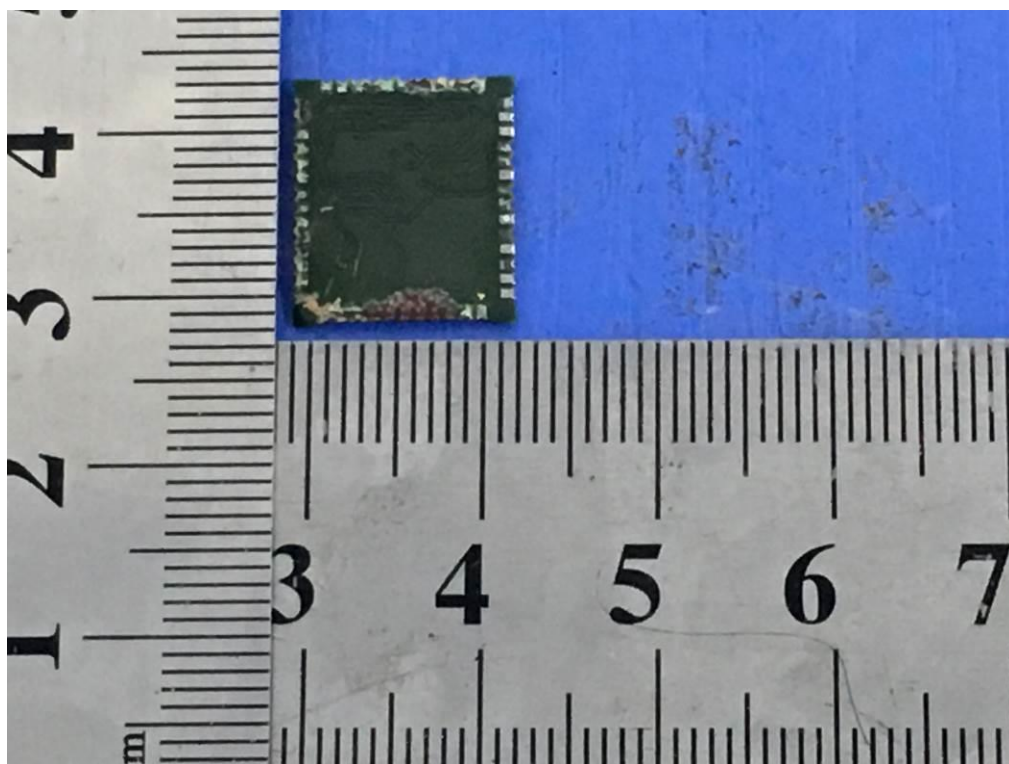


Fig.6

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