



## TEST REPORT

### FCC PART 15 SUBPART C 15.247

**Test report**

**On Behalf of**

**SHENZHEN NEO ELECTRONICS CO., LTD**

**For**

**WIFI siren alarm**

**Model No.: NAS-AB02W0**

**FCC ID: Z52NAS-AB02W0**

**Prepared for :** SHENZHEN NEO ELECTRONICS CO., LTD  
East 6/F Building 2, Laobing industry, Baoan District, Shenzhen.

**Prepared By :** SHENZHEN NEO ELECTRONICS CO., LTD  
East 6/F Building 2, Laobing industry, Baoan District, Shenzhen.

**Date of Test:** Sep. 14, 2018 ~ Sep. 20, 2018

**Date of Report:** Sep. 20, 2018

**Report Number:** HK1809201132E

**TEST RESULT CERTIFICATION****Applicant's name .....**: SHENZHEN NEO ELECTRONICS CO., LTD

Address .....: East 6/F Building 2, Laobing industry, Baoan District, Shenzhen.

**Manufacture's Name.....**: SHENZHEN NEO ELECTRONICS CO., LTD

Address .....: East 6/F Building 2, Laobing industry, Baoan District, Shenzhen.

**Product description**

Trade Mark: NEO Coolcam

Product name.....: WIFI siren alarm

Model and/or type reference ...: NAS-AB02W0

Serial Model GN-SS004

Difference Description Series model are identical with EUT except model number

**Standards.....: 47 CFR FCC Part 15 Subpart C 15.247**

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**Date of Test .....**:

Date (s) of performance of tests .....: Sep. 14, 2018 to Sep. 20, 2018

Date of Issue .....: Sep. 20, 2018

Test Result.....: **Pass**

Testing Engineer :

(Gary Qian)

Technical Manager :

(Eden Hu)

Authorized Signatory :

(Jason Zhou)



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## 1. SUMMARY

### 1.1 TEST STANDARDS

The tests were performed according to following standards:

[FCC Rules Part 15.247](#): Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

[ANSI C63.10:2013](#) : American National Standard for Testing Unlicensed Wireless Devices

[KDB558074 D01 15.247 Meas Guidance v05](#): Guidance for compliance measurements on Digital transmission system, frequency hopping spread spectrum system, and hybrid system devices operating under section 15.247 of the FCC rules.

### 1.2 TEST DESCRIPTION

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.247	Output Power	Compliant
§15.247	6 dB Bandwidth	Compliant
§15.247	Conducted Spurious Emission	Compliant
§15.247	Maximum Conducted Output Power SPECTRAL Density	Compliant
§15.209	Radiated Emission	Compliant
§15.247	Band Edges	Compliant
§15.207	Line Conduction Emission	Compliant

NOTE: N/A stands for not applicable.



## 1.3 TEST FACILITY

### 1.3.1 Address of the test laboratory

Shenzhen HUAK Testing Technology Co., Ltd.

Add.:1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 32/EN 55032 requirements.

### 1.3.2 Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

#### **IC Registration No.: 21210**

The 3m alternate test site of Shenzhen HUAK Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 21210 on May 24, 2016.

#### **FCC Registration No.: CN1229**

Test Firm Registration Number : 616276

## 1.4 STATEMENT OF THE MEASUREMENT UNCERTAINTY

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the Shenzhen HUAK Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for HUAK laboratory is reported:

Test	Measurement Uncertainty	Notes
Transmitter power conducted	±0.57 dB	(1)
Transmitter power Radiated	±2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	±2.20 dB	(1)
Occupied Bandwidth	±0.01ppm	(1)
Radiated Emission 30~1000MHz	±4.10dB	(1)
Radiated Emission Above 1GHz	±4.32dB	(1)
Conducted Disturbance 0.15~30MHz	±3.20dB	(1)

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



## 2.GENERAL INFORMATION

### 2.1 ENVIRONMENTAL CONDITIONS

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

### 2.2 GENERAL DESCRIPTION OF EUT

Product Name:	WIFI siren alarm
Model/Type reference:	NAS-AB02W0
Power supply:	DC5V by Adapter or DC 6V by Battery
Modulation	DSSS(DBPSK/DQPSK/CCK);OFDM(BPSK/QPSK/16-QAM/64-QAM)
Supported modes	802.11 b/g/n20
Operation Frequency	2.412 GHz~2.462GHz
Channel number:	11
Antenna type:	Fixed Antenna
Antenna gain:	0dBi
Hardware Version:	V2.0
Software Version:	V1.0

Note: For more details, refer to the user's manual of the EUT.

### 2.3 DESCRIPTION OF TEST MODES AND TEST FREQUENCY

Frequency Band	Channel Number	Frequency
2400~2483.5MHZ	1	2412 MHZ
	2	2417 MHZ
	3	2422 MHZ
	4	2427 MHZ
	5	2432 MHZ
	6	2437 MHZ
	7	2442 MHZ
	8	2447 MHZ
	9	2452 MHZ
	10	2457 MHZ
	11	2462 MHZ

Note: For 20MHZ bandwidth system use Channel 1 to Channel 11, For 40MHZ bandwidth system use Channel 3 to Channel 9



NO.	TEST MODE DESCRIPTION
1	Low channel TX
2	Middle channel TX
3	High channel TX
4	Normal operating

**Note:**  
Transmit by 802.11b with Date rate (1/2/5.5/11)  
Transmit by 802.11g with Date rate (6/9/12/18/24/36/48/54)  
Transmit by 802.11n (20MHz) with Date rate (6.5/13/19.5/26/39/52/58.5/65)  
Transmit by 802.11n (40MHz) with Date rate (13.5/27/40.5/54/81/108/121.5/135)

**Note:**

1. The EUT has been set to operate continuously on the lowest, middle and highest operation frequency individually, and the eut is operating at its maximum duty cycle>or equal 98%
2. All modes under which configure applicable have been tested and the worst mode test data recording in the test report, if no other mode data.
3. For Radiated Emission, 3axis were chosen for testing for each applicable mode.

**2.4 RELATED SUBMITTAL(S) / GRANT (S)**

This submittal(s) (test report) is intended to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

**2.5 MODIFICATIONS**

No modifications were implemented to meet testing criteria.

**2.6. IEEE 802.11N MODULATION SCHEME**

MCS Index	Nss	Modulation	R	NBPSC	NCBPS		NDBPS		Data rate(Mbps)	
					20MHz	40MHz	20MHz	40MHz	20MHz	40MHz
0	1	BPSK	1/2	1	52	108	26	54	6.5	13.5
1	1	QPSK	1/2	2	104	216	52	108	13.0	27.0
2	1	QPSK	3/4	2	104	216	78	162	19.5	40.5
3	1	16-QAM	1/2	4	208	432	104	216	26.0	54.0
4	1	16-QAM	3/4	4	208	432	156	324	39.0	81.0
5	1	64-QAM	2/3	6	312	648	208	432	52.0	108.0
6	1	64-QAM	3/4	6	312	648	234	489	58.5	121.5
7	1	64-QAM	5/6	6	312	648	260	540	65.0	135.0



Symbol	Explanation
NSS	Number of spatial streams
R	Code rate
NBPSC	Number of coded bits per single carrier
NCBPS	Number of coded bits per symbol
NDBPS	Number of data bits per symbol
GI	Guard interval

## 2.7 EQUIPMENT USED

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	R&S	ENV216	HKE-002	Dec. 28, 2017	1 Year
2.	Receiver	R&S	ESCI 7	HKE-010	Dec. 28, 2017	1 Year
3.	RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 28, 2017	1 Year
4.	Spectrum analyzer	R&S	FSP40	HKE-025	Dec. 28, 2017	1 Year
5.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 28, 2017	1 Year
6.	Preamplifier	Schwarzbeck	BBV 9743	HKE-006	Dec. 28, 2017	1 Year
7.	EMI Test Receiver	Rohde & Schwarz	ESCI 7	HKE-010	Dec. 28, 2017	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	HKE-012	Dec. 28, 2017	1 Year
9.	Loop Antenna	Schwarzbeck	FMZB 1519 B	HKE-014	Dec. 28, 2017	1 Year
10.	Horn Antenna	Schwarzbeck	9120D	HKE-013	Dec. 28, 2017	1 Year
11.	Pre-amplifier	EMCI	EMC051845 SE	HKE-015	Dec. 28, 2017	1 Year
12.	Pre-amplifier	Agilent	83051A	HKE-016	Dec. 28, 2017	1 Year
13.	EMI Test Software EZ-EMC	Tonscend	JS1120-B Version	HKE-083	Dec. 28, 2017	N/A
14.	Power Sensor	Agilent	E9300A	HKE-086	Dec. 28, 2017	1 Year
15.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 28, 2017	1 Year
16.	Signal generator	Agilent	N5182A	HKE-029	Dec. 28, 2017	1 Year
17.	Signal Generator	Agilent	83630A	HKE-028	Dec. 28, 2017	1 Year
18.	Shielded room	Shiel Hong	4*3*3	HKE-039	Dec. 28, 2017	3 Year

The calibration interval was one year



### 3. OUTPUT POWER

#### 3.1. MEASUREMENT PROCEDURE

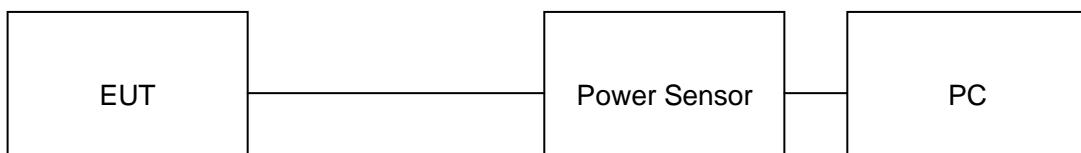
For average power test:

1. Connect EUT RF output port to power sensor through an RF attenuator.
2. Connect the power sensor to the PC.
3. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
4. Record the maximum power from the software.

**Note :** The EUT was tested according to ANSI C63.10 (2013) for compliance to FCC 47CFR 15.247 requirements.

#### 3.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

##### AVERAGE POWER SETUP





### 3.3. LIMITS AND MEASUREMENT RESULT

TEST ITEM	OUTPUT POWER		
TEST MODE	802.11b with data rate 1		

Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.412	15.72	30	Pass
2.437	15.30	30	Pass
2.462	15.09	30	Pass

TEST ITEM	OUTPUT POWER		
TEST MODE	802.11g with data rate 6		

Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.412	12.93	30	Pass
2.437	12.66	30	Pass
2.462	12.23	30	Pass

TEST ITEM	OUTPUT POWER		
TEST MODE	802.11n 20 with data rate 6.5		

Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.412	11.42	30	Pass
2.437	11.17	30	Pass
2.462	11.01	30	Pass



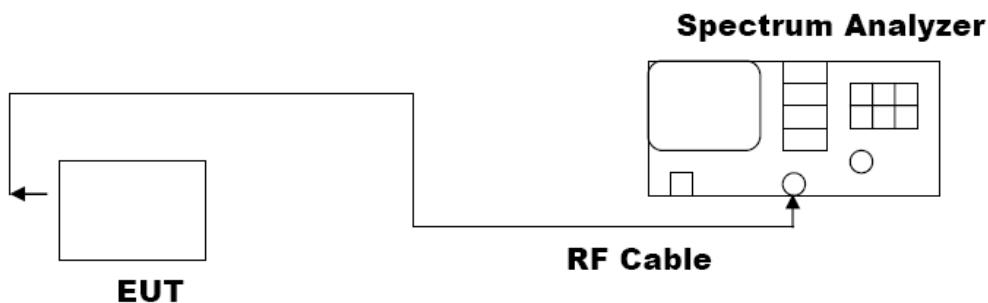
## 4. 6 DB BANDWIDTH

### 4.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set SPA Centre Frequency = Operation Frequency, RBW= 100 KHz, VBW $\geqslant$ 3 $\times$ RBW.
4. Set SPA Trace 1 Max hold, then View.

**Note:** The EUT was tested according to ANSI C63.10 (2013) for compliance to FCC 47CFR 15.247 requirements.

### 4.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)





#### 4.3. LIMITS AND MEASUREMENT RESULTS

TEST ITEM	6DB BANDWIDTH	
TEST MODE	802.11b with data rate 11	

LIMITS AND MEASUREMENT RESULT			
Applicable Limits	Applicable Limits		
	Test Data (MHz)		Criteria
>500KHZ	Low Channel	8.562	PASS
	Middle Channel	9.033	PASS
	High Channel	8.565	PASS

TEST ITEM	6DB BANDWIDTH	
TEST MODE	802.11g with data rate 54	

LIMITS AND MEASUREMENT RESULT			
Applicable Limits	Applicable Limits		
	Test Data (MHz)		Criteria
>500KHZ	Low Channel	16.03	PASS
	Middle Channel	16.04	PASS
	High Channel	15.91	PASS

TEST ITEM	6DB BANDWIDTH	
TEST MODE	802.11n 20 with data rate 65	

LIMITS AND MEASUREMENT RESULT			
Applicable Limits	Applicable Limits		
	Test Data (MHz)		Criteria
>500KHZ	Low Channel	16.26	PASS
	Middle Channel	16.26	PASS
	High Channel	16.27	PASS



## 802.11b TEST RESULT

### TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



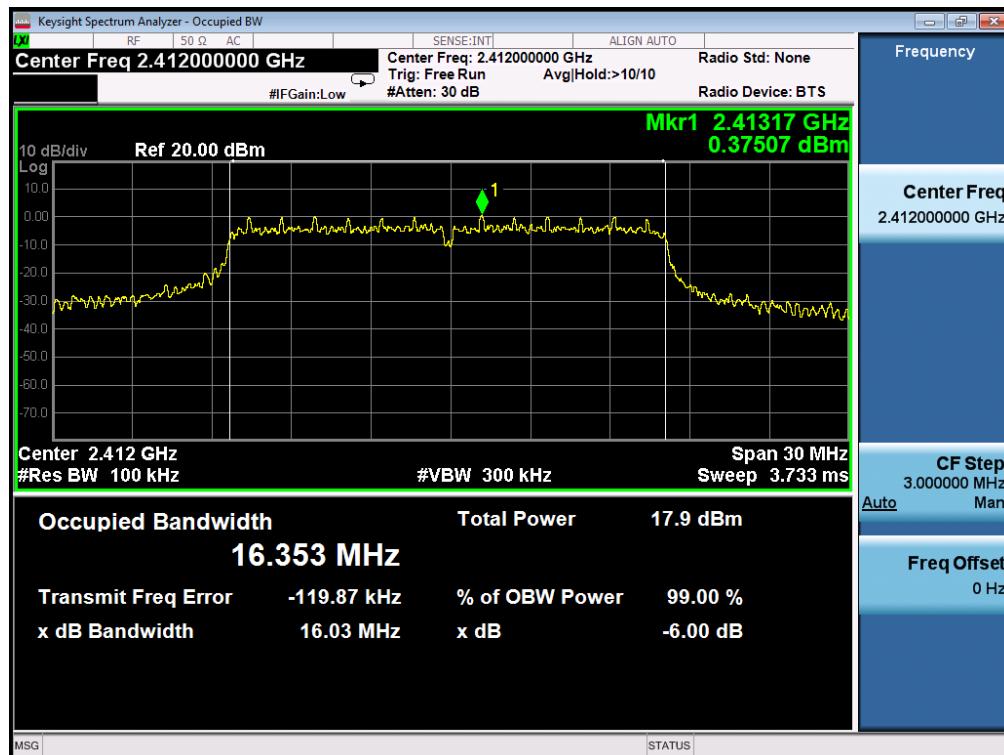


## TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



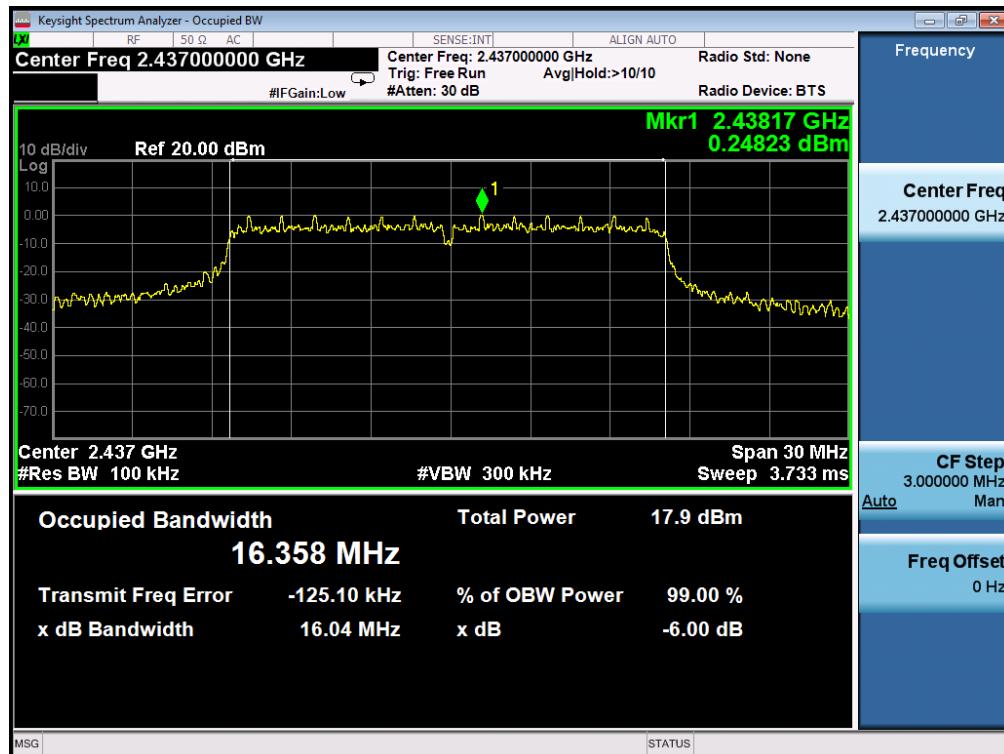
## 802.11g TEST RESULT

## TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

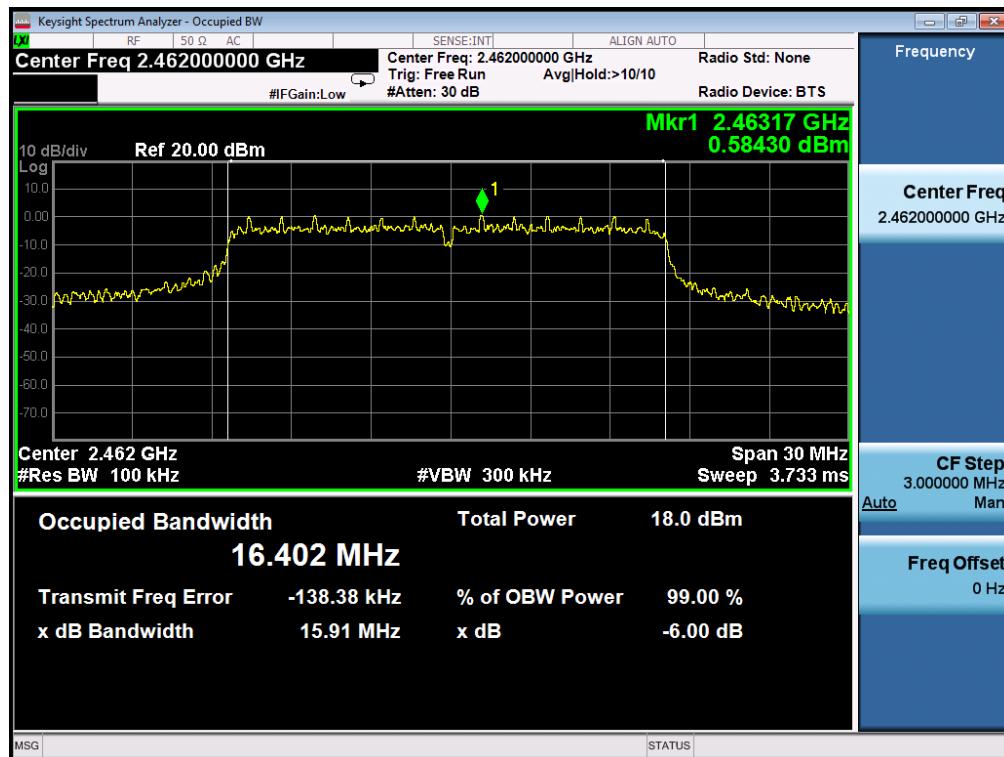




## TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



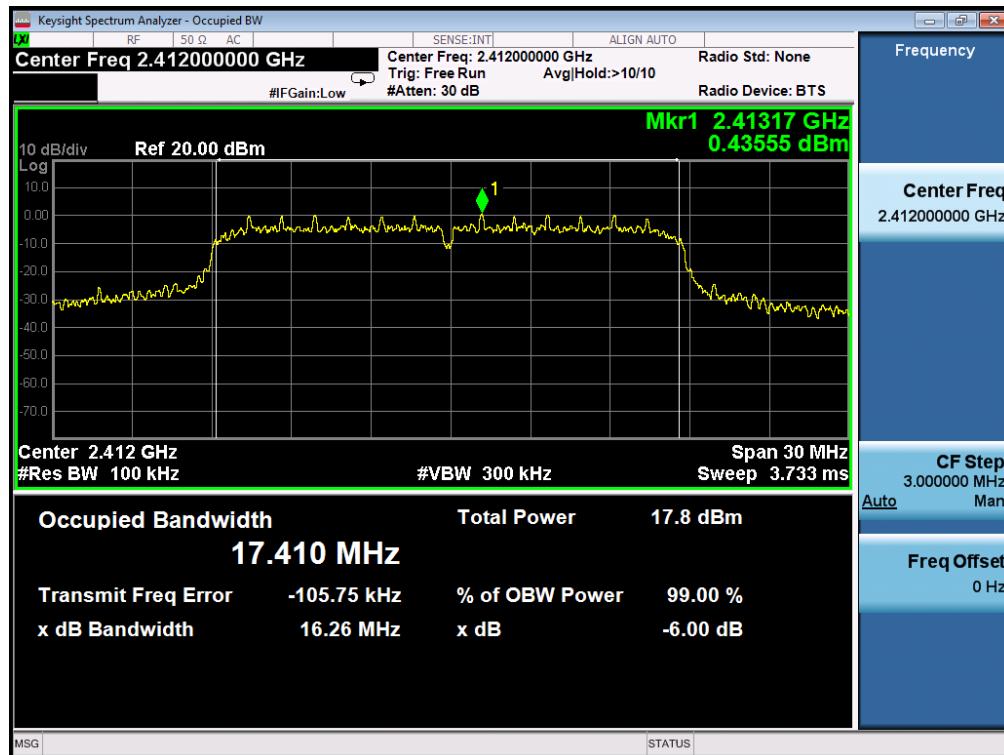
## TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



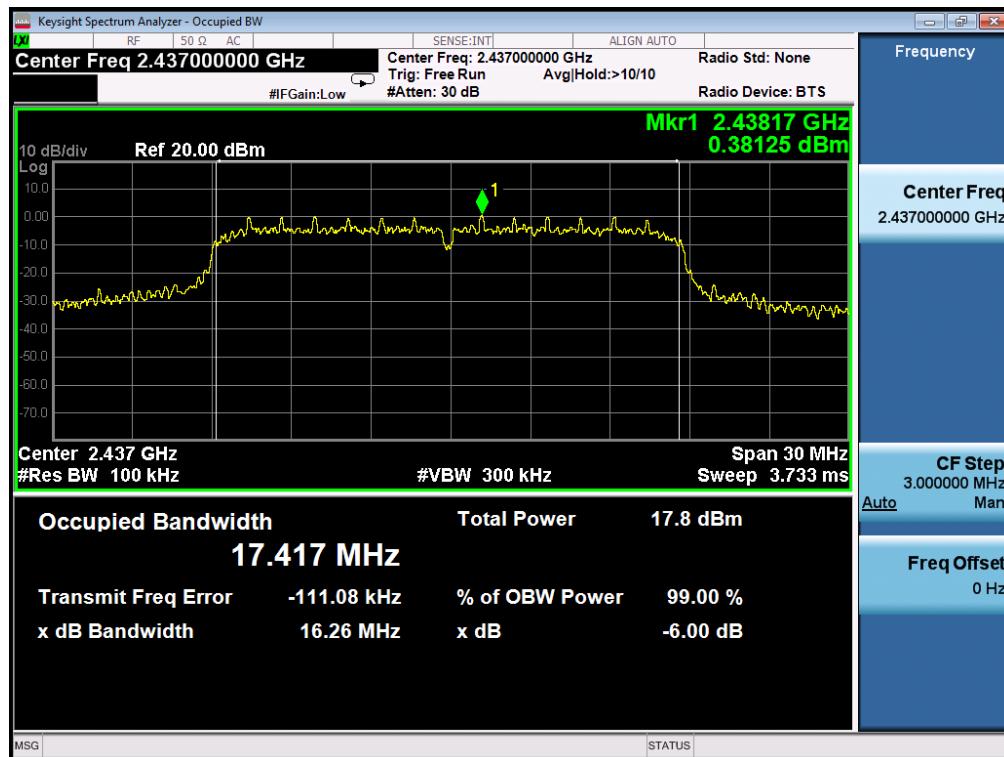


## 802.11n (20) TEST RESULT

### TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

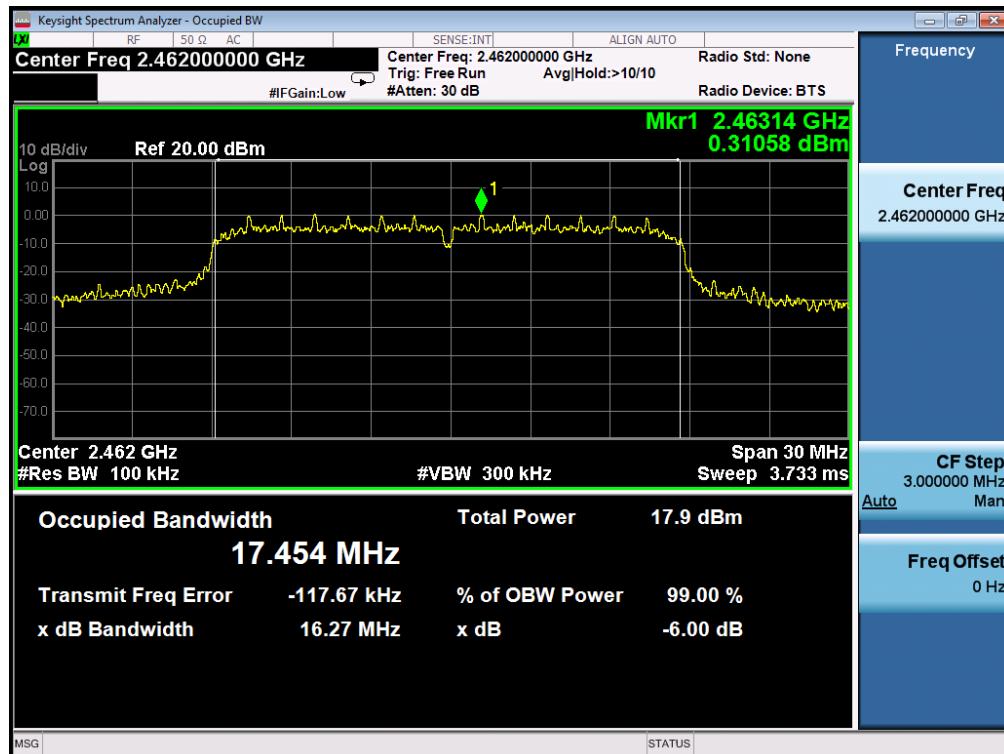


### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL





## TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL





## 5. CONDUCTED SPURIOUS EMISSION

### 5.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set SPA Trace 1 Max hold, then View.

**Note:** The EUT was tested according to ANSI C63.10 (2013) for compliance to FCC 47CFR 15.247 requirements. Owing to satisfy the requirements of the number of measurement points, we set the RBW=1MHz, VBW>RBW, scan up through 10th harmonic, and consider the tested results as the worst case, if the tested results conform to the requirement, we can deem that the real tested results(set the RBW=100KHz, VBW>RBW) are conform to the requirement.

### 5.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

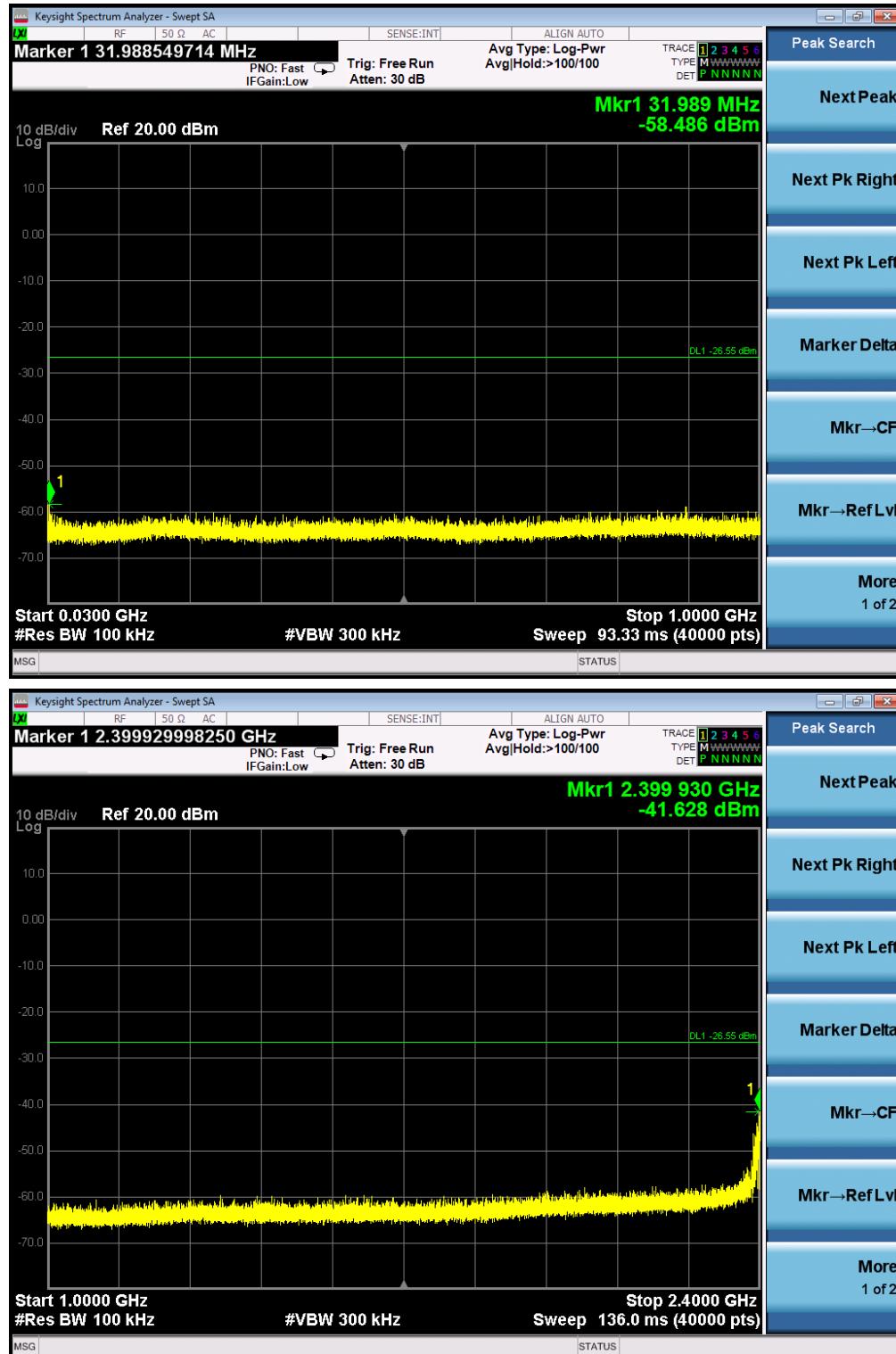
The same as described in section 4.2.

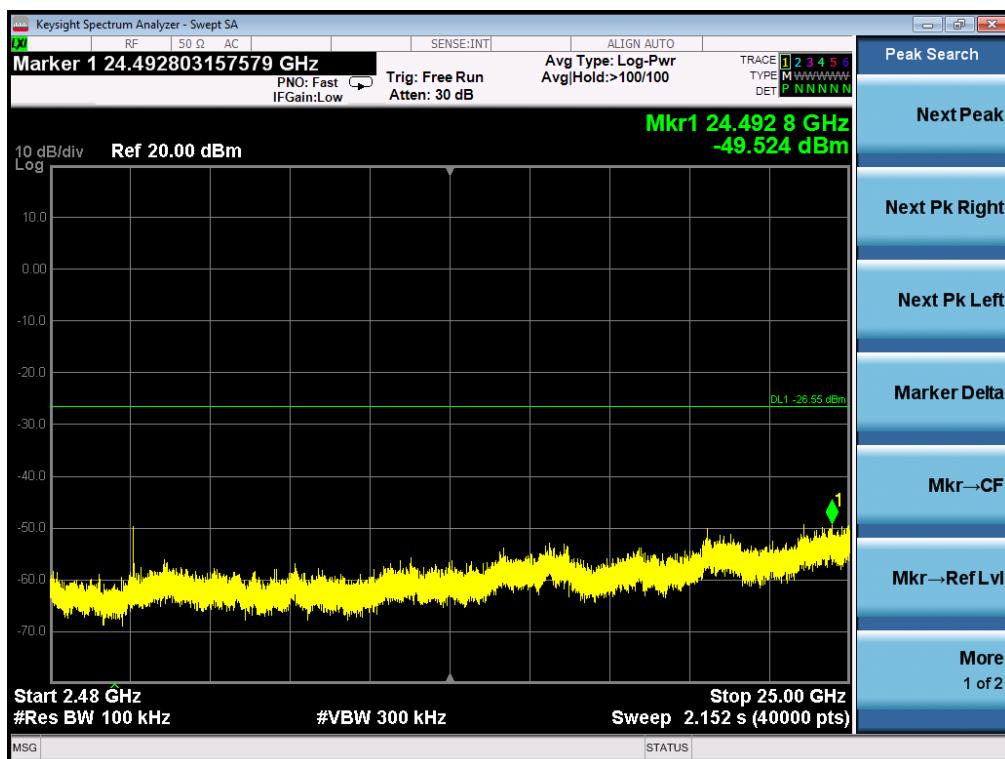
### 5.3. LIMITS AND MEASUREMENT RESULT

LIMITS AND MEASUREMENT RESULT		
Applicable Limits	Measurement Result	
	Test Data	Criteria
In any 100 KHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produce by the intentional radiator shall be at least 30 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power. In addition, radiation emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in§15.209(a))	At least -30dBc than the limit Specified on the BOTTOM Channel	PASS
	At least -30dBc than the limit Specified on the TOP Channel	PASS

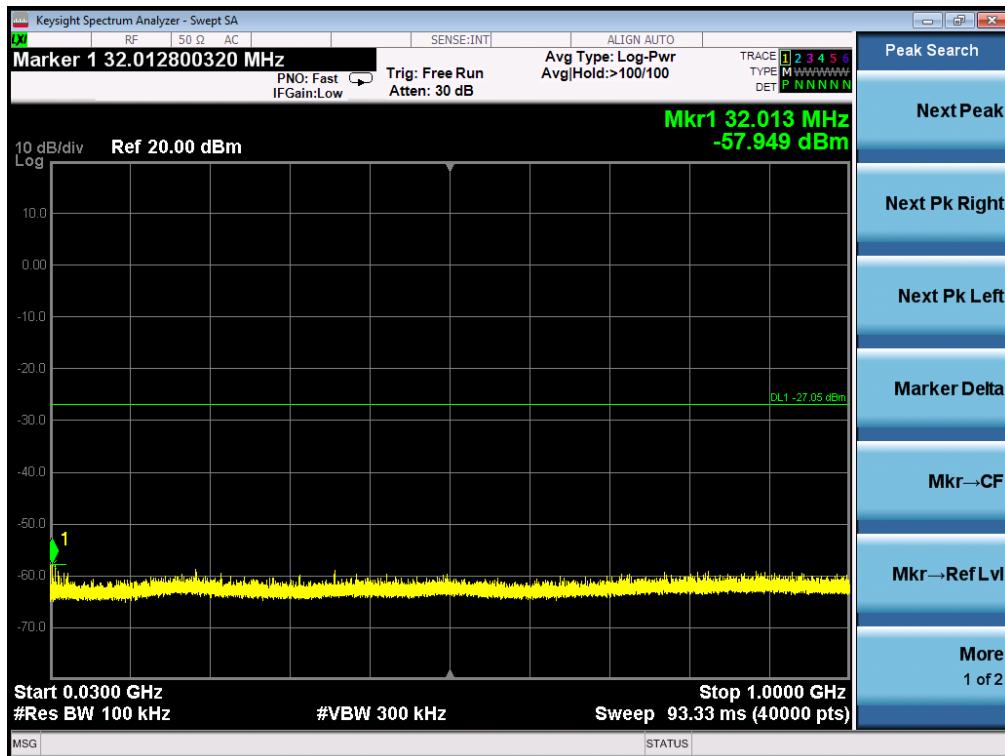


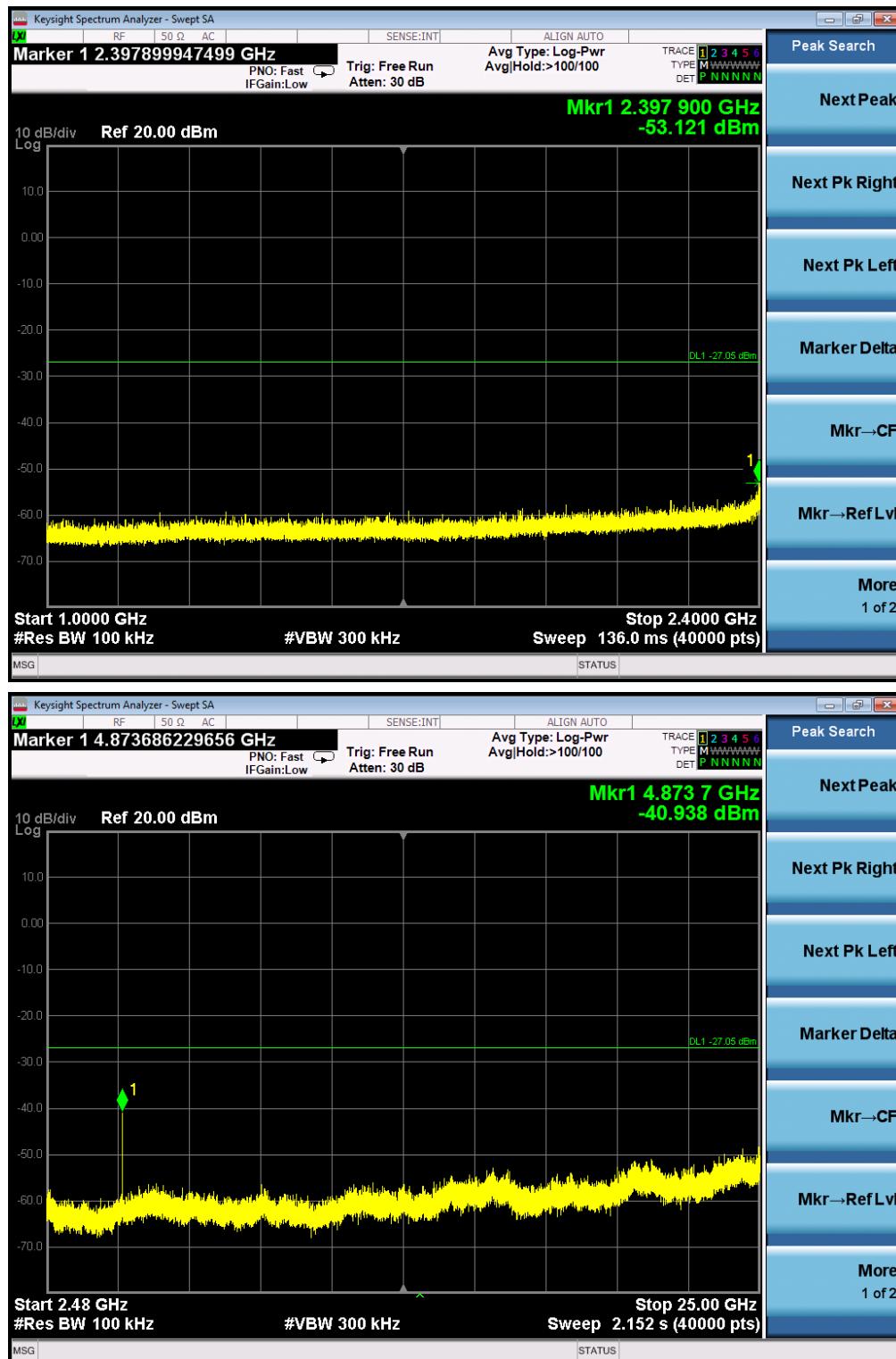
TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE  
OF 802.11b FOR MODULATION IN LOW CHANNEL





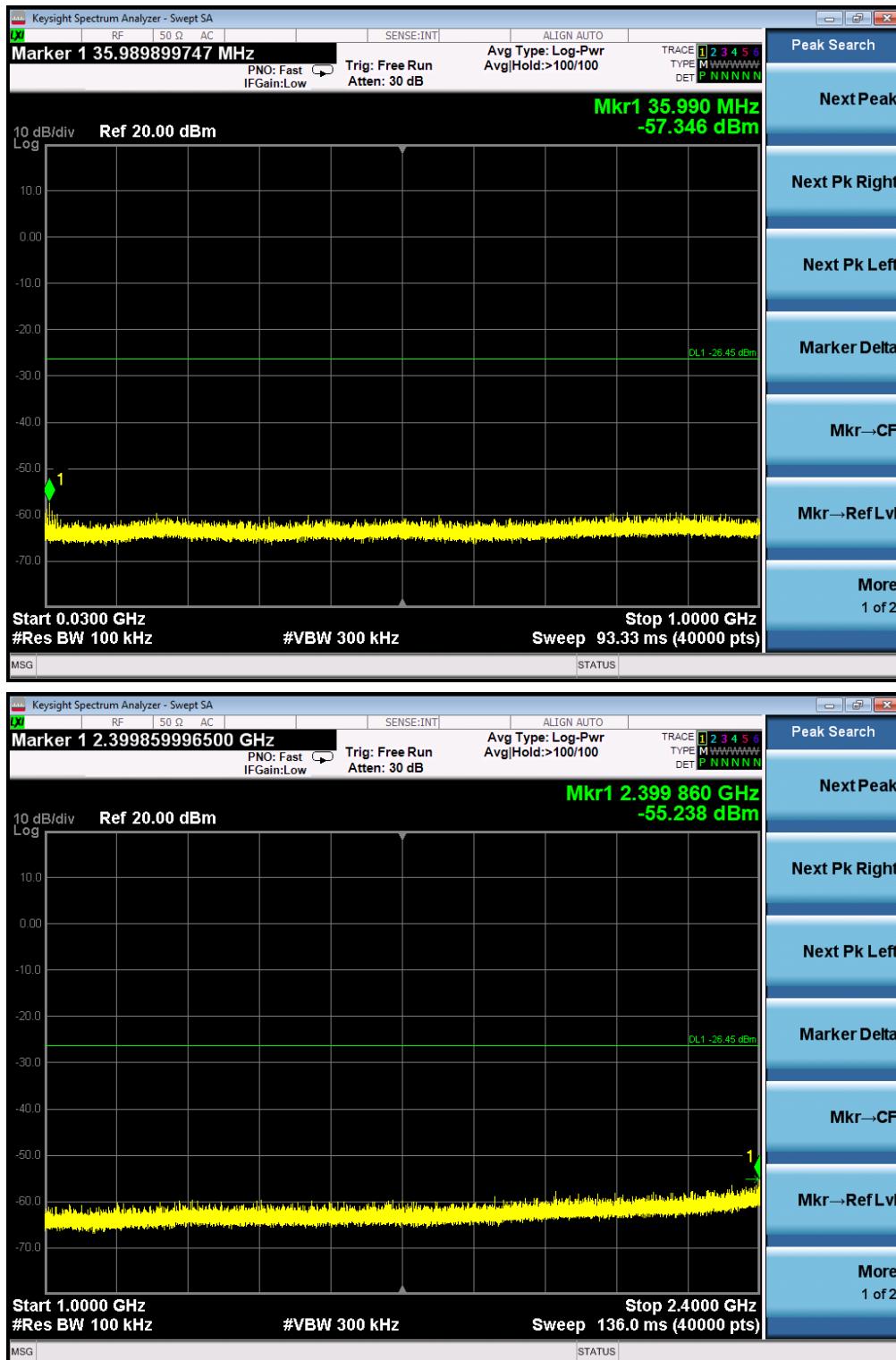
TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE  
OF 802.11b FOR MODULATION IN MIDDLE CHANNEL

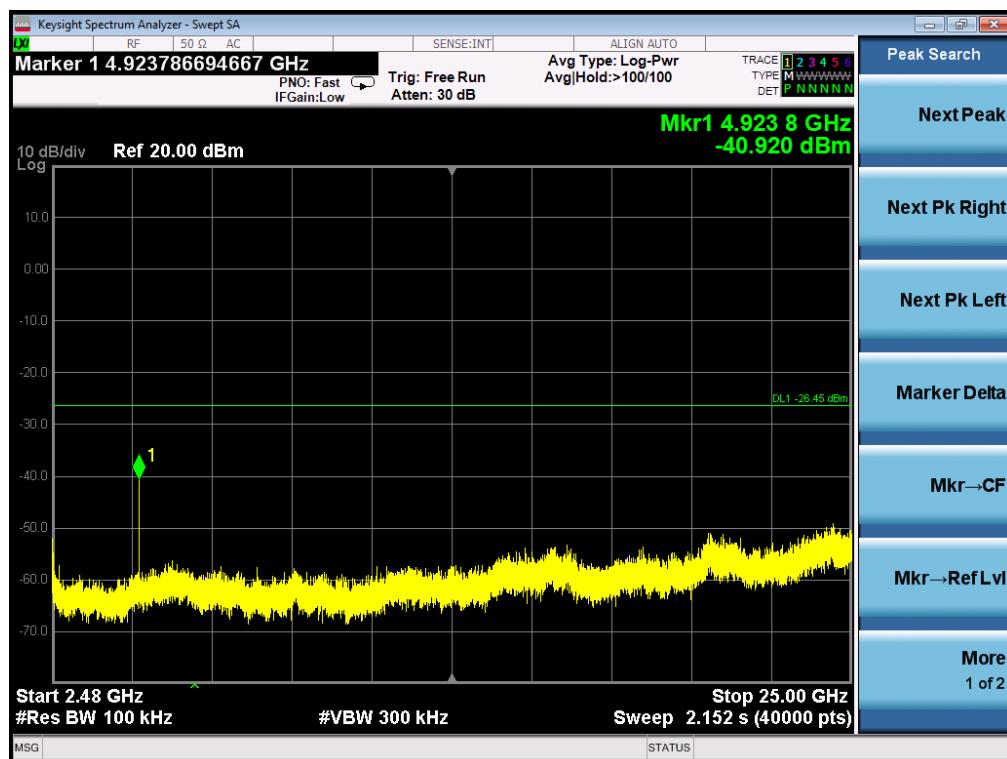




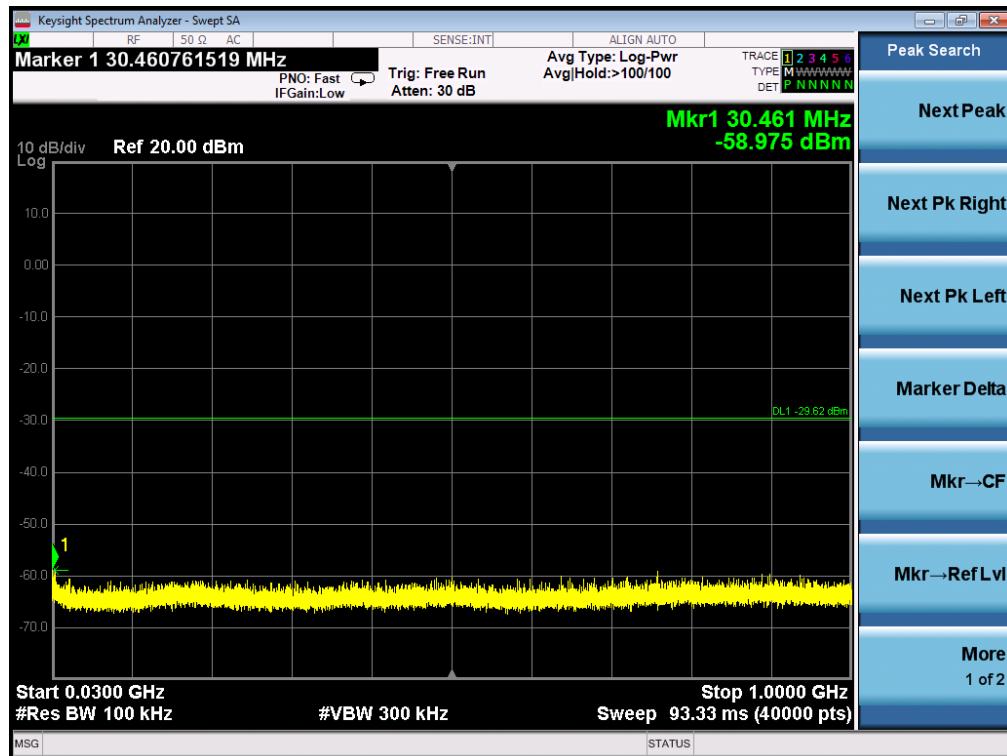


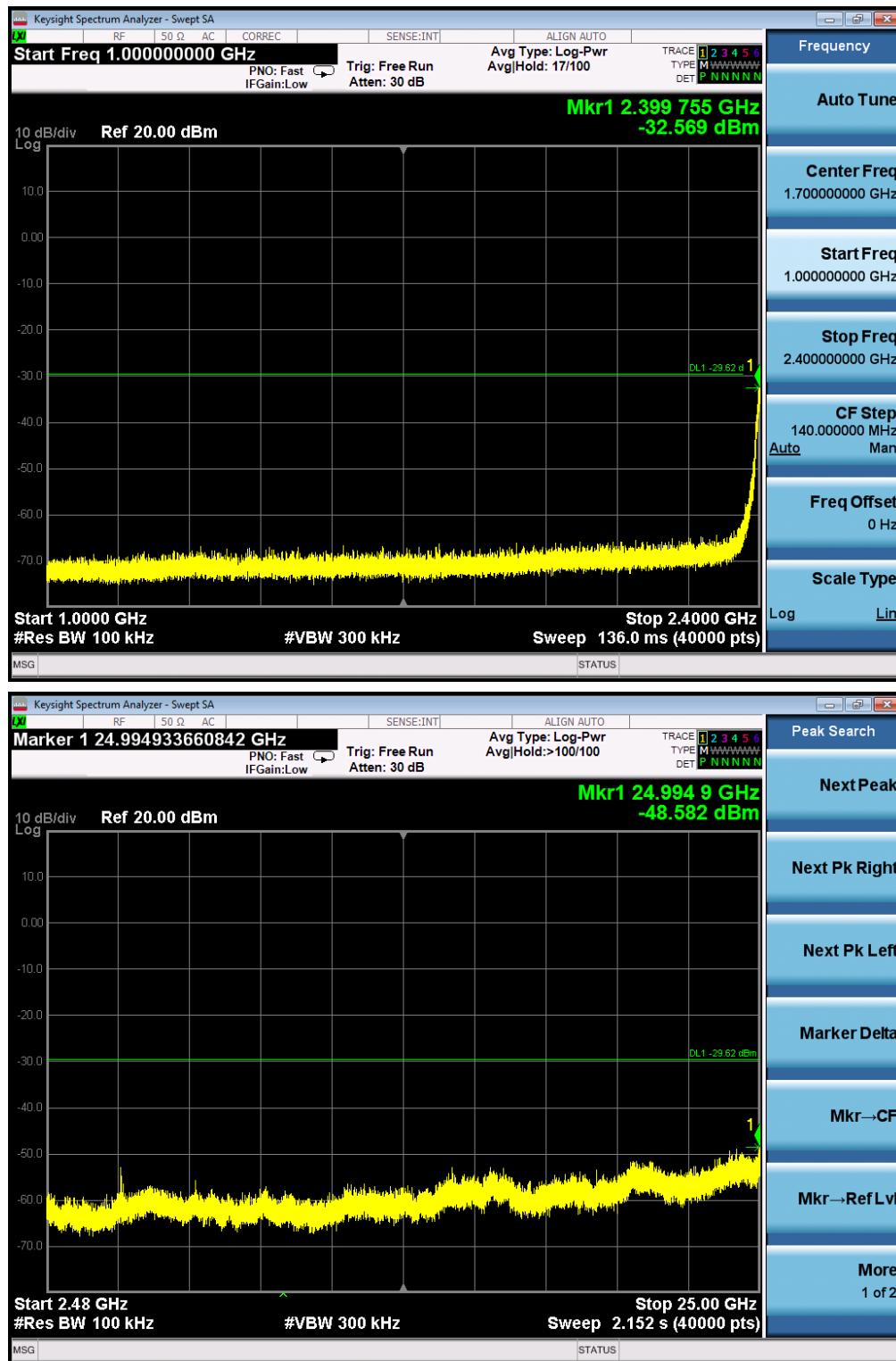
TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE  
OF 802.11b FOR MODULATION IN HIGH CHANNEL





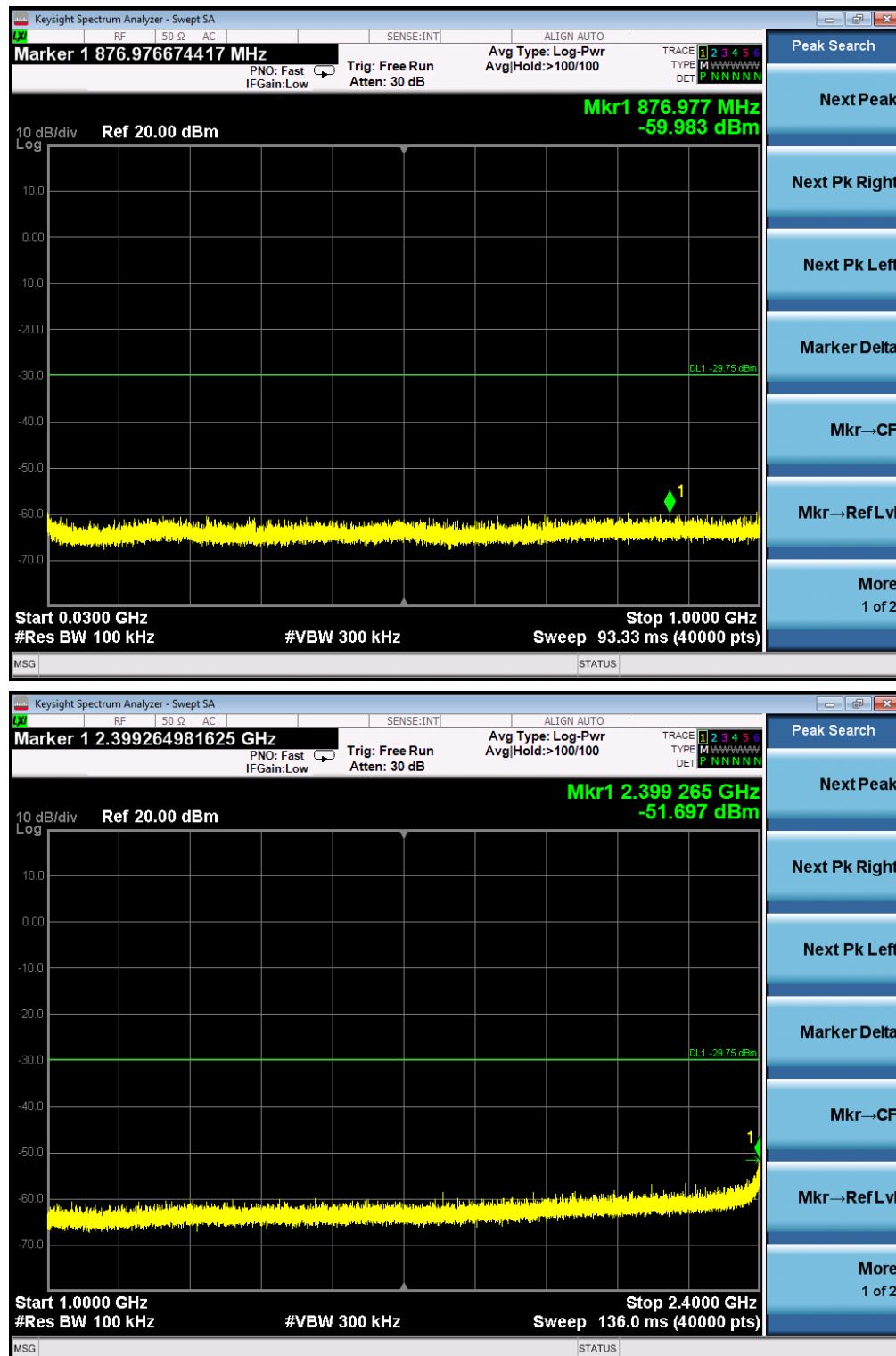
TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE  
OF 802.11g FOR MODULATION IN LOW CHANNEL





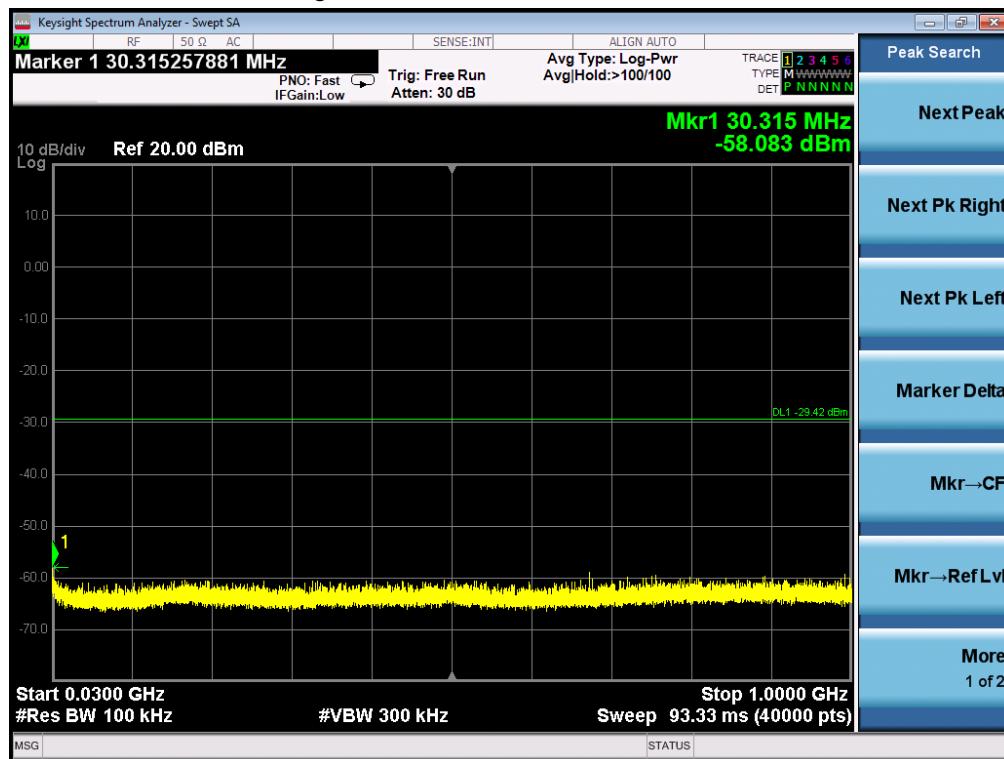


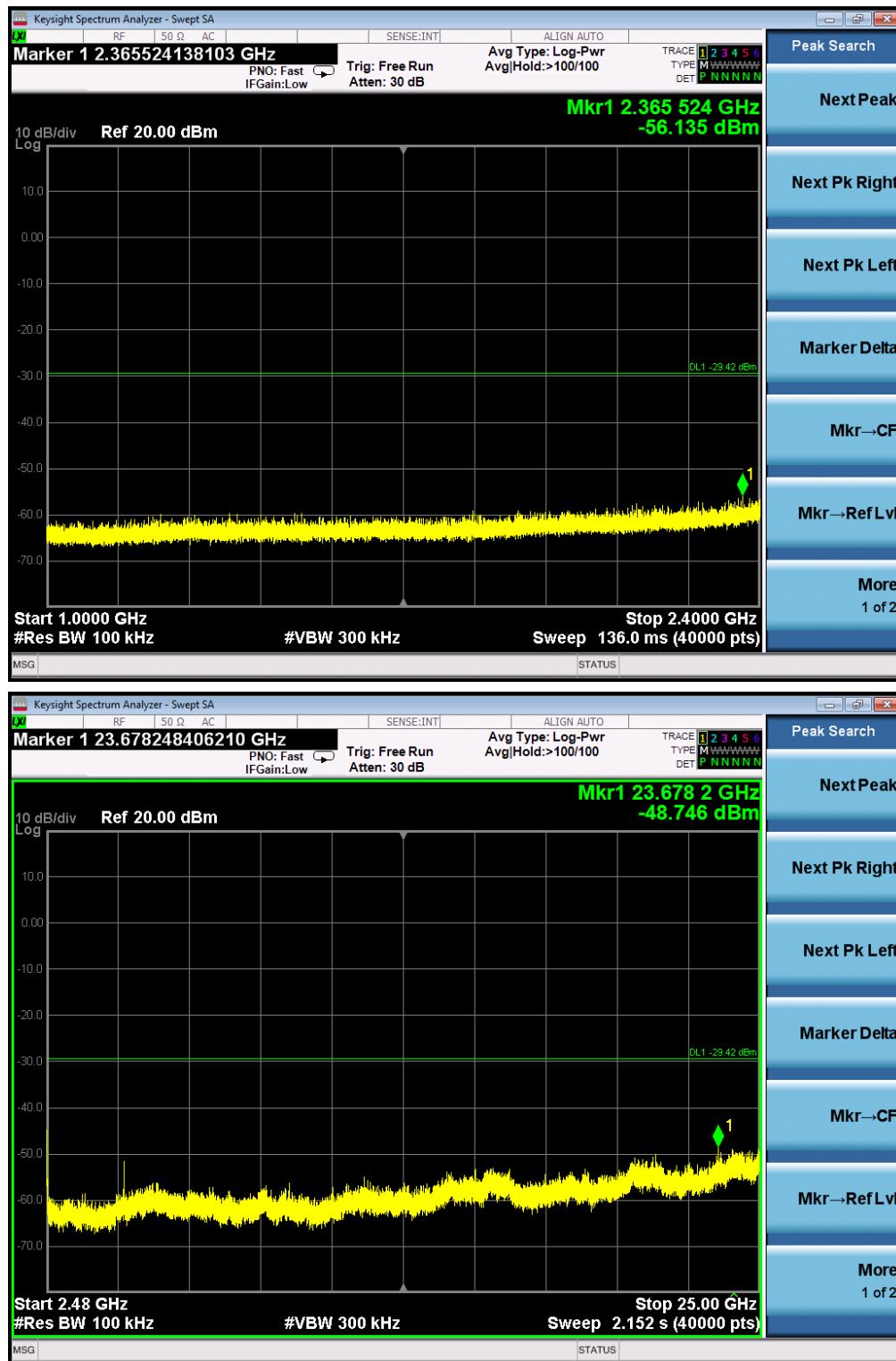
TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE  
OF 802.11g FOR MODULATION IN MIDDLE CHANNEL





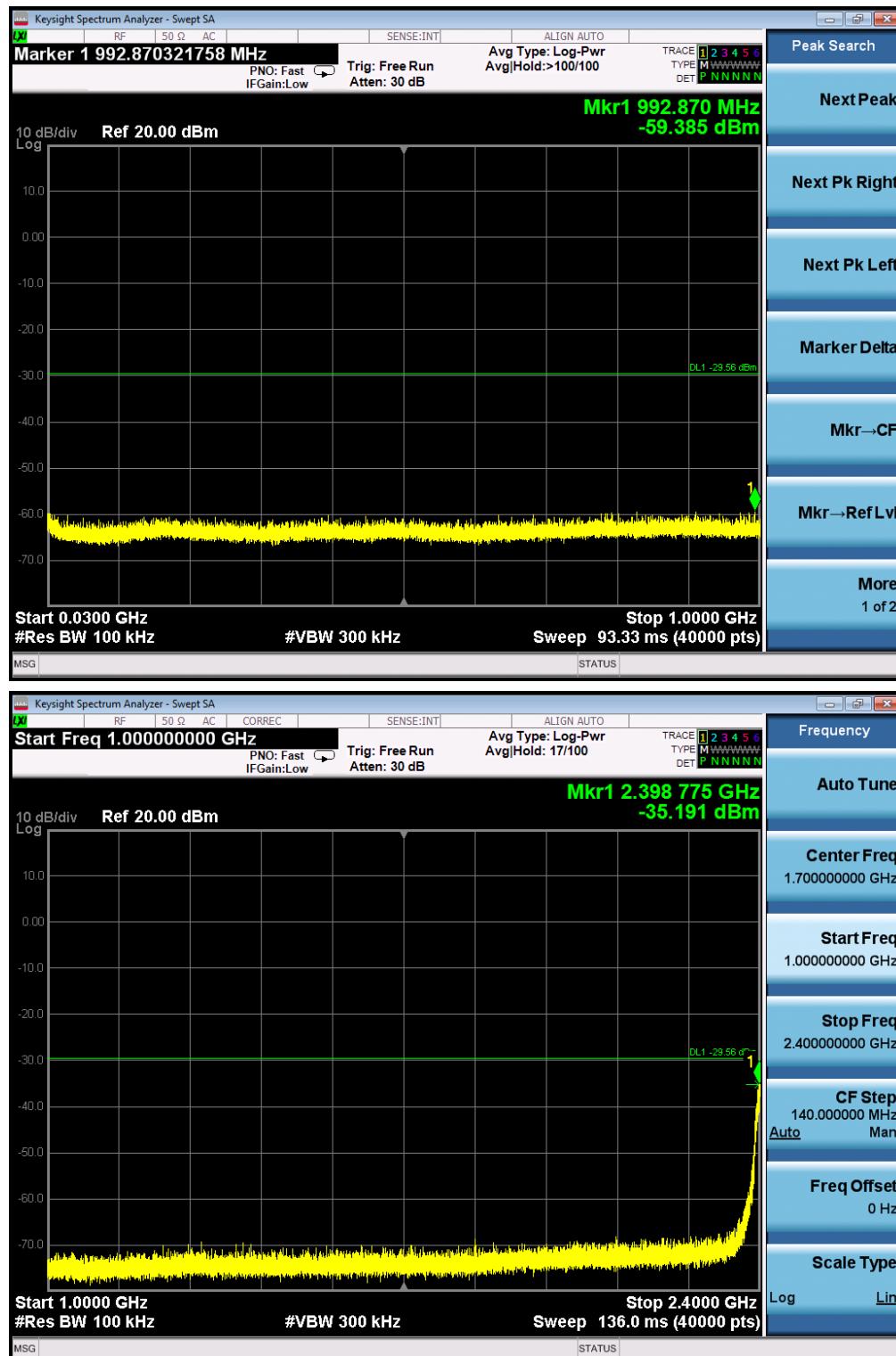
TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE  
OF 802.11g FOR MODULATION IN HIGH CHANNEL

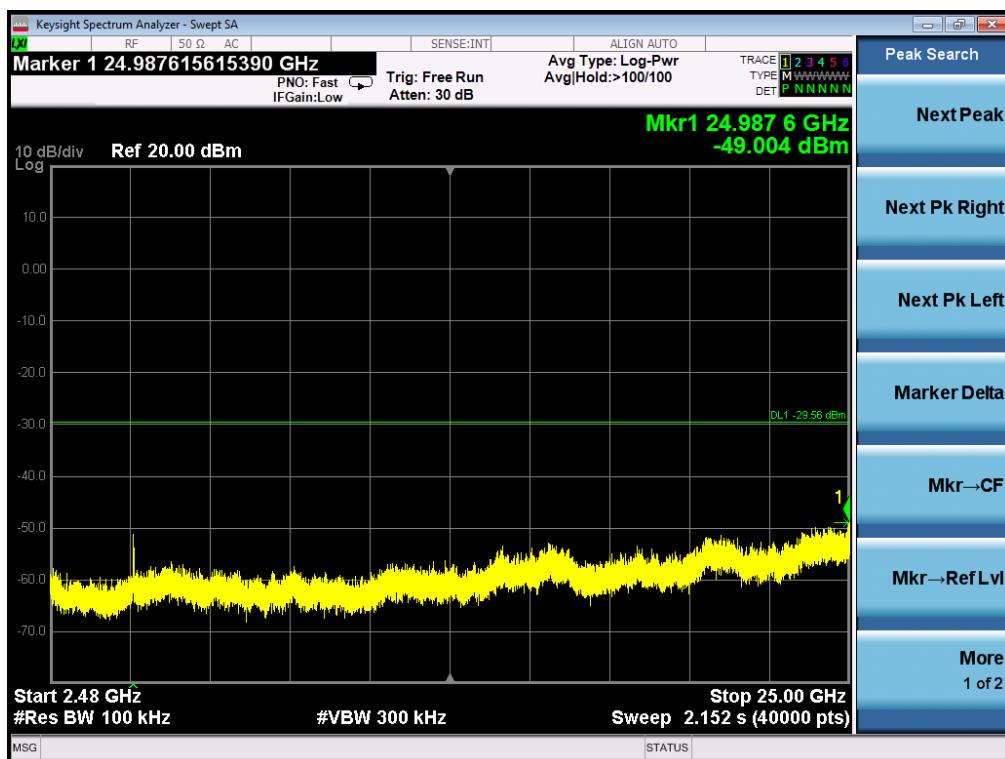




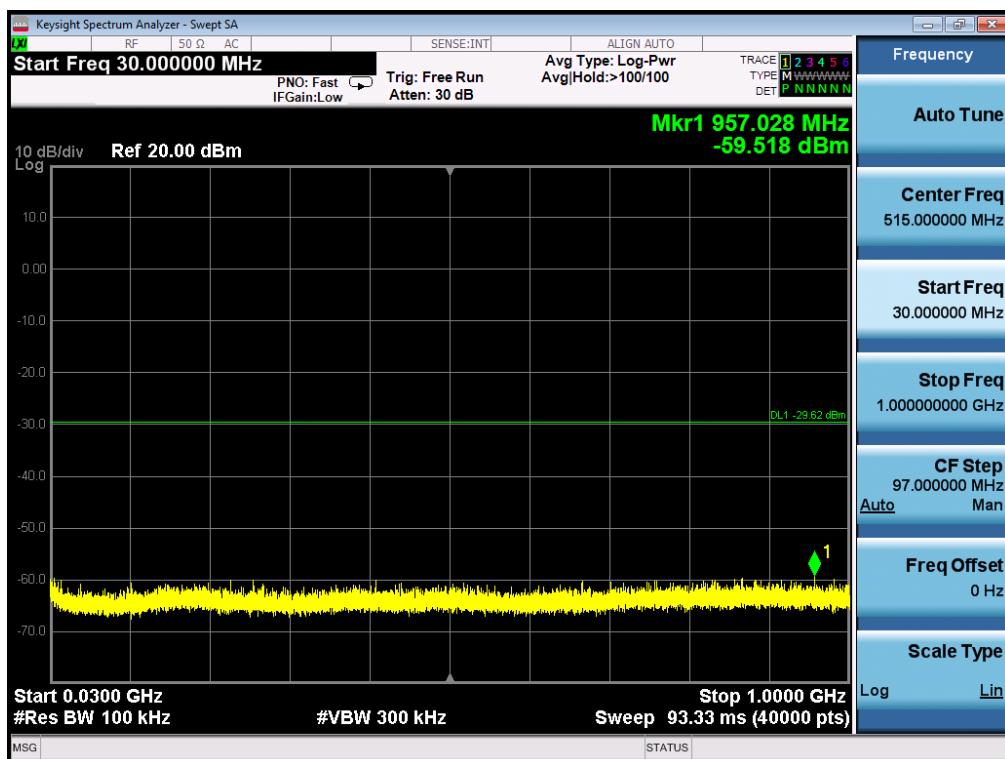


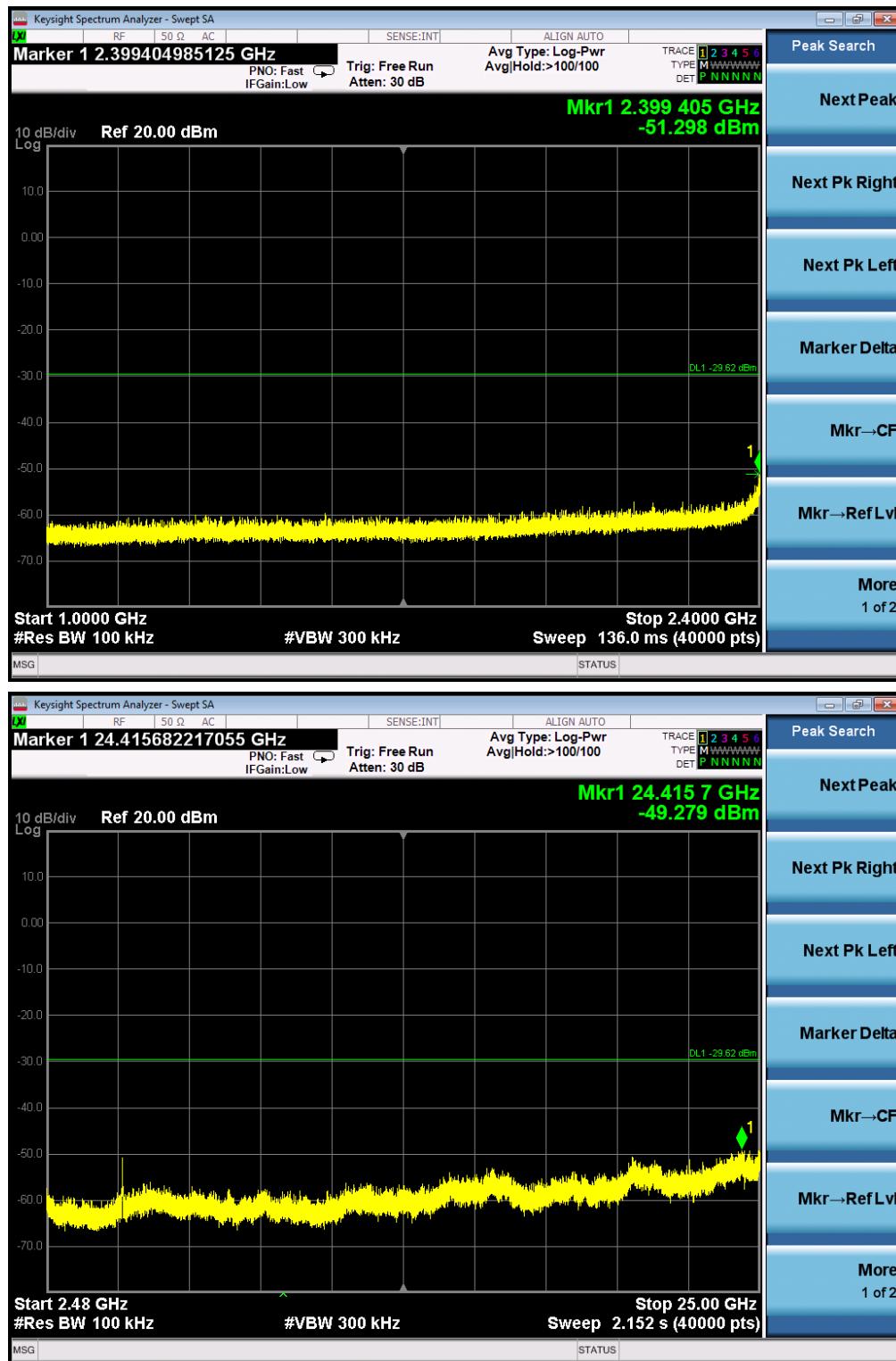
TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE  
OF 802.11n20 FOR MODULATION IN LOW CHANNEL





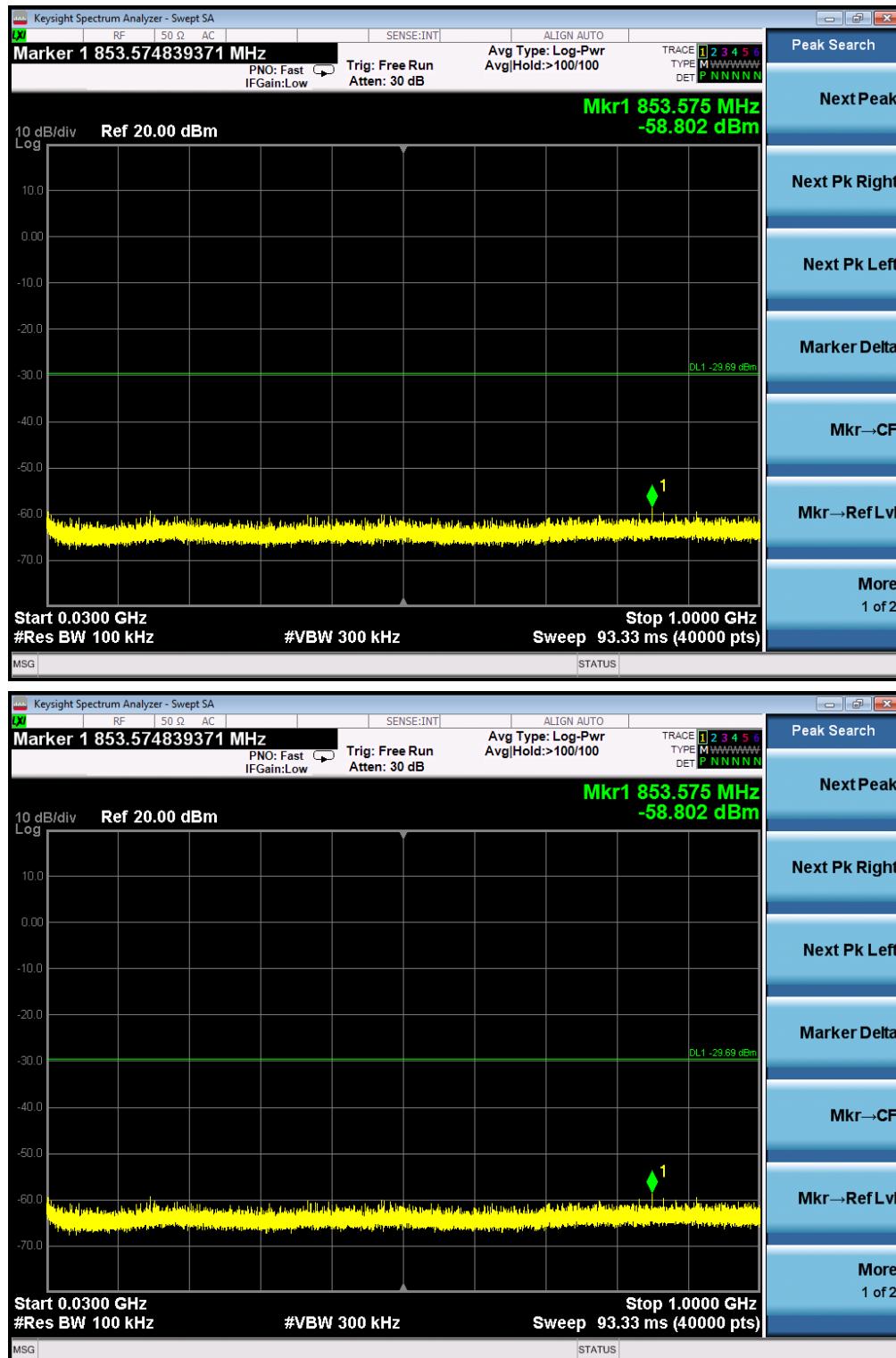
TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE  
OF 802.11n20 FOR MODULATION IN MIDDLE CHANNEL

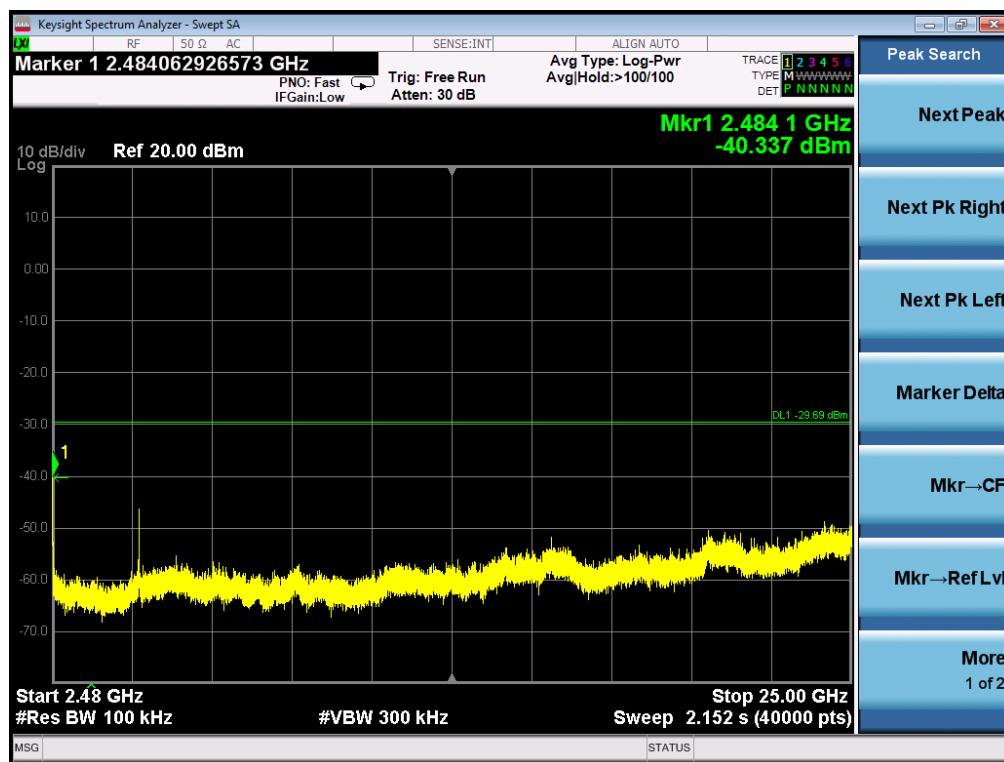






TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE  
OF 802.11n20 FOR MODULATION IN HIGH CHANNEL







## 6. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY

### 6.1 MEASUREMENT PROCEDURE

- (1). Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- (2). Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- (3). Set SPA Trace 1 Max hold, then View.

Note: The method of AVGPSD-1 in the ANSI C63.10 (2013) item 11.10 was used in this testing.

### 6.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

Refer To Section 4.2.

### 6.3 LIMITS AND MEASUREMENT RESULT

TEST ITEM	POWER SPECTRAL DENSITY		
TEST MODE	802.11b with data rate 1		

Channel No.	Power density (dBm/20kHz)	Limit (dBm/3kHz)	Result
Low Channel	-1.964	8	Pass
Middle Channel	-2.024	8	Pass
High Channel	-1.762	8	Pass

TEST ITEM	POWER SPECTRAL DENSITY		
TEST MODE	802.11g with data rate 6		

Channel No.	Power density (dBm/20kHz)	Limit (dBm/3kHz)	Result
Low Channel	-5.699	8	Pass
Middle Channel	-5.800	8	Pass
High Channel	-5.724	8	Pass

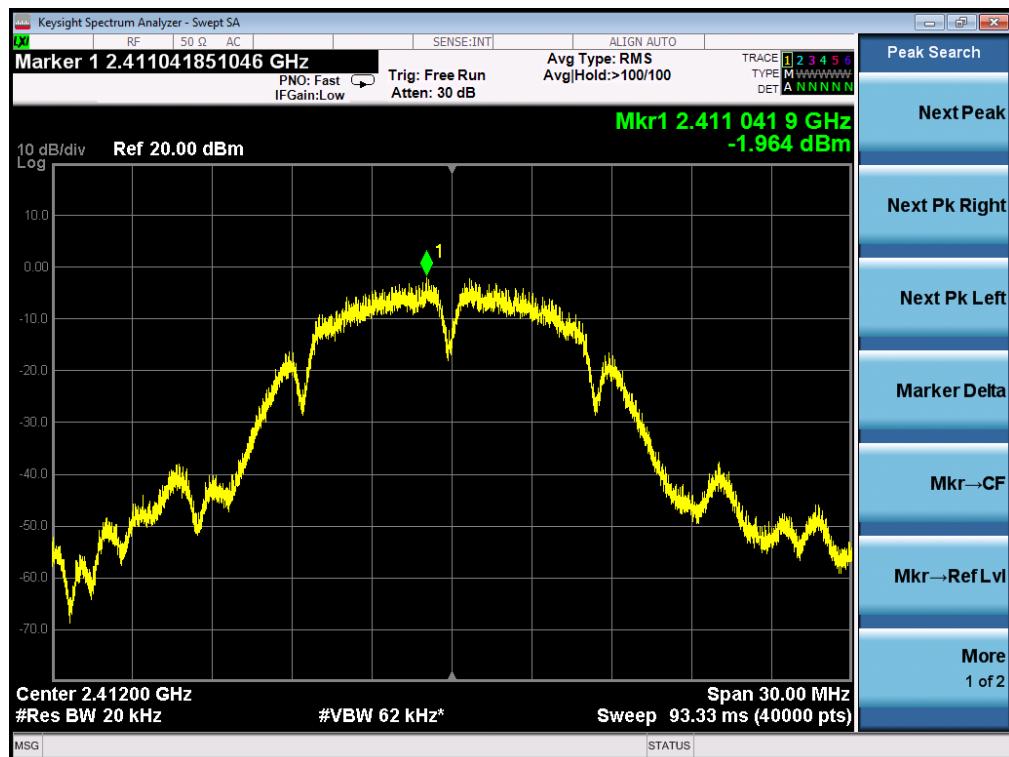
TEST ITEM	POWER SPECTRAL DENSITY		
TEST MODE	802.11n 20 with data rate 6.5		

Channel No.	Power density (dBm/20kHz)	Limit (dBm/3kHz)	Result
Low Channel	-5.093	8	Pass
Middle Channel	-5.225	8	Pass
High Channel	-5.025	8	Pass



## 802.11b TEST RESULT

### TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL



### TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL



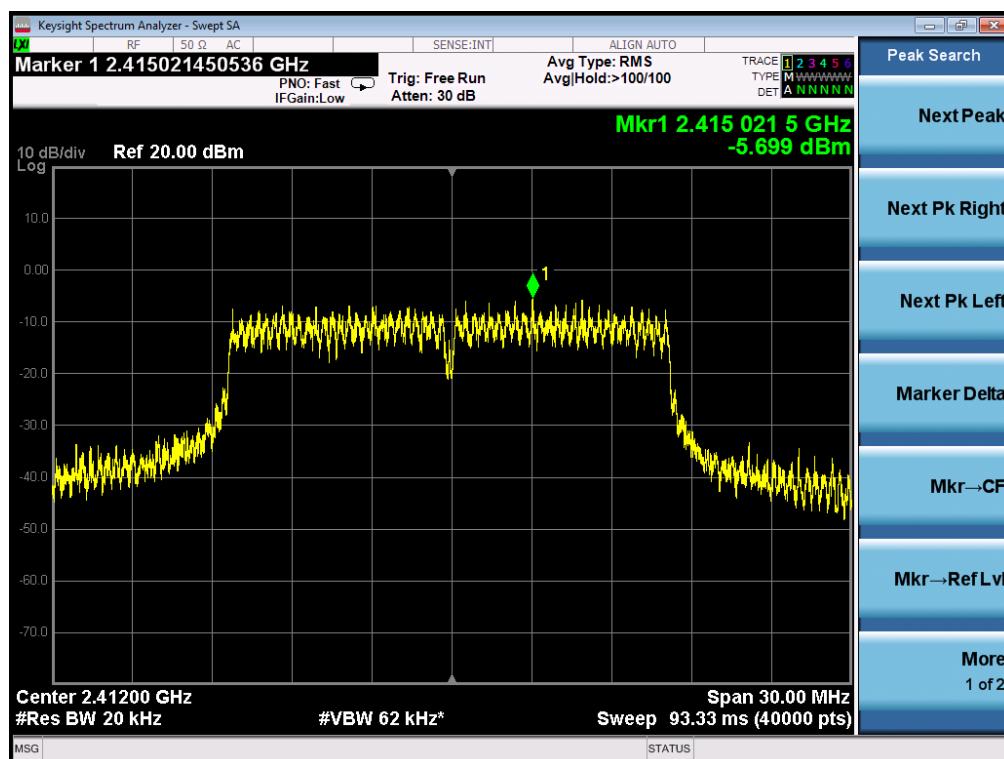


## TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL



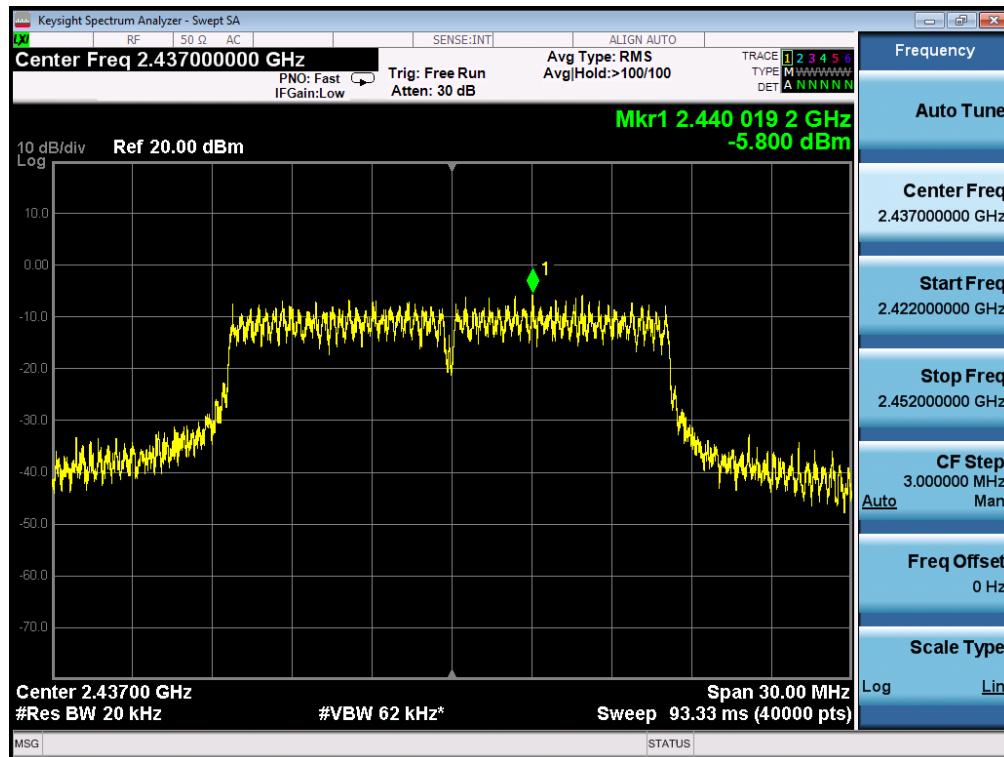
## 802.11g TEST RESULT

## TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL

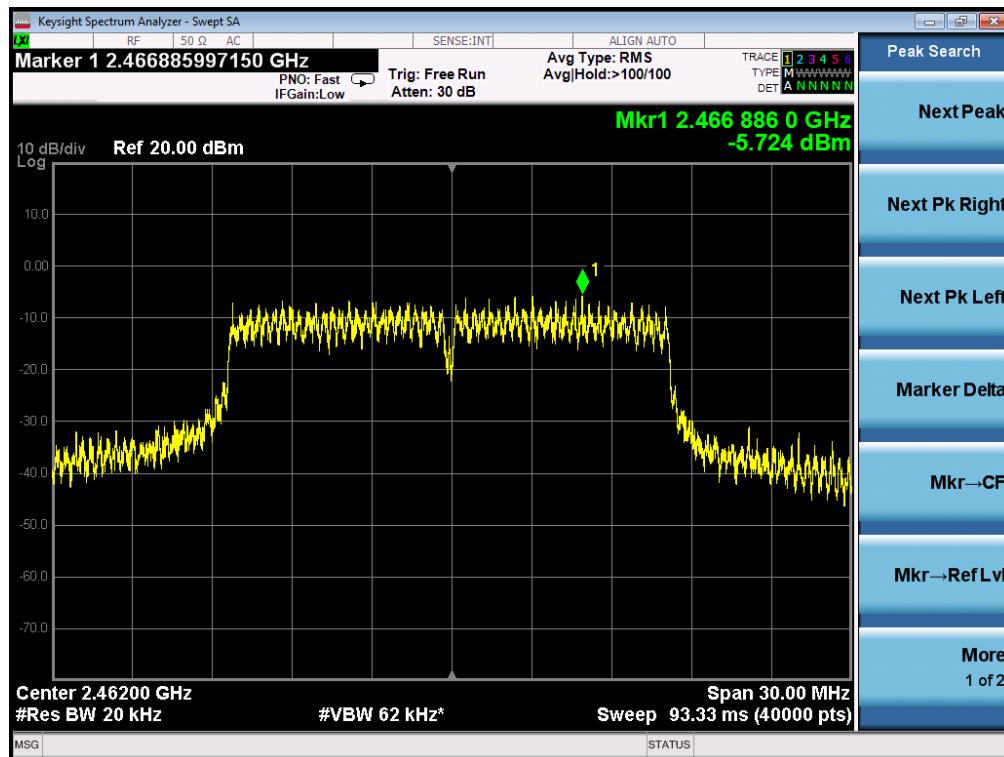




## TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL



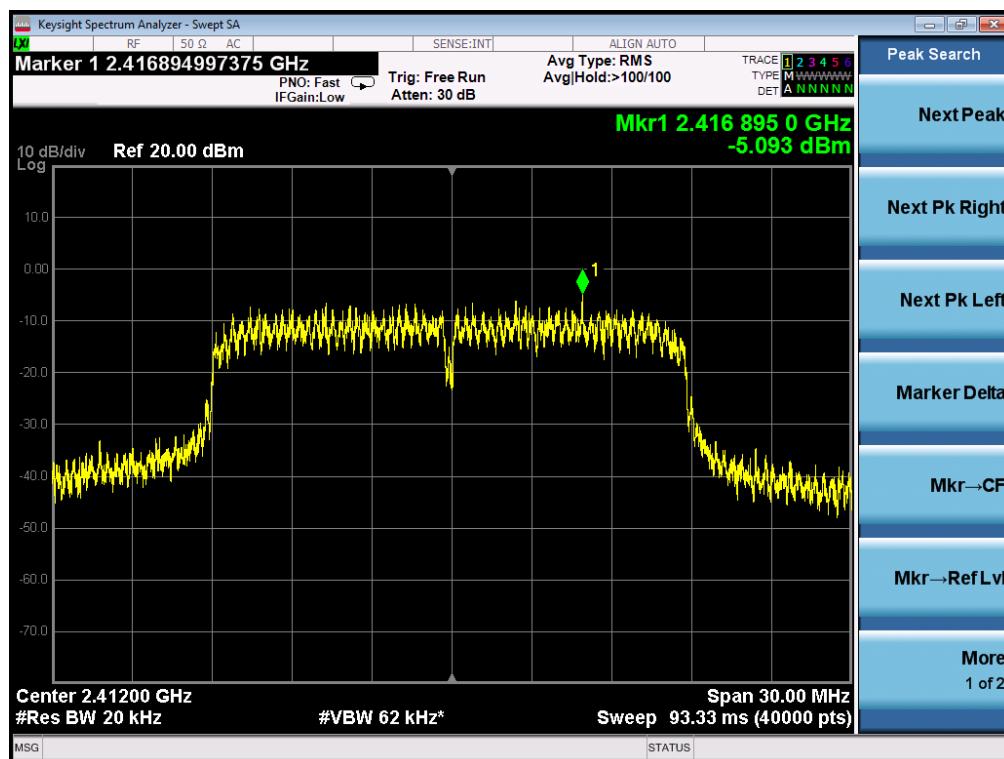
## TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL



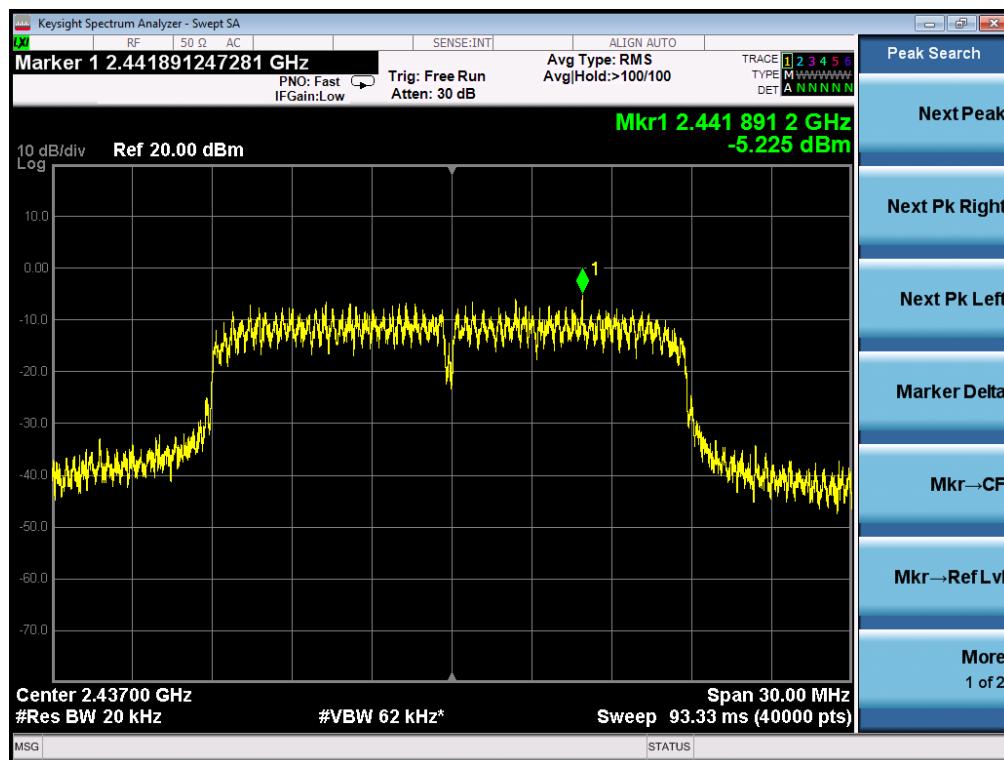


## 802.11n 20 TEST RESULT

### TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL

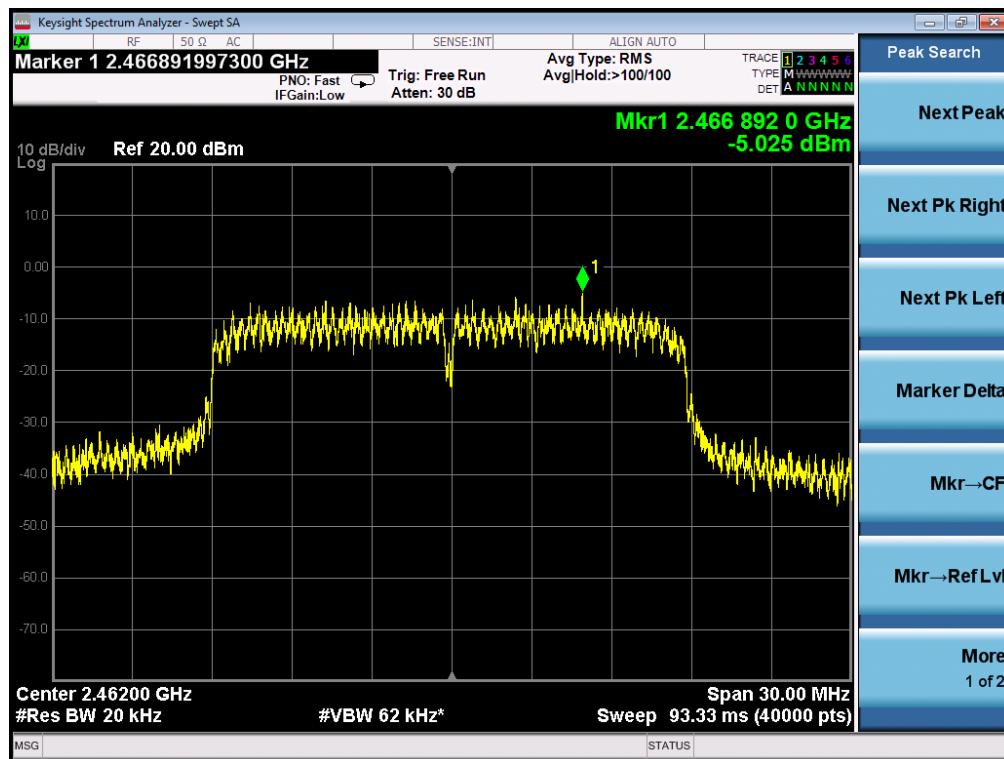


### TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL





## TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL





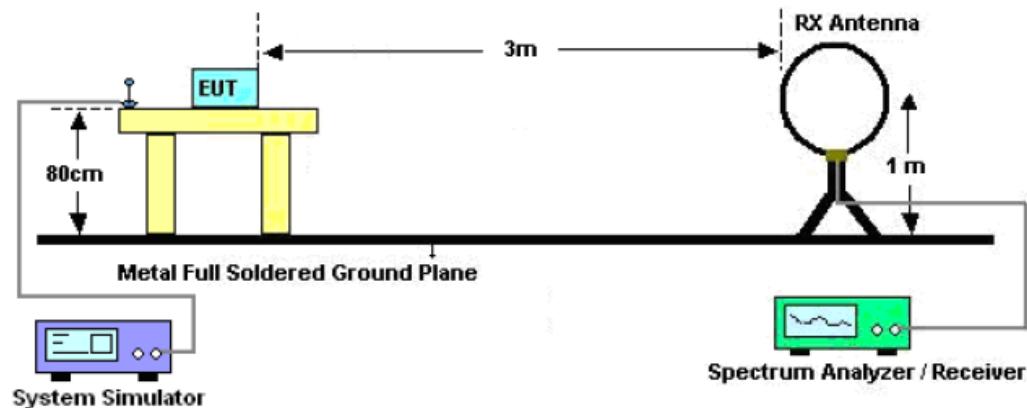
## 7. RADIATED EMISSION

### 7.1. MEASUREMENT PROCEDURE

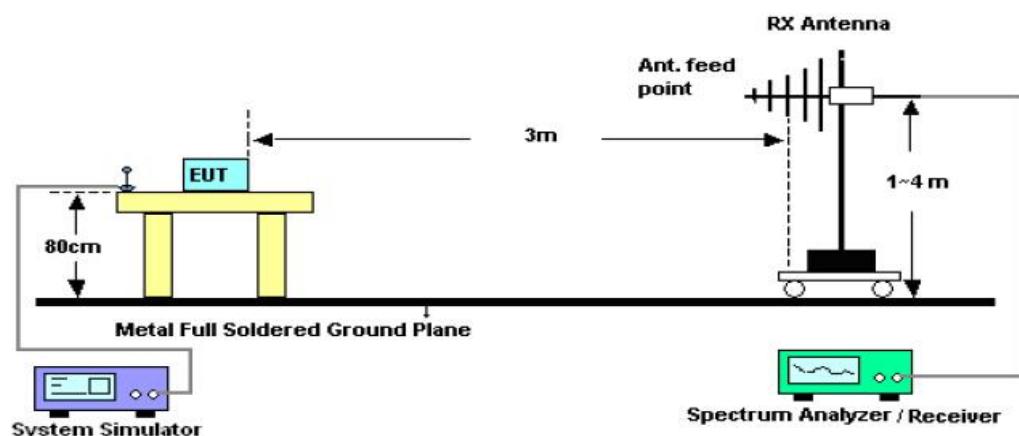
1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

## 7.2. TEST SETUP

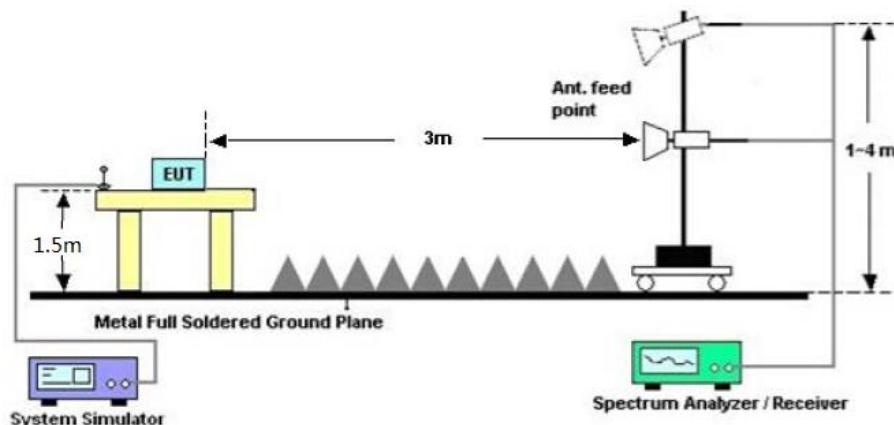
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz





### 7.3. LIMITS AND MEASUREMENT RESULT

15.209(a) Limit in the below table has to be followed

Frequencies (MHz)	Field Strength (micorvolts/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

Note: All modes were tested For restricted band radiated emission,  
the test records reported below are the worst result compared to other modes.

### 7.4. TEST RESULT

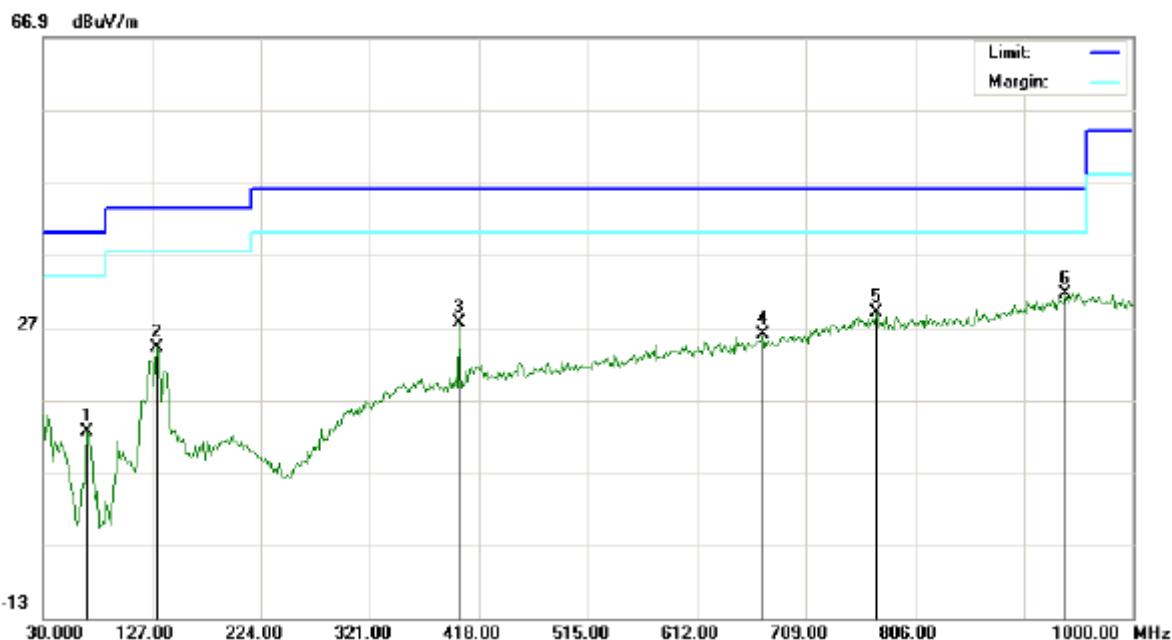
#### RADIATED EMISSION BELOW 30MHZ

No emission found between lowest internal used/generated frequencies to 30MHz.



## RADIATED EMISSION BELOW 1GHZ

EUT	WIFI siren alarm	Model Name	NAS-AB02W0
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2412MHZ	Antenna	Horizontal

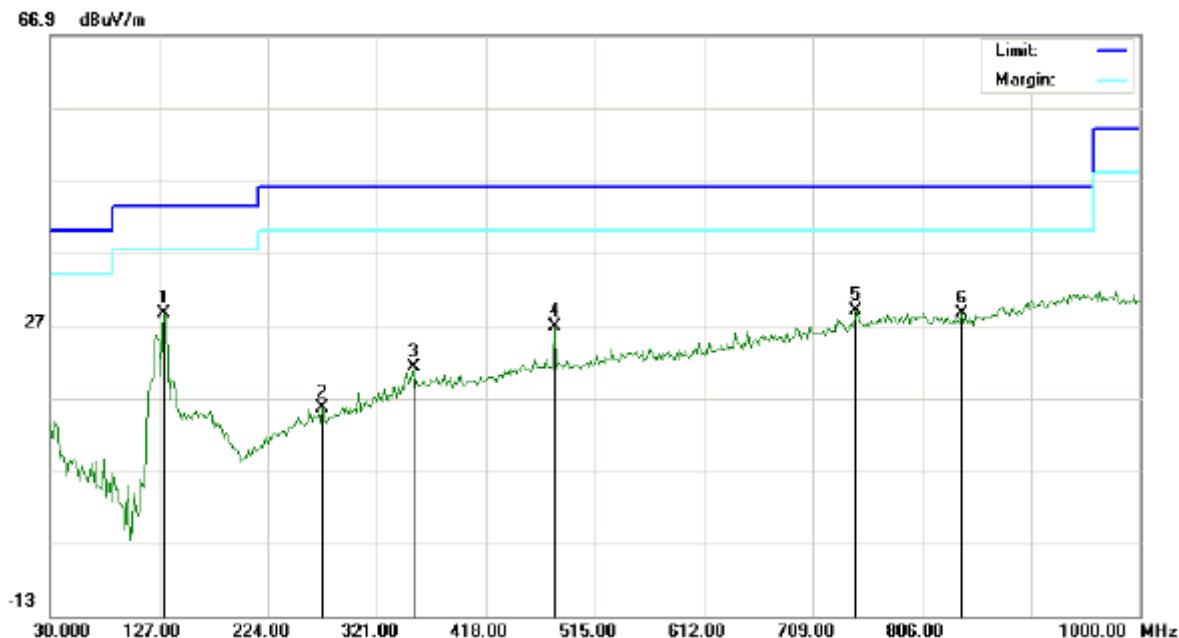


No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB				
1		68.8000	3.50	9.09	12.59	40.00	-27.41	peak			
2		131.8500	12.84	11.39	24.23	43.50	-19.27	peak			
3		400.2167	8.60	19.08	27.68	46.00	-18.32	peak			
4		670.2000	1.68	24.40	26.08	46.00	-19.92	peak			
5		772.0500	1.98	26.93	28.91	46.00	-17.09	peak			
6	*	940.1833	1.95	29.73	31.68	46.00	-14.32	peak			

RESULT: PASS



<b>EUT</b>	WIFI siren alarm	<b>Model Name</b>	NAS-AB02W0
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11b with date rate 1 2412MHZ	<b>Antenna</b>	Vertical



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB				
1	*	131.8499	16.81	11.80	28.61	43.50	-14.89	peak			
2		272.5000	1.12	14.58	15.70	46.00	-30.30	peak			
3		353.3333	2.45	18.76	21.21	46.00	-24.79	peak			
4		479.4332	5.89	20.91	26.80	46.00	-19.20	peak			
5		747.7999	2.45	26.57	29.02	46.00	-16.98	peak			
6		841.5666	1.32	27.31	28.63	46.00	-17.37	peak			

## RESULT: PASS

- Note:** 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.  
2. The "Factor" value can be calculated automatically by software of measurement system.  
3. All test modes had been pre-tested. The 802.11b at low channel is the worst case and recorded in the report.

**RADIATED EMISSION ABOVE 1GHZ**

<b>EUT</b>	WIFI siren alarm	<b>Model Name</b>	NAS-AB02W0
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11b with date rate 1 2412MHZ	<b>Antenna</b>	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
4824.069	44.14	3.72	47.86	74	-26.14	peak
4824.109	40.53	3.72	44.25	54	-9.75	AVG
7236.070	43.68	8.15	51.83	74	-22.17	peak
7236.087	41.11	8.15	49.26	54	-4.74	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

<b>EUT</b>	WIFI siren alarm	<b>Model Name</b>	NAS-AB02W0
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11b with date rate 1 2412MHZ	<b>Antenna</b>	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
4824.084	44.81	3.72	48.53	74	-25.47	peak
4824.113	40.26	3.72	43.98	54	-10.02	AVG
7236.115	43.14	8.15	51.29	74	-22.71	peak
7236.097	34.53	8.15	42.68	54	-11.32	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.



<b>EUT</b>	WIFI siren alarm	<b>Model Name</b>	NAS-AB02W0
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11b with date rate 1 2437MHZ	<b>Antenna</b>	Horizontal

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Value Type
4874.112	46.13	3.75	49.88	74	-24.12	peak
4874.075	43.28	3.75	47.03	54	-6.97	AVG
7311.035	43.01	8.16	51.17	74	-22.83	peak
7311.115	39.86	8.16	48.02	54	-5.98	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

<b>EUT</b>	WIFI siren alarm	<b>Model Name</b>	NAS-AB02W0
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11b with date rate 1 2437MHZ	<b>Antenna</b>	Vertical

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Value Type
4874.067	46.79	3.75	50.54	74	-23.46	peak
4874.111	41.62	3.75	45.37	54	-8.63	AVG
7311.053	44.21	8.16	52.37	74	-21.63	peak
7311.078	40.33	8.16	48.49	54	-5.51	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.



<b>EUT</b>	WIFI siren alarm	<b>Model Name</b>	NAS-AB02W0
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11b with date rate 1 2462MHZ	<b>Antenna</b>	Horizontal

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Value Type
4924.070	46.61	3.81	50.42	74	-23.58	peak
4924.029	40.38	3.81	44.19	54	-9.81	AVG
7386.036	46.15	8.19	54.34	74	-19.66	peak
7386.040	41.43	8.19	49.62	54	-4.38	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

<b>EUT</b>	WIFI siren alarm	<b>Model Name</b>	NAS-AB02W0
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11b with date rate 1 2462MHZ	<b>Antenna</b>	Vertical

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Value Type
4924.116	43.53	3.81	47.34	74	-26.66	peak
4924.109	41.62	3.81	45.43	54	-8.57	AVG
7386.079	44.37	8.19	52.56	74	-21.44	peak
7386.117	38.66	8.19	46.85	54	-7.15	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

## RESULT: PASS

### Note:

Other emissions from 1G to 25 GHz are considered as ambient noise. No recording in the test report.

Factor = Antenna Factor + Cable loss - Amplifier gain, Over=Measure-Limit.

The “Factor” value can be calculated automatically by software of measurement system.

All test modes had been pre-tested. The 802.11b mode is the worst case and recorded in the report.



## 8. BAND EDGE EMISSION

### 8.1. MEASUREMENT PROCEDURE

Radiated restricted band edge measurements

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting

### 8.2. TEST SET-UP

same as 7.2

**Note:**

1. Factor=Antenna Factor + Cable loss - Amplifier gain. Field Strength=Factor + Reading level
2. The factor had been edited in the “Input Correction” of the Spectrum Analyzer. So the Amplitude of test plots is equal to Reading level plus the Factor in dB. Use the A dB( $\mu$ V) to represent the Amplitude. Use the F dB( $\mu$ V/m) to represent the Field Strength. So A=F.



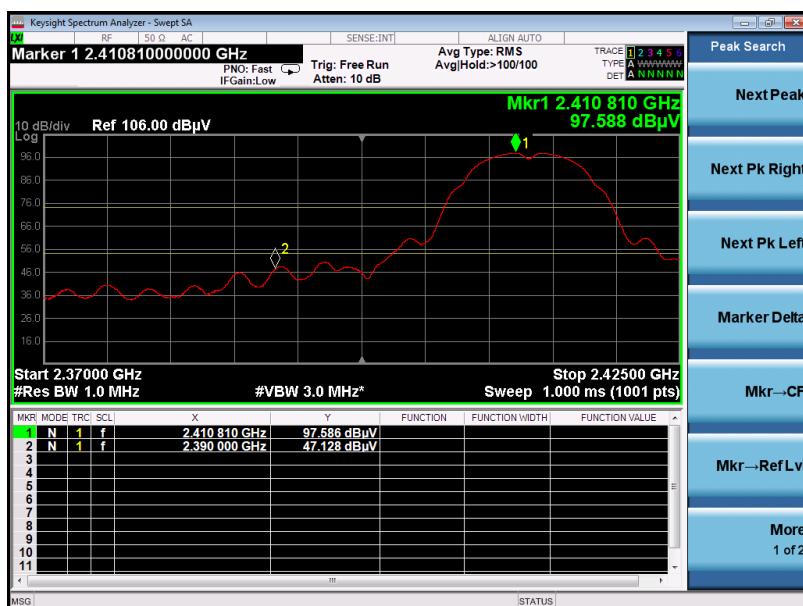
### 8.3. TEST RESULT

EUT	WIFI siren alarm	Model Name	NAS-AB02W0
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with data rate 1 2412MHZ	Antenna	Horizontal

PK



AV

**RESULT: PASS**

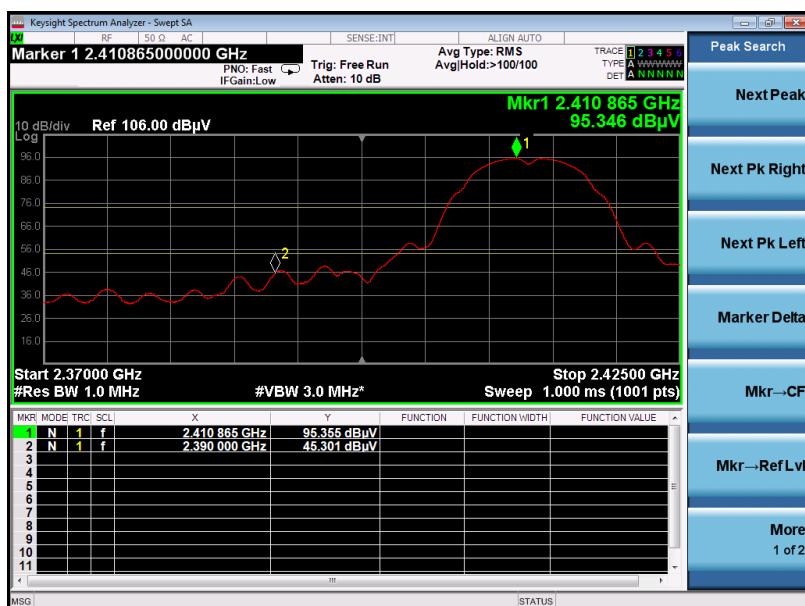


<b>EUT</b>	WIFI siren alarm	<b>Model Name</b>	NAS-AB02W0
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11b with data rate 1 2412MHz	<b>Antenna</b>	Vertical

PK



AV

**RESULT: PASS**



<b>EUT</b>	WIFI siren alarm	<b>Model Name</b>	NAS-AB02W0
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11b with data rate 1 2462MHz	<b>Antenna</b>	Horizontal

PK



AV

**RESULT: PASS**



<b>EUT</b>	WIFI siren alarm	<b>Model Name</b>	NAS-AB02W0
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11b with data rate 1 2462MHz	<b>Antenna</b>	Vertical

PK



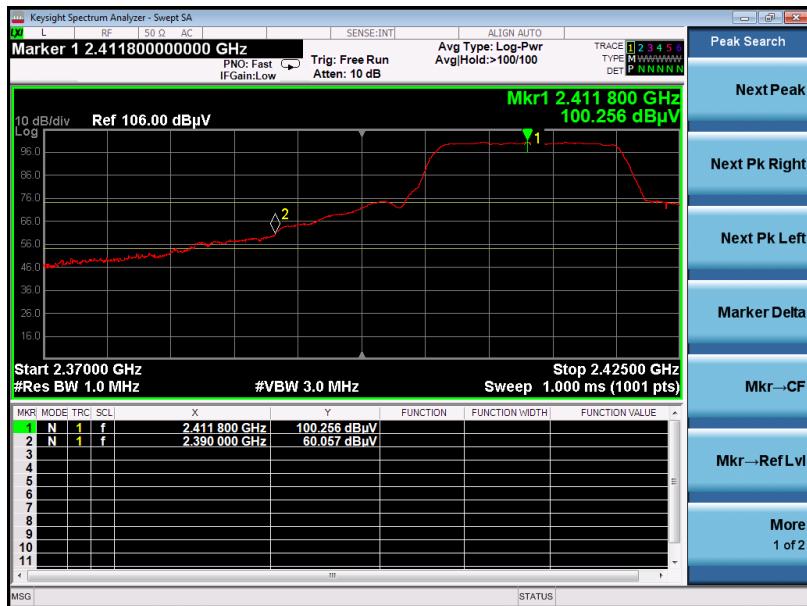
AV

**RESULT: PASS**



<b>EUT</b>	WIFI siren alarm	<b>Model Name</b>	NAS-AB02W0
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11g with data rate 6 2412MHz	<b>Antenna</b>	Horizontal

PK



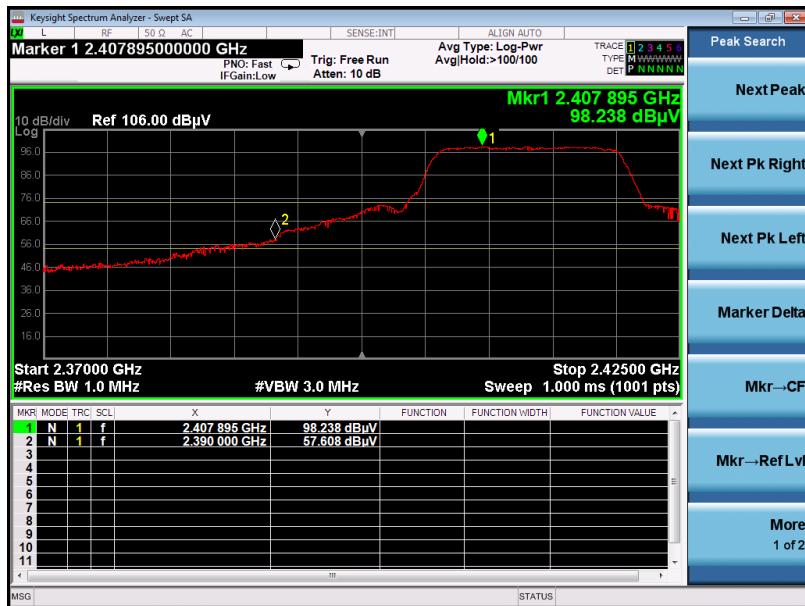
AV

**RESULT: PASS**



<b>EUT</b>	WIFI siren alarm	<b>Model Name</b>	NAS-AB02W0
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11g with data rate 6 2412MHz	<b>Antenna</b>	Vertical

PK



AV

**RESULT: PASS**

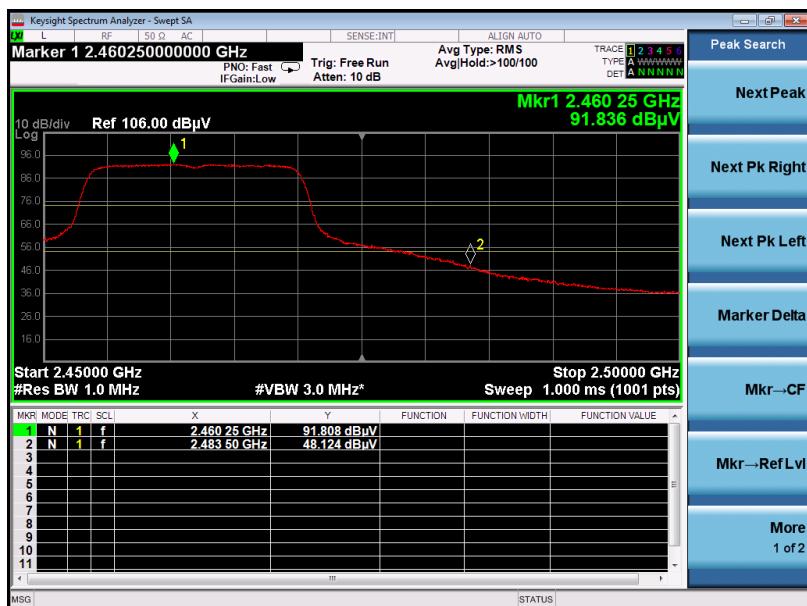


<b>EUT</b>	WIFI siren alarm	<b>Model Name</b>	NAS-AB02W0
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11g with data rate 6 2462MHz	<b>Antenna</b>	Horizontal

PK



AV

**RESULT: PASS**



<b>EUT</b>	WIFI siren alarm	<b>Model Name</b>	NAS-AB02W0
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11g with data rate 6 2462MHz	<b>Antenna</b>	Vertical

PK



AV

**RESULT: PASS**



<b>EUT</b>	WIFI siren alarm	<b>Model Name</b>	NAS-AB02W0
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11n 20 with data rate 6.5 2412MHZ	<b>Antenna</b>	Horizontal

PK



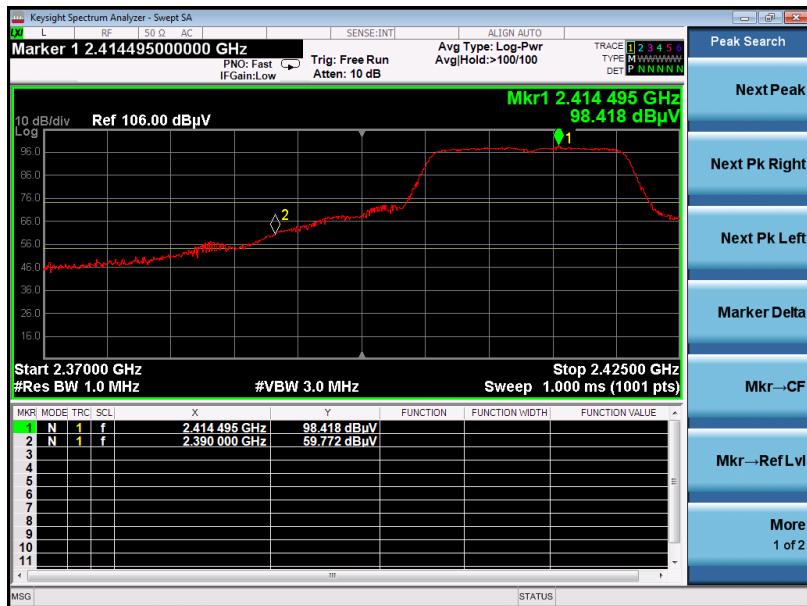
AV

**RESULT: PASS**



<b>EUT</b>	WIFI siren alarm	<b>Model Name</b>	NAS-AB02W0
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11n 20 with data rate 6.5 2412MHZ	<b>Antenna</b>	Vertical

PK



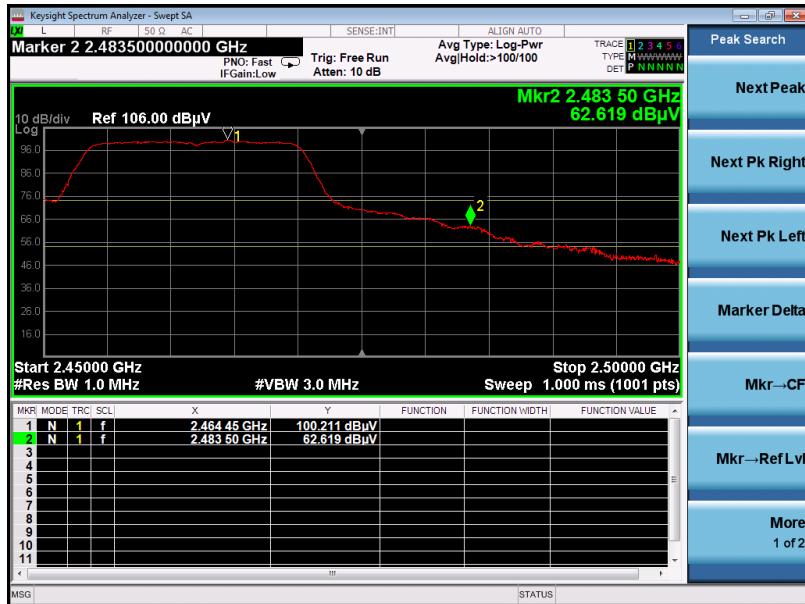
AV

**RESULT: PASS**

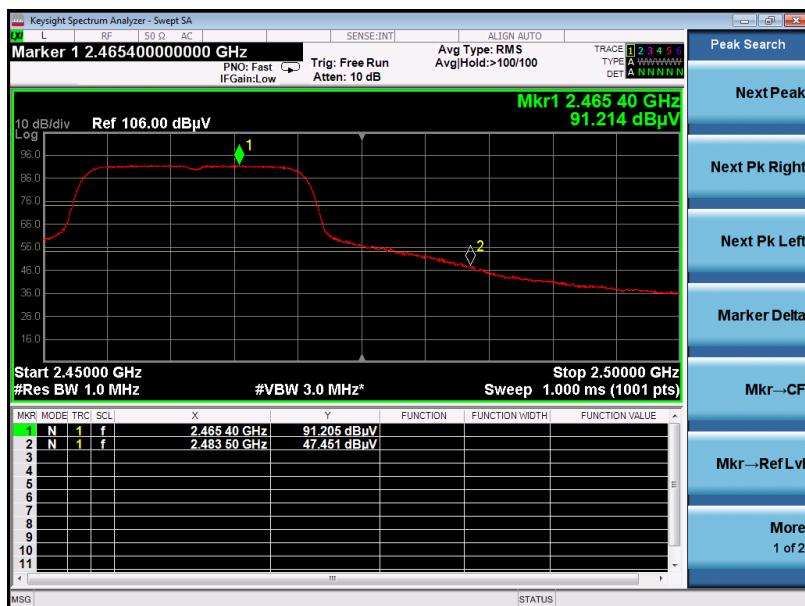


<b>EUT</b>	WIFI siren alarm	<b>Model Name</b>	NAS-AB02W0
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11n 20 with data rate 6.5 2462MHz	<b>Antenna</b>	Horizontal

PK



AV

**RESULT: PASS**



<b>EUT</b>	WIFI siren alarm	<b>Model Name</b>	NAS-AB02W0
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11n 20 with data rate 6.5 2462MHz	<b>Antenna</b>	Vertical

PK



AV

**RESULT: PASS**



## 9. FCC LINE CONDUCTED EMISSION TEST

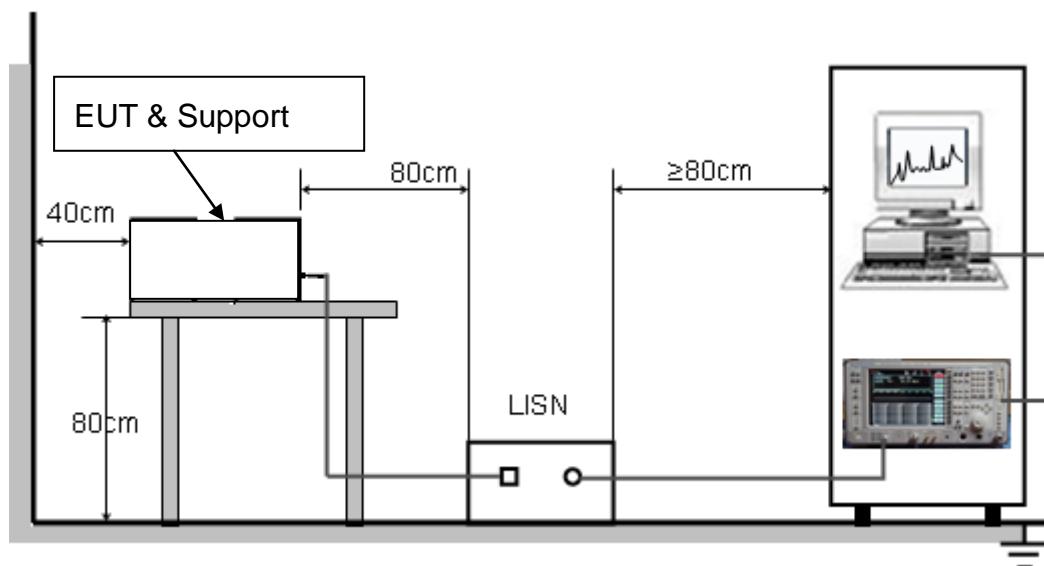
### 9.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.( dBuV)	Average( dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

### 9.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST





### 9.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipments received AC120V/60Hz power from a LISN, if any.
5. The EUT received DC 5V power from adapter which received AC120V/60Hz power from a LISN.
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

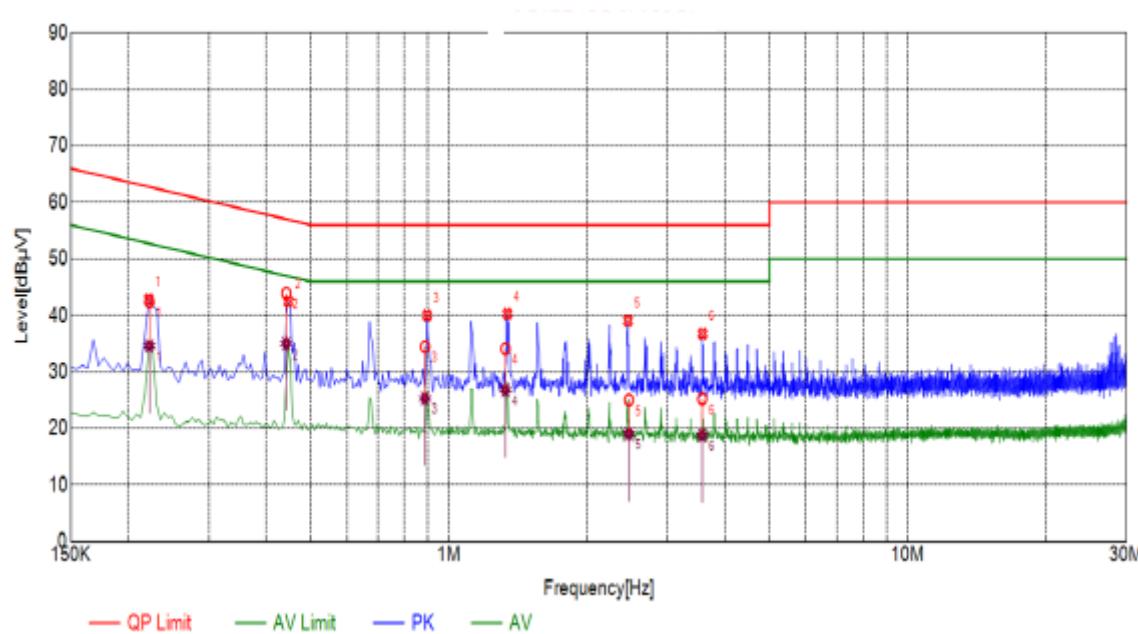
### 9.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.



## 9.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

Line Conducted Emission Test Line 1-L

**Suspected List**

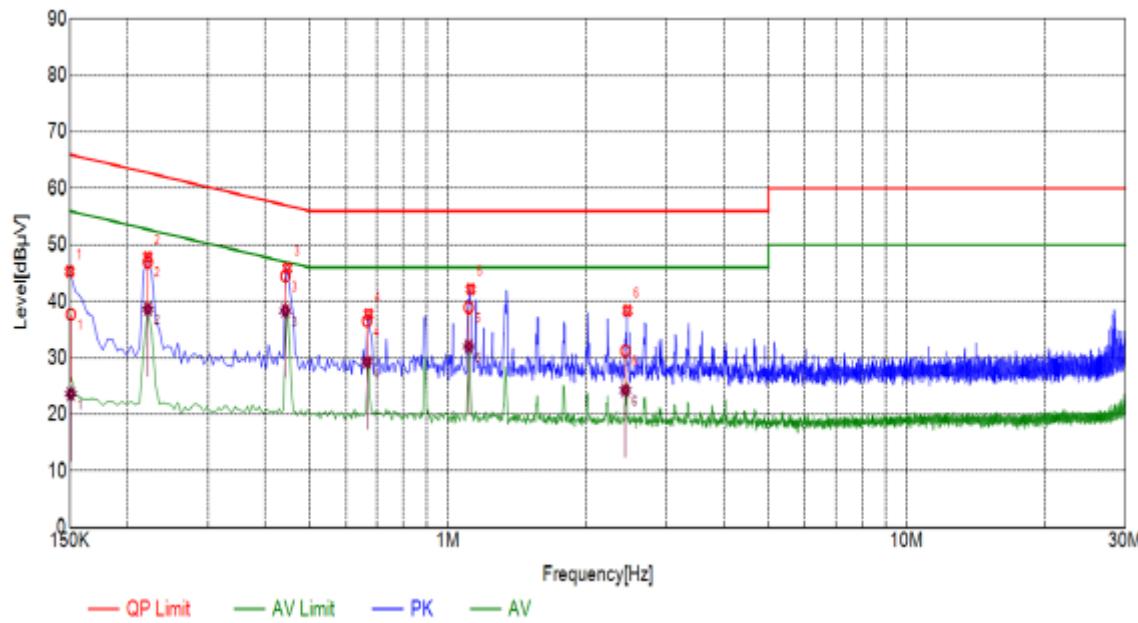
NO.	Freq. [MHz]	Level [dB $\mu$ V]	Factor [dB]	Limit [dB $\mu$ V]	Margin [dB]	Detector
1	0.2220	42.86	10.04	62.74	19.88	PK
2	0.4470	42.47	10.04	56.93	14.46	PK
3	0.8970	40.01	10.06	56.00	15.99	PK
4	1.3425	40.24	10.10	56.00	15.76	PK
5	2.4585	39.05	10.19	56.00	16.95	PK
6	3.5745	36.78	10.25	56.00	19.22	PK

**Final Data List**

NO.	Freq. [MHz]	Factor [dB]	QP Value [dB $\mu$ V]	QP Limit [dB $\mu$ V]	QP Margin [dB]	AV Value [dB $\mu$ V]	AV Limit [dB $\mu$ V]	AV Margin [dB]
1	0.2226	10.04	42.35	62.72	20.37	34.61	52.72	18.11
2	0.4425	10.05	43.89	57.01	13.12	34.99	47.01	12.02
3	0.8880	10.06	34.45	56.00	21.55	25.29	46.00	20.71
4	1.3291	10.10	34.08	56.00	21.92	26.77	46.00	19.23
5	2.4694	10.19	25.04	56.00	30.96	19.01	46.00	26.99
6	3.5675	10.25	25.23	56.00	30.77	18.80	46.00	27.20



## Line Conducted Emission Test Line 2-N



## Suspected List

NO.	Freq. [MHz]	Level [dB $\mu$ V]	Factor [dB]	Limit [dB $\mu$ V]	Margin [dB]	Detector
1	0.1500	45.28	10.03	66.00	20.72	PK
2	0.2220	47.87	10.04	62.74	14.87	PK
3	0.4470	45.86	10.04	56.93	11.07	PK
4	0.6720	37.74	10.05	56.00	18.26	PK
5	1.1220	42.14	10.08	56.00	13.86	PK
6	2.4630	38.38	10.19	56.00	17.62	PK

## Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Value [dB $\mu$ V]	QP Limit [dB $\mu$ V]	QP Margin [dB]	AV Value [dB $\mu$ V]	AV Limit [dB $\mu$ V]	AV Margin [dB]
1	0.1508	10.03	37.70	65.96	28.26	23.59	55.96	32.37
2	0.2220	10.04	46.98	62.74	15.76	38.67	52.74	14.07
3	0.4429	10.05	44.52	57.01	12.49	38.37	47.01	8.64
4	0.6670	10.05	36.58	56.00	19.42	29.24	46.00	16.76
5	1.1110	10.08	38.89	56.00	17.11	32.03	46.00	13.97
6	2.4384	10.18	31.28	56.00	24.72	24.24	46.00	21.76

**RESULT: PASS**

Note: All the test modes had been tested, the mode 1 was the worst case. Only the data of the worst case would be record in this test report.

**APPENDIX A: PHOTOGRAPHS OF TEST SETUP****FCC RADIATED EMISSION TEST SETUP BELOW 1GHZ****FCC RADIATED EMISSION TEST SETUP ABOVE 1GHZ**



FCC LINE CONDUCTED EMISSION TEST SETUP



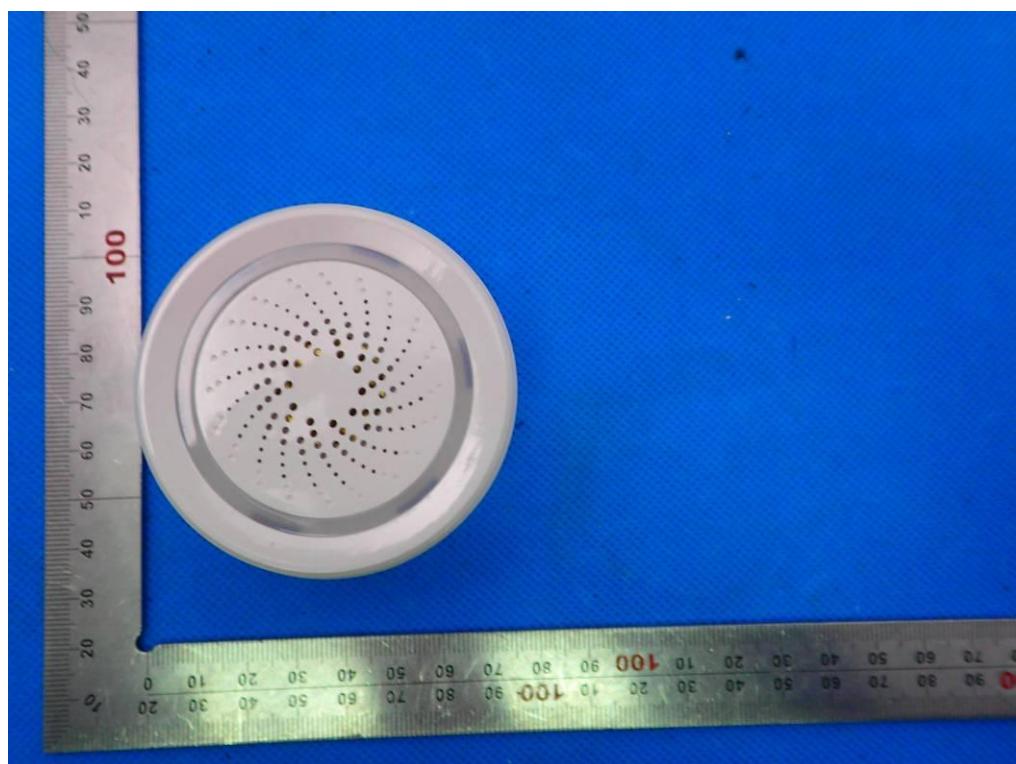


## APPENDIX B: PHOTOGRAPHS OF EUT

### ALL VIEW OF EUT

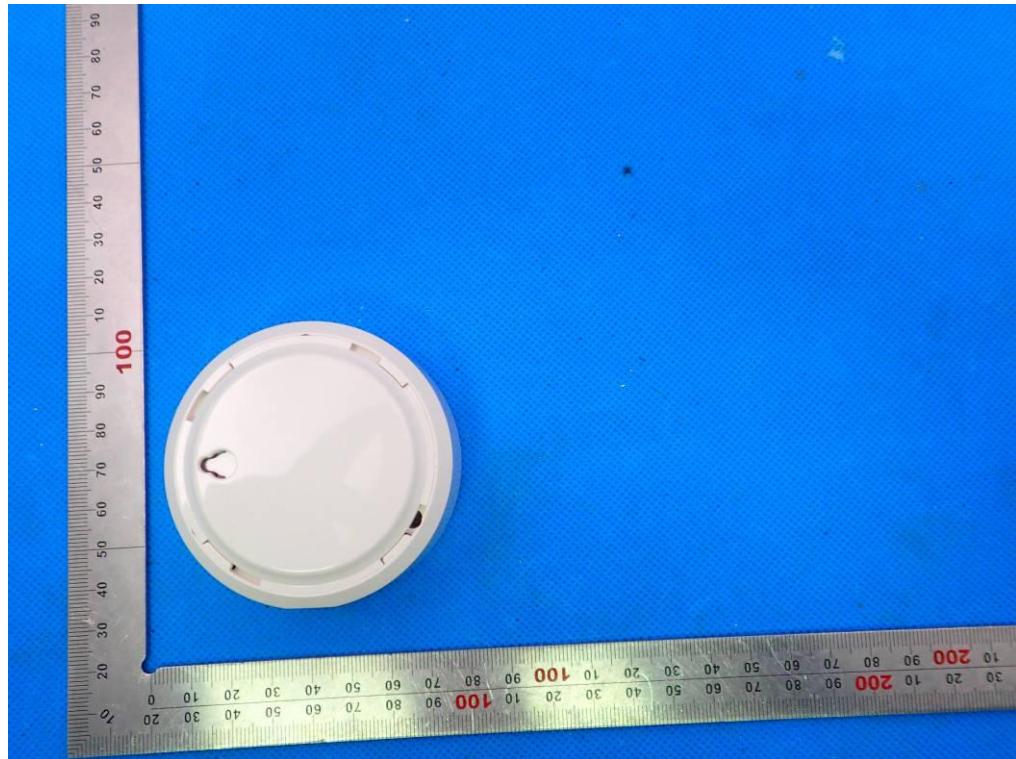


### TOP VIEW OF EUT

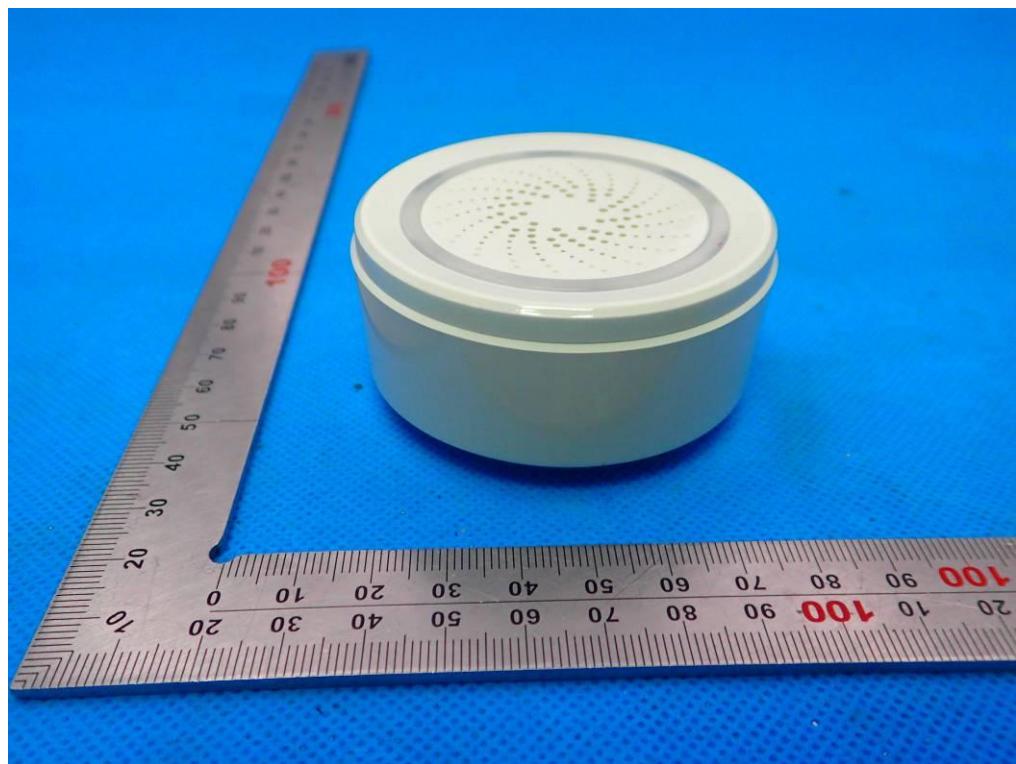




BOTTOM VIEW OF EUT

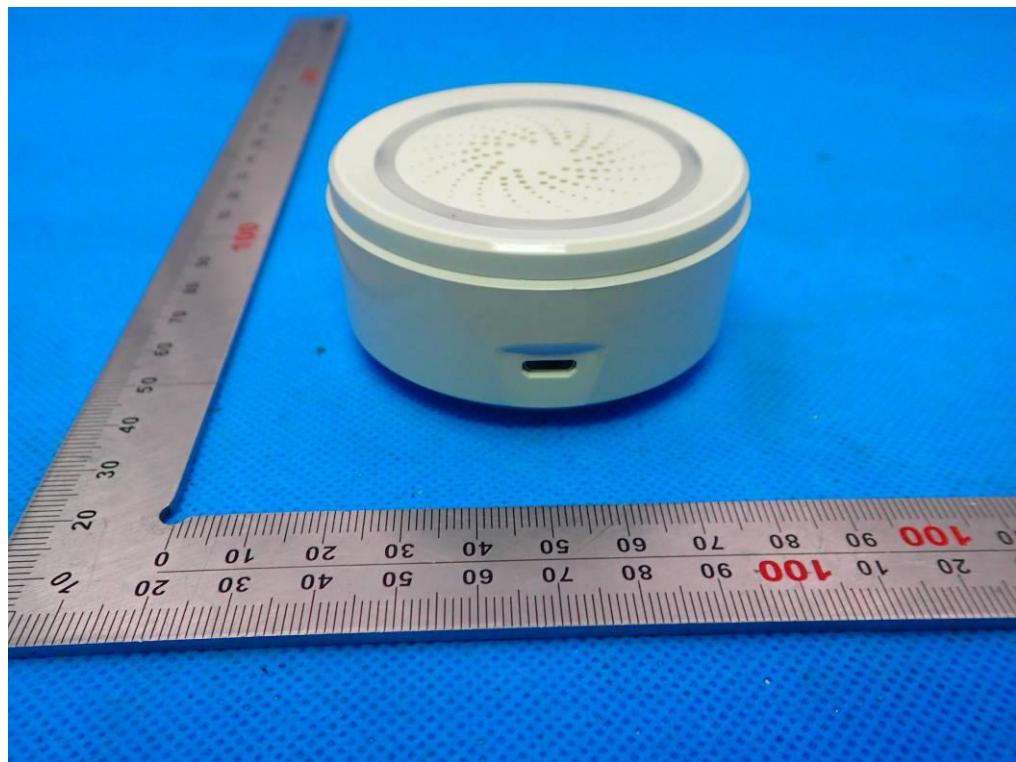


FRONT VIEW OF EUT

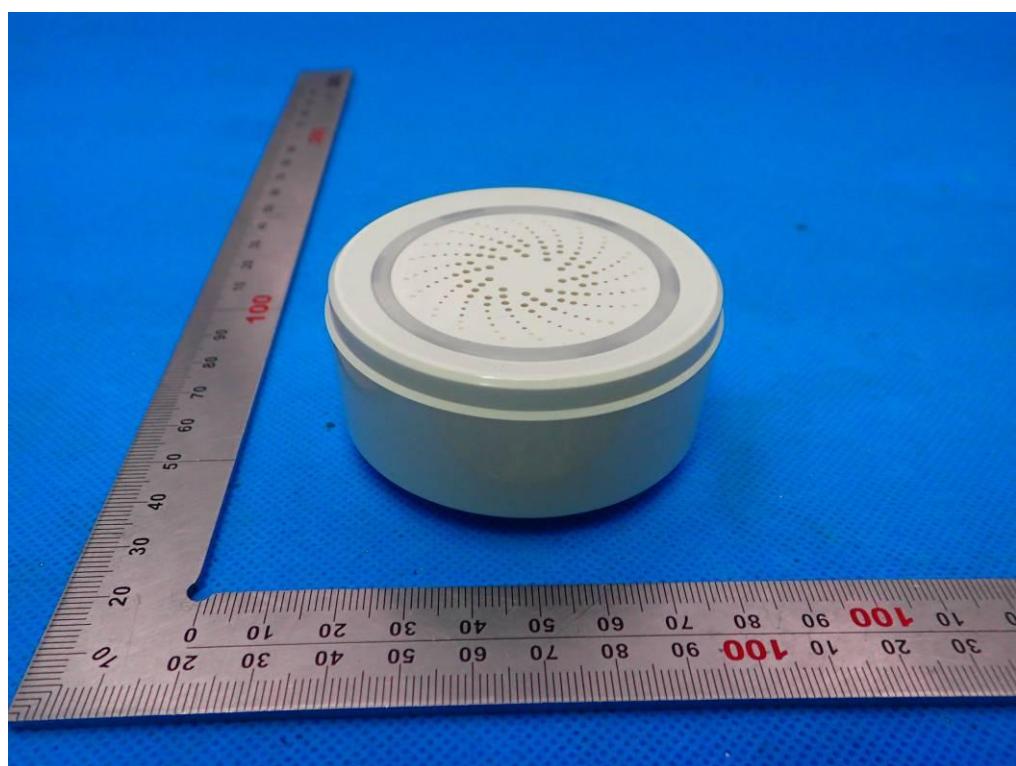




BACK VIEW OF EUT

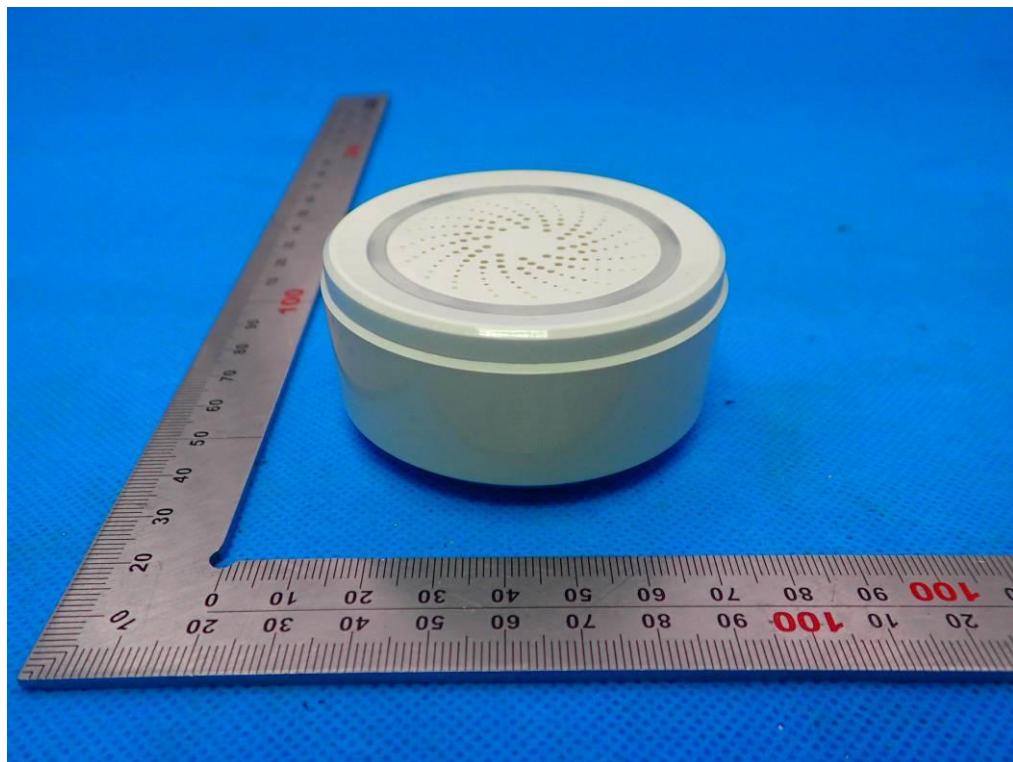


LEFT VIEW OF EUT

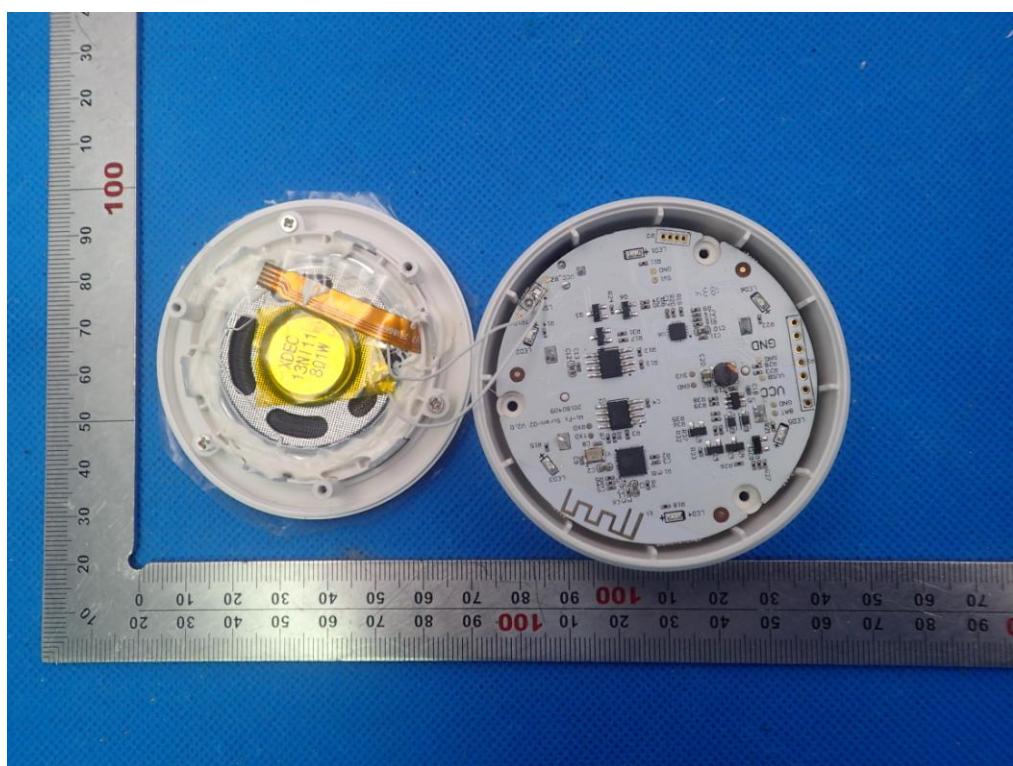




RIGHT VIEW OF EUT

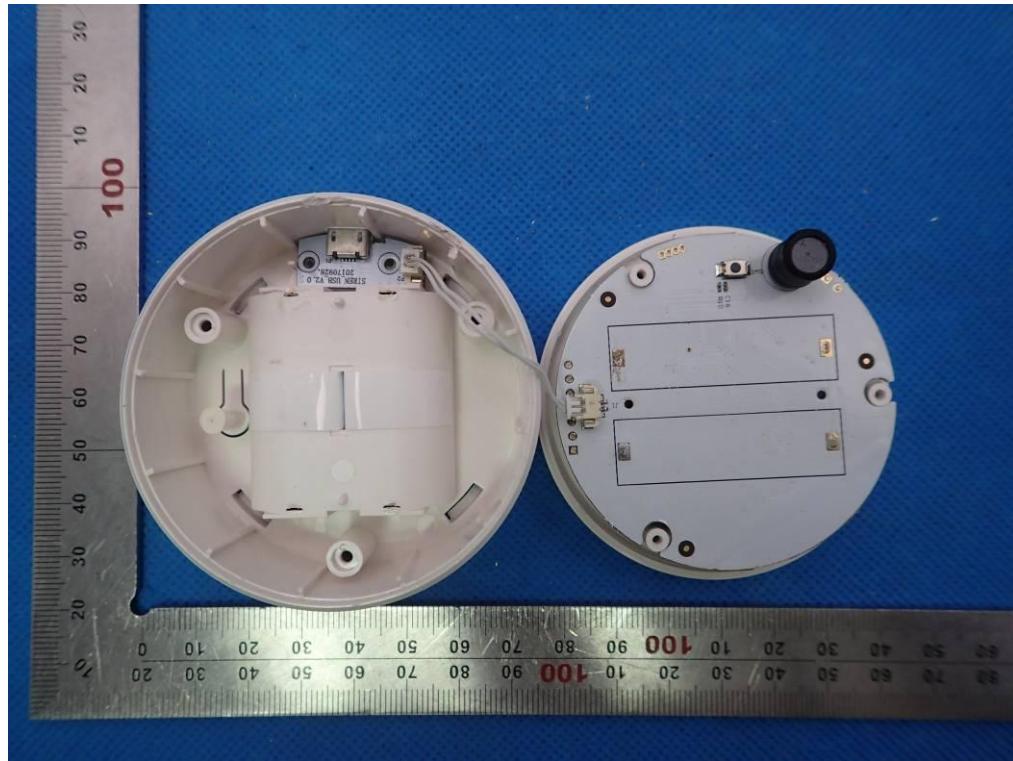


OPEN VIEW OF EUT 1

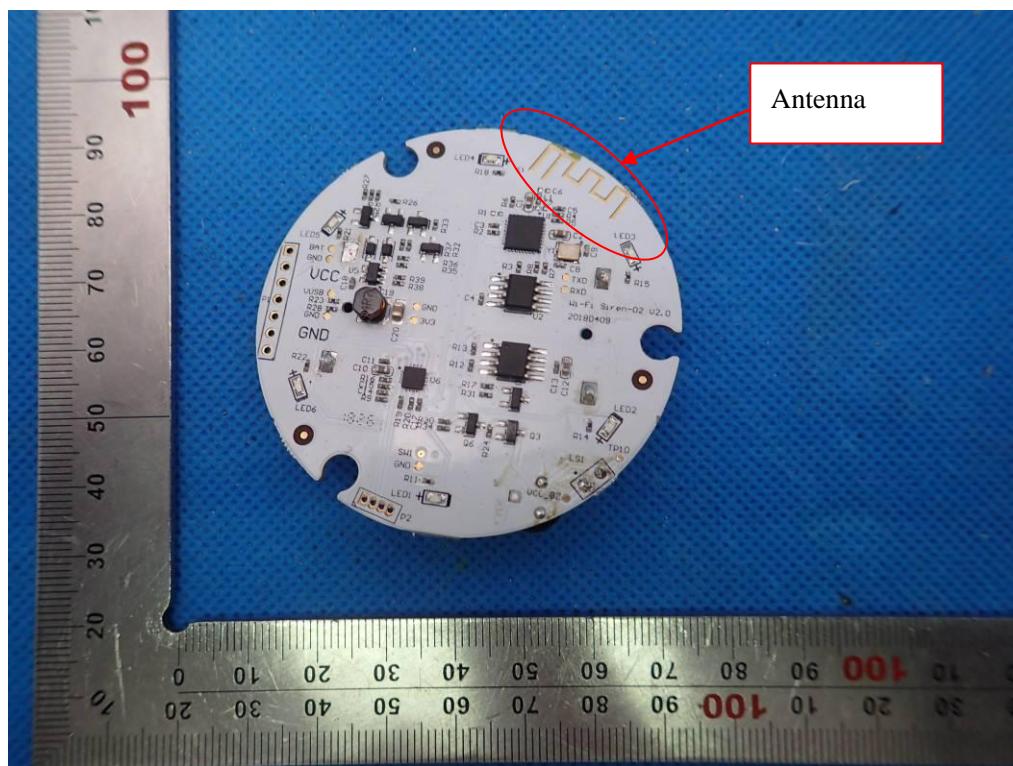




## OPEN VIEW OF EUT 2

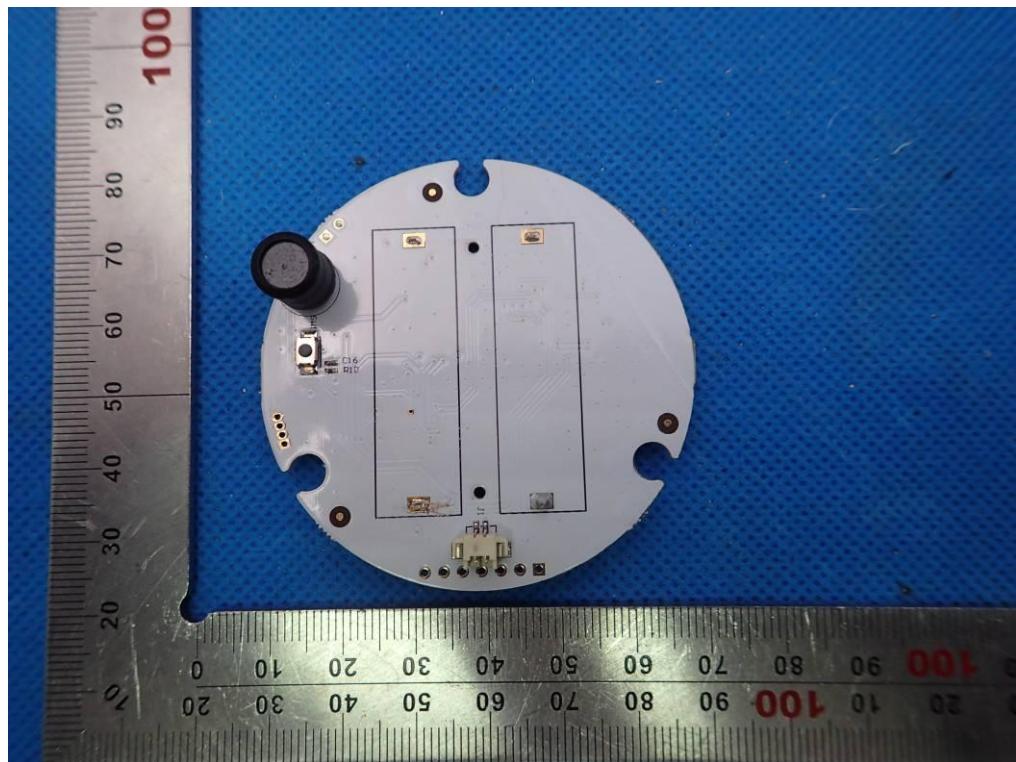


## INTERNAL VIEW OF EUT-1

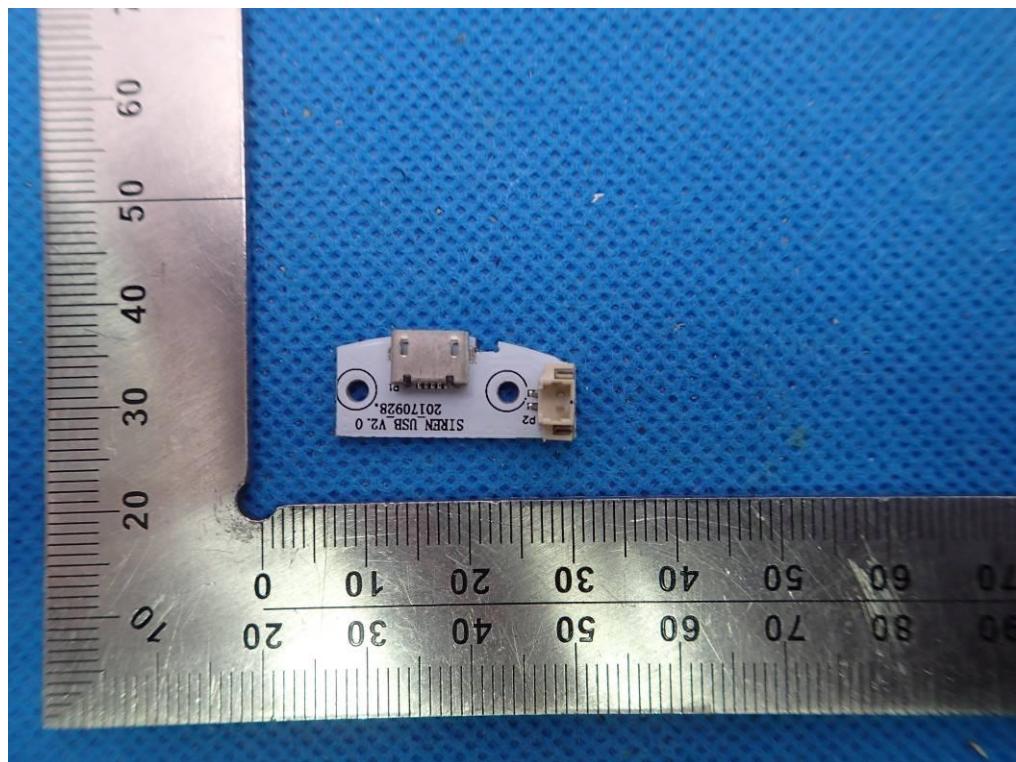




## INTERNAL VIEW OF EUT-2

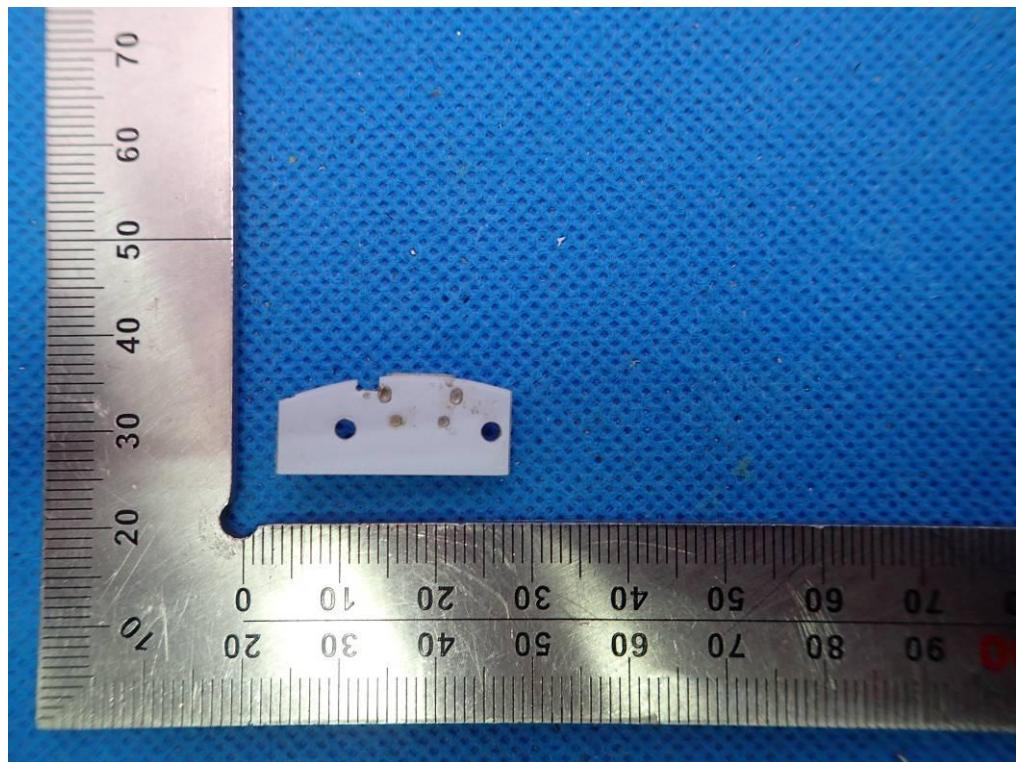


## INTERNAL VIEW OF EUT-3





INTERNAL VIEW OF EUT-4



----END OF REPORT----