



# FCC TEST REPORT

**Test report  
On Behalf of  
Shenzhen Huafurui Technology Co., Ltd.  
For  
Smart Phone  
Model No.: QUEST**

**FCC ID: 2AHZ5QUEST**

**Prepared for :** Shenzhen Huafurui Technology Co., Ltd.  
Unit 1401 &1402, 14/F, Jin qi zhi gu mansion (No. 4 building of Chong wen Garden),  
Crossing of the Liu xian street and Tang ling road, Tao yuan street, Nan shan district,  
Shenzhen,P.R. China

**Prepared By :** Shenzhen HUAK Testing Technology Co., Ltd.  
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District, Shenzhen City, China

**Date of Test:** Dec. 28, 2018~Feb. 18, 2019

**Date of Report:** Feb. 18, 2019

**Report Number:** HK1812211955E

**TEST RESULT CERTIFICATION**

**Applicant's name** ..... : Shenzhen Huafurui Technology Co., Ltd.  
Address ..... : Unit 1401 &1402, 14/F, Jin qi zhi gu mansion (No. 4 building of Chong wen Garden), Crossing of the Liu xian street and Tang ling road, Tao yuan street, Nan shan district, Shenzhen,P.R. China

**Manufacturer's Name** ..... : Shenzhen Huafurui Technology Co., Ltd.  
Address ..... : Unit 1401 &1402, 14/F, Jin qi zhi gu mansion (No. 4 building of Chong wen Garden), Crossing of the Liu xian street and Tang ling road, Tao yuan street, Nan shan district, Shenzhen,P.R. China

**Factory's Name** Shenzhen Huafurui Technology Co., Ltd.

Address ..... : Unit 1401 &1402, 14/F, Jin qi zhi gu mansion (No. 4 building of Chong wen Garden), Crossing of the Liu xian street and Tang ling road, Tao yuan street, Nan shan district, Shenzhen,P.R. China

**Product description** Smart Phone

Brand Name CUBOT

Model Name QUEST

**Standards** ..... : FCC Rules and Regulations Part 15 Subpart C Section 15.247  
KDB 558074 D01 15.247 Meas Guidance v05

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

Date (s) of performance of tests ..... : Dec. 28, 2018~Feb. 18, 2019

Date of Issue ..... : Feb. 18, 2019

Test Result ..... : Pass

Testing Engineer : 

(Gary Qian)

Technical Manager : 

(Eden Hu)

Authorized Signatory : 

(Jason Zhou)



Revision	Issue Date	Revisions	Revised By
V1.0	Feb. 18, 2019	Initial Issue	Jason Zhou



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## 1. GENERAL INFORMATION

### 1.1. PRODUCT DESCRIPTION

The EUT is designed as "Smart Phone ". It is designed by way of utilizing the DSSS and OFDM technology to achieve the system operation.

A major technical description of EUT is described as following

<b>Operation Frequency</b>	2.412 GHz~2.462GHz
<b>Output Power</b>	IEEE 802.11b: <b>14.73</b> dBm, IEEE 802.11g: <b>13.63</b> dBm; IEEE 802.11n(20): <b>13.23</b> dBm, IEEE 802.11n(40): <b>13.69</b> dBm
<b>Modulation</b>	DSSS(DBPSK/DQPSK/CCK);OFDM(BPSK/QPSK/16-QAM/64-QAM)
<b>Number of channels</b>	11 Channels (IEEE802.11b/g/h20)& 7 Channels (IEEE802.11n40)
<b>Hardware Version</b>	A799_MAIN_PCB_V1.1
<b>Software Version</b>	CUBOT_CUBOT_QUEST_8123C_V01_20181122
<b>Antenna Designation</b>	PIFA Antenna
<b>Antenna Gain</b>	3.90dBi
<b>Power Supply</b>	DC3.85V by Built-in Li-ion Battery

### 1.2. TABLE OF CARRIER FREQUENCYS

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 802.11n 40MHZ bandwidth system use Channel 3 to Channel 9.

**1.3. IEEE 802.11N MODULATION SCHEME**

MCS Index	Nss	Modulation	R	NBPSC	NCBPS		NDBPS		Data rate(Mbps)	
					800nsGI		400nsGI		200nsGI	
					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

**1.4. RELATED SUBMITTAL(S) / GRANT (S)**

This submittal(s) (test report) is intended for **FCC ID: 2AHZ5QUEST** filing to comply with the FCC Part 15 requirements.



## **1.5. TEST METHODOLOGY**

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013).

Radiated testing was performed at an antenna to EUT distance 3 meters.

Others testing (listed at item 5.3) was performed according to the procedures in FCC Part 15.247 rules KDB 558074 D01 DTS Meas Guidance v05.

## **1.6. SPECIAL ACCESSORIES**

Refer to section 5.2.

## **1.7. EQUIPMENT MODIFICATIONS**

Not available for this EUT intended for grant.



## 2. MEASUREMENT UNCERTAINTY

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)

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



### 3. DESCRIPTION OF TEST MODES

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:**

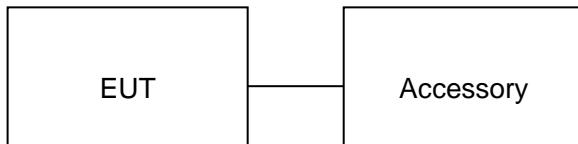
1. The EUT has been set to operate continuously on the lowest, middle and highest operation frequency individually, and the eut is operating at its maximum duty cycle>or equal 98%
2. All modes under which configure applicable have been tested and the worst mode test data recording in the test report,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



## 4 SYSTEM TEST CONFIGURATION

### 4.1. CONFIGURATION OF EUT SYSTEM

Configure:



### 4.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	Smart Phone	QUEST	2AHZ5QUEST	EUT
2	Adapter	QUEST	DC 5.0V 2A	Accessory
3	Battery	QUEST	DC3.85V/ 4000mAh	Accessory
4	USB	N/A	N/A	Accessory

Note: All the accessories have been used during the test in conduction emission test.

### 4.3. SUMMARY OF TEST RESULTS

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



## 5. TEST FACILITY

<b>Site</b>	Shenzhen HUAK Testing Technology Co., Ltd.
<b>Location</b>	1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China
<b>Designation Number</b>	CN1229
Test Firm Registration Number : 616276	

## ALL TEST EQUIPMENT LIST

RF Test Room					
Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Power meter	Agilent	E4417B	HKE-107	Dec. 27, 2018	Dec. 26, 2019
Power Sensor	Agilent	E9327A	HKE-113	Dec. 27, 2018	Dec. 26, 2019
RF cable	Times	1-40G	HKE-034	Dec. 27, 2018	Dec. 26, 2019
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 27, 2018	Dec. 26, 2019
Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 27, 2018	Dec. 26, 2019
RF Cable (9KHz-26.5GHz)	Tonscend	170660	N/A	Dec. 27, 2018	Dec. 26, 2019
Signal generator	Agilent	N5183A	HKE-071	Dec. 27, 2018	Dec. 26, 2019
Receiver	R&S	ESCI-7	HKE-010	Dec. 27, 2018	Dec. 26, 2019
Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 27, 2018	Dec. 26, 2019
Preamplifier	EMCI	EMC051845SE	HKE-015	Dec. 27, 2018	Dec. 26, 2019
Preamplifier	Agilent	83051A	HKE-016	Dec. 27, 2018	Dec. 26, 2019
Loop antenna	Schwarzbeck	FMZB 1519 B	HKE-014	Dec. 27, 2018	Dec. 26, 2019
Broadband antenna	Schwarzbeck	VULB 9163	HKE-012	Dec. 27, 2018	Dec. 26, 2019
Horn antenna	Schwarzbeck	9120D	HKE-013	Dec. 27, 2018	Dec. 26, 2019
Antenna Mast	Keleto	CC-A-4M	N/A	Dec. 27, 2018	Dec. 26, 2019
Position controller	Taiwan MF	MF7802	HKE-011	Dec. 27, 2018	Dec. 26, 2019
Radiated test software	Tonscend	TS+ Rev 2.5.0.0	HKE-082	Dec. 27, 2018	Dec. 26, 2019
RF cable (9KHz-1GHz)	Times	381806-001	N/A	Dec. 27, 2018	Dec. 26, 2019
RF cable	Times	1-40G	HKE-034	Dec. 27, 2018	Dec. 26, 2019
Horn Ant (18G-40GHz)	Schwarzbeck	BBHA 9170	HKE-094	Mar. 01, 2018	Feb. 28, 2020
Horn Ant (18G-40GHz)	ETS	QWH_SL_18_40_K_SG	HKE-092	Mar. 01, 2018	Feb. 28, 2020



## 6. OUTPUT POWER

### 7.1. MEASUREMENT PROCEDURE

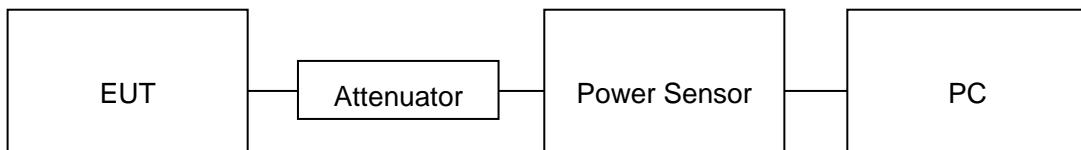
For max average conducted output power test:

1. Connect EUT RF output port to power probe through an RF attenuator.
2. Connect the power probe 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 KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

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

#### AVERAGE POWER SETUP





### 6.3. 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	13.72	30	Pass
2.437	14.50	30	Pass
2.462	14.73	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	13.01	30	Pass
2.437	13.63	30	Pass
2.462	13.48	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	12.17	30	Pass
2.437	13.23	30	Pass
2.462	13.09	30	Pass



<b>TEST ITEM</b>	OUTPUT POWER
<b>TEST MODE</b>	802.11n 40 with data rate 13.5

Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.422	13.13	30	Pass
2.437	13.69	30	Pass
2.452	13.69	30	Pass



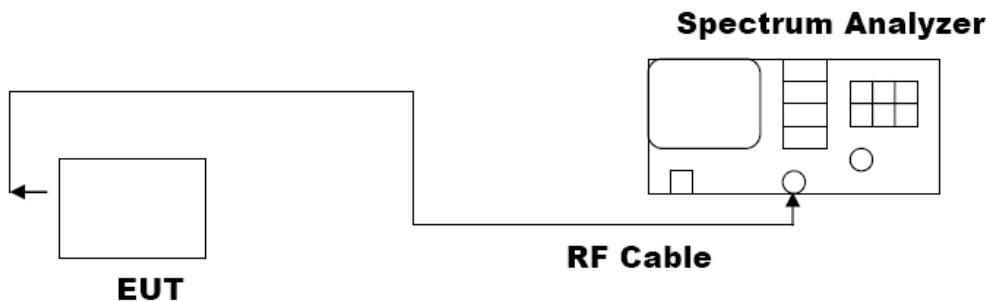
## 7. 6dB BANDWIDTH

### 7.1. 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 KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

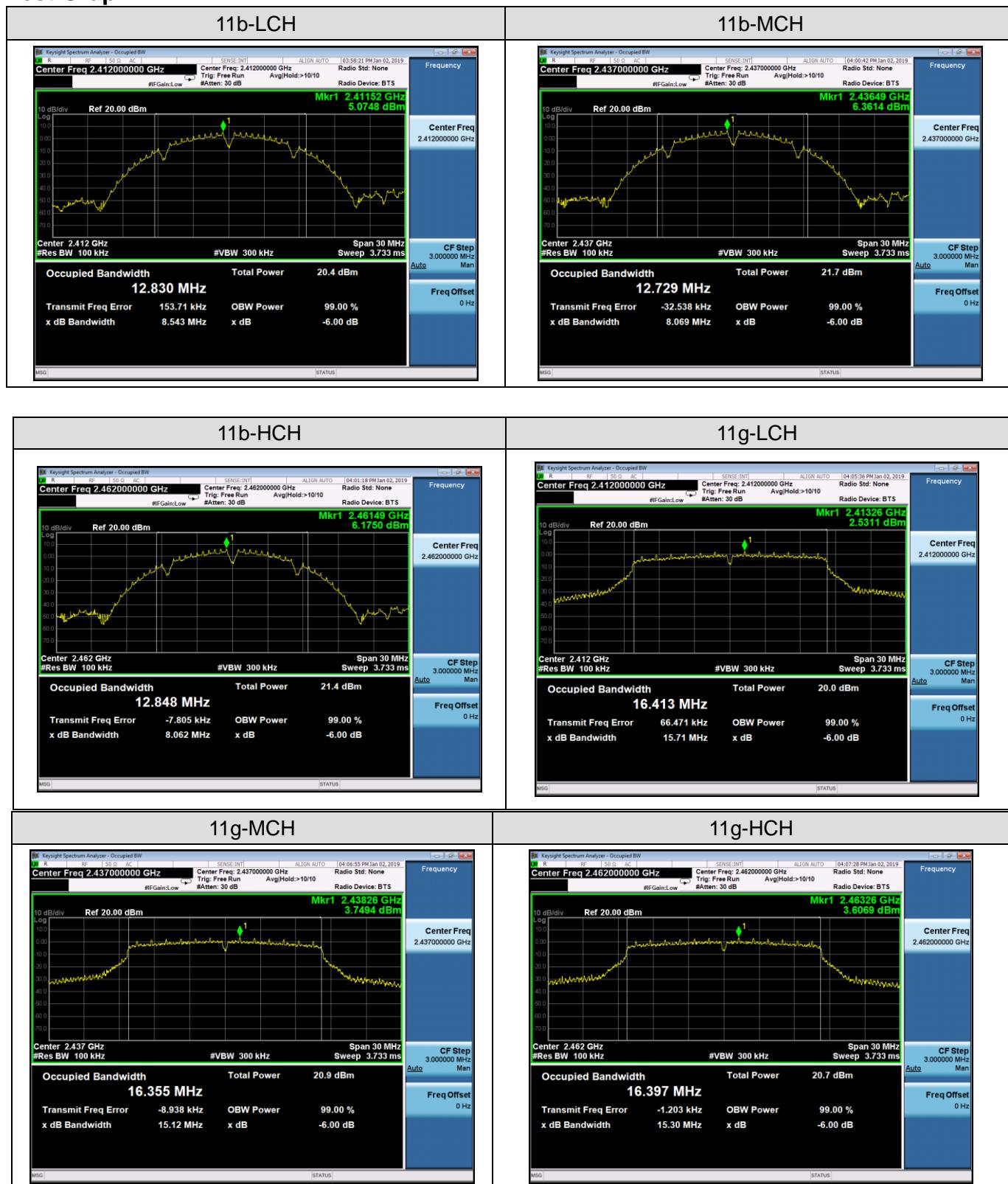
### 7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

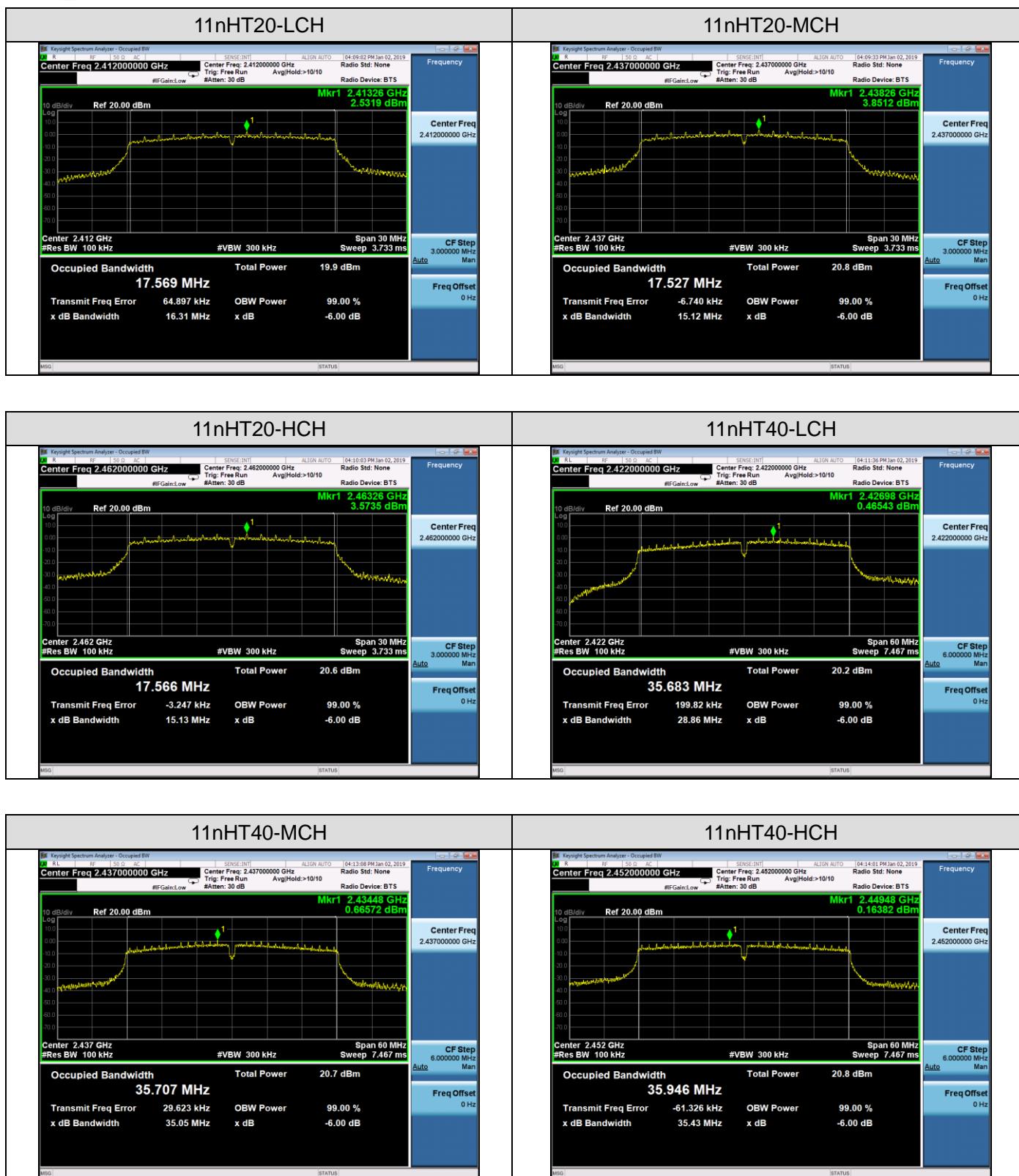




### 8.3. LIMITS AND MEASUREMENT RESULTS

Mode	Channel	6dB Bandwidth [MHz]	Verdict
11b	LCH	8.543	PASS
	MCH	8.069	PASS
	HCH	8.062	PASS
11g	LCH	15.71	PASS
	MCH	15.12	PASS
	HCH	15.30	PASS
11nHT20	LCH	16.31	PASS
	MCH	15.12	PASS
	HCH	15.13	PASS
11nHT40	LCH	28.86	PASS
	MCH	35.05	PASS
	HCH	35.43	PASS

**Test Graph**





## 9. CONDUCTED SPURIOUS EMISSION

### 9.1. 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 KDB 558074 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.

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

The same as described in section 8.2.

### 9.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6.



#### 9.4. LIMITS AND MEASUREMENT RESULT

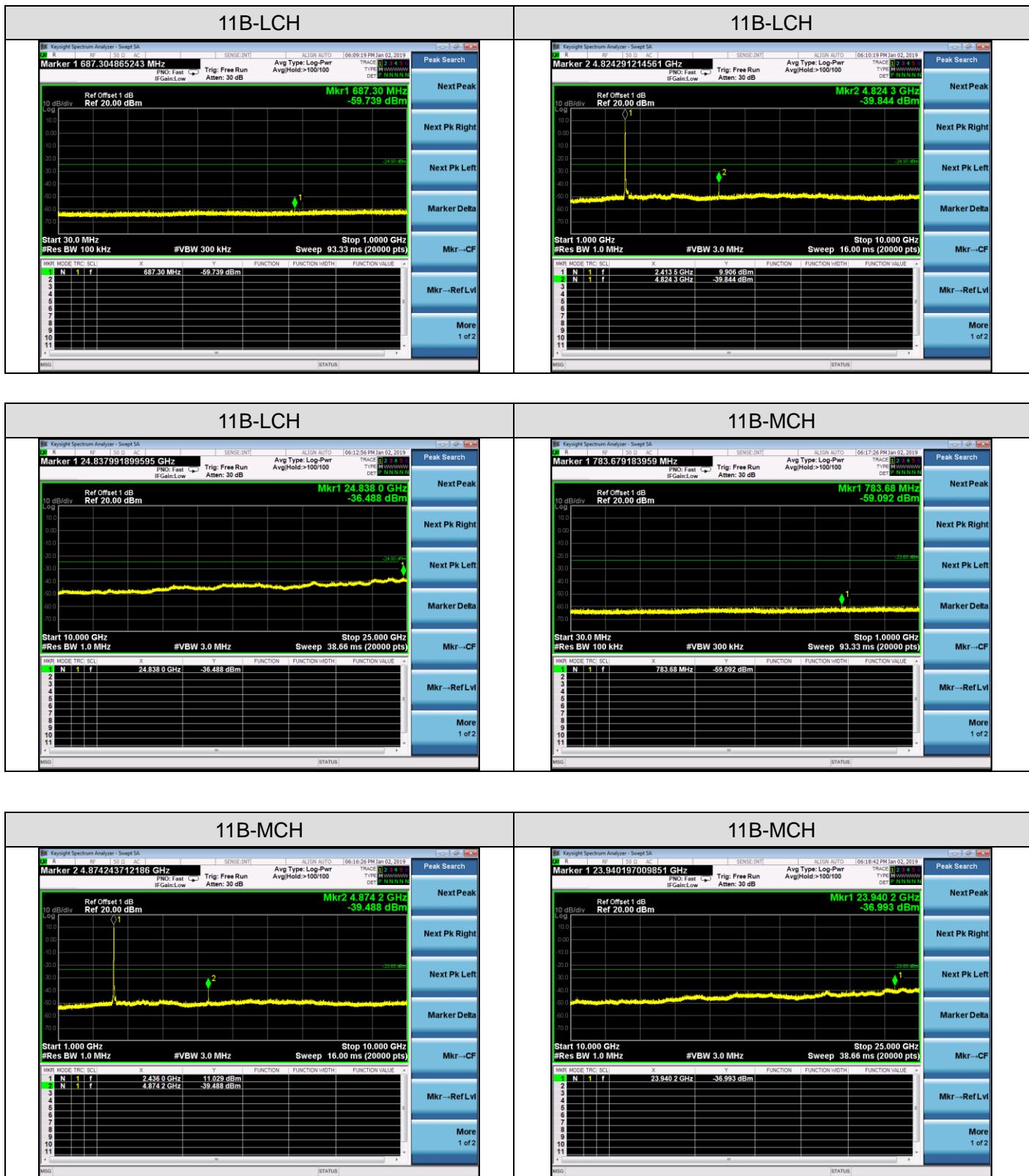
LIMITS AND MEASUREMENT RESULT		
Applicable Limits	Measurement Result	
	Test Data	Criteria
In any 100 KHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 dB 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))	Refer Test Graph	PASS

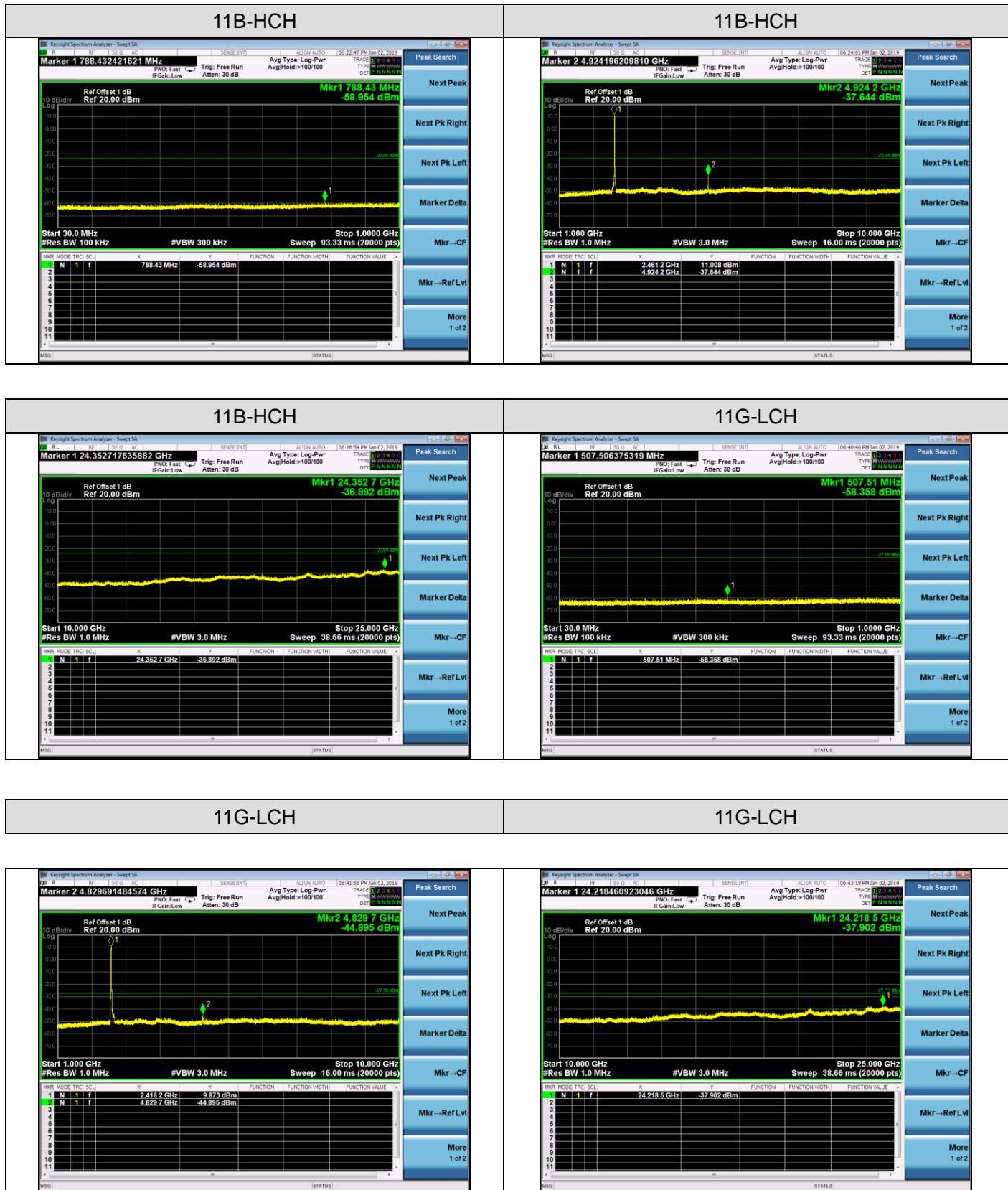


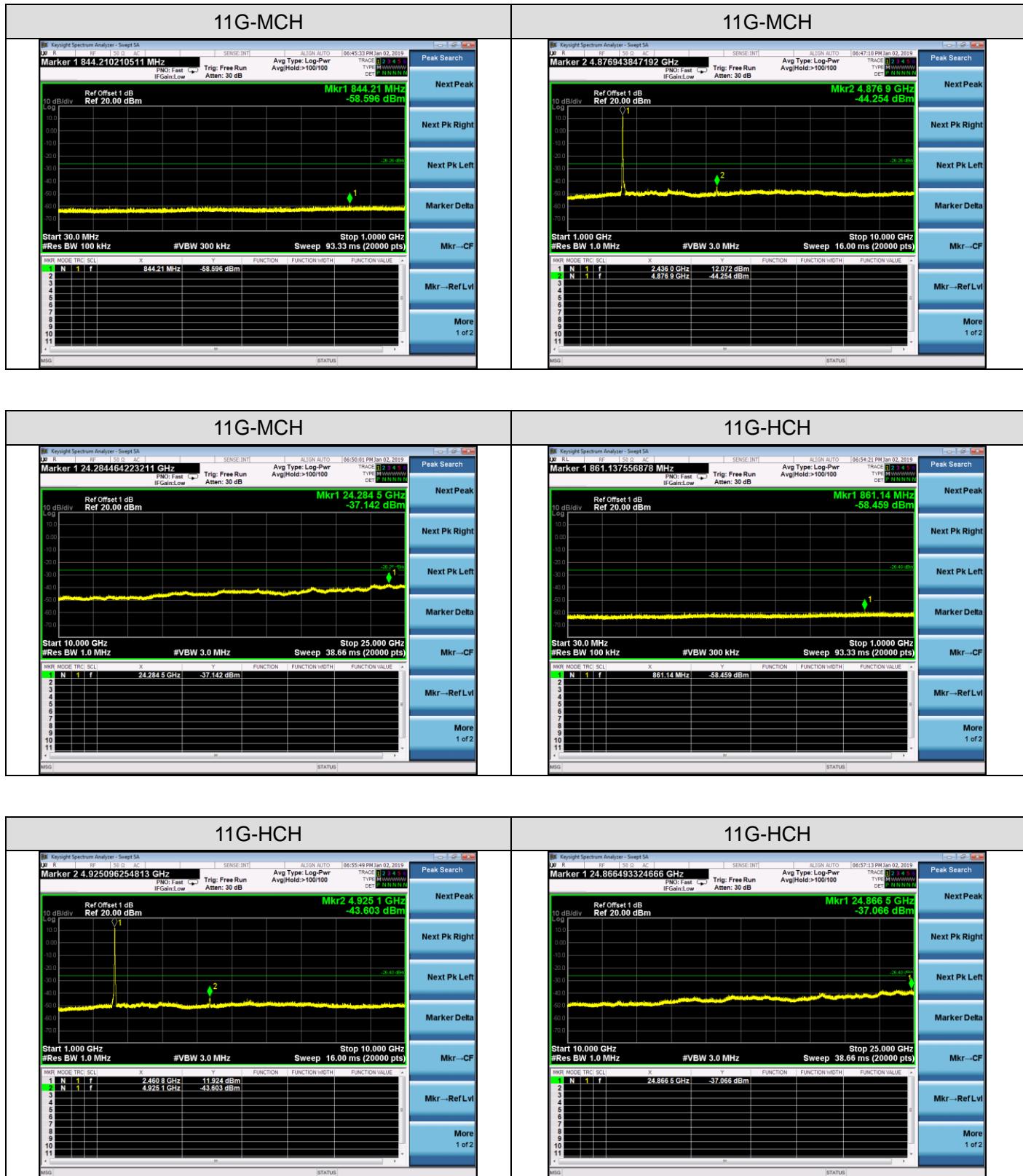
## Test Graph

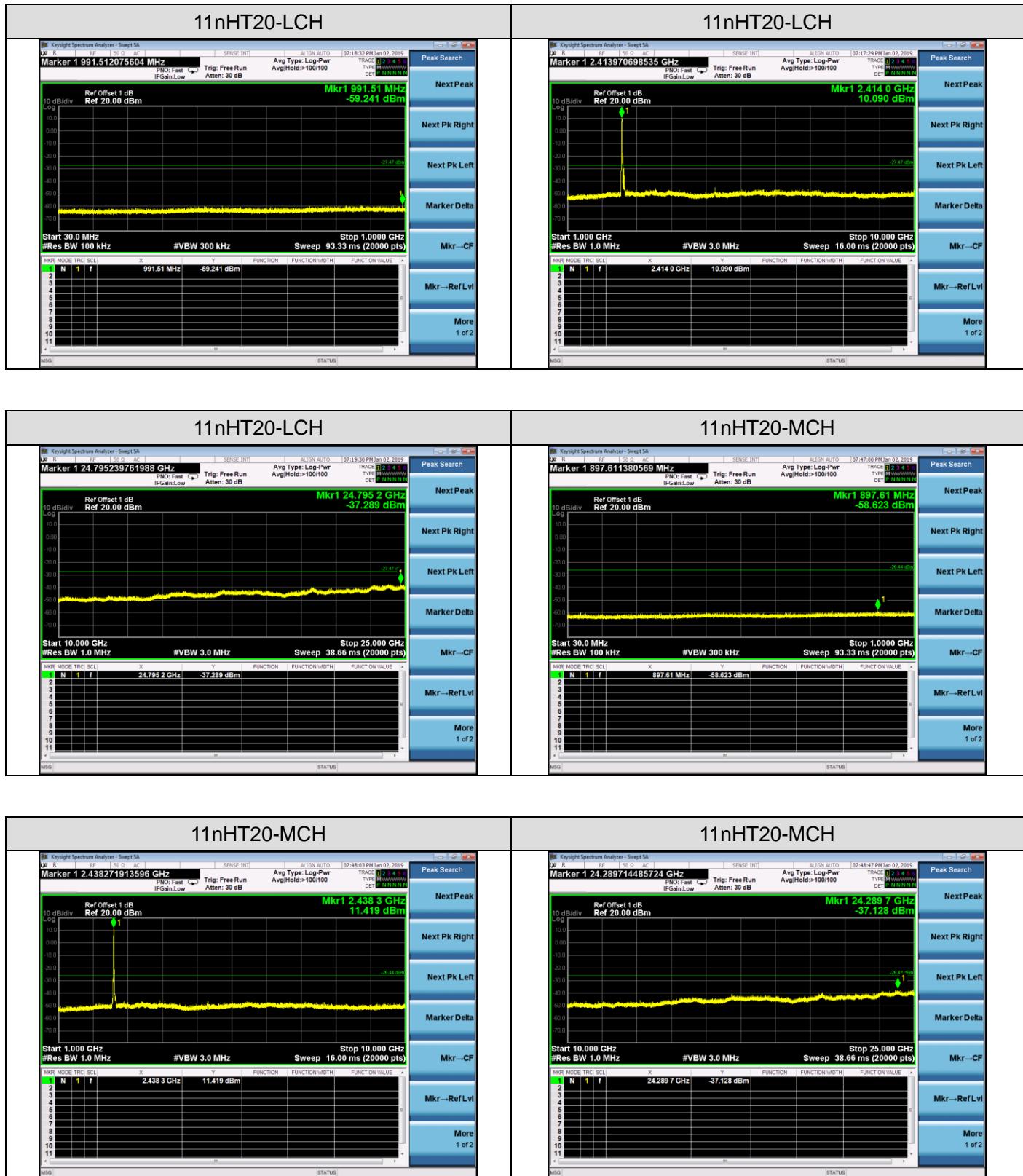
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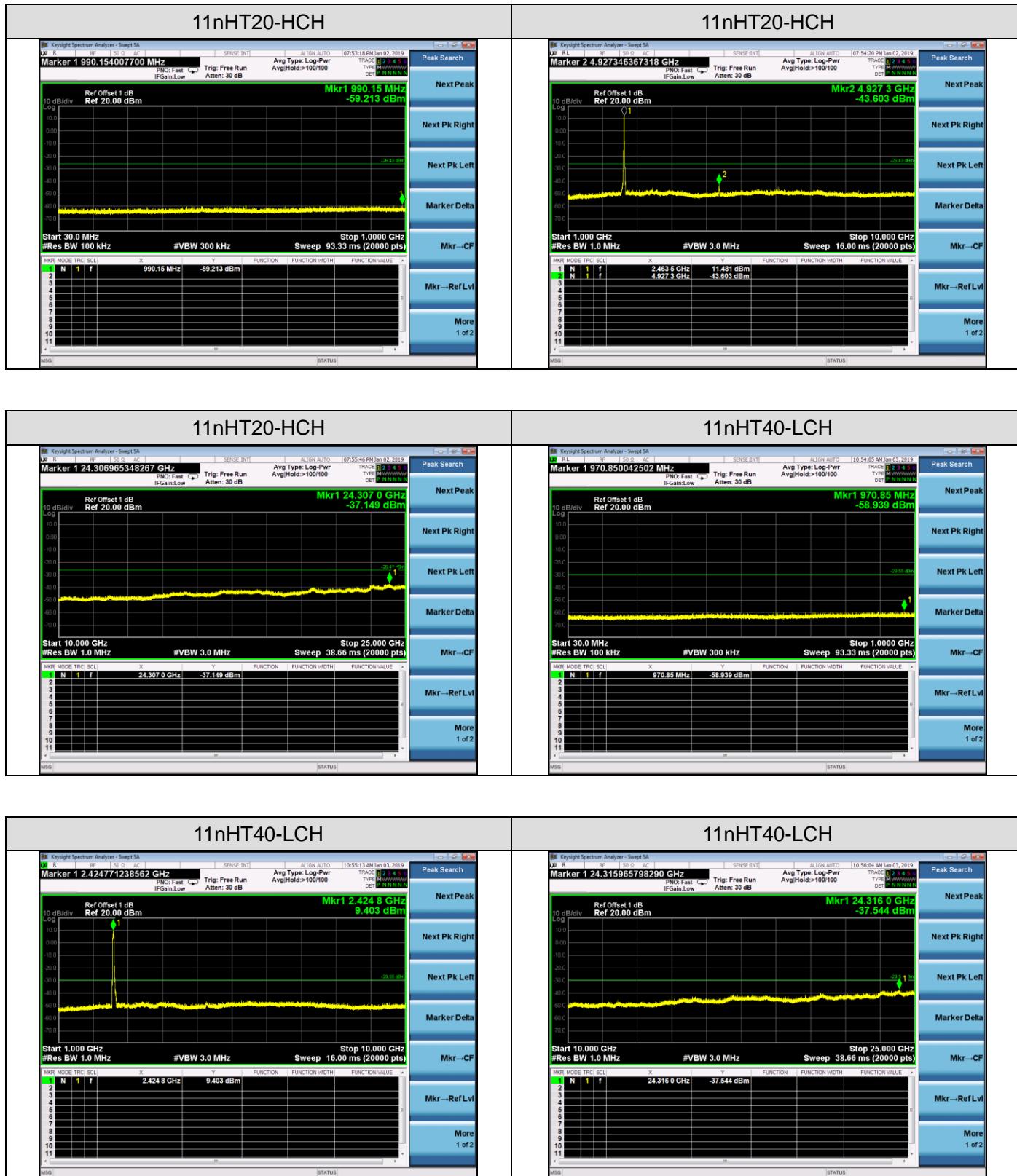
Report No.: HK1812211955E

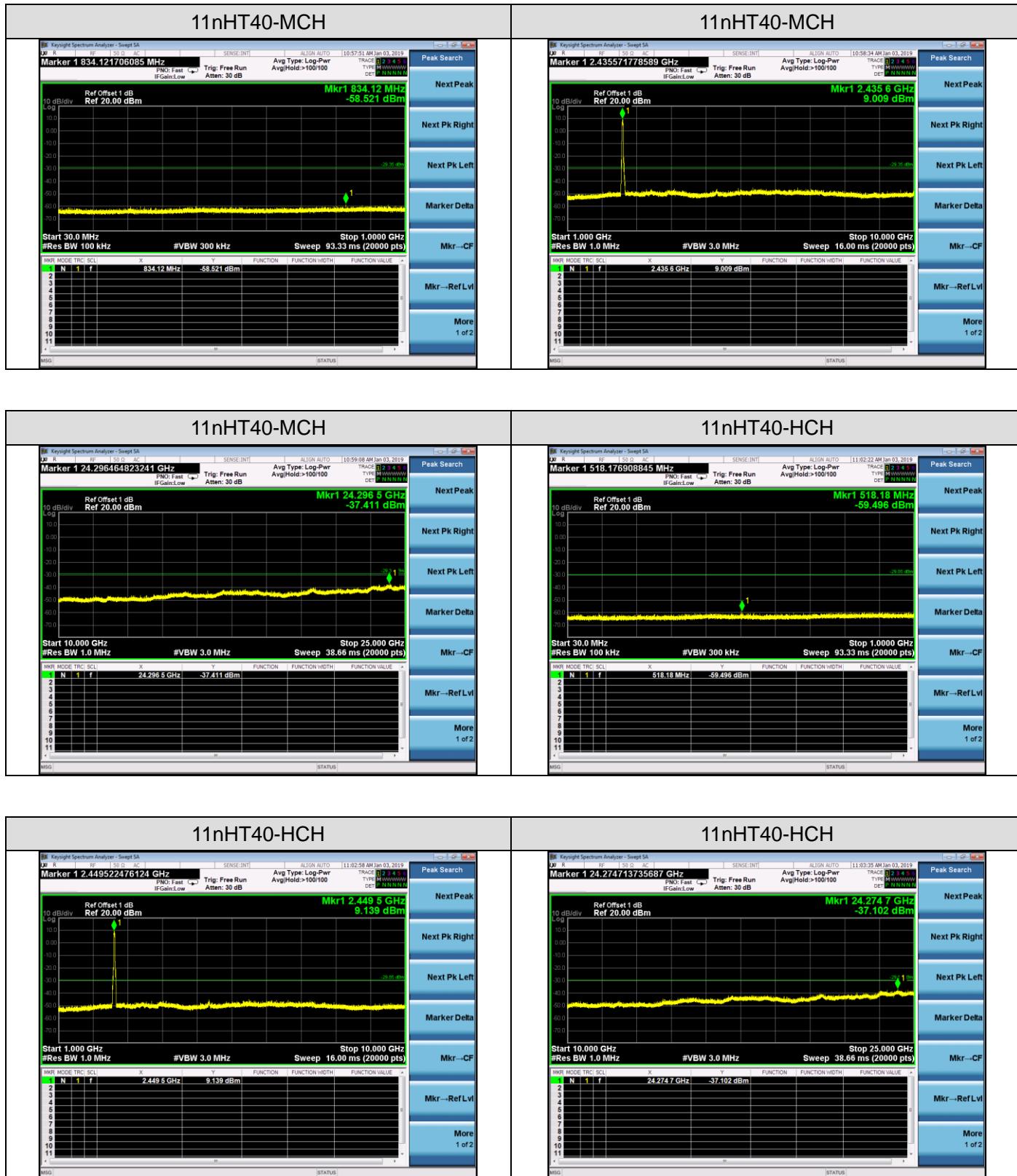














## 10. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY

### 10.1 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.

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

Refer To Section 8.2.

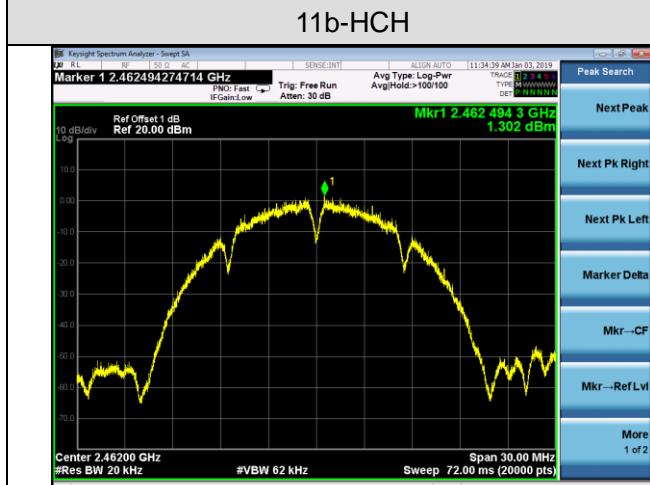
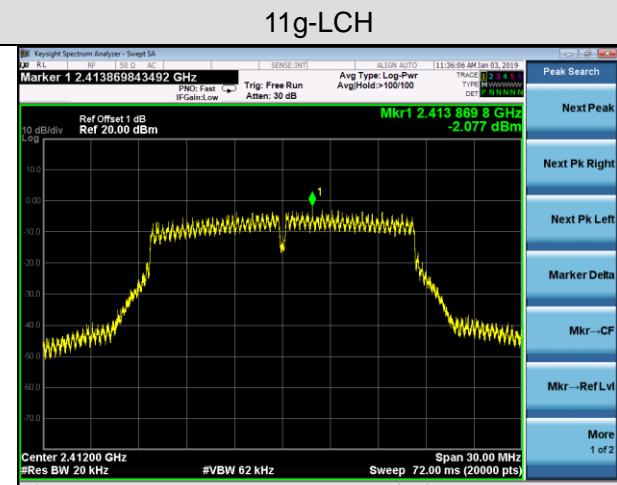
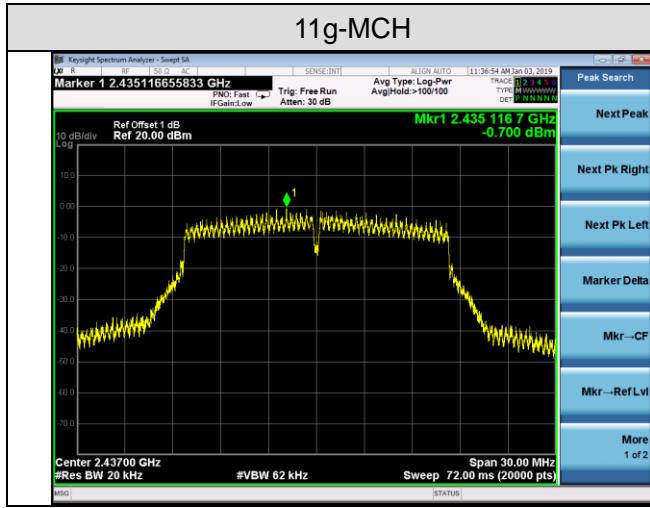
### 10.3 MEASUREMENT EQUIPMENT USED

Refer To Section 6.



#### 10.4 LIMITS AND MEASUREMENT RESULT

Mode	Channel	PSD [dBm/20kHz]	Limit[dBm/3kHz]	Verdict
11b	LCH	0.678	8	PASS
	MCH	2.659	8	PASS
	HCH	1.302	8	PASS
11g	LCH	-2.077	8	PASS
	MCH	-0.700	8	PASS
	HCH	-1.000	8	PASS
11nHT20	LCH	-2.892	8	PASS
	MCH	-1.436	8	PASS
	HCH	-1.398	8	PASS
11NHT40	LCH	-4.251	8	PASS
	MCH	-3.064	8	PASS
	HCH	-4.126	8	PASS

**Test Graph****11b-LCH****11b-MCH****11b-HCH****11g-LCH****11g-MCH****11g-HCH**