



**CFR 47 FCC PART 15 SUBPART C  
ISED RSS-247 ISSUE 2**

**CERTIFICATION TEST REPORT**

*For*

**Kami Secure Home Hub**

**MODEL NUMBER: YNS.1018**

**PROJECT NUMBER: 4788825511**

**REPORT NUMBER: 4788825511-1**

**FCC ID: 2AFIB-YNS1018**

**IC: 20436-YNS1018**

**ISSUE DATE: Mar. 6, 2019**

*Prepared for*

**Shanghai Xiaoyi Technology Co., Ltd.**

*Prepared by*

**UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch  
Building 10, Innovation Technology Park, No. 1, Li Bin Road, Song Shan Lake  
Hi-Tech Development Zone Dongguan, People's Republic of China**

**Tel: +86 769 22038881**

**Fax: +86 769 33244054**

**Website: [www.ul.com](http://www.ul.com)**

Revision History

Rev.	Issue Date	Revisions	Revised By
V0	03/06/2019	Initial Issue	

Summary of Test Results			
Clause	Test Items	FCC/IC Rules	Test Results
1	6dB Bandwidth and 99% Occupied Bandwidth	FCC Part 15.247 (a) (2) RSS-247 Clause 5.2 (a) ISED RSS-Gen Clause 6.7	Pass
2	Peak Conducted Output Power	FCC Part 15.247 (b) (3) RSS-247 Clause 5.4 (d)	Pass
3	Power Spectral Density	FCC Part 15.247 (e) RSS-247 Clause 5.2 (b)	Pass
4	Conducted Bandedge and Spurious Emission	FCC Part 15.247 (d) RSS-247 Clause 5.5	Pass
5	Radiated Bandedge and Spurious Emission	FCC Part 15.247 (d) FCC Part 15.209 FCC Part 15.205 RSS-247 Clause 5.5 RSS-GEN Clause 8.9&8.10	Pass
6	Conducted Emission Test For AC Power Port	FCC Part 15.207 RSS-GEN Clause 8.8	Pass
7	Antenna Requirement	FCC Part 15.203 RSS-GEN Clause 6.8	Pass
Remark: 1) The measurement result for the sample received is <Pass> according to < CFR 47 FCC PART 15 SUBPART C, ISED RSS-GEN Issue 5 and ISED RSS-247 Issue 2> when <Accuracy Method> decision rule is applied.			

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## 1. ATTESTATION OF TEST RESULTS

### Applicant Information

Company Name: Shanghai Xiaoyi Technology Co., Ltd.  
Address: 6F, Building E, No. 2889, Jinke Road Shanghai, China

### Manufacturer Information

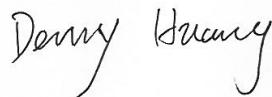
Company Name: Shanghai Xiaoyi Technology Co., Ltd.  
Address: 6F, Building E, No. 2889, Jinke Road Shanghai, China

### EUT Description

Product Name Kami Secure Home Hub  
Model Name YNS.1018  
Sample Number 2008942  
Data of Receipt Sample January 7, 2019  
Date Tested Jan. 7~ Mar. 4, 2019

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 FCC PART 15 SUBPART C	PASS
ISED RSS-247 Issue 2	PASS
ISED RSS-GEN Issue 5	PASS

Tested By:



Denny Huang  
Engineer Project Associate  
Approved By:



Stephen Guo  
Laboratory Manager

Check By:



Shawn Wen  
Laboratory Leader

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with KDB 558074 D01 DTS Meas Guidance v05, KDB 414788 D01 Radiated Test Site v01r01, KDB 662911 D01 Multiple Transmitter Output v02r01, CFR 47 FCC Part 2, CFR 47 FCC Part 15, ANSI C63.10-2013, ISED RSS-247 Issue 2 and ISED RSS-GEN Issue 5.

## 3. FACILITIES AND ACCREDITATION

Accreditation Certificate	<p><b>A2LA (Certificate No.: 4102.01)</b> UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA.</p> <p><b>FCC (FCC Designation No.: CN1187)</b> UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules</p> <p><b>IC(Company No.: 21320)</b> UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with ISED. The Company Number is 21320.</p> <p><b>VCCI (Registration No.: G-20019, R-20004, C-20012 and T-20011)</b> UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793.</p> <p>Facility Name: Chamber D, the VCCI registration No. is G-20019 and R-20004 Shielding Room B , the VCCI registration No. is C-20012 and T-20011</p>
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Note 1: All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China

Note 2 : For below 30MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. These measurements below 30MHz had been correlated to measurements performed on an OATS.

Note 3 : The test anechoic chamber in UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognize national standards.

### 4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty
Conduction emission	3.62dB
Radiation Emission test(include Fundamental emission) (9KHz-30MHz)	2.2dB
Radiation Emission test(include Fundamental emission) (30MHz-1GHz)	4.00dB
Radiation Emission test (1GHz to 26GHz)( include Fundamental emission)	5.78dB (1GHz-18Gz) 5.23dB (18GHz-26Gz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

Product Name:	Kami Secure Home Hub	
Model No.:	YNS.1018	
Operating Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz IEEE 802.11n(HT40): 2422MHz to 2452MHz	
Type of Modulation:	IEEE for 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE for 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n (HT20 & HT40): OFDM (64QAM, 16QAM, QPSK, BPSK)	
Channel Number:	IEEE 802.11b/g, IEEE 802.11n(HT20): 11 Channels IEEE 802.11n(HT40): 7 Channels	
Channels Step:	Channels with 5MHz step	
Sample Type:	Fixed production	
Test power grade:	0A	
Test software of EUT:	QA Tool (manufacturer declare)	
Antenna Type:	Internal Antenna	
Antenna Gain:	1.91dBi	
Power Supply	Adapter	Model: A8-501000 INPUT:100-240V~,50/60Hz, 0.2 Max OUTPUT:5V <input type="checkbox"/> 1A

### 5.2. MAXIMUM OUTPUT POWER

Frequency Range (MHz)	Number of Transmit Chains (NTX)	IEE Std. 802.11	Channel Number	Max PK Conducted Power-Antenna 1 (dBm)
2412-2462	1	IEEE 802.11B	1-11[11]	15.81
2412-2462	1	IEEE 802.11G	1-11[11]	21.68
2412-2462	1	IEEE 802.11nHT20	1-11[11]	21.40
2422-2452	1	IEEE 802.11nHT40	3-9[7]	19.88

### 5.3. CHANNEL LIST

Channel List for 802.11b/g/n (20 MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	4	2427	7	2442	10	2457
2	2417	5	2432	8	2447	11	2462
3	2422	6	2437	9	2452	/	/

Channel List for 802.11n (40 MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	5	2432	7	2442	9	2452
4	2427	6	2437	8	2447		

### 5.4. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel	Frequency
WIFI TX (802.11b)	CH 1, CH 6, CH 11	2412MHz, 2437MHz, 2462MHz
WIFI TX (802.11g)	CH 1, CH 6, CH 11	2412MHz, 2437MHz, 2462MHz
WIFI TX (802.11n HT20)	CH 1, CH 6, CH 11	2412MHz, 2437MHz, 2462MHz
WIFI TX (802.11n HT40)	CH 3, CH 6, CH 9	2422MHz, 2437MHz, 2452MHz

## 5.5. THE WORSE CASE CONFIGURATIONS

The Worse Case Power Setting Parameter under 2400 ~ 2483.5MHz Band							
Test Software		cart					
Modulation Mode	Transmit Antenna Number	Test Channel					
		NCB: 20MHz			NCB: 40MHz		
		CH 1	CH 6	CH 11	CH 3	CH 6	CH 9
802.11b	1	0A	0A	0A	N/A		
802.11g	1	0A	0A	0A			
802.11n HT20	1	0A	0A	0A			
802.11n HT40	1	N/A			0A	0A	0A

## 5.6. DESCRIPTION OF AVAILABLE ANTENNAS

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	2400-2483.5	Internal Antenna	1.91

Test Mode	Transmit and Receive Mode	Description
IEEE 802.11b	<input checked="" type="checkbox"/> 1TX, 1RX	Antenna1 can be used as transmitting/receiving antenna.
IEEE 802.11g	<input checked="" type="checkbox"/> 1TX, 1RX	Antenna1 can be used as transmitting/receiving antenna.
IEEE 802.11N (HT20) SISO	<input checked="" type="checkbox"/> 1TX, 1RX	Antenna1 can be used as transmitting/receiving antenna.
IEEE 802.11N (HT40) SISO	<input checked="" type="checkbox"/> 1TX, 1RX	Antenna1 can be used as transmitting/receiving antenna.

## 5.7. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	FCC ID
1	Laptop	ThinkPad	E550c	N/A

### I/O CABLES

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	LAN	LAN	N/A	2m	N/A

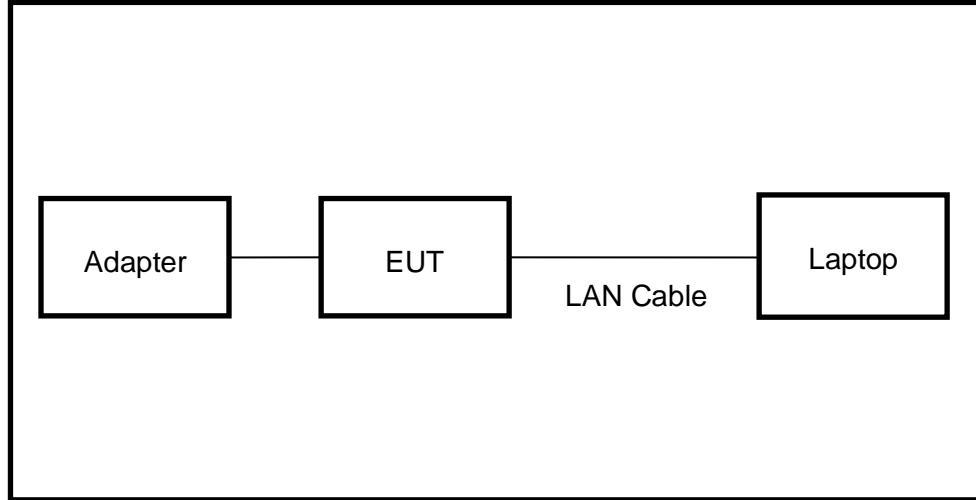
### ACCESSORIES

Item	Accessory	Brand Name	Model Name	Description
1	N/A	N/A	N/A	N/A

### TEST SETUP

The EUT can work in engineering mode with a software through a Laptop.

### SETUP DIAGRAM FOR TESTS





## 6. MEASURING INSTRUMENT AND SOFTWARE USED

Conducted Emissions							
Used	Equipment	Manufacturer	Model No.	Serial No.	Upper Cal.	Last Cal.	Next Cal.
<input checked="" type="checkbox"/>	EMI Test Receiver	R&S	ESR3	101961	Dec.12,2017	Dec. 10, 2018	Dec. 10, 2019
<input checked="" type="checkbox"/>	Two-Line V-Network	R&S	ENV216	101983	Dec.12,2017	Dec. 10, 2018	Dec. 10, 2019
Software							
Used	Description		Manufacturer	Name	Version		
<input checked="" type="checkbox"/>	Test Software for Conducted disturbance		UL	Antenna port	Ver. 7.2		
Radiated Emissions							
Used	Equipment	Manufacturer	Model No.	Serial No.	Upper Cal.	Last Cal.	Next Cal.
<input checked="" type="checkbox"/>	MXE EMI Receiver	KESIGHT	N9038A	MY564000	Dec.12,2017	Dec. 10, 2018	Dec. 10, 2019
<input checked="" type="checkbox"/>	Hybrid Log Periodic Antenna	TDK	HLP-3003C	130960	Jan.09, 2016	Sept. 17, 2018	Sept. 17, 2021
<input checked="" type="checkbox"/>	Preamplifier	HP	8447D	2944A0909	Dec.12,2017	Dec. 10, 2018	Dec. 10, 2019
<input checked="" type="checkbox"/>	EMI Measurement Receiver	R&S	ESR26	101377	Dec.12,2017	Dec. 10, 2018	Dec. 10, 2019
<input checked="" type="checkbox"/>	Horn Antenna	TDK	HRN-0118	130939	Jan. 09, 2016	Sept. 17, 2021	Sept. 17, 2021
<input checked="" type="checkbox"/>	High Gain Horn	Schwarzbe	BBHA-9170	691	Jan.06, 2016	Aug. 11, 2018	Aug. 11, 2019
<input checked="" type="checkbox"/>	Preamplifier	TDK	PA-02-0118	TRS-305-00066	Dec.12,2017	Dec. 10, 2018	Dec. 10, 2019
<input checked="" type="checkbox"/>	Preamplifier	TDK	PA-02-2	TRS-307-00003	Dec.12,2017	Dec. 10, 2018	Dec. 10, 2019
<input checked="" type="checkbox"/>	Loop antenna	Schwarzbe	1519B	00008	Mar. 26,	Mar. 26, 2016	Mar. 26, 2019
Software							
Used	Description		Manufacturer	Name	Version		
<input checked="" type="checkbox"/>	Test Software for Radiated disturbance		Farad	EZ-EMC	Ver. UL-3A1		
Other instruments							
Used	Equipment	Manufacturer	Model No.	Serial No.	Upper Cal.	Last Cal.	Next Cal.
<input checked="" type="checkbox"/>	Spectrum Analyzer	Keysight	N9030A	MY554105 12	Dec.12,2017	Dec.10,2018	Dec.10,2019
<input checked="" type="checkbox"/>	Power Sensor	Keysight	U2021XA	MY570300 04	Dec.12,2017	Dec.10,2018	Dec.10,2019
<input checked="" type="checkbox"/>	Power Meter	Keysight	N1911A	MY554160 24	Dec.12,2017	Dec.11,2018	Dec.10,2019
<input checked="" type="checkbox"/>	High Pass Filter	Wainwright	WHKX10-5850-6500-1800-40SS	4	Dec.12,2017	Dec.11,2018	Dec.10,2019
<input checked="" type="checkbox"/>	Band Reject Filter	Wainwright	WRCJV20-5440-5470-5725-5755-60SS	1	Dec.12,2017	Dec.11,2018	Dec.10,2019

## 7. MEASUREMENT METHODS

No.	Test Item	KDB Name	Section
1	6dB Bandwidth	KDB 558074 D01 DTS Meas Guidance v05	8.2
2	Peak Output Power	KDB 558074 D01 DTS Meas Guidance v05	8.3.1.3/8.3.2.3
3	Power Spectral Density	KDB 558074 D01 DTS Meas Guidance v05	8.4
4	Out-of-band emissions in non-restricted bands	KDB 558074 D01 DTS Meas Guidance v05	8.5
5	Out-of-band emissions in restricted bands	KDB 558074 D01 DTS Meas Guidance v05	8.6
6	Band-edge	KDB 558074 D01 DTS Meas Guidance v05	8.7
7	Conducted Emission Test For AC Power Port	ANSI C63.10-2013	6.2

## 8. ANTENNA PORT TEST RESULTS

### 8.1. ON TIME AND DUTY CYCLE

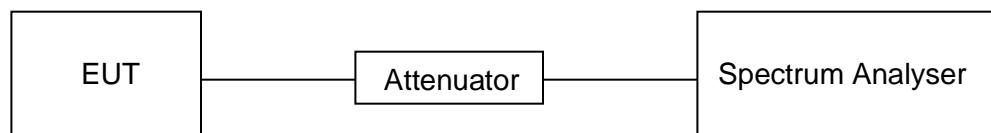
#### LIMITS

None; for reporting purposes only

#### PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method

#### TEST SETUP



#### TEST ENVIRONMENT

Temperature	25°C	Relative Humidity	58 %
Atmosphere Pressure	101 kPa	Test Voltage	AC 120 V

#### RESULTS

Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle	Duty Cycle Correction Factor (db)	1/T Minimum VBW (KHz)
11B	100.3	100.3	1	100%	0	100
11G	100.3	100.3	1	100%	0	100
11N20 SISO	100.3	100.3	1	100%	0	100
11N40 SISO	100.3	100.3	1	100%	0	100

Note: 1) Duty Cycle Correction Factor=10log(1/x).  
2) Where: x is Duty Cycle (Linear)  
3) Where: T is On Time (transmit duration)  
4) Pre-testing all the modes, only the data of worse case is shown in this test report.




**Remark:**

- 1) For the period time=N (the end time of the burst) – F (the start time of the burst)

## 8.2. 6 dB DTS BANDWIDTH AND 99% OCCUPIED BANDWIDTH

### LIMITS

CFR 47 FCC Part15 (15.247) Subpart C ISED RSS-247 ISSUE 2			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247(a)(2) ISED RSS-247 5.2 (a)	6 dB Bandwidth	$\geq 500\text{KHz}$	2400-2483.5
ISED RSS-Gen Clause 6.7	99% Occupied Bandwidth	For reporting purposes only.	2400-2483.5

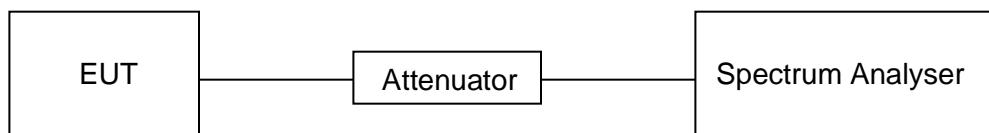
### TEST PROCEDURE

Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	For 6dB Bandwidth :100K For 99% Occupied Bandwidth :1% to 5% of the occupied bandwidth
VBW	For 6dB Bandwidth: $\geq 3 \times \text{RBW}$ For 99% Occupied Bandwidth: approximately $3 \times \text{RBW}$
Trace	Max hold
Sweep	Auto couple

Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB and 99% relative to the maximum level measured in the fundamental emission.

### TEST SETUP



**TEST ENVIRONMENT**

Temperature	25°C	Relative Humidity	58 %
Atmosphere Pressure	101 kPa	Test Voltage	AC 120 V

**RESULTS**

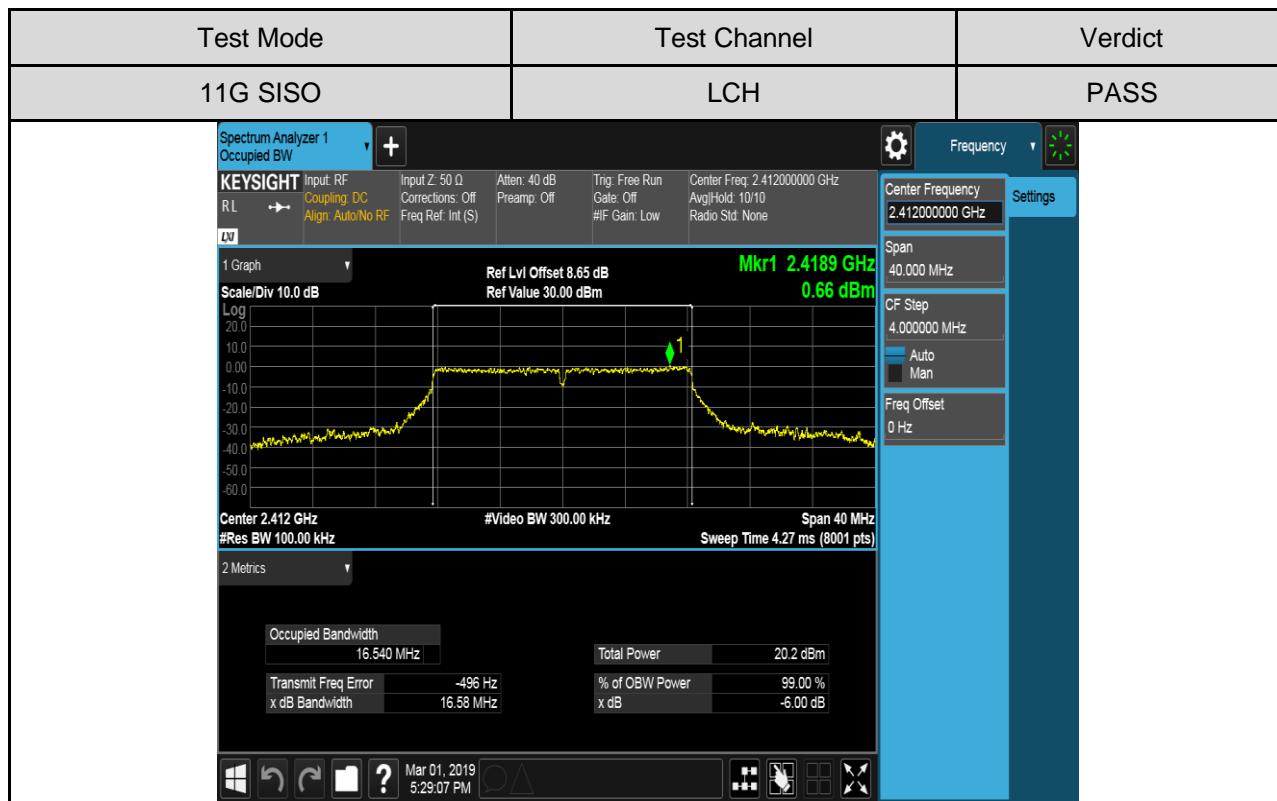
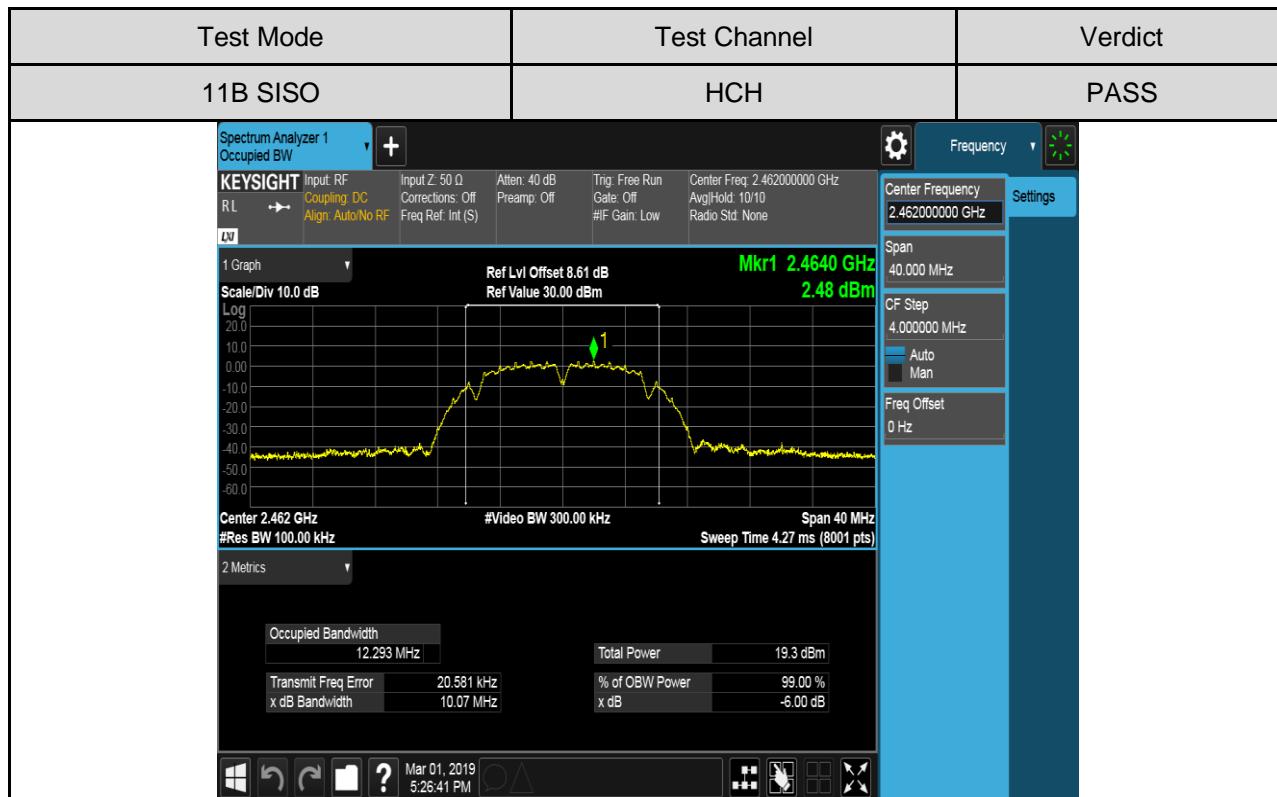
Test Mode	Test Antenna	Test Channel	6dB bandwidth (MHz)	99% bandwidth (MHz)	Result
11B SISO	Antenna 1	LCH	10.08	12.328	Pass
		MCH	10.07	12.270	Pass
		HCH	10.07	12.293	Pass
11G SISO	Antenna 1	LCH	16.58	16.540	Pass
		MCH	16.58	16.513	Pass
		HCH	16.57	16.522	Pass
11N HT 20SISO	Antenna 1	LCH	17.71	17.619	Pass
		MCH	17.72	17.596	Pass
		HCH	17.74	17.608	Pass
11N HT40SISO/SISO	Antenna 1	LCH	36.47	36.194	Pass
		MCH	36.50	36.181	Pass
		HCH	36.51	36.206	Pass

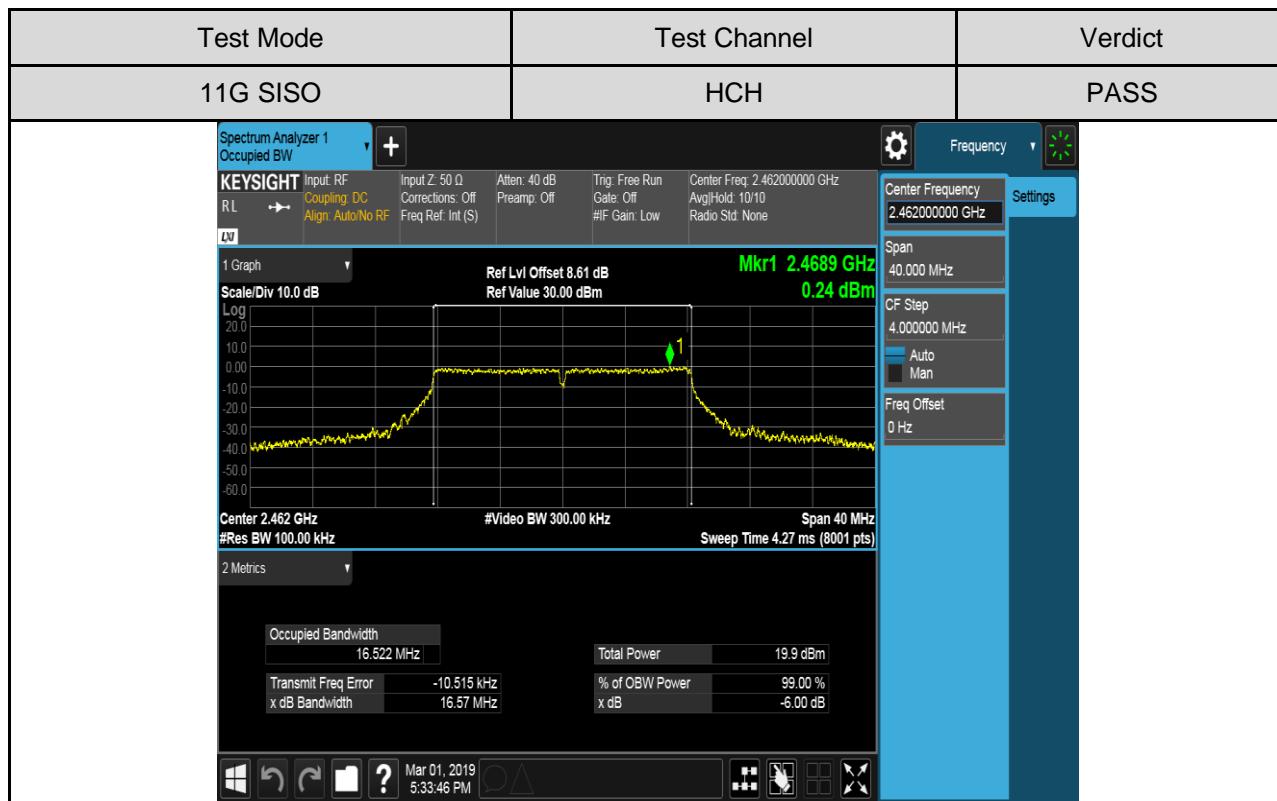
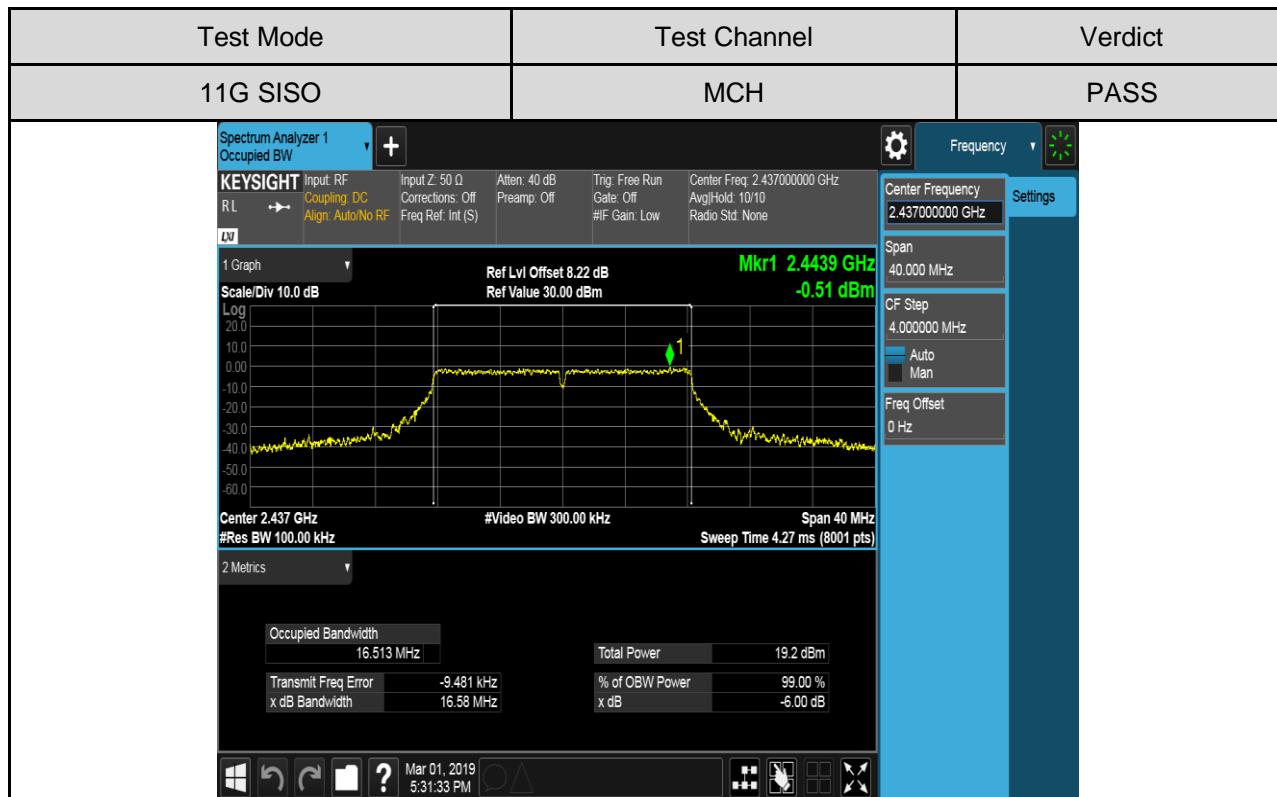
## Test Graphs

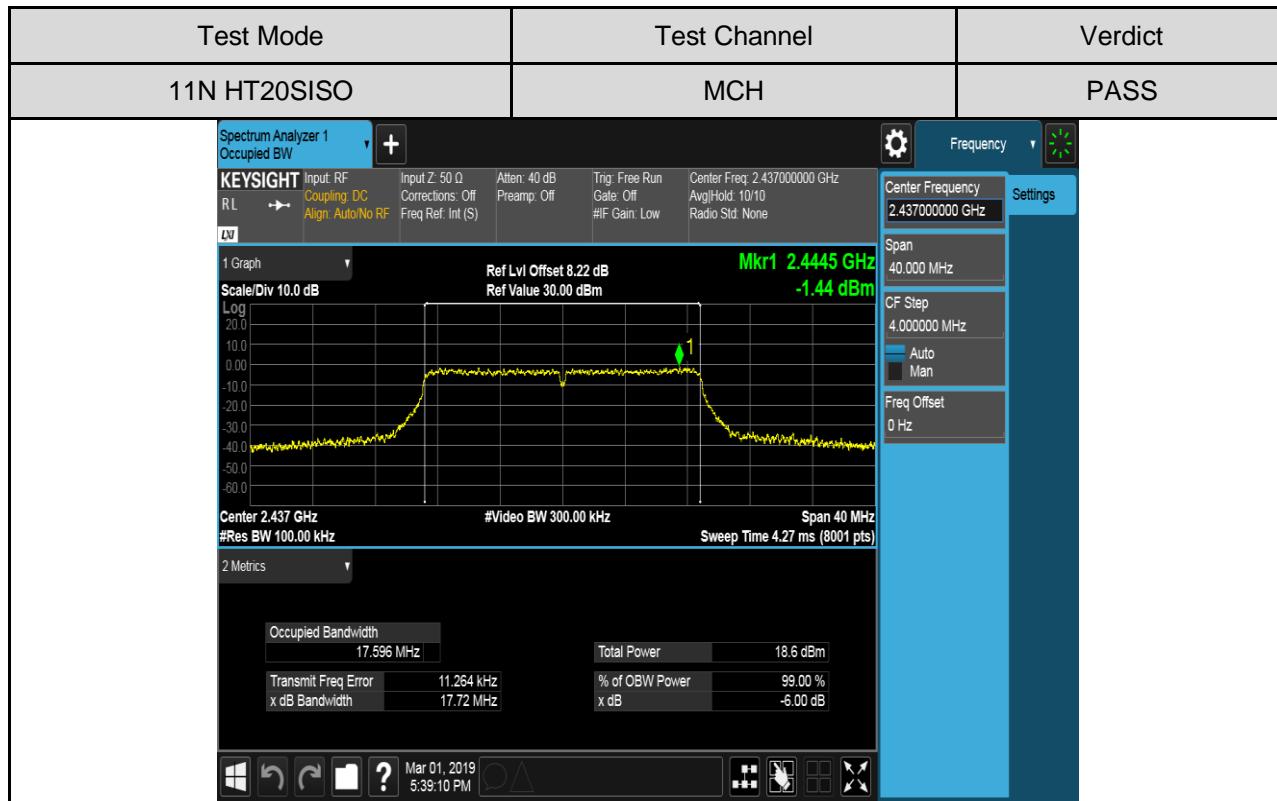
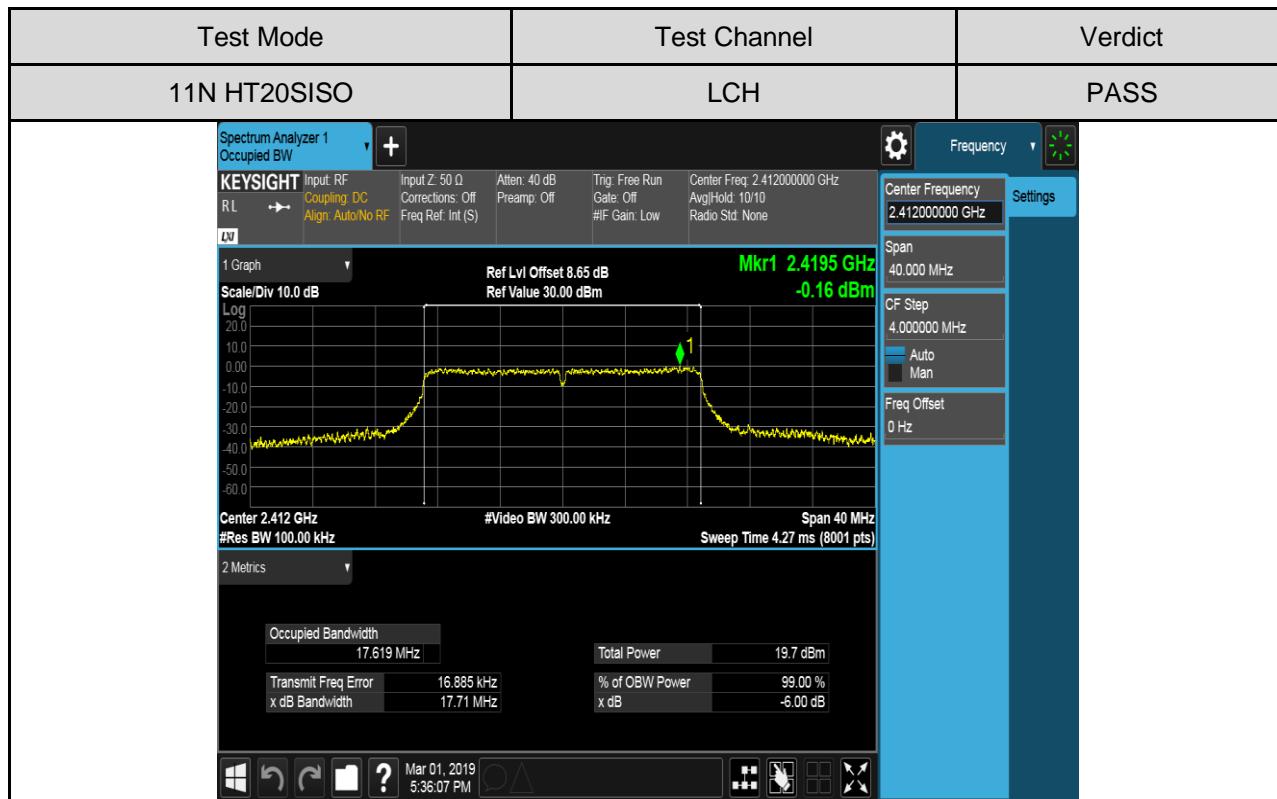
Test Mode	Test Channel	Verdict												
11B SISO	LCH	PASS												
<p><b>Spectrum Analyzer 1</b> Occupied BW</p> <p><b>KEYSIGHT</b> Input: RF Coupling: DC Input Z: 50 Ω Corrections: Off Atten: 40 dB Preamp: Off Trig: Free Run Gate: Off #IF Gain: Low Center Freq: 2.412000000 GHz Avg/Hold: 10/10 Radio Std: None</p> <p>1 Graph Ref Lvl Offset 8.65 dB Ref Value 30.00 dBm Mkr1 2.4140 GHz 2.55 dBm</p> <p>Scale/Div 10.0 dB Log 20.0 10.0 0.0 -10.0 -20.0 -30.0 -40.0 -50.0 -60.0</p> <p>Center 2.412 GHz #Video BW 300.00 kHz Span 40 MHz #Res BW 100.00 kHz Sweep Time 4.27 ms (8001 pts)</p> <p>2 Metrics</p> <table border="1"> <tr><td>Occupied Bandwidth</td><td>12.328 MHz</td></tr> <tr><td>Transmit Freq Error</td><td>25.654 kHz</td></tr> <tr><td>x dB Bandwidth</td><td>10.08 MHz</td></tr> <tr><td>Total Power</td><td>19.4 dBm</td></tr> <tr><td>% of OBW Power</td><td>99.00 %</td></tr> <tr><td>x dB</td><td>-6.00 dB</td></tr> </table> <p>Mar 01, 2019 5:21:31 PM</p>		Occupied Bandwidth	12.328 MHz	Transmit Freq Error	25.654 kHz	x dB Bandwidth	10.08 MHz	Total Power	19.4 dBm	% of OBW Power	99.00 %	x dB	-6.00 dB	
Occupied Bandwidth	12.328 MHz													
Transmit Freq Error	25.654 kHz													
x dB Bandwidth	10.08 MHz													
Total Power	19.4 dBm													
% of OBW Power	99.00 %													
x dB	-6.00 dB													

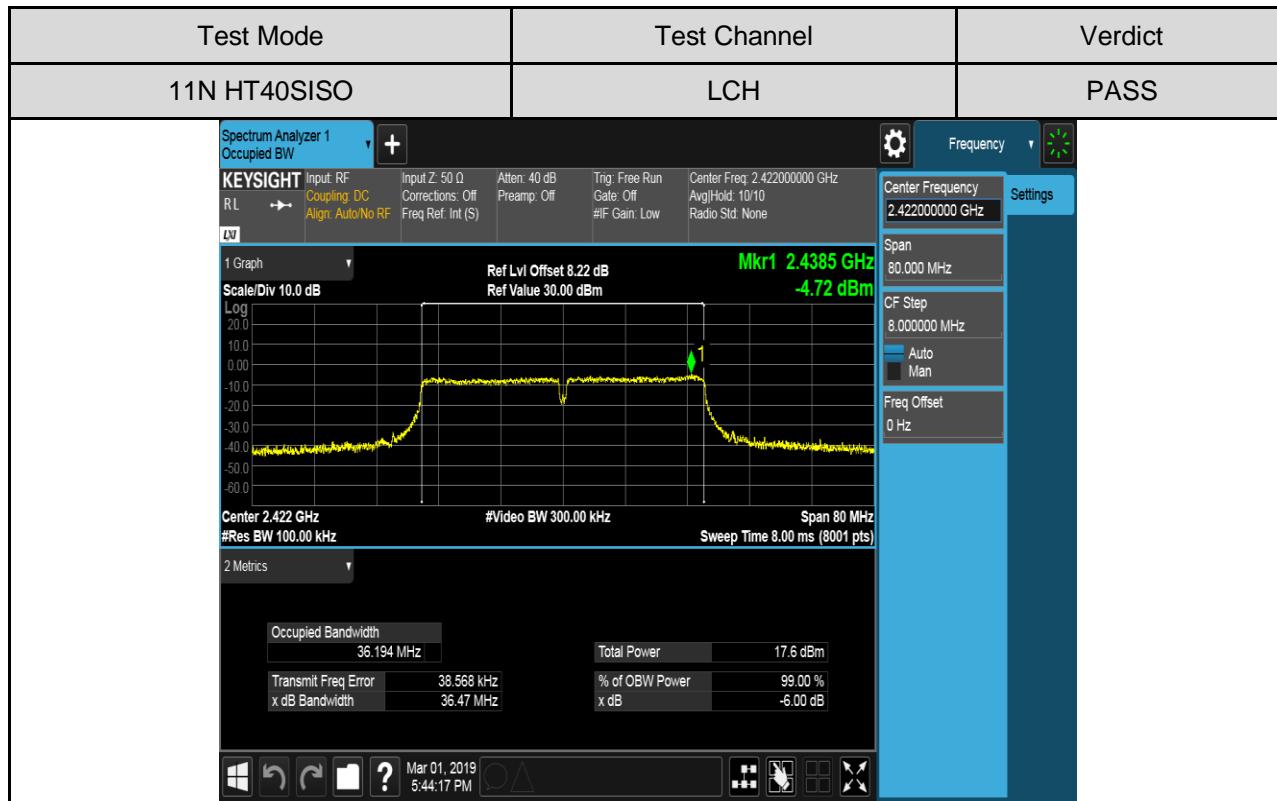
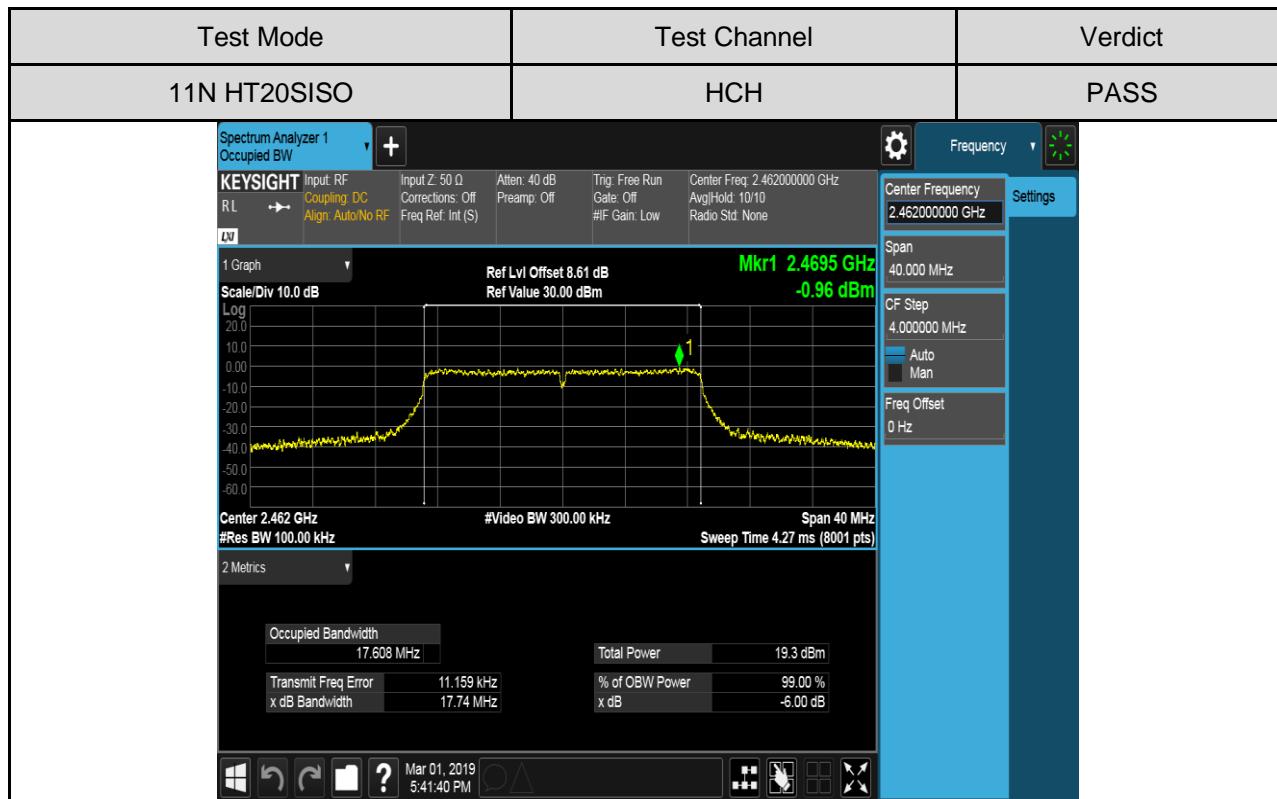
  

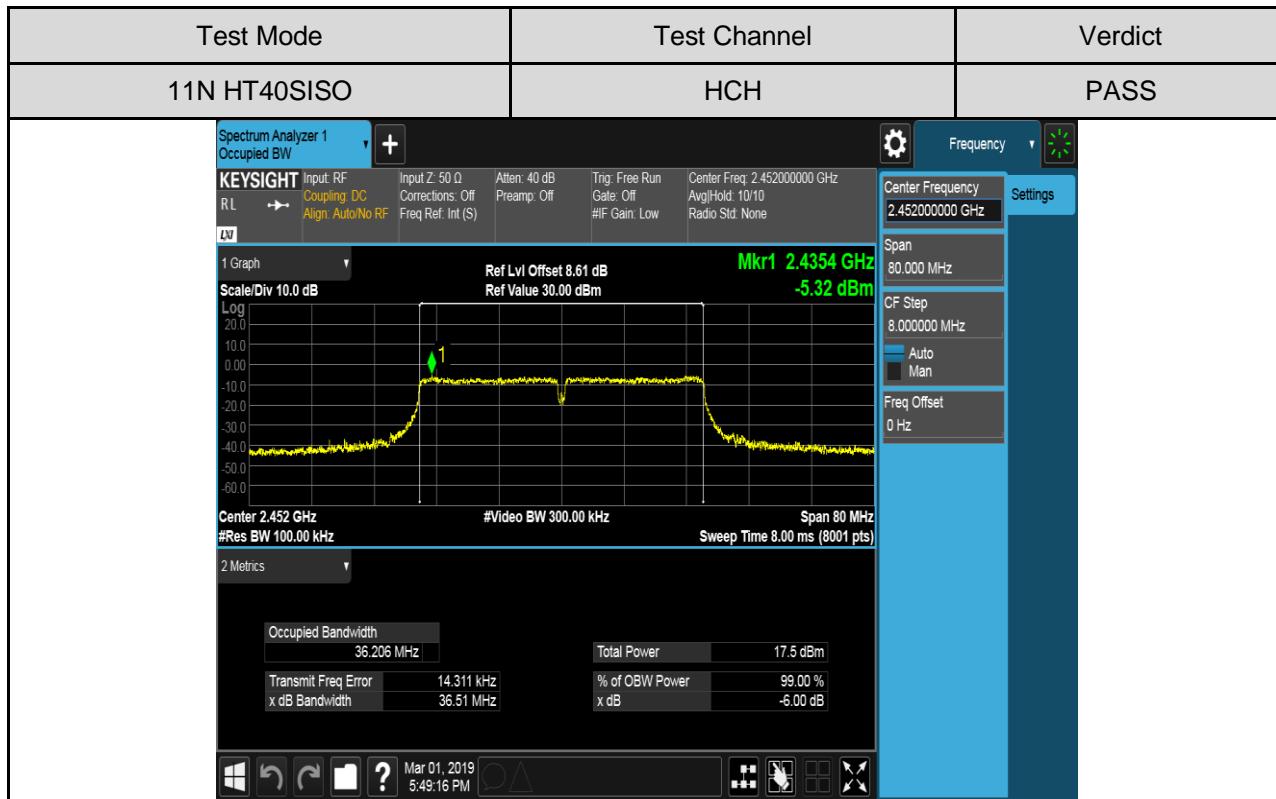
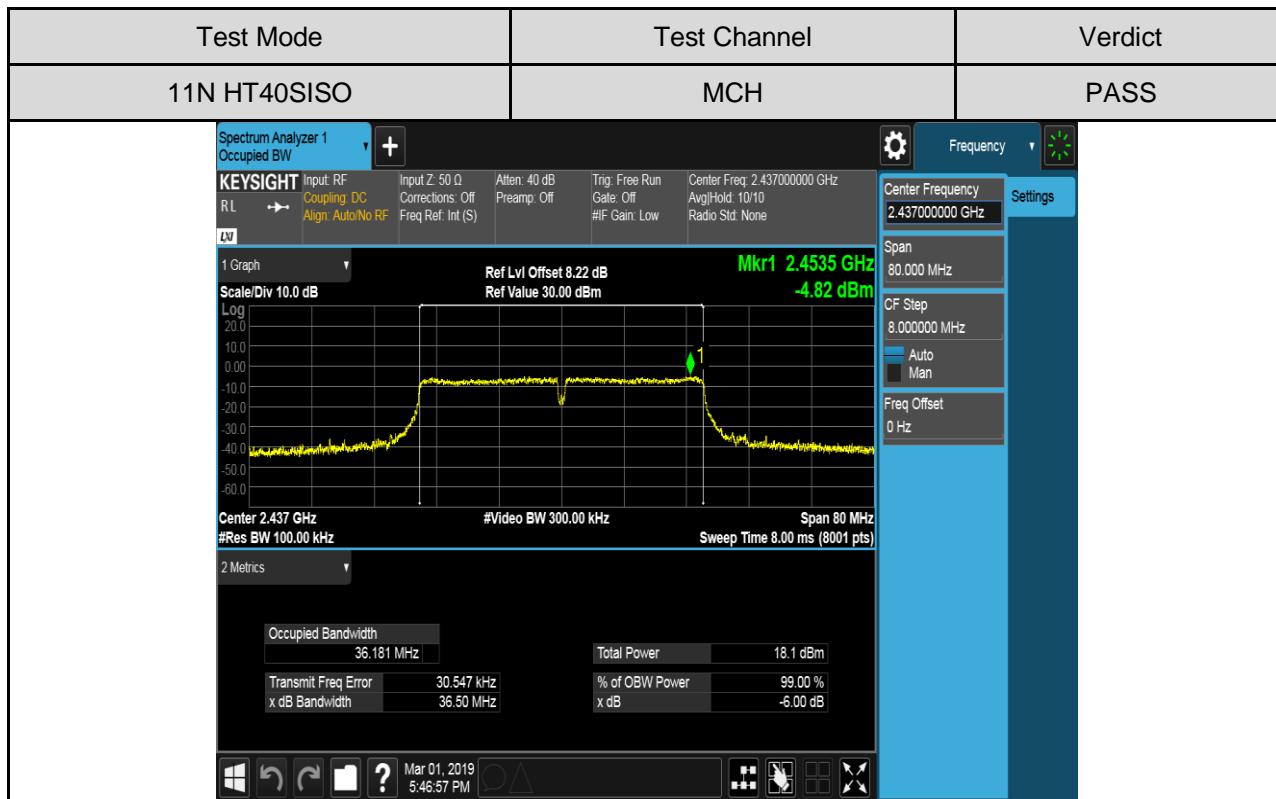
Test Mode	Test Channel	Verdict												
11B SISO	MCH	PASS												
<p><b>Spectrum Analyzer 1</b> Occupied BW</p> <p><b>KEYSIGHT</b> Input: RF Coupling: DC Input Z: 50 Ω Corrections: Off Atten: 40 dB Preamp: Off Trig: Free Run Gate: Off #IF Gain: Low Center Freq: 2.437000000 GHz Avg/Hold: 10/10 Radio Std: None</p> <p>1 Graph Ref Lvl Offset 8.22 dB Ref Value 30.00 dBm Mkr1 2.4370 GHz 1.76 dBm</p> <p>Scale/Div 10.0 dB Log 20.0 10.0 0.0 -10.0 -20.0 -30.0 -40.0 -50.0 -60.0</p> <p>Center 2.437 GHz #Video BW 300.00 kHz Span 40 MHz #Res BW 100.00 kHz Sweep Time 4.27 ms (8001 pts)</p> <p>2 Metrics</p> <table border="1"> <tr><td>Occupied Bandwidth</td><td>12.270 MHz</td></tr> <tr><td>Transmit Freq Error</td><td>18.053 kHz</td></tr> <tr><td>x dB Bandwidth</td><td>10.07 MHz</td></tr> <tr><td>Total Power</td><td>18.6 dBm</td></tr> <tr><td>% of OBW Power</td><td>99.00 %</td></tr> <tr><td>x dB</td><td>-6.00 dB</td></tr> </table> <p>Mar 01, 2019 5:24:27 PM</p>		Occupied Bandwidth	12.270 MHz	Transmit Freq Error	18.053 kHz	x dB Bandwidth	10.07 MHz	Total Power	18.6 dBm	% of OBW Power	99.00 %	x dB	-6.00 dB	
Occupied Bandwidth	12.270 MHz													
Transmit Freq Error	18.053 kHz													
x dB Bandwidth	10.07 MHz													
Total Power	18.6 dBm													
% of OBW Power	99.00 %													
x dB	-6.00 dB													











### 8.3. PEAK CONDUCTED OUTPUT POWER

#### LIMITS

CFR 47 FCC Part15 (15.247) Subpart C ISED RSS-247 ISSUE 2			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247(b)(3) ISED RSS-247 5.4 (e)	Peak Output Power	1 watt or 30dBm (See Note 1/2)	2400-2483.5
1. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. 2. Limit=30dBm – (Directional gain -6) dB Directional gain = $10\log [(10^{G1/20} + 10^{G2/20})^2 / N_{ANT}] = 0 < 6\text{dBi}$ , where the $N_{ANT}$ is the numbers of antenna. So, the power limit shall be still 1 watt or 30dBm			

#### TEST PROCEDURE

Place the EUT on the table and set it in the transmitting mode.

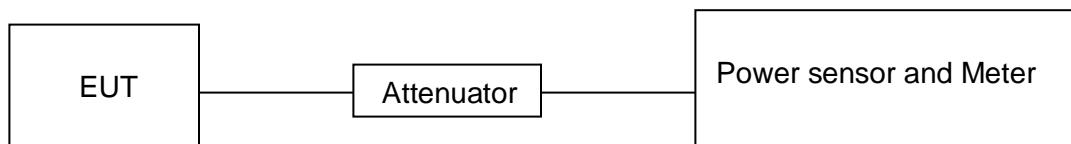
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Power sensor.

Measure peak power each channel.

Peak Detector used for Peak result.

AVG Detector used for AVG result.

#### TEST SETUP



#### TEST ENVIRONMENT

Temperature	25°C	Relative Humidity	58 %
Atmosphere Pressure	101 kPa	Test Voltage	AC 120 V

**RESULTS**

## 1) Maximum Peak Conducted Output Power

Test Mode	Test Antenna	Test Channel	Maximum Peak Conducted Output Power(dBm)	Result
11B	Ant1	LCH	15.81	Pass
		MCH	14.96	Pass
		HCH	15.72	Pass
11G	Ant	LCH	21.68	Pass
		MCH	20.68	Pass
		HCH	21.43	Pass
11N20SISO	Ant1	LCH	21.4	Pass
		MCH	20.34	Pass
		HCH	21.07	Pass
11N40SISO	Ant1	LCH	19.41	Pass
		MCH	19.88	Pass
		HCH	19.31	Pass

## 2) Maximum Average Conducted Output Power

Test Mode	Test Antenna	Test Channel	Maximum Average Conducted Output Power(dBm)	Result
11B	Ant 1	LCH	13.17	Pass
		MCH	12.52	Pass
		HCH	13.46	Pass
11G	Ant 1	LCH	13.88	Pass
		MCH	13.14	Pass
		HCH	14.01	Pass
11N20SISO	Ant 1	LCH	13.35	Pass
		MCH	12.65	Pass
		HCH	13.45	Pass
11N40SISO	Ant 1	LCH	12.02	Pass
		MCH	12.64	Pass
		HCH	11.92	Pass

## 8.4. POWER SPECTRAL DENSITY

### LIMITS

CFR 47 FCC Part15 (15.247) Subpart C ISED RSS-247 ISSUE 2			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC §15.247 (e) ISED RSS-247 5.2 (b)	Power Spectral Density	8 dBm/3 kHz (See Note 1/2)	2400-2483.5

1. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

2. Limit=8dBm – (Directional gain -6) dBi

Directional gain =  $10\log [(10G1/20GANT + 10 \log (N_{ANT}) \text{ dBi, where } N_{ANT} \text{ is the number of outputs, } G_{ANT} \text{ is the Antenna gain.}]$

Directional gain =  $10\log [(10^{G1/20} + 10^{G2/20})^2/N_{ANT}] = 0 < 6 \text{ dBi, where the } N_{ANT} \text{ is the numbers of antenna. So, the power density limit shall be still 8 dBm in any 3KHz band.}]$

### TEST PROCEDURE

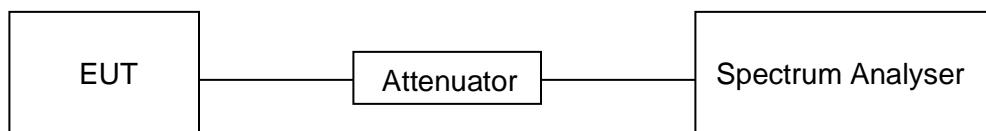
Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	$3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
VBW	$\geq 3 \times \text{RBW}$
Span	$1.5 \times \text{DTS bandwidth}$
Trace	Max hold
Sweep time	Auto couple.

Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

### TEST SETUP



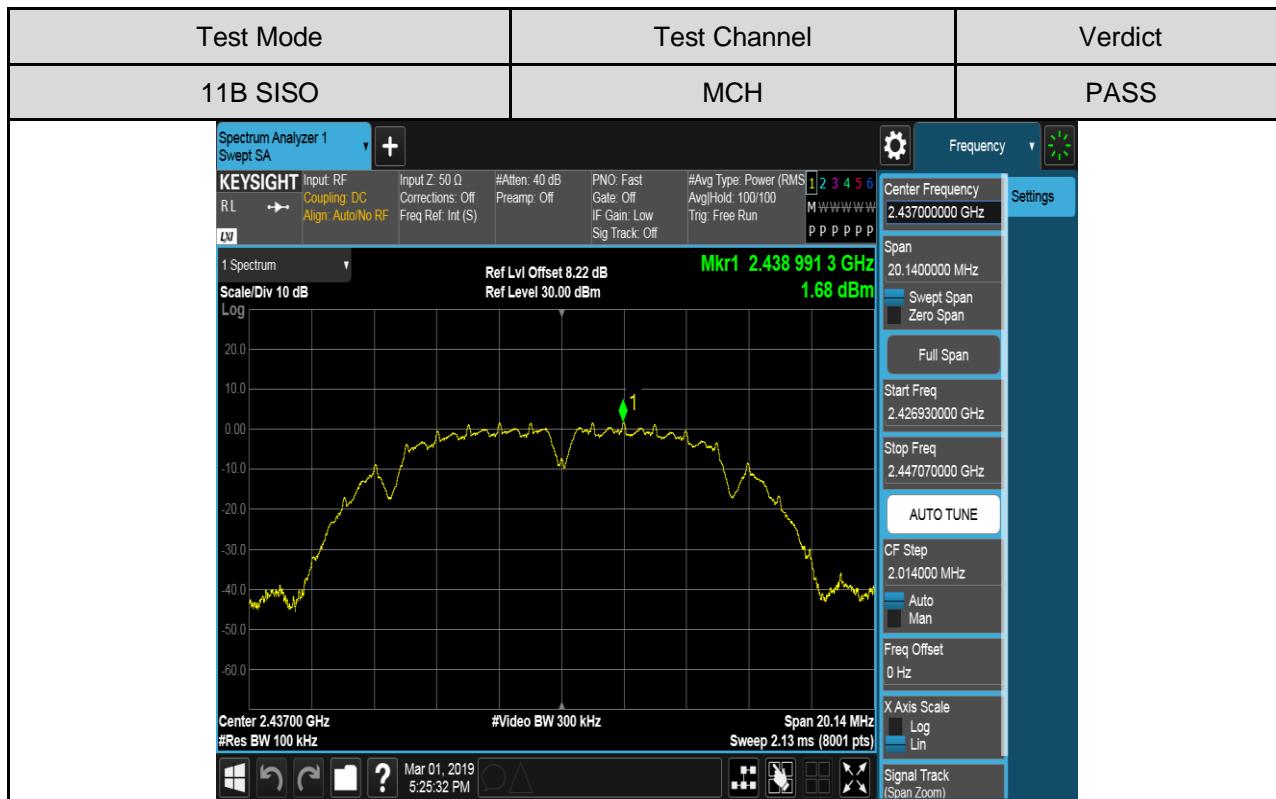
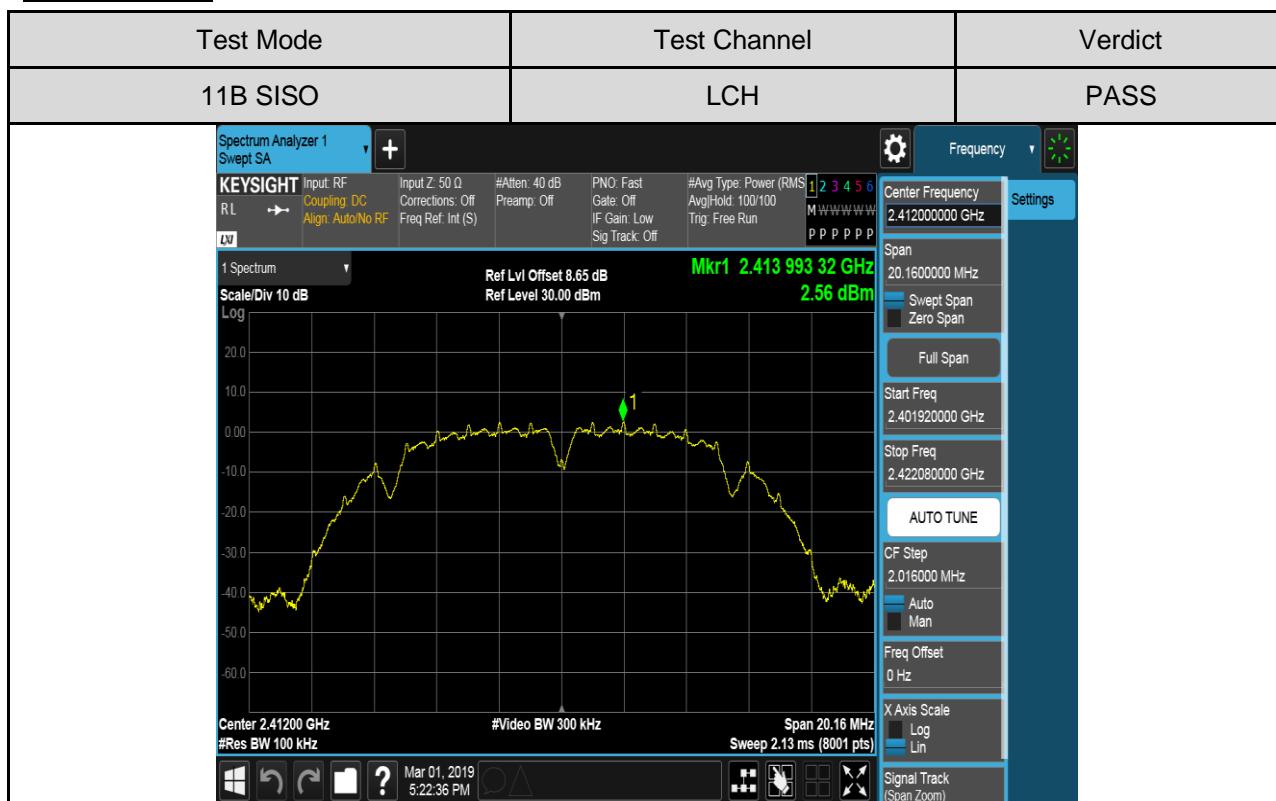
**TEST ENVIRONMENT**

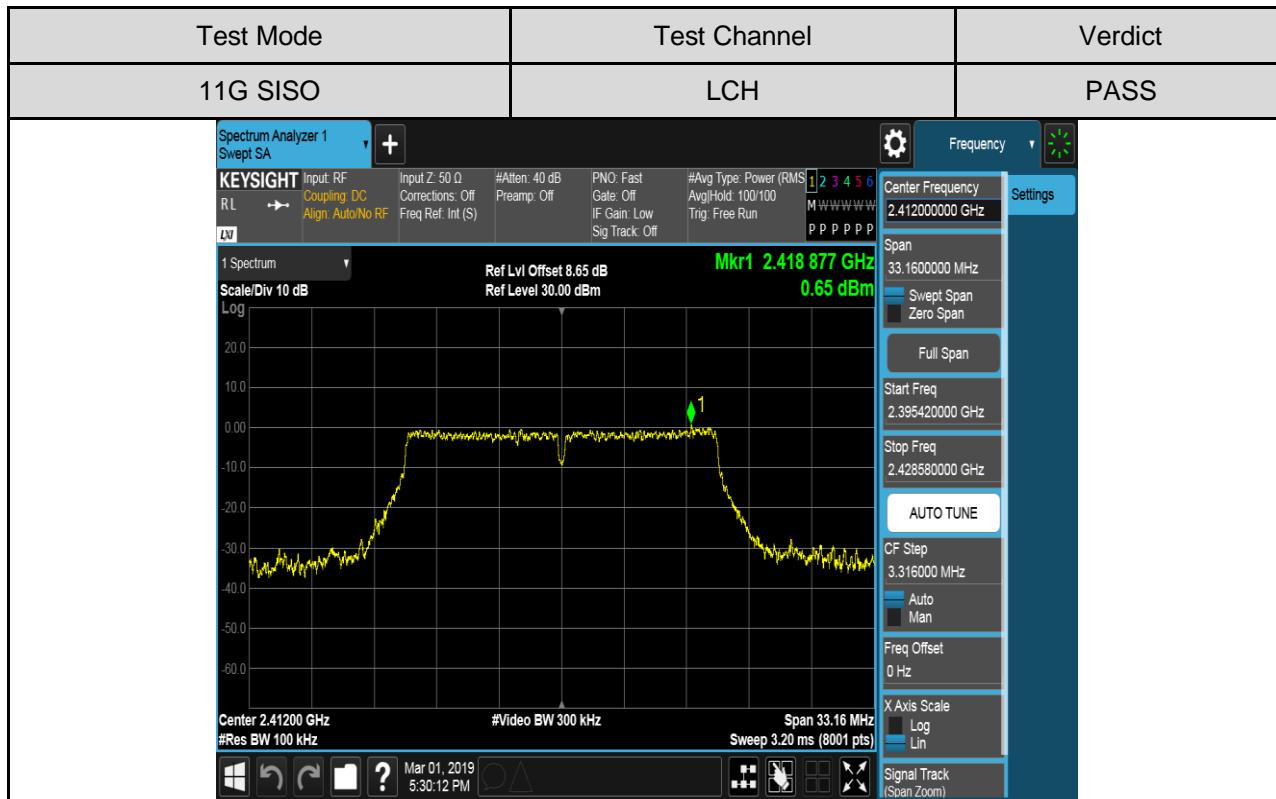
Temperature	25°C	Relative Humidity	58 %
Atmosphere Pressure	101 kPa	Test Voltage	AC 120 V

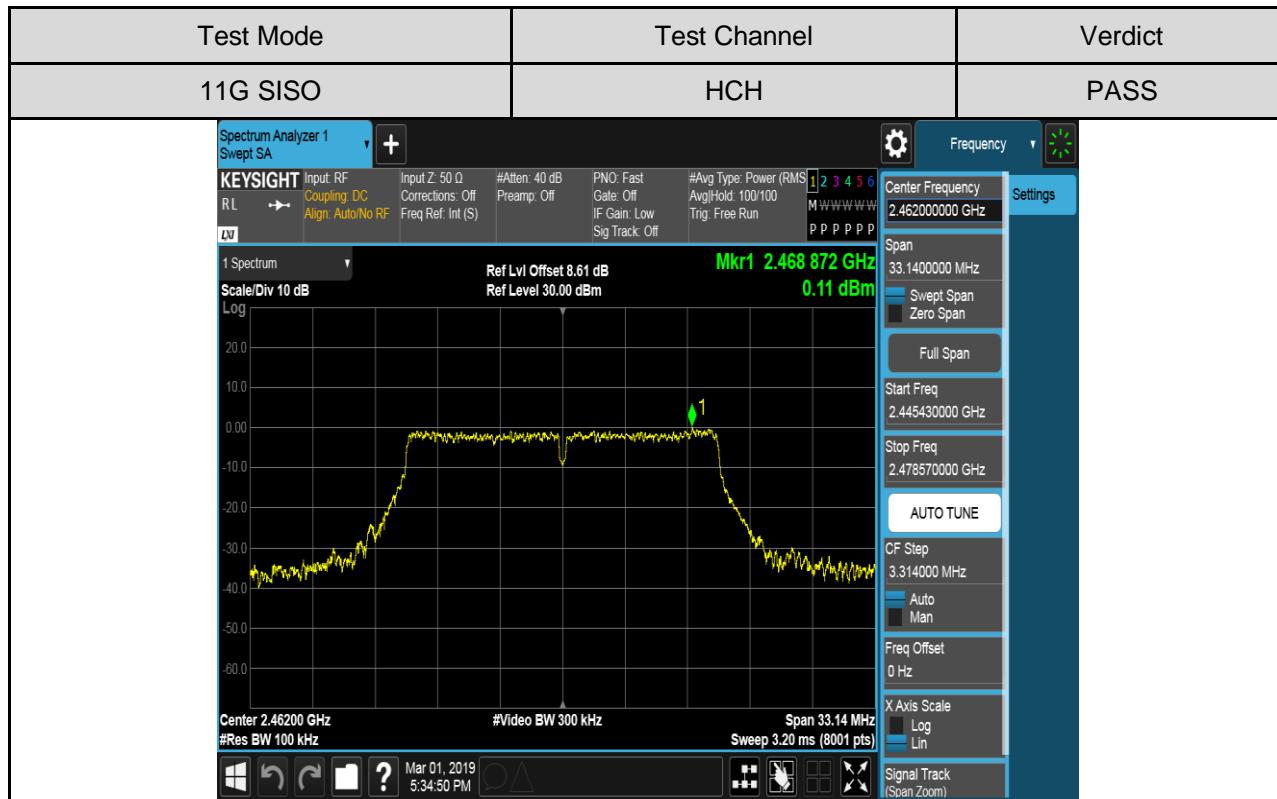
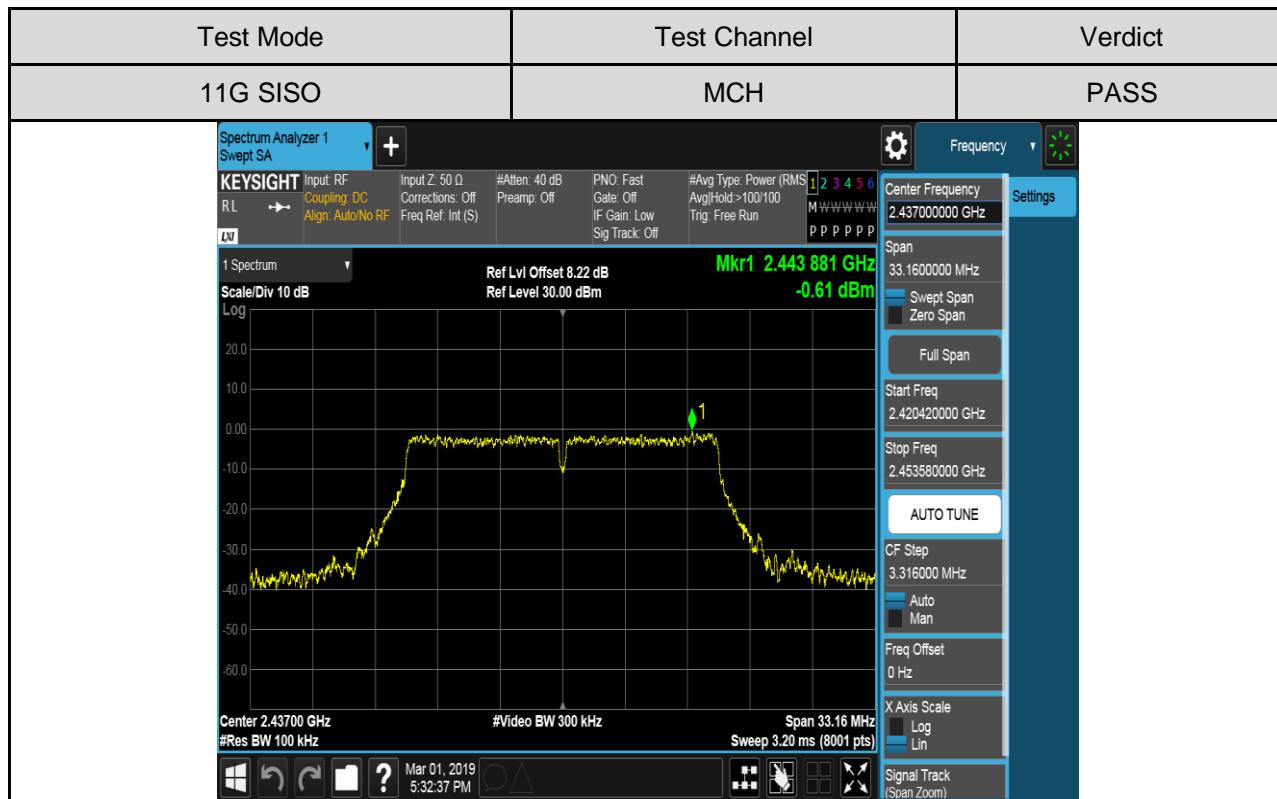
**RESULTS TABLE**

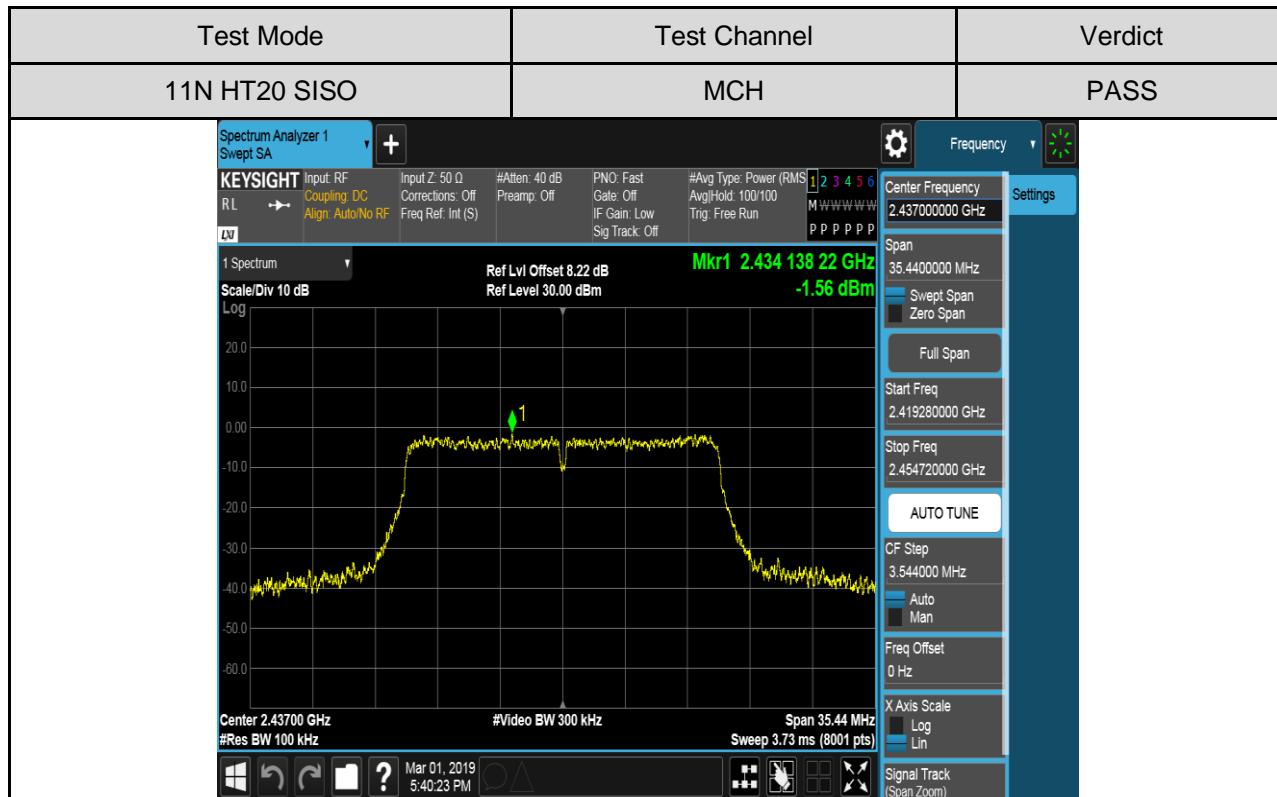
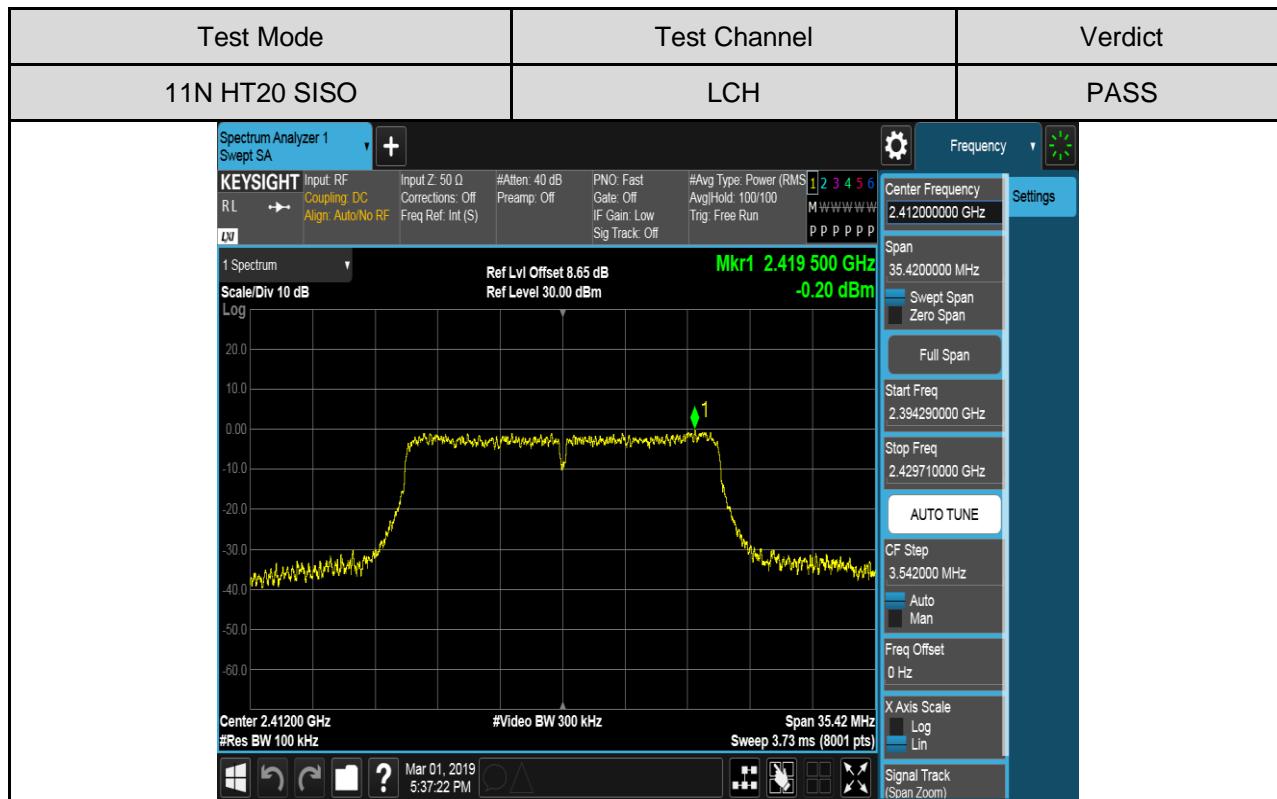
Test Mode	Test Antenna	Test Channel	Maximum Peak power spectral density (dBm/100K)	Result
11B	Antenna 1	LCH	2.56	Pass
		MCH	1.68	Pass
		HCH	2.47	Pass
11G	Antenna 1	LCH	0.65	Pass
		MCH	-0.61	Pass
		HCH	0.11	Pass
11N HT20	Antenna 1	LCH	-0.20	Pass
		MCH	-1.56	Pass
		HCH	-0.69	Pass
11N40SISO	Antenna 1	LCH	-4.85	Pass
		MCH	-4.99	Pass
		HCH	-5.58	Pass

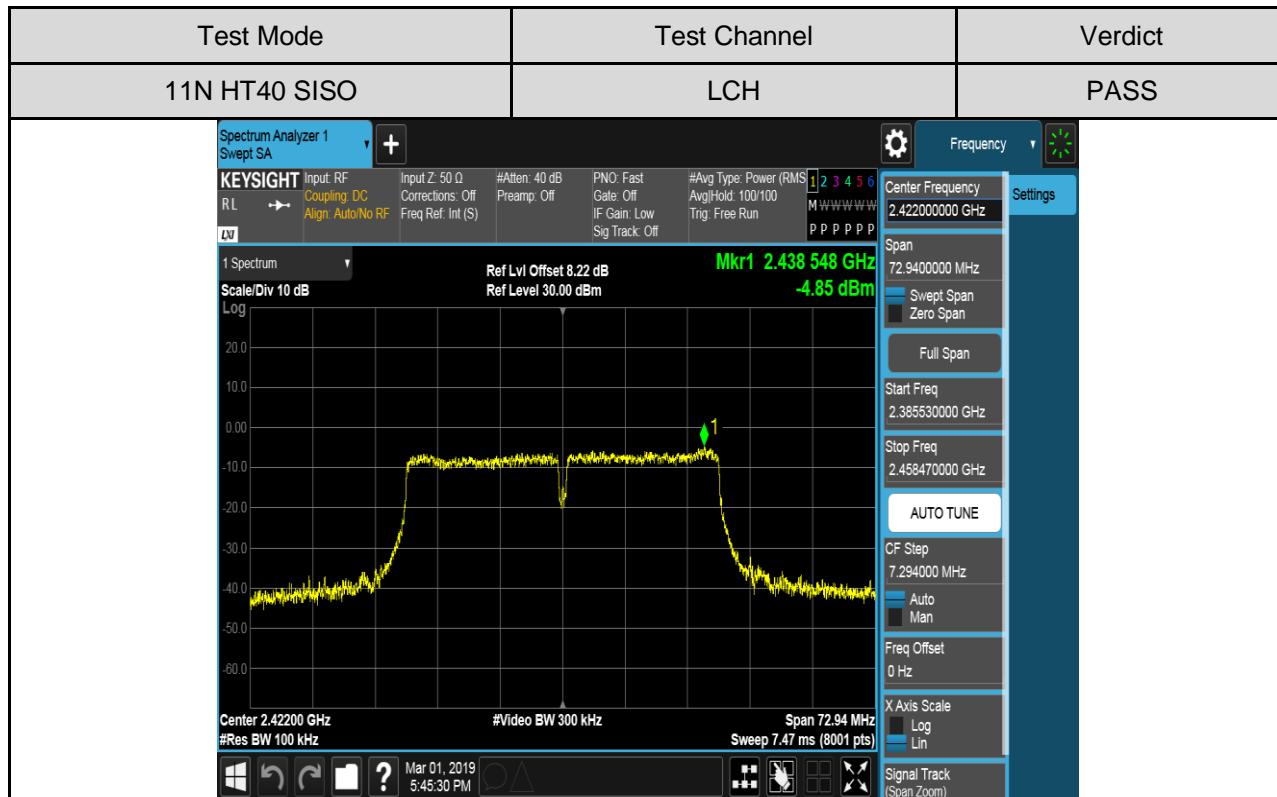
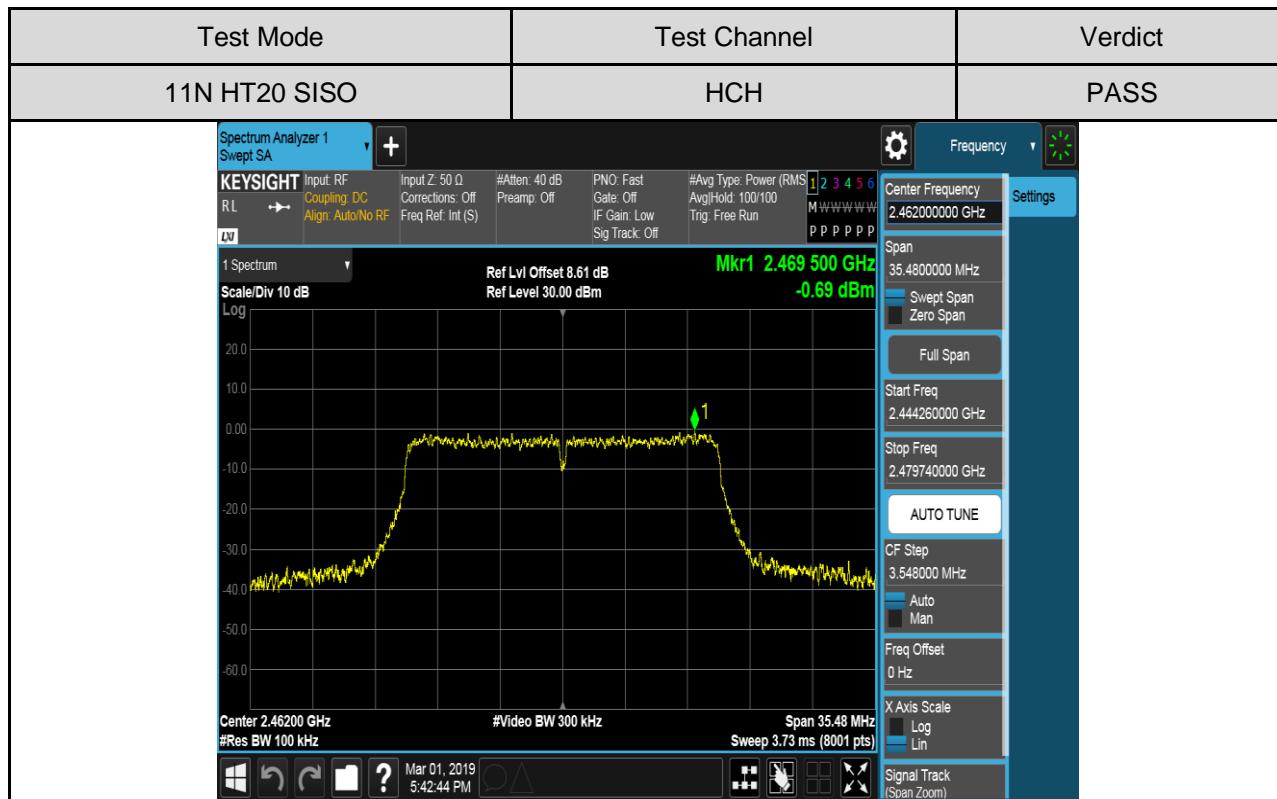
## TEST GRAPHS

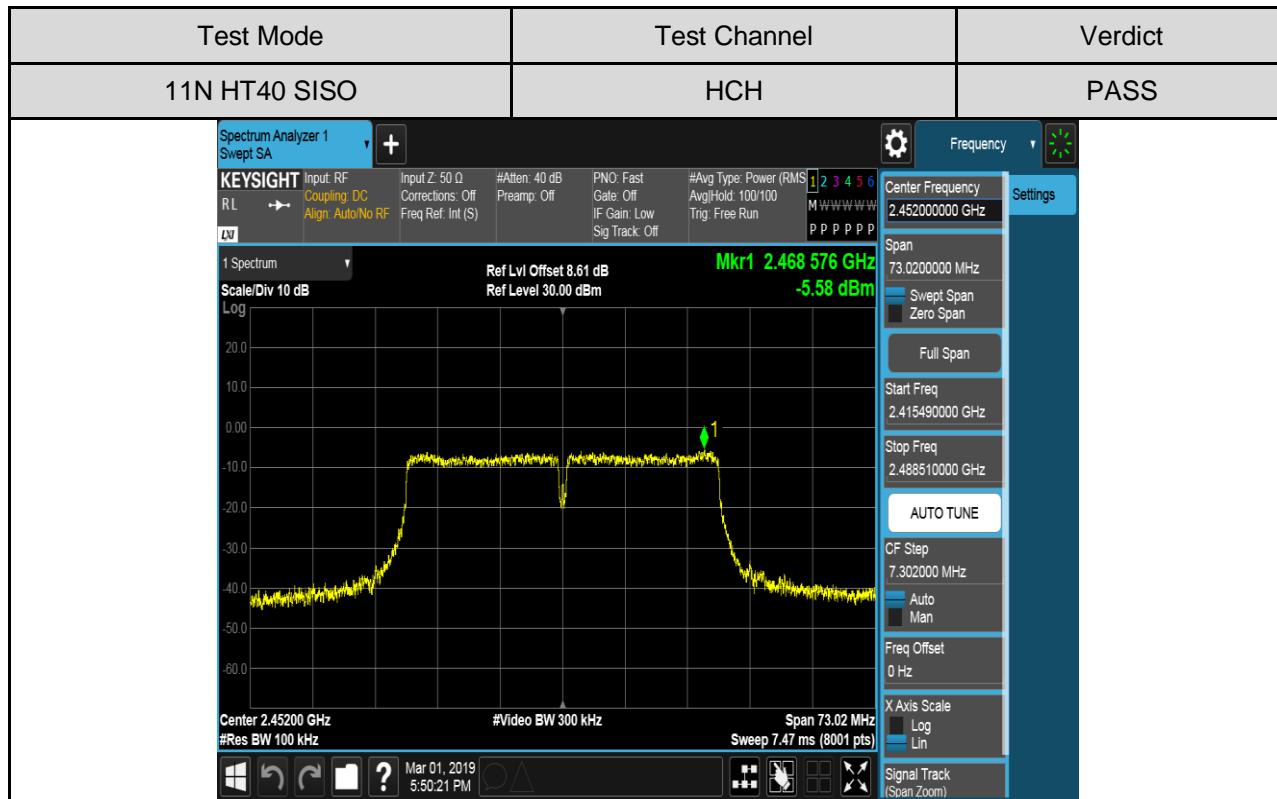
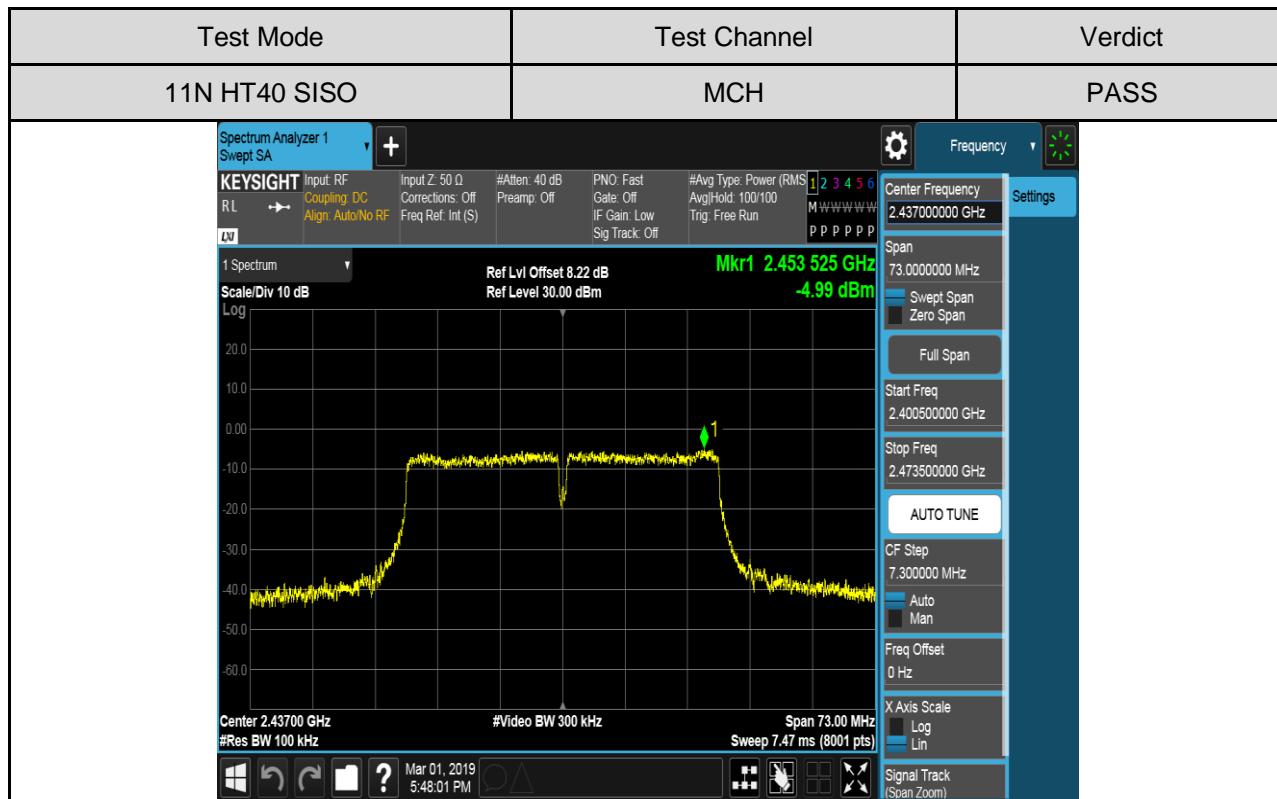












## 8.5. CONDUCTED BANDEdge AND SPURIOUS EMISSIONS

### LIMITS

CFR 47 FCC Part15 (15.247) Subpart C ISED RSS-247 ISSUE 2		
Section	Test Item	Limit
CFR 47 FCC §15.247 (d) ISED RSS-247 5.5	Conducted Bandedge and Spurious Emissions	at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

### TEST PROCEDURE

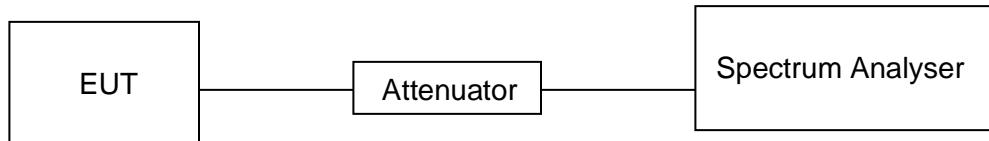
Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	100K
VBW	$\geq 3 \times$ RBW
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

Use the peak marker function to determine the maximum PSD level.

Span	Set the center frequency and span to encompass frequency range to be measured
Detector	Peak
RBW	100K
VBW	$\geq 3 \times$ RBW
measurement points	$\geq$ span/RBW
Trace	Max hold
Sweep time	Auto couple.

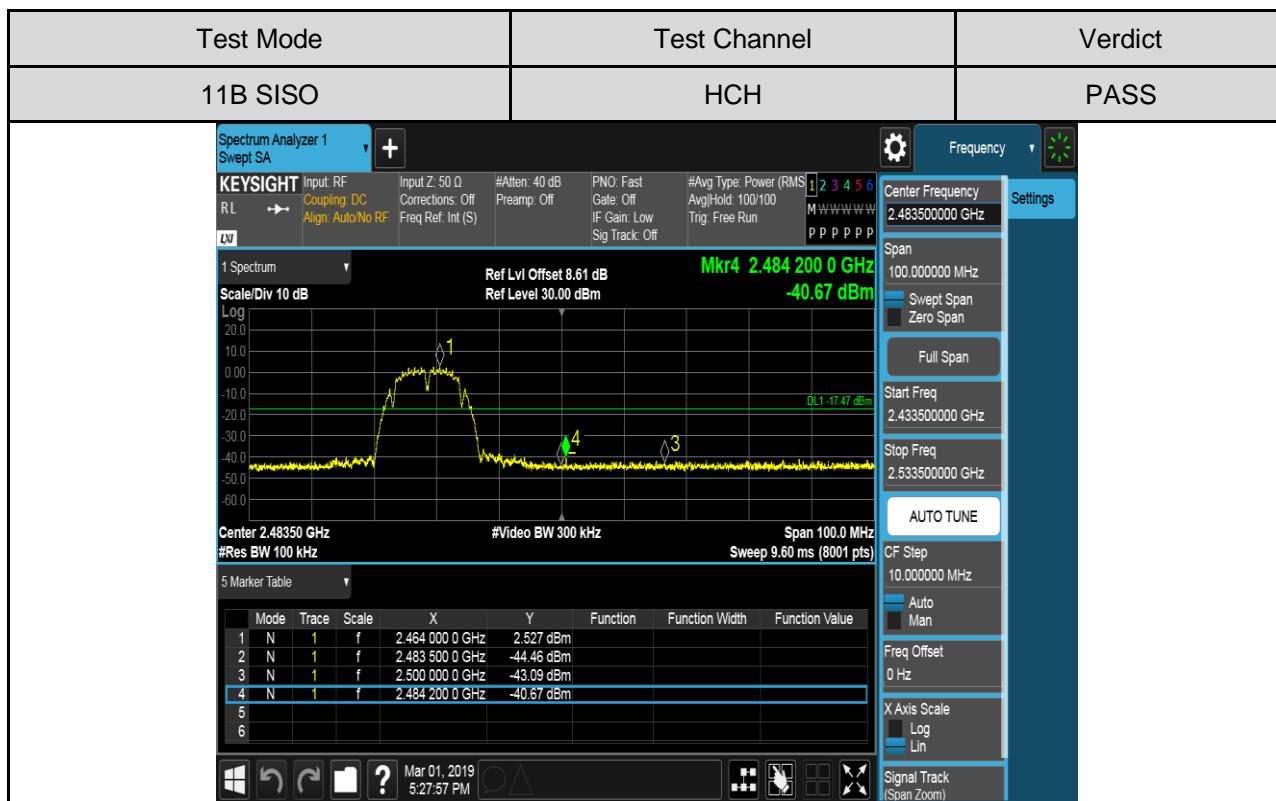
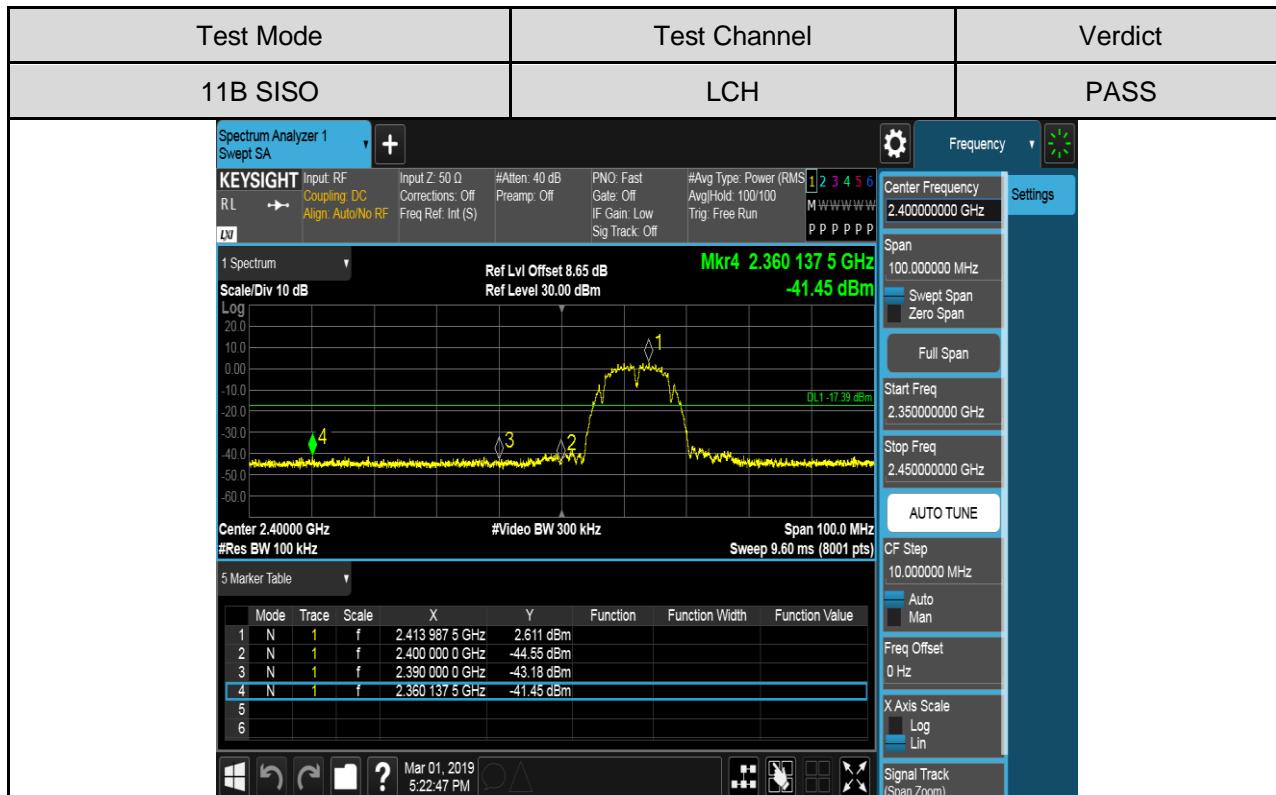
Use the peak marker function to determine the maximum amplitude level.

**TEST SETUP****TEST ENVIRONMENT**

Temperature	25°C	Relative Humidity	58 %
Atmosphere Pressure	101 kPa	Test Voltage	AC 120 V

**Part I: CONDUCTED BANDEDGE****RESULTS TABLE**

Test Mode	Test Antenna	Test Channel	Carrier Power[dBm]	Max. Spurious Level [dBm]	Limit [dBm]	Verdict
11B	Antenna 1	LCH	2.611	-41.450	-17.39	PASS
		HCH	2.527	-40.665	-17.47	PASS
11G	Antenna 1	LCH	0.284	-40.076	-19.72	PASS
		HCH	0.051	-39.437	-19.95	PASS
11N20SISO	Antenna 1	LCH	-0.330	-38.775	-20.33	PASS
		HCH	-0.703	-37.719	-20.7	PASS
11N40SISO	Antenna 1	LCH	-4.934	-39.290	-24.93	PASS
		HCH	-5.609	-38.930	-25.61	PASS

TEST GRAPHS

Test Mode		Test Channel		Verdict
11G SISO		LCH		PASS
				

Test Mode	Test Channel	Verdict
11G SISO	HCH	PASS

**Spectrum Analyzer 1** **Test Mode**

**KEYSIGHT** Input: RF Coupling: DC  
RL Align: Auto/No RF

Input Z: 50 Ω Corrections: Off  
PNO: Fast  
Preamp: Off Gate: Off  
Freq Ref. Int (S) IF Gain: Low  
Sig Track: Off Avg/Hold: 100/100  
Trig: Free Run

1 Spectrum Ref Lvl Offset 8.61 dB  
Scale/Div 10 dB Ref Level 30.00 dBm

Center Frequency 2.483500000 GHz  
Span 100.00000 MHz  
Swept Span  
Zero Span

Full Span

Start Freq 2.433500000 GHz  
Stop Freq 2.533500000 GHz

AUTO TUNE

CF Step 10.00000 MHz  
Auto  
Man

Freq Offset 0 Hz

X Axis Scale Log  
Lin

Signal Track (Span Zoom)

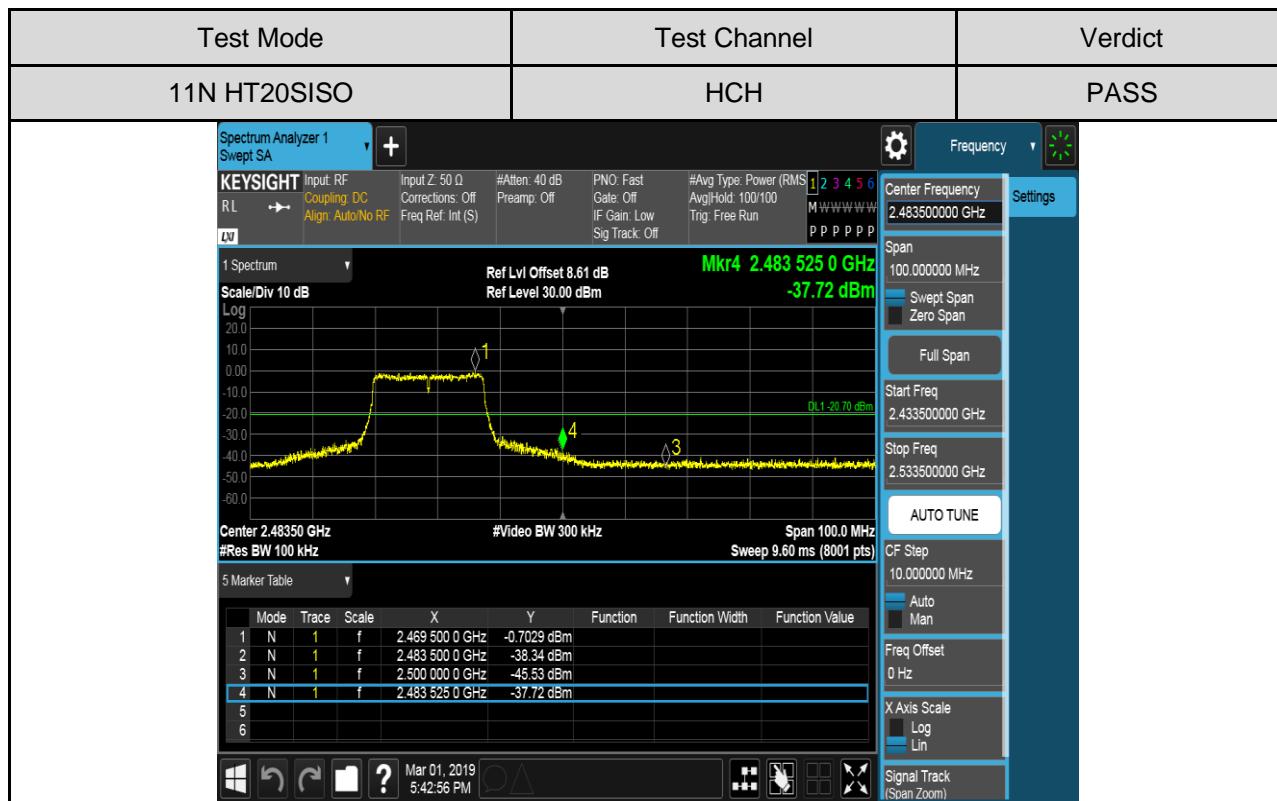
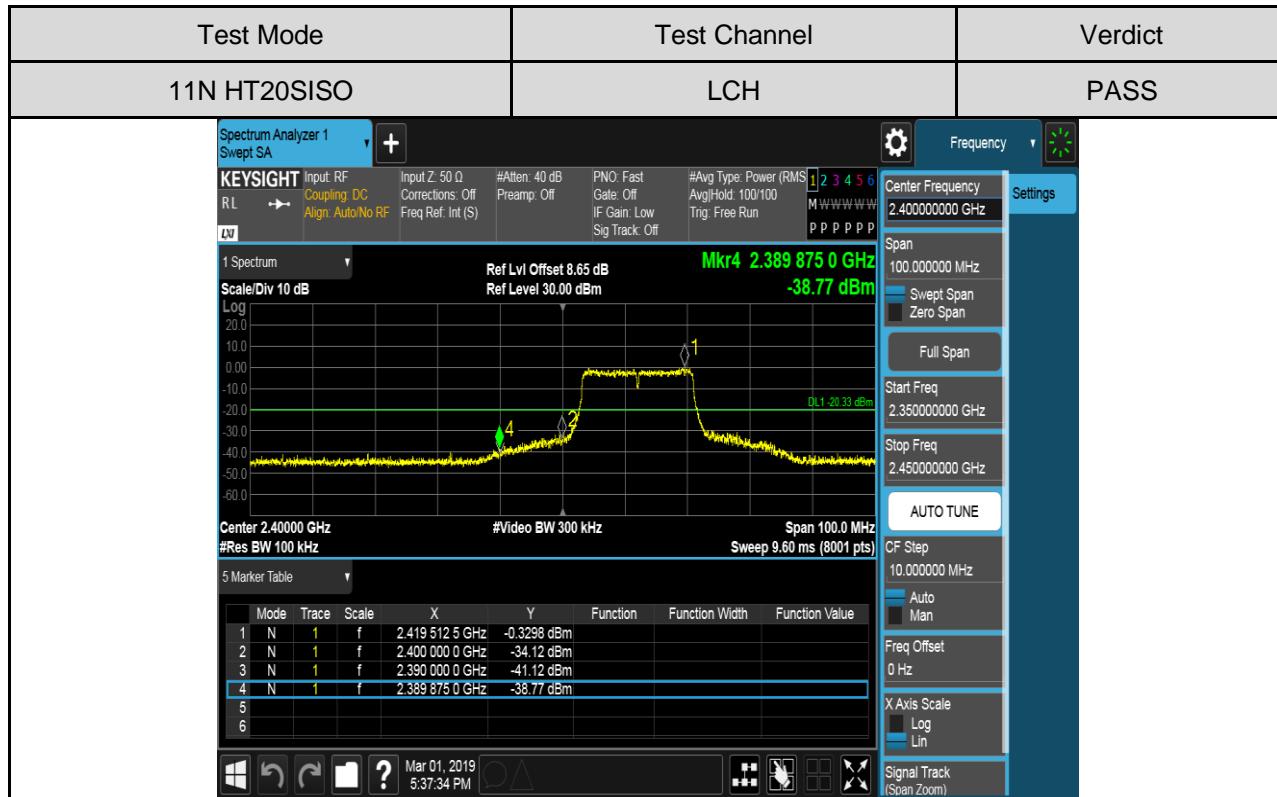
**Marker Table**

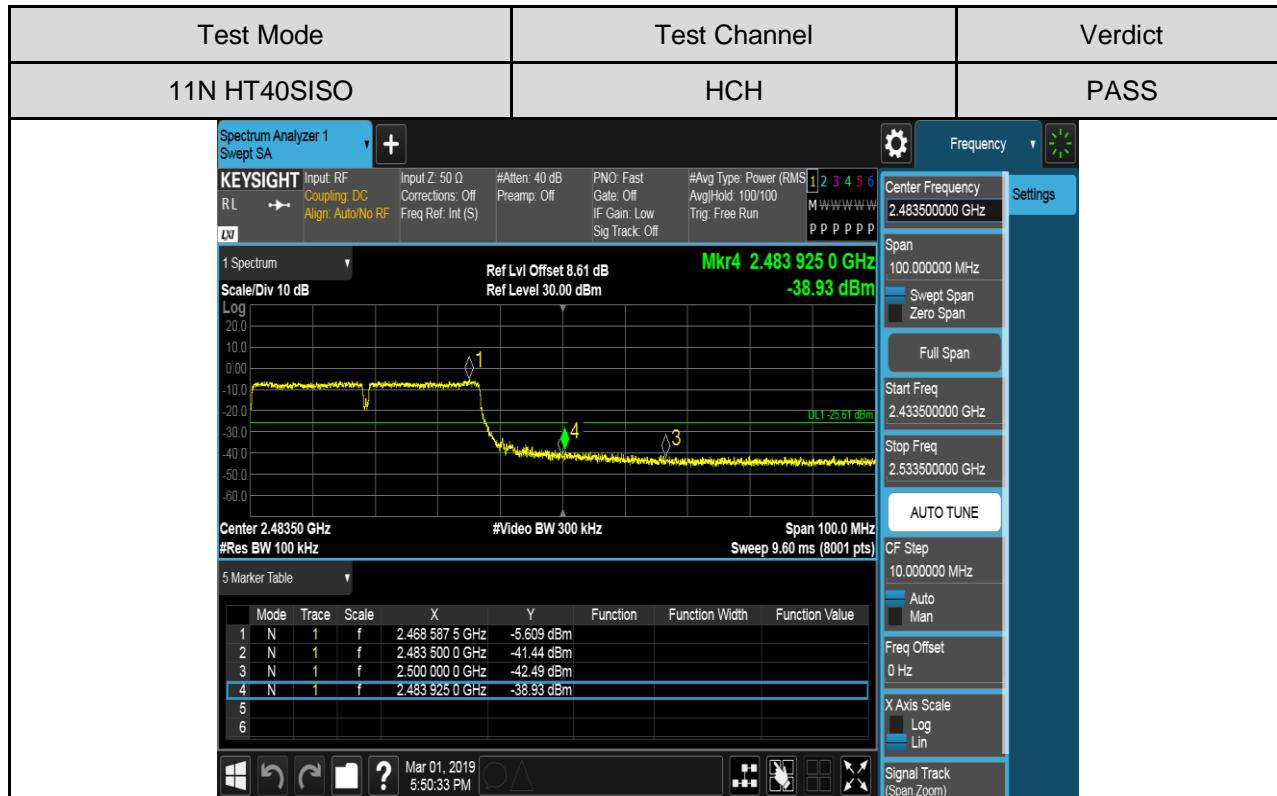
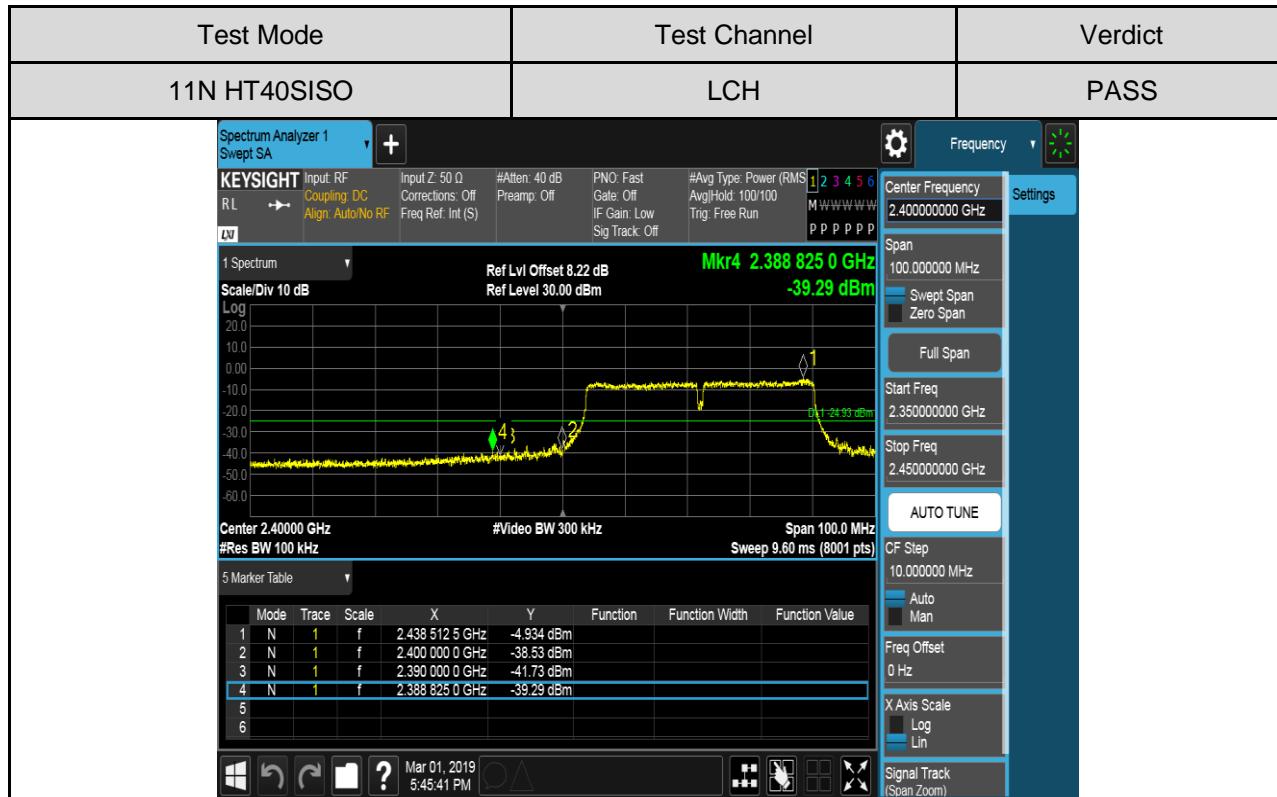
Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	2.468 862 5 GHz	0.05077 dBm		
2	N	1	f	2.483 500 0 GHz	-41.73 dBm		
3	N	1	f	2.500 000 0 GHz	-45.10 dBm		
4	N	1	f	2.483 750 0 GHz	-39.44 dBm		
5							
6							

5 Marker Table

Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	2.468 862 5 GHz	0.05077 dBm		
2	N	1	f	2.483 500 0 GHz	-41.73 dBm		
3	N	1	f	2.500 000 0 GHz	-45.10 dBm		
4	N	1	f	2.483 750 0 GHz	-39.44 dBm		
5							
6							

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**Part II: Conducted Spurious Emissions****TEST RESULT TABLE**

Test Mode	Test Antenna	Channel	Pref(dBm)	Puw(dBm)	Verdict
11B SISO	Antenna 1	LCH	2.55	<Limit	PASS
		MCH	1.67	<Limit	PASS
		HCH	2.45	<Limit	PASS
11G SISO	Antenna 1	LCH	0.51	<Limit	PASS
		MCH	-0.81	<Limit	PASS
		HCH	0.13	<Limit	PASS
11N HT20 SISO	Antenna 1	LCH	-0.20	<Limit	PASS
		MCH	-1.73	<Limit	PASS
		HCH	-0.85	<Limit	PASS
11N HT40 SISO	Antenna 1	LCH	-4.80	<Limit	PASS
		MCH	-5.00	<Limit	PASS
		HCH	-5.49	<Limit	PASS

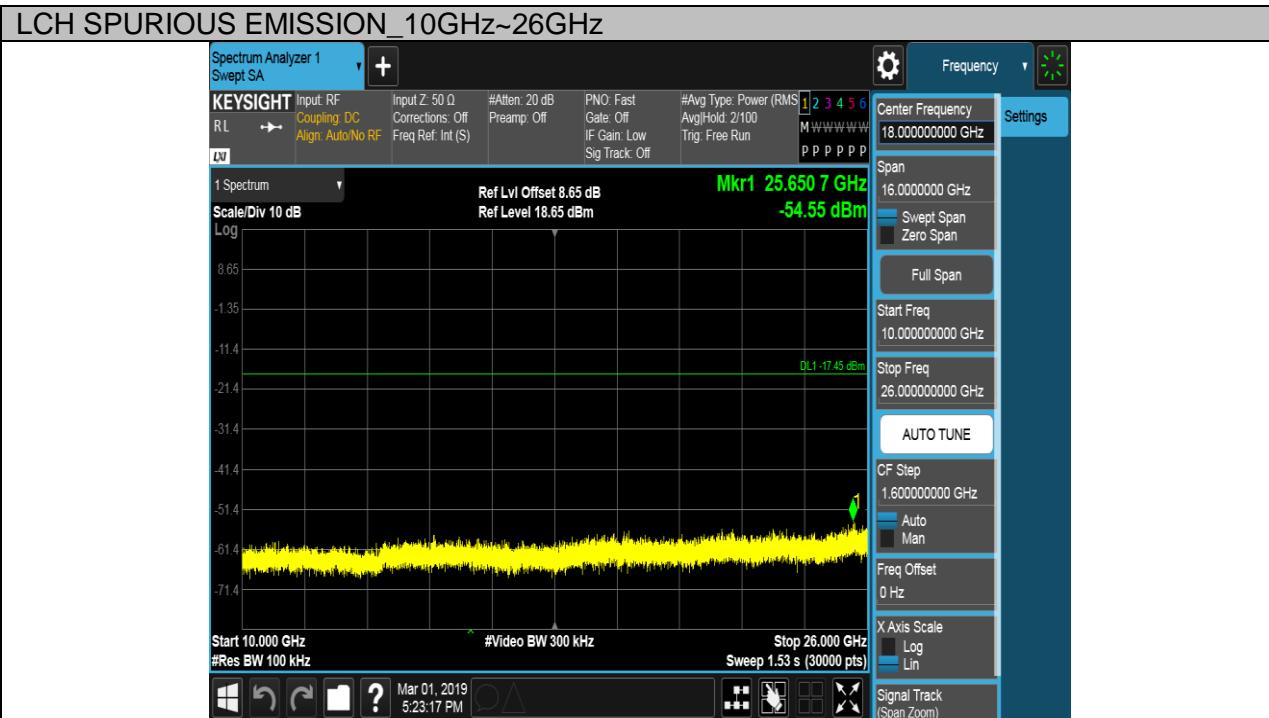
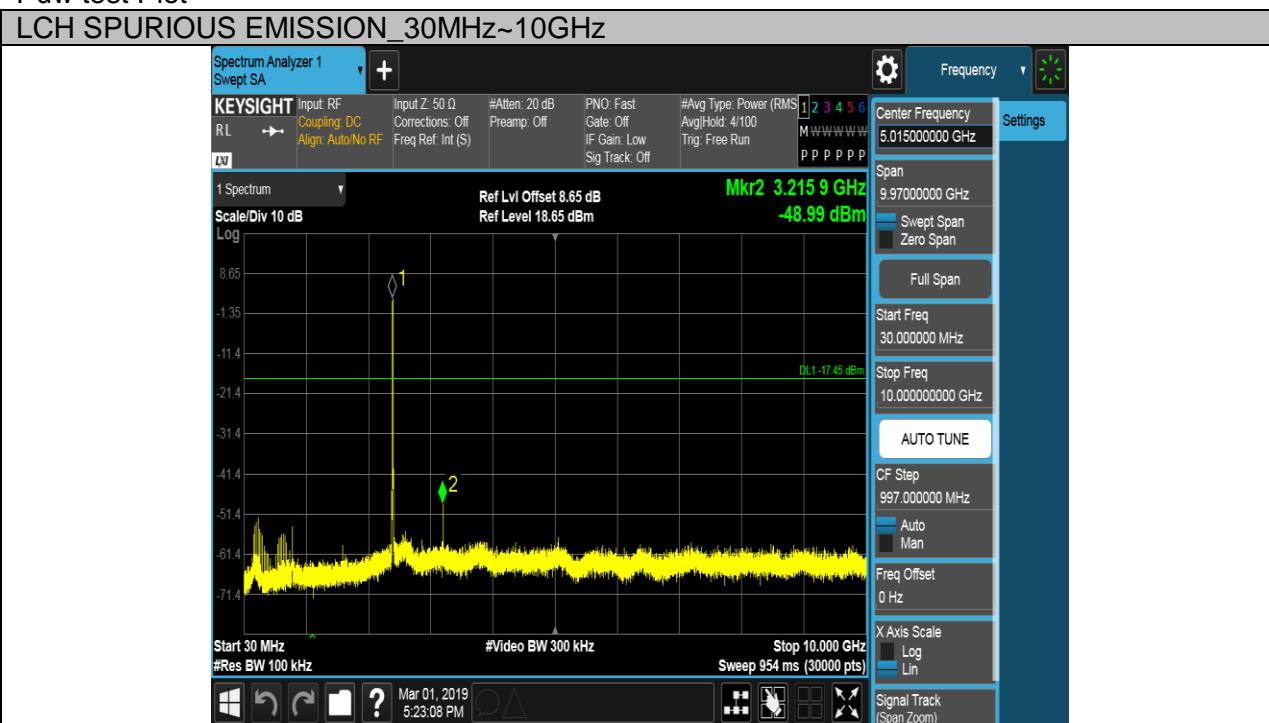
TEST GRAPHSANTENNA1

Test Mode	Channel	Verdict
11B SISO	LCH	PASS

Pref test Plot

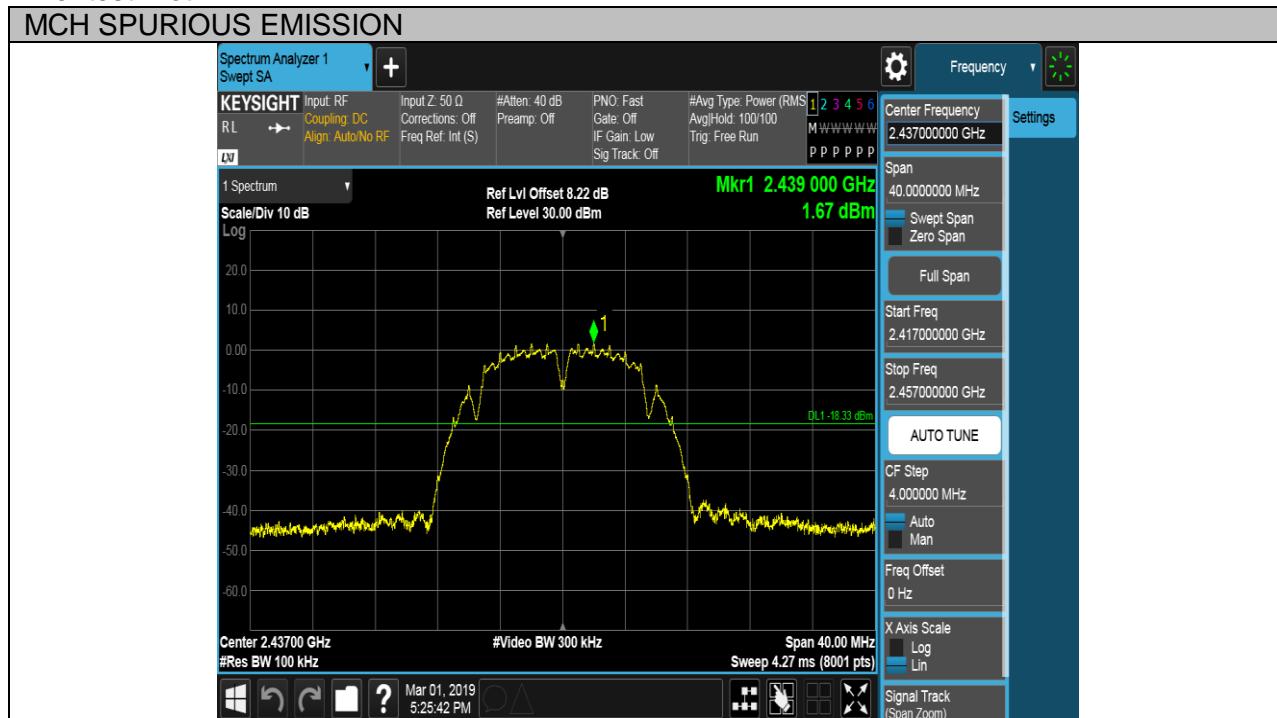


## Puw test Plot

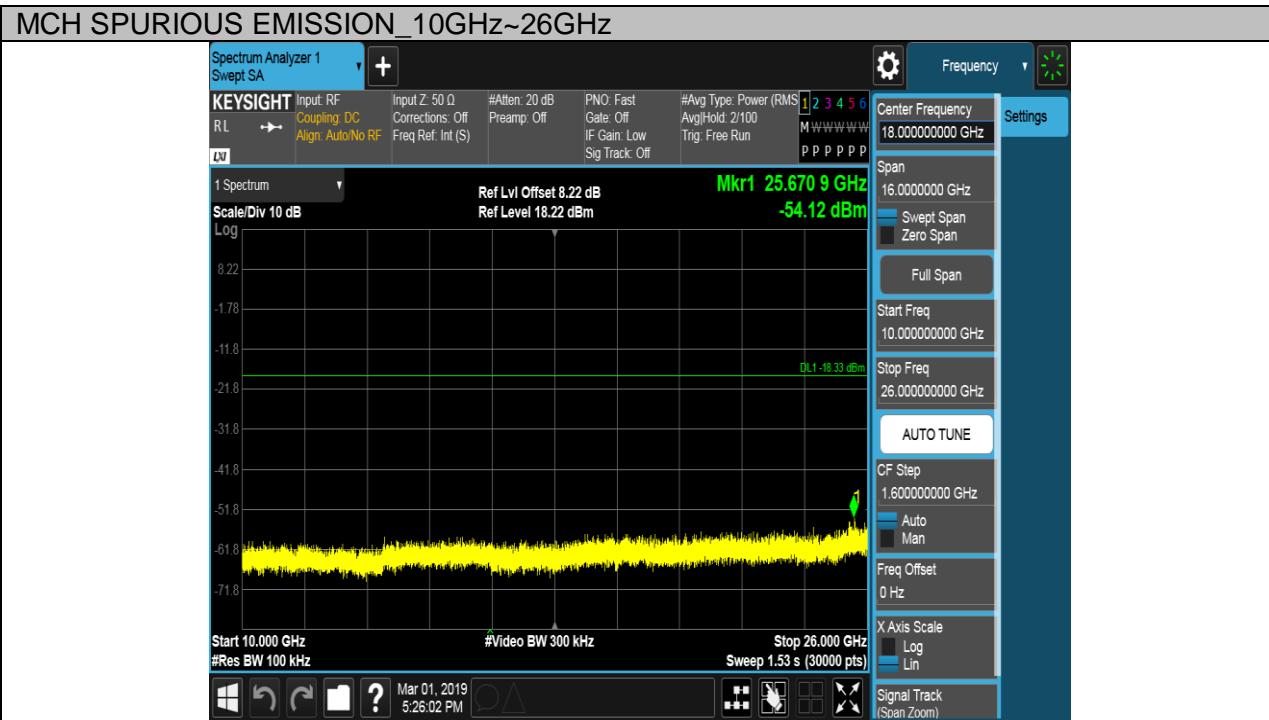
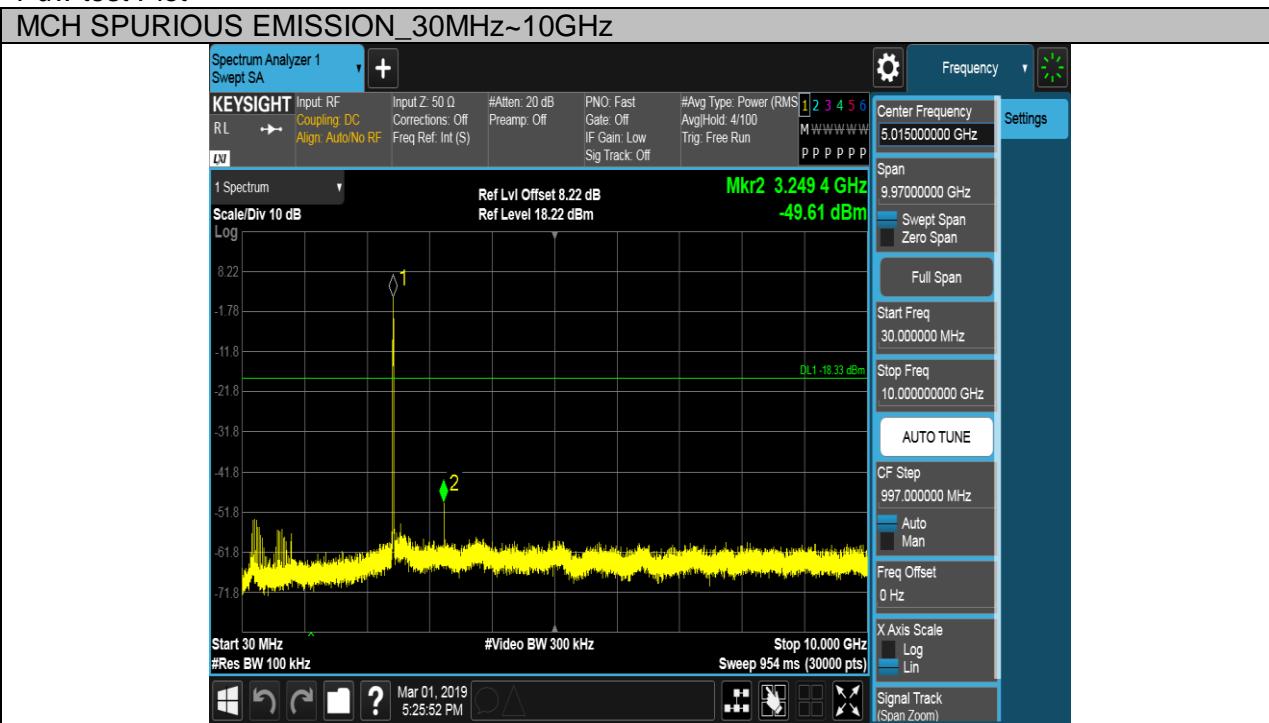


Test Mode	Channel	Verdict
11B SISO	MCH	PASS

## Pref test Plot



## Puw test Plot



Test Mode	Channel	Verdict
11B SISO	HCH	PASS

## Pref test Plot



## PuW test Plot

