



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

CERTIFICATION TEST REPORT

For

Kami Wire Free Camera

MODEL NUMBER: YWS.1018

PROJECT NUMBER: 4788754157

REPORT NUMBER: 4788754157-1

FCC ID: 2AFIB-YWS1018

IC: 20436-YWS1018

ISSUE DATE: Mar. 11, 2019

Prepared for

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Revision History

| Rev. | Issue Date | Revisions | Revised By |
|------|------------|---------------|------------|
| V0 | 03/11/2019 | 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 Wire Free Camera
Model Name YWS.1018
Sample Number 1913395
Data of Receipt Sample November 7, 2018
Date Tested Feb. 10~ 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
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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>A2LA (Certificate No.: 4102.01) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA.</p> <p>FCC (FCC Designation No.: CN1187) 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>IC(Company No.: 21320) 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>VCCI (Registration No.: G-20019, R-20004, C-20012 and T-20011) 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> |
|---------------------------|--|

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. CMEASUREMENT 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 Wire Free Camera | |
| Model No.: | YWS.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: | 11B | 5a |
| | 11G | 0a |
| | 11n(HT20) | 81 |
| | 11n(HT40) | 81 |
| Test software of EUT: | SecureCRT (manufacturer declare) | |
| Antenna Type: | Internal Antenna | |
| Antenna Gain: | 1.91dBi | |
| Power Supply | Battery | DC 7.4V |

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] | 19.28 |
| 2412-2462 | 1 | IEEE 802.11G | 1-11[11] | 16.14 |
| 2412-2462 | 1 | IEEE 802.11nHT20 | 1-11[11] | 15.57 |
| 2422-2452 | 1 | IEEE 802.11nHT40 | 3-9[7] | 15.30 |

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 | 5a | 5a | 5a | N/A | | |
| 802.11g | 1 | 0a | 0a | 0a | | | |
| 802.11n HT20 | 1 | 81 | 81 | 81 | | | |
| 802.11n HT40 | 1 | N/A | | | 81 | 81 | 81 |

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 | USB to TTL | USB to TTL | USB | 2.0 m | N/A |

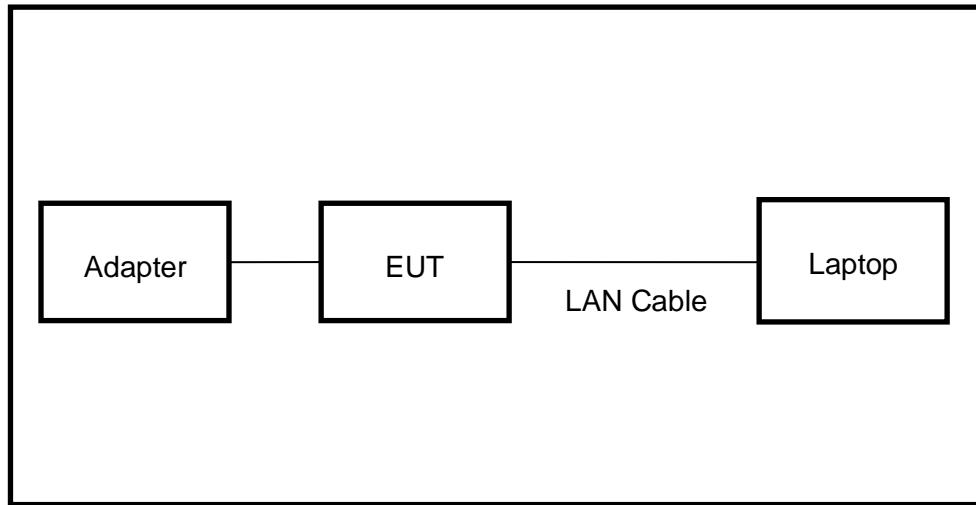
ACCESSORIES

| 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, 2018 | 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

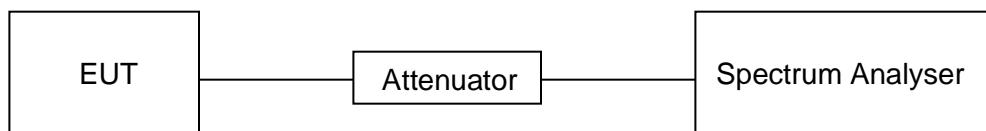
LIMITS

None; for reporting purposes only

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method

TEST SETUP



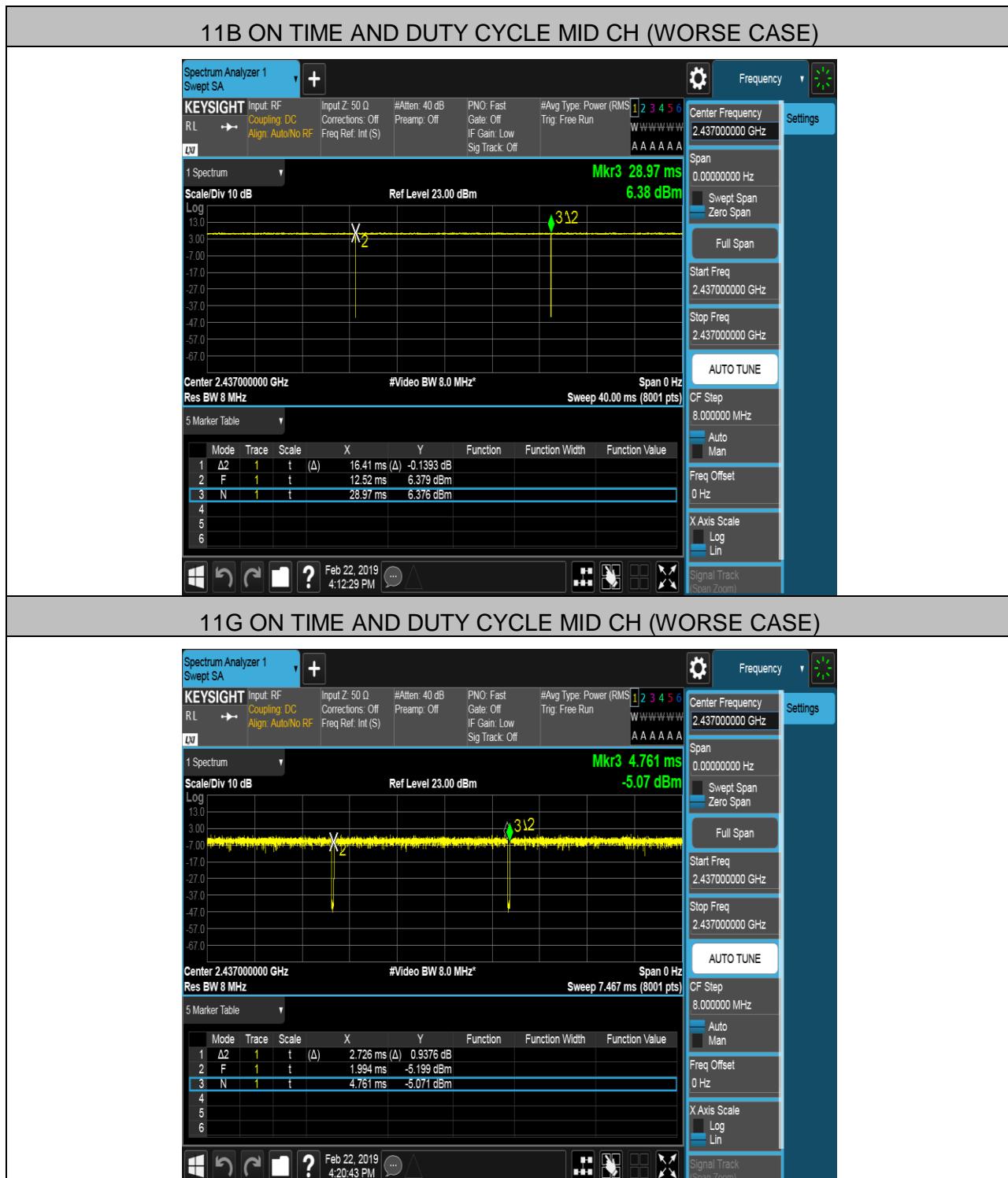
TEST ENVIRONMENT

| | | | |
|---------------------|---------|-------------------|---------|
| Temperature | 25°C | Relative Humidity | 58 % |
| Atmosphere Pressure | 101 kPa | Test Voltage | DC 7.4V |

RESULTS

| Mode | On Time (msec) | Period (msec) | Duty Cycle x (Linear) | Duty Cycle | Duty Cycle Correction Factor (db) | 1/T Minimum VBW (KHz) |
|---------------|----------------|---------------|-----------------------|------------|-----------------------------------|-----------------------|
| 11B | 16.41 | 16.45 | 1 | 99.76% | 0.01 | 0.0609 |
| 11G | 2.726 | 2.767 | 1 | 98.52% | 0.06 | 0.3368 |
| 11N HT20 SISO | 2.524 | 2.564 | 1 | 98.44% | 0.07 | 0.3962 |
| 11N HT40 SISO | 1.229 | 1.266 | 1 | 97.08% | 0.13 | 0.8137 |

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 |

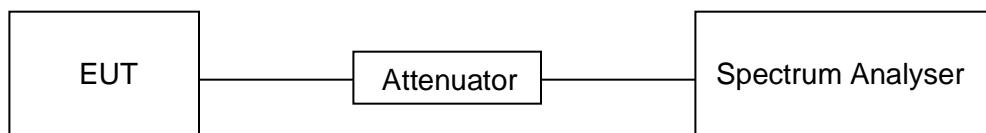
TEST PROCEDURE

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 | DC 7.4V |

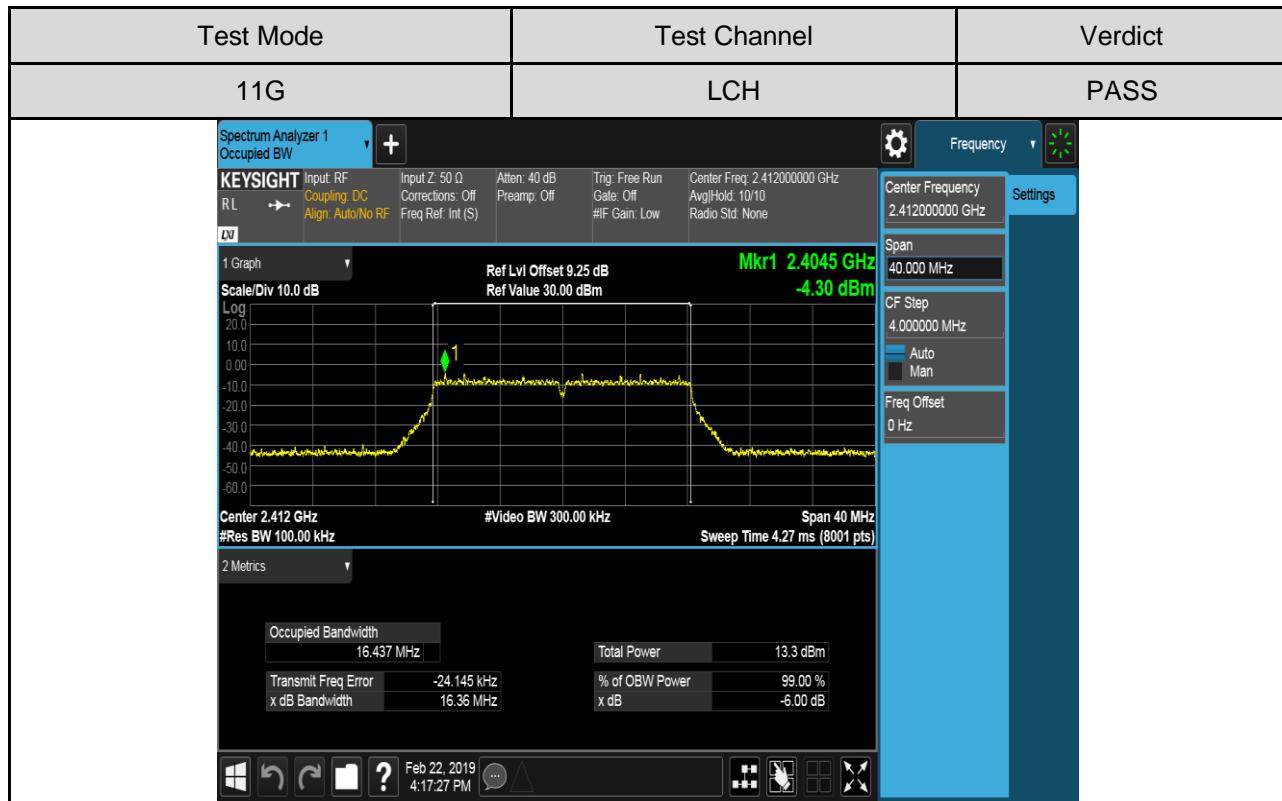
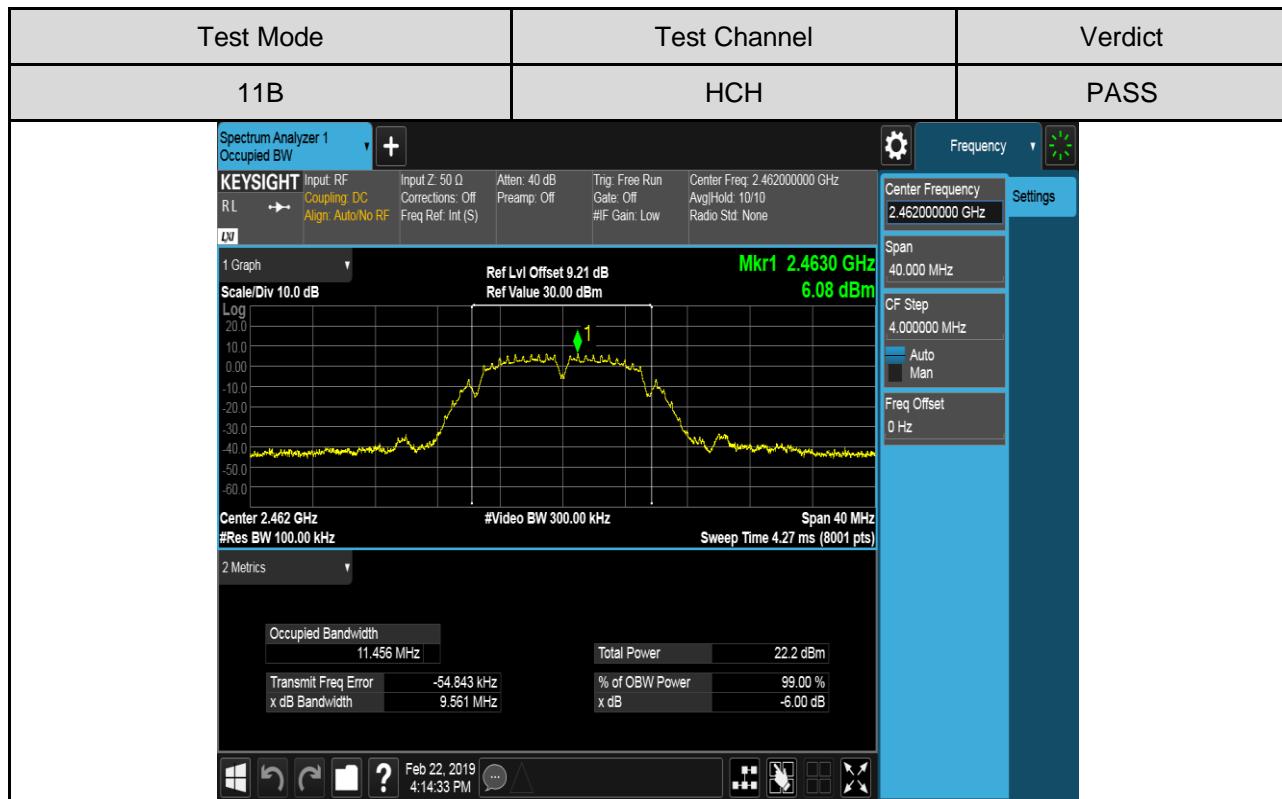
RESULTS

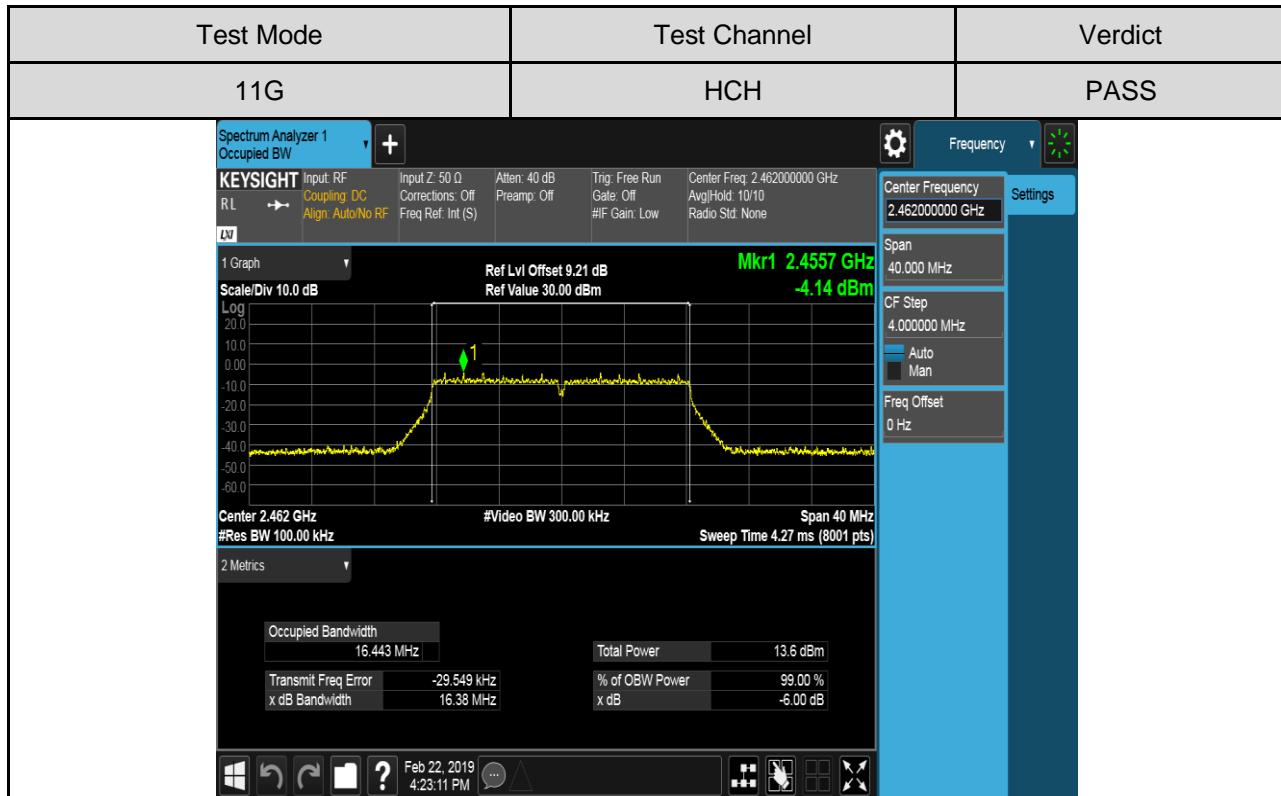
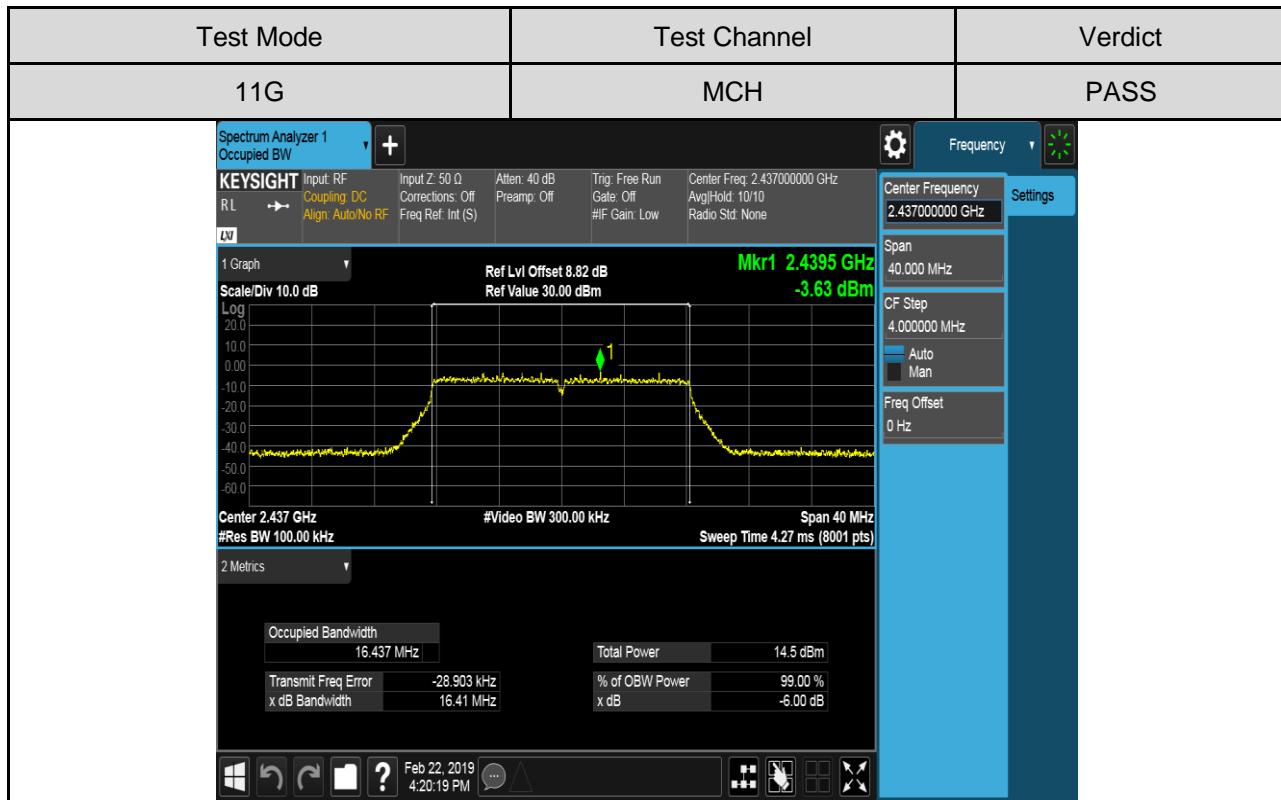
| Test Mode | Test Antenna | Test Channel | 6dB bandwidth (MHz) | 99% bandwidth (MHz) | Result |
|---------------|--------------|--------------|---------------------|---------------------|--------|
| 11B | Antenna 1 | LCH | 9.105 | 11.281 | Pass |
| | | MCH | 9.105 | 11.449 | Pass |
| | | HCH | 9.561 | 11.456 | Pass |
| 11G | Antenna 1 | LCH | 16.36 | 16.437 | Pass |
| | | MCH | 16.41 | 16.437 | Pass |
| | | HCH | 16.38 | 16.443 | Pass |
| 11N HT20 SISO | Antenna 1 | LCH | 17.61 | 17.607 | Pass |
| | | MCH | 17.59 | 17.595 | Pass |
| | | HCH | 17.61 | 17.603 | Pass |
| 11N HT40 SISO | Antenna 1 | LCH | 35.90 | 35.980 | Pass |
| | | MCH | 35.43 | 35.915 | Pass |
| | | HCH | 35.50 | 35.978 | Pass |

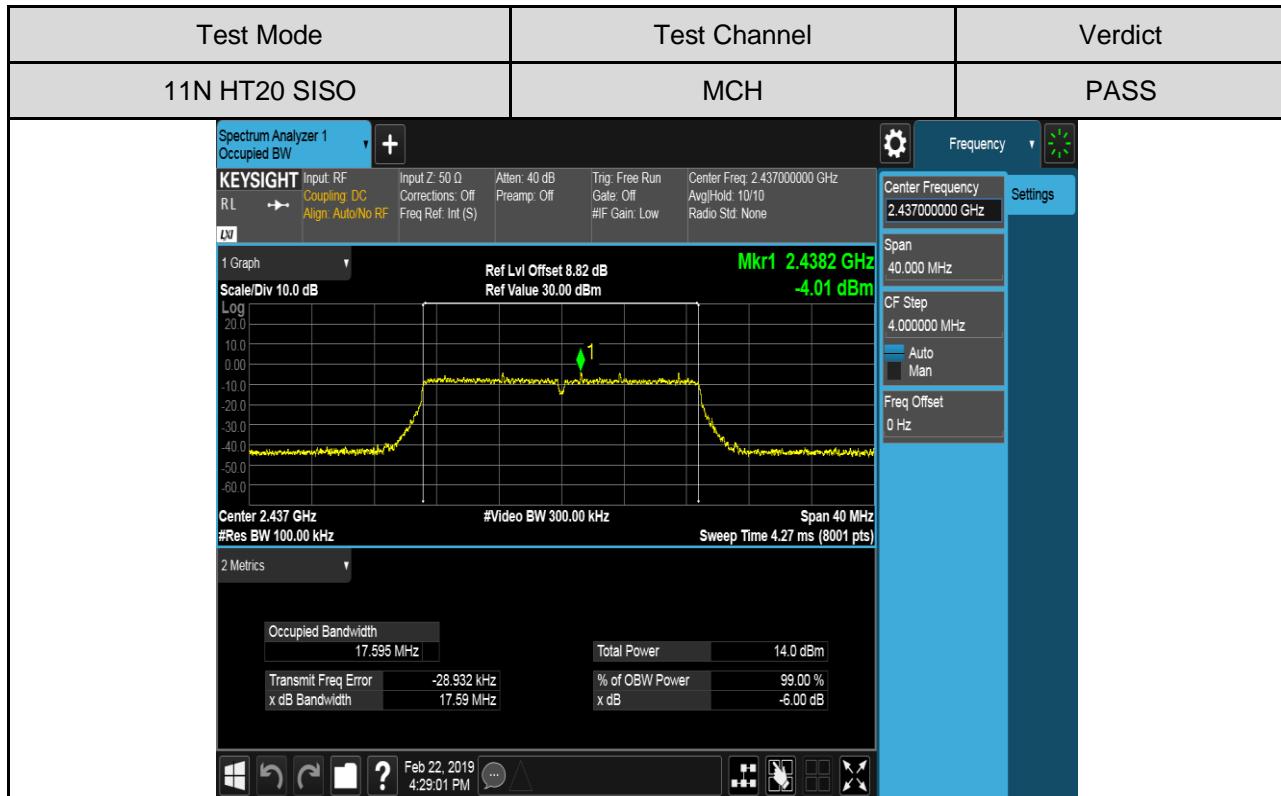
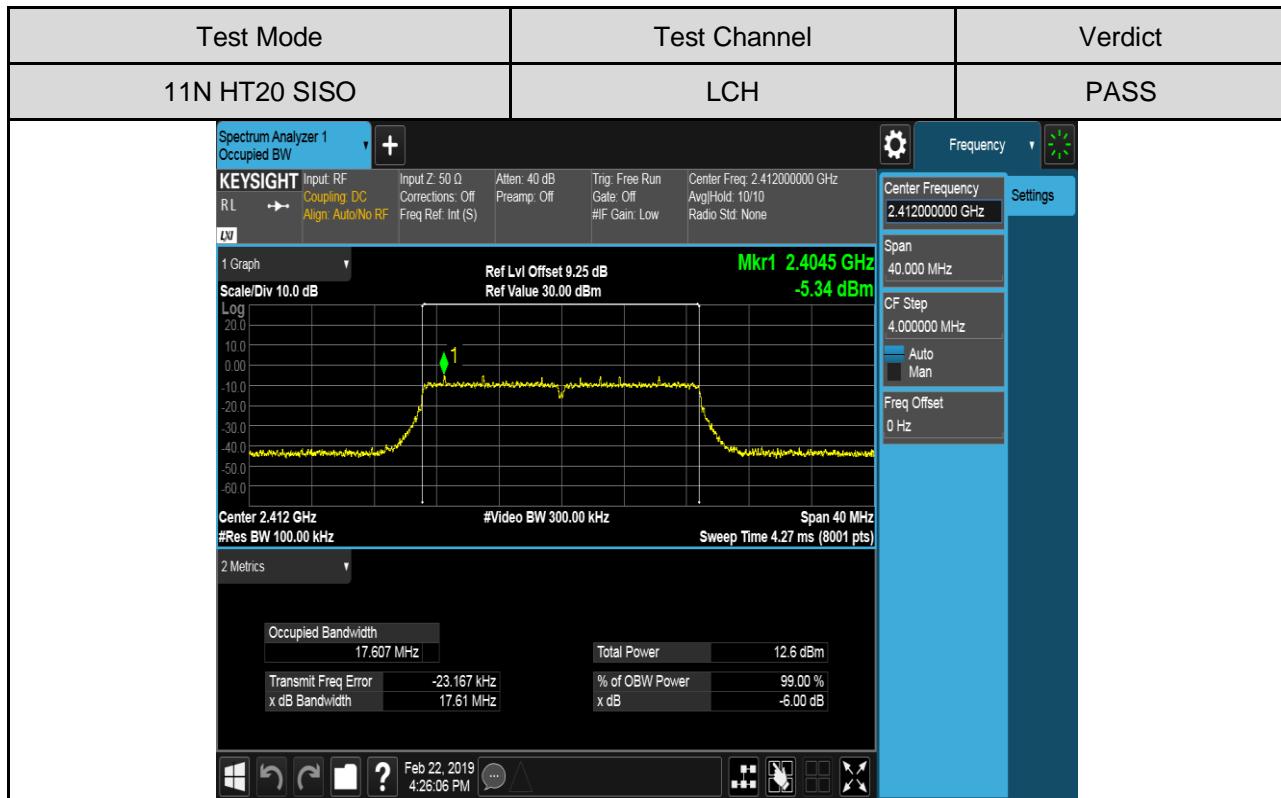
Test Graphs

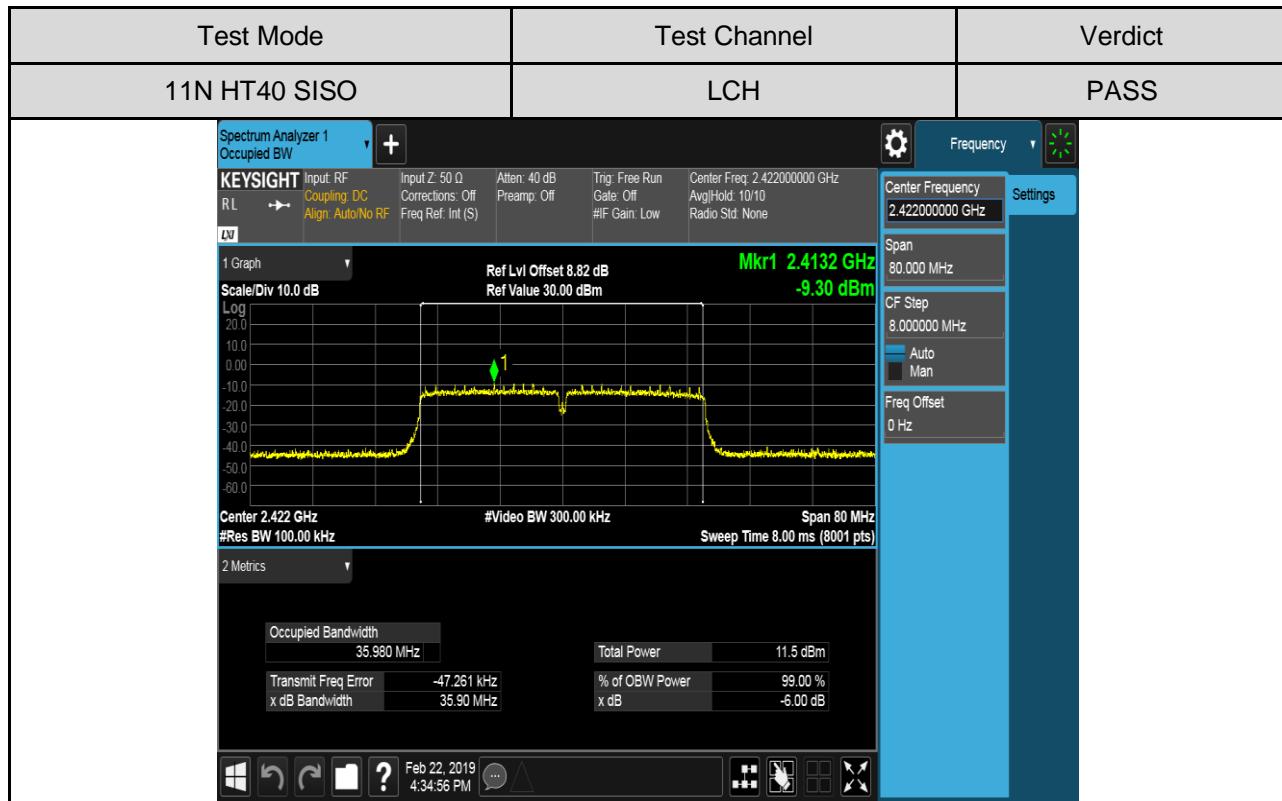
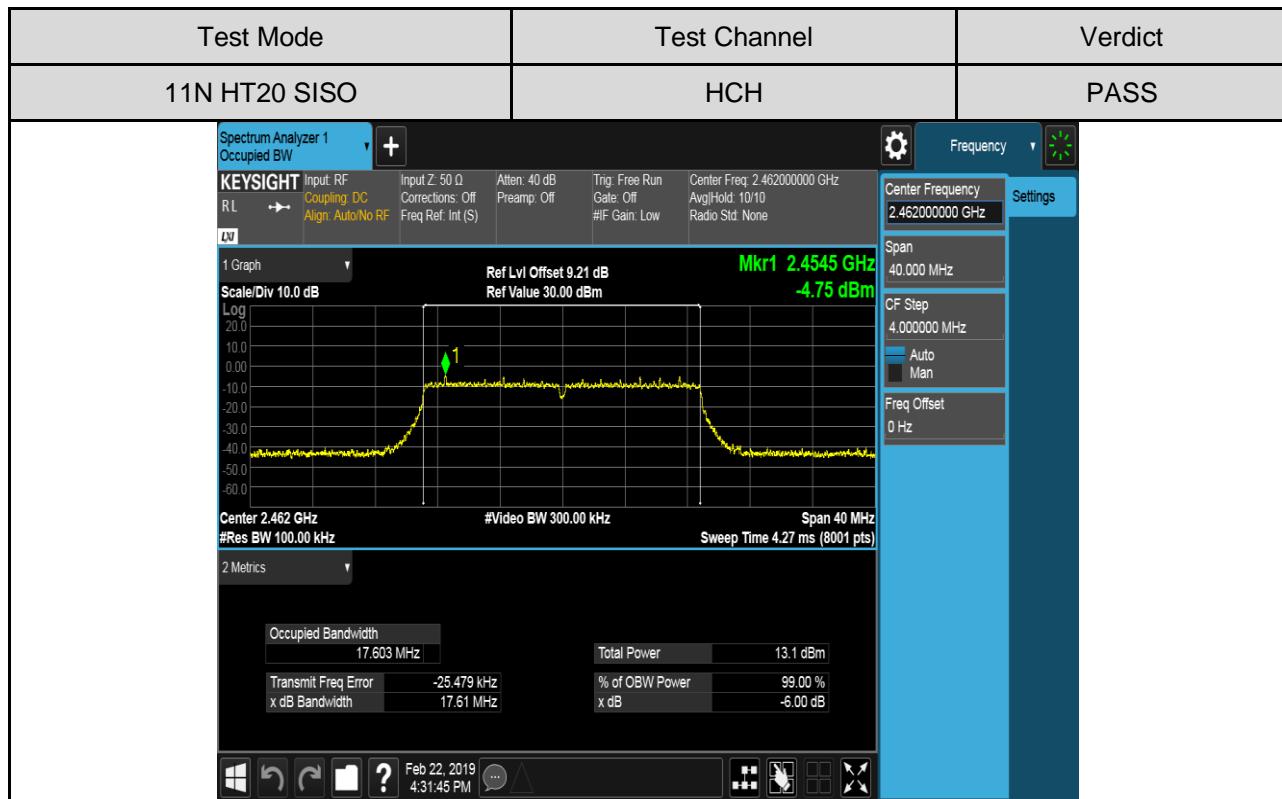
| Test Mode | Test Channel | Verdict |
|-----------|--------------|---------|
| 11B | LCH | PASS |
| | | |

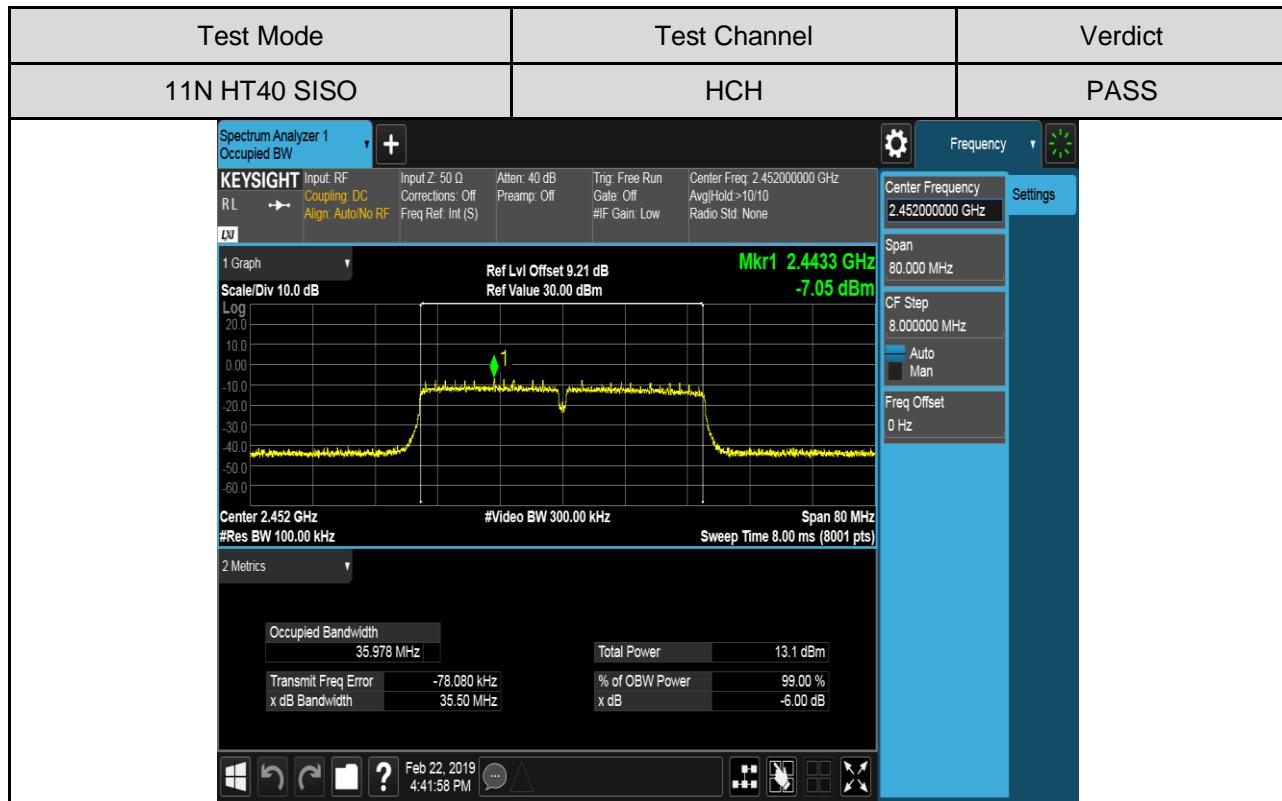
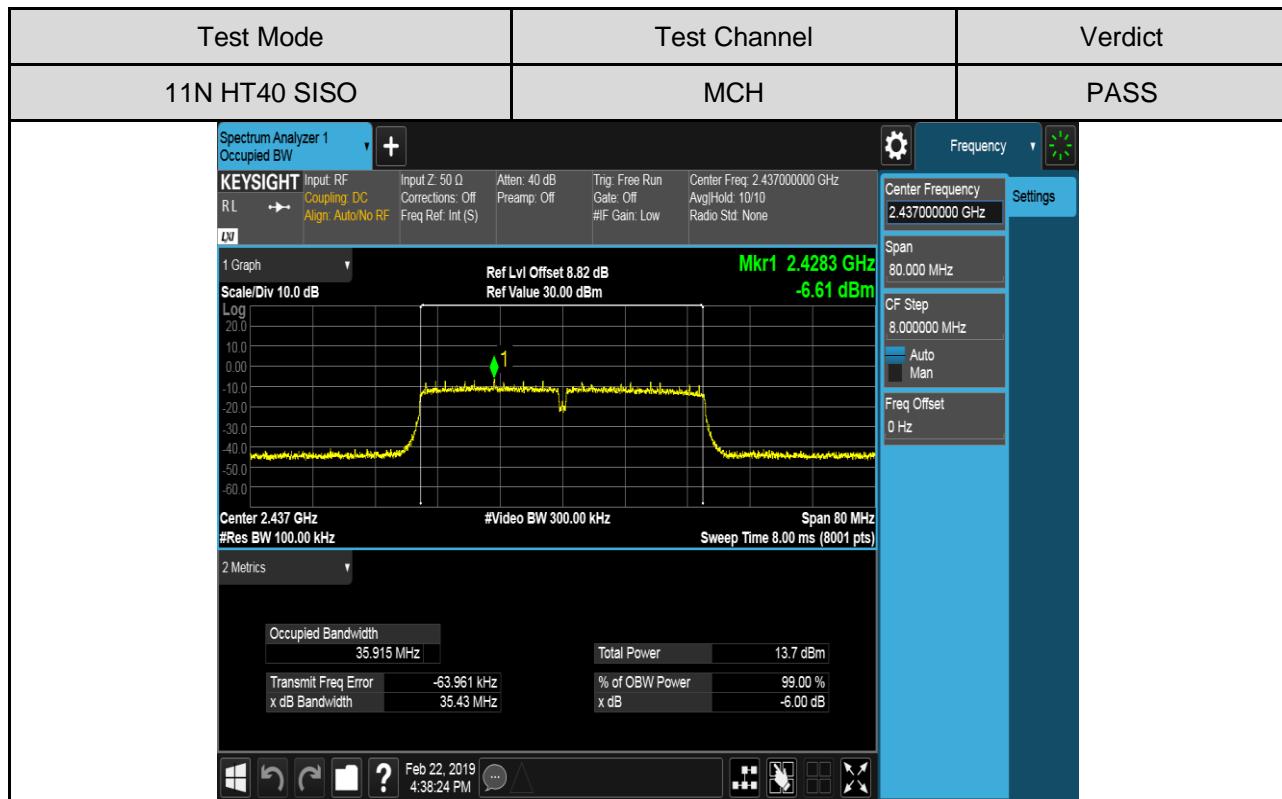
| Test Mode | Test Channel | Verdict |
|-----------|--------------|---------|
| 11B | MCH | PASS |
| | | |











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 (d) | Peak Output Power | 1 watt or 30dBm (See Note 1/2) | 2400-2483.5 |
| <p>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.</p> <p>2. Limit=30dBm - (Directional gain -6) dBi</p> <p>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</p> | | | |

TEST PROCEDURE

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

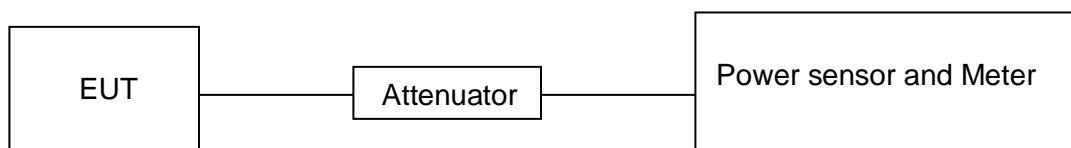
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Power sensor.

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 | DC 7.4V |

RESULTS

1) Maximum Peak Conducted Output Power

| Test Mode | Test Antenna | Test Channel | Maximum Peak Conducted Output Power(dBm) | Result |
|---------------|--------------|--------------|--|--------|
| 11B | Ant1 | LCH | 18.42 | Pass |
| | | MCH | 19.28 | Pass |
| | | HCH | 18.44 | Pass |
| 11G | Ant | LCH | 15.18 | Pass |
| | | MCH | 16.14 | Pass |
| | | HCH | 15.35 | Pass |
| 11N HT20 SISO | Ant1 | LCH | 14.62 | Pass |
| | | MCH | 15.57 | Pass |
| | | HCH | 14.77 | Pass |
| 11N HT40 SISO | Ant1 | LCH | 13.43 | Pass |
| | | MCH | 15.30 | Pass |
| | | HCH | 14.85 | Pass |

2) Maximum Average Conducted Output Power

| Test Mode | Test Antenna | Test Channel | Maximum Average Conducted Output Power(dBm) | Result |
|---------------|--------------|--------------|---|--------|
| 11B | Ant 1 | LCH | 14.92 | Pass |
| | | MCH | 15.99 | Pass |
| | | HCH | 15.2 | Pass |
| 11G | Ant 1 | LCH | 7.07 | Pass |
| | | MCH | 8.01 | Pass |
| | | HCH | 7.26 | Pass |
| 11N HT20 SISO | Ant 1 | LCH | 6.43 | Pass |
| | | MCH | 7.43 | Pass |
| | | HCH | 6.66 | Pass |
| 11N HT40 SISO | Ant 1 | LCH | 5.11 | Pass |
| | | MCH | 7.07 | Pass |
| | | HCH | 6.70 | 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 |
| <p>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.</p> <p>2. Limit=8dBm – (Directional gain -6) dBi</p> <p>Directional gain = $10\log [(10G1/20GANT + 10 \log (N_{ANT}) \text{ dBi}$, where N_{ANT} is the number of outputs, $GANT$ is the Antenna gain.</p> <p>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 density limit shall be still 8 dBm in any 3KHz band.</p> | | | |

TEST PROCEDURE

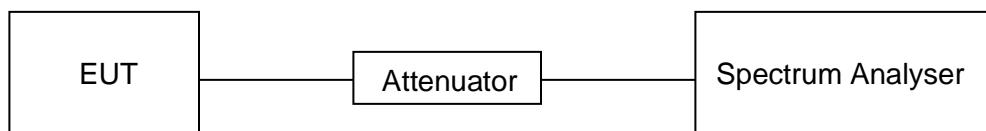
Connect the UUT to the spectrum analyser and use the following settings:

| | |
|------------------|--|
| 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



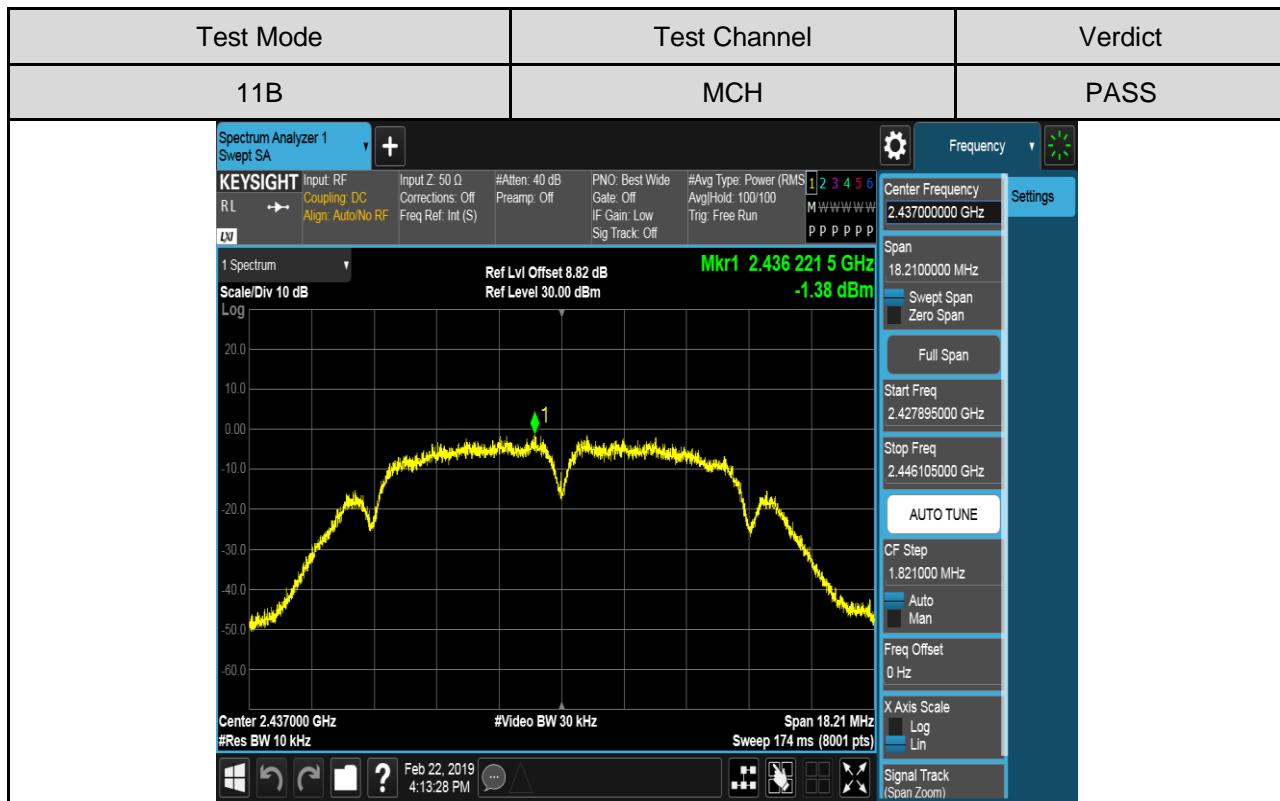
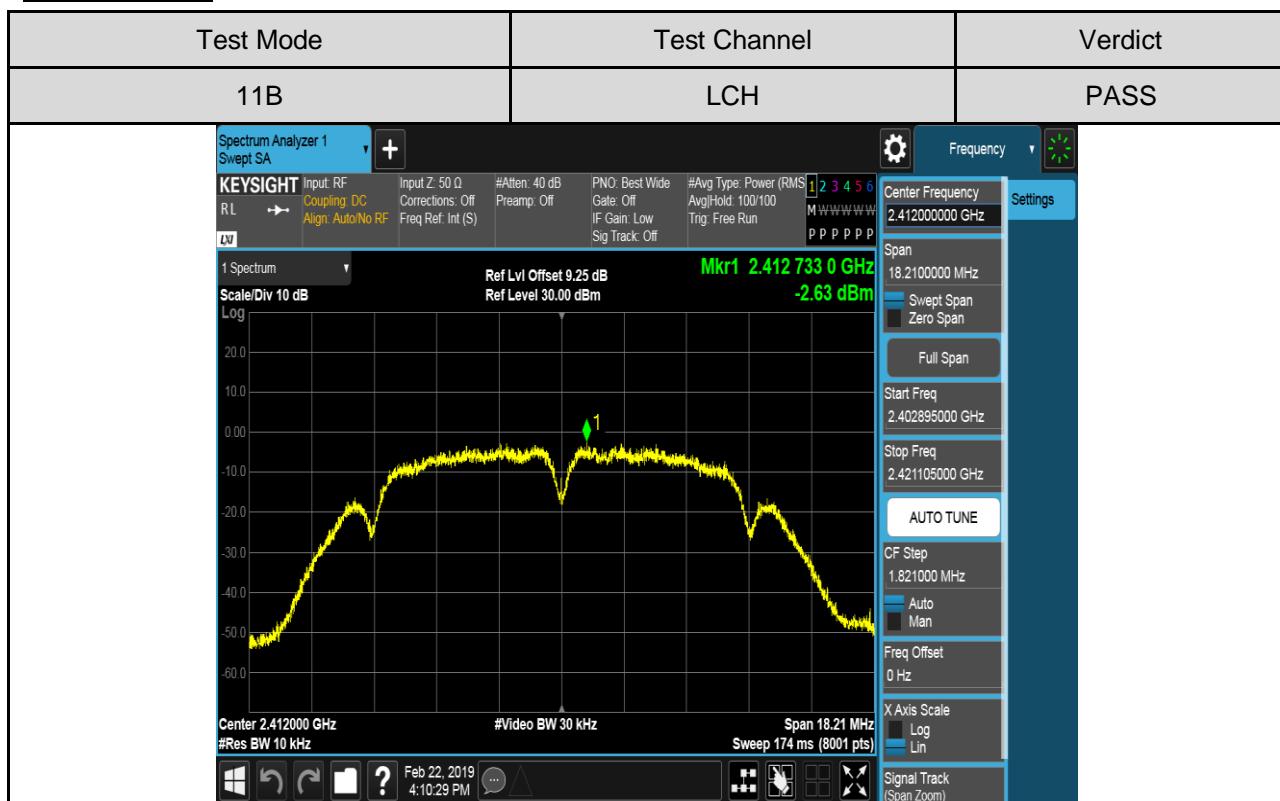
TEST ENVIRONMENT

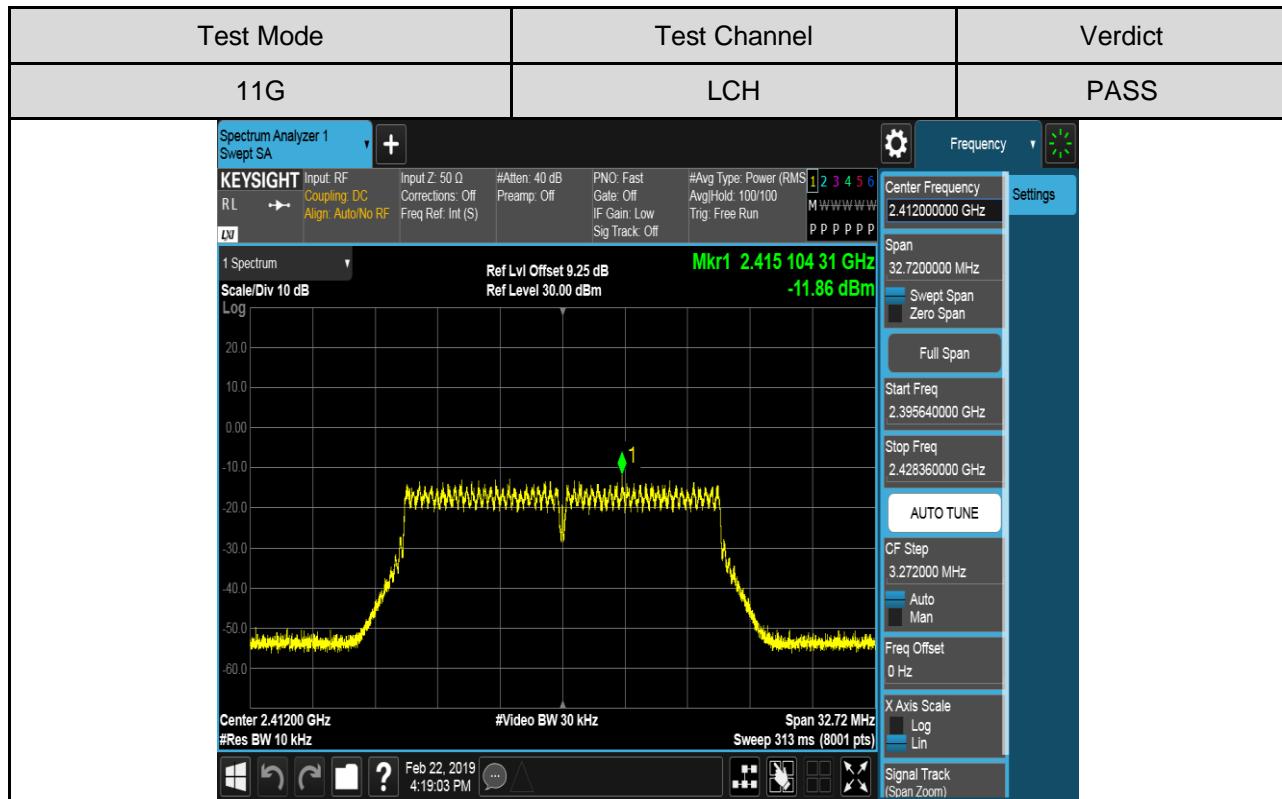
| | | | |
|---------------------|---------|-------------------|---------|
| Temperature | 25°C | Relative Humidity | 58 % |
| Atmosphere Pressure | 101 kPa | Test Voltage | DC 7.4V |

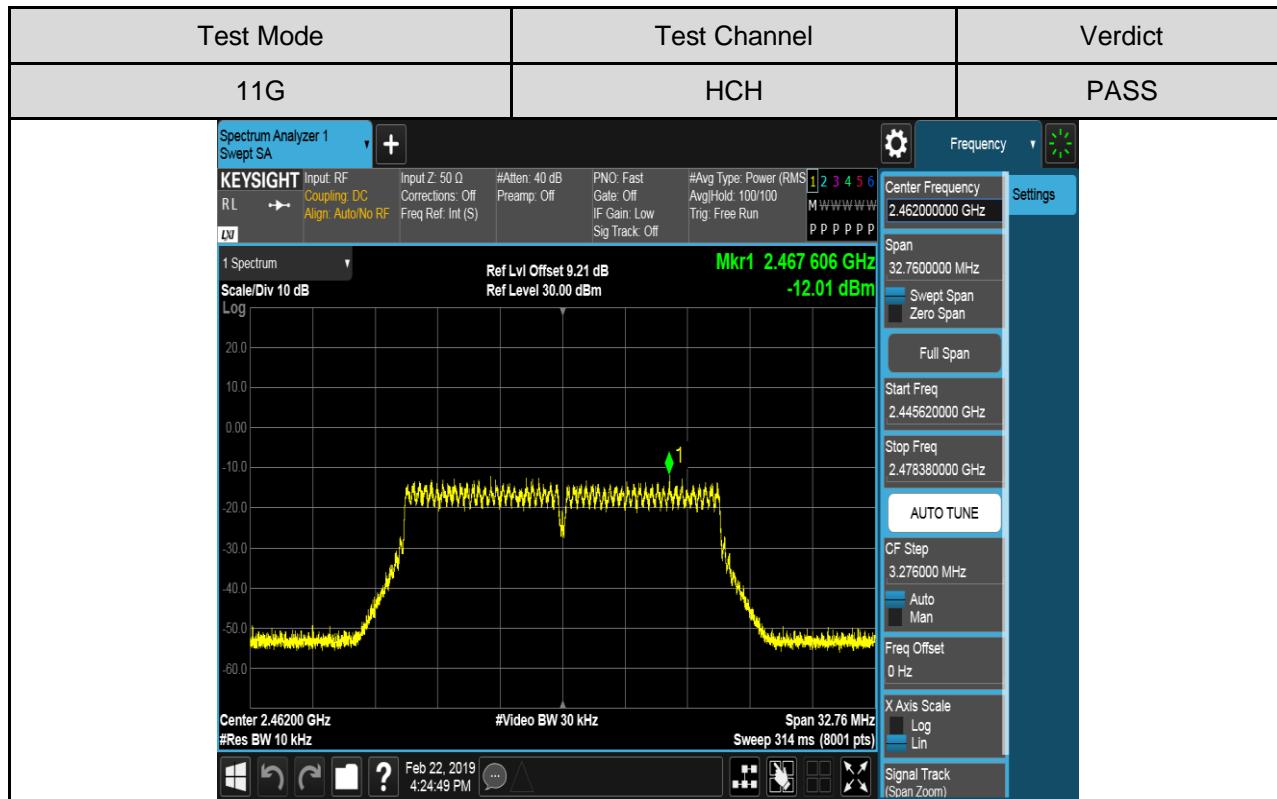
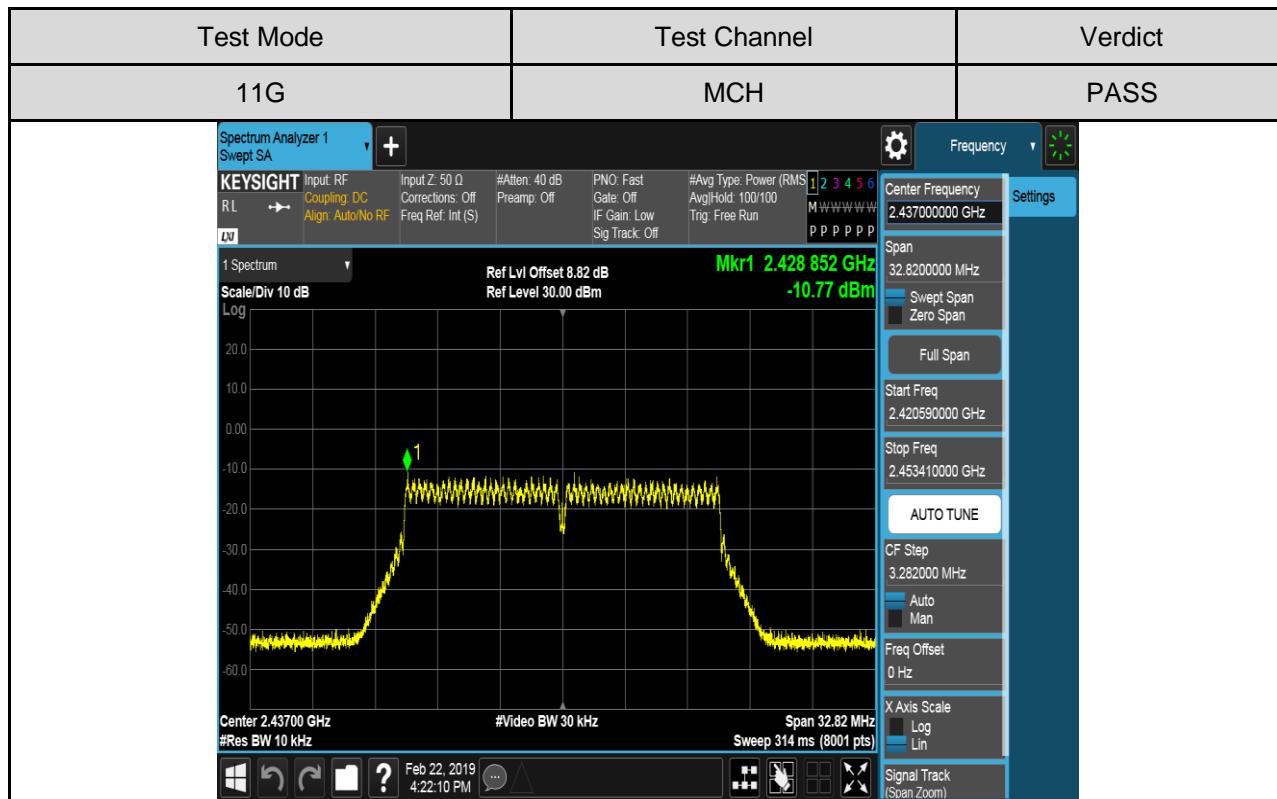
RESULTS TABLE

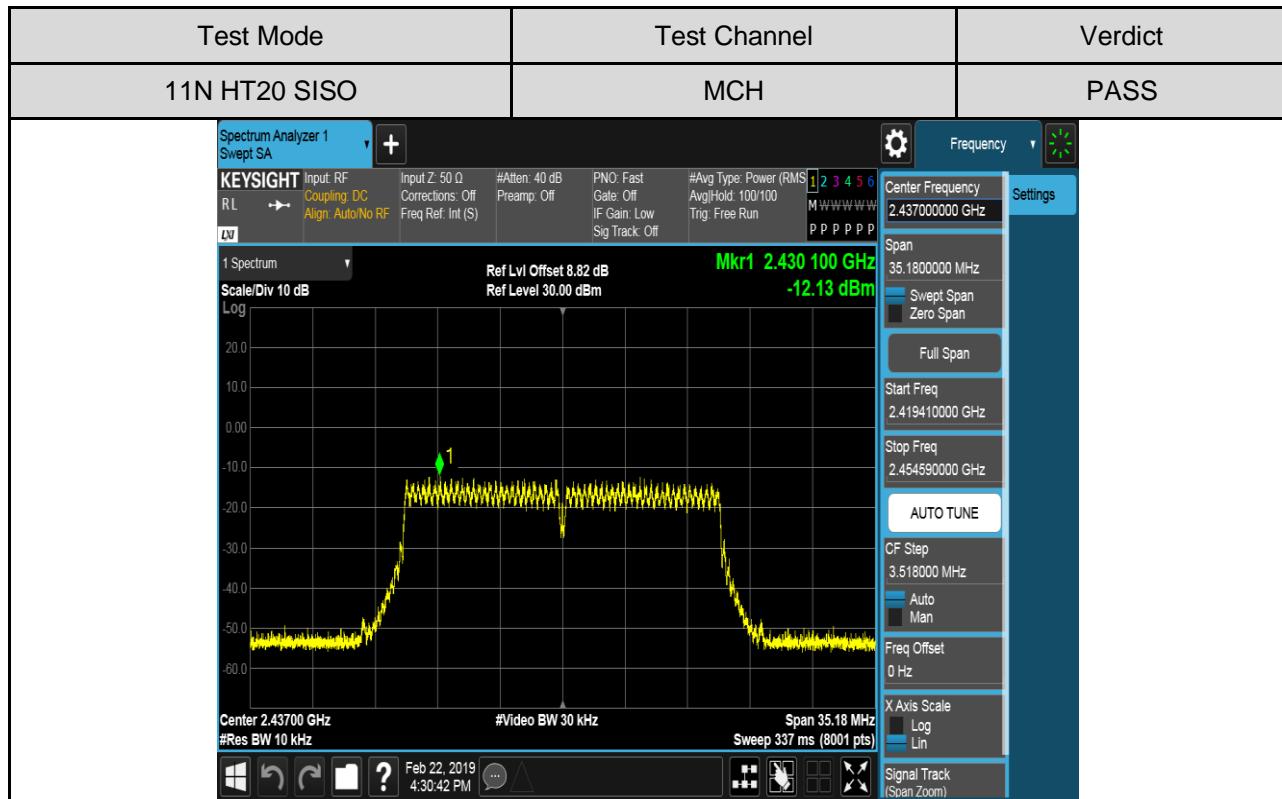
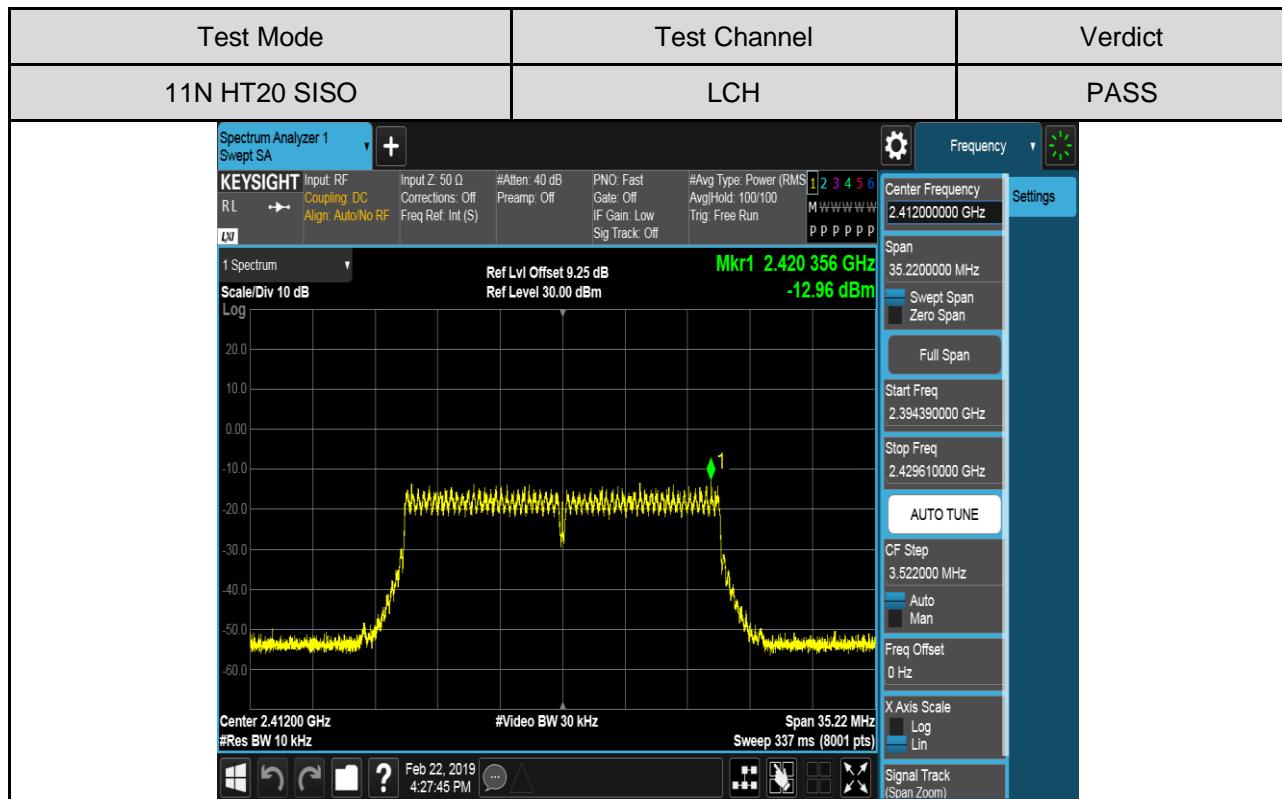
| Test Mode | Test Antenna | Test Channel | Maximum Peak power spectral density (dBm/100K) | Result |
|---------------|--------------|--------------|--|--------|
| 11B | Antenna 1 | LCH | -2.628 | Pass |
| | | MCH | -1.385 | Pass |
| | | HCH | -2.749 | Pass |
| 11G | Antenna 1 | LCH | -11.865 | Pass |
| | | MCH | -10.77 | Pass |
| | | HCH | -12.013 | Pass |
| 11N HT20 SISO | Antenna 1 | LCH | -12.959 | Pass |
| | | MCH | -12.134 | Pass |
| | | HCH | -12.71 | Pass |
| 11N HT40 SISO | Antenna 1 | LCH | -17.135 | Pass |
| | | MCH | -15.555 | Pass |
| | | HCH | -15.294 | Pass |

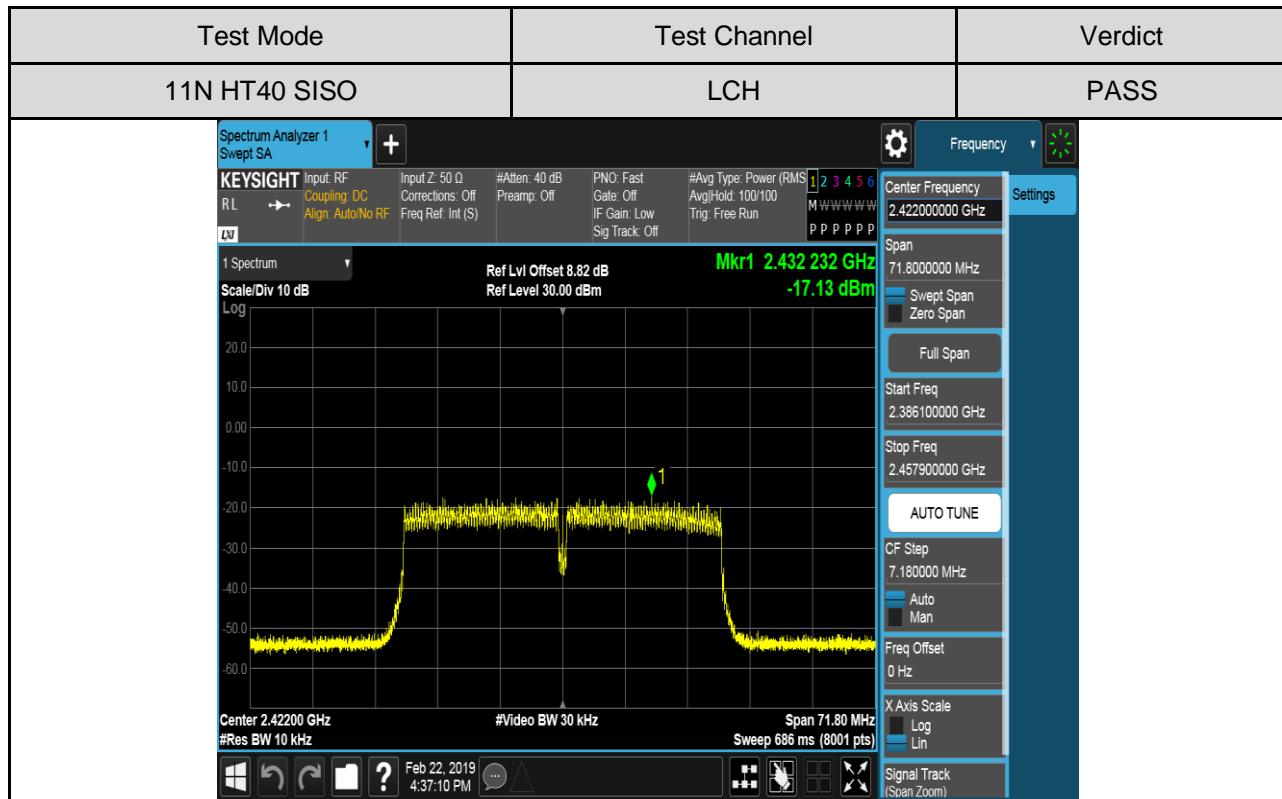
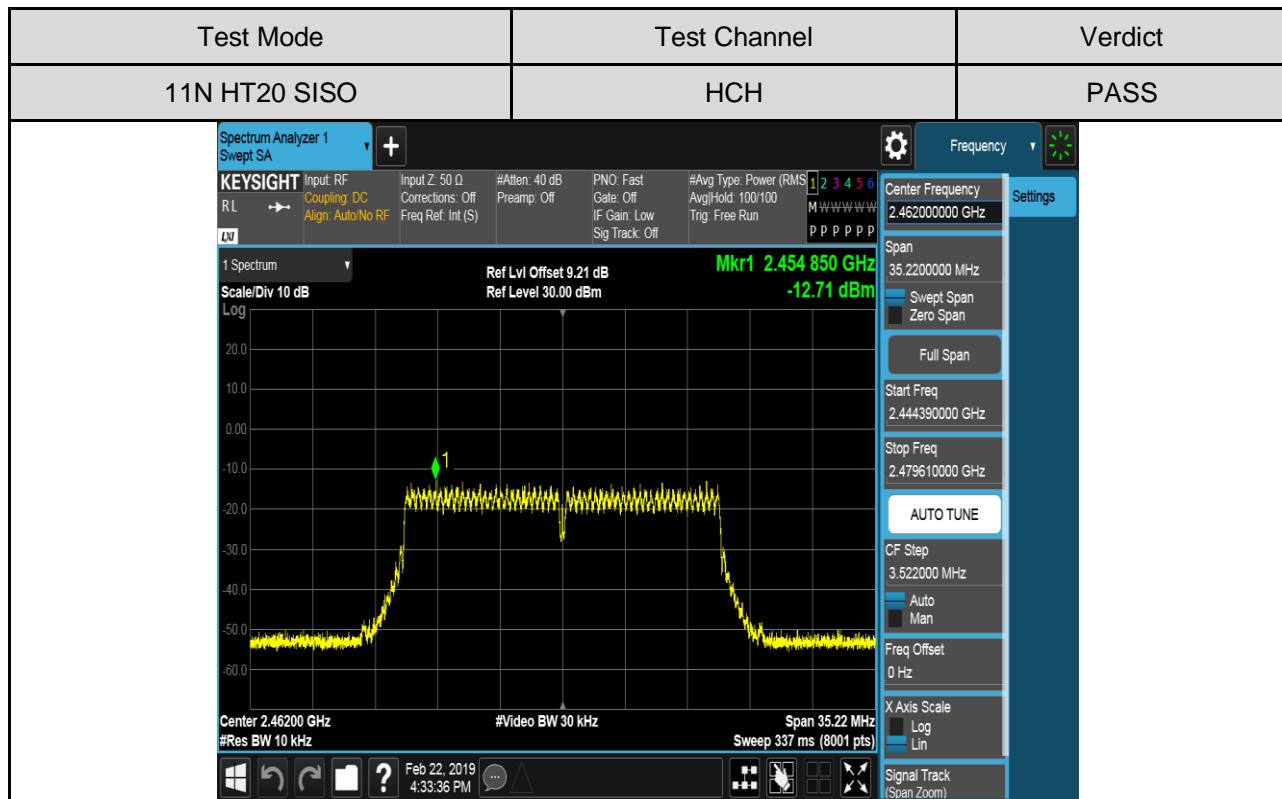
TEST GRAPHS

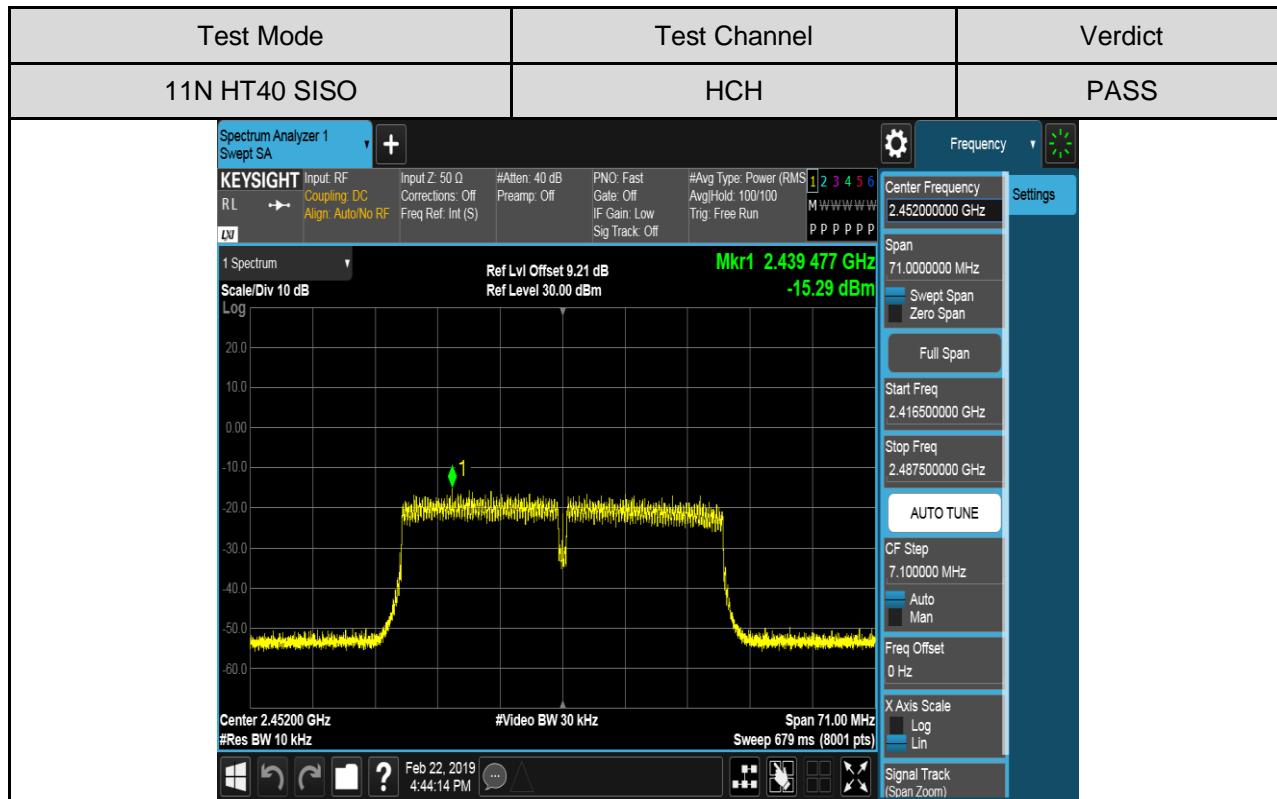
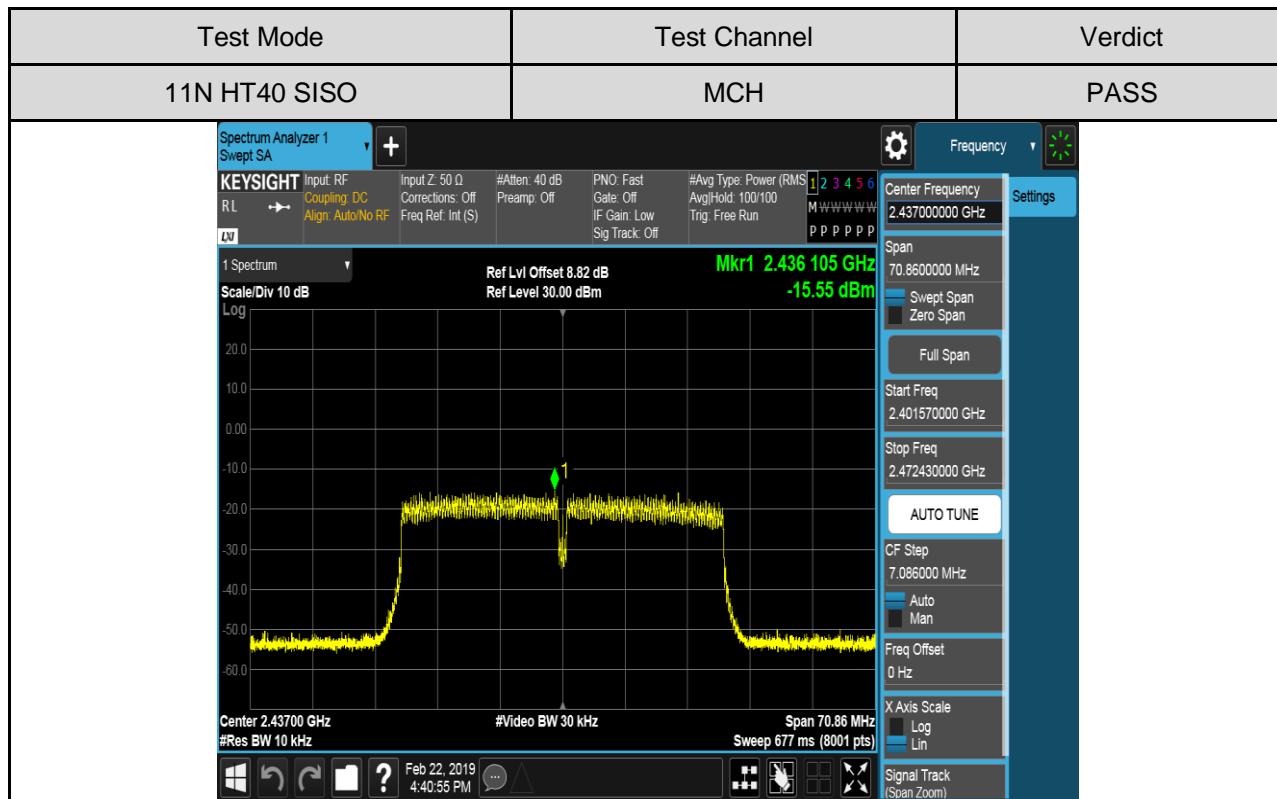












8.5. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

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

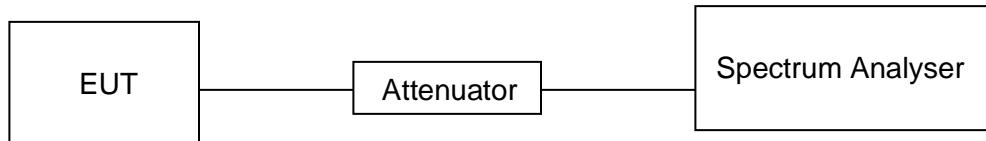
Connect the UUT to the spectrum analyser and use the following settings:

| | |
|------------------|--|
| 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. |

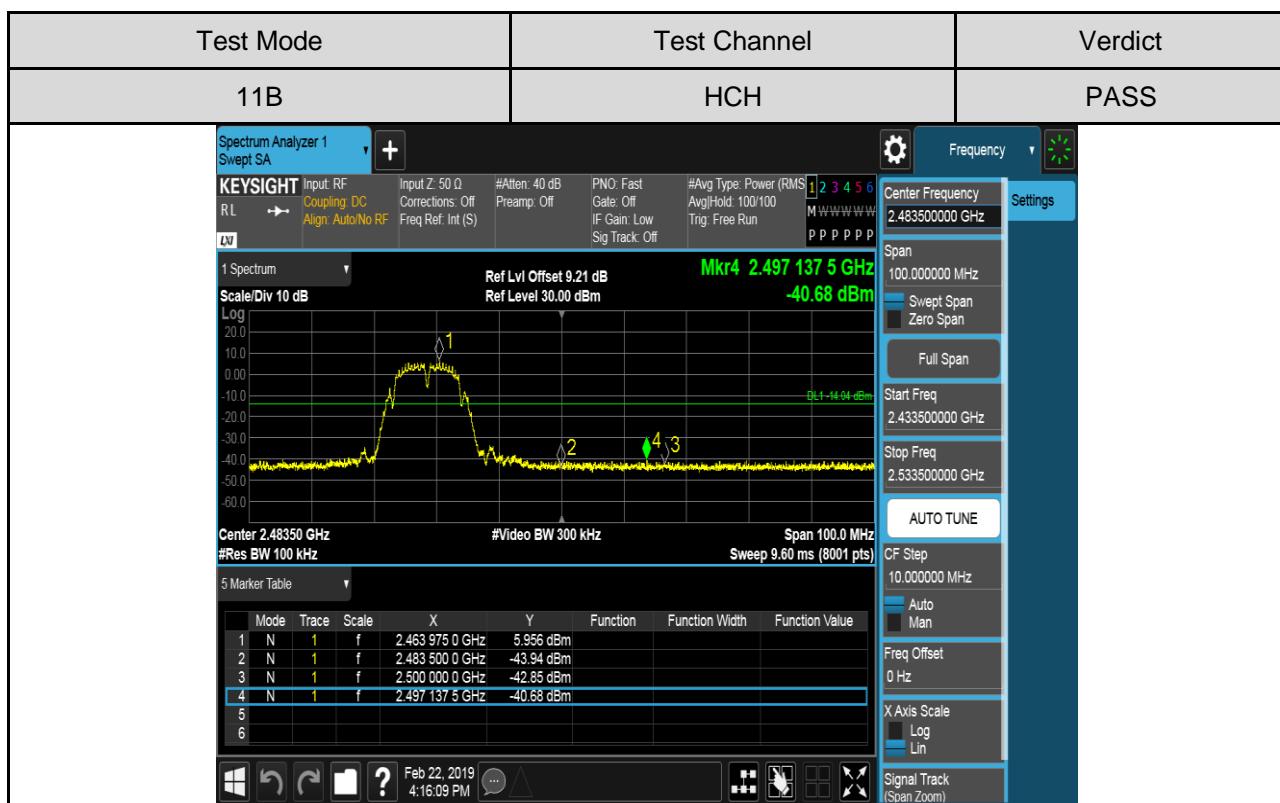
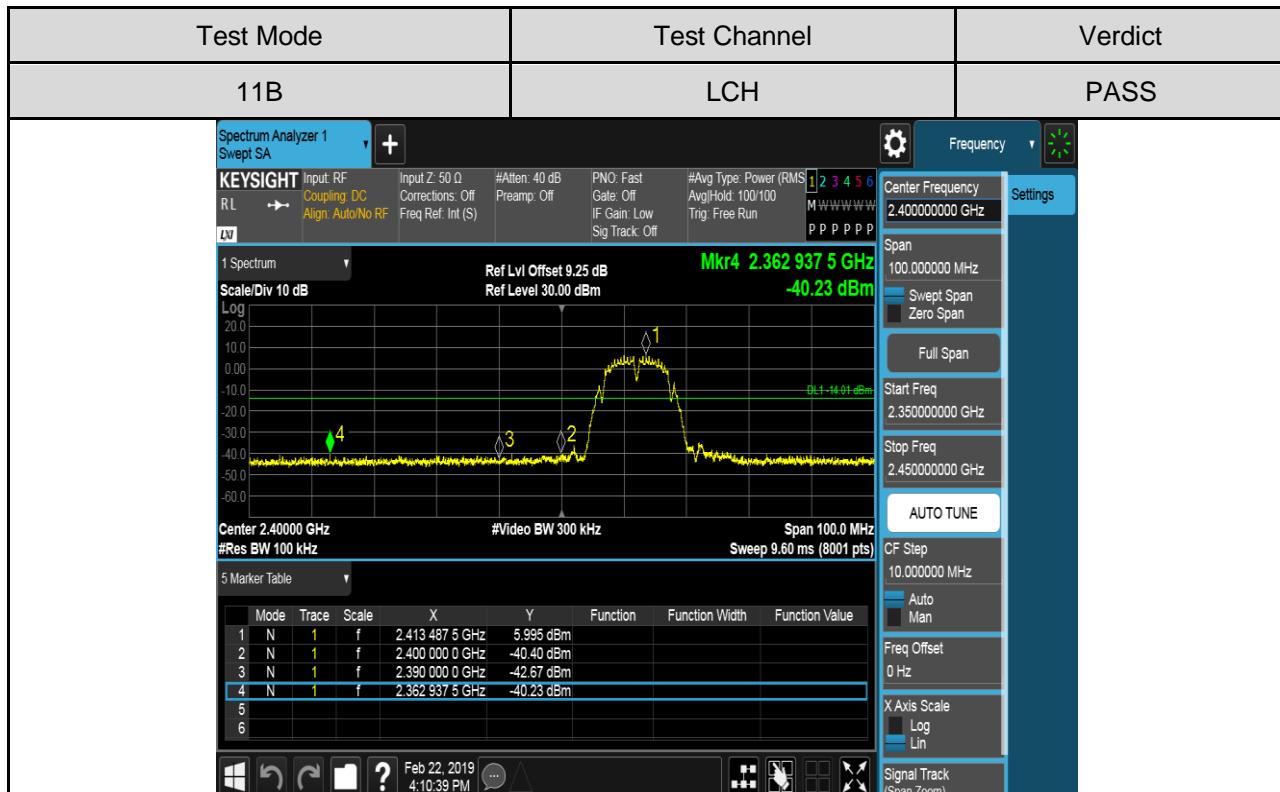
Use the peak marker function to determine the maximum amplitude level.

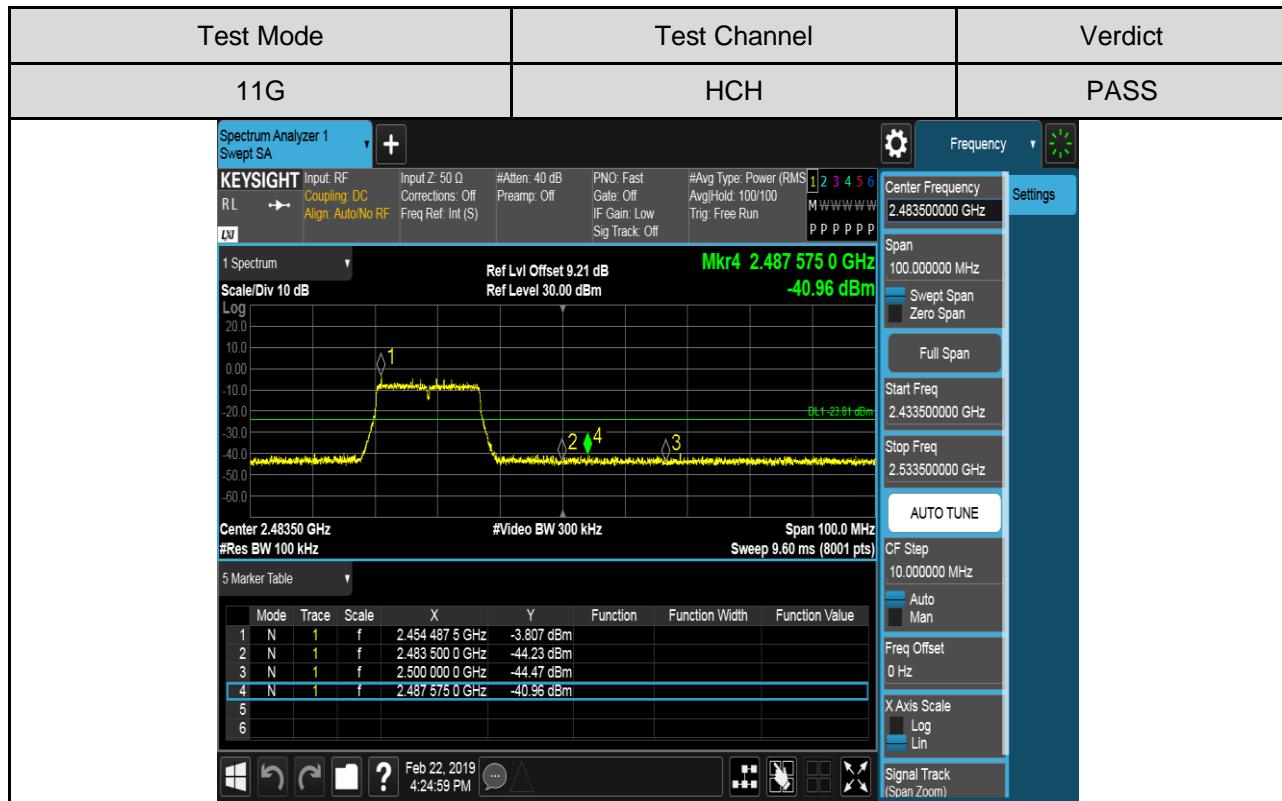
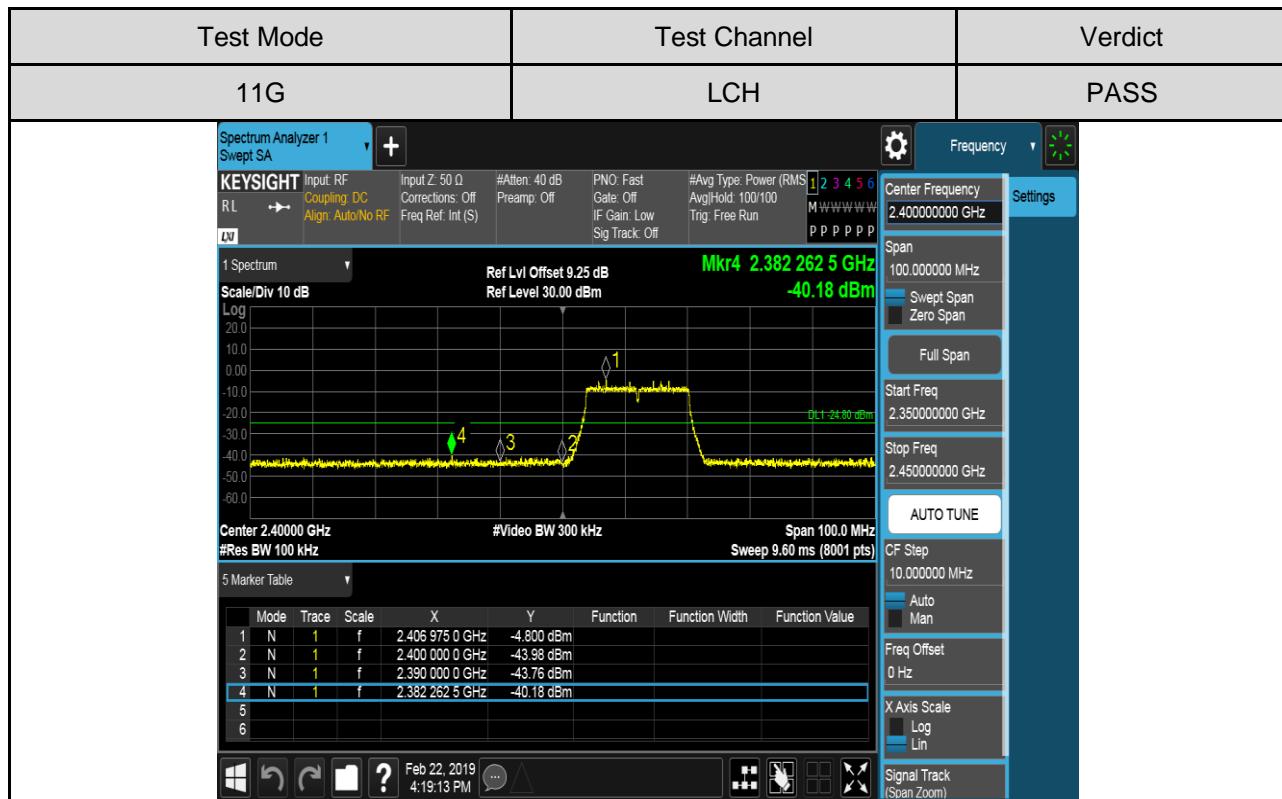
TEST SETUP**TEST ENVIRONMENT**

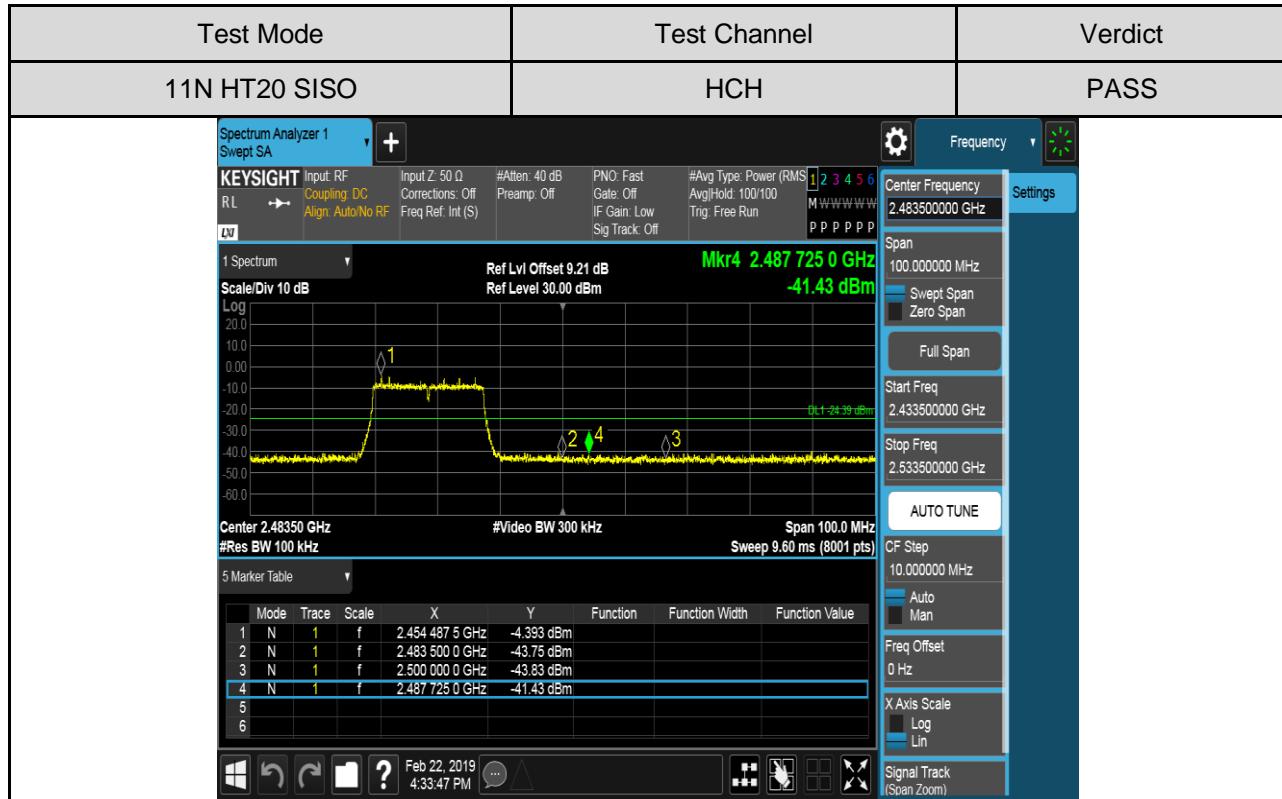
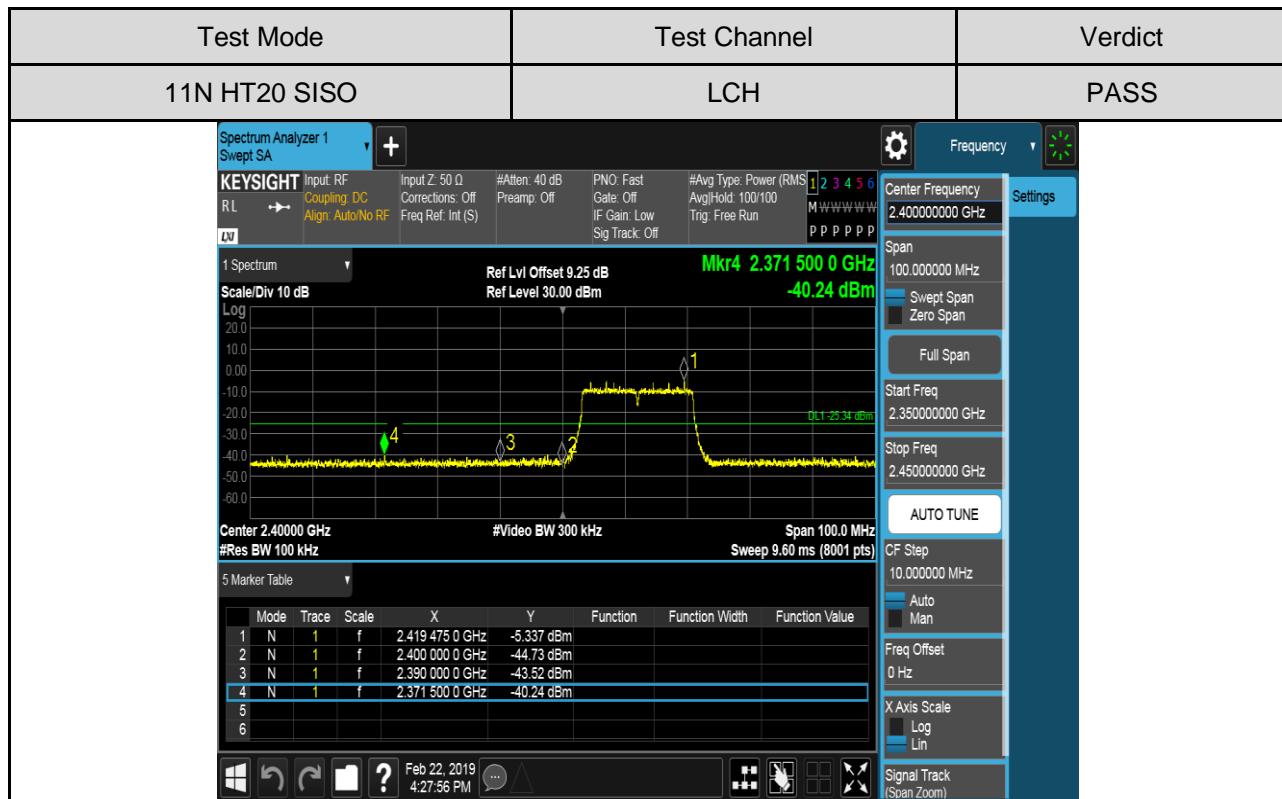
| | | | |
|---------------------|---------|-------------------|---------|
| Temperature | 25°C | Relative Humidity | 58 % |
| Atmosphere Pressure | 101 kPa | Test Voltage | DC 7.4V |

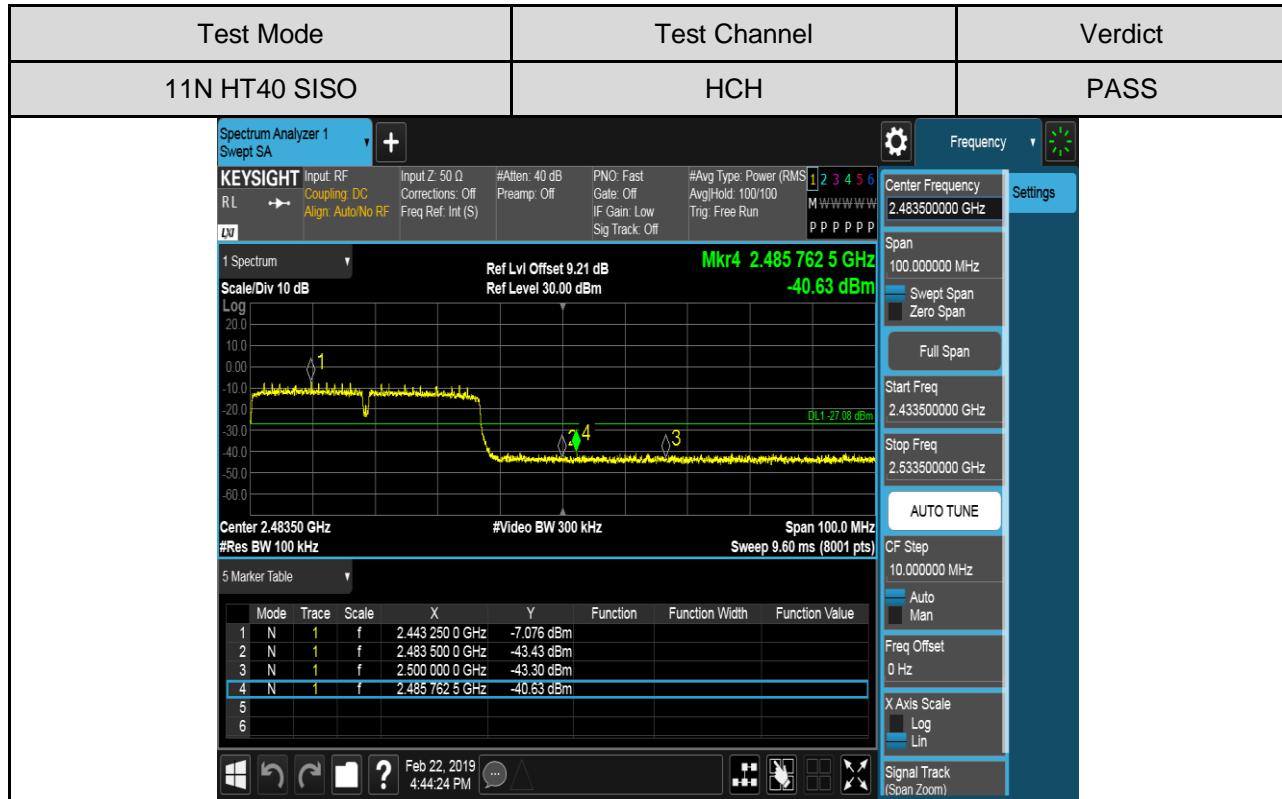
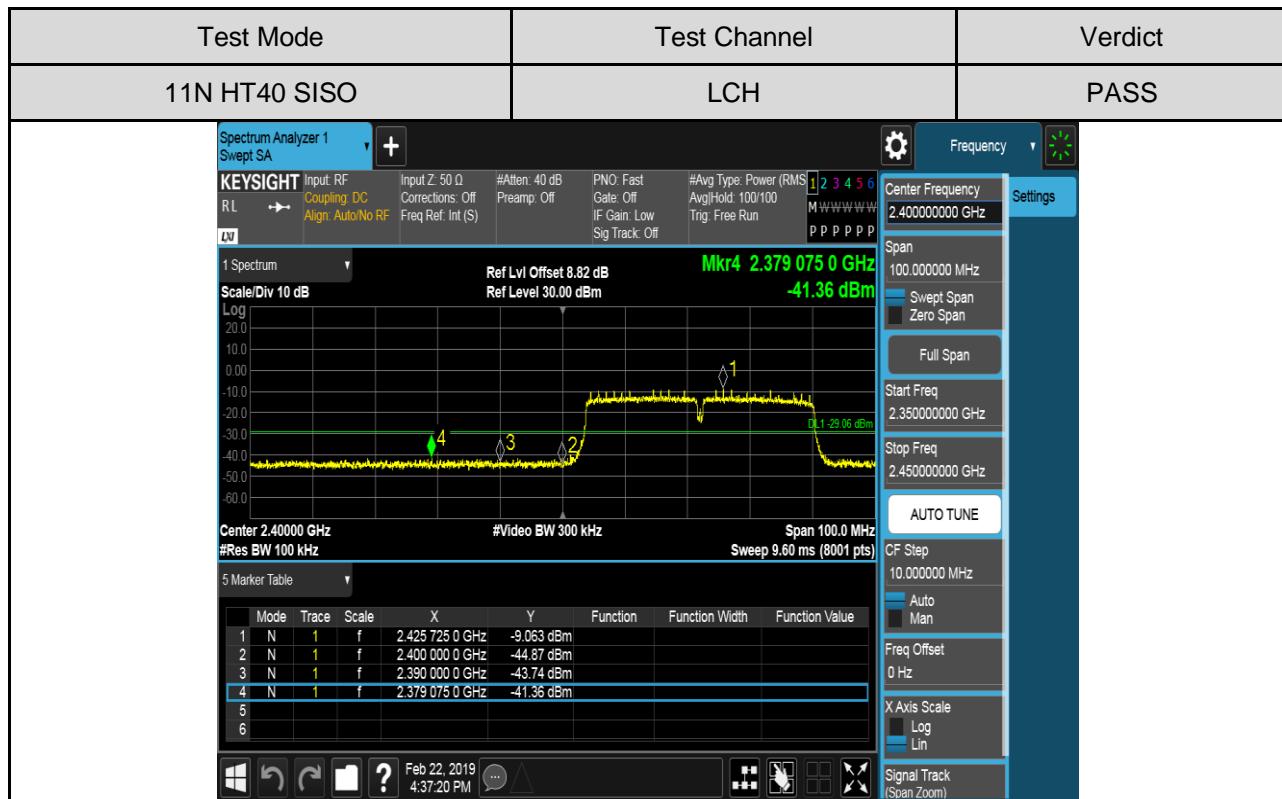
Part I: CONDUCTED BANDEDGE**RESULTS TABLE**

| Test Mode | Test Antenna | Test Channel | Carrier Power[dBm] | Max. Spurious Level [dBm] | Limit [dBm] | Verdict |
|---------------|--------------|--------------|--------------------|---------------------------|-------------|---------|
| 11B | Antenna 1 | LCH | 2.611 | -40.229 | -17.39 | PASS |
| | | HCH | 2.527 | -40.684 | -17.47 | PASS |
| 11G | Antenna 1 | LCH | 0.284 | -40.182 | -19.72 | PASS |
| | | HCH | 0.051 | -40.962 | -19.95 | PASS |
| 11N HT20 SISO | Antenna 1 | LCH | -0.330 | -40.242 | -20.33 | PASS |
| | | HCH | -0.703 | -41.435 | -20.7 | PASS |
| 11N HT40 SISO | Antenna 1 | LCH | -4.934 | -41.359 | -24.93 | PASS |
| | | HCH | -5.609 | -40.629 | -25.61 | PASS |

TEST GRAPHS







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

| Test Mode | Test Antenna | Channel | Pref(dBm) | Puw(dBm) | Verdict |
|------------------|--------------|---------|-----------|----------|---------|
| 11B | Antenna 1 | LCH | 6.19 | <Limit | PASS |
| | | MCH | 7.11 | <Limit | PASS |
| | | HCH | 5.97 | <Limit | PASS |
| 11G | Antenna 1 | LCH | -4.74 | <Limit | PASS |
| | | MCH | -3.32 | <Limit | PASS |
| | | HCH | -3.90 | <Limit | PASS |
| 11N HT20 SISO | Antenna 1 | LCH | -5.17 | <Limit | PASS |
| | | MCH | -3.85 | <Limit | PASS |
| | | HCH | -4.72 | <Limit | PASS |
| 11N HT40 SISO | Antenna 1 | LCH | -9.04 | <Limit | PASS |
| | | MCH | -6.75 | <Limit | PASS |
| | | HCH | -7.24 | <Limit | PASS |

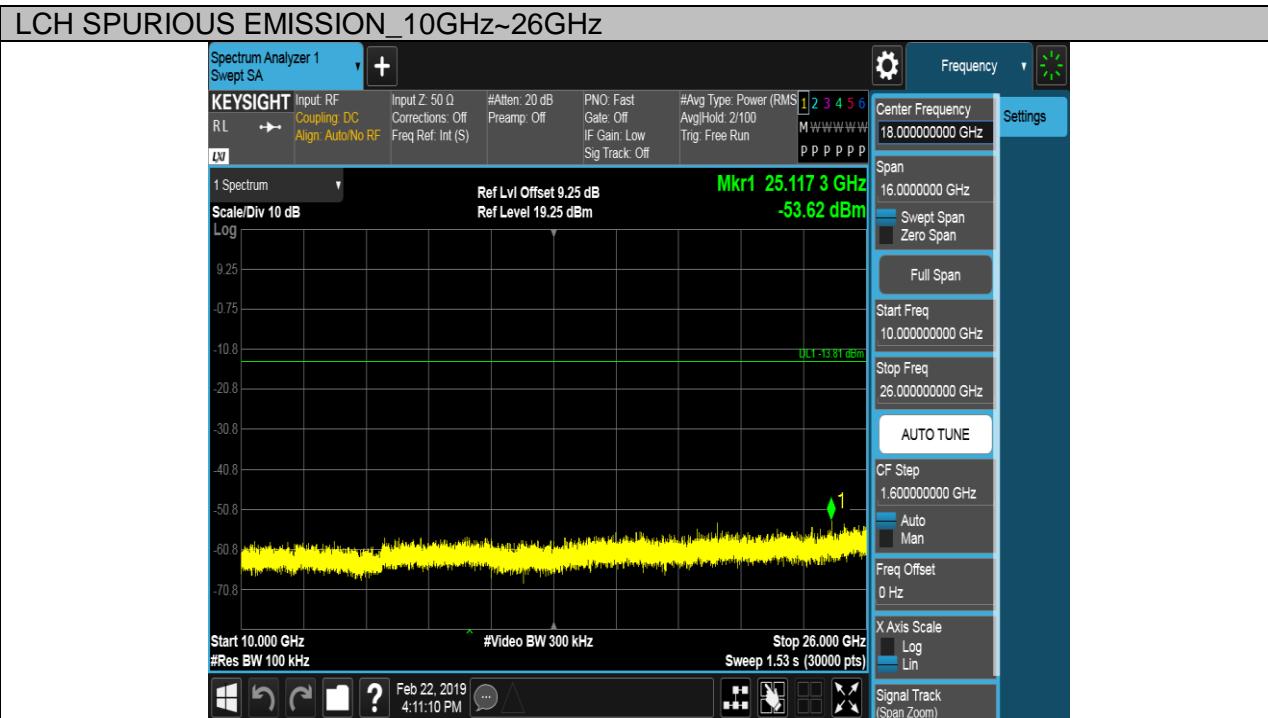
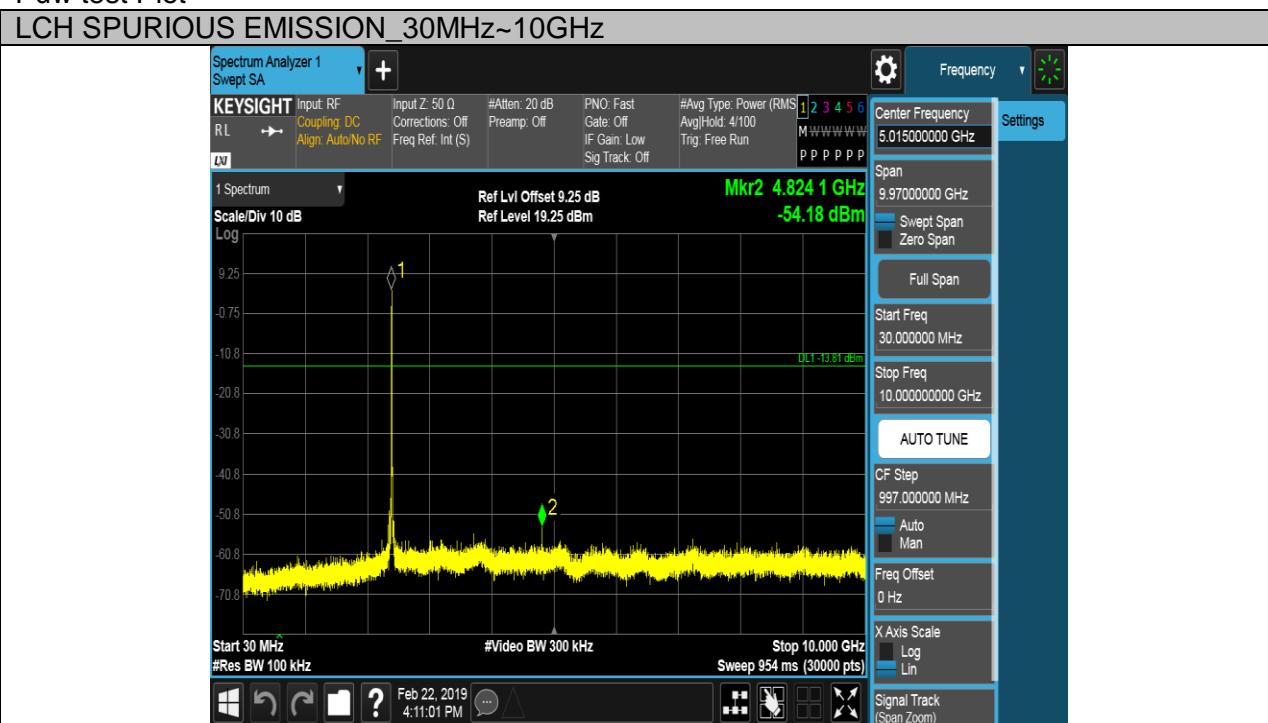
TEST GRAPHSANTENNA1

| Test Mode | Channel | Verdict |
|-----------|---------|---------|
| 11B | LCH | PASS |

Pref test Plot



Puw test Plot

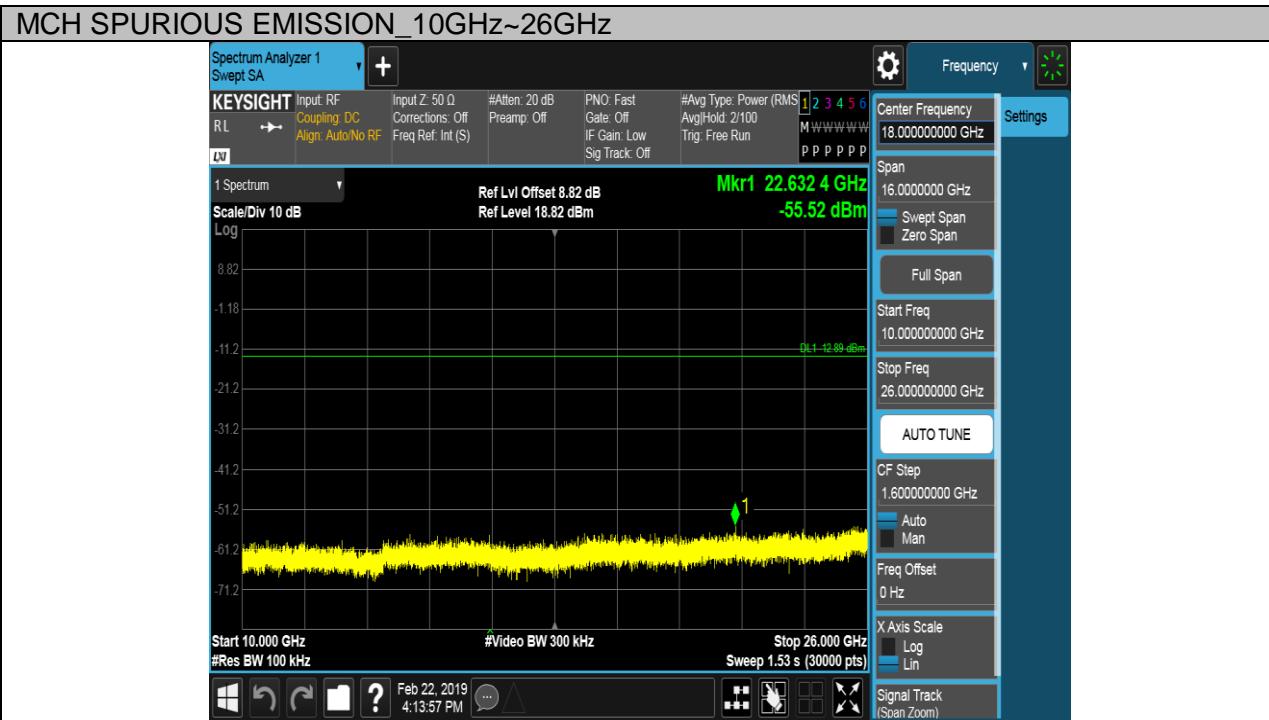
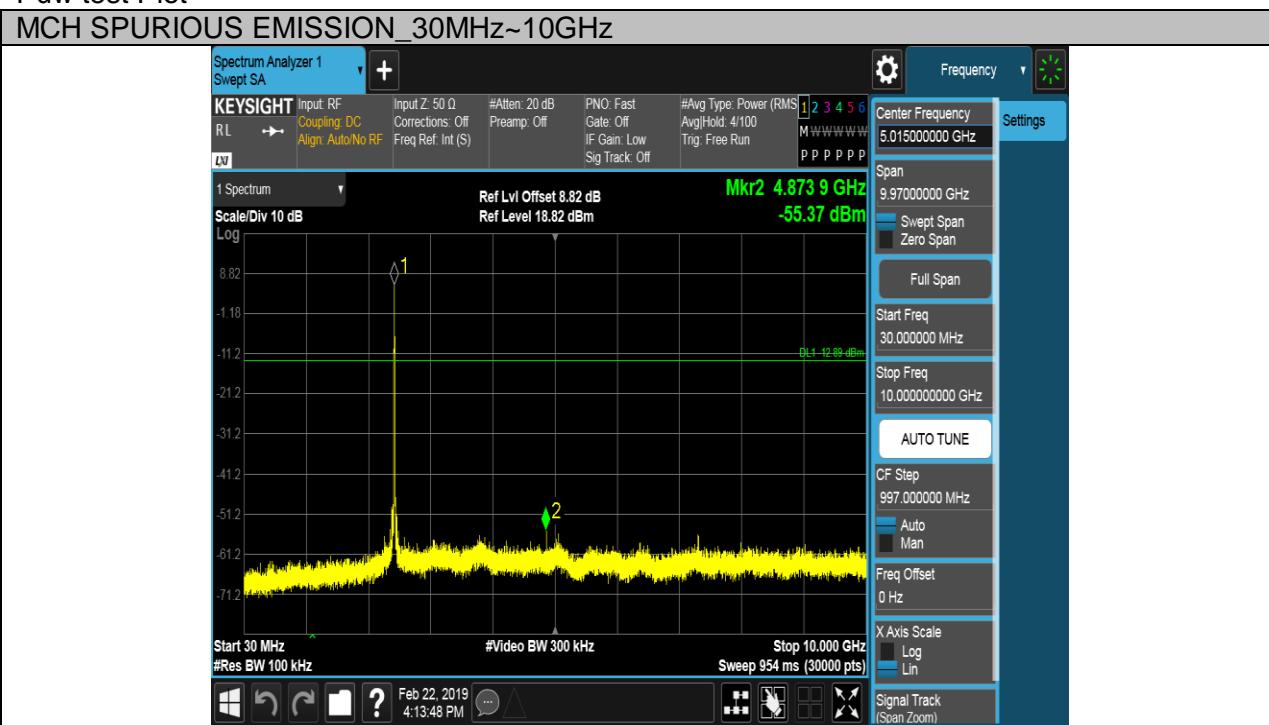


| Test Mode | Channel | Verdict |
|-----------|---------|---------|
| 11B | MCH | PASS |

Pref test Plot



Puw test Plot

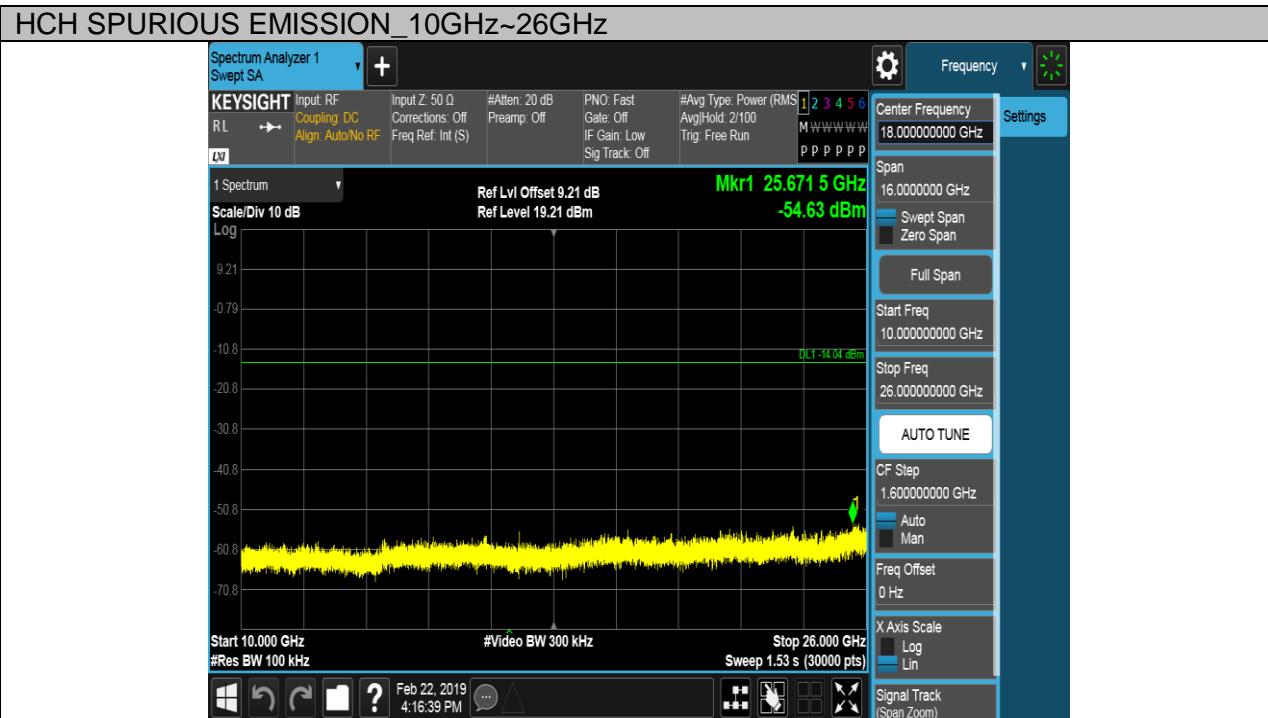
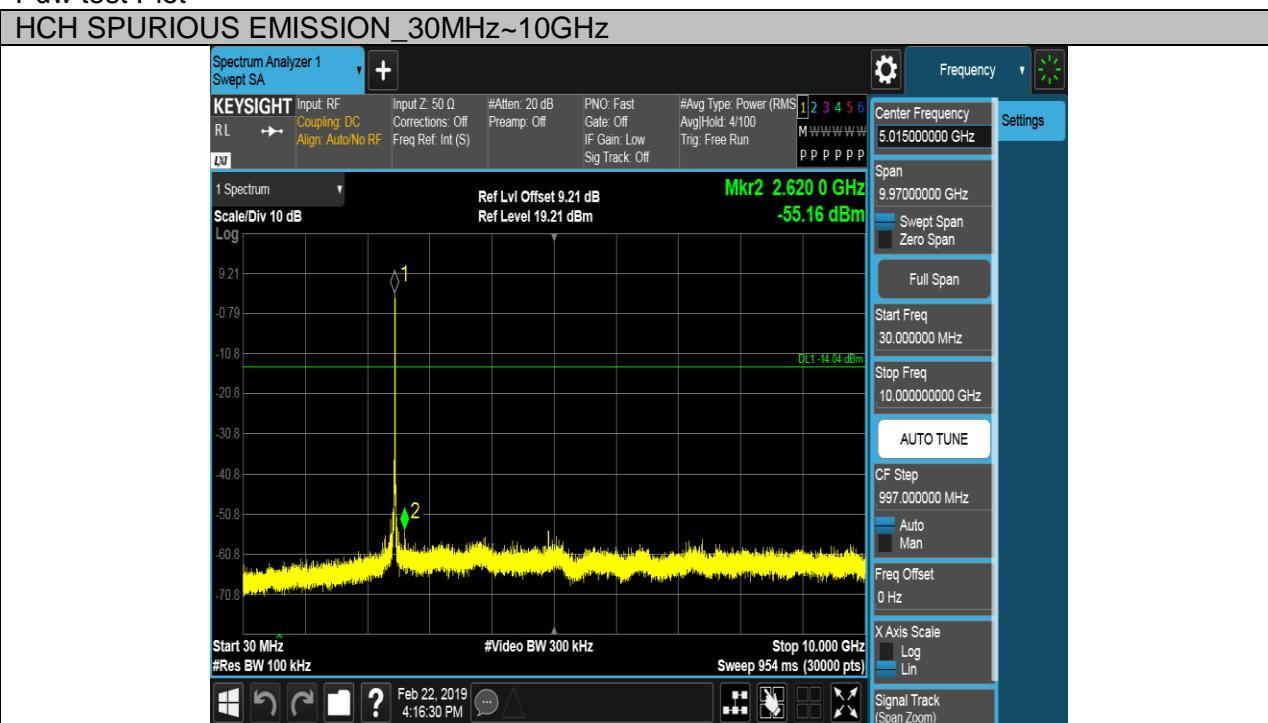


| Test Mode | Channel | Verdict |
|-----------|---------|---------|
| 11B | HCH | PASS |

Pref test Plot



Puw test Plot



| Test Mode | Channel | Verdict |
|-----------|---------|---------|
| 11G | LCH | PASS |

Pref test Plot

