



FCC 47 CFR PART 15 SUBPART C

CERTIFICATION TEST REPORT

For

Wi-Fi Indoor Monitor

MODEL NUMBER: DHI-VTH5241DW-S2

**ADDITIONAL MODEL NUMBER: VTH5241DW-S2; DHI-VTH5241D-S2;
VTH5241D-S2**

PROJECT NUMBER: 4788923491

REPORT NUMBER: 4788923491-1

FCC ID: SVNVTH5241DW-S2

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Prepared for

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Prepared by

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Revision History

| Rev. | Issue Date | Revisions | Revised By |
|------|------------|---------------|------------|
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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name: Zhejiang Dahua Vision Technology Co., Ltd.

Address: No.1199, Bin'an road, Binjiang District, Hangzhou, P.R.China.

Manufacturer Information

Company Name: Zhejiang Dahua Vision Technology Co., Ltd.
Address: No.1199, Bin'an road, Binjiang District, Hangzhou, P.R.China.

Factory Information

Company Name: ZHEJIANG DAHUA VISION TECHNOLOGY CO.,LTD
Address: No.1199, Bin'an road, Binjiang District, Hangzhou, P.R.China.

Company Name: ZHEJIANG DAHUA ZHILIAN CO.,LTD.
Address: No.28, Dongqiao Road, Dongzhou Street, Fuyang District, Hangzhou,P.R.China.

EUT Description

Product Name: Wi-Fi Indoor Monitor
Model Name: DHI-VTH5241DW-S2
Additional No.: VTH5241DW-S2; DHI-VTH5241D-S2; VTH5241D-S2
Sample Number: 2511625
Data of Receipt Sample: May 31, 2019
Date Tested: May 31, 2019 ~ Sep. 14, 2019

| APPLICABLE STANDARDS | |
|--------------------------|--------------|
| STANDARD | TEST RESULTS |
| CFR 47 Part 15 Subpart C | PASS |

| Summary of Test Results | | | |
|-------------------------|---|--|--------------|
| Clause | Test Items | FCC/IC Rules | Test Results |
| 1 | 6db DTS Bandwidth | FCC 15.247 (a) (2) | Complied |
| 2 | Peak Conducted Power | FCC 15.247 (b) (3) | Complied |
| 3 | Power Spectral Density | FCC 15.247 (e) | Complied |
| 4 | Conducted Band edge And Spurious emission | FCC 15.247 (d) | Complied |
| 5 | Radiated Band edges and Spurious emission | FCC 15.247 (d) FCC 15.209 FCC 15.205 | Complied |
| 6 | Conducted Emission Test For AC Power Port | FCC 15.207 | Complied |
| 7 | Antenna Requirement | FCC 15.203 | Complied |

Remark:

1) The measurement result for the sample received is <Pass> according to < ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15C> when <Accuracy Method> decision rule is applied.

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Authorized By:

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Scholl Zhang
Laboratory Leader

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC KDB 558074 D01 15.247 Meas Guidance v05r02, KDB 414788 D01 Radiated Test Site v01r01, ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15.

3. FACILITIES AND ACCREDITATION

| | |
|---------------------------|---|
| Accreditation Certificate | <p>A2LA (Certificate No.: 4829.01) UL-CCIC COMPANY LIMITED has been assessed and proved to be in compliance with A2LA.</p> <p>FCC (FCC Designation No.: CN1247) UL-CCIC COMPANY LIMITED has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules.</p> <p>IC (IC Designation No.: 25056) UL-CCIC COMPANY LIMITED has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules.</p> |
|---------------------------|---|

Note 1: All tests measurement facilities use to collect the measurement data are located at No. 2, Chengwan Road, Suzhou Industrial Park, Suzhou 215122, People's Republic of 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 OFS.

Note 3: The test anechoic chamber in UL-CCIC COMPANY LIMITED 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 recognized 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 | 3.00dB |
| Radiation Emission test(include Fundamental emission) (9KHz-30MHz) | 3.31dB |
| Radiation Emission test(include Fundamental emission) (30MHz-1GHz) | 3.31dB |
| Radiation Emission test (1GHz to 26GHz)(include Fundamental emission) | 3.83dB (1GHz-18Gz) 4.13dB (18GHz-26.5Gz) |

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: | Wi-Fi Indoor Monitor |
| Model No.: | DHI-VTH5241DW-S2 |
| 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 and HT40): OFDM (64QAM, 16QAM, QPSK, BPSK) |
| Channels Step: | Channels with 5MHz step |
| Sample Type: | Fixed production |
| Test power grade: | 44 (manufacturer declare) |
| Test software of EUT: | Secure CRT (manufacturer declare) |
| Antenna Type: | Meander Antenna |
| Antenna Gain: | 3.16 dBi |

Remark:

Model No.:

| Number: | Name: | Number: | Name: | Number: | Name: |
|---------|------------------|---------|--------------|---------|-----------------|
| 1 | DHI-VTH5241DW-S2 | 2 | VTH5241DW-S2 | 3 | DHI-VTH5241D-S2 |
| 4 | VTH5241D-S2 | | | | |

Only the main model **DHI-VTH5241DW-S2** was tested and only the data of this model is shown in this test report. Since their electrical circuit design, layout, components used and internal wiring are identical, only the model name and selling area are different.

5.2. MAXIMUM OUTPUT POWER

| Number of Transmit Chains (NTX) | IEE Std. 802.11 | Channel Number | Max PK Conducted Power-Antenna1 (dBm) |
|---------------------------------|------------------|----------------|---------------------------------------|
| 1 | IEEE 802.11B | 1-11[11] | 18.92 |
| 1 | IEEE 802.11G | 1-11[11] | 18.53 |
| 1 | IEEE 802.11nHT20 | 1-11[11] | 18.54 |
| 1 | IEEE 802.11nHT40 | 3-9[7] | 18.06 |

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 (MHz) |
|-------------------|--------------------|
| IEEE 802.11B | LCH :CH01 2412 |
| | MCH: CH06 2437 |
| | HCH: CH11 2462 |
| IEEE 802.11G | LCH :CH01 2412 |
| | MCH: CH06 2437 |
| | HCH: CH11 2462 |
| IEEE 802.11n HT20 | LCH :CH01 2412 |
| | MCH: CH06 2437 |
| | HCH: CH11 2462 |
| IEEE 802.11n HT40 | LCH :CH03 2422 |
| | MCH: CH06 2437 |
| | HCH: CH09 2452 |

5.5. THE WORSE CASE POWER SETTING PARAMETER

| The Worse Case Power Setting Parameter under 2400 ~ 2483.5MHz Band | | | | | | | |
|--|-------------------------|--------------|------|-------|------------|------|------|
| Test Software | | SecureCRT | | | | | |
| 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 | 40 | 40 | 40 | / | | |
| 802.11g | 1 | 40 | 40 | 40 | | | |
| 802.11n HT20 | 1 | 40 | 40 | 40 | | | |
| 802.11n HT40 | 1 | / | | 40 | 40 | 40 | |

5.6. DESCRIPTION OF AVAILABLE ANTENNAS

| Ant. | Frequency (MHz) | Antenna Type | Antenna Gain (dBi) |
|------|-----------------|-----------------|--------------------|
| 1 | 2400-2483.5 | Meander Antenna | 3.16 |

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

5.7. THE WORSE CASE CONFIGURATIONS

For the product, there are two transmission antennas, and pre-testing both of them, only the worse data for the antenna is recorded in the report.

Worst-case data rates as provided by the client were:

802.11b mode: 1 Mbps
802.11b mode: 6 Mbps
802.11n HT20 mode: MCS0
802.11n HT40 mode: MCS0

5.8. TEST ENVIRONMENT

| Environment Parameter | Selected Values During Tests | |
|-----------------------|------------------------------|-----------|
| Relative Humidity | 55 ~ 65% | |
| Atmospheric Pressure: | 1025Pa | |
| Temperature | TN | 23 ~ 28°C |
| Voltage : | VL | N/A |
| | VN | AC 120V |
| | VH | N/A |

Note: VL= Lower Extreme Test Voltage

VN= Nominal Voltage

VH= Upper Extreme Test Voltage

TN= Normal Temperature

5.9. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

| Item | Equipment | Brand Name | Model Name | Description |
|------|-----------------------|------------|------------|------------------|
| 1 | Laptop | ThinkPad | E550c | N/A |
| 2 | Fixed Frequency Board | N/A | N/A | Supply by UL Lab |

I/O PORT

| Cable No | Port | Connector Type | Cable Type | Cable Length(m) | Remarks |
|----------|------|----------------|------------|-----------------|---------|
| 1 | N/A | N/A | N/A | N/A | N/A |

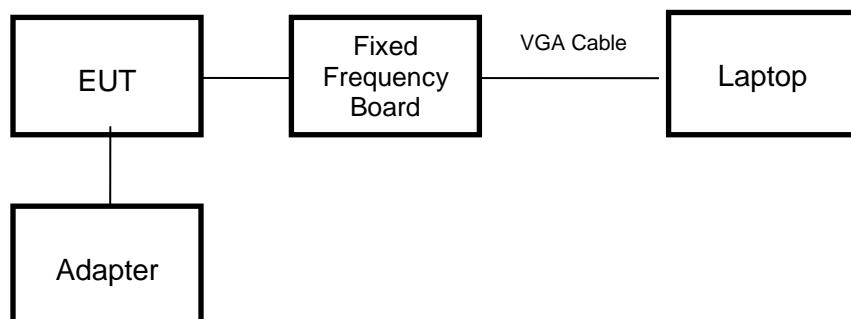
ACCESSORY

| Item | Accessory | Brand Name | Model Name | Description |
|------|-----------|------------|------------|---------------------------------|
| 1 | SD Card | Kingston | 32GB | Supply by UL Lab |
| 2 | VGA Cable | N/A | N/A | 100cm Length (Supply by UL Lab) |

TEST SETUP

The EUT can work in an engineer mode with a software through a table PC.

SETUP DIAGRAM FOR TESTS





5.10. MEASURING INSTRUMENT AND SOFTWARE USED

| Conducted Emissions (Instrument) | | | | | | | |
|-------------------------------------|---|----------------------------------|-------------------------------------|-------------|-----------------|------------|------------|
| Used | Equipment | Manufacturer | Model No. | Serial No. | Upper Last Cal. | Last Cal. | Next Cal. |
| <input checked="" type="checkbox"/> | EMI Test Receiver | R&S | ESR3 | 126700 | 2017-12-14 | 2018-12-13 | 2019-12-12 |
| <input checked="" type="checkbox"/> | Two-Line V-Network | R&S | ENV216 | 126701 | 2017-12-14 | 2018-12-13 | 2019-12-12 |
| <input checked="" type="checkbox"/> | Artificial Mains Networks | R&S | ENY81 | 126711 | 2017-12-14 | 2018-12-13 | 2019-12-12 |
| Software | | | | | | | |
| Used | Description | | Manufacturer | Name | Version | | |
| <input checked="" type="checkbox"/> | Test Software for Conducted disturbance | | R&S | EMC32 | Ver. 9.25 | | |
| Radiated Emissions (Instrument) | | | | | | | |
| Used | Equipment | Manufacturer | Model No. | Serial No. | Upper Last Cal. | Last Cal. | Next Cal. |
| <input checked="" type="checkbox"/> | Spectrum Analyzer | Keysight | N9010B | MY57110128 | 2018-05-30 | 2019-05-29 | 2020-05-28 |
| <input checked="" type="checkbox"/> | EMI test receiver | R&S | ESR26 | 1267603 | 2017-12-14 | 2018-12-13 | 2019-12-22 |
| <input checked="" type="checkbox"/> | Receiver Antenna (9kHz-30MHz) | Schwarzbeck | FMZB 1513 | 513-265 | 2018-06-17 | 2019-06-16 | 2020-06-15 |
| <input checked="" type="checkbox"/> | Receiver Antenna (30MHz-1GHz) | SunAR RF Motion | JB1 | 126704 | N/A | 2019-01-28 | 2022-01-27 |
| <input checked="" type="checkbox"/> | Receiver Antenna (1GHz-18GHz) | R&S | HF907 | 126705 | 2018-01-27 | 2019-01-26 | 2020-01-26 |
| <input checked="" type="checkbox"/> | Receiver Antenna (18GHz-26.5GHz) | Schwarzbeck | BBHA9170 | 126706 | 2018-02-07 | 2019-02-06 | 2020-02-05 |
| <input checked="" type="checkbox"/> | Receiver Antenna (26.5GHz-40GHz) | TOYO | HAP 26-40W | 00000012 | 2018-07-25 | 2019-07-23 | 2020-07-22 |
| <input checked="" type="checkbox"/> | Pre-amplification (To 1GHz) | R&S | SCU-03D | 134666 | 2018-02-07 | 2019-02-06 | 2020-02-05 |
| <input checked="" type="checkbox"/> | Pre-amplification (To 18GHz) | Compliance Direction System Inc. | PAP-1G18-50 | 14140-13467 | N/A | 2019-03-18 | 2020-03-17 |
| <input checked="" type="checkbox"/> | Pre-amplification (To 26.5GHz) | R&S | SCU-26D | 134668 | 2018-02-07 | 2019-02-06 | 2020-02-05 |
| <input checked="" type="checkbox"/> | Band Reject Filter | Wainwright | WRCJV8-2350-2400-2483.5-2533.5-40SS | 1 | 2018-05-30 | 2019-05-29 | 2020-05-28 |
| <input checked="" type="checkbox"/> | Highpass Filter | Wainwright | WHKX10-2700-3000-18000-40SS | 2 | 2018-05-30 | 2019-05-29 | 2020-05-28 |
| Software | | | | | | | |
| Used | Description | | Manufacturer | Name | Version | | |
| <input checked="" type="checkbox"/> | Test Software for Radiated disturbance | | Tonscend | JS32 | V1.0 | | |
| Other instruments | | | | | | | |
| Used | Equipment | Manufacturer | Model No. | Serial No. | Upper Last Cal. | Last Cal. | Next Cal. |
| <input checked="" type="checkbox"/> | Spectrum Analyzer | Keysight | N9010B | MY57110128 | 2018-05-30 | 2019-05-29 | 2020-05-28 |



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| | | | | | | | |
|-------------------------------------|-------------|----------|---------|------------|------------|------------|------------|
| <input checked="" type="checkbox"/> | Power Meter | Keysight | U2021XA | MY57110002 | 2018-06-13 | 2019-06-12 | 2020-06-11 |
|-------------------------------------|-------------|----------|---------|------------|------------|------------|------------|

6. MEASUREMENT METHODS

| No. | Test Item | KDB Name | Section |
|-----|---|--|-----------------|
| 1 | 6dB Bandwidth | KDB 558074 D01 15.247 Meas Guidance v05r02 | 8.2 |
| 2 | Peak Output Power | KDB 558074 D01 15.247 Meas Guidance v05r02 | 8.3.1.3/8.3.2.3 |
| 3 | Power Spectral Density | KDB 558074 D01 15.247 Meas Guidance v05r02 | 8.4 |
| 4 | Out-of-band emissions in non-restricted bands | KDB 558074 D01 15.247 Meas Guidance v05r02 | 8.5 |
| 5 | Out-of-band emissions in restricted bands | KDB 558074 D01 15.247 Meas Guidance v05r02 | 8.6 |
| 6 | Band-edge | KDB 558074 D01 15.247 Meas Guidance v05r02 | 8.7 |
| 7 | Conducted Emission Test For AC Power Port | ANSI C63.10-2013 | 6.2 |

7. ANTENNA PORT TEST RESULTS

7.1. ON TIME AND DUTY CYCLE

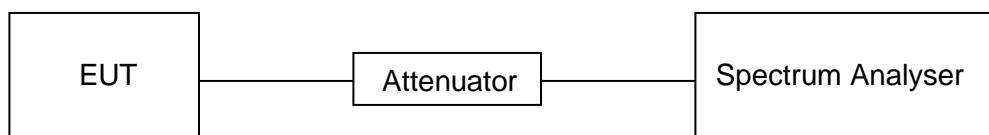
LIMITS

None; for reporting purposes only

PROCEDURE

FCC KDB 558074 Zero-Span Spectrum Analyzer Method

TEST SETUP



TEST ENVIRONMENT

| | | | |
|---------------------|--------|-------------------|---------|
| Temperature | 22°C | Relative Humidity | 56% |
| Atmosphere Pressure | 101kPa | Test Voltage | AC 120V |

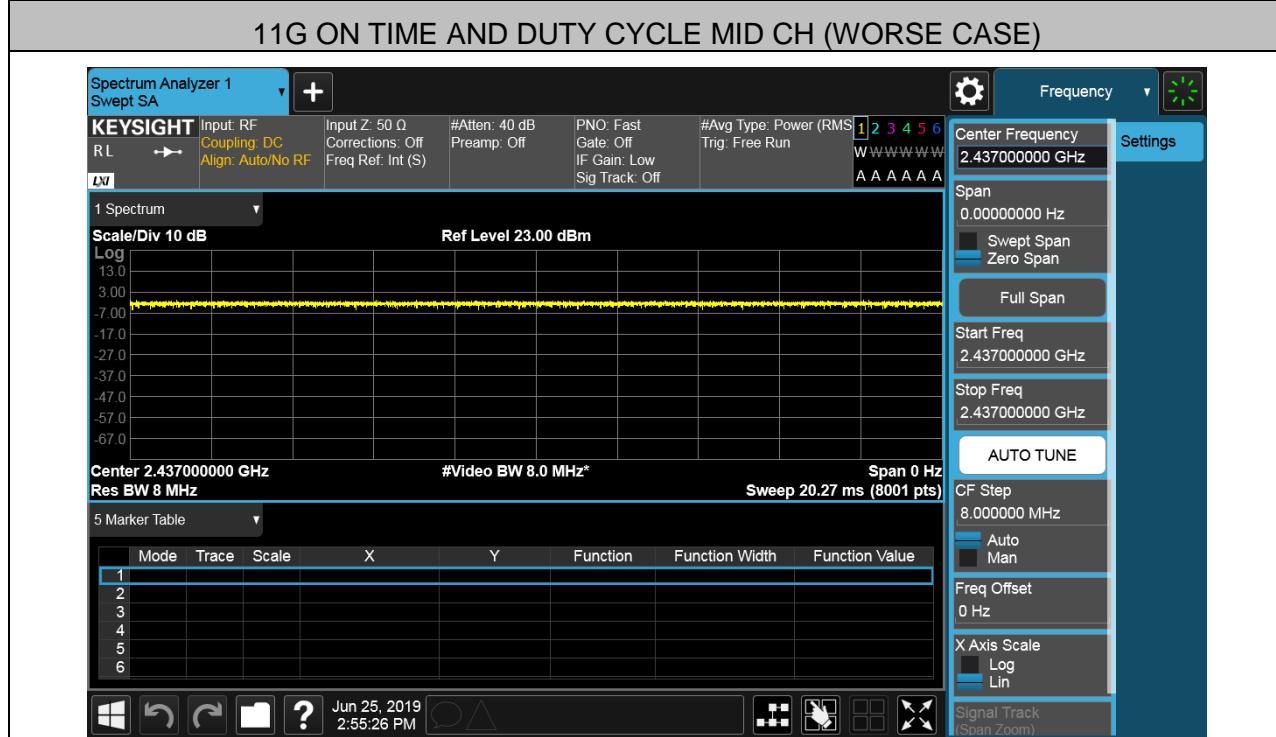
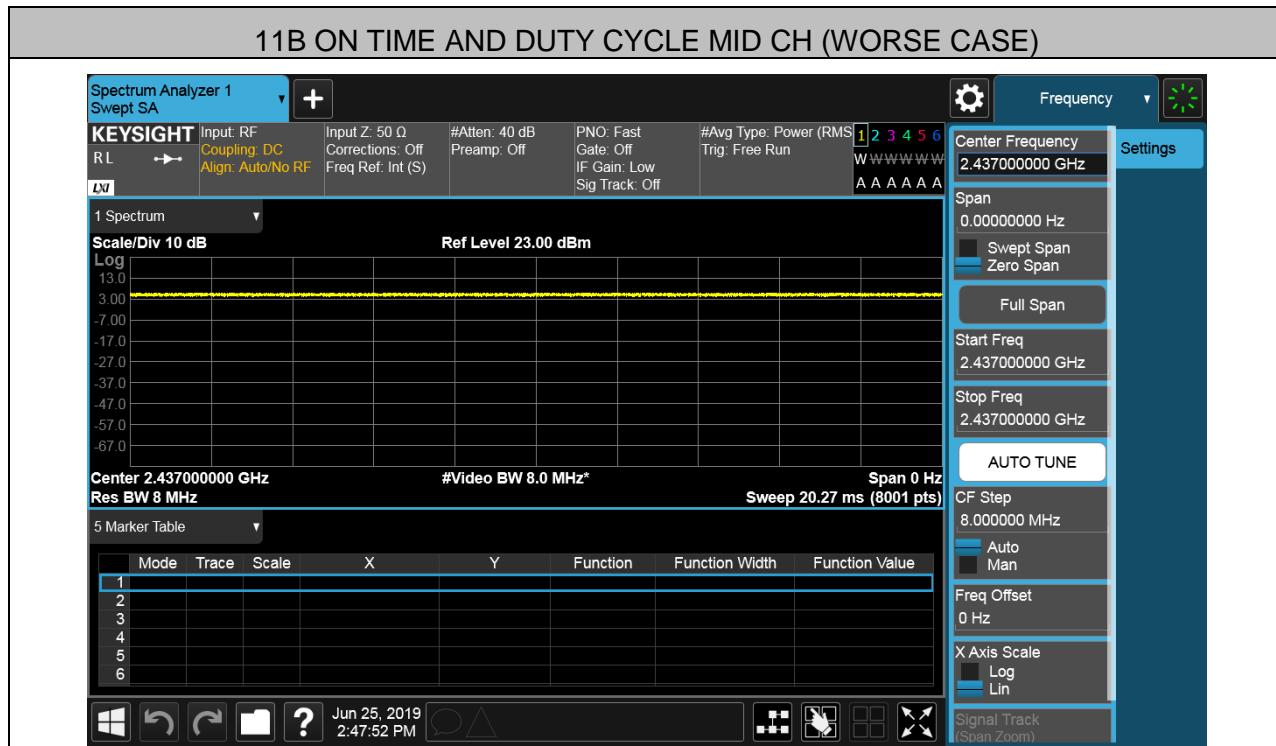
RESULTS

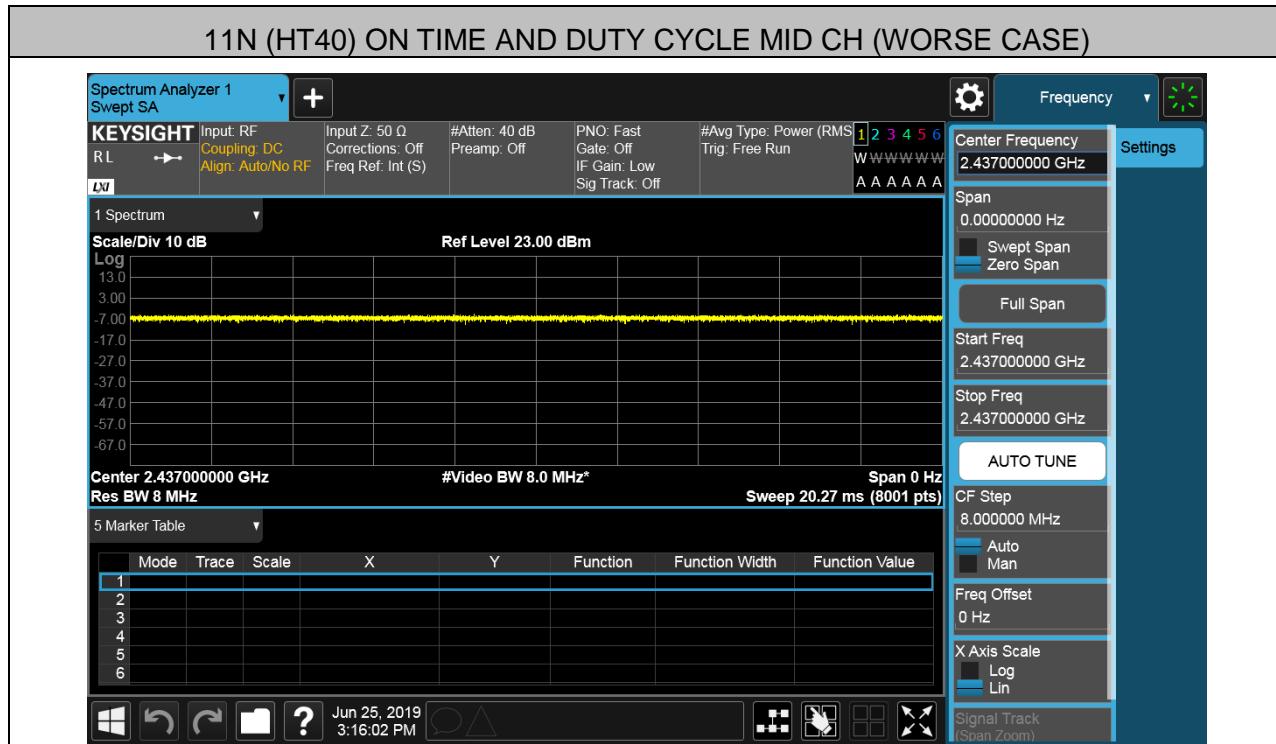
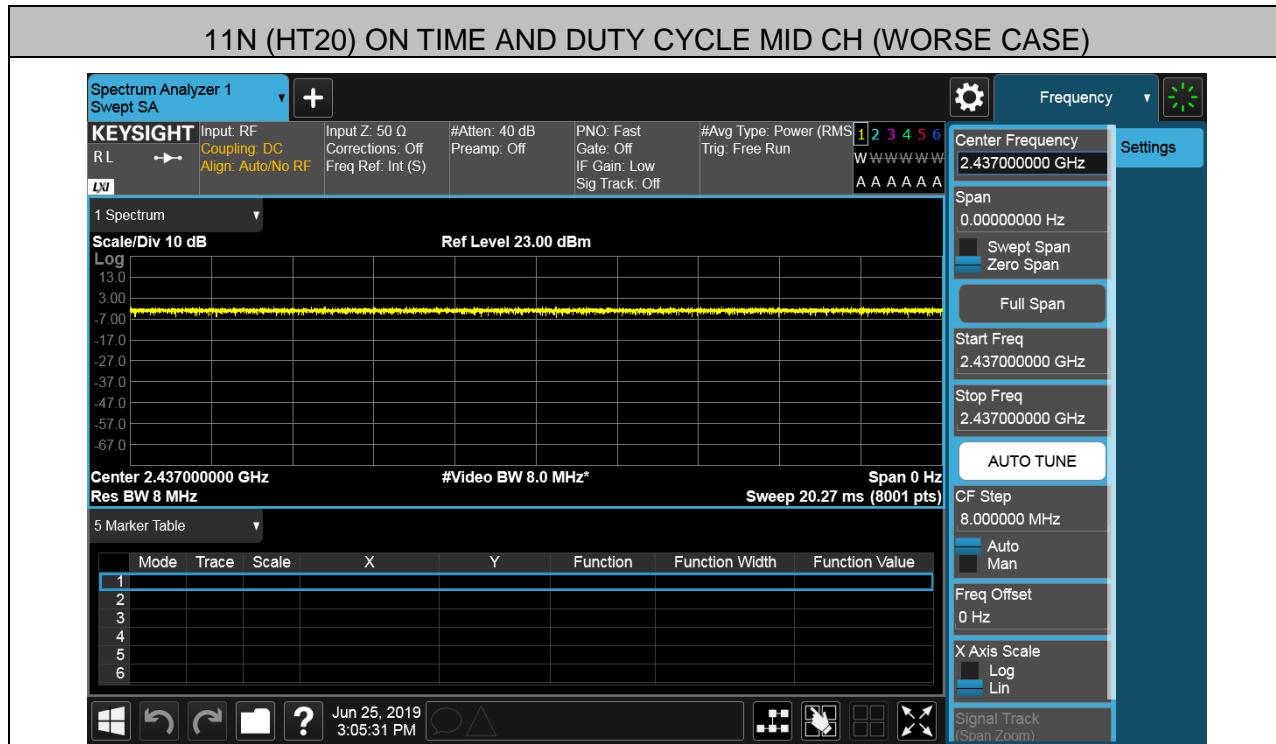
| Mode | On Time (msec) | Period (msec) | Duty Cycle x (Linear) | Duty Cycle (%) | Duty Cycle Correction Factor (db) | 1/T Minimum VBW (KHz) | Final VBW (Hz) |
|--------------|----------------|---------------|-----------------------|----------------|-----------------------------------|-----------------------|----------------|
| 11B | 100 | 100 | 1 | 100 | 0 | 0.01 | 10 |
| 11G | 100 | 100 | 1 | 100 | 0 | 0.01 | 10 |
| 802.11n HT20 | 100 | 100 | 1 | 100 | 0 | 0.01 | 10 |
| 802.11n HT40 | 100 | 100 | 1 | 100 | 0 | 0.01 | 10 |

Note: 1) Duty Cycle Correction Factor=10log(1/x).

2) Where: x is Duty Cycle(Linear)

3) Where: T is On Time (transmit duration)





7.2. 6 dB BANDWIDTH

LIMITS

| FCC Part15 (15.247) Subpart C | | | |
|-------------------------------|---------------|-----------|-----------------------|
| Section | Test Item | Limit | Frequency Range (MHz) |
| FCC 15.247(a)(2) | 6dB Bandwidth | >= 500KHz | 2400-2483.5 |

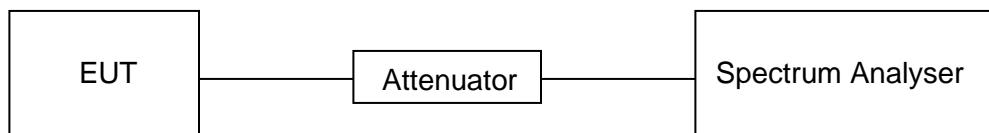
TEST PROCEDURE

Refer to FCC KDB 558074, 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 6 dB Bandwidth :100K |
| VBW | For 6dB Bandwidth : $\geq 3 \times$ RBW |
| Trace | Max hold |
| Sweep | Auto couple |

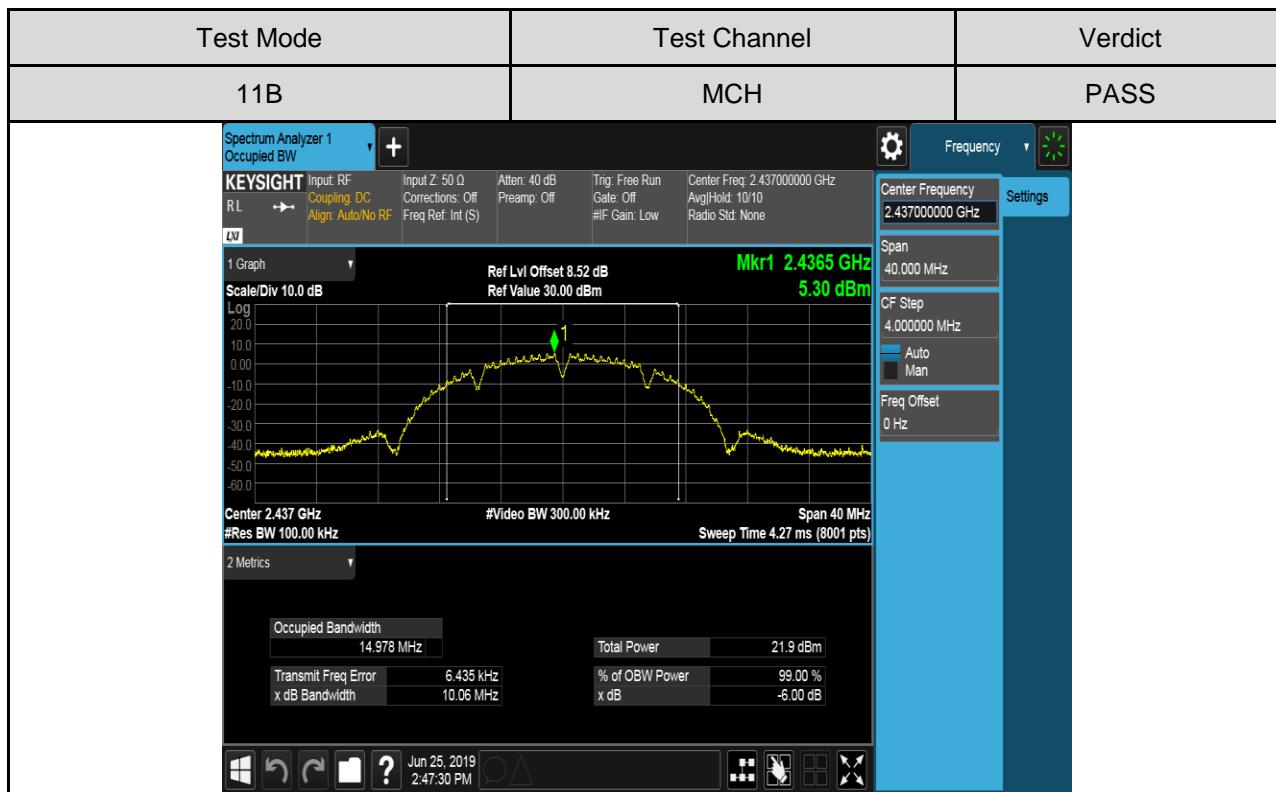
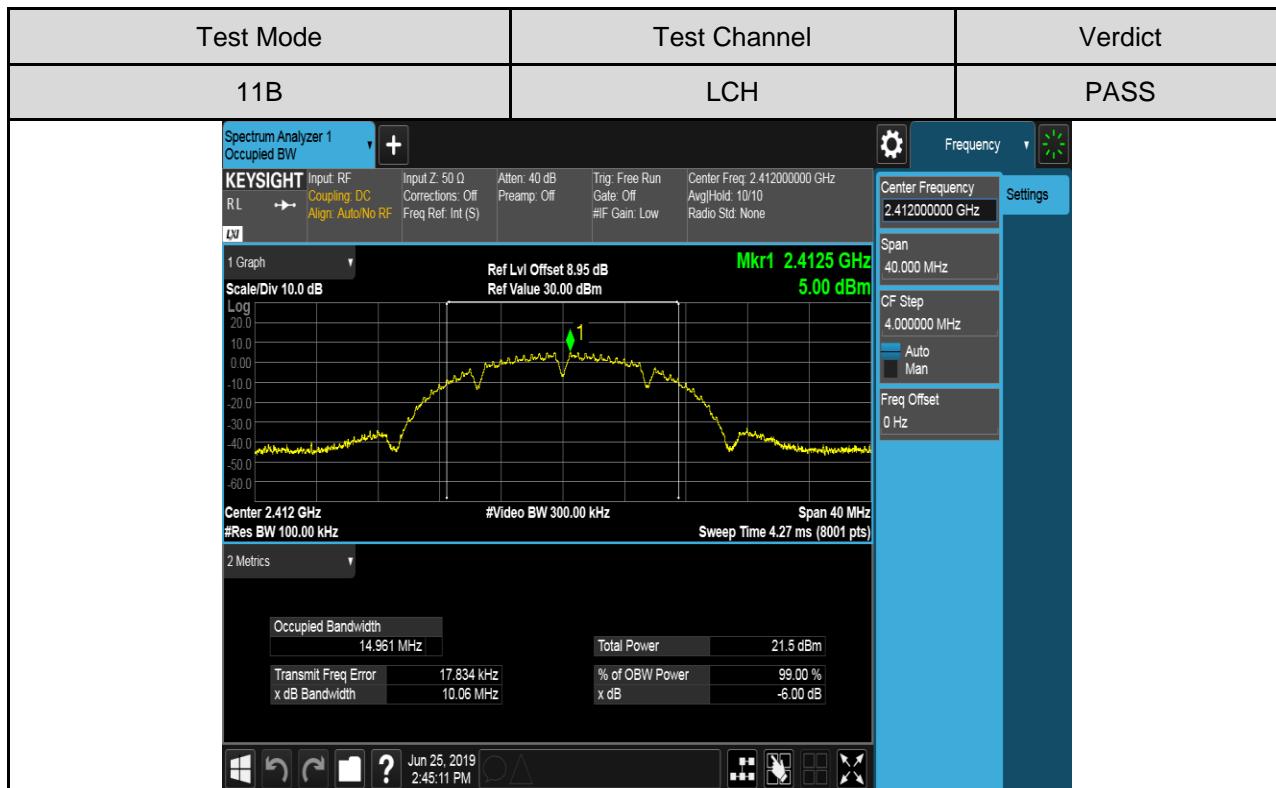
Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

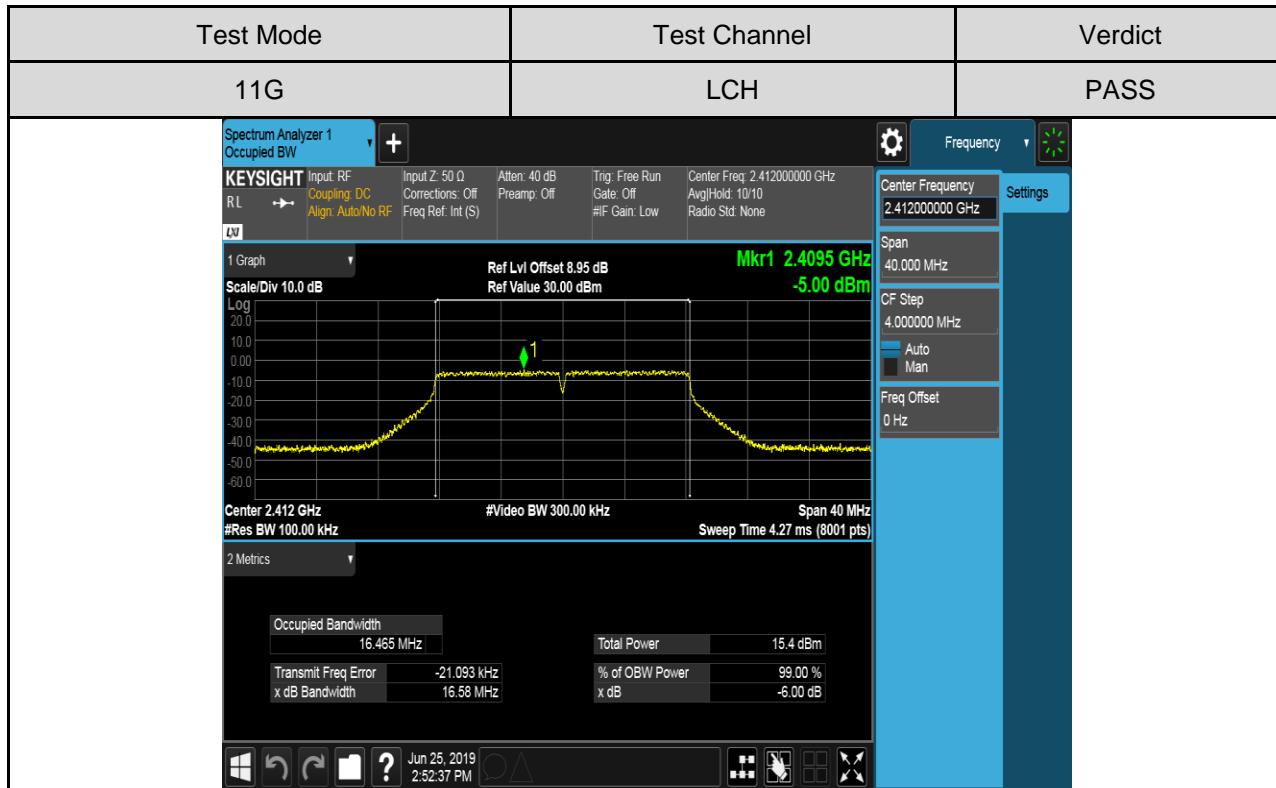
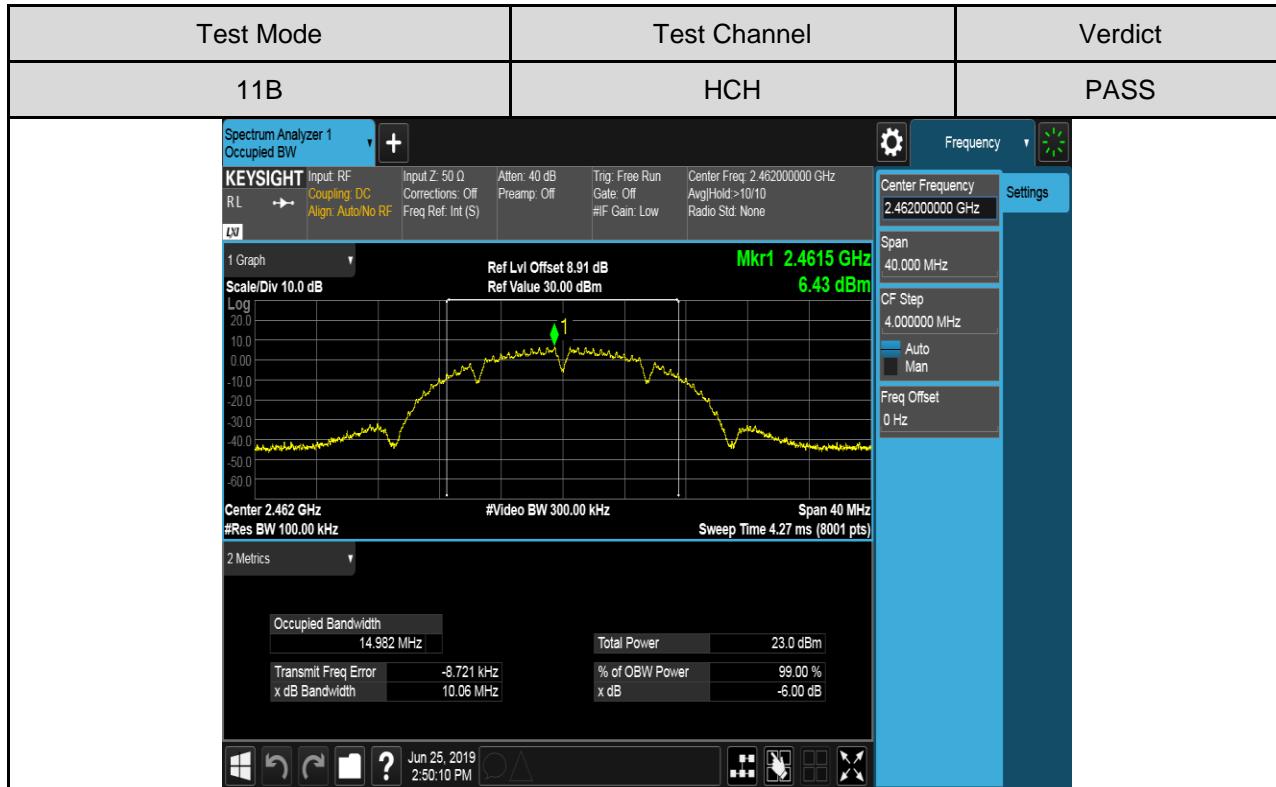
TEST SETUP

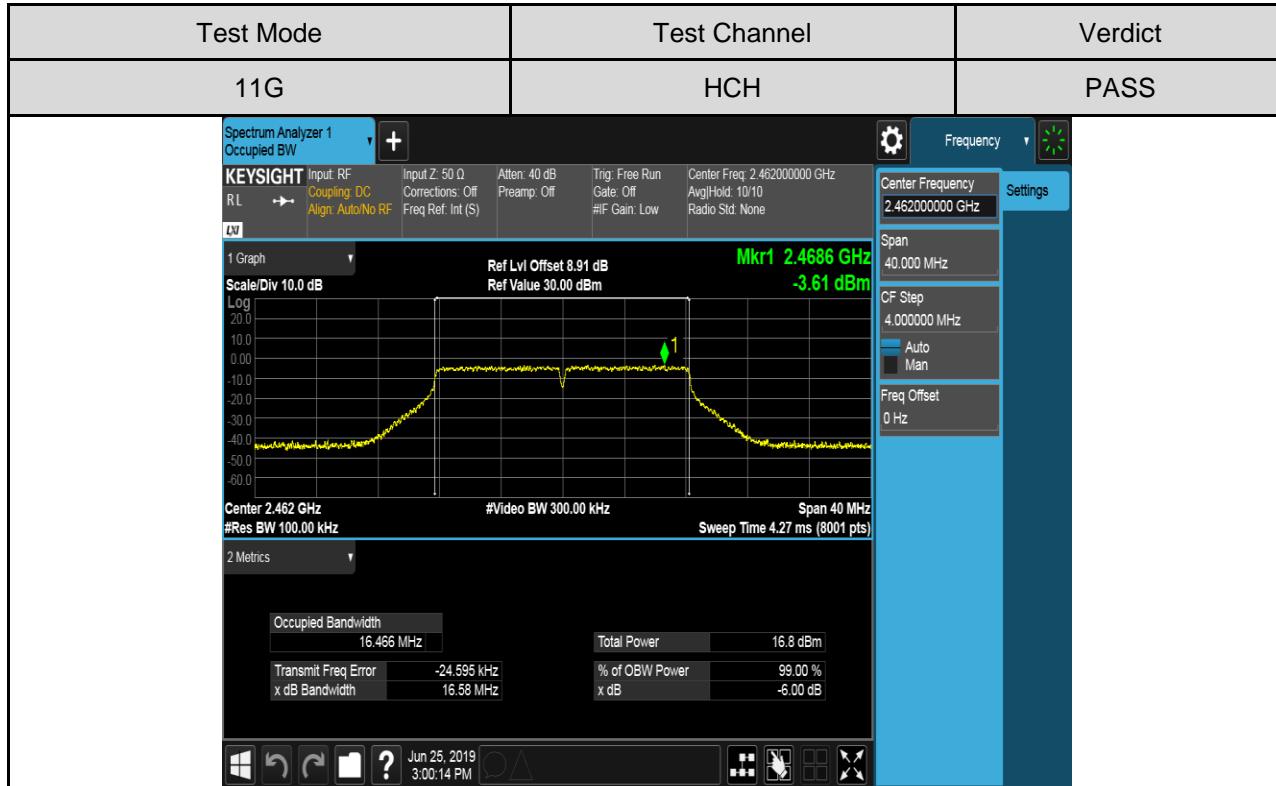
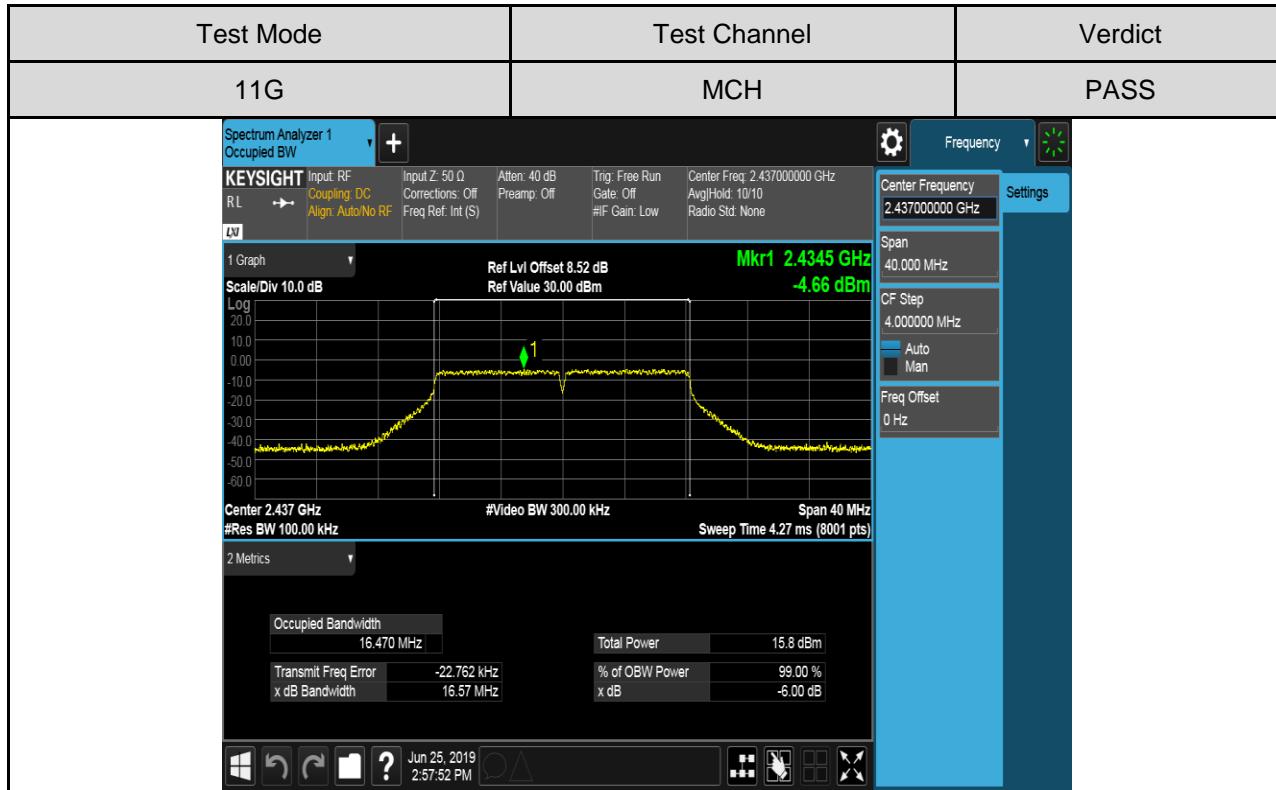


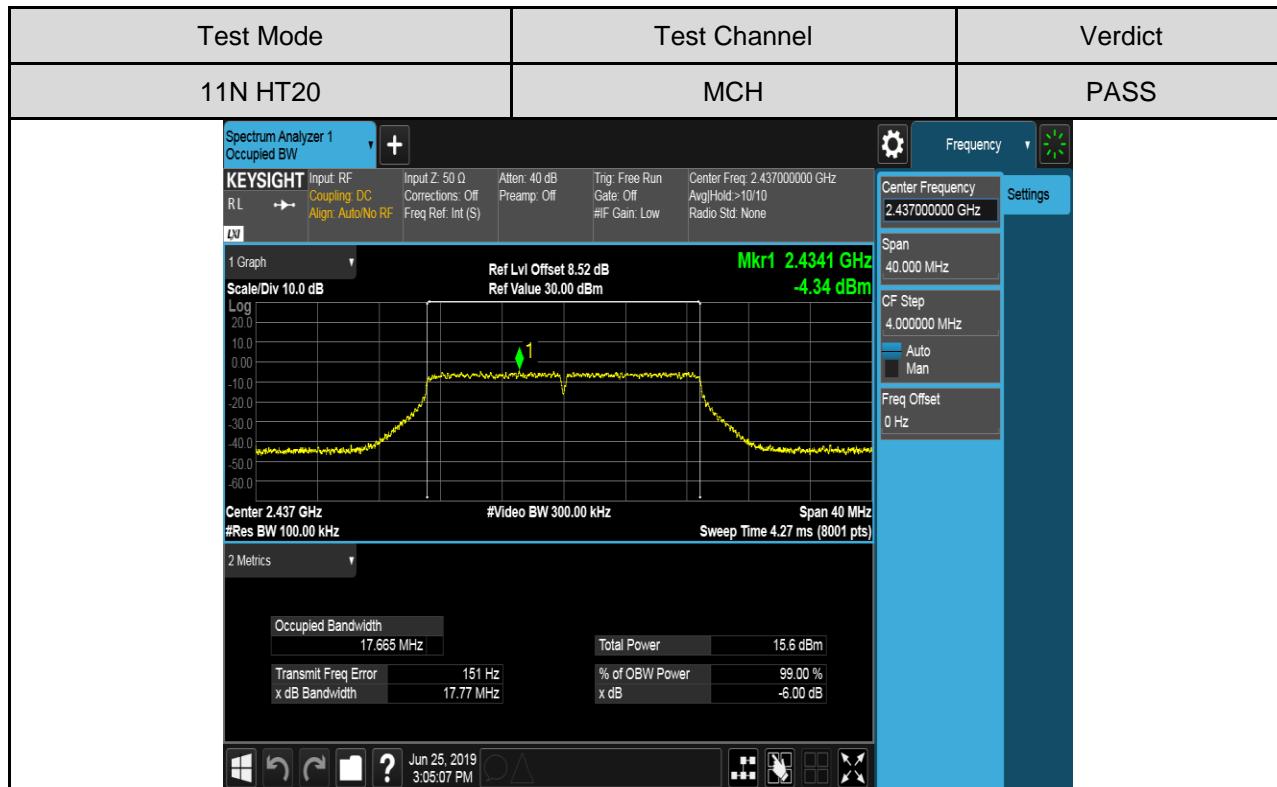
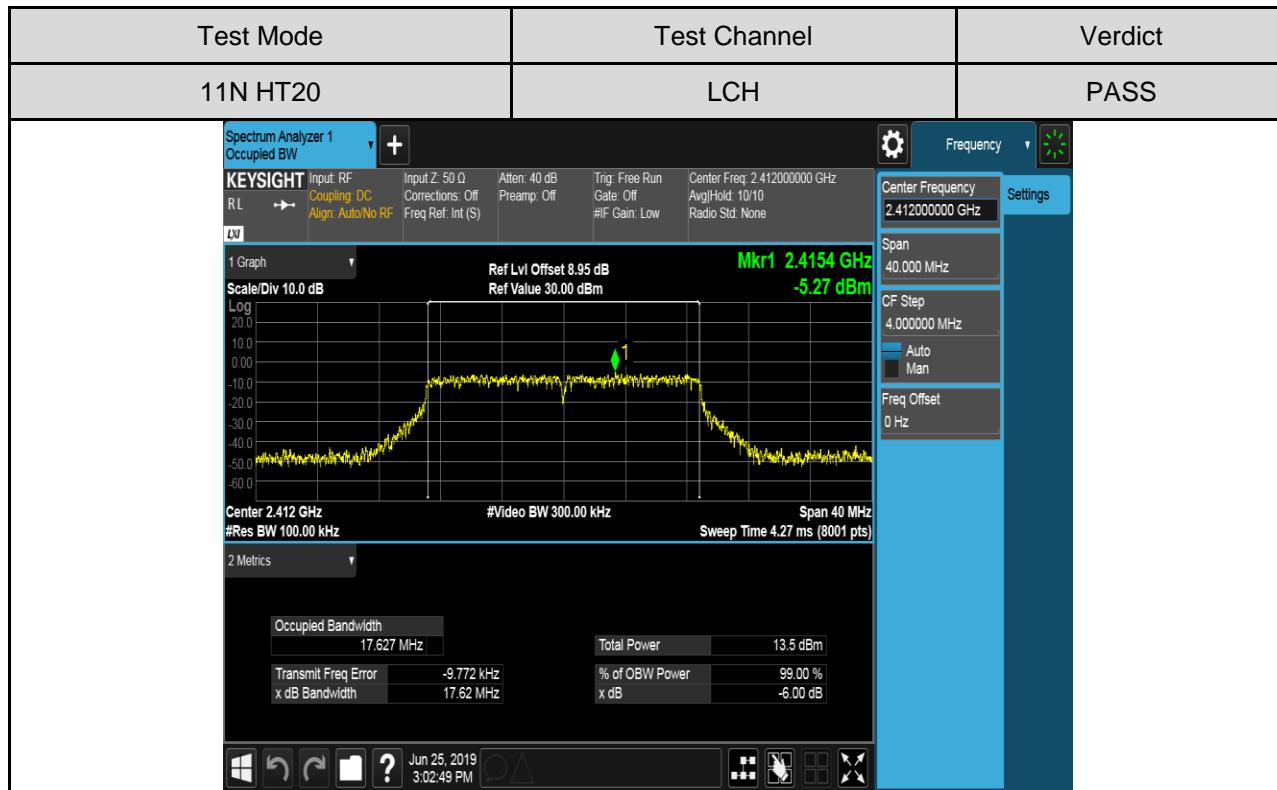
RESULTS

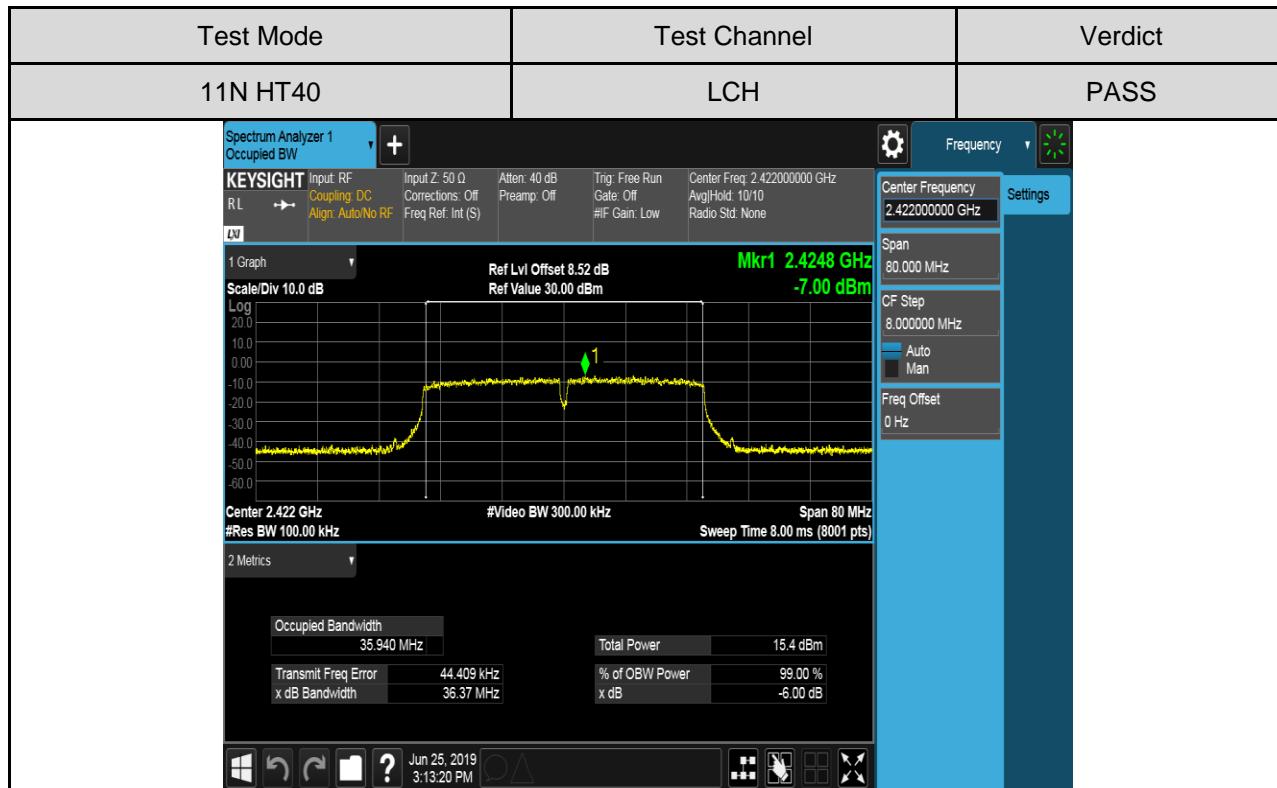
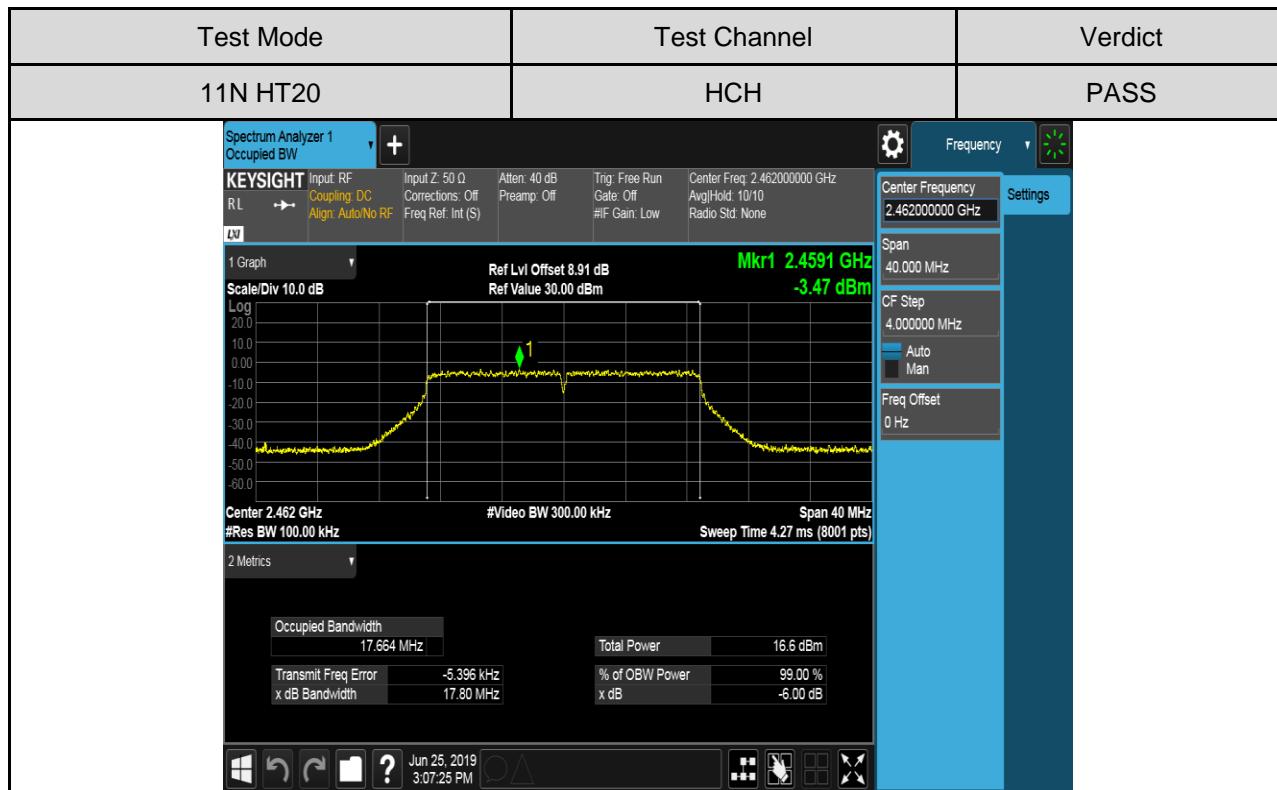
| Test Mode | Test Antenna | Test Channel | 6dB bandwidth (MHz) | Result |
|-----------|--------------|--------------|---------------------|--------|
| 11B | Antenna 1 | LCH | 10.06 | Pass |
| | | MCH | 10.06 | Pass |
| | | HCH | 10.06 | Pass |
| 11G | Antenna 1 | LCH | 16.58 | Pass |
| | | MCH | 16.57 | Pass |
| | | HCH | 16.58 | Pass |
| 11N HT20 | Antenna 1 | LCH | 17.62 | Pass |
| | | MCH | 17.77 | Pass |
| | | HCH | 17.80 | Pass |
| 11N HT40 | Antenna 1 | LCH | 36.37 | Pass |
| | | MCH | 36.34 | Pass |
| | | HCH | 36.34 | Pass |

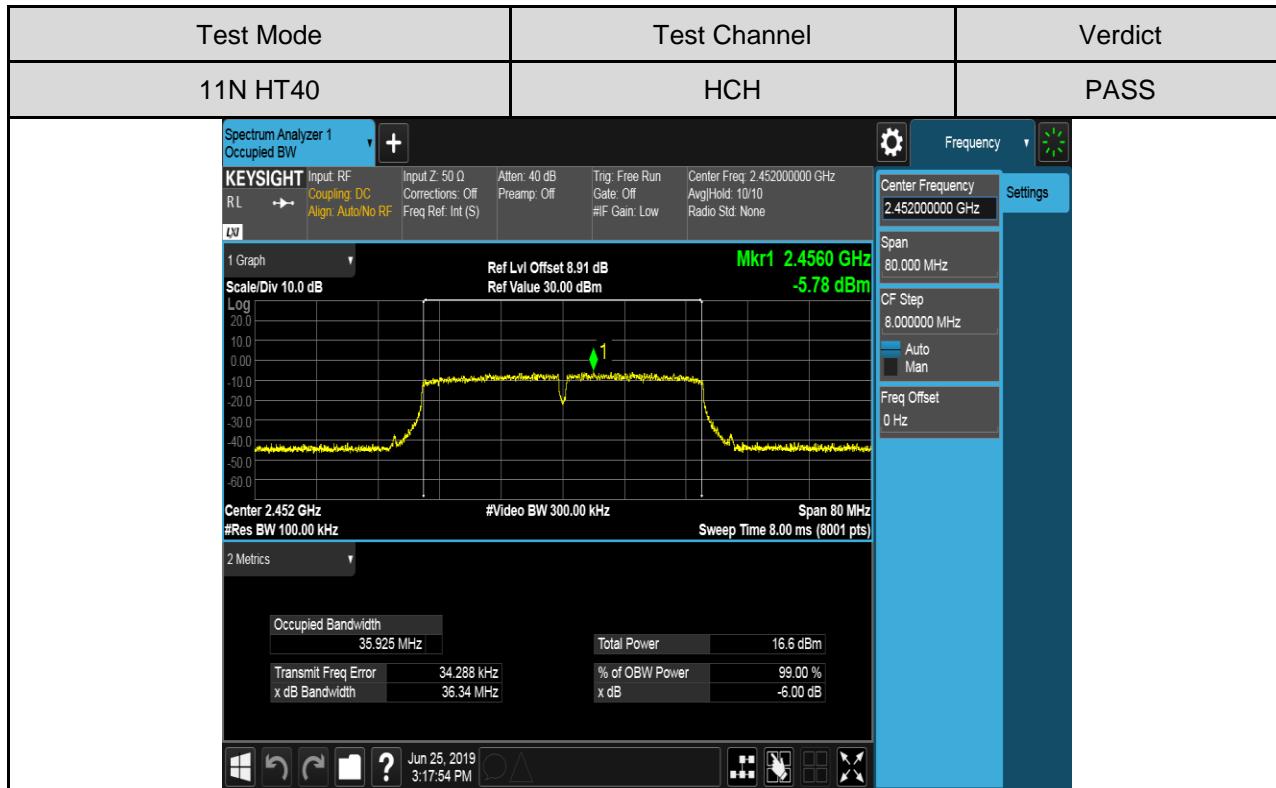
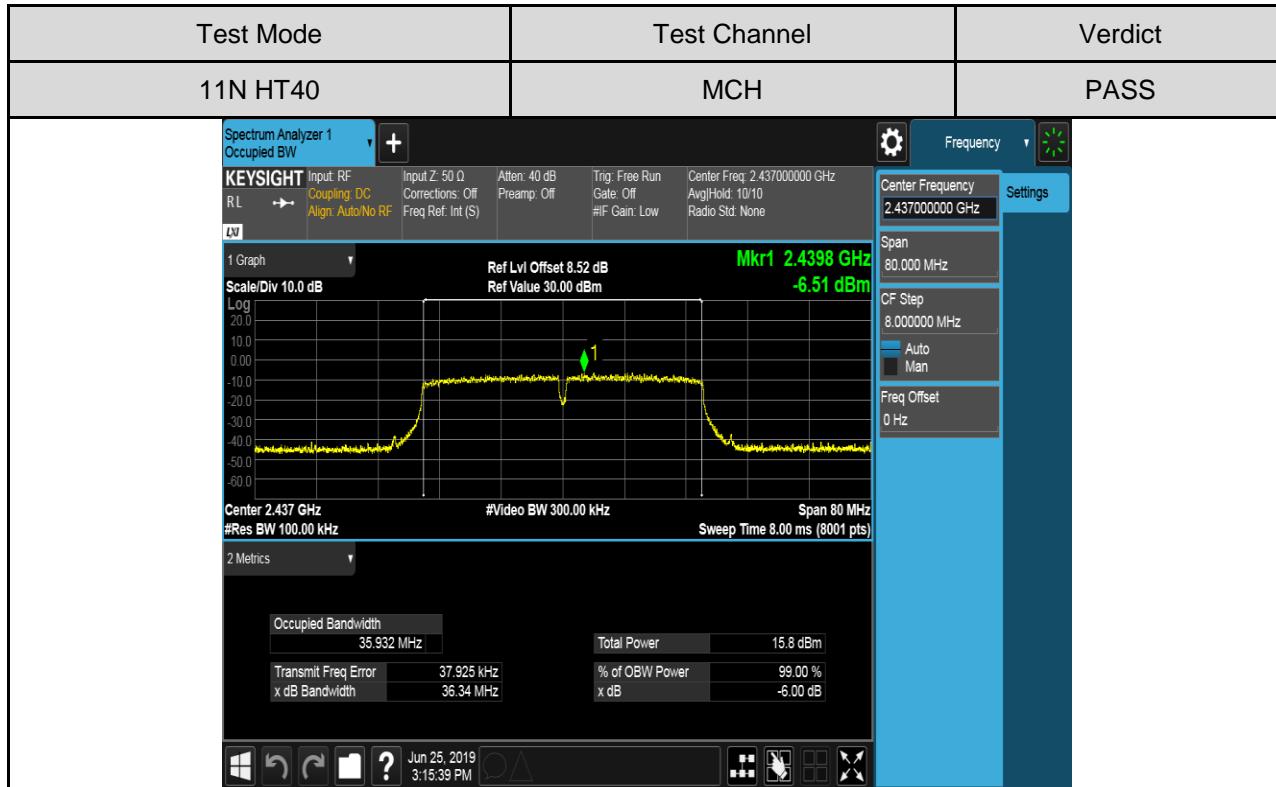
Test Graphs











7.3. PEAK CONDUCTED OUTPUT POWER

LIMITS

| FCC Part15 (15.247) , Subpart C | | | |
|---------------------------------|-------------------|-----------------|-----------------------|
| Section | Test Item | Limit | Frequency Range (MHz) |
| FCC 15.247(b)(3) | Peak Output Power | 1 watt or 30dBm | 2400-2483.5 |

TEST PROCEDURE

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

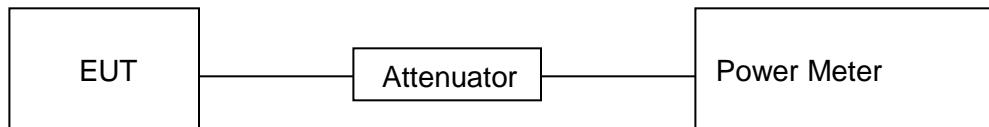
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Power sensor.

Measure the power of each channel.

Peak Detector use for Peak result.

AVG Detector use for AVG result.

TEST SETUP



RESULTS

Maximum Peak Conducted Output Power(dBm)

| Test Mode | Test Antenna | Test Channel | Maximum Peak Conducted Output Power(dBm) | EIRP (dBm) | Result |
|-----------|--------------|--------------|--|------------|--------|
| 11B | Antenna 1 | LCH | 17.44 | 20.60 | Pass |
| | | MCH | 17.83 | 20.99 | Pass |
| | | HCH | 18.92 | 22.08 | Pass |
| 11G | Antenna 1 | LCH | 17.11 | 20.27 | Pass |
| | | MCH | 17.47 | 20.63 | Pass |
| | | HCH | 18.53 | 21.69 | Pass |
| 11N HT20 | Antenna 1 | LCH | 17.15 | 20.31 | Pass |
| | | MCH | 17.49 | 20.65 | Pass |
| | | HCH | 18.54 | 21.70 | Pass |
| 11N HT40 | Antenna 1 | LCH | 16.83 | 19.99 | Pass |
| | | MCH | 17.25 | 20.41 | Pass |
| | | HCH | 18.06 | 21.22 | Pass |

7.4. POWER SPECTRAL DENSITY

LIMITS

| FCC Part15 (15.247) , Subpart C | | | |
|---------------------------------|------------------------|-------------------------|-----------------------|
| Section | Test Item | Limit | Frequency Range (MHz) |
| FCC §15.247 (e) | Power Spectral Density | 8 dBm in any 3 kHz band | 2400-2483.5 |

TEST PROCEDURE

Refer to FCC KDB 558074, 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. |

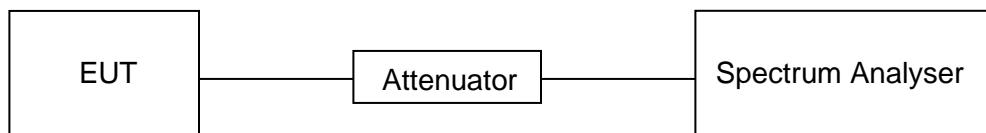
Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

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

TEST ENVIRONMENT

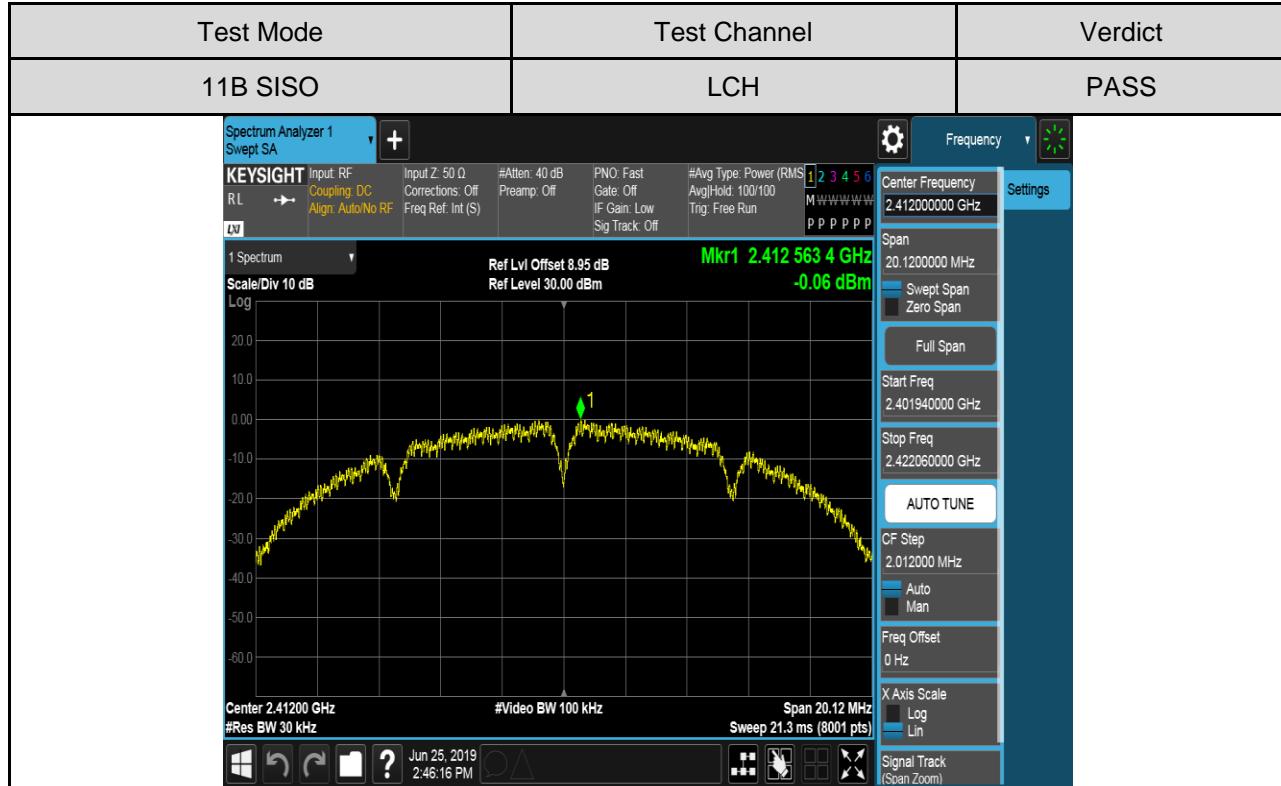
| | | | |
|---------------------|--------|-------------------|---------|
| Temperature | 22°C | Relative Humidity | 56% |
| Atmosphere Pressure | 101kPa | Test Voltage | AC 120V |

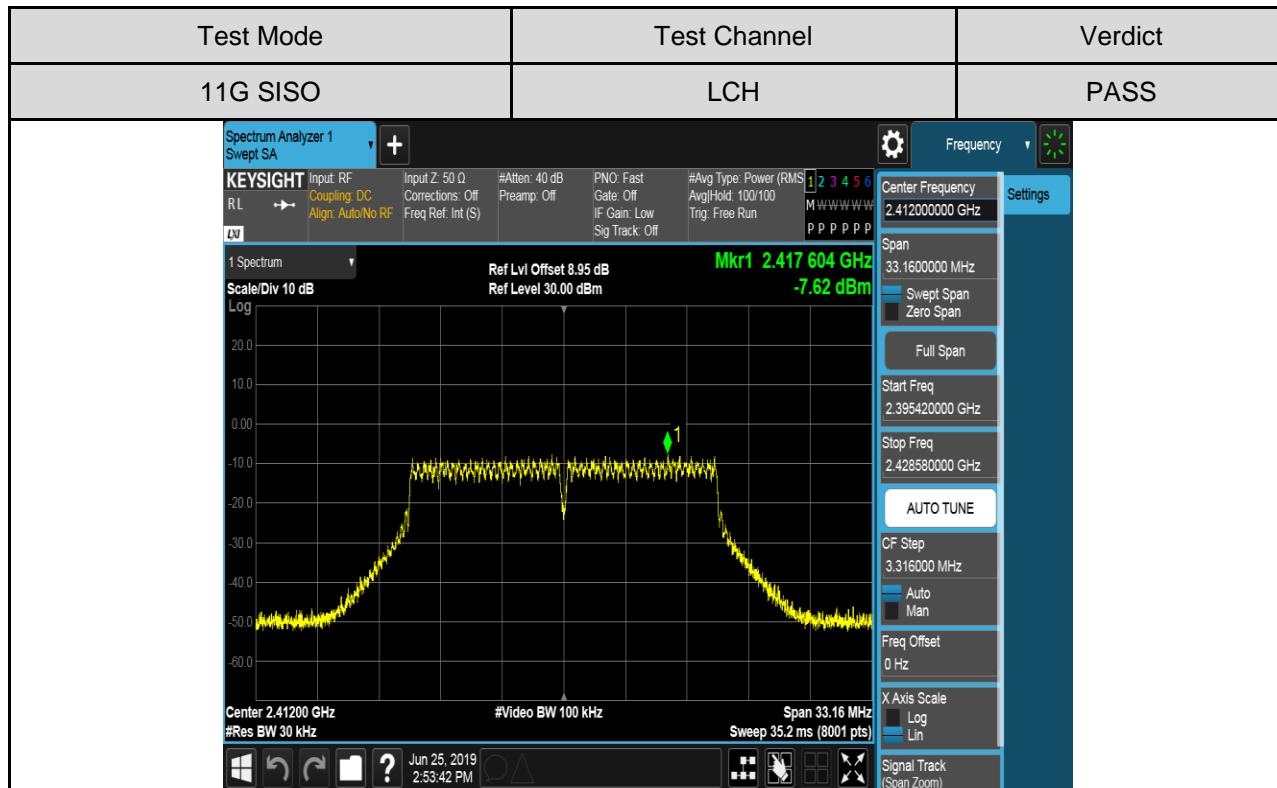
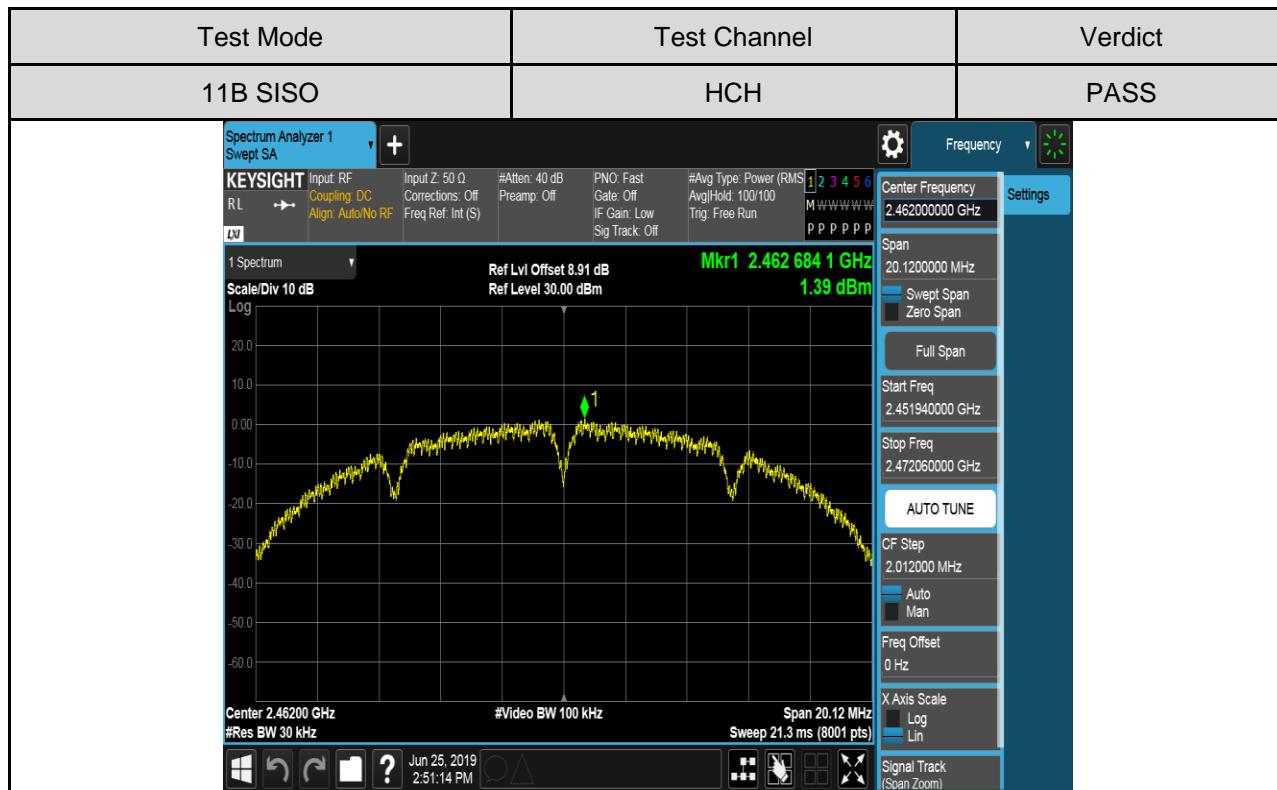
TEST SETUP

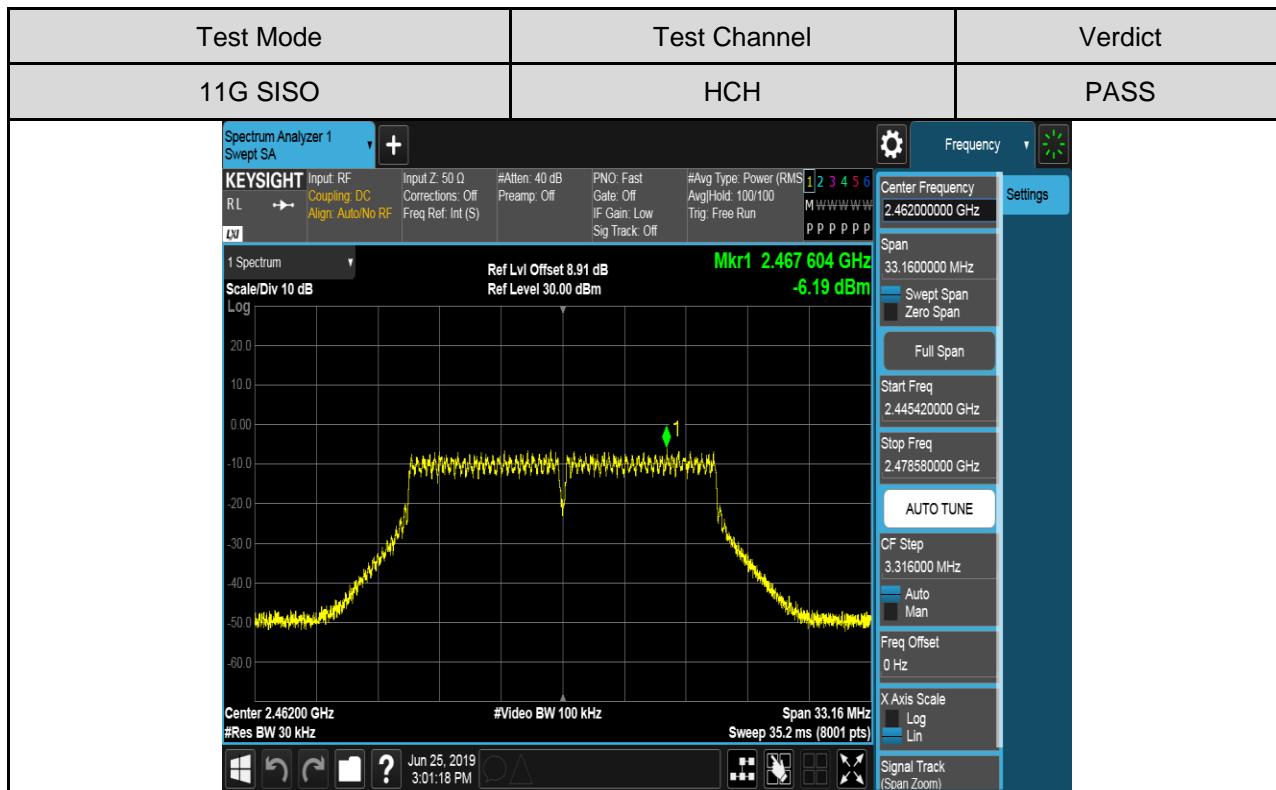
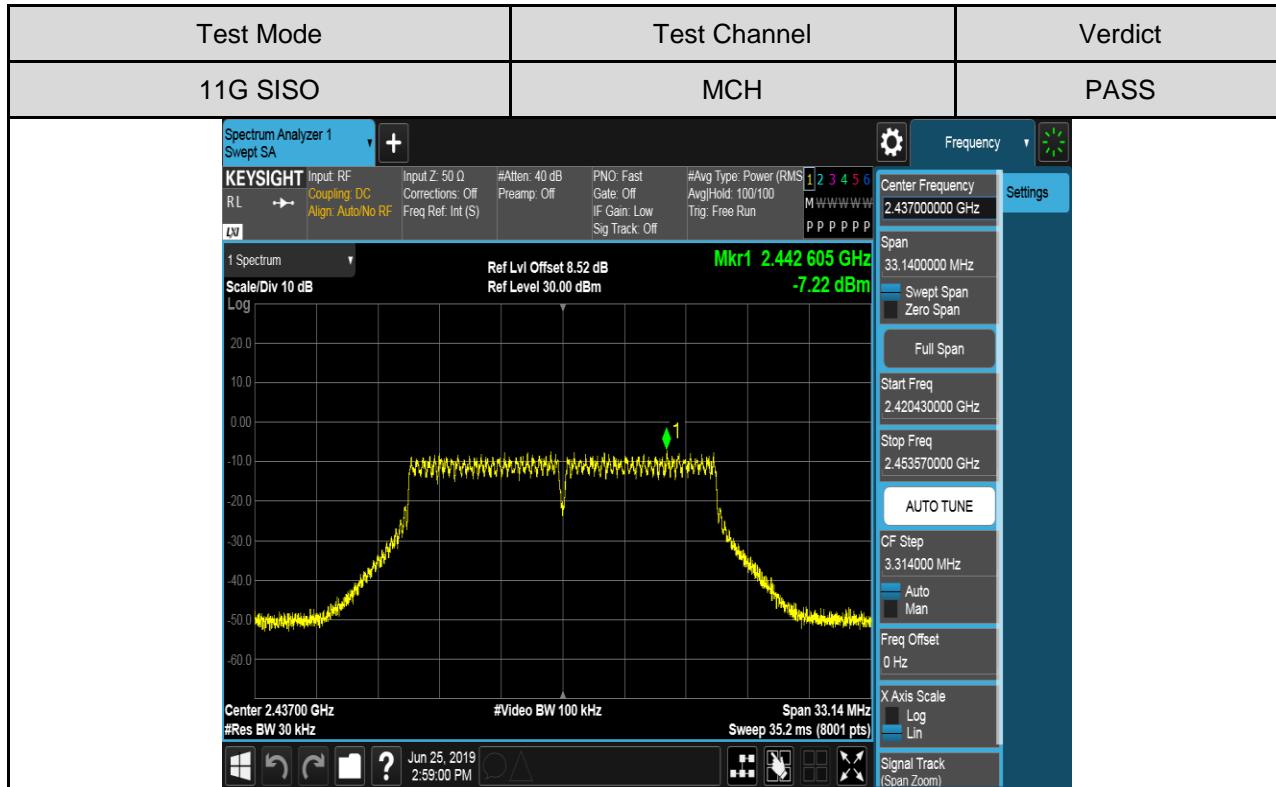


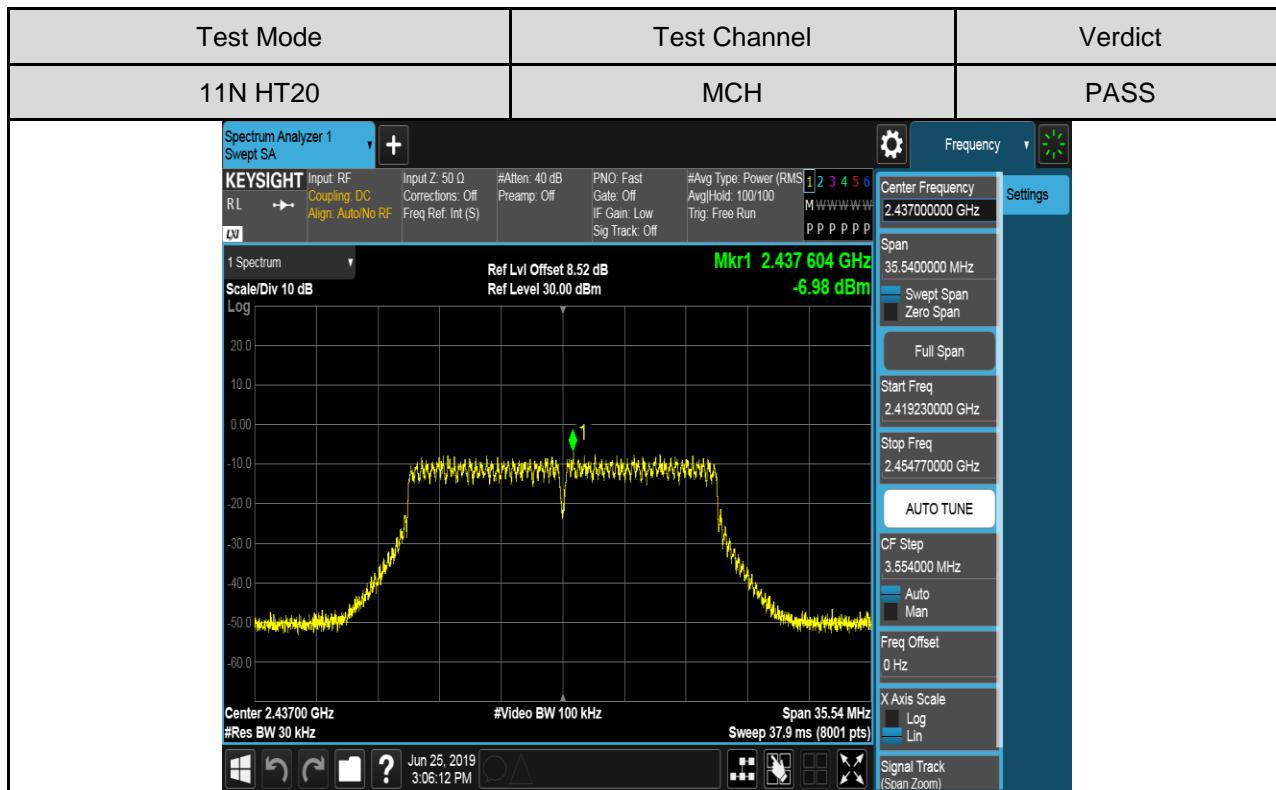
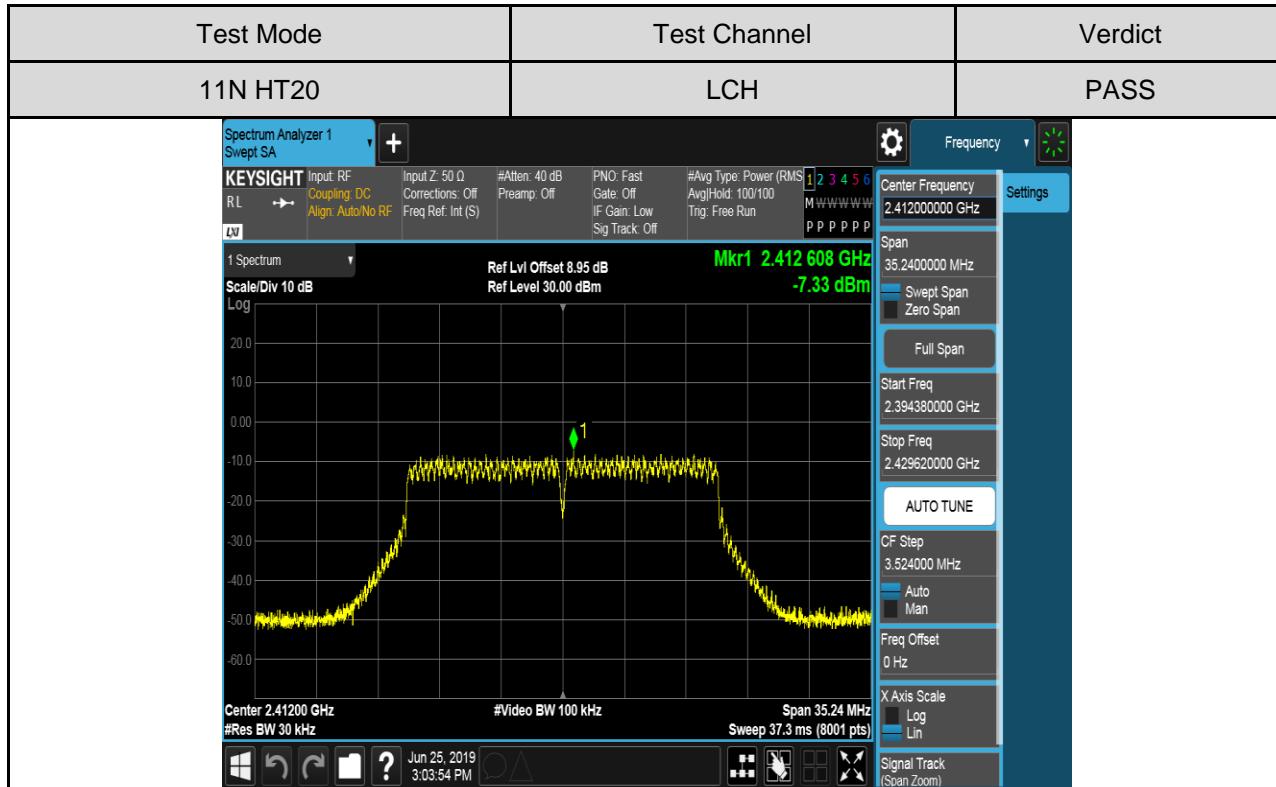
RESULTS

| Test Mode | Test Antenna | Test Channel | Maximum Peak power spectral density (dBm/3kHz) | Result |
|-----------|--------------|--------------|--|--------|
| 11B | Antenna 1 | LCH | -0.06 | Pass |
| | | MCH | 0.25 | Pass |
| | | HCH | 1.39 | Pass |
| 11G | Antenna 1 | LCH | -7.62 | Pass |
| | | MCH | -7.22 | Pass |
| | | HCH | -6.19 | Pass |
| 11N HT20 | Antenna 1 | LCH | -7.33 | Pass |
| | | MCH | -6.98 | Pass |
| | | HCH | -5.78 | Pass |
| 11N HT40 | Antenna 1 | LCH | -9.46 | Pass |
| | | MCH | -8.59 | Pass |
| | | HCH | -9.87 | Pass |

Test Graphs:








| Test Mode | Test Channel | Verdict |
|-----------|--------------|---------|
| 11N HT20 | HCH | PASS |

Spectrum Analyzer 1
Swept SA

KEYSIGHT Input: RF
Coupling: DC
RL: Align: Auto/No RF
Freq Ref: Int (S)

Input Z: 50 Ω
Corrections: Off
Preamp: Off

#Atten: 40 dB
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off

#Avg Type: Power (RMS)
Avg/Hold: 100/100
Trig: Free Run
Sig Track: Off

1 2 3 4 5 6

Frequency
Center Frequency: 2.46200000 GHz
Span: 35.600000 MHz
Sweep Span: Zero Span
Full Span
Start Freq: 2.44420000 GHz
Stop Freq: 2.47980000 GHz
AUTO TUNE
CF Step: 3.560000 MHz
Auto: Man
Freq Offset: 0 Hz
X Axis Scale: Log
Signal Track (Span Zoom)

1 Spectrum
Ref Lvl Offset: 8.91 dB
Ref Level: 30.00 dBm

Mkr1 2.462 600 75 GHz -5.78 dBm

1

Center 2.46200 GHz Video BW 100 kHz Span 35.60 MHz
#Res BW 30 kHz Sweep 37.9 ms (8001 pts)

Jun 25, 2019
3:08:30 PM

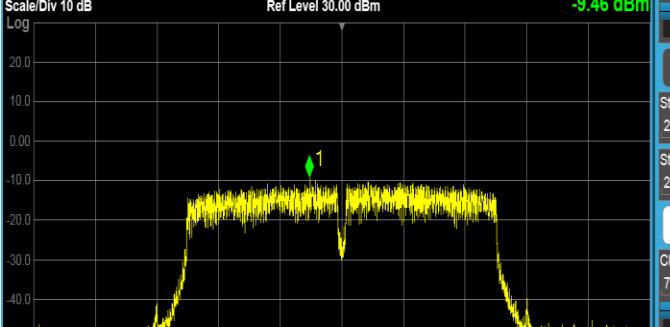
| Test Mode | Test Channel | Verdict |
|-----------|--------------|---------|
| 11N HT40 | LCH | PASS |

Spectrum Analyzer 1
Swept SA

KEYSIGHT Input: RF Coupling: DC Input Z: 50 Ω #Atten: 40 dB PNO: Fast #Avg Type: Power (RMS) 1 2 3 4 5 6
RL → Corrections: Off Preamp: Off Gate: Off Avg/Hold: 100/100
Align: Auto/No RF Freq Ref: Int (\$) IF Gain: Low Trig: Free Run
DV Sig Track: Off P P P P P P P P

1 Spectrum Ref Lvl Offset 8.52 dB Mkr1 2.433 230 GHz
Scale/Div 10 dB Ref Level 30.00 dBm -9.46 dBm

Log



20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0

Center 2.43700 GHz #Video BW 100 kHz Span 72.68 MHz
#Res BW 30 kHz Sweep 76.8 ms (8001 pts)

Frequency

Center Frequency 2.43700000 GHz

Span 72.680000 MHz

Full Span

Start Freq 2.400660000 GHz

Stop Freq 2.473340000 GHz

AUTO TUNE

CF Step 7.268000 MHz

Auto Man

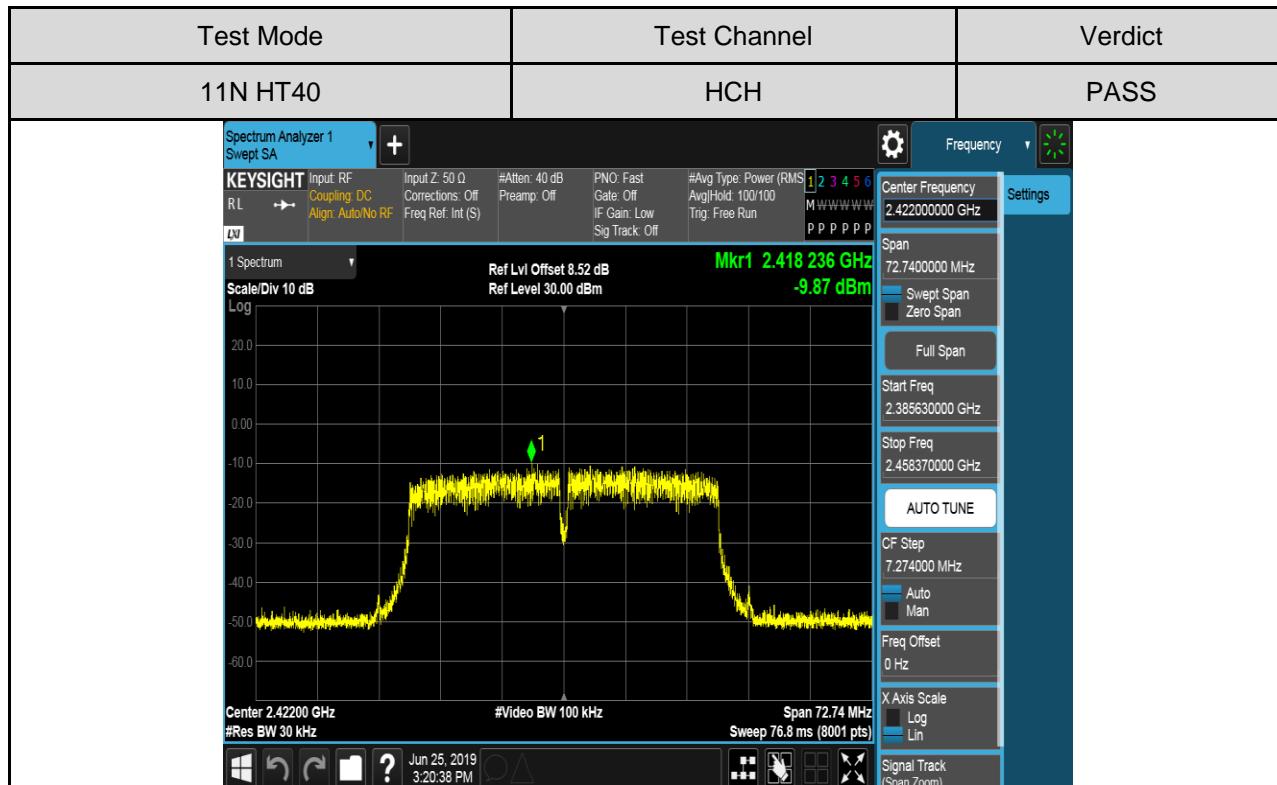
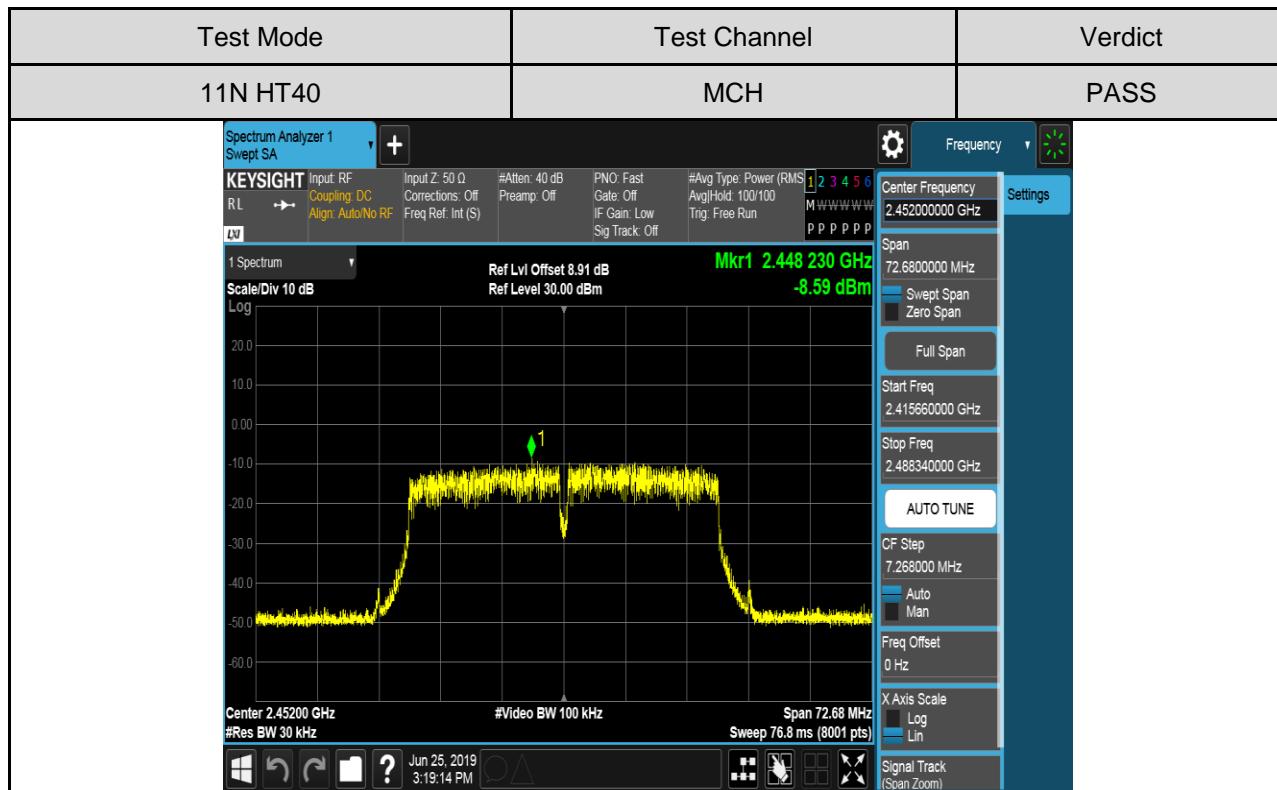
Freq Offset 0 Hz

X Axis Scale Log

Signal Track (Span Zoom)

Settings

Jun 25, 2019 3:16:52 PM



7.5. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

LIMITS

| FCC Part15 (15.247) , Subpart C | | |
|---------------------------------|---|---|
| Section | Test Item | Limit |
| FCC §15.247 (d) | 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

Refer to FCC KDB 558074, connect the UUT to the spectrum analyser and use the following

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

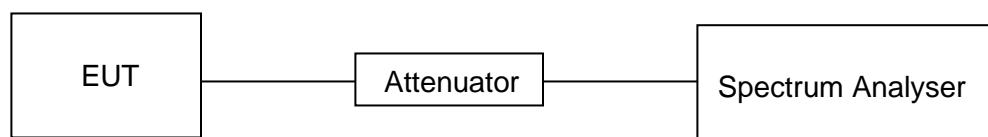
settings:

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



UL-CCIC COMPANY LIMITED

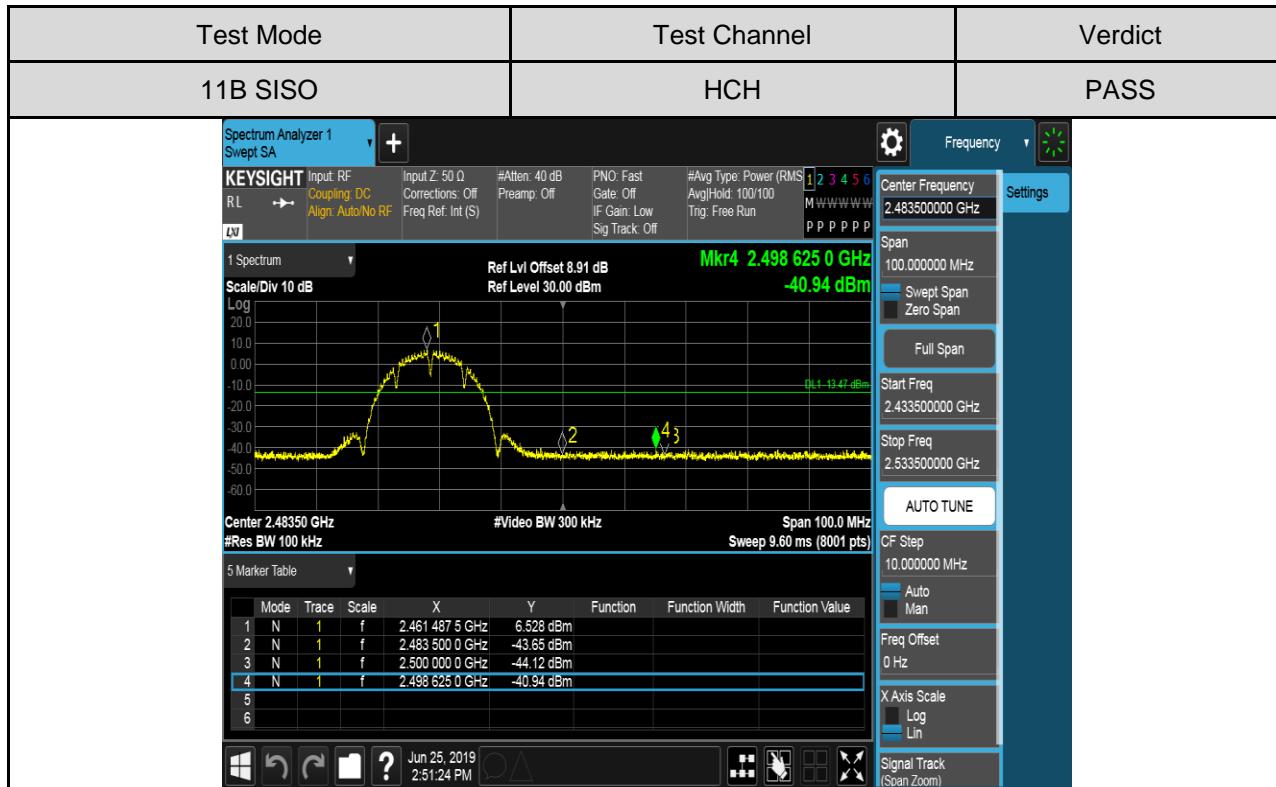
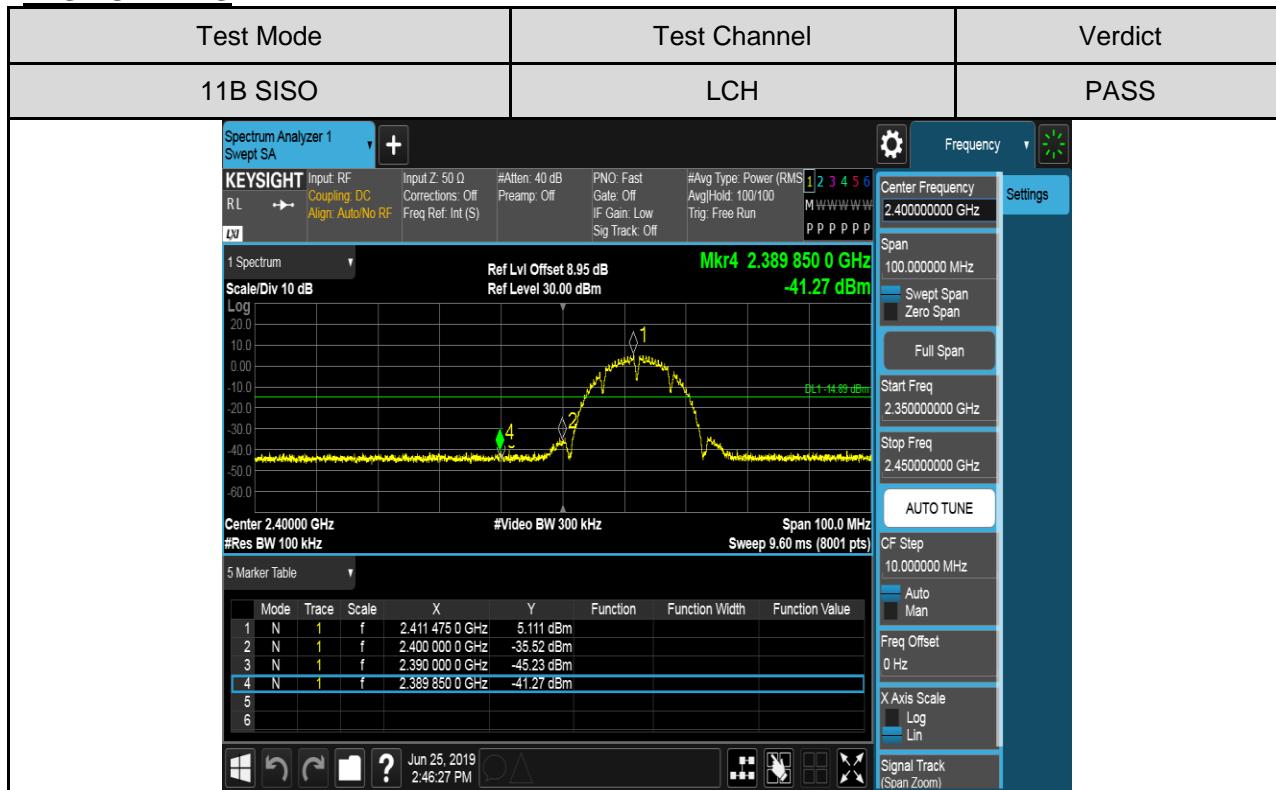
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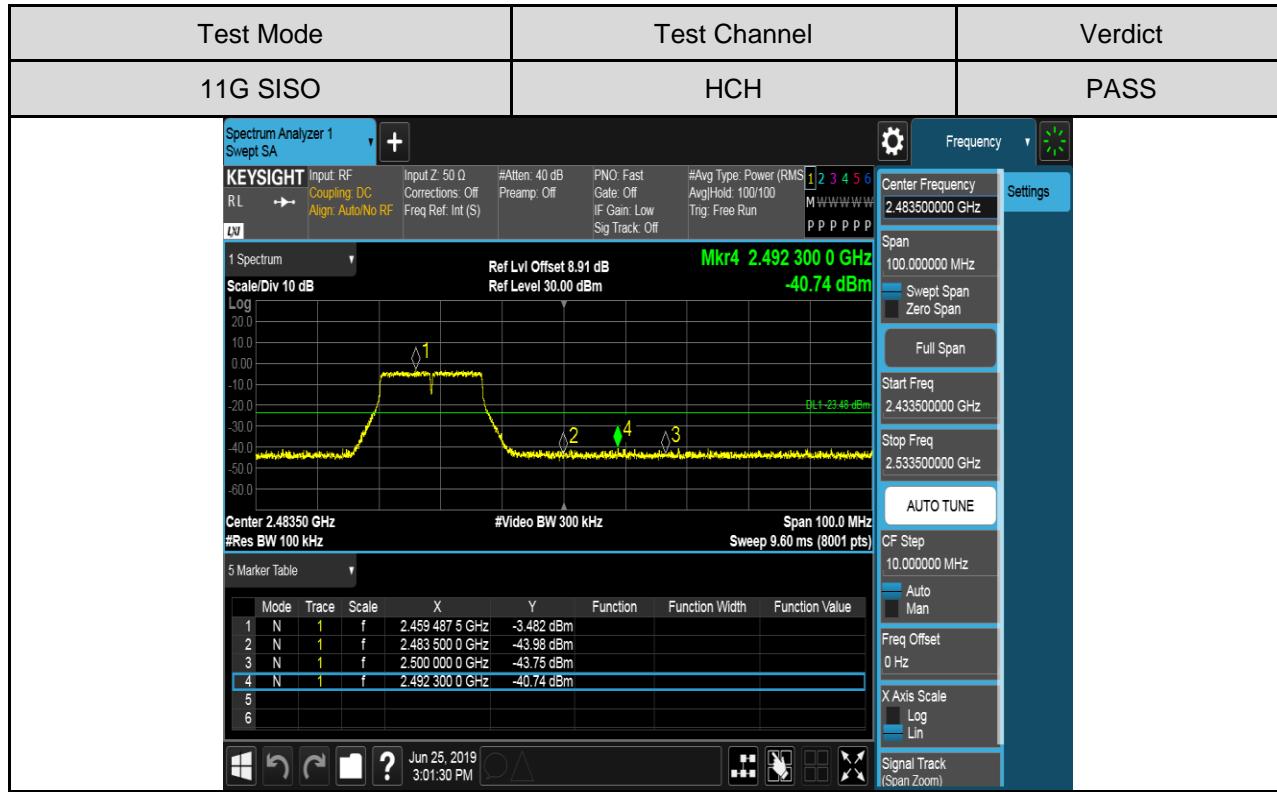
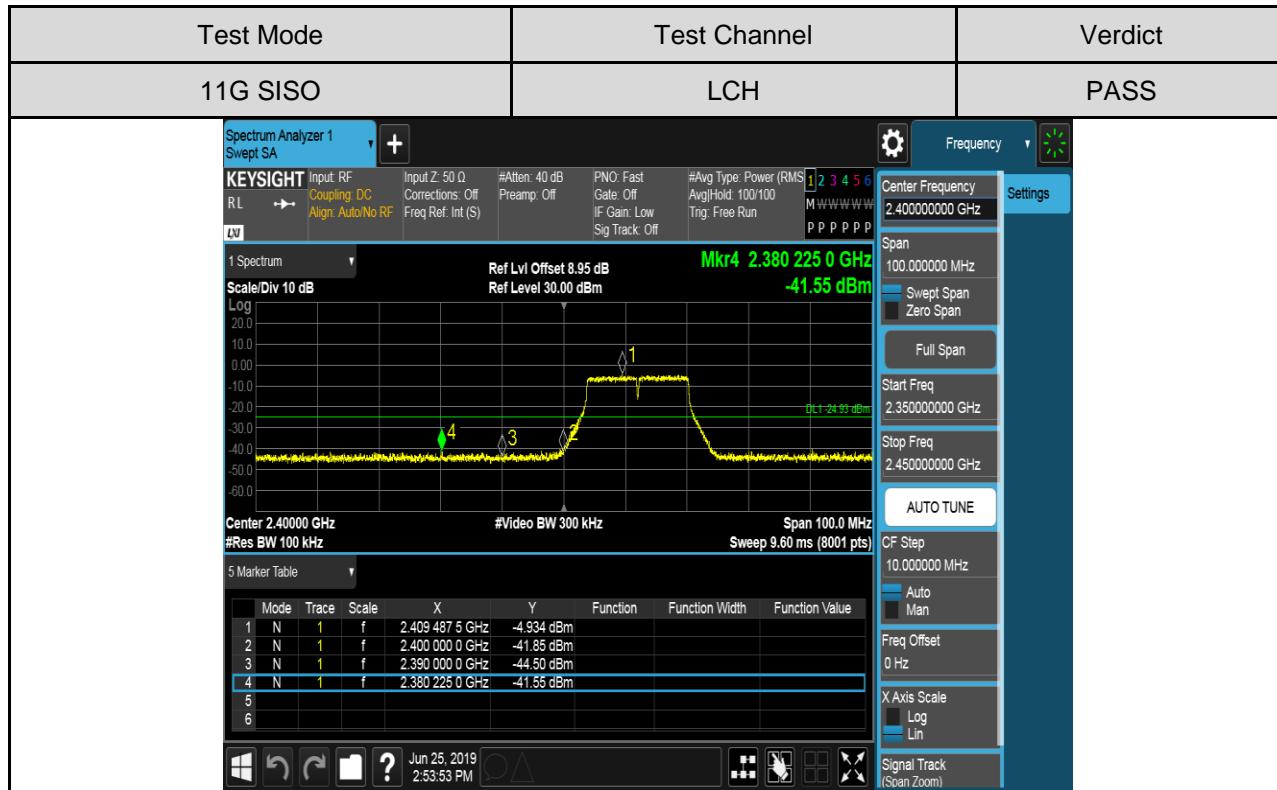
**TEST ENVIRONMENT**

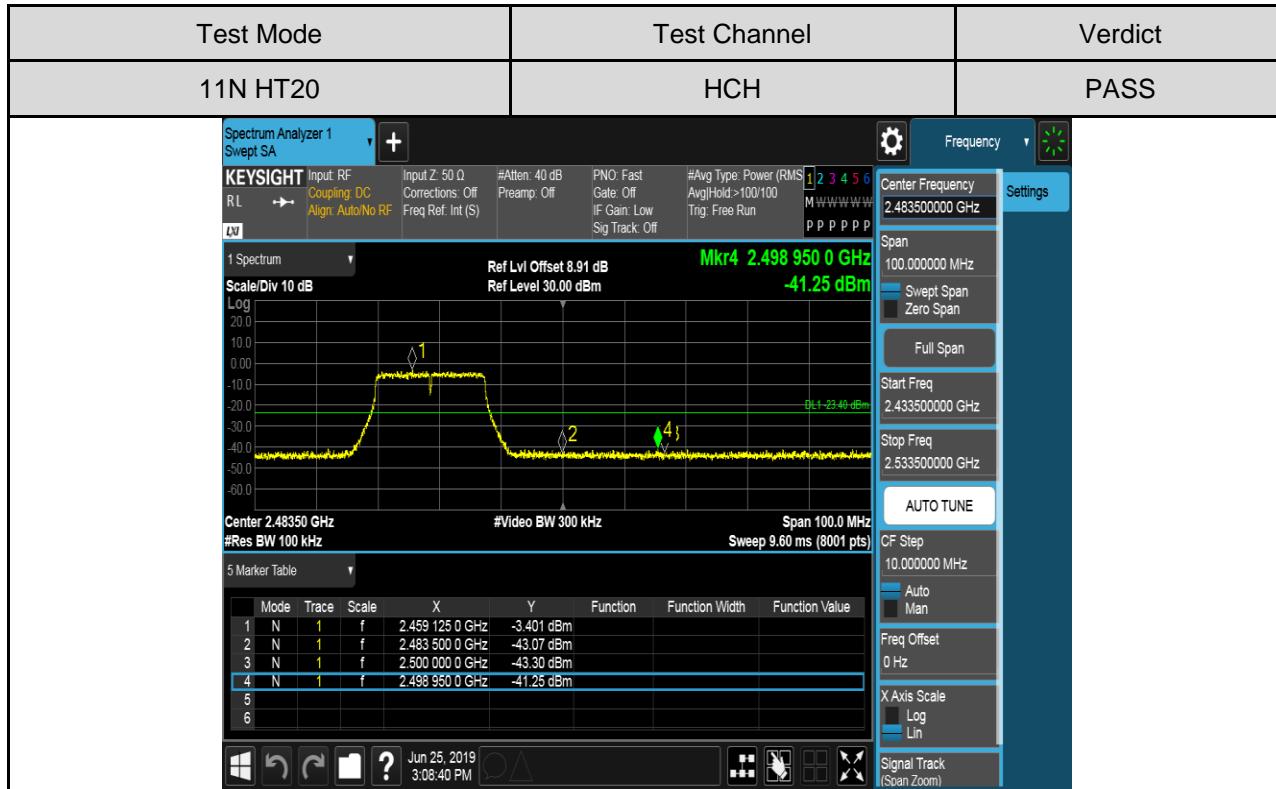
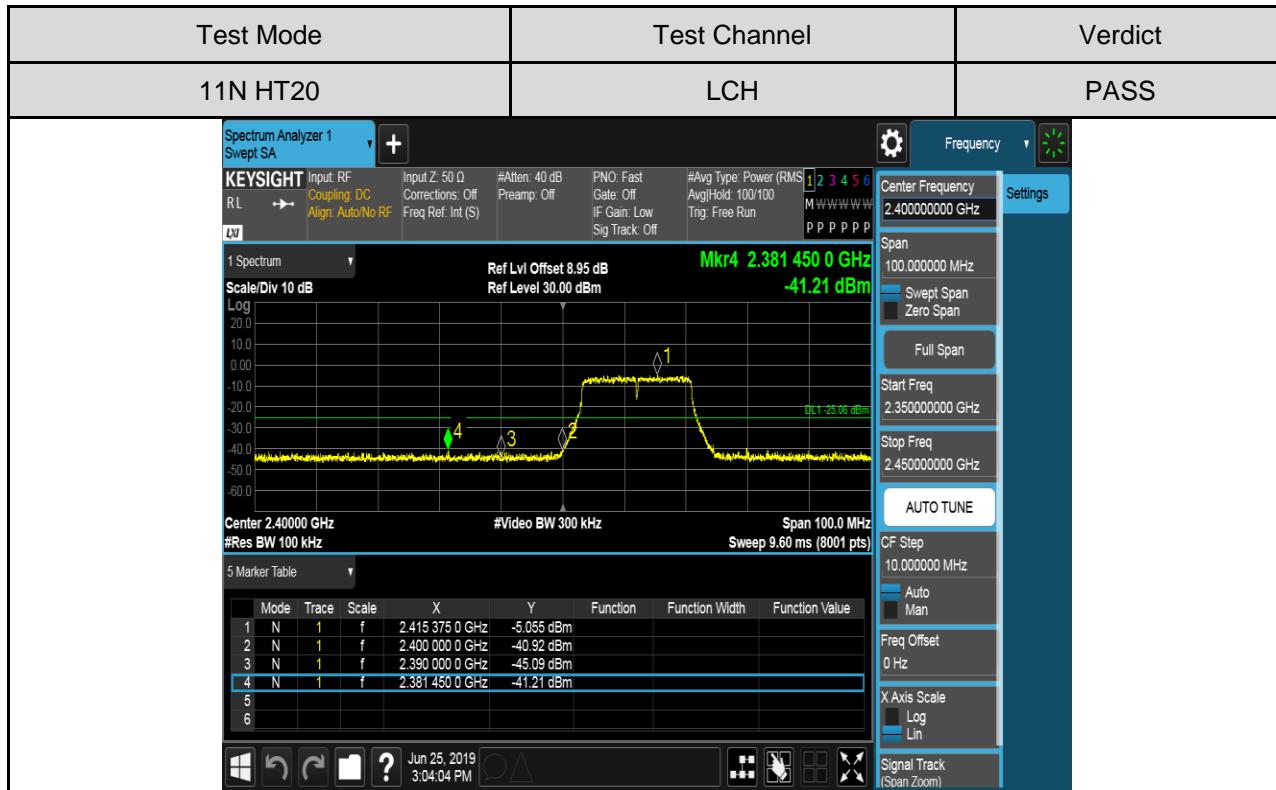
| | | | |
|---------------------|--------|-------------------|---------|
| Temperature | 22°C | Relative Humidity | 56% |
| Atmosphere Pressure | 101kPa | Test Voltage | AC 120V |

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 | 5.111 | -41.270 | -14.89 | PASS |
| | | HCH | 6.528 | -40.937 | -13.47 | PASS |
| 11G | Antenna 1 | LCH | -4.934 | -41.548 | -24.93 | PASS |
| | | HCH | -3.482 | -40.740 | -23.48 | PASS |
| 11N HT20 | Antenna 1 | LCH | -5.055 | -41.207 | -25.06 | PASS |
| | | HCH | -3.401 | -41.252 | -23.4 | PASS |
| 11N HT40 | Antenna 1 | LCH | -6.918 | -41.865 | -26.92 | PASS |
| | | HCH | -5.779 | -41.479 | -25.78 | PASS |

TEST GRAPHS






| Test Mode | Test Channel | Verdict |
|--|--------------|---------|
| 11N HT40 | LCH | PASS |
|  | | |

Part II :Conducted Emission

Test Result Table

| Test Mode | Test Antenna | Channel | Pref(dBm) | Puw(dBm) | Verdict |
|-----------|--------------|---------|-----------|----------|---------|
| 11B | Antenna 1 | LCH | 5.01 | <Limit | PASS |
| | | MCH | 5.31 | <Limit | PASS |
| | | HCH | 6.45 | <Limit | PASS |
| 11G | Antenna 1 | LCH | -5.01 | <Limit | PASS |
| | | MCH | -4.58 | <Limit | PASS |
| | | HCH | -3.54 | <Limit | PASS |
| 11N HT20 | Antenna 1 | LCH | -4.95 | <Limit | PASS |
| | | MCH | -4.47 | <Limit | PASS |
| | | HCH | -3.38 | <Limit | PASS |
| 11N HT40 | Antenna 1 | LCH | -6.91 | <Limit | PASS |
| | | MCH | -6.41 | <Limit | PASS |
| | | HCH | -5.67 | <Limit | PASS |

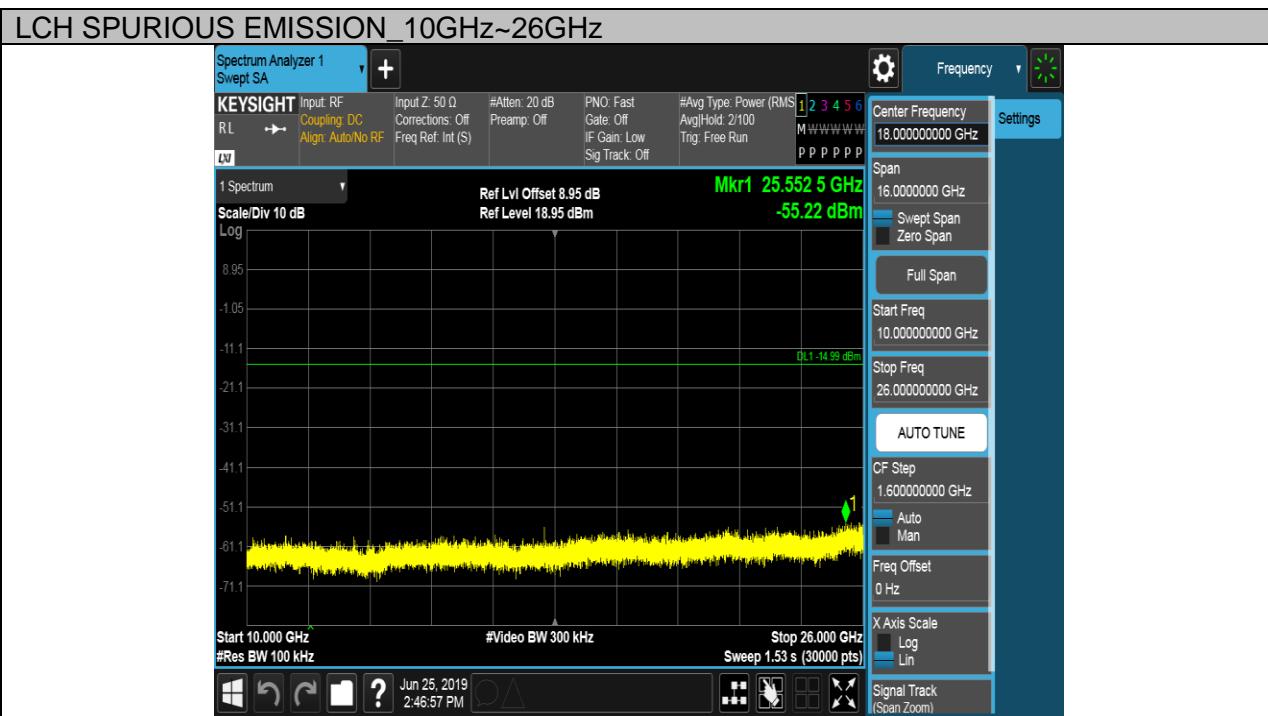
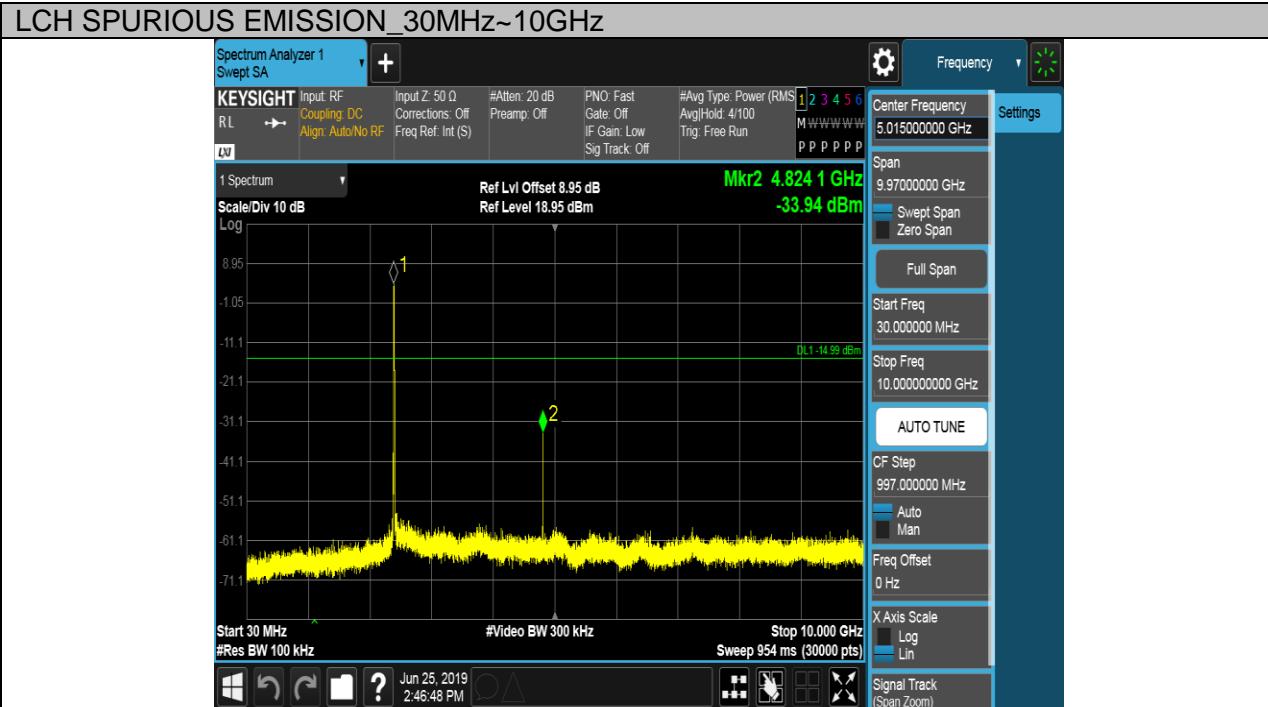
Test Plots

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

Pref test Plot



Puw test Plot

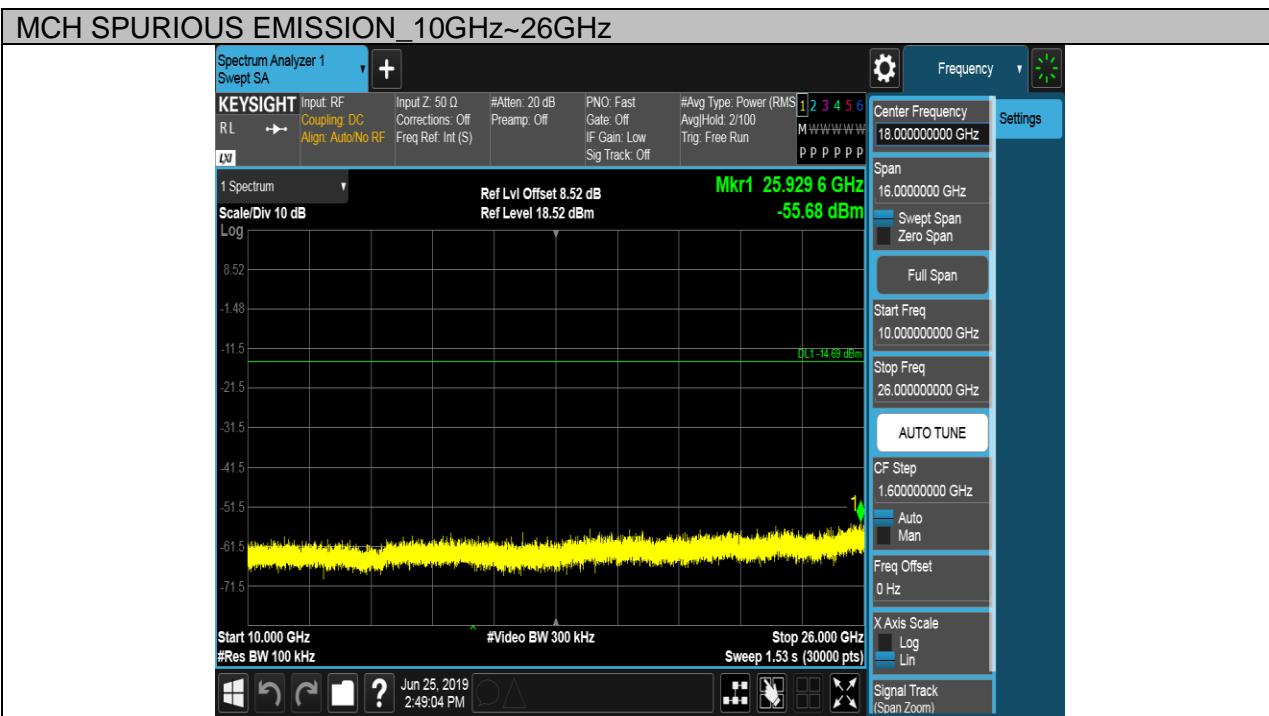
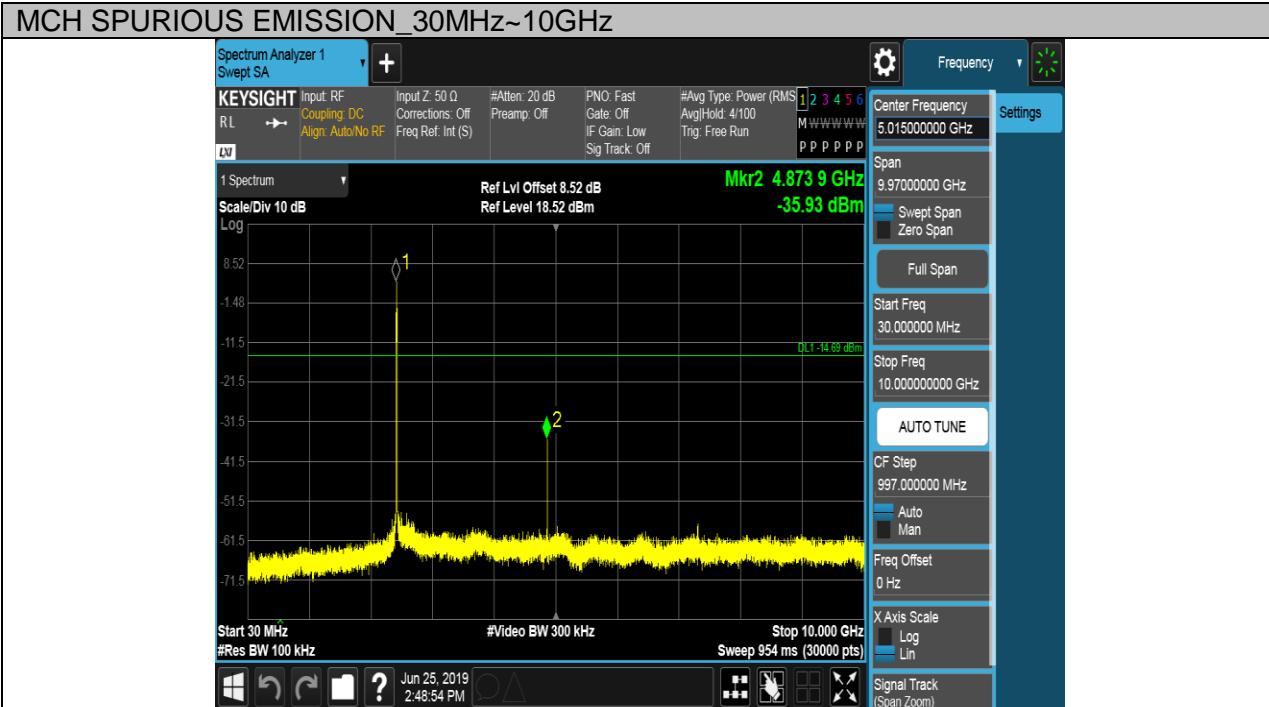


| Test Mode | Channel | Verdict |
|-----------|---------|---------|
| 11B | MCH | PASS |

Pref test Plot



Puw test Plot



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

Pref test Plot

