

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

CERTIFICATION TEST REPORT

For

CONSUMER CAMERA

MODEL NUMBER: IPC-A43P

ADDTIONAL MODEL NUMBER: IPC-A43P-imou; IPC-A43N-imou; IPC-A43N;

IPC-TA43-LC; LC-TA3-4M

PROJECT NUMBER: 4790015544-3

REPORT NUMBER: 4790015544-3-5

FCC ID: 2AVYF-IPC-A3X

ISSUE DATE: Jul.19, 2021

Prepared for

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Prepared by

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Revision History

| Rev. | Issue Date | Revisions | Revised By |
|------|------------|---------------|------------|
| V0 | 07/19/2021 | Initial Issue | |



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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name: Hangzhou Huacheng Network Technology Co., Ltd.

Address: No.2930, Nanhuan Road, Binjiang District, Hangzhou, China

Manufacturer Information

Company Name: Hangzhou Huacheng Network Technology Co., Ltd.

Address: No.2930, Nanhuan Road, Binjiang District, Hangzhou, China

EUT Description

Product Name CONSUMER CAMERA

Model Name IPC-A43P

Additional No. IPC-A43P-imou; IPC-A43N-imou; IPC-A43N; IPC-TA43-LC;

LC-TA3-4M

Sample Number 4060126
Data of Receipt Sample Jul.11,2021

Test Date Jul.11,2021~ Jul.18,2021

APPLICABLE STANDARDS

STANDARD TEST RESULTS

CFR 47 Part 15 Subpart C PASS



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

Remark:

| Prepared By: | Reviewed By: | | | |
|----------------------------------|------------------------------------|--|--|--|
| Tom Tang | Leon Wu | | | |
| Tom Tang Project Engineer | Leon Wu Senior Project Engineer | | | |
| Authorized By: | | | | |
| Chris Zhong | | | | |
| Chris Zhong Laboratory Leader | | | | |

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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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 | A2LA (Certificate No.: 4829.01) UL-CCIC COMPANY LIMITED has been assessed and proved to be in compliance with A2LA. 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. 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. |
|------------------------------|---|
|------------------------------|---|

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.

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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 | 3.1dB |
| Radiation Emission test(include Fundamental emission) (9KHz-30MHz) | 3.4dB |
| Radiation Emission test(include Fundamental emission) (30MHz-1GHz) | 3.4dB |
| Radiation Emission test (1GHz to 26GHz)(include Fundamental emission) | 3.9dB (1GHz-18Gz) |
| Note: This was estaints assume that a surrounded by | 4.2dB (18GHz-26.5Gz) |

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

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

| Product Name: | CONSUMER CAMERA | | | |
|-----------------------|--|--|--|--|
| Model No.: | IPC-A43P | | | |
| 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 software of EUT: | Secure CRT (manufacturer declare) | | | |
| Antenna Type: | Monopole Antenna | | | |
| | 2.4 dBi | | | |
| Antenna Gain: | Remark: This data is provided by customer and our lab isn't responsible for this data | | | |
| Adapter | NAME: AC Adapter MODEL: NBS05B050100VUU INPUT:100-240V,50/60Hz, 0.2A OUTPUT:5.0V 1.0A | | | |

Remark:

Model No.:

| Number: | Name: | Number: | Name: | Number: | Name: |
|---------|----------|---------|---------------|---------|---------------|
| 1 | IPC-A43P | 2 | IPC-A43P-imou | 3 | IPC-A43N-imou |
| 4 | IPC-A43N | 5 | IPC-TA43-LC | 6 | LC-TA3-4M |

Only the main model IPC-A22EP-D 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 name of the models.

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5.2. MAXIMUM OUTPUT POWER

| Number of Transmit Chains (NTX) | IEE Std. 802.11 | Channel Number | Max AV Conducted Power (dBm) |
|---------------------------------------|-------------------|----------------|------------------------------|
| 1 | IEEE 802.11B SISO | 1-11[11] | 15.96 |
| 1 | IEEE 802.11G SISO | 1-11[11] | 13.79 |
| 1 | IEEE 802.11nHT20 | 1-11[11] | 13.70 |
| 1 | IEEE 802.11nHT40 | 3-9[7] | 12.07 |

5.3. CHANNEL LIST

| | Channel List for 802.11b/g/n (20 MHz) | | | | | | |
|---------|---------------------------------------|---------|--------------------|---------|--------------------|---------|--------------------|
| Channel | Frequency (MHz) | Channel | Frequenc y(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 | Frequenc y(MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 3 | 2422 | 5 | 2432 | 7 | 2442 | 9 | 2452 |
| 4 | 2427 | 6 | 2437 | 8 | 2447 | | |



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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 POWER SETTING PARAMETER

| The Worse Case Power Setting Parameter under 2400 ~ 2483.5MHz Band | | | | | | | | |
|--|----------|-------------|---------------|-------|------|------------|------|--|
| Test Softw | vare | | EspRFtestTool | | | | | |
| | Transmit | | Test Channel | | | | | |
| Modulation Mode | Antenna | | NCB: 20MHz | | | NCB: 40MHz | | |
| Mode | Number | CH 1 | CH 6 | CH 11 | CH 3 | CH 6 | CH 9 | |
| 802.11b | 1 | N/A | N/A | N/A | | | | |
| 802.11g | 1 | N/A | N/A N/A N/A | | | / | | |
| 802.11n HT20 | 1 | N/A N/A N/A | | | | | | |
| 802.11n HT40 | 1 | | / | | | 54 | 54 | |



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5.6. DESCRIPTION OF AVAILABLE ANTENNAS

| Ant. | Frequency (MHz) | Antenna Type | Antenna Gain (dBi) |
|------|-----------------|------------------|--------------------|
| 1 | 2400-2483.5 | Monopole Antenna | 2.4 |

| Test Mode Transmit and Receive Mode | | Description | | |
|-------------------------------------|-----------|---|--|--|
| IEEE 802.11b | ⊠1TX, 1RX | Antenna1 can be used as transmitting/receiving antenna independently. | | |
| IEEE 802.11g | ⊠1TX, 1RX | Antenna1 can be used as transmitting/receiving antenna independently. | | |
| IEEE 802.11N (HT20) | ⊠1TX, 1RX | Antenna1 can be used as transmitting/receiving antenna independently. | | |
| IEEE 802.11N (HT20) | ⊠1TX, 1RX | Antenna1 can be used as transmitting/receiving antenna independently. | | |

5.7. THE WORSE CASE CONFIGURATIONS

For the product, there 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



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5.8. **TEST ENVIRONMENT**

| Environment Parameter | Selected Values During Tests | | | |
|-----------------------|------------------------------|-----------|--|--|
| Relative Humidity | 55 ~ 65% | | | |
| Atmospheric Pressure: | 1010Pa | | | |
| Temperature | TN | 23 ~ 28°C | | |
| | VL | N/A | | |
| Voltage : | VN | AC 120V | | |
| | VH | N/A | | |

Note: VL= Lower Extreme Test Voltage

VN= Nominal Voltage

VH= Upper Extreme Test Voltage TN= Normal Temperature

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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 | USB | USB | USB-VGA | 100cm Length (Supply by UL Lab) | N/A |

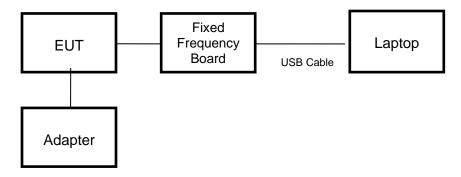
ACCESSORY

| Item | Accessory | Brand Name | Model Name | Description |
|------|---------------|------------|------------|------------------|
| 1 | Micro SD card | Kingston | 32GB | 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



Remark: The EUT has been built one SD card during the testing



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5.10. MEASURING INSTRUMENT AND SOFTWARE USED

| | J. IV. IVIL | Conducted Emissions (Instrument) | | | | | | |
|-------------------------|-------------------------------------|----------------------------------|--|----------------|----------------|--------------------|------------|------------|
| | | Cor | iauctea | Emis: | sions (instrur | | | |
| Used | Equipment | Manufacturer | Model | No. | Serial No. | Upper Last Cal. | Last Cal. | Next Cal. |
| $\overline{\checkmark}$ | EMI Test Receiver | R&S | ESR: | 3 | 126700 | 2019-12-12 | 2020-12-05 | 2021-12-04 |
| $\overline{\mathbf{V}}$ | Two-Line V-Network | R&S | ENV2 | 16 | 126701 | 2019-12-12 | 2020-12-05 | 2021-12-04 |
| V | Artificial Mains Networks | R&S | ENY8 | 31 | 126711 | 2019-12-12 | 2020-12-05 | 2021-12-04 |
| | | | | Soft | ware | | | |
| Used | Des | cription | | Ма | ınufacturer | Name | Version | |
| V | Test Software for 0 | Conducted distur | bance | | R&S | EMC32 | Ver. 9.25 | |
| | | Ra | diated E | miss | ions (Instrum | ent) | | |
| Used | Equipment | Manufacturer | Model | No. | Serial No. | Upper Last Cal. | Last Cal. | Next Cal. |
| | Spectrum Analyzer | Keysight | N9010 |)B | MY57110128 | 2020-05-10 | 2021-05-09 | 2022-05-08 |
| | EMI test receiver | R&S | ESR2 | 26 | 1267603 | 2019-12-12 | 2020-12-05 | 2021-12-04 |
| | Receiver Antenna (9kHz-30MHz) | Schwarzbeck | FMZB 1513 | | 513-265 | 2018-06-15 | 2021-06-03 | 2022-06-02 |
| | Receiver Antenna (30MHz-1GHz) | SunAR RF Motion | JB1 | | 177821 | N/A | 2019-01-28 | 2022-01-27 |
| | Receiver Antenna (1GHz-18GHz) | R&S | HF907 | | 126705 | 2018-01-29 | 2019-01-28 | 2022-01-27 |
| V | Receiver Antenna (18GHz-26.5GHz) | Schwarzbeck | BBHA9 | 170 | 126706 | 2019-02-06 | 2020-12-05 | 2021-12-04 |
| V | Pre-amplification (To 18GHz) | Compliance Direction System Inc. | PAP-1G1 | 18-50 | 14140-13467 | 2019-03-18 | 2020-12-05 | 2021-12-04 |
| V | Pre-amplification (To 26.5GHz) | R&S | SCU-2 | | 134668 | 2019-02-06 | 2020-09-27 | 2021-09-26 |
| V | Band Reject Filter | Wainwright | WRCJ\ 2350-24 2483.5-25 40S\$ | 400- 533.5- | 1 | 2020-05-10 | 2021-05-09 | 2022-05-08 |
| V | Highpass Filter | Wainwright | WHKX 2700-30 18000-4 | 000- | 2 | 2020-05-10 | 2021-05-09 | 2022-05-08 |
| | | | | Soft | ware | | | |
| Used | Desci | ription | Ma | nufac | turer | Name | Version | |
| $\overline{\mathbf{V}}$ | Test Software for R | adiated disturbar | nce Tonsce | | end | JS32 | V1.0 | |
| | | | Oth | er ins | truments | | | |
| Used | Equipment | Manufacturer | Model | No. | Serial No. | Upper Last Cal. | Last Cal. | Next Cal. |
| | Spectrum Analyzer | Keysight | N9010 | OB | MY57110128 | 2020-05-10 | 2021-05-09 | 2022-05-08 |
| | Power Meter | Keysight | U2021 | XA | MY57110002 | 2020-05-10 | 2021-05-09 | 2022-05-08 |



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6. MEASUREMENT METHODS

| No. | Test Item | KDB Name | Section |
|-----|---|---|-----------------|
| 1 | 6dB Bandwidth | KDB 558074 D01 15.247 Meas Guidance v05r02 | 8.2 |
| 2 | Conducted 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 |



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7. ANTENNA PORT TEST RESULTS

7.1. ON TIME AND DUTY CYCLE

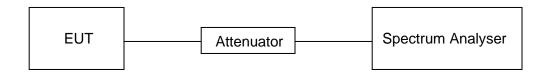
LIMITS

None; for reporting purposes only

PROCEDURE

FCC KDB 558074 Zero-Span Spectrum Analyzer Method

TEST SETUP



RESULTS

| Mode | On Time (msec) | Period (msec) | Duty Cycle x (Linear) | Duty Cycle (%) | Duty Cycle Correction Factor (db) | 1/T Minimum VBW (KHz) | Final Minimum VBW (KHz) |
|-------------|----------------------|------------------|--------------------------------|----------------------|--|--------------------------------|----------------------------------|
| 11B | 8.380 | 8.453 | 0.991 | 99.1 | 0.04 | 0.12 | 0.01(Note 4) |
| 11G | 1.391 | 1.4601 | 0.953 | 95.3 | 0.21 | 0.72 | 1 |
| 11N HT20 | 5.082 | 5.152 | 0.986 | 98.6 | 0.06 | 0.20 | 0.01(Note 4) |
| 11N HT40 | 2.467 | 2.536 | 0.973 | 97.3 | 0.12 | 0.41 | 1 |

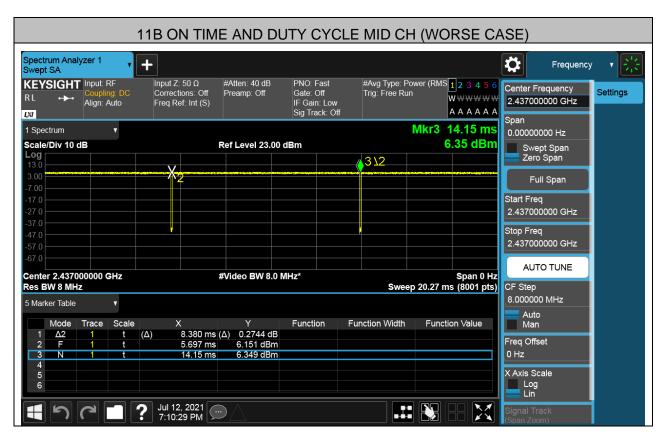
Note: 1) Duty Cycle Correction Factor=10log(1/x).

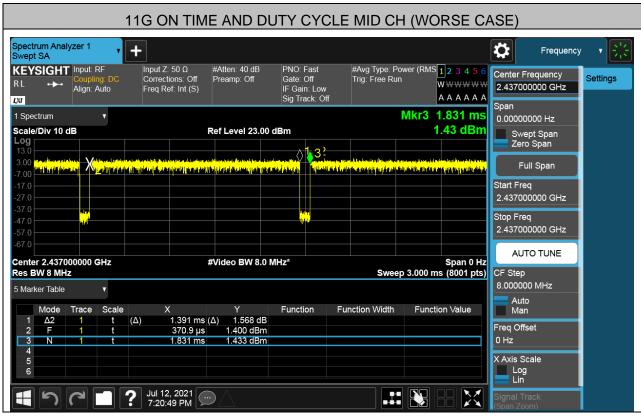
2) Where: x is Duty Cycle(Linear)

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

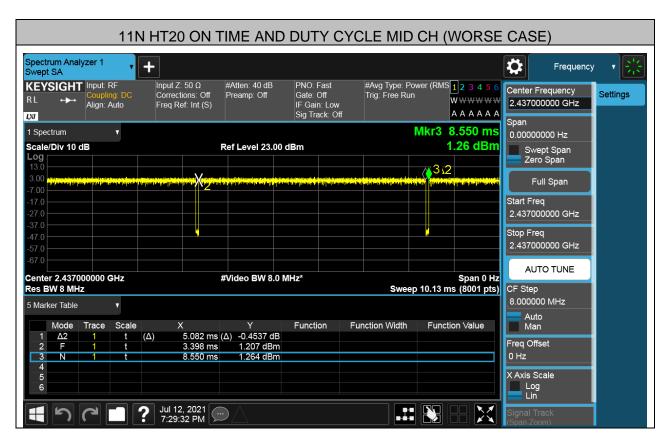
4) The minimum VBW should be 10Hz if the duty cycle is over 98%.

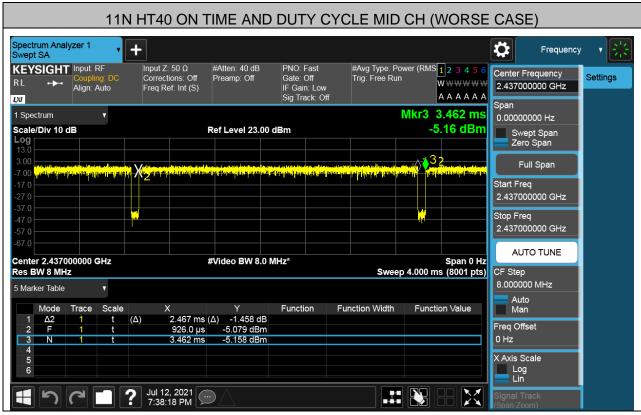












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7.2. 6 dB BANDWIDTH

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 | | |

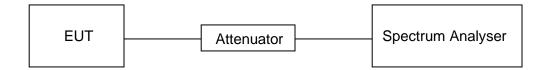
TEST PROCEDURE

Refer to FCC KDB 558074, connect the UUT to the spectrum analyzer and use the following settings:

| Center Frequency | The centre frequency of the channel under test |
|------------------|--|
| Detector | Peak |
| RBW | For 6dB Bandwidth :100K |
| VBW | For 6dB Bandwidth : ≥3 × 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





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RESULTS

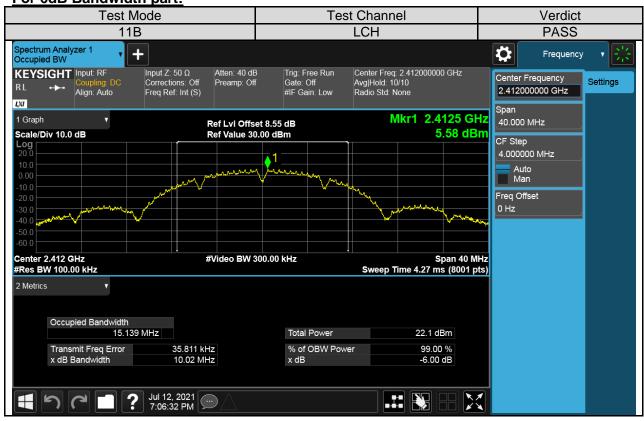
| Test Mode | Test Channel | 6dB bandwidth (MHz) | Result |
|-----------|--------------|------------------------|--------|
| | LCH | 10.02 | Pass |
| 11B | MCH | 10.05 | Pass |
| | HCH | 10.06 | Pass |
| 11G | LCH | 16.34 | Pass |
| | MCH | 16.35 | Pass |
| | HCH | 16.35 | Pass |
| 11N HT20 | LCH | 17.60 | Pass |
| | MCH | 17.60 | Pass |
| | HCH | 17.60 | Pass |
| 11N HT40 | LCH | 36.31 | Pass |
| | MCH | 36.30 | Pass |
| | HCH | 36.32 | Pass |

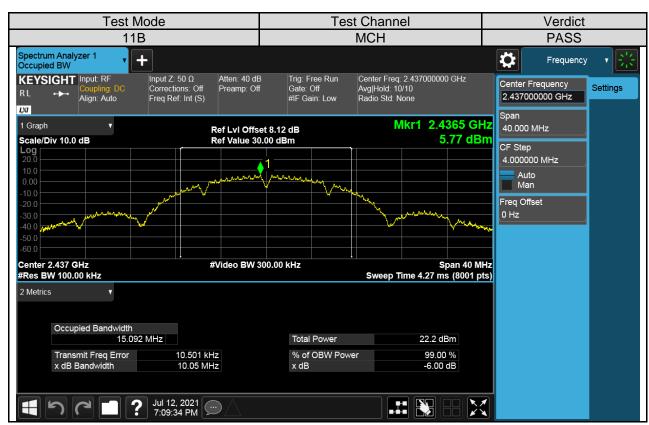


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<u>Test Graphs</u>

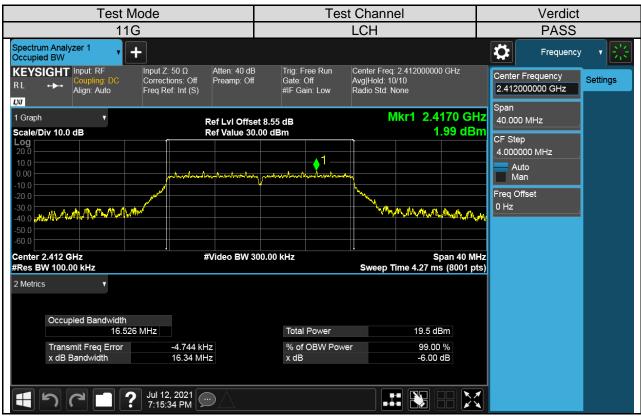
For 6dB Bandwidth part:





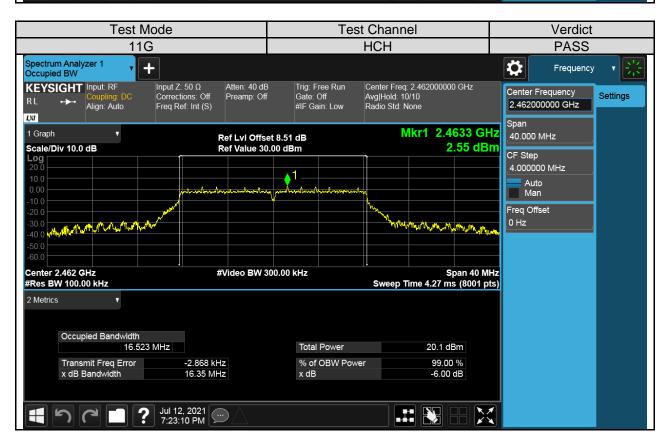






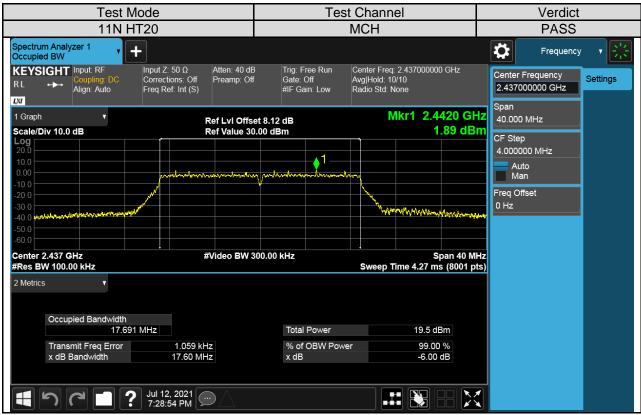


Test Channel Test Mode Verdict 11G MCH **PASS** Spectrum Analyzer 1 Occupied BW Ö Frequency KEYSIGHT Input: RF Atten: 40 dB Input Z: 50 Ω Trig: Free Run Center Freq: 2.437000000 GHz Center Frequency Corrections: Off Freq Ref: Int (S) Avg|Hold:>10/10 Radio Std: None Settings Preamp: Off Gate: Off Align: Auto 2.437000000 GHz #IF Gain: Low ĻXI Mkr1 2.4383 GHz 1 Graph Ref Lvi Offset 8.12 dB Ref Value 30.00 dBm 40.000 MHz Scale/Div 10.0 dB 2.18 dBm CF Step _og 4.000000 MHz Auto Man Freq Offset 0 Hz <u>~_^_^__</u> The track was a few and the second #Video BW 300.00 kHz Center 2.437 GHz Span 40 MHz #Res BW 100.00 kHz Sweep Time 4.27 ms (8001 pts) 2 Metrics Occupied Bandwidth 16.509 MHz Total Power 19.8 dBm Transmit Freq Error -8.625 kHz % of OBW Power 99.00 % 16.35 MHz -6 00 dB x dB Bandwidth x dB Jul 12, 2021 7:18:36 PM







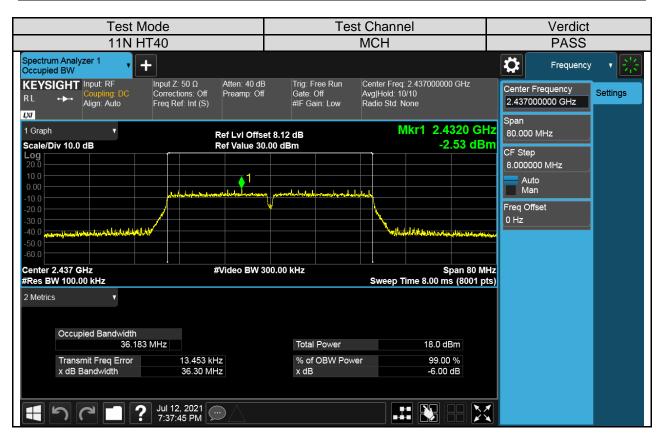


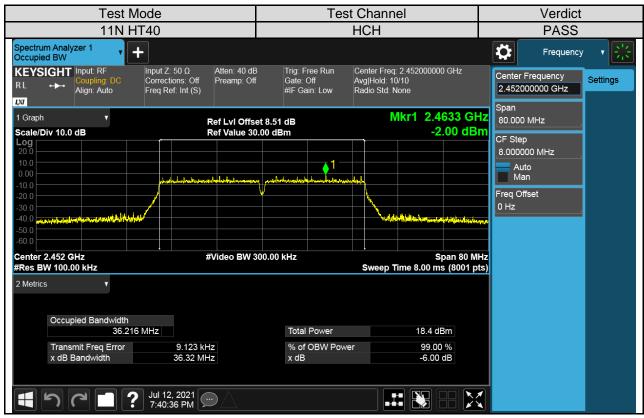












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7.3. CONDUCTED POWER

LIMITS

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

TEST PROCEDURE

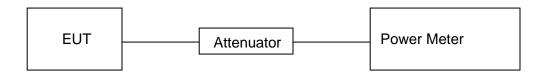
Place the EUT on the table and set it in the transmitting mode.

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.

AVG Detector use for AVG result.

TEST SETUP





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RESULTS

| Test Mode | Test Channel | Maximum Conducted Output Power (AV) dBm | Result |
|--------------|--------------|--|--------|
| 11B | LCH | 15.38 | Pass |
| | MCH | 15.55 | Pass |
| | HCH | 15.96 | Pass |
| 11G | LCH | 13.21 | Pass |
| | MCH | 13.36 | Pass |
| | HCH | 13.79 | Pass |
| 11N HT20 | LCH | 13.13 | Pass |
| | MCH | 13.32 | Pass |
| | HCH | 13.70 | Pass |
| 11N HT40 | LCH | 11.47 | Pass |
| | MCH | 11.69 | Pass |
| | HCH | 12.07 | Pass |

Remark:

- For all the test results has been adjusted the duty cycle factor.
 For Correction Factor is refer to the result in section 7.1

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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

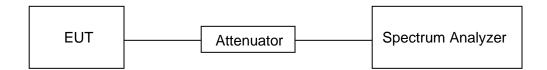
Refer to FCC KDB 558074, connect the UUT to the spectrum analyser and use the following settings:

| Center Frequency | The centre frequency of the channel under test | |
|------------------|--|--|
| Detector | Peak | |
| RBW | 3 kHz ≤ RBW ≤100 kHz | |
| VBW | ≥3 × RBW | |
| Span | 1.5 x 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





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RESULTS

| Test Mode | Test Channel | Maximum Peak power spectral density (dBm/30kHz) | Result |
|-----------|--------------|--|--------|
| | LCH | 0.61 | Pass |
| 11B | MCH | 0.83 | Pass |
| | HCH | 1.16 | Pass |
| 11G | LCH | -2.40 | Pass |
| | MCH | -2.22 | Pass |
| | HCH | -2.33 | Pass |
| 11N HT20 | LCH | -2.81 | Pass |
| | MCH | -3.79 | Pass |
| | HCH | -3.11 | Pass |
| 11N HT40 | LCH | -7.69 | Pass |
| | MCH | -7.89 | Pass |
| | HCH | -7.23 | Pass |



Test Graphs:







Test Channel Test Mode Verdict 11B **HCH PASS** Spectrum Analyzer 1 Swept SA Ö Frequency #Avg Type: Power (RMS 1 2 3 4 5 6 Avg|Hold: 100/100 M www.ww KEYSIGHT Input: RF Input Z: 50 Ω #Atten: 40 dB PNO: Best Wide Center Frequency Corrections: Off Freq Ref: Int (S) Gate: Off IF Gain: Low Sig Track: Off Settings Preamp: Off M + W + W + WAlign: Auto Trig: Free Run 2.462000000 GHz PPPPPP ĻXI Mkr1 2.462 700 GHz 1 Spectrum 16.0000000 MHz Ref Lvl Offset 8.51 dB Scale/Div 10 dB Ref Level 30.00 dBm 1.16 dBm Swept Span Zero Span Log Full Span Start Freq **(1**) 2.454000000 GHz 2.470000000 GHz **AUTO TUNE** CF Step 1.600000 MHz Auto Man Freq Offset 0 Hz X Axis Scale Span 16.00 MHz Center 2.462000 GHz #Video BW 100 kHz Log Lin #Res BW 30 kHz Sweep 17.1 ms (8001 pts) Jul 12, 2021 7:14:23 PM Signal Track

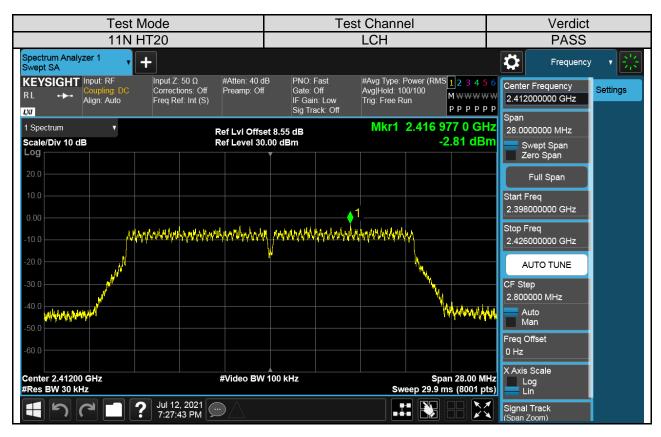


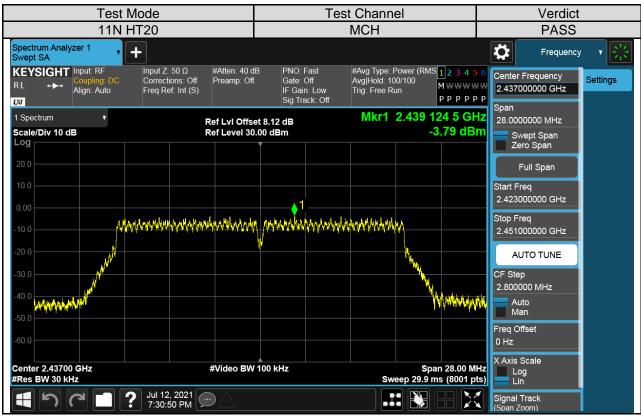


Test Channel Test Mode Verdict 11G MCH **PASS** Spectrum Analyzer 1 Swept SA + Ö Frequency #Avg Type: Power (RMS 1 2 3 4 5 6 Avg|Hold: 100/100 KEYSIGHT Input: RF Input Z: 50 Ω #Atten: 40 dB PNO: Fast Center Frequency Corrections: Off Freq Ref: Int (S) Gate: Off IF Gain: Low Sig Track: Off Settings Preamp: Off M + W + W + WAlign: Auto 2.437000000 GHz Trig: Free Run PPPPPP ĻXI Mkr1 2.444 484 75 GHz 1 Spectrum 26.0000000 MHz Ref Lvl Offset 8.12 dB Scale/Div 10 dB Ref Level 30.00 dBm -2.22 dBm Swept Span Zero Span Log Full Span Start Freq 2.424000000 GHz nyanananananananananana 2.450000000 GHz **AUTO TUNE** CF Step 2.600000 MHz Auto Man Freq Offset 0 Hz X Axis Scale Center 2.43700 GHz #Res BW 30 kHz Span 26.00 MHz #Video BW 100 kHz Log Lin Sweep 27.7 ms (8001 pts) Jul 12, 2021 7:22:04 PM ÷ Signal Track









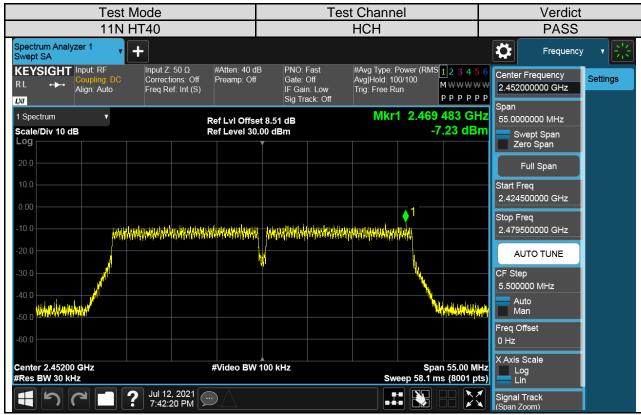














7.5. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

LIMITS

| FCC Part15 (15.247) Subpart C | | | |
|---|--|--|--|
| Section Test Item Limit | | | |
| FCC §15.247 (d) Conducted Bandedge and Spurious Emissions At least 30 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 | ≥3 × RBW |
| Span | 1.5 x DTS bandwidth |
| Trace | Max hold |
| Sweep time | Auto couple. |

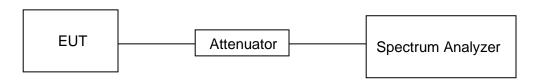
settings:

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 | ≥3 × RBW |
| measurement points | ≥span/RBW |
| Trace | Max hold |
| Sweep time | Auto couple. |

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

TEST SETUP





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Part I: Conducted Bandedge

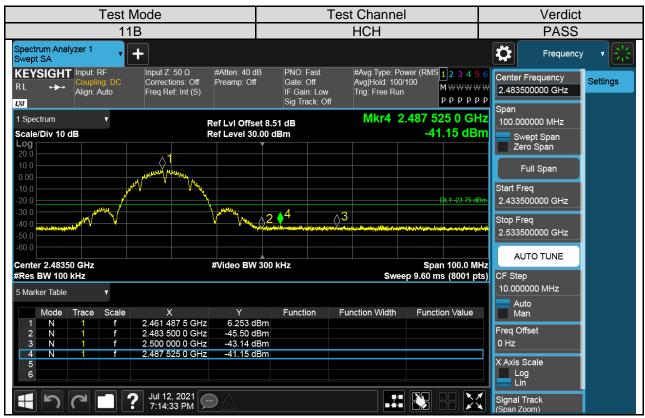
RESULTS TABLE

| Test Mode | Test Channel | Carrier Power[dBm] | Max. Spurious Level [dBm] | Limit [dBm] | Verdict |
|--------------|-----------------|-----------------------|------------------------------|----------------|---------|
| 11D | LCH | 5.648 | -41.60 | -24.35 | PASS |
| 11B | HCH | 6.253 | -41.15 | -23.75 | PASS |
| 110 | LCH | 2.007 | -41.17 | -27.99 | PASS |
| 11G | HCH | 2.658 | -37.74 | -27.34 | PASS |
| 11N UT20 | LCH | 1.422 | -40.38 | -28.58 | PASS |
| 11N HT20 | HCH | 2.158 | -38.58 | -27.84 | PASS |
| 11N UT10 | LCH | -2.901 | -39.11 | -32.90 | PASS |
| 11N HT40 | HCH | -2.045 | -36.98 | -32.05 | PASS |

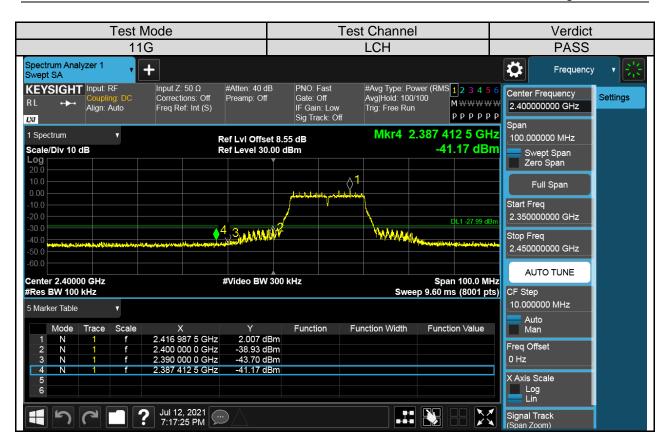


TEST GRAPHS

























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Part II : Conducted Emission

Test Result Table

| Test Mode | Test Antenna | Channel | Pref(dBm) | Puw(dBm) | Verdict |
|------------|--------------|---------|---------------------|--------------------------------------|---------|
| | | LCH | See the test graphs | <limit< td=""><td>PASS</td></limit<> | PASS |
| 11B | Antenna 1 | MCH | See the test graphs | <limit< td=""><td>PASS</td></limit<> | PASS |
| | | HCH | See the test graphs | <limit< td=""><td>PASS</td></limit<> | PASS |
| | | LCH | See the test graphs | <limit< td=""><td>PASS</td></limit<> | PASS |
| 11G | Antenna 1 | MCH | See the test graphs | <limit< td=""><td>PASS</td></limit<> | PASS |
| 110 | | HCH | See the test graphs | <limit< td=""><td>PASS</td></limit<> | PASS |
| | | LCH | See the test graphs | <limit< td=""><td>PASS</td></limit<> | PASS |
| 11N HT20 | Antenna 1 | MCH | See the test graphs | <limit< td=""><td>PASS</td></limit<> | PASS |
| 111111120 | | HCH | See the test graphs | <limit< td=""><td>PASS</td></limit<> | PASS |
| | | LCH | See the test graphs | <limit< td=""><td>PASS</td></limit<> | PASS |
| 11N HT40 | Antenna 1 | MCH | See the test graphs | <limit< td=""><td>PASS</td></limit<> | PASS |
| 1111111140 | | HCH | See the test graphs | <limit< td=""><td>PASS</td></limit<> | PASS |



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Test Plots

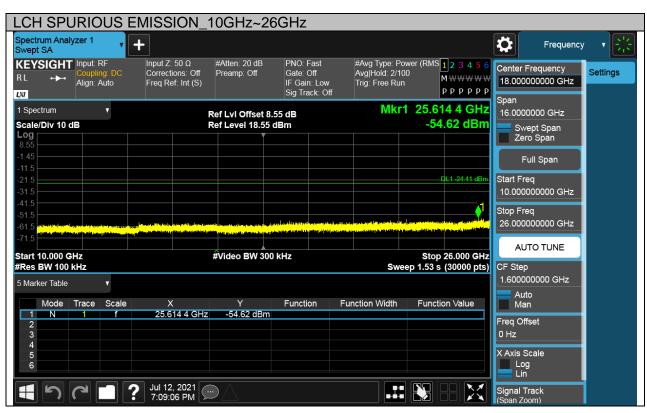
| Test Mode | Channel | Verdict |
|-----------|---------|---------|
| 11B | LCH | PASS |





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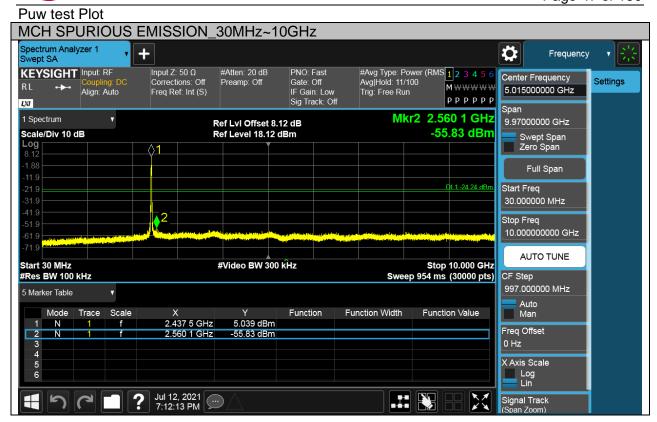
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| Test Mode | Channel | Verdict |
|-----------|---------|---------|
| 11B | MCH | PASS |





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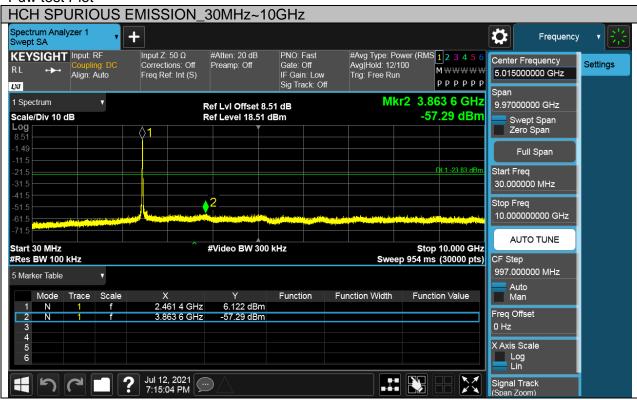
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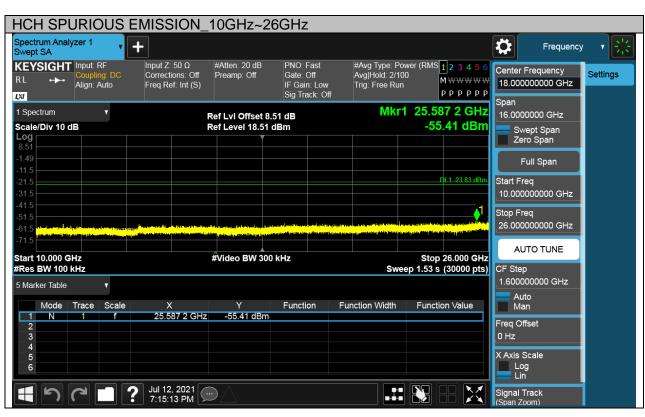
| Test Mode | Channel | Verdict |
|-----------|---------|---------|
| 11B | HCH | PASS |





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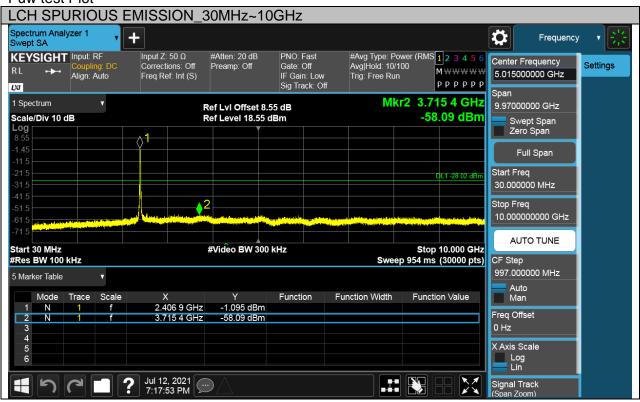
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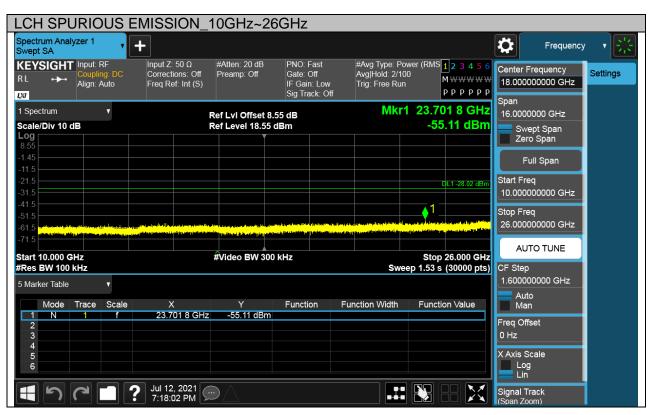
| Test Mode | Channel | Verdict |
|-----------|---------|---------|
| 11G | LCH | PASS |





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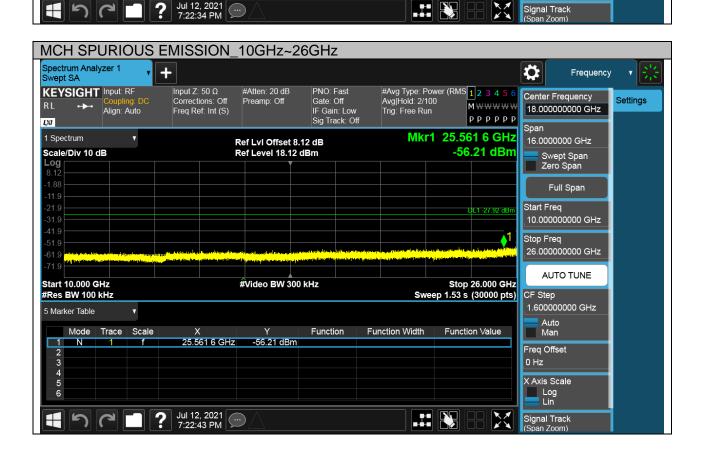
| Test Mode | Channel | Verdict |
|-----------|---------|---------|
| 11G | MCH | PASS |





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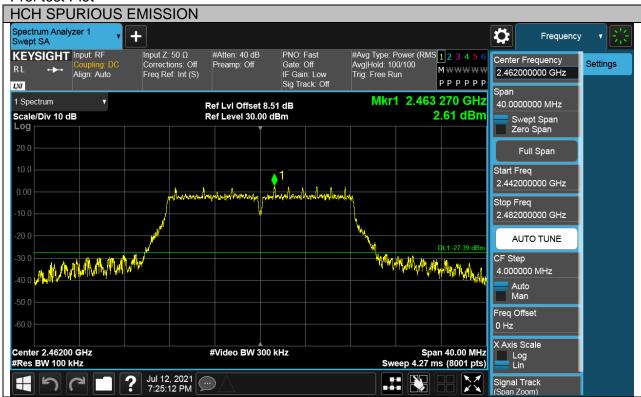
Puw test Plot MCH SPURIOUS EMISSION_30MHz~10GHz Spectrum Analyzer 1 Swept SA Ö Frequency #Avg Type: Power (RMS 1 2 3 4 5 (Avg|Hold: 12/100 Input Z: 50 Ω #Atten: 20 dB KEYSIGHT Input: RF PNO: Fast Center Frequency Corrections: Off Preamp: Off Gate: Off Settings MWWWW Align: Auto 5.015000000 GHz Freq Ref: Int (S) IF Gain: Low Trig: Free Run PPPPP LXI Sig Track: Off Mkr2 2.560 1 GHz 1 Spectrum 9.97000000 GHz Ref Lvi Offset 8.12 dB Ref Level 18.12 dBm -55.91 dBm Scale/Div 10 dB Swept Span Zero Span Log Full Span Start Freq 30.000000 MHz 2 Stop Freq 10.000000000 GHz 61.9 AUTO TUNE Start 30 MHz #Video BW 300 kHz Stop 10.000 GHz #Res BW 100 kHz Sweep 954 ms (30000 pts) 997.000000 MHz 5 Marker Table Function Function Width Function Value Mode Trace Scale 2.041 dBm 2.442 2 GHz Freq Offset 2.560 1 GHz -55.91 dBm N 0 Hz X Axis Scale Log Lin 6





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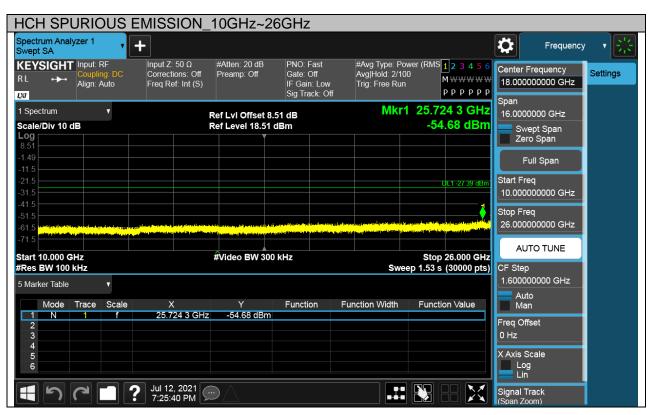
| Test Mode | Channel | Verdict |
|-----------|---------|---------|
| 11G | HCH | PASS |





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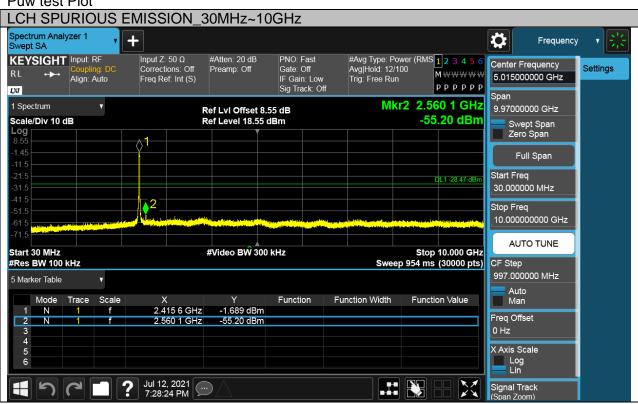
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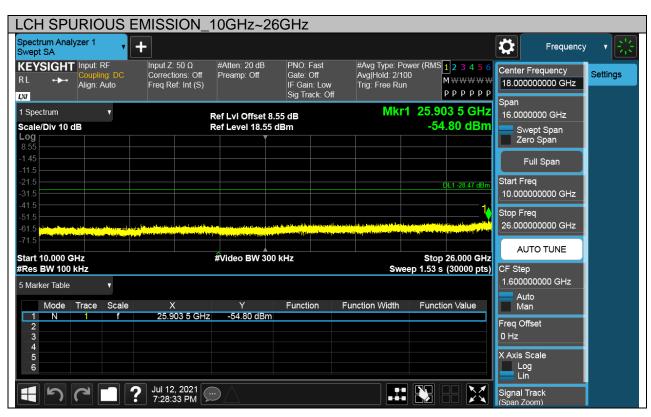
| Test Mode | Channel | Verdict |
|-----------|---------|---------|
| 11N HT20 | LCH | PASS |





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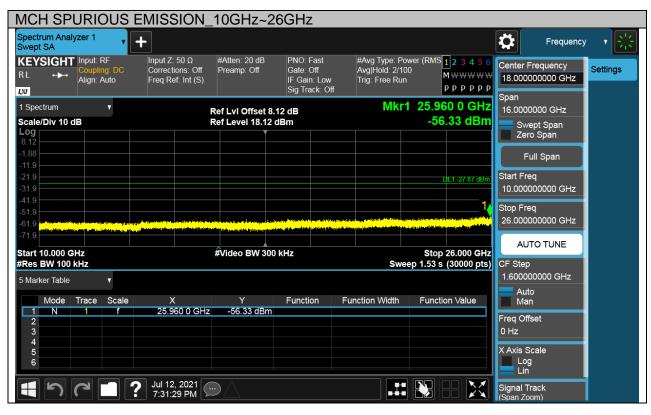
| Test Mode | Channel | Verdict |
|-----------|---------|---------|
| 11N HT20 | MCH | PASS |





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Puw test Plot MCH SPURIOUS EMISSION_30MHz~10GHz Spectrum Analyzer 1 Swept SA Ö Frequency #Avg Type: Power (RMS 1 2 3 4 5 (Avg|Hold: 12/100 Input Z: 50 Ω #Atten: 20 dB KEYSIGHT Input: RF PNO: Fast Center Frequency Corrections: Off Preamp: Off Gate: Off Settings MWWWW Align: Auto 5.015000000 GHz Freq Ref: Int (S) IF Gain: Low Trig: Free Run PPPPP LXI Sig Track: Off Mkr2 5.134 1 GHz 1 Spectrum 9.97000000 GHz Ref Lvi Offset 8.12 dB Ref Level 18.12 dBm -56.92 dBm Scale/Div 10 dB Swept Span Zero Span Log Full Span Start Freq 30.000000 MHz Stop Freq 10.000000000 GHz 619 AUTO TUNE Start 30 MHz #Video BW 300 kHz Stop 10.000 GHz #Res BW 100 kHz Sweep 954 ms (30000 pts) 997.000000 MHz 5 Marker Table Function Function Width Function Value Mode Trace Scale -1.509 dBm -56.92 dBm 2.439 8 GHz Freq Offset 5.134 1 GHz N 0 Hz X Axis Scale Log Lin 6 Jul 12, 2021 7:31:20 PM Signal Track





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

