

RADIO TEST REPORT

FCC 47 CFR PART 15 SUBPART C

| | |
|---------------------------------|--|
| Test Standard | FCC Part 15.247 |
| Product name | Wireless Full HD Network Camera |
| Brand Name | Sercomm |
| Model No. | RC8520S; RC8520SXXXXXXXX (the 1st X should be "blank" or "-"; the rest X could be 0 to 9, A to Z, a to z, "blank" or "-", for marketing purpose) |
| Test Result | Pass |
| Statements of Conformity | Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty. |

The test Result was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were given in ANSI C63.10: 2013 and compliance standards.

The test results of this report relate only to the tested sample (EUT) identified in this report.

The test Report of full or partial shall not copy. Without written approval of Compliance Certification Services Inc. (Wugu Laboratory).

Approved by:



Shawn Wu
Supervisor

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.
除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部份複製。

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Revision History

| Rev. | Issue Date | Revisions | Effect Page | Revised By |
|------|-------------------|---------------------------------|----------------------------------|--------------|
| 00 | November 11, 2021 | Initial Issue | ALL | Allison Chen |
| 01 | November 19, 2021 | See the following Note Rev.(01) | P.4, P.6, P.9, P.17, P.80~103 | Allison Chen |
| 02 | December 6, 2021 | See the following Note Rev.(02) | P.4 | Allison Chen |

Note:**Rev.(01)**

1. Modified power supply for adapter M/N, remark of directional gain formula and support equipment information.
2. Removed 99% OBW description in section 5.2, and remark of above 1GHz in section 5.6.

Rev.(02)

1. Modified power supply for adapter model number: MU05C2050100-A1.

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Report No.: TMWK2109000768KR

1. GENERAL INFORMATION

1.1 EUT INFORMATION

| | |
|-------------------|--|
| Applicant | Sercomm Corporation 8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan |
| Manufacturer | Sercomm Corporation 8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan |
| Equipment | Wireless Full HD Network Camera |
| Model No. | RC8520S; RC8520SXXXXXXXX (the 1st X should be "blank" or "-"; the rest X could be 0 to 9, A to Z, a to z, "blank" or "-", for marketing purpose) |
| Model Discrepancy | All the above models are identical except for the designation of model numbers. The suffix of (the 1st X should be "blank" or "-"; the rest X could be 0 to 9, A to Z, a to z, "blank" or "-") on model number is just for marketing purpose only. |
| Trade Name | Sercomm |
| Received Date | September 30, 2021 |
| Date of Test | October 8 ~ 14, 2021 |
| Power Supply | Power from Adapter. I.T.E.POWER SUPPLY / MU05C2050100-A1 I/P: 100-240VAC, 50/60Hz, 0.15A O/P: 5.0VDC, 1.0A, 5.0W |
| HW Version | Mainbaord: C-1 Wifi Board: B-1 |
| SW Version | V1.2.01R01 |

Remark:

1. For more details, please refer to the User's manual of the EUT.
2. Disclaimer: Variant information between/among model numbers / trademarks is provided by the applicant, test results of this report are applicable to the sample EUT received of main test model name.

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1.2 EUT CHANNEL INFORMATION

| | |
|-------------------|---|
| Frequency Range | 802.11b/g/n HT 20: 2412MHz ~ 2462MHz 802.11n HT40: 2422MHz ~ 2452MHz |
| Modulation Type | 1. IEEE 802.11b mode: CCK 2. IEEE 802.11g mode: OFDM 3. IEEE 802.11n HT 20 MHz mode : OFDM 4. IEEE 802.11n HT 40 MHz mode : OFDM |
| Number of channel | 1. IEEE 802.11b mode: 11 Channels 2. IEEE 802.11g mode: 11 Channels 3. IEEE 802.11n HT 20 MHz mode : 11 Channels 4. IEEE 802.11n HT 40 MHz mode : 7 Channels |

Remark:

Refer as ANSI C63.10: 2013 clause 5.6.1 Table 4 for test channels

| Number of frequencies to be tested | | |
|--|-----------------------|--|
| Frequency range in which device operates | Number of frequencies | Location in frequency range of operation |
| <input type="checkbox"/> 1 MHz or less | 1 | Middle |
| <input type="checkbox"/> 1 MHz to 10 MHz | 2 | 1 near top and 1 near bottom |
| <input checked="" type="checkbox"/> More than 10 MHz | 3 | 1 near top, 1 near middle, and 1 near bottom |

1.3 ANTENNA INFORMATION

| | |
|--------------------------|--|
| Antenna Type | <input type="checkbox"/> PCB <input checked="" type="checkbox"/> Dipole <input type="checkbox"/> Coils <input type="checkbox"/> PIFA |
| Antenna Gain | Chain 0 (Ant 1): Gain: 2.9 dBi Chain 1 (Ant 2): Gain: 3.4 dBi Directional Gain: 6.16 dBi |
| Antenna Connector | I-PEX |

Remark:

- 1.The antenna(s) of the EUT are permanently attached and there are no provisions for connection to an external antenna. So the EUT complies with the requirements of §15.203.
2. Disclaimer: Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.
3. Directional Gain = $10 \log [(10^{ANT1/20} + 10^{ANT2/20} + \dots + 10^{ANT N/20})^2 / N_{ANT}]$ dBi

1.4 MEASUREMENT UNCERTAINTY

| PARAMETER | UNCERTAINTY |
|--|-------------|
| AC Powerline Conducted Emission | +/- 1.2575 |
| Emission bandwidth, 20dB bandwidth | +/- 0.0014 |
| RF output power, conducted | +/- 1.14 |
| Power density, conducted | +/- 1.40 |
| 3M Semi Anechoic Chamber / 30M~1G (Horizontally) | +/- 3.91 |
| 3M Semi Anechoic Chamber / 30M~1G (Vertically) | +/- 4.57 |
| 3M Semi Anechoic Chamber / 1G~6G | +/- 5.20 |
| 3M Semi Anechoic Chamber / 6G~18G | +/- 5.18 |
| 3M Semi Anechoic Chamber / 18G~40G | +/- 3.68 |

Remark:

- 1.This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2
2. ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report.

1.5 FACILITIES AND TEST LOCATION

All measurement facilities used to collect the measurement data are located at

No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan. (R.O.C.)

CAB identifier: TW1309

| Test site | Test Engineer | Remark |
|--------------------|-------------------|--------|
| AC Conduction Room | Jack Chen | - |
| Radiation | Ray Li, Tony Chao | - |
| RF Conducted | Lance Chen | - |

Remark: The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC public Access Link (PAL) database, FCC Registration No. :444940, the FCC Designation No.:TW1309

1.6 INSTRUMENT CALIBRATION

| RF Conducted Test Site | | | | | |
|------------------------|-----------------------------|---------|---------------|------------------|-----------------|
| Name of Equipment | Manufacturer | Model | Serial Number | Calibration Date | Calibration Due |
| Coaxial Cable | Woken | WC12 | CC001 | 06/28/2021 | 06/27/2022 |
| Coaxial Cable | Woken | WC12 | CC003 | 06/28/2021 | 06/27/2022 |
| EXA Signal Analyzer | KEYSIGHT | N9010B | MY55460167 | 09/07/2021 | 09/06/2022 |
| Power Meter | Anritsu | ML2487A | 6K00003260 | 05/24/2021 | 05/23/2022 |
| Power Seneor | Anritsu | MA2490A | 032910 | 05/24/2021 | 05/23/2022 |
| Software | Radio Test Software Ver. 21 | | | | |

| Conducted Emission Room | | | | | |
|-------------------------|-------------------------|-----------|---------------|------------------|-----------------|
| Name of Equipment | Manufacturer | Model | Serial Number | Calibration Date | Calibration Due |
| CABLE | EMCI | CFD300-NL | CERF | 06/28/2021 | 06/27/2022 |
| EMI Test Receiver | R&S | ESCI | 100064 | 07/05/2021 | 07/04/2022 |
| LISN | SCHAFFNER | NNB 41 | 03/10013 | 02/02/2021 | 02/01/2022 |
| Software | EZ-EMC(CCS-3A1-CE-wugu) | | | | |

Remark: Each piece of equipment is scheduled for calibration once a year.

| 3M 966 Chamber Test Site | | | | | |
|----------------------------|-------------------|-----------------------|-----------------|------------|------------|
| Equipment | Manufacturer | Model | Serial Number | Cal Date | Cal Due |
| Band Reject Filters | MICRO TRONICS | BRM 50702 | 120 | 02/08/2021 | 02/07/2022 |
| Bilog Antenna | Sunol Sciences | JB3 | A030105 | 07/19/2021 | 07/18/2022 |
| Coaxial Cable | HUBER SUHNER | SUCOFLEX 104PEA | 20995 | 02/24/2021 | 02/23/2022 |
| Coaxial Cable | EMCI | EMC105 | 190914+327109/4 | 09/17/2021 | 09/16/2022 |
| Digital Thermo-Hygro Meter | WISEWIND | 1206 | D07 | 01/06/2021 | 01/05/2022 |
| Horn Antenna | ETS LINDGREN | 3116 | 26370 | 12/11/2020 | 12/10/2021 |
| Horn Antenna | ETS LINDGREN | 3117 | 55165 | 07/29/2021 | 07/28/2022 |
| K Type Cable | Huber+Suhner | SUCOFLEX 102 | 29406/2 | 12/09/2020 | 12/08/2021 |
| K Type Cable | Huber+Suhner | SUCOFLEX 102 | 22470/2 | 12/09/2020 | 12/08/2021 |
| Pre-Amplifier | EMEC | EM330 | 060609 | 02/24/2021 | 02/23/2022 |
| Pre-Amplifier | HP | 8449B | 3008A00965 | 12/25/2020 | 12/24/2021 |
| Pre-Amplifier | MITEQ | AMF-6F-18004000-37-8P | 985646 | 09/08/2021 | 09/07/2022 |
| Signal Analyzer | R&S | FSV 40 | 101073 | 09/07/2021 | 09/06/2022 |
| Antenna Tower | CCS | CC-A-1F | N/A | N.C.R | N.C.R |
| Controller | CCS | CC-C-1F | N/A | N.C.R | N.C.R |
| Turn Table | CCS | CC-T-1F | N/A | N.C.R | N.C.R |
| Software | e3 6.11-20180419c | | | | |

Remark: Each piece of equipment is scheduled for calibration once a year.

1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

| EUT Accessories Equipment | | | | | | |
|---------------------------|-----------|-------|-------|------------|--------|----|
| No. | Equipment | Brand | Model | Series No. | FCC ID | IC |
| | N/A | | | | | |

| Support Equipment | | | | | | |
|-------------------|-----------|--------|------------|------------|---------------|-----------------|
| No. | Equipment | Brand | Model | Series No. | FCC ID | IC |
| 1 | NB | Lenovo | 20175 | N/A | TX2-RTL8723AS | 6317A-RTL8723AS |
| 2 | NB (C) | HP | dv6-1332TX | CNF9491GM4 | PD9112BNHU | 1000M-112BNHU |

1.8 TEST METHODOLOGY AND APPLIED STANDARDS

The test methodology, setups and results comply with all requirements in accordance with ANSI C63.10:2013, FCC Part 2, FCC Part 15.247.

2. TEST SUMMARY

| FCC Standard Section | Report Section | Test Item | Result |
|----------------------|----------------|-----------------------------|--------|
| 15.203 | 1.3 | Antenna Requirement | Pass |
| 15.207(a) | 5.1 | AC Conducted Emission | Pass |
| 15.247(a)(2) | 5.2 | 6 dB Bandwidth | Pass |
| - | 5.2 | Occupied Bandwidth (99%) | Pass |
| 15.247(b)(3) | 5.3 | Output Power Measurement | Pass |
| 15.247(e) | 5.4 | Power Spectral Density | Pass |
| 15.247(d) | 5.5 | Conducted Band Edge | Pass |
| 15.247(d) | 5.5 | Conducted Emission | Pass |
| 15.247(d) | 5.6 | Radiation Band Edge | Pass |
| 15.247(d) | 5.6 | Radiation Spurious Emission | Pass |

3. DESCRIPTION OF TEST MODES

3.1 THE WORST MODE OF OPERATING CONDITION

| | |
|---------------------------------|---|
| <p>Operation mode</p> | <p>IEEE 802.11b mode :1Mbps IEEE 802.11g mode :6Mbps IEEE 802.11n HT20 mode :MCS0 IEEE 802.11n HT40 Mode: MCS0</p> |
| <p>Test Channel Frequencies</p> | <p>IEEE 802.11b mode : 1. Lowest Channel : 2412MHz 2. Middle Channel : 2437MHz 3. Highest Channel : 2462MHz IEEE 802.11g mode : 1. Lowest Channel : 2412MHz 2. Middle Channel : 2437MHz 3. Highest Channel : 2462MHz IEEE 802.11n HT20 mode : 1. Lowest Channel : 2412MHz 2. Middle Channel : 2437MHz 3. Highest Channel : 2462MHz IEEE 802.11n HT40 Mode: 1. Lowest Channel: 2422MHz 2. Middle Channel: 2437MHz 3. Highest Channel: 2452MHz</p> |
| <p>Operation Transmitter</p> | <p>IEEE 802.11b mode :1T1R IEEE 802.11g mode :1T1R IEEE 802.11n HT20 mode : 2T2R IEEE 802.11n HT40 mode : 2T2R</p> |

Remark:

1. EUT pre-scanned data rate of output power for each mode, the worst data rate were recorded in this report.

3.2 THE WORST MODE OF MEASUREMENT

| AC Power Line Conducted Emission | |
|----------------------------------|--|
| Test Condition | AC Power line conducted emission for line and neutral |
| Power supply Mode | Mode 1: EUT power by Adapter |
| Worst Mode | <input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4 |

| Radiated Emission Measurement Above 1G | |
|--|---|
| Test Condition | Radiated Emission Above 1G |
| Power supply Mode | Mode 1: EUT power by Adapter |
| Worst Mode | <input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4 |
| Worst Position | <input type="checkbox"/> Placed in fixed position. <input checked="" type="checkbox"/> Placed in fixed position at X-Plane (E2-Plane) <input type="checkbox"/> Placed in fixed position at Y-Plane (E1-Plane) <input type="checkbox"/> Placed in fixed position at Z-Plane (H-Plane) |

| Radiated Emission Measurement Below 1G | |
|--|--|
| Test Condition | Radiated Emission Below 1G |
| Power supply Mode | Mode 1: EUT power by Adapter |
| Worst Mode | <input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4 |

Remark:

1. The worst mode was record in this test report.
2. EUT pre-scanned in three axis ,X,Y, Z and two polarity, for radiated measurement. The worst case(X-Plane) were recorded in this report
3. AC power line conducted emission and for below 1G radiation emission were performed the EUT transmit at the highest output power channel as worse case.

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4. EUT DUTY CYCLE

Temperature: 24.7°C

Test date: October 8, 2021

Humidity: 58% RH

Tested by: Lance Chen

| Duty Cycle | | | | |
|---------------|--------------------------------------|--|-----------|-------------------|
| Configuration | Duty Cycle (%) = Ton / (Ton+Toff) | Duty Factor (dB) =10*log (1/Duty Cycle) | 1/T (kHz) | VBW setting (kHz) |
| 802.11b | 99.14 | 0.04 | 0.08 | 0.01 |
| 802.11g | 94.68 | 0.24 | 0.48 | 1.00 |
| 802.11n HT20 | 97.31 | 0.12 | 0.52 | 1.00 |
| 802.11n HT40 | 89.82 | 0.47 | 1.06 | 2.00 |



5. TEST RESULT

5.1 AC POWER LINE CONDUCTED EMISSION

5.1.1 Test Limit

According to §15.207(a)(2),

| Frequency Range (MHz) | Limits(dBμV) | |
|-----------------------|--------------|-----------|
| | Quasi-peak | Average |
| 0.15 to 0.50 | 66 to 56* | 56 to 46* |
| 0.50 to 5 | 56 | 46 |
| 5 to 30 | 60 | 50 |

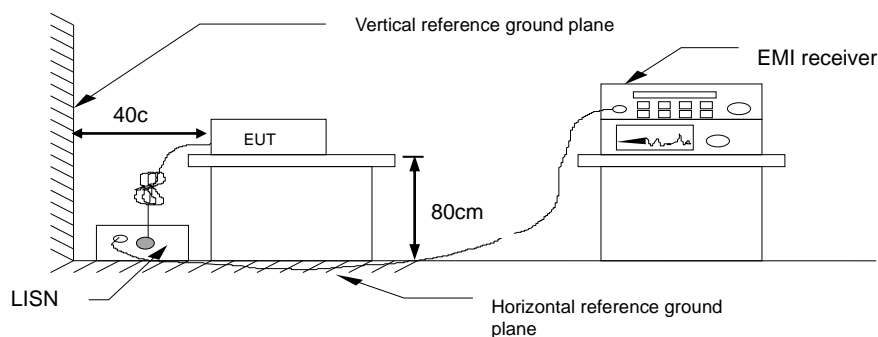
* Decreases with the logarithm of the frequency.

5.1.2 Test Procedure

Test method Refer as ANSI C63.10: 2013 clause 6.2,

1. The EUT was placed on a non-conducted table, which is 0.8m above horizontal ground plane and 0.4m above vertical ground plane.
2. EUT connected to the line impedance stabilization network (LISN)
3. Receiver set RBW of 9kHz and Detector Peak, and note as quasi-peak and average.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. Recorded Line for Neutral and Line.

5.1.3 Test Setup

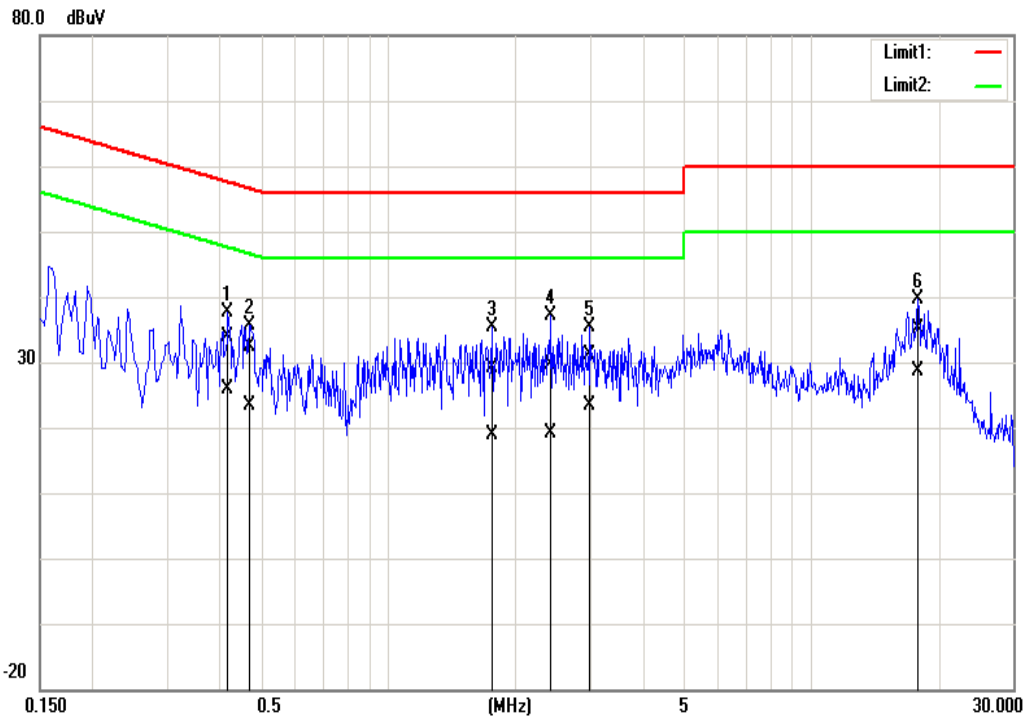


5.1.4 Test Result

PASS

Test Data

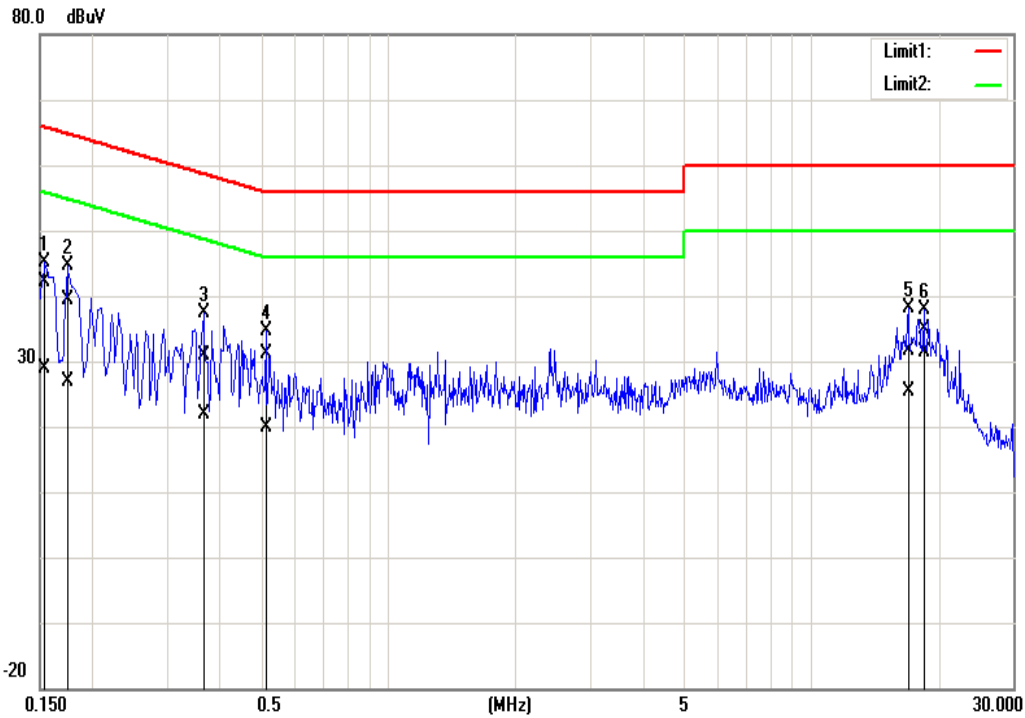
| | | | |
|------------|--------|---------------|------------------|
| Test Mode: | Mode 1 | Temp/Hum | 26.5(°C)/ 45%RH |
| Phase: | Line | Test Date | October 12, 2021 |
| | | Test Engineer | Jack Chen |



| Frequency (MHz) | Quasi Peak reading (dBuV) | Average reading (dBuV) | Correction factor (dB) | Quasi Peak result (dBuV) | Average result (dBuV) | Quasi Peak limit (dBuV) | Average limit (dBuV) | Quasi Peak margin (dB) | Average margin (dB) | Remark |
|-----------------|---------------------------|------------------------|------------------------|--------------------------|-----------------------|-------------------------|----------------------|------------------------|---------------------|--------|
| 0.4180 | 23.55 | 15.65 | 10.29 | 33.84 | 25.94 | 57.49 | 47.49 | -23.65 | -21.55 | Pass |
| 0.4700 | 22.14 | 13.16 | 10.29 | 32.43 | 23.45 | 56.51 | 46.51 | -24.08 | -23.06 | Pass |
| 1.7620 | 18.85 | 8.60 | 10.34 | 29.19 | 18.94 | 56.00 | 46.00 | -26.81 | -27.06 | Pass |
| 2.4220 | 19.41 | 8.84 | 10.34 | 29.75 | 19.18 | 56.00 | 46.00 | -26.25 | -26.82 | Pass |
| 3.0060 | 20.68 | 13.09 | 10.36 | 31.04 | 23.45 | 56.00 | 46.00 | -24.96 | -22.55 | Pass |
| 17.9420 | 24.76 | 18.18 | 10.46 | 35.22 | 28.64 | 60.00 | 50.00 | -24.78 | -21.36 | Pass |

Note: Correction factor = LISN loss + Cable loss.

| | | | |
|------------|---------|---------------|------------------|
| Test Mode: | Mode 1 | Temp/Hum | 26.5(°C)/ 45%RH |
| Phase: | Neutral | Test Date | October 12, 2021 |
| | | Test Engineer | Jack Chen |



| Frequency (MHz) | Quasi Peak reading (dBuV) | Average reading (dBuV) | Correction factor (dB) | Quasi Peak result (dBuV) | Average result (dBuV) | Quasi Peak limit (dBuV) | Average limit (dBuV) | Quasi Peak margin (dB) | Average margin (dB) | Remark |
|-----------------|---------------------------|------------------------|------------------------|--------------------------|-----------------------|-------------------------|----------------------|------------------------|---------------------|--------|
| 0.1540 | 31.79 | 18.49 | 10.29 | 42.08 | 28.78 | 65.78 | 55.78 | -23.70 | -27.00 | Pass |
| 0.1740 | 29.12 | 16.51 | 10.29 | 39.41 | 26.80 | 64.77 | 54.77 | -25.36 | -27.97 | Pass |
| 0.3660 | 20.48 | 11.64 | 10.29 | 30.77 | 21.93 | 58.59 | 48.59 | -27.82 | -26.66 | Pass |
| 0.5140 | 20.93 | 9.68 | 10.29 | 31.22 | 19.97 | 56.00 | 46.00 | -24.78 | -26.03 | Pass |
| 16.9500 | 21.16 | 14.84 | 10.46 | 31.62 | 25.30 | 60.00 | 50.00 | -28.38 | -24.70 | Pass |
| 18.4300 | 24.48 | 20.89 | 10.46 | 34.94 | 31.35 | 60.00 | 50.00 | -25.06 | -18.65 | Pass |

Note: Correction factor = LISN loss + Cable loss.

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5.26dB BANDWIDTH

5.2.1 Test Limit

According to §15.247(a)(2),

6 dB Bandwidth :

| | |
|-------|--------------------------|
| Limit | Shall be at least 500kHz |
|-------|--------------------------|

5.2.2 Test Procedure

Test method Refer as ANSI C63.10: 2013,

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. SA set RBW = 100kHz, VBW = 300kHz and Detector = Peak, to measurement 6 dB Bandwidth.
4. Measure and record the result of 6 dB Bandwidth in the test report.

5.2.3 Test Setup



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5.2.4 Test Result

Temperature: 24.7°C

Test date: October 8, 2021

Humidity: 58% RH

Tested by: Lance Chen

Chain 0 (ANT 1)

| Test mode: IEEE 802.11b mode / 2412-2462 MHz | | | |
|--|-----------------|--------------|-----------------|
| Channel | Frequency (MHz) | 6dB BW (kHz) | 6dB limit (kHz) |
| Low | 2412 | 10080.00 | ≥500 |
| Mid | 2437 | 10080.00 | |
| High | 2462 | 10080.00 | |

| Test mode: IEEE 802.11g mode / 2412-2462 MHz | | | |
|--|-----------------|--------------|-----------------|
| Channel | Frequency (MHz) | 6dB BW (kHz) | 6dB limit (kHz) |
| Low | 2412 | 16380.00 | ≥500 |
| Mid | 2437 | 16370.00 | |
| High | 2462 | 16360.00 | |

| Test mode: IEEE 802.11n HT 20 MHz mode / 2412-2462 MHz | | | |
|--|-----------------|--------------|-----------------|
| Channel | Frequency (MHz) | 6dB BW (kHz) | 6dB limit (kHz) |
| Low | 2412 | 17230.00 | ≥500 |
| Mid | 2437 | 17140.00 | |
| High | 2462 | 17340.00 | |

| Test mode: IEEE 802.11n HT40 Mode / 2422-2452 MHz | | | |
|---|-----------------|--------------|-----------------|
| Channel | Frequency (MHz) | 6dB BW (kHz) | 6dB limit (kHz) |
| Low | 2422 | 35200.00 | ≥500 |
| Mid | 2437 | 35190.00 | |
| High | 2452 | 35210.00 | |

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Chain 1 (ANT 2)

| Test mode: IEEE 802.11n HT 20 MHz mode / 2412-2462 MHz | | | |
|---|------------------------|---------------------|------------------------|
| Channel | Frequency (MHz) | 6dB BW (kHz) | 6dB limit (kHz) |
| Low | 2412 | 17220.00 | ≥500 |
| Mid | 2437 | 17360.00 | |
| High | 2462 | 17340.00 | |

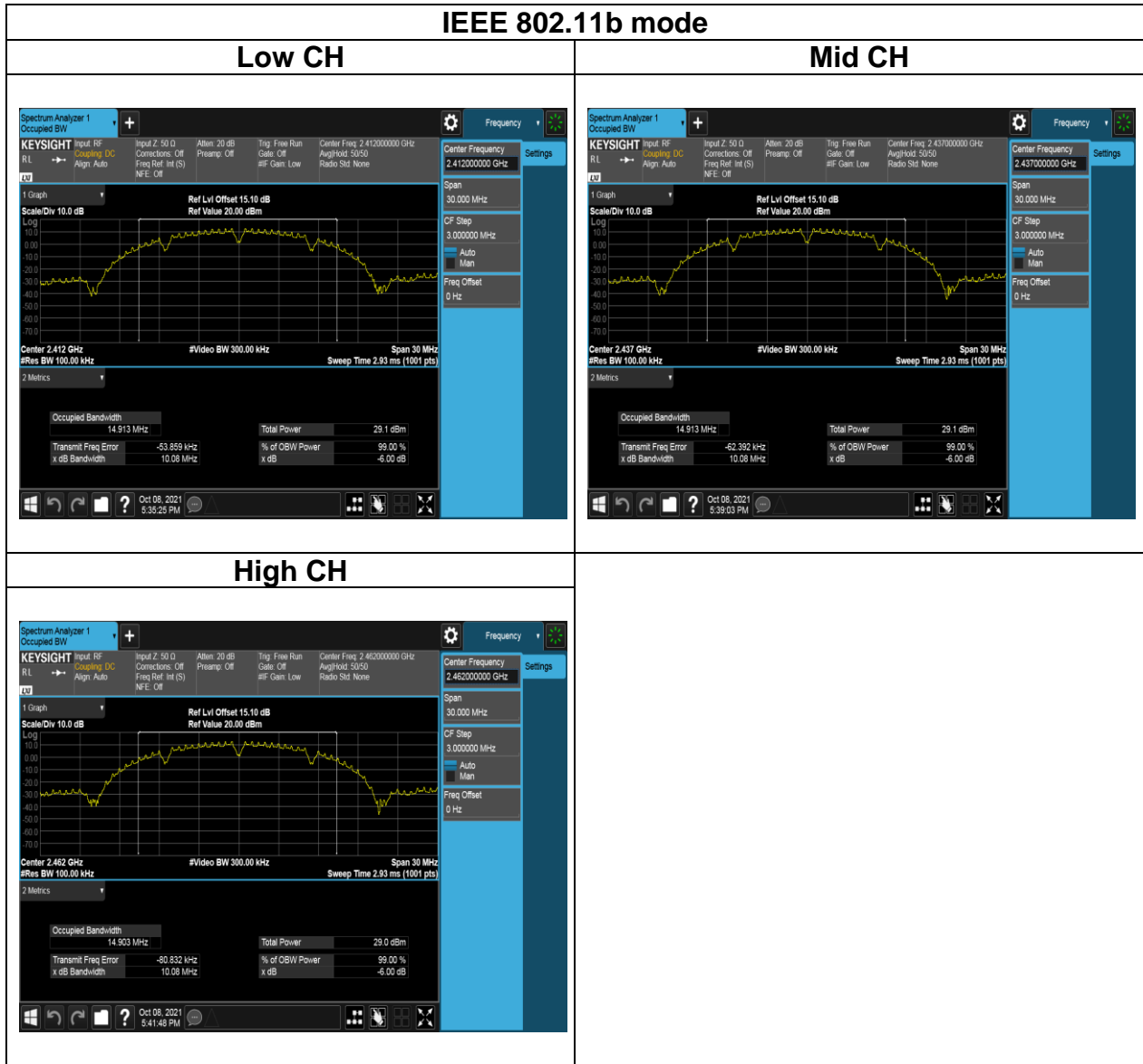
| Test mode: IEEE 802.11n HT40 Mode / 2422-2452 MHz | | | |
|--|------------------------|---------------------|------------------------|
| Channel | Frequency (MHz) | 6dB BW (kHz) | 6dB limit (kHz) |
| Low | 2422 | 35180.00 | ≥500 |
| Mid | 2437 | 35200.00 | |
| High | 2452 | 35190.00 | |

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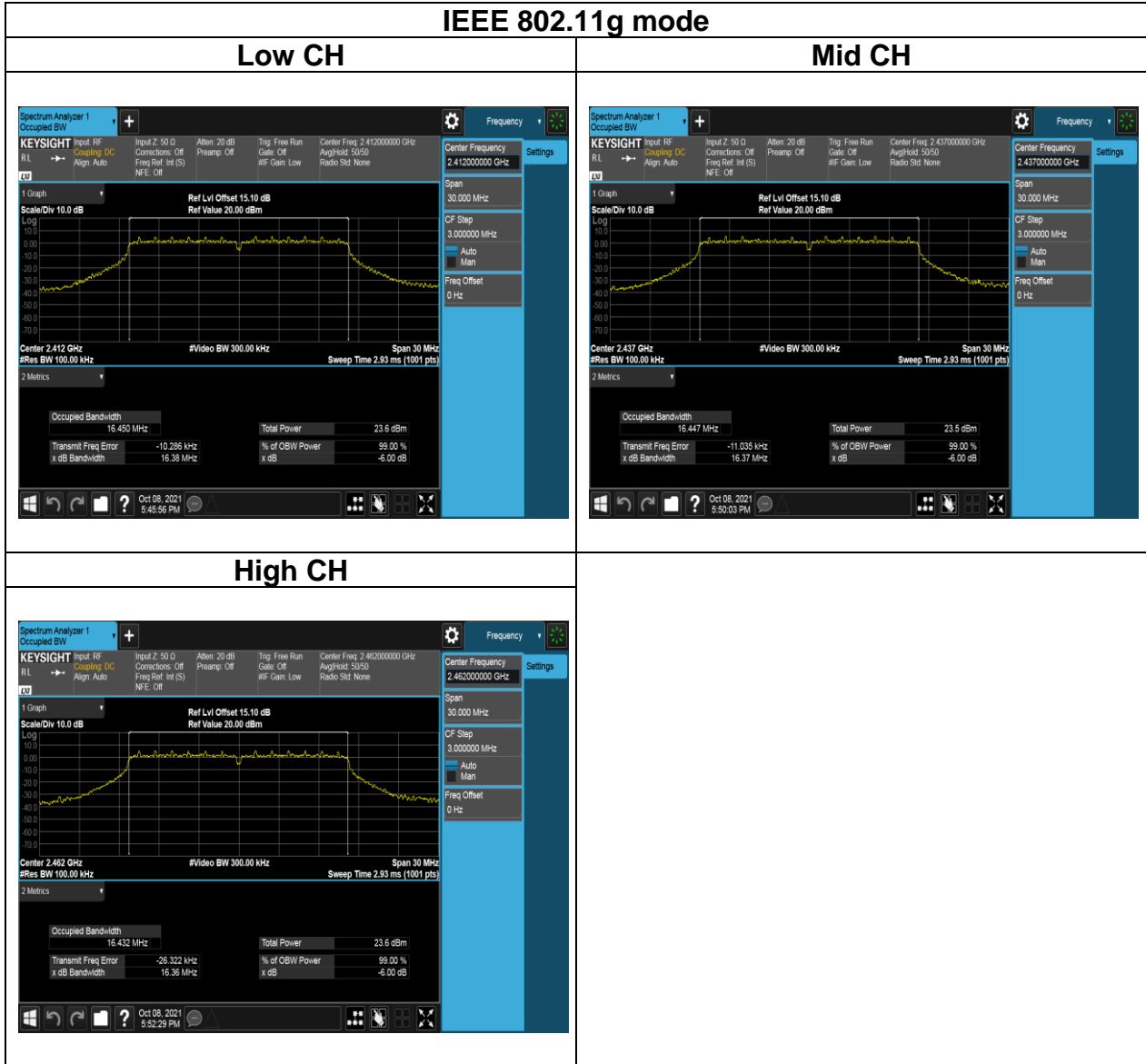
Test Data

6dB BANDWIDTH

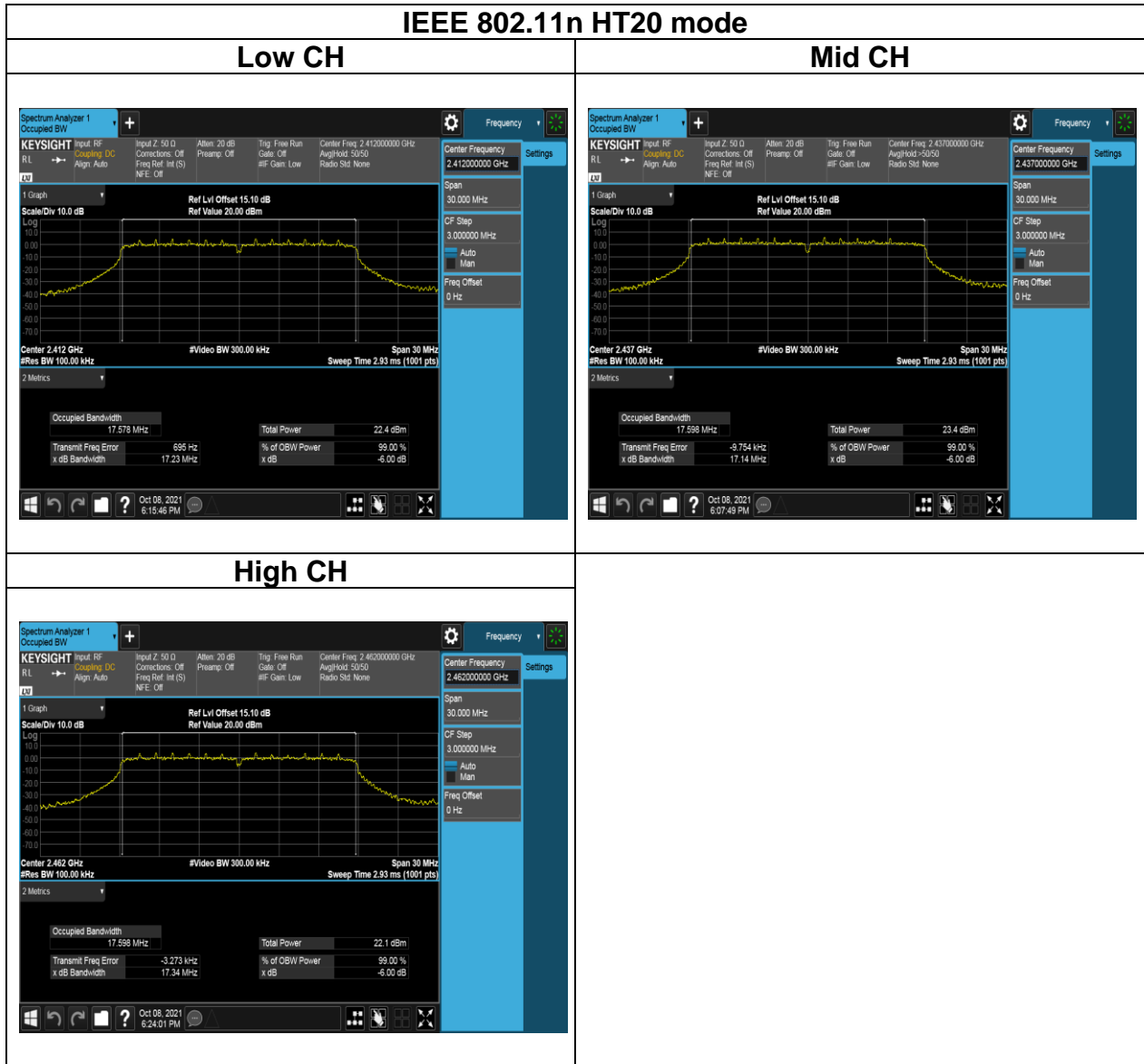
Chain 0 (ANT 1)

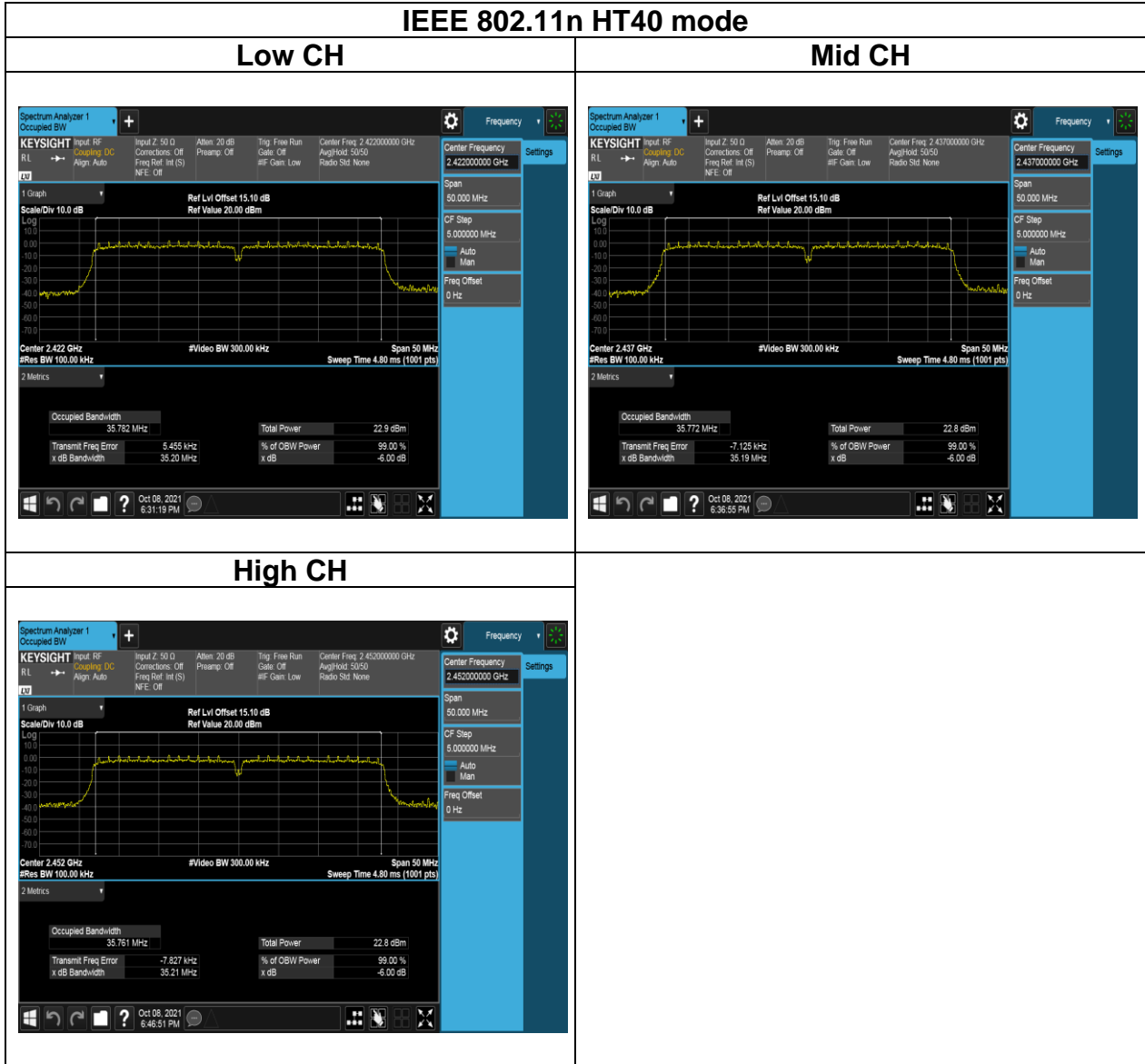


Report No.: TMWK2109000768KR

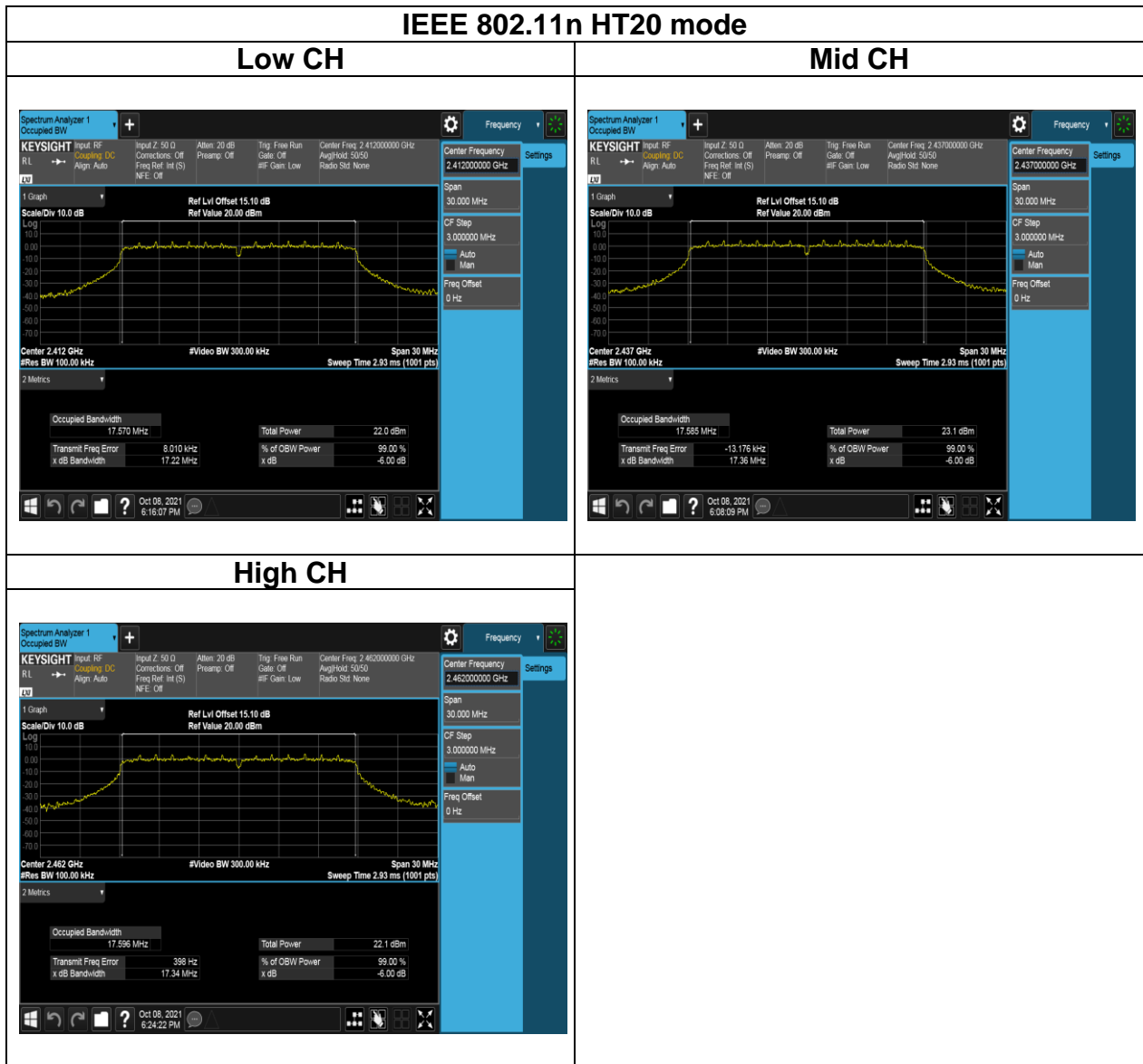


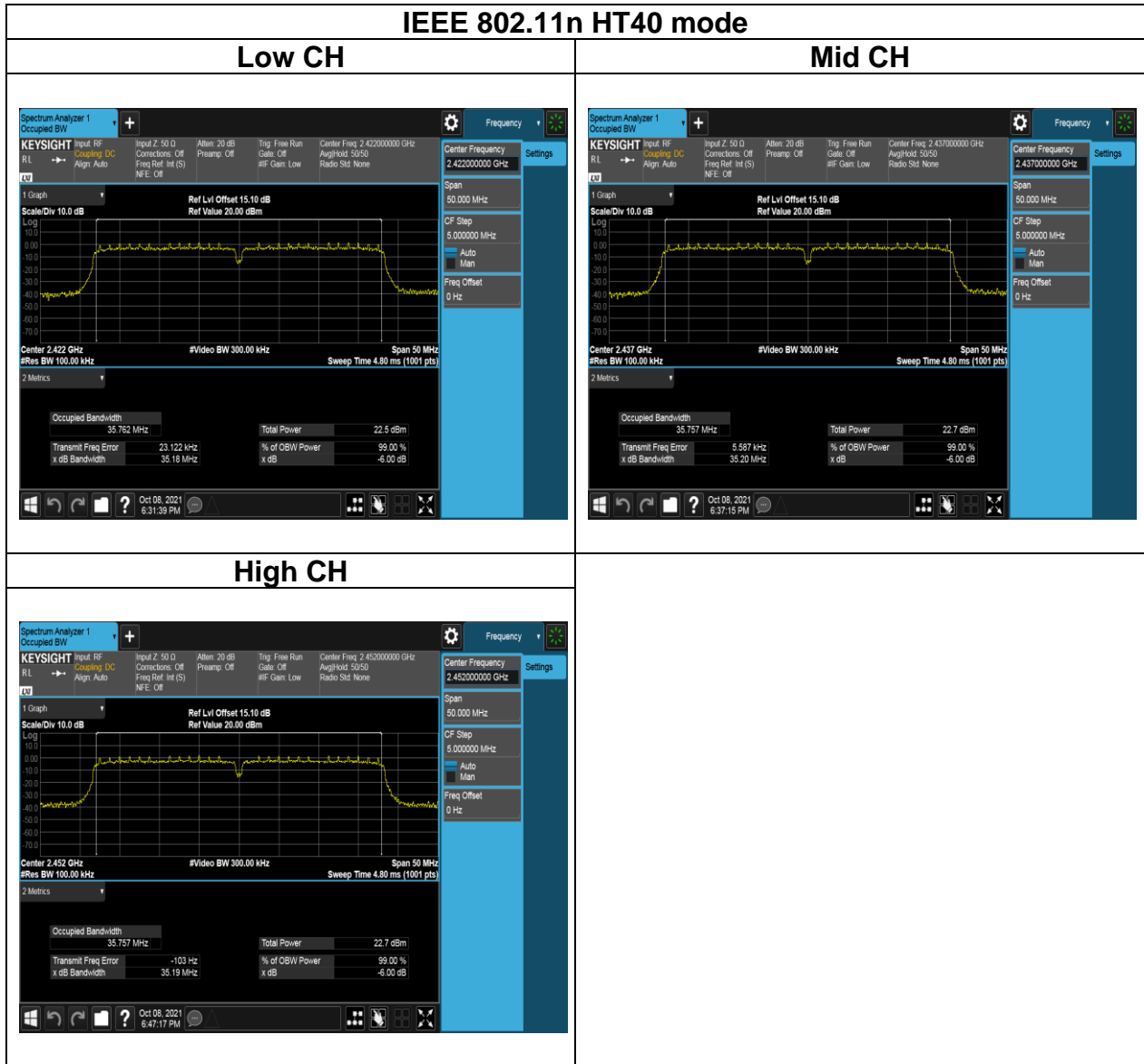
Report No.: TMWK2109000768KR





Chain 1 (ANT 2)





Report No.: TMWK2109000768KR

5.3 OUTPUT POWER MEASUREMENT

5.3.1 Test Limit

According to §15.247(b),

Peak output power :

FCC:

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement,

| | |
|-------|---|
| Limit | <input type="checkbox"/> Antenna not exceed 6 dBi : 30dBm <input checked="" type="checkbox"/> Antenna with DG greater than 6 dBi : [Limit = 30 – (DG – 6)] <input type="checkbox"/> Point-to-point operation : |
|-------|---|

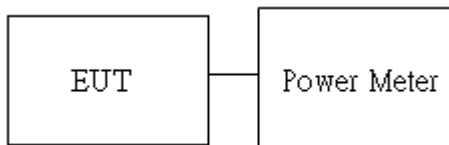
Average output power : For reporting purposes only.

5.3.2 Test Procedure

Test method Refer as ANSI C63.10:2013.

1. The EUT RF output connected to the power meter by RF cable.
2. Setting maximum power transmit of EUT.
3. The path loss was compensated to the results for each measurement.
4. Measure and record the result of Peak output power and Average output power. in the test report.

5.3.3 Test Setup



Report No.: TMWK2109000768KR

5.3.4 Test Result

Temperature: 24.7°C

Test date: October 8, 2021

Humidity: 58% RH

Tested by: Lance Chen

Peak output power :

| 802.11b Ch0 | | | | | | |
|-------------|-------------|-----------|-----------|-------------------------|-------------|--------|
| CH | Freq. (MHz) | Data Rate | Power set | Peak Output Power (dBm) | Limit (dBm) | RESULT |
| 1 | 2412 | 1 | 40 | 23.41 | 30.00 | PASS |
| 6 | 2437 | 1 | 45 | 24.97 | 30.00 | PASS |
| 11 | 2462 | 1 | 45 | 24.82 | 30.00 | PASS |

| 802.11g Ch0 | | | | | | |
|-------------|-------------|-----------|-----------|-------------------------|-------------|--------|
| CH | Freq. (MHz) | Data Rate | Power set | Peak Output Power (dBm) | Limit (dBm) | RESULT |
| 1 | 2412 | 6 | 39 | 24.42 | 30.00 | PASS |
| 6 | 2437 | 6 | 45 | 25.92 | 30.00 | PASS |
| 11 | 2462 | 6 | 44 | 25.53 | 30.00 | PASS |

| 802.11b Ch1 | | | | | | |
|-------------|-------------|-----------|-----------|-------------------------|-------------|--------|
| CH | Freq. (MHz) | Data Rate | Power set | Peak Output Power (dBm) | Limit (dBm) | RESULT |
| 1 | 2412 | 1 | 42 | 22.93 | 30.00 | PASS |
| 6 | 2437 | 1 | 47 | 24.79 | 30.00 | PASS |
| 11 | 2462 | 1 | 47 | 24.67 | 30.00 | PASS |

| 802.11g Ch1 | | | | | | |
|-------------|-------------|-----------|-----------|-------------------------|-------------|--------|
| CH | Freq. (MHz) | Data Rate | Power set | Peak Output Power (dBm) | Limit (dBm) | RESULT |
| 1 | 2412 | 6 | 39 | 23.79 | 30.00 | PASS |
| 6 | 2437 | 6 | 45 | 25.76 | 30.00 | PASS |
| 11 | 2462 | 6 | 44 | 23.56 | 30.00 | PASS |

| 802.11n_HT20M MIMO | | | | | | | | |
|--------------------|-------------|-----------|-----------|-------------------------|-------|-------------------------------|-------------|--------|
| CH | Freq. (MHz) | Data Rate | Power set | Peak Output Power (dBm) | | Total Peak Output Power (dBm) | Limit (dBm) | RESULT |
| | | | | CH 0 | CH 1 | | | |
| 1 | 2412 | MCS0 | 43 | 25.35 | 25.13 | 28.25 | 29.84 | PASS |
| 6 | 2437 | MCS0 | 45 | 25.96 | 25.75 | 28.87 | 29.84 | PASS |
| 11 | 2462 | MCS0 | 41 | 24.11 | 24.05 | 27.09 | 29.84 | PASS |

| 802.11n_HT40M MIMO | | | | | | | | |
|--------------------|-------------|-----------|-----------|-------------------------|-------|-------------------------------|-------------|--------|
| CH | Freq. (MHz) | Data Rate | Power set | Peak Output Power (dBm) | | Total Peak Output Power (dBm) | Limit (dBm) | RESULT |
| | | | | CH 0 | CH 1 | | | |
| 3 | 2422 | MCS0 | 35 | 22.94 | 22.29 | 25.64 | 29.84 | PASS |
| 6 | 2437 | MCS0 | 45 | 25.51 | 25.36 | 28.45 | 29.84 | PASS |
| 9 | 2452 | MCS0 | 36 | 23.42 | 23.27 | 26.36 | 29.84 | PASS |

Average output power :

| 802.11b Ch0 | | | | | |
|-------------|-------------|-----------|-----------|-----------------------|--------|
| CH | Freq. (MHz) | Data Rate | Power set | Total avg power (dBm) | RESULT |
| 1 | 2412 | 1 | 40 | 21.67 | PASS |
| 6 | 2437 | 1 | 45 | 22.49 | PASS |
| 11 | 2462 | 1 | 45 | 22.37 | PASS |

| 802.11g Ch0 | | | | | |
|-------------|-------------|-----------|-----------|-----------------------|--------|
| CH | Freq. (MHz) | Data Rate | Power set | Total avg power (dBm) | RESULT |
| 1 | 2412 | 6 | 39 | 15.51 | PASS |
| 6 | 2437 | 6 | 45 | 17.30 | PASS |
| 11 | 2462 | 6 | 44 | 16.96 | PASS |

| 802.11b Ch1 | | | | | |
|-------------|-------------|-----------|-----------|-----------------------|--------|
| CH | Freq. (MHz) | Data Rate | Power set | Total avg power (dBm) | RESULT |
| 1 | 2412 | 1 | 42 | 21.53 | PASS |
| 6 | 2437 | 1 | 47 | 22.41 | PASS |
| 11 | 2462 | 1 | 47 | 22.35 | PASS |

| 802.11g Ch1 | | | | | |
|-------------|-------------|-----------|-----------|-----------------------|--------|
| CH | Freq. (MHz) | Data Rate | Power set | Total avg power (dBm) | RESULT |
| 1 | 2412 | 6 | 39 | 15.18 | PASS |
| 6 | 2437 | 6 | 45 | 16.85 | PASS |
| 11 | 2462 | 6 | 44 | 16.72 | PASS |

| 802.11n_HT20M MIMO | | | | | | | |
|--------------------|-------------|-----------|-----------|-------------------------|-------|-----------------------|--------|
| CH | Freq. (MHz) | Data Rate | Power set | Avg. Output Power (dBm) | | Total avg power (dBm) | RESULT |
| | | | | CH 0 | CH 1 | | |
| 1 | 2412 | MCS0 | 43 | 15.97 | 15.84 | 19.04 | PASS |
| 6 | 2437 | MCS0 | 45 | 16.47 | 16.22 | 19.48 | PASS |
| 11 | 2462 | MCS0 | 41 | 14.93 | 14.79 | 17.99 | PASS |

| 802.11n_HT40M MIMO | | | | | | | |
|--------------------|-------------|-----------|-----------|-------------------------|-------|-----------------------|--------|
| CH | Freq. (MHz) | Data Rate | Power set | Avg. Output Power (dBm) | | Total avg power (dBm) | RESULT |
| | | | | CH 0 | CH 1 | | |
| 3 | 2422 | MCS0 | 35 | 12.52 | 11.76 | 15.64 | PASS |
| 6 | 2437 | MCS0 | 45 | 16.04 | 15.93 | 19.47 | PASS |
| 9 | 2452 | MCS0 | 36 | 12.91 | 12.88 | 16.38 | PASS |

Report No.: TMWK2109000768KR

5.4 POWER SPECTRAL DENSITY

5.4.1 Test Limit

According to §15.247(e),

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

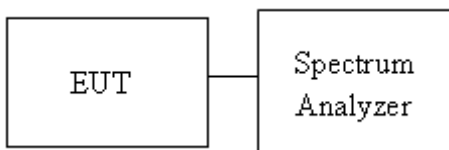
| | |
|-------|---|
| Limit | <input type="checkbox"/> Antenna not exceed 6 dBi : 8dBm <input checked="" type="checkbox"/> Antenna with DG greater than 6 dBi : [Limit = 8 – (DG – 6)] <input type="checkbox"/> Point-to-point operation : |
|-------|---|

5.4.2 Test Procedure

Test method Refer as ANSI C63.10:2013

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. SA set RBW = 3kHz, VBW = 10kHz, Span = 1.5 times DTS Bandwidth (6 dB BW), Detector = Peak, Sweep Time = Auto and Trace = Max hold.
4. The path loss and Duty Factor were compensated to the results for each measurement by SA.
5. Mark the maximum level.
6. Measure and record the result of power spectral density. in the test report.

5.4.3 Test Setup



Report No.: TMWK2109000768KR

5.4.4 Test Result

Temperature: 24.7°C

Test date: October 8, 2021

Humidity: 58% RH

Tested by: Lance Chen

| Gain | | | 3.40 | dBi | |
|------------------------------|---------|---------|----------------|------------------|--------|
| | | | SISO | | |
| POWER DENSITY 802.11b | | | | | |
| Freq. (MHz) | Ch0 PSD | Ch1 PSD | PSD (dBm/3kHz) | Limit (dBm/3kHz) | Result |
| 2412 | -1.97 | - | -1.97 | 8.00 | PASS |
| 2437 | -2.4 | - | -2.40 | 8.00 | PASS |
| 2462 | -1.95 | - | -1.95 | 8.00 | PASS |

| Gain | | | 3.40 | dBi | |
|------------------------------|---------|---------|----------------|------------------|--------|
| | | | SISO | | |
| POWER DENSITY 802.11g | | | | | |
| Freq. (MHz) | Ch0 PSD | Ch1 PSD | PSD (dBm/3kHz) | Limit (dBm/3kHz) | Result |
| 2412 | -7.01 | - | -7.01 | 8.00 | PASS |
| 2437 | -9.1 | - | -9.10 | 8.00 | PASS |
| 2462 | -8.41 | - | -8.41 | 8.00 | PASS |

| Gain | | | 6.16 | dBi | |
|-----------------------------------|---------|---------|---------------------|------------------|--------|
| Mimo support | | | 2 Transmit antennas | | |
| POWER DENSITY 802.11n HT20 | | | | | |
| Freq. (MHz) | Ch0 PSD | Ch1 PSD | PSD (dBm/3kHz) | Limit (dBm/3kHz) | Result |
| 2412 | -10.94 | -10.86 | -7.89 | 7.84 | PASS |
| 2437 | -10.39 | -9.92 | -7.14 | 7.84 | PASS |
| 2462 | -10.53 | -11.38 | -7.92 | 7.84 | PASS |

| Gain | | | 6.16 | dBi | |
|-----------------------------------|---------|---------|---------------------|------------------|--------|
| Mimo support | | | 2 Transmit antennas | | |
| POWER DENSITY 802.11n HT40 | | | | | |
| Freq. (MHz) | Ch0 PSD | Ch1 PSD | PSD (dBm/3kHz) | Limit (dBm/3kHz) | Result |
| 2422 | -12.06 | -12.31 | -9.17 | 7.84 | PASS |
| 2437 | -12.66 | -12.81 | -9.72 | 7.84 | PASS |
| 2452 | -13.02 | -13.92 | -10.44 | 7.84 | PASS |

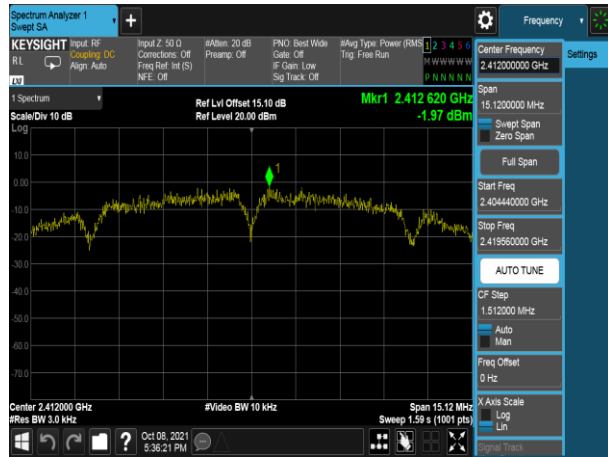
Report No.: TMWK2109000768KR

Test Data

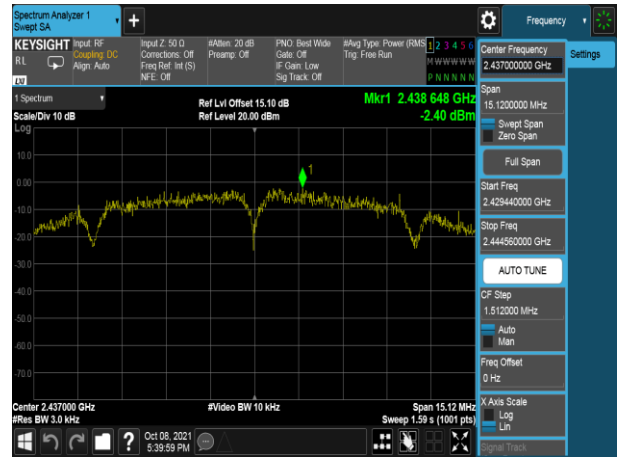
Chain 0 (ANT 1)

IEEE 802.11b mode

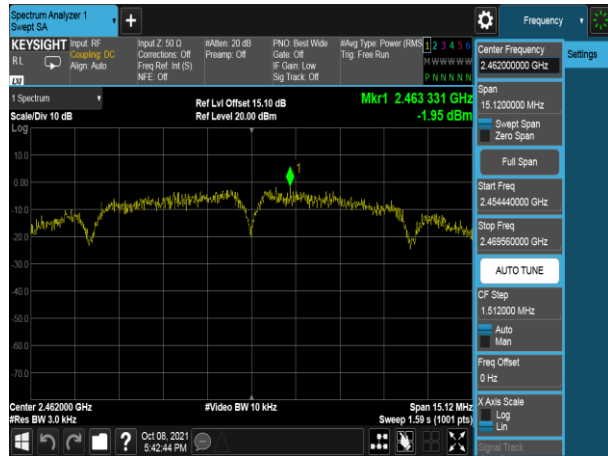
Low CH

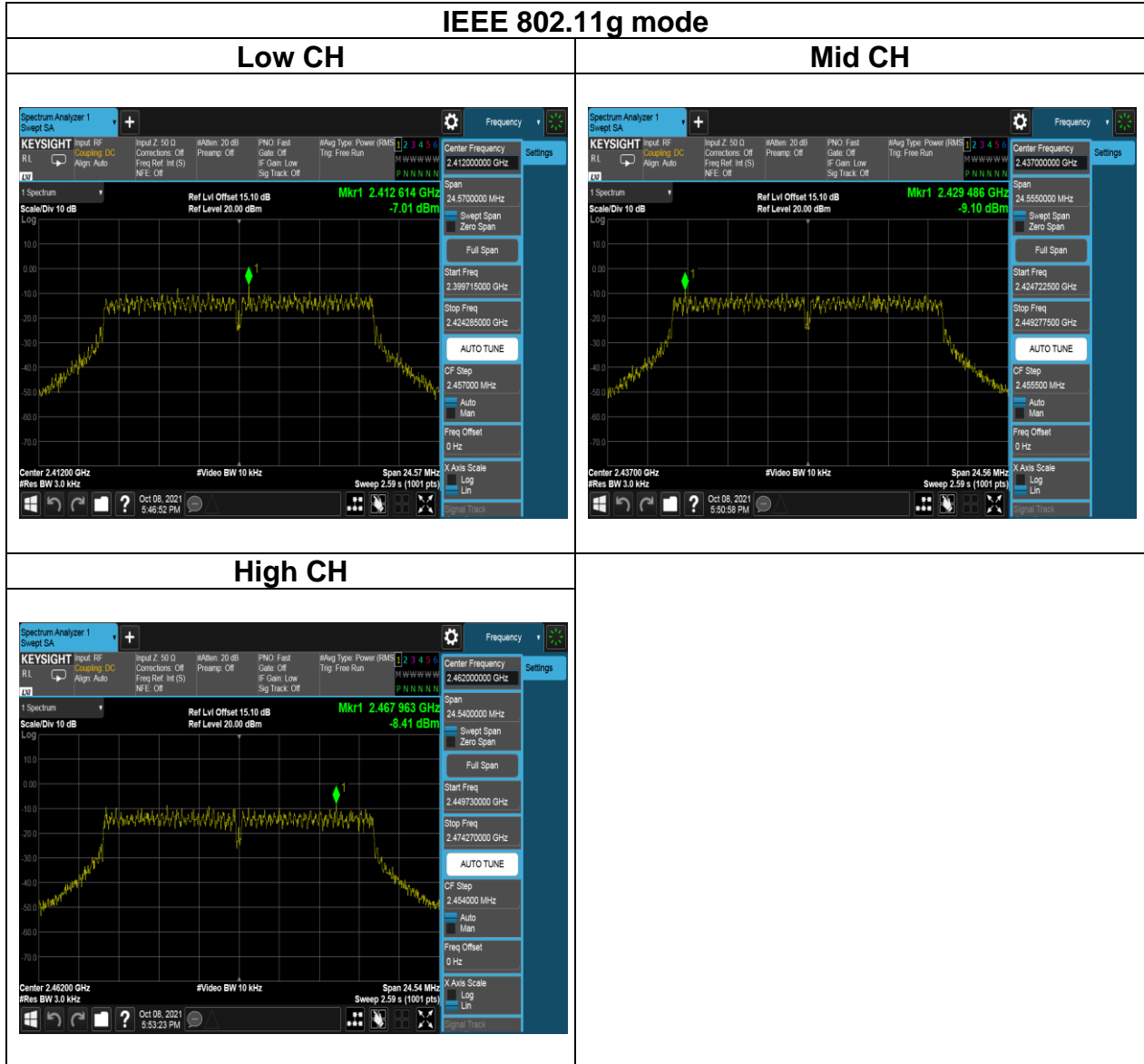


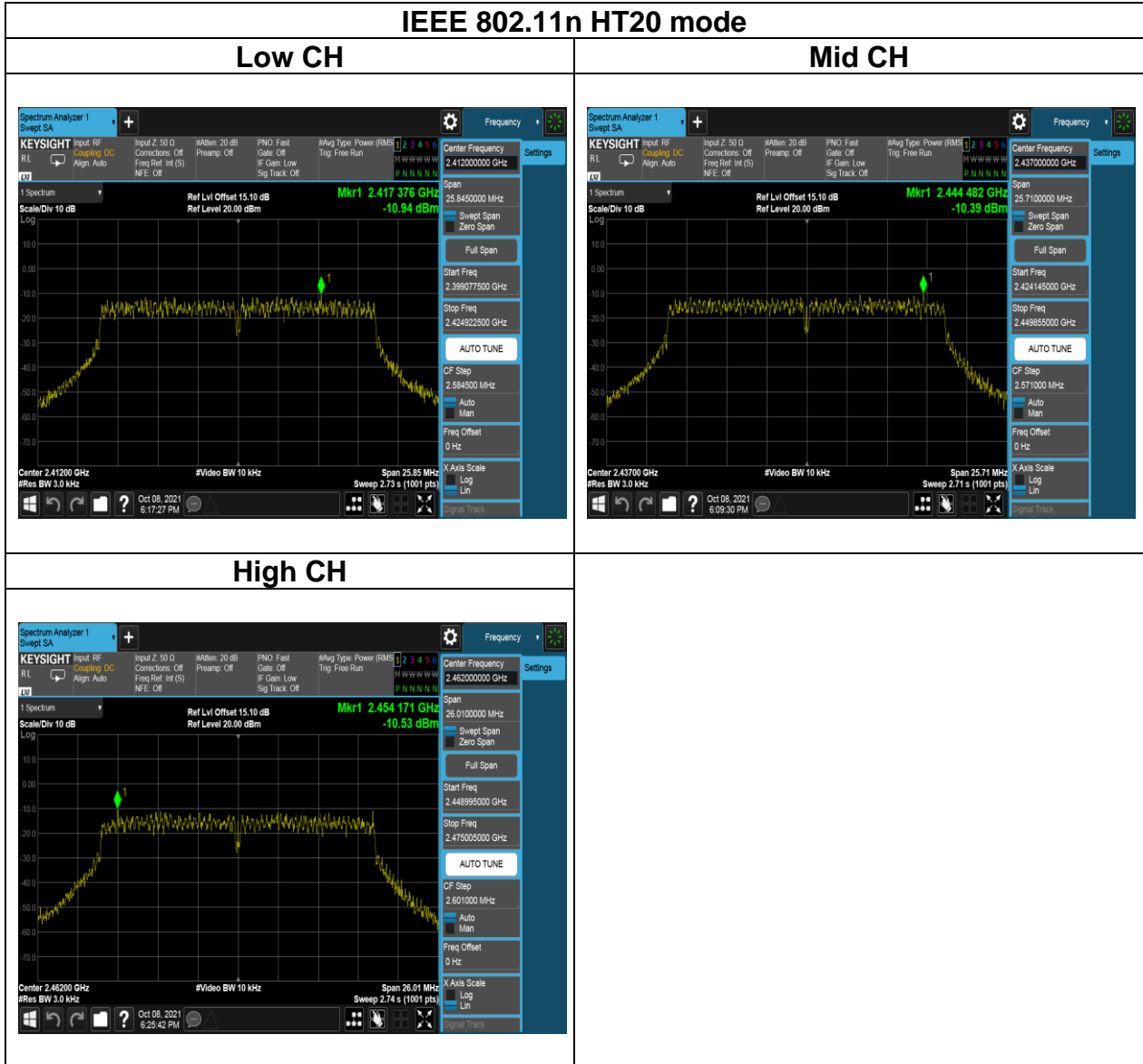
Mid CH

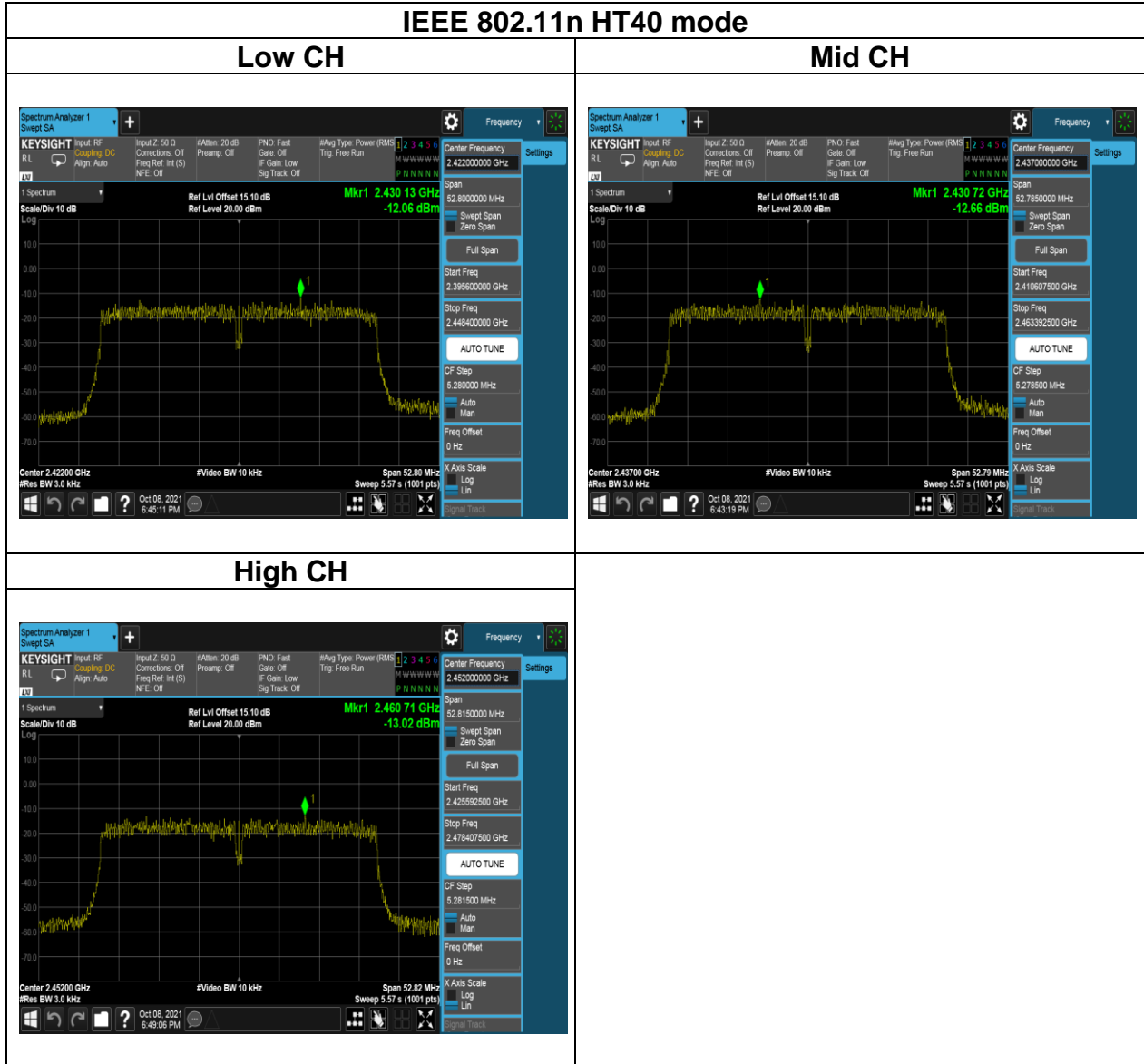


High CH





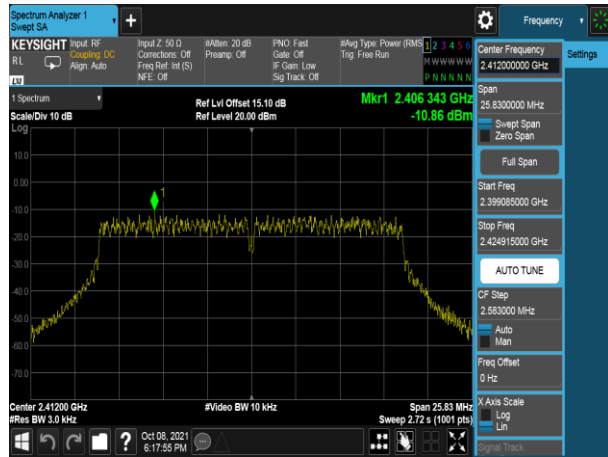




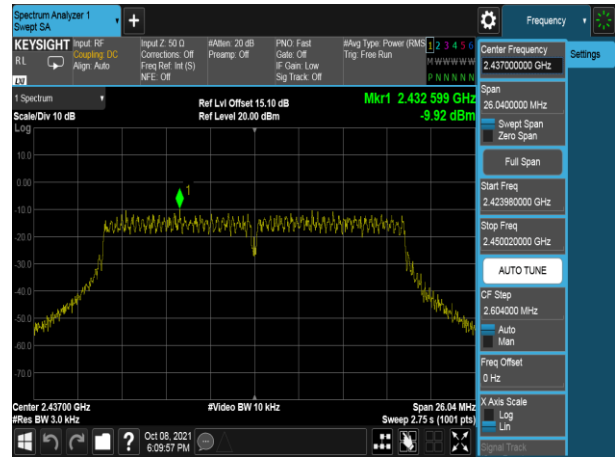
Chain 1 (ANT 2)

IEEE 802.11n HT20 mode

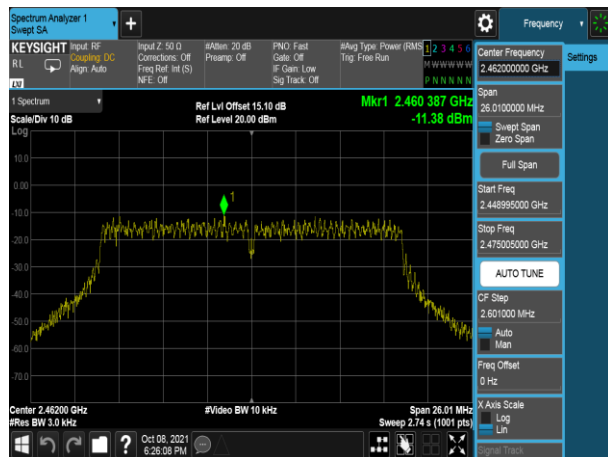
Low CH

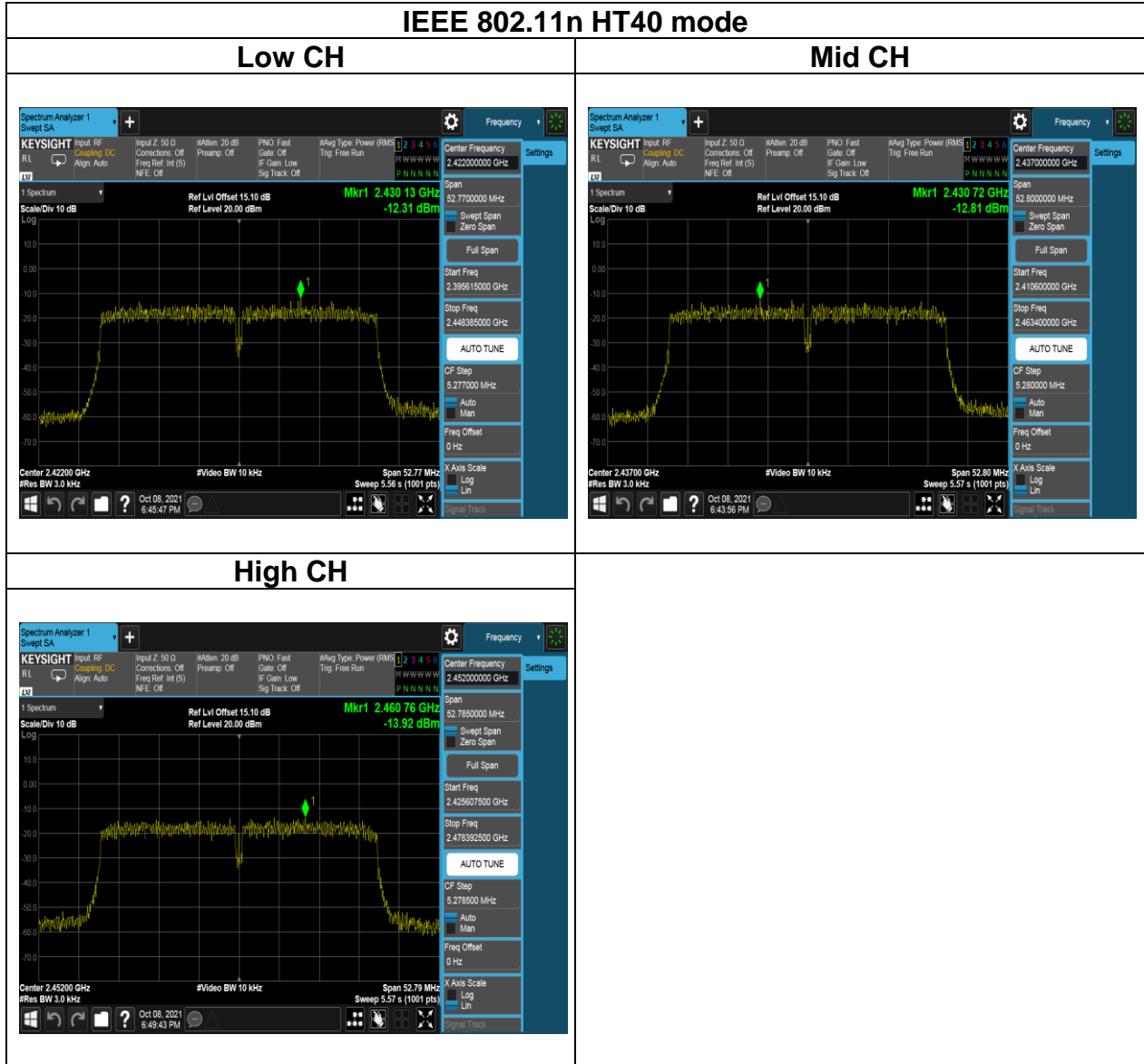


Mid CH



High CH





5.5 CONDUCTED BANDEDGE AND SPURIOUS EMISSION

5.5.1 Test Limit

According to §15.247(d),

FCC:

In any 100 kHz bandwidth outside the authorized frequency band,

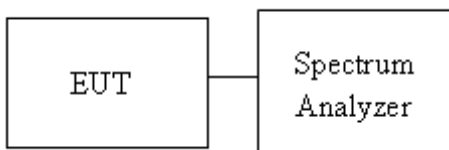
Non-restricted bands shall be attenuated at least 20 dB/30 dB relative to the maximum PSD level in 100 kHz by RF conducted or a radiated measurement which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

5.5.2 Test Procedure

Test method Refer as ANSI C63.10:2013.

1. EUT RF output port connected to the SA by RF cable, and the path loss was compensated to result.
2. SA setting, RBW=100kHz, VBW=300kHz, Detector=Peak, Trace mode = max hold, SWT = Auto.
3. In any 100 kHz bandwidth outside the authorized frequency band, shall be attenuated at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when conducted power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

5.5.3 Test Setup



Report No.: TMWK2109000768KR

5.5.4 Test Result

Test Data

Temperature: 24.7°C

Test date: October 8, 2021

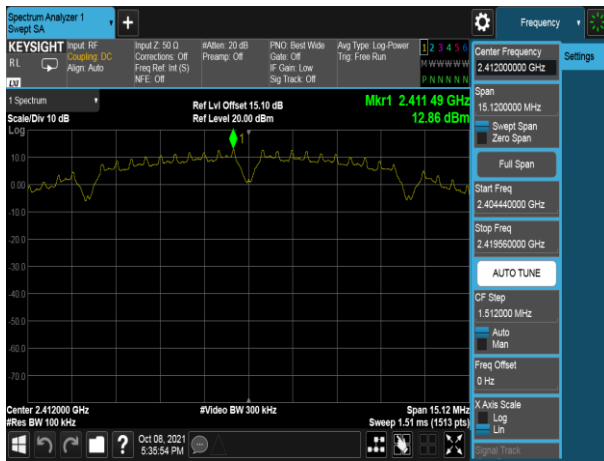
Humidity: 58% RH

Tested by: Lance Chen

Chain 0 (ANT 1)

IEEE 802.11b mode Low CH

Reference Level



Band Edge



Spurious Emission 30MHz-25GHz

