

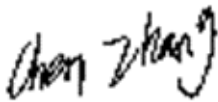


TEST REPORT

Product Name: Wi-Fi & BT Module
FCC ID: 2ATPO-AIWB2
Trademark:  
Model Number: Ai-WB2-12F, Ai-WB2-12S, Ai-WB2-07S, Ai-WB2-32S, Ai-WB2-13, Ai-WB2-13U, Ai-WB2-01M, Ai-WB2-01N, Ai-WB2-01D, Ai-WB2-01C, Ai-WB2-M1
Prepared For: Shenzhen Ai-Thinker Technology Co., Ltd
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Manufacturer: Shenzhen Ai-Thinker Technology Co., Ltd
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Prepared By: Shenzhen CTB Testing Technology Co., Ltd.
Address: Floor 1&2, Building A, No. 26 of Xinghe Road, Xinqiao Community, Xinqiao Street, Baoan District, Shenzhen, Guangdong, China.
Sample Received Date: Jun. 28, 2022
Sample tested Date: Jun. 28, 2022 to Jul. 11, 2022
Issue Date: Jul. 11, 2022
Report No.: CTB220711029RFX
Test Standards: FCC Part15.247
ANSI C63.10:2013
Test Results: PASS
Remark: This is WIFI-2.4GHz band radio test report.

Compiled by:

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Reviewed by:

Arron Liu

Approved by:

Bin Hei
Director

Note: If there is any objection to the inspection results in this report, please submit a written report to the company within 15 days from the date of receiving the report. The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen CTB Testing Technology Co., Ltd. this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client. "*" indicates the testing items were fulfilled by subcontracted lab. "#" indicates the items are not in CNAS accreditation scope.

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(Note: N/A means not applicable)

1. VERSION

| Report No. | Issue Date | Description | Approved |
|-----------------|---------------|-------------|----------|
| CTB220711029RFX | Jul. 11, 2022 | Original | Valid |

2. TEST SUMMARY

The Product has been tested according to the following specifications:

| Test Item | Test Requirement | Test method | Result |
|--|---|--|--------|
| AC Power Line Conducted Emission | 47 CFR Part 15 Subpart C Section 15.207 | ANSI C63.10-2013 | PASS |
| Radiated Spurious emissions | 47 CFR Part 15 Subpart C Section 15.205/15.209 | ANSI C63.10-2013 | PASS |
| Band edge and RF Conducted Spurious Emissions | 47 CFR Part 15 Subpart C Section 15.247(d)/15.205(a) | ANSI C63.10-2013 | PASS |
| Conducted Peak Output Power | 47 CFR Part 15 Subpart C Section 15.247 (b)(3) | ANSI C63.10-2013 | PASS |
| 6dB Occupied Bandwidth | 47 CFR Part 15 Subpart C Section 15.247 (a)(2) | ANSI C63.10-2013 | PASS |
| Power Spectral Density | 47 CFR Part 15 Subpart C Section 15.247 (e) | ANSI C63.10-2013/ KDB 558074 D05v02 | PASS |
| Antenna Requirement | 47 CFR Part 15 Subpart C Section 15.203/15.247 (b) | ANSI C63.10-2013 | PASS |
| RF Exposure Evaluation | 47 CFR Part 15 Subpart C Section 15.247 (i)/1.1310/2.1091 | KDB447498D01v06 | PASS |

Remark:

Test according to ANSI C63.4-2014 & ANSI C63.10-2013.

3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

| Item | Uncertainty |
|--|-------------|
| Occupancy bandwidth | U=±54.3Hz |
| Conducted output power Above 1G | U=±1.0dB |
| Conducted output power below 1G | U=±0.9dB |
| Power Spectral Density , Conduction | U=±1.0dB |
| Conduction spurious emissions | U=±2.8dB |
| Out of band emission | U=±54Hz |
| 3m chamber Radiated spurious emission(9KHz-30MHz) | U=±4.8dB |
| 3m chamber Radiated spurious emission(30MHz-1GHz) | U=±4.3dB |
| 3m chamber Radiated spurious emission(1GHz-18GHz) | U=±4.5dB |
| 3m chamber Radiated spurious emission(18GHz-40GHz) | U=±3.4dB |
| humidity uncertainty | U=±5.3% |
| Temperature uncertainty | U=±0.59°C |
| Supply voltages | U=±3% |
| Time | U=±5% |

4. PRODUCT INFORMATION AND TEST SETUP

4.1 Product Information

| | |
|-----------------------|--|
| Model(s): | Ai-WB2-12F, Ai-WB2-12S, Ai-WB2-07S, Ai-WB2-32S, Ai-WB2-13, Ai-WB2-13U, Ai-WB2-01M, Ai-WB2-01N, Ai-WB2-01D, Ai-WB2-01C, Ai-WB2-M1 |
| Model Description: | All the model are the same circuit and RF module, only for model name. Test sample model: Ai-WB2-12F |
| Wi-Fi Specification: | IEEE 802.11b/g/n |
| Hardware Version: | V1.1 |
| Software Version: | V1.0 |
| Operation Frequency: | WiFi: IEEE 802.11b/g/n 20: 2412-2462MHz/ 11 channel |
| Max. RF output power: | WiFi (2.4G) : 19.224dBm |
| Type of Modulation: | WiFi: DSSS, OFDM, CCK |
| Antenna installation: | WiFi: PCB Antenna |
| Antenna Gain: | WiFi (2.4G) : 1.0dBi |
| Ratings: | DC3.3 by Notebook |

4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

4.3 Support Equipment

| Item | Equipment | Mfr/Brand | Model/Type No. | Series No. | Note |
|------|-----------|-----------|----------------|------------|------|
| 1 | Notebook | DELL | Vostro 5490 | / | AE |

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.4 Channel List

| CH | Frequency (MHz) | CH | Frequency (MHz) | CH | Frequency (MHz) | CH | Frequency (MHz) |
|----|-----------------|----|-----------------|----|-----------------|----|-----------------|
| 1 | 2412 | 2 | 2417 | 3 | 2422 | 4 | 2427 |
| 5 | 2432 | 6 | 2437 | 7 | 2442 | 8 | 2447 |
| 9 | 2452 | 10 | 2457 | 11 | 2462 | | |
| | | | | | | | |

4.5 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

| Test mode | Low channel | Middle channel | High channel |
|-----------------------------|-------------|----------------|--------------|
| Transmitting(802.11b/g/n20) | 2412MHz | 2437MHz | 2462MHz |

NOTE: Duty cycle > 98%.

| Test mode | rate |
|------------|------|
| 802.11b | 11M |
| 802.11g | 54M |
| 802.11/n20 | 65M |

4.6 Test Environment

| | |
|----------------------------|------|
| Humidity(%): | 54 |
| Atmospheric Pressure(kPa): | 101 |
| Normal Voltage(DC): | 3.3V |
| Normal Temperature(°C) | 23 |
| Low Temperature(°C) | 0 |
| High Temperature(°C) | 50 |

5. TEST FACILITY AND TEST INSTRUMENT USED

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Floor 1&2, Building A, No. 26 of Xinhe Road, Xinqiao Street, Baoan District, Shenzhen China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

5.2 Test Instrument Used

| No. | Equipment | Manufacturer | Model No. | Serial No. | Calibrated date | Calibrated until |
|-----|---|--------------|---------------------------|--------------|-----------------|------------------|
| 1 | Spectrum Analyzer | Agilent | N9020A | MY52090073 | 2021.09.27 | 2022.08.05 |
| 2 | Power Sensor | Agilent | U2021XA | MY56120032 | 2021.09.27 | 2022.08.05 |
| 3 | Power Sensor | Agilent | U2021XA | MY56120034 | 2021.09.27 | 2022.08.05 |
| 4 | Communication test set | R&S | CMW500 | 108058 | 2021.09.27 | 2022.08.05 |
| 5 | Spectrum Analyzer | R&S | FSP40 | 100550 | 2021.09.27 | 2022.08.05 |
| 6 | Signal Generator | Agilent | N5181A | MY49060920 | 2021.09.27 | 2022.08.16 |
| 7 | Signal Generator | Agilent | N5182A | MY47420195 | 2021.09.27 | 2022.08.05 |
| 8 | Communication test set | Agilent | E5515C | MY50102567 | 2021.09.27 | 2022.08.16 |
| 9 | band rejection filter | Shenxiang | MSF2400-2483.5MS-115 4 | 20181015001 | 2021.09.27 | 2022.08.05 |
| 10 | band rejection filter | Shenxiang | MSF5150-5850MS-1155 | 20181015001 | 2021.09.27 | 2022.08.05 |
| 11 | band rejection filter | Xingbo | XBLBQ-DZA120 | 190821-1-1 | 2021.09.27 | 2022.08.05 |
| 12 | BT&WI-FI Automatic test software | Microwave | MTS8310 | Ver. 2.0.0.0 | 2021.09.27 | 2022.08.05 |
| 13 | Rohde & Schwarz SFU Broadcast Test System | R&S | SFU | 101017 | 2021.09.27 | 2022.08.05 |
| 14 | Temperature humidity chamber | Hongjing | TH-80CH | DG-15174 | 2021.09.27 | 2022.08.05 |
| 15 | 234G Automatic test software | Microwave | MTS8200 | Ver. 2.0.0.0 | 2021.09.27 | 2022.08.05 |
| 16 | 966 chamber | C.R.T. | 966 Room | 966 | 2021.09.27 | 2024.08.11 |
| 17 | Receiver | R&S | ESPI | 100362 | 2021.09.27 | 2022.08.05 |

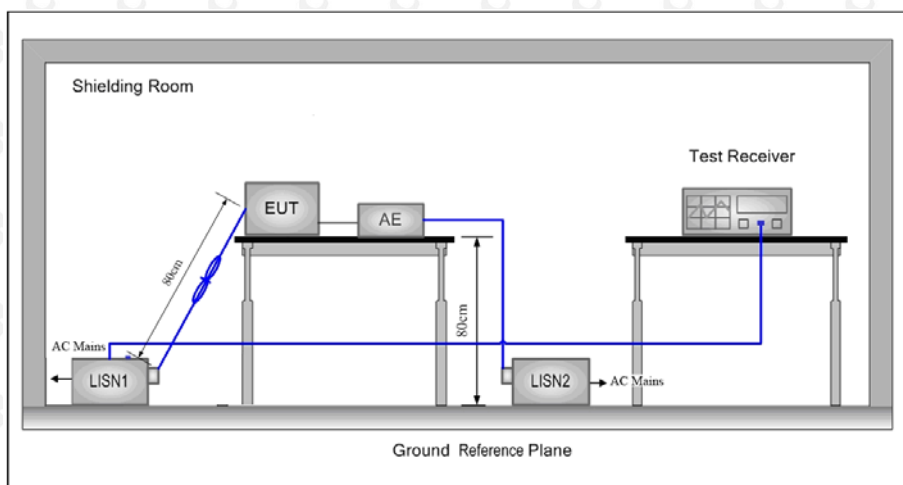
| | | | | | | |
|----|--------------------------------|-------------|-----------|------------|------------|------------|
| 18 | Amplifier | HP | 8447E | 2945A02747 | 2021.09.27 | 2022.08.05 |
| 19 | Amplifier | Agilent | 8449B | 3008A01838 | 2021.09.27 | 2022.08.05 |
| 20 | TRILOG Broadband Antenna | Schwarzbeck | VULB 9163 | 869 | 2021.09.27 | 2022.08.07 |
| 21 | Horn Antenna | Schwarzbeck | BBHA9120D | 1911 | 2021.09.27 | 2022.08.08 |
| 22 | Software | Fala | EZ-EMC | FA-03A2 RE | 2021.09.27 | 2022.08.05 |
| 23 | 3-Loop Antenna | Daze | ZN30401 | 17014 | 2021.09.27 | 2022.08.05 |
| 24 | loop antenna | ZHINAN | ZN30900A | / | 2021.09.27 | 2022.08.05 |
| 25 | Horn antenna | A/H/System | SAS-574 | 588 | 2021.09.27 | 2022.08.05 |
| 26 | Amplifier | AEROFLEX | / | S/N/ 097 | 2021.09.27 | 2022.08.05 |

| Continuous disturbance | | | | | | |
|------------------------|------------------------|---------------|--------------|------------|-----------------|------------------|
| No. | Equipment | Manufacturer | Model No. | Serial No. | Calibrated date | Calibrated until |
| 1 | AMN | ROHDE&SCHWARZ | ESH3-Z5 | 831551852 | 2021.09.27 | 2022.08.05 |
| 2 | Pulse limiter | ROHDE&SCHWARZ | ESH3Z2 | 357881052 | 2021.09.27 | 2022.08.05 |
| 3 | EMI TEST RECEIVER | ROHDE&SCHWARZ | ESCS30 | 834115/006 | 2021.09.27 | 2022.08.05 |
| 4 | Coaxial cable | ZDECL | Z302S | 18091904 | 2021.09.27 | 2022.08.05 |
| 5 | AAN | Schwarzbeck | NTFM8158 | 183 | 2021.09.27 | 2022.08.05 |
| 6 | Communication test set | Agilent | E5515C | MY50102567 | 2021.09.27 | 2022.08.05 |
| 7 | Communication test set | R&S | CMW500 | 108058 | 2021.09.27 | 2022.08.05 |
| 8 | EZ-EMC | Frad | EMC-con3A1.1 | / | / | / |

| Radiated emission | | | | | | |
|-------------------|--------------------------------------|---------------|------------------------|------------|-----------------|------------------|
| No. | Equipment | Manufacturer | Model No. | Serial No. | Calibrated date | Calibrated until |
| 1 | Double Ridged Broadband Horn Antenna | Schwarzbeck | BBHA 9120D | 1911 | 2021.09.27 | 2022.08.05 |
| 2 | TRILOG Broadband Antenna | Schwarzbeck | VULB 9168 | 869 | 2021.09.27 | 2022.08.05 |
| 3 | Amplifier | Agilent | 8449B | 3008A01838 | 2021.09.27 | 2022.08.05 |
| 4 | Amplifier | HP | 8447E | 2945A02747 | 2021.09.27 | 2022.08.05 |
| 5 | EMI TEST RECEIVER | ROHDE&SCHWARZ | ESPI7 | 100362 | 2021.09.27 | 2022.08.05 |
| 6 | Coaxial cable | ETS | RFC-SNS-100-NMS-80 NI | / | 2021.09.27 | 2022.08.05 |
| 7 | Coaxial cable | ETS | RFC-SNS-100-NMS-20 NI | / | 2021.09.27 | 2022.08.05 |
| 8 | Coaxial cable | ETS | RFC-SNS-100-SMS-20 NI | / | 2021.09.27 | 2022.08.05 |
| 9 | Coaxial cable | ETS | RFC-NNS-100-NMS-300 NI | / | 2021.09.27 | 2022.08.05 |
| 10 | Communication test set | Agilent | E5515C | MY50102567 | 2021.09.27 | 2022.08.05 |
| 11 | Communication test set | R&S | CMW500 | 108058 | 2021.09.27 | 2022.08.05 |
| 12 | EZ-EMC | Frad | EMC-con3A1.1 | / | / | / |

6. AC POWER LINE CONDUCTED EMISSION

6.1 Block Diagram Of Test Setup



6.2 Limit

Table 4 – AC power-line conducted emissions limits

| Frequency (MHz) | Conducted limit (dB μ V) | |
|-----------------|------------------------------|----------------------------|
| | Quasi-peak | Average |
| 0.15 - 0.5 | 66 to 56 ^{Note 1} | 56 to 46 ^{Note 1} |
| 0.5 - 5 | 56 | 46 |
| 5 - 30 | 60 | 50 |

Note 1: The level decreases linearly with the logarithm of the frequency.

* Decreasing linearly with the logarithm of the frequency

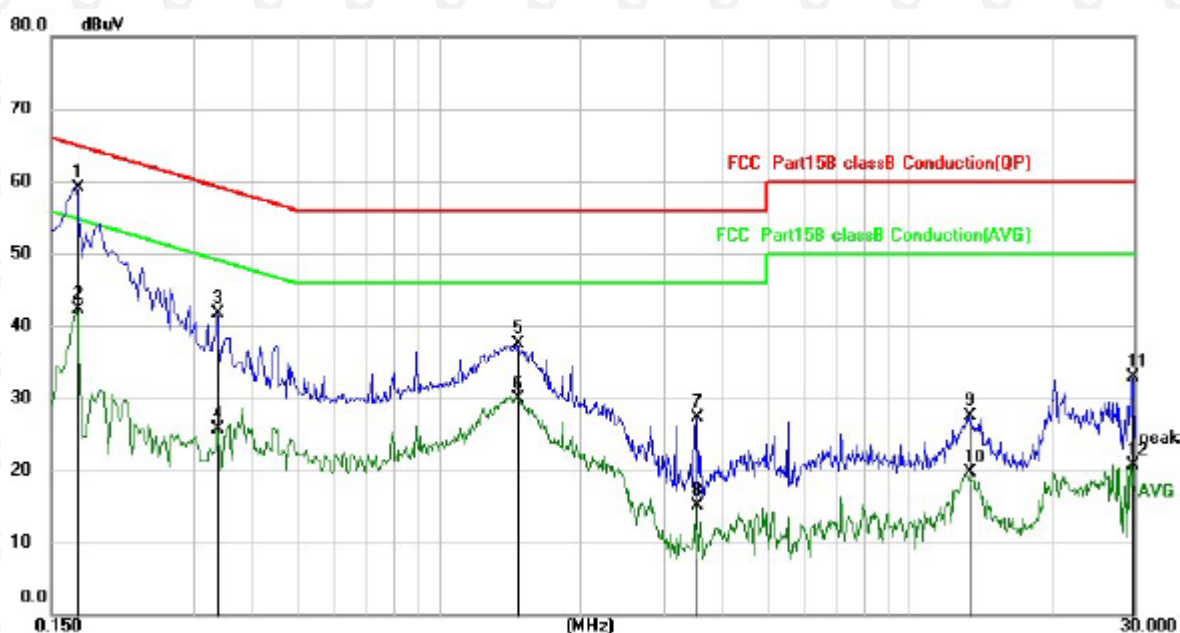
6.3 Test procedure

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50 Ω /50 μ H + 5 Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0,4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0,8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0,8 m from the LISN 2.

- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

6.4 Test Result

Test Specification: Line

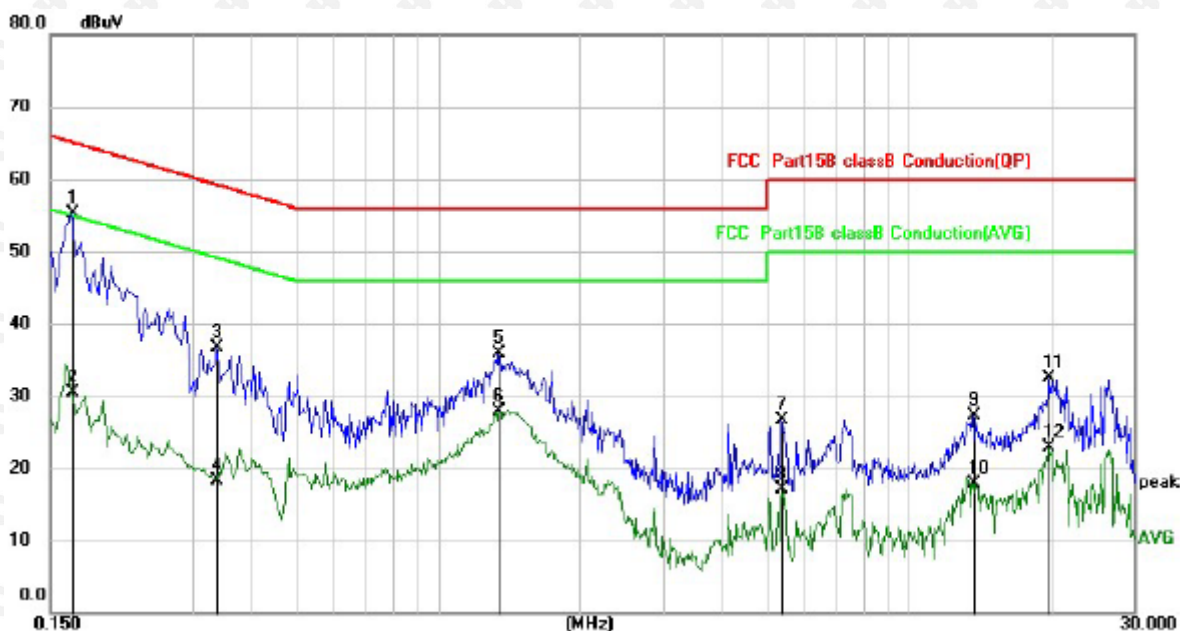


| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Margin | Detector |
|-----|-----|---------|---------------|----------------|-------------|-------|--------|----------|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | |
| 1 | * | 0.1700 | 48.46 | 10.71 | 59.17 | 64.96 | -5.79 | QP |
| 2 | | 0.1700 | 31.67 | 10.71 | 42.38 | 54.96 | -12.58 | AVG |
| 3 | | 0.3379 | 31.09 | 10.61 | 41.70 | 59.25 | -17.55 | QP |
| 4 | | 0.3379 | 15.19 | 10.61 | 25.80 | 49.25 | -23.45 | AVG |
| 5 | | 1.4700 | 26.83 | 10.62 | 37.45 | 56.00 | -18.55 | QP |
| 6 | | 1.4700 | 19.35 | 10.62 | 29.97 | 46.00 | -16.03 | AVG |
| 7 | | 3.5220 | 16.59 | 10.64 | 27.23 | 56.00 | -28.77 | QP |
| 8 | | 3.5220 | 4.54 | 10.64 | 15.18 | 46.00 | -30.82 | AVG |
| 9 | | 13.3700 | 16.57 | 10.88 | 27.45 | 60.00 | -32.55 | QP |
| 10 | | 13.3700 | 8.88 | 10.88 | 19.76 | 50.00 | -30.24 | AVG |
| 11 | | 29.7300 | 21.91 | 11.03 | 32.94 | 60.00 | -27.06 | QP |
| 12 | | 29.7300 | 9.73 | 11.03 | 20.76 | 50.00 | -29.24 | AVG |

Remark:

Factor = Cable loss + LISN factor, Margin = Measurement - Limit

Test Specification: Neutral



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV | Limit dBuV | Margin dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|--------------|----------|
| 1 | * | 0.1660 | 44.61 | 10.71 | 55.32 | 65.16 | -9.84 | QP |
| 2 | | 0.1660 | 19.77 | 10.71 | 30.48 | 55.16 | -24.68 | AVG |
| 3 | | 0.3379 | 26.02 | 10.61 | 36.63 | 59.25 | -22.62 | QP |
| 4 | | 0.3379 | 7.62 | 10.61 | 18.23 | 49.25 | -31.02 | AVG |
| 5 | | 1.3420 | 25.25 | 10.62 | 35.87 | 56.00 | -20.13 | QP |
| 6 | | 1.3420 | 17.25 | 10.62 | 27.87 | 46.00 | -18.13 | AVG |
| 7 | | 5.3540 | 16.13 | 10.66 | 26.79 | 60.00 | -33.21 | QP |
| 8 | | 5.3540 | 6.42 | 10.66 | 17.08 | 50.00 | -32.92 | AVG |
| 9 | | 13.6700 | 16.33 | 10.88 | 27.21 | 60.00 | -32.79 | QP |
| 10 | | 13.6700 | 7.12 | 10.88 | 18.00 | 50.00 | -32.00 | AVG |
| 11 | | 19.8060 | 21.45 | 10.99 | 32.44 | 60.00 | -27.56 | QP |
| 12 | | 19.8060 | 12.01 | 10.99 | 23.00 | 50.00 | -27.00 | AVG |

Remark:

Factor = Cable loss + LISN factor, Margin = Measurement – Limit

7. RADIATED SPURIOUS EMISSION

7.1 Block Diagram Of Test Setup

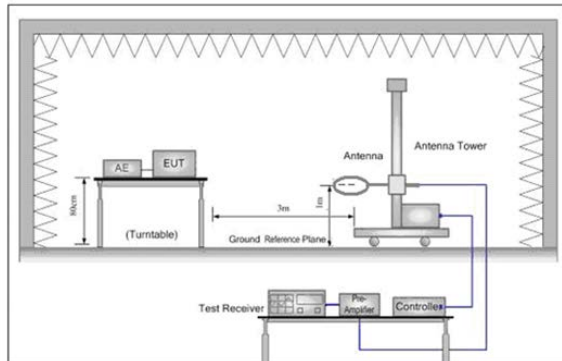


Figure 1. Below 30MHz

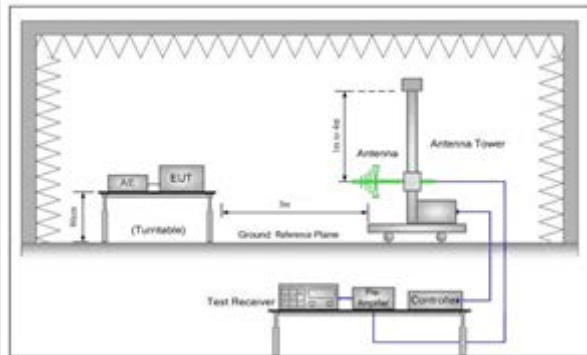


Figure 2. 30MHz to 1GHz

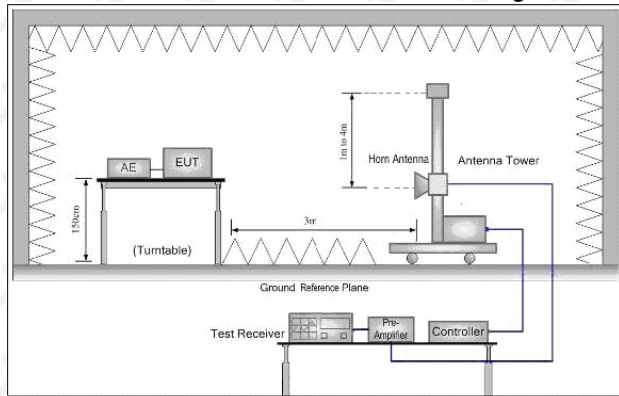


Figure 3. Above 1GHz

7.2 Limit

Spurious Emissions:

| Frequency | Field strength (microvolt/meter) | Limit (dB μ V/m) | Remark | Measurement distance (m) |
|-------------------|----------------------------------|-----------------------|------------|--------------------------|
| 0.009MHz-0.490MHz | 2400/F(kHz) | - | - | 300 |
| 0.490MHz-1.705MHz | 24000/F(kHz) | - | - | 30 |
| 1.705MHz-30MHz | 30 | - | - | 30 |
| 30MHz-88MHz | 100 | 40.0 | Quasi-peak | 3 |
| 88MHz-216MHz | 150 | 43.5 | Quasi-peak | 3 |
| 216MHz-960MHz | 200 | 46.0 | Quasi-peak | 3 |
| 960MHz-1GHz | 500 | 54.0 | Quasi-peak | 3 |
| Above 1GHz | 500 | 54.0 | Average | 3 |

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

7.3 Test procedure

Below 1GHz test procedure as below:

- a.The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b.The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c.The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d.For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rota table table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e.The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f.If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

- g.Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter).
- h.Test the EUT in the lowest channel ,the middle channel ,the Highest channel
- j.Repeat above procedures until all frequencies measured was complete.

Receiver set:

| Frequency | Detector | RBW | VBW | Remark |
|-------------------|------------|---------|--------|------------|
| 0.009MHz-0.090MHz | Peak | 10kHz | 30KHz | Peak |
| 0.009MHz-0.090MHz | Average | 10kHz | 30KHz | Average |
| 0.090MHz-0.110MHz | Quasi-peak | 10kHz | 30KHz | Quasi-peak |
| 0.110MHz-0.490MHz | Peak | 10kHz | 30KHz | Peak |
| 0.110MHz-0.490MHz | Average | 10kHz | 30KHz | Average |
| 0.490MHz -30MHz | Quasi-peak | 10kHz | 30kHz | Quasi-peak |
| 30MHz-1GHz | Quasi-peak | 120 kHz | 300KHz | Quasi-peak |
| Above 1GHz | Peak | 1MHz | 3MHz | Peak |
| | Peak | 1MHz | 10Hz | Average |

7.4 Test Result

Below 1GHz Test Results:
Antenna polarity: H



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | |
|-----|-----|----------|---------------|----------------|-------------|-------|--------|----------|
| | | MHz | dBuV | dB | dBuV/m | dB/m | dB | Detector |
| 1 | | 40.0644 | 31.99 | -5.27 | 26.72 | 40.00 | -13.28 | QP |
| 2 | | 142.8243 | 36.73 | -5.46 | 31.27 | 43.50 | -12.23 | QP |
| 3 | * | 235.4033 | 44.97 | -5.84 | 39.13 | 46.00 | -6.87 | QP |
| 4 | | 381.2487 | 40.53 | -2.34 | 38.19 | 46.00 | -7.81 | QP |
| 5 | | 560.6928 | 33.93 | 1.84 | 35.77 | 46.00 | -10.23 | QP |
| 6 | | 948.7610 | 31.26 | 5.91 | 37.17 | 46.00 | -8.83 | QP |

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Limit – Level

Antenna polarity: V



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dB/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|---------------|------------|----------|
| 1 | | 40.4172 | 32.23 | -5.29 | 26.94 | 40.00 | -13.06 | QP |
| 2 | | 147.9214 | 34.71 | -5.49 | 29.22 | 43.50 | -14.28 | QP |
| 3 | | 237.4760 | 37.47 | -5.82 | 31.65 | 46.00 | -14.35 | QP |
| 4 | | 419.8436 | 33.73 | -1.21 | 32.52 | 46.00 | -13.48 | QP |
| 5 | | 601.4265 | 32.55 | 2.59 | 35.14 | 46.00 | -10.86 | QP |
| 6 | * | 948.7610 | 33.18 | 5.91 | 39.09 | 46.00 | -6.91 | QP |

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Limit – Level

1. The margin of 9K-30MH measurement exceeds 20dB, so the test chart is not included. Test Mode: TM1 (the worst)
2. All modes have been tested, and the test results show that b-mode data is the worst, only b-mode test chart is put. Test Mode: TM1 (the worst)
3. After pre-scanning three directions, the report recorded the worst case Test Mode: TM1 (the worst)

Above 1 GHz Test Results:

LOW CH1 (802.11b Mode)/2412

Horizontal:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 4824 | 64.84 | -3.64 | 61.20 | 74 | -12.80 | peak |
| 4824 | 48.99 | -3.64 | 45.35 | 54 | -8.65 | AVG |
| 7236 | 59.28 | -0.95 | 58.33 | 74 | -15.67 | peak |
| 7236 | 45.73 | -0.95 | 44.78 | 54 | -9.22 | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 4824 | 65.16 | -3.64 | 61.52 | 74 | -12.48 | peak |
| 4824 | 47.54 | -3.64 | 43.90 | 54 | -10.10 | AVG |
| 7236 | 58.10 | -0.95 | 57.15 | 74 | -16.85 | peak |
| 7236 | 43.90 | -0.95 | 42.95 | 54 | -11.05 | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

MID CH6 (802.11b Mode)/2437

Horizontal:

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type |
|--------------------|-------------------------|----------------|----------------------------|--------------------|----------------|---------------|
| 4874 | 64.66 | -3.51 | 61.15 | 74 | -12.85 | peak |
| 4874 | 47.87 | -3.51 | 44.36 | 54 | -9.64 | AVG |
| 7311 | 59.60 | -0.82 | 58.78 | 74 | -15.22 | peak |
| 7311 | 44.89 | -0.82 | 44.07 | 54 | -9.93 | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type |
|--------------------|-------------------------|----------------|----------------------------|--------------------|----------------|---------------|
| 4874 | 63.77 | -3.51 | 60.26 | 74 | -13.74 | peak |
| 4874 | 49.44 | -3.51 | 45.93 | 54 | -8.07 | AVG |
| 7311 | 58.58 | -0.82 | 57.76 | 74 | -16.24 | peak |
| 7311 | 42.87 | -0.82 | 42.05 | 54 | -11.95 | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

HIGH CH11 (802.11b Mode)/2462

Horizontal:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 4924 | 64.16 | -3.43 | 60.73 | 74 | -13.27 | peak |
| 4924 | 47.28 | -3.43 | 43.85 | 54 | -10.15 | AVG |
| 7386 | 58.03 | -0.75 | 57.28 | 74 | -16.72 | peak |
| 7386 | 43.84 | -0.75 | 43.09 | 54 | -10.91 | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 4924 | 64.07 | -3.43 | 60.64 | 74 | -13.36 | peak |
| 4924 | 47.88 | -3.43 | 44.45 | 54 | -9.55 | AVG |
| 7386 | 59.15 | -0.75 | 58.40 | 74 | -15.60 | peak |
| 7386 | 43.14 | -0.75 | 42.39 | 54 | -11.61 | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Remark:

- (1) Measuring frequencies from 1 GHz to the 25 GHz.
- (2) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (3) Data of measurement within this frequency range shown “---” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.

LOW CH1 (802.11g Mode)/2412

Horizontal:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 4824 | 66.13 | -3.64 | 62.49 | 74 | -11.51 | peak |
| 4824 | 50.04 | -3.64 | 46.40 | 54 | -7.60 | AVG |
| 7236 | 59.23 | -0.95 | 58.28 | 74 | -15.72 | peak |
| 7236 | 46.16 | -0.95 | 45.21 | 54 | -8.79 | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 4824 | 62.81 | -3.64 | 59.17 | 74 | -14.83 | peak |
| 4824 | 48.67 | -3.64 | 45.03 | 54 | -8.97 | AVG |
| 7236 | 58.85 | -0.95 | 57.90 | 74 | -16.10 | peak |
| 7236 | 43.16 | -0.95 | 42.21 | 54 | -11.79 | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

MID CH6 (802.11g Mode)/2437

Horizontal:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz) | (dB μ V) | (dB) | (dB μ V/m) | (dB μ V/m) | (dB) | |
| 4874 | 64.42 | -3.51 | 60.91 | 74 | -13.09 | peak |
| 4874 | 48.81 | -3.51 | 45.30 | 54 | -8.70 | AVG |
| 7311 | 59.87 | -0.82 | 59.05 | 74 | -14.95 | peak |
| 7311 | 45.69 | -0.82 | 44.87 | 54 | -9.13 | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz) | (dB μ V) | (dB) | (dB μ V/m) | (dB μ V/m) | (dB) | |
| 4874 | 63.52 | -3.51 | 60.01 | 74 | -13.99 | peak |
| 4874 | 47.88 | -3.51 | 44.37 | 54 | -9.63 | AVG |
| 7311 | 57.36 | -0.82 | 56.54 | 74 | -17.46 | peak |
| 7311 | 41.62 | -0.82 | 40.80 | 54 | -13.20 | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

HIGH CH11 (802.11g Mode)/2462

Horizontal:

| Frequency (MHz) | Meter Reading (dB μ V) | Factor (dB) | Emission Level (dB μ V/m) | Limits (dB μ V/m) | Margin (dB) | Detector Type |
|--------------------|-------------------------------|----------------|----------------------------------|--------------------------|----------------|---------------|
| 4924 | 63.26 | -3.43 | 59.83 | 74 | -14.17 | peak |
| 4924 | 47.78 | -3.43 | 44.35 | 54 | -9.65 | AVG |
| 7386 | 56.41 | -0.75 | 55.66 | 74 | -18.34 | peak |
| 7386 | 41.59 | -0.75 | 40.84 | 54 | -13.16 | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

| Frequency (MHz) | Meter Reading (dB μ V) | Factor (dB) | Emission Level (dB μ V/m) | Limits (dB μ V/m) | Margin (dB) | Detector Type |
|--------------------|-------------------------------|----------------|----------------------------------|--------------------------|----------------|---------------|
| 4924 | 62.02 | -3.43 | 58.59 | 74 | -15.41 | peak |
| 4924 | 47.54 | -3.43 | 44.11 | 54 | -9.89 | AVG |
| 7386 | 56.16 | -0.75 | 55.41 | 74 | -18.59 | peak |
| 7386 | 42.93 | -0.75 | 42.18 | 54 | -11.82 | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Remark:

- (1) Measuring frequencies from 1 GHz to the 25 GHz.
- (2) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (3) Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.

LOW CH1 (802.11n/H20 Mode)/2412

Horizontal:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 4824 | 63.76 | -3.64 | 60.12 | 74 | -13.88 | peak |
| 4824 | 47.09 | -3.64 | 43.45 | 54 | -10.55 | AVG |
| 7236 | 57.37 | -0.95 | 56.42 | 74 | -17.58 | peak |
| 7236 | 44.35 | -0.95 | 43.40 | 54 | -10.60 | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 4824 | 62.13 | -3.64 | 58.49 | 74 | -15.51 | peak |
| 4824 | 50.11 | -3.64 | 46.47 | 54 | -7.53 | AVG |
| 7236 | 58.12 | -0.95 | 57.17 | 74 | -16.83 | peak |
| 7236 | 44.99 | -0.95 | 44.04 | 54 | -9.96 | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

MID CH6 (802.11n/H20 Mode)/2437

Horizontal:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz) | (dB μ V) | (dB) | (dB μ V/m) | (dB μ V/m) | (dB) | |
| 4874.00 | 63.12 | -3.51 | 59.61 | 74.00 | -14.39 | peak |
| 4874.00 | 48.26 | -3.51 | 44.75 | 54.00 | -9.25 | AVG |
| 7311.00 | 56.42 | -0.82 | 55.60 | 74.00 | -18.40 | peak |
| 7311.00 | 43.14 | -0.82 | 42.32 | 54.00 | -11.68 | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz) | (dB μ V) | (dB) | (dB μ V/m) | (dB μ V/m) | (dB) | |
| 4874.00 | 61.79 | -3.51 | 58.28 | 74.00 | -15.72 | peak |
| 4874.00 | 47.02 | -3.51 | 43.51 | 54.00 | -10.49 | AVG |
| 7311.00 | 59.45 | -0.82 | 58.63 | 74.00 | -15.37 | peak |
| 7311.00 | 42.14 | -0.82 | 41.32 | 54.00 | -12.68 | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

HIGH CH11 (802.11n/H20 Mode)/2462

Horizontal:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz) | (dB μ V) | (dB) | (dB μ V/m) | (dB μ V/m) | (dB) | |
| 4924 | 62.88 | -3.43 | 59.45 | 74 | -14.55 | peak |
| 4924 | 48.21 | -3.43 | 44.78 | 54 | -9.22 | AVG |
| 7386 | 57.89 | -0.75 | 57.14 | 74 | -16.86 | peak |
| 7386 | 41.22 | -0.75 | 40.47 | 54 | -13.53 | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz) | (dB μ V) | (dB) | (dB μ V/m) | (dB μ V/m) | (dB) | |
| 4924 | 62.80 | -3.43 | 59.37 | 74 | -14.63 | peak |
| 4924 | 46.53 | -3.43 | 43.10 | 54 | -10.90 | AVG |
| 7386 | 57.34 | -0.75 | 56.59 | 74 | -17.41 | peak |
| 7386 | 42.65 | -0.75 | 41.90 | 54 | -12.10 | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Remark:

- (1) Measuring frequencies from 1 GHz to the 25 GHz.
- (2) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (3) Data of measurement within this frequency range shown “---” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed
- (5)Have tested in three orientations for radiated emissions, Only The worst record is in this report

Restricted bands around fundamental frequency (Radiated)

Operation Mode:
802.11b Mode TX CH Low (2412MHz)

Horizontal

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2390 | 57.75 | -5.81 | 51.94 | 74 | -22.06 | peak |
| 2390 | / | -5.81 | / | 54 | / | AVG |
| 2399 | 64.64 | -5.84 | 58.80 | 74 | -15.20 | peak |
| 2399 | 48.44 | -5.84 | 42.60 | 54 | -11.40 | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2390 | 56.38 | -5.81 | 50.57 | 74 | -23.43 | peak |
| 2390 | / | -5.81 | / | 54 | / | AVG |
| 2399 | 63.56 | -5.84 | 57.72 | 74 | -16.28 | peak |
| 2399 | 46.67 | -5.84 | 40.83 | 54 | -13.17 | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Operation Mode:
802.11b Mode TX CH High (2462MHz)

Horizontal

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2483.5 | 57.68 | -5.65 | 52.03 | 74 | -21.97 | peak |
| 2483.5 | / | -5.65 | / | 54 | / | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2483.5 | 55.24 | -5.65 | 49.59 | 74 | -24.41 | peak |
| 2483.5 | / | -5.65 | / | 54 | / | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Remark: All the other emissions not reported were too low to read and deemed to comply with FCC limit.

Operation Mode: 802.11g Mode TX CH Low (2412MHz)

Horizontal

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2390 | 59.40 | -5.81 | 53.59 | 74 | -20.41 | peak |
| 2390 | / | -5.81 | / | 54 | / | AVG |
| 2399 | 61.52 | -5.84 | 55.68 | 74 | -18.32 | peak |
| 2399 | 47.04 | -5.84 | 41.20 | 54 | -12.80 | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2390 | 57.50 | -5.81 | 51.69 | 74 | -22.31 | peak |
| 2390 | / | -5.81 | / | 54 | / | AVG |
| 2399 | 61.81 | -5.84 | 55.97 | 74 | -18.03 | peak |
| 2399 | 46.13 | -5.84 | 40.29 | 54 | -13.71 | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Operation Mode: 802.11g Mode TX CH High (2462MHz)

Horizontal

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2483.5 | 56.03 | -5.65 | 50.38 | 74 | -23.62 | peak |
| 2483.5 | / | -5.65 | / | 54 | / | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor,
Margin = Emission level - Limits

Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2483.5 | 56.26 | -5.65 | 50.61 | 74 | -23.39 | peak |
| 2483.5 | / | -5.65 | / | 54 | / | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor,
Margin = Emission level - Limits

Remark: All the other emissions not reported were too low to read and deemed to comply with FCC limit.

Operation Mode: 802.11n/H20 Mode TX CH Low (2412MHz)

Horizontal

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2390 | 57.07 | -5.81 | 51.26 | 74 | -22.74 | peak |
| 2390 | / | -5.81 | / | 54 | / | AVG |
| 2399 | 63.61 | -5.84 | 57.77 | 74 | -16.23 | peak |
| 2399 | 47.19 | -5.84 | 41.35 | 54 | -12.65 | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2390 | 56.85 | -5.81 | 51.04 | 74 | -22.96 | peak |
| 2390 | / | -5.81 | / | 54 | / | AVG |
| 2399 | 61.02 | -5.84 | 55.18 | 74 | -18.82 | peak |
| 2399 | 46.92 | -5.84 | 41.08 | 54 | -12.92 | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Operation Mode: 802.11n/H20 Mode TX CH High (2462MHz)

Horizontal

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2483.5 | 57.45 | -5.65 | 51.80 | 74 | -22.20 | peak |
| 2483.5 | / | -5.65 | / | 54 | / | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Vertical:

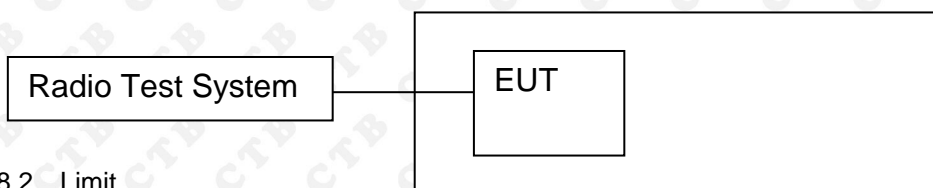
| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2483.5 | 55.67 | -5.65 | 50.02 | 74 | -23.98 | peak |
| 2483.5 | / | -5.65 | / | 54 | / | AVG |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits

Remark: All the other emissions not reported were too low to read and deemed to comply with FCC limit.

8. BAND EDGE AND RF CONDUCTED SPURIOUS EMISSIONS

8.1 Block Diagram Of Test Setup



8.2 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions 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) (see §15.205(c)).

8.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer:

Below 30MHz:

RBW = 100kHz, VBW = 300kHz, Sweep = auto

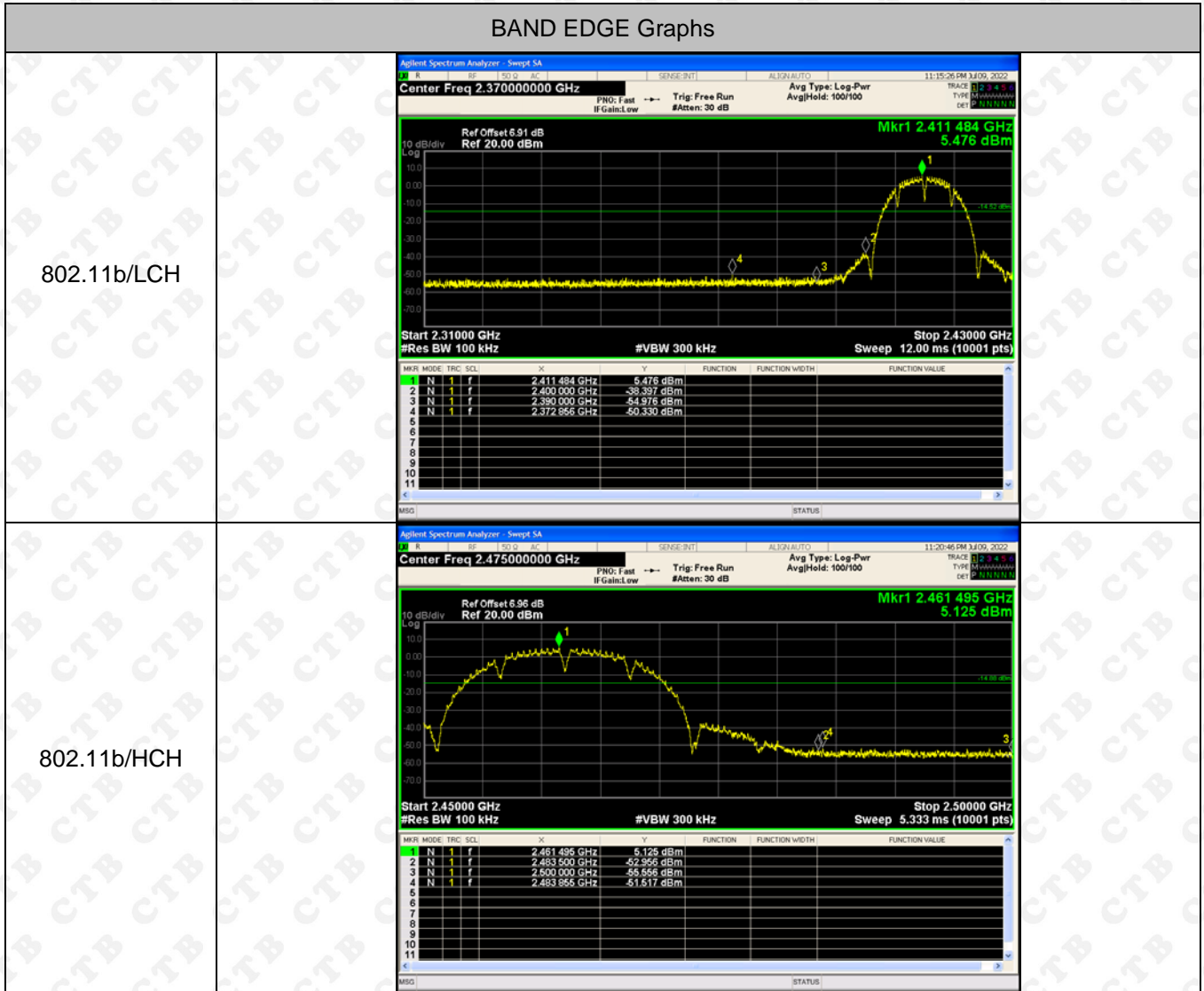
Detector function = peak, Trace = max hold

Above 30MHz:

RBW = 100KHz, VBW = 300KHz, Sweep = auto

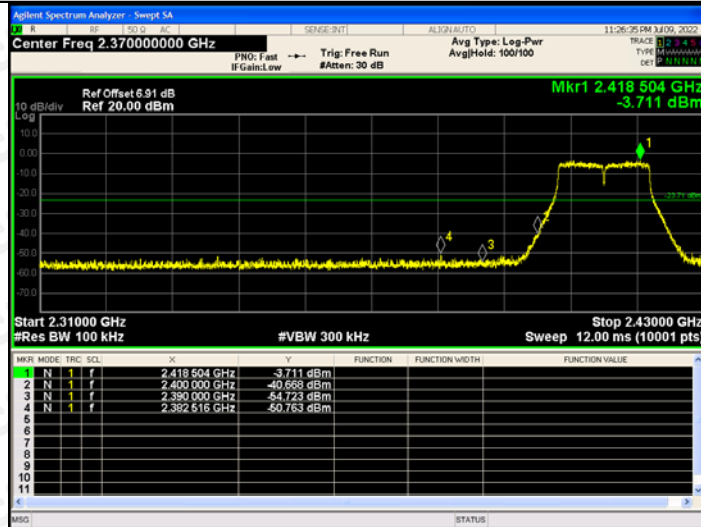
Detector function = peak, Trace = max hold

8.4 Test Result

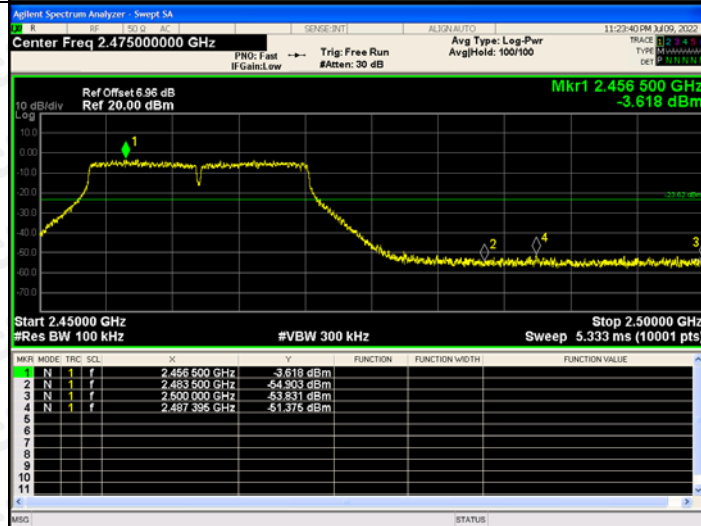


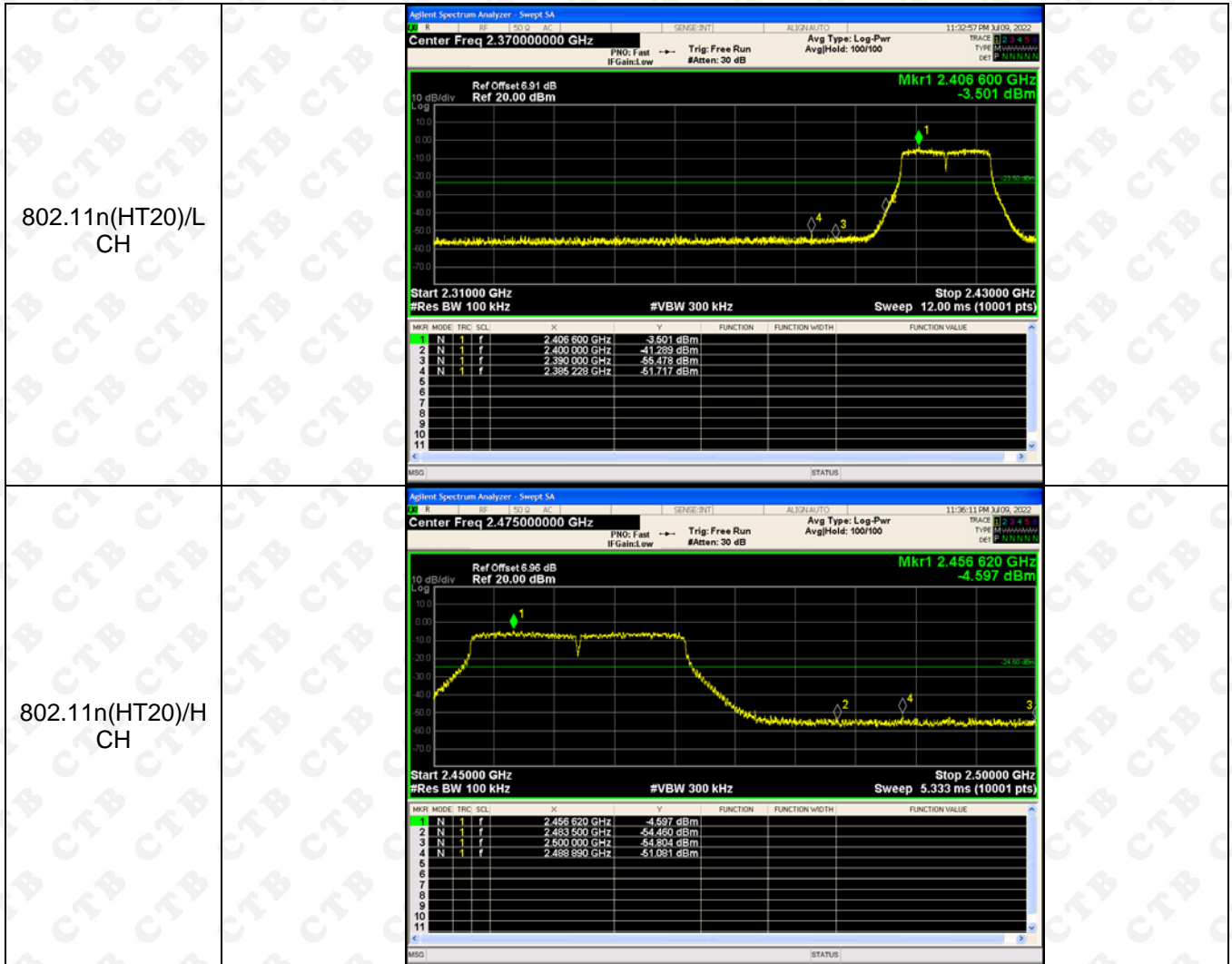
BAND EDGE Graphs

802.11g/LCH

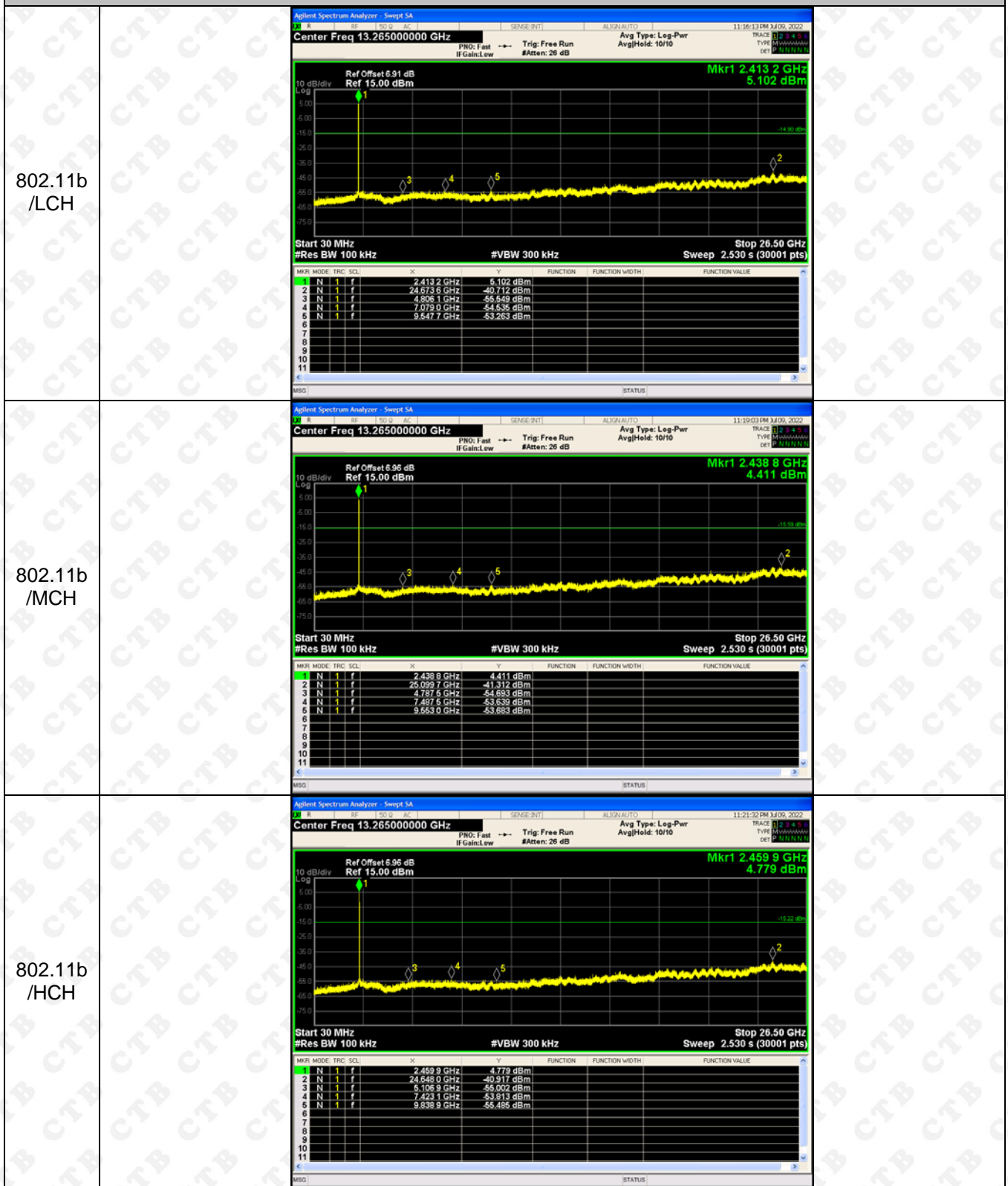


802.11g/HCH

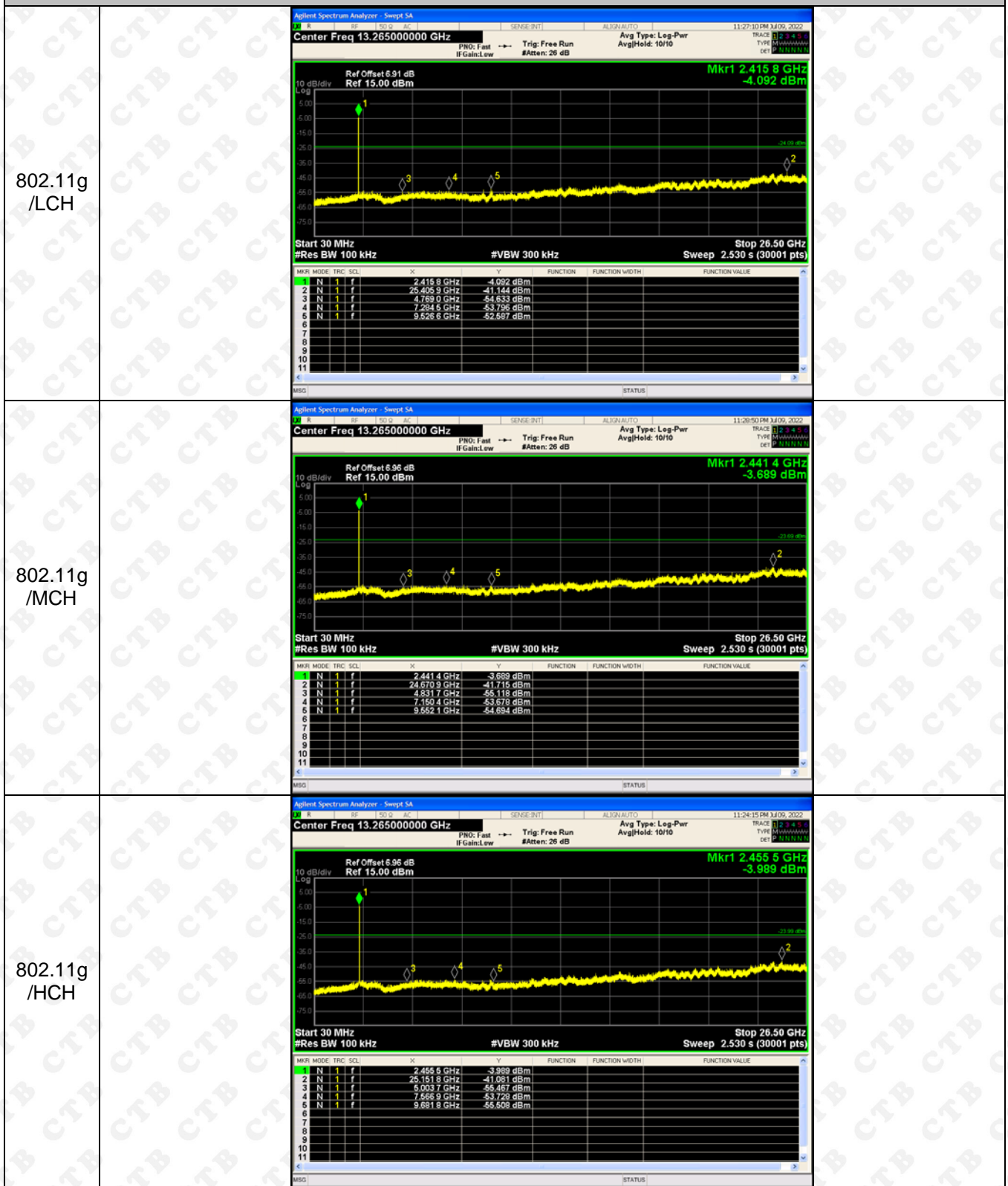




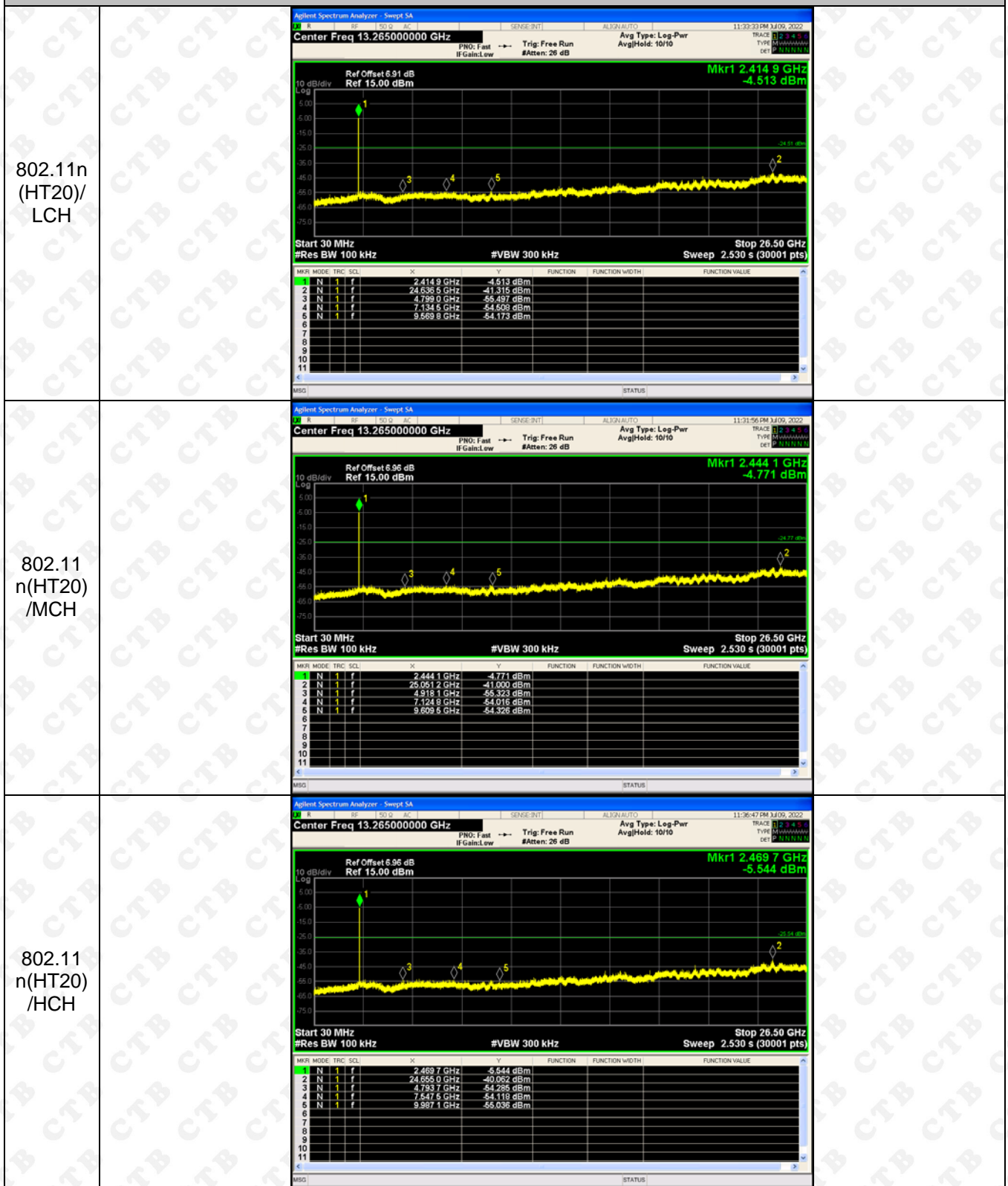
RF Conducted Spurious Emissions Graphs



RF Conducted Spurious Emissions Graphs



RF Conducted Spurious Emissions Graphs



9. COUDUCTED OUTPUT POWER

9.1 Block Diagram Of Test Setup



9.2 Limit

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

9.3 Test procedure

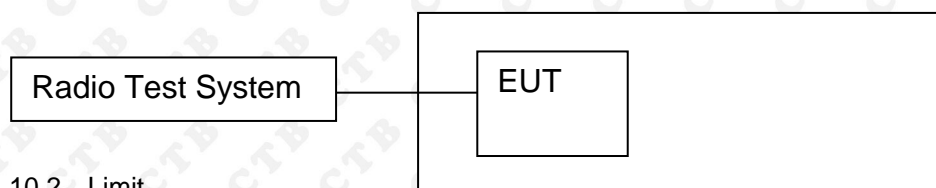
1. The EUT was directly connected to the Power meter

9.4 Test Result

| Mode | Channel. | Peak Output Power [dBm] | Limit[dBm] | Verdict |
|---------------|----------|-------------------------|------------|---------|
| 802.11b | LCH | 19.139 | 30 | PASS |
| | MCH | 19.224 | 30 | PASS |
| | HCH | 18.946 | 30 | PASS |
| 802.11g | LCH | 17.66 | 30 | PASS |
| | MCH | 17.76 | 30 | PASS |
| | HCH | 17.567 | 30 | PASS |
| 802.11n(HT20) | LCH | 17.59 | 30 | PASS |
| | MCH | 17.921 | 30 | PASS |
| | HCH | 17.108 | 30 | PASS |

10. 6DB OCCUPIED BANDWIDTH

10.1 Block Diagram Of Test Setup



10.2 Limit

| FCC Part15 (15.247) , Subpart C | | | | |
|---------------------------------|-----------|---|-----------------------|--------|
| Section | Test Item | Limit | Frequency Range (MHz) | Result |
| 15.247(a)(2) | Bandwidth | $\geq 500\text{KHz}$ (6dB bandwidth) | 2400-2483.5 | PASS |

10.3 Test procedure

1. Rem1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. 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.

10.4 Test Result

| Test Mode | Frequency | 6dB Bandwidth (MHz) | Limit(kHz) | Result |
|---------------|-----------|---------------------|------------|--------|
| 802.11b | LCH | 10.109 | 500 | PASS |
| | MCH | 10.133 | 500 | PASS |
| | HCH | 10.14 | 500 | PASS |
| 802.11g | LCH | 16.56 | 500 | PASS |
| | MCH | 16.548 | 500 | PASS |
| | HCH | 16.547 | 500 | PASS |
| 802.11n(HT20) | LCH | 17.689 | 500 | PASS |
| | MCH | 17.753 | 500 | PASS |
| | HCH | 17.742 | 500 | PASS |

Test Graph:

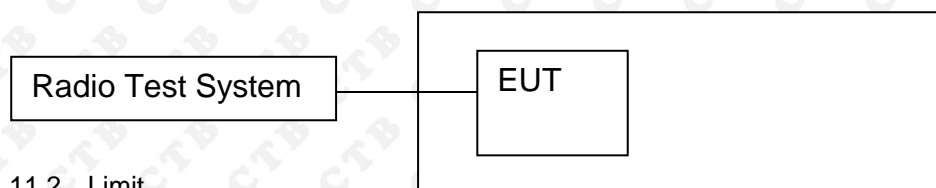


| | |
|--------------------|--|
| <p>802.11g/LCH</p> | <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.412000000 GHz</p> <p>Center Freq: 2.412000000 GHz</p> <p>Trig: Free Run</p> <p>#Atten: 30 dB</p> <p>Avg/Hold: 100/100</p> <p>Radio Std: None</p> <p>Radio Device: BTS</p> <p>Ref Offset: 6.91 dB</p> <p>Ref: 26.91 dBm</p> <p>Mkr3 2.420244 GHz</p> <p>-9.7687 dBm</p> <p>Center 2.412 GHz</p> <p>#Res BW 100 kHz</p> <p>#VBW 300 kHz</p> <p>Span 30 MHz</p> <p>Sweep 2.933 ms</p> <p>Occupied Bandwidth 16.469 MHz</p> <p>Total Power 16.4 dBm</p> <p>Transmit Freq Error -36.230 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 16.56 MHz</p> <p>x dB -6.00 dB</p> |
| <p>802.11g/MCH</p> | <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.437000000 GHz</p> <p>Center Freq: 2.437000000 GHz</p> <p>Trig: Free Run</p> <p>#Atten: 30 dB</p> <p>Avg/Hold: 100/100</p> <p>Radio Std: None</p> <p>Radio Device: BTS</p> <p>Ref Offset: 6.96 dB</p> <p>Ref: 26.96 dBm</p> <p>Mkr3 2.445243 GHz</p> <p>-9.4677 dBm</p> <p>Center 2.437 GHz</p> <p>#Res BW 100 kHz</p> <p>#VBW 300 kHz</p> <p>Span 30 MHz</p> <p>Sweep 2.933 ms</p> <p>Occupied Bandwidth 16.450 MHz</p> <p>Total Power 16.5 dBm</p> <p>Transmit Freq Error -30.928 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 16.55 MHz</p> <p>x dB -6.00 dB</p> |
| <p>802.11g/HCH</p> | <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.462000000 GHz</p> <p>Center Freq: 2.462000000 GHz</p> <p>Trig: Free Run</p> <p>#Atten: 30 dB</p> <p>Avg/Hold: 100/100</p> <p>Radio Std: None</p> <p>Radio Device: BTS</p> <p>Ref Offset: 6.96 dB</p> <p>Ref: 26.96 dBm</p> <p>Mkr3 2.470241 GHz</p> <p>-9.2920 dBm</p> <p>Center 2.462 GHz</p> <p>#Res BW 100 kHz</p> <p>#VBW 300 kHz</p> <p>Span 30 MHz</p> <p>Sweep 2.933 ms</p> <p>Occupied Bandwidth 16.451 MHz</p> <p>Total Power 16.4 dBm</p> <p>Transmit Freq Error -32.373 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 16.55 MHz</p> <p>x dB -6.00 dB</p> |

| | | | | | | | | | | | | | | | | | | | |
|-------------------------------|---|--------------------|-------------|----------|------------|--|--|---------------------|-----------|---------|-------------|------|----------|----------------|--|--|-----------|--|--|
| <p>802.11n(HT20)/LC H</p> | <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.412000000 GHz</p> <p>Ref Offset: 6.91 dB Ref 26.91 dBm</p> <p>Mkr3 2.420824 GHz -9.3784 dBm</p> <p>Center 2.412 GHz #Res BW 100 kHz</p> <p>#VBW 300 kHz</p> <p>Span 30 MHz Sweep 2.933 ms</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>16.0 dBm</td> </tr> <tr> <td>17.646 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>-20.699 kHz</td> <td>x dB</td> <td>-6.00 dB</td> </tr> <tr> <td>x dB Bandwidth</td> <td></td> <td></td> </tr> <tr> <td>17.69 MHz</td> <td></td> <td></td> </tr> </table> | Occupied Bandwidth | Total Power | 16.0 dBm | 17.646 MHz | | | Transmit Freq Error | OBW Power | 99.00 % | -20.699 kHz | x dB | -6.00 dB | x dB Bandwidth | | | 17.69 MHz | | |
| Occupied Bandwidth | Total Power | 16.0 dBm | | | | | | | | | | | | | | | | | |
| 17.646 MHz | | | | | | | | | | | | | | | | | | | |
| Transmit Freq Error | OBW Power | 99.00 % | | | | | | | | | | | | | | | | | |
| -20.699 kHz | x dB | -6.00 dB | | | | | | | | | | | | | | | | | |
| x dB Bandwidth | | | | | | | | | | | | | | | | | | | |
| 17.69 MHz | | | | | | | | | | | | | | | | | | | |
| <p>802.11n(HT20)/MC H</p> | <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.437000000 GHz</p> <p>Ref Offset: 6.96 dB Ref 26.96 dBm</p> <p>Mkr3 2.445847 GHz -10.113 dBm</p> <p>Center 2.437 GHz #Res BW 100 kHz</p> <p>#VBW 300 kHz</p> <p>Span 30 MHz Sweep 2.933 ms</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>16.4 dBm</td> </tr> <tr> <td>17.647 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>-29.655 kHz</td> <td>x dB</td> <td>-6.00 dB</td> </tr> <tr> <td>x dB Bandwidth</td> <td></td> <td></td> </tr> <tr> <td>17.75 MHz</td> <td></td> <td></td> </tr> </table> | Occupied Bandwidth | Total Power | 16.4 dBm | 17.647 MHz | | | Transmit Freq Error | OBW Power | 99.00 % | -29.655 kHz | x dB | -6.00 dB | x dB Bandwidth | | | 17.75 MHz | | |
| Occupied Bandwidth | Total Power | 16.4 dBm | | | | | | | | | | | | | | | | | |
| 17.647 MHz | | | | | | | | | | | | | | | | | | | |
| Transmit Freq Error | OBW Power | 99.00 % | | | | | | | | | | | | | | | | | |
| -29.655 kHz | x dB | -6.00 dB | | | | | | | | | | | | | | | | | |
| x dB Bandwidth | | | | | | | | | | | | | | | | | | | |
| 17.75 MHz | | | | | | | | | | | | | | | | | | | |
| <p>802.11n(HT20)/HC H</p> | <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.462000000 GHz</p> <p>Ref Offset: 6.96 dB Ref 26.96 dBm</p> <p>Mkr3 2.470841 GHz -10.642 dBm</p> <p>Center 2.462 GHz #Res BW 100 kHz</p> <p>#VBW 300 kHz</p> <p>Span 30 MHz Sweep 2.933 ms</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>15.5 dBm</td> </tr> <tr> <td>17.638 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>-29.999 kHz</td> <td>x dB</td> <td>-6.00 dB</td> </tr> <tr> <td>x dB Bandwidth</td> <td></td> <td></td> </tr> <tr> <td>17.74 MHz</td> <td></td> <td></td> </tr> </table> | Occupied Bandwidth | Total Power | 15.5 dBm | 17.638 MHz | | | Transmit Freq Error | OBW Power | 99.00 % | -29.999 kHz | x dB | -6.00 dB | x dB Bandwidth | | | 17.74 MHz | | |
| Occupied Bandwidth | Total Power | 15.5 dBm | | | | | | | | | | | | | | | | | |
| 17.638 MHz | | | | | | | | | | | | | | | | | | | |
| Transmit Freq Error | OBW Power | 99.00 % | | | | | | | | | | | | | | | | | |
| -29.999 kHz | x dB | -6.00 dB | | | | | | | | | | | | | | | | | |
| x dB Bandwidth | | | | | | | | | | | | | | | | | | | |
| 17.74 MHz | | | | | | | | | | | | | | | | | | | |

11. POWER SPECTRAL DENSITY

11.1 Block Diagram Of Test Setup



11.2 Limit

| FCC Part15 (15.247) , Subpart C | | | | |
|---------------------------------|------------------------|------------------------|-----------------------|--------|
| Section | Test Item | Limit | Frequency Range (MHz) | Result |
| 15.247 | Power Spectral Density | 8 dBm (in any 3KHz) | 2400-2483.5 | PASS |

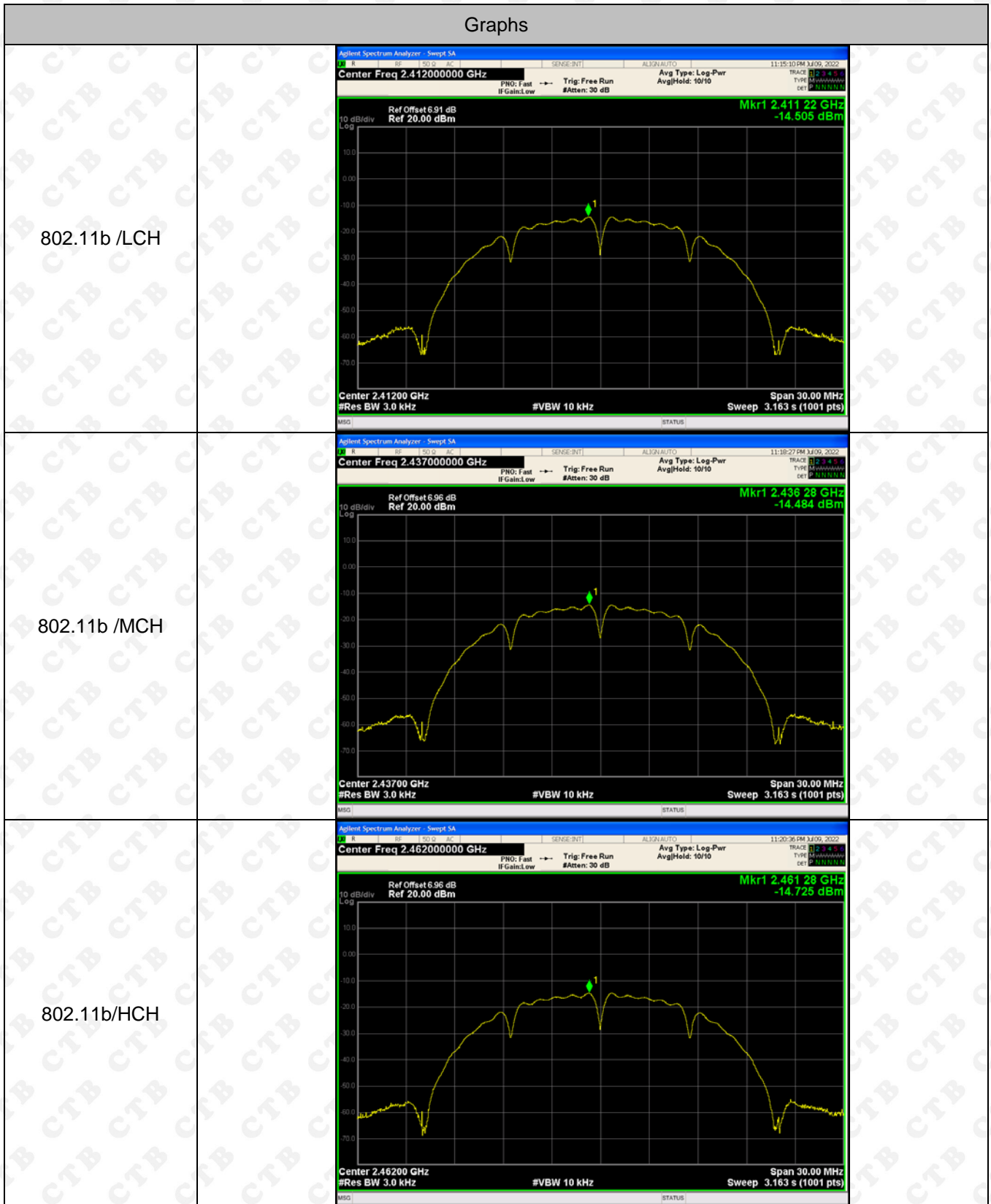
11.3 Test procedure

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
4. Set the VBW $\geq 3 \times \text{RBW}$.
5. Detector = PEAK.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

11.4 Test Result

| Mode | Channel. | Power Spectral Density [dBm /3KHz] | Limit(8 dBm (in any 3KHz)) | Verdict |
|----------------|----------|------------------------------------|----------------------------|---------|
| 802.11b | LCH | -14.505 | 8 | PASS |
| | MCH | -14.484 | 8 | PASS |
| | HCH | -14.725 | 8 | PASS |
| 802.11g | LCH | -17.868 | 8 | PASS |
| | MCH | -17.97 | 8 | PASS |
| | HCH | -17.85 | 8 | PASS |
| 802.11n(H T20) | LCH | -17.581 | 8 | PASS |
| | MCH | -16.778 | 8 | PASS |
| | HCH | -17.921 | 8 | PASS |

Test Graph



| | |
|--------------------|--|
| <p>802.11g/LCH</p> | <p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.41200000 GHz Ref Offset 6.91 dB Ref 20.00 dBm Mkr1 2.417 28 GHz -17.988 dBm Center 2.41200 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 30.00 MHz Sweep 3.163 s (1001 pts)</p> |
| <p>802.11g/MCH</p> | <p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.43700000 GHz Ref Offset 6.96 dB Ref 20.00 dBm Mkr1 2.442 28 GHz -17.970 dBm Center 2.43700 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 30.00 MHz Sweep 3.163 s (1001 pts)</p> |
| <p>802.11g/HCH</p> | <p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.46200000 GHz Ref Offset 6.96 dB Ref 20.00 dBm Mkr1 2.467 28 GHz -17.850 dBm Center 2.46200 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 30.00 MHz Sweep 3.163 s (1001 pts)</p> |

| | |
|-------------------------------|--|
| <p>802.11n(HT20)/LC H</p> | <p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.412000000 GHz Ref Offset 6.91 dB Ref 20.00 dBm Mkr1 2.40537 GHz -17.581 dBm Center 2.41200 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 30.00 MHz Sweep 3.163 s (1001 pts)</p> |
| <p>802.11n(HT20)/MC H</p> | <p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.437000000 GHz Ref Offset 6.96 dB Ref 20.00 dBm Mkr1 2.44351 GHz -16.778 dBm Center 2.43700 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 30.00 MHz Sweep 3.163 s (1001 pts)</p> |
| <p>802.11n(HT20)/HC H</p> | <p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.462000000 GHz Ref Offset 6.96 dB Ref 20.00 dBm Mkr1 2.45975 GHz -17.921 dBm Center 2.46200 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 30.00 MHz Sweep 3.163 s (1001 pts)</p> |

12. ANTENNA REQUIREMENT

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:

The antenna is PCB Antenna and no consideration of replacement. The best case gain of the antenna is 1dBi.

13. EUT TEST SETUP PHOTOGRAPHS

Radiated Emission

Below 1G



Above 1G



Conducted Emission



***** END OF REPORT *****