# TEST REPORT

| | |
|---|---|
| Product Name: | Car Connectivity Box |
| FCC ID: | 2BHNQ-U1 |
| Trademark: | N/A |
| Model Number: | U1, T1, U2, T2+, TC2, U3, U4, U5, U6, U7, U8, U9 |
| Prepared For: | Guangdong Junyong Technology Co., Ltd. |
| Address: | Slot 23B, 7th Floor, Zhixian Building, No.3 Longjing South Road, Shiqi District, Zhongshan City |
| Manufacturer: | Guangdong Junyong Technology Co., Ltd. |
| Address: | Slot 23B, 7th Floor, Zhixian Building, No.3 Longjing South Road, Shiqi District, Zhongshan City |
| Prepared By: | Shenzhen CTB Testing Technology Co., Ltd. |
| Address: | 1&2/F., Building A, No.26, Xinhe Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, China |
| Sample Received Date: | Jul. 08, 2024 |
| Sample tested Date: | Jul. 08, 2024 to Jul. 24, 2024 |
| Issue Date: | Jul. 24, 2024 |
| Report No.: | CTB240724045RFX |
| Test Standards | FCC CFR Title 47 Part 15 Subpart C Section 15.247<br>ANSI C63.10:2013 |
| Test Results | PASS |
| Remark: | This is WIFI-2.4GHz band radio test report. |

| Compiled by: | Reviewed by: | Approved by: |
|---|---|---|
| Zhou Kui | Arron Liu | Bin Mei |
| Zhou Kui | Arron Liu | Bin Mei / 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.

**TABLE OF CONTENT**

Test Report Declaration Page
**1. VERSION** . . . . . 4
**2. TEST SUMMARY** . . . . . 5
**3. MEASUREMENT UNCERTAINTY** . . . . . 6
**4. PRODUCT INFORMATION AND TEST SETUP** . . . . . 7
4.1 Product Information . . . . . 7
4.2 Test Setup Configuration . . . . . 7
4.3 Support Equipment . . . . . 7
4.4 Channel List . . . . . 8
4.5 Test Mode . . . . . 8
4.6 Test Environment . . . . . 8
**5. TEST FACILITY AND TEST INSTRUMENT USED** . . . . . 9
5.1 Test Facility . . . . . 9
5.2 Test Instrument Used . . . . . 9
**6. AC POWER LINE CONDUCTED EMISSION** . . . . . 12
6.1 Block Diagram Of Test Setup . . . . . 12
6.2 Limit . . . . . 12
6.3 Test procedure . . . . . 12
6.4 Test Result . . . . . 14
**7. RADIATED SPURIOUS EMISSION** . . . . . 16
7.1 Block Diagram Of Test Setup . . . . . 16
7.2 Limit . . . . . 16
7.3 Test procedure . . . . . 17
7.4 Test Result . . . . . 18
**8. BAND EDGE AND RF COUNDUCTED SPURIOUS EMISSIONS** . . . . . 35
8.1 Block Diagram Of Test Setup . . . . . 35
8.2 Limit . . . . . 35
8.3 Test procedure . . . . . 35
8.4 Test Result . . . . . 36
**9. COUDUCTED OUTPUT POWER** . . . . . 48
9.1 Block Diagram Of Test Setup . . . . . 48
9.2 Limit . . . . . 48
9.3 Test procedure . . . . . 48
9.4 Test Result . . . . . 48
**10. 6DB OCCUPIED BANDWIDTH** . . . . . 49
10.1 Block Diagram Of Test Setup . . . . . 49
10.2 Limit . . . . . 49
10.3 Test procedure . . . . . 49
10.4 Test Result . . . . . 49
**11. POWER SPECTRAL DENSITY** . . . . . 57
11.1 Block Diagram Of Test Setup . . . . . 57
11.2 Limit . . . . . 57

11.3 Test procedure . . . . . 57
11.4 Test Result . . . . . 57
**12. ANTENNA REQUIREMENT . . . . . 64**
**13. EUT TEST SETUP PHOTOGRAPHS . . . . . 65**

*(Note: N/A means not applicable)*

## 1. VERSION

| Report No. | Issue Date | Description | Approved |
|---|---|---|---|
| CTB240724045RFX | Jul. 24, 2024 | 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 15Subpart 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) | / | 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 C63.10-2013.

## 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 camber Radiated spurious emission(9KHz-30MHz) | U=±4.8dB |
| 3m camber 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℃ |
| Supply voltages | U=±3% |
| Time | U=±5% |

## 4. PRODUCT INFORMATION AND TEST SETUP

### 4.1 Product Information

| | |
|---|---|
| Model(s): | U1, T1, U2, T2+, TC2, U3, U4, U5, U6, U7, U8, U9 |
| Model Description: | All the model are the same circuit and RF module, only the name and appearance are different. Test sample model: U1 |
| Wi-Fi Specification: | IEEE 802.11b/g/n |
| Hardware Version: | A18 V05 |
| Software Version: | V1.0 |
| Operation Frequency: | WiFi: IEEE 802.11b/g/n 20: 2412-2462MHz/ 11 channel |
| Max. RF output power: | WiFi (2.4G): 16.801dBm |
| Type of Modulation: | WiFi: DSSS, OFDM |
| Antenna installation: | WiFi: PCB antenna |
| Antenna Gain: | WiFi (2.4G): ANT1: 2.28dBi<br>ANT2: 0.72dBi |
| Ratings: | DC 5V charging from adapter |

### 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/TypeNo. | SeriesNo. | Note |
|---|---|---|---|---|---|
| 1 | Laptop | DELL | Vostro 5490 | N/A | N/A |

***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.

ANT 1, ANT 2

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

MIMO(ANT 1+ANT 2)

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

NOTE: Dutycycle>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): | 5V |
| Normal Temperature(℃) | 23 |
| Low Temperature(℃) | 0 |
| High Temperature(℃) | 50 |

## 5. TEST FACILITY AND TEST INSTRUMENT USED

### 5.1 Test Facility

All measurement facilities used to collect the measurement data are located at 1&2F., Building A, No. 26, Xinhe Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, 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 | Type No. | Serial No. | Firmware Version | Calibrated until |
|---|---|---|---|---|---|---|
| 1 | Spectrum Analyzer | Agilent | N9020A | MY52090073 | A.14.16 | 2025/6/28 |
| 2 | Power Sensor | Agilent | U2021XA | MY56120032 | / | 2025/6/28 |
| 3 | Power Sensor | Agilent | U2021XA | MY56120034 | / | 2025/6/28 |
| 4 | Communication test set | R&S | CMW500 | 108058 | V3.5.80 | 2025/6/28 |
| 5 | Spectrum Analyzer | KEYSIGHT | N9020A | MY51289897 | A.14.16 | 2025/6/28 |
| 6 | Signal Generator | Agilent | N5181A | MY50140365 | A.01.60 | 2025/6/28 |
| 7 | Vector signal generator | Agilent | N5182A | MY47420195 | A.01.87 | 2025/6/28 |
| 8 | Communication test set | Agilent | E5515C | MY50102567 | B.19.07 (E1962B) | 2025/6/28 |
| 9 | 2.4 GHz Filter | Shenxiang | MSF2400-2483.5MS-1154 | 20181015001 | / | 2025/6/30 |
| 10 | 5 GHz Filter | Shenxiang | MSF5150-5850MS-1155 | 20181015001 | / | 2025/6/30 |
| 11 | Filter | Xingbo | XBLBQ-DZA 120 | 190821-1-1 | / | 2025/6/30 |
| 12 | BT&WI-FI Automatic test software | Micowave | MTS8000 | Ver. 2.0.0.0 | / | / |
| 13 | Rohde & Schwarz SFU Broadcast Test System | R&S | SFU | 101017 | / | 2025/6/28 |
| 14 | Temperature humidity chamber | Hongjing | TH-80CH | DG-15174 | / | 2025/6/28 |
| 15 | 234G Automatic test software | Micowave | MTS8200 | Ver. 2.0.0.0 | / | / |
| 16 | 966 chamber | C.R.T. | 966 | / | / | 2027/6/21 |
| 17 | Receiver | R&S | ESPI | 100362 | RF_ATTEN_7 (104489/003) | 2025/6/28 |
| 18 | Amplifier | HP | 8447E | 2945A02747 | / | 2025/6/28 |
| 19 | Amplifier | Agilent | 8449B | 3008A01838 | / | 2025/6/28 |
| 20 | TRILOG Broadband Antenna | Schwarzbeck | VULB 9168 | 00869 | / | 2025/6/28 |
| 21 | Double Ridged Broadband Horn Antenna | Schwarzbeck | BBHA9120D | 01911 | / | 2025/6/28 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 22 | EMI test software | Fala | EZ-EMC | FA-03A2 RE | / | / |
| 23 | Loop Antenna | Schwarzbeck | FMZB 1519B | 1519B-224 | / | 2025/6/28 |
| 24 | loop antenna | ZHINAN | ZN30900A | GTS534 | / | / |
| 25 | 40G Horn antenna | A/H/System | SAS-574 | 588 | / | 2025/6/28 |
| 26 | Amplifier | AEROFLEX | Aeroflex | 097 | / | 2025/6/28 |
| 27 | Power Metter | KEYSIGHT | N1912AP | N/A | A.05.00 | 2025/6/28 |

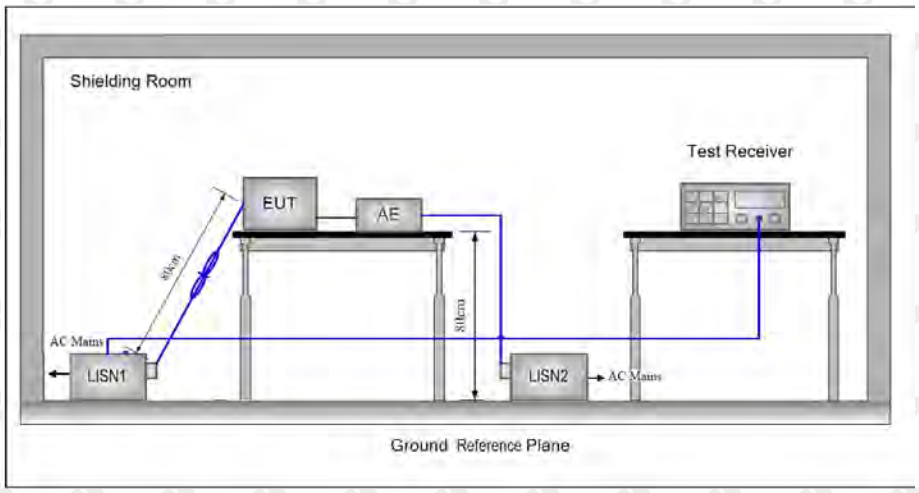
| Continuous disturbance | | | | | | |
|---|---|---|---|---|---|---|
| No. | Equipment | Manufacturer | Model No. | Serial No. | Firmware version | Calibrated until |
| 1 | 843 Shield Room | C/ R/ T | 843 | / | / | 2027/6/21 |
| 2 | AMN | ROHDE&SCHWARZ | ESH3-Z5 | 831551852 | / | 2025/6/30 |
| 3 | Pulse limiter | ROHDE&SCHWARZ | ESH3Z2 | 357881052 | / | 2025/6/28 |
| 4 | EMI TEST RECEIVER | ROHDE&SCHWARZ | ESCI | 100428 | V4.42.SP3 | 2025/6/30 |
| 5 | Coaxial cable | ZDECL | Z302S | 18091904 | / | 2025/6/30 |
| 6 | ISN | Schwarzbeck | NTFM8158 | 183 | / | 2025/6/30 |
| 7 | Voltage sensor | Schwarzbeck | TK 9420 | 01189 | / | 2024/11/16 |
| 8 | EZ-EMC | Frad | EMC-con3A1.1 | / | / | / |
| 9 | Current Probe | FCC | F-52B | 199453 | / | 2025/5/27 |
| 10 | Communication test set | R&S | CMW500 | 108058 | B.19.07 (E1962B) | 2025/6/28 |
| 11 | Communication test set | Agilent | E5515C | MY50102567 | V3.5.80 | 2025/6/28 |

| Radiated emission | | | | | | |
|---|---|---|---|---|---|---|
| No. | Equipment | Manufacturer | Model No. | Serial No. | Firmware version | Calibrated until |
| 1 | 966 Chamber | C/ R/ T | 966 | / | / | 2027/6/21 |
| 2 | Double Ridged Broadband Horn Antenna | Schwarzbeck | BBHA 9120 D | 01911 | / | 2025/7/06 |
| 3 | TRILOG Broadband Antenna | Schwarzbeck | VULB 9168 | 00869 | / | 2025/6/29 |
| 4 | Amplifier | Agilent | 8449B | 3008A01838 | / | 2025/6/30 |
| 5 | Amplifier | HP | 8447E | 2945A02747 | / | 2025/6/28 |
| 6 | loop antenna | Schwarzbeck | FMZB 1519B | 1519B-224 | / | 2025/6/29 |
| 7 | EMI TEST RECEIVER | ROHDE&SCHWARZ | ESPI | 100362 | RF_ATTEN_7 (104489/003) | 2025/6/28 |
| 8 | Spectrum Analyzer | KEYSIGHT | N9020A | MY51289897 | A.14.16 | 2025/6/28 |
| 9 | Coaxial cable | ETS | RFC-SNS-100-N MS-80 | / | / | 2025/6/28 |
| 10 | Coaxial cable | ETS | RFC-SN-100-N MS-20 | / | / | 2025/6/28 |
| 11 | Coaxial cable | ETS | RFC-SNS-100-S MS-20 | / | / | 2025/6/28 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 12 | Coaxial cable | ETS | RFC-NNS-100-NMS-300 | / | / | 2025/6/28 |
| 13 | EMI test software | Frad | EZ-EMC | Ver/ FA-03A2 RE | / | / |
| 14 | Communication test set | R&S | CMW500 | 108058 | B.19.07 (E1962B) | 2025/6/28 |
| 15 | Communication test set | Agilent | E5515C | MY50102567 | V3.5.80 | 2025/6/28 |

## 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 (dBµV) | |
|---|---|---|
| | 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 50Ω/50µH + 5Ω 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.

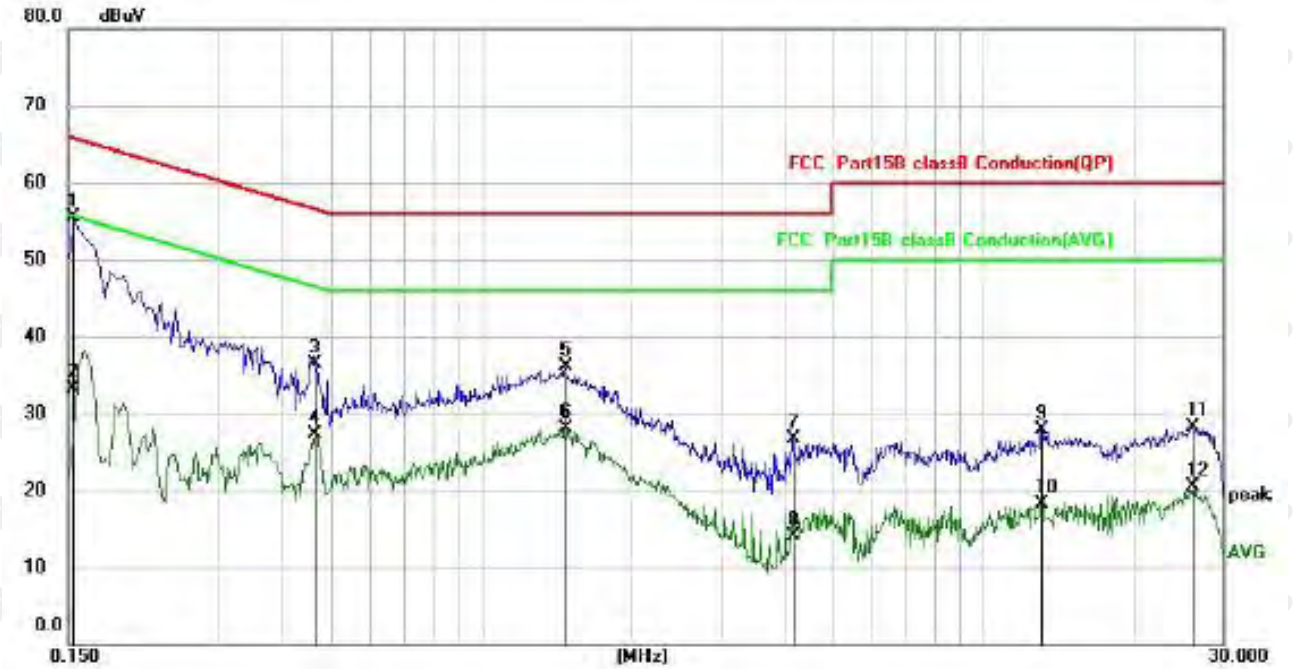
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,

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 C63.10:2013 on conducted measurement.

6.4 Test Result

Test Specification: Line
AC 120V 60Hz
the worst: 802.11b (low channel)

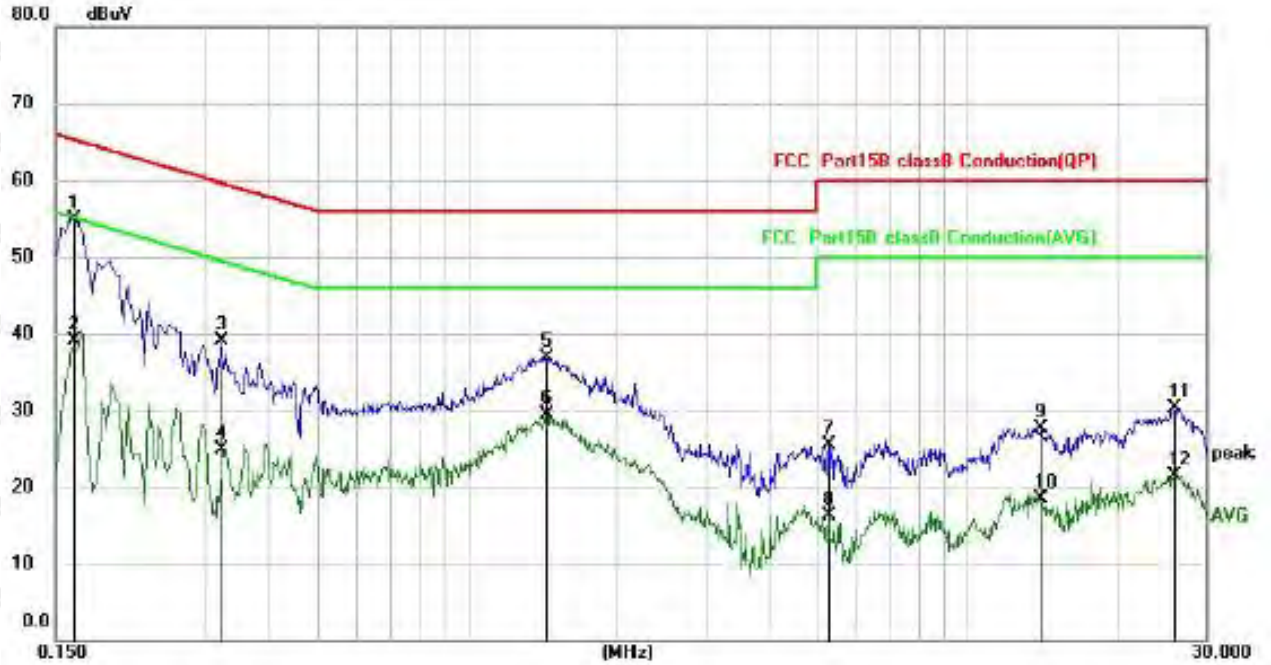



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector |
| 1 | * | 0.1539 | 45.56 | 9.95 | 55.51 | 65.79 | -10.28 | QP |
| 2 | | 0.1539 | 23.32 | 9.95 | 33.27 | 55.79 | -22.52 | AVG |
| 3 | | 0.4661 | 26.58 | 9.99 | 36.57 | 56.58 | -20.01 | QP |
| 4 | | 0.4661 | 17.25 | 9.99 | 27.24 | 46.58 | -19.34 | AVG |
| 5 | | 1.4700 | 26.04 | 10.05 | 36.09 | 56.00 | -19.91 | QP |
| 6 | | 1.4700 | 18.12 | 10.05 | 28.17 | 46.00 | -17.83 | AVG |
| 7 | | 4.1779 | 16.47 | 10.30 | 26.77 | 56.00 | -29.23 | QP |
| 8 | | 4.1779 | 3.82 | 10.30 | 14.12 | 46.00 | -31.88 | AVG |
| 9 | | 13.0059 | 17.31 | 10.67 | 27.98 | 60.00 | -32.02 | QP |
| 10 | | 13.0059 | 7.56 | 10.67 | 18.23 | 50.00 | -31.77 | AVG |
| 11 | | 26.0019 | 17.18 | 11.10 | 28.28 | 60.00 | -31.72 | QP |
| 12 | | 26.0019 | 9.36 | 11.10 | 20.46 | 50.00 | -29.54 | AVG |

Remark:

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

Test Specification: Neutral
AC 120V 60Hz
the worst: 802.11b (low channel)




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector |
| 1 | * | 0.1640 | 44.87 | 9.95 | 54.82 | 65.26 | -10.44 | QP |
| 2 | | 0.1640 | 29.10 | 9.95 | 39.05 | 55.26 | -16.21 | AVG |
| 3 | | 0.3220 | 29.09 | 9.97 | 39.06 | 59.66 | -20.60 | QP |
| 4 | | 0.3220 | 14.84 | 9.97 | 24.81 | 49.66 | -24.85 | AVG |
| 5 | | 1.4379 | 26.84 | 10.04 | 36.88 | 56.00 | -19.12 | QP |
| 6 | | 1.4379 | 19.44 | 10.04 | 29.48 | 46.00 | -16.52 | AVG |
| 7 | | 5.2900 | 15.12 | 10.40 | 25.52 | 60.00 | -34.48 | QP |
| 8 | | 5.2900 | 5.85 | 10.40 | 16.25 | 50.00 | -33.75 | AVG |
| 9 | | 13.9219 | 17.09 | 10.70 | 27.79 | 60.00 | -32.21 | QP |
| 10 | | 13.9219 | 7.87 | 10.70 | 18.57 | 50.00 | -31.43 | AVG |
| 11 | | 25.9579 | 19.30 | 11.09 | 30.39 | 60.00 | -29.61 | QP |
| 12 | | 25.9579 | 10.51 | 11.09 | 21.60 | 50.00 | -28.40 | AVG |

Remark:

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

## 7. RADIATED SPURIOUS EMISSION

### 7.1 Block Diagram Of Test Setup

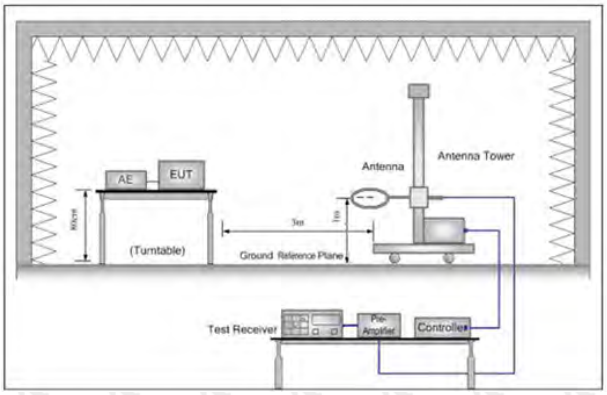



Figure 1. Below 30MHz

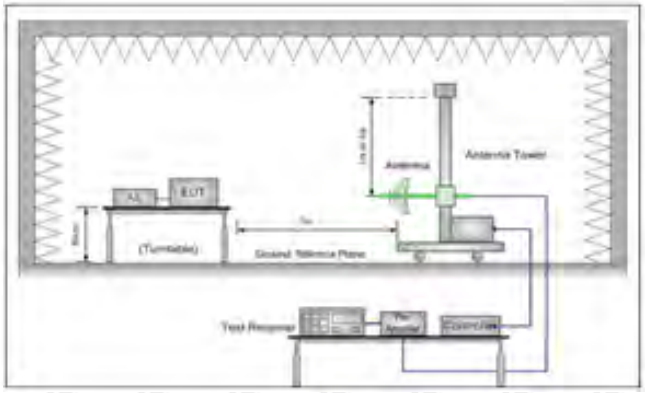


Figure 2. 30MHz to 1GHz

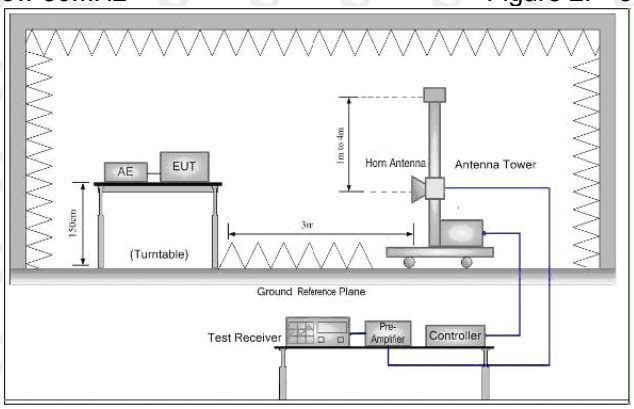



Figure 3. Above 1GHz

### 7.2 Limit

Spurious Emissions:

| Frequency | Field strength (microvolt/meter) | Limit (dBμV/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 camber. 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

i.Repeat above procedures until all frequencies measured was complete.

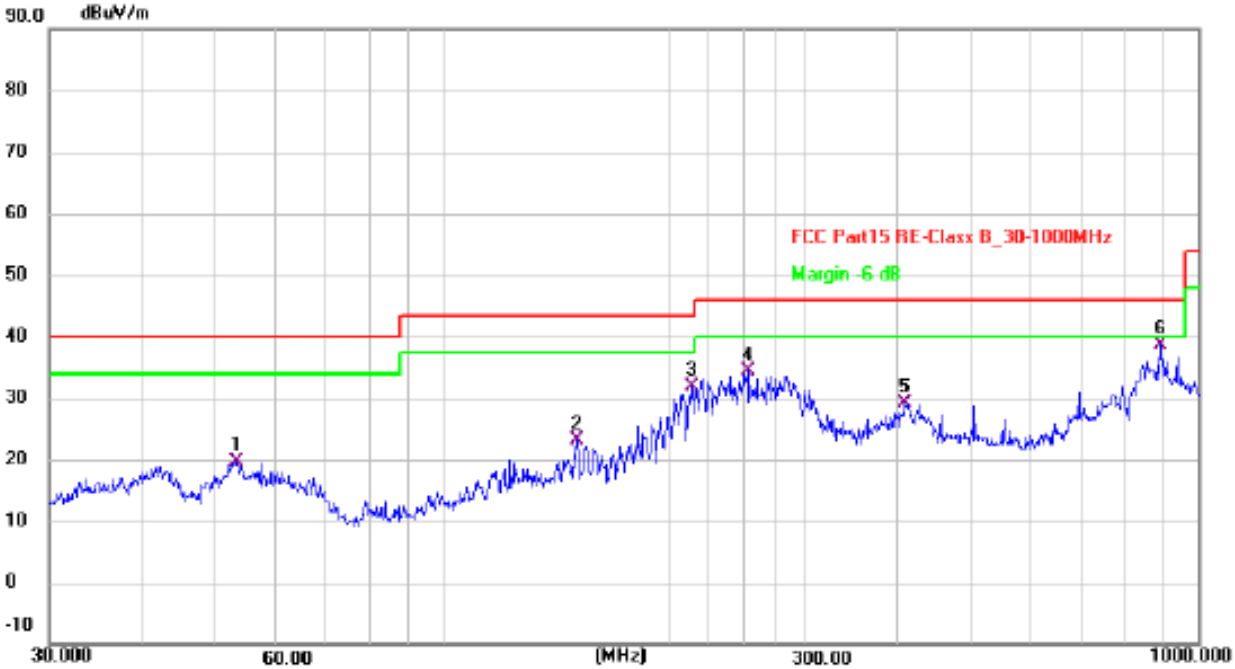
.

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

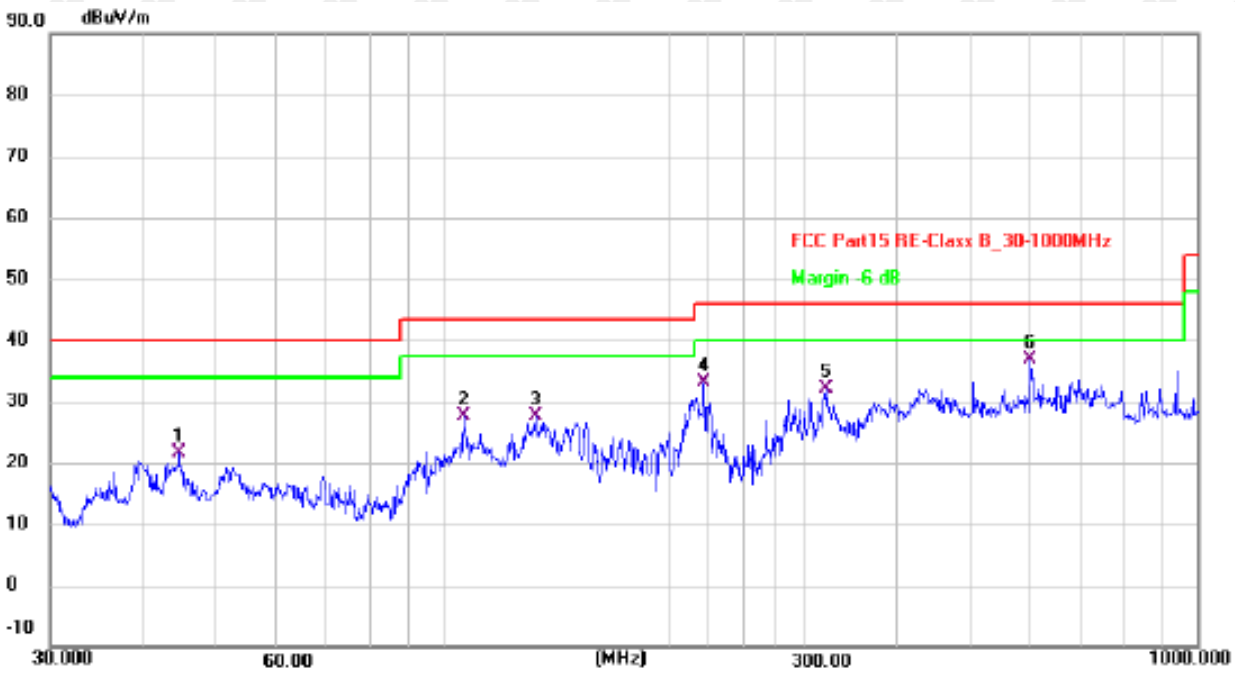
Below 1GHz Test Results:
Antenna polarity: H




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 53.1313 | 34.87 | -15.33 | 19.54 | 40.00 | -20.46 | QP |
| 2 | 150.0107 | 35.63 | -12.54 | 23.09 | 43.50 | -20.41 | QP |
| 3 | 213.0150 | 48.06 | -16.16 | 31.90 | 43.50 | -11.60 | QP |
| 4 | 252.9481 | 49.79 | -15.49 | 34.30 | 46.00 | -11.70 | QP |
| 5 | 408.9460 | 40.39 | -11.22 | 29.17 | 46.00 | -16.83 | QP |
| 6 * | 890.7277 | 37.53 | 1.16 | 38.69 | 46.00 | -7.31 | QP |

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

Antenna polarity: V




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 44.5867 | 35.97 | -14.39 | 21.58 | 40.00 | -18.42 | QP |
| 2 | 106.0126 | 44.60 | -16.95 | 27.65 | 43.50 | -15.85 | QP |
| 3 | 132.2204 | 42.02 | -14.36 | 27.66 | 43.50 | -15.84 | QP |
| 4 | 221.3920 | 49.24 | -16.04 | 33.20 | 46.00 | -12.80 | QP |
| 5 | 322.1884 | 44.68 | -12.67 | 32.01 | 46.00 | -13.99 | QP |
| 6 * | 599.3211 | 42.23 | -5.36 | 36.87 | 46.00 | -9.13 | 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: 802.11b low channel (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: 802.11b low channel (the worst)
3. After pre-scanning three directions, the report recorded the worst case Test Mode: 802.11b low channel (the worst)

Above 1 GHz Test Results:

ANT1 LOW CH1 (802.11b Mode)/2412

Horizontal:

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|
| 4824 | 63.69 | -3.64 | 60.05 | 74 | -13.95 | peak |
| 4824 | 50.94 | -3.64 | 47.30 | 54 | -6.70 | AVG |
| 7236 | 57.98 | -0.95 | 57.03 | 74 | -16.97 | peak |
| 7236 | 43.79 | -0.95 | 42.84 | 54 | -11.16 | 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 |
|---|---|---|---|---|---|---|
| 4824 | 66.10 | -3.64 | 62.46 | 74 | -11.54 | peak |
| 4824 | 46.87 | -3.64 | 43.23 | 54 | -10.77 | AVG |
| 7236 | 56.54 | -0.95 | 55.59 | 74 | -18.41 | peak |
| 7236 | 45.52 | -0.95 | 44.57 | 54 | -9.43 | AVG |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission le Margin = Emission level - Limits | | | | | | |

ANT1 MID CH6 (802.11b Mode)/2437

Horizontal:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|---|---|---|---|---|---|---|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 4874 | 65.11 | -3.51 | 61.60 | 74 | -12.40 | peak |
| 4874 | 49.24 | -3.51 | 45.73 | 54 | -8.27 | AVG |
| 7311 | 58.27 | -0.82 | 57.45 | 74 | -16.55 | peak |
| 7311 | 43.00 | -0.82 | 42.18 | 54 | -11.82 | AVG |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission le Margin = Emission level - Limits | | | | | | |

Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|---|---|---|---|---|---|---|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 4874 | 65.24 | -3.51 | 61.73 | 74 | -12.27 | peak |
| 4874 | 49.57 | -3.51 | 46.06 | 54 | -7.94 | AVG |
| 7311 | 60.48 | -0.82 | 59.66 | 74 | -14.34 | peak |
| 7311 | 42.66 | -0.82 | 41.84 | 54 | -12.16 | AVG |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission le Margin = Emission level - Limits | | | | | | |

ANT1 HIGH CH11 (802.11b Mode)/2462

Horizontal:

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|
| 4924 | 63.79 | -3.43 | 60.36 | 74 | -13.64 | peak |
| 4924 | 46.22 | -3.43 | 42.79 | 54 | -11.21 | AVG |
| 7386 | 59.72 | -0.75 | 58.97 | 74 | -15.03 | peak |
| 7386 | 42.46 | -0.75 | 41.71 | 54 | -12.29 | AVG |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission le Margin = Emission level - Limits | | | | | | |

Vertical:

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|
| 4924 | 63.02 | -3.43 | 59.59 | 74 | -14.41 | peak |
| 4924 | 48.37 | -3.43 | 44.94 | 54 | -9.06 | AVG |
| 7386 | 58.86 | -0.75 | 58.11 | 74 | -15.89 | peak |
| 7386 | 43.05 | -0.75 | 42.30 | 54 | -11.70 | AVG |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission le Margin = Emission level - Limits | | | | | | |

Remark:
(1). Measuring frequencies from 9KHz to the 25 GHz. The test range is 9K ~10 times the main wave, and other spurious below the limit of 20dB will not be reflected in the report
(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.

ANT1 LOW CH1 (802.11g Mode)/2412

Horizontal:

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|
| 4824 | 66.59 | -3.64 | 62.95 | 74 | -11.05 | peak |
| 4824 | 50.42 | -3.64 | 46.78 | 54 | -7.22 | AVG |
| 7236 | 56.87 | -0.95 | 55.92 | 74 | -18.08 | peak |
| 7236 | 44.64 | -0.95 | 43.69 | 54 | -10.31 | 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) | Detecto Type |
|---|---|---|---|---|---|---|
| 4824 | 66.35 | -3.64 | 62.71 | 74 | -11.29 | peak |
| 4824 | 49.50 | -3.64 | 45.86 | 54 | -8.14 | AVG |
| 7236 | 56.15 | -0.95 | 55.20 | 74 | -18.80 | peak |
| 7236 | 45.77 | -0.95 | 44.82 | 54 | -9.18 | AVG |

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

ANT1 MID CH6 (802.11g Mode)/2437

Horizontal:

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|
| 4874 | 65.33 | -3.51 | 61.82 | 74 | -12.18 | peak |
| 4874 | 47.97 | -3.51 | 44.46 | 54 | -9.54 | AVG |
| 7311 | 58.17 | -0.82 | 57.35 | 74 | -16.65 | peak |
| 7311 | 43.93 | -0.82 | 43.11 | 54 | -10.89 | AVG |

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

Vertical:

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|
| 4874 | 63.89 | -3.51 | 60.38 | 74 | -13.62 | peak |
| 4874 | 48.51 | -3.51 | 45.00 | 54 | -9.00 | AVG |
| 7311 | 58.44 | -0.82 | 57.62 | 74 | -16.38 | peak |
| 7311 | 43.72 | -0.82 | 42.90 | 54 | -11.10 | AVG |

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

ANT1 HIGH CH11 (802.11g Mode)/2462

Horizontal:

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|
| 4924 | 64.14 | -3.43 | 60.71 | 74 | -13.29 | peak |
| 4924 | 48.40 | -3.43 | 44.97 | 54 | -9.03 | AVG |
| 7386 | 59.80 | -0.75 | 59.05 | 74 | -14.95 | peak |
| 7386 | 44.29 | -0.75 | 43.54 | 54 | -10.46 | AVG |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission le Margin = Emission level - Limits | | | | | | |

Vertical:

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|
| 4924 | 65.32 | -3.43 | 61.89 | 74 | -12.11 | peak |
| 4924 | 46.86 | -3.43 | 43.43 | 54 | -10.57 | AVG |
| 7386 | 56.35 | -0.75 | 55.60 | 74 | -18.40 | peak |
| 7386 | 42.06 | -0.75 | 41.31 | 54 | -12.69 | AVG |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission le Margin = Emission level - Limits | | | | | | |

Remark:
(1). Measuring frequencies from 9KHz to the 25 GHz. The test range is 9K ~10 times the main wave, and other spurious below the limit of 20dB will not be reflected in the report
(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.

Above 1GHz ANT1+ANT2 :

LOW CH1 (802.11n/H20 Mode)/2412

Horizontal:

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|
| 4824 | 64.26 | -3.64 | 60.62 | 74 | -13.38 | peak |
| 4824 | 50.68 | -3.64 | 47.04 | 54 | -6.96 | AVG |
| 7236 | 57.14 | -0.95 | 56.19 | 74 | -17.81 | peak |
| 7236 | 44.49 | -0.95 | 43.54 | 54 | -10.46 | 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) | Detecto Type |
|---|---|---|---|---|---|---|
| 4824 | 66.31 | -3.64 | 62.67 | 74 | -11.33 | peak |
| 4824 | 47.18 | -3.64 | 43.54 | 54 | -10.46 | AVG |
| 7236 | 57.08 | -0.95 | 56.13 | 74 | -17.87 | peak |
| 7236 | 45.21 | -0.95 | 44.26 | 54 | -9.74 | AVG |

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

LOW CH1 (802.11n/H20 Mode)/2437

Horizontal:

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|
| 4874 | 65.29 | -3.51 | 61.78 | 74 | -12.22 | peak |
| 4874 | 48.09 | -3.51 | 44.58 | 54 | -9.42 | AVG |
| 7311 | 58.90 | -0.82 | 58.08 | 74 | -15.92 | peak |
| 7311 | 43.58 | -0.82 | 42.76 | 54 | -11.24 | AVG |

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

Vertical:

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|
| 4874 | 63.80 | -3.51 | 60.29 | 74 | -13.71 | peak |
| 4874 | 48.96 | -3.51 | 45.45 | 54 | -8.55 | AVG |
| 7311 | 59.87 | -0.82 | 59.05 | 74 | -14.95 | peak |
| 7311 | 42.94 | -0.82 | 42.12 | 54 | -11.88 | AVG |

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

LOW CH1 (802.11n/H20 Mode)/2462

Horizontal:

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|
| 4924 | 64.32 | -3.43 | 60.89 | 74 | -13.11 | peak |
| 4924 | 45.88 | -3.43 | 42.45 | 54 | -11.55 | AVG |
| 7386 | 58.94 | -0.75 | 58.19 | 74 | -15.81 | peak |
| 7386 | 45.20 | -0.75 | 44.45 | 54 | -9.55 | AVG |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission le Margin = Emission level - Limits | | | | | | |

Vertical:

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|
| 4924 | 64.78 | -3.43 | 61.35 | 74 | -12.65 | peak |
| 4924 | 48.11 | -3.43 | 44.68 | 54 | -9.32 | AVG |
| 7386 | 59.17 | -0.75 | 58.42 | 74 | -15.58 | peak |
| 7386 | 41.43 | -0.75 | 40.68 | 54 | -13.32 | AVG |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission le Margin = Emission level - Limits | | | | | | |

Remark:
(1). Measuring frequencies from 9KHz to the 25 GHz. The test range is 9K ~10 times the main wave, and other spurious below the limit of 20dB will not be reflected in the report
(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.

**Restricted bands around fundamental frequency (Radiated)**

Operation Mode:

ANT 1 802.11b Mode TX CH Low (2412MHz)

Horizontal

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|
| 2390 | 57.96 | -5.81 | 52.15 | 74 | -21.85 | peak |
| 2390 | / | -5.81 | / | 54 | / | AVG |
| 2399 | 64.52 | -5.84 | 58.68 | 74 | -15.32 | peak |
| 2399 | 49.91 | -5.84 | 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 |
|---|---|---|---|---|---|---|
| 2390 | 56.74 | -5.81 | 50.93 | 74 | -23.07 | peak |
| 2390 | / | -5.81 | / | 54 | / | AVG |
| 2399 | 61.91 | -5.84 | 56.07 | 74 | -17.93 | peak |
| 2399 | 46.57 | -5.84 | 40.73 | 54 | -13.27 | AVG |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits | | | | | | |

When the peak value is smaller than the AVG limit, AVG is not reflected.

Operation Mode:

ANT1 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 | 56.10 | -5.65 | 50.45 | 74 | -23.55 | 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 | 56.19 | -5.65 | 50.54 | 74 | -23.46 | 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:

ANT1 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 | 59.02 | -5.81 | 53.21 | 74 | -20.79 | peak |
| 2390 | / | -5.81 | / | 54 | / | AVG |
| 2399 | 61.53 | -5.84 | 55.69 | 74 | -18.31 | peak |
| 2399 | 45.79 | -5.84 | 39.95 | 54 | -14.05 | 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 | 56.72 | -5.81 | 50.91 | 74 | -23.09 | peak |
| 2390 | / | -5.81 | / | 54 | / | AVG |
| 2399 | 61.78 | -5.84 | 55.94 | 74 | -18.06 | peak |
| 2399 | 46.58 | -5.84 | 40.74 | 54 | -13.26 | AVG |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits | | | | | | |

Operation Mode:

ANT1 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 | 56.85 | -5.65 | 51.20 | 74 | -22.80 | 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 | 57.16 | -5.65 | 51.51 | 74 | -22.49 | 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:

ANT1+ANT2 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 | 56.90 | -5.81 | 51.09 | 74 | -22.91 | peak |
| 2390 | / | -5.81 | / | 54 | / | AVG |
| 2399 | 63.54 | -5.84 | 57.70 | 74 | -16.30 | peak |
| 2399 | 47.74 | -5.84 | 41.90 | 54 | -12.10 | 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 | 56.56 | -5.81 | 50.75 | 74 | -23.25 | peak |
| 2390 | / | -5.81 | / | 54 | / | AVG |
| 2399 | 60.56 | -5.84 | 54.72 | 74 | -19.28 | peak |
| 2399 | 48.05 | -5.84 | 42.21 | 54 | -11.79 | AVG |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits | | | | | | |

Operation Mode:

ANT1+ANT2 802.11n/H20 Mode TX CH High (2462MHz)

Horizontal

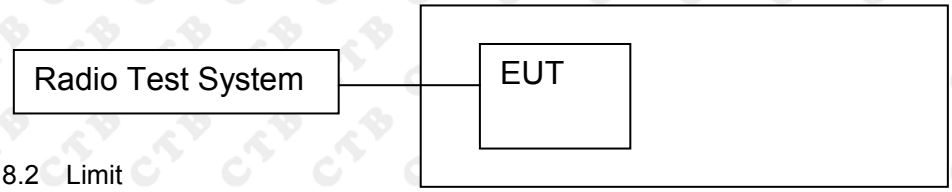
| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|---|---|---|---|---|---|---|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2483.5 | 56.31 | -5.65 | 50.66 | 74 | -23.34 | peak |
| 2483.5 | / | -5.65 | / | 54 | / | AVG |
| Remark: Factor = Antenna 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 | 56.00 | -5.65 | 50.35 | 74 | -23.65 | 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 COUNDUCTED SPURIOUS EMISSIONS

### 8.1 Block Diagram Of Test Setup




### 8.2 Limit

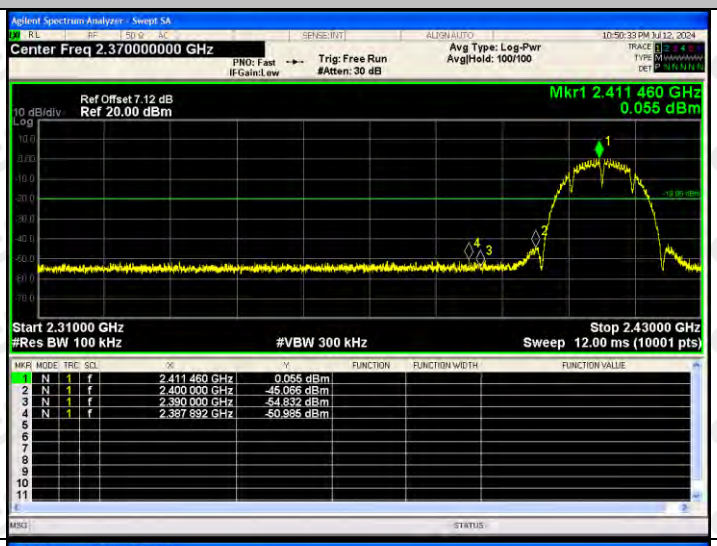
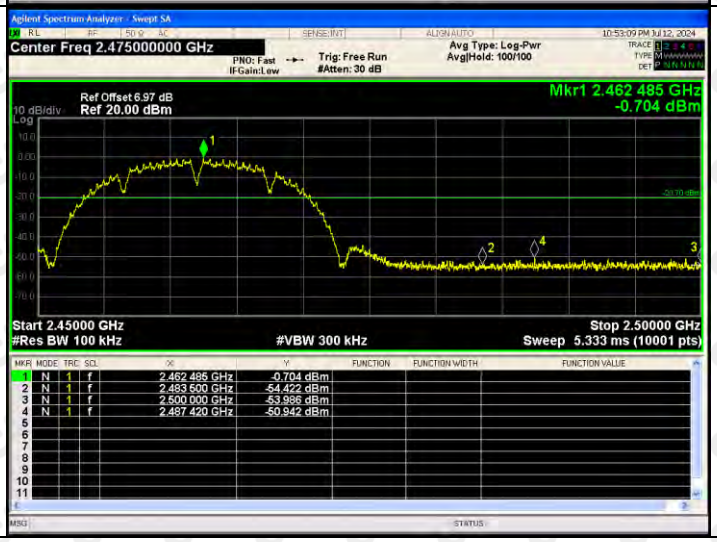
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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)).

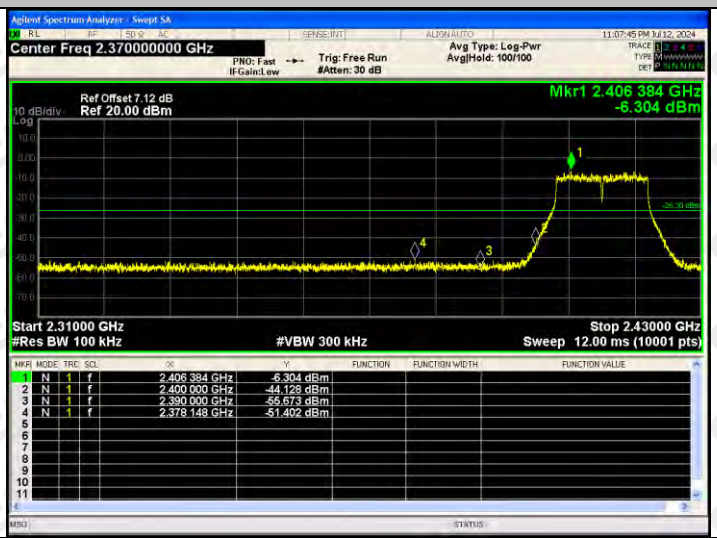
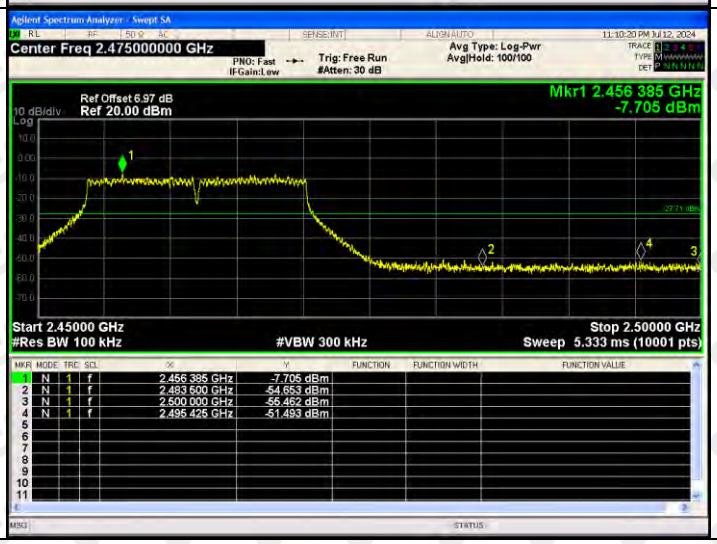
### 8.3 Test procedure

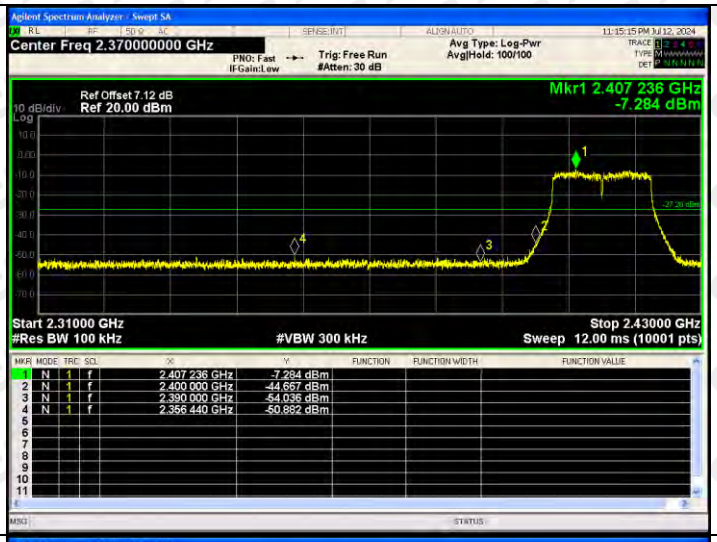
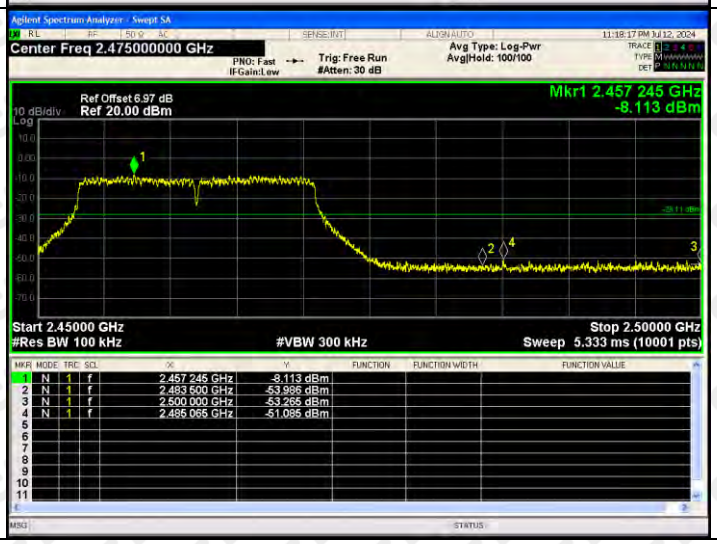
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer:
Blow 30MHz:
RBW = 100kHz, VBW = 300kHz, Sweep = auto
Detector function = peak, Trace = max hold
Above 30MHz:
RBW = 100KHz, VBW = 300KHz, Sweep = auto
Detector function = peak, Trace = max hold

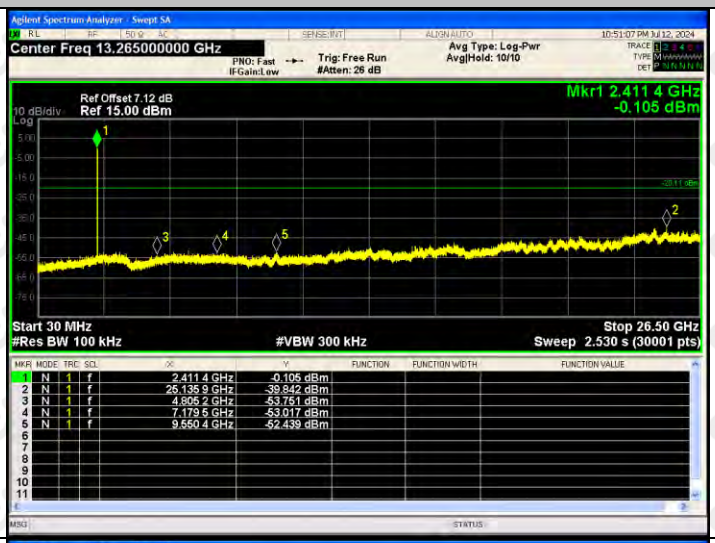
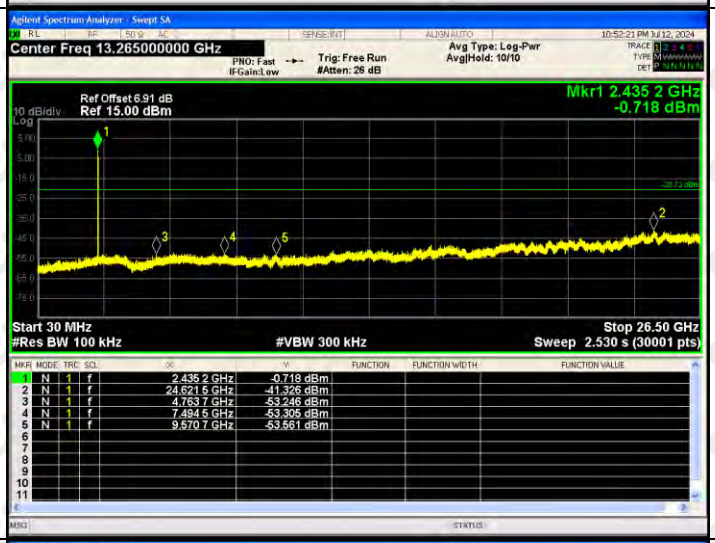
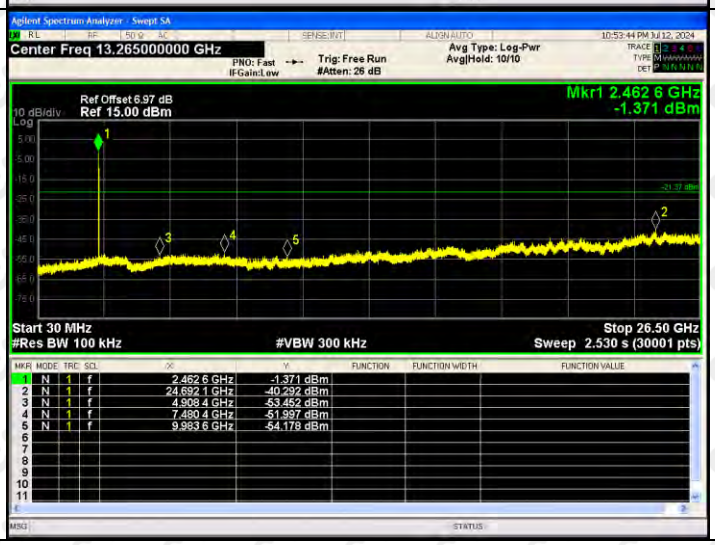
## 8.4 Test Result

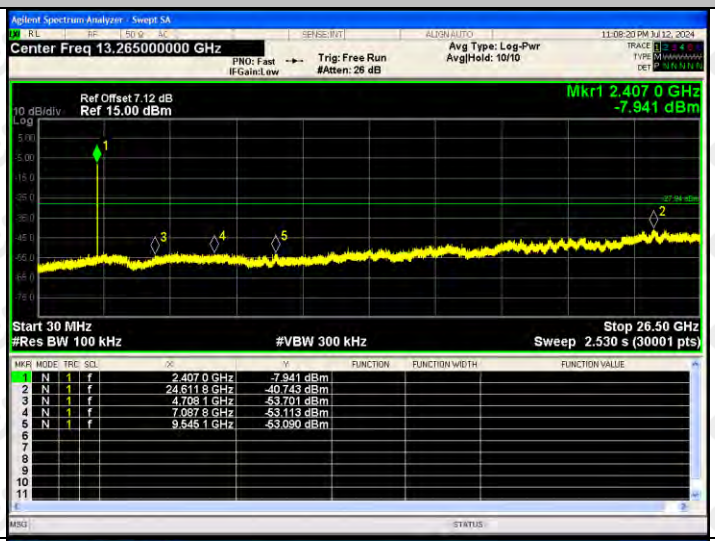
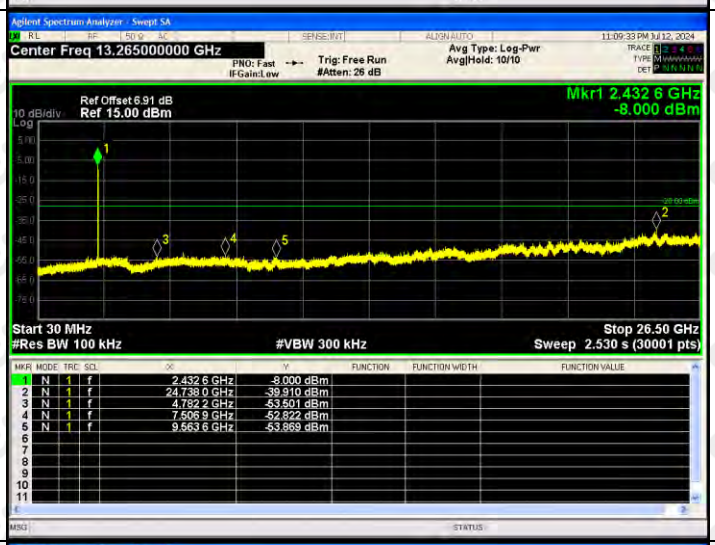
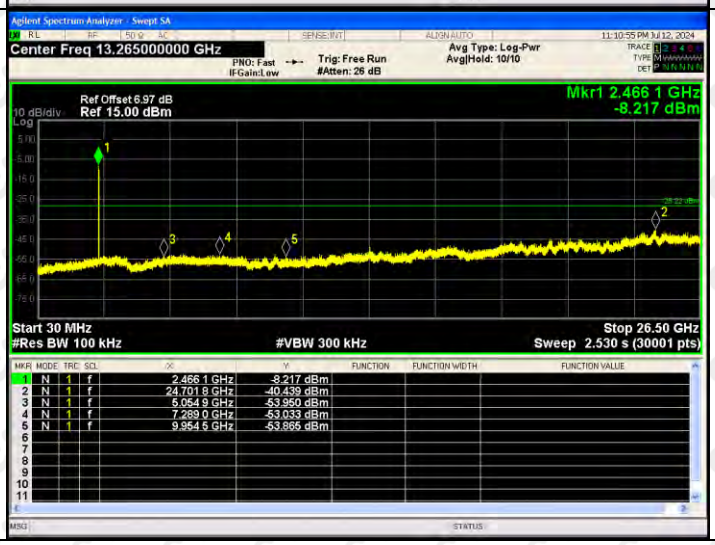
ANT1:

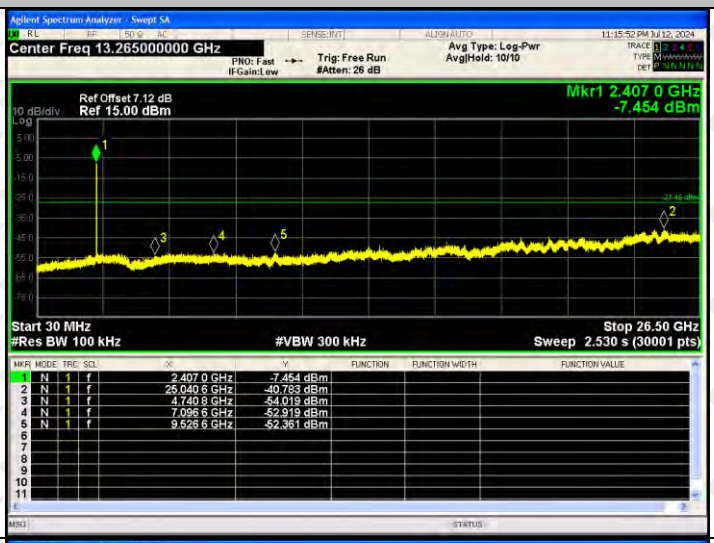
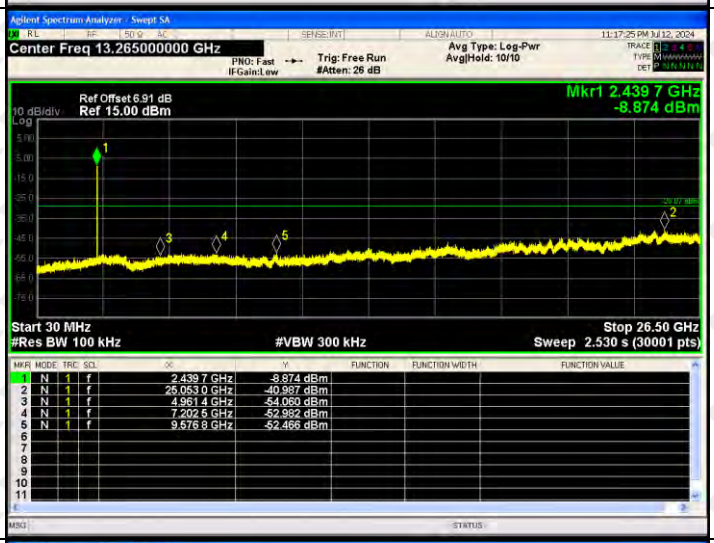
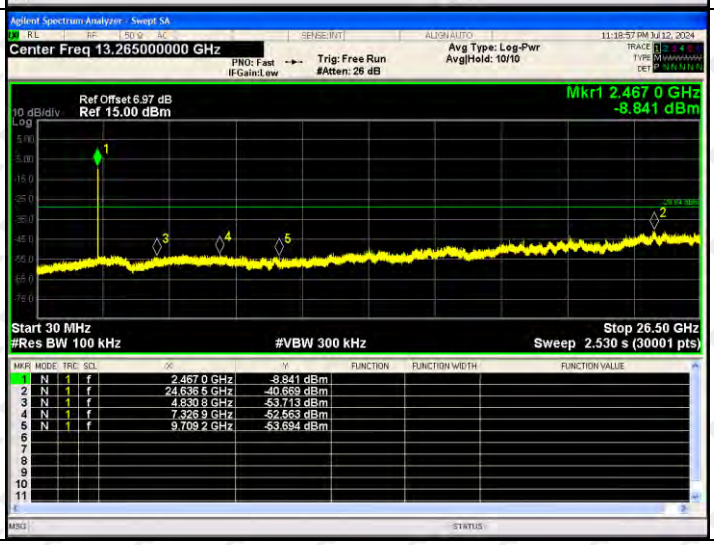
| BAND EDGE Graphs | | | |
|---|---|---|---|
| 802.11b/LCH | |  | |
| 802.11b/HCH | |  | |

| BAND EDGE Graphs | | | |
|---|---|---|---|
| 802.11g/LCH | |  | |
| 802.11g/HCH | |  | |

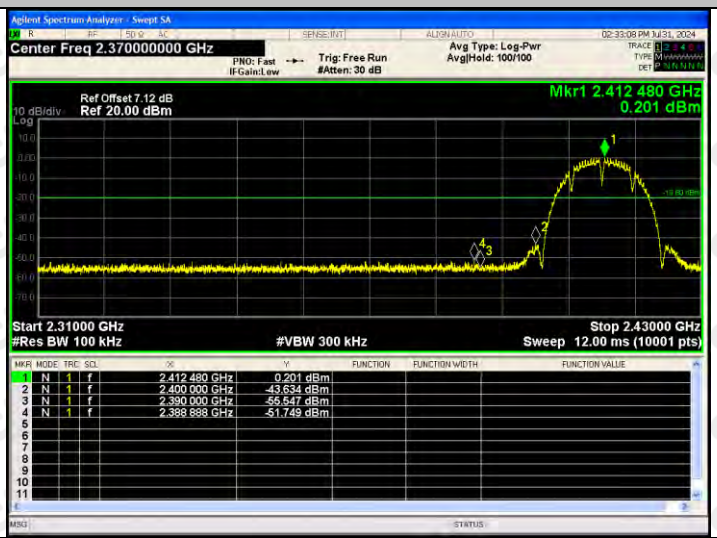
| | | | |
|---|---|---|---|
| 802.11n(HT20)/LCH | |  | |
| 802.11n(HT20)/HCH | |  | |

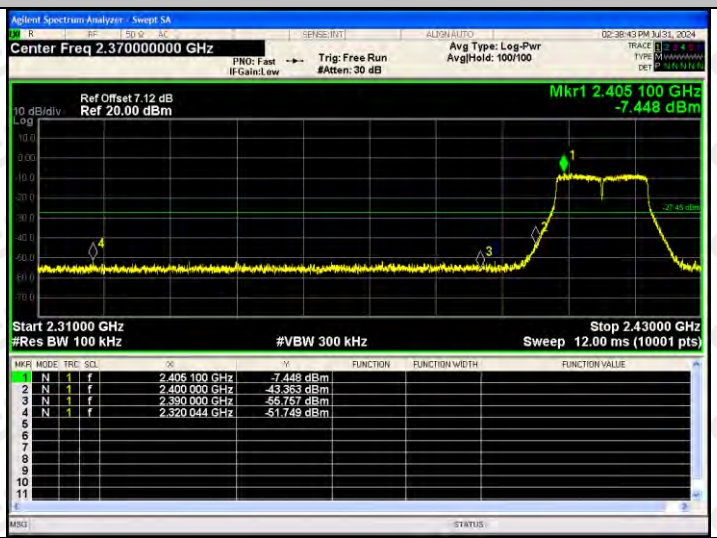
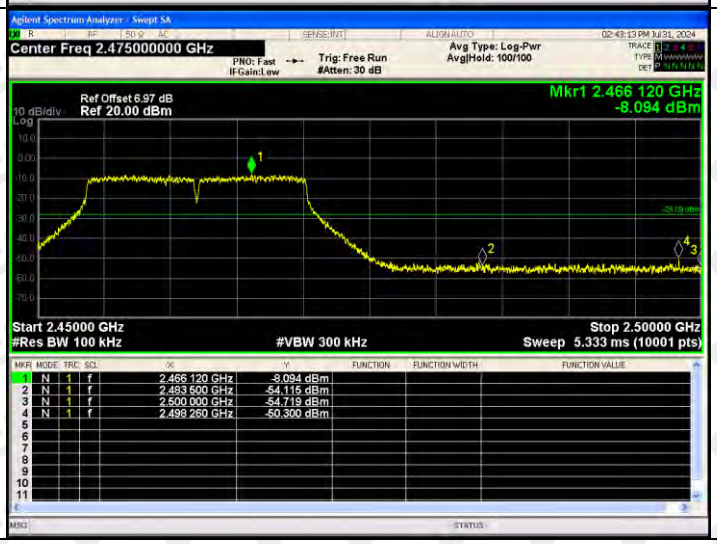
| RF Conducted Spurious Emissions Graphs | | | |
|---|---|---|---|
| 802.11b/LCH | |  | |
| 802.11b/MCH | |  | |
| 802.11b/HCH | |  | |

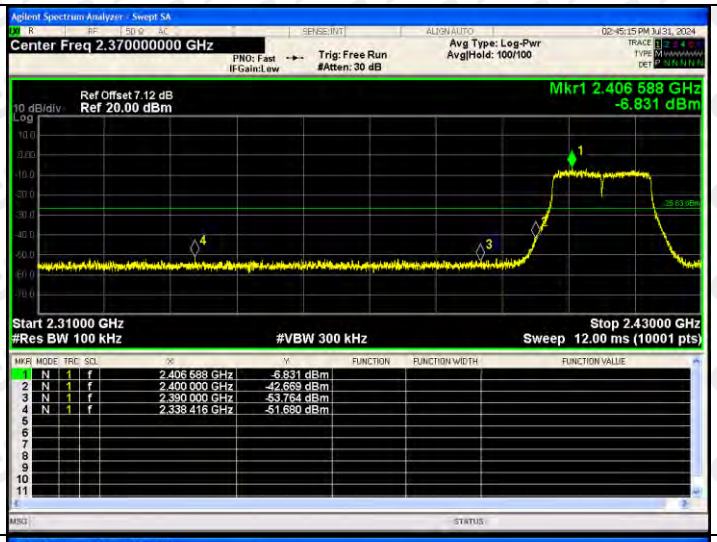
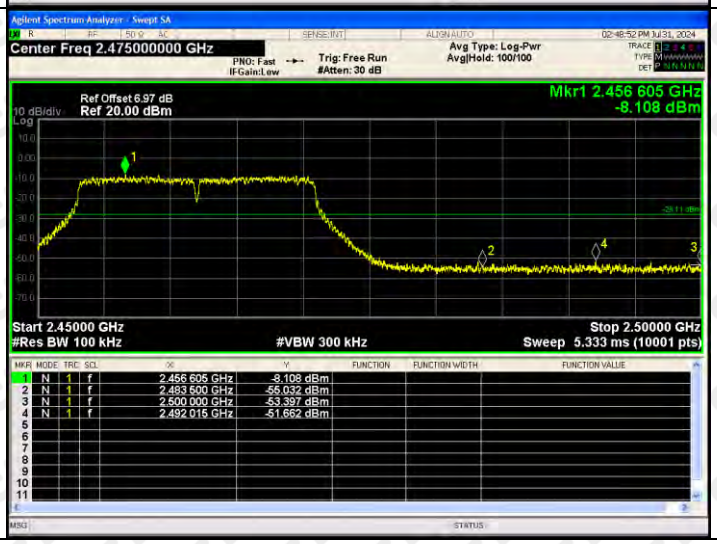
| RF Conducted Spurious Emissions Graphs | | | |
|---|---|---|---|
| 802.11g/LCH | |  | |
| 802.11g/MCH | |  | |
| 802.11g/HCH | |  | |

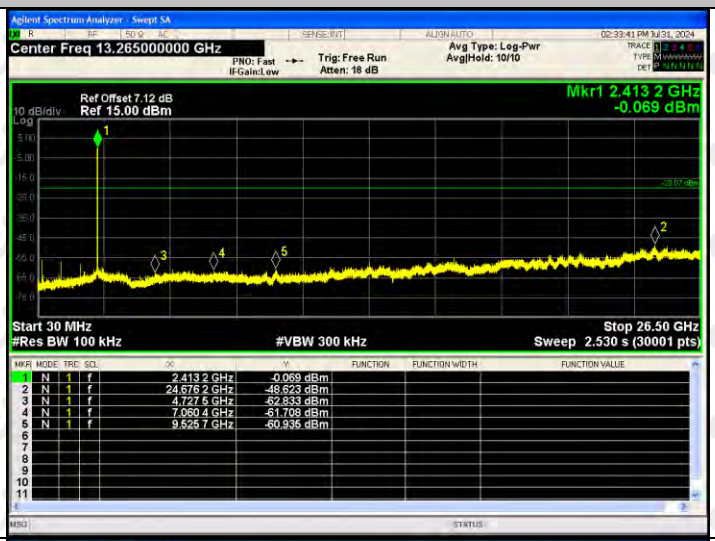
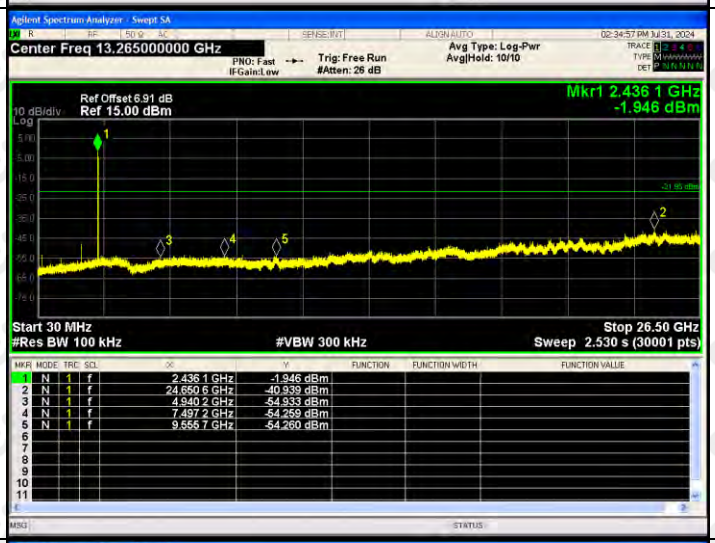
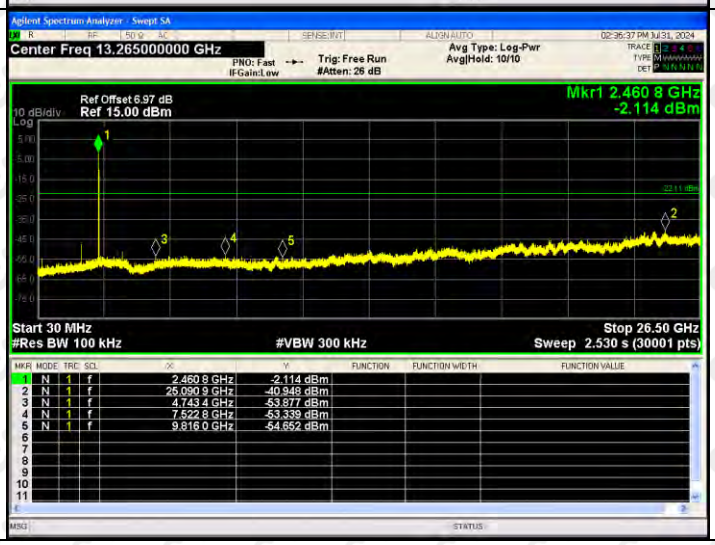
| RF Conducted Spurious Emissions Graphs | | | |
|---|---|---|---|
| 802.11n(HT20)/LCH | |  | |
| 802.11 n(HT20)/MCH | |  | |
| 802.11 n(HT20)/HCH | |  | |

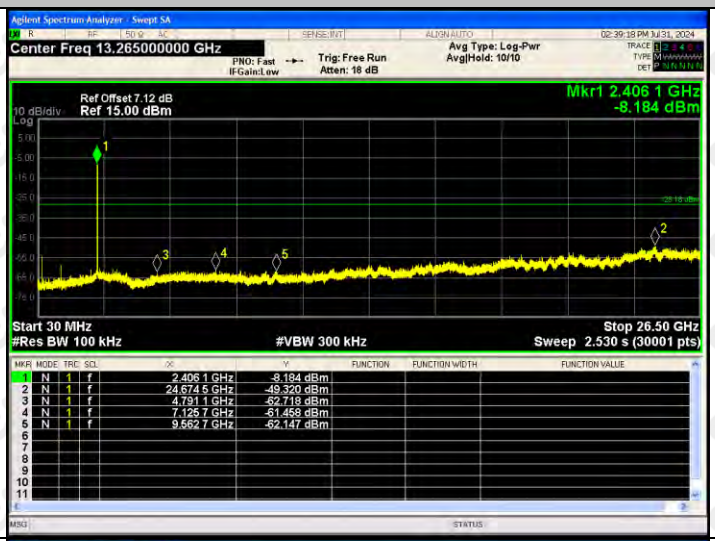
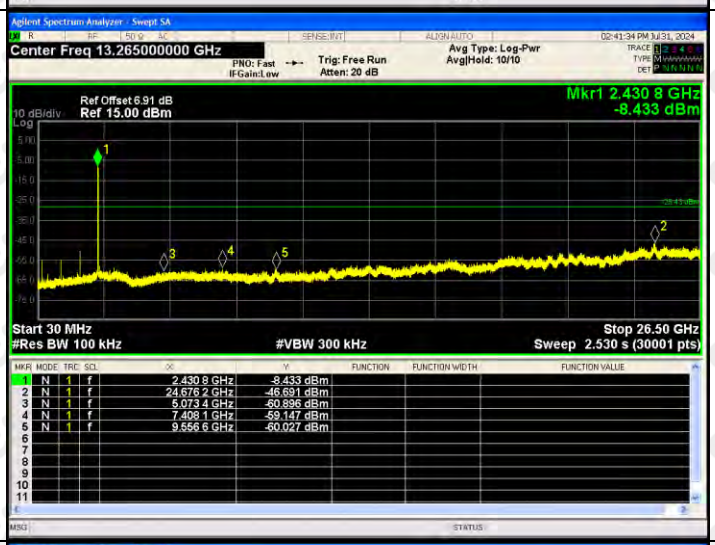
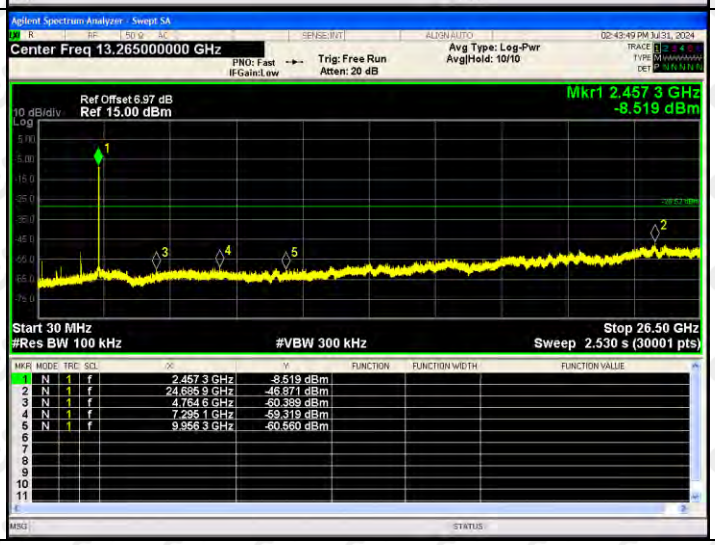
ANT2:

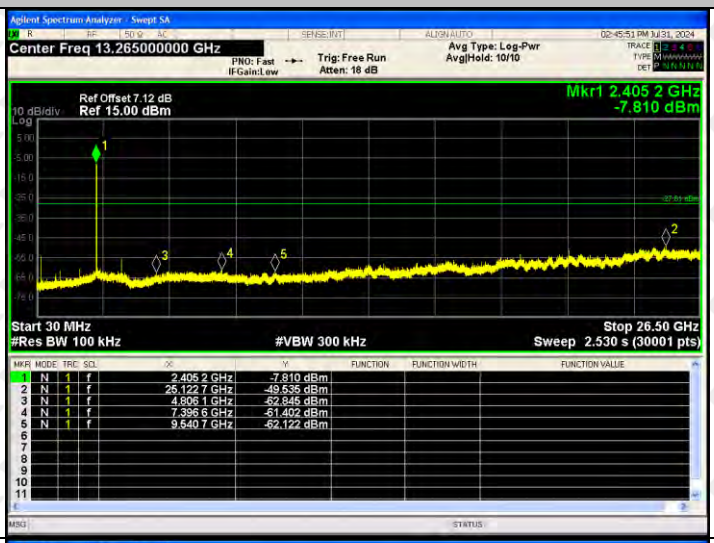
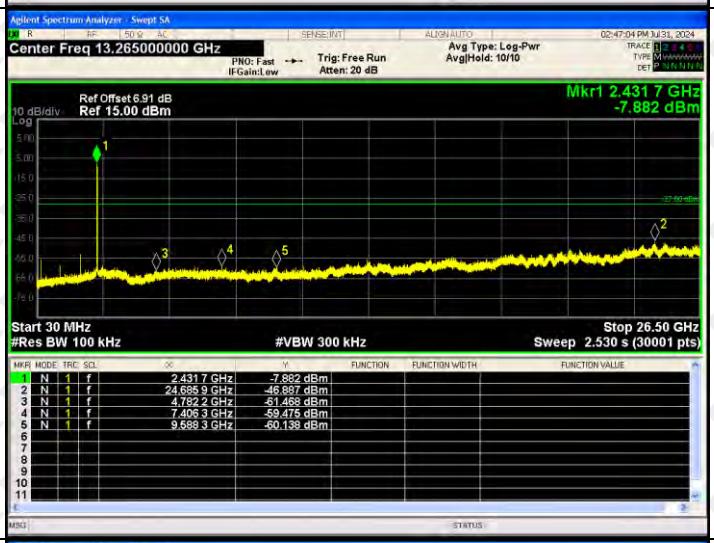
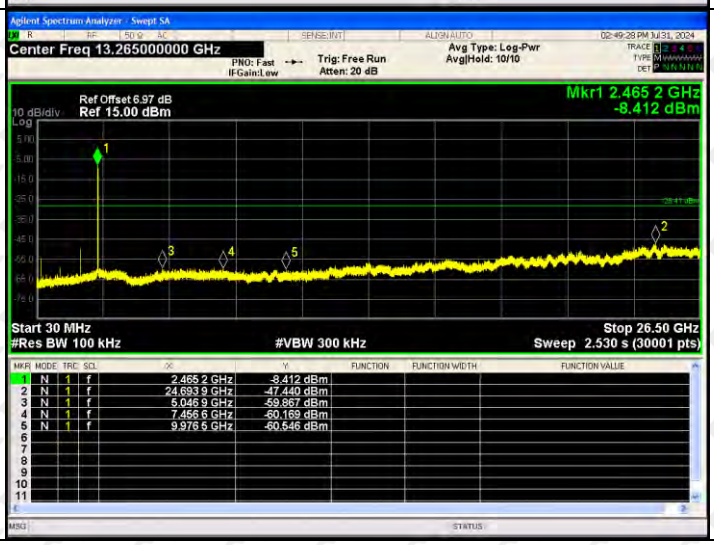
| BAND EDGE Graphs | | | |
|---|---|---|---|
| 802.11b/LCH | |  | |
| 802.11b/HCH | | | |

| BAND EDGE Graphs | | | |
|---|---|---|---|
| 802.11g/LCH | |  | |
| 802.11g/HCH | |  | |

| | | | |
|---|---|---|---|
| 802.11n(HT20)/LCH | |  | |
| 802.11n(HT20)/HCH | |  | |

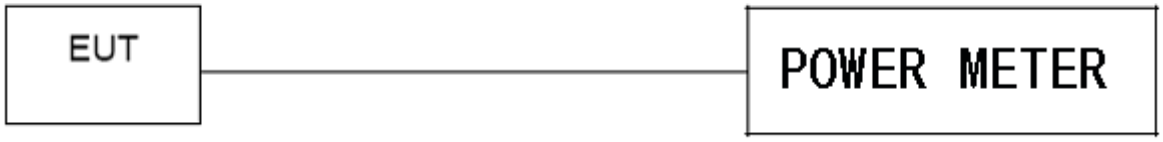
| RF Conducted Spurious Emissions Graphs | | | |
|---|---|---|---|
| 802.11b/LCH | |  | |
| 802.11b/MCH | |  | |
| 802.11b/HCH | |  | |

| RF Conducted Spurious Emissions Graphs | | | |
|---|---|---|---|
| 802.11g/LCH | |  | |
| 802.11g/MCH | |  | |
| 802.11g/HCH | |  | |

| RF Conducted Spurious Emissions Graphs | | | |
|---|---|---|---|
| 802.11n(HT20)/LCH | |  | |
| 802.11 n(HT20)/MCH | |  | |
| 802.11 n(HT20)/HCH | |  | |

## 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) | Maximum Conducted Output Power | 1 watt or 30dBm | 2400-2483.5 | PASS |

### 9.3 Test procedure

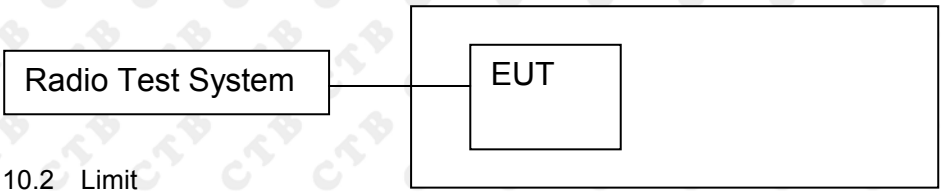
1. The EUT was directly connected to the Power meter

### 9.4 Test Result

| Mode | Channel. | Maximum Peak Power [dBm] ant 1 | Maximum Peak Power [dBm] ant 2 | Total Power Peak Output Power(dBm) | Limit[dBm] |
|---|---|---|---|---|---|
| 802.11b | LCH | 13.986 | 13.613 | / | 30 |
| | MCH | 12.717 | 12.387 | / | 30 |
| | HCH | 12.649 | 12.525 | / | 30 |
| 802.11g | LCH | 13.471 | 13.572 | / | 30 |
| | MCH | 12.236 | 13.176 | / | 30 |
| | HCH | 12.082 | 13.268 | / | 30 |
| 802.11n(HT20) | LCH | 13.038 | 14.432 | 16.801 | 30 |
| | MCH | 12.381 | 13.336 | 15.895 | 30 |
| | HCH | 12.127 | 13.443 | 15.845 | 30 |

## 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 | >= 500KHz (6dB bandwidth) | 2400-2483.5 | PASS |

### 10.3 Test procedure

1. Rem1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 x 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

ANT1:

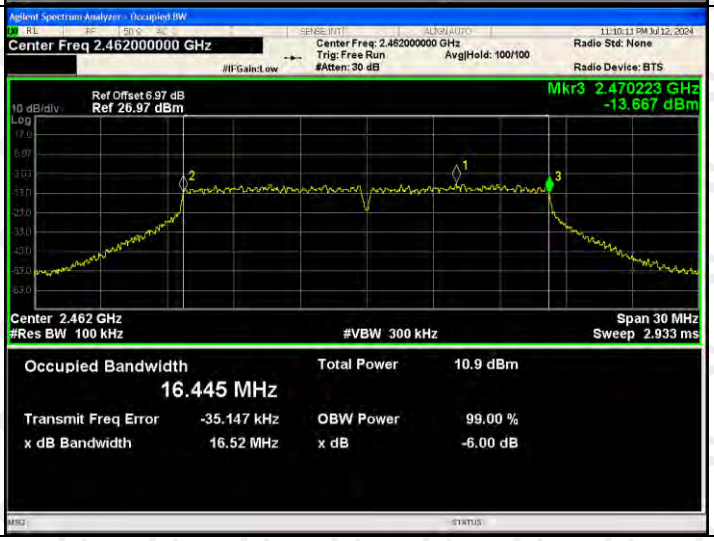
| Test Mode | Frequency | 6dB Bandwidth (MHz) | Limit(kHz) | Result |
|---|---|---|---|---|
| 802.11b | LCH | 10.122 | 500 | PASS |
| | MCH | 10.135 | 500 | PASS |
| | HCH | 10.083 | 500 | PASS |
| 802.11g | LCH | 16.485 | 500 | PASS |
| | MCH | 16.526 | 500 | PASS |
| | HCH | 16.516 | 500 | PASS |
| 802.11n(HT20) | LCH | 17.759 | 500 | PASS |
| | MCH | 17.758 | 500 | PASS |
| | HCH | 17.777 | 500 | PASS |

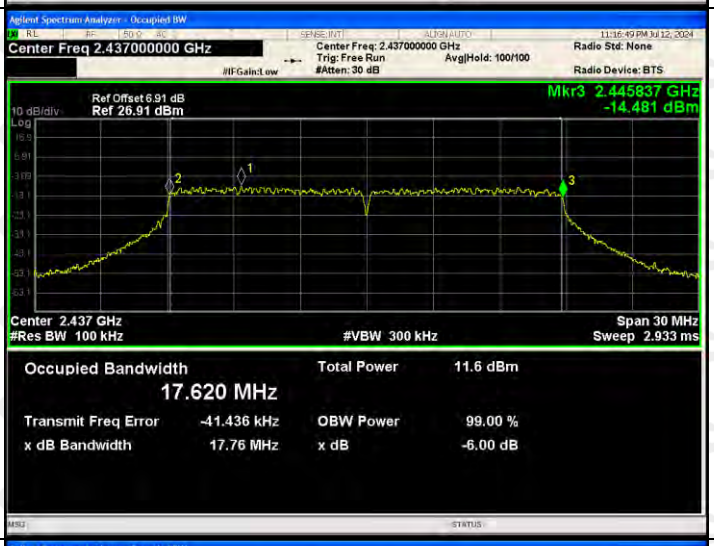
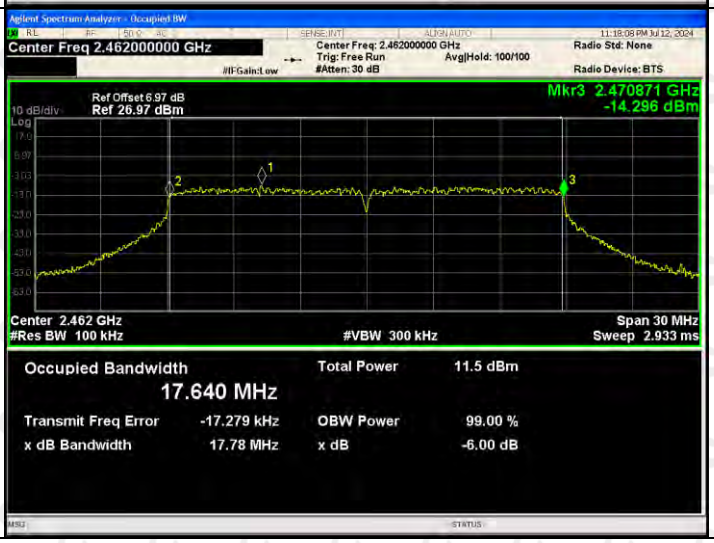
ANT2:

| Test Mode | Frequency | 6dB Bandwidth (MHz) | Limit(kHz) | Result |
|---|---|---|---|---|
| 802.11b | LCH | 10.127 | 500 | PASS |
| | MCH | 10.117 | 500 | PASS |
| | HCH | 10.124 | 500 | PASS |
| 802.11g | LCH | 16.534 | 500 | PASS |
| | MCH | 16.552 | 500 | PASS |
| | HCH | 16.549 | 500 | PASS |
| 802.11n(HT20) | LCH | 17.778 | 500 | PASS |
| | MCH | 17.676 | 500 | PASS |
| | HCH | 17.762 | 500 | PASS |

ANT1:
Test Graph:

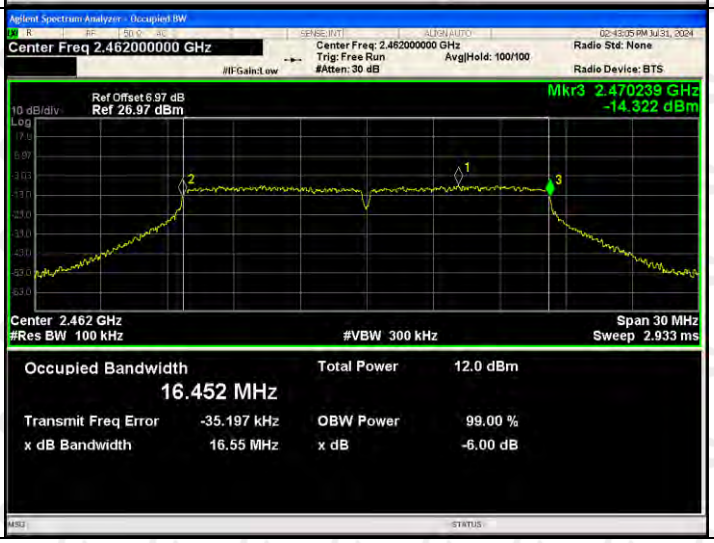
| Graphs | | | |
|---|---|---|---|
| 802.11b /LCH | | | |
| 802.11b /MCH | | | |
| 802.11b/HCH | | | |

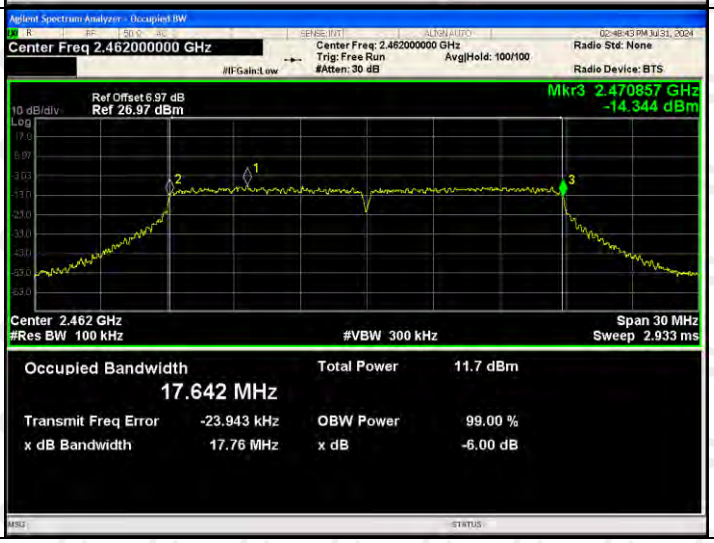
| | | | |
|---|---|---|---|
| 802.11g/LCH | | | |
| 802.11g/MCH | | | |
| 802.11g/HCH | |  | |

| | | | |
|---|---|---|---|
| 802.11n(HT20)/LCH | | | |
| 802.11n(HT20)/MCH | |  | |
| 802.11n(HT20)/HCH | |  | |

ANT2:
Test Graph:

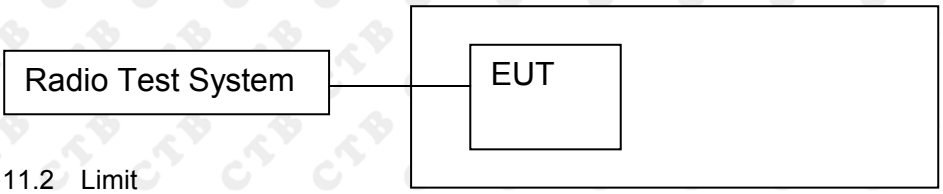
| Graphs | | | |
|---|---|---|---|
| 802.11b /LCH | | | |
| 802.11b /MCH | | | |
| 802.11b/HCH | | | |

| | | | |
|---|---|---|---|
| 802.11g/LCH | | | |
| 802.11g/MCH | | | |
| 802.11g/HCH | |  | |

| | | | |
|---|---|---|---|
| 802.11n(HT20)/LCH | | | |
| 802.11n(HT20)/MCH | | | |
| 802.11n(HT20)/HCH | |  | |

## 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

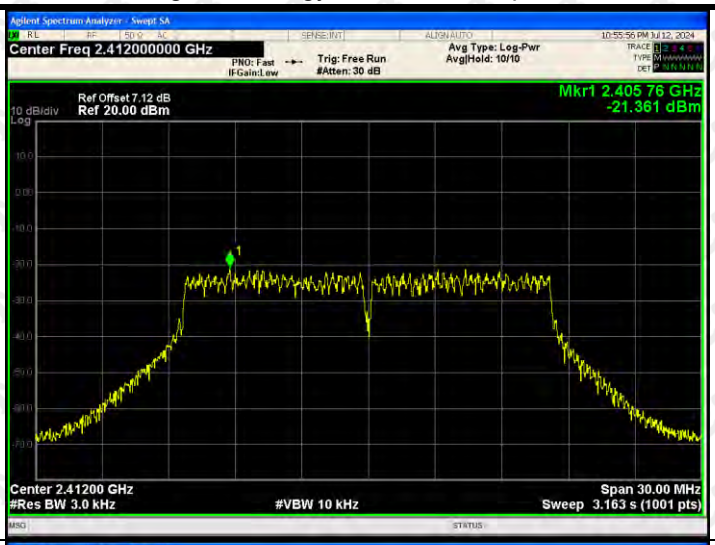
1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = PEAK.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the 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] ANT 1 | Power Spectral Density [dBm /3KHz]] ANT 2 | Power Spectral Density [dBm /3KHz]Total | Limit(dBm) |
|---|---|---|---|---|---|
| 802.11b | LCH | -14.007 | -15.807 | / | 8 |
| | MCH | -14.355 | -15.651 | / | 8 |
| | HCH | -14.521 | -15.554 | / | 8 |
| 802.11g | LCH | -21.361 | -19.264 | / | 8 |
| | MCH | -20.81 | -18.899 | / | 8 |
| | HCH | -21.273 | -18.876 | / | 8 |
| 802.11n(HT20) | LCH | -21.168 | -17.388 | -15.869 | 8 |
| | MCH | -21.81 | -19.675 | -17.602 | 8 |
| | HCH | -21.702 | -17.306 | -15.960 | 8 |

**ANT1:**
**Test Graph**

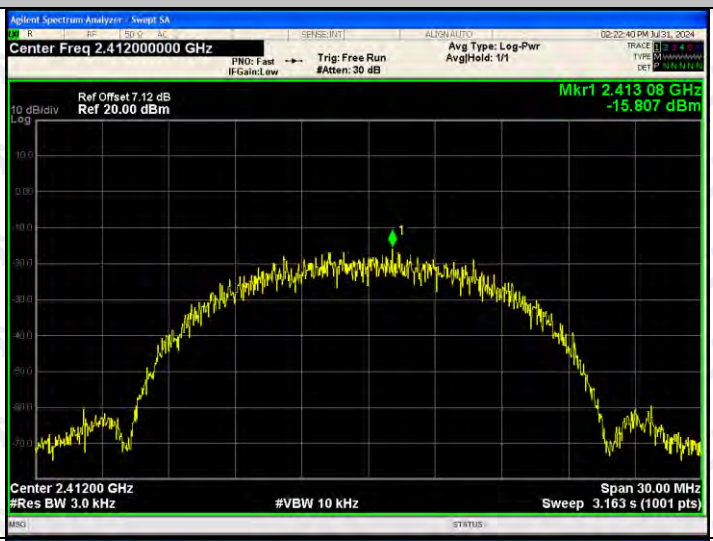
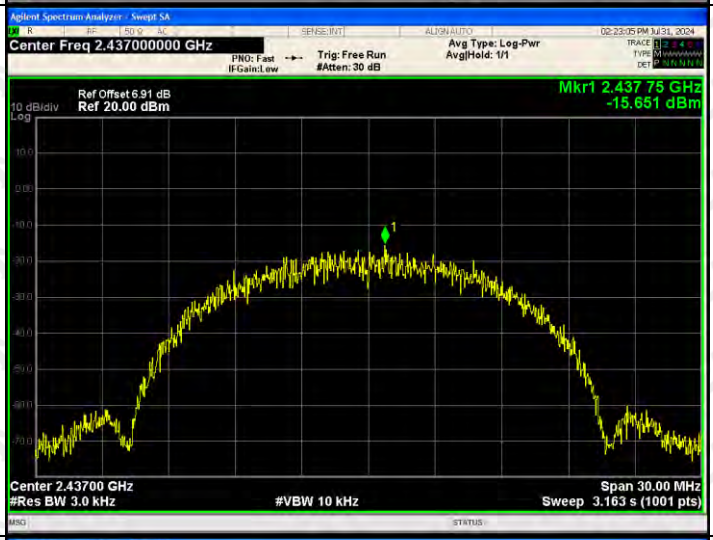
| Graphs | | | |
|---|---|---|---|
| 802.11b /LCH | | | |
| 802.11b /MCH | | | |
| 802.11b/HCH | | | |

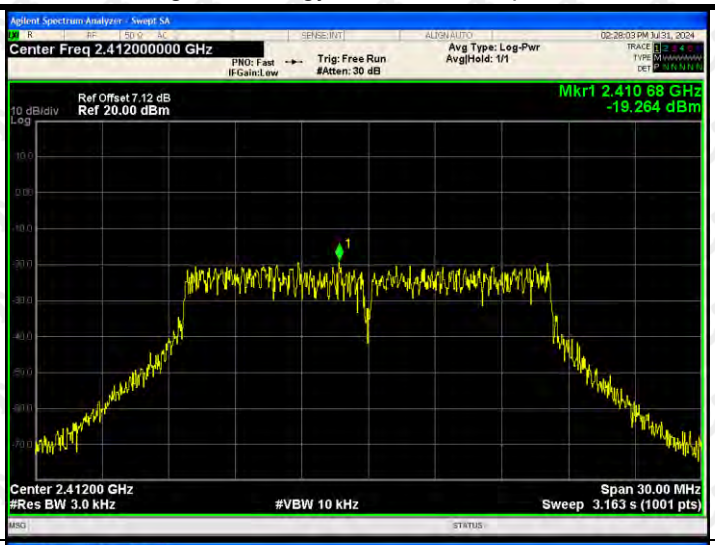
| | | | |
|---|---|---|---|
| 802.11g/LCH | |  | |
| 802.11g/MCH | | | |
| 802.11g/HCH | | | |

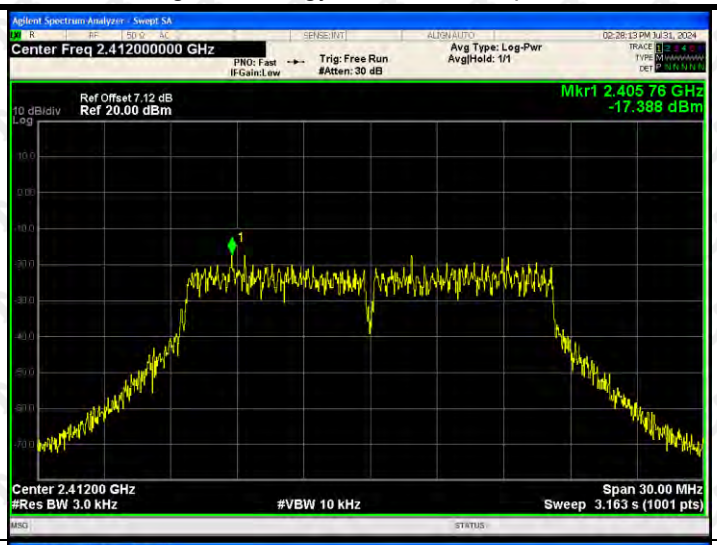
| | | | |
|---|---|---|---|
| 802.11n(HT20)/LCH | | | |
| 802.11n(HT20)/MCH | | | |
| 802.11n(HT20)/HCH | | | |

ANT2:

**Test Graph**

| Graphs | | | |
|---|---|---|---|
| 802.11b /LCH | |  | |
| 802.11b /MCH | |  | |
| 802.11b/HCH | | | |

| | | | |
|---|---|---|---|
| 802.11g/LCH | |  | |
| 802.11g/MCH | | | |
| 802.11g/HCH | | | |

| | | | |
|---|---|---|---|
| 802.11n(HT20)/LCH | |  | |
| 802.11n(HT20)/MCH | | | |
| 802.11n(HT20)/HCH | | | |

## 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.

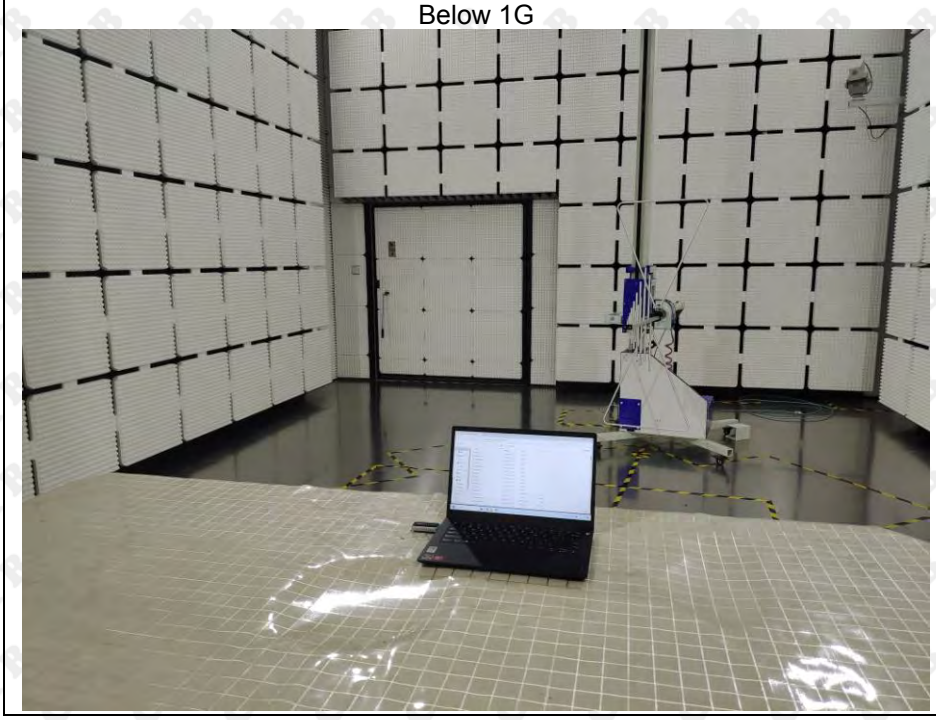
**EUT Antenna:**

The antenna is PCB antenna and no consideration of replacement. The best case gain of the antenna is ANT1: 2.28dBi, ANT2: 0.72dBi

## 13. EUT TEST SETUP PHOTOGRAPHS

Radiated Emission

Below 1G



Above 1G

Conducted Emission

※※※※※ **END OF REPORT** ※※※※※