# Radio Test Report

Report No.: STS2512529W02

Issued for

SHENZHEN ZHIBOTONG ELECTRONICS CO.,LTD.

Floor 4, Bldg. A2, Hedian Industrial Park, NO.9 Shijing Rd, Guanlan, Longhua District, Shenzhen, China

| | |
|---|---|
| Product Name: | 5G Wifi Router |
| Brand Name: | N/A |
| Model Name: | Z8102AX-A-M2-T |
| Series Model(s): | Z8102AX-M2-T,Z8102AX-PCIE-T,Z8102AX-M2-S,Z8102AX-M2-H,Z8103AX-C,Z8103AX-D,Z8103AX-E,Z8103AX-G,Z8107AX-S,Z8109AX-M2-T,Z8119AX-M2-T,Z8112AX-B |
| FCC ID: | 2AC47-Z8102AX |
| Test Standards: | FCC Part15.407 |

# TEST REPORT

| | |
|---|---|
| **Applicant's Name** | SHENZHEN ZHIBOTONG ELECTRONICS CO.,LTD. |
| Address | Floor 4, Bldg. A2, Hedian Industrial Park, NO.9 Shijing Rd, Guanlan, Longhua District, Shenzhen, China |
| **Manufacturer's Name** | SHENZHEN ZHIBOTONG ELECTRONICS CO.,LTD. |
| Address | Floor 4, Bldg. A2, Hedian Industrial Park, NO.9 Shijing Rd, Guanlan, Longhua District, Shenzhen, China |
| **Product Description** | |
| Product Name | 5G Wifi Router |
| Brand Name | N/A |
| Model Name | Z8102AX-A-M2-T |
| Series Model(s) | Z8102AX-M2-T,Z8102AX-PCIE-T,Z8102AX-M2-S,Z8102AX-M2-H, Z8103AX-C,Z8103AX-D,Z8103AX-E,Z8103AX-G,Z8107AX-S, Z8109AX-M2-T, Z8119AX-M2-T,Z8112AX-B |
| **Test Standards** | FCC Part15.407 |
| Test Procedure | ANSI C63.10-2020 |

This device described above has been tested by STS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.
The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Shenzhen STS Test Services Co., Ltd.

| | |
|---|---|
| **Date of Test** | |
| Date of receipt of test item | 2025-12-15 |
| Date (s) of performance of tests | 2025-12-15 to 2025-12-27 |
| Date of Issue | 2025-12-27 |
| Test Result | **Pass** |

Testing Engineer : Aaron Bu

(Aaron Bu)

Technical Manager : Skylar Li

(Skylar Li)

Authorized Signatory : Bovey Yang

(Bovey Yang)

SHENZHEN STS TEST SERVICES CO.,LTD. TESTING APPROVAL

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## Revision History

| Rev. | Issue Date | Report No. | Effect Page | Contents |
|---|---|---|---|---|
| 00 | 2025-12-27 | STS2512529W02 | ALL | Initial Issue |
| | | | | |

# 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:
§ 15.407,KDB 789033 D02 General U-NII Test Procedures New Rules v02r01

| FCC Part 15.407 | | |
|---|---|---|
| FCC standard | Test Item | Results |
| 15.207 | AC Conducted Emission | PASS |
| 15.407 (a) /15.407 (e) | 26dB/6dB &99% Bandwidth | PASS |
| 15.407(a) | Maximum Conducted Output Power | PASS |
| 15.407(b)/15.209 | Radiated Emission And (bandedge Emissions) Measurement | PASS |
| 15.407(a) | Power Spectral Density | PASS |
| 15.407(c) | Automatically Discontinue Transmission | PASS |
| 15.203/15.204 | Antenna Requirement | PASS |

Note:

(1) 'N/A' denotes test is not applicable in this Test Report.

(2) All tests are according to ANSI C63.10-2020.

## 1.1 TEST FACTORY

SHENZHEN STS TEST SERVICES CO., LTD
Add.: 101, Building B, Zhuoke Science Park, No.190 Chongqing Road, ZhanChengShequ, Fuhai Sub-District, Bao'an District, Shenzhen, Guang Dong, China
FCC test Firm Registration Number: 625569
IC test Firm Registration Number: 12108A
A2LA Certificate No.: 4338.01

## 1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y ± U**, where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**, providing a level of confidence of approximately **95** %.

| No. | Item | Uncertainty |
|---|---|---|
| 1 | RF output power, conducted | ±0.751dB |
| 2 | Unwanted Emissions, conducted | ±2.888dB |
| 3 | All emissions, radiated 9K-30MHz | ±2.48dB |
| 4 | All emissions, radiated 30M-1GHz | ±2.52dB |
| 5 | All emissions, radiated 1G-18GHz | ±3.48dB |
| 6 | All emissions, radiated>18GHz | ±4.18dB |
| 7 | Conducted Emission (9KHz-150KHz) | ±2.48dB |
| 8 | Conducted Emission (150KHz-30MHz) | ±2.52dB |
| 9 | Occupied Channel Bandwidth | ±3.6% |
| 10 | Power Spectral Density, conducted | ±1.214dB |
| 11 | Duty Cycle | ±3.2% |

## 2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

<table>
<tr><td>Product Name</td><td>5G Wifi Router</td></tr>
<tr><td>Brand Name</td><td>N/A</td></tr>
<tr><td>Model Name</td><td>Z8102AX-A-M2-T</td></tr>
<tr><td>Series Model(s)</td><td>Z8102AX-M2-T,Z8102AX-PCIE-T,Z8102AX-M2-S,Z8102AX-M2-H, Z8103AX-C,Z8103AX-D,Z8103AX-E,Z8103AX-G,Z8107AX-S, Z8109AX-M2-T, Z8119AX-M2-T,Z8112AX-B</td></tr>
<tr><td>Model Difference</td><td>Only the model is different, the motherboard and the circuit are the same.</td></tr>
<tr><td>Product Description</td><td>The EUT is 5G Wifi Router
<table>
<tr><td>Operation Frequency:</td><td>IEEE 802.11a/ n(HT20)/ac(VHT20)/ax(HE20): 5.745GHz-5.825GHz<br>IEEE 802.11n(HT40)/ac(VHT40)/ax(HE20): 5.755GHz-5.795GHz<br>IEEE 802.11ac(VHT80)/ax(HE80): 5.775GHz</td></tr>
<tr><td>Modulation Type:</td><td>802.11a(OFDM): BPSK,QPSK,16-QAM,64-QAM<br>802.11n(OFDM): BPSK,QPSK,16-QAM,64-QAM<br>802.11ac(OFDM): BPSK,QPSK,16-QAM,64-QAM,256-QAM<br>802.11ax(OFDM, OFDMA): BPSK,QPSK,16-QAM,64-QAM,256-QAM, 1024QAM</td></tr>
<tr><td>Antenna Type:</td><td>External antenna*2</td></tr>
<tr><td>Antenna Gain:</td><td>Antenna 1&2: 3.98dBi</td></tr>
</table>
More details of EUT technical specification, please refer to the User Manual.</td></tr>
<tr><td>Test Channel</td><td>Please refer to the Note 3.</td></tr>
<tr><td>Power Rating</td><td>DC 12V</td></tr>
<tr><td>Adapter</td><td>N/A</td></tr>
<tr><td>Battery</td><td>N/A</td></tr>
<tr><td>Hardware version number</td><td>N/A</td></tr>
<tr><td>Software version number</td><td>N/A</td></tr>
<tr><td>Connecting I/O Port(s)</td><td>Please refer to the Note 1.</td></tr>
</table>

Note

1. For a more detailed features description, please refer to the manufacturer's specifications or the User Manual.
2. The antenna details in this report are based on the manufacturer provided antenna specification documents and apply only to the tested sample identified herein.
   Any discrepancies in the antenna information may affect the accuracy of the test results, and the customer assumes responsibility for any related issues.

3.

| Operation Frequency of channel | |
|---|---|
| 5.745GHz-5.825GHz | |
| Channel | Frequency |
| 149 | 5745 |
| 151 | 5755 |
| 153 | 5765 |
| 155 | 5775 |
| 157 | 5785 |
| 159 | 5795 |
| 161 | 5805 |
| 165 | 5825 |

Note:
In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:
Carrier Frequency Channel

5GHz:

| For 802.11a/n(HT20)/ac(VHT20)/ax(HE20) | | | |
|---|---|---|---|
| Channel | Freq.(MHz) | Channel | Freq.(MHz) |
| 149 | 5745 | 157 | 5785 |
| 165 | 5825 | | |

| For 802.11 n(HT40)/ac(VHT40)/ax(HE40) | | | |
|---|---|---|---|
| Channel | Freq.(MHz) | Channel | Freq.(MHz) |
| 151 | 5755 | 159 | 5795 |

| For 802.11 ac(VHT80)/ax(HE80) | | | |
|---|---|---|---|
| Channel | Freq.(MHz) | Channel | Freq.(MHz) |
| 155 | 5775 | | |

4. KDB 662911 D01 Multiple Transmitter Output v02r01
2) Directional Gain Calculations for In-Band Measurements
a) Basic methodology with NANT transmit antennas, each with the same directional gain GANT dB i, being driven by NANT transmitter outputs of equal power. Directional gain is to be computed as f ollows:
(i) If any transmit signals are correlated with each other,
Directional gain = GANT + 10 log(NANT) dBi
(ii) If all transmit signals are completely uncorrelated with each other,
Directional gain = GANT
ANT 1: 3.98 dBi
ANT 2: 3.98 dBi
Directional gain = GANT + 10 log (NANT) dBi=3.98+10log (2) =6.99dBi

## 2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

| Worst Mode | Description | Data Rate |
|---|---|---|
| Mode 1 | TX IEEE 802.11a HT20 CH149&CH157&CH165 | 6 Mbps |
| Mode 2 | TX IEEE 802.11n HT20 CH149&CH157&CH165 | MCS 0 |
| Mode 3 | TX IEEE 802.11ac VHT20 CH149&CH157&CH165 | NSS1 MCS0 |
| Mode 4 | TX IEEE 802.11ax HE20 CH149&CH157&CH165 | NSS1 MCS0 |
| Mode 5 | TX IEEE 802.11n HT40 CH151&CH159 | MCS 0 |
| Mode 6 | TX IEEE 802.11ac VHT40 CH151&CH159 | NSS1 MCS0 |
| Mode 7 | TX IEEE 802.11ax HE40 CH151&CH159 | NSS1 MCS0 |
| Mode 8 | TX IEEE 802.11ac VHT80 CH155 | NSS1 MCS0 |
| Mode 9 | TX IEEE 802.11ax HE80 CH155 | NSS1 MCS0 |

Note: (1) The measurements are performed at the highest, middle, lowest available channels.

(2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported.

(3) We have be tested for all avaiable U.S. voltage and frequencies(For 120V,50/60Hz and 240V, 50/60Hz) for which the device is capable of operation.

(4) The 802.11ax mode is investigated among different tones(26/52/106/242-tone RU channel), full resource units (RU), partial resourceunits. The partial RU has no higher power than full RU's, thus the full RU is chosen as main testconfiguration.

AC Conducted Emission

| Test Case | |
|---|---|
| AC Conducted Emission | Mode 10: Keeping TX + WLAN Link |

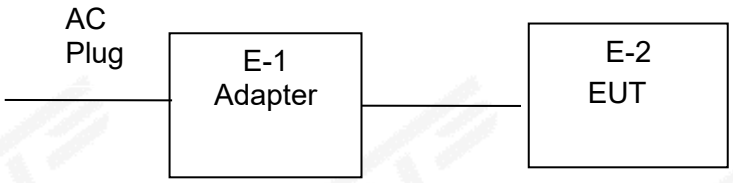
2.3 TEST SOFTWARE AND POWER LEVEL

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level.

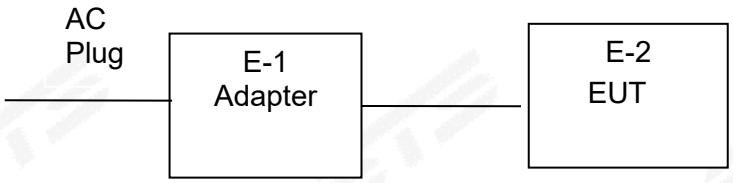
| RF Function | Type | Mode Or Modulation type | ANT Gain(dBi) | ANT 1 Power Class | ANT 2 Power Class | Software For Testing |
|---|---|---|---|---|---|---|
| WIFI(5G) | (5725MHz-5895MHz) | 802.11a | ANT 1:3.98 ANT 2:3.98 | 12 | 11 | QATool_UIv2.78 |
| | | 802.11n(HT20) | | 11 | 11 | |
| | | 802.11n(HT40) | | 11 | 10.5 | |
| | | 802.11ac(HT20) | | 12 | 12 | |
| | | 802.11ac(HT40) | | 12 | 11 | |
| | | 802.11ac(VHT80) | | 12 | 11 | |
| | | 802.11ax(HE20) | | 12 | 12 | |
| | | 802.11ax(HE40) | | 11 | 11.5 | |
| | | 802.11ax(HE80) | | 11 | 10.5 | |

2.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious EmissionTest




AC Conducted Emission Test



2.5 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| No. | Device Type | Brand | Model | Note |
|---|---|---|---|---|
| E-1 | Adapter | N/A | N/A | N/A |
| | | | | |
| | | | | |

Note:

(1) For detachable type I/O cable should be specified the length in cm in『Length』column.

## 2.6 EQUIPMENTS LIST

### RF Radiation Test Equipment

| Kind of Equipment | Manufacturer | Type No. | Serial No. | Last Calibration | Calibrated Until |
|---|---|---|---|---|---|
| Temperature & Humidity | SW-108 | SuWei | N/A | 2025.02.24 | 2026.02.23 |
| Pre-Amplifier(0.1M -3GHz) | EM | EM330 | 060665 | 2025.02.22 | 2026.02.21 |
| Pre-Amplifier(1G-18GHz) | SKET | LNPA-01018G-45 | SK2018080901 | 2025.09.25 | 2026.09.24 |
| Pre-Amplifier(18G-40GHz) | SKET | LNPA_1840-50 | SK2018101801 | 2025.02.22 | 2026.02.21 |
| Active loop Antenna | ZHINAN | ZN30900C | 16035 | 2025.02.25 | 2027.02.24 |
| Bilog Antenna | TESEQ | CBL6111D | 34678 | 2025.09.27 | 2027.09.26 |
| Horn Antenna | SCHWARZBECK | BBHA 9120D | 02014 | 2025.09.27 | 2027.09.26 |
| Horn Antenna | A-INFOMW | LB-180400-KF | J211020657 | 2025.09.27 | 2027.09.26 |
| Positioning Controller | MF | MF-7802 | MF-780208587 | N/A | N/A |
| Signal Analyzer | R&S | FSV 40-N | 101823 | 2025.09.26 | 2026.09.25 |
| Switch Control Box | N/A | N/A | N/A | N/A | N/A |
| Filter Box | BALUN Technology | SU319E | BL-SZ1530051 | N/A | N/A |
| Antenna Mast | MF | MFA-440H | N/A | N/A | N/A |
| Turn Table | MF | SC100_1 | 60531 | N/A | N/A |
| AC Power Source | APC | KDF-11010G | F214050035 | N/A | N/A |
| DC power supply | HONGSHENGFENG | DPS-305AF | 17064939 | 2025.09.22 | 2026.09.21 |
| Test SW | EZ-EMC | Ver.STSLAB-03A1 RE | | | |
| Conduction Test Equipment | | | | | |
| Kind of Equipment | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until |
| Test Receiver | R&S | ESCI | 101427 | 2025.09.25 | 2026.09.24 |
| Limiter | CYBERTEK | EM5010 | N/A | 2025.09.25 | 2026.09.24 |
| LISN | R&S | ENV216 | 101242 | 2025.09.25 | 2026.09.24 |
| LISN | EMCO | 3810/2NM | 23625 | 2025.09.25 | 2026.09.24 |
| Temperature & Humidity | SW-108 | SuWei | N/A | 2025.02.24 | 2026.02.23 |
| Test SW | EZ-EMC | Ver.STSLAB-03A1 CE | | | |
| RF Connected Test | | | | | |
| Kind of Equipment | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until |
| Signal Analyzer | Agilent | N9020A | MY51510623 | 2025.02.22 | 2026.02.21 |
| Power detector group | Keysight | NW2021031 | N/A | 2025.09.23 | 2026.09.22 |
| Switch control box | MW | MW100-RFCB | N/A | N/A | N/A |
| Temperature& Humidity test chamber | Safety test | AG80L | 171200018 | 2025.02.22 | 2026.02.21 |
| Temperature & Humidity | SW-108 | SuWei | N/A | 2025.02.24 | 2026.02.23 |
| Test SW | MW | MTS 8310_2.0.0.0 | | | |

# 3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

| FREQUENCY (MHz) | Class B (dBuV) | | Standard |
|---|---|---|---|
| | Quasi-peak | Average | |
| 0.15 -0.5 | 66 - 56 * | 56 - 46 * | CISPR |
| 0.50 -5.0 | 56.00 | 46.00 | CISPR |
| 5.0 -30.0 | 60.00 | 50.00 | CISPR |

| | | | |
|---|---|---|---|
| 0.15 -0.5 | 66 - 56 * | 56 - 46 * | FCC |
| 0.50 -5.0 | 56.00 | 46.00 | FCC |
| 5.0 -30.0 | 60.00 | 50.00 | FCC |

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

| Receiver Parameters | Setting |
|---|---|
| Attenuation | 10 dB |
| Start Frequency | 0.15 MHz |
| Stop Frequency | 30 MHz |
| IF Bandwidth | 9 kHz |

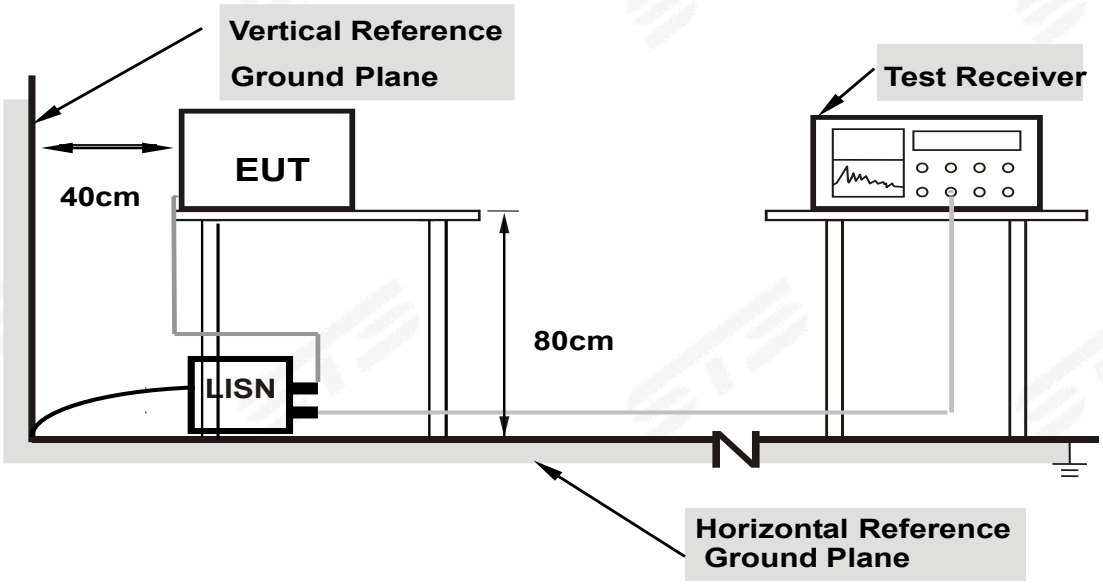
3.1.2 TEST PROCEDURE

a. The EUT is 0.8 m from the horizontal ground plane and 0.4 m from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments are powered from additional LISN(s). The LISN provides 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN is at least 80 cm from the nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP




**Note: 1. Support units were connected to second LISN.**

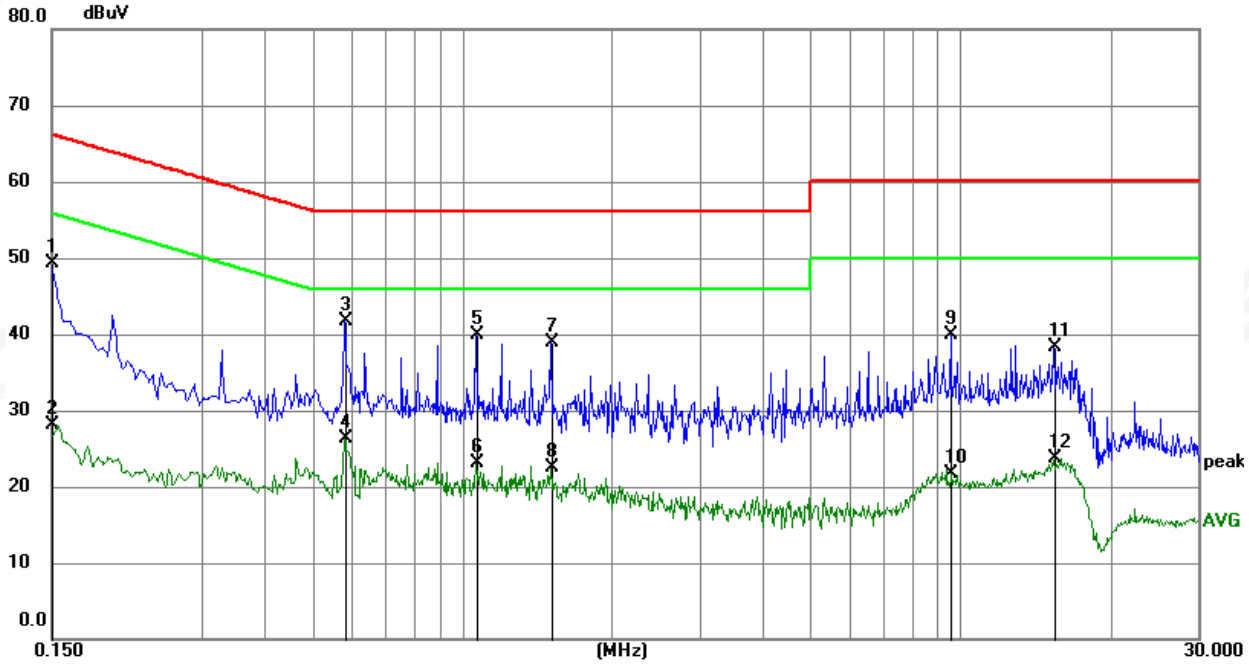
**2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes support units.**

3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

3.1.6 TEST RESULTS

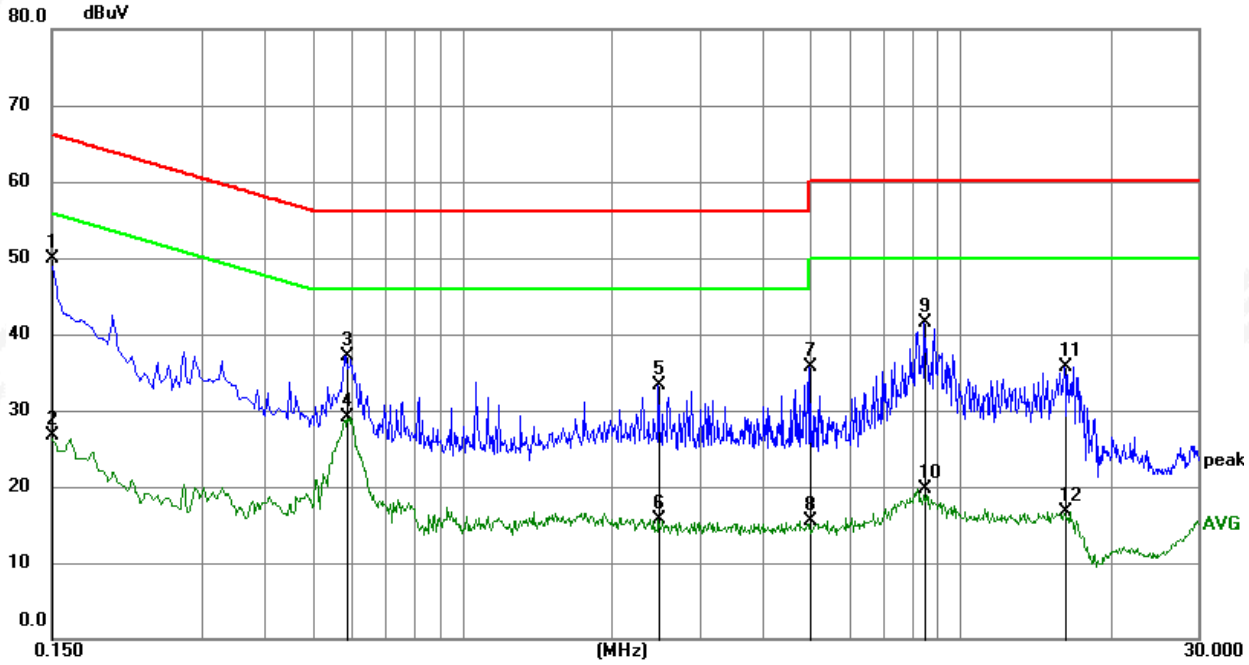
| Temperature: | 26 ℃ | Relative Humidity: | 54% |
|---|---|---|---|
| Test Voltage: | AC 120V/60Hz | Phase: | L |
| Test Mode： | Mode 10 | | |




Remark:
1. All readings are Quasi-Peak and Average values
2. Margin = Result (Result =Reading + Factor )–Limit
3. Factor=LISN factor+Cable loss+Limiter (10dB)

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 0.1500 | 38.73 | 10.57 | 49.30 | 66.00 | -16.70 | QP |
| 2 | 0.1500 | 17.46 | 10.57 | 28.03 | 56.00 | -27.97 | AVG |
| 3 * | 0.5820 | 30.96 | 10.66 | 41.62 | 56.00 | -14.38 | QP |
| 4 | 0.5820 | 15.65 | 10.66 | 26.31 | 46.00 | -19.69 | AVG |
| 5 | 1.0680 | 29.25 | 10.60 | 39.85 | 56.00 | -16.15 | QP |
| 6 | 1.0680 | 12.49 | 10.60 | 23.09 | 46.00 | -22.91 | AVG |
| 7 | 1.5045 | 28.31 | 10.68 | 38.99 | 56.00 | -17.01 | QP |
| 8 | 1.5045 | 11.84 | 10.68 | 22.52 | 46.00 | -23.48 | AVG |
| 9 | 9.5730 | 28.33 | 11.51 | 39.84 | 60.00 | -20.16 | QP |
| 10 | 9.5730 | 10.20 | 11.51 | 21.71 | 50.00 | -28.29 | AVG |
| 11 | 15.4275 | 26.04 | 12.18 | 38.22 | 60.00 | -21.78 | QP |
| 12 | 15.4275 | 11.53 | 12.18 | 23.71 | 50.00 | -26.29 | AVG |

| | | | |
|---|---|---|---|
| Temperature: | 26 ℃ | Relative Humidity: | 54% |
| Test Voltage: | AC 120V/60Hz | Phase: | N |
| Test Mode : | Mode 10 | | |




Remark:
1. All readings are Quasi-Peak and Average values
2. Margin = Result (Result =Reading + Factor )–Limit
3. Factor=LISN factor+Cable loss+Limiter (10dB)

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 * | 0.1500 | 39.30 | 10.57 | 49.87 | 66.00 | -16.13 | QP |
| 2 | 0.1500 | 16.16 | 10.57 | 26.73 | 56.00 | -29.27 | AVG |
| 3 | 0.5865 | 26.42 | 10.66 | 37.08 | 56.00 | -18.92 | QP |
| 4 | 0.5865 | 18.41 | 10.66 | 29.07 | 46.00 | -16.93 | AVG |
| 5 | 2.4855 | 22.52 | 10.84 | 33.36 | 56.00 | -22.64 | QP |
| 6 | 2.4855 | 4.94 | 10.84 | 15.78 | 46.00 | -30.22 | AVG |
| 7 | 4.9830 | 24.41 | 11.28 | 35.69 | 56.00 | -20.31 | QP |
| 8 | 4.9830 | 4.20 | 11.28 | 15.48 | 46.00 | -30.52 | AVG |
| 9 | 8.4570 | 30.18 | 11.38 | 41.56 | 60.00 | -18.44 | QP |
| 10 | 8.4570 | 8.23 | 11.38 | 19.61 | 50.00 | -30.39 | AVG |
| 11 | 16.1655 | 23.47 | 12.24 | 35.71 | 60.00 | -24.29 | QP |
| 12 | 16.1655 | 4.51 | 12.24 | 16.75 | 50.00 | -33.25 | AVG |

3.2 RADIATED EMISSION AND MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

In case the emission fall within the restricted band specified on 15.407(b)7&209(a), then the limit in the table below has to be followed.

| Frequencies (MHz) | Field Strength (micorvolts/meter) | Measurement Distance (meters) |
|---|---|---|
| 0.009~0.490 | 2400/F(KHz) | 300 |
| 0.490~1.705 | 24000/F(KHz) | 30 |
| 1.705~30.0 | 30 | 30 |
| 30~88 | 100 | 3 |
| 88~216 | 150 | 3 |
| 216~960 | 200 | 3 |
| Above 960 | 500 | 3 |

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

| FREQUENCY (MHz) | Class B (dBuV/m) (at 3M) | |
|---|---|---|
| | PEAK | AVERAGE |
| Above 1000 | 74 | 54 |

Notes:

(1) The limit for radiated test was performed according to FCC PART 15E.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

LIMITS OF RESTRICTED FREQUENCY BANDS

| FREQUENCY (MHz) | FREQUENCY (MHz) | FREQUENCY (MHz) | FREQUENCY (GHz) |
|---|---|---|---|
| 0.090-0.110 | 16.42-16.423 | 399.9-410 | 4.5-5.15 |
| 0.495-0.505 | 16.69475-16.69525 | 608-614 | 5.35-5.46 |
| 2.1735-2.1905 | 16.80425-16.80475 | 960-1240 | 7.25-7.75 |
| 4.125-4.128 | 25.5-25.67 | 1300-1427 | 8.025-8.5 |
| 4.17725-4.17775 | 37.5-38.25 | 1435-1626.5 | 9.0-9.2 |
| 4.20725-4.20775 | 73-74.6 | 1645.5-1646.5 | 9.3-9.5 |
| 6.215-6.218 | 74.8-75.2 | 1660-1710 | 10.6-12.7 |
| 6.26775-6.26825 | 108-121.94 | 1718.8-1722.2 | 13.25-13.4 |
| 6.31175-6.31225 | 123-138 | 2200-2300 | 14.47-14.5 |
| 8.291-8.294 | 149.9-150.05 | 2310-2390 | 15.35-16.2 |
| 8.362-8.366 | 156.52475-156.52525 | 2483.5-2500 | 17.7-21.4 |
| 8.37625-8.38675 | 156.7-156.9 | 2690-2900 | 22.01-23.12 |
| 8.41425-8.41475 | 162.0125-167.17 | 3260-3267 | 23.6-24.0 |
| 12.29-12.293 | 167.72-173.2 | 3332-3339 | 31.2-31.8 |
| 12.51975-12.52025 | 240-285 | 3345.8-3358 | 36.43-36.5 |
| 12.57675-12.57725 | 322-335.4 | 3600-4400 | Above 38.6 |
| 13.36-13.41 | | | |

LIMITS OF EMISSIONS OUTSIDE OF THE FREQUENCY BANDS

Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band:

(i) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Note: dBuV/m(at 3M) = EIRP(dBm) + 95.2.

Peak Limit = -27dBm/MHz + 95.2 = 68.2 dBuV/m.

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Detector | Peak |
| Start Frequency | 1000 MHz(Peak/AV) |
| Stop Frequency | 10th carrier harmonic (Peak/AV) |
| RB / VB (emission in restricted band) | 1 MHz / 1 MHz, AV=1 MHz /3 MHz |

For Band edge

| Spectrum Parameter | Setting |
|---|---|
| Detector | Peak |
| RB / VB (emission in restricted band) | 1 MHz / 1 MHz, AV=1 MHz /3 MHz |

| Receiver Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start ~ Stop Frequency | 9kHz~90kHz / RB 200Hz for PK & AV |
| Start ~ Stop Frequency | 90kHz~110kHz / RB 200Hz for QP |
| Start ~ Stop Frequency | 110kHz~490kHz / RB 200Hz for PK & AV |
| Start ~ Stop Frequency | 490kHz~30MHz / RB 9kHz for QP |
| Start ~ Stop Frequency | 30MHz~1000MHz / RB 120kHz for QP |

3.2.2 TEST PROCEDURE

a. The measuring distance at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz, and above 1GHz.
b. The EUT was placed on the top of a rotating table 0.8 m (above 1GHz is 1.5 m) above the ground at a 3 m anechoic chamber test site. The table was rotated 360 degree to determine the position of the highest radiation.
c. The height of the equipment shall be 0.8 m (above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. Horizontal and vertical polarization of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and QuasiPeak detector mode will be re-measured.
e. If the Peak Mode measured value is compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and no additional QP Mode measurement was performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

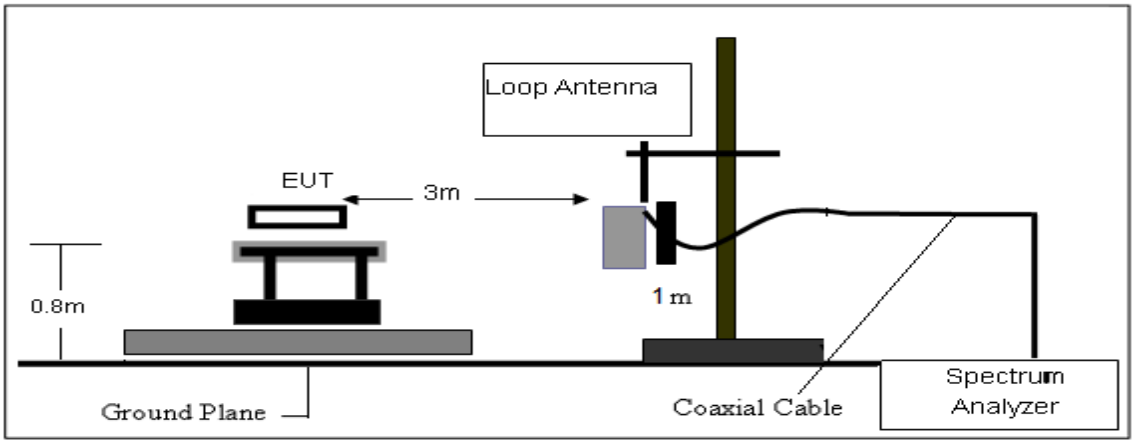
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

3.2.3 DEVIATION FROM TEST STANDARD

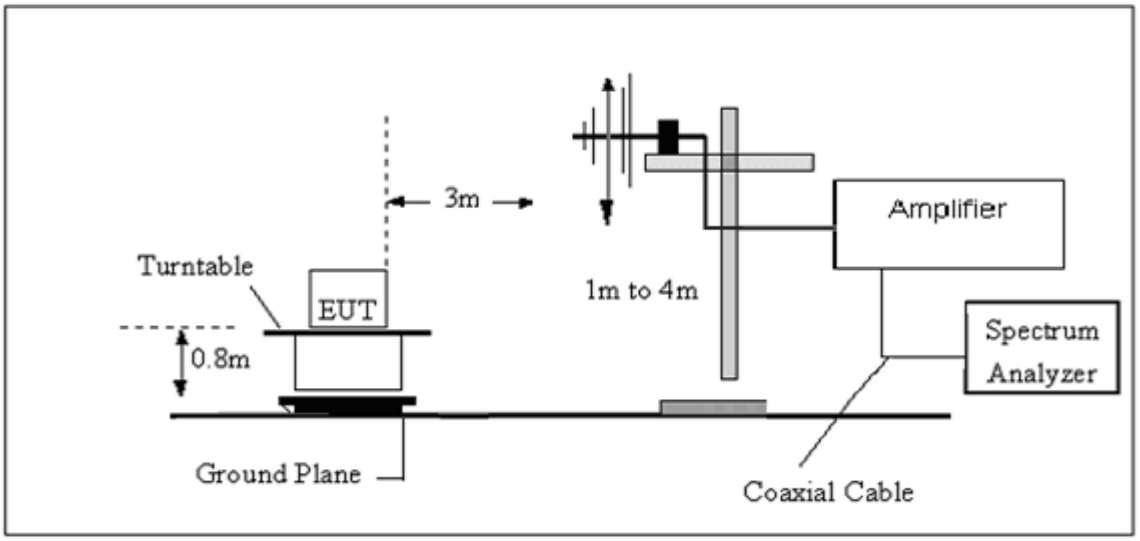
No deviation

3.2.4 TEST SETUP

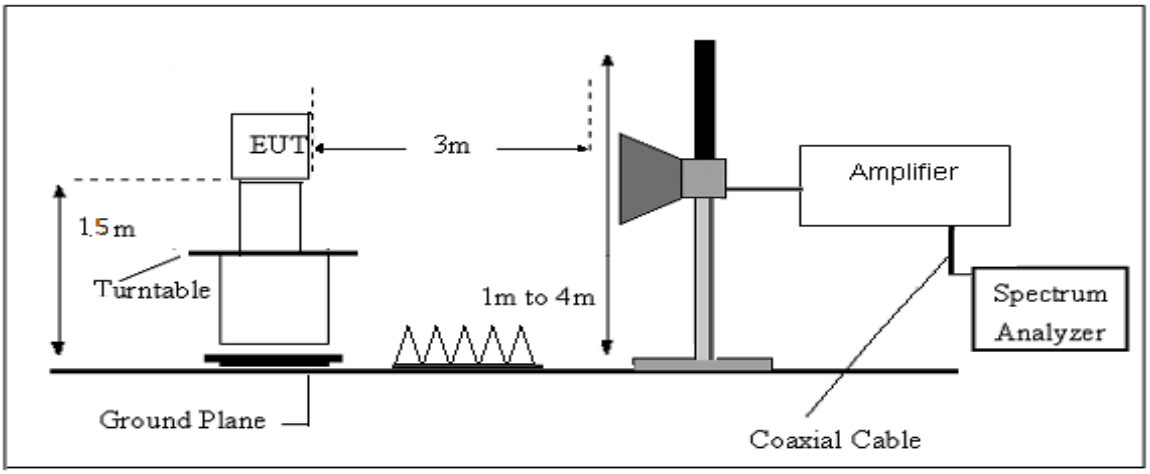
(A) Radiated Emission Test-Up Frequency Below 30MHz




(B) Radiated Emission Test-Up Frequency 30MHz~1GHz




(C) Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.6 FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where

FS = Field Strength

CL = Cable Attenuation Factor (Cable Loss)

RA = Reading Amplitude

AG = Amplifier Gain

AF = Antenna Factor

For example

| Frequency | FS | RA | AF | CL | AG | Factor |
|---|---|---|---|---|---|---|
| (MHz) | (dBμV/m) | (dBμV/m) | (dB) | (dB) | (dB) | (dB) |
| 300 | 40 | 58.1 | 12.2 | 1.6 | 31.9 | -18.1 |

Factor=AF+CL-AG

3.2.7 TEST RESULTS (Between 9KHz – 30 MHz)

| | | | |
|---|---|---|---|
| Temperature: | 26 ℃ | Relative Humidtity: | 54% |
| Test Voltage: | AC120V/60Hz | Polarization : | -- |
| Test Mode: | TX Mode | | |

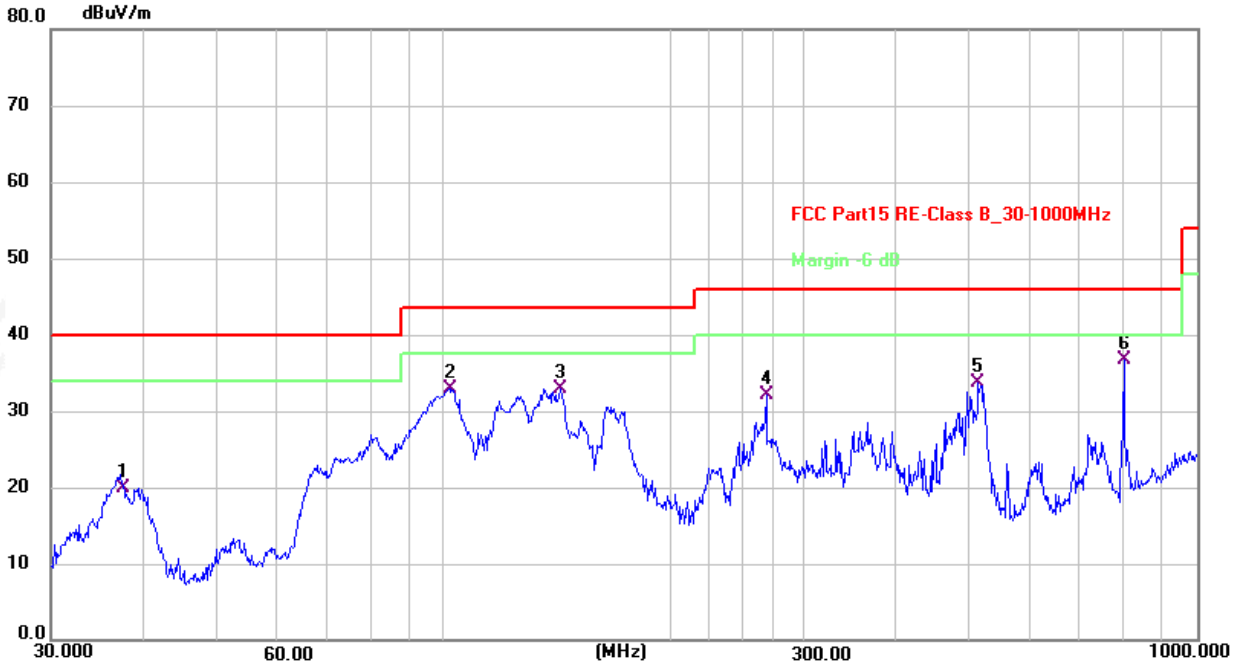
| Freq. | Reading | Limit | Margin | State |
|---|---|---|---|---|
| (MHz) | (dBuV/m) | (dBuV/m) | (dB) | P/F |
| -- | -- | -- | -- | PASS |
| -- | -- | -- | -- | PASS |

Note:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =40 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor.

3.2.8 TEST RESULTS (Between 30MHz – 1GHz)

| Temperature | 26 ℃ | Relative Humidtity: | 54% |
|---|---|---|---|
| Test Voltage | AC120V/60HZ | Polarization: | Horizontal |
| Test Mode | Mode 1~9 (Mode 9 worst mode) | | |

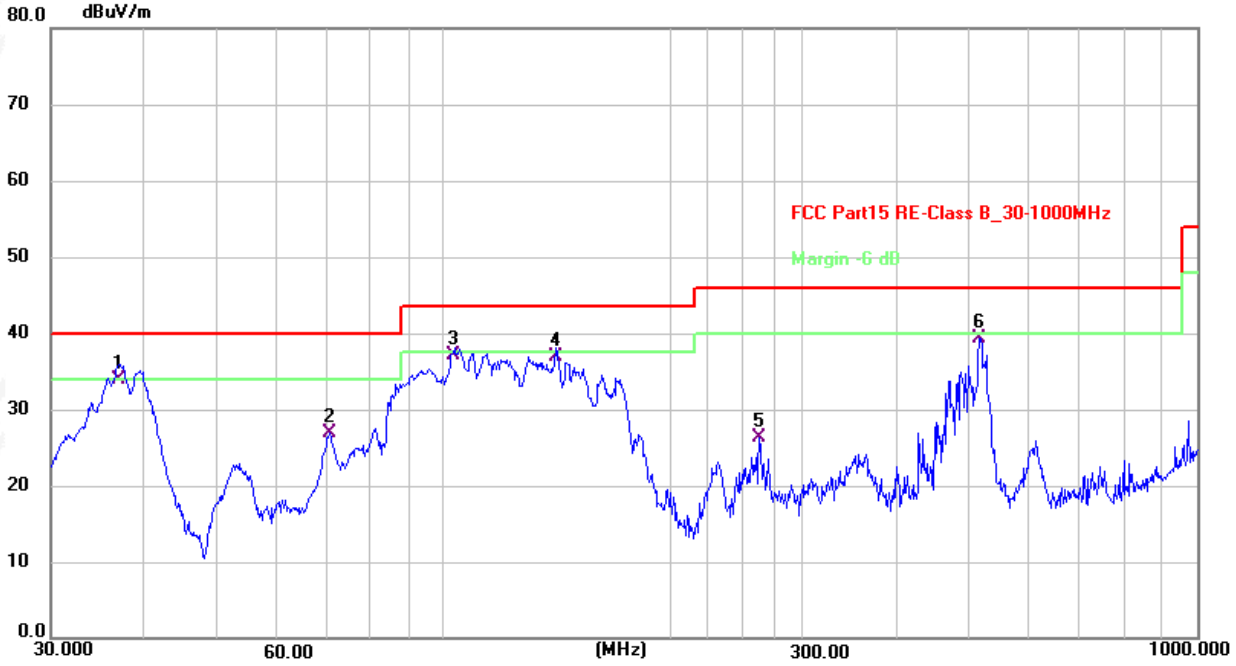



Remark:

1. Margin = Result (Result =Reading + Factor )–Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 37.5084 | 36.61 | -16.69 | 19.92 | 40.00 | -20.08 | QP |
| 2 | 101.8227 | 53.26 | -20.29 | 32.97 | 43.50 | -10.53 | QP |
| 3 | 142.9747 | 51.18 | -18.29 | 32.89 | 43.50 | -10.61 | QP |
| 4 | 267.6393 | 49.58 | -17.39 | 32.19 | 46.00 | -13.81 | QP |
| 5 | 513.0931 | 44.15 | -10.50 | 33.65 | 46.00 | -12.35 | QP |
| 6 * | 800.1012 | 43.34 | -6.71 | 36.63 | 46.00 | -9.37 | QP |

| Temperature | 26 ℃ | Relative Humidtity: | 54% |
|---|---|---|---|
| Test Voltage | AC120V/60Hz | Polarization: | Vertical |
| Test Mode | Mode 1~9 (Mode 9 worst mode) | | |




Remark:

3. Margin = Result (Result =Reading + Factor )–Limit
4. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 * | 37.1289 | 50.71 | -16.71 | 34.00 | 40.00 | -6.00 | QP |
| 2 | 70.5588 | 45.00 | -18.05 | 26.95 | 40.00 | -13.05 | QP |
| 3 | 103.2609 | 57.41 | -20.21 | 37.20 | 43.50 | -6.30 | QP |
| 4 | 140.6870 | 55.41 | -18.41 | 37.00 | 43.50 | -6.50 | QP |
| 5 | 262.7112 | 43.92 | -17.55 | 26.37 | 46.00 | -19.63 | QP |
| 6 | 513.6331 | 49.79 | -10.49 | 39.30 | 46.00 | -6.70 | QP |

3.2.8 TEST RESULTS (Above 1000 MHz)

5725-5850MHz

| Frequency (MHz) | Meter Reading (dBμV) | Amplifier (dB) | Loss (dB) | Antenna Factor (dB/m) | Corrected Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type | Detector Type |
|---|---|---|---|---|---|---|---|---|---|---|
| Low Channel (802.11n20/ 5745 MHz) | | | | | | | | | | |
| 3261.39 | 44.61 | 44.70 | 6.70 | 28.20 | -9.80 | 34.81 | 74.00 | -39.19 | Pk | Vertical |
| 3261.39 | 42.16 | 44.70 | 6.70 | 28.20 | -9.80 | 32.36 | 54.00 | -21.64 | AV | Vertical |
| 3248.85 | 44.79 | 44.70 | 6.70 | 28.20 | -9.80 | 34.99 | 68.20 | -33.21 | Pk | Horizontal |
| 3248.85 | 42.05 | 44.70 | 6.70 | 28.20 | -9.80 | 32.25 | 54.00 | -21.75 | AV | Horizontal |
| 3988.21 | 39.08 | 44.20 | 7.90 | 29.70 | -6.60 | 32.48 | 74.00 | -41.52 | Pk | Vertical |
| 3988.21 | 35.96 | 44.20 | 7.90 | 29.70 | -6.60 | 29.36 | 54.00 | -24.64 | AV | Vertical |
| 3993.84 | 39.84 | 44.20 | 7.90 | 29.70 | -6.60 | 33.24 | 74.00 | -40.76 | Pk | Horizontal |
| 3993.84 | 35.91 | 44.20 | 7.90 | 29.70 | -6.60 | 29.31 | 54.00 | -24.69 | AV | Horizontal |
| 7217.37 | 36.53 | 43.50 | 11.40 | 35.50 | 3.40 | 39.93 | 68.20 | -28.27 | Pk | Vertical |
| 7217.37 | 33.87 | 43.50 | 11.40 | 35.50 | 3.40 | 37.27 | 54.00 | -16.73 | AV | Vertical |
| 7228.52 | 36.82 | 43.50 | 11.40 | 35.50 | 3.40 | 40.22 | 68.20 | -27.98 | Pk | Horizontal |
| 7228.52 | 34.09 | 43.50 | 11.40 | 35.50 | 3.40 | 37.49 | 54.00 | -16.51 | AV | Horizontal |
| 10512.33 | 39.07 | 44.50 | 13.90 | 38.80 | 8.20 | 47.27 | 68.20 | -20.93 | Pk | Vertical |
| 10512.33 | 35.99 | 44.50 | 13.90 | 38.80 | 8.20 | 44.19 | 54.00 | -9.81 | AV | Vertical |
| 10501.05 | 38.91 | 44.50 | 13.90 | 38.80 | 8.20 | 47.11 | 68.20 | -21.09 | Pk | Horizontal |
| 10501.05 | 35.79 | 44.50 | 13.90 | 38.80 | 8.20 | 43.99 | 54.00 | -10.01 | AV | Horizontal |
| 11490.36 | 33.35 | 43.60 | 14.30 | 39.50 | 10.20 | 43.55 | 74.00 | -30.45 | Pk | Vertical |
| 11490.36 | 30.32 | 43.60 | 14.30 | 39.50 | 10.20 | 40.52 | 54.00 | -13.48 | AV | Vertical |
| 11490.32 | 33.95 | 43.60 | 14.30 | 39.50 | 10.20 | 44.15 | 74.00 | -29.85 | Pk | Horizontal |
| 11490.32 | 29.82 | 43.60 | 14.30 | 39.50 | 10.20 | 40.02 | 54.00 | -13.98 | AV | Horizontal |
| 13294.63 | 32.71 | 42.60 | 15.90 | 38.90 | 12.20 | 44.91 | 74.00 | -29.09 | Pk | Vertical |
| 13294.63 | 29.76 | 42.60 | 15.90 | 38.90 | 12.20 | 41.96 | 54.00 | -12.04 | AV | Vertical |
| 13299.68 | 32.64 | 42.60 | 15.90 | 38.90 | 12.20 | 44.84 | 74.00 | -29.16 | Pk | Horizontal |
| 13299.68 | 29.86 | 42.60 | 15.90 | 38.90 | 12.20 | 42.06 | 54.00 | -11.94 | AV | Horizontal |
| Mid Channel (802.11n20/ 5785MHz) | | | | | | | | | | |
| 3253.32 | 44.35 | 44.70 | 6.70 | 28.20 | -9.80 | 34.55 | 68.20 | -33.65 | Pk | Vertical |
| 3253.32 | 40.73 | 44.70 | 6.70 | 28.20 | -9.80 | 30.93 | 54.00 | -23.07 | AV | Vertical |
| 3250.89 | 43.88 | 44.70 | 6.70 | 28.20 | -9.80 | 34.08 | 68.20 | -34.12 | Pk | Horizontal |
| 3250.89 | 41.93 | 44.70 | 6.70 | 28.20 | -9.80 | 32.13 | 54.00 | -21.87 | AV | Horizontal |
| 3998.02 | 40.08 | 44.20 | 7.90 | 29.70 | -6.60 | 33.48 | 74.00 | -40.52 | Pk | Vertical |
| 3998.02 | 36.17 | 44.20 | 7.90 | 29.70 | -6.60 | 29.57 | 54.00 | -24.43 | AV | Vertical |
| 3983.71 | 40.11 | 44.20 | 7.90 | 29.70 | -6.60 | 33.51 | 74.00 | -40.49 | Pk | Horizontal |
| 3983.71 | 35.84 | 44.20 | 7.90 | 29.70 | -6.60 | 29.24 | 54.00 | -24.76 | AV | Horizontal |
| 7218.03 | 37.61 | 43.50 | 11.40 | 35.50 | 3.40 | 41.01 | 68.20 | -27.19 | Pk | Vertical |
| 7218.03 | 34.43 | 43.50 | 11.40 | 35.50 | 3.40 | 37.83 | 54.00 | -16.17 | AV | Vertical |
| 7235.28 | 37.27 | 43.50 | 11.40 | 35.50 | 3.40 | 40.67 | 68.20 | -27.53 | Pk | Horizontal |
| 7235.28 | 34.66 | 43.50 | 11.40 | 35.50 | 3.40 | 38.06 | 54.00 | -15.94 | AV | Horizontal |
| 10585.74 | 39.17 | 44.50 | 13.80 | 38.80 | 8.10 | 47.27 | 68.20 | -20.93 | Pk | Vertical |
| 10585.74 | 36.41 | 44.50 | 13.80 | 38.80 | 8.10 | 44.51 | 54.00 | -9.49 | AV | Vertical |
| 10596.29 | 38.99 | 44.50 | 13.80 | 38.80 | 8.10 | 47.09 | 68.20 | -21.11 | Pk | Horizontal |
| 10596.29 | 35.68 | 44.50 | 13.80 | 38.80 | 8.10 | 43.78 | 54.00 | -10.22 | AV | Horizontal |
| 11570.35 | 33.97 | 43.60 | 14.30 | 39.50 | 10.20 | 44.17 | 74.00 | -29.83 | Pk | Vertical |
| 11570.35 | 29.90 | 43.60 | 14.30 | 39.50 | 10.20 | 40.10 | 54.00 | -13.90 | AV | Vertical |
| 11570.06 | 33.13 | 43.60 | 14.30 | 39.50 | 10.20 | 43.33 | 74.00 | -30.67 | Pk | Horizontal |
| 11570.06 | 30.07 | 43.60 | 14.30 | 39.50 | 10.20 | 40.27 | 54.00 | -13.73 | AV | Horizontal |
| 13290.88 | 31.85 | 42.60 | 15.90 | 38.90 | 12.20 | 44.05 | 74.00 | -29.95 | Pk | Vertical |
| 13290.88 | 28.56 | 42.60 | 15.90 | 38.90 | 12.20 | 40.76 | 54.00 | -13.24 | AV | Vertical |
| 13280.67 | 31.97 | 42.60 | 15.90 | 38.90 | 12.20 | 44.17 | 74.00 | -29.83 | Pk | Horizontal |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 13280.67 | 28.69 | 42.60 | 15.90 | 38.90 | 12.20 | 40.89 | 54.00 | -13.11 | AV | Horizontal |
| High Channel (802.11n20/ 5825 MHz) | | | | | | | | | | |
| 3259.07 | 44.02 | 44.70 | 6.70 | 28.20 | -9.80 | 34.22 | 68.20 | -33.98 | Pk | Vertical |
| 3259.07 | 41.50 | 44.70 | 6.70 | 28.20 | -9.80 | 31.70 | 54.00 | -22.30 | AV | Vertical |
| 3264.26 | 44.16 | 44.70 | 6.70 | 28.20 | -9.80 | 34.36 | 74.00 | -39.64 | Pk | Horizontal |
| 3264.26 | 41.45 | 44.70 | 6.70 | 28.20 | -9.80 | 31.65 | 54.00 | -22.35 | AV | Horizontal |
| 3997.65 | 38.72 | 44.20 | 7.90 | 29.70 | -6.60 | 32.12 | 74.00 | -41.88 | Pk | Vertical |
| 3997.65 | 36.16 | 44.20 | 7.90 | 29.70 | -6.60 | 29.56 | 54.00 | -24.44 | AV | Vertical |
| 3981.87 | 39.83 | 44.20 | 7.90 | 29.70 | -6.60 | 33.23 | 74.00 | -40.77 | Pk | Horizontal |
| 3981.87 | 36.51 | 44.20 | 7.90 | 29.70 | -6.60 | 29.91 | 54.00 | -24.09 | AV | Horizontal |
| 7216.97 | 37.88 | 43.50 | 11.40 | 35.50 | 3.40 | 41.28 | 68.20 | -26.92 | Pk | Vertical |
| 7216.97 | 33.66 | 43.50 | 11.40 | 35.50 | 3.40 | 37.06 | 54.00 | -16.94 | AV | Vertical |
| 7229.37 | 36.57 | 43.50 | 11.40 | 35.50 | 3.40 | 39.97 | 68.20 | -28.23 | Pk | Horizontal |
| 7229.37 | 33.86 | 43.50 | 11.40 | 35.50 | 3.40 | 37.26 | 54.00 | -16.74 | AV | Horizontal |
| 10623.70 | 39.36 | 44.50 | 13.80 | 38.80 | 8.10 | 47.46 | 74.00 | -26.54 | Pk | Vertical |
| 10623.70 | 36.97 | 44.50 | 13.80 | 38.80 | 8.10 | 45.07 | 54.00 | -8.93 | AV | Vertical |
| 10640.15 | 39.51 | 44.50 | 13.80 | 38.80 | 8.10 | 47.61 | 74.00 | -26.39 | Pk | Horizontal |
| 10640.15 | 36.99 | 44.50 | 13.80 | 38.80 | 8.10 | 45.09 | 54.00 | -8.91 | AV | Horizontal |
| 11650.21 | 33.09 | 43.60 | 14.30 | 39.50 | 10.20 | 43.29 | 74.00 | -30.71 | Pk | Vertical |
| 11650.21 | 30.21 | 43.60 | 14.30 | 39.50 | 10.20 | 40.41 | 54.00 | -13.59 | AV | Vertical |
| 11650.27 | 33.64 | 43.60 | 14.30 | 39.50 | 10.20 | 43.84 | 74.00 | -30.16 | Pk | Horizontal |
| 11650.27 | 31.06 | 43.60 | 14.30 | 39.50 | 10.20 | 41.26 | 54.00 | -12.74 | AV | Horizontal |
| 13287.77 | 32.22 | 42.70 | 18.00 | 37.10 | 12.40 | 44.62 | 74.00 | -29.38 | Pk | Vertical |
| 13287.77 | 29.48 | 42.70 | 18.00 | 37.10 | 12.40 | 41.88 | 54.00 | -12.12 | AV | Vertical |
| 13285.44 | 31.99 | 42.70 | 18.00 | 37.10 | 12.40 | 44.39 | 74.00 | -29.61 | Pk | Horizontal |
| 13285.44 | 29.50 | 42.70 | 18.00 | 37.10 | 12.40 | 41.90 | 54.00 | -12.10 | AV | Horizontal |

Remark:
1.Factor = Antenna Factor + Cable Loss – Pre-amplifier.
2. All modes have been measurement, only worst mode was reported.
3. The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise.

## 4. POWER SPECTRAL DENSITY TEST

4.1 LIMIT

1. For mobile and portable client devices in the 5.15-5.25 GHz band, , the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
2. For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
3. For the band 5.725-5.850 GHz, the peak power spectral density shall not exceed 30 dBm in any 500KHz band. If transmitting antenna directional gain is greater than 6 dBi, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.2 TEST PROCEDURE

1. The setting follows Method SA-1 of FCC KDB 789033 D02 General U-NII Test Procedures New Rules v02r01.

For devices operating in the band, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (*i.e.,* 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 KHz bandwidth, the following adjustments to the procedures apply:

a) Set RBW ≥ 1/*T*, where *T* is defined in section II.B.I.a).

b) Set VBW ≥ 3 RBW.

c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10 log (500kHz/RBW) to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.

d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10 log (1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.

e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

f) Please refer to ANSI C63.10-2020 Section 12.6 Method SA-2.

Note: As a practical matter, it is recommended to use reduced RBW of 100 kHz for the sections5.c) and 5.d) above, since RBW=100 KHZ is available on nearly all spectrum analyzers.

4.3 DEVIATION FROM STANDARD

No deviation.

4.4 TEST SETUP


4.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

4.6 TEST RESULTS

Note: The test data please reference to attachment “STS2512529W02_Appendix 5G WIFI”.

# 5. DUTY CYCLE

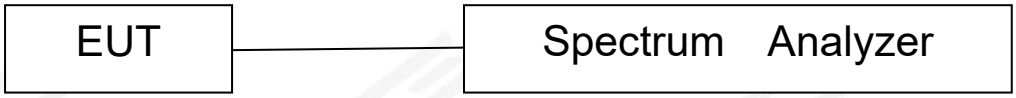
5.1 TEST STANDARD
Please refer to ANSI C63.10-2020 Section 12.2

5.2 TEST PROCEDURE

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Span Frequency | Zero |
| RB | set RBW to the largest available value |
| VB | VBW ⩾ RBW. |
| Detector | Peak |
| Trace | Clear Write |
| Sweep Time | Auto |

5.3 DEVIATION FROM STANDARD
No deviation.

5.4 TEST SETUP




5.5 EUT OPERATION CONDITIONS
The EUT tested system was configured as the statements of 5 Unless otherwise a special operating condition is specified in the follows during the testing.

5.6 TEST RESULTS
Note: The test data please reference to attachment “STS2512529W02_Appendix 5G WIFI”.

# 6. BANDWIDTH MEASUREMENT

6.1 EMISSION BANDWIDTH (EBW) 26 BANDWID PROCEDURES / LIMIT

The following procedure shall be used for measuring 26 bandwidth

6.1.1 TEST PROCEDURE

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > =RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP


6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

6.1.5 TEST RESULTS

Note: The test data please reference to attachment “STS2512529W02_Appendix 5G WIFI”.

6.2 OCCUPIED BANDWIDTH ( 99%) TEST APPLIED PROCEDURES / LIMIT

The following procedure shall be used for measuring (99 %) power bandwidth.

6.2.1 TEST PROCEDURE

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures v02r01.

The following procedure shall be used for measuring (99 %) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW ≥ 3 · RBW
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
6. Use the 99 % power bandwidth function of the instrument (if available).
7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

6.2.2 DEVIATION FROM STANDARD

No deviation.

6.2.3 TEST SETUP


6.2.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

6.2.5 TEST RESULTS

Note: The test data please reference to attachment “STS2512529W02_Appendix 5G WIFI”.

6.3 MINIMUM EMISSION BANDWIDTH(6 DB) PROCEDURES / LIMIT

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.725-5.85 GHz. The following procedure shall be used for measuring this bandwidth.

6.3.1 TEST PROCEDURE

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures v02r01.

a) Set RBW = 100 kHz.

b) Set the video bandwidth (VBW) ≥ 3 × RBW.

c) Detector = Peak.

d) Trace mode = max hold.

e) Sweep = auto couple.

f) Allow the trace to stabilize.

g) 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.

6.3.2 DEVIATION FROM STANDARD

No deviation.

6.3.3 TEST SETUP


6.3.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

6.3.5 TEST RESULTS

Note: The test data please reference to attachment “STS2512529W02_Appendix 5G WIFI”.

# 7. MAXIMUM OUTPUT POWER

7.1 LIMIT

For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz,If transmitting antennas of directional gain greater than 6 dBi are used.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. If transmitting antennas of directional gain greater than 6 dBi are used.

| FCC Part15 (15.407) , Subpart E | | | | |
|---|---|---|---|---|
| Section | Test Item | Limit | Frequency Range (MHz) | Result |
| 15.407(a) (1) (iv) | Max Output Power | 0.25 watt | 5150-5250 | PASS |
| | | The lesser of 250 mW or 11 dBm + 10 log (26 dB emission bandwidth) | 5250-5350<br>5470-5725 | |
| 15.407(a) (3) | | 1 watt | 5725-5895 | |

7.2 TEST PROCEDURE

Please refer to ANSI C63.10-2020 Section 12.4.2 Method SA-2

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP


7.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 5 Unless otherwise a special operating condition is specified in the follows during the testing.

7.6 TEST RESULTS

Note: The test data please reference to attachment “STS2512529W02_Appendix 5G WIFI”.

# 8. AUTOMATICALLY DISCONTINUE TRANSMISSION

## 8.1 LIMIT OF AUTOMATICALLY DISCONTINUE TRANSMISSION

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to
complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

## 8.2 TEST RESULT OF AUTOMATICALLY DISCONTINUE TRANSMISSION

During no any information transmission, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message
transmitting from remote device and verify whether it shall resend or discontinue transmission

# 9. ANTENNA REQUIREMENT

9.1 STANDARD 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 shall be considered sufficient to comply with the provisions of this section. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217,§15.219, or §15.221. Further, this requirement does not apply to intentionalradiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

9.2 EUT ANTENNA

The EUT antenna is external antenna, not using a standard antenna jack or electrical connector for antenna replacement, fulfill the requirement of this section.

## APPENDIX - PHOTOS OF TEST SETUP

Note: See test photos in setup photo document for the actual connections between Product and support equipment.

※※※※※END OF THE REPORT※※※※※