



Test Report No.:  
**FCCSZ2024-0004-RF2**

## RF Test Report

**FCC ID** : 2BEA6IPCRK3588  
**EUT** : IBOX3588  
**MODEL** : VT-IPC-RK3588  
**BRAND NAME** : N/A  
**APPLICANT** : Vantron Technology, Inc.  
**Classification Of Test** : N/A

**CVC Testing Technology (Shenzhen) Co., Ltd.**

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|                                                                                                                                |                                                                                                                                                                                     |                                                                                                              |                       |
|--------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>Applicant</b>                                                                                                               |                                                                                                                                                                                     | Name: Vantron Technology, Inc.<br>Address: 48434 Milmont Drive Fremont, CA 94538-7324, USA.                  |                       |
| <b>Manufacturer</b>                                                                                                            |                                                                                                                                                                                     | Name: Vantron Technology, Inc.<br>Address: 48434 Milmont Drive Fremont, CA 94538-7324, USA.                  |                       |
| <b>Equipment Under Test</b>                                                                                                    |                                                                                                                                                                                     | Product Name: IBOX3588<br>Model/Type: VT-IPC-RK3588<br>Brand Name: N/A<br>Serial NO.: N/A<br>Sample NO.: 3-1 |                       |
| Date of Receipt.                                                                                                               | 2024.01.18                                                                                                                                                                          | Date of Testing                                                                                              | 2024.01.18~2024.03.13 |
| <b>Test Specification</b>                                                                                                      |                                                                                                                                                                                     | <b>Test Result</b>                                                                                           |                       |
| FCC Part 15, Subpart E (15.407)                                                                                                |                                                                                                                                                                                     | PASS                                                                                                         |                       |
| <b>Evaluation of Test Result</b>                                                                                               | <p>The equipment under test was found to comply with the requirements of the standards applied.</p> <p style="text-align: right;">Seal of CVC<br/><b>Issue Date: 2024.03.13</b></p> |                                                                                                              |                       |
| <p>Tested by:</p> <p><i>Cai Jianyu</i></p> <p><u>Cai Jianyu</u></p> <p>Name      Signature</p>                                 | <p>Reviewed by:</p> <p><i>Mo Xianbiao</i></p> <p><u>Mo Xianbiao</u></p> <p>Name      Signature</p>                                                                                  | <p>Approved by:</p> <p><i>Dong Sanbi</i></p> <p><u>Dong Sanbi</u></p> <p>Name      Signature</p>             |                       |
| <b>Other Aspects: NONE.</b>                                                                                                    |                                                                                                                                                                                     |                                                                                                              |                       |
| <p>Abbreviations: OK, Pass= passed      Fail = failed      N/A= not applicable      EUT= equipment, sample(s) under tested</p> |                                                                                                                                                                                     |                                                                                                              |                       |

This test report relates only to the EUT, and shall not be reproduced except in full, without written approval of CVC.

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## RELEASE CONTROL RECORD

| ISSUE NO.          | REASON FOR CHANGE | DATE ISSUED |
|--------------------|-------------------|-------------|
| FCCSZ2024-0004-RF2 | Original release  | 2024.03.13  |

## 1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC PART 15, SUBPARTE (SECTION 15.407) |                                   |                      |                                                      |
|----------------------------------------------------------|-----------------------------------|----------------------|------------------------------------------------------|
| STANDARD SECTION                                         | TEST TYPE                         | RESULT               | REMARK                                               |
| FCC 15.207                                               | AC Power Conducted Emission       | PASS                 | See section 3.1                                      |
| FCC 15.403(a)(e)                                         | 6dB&26dB Emission Bandwidth       | PASS                 | Appendix A1&A3 of<br>FCCSZ2024-0004-RF2-<br>A1&A2&A3 |
| ---                                                      | Occupied Bandwidth<br>Measurement | ONLY FOR<br>REPORTED | Appendix A2 of<br>FCCSZ2024-0004-RF2-<br>A1&A2&A3    |
| FCC 15.407(b)                                            | Radiated Emission and<br>Bandedge | PASS                 | See section 3.2                                      |
| FCC 15.407(a)                                            | Transmit Power                    | PASS                 | Appendix C of<br>FCCSZ2024-0004-<br>RF2A1&A2&A3      |
| FCC 15.407(a)                                            | Power Spectral Density            | PASS                 | Appendix D of<br>FCCSZ2024-0004-RF2-<br>A1&A2&A3     |
| FCC 15.407(g)                                            | Frequency Stability               | PASS                 | Appendix E of<br>FCCSZ2024-0004-RF2-A1&A2            |
| FCC 15.203<br>FCC 15.407(a)                              | Antenna Requirement               | PASS                 | See section 3.9                                      |

## 1.1 LIST OF TEST AND MEASUREMENT INSTRUMENTS

| Equipment                                | Manufacturer  | Model No.          | Serial Number | Cal. interval | Cal. Due  |
|------------------------------------------|---------------|--------------------|---------------|---------------|-----------|
| WIFI & Bluetooth Test System             |               |                    |               |               | /         |
| Signal&Spectrum Analyzer                 | Rohde&Schwarz | FSV 30             | 104408        | 1 year        | 2024.5.21 |
| #3Shielding room                         | MORI          | 443                | N/A           | 3 year        | 2026.5.16 |
| Wideband radio communication tester      | Rohde&Schwarz | CMW 500            | 168778        | 1 year        | 2024.5.25 |
| Analog signal Generator (100kHz ~ 40GHz) | Rohde&Schwarz | SMB 100A           | 181934        | 1 year        | 2024.5.21 |
| Vector signal Generator (9kHz ~ 6GHz)    | Keysight      | N5182B             | MY57301451    | 1 year        | 2024.4.25 |
| Vector signal Generator (9kHz ~ 6GHz)    | Rohde&Schwarz | SGT 100A           | 111724        | 1 year        | 2024.5.21 |
| RF control unit(BT/WiFi)                 | Tonscend      | JS0806-2-8CH       | 20E8060261    | 1 year        | 2024.5.21 |
| Radiation Spurious(Above 1GHz)           |               |                    |               |               | /         |
| Signal&Spectrum Analyzer                 | Rohde&Schwarz | FSV 40             | 101898        | 1 year        | 2024.5.21 |
| EMI Test Receiver                        | Rohde&Schwarz | ESR3               | 102693        | 1 year        | 2024.5.25 |
| Antenna(30MHz~1001MHz)                   | SCHWARZBECK   | VULB 9168          | 1133          | 1 year        | 2025.2.4  |
| Horn antenna(1GHz-18GHz)                 | ETS           | 3117               | 227611        | 1 year        | 2024.3.25 |
| Horn antenna(18GHz-40GHz)                | QMS           | QMS-00880          | 22051         | 1 year        | 2024.3.25 |
| 3m anechoic chamber                      | MORI          | 966                | CS0300011     | 3 year        | 2026.5.18 |
| Filter group(RSE-BT/WiFi)                | Rohde&Schwarz | WiFi /BT Variant 1 | 100820        | 1 year        | 2024.5.21 |
| Filter group(RSE-Cellular)               | Rohde&Schwarz | Cellular Variant 1 | 100768        | 1 year        | 2024.5.21 |
| Preamplifier(10kHz-1GHz)                 | Rohde&Schwarz | SCU-01F            | 100299        | 1 year        | 2024.5.21 |
| Preamplifier(1GHz-18GHz)                 | Rohde&Schwarz | SCU-18F            | 100799        | 1 year        | 2024.5.21 |
| Preamplifier(1GHz-18GHz)                 | Rohde&Schwarz | SCU-18F            | 100801        | 1 year        | 2024.5.21 |
| Preamplifier(18Gz-40GHz)                 | Rohde&Schwarz | SCU-40A            | 101209        | 1 year        | 2024.5.21 |
| #2 control room                          | MORI          | 433                | CS0300028     | 3 year        | 2024.5.21 |
| Temperature and humidity meter           | /             | C193561517         | C193561517    | 1 year        | 2024.5.21 |
| Radiation Spurious(Below 1GHz)           |               |                    |               |               | /         |
| EMI Test Receiver                        | Rohde&Schwarz | ESR 26             | 101718        | 1 year        | 2024.5.25 |
| Loop antenna (8.3k~30MHz)                | Rohde&Schwarz | HFH2-Z2E           | 100951        | 1 year        | 2024.5.26 |
| Antenna(30MHz~1000MHz)                   | SCHWARZBECK   | VULB 9168          | 1132          | 1 year        | 2025.2.27 |
| 3m anechoic chamber                      | MORI          | 966                | CS0200019     | 3 year        | 2026.5.18 |
| Attenuator                               | /             | SJ-5dB             | 607684        | 1 year        | 2025.2.4  |
| #1 control room                          | MORI          | 433                | CS0300028     | 3 year        | 2026.5.16 |
| Temperature and humidity meter           | /             | C193561473         | CS0200071     | 1 year        | 2024.5.21 |
| Conducted emission                       |               |                    |               |               | /         |
| EMI Test Receiver                        | Rohde&Schwarz | ESR3               | 102694        | 1 year        | 2024.5.25 |
| limiter (10 dB)                          | Rohde&Schwarz | ESH3-Z2            | 102824        | 1 year        | 2024.5.16 |
| Voltage probe                            | Rohde&Schwarz | CVP9222C           | 28            | 1 year        | 2024.5.16 |
| Current probe                            | Rohde&Schwarz | EZ-17              | 101442        | 1 year        | 2024.5.21 |
| ISN network                              | Rohde&Schwarz | ENV 81             | 100401        | 1 year        | 2024.5.16 |
| ISN network                              | Rohde&Schwarz | ENV 81 Cat6        | 101896        | 1 year        | 2024.5.16 |
| LISN (single-phase )                     | Rohde&Schwarz | ENV216             | 102569        | 1 year        | 2024.4.11 |
| #1Shielding room                         | MORI          | 854                | N/A           | 3 year        | 2026.5.16 |

## 1.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT:

| No.                                        | Item                          | Measurement Uncertainty |
|--------------------------------------------|-------------------------------|-------------------------|
| 1                                          | Conducted emission test       | +/-2.7 dB               |
| 2                                          | Radiated emission 9kHz-30MHz  | +/-5.6 dB               |
| 3                                          | Radiated emission 30MHz-1GHz  | +/-4.6 dB               |
| 4                                          | Radiated emission 1GHz-18GHz  | +/-4.4 dB               |
| 5                                          | Radiated emission 18GHz-40GHz | +/-5.1 dB               |
| 6                                          | RF power                      | +/-0.9 dB               |
| 7                                          | Power Spectral Density        | +/-0.8 dB               |
| 8                                          | Conducted spurious emissions  | +/-2.7 dB               |
| 9                                          | Transmission Time             | +/-0.27%                |
| 10                                         | Occupied Bandwidth            | +/-1.86%                |
| <b>Remark: 95% Confidence Levels, k=2.</b> |                               |                         |

## 1.3 TEST LOCATION

The tests and measurements refer to this report were performed by EMC testing Lab. of CVC Testing Technology (Shenzhen) Co., Ltd.

CABID:CN0137

Lab Address: No. 1301, Guanguang Road, Xinlan Community, Guanlan Street, Longhua District, Shenzhen City, Guangdong Province 518110 P.R.China

Post Code: 518110 Tel: 0755-23763060-8805

Fax: 0755-23763060 E-mail: sz-kf@cvc.org.cn

FCC(Test firm designation number: CN1363)

IC(Test firm CAB identifier number: CN0137)

CNAS(Test firm designation number: L16091)

## 2 GENERAL INFORMATION

### 2.1 GENERAL PRODUCT INFORMATION

|                                                  |                                                                                                               |                       |               |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------|-----------------------|---------------|
| <b>PRODUCT</b>                                   | IBOX3588                                                                                                      |                       |               |
| <b>BRAND</b>                                     | N/A                                                                                                           |                       |               |
| <b>TEST MODEL</b>                                | VT-IPC-RK3588                                                                                                 |                       |               |
| <b>ADDITIONAL MODEL</b>                          | N/A                                                                                                           |                       |               |
| <b>POWER SUPPLY</b>                              | DC 24V From Adapter                                                                                           |                       |               |
| <b>MODULATION TECHNOLOGY</b>                     | OFDM, OFDMA                                                                                                   |                       |               |
| <b>MODULATION TYPE</b>                           | 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM<br>1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDMA              |                       |               |
| <b>TRANSFER RATE</b>                             | 802.11a: up to 54Mbps,<br>802.11n: up to 300Mbps,<br>802.11ac: up to 866.7Mbps,<br>802.11ax: up to 2401.9Mbps |                       |               |
| <b>OPERATING FREQUENCY<br/>AND MAXIMUM POWER</b> | Frequency                                                                                                     | MAX output power(dBm) | MAX.EIRP(dBm) |
|                                                  | 5180 ~ 5240MHz                                                                                                | 17.18                 | 19.97         |
|                                                  | 5745 ~ 5825MHz                                                                                                | 15.99                 | 18.78         |
| <b>NUMBER OF CHANNEL</b>                         | See item 2.3                                                                                                  |                       |               |
| <b>ANTENNA TYPE(NOTE 4)</b>                      | ANT 1:<br>External Antenna with 2.79dBi gain<br>Ant 2:<br>External Antenna with 2.79dBi gain                  |                       |               |
| <b>FIX FREQUENCY SOFTWARE</b>                    | adb                                                                                                           |                       |               |
| <b>I/O PORTS</b>                                 | Refer to user's manual                                                                                        |                       |               |
| <b>CABLE SUPPLIED</b>                            | N/A                                                                                                           |                       |               |

**NOTE:**

- For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
- For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
- EUT photo refer to report (Report NO.: FCCSZ2024-0004-EUT).
- Since the above data and/or information is provided by the client, CVC is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.
- At the same time, EUT incorporates a MIMO function. Physically, the EUT provides 2 completed transmitter and 2 receiver.

| MODULATION MODE | TX FUNCTION | Beamforming mode |
|-----------------|-------------|------------------|
| 802.11a         | SISO        | Not support      |
| 802.11n         | MIMO        | support          |
| 802.11ac        | MIMO        | support          |
| 802.11ax        | MIMO        | support          |

## 2.2 CARRIER FREQUENCY AND CHANNEL

### FOR 5180 ~ 5320MHz

8 channels are provided for 802.11a, 802.11n (HT20),802.11ax(HE20):

| CHANNEL   | FREQUENCY      | CHANNEL   | FREQUENCY      |
|-----------|----------------|-----------|----------------|
| <b>36</b> | <b>5180MHz</b> | <b>40</b> | <b>5200MHz</b> |
| 44        | 5220 MHz       | <b>48</b> | <b>5240MHz</b> |

4 channels are provided for 802.11n (HT40),802.11ax(HE40):

| CHANNEL   | FREQUENCY      | CHANNEL   | FREQUENCY       |
|-----------|----------------|-----------|-----------------|
| <b>38</b> | <b>5190MHz</b> | <b>46</b> | <b>5230 MHz</b> |

2 channels are provided for 802.11ac (VHT80),802.11ax(HE80):

| CHANNEL   | FREQUENCY      | CHANNEL | FREQUENCY |
|-----------|----------------|---------|-----------|
| <b>42</b> | <b>5210MHz</b> | --      | --        |

### FOR 5745 ~ 5825MHz

5 channels are provided for 802.11a, 802.11n (HT20),802.11ax(HE20):

| CHANNEL    | FREQUENCY      | CHANNEL | FREQUENCY |
|------------|----------------|---------|-----------|
| <b>149</b> | <b>5745MHz</b> | 153     | 5765MHz   |
| <b>157</b> | <b>5785MHz</b> | 161     | 5805MHz   |
| <b>165</b> | <b>5825MHz</b> | --      | --        |

2 channels are provided for 802.11n (HT40),802.11ax(HE40):

| CHANNEL    | FREQUENCY      | CHANNEL    | FREQUENCY      |
|------------|----------------|------------|----------------|
| <b>151</b> | <b>5755MHz</b> | <b>159</b> | <b>5795MHz</b> |

1 channels are provided for 802.11ac (VHT80),802.11ax(HE80):

| CHANNEL    | FREQUENCY      |
|------------|----------------|
| <b>155</b> | <b>5775MHz</b> |

The channels which were indicated in bold type of the above channel list were selected as representative test channel. Therefore only the data of the test channels were recorded in this report.

By means of test software which provided by manufacture, the power levels during the tests were set according to the following codes:

| Operated in 5180 ~ 5240MHz band |                  |                    |                  |                    |                  |                                    |                  |
|---------------------------------|------------------|--------------------|------------------|--------------------|------------------|------------------------------------|------------------|
| 802.11a                         |                  | 802.11n(HT20)      |                  | 802.11n(HT40)      |                  | 802.11ac (VHT80)<br>802.11ax(HE80) |                  |
| FREQUENCY<br>(MHZ)              | POWER<br>SETTING | FREQUENCY<br>(MHZ) | POWER<br>SETTING | FREQUENCY<br>(MHZ) | POWER<br>SETTING | FREQUENCY<br>(MHZ)                 | POWER<br>SETTING |
| 5180                            | 15               | 5180               | 15               | 5190               | 15               | 5210                               | 15               |
| 5200                            | 15               | 5200               | 15               | 5230               | 15               | --                                 | --               |
| 5240                            | 15               | 5240               | 15               | --                 | --               | --                                 | --               |
| Operated in 5745 ~ 5825MHz band |                  |                    |                  |                    |                  |                                    |                  |
| 802.11a                         |                  | 802.11n(HT20)      |                  | 802.11n(HT40)      |                  | 802.11ac (VHT80)<br>802.11ax(HE80) |                  |
| FREQUENCY<br>(MHZ)              | POWER<br>SETTING | FREQUENCY<br>(MHZ) | POWER<br>SETTING | FREQUENCY<br>(MHZ) | POWER<br>SETTING | FREQUENCY<br>(MHZ)                 | POWER<br>SETTING |
| 5745                            | 15               | 5745               | 15               | 5755               | 15               | 5755                               | 15               |
| 5785                            | 15               | 5785               | 15               | 5795               | 15               | --                                 | --               |
| 5825                            | 15               | 5825               | 15               | --                 | --               | --                                 | --               |

## 2.3 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

| EUT<br>CONFIGURE<br>MODE | APPLICABLE TO |       |     |      | DESCRIPTION                             |
|--------------------------|---------------|-------|-----|------|-----------------------------------------|
|                          | RE≥1G         | RE<1G | PLC | APCM |                                         |
| -                        | √             | √     | √   | √    | Powered by host unit with wifi(5G) link |

Where **RE≥1G**: Radiated Emission above 1GHz

**RE<1G**: Radiated Emission below 1GHz

**PLC**: Power Line Conducted Emission

**APCM**: Antenna Port Conducted Measurement

### NOTE:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

**NOTE**: "-" means no effect.

The worst case Antenna mode for each of the following tests for Wi-Fi:

| TEST CASES                                                                                                              | ANTENNA 1 | ANTENNA 2  | MIMO/CDD   | Beamforming Mode | PARTIAL RU |
|-------------------------------------------------------------------------------------------------------------------------|-----------|------------|------------|------------------|------------|
| AC Power Conducted Emission                                                                                             | /         | /          | O          | /                | /          |
| 6dB&26dB Emission Bandwidth                                                                                             | O         | O          | /          | /                | O          |
| Occupied Bandwidth Measurement                                                                                          | O         | O          | /          | /                | O          |
| Radiated Emission and Band edge                                                                                         | /         | /          | O          | /                | /          |
| Transmit Power                                                                                                          | O         | O          | O          | O                | O          |
| Power Spectral Density                                                                                                  | O         | O          | O          | /                | O          |
| Frequency Stability                                                                                                     | O         | O          | /          | /                | /          |
| RU Configure (OFDMA)                                                                                                    |           | 802.11ax20 | 802.11ax40 | 802.11ax80       |            |
| 26 Tone RU Index 0                                                                                                      |           | O          | /          | /                |            |
| 26 Tone RU Index 8                                                                                                      |           | O          | /          | /                |            |
| 52 Tone RU Index 37                                                                                                     |           | O          | /          | /                |            |
| 52 Tone RU Index 40                                                                                                     |           | O          | /          | /                |            |
| 106 Tone RU Index 53                                                                                                    |           | O          | /          | /                |            |
| 106 Tone RU Index 54                                                                                                    |           | O          | /          | /                |            |
| 242 Tone RU Index 61                                                                                                    |           | /          | O          | /                |            |
| 242 Tone RU Index 62                                                                                                    |           | /          | O          | /                |            |
| 484 Tone RU Index 65                                                                                                    |           | /          | /          | O                |            |
| 484 Tone RU Index 66                                                                                                    |           | /          | /          | O                |            |
| Full RU                                                                                                                 |           | O          | O          | O                |            |
| Note1: “O” mean test                                                                                                    |           |            |            |                  |            |
| Note2: Partial RU PSD < Full RU PSD,perform additional testing on Partial RU modes for band edge and spurious emissions |           |            |            |                  |            |
| Note3: All the RU mode have been tested, only worst case are recorded                                                   |           |            |            |                  |            |

| MODULATION | DATA RATE |
|------------|-----------|
|------------|-----------|

|                                 |       |
|---------------------------------|-------|
| 802.11a                         | 6Mbps |
| 802.11n HT20                    | MCS0  |
| 802.11n HT40                    | MCS0  |
| 802.11ac VHT20(Covered by HT20) | MCS0  |
| 802.11ac VHT40(Covered by HT40) | MCS0  |
| 802.11ac VHT80                  | MCS0  |
| 802.11ax HE20(Covered by HT20)  | MCS0  |
| 802.11ax HE40(Covered by HT40)  | MCS0  |
| 802.11ax HE80                   | MCS0  |

**TEST CONDITION:**

| APPLICABLE TO | ENVIRONMENTAL CONDITIONS | INPUT POWER         | TESTED BY    |
|---------------|--------------------------|---------------------|--------------|
| RE<1G         | 25deg. C, 54%RH          | DC 24V from adapter | Liu Yuan     |
| RE≥1G         | 25deg. C, 54%RH          | DC 24V from adapter | Liu Yuan     |
| PLC           | 20deg. C, 56%RH          | DC 24V from adapter | Wang Zhiming |
| APCM          | 20deg. C, 55%RH          | DC 24V from adapter | Cai Jianyu   |

## 2.4 DESCRIPTION OF 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.

| Support Equipment |             |                   |             |                      |                    |                |             |
|-------------------|-------------|-------------------|-------------|----------------------|--------------------|----------------|-------------|
| NO                | Description | Brand             |             | Model No.            | Serial Number      | Supplied by    |             |
| 1                 | Laptop      | Lenovo            |             | K4e-ARE120           | MP20kshe           | Lab            |             |
| 2                 | Computer    | DELL              |             | 783368-01            | Vgdt0041           | Lab            |             |
| 3                 | Phone       | N/A               |             | 4G                   | 1693               | Lab            |             |
| 4                 | Adapter     | MW                |             | GST90A24             | N/A                | Client         |             |
| Support Cable     |             |                   |             |                      |                    |                |             |
| NO                | Description | Quantity (Number) | Length (cm) | Detachable (Yes/ No) | Shielded (Yes/ No) | Cores (Number) | Supplied by |
| N/A               | N/A         | N/A               | N/A         | N/A                  | N/A                | N/A            | N/A         |

## 2.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

**FCC Part 15, Subpart E (15.407)**

**KDB 789033 D02 General UNII Test Procedures New Rules v02r01**

**KDB 662911 D01 Multiple Transmitter Output v02r01**

**ANSI C63.10-2013**

All test items have been performed and recorded as per the above standards

### 3 TEST TYPES AND RESULTS

#### 3.1 CONDUCTED EMISSION MEASUREMENT

##### 3.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

| FREQUENCY OF EMISSION (MHz) | CONDUCTED LIMIT (dB $\mu$ V) |          |
|-----------------------------|------------------------------|----------|
|                             | Quasi-peak                   | Average  |
| 0.15 ~ 0.5                  | 66 to 56                     | 56 to 46 |
| 0.5 ~ 5                     | 56                           | 46       |
| 5 ~ 30                      | 60                           | 50       |

**NOTE:**1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

##### 3.1.2 TEST PROCEDURES

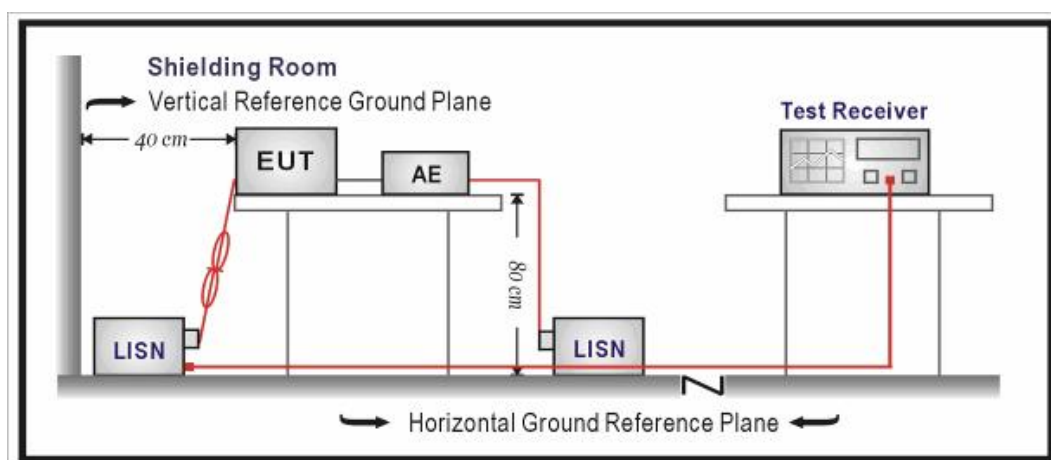
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

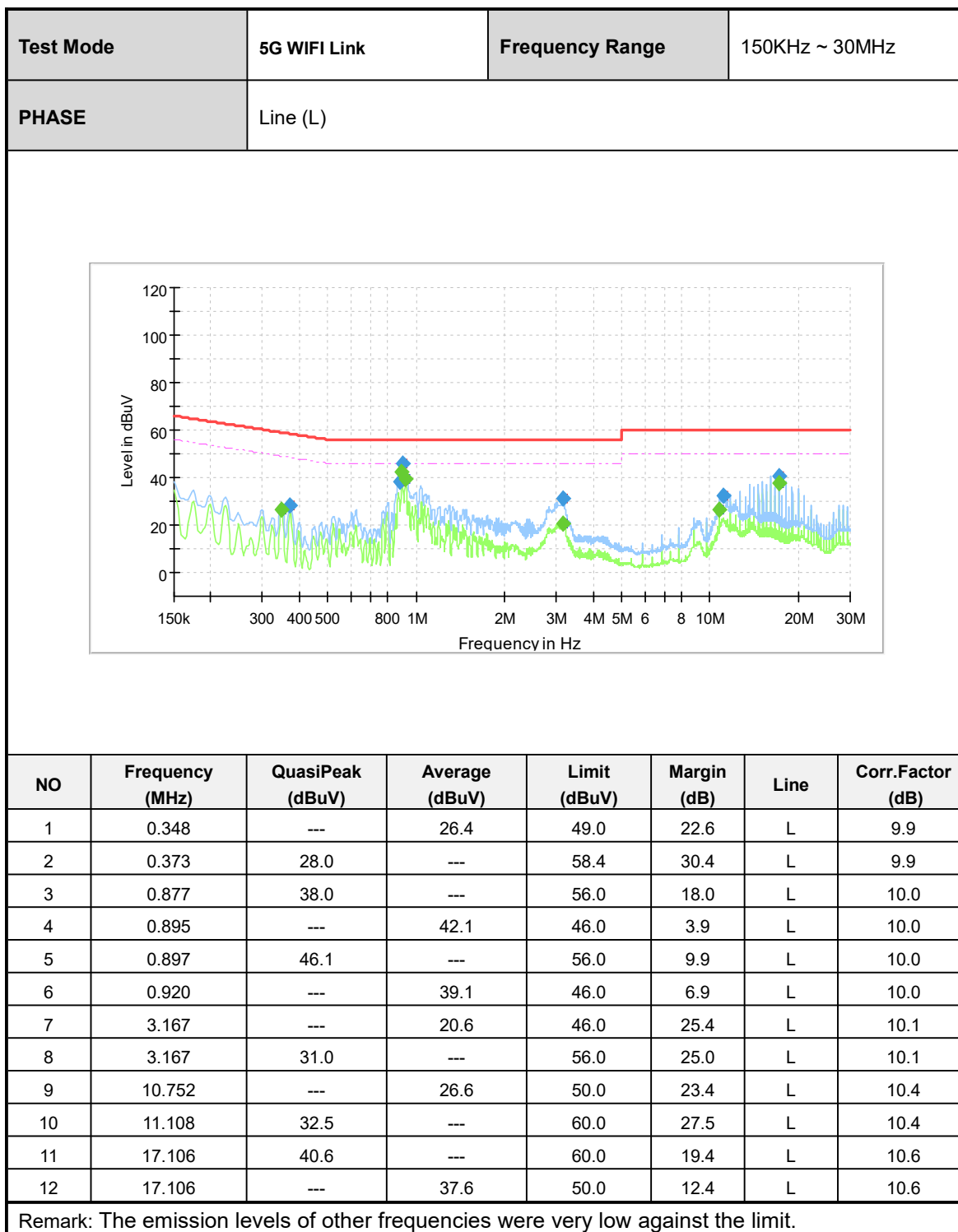
**NOTE:** All modes of operation were investigated and the worst-case emissions are reported.

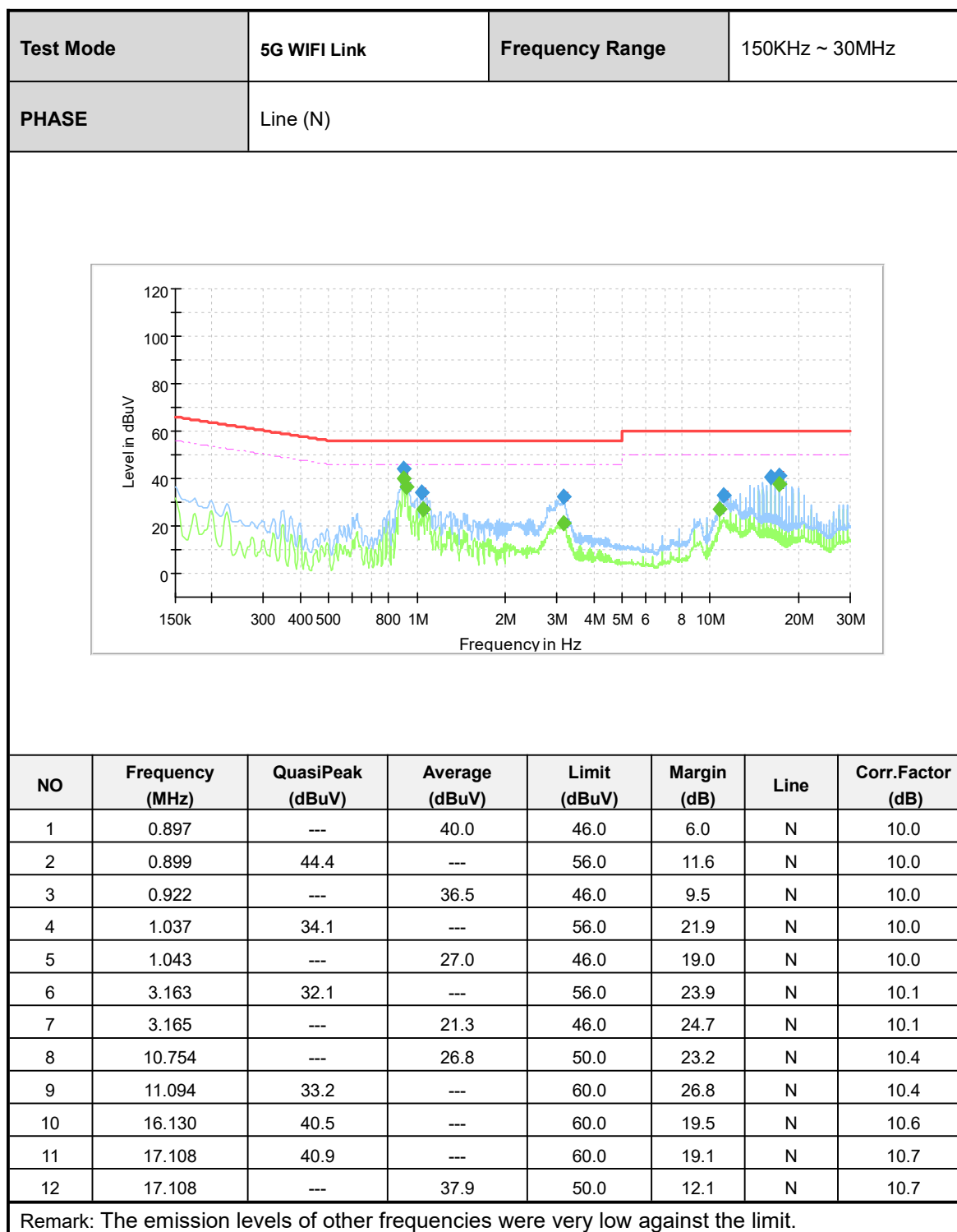
##### 3.1.3 TEST SETUP



**NOTE:** For the actual test configuration, please refer to the attached file (Test Setup Photo).

### 3.1.4 TEST RESULTS





## 3.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT

### 3.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table:

| FREQUENCIES<br>(MHz) | FIELD STRENGTH<br>(microvolts/meter) | MEASUREMENT DISTANCE<br>(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                                |

**NOTE:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 30dB under any condition of modulation.

### 3.1.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

| APPLICABLE TO                                                   | LIMIT                |                                 |
|-----------------------------------------------------------------|----------------------|---------------------------------|
| KDB 789033 D02 General UNII<br>Test Procedures New Rules v02r01 | FIELD STRENGTH AT 3m |                                 |
|                                                                 | PK:74 (dBμV/m)       | AV:54 (dBμV/m)                  |
| APPLICABLE TO                                                   | EIRP LIMIT           | EQUIVALENT FIELD STRENGTH AT 3m |
| 15.407(b)(1)                                                    | PK:-27 (dBm/MHz)     | PK:68.2(dBμV/m)                 |
| 15.407(b)(2)                                                    |                      |                                 |
| 15.407(b)(3)                                                    |                      |                                 |
| 15.407(b)(4)                                                    | Note                 | Note                            |

**NOTE:**

For transmitters operating in the 5.725-5.85 GHz band:Section 15.407(b)(4) specifies the unwanted emissions limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). An alternative to the band emissions mask is specified in Section 15.407(b)(4)(ii). The alternative limits are based on the highest antenna gain specified in the filing. There are also marketing and importation restrictions for the alternative limit.

15.407(b)(4)(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below theband edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above orbelow the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27dBm/MHz at the band edge.

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where } P \text{ is the eirp (Watts).}$$

### 3.1.3 TEST PROCEDURES

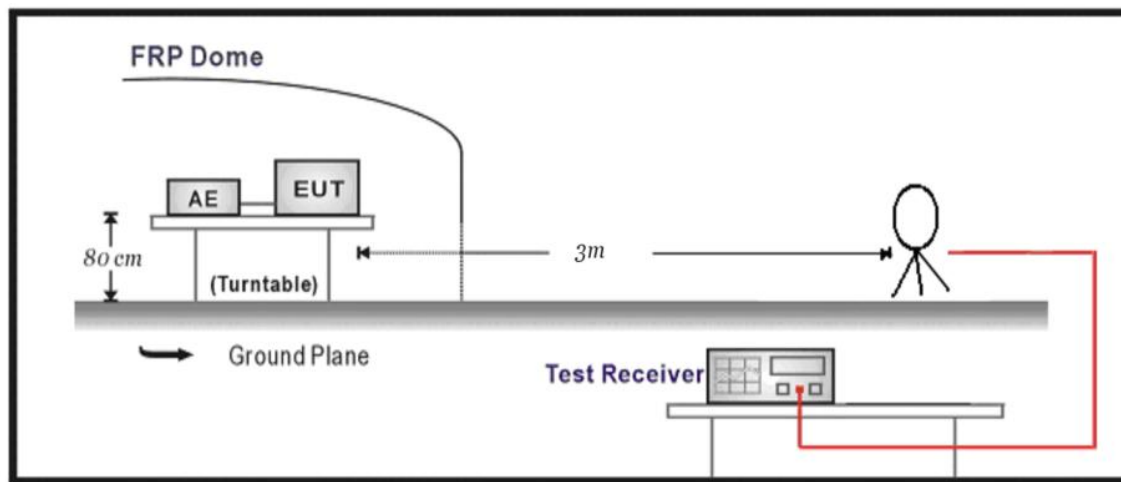
- a. The EUT was placed on the top of a rotating table 1.5 meters(above 1GHz)and 0.8 meters(below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its 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 and the rotatable 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.

**NOTE:**

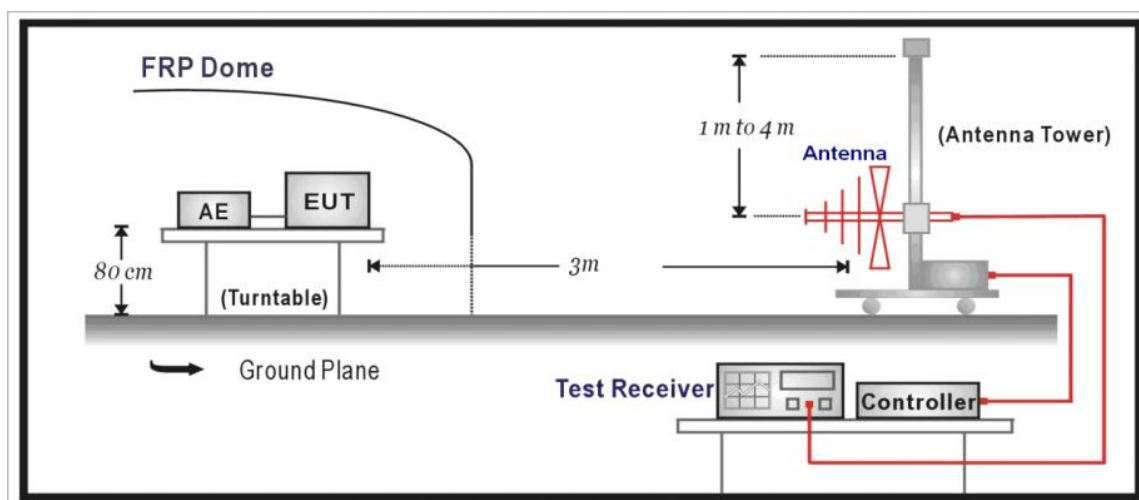
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is  $\geq 1/T$  (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

### 3.1.4 TEST SETUP

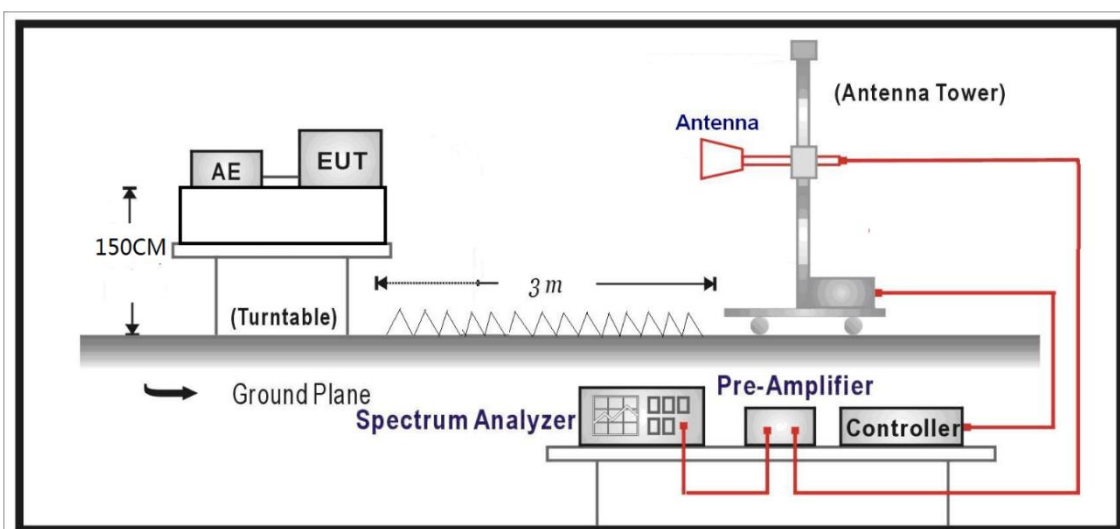
Below 30MHz Test Setup:



Below 1GHz Test Setup:

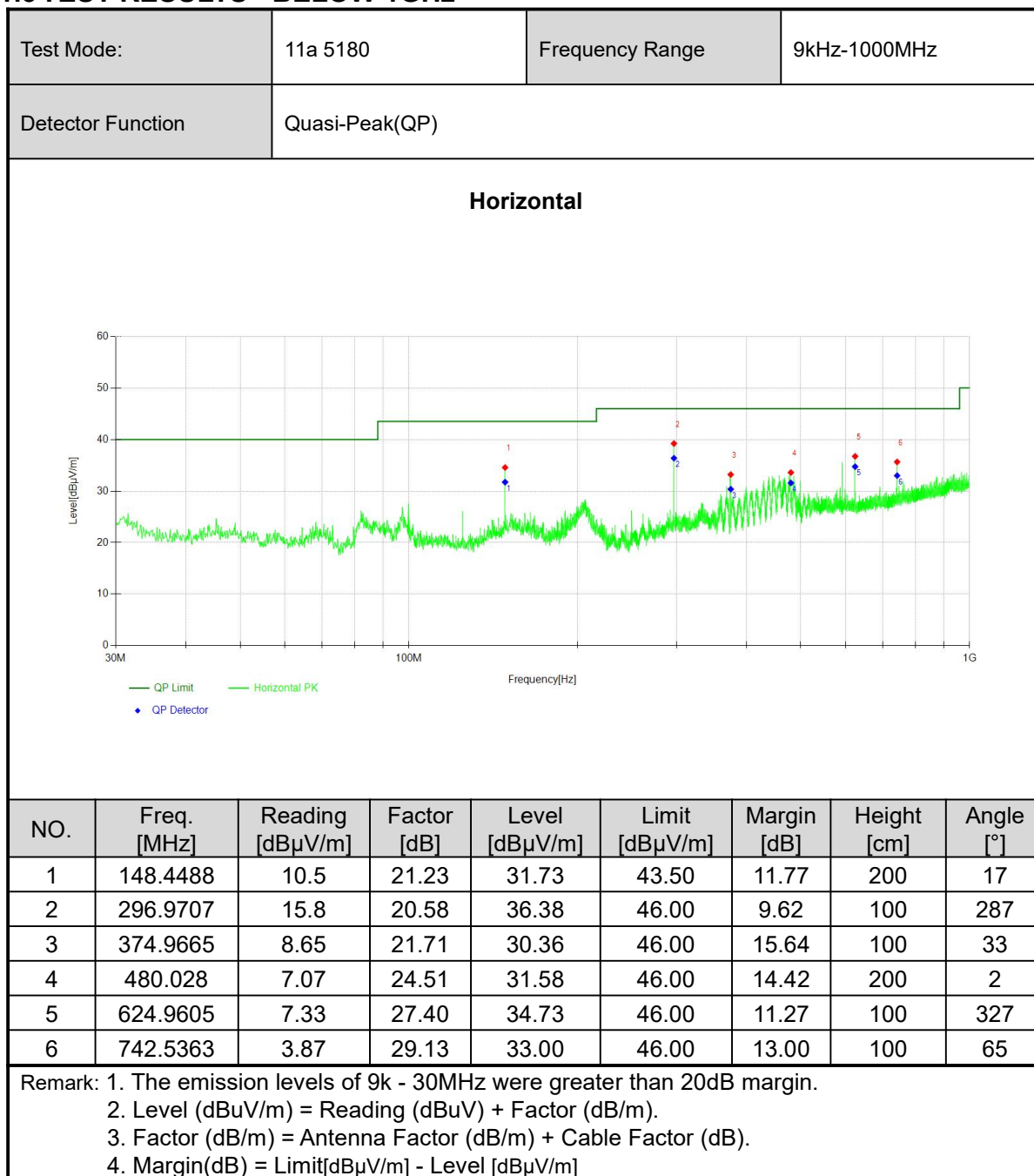


Above 1GHz Test Setup:



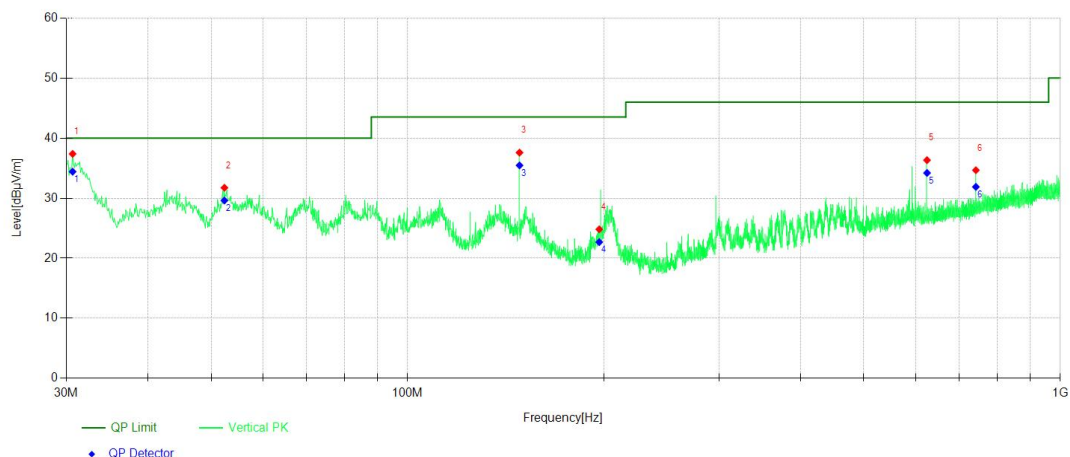
**Note:** For the actual test configuration, please refer to the related Item in this test report (Photographs of the Test Setup)

### 3.1.5 TEST RESULTS - BELOW 1GHz



|                   |                |                 |              |
|-------------------|----------------|-----------------|--------------|
| Test Mode:        | 11a 5180       | Frequency Range | 9kHz-1000MHz |
| Detector Function | Quasi-Peak(QP) |                 |              |

**Vertical**



| NO. | Freq. [MHz] | Reading [dBμV/m] | Factor [dB] | Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] |
|-----|-------------|------------------|-------------|----------------|----------------|-------------|-------------|-----------|
| 1   | 30.6791     | 14.19            | 20.22       | 34.41          | 40.00          | 5.59        | 100         | 311       |
| 2   | 52.4092     | 10.19            | 19.42       | 29.61          | 40.00          | 10.39       | 100         | 41        |
| 3   | 148.4488    | 14.23            | 21.23       | 35.46          | 43.50          | 8.04        | 100         | 9         |
| 4   | 196.6627    | 5.33             | 17.36       | 22.69          | 43.50          | 20.81       | 100         | 41        |
| 5   | 624.9605    | 6.8              | 27.40       | 34.20          | 46.00          | 11.80       | 100         | 73        |
| 6   | 742.5363    | 2.75             | 29.13       | 31.88          | 46.00          | 14.12       | 100         | 57        |

Remark: 1. The emission levels of 9k - 30MHz were greater than 20dB margin.  
2. Level (dBuV/m) = Reading (dBuV) + Factor (dB/m).  
3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).  
4. Margin(dB) = Limit[dBμV/m] - Level [dBμV/m]

### 3.1.6 TEST RESULTS - Band 1 (5180-5240MHz):

#### ABOVE 1GHz DATA

All test modes have been conducted, and the report only presents the worst case.

|                 |                            |                   |                  |                   |                   |                |          |
|-----------------|----------------------------|-------------------|------------------|-------------------|-------------------|----------------|----------|
| Channel         | 802.11n(HT40)<br>CH38 MIMO |                   |                  | Frequency         | 5190 MHz          |                |          |
| Frequency Range | Above 1G                   |                   |                  | Detector Function | PK/AV             |                |          |
| Horizontal      |                            |                   |                  |                   |                   |                |          |
| NO.             | Freq.<br>[MHz]             | Reading<br>[dBμV] | Factor<br>[dB/m] | Level<br>[dBμV/m] | Limit<br>[dBμV/m] | Margin<br>[dB] | Detector |
| 1               | 4961.03                    | 34.51             | 7.39             | 41.90             | 54.00             | 12.10          | AV       |
| 2               | 5096.46                    | 46.08             | 7.57             | 53.65             | 74.00             | 20.35          | PK       |
| 3               | 5150.00                    | 35.97             | 8.03             | 44.00             | 54.00             | 10.00          | AV       |
| 4               | 5150.00                    | 46.77             | 8.03             | 54.80             | 74.00             | 19.20          | PK       |
| 5               | 5183.38                    | 83.79             | 7.82             | 91.61             |                   |                | PK       |
| 6               | 5205.47                    | 75.92             | 8.15             | 84.07             |                   |                | AV       |
| 7               | 10380.00                   | 25.56             | 16.32            | 41.88             | 68.20             | 26.32          | PK       |
| 8               | 10380.00                   | 16.86             | 16.32            | 33.18             | 54.00             | 20.82          | AV       |
| 9               | 15570.00                   | 21.02             | 19.48            | 40.50             | 74.00             | 33.50          | PK       |
| 10              | 15570.00                   | 12.53             | 19.48            | 32.01             | 54.00             | 21.99          | AV       |

Remark: 1. The emission levels of other frequencies were greater than 20dB margin.  
2. Level (dBμV/m) = Reading (dBμV) + Factor (dB/m).  
3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).  
4. Margin(dB) = Limit[dBμV/m] - Level [dBμV/m]

|                 |                |                            |                  |                   |                   |                |          |
|-----------------|----------------|----------------------------|------------------|-------------------|-------------------|----------------|----------|
| Channel         |                | 802.11n(HT40)<br>CH38 MIMO |                  | Frequency         |                   | 5190 MHz       |          |
| Frequency Range |                | Above 1G                   |                  | Detector Function |                   | PK/AV          |          |
| Vertical        |                |                            |                  |                   |                   |                |          |
| NO.             | Freq.<br>[MHz] | Reading<br>[dBμV]          | Factor<br>[dB/m] | Level<br>[dBμV/m] | Limit<br>[dBμV/m] | Margin<br>[dB] | Detector |
| 1               | 5145.44        | 39.46                      | 7.99             | 47.45             | 54.00             | 6.55           | AV       |
| 2               | 5146.88        | 55.81                      | 7.99             | 63.80             | 74.00             | 10.20          | PK       |
| 3               | 5150.00        | 41.25                      | 8.03             | 49.28             | 54.00             | 4.72           | AV       |
| 4               | 5150.00        | 55.68                      | 8.03             | 63.71             | 74.00             | 10.29          | PK       |
| 5               | 5191.55        | 92.90                      | 7.64             | 100.54            |                   |                | PK       |
| 6               | 5206.43        | 84.18                      | 8.25             | 92.43             |                   |                | AV       |
| 7               | 10380.00       | 26.17                      | 16.32            | 42.49             | 68.20             | 25.71          | PK       |
| 8               | 10380.00       | 16.94                      | 16.32            | 33.26             | 54.00             | 20.74          | AV       |
| 9               | 15570.00       | 21.80                      | 19.48            | 41.28             | 74.00             | 32.72          | PK       |
| 10              | 15570.00       | 13.41                      | 19.48            | 32.89             | 54.00             | 21.11          | AV       |

Remark: 1. The emission levels of other frequencies were greater than 20dB margin.

2. Level (dBuV/m) = Reading (dBuV) + Factor (dB/m).

3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).

4. Margin(dB) = Limit[dBμV/m] - Level [dBμV/m]

|                 |                            |                   |                  |                   |                   |                |          |
|-----------------|----------------------------|-------------------|------------------|-------------------|-------------------|----------------|----------|
| Channel         | 802.11n(HT40)<br>CH46 MIMO |                   |                  | Frequency         | 5230 MHz          |                |          |
| Frequency Range | Above 1G                   |                   |                  | Detector Function | PK/AV             |                |          |
| Horizontal      |                            |                   |                  |                   |                   |                |          |
| NO.             | Freq.<br>[MHz]             | Reading<br>[dBμV] | Factor<br>[dB/m] | Level<br>[dBμV/m] | Limit<br>[dBμV/m] | Margin<br>[dB] | Detector |
| 1               | 5232.85                    | 84.73             | 8.21             | 92.94             |                   |                | PK       |
| 2               | 5235.73                    | 76.47             | 8.21             | 84.68             |                   |                | AV       |
| 3               | 5350.00                    | 33.82             | 9.96             | 43.78             | 54.00             | 10.22          | AV       |
| 4               | 5350.00                    | 44.76             | 9.96             | 54.72             | 74.00             | 19.28          | PK       |
| 5               | 5378.84                    | 46.43             | 10.10            | 56.53             | 74.00             | 17.47          | PK       |
| 6               | 5409.09                    | 34.32             | 10.27            | 44.59             | 54.00             | 9.41           | AV       |
| 7               | 10460.00                   | 24.78             | 16.86            | 41.64             | 68.20             | 26.56          | PK       |
| 8               | 10460.00                   | 16.48             | 16.86            | 33.34             | 54.00             | 20.66          | AV       |
| 9               | 15690.00                   | 13.35             | 20.19            | 33.54             | 54.00             | 20.46          | AV       |
| 10              | 15690.00                   | 22.18             | 20.19            | 42.37             | 74.00             | 31.63          | PK       |

The spectrum plot shows the emission levels across a frequency range from 4.5 GHz to 5.46 GHz. The y-axis represents the level in dBμV/m, ranging from 0 to 120. A prominent peak is observed at 5232.85 MHz, reaching a level of approximately 93 dBμV/m. Red horizontal lines indicate the limit and margin levels. The x-axis is labeled with Frequency [Hz] and the y-axis is labeled with Level [dBμV/m].

Remark: 1. The emission levels of other frequencies were greater than 20dB margin.  
2. Level (dBμV/m) = Reading (dBμV) + Factor (dB/m).  
3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).  
4. Margin(dB) = Limit[dBμV/m] - Level [dBμV/m]

|                 |                |                            |                  |                   |                   |                |          |
|-----------------|----------------|----------------------------|------------------|-------------------|-------------------|----------------|----------|
| Channel         |                | 802.11n(HT40)<br>CH46 MIMO |                  | Frequency         |                   | 5230 MHz       |          |
| Frequency Range |                | Above 1G                   |                  | Detector Function |                   | PK/AV          |          |
| Vertical        |                |                            |                  |                   |                   |                |          |
| NO.             | Freq.<br>[MHz] | Reading<br>[dBμV]          | Factor<br>[dB/m] | Level<br>[dBμV/m] | Limit<br>[dBμV/m] | Margin<br>[dB] | Detector |
| 1               | 5223.24        | 84.46                      | 8.21             | 92.67             |                   |                | AV       |
| 2               | 5241.01        | 93.35                      | 8.22             | 101.57            |                   |                | PK       |
| 3               | 5350.00        | 47.12                      | 9.96             | 57.08             | 74.00             | 16.92          | PK       |
| 4               | 5350.00        | 34.18                      | 9.96             | 44.14             | 54.00             | 9.86           | AV       |
| 5               | 5371.64        | 47.12                      | 9.96             | 57.08             | 74.00             | 16.92          | PK       |
| 6               | 5410.06        | 34.59                      | 10.29            | 44.88             | 54.00             | 9.12           | AV       |
| 7               | 10460.00       | 24.94                      | 16.86            | 41.80             | 68.20             | 26.40          | PK       |
| 8               | 10460.00       | 16.57                      | 16.86            | 33.43             | 54.00             | 20.57          | AV       |
| 9               | 15690.00       | 13.84                      | 20.19            | 34.03             | 54.00             | 19.97          | AV       |
| 10              | 15690.00       | 23.93                      | 20.19            | 44.12             | 74.00             | 29.88          | PK       |

Remark: 1. The emission levels of other frequencies were greater than 20dB margin.  
2. Level (dBuV/m) = Reading (dBuV) + Factor (dB/m).  
3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).  
4. Margin(dB) = Limit[dBμV/m] - Level [dBμV/m]

### 3.1.7 TEST RESULTS - Band 4 (5745-5825MHz):

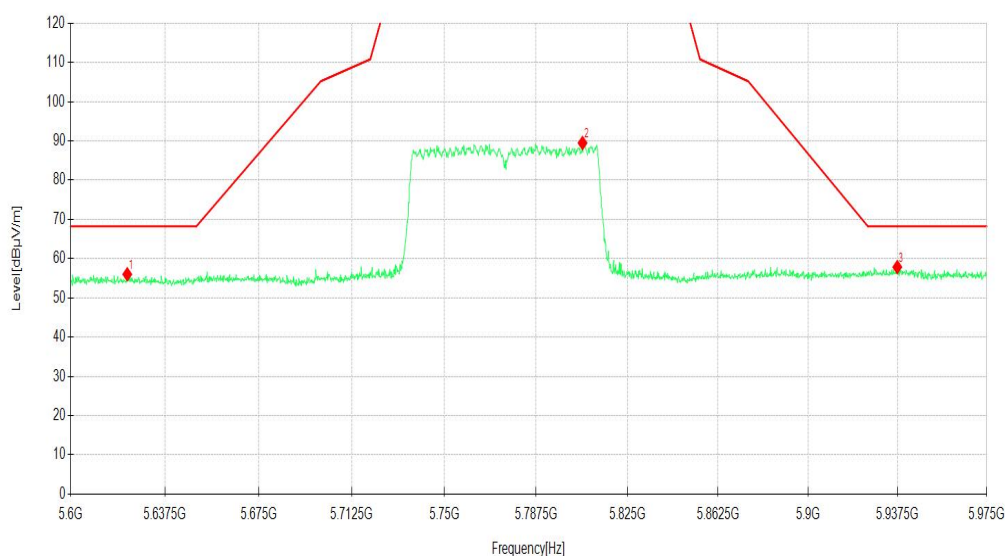
#### ABOVE 1GHz DATA

All test modes have been conducted, and the report only presents the worst case.

|                 |                                |                   |          |
|-----------------|--------------------------------|-------------------|----------|
| Channel         | 802.11ac(VHT80 )<br>CH157 MIMO | Frequency         | 5775 MHz |
| Frequency Range | Above 1G                       | Detector Function | PK/AV    |

#### Horizontal

| NO. | Freq. [MHz] | Reading [dBμV] | Factor [dB/m] | Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Detector |
|-----|-------------|----------------|---------------|----------------|----------------|-------------|----------|
| 1   | 5622.51     | 47.00          | 9.01          | 56.01          | 68.20          | 12.19       | PK       |
| 2   | 5806.54     | 80.40          | 9.06          | 89.46          | 122.20         | 32.74       | PK       |
| 3   | 5937.29     | 47.12          | 10.73         | 57.85          | 68.20          | 10.35       | PK       |
| 4   | 11550.00    | 24.38          | 15.40         | 39.78          | 74.00          | 34.22       | PK       |
| 5   | 11550.00    | 17.06          | 15.40         | 32.46          | 54.00          | 21.54       | AV       |
| 6   | 17325.00    | 18.62          | 26.20         | 44.82          | 68.20          | 23.38       | PK       |
| 7   | 17325.00    | 10.75          | 26.20         | 36.95          | 54.00          | 17.05       | AV       |



Remark: 1. The emission levels of other frequencies were greater than 20dB margin.  
 2. Level (dBμV/m) = Reading (dBμV) + Factor (dB/m).  
 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).  
 4. Margin(dB) = Limit[dBμV/m] - Level [dBμV/m]

|                 |                |                                |                  |                   |                   |                |          |
|-----------------|----------------|--------------------------------|------------------|-------------------|-------------------|----------------|----------|
| Channel         |                | 802.11ac(VHT80 )<br>CH157 MIMO |                  | Frequency         |                   | 5775 MHz       |          |
| Frequency Range |                | Above 1G                       |                  | Detector Function |                   | PK/AV          |          |
| Vertical        |                |                                |                  |                   |                   |                |          |
| NO.             | Freq.<br>[MHz] | Reading<br>[dBμV]              | Factor<br>[dB/m] | Level<br>[dBμV/m] | Limit<br>[dBμV/m] | Margin<br>[dB] | Detector |
| 1               | 5628.33        | 47.61                          | 9.04             | 56.65             | 68.20             | 11.55          | PK       |
| 2               | 5790.60        | 89.36                          | 8.61             | 97.97             | 122.20            | 24.23          | PK       |
| 3               | 5941.80        | 48.21                          | 10.61            | 58.82             | 68.20             | 9.38           | PK       |
| 4               | 11550.00       | 25.24                          | 15.40            | 40.64             | 74.00             | 33.36          | PK       |
| 5               | 11550.00       | 17.54                          | 15.40            | 32.94             | 54.00             | 21.06          | AV       |
| 6               | 17325.00       | 17.75                          | 26.20            | 43.95             | 68.20             | 24.25          | PK       |
| 7               | 17325.00       | 11.18                          | 26.20            | 37.38             | 54.00             | 16.62          | AV       |

Level[dBuV/m]

Frequency[Hz]

Remark: 1. The emission levels of other frequencies were greater than 20dB margin.

2. Level (dBuV/m) = Reading (dBuV) + Factor (dB/m).

3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).

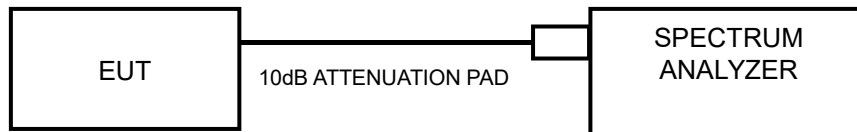
4. Margin(dB) = Limit[dBuV/m] - Level [dBuV/m]

### 3.3 OCCUPIED BANDWIDTH MEASUREMENT

#### 3.3.1 Measurement procedure

The transmitter antenna output was connected to the spectrum analyzer through an attenuator. The resolution bandwidth shall be set to the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth.  
below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

#### 3.3.2 TEST SETUP



### 3.4 26DB EMISSION BANDWIDTH

#### 3.4.1 LIMITS OF 26DB EMISSION BANDWIDTH

This section is for reporting purpose only, there is on restriction limit of bandwidth

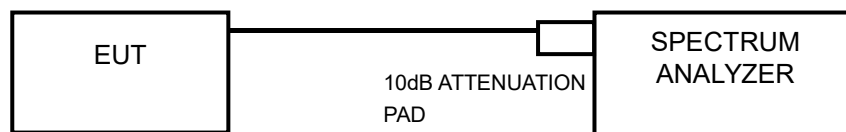
#### 3.4.2 TEST PROCEDURES

##### FOR 26dB BANDWIDTH

- 1) Set RBW = approximately 1% of the emission bandwidth.
- 2) Set the VBW > RBW.
- 3) Detector = Peak
- 4) Trace mode = max hold.
- 5) 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%.

#### 3.4.3 TEST SETUP

##### FOR 26dB BANDWIDTH



### 3.5 6DB EMISSION BANDWIDTH

#### 3.5.1 LIMITS OF 6DB EMISSION BANDWIDTH

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

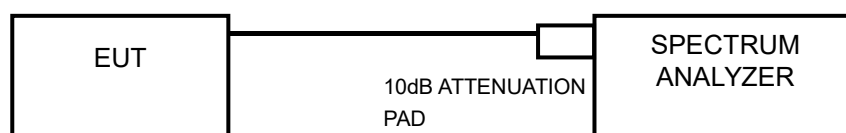
#### 3.5.2 TEST PROCEDURES

##### FOR 6dB BANDWIDTH

- 1)Set RBW = 100 kHz.
- 2)Set the video bandwidth (VBW)  $\geq 3$  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.

#### 3.5.3 TEST SETUP

##### FOR 6dB BANDWIDTH



### 3.6 TRANSMIT POWER MEASUREMENT

#### 3.6.1 LIMITS OF TRANSMIT POWER MEASUREMENT(FCC)

| Operation Band | EUT Category |                                   | LIMIT                                                                                                                       |
|----------------|--------------|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| U-NII-1        |              | Outdoor Access Point              | 1 Watt (30 dBm)<br>(Max. e.i.r.p $\leq$ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon) |
|                |              | Fixed point-to-point Access Point | 1 Watt (30 dBm)                                                                                                             |
|                |              | Indoor Access Point               | 1 Watt (30 dBm)                                                                                                             |
|                | √            | Mobile and Portable client device | 250mW (24 dBm)                                                                                                              |
| U-NII-2A       | √            |                                   | 250mW(24dBm) or 11 dBm+10LogB*                                                                                              |
| U-NII-2C       | √            |                                   | 250mW(24dBm) or 11 dBm+10LogB*                                                                                              |
| U-NII-3        | √            |                                   | 1 Watt (30 dBm)                                                                                                             |

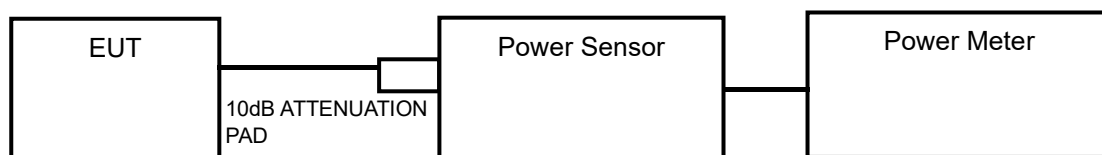
**NOTE:** 1. Where B is the 26dB emission bandwidth in MHz.

#### 3.6.2 TEST PROCEDURES

##### FOR AVERAGE POWER MEASUREMENT

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

#### 3.6.3 TEST SETUP



### 3.7 POWER SPECTRAL DENSITY MEASUREMENT

#### 3.7.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT(FCC)

| Operation Band | EUT Category |                                   | LIMIT         |
|----------------|--------------|-----------------------------------|---------------|
| U-NII-1        |              | Outdoor Access Point              | 17dBm/ MHz    |
|                |              | Fixed point-to-point Access Point |               |
|                |              | Indoor Access Point               |               |
|                | √            | Mobile and Portable client device | 11dBm/ MHz    |
| U-NII-2A       | √            |                                   | 11dBm/ MHz    |
| U-NII-2C       | √            |                                   | 11dBm/ MHz    |
| U-NII-3        | √            |                                   | 30dBm/ 500kHz |

#### 3.7.2 TEST PROCEDURE

##### For U-NII-1, U-NII-2A, U-NII-2Cband:

Using method SA-2

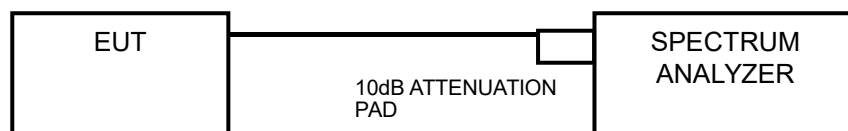
- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 1MHz, Set VBW =3 MHz, Detector = AV
- 3) Set Channel power measure = 1MHz
- 4) Sweep time = auto, trigger set to“free run”.
- 5) Trace average at least 100 traces in power averaging mode.
- 6) Record the max value and add 10 log (1/duty cycle)

##### For U-NII-3 band:

Using method SA-2

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 300 kHz, Set VBW =1 MHz, Detector = AV
- 3) Set Channel power measure = 1MHz
- 4) Sweep time = auto, trigger set to“free run”.
- 5) Trace average at least 100 traces in power averaging mode.
- 6) Record the max value and add 10 log (1/duty cycle)

#### 3.7.3 TEST SETUP



### 3.8 FREQUENCY STABILITY

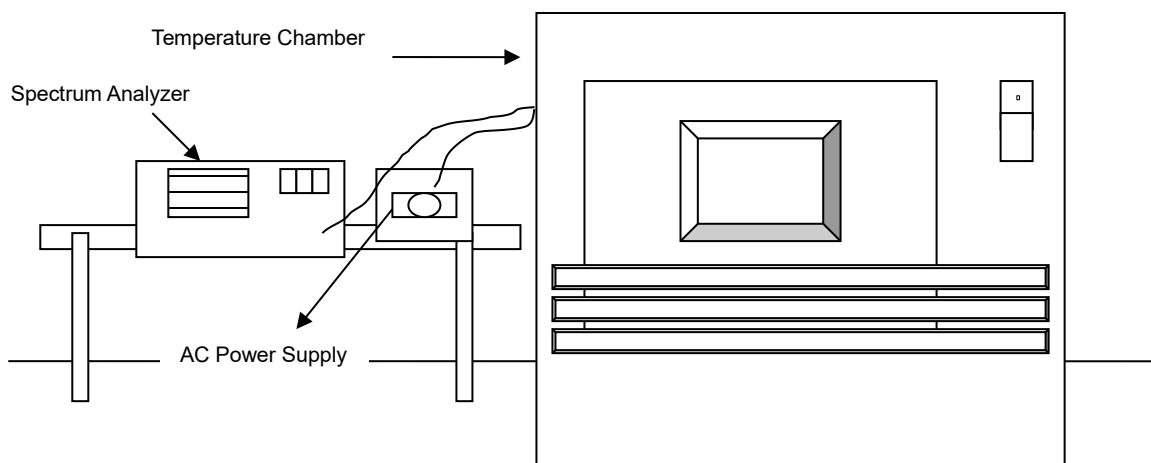
#### 3.8.1 LIMITS OFFREQUENCY STABILITY

The frequency of the carrier signal shall be maintained within band of operation.

#### 3.8.2 TEST PROCEDURES

- The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
- Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

#### 3.8.3 TEST SETUP



### 3.9 ANTENNA REQUIREMENT

#### 3.9.1 LIMITS OFFREQUENCY STABILITY

For intentional device, according to FCC 47 CFR Section 15.203, 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. According to FCC 47 CFR Section 15.407(a)(1)(2) , if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### 3.9.2 ANTENNA ANTI-REPLACEMENT CONSTRUCTION

The antenna used for this product is FPC antenna and that no antenna other than that furnished by the responsible party shall be used with the device

#### 3.9.3 ANTENNA GAIN

The maximum peak gain of the transmit antenna 1 is 2.79 dBi.

The maximum peak gain of the transmit antenna 2 is 2.79dBi.

| Operation Band                   | Chain 1 Antenna Gain(dBi) | Chain 2 Antenna Gain(dBi) | DG For Power (dBi) | Power Limit Reduction |
|----------------------------------|---------------------------|---------------------------|--------------------|-----------------------|
| 5180 ~ 5240MHz<br>5745 ~ 5825MHz | 2.79                      | 2.79                      | 5.80               | 0                     |

Refer to KDB662911 D01 Multiple Transmitter Output v02r01.

d) *Unequal antenna gains, with equal transmit powers.* For antenna gains given by  $G_1, G_2, \dots, G_N$  dBi

(i) If transmit signals are *correlated*, then

Directional gain =  $10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N_{\text{ANT}}]$  dBi [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

(ii) If all transmit signals are *completely uncorrelated*, then

Directional gain =  $10 \log[(10^{G_1/10} + 10^{G_2/10} + \dots + 10^{G_N/10}) / N_{\text{ANT}}]$  dBi

#### **4 PHOTOGRAPHS OF TEST SETUP**

Please refer to the attached file (Test Setup Photo).

## **5 PHOTOGRAPHS OF THE EUT**

Please refer to the attached file (External Photos report and Internal Photos).

----- End of the Report -----

## Important

- (1) The test report is invalid without the official stamp of CVC;
- (2) Any part photocopies of the test report are forbidden without the written permission from CVC;
- (3) The test report is invalid without the signatures of Approval and Reviewer;
- (4) The test report is invalid if altered;
- (5) Objections to the test report must be submitted to CVC within 15 days.
- (6) Generally, commission test is responsible for the tested samples only.
- (7) As for the test result “-” or “N” means “not applicable”, “/” means “not test”, “P” means “pass” and “F” means “fail”

*\*\*The test data and test results given in this test report should only be used for purposes of scientific research, teaching and internal quality control when the CMA symbol is not presented.\*\**

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