



FCC&IC TEST REPORT

FCC ID:2AO8RNI-9000

IC:29263-NI9000

Report Number..... ZKT-230316L1780E-2

Date of Test..... Apr.13, 2023 to May.6, 2023

Date of issue..... May.6, 2023

Total number of pages..... 40

Test Result..... PASS

Testing Laboratory..... **Shenzhen ZKT Technology Co., Ltd.**

Address 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue,
Fuhai Street, Bao'an District, Shenzhen, China

Applicant's name **Netvue Technologies Co.,Ltd.**

Address Room A501-502, Academy of Aerospace Technology, 10 Kejinan
Road, Nanshan District, Shenzhen, China, 518057

Manufacturer's name **Netvue Technologies Co.,Ltd.**

Address Room A501-502, Academy of Aerospace Technology, 10 Kejinan
Road, Nanshan District, Shenzhen, China, 518057

Test specification:

Standard..... RSS-247 Issue 2, February 2017
RSS-GEN Issue 5 April 2018 Amendment 2(February 2021)
ANSI C63.10:2013

Test procedure..... /

Non-standard test method N/A

Test Report Form No..... TRF-EL-110_V0

Test Report Form(s) Originator..... ZKT Testing

Master TRF Dated: 2020-01-06

This device described above has been tested by ZKT, and 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.

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Product name: Peekababy

Trademark : Netvue

Model/Type reference: NI-9000

Serial model No: NI-9001,NI-9002, NI-9003, NI-9004, NI-9005, NI-9006, NI-9007,
NI-9008, NI-9009

Ratings: DC 5V from adapter input AC 120V/60Hz

**Testing procedure and testing location:****Testing Laboratory.....: Shenzhen ZKT Technology Co., Ltd.**Address.....: 1/F, No. 101, Building B, No. 6, Tangwei Community
Industrial Avenue, Fuhai Street, Bao'an District,
Shenzhen, China

Tested by (name + signature).....: Alen He

Reviewer (name + signature).....: Joe Liu

Approved (name + signature).....: Lake Xie





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1. VERSION

| Report No. | Version | Description | Approved |
|--------------------|---------|-------------------------|--------------|
| ZKT-230316L1780E-2 | Rev.01 | Initial issue of report | May. 6, 2023 |
| | | | |
| | | | |



2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

| FCC part 15 C RSS-247 Issue 2 RSS-Gen Issue 5 | | | |
|--|----------------------------------|--------|--------|
| Standard Section | Test Item | Result | Remark |
| FCC part 15.203/15.247 (c) RSS-GEN §6.8 | Antenna requirement | PASS | |
| FCC part 15.207 RSS-Gen§8.8 RSS-247§ 3.1 | AC Power Line Conducted Emission | PASS | |
| FCC part 15.247 (b)(3) RSS-247§5.4 | Conducted Peak Output Power | PASS | |
| FCC part 15.247 (a)(2) RSS-GEN §6.7 RSS-247 §5.2 | 6dB Channel Bandwidth& 99% OCB | PASS | |
| FCC part 15.247 (e) RSS-247 §5.2 | Power Spectral Density | PASS | |
| FCC part 15.247(d) RSS-247 §5.5 | Band Edge | PASS | |
| FCC part 15.205/15.209 RSS-Gen §8.9&8.10 | Spurious Emission | PASS | |

NOTE:

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



2.1 TEST FACILITY

Shenzhen ZKT Technology Co., Ltd.

Add. : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

FCC Test Firm Registration Number: 692225

Designation Number: CN1299

IC Registered No.: 27033

CAB identifier: CN0110

2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$ · 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 | 3m chamber Radiated spurious emission(9KHz-30MHz) | U=4.5dB |
| 2 | 3m chamber Radiated spurious emission(30MHz-1GHz) | U=4.8dB |
| 3 | 3m chamber Radiated spurious emission(1GHz-6GHz) | U=4.9dB |
| 4 | 3m chamber Radiated spurious emission(6GHz-40GHz) | U=5.0dB |
| 5 | Conducted disturbance | U=3.2dB |
| 6 | RF Band Edge | U=1.68dB |
| 7 | RF power conducted | U=1.86dB |
| 8 | RF conducted Spurious Emission | U=2.2dB |
| 9 | RF Occupied Bandwidth | U=1.8dB |
| 10 | RF Power Spectral Density | U=1.75dB |
| 11 | humidity uncertainty | U=5.3% |
| 12 | Temperature uncertainty | U=0.59°C |




3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

| | |
|------------------------|---|
| Product Name: | Peekababy |
| Model No.: | NI-9000 |
| Model Different.: | NI-9001,NI-9002, NI-9003, NI-9004, NI-9005, NI-9006, NI-9007, NI-9008, NI-9009 |
| Difference: | All the same except the model number. |
| Hardware Version: | M23_PAD_V1_1_1202 |
| Software Version: | NI-9000_v1.0.0.C00 |
| Sample ID: | #230413-A01 |
| Sample(s) Status: | Engineer sample |
| Frequency: | 905-925MHz |
| Channel numbers: | 802.11ah:11 |
| Channel separation: | 2MHz |
| Modulation technology: | 802.11ah: Orthogonal Frequency Division Multiplexing(OFDM) |
| Antenna Type: | FPCB Antenna |
| Antenna gain: | 0.61 dBi |
| Adapter 1: | Manufacturer: Dongguan Aohai Technology Co.,Ltd. Model:A18A-050100U-US2 Input: AC 100-240V 50/60Hz 0.2A Output: DC 5V/1A |
| Adapter 2: | Manufacturer: SHENZHEN TIANYIN ELECTRONICS CO.,LTD Model: TPA-46B050100UU Input: AC 100-240V 50/60Hz 0.15A Output: DC 5V/1A |
| Adapter 3: | Manufacturer: Chenzhou Frecom Electronics Co.,Ltd Model:F05L5-050100SPAU-U Input: AC 100-240V 50/60Hz 0.15A Output: DC 5V/1A |
| Remark: | All the modes and the adapters have tested and recorded the worst mode and adapter in the report. |

Operation Frequency each of channel

| Channel | Frequency | Chann el | Frequency | Chann el | Frequency | Chann el | Frequency |
|---------|-----------|-------------|-----------|-------------|-----------|---|-----------|
| 1 | 905MHz | 4 | 911MHz | 7 | 917MHz | 10 | 923MHz |
| 2 | 907MHz | 5 | 913MHz | 8 | 919MHz | 11 | 925MHz |
| 3 | 909MHz | 6 | 915MHz | 9 | 921MHz |  | |
| | | | | | | | |

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:

| Test channel | Frequency (MHz) | |
|-----------------|-----------------|--|
| | 802.11ah | |
| Lowest channel | 905MHz | |
| Middle channel | 915MHz | |
| Highest channel | 925MHz | |

3.2 DESCRIPTION OF TEST MODES

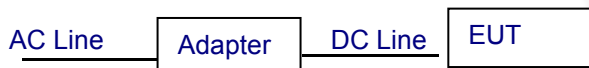
| | |
|--|--|
| Transmitting mode | Keep the EUT in continuously transmitting mode |
| Remark: During the test, the duty cycle >98%, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data. | |

| | | | | | | |
|--|----------|--|--|--|--|--|
| We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows: | | | | | | |
| Pre-scan all kind of data rate in lowest channel, and found the follow list which it was worst case. | | | | | | |
| Mode | 802.11ah | | | | | |
| Data rate | 100Kbps | | | | | |

| | |
|-------------------|-------------------|
| Test Software | Realtek Test Tool |
| Power level setup | <13dBm |

3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Emission



Radiated Emission



Conducted Spurious





3.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

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.

| Item | Equipment | Mfr/Brand | Model/Type No. | Series No. | Note |
|------|-----------|-----------|----------------|------------|------|
| E-1 | Peekababy | Netvue | NI-9000 | N/A | EUT |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| Item | Shielded Type | Ferrite Core | Length | Note |
|------|---------------|--------------|--------|------|
| | | | | |
| | | | | |
| | | | | |

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.



3.5EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

| Item | Equipment | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until |
|------|-----------------------------------|----------------|-----------------|-------------------|------------------|------------------|
| 1 | Spectrum Analyzer (9kHz-26.5GHz) | KEYSIGHT | 9020A | MY55370835 | Oct. 28, 2022 | Oct. 27, 2023 |
| 2 | Spectrum Analyzer (10kHz-39.9GHz) | R&S | FSQ | 100363 | Oct. 28, 2022 | Oct. 27, 2023 |
| 3 | EMI Test Receiver (9kHz-7GHz) | R&S | ESCI7 | 101169 | Oct. 28, 2022 | Oct. 27, 2023 |
| 4 | Bilog Antenna (30MHz-1500MHz) | Schwarzbeck | VULB9168 | N/A | Nov. 02, 2022 | Nov. 01, 2023 |
| 5 | Horn Antenna (1GHz-18GHz) | Agilent | AH-118 | 071145 | Nov. 01, 2022 | Oct. 31, 2023 |
| 6 | Horn Antenna (15GHz-40GHz) | A.H.System | SAS-574 | 588 | Oct. 28, 2022 | Oct. 27, 2023 |
| 7 | Loop Antenna | TESEQ | HLA6121 | 58357 | Nov. 01, 2022 | Oct. 31, 2023 |
| 8 | Amplifier (30-1000MHz) | EM Electronics | EM330 Amplifier | 060747 | Nov. 15, 2022 | Nov. 14, 2023 |
| 9 | Amplifier (1GHz-26.5GHz) | Agilent | 8449B | 3008A00315 | Oct. 28, 2022 | Oct. 27, 2023 |
| 10 | Amplifier (500MHz-40GHz) | 全聚达 | DLE-161 | 097 | Oct. 28, 2022 | Oct. 27, 2023 |
| 11 | Test Cable | N/A | R-01 | N/A | Oct. 28, 2022 | Oct. 27, 2023 |
| 12 | Test Cable | N/A | R-02 | N/A | Oct. 28, 2022 | Oct. 27, 2023 |
| 13 | Test Cable | N/A | R-03 | N/A | Oct. 28, 2022 | Oct. 27, 2023 |
| 14 | Test Cable | N/A | RF-01 | N/A | Oct. 28, 2022 | Oct. 27, 2023 |
| 15 | Test Cable | N/A | RF-02 | N/A | Oct. 28, 2022 | Oct. 27, 2023 |
| 16 | Test Cable | N/A | RF-03 | N/A | Oct. 28, 2022 | Oct. 27, 2023 |
| 17 | ESG Signal Generator | Agilent | E4421B | N/A | Oct. 21, 2022 | Oct. 20, 2023 |
| 18 | Signal Generator | Agilent | N5182A | N/A | Oct. 21, 2022 | Oct. 20, 2023 |
| 19 | Magnetic Field Probe Tester | Narda | ELT-400 | 0-0344 | Nov. 15, 2022 | Nov. 14, 2023 |
| 20 | Wideband Radio Communication Test | R&S | CMW500 | 106504 | Oct. 28, 2022 | Oct. 27, 2023 |
| 21 | MWRF Power Meter Test system | MW | MW100-RPCB | N/A | Oct. 21, 2022 | Oct. 20, 2023 |
| 22 | D.C. Power Supply | LongWei | TPR-6405D | N/A | \ | \ |
| 23 | EMC Software | Frad | EZ-EMC | Ver.EMC-CON 3A1.1 | \ | \ |
| 24 | RF Software | MW | MTS8310 | V2.0.0.0 | \ | \ |
| 25 | Turntable | MF | MF-7802BS | N/A | \ | \ |
| 26 | Antenna tower | MF | MF-7802BS | N/A | \ | \ |



Conduction Test equipment

| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until |
|------|-------------------|--------------|----------|-----------------|------------------|------------------|
| 1 | LISN | R&S | ENV216 | 101471 | Oct. 28, 2022 | Oct. 27, 2023 |
| 2 | LISN | CYBERTEK | EM5040A | E185040014 9 | Oct. 28, 2022 | Oct. 27, 2023 |
| 3 | Test Cable | N/A | C01 | N/A | Oct. 28, 2022 | Oct. 27, 2023 |
| 4 | Test Cable | N/A | C02 | N/A | Oct. 28, 2022 | Oct. 27, 2023 |
| 5 | EMI Test Receiver | R&S | ESRP3 | 101946 | Oct. 28, 2022 | Oct. 27, 2023 |
| 6 | Absorbing Clamp | DZ | ZN23201 | N/A | Oct. 28, 2022 | Oct. 27, 2023 |



4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

| | |
|-----------------------|--|
| Test Requirement: | FCC Part15 C Section 15.207, RSS-Gen§8.8, RSS-247§ 3.1 |
| Test Method: | ANSI C63.10:2013 |
| Test Frequency Range: | 150KHz to 30MHz |
| Receiver setup: | RBW=9KHz, VBW=30KHz, Sweep time=auto |

4.1.1 POWER LINE CONDUCTED EMISSION Limits

| FREQUENCY (MHz) | Limit (dBuV) | | Standard |
|-----------------|--------------|-----------|----------|
| | Quasi-peak | Average | |
| 0.15 -0.5 | 66 - 56 * | 56 - 46 * | FCC/IC |
| 0.50 -5.0 | 56.00 | 46.00 | FCC/IC |
| 5.0 -30.0 | 60.00 | 50.00 | FCC/IC |

Note:

(1) *Decreases with the logarithm of the frequency.

4.1.2 TEST PROCEDURE

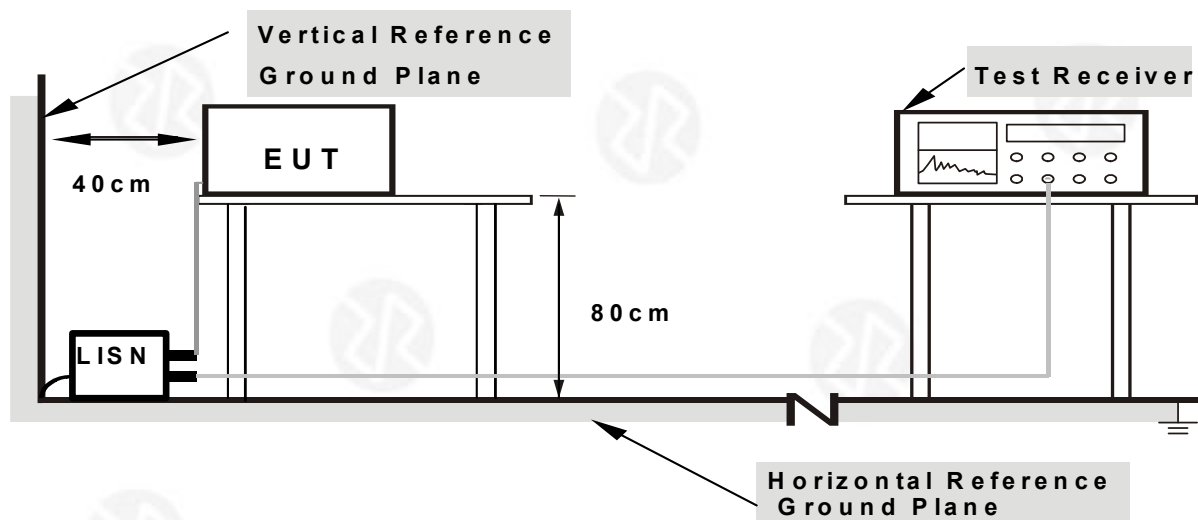
- The EUT was placed 0.1 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- 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.
- 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.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.3 DEVIATION FROM TEST STANDARD

No deviation



4.1.4 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

4.1.5 EUT OPERATING CONDITIONS

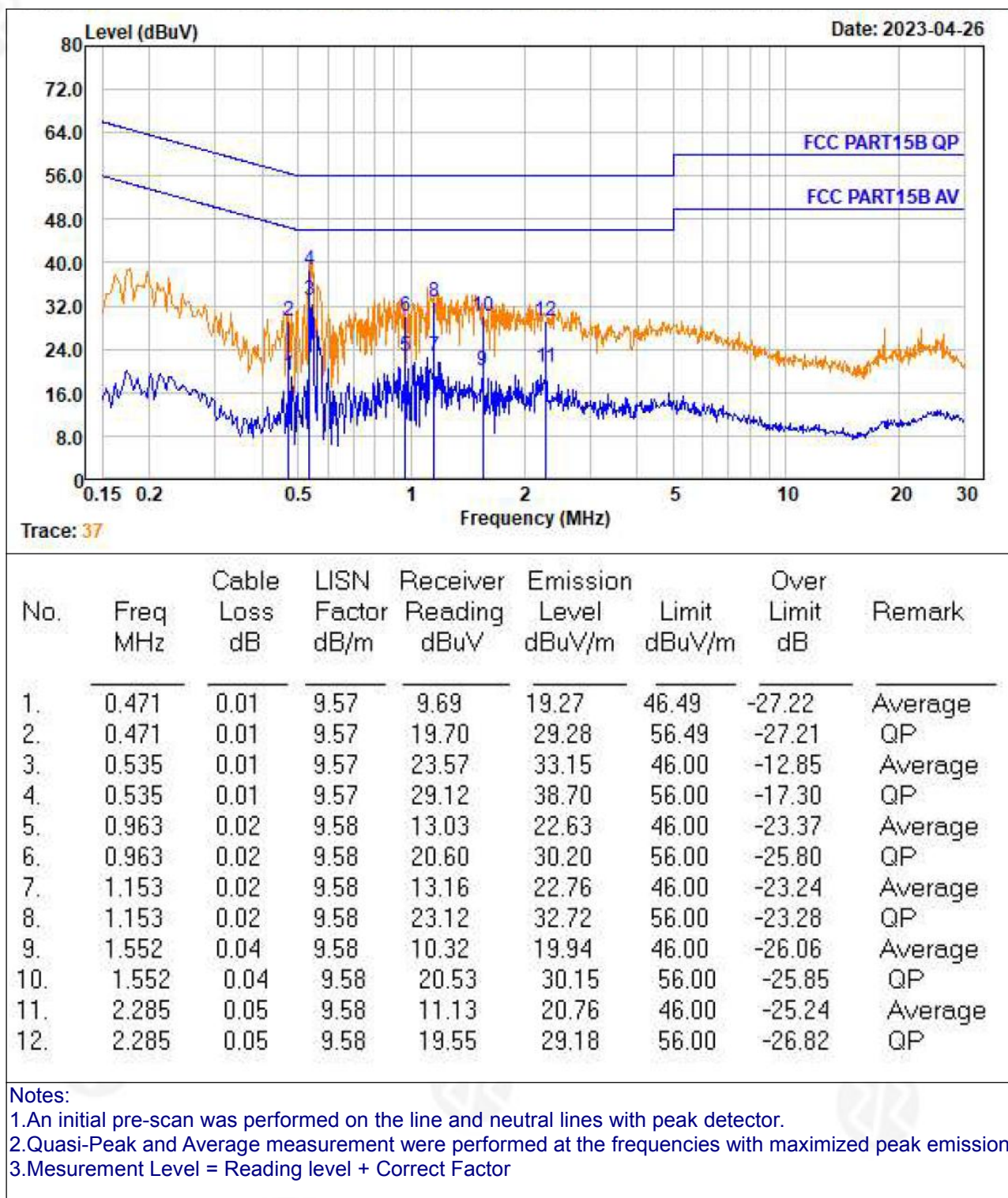
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

We pretest AC 120V and AC 230V, the worst voltage was AC 120V and the data recording in the report.



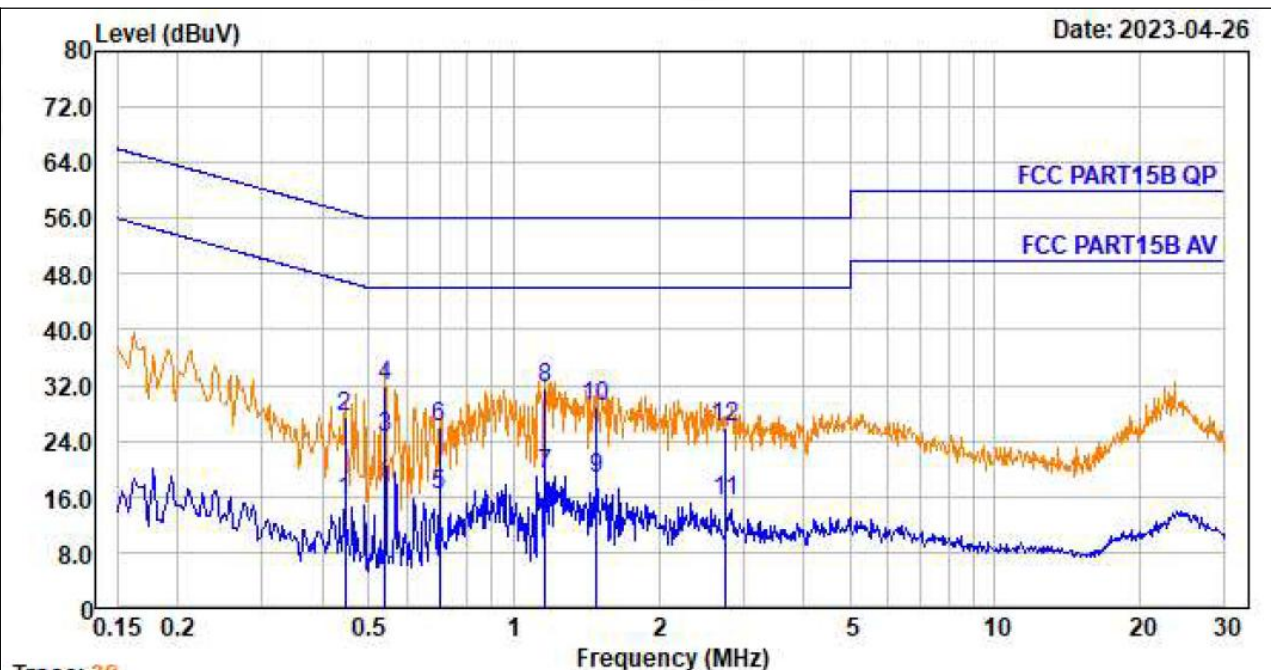
4.1.6 TEST RESULT

| | | | |
|----------------|--------------|--------------------|-----|
| Temperature : | 26℃ | Relative Humidity: | 54% |
| Pressure : | 101kPa | Phase : | L |
| Test Voltage : | AC 120V/60Hz | | |





| | | | |
|----------------|--------------|--------------------|-----|
| Temperature : | 26℃ | Relative Humidity: | 54% |
| Pressure : | 101kPa | Phase : | N |
| Test Voltage : | AC 120V/60Hz | | |



| No. | Freq MHz | Cable Loss dB | LISN Factor dB/m | Receiver Reading dBuV | Emission Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark |
|-----|-------------|---------------------|------------------------|-----------------------------|-----------------------------|-----------------|---------------------|---------|
| 1. | 0.447 | 0.01 | 9.58 | 5.84 | 15.43 | 46.93 | -31.50 | Average |
| 2. | 0.447 | 0.01 | 9.58 | 17.97 | 27.56 | 56.93 | -29.37 | QP |
| 3. | 0.541 | 0.01 | 9.58 | 15.02 | 24.61 | 46.00 | -21.39 | Average |
| 4. | 0.541 | 0.01 | 9.58 | 22.30 | 31.89 | 56.00 | -24.11 | QP |
| 5. | 0.701 | 0.02 | 9.58 | 6.64 | 16.24 | 46.00 | -29.76 | Average |
| 6. | 0.701 | 0.02 | 9.58 | 16.46 | 26.06 | 56.00 | -29.94 | QP |
| 7. | 1.160 | 0.03 | 9.58 | 9.62 | 19.23 | 46.00 | -26.77 | Average |
| 8. | 1.160 | 0.03 | 9.58 | 21.84 | 31.45 | 56.00 | -24.55 | QP |
| 9. | 1.487 | 0.03 | 9.58 | 8.96 | 18.57 | 46.00 | -27.43 | Average |
| 10. | 1.487 | 0.03 | 9.58 | 19.23 | 28.84 | 56.00 | -27.16 | QP |
| 11. | 2.765 | 0.06 | 9.60 | 5.63 | 15.29 | 46.00 | -30.71 | Average |
| 12. | 2.765 | 0.06 | 9.60 | 16.25 | 25.91 | 56.00 | -30.09 | QP |

Notes:
1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Measurement Level = Reading level + Correct Factor



4.2 RADIATED EMISSION MEASUREMENT

| | | | | | |
|-----------------------|--|------------|--------|--------|------------|
| Test Requirement: | FCC Part15 C Section 15.209, RSS-Gen §8.9, RSS-Gen §8.10 | | | | |
| Test Method: | ANSI C63.10:2013 | | | | |
| Test Frequency Range: | 9kHz to 25GHz | | | | |
| Test site: | Measurement Distance: 3m | | | | |
| Receiver setup: | Frequency | Detector | RBW | VBW | Value |
| | 9KHz-150KHz | Quasi-peak | 200Hz | 600Hz | Quasi-peak |
| | 150KHz-30MHz | Quasi-peak | 9KHz | 30KHz | Quasi-peak |
| | 30MHz-1GHz | Quasi-peak | 100KHz | 300KHz | Quasi-peak |
| | Above 1GHz | Peak | 1MHz | 3MHz | Peak |
| | | Peak | 1MHz | 10Hz | Average |

4.2.1 RADIATED EMISSION LIMITS

| 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

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

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

4.2.2 TEST PROCEDURE

Below 1GHz test procedure as below:

- a. The EUT was placed on the top of a rotating table 0.1 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of variable-height antenna tower.



- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1meter) 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 10dBmargin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

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

Note:

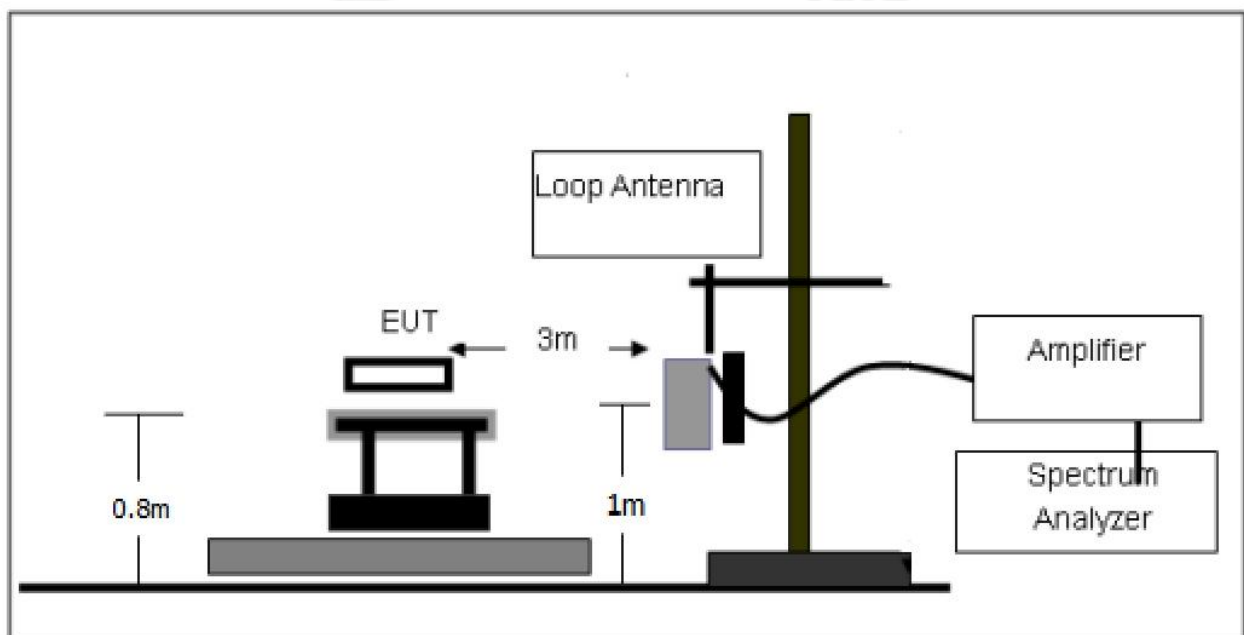
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

4.2.3 DEVIATION FROM TEST STANDARD

No deviation

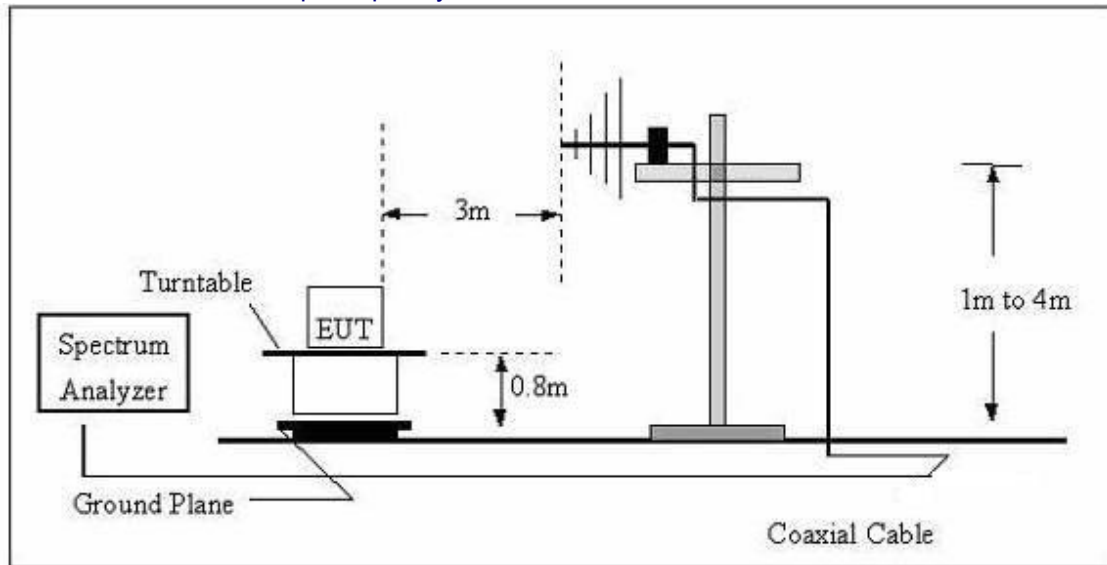
4.2.4 TEST SETUP

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

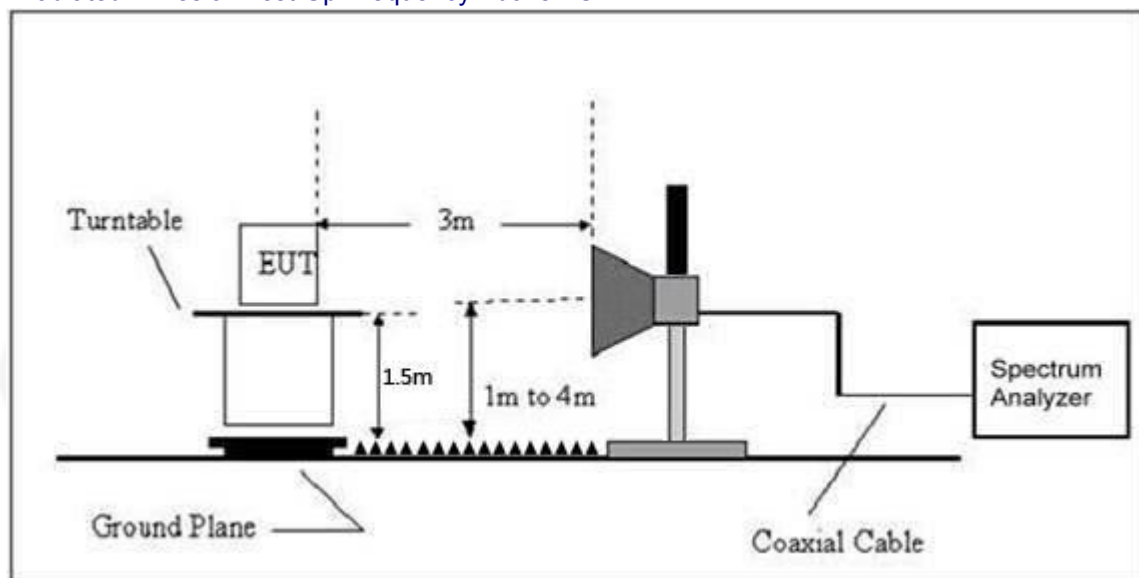




(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



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



4.2.5 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.

4.2.6 TEST RESULTS

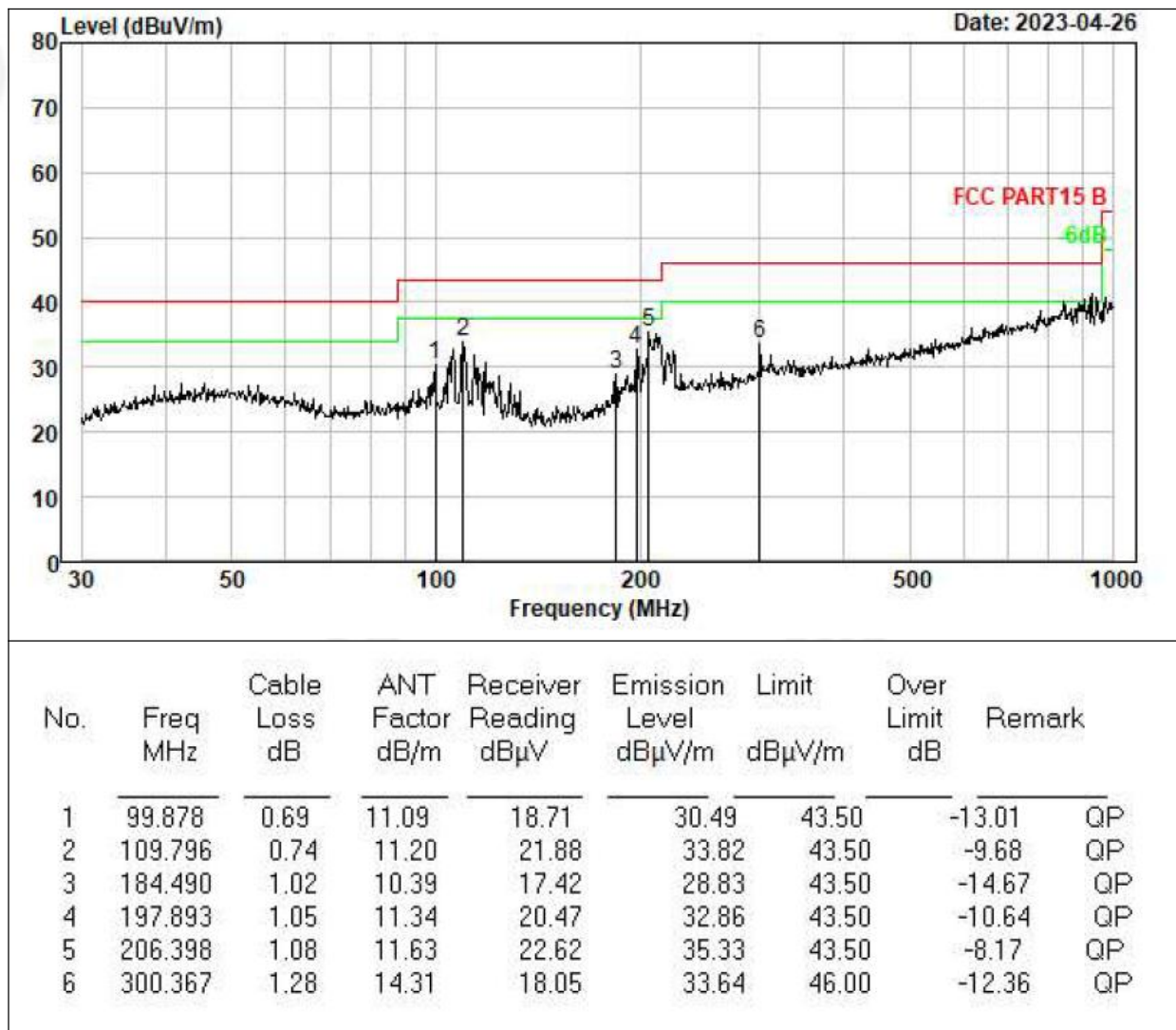
Between 9KHz – 30MHz

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.



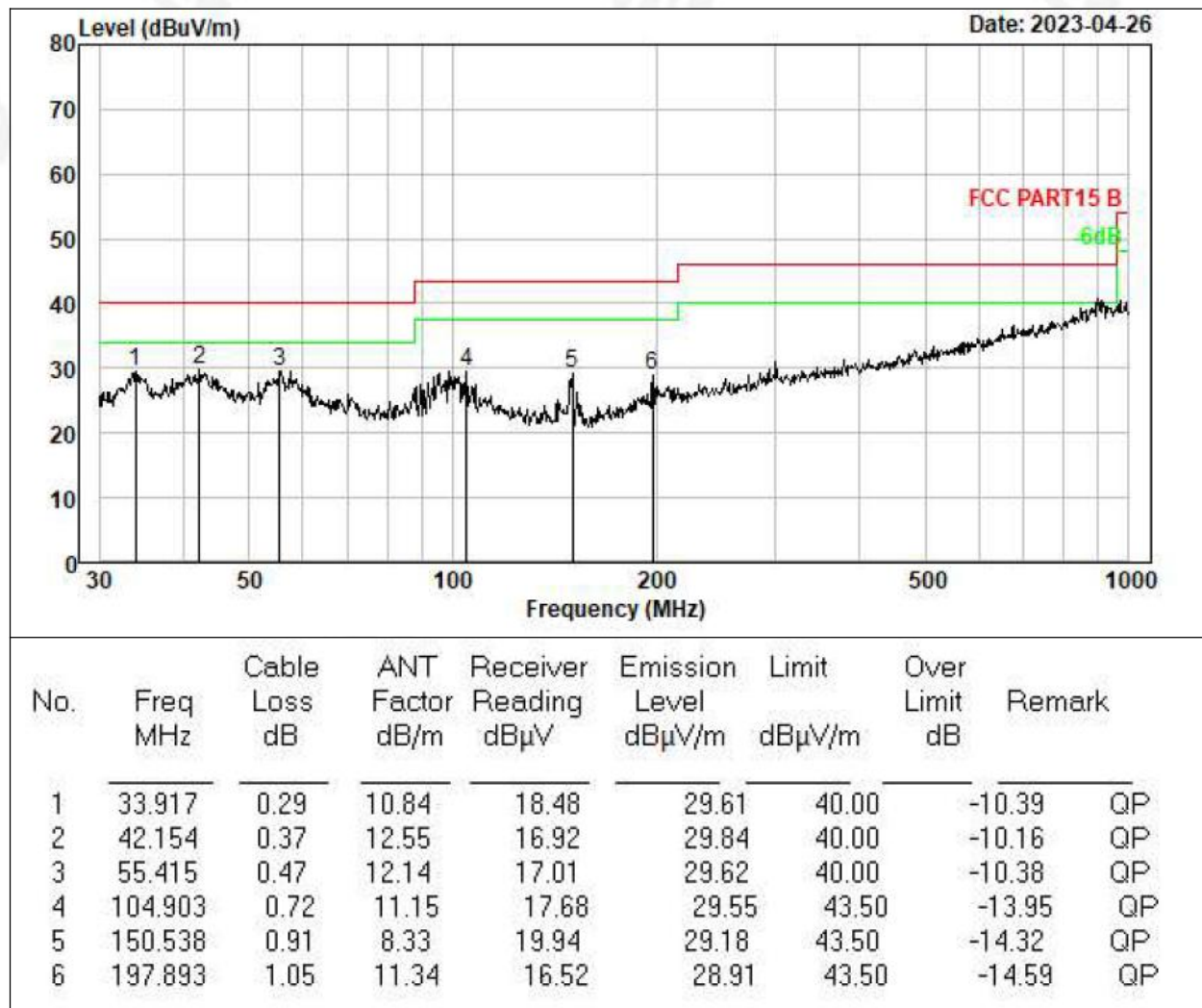
Between 30MHz – 1GHz

| | | | |
|---------------|--------------|--------------------|------------|
| Temperature: | 26℃ | Relative Humidity: | 54% |
| Pressure: | 101 kPa | Polarization: | Horizontal |
| Test Voltage: | AC 120V/60Hz | | |





| | | | |
|---------------|--------------|--------------------|----------|
| Temperature: | 26℃ | Relative Humidity: | 54% |
| Pressure: | 101kPa | Polarization: | Vertical |
| Test Voltage: | AC 120V/60Hz | | |



Remarks:

- 1.Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
- 2.The emission levels of other frequencies are very lower than the limit and not show in test report.



1GHz~25GHz

802.11ah

| Polar (H/V) | Frequency | Meter Reading | Pre-ampl ifier | Cable Loss | Antenna Factor | Emission Level | Limits | Margin | Detect or Type |
|--------------------|-----------|------------------|-------------------|---------------|-------------------|-------------------|--------------|--------|----------------------|
| | (MHz) | (dBuV) | (dB) | (dB) | (dB) | (dBuV/m) | (dBuV/ m) | (dB) | |
| Low Channel:905MHz | | | | | | | | | |
| V | 1810 | 60.49 | 28.86 | 3.79 | 24.17 | 59.59 | 74.00 | -14.41 | PK |
| V | 1810 | 39.09 | 28.86 | 3.79 | 24.17 | 38.19 | 54.00 | -15.81 | AV |
| V | 2715 | 54.18 | 29.01 | 4.68 | 24.26 | 54.11 | 74.00 | -19.89 | PK |
| V | 2715 | 40.35 | 29.01 | 4.68 | 24.26 | 40.28 | 54.00 | -13.72 | AV |
| V | 3620 | 57.60 | 29.64 | 5.01 | 24.38 | 57.35 | 74.00 | -16.65 | PK |
| V | 3620 | 38.96 | 29.64 | 5.01 | 24.38 | 38.71 | 54.00 | -15.29 | AV |
| V | 4525 | 58.01 | 30.08 | 5.33 | 24.57 | 57.83 | 74.00 | -16.17 | PK |
| V | 4525 | 38.14 | 30.08 | 5.33 | 24.57 | 37.96 | 54.00 | -16.04 | AV |
| H | 1810 | 59.27 | 28.86 | 3.79 | 24.17 | 58.37 | 74.00 | -15.63 | PK |
| H | 1810 | 38.82 | 28.86 | 3.79 | 24.17 | 37.92 | 54.00 | -16.08 | AV |
| H | 2715 | 58.30 | 29.01 | 4.68 | 24.26 | 58.23 | 74.00 | -15.77 | PK |
| H | 2715 | 37.56 | 29.01 | 4.68 | 24.26 | 37.49 | 54.00 | -16.51 | AV |
| H | 3620 | 58.19 | 29.64 | 5.01 | 24.38 | 57.94 | 74.00 | -16.06 | PK |
| H | 3620 | 38.64 | 29.64 | 5.01 | 24.38 | 38.39 | 54.00 | -15.61 | AV |
| H | 4525 | 59.07 | 30.08 | 5.33 | 24.57 | 58.89 | 74.00 | -15.11 | PK |
| H | 4525 | 40.05 | 30.08 | 5.33 | 24.57 | 39.87 | 54.00 | -14.13 | AV |

| Polar (H/V) | Frequency | Meter Reading | Pre-ampl ifier | Cable Loss | Antenna Factor | Emission Level | Limits | Margin | Detect or Type |
|-----------------------|-----------|------------------|-------------------|---------------|-------------------|-------------------|--------------|--------|----------------------|
| | (MHz) | (dBuV) | (dB) | (dB) | (dB) | (dBuV/m) | (dBuV/ m) | (dB) | |
| Middle Channel:915MHz | | | | | | | | | |
| V | 1830 | 58.81 | 28.86 | 3.79 | 24.17 | 57.91 | 74.00 | -16.09 | PK |
| V | 1830 | 39.03 | 28.86 | 3.79 | 24.17 | 38.13 | 54.00 | -15.87 | AV |
| V | 2745 | 54.93 | 29.01 | 4.68 | 24.26 | 54.86 | 74.00 | -19.14 | PK |
| V | 2745 | 38.89 | 29.01 | 4.68 | 24.26 | 38.82 | 54.00 | -15.18 | AV |
| V | 3660 | 56.39 | 29.64 | 5.01 | 24.38 | 56.14 | 74.00 | -17.86 | PK |
| V | 3660 | 37.60 | 29.64 | 5.01 | 24.38 | 37.35 | 54.00 | -16.65 | AV |
| V | 4575 | 59.66 | 30.08 | 5.33 | 24.57 | 59.48 | 74.00 | -14.52 | PK |
| V | 4575 | 37.82 | 30.08 | 5.33 | 24.57 | 37.64 | 54.00 | -16.36 | AV |
| H | 1830 | 57.37 | 28.86 | 3.79 | 24.17 | 56.47 | 74.00 | -17.53 | PK |
| H | 1830 | 38.47 | 28.86 | 3.79 | 24.17 | 37.57 | 54.00 | -16.43 | AV |
| H | 2745 | 57.73 | 29.01 | 4.68 | 24.26 | 57.66 | 74.00 | -16.34 | PK |
| H | 2745 | 38.04 | 29.01 | 4.68 | 24.26 | 37.97 | 54.00 | -16.03 | AV |
| H | 3660 | 60.30 | 29.64 | 5.01 | 24.38 | 60.05 | 74.00 | -13.95 | PK |
| H | 3660 | 41.26 | 29.64 | 5.01 | 24.38 | 41.01 | 54.00 | -12.99 | AV |
| H | 4575 | 58.75 | 30.08 | 5.33 | 24.57 | 58.57 | 74.00 | -15.43 | PK |
| H | 4575 | 41.32 | 30.08 | 5.33 | 24.57 | 41.14 | 54.00 | -12.86 | AV |



| Polar (H/V) | Frequency (MHz) | Meter Reading (dBuV) | Pre-ampli fier (dB) | Cable Loss (dB) | Antenna Factor (dB) | Emission Level (dBuV/m) | Limits (dBuV/ m) | Margin (dB) | Detect or Type |
|---------------------|--------------------|----------------------------|---------------------------|-----------------------|---------------------------|-------------------------------|------------------------|----------------|----------------------|
| High Channel:925MHz | | | | | | | | | |
| V | 1850 | 59.75 | 28.86 | 3.79 | 24.17 | 58.85 | 74.00 | -15.15 | PK |
| V | 1850 | 38.88 | 28.86 | 3.79 | 24.17 | 37.98 | 54.00 | -16.02 | AV |
| V | 2775 | 56.98 | 29.01 | 4.68 | 24.26 | 56.91 | 74.00 | -17.09 | PK |
| V | 2775 | 39.35 | 29.01 | 4.68 | 24.26 | 39.28 | 54.00 | -14.72 | AV |
| V | 3700 | 56.13 | 29.64 | 5.01 | 24.38 | 55.88 | 74.00 | -18.12 | PK |
| V | 3700 | 38.79 | 29.64 | 5.01 | 24.38 | 38.54 | 54.00 | -15.46 | AV |
| V | 4625 | 57.24 | 30.08 | 5.33 | 24.57 | 57.06 | 74.00 | -16.94 | PK |
| V | 4625 | 40.67 | 30.08 | 5.33 | 24.57 | 40.49 | 54.00 | -13.51 | AV |
| H | 1850 | 58.34 | 28.86 | 3.79 | 24.17 | 57.44 | 74.00 | -16.56 | PK |
| H | 1850 | 40.09 | 28.86 | 3.79 | 24.17 | 39.19 | 54.00 | -14.81 | AV |
| H | 2775 | 55.32 | 29.01 | 4.68 | 24.26 | 55.25 | 74.00 | -18.75 | PK |
| H | 2775 | 38.49 | 29.01 | 4.68 | 24.26 | 38.42 | 54.00 | -15.58 | AV |
| H | 3700 | 58.23 | 29.64 | 5.01 | 24.38 | 57.98 | 74.00 | -16.02 | PK |
| H | 3700 | 40.08 | 29.64 | 5.01 | 24.38 | 39.83 | 54.00 | -14.17 | AV |
| H | 4625 | 61.62 | 30.08 | 5.33 | 24.57 | 61.44 | 74.00 | -12.56 | PK |
| H | 4625 | 37.65 | 30.08 | 5.33 | 24.57 | 37.47 | 54.00 | -16.53 | AV |

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
4. We test all the mode and recorded the worst mode in the report.



5. RADIATED BAND EMISSION MEASUREMENT

5.1 TEST REQUIREMENT:

| | | | | | |
|-----------------------|--|----------|--------|--------|---------|
| Test Requirement: | FCC Part15 C Section 15.209 and 15.205, RSS-Gen §8.9, RSS-Gen §8.10 | | | | |
| Test Method: | ANSI C63.10: 2013 | | | | |
| Test Frequency Range: | All of the restrict bands were tested, only the worst band's (902MHz to 928MHz) data was showed. | | | | |
| Test site: | Measurement Distance: 3m | | | | |
| Receiver setup: | Frequency | Detector | RBW | VBW | Value |
| | below 1GHz | Peak | 100KHz | 300KHz | Peak |
| | | Average | 100KHz | 300KHz | Average |

LIMITS OF RADIATED EMISSION MEASUREMENT (below 1000MHz)

| FREQUENCY (MHz) | Class B (dBuV/m) (at 3M) |
|-----------------|--------------------------|
| | QP |
| 902-928 | 46 |

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

5.2 TEST PROCEDURE

Above 1GHz test procedure as below:

- a. 1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota 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 10dBmargin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- g. Test the EUT in the lowest channel, the Highest channel

Note:

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

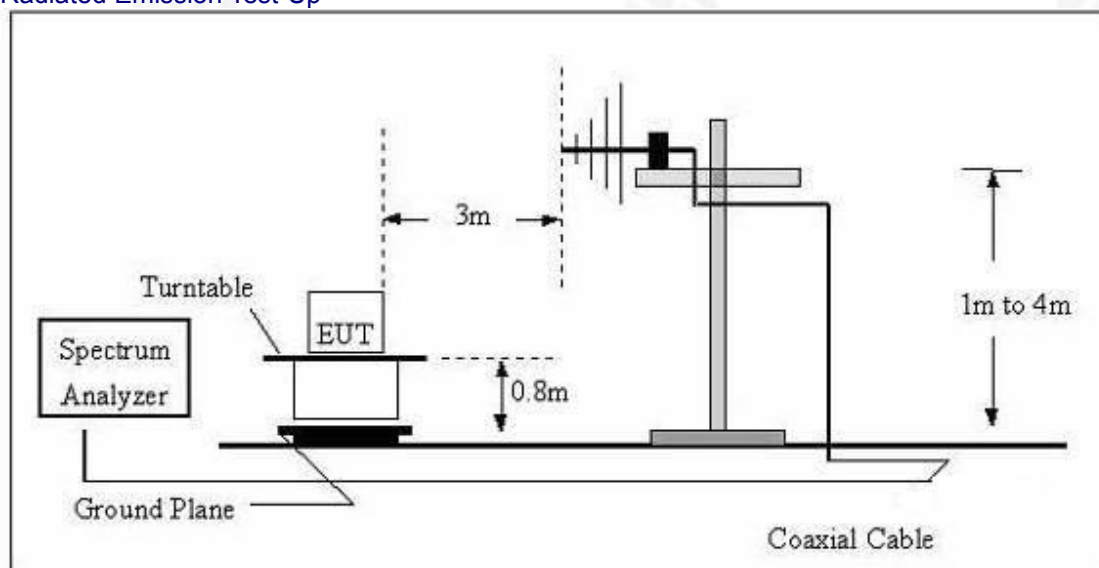
5.3 DEVIATION FROM TEST STANDARD

No deviation



5.4 TEST SETUP

Radiated Emission Test-Up



5.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



5.6 TEST RESULT

| | Polar (H/V) | Frequenc y (MHz) | Meter Reading (dBuV) | Pre- amplifier (dB) | Cable Loss (dB) | Antenna Factor (dB/m) | Emission level (dBuV/m) | Limit (dBuV /m) | Detec tor Type | Result |
|---|---------------------|------------------------|----------------------------|---------------------------|-----------------------|-----------------------------|-------------------------------|-----------------------|----------------------|--------|
| 802.11ah | Low Channel 905MHz | | | | | | | | | |
| | H | 899.08 | 33.35 | 22.59 | 2.37 | 19.75 | 32.88 | 46.00 | QP | PASS |
| | H | 902.00 | 38.80 | 22.59 | 2.37 | 19.75 | 38.33 | 46.00 | QP | PASS |
| | V | 900.90 | 31.98 | 22.59 | 2.37 | 19.75 | 31.51 | 46.00 | QP | PASS |
| | V | 902.00 | 38.84 | 22.59 | 2.37 | 19.75 | 38.37 | 46.00 | QP | PASS |
| | High Channel 925MHz | | | | | | | | | |
| | H | 928.00 | 36.92 | 22.59 | 2.37 | 19.75 | 36.45 | 46.00 | QP | PASS |
| | H | 932.38 | 35.74 | 22.59 | 2.37 | 19.75 | 35.27 | 46.00 | QP | PASS |
| | V | 928.00 | 29.15 | 22.59 | 2.37 | 19.75 | 28.68 | 46.00 | QP | PASS |
| | V | 929.58 | 30.62 | 22.59 | 2.37 | 19.75 | 30.15 | 46.00 | QP | PASS |
| Remark: | | | | | | | | | | |
| 1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit | | | | | | | | | | |



6. POWER SPECTRAL DENSITY TEST

| | |
|-------------------|---|
| Test Requirement: | FCC Part15 C Section 15.247 (e), RSS-247 §5.2 |
| Test Method: | KDB558074 D0115.247 Meas Guidancev05r02 |

6.1 APPLIED PROCEDURES / LIMIT

| RSS-247 §5.2 (b) | | | | |
|------------------|------------------------|-----------|-----------------------|--------|
| Section | Test Item | Limit | Frequency Range (MHz) | Result |
| RSS-247 §5.2 (b) | Power Spectral Density | 8dBm/3kHz | 2400-2483.5 | PASS |

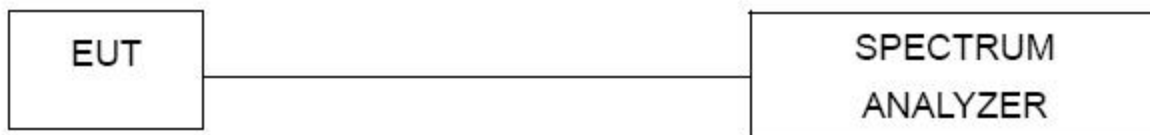
6.2 TEST PROCEDURE

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

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

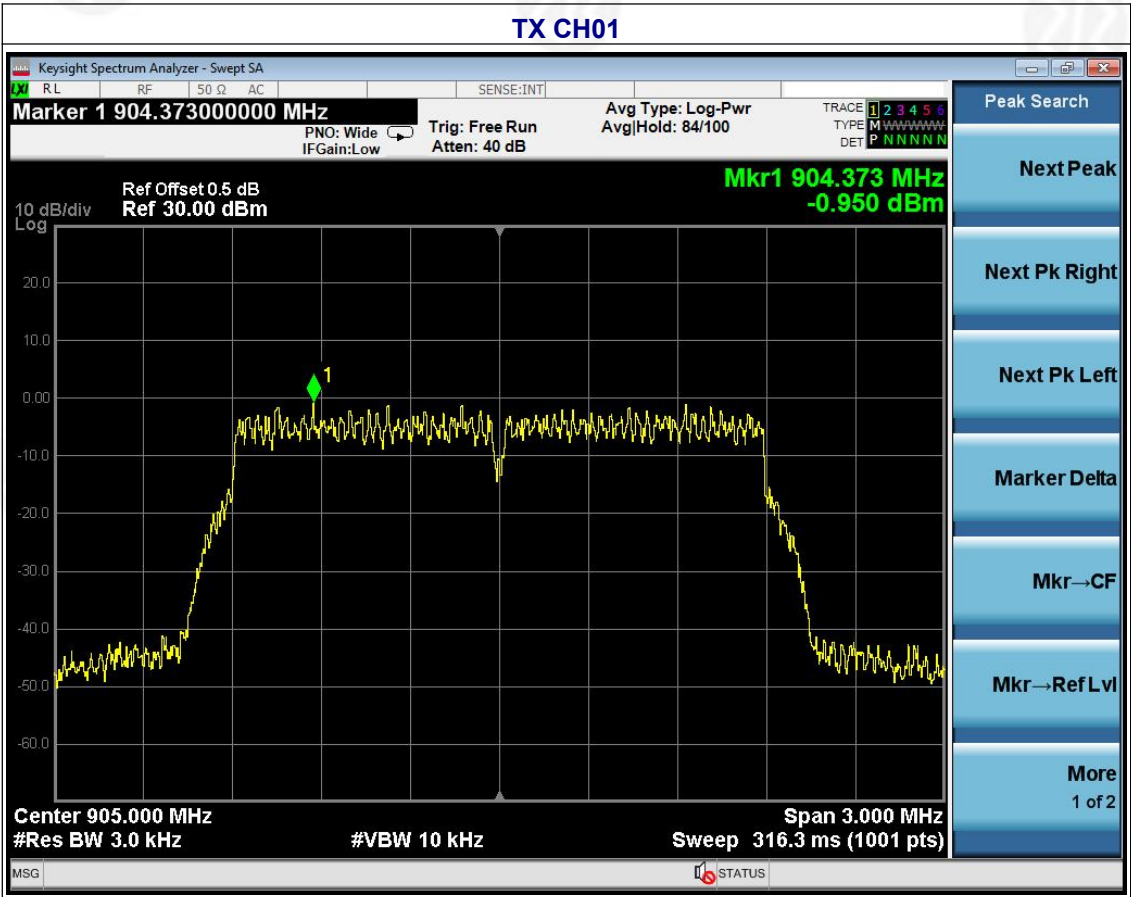
The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

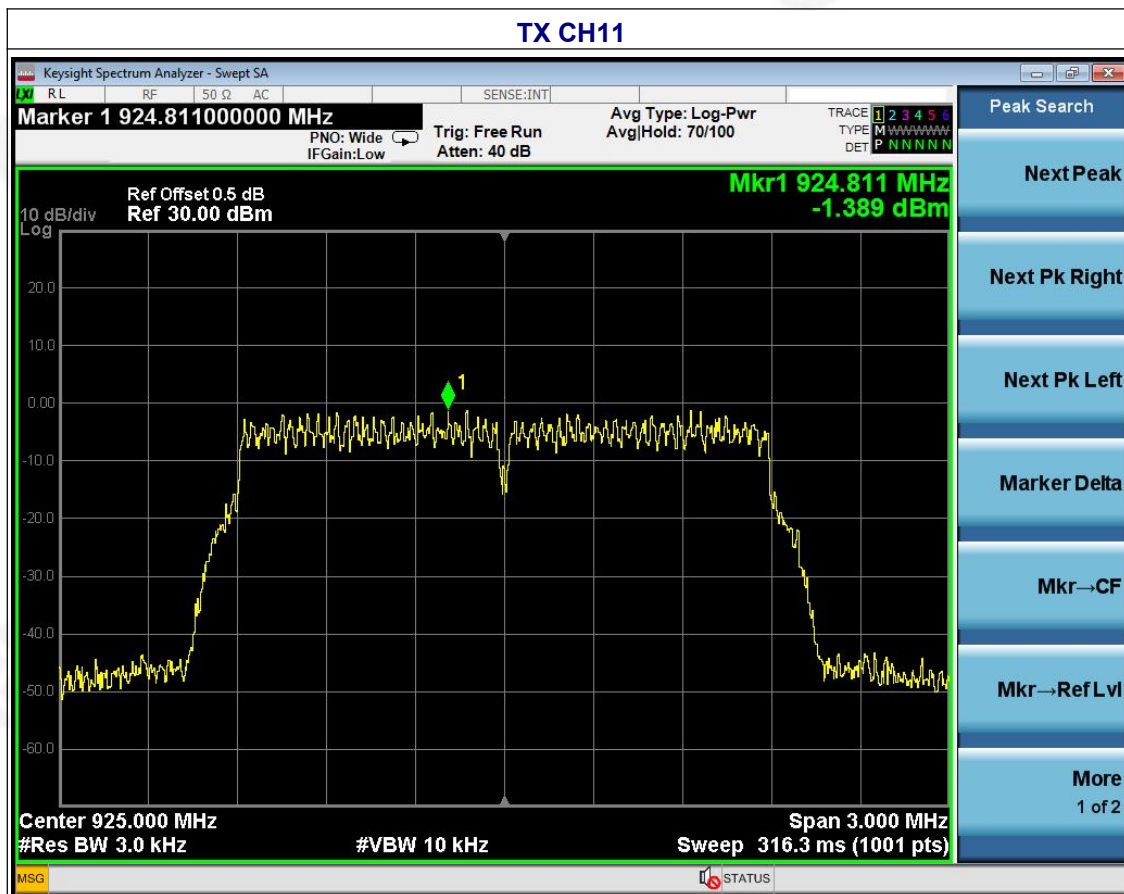
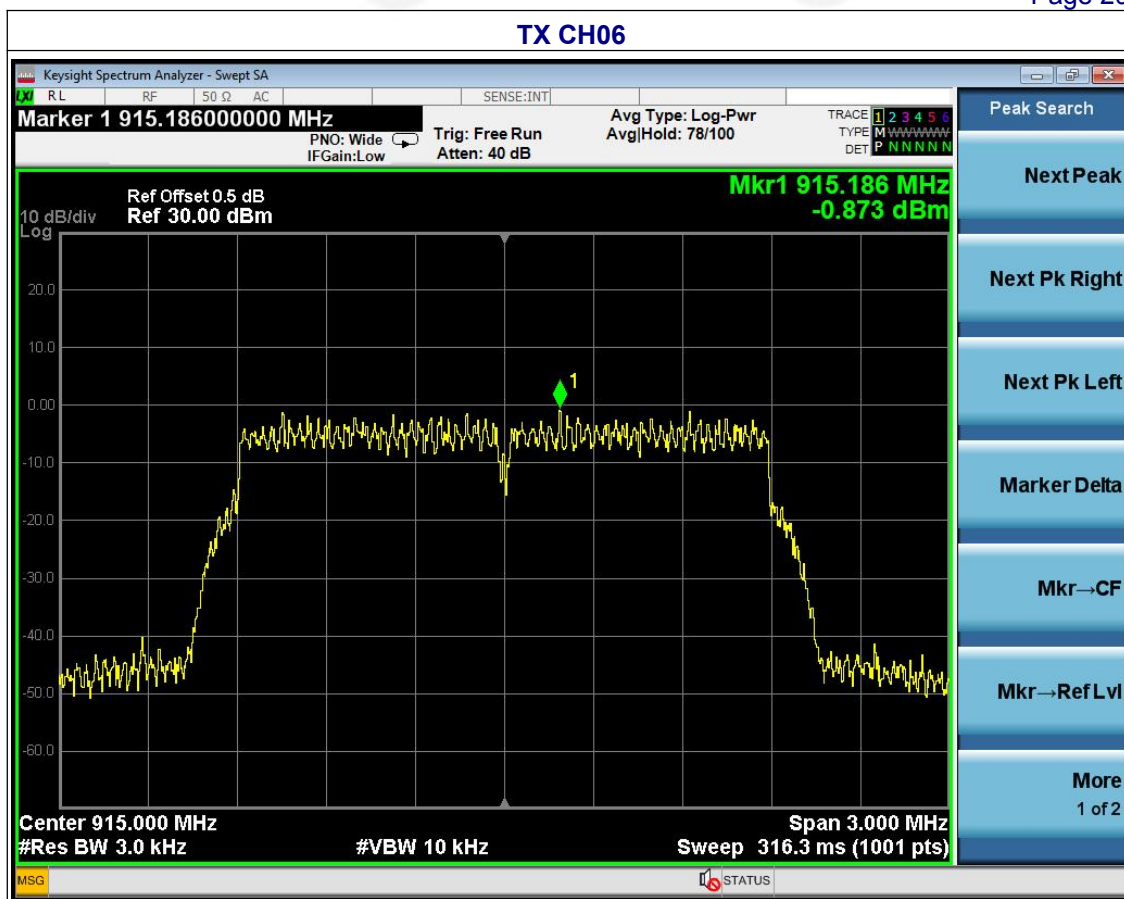


6.6 TEST RESULT

| | | | |
|---------------|---------|---------------------|--------------|
| Temperature : | 26℃ | Relative Humidity : | 54% |
| Pressure : | 101kPa | Test Voltage : | AC 120V/60Hz |
| Test Mode : | TX Mode | | |

| Frequency | Power Spectral Density (dBm/3kHz) | Limit (dBm/3kHz) | Result |
|-----------|--------------------------------------|---------------------|--------|
| 905 MHz | -0.950 | 8 | PASS |
| 915 MHz | -0.873 | 8 | PASS |
| 925 MHz | -1.389 | 8 | PASS |







7. CHANNEL BANDWIDTH& 99% OCCUPY BANDWIDTH

| | |
|-------------------|--|
| Test Requirement: | FCC Part15 C Section 15.247 (a)(2), RSS-GEN §6.7& RSS-247 §5.2 |
| Test Method: | KDB558074 D0115.247 Meas Guidancev05r02 |

7.1 APPLIED PROCEDURES / LIMIT

| RSS-247 §5.2(a) | | | | |
|-----------------|-----------|---|-----------------------|--------|
| Section | Test Item | Limit | Frequency Range (MHz) | Result |
| RSS-247 §5.2(a) | Bandwidth | $\geq 500\text{KHz}$ (6dB bandwidth) | 2400-2483.5 | PASS |

7.2 TEST PROCEDURE

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times \text{RBW}$.
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.

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 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



7.6 TEST RESULT

| | | | |
|---------------|---------|---------------------|--------------|
| Temperature : | 26°C | Relative Humidity : | 54% |
| Pressure : | 101kPa | Test Voltage : | AC 120V/60Hz |
| Test Mode : | TX Mode | | |

| | Test CH | -6dB Occupy Bandwidth (MHz) | | | | Limit (KHz) | Result |
|------|---------|-----------------------------|--|--|--|-------------|--------|
| | | 802.11ah | | | | | |
| ANT1 | Lowest | 1.804 | | | | >500 | Pass |
| | Middle | 1.811 | | | | | |
| | Highest | 1.818 | | | | | |

| | Test CH | 99% Occupy Bandwidth (MHz) | | | | Limit (KHz) | Result |
|------|---------|----------------------------|--|--|--|-------------|--------|
| | | 802.11ah | | | | | |
| ANT1 | Lowest | 2.0169 | | | | / | Pass |
| | Middle | 2.0268 | | | | | |
| | Highest | 2.0272 | | | | | |



Test plot as follows:

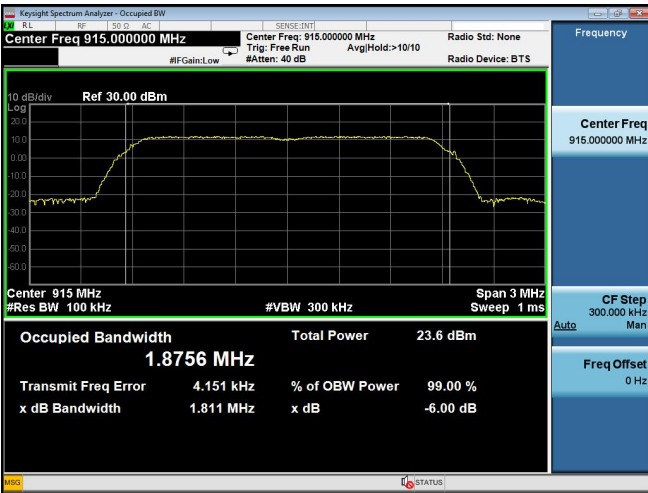
-6dB Occupy Bandwidth 802.11ah

99% Occupy Bandwidth 802.11ah

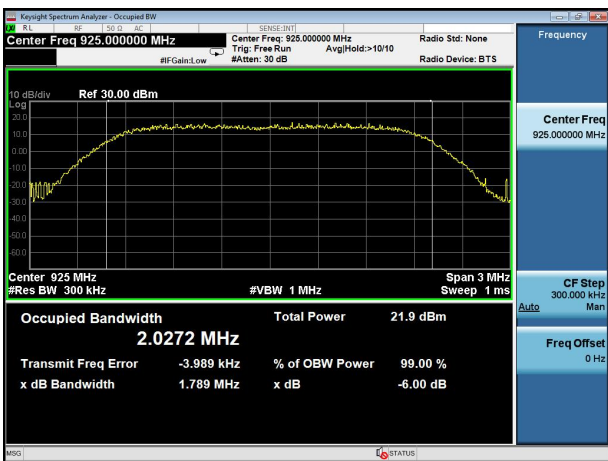
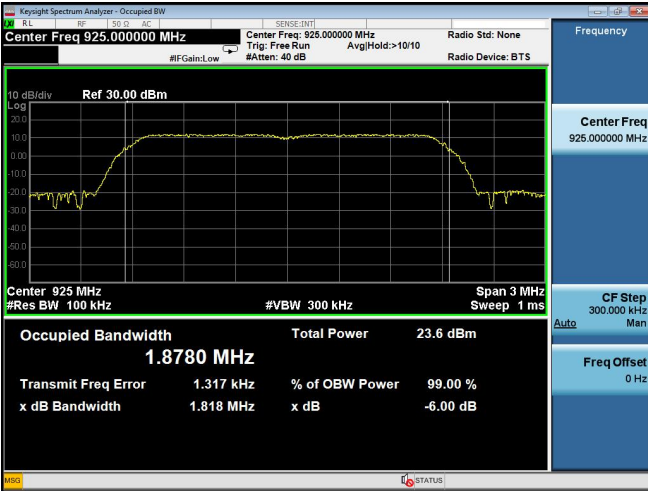
Lowest channel



Middle channel



Highest channel





8. PEAK OUTPUT POWER TEST

| | |
|-------------------|---|
| Test Requirement: | FCC Part15 C Section 15.247 (b)(3), RSS-247 § 5.4 |
| Test Method: | KDB558074 D0115.247 Meas Guidance v05r02 |

8.1 APPLIED PROCEDURES/LIMIT

| RSS-247 § 5.4(d) | | | | |
|------------------|-------------------|-----------------|-----------------------|--------|
| Section | Test Item | Limit | Frequency Range (MHz) | Result |
| RSS-247 § 5.4(d) | Peak Output Power | 1 watt or 30dBm | 2400-2483.5 | PASS |

8.2 TEST PROCEDURE

- a. The EUT was directly connected to the Power meter

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP



8.5 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.



8.6 TEST RESULT

| | | | |
|---------------|--------|---------------------|--------------|
| Temperature : | 26℃ | Relative Humidity : | 54% |
| Pressure : | 101kPa | Test Voltage : | AC 120V/60Hz |

| Test Channel | Frequency (MHz) | Maximum Conducted Output Power | Total power (dBm) | Limit (dBm) |
|------------------|-----------------|--------------------------------|-------------------|-------------|
| | | (dBm) | | |
| | | | | |
| TX 802.11ah Mode | | | | |
| CH01 | 905 | 18.53 | - | 30.00 |
| CH06 | 915 | 18.72 | - | 30.00 |
| CH11 | 925 | 18.15 | - | 30.00 |

Note:

1. For power test the duty cycle is 100% in continuous transmitting mode;
2. TX means Transmit, RX means Receive.



9. CONDUCTED BAND EDGE AND SPURIOUS EMISSION

| | |
|-------------------|---|
| Test Requirement: | FCC Part15 C Section 15.247 (d), RSS-247 §5.5 |
| Test Method: | KDB558074 D0115.247 Meas Guidancev05r02 |

9.1 APPLICABLE STANDARD

in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in§15.205(a), must also comply with the radiated emission limits specified in15.209(a).

9.2 TEST PROCEDURE

Using the following spectrum analyzer setting:

- A) Set the RBW = 100KHz.
- B) Set the VBW = 300KHz.
- C) Sweep time = auto couple.
- D) Detector function = peak.
- E) Trace mode = max hold.
- F) Allow trace to fully stabilize.

9.3 DEVIATION FROM STANDARD

No deviation.

9.4 TEST SETUP



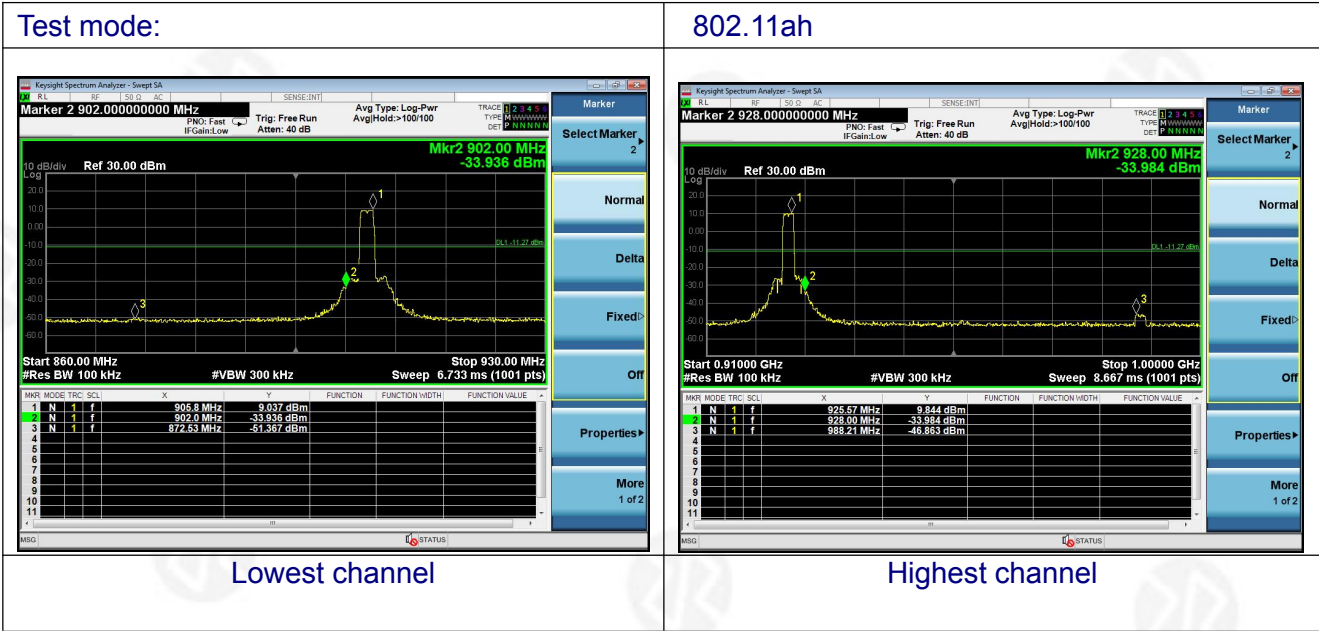
9.5 EUT OPERATION CONDITIONS

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.

9.6 TEST RESULTS



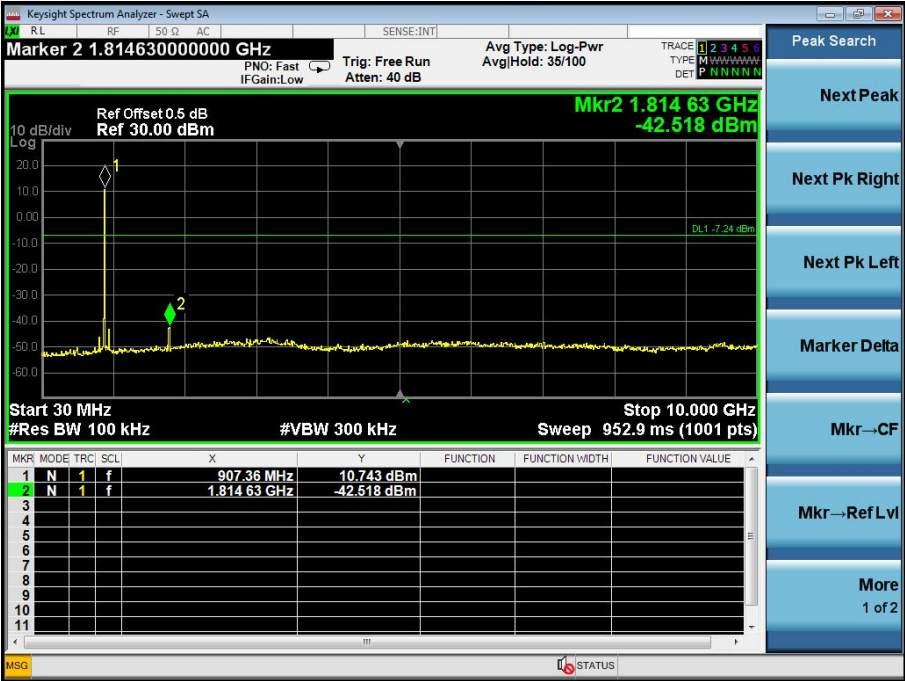
Test plot as follows:



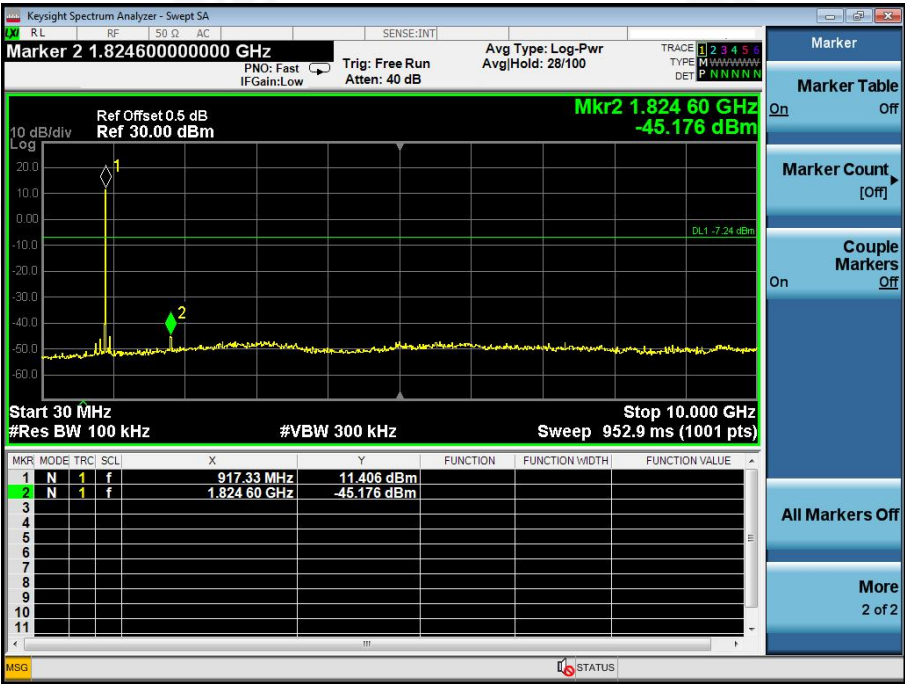


Test plot as follows:

802.11ah
Lowest channel



Middle channel





Highest channel





10. ANTENNA REQUIREMENT

| | |
|--|--|
| Standard requirement: | FCC Part15 C Section 15.203 /247(c), RSS-GEN section 6.8 |
| <p>15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</p> <p>15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.</p> <p>According to RSS-GEN section 6.8 The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.</p> <p>For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).</p> <p>When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.</p> <p>The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.</p> <p>For licence-exempt equipment with detachable antennas, the user manual shall also contain the following notice in a conspicuous location: This radio transmitter [enter the device's ISED certification number] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.</p> <p>Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.</p> | |
| EUT Antenna: | |
| The antenna is FPCB antenna, the best case gain of the antennas is 0.61 dBi, reference to the appendix II for details | |



11. TEST SETUP PHOTO

Reference to the appendix I for details.

12. EUT CONSTRUCTIONAL DETAILS

Reference to the appendix II for details.

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