

VARIANT FCC TEST REPORT

(Part 15, Subpart E)


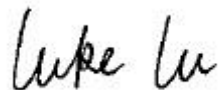
| | |
|------------|--|
| Applicant: | Honeywell International Inc Honeywell Safety and Productivity Solutions |
| Address: | 9680 Old Bailes Road, Fort Mill, SC 29707 United States |

| | |
|---------------------------|--|
| Manufacturer or Supplier: | Honeywell International Inc Honeywell Safety and Productivity Solutions |
| Address: | 9680 Old Bailes Road, Fort Mill, SC 29707 United States |
| Product: | Mobile Computer |
| Brand Name: | Honeywell |
| Model Name: | CT45P-L1N-2 |
| FCC ID: | HD5-CT45PL1N2 |
| Date of tests: | Oct. 25, 2021 ~ Nov. 08, 2021 |

The tests have been carried out according to the requirements of the following standard:

☒ **FCC Part 15, Subpart E, Section 15.407**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

| | |
|--|--|
| Prepared by Simon Wang Engineer / Mobile Department | Approved by Luke Lu Manager / Mobile Department |
|  Date: Nov. 12, 2021 |  Date: Nov. 12, 2021 |

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TABLE OF CONTENTS

| | |
|---|-----------|
| RELEASE CONTROL RECORD | 3 |
| 1 SUMMARY OF TEST RESULTS | 4 |
| 1.1 MEASUREMENT UNCERTAINTY | 4 |
| 2 GENERAL INFORMATION..... | 5 |
| 2.1 GENERAL DESCRIPTION OF EUT | 5 |
| 2.2 DESCRIPTION OF TEST MODES | 7 |
| 2.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL..... | 9 |
| 2.3 DESCRIPTION OF SUPPORT UNITS | 11 |
| 2.3.1 CONFIGURATION OF SYSTEM UNDER TEST | 12 |
| 2.4 GENERAL DESCRIPTION OF APPLIED STANDARDS | 12 |
| 3 TEST TYPES AND RESULTS..... | 13 |
| 3.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT..... | 13 |
| 3.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT..... | 13 |
| 3.1.2 LIMITS OF UNWANTED EMISSION..... | 13 |
| 3.1.3 TEST INSTRUMENTS..... | 14 |
| 3.1.4 TEST PROCEDURES | 15 |
| 3.1.5 DEVIATION FROM TEST STANDARD | 15 |
| 3.1.6 TEST SETUP | 16 |
| 3.1.7 EUT OPERATING CONDITION | 17 |
| 3.1.8 TEST RESULTS | 18 |
| 3.2 CONDUCTED EMISSION MEASUREMENT | 21 |
| 3.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT | 21 |
| 3.2.2 TEST INSTRUMENTS..... | 21 |
| 3.2.3 TEST PROCEDURES | 21 |
| 3.2.4 DEVIATION FROM TEST STANDARD | 22 |
| 3.2.5 TEST SETUP | 22 |
| 3.2.6 EUT OPERATING CONDITIONS | 22 |
| 3.2.7 TEST RESULTS | 23 |
| 4 PHOTOGRAPHS OF THE TEST CONFIGURATION..... | 25 |
| 5 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB | 26 |



Test Report No.: W7L-P21110008RF14

RELEASE CONTROL RECORD

| ISSUE NO. | REASON FOR CHANGE | DATE ISSUED |
|-------------------|---|---------------|
| W7L-P21080006RF14 | Original release | Sep. 01, 2021 |
| W7L-P21110008RF14 | Based on the original report W7L-P21080006RF14 add the band 41C, changing components. | Nov. 12, 2021 |



1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC PART 15, SUBPART E | | |
|--|---|------------|
| STANDARD SECTION | TEST TYPE AND LIMIT | RESULT |
| 15.407(b)(6) | AC Power Conducted Emission | Compliance |
| 15.407(b) (1/2/3/4/5) | Radiated Emission & Band Edge Measurement | Compliance |
| 15.407(a/1/2/3) | Maximum conducted output Power | N.A |
| 15.407(a/1/2/3) | Peak Power Spectral Density | N.A |
| 15.403(i) | 26 dB Bandwidth | N.A |
| 15.407(e) | 6 dB Bandwidth | N.A |
| 15.203 | Antenna Requirement | N.A |

Note:

1. Per the change notice provide by manufactory, the difference is add the band 41C, changing components., all the change no effect any RF parameter, Therefore only verify the CE and radiated emission worse case. The report only show the verify test data. N.A test details please refer to the original report.

1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| MEASUREMENT | UNCERTAINTY |
|-------------------------------------|---------------------|
| AC Power Conducted emissions | $\pm 2.70\text{dB}$ |
| Radiated emissions (30MHz~1GMHz) | $\pm 4.98\text{dB}$ |
| Radiated emissions (1GMHz ~6GMHz) | $\pm 4.70\text{dB}$ |
| Radiated emissions (6GMHz ~18GMHz) | $\pm 4.60\text{dB}$ |
| Radiated emissions (18GMHz ~40GMHz) | $\pm 4.12\text{dB}$ |
| Conducted emissions | $\pm 4.01\text{dB}$ |

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.



2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

| | |
|----------------------------|--|
| PRODUCT | Mobile Computer |
| BRAND NAME | Honeywell |
| MODEL NAME | CT45P-L1N-2 |
| NOMINAL VOLTAGE | 3.85Vdc (Lithium-ion cell, battery) |
| MODULATION | OFDM |
| TRANSFER RATE | 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to MCS7 802.11ac: up to 390.0Mbps |
| OPERATING FREQUENCY | 5180 ~ 5240MHz, 5260 ~ 5320MHz, 5500 ~ 5720MHz, 5745 ~ 5825MHz |
| NUMBER OF CHANNEL | 5180 ~ 5240MHz: 4 for 802.11a, 802.11n, 802.11ac (20MHz) 2 for 802.11n, 802.11ac (40MHz) 1 for 802.11ac (80MHz) 5260 ~ 5320MHz: 4 for 802.11a, 802.11n, 802.11ac (20MHz) 2 for 802.11n, 802.11ac (40MHz) 1 for 802.11ac (80MHz) 5500 ~ 5720MHz: 12 for 802.11a, 802.11n, 802.11ac(20MHz) 6 for 802.11n, 802.11ac (40MHz) 3 for 802.11ac (80MHz) 5745 ~ 5825MHz: 5 for 802.11a, 802.11n, 802.11ac (20MHz) 3 for 802.11n, 802.11ac (40MHz) 2 for 802.11ac (80MHz) |
| AVERAGE POWER | 40.46mW for 5180 ~ 5240MHz 40.18mW for 5260 ~ 5320MHz 46.77mW for 5500 ~ 5720MHz 56.75mW for 5745 ~ 5825MHz |
| ANTENNA TYPE | PIFA Antenna |
| ANTENNA GAIN | 0.72 dBi for 5180 ~ 5240MHz 0.62 dBi for 5260 ~ 5320MHz 0.52 dBi for 5500 ~ 5720MHz 0.78 dBi for 5745 ~ 5825MHz |
| HW VERSION | V1.0 |
| SW VERSION | OS.11.002-HON.11.002 |
| I/O PORTS | Refer to user's manual |
| CABLE SUPPLIED | USB cable: unshielded without ferrite, 1.25 meter Earphone cable: unshielded without ferrite, 1.27 meter |



NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. This product includes the following Three SKU which hardware is exactly same, the difference is described as following, Sample 1 was full test, sample 2 verify the worst case, check worst case Radiated emission:

| SAMPLE | EUT CONFIGURATION INFORMATION |
|--------|--|
| 1 | SKU ID:CT45-L1N-37D120G ,Assembled Scanner Imager: 7-S0703 |
| 2 | SKU ID:CT45-L1N-38D120G ,Assembled Scanner Imager: 8 - N6803/S0803 |
| 3 | SKU ID: CT45-L1N-37D220G , Assembled with Scanner: 7-S0703 for China Only with Android non-GMS |

3. The EUT incorporates a SISO function. Physically, the EUT provides one completed transmitter and one receiver.

| MODULATION MODE | TX FUNCTION |
|--------------------------|-------------|
| 802.11a | 1TX/1RX |
| 802.11n/802.11ac (20MHz) | 1TX/1RX |
| 802.11n/802.11ac (40MHz) | 1TX/1RX |
| 802.11ac (80MHz) | 1TX/1RX |

4. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

List of Accessory:

| ACCESSORIES | BRAND | MODEL | SPECIFICATION |
|-------------|-----------|----------------------|---------------------------------------|
| Battery | Honeywell | CT50-BTSC | Capacity: 3.85vdc 4020mAh |
| AC Adapter | HONOR | ADS-12B-06 05010E | I/P:100-240Vac, 0.3A O/P: 5Vdc, 2A |
| USB Cable | Honeywell | CT40-SN | Shielded, 1.25meter |
| Earphone | VIVO | N/A | Shielded, 1.27meter |
| LCD Panel | CASIL | CTM10801920T01 | 5.0" FHD(1928*1080) |

2.2 DESCRIPTION OF TEST MODES

FOR 5180 ~ 5240MHz

4 channels are provided for 802.11a, 802.11n, 802.11ac (20MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 36 | 5180 MHz | 44 | 5220 MHz |
| 40 | 5200 MHz | 48 | 5240 MHz |

2 channels are provided for 802.11n, 802.11ac (40MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 38 | 5190 MHz | 46 | 5230 MHz |

1 channel is provided for 802.11ac (80MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 42 | 5210 MHz | | |

FOR 5260 ~ 5320MHz

4 channels are provided for 802.11a, 802.11n, 802.11ac (20MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 52 | 5260 MHz | 60 | 5300 MHz |
| 56 | 5280 MHz | 64 | 5320 MHz |

2 channels are provided for 802.11n, 802.11ac (40MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 54 | 5270 MHz | 62 | 5310 MHz |

1 channel is provided for 802.11ac (80MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 58 | 5290 MHz | | |

**FOR 5500 ~ 5720MHz**

12 channels are provided for 802.11a, 802.11n, 802.11ac (20MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 100 | 5500 MHz | 124 | 5620MHz |
| 104 | 5520 MHz | 128 | 5640MHz |
| 108 | 5540 MHz | 132 | 5660 MHz |
| 112 | 5560 MHz | 136 | 5680 MHz |
| 116 | 5580 MHz | 140 | 5700 MHz |
| 120 | 5600 MHz | 144 | 5720 MHz |

6 channels are provided for 802.11n, 802.11ac (40MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 102 | 5510 MHz | 126 | 5630MHz |
| 110 | 5550 MHz | 134 | 5670 MHz |
| 118 | 5590 MHz | 142 | 5710 MHz |

3 channel is provided for 802.11ac (80MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 106 | 5530 MHz | 138 | 5690 MHz |
| 122 | 5610 MHz | | |

FOR 5745 ~ 5825MHz

5 channels are provided for 802.11a, 802.11n, 802.11ac (20MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 144 | 5720MHz | 157 | 5785 MHz |
| 149 | 5745 MHz | 165 | 5825 MHz |
| 153 | 5765 MHz | | |

3 channels are provided for 802.11n, 802.11ac (40MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 142 | 5710 MHz | 159 | 5795 MHz |
| 151 | 5755 MHz | | |

2 channel is provided for 802.11ac (80MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 138 | 5690MHz | 155 | 5775 MHz |



2.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

| EUT CONFIGURE MODE | APPLICABLE TO | | | | DESCRIPTION |
|--------------------------|---------------|-------|-----|------|---------------------------------------|
| | RE \geq 1G | RE<1G | PLC | APCM | |
| A | √ | √ | √ | - | Powered by Adapter with wifi(5G) link |
| B | - | - | - | - | Powered by Battery with wifi(5G) link |
| C | - | - | - | - | Powered by USB with wifi(5G) link |

Where

RE \geq 1G: Radiated Emission above 1GHz**RE<1G:** Radiated Emission below 1GHz**PLC:** Power Line Conducted Emission**APCM:** Antenna Port Conducted Measurement**NOTE:**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.**RADIATED EMISSION TEST (BELOW 1GHz):**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | MODE | FREQ. BAND (MHz) | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION | DATA RATE (Mbps) |
|--------------------------|-----------------|---------------------|----------------------|-------------------|------------|---------------------|
| A | 802.11n (40MHz) | 5180-5240 | 38 to 46 | 38, | OFDM | MCS0 |

**RADIATED EMISSION TEST (ABOVE 1GHz):**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | MODE | FREQ. BAND (MHz) | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION | DATA RATE (Mbps) |
|--------------------------|-----------------|---------------------|----------------------|----------------|------------|------------------|
| A | 802.11n (40MHz) | 5180-5240 | 38 to 46 | 38, | OFDM | MCS0 |

POWER LINE CONDUCTED EMISSION TEST:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | MODE | FREQ. BAND (MHz) | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION | DATA RATE (Mbps) |
|--------------------------|-----------------|---------------------|----------------------|-------------------|------------|---------------------|
| A | 802.11n (40MHz) | 5180-5240 | 38 to 46 | 38, | OFDM | MCS0 |

TEST CONDITION:

| APPLICABLE TO | ENVIRONMENTAL CONDITIONS | INPUT POWER | TESTED BY |
|---------------|--------------------------|---------------------|-----------|
| RE<1G | 23deg. C, 70%RH | DC 3.85V By Battery | Jace Hu |
| RE≥1G | 23deg. C, 70%RH | DC 3.85V By Battery | Jace Hu |
| PLC | 25deg. C, 52%RH | DC 3.85V By Battery | Carl Xie |

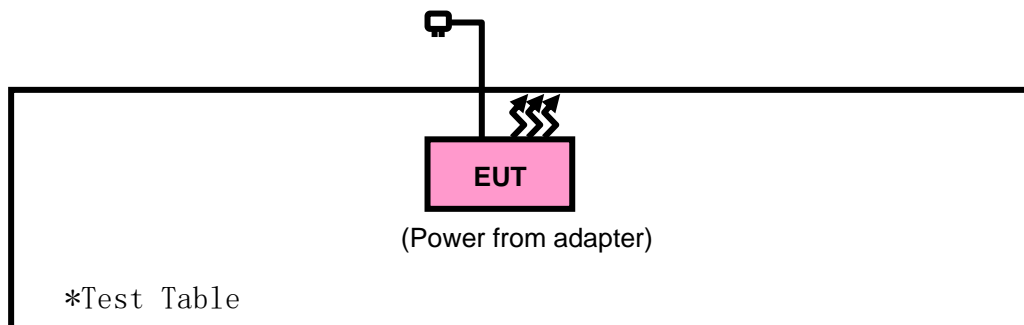
2.3 DESCRIPTION OF SUPPORT UNITS

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.

| NO. | PRODUCT | BRAND | MODEL NO. | SERIAL NO. | FCC ID |
|-----|-----------|------------|---------------|------------|--------|
| 1 | Desktop | Lenovo | M73 SFF | PC04GRQV | N/A |
| 2 | Desktop | Lenovo | M73 SFF | PC06CS27 | N/A |
| 3 | Laptop | Lenovo | Thnikpad L440 | R90FTFKN | N/A |
| 4 | DC source | Kikusui/JP | PMX18-5A | 0000001 | N/A |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS |
|-----|---|
| 1 | AC Line: Unshielded, Detachable 1.5m |
| 2 | AC Line: Unshielded, Detachable 1.5m |
| 3 | AC Line: Unshielded, Detachable 1.5m |
| 4 | DC Line: Unshielded, Detachable 1.0m |

2.3.1 CONFIGURATION OF SYSTEM UNDER TEST



2.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart E (15.407)

KDB 789033 D02 General U-NII Test Procedures New Rules v02r01

ANSI C63.10-2013

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

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (Certification). The test report has been issued separately.

3 TEST TYPES AND RESULTS

3.1 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 (MHz) | FIELD STRENGTH (microvolts/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 |

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 20dB under any condition of modulation.

3.1.2 LIMITS OF UNWANTED EMISSION

| RESTRICTED BANDS | APPLICABLE TO | LIMIT | |
|-----------------------------|--|-------------------------------|--|
| | 789033 D02 General UNII Test Procedures New Rules v02r01 | FIELD STRENGTH AT 3m (dBµV/m) | |
| | | PK : 74 | AV : 54 |
| OUT OF THE RESTRICTED BANDS | APPLICABLE TO | EIRP LIMIT (dBm/MHz) | EQUIVALENT FIELD STRENGTH AT 3m (dBµV/m) |
| | 15.407(b)(1) | PK : -27 | PK : 68.2 |
| | 15.407(b)(2) | | |
| | 15.407(b)(3) | | |
| | 15.407(b)(4) | See note 2 (FCC 16-24) | |



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

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

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

3.1.3 TEST INSTRUMENTS

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
|----------------------------|--------------|-----------------------------|-----------------------------|-------------|-------------|
| 3m Semi-anechoic Chamber | ETS-LINDGREN | 9m*6m*6m | Euroshieldpn-CT0001143-1216 | May. 19,20 | May. 18,23 |
| Bilog Antenna | ETS-LINDGREN | 3143B | 00161965 | Mar. 05,21 | Mar. 04,22 |
| Horn Antenna | ETS-LINDGREN | 3117 | 00168728 | Apr. 02,21 | Apr. 01,22 |
| Horn Antenna (18GHz-40GHz) | N/A | QWH-SL-18-40-K-SG/QMS-00361 | 15433 | Aug. 25, 21 | Aug. 24, 22 |
| Test Software | E3 | V 9.160323 | N/A | N/A | N/A |
| Test Software | ADT | ADT_Radiated_V7.6.15.9.2 | N/A | N/A | N/A |
| 10dB Attenuator | JFW/USA | 50HF-010-SMA | 1505 | Jun. 03,21 | Jun. 02,22 |
| MXE EMI Receiver | KEYSIGHT | N9038A-544 | MY54450026 | Apr. 22,21 | Apr. 21,22 |
| Signal Pre-Amplifier | EMSI | EMC 9135 | 980249 | Jun. 02,21 | Jun. 01,22 |
| Signal Pre-Amplifier | EMSI | EMC 012645B | 980257 | Jun. 03,21 | Jun. 02,22 |
| Signal Pre-Amplifier | EMSI | EMC 184045B | 980259 | Apr. 22,21 | Apr. 21,22 |

NOTE:

1. The calibration interval of the above test instruments is 12 months or 36 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed in 3m Chamber.
3. The FCC Site Registration No. is 525120; The Designation No. is CN1171.

3.1.4 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. 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:

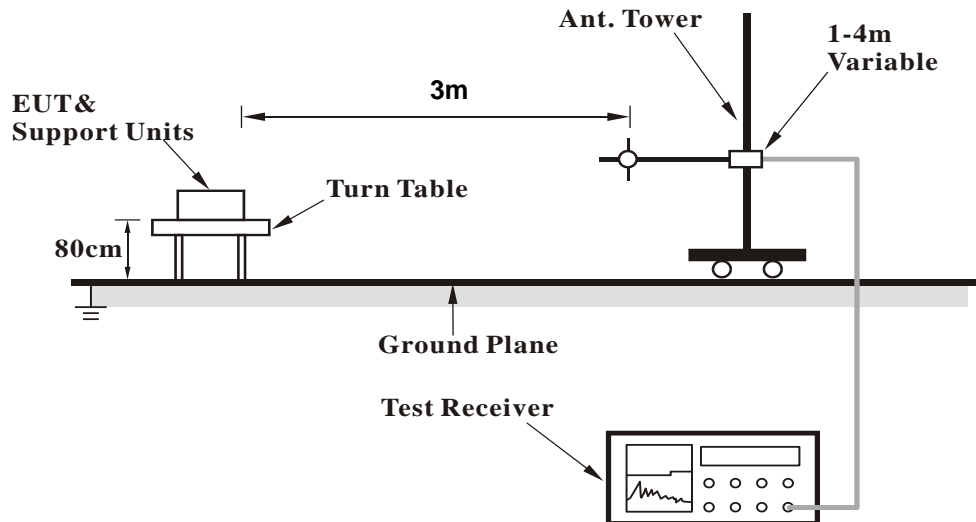
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ($10 \log(1/\text{duty cycle})$).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

3.1.5 DEVIATION FROM TEST STANDARD

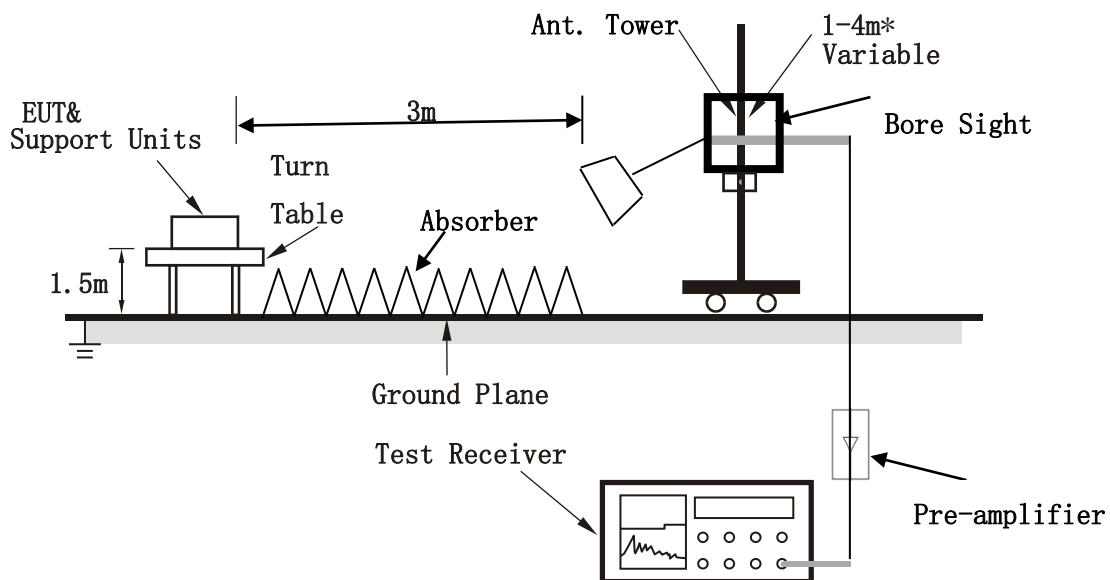
No deviation.

3.1.6 TEST SETUP

< Frequency Range 30MHz~1GHz >



<Frequency Range above 1GHz>



Note: Above 1G is a directional antenna

Depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

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



Test Report No.: W7L-P21110008RF14

3.1.7 EUT OPERATING CONDITION

- a. Set the EUT under full load condition and placed them on a testing table.
- b. Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.
- c. The necessary accessories enable the EUT in full functions.



3.1.8 TEST RESULTS

BELOW 1GHz WORST-CASE DATA:

30 MHz – 1GHz data:

Band 1

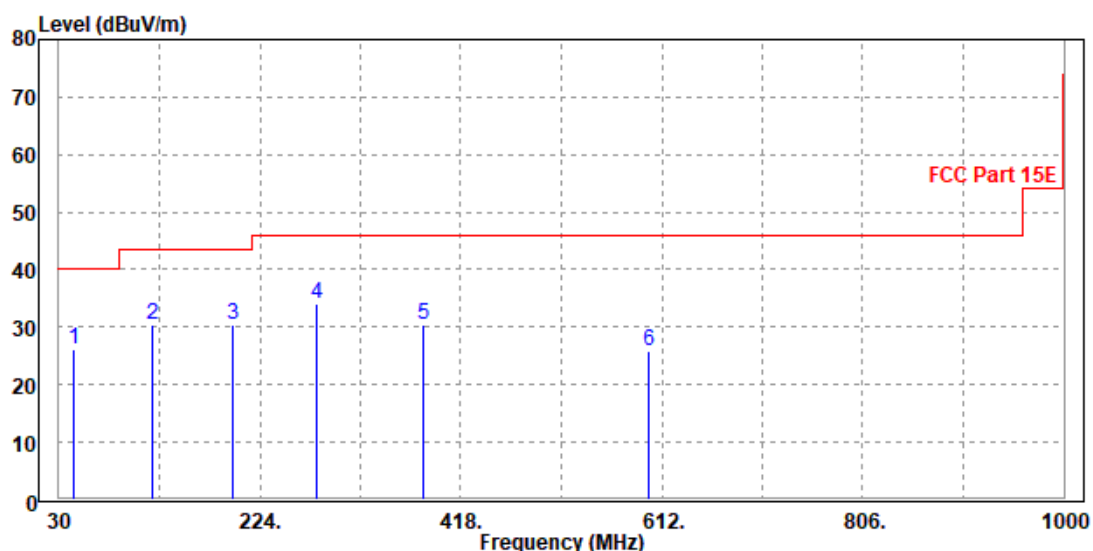
802.11n (40MHz)

| | | | |
|-----------------|---------------|-------------------|-----------------|
| CHANNEL | TX Channel 38 | DETECTOR FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 30MHz ~ 1GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | | | |
|---|-------------------------------|-------------------------|-------------------|----------------|------------------------------|-----------------------|--------------------------|---------------------------|----------------------------|--------|
| FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | READ LEVEL (dBuV) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA FACTOR (dB /m) | CABLE LOSS (dB) | PREAMP FACTOR (dB) | ANTENNA HEIGHT (cm) | TABLE ANGLE (Degree) | REMARK |
| 43.58 | 26.29 | 51.82 | 40 | -13.71 | 11.87 | 0.85 | 38.25 | 300 | 360 | Peak |
| 120.21 | 30.27 | 58.81 | 43.5 | -13.23 | 7.89 | 1.4 | 37.83 | 300 | 360 | Peak |
| 197.81 | 30.46 | 55.15 | 43.5 | -13.04 | 10.91 | 1.79 | 37.39 | 300 | 360 | Peak |
| 279.29 | 34.17 | 55.63 | 46 | -11.83 | 13.67 | 2.12 | 37.25 | 300 | 360 | Peak |
| 381.14 | 30.44 | 48.92 | 46 | -15.56 | 16.35 | 2.49 | 37.32 | 300 | 360 | Peak |
| 599.39 | 25.76 | 39.68 | 46 | -20.24 | 20.69 | 3.22 | 37.83 | 300 | 360 | Peak |

REMARKS:

1. Emission level (dBuV/m) = Read level (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.



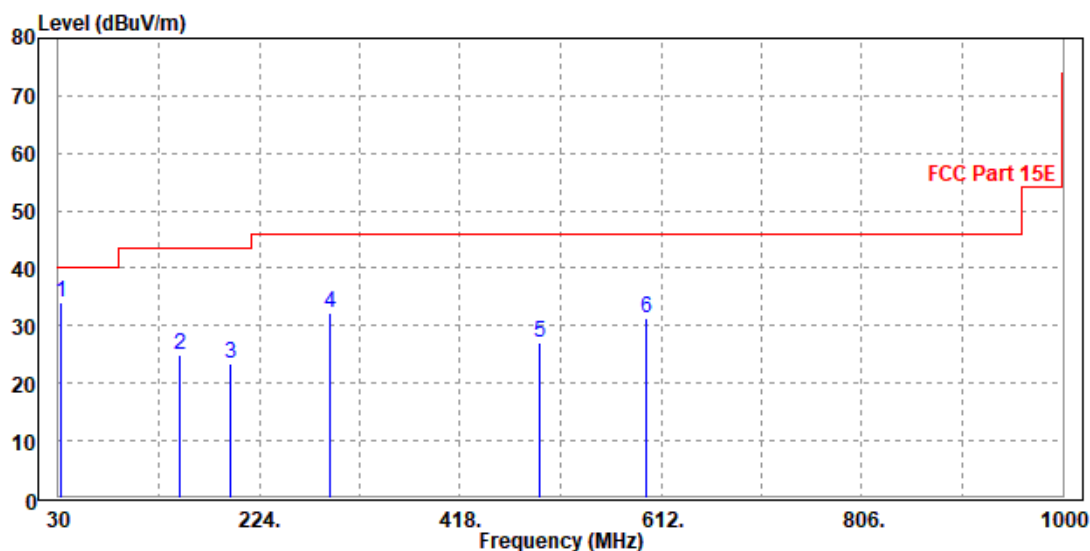


| | | | |
|------------------------|--------------|--------------------------|-----------------|
| CHANNEL | Channel 38 | DETECTOR FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 30MHz ~ 1GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | | | |
|---|-------------------------------|-------------------------|-------------------|----------------|------------------------------|-----------------------|--------------------------|---------------------------|----------------------------|--------|
| FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | READ LEVEL (dBuV) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA FACTOR (dB /m) | CABLE LOSS (dB) | PREAMP FACTOR (dB) | ANTENNA HEIGHT (cm) | TABLE ANGLE (Degree) | REMARK |
| 32.91 | 34.01 | 52.41 | 40 | -5.99 | 18.92 | 0.73 | 38.05 | 200 | 0 | Peak |
| 147.37 | 24.93 | 51.5 | 43.5 | -18.57 | 9.55 | 1.55 | 37.67 | 200 | 0 | Peak |
| 196.84 | 23.45 | 47.76 | 43.5 | -20.05 | 11.31 | 1.78 | 37.4 | 200 | 0 | Peak |
| 291.9 | 32.34 | 52.58 | 46 | -13.66 | 14.81 | 2.17 | 37.22 | 200 | 0 | Peak |
| 495.6 | 27.09 | 42.67 | 46 | -18.91 | 19.02 | 2.91 | 37.51 | 200 | 0 | Peak |
| 597.45 | 31.23 | 44.99 | 46 | -14.77 | 20.85 | 3.21 | 37.82 | 200 | 0 | Peak |

REMARKS:

1. Emission level (dBuV/m) = Read level (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.



**ABOVE 1GHz WORST-CASE DATA:****Note:** For higher frequency, the emission is too low to be detected.**Band 1****802.11n (40MHz)**

| | | | |
|------------------------|---------------|--------------------------|--------------|
| CHANNEL | TX Channel 38 | DETECTOR FUNCTION | Peak (PK) |
| FREQUENCY RANGE | 1GHz ~ 40GHz | | Average (AV) |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | | | |
|---|-------------------------------|-------------------------|-------------------|----------------|------------------------------|-----------------------|--------------------------|---------------------------|----------------------------|---------|
| FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | READ LEVEL (dBuV) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA FACTOR (dB /m) | CABLE LOSS (dB) | PREAMP FACTOR (dB) | ANTENNA HEIGHT (cm) | TABLE ANGLE (Degree) | REMARK |
| 5150 | 55.44 | 56.74 | 74 | -18.56 | 34.52 | 9.52 | 45.34 | 100 | 280 | Peak |
| 5150 | 49.95 | 51.25 | 54 | -4.05 | 34.52 | 9.52 | 45.34 | 100 | 280 | Average |
| 5190 | 91.67 | 92.85 | - | - | 34.55 | 9.6 | 45.33 | 100 | 280 | Peak |
| 5190 | 83.75 | 84.93 | - | - | 34.55 | 9.6 | 45.33 | 100 | 280 | Average |
| 5350 | 54.39 | 55.05 | 74 | -19.61 | 34.68 | 9.94 | 45.28 | 100 | 280 | Peak |
| 5350 | 48.55 | 49.21 | 54 | -5.45 | 34.68 | 9.94 | 45.28 | 100 | 280 | Average |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | | | |
| FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | READ LEVEL (dBuV) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA FACTOR (dB /m) | CABLE LOSS (dB) | PREAMP FACTOR (dB) | ANTENNA HEIGHT (cm) | TABLE ANGLE (Degree) | REMARK |
| 5150 | 56.31 | 57.53 | 74 | -17.69 | 34.6 | 9.52 | 45.34 | 100 | 150 | Peak |
| 5150 | 49.03 | 50.25 | 54 | -4.97 | 34.6 | 9.52 | 45.34 | 100 | 150 | Average |
| 5190 | 88.22 | 89.35 | - | - | 34.6 | 9.6 | 45.33 | 100 | 150 | Peak |
| 5190 | 82.12 | 83.25 | - | - | 34.6 | 9.6 | 45.33 | 100 | 150 | Average |
| 5350 | 54.23 | 54.97 | 74 | -19.77 | 34.6 | 9.94 | 45.28 | 100 | 150 | Peak |
| 5350 | 47.83 | 48.57 | 54 | -6.17 | 34.6 | 9.94 | 45.28 | 100 | 150 | Average |

REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
- 5190MHz: Fundamental frequency.

3.2 CONDUCTED EMISSION MEASUREMENT

3.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

| FREQUENCY OF EMISSION (MHz) | CONDUCTED LIMIT (dB μ 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.

3.2.2 TEST INSTRUMENTS

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
|---------------------|---------------|-----------|------------|------------|------------|
| EMI Test Receiver | Rohde&Schwarz | ESR3 | 101900 | Mar. 03,21 | Mar. 02,22 |
| EMC32 test software | Rohde&Schwarz | EMC32 | NA | NA | NA |
| LISN network | Rohde&Schwarz | ENV216 | 101922 | Feb. 22,21 | Feb. 21,22 |

NOTE:

1. The test was performed in CE shielded room.
2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

3.2.3 TEST PROCEDURES

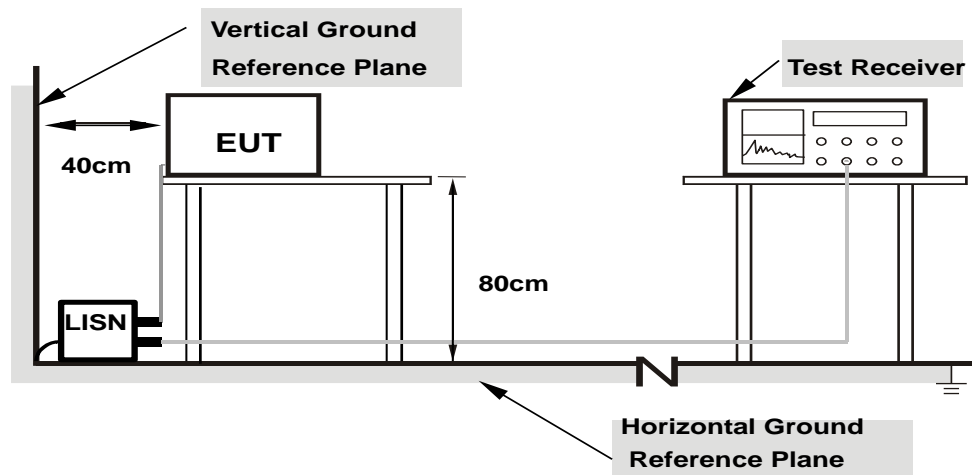
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling 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) was not recorded.

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

3.2.4 DEVIATION FROM TEST STANDARD

No deviation.

3.2.5 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 from other units and other metal planes

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

3.2.6 EUT OPERATING CONDITIONS

Same as 3.1.6.



3.2.7 TEST RESULTS

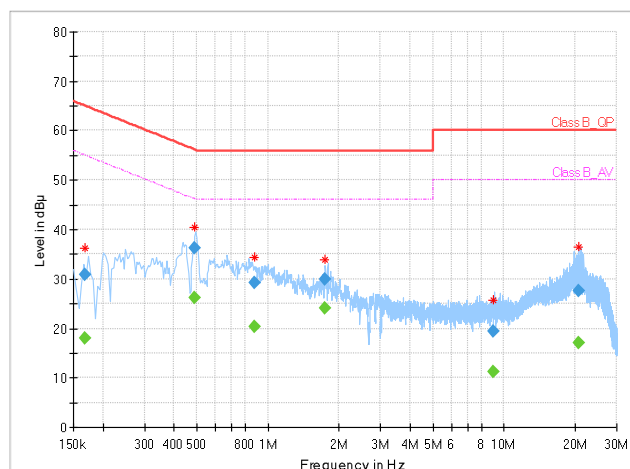
CONDUCTED WORST-CASE DATA:

| | | | |
|-----------------|----------------|--|---------------------------------------|
| Frequency Range | 150KHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9 kHz |
| Input Power | 120Vac, 60Hz | Environmental Conditions | 24deg. C, 55%RH |
| Tested By | Carl Xie | | |

| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Limit (dBuV) | Margin (dB) | Line | Filter | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|------|--------|------------|
| 0.168000 | --- | 18.05 | 55.06 | 37.01 | L1 | ON | 9.7 |
| 0.168000 | 30.79 | --- | 65.06 | 34.27 | L1 | ON | 9.7 |
| 0.488000 | --- | 26.31 | 46.20 | 19.89 | L1 | ON | 9.7 |
| 0.488000 | 36.23 | --- | 56.20 | 19.97 | L1 | ON | 9.7 |
| 0.880000 | --- | 20.32 | 46.00 | 25.68 | L1 | ON | 9.7 |
| 0.880000 | 29.32 | --- | 56.00 | 26.68 | L1 | ON | 9.7 |
| 1.748000 | --- | 24.20 | 46.00 | 21.80 | L1 | ON | 9.7 |
| 1.748000 | 29.93 | --- | 56.00 | 26.07 | L1 | ON | 9.7 |
| 9.048000 | --- | 11.27 | 50.00 | 38.73 | L1 | ON | 9.7 |
| 9.048000 | 19.41 | --- | 60.00 | 40.59 | L1 | ON | 9.7 |
| 20.700000 | --- | 17.03 | 50.00 | 32.97 | L1 | ON | 9.8 |
| 20.700000 | 27.56 | --- | 60.00 | 32.44 | L1 | ON | 9.8 |

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Limit value - Emission level
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

Full Spectrum



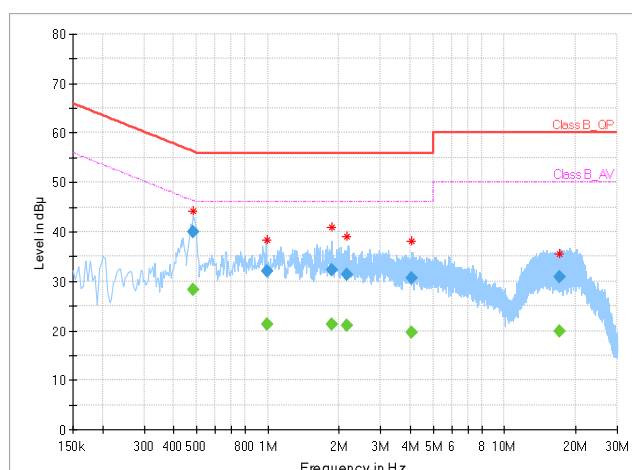


| | | | |
|-----------------|----------------|--|---------------------------------------|
| Frequency Range | 150KHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9 kHz |
| Input Power | 120Vac, 60Hz | Environmental Conditions | 24deg. C, 55%RH |
| Tested By | Carl Xie | | |

| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Limit (dBuV) | Margin (dB) | Line | Filter | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|------|--------|------------|
| 0.484000 | --- | 28.21 | 46.27 | 18.06 | N | ON | 9.7 |
| 0.484000 | 40.02 | --- | 56.27 | 16.25 | N | ON | 9.7 |
| 0.988000 | --- | 21.37 | 46.00 | 24.63 | N | ON | 9.7 |
| 0.988000 | 32.05 | --- | 56.00 | 23.95 | N | ON | 9.7 |
| 1.868000 | --- | 21.25 | 46.00 | 24.75 | N | ON | 9.8 |
| 1.868000 | 32.35 | --- | 56.00 | 23.65 | N | ON | 9.8 |
| 2.160000 | --- | 20.99 | 46.00 | 25.01 | N | ON | 9.8 |
| 2.160000 | 31.39 | --- | 56.00 | 24.61 | N | ON | 9.8 |
| 4.060000 | --- | 19.66 | 46.00 | 26.34 | N | ON | 9.8 |
| 4.060000 | 30.55 | --- | 56.00 | 25.45 | N | ON | 9.8 |
| 17.120000 | --- | 19.87 | 50.00 | 30.13 | N | ON | 9.9 |
| 17.120000 | 30.84 | --- | 60.00 | 29.16 | N | ON | 9.9 |

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Limit value - Emission level
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

Full Spectrum



4 PHOTOGRAPHS OF THE TEST CONFIGURATION

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



Test Report No.: W7L-P21110008RF14

5 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

---END---