



FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

MICROWAVE OCCUPANCY SENSOR

Model: PSC-ID-M-FM-600

Brand:  MCWONG

Test Report Number:

C180824Z01-RP1

Issued for

MW McWong International Inc.

1921 Arena BLVD., Sacramento, CA 95834

Issued by:

COMPLIANCE CERTIFICATION SERVICES (SHENZHEN) INC.

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Issued Date: Aug 24, 2018



Certificate Number: 2861.01

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Revision History

| Rev. | Issue Date | Revisions | Effect Page | Revised By |
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1. TEST RESULT CERTIFICATION

| | |
|---------------------|---|
| Product | MICROWAVE OCCUPANCY SENSOR |
| Model | PSC-ID-M-FM-600 |
| Brand |  MCWONG |
| Tested | Aug 24, 2018 |
| Applicant | MW McWong International Inc. |
| Manufacturer | 1921 Arena BLVD., Sacramento, CA 95834 |

| APPLICABLE STANDARDS | |
|------------------------------|-------------------------|
| STANDARD | TEST RESULT |
| FCC 47 CFR Part 15 Subpart C | No non-compliance noted |

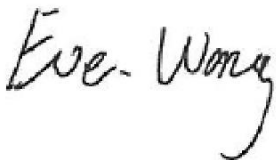
We hereby certify that:

The above equipment was tested by Compliance Certification Services (Shenzhen) Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.207, 15.209 and 15.249.

The test results of this report relate only to the tested sample EUT identified in this report.

Approved by:

Reviewed by:



Eve Wang
Supervisor of EMC Dept.
Compliance Certification Services (Shenzhen) Inc.

Nancy Fu
Supervisor of Report Dept.
Compliance Certification Services (Shenzhen) Inc.



2. EUT DESCRIPTION

| | |
|------------------------------|---|
| Product | MICROWAVE OCCUPANCY SENSOR |
| Model Number | PSC-ID-M-FM-600 |
| Brand | PacWave™ and/or McWONG |
| Model Discrepancy | PSC-ID-M-FM-600-XXX/(-X) |
| Model difference: | All models followed by “xxx” for alphanumeric characters (“XXX” for manufacturing and / or marketing purposes). |
| Identify Number | C180824Z01-RP1 |
| Received Date | Aug 24, 2018 |
| Power Supply | 120~277VAC 50/60 Hz |
| Frequency Range | 5758MHz~ 5835MHz |
| Channel separation: | 1MHz |
| Antenna Specification | Square antenna with a gain of 4.50dBi (maximum) |
| Hardware Version | V1.0 |
| Software Version | V1.0 |

Note: This submittal(s) (test report) is intended for FCC ID: **ZZOPSC-ID-M-FM600** filing to comply with Section 15.207, 15.209 and 15.249 of the FCC Part 15, Subpart C Rules.



3. TEST METHODOLOGY

3.1 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

Use Certification Tool 1.26 to control the EUT for staying in continuous transmitting and receiving mode.

| Test Item | Test mode | Worse mode |
|-------------------|-------------------|-------------------------------------|
| Radiated Emission | Mode 1: TX | <input checked="" type="checkbox"/> |

Note:

1. Select 5758MHz, 5797MHz, 5835MHz, the channel is pre-tested and reflected in the report.
2. Radiated band edges were tested with both fixed and hopping mode; the fixed mode was the worse case and recorded in the report.

3.2 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

3.3 SUPPORT EQUIPMENT

| No. | Equipment | Model No. | Serial No. | FCC ID | Brand | Data Cable | Power Cord |
|-----|-----------|-----------------|------------|--------|--------|------------|------------|
| 1 | Notebook | TianYi310-14ISK | NA | DoC | Lenovo | NA | NA |

Notes:

Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.



4. FACILITIES AND ACCREDITATIONS

4.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

☒ **No.10-1, Mingkeda Logistics Park, No.18, Huanguan South Rd.,
Guan Lan Town, Baoan District, Shenzhen, China**

The sites are constructed in conformance with the requirements of ANSI C63.10:2013, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

4.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

| | |
|--------------|------|
| USA | A2LA |
| China | CNAS |

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

| | |
|---------------|---------------------------------------|
| USA | FCC |
| Japan | VCCI(C-4815, R-4320, T-2317, G-10624) |
| Canada | INDUSTRY CANADA |

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.ccssz.com>

4.3 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:

| Parameter | Uncertainty |
|--|-------------|
| Radiated Emission, 30 to 200 MHz Test Site : 966(2) | +/-3.6880dB |
| Radiated Emission, 200 to 1000 MHz Test Site : 966(2) | +/-3.6695dB |
| Radiated Emission, 1 to 8 GHz | +/-5.1782dB |
| Radiated Emission, 8 to 18 GHz | +/-5.2173dB |

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

The measured result is above (below) the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to state compliance based on the 95% level of confidence. However, the result indicates that compliance (non-compliance) is more probable than non-compliance) with the specification limit.



5. FCC PART 15.249 REQUIREMENTS

5.1 RADIATED EMISSIONS

LIMIT

1. Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (MHz) | Field Strength (mV/m) | Measurement Distance (m) |
|-----------------|-----------------------|--------------------------|
| 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: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

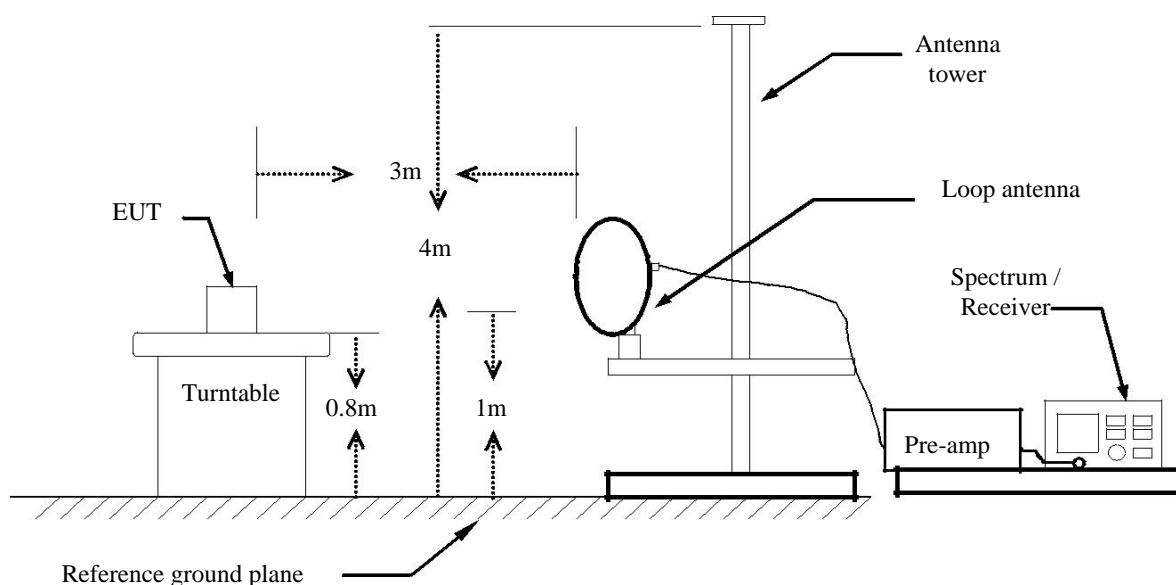
2. In the above emission table, the tighter limit applies at the band edges.

| Frequency (Hz) | Field Strength (μ V/m at 3-meter) | Field Strength (dB μ V/m at 3-meter) |
|----------------|--|--|
| 30-88 | 100 | 40 |
| 88-216 | 150 | 43.5 |
| 216-960 | 200 | 46 |
| Above 960 | 500 | 54 |

**MEASUREMENT EQUIPMENT USED**

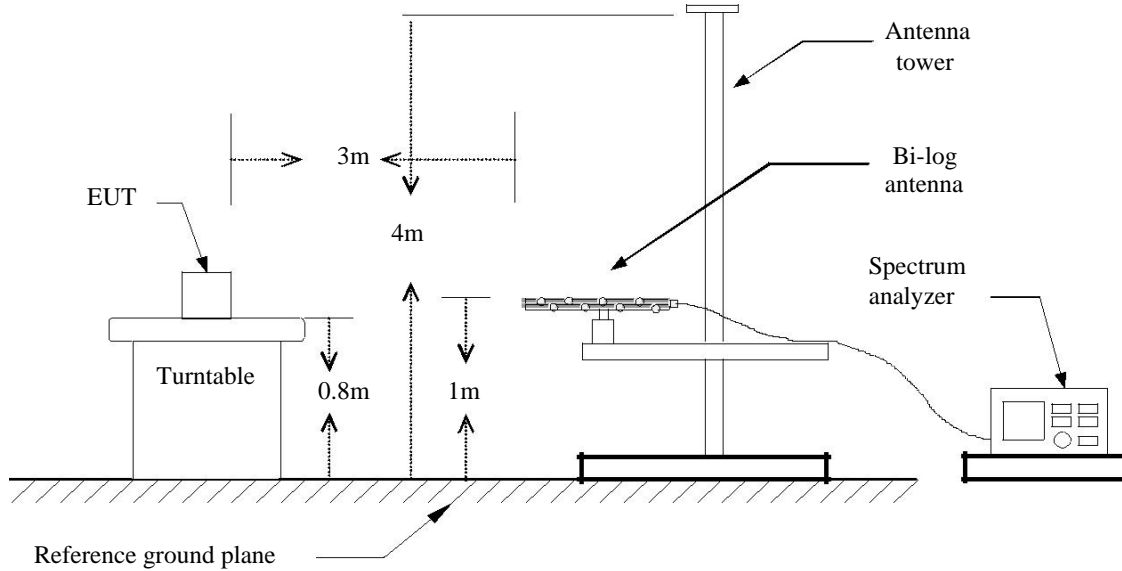
| Radiated Emission Test Site 966(2) | | | | | |
|------------------------------------|----------------|--------------------|---------------|------------------|-----------------|
| Name of Equipment | Manufacturer | Model Number | Serial Number | Last Calibration | Due Calibration |
| PSA Series Spectrum Analyzer | Agilent | N9010A | MY52221469 | 02/18/2018 | 02/19/2019 |
| EMI TEST RECEIVER | ROHDE&SCHWARZ | ESCI | 100783 | 02/18/2018 | 02/19/2019 |
| Amplifier | EMEC | EM330 | 060661 | 02/17/2018 | 03/16/2019 |
| High Noise Amplifier | Agilent | 8449B | 3008A01838 | 02/20/2018 | 02/19/2019 |
| Loop Antenna | COM-POWER | AL-130 | 121044 | 09/25/2017 | 09/24/2018 |
| Bilog Antenna | SCHAFFNER | CBL6143 | 5082 | 02/20/2018 | 02/19/2019 |
| Horn Antenna | SCHWARZBECK | BBHA9120 | D286 | 02/20/2018 | 02/19/2019 |
| Board-Band Horn Antenna | Schwarzbeck | BBHA 9170 | 9170-497 | 02/20/2018 | 02/19/2019 |
| Turn Table | N/A | N/A | N/A | N.C.R | N.C.R |
| Antenna Tower | SUNOL | TLT2 | N/A | N.C.R | N.C.R |
| Controller | Sunol Sciences | SC104V | 022310-1 | N.C.R | N.C.R |
| Controller | CT | N/A | N/A | N.C.R | N.C.R |
| Temp. / Humidity Meter | Anymetre | JR913 | N/A | 02/20/2018 | 02/19/2019 |
| Test S/W | FARAD | LZ-RF / CCS-SZ-3A2 | | | |

Remark: Each piece of equipment is scheduled for calibration once a year.

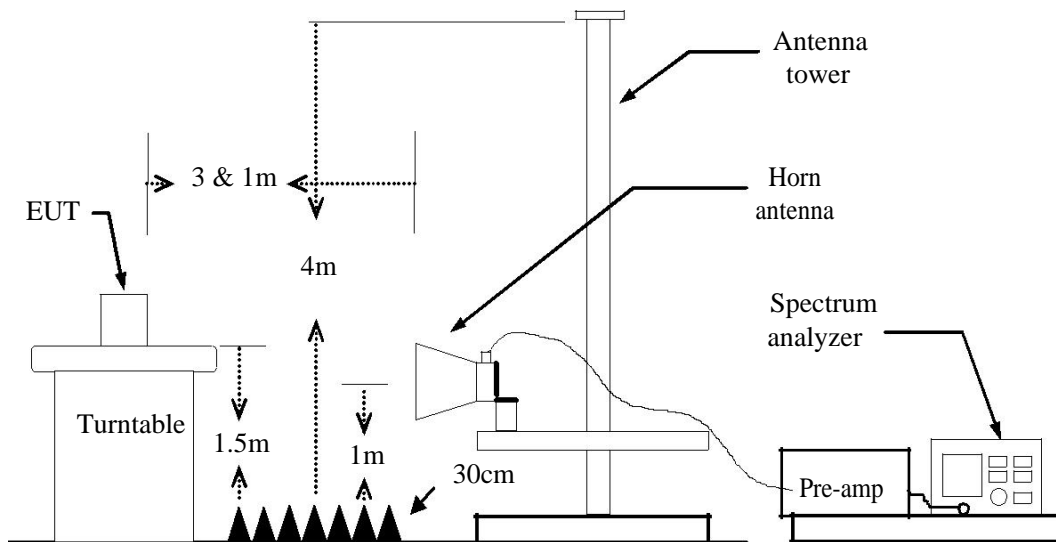
Test Configuration**Below 30MHz**



Below 1 GHz



Above 1 GHz





MEASURING SETTING

The following table is the setting of spectrum analyzer and receiver.

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start Frequency | 1000 MHz |
| Stop Frequency | 10th carrier harmonic |
| RB / VB (Emission in restricted band) | 1MHz / 1MHz for Peak, 1 MHz / 1/T for Average |
| RB / VB (Emission in non-restricted band) | 1MHz / 1MHz for Peak, 1 MHz / 1/T for Average |

| Receiver Parameter | Setting |
|------------------------|-----------------------------------|
| Attenuation | Auto |
| Start ~ Stop Frequency | 9kHz~150kHz / RB 200Hz for QP/AVG |
| Start ~ Stop Frequency | 150kHz~30MHz / RB 9kHz for QP/AVG |
| Start ~ Stop Frequency | 30MHz~1000MHz / RB 100kHz for QP |

TEST PROCEDURE

1) Sequence of testing 9 kHz to 30

MHz Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions.

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Pre measurement:

--- The turntable rotates from 0°to 315°using 45°steps.

--- The antenna height is 0.8 meter.

--- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions



Final measurement:

--- Identified emissions during the pre measurement the software maximizes by rotating the turntable position (0°to 360°) and by rotating the elevation axes (0°to 360°).

--- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement and the limit will be stored.

2) Sequence of testing 30 MHz to 1

GHz Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Pre measurement:

--- The turntable rotates from 0°to 315°using 45°steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height changes from 1 to 3 meter.

--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.



Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ($\pm 45^\circ$) and antenna movement between 1 and 4 meter.

--- The final measurement will be done with QP detector with an EMI receiver.

--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

3) Sequence of testing 1 GHz to 18

GHz Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Pre measurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height scan range is 1 meter to 2.5 meter.

--- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.



Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ($\pm 45^\circ$) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.

--- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement with marked maximum final measurements and the limit will be stored.

4) Sequence of testing above 18

GHz Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 1 meter.

--- The EUT was set into operation.

Pre measurement:

--- The antenna is moved spherical over the EUT in different polarisations of the antenna.

Final measurement:

--- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.

--- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

**TEST RESULTS****Above 1 GHz****Test Mode:** TX(5758MHz)**Tested by:** Fade Zhong**Ambient temperature:** 24°C **Relative humidity:** 52% RH**Date:** Aug 24,2018

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|-----------------|----------------|--------------------------|-----------------|----------------|-------------|--------------------|--------|
| 7854 | 31.85 | 11.93 | 43.78 | 74 | -30.22 | V | peak |
| 9983 | 31.99 | 14.91 | 46.90 | 74 | -27.10 | V | peak |
| 11516 | 31.52 | 17.97 | 49.49 | 74 | -24.51 | V | peak |
| 17274 | 31.48 | 20.58 | 52.06 | 74 | -21.94 | V | peak |
| 7963 | 31.34 | 11.93 | 43.27 | 74 | -30.73 | H | peak |
| 8758 | 32.34 | 15.06 | 47.40 | 74 | -26.60 | H | peak |
| 11516 | 31.58 | 14.71 | 46.29 | 74 | -27.71 | H | peak |
| 17274 | 31.55 | 18.32 | 49.87 | 74 | -24.13 | H | peak |

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
- Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- Spectrum setting:
 - Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 3MHz, Sweep time = auto.
 - AV Setting 1GH z- 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = auto.
- Frequency (MHz). = Emission frequency in MHz
 Reading (dBuV/m) = Uncorrected Analyzer / Receiver Reading
 Correction Factor (dB) = Antenna factor + Cable loss – Amplifier gain
 Limit (dBuV/m) = Limit stated in standard
 Margin (dB) = Result (dBuV/m)- Limit (dBuV/m)
 Peak =Peak Reading
 AVG. =Average Reading
 Remark = Mark Peak Reading or Average Reading

**TEST RESULTS****Above 1 GHz****Test Mode:** TX(5797MHz)**Tested by:** Fade Zhong**Ambient temperature:** 24°C **Relative humidity:** 52% RH**Date:** Aug 24,2018

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|-----------------|----------------|--------------------------|-----------------|----------------|-------------|--------------------|--------|
| 8864 | 30.10 | 12.01 | 42.11 | 74 | -31.89 | V | peak |
| 9601 | 31.87 | 15.21 | 47.08 | 74 | -26.92 | V | peak |
| 11594 | 30.80 | 18.21 | 49.01 | 74 | -24.99 | V | peak |
| 17391 | 30.36 | 20.21 | 50.57 | 74 | -23.43 | V | peak |
| 8354 | 30.67 | 11.93 | 42.60 | 74 | -31.40 | H | peak |
| 9650 | 30.22 | 15.06 | 45.28 | 74 | -28.72 | H | peak |
| 11594 | 30.36 | 14.66 | 45.02 | 74 | -28.98 | H | peak |
| 17391 | 30.24 | 18.71 | 48.95 | 74 | -25.05 | H | peak |

Remark:

5. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
6. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
7. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
8. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 3MHz, Sweep time = auto.
 - b. AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = auto.
5. Frequency (MHz). = Emission frequency in MHz
 Reading (dBμV/m) = Uncorrected Analyzer / Receiver Reading
 Correction Factor (dB) = Antenna factor + Cable loss – Amplifier gain
 Limit (dBμV/m) = Limit stated in standard
 Margin (dB) = Result (dBμV/m)- Limit (dBμV/m)
 Peak =Peak Reading
 AVG. =Average Reading
 Remark = Mark Peak Reading or Average Reading

**TEST RESULTS****Above 1 GHz****Test Mode:** TX(5835MHz)**Tested by:** Fade Zhong**Ambient temperature:** 24°C **Relative humidity:** 52% RH**Date:** Aug 24,2018

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|-----------------|----------------|--------------------------|-----------------|----------------|-------------|--------------------|--------|
| 6941 | 32.41 | 12.01 | 44.42 | 74 | -29.58 | V | peak |
| 9872 | 32.54 | 15.21 | 47.75 | 74 | -26.25 | V | peak |
| 11670 | 31.39 | 18.21 | 49.60 | 74 | -24.40 | V | peak |
| 17505 | 32.61 | 20.21 | 52.82 | 74 | -21.18 | V | peak |
| 8354 | 30.60 | 11.93 | 42.53 | 74 | -31.47 | H | peak |
| 9650 | 32.04 | 15.06 | 47.10 | 74 | -26.90 | H | peak |
| 11670 | 31.45 | 14.66 | 46.11 | 74 | -27.89 | H | peak |
| 17505 | 32.76 | 18.71 | 51.47 | 74 | -22.53 | H | peak |

Remark:

9. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
10. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
11. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
12. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 3MHz, Sweep time = auto.
 - b. AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = auto.
5. Frequency (MHz). = Emission frequency in MHz
 Reading (dBμV/m) = Uncorrected Analyzer / Receiver Reading
 Correction Factor (dB) = Antenna factor + Cable loss – Amplifier gain
 Limit (dBμV/m) = Limit stated in standard
 Margin (dB) = Result (dBμV/m)- Limit (dBμV/m)
 Peak =Peak Reading
 AVG. =Average Reading
 Remark = Mark Peak Reading or Average Reading