



FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

RF REMOTE 315

Model: OKL-LC315TX

Brand: 2AO8FOKL-LC315TX

Test Report Number:

C180313Z01-RP1

Issued for

OKEY-LA INTERNATIONAL LTD.

**No.1 Building, HengGangTou Industrial park, Changan Town,
Dongguan City, Guangdong Province, China. Zip:523850**

Issued By

Compliance Certification Services (Shenzhen) Inc.

**No.10-1 Mingkeda Logistics park, No.18 Huanguan South Rd.,
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Issued Date: May 10, 2018



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Revision History

Rev.	Issue Date.	Revisions	Effect Page	Revised By
00	May 10, 2018	Initial Issue	ALL	Sabrina Wang



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**1. TEST RESULT CERTIFICATION**

Product	RF REMOTE 315
Model	OKL-LC315TX
Brand	2AO8FOKL-LC315TX
Tested	March 13–May 10, 2018
Applicant	OKEY-LA INTERNATIONAL LTD. No.1 Building, HengGangTou Industrial park, Changan Town, Dongguan City, Guangdong Province, China. Zip:523850
Manufacturer	OKEY-LA INTERNATIONAL LTD. No.1 Building, HengGangTou Industrial park, Changan Town, Dongguan City, Guangdong Province, China. Zip:523850

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart C	No non-compliance noted
DEVIATION FROM APPLICABLE STANDARD	
None	

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 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 15.209 and Part 15.231.

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

Approved by:**Reviewed by:**

Eve Wang
Supervisor of RF Dept.
Compliance Certification Service (Shenzhen)
Inc.

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



2. EUT DESCRIPTION

Product	RF REMOTE 315
Model	OKL-LC315TX
Brand	2AO8FOKL-LC315TX
Model Difference	N/A
Power Supply	DC12V supplied by the battery
Frequency Range	315 MHz
Transmit Power	Peak: 81.60dBuV/m (Max.) Average: 67.49dBuV/m (Max.)
Modulation Technique	AM
Number of Channels	1 Channels
Antenna Designation	telescopic antenna with 12dBi (Max.)
Temperature Range	-5°C ~ +45°C
Hardware Version	08083A-Y330-171125
Software Version	JF001-RF04-120D-V1

Remark: This submittal(s) (test report) is intended for FCC ID: 2AO8FOKL-LC315TX filing to comply with Section 15.209 and 15.231 of the FCC Part 15, Subpart C Rules.



3. TEST METHODOLOGY

3.1 DESCRIPTION OF TEST MODES

The EUT has been tested under engineering test mode condition and the EUT staying in continuous transmitting mode.

The following test mode(s) were scanned during the preliminary test below 1G:

Test Item	Test mode	Worse mode
Conducted Emission	Not applicable since the EUT supplied by the battery.	☐
Radiated Emission	Mode 1: TX	☒

Above 1G, TX mode with the highest data rate (worst case) are chosen for full testing.

The field strength of spurious radiation emission was measured in the following position: EUT stand-up position (Y mode) and lie-down position (X, Z mode) The following data show only the worst case setup.

The worst case (Y axis) was reported.



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
Conducted Emissions	+/-3.6836dB
Band Width	178kHz
Peak Output Power MU	+/-1.906dB
Band Edge MU	+/-0.182dB
Channel Separation MU	416.178Hz
Duty Cycle MU	0.054ms
Frequency Stability MU	226Hz

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. SETUP OF EQUIPMENT UNDER TEST

5.1 SETUP CONFIGURATION OF EUT

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

5.2 SUPPORT EQUIPMENT

No.	Equipment	Model No.	Serial No.	FCC	Brand	Data Cable	Power Cord
1	N/A						

Remark:

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



6. FCC PART 15.231 REQUIREMENTS

6.1 20 DB BANDWIDTH

LIMIT

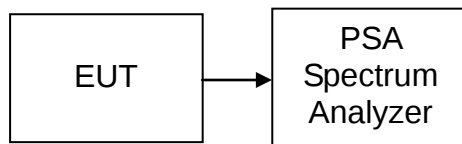
The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Due Calibration
Spectrum Analyzer	Agilent	N9010A	MY55370330	01/27/2018	01/26/2019

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

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The spectrum analyzer center frequency is set to the transmitter frequency. The RBW is set to 10 kHz and VBW is set 30kHz.

TEST RESULTS

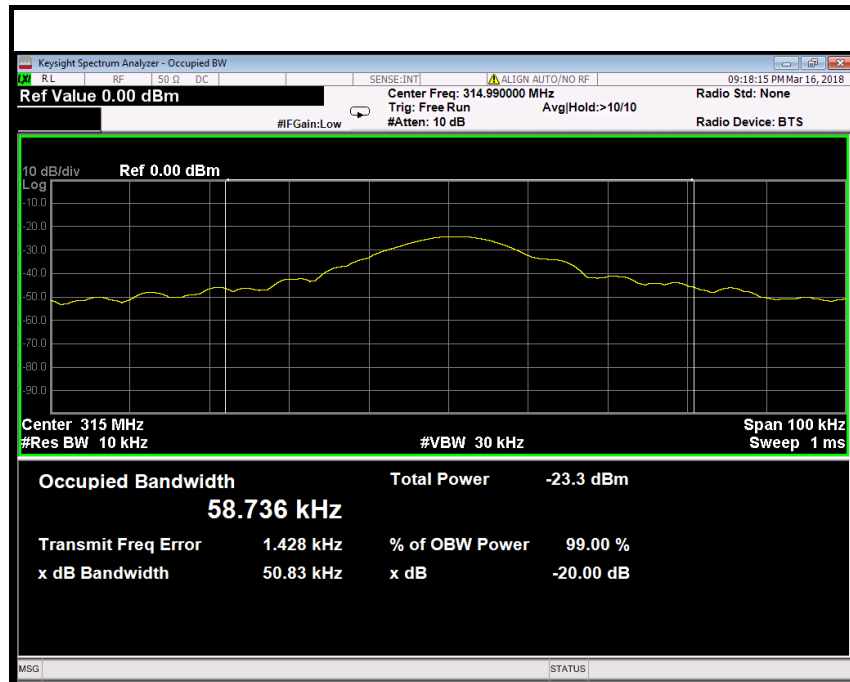
No non-compliance noted.

Test Data

Frequency (MHz)	20 dB Bandwidth (MHz)	Limit (MHz)	Result
315.00	0.0508	0.7875	PASS



Test plot





6.2 LIMIT OF TRANSMISSION TIME

LIMIT

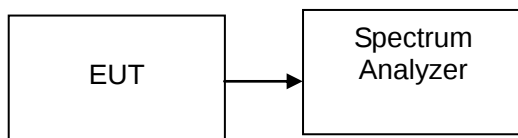
According to 15.231 (a)(1), a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Due Calibration
Spectrum Analyzer	Agilent	N9010A	MY55370330	01/27/2018	01/26/2019

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

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The spectrum analyzer center frequency is set to the transmitter frequency. The RBW and VBW are set to 1MHz.

TEST RESULTS

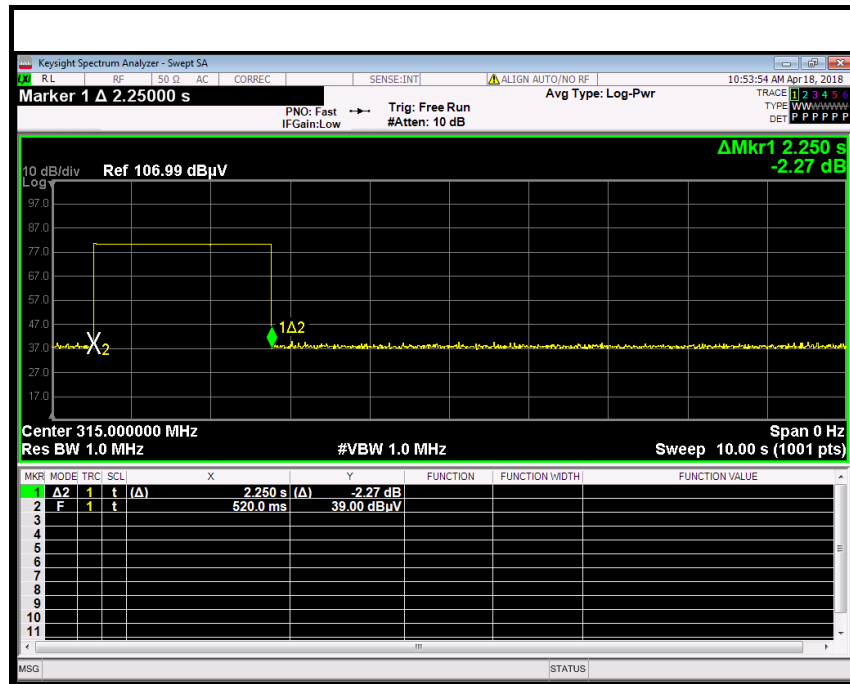
No non-compliance noted

Test Data

Frequency (MHz)	Test (S)	Limit (Second)	Result
315.00	2.25	5.00	Pass



Test plot





6.3 DUTY CYCLE

LIMIT

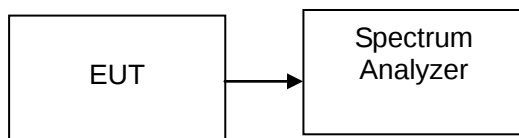
Nil (No dedicated limit specified in the Rules)

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Due Calibration
Spectrum Analyzer	Agilent	N9010A	MY55370330	01/27/2018	01/26/2019

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

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=100KHz, Span = 0Hz, Adjust Sweep = 50ms
5. Repeat above procedures until all frequency measured were complete.

TEST RESULTS

No non-compliance noted

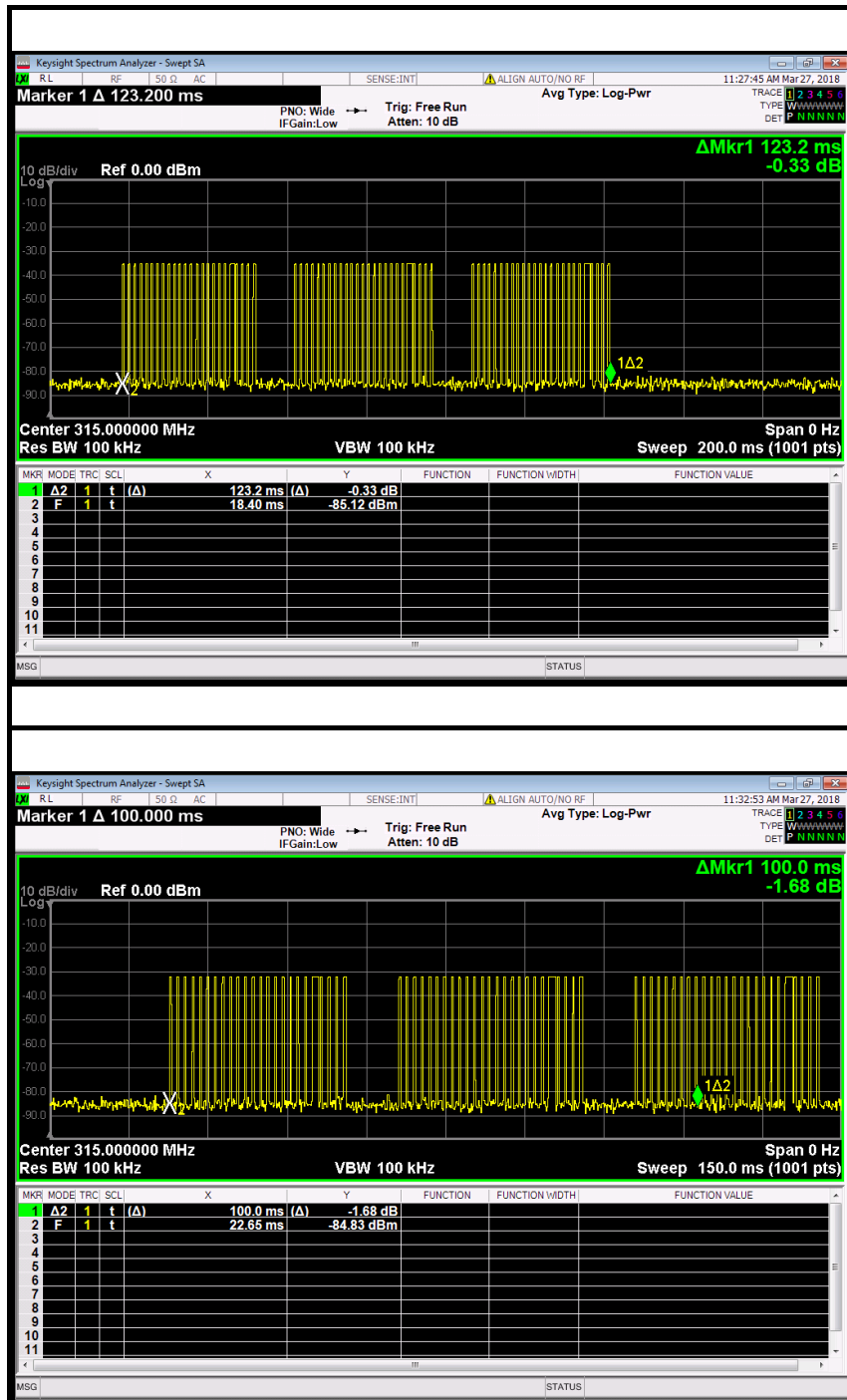
Test Data

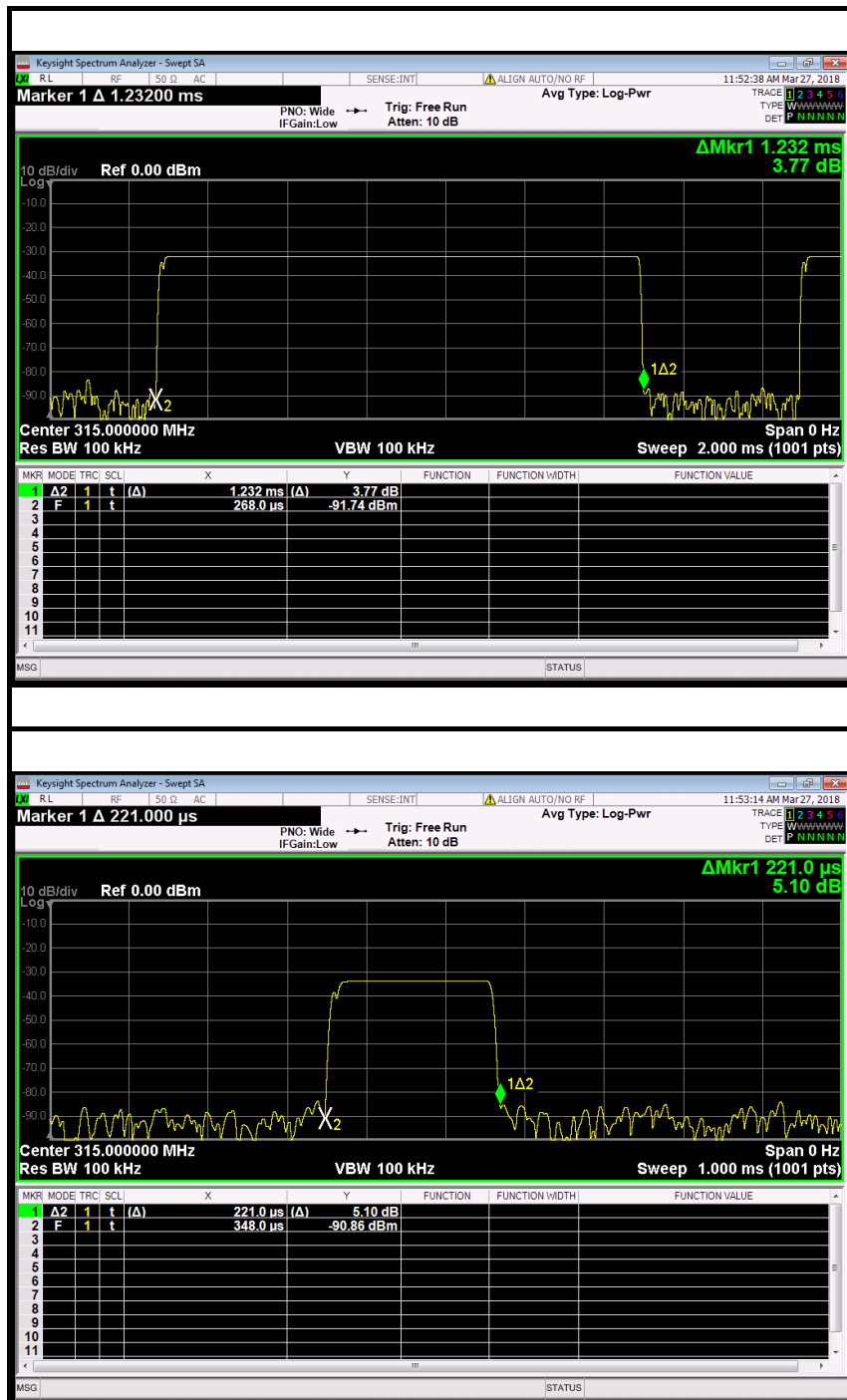
$$T = (0.221 \times 32 + 0.424 \times 24 + 1.232 \times 2) / 100 = (7.072 + 10.176 + 2.464) / 100 = 0.19712 \text{ ms}$$

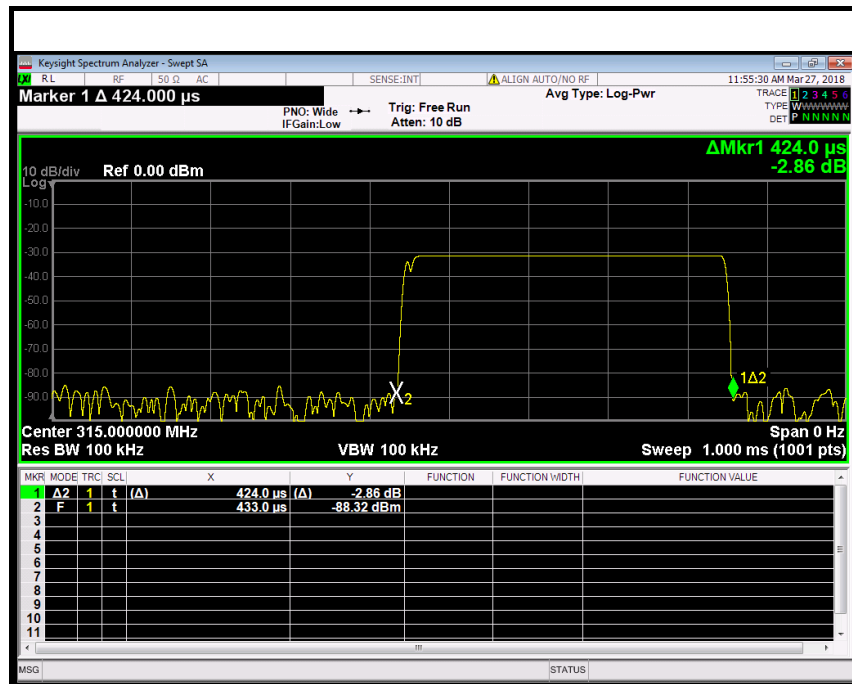
$$\text{Duty Cycle Correction Factor} = 20 \times \log(1/T) = 20 \times \log(1/0.19712) = 14.11 \text{ dB}$$



Test plot









6.4 RADIATED EMISSIONS

LIMIT

1. According to §15.231(b), In addition to the provisions of Section 15.205, the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:
- | Fundamental Frequency (MHz) | Strength of Field Strength of Frequency Fundamental Spurious Emissions (microvolts/meter) | Strength of Field Strength of Frequency Fundamental Spurious Emissions (microvolts/meter) |
|-----------------------------|---|---|
| 40.66 – 40.70 | 2,250 | 225 |
| 70 – 130 | 1,250 | 125 |
| 130 – 174 | 1,250 to 3,750 ** | 125 to 375 ** |
| 174 – 260 | 3,750 | 375 |
| 260 – 470 | 3,750 to 12,500 ** | 375 to 1,250 ** |
| Above 470 | 12,500 | 1,250 |

Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)
40.66 – 40.70	2,250	225
70 – 130	1,250	125
130 – 174	1,250 to 3,750 **	125 to 375 **
174 – 260	3,750	375
260 – 470	3,750 to 12,500 **	375 to 1,250 **
Above 470	12,500	1,250

** linear interpolations

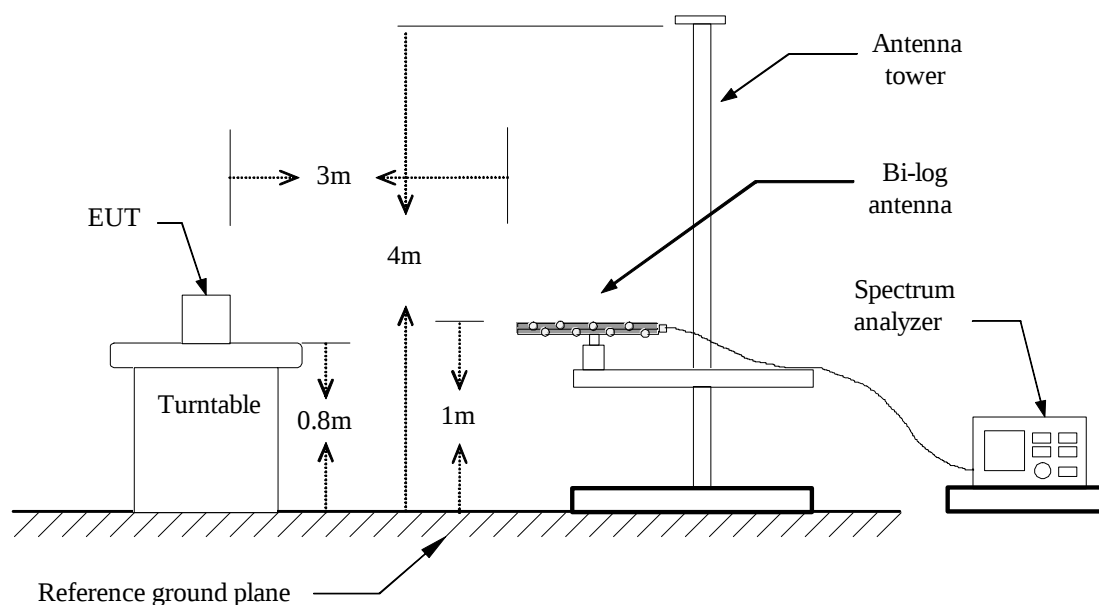
[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, $\mu\text{V/m}$ at 3 meters = $56.81818(F) - 6136.3636$; for the band 260-470 MHz, $\mu\text{V/m}$ at 3 meters = $41.6667(F) - 7083.3333$. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

- (1) The above field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.
- (2) Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in §15.35 for averaging pulsed emissions and for limiting peak emissions apply. Further, compliance with the provisions of §15.205 shall be demonstrated using the measurement instrumentation specified in that section.
- (3) The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength.

**MEASUREMENT EQUIPMENT USED**

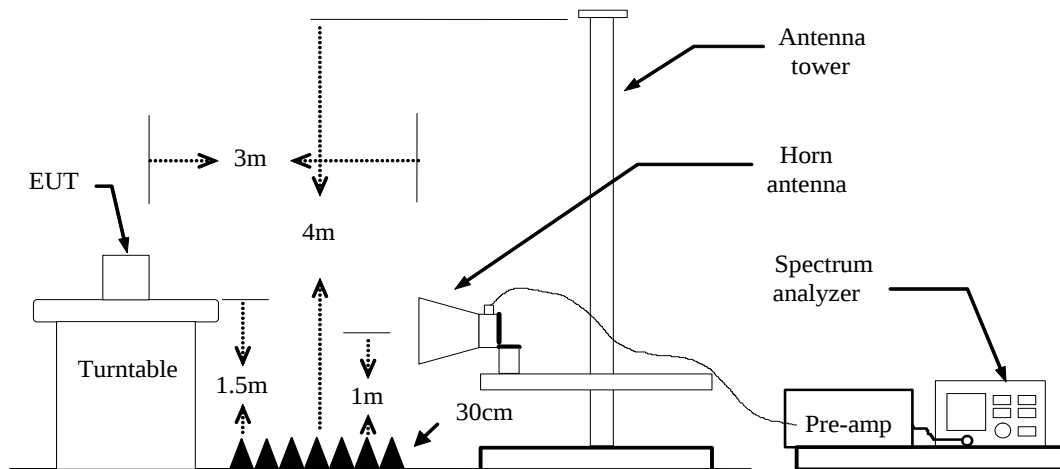
Radiated Emission Test Site 966 (2)					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
PSA Series Spectrum Analyzer	Agilent	N9010A	MY52221469	01/27/2018	01/26/2019
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	01/27/2018	01/26/2019
Amplifier	EMEC	EM330	060661	01/27/2018	01/26/2019
High Noise Amplifier	Agilent	8449B	3008A01838	01/27/2018	01/26/2019
Loop Antenna	COM-POWER	AL-130	121044	01/30/2018	01/29/2019
Bilog Antenna	SCHAFFNER	CBL6143	5082	02/21/2018	02/20/2019
Horn Antenna	SCHWARZBECK	BBHA9120	D286	01/27/2018	01/26/2019
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170-497	01/24/2018	01/23/2019
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	01/29/2018	01/28/2019
Test S/W	FARAD	LZ-RF / CCS-SZ-3A2			

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

Test Configuration**Below 1 GHz**



Above 1 GHz



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m or 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

Below 1GHz:

RBW=100kHz / VBW=300kHz / Sweep=AUTO

Above 1GHz:

(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO

(b) AVERAGE: RBW=1MHz / VBW=1/T / Sweep=AUTO

7. Repeat above procedures until the measurements for all frequencies are complete.



TEST RESULTS

Operation Mode: TX

Test Date: May 10, 2018

Temperature: 24°C

Tested by: Darry Wu

Humidity: 52 % RH

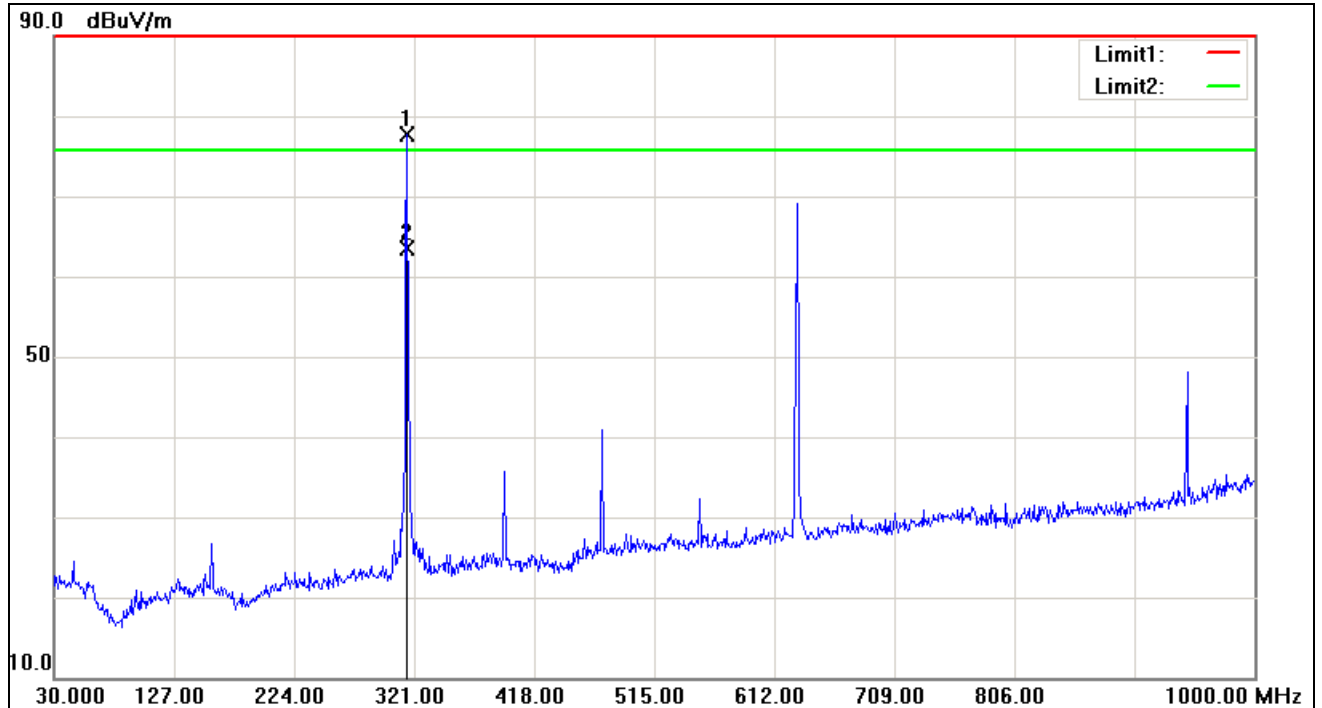
Polarity: Ver. / Hor.

Fundamental:

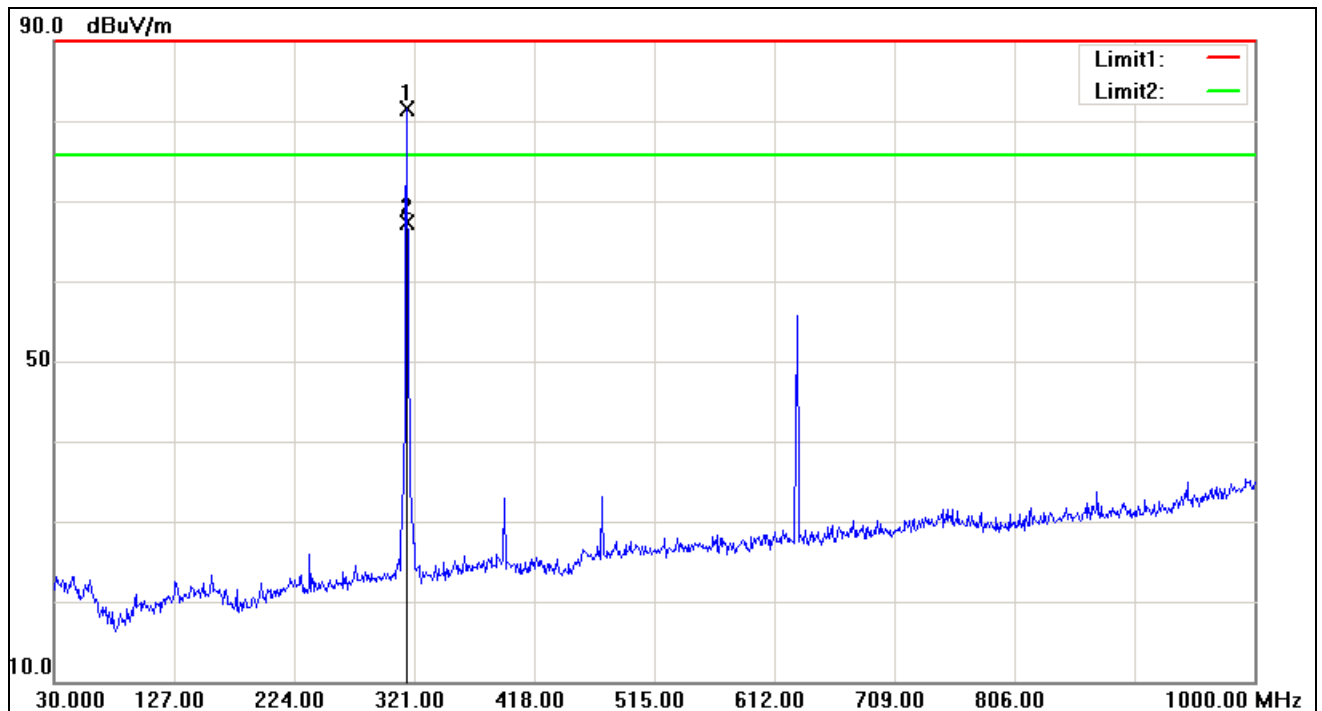
Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
315.1800	87.61	-9.91	77.70	95.62	-17.92	V	QP
315.1800	73.50	-9.91	63.59	75.62	-12.03	V	AVG
315.1800	91.51	-9.91	81.60	95.62	-14.02	H	QP
315.1800	77.40	-9.91	67.49	75.62	-8.13	H	AVG



Vertical



Horizontal





Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
393.7500	43.38	-8.50	34.88	75.62	-40.74	V	QP
472.3200	46.64	-7.39	39.25	75.62	-36.37	V	QP
551.8600	37.96	-6.40	31.56	75.62	-44.06	V	QP
630.4300	74.48	-5.44	69.04	75.62	-6.58	V	QP
630.4300	60.19	-5.44	54.75	55.62	-0.87	V	AVG
799.2100	41.65	-4.13	37.52	75.62	-38.10	V	QP
945.6800	49.35	-1.30	48.05	75.62	-27.57	V	QP
945.6800	35.06	-1.30	33.76	55.62	-21.86	V	AVG
236.6100	35.45	-10.87	24.58	75.62	-51.04	H	QP
393.7500	39.73	-8.50	31.23	75.62	-44.39	H	QP
472.3200	39.47	-7.39	32.08	75.62	-43.54	H	QP
630.4300	61.07	-5.44	55.63	75.62	-19.99	H	QP
630.4300	46.78	-5.44	41.34	55.62	-14.28	H	AVG
747.8000	33.75	-3.53	30.22	75.62	-45.40	H	QP
872.9300	34.34	-2.47	31.87	75.62	-43.75	H	QP

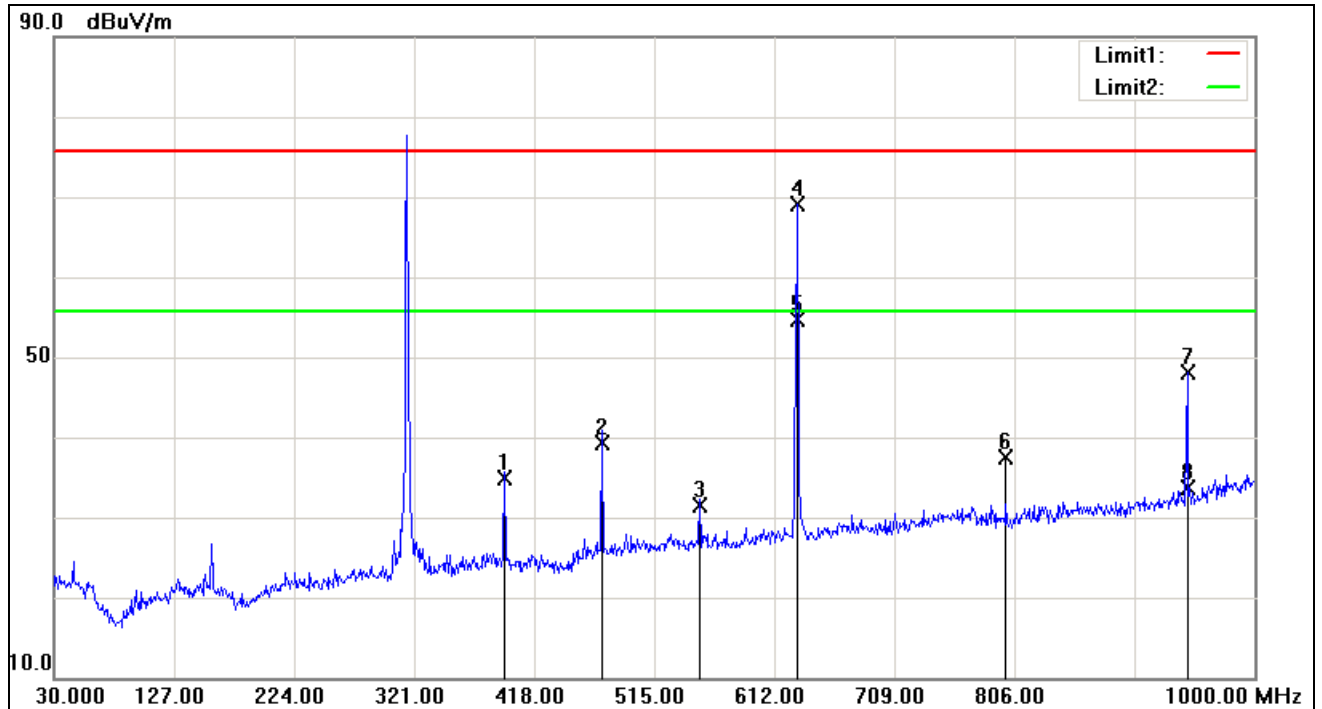
Remark: Average =peak result - Duty cycle correction factor

Remark:

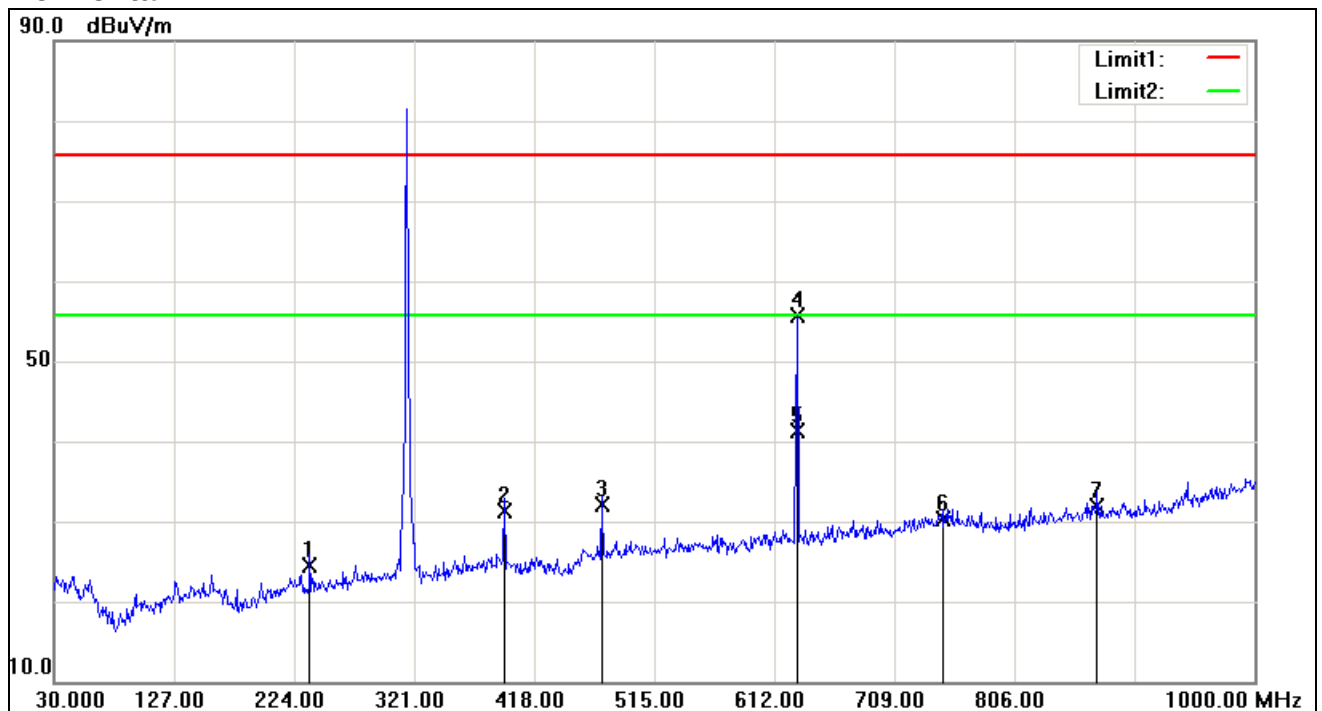
1. Measuring frequencies from 30 MHz to the 1GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.
5. As the limit shown in the 15.231 table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the this table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in §15.35 for averaging pulsed emissions and for limiting peak emissions apply.
6. So for suprious emissions below 1G used CISPR quasi-peak detector(55.62+20 dBuV/m). The harmonic part, used average (55.62 dBuV/m) and quasi-peak (55.62+20 dBuV/m) detector of the measured emissions.



Vertical



Horizontal



**Above 1 GHz**

Operation Mode: TX **Test Date:** May 10, 2018
Temperature: 24°C **Humidity:** 52 % RH
Tested by: Darry Wu

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1575.000	49.51	-6.74	42.77	75.62	-32.85	V	peak
1750.000	61.01	-6.38	54.63	75.62	-20.99	V	peak
1750.000	46.90	-6.38	40.52	55.62	-15.10	V	AVG
1950.000	51.08	-5.32	45.76	75.62	-29.86	V	peak
2595.000	49.26	-2.09	47.17	75.62	-28.45	V	peak
2835.000	46.71	-1.66	45.05	75.62	-30.57	V	peak
4865.000	41.57	4.54	46.11	75.62	-29.51	V	peak
1575.000	46.31	-6.74	39.57	75.62	-36.05	H	peak
1770.000	53.37	-6.33	47.04	75.62	-28.58	H	peak
1770.000	39.26	-6.33	32.93	55.62	-22.69	H	AVG
2515.000	44.01	-2.23	41.78	75.62	-33.84	H	peak
4220.000	41.66	2.36	44.02	75.62	-31.60	H	peak
4590.000	41.50	3.64	45.14	75.62	-30.48	H	peak
5380.000	40.71	5.66	46.37	75.62	-29.25	H	peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. 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.
3. 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.
4. Spectrum setting:
 - a. Spectrum Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
 - b. Spectrum AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.
5. For the spurious emissions above 1G, all used average (55.62 dBuV/m) and peak (55.62+20 dBuV/m) detector of the measured emissions. Since the peak value are lower than average limit, so reported the peak value only.



6.5 POWERLINE CONDUCTED EMISSIONS

LIMIT

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

MEASUREMENT EQUIPMENT USED

Conducted Emission Test Site					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	01/27/2018	01/26/2019
LISN(EUT)	ROHDE&SCHWARZ	ENV216	101543-WX	01/27/2018	01/26/2019
LISN	EMCO	3825/2	8901-1459	01/27/2018	01/26/2019
Temp. / Humidity Meter	VICTOR	HTC-1	N/A	01/29/2018	01/28/2019
Test S/W	FARAD	EZ-EMC/ CCS-3A1-CE			

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

TEST CONFIGURATION

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

TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

TEST RESULTS

Not applicable since the EUT supplied by the battery.