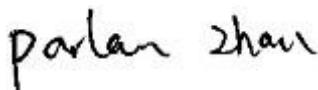


**TEST REPORT**

**Application No.:** SHEM1909016862CR  
**FCC ID:** 2ABGLSW79777WMH  
**Applicant:** Pacific Cycle  
**Address of Applicant:** 4902 Hammersley Road Madison, WI 53711 USA  
**Factory:** UNI-VICTOR INTERNATIONAL CORP.  
**Address of Factory:** No.1, Renhuagong 10th Rd., Dali Dist., Taichuang 41278, Taiwan  
**Equipment Under Test (EUT):**  
**EUT Name:** Sch 200L Sync Light Set  
**Model No.:** SW79777WM-4  
**Standard(s) :** 47 CFR Part 15, Subpart C 15.249  
**Date of Receipt:** 2019-09-03  
**Date of Test:** 2019-09-05 to 2019-09-06  
**Date of Issue:** 2019-10-15

<b>Test Result:</b>	<b>Pass*</b>
---------------------	--------------

\* In the configuration tested, the EUT complied with the standards specified above.



Parlam Zhan  
E&E Section Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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Attention: To check the authenticity of testing /inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: [CN.Doccheck@sgs.com](mailto:CN.Doccheck@sgs.com)



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Revision Record			
Version	Description	Date	Remark
00	Original	2019-10-15	/

Authorized for issue by:			
		Bill Wu	
		Bill Wu / Project Engineer	
		Parlam Zhan	
		Parlam Zhan / Reviewer	

## 2 Test Summary

<b>Radio Spectrum Technical Requirement</b>				
<b>Item</b>	<b>Standard</b>	<b>Method</b>	<b>Requirement</b>	<b>Result</b>
Antenna Requirement	47 CFR Part 15, Subpart C 15.249	N/A	47 CFR Part 15, Subpart C 15.203	Pass

<b>Radio Spectrum Matter Part</b>				
<b>Item</b>	<b>Standard</b>	<b>Method</b>	<b>Requirement</b>	<b>Result</b>
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
20dB Bandwidth	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.215	Pass
Field Strength of the Fundamental Signal (15.249(a))	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.5&6.6	47 CFR Part 15, Subpart C 15.249(a)	Pass
Restricted Band Around Fundamental Frequency	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209	Pass
Radiated Emissions	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)	Pass

### **3 Contents**

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## 4 General Information

### 4.1 Details of E.U.T.

Power supply:	DC 3.7V 1200mAh rechargeable Li-ion battery
Test voltage:	AC 120V/60Hz
Channel List	2403MHz,2440MHz,2478MHz
Modulation Type	GFSK
Number of Channels	3
Antenna Type	PCB Antenna
Antenna Gain	0dBi

### 4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
AC Adapter	Apple	A1402	/

### 4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 8.4 \times 10^{-8}$
2	Timeout	$\pm 2s$
3	Duty cycle	$\pm 0.37\%$
4	Occupied Bandwidth	$\pm 3\%$
5	RF conducted power	$\pm 0.6\text{dB}$
6	RF power density	$\pm 2.84\text{dB}$
7	Conducted Spurious emissions	$\pm 0.75\text{dB}$
8	RF Radiated power	$\pm 4.6\text{dB}$ (Below 1GHz) $\pm 4.1\text{dB}$ (Above 1GHz)
9	Radiated Spurious emission test	$\pm 4.2\text{dB}$ (Below 30MHz) $\pm 4.4\text{dB}$ (30MHz-1GHz) $\pm 4.8\text{dB}$ (1GHz-18GHz) $\pm 5.2\text{dB}$ (Above 18GHz)
10	Temperature test	$\pm 1^\circ\text{C}$
11	Humidity test	$\pm 3\%$
12	Supply voltages	$\pm 1.5\%$
13	Time	$\pm 3\%$

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

#### **4.4 Test Location**

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shanghai Branch  
588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China  
Tel: +86 21 6191 5666      Fax: +86 21 6191 5678

No tests were sub-contracted.

#### **4.5 Test Facility**

The test facility is recognized, certified, or accredited by the following organizations:

- CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- NVLAP (Certificate No. 201034-0)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the National Voluntary Laboratory Accreditation Program(NVLAP). Certificate No. 201034-0.

- FCC –Designation Number: CN5033**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

Designation Number: CN5033. Test Firm Registration Number: 479755.

- Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

IC Registration No.: 8617A-1. CAB identifier: CN0020.

- VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868, C-14336, T-12221, G-10830 respectively.

#### **4.6 Deviation from Standards**

None

#### **4.7 Abnormalities from Standard Conditions**

None



## 5 Equipment List

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
<b>RF Conducted Test</b>					
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2018-12-20	2019-12-19
Spectrum Analyzer	Agilent	N9020A	SHEM181-1	2019-08-13	2020-08-12
Signal Generator	R&S	SMR20	SHEM006-1	2019-08-13	2020-08-12
Signal Generator	Agilent	N5182A	SHEM182-1	2019-08-13	2020-08-12
Communication Tester	R&S	CMW270	SHEM183-1	2019-08-13	2020-08-12
Switcher	Tonscend	JS0806	SHEM184-1	2019-08-13	2020-08-12
Power Sensor	Keysight	U2021XA * 4	SHEM184-1	2019-08-13	2020-08-12
Splitter	Anritsu	MA1612A	SHEM185-1	/	/
Coupler	e-meca	803-S-1	SHEM186-1	/	/
High-low Temp Cabinet	Suzhou Zhihe	TL-40	SHEM087-1	2017-09-25	2020-09-24
AC Power Stabilizer	WOCEN	6100	SHEM045-1	2018-12-26	2019-12-25
DC Power Supply	MCN	MCH-303A	SHEM210-1	2018-12-26	2019-12-25
Conducted test Cable	/	RF01~RF04	/	2018-12-26	2019-12-25
<b>RF Radiated Test</b>					
EMI test Receiver	R&S	ESU40	SHEM051-1	2018-12-20	2019-12-19
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2018-12-20	2019-12-19
Loop Antenna (9kHz-30MHz)	Schwarzbeck	FMZB1519	SHEM135-1	2017-04-10	2020-04-09
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM048-1	2017-02-28	2020-02-27
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM202-1	2019-04-30	2022-04-29
Horn Antenna (1-18GHz)	Schwarzbeck	HF906	SHEM009-1	2017-10-24	2020-10-23
Horn Antenna (1-18GHz)	Schwarzbeck	BBHA9120D	SHEM050-1	2017-01-14	2020-01-13
Horn Antenna (14-40GHz)	Schwarzbeck	BBHA 9170	SHEM049-1	2017-12-03	2020-12-02
Pre-amplifier (9KHz-2GHz)	CLAVIIO	BDLNA-0001	SHEM164-1	2019-08-13	2020-08-12
Pre-amplifier (1-18GHz)	CLAVIIO	BDLNA-0118	SHEM050-2	2019-08-13	2020-08-12
High-amplifier (14-40GHz)	Schwarzbeck	10001	SHEM049-2	2018-12-20	2019-12-19
Signal Generator	R&S	SMR40	SHEM058-1	2019-08-13	2020-08-12
Band Filter	LORCH	9BRX-875/X150	SHEM156-1	/	/
Band Filter	LORCH	13BRX-1950/X500	SHEM083-2	/	/
Band Filter	LORCH	5BRX-2400/X200	SHEM155-1	/	/
Band Filter	LORCH	5BRX-5500/X1000	SHEM157-2	/	/
High pass Filter	Wainwright	WHK3.0/18G	SHEM157-1	/	/
High pass Filter	Wainwright	WHKS1700	SHEM157-3	/	/
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2017-07-22	2020-07-21
RE test Cable	/	RE01, RE02, RE06	/	2018-12-26	2019-12-25

## 6 Radio Spectrum Technical Requirement

### 6.1 Antenna Requirement

#### 6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203

Limit:

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.

#### 6.1.2 Conclusion

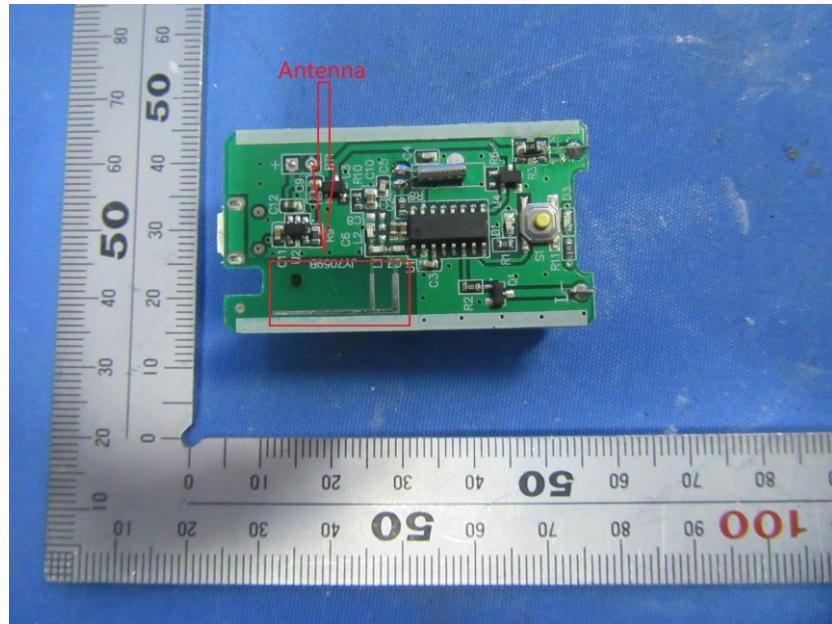
Standard Requirement:

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.

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.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0dBi.



## 7 Radio Spectrum Matter Test Results

### 7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207

Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\* Decreases with the logarithm of the frequency.

#### 7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 48 % RH Atmospheric Pressure: 1010 mbar

Test mode c:Charge + TX mode\_Keep the EUT in charging and transmitting with modulation mode.

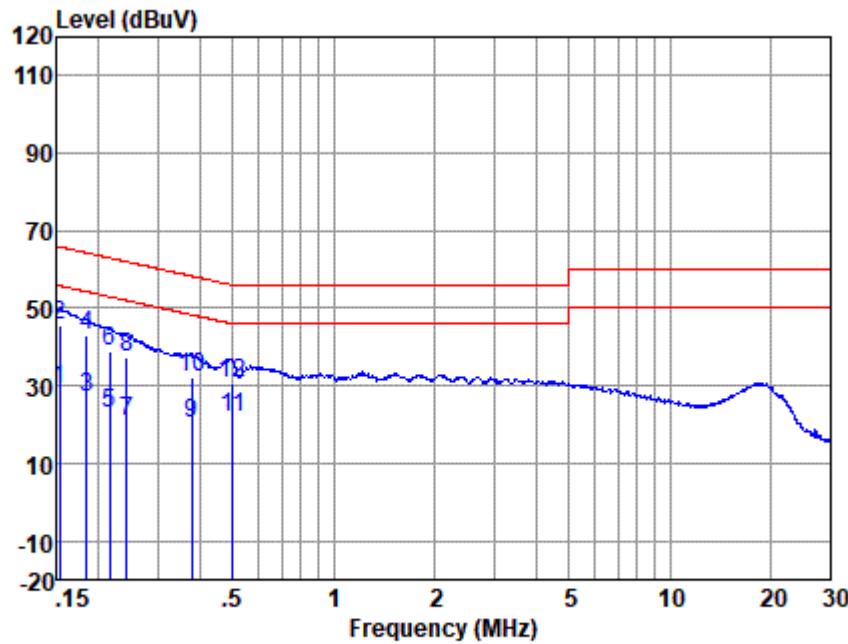
#### 7.1.2 Measurement Procedure and Data

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 50hm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: LISN=Read Level+ Cable Loss+ LISN Factor

#### 7.1.3 Test Result

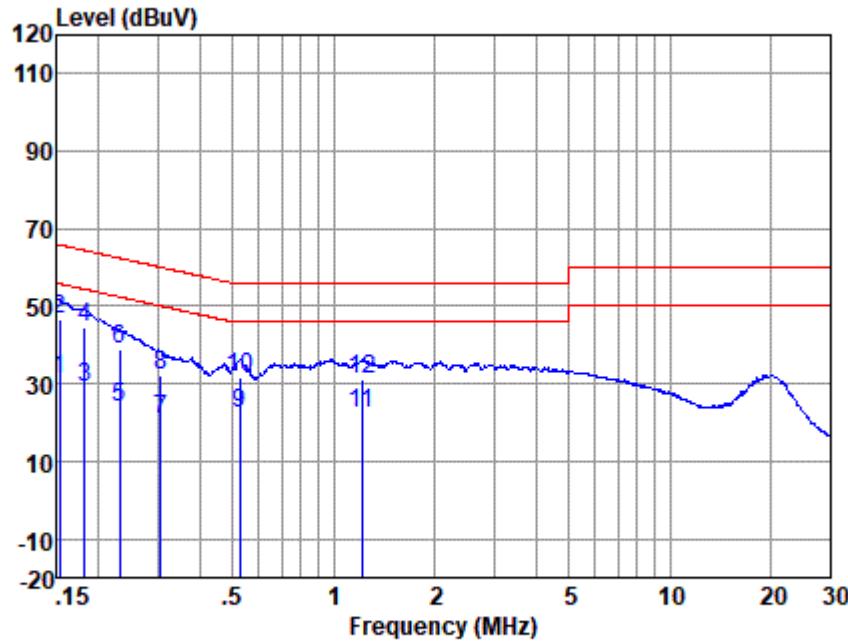
Mode:c; Line:Live Line

**LISN : LINE****Test Mode : a**

Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Over Limit (dBuV)	Over Limit (dB)	Remark
1 0.15	18.91	0.09	9.97	28.97	55.87	-26.90	Average
2 0.15	35.34	0.09	9.97	45.40	65.87	-20.47	QP
3 0.18	16.81	0.07	10.02	26.90	54.28	-27.38	Average
4 0.18	32.82	0.07	10.02	42.91	64.28	-21.37	QP
5 0.22	13.00	0.07	10.03	23.10	53.01	-29.91	Average
6 0.22	29.01	0.07	10.03	39.11	63.01	-23.90	QP
7 0.24	10.77	0.07	10.02	20.86	52.04	-31.18	Average
8 0.24	27.04	0.07	10.02	37.13	62.04	-24.91	QP
9 0.38	10.20	0.08	9.99	20.27	48.30	-28.03	Average
10 0.38	21.93	0.08	9.99	32.00	58.30	-26.30	QP
11 0.50	11.76	0.08	9.97	21.81	46.01	-24.20	Average
12 0.50	20.70	0.08	9.97	30.75	56.01	-25.26	QP

Notes: Emission Level = Read Level + LISN Factor + Cable loss

Mode:c; Line:Neutral Line



LISN : NEUTRAL  
Test Mode : a

Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1 0.15	21.07	0.07	9.97	31.11	55.87	-24.76	Average
2 0.15	36.79	0.07	9.97	46.83	65.87	-19.04	QP
3 0.18	19.04	0.06	10.01	29.11	54.42	-25.31	Average
4 0.18	34.64	0.06	10.01	44.71	64.42	-19.71	QP
5 0.23	13.84	0.06	10.02	23.92	52.44	-28.52	Average
6 0.23	28.71	0.06	10.02	38.79	62.44	-23.65	QP
7 0.31	10.81	0.06	10.00	20.87	50.10	-29.23	Average
8 0.31	21.89	0.06	10.00	31.95	60.10	-28.15	QP
9 0.53	12.47	0.06	9.97	22.50	46.00	-23.50	Average
10 0.53	21.68	0.06	9.97	31.71	56.00	-24.29	QP
11 1.21	12.08	0.09	10.05	22.22	46.00	-23.78	Average
12 1.21	21.10	0.09	10.05	31.24	56.00	-24.76	QP

Notes: Emission Level = Read Level + LISN Factor + Cable loss

## 7.2 20dB Bandwidth

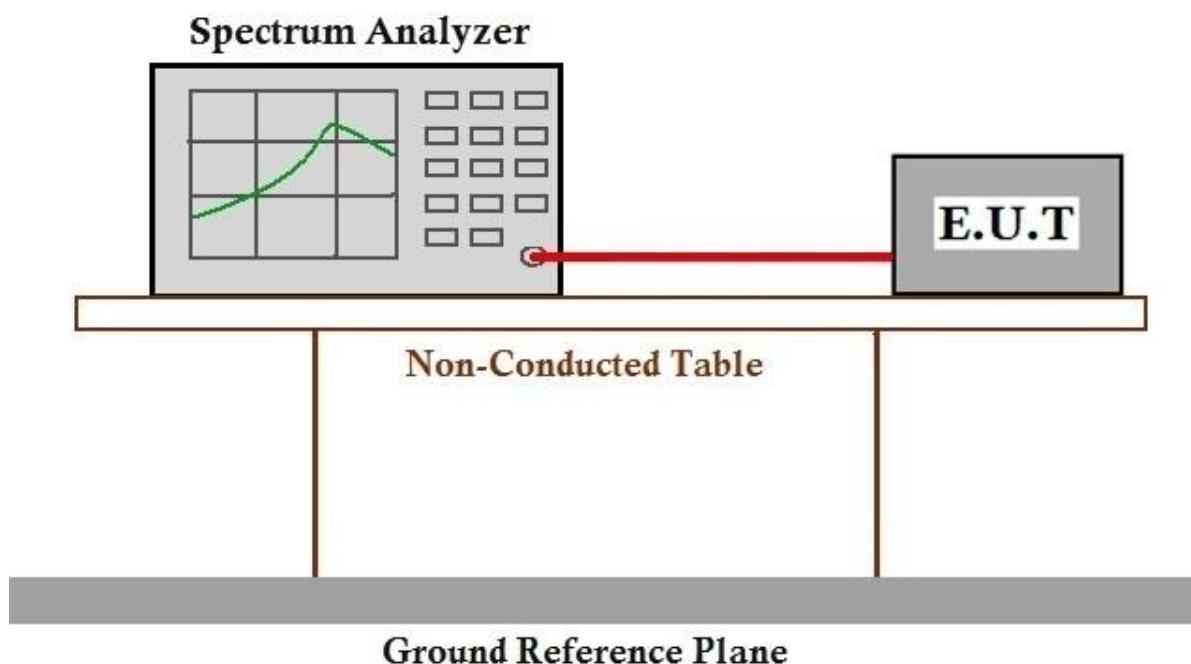
Test Requirement 47 CFR Part 15, Subpart C 15.215  
Test Method: ANSI C63.10 (2013) Section 6.9

### 7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 20 °C      Humidity: 50 % RH      Atmospheric Pressure: 1010 mbar  
Test mode c:Charge + TX mode\_Keep the EUT in charging and transmitting with modulation mode.

### 7.2.2 Test Setup Diagram

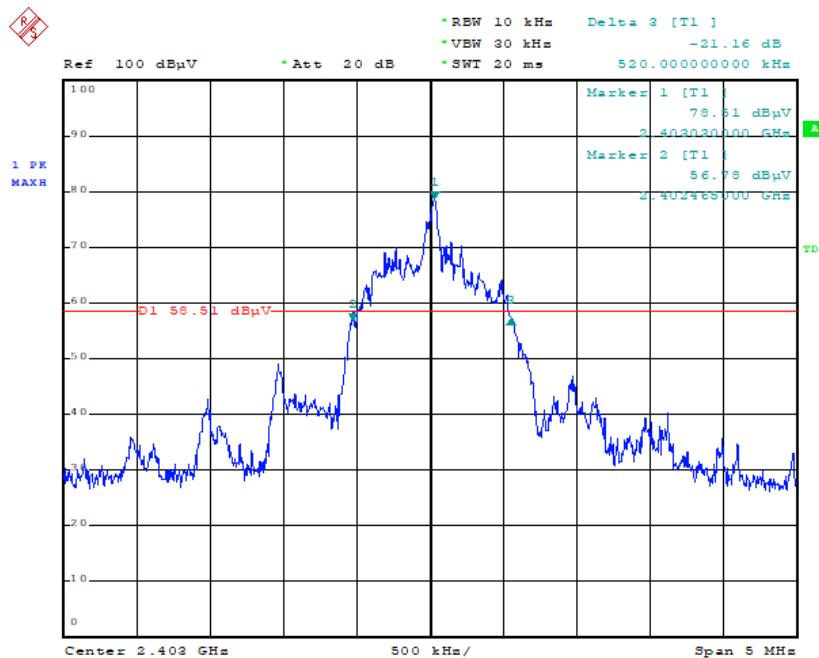


### 7.2.3 Measurement Procedure and Data

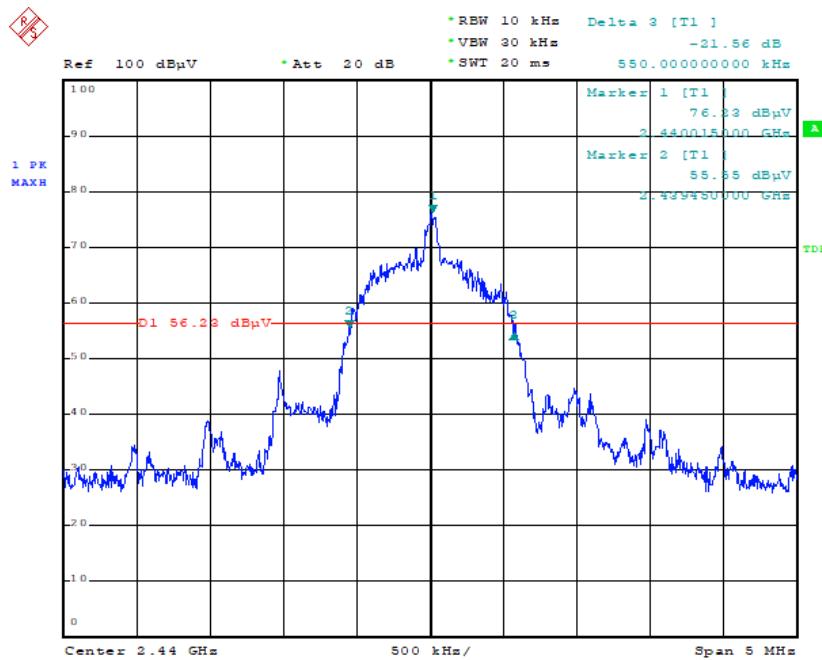
1. Place the EUT on the table and set it in Engineering mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = approximately 1 % to 5 % of the OBW (set 100 kHz), VBW =3\* RBW, Span=10MHz, Sweep=auto
4. Mark the peak frequency and -20dB (upper and lower) frequency.
5. Repeat above procedures until all frequency measured was complete.

Frequency (MHz)	Bandwidth (MHz)	Result
2403	0.52	PASS
2440	0.55	PASS
2478	0.52	PASS

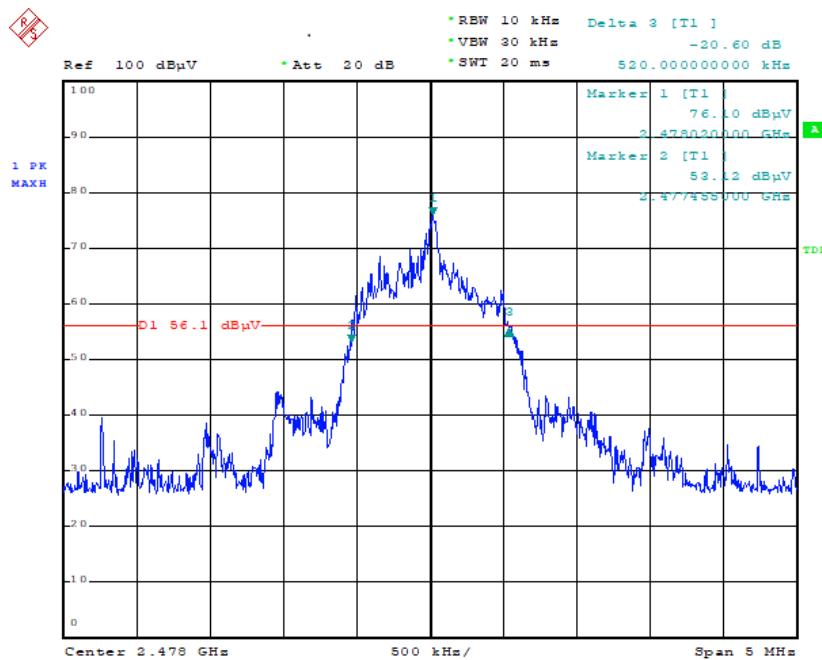
2403MHz



2440MHz



2478MHz



### 7.3 Field Strength of the Fundamental Signal (15.249(a))

Test Requirement 47 CFR Part 15, Subpart C 15.249(a)

Test Method: ANSI C63.10 (2013) Section 6.5&amp;6.6

Limit:

Frequency	Limit (dBuV/m @3m)	Remark
2400MHz-2483.5MHz	94.0	Average Value
	114.0	Peak Value

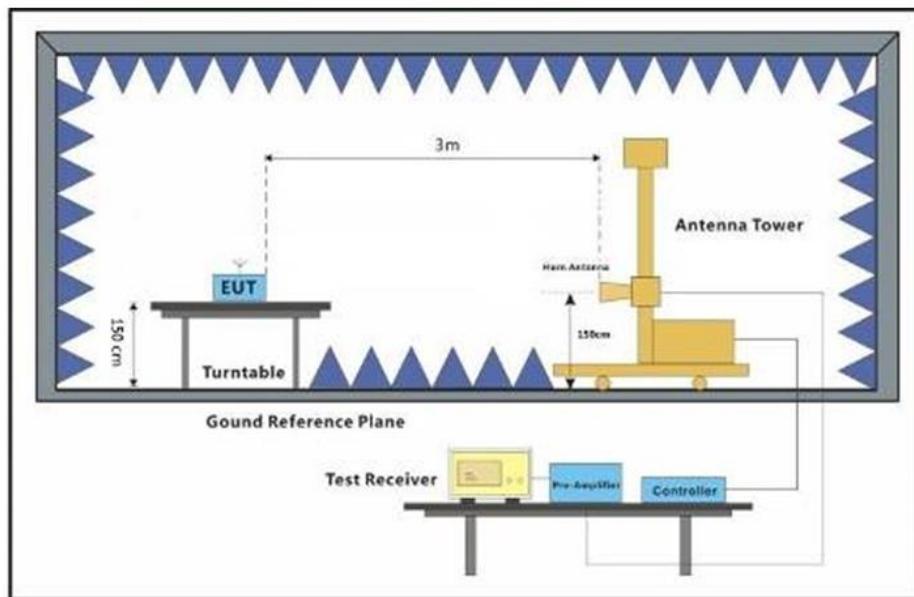
#### 7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1002 mbar

Test mode c:Charge + TX mode\_Keep the EUT in charging and transmitting with modulation mode.

#### 7.3.2 Test Setup Diagram



### **7.3.3 Measurement Procedure and Data**

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. 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.
- e. 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 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. 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.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor



Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Detector	Polarization
2403	77.22	-3.92	73.30	94	-20.70	Peak	Horizontal
	82.56	-3.92	78.64	94	-15.36	Peak	Vertical
2440	75.89	-3.96	71.93	94	-22.07	Peak	Horizontal
	80.98	-3.96	77.02	94	-16.98	Peak	Vertical
2478	76.45	-4.00	72.45	94	-21.55	Peak	Horizontal
	81.03	-4.00	77.03	94	-16.97	Peak	Vertical

Remark:

1) The basic equation with a sample calculation is as follows: Level = Read Level + Factor.  
(The Factor is calculated by adding the Antenna Factor, Cable Loss and Preamp Factor)

If the Peak value below the AV Limit, the AV test doesn't perform for this submission.

## 7.4 Restricted Band Around Fundamental Frequency

Test Requirement 47 CFR Part 15, Subpart C 15.205 &amp; 15.249(d) &amp; 15.209

Test Method: ANSI C63.10 (2013) Section 6.4&amp;6.5&amp;6.6

Limit:

Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
Above 1GHz	74.0	Peak Value

Emission radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

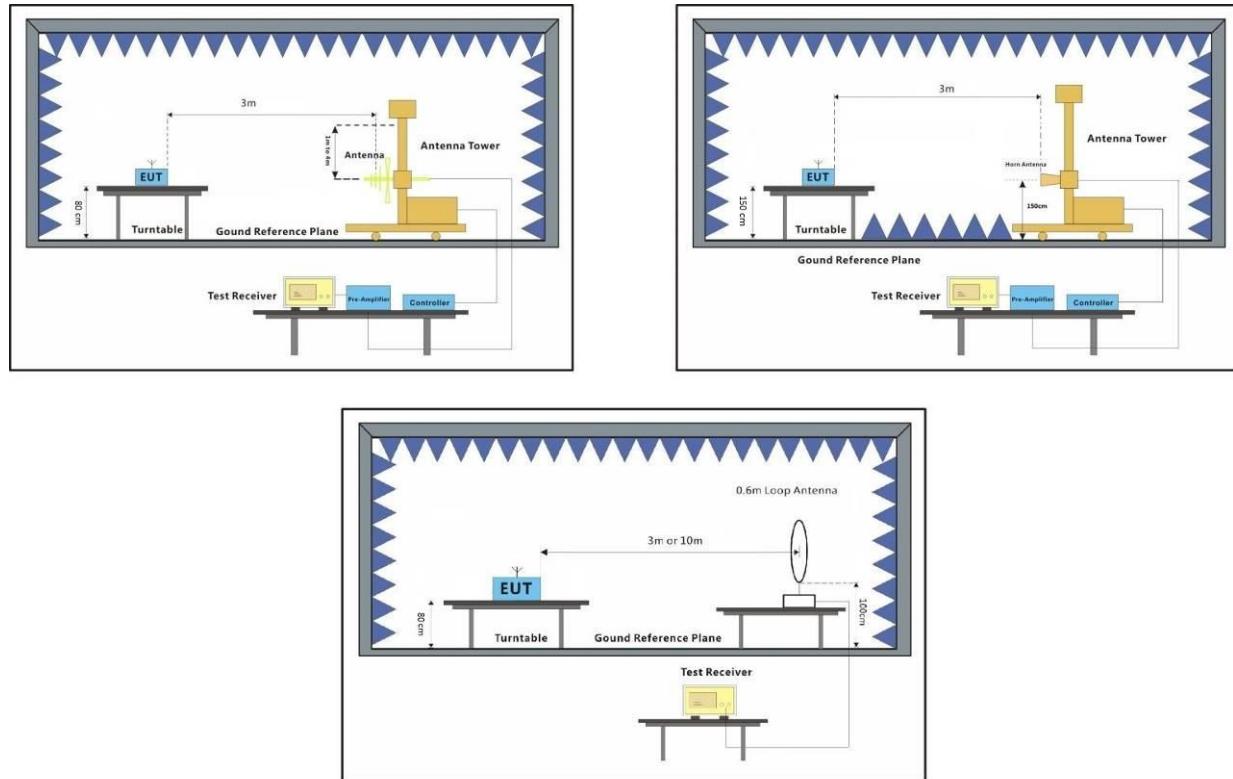
### 7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1002 mbar

Test mode c:Charge + TX mode \_Keep the EUT in charging and transmitting with modulation mode.

### 7.4.2 Test Setup Diagram

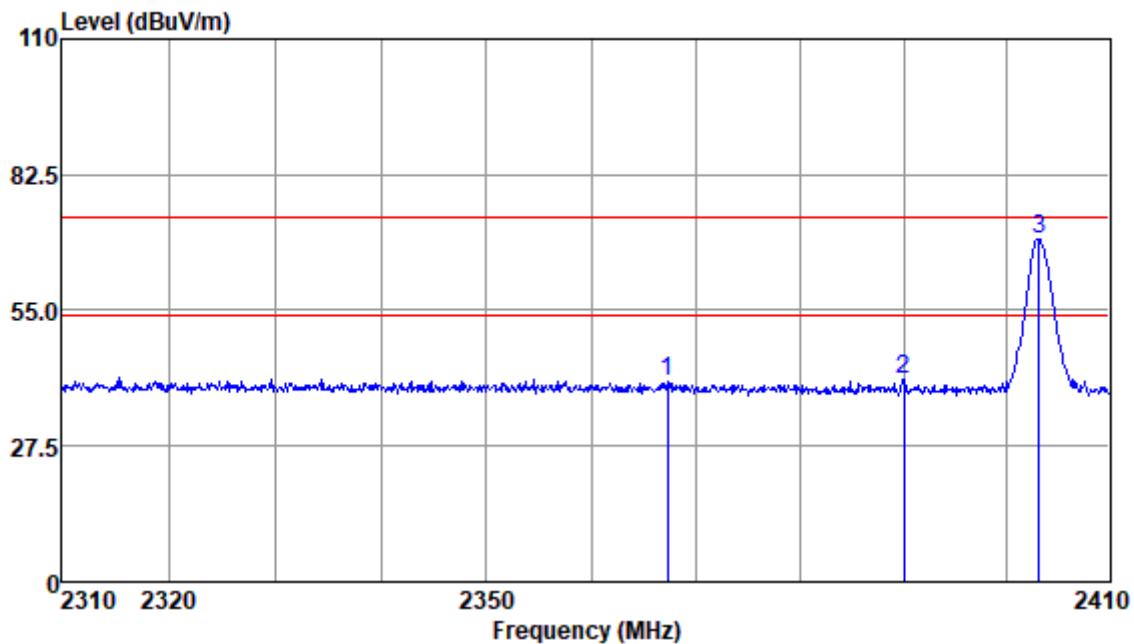


#### **7.4.3 Measurement Procedure and Data**

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. 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.
- e. 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 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. 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.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

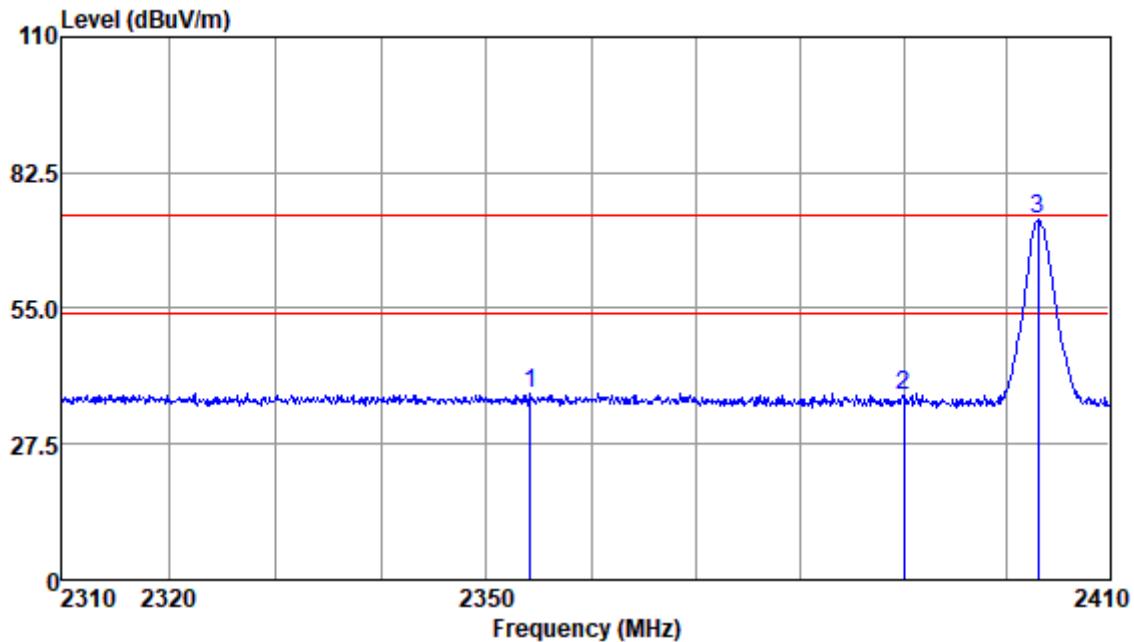
Mode:c; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low

**Antenna Polarity :HORIZONTAL**

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2367.28	48.71	26.00	3.17	37.36	40.52	74.00	-33.48	Peak
2390.00	49.23	26.03	3.15	37.36	41.05	74.00	-32.95	Peak
2403.17	77.72	26.05	3.14	37.35	69.56	74.00	-4.44	Peak

Note: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

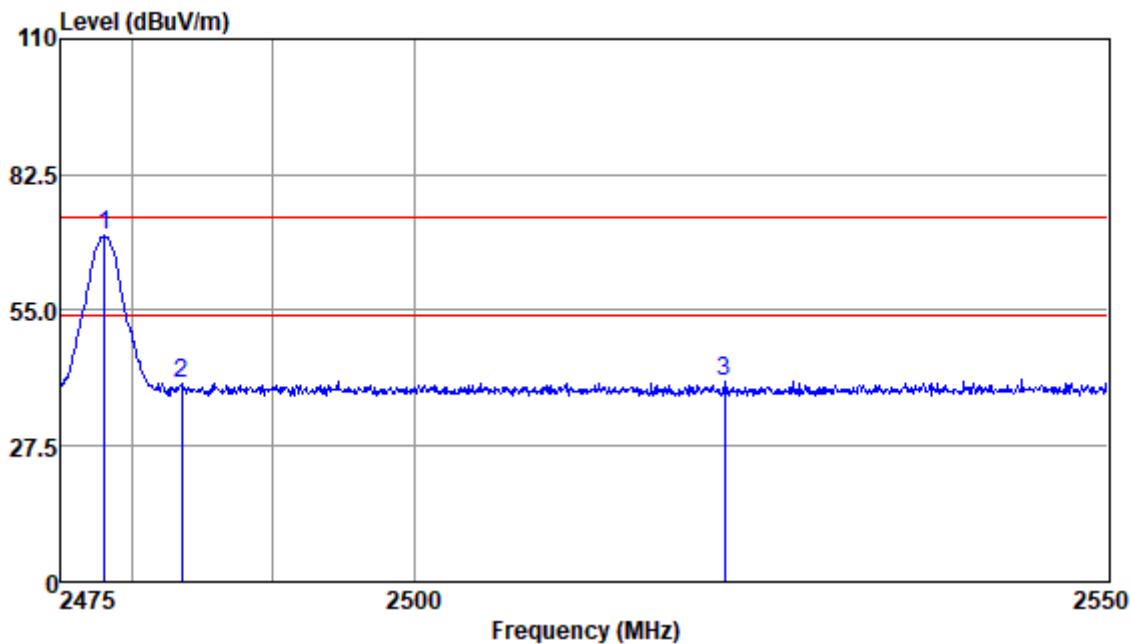
Mode:c; Polarization:Vertical; Modulation:GFSK; ; Channel:Low

**Antenna Polarity :VERTICAL**

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2354.18	39.55	25.98	3.12	37.36	37.71	74.00	-36.29	Peak
2390.00	39.17	26.03	3.15	37.36	37.46	74.00	-36.54	Peak
2403.07	74.53	26.05	3.14	37.35	72.87	74.00	-1.13	Peak

Note: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

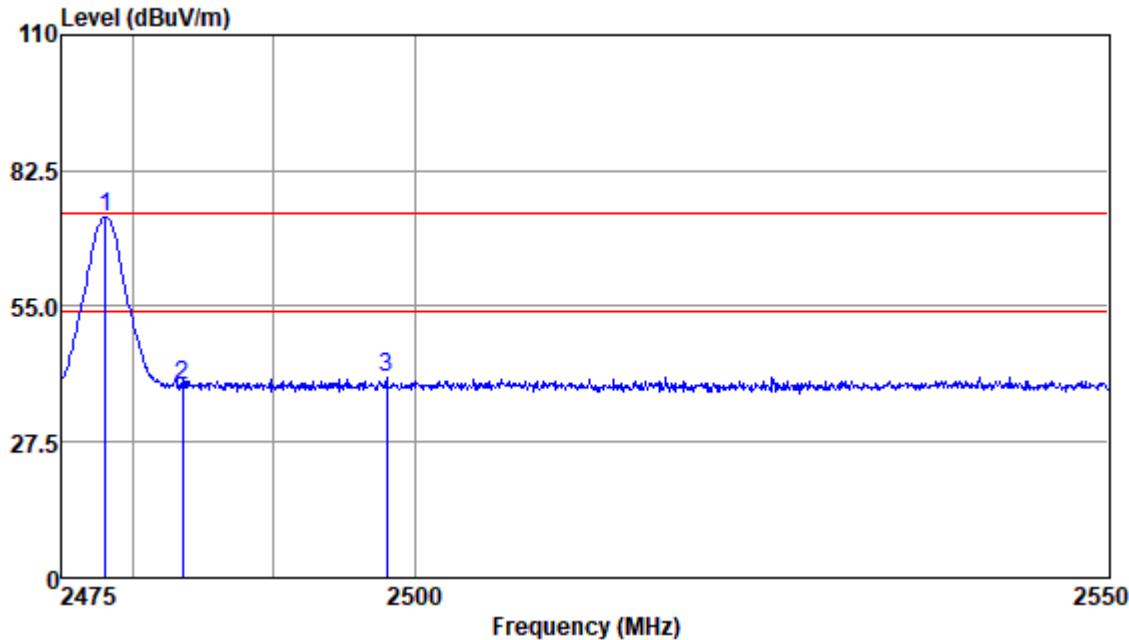
Mode:c; Polarization:Horizontal; Modulation:GFSK; ; Channel:High

**Antenna Polarity :HORIZONTAL**

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
2478.11	78.33	26.17	3.14	37.49	70.15	74.00	-3.85	Peak
2483.50	48.31	26.18	3.14	37.51	40.12	74.00	-33.88	Peak
2522.22	48.86	26.27	3.16	37.58	40.71	74.00	-33.29	Peak

Note: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Mode:c; Polarization:Vertical; Modulation:GFSK; ; Channel:High

**Antenna Polarity :VERTICAL**

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit	Over Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
2478.11	81.37	26.17	3.14	37.49	73.19	74.00	-0.81	Peak	
2483.50	47.11	26.18	3.14	37.51	38.92	74.00	-35.08	Peak	
2498.01	48.59	26.20	3.15	37.53	40.41	74.00	-33.59	Peak	

Note: Emission Level=Read Level+Antenna Factor+Cable loss+Preamp Factor

## 7.5 Radiated Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.209 &amp; 15.249 (a),(d)

Test Method: ANSI C63.10 (2013) Section 6.4&amp;6.5&amp;6.6

Limit:

Frequency(MHz)	Field strength (microvolts/meter)	Limit (dBuV/m)	Detector	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	-	-	300
0.490-1.705	24000/F(kHz)	-	-	30
1.705-30	30	-	-	30
30-88	100	40.0	QP	3
88-216	150	43.5	QP	3
216-960	200	46.0	QP	3
960-1000	500	54.0	QP	3
Above 1000	500	54.0	AV	3

### 7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1002 mbar

Test mode c:Charge + TX mode\_Keep the EUT in charging and transmitting with modulation mode.

### **7.5.2 Measurement Procedure and Data**

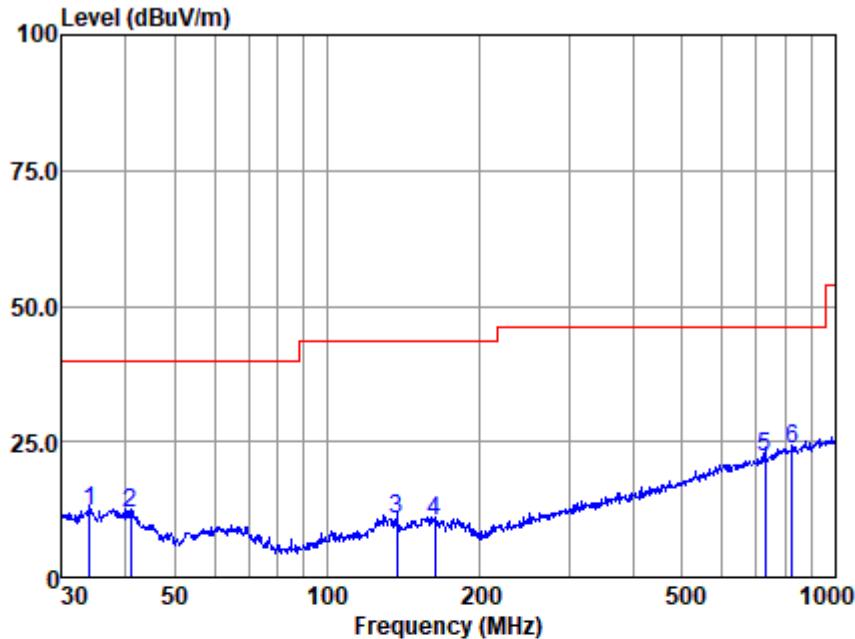
- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. 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.
- e. 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 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. 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.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

**Remark:**

- 1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.
- 2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:  
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor
- 3) Scan from 9kHz to 25GHz, the disturbance above 18GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
- 4) For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown

Below 1GHz

Mode:c; Polarization:Horizontal



Antenna Polarity :HORIZONTAL

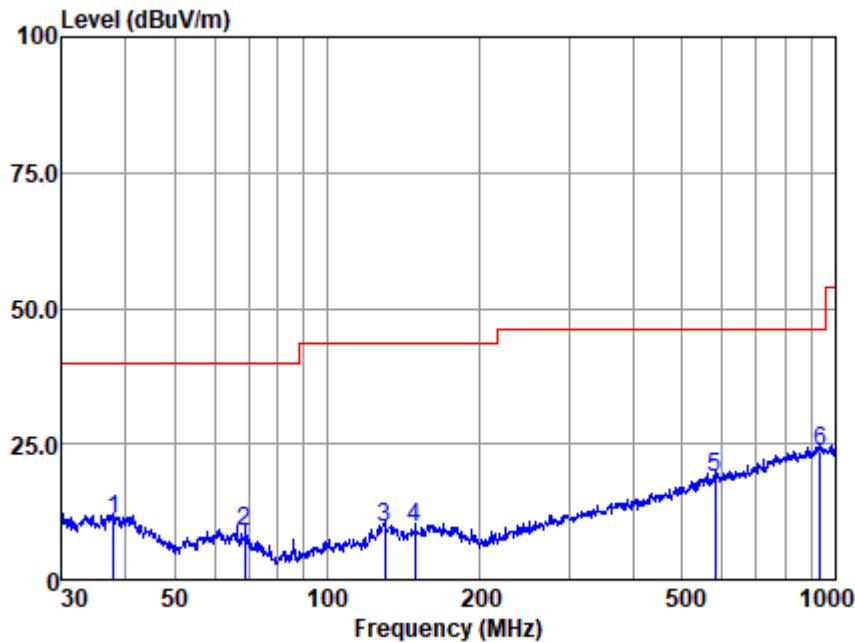
EUT/Project :16862CR

Test mode :a

Freq	Read	Antenna	Cable	Preamp	Emission	Limit	Over	Remark
	Level	Factor	Loss	Factor	Level	Line	Limit	
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	34.037	38.24	15.74	0.50	42.36	12.12	40.00	-27.88 QP
2	40.988	38.04	15.60	0.34	42.33	11.65	40.00	-28.35 QP
3	136.939	39.83	11.74	1.39	42.25	10.71	43.50	-32.79 QP
4	163.182	38.42	12.56	1.48	42.22	10.24	43.50	-33.26 QP
5	729.358	39.01	20.73	4.32	41.92	22.14	46.00	-23.86 QP
6	824.597	38.88	22.12	4.40	41.91	23.49	46.00	-22.51 QP

Note: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Mode:c; Polarization:Vertical



Antenna Polarity : VERTICAL

EUT/Project : 16862CR

Test mode : a

	Read Freq	Antenna Level	Cable Factor	Preamp Loss	Emission Factor	Limit Level	Over Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	37.945	36.84	16.12	0.49	42.34	11.11	40.00	-28.89	QP
2	68.872	39.05	11.55	0.64	42.27	8.97	40.00	-31.03	QP
3	129.923	37.63	12.80	1.43	42.26	9.60	43.50	-33.90	QP
4	148.963	38.52	11.86	1.36	42.23	9.51	43.50	-33.99	QP
5	580.703	37.82	18.96	3.71	41.67	18.82	46.00	-27.18	QP
6	935.546	37.33	23.10	4.73	41.50	23.66	46.00	-22.34	QP

Note: Emission Level = Read Level + Antenna Factor + Cable loss - Preamp Factor

Mode:c; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low

Frequency	RX_R	Factor	Emission	Limit	Over Limit	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
7945.62	37.99	12.39	50.38	54	-3.62	peak
9005.45	37.25	14.42	51.67	54	-2.33	peak
11565.85	38.02	14.55	52.57	54	-1.43	peak

Mode:c; Polarization:Vertical; Modulation:GFSK; ; Channel:Low

Frequency	RX_R	Factor	Emission	Limit	Over Limit	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1352.46	72.10	-30.2	41.90	54	-12.10	peak
5895.88	68.85	-24.69	44.16	54	-9.84	peak
11788.53	60.44	-22.85	37.59	54	-16.41	peak

Mode:c; Polarization:Horizontal; Modulation:GFSK; ; Channel:Middle

Frequency	RX_R	Factor	Emission	Limit	Over Limit	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
7895.28	37.55	12.12	49.67	54	-4.33	peak
10052.55	36.98	14.38	51.36	54	-2.64	peak
13150.26	37.42	14.25	51.67	54	-2.33	peak

Mode:c; Polarization:Vertical; Modulation:GFSK; ; Channel: Middle

Frequency	RX_R	Factor	Emission	Limit	Over Limit	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
2015.55	68.75	-28.78	39.97	54	-14.03	peak
6548.75	66.11	-25.33	40.78	54	-13.22	peak
12255.52	59.55	-22.11	37.44	54	-16.56	peak

Mode:c; Polarization:Horizontal; Modulation:GFSK; ; Channel:High

Frequency	RX_R	Factor	Emission	Limit	Over Limit	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
7685.25	37.85	12.41	50.26	54	-3.74	peak
9888.58	36.60	14.55	51.15	54	-2.85	peak
12150.09	38.05	13.75	51.80	54	-2.20	peak

Mode:c; Polarization:Vertical; Modulation:GFSK; ; Channel: High

Frequency	RX_R	Factor	Emission	Limit	Over Limit	Detector
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1345.68	74.52	-30.02	44.5	54	-9.50	peak
6025.44	64.55	-25.89	38.7	54	-15.34	peak
12485.55	62.33	-21.78	40.6	54	-13.45	peak



## **8 Test Setup Photographs**

Refer to the < Test Setup photos-FCC>.

## **9 EUT Constructional Details**

Refer to the < External Photos > & < Internal Photos >.

**- End of the Report -**