



# **TEST REPORT**

Applicant Name : Address : Report Number: FCC ID: Feit Electric Company 4901 Gregg Road, Pico Rivera, California, United States 90660 RA230522-28374E-RFA SYW-FM11LP6WYMMHD

Test Standard (s)

FCC PART 15.249

# **Sample Description**

Product Type: Model No.:

Trade Mark: Date Received: Date of Test: Report Date: Luminaire FM11LP6WYMMBKHD, FM11LP6WYMMBKHDDF FM11LP6WYMMNKHD, FM11LP6WYMMNKHDDF Commercial 2023-05-22 2023-06-05 to 2023-07-05 2023-07-05

Pass\*

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

# **Prepared and Checked By:**

Bob. Liao

Test Result:

Bob.Liao EMC Engineer

# **Approved By:**

Candy . Li

Candy Li EMC Engineer

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "\* ".

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FCC-RF

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# **DOCUMENT REVISION HISTORY**

Revision Number	Report Number	Description of Revision	Date of Revision
0	RA230522-28374E-RF	Original Report	2023-06-19
1	RA230522-28374E-RFA	Revised some notes in the report	2023-07-05

# **GENERAL INFORMATION**

<b>Product Description for</b>	<b>Equipment under</b>	Test (EUT)
--------------------------------	------------------------	------------

Product	Luminaire
Tested Model	FM11LP6WYMMBKHD
Multiple Model	FM11LP6WYMMBKHDDF, FM11LP6WYMMNKHD FM11LP6WYMMNKHDDF
Model Difference	Please refer to DOS letter
Frequency Range	SRD: 5750MHz~5870MHz(121CH)
Maximum E-Field Strength (Peak)	84.12dBuV/m@3m
Modulation Technique	CW
Antenna Specification*	Internal Antenna (It is provided by the applicant)
Voltage Range	AC 120V/60Hz
Sample serial number	2631-1(CE&RE)
Sample/EUT Status	Good condition

# Objective

This type approval report is in accordance with Part 2-Subpart J, and Part 15-Subparts A and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.249 rules.

## **Test Methodology**

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliant Testing of Unlicensed Wireless Devices.

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Parameter		Uncertainty
Occupied Channel Bandwidth		5%
RF output	power, conducted	0.71dB
Unwanted I	Emission, conducted	1.6dB
AC Power Line	es Conducted Emissions	2.74dB
	30MHz - 1GHz	5.08dB
Emissions,	1GHz - 18GHz	4.96dB
Radiated	18GHz - 26.5GHz	5.16dB
	26.5GHz - 40GHz	4.64dB
Te	emperature	1°C
Humidity		6%
Sup	ply voltages	0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

# **Test Facility**

The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the Floor 1, KuMaKe Building, Dongzhou Community, Guangming Street, Guangming District, Shenzhen, Guangdong, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 708358, the FCC Designation No.: CN1189.

Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 4297.01.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0016. The Registration Number is 30241.

# SYSTEM TEST CONFIGURATION

## Justification

The system was configured for testing in an engineering mode and the power level setting was default\*, which provided by manufacturer.

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	5750	31	5781	62	5812	93	5843
1	5751	32	5782	63	5813	94	5844
2	5752	33	5783	64	5814	95	5845
3	5753	34	5784	65	5815	96	5846
4	5754	35	5785	66	5816	97	5847
5	5755	36	5786	67	5817	98	5848
6	5756	37	5787	68	5818	99	5849
7	5757	38	5788	69	5819	100	5850
8	5758	39	5789	70	5820	101	5851
9	5759	40	5790	71	5821	102	5852
10	5760	41	5791	72	5822	103	5853
11	5761	42	5792	73	5823	104	5854
12	5762	43	5793	74	5824	105	5855
13	5763	44	5794	75	5825	106	5856
14	5764	45	5795	76	5826	107	5857
15	5765	46	5796	77	5827	108	5858
16	5766	47	5797	78	5828	109	5859
17	5767	48	5798	79	5829	110	5860
18	5768	49	5799	80	5830	111	5861
19	5769	50	5800	81	5831	112	5862
20	5770	51	5801	82	5832	113	5863
21	5771	52	5802	83	5833	114	5864
22	5772	53	5803	84	5834	115	5865
23	5773	54	5804	85	5835	116	5866
24	5774	55	5805	86	5836	117	5867
25	5775	56	5806	87	5837	118	5868
26	5776	57	5807	88	5838	119	5869
27	5777	58	5808	89	5839	120	5870
28	5778	59	5809	90	5840		
29	5779	60	5810	91	5841		
30	5780	61	5811	92	5842		

Test Channel: Channel0, Channel50, Channel120

# **EUT Exercise Software**

No exercise software

## **Special Accessories**

No special accessory.

# **Equipment Modifications**

No modifications were made to the unit tested.

# **Support Equipment List and Details**

Manufacturer	Description	Model	Serial Number
/	/	/	/

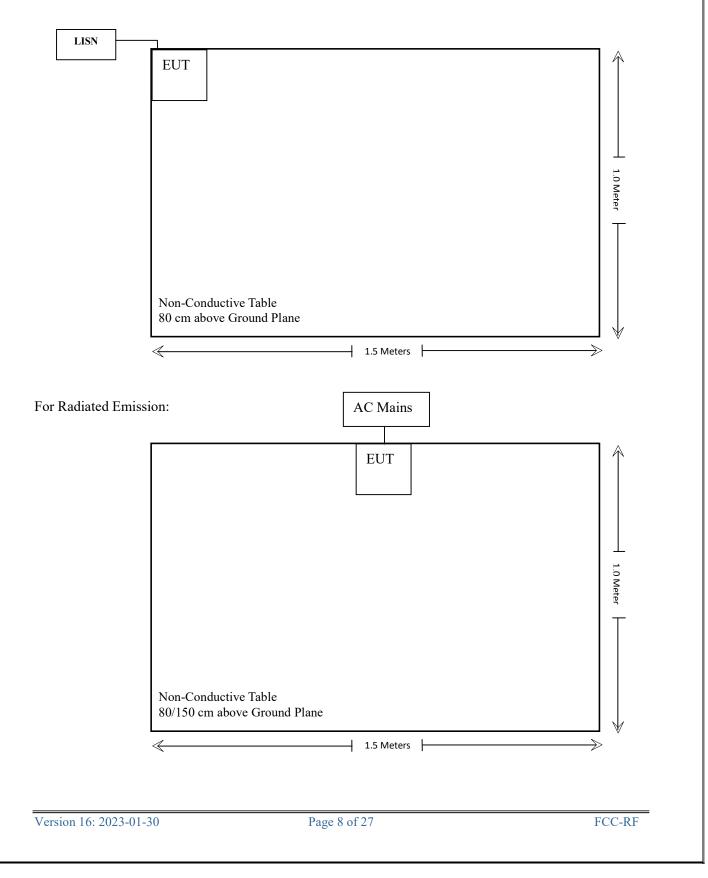
# **Support Cable Descriptions**

Cable Description	Length (m)	From/Port	То
Un-shielding Detachable AC Cable	1	EUT	L.I.S.N

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# **Block Diagram of Test Setup**

For Conducted Emission:



# SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §1.1307 (b) & §2.1093	RF Exposure	Compliant
§15.203	Antenna Requirement	Compliant
§15.207(a)	Conduction Emissions	Compliant
15.205, §15.209, §15.249(d)	Radiated Emissions& Outside of Band Emission	Compliant
§15.215 (c)	20dB Bandwidth	Compliant

# **TEST EQUIPMENT LIST**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date		
Conducted Emissions Test							
Rohde & Schwarz	EMI Test Receiver	ESCI	100784	2022/11/25	2023/11/24		
R & S	L.I.S.N.	ENV216	101314	2022/11/25	2023/11/24		
Anritsu Corp	50Ω Coaxial Switch	MP59B	6100237248	2022/12/07	2023/12/06		
Unknown	RF Coaxial Cable	No.17	N0350	2022/11/25	2023/11/24		
	Conducted E	mission Test Sof	tware: e3 191218 (	V9)	_		
		Radiated Emiss	ions Test				
Rohde & Schwarz	Test Receiver	ESR	102725	2022/11/25	2023/11/24		
Rohde & Schwarz	Spectrum Analyzer	FSV40	101949	2022/11/25	2023/11/24		
SONOMA INSTRUMENT	Amplifier	310 N	186131	2022/11/08	2023/11/07		
A.H. Systems, inc.	Preamplifier	PAM-0118P	135	2022/11/08	2023/11/07		
Quinstar	Amplifier	QLW-184055 36-J0	15964001002	2022/11/08	2023/11/07		
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2021/07/06	2024/07/05		
Schwarzbeck	Horn Antenna	BBHA9120D	837	2023/02/22	2026/02/21		
Schwarzbeck	HORN ANTENNA	BBHA9170	9170-359	2022/12/26	2025/12/25		
Unknown	RF Coaxial Cable	No.10	N050	2022/11/25	2023/11/24		
Unknown	RF Coaxial Cable	No.11	N1000	2022/11/25	2023/11/24		
Unknown	RF Coaxial Cable	No.12	N040	2022/11/25	2023/11/24		
Unknown	RF Coaxial Cable	No.13	N300	2022/11/25	2023/11/24		
Unknown	RF Coaxial Cable	No.14	N800	2022/11/25	2023/11/24		
Unknown	RF Coaxial Cable	No.15	N600	2022/11/25	2023/11/24		
Unknown	RF Coaxial Cable	No.16	N650	2022/11/25	2023/11/24		
	Radiated En	nission Test Soft	ware:e3 191218 (V	79)			

\* **Statement of Traceability:** Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

# FCC §1.1307 (b) & §2.1093 – RF EXPOSURE

# Applicable Standard

According to FCC §2.1093 and §1.1307(b), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D04 Interim General RF Exposure Guidance v01, clause 2.1.2 – 1-mW test Exemption:

Per § 1.1307(b)(3)(i)(A), a single RF source is exempt RF device (from the requirement to show data demonstrating compliance to RF exposure limits, as previously mentioned) if the available maximum time-averaged power is no more than 1 mW, regardless of separation distance.

This exemption applies to all operating configurations and exposure conditions, for the frequency range 100 kHz to 100 GHz, regardless of fixed, mobile, or portable device exposure conditions. This is a standalone exemption, and it cannot be applied in conjunction with any other test exemption.

# **Test Result:**

For worst case:

Mada	Frequency	Maximum Power		1-mW test
Mode	(MHz)	(dBm)	(mW)	Exemption
SRD	5870	-11.08	0.08	Yes

Note: Use the highest e-field strength(84.12dBuV/m@3m) for the evaluation E(dBuV/m)=EIRP(dBm)-95.2 for distance 3m so the EIRP=84.12dBuV/m-95.2=-11.08dBm

Result: Compliant.

# FCC§15.203 - ANTENNA REQUIREMENT

## **Applicable Standard**

According to FCC § 15.203, 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 shall be considered sufficient to comply with the provisions of this Section. 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.

#### Antenna Connector Construction

The EUT has one internal antenna which was permanently attached, fulfill the requirement of this section. Please refer to the EUT photos.

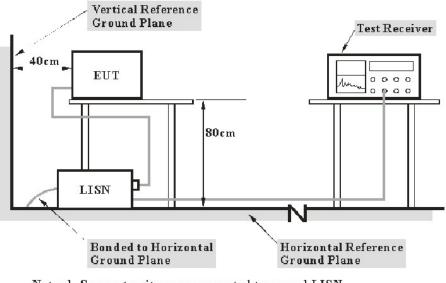
Result: Compliant.

# FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

## Applicable Standard

FCC §15.207(a)

# **EUT Setup**



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The measurement procedure of EUT setup is according with ANSI C63.10-2013. The related limit was specified in FCC Part 15.207.

The spacing between the peripherals was 10 cm.

# EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

# **Test Procedure**

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

#### Calculation

The factor is calculated by adding LISN VDF (Voltage Division Factor) and Cable Loss. The basic equation is as follows:

Factor = LISN VDF + Cable Loss

The "**Over Limit**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over limit of -7 dB means the emission is 7 dB below the limit. The equation for calculation is as follows:

Over Limit = Level – Limit Level = Read Level + Factor

#### **Test Data**

#### **Environmental Conditions**

Temperature:	23°C
<b>Relative Humidity:</b>	50%
ATM Pressure:	101.0 kPa

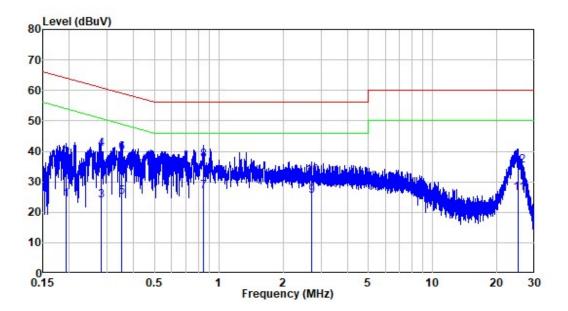
The testing was performed by Jerry Wu on 2023-06-06.

*EUT operation mode: Transmitting (worst case is high channel)* 

Test Result: Please refer the below plots.

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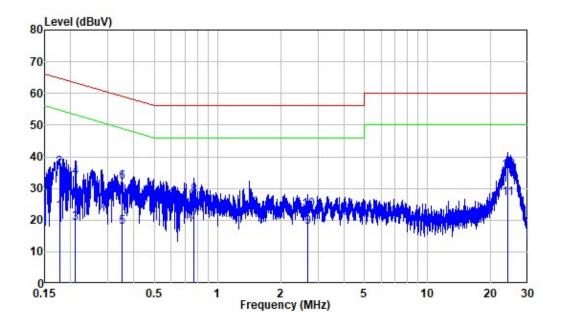
# AC 120V/60 Hz, Line



Site	:	Shielding Room
Condition	:	Line
Job No.	:	RA230522-28374E-RF
Mode	:	Transmitting
Power	:	AC 120V 60Hz

			Read		Limit	Over	
	Freq	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.193	10.29	13.92	24.21	53.89	-29.68	Average
2	0.193	10.29	27.56	37.85	63.89	-26.04	QP
з	0.282	10.31	13.67	23.98	50.77	-26.79	Average
4	0.282	10.31	30.54	40.85	60.77	-19.92	QP
5	0.349	10.33	14.63	24.96	48.98	-24.02	Average
6	0.349	10.33	29.24	39.57	58.98	-19.41	QP
7	0.847	10.45	16.49	26.94	46.00	-19.06	Average
8	0.847	10.45	26.73	37.18	56.00	-18.82	QP
9	2.705	10.46	14.89	25.35	46.00	-20.65	Average
10	2.705	10.46	21.58	32.04	56.00	-23.96	QP
11	25.204	10.07	16.31	26.38	50.00	-23.62	Average
12	25.204	10.07	25.16	35.23	60.00	-24.77	QP

# AC 120V/60 Hz, Neutral



Site	:	Shielding Room
Condition	:	Neutral
Job No.	:	RA230522-28374E-RF
Mode	:	Transmitting
Power	:	AC 120V 60Hz

			Read		Limit	Over	
	Freq	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.177	10.34	12.32	22.66	54.65	-31.99	Average
2	0.177	10.34	26.06	36.40	64.65	-28.25	QP
3	0.211	10.38	8.73	19.11	53.17	-34.06	Average
4	0.211	10.38	23.23	33.61	63.17	-29.56	QP
5	0.351	10.37	7.39	17.76	48.93	-31.17	Average
6	0.351	10.37	21.52	31.89	58.93	-27.04	QP
7	0.768	10.43	8.79	19.22	46.00	-26.78	Average
8	0.768	10.43	17.42	27.85	56.00	-28.15	QP
9	2.698	10.53	7.40	17.93	46.00	-28.07	Average
10	2.698	10.53	12.74	23.27	56.00	-32.73	QP
11	23.983	10.27	16.61	26.88	50.00	-23.12	Average
12	23.983	10.27	25.43	35.70	60.00	-24.30	QP

# FCC§15.205, §15.209 & §15.249(d) - RADIATED EMISSIONS

## **Applicable Standard**

As per FCC§15.249 (a), except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

As per FCC§15.249 (c), Field strength limits are specified at a distance of 3 meters. As per FCC§15.249 (d), Emissions 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 §15.209, whichever is the lesser attenuation.

# **Test Equipment Setup**

The spectrum analyzer or receiver is set as:

Below 1000MHz:

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

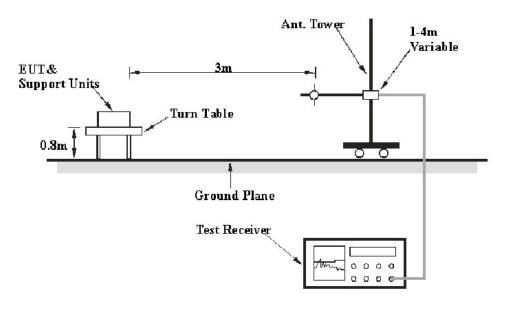
Above 1000MHz:

Peak: RBW = 1MHz / VBW = 1MHz / Sweep = Auto Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto

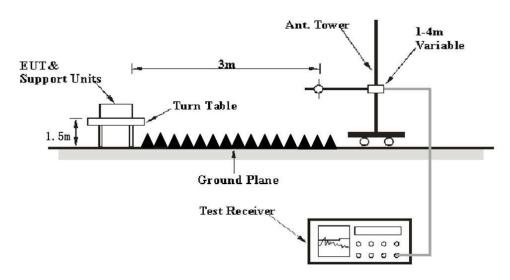
If the maximized peak measured value complies with the limit, then it is unnecessary to perform QP/Average measurement.

# EUT Setup

# Below 1GHz:



Above 1GHz:



The radiated emission and out of band emission tests were performed in the 3meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209/15.205 and FCC 15.249 limits.

#### **Test Procedure**

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 meter above ground plane for below 1GHz or 1.5 meter for above 1GHz, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

#### **Corrected Amplitude & Margin Calculation**

The Factor is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain. The basic equation is as follows:

Factor = Antenna Factor + Cable Loss - Amplifier Gain

The "**Over Limit/Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over Limit/margin of -7dB means the emission is 7dB below the limit. The equation for calculation is as follows:

Over Limit/Margin = Level / Corrected Amplitude – Limit Level / Corrected Amplitude = Read Level + Factor

#### **Test Results Summary**

According to the EUT complied with the FCC Part 15.205, 15.209 & §15.249

#### **Test Data**

#### **Environmental Conditions**

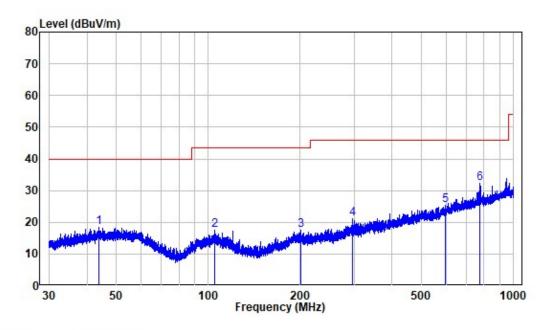
Temperature:	23-24 °C
<b>Relative Humidity:</b>	53-56 %
ATM Pressure:	101.0 kPa

*The testing was performed by Jason Liu on 2023-06-05 for below 1GHz. The testing was performed by Jeef Huang on 2023-06-06 for above 1GHz.* 

Test Mode: Transmitting

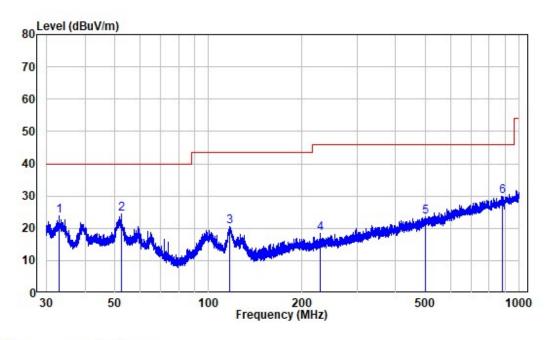
Below 1GHz: (worst case is High channel)

#### Horizontal



Site : chamber Condition: 3m HORIZONTAL Job No. : RA230522-28374E-RF Test Mode: 5G Transmitting

	Freq	Factor		Level		Over Limit	Remark
-	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	-
1	43.889	-9.91	28.43	18.52	40.00	-21.48	Peak
2	104.536	-11.78	29.37	17.59	43.50	-25.91	Peak
з	201.217	-11.50	29.07	17.57	43.50	-25.93	Peak
4	296.834	-9.25	30.51	21.26	46.00	-24.74	Peak
5	596.962	-2.58	27.92	25.34	46.00	-20.66	Peak
6	774.837	0.03	32.30	32.33	46.00	-13.67	Peak



Vertical

Site : chamber Condition: 3m VERTICAL Job No. : RA230522-28374E-RF Test Mode: 5G Transmitting

	Freq	Factor			Limit Line		Remark
-	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	33.037	-12.01	35.73	23.72	40.00	-16.28	Peak
2	52.300	-10.03	34.43	24.40	40.00	-15.60	Peak
3	116.950	-12.96	33.46	20.50	43.50	-23.00	Peak
4	229.293	-11.14	29.52	18.38	46.00	-27.62	Peak
5	499.206	-4.28	27.72	23.44	46.00	-22.56	Peak
6	882.180	1.15	28.84	29.99	46.00	-16.01	Peak

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#### Above 1 GHz:

Frequency	Rece	eiver	Turntable	Rx An	tenna	Factor	Corrected	Limit	Margin
(MHz)	Reading (dBuV)	PK/Ave	Angle Degree	Height (m)	Polar (H/V)	(dB/m)	Amplitude (dBuV/m)	(dBuV/m)	(dB)
				Low C	Channel				
5725	47.99	РК	90	1.3	Н	-2.73	45.26	74	-28.74
5725	48.42	PK	154	1.4	V	-2.73	45.69	74	-28.31
5750	85.11	PK	104	1.9	Н	-3.15	81.96	114	-32.04
5750	85.91	РК	173	2.0	V	-3.15	82.76	114	-31.24
11500	45.29	РК	104	1.9	Н	7.13	52.42	74	-21.58
11500	46.00	PK	173	2.0	V	7.13	53.13	74	-20.87
				Middle	Channel				
5800	82.23	PK	173	2.0	Н	-1.7	80.53	114	-33.47
5800	84.89	PK	317	1.1	V	-1.7	83.19	114	-30.81
11600	44.26	PK	173	2.0	Н	7.56	51.82	74	-22.18
11600	45.08	РК	317	1.1	V	7.56	52.64	74	-21.36
				High (	Channel				
5870	81.78	PK	146	1.5	Н	-0.19	81.59	114	-32.41
5870	84.31	PK	88	1.5	V	-0.19	84.12	114	-29.88
5875	49.79	PK	353	1.1	Н	-0.1	49.69	74	-24.31
5875	50.55	PK	188	1.8	V	-0.1	50.45	74	-23.55
5925	48.52	PK	69	1.4	Н	0.11	48.63	74	-25.37
5925	48.97	PK	136	1.7	V	0.11	49.08	74	-24.92
11740	45.48	PK	74	1.4	Н	7.47	52.95	74	-21.05
11740	45.70	РК	346	1.3	V	7.47	53.17	74	-20.83

#### Note:

Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor

Corrected Amplitude = Factor + Reading

Margin = Corrected Amplitude – Limit

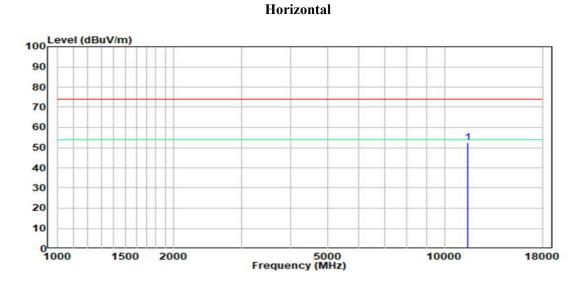
Another spurious emission at the noise base level was not recorded.

All background noises are not recorded in the table.

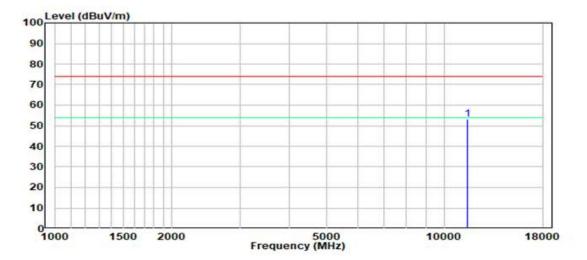
For above 1GHz, the test result of peak was 20dB below to the limit of peak, which can be compliant to the average limit, so just peak value was recorded.

### **Pre-scan plots:**

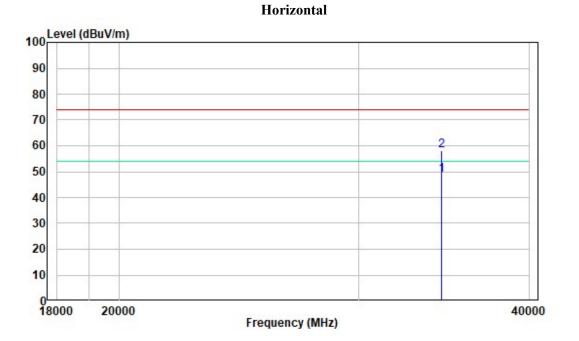
1-18GHz: (worst case is High channel)



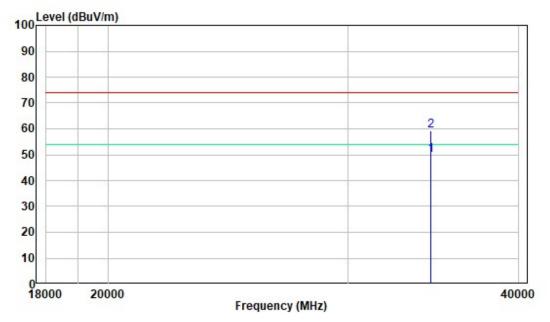
#### Vertical



### **18-40GHz:** (worst case is High channel)



#### Vertical



# FCC§15.215(c) - 20dB EMISSION BANDWIDTH

# Applicable Standard

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

# **Test Procedure**

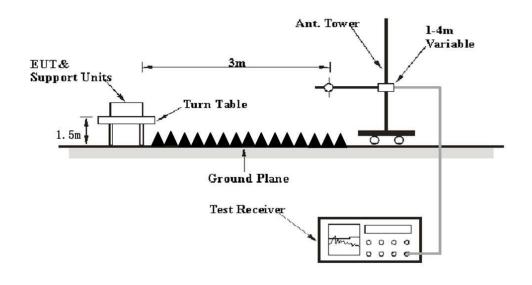
According to ANSI C63.10-2013, section 6.9.

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.

3. Measure the frequency difference of two frequencies that indicated 20dBbandwidth.

4. Repeat above procedures until all frequencies measured were complete.



## **Test Data**

#### **Environmental Conditions**

Temperature:	23°C
<b>Relative Humidity:</b>	49%
ATM Pressure:	101.0 kPa

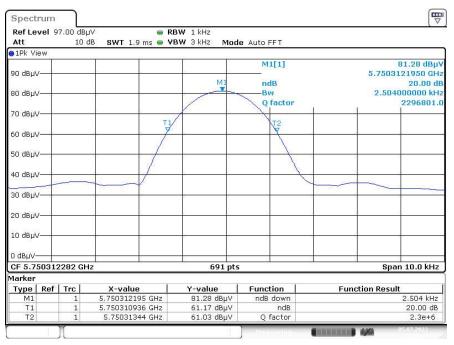
The testing was performed by Matt Liang on 2023-07-05.

Test Mode: Transmitting

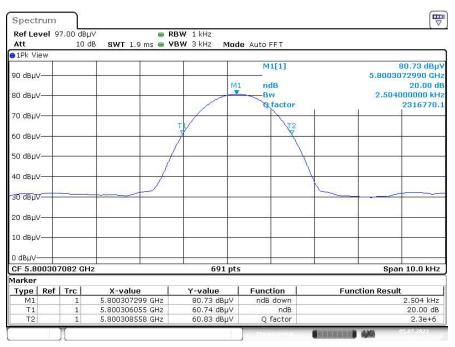
Test Result: Please refer to the following table and plots.

Channel	Frequency (MHz)	20dB Bandwidth (kHz)
Low	5750	2.504
Middle	5800	2.504
High	5870	2.562

#### Low Channel



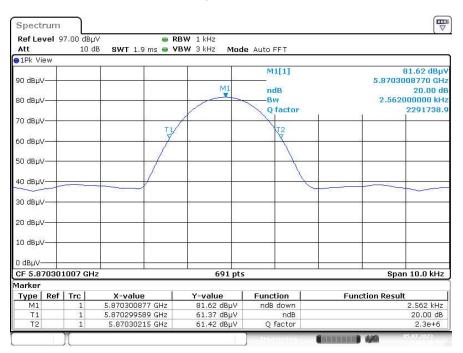
Date: 5.JUL.2023 15:38:34



**Middle Channel** 

Date: 5.JUL.2023 15:34:13

#### **High Channel**



Date: 5.JUL.2023 15:42:40

#### \*\*\*\*\* END OF REPORT \*\*\*\*\*