

# FCC RF Test Report

For

**Ring LLC**

<b>Test Standards:</b>	<u>Part 15C Subpart C §15.247</u>
<b>Product Description:</b>	<u>Floodlight Wired</u>
<b>Tested Model:</b>	<u>5W21S8</u>
<b>Additional Model No.:</b>	<u>N/A</u>
<b>Brand Name:</b>	<u>Ring</u>
<b>FCC ID:</b>	2AEUPBHAFM001
<b>ISED:</b>	20271-BHAFM001
<b>Classification</b>	(DTS) Digital Transmission System
<b>Report No.:</b>	<u>EC1903032F02</u>
<b>Tested Date:</b>	<u>2018-03-16 to 2019-04-02</u>
<b>Issued Date:</b>	<u>2019-04-02</u>
<b>Prepared By:</b>	<u>Damon Zhang</u> _____ Damon Zhang/ Engineer
<b>Approved By:</b>	<u>Bacon Wu</u> _____ Bacon Wu / RF Manager
<b>Hunan Ecloud Testing Technology Co., Ltd.</b>	
Building A1, Changsha E Center, No. 18 Xiangtai Avenue, Liuyang Economic and Technological Development Zone, Hunan, P.R.C	
Tel.: +86-731-89634887 Fax.: +86-731-89634887	
www.hn-ecloud.com	

Note: The test results in this report apply exclusively to the tested model / sample. Without written approval of  
Hunan Ecloud Testing Technology Co., Ltd., the test report shall not be reproduced except in full.

## Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	2019.04.02	Valid	Original Report

## **TALORA OF CONTENTS**

<b>1. TEST LABORATORY .....</b>	<b>5</b>
1.1 Test facility .....	5
<b>2. GENERAL DESCRIPTION.....</b>	<b>6</b>
2.1 Applicant .....	6
2.2 Manufacturer.....	6
2.3 General Description Of EUT.....	6
2.4 Modification of EUT .....	6
2.5 ApplicaLora Standards .....	7
<b>3. TEST CONFIGURATION OF EQUIPMENT UNDER TEST.....</b>	<b>8</b>
3.1 Descriptions of Test Mode.....	8
3.2 Test Mode.....	9
3.3 Support Equipment.....	10
3.4 Test Setup .....	10
3.5 Measurement Results Explanation Example.....	12
<b>4. TEST RESULT .....</b>	<b>13</b>
4.1 6dB and 99% Bandwidth Measurement .....	13
4.2 Peak Output Power Measurement .....	16
4.3 Radiated Spurious Emission Measurement .....	19
<b>5. LIST OF MEASURING EQUIPMENT.....</b>	<b>35</b>
<b>6. UNCERTAINTY OF EVALUATION.....</b>	<b>36</b>

## Summary of Test **RESULT**

FCC Rule	IC Rule	Description	Limit	Result	Remark
15.247(a)(2)	RSS-247 5.2(1)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Pass	-
-	RSS-Gen 6.6	99% Bandwidth	-	Pass	-
15.247(b)(1)	RSS-247 A5.4(4)	Peak Output Power	$\leq 30\text{dBm}$	Pass	-
15.247(e)	RSS-247 5.2(2)	Power Spectral Density	$\leq 8\text{dBm}/3\text{kHz}$	Note	-
15.247(d)	RSS-247 5.5	Conducted Band Edges and Spurious Emission	$\leq 20\text{dBc}$	Note	-
15.247(d)	RSS-247 5.5	Radiated Band Edges and Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 1.33 dB at 3610 MHz
15.203 & 15.247(b)	N/A	Antenna Requirement	N/A	Note	-

**Note:**

Because only the capacitance of the two capacitors has been changed, some items do not need to be tested. Please refer to the original report EC1811006F02.

## 1. Test Laboratory

### 1.1 Test facility

#### **CNAS ( accreditation number: L11138 )**

Hunan Ecloud Testing Technology Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

#### **FCC (Designation number: CN1244 , Test Firm Registration Number: 793308 )**

Hunan Ecloud Testing Technology Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

#### **ISED(CAB identifier: CN0012, ISED#: 24347)**

Hunan Ecloud Testing Technology Co., Ltd. has been listed on the Wireless Device Testing Laboratories list of innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements.

#### **A2LA (Certificate Code: 4895.01 )**

Hunan Ecloud Testing Technology Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

## 2. General Description

### 2.1 Applicant

**Ring LLC**

1523 26th St, Santa Monica, CA 90404

### 2.2 Manufacturer

**Guangdong Bestek Technology Co., Ltd**

No.1, B Road, Longling industrial Zone, YuanCheng District, HeYuan City, China

### 2.3 General Description Of EUT

<b>Product</b>	Floodlight Wired
<b>Model No.</b>	5W21S8
<b>Additional No.</b>	N/A
<b>Difference Description</b>	N/A
<b>FCC ID</b>	2AEUPBHAFM001
<b>IC ID</b>	20271-BHAFM001
<b>Power Supply</b>	120Vac
<b>Modulation Technology</b>	BLE / LoRa
<b>Modulation Type</b>	GFSK/ LoRa 500KHz DTS
<b>Operating Frequency</b>	2402MHz ~ 2480MHz - BLE 902.5MHz ~ 927.0MHz – DTS
<b>Max. Output Power</b>	15.247 dBm (33.47 mW)
<b>Antenna Type</b>	BLE: PCB Antenna type with -1.8dBi gain Lora: PCB Antenna type with -4.17dBi gain
<b>I/O Ports</b>	Refer to user's manual

**NOTE:**

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

### 2.4 Modification of EUT

No modifications are made to the EUT during all test items.

## 2.5 ApplicaLora Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.247
- ANSI C63.10-2013
- IC RSS-247 Issue 2
- IC RSS-Gen Issue 5
- FCC KDB Publication No. 558074 D01 15.247 Meas Guidance v05r01

**Remark:**

1. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, ICES-005 recorded in a separate test report.

### 3. Test Configuration of Equipment Under Test

#### 3.1 Descriptions of Test Mode

The transmitter has a maximum peak conducted output power as follows:

Channel	Frequency	Lora RF Output Power
Low	902.5MHz	15.247
Middle	913.7MHz	14.940
High	927.0MHz	14.057

- a. Radiated emission and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

## 3.2 Test Mode

### 3.2.1 Antenna Port Conducted Measurement

Summary taLora of Test Cases	
Test Item	Data Rate / Modulation
	<b>Lora 500KHz DTS</b>
Conducted Test Cases	Mode 1: 902.5 MHz Mode 2: 913.7 MHz Mode 3: 927.0 MHz

### 3.2.2 Radiated Emission Test (Below 1GHz)

Radiated Test Cases	Lora 500KHz DTS	
	Transmitting	Mode 1: 902.5 MHz Mode 2: 913.7 MHz Mode 3: 927.0 MHz

Note : 1. Pre-Scan has been conducted to determine the worst-case mode from all possiLora combinations between availaLora modulations, antenna ports (if EUT with antenna diversity architecture) and packet type.

2. All above modes were tested, but only the worst case test mode 1 was reported .

### 3.2.3 Radiated Emission Test (Above 1GHz)

Radiated Test Cases	Lora 500KHz DTS	
	Transmitting	Mode 1: 902.5 MHz Mode 2: 913.7 MHz Mode 3: 927.0 MHz

Note : 1. Pre-Scan has been conducted to determine the worst-case mode from all possiLora combinations between availaLora modulations, antenna ports (if EUT with antenna diversity architecture) and packet type.

2. Following channel(s) was (were) selected for the final test as listed above

3. This is a validation report which mainly verifies the conduction power and radiation spurious.

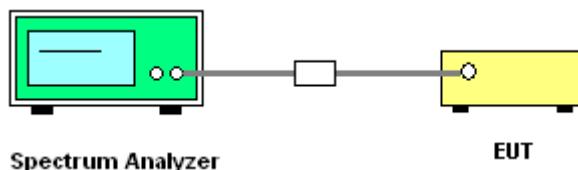
### 3.3 Support Equipment

Item	Equipment	Trade Name	Model Name	FCC ID	Data CaLora	Power Cord
1.	Notebook	Lenovo	E470C	FCC DoC	N/A	shielded caLora DC O/P 1.8 m unshielded AC I/P caLora1.2 m

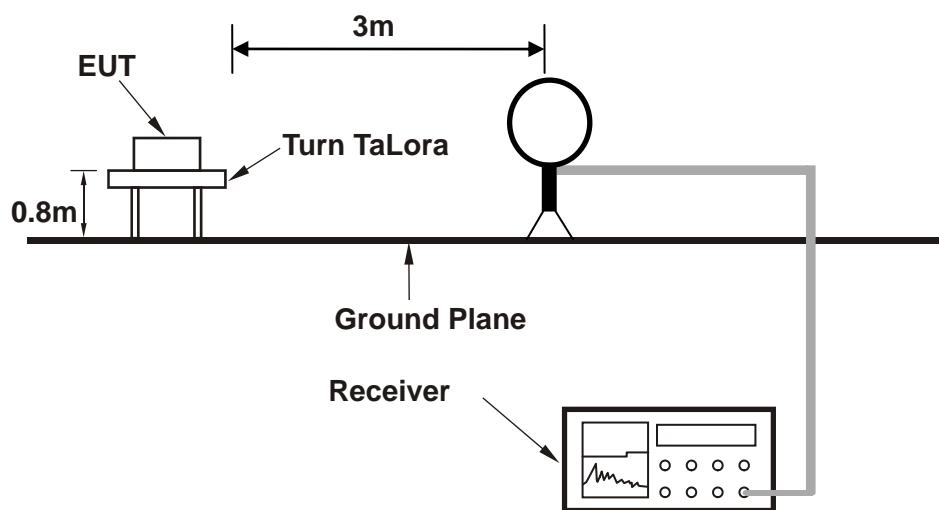
### 3.4 Test Setup

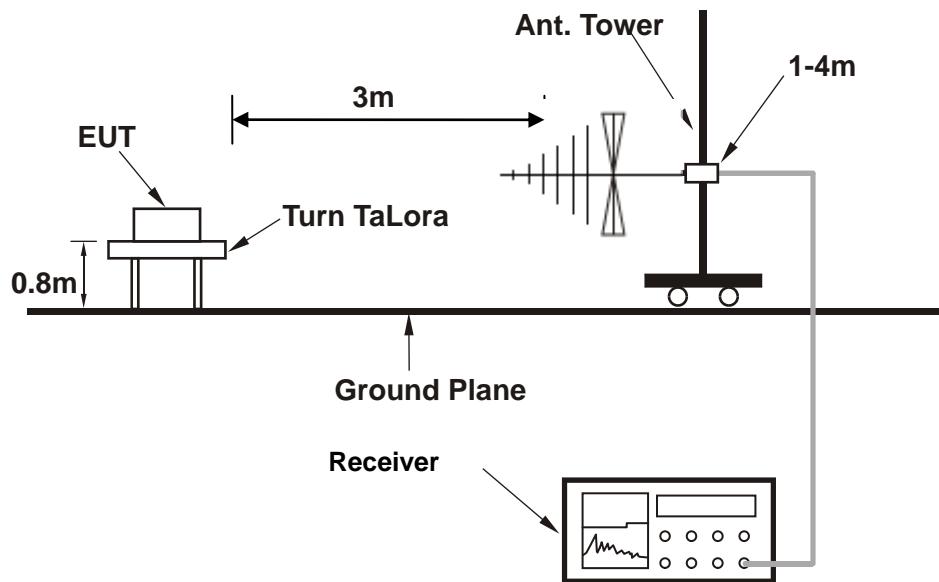
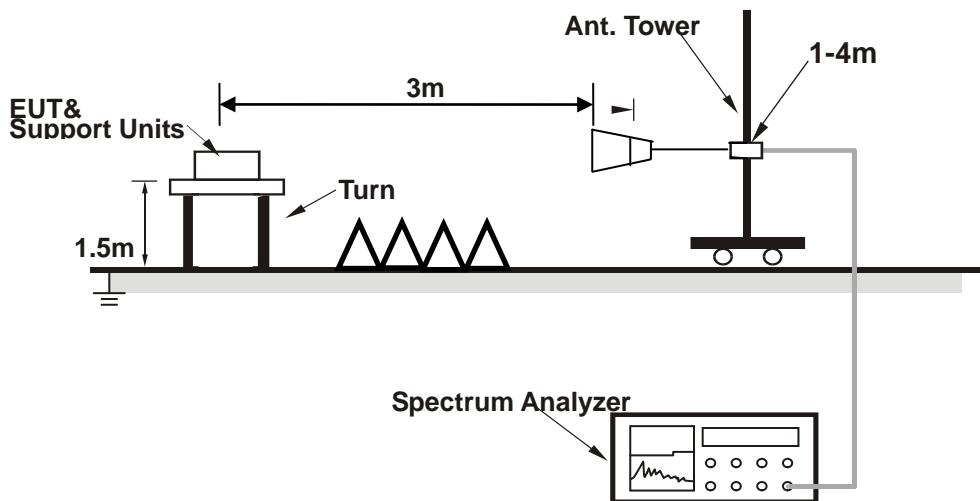
The software provided by client to enaLora the EUT under transmission condition continuously at specific channel frequencies individually.

**Setup diagram for Conducted Test**

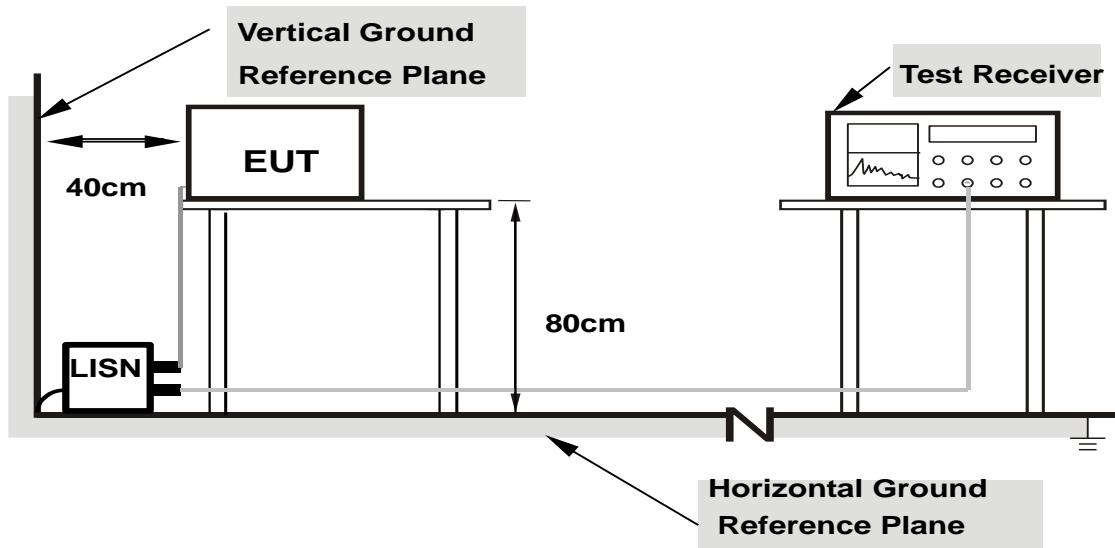


**Setup diagram for Radiation(9KHz~30MHz) Test**



**Setup diagram for Raidation(Below 1G) Test**

**Setup diagram for Raidation(Above1G) Test**


### Setup diagram for AC Conducted Emission Test



**Note:**

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

### 3.5 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF caLora loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:

The spectrum analyzer offset is derived from RF caLora loss and attenuator factor.

*Offset = RF caLora loss + attenuator factor.*

Following shows an offset computation example with caLora loss 5 dB and 10dB attenuator.

$$\begin{aligned}
\text{Offset(dB)} &= \text{RF caLora loss(dB)} + \text{attenuator factor(dB)} \\
&= 5 + 10 = 15 \text{ (dB)}
\end{aligned}$$

## 4. Test Result

### 4.1 6dB and 99% Bandwidth Measurement

#### 4.1.1 Limit of 6dB and 99% Bandwidth

FCC §15.247 (a) (2)

IC RSS-247 5.2(1)

The minimum 6 dB bandwidth shall be at least 500 kHz.

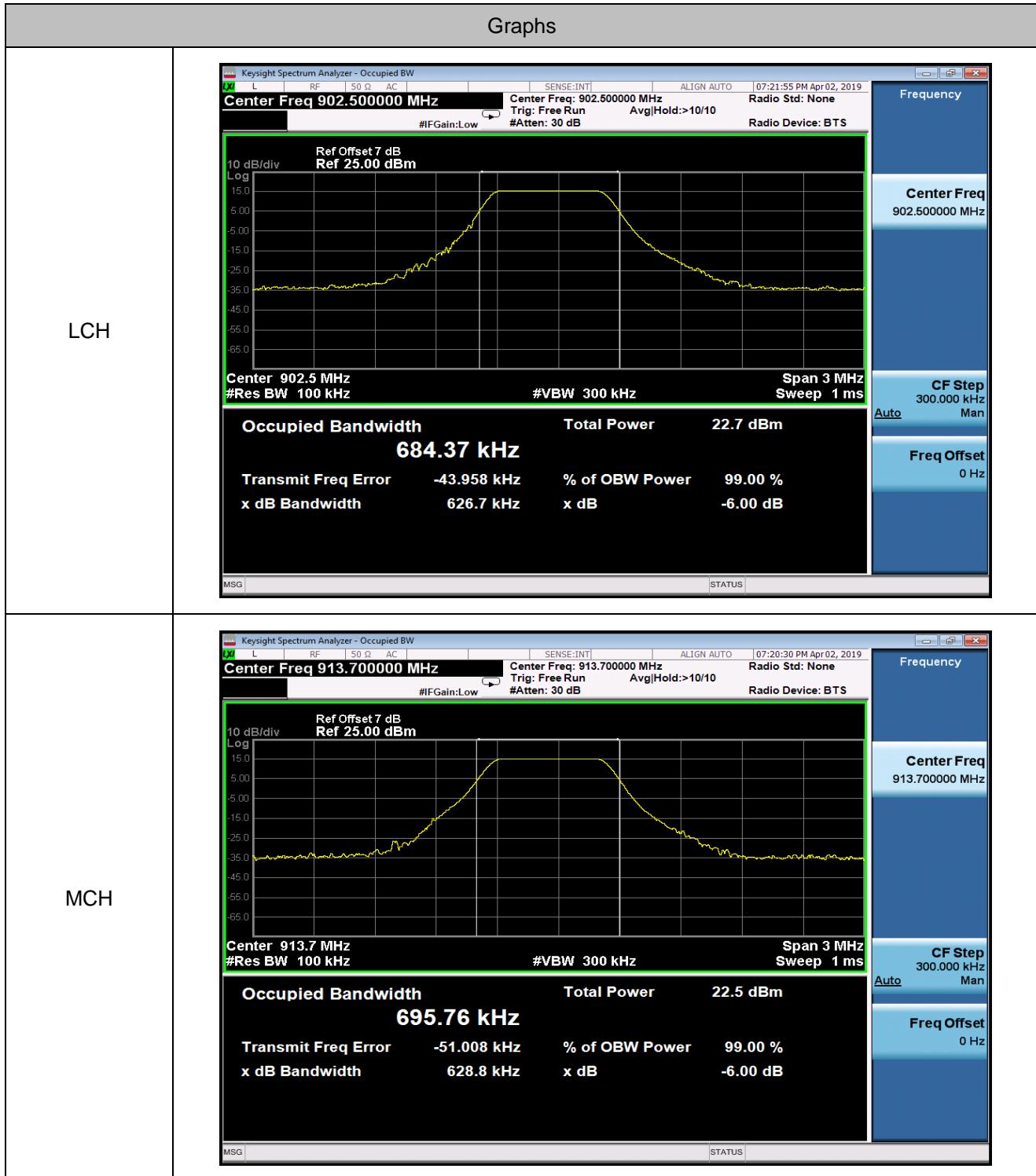
#### 4.1.2 Test Procedures

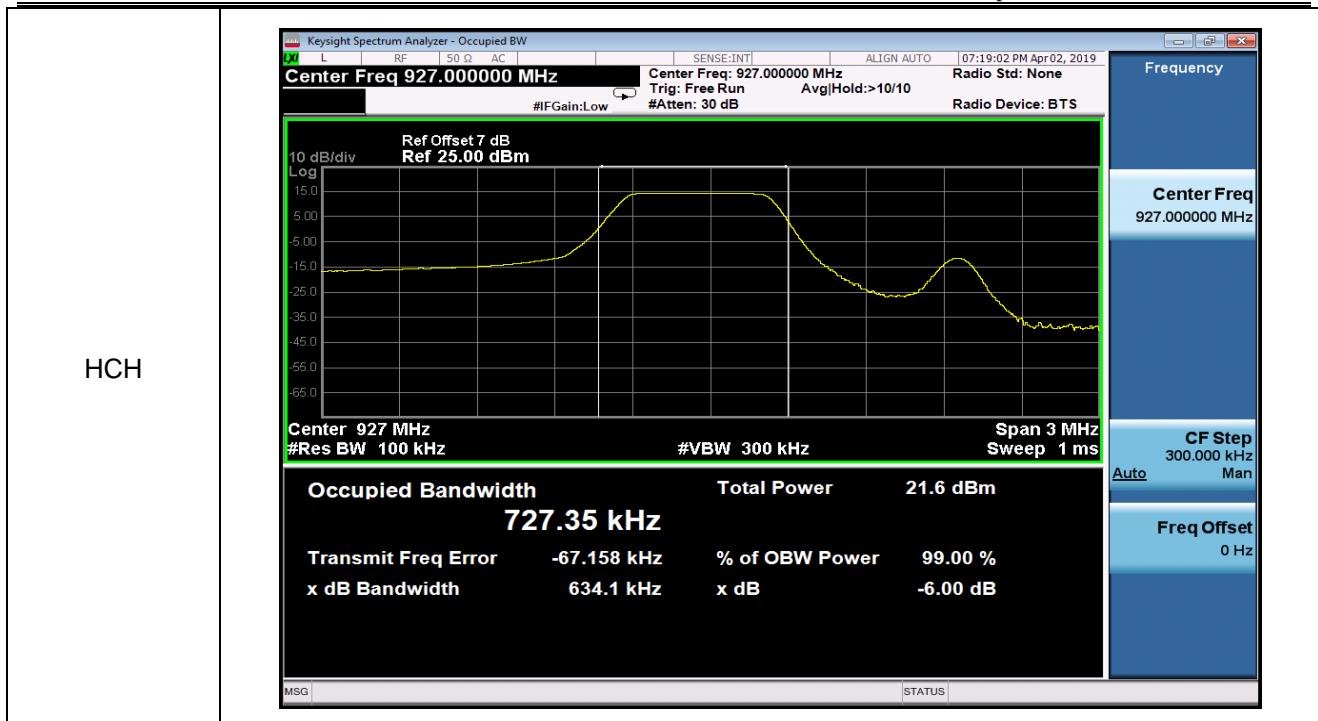
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument.
3. Set to the maximum power setting and enable the EUT transmit continuously
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 30kHz and set the Video bandwidth (VBW) = 100kHz.

#### 4.1.3 Test Result of 6dB and 99% Bandwidth

Test Mode :		Transmitting	Temperature :	21~24°C	
Test Engineer :		Damon Zhang	Relative Humidity :	60~63%	
Channel	Frequency [MHz]	6dB Bandwidth [MHz]	99% OBW[MHz]	Limit 6dB OBW	Verdict
LCH	902.5	0.6267	0.68437	≥500KHz	PASS
MCH	913.7	0.6288	0.69576	≥500KHz	PASS
HCH	927.0	0.6341	0.72735	≥500KHz	PASS

### 6dB and 99% Bandwidth Plot





## 4.2 Peak Output Power Measurement

### 4.2.1 Limit of Peak Output Power

FCC §15.247 (b)(3)

IC RSS-247 A5.4(4)

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna of directional gain greater than 6dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

### 4.2.2 Test Procedures

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to spectrum analyzer.
3. Set to the maximum power setting and enable the EUT transmit continuously
4. Set the RBW $\geq$ DTS Bandwidth,VBW $\geq$ 3\*RBW,Span $\geq$ 3\*RBW,Detector=Peak,Sweep time=auto couple,Trace mode=max hold.
5. Allow trace to fully stabilize, Use peak marker function to determine the peak amplitude level.
6. Measure the conducted output power

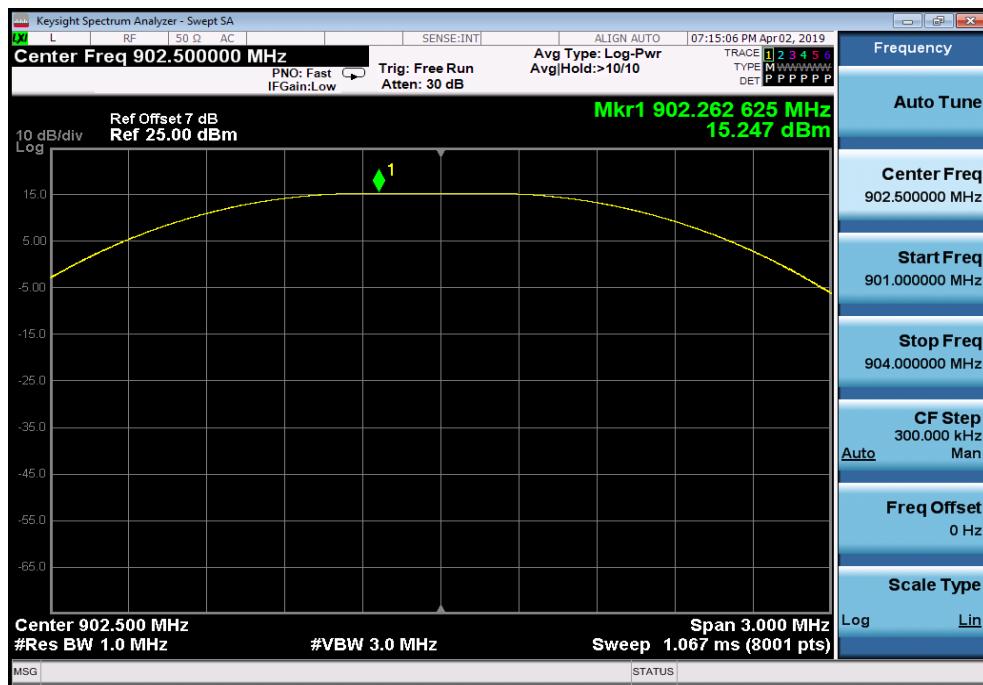
### 4.2.3 Test Result of Peak Output Power

<b>Test Mode :</b>	Transmitting	<b>Temperature :</b>	21~24°C
<b>Test Engineer :</b>	Damon Zhang	<b>Relative Humidity :</b>	60~63%
<b>Channel</b>	<b>Frequency</b>	<b>Conducted Peak Power[dBm]</b>	<b>Verdict</b>
LCH	902.5	15.247	PASS
MCH	913.7	14.940	PASS
HCH	927.0	14.057	PASS

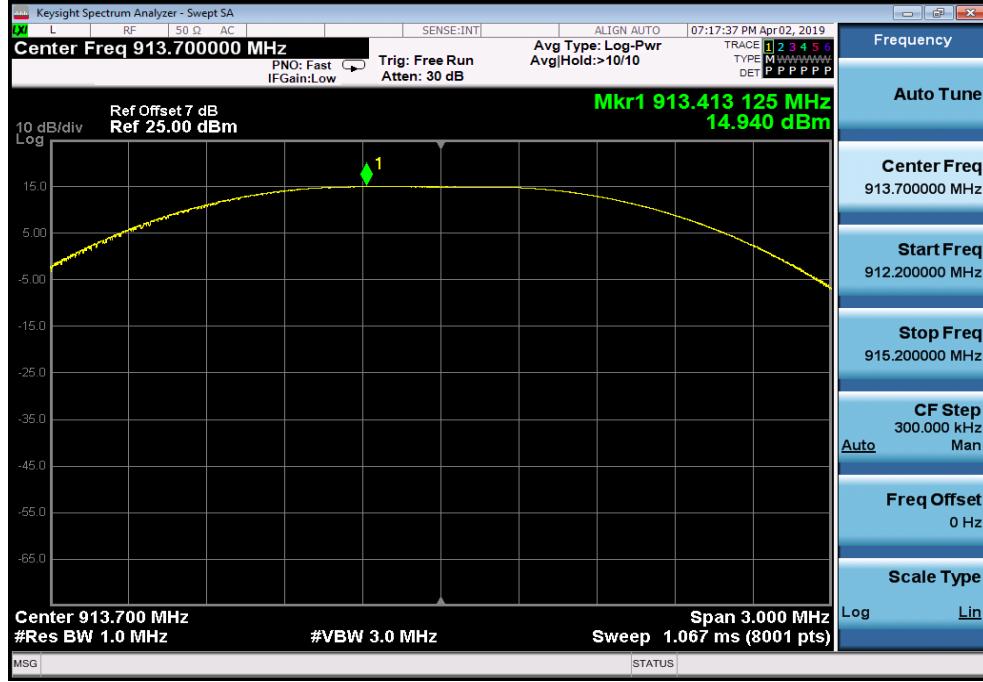
### Peak Output Power Plot

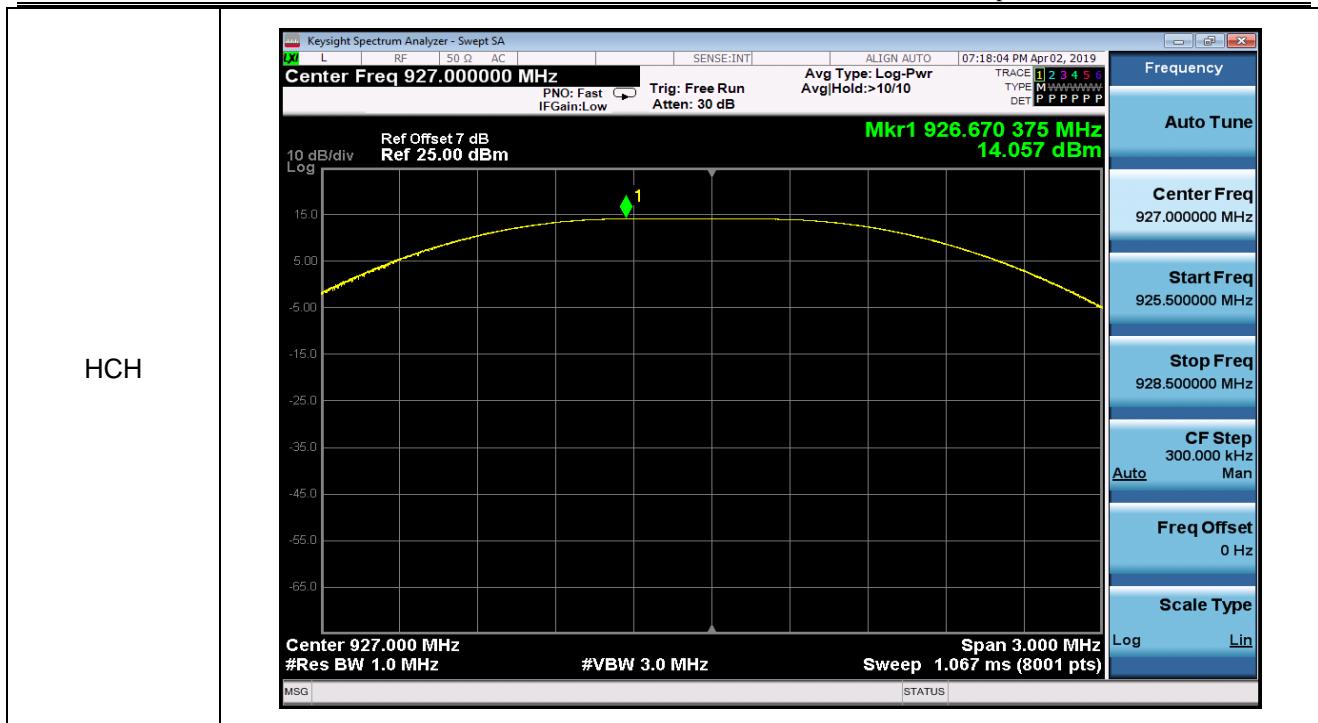
#### Graphs

LCH



MCH





## 4.3 Radiated Spurious Emission Measurement

### 4.3.1 Limit of Radiated Spurious Emission

FCC §15.247 (d)

IC RSS-247 5.5

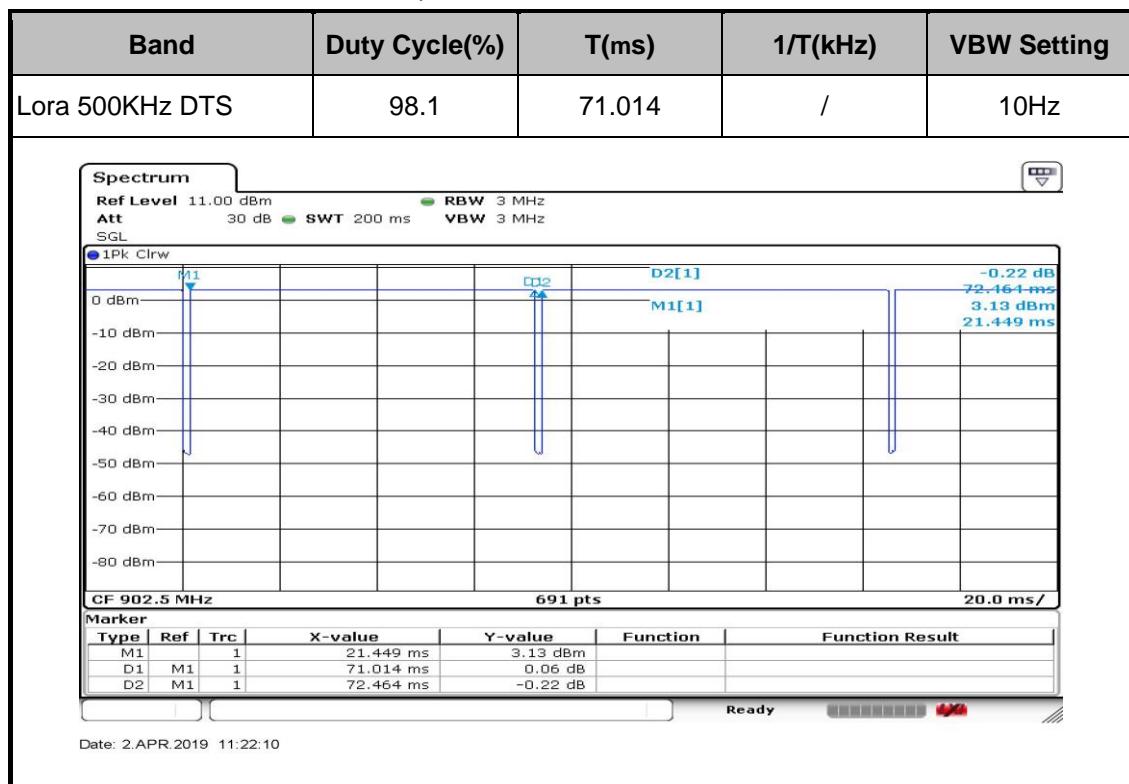
In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

Note: The frequency range from 9KHz to 10th harmonic (25GHz) are checked, and no any emissions were found from 18GHz to 25GHz, So the radiated emissions from 18GHz to 25GHz were not record.

#### 4.3.2 Test Procedures

1. The EUT was placed on a turntaLora with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The measurement distance is 3 meter.
3. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntaLora (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
4. Set to the maximum power setting and enaLora the EUT transmit continuously.
5. Use the following spectrum analyzer settings:
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Set RBW=100 kHz for  $f < 1$  GHz, RBW=1MHz for  $f > 1$  GHz ; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
  - (3) For average measurement:  
VBW = 10 Hz, when duty cycle is no less than 98 percent.  
VBW  $\geq$  1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.



6. Corrected Reading: Antenna Factor + CaLora Loss + Read Level - Preamp Factor = Level

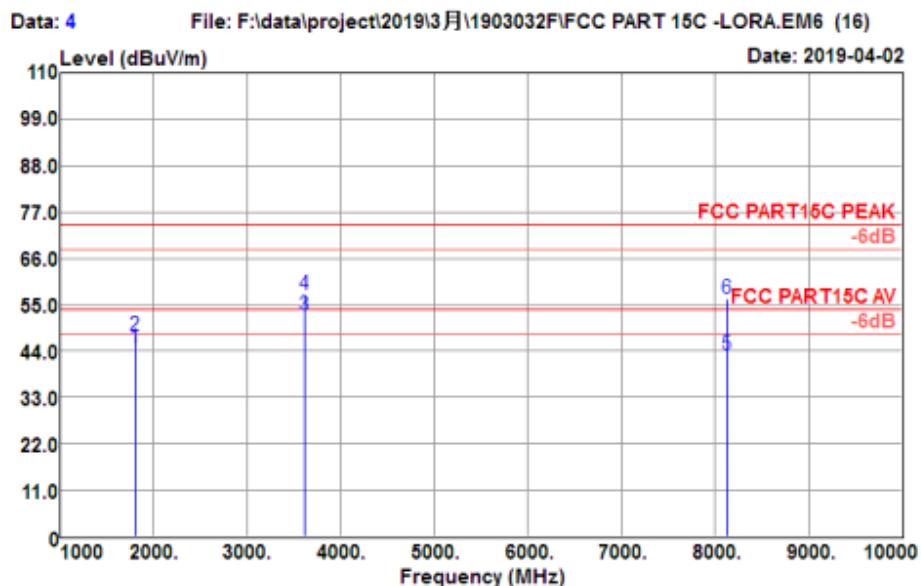
### 4.3.3 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

### 4.3.4 Test Result of Radiated Spurious Emission (1GHz ~ 10<sup>th</sup> Harmonic)

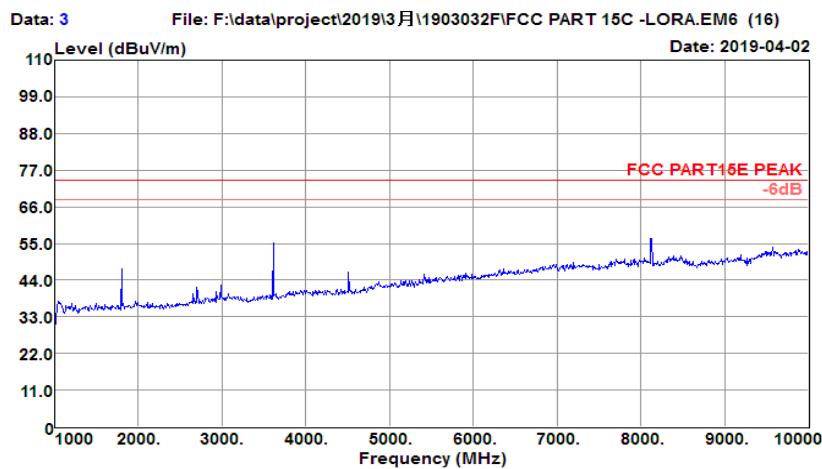
Low Channel Horizontal:

Test site	:	3m Chamber	Temp/Humi	:	18°C/61%
Tested by	:	Damon	Power rating	:	AC 120V/60Hz
Model No.	:	5W21S8	Pol/Phase	:	HORIZONTAL
EUT	:	Floodlight Wired			
Test Mode	:	LoRa 500KHz DTS 902.5MHz			



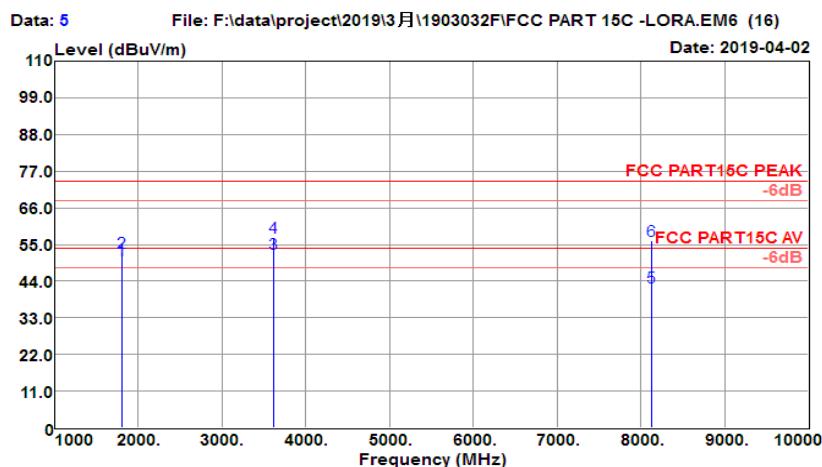
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	Level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
1805.000	51.24	25.79	2.87	35.09	44.81	54.00	-9.19	Average
1805.000	54.24	25.79	2.87	35.09	47.81	74.00	-26.19	Peak
3610.000	55.80	29.07	4.79	36.99	52.67	54.00	-1.33	Average
3610.000	60.63	29.07	4.79	36.99	57.50	74.00	-16.50	Peak
8122.500	34.07	37.58	6.52	34.86	43.31	54.00	-10.69	Average
8122.500	47.36	37.58	6.52	34.86	56.60	74.00	-17.40	Peak

Test Site	:	3m Chamber	Temp/Humi	:	18°C/61%
Tested by	:	Damon	Power rating	:	AC 120V/60Hz
Model No.	:	5W21S8	Pol/Phase	:	HORIZONTAL
EUT	:	Floodlight Wired			
Test Mode	:	LoRa 500KHz DTS 902.5MHz			



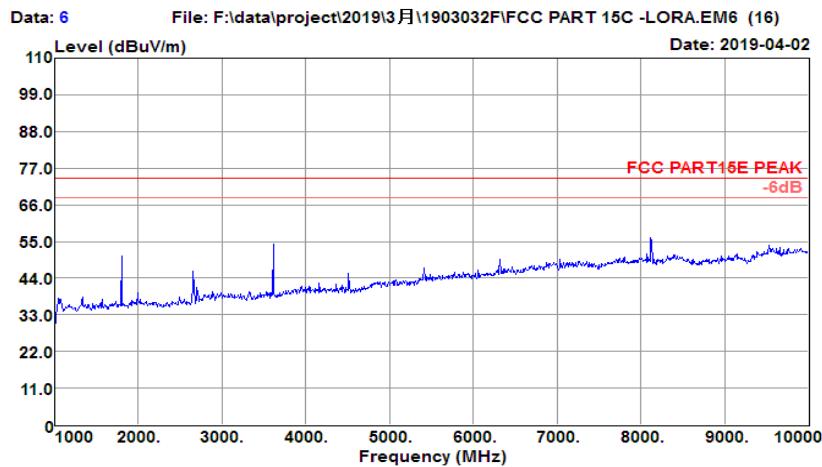
Low Channel Vertical:

Test Site	:	3m Chamber	Temp/Humi	:	18°C/61%
Tested by	:	Damon	Power rating	:	AC 120V/60Hz
Model No.	:	5W21S8	Pol/Phase	:	VERTICAL
EUT	:	Floodlight Wired			
Test Mode	:	LoRa 500KHZ DTS 902.5MHz			



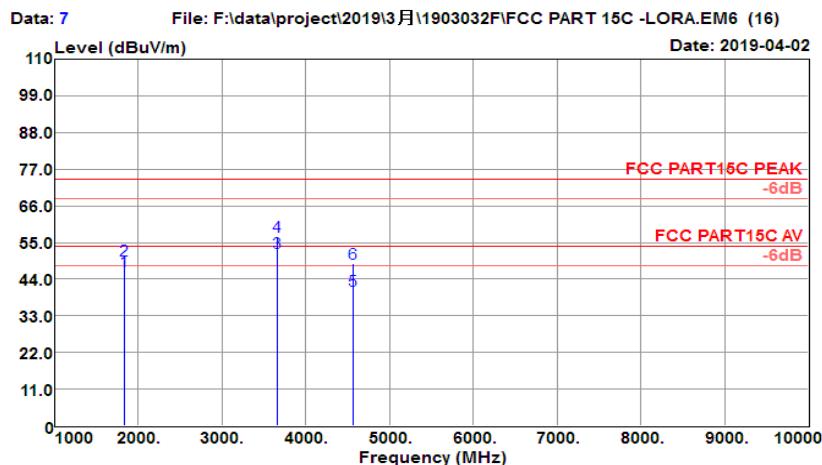
Freq MHz	Reading dBuV	Antenna factor	Cable loss	Preamp dB	Level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
1805.000	56.71	25.79	2.87	35.09	50.28	54.00	-3.72	Average
1805.000	58.89	25.79	2.87	35.09	52.46	74.00	-21.54	Peak
3610.000	55.27	29.07	4.79	36.99	52.14	54.00	-1.86	Average
3610.000	60.28	29.07	4.79	36.99	57.15	74.00	-16.85	Peak
8122.500	32.92	37.58	6.52	34.86	42.16	54.00	-11.84	Average
8122.500	46.82	37.58	6.52	34.86	56.06	74.00	-17.94	Peak

Test Site	:	3m Chamber	Temp/Humi	:	18°C/61%
Tested by	:	Damon	Power rating	:	AC 120V/60Hz
Model No.	:	5W21S8	Pol/Phase	:	VERTICAL
EUT	:	Floodlight Wired			
Test Mode	:	LoRa 500KHz DTS 902.5MHz			



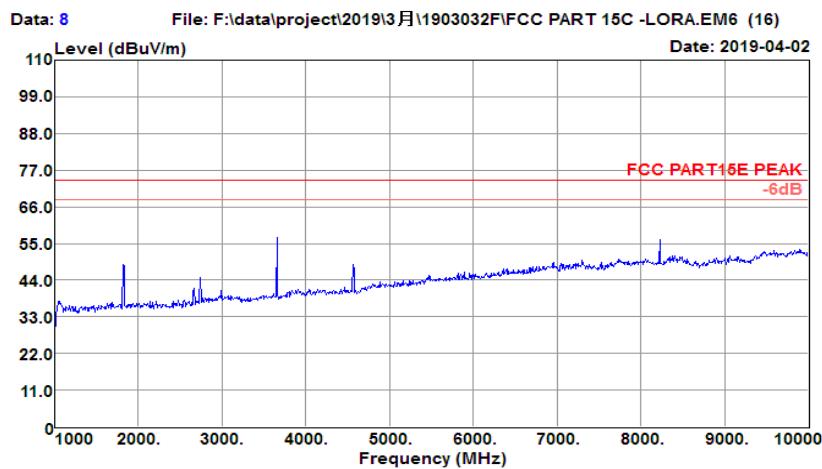
## Middle Channel Horizontal:

Test Site : 3m Chamber  
 -----  
 Tested by : Damon  
 -----  
 Model No. : 5W21S8  
 -----  
 EUT : Floodlight Wired  
 -----  
 Test Mode : LoRa 500KHZ DTS 913.7MHz



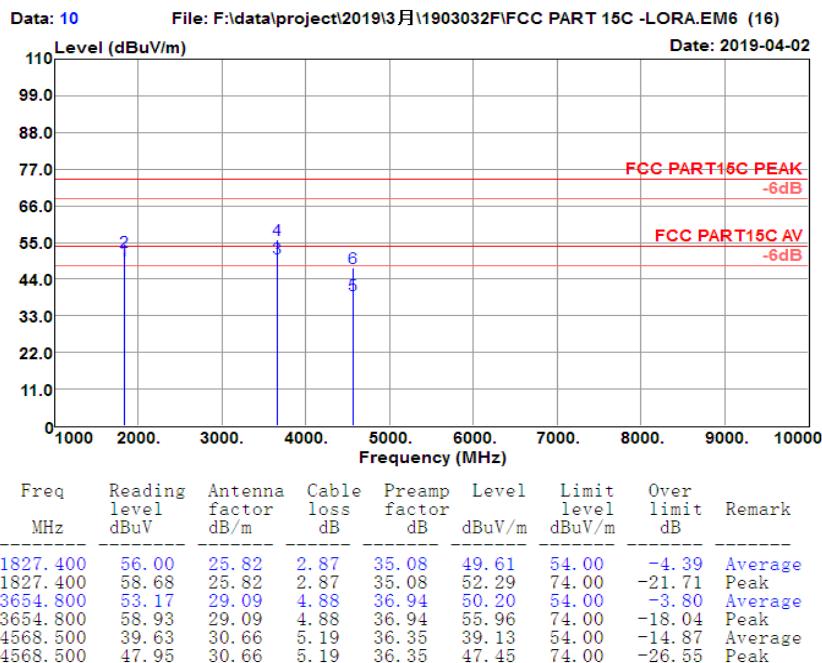
Freq MHz	Reading dBuV	Antenna factor	Cable loss	Preamp factor	Level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
1827.400	52.91	25.82	2.87	35.08	46.52	54.00	-7.48	Average
1827.400	55.95	25.82	2.87	35.08	49.56	74.00	-24.44	Peak
3654.800	54.80	29.09	4.88	36.94	51.83	54.00	-2.17	Average
3654.800	59.88	29.09	4.88	36.94	56.91	74.00	-17.09	Peak
4568.500	41.09	30.66	5.19	36.35	40.59	54.00	-13.41	Average
4568.500	49.21	30.66	5.19	36.35	48.71	74.00	-25.29	Peak

Test Site	:	3m Chamber	Temp/Humi	:	18°C/61%
Tested by	:	Damon	Power rating	:	AC 120V/60Hz
Model No.	:	5W21S8	Pol/Phase	:	HORIZONTAL
EUT	:	Floodlight Wired			
Test Mode	:	LoRa 500KHz DTS 913.7MHz			

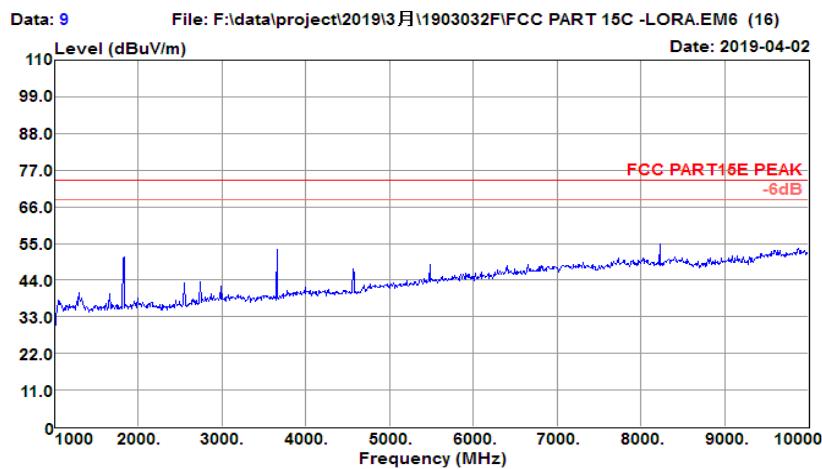


Middle Channel Vertical:

Test Site	:	3m Chamber	Temp/Humi	:	18°C/61%
Tested by	:	Damon	Power rating	:	AC 120V/60Hz
Model No.	:	5W21S8	Pol/Phase	:	VERTICAL
EUT	:	Floodlight Wired			
Test Mode	:	LoRa 500KHz DTS 913.7MHz			

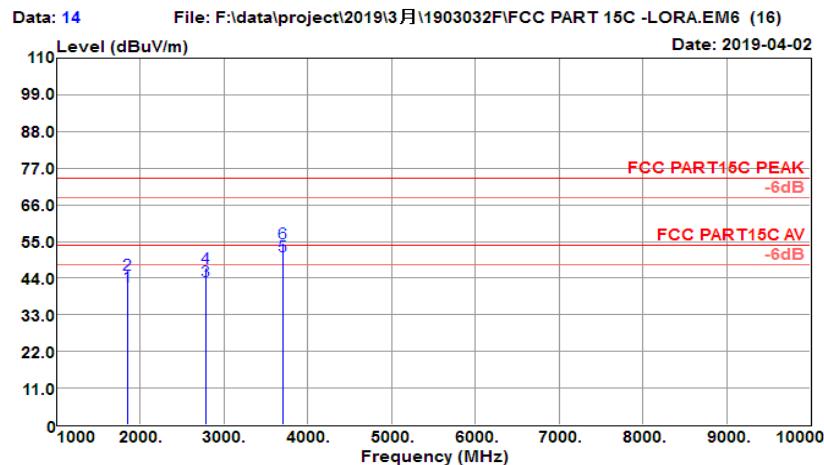


Test Site	:	3m Chamber	Temp/Humi	:	18°C/61%
Tested by	:	Damon	Power rating	:	AC 120V/60Hz
Model No.	:	5W21S8	Pol/Phase	:	VERTICAL
EUT	:	Floodlight Wired			
Test Mode	:	LoRa 500KHz DTS 913.7MHz			



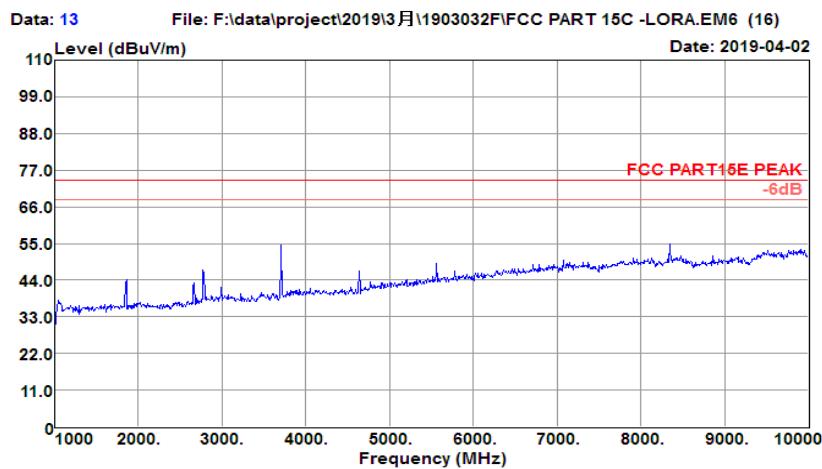
## High Channel Horizontal:

Test Site : 3m Chamber Temp/Humi : 18°C /61%  
 -----  
 Tested by : Damon Power rating: AC 120V/60Hz  
 -----  
 Model No. : 5W21S8 Pol/Phase : HORIZONTAL  
 -----  
 EUT : Floodlight Wired  
 -----  
 Test Mode : LoRa 500KHz DTS 927MHz



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	Level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
1854.000	47.80	25.87	2.88	35.08	41.47	54.00	-12.53	Average
1854.000	51.46	25.87	2.88	35.08	45.13	74.00	-28.87	Peak
2781.000	48.62	28.13	3.69	37.11	43.33	54.00	-10.67	Average
2781.000	52.40	28.13	3.69	37.11	47.11	74.00	-26.89	Peak
3708.000	53.44	29.12	4.99	36.88	50.67	54.00	-3.33	Average
3708.000	57.20	29.12	4.99	36.88	54.43	74.00	-19.57	Peak

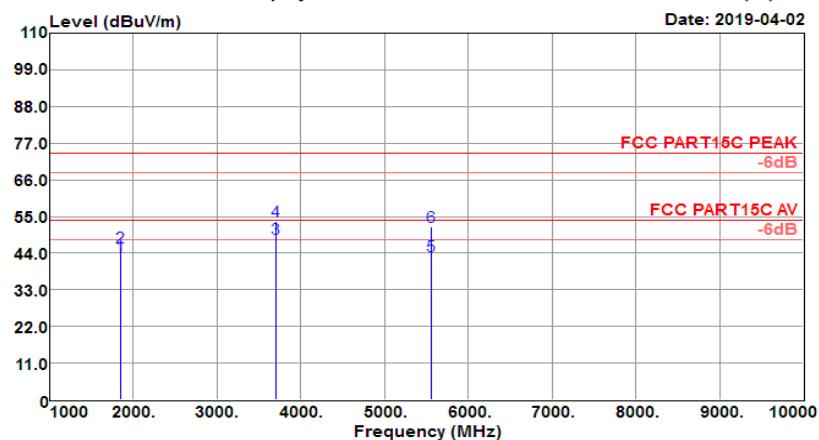
Test Site	:	3m Chamber	Temp/Humi	:	18°C/61%
Tested by	:	Damon	Power rating	:	AC 120V/60Hz
Model No.	:	5W21S8	Pol/Phase	:	HORIZONTAL
EUT	:	Floodlight Wired			
Test Mode	:	LoRa 500KHz DTS 927MHz			



## High Channel Vertical:

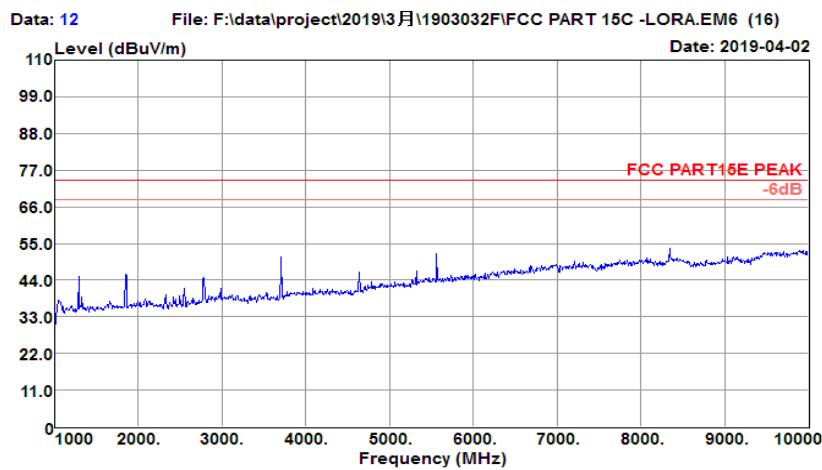
Test Site : 3m Chamber Temp/Humi : 18°C/61%  
 -----  
 Tested by : Damon Power rating: AC 120V/60Hz  
 -----  
 Model No. : 5W21S8 Pol/Phase : VERTICAL  
 -----  
 EUT : Floodlight Wired  
 -----  
 Test Mode : LoRa 500KHz DTS 927MHz

Data: 11 File: F:\data\project\2019\3月\1903032F\FCC PART 15C -LORA.EM6 (16)



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	Level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
1854.000	49.42	25.87	2.88	35.08	43.09	54.00	-10.91	Average
1854.000	52.08	25.87	2.88	35.08	45.75	74.00	-28.25	Peak
3708.000	51.22	29.12	4.99	36.88	48.45	54.00	-5.55	Average
3708.000	56.39	29.12	4.99	36.88	53.62	74.00	-20.38	Peak
5562.000	40.19	32.15	6.23	35.37	43.20	54.00	-10.80	Average
5562.000	48.83	32.15	6.23	35.37	51.84	74.00	-22.16	Peak

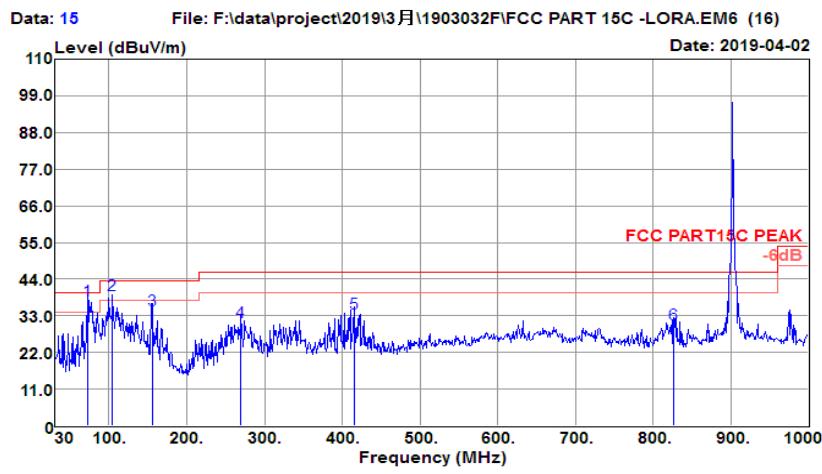
Test Site : 3m Chamber Temp/Humi : 18°C/61%  
-----  
Tested by : Damon Power rating: AC 120V/60Hz  
-----  
Model No. : 5W21S8 Pol/Phase : VERTICAL  
-----  
EUT : Floodlight Wired  
-----  
Test Mode : LoRa 500KHz DTS 927MHz  
-----



### 4.3.5 Test Result of Radiated Spurious Emission (30MHz ~ 1GHz)

Horizontal:

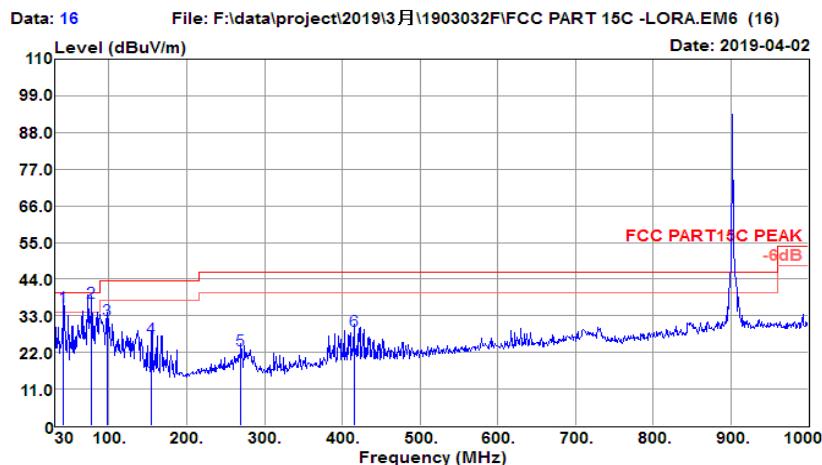
Test Site	:	3m Chamber	Temp/Humi	:	18°C/61%
Tested by	:	Damon	Power rating	:	AC 120V/60Hz
Model No.	:	5W21S8	Pol/Phase	:	HORIZONTAL
EUT	:	Floodlight Wired			
Test Mode	:	LoRa 500KHz DTS 902.5MHz			



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	Level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
71.710	57.94	10.54	1.71	32.51	37.68	40.00	-2.32	QP
104.690	59.06	10.67	2.00	32.45	39.28	43.50	-4.22	QP
155.130	50.51	14.20	2.46	32.51	34.66	43.50	-8.84	QP
269.590	48.54	11.99	3.26	32.53	31.26	46.00	-14.74	QP
415.090	47.16	15.06	4.09	32.48	33.83	46.00	-12.17	QP
827.340	35.96	21.05	6.04	32.49	30.56	46.00	-15.44	QP

Vertical:

Test Site : 3m Chamber  
 -----  
 Tested by : Damon  
 -----  
 Model No. : 5W21S8  
 -----  
 EUT : Floodlight Wired  
 -----  
 Test Mode : LoRa 500KHZ DTS 902.5MHz



Freq MHz	Reading dBuV	Antenna factor	Cable loss	Preamp dB	Level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
41.640	53.22	14.00	1.17	32.56	35.83	40.00	-4.17	QP
77.530	57.96	9.67	1.72	32.50	36.85	40.00	-3.15	QP
96.930	52.50	9.99	1.92	32.45	31.96	43.50	-11.54	QP
154.160	42.09	14.20	2.45	32.51	26.23	43.50	-17.27	QP
269.590	39.94	11.99	3.26	32.53	22.66	46.00	-23.34	QP
415.090	41.74	15.06	4.09	32.48	28.41	46.00	-17.59	QP

## 5. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Due Date	Remark
Spectrum Analyzer	Keysight	N9010A	MY56070788	2019/1/23	2020/1/22	Conducted
Power Sensor	Keysight	U2021XA	MY56510025	2019/1/23	2020/1/22	Conducted
Power Sensor	Keysight	U2021XA	MY57030005	2019/1/23	2020/1/22	Conducted
Power Sensor	Keysight	U2021XA	MY56510018	2019/1/23	2020/1/22	Conducted
Power Sensor	Keysight	U2021XA	MY56480002	2019/1/23	2020/1/22	Conducted
Thermal Chamber	Sanmtest	SMC-408-CD	2435	2018/7/5	2019/7/4	Conducted
Base Station	R&S	CMW 270	101231	2019/1/23	2020/1/22	Conducted
Signal Generator (Blocker)	Keysight	N5171B	MY56200661	2019/1/23	2020/1/22	Conducted

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV 40	101433	2019/2/18	2020/2/17	Radiation
Amplifier	Sonoma	310	363917	2019/1/22	2020/1/21	Radiation
Amplifier	Schwarzbeck	BBV 9718	327	2019/1/22	2020/1/21	Radiation
Amplifier	Narda	TTA1840-35-HG	2034380	2018/7/18	2019/7/17	Radiation
Broadband Antenna	Schwarzbeck	VULB 9168	9168-757	2017-03-03	2020-03-02	Radiation
Horn Antenna	Schwarzbeck	BBHA 9120 D	1677	2017-03-03	2020-03-02	Radiation
Horn Antenna	COM-POWER	AH-1840	101117	2018-06-20	2021-06-19	Radiation
Test Software	Auidx	E3	6.111221a	N/A	N/A	Radiation
Filter	Micro-Tronics	BRM 50702	G266	N/A	N/A	Radiation

N/A: No Calibration Required

## 6. Uncertainty of Evaluation

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.64dB
Radiated emission	30MHz ~ 1GHz	5.05dB
	1GHz ~ 18GHz	5.06 dB
	18GHz ~ 40GHz	3.65dB

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

-----End of the report-----