



# FCC EMI TEST REPORT

**FCC ID** : 2A8GD-SMART-V5  
**Equipment** : NESDR SMarT  
**Brand Name** : Nooelec  
**Model Name** : NESDR SMarT - v5.2b1  
**Applicant** : Nooelec Inc.  
3-250 Harry Walker Pkwy N, Newmarket, ON, L3Y 7B4  
**Manufacturer** : Nooelec Inc.  
3-250 Harry Walker Pkwy N, Newmarket, ON, L3Y 7B4  
**Standard** : FCC 47 CFR FCC Part 15 Subpart B Class B

The product was received on Aug. 30, 2022 and testing was performed from Sep. 02, 2022 to Sep. 07, 2022. We, Sporton International (USA) Inc. would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2014 and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval from Sporton International (USA) Inc., the test report shall not be reproduced except in full.

Approved by: Neil Kao

**Sporton International (USA) Inc.**  
1175 Montague Expressway, Milpitas, CA 95035

## Table of Contents

<b>History of this test report.....</b>	<b>3</b>
<b>Summary of Test Result.....</b>	<b>4</b>
<b>1. General Description .....</b>	<b>5</b>
1.1. Modification of EUT .....	5
1.2. Test Location .....	5
1.3. Applicable Standards .....	5
<b>2. Test Configuration of Equipment Under Test .....</b>	<b>6</b>
2.1. Test Mode .....	6
2.2. Connection Diagram of Test System .....	7
2.3. Support Unit used in test configuration and system .....	7
2.4. EUT Operation Test Setup .....	7
<b>3. Test Result .....</b>	<b>8</b>
3.1. Test of AC Conducted Emission Measurement .....	8
3.2. Test of Radiated Emission Measurement .....	10
3.3. Antenna Conducted Power for receivers .....	12
<b>4. List of Measuring Equipment.....</b>	<b>16</b>
<b>5. Uncertainty of Evaluation .....</b>	<b>17</b>
<b>Appendix A. AC Conducted Emission Test Result</b>	
<b>Appendix B. Radiated Emission Test Result</b>	
<b>Appendix C. Setup Photographs</b>	



## History of this test report

Report No.	Version	Description	Issue Date
FC220831001	01	Initial issue of report	Sep. 14, 2022

## Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.107	AC Conducted Emission	Pass	11.55 dB under the limit at 0.189 MHz
3.2	15.109	Radiated Emission	Pass	6.06 dB under the limit at 42.610 MHz
3.3	15.111	Antenna Conducted Power for receivers	Pass	-
-	15.121	Scanning receivers and frequency converters used with scanning receivers	Not Applicable	See Note

**Note:** Not applicable since the EUT is not a scanning receiver, it does not automatically switch among frequencies and does not have a dedicated circuit to automatically change the frequency as declared by the manufacturer.

### Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. Please refer to the section " Uncertainty of Evaluation " for measurement uncertainty.

### Comments and Explanations:

The product specifications of the EUT presented in the report are declared by the manufacturer who shall take full responsibility for the authenticity.



# 1. General Description

## 1.1. Modification of EUT

No modifications made to the EUT during the testing.

## 1.2. Test Location

<b>Test Site</b>	Sporton International (USA) Inc.
<b>Test Site Location</b>	1175 Montague Expressway, Milpitas, CA 95035 TEL : 408 9043300
<b>Test Site No.</b>	<b>Sporton Site No.</b> TH01-CA, CO01-CA, 03CH01-CA

FCC Designation No.: US 1250

## 1.3. Applicable Standards

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

- ♦ FCC 47 CFR FCC Part 15 Subpart B Class B
- ♦ ANSI C63.4-2014

**Remark:** All test items were verified and recorded according to the standards and without any deviation during the test.

## 2. Test Configuration of Equipment Under Test

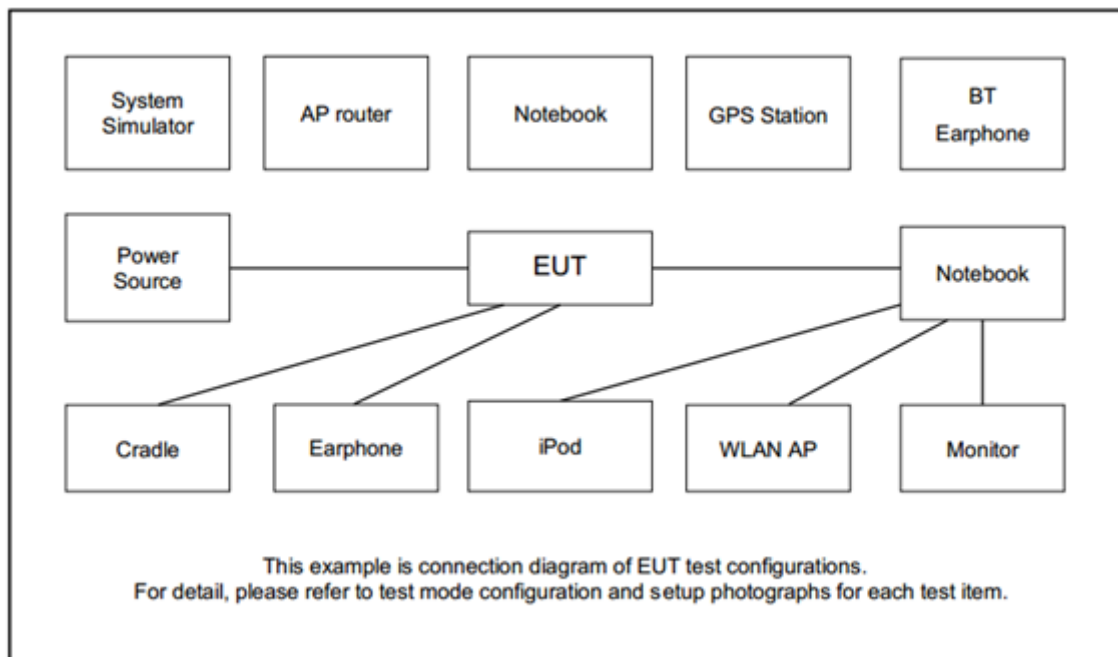
### 2.1. Test Mode

The EUT is tested along with the peripherals, operating under possible configurations in compliant with normal operation. The maximum emissions can be identified by a pre-scan carried out in different orientations of placement pursuant to ANSI C63.4-2014. Frequency range covered: Conduction Emission (150 kHz to 30 MHz), Radiation Emission (30 MHz to the 5<sup>th</sup> harmonics of the highest fundamental frequency or to 40 GHz, whichever is lower).

The EUT has a Local Oscillator which operates at 28.8MHz.

Test Items	Functions Enabled
<b>AC Conducted Emission</b>	Mode 1: Radio Receiver (100kHz) + ANT Mode 2: Radio Receiver (880MHz) + ANT Mode 3: Radio Receiver (1.75GHz) + ANT
<b>Radiated Emissions</b>	Mode 1: Radio Receiver (100kHz) + ANT Mode 2: Radio Receiver (880MHz) + ANT Mode 3: Radio Receiver (1.75GHz) + ANT
<b>Remark:</b> 1. The worst case of AC is mode 1; only the test data of this mode was reported. 2. The worst case of RE is mode 1; only the test data of this mode was reported.	

## 2.2. Connection Diagram of Test System



## 2.3. Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Notebook	Dell	W530	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
2.	WLAN AP	Acer	RT-AC66U B1	N/A	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.2 m
3.	HDD	WD	WDBYNN0010BBL-WESN	FCC DoC	Unshielded,0.3m	N/A

## 2.4. EUT Operation Test Setup

EUT connect with notebook and execute “cubicsdr tool” to make the EUT receive continuous signals from Signal Generator.

### 3. Test Result

#### 3.1. Test of AC Conducted Emission Measurement

##### 3.1.1. Limits of AC Conducted Emission

For equipment that 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 the limits in the following table.

<Class B>

Frequency of emission (MHz)	Conducted 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.

##### 3.1.2. Measuring Instruments

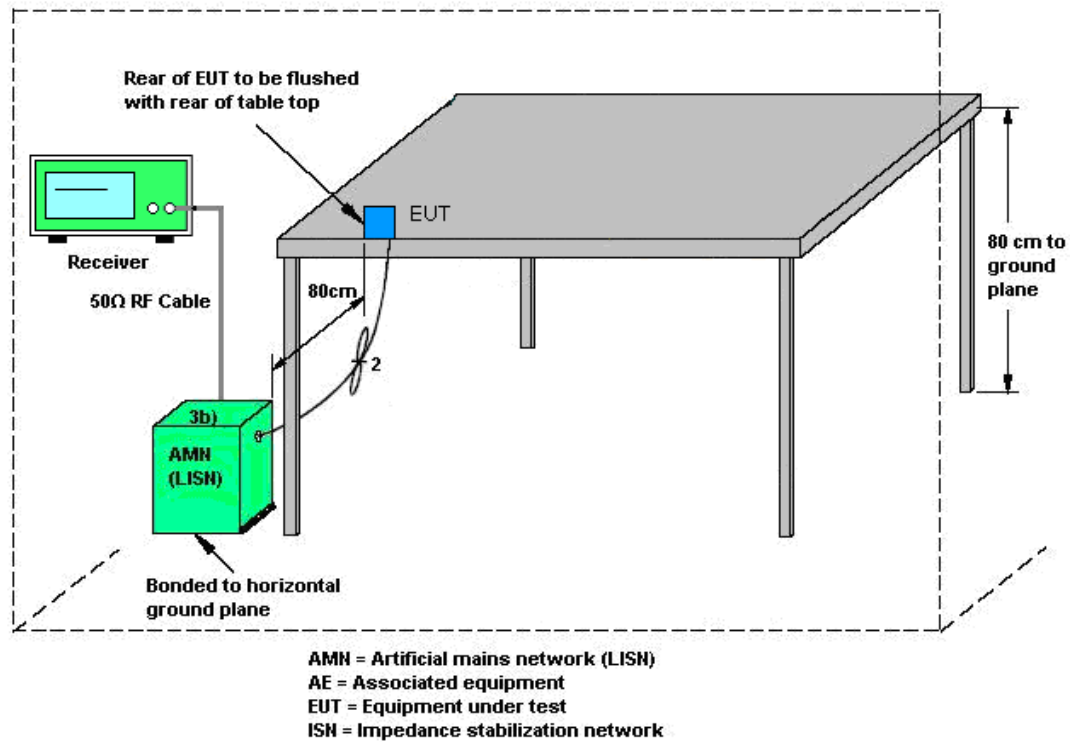
Please refer to the measuring equipment list in this test report.

##### 3.1.3. Test Procedure

1. The EUT is placed 0.4 meter away from the conducting wall of the shielding room, and is kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN shall be used.
6. Both Line and Neutral shall be tested in order to find out the maximum conducted emission.
7. The frequency range from 150 kHz to 30 MHz is scanned.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (If Bandwidth = 9 kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.



### 3.1.4. Test Setup



### 3.1.5. Test Result of AC Conducted Emission

Please refer to Appendix A.

## 3.2. Test of Radiated Emission Measurement

### 3.2.1. Limit of Radiated Emission

The emissions from an unintentional radiator shall not exceed the field strength levels specified in the following table:

<Class B>

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

### 3.2.2. Measuring Instruments

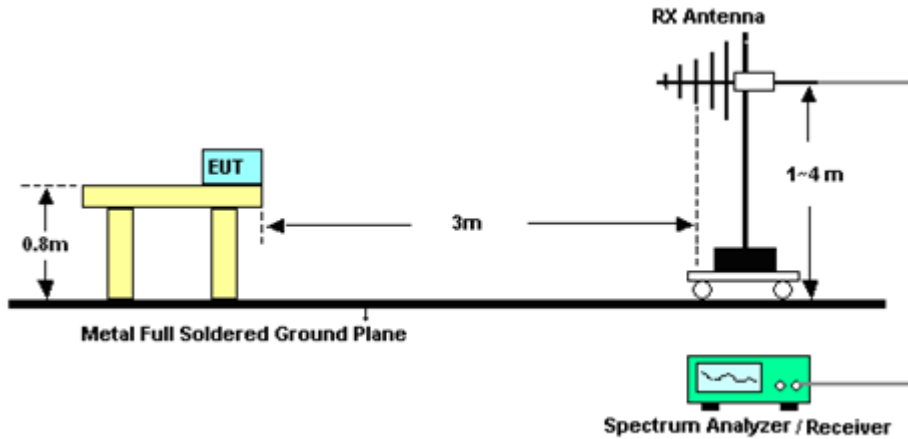
Please refer to the measuring equipment list in this test report.

### 3.2.3. Test Procedures

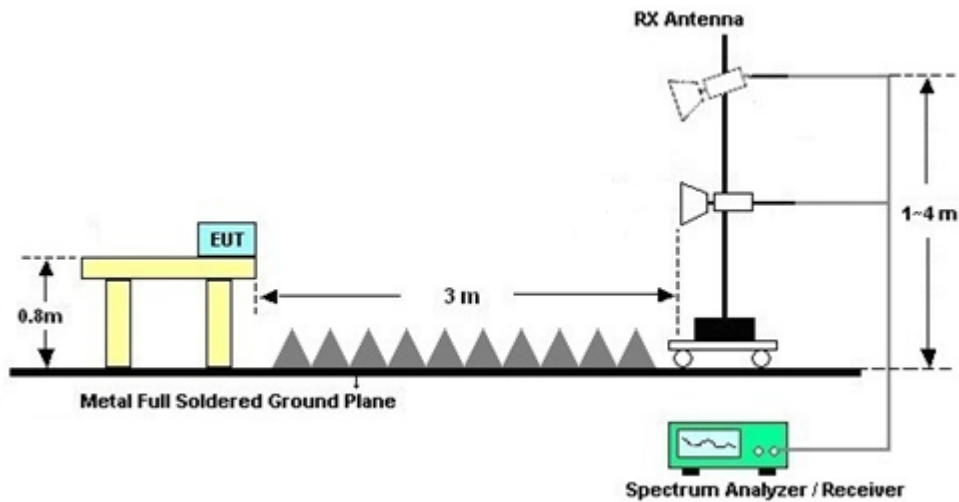
1. The EUT is placed on a turntable with 0.8 meter above ground.
2. The EUT is set 3 meters from the interference receiving antenna, which is mounted on the top of a variable height antenna tower.
3. The table is rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT is arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120 kHz/VBW=300 kHz for frequency below 1 GHz; RBW=1 MHz VBW=3 MHz (Peak), RBW=1 MHz/VBW=10 Hz (Average) for frequency above 1 GHz).
7. If the emission level of the EUT in peak mode is 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.
8. Emission level (dBμV/m) = 20 log Emission level (μV/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamplifier Factor = Level

### 3.2.4. Test Setup of Radiated Emission

For Radiated Emissions from 30 MHz to 1 GHz



For Radiated Emissions above 1 GHz



### 3.2.5. Test Result of Radiated Emission

Please refer to Appendix B.

### 3.3. Antenna Conducted Power for receivers

#### 3.3.1. Limit

With the receiver antenna terminal connected to a resistive termination equal to the impedance specified or employed for the antenna, the power at the antenna terminal at any frequency within the range of measurements specified in § 15.33 shall not exceed 2.0 nanowatts.

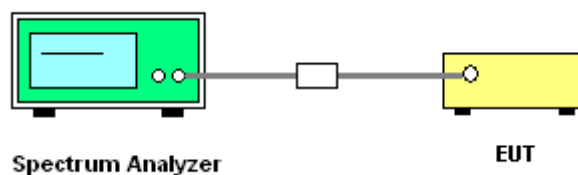
#### 3.3.2. Measuring Instruments

Please refer to the measuring equipment list in this test report.

#### 3.3.3. Test Procedures

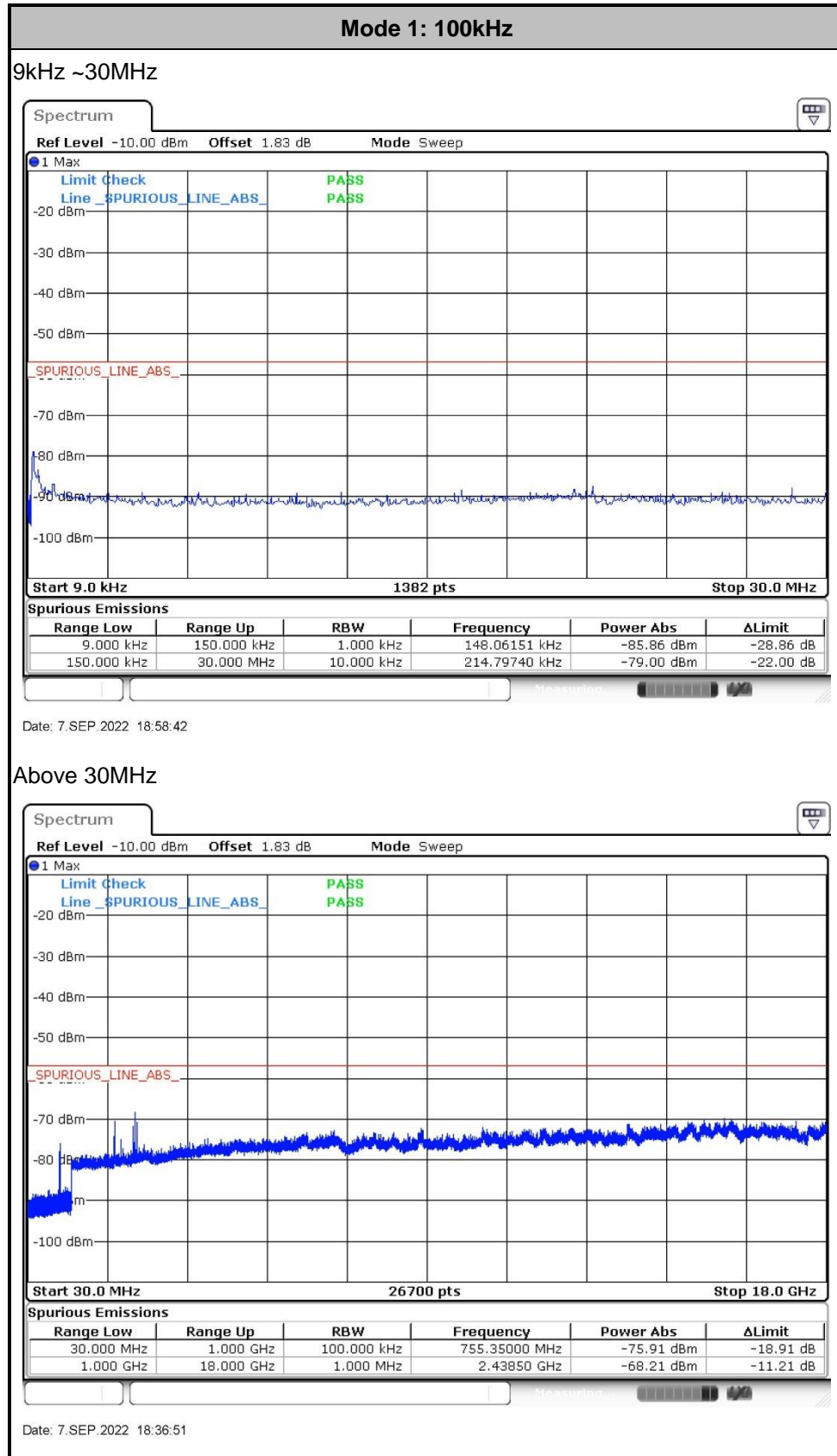
1. The testing follows the ANSI C63.4 Section 12.2.6 Antenna-conducted power measurement.
2. The antenna connector of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set the spectrum analyzer to peak detect function with maximum hold.  
(RBW=120kHz/VBW=300kHz for frequency below 1GHz; RBW=1MHz/VBW=3MHz for frequency above 1GHz)
4. For frequency below 1GHz, If the emission level of the EUT in peak mode was 3dB lower than limit, then no further investigation of the quasi-peak is required.
5. For frequency above 1GHz, If the emission level of the EUT in peak mode was 3dB lower than limit, then no further investigation of the average is required.
6. Measure and record the results in the test report.

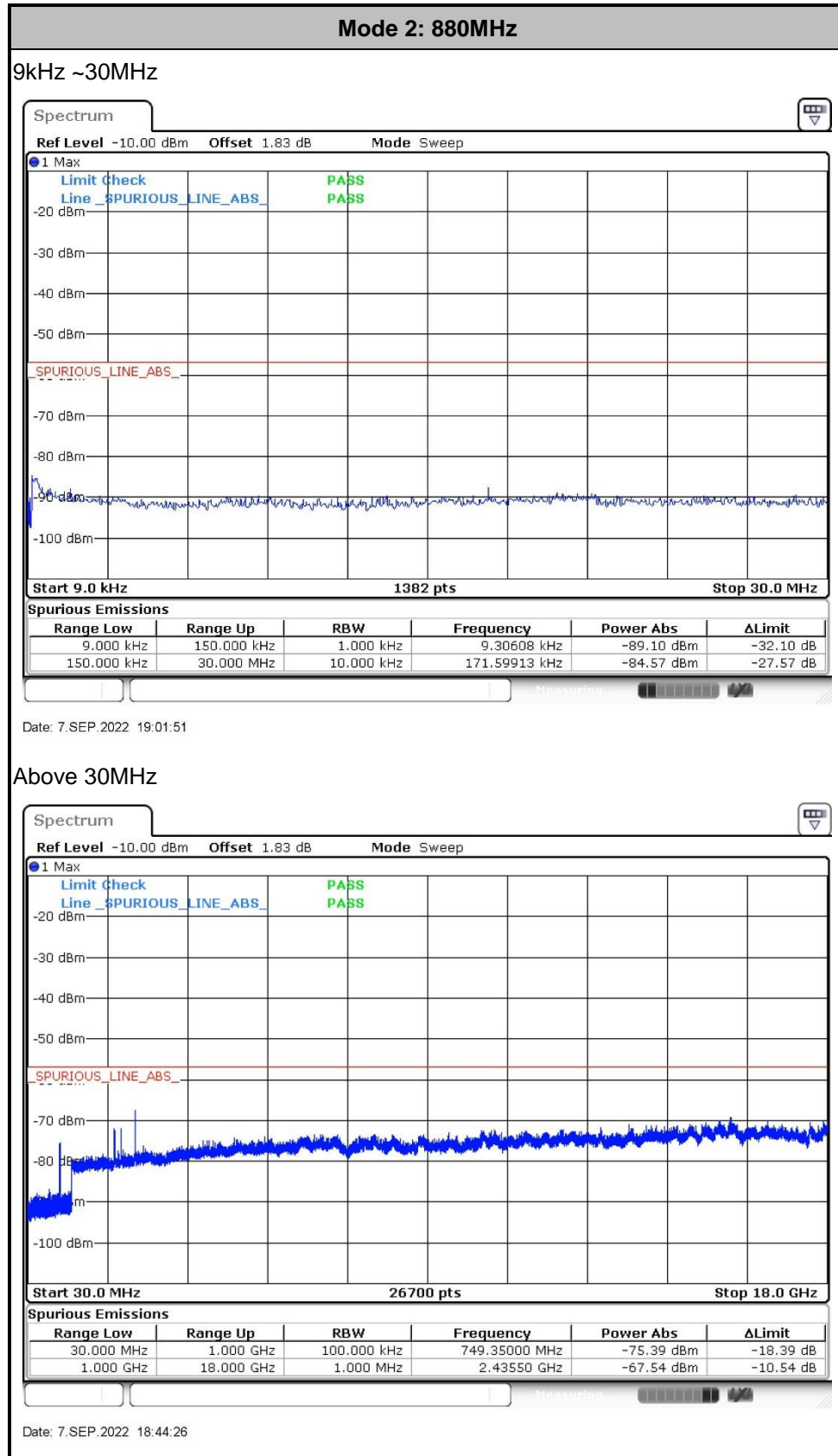
#### 3.3.4. Test Setup

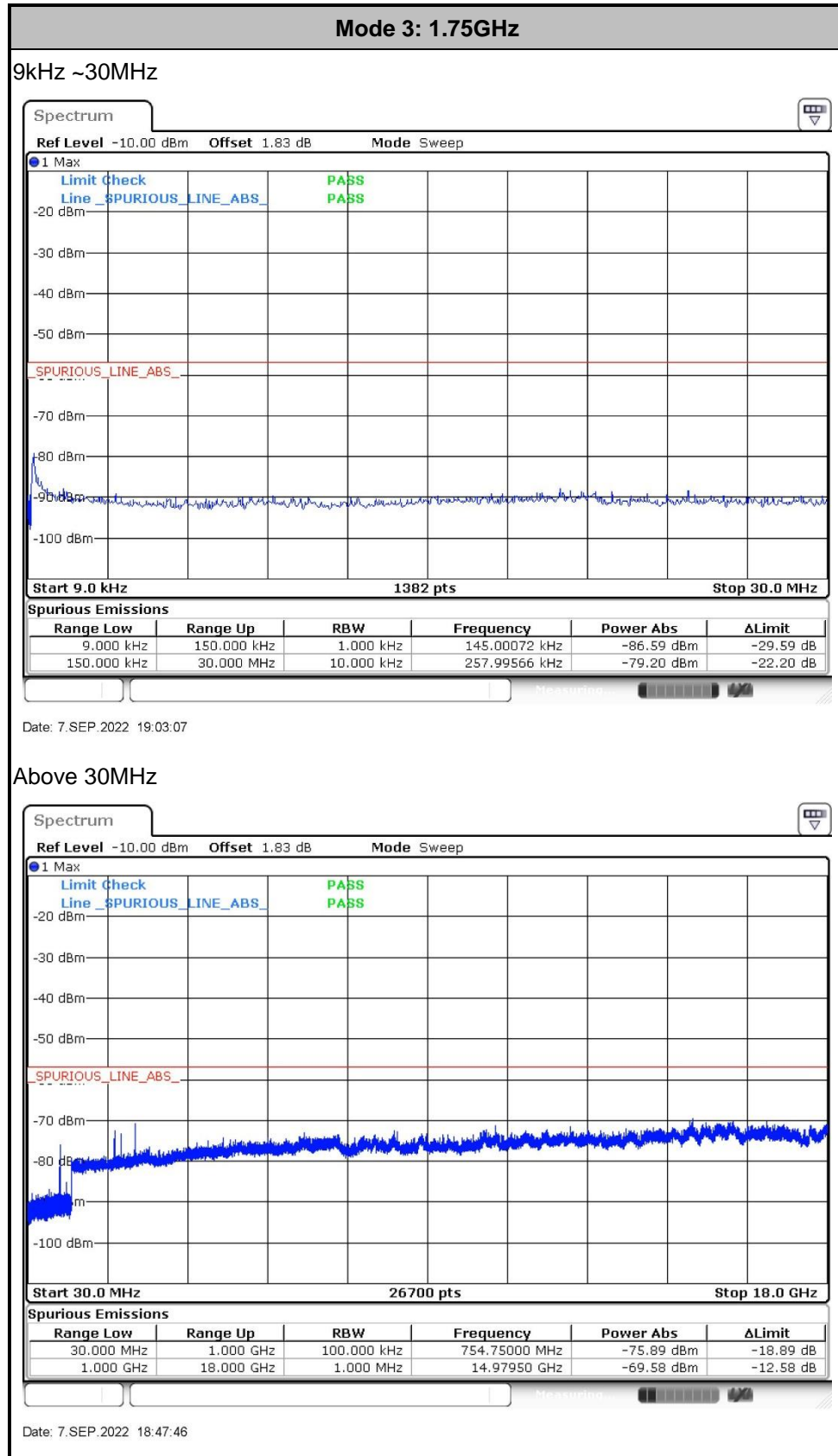


#### 3.3.5. Test Result

<b>Test Engineer :</b>	Liliana Gonzalez	<b>Temperature :</b>	24.2~24.3°C
		<b>Relative Humidity :</b>	45.6~48.2%









## 4. List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
LISN	TESEQ	NNB51	47407	N/A	May 10, 2022	Sep. 02, 2022	May 09, 2023	Conduction (CO01-CA)
LISN	TESEQ	NNB51	47415	N/A	May 10, 2022	Sep. 02, 2022	May 09, 2023	Conduction (CO01-CA)
ISN	TESEQ	T8-cat6	41577	N/A	May 10, 2022	Sep. 02, 2022	May 09, 2023	Conduction (CO01-CA)
SMB100B Signal Generator Base Unit	Rohde & Schwarz	SMB100B	101458	8KHz-6GHz	May 10, 2022	Sep. 02, 2022	May 09, 2023	Radiation (03CH01-CA)
EMI Test Receiver	R&S	ESR7	102177	9kHz~7GHz	May 31, 2022	Sep. 02, 2022	May 30, 2023	Conduction (CO01-CA)
Pulse limiter with 10dB attenuation	R&S	VTSD 9561-F N	9561-F-N00412	N/A	Jul. 05, 2022	Sep. 02, 2022	Jul. 04, 2023	Conduction (CO01-CA)
Test Software	R&S	EMC32 V10.30.0	N/A	N/A	N/A	Sep. 02, 2022	N/A	Conduction (CO01-CA)
Bilog Antenna	TESEQ	6111D	54683	30MHz~1GHz	Oct. 15, 2021	Sep. 02, 2022	Oct. 14, 2022	Radiation (03CH01-CA)
SMB100B Signal Generator Base Unit	Rohde & Schwarz	SMB100B	101458	9kHz~6GHz	May 31, 2022	Sep. 02, 2022	May 30, 2023	Radiation (03CH01-CA)
Horn Antenna	SCHWARZBECK	BBHA 9120D	02115	1GHz~18GHz	Aug. 16, 2022	Sep. 02, 2022	Aug. 15, 2023	Radiation (03CH01-CA)
Preamplifier	SONOMA	310N	372241	9kHz~1GHz	May 09, 2022	Sep. 02, 2022	May 08, 2023	Radiation (03CH01-CA)
Preamplifier	Jet-Power	JPA0118-55-303	1710001800055004	1GHz~18GHz	May 10, 2022	Sep. 02, 2022	May 09, 2023	Radiation (03CH01-CA)
EMI Test Receiver	R&S	ESU26	100049	20Hz~26.5GHz	Jun. 01, 2022	Sep. 02, 2022	May 31, 2023	Radiation (03CH01-CA)
Filter	Wainwright	WLK12-1200-1272-11000-40SS	SN1	1.2GHz Low Pass Filter	Jul. 21, 2022	Sep. 02, 2022	Jul. 20, 2023	Radiation (03CH01-CA)
Filter	Wainwright	WHKX12-1080-1200-15000-60ST	SN7	1.2GHz High Pass Filter	Jul. 21, 2022	Sep. 02, 2022	Jul. 20, 2023	Radiation (03CH01-CA)
Filter	Wainwright	WHKX8-5872.5-6750-18000-40S	SN8	6.75GHz High Pass Filter	Jul. 21, 2022	Sep. 02, 2022	Jul. 20, 2023	Radiation (03CH01-CA)
RF Cable	HUBER+SUHNER	SUCOFLEX 102	8015932/2, 8015762/2, 6015772/2	N/A	Aug. 08, 2022	Sep. 02, 2022	Aug. 07, 2023	Radiation (03CH01-CA)
Hygrometer	TESTO	608-H1	45141354	N/A	Jul. 27, 2022	Sep. 02, 2022	Jul. 26, 2023	Radiation (03CH01-CA)
Controller	Chaintek	EM-1000	060881	Control Turn Table & Antenna Mast	N/A	Sep. 02, 2022	N/A	Radiation (03CH01-CA)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Sep. 02, 2022	N/A	Radiation (03CH01-CA)
Test Software	Audix E3	E6.2009-8-24d	PK-002093	N/A	N/A	Sep. 02, 2022	N/A	Radiation (03CH01-CA)
Hygrometer	Testo	608-H1	45141354	N/A	Jul. 27, 2022	Sep. 07, 2022	Jul. 26, 2023	Conducted (TH01-CA)
Spectrum Analyzer	Rohde & Schwarz	FSV40	101089	10Hz-40GHz	Jun. 01, 2022	Sep. 07, 2022	May 31, 2023	Conducted (TH01-CA)



## 5. Uncertainty of Evaluation

### Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.0 dB
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### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.0 dB
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### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	6.2 dB
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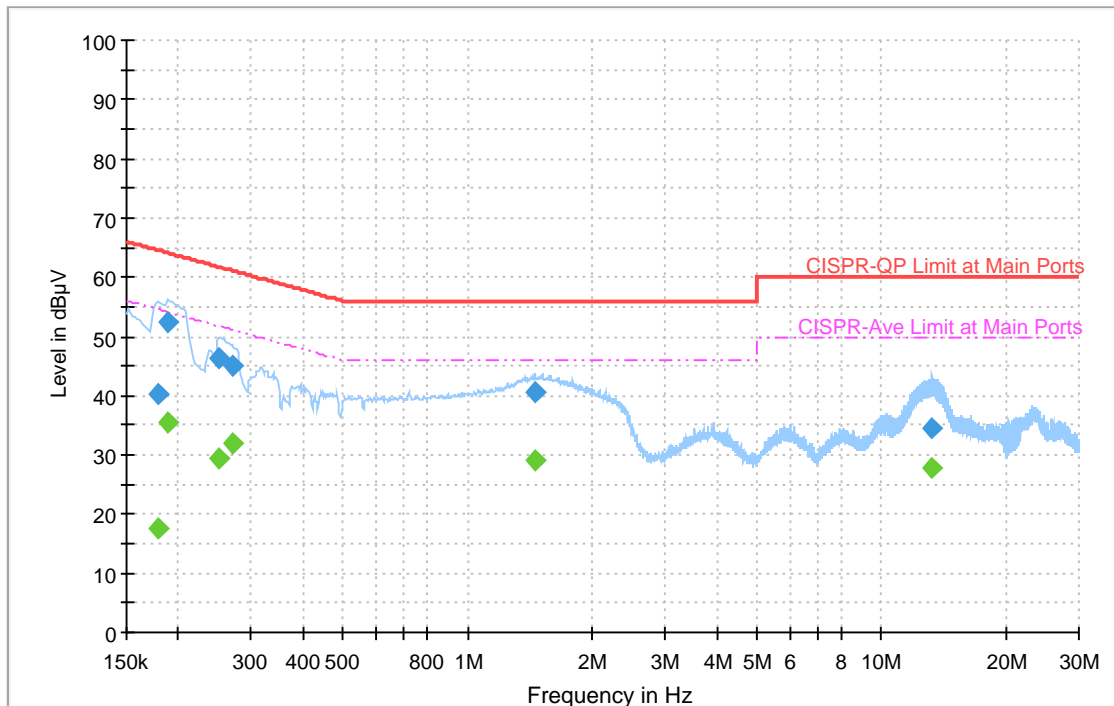
## **Appendix A. AC Conducted Emission Test Results**

<b>Test Engineer :</b>	Leo Liu	<b>Temperature :</b>	20~22℃
		<b>Relative Humidity :</b>	38~43%

## EUT Information

Test Site Location : CO01-CA  
Power: 120Vac/60Hz  
Project: 220831001  
Mode: 1

Full Spectrum



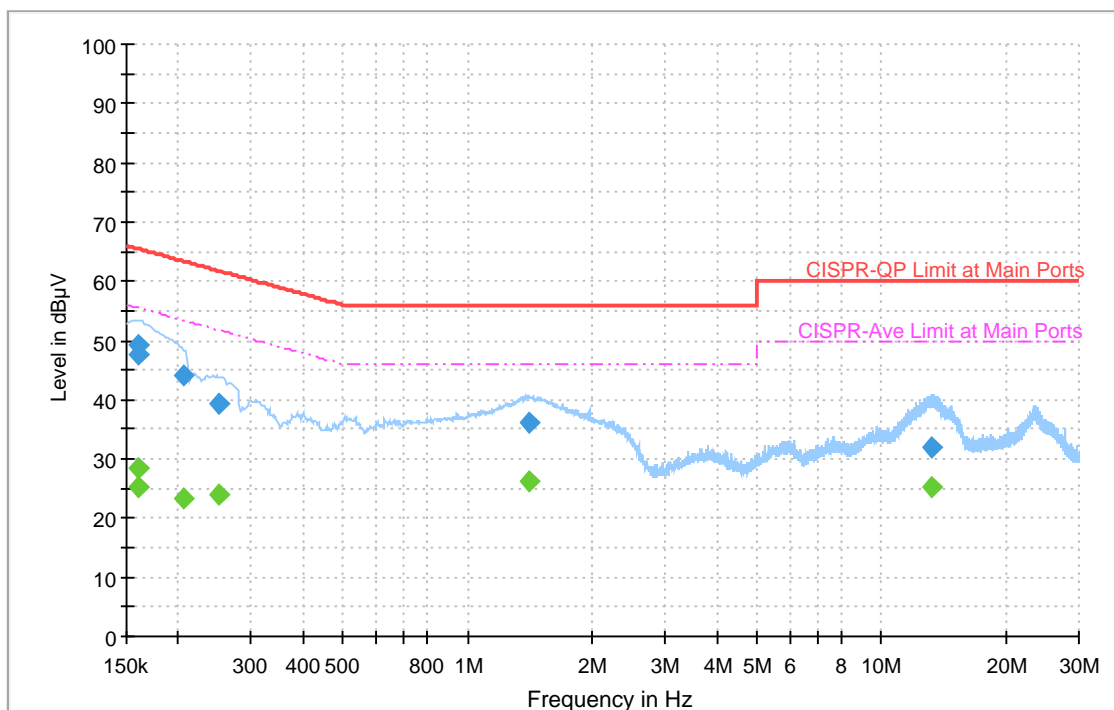
## Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.178773	---	17.53	54.54	37.01	L1	OFF	20.3
0.178773	40.34	---	64.54	24.20	L1	OFF	20.3
0.188664	---	35.50	54.10	18.60	L1	OFF	20.3
0.188664	52.55	---	64.10	11.55	L1	OFF	20.3
0.251664	---	29.53	51.70	22.17	L1	OFF	20.3
0.251664	46.35	---	61.70	15.35	L1	OFF	20.3
0.269556	---	31.95	51.13	19.18	L1	OFF	20.3
0.269556	44.89	---	61.13	16.24	L1	OFF	20.3
1.454631	---	29.20	46.00	16.80	L1	OFF	20.3
1.454631	40.62	---	56.00	15.38	L1	OFF	20.3
13.290468	---	27.74	50.00	22.26	L1	OFF	20.5
13.290468	34.66	---	60.00	25.34	L1	OFF	20.5

## EUT Information

Site: CO01-CA  
Power: 120Vac/60Hz  
Project: 220831001  
Mode: 1

Full Spectrum



## Final Result

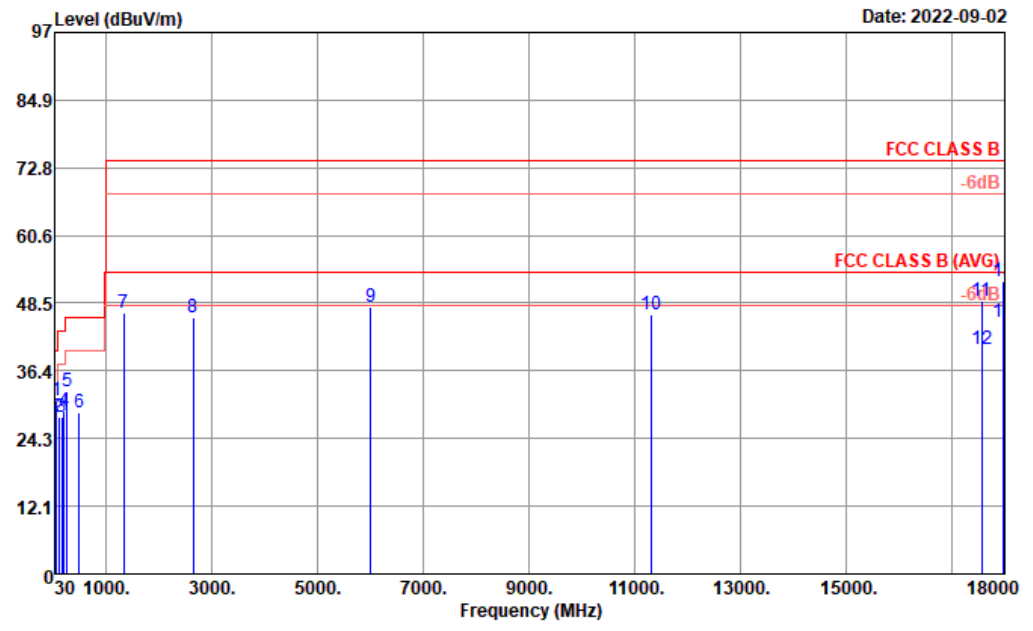
Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.160107	---	25.24	55.46	30.22	N	OFF	20.3
0.160107	47.68	---	65.46	17.78	N	OFF	20.3
0.160845	---	28.53	55.42	26.89	N	OFF	20.3
0.160845	49.31	---	65.42	16.11	N	OFF	20.3
0.205179	---	23.24	53.40	30.16	N	OFF	20.3
0.205179	43.96	---	63.40	19.44	N	OFF	20.3
0.250935	---	23.84	51.73	27.89	N	OFF	20.3
0.250935	39.21	---	61.73	22.52	N	OFF	20.3
1.414050	---	26.17	46.00	19.83	N	OFF	20.3
1.414050	36.14	---	56.00	19.86	N	OFF	20.3
13.204068	---	25.23	50.00	24.77	N	OFF	20.5
13.204068	31.96	---	60.00	28.04	N	OFF	20.5

## Appendix B. Radiated Emission Test Result

<b>Test Engineer :</b>	Leo Liu	<b>Temperature :</b>	19~23°C
		<b>Relative Humidity :</b>	39~42%
<b>Test Distance :</b>	3m	<b>Polarization :</b>	Horizontal

■ Emission level (dBμV/m) = 20 log Emission level (μV/m)  
 ■ Factor(dB) = Antenna Factor + Cable Loss + Filter loss – Preamp Factor  
 ■ Corrected Reading: Factor(dB) + Read Level = Level

Date: 2022-09-02



The graph shows the emission level (dBμV/m) on the y-axis (ranging from 0 to 97) versus frequency (MHz) on the x-axis (ranging from 30 to 18000). Two red horizontal lines represent the FCC CLASS B limits: one at 72.8 dBμV/m and another at 48.5 dBμV/m (labeled as -6dB and -60dB respectively). Blue vertical lines indicate measured peaks at various frequencies, with the highest peak at 17560 MHz reaching 48.88 dBμV/m. The graph also shows an average reading at 17560 MHz.

Site : 03CH01-CA  
 Condition : FCC CLASS B 3m HORN\_02115\_220816 HORIZONTAL  
 Project : 220831001  
 Power : 120Vac/60Hz  
 Mode : 1  
 Plane : X

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark
	MHz	dBμV/m	dB	dBμV/m	dBμV	dB/m	cm	deg	
1	60.07	31.13	-8.87	40.00	50.46	-19.33	---	---	Peak
2	104.69	28.19	-15.31	43.50	42.28	-14.09	---	---	Peak
3	169.68	28.16	-15.34	43.50	42.69	-14.53	---	---	Peak
4	201.69	29.08	-14.42	43.50	44.13	-15.05	---	---	Peak
5	258.92	32.74	-13.26	46.00	42.66	-9.92	---	---	Peak
6	497.54	28.97	-17.03	46.00	34.17	-5.20	---	---	Peak
7	1330.00	46.83	-27.17	74.00	75.24	-28.41	---	---	Peak
8	2656.00	46.03	-27.97	74.00	68.60	-22.57	---	---	Peak
9	6010.00	47.79	-26.21	74.00	58.81	-11.02	---	---	Peak
10	11301.00	46.55	-27.45	74.00	50.07	-3.52	---	---	Peak
11	17560.00	48.88	-25.12	74.00	46.05	2.83	---	---	Peak
12	17560.00	40.31	-13.69	54.00	37.48	2.83	---	---	Average
13	17967.00	52.29	-21.71	74.00	44.73	7.56	---	---	Peak
14	17967.00	45.00	-9.00	54.00	37.44	7.56	---	---	Average

