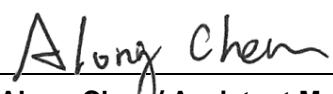


# FCC C2PC Test Report

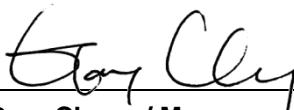
**FCC ID** : U280MSTREAMER  
**Equipment** : Audio Streaming Module XM  
**Model No.** : Audio Streaming Module XM  
**Brand Name** : Oticon  
**Applicant** : Oticon A/S  
**Address** : Kongebakken 9 DK-2765 Smoerum, Denmark  
**Standard** : 47 CFR FCC Part 15.223  
**Received Date** : Mar. 30, 2021  
**Tested Date** : Apr. 07 ~ Apr. 22, 2021

We, International Certification Corporation, would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by:

  
Along Chen / Assistant Manager

Approved by:

  
Gary Chang / Manager



## Table of Contents

<b>1</b>	<b>GENERAL DESCRIPTION .....</b>	<b>5</b>
1.1	Information.....	5
1.2	Local Support Equipment List .....	7
1.3	Test Setup Chart .....	7
1.4	The Equipment List .....	9
1.5	Test Standards .....	11
1.6	Deviation from Test Standard and Measurement Procedure.....	11
1.7	Measurement Uncertainty .....	11
<b>2</b>	<b>TEST CONFIGURATION.....</b>	<b>12</b>
2.1	Testing Facility .....	12
2.2	The Worst Test Modes and Channel Details .....	12
<b>3</b>	<b>TRANSMITTER TEST RESULTS .....</b>	<b>13</b>
3.1	Conducted Emissions.....	13
3.2	6dB and Occupied Bandwidth.....	18
3.3	Radiated Emissions.....	20
<b>4</b>	<b>TEST LABORATORY INFORMATION .....</b>	<b>34</b>

## Release Record

Report No.	Version	Description	Issued Date
FR8N1301-06	Rev. 01	Initial issue	Nov. 04, 2021

## Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	Meet the requirement of limit	Pass
15.223(a)(b)	Radiated Emissions	Meet the requirement of limit	Pass
15.223(a)	6dB Bandwidth	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass

**Declaration of Conformity:**

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

**Comments and Explanations:**

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

## 1 General Description

### 1.1 Information

This is a Class II Permissive Change report (C2PC).

This report is issued as a supplementary report to original ICC report no. FR8N1301. The modification is change PCB component and audio cable (3.5mm mini jack stereo cable). Therefore, all test items had been re-tested and was recorded in the following sections. Test results are leveraged from ICC report no. FR8N1301-04.

#### 1.1.1 Product Details

The following models are provided to this EUT.

Brand Name	Sample Number	Model Name	Product Name	Description
Oticon	7059526	Audio Streaming Module XM	Audio Streaming Module XM	---

#### 1.1.2 Specification of the Equipment under Test (EUT)

RF General Information			
Frequency Range (MHz)	Modulation	Ch. Frequency (MHz)	Channel Number
3.84	ASK	3.84	1

#### 1.1.3 Antenna Details

Ant. No.	Type	Gain (dBi)	Connector	Remark
1	Ferrite coil antenna	---	---	---
2	Neckloop antenna	---	---	---

#### 1.1.4 EUT Operational Condition

Power Supply Type	3.7Vdc from battery		
Operational Voltage	<input checked="" type="checkbox"/> Vnom (3.7 V)	<input checked="" type="checkbox"/> Vmax (4.1 V)	<input checked="" type="checkbox"/> Vmin (3.45 V)

### 1.1.5 Accessories

Accessories		
No.	Equipment	Description
1	AC Adapter	Brand: PHIHONG Model: AM05E-050A Power Rating: I/P: 100-240Vac, 50/60Hz, 0.2A O/P: 5Vdc, 1A Power Line: 1.8m non-shielded cable without core
2	Battery	Brand: ZHUHAI COSLIGHT BATTERY CO., LTD Model: CA422258 Power Rating: I/P: 3.7Vdc, 520mAh
3	USB charger cable	1.2m shielded without core
4	3.5mm mini jack stereo cable	1.05m non-shielded with two cores
5	3.5mm headset splitter cable	0.14m non-shielded without core
6	Neck loop-long	0.81m non-shielded without core
7	Neck loop-medium	0.66m non-shielded without core

## 1.2 Local Support Equipment List

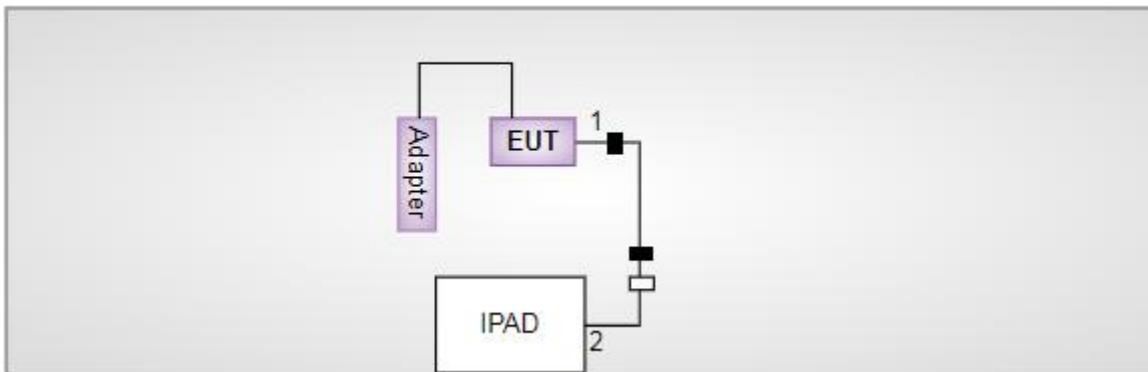
Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Remarks
1	IPAD	Apple	A1446	JF0GT	---

## 1.3 Test Setup Chart

Test Setup Diagram (Ferrite coil antenna, battery mode)	
No.	Signal cable / Length (m)
1	3.5mm mini jack stereo cable, 1.05m non-shielded with two cores
2	3.5mm headset splitter cable, 0.14m non-shielded.

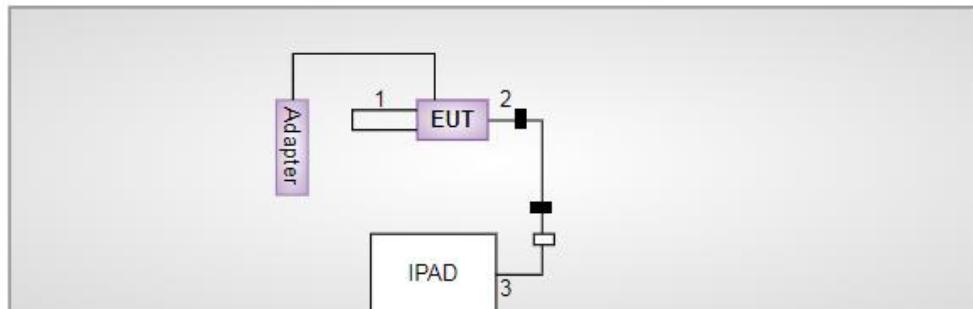
Test Setup Diagram (Neckloop antenna, battery mode)	
No.	Signal cable / Length (m)
1	Neck loop- long, 0.81m non-shielded.
2	3.5mm mini jack stereo cable, 1.05m non-shielded with two cores
3	3.5mm headset splitter cable, 0.14m non-shielded.

**Test Setup Diagram (Ferrite coil antenna, adapter mode)**



No.	Signal cable / Length (m)
1	3.5mm mini jack stereo cable, 1.05m non-shielded with two cores
2	3.5mm headset splitter cable, 0.14m non-shielded.

**Test Setup Diagram (Neckloop antenna, adapter mode)**



No.	Signal cable / Length (m)
1	Neck loop- long, 0.81m non-shielded.
2	3.5mm mini jack stereo cable, 1.05m non-shielded with two cores
3	3.5mm headset splitter cable, 0.14m non-shielded.

## 1.4 The Equipment List

<b>Test Item</b>	Conducted Emission				
<b>Test Site</b>	Conduction room 1 / (CO01-WS)				
<b>Tested Date</b>	Apr. 12, 2021				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101658	Feb. 08, 2021	Feb. 07, 2022
LISN	R&S	ENV216	101579	Mar. 17, 2021	Mar. 16, 2022
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 21, 2020	Oct. 20, 2021
Measurement Software	AUDIX	e3	6.120210k	NA	NA

Note: Calibration Interval of instruments listed above is one year.

<b>Test Item</b>	Radiated Emission				
<b>Test Site</b>	966 chamber1 / (03CH01-WS)				
<b>Tested Date</b>	Apr. 07, 2021				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101658	Feb. 08, 2021	Feb. 07, 2022
Spectrum Analyzer	R&S	FSV40	101498	Dec. 04, 2020	Dec. 03, 2021
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 17, 2020	Nov. 16, 2021
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jul. 10, 2020	Jul. 09, 2021
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 11, 2020	Dec. 10, 2021
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 06, 2020	Nov. 05, 2021
Preamplifier	EMC	EMC02325	980225	Jul. 03, 2020	Jul. 02, 2021
Preamplifier	Agilent	83017A	MY39501308	Sep. 26, 2020	Sep. 25, 2021
Preamplifier	EMC	EMC184045B	980192	Jul. 21, 2020	Jul. 20, 2021
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 06, 2020	Oct. 05, 2021
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Oct. 06, 2020	Oct. 05, 2021
LF cable 11M	EMC	EMCCFD400-NW-N W-11000	200801	Oct. 06, 2020	Oct. 05, 2021
LF cable 1M	EMC	EMCCFD400-NM-N M-1000	160502	Oct. 06, 2020	Oct. 05, 2021
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Oct. 06, 2020	Oct. 05, 2021
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Oct. 06, 2020	Oct. 05, 2021
Measurement Software	AUDIX	e3	6.120210g	NA	NA

Note: Calibration Interval of instruments listed above is one year.

<b>Test Item</b>	RF Conducted				
<b>Test Site</b>	(TH01-WS)				
<b>Tested Date</b>	Apr. 22, 2021				
<b>Instrument</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Calibration Date</b>	<b>Calibration Until</b>
Spectrum Analyzer	R&S	FSV40	101063	Apr. 30, 2020	Apr. 29, 2021

Note: Calibration Interval of instruments listed above is one year.

<b>Test Item</b>	Radiated Emissions				
<b>Test Site</b>	(10CH02-HY)				
<b>Tested Date</b>	Apr. 20, 2021				
<b>Instrument</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Calibration Date</b>	<b>Calibration Until</b>
10m Semi Anechoic Chamber	TDK	SAC-10M	10CH02-HY	Sep. 20, 2020	Sep. 19, 2021
Amplifier	AGILENT	8447D	2944A10828	Jan. 04, 2021	Jan. 03, 2022
Amplifier	AGILENT	8447D	2944A10827	Jan. 04, 2021	Jan. 03, 2022
Receiver	R&S	ESU-26	100422	Nov. 03, 2020	Nov. 02, 2021
EXA Signal Analyzer	KEYSIGHT	N9010A	MY54200401	Dec. 23, 2020	Dec. 22, 2021
Biconical Antenna	Schwarzbeck	VHBB 9124	287	Aug. 22, 2020	Aug. 21, 2021
Log Periodic Antenna	Schwarzbeck	VUSLP 9111	207	Aug. 22, 2020	Aug. 21, 2021
Turn Table	EM Electronics	EM 1000	60546	NA	NA
Antenna Mast	HD	MA240	240/664	NA	NA
Antenna Mast	MF	MFA-515BSN	1308569	NA	NA
RF Cable-R10m	Jye Bao	RG142	CB027-INSIDE	Sep. 17, 2020	Sep. 16, 2021
RF Cable-R10m	HUBER+SUHNER	RG223/U + RG8/U	CB026-DOOR	Sep. 17, 2020	Sep. 16, 2021

Note: Calibration Interval of instruments listed above is one year.

## 1.5 Test Standards

47 CFR FCC Part 15.223

ANSI C63.10-2013

## 1.6 Deviation from Test Standard and Measurement Procedure

None

## 1.7 Measurement Uncertainty

The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)).

Measurement Uncertainty	
Parameters	Uncertainty
Bandwidth	±34.130 Hz
Conducted power	±0.808 dB
AC conducted emission	±2.92 dB
Radiated emission ≤ 1GHz	±3.41 dB
Radiated emission > 1GHz	±4.59 dB

## 2 Test Configuration

### 2.1 Testing Facility

<b>Test Laboratory</b>	International Certification Corporation
<b>Test Site</b>	CO01-WS, 03CH01-WS, TH01-WS
<b>Address of Test Site</b>	No.3-1, Lane 6, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.)

- FCC Designation No.: TW2732
- FCC site registration No.: 181692
- ISED#: 10807A
- CAB identifier: TW2732

<b>Test Laboratory</b>	Sporton International Inc. Hsinhua Laboratory
<b>Test Site</b>	10CH02-HY
<b>Address of Test Site</b>	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.) Tel: 886-3-327-3456, Fax: 886-3-327-0973

Note: \* ICC lab subcontracts this test item to Sporton Lab (TAF: 3785).

Sporton Lab is a TAF accreditation test firm and also is an approved provider of ICC lab.

### 2.2 The Worst Test Modes and Channel Details

Test item	Mode	Test Frequency (MHz)	Test Configuration
Conducted Emissions	ASK	3.84	3, 4
Radiated Emissions	ASK	3.84	1, 2, 3, 4
6dB bandwidth	ASK	3.84	2
1) The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The <b>Z-plane</b> results were found as the worst case and were shown in this report. 2) Two antennas are used for 3.84 MHz. The antennas are selected to perform radiated emission test with Bluetooth antenna as below test configurations. Configuration 1 :Ferrite coil antenna: 3.84 MHz / Inverted F: Bluetooth, battery mode Configuration 2 : Neckloop antenna 0.81m: 3.84 MHz / Inverted F: Bluetooth, battery mode Configuration 3 :Ferrite coil antenna: 3.84 MHz / Inverted F: Bluetooth, adapter mode Configuration 4 : Neckloop antenna 0.81m: 3.84 MHz / Inverted F: Bluetooth, adapter mode			

## 3 Transmitter Test Results

### 3.1 Conducted Emissions

#### 3.1.1 Limit of Conducted Emissions

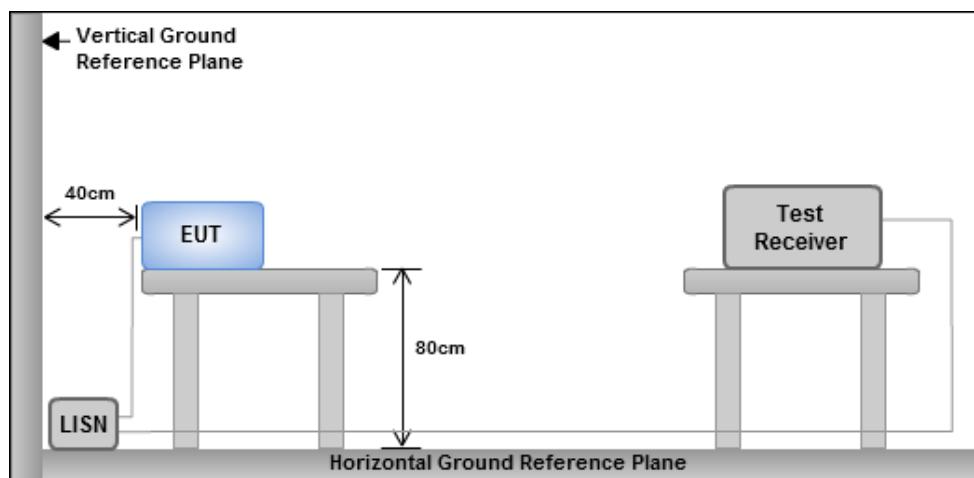
Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: \* Decreases with the logarithm of the frequency.

#### 3.1.2 Test Procedures

1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50 Ω LISN port.
3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
4. This measurement was performed with AC 120V / 60Hz.

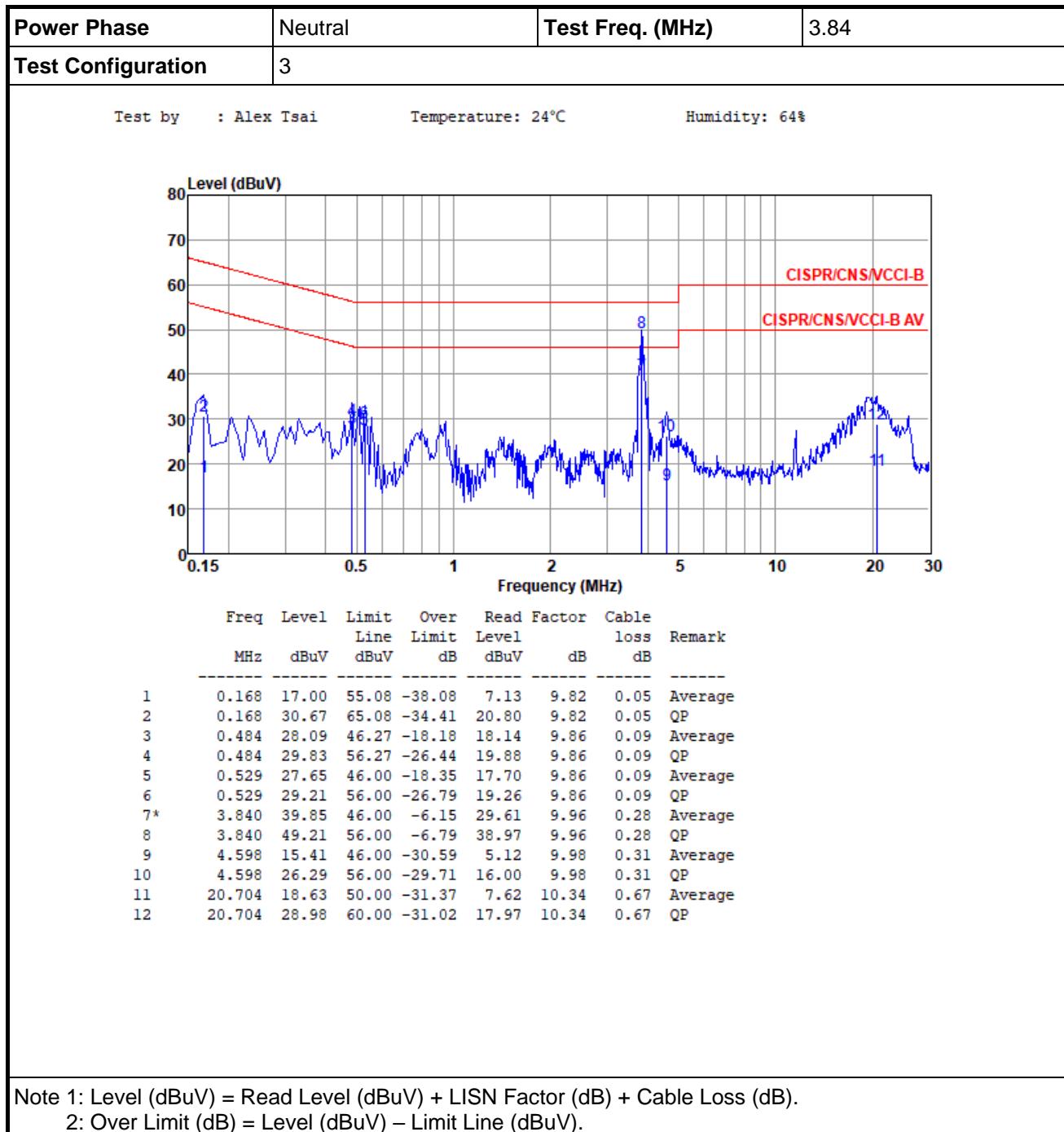
#### 3.1.3 Test Setup

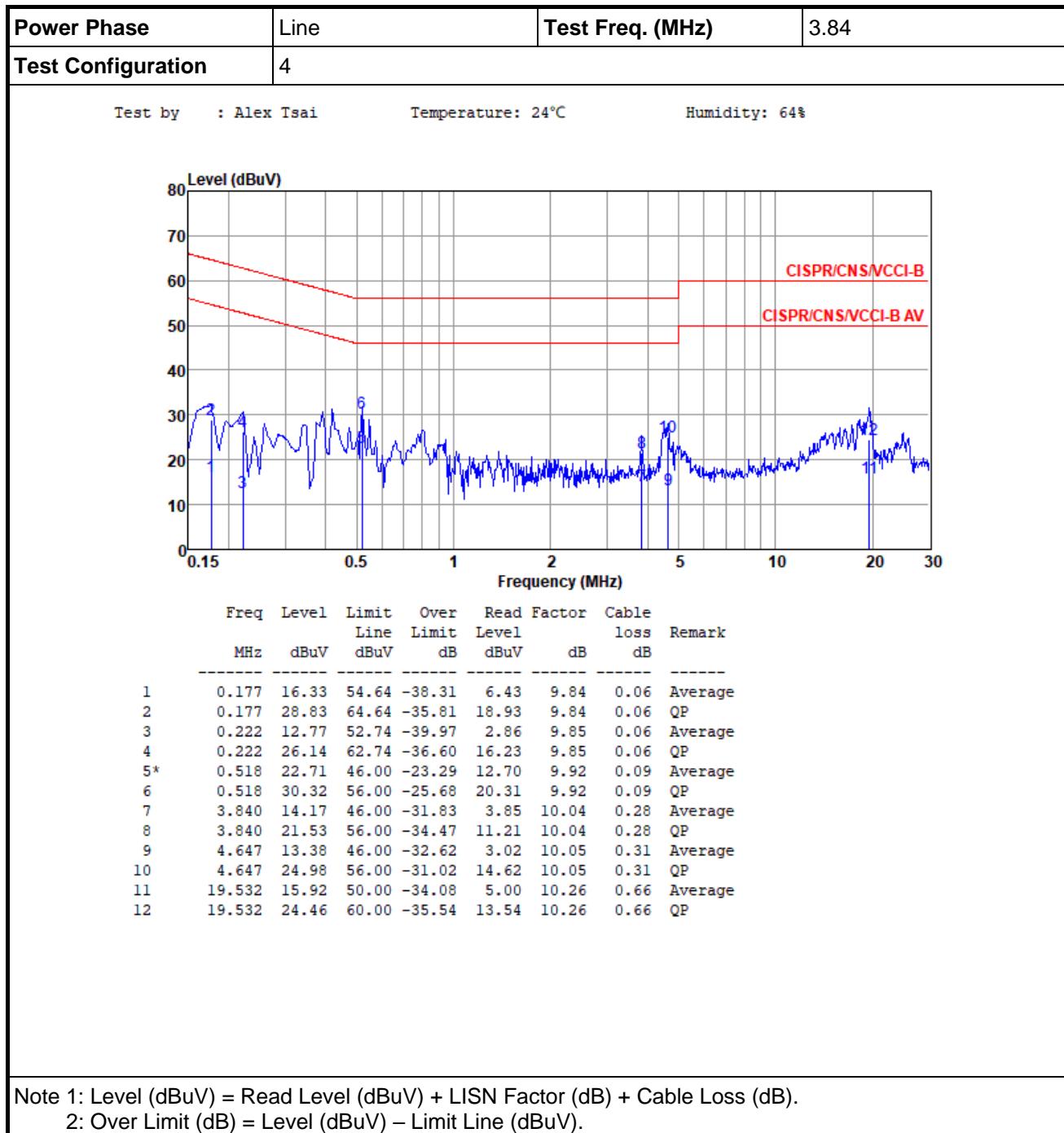


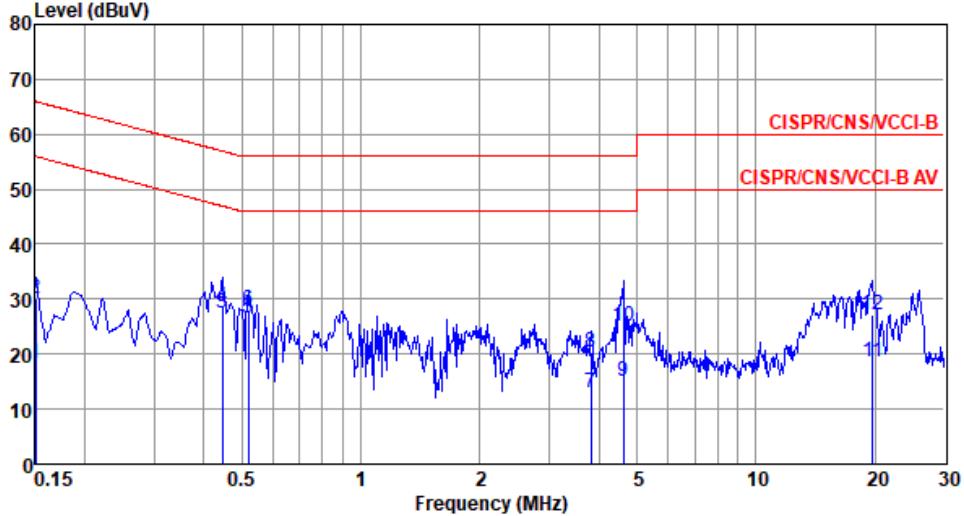
Note: 1. Support units were connected to second LISN.  
 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

### 3.1.4 Test Result of Conducted Emissions

<b>Power Phase</b>	Line	<b>Test Freq. (MHz)</b>	3.84																																																																																																																
<b>Test Configuration</b>	3																																																																																																																		
Test by	: Alex Tsai	Temperature: 24°C	Humidity: 64%																																																																																																																
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding-bottom: 2px;">Freq</th><th style="text-align: left; padding-bottom: 2px;">Level</th><th style="text-align: left; padding-bottom: 2px;">Limit</th><th style="text-align: left; padding-bottom: 2px;">Over</th><th style="text-align: left; padding-bottom: 2px;">Read</th><th style="text-align: left; padding-bottom: 2px;">Factor</th><th style="text-align: left; padding-bottom: 2px;">Cable</th><th></th></tr> <tr> <th style="text-align: left;">MHz</th><th style="text-align: left;">dBuV</th><th style="text-align: left;">dBuV</th><th style="text-align: left;">Line</th><th style="text-align: left;">Limit</th><th style="text-align: left;">Level</th><th style="text-align: left;">loss</th><th style="text-align: left;">Remark</th></tr> </thead> <tbody> <tr><td>1</td><td>0.150</td><td>16.91</td><td>56.00</td><td>-39.09</td><td>7.03</td><td>9.83</td><td>0.05 Average</td></tr> <tr><td>2</td><td>0.150</td><td>33.74</td><td>66.00</td><td>-32.26</td><td>23.86</td><td>9.83</td><td>0.05 QP</td></tr> <tr><td>3</td><td>0.529</td><td>21.53</td><td>46.00</td><td>-24.47</td><td>11.52</td><td>9.92</td><td>0.09 Average</td></tr> <tr><td>4</td><td>0.529</td><td>28.81</td><td>56.00</td><td>-27.19</td><td>18.80</td><td>9.92</td><td>0.09 QP</td></tr> <tr><td>5*</td><td>3.840</td><td>42.81</td><td>46.00</td><td>-3.19</td><td>32.49</td><td>10.04</td><td>0.28 Average</td></tr> <tr><td>6</td><td>3.840</td><td>52.05</td><td>56.00</td><td>-3.95</td><td>41.73</td><td>10.04</td><td>0.28 QP</td></tr> <tr><td>7</td><td>4.574</td><td>13.41</td><td>46.00</td><td>-32.59</td><td>3.05</td><td>10.05</td><td>0.31 Average</td></tr> <tr><td>8</td><td>4.574</td><td>22.74</td><td>56.00</td><td>-33.26</td><td>12.38</td><td>10.05</td><td>0.31 QP</td></tr> <tr><td>9</td><td>11.559</td><td>12.11</td><td>50.00</td><td>-37.89</td><td>1.50</td><td>10.14</td><td>0.47 Average</td></tr> <tr><td>10</td><td>11.559</td><td>20.01</td><td>60.00</td><td>-39.99</td><td>9.40</td><td>10.14</td><td>0.47 QP</td></tr> <tr><td>11</td><td>19.845</td><td>17.29</td><td>50.00</td><td>-32.71</td><td>6.36</td><td>10.26</td><td>0.67 Average</td></tr> <tr><td>12</td><td>19.845</td><td>25.13</td><td>60.00</td><td>-34.87</td><td>14.20</td><td>10.26</td><td>0.67 QP</td></tr> </tbody> </table>				Freq	Level	Limit	Over	Read	Factor	Cable		MHz	dBuV	dBuV	Line	Limit	Level	loss	Remark	1	0.150	16.91	56.00	-39.09	7.03	9.83	0.05 Average	2	0.150	33.74	66.00	-32.26	23.86	9.83	0.05 QP	3	0.529	21.53	46.00	-24.47	11.52	9.92	0.09 Average	4	0.529	28.81	56.00	-27.19	18.80	9.92	0.09 QP	5*	3.840	42.81	46.00	-3.19	32.49	10.04	0.28 Average	6	3.840	52.05	56.00	-3.95	41.73	10.04	0.28 QP	7	4.574	13.41	46.00	-32.59	3.05	10.05	0.31 Average	8	4.574	22.74	56.00	-33.26	12.38	10.05	0.31 QP	9	11.559	12.11	50.00	-37.89	1.50	10.14	0.47 Average	10	11.559	20.01	60.00	-39.99	9.40	10.14	0.47 QP	11	19.845	17.29	50.00	-32.71	6.36	10.26	0.67 Average	12	19.845	25.13	60.00	-34.87	14.20	10.26	0.67 QP
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Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB). Note 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).																																																																																																																			





<b>Power Phase</b>	Neutral	<b>Test Freq. (MHz)</b>	3.84																																																																																																																
<b>Test Configuration</b>	4																																																																																																																		
Test by : Alex Tsai      Temperature: 24°C      Humidity: 64%																																																																																																																			
																																																																																																																			
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Freq</th> <th style="text-align: left;">Level</th> <th style="text-align: left;">Limit</th> <th style="text-align: left;">Over</th> <th style="text-align: left;">Read</th> <th style="text-align: left;">Factor</th> <th style="text-align: left;">Cable</th> <th style="text-align: left;"> </th> </tr> <tr> <th style="text-align: left;">MHz</th> <th style="text-align: left;">dBuV</th> <th style="text-align: left;">dBuV</th> <th style="text-align: left;">Line</th> <th style="text-align: left;">Limit</th> <th style="text-align: left;">Level</th> <th style="text-align: left;">loss</th> <th style="text-align: left;">Remark</th> </tr> </thead> <tbody> <tr><td>1</td><td>0.150</td><td>18.22</td><td>56.00</td><td>-37.78</td><td>8.35</td><td>9.82</td><td>0.05 Average</td></tr> <tr><td>2</td><td>0.150</td><td>30.22</td><td>66.00</td><td>-35.78</td><td>20.35</td><td>9.82</td><td>0.05 QP</td></tr> <tr><td>3</td><td>0.447</td><td>27.41</td><td>46.93</td><td>-19.52</td><td>17.48</td><td>9.85</td><td>0.08 Average</td></tr> <tr><td>4</td><td>0.447</td><td>28.51</td><td>56.93</td><td>-28.42</td><td>18.58</td><td>9.85</td><td>0.08 QP</td></tr> <tr><td>5*</td><td>0.518</td><td>26.64</td><td>46.00</td><td>-19.36</td><td>16.69</td><td>9.86</td><td>0.09 Average</td></tr> <tr><td>6</td><td>0.518</td><td>27.96</td><td>56.00</td><td>-28.04</td><td>18.01</td><td>9.86</td><td>0.09 QP</td></tr> <tr><td>7</td><td>3.820</td><td>12.93</td><td>46.00</td><td>-33.07</td><td>2.69</td><td>9.96</td><td>0.28 Average</td></tr> <tr><td>8</td><td>3.820</td><td>20.45</td><td>56.00</td><td>-35.55</td><td>10.21</td><td>9.96</td><td>0.28 QP</td></tr> <tr><td>9</td><td>4.622</td><td>14.96</td><td>46.00</td><td>-31.04</td><td>4.67</td><td>9.98</td><td>0.31 Average</td></tr> <tr><td>10</td><td>4.622</td><td>25.10</td><td>56.00</td><td>-30.90</td><td>14.81</td><td>9.98</td><td>0.31 QP</td></tr> <tr><td>11</td><td>19.740</td><td>18.70</td><td>50.00</td><td>-31.30</td><td>7.71</td><td>10.32</td><td>0.67 Average</td></tr> <tr><td>12</td><td>19.740</td><td>27.25</td><td>60.00</td><td>-32.75</td><td>16.26</td><td>10.32</td><td>0.67 QP</td></tr> </tbody> </table>				Freq	Level	Limit	Over	Read	Factor	Cable		MHz	dBuV	dBuV	Line	Limit	Level	loss	Remark	1	0.150	18.22	56.00	-37.78	8.35	9.82	0.05 Average	2	0.150	30.22	66.00	-35.78	20.35	9.82	0.05 QP	3	0.447	27.41	46.93	-19.52	17.48	9.85	0.08 Average	4	0.447	28.51	56.93	-28.42	18.58	9.85	0.08 QP	5*	0.518	26.64	46.00	-19.36	16.69	9.86	0.09 Average	6	0.518	27.96	56.00	-28.04	18.01	9.86	0.09 QP	7	3.820	12.93	46.00	-33.07	2.69	9.96	0.28 Average	8	3.820	20.45	56.00	-35.55	10.21	9.96	0.28 QP	9	4.622	14.96	46.00	-31.04	4.67	9.98	0.31 Average	10	4.622	25.10	56.00	-30.90	14.81	9.98	0.31 QP	11	19.740	18.70	50.00	-31.30	7.71	10.32	0.67 Average	12	19.740	27.25	60.00	-32.75	16.26	10.32	0.67 QP
Freq	Level	Limit	Over	Read	Factor	Cable																																																																																																													
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Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB). Note 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).																																																																																																																			

## 3.2 6dB and Occupied Bandwidth

### 3.2.1 Test Procedures

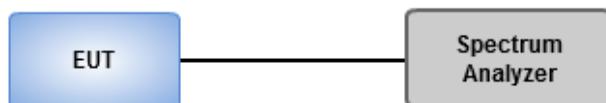
#### 6dB Bandwidth

1. Set resolution bandwidth (RBW) = 2 kHz, Video bandwidth = 10 kHz.
2. Detector = Peak, Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6dB relative to the maximum level measured in the fundamental emission.

#### Occupied Bandwidth

1. Set resolution bandwidth (RBW) = 1% ~ 5 % of OBW, Video bandwidth = 3 x RBW
2. Detector = Sample, Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Use the OBW measurement function of spectrum analyzer to measure the occupied bandwidth.

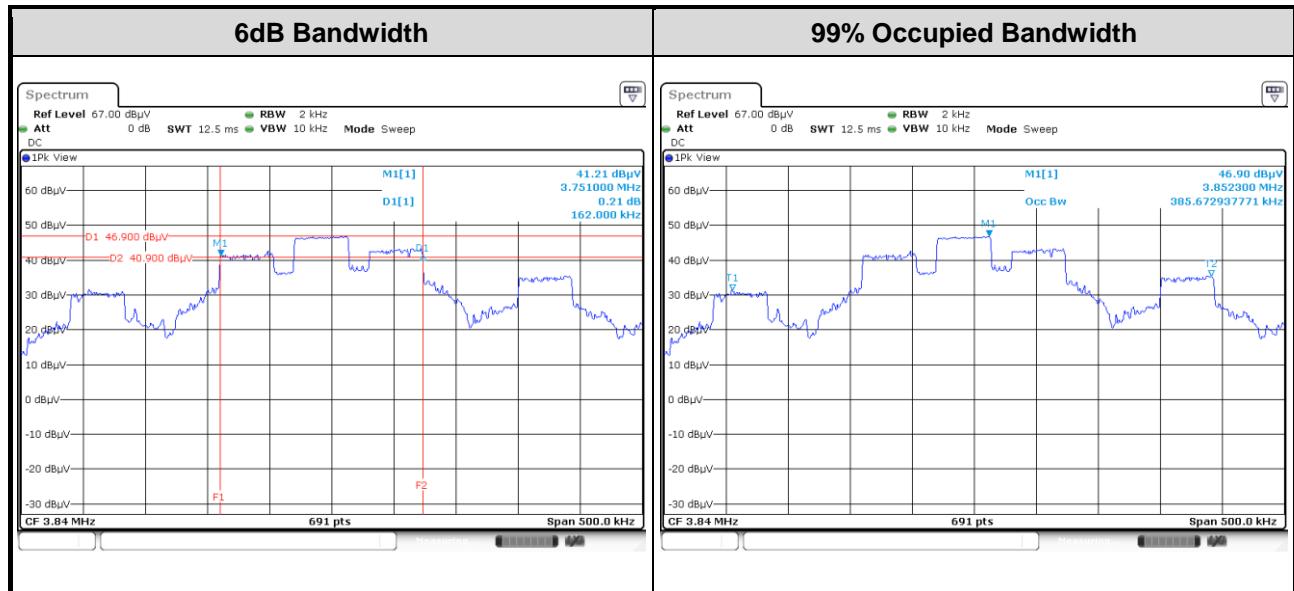
### 3.2.2 Test Setup



### 3.2.3 Test Result of 6dB and Occupied Bandwidth

Ambient Condition	26°C / 60%	Tested By	Aska Huang
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Freq. (MHz)	6dB Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
3.84	162.00	385.67



### 3.3 Radiated Emissions

#### 3.3.1 Limit of Radiated Emissions

##### Emission within the band 1.705-10.0 MHz

<input type="checkbox"/>	The field strength of any emission within the band 1.705-10.0 MHz shall not exceed 100 microvolts/meter at a distance of 30 meters
<input checked="" type="checkbox"/>	If the bandwidth of the emission is less than 10% of the center frequency, the field strength shall not exceed 15 microvolts/meter or (the bandwidth of the device in kHz) divided by (the center frequency of the device in MHz) microvolts/meter at a distance of 30 meters, whichever is the higher level.

##### Emissions outside of the band 1.705-10.0 MHz

The field strength of emissions outside of the band 1.705-10.0 MHz shall not exceed the general radiated emission limits as below.

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29.54	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

##### Note 1:

Quasi-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit

##### Note 2:

Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

#### Limit Extrapolation

Measurement distance below 30 MHz is not at 30 meters thus the limit is extrapolated as below formula

$$FS_{\text{limit}} = FS_{\text{max}} - 40 \log\left(\frac{d_{\text{near field}}}{d_{\text{measure}}}\right) - 20 \log\left(\frac{d_{\text{limit}}}{d_{\text{near field}}}\right)$$

$FS_{\text{limit}}$  is the calculation of field strength at the limit distance, expressed in dB $\mu$ V/m

$FS_{\text{max}}$  is the measured field strength, expressed in dB $\mu$ V/m

$d_{\text{near field}}$  is the  $\lambda/2\pi$  distance

$d_{\text{measure}}$  is the distance of the measurement point from the EUT

$d_{\text{limit}}$  is the reference limit distance

### 3.3.2 Test Procedures

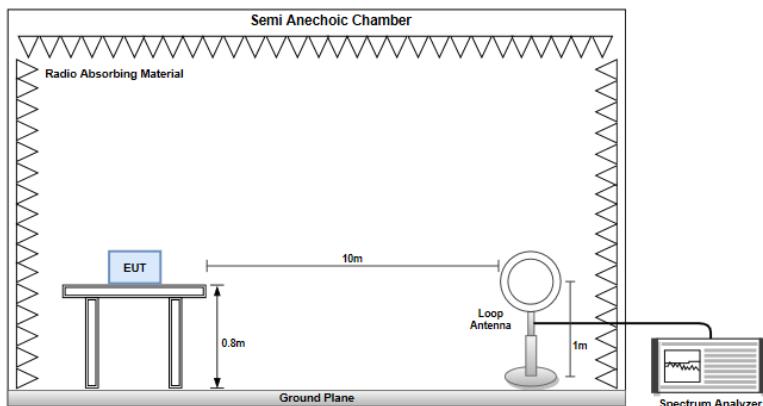
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at a height of 0.8 m test table above the ground plane.
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m or 10 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

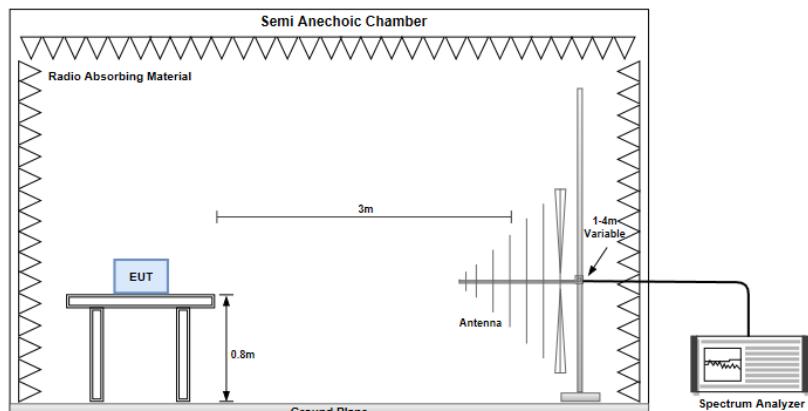
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.

### 3.3.3 Test Setup

#### Radiated Emissions below 30MHz



#### Radiated Emissions below 1 GHz



### 3.3.4 Transmitter Radiated Unwanted Emissions (Below 30MHz)

Ambient Condition	24°C / 63%	Tested By	Joy Zheng
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**Test Configuration 1: Ferrite coil antenna, battery mode**

Main frequency - Loop Pol. open						
Emission Freq. (MHz)	Emission Level (dBuV/m)	FS max Limit (dBuV/m)	Margin (dB)	SA Reading (dBuV)	Factor	Remark
3.84	28.25	43.94	-15.69	8	20.25	Average
3.84	39.87	63.94	-24.07	19.62	20.25	Peak

Main frequency - Loop Pol. close						
Emission Freq. (MHz)	Emission Level (dBuV/m)	FS max Limit (dBuV/m)	Margin (dB)	SA Reading (dBuV)	Factor	Remark
3.84	29.75	43.94	-14.19	9.5	20.25	Average
3.84	41.98	63.94	-21.96	21.73	20.25	Peak

FCC Emission - Loop Pol. open						
Emission Freq. (MHz)	Emission Level (dBuV/m)	FS max Limit (dBuV/m)	Margin (dB)	SA Reading (dBuV)	Factor	Remark
7.68	26.99	39.08	-12.09	5.41	21.58	QP
11.52	27.21	39.08	-11.87	4.75	22.46	QP

FCC Emission - Loop Pol. close						
Emission Freq. (MHz)	Emission Level (dBuV/m)	FS max Limit (dBuV/m)	Margin (dB)	SA Reading (dBuV)	Factor	Remark
7.68	26.96	39.08	-12.12	5.38	21.58	QP
11.52	27.07	39.08	-12.01	4.61	22.46	QP

**Test Configuration 2: Neckloop antenna, battery mode**

Main frequency - Loop Pol. open						
Emission Freq. (MHz)	Emission Level (dBuV/m)	FS max Limit (dBuV/m)	Margin (dB)	SA Reading (dBuV)	Factor	Remark
3.84	27.55	43.94	-16.39	7.3	20.25	Average
3.84	38.24	63.94	-25.7	17.99	20.25	Peak

Main frequency - Loop Pol. close						
Emission Freq. (MHz)	Emission Level (dBuV/m)	FS max Limit (dBuV/m)	Margin (dB)	SA Reading (dBuV)	Factor	Remark
3.84	27.45	43.94	-16.49	7.2	20.25	Average
3.84	39.08	63.94	-24.86	18.83	20.25	Peak

FCC Emission - Loop Pol. open						
Emission Freq. (MHz)	Emission Level (dBuV/m)	FS max Limit (dBuV/m)	Margin (dB)	SA Reading (dBuV)	Factor	Remark
7.68	27.14	39.08	-11.94	5.56	21.58	QP
11.52	27.27	39.08	-11.81	4.81	22.46	QP

FCC Emission - Loop Pol. close						
Emission Freq. (MHz)	Emission Level (dBuV/m)	FS max Limit (dBuV/m)	Margin (dB)	SA Reading (dBuV)	Factor	Remark
7.68	26.86	39.08	-12.22	5.28	21.58	QP
11.52	27.13	39.08	-11.95	4.67	22.46	QP

**Test Configuration 3: Ferrite coil antenna, adapter mode**

Main frequency - Loop Pol. open						
Emission Freq. (MHz)	Emission Level (dBuV/m)	FS max Limit (dBuV/m)	Margin (dB)	SA Reading (dBuV)	Factor	Remark
3.84	28.45	43.94	-15.49	8.2	20.25	Average
3.84	40.4	63.94	-23.54	20.15	20.25	Peak

Main frequency - Loop Pol. close						
Emission Freq. (MHz)	Emission Level (dBuV/m)	FS max Limit (dBuV/m)	Margin (dB)	SA Reading (dBuV)	Factor	Remark
3.84	29.96	43.94	-13.98	9.71	20.25	Average
3.84	41.2	63.94	-22.74	20.95	20.25	Peak

FCC Emission - Loop Pol. open						
Emission Freq. (MHz)	Emission Level (dBuV/m)	FS max Limit (dBuV/m)	Margin (dB)	SA Reading (dBuV)	Factor	Remark
7.68	27.26	39.08	-11.82	5.68	21.58	QP
11.52	27.19	39.08	-11.89	4.73	22.46	QP

FCC Emission - Loop Pol. close						
Emission Freq. (MHz)	Emission Level (dBuV/m)	FS max Limit (dBuV/m)	Margin (dB)	SA Reading (dBuV)	Factor	Remark
7.68	27.02	39.08	-12.06	5.44	21.58	QP
11.52	27.31	39.08	-11.77	4.85	22.46	QP

**Test Configuration 4: Neckloop antenna, adapter mode**

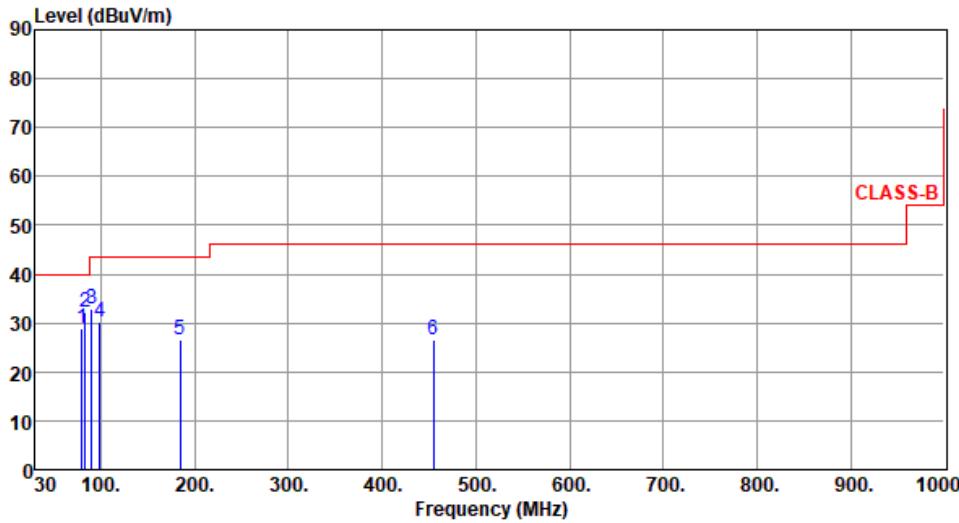
Main frequency - Loop Pol. open						
Emission Freq. (MHz)	Emission Level (dBuV/m)	FS max Limit (dBuV/m)	Margin (dB)	SA Reading (dBuV)	Factor	Remark
3.84	25.95	43.94	-17.99	5.7	20.25	Average
3.84	39.02	63.94	-24.92	18.77	20.25	Peak

Main frequency - Loop Pol. close						
Emission Freq. (MHz)	Emission Level (dBuV/m)	FS max Limit (dBuV/m)	Margin (dB)	SA Reading (dBuV)	Factor	Remark
3.84	25.71	43.94	-18.23	5.46	20.25	Average
3.84	38.86	63.94	-25.08	18.61	20.25	Peak

FCC Emission - Loop Pol. open						
Emission Freq. (MHz)	Emission Level (dBuV/m)	FS max Limit (dBuV/m)	Margin (dB)	SA Reading (dBuV)	Factor	Remark
7.68	27.13	39.08	-11.95	5.55	21.58	QP
11.52	26.89	39.08	-12.19	4.43	22.46	QP

FCC Emission - Loop Pol. close						
Emission Freq. (MHz)	Emission Level (dBuV/m)	FS max Limit (dBuV/m)	Margin (dB)	SA Reading (dBuV)	Factor	Remark
7.68	27.13	39.08	-11.95	5.55	21.58	QP
11.52	26.89	39.08	-12.19	4.43	22.46	QP

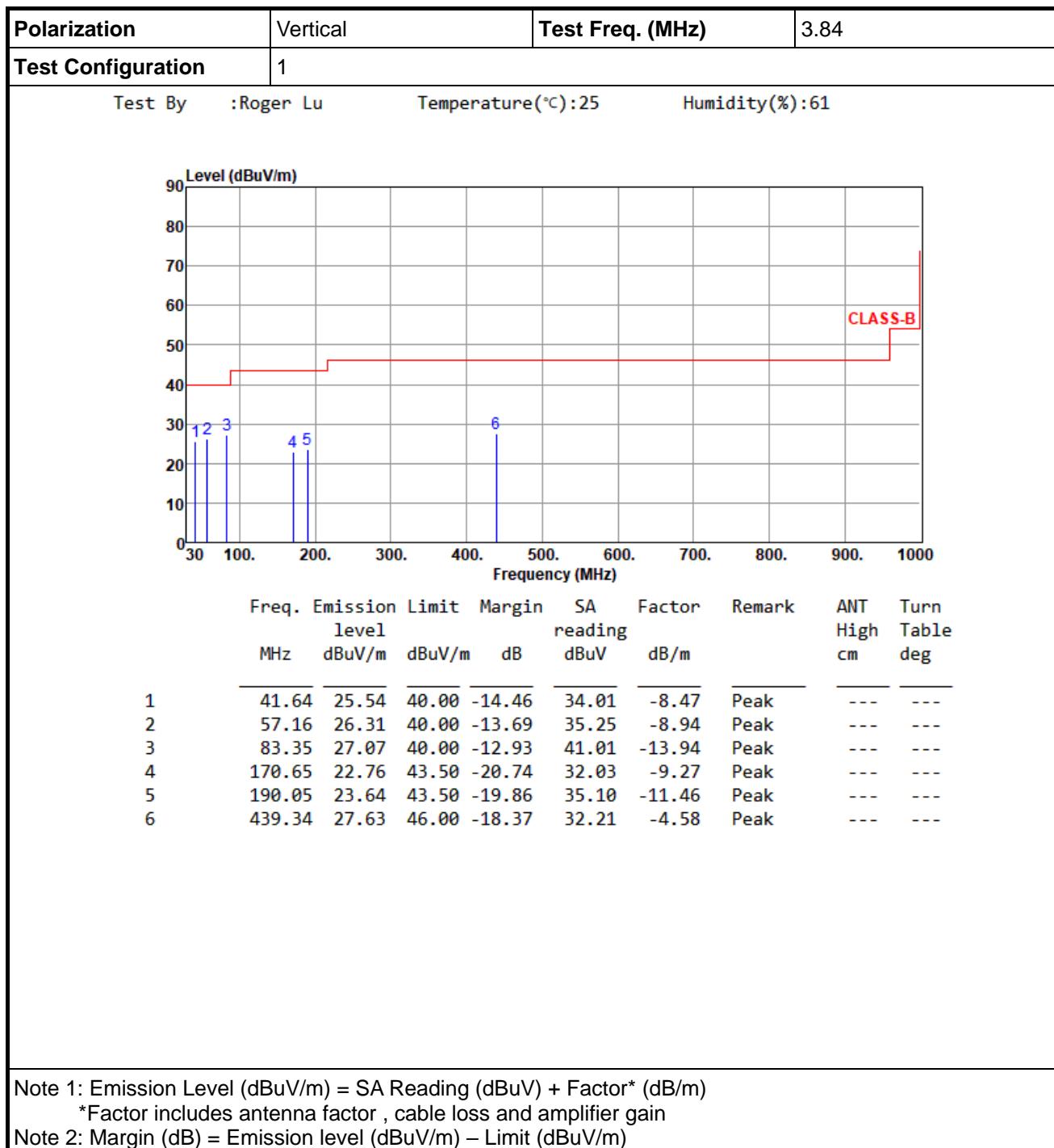
### 3.3.5 Transmitter Radiated Unwanted Emissions (Above 30MHz)

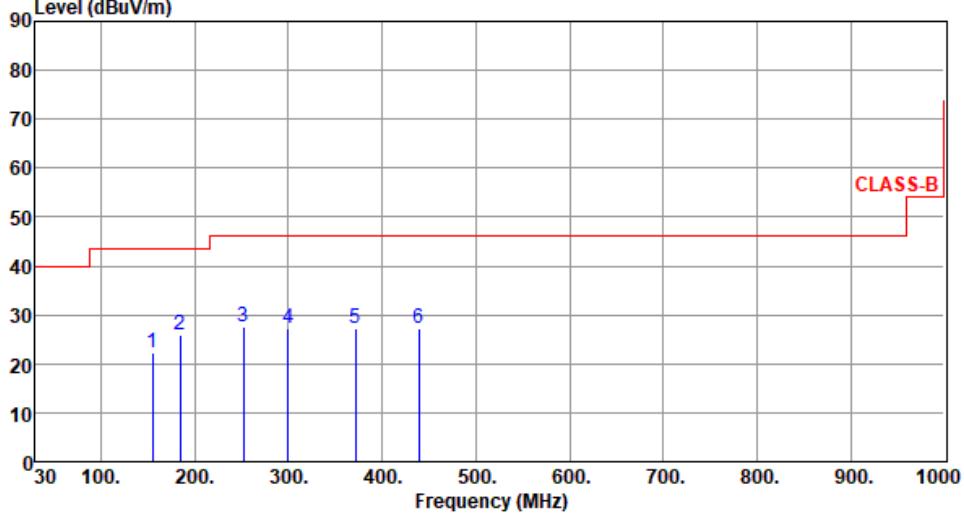
<b>Polarization</b>	Horizontal	<b>Test Freq. (MHz)</b>	3.84																																																																								
<b>Test Configuration</b>	1																																																																										
Test By	: Roger Lu	Temperature (°C): 25	Humidity (%): 61																																																																								
																																																																											
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding-bottom: 2px;">Freq.</th> <th style="text-align: left; padding-bottom: 2px;">Emission</th> <th style="text-align: left; padding-bottom: 2px;">Limit</th> <th style="text-align: left; padding-bottom: 2px;">Margin</th> <th style="text-align: left; padding-bottom: 2px;">SA</th> <th style="text-align: left; padding-bottom: 2px;">Factor</th> <th style="text-align: left; padding-bottom: 2px;">Remark</th> <th style="text-align: left; padding-bottom: 2px;">ANT</th> <th style="text-align: left; padding-bottom: 2px;">Turn</th> </tr> <tr> <th style="text-align: left;">MHz</th> <th style="text-align: left;">level</th> <th style="text-align: left;">dBuV/m</th> <th style="text-align: left;">dB</th> <th style="text-align: left;">reading</th> <th style="text-align: left;">dBuV</th> <th style="text-align: left;">dB/m</th> <th style="text-align: left;">High</th> <th style="text-align: left;">Table</th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">1</td> <td style="text-align: left;">79.47</td> <td style="text-align: left;">29.02</td> <td style="text-align: left;">40.00</td> <td style="text-align: left;">-10.98</td> <td style="text-align: left;">42.16</td> <td style="text-align: left;">-13.14</td> <td style="text-align: left;">Peak</td> <td style="text-align: left;">---</td> </tr> <tr> <td style="text-align: left;">2</td> <td style="text-align: left;">83.35</td> <td style="text-align: left;">32.12</td> <td style="text-align: left;">40.00</td> <td style="text-align: left;">-7.88</td> <td style="text-align: left;">46.06</td> <td style="text-align: left;">-13.94</td> <td style="text-align: left;">Peak</td> <td style="text-align: left;">---</td> </tr> <tr> <td style="text-align: left;">3</td> <td style="text-align: left;">90.14</td> <td style="text-align: left;">32.86</td> <td style="text-align: left;">43.50</td> <td style="text-align: left;">-10.64</td> <td style="text-align: left;">47.43</td> <td style="text-align: left;">-14.57</td> <td style="text-align: left;">Peak</td> <td style="text-align: left;">---</td> </tr> <tr> <td style="text-align: left;">4</td> <td style="text-align: left;">98.87</td> <td style="text-align: left;">30.14</td> <td style="text-align: left;">43.50</td> <td style="text-align: left;">-13.36</td> <td style="text-align: left;">43.92</td> <td style="text-align: left;">-13.78</td> <td style="text-align: left;">Peak</td> <td style="text-align: left;">---</td> </tr> <tr> <td style="text-align: left;">5</td> <td style="text-align: left;">184.23</td> <td style="text-align: left;">26.48</td> <td style="text-align: left;">43.50</td> <td style="text-align: left;">-17.02</td> <td style="text-align: left;">37.27</td> <td style="text-align: left;">-10.79</td> <td style="text-align: left;">Peak</td> <td style="text-align: left;">---</td> </tr> <tr> <td style="text-align: left;">6</td> <td style="text-align: left;">454.86</td> <td style="text-align: left;">26.63</td> <td style="text-align: left;">46.00</td> <td style="text-align: left;">-19.37</td> <td style="text-align: left;">30.75</td> <td style="text-align: left;">-4.12</td> <td style="text-align: left;">Peak</td> <td style="text-align: left;">---</td> </tr> </tbody> </table>				Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn	MHz	level	dBuV/m	dB	reading	dBuV	dB/m	High	Table	1	79.47	29.02	40.00	-10.98	42.16	-13.14	Peak	---	2	83.35	32.12	40.00	-7.88	46.06	-13.94	Peak	---	3	90.14	32.86	43.50	-10.64	47.43	-14.57	Peak	---	4	98.87	30.14	43.50	-13.36	43.92	-13.78	Peak	---	5	184.23	26.48	43.50	-17.02	37.27	-10.79	Peak	---	6	454.86	26.63	46.00	-19.37	30.75	-4.12	Peak	---
Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn																																																																			
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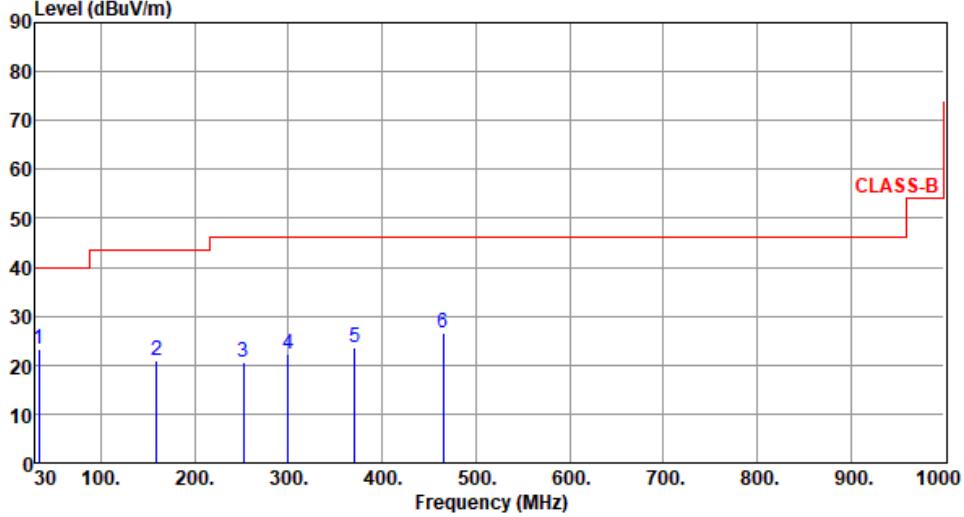
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor\* (dB/m)

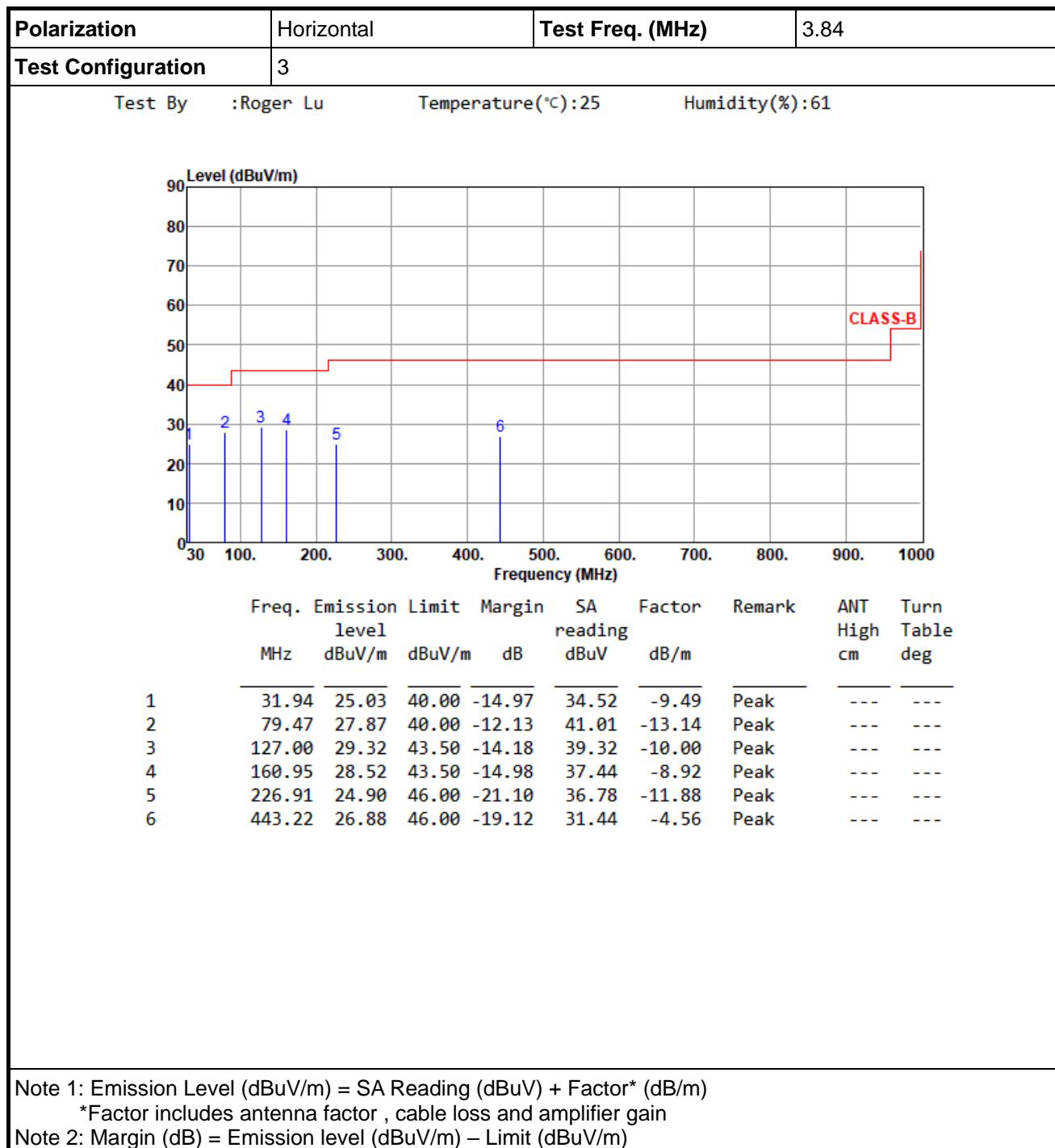
\*Factor includes antenna factor, cable loss and amplifier gain

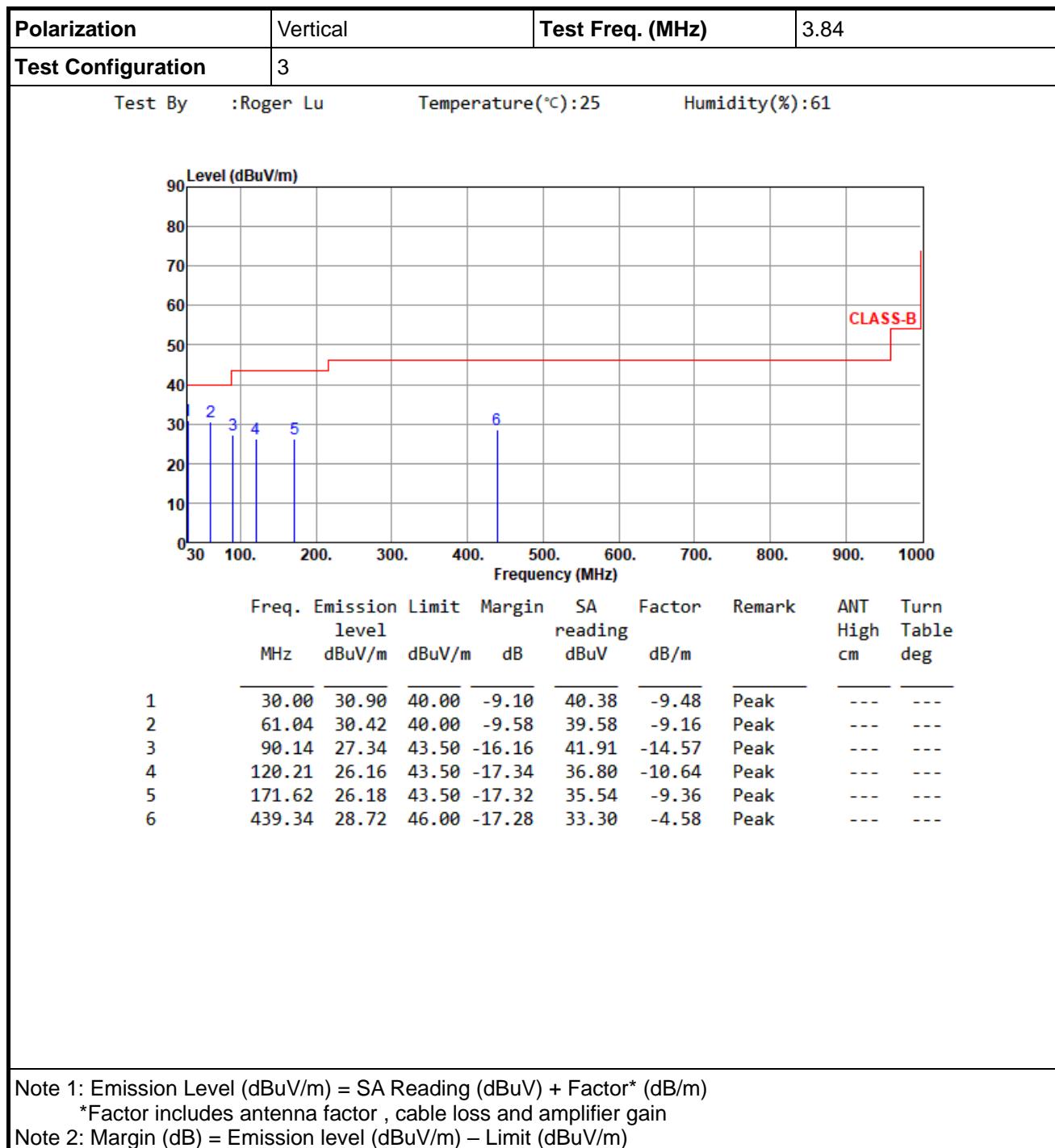
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m)

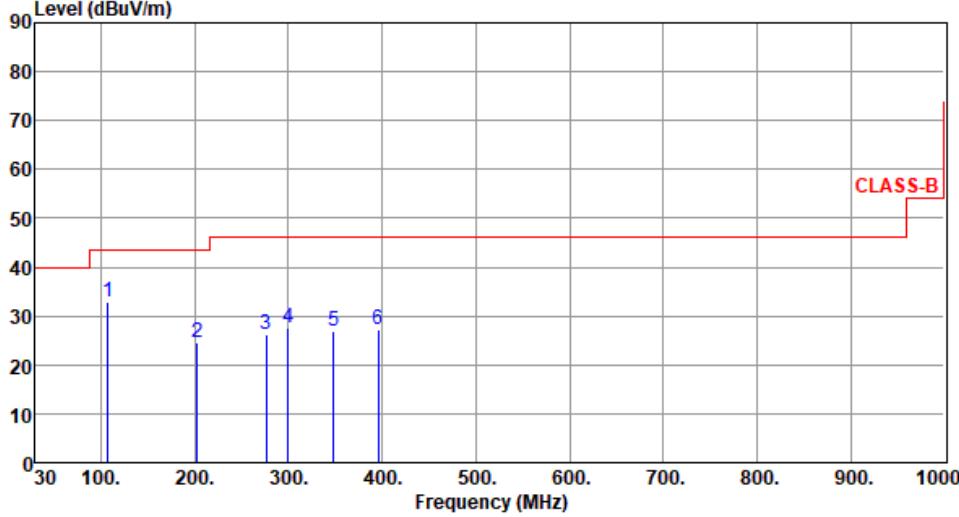


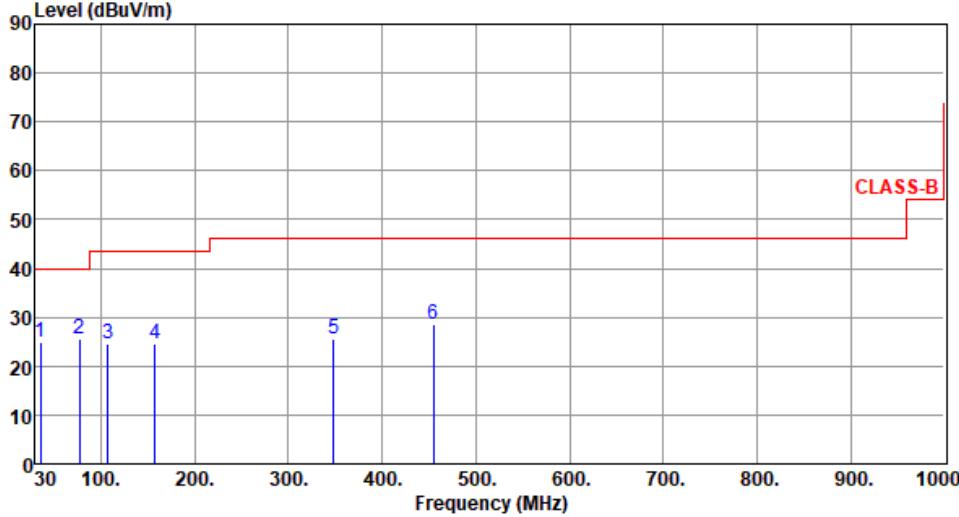
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## 4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corporation (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website <http://www.icertifi.com.tw>.

### Linkou

Tel: 886-2-2601-1640  
No.30-2, Ding Fwu Tsuen, Lin Kou  
District, New Taipei City, Taiwan  
(R.O.C.)

### Kwei Shan

Tel: 886-3-271-8666  
No.3-1, Lane 6, Wen San 3rd  
St., Kwei Shan Dist., Tao Yuan  
City 33381, Taiwan (R.O.C.)  
No.2-1, Lane 6, Wen San 3rd  
St., Kwei Shan Dist., Tao Yuan  
City 33381, Taiwan (R.O.C.)

### Kwei Shan Site II

Tel: 886-3-271-8640  
No.14-1, Lane 19, Wen San 3rd  
St., Kwei Shan Dist., Tao Yuan  
City 333, Taiwan (R.O.C.)

If you have any suggestion, please feel free to contact us as below information.

Tel: 886-3-271-8666  
Fax: 886-3-318-0345  
Email: ICC\_Service@icertifi.com.tw

—END—