

# FCC C2PC Test Report

**FCC ID** : SQG-MSD45N  
**Equipment** : 45 Series Pluggable module  
**Model No.** : MSD45N  
**Brand Name** : Laird Technologies  
**Applicant** : Laird Technologies  
**Address** : 11160 Thompson Ave. / Lenexa, Kansas /  
66219 / USA  
**Standard** : 47 CFR FCC Part 15.407  
**Received Date** : Jun. 03, 2015  
**Tested Date** : Jul. 31 ~ Aug. 17, 2015

We, International Certification Corp., 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.

Approved & Reviewed by:

  
\_\_\_\_\_  
Gary Chang / Manager



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## Release Record

Report No.	Version	Description	Issued Date
FR371704-01AN	Rev. 01	Initial issue	Sep. 04, 2015

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## Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.479MHz 31.73 (Margin -14.63dB) - AV	Pass
15.407(b) 15.209	Radiated Emissions	[dBuV/m at 3m]: 5725.00MHz 52.19 (Margin -1.81dB) - AV	Pass

# 1 General Description

## 1.1 Information

This report is prepared for FCC class II permissive change.

This report is issued as a supplementary report to original ICC report no. FR371704AN. The modification is concerned with following:

- ✧ Complying with New U-NII rule requirement.
- ✧ Additional Dipole antennas.

For original antennas

Test for original antennas are not required since output power is not changed for all bands.

For additional antennas

Only conducted emission and radiated emission tests for 5470-5725 MHz band had been tested and presented in following section since antenna gain in 5470~5725MHz band is higher than original antenna.

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

RF General Information					
Frequency Range (MHz)	IEEE Std. 802.11	Ch. Freq. (MHz)	Channel Number	Transmit Chains (N <sub>TX</sub> )	Data Rate / MCS
5150-5250 5250-5350 5470-5725	a	5180-5240 5260-5320 5500-5700	36-48 [4] 52-64 [4] 100-140 [8]	1	6-54 Mbps
5150-5250 5250-5350 5470-5725	n (HT20)	5180-5240 5260-5320 5500-5700	36-48 [4] 52-64 [4] 100-140 [8]	1	MCS 0-7

Note 1: RF output power specifies that Maximum Conducted Output Power.  
 Note 2: 802.11a/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.  
 Note 3: 802.11n supports HT20 only.

### 1.1.2 Antenna Details (The additional antenna were marked in boldface.)

Ant. No.	Brand /Model	Type	Connector	Operating Frequencies (MHz) / Antenna Gain (dBi)				
				2400~2483.5	5150~5250	5250~5350	5470~5725	5725~5850
1	MAG.LAYERS EDA-1513-25GR2-B2-CY	Dipole	SMA Jack Reverse	2	2	2	2	2
2	MAG.LAYERS PCA-4606-2G4C1-A13-CY	PCB Dipole	UFL	2.21	2.21	2.21	2.21	2.21
3	Larid NanoBlade-IP04	PCB Dipole	UFL	2	3.9	3.9	4	4
4	Larid MAF95310 Mini NanoBlade Flex	PCB Dipole	UFL	2.79	3.38	3.38	3.38	3.38
5	Larid NanoBlue-IP04	PCB Dipole	UFL	2	---	---	---	---
6	Ethertronics WLAN_1000146	PIFA	UFL	2.5	3.5	3.5	3.5	3.5
7	<b>SAA MG7018-41-000-R</b>	<b>Dipole</b>	<b>UFL</b>	<b>1.87</b>	<b>0.85</b>	<b>0.6</b>	<b>0.94</b>	<b>0.92</b>
8	<b>SAA MG7324-41-000-R</b>	<b>Dipole</b>	<b>UFL</b>	<b>1.32</b>	<b>1.04</b>	<b>1.6</b>	<b>2.75</b>	<b>2.24</b>

Note: The additional antenna with highest gain is selected for final testing.

### 1.1.3 Power Supply Type of Equipment under Test (EUT)

<b>Power Supply Type</b>	3.3Vdc from host
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### 1.1.4 Accessories

N/A

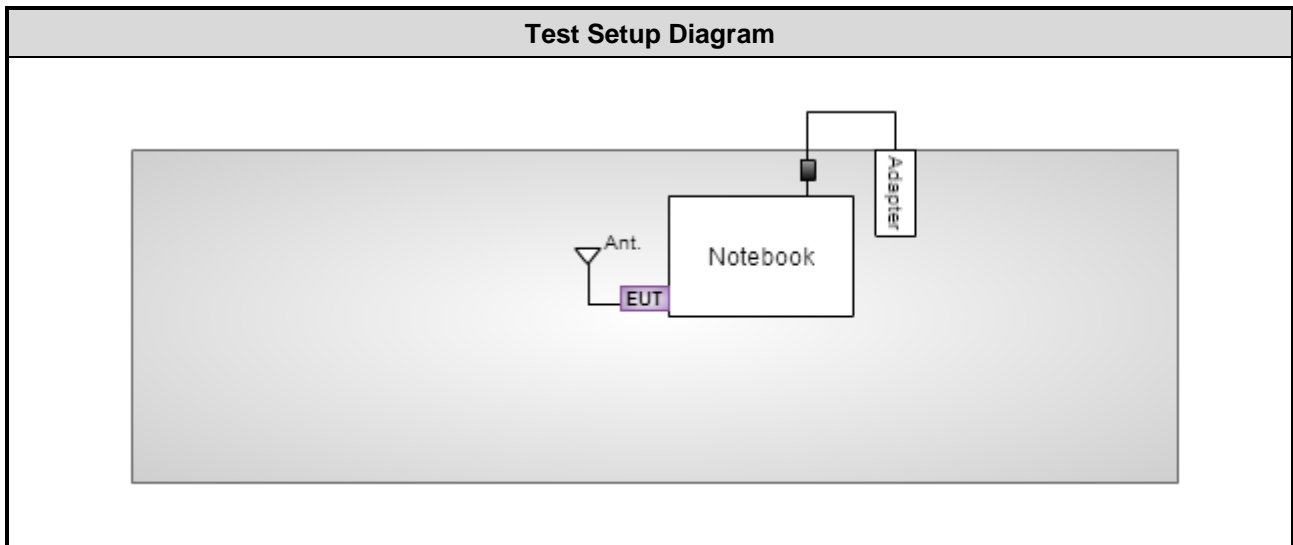
### 1.1.5 Channel List

Frequency band (MHz)	
802.11 a / n HT20	
Channel	Frequency(MHz)
36	5180
40	5200
44	5220
48	5240
52	5260
56	5280
60	5300
64	5320
100	5500
104	5520
108	5540
112	5560
116	5580
132	5660
136	5680
140	5700

## 1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	S/N	Signal cable / Length (m)
1	Notebook	DELL	Latitude E6430	F2JB4X1	---

## 1.3 Test Setup Chart





## 1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
EMC Receiver	R&S	ESCS 30	100169	Oct. 17, 2014	Oct. 16, 2015
LISN	SCHWARZBECK	Schwarzbeck 8127	8127-667	Nov. 17, 2014	Nov. 16, 2015
LISN (Support Unit)	SCHWARZBECK	Schwarzbeck 8127	8127-666	Nov. 26, 2014	Nov. 25, 2015
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Dec. 31, 2014	Dec. 30, 2015
50 ohm terminal (Support Unit)	NA	50	04	Apr. 15, 2015	Apr. 14, 2016
Measurement Software	AUDIX	e3	6.120210k	NA	NA

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

Test Item	Radiated Emission				
Test Site	966 chamber 2 / (03CH02-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101499	Dec. 31, 2014	Dec. 30, 2015
Receiver	R&S	ESR3	101657	Jan. 15, 2015	Jan. 14, 2016
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-524	Oct. 16, 2014	Oct. 15, 2015
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1095	Oct. 14, 2014	Oct. 13, 2015
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 10, 2014	Nov. 09, 2015
Loop Antenna	R&S	HFH2-Z2	11900	Nov. 10, 2014	Nov. 09, 2015
Preamplifier	Burgeon	BPA-530	100218	Nov. 10, 2014	Nov. 09, 2015
Preamplifier	Agilent	83017A	MY39501309	Sep. 29, 2014	Sep. 28, 2015
Preamplifier	EMC	EMC184045B	980192	Aug. 26, 2014	Aug. 25, 2015
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16140/4	Dec. 16, 2014	Dec. 15, 2015
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16018/4	Dec. 16, 2014	Dec. 15, 2015
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16015/4	Dec. 16, 2014	Dec. 15, 2015
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-003	Dec. 16, 2014	Dec. 15, 2015
LF cable 10M	Woken	CFD400NL-LW	CFD400NL-004	Dec. 16, 2014	Dec. 15, 2015
Measurement Software	AUDIX	e3	6.120210g	NA	NA

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

## 1.5 Testing Applied Standards

According to the specification of EUT, the EUT must comply with following standards and KDB documents.

47 CFR FCC Part 15.407

ANSI C63.10-2013

FCC KDB 789033 D02 General UNII Test Procedures New Rules v01

FCC KDB 644545 D03 Guidance for IEEE 802 11ac New Rules v01

FCC KDB 412172 D01 Determining ERP and EIRP v01r01

## 1.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

Measurement Uncertainty	
Parameters	Uncertainty
Conducted emission	±2.670 dB
AC conducted emission	±2.92 dB
Radiated emission ≤ 1GHz	±3.62 dB
Radiated emission > 1GHz	±5.6 dB

## 2 Test Configuration

### 2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	21°C / 60%	Kevin Ma
Radiated Emissions	03CH02-WS	21-25°C / 61-65%	Anderson Hung Aska Huang Morgan Chen

➤ FCC site registration No.: 657002

➤ IC site registration No.: 10807A-2

### 2.2 The Worst Test Modes and Channel Details

Test item	Modulation Mode	Test Frequency (MHz)	Data Rate (Mbps) / MCS	Test Configuration
Conducted Emissions	11a	5580	6 Mbps	---
Radiated Emissions ≤1GHz	11a	5580	6 Mbps	---
Radiated Emissions >1GHz	11a	5500 / 5580 / 5700	6 Mbps	---
	HT20	5500 / 5580 / 5700	MCS 0	---

## 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  $\Omega$  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



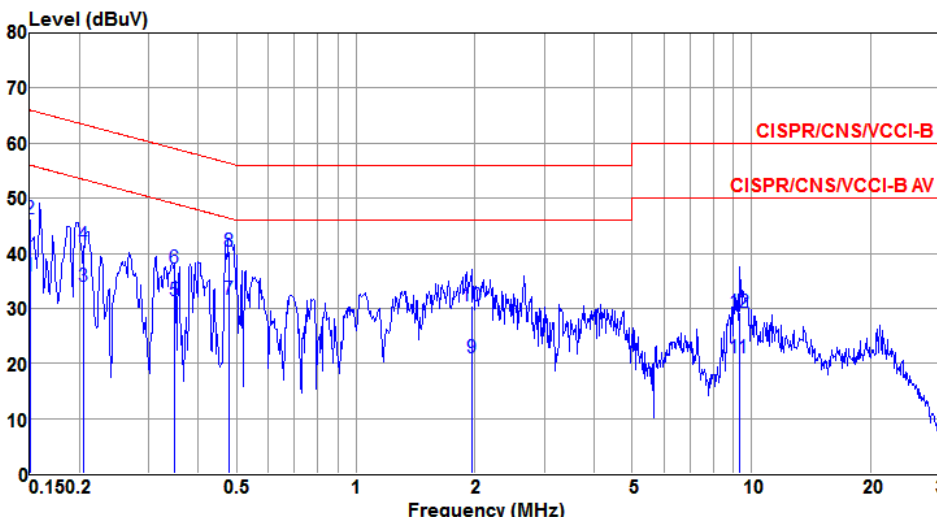
Note: 1. Support units were connected to second LISN.

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

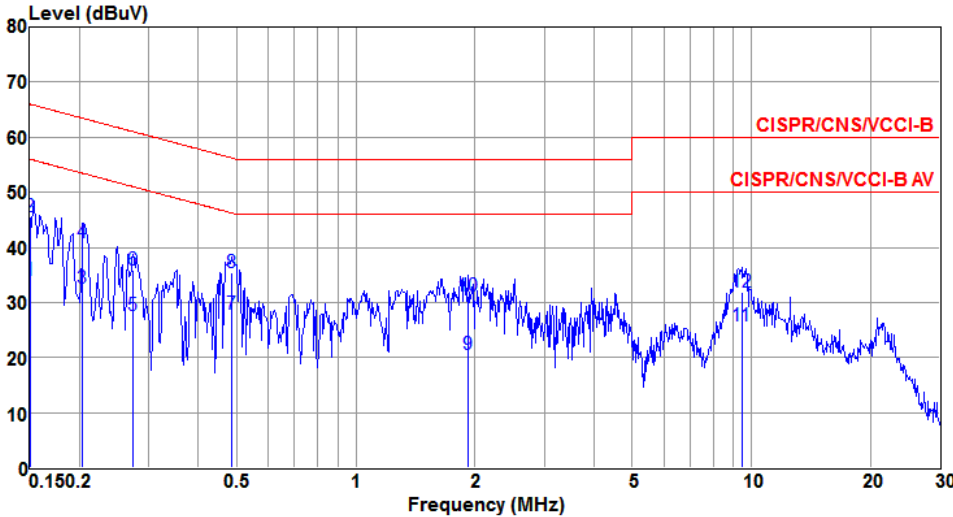
<b>Modulation</b>	11a	<b>Test Freq. (MHz)</b>	5580
<b>Power Phase</b>	Line		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.150	35.87	56.00	-20.13	35.72	0.07	0.08	Average
2	0.150	46.17	66.00	-19.83	46.02	0.07	0.08	QP
3	0.205	33.97	53.41	-19.44	33.81	0.07	0.09	Average
4	0.205	41.56	63.41	-21.85	41.40	0.07	0.09	QP
5	0.347	31.44	49.04	-17.60	31.26	0.07	0.11	Average
6	0.347	37.21	59.04	-21.83	37.03	0.07	0.11	QP
7*	0.479	31.73	46.36	-14.63	31.54	0.07	0.12	Average
8	0.479	40.44	56.36	-15.92	40.25	0.07	0.12	QP
9	1.959	20.99	46.00	-25.01	20.65	0.10	0.24	Average
10	1.959	30.47	56.00	-25.53	30.13	0.10	0.24	QP
11	9.302	20.94	50.00	-29.06	20.44	0.20	0.30	Average
12	9.302	29.38	60.00	-30.62	28.88	0.20	0.30	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).  
 Note 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

<b>Modulation</b>	11a	<b>Test Freq. (MHz)</b>	5580																																																																																																																					
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 <p>The graph displays the measured electromagnetic interference level in dBuV across a frequency range from 0.1502 MHz to 30 MHz. Two red lines represent the CISPR/CNS/VCCI-B and CISPR/CNS/VCCI-B AV limits. The measured signal (blue line) shows several peaks, with the highest being at 0.150 MHz (45.66 dBuV) and 0.204 MHz (40.94 dBuV). The signal generally stays below the limits, with a notable peak at 9.451 MHz (31.88 dBuV) which is below the 50 dBuV limit.</p>																																																																																																																								
<table border="1"> <thead> <tr> <th></th> <th>Freq MHz</th> <th>Level dBuV</th> <th>Limit Line dBuV</th> <th>Over Limit dB</th> <th>Read Level dBuV</th> <th>LISN factor dB</th> <th>cable loss dB</th> <th>Remark</th> </tr> </thead> <tbody> <tr><td>1</td><td>0.150</td><td>34.10</td><td>56.00</td><td>-21.90</td><td>33.95</td><td>0.07</td><td>0.08</td><td>Average</td></tr> <tr><td>2</td><td>0.150</td><td>45.66</td><td>66.00</td><td>-20.34</td><td>45.51</td><td>0.07</td><td>0.08</td><td>QP</td></tr> <tr><td>3</td><td>0.204</td><td>32.51</td><td>53.45</td><td>-20.94</td><td>32.35</td><td>0.07</td><td>0.09</td><td>Average</td></tr> <tr><td>4</td><td>0.204</td><td>40.94</td><td>63.45</td><td>-22.51</td><td>40.78</td><td>0.07</td><td>0.09</td><td>QP</td></tr> <tr><td>5</td><td>0.273</td><td>27.52</td><td>51.03</td><td>-23.51</td><td>27.35</td><td>0.07</td><td>0.10</td><td>Average</td></tr> <tr><td>6</td><td>0.273</td><td>35.97</td><td>61.03</td><td>-25.06</td><td>35.80</td><td>0.07</td><td>0.10</td><td>QP</td></tr> <tr><td>7*</td><td>0.484</td><td>27.86</td><td>46.27</td><td>-18.41</td><td>27.67</td><td>0.07</td><td>0.12</td><td>Average</td></tr> <tr><td>8</td><td>0.484</td><td>35.51</td><td>56.27</td><td>-20.76</td><td>35.32</td><td>0.07</td><td>0.12</td><td>QP</td></tr> <tr><td>9</td><td>1.918</td><td>20.63</td><td>46.00</td><td>-25.37</td><td>20.29</td><td>0.10</td><td>0.24</td><td>Average</td></tr> <tr><td>10</td><td>1.918</td><td>31.12</td><td>56.00</td><td>-24.88</td><td>30.78</td><td>0.10</td><td>0.24</td><td>QP</td></tr> <tr><td>11</td><td>9.451</td><td>25.77</td><td>50.00</td><td>-24.23</td><td>25.25</td><td>0.22</td><td>0.30</td><td>Average</td></tr> <tr><td>12</td><td>9.451</td><td>31.88</td><td>60.00</td><td>-28.12</td><td>31.36</td><td>0.22</td><td>0.30</td><td>QP</td></tr> </tbody> </table>					Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark	1	0.150	34.10	56.00	-21.90	33.95	0.07	0.08	Average	2	0.150	45.66	66.00	-20.34	45.51	0.07	0.08	QP	3	0.204	32.51	53.45	-20.94	32.35	0.07	0.09	Average	4	0.204	40.94	63.45	-22.51	40.78	0.07	0.09	QP	5	0.273	27.52	51.03	-23.51	27.35	0.07	0.10	Average	6	0.273	35.97	61.03	-25.06	35.80	0.07	0.10	QP	7*	0.484	27.86	46.27	-18.41	27.67	0.07	0.12	Average	8	0.484	35.51	56.27	-20.76	35.32	0.07	0.12	QP	9	1.918	20.63	46.00	-25.37	20.29	0.10	0.24	Average	10	1.918	31.12	56.00	-24.88	30.78	0.10	0.24	QP	11	9.451	25.77	50.00	-24.23	25.25	0.22	0.30	Average	12	9.451	31.88	60.00	-28.12	31.36	0.22	0.30	QP
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## 3.2 Transmitter Radiated and Band Edge Emissions

### 3.2.1 Limit of Transmitter Radiated and Band Edge Emissions

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	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

**Note 1:**  
Qusai-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.

Un-restricted band emissions above 1GHz Limit	
Operating Band	Limit
5.15 - 5.25 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.25 - 5.35 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.47 - 5.725 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.725 - 5.850 GHz	5.715 5.725 GHz: e.i.r.p. -17 dBm [78.2 dBuV/m@3m] 5.85 5.86 GHz: e.i.r.p. -17 dBm [78.2 dBuV/m@3m] Other un-restricted band: e.i.r.p. -27 dBm [68.2 dBuV/m@3m]

**Note 1:** Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

### 3.2.2 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 test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
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.
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.

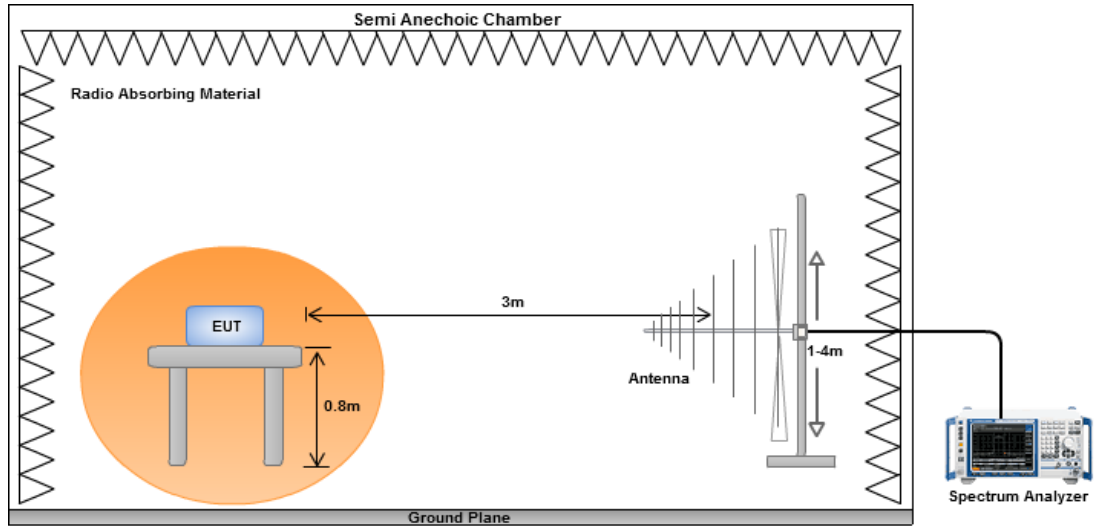
Note:

1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 1GHz.

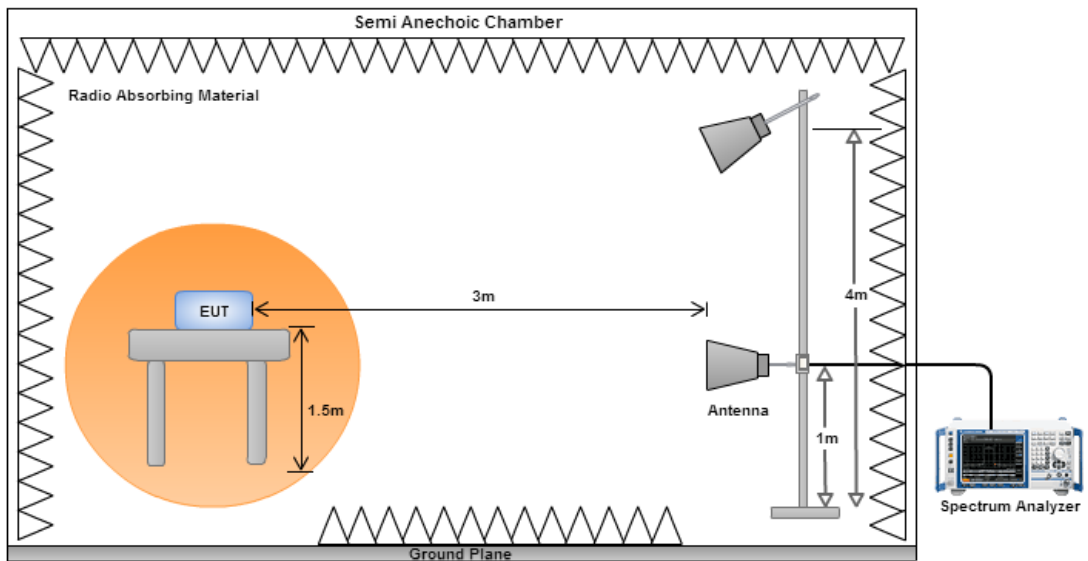


### 3.2.3 Test Setup

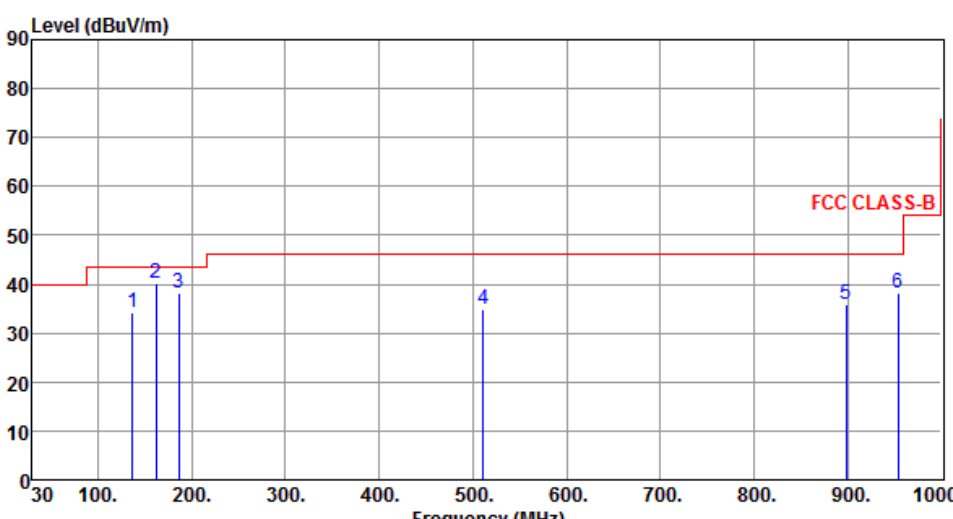
#### Radiated Emissions below 1 GHz



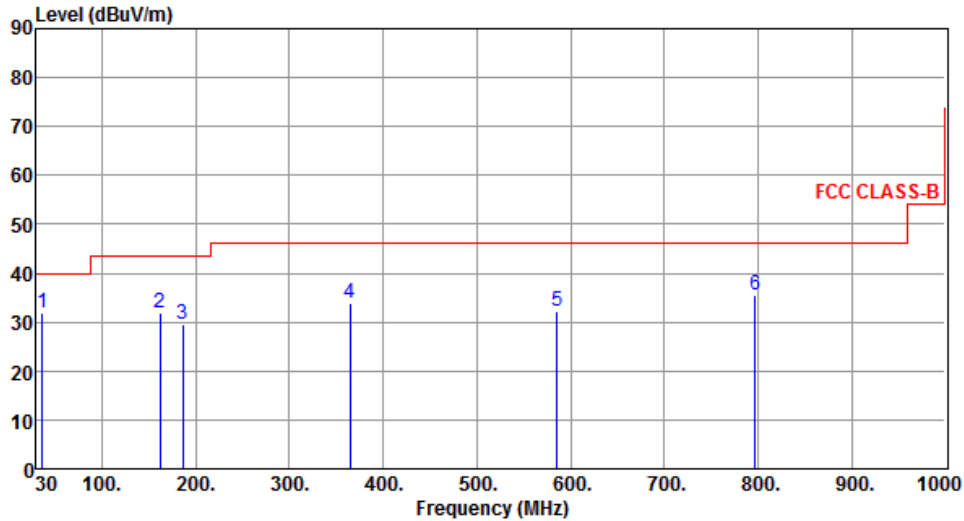
#### Radiated Emissions above 1 GHz



### 3.2.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation	11a	Test Freq. (MHz)	5580																																																																						
Polarization	Horizontal																																																																								
 <p>The graph plots Level (dBUV/m) on the y-axis (0 to 90) against Frequency (MHz) on the x-axis (30 to 1000). A red line represents the FCC CLASS-B limit, which is 40 dBUV/m from 30 to 100 MHz, 45 dBUV/m from 100 to 200 MHz, and 50 dBUV/m from 200 to 1000 MHz. Six blue vertical lines represent emission peaks labeled 1 through 6, with their respective frequencies and levels listed in the table below.</p>																																																																									
	<table border="1"> <thead> <tr> <th>Freq.</th> <th>Emission level</th> <th>Limit</th> <th>Margin</th> <th>SA reading</th> <th>Factor</th> <th>Remark</th> <th>ANT High cm</th> <th>Turn Table deg</th> </tr> <tr> <th>MHz</th> <th>dBUV/m</th> <th>dBUV/m</th> <th>dB</th> <th>dBuV</th> <th>dB</th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>136.70</td> <td>34.10</td> <td>43.50</td> <td>-9.40</td> <td>51.91</td> <td>-17.81</td> <td>Peak</td> <td>---</td> </tr> <tr> <td>2</td> <td>161.92</td> <td>40.06</td> <td>43.50</td> <td>-3.44</td> <td>57.13</td> <td>-17.07</td> <td>Peak</td> <td>---</td> </tr> <tr> <td>3</td> <td>186.17</td> <td>38.17</td> <td>43.50</td> <td>-5.33</td> <td>57.23</td> <td>-19.06</td> <td>Peak</td> <td>---</td> </tr> <tr> <td>4</td> <td>511.12</td> <td>34.89</td> <td>46.00</td> <td>-11.11</td> <td>46.37</td> <td>-11.48</td> <td>Peak</td> <td>---</td> </tr> <tr> <td>5</td> <td>898.15</td> <td>35.73</td> <td>46.00</td> <td>-10.27</td> <td>40.97</td> <td>-5.24</td> <td>Peak</td> <td>---</td> </tr> <tr> <td>6</td> <td>953.44</td> <td>38.22</td> <td>46.00</td> <td>-7.78</td> <td>42.97</td> <td>-4.75</td> <td>Peak</td> <td>---</td> </tr> </tbody> </table>	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High cm	Turn Table deg	MHz	dBUV/m	dBUV/m	dB	dBuV	dB				1	136.70	34.10	43.50	-9.40	51.91	-17.81	Peak	---	2	161.92	40.06	43.50	-3.44	57.13	-17.07	Peak	---	3	186.17	38.17	43.50	-5.33	57.23	-19.06	Peak	---	4	511.12	34.89	46.00	-11.11	46.37	-11.48	Peak	---	5	898.15	35.73	46.00	-10.27	40.97	-5.24	Peak	---	6	953.44	38.22	46.00	-7.78	42.97	-4.75	Peak	---
Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High cm	Turn Table deg																																																																	
MHz	dBUV/m	dBUV/m	dB	dBuV	dB																																																																				
1	136.70	34.10	43.50	-9.40	51.91	-17.81	Peak	---																																																																	
2	161.92	40.06	43.50	-3.44	57.13	-17.07	Peak	---																																																																	
3	186.17	38.17	43.50	-5.33	57.23	-19.06	Peak	---																																																																	
4	511.12	34.89	46.00	-11.11	46.37	-11.48	Peak	---																																																																	
5	898.15	35.73	46.00	-10.27	40.97	-5.24	Peak	---																																																																	
6	953.44	38.22	46.00	-7.78	42.97	-4.75	Peak	---																																																																	
<p>Note 1: Emission Level (dBUV/m) = SA Reading (dBUV/m) + Factor* (dB)            *Factor includes antenna factor , cable loss and amplifier gain            Note 2: Margin (dB) = Emission level (dBUV/m) – Limit (dBUV/m).            Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.</p>																																																																									

<b>Modulation</b>	11a	<b>Test Freq. (MHz)</b>	5580
<b>Polarization</b>	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	36.79	31.85	40.00	-8.15	49.35	-17.50	Peak	---	---
2	161.92	32.00	43.50	-11.50	49.07	-17.07	Peak	---	---
3	186.17	29.62	43.50	-13.88	48.68	-19.06	Peak	---	---
4	364.65	33.92	46.00	-12.08	48.52	-14.60	Peak	---	---
5	585.81	32.22	46.00	-13.78	42.05	-9.83	Peak	---	---
6	797.27	35.64	46.00	-10.36	42.58	-6.94	Peak	---	---

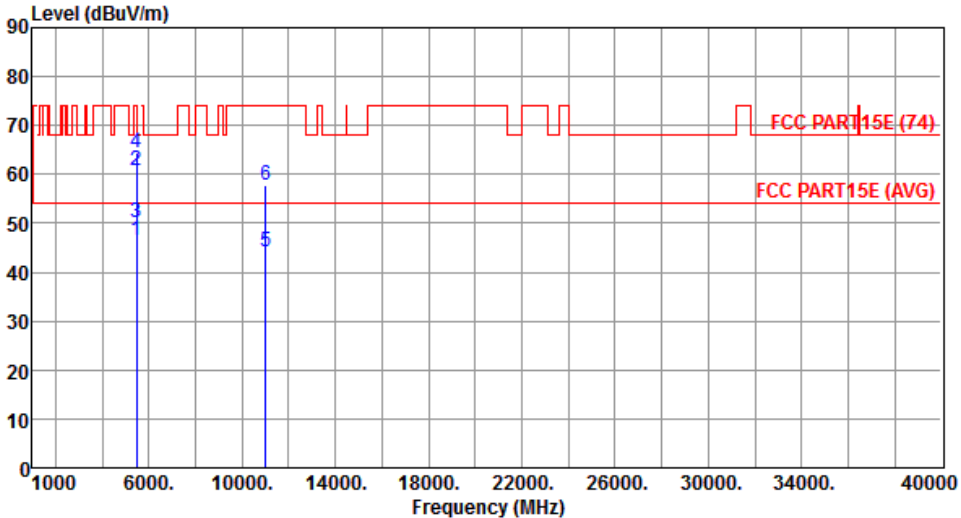
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

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

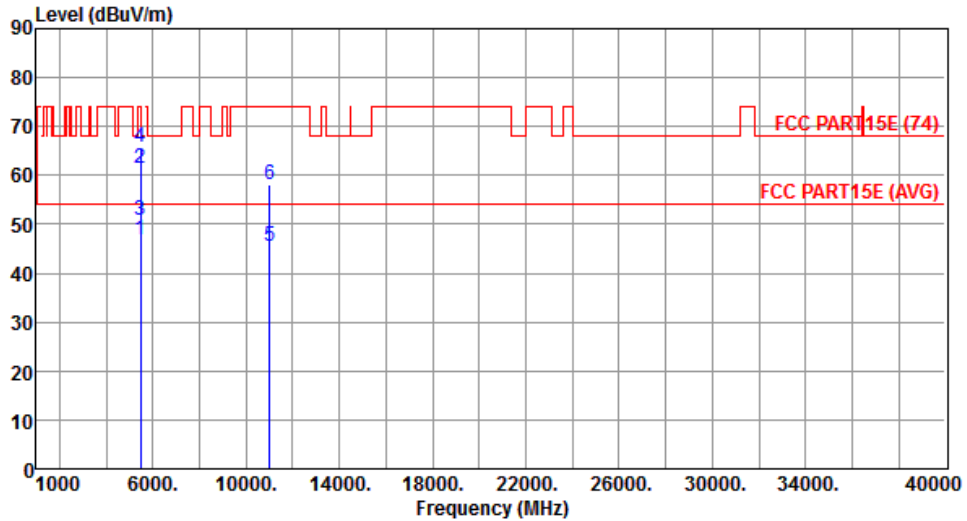
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

### 3.2.5 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11a

Modulation	11a	Test Freq. (MHz)	5500						
Polarization	Horizontal								
									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	5460.00	46.56	54.00	-7.44	40.36	6.20	Average	100	157
2	5460.00	60.91	74.00	-13.09	54.71	6.20	Peak	100	157
3	5470.00	50.10	54.00	-3.90	43.88	6.22	Average	100	157
4	5470.00	64.56	74.00	-9.44	58.34	6.22	Peak	100	157
5	11000.00	44.19	54.00	-9.81	28.09	16.10	Average	212	222
6	11000.00	57.88	74.00	-16.12	41.78	16.10	Peak	212	222
<p>Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)            *Factor includes antenna factor , cable loss and amplifier gain            Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).</p>									

<b>Modulation</b>	11a	<b>Test Freq. (MHz)</b>	5500
<b>Polarization</b>	Vertical		



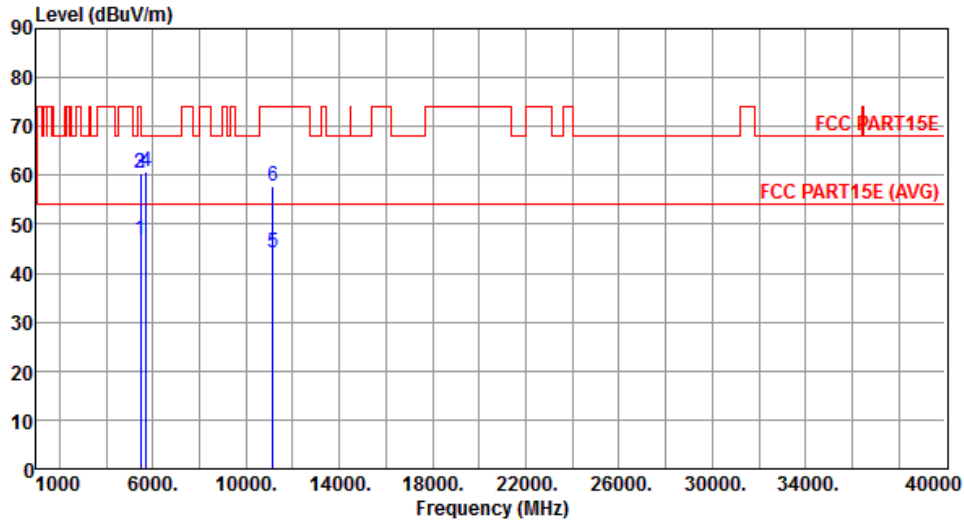
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5460.00	46.80	54.00	-7.20	40.60	6.20	Average	236	92
2	5460.00	61.35	74.00	-12.65	55.15	6.20	Peak	236	92
3	5470.00	50.95	54.00	-3.05	44.73	6.22	Average	236	92
4	5470.00	65.90	74.00	-8.10	59.68	6.22	Peak	236	92
5	11000.00	45.61	54.00	-8.39	29.51	16.10	Average	309	112
6	11000.00	58.23	74.00	-15.77	42.13	16.10	Peak	309	112

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

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

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

<b>Modulation</b>	11a	<b>Test Freq. (MHz)</b>	5580
<b>Polarization</b>	Horizontal		



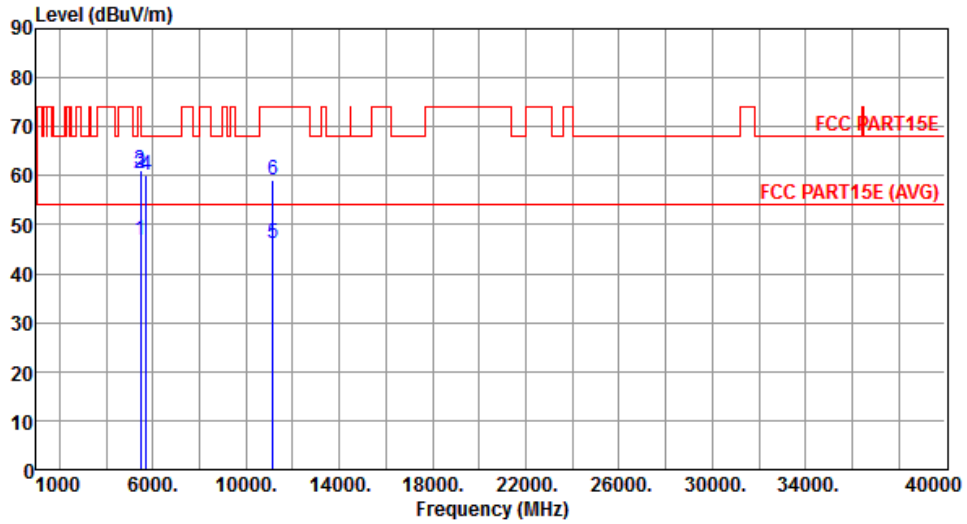
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5460.00	46.83	54.00	-7.17	40.63	6.20	Average	100	157
2	5460.00	60.40	74.00	-13.60	54.20	6.20	Peak	100	157
3	5470.00	60.57	68.20	-7.63	54.35	6.22	Peak	100	157
4	5725.00	60.86	68.20	-7.34	54.15	6.71	Peak	100	157
5	11160.00	44.17	54.00	-9.83	28.03	16.14	Average	213	218
6	11160.00	57.71	74.00	-16.29	41.57	16.14	Peak	213	218

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

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

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

<b>Modulation</b>	11a	<b>Test Freq. (MHz)</b>	5580
<b>Polarization</b>	Vertical		



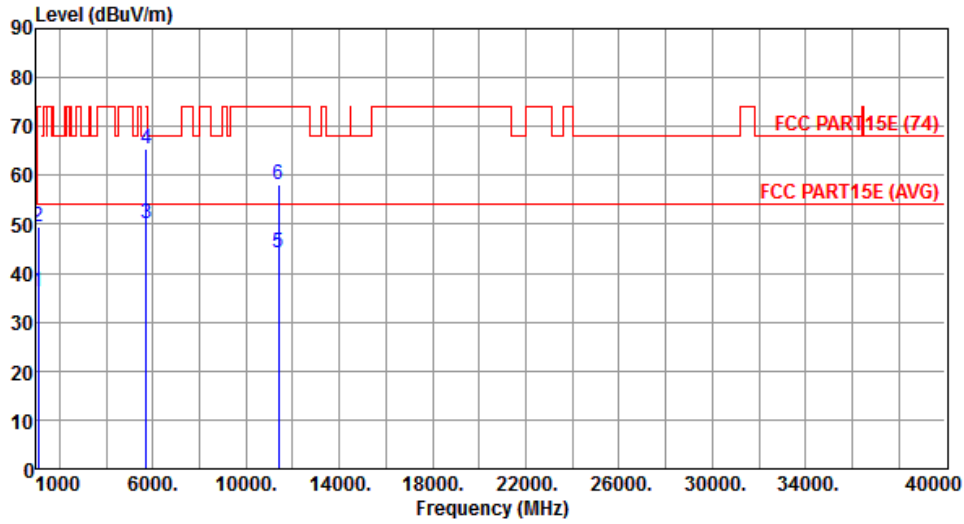
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5460.00	46.98	54.00	-7.02	40.78	6.20	Average	246	158
2	5460.00	60.53	74.00	-13.47	54.33	6.20	Peak	246	158
3	5470.00	61.06	68.20	-7.14	54.84	6.22	Peak	246	158
4	5725.00	60.19	68.20	-8.01	53.48	6.71	Peak	246	158
5	11160.00	46.26	54.00	-7.74	30.12	16.14	Average	318	123
6	11160.00	58.97	74.00	-15.03	42.83	16.14	Peak	318	123

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

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

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

<b>Modulation</b>	11a	<b>Test Freq. (MHz)</b>	5700
<b>Polarization</b>	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1096.00	36.33	54.00	-17.67	44.52	-8.19	Average	105	307
2	1096.00	49.52	74.00	-24.48	57.71	-8.19	Peak	105	307
3	5725.00	50.26	54.00	-3.74	43.55	6.71	Average	100	172
4	5725.00	65.33	74.00	-8.67	58.62	6.71	Peak	100	172
5	11400.00	44.30	54.00	-9.70	28.11	16.19	Average	215	222
6	11400.00	58.02	74.00	-15.98	41.83	16.19	Peak	215	222

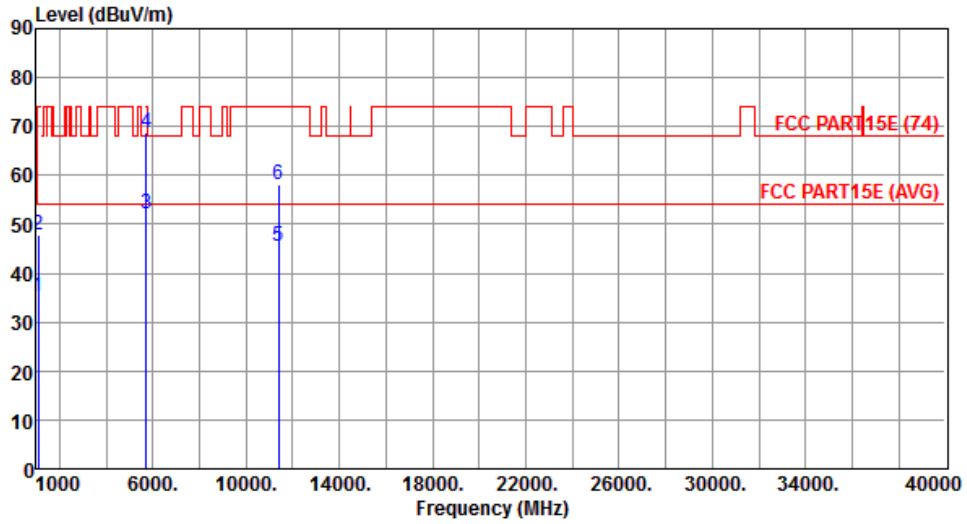
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

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

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



<b>Modulation</b>	11a	<b>Test Freq. (MHz)</b>	5700
<b>Polarization</b>	Vertical		



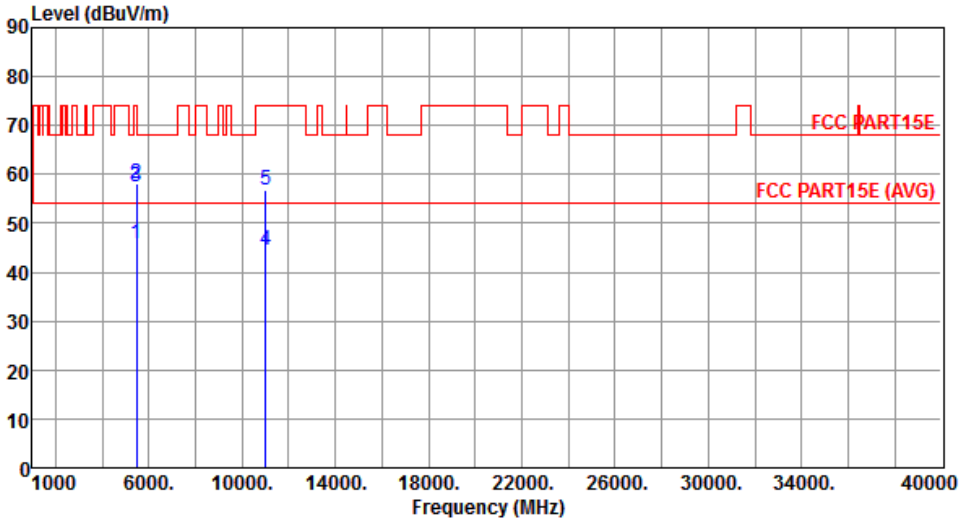
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1096.00	35.21	54.00	-18.79	43.40	-8.19	Average	175	63
2	1096.00	47.87	74.00	-26.13	56.06	-8.19	Peak	175	63
3	5725.00	52.19	54.00	-1.81	45.48	6.71	Average	274	179
4	5725.00	68.65	74.00	-5.35	61.94	6.71	Peak	274	179
5	11400.00	45.57	54.00	-8.43	29.38	16.19	Average	305	115
6	11400.00	58.09	74.00	-15.91	41.90	16.19	Peak	305	115

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

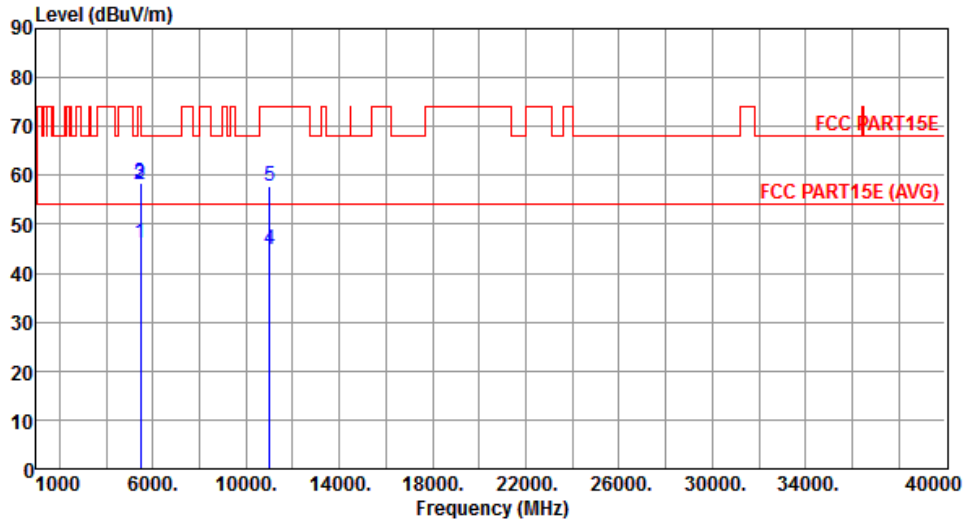
\*Factor includes antenna factor , cable loss and amplifier gain

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

### 3.2.6 Transmitter Radiated Unwanted Emissions (Above 1GHz) for HT20

Modulation	HT20	Test Freq. (MHz)	5500																																																																		
Polarization	Horizontal																																																																				
																																																																					
	<table border="1"> <thead> <tr> <th>Freq.</th> <th>Emission level</th> <th>Limit</th> <th>Margin</th> <th>SA reading</th> <th>Factor</th> <th>Remark</th> <th>ANT High</th> <th>Turn Table</th> </tr> <tr> <th>MHz</th> <th>dBuV/m</th> <th>dBuV/m</th> <th>dB</th> <th>dBuV</th> <th>dB</th> <th></th> <th>cm</th> <th>deg</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>5460.00</td> <td>45.99</td> <td>54.00</td> <td>-8.01</td> <td>39.79</td> <td>6.20</td> <td>Average</td> <td>100</td> <td>157</td> </tr> <tr> <td>2</td> <td>5460.00</td> <td>58.17</td> <td>74.00</td> <td>-15.83</td> <td>51.97</td> <td>6.20</td> <td>Peak</td> <td>100</td> <td>157</td> </tr> <tr> <td>3</td> <td>5470.00</td> <td>57.42</td> <td>68.20</td> <td>-10.78</td> <td>51.20</td> <td>6.22</td> <td>Peak</td> <td>100</td> <td>157</td> </tr> <tr> <td>4</td> <td>11000.00</td> <td>44.65</td> <td>54.00</td> <td>-9.35</td> <td>28.55</td> <td>16.10</td> <td>Average</td> <td>259</td> <td>160</td> </tr> <tr> <td>5</td> <td>11000.00</td> <td>56.88</td> <td>74.00</td> <td>-17.12</td> <td>40.78</td> <td>16.10</td> <td>Peak</td> <td>259</td> <td>160</td> </tr> </tbody> </table>	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg	1	5460.00	45.99	54.00	-8.01	39.79	6.20	Average	100	157	2	5460.00	58.17	74.00	-15.83	51.97	6.20	Peak	100	157	3	5470.00	57.42	68.20	-10.78	51.20	6.22	Peak	100	157	4	11000.00	44.65	54.00	-9.35	28.55	16.10	Average	259	160	5	11000.00	56.88	74.00	-17.12	40.78	16.10	Peak	259	160
Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table																																																													
MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg																																																													
1	5460.00	45.99	54.00	-8.01	39.79	6.20	Average	100	157																																																												
2	5460.00	58.17	74.00	-15.83	51.97	6.20	Peak	100	157																																																												
3	5470.00	57.42	68.20	-10.78	51.20	6.22	Peak	100	157																																																												
4	11000.00	44.65	54.00	-9.35	28.55	16.10	Average	259	160																																																												
5	11000.00	56.88	74.00	-17.12	40.78	16.10	Peak	259	160																																																												
<p>Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)            *Factor includes antenna factor , cable loss and amplifier gain            Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).</p>																																																																					

<b>Modulation</b>	HT20	<b>Test Freq. (MHz)</b>	5500
<b>Polarization</b>	Vertical		



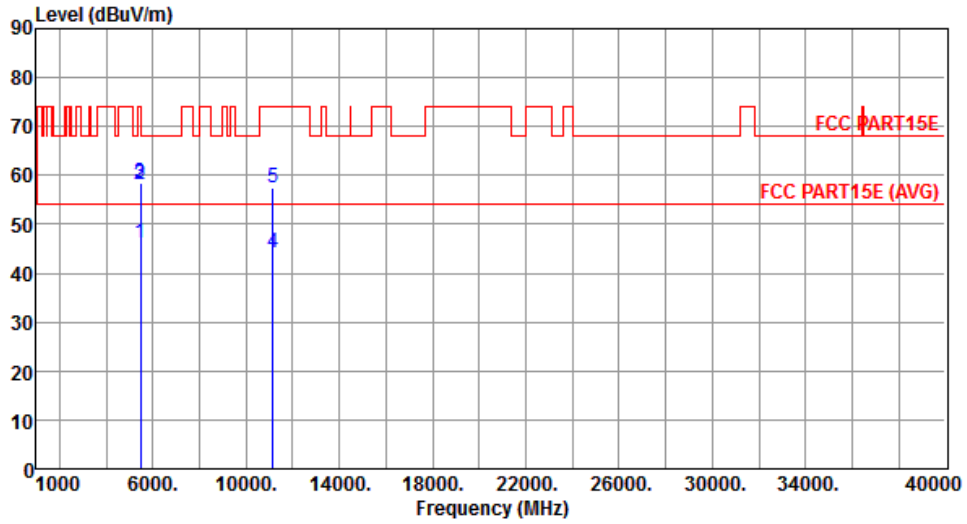
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5460.00	46.21	54.00	-7.79	40.01	6.20	Average	250	122
2	5460.00	58.28	74.00	-15.72	52.08	6.20	Peak	250	122
3	5470.00	58.39	68.20	-9.81	52.17	6.22	Peak	250	122
4	11000.00	44.85	54.00	-9.15	28.75	16.10	Average	289	53
5	11000.00	57.68	74.00	-16.32	41.58	16.10	Peak	289	53

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

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

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

<b>Modulation</b>	HT20	<b>Test Freq. (MHz)</b>	5580
<b>Polarization</b>	Horizontal		



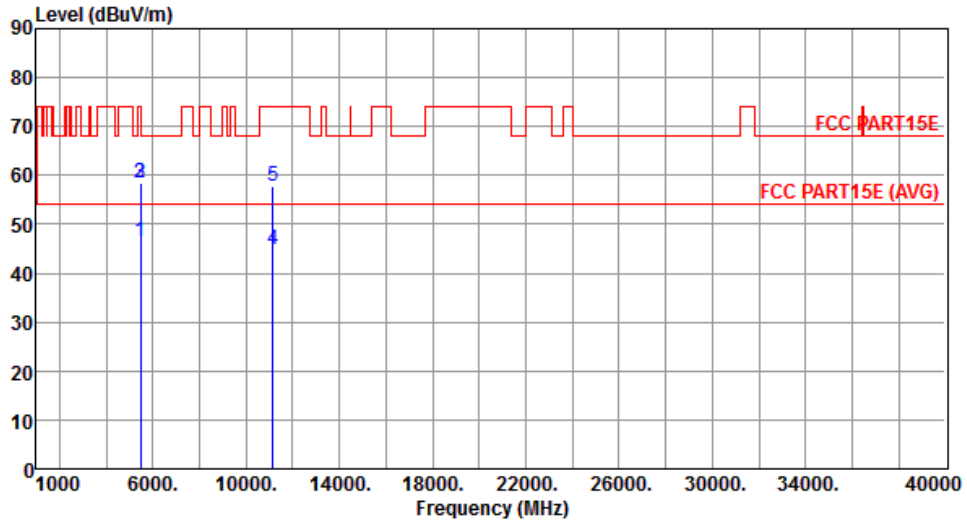
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5460.00	46.24	54.00	-7.76	40.04	6.20	Average	100	157
2	5460.00	58.28	74.00	-15.72	52.08	6.20	Peak	100	157
3	5470.00	58.51	68.20	-9.69	52.29	6.22	Peak	100	157
4	11160.00	44.33	54.00	-9.67	28.19	16.14	Average	271	65
5	11160.00	57.31	74.00	-16.69	41.17	16.14	Peak	271	65

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

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

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

<b>Modulation</b>	HT20	<b>Test Freq. (MHz)</b>	5580
<b>Polarization</b>	Vertical		



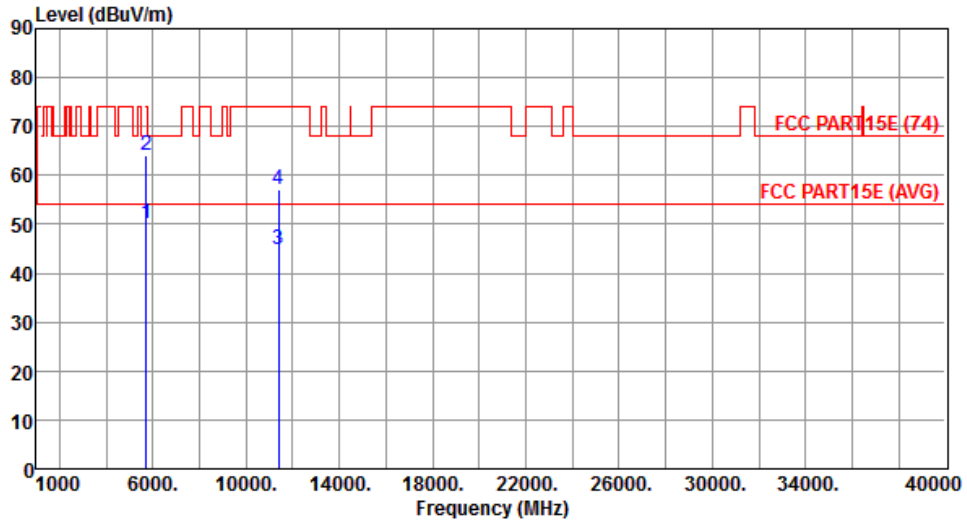
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5460.00	46.44	54.00	-7.56	40.24	6.20	Average	264	161
2	5460.00	58.34	74.00	-15.66	52.14	6.20	Peak	264	161
3	5470.00	58.29	68.20	-9.91	52.07	6.22	Peak	264	161
4	11160.00	44.68	54.00	-9.32	28.54	16.14	Average	290	55
5	11160.00	57.68	74.00	-16.32	41.54	16.14	Peak	26	55

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

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

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

<b>Modulation</b>	HT20	<b>Test Freq. (MHz)</b>	5700
<b>Polarization</b>	Horizontal		



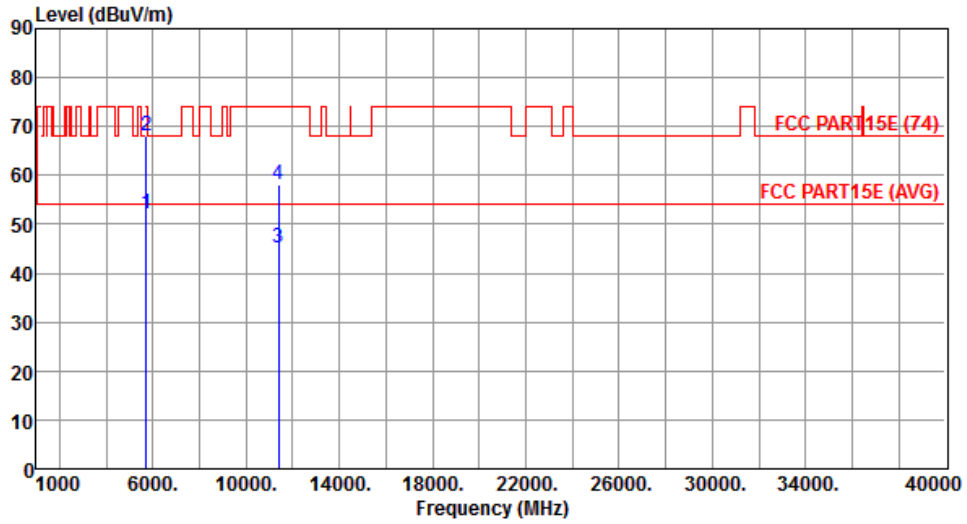
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5725.00	50.08	54.00	-3.92	43.37	6.71	Average	107	147
2	5725.00	64.08	74.00	-9.92	57.37	6.71	Peak	107	147
3	11400.00	44.89	54.00	-9.11	28.70	16.19	Average	241	163
4	11400.00	57.01	74.00	-16.99	40.82	16.19	Peak	241	163

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

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

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

<b>Modulation</b>	HT20	<b>Test Freq. (MHz)</b>	5700
<b>Polarization</b>	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5725.00	52.14	54.00	-1.86	45.43	6.71	Average	264	161
2	5725.00	68.18	74.00	-5.82	61.47	6.71	Peak	264	161
3	11400.00	45.05	54.00	-8.95	28.86	16.19	Average	291	39
4	11400.00	58.16	74.00	-15.84	41.97	16.19	Peak	291	39

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

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

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

## 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 Corp, 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 Hsiang. 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 Hsiang, Tao Yuan  
Hsien 333, Taiwan, R.O.C.

### **Kwei Shan Site II**

Tel: 886-3-271-8640

No. 14-1, Lane 19, Wen San 3rd  
St., Kwei Shan Hsiang, Tao Yuan  
Hsien 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: 886-3-318-0155

Email: ICC\_Service@icertifi.com.tw

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