FCC 15B Test Report

Equipment	:	**802.11 ac/a/b/g/n M.2 2230 + Bluetooth 4.2 module** **(Please refer to section 1.1.1 for more details.)**
Model No.	:	**ST60-2230C** **(Please refer to section 1.1.1 for more details.)**
Brand Name	:	**Laird Connectivity** **(Please refer to section 1.1.1 for more details.)**
Applicant	:	**Laird Connectivity, Inc.**
Address	:	**W66N220 Commerce Court, Cedarburg, Wisconsin 53012, USA**
Standard	:	**FCC Part 15, Subpart B, Class B** **ICES-003 Issue 6, Class B** **ANSI C63.4:2014**
Received Date	:	**Jul. 20, 2020**
Tested Date	:	**May 16 ~ May 18, 2017 (for original test)** **Aug. 04 ~ Sep. 28, 2020 (for new test)**

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. 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:

Peter Lin / Supervisor

Approved by:

Kent Chen / Assistant Manager

Testing Laboratory 2732

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Release Record

Report No.	Version	Description	Issued Date
FD740701-09	Rev. 01	Initial issue	Oct. 27, 2020

Summary of Test Results

FCC Part 15, Subpart B Emission Tests				
Ref. Std. Clause	**Test Standard**	**Test Items**	**Measured**	**Result**
15.107	FCC Part 15, Subpart B, Class B	Conducted Emissions	Under limit -11.06dB @ 0.160MHz.	Pass
15.109	FCC Part 15, Subpart B, Class B	Radiated Emissions	Under limit -3.05dB @ 39.95MHz.	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.

1 General Description

1.1 Information

This report is issued as a supplementary report to original report no. FD740701. The difference is concerned with following items:

1. Components of non-RF section are replaced to switch interface.
2. Adding two models

In this report, all tests had been re-tested and presented in the following sections.

1.1.1 Product Details

The following models are provided to this EUT. **(New additions are marked in boldface.)**

Brand Name	Model Name	Product Name	Description	
Laird Technologies	ST60-SIPT	802.11 ac/a/b/g/n + Bluetooth 4.2 module	SIPT only	For marketing purpose
	SU60-SIPT			
	ST60-2230C	802.11 ac/a/b/g/n M.2 2230 + Bluetooth 4.2 module	with carrier board	
	SU60-2230C			
Laird Connectivity	**ST60-2230C-P**	**802.11 ac/a/b/g/n M.2 2230 + Bluetooth 4.2 module PCIe/UART interface**	**PCIe/UART interface**	
	ST60-2230C-PU	**802.11 ac/a/b/g/n M.2 2230 + Bluetooth 4.2 module PCIe/USB interface**	**PCIe/USB interface**	
✦ The above models, model ST60-2230C, ST60-2230C-P & ST60-2230C-PU were selected as a representative one for the final test and only its data was recorded in this report.				

1.1.2 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	DC 2.97V & DC 3.3V from host
Highest Frequency of the Internal Sources	5.8GHz

1.1.3 Accessories

N/A

1.2 The Equipment List

For original test

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	May 16 ~ May 18, 2017				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Receiver	R&S	ESR3	101657	Dec. 21, 2016	Dec. 20, 2017
LISN	SCHWARZBECK	Schwarzbeck 8127	8127-667	Nov. 08, 2016	Nov. 07, 2017
LISN (Support Unit)	SCHWARZBECK	Schwarzbeck 8127	8127-666	Nov. 25, 2016	Nov. 24, 2017
RF Cable-CON	EMC	EMCCFD300-BM-BM-6000	50821	Dec. 20, 2016	Dec. 19, 2017
50 ohm terminal (Support Unit)	NA	50	02	Apr. 07, 2017	Apr. 06, 2018
Measurement Software	AUDIX	e3	6.120210k	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission below 1GHz				
Test Site	966 chamber 2 / (03CH02-WS)				
Tested Date	May 18, 2017				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Receiver	R&S	ESR3	101657	Dec. 21, 2016	Dec. 20, 2017
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 10, 2016	Nov. 09, 2017
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-523	Nov. 07, 2016	Nov. 06, 2017
Preamplifier	EMC	EMC02325	980194	Sep. 26, 2016	Sep. 25, 2017
LF cable 1M	EMC	EMCCFD400-NM-NM-1000	16051	Dec. 09, 2016	Dec. 08, 2017
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-003	Dec. 09, 2016	Dec. 08, 2017
LF cable 10M	EMCC	CFD400-E	CFD400-001	Dec. 09, 2016	Dec. 08, 2017
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission above 1GHz				
Test Site	966 chamber 2 / (03CH02-WS)				
Tested Date	May 18, 2017				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	R&S	FSV40	101499	Dec. 16, 2016	Dec. 15, 2017
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1095	Sep. 21, 2016	Sep. 20, 2017
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Oct. 25, 2016	Oct. 24, 2017
Preamplifier	Agilent	83017A	MY39501309	Sep. 29, 2016	Sep. 28, 2017
Preamplifier	EMC	EMC184045B	980192	Aug. 24, 2016	Aug. 23, 2017
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16140/4	Dec. 09, 2016	Dec. 08, 2017
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16018/4	Dec. 09, 2016	Dec. 08, 2017
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

For new test

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Test Date	Aug. 04, 2020				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Receiver	R&S	ESR3	101658	Dec. 12, 2019	Dec. 11, 2020
LISN	R&S	ENV216	101579	Mar. 12, 2020	Mar. 11, 2021
LISN (Support Unit)	SCHWARZBECK	Schwarzbeck 8127	8127-666	Dec. 20, 2019	Dec. 19, 2020
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 22, 2019	Oct. 21, 2020
50 ohm terminal (Support Unit)	NA	50	04	Jun. 05, 2020	Jun. 04, 2021
Measurement Software	AUDIX	e3	6.120210k	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission below 1GHz				
Test Site	966 chamber 2 / (03CH02-WS)				
Test Date	Sep. 28, 2020				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Receiver	Agilent	N9038A	MY53290044	Sep. 15, 2020	Sep. 14, 2021
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 13, 2019	Nov. 12, 2020
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-523	Dec. 26, 2019	Dec. 25, 2020
Preamplifier	EMC	EMC02325	980194	Sep. 16, 2020	Sep. 15, 2021
LF cable 1M	EMC	EMCCFD400-NM-NM-1000	160501	Oct. 18, 2019	Oct. 17, 2020
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-003	Oct. 18, 2019	Oct. 17, 2020
LF cable 10M	EMC	CFD400-E	CFD400-001	Oct. 18, 2019	Oct. 17, 2020
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission above 1GHz				
Test Site	966 chamber 2 / (03CH02-WS)				
Test Date	Sep. 28, 2020				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	Agilent	N9010A	MY53400091	Nov. 15, 2019	Nov. 14, 2020
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1095	Sep. 25, 2020	Sep. 24, 2021
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 15, 2019	Nov. 14, 2020
Preamplifier	Agilent	83017A	MY53270014	Jul. 30, 2020	Jul. 29, 2021
Preamplifier	EMC	EMC184045B	980192	Jul. 21, 2020	Jul. 20, 2021
RF Cable	EMC	EMC105-SM-SM-8000	180512	Oct. 18, 2019	Oct. 17, 2020
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16018/4	Oct. 18, 2019	Oct. 17, 2020
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

1.3 Testing Applied Standards

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

FCC Part 15, Subpart B, Class B
ICES-003 Issue 6, Class B
ANSI C63.4:2014

1.4 Deviation from Test Standard and Measurement Procedure

None

1.5 Measurement Uncertainty

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

Measurement Uncertainty		
Test Item	**Frequency**	**Uncertainty**
Conducted Emissions	150kHz ~ 30MHz	±2.92 dB
Radiated Emissions	30MHz ~ 1GHz	±4.32 dB
	Above 1GHz	±4.9 dB

Note: The results of measurements of emissions shall reference the measurement uncertainty considerations contained in CISPR 16-4-2.

2 Test Configuration

2.1 Testing Condition

For original test

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	22°C/58%	Alex Tsai
Radiated Emissions	03CH02-WS	22°C/61%	Alex Tsai

- FCC Designation No.: TW1073
- FCC site registration No.: 933633

For new test

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	24°C / 66%	Alex Tsai
Radiated Emissions	03CH02-WS	23°C / 67%	Aska Huang

- FCC Designation No.: TW1073
- FCC site registration No.: 933633

2.2 Testing Facility

Test Laboratory	International Certification Corp.
Test Site	CO01-WS, 03CH02-WS
Address of Test Site	No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.

2.3 The Worst Case Measurement Configuration

Radiation Pretest Mode	
Pretest Mode	**Operating Description**
1	Antenna: LSR/001-0009, EUT: ST60-2230C, WiFi 5G TX, EUT: Y-axis
2	Antenna: NanoBlade-IP04 , EUT: ST60-2230C, WiFi 2.4G TX, EUT: Y-axis
3	Antenna: MAF95310 Mini NanoBlade Flex, EUT: ST60-2230C, WiFi 5G TX, EUT: Y-axis
4	Antenna: LSR/FlexPIFA 001-0016, EUT: ST60-2230C, WiFi 2.4G TX, EUT: Y-axis
5	Antenna: Ethertronics WLAN_1000146, EUT: ST60-2230C, WiFi 5G TX, EUT: Y-axis
6	Antenna: LSR/001-0009, EUT: ST60-2230C, BT TX, EUT: Y-axis
7	Antenna: LSR/001-0009, EUT: ST60-2230C-P, WiFi 5G & BT Link, with notebook
8	Antenna: LSR/001-0009, EUT: ST60-2230C-P, WiFi 2.4G & BT Link, with notebook
9	Antenna: LSR/001-0009, EUT: ST60-2230C-PU, WiFi 5G & BT Link, with notebook
NOTE: For **Pretest Mode 6 &7** are the worst cases and only its data was record in this test report.	

The Determined Worst Case Configurations	
Conducted Emissions	
Test Mode	**Operating Description**
1	Antenna: LSR/001-0009, EUT: ST60-2230C, BT TX, EUT: Y-axis
2	Antenna: LSR/001-0009, EUT: ST60-2230C-P, WiFi 5G & BT Link, with notebook
Radiated Emissions	
Test Mode ≤ 1GHz	**Operating Description**
1	Antenna: LSR/001-0009, EUT: ST60-2230C, BT TX, EUT: Y-axis
2	Antenna: LSR/001-0009, EUT: ST60-2230C-P, WiFi 5G & BT Link, with notebook
Test Mode > 1GHz	**Operating Description**
1	Antenna: LSR/001-0009, EUT: ST60-2230C, BT TX, EUT: Y-axis
2	Antenna: LSR/001-0009, EUT: ST60-2230C-P, WiFi 5G & BT Link, with notebook

2.4 Local Support Equipment List

For original test

Support Equipment List					
No.	**Equipment**	**Brand**	**Model**	**S/N**	**Remarks**
1	Notebook	Lenovo	1706-BW8	LV-AF745 07/04	Provided by applicant.
2	Printer	EPSON	XP-30	QSDK002410	---
3	Mouse	DELL	MS111-L	2C3-00MM	---

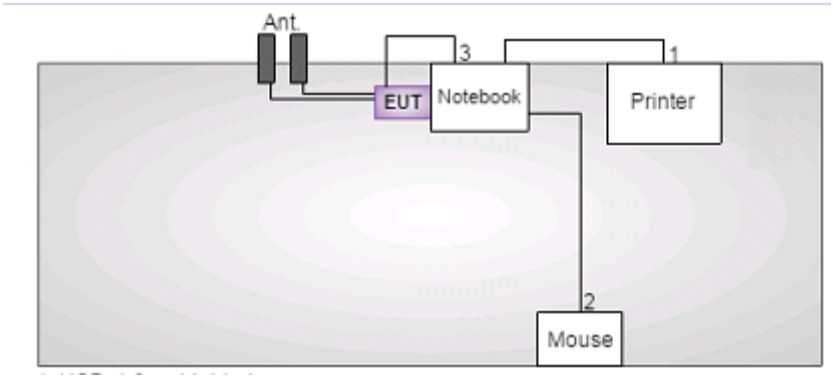
For new test

Support Equipment List					
No.	**Equipment**	**Brand**	**Model**	**S/N**	**Remarks**
1	Notebook	Lenovo	TP00003B	---	Provided by applicant.
2	Printer	EPSON	XP-30	QSDK002410	---
3	Mouse	DELL	MS111-L	2C3-00MM	---
4	Wireless AP	D-LINK	DIR-850L	RZ1Q4G6000261	---
5	Cellphone	Apple	A1586	F17VVCEDHXR6	---
6	Fixture	Laird	DVK-SU60-223 0C_B0	---	Provided by applicant.

2.5 Test Setup Chart

For original test

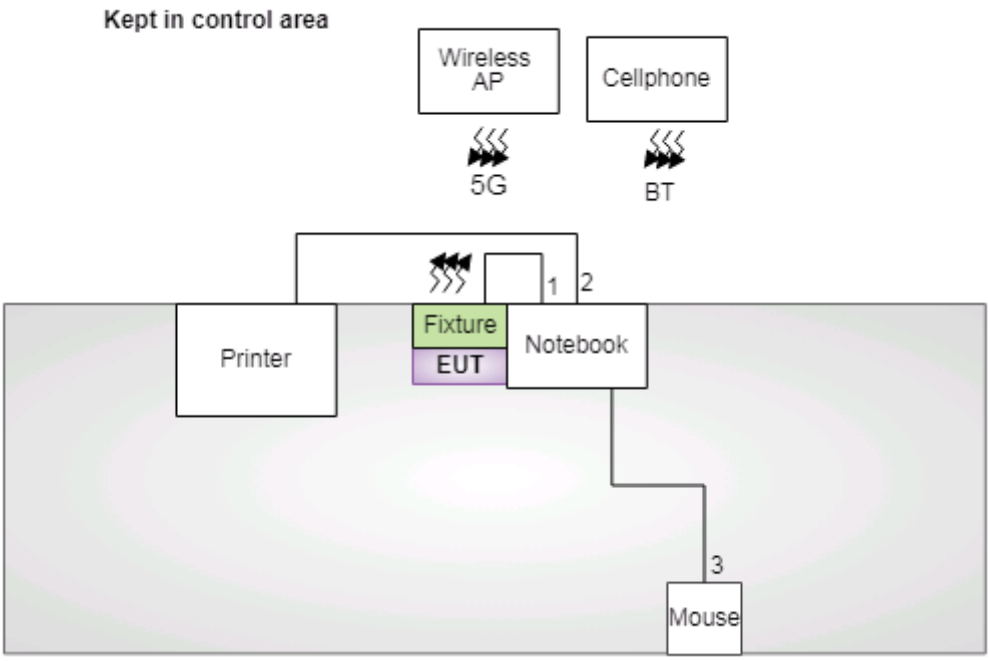
Test Setup Diagram



No.	Signal cable / Length (m)
1	USB, 1.8m shielded.
2	USB, 1.8m shielded.
3	USB, 1m shielded.

For new test

Test Setup Diagram



No.	Signal cable / Length (m)
1	USB, 1m shielded.
2	USB, 1.8m shielded.
3	USB, 1.8m shielded.

2.6 Test Software and Operating Condition

For original test

a. To enable all functions of test system.
b. The support notebook was set in Linux OS.
c. The support notebook executed Terminal command to EUT in BT Tx mode.

For new test

a. To enable all functions of test system.
b. The support notebook was set in Linux OS.
c. The support cellphone links to the EUT by BT.
d. The EUT links to Wireless AP by WiFi.
e. The support notebook communicated with EUT by executing “Terminal.exe” to transmitting continuously by BT and WiFi.

3 Emission Tests Results

3.1 Conducted Emissions

3.1.1 Limit of Conducted Emissions

Conducted Emissions Limit		
Frequency Emission (MHz)	**Quasi-Peak**	**Average**
0,15 to 0,5	66 - 56 *	56 - 46 *
0,5 to 5	56	46
5 to 30	60	50
Note 1: * Decreases with the logarithm of the frequency.		

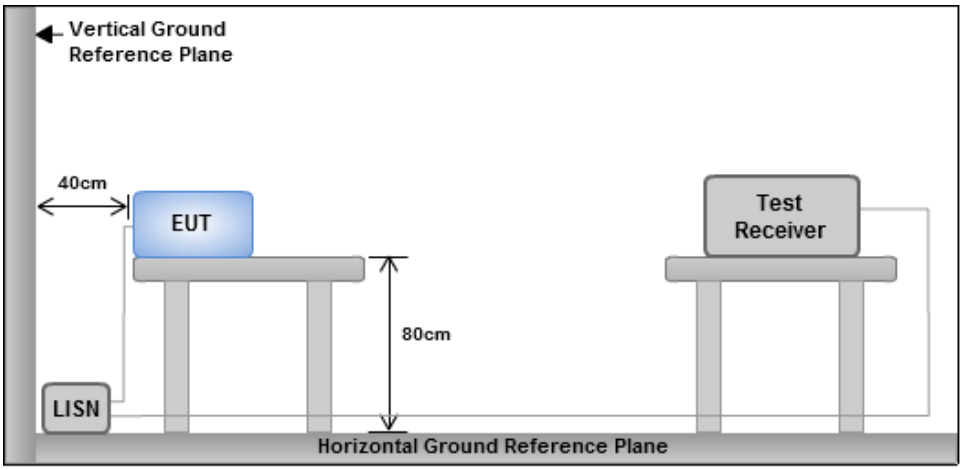
3.1.2 Test Procedures

a. 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.

b. 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.

c. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.

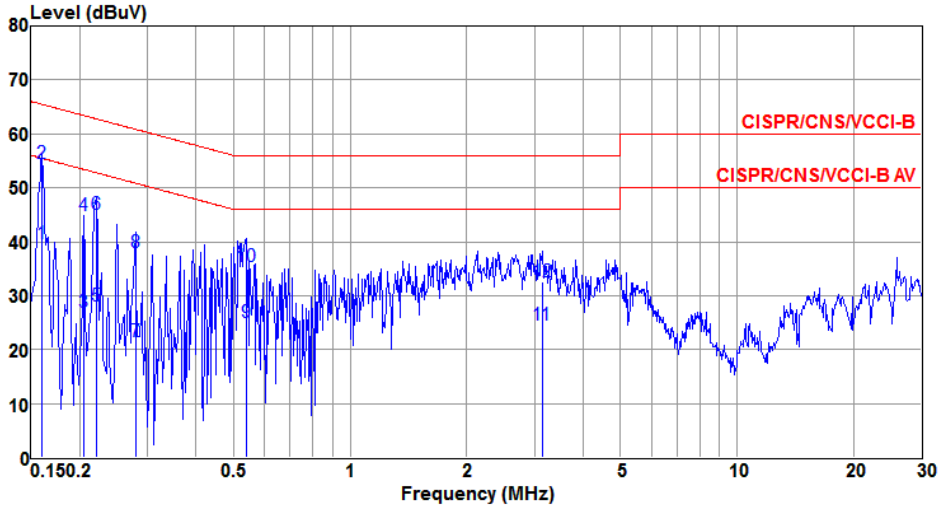
3.1.3 Test Setup



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

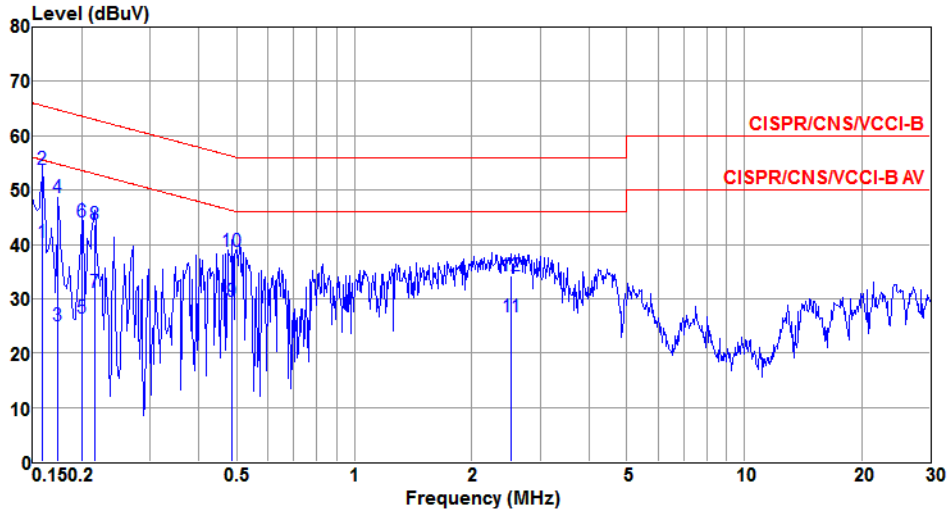
Power Phase	Line	Test Mode	1



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.160	39.55	55.47	-15.92	39.43	0.08	0.04	Average
2@	0.160	54.41	65.47	-11.06	54.29	0.08	0.04	QP
3	0.205	26.95	53.40	-26.45	26.81	0.10	0.04	Average
4	0.205	44.85	63.40	-18.55	44.71	0.10	0.04	QP
5	0.221	28.06	52.79	-24.73	27.93	0.09	0.04	Average
6	0.221	45.05	62.79	-17.74	44.92	0.09	0.04	QP
7	0.279	21.54	50.85	-29.31	21.42	0.08	0.04	Average
8	0.279	38.08	60.85	-22.77	37.96	0.08	0.04	QP
9	0.538	24.91	46.00	-21.09	24.81	0.06	0.04	Average
10	0.538	35.40	56.00	-20.60	35.30	0.06	0.04	QP
11	3.140	24.67	46.00	-21.33	24.39	0.16	0.12	Average
12	3.140	32.62	56.00	-23.38	32.34	0.16	0.12	QP

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

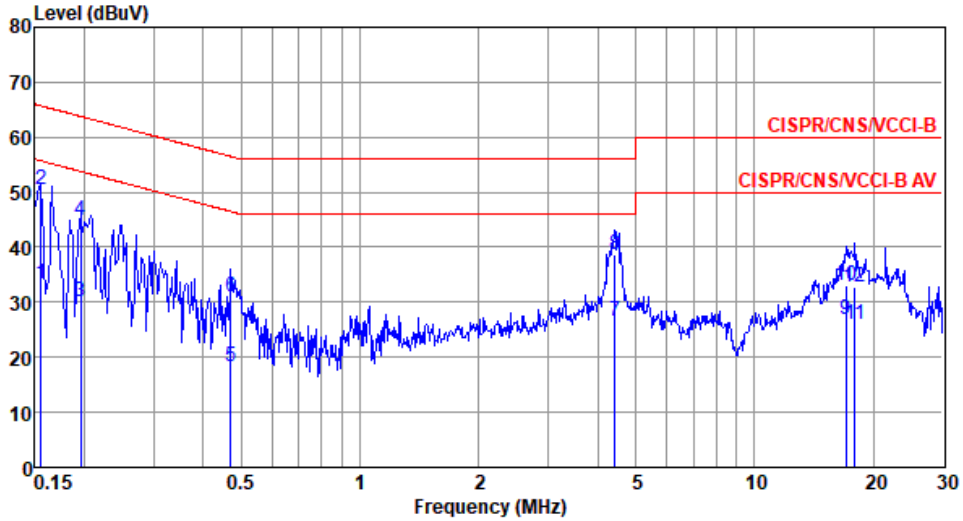
Power Phase	Neutral	Test Mode	1



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.159	40.32	55.52	-15.20	40.18	0.10	0.04	Average
2@	0.159	53.72	65.52	-11.80	53.58	0.10	0.04	QP
3	0.174	25.01	54.77	-29.76	24.88	0.09	0.04	Average
4	0.174	48.70	64.77	-16.07	48.57	0.09	0.04	QP
5	0.201	26.38	53.58	-27.20	26.25	0.09	0.04	Average
6	0.201	44.09	63.58	-19.49	43.96	0.09	0.04	QP
7	0.216	31.25	52.96	-21.71	31.12	0.09	0.04	Average
8	0.216	43.70	62.96	-19.26	43.57	0.09	0.04	QP
9	0.486	29.40	46.23	-16.83	29.24	0.12	0.04	Average
10	0.486	38.72	56.23	-17.51	38.56	0.12	0.04	QP
11	2.527	26.64	46.00	-19.36	26.41	0.15	0.08	Average
12	2.527	34.12	56.00	-21.88	33.89	0.15	0.08	QP

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

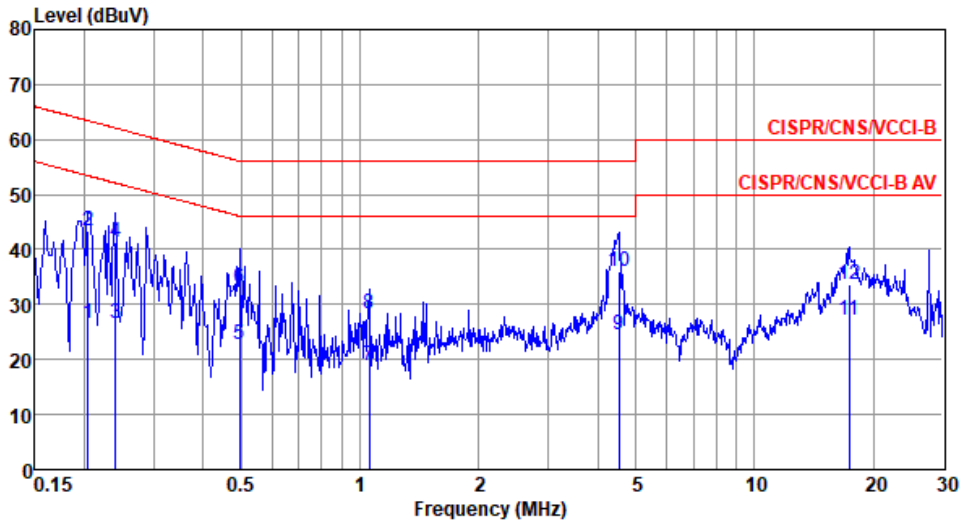
Power Phase	Line	Test Mode	2



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.156	33.35	55.69	-22.34	23.50	9.64	0.05	Average
2*	0.156	50.34	65.69	-15.35	40.49	9.64	0.05	QP
3	0.195	30.01	53.80	-23.79	20.13	9.63	0.06	Average
4	0.195	44.73	63.80	-19.07	34.85	9.63	0.06	QP
5	0.471	18.27	46.49	-28.22	8.29	9.63	0.09	Average
6	0.471	30.91	56.49	-25.58	20.93	9.63	0.09	QP
7	4.430	26.46	46.00	-19.54	16.14	9.65	0.30	Average
8	4.430	38.80	56.00	-17.20	28.48	9.65	0.30	QP
9	17.018	26.97	50.00	-23.03	16.09	9.71	0.63	Average
10	17.018	33.10	60.00	-26.90	22.22	9.71	0.63	QP
11	17.944	26.03	50.00	-23.97	15.11	9.72	0.64	Average
12	17.944	32.91	60.00	-27.09	21.99	9.72	0.64	QP

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

Power Phase	Neutral	Test Mode	2



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.204	26.68	53.45	-26.77	16.82	9.65	0.06	Average
2*	0.204	43.53	63.45	-19.92	33.67	9.65	0.06	QP
3	0.240	26.45	52.08	-25.63	16.57	9.65	0.07	Average
4	0.240	41.23	62.08	-20.85	31.35	9.65	0.07	QP
5	0.494	22.63	46.10	-23.47	12.71	9.65	0.09	Average
6	0.494	33.06	56.10	-23.04	23.14	9.65	0.09	QP
7	1.054	18.81	46.00	-27.19	8.84	9.65	0.12	Average
8	1.054	28.32	56.00	-27.68	18.35	9.65	0.12	QP
9	4.525	24.41	46.00	-21.59	14.16	9.68	0.30	Average
10	4.525	35.91	56.00	-20.09	25.66	9.68	0.30	QP
11	17.383	27.03	50.00	-22.97	16.13	9.82	0.63	Average
12	17.383	33.75	60.00	-26.25	22.85	9.82	0.63	QP

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

3.2 Radiated Emissions

3.2.1 Limit of Radiated Emissions

According to FCC Part 15, Subpart B §15.109, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of Emission (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
Above 960	500	54	3

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705-108	1000
108-500	2000
500-1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

Note: According to FCC Part 15, Subpart B §15.33: For an unintentional radiator is shown in the table above.

3.2.2 Test Procedures

Measuring below 1 GHz:

a. 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.

b. 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.

c. 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.

Measuring above 1 GHz:

a. Same test set up as below 1GHz radiated testing.

b. The EUT was set 3 meters from the interference-receiving antenna which was mounted on the top of a variable height antenna tower.

c. There should be absorber placed between the EUT and Antenna and its located size should let the test site meet CISPR16-1-4 requirement.

d. The table was rotated 360 degrees to determine the position of the highest radiation.

e. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

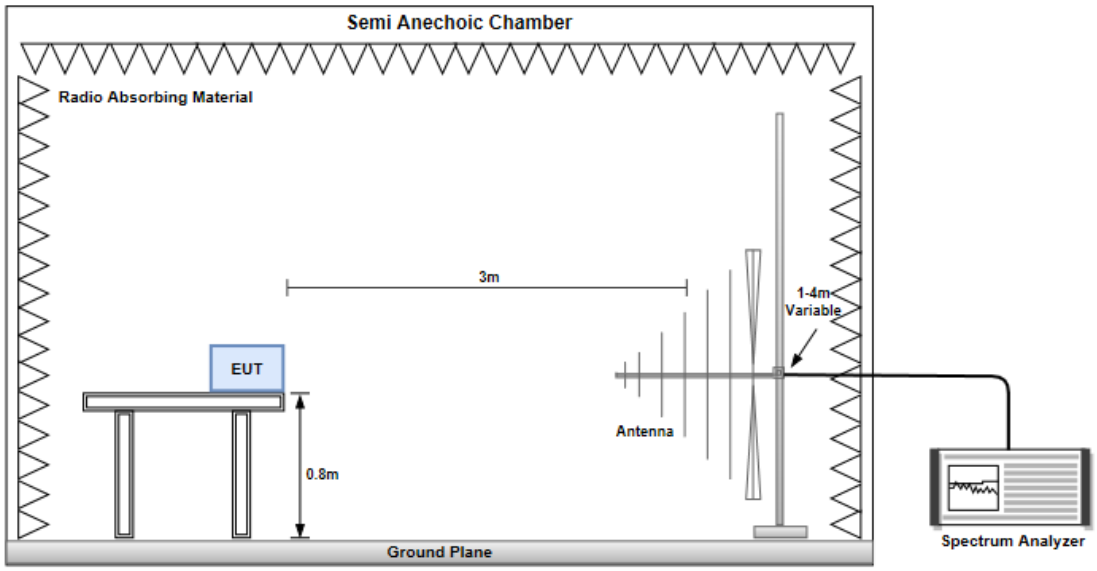
f. Set the Horn Antenna at 1m height, then run the turn table to get the maximum noise reading from Horizontal and Vertical polarity separately.

g. When EUT locating on the turn-table, the Horn Antenna must be raised up and descended down, then turning around the turn-table to get the maximum noise reading of the Horizontal and Vertical polarity separately. Note the maximum raise up height is same as the top of EUT.

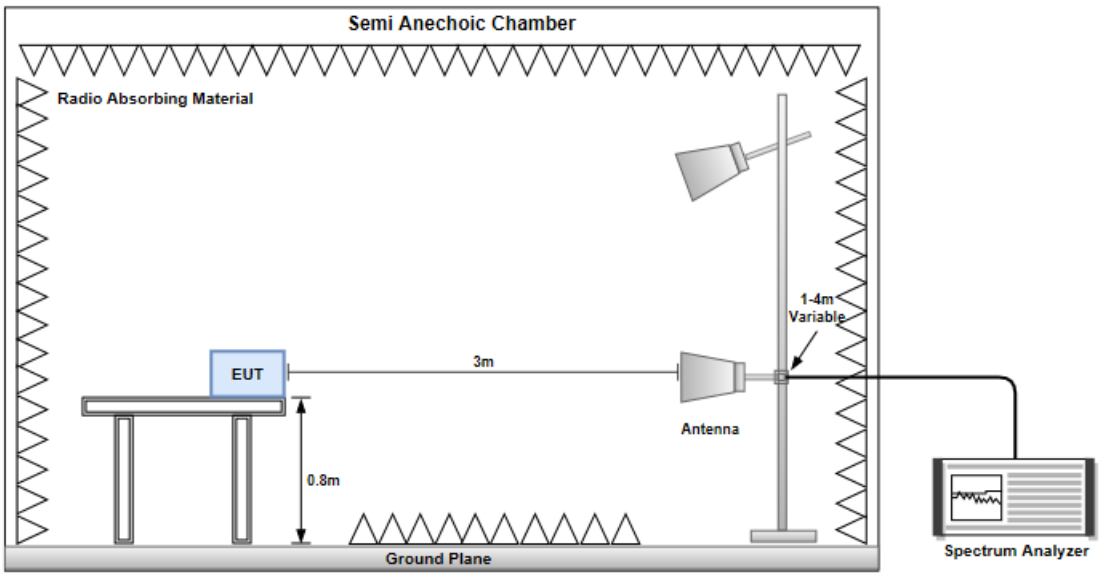
h. If emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.2.3 Test Setup

Radiated Emissions below 1 GHz

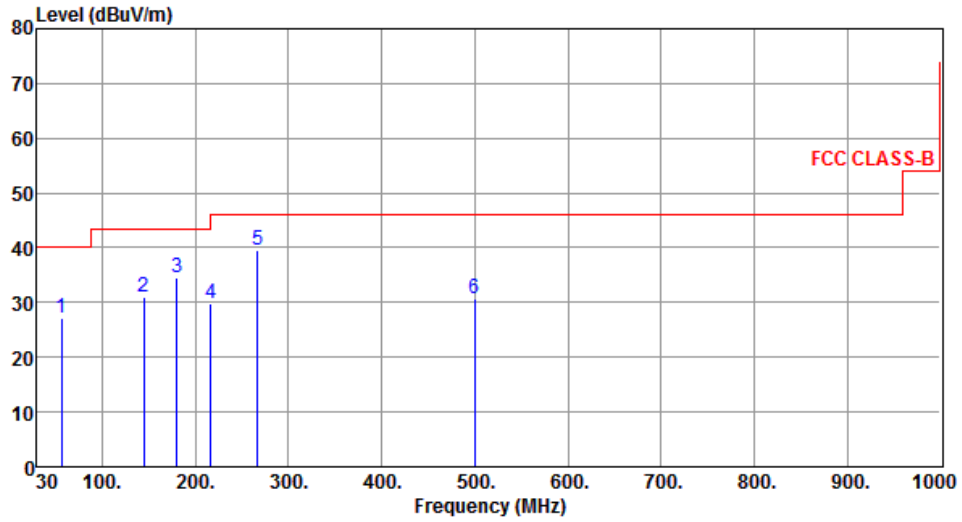


Radiated Emissions above 1 GHz



3.2.4 Radiated Emissions (Below 1GHz)

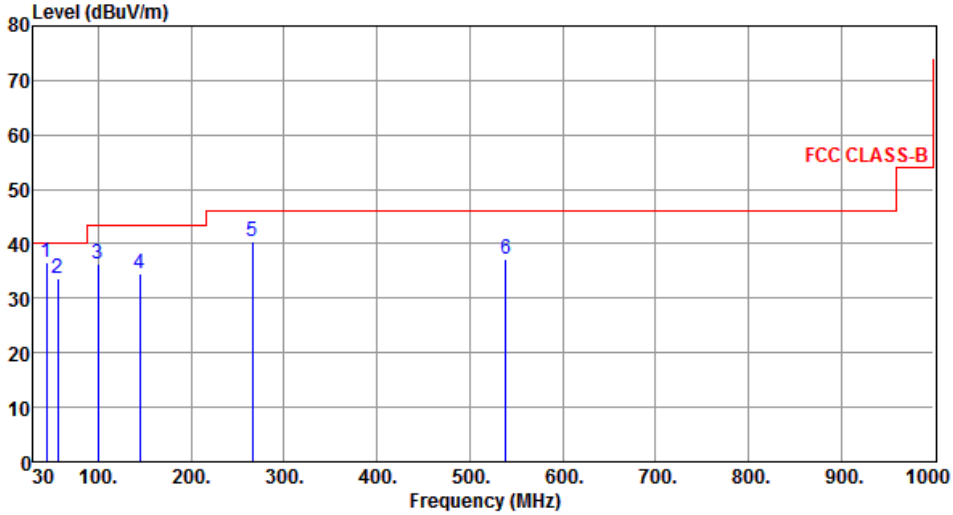
Polarization	Horizontal	Test Mode	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	56.19	27.02	40.00	-12.98	35.87	-8.85	Peak	---	---
2	144.46	30.99	43.50	-12.51	39.41	-8.42	Peak	---	---
3	180.35	34.52	43.50	-8.98	44.53	-10.01	Peak	---	---
4	216.24	29.88	46.00	-16.12	41.01	-11.13	Peak	---	---
5	266.68	39.57	46.00	-6.43	48.46	-8.89	Peak	---	---
6	499.48	30.79	46.00	-15.21	33.47	-2.68	Peak	---	---

Note 1: Emission level (dBuV/m) = SA reading (dBuV) + Factor (dB)
2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m)

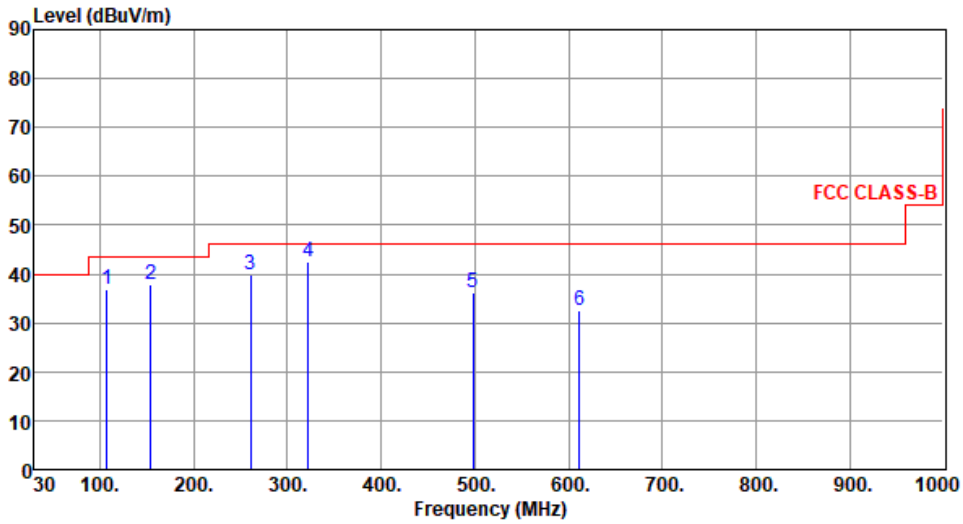
Polarization	Vertical	Test Mode	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	44.55	36.48	40.00	-3.52	44.61	-8.13	Peak	---	---
2	56.19	33.77	40.00	-6.23	42.62	-8.85	Peak	---	---
3	99.84	36.18	43.50	-7.32	49.41	-13.23	Peak	---	---
4	144.46	34.52	43.50	-8.98	42.94	-8.42	Peak	---	---
5	265.71	40.34	46.00	-5.66	49.29	-8.95	Peak	---	---
6	539.25	37.23	46.00	-8.77	39.04	-1.81	Peak	---	---

Note 1: Emission level (dBuV/m) = SA reading (dBuV) + Factor (dB)
2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m)

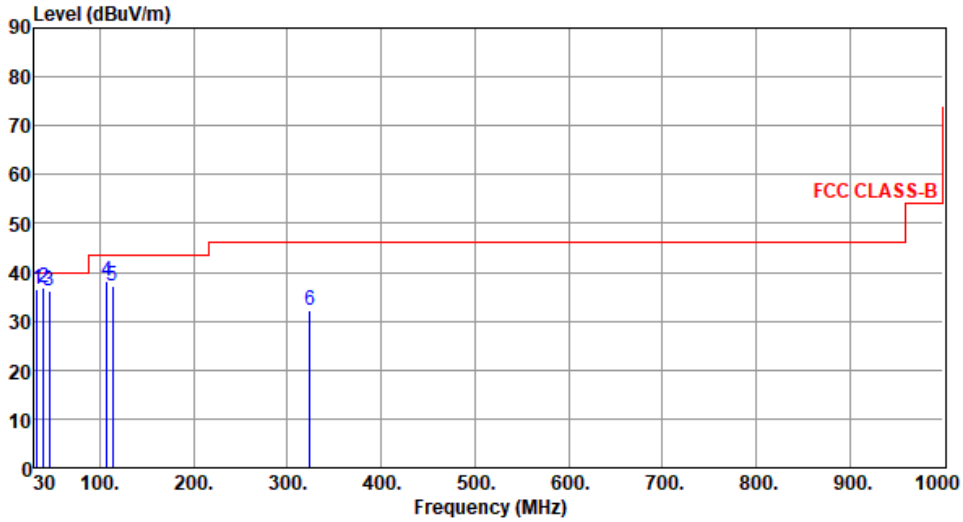
Polarization	Horizontal	Test Mode	2



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	107.60	36.98	43.50	-6.52	49.19	-12.21	Peak	---	---
2	154.16	38.00	43.50	-5.50	46.94	-8.94	Peak	---	---
3	260.86	39.93	46.00	-6.07	49.77	-9.84	Peak	---	---
4	321.97	42.65	46.00	-3.35	50.13	-7.48	Peak	---	---
5	498.51	36.31	46.00	-9.69	39.66	-3.35	Peak	---	---
6	612.00	32.58	46.00	-13.42	33.44	-0.86	Peak	---	---

Note 1: Emission level (dBuV/m) = SA reading (dBuV) + Factor (dB)
2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m)

Polarization	Vertical	Test Mode	2

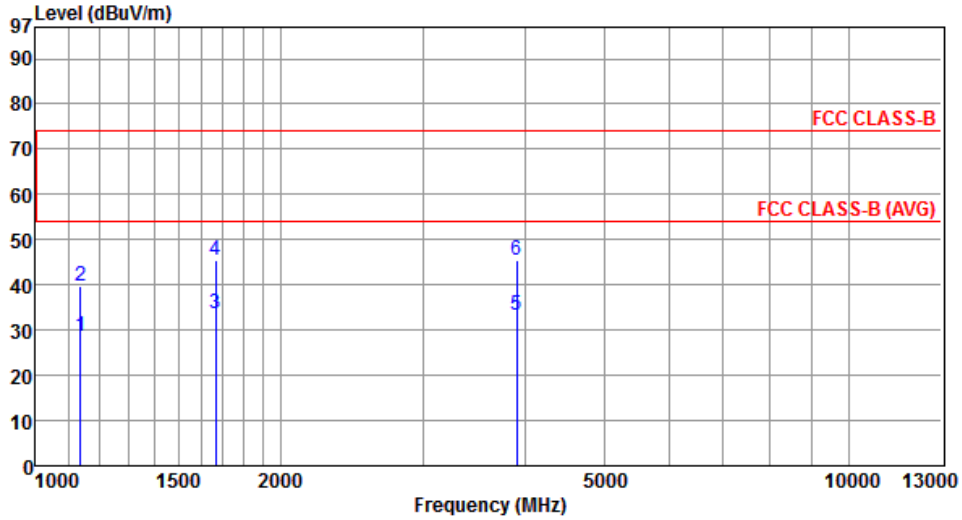


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	32.79	36.65	40.00	-3.35	46.10	-9.45	QP	100	91
2	39.95	36.95	40.00	-3.05	45.41	-8.46	QP	100	70
3	45.52	36.33	40.00	-3.67	44.54	-8.21	QP	100	85
4	107.60	38.33	43.50	-5.17	50.54	-12.21	Peak	---	---
5	113.42	37.06	43.50	-6.44	48.43	-11.37	Peak	---	---
6	323.91	32.26	46.00	-13.74	39.68	-7.42	Peak	---	---

Note 1: Emission level (dBuV/m) = SA reading (dBuV) + Factor (dB)
2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m)

3.2.5 Radiated Emissions (Above 1GHz)

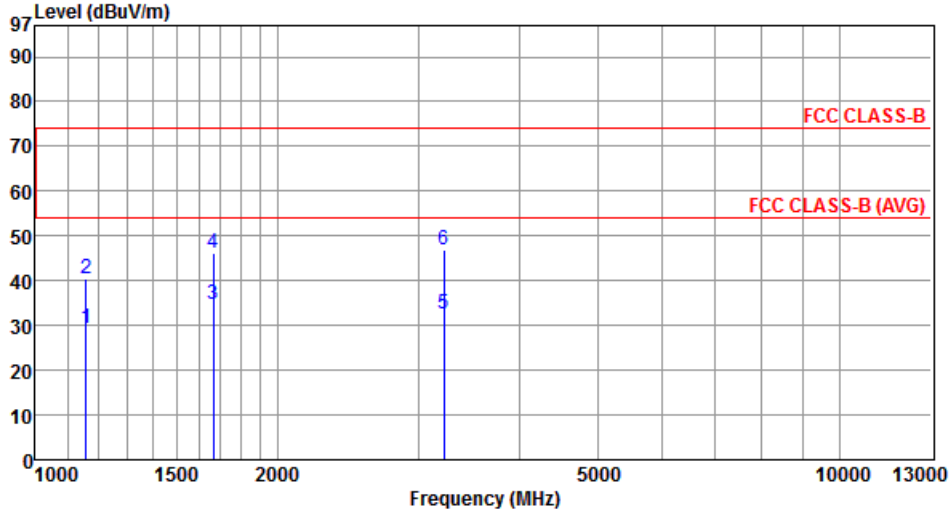
Polarization	Horizontal	Test Mode	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1135.00	28.63	54.00	-25.37	37.56	-8.93	Average	125	111
2	1135.00	39.63	74.00	-34.37	48.56	-8.93	Peak	125	111
3	1664.00	33.54	54.00	-20.46	38.88	-5.34	Average	130	33
4	1664.00	45.32	74.00	-28.68	50.66	-5.34	Peak	130	33
5	3900.00	33.42	54.00	-20.58	31.04	2.38	Average	115	277
6	3900.00	45.31	74.00	-28.69	42.93	2.38	Peak	115	277

Note 1: Emission level (dBuV/m) = SA reading (dBuV) + Factor (dB)
2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m)

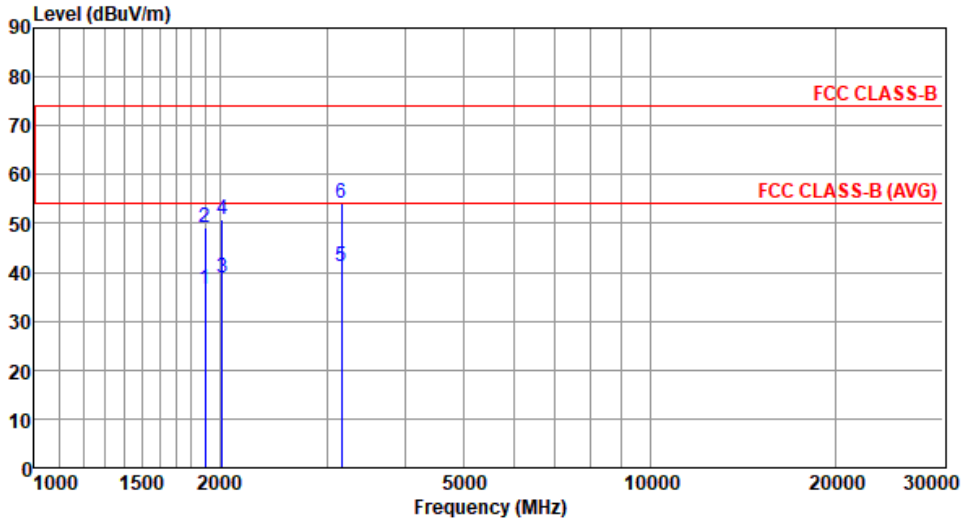
Polarization	Vertical	Test Mode	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1155.00	29.33	54.00	-24.67	38.11	-8.78	Average	100	166
2	1155.00	40.37	74.00	-33.63	49.15	-8.78	Peak	100	166
3	1665.00	34.82	54.00	-19.18	40.15	-5.33	Average	100	280
4	1665.00	46.10	74.00	-27.90	51.43	-5.33	Peak	100	280
5	3220.00	32.48	54.00	-21.52	32.11	0.37	Average	100	211
6	3220.00	46.92	74.00	-27.08	46.55	0.37	Peak	100	211

Note 1: Emission level (dBuV/m) = SA reading (dBuV) + Factor (dB)
2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m)

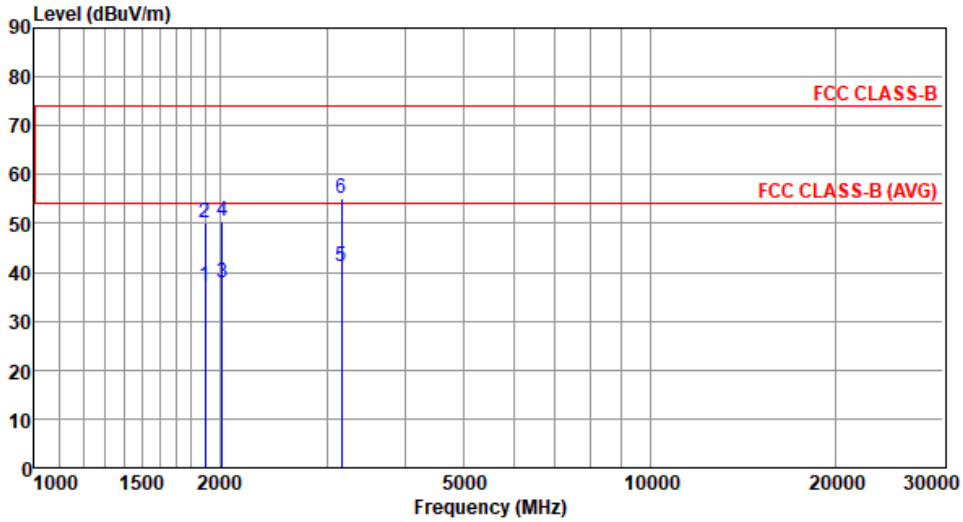
Polarization	Horizontal	Test Mode	2



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1896.00	36.42	54.00	-17.58	42.17	-5.75	Average	100	156
2	1896.00	49.31	74.00	-24.69	55.06	-5.75	Peak	100	156
3	2020.00	38.84	54.00	-15.16	43.70	-4.86	Average	100	172
4	2020.00	50.65	74.00	-23.35	55.51	-4.86	Peak	100	172
5	3152.00	41.20	54.00	-12.80	41.96	-0.76	Average	100	165
6	3152.00	54.01	74.00	-19.99	54.77	-0.76	Peak	100	165

Note 1: Emission level (dBuV/m) = SA reading (dBuV) + Factor (dB)
2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m)

Polarization	Vertical	Test Mode	2



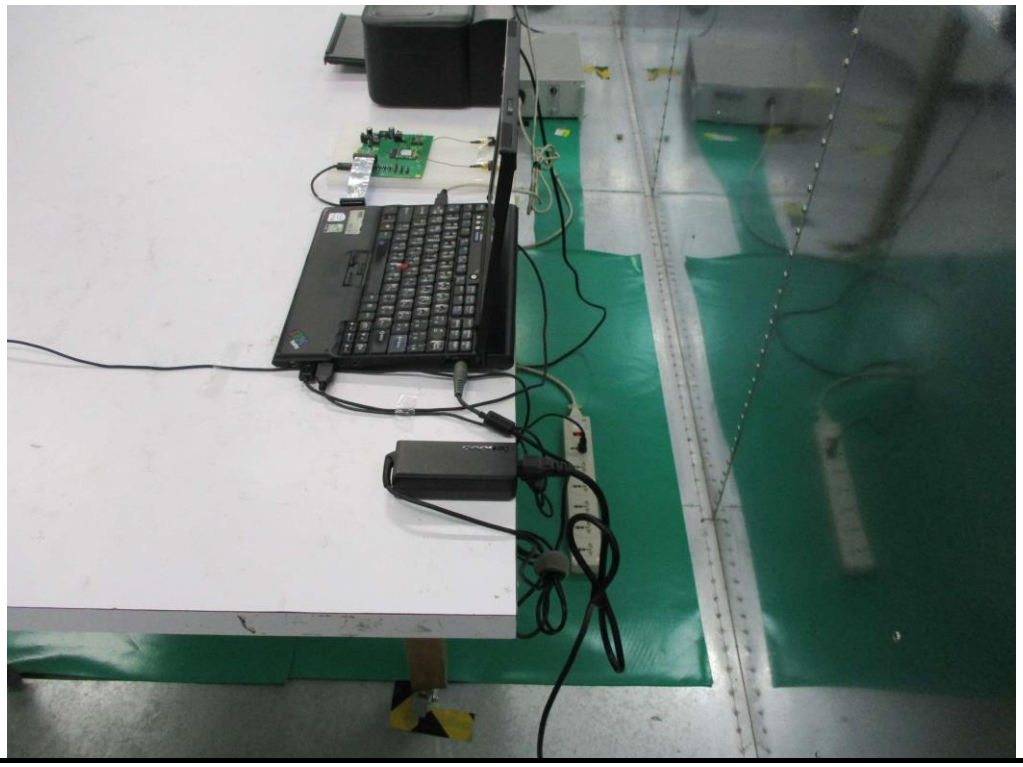
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1896.00	37.27	54.00	-16.73	43.02	-5.75	Average	100	53
2	1896.00	50.05	74.00	-23.95	55.80	-5.75	Peak	100	53
3	2020.00	37.82	54.00	-16.18	42.68	-4.86	Average	100	154
4	2020.00	50.44	74.00	-23.56	55.30	-4.86	Peak	100	154
5	3152.00	41.09	54.00	-12.91	41.85	-0.76	Average	100	154
6	3152.00	55.12	74.00	-18.88	55.88	-0.76	Peak	100	154

Note 1: Emission level (dBuV/m) = SA reading (dBuV) + Factor (dB)
2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m)

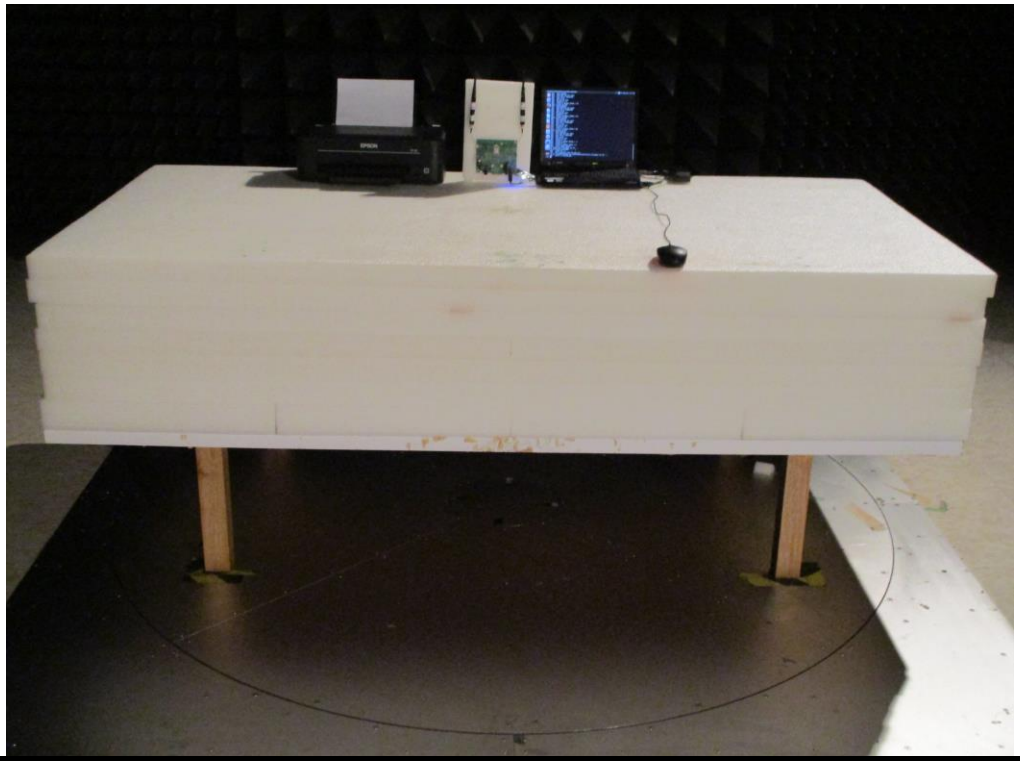
4 Photographs of the Test Configuration

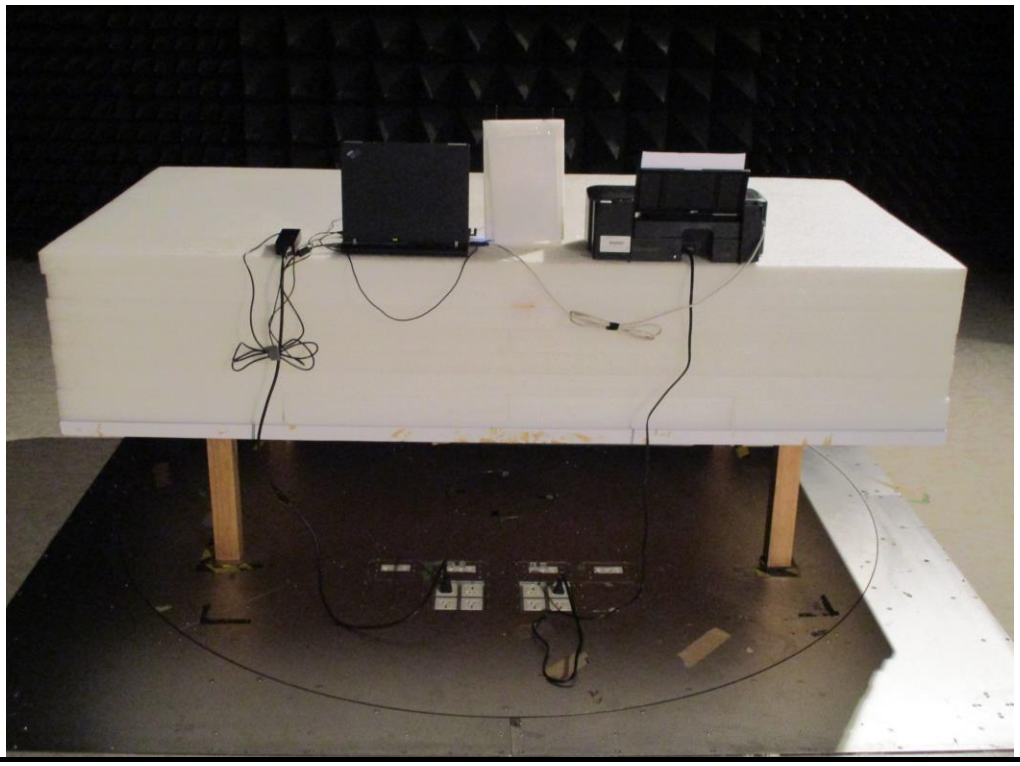
For original test

Conducted Emission Test

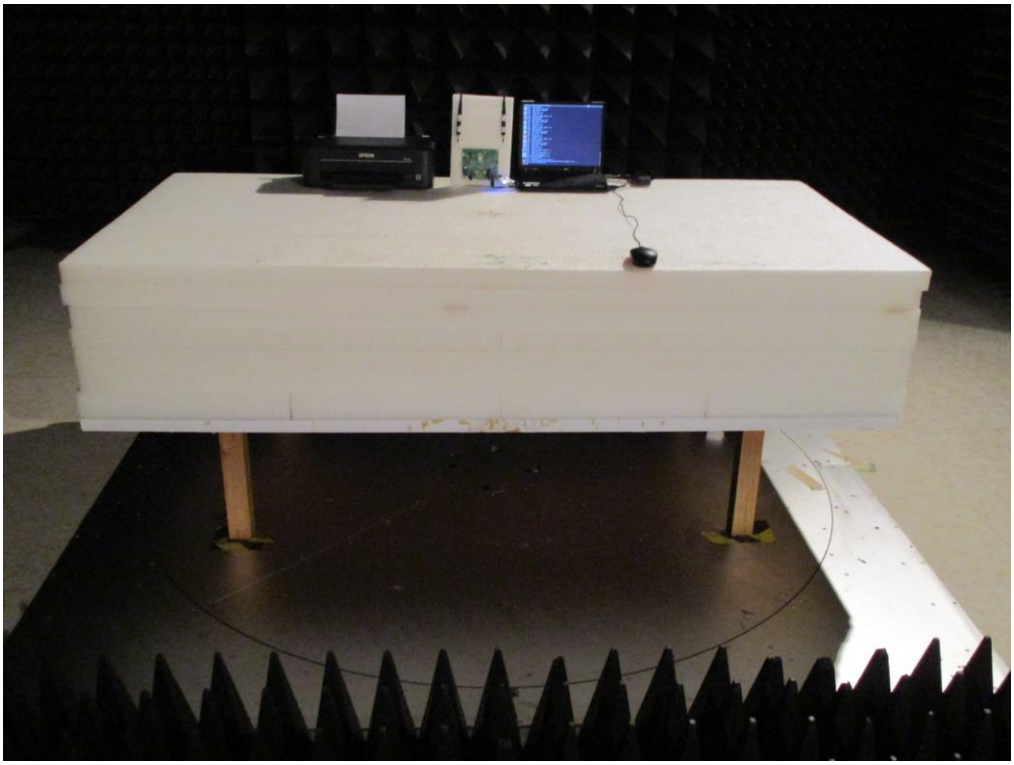


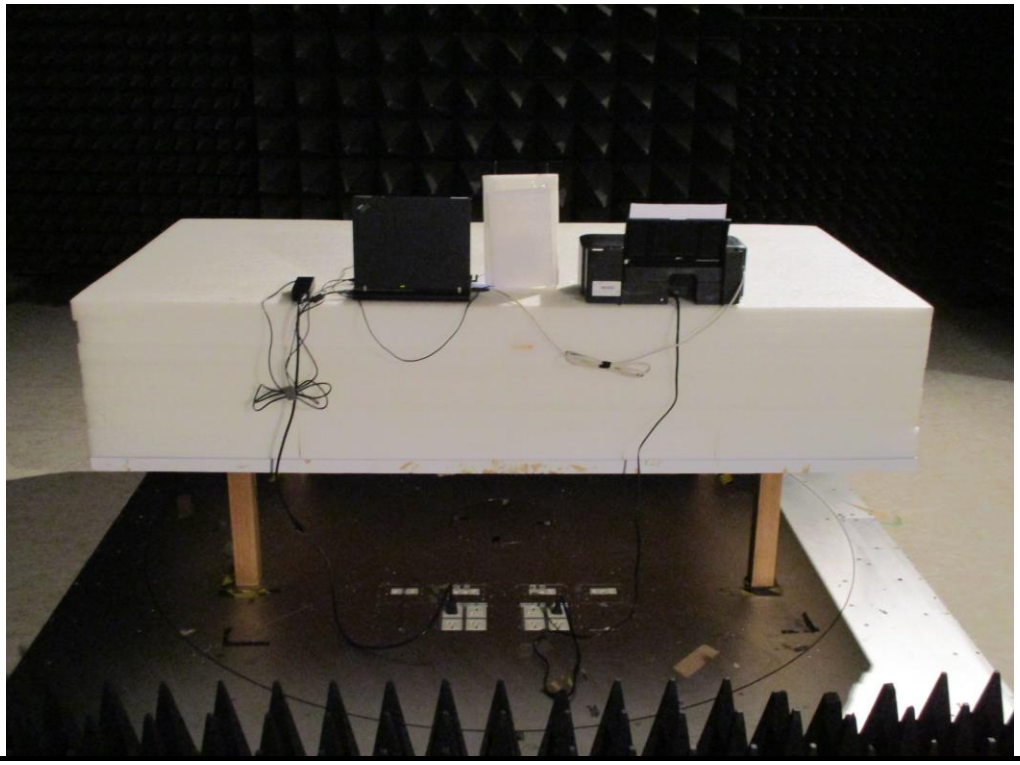
Radiated Emission Below 1GHz Test





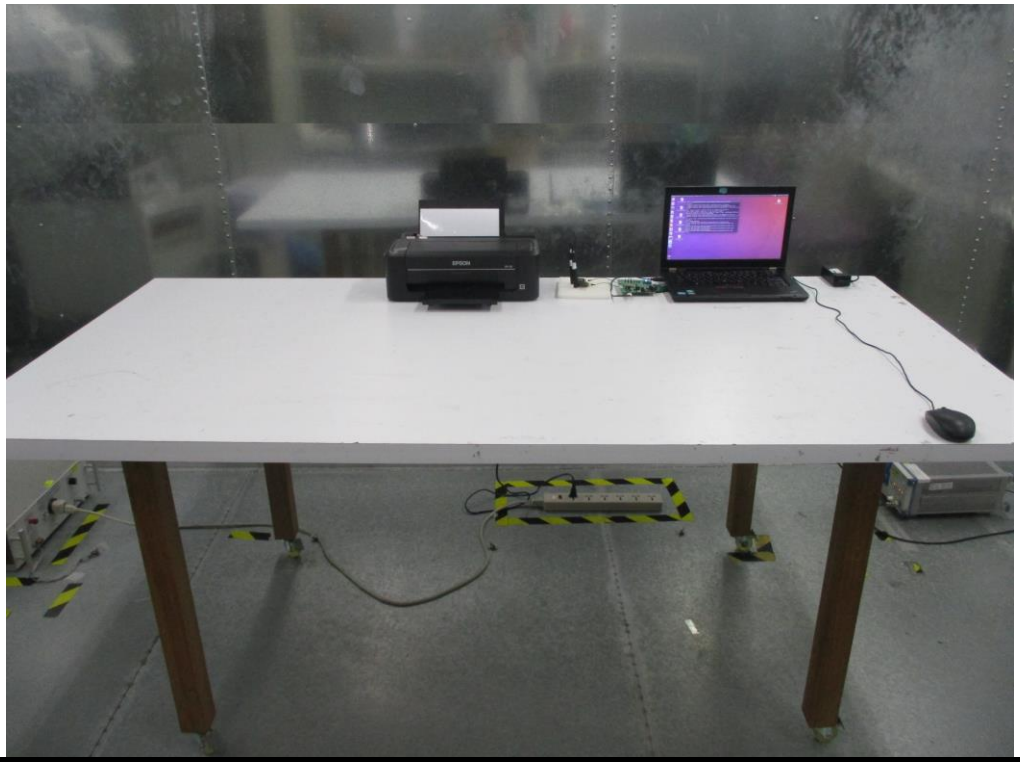
Radiated Emission Above 1GHz Test

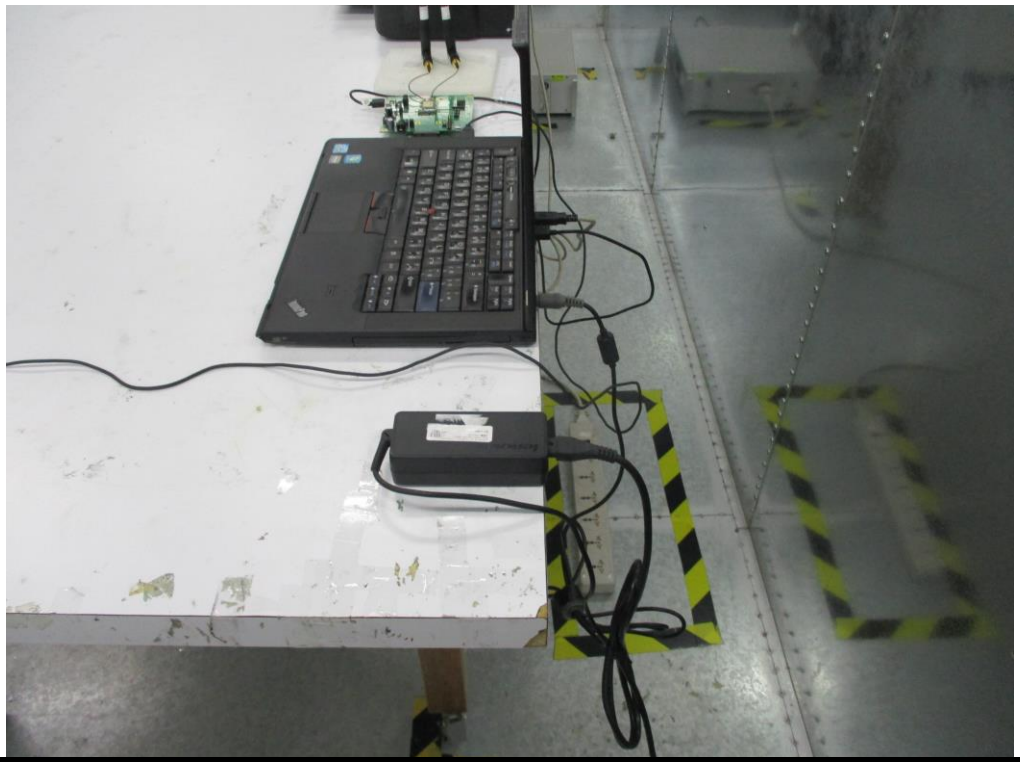




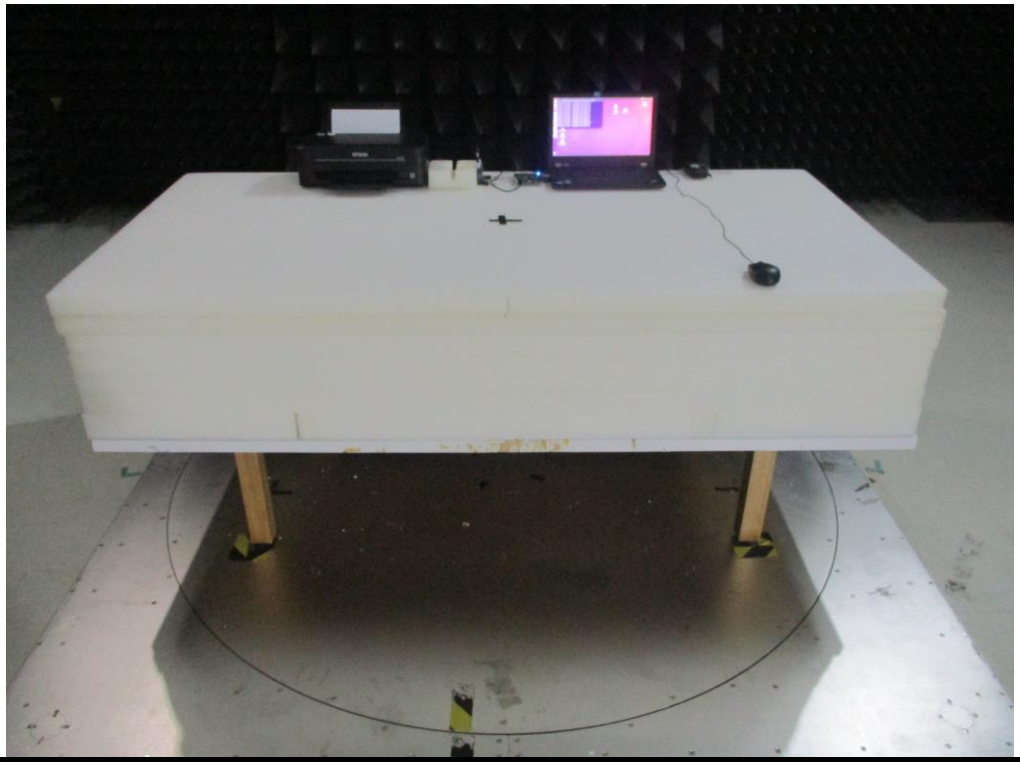
For new test

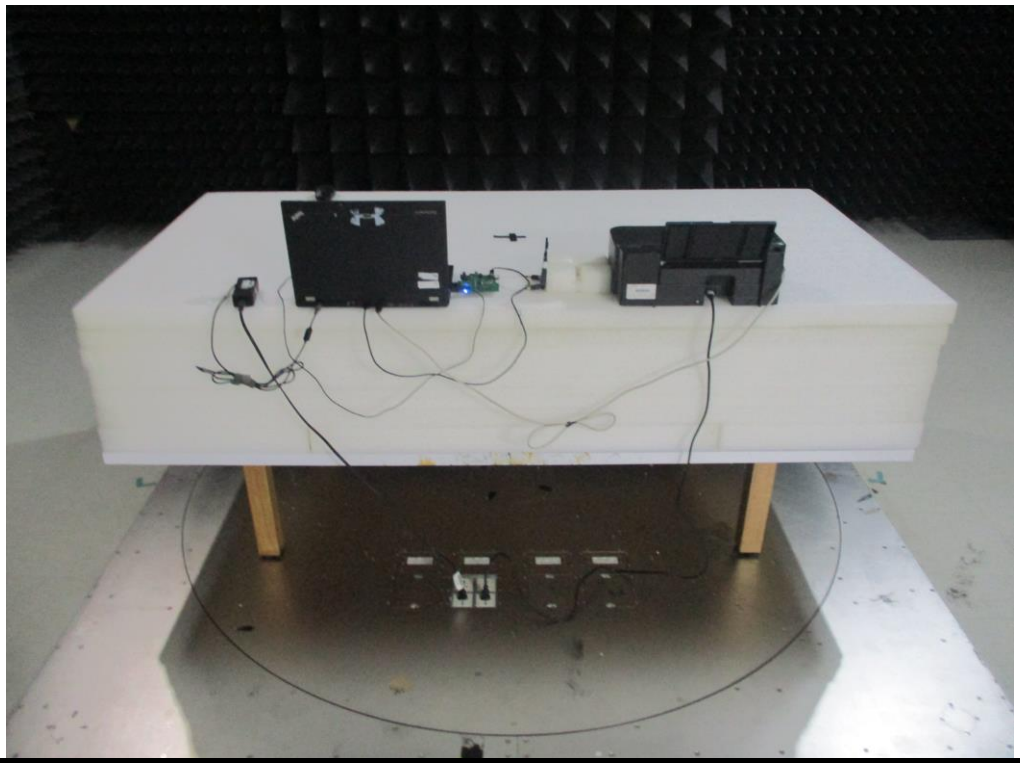
Conducted Emission Test



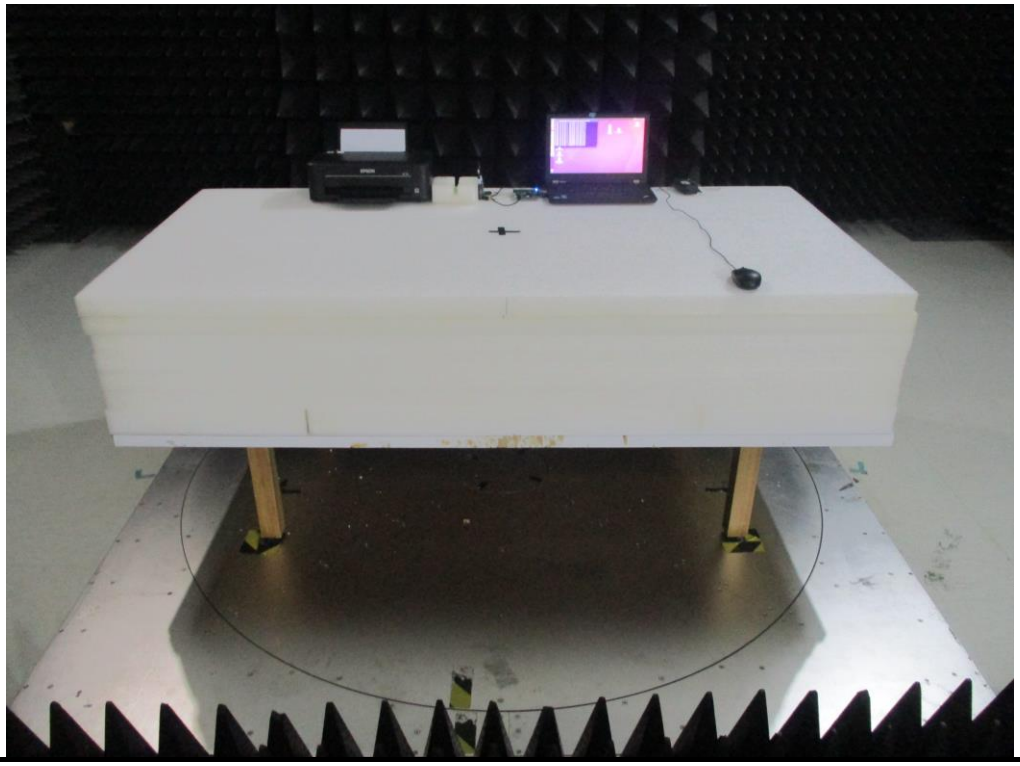


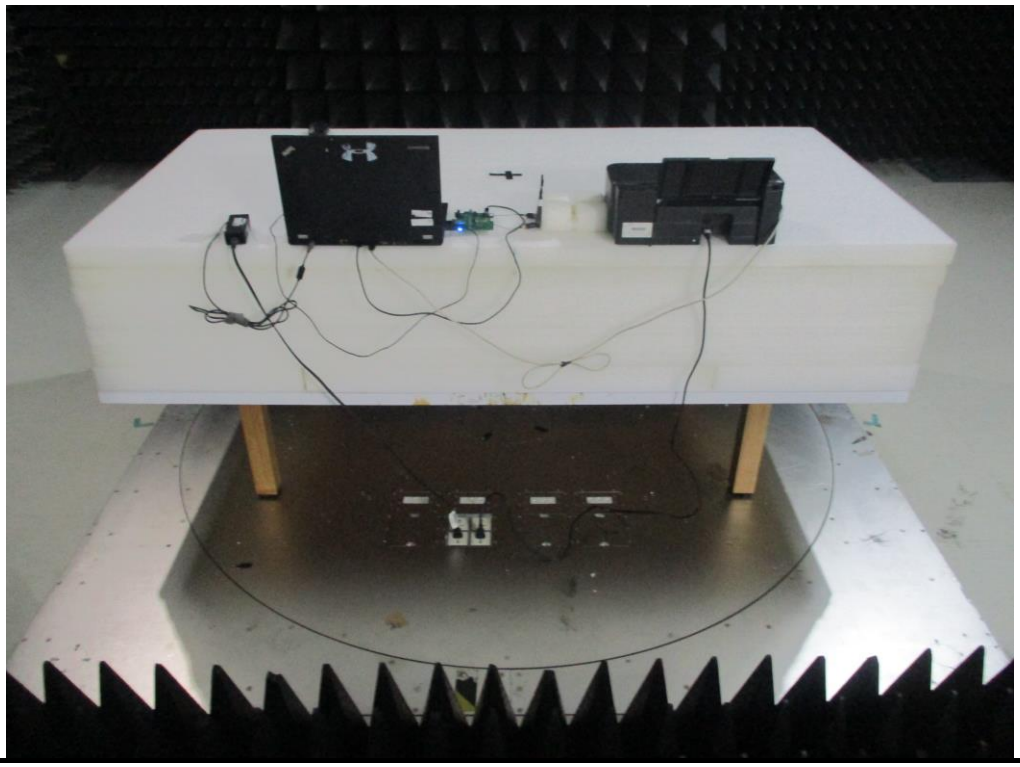
Radiated Emission Below 1GHz Test





Radiated Emission Above 1GHz Test





5 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 (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	**Kwei Shan**	**Kwei Shan Site II**
Tel: 886-2-2601-1640	Tel: 886-3-271-8666	Tel: 886-3-271-8640
No. 30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan, R.O.C.	No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.	No. 14-1, Lane 19, Wen San 3rd St., Kwei Shan District, 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: 886-3-318-0155
Email: ICC_Service@icertifi.com.tw

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