TEST REPORT

of

Australian/New Zealand Standard AS/NZS 4268:2017

Product :	**Bluetooth 5.0 Module**
Brand:	**Fanstel**
Model:	**BT840X, BT840XE**
Model Difference:	**Please see page 5 model summaries table**
Applicant:	**Fanstel Corporation, Taipei**
Address:	**10F-10, No. 79, Sec. 1, Hsin Tai Wu Rd., Hsi-Chih, New Taipei City 221 Taiwan**

Test Performed by:

International Standards Laboratory Corp. LT Lab.
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No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan

Report No.: **ISL-19LR022ANZ-R5**

Issue Date : **2023/12/06**

VERIFICATION OF COMPLIANCE

Applicant:	Fanstel Corporation, Taipei
Product Description:	Bluetooth 5.0 Module
Brand Name:	Fanstel
Model No.:	BT840X, BT840XE
Model Difference:	Please see page 5 model summaries table
Date of test:	2023/11/24 ~ 2023/12/05
Date of EUT Received:	2023/11/24

APPLICABLE STANDARDS
AS/NZS 4268:2017, Row 59 Row 21
This report only covers partial test item, including EIRP, TX RSE, and RX RSE.

We hereby certify that:

All the tests in this report have been performed and recorded in accordance with the standards described above and performed by an independent electromagnetic compatibility consultant, International Standards Laboratory Corp.

The test results contained in this report accurately represent the measurements of the characteristics and the energy generated by sample equipment under test at the time of the test. The sample equipment tested as described in this report is in compliance with the limits of above standards.

Test By:	Weitin Chen	***Date:***	2023/12/06
	Weitin Chen / Senior Engineer		
Prepared By:	Gigi yeh	***Date:***	2023/12/06
	Gigi Yeh / Senior Engineer		
Approved By:	Jerry Liu	***Date:***	2023/12/06
	Jerry Liu / Manager		

Version

Version No.	Date	Description
00	2019/06/27	Initial creation of document
01	2023/12/06	This is an additional report. Due to the replacement of the SAW filter in the product, RF output power, transmitter unwanted radiation and Receiver Spurious Emissions tests were conducted, with comparisons made against the original data. For other test data, please refer to the original case 19LR022ANZ.

Table of Contents

1 Description of Equipment Under Test (EUT)

General:

Product Name:	Bluetooth 5.0 Module
Brand Name:	Fanstel
Model Name:	BT840X, BT840XE
Model Difference:	Please see model summaries table below
Type of Equipment:	Embed Modular
Temperature Range:	-40°C to +85°C
Simultaneous transmissions:	Yes
Geo-location capability:	No
Power Supply	5Vdc

Model Summaries

module	BT840X	BT840XE
SoC	nRF52840-QIAA	nRF52840-QIAA
Size	15x20.8x1.9mm	15x20.8x1.9mm
BT Antenna	PCB trace	PA + u.FL
32.768 sleep crystal	Integrated	Integrated
Availability	Sample	Sample

BT BLE:

Bluetooth Version	BT 5.0 (GFSK)
Frequency Range	2402 – 2480MHz
Channel number	40 channels
Modulation type	GFSK
Transmit Power (EIRP)	16.17dBm
Dwell Time	N/A
Operating Mode	Point-to-Point
Adaptive/ Non-Adaptive	Non-Adaptive
LBT (Listen Before Talk)	Yes
	■ Adaptive Frequency Hopping using LBT based DAA ☐ Adaptive Frequency Hopping using other forms of DAA (non-LBT based) ☐ Short Control Signaling Transmissions
Occupied Channel Bandwidth	Within 2400-2483.5MHz
Duty Cycle	N/A
Antenna Beam forming	No
Antenna Designation:	Type: PCB Antenna, BT840X : 0.87 dBi Type: Dipole Antenna,BT840XE : 0 dBi

This test report applies for Bluetooth BLE.

Remark: The above DUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

RF Output Power Comparison Results:

Frequency (MHz)	Test Condition	Output Power e.i.r.p. (dBm)		Power Deviation (dB)
		Original Value	Present Value	
2402	T_{nor}, V_{nor}	6.57	6.77	0.2
	T_{low}, V_{min}	14.47	16.17	1.7
	T_{low}, V_{max}	14.47	16.17	1.7
	T_{high}, V_{min}	6.57	6.77	0.2
	T_{high}, V_{max}	6.67	6.57	-0.1
2442	T_{nor}, V_{nor}	8.27	8.47	0.2
	T_{low}, V_{min}	16.07	16.17	0.1
	T_{low}, V_{max}	15.17	15.37	0.2
	T_{high}, V_{min}	8.17	7.97	-0.2
	T_{high}, V_{max}	8.27	8.37	0.1
2480	T_{nor}, V_{nor}	7.67	7.37	-0.3
	T_{low}, V_{min}	15.37	15.37	0
	T_{low}, V_{max}	15.37	15.37	0
	T_{high}, V_{min}	7.87	8.07	0.2
	T_{high}, V_{max}	7.77	7.67	-0.1

2 Description of Test Modes and Test Condition

The EUT has been tested under Operating and standby condition. And used to control the EUT for staying in continuous transmitting and receiving mode is programmed. Channel lower, mid and higher of Bluetooth BLE modes were chosen for testing.

Normal test conditions:

Temperature : + 15℃ to 35 ℃
Relative humidity: 20 % to 75 %
3.7Vdc Voltage

Extreme Temperatures

For test at extreme temperatures, measurements shall be in accordance with the procedures specified in section 5.3 of AS/NZS 4268 at upper value of +55 degree and at a lower value of -10 degree.

Extreme Test Source Voltages

Low voltage is 3.33Vdc and 4.07Vdc for high voltage nominal voltage 3.7Vdc

3 General Description of Apply Standards

The EUT According to the Specifications, it must comply with the requirements of the following standards:

AS/NZS 4268:2017, – Radio equipment and systems – Short range devices – Limits and methods of measurement.

Row 59: Digital modulation transmitters
Row 21: All transmitters

EN 300 440 V1.6.1 – Part 1: Technical characteristics and test method.

4 Test Facility

International Standards Laboratory Corp.
<LT Lab.>
No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan

A fully anechoic chamber was used for the radiated spurious emissions test.

TAF Accreditation Lab. Lab number: 0997

5 Support Equipment

Fig. 5-1 Configuration of Tested System

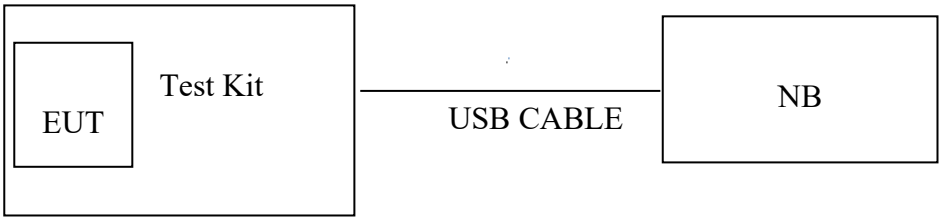


Table 5-1 Equipment Used in Tested System

Item	Equipment	Mrf/Brand	Model name	Series No	Data Cable	Power Cable
1	Notebook	Lenovo	X220i	N/A	N/A	Non-shielded
2	Test Kit	N/A	N/A	N/A	N/A	N/A

6 Maximum EIRP Measurement

6.1. Limit:

4W(36dBm) for Row 59

10W(20dBm) for Row 21

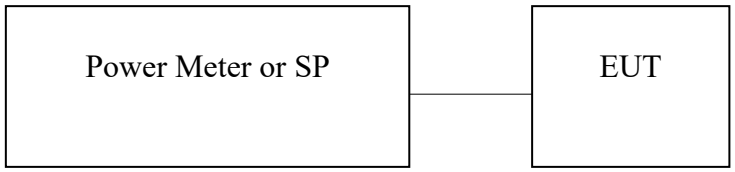
According to AS/NZS 4268:2017, Table 1, row 59: Digital modulation transmitters

According to AS/NZS 4268:2017, Table 1, row 21: All transmitters

6.2. Measurement Equipment Used:

Location Conducted	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Conducted	Power Meter	Anritsu	ML2495A	1116010	09/27/2023	09/27/2024
Conducted	Power Sensor	Anritsu	MA2411B	34NKF50	09/27/2023	09/27/2024
Conducted	Power Sensor	DARE	RPR3006W	13I00030SNO33	01/06/2023	01/06/2024
Conducted	Power Sensor	DARE	RPR3006W	13I00030SNO34	01/06/2023	01/06/2024
Conducted	Power Sensor	DARE	RPR3006W	14I00889SNO35	06/21/2023	06/21/2024
Conducted	Power Sensor	DARE	RPR3006W	14I00889SNO36	06/21/2023	06/21/2024
Conducted	Temperature Chamber	KSON	THS-B4H100	2287	05/17/2023	05/17/2024
Conducted	DC Power supply	ABM	8185D	N/A	01/04/2023	01/04/2024
Conducted	AC Power supply	EXTECH	CFC105W	NA	N/A	N/A
Conducted	Spectrum analyzer	Keysight	N9010A	MY56070257	09/26/2023	09/26/2024
Conducted	Test Software	DARE	Radiation Ver:2013.1.23	NA	NA	NA
Conducted	Wideband Radio Comm. Tester	R&S	CMW500	1201.002K50108 793-JG	10/26/2023	10/26/2024
Conducted	Radio Communication Test Station	Anritsu	MT8000A	6272539604	08/30/2023	08/30/2024
Conducted	BT Simulator	Agilent	N4010A	MY48100200	NA	NA
Conducted	Signal Generator	Agilent	E4438C	MY49071550	12/28/2022	12/28/2023
Conducted	Signal Generator	Keysight	N5182B	MY53052399	12/28/2022	12/28/2023
Conducted (TS8997)	Wideband Radio Comm. Tester	R&S	CMW500	168811	09/13/2023	09/13/2024
Conducted (TS8997)	UP/DOWN converter	R&S	CMW-Z800A	100566	09/13/2023	09/13/2024
Conducted (TS8997)	Signal Generator	R&S	SMB100A	183701	09/14/2023	09/14/2024
Conducted (TS8997)	Vector Signal Generator	R&S	SMM100A	101908	09/13/2023	09/13/2024
Conducted (TS8997)	Signal analyzer 40GHz	R&S	FSV40	101884	09/13/2023	09/13/2024
Conducted (TS8997)	OSP150 extension unit CAM-BUS	R&S	OSP150	101107	09/15/2023	09/15/2024
Conducted (TS8997)	Test Software	R&S	EMC32 Ver:11.60.00	NA	NA	NA

6.3. Test Setup:



6.4. Test Procedure:

Refer to ETSI EN 300 440-1 V1.6.1, clause 7.1.

Refer to ETSI EN 300 328 V2.1.1,

See Sub-Clause 5.3.2.1 of ETSI EN 300 328 for the test conditions

See Sub-Clause 5.3.2.2.1.1 of ETSI EN 300 328 for conducted method.

6.5. Measurement Result: Refer to next page for the details.

6.5.1. Test Results:

Example Calculation:
Pburst values (A) = Reading + Cable Loss
RF output power (P) = A+G+Y

Ambient temperature: 23℃ Relative humidity: 71% Test Date: 2023/11/27

Test Mode: BT LE

Pburst values (value "A" in dBm)

antenna assembly gain "G" in dBi	0.87 dBi
beamforming gain "Y" in dB	0.00 dB
Cable Loss=	1.00 dB

TEST CONDITIONS		TRANSMITTER POWER (dBm)		
		Lowest Frequency	Middle Frequency	Highest Frequency
Temp -40 °C	Vmin 4.5 V	P 14.37 dBm	P 16.17 dBm	P 15.37 dBm
		A 13.50 dBm	A 15.30 dBm	A 14.50 dBm
		Reading 12.5 dBm	Reading 14.3 dBm	Reading 13.5 dBm
	Vmax 5.5 V	P 14.37 dBm	P 15.37 dBm	P 15.37 dBm
		A 13.50 dBm	A 14.50 dBm	A 14.50 dBm
		Reading 12.5 dBm	Reading 13.5 dBm	Reading 13.5 dBm
Temp 25 °C	Vnom 5 V	P 6.77 dBm	P 8.47 dBm	P 7.37 dBm
		A 5.90 dBm	A 7.60 dBm	A 6.50 dBm
		Reading 4.9 dBm	Reading 6.6 dBm	Reading 5.5 dBm
Temp 85 °C	Vmin 4.5 V	P 6.77 dBm	P 7.97 dBm	P 8.07 dBm
		A 5.90 dBm	A 7.10 dBm	A 7.20 dBm
		Reading 4.9 dBm	Reading 6.1 dBm	Reading 6.2 dBm
	Vmax 5.5 V	P 6.57 dBm	P 8.37 dBm	P 7.67 dBm
		A 5.70 dBm	A 7.50 dBm	A 6.80 dBm
		Reading 4.7 dBm	Reading 6.5 dBm	Reading 5.8 dBm
Limit(P)		36dBm		

7 Transmitter Spurious Emissions Measurement

7.1. Limit:

According to AS/NZS 4268:2017, Table 1, row 59: Digital modulation transmitters

According to AS/NZS 4268:2017, Table 1, row 21: All transmitters

7.2. Measurement Equipment Used:

Refer to section 6.2 of present report.

7.3. Test Setup:

Refer to section 6.3 of present report.

7.4. Test Procedure:

Refer to ETSI EN 300 440-1 V1.6.1, clause 7.3.

7.5. Measurement Result:

Refer to next page for the details.

7.5.1. Test Results: (Radiated)

Ambient temperature: 23 ℃ Relative humidity: 71 % Test Date: 2023/11/27

Test Mode: Bluetooth BLE mode, TX CH Low (model: BT840X)

No	Freq MHz	Reading dBm	Aux dB	Level dBm	Limit dBm	Margin dB	Pol V/H
1	85.16	-52.59	1.00	-51.59	-36.00	-15.59	VERTICAL
2	192.74	-63.49	2.23	-61.26	-54.00	-7.26	VERTICAL
3	504.72	-74.26	8.95	-65.31	-54.00	-11.31	VERTICAL
4	615.08	-74.44	10.73	-63.71	-54.00	-9.71	VERTICAL
5	743.57	-78.56	13.73	-64.83	-54.00	-10.83	VERTICAL
6	814.48	-75.08	13.83	-61.25	-54.00	-7.25	VERTICAL
7	1,550.00	-63.31	2.18	-61.13	-30.00	-31.13	VERTICAL
8	4,804.00	-72.94	15.71	-57.23	-30.00	-27.23	VERTICAL
1	84.85	-52.81	0.37	-52.44	-36.00	-16.44	HORIZONTAL
2	192.62	-57.66	1.70	-55.96	-54.00	-1.96	HORIZONTAL
3	594.63	-75.26	11.10	-64.16	-54.00	-10.16	HORIZONTAL
4	666.18	-76.63	11.93	-64.70	-54.00	-10.70	HORIZONTAL
5	740.23	-76.58	13.94	-62.64	-54.00	-8.64	HORIZONTAL
6	813.99	-77.35	14.39	-62.96	-54.00	-8.96	HORIZONTAL
7	1,440.00	-62.86	2.16	-60.70	-30.00	-30.70	HORIZONTAL
8	4,804.00	-73.55	15.63	-57.92	-30.00	-27.92	HORIZONTAL

Remark:

1. The emission behaviors belong to narrowband spurious emission.
2. Remark " --- " means that the emission level is too low to be measured
3. Aux: Field strength to EIRP correction factor
4. Level (dBm) = Reading (dBm)+Aux(dB)
5. Measurement Range upto 40GHz.

Ambient temperature: 23 ℃ Relative humidity: 71 % Test Date: 2023/11/27

Test Mode: Bluetooth BLE mode, TX CH Mid (model: BT840X)

No	Freq MHz	Reading dBm	Aux dB	Level dBm	Limit dBm	Margin dB	Pol V/H
1	85.22	-51.93	1.00	-50.93	-36.00	-14.93	VERTICAL
2	192.17	-63.92	2.23	-61.69	-54.00	-7.69	VERTICAL
3	516.26	-74.30	8.94	-65.36	-54.00	-11.36	VERTICAL
4	591.91	-74.63	9.94	-64.69	-54.00	-10.69	VERTICAL
5	743.24	-79.71	13.73	-65.98	-54.00	-11.98	VERTICAL
6	817.18	-77.74	13.92	-63.82	-54.00	-9.82	VERTICAL
7	1,564.00	-64.79	2.22	-62.57	-30.00	-32.57	VERTICAL
8	4,884.00	-72.94	16.07	-56.87	-30.00	-26.87	VERTICAL
1	84.87	-45.04	0.37	-44.67	-36.00	-8.67	HORIZONTAL
2	192.27	-57.58	1.70	-55.88	-54.00	-1.88	HORIZONTAL
3	591.99	-76.77	11.04	-65.73	-54.00	-11.73	HORIZONTAL
4	668.58	-77.07	11.98	-65.09	-54.00	-11.09	HORIZONTAL
5	740.17	-78.70	13.94	-64.76	-54.00	-10.76	HORIZONTAL
6	817.14	-78.31	14.44	-63.87	-54.00	-9.87	HORIZONTAL
7	1,990.00	-65.37	4.75	-60.62	-30.00	-30.62	HORIZONTAL
8	4,884.00	-72.55	15.90	-56.65	-30.00	-26.65	HORIZONTAL

Remark:

1. The emission behaviors belong to narrowband spurious emission.
2. Remark " --- " means that the emission level is too low to be measured
3. Aux: Field strength to EIRP correction factor
4. Level (dBm) = Reading (dBm)+Aux(dB)
5. Measurement Range upto 40GHz.

Ambient temperature: 23 ℃ Relative humidity: 71 % Test Date: 2023/11/27

Test Mode: Bluetooth BLE mode, TX CH High (model: BT840X)

No	Freq MHz	Reading dBm	Aux dB	Level dBm	Limit dBm	Margin dB	Pol V/H
1	84.73	-48.16	1.00	-47.16	-36.00	-11.16	VERTICAL
2	192.80	-62.61	2.23	-60.38	-54.00	-6.38	VERTICAL
3	480.94	-71.82	8.99	-62.83	-54.00	-8.83	VERTICAL
4	592.19	-72.32	9.94	-62.38	-54.00	-8.38	VERTICAL
5	741.09	-79.04	13.74	-65.30	-54.00	-11.30	VERTICAL
6	814.08	-74.82	13.83	-60.99	-54.00	-6.99	VERTICAL
7	1,990.00	-62.03	4.60	-57.43	-30.00	-27.43	VERTICAL
8	4,960.00	-72.49	16.40	-56.09	-30.00	-26.09	VERTICAL
1	85.08	-50.30	0.37	-49.93	-36.00	-13.93	HORIZONTAL
2	192.00	-57.17	1.70	-55.47	-54.00	-1.47	HORIZONTAL
3	594.90	-77.78	11.10	-66.68	-54.00	-12.68	HORIZONTAL
4	665.86	-77.90	11.93	-65.97	-54.00	-11.97	HORIZONTAL
5	743.79	-78.20	14.04	-64.16	-54.00	-10.16	HORIZONTAL
6	817.05	-76.03	14.44	-61.59	-54.00	-7.59	HORIZONTAL
7	1,992.00	-63.20	4.75	-58.45	-30.00	-28.45	HORIZONTAL
8	4,960.00	-72.92	16.15	-56.77	-30.00	-26.77	HORIZONTAL

Remark:

1. The emission behaviors belong to narrowband spurious emission.
2. Remark " --- " means that the emission level is too low to be measured
3. Aux: Field strength to EIRP correction factor
4. Level (dBm) = Reading (dBm)+Aux(dB)
5. Measurement Range upto 40GHz.

Ambient temperature: 23 ℃ Relative humidity: 71 % Test Date: 2023/11/27

Test Mode: Bluetooth BLE mode, TX CH Low (model: BT840XE)

No	Freq MHz	Reading dBm	Aux dB	Level dBm	Limit dBm	Margin dB	Pol V/H
1	85.08	-55.31	1.00	-54.31	-36.00	-18.31	VERTICAL
2	192.36	-63.22	2.23	-60.99	-54.00	-6.99	VERTICAL
3	336.78	-64.45	5.18	-59.27	-36.00	-23.27	VERTICAL
4	592.69	-74.03	9.96	-64.07	-54.00	-10.07	VERTICAL
5	748.45	-77.52	13.72	-63.80	-54.00	-9.80	VERTICAL
6	814.67	-74.26	13.83	-60.43	-54.00	-6.43	VERTICAL
7	1,991.00	-64.51	4.60	-59.91	-30.00	-29.91	VERTICAL
8	4,804.00	-72.96	15.71	-57.25	-30.00	-27.25	VERTICAL
1	84.46	-54.32	0.37	-53.95	-36.00	-17.95	HORIZONTAL
2	192.69	-59.21	1.70	-57.51	-54.00	-3.51	HORIZONTAL
3	594.90	-77.37	11.10	-66.27	-54.00	-12.27	HORIZONTAL
4	701.63	-81.26	12.57	-68.69	-54.00	-14.69	HORIZONTAL
5	796.61	-80.64	14.17	-66.47	-54.00	-12.47	HORIZONTAL
6	860.38	-78.40	15.13	-63.27	-54.00	-9.27	HORIZONTAL
7	1,339.00	-63.81	1.89	-61.92	-30.00	-31.92	HORIZONTAL
8	4,804.00	-72.24	15.63	-56.61	-30.00	-26.61	HORIZONTAL

Remark:

1. The emission behaviors belong to narrowband spurious emission.
2. Remark " --- " means that the emission level is too low to be measured
3. Aux: Field strength to EIRP correction factor
4. Level (dBm) = Reading (dBm)+Aux(dB)
5. Measurement Range upto 40GHz.

Ambient temperature: 23 ℃ Relative humidity: 71 % Test Date: 2023/11/27

Test Mode: Bluetooth BLE mode, TX CH Mid (model: BT840XE)

No	Freq MHz	Reading dBm	Aux dB	Level dBm	Limit dBm	Margin dB	Pol V/H
1	85.25	-50.51	1.00	-49.51	-36.00	-13.51	VERTICAL
2	192.45	-63.51	2.23	-61.28	-54.00	-7.28	VERTICAL
3	527.17	-74.75	8.93	-65.82	-54.00	-11.82	VERTICAL
4	593.88	-75.43	9.99	-65.44	-54.00	-11.44	VERTICAL
5	719.56	-81.97	13.82	-68.15	-54.00	-14.15	VERTICAL
6	740.11	-78.57	13.74	-64.83	-54.00	-10.83	VERTICAL
7	1,998.00	-60.28	4.60	-55.68	-30.00	-25.68	VERTICAL
8	4,884.00	-73.73	16.07	-57.66	-30.00	-27.66	VERTICAL
1	85.08	-50.26	0.37	-49.89	-36.00	-13.89	HORIZONTAL
2	192.44	-58.04	1.70	-56.34	-54.00	-2.34	HORIZONTAL
3	504.78	-73.88	8.57	-65.31	-54.00	-11.31	HORIZONTAL
4	645.71	-80.66	11.61	-69.05	-54.00	-15.05	HORIZONTAL
5	740.20	-75.39	13.94	-61.45	-54.00	-7.45	HORIZONTAL
6	815.80	-77.73	14.42	-63.31	-54.00	-9.31	HORIZONTAL
7	1,996.00	-64.08	4.75	-59.33	-30.00	-29.33	HORIZONTAL
8	4,884.00	-73.66	15.90	-57.76	-30.00	-27.76	HORIZONTAL

Remark:

1. The emission behaviors belong to narrowband spurious emission.
2. Remark " --- " means that the emission level is too low to be measured
3. Aux: Field strength to EIRP correction factor
4. Level (dBm) = Reading (dBm)+Aux(dB)
5. Measurement Range upto 40GHz.

Ambient temperature: 23 ℃ Relative humidity: 71 % Test Date: 2023/11/27

Test Mode: Bluetooth BLE mode, TX CH High (model: BT840XE)

No	Freq MHz	Reading dBm	Aux dB	Level dBm	Limit dBm	Margin dB	Pol V/H
1	85.13	-49.59	1.00	-48.59	-36.00	-12.59	VERTICAL
2	517.30	-74.33	8.94	-65.39	-54.00	-11.39	VERTICAL
3	606.41	-73.30	10.39	-62.91	-54.00	-8.91	VERTICAL
4	621.45	-76.96	10.96	-66.00	-54.00	-12.00	VERTICAL
5	716.10	-79.69	13.83	-65.86	-54.00	-11.86	VERTICAL
6	814.43	-74.14	13.83	-60.31	-54.00	-6.31	VERTICAL
7	1,996.00	-57.36	4.60	-52.76	-30.00	-22.76	VERTICAL
8	4,960.00	-72.08	16.40	-55.68	-30.00	-25.68	VERTICAL
1	85.25	-48.93	0.37	-48.56	-36.00	-12.56	HORIZONTAL
2	192.69	-58.55	1.70	-56.85	-54.00	-2.85	HORIZONTAL
3	527.56	-75.37	9.30	-66.07	-54.00	-12.07	HORIZONTAL
4	668.41	-77.50	11.98	-65.52	-54.00	-11.52	HORIZONTAL
5	743.20	-77.96	14.04	-63.92	-54.00	-9.92	HORIZONTAL
6	817.39	-77.42	14.44	-62.98	-54.00	-8.98	HORIZONTAL
7	1,997.00	-63.44	4.75	-58.69	-30.00	-28.69	HORIZONTAL
8	4,960.00	-72.85	16.15	-56.70	-30.00	-26.70	HORIZONTAL

Remark:

1. The emission behaviors belong to narrowband spurious emission.
2. Remark " --- " means that the emission level is too low to be measured
3. Aux: Field strength to EIRP correction factor
4. Level (dBm) = Reading (dBm)+Aux(dB)
5. Measurement Range upto 40GHz.

8 Receiver Emissions Measurement

8.1 Limit:

According to section 7.2 of AS/NZS 4268:2017

25MHz to 1 GHz 2.0 nW ERP (-57 dBm).

1GHz to 40 GHz 20nW ERP (-47 dBm).

8.2 Measurement Equipment Used:

Refer to section 6.2 of present report.

8.3 Test Setup:

Refer to section 6.3 of present report.

8.4 Test Procedure:

Refer to ETSI EN 300 440-1 V1.6.1, clause 8.4.

8.5 Measurement Result:

Ambient temperature: 23℃ Relative humidity: 71% Test Date: 2023/11/27
Test Mode: BT BLE mode, RX CH Low (Model: BT840X)

No	Freq MHz	Reading dBm	Aux dB	Level dBm	Limit dBm	Margin dB	Pol V/H
1	108.57	-60.51	0.79	-59.72	-57.00	-2.72	VERTICAL
2	216.24	-60.72	2.73	-57.99	-57.00	-0.99	VERTICAL
3	332.67	-63.55	5.09	-58.46	-57.00	-1.46	VERTICAL
4	468.87	-69.84	9.01	-60.83	-57.00	-3.83	VERTICAL
5	592.50	-73.88	9.94	-63.94	-57.00	-6.94	VERTICAL
6	814.11	-76.71	13.83	-62.88	-57.00	-5.88	VERTICAL
7	3,778.00	-70.72	11.08	-59.64	-47.00	-12.64	VERTICAL
8	6,202.00	-73.48	19.01	-54.47	-47.00	-7.47	VERTICAL
1	108.57	-59.58	1.29	-58.29	-57.00	-1.29	HORIZONTAL
2	191.99	-62.08	1.70	-60.38	-57.00	-3.38	HORIZONTAL
3	336.87	-62.65	4.81	-57.84	-57.00	-0.84	HORIZONTAL
4	456.01	-74.32	8.36	-65.96	-57.00	-8.96	HORIZONTAL
5	533.44	-75.80	9.49	-66.31	-57.00	-9.31	HORIZONTAL
6	740.56	-78.80	13.94	-64.86	-57.00	-7.86	HORIZONTAL
7	3,853.00	-70.36	11.80	-58.56	-47.00	-11.56	HORIZONTAL
8	6,429.00	-73.26	23.17	-50.09	-47.00	-3.09	HORIZONTAL

Remark:

1. The emission behaviors belong to narrowband spurious emission.
2. Remark " --- " means that the emission level is too low to be measured
3. Aux: Field strength to EIRP correction factor
4. Level (dBm) = Reading (dBm)+Aux(dB)
5. Measurement Range upto 40GHz.

Ambient temperature: 23℃ Relative humidity: 71% Test Date: 2023/11/27

Test Mode: BT BLE mode, RX CH Mid (Model: BT840X)

No	Freq MHz	Reading dBm	Aux dB	Level dBm	Limit dBm	Margin dB	Pol V/H
1	84.32	-61.36	1.00	-60.36	-57.00	-3.36	VERTICAL
2	120.21	-63.47	2.49	-60.98	-57.00	-3.98	VERTICAL
3	192.65	-62.69	2.23	-60.46	-57.00	-3.46	VERTICAL
4	337.49	-63.90	5.18	-58.72	-57.00	-1.72	VERTICAL
5	526.19	-73.19	8.93	-64.26	-57.00	-7.26	VERTICAL
6	593.05	-73.51	9.96	-63.55	-57.00	-6.55	VERTICAL
7	3,724.00	-70.62	10.74	-59.88	-47.00	-12.88	VERTICAL
8	6,897.00	-74.74	21.46	-53.28	-47.00	-6.28	VERTICAL
1	67.83	-65.66	4.58	-61.08	-57.00	-4.08	HORIZONTAL
2	336.52	-62.53	4.81	-57.72	-57.00	-0.72	HORIZONTAL
3	455.93	-70.63	8.36	-62.27	-57.00	-5.27	HORIZONTAL
4	595.47	-76.99	11.10	-65.89	-57.00	-8.89	HORIZONTAL
5	741.03	-77.62	13.94	-63.68	-57.00	-6.68	HORIZONTAL
6	816.99	-75.68	14.44	-61.24	-57.00	-4.24	HORIZONTAL
7	4,530.00	-71.44	14.68	-56.76	-47.00	-9.76	HORIZONTAL
8	6,764.00	-73.52	23.70	-49.82	-47.00	-2.82	HORIZONTAL

Remark:

1. The emission behaviors belong to narrowband spurious emission.
2. Remark " --- " means that the emission level is too low to be measured
3. Aux: Field strength to EIRP correction factor
4. Level (dBm) = Reading (dBm)+Aux(dB)
5. Measurement Range upto 40GHz.

Ambient temperature: 23℃ Relative humidity: 71% Test Date: 2023/11/27

Test Mode: BT BLE mode, RX CH High (Model: BT840X)

No	Freq MHz	Reading dBm	Aux dB	Level dBm	Limit dBm	Margin dB	Pol V/H
1	84.32	-58.84	1.00	-57.84	-57.00	-0.84	VERTICAL
2	191.99	-62.96	2.23	-60.73	-57.00	-3.73	VERTICAL
3	280.54	-64.49	4.49	-60.00	-57.00	-3.00	VERTICAL
4	336.90	-65.46	5.18	-60.28	-57.00	-3.28	VERTICAL
5	456.10	-74.68	9.04	-65.64	-57.00	-8.64	VERTICAL
6	592.32	-73.57	9.94	-63.63	-57.00	-6.63	VERTICAL
7	3,656.00	-71.99	10.35	-61.64	-47.00	-14.64	VERTICAL
8	6,223.00	-72.61	19.05	-53.56	-47.00	-6.56	VERTICAL
1	84.32	-59.17	0.37	-58.80	-57.00	-1.80	HORIZONTAL
2	216.24	-60.31	2.41	-57.90	-57.00	-0.90	HORIZONTAL
3	337.49	-63.33	4.81	-58.52	-57.00	-1.52	HORIZONTAL
4	534.33	-73.27	9.52	-63.75	-57.00	-6.75	HORIZONTAL
5	740.10	-77.91	13.94	-63.97	-57.00	-6.97	HORIZONTAL
6	817.22	-75.02	14.44	-60.58	-57.00	-3.58	HORIZONTAL
7	2,969.00	-70.05	7.30	-62.75	-47.00	-15.75	HORIZONTAL
8	5,541.00	-71.62	17.45	-54.17	-47.00	-7.17	HORIZONTAL

Remark:

1. The emission behaviors belong to narrowband spurious emission.
2. Remark " --- " means that the emission level is too low to be measured
3. Aux: Field strength to EIRP correction factor
4. Level (dBm) = Reading (dBm)+Aux(dB)
5. Measurement Range upto 40GHz.

Ambient temperature: 23℃ Relative humidity: 71% Test Date: 2023/11/27
Test Mode: BT BLE mode, RX CH Low (Model: BT840XE)

No	Freq MHz	Reading dBm	Aux dB	Level dBm	Limit dBm	Margin dB	Pol V/H
1	36.25	-64.14	6.41	-57.73	-57.00	-0.73	VERTICAL
2	85.00	-60.74	1.00	-59.74	-57.00	-2.74	VERTICAL
3	336.58	-64.53	5.18	-59.35	-57.00	-2.35	VERTICAL
4	602.31	-74.76	10.19	-64.57	-57.00	-7.57	VERTICAL
5	743.07	-79.39	13.73	-65.66	-57.00	-8.66	VERTICAL
6	816.87	-76.99	13.92	-63.07	-57.00	-6.07	VERTICAL
7	1,990.00	-64.88	4.60	-60.28	-47.00	-13.28	VERTICAL
8	5,399.00	-72.22	17.59	-54.63	-47.00	-7.63	VERTICAL
1	33.78	-68.45	9.65	-58.80	-57.00	-1.80	HORIZONTAL
2	109.52	-60.52	1.29	-59.23	-57.00	-2.23	HORIZONTAL
3	216.62	-60.45	2.41	-58.04	-57.00	-1.04	HORIZONTAL
4	337.19	-63.81	4.81	-59.00	-57.00	-2.00	HORIZONTAL
5	594.10	-77.41	11.08	-66.33	-57.00	-9.33	HORIZONTAL
6	740.47	-78.06	13.94	-64.12	-57.00	-7.12	HORIZONTAL
7	1,479.00	-65.68	2.28	-63.40	-47.00	-16.40	HORIZONTAL
8	5,260.00	-72.83	16.82	-56.01	-47.00	-9.01	HORIZONTAL

Remark:

1. The emission behaviors belong to narrowband spurious emission.
2. Remark " --- " means that the emission level is too low to be measured
3. Aux: Field strength to EIRP correction factor
4. Level (dBm) = Reading (dBm)+Aux(dB)
5. Measurement Range upto 40GHz.

Ambient temperature: 23℃ Relative humidity: 71% Test Date: 2023/11/27

Test Mode: BT BLE mode, RX CH Mid (Model: BT840XE)

No	Freq MHz	Reading dBm	Aux dB	Level dBm	Limit dBm	Margin dB	Pol V/H
1	97.67	-59.90	-0.23	-60.13	-57.00	-3.13	VERTICAL
2	192.91	-63.10	2.23	-60.87	-57.00	-3.87	VERTICAL
3	280.96	-65.62	4.49	-61.13	-57.00	-4.13	VERTICAL
4	313.82	-64.17	4.61	-59.56	-57.00	-2.56	VERTICAL
5	592.18	-73.67	9.94	-63.73	-57.00	-6.73	VERTICAL
6	817.14	-75.32	13.92	-61.40	-57.00	-4.40	VERTICAL
7	1,996.00	-62.27	4.60	-57.67	-47.00	-10.67	VERTICAL
8	5,068.00	-72.73	16.74	-55.99	-47.00	-8.99	VERTICAL
1	71.85	-64.64	3.91	-60.73	-57.00	-3.73	HORIZONTAL
2	109.05	-59.74	1.29	-58.45	-57.00	-1.45	HORIZONTAL
3	192.49	-60.97	1.70	-59.27	-57.00	-2.27	HORIZONTAL
4	336.82	-63.09	4.81	-58.28	-57.00	-1.28	HORIZONTAL
5	743.81	-76.74	14.04	-62.70	-57.00	-5.70	HORIZONTAL
6	936.86	-77.27	16.69	-60.58	-57.00	-3.58	HORIZONTAL
7	1,991.00	-65.43	4.75	-60.68	-47.00	-13.68	HORIZONTAL
8	5,105.00	-72.33	16.51	-55.82	-47.00	-8.82	HORIZONTAL

Remark:

1. The emission behaviors belong to narrowband spurious emission.
2. Remark " --- " means that the emission level is too low to be measured
3. Aux: Field strength to EIRP correction factor
4. Level (dBm) = Reading (dBm)+Aux(dB)
5. Measurement Range upto 40GHz.

Ambient temperature: 23℃ Relative humidity: 60% Test Date: 2023/11/27

Test Mode: BT BLE mode, RX CH High (Model: BT840XE)

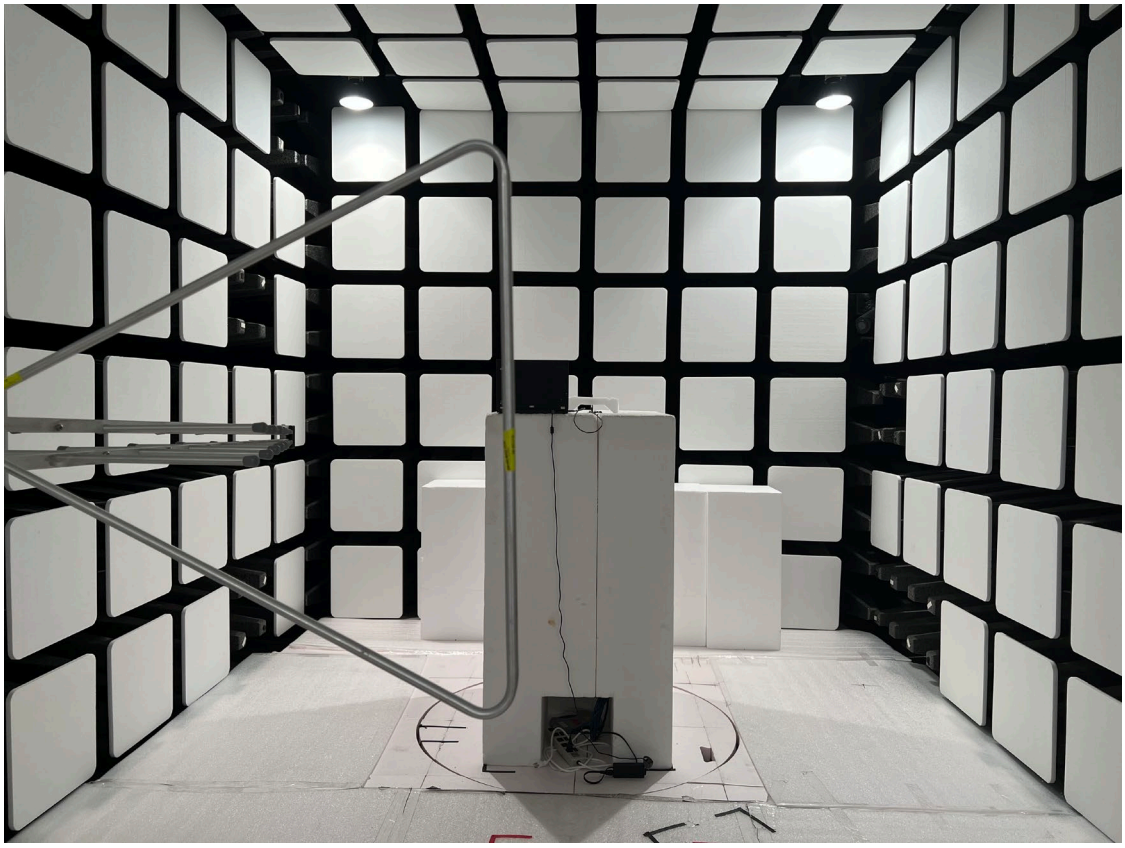
No	Freq MHz	Reading dBm	Aux dB	Level dBm	Limit dBm	Margin dB	Pol V/H
1	84.32	-60.06	1.00	-59.06	-57.00	-2.06	VERTICAL
2	216.38	-61.92	2.73	-59.19	-57.00	-2.19	VERTICAL
3	337.14	-64.26	5.18	-59.08	-57.00	-2.08	VERTICAL
4	740.84	-78.18	13.74	-64.44	-57.00	-7.44	VERTICAL
5	816.70	-75.58	13.92	-61.66	-57.00	-4.66	VERTICAL
6	947.77	-76.98	17.65	-59.33	-57.00	-2.33	VERTICAL
7	1,974.00	-67.13	4.50	-62.63	-47.00	-15.63	VERTICAL
8	4,941.00	-72.28	16.32	-55.96	-47.00	-8.96	VERTICAL
1	192.79	-60.29	1.70	-58.59	-57.00	-1.59	HORIZONTAL
2	246.74	-62.85	4.38	-58.47	-57.00	-1.47	HORIZONTAL
3	520.37	-73.45	9.08	-64.37	-57.00	-7.37	HORIZONTAL
4	666.04	-78.05	11.93	-66.12	-57.00	-9.12	HORIZONTAL
5	743.90	-76.94	14.04	-62.90	-57.00	-5.90	HORIZONTAL
6	817.23	-76.07	14.44	-61.63	-57.00	-4.63	HORIZONTAL
7	4,605.00	-71.61	14.95	-56.66	-47.00	-9.66	HORIZONTAL
8	6,531.00	-73.92	23.84	-50.08	-47.00	-3.08	HORIZONTAL

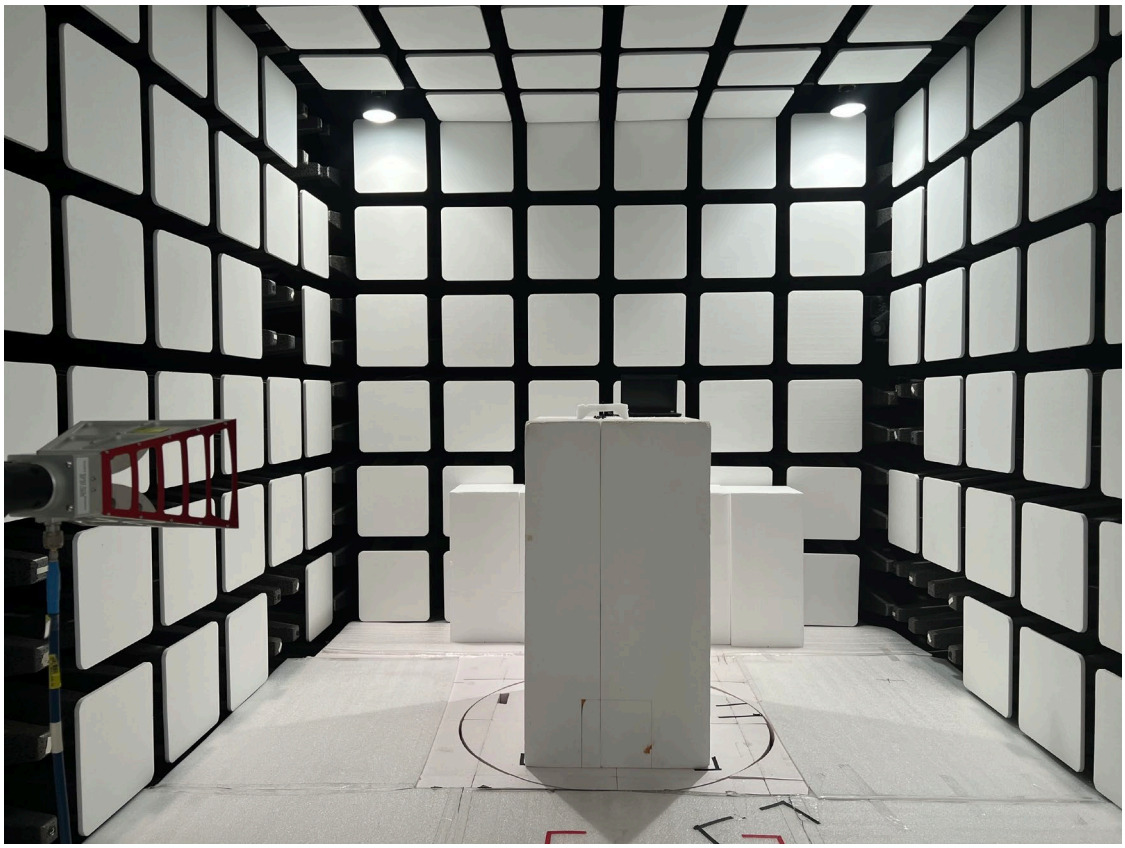
Remark:

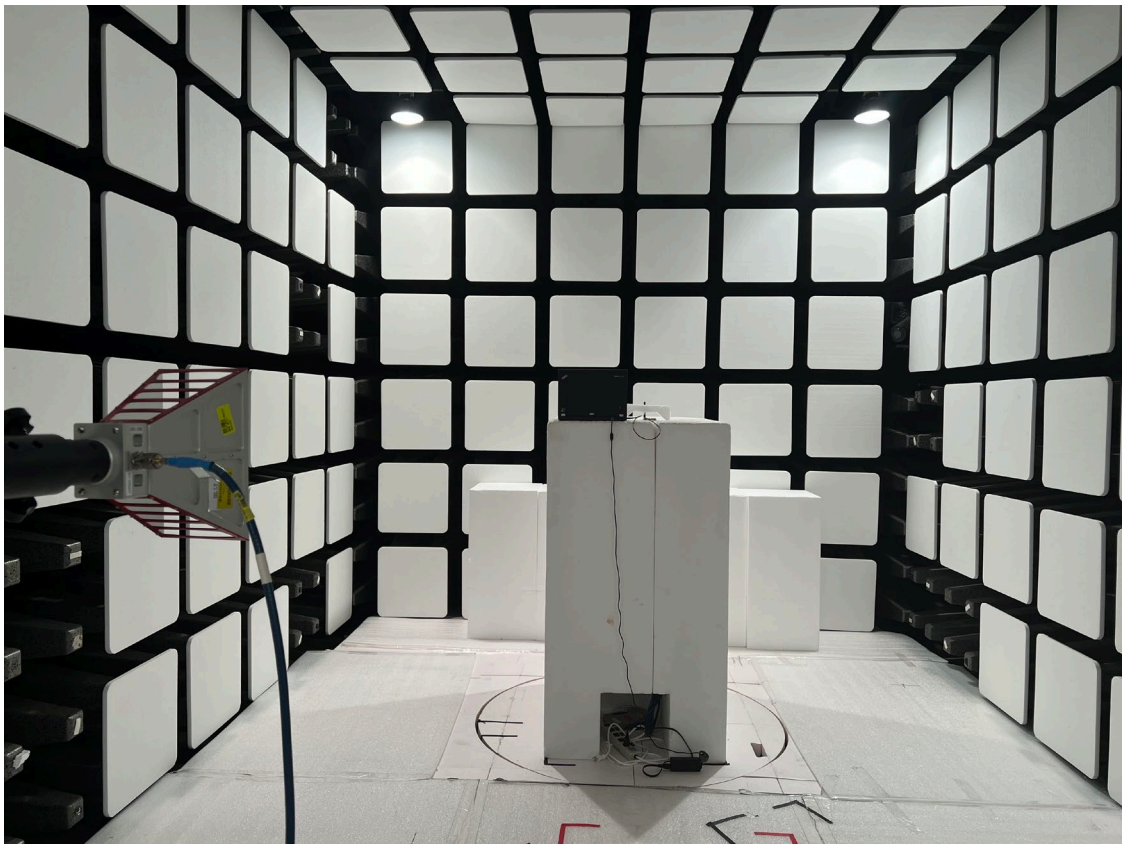
1. The emission behaviors belong to narrowband spurious emission.
2. Remark " --- " means that the emission level is too low to be measured
3. Aux: Field strength to EIRP correction factor
4. Level (dBm) = Reading (dBm)+Aux(dB)
5. Measurement Range upto 40GHz.

Appendix 1
Photographs of Test Setup

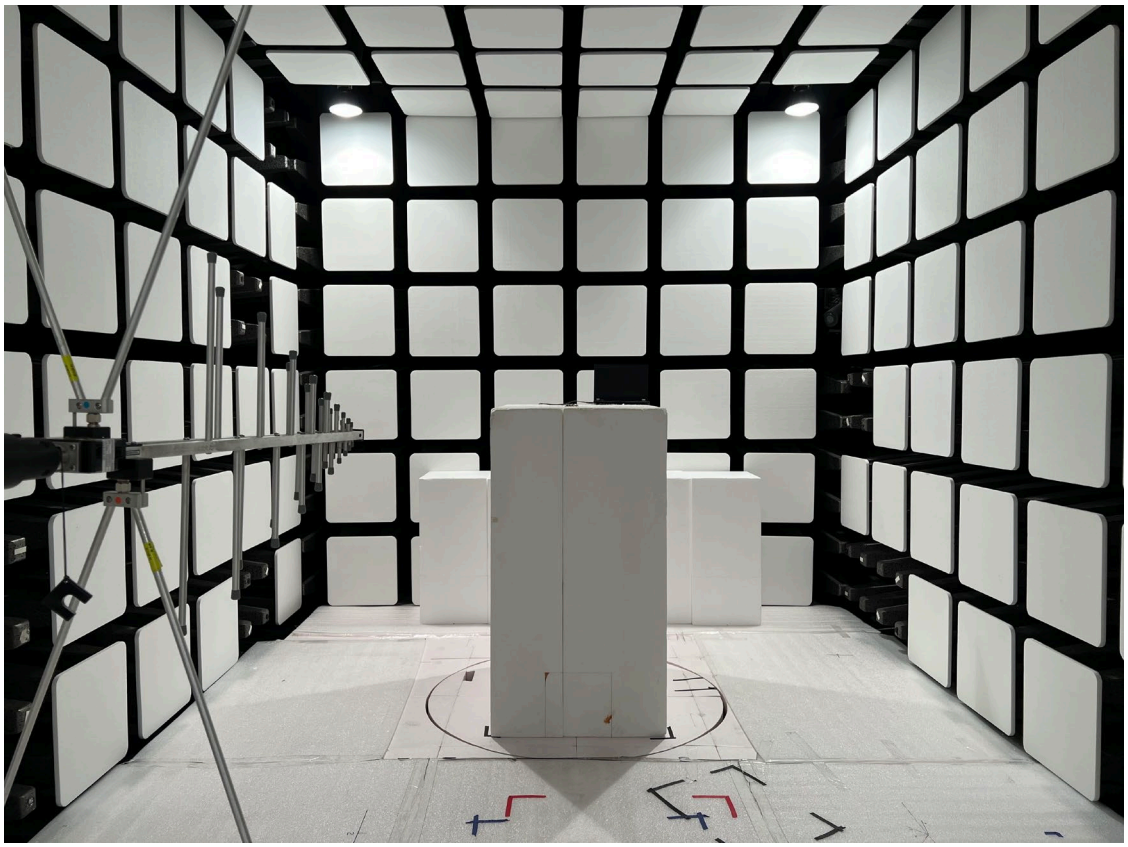
Dipole Ant.

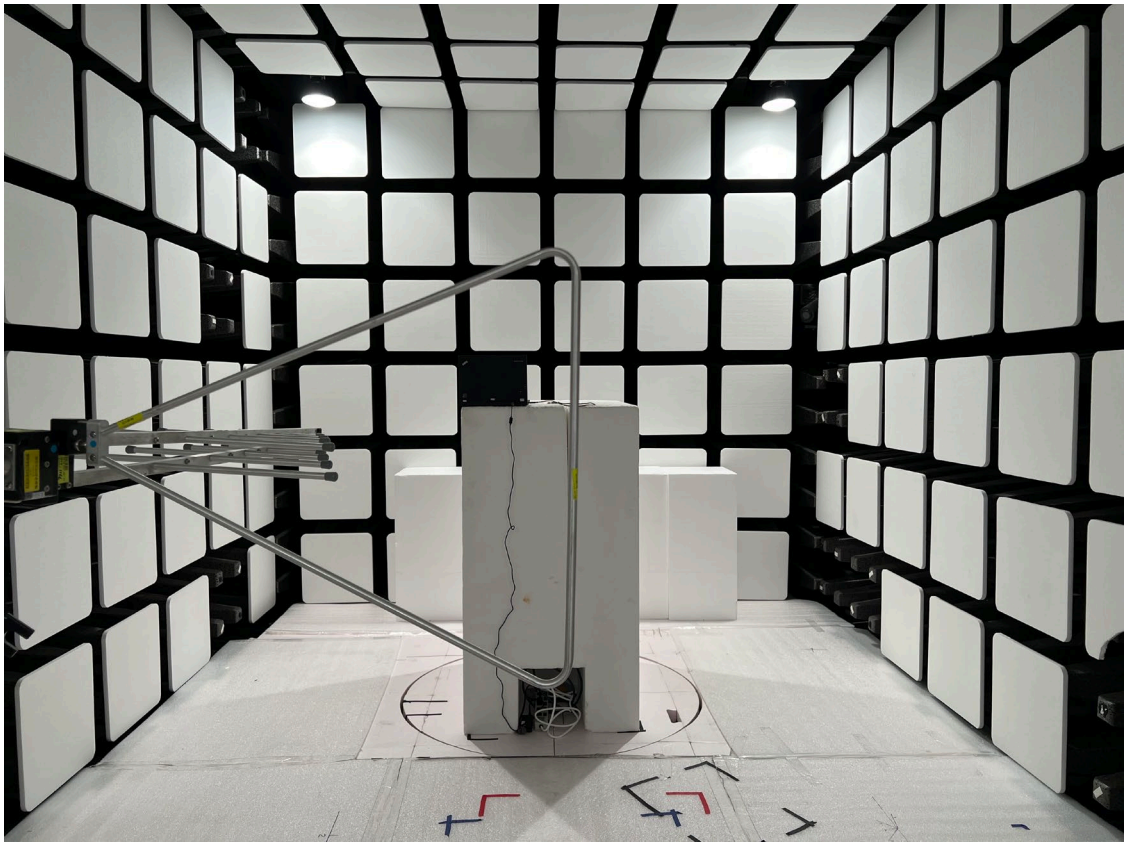


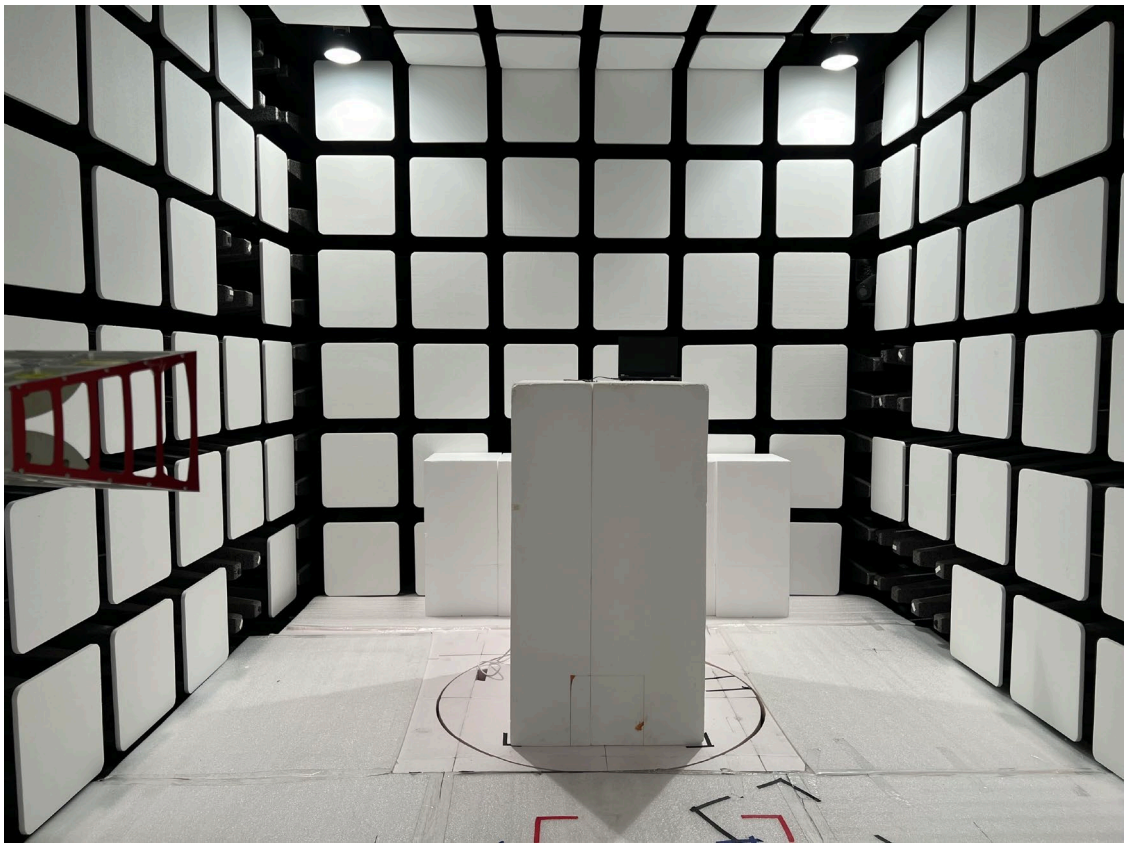


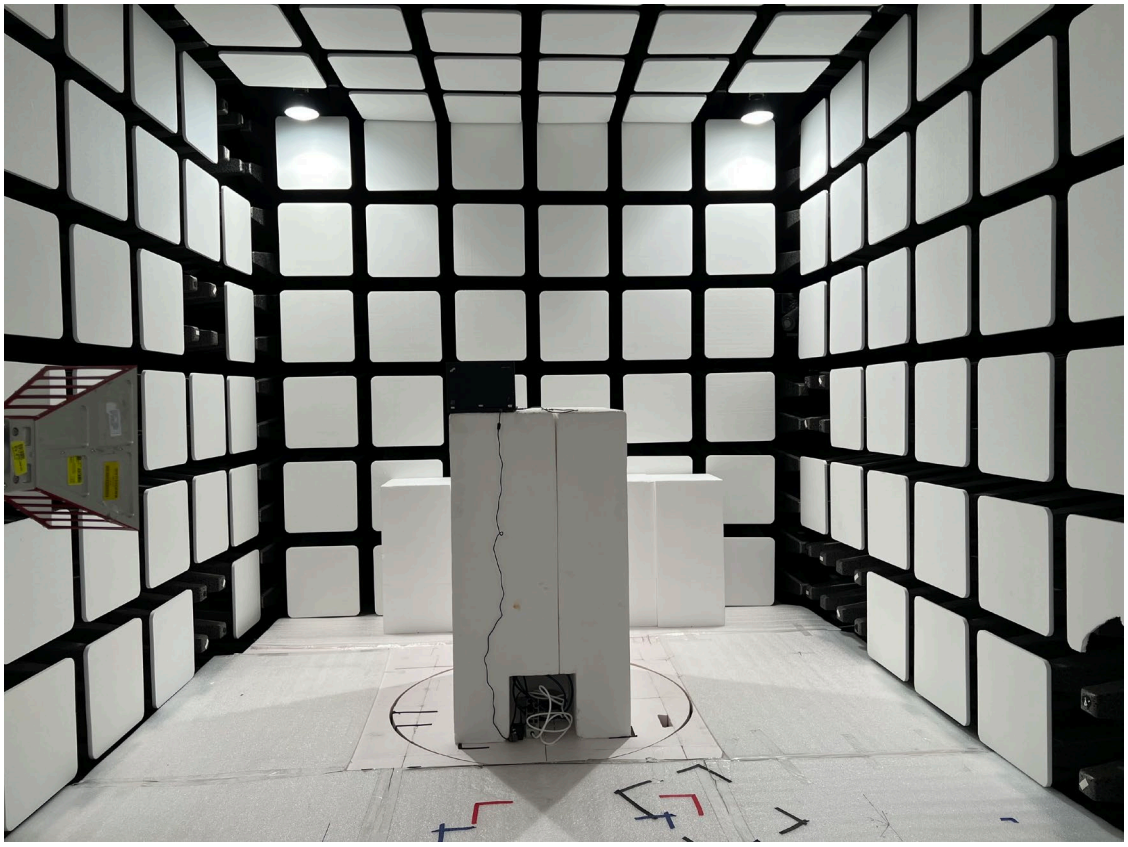


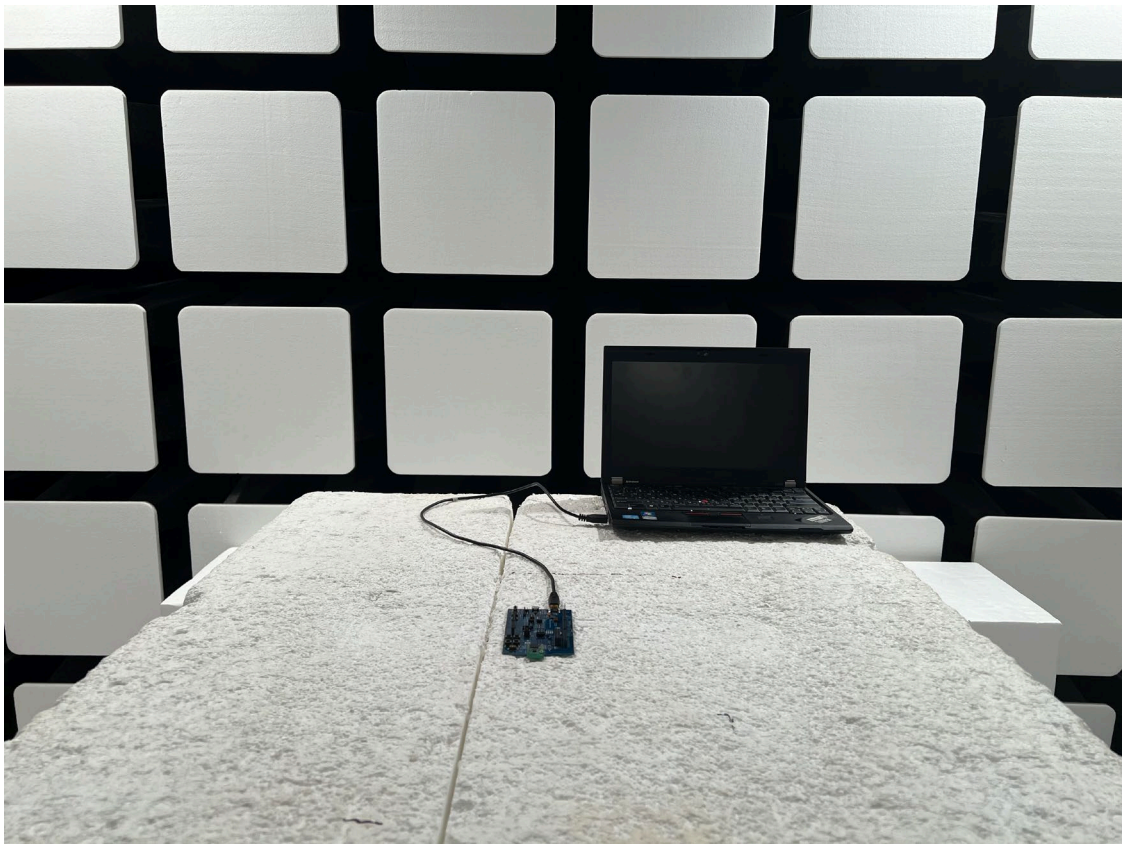
PCB Ant.











Appendix 2
Photographs of EUT

Please refer to the file ISL-19LR022P-R5

~ End of Report ~