Certificate

Issue Date: December 26, 2023
Ref. Report No. ISL-23LR0182FB

Product Name	:	LoRa transceiver Module
Main Model	:	LR62E1
Series Model	:	LR62C
Brand	:	Fanstel
Applicant	:	Fanstel Corporation, Taipei
Address	:	10F-10, No. 79, Sec. 1, Hsin Tai Wu Rd., Hsi-Chih, New Taipei City 221 Taiwan

We, **International Standards Laboratory Corp.**, hereby certify that:

The sample ISL received which bearing the trade name and model specified above has shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified. (refer to Test Report if any modifications were made for compliance). And Our laboratories is the accredited laboratories and are approved according to ISO/IEC 17025.

Standards:

FCC CFR Title 47 Part 15 Subpart B: Section 15.107 and 15.109
ANSI C63.4-2014
Industry Canada Interference-Causing Equipment Standard ICES-003 Issue 7: 2020
Class B

I attest to the accuracy of data and all measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.
The Laboratory evaluates measurement inaccuracies based on regulatory or standard document specifications and is listed in the report for reference. According to customer agreement, the laboratory issues test reports based on the regulations or standards specifications, the measurement uncertainty is not considered in conformity decision rules.

Benson Chen / Manager

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No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan

TEST REPORT

of

CFR 47 Part 15 Subpart B Class B
&
Industry Canada Interference-Causing Equipment Standard ICES-003 Class B

Application Type: Supplier's Declaration of Conformity

Product:	**LoRa transceiver Module**
Main Model:	**LR62E1**
Series Model:	**LR62C**
Brand:	**Fanstel**
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-23LR0182FB**
Issue Date : **December 26, 2023**

Testing Laboratory
0997

Contents of Report

1. General

1.1 Certification of Accuracy of Test Data

Standards:	FCC CFR Title 47 Part 15 Subpart B: Section 15.107 and 15.109 ANSI C63.4-2014 Industry Canada Interference-Causing Equipment Standard ICES-003 Issue 7: 2020 Class B
Equipment Tested:	LoRa transceiver Module
Main Model:	LR62E1
Series Model:	LR62C
Brand:	Fanstel
Applicant:	Fanstel Corporation, Taipei
Sample received Date:	December 13, 2023
Final test Date:	refer to the date of test data
Test Site:	Chamber 12; Chamber 19; Conduction 03
Test Distance:	10m; 3m (above 1GHz)
Temperature:	refer to each site test data
Humidity:	refer to each site test data
Input power:	Conduction input power: AC 120 V / 60 Hz Radiation input power: AC 120 V / 60 Hz
Test Result:	**PASS**
Report Engineer:	Gigi Yeh
Test Engineer:	Weitin Chen Weitin Chen
Approved By:	Jerry Liu / Manager

1.2 Description of EUT

EUT

General Information	
Product Name:	LoRa transceiver Module
Brand Name:	Fanstel
Model Name:	LR62E1
Series Model No.	LR62C
Model Difference:	Antenna Difference:
Power Supply:	5VdC from USB

	Antenna Type	Brand	Model	Peak Gain	Frequency Range	Connector Type
1	Dipole	Fanstel	YZ868-915-RPSMA-200	1.46dBi	868-930 MHz	RPSMA
2	Flexible PCB	TE Connectivity	2195835-5	4.50dBi	868-930 MHz	U.FL
3	CHIP	onewave	WAN031003F0391SM03	1.32dBi	898-928 MHz	------

1.3 Description of test modes

Applicable standard		FCC 15B		
Test Configuration		Config 1	Config 2	Config 3
		EUT + LoRa modular	EUT + LoRa modular	EUT + LoRa modular
Operation mode		LR62E link (Dipole Antenna)	LR62E link (Flexible PCB Antenna)	LR62C link (Chip Antenna)
No.	**Description**			
1	Radiated emission(30M~1GHz)(above 1GHz)	Measured	Pretest	Pretest
2	Conducted emission (AC Power)	Measured	Pretest	Pretest

1.4 Configuration of Tested System

Fig. 1-1 Configuration

Config 1

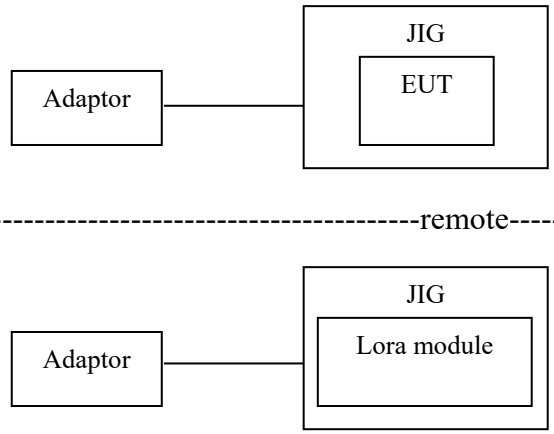


Table 1-1 Support Equipment Used in Tested System

Item	Equipment	Mrf/Brand	Model name	Series No	Data Cable	Power Cable
1	adaptor	Apple	A1385	N/A	N/A	Shielded /1m

I/O Cable Condition of EUT and Support Units

Description	Path	Cable Length	Cable Type	Connector Type
USB power cable	Adaptor USB port to JIG micro USB port	1m	Non-Shielded	Metal Head

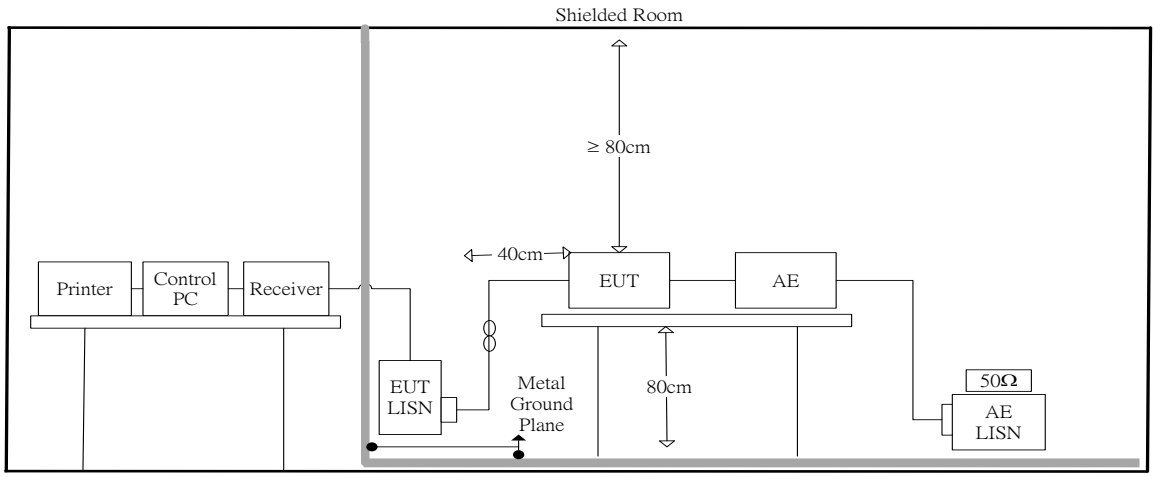
Note: All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.

Grounding: Grounding was in accordance with the manufacturer's requirements and conditions for the intended use.

2. Power Line Conducted Emissions

2.1 Test Setup and Procedure

2.1.1 Test Setup



2.1.2 Test Procedure

The measurements are performed in a shielded room test site. The EUT was placed on non-conduction 1.0m x 1.5m table, which is 0.8 meters above an earth-grounded.

Power to the EUT was provided through the LISN which has the Impedance (50ohm/50uH) vs. Frequency Characteristic in accordance with the standard. Power to the LISNs were filtered to eliminate ambient signal interference and these filters were bonded to the ground plane. Peripheral equipment required to provide a functional system (support equipment) for EUT testing was powered from the second LISN through a ganged, metal power outlet box which is bonded to the ground plane at the LISN.

The interconnecting cables were arranged and moved to get the maximum measurement. Both the line of power cord, hot and neutral, were measured. All of the interface cables were manipulated according to ANSI C63.4 requirements.

The highest emissions were analyzed in details by operating the spectrum analyzer in fixed tuned mode to determine the nature of the emissions and to provide information which could be useful in reducing their amplitude.

2.1.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)

Frequency Range:	150kHz~30MHz
Detector Function:	Quasi-Peak / Average Mode
Resolution Bandwidth:	9kHz

2.1.4 Limit

Conducted emissions limits of Class_A equipment. (AC mains power terminals):

Frequency range (MHz)	Quasi-peak (dBμV)	Average (dBμV)
0.15-0.50	79	66
0.50-5.0	73	60
5.0-30	73	60

Note 1: Conducted emissions limits of FCC CFR Title 47 Part 15 Subpart B & Industry Canada Interference-Causing Equipment Standard ICES-003 are same.
Note2: The more stringent limit applies at transition frequencies.

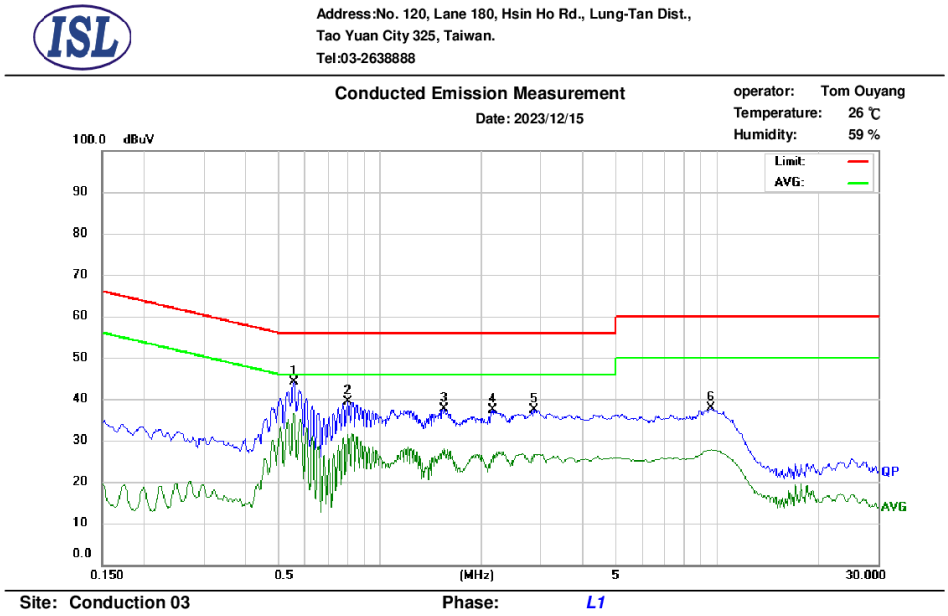
Conducted emissions limits of Class_B equipment. (AC mains power terminals):

Frequency range (MHz)	Quasi-peak (dBμV)	Average (dBμV)
0.15-0.50	66 to 56*	56-46*
0.50-5.0	56	46
5.0-30	60	50
*The limit level in dBμV decreases linearly with the logarithm of frequency.		

Note 1: Conducted emissions limits of FCC CFR Title 47 Part 15 Subpart B & Industry Canada Interference-Causing Equipment Standard ICES-003 are same.
Note2: The more stringent limit applies at transition frequencies.

2.2 Conduction Test Data: Configuration 1

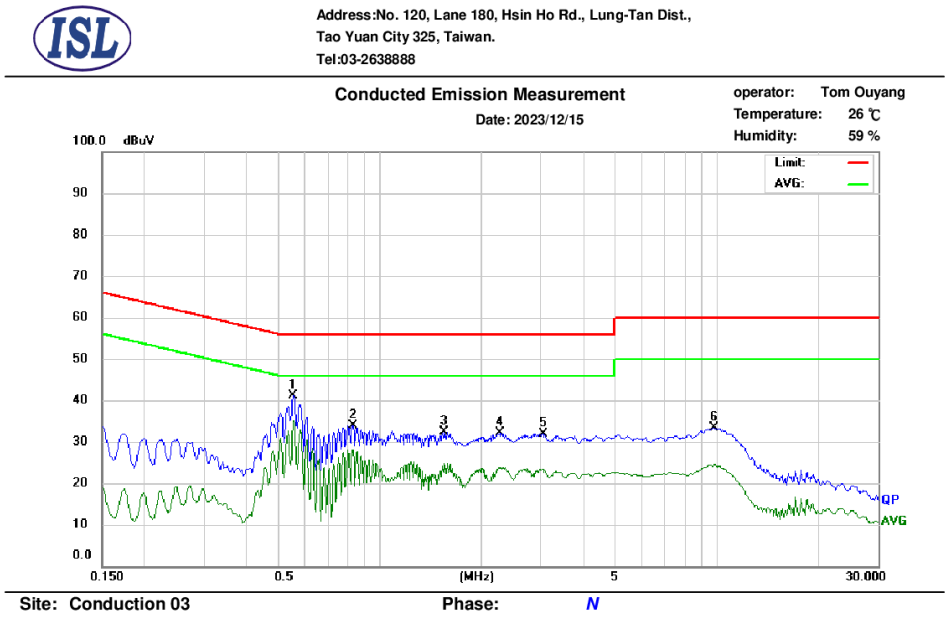
- Line



No.	Frequency (MHz)	QP_R (dBuV)	AVG_R (dBuV)	Correct Factor (dB)	QP Emission (dBuV)	QP Limit (dBuV)	QP Margin (dB)	AVG Emission (dBuV)	AVG Limit (dBuV)	AVG Margin (dB)
1*	0.557	34.33	26.85	9.70	44.03	56.00	-11.97	36.55	46.00	-9.45
2	0.802	29.65	21.60	9.71	39.36	56.00	-16.64	31.31	46.00	-14.69
3	1.556	27.88	18.38	9.75	37.63	56.00	-18.37	28.13	46.00	-17.87
4	2.159	27.58	16.40	9.77	37.35	56.00	-18.65	26.17	46.00	-19.83
5	2.861	27.62	16.71	9.79	37.41	56.00	-18.59	26.50	46.00	-19.50
6	9.582	27.88	17.86	9.92	37.80	60.00	-22.20	27.78	50.00	-22.22

Note:
Margin = QP/AVG Emission - Limit
QP/AVG Emission = QP_R/AVG_R + Correct Factor
Correct Factor = LISN Loss + Cable Loss
A margin of -8dB means that the emission is 8dB below the limit
The frequency spectrum graph is for final peak graph, and the attached table is for QP/AVG test result.
If peak data can pass, it will be shown in “QP/AVG Correct” column, if not, QP/AVG data will instead.
The CISPR 22 limits would be applied to all FCC Part 15 devices.

- Neutral

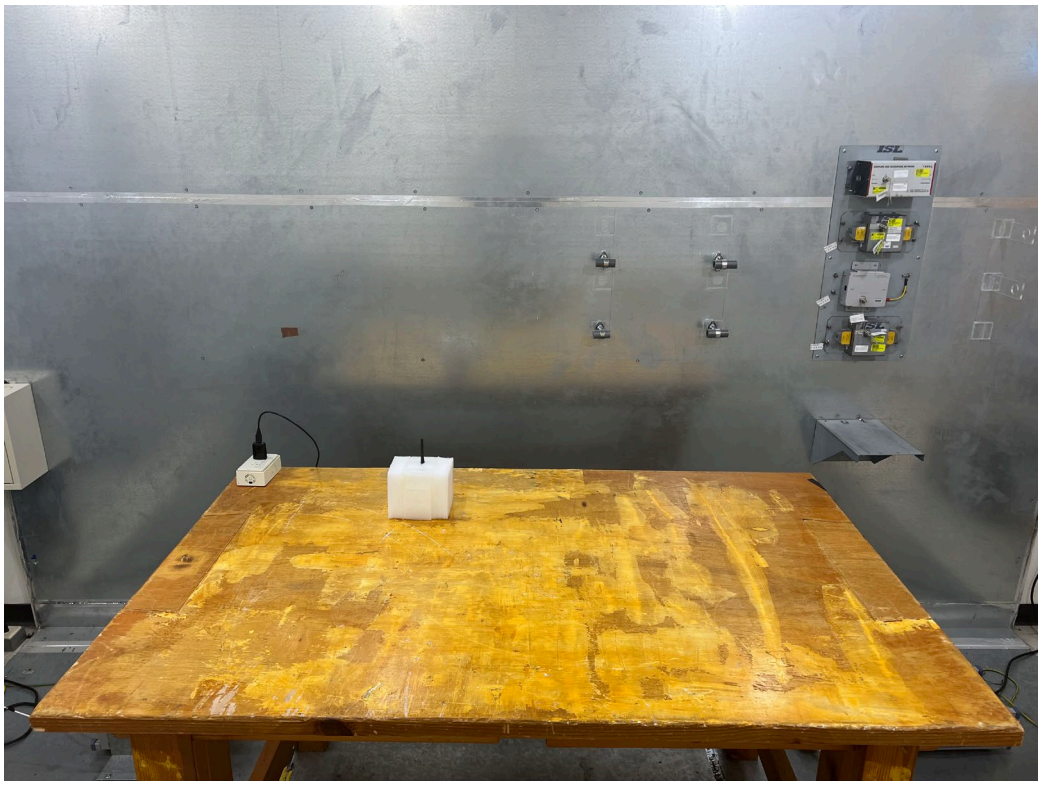


No.	Frequency (MHz)	QP_R (dBuV)	AVG_R (dBuV)	Correct Factor (dB)	QP Emission (dBuV)	QP Limit (dBuV)	QP Margin (dB)	AVG Emission (dBuV)	AVG Limit (dBuV)	AVG Margin (dB)
1*	0.555	31.53	25.39	9.70	41.23	56.00	-14.77	35.09	46.00	-10.91
2	0.832	24.17	18.31	9.73	33.90	56.00	-22.10	28.04	46.00	-17.96
3	1.556	22.68	15.15	9.76	32.44	56.00	-23.56	24.91	46.00	-21.09
4	2.263	22.34	13.99	9.78	32.12	56.00	-23.88	23.77	46.00	-22.23
5	3.053	22.12	13.58	9.80	31.92	56.00	-24.08	23.38	46.00	-22.62
6	9.787	23.34	14.48	9.96	33.30	60.00	-26.70	24.44	50.00	-25.56

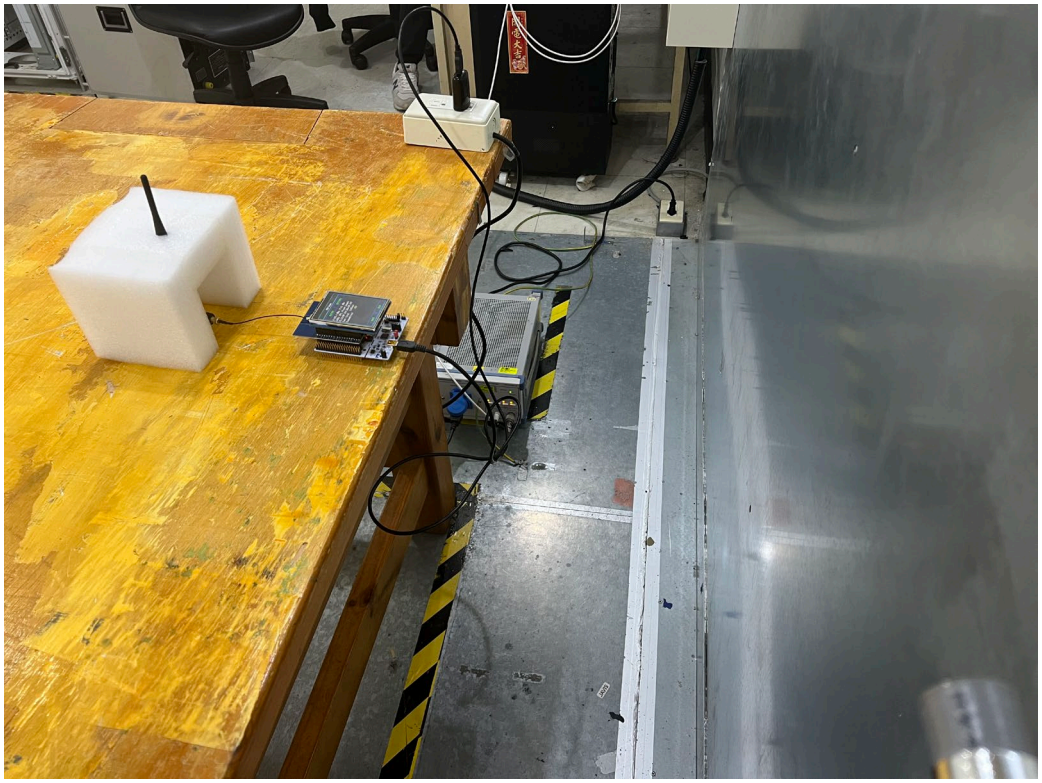
Note:
Margin = QP/AVG Emission - Limit
QP/AVG Emission = QP_R/AVG_R + Correct Factor
Correct Factor = LISN Loss + Cable Loss
A margin of -8dB means that the emission is 8dB below the limit
The frequency spectrum graph is for final peak graph, and the attached table is for QP/AVG test result.
If peak data can pass, it will be shown in “QP/AVG Correct” column, if not, QP/AVG data will instead.
The CISPR 22 limits would be applied to all FCC Part 15 devices.

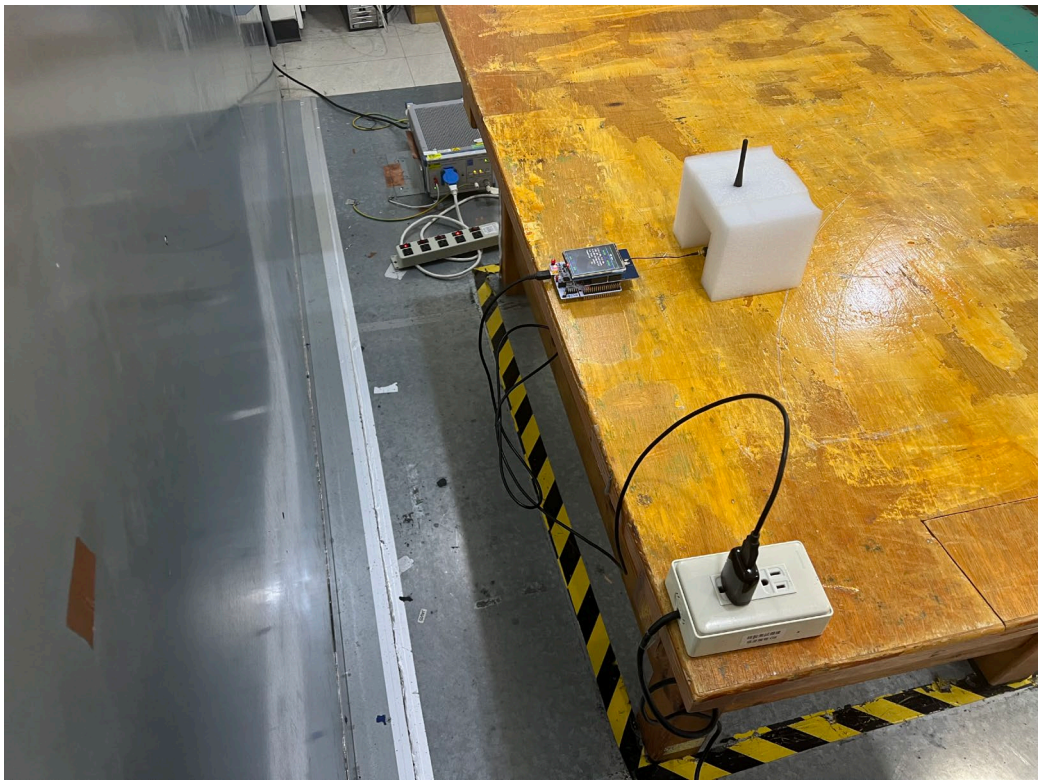
2.3 Test Setup Photo

Front View



Back View

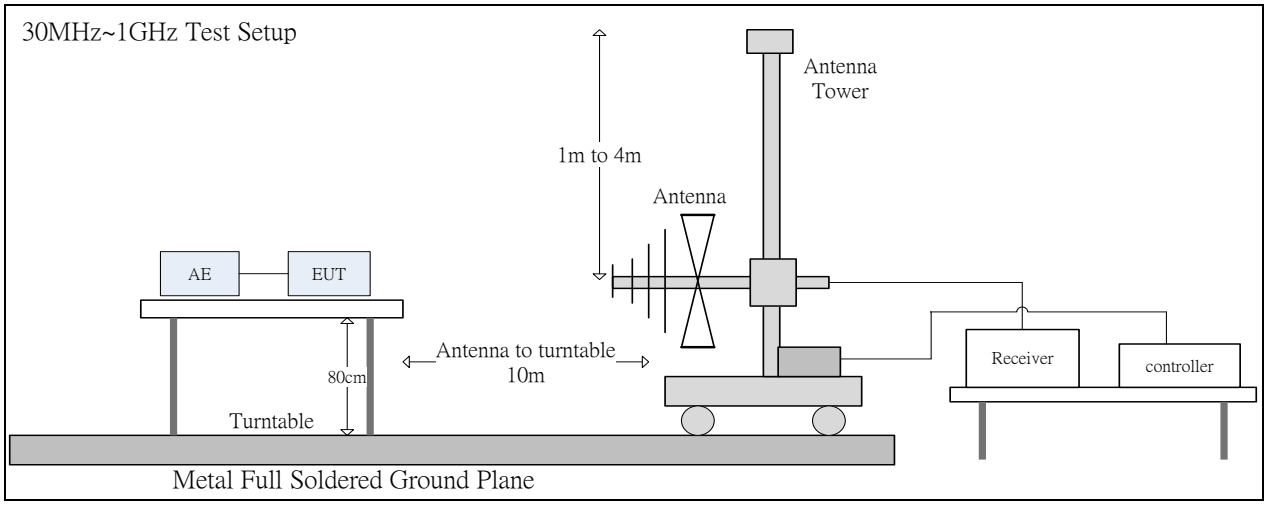


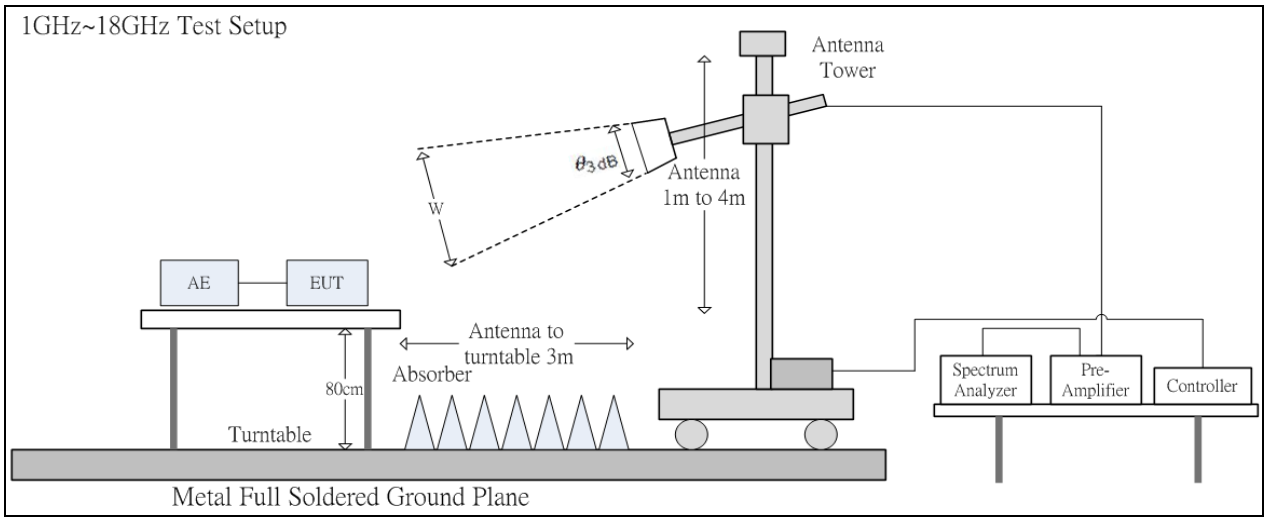


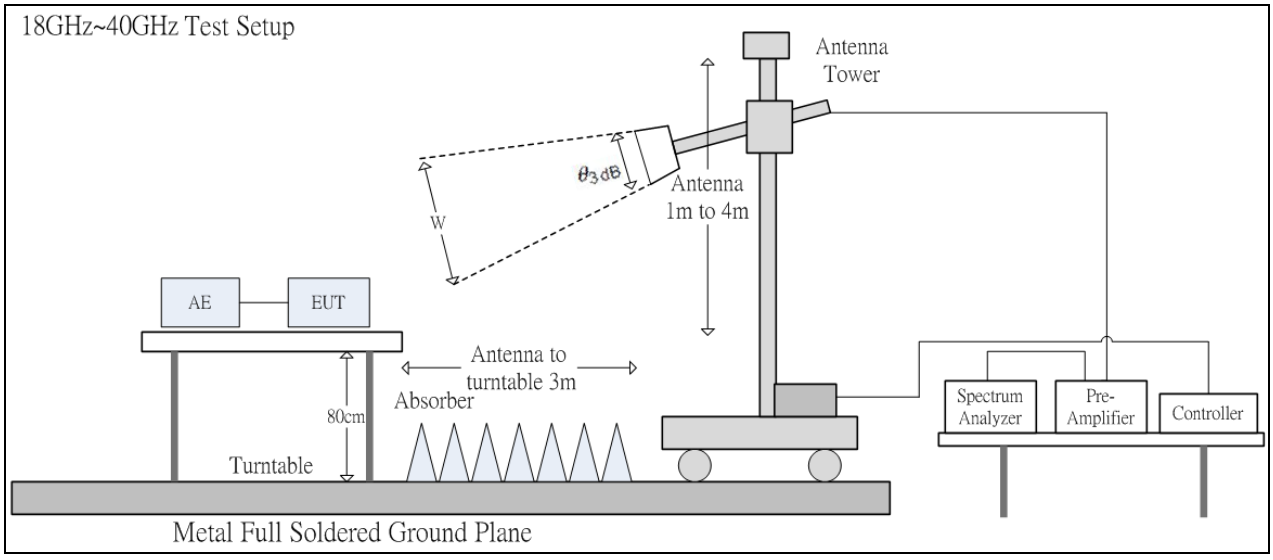
3. Radiated Emissions

3.1 Test Setup and Procedure

3.1.1 Test Setup







The 3dB beam width of the horn antenna used for the test is as shown in the table below.

1GHz~18GHz

Frequency GHz	E-plane	H-plane	$\theta_{3\,dB}$ (min)	d= 3 m
				w (m)
1	88°	147°	88°	5.79
2	68°	119°	68°	4.04
3	73°	92°	73°	4.44
4	70°	89°	70°	4.20
5	55°	60°	55°	3.12
6	63°	62°	62°	3.60
7	48°	49°	48°	2.67
8	39°	46°	39°	2.12
9	32°	42°	32°	1.72
10	30°	39°	30°	1.61
11	32°	35°	32°	1.72
12	35°	32°	35°	1.89
13	34°	31°	31°	1.66
14	32°	27°	27°	1.44
15	36°	26°	26°	1.39
16	40°	28°	28°	1.50
17	43°	26°	26°	1.39
18	41°	22°	22°	1.17

18 GHz~26.5 GHz

Frequency GHz	E-plane	H-plane	$\theta_{3\,dB}$ (min)	d= 1 m	d= 3 m
				w (m)	w (m)
18	11.4°	12.7°	11.4°	0.199	0.598
19	10.9°	12.4°	10.9°	0.190	0.572
20	10.8°	12.4°	10.8°	0.189	0.567
21	9.8°	12°	9.8°	0.171	0.514
22	9.7°	11°	9.7°	0.169	0.509
23	10°	11.8°	10°	0.174	0.524
24	9°	11°	9°	0.157	0.472
25	10°	12.3°	10°	0.174	0.524
26	9.9°	11.1°	9.9°	0.173	0.519
26.5	9.4°	11.3°	9.4°	0.164	0.493

26 GHz~40 GHz

Frequency GHz	E-plane	H-plane	$\theta_{3\,dB}$ (min)	d= 1 m	d= 3 m
				w (m)	w (m)
26	12°	12.2°	12°	0.210	0.631
27	13°	10.5°	10.5°	0.184	0.551
28	13.2°	12.3°	12.3°	0.216	0.647
29	11.5°	12.8°	11.5°	0.201	0.604
30	12°	8°	8°	0.140	0.420
31	11.5°	10.1°	10.1°	0.177	0.530
32	11.8°	10°	10°	0.175	0.525
33	11.8°	9.5°	9.5°	0.166	0.499
34	11.6°	10°	10°	0.175	0.525
35	10.9°	9.8°	9.8°	0.171	0.514

36	11.8°	8.6°	8.6°	0.150	0.451
37	12.9°	10.5°	10.5°	0.184	0.551
38	12°	10.3°	10.3°	0.180	0.541
39	11.8°	9.8°	9.8°	0.171	0.514
40	12.5°	11.2°	11.2°	0.196	0.588

3.1.2 Test Procedure

The radiated emissions test will then be repeated on the chamber to measure the amplitudes accurately and without the multiple reflections existing in the shielded room. The EUT and support equipment are set up on the turntable of one of 10 meter chamber. Desktop EUT are set up on a wooden stand 0.8 meter above the ground or floor-standing arrangement shall be placed on the horizontal ground reference plane. The test volume for a height of up to 30 cm may be obstructed by absorber placed on the ground plane.

For the initial measurements, the receiving antenna is varied from 1-4 meter height and is changed in the vertical plane from vertical to horizontal polarization at each frequency. The highest emissions between 30 MHz to 1000 MHz were analyzed in details by operating the spectrum analyzer and/or EMI receiver in quasi-peak mode to determine the precise amplitude of the emissions. The highest emissions between 1 GHz to 40 GHz were analyzed in details by operating the spectrum analyzer in peak and average mode to determine the precise amplitude of the emissions.

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the antenna in the cone of radiation from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response. At the highest amplitudes observed, the EUT is rotated in the horizontal plane while changing the antenna polarization in the vertical plane to maximize the reading. The interconnecting cables were arranged and moved to get the maximum measurement. Once the maximum reading is obtained, the antenna elevation and polarization will be varied between specified limits to maximize the readings. All of the interface cables were manipulated according to ANSI C63.4 requirements.

The highest internal source of the EUT is defined as the highest frequency generated or used within the EUT or on which the EUT operates or tunes. If the highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz. If the highest frequency of the internal sources of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz. If the highest frequency of the internal sources of the EUT is between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz. If the highest frequency of the internal sources of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 40 GHz, whichever is less.

3.1.3 Spectrum Analyzer Configuration (for the frequencies tested)

Frequency Range: 30MHz--1000MHz
Detector Function: Quasi-Peak Mode
Resolution Bandwidth: 120kHz

Frequency Range: Above 1000MHz
Detector Function: Peak/Average Mode
Resolution Bandwidth: 1MHz

3.1.4 Limit

Radiated emissions limits of Class_A equipment. (30 MHz to 1 GHz)

Frequency range (MHz)	FCC Part 15 Subpart B 15.109(g)	ICES-003
	at 10 m distance Quasi-peak (dBμV/m)	at 10 m distance Quasi-peak (dBμV/m)
30-88	40	40.0
88-216	40	43.5
216-230	40	46.4
230-960	47	47.0
960-1000	47	49.5

Note 1: The test limit in this report is based on FCC CFR Title 47 Part 15 Subpart B 15.109(g).
Note 2: The more stringent limit applies at transition frequencies.
Note 3: Test data in this report has been taken against the FCC CFR Title 47 Part 15 Subpart B 15.109(g) limit as it is the most stringent limit. By complying with the more restrictive Part 15 Subpart B 15.109(g) limit compliance with the Industry Canada Interference-Causing Equipment Standard ICES-003 limit is also demonstrated.

Radiated emission limits of Class_A equipment at 3 m distance (at and above 1 GHz)

Frequency range (GHz)	Average dB(μV/m)	Peak dB(μV/m)
1 – 40G	60	80

Note 1: Radiated emissions limits of FCC CFR Title 47 Part 15 Subpart B & Industry Canada Interference-Causing Equipment Standard ICES-003 are same.

Radiated emissions limits of Class_B equipment. (30 MHz to 1 GHz)

Frequency range (MHz)	FCC Part 15 Subpart B 15.109(g)	ICES-003
	at 10 m distance Quasi-peak (dBμV/m)	at 10 m distance Quasi-peak (dBμV/m)
30-88	30	30.0
88-216	30	33.1
216-230	30	35.6
230-960	37	37.0
960-1000	37	43.5

Note 1: The test limit in this report is based on FCC CFR Title 47 Part 15 Subpart B 15.109(g).
Note 2: The more stringent limit applies at transition frequencies.
Note 3: Test data in this report has been taken against the FCC CFR Title 47 Part 15 Subpart B 15.109(g) limit as it is the most stringent limit. By complying with the more restrictive Part 15 Subpart B 15.109(g) limit compliance with the Industry Canada Interference-Causing Equipment Standard ICES-003 limit is also demonstrated.

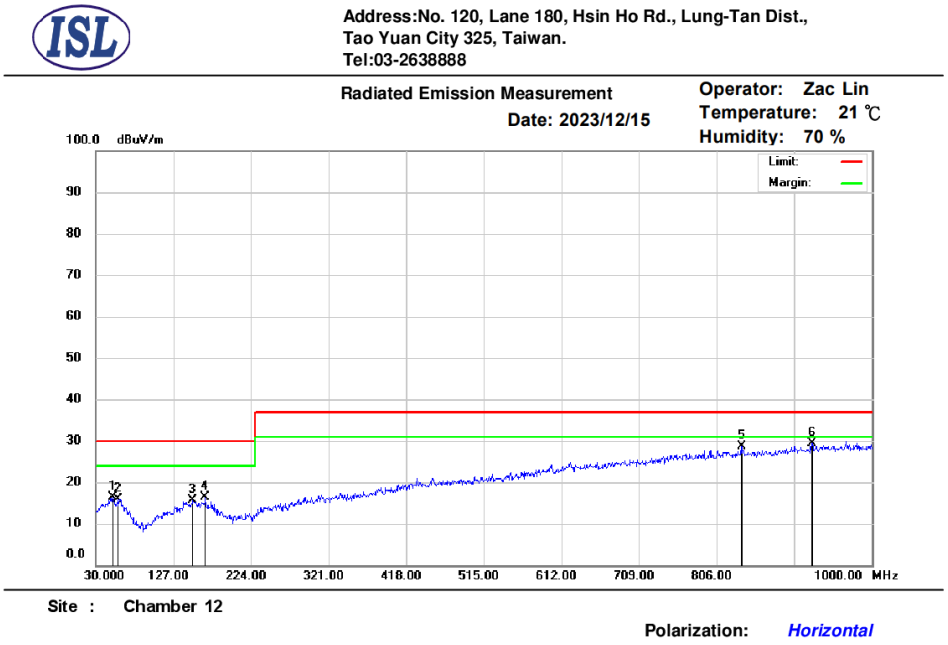
Radiated emission limits of Class_B equipment at 3 m distance (at and above 1 GHz)

Frequency range (GHz)	Average dB(μV/m)	Peak dB(μV/m)
1 – 40G	54	74

Note 1: Radiated emissions limits of FCC CFR Title 47 Part 15 Subpart B & Industry Canada Interference-Causing Equipment Standard ICES-003 are same.

3.2 Radiation Test Data: Configuration 1

- Radiated Emissions (Horizontal)



Mk.	Frequency (MHz)	RX_R (dBuV)	Correct Factor(dB/m)	Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.Pos (cm)	Tab.Pos (deg.)	Detector
1	51.34	33.14	-16.64	16.50	30.00	-13.50	350	357	peak
2	58.13	32.99	-17.13	15.86	30.00	-14.14	300	46	peak
3	151.25	31.19	-15.63	15.56	30.00	-14.44	200	174	peak
4	166.77	32.34	-15.84	16.50	30.00	-13.50	300	0	peak
5	837.04	31.29	-2.69	28.60	37.00	-8.40	400	113	peak
6*	925.31	30.78	-1.46	29.32	37.00	-7.68	350	88	peak

* Note:
Margin = Emission – Limit
Emission = Radiated Amplitude + Correct Factor
Correct Factor = Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain
A margin of -8dB means that the emission is 8dB below the limit
Antenna Distance: 10 meters
The CISPR 22 limits would be applied to all FCC Part 15 devices.
If the peak measured value meets the QP limit, The QP value is inherently compliant.

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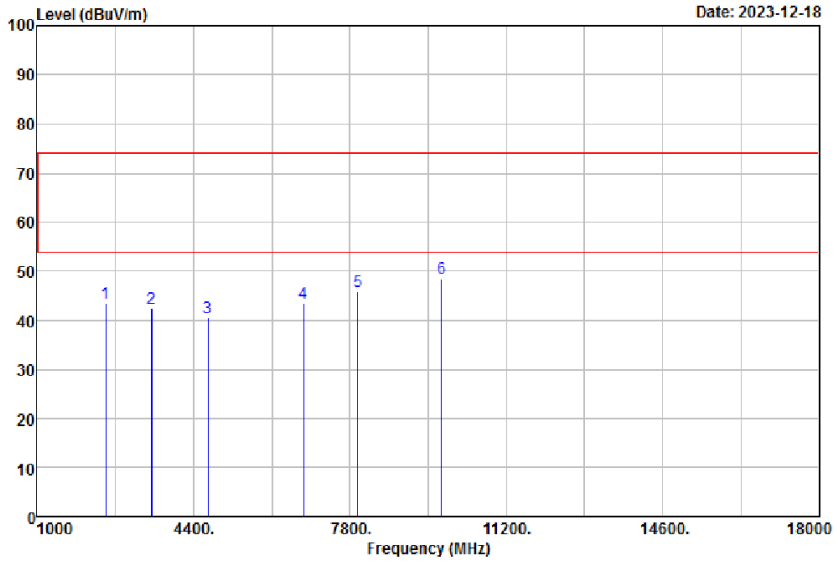


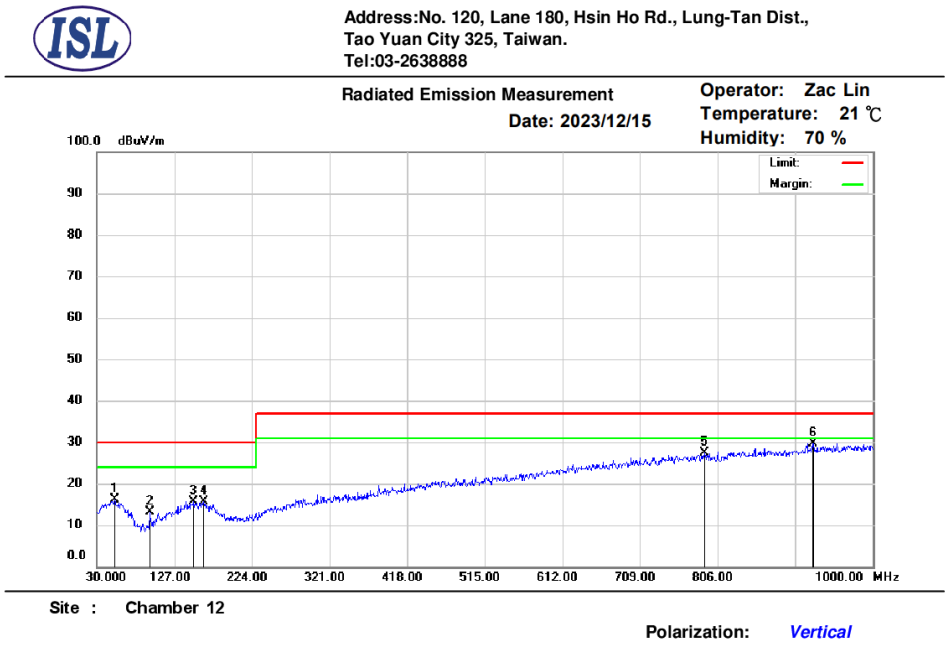
Condition: FCC CLASS B 3M PK 3m HORIZONTAL
Site : Chamber 19
Model : LR62E
Test Mode: Config 1
Operator :
Temp : 24
Hum : 62

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	2479.00	41.75	1.64	43.39	74.00	-30.61	Peak	HORIZONTAL
2	3482.00	38.65	3.72	42.37	74.00	-31.63	Peak	HORIZONTAL
3	4706.00	34.33	6.15	40.48	74.00	-33.52	Peak	HORIZONTAL
4	6780.00	34.31	9.26	43.57	74.00	-30.43	Peak	HORIZONTAL
5	7970.00	35.78	10.20	45.98	74.00	-28.02	Peak	HORIZONTAL
6	9789.00	36.60	11.86	48.46	74.00	-25.54	Peak	HORIZONTAL

- 1 -

* Note:
Margin = Emission – Limit
Emission = Radiated Amplitude + Correct Factor
Correct Factor = Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain
A margin of -8dB means that the emission is 8dB below the limit
Antenna Distance: 3 meters
If the peak measured value meets the Average limit, The Average value is inherently compliant.

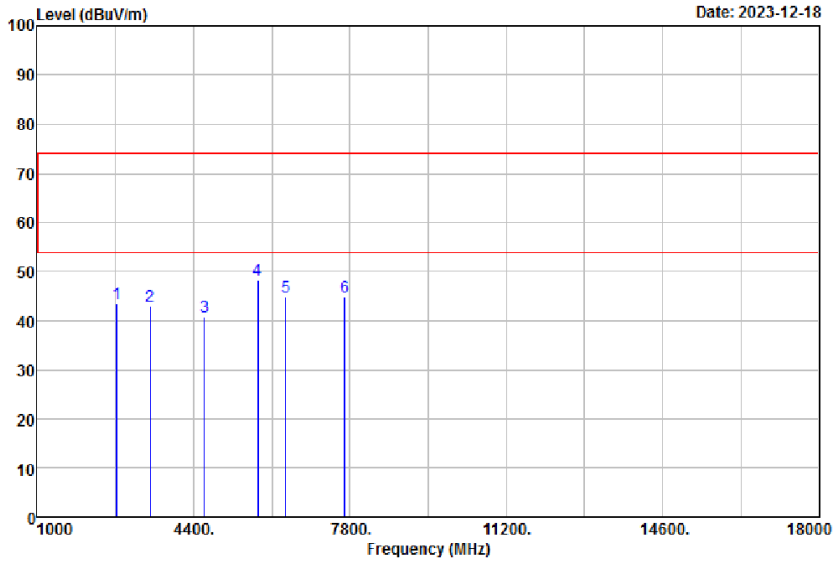
-Radiated Emissions (Vertical)



Mk.	Frequency (MHz)	RX_R (dBuV)	Correct Factor(dB/m)	Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.Pos (cm)	Tab.Pos (deg.)	Detector
1	52.31	32.87	-16.75	16.12	30.00	-13.88	250	359	peak
2	95.96	34.76	-21.54	13.22	30.00	-16.78	100	272	peak
3	151.25	31.25	-15.63	15.62	30.00	-14.38	250	10	peak
4	163.86	31.36	-15.69	15.67	30.00	-14.33	250	112	peak
5	789.51	30.58	-3.17	27.41	37.00	-9.59	350	102	peak
6*	925.31	31.14	-1.46	29.68	37.00	-7.32	309	0	peak

* Note:
Margin = Emission – Limit
Emission = Radiated Amplitude + Correct Factor
Correct Factor = Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain
A margin of -8dB means that the emission is 8dB below the limit
Antenna Distance: 10 meters
The CISPR 22 limits would be applied to all FCC Part 15 devices.
If the peak measured value meets the QP limit, The QP value is inherently compliant.

International Standard Laboratory Corp.
Company Address:No.120,Lane 180, Hsin Ho Rd.
Lung-Tan Dist., Tao Yuan City 325, Taiwan
Tel:(03)2638888 ; Fax:(03)2638899
Web:www.isl.com.tw



Condition: FCC CLASS B 3M PK 3m VERTICAL
Site : Chamber 19
Model : LR62E
Test Mode: Config 1
Operator :
Temp : 24
Hum : 62

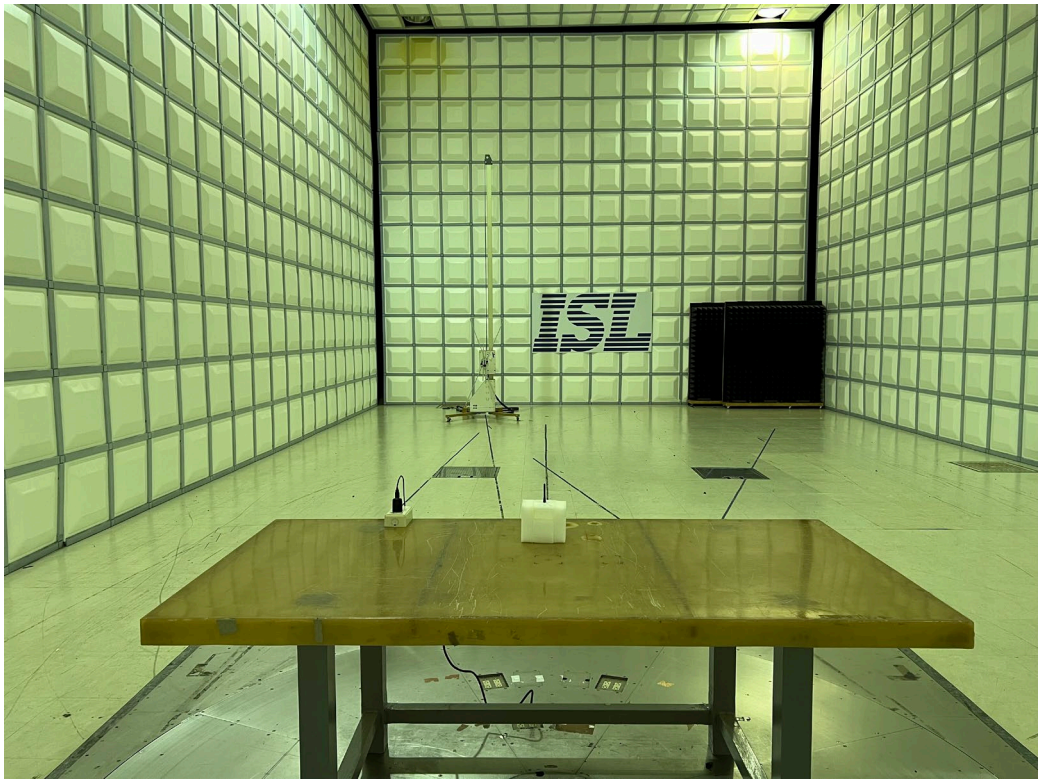
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	2734.00	40.87	2.49	43.36	74.00	-30.64	Peak	VERTICAL
2	3448.00	39.29	3.61	42.90	74.00	-31.10	Peak	VERTICAL
3	4638.00	34.80	5.89	40.69	74.00	-33.31	Peak	VERTICAL
4	5794.00	40.31	8.09	48.40	74.00	-25.60	Peak	VERTICAL
5	6406.00	35.75	9.12	44.87	74.00	-29.13	Peak	VERTICAL
6	7681.00	34.89	10.00	44.89	74.00	-29.11	Peak	VERTICAL

- 1 -

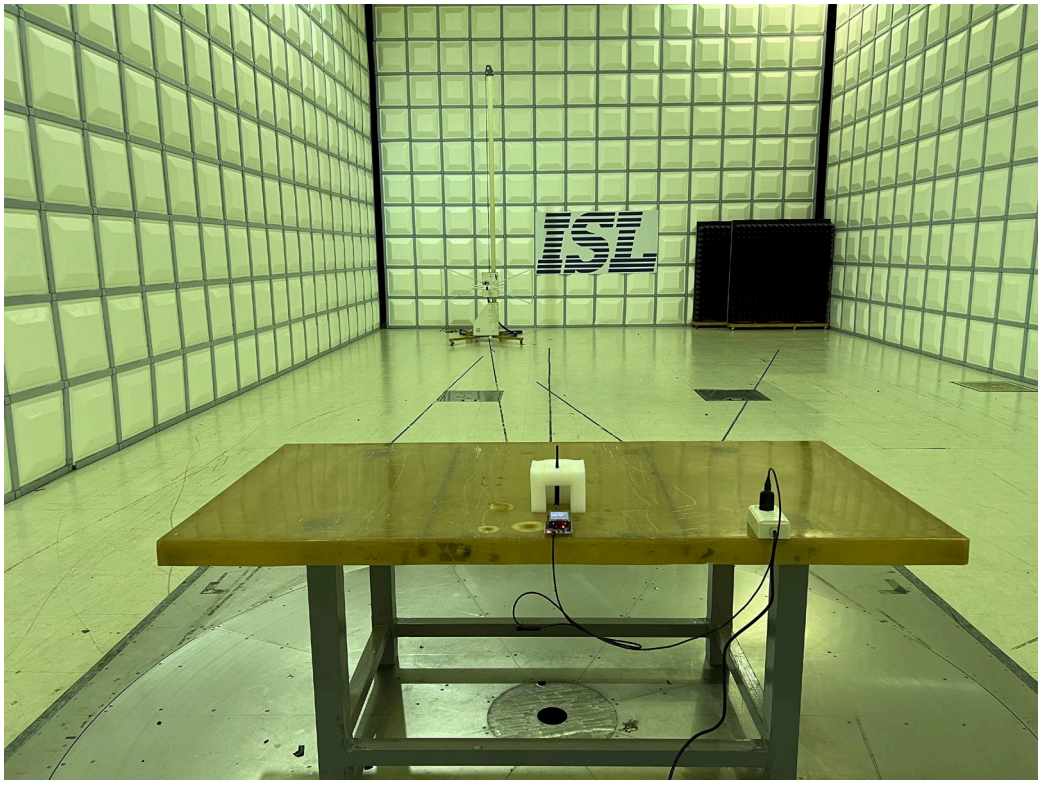
* Note:
Margin = Emission – Limit
Emission = Radiated Amplitude + Correct Factor
Correct Factor = Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain
A margin of -8dB means that the emission is 8dB below the limit
Antenna Distance: 3 meters
If the peak measured value meets the Average limit, The Average value is inherently compliant.

3.3 Test Setup Photo

Front View (30MHz~1GHz)

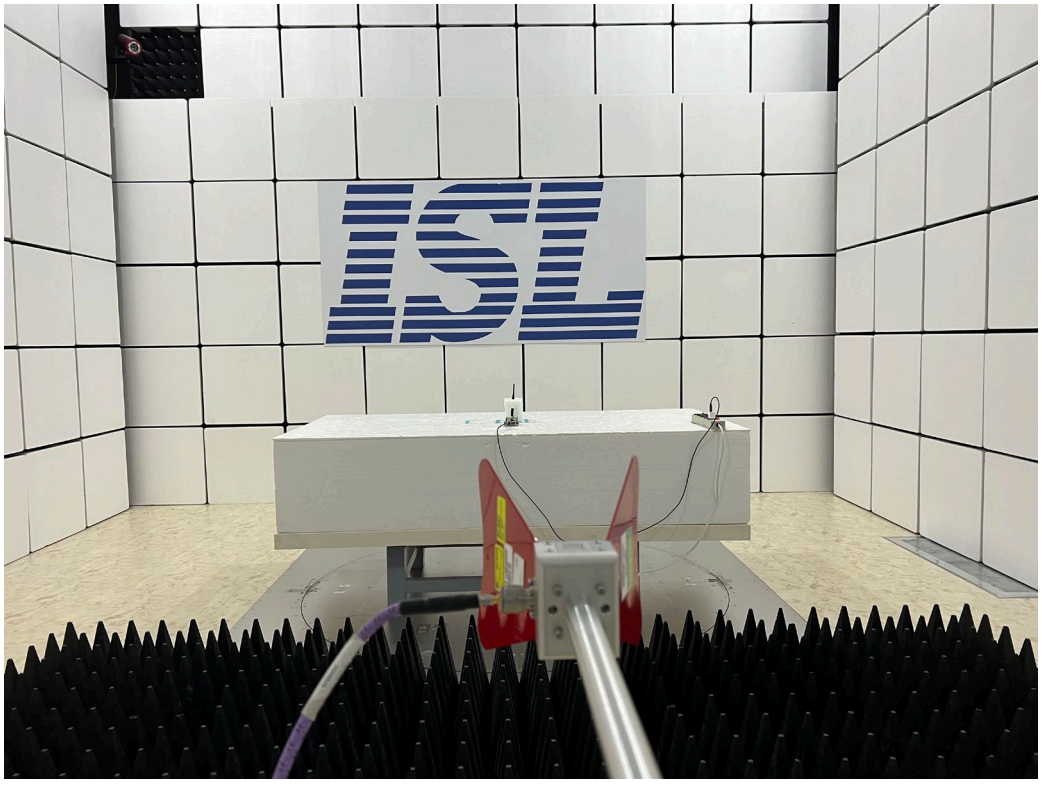


Back View (30MHz~1GHz)



Front View (above 1GHz)

Back View (above 1GHz)



4. Appendix

4.1 Appendix A: (FCC)Warning Labels

Label Requirements

A Class B digital device subject to authorization under Supplier's Declaration of Conformity of FCC shall carry a label which includes the following statement:

*** * * W A R N I N G * * ***

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Devices subject to authorization under Supplier's Declaration of Conformity may be labeled with FCC logo on a voluntary basis as a visual indication that the product complies with the applicable FCC requirements

The sample label shown shall be permanently affixed at a conspicuous location on the device and be readily visible to the user at the time of purchase.

When the device is so small or for such use that it is impracticable to label it with the statement specified under (§15.19 Labeling requirements) paragraph (a) of this section in a font that is four-point or larger, and the device does not have a display that can show electronic labeling, then the information required by this paragraph shall be placed in the user manual and must also either be placed on the device packaging or on a removable label attached to the device.

4.2 Appendix B: (FCC)Warning Statement

Statement Requirements

The operators' manual for a Class B digital device shall contain the following statements or their equivalent:

*** * * W A R N I N G * * ***

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/TV technician for help.

Notice: The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equivalent.

* * * * * * * * * *

If the EUT was tested with special shielded cables the operator's manual for such product shall also contain the following statements or their equivalent:

Shielded interface cables and/or AC power cord, if any, must be used in order to comply with the emission limits.

4.3 Appendix C: (Canada ISED) Labelling and user manual requirements

The requirements specified in ICES-Gen shall apply. An example ISED compliance label, to be placed on each unit of an equipment model (or in the user manual, if allowed), is given below:

CAN ICES-003(*) / NMB-003(*)

* Insert either “A” or “B”, but not both, to identify the applicable Class of the device used for compliance verification.

The above label is only an example. The specific format is left to the manufacturer to decide, as long as the label includes the required information, in accordance with ICES-Gen.

4.4 Appendix D: Test Equipment

4.4.1 Test Equipment List

Location	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Conduction 03	EMI Receiver 20	R&S	ESR7	101326	05/25/2023	05/25/2024
Conduction 03	Chamber05-1 Cable	WOKEN	CFD 300-NL	Chamber05-1 Cable	08/25/2023	08/25/2024
Conduction 03	LISN 19	R&S	ENV216	101425	11/23/2023	11/23/2024
Conduction 03	LISN 22	ROHDE & SCHWARZ	ENV216	101478	11/01/2023	11/01/2024
Conduction 03	LISN 24	SCHWARZBECK	NNLK 8121	8121-829	07/27/2023	07/27/2024
Conduction 03	ISN T8 CAT6A_03	SCHWARZBECK	NTFM 8158	NTFM 8158-00367	06/30/2023	06/30/2024
Conduction 03	ISN T4 06	Teseq GmbH	ISN T400A	28574	10/12/2023	10/12/2024
Conduction 03	ISN T8 09	Teseq GmbH	ISN T800	36190	09/26/2023	09/26/2024
Conduction 03	CDN ISN ST08A_1	Teseq GmbH	CDN ISN ST08A	43352	09/27/2023	09/27/2024
Conduction 03	Capacitive Voltage Probe 01	SCHAFFNER	CVP 2200A	18711	02/22/2023	02/22/2024
Conduction 03	Current Probe	SCHAFFNER	SMZ 11	18030	02/22/2023	02/22/2024

Location Chmb12	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Radiation (Chamber12)	BILOG Antenna 18	Schwarzbeck	Schwarzbeck VULB 9168+EMCI-N-6-05	646	03/15/2023	03/15/2024
Radiation (Chamber12)	Preamplifier 26	EMCI	EMC9135	980297	03/03/2023	03/03/2024
Radiation (Chamber12)	Coaxial Cable Chmb 12-10M-01	PEWC	CFD400-NL	Chmb 12-10M-01	10/04/2023	10/04/2024
Radiation (Chamber12)	EMI Receiver 18	ROHDE & SCHWARZ	ESCI	101392	05/25/2023	05/25/2024

Location	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Chamber 19	Signal analyzer	R&S	FSV40	101919	08/16/2023	08/16/2024
Chamber 19	EMI Receiver	R&S	ESR3	102461	05/08/2023	05/08/2024
Chamber 19	Loop Antenna	EM	EM-6879	271	10/02/2023	10/02/2024
Chamber 19	Bilog Antenna (30MHz-1GHz)	Schwarzbeck	VULB9168 w 6dB Att.	9168-736	03/09/2023	03/09/2024
Chamber 19	Horn antenna (1GHz-18GHz)	ETS • LINDGREN	3117	00218718	10/04/2023	10/04/2024
Chamber 19	Horn antenna (18GHz-26GHz)	Com-power	AH-826	081001	11/24/2023	11/24/2024
Chamber 19	Horn antenna (26GHz-40GHz)	Com-power	AH-640	100A	03/25/2023	03/25/2024
Chamber 19	Preamplifier (9kHz - 3GHz)	EM	EM330	060822	1/05/2023	1/05/2024
Chamber 19	Preamplifier (1GHz - 26GHz)	HP	8449B	3008A02471	10/25/2023	10/25/2024
Chamber 19	Preamplifier (26GHz-40GHz)	MITEQ	JS4-26004000-27-5A	818471	05/04/2023	05/04/2024
Chamber 19	RF Cable (9kHz-26.5GHz)	Huber Suhner	SUCOFLEX 104A	MY1394/4A &MY1395/4A	09/06/2023	09/06/2024
Chamber 19	RF Cable (18GHz-40GHz)	HUBER SUHNER	Sucoflex 102	27963/2&37421/2	11/22/2023	11/22/2024
Chamber 19	Signal Generator	Anritsu	MG3692A	20311	12/29/2022	12/29/2023
Chamber 19	Test Software	Audix	E3 Ver:6.120203b	N/A	N/A	N/A

4.4.2 Software for Controlling Spectrum/Receiver and Calculating Test Data

Site	Filename	Version
Conduction/Radiation	EZ EMC	ISL-03A2

4.5 Appendix E: Uncertainty of Measurement

The laboratory measurement uncertainty accordance with refers to CISPR 16-4-2. If Ulab is less than or equal to Ucispr in Table 1, then the test report may either state the value of Ulab or state that Ulab is less than Ucispr.
The coverage factor k = 2 yields approximately a 95 % level of confidence.

<Conduction 03>
AMN: ± 2.9 dB
ISN T4: ± 3.2 dB
ISN T8: ± 3.2 dB
ISN-T8(Cat 6a_10Gbps): ± 3.2 dB
CVP: ± 3.7 dB
CP: ± 3.0 dB

<Chamber 12 (10m)>
Horizontal
30MHz~200MHz: ± 4.9 dB
200MHz~1000MHz: ± 4.5 dB
Vertical
30MHz~200MHz: ± 4.9 dB
200MHz~1000MHz: ± 4.4 dB

<Chamber 19 (3m)>
30MHz~1000MHz: ±4.22 dB
1GHz~40GHz: ±4.08 dB

4.6 Appendix F: Photographs of EUT

Please refer to the File of **ISL-23LR0182P**

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