Certificate

Issue Date: December 7, 2023
Ref. Report No. ISL-19LR022E489-R5

Product Name	:	BT module
Main Model	:	BT840X
Series Model	:	BT840XE
Brand	:	Fanstel
Responsible Party	:	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 device bearing the trade name and model specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in RE Directive 2014/53/EU and EMC Directive 2014/30/EU and UK Directive Electromagnetic Compatibility Regulations 2016. The device was passed the test performed according to :

Standards:

CE
ETSI EN 301 489-1 V2.2.3
ETSI EN 301 489-17 V3.2.4

UK
BS EN 55032:2015+A11:2020 and
BS EN 55032:2015+A1:2020 Class B
BS EN IEC 61000-3-2:2019+A1:2021
BS EN 61000-3-3:2013+A2:2021+AC:2022
BS EN 61000-4-2:2009
BS EN IEC 61000-4-3:2020
BS EN 61000-4-4:2012
BS EN 61000-4-5:2014+A1:2017
BS EN 61000-4-6:2014
BS EN 61000-4-11:2004+A1:2017

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

International Standards Laboratory Corp. LT Lab.
TEL: +886-3-263-8888 FAX: +886-3-263-8899
No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan

TEST REPORT

of

ETSI EN 301 489-1

ETSI EN 301 489-17

Product:	**BT module**
Main Model:	**BT840X**
Series Model:	**BT840XE**
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

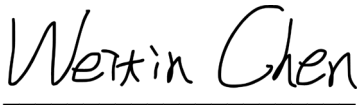
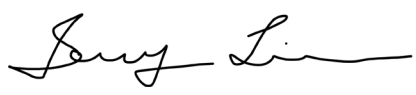
Report No.: **ISL-19LR022E489-R5**
Issue Date : **December 7, 2023**

Testing Laboratory
0997

Contents of Report

1. General

1.1 Certification of Accuracy of Test Data

Standards:	Please refer to 1.2
Equipment Tested:	BT module
Main Model:	BT840X
Series Model:	BT840XE
Brand:	Fanstel
Applicant:	Fanstel Corporation, Taipei
Sample received Date:	November 24, 2023
Final test Date:	refer to the date of test data
Test Site:	Chamber 02;Chamber 19
Test Distance:	10m; 3m (above 1GHz) (EMI test)
Temperature:	refer to each site test data
Humidity:	refer to each site test data
Atmospheric Pressure:	86 kPa to 106 kPa
Input power:	Conduction input power: AC 230 V / 50 Hz Radiation input power: AC 230 V / 50 Hz Immunity input power: AC 230 V / 50 Hz
Test Result:	**PASS**
Report Engineer:	Gigi Yeh
Test Engineer:	 Weitin Chen
Approved By:	 Jerry Liu / Manager

1.2 Test Standards

The tests which this report describes were conducted by an independent electromagnetic compatibility consultant, International Standards Laboratory Corp. in accordance with the following

ETSI EN 301 489-1 V2.2.3 ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility

ETSI EN 301 489-17 V3.2.4 ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard for ElectroMagnetic Compatibility

Standard	Description	Results
EN 61000-4-2:2009 IEC 61000-4-2:2008 BS EN 61000-4-2:2009	Electrostatic discharge immunity	Pass
EN IEC 61000-4-3:2020 IEC 61000-4-3:2020 BS EN IEC 61000-4-3:2020	Radiated, radio-frequency, electromagnetic field immunity	Pass
EN 61000-4-4:2012 IEC 61000-4-4:2012 BS EN 61000-4-4:2012	Electrical fast transient/burst immunity	Pass
EN 61000-4-5:2014+A1:2017 IEC 61000-4-5:2014+A1:2017 BS EN 61000-4-5:2014+A1:2017	Surge immunity	Pass
EN 61000-4-6:2014+AC:2015 IEC 61000-4-6:2013 BS EN 61000-4-6:2014	Immunity to conducted disturbances	Pass
EN 61000-4-11:2004+A1:2017 IEC 61000-4-11:2004+A1:2017 BS EN 61000-4-11:2004+A1:2017	Voltage dips, short interruptions and voltage variations immunity	Pass

Standard	Description	Criteria	Results
EN 55032:2015+A11:2020 EN 55032:2015+A1:2020 CISPR 32:2015+A1:2019 BS EN 55032:2015+A11:2020 BS EN 55032:2015+A1:2020	Conductive Test	Class B (EN 55032)	Pass
	Radiated Test	Class B (EN 55032)	Pass

Standard	Description	Results
EN 61000-3-2:2014 IEC 61000-3-2:2014 EN IEC 61000-3-2:2019+A1:2021 IEC 61000-3-2:2018+A1:2020 BS EN IEC 61000-3-2:2019+A1:2021	Limits for harmonic current emissions (equipment input current ≤ 16A per phase)	Pass
EN 61000-3-3:2013 IEC 61000-3-3:2013 EN 61000-3-3:2013+A2:2021+AC:2022 IEC 61000-3-3:2013+A2:2021+COR1:2022 BS EN 61000-3-3:2013+A2:2021+AC:2022	Limits for voltage fluctuations and flicker in low-voltage supply systems (equipment with input current ≤ 16 A per phase)	Pass

1.2.1 Criteria for Compliance: ETSI EN 301 489-1 V2.2.3

Performance criteria	
Performance criteria for continuous phenomena	During the test, the equipment shall: • continue to operate as intended; • not unintentionally transmit; • not unintentionally change its operating state; • not unintentionally change critical stored data.
Performance criteria for transient phenomena	For all ports and transient phenomena with the exception described below, the following applies: • The application of the transient phenomena shall not result in a change of the mode of operation (e.g. unintended transmission) or the loss of critical stored data. • After application of the transient phenomena, the equipment shall operate as intended. For surges applied to symmetrically operated wired network ports intended to be connected directly to outdoor lines the following criteria applies: • For products with only one symmetrical port intended for connection to outdoor lines, loss of function is allowed, provided the function is self-recoverable, or can be otherwise restored. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost. • For products with more than one symmetrical port intended for connection to outdoor lines, loss of function on the port under test is allowed, provided the function is self-recoverable. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

1.2.2 Criteria for Compliance: ETSI EN 301 489-17 V3.2.4

The performance criteria are:

- performance criteria A for immunity tests with phenomena of a continuous nature;
- performance criteria B for immunity tests with phenomena of a transient nature;
- performance criteria C for immunity tests with power interruptions exceeding a certain time.

The equipment shall meet the minimum performance criteria as specified in the following clauses.

Criteria	During test	After test (i.e. as a result of the application of the test)
A	• Shall operate as intended. (See note). • Shall be no loss of function. • Shall be no unintentional transmissions.	• Shall operate as intended. • Shall be no degradation of performance. • Shall be no loss of function. • Shall be no loss of critical stored data.
B	• May be loss of function.	• Functions shall be self-recoverable. • Shall operate as intended after recovering. • Shall be no loss of critical stored data.
C	• May be loss of function.	• Functions shall be recoverable by the operator. • Shall operate as intended after recovering. • Shall be no loss of critical stored data.
NOTE	Operate as intended during the test allows a level of degradation: Minimum performance level: • For equipment that supports a PER or FER, the minimum performance level shall be a PER or FER less than or equal to 10 %. • For equipment that does not support a PER or a FER, the minimum performance level shall be no loss of the wireless transmission function needed for the intended use of the equipment.	

Performance criteria for Continuous phenomena

The performance criteria A shall apply.

Where the EUT is a transmitter in standby mode, unintentional transmission shall not occur during the test.

Where the EUT is a transceiver in receive mode, unintentional transmission shall not occur during the test.

Performance criteria for Transient phenomena

The performance criteria B shall apply, except for voltage dips greater than or equal to 100 ms and voltage interruptions of 5000 ms duration, for which performance criteria C shall apply.

Where the EUT is a transmitter in standby mode, unintentional transmission shall not occur as a result of the application of the test.

Where the EUT is a transceiver in receive mode, unintentional transmission shall not occur as a result of the application of the test.

1.3 Test Mode

		Config 1	Config 2
	Applicable standard	EN 301489-17 V3.1.1	
	Accessories	UE + Smart phone	UE + Smart phone
		BT link(BT840X Antenna:Ant0)	BT link(BT840XE)
EN No.	**Description**		
8.2	radiated emission (30M-1GHz) (1-6GHz)	measured	pretest
8.3	conducted emission (DC Power)	N/A	N/A
8.4	conducted emission (AC Power)	N/A	N/A
8.5	harmonic current emissions	N/A	N/A
8.6	voltage fluctuations and flicker	N/A	N/A
8.7	Conducted emission (wired network)	N/A	N/A
9.2	RF electromagnetic field (80MHz to 6GHz)	N/A	N/A
9.3	electrostatic discharge	N/A	N/A
9.4	fast transients common mode	N/A	N/A
9.5	RF common mode 0,15 MHz to 80 MHz	N/A	N/A
9.6	transients and surges	N/A	N/A
9.7	voltage dips and interruptions	N/A	N/A
9.8	surges, line to line and line to ground	N/A	N/A

Note 1: This is an additional report. Due to the replacement of the SAW filter in the product, Radiated Disturbance Emissions tests were conducted, with comparisons made against the original data. For other test data, please refer to the original case 19LR022E489-R3.

1.4 Description of EUT Test Mode

EUT

Product Name:	Bluetooth 5.0 Module
Brand:	Fanstel
Model:	BT840X, BT840XE
Model different:	Please see model summaries table below
Power Supply:	5Vdc
RF function	BT 5.0

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

1.5 Configuration of Tested System

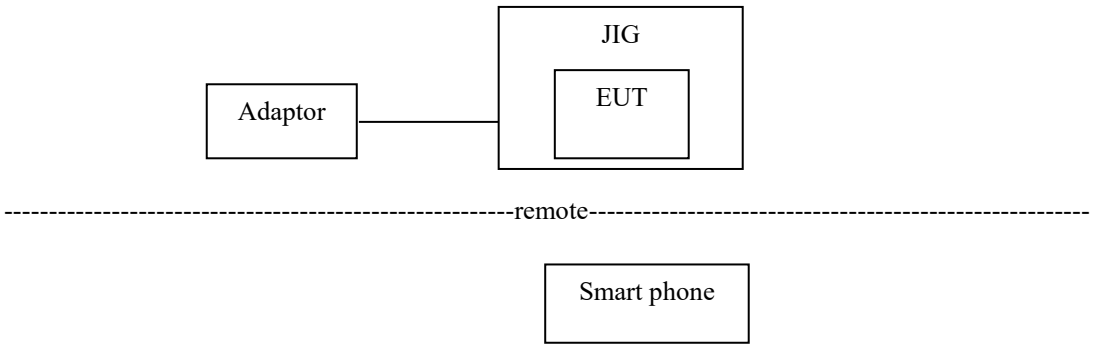


Table 1-1 Support Equipment Used in Tested System

Item	Equipment	Mrf/Brand	Model name	Series No	Data Cable	Power Cable
1	adaptor	Apple	A1385	N/A	N/A	Shielded /0.6m
2	Smart phone	hTC	PL99110	N/A	N/A	N/A

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	0.6m	Non-Shielded	Metal Head

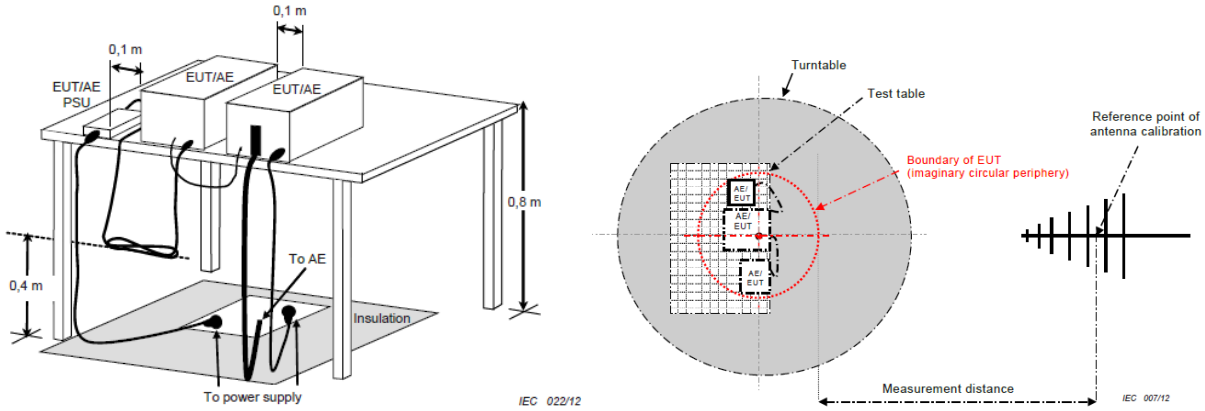
Note: All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.

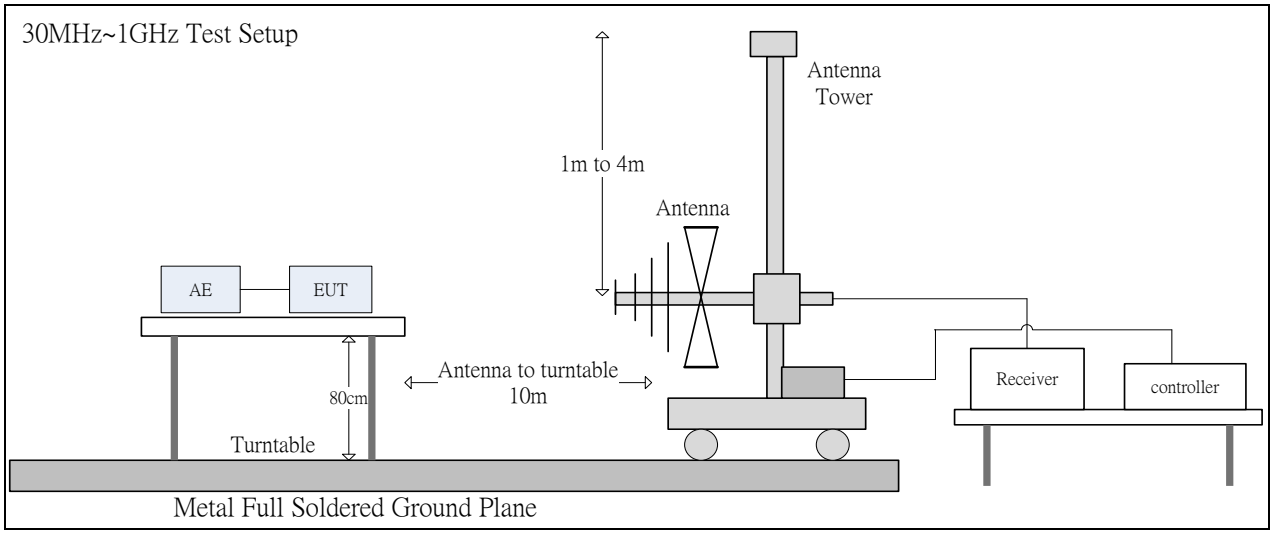
Grounding: Grounding was in accordance with the manufacturer's requirements and conditions for the intended use.

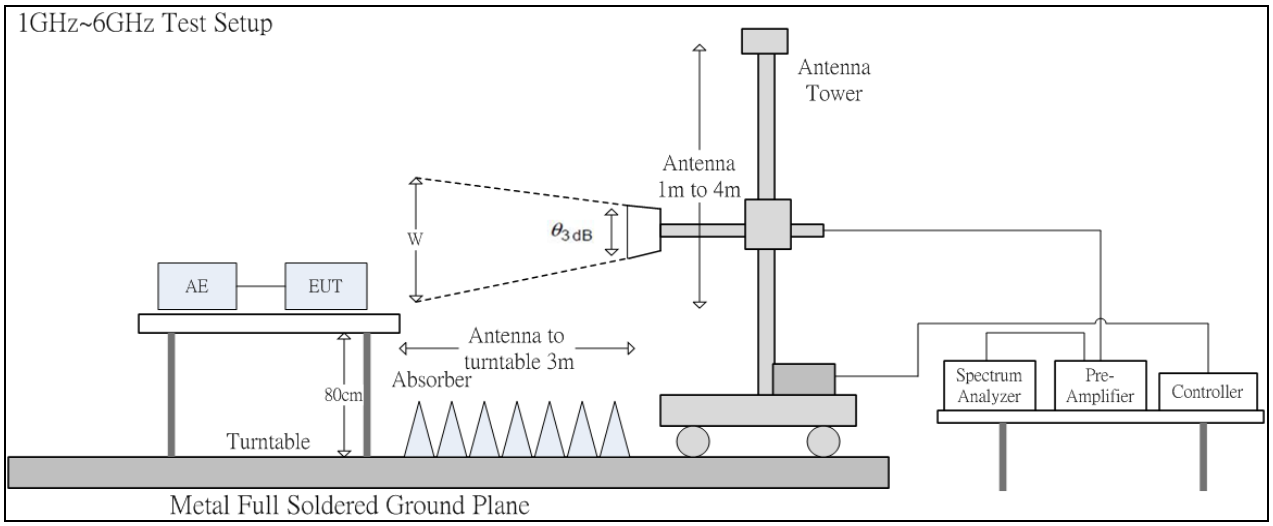
2. Radiated Disturbance Emissions

2.1 Test Setup and Procedure

2.1.1 Test Setup







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

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

2.1.2 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 FRP stand 0.8 meter above the ground or floor-standing arrangement shall be placed on the horizontal ground reference 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 6 GHz were analyzed in details by operating the spectrum analyzer in peak and average mode to determine the precise amplitude of the emissions. The test volume for a height of up to 30 cm may be obstructed by absorber placed on the ground plane.

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 EN 55032 / BS EN 55032 requirements.

The highest internal source of an 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 6 GHz, whichever is less.

2.1.3 Spectrum Analyzer Configuration (for the frequencies tested)

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

Frequency Range: Above 1 GHz to 6 GHz
Detector Function: Peak/Average Mode
Resolution Bandwidth: 1MHz

2.2 Limit

Radiated emissions at frequencies up to 1 GHz for Class_A equipment:

Frequency range MHz	Measurement		Class A limits dB(μV/m)
	Distance m	Detector type / bandwidth	OATS/SAC
30-230	10	Quasi Peak / 120 kHz	40
230-1000			47
30-230	3		50
230-1000			57

Radiated emissions at frequencies above 1 GHz for Class_A equipment of the EN 55032:2015+A11:2020:

Frequency range MHz	Measurement		Class_A limits dB(μV/m)
	Distance m	Detector type / bandwidth	FSOATS
1000-3000	3	Average / 1MHz	56
3000-6000			60
1000-3000		Peak / 1MHz	76
3000-6000			80

Radiated emissions at frequencies above 1 GHz for Class_A equipment of the EN 55032:2015+A1:2020:

Frequency range MHz	Measurement		Class_A limits dB(μV/m)
	Distance m	Detector type / bandwidth	FSOATS
1000-6000	3	Average / 1MHz	60
1000-6000		Peak / 1MHz	80

Note 1: The radiated emissions at frequencies above 1 GHz test limit in this report is based on EN 55032:2015+A11:2020.

Note 2: Test data in this report has been taken against the EN 55032:2015+A11:2020 limit as it is the most stringent limit. By complying with the more restrictive EN 55032:2015+A11:2020 limit compliance with the EN 55032:2015+A1:2020 limit is also demonstrated.

Radiated emissions at frequencies up to 1 GHz for Class_B equipment:

Frequency range MHz	Measurement		Class_B limits dB(μV/m)
	Distance m	Detector type / bandwidth	OATS/SAC
30-230	10	Quasi Peak / 120 kHz	30
230-1000			37
30-230	3		40
230-1000			47

Radiated emissions at frequencies above 1 GHz for Class_B equipment of the EN 55032:2015+A11:2020:

Frequency range MHz	Measurement		Class_B limits dB(μV/m)
	Distance m	Detector type / bandwidth	FSOATS
1000-3000	3	Average / 1MHz	50
3000-6000			54
1000-3000		Peak / 1MHz	70
3000-6000			74

Radiated emissions at frequencies above 1 GHz for Class_B equipment of the EN 55032:2015+A1:2020:

Frequency range MHz	Measurement		Class_B limits dB(μV/m)
	Distance m	Detector type / bandwidth	FSOATS
1000-6000	3	Average / 1MHz	54
1000-6000		Peak / 1MHz	74

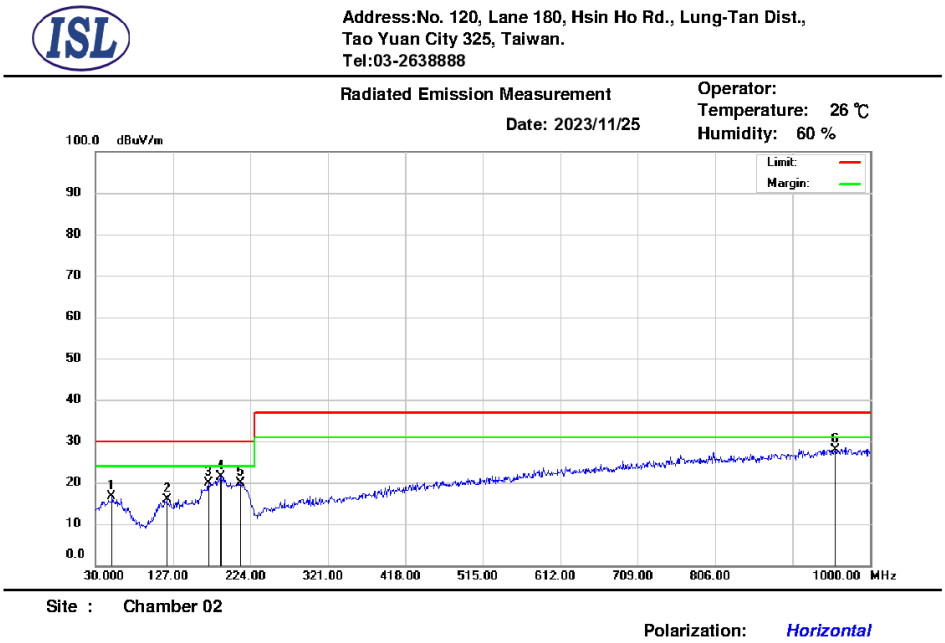
Note 1: The radiated emissions at frequencies above 1 GHz test limit in this report is based on EN 55032:2015+A11:2020.

Note 2: Test data in this report has been taken against the EN 55032:2015+A11:2020 limit as it is the most stringent limit. By complying with the more restrictive EN 55032:2015+A11:2020 limit compliance with the EN 55032:2015+A1:2020 limit is also demonstrated.

Radiated emissions from FM receivers:

Frequency range MHz	Measurement		Class_B limits dB(μV/m)	
	Distance m	Detector type / bandwidth	Fundamental	Harmonics
			OATS/SAC	OATS/SAC
30-230	10	Quasi Peak / 120 kHz	50	42
230-300				42
300-1000				46
30-230	3		60	52
230-300				52
300-1000				56

2.3 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	50.37	33.61	-16.90	16.71	30.00	-13.29	350	115	peak
2	119.24	34.40	-18.41	15.99	30.00	-14.01	350	26	peak
3	171.62	36.05	-16.25	19.80	30.00	-10.20	400	186	peak
4	187.14	39.35	-18.01	21.34	30.00	-8.66	350	174	peak
5	211.39	38.66	-18.81	19.85	30.00	-10.15	400	164	peak
6	956.35	30.88	-2.90	27.98	37.00	-9.02	250	293	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
If the peak measured value meets the QP limit, The QP value is inherently compliant.

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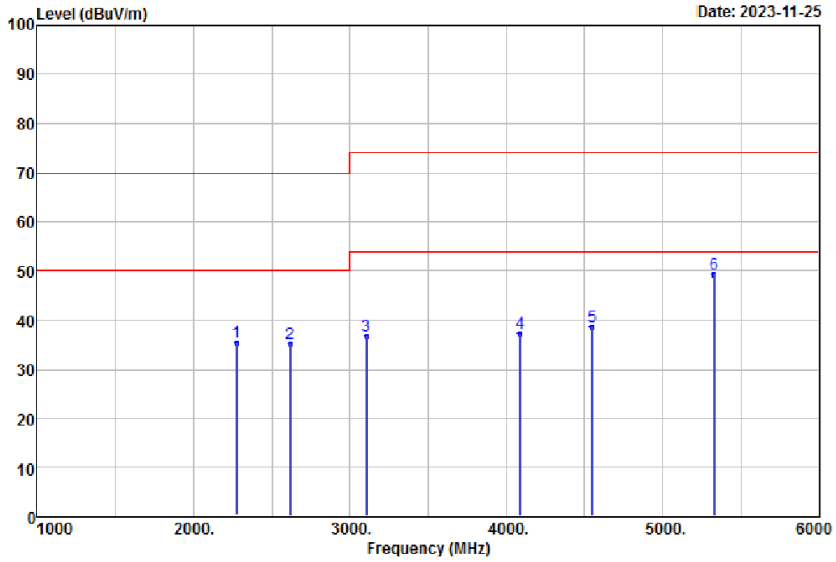


Condition: 55032 CLASS B PK 3m HORIZONTAL
Site : Chamber 19

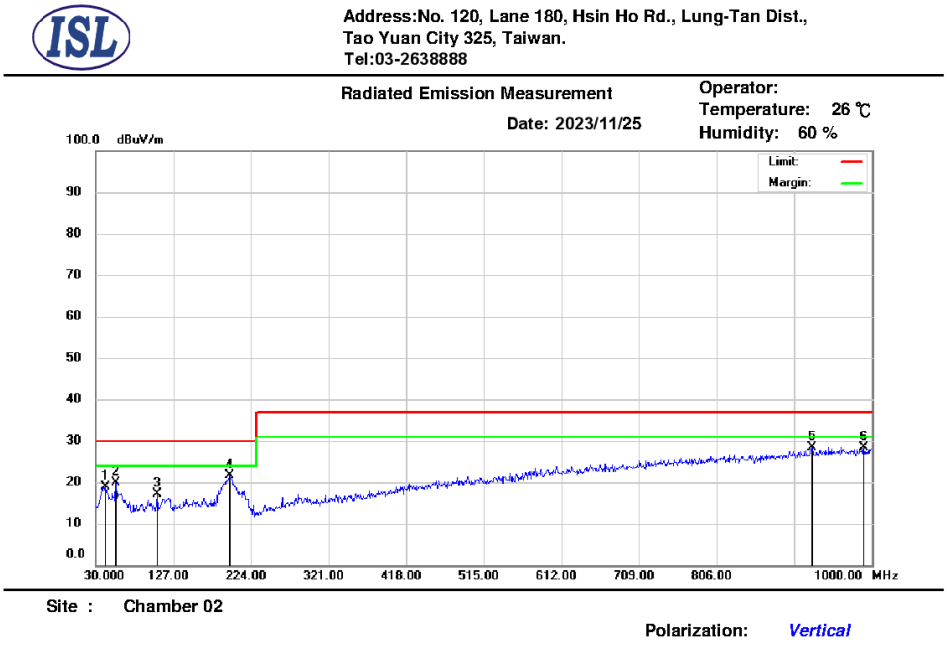
Operator :

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	2275.00	51.07	-15.62	35.45	70.00	-34.55	Peak	HORIZONTAL
2	2620.00	50.54	-15.39	35.15	70.00	-34.85	Peak	HORIZONTAL
3	3105.00	51.22	-14.32	36.90	74.00	-37.10	Peak	HORIZONTAL
4	4090.00	49.09	-11.68	37.41	74.00	-36.59	Peak	HORIZONTAL
5	4550.00	48.75	-10.14	38.61	74.00	-35.39	Peak	HORIZONTAL
6	5330.00	57.36	-8.02	49.34	74.00	-24.66	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: 10 meters
If the peak measured value meets the QP limit, The QP 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	42.61	36.32	-17.44	18.88	30.00	-11.12	200	359	peak
2	55.22	37.04	-17.05	19.99	30.00	-10.01	117	360	peak
3	106.63	37.01	-19.89	17.12	30.00	-12.88	250	0	peak
4	197.81	40.38	-18.76	21.62	30.00	-8.38	100	122	peak
5	925.31	31.66	-3.36	28.30	37.00	-8.70	350	250	peak
6	990.30	30.86	-2.52	28.34	37.00	-8.66	100	313	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
If the peak measured value meets the QP limit, The QP value is inherently compliant.

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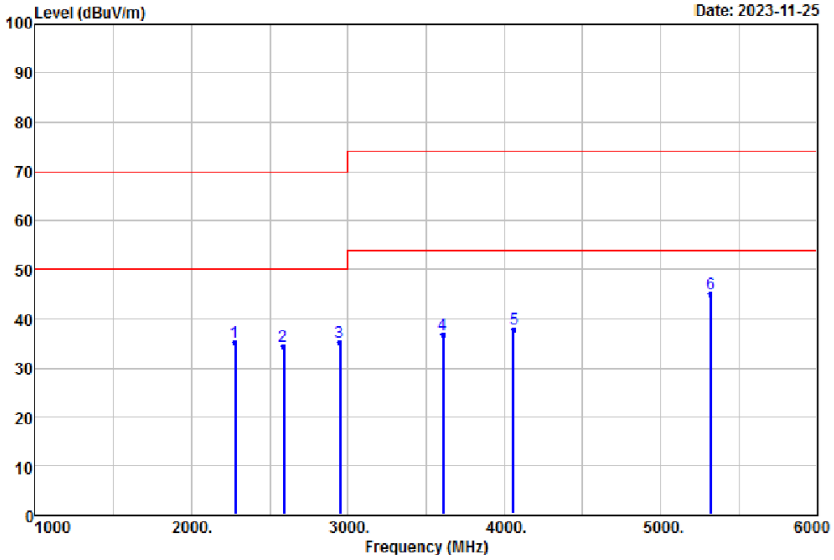


Condition: 55032 CLASS B PK 3m VERTICAL
Site : Chamber 19

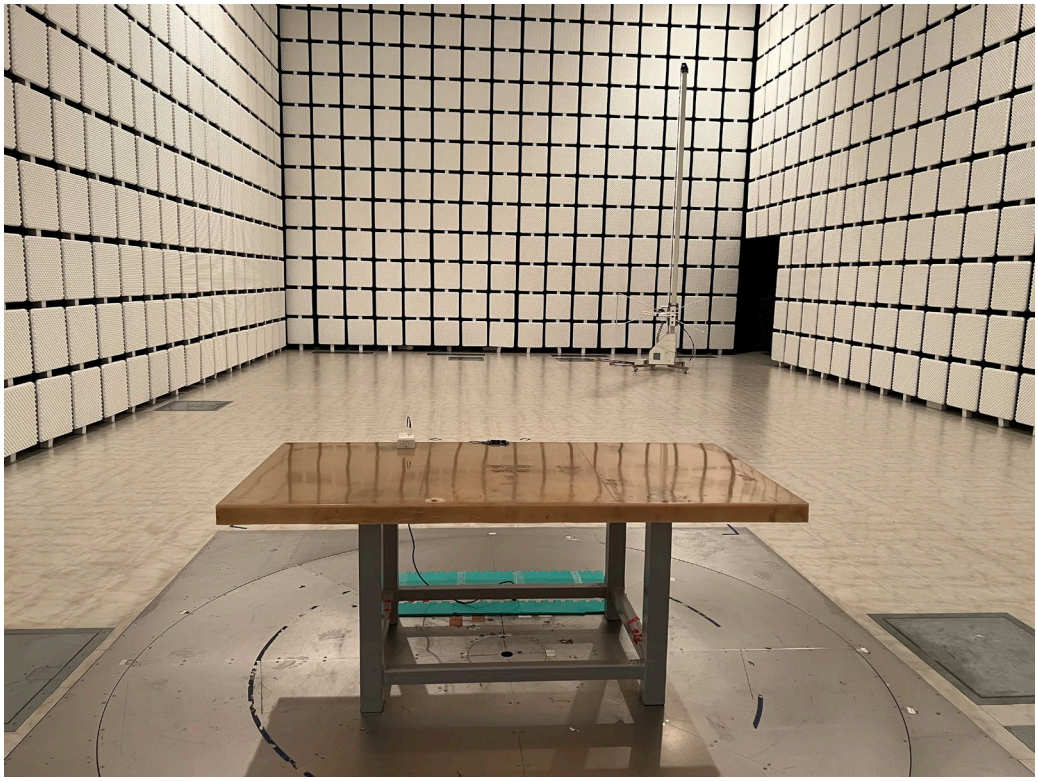
Operator :

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	2275.00	50.74	-15.62	35.12	70.00	-34.88	Peak	VERTICAL
2	2585.00	49.97	-15.49	34.48	70.00	-35.52	Peak	VERTICAL
3	2945.00	50.01	-14.76	35.25	70.00	-34.75	Peak	VERTICAL
4	3605.00	50.00	-13.28	36.72	74.00	-37.28	Peak	VERTICAL
5	4065.00	49.73	-11.75	37.98	74.00	-36.02	Peak	VERTICAL
6	5320.00	53.15	-8.03	45.12	74.00	-28.88	Peak	VERTICAL

* 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
If the peak measured value meets the QP limit, The QP value is inherently compliant.

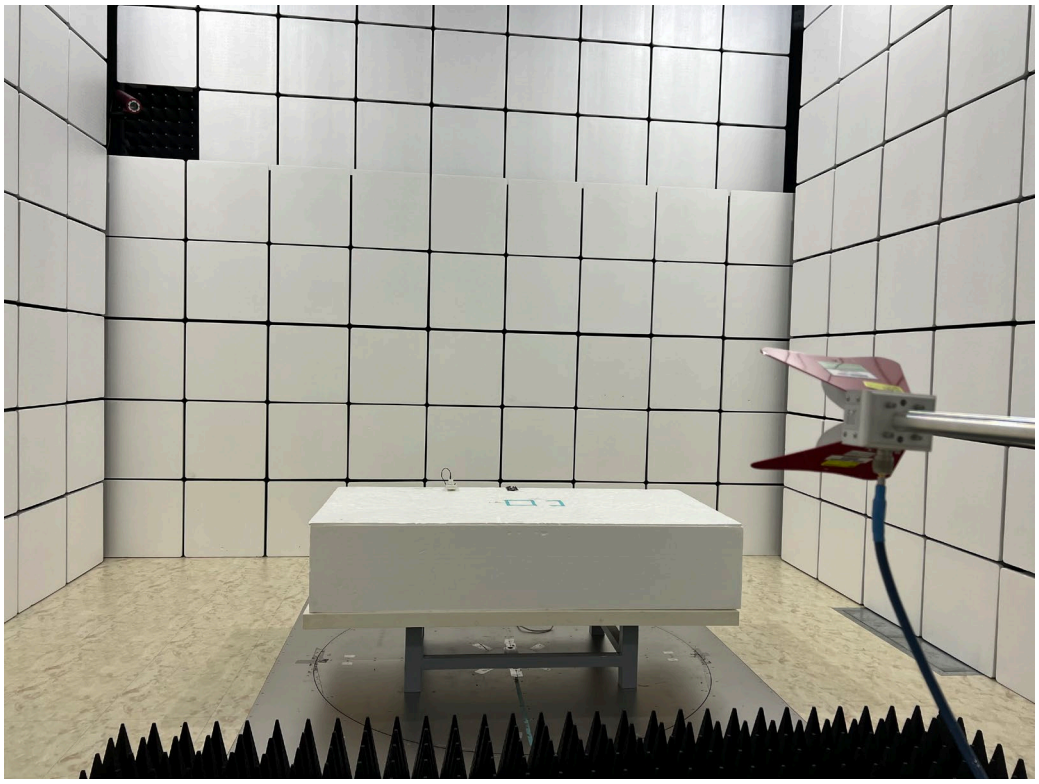
2.4 Test Setup Photo

Front View (30MHz~1GHz)



Back View (30MHz~1GHz)

Front View (above 1GHz)



Back View (above 1GHz)

3. Appendix

3.1 Appendix A: Test Equipment

3.1.1 Test Equipment List

Location Chamber02	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Radiation	BILOG Antenna 17 (30MHz~1GHz)	SCHWARZBECK	VULB 9168+EMCI-N-6-05	645	11/16/2023	11/16/2024
Radiation	Preamplifier 25	EMCI	EMC9135	980295	03/24/2023	03/24/2024
Radiation	Coaxial Cable Chmb 02-10M-02	EMC	RG214U	Chmb 02-10M-02	10/04/2023	10/04/2024
Radiation	EMI Receiver 14	R&S	ESCI	100887	05/19/2023	05/19/2024

Location Conducted	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Chamber 19	Spectrum 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	01/05/2023	01/05/2024
Chamber 19	Preamplifier (1GHz-26GHz)	HP	8449B	3008A02471	10/25/2023	10/25/2024
Chamber 19	Preamplifier (26GHz-40GHz)	MITEQ	JS4-26004000-27-5 A	818471	05/04/2023	05/04/2024
Chamber 19	RF Cable (9kHz-26.5GHz)	Huber Suhner & Woken	Sucoflex 104A & 18GHz SMA(M)-SMA(M)-10M	MY817/4A & 20200525	12/21/2022	12/21/2023
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

**Software for Controlling Spectrum/Receiver and Calculating Test Data

Test Item	Filename	Version
EN IEC 61000-3-2	California Instruments	CTSMXL V2.26.0
EN 61000-3-3	California Instruments	CTSMXL V2.26.0
EN 61000-3-11	California Instruments	CTSMXL V2.23.0
EN 61000-3-12	California Instruments	CTSMXL V2.23.0
EN IEC 61000-3-2	HFa-16 Program	v1.0.0.14
EN 61000-3-3	HFa-16 Program	v1.0.0.14
EN 61000-3-11	HFa-75 Program	v1.0.0.2.5
EN 61000-3-12	HFa-75 Program	v1.0.0.2.5
EN 61000-4-2	N/A	2.0
EN IEC 61000-4-3	i2	529b
EN 61000-4-4	TEM A3000	v4.6.1
EN 61000-4-5	EMC Partner	1.69
EN 61000-4-6	i2	529b
EN 61000-4-8	N/A	
EN IEC 61000-4-11 (<16A)	NOISE KEN	2.0
EN IEC 61000-4-11 (>16A)	DRP61011CX	V1.0.0.2.20171219

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

3.2 Appendix B: 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.

<Chamber 02 (10m)>
Horizontal
30MHz~200MHz: ± 4.5 dB
200MHz~1000MHz: ± 4.3 dB
Vertical
30MHz~200MHz: ± 4.9 dB
200MHz~1000MHz: ± 4.7 dB

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

<Immunity 02>

Test item	Uncertainty	Test item	Uncertainty
EN 61000-4-2 (ESD)		EN 61000-4-6 (CS)	
Rise time tr	≦ 11%	CDN	1.9 dB
Peak current Ip	≦ 5.9%	EM Clamp	3.4 dB
current at 30 ns	≦ 6.0%	EN 61000-4-8 (Magnetic)	5.6 %
current at 60 ns	≦ 5.9%	EN IEC 61000-4-11 (Dips)	0.57 %
EN IEC 61000-4-3 (RS)	2.7 dB	EN IEC 61000-3-2 (Harmonics)	1.2 %
EN 61000-4-4 (EFT)		EN 61000-3-3 (Fluctuations and Flicker)	8.1 %
voltage rise time (tr)	7.2 %	EN 61000-3-12 (Harmonics)	1.3 %
peak voltage value (VP)	6.3 %	EN 61000-3-11 (Fluctuations and Flicker)	8.1 %
voltage pulse width (t_w)	5.1 %	EN 61000-4-34 (Dips)	0.83 %
EN 61000-4-5 (Surge)			
open-circuit voltage front time	12 %		
open-circuit voltage peak value	8.7 %		
open-circuit voltage duration (T_d)	0.55%		

IEC 61000-4-17 (Ripple)		IEC 61000-4-18 (Damped oscillatory wave)	
Voltage	18 μV/V	Rise Time	5.3 ns
Current	0.83 mA/A	Peak	0.97 kV
		IEC 61000-4-29 (Voltage dips on d.c)	
		Voltage	17 μV/V
		Current	0.83 mA/A
		Time	2.8 %

3.3 Appendix C: Photographs of EUT

Please refer to the File of **ISL-19LR022P-R5**

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