FCC Part 15, Subpart B, Class B

iSocket Systems Ltd

iSocket

Test Model: ISPROEMUS

Prepared for	:	iSocket Systems Ltd
Address	:	Kurolantie 1, 78500 Varkaus, Finland
Prepared by	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address	:	101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China
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Date of receipt of test sample	:	February 08, 2023
Number of tested samples	:	2
Sample No.	:	A011723017
Serial number	:	Prototype
Date of Test	:	February 08, 2023 ~ May 10, 2023
Date of Report	:	May 11, 2023

FCC Part 15, Subpart B, Class B
FCC 47 CFR Part 15 Subpart B, Class B, ANSI C63.4 -2014

Report Reference No.	**: LCSA011723017E**
Date Of Issue.....	: May 11, 2023
Testing Laboratory Name.....	**: Shenzhen LCS Compliance Testing Laboratory Ltd.**
Address.....	: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China
Testing Location/ Procedure....	: Full application of Harmonised standards ■ Partial application of Harmonised standards □ Other standard testing method □
Applicant's Name.....	**: iSocket Systems Ltd**
Address.....	: Kurolantie 1, 78500 Varkaus, Finland
Test Specification	
Standard.....	: FCC 47 CFR Part 15 Subpart B, Class B, ANSI C63.4 -2014
Test Report Form No.....	: LCSEMC-1.0
TRF Originator.....	: Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF.....	: Dated 2011-03

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Test Item Description.....	**: iSocket**
Test Model	: ISPROEMUS
Trade Mark.....	: ISPROEMUS
Ratings.....	: Input: AC 100-240V, 50-60Hz, Max 15A
Result	**: Positive**

Compiled by:	**Supervised by:**	**Approved by:**
Kevin Huang	Cary Luo	Gavin Liang
Kevin Huang/ Administrator	Cary Luo/ Technique principal	Gavin Liang/ Manager

FCC -- TEST REPORT

Test Report No. : LCSA011723017E	May 11, 2023 Date of issue

Test Model	: ISPROEMUS
EUT.....	: iSocket
Applicant.....	**: iSocket Systems Ltd**
Address.....	: Kurolantie 1, 78500 Varkaus, Finland
Telephone.....	: /
Fax.....	: /
Manufacturer.....	**: iSocket Systems Ltd**
Address.....	: Kurolantie 1, 78500 Varkaus, Finland
Telephone.....	: /
Fax.....	: /
Factory.....	: **iSocket Systems Ltd**
Address.....	: Kurolantie 1, 78500 Varkaus, Finland
Telephone.....	: /
Fax.....	: /

Test Result according to the standards on page 6: **Positive**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Revision History

Report Version	Issue Date	Revision Content	Revised By
000	May 11, 2023	Initial Issue	---

TABLE OF CONTENTS

Test Report Description Page

1. SUMMARY OF STANDARDS AND RESULTS 6
1.1. Description of Standards and Results 6
2. GENERAL INFORMATION 7
2.1. Description of Device (EUT) 7
2.2. Support Equipment List 7
2.3. Description of Test Facility 8
2.4. Statement of the Measurement Uncertainty 8
2.5. Measurement Uncertainty 8
3. TEST RESULTS 9
3.1. POWER LINE CONDUCTED EMISSION MEASUREMENT 9
3.2. Radiated emission Measurement 13
4. TEST SETUP PHOTOGRAPHS OF EUT 19
5. EXTERIOR PHOTOGRAPHS OF THE EUT 19
6. INTERIOR PHOTOGRAPHS OF THE EUT 19

1. SUMMARY OF STANDARDS AND RESULTS

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

EMISSION			
Description of Test Item	Standard	Limits	Results
Conducted disturbance at mains terminals	FCC 47 CFR Part 15 Subpart B, Class B, ANSI C63.4 -2014	Class B	PASS
Radiated disturbance	FCC 47 CFR Part 15 Subpart B, Class B, ANSI C63.4 -2014	Class B	PASS
N/A is an abbreviation for Not Applicable.			

Test mode:		
Mode1	Normal Operation	Record

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

EUT : iSocket

Trade Mark : ISPROEMUS

Test Model : ISPROEMUS

Power Supply : Input: AC 100-240V, 50-60Hz, Max 15A

Highest internal frequency (Fx) : Fx = 1.915 GHz

Highest internal frequency (Fx)	Highest measured frequency
Fx ≤ 108 MHz 108 MHz < Fx ≤ 500 MHz 500 MHz < Fx ≤ 1 GHz Fx > 1 GHz	1 GHz 2 GHz 5 GHz 5 × Fx up to a maximum of 40 GHz
NOTE 1 For FM and TV broadcast receivers, Fx is determined from the highest frequency generated or used excluding the local oscillator and tuned frequencies. Where Fx is unknown, the radiated emission measurements shall be performed up to 40 GHz.	

2.2. Support Equipment List

Name	Manufacturers	M/N	S/N
--	--	--	--

2.3. Description of Test Facility

Site Description

EMC Lab. : NVLAP Accreditation Code is 600167-0.
FCC Designation Number is CN5024.
CAB identifier is CN0071.
CNAS Registration Number is L4595.
FCC Test Firm Registration Number: 254912

2.4. Statement of the Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

2.5. Measurement Uncertainty

Test	Parameters	Expanded Uncertainty (Ulab)	Expanded Uncertainty (Ucispr)
Conducted Emission	Level accuracy (9kHz to 150kHz) (150kHz to 30MHz)	± 2.63 dB ± 2.35 dB	± 3.8 dB ± 3.4 dB
Radiated Emission	Level accuracy (30MHz to 1000MHz)	± 3.48 dB	± 5.3 dB
Radiated Emission	Level accuracy (above 1000MHz)	± 3.90 dB	± 5.2 dB

（1）Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus.

（2）The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

3. TEST RESULTS

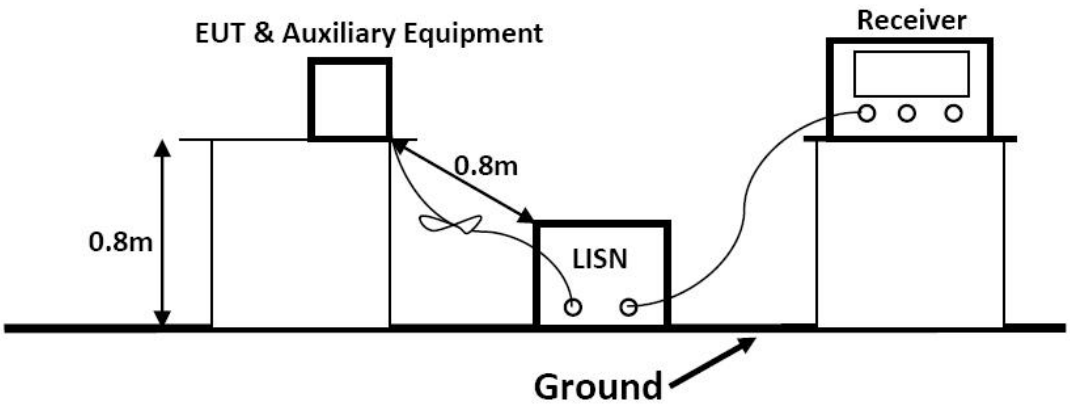
3.1. POWER LINE CONDUCTED EMISSION MEASUREMENT

3.1.1. Test Equipment

The following test equipments are used during the power line conducted measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI Test Software	Farad	EZ	/	N/A	N/A
2	EMI Test Receiver	R&S	ESR3	102312	2022-02-16	2023-02-15
3	Artificial Mains	R&S	ENV216	101288	2022-06-16	2023-06-15
4	Pulse Limiter	R&S	ESH3-Z2	102750-NB	2022-08-19	2023-08-18
5	Impedance Stabilization Network	TESEQ	ISN T800	45130	2022-10-29	2023-10-28

3.1.2.Block Diagram of Test Setup



3.1.3.Test Standard

Power Line Conducted Emission Limits (Class B)

Frequency (MHz)			Limit (dBμV)	
			Quasi-peak Level	Average Level
0.15	~	0.50	66.0 ~ 56.0 *	56.0 ~ 46.0 *
0.50	~	5.00	56.0	46.0
5.00	~	30.00	60.0	50.0

NOTE1-The lower limit shall apply at the transition frequencies.
NOTE2-The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.

3.1.4.EUT Configuration on Test

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.

3.1.5.Operating Condition of EUT

3.1.5.1.Setup the EUT as shown on Section 3.1.2

3.1.5.2.Turn on the power of all equipments.

3.1.5.3.Let the EUT work in measuring Lighting and measure it.

3.1.6.Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC/ANSI C63.4-2014 on Conducted Emission Measurement.

The bandwidth of the test receiver is set at 9kHz.

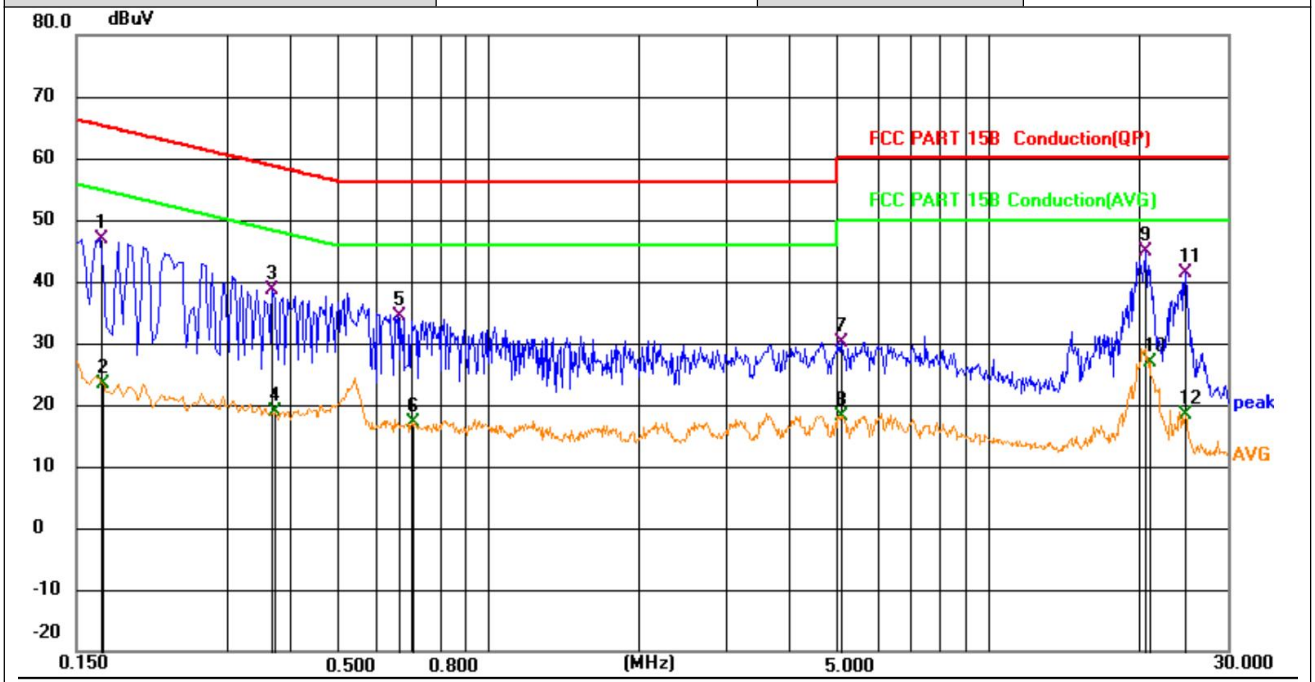
The frequency range from 150kHz to 30MHz is investigated

3.1.7.Test Results

PASS.

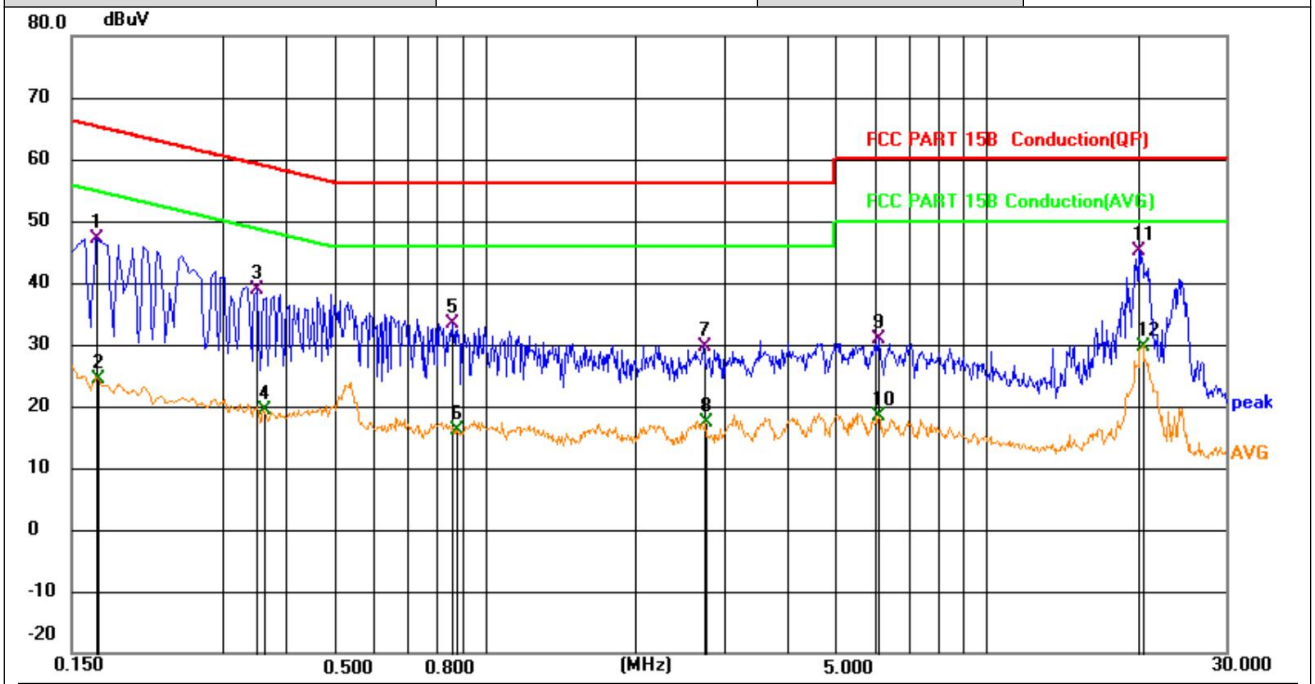
The test result please refer to the next page.

Test Model	ISPROEMUS	Test Mode	Mode1
Environmental Conditions	23.4℃, 53.3% RH	Test Engineer	Mening Su
Pol	Line	Test Voltage	AC 120V/60Hz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1681	27.26	19.63	46.89	65.05	-18.16	QP	
2		0.1694	3.73	19.63	23.36	54.99	-31.63	AVG	
3		0.3706	18.90	19.63	38.53	58.49	-19.96	QP	
4		0.3751	-0.64	19.63	18.99	48.39	-29.40	AVG	
5		0.6586	14.68	19.65	34.33	56.00	-21.67	QP	
6		0.7036	-2.44	19.65	17.21	46.00	-28.79	AVG	
7		5.0731	10.30	19.80	30.10	60.00	-29.90	QP	
8		5.0731	-1.62	19.80	18.18	50.00	-31.82	AVG	
9	*	20.6611	24.74	20.17	44.91	60.00	-15.09	QP	
10		20.9401	6.72	20.15	26.87	50.00	-23.13	AVG	
11		24.7066	21.40	20.04	41.44	60.00	-18.56	QP	
12		24.7066	-1.68	20.04	18.36	50.00	-31.64	AVG	

Test Model	ISPROEMUS	Test Mode	Mode1
Environmental Conditions	23.4℃, 53.3% RH	Test Engineer	Mening Su
Pol	Neutral	Test Voltage	AC 120V/60Hz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1677	27.54	19.63	47.17	65.07	-17.90	QP	
2		0.1694	4.74	19.63	24.37	54.99	-30.62	AVG	
3		0.3520	19.13	19.63	38.76	58.92	-20.16	QP	
4		0.3615	-0.26	19.63	19.37	48.69	-29.32	AVG	
5		0.8618	13.66	19.64	33.30	56.00	-22.70	QP	
6		0.8803	-3.45	19.64	16.19	46.00	-29.81	AVG	
7		2.7212	10.01	19.72	29.73	56.00	-26.27	QP	
8		2.7502	-2.39	19.72	17.33	46.00	-28.67	AVG	
9		6.0885	11.01	19.80	30.81	60.00	-29.19	QP	
10		6.0885	-1.47	19.80	18.33	50.00	-31.67	AVG	
11	*	20.0559	24.91	20.21	45.12	60.00	-14.88	QP	
12		20.4854	9.57	20.18	29.75	50.00	-20.25	AVG	

Note: Margin= Reading Level+Correct Factor – Limit
Correct Factor=Lisn Factor+Cable Factor

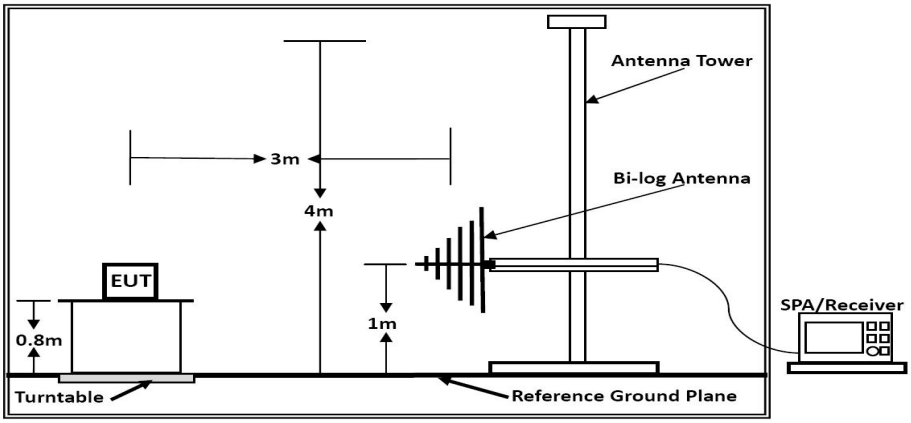
3.2. Radiated emission Measurement

3.2.1. Test Equipment

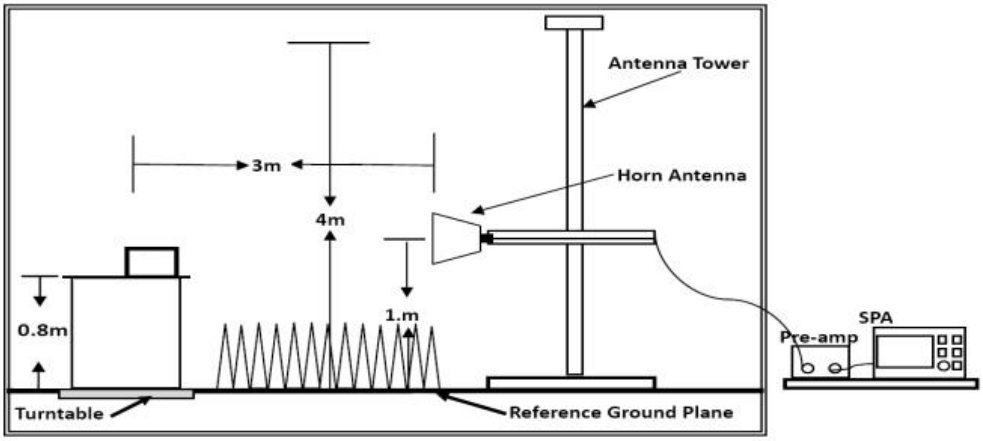
The following test equipments are used during the radiated emission measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI Test Software	AUDIX	E3	/	N/A	N/A
2	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2021-09-12	2024-09-11
3	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2021-09-05	2024-09-04
4	EMI Test Receiver	R&S	ESPI	101940	2022-08-18	2023-08-17
5	Broadband Preamplifier	/	BP-01M18G	P190501	2022-06-16	2023-06-15
6	EMI Test Software	Farad	EZ	/	N/A	N/A
7	MXA Signal Analyzer	Agilent	N9020A	MY50510140	2022-10-29	2023-10-28
8	EMI Test Receiver	R&S	ESPI	101940	2022-08-18	2023-08-17

3.2.2. Block Diagram of Test Setup



Below 1GHz



Above 1GHz

3.2.3. Radiated Emission Limit (Class B)

Limits for Radiated Disturbance Below 1GHz

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
30 ~ 88	3	100	40
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46
960 ~ 1000	3	500	54

Remark: (1) Emission level (dB)μV = 20 log Emission level μV/m
(2) The smaller limit shall apply at the cross point between two frequency bands.
(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

Limits for Radiated Emission Above 1GHz

Frequency (MHz)	Distance (Meters)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)
Above 1000	3	74	54

***Note: The lower limit applies at the transition frequency.

3.2.4. EUT Configuration on Measurement

The following equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

3.2.5. Operating Condition of EUT

3.2.5.1.Setup the EUT as shown in Section 3.2.2.
3.2.5.2.Let the EUT work in test Lighting and measure it.

3.2.6. Test Procedure

EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated by-log antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4-2014 on radiated emission measurement.

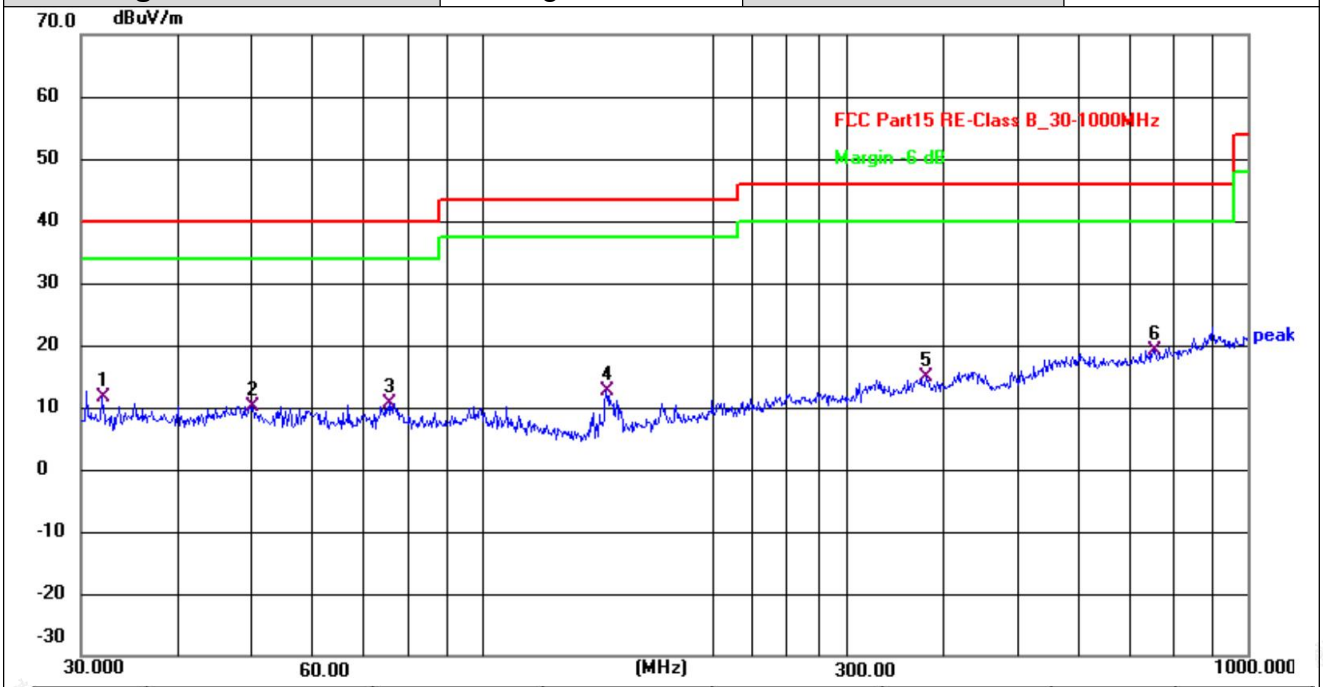
The bandwidth of the EMI test receiver is set at 120kHz, 300kHz.
The frequency range from 30MHz to 1000MHz is checked.

3.2.7. Radiated Emission Noise Measurement Result

PASS.

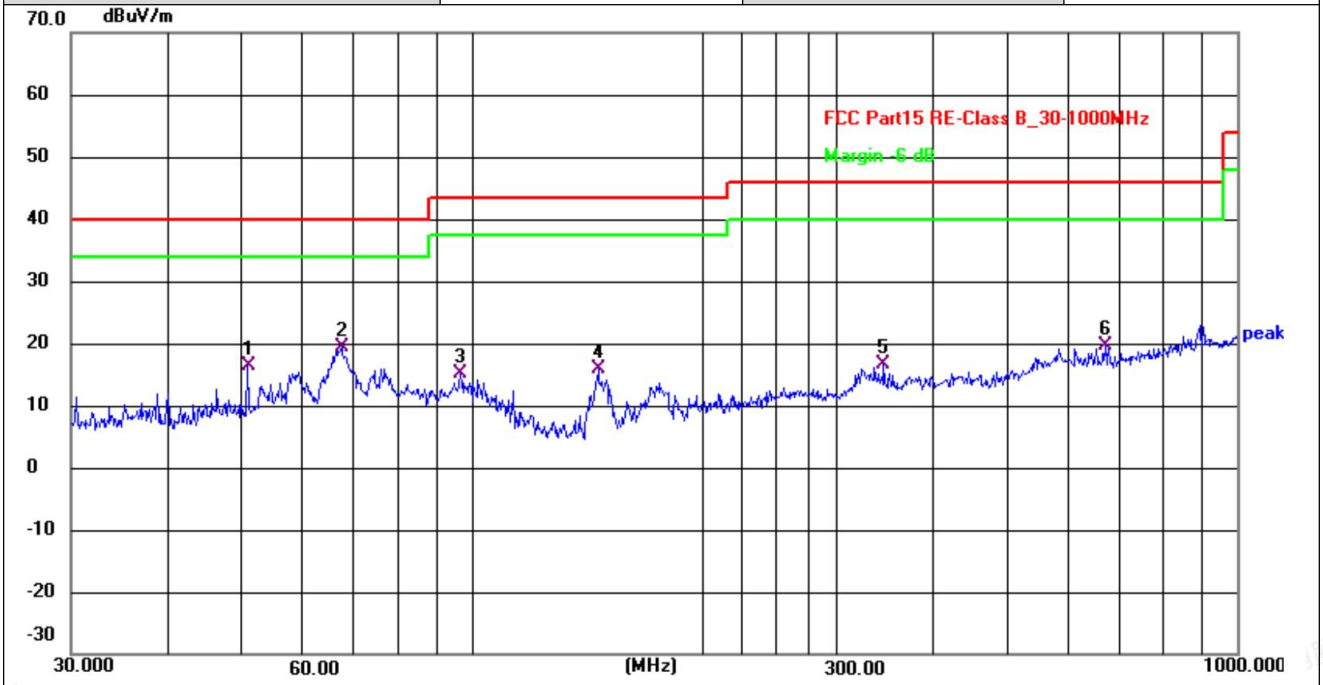
The scanning waveforms please refer to the next page.

Test Model	ISPROEMUS	**Test Mode**	Mode1
Environmental Conditions	23.8℃, 52.3% RH	**Detector Function**	Quasi-peak
Pol	Vertical	**Distance**	3m
Test Engineer	Mening Su	**Test Voltage**	AC 120V/60Hz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	31.9546	29.74	-18.20	11.54	40.00	-28.46	QP
2	50.2324	27.32	-17.08	10.24	40.00	-29.76	QP
3	75.9773	30.47	-19.72	10.75	40.00	-29.25	QP
4	145.3506	32.83	-20.32	12.51	43.50	-30.99	QP
5	379.9141	29.56	-14.67	14.89	46.00	-31.11	QP
6	755.3873	29.27	-10.14	19.13	46.00	-26.87	QP

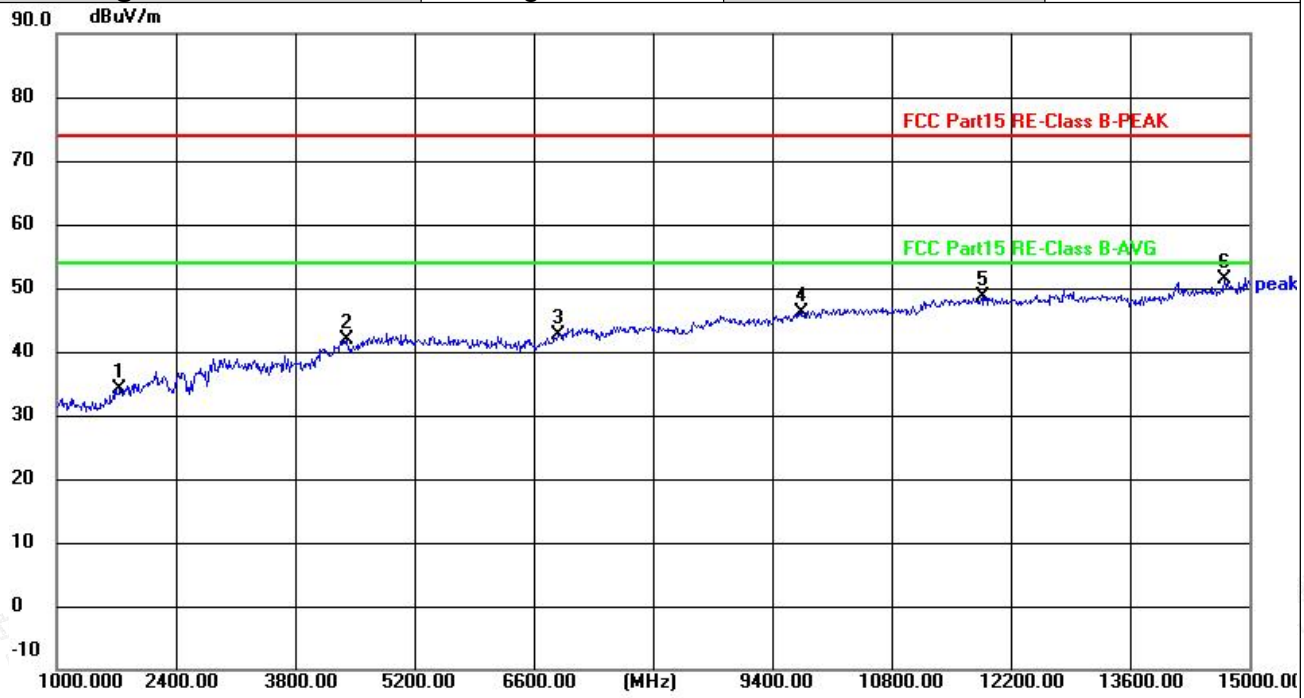
Test Model	ISPROEMUS	**Test Mode**	Mode1
Environmental Conditions	23.8℃, 52.3% RH	**Detector Function**	Quasi-peak
Pol	Horizontal	**Distance**	3m
Test Engineer	Mening Su	**Test Voltage**	AC 120V/60Hz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	50.9420	33.49	-17.21	16.28	40.00	-23.72	QP
2	67.6751	38.68	-19.32	19.36	40.00	-20.64	QP
3	96.7749	33.44	-18.41	15.03	43.50	-28.47	QP
4	146.3735	36.02	-20.22	15.80	43.50	-27.70	QP
5	345.5952	31.28	-14.75	16.53	46.00	-29.47	QP
6	672.8444	30.76	-11.06	19.70	46.00	-26.30	QP

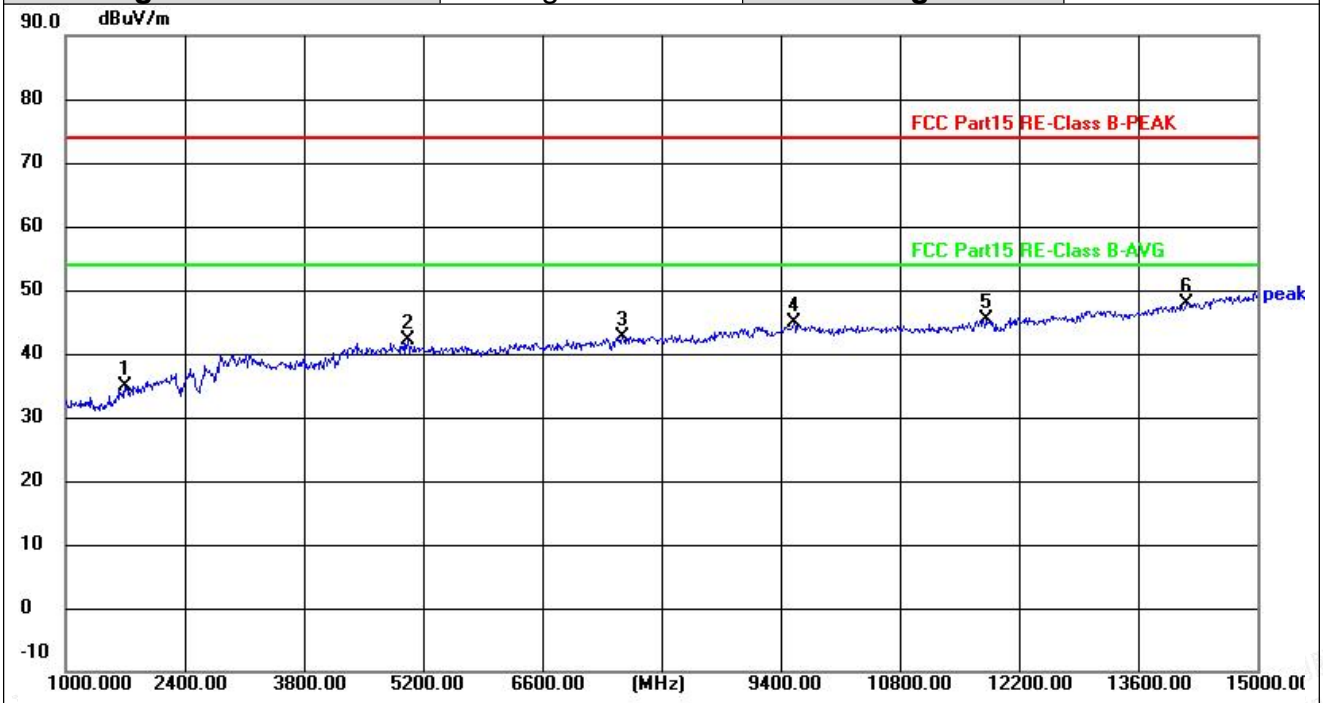
Note: Margin= Reading Level+Correct Factor – Limit
Correct Factor=Antenna Factor+Cable Factor – Pre-Amplifier Factor

Test Model	ISPROEMUS	**Test Mode**	Mode 1 (Above 1GHz)
Environmental Conditions	23.9℃, 52.0% RH	**Detector Function**	Peak + AV
Pol	Horizontal	**Distance**	3m
Test Engineer	Mening Su	**Test Voltage**	AC 120V/60Hz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1742.000	48.45	-14.28	34.17	74.00	-39.83	peak
2	4402.000	48.86	-6.97	41.89	74.00	-32.11	peak
3	6880.000	43.24	-0.50	42.74	74.00	-31.26	peak
4	9750.000	42.89	3.13	46.02	74.00	-27.98	peak
5	11864.000	42.03	6.50	48.53	74.00	-25.47	peak
6	14706.000	41.63	9.76	51.39	74.00	-22.61	peak

Test Model	ISPROEMUS	**Test Mode**	Mode 1 (Above 1GHz)
Environmental Conditions	23.9℃, 52.0% RH	**Detector Function**	Peak + AV
Pol	Vertical	**Distance**	3m
Test Engineer	Mening Su	**Test Voltage**	AC 120V/60Hz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1700.000	49.34	-14.38	34.96	74.00	-39.04	peak
2	5018.000	46.33	-4.09	42.24	74.00	-31.76	peak
3	7538.000	41.95	0.64	42.59	74.00	-31.41	peak
4	9554.000	42.18	2.80	44.98	74.00	-29.02	peak
5	11822.000	39.03	6.44	45.47	74.00	-28.53	peak
6	14174.000	38.59	9.32	47.91	74.00	-26.09	peak

Note:
1. Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
2. Measurements above show only up to 6 maximum emissions noted.
3. Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. Factor = Antenna Factor + Cable Loss + Amplifier Factor
Emission Level = Reading level + Factor
Margin = Emission Level - Limit

4. TEST SETUP PHOTOGRAPHS OF EUT

Please refer to separated files for Test Setup Photos of the EUT.

5. EXTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for External Photos of the EUT.

6. INTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for Internal Photos of the EUT.

----------THE END OF TEST REPORT----------