TEST REPORT

Reference No.	:	WTX23X10221093W005
FCC ID	:	2AUI4-E86
Applicant	:	Universal Ubiquitous AI Co., Ltd.
Address	:	Floor 24-26 Building 3, Fashion Vantone City, Cangqian Street, Yuhang District, Hangzhou, Zhejiang, China
Manufacturer	:	The same as Applicant
Address	:	The same as Applicant
Product Name	:	FACE RECOGNITION TERMINAL
Model No.	:	E86-1701-OS-VF
Standards	:	FCC Part 15.225
Date of Receipt sample	:	2023-10-16
Date of Test	:	2023-10-16 to 2023-12-20
Date of Issue	:	2023-12-20
Test Report Form No.	:	WTX_Part 15_225W
Test Result	:	**Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of approver.

Prepared By:

Waltek Testing Group (Shenzhen) Co., Ltd.

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Tested by:

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Approved by:

Silin Chen

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Version No.	Date of issue	Description
Rev.00	2023-12-20	Original
/	/	/

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT	
Product Name:	FACE RECOGNITION TERMINAL
Trade Name	UNIUBI
Model No.:	E86-1701-OS-VF
Adding Model(s):	E86-1701-V, E86-1711-V, E86-1701, E86-1711, E86-1701-VF, E86-1701-F, E86-1701-VG, E86-1711-VG, E86-1701-G, E86-1711-G, E86-1701-OS, E86-1711-OS, E86-1701-OS-V, E86-1711-OS-V, E86-1701-OS-G, E86-1711-OS-G, E86-1711-OS-VG, E86-1701-OS-VG, E86-1701-OS-F, E86-1702-OS, E86-1702-OS-V, E86-1702-OS-G, E86-1702-OS-VG, E86-1702-OS-F, E86-1702-OS-VF, E86-1702-V, E86-1702, E86-1702-VF, E86-1702-F, E86-1702-VG, E86-1702-G, E86-1712-V, E86-1712, E86-1712-VG, E86-1712-G
Rated Voltage:	DC 12V
Power Adapter:	/
Note: The test data is gathered from a production sample, provided by the manufacturer. The appearance of others models listed in the report is different from main-test model E53-1711-OS-F, but the circuit and the electronic construction do not change, declared by the manufacturer.	

Technical Characteristics of EUT	
Support Standards:	NFC
Frequency Range:	13.56MHz
Modulation Type:	ASK, BPSK
Max. Field Strength:	58.16dBuV/m (at 3m)
Antenna Type:	FPC Antenna
Antenna Gain	0dBi
Note The Antenna Gain is provided by the customer and can affect the validity of results.	

1.2 Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.225: Operation within the band 13.110-14.010MHz.
ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission/immunity, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013,
The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions.

1.4 Test Facility

Address of the test laboratory
Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.
Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

FCC – Registration No.: 125990
Waltek Testing Group (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is mai ntained in our files. The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A
The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A and the CAB identifier is CN0057.

1.5 EUT Setup and Test Mode

The EUT was operated in the continuous transmitting mode that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	Transmit	13.56MHz

Test Conditions	
Temperature:	22~25 °C
Relative Humidity:	50~55 %.
ATM Pressure:	1019 mbar

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
Network Cable	1.0	Unshielded	Without Ferrite
DC Cable	1.0	Unshielded	Without Ferrite

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Notebook	Lenovo	TianYi 100-14IBD	PF0F4ABV
adapter	Xiaoerduo	HMQ-Z24T-12C	/

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
Frequency Deviation	2.3%	±5%
Conducted Emissions	Conducted	9-150kHz ±3.74dB
		0.15-30MHz ±3.34dB
Transmitter Spurious Emissions	Radiated	30-200MHz ±4.52dB
		0.2-1GHz ±5.56dB
		1-6GHz ±3.84dB
		6-18GHz ±3.92dB

1.7 Test Equipment List and Details

Fixed asset Number	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
WTXE1005A1005	Spectrum Analyzer	Agilent	N9020A	US47140102	2023-02-25	2024-02-24
WTXE1084A1001	Spectrum Analyzer	Agilent	N9020A	MY54320548	2023-02-25	2024-02-24
WTXE1004A1-001	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2023-02-25	2024-02-24
☐Chamber A: Below 1GHz						
WTXE1005A1003	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2023-02-25	2024-02-24
WTXE1007A1001	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2023-02-25	2024-02-24
WTXE1007A1001	Amplifier	HP	8447F	2805A03475	2023-02-25	2024-02-24
WTXE1010A1007	Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-20	2024-03-19
WTXE1010A1006	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2023-03-20	2026-03-19
☐Chamber A: Above 1GHz						
WTXE1005A1003	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2023-02-25	2024-02-24
WTXE1007A1001	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2023-02-25	2024-02-24
WTXE1065A1001	Amplifier	C&D	PAP-1G18	14918	2023-02-25	2024-02-24
WTXE1010A1005	Horn Antenna	ETS	3117	00086197	2021-03-19	2024-03-18
WTXE1010A1010	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2021-03-19	2024-03-18
WTXE1003A1001	Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2023-02-25	2024-02-24
☐Chamber B:Below 1GHz						
WTXE1010A1006	Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2021-04-09	2024-04-08
WTXE1038A1001	Amplifier	Agilent	8447D	2944A10457	2023-02-25	2024-02-24
WTXE1001A1002	EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2023-02-25	2024-02-24

☒Chamber C:Below 1GHz						
WTXE1093A 1001	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2023-02-25	2024-02-24
WTXE1010A 1013-1	Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2021-05-28	2024-05-27
WTXE1010A 1007	Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-20	2024-03-19
WTXE1007A 1002	Amplifier	HP	8447F	2944A038 69	2023-02-25	2024-02-24
☒Chamber C: Above 1GHz						
WTXE1093A 1001	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2023-02-25	2024-02-24
WTXE1103A 1005	Horn Antenna	POAM	RTF-118A	1820	2023-03-10	2026-03-09
WTXE1103A 1006	Amplifier	Tonscend	TAP01018050	AP22E806 235	2023-02-25	2024-02-24
WTXE1010A 1010	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2021-03-19	2024-03-18
WTXE1003A 1001	Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2023-02-25	2024-02-24
☐Conducted Room 1#						
WTXE1001A 1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2023-02-25	2024-02-24
WTXE1002A 1001	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2023-02-25	2024-02-24
WTXE1003A 1001	AC LISN	Schwarz beck	NSLK8126	8126-279	2023-02-25	2024-02-24
☒Conducted Room 2#						
WTXE1001A 1004	EMI Test Receiver	Rohde & Schwarz	ESPI	101259	2023-02-25	2024-02-24
WTXE1003A 1003	LISN	Rohde & Schwarz	ENV 216	100097	2023-02-25	2024-02-24

Software List			
Description	**Manufacturer**	**Model**	**Version**
EMI Test Software (Radiated Emission)*	Farad	EZ-EMC	RA-03A1
EMI Test Software (Conducted Emission Room 1#)*	Farad	EZ-EMC	RA-03A1
EMI Test Software (Conducted Emission Room 2#)*	SKET	EMC-I	V2.0

*Remark: indicates software version used in the compliance certification testing.

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§15.203	Antenna Requirement	Compliant
§15.205	Restricted Band of Operation	Compliant
§15.209	Radiated Emission	Compliant
§15.225(a)	Field Strength	Compliant
§15.225(b)(c)	Out of Band Emission	Compliant
§15.225(e)	Frequency Stability	Compliant
§15.207(a)	Conducted Emission	Compliant
§15.215(c)	Emission Bandwidth	Compliant

N/A: not applicable.

3. Antenna Requirement

3.1 Standard Applicable

According to FCC Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

3.2 Test Result

This product has an FPC antenna, fulfill the requirement of this section.

4. Radiated Emissions

4.1 Standard Applicable

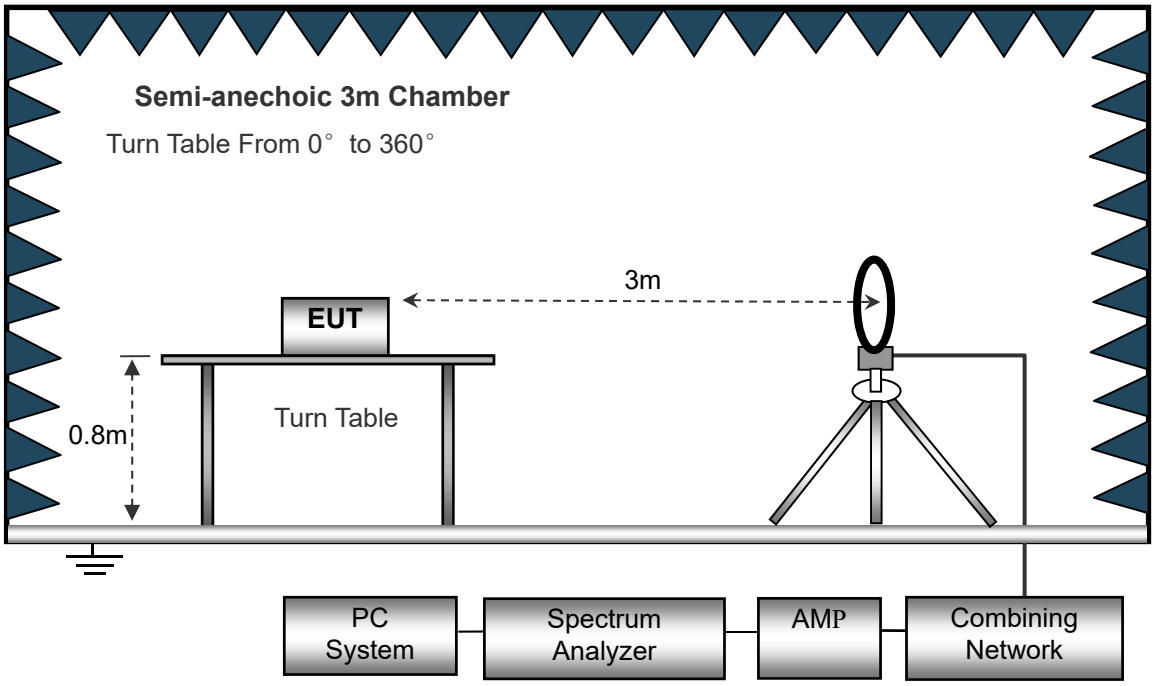
According to §15.225(a), the field strength of any emissions within the band 13.553–13.567MHz shall not exceed 15,848 microvolts/meter at 30 meters.

According to §15.225(d), the field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in §15.209.

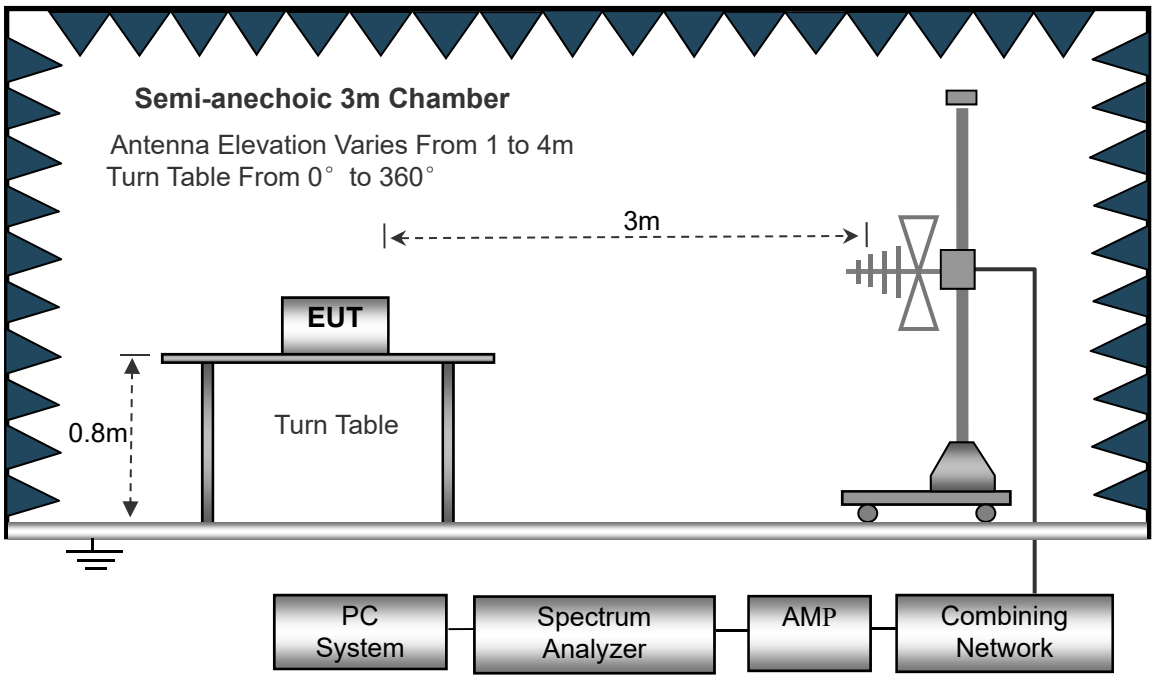
Note: Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

4.2 Test Procedure

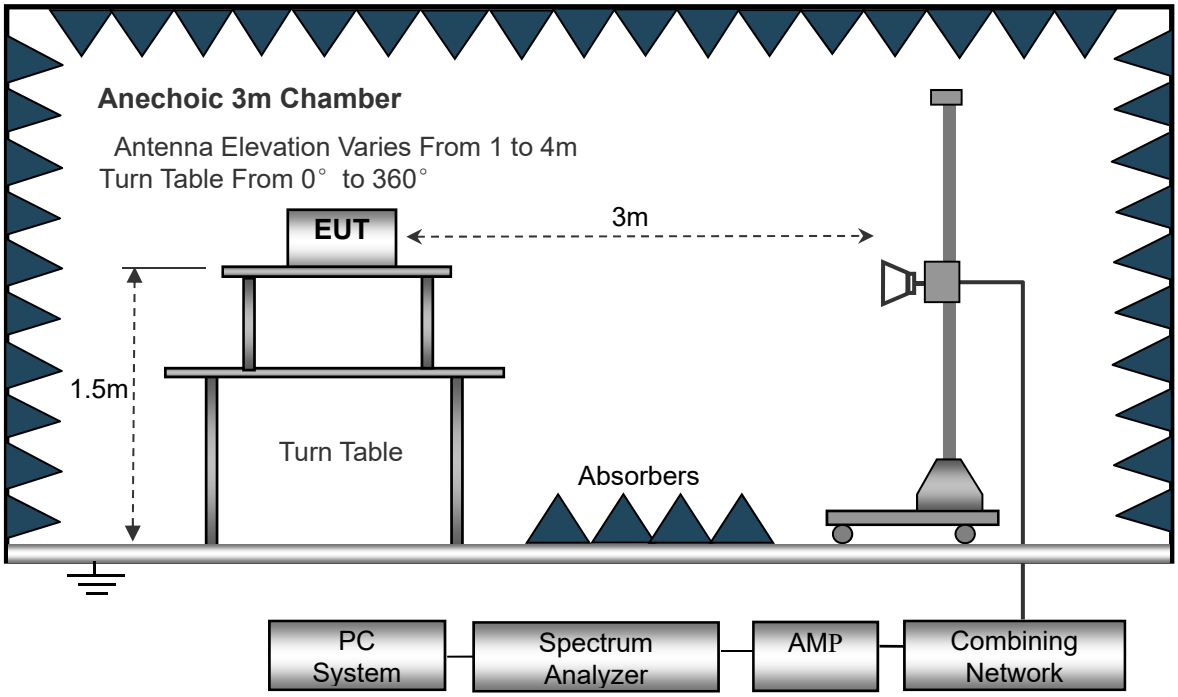
The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.205 15.225(d) and FCC Part 15.209 Limit.
The external I/O cables were draped along the test table and formed a bundle 30 to 40cm long in the middle. The spacing between the peripherals was 10cm.The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30MHz to 1GHz.



The test setup for emission measurement above 1GHz.



Frequency :9kHz-30MHz	Frequency :30MHz-1GHz	Frequency :Above 1GHz
RBW=10KHz,	RBW=120KHz,	RBW=1MHz,
VBW =30KHz	VBW=300KHz	VBW=3MHz(Peak), 10Hz(AV)
Sweep time= Auto	Sweep time= Auto	Sweep time= Auto
Trace = max hold	Trace = max hold	Trace = max hold
Detector function = peak	Detector function = peak, QP	Detector function = peak, AV

4.3 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading – Corr. Factor

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – FCC Part 15 Limit

4.4 Summary of Test Results/Plots

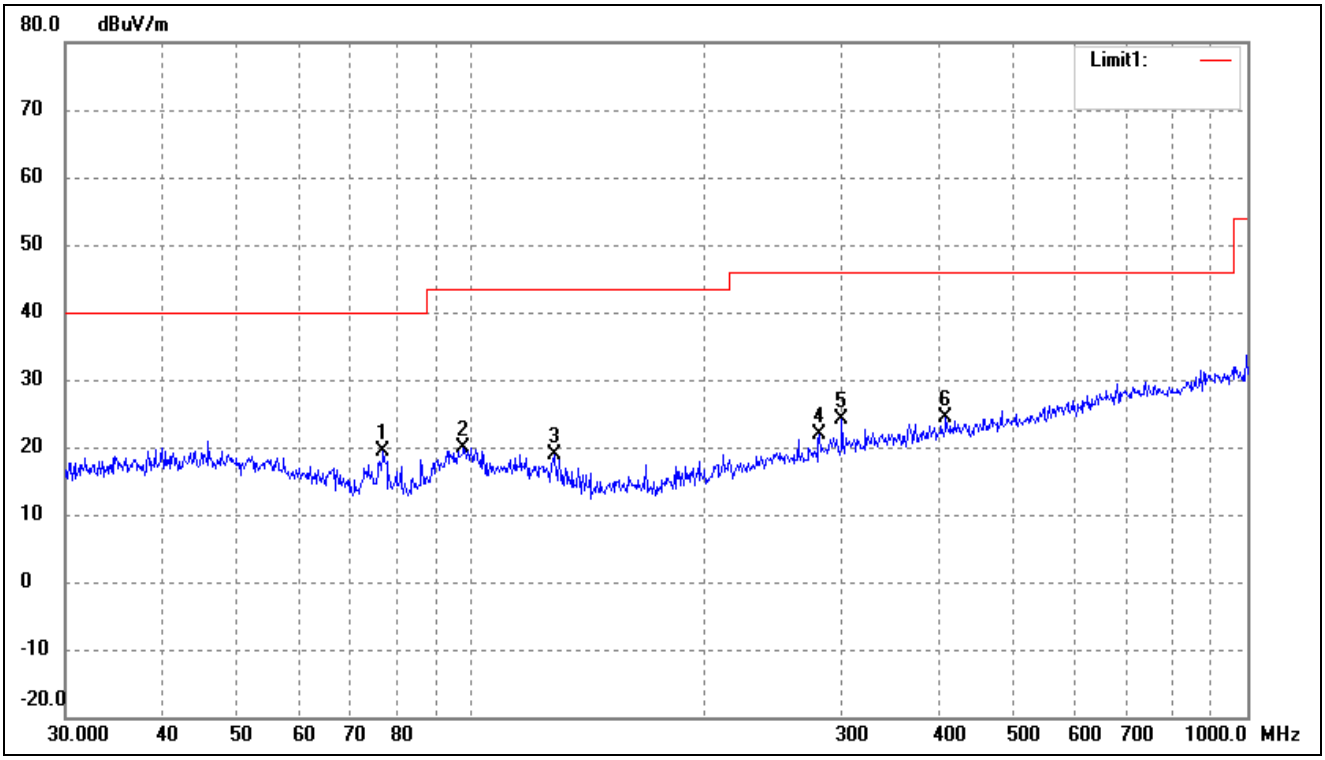
Note: *this EUT was tested in 3 orthogonal positions and the worst case position data was reported.*

- Below 30MHz

Frequency	Reading	Correction Factor	Result	Limit	Margin	Polar	Detector
MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	X/Y/Z	
13.56	60.24	-2.08	58.16	124.0	-65.84	X	Peak
27.12	51.39	-2.27	49.12	69.5	-20.38	X	Peak
13.56	60.12	-2.08	58.04	124.0	-65.96	Y	Peak
27.12	50.34	-2.27	48.07	69.5	-21.43	Y	Peak
13.56	59.87	-2.08	57.79	124.0	-66.21	Z	Peak
27.12	50.09	-2.27	47.82	69.5	-21.68	Z	Peak

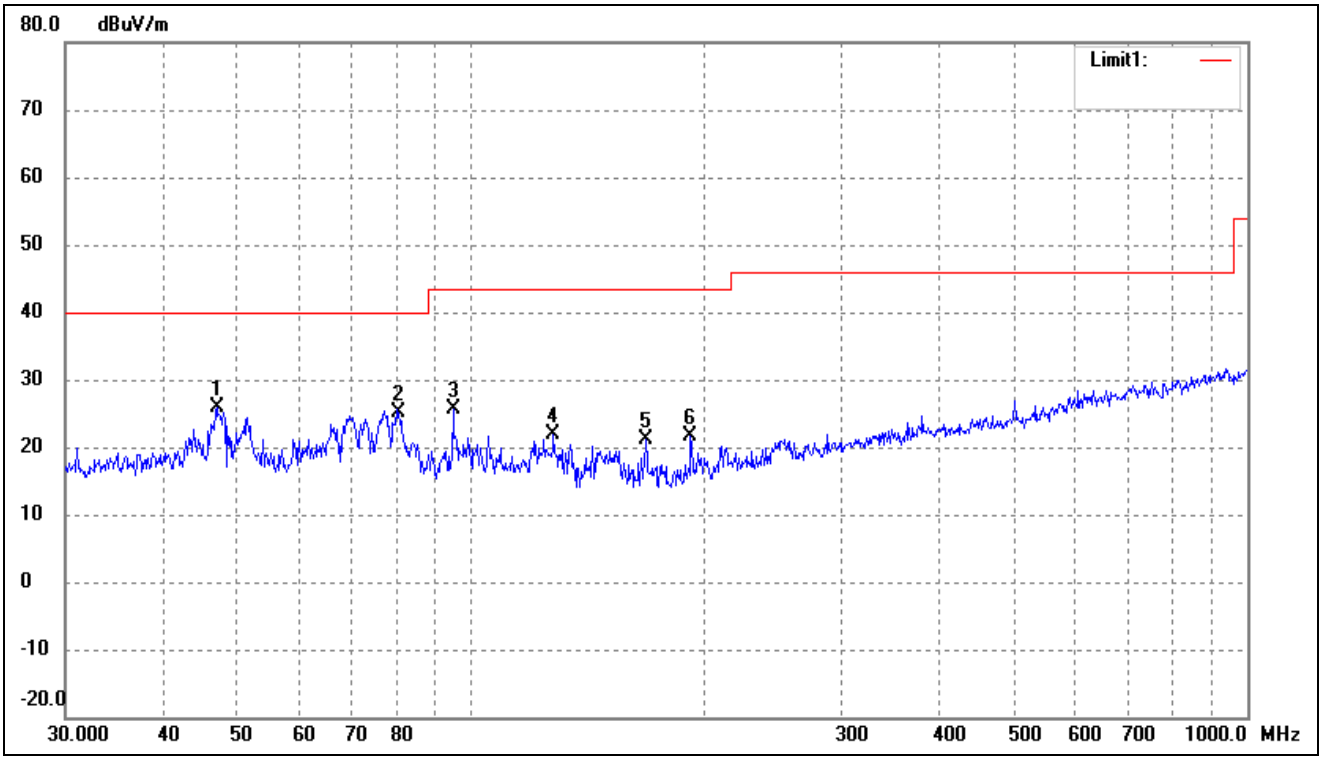
➢ Above 30MHz

Test Mode	TM1	Polarity:	Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(·)	(cm)	
1	77.0505	30.98	-11.67	19.31	40.00	-20.69	-	-	peak
2	97.7983	28.58	-8.67	19.91	43.50	-23.59	-	-	peak
3	128.1130	29.21	-10.27	18.94	43.50	-24.56	-	-	peak
4	281.0075	27.64	-5.65	21.99	46.00	-24.01	-	-	peak
5	300.3673	29.22	-5.01	24.21	46.00	-21.79	-	-	peak
6	408.9460	27.58	-3.22	24.36	46.00	-21.64	-	-	peak

Test Mode	TM1	Polarity:	Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(·)	(cm)	
1	46.9948	33.24	-7.26	25.98	40.00	-14.02	-	-	peak
2	80.6442	37.02	-11.85	25.17	40.00	-14.83	-	-	peak
3	94.7601	35.06	-9.52	25.54	43.50	-17.96	-	-	peak
4	127.6645	32.13	-10.19	21.94	43.50	-21.56	-	-	peak
5	167.8243	31.94	-10.76	21.18	43.50	-22.32	-	-	peak
6	191.7450	30.51	-8.76	21.75	43.50	-21.75	-	-	peak

Remark: '-'Means' the test Degree and Height are not recorded by the test software and only show the worst case in the test report.

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics.

5. OUT OF BAND EMISSIONS

5.1 Standard Applicable

According to FCC 15.225 (b), within the bands 13.410–13.553MHz and 13.567–13.710MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters. (c) Within the bands 13.110–13.410MHz and 13.710–14.010MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

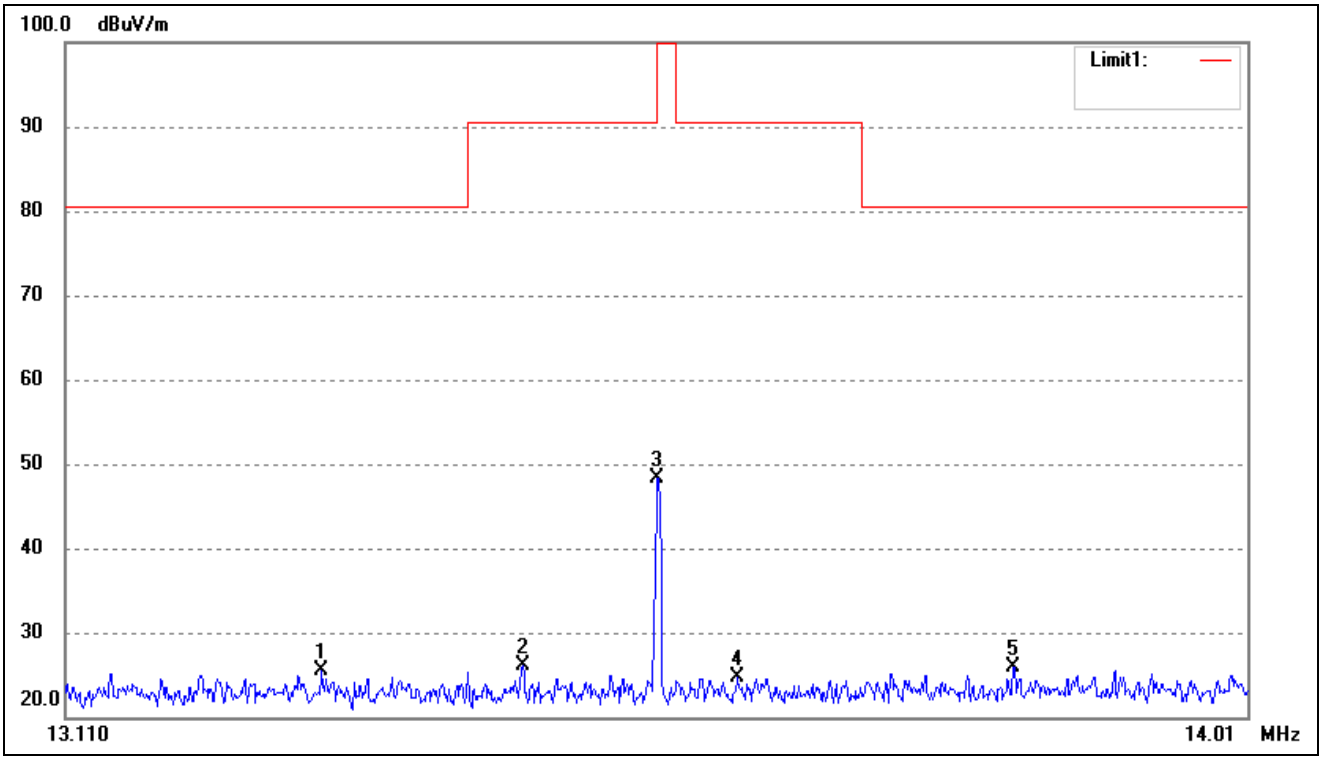
5.2 Test Procedure

As the radiation test, set the RBW=10kHz VBW=30kHz, observed the outside band of 13.11MHz to 14.01MHz, than mark the higher-level emission for comparing with the FCC rules.

5.3 Summary of Test Results/Plots

Note: *this EUT was tested in 3 orthogonal positions and the worst case position data was reported.*

Test Mode	TM1	Polarity:	/



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	13.3003	28.09	-2.67	25.42	80.50	-55.08	-	-	peak
2	13.4512	28.78	-2.65	26.13	90.50	-64.37	-	-	peak
3	13.5534	51.00	-2.62	48.38	124.00	-75.62	-	-	peak
4	13.6148	27.30	-2.61	24.69	90.50	-65.81	-	-	peak
5	13.8270	28.43	-2.57	25.86	80.50	-54.64	-	-	peak

Remark: '-'Means' the test Degree and Height are not recorded by the test software and only show the worst case in the test report.

6. Frequency Stability

6.1 Standard Applicable

According to 15.225(e), the frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency over a temperature variation of −20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

6.2 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure.

6.3 Summary of Test Results/Plots

Reference Frequency: 13.56MHz, Limit: 100ppm				
Voltage(%)	Power(VDC)	TEMP(°C)	Freq.Dev(Hz)	Deviation(ppm)
100%	12	-30	656	48.38
100%		-20	796	58.70
100%		-10	834	61.50
100%		0	880	64.90
100%		+10	842	62.09
100%		+20	673	49.63
100%		+30	734	54.13
100%		+40	897	66.15
100%		+50	694	51.18
Low	10.2	+20	831	61.28
High	13.8	+20	876	64.60

7. EMISSION BANDWIDTH

7.1 Applicable Standard

According to 15.215(c), intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

7.2 Test Procedure

According to the ANSI 63.10-2013, the emission bandwidth test method as follows.

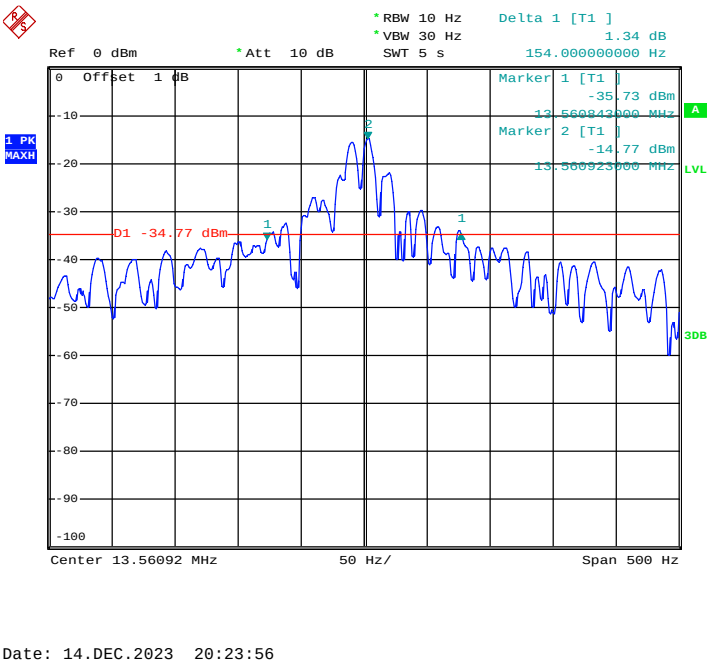
Set span =1~5 * EBW, centered on a transmitting channel
RBW =1%~5% * EBW, VBW=3* RBW
Sweep = auto
Detector function = peak
Trace = max hold

All the trace to stabilize, use the marker-to-peak function to set the marker to the peak of the emission, use the marker-delta function to measure and record the 20dB down of the emission.

7.3 Summary of Test Results/Plots

Tx Frequency	20dB Emission bandwidth(KHz)
13.56MHz	0.154

Please refer to the test plots as below:



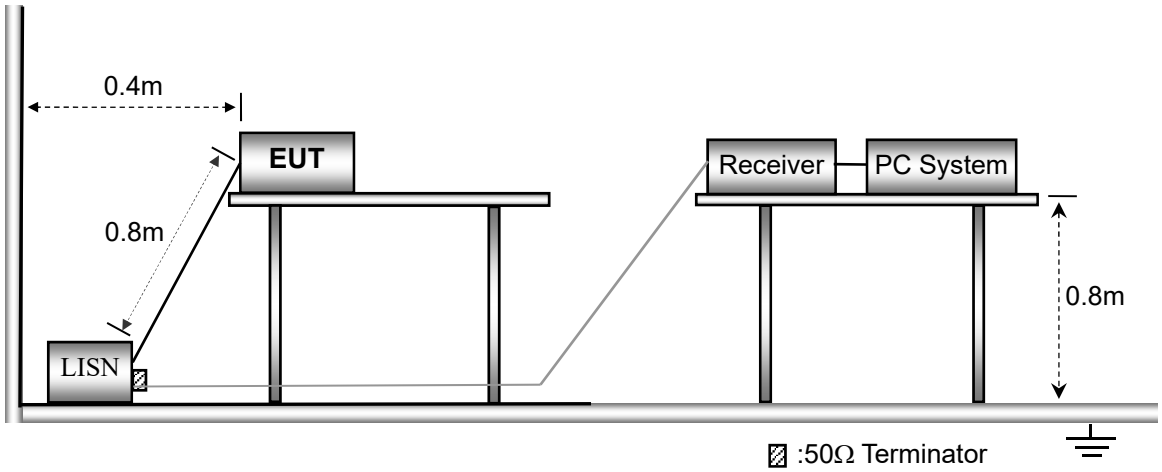
Note: The RBW of the analyzer measuring Bandwidth cannot be adjusted to 1%-5% 20dB Bandwidth, the RBW of the test setting is the closest value.

8. Conducted Emissions

8.1 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15.207 Limit.
The external I/O cables were draped along the test table and formed a bundle 30 to 40cm long in the middle. The spacing between the peripherals was 10cm.

8.2 Basic Test Setup Block Diagram



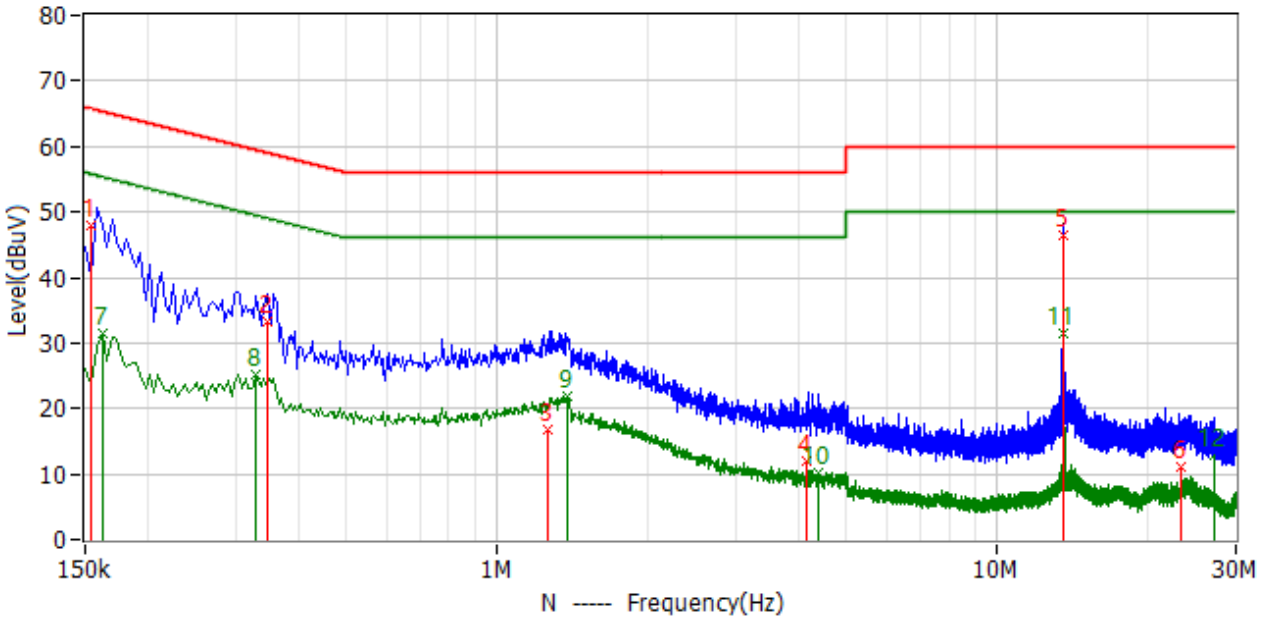
8.3 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency 150kHz
Stop Frequency 30MHz
Sweep Speed ..... Auto
IF Bandwidth..... 10kHz
Quasi-Peak Adapter Bandwidth 9kHz
Quasi-Peak Adapter Mode ..... Normal

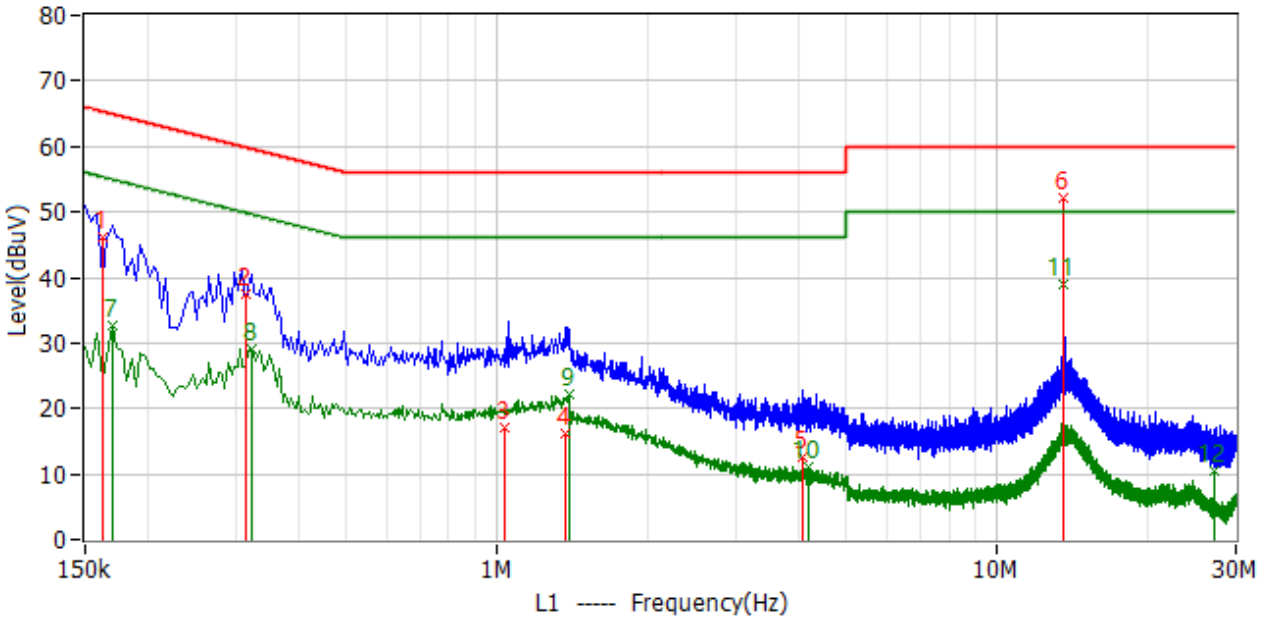
8.4 Summary of Test Results/Plots

Test Mode	TM1(AC120V 60Hz)	Polarity:	Neutral



No.	Frequency	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Delta dB	Detector
1	154.000kHz	38.2	9.7	47.9	65.8	-17.9	QP
2	346.000kHz	23.2	10.0	33.2	59.1	-25.9	QP
3	1.262MHz	7.0	9.7	16.7	56.0	-39.3	QP
4	4.158MHz	2.2	9.8	12.0	56.0	-44.0	QP
5	13.554MHz	36.7	9.8	46.5	60.0	-13.5	QP
6	23.278MHz	0.9	10.2	11.1	60.0	-48.9	QP
7*	162.000kHz	21.8	9.7	31.5	55.4	-23.9	AV
8*	330.000kHz	15.2	10.0	25.2	49.5	-24.3	AV
9*	1.378MHz	12.1	9.7	21.8	46.0	-24.2	AV
10*	4.370MHz	0.3	9.8	10.1	46.0	-35.9	AV
11*	13.570MHz	21.6	9.8	31.4	50.0	-18.6	AV
12*	27.122MHz	2.8	10.2	13.0	50.0	-37.0	AV

Test Mode	TM1(AC120V 60Hz)	Polarity:	Line



No.	Frequency	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Delta dB	Detector
1	162.000kHz	36.1	9.9	46.0	65.4	-19.4	QP
2	314.000kHz	27.3	10.1	37.4	59.9	-22.5	QP
3	1.038MHz	7.3	9.8	17.1	56.0	-38.9	QP
4	1.374MHz	6.3	9.8	16.1	56.0	-39.9	QP
5	4.078MHz	2.8	9.9	12.7	56.0	-43.3	QP
6	13.566MHz	42.3	9.8	52.1	60.0	-7.9	QP
7*	170.000kHz	22.8	9.8	32.6	55.0	-22.3	AV
8*	322.000kHz	18.9	10.1	29.0	49.7	-20.6	AV
9*	1.390MHz	12.4	9.8	22.2	46.0	-23.8	AV
10*	4.202MHz	1.1	9.9	11.0	46.0	-35.0	AV
11*	13.554MHz	29.3	9.8	39.1	50.0	-10.9	AV
12*	27.122MHz	0.6	9.9	10.5	50.0	-39.5	AV

APPENDIX PHOTOGRAPHS

Please refer to “ANNEX”

******* END OF REPORT *******