



FCC Test Report

**Test Report
On Behalf of
Mantra Softech (India) Private Limited
For
Enterprise Facial Terminal
Model No.: BioNIC Xtreme**

FCC ID: 2BKRV-BIONICXTREME

Prepared For: **Mantra Softech (India) Private Limited**
B-203, Shapath Hexa, Opp. Gujarat High Court, S. G. Highway, Ahmedabad,
380060, India

Prepared By: **Shenzhen HUAK Testing Technology Co., Ltd.**
1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai
Street, Bao'an District, Shenzhen, Guangdong, China

Date of Test: **June 28, 2024 ~ July 30, 2024**

Date of Report: **July 30, 2024**

Report Number: **HK2406283495-3E**

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Test Result Certification

Applicant's Name Mantra Softech (India) Private Limited

Address B-203, Shapath Hexa, Opp. Gujarat High Court, S. G. Highway, Ahmedabad, 380060, India

Manufacturer's Name Mantra Softech (India) Private Limited

Address LS No- 2376/1A 13501, Near Rainbow Company, Jhulasan Road, Village-Rajpur, Taluka-Kadi, Dist. Mehsana, Gujarat -382705 India

Product Description

Trade Mark Mantra

Product Name Enterprise Facial Terminal

Model and/or Type Reference : BioNIC Xtreme

Standards FCC Rules and Regulations Part 15 Subpart C Section 15.225
ANSI C63.10: 2013

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Date of Test

Date (s) of Performance of Tests **June 28, 2024 ~ July 30, 2024**

Date of Issue **July 30, 2024**

Test Result **Pass**

Testing Engineer

Len Liao

Technical Manager

Sliver Wan

Authorized Signatory

Jason Zhou



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**** Modified History ****

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	July 30, 2024	Jason Zhou

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1. Test Result Summary

Requirement	CFR 47 Section	Result
Conduction Emission, 0.15MHz to 30MHz	§15.207	PASS
Radiation Emission	§15.225, §15.205, §15.209, §15.35	PASS
Occupied Bandwidth	§ 15.215	PASS
Antenna Requirement	§ 15.203	PASS
Frequency Stability	§ 15.225	PASS

Note:

1. PASS: Test item meets the requirement.
2. Fail: Test item does not meet the requirement.
3. N/A: Test case does not apply to the test object.
4. The test result judgment is decided by the limit of test standard.

1.1 Information of the Test Laboratory

Shenzhen HUAK Testing Technology Co., Ltd.

Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Testing Laboratory Authorization:

A2LA Accreditation Code is 4781.01.

FCC Designation Number is CN1229.

Canada IC CAB identifier is CN0045.

CNAS Registration Number is L9589.

1.2 Measurement Uncertainty

Measurement Uncertainty

Conducted Emission Expanded Uncertainty	= 2.71dB, k=2
Radiated emission expanded uncertainty(9kHz-30MHz)	= 3.90dB, k=2
Radiated emission expanded uncertainty(30MHz-1000MHz)	= 3.90dB, k=2
Radiated emission expanded uncertainty(Above 1GHz)	= 4.28dB, k=2



2. EUT Description

Equipment:	Enterprise Facial Terminal
Model Name:	BioNIC Xtreme
Series Model:	N/A
Model Difference:	N/A
FCC ID:	2BKRV-BIONICXTREME
Antenna Type:	PCB antenna
Antenna Gain:	3dBi
Operation frequency:	13.56MHz
Modulation Type:	ASK
Power Source:	DC12V from adapter
Power Rating:	DC12V from adapter
Note:	
1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.	
2. Antenna gain Refer to the antenna specifications.	
3. The cable loss data is obtained from the supplier.	
4. The test results in the report only apply to the tested sample.	

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3. General Information

3.1 Test Environment and Mode

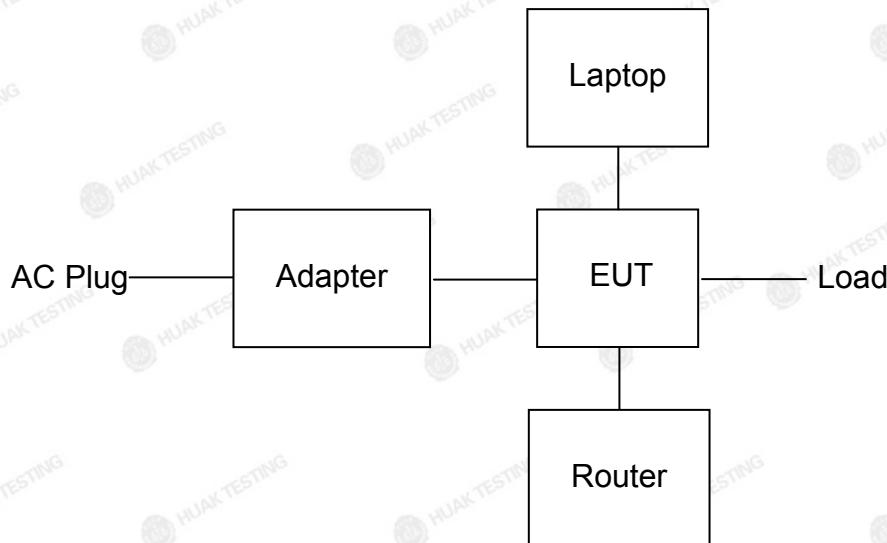
Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test Mode:	
Operation mode:	Keep the EUT in continuous transmitting with modulation
The sample was placed (0.8m below 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.	

Per-test mode.			
We have verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:			
Axis	X	Y	Z
Field Strength(dBuV/m)	93.29	96.51	94.18
Final Test Mode:			
According to ANSI C63.10 standards, the test results are both the "worst case" and "worst setup": Y axis (see the test setup photo)			

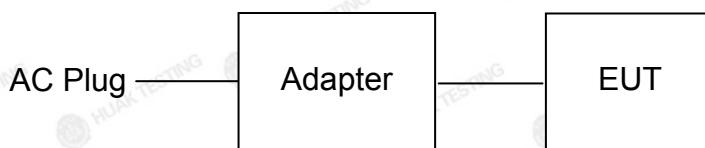


3.2 Description of Test Setup

Operation of EUT during Conducted and below 1GHz Radiation testing:



Operation of EUT during below 30MHz Radiation testing:



The sample was placed (0.8m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed.

During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages. The worst case is X position



3.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Trade Mark	Model/Type No.	Specification	Remark
1	Enterprise Facial Terminal	Mantra	BioNIC Xtreme	N/A	EUT
2	Adapter	N/A	AS2401A-1202000US	Input: AC100-240V, 50/60Hz 0.8A MAX Output: DC12V, 2000mA	Peripheral
3	Laptop	Lenovo	TP00096A	Input: DC 20V, 2.25~3.25A Output: 5VDC, 0.5A	Peripheral
4	Router	N/A	N/A	N/A	Peripheral

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.



4. Test Results and Measurement Data

4.1 Antenna Requirement

Standard requirement:	FCC Part15 C Section 15.203
<p>15.203 requirement: 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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</p>	
E.U.T Antenna:	PCB antenna
<p>The antenna used in this product is a PCB Antenna, is a permanently attached antenna on the PCB. It conforms to the standard requirements. The directional gains of antenna used for transmitting is 3dBi.</p>	

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4.2 Conducted Emission

4.2.1 Conducted Power Line Emission Limit

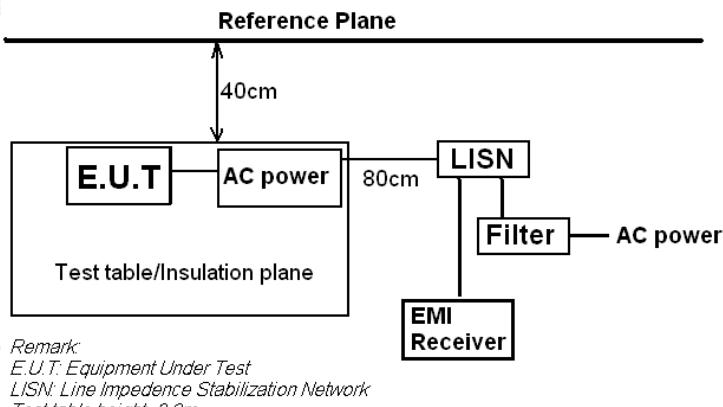
For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following.

Frequency (MHz)	Maximum RF Line Voltage (dB μ V)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency.

For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

4.2.2 Test Setup



4.2.3 Test Procedure

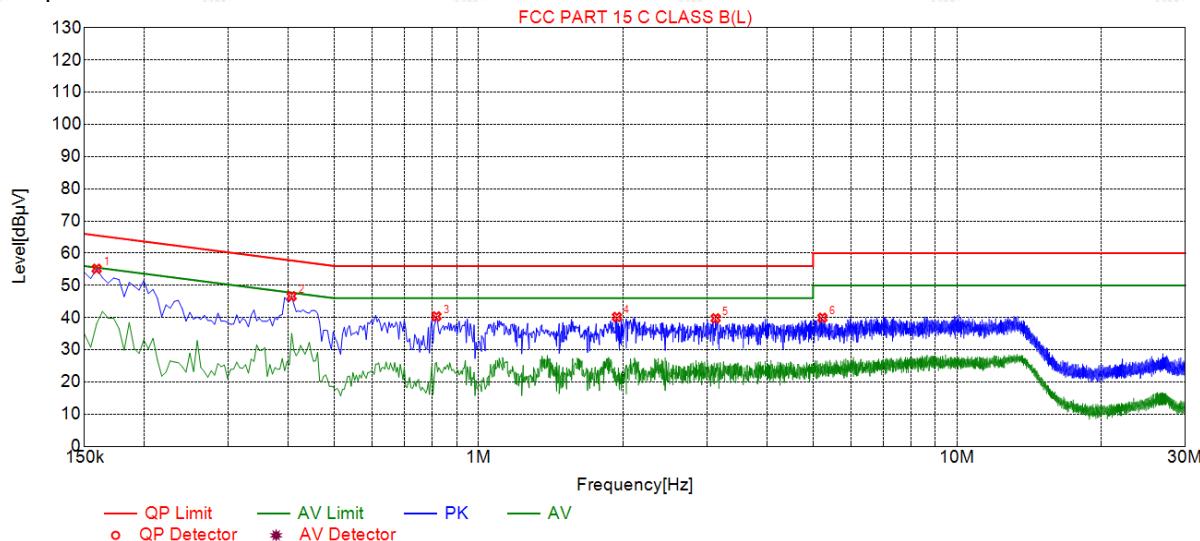
1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.



4.2.4 Test Result

All modes have been tested, only the worst result was reported as below:

Test Specification: Line



Suspected List

NO.	Freq. [MHz]	Level [dB μ V]	Factor [dB]	Limit [dB μ V]	Margin [dB]	Reading [dB μ V]	Detector	Type
1	0.1590	55.16	19.81	65.52	10.36	35.35	PK	L
2	0.4065	46.62	19.84	57.72	11.10	26.78	PK	L
3	0.8160	40.37	19.87	56.00	15.63	20.50	PK	L
4	1.9455	40.19	19.96	56.00	15.81	20.23	PK	L
5	3.1290	39.77	20.06	56.00	16.23	19.71	PK	L
6	5.2305	39.94	20.11	60.00	20.06	19.83	PK	L

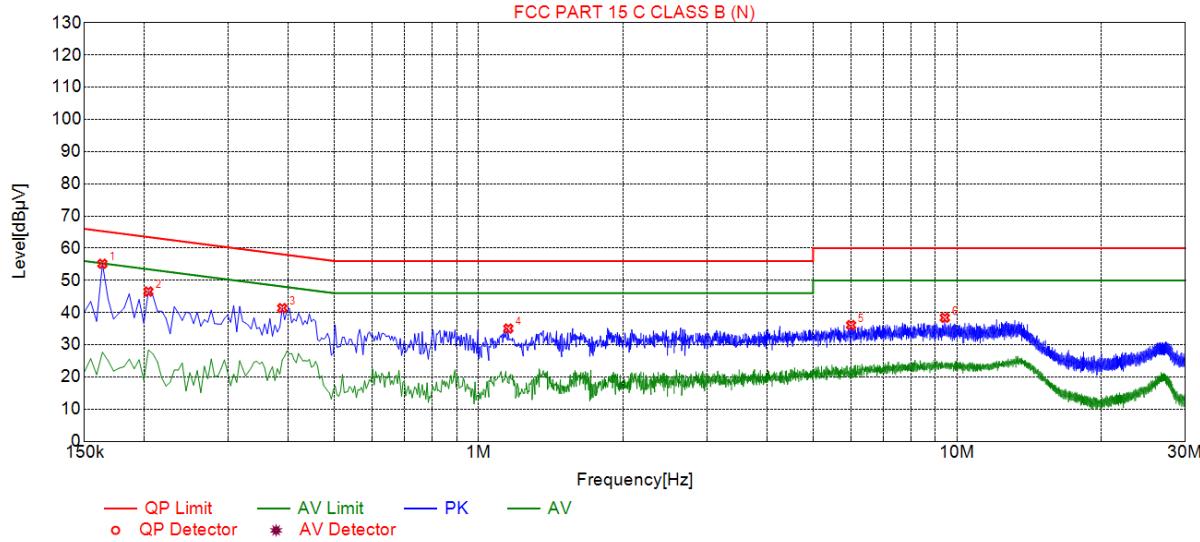
Remark: Margin = Limit – Level

Correction factor = Cable loss + LISN insertion loss

Level=Test receiver reading + correction factor



Test Specification: Neutral

**Suspected List**

NO.	Freq. [MHz]	Level [dB μ V]	Factor [dB]	Limit [dB μ V]	Margin [dB]	Reading [dB μ V]	Detector	Type
1	0.1635	55.16	19.68	65.28	10.12	35.48	PK	N
2	0.2040	46.53	19.73	63.45	16.92	26.80	PK	N
3	0.3885	41.39	19.74	58.10	16.71	21.65	PK	N
4	1.1535	35.05	19.77	56.00	20.95	15.28	PK	N
5	6.0045	36.10	19.98	60.00	23.90	16.12	PK	N
6	9.4290	38.39	19.90	60.00	21.61	18.49	PK	N

Remark: Margin = Limit – Level

Correction factor = Cable loss + LISN insertion loss

Level=Test receiver reading + correction factor



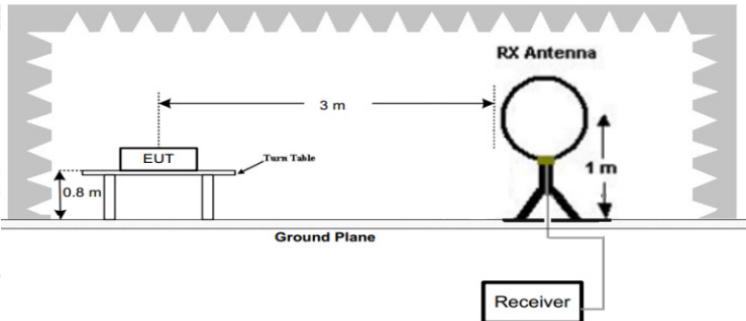
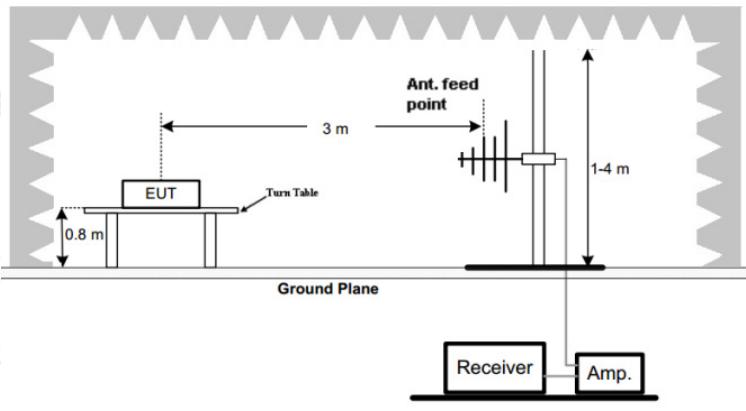
4.3 Radiated Emission Measurement

4.3.1 Test Specification

Test Requirement:	FCC Part15 C Section 15.225(a) and 15.209				
Test Method:	ANSI C63.10:2013				
Frequency Range:	9 kHz to 1 GHz				
Measurement Distance:	3 m				
Antenna Polarization:	Horizontal & Vertical				
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	9kHz- 150kHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value
	150kHz- 30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
	<ol style="list-style-type: none">1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber in below 1GHz. The table was rotated 360 degrees to determine the position of the highest radiation.2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.				

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	<p>For radiated emissions</p> 
Test Setup:	30MHz to 1GHz
	
Test Mode:	Transmitting Mode
Test Results:	PASS

4.3.2 Limit

- (a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
- (b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- (c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
- (d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in §15.209.



4.3.3 Frequencies in restricted band are complied to limit on Paragraph 15.209

Frequency Range (MHz)	Distance (m)	Field strength (dB μ V/m)	Field strength (microvolts/meter)
0.009-0.490	300	20log 2400/F (kHz)	2400/F (kHz)
0.490-1.705	30	20log 24000/F (kHz)	24000/F (kHz)
1.705-30	30	20log 30	30
30-88	3	40.0	100**
88-216	3	43.5	150**
216-960	3	46.0	200**
Above 960	3	54.0	500

NOTE:
**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., S 15.231 and 15.241.



4.3.4 Test Instruments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum analyzer	Agilent	N9020A	HKE-025	Feb. 20, 2024	1 Year
2.	L.I.S.N.	R&S	ENV216	HKE-002	Feb. 20, 2024	1 Year
3.	L.I.S.N.	R&S	ENV216	HKE-059	Feb. 20, 2024	1 Year
4.	EMI Test Receiver	R&S	ESR	HKE-005	Feb. 20, 2024	1 Year
5.	Spectrum analyzer	Agilent	N9020A	HKE-025	Feb. 20, 2024	1 Year
6.	Spectrum analyzer	R&S	FSV3044	HKE-126	Feb. 20, 2024	1 Year
7.	Preamplifier	EMCI	EMC051845S	HKE-006	Feb. 20, 2024	1 Year
8.	Preamplifier	Schwarzbeck	BBV 9743	HKE-016	Feb. 20, 2024	1 Year
9.	Preamplifier	A.H. Systems	SAS-574	HKE-182	Feb. 20, 2024	1 Year
10.	6dB Attenuator	Pasternack	6db	HKE-184	Feb. 20, 2024	1 Year
11.	EMI Test Receiver	Rohde & Schwarz	ESR-7	HKE-010	Feb. 20, 2024	1 Year
12.	Broadband Antenna	Schwarzbeck	VULB9168	HKE-167	Feb. 21, 2024	2 Year
13.	Loop Antenna	COM-POWER	AL-130R	HKE-014	Feb. 21, 2024	2 Year
14.	Horn Antenna	Schwarzbeck	9120D	HKE-013	Feb. 21, 2024	2 Year
15.	EMI Test Software	Tonscend	JS32-CE 2.5.0.6	HKE-081	/	/
16.	EMI Test Software	Tonscend	JS32-RE 5.0.0	HKE-082	/	/
17.	10dB Attenuator	Schwarzbeck	VTSD9561F	HKE-153	Feb. 20, 2024	1 Year

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4.3.5 Test Data

PASS

Note: this EUT was tested for all models and the worst case model (DC 12V) data was reported.

Field Strength of Fundamental

Frequency (MHz)	Reading (dBuV/m)	Correction Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar (H/V)	Detector
13.21	45.84	15.82	61.66	80.51	-18.85	H	QP
13.21	45.96	15.82	61.78	80.51	-18.73	V	QP
13.85	48.35	15.82	64.17	80.51	-16.34	H	QP
13.85	47.92	15.82	63.74	80.51	-16.77	V	QP
13.56	84.18	12.33	96.51	124	-27.49	H	Peak
13.56	83.06	12.33	95.39	124	-28.61	V	Peak
13.45	52.77	15.82	68.59	90.47	-21.88	H	QP
13.45	50.19	15.82	66.01	90.47	-24.46	V	QP
13.62	49.36	15.82	65.18	90.47	-25.29	H	QP
13.62	45.83	15.82	61.65	90.47	-28.82	V	QP

Remark: Margin = Result - Limit

Result = Reading + Correction Factor

Correction Factor = Antenna Factor + Cable Factor

Spurious Emissions

Frequency Range (9 kHz-30MHz)

Frequency (MHz)	Level@3m (dB μ V/m)	Limit@3m (dB μ V/m)
--	--	--
--	--	--
--	--	--
--	--	--

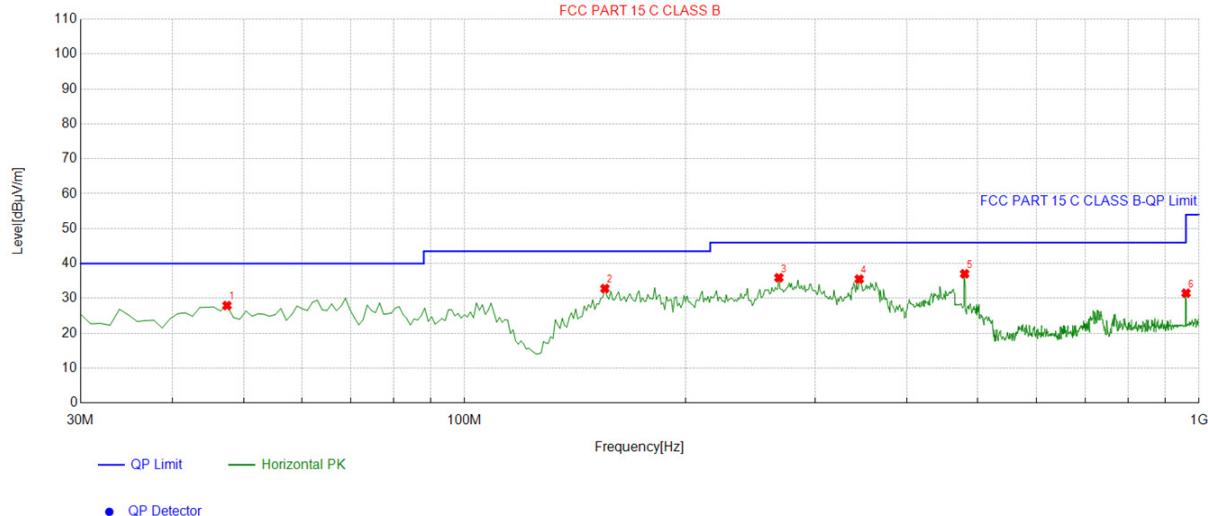
Note: 1. Emission Level=Reading+ Cable loss+ Antenna factor-Amp factor.

2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement.

**About 30MHz-1GHz**

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

Antenna polarity: H

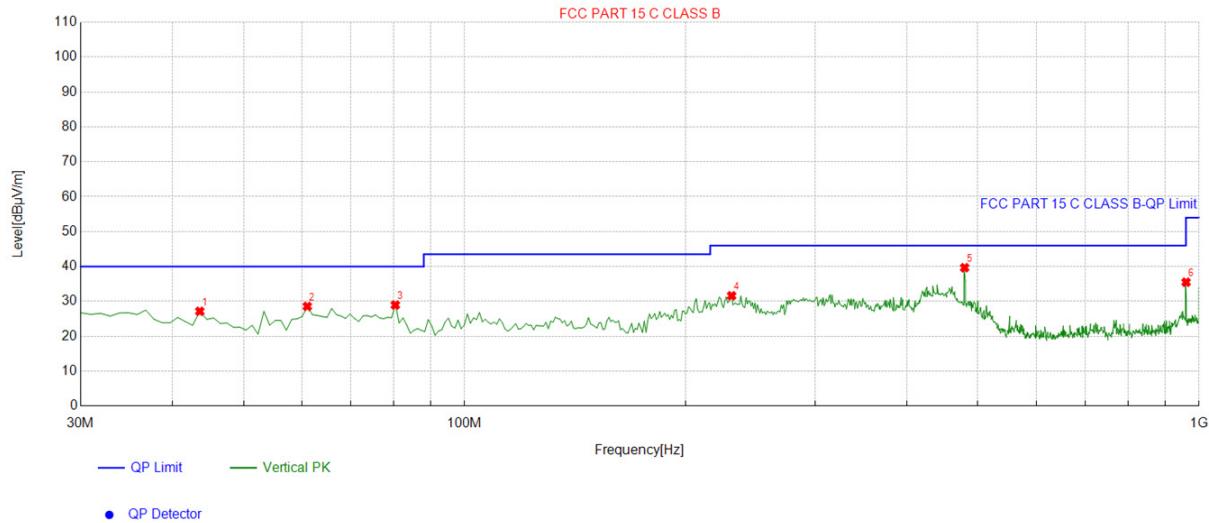


Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dB μ V/m]	Level [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	47.477477	-13.86	41.80	27.94	40.00	12.06	100	281	Horizontal
2	155.25525	-17.80	50.61	32.81	43.50	10.69	100	246	Horizontal
3	267.88788	-12.76	48.68	35.92	46.00	10.08	100	267	Horizontal
4	344.59459	-10.15	45.67	35.52	46.00	10.48	100	267	Horizontal
5	479.55956	-8.27	45.31	37.04	46.00	8.96	100	222	Horizontal
6	960.19019	-0.54	32.03	31.49	54.00	22.51	100	166	Horizontal

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level;



Antenna polarity: V



Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dB μ V/m]	Level [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	43.593594	-13.30	40.46	27.16	40.00	12.84	100	359	Vertical
2	61.071071	-13.82	42.38	28.56	40.00	11.44	100	38	Vertical
3	80.49049	-18.34	47.30	28.96	40.00	11.04	100	38	Vertical
4	230.99099	-13.92	45.53	31.61	46.00	14.39	100	73	Vertical
5	479.55956	-8.27	47.92	39.65	46.00	6.35	100	195	Vertical
6	960.19019	-0.54	36.04	35.50	54.00	18.50	100	212	Vertical

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level;



4.4 Occupied Bandwidth

4.4.1 Test Specification

Test Requirement:	FCC Part15 C Section 15.215(c)
Test Method:	ANSI C63.10: 2013
Limit:	N/A
	<ol style="list-style-type: none">1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT.2. Set to the maximum power setting and enable the EUT transmit continuously.3. Use the following spectrum analyzer settings for 20dB Bandwidth measurement. Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel; $RBW \geq 1\%$ of the 20 dB bandwidth; $VBW \geq RBW$; Sweep = auto; Detector function = peak; Trace = max hold.4. Measure and record the results in the test report.
Test Setup:	
Test Mode:	Transmitting Mode
Test Results:	PASS

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4.4.2 Test data

Test Channel (MHz)	20dB Occupy Bandwidth (kHz)	Limit (kHz)	Conclusion
13.56	4.470	N/A	PASS

Test plots as follows:



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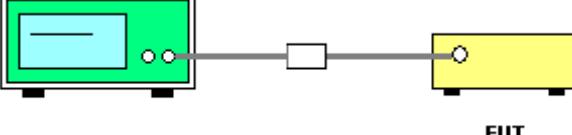
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4.5 Frequency Stability

4.5.1 Test Specification

Test Requirement:	FCC Part15 C Section 15.225
Test Method:	ANSI C63.10: 2013
Limit:	+/-0.01%
	<ol style="list-style-type: none">1. The equipment under test was connected to an external DC power supply and input rated voltage.2. RF output was connected to a spectrum analyzer.3. The EUT was placed inside the temperature chamber.4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency.5. Turn EUT off and set the chamber temperature to - 20°C. After the temperature stabilized for approximately 30 minutes recorded the frequency.6. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.
Test Setup:	 <p>The diagram illustrates the test setup. A green rectangular box labeled 'Spectrum Analyzer' is connected via a coaxial cable to a yellow rectangular box labeled 'EUT'. The connection is made at the top and bottom of the cable, with a small white square component in the middle.</p>
Test Mode:	Transmitting Mode
Test Results:	PASS

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4.5.2 Test Data

PASS

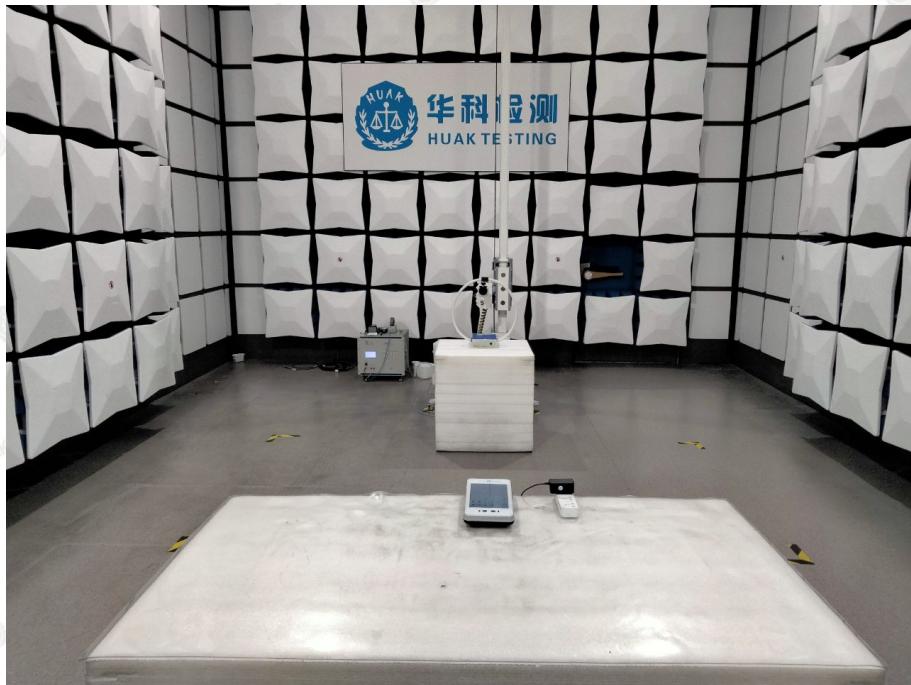
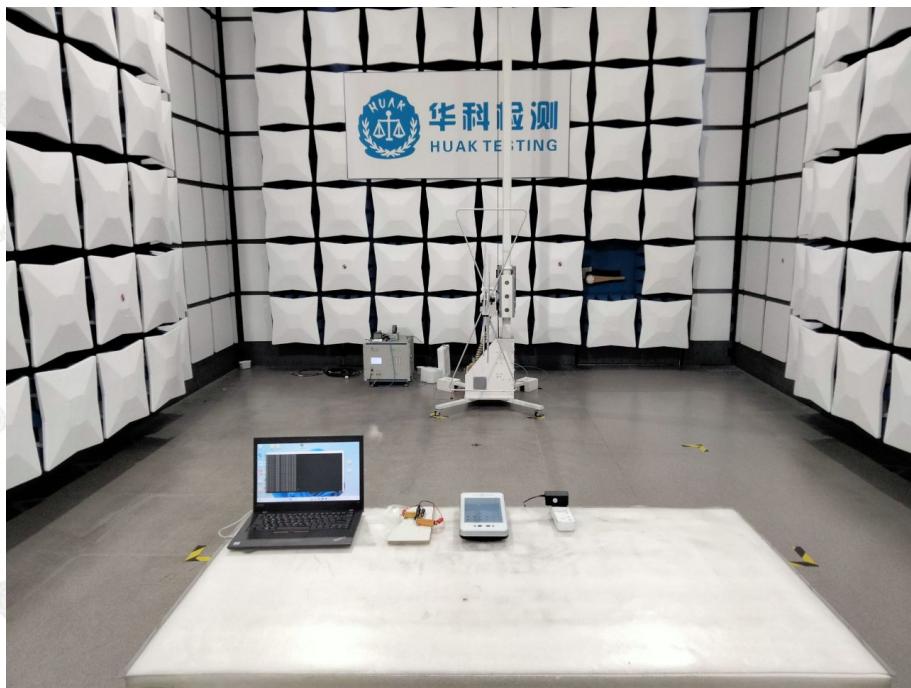
Note: this EUT was tested for all models and the worst case model (DC 12V) data was reported.

Voltage (Vdc)	Temperature (°C)	Frequency (MHz)	Deviation (%)	Limit (%)
12	-20	13.560282	0.00208%	+/-0.01%
12	-10	13.560149	0.00110%	
12	0	13.560279	0.00206%	
12	10	13.560208	0.00153%	
12	20	13.560152	0.00112%	
12	30	13.560063	0.00046%	
12	40	13.559961	-0.00029%	
12	50	13.560259	0.00191%	
10.2	-20	13.560236	0.00174%	
10.2	-10	13.560017	0.00013%	
10.2	0	13.559829	-0.00126%	
10.2	10	13.560438	0.00323%	
10.2	20	13.560025	0.00018%	
10.2	30	13.560414	0.00305%	
10.2	40	13.559936	-0.00047%	
10.2	50	13.560388	0.00286%	
13.8	-20	13.560475	0.00350%	
13.8	-10	13.560201	0.00148%	
13.8	0	13.560229	0.00169%	
13.8	10	13.560386	0.00285%	
13.8	20	13.560315	0.00232%	
13.8	30	13.560258	0.00190%	
13.8	40	13.559971	-0.00021%	
13.8	50	13.560349	0.00257%	



5. Photographs of Test Setup

Radiated Emission



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**Conducted Emission**

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6. Photos of the EUT

Reference to the report: ANNEX A of external photos and ANNEX B of internal photos.

-----End of test report-----