中认信通
CHINA CERTIFICATION ICT CO., LTD (DONGGUAN)

ACCREDITED
TESTING LABORATORY
CERTIFICATE # 6356.01

TEST REPORT

Applicant: **AKUVOX (XIAMEN) NETWORKS CO., LTD.**

Address: 10/F, No.56 Guanri Road, Software Park II, Xiamen 361009, China

FCC ID: **2AHCR-R20K-2V1**

Product Name: **Elevator Access Controller**

Standard(s): **47 CFR Part 15, Subpart C(15.207, 15.209, 15.225)**
ANSI C63.10-2013

The above equipment has been tested and found compliant with the requirement of the relative standards by China Certification ICT Co., Ltd (Dongguan)

Report Number: **CR230635429-00B**

Date Of Issue: **2023/8/28**

Reviewed By: **Julie Tan** Julie Tan
Title: RF Engineer

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Title: Manager

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Test Facility

The Test site used by China Certification ICT Co., Ltd (Dongguan) to collect test data is located on the No. 113, Pingkang Road, Dalang Town, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 442868, the FCC Designation No. : CN1314.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0123.

Declarations

China Certification ICT Co., Ltd (Dongguan) is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol "▲". Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	CR230635429-00B	Original Report	2023/8/28

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

EUT Name:	Elevator Access Controller
EUT Model:	R20K-2
Operation Frequency:	13.56 MHz 125kHz
Modulation Type:	ASK
Rated Input Voltage:	DC 48V From Switching Power
Serial Number:	278Y_1
EUT Received Date:	2023/6/27
EUT Received Status:	Good

Antenna Information Detail▲:

13.56 MHz:

Antenna Type	input impedance (Ohm)	Frequency Range	Antenna Gain
Loop	50	13.56MHz	0dBi
The Method of §15.203 Compliance: ☒Antenna must be permanently attached to the unit. ☐Antenna must use a unique type of connector to attach to the EUT. ☐Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.			

125 kHz:

Antenna Type	input impedance (Ohm)	Frequency Range	Antenna Gain
Loop	50	0.125MHz	0dBi
The Method of §15.203 Compliance: ☒Antenna must be permanently attached to the unit. ☐Antenna must use a unique type of connector to attach to the EUT. ☐Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.			

Accessory Information:

Accessory Description	Manufacturer	Model
/	/	/

1.2 Description of Test Configuration

1.2.1 EUT Operation Condition:

EUT Operation Mode:	The system was configured for testing in Engineering Mode, which was provided by the manufacturer. 125kHz and 13.56MHz was transmission simultenously.
Equipment Modifications:	No
EUT Exercise Software:	No
Engineering Mode was provided by manufacturer▲. The maximum power was configured default setting.	

1.2.2 Support Equipment List and Details

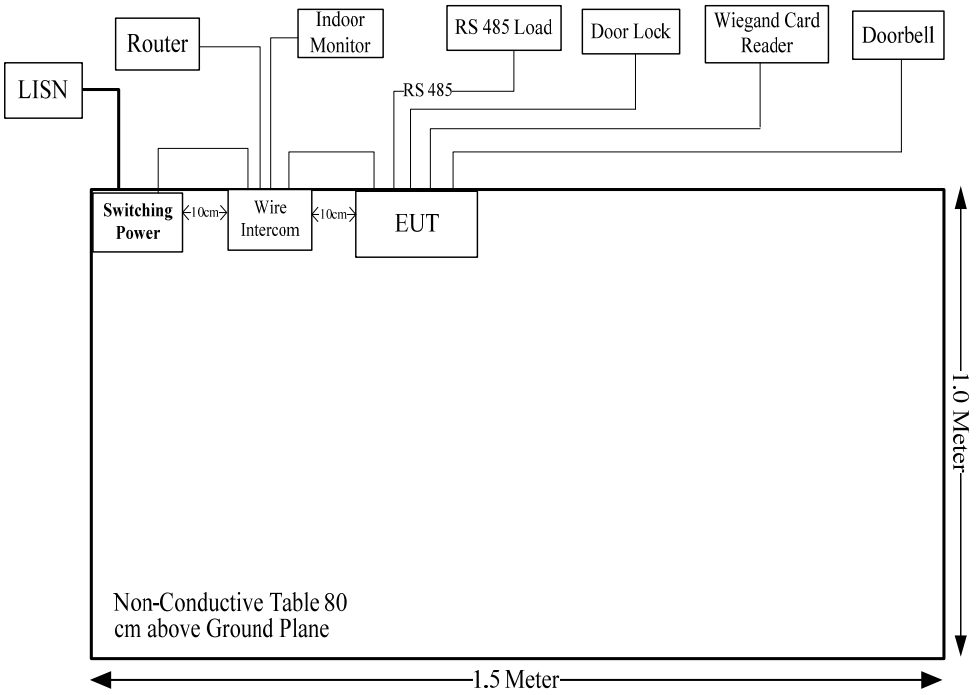
Manufacturer	Description	Model	Serial Number
MORNSUN	Switching Power	LI60-20B 48PR2	Unknown
AKUVOX	2-Wrire Intercom	NS-2	Unknown
ZKAT	Wiegand card reader	Q-K201D	N/A
AKUVOX	Indoor Monitor	C313W-2	P1QLC2QJ00129
D-Link	Router	DGS-1100-08PD	S01Z1H000012
Unknown	RS485 Load	RS485-X1	F-EM-PHRJ45X8011
Unknown	Door Lock	Unknown	Unknown
Unknown	Door Bell	Unknown	Unknown

1.2.3 Support Cable List and Details

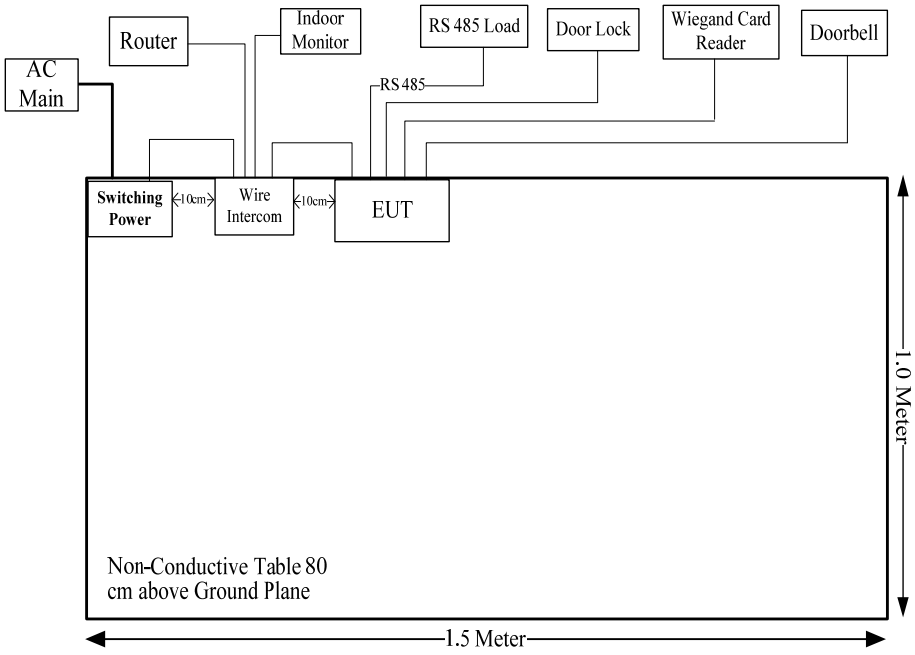
Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
AC Cable	No	No	1.2	LISN	Switching Power
DC Cable	No	No	1	Switching Power	2-Wrire Intercom
RJ45 Cable	No	No	10	2-Wrire Intercom	Router
DC Cable	No	No	10	2-Wrire Intercom	Indoor Monitor
DC Cable	No	No	2	2-Wrire Intercom	EUT
RS485 Cable	No	No	10	EUT	RS485 Load
DC Cable	No	No	10	EUT	Door Lock
DC Cable	No	No	10	EUT	Door Bell
DC Cable	No	No	10	EUT	Wiegand card reader

1.2.4 Block Diagram of Test Setup

AC line conducted emissions:



Spurious Emissions:



1.3 Measurement Uncertainty

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
Unwanted Emissions, radiated	9kHz~30MHz: 4.12dB 30M~200MHz: 4.15 dB,200M~1GHz: 5.61 dB,1G~6GHz: 5.14 dB, 6G~18GHz: 5.93 dB,18G~26.5G:5.47 dB,26.5G~40G:5.63 dB
Temperature	±1℃
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	2.8 dB (150 kHz to 30 MHz)

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC§15.203	Antenna Requirement	Compliant
FCC§15.207 (a)	Conducted Emissions	Compliant
§15.225 §15.209 §15.205	Radiated Emission Test	Compliant
§15.225(e)	Frequency Stability	Compliant
§15.215(c)	20 dB Bandwidth	Compliant
§1.1310 & §2.1093	RF Exposure	Compliant

3. REQUIREMENTS AND TEST PROCEDURES

3.1 AC Line Conducted Emissions

3.1.1 Applicable Standard

FCC§15.207(a).

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

	Conducted limit (dBμV)	
Frequency of emission (MHz)	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

(b) The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

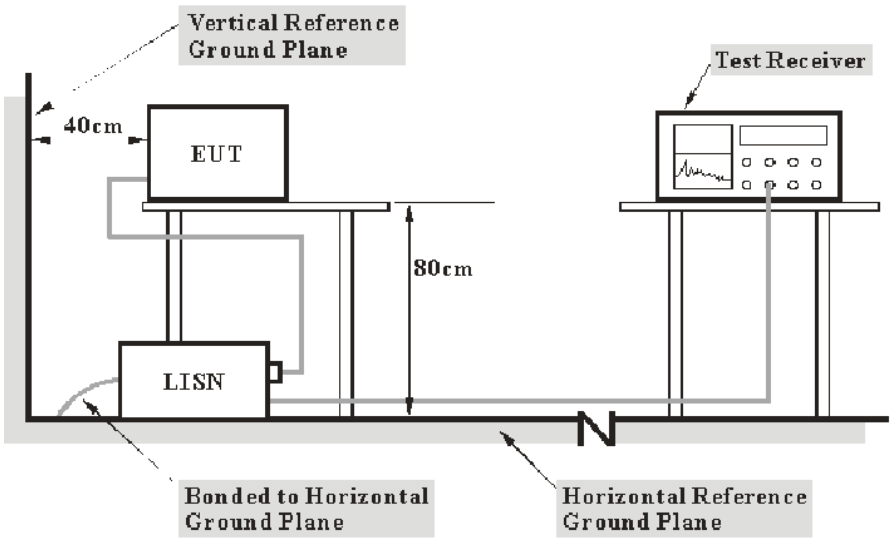
(1) For carrier current system containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(2) For all other carrier current systems: 1000 μV within the frequency band 535-1705 kHz, as measured using a 50 μH/50 ohms LISN.

(3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits in §15.205, §15.209, §15.221, §15.223, or §15.227, as appropriate.

(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provisions for, the use of battery chargers which permit operating while charging, AC adapters or battery eliminators or that connect to the AC power lines indirectly, obtainig their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

3.1.2 EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter or EUT was connected to the main LISN with a 120 V/60 Hz AC power source.

3.1.3 EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

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

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

3.1.4 Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

The frequency and amplitude of the six highest ac power-line conducted emissions relative to the limit, measured over all the current-carrying conductors of the EUT power cords, and the operating frequency or frequency to which the EUT is tuned (if appropriate), should be reported, unless such emissions are more than 20 dB below the limit. AC power-line conducted emissions measurements are to be separately carried out only on each of the phase ("hot") line(s) and (if used) on the neutral line(s), but not on the ground [protective earth] line(s). If less than six emission frequencies are within 20 dB of the limit, then the noise level of the measuring instrument at representative frequencies should be reported. The specific conductor of the power-line cord for each of the reported emissions should be identified. Measure the six highest emissions with respect to the limit on each current-carrying conductor of each power cord associated with the EUT (but not the power cords of associated or peripheral equipment that are part of the test configuration). Then, report the six highest emissions with respect to the limit from among all the measurements identifying the frequency and specific current-carrying conductor identified with the emission. The six highest emissions should be reported for each of the current-carrying conductors, or the six highest emissions may be reported over all the current-carrying conductors.

According FCC publication number 174176,for a device with a permanent antenna operating at or below 30 MHz, the measurements done with a suitable dummy load, in lieu of the permanent antenna under the following conditions: (1) perform the AC line conducted tests with the permanent antenna to determine compliance with the Section 15.207 limits outside the transmitter's fundamental emission band; (2) retest with a dummy load in lieu of the permanent antenna to determine compliance with the Section 15.207 limits within the transmitter's fundamental emission band.

3.1.5 Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Reading + Factor
Factor = attenuation caused by cable loss + voltage division factor of AMN

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

3.2 Radiated Emissions

3.2.1 Applicable Standard

As per FCC Part 15.225

(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.

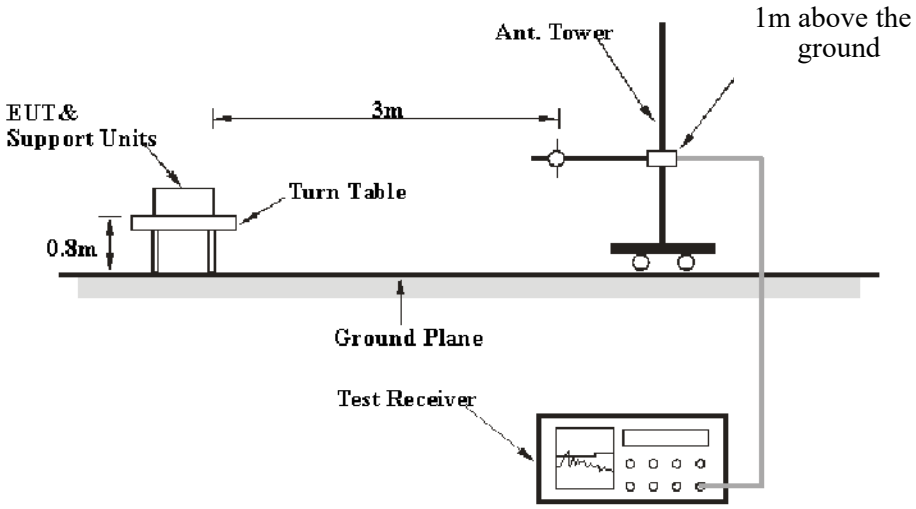
(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(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.

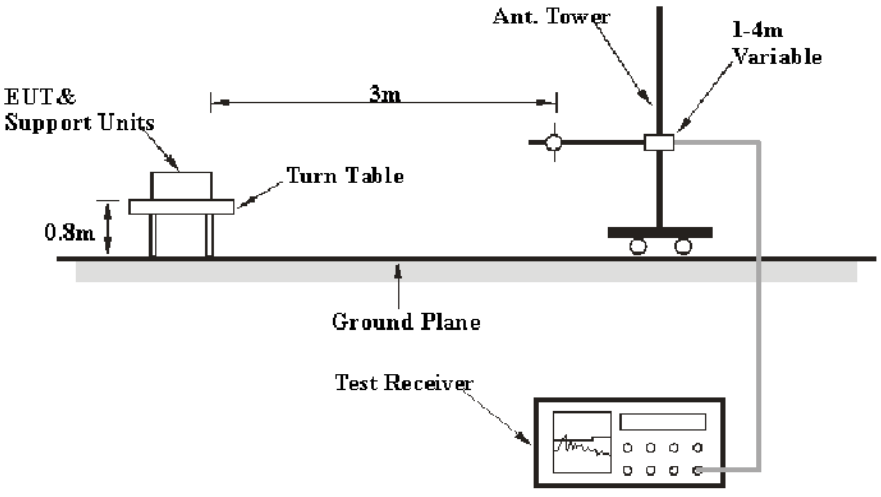
(d) The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

3.2.2 EUT Setup

9kHz-30MHz:



30MHz-1GHz:



The radiated emission tests were performed in the 3-meter chamber test site, using the setup accordance with the ANSI C63.10-2013.

The spacing between the peripherals was 10 cm.

For 9kHz-30MHz test, the lowest height of the magnetic antenna shall be 1 m above the ground and three antenna orientations (parallel, perpendicular, and ground-parallel) shall be measured.

3.2.3 EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 9 kHz to 1 GHz.

During the radiated emission test, the EMI test Receiver was set with the following configurations:

Frequency Range	RBW	Video B/W	Detector
9 kHz – 150 kHz	200 Hz	1 kHz	QP
150 kHz – 30 MHz	9 kHz	30 kHz	QP
30 MHz – 1000 MHz	120 kHz	300 kHz	QP

If the maximized peak measured value complies with the limit, then it is unnecessary to perform an QP measurement

3.2.4 Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Reading + Factor
Factor = Antenna Factor + Cable Loss- Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

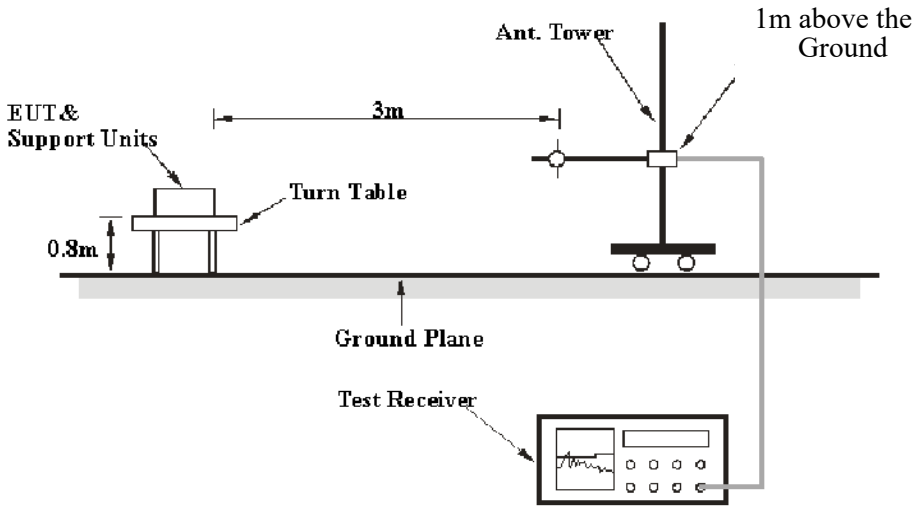
3.3 20 dB Emission Bandwidth

3.3.1 Applicable Standard

FCC §15.215

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 20 dB 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.

3.3.2 EUT Setup



3.3.3 Test Procedure

1. Position the EUT on the test table without connection to measurement instrument. Turn on the EUT. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
2. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.

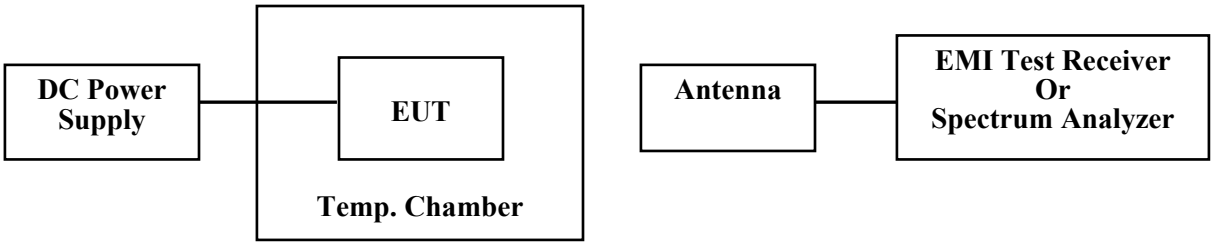
3.4 Frequency Stability

3.4.1 Applicable Standard

As per FCC Part 15.225:

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.

3.4.2 EUT Setup



3.4.3 Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power.

The EUT was placed inside the temperature chamber.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the Spectrum Analyzer.

Frequency Stability vs. Voltage: An external variable DC power supply Source. The voltage was set to the end point of the battery. The output frequency was recorded for each voltage.

3.5 Antenna Requirement

3.5.1 Applicable Standard

FCC §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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.
c. Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

3.5.2 Judgment

Please refer to the Antenna Information detail in Section 1.

4. TEST DATA AND RESULTS

4.1 AC Line Conducted Emissions

Serial Number:	278Y_1	Test Date:	2023/07/03
Test Site:	CE	Test Mode:	Transmitting
Tester:	David Huang	Test Result:	Pass

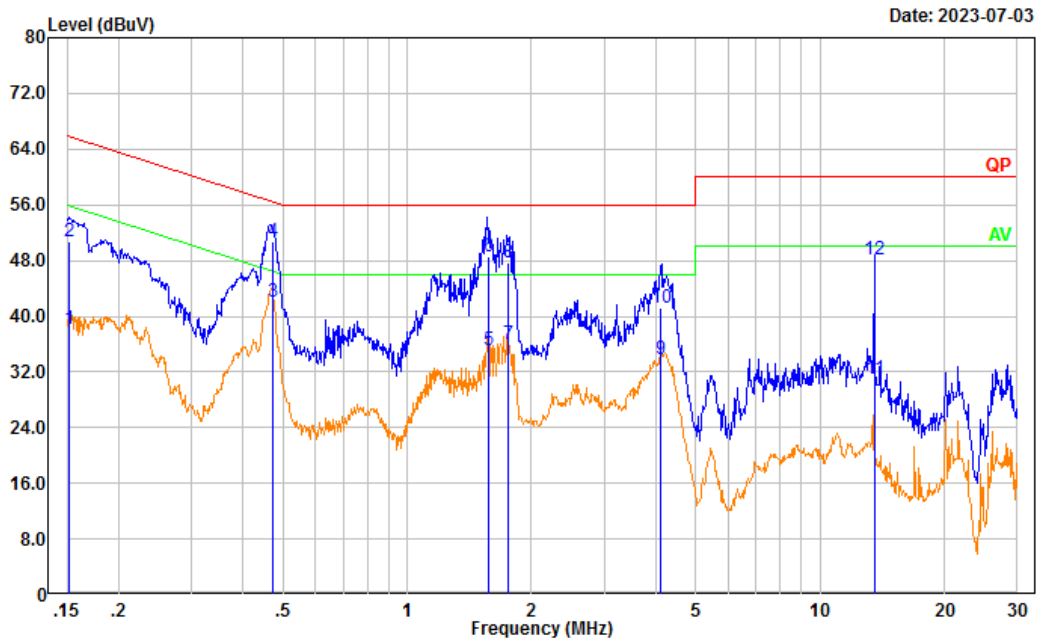
Environmental Conditions:					
Temperature: (℃)	26.2	Relative Humidity: (%)	67	ATM Pressure: (kPa)	100.9

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	LISN	ENV216	101134	2023/03/31	2024/03/30
R&S	EMI Test Receiver	ESR3	102726	2022/07/15	2023/07/14
MICRO-COAX	Coaxial Cable	UTIFLEX	C-0200-01	2022/08/07	2023/08/06
Audix	Test Software	E3	190306 (V9)	N/A	N/A

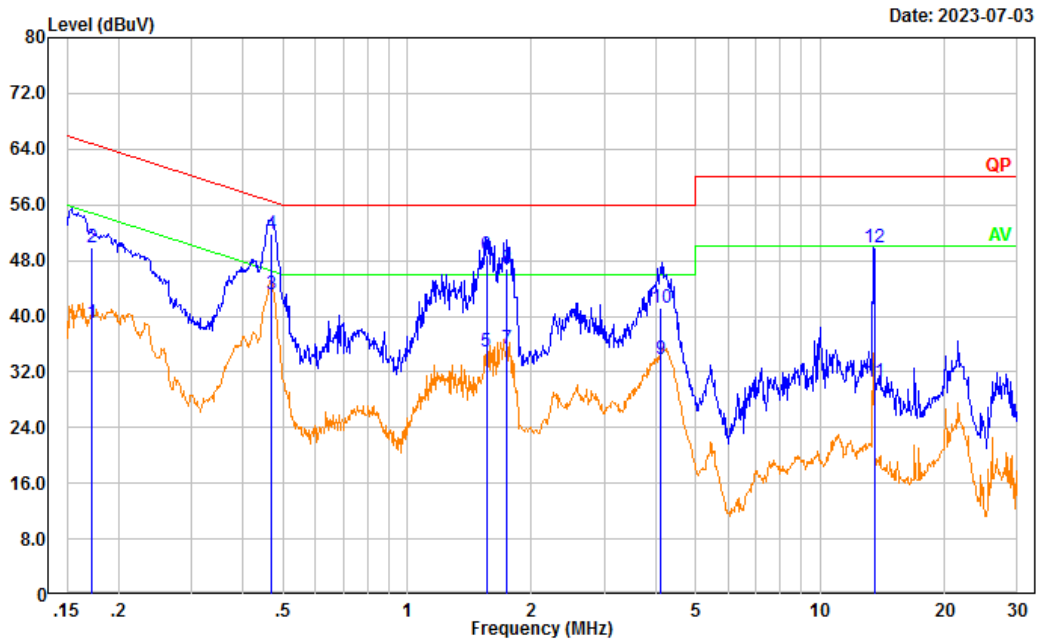
** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Mode: Transmitting
Port: Line
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.152	28.64	9.61	38.25	55.87	17.62	Average
2	0.152	41.15	9.61	50.76	65.87	15.11	QP
3	0.471	32.49	9.61	42.10	46.50	4.40	Average
4	0.471	41.06	9.61	50.67	56.50	5.83	QP
5	1.578	25.53	9.63	35.16	46.00	10.84	Average
6	1.578	39.04	9.63	48.67	56.00	7.33	QP
7	1.757	26.26	9.63	35.89	46.00	10.11	Average
8	1.757	38.14	9.63	47.77	56.00	8.23	QP
9	4.105	24.14	9.65	33.79	46.00	12.21	Average
10	4.105	31.50	9.65	41.15	56.00	14.85	QP
11	13.510	21.26	9.68	30.94	50.00	19.06	Average
12	13.510	38.44	9.68	48.12	60.00	11.88	QP

Test Mode: Transmitting
Port: Neutral
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.172	29.50	9.61	39.11	54.87	15.76	Average
2	0.172	40.17	9.61	49.78	64.87	15.09	QP
3	0.470	33.54	9.61	43.15	46.52	3.37	Average
4	0.470	42.20	9.61	51.81	56.52	4.71	QP
5	1.554	25.17	9.63	34.80	46.00	11.20	Average
6	1.554	39.06	9.63	48.69	56.00	7.31	QP
7	1.746	25.77	9.63	35.40	46.00	10.60	Average
8	1.746	37.15	9.63	46.78	56.00	9.22	QP
9	4.109	24.23	9.65	33.88	46.00	12.12	Average
10	4.109	31.58	9.65	41.23	56.00	14.77	QP
11	13.510	20.83	9.68	30.51	50.00	19.49	Average
12	13.510	40.10	9.68	49.78	60.00	10.22	QP

4.2 Radiation Spurious Emissions

Serial Number:	278Y_1	Test Date:	2023/8/26
Test Site:	966-2	Test Mode:	Transmitting
Tester:	Carl Xue	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	25.1	Relative Humidity: (%)	66	ATM Pressure: (kPa)	100

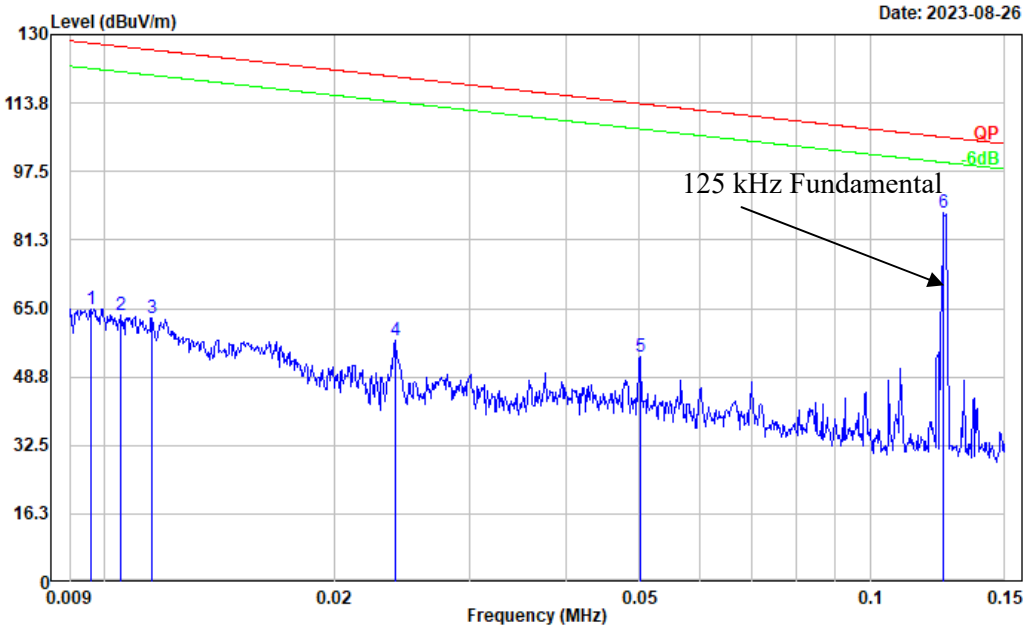
Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EMCO	Passive Loop Antenna	6512	9706-1209	2023/2/15	2026/2/14
Sunol Sciences	Antenna	JB6	A082520-5	2020/10/19	2023/10/18
R&S	EMI Test Receiver	ESR3	102724	2023/3/31	2024/3/30
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0470-02	2023/7/16	2024/7/15
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0780-01	2023/7/16	2024/7/15
Sonoma	Amplifier	310N	186165	2023/7/16	2024/7/15
Audix	Test Software	E3	201021 (V9)	N/A	N/A

** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

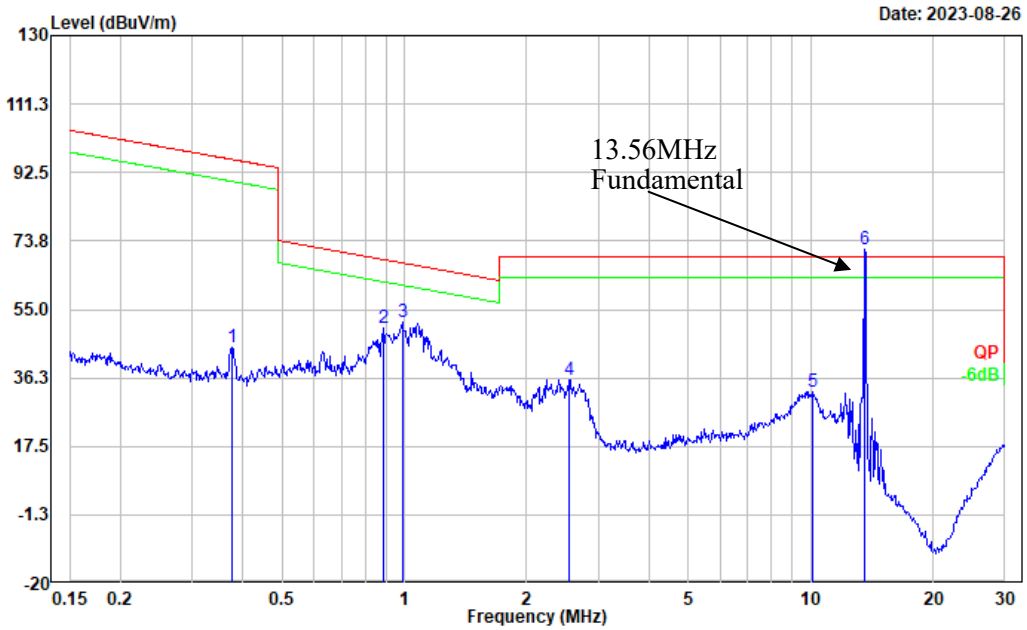
1) 9 kHz~30MHz:
Parallel:

Test Mode: Transmitting
Polarization: Parallel
Note:



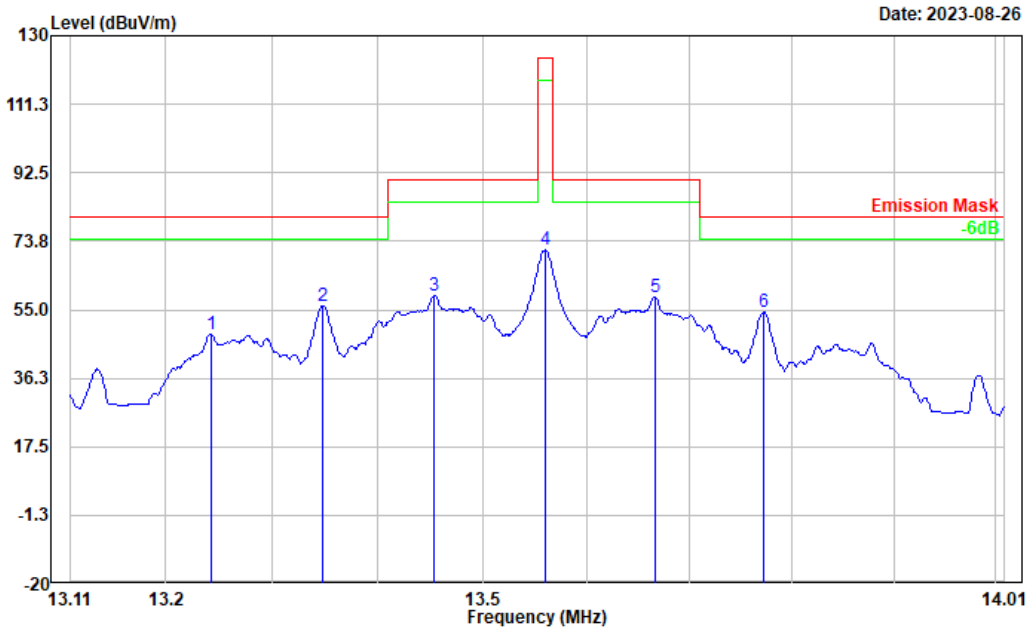
No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	0.010	6.34	58.46	64.80	127.96	63.16	Peak
2	0.011	5.83	57.58	63.41	127.18	63.77	Peak
3	0.012	6.18	56.69	62.87	126.37	63.50	Peak
4	0.024	9.78	47.82	57.60	120.02	62.42	Peak
5	0.050	11.36	42.26	53.62	113.61	59.99	Peak
6	0.125	53.83	33.84	87.67	105.67	18.00	Peak

Test Mode: Transmitting
Polarization: Parallel
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	0.377	20.24	24.47	44.71	96.07	51.36	Peak
2	0.885	31.99	17.85	49.84	68.56	18.72	Peak
3	0.989	34.75	16.96	51.71	67.57	15.86	Peak
4	2.540	26.17	9.65	35.82	69.54	33.72	Peak
5	10.125	28.41	4.07	32.48	69.54	37.06	Peak
6	13.551	77.76	-6.36	71.40	69.54	-1.86	Peak

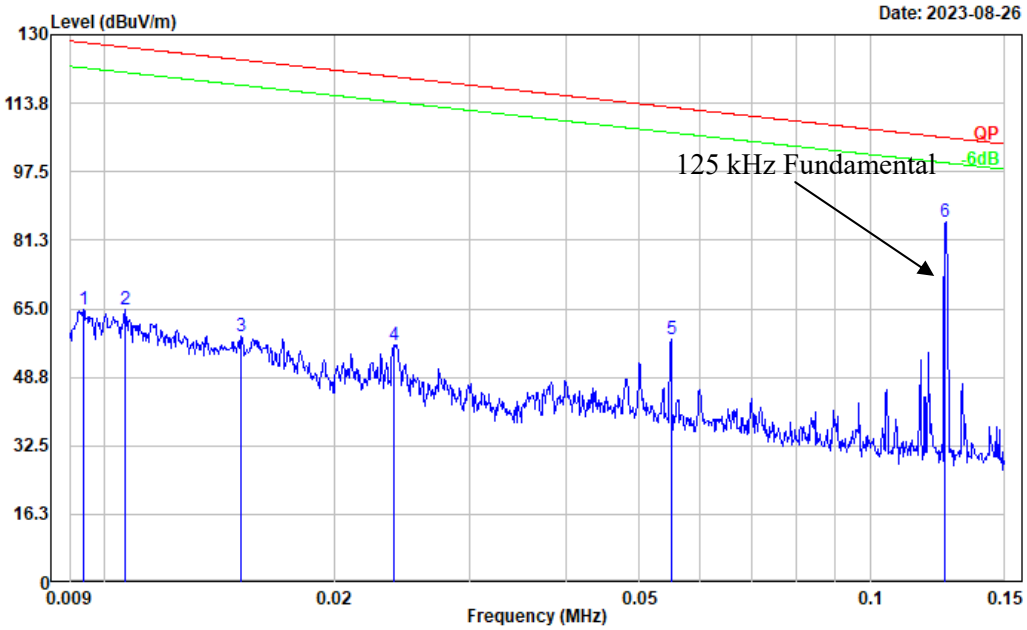
Test Mode: Transmitting
Polarization: Parallel
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	13.242	53.87	-5.43	48.44	80.51	32.07	Peak
2	13.348	61.80	-5.75	56.05	80.51	24.46	Peak
3	13.454	65.07	-6.08	58.99	90.47	31.48	Peak
4	13.560	77.68	-6.38	71.30	124.00	52.70	Peak
5	13.666	65.12	-6.71	58.41	90.47	32.06	Peak
6	13.772	61.45	-7.03	54.42	80.51	26.09	Peak

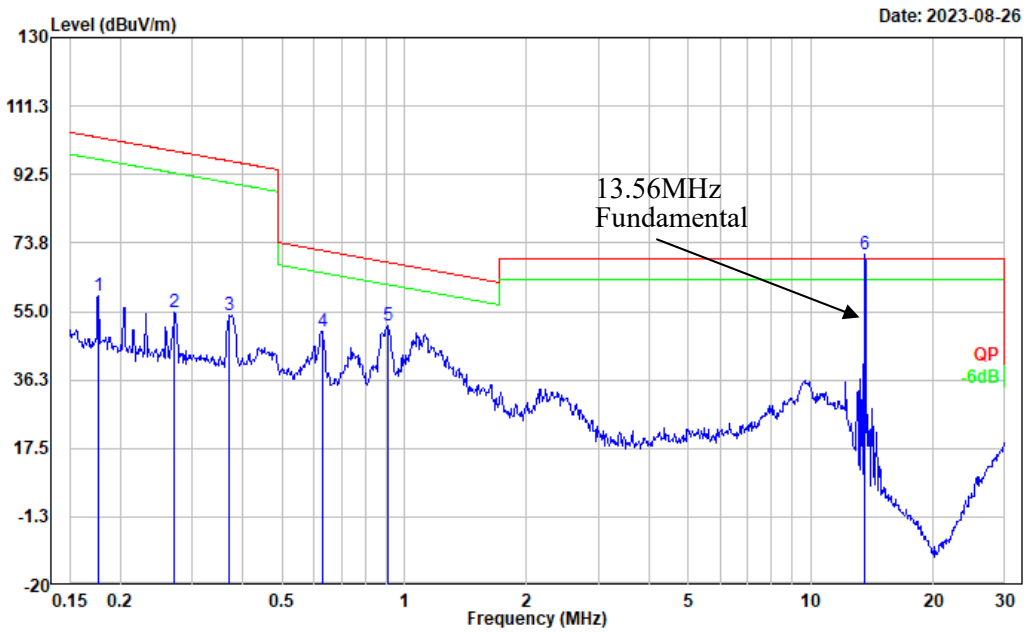
Perpendicular:

Test Mode: Transmitting
Polarization: Perpendicular
Note:



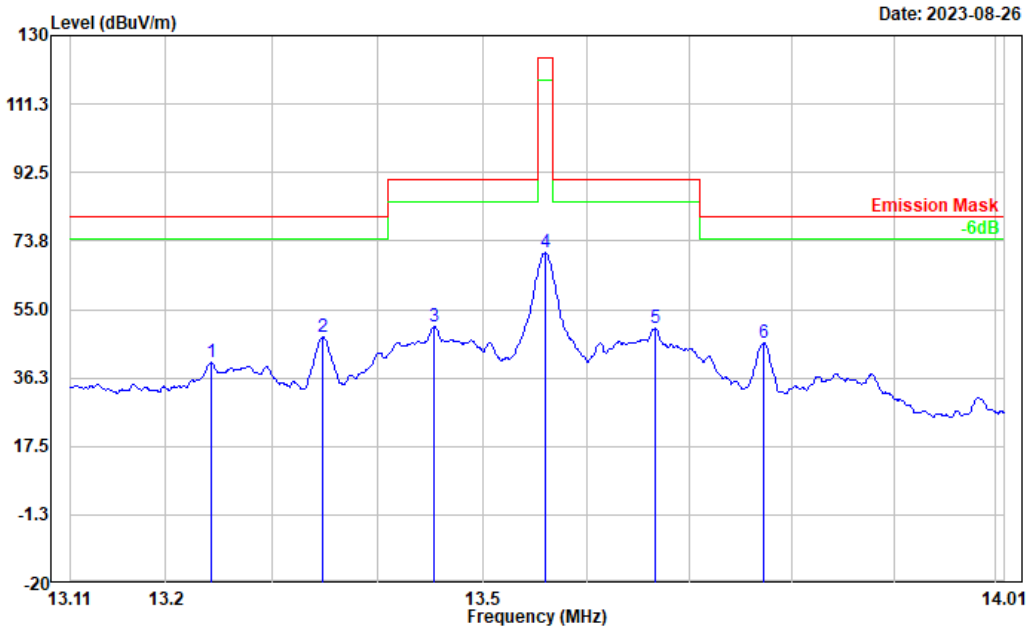
No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	0.009	6.01	58.68	64.69	128.15	63.46	Peak
2	0.011	7.51	57.47	64.98	127.07	62.09	Peak
3	0.015	4.83	53.57	58.40	124.03	65.63	Peak
4	0.024	8.69	47.85	56.54	120.04	63.50	Peak
5	0.055	16.57	41.18	57.75	112.81	55.06	Peak
6	0.125	51.69	33.84	85.53	105.67	20.14	Peak

Test Mode: Transmitting
Polarization: Perpendicular
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	0.177	28.20	30.89	59.09	102.66	43.57	Peak
2	0.272	27.81	27.03	54.84	98.93	44.09	Peak
3	0.371	29.56	24.59	54.15	96.21	42.06	Peak
4	0.627	29.01	20.58	49.59	71.61	22.02	Peak
5	0.914	33.60	17.64	51.24	68.27	17.03	Peak
6	13.551	77.12	-6.36	70.76	69.54	-1.22	Peak

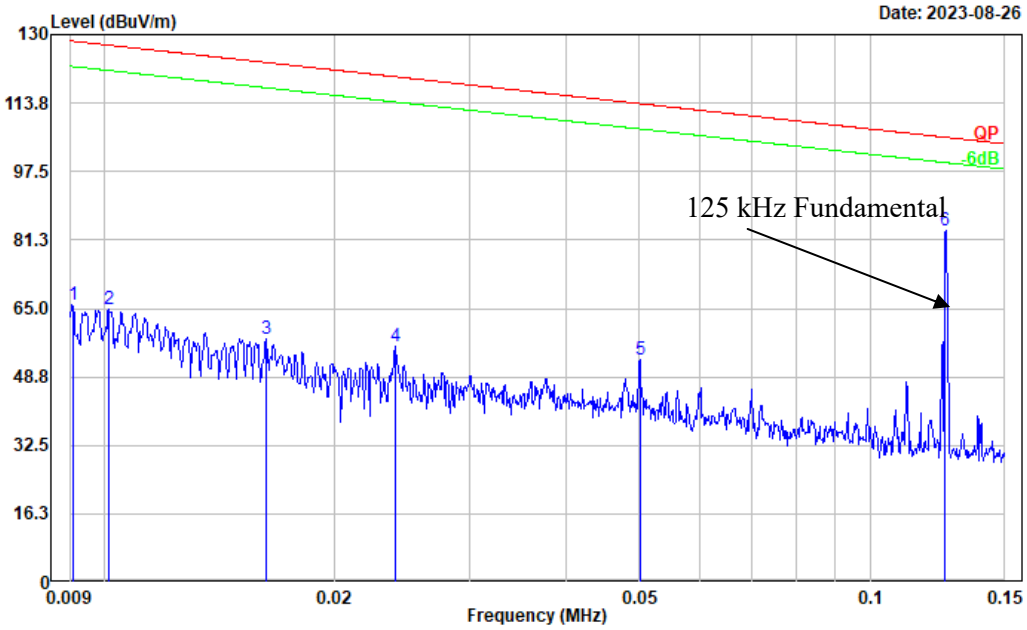
Test Mode: Transmitting
Polarization: Perpendicular
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	13.242	45.82	-5.43	40.39	80.51	40.12	Peak
2	13.348	53.13	-5.75	47.38	80.51	33.13	Peak
3	13.454	56.34	-6.08	50.26	90.47	40.21	Peak
4	13.560	76.91	-6.38	70.53	124.00	53.47	Peak
5	13.666	56.46	-6.71	49.75	90.47	40.72	Peak
6	13.772	52.81	-7.03	45.78	80.51	34.73	Peak

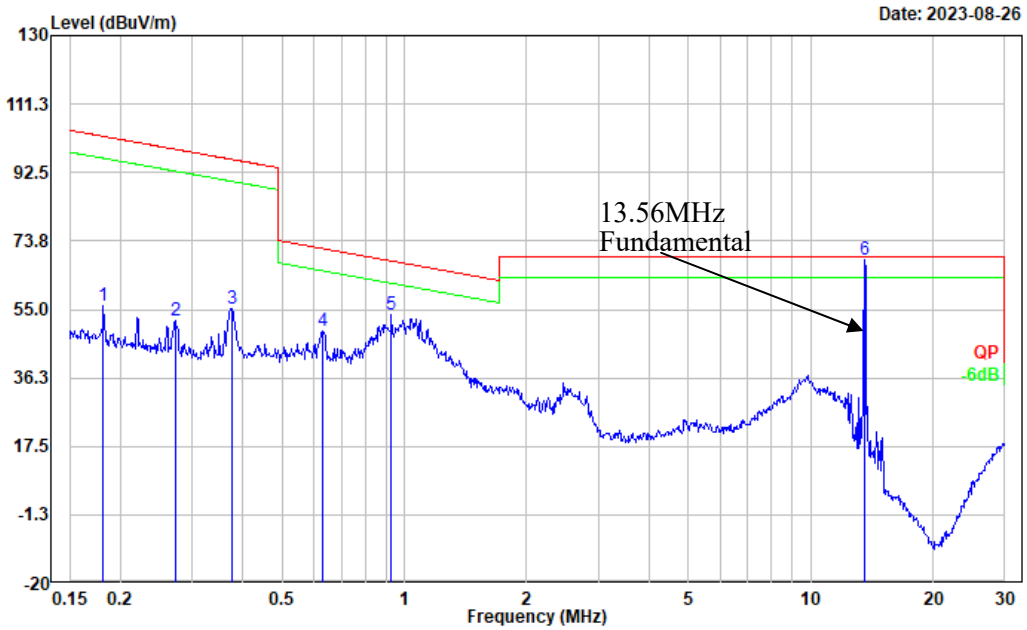
Ground-parallel:

Test Mode: Transmitting
Polarization: Ground-parallel
Note:



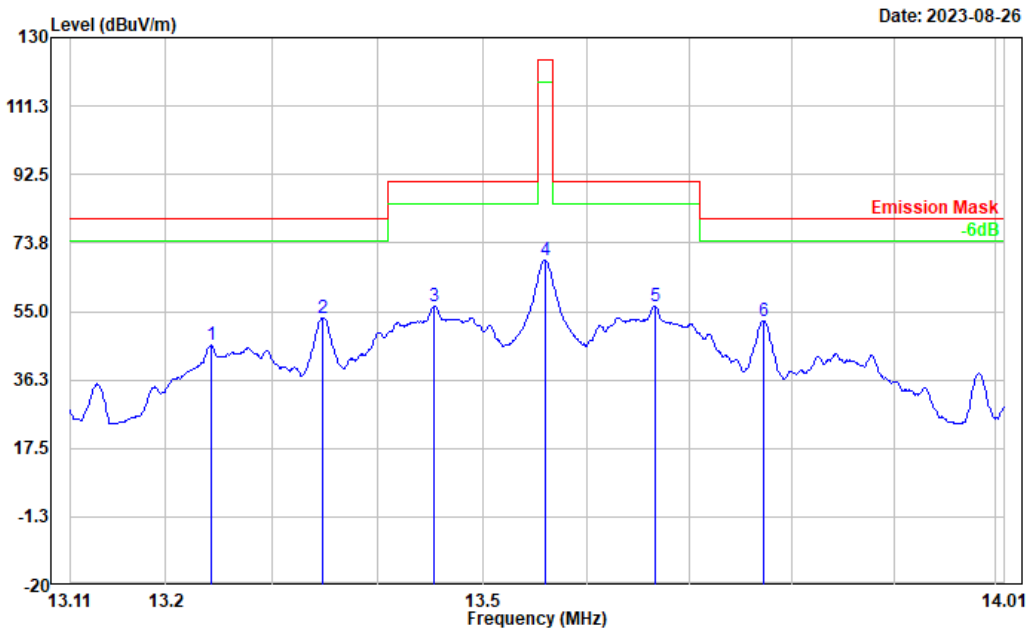
No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	0.009	6.72	59.00	65.72	128.44	62.72	Peak
2	0.010	7.06	57.91	64.97	127.49	62.52	Peak
3	0.016	5.29	52.56	57.85	123.39	65.54	Peak
4	0.024	8.11	47.80	55.91	119.99	64.08	Peak
5	0.050	10.65	42.26	52.91	113.61	60.70	Peak
6	0.125	49.53	33.84	83.37	105.67	22.30	Peak

Test Mode: Transmitting
Polarization: Ground-parallel
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	0.182	25.36	30.62	55.98	102.43	46.45	Peak
2	0.273	24.92	26.97	51.89	98.88	46.99	Peak
3	0.377	30.68	24.47	55.15	96.07	40.92	Peak
4	0.630	28.63	20.53	49.16	71.56	22.40	Peak
5	0.928	36.04	17.51	53.55	68.13	14.58	Peak
6	13.551	75.13	-6.36	68.77	69.54	0.77	Peak

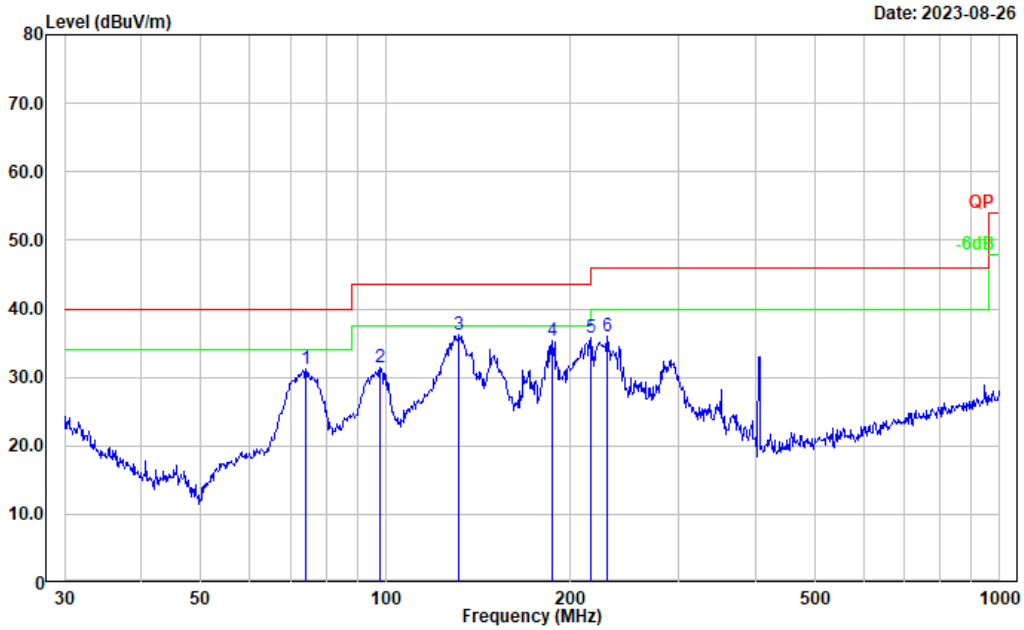
Test Mode: Transmitting
Polarization: Ground-parallel
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	13.242	51.10	-5.43	45.67	80.51	34.84	Peak
2	13.348	59.10	-5.75	53.35	80.51	27.16	Peak
3	13.454	62.71	-6.08	56.63	90.47	33.84	Peak
4	13.560	75.34	-6.38	68.96	124.00	55.04	Peak
5	13.666	63.14	-6.71	56.43	90.47	34.04	Peak
6	13.772	59.47	-7.03	52.44	80.51	28.07	Peak

2) 30 MHz~1GHz
Horizontal:

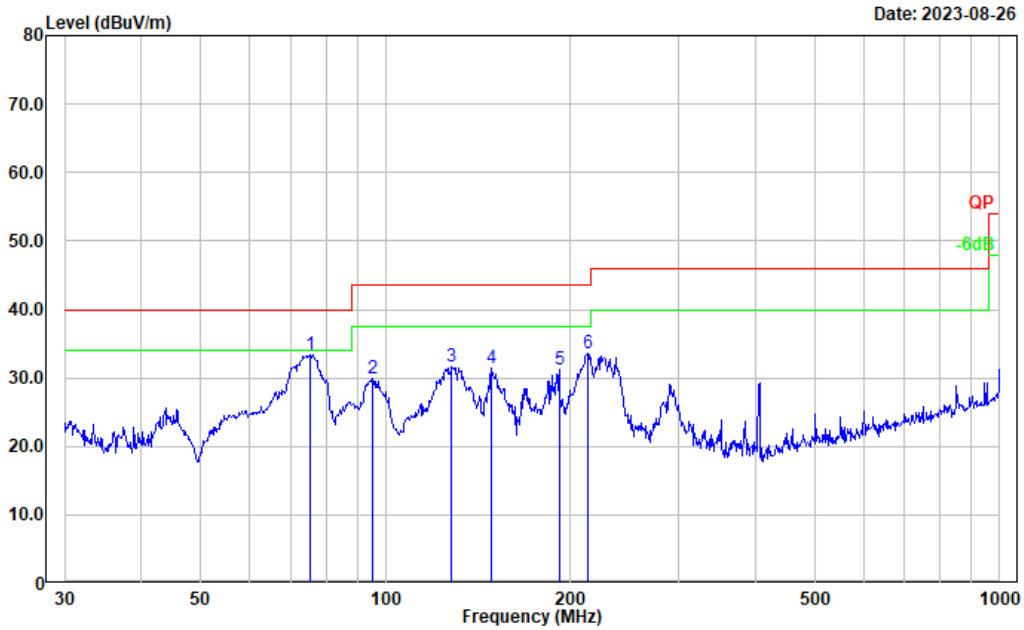
Test Mode: Transmitting
Polarization: horizontal
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	74.135	48.21	-16.90	31.31	40.00	8.69	Peak
2	97.798	46.37	-14.85	31.52	43.50	11.98	Peak
3	131.758	47.67	-11.39	36.28	43.50	7.22	Peak
4	186.441	48.81	-13.57	35.24	43.50	8.26	Peak
5	215.268	48.47	-12.61	35.86	43.50	7.64	Peak
6	229.293	48.89	-12.97	35.92	46.00	10.08	Peak

Vertical:

Test Mode: Transmitting
Polarization: vertical
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	75.182	50.38	-16.95	33.43	40.00	6.57	Peak
2	95.093	45.46	-15.60	29.86	43.50	13.64	Peak
3	128.113	42.81	-11.26	31.55	43.50	11.95	Peak
4	148.963	43.34	-12.00	31.34	43.50	12.16	Peak
5	191.745	44.39	-13.21	31.18	43.50	12.32	Peak
6	213.763	46.25	-12.58	33.67	43.50	9.83	Peak

4.3 20 dB Emission Bandwidth

Serial Number:	278Y_1	Test Date:	2023/8/26
Test Site:	966-2	Test Mode:	Transmitting
Tester:	Carl Xue	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	25.1	Relative Humidity: (%)	66	ATM Pressure: (kPa)	100

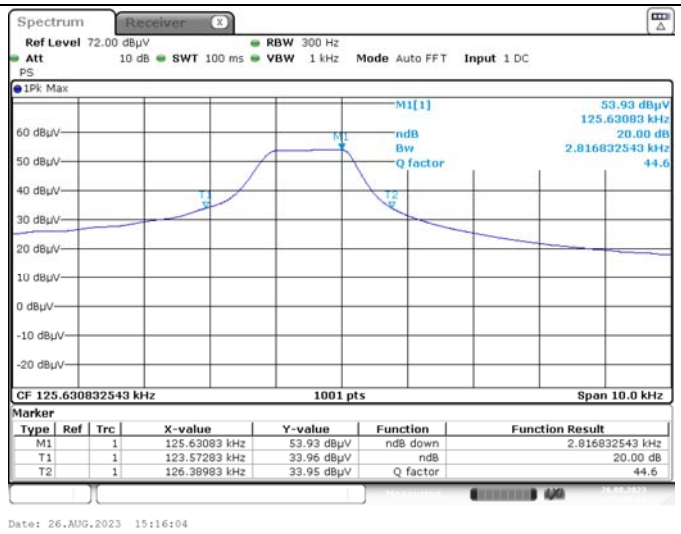
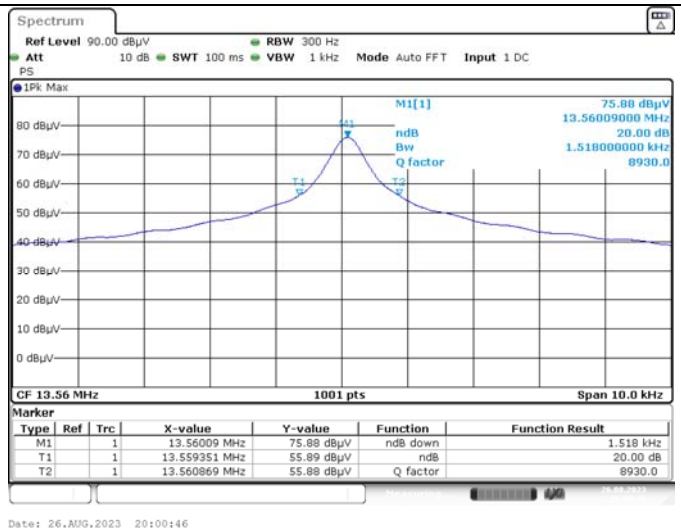
Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EMCO	Passive Loop Antenna	6512	9706-1209	2023/2/15	2026/2/14
R&S	EMI Test Receiver	ESR3	102724	2023/3/31	2024/3/30
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0470-02	2023/7/16	2024/7/15
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0780-01	2023/7/16	2024/7/15
Audix	Test Software	E3	201021 (V9)	N/A	N/A

**** Statement of Traceability:*** *China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

Test Frequency (MHz)	20 dB Emission Bandwidth (Hz)
0.1256	2816.83
13.56	1518

20dB Emission Bandwidth	
125kHz	
13.56MHz	

4.4 Frequency Stability

Serial Number:	278Y_1	Test Date:	2023/8/26
Test Site:	RF	Test Mode:	Transmitting
Tester:	Carl Xue	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	25.1	Relative Humidity: (%)	66	ATM Pressure: (kPa)	100

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EMCO	Passive Loop Antenna	6512	9706-1209	2023/2/15	2026/2/14
R&S	EMI Test Receiver	ESR3	102724	2023/3/31	2024/3/30
BACL	TEMP&HUMI Test Chamber	BTH-150-40	30174	2023/3/31	2024/3/30
YINSAIGE	Coaxial Cable	SS402	SJ0300001	Each time	N/A
UNI-T	Multimeter	UT39A+	C210582554	2022/9/29	2023/9/28
ZHAOXIN	DC Power Supply	RXN-6010D	21R6010D0912386	N/A	N/A

**** Statement of Traceability:*** *China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

f_o = 13.56 MHz				
Temperature	**Voltage**	**Measured frequency**	**Frequency Error**	**Limit**
℃	**V_{AC}**	**MHz**	**Hz**	**Hz**
-20	120	13.560110	110	±1356
-10		13.560076	76	±1356
0		13.560166	166	±1356
10		13.560035	35	±1356
20		13.560090	90	±1356
25		13.560013	13	±1356
30		13.560124	124	±1356
40		13.560205	205	±1356
50		13.560183	183	±1356
20	102	13.560145	145	±1356
20	138	13.560054	54	±1356

5. RF EXPOSURE EVALUATION

5.1 Applicable Standard

According to subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*($180/f^2$)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

5.2 Calculation formula:

Prediction of power density at the distance of the applicable MPE limit
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

5.3 EUT Information▲:

Operation Modes	Operation Frequency (MHz)	Max Conducted output power including Tune-up Tolerance (dBm)	Maximum Antenna Gain (dBi)
NFC(13.56MHz)	13.56	-23.9	0
125kHz	0.125	-7.53	0

Note:
1. The Above Parameters were provided by the manufacturer.
2. *NFC field strength is 71.3dBμV/m @ 3m = -23.9 dBm(0.0047mW) EIRP. That equal to antenna gain is 0dBi and used the EIRP value as conducted power.
3. *125kHz field strength is 87.67dBμV/m @ 3m = -7.53 dBm(0.0015mW) EIRP. That equal to antenna gain is 0dBi and used the EIRP value as conducted power.

5.4 Calculated Data:

Operation Modes	Frequency (MHz)	Antenna Gain		Conducted output power including Tune-up Tolerance		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
NFC(13.56MHz)	13.56	0	1.00	-23.9	0.0041	20	<<0.0001	0.98
125kHz	0.125	0	1.00	-7.53	0.1766	20	<<0.0001	/

The NFC and 125kHz can transmit simultaneously:

Note: the power Density of 13.56MHz and 125 kHz too low to calculate the MPE

Result: The device meet FCC MPE at 20 cm distance

Result: Compliant.

===== END OF REPORT =====