

TESTREPORT

Applicant Name : Inrico Technologies Co., Ltd
Address : 3/F, Building No.118, High Tech Industrial Park, 72 Guowei Road, Luohu District, Shenzhen, China
ReportNumber: SZ1211009-52872E-RF-00C
FCC ID: 2AIV6-I-10

Test Standard (s)

FCC PART 15.225

Sample Description

Product Type: Body Worn Camera
Model No.: I-10
Multiple Model(s) No.: N/A
Trade Mark: Inrico
Date Received: 2021/10/09
Date of Test: 2021/10/29~2021/11/16
Report Date: 2021/11/24

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

Approved By:



Black Ding
EMC Engineer



Candy Li
EMC Engineer

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "★".

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Frequency Range	13.56 MHz
Modulation Technique	ASK
Voltage Range	DC 3.8V from battery or DC 5.0V from adapter.
Sample serial number	SZ1211009-52872E-RF-S1 (CE&RE) SZ1211009-52872E-RF-S2 (RF Conducted Test) (Assigned by ATC, Shenzhen)
Sample/EUT Status	Good condition
Adapter information	Model:LM-601E-050200U01CE Input: AC 100-240V, 50/60Hz, 0.35A Output: DC 5.0V,2000mA

Objective

This Type approval report is in accordance with Part 2- Subpart J, and Part 15-Subparts A and C of the Federal Communication Commissions rules.

The objective is to determine the compliance of the EUT with FCC rules, section 15.203, 15.205, 15.207, 15.209 and 15.225.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		5%
RF Frequency		0.082×10^{-7}
RF output power, conducted		0.73dB
Unwanted Emission, conducted		1.6dB
AC Power Lines Conducted Emissions		2.72dB
Emissions, Radiated	9kHz - 30MHz	2.66dB
	30MHz - 1GHz	4.28dB
	1GHz- 18GHz	4.98dB
	18GHz-26.5GHz	5.06dB
	26.5GHz-40GHz	4.72dB
Temperature		1°C
Humidity		6%
Supply voltages		0.4%

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

Test Facility

The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 708358, the FCC Designation No.: CN1189. Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 429 7.01.

Listed by Innovation, Science and Economic Development Canada (ISED), the Registration Number is 5077A.

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

EUT Exercise Software

No Exercise Software was used.

Equipment Modifications

No modificationon the EUT.

Support Equipment List and Details

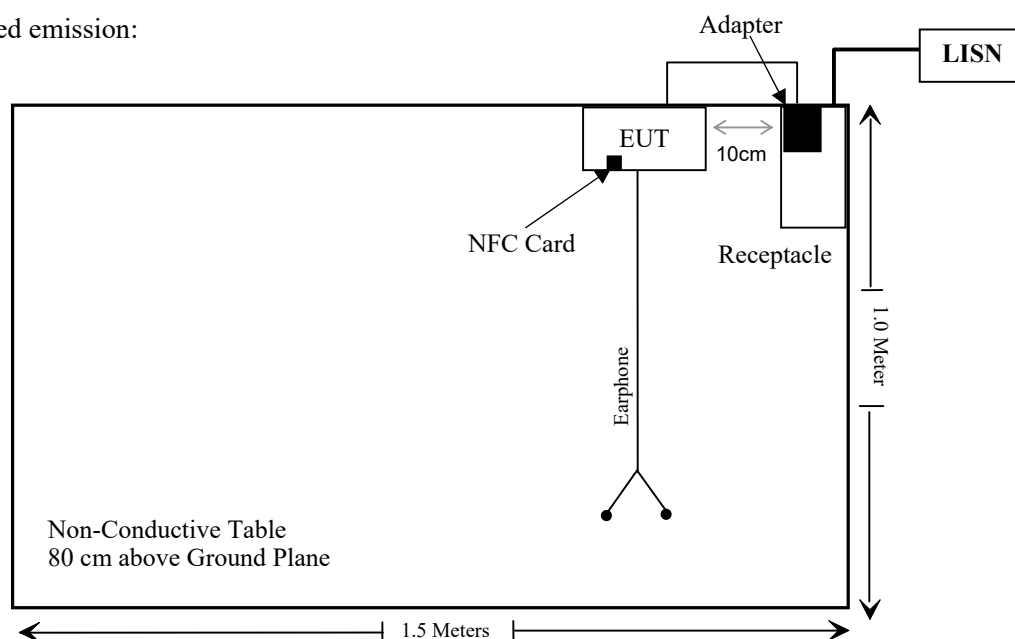
Manufacturer	Description	Model	Serial Number
Unknown	NFC Card	Unknown	Unknown
Unknown	Earphone	Unknown	Unknown

External I/O Cable

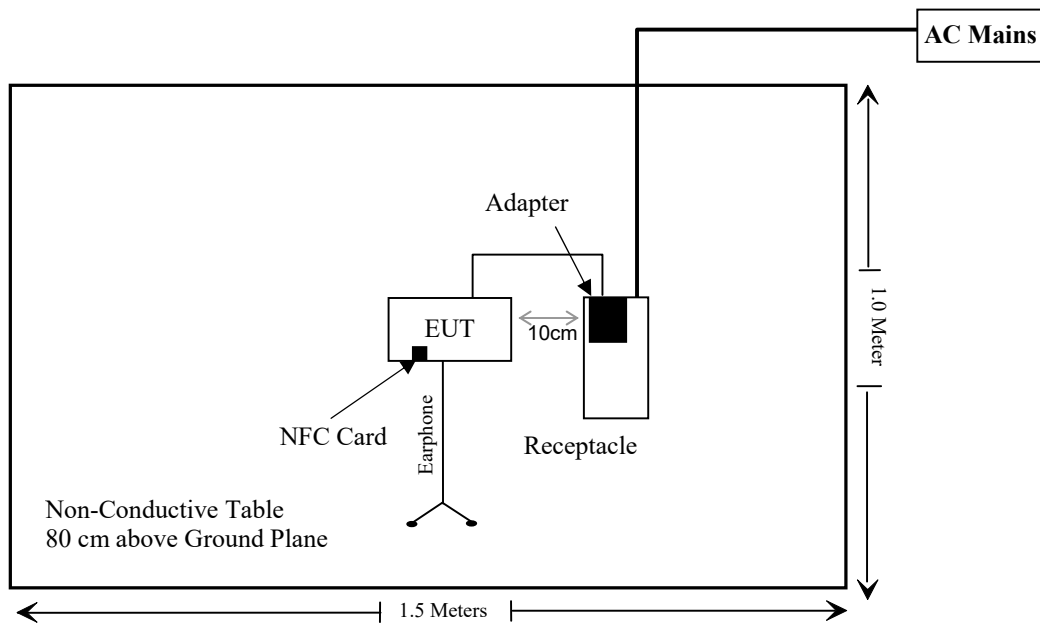
Cable Description	Length (m)	From Port	To
Un-shielding Detachable USB Cable	1.0	EUT	Adapter

Block Diagram of Test Setup

For conducted emission:



For radiated emission:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliant
§15.207	AC Line Conducted Emission	Compliant
§15.225 §15.209§15.205	Radiated Emission Test	Compliant
§15.225(e)	Frequency Stability	Compliant
§15.215(c)	20dB Emission Bandwidth	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions Test					
Rohde& Schwarz	EMI Test Receiver	ESCI	100784	2021/02/03	2022/02/02
R & S	L.I.S.N.	ENV216	101314	2020/12/25	2021/12/24
Anritsu Corp	50Ω Coaxial Switch	MP59B	6200506474	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-2m	No.2	2020/12/25	2021/12/24
Conducted Emission Test Software: e3 19821G (V9)					
Radiated Emission Test					
Rohde& Schwarz	Test Receiver	ESR	101817	2020/12/24	2021/12/23
SONOMA INSTRUMENT	Amplifier	310 N	186131	2020/12/25	2021/12/24
Anritsu Corp	50 Coaxial Switch	MP59B	6100237248	2020/12/25	2021/12/24
SCHWARZBECK	LOOP ANTENNA	FMZB1516	1516131	2020/01/05	2023/01/04
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2020/01/05	2023/01/04
Gongwen	Temp. & Humid. Chamber	JB913R	GZ-WS004	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-5m	No.3	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-1m	No.5	2020/12/25	2021/12/24
Radiated Emission Test Software: e3 19821G (V9)					

* **Statement of Traceability:** Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC§15.203 - ANTENNA REQUIREMENT

Applicable Standard

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.

Antenna Connected Construction

The EUT has one internal antenna arrangement for NFC which was permanently attached, fulfill the requirement of this section. Please refer to the EUT photos.

Result: Compliant.

Test Procedure

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

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

$$\text{Correction Factor} = \text{LISN VDF} + \text{Cable Loss} + \text{Transient Limiter Attenuation}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

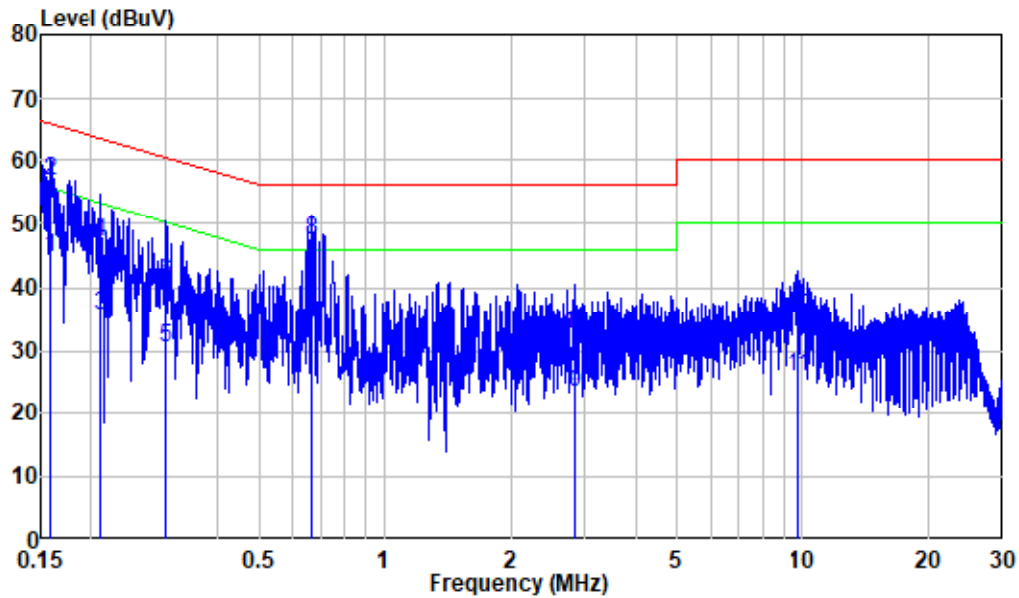
Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	64%
ATM Pressure:	101.0kPa

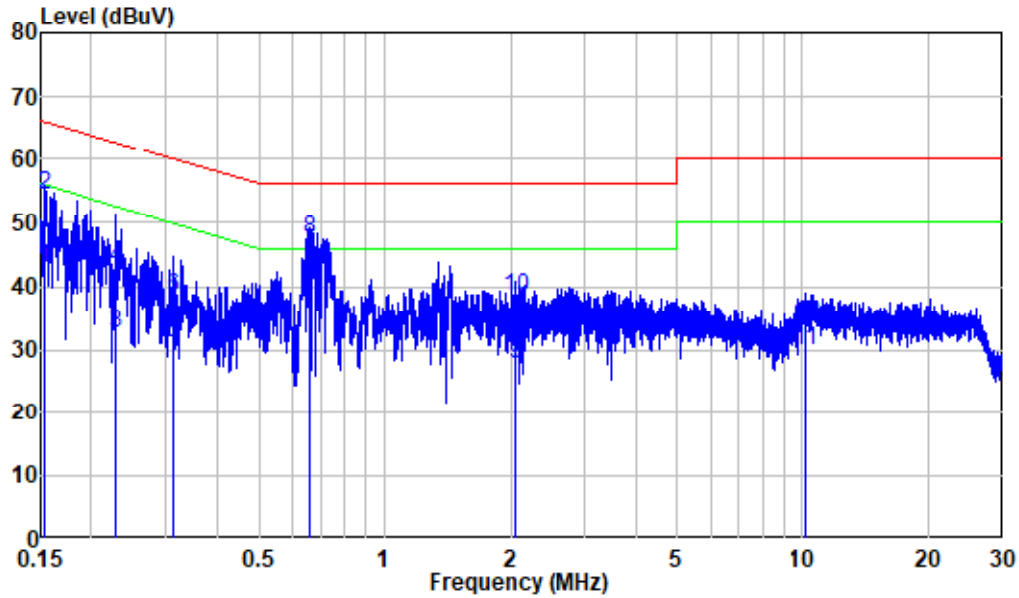
The testing was performed by Bin Duanon 2021-11-09.

Test mode: Transmitting

AC 120 V/60 Hz, Line:

Site : Shielding Room
 Condition: Line
 Mode : NFC
 Model : I-10

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.159	9.88	34.83	44.71	55.53	-10.82	Average
2	0.159	9.88	46.78	56.66	65.53	-8.87	QP
3	0.210	9.80	25.85	35.65	53.22	-17.57	Average
4	0.210	9.80	37.29	47.09	63.22	-16.13	QP
5	0.301	9.80	20.68	30.48	50.21	-19.73	Average
6	0.301	9.80	30.99	40.79	60.21	-19.42	QP
7	0.667	9.81	23.07	32.88	46.00	-13.12	Average
8	0.667	9.81	37.52	47.33	56.00	-8.67	QP
9	2.867	9.93	13.19	23.12	46.00	-22.88	Average
10	2.867	9.93	22.79	32.72	56.00	-23.28	QP
11	9.737	10.10	15.76	25.86	50.00	-24.14	Average
12	9.737	10.10	25.28	35.38	60.00	-24.62	QP

AC 120V/ 60 Hz, Neutral:

Site : Shielding Room
 Condition: Neutral
 Mode : NFC
 Model : I-10

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.153	9.91	33.05	42.96	55.84	-12.88	Average
2	0.153	9.91	44.39	54.30	65.84	-11.54	QP
3	0.228	9.99	22.65	32.64	52.53	-19.89	Average
4	0.228	9.99	32.81	42.80	62.53	-19.73	QP
5	0.312	9.95	21.02	30.97	49.92	-18.95	Average
6	0.312	9.95	28.52	38.47	59.92	-21.45	QP
7	0.656	9.91	29.02	38.93	46.00	-7.07	Average
8	0.656	9.91	37.41	47.32	56.00	-8.68	QP
9	2.051	9.92	17.72	27.64	46.00	-18.36	Average
10	2.051	9.92	28.40	38.32	56.00	-17.68	QP
11	10.166	10.10	19.67	29.77	50.00	-20.23	Average
12	10.166	10.10	24.05	34.15	60.00	-25.85	QP

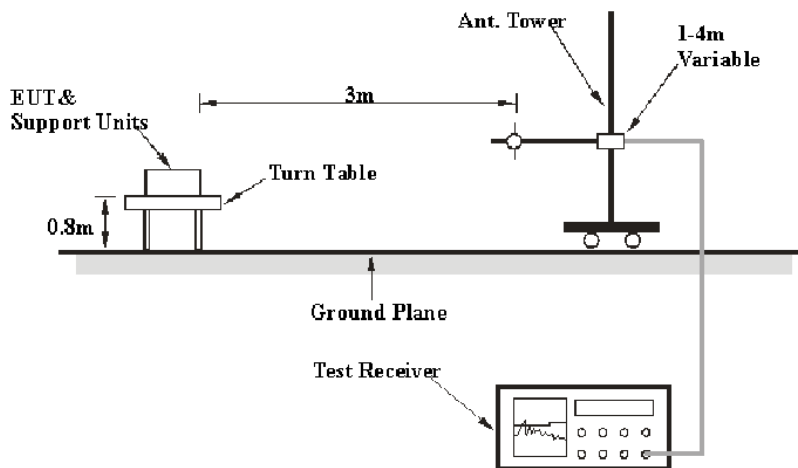
FCC§15.225, §15.205& §15.209 - RADIATED EMISSIONS TEST

Applicable Standard

As per FCC Part 15.225

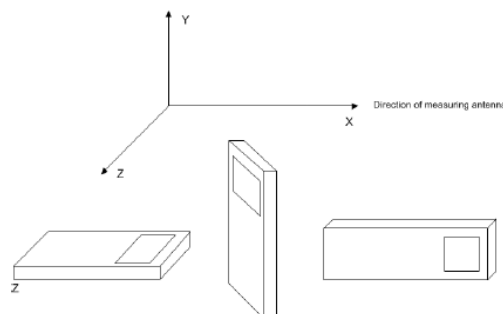
- (a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
- (b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- (c) Within the bands 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.

EUT Setup



Note: For Below 30MHz test, the Loop Antenna is set above 1.0 meter from ground to the lowest height of loop antenna. Three antenna orientations are set separately (parallel, perpendicular, and ground-parallel) unless the margin is greater than 20 dB

and the EUT set the X, Y and Z axes of orientation position



The radiated emission tests were performed in the 3-meter chamber a test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC Part Subpart C limits.

EMI Test Receiver Setup

According to FCC Rules, 47 CFR 15.33, the EUT emissions were investigated up to 1000 MHz.

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

Frequency Range	RBW	Video B/W	IF B/W	Detector
9 kHz – 150 kHz	300 Hz	1kHz	/	PK
150 kHz –30MHz	10 kHz	30 kHz	/	PK
30MHz – 1000 MHz	100 kHz	300 kHz	/	PK

Corrected Factor& Margin Calculation

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

$$\text{Corrected Factor} = \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Over Limit**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a over limit of -7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

$$\begin{aligned}\text{Over Limit} &= \text{Level} - \text{Limit} \\ \text{Level} &= \text{Reading} + \text{Corrected Factor}\end{aligned}$$

Test Data

Environmental Conditions

Temperature:	25°C
Relative Humidity:	64%
ATM Pressure:	101.0 kPa

The testing was performed by Bin Duan on 2021-11-09 for Below30MHz and Chao Mo on 2021-11-09 for Below 1GHz.

Test mode: Transmitting

1) Spurious Emissions (9 kHz~30 MHz):

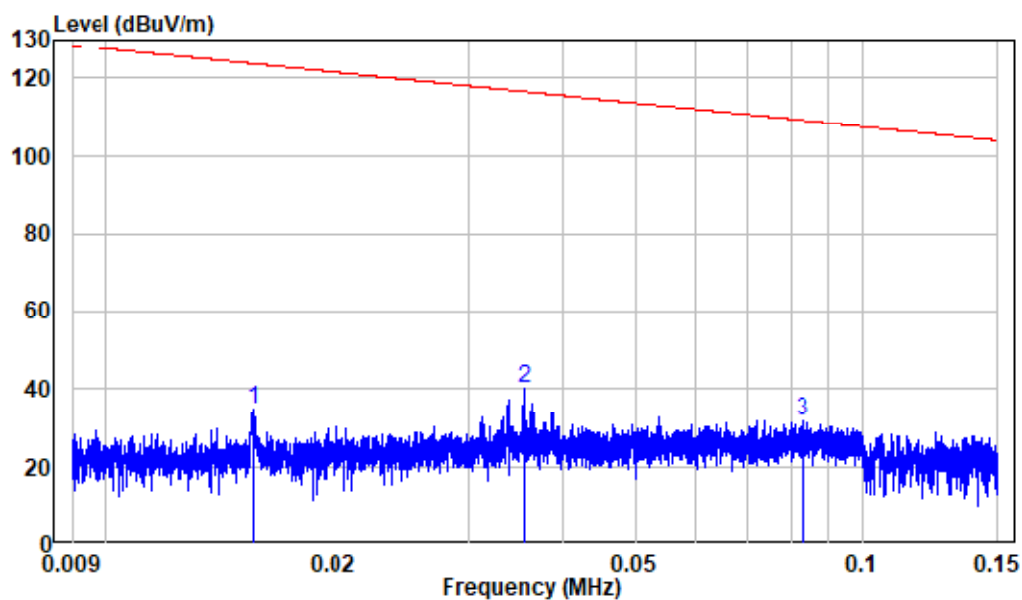
Note: (the worst case at EUT X-axis of orientation with loop antenna perpendicular was recorded)

Part 15 Section 15.31(f)(2) (9kHz-30MHz)

Limit @ 3m=Limit @ 300m-40*log(3(m)/300(m))

Limit @ 3m=Limit @ 30m-40*log(3(m)/30(m))

9 kHz~150 kHz



Site : chamber

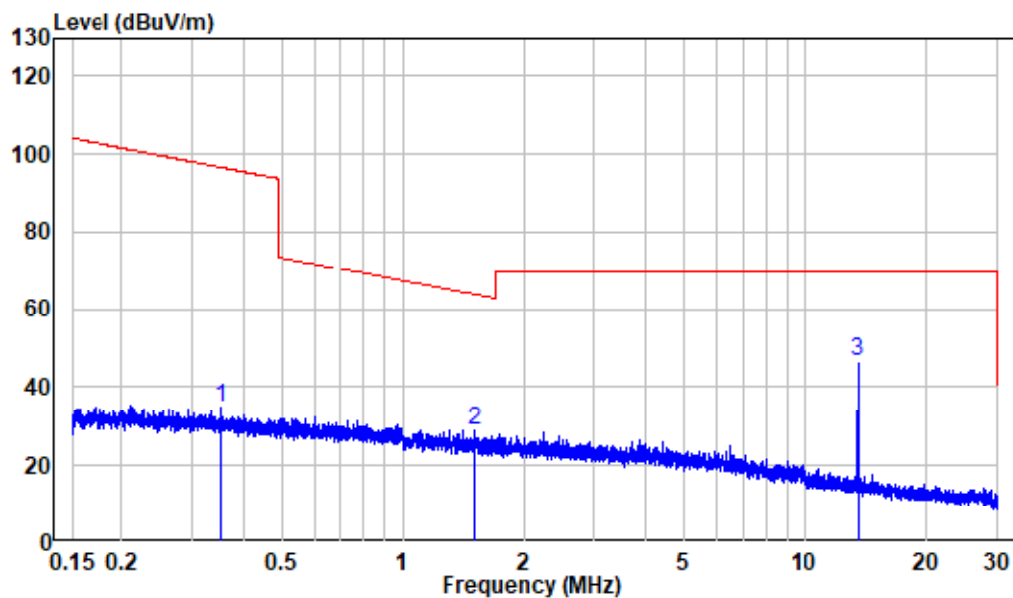
Condition: 3m

Job NO. : SZ1211009-52872E-RF

Mode : NFC

	Freq	Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.02	-14.68	49.32	34.64	123.72	-89.08	Peak
2	0.04	-14.87	55.03	40.16	116.60	-76.44	Peak
3	0.08	-14.90	46.95	32.05	109.21	-77.16	Peak

150 kHz~30 MHz



Site : chamber

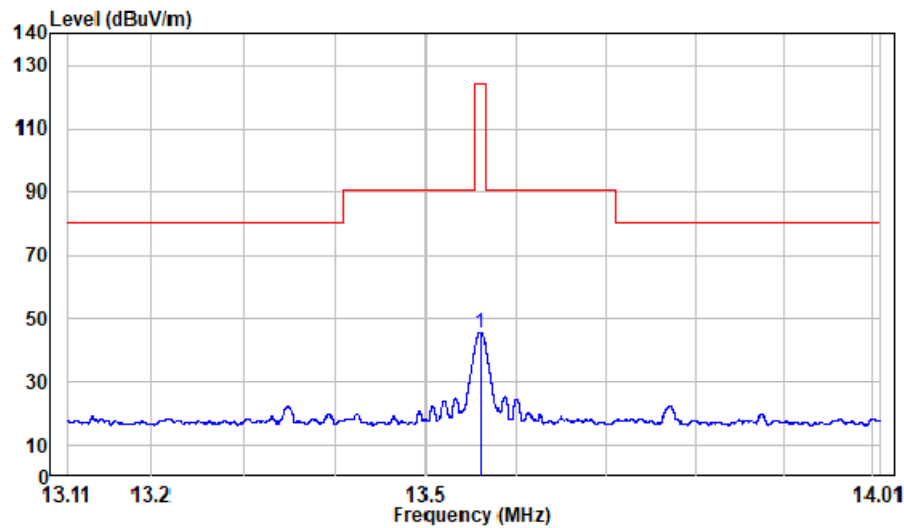
Condition: 3m

Job NO. : SZ1211009-52872E-RF

Mode : NFC

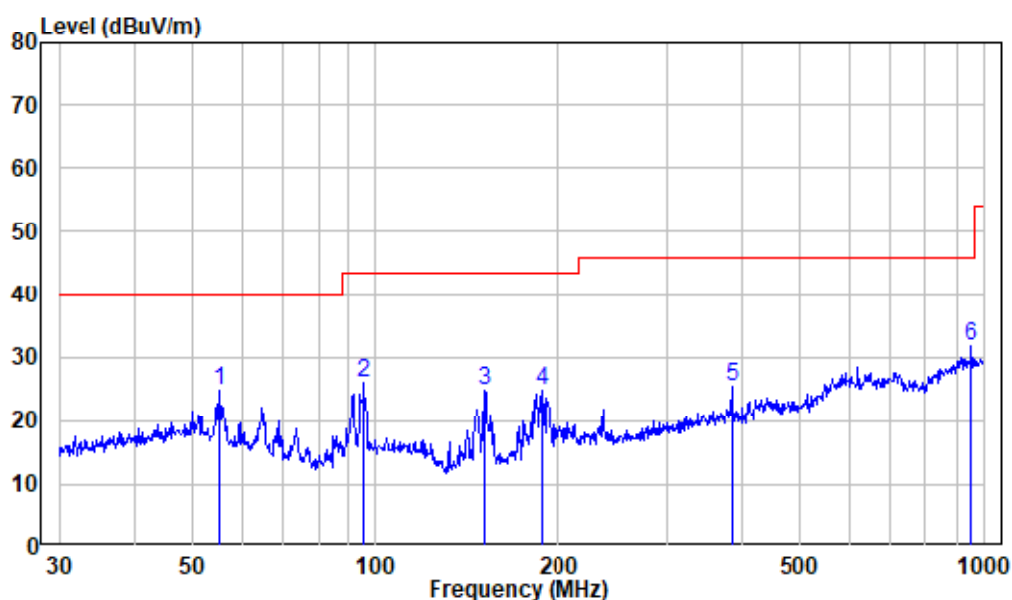
	Freq	Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.35	-14.77	49.36	34.59	96.63	-62.04	Peak
2	1.51	-14.94	43.86	28.92	63.83	-34.91	Peak
3	13.56	-15.97	62.42	46.45	69.54	-23.09	Peak

2) Emission Mask & Fundamental:



Site : chamber
Condition: 3m
Job NO. : SZ1211009-52872E-RF
Mode : NFC

	Freq	Factor	Read		Limit	Over	Remark
			Level	Level	Line	Limit	
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	13.56	-15.97	61.62	45.65	124.00	-78.35	Peak

3) Spurious Emissions (30 MHz~1GHz): *(The worst case at EUT X-axis of orientation)***Horizontal:**

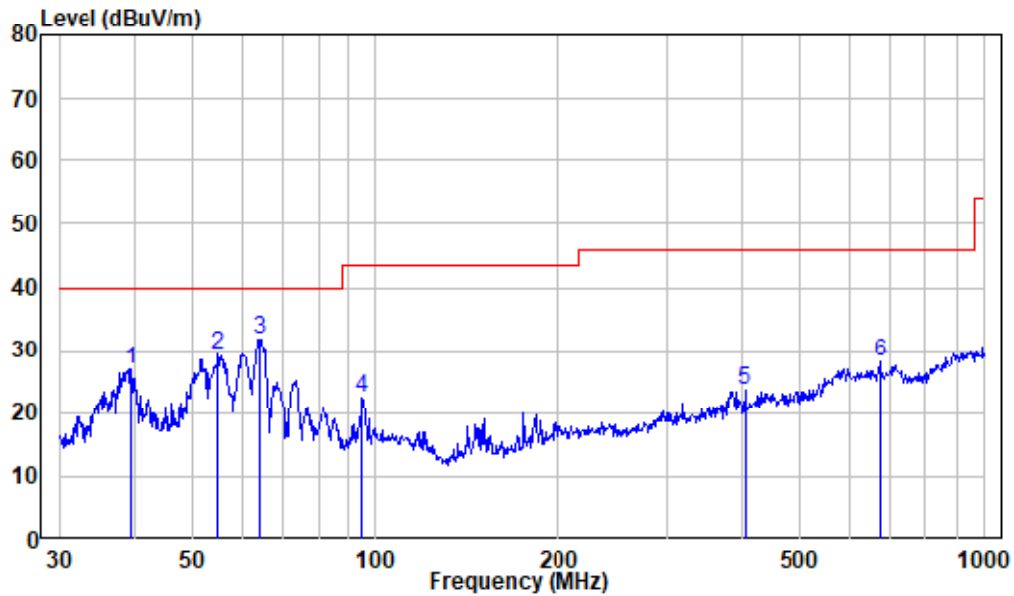
Site : chamber

Condition: 3m HORIZONTAL

Job NO. : SZ1211009-52872E-RF

Mode : NFC

	Freq Factor		Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	55.03	-18.38	43.05	24.67	40.00	-15.33	Peak
2	95.76	-20.05	46.00	25.95	43.50	-17.55	Peak
3	150.54	-21.59	46.21	24.62	43.50	-18.88	Peak
4	186.44	-20.60	45.24	24.64	43.50	-18.86	Peak
5	383.93	-15.75	41.17	25.42	46.00	-20.58	Peak
6	952.09	-8.04	39.69	31.65	46.00	-14.35	Peak

Vertical:

Site : chamber
Condition: 3m VERTICAL
Job NO. : SZ1211009-52872E-RF
Mode : NFC

	Freq	Factor	Read Level	Level	Limit	Over	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	39.58	-18.72	45.53	26.81	40.00	-13.19	Peak
2	54.83	-18.34	47.52	29.18	40.00	-10.82	Peak
3	64.21	-20.27	51.99	31.72	40.00	-8.28	Peak
4	95.09	-20.19	42.41	22.22	43.50	-21.28	Peak
5	403.25	-15.64	39.05	23.41	46.00	-22.59	Peak
6	675.21	-11.84	39.85	28.01	46.00	-17.99	Peak

FCC§15.225(e) - FREQUENCY STABILITY

Applicable Standard

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ 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.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and inductive antenna was connected to a Spectrum Analyzer. 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 DC power supplySource. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the end point. The output frequency was recorded for each voltage.

Test Data

Environmental Conditions

Temperature:	25°C
Relative Humidity:	64%
ATM Pressure:	101.0 kPa

The testing was performed by Chao Mo on 2021-10-29.

Test Mode: Transmitting

Test Result: Pass

Voltage Supply (V _{DC})	Temperature (°C)	Measured Frequency (MHz)	Frequency Error (%)	Limit (%)
3.8	-20	13.559752	-0.00183	± 0.01
	-10	13.559949	-0.00038	± 0.01
	0	13.559911	-0.00066	± 0.01
	10	13.559995	-0.00004	± 0.01
	20	13.560029	0.00021	± 0.01
	30	13.560113	0.00083	± 0.01
	40	13.560226	0.00167	± 0.01
	50	13.560316	0.00233	± 0.01
3.5	20	13.560354	0.00261	± 0.01
4.35	20	13.560397	0.00293	± 0.01

Note: the extreme voltage was declared by the applicant.

FCC§15.215(c) -20dBEMISSION BANDWIDTH**Requirement**

Per 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 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.

Test Procedure

Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.

Test Data**Environmental Conditions**

Temperature:	25°C
Relative Humidity:	64%
ATM Pressure:	101.0 kPa

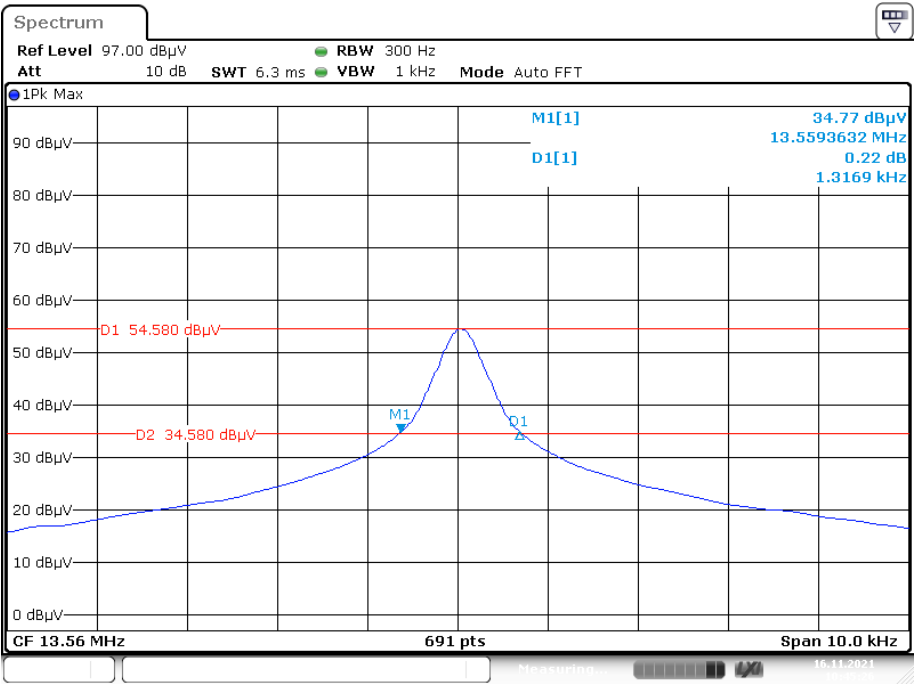
The testing was performed by Chao Mo on 2021-11-16.

Test Mode: Transmitting

Test Result: Pass

Test Frequency (MHz)	20dB Bandwidth (kHz)
13.56	1.317

20 dB Emission Bandwidth



Date: 16.NOV.2021 10:45:27

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