Test Report

Date : 2024-08-23
No. : HMD24070007

Applicant	:	Radiance Instruments Ltd. Flat 2002, 20/F, CEO Tower, 77 Wing Hong Street Lai Chi Kok, Kowloon, Hong Kong, China.
Supplier / Manufacturer	:	HUIZHOU LIHENG ELECTRONICS PLASTIC CO.LTD Da Jing Village, Si Jiao Lou, Luo Yang Town, Hui Zhou City, China
Description of Sample(s)	:	Submitted sample(s) said to be Product: RFX MEAT Brand Name: N/A Model No.: TX-5630 FCC ID: 2AI67-TX5630
Date Samples Received	:	2024-07-11
Date Tested	:	2024-07-25 to 2024-08-19
Investigation Requested	:	Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15 and ANSI C63.10:2013 for FCC Certification.
Conclusions	:	The submitted product COMPLIED with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.
Remarks	:	---
Test by:		Susu

Dr.CHAN Kwok Hung, Brian
Authorized Signatory

Test Report

CONTENT:

1.0 General Details

1.1 Test Laboratory

The Hong Kong Standards and Testing Centre Ltd.
EMC Laboratory
10 Dai Wang Street, Taipo Industrial Estate, New Territories, Hong Kong
Telephone: 852 2666 1888
Fax: 852 2664 4353

1.2 Equipment Under Test [EUT]

Description of Sample(s)

Product:	RFX MEAT
Manufacturer:	HUIZHOU LIHENG ELECTRONICS PLASTIC CO.LTD Da Jing Village, Si Jiao Lou, Luo Yang Town, Hui Zhou City, China
Brand Name:	N/A
Model Number:	TX-5630
Rating:	2.4Vd.c.(Li-ion battery *1) Charger Block:1.5Vd.c.(“AAA” battery*1)

1.2.1 Description of EUT Operation

The Equipment Under Test (EUT) is a RFX MEAT. The EUT is operating at 433.92MHz.
Test was conducted under Tx mode.

TX Frequency: 433.92MHz
RF modulation: GFSK
Antenna gain:3dBi
Antenna type: spring antenna

1.3 Date of Order

2024-07-11

1.4 Submitted Sample(s):

1 Sample

1.5 Test Duration

2024-07-25 to 2024-08-19

1.6 Country of Origin

China

2.0 Technical Details

2.1 Investigations Requested

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15 and ANSI C63.10: 2013 for FCC Certification.
This is a manually operated transmitter, Press the button to start sending signals.

2.2 Test Standards and Results Summary Tables

EMISSION
Results Summary

Test Condition	Test Requirement	Test Method	Class / Severity	Test Result		
				Pass	Failed	N/A
Field Strength of Fundamental Emissions & Spurious Emissions	FCC 47CFR 15.231(a)	ANSI C63.10: 2013	N/A	☒	☐	☐
20dB Bandwidth of Fundamental Emission	FCC 47CFR 15.231(c)	ANSI C63.10: 2013	N/A	☒	☐	☐
Radiated Emissions	FCC 47CFR 15.209	ANSI C63.10: 2013	N/A	☒	☐	☐
Manual Operated Transmitter Transmission Time	FCC 47CFR 15.231(a)	ANSI C63.10: 2013	N/A	☒	☐	☐
Antenna requirement	FCC 47CFR 15.203	N/A	N/A	☒	☐	☐

Note: N/A - Not Applicable

3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions

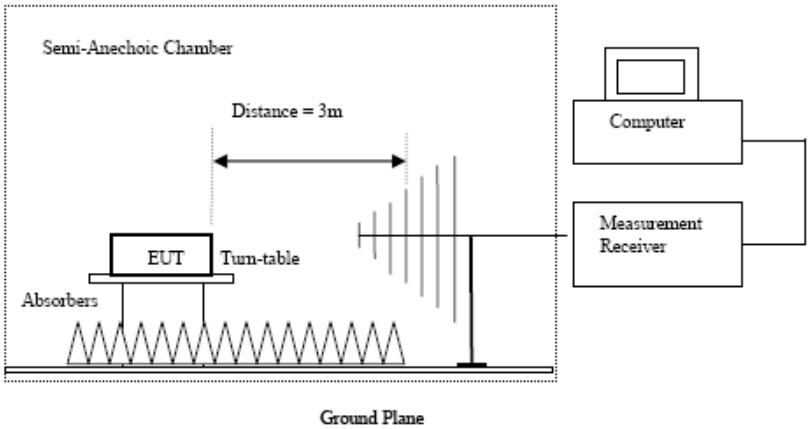
Test Requirement:	FCC 47CFR 15.231(a)	
Test Method:	ANSI C63.10:2013	
Test Date:	2024-08-12	
Mode of Operation:	Tx mode	
Ambient Temperature: 25℃	Relative Humidity: 52%	Atmospheric Pressure: 101 kPa

Test Method:

For emission measurements at or below 1 GHz, the sample was placed 0.8m above the ground plane of semi-anechoic Chamber*. For emission measurements above 1 GHz, the sample was placed 1.5m above the ground plane of semi-anechoic 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 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.

* Semi-Anechoic chamber located on the G/F of The Hong Kong Standards and Testing Centre Ltd. with Registration Number: HK0001
Test Firm Registration Number: 367672

Test Setup:



- Absorbers placed on top of the ground plane are for measurements above 1000MHz only.
- Measurements between 30MHz to 1000MHz made with Bi-log antennas, above 1000MHz horn antennas are used, 9kHz to 30MHz loop antennas are used.

Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.231a]:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [Average] [μV/m]	Field Strength of Spurious Emission [Average] [μV/m]
40.66-40.70	2,250	225
70-130	1,250	125
130-174	1,250 to 3,750 *	125 to 375 *
174-260	3,750	375
260-470	3,750 to 12,500 *	375 to 1,250 *
Above 470	12,500	1,250

[1]Linear interpolations.
The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

Results of Tx mode(1GHz – 18GHz): PASS

Field Strength of Fundamental Emissions Peak Value						
Frequency MHz	Measured Level @3m	Correction Factor dB/m	Field Strength	Field Strength μV/m	Limit @3m	E-Field Polarity
433.92	64.5	15.4	79.9	9896.9	109,966.8	Vertical
433.92	77.3	15.3	92.6	42805.5	109,966.8	Horizontal

Field Strength of Spurious Emissions Peak Value						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
867.84	17.4	22.8	40.2	102.4	10,996.7	Vertical
867.84	24.4	22.5	46.9	221.8	10,996.7	Horizontal
1301.76	11.7	26.8	38.5	84.2	5,011.87	Vertical
1301.76	11.6	26.8	38.4	83.2	5,011.87	Horizontal
1735.68	7.2	32.9	40.1	101.2	10,996.7	Vertical
1735.68	6.9	32.7	39.6	95.5	10,996.7	Horizontal
2169.60	2.0	38.2	40.2	102.3	10,996.7	Vertical
2169.60	2.1	38.1	40.2	102.3	10,996.7	Horizontal

Results of Tx mode(1GHz – 18GHz): PASS

Field Strength of Fundamental Emissions Average Value						
Frequency MHz	Peak Value Level @3m dBμV	Duty Cycle Factor dB/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
433.92	79.9	-15.7	64.2	1623.7	10,996.7	Vertical
433.92	92.6	-15.7	76.9	7022.6	10,996.7	Horizontal

Field Strength of Spurious Emissions Average Value						
Frequency MHz	Peak Value Level @3m dBμV	Duty Cycle Factor dB/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
867.84	40.2	-15.7	24.5	16.8	1,099.7	Vertical
867.84	46.9	-15.7	31.2	36.3	1,099.7	Horizontal
1301.76	38.5	-15.7	22.8	13.8	501.190	Vertical
1301.76	38.4	-15.7	22.7	13.6	501.190	Horizontal
1735.68	40.1	-15.7	24.4	16.6	1,099.7	Vertical
1735.68	39.6	-15.7	23.9	15.7	1,099.7	Horizontal
2169.60	40.2	-15.7	24.5	16.8	1,099.7	Vertical
2169.60	40.2	-15.7	24.5	16.8	1,099.7	Horizontal

Remarks:

FCC Limit for Fundamental Average Measurement: Linear interpolations

+: Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 were not adjusted for averaging and the limits of FCC Rules Part 15 Section 15.209 were applied.

*: Adjusted by Duty Cycle = -20.0dB
Duty Cycle Correction = -20.0dB
Correction Factor= Cable loss Factor+ Ant Factor-Amp Factor
Average Value Final Field Strengted = Peak Value Final Field Strengted +Duty Cycle

Correction Factor includes Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty (9kHz-30MHz): 2.0dB
(30MHz -1GHz): 4.9dB
(1GHz -6GHz): 4.02dB
(6GHz -26.5GHz): 4.03dB

Emissions in the vertical and horizontal polarizations have been investigated and the worst-case test results are recorded in this report.

Limits for Radiated Emissions FCC 47 CFR 15.209 Class B]:

Frequency Range	Quasi-Peak Limits
[MHz]	[μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Remarks:

Correction Factor includes Antenna Factor and Cable Attenuation.

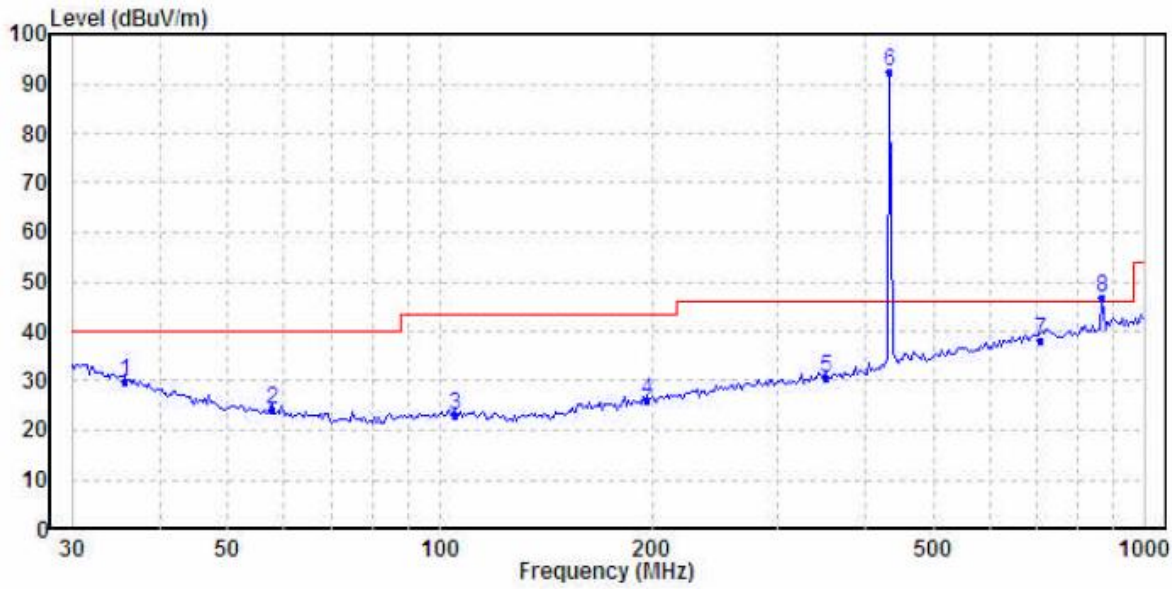
Calculated measurement uncertainty: (9kHz-30MHz): 2.0dB
(30MHz -1GHz): 4.9dB
(1GHz -6GHz): 4.02dB
(6GHz -26.5GHz): 4.03dB

Emissions in the vertical and horizontal polarizations have been investigated and the worst-case test results are recorded in this report.

Result of Tx mode (9kHz - 30MHz): PASS

Emissions detected are more than 20 dB below the limit line(s).

Results of Tx mode (30MHz – 1GHz): PASS
Horizontal

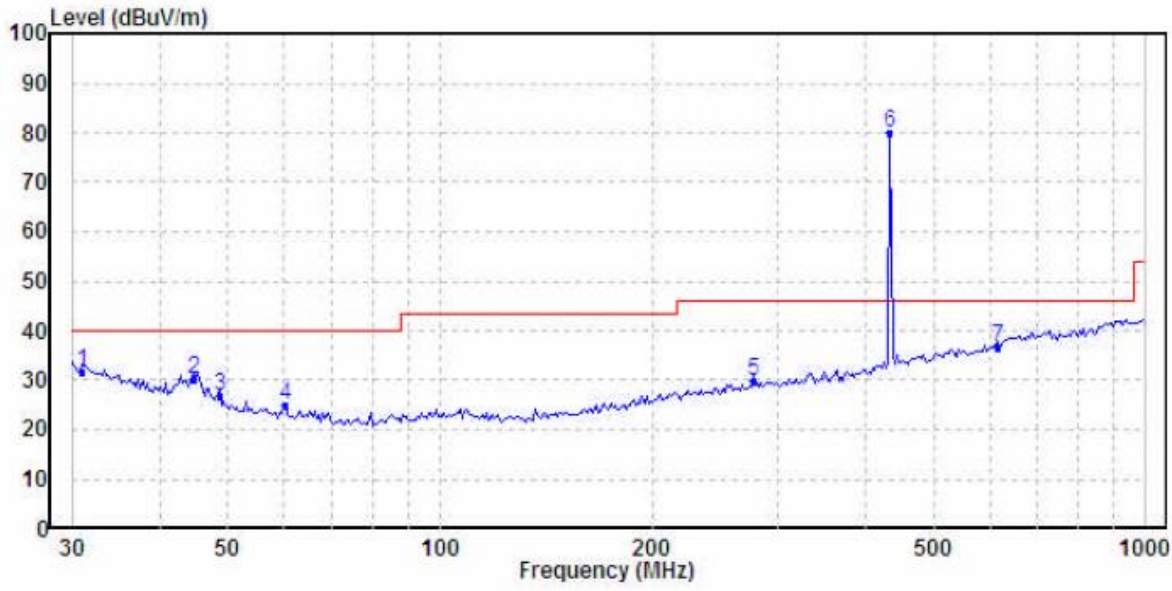


Ambient Temperature: 26.3C
Relative Humidity : 54.7%
Air Pressure : 100.9kPa

	Freq	Level	Limit Line	Over Limit	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB		
1	35.749	29.74	40.00	-10.26	QP	Horizontal
2	57.594	24.10	40.00	-15.90	QP	Horizontal
3	104.536	22.89	43.50	-20.61	QP	Horizontal
4	196.510	25.96	43.50	-17.54	QP	Horizontal
5	351.708	30.38	46.00	-15.62	QP	Horizontal
6	433.920	92.63				
7	709.182	38.09	46.00	-7.91	QP	Horizontal
8	867.840	46.92				

*: Frequency 434.92MHz is the fundamental.

Vertical



Ambient Temperature: 26.3C
Relative Humidity : 54.7%
Air Pressure : 100.9kPa

	Freq	Level	Limit Line	Over Limit	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB		
1	31.071	31.89	40.00	-8.11	QP	Vertical
2	44.743	30.14	40.00	-9.86	QP	Vertical
3	48.672	26.86	40.00	-13.14	QP	Vertical
4	60.069	25.08	40.00	-14.92	QP	Vertical
5	277.094	29.64	46.00	-16.36	QP	Vertical
6	433.920	79.91				
7	616.372	36.43	46.00	-9.57	QP	Vertical

*: Frequency 434.92MHz is the fundamental.

3.1.2 Antenna Requirement

Ambient Temperature: 25℃ Relative Humidity: 51% Atmospheric Pressure: 101 kPa

Test Requirements: § 15.203

Test Specification:

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 use of a standard antenna jack or electrical connector is prohibited.

Test Results:

This is integral antenna. There is no external antenna, the antenna gain = 3dBi. User is unable to remove or changed the Antenna.

3.2 20dB Bandwidth of Fundamental Emission

Test Requirement:	FCC 47 CFR 15.231(c)
Test Method:	ANSI C63.10:2013
Test Date:	2024-08-19
Mode of Operation:	Tx mode

Ambient Temperature: 25℃ Relative Humidity: 52% Atmospheric Pressure: 101 kPa

Test Method:

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

Test Setup:

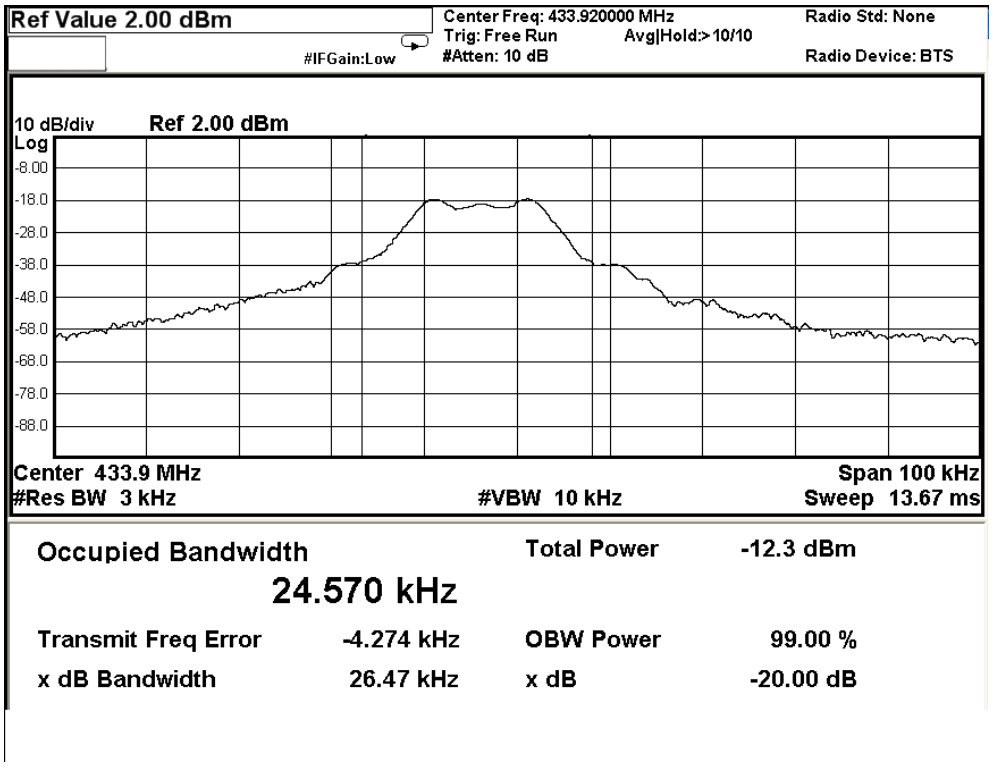
As Test Setup of clause 3.1.1 in this test report.

Limits for 20 dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [kHz]	FCC Limits * [MHz]
433.92	26.47	1.0848

*: FCC Limit for Bandwidth measurement = (0.25%)(Center Frequency)
= (0.0025)(433.92)
= 1.0848MHz

20dB Bandwidth of Fundamental Emission



Appendix A

List of Measurement Equipment

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM215	MULTIDEVICE CONTROLLER	EMCO	2090	00024676	N/A	N/A
EM217	ELECTRIC POWERED TURNTABLE	EMCO	2088	00029144	N/A	N/A
EM218	ANECHOIC CHAMBER	ETS-LINDGREN	FACT-3	--	2024-04-18	2029-04-18
EM356	ANTENNA POSITIONING TOWER	ETS-LINDGREN	2171B	00150346	N/A	N/A
EM293	SPECTRUM ANALYZER	AGILENT TECHNOLOGIES	N9020A	MY50510152	2023-03-21	2025-03-21
EM299	BROADBAND HORN ANTENNA	ETS-LINDGREN	3115	00114120	2023-01-25	2025-01-25
EM300	PYRAMIDAL STANDARD GAIN HORN ANTENNA	ETS-LINDGREN	3160-09	00130130	2023-01-16	2025-01-16
EM301	PYRAMIDAL STANDARD GAIN HORN ANTENNA	ETS-LINDGREN	3160-10	00130988	2023-02-15	2025-02-15
EM353	LOOP ANTENNA	ETS_LINDGREN	6502	00206533	2022-09-26	2025-09-26
EM355	BICONILOG ANTENNA	ETS-LINDGREN	3143B	00094856	2022-08-26	2025-08-26
EM200	DUAL CHANNEL POWER METER	R & S	NRVD	100592	2023-08-02	2025-08-02
EM012	PRE-AMPLIFIER	HP	HP8448B	3008A00262	2022-11-08	2025-11-08

Remarks:-

CM Corrective Maintenance
N/A Not Applicable
TBD To Be Determined

Appendix B

Duty Cycle Correction During 100msec

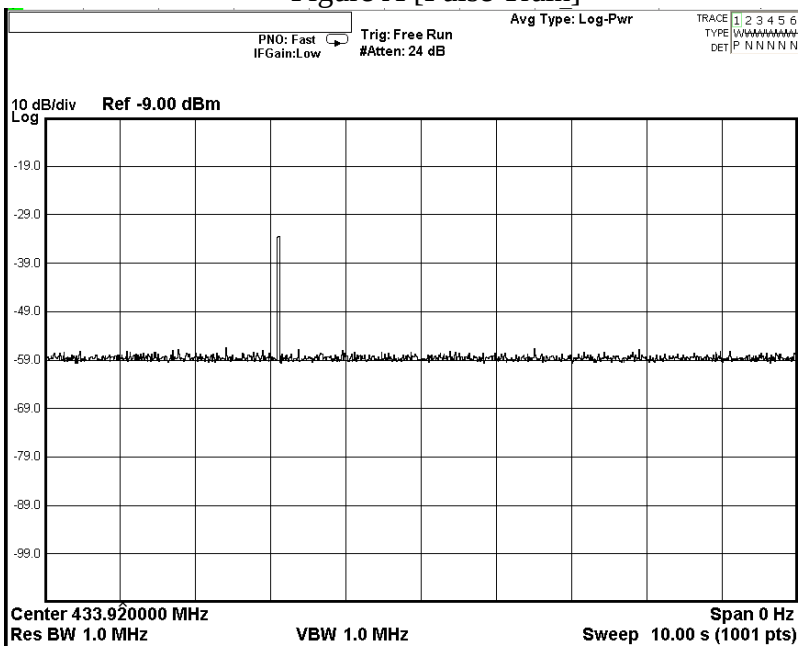
Each packet period (100msec) never exceeds a series of 1 (1*16.4ms) pulses. Assuming any combination of pulses may be obtained due to encoding the worst case transmit duty cycle would be considered
(16.4 ms) per 100msec =16.4% duty cycle.

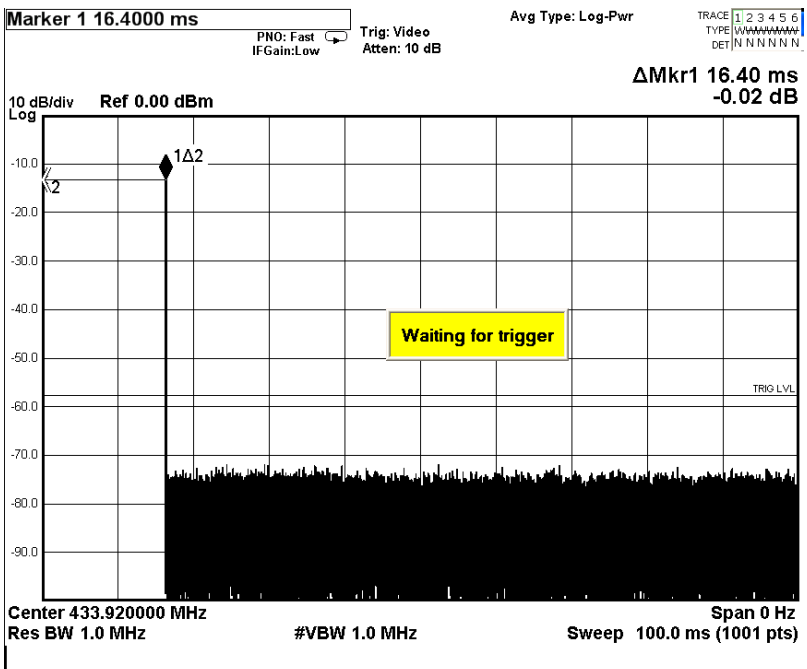
Remarks:

Duty cycle factor = 20Log [16.4/100]= -15.7dB

The following figures [Figure A to Figure B] showed the characteristics of the pulse train for one of these functions.

Figure A [Pulse Train]



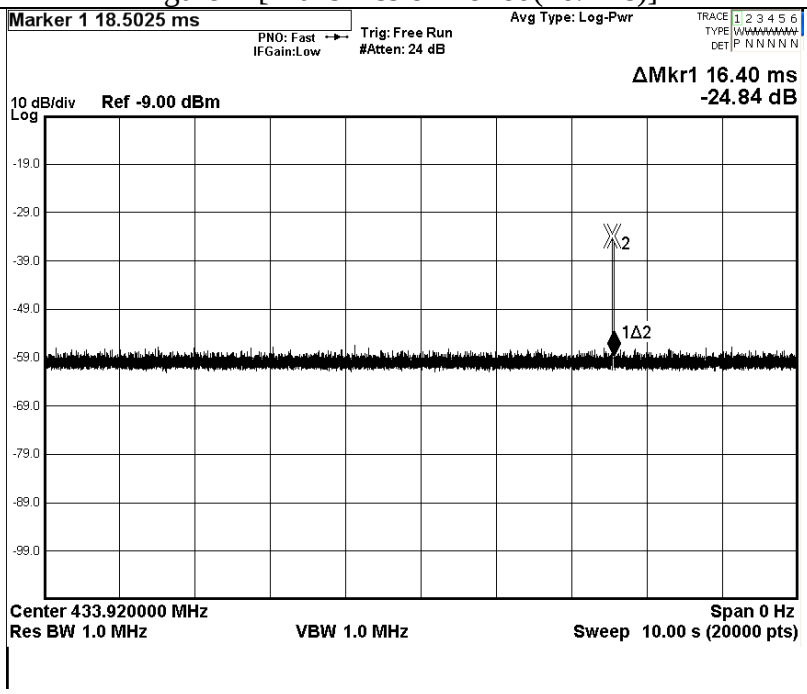


Appendix C

Manually Operated Transmitter Transmission Time [FCC 47CFR 15.231(a)]

According to FCC 47CFR15.231 (a). A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
The EUT ceases transmission almost immediately upon being released and appears to finish the current packet being transmitted. Therefore the longest period of time the transmitter should take to deactivate is a packet length.

Figure B [Transmission Period(16.4ms)]

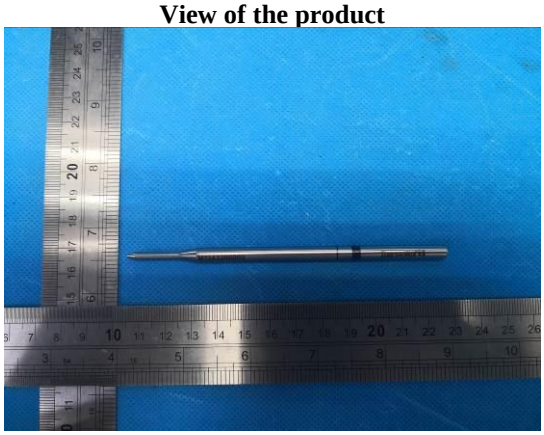


Appendix D
Photographs of EUT

Front View of the product

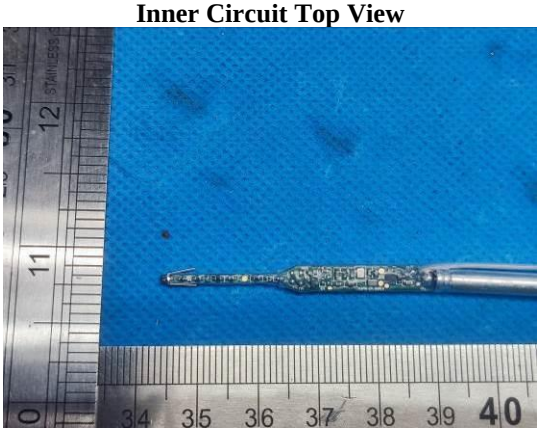
Rear View of the product

View of the product

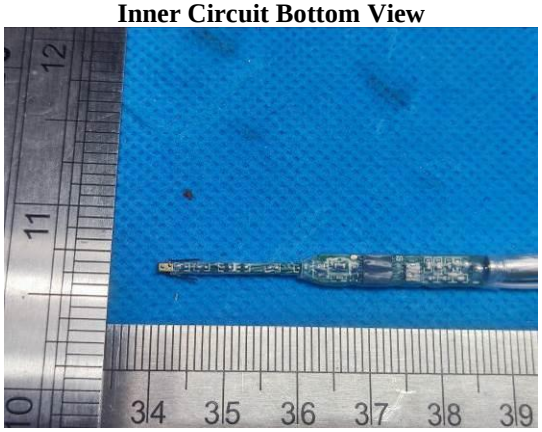


Inner Circuit Bottom View

Inner Circuit Top View

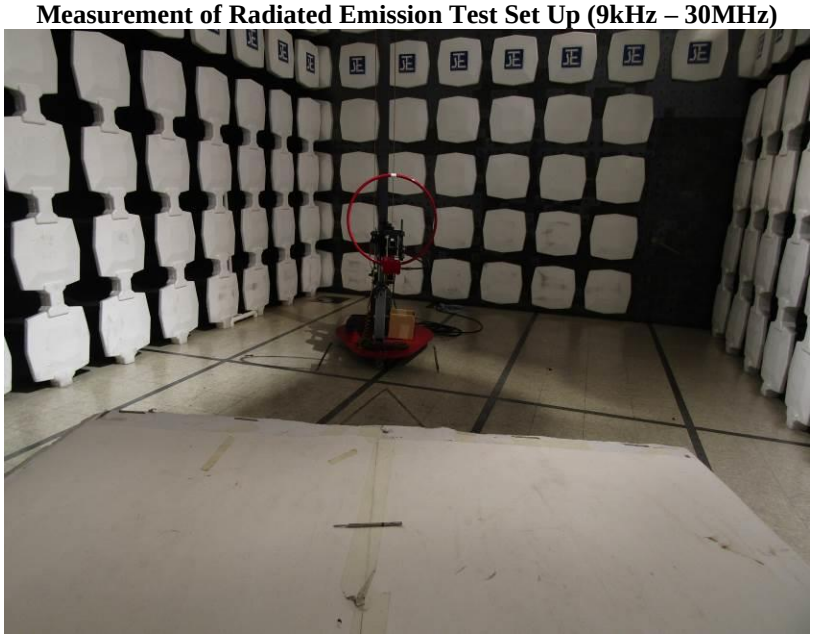


Inner Circuit Bottom View

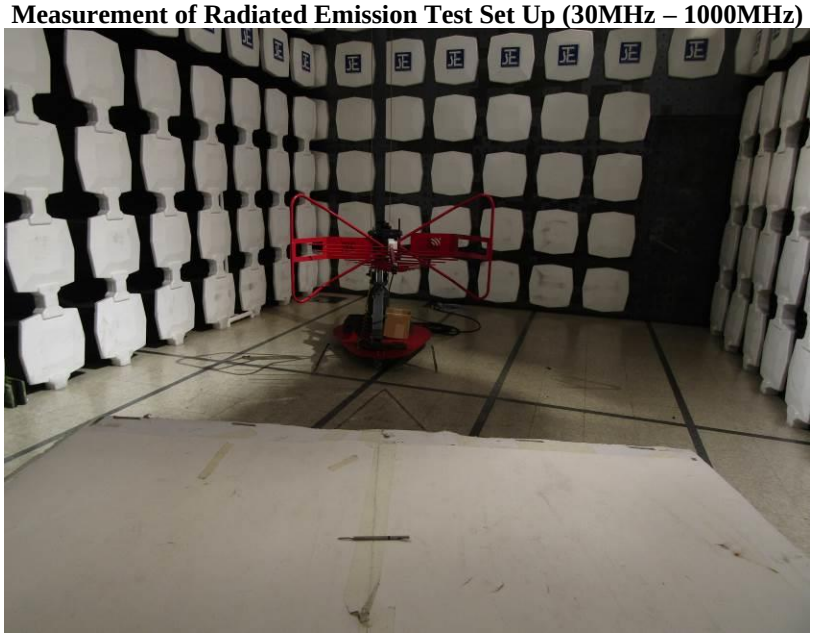


Photographs of EUT

Measurement of Radiated Emission Test Set Up (9kHz – 30MHz)

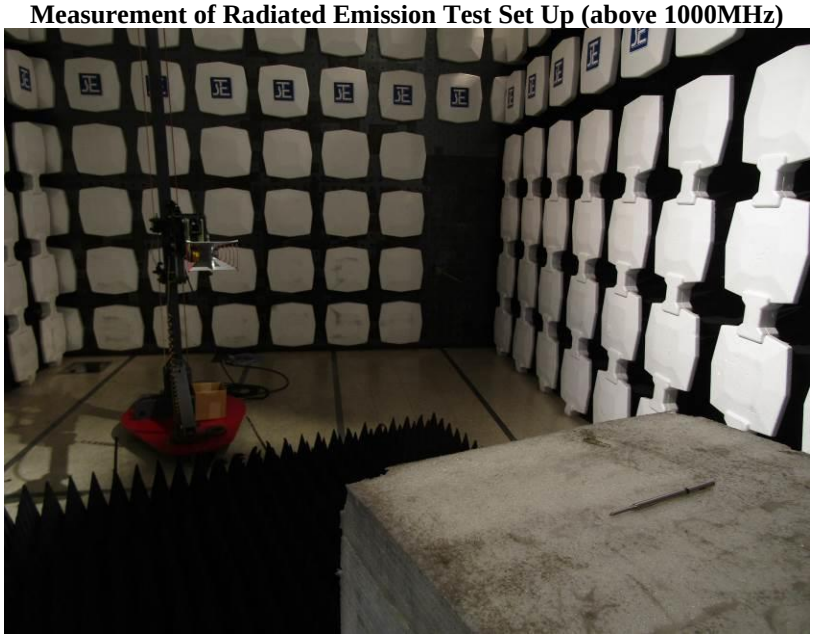


Measurement of Radiated Emission Test Set Up (30MHz – 1000MHz)



Photographs of EUT

Measurement of Radiated Emission Test Set Up (above 1000MHz)



******* End of Test Report *******

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4. The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

5. The results in Report apply only to the sample as received and do not apply to the bulk, unless the sampling has been carried out by the Company and is stated as such in the Report.

6. When a statement of conformity to a specification or standard is provided, the ILAC-G8 Guidance document (and/or IEC Guide 115 in the electrotechnical sector) will be adopted as a decision rule for the determination of conformity unless it is inherent in the requested specification or standard, or otherwise specified in the Report.

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8. Sample submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

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10. Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

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