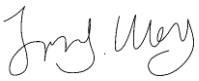
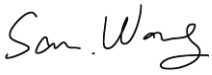
Shenzhen GUOREN Certification Technology Service Co., Ltd.

101#, Building K & Building T, The Second Industrial Zone, Jiazitang Community, Fenghuang Street, Guangming District, Shenzhen, China

FCC PART 15 SUBPART C TEST REPORT

FCC PART 15.249

Report Reference No......:	**GRCTR211002002-02**	
FCC ID..... **:**	**HLEMS838BG**	
Compiled by (position+printed name+signature)..:	File administrators Jimmy Wang	
Supervised by (position+printed name+signature)..:	Test Engineer Kelley Zhang	
Approved by (position+printed name+signature)..:	Manager Sam Wang	
Date of issue.....:	Oct. 29, 2021	
Testing Laboratory Name .....:	**Shenzhen GUOREN Certification Technology Service Co., Ltd.**	
Address .....:	101#, Building K & Building T, The Second Industrial Zone, Jiazitang Community, Fenghuang Street, Guangming District, Shenzhen, China	
Applicant's name.....:	**unitech electronics co., ltd.**	
Address .....:	5F, No. 136, Lane 235, Pao-Chiao Rd., Hsin-Tien Dist., New Taipei City, Taiwan	
Test specification .....**:**		
Standard .....:	**FCC Part 15.249: Operation within the bands 902-928 MHz, 2400-2483.5 MHz ,5725-5850 MHz, and 24.0-24.25 GHz**	

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Test item description .....:	**2.4G Wireless 2D Barcode Scanner**
Trade Mark .....:	unitech
Manufacturer .....:	unitech electronics co., ltd.
Model/Type reference.....:	MS838B
Listed Models .....:	N/A
Modulation Type .....:	GFSK
Operation Frequency.....:	2478MHz
Software Version .....:	V1.0
Rating .....:	DC 3.70V from battery and DC 5V from external circuit
Result.....:	**PASS**

TEST REPORT

Equipment under Test	:	2.4G Wireless 2D Barcode Scanner
Model /Type	:	MS838B
Listed Models	:	N/A
Applicant	:	**unitech electronics co., ltd.**
Address	:	5F, No. 136, Lane 235, Pao-Chiao Rd., Hsin-Tien Dist., New Taipei City, Taiwan
Manufacturer	:	**unitech electronics co., ltd.**
Address	:	5F, No. 136, Lane 235, Pao-Chiao Rd., Hsin-Tien Dist., New Taipei City, Taiwan

Test Result:	**PASS**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1. TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.249: Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz, 5725 - 5875 MHz, and 24.0 - 24.25 GHz.
ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	Oct. 11, 2021
Testing commenced on	:	Oct. 11, 2021
Testing concluded on	:	Oct. 29, 2021

2.2. Product Description

Product Description:	2.4G Wireless 2D Barcode Scanner
Model/Type reference:	MS838B
Listed Models:	N/A
Power supply:	DC 3.70V from battery and DC 5V from external circuit
Adapter:	Model: EP-TA20CBC Input:AC 100-240V 50/60Hz Output:DC 5V 2A
Testing sample ID:	GRCTR211002002-1# (Engineer sample), GRCTR211002002-2# (Normal sample)
Firmware Version:	V1.0
Hardware Version:	V1.0
Modulation:	GFSK
Operation frequency:	2478MHz
Channel number:	1
Antenna type:	Internal antenna
Antenna gain*（Supplied by the customer）:	0.00 dBi
Remark:*When the information provided by the customer was used to calculate test results, if the information provided by the customer is not accurate, shenzhen GUOREN Certification Technology Service Co., Ltd. does not assume any responsibility.	

2.3. Short description of the Equipment under Test (EUT)

This is a 2.4G Wireless 2D Barcode Scanner.

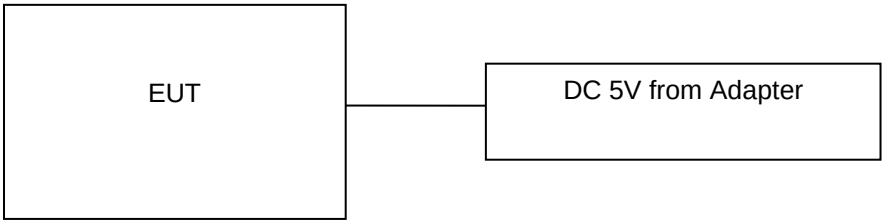
For more details, refer to the user's manual of the EUT.

2.4. EUT operation mode

There are 1 channels provided to the EUT. Channel 1 was selected to test.

Channel	Frequency(MHz)
1	**2478**

2.5. Block Diagram of Test Setup



2.6. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for the device filing to comply with Section 15.249 of the FCC Part 15, Subpart C Rules.

2.7. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - Supplied by the lab

○	/	M/N:	/
		Manufacturer:	/

2.8. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen GUOREN Certification Technology Service Co., Ltd.
101#, Building K & Building T, The Second Industrial Zone, Jiazitang Community, Fenghuang Street, Guangming District, Shenzhen, China

3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 920798 Designation Number: CN1304

Shenzhen GUOREN Certification Technology Service Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA-Lab Cert. No.: 6202.01

Shenzhen GUOREN Certification Technology Service Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

ISED#: 27264 CAB identifier: CN0115
Shenzhen GUOREN Certification Technology Service Co., Ltd. has been listed by Innovation, Science and Economic Development Canada to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Radiated Emission:

Temperature:	23 ° C
Humidity:	47 %
Atmospheric pressure:	950-1050mbar

AC Main Conducted testing：

Temperature:	24 ° C
Humidity:	49%
Atmospheric pressure:	950-1050mbar

Conducted testing：

Temperature:	24 ° C
Humidity:	48 %
Atmospheric pressure:	950-1050mbar

3.4. Test Description

FCC PART 15.249		
FCC Part 15.249(a)	Field Strength of Fundamental	PASS
FCC Part 15.249 (a) (d)/15.209	Spurious Emission	PASS
FCC Part 15.249 (d)/15.205	Band edge	PASS
FCC Part 15.215(c)	Occupied bandwidth	PASS
FCC Part 15.207	Conducted Emission	PASS
FCC Part 15.203	Antenna Requirement	PASS

Remark:
1. The measurement uncertainty is not included in the test result.
2. N/A = Not Applicable; N/P = Not Performed

3.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the Shenzhen GUOREN Certification Technology Service Co., Ltd.quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen GUOREN Certification Technology Service Co., Ltd.:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.06 dB	(1)
Radiated Emission	1~18GHz	5.14 dB	(1)
Radiated Emission	18-40GHz	5.38 dB	(1)
Conducted Disturbance	0.15~30MHz	2.14 dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.6. Equipments Used during the Test

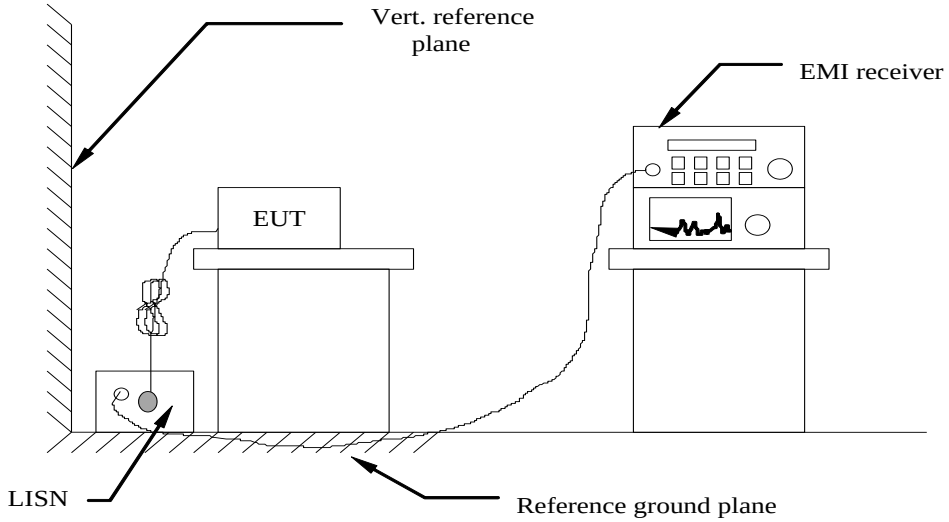
Test Equipment	Manufacturer	Model No.	Equipment No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	GRCTEE009	2020/11/3	2021/11/2
LISN	R&S	ENV216	GRCTEE010	2020/11/3	2021/11/2
EMI Test Receiver	R&S	ESPI	GRCTEE017	2020/11/3	2021/11/2
EMI Test Receiver	R&S	ESCI	GRCTEE008	2020/11/3	2021/11/2
Spectrum Analyzer	Agilent	N9020A	GRCTEE002	2020/11/3	2021/11/2
Spectrum Analyzer	R&S	FSP	GRCTEE003	2020/11/19	2021/11/18
Vector Signal generator	Agilent	N5181A	GRCTEE007	2020/11/3	2021/11/2
Analog Signal Generator	R&S	SML03	GRCTEE006	2020/11/3	2021/11/2
Universal Radio Communication	CMW500	R&S	GRCTEE001	2020/11/3	2021/11/2
Climate Chamber	QIYA	LCD-9530	GRCTES016	2020/11/1	2021/10/31
Ultra-Broadband Antenna	Schwarzbeck	VULB9163	GRCTEE018	2020/10/25	2023/10/24
Horn Antenna	Schwarzbeck	BBHA 9120D	GRCTEE019	2020/10/25	2023/10/24
Loop Antenna	Zhinan	ZN30900C	GRCTEE020	2020/10/25	2023/10/24
Horn Antenna	Beijing Hangwei Dayang	OBH100400	GRCTEE049	2021/1/18	2024/1/17
Amplifier	Schwarzbeck	BBV 9745	GRCTEE021	2021/1/18	2022/1/17
Amplifier	Taiwan chengyi	EMC051845B	GRCTEE022	2020/11/19	2021/11/18
Temperature/Humidity Meter	Huaguan	HG-308	GRCTES037	2020/11/1	2021/10/31
Directional coupler	NARDA	4226-10	GRCTEE004	2020/11/3	2021/11/2
High-Pass Filter	XingBo	XBLBQ-GTA18	GRCTEE053	2020/11/3	2021/11/2
High-Pass Filter	XingBo	XBLBQ-GTA27	GRCTEE054	2020/11/3	2021/11/2
Automated filter bank	Tonscend	JS0806-F	GRCTEE055	2020/11/3	2021/11/2
EMI Test Software	ROHDE & SCHWARZ	ESK1-V1.71	GRCTEE060	N/A	N/A
EMI Test Software	Fera	EZ-EMC	GRCTEE061	N/A	N/A
Power Sensor	Agilent	U2021XA	GRCTEE070	2020/11/3	2021/11/2

Note: The Cal.Interval was one year.

4. TEST CONDITIONS AND RESULTS

4.1. AC Power Conducted Emission

TEST CONFIGURATION



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 C63.10-2013.
2 Support equipment, if needed, was placed as per ANSI C63.10-2013.
3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013.
4 The EUT received power from adapter, the adapter received AC120V/60Hz and AC 240V/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.
8 During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

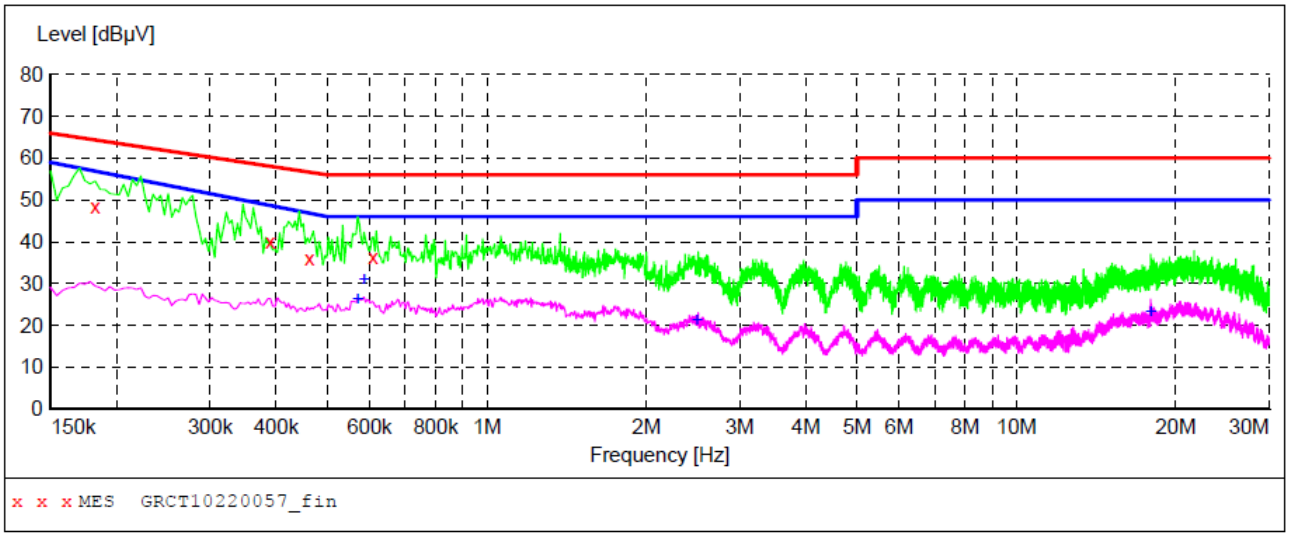
For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following：

Frequency range (MHz)	Limit (dBuV)	
	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.		

TEST RESULTS

Remark:
1. Both 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz power supply have been tested, only the worst result of 120 VAC, 60 Hz was reported as below:

Power supply:	DC 5V from Adapter AC 120V/60Hz	Polarization	L



MEASUREMENT RESULT: "GRCT10220057_fin"

10/22/2021 7:14PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.182000	48.40	10.3	64	16.0	QP	L1	GND
0.390000	40.00	10.3	58	18.1	QP	L1	GND
0.462000	36.00	10.3	57	20.7	QP	L1	GND
0.610000	36.40	10.3	56	19.6	QP	L1	GND

MEASUREMENT RESULT: "GRCT10220057_fin2"

10/22/2021 7:14PM

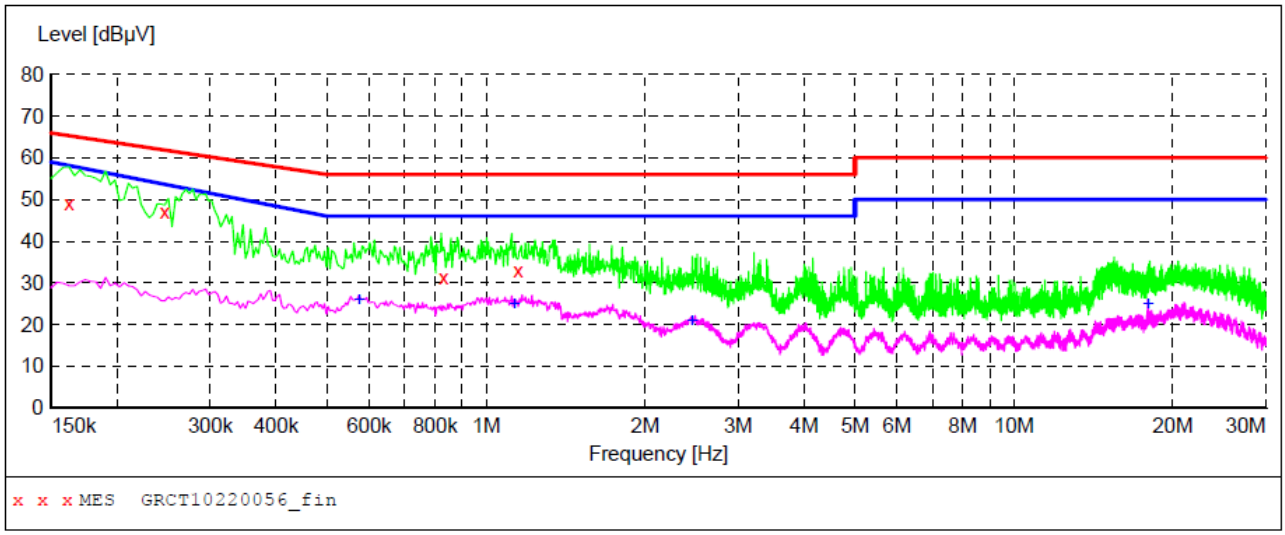
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.570000	26.30	10.3	46	19.7	AV	L1	GND
0.586000	30.90	10.3	46	15.1	AV	L1	GND
2.490000	21.40	10.5	46	24.6	AV	L1	GND
17.902000	23.40	10.9	50	26.6	AV	L1	GND

Note:1).Level (dBµV)= Reading (dBµV)+ Transducer (dB)

2). Transducer (dB)=insertion loss of LISN (dB) + Cable loss (dB)

3). Margin(dB) = Limit (dBµV) - Level (dBµV)

Power supply:	DC 5V from Adapter AC 120V/60Hz	Polarization	N



MEASUREMENT RESULT: "GRCT10220056_fin"

10/22/2021 7:10PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.162000	49.10	10.3	65	16.3	QP	N	GND
0.246000	47.10	10.3	62	14.8	QP	N	GND
0.830000	31.40	10.3	56	24.6	QP	N	GND
1.150000	32.90	10.4	56	23.1	QP	N	GND

MEASUREMENT RESULT: "GRCT10220056_fin2"

10/22/2021 7:10PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.574000	26.00	10.3	46	20.0	AV	N	GND
1.130000	24.90	10.4	46	21.1	AV	N	GND
2.454000	21.00	10.5	46	25.0	AV	N	GND
17.946000	24.80	10.9	50	25.2	AV	N	GND

Note:1).Level (dBµV)= Reading (dBµV)+ Transducer (dB)

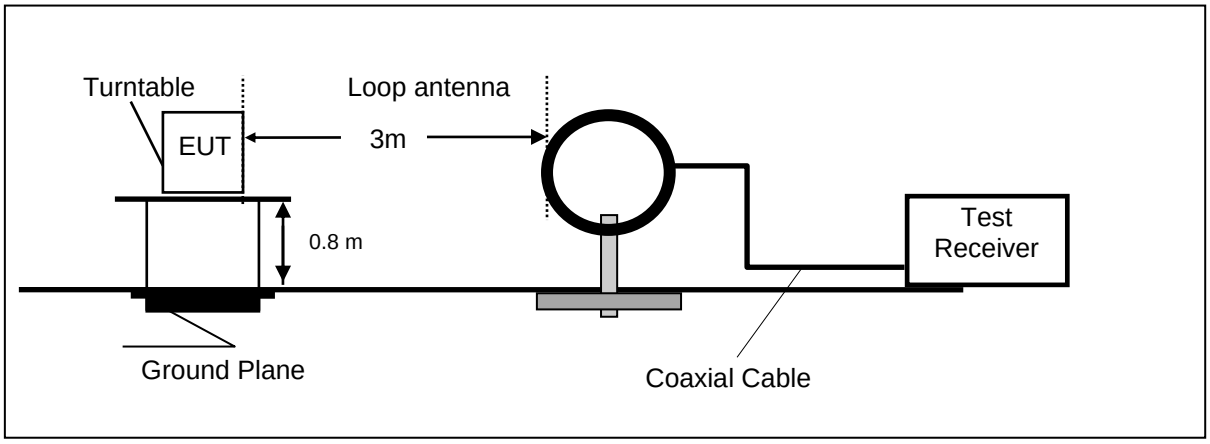
2). Transducer (dB)=insertion loss of LISN (dB) + Cable loss (dB)

3). Margin(dB) = Limit (dBµV) - Level (dBµV)

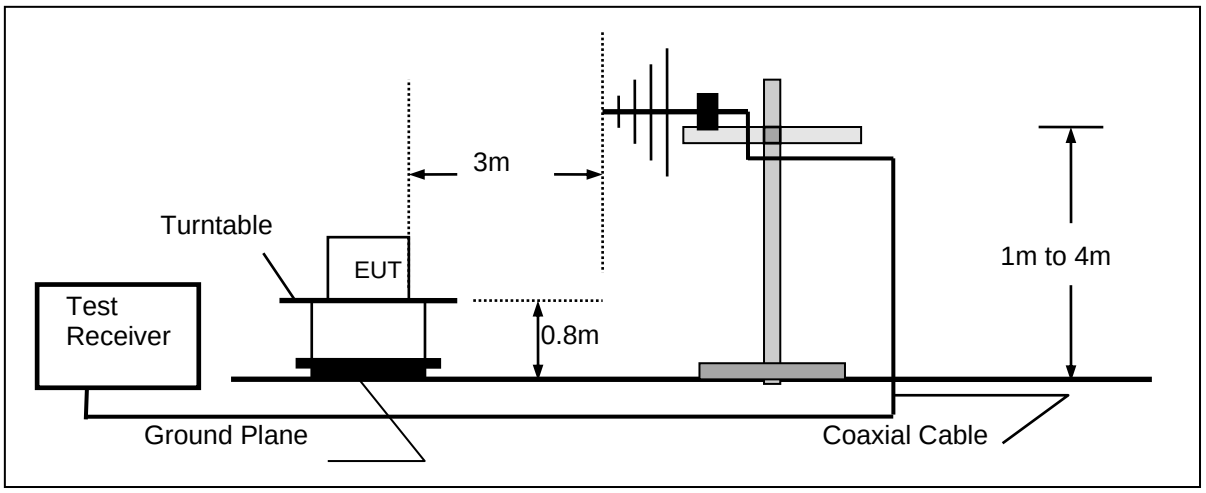
4.2. Radiated Emissions and Band Edge

TEST CONFIGURATION

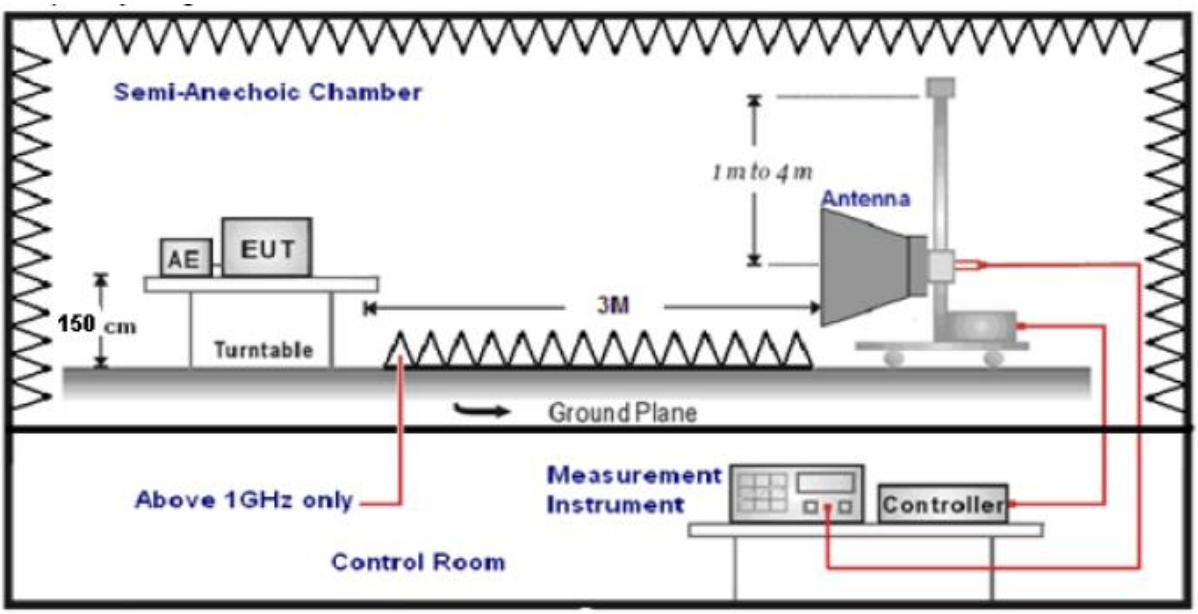
Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



TEST PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane when testing frequency range 9 KHz –1GHz; the EUT was placed on a turn table which is 1.5m above ground plane when testing frequency range 1GHz – 25GHz.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Ultra-Broadband Antenna	3
1GHz-18GHz	Double Ridged Horn Antenna	3
18GHz-25GHz	Horn Anternna	1

6. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz,Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz,Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz,Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

Transd=AF +CL-AG

LIMIT

According 15.249, the field strength of emissions from intentional radiators operated within 2400MHz-2483.5 MHz shall not exceed 94dBμV/m (50mV/m):

FCC PART 15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.
In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	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

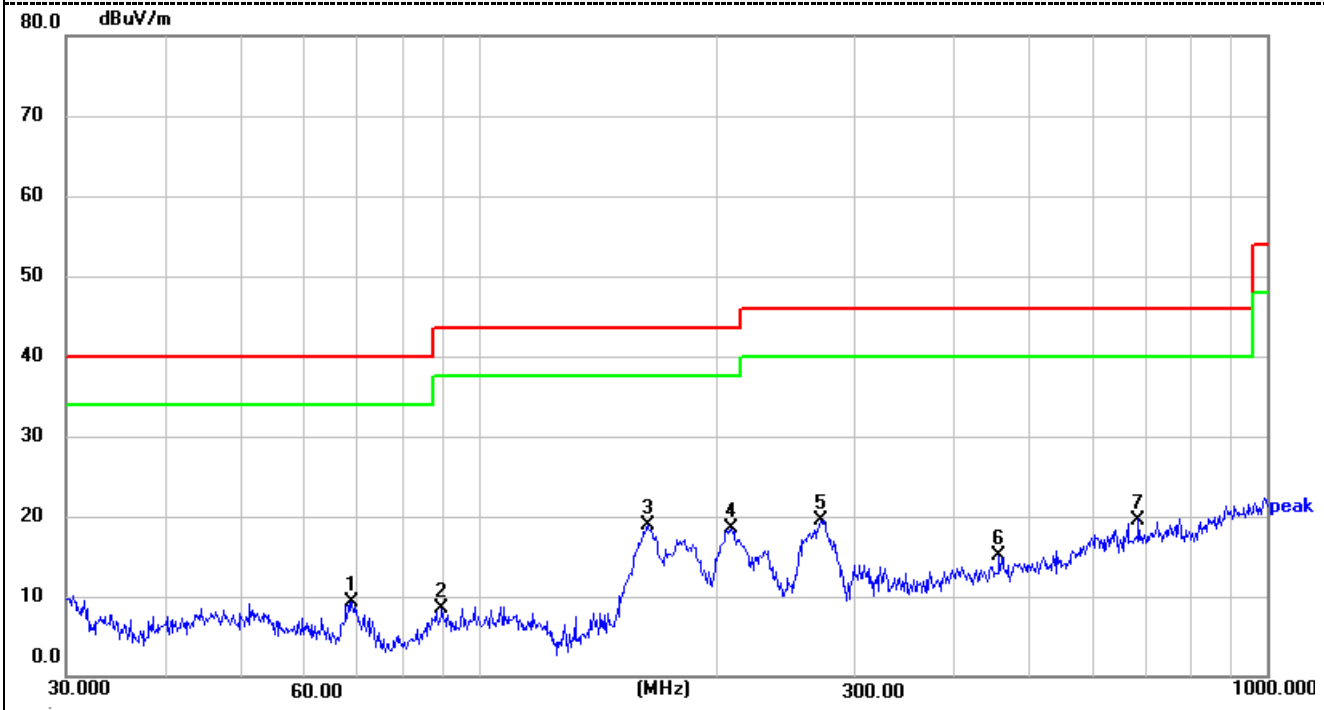
TEST RESULTS

Remark:

1. This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position.
2. EUT was tested at Low, Middle, and High channel, only the worst result of Middle Channel was reported for below 1GHz.
3. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.

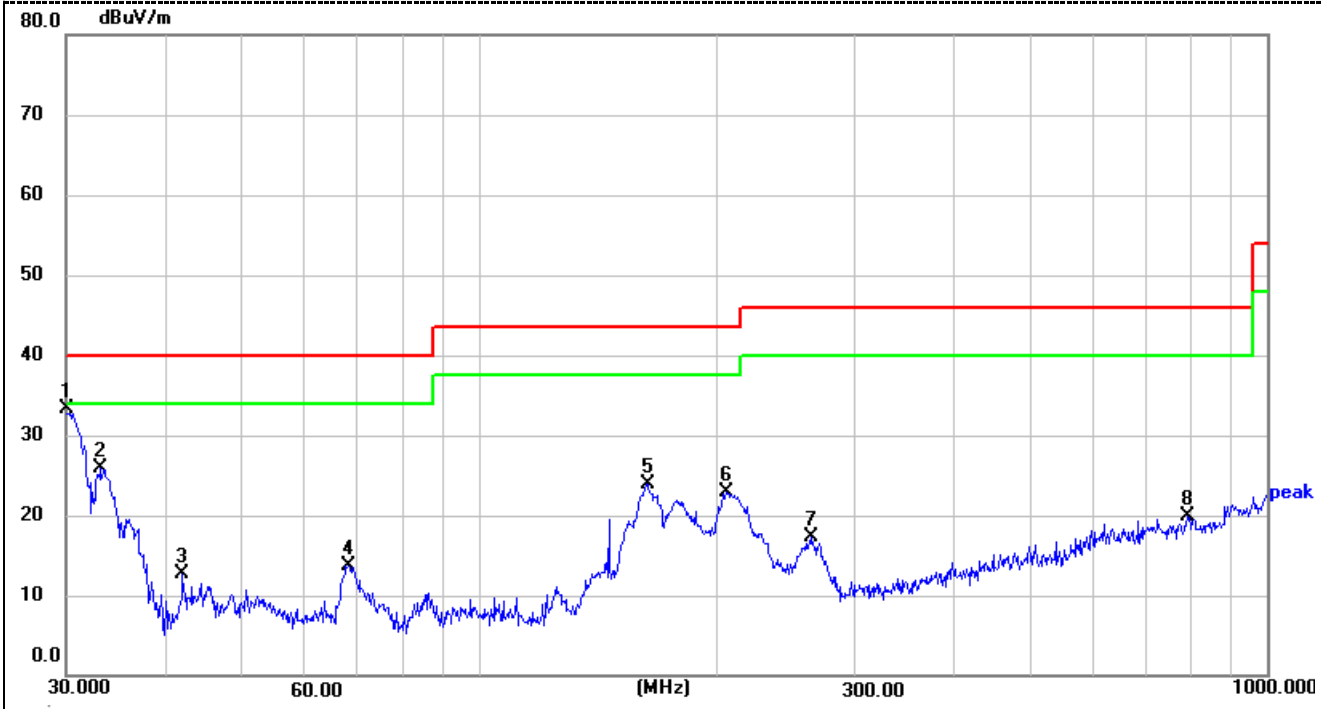
For 30MHz to 1000MHz

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	69.1140	30.04	-20.76	9.28	40.00	-30.72	peak
2	89.9046	29.10	-20.67	8.43	43.50	-35.07	peak
3 *	163.7547	40.60	-21.61	18.99	43.50	-24.51	peak
4	209.3129	37.34	-18.83	18.51	43.50	-24.99	peak
5	272.2776	37.29	-17.70	19.59	46.00	-26.41	peak
6	457.5072	29.61	-14.48	15.13	46.00	-30.87	peak
7	687.1506	30.01	-10.41	19.60	46.00	-26.40	peak

Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	30.0000	53.41	-20.10	33.31	40.00	-6.69	peak
2	33.2111	45.92	-19.95	25.97	40.00	-14.03	peak
3	42.1540	30.81	-18.08	12.73	40.00	-27.27	peak
4	68.3906	34.39	-20.68	13.71	40.00	-26.29	peak
5	163.7547	45.57	-21.61	23.96	43.50	-19.54	peak
6	206.3975	41.83	-18.88	22.95	43.50	-20.55	peak
7	264.7456	35.27	-17.89	17.38	46.00	-28.62	peak
8	793.3958	29.54	-9.54	20.00	46.00	-26.00	peak

For 1GHz to 25GHz

Frequency(MHz):			2478		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2478.00	103.76	PK	114	10.24	128.32	25.8	4.49	54.85	-24.56
2478.00	88.30	AV	94	5.70	112.86	25.8	4.49	54.85	-24.56
4956.00	63.66	PK	74	10.34	83.17	29.53	5.65	54.69	-19.51
4956.00	46.24	AV	54	7.76	65.75	29.53	5.65	54.69	-19.51
7434.00	52.66	PK	74	21.34	65.87	34.48	7.24	54.93	-13.21
7434.00	40.11	AV	54	13.89	53.32	34.48	7.24	54.93	-13.21

Frequency(MHz):			2478		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2478.00	102.28	PK	114	11.72	126.84	25.8	4.49	54.85	-24.56
2478.00	85.95	AV	94	8.05	110.51	25.8	4.49	54.85	-24.56
4956.00	63.24	PK	74	10.76	82.75	29.53	5.65	54.69	-19.51
4956.00	44.78	AV	54	9.22	64.29	29.53	5.65	54.69	-19.51
7434.00	52.50	PK	74	21.50	65.71	34.48	7.24	54.93	-13.21
7434.00	41.00	AV	54	13.00	54.21	34.48	7.24	54.93	-13.21

REMARKS:
1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)- Pre-amplifier
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.

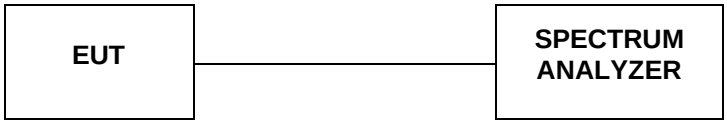
Results of Band Edges Test (Radiated)

Frequency(MHz):			2478		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	58.45	PK	74	15.55	83.17	25.72	4.32	54.76	-24.72
2390.00	41.73	AV	54	12.27	66.45	25.72	4.32	54.76	-24.72
Frequency(MHz):			**2478**		**Polarity:**		**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	57.77	PK	74	16.23	82.49	25.72	4.32	54.76	-24.72
2390.00	40.73	AV	54	13.27	65.45	25.72	4.32	54.76	-24.72
Frequency(MHz):			**2478**		**Polarity:**		**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	58.12	PK	74	15.88	82.69	25.78	4.48	54.83	-24.57
2483.50	41.68	AV	54	12.32	66.25	25.78	4.48	54.83	-24.57
Frequency(MHz):			**2478**		**Polarity:**		**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	58.25	PK	74	15.75	82.82	25.78	4.48	54.83	-24.57
2483.50	40.62	AV	54	13.38	65.19	25.78	4.48	54.83	-24.57

REMARKS:
1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)- Pre-amplifier
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.

4.3. Occupied Bandwidth Measurement

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 KHz RBW and 300 KHz VBW.

TEST RESULTS

Type	Channel	99% OBW (MHz)	20dB bandwidth (MHz)	Result
GFSK	1	1.0790	1.190	Pass

Note: 1.The test results including the cable lose.

2478MHz

4.4. Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 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, 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

FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1) (I):

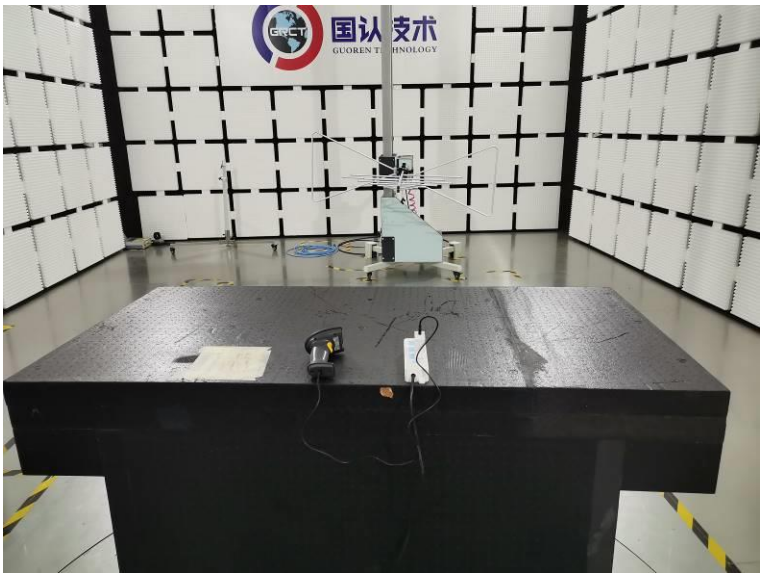
(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

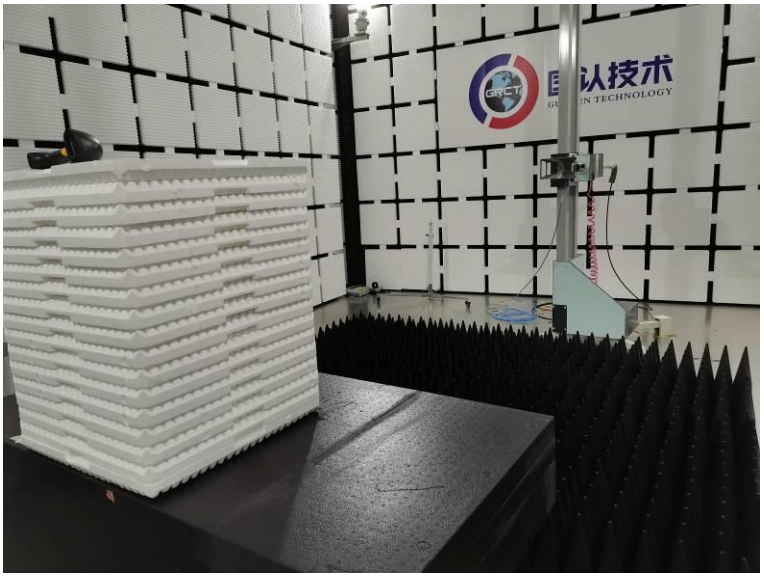
Antenna Connected Construction

The maximum gain of antenna was 0.00 dBi.

Remark:The antenna gain is provided by the customer , if the data provided by the customer is not accurate, Shenzhen GUOREN Certification Technology Service Co., Ltd. does not assume any responsibility.

5. Test Setup Photos of the EUT

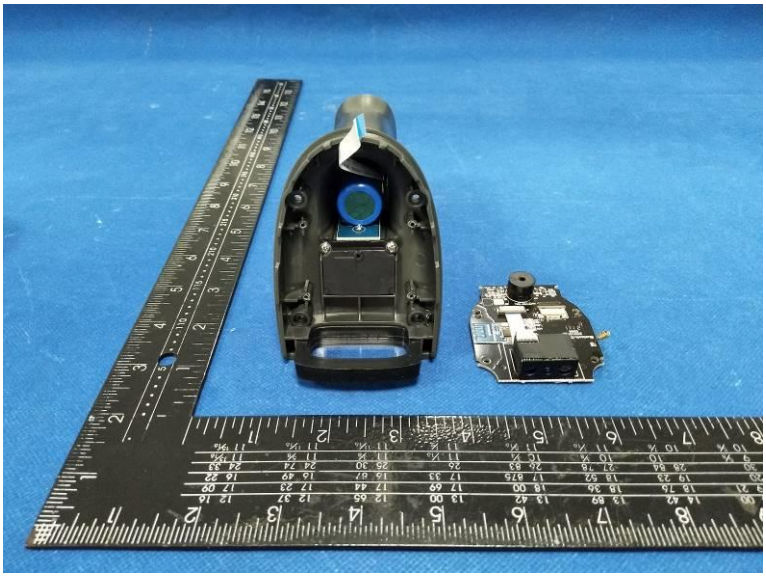


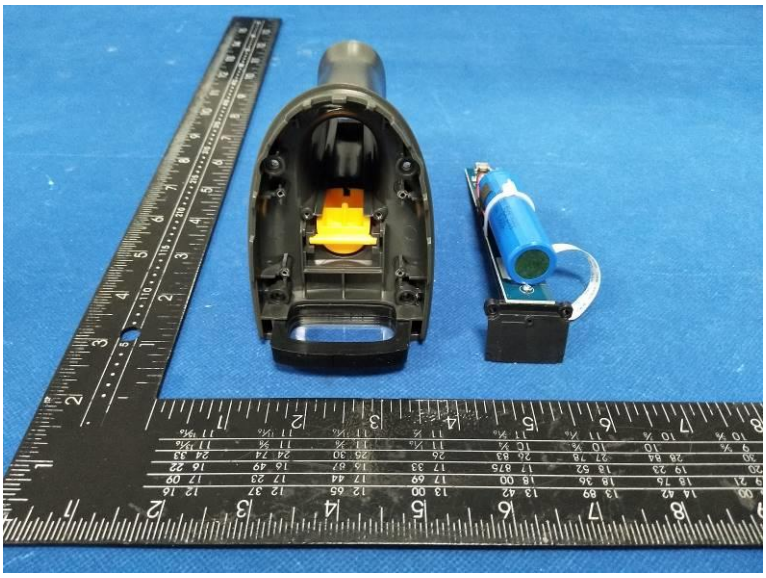


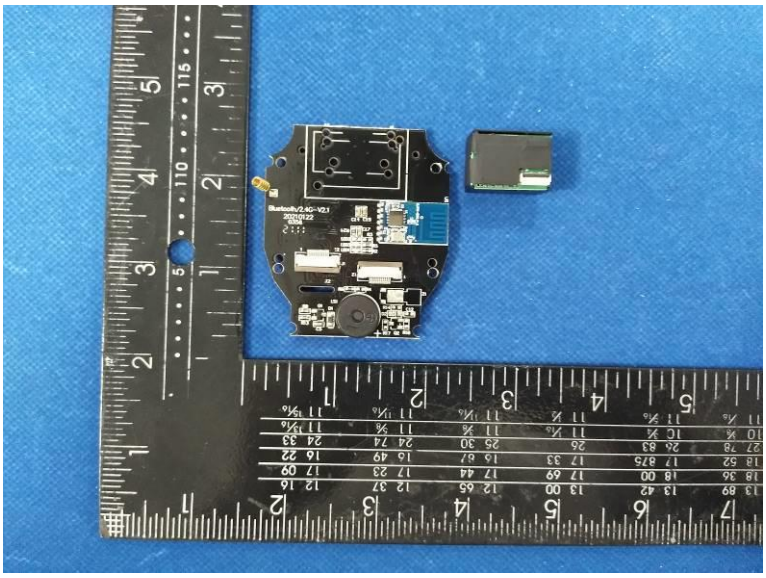
6. Photos of the EUT

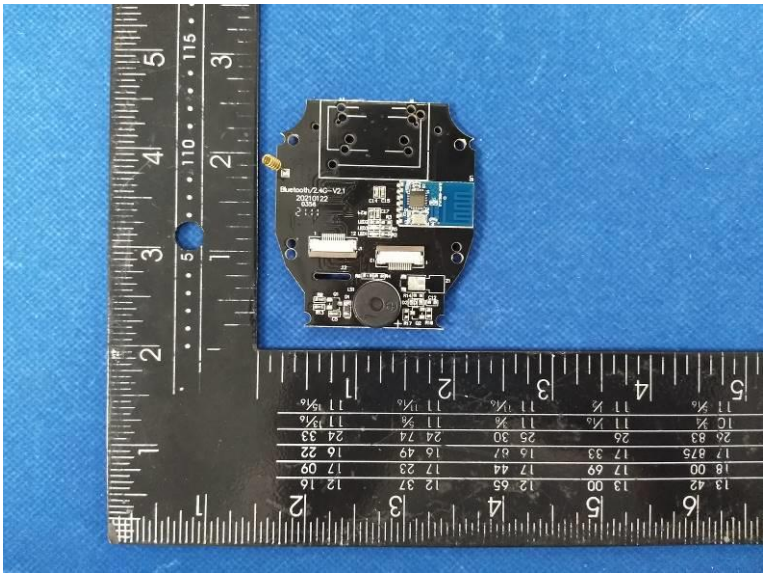

unitech

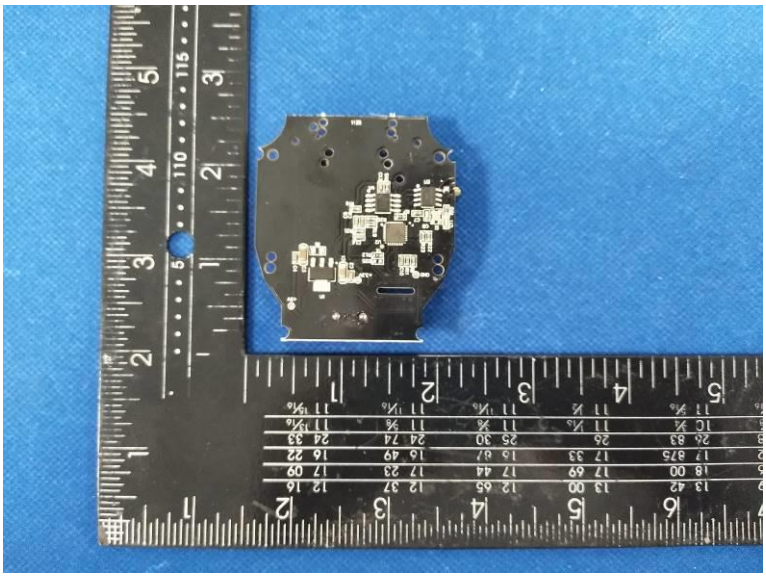

unitech

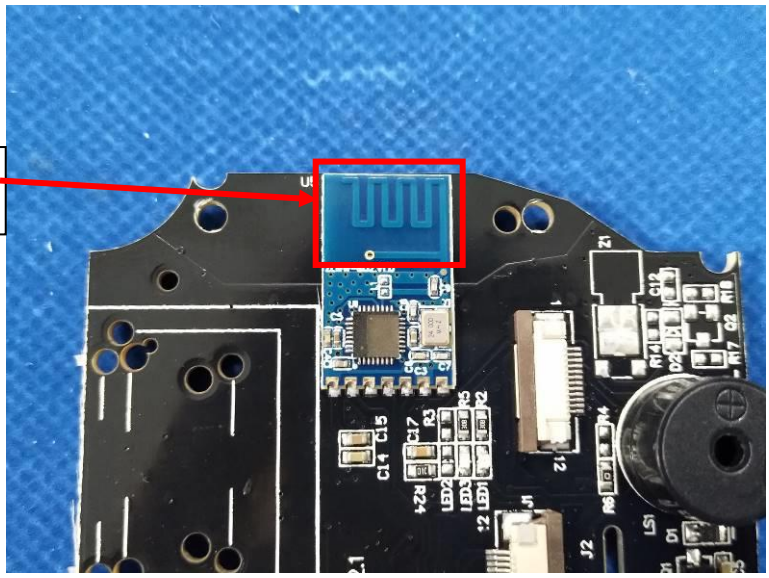


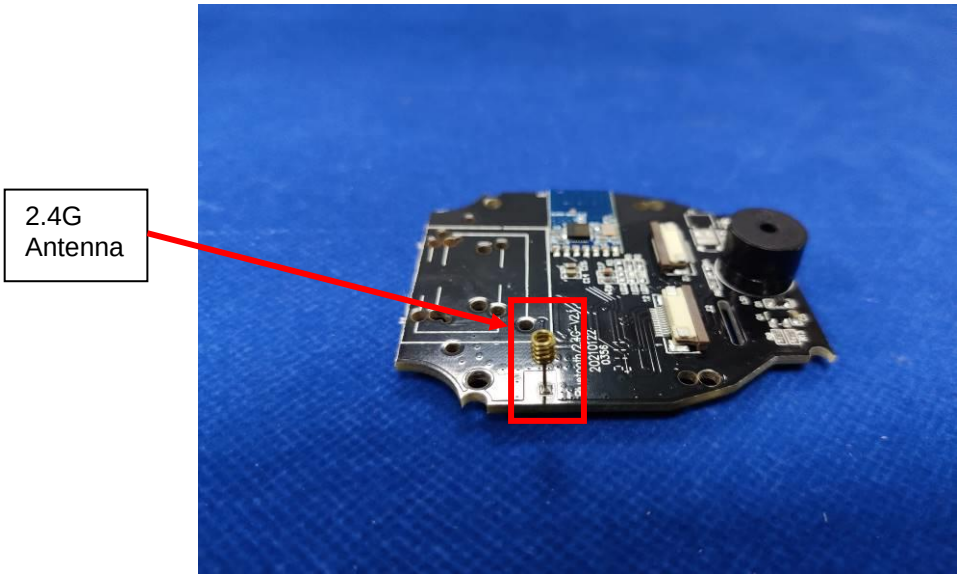


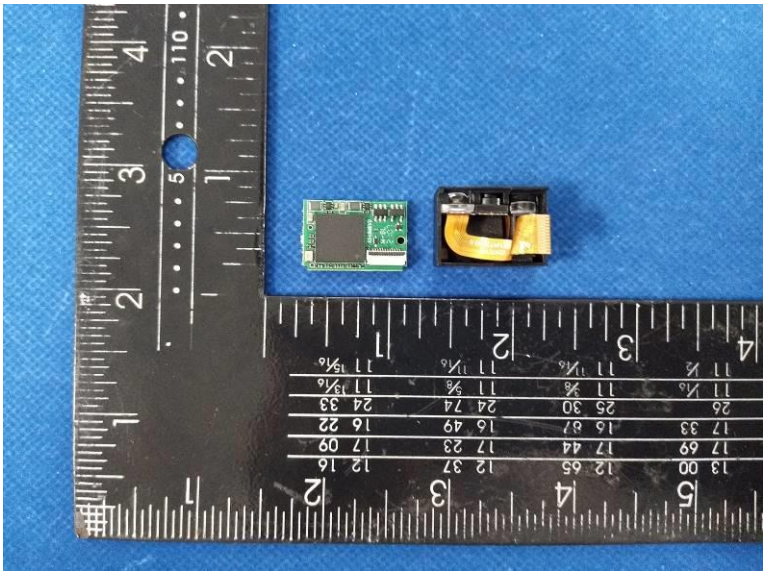


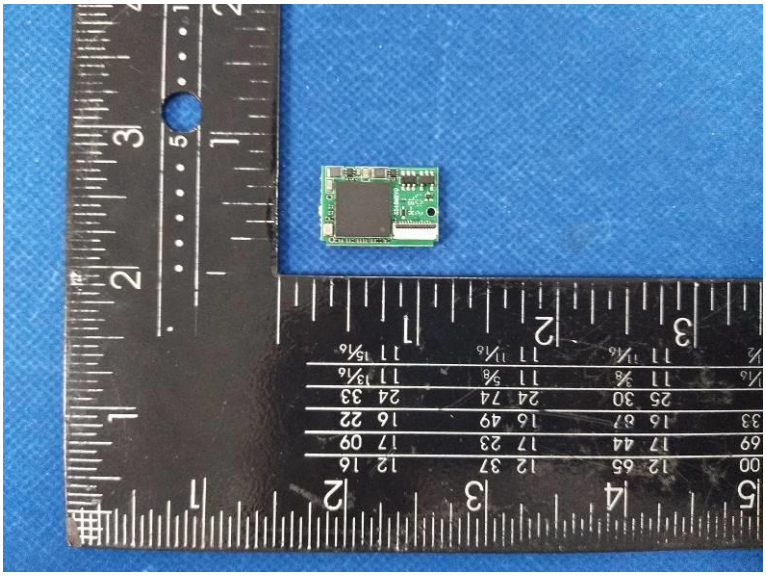


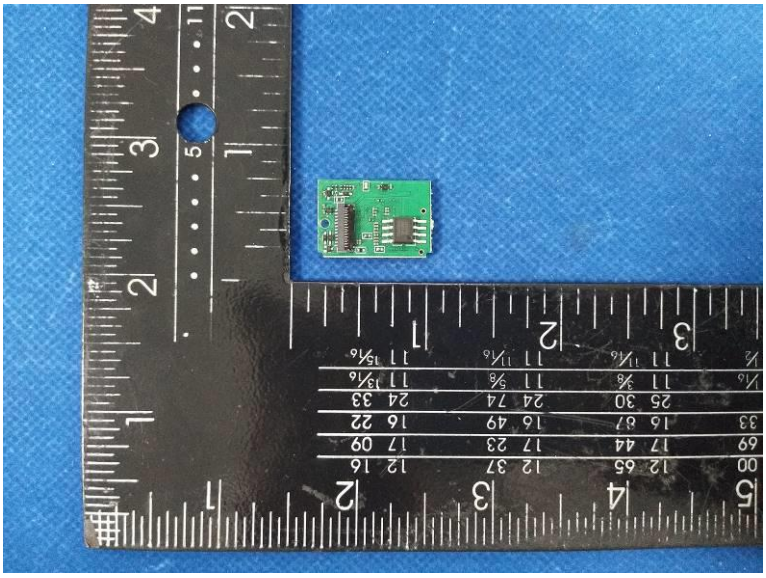


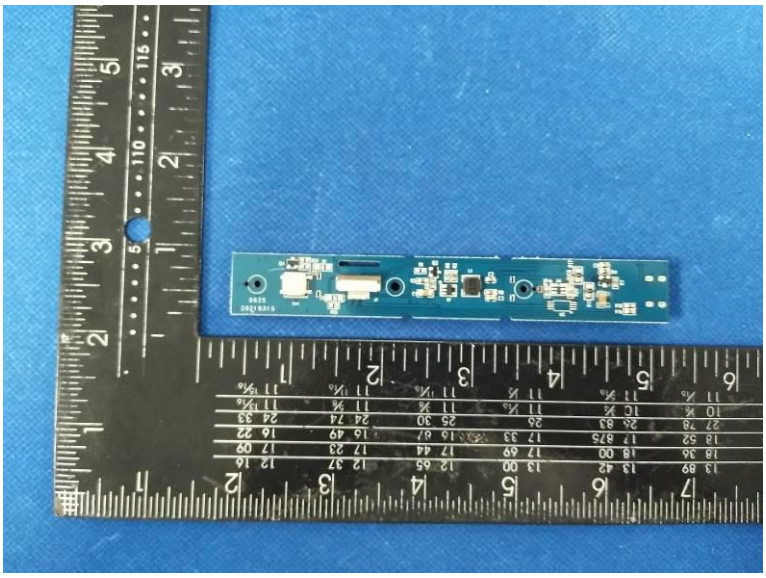

Bluetooth
Antenna

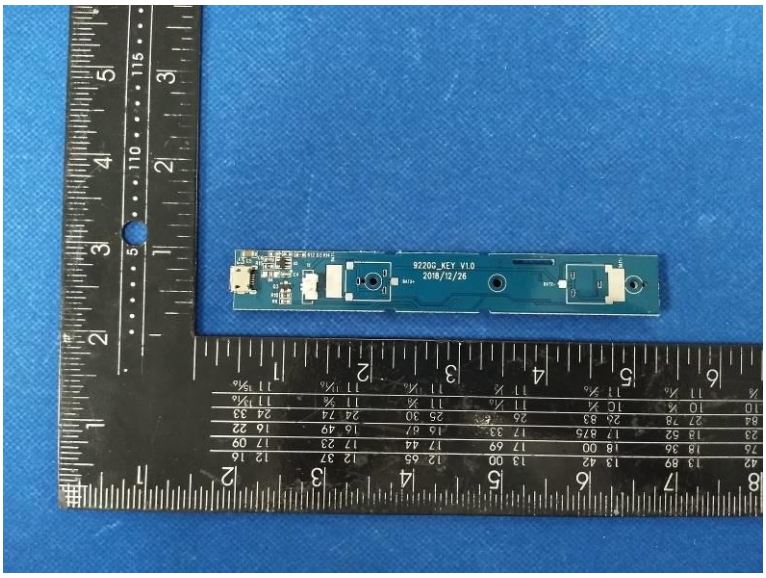

2.4G
Antenna

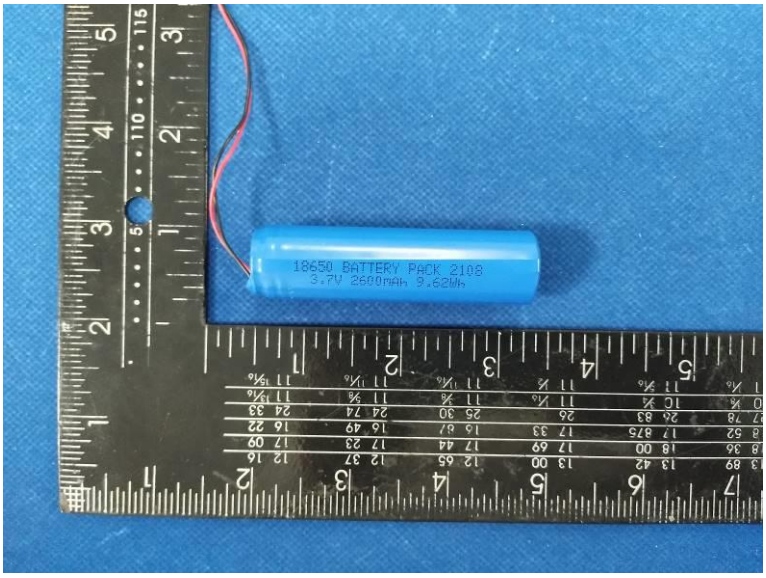












.....End of Report.....