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TEST REPORT

FOR FCC PART 15 SUBPART C 15.249

Report Reference No. .....: **CTL1903141022-WF**

Compiled by: (position+printed name+signature)	Happy Guo (File administrators)	Happy Guo
Tested by: (position+printed name+signature)	Nice Nong (Test Engineer)	Nice Nong
Approved by: (position+printed name+signature)	Ivan Xie (Manager)	Ivan Xie

Product Name.....:	2.4G Wireless mouse
Model/Type reference .....:	G-221
List Model(s).....:	G-222, G-232, G-536, G-538, G-539, G-537
Trade Mark .....:	Indena Ihome G-sedo
FCC ID .....:	OIHG-221
Applicant's name .....:	**Shenzhen Leader-Union Technology Co., Ltd.**
Address of applicant .....:	3F, No. 88, Alley 5, Hekan Village, Ban Tian, LongGang District, Shenzhen City, China
Test Firm .....:	**Shenzhen CTL Testing Technology Co., Ltd.**
Address of Test Firm .....:	Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055
Test specification.....:	
Standard.....:	**FCC Part 15.249:**Operation within the bands 920-928 MHz, 2400-2483.5 MHz, 5725-5850 MHz and 24.0 - 24.25 GHz.
TRF Originator .....:	Shenzhen CTL Testing Technology Co., Ltd.
Master TRF .....:	Dated 2011-01
Date of receipt of test item.....:	Mar. 21, 2019
Date of sampling .....:	Mar. 21, 2019
Date of Test Date.....:	Mar. 21, 2019–Apr. 09, 2019
Data of Issue.....:	Apr. 10, 2019
Result.....:	**Pass**

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TEST REPORT

Test Report No. :	CTL1903141022-WF	Apr. 10, 2019 Date of issue

Equipment under Test	:	2.4G Wireless mouse
Model /Type	:	G-221
Listed Models	:	G-222, G-232, G-536, G-538, G-539, G-537
Applicant	:	**Shenzhen Leader-union Technology Co ., Ltd**
Address	:	3F, No. 90, Alley 5, Hekan Village, Ban Tian, LongGang District, Shenzhen, China
Manufacturer	:	**Dongguan Indena Electronic Technology Co., Ltd.**
Address	:	No. 6, 7th Road Gaoli Qinghutou Community, Tangxia Town, Dongguan, China

Test result	Pass *

∗ In the configuration tested, the EUT complied with the standards specified page 5.

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the issuing testing laboratory.

** Modified History **

Revision	Description	Issued Data	Report No.	Remark
Version 1.0	Initial Test Report Release	2019-04-10	CTL1903141022-WF	Tracy Qi

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1. SUMMARY

1.1. 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

1.2. Test Description

FCC PART 15.249		
FCC Part 15.249(a)	Field Strength of Fundamental	PASS
FCC Part 15.209	Spurious Emission	PASS
FCC Part 15.209	Band edge	PASS
FCC Part 15.215(c)	20dB bandwidth	PASS
FCC Part 15.207	Conducted Emission	N/A
FCC Part 15.203	Antenna Requirement	PASS

1.3. Test Facility

1.3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.
Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 32/EN 55032 requirements.

1.3.2 Laboratory accreditation

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

CNAS-Lab Code: L7497

Shenzhen CTL Testing Technology Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No. 4343.01

Shenzhen CTL Testing Technology Co., Ltd, EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

IC Registration No.: 9518B

CAB identifier: CN0041

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements with Registration No.: 9518B on Jan. 22, 2019.

1.4. 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 CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL Testing Technology 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 CTL laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	Above 1GHz	4.32dB	(1)
Conducted Disturbance	0.15~30MHz	3.20dB	(1)

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

2. GENERAL INFORMATION

2.1. Environmental conditions

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

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2. General Description of EUT

Product Name:	2.4G Wireless mouse
Model/Type reference:	G-221
Power supply:	DC3.0V from battery
2.4GHz Wireless	
Modulation:	GFSK
Operation frequency:	2402MHz~2480MHz
Channel number:	40
Channel separation:	1MHz
Antenna type:	PCB antenna
Antenna gain:	0dBi

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

2.3. Description of Test Modes and Test Frequency

The Applicant provides communication tools software to control the EUT for staying in continuous transmitting (Duty Cycle more than 98%) and receiving mode for testing .There are 40 channels provided to the EUT and Channel 00/19/39 were selected for testing.

Operation Frequency List：

Channel	Frequency (MHz)
00	**2402**
02	2404
03	2406
⋮	⋮
19	**2440**
⋮	⋮
37	2476
38	2478
39	**2480**

Note: The line display in grey is the channel selected to perform test.

2.4. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date recent	Calibration Due Date
LISN	R&S	ENV216	3560.6550.12	2018/06/01	2019/05/31
LISN	R&S	ESH2-Z5	860014/010	2018/06/01	2019/05/31
Power Meter	Agilent	U2531A	TW53323507	2018/06/01	2019/05/31
Power Sensor	Agilent	U2021XA	MY5365004	2018/05/20	2019/05/19
EMI Test Receiver	R&S	ESCI	103710	2018/06/01	2019/05/31
Spectrum Analyzer	Agilent	E4407B	MY41440676	2018/05/20	2019/05/19
Spectrum Analyzer	Agilent	N9020	US46220290	2019/01/15	2020/01/14
Controller	EM Electronics	Controller EM 1000	N/A	2018/05/20	2019/05/19
Active Loop Antenna	Daze	ZN30900A	N/A	2018/05/18	2019/05/17
Bilog Antenna	Schwarzbeck	VULB 9168	00824	2018/10/25	2019/10/24
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2018/05/18	2019/05/17
Horn Antenna	SCHWARZBACK	BBHA 9170	BBHA9170184	2018/05/18	2019/05/17
Amplifier	Agilent	8349B	3008A02306	2018/05/18	2019/05/17
Amplifier	Agilent	8447D	2944A10176	2018/05/18	2019/05/17
Temperature/Humidity Meter	Gangxing	CTH-608	02	2018/05/19	2019/05/18
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	N/A	2018/05/19	2019/05/18
High-Pass Filter	K&L	41H10-1375/U12750-O/O	N/A	2018/05/19	2019/05/18
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-10M	10m	2018/06/01	2019/05/31
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	2018/06/01	2019/05/31
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	2018/06/01	2019/05/31
RF Cable	Megalon	RF-A303	N/A	2018/06/01	2019/05/31
EMI Test Software	R&S	ES-K1	V1.7.1	2018/06/01	2019/05/31
EMI Test Software	AUDIX	E3	V6.0	2018/06/01	2019/05/31

The calibration interval was one year

2.5. Special Accessories

Manufacturer	Description	Model	Serial Number	Certificate
ASUS	Notebook PC	FL5900U	9014	FCC ID:PPD-QCNFA335
/	/	/	/	/

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

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

2.7. Modifications

No modifications were implemented to meet testing criteria.

3. TEST CONDITIONS AND RESULTS

3.1. Conducted Emissions Test

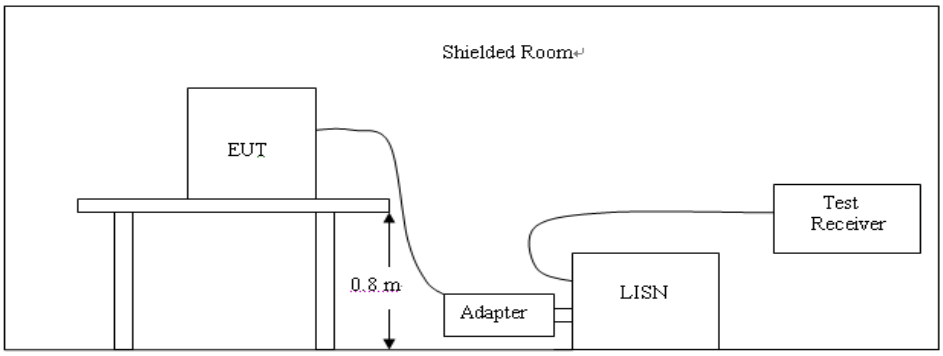
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

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 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. If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.

TEST RESULTS

Not applicable to this device.

3.2. Radiated Emissions and Band Edge

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):

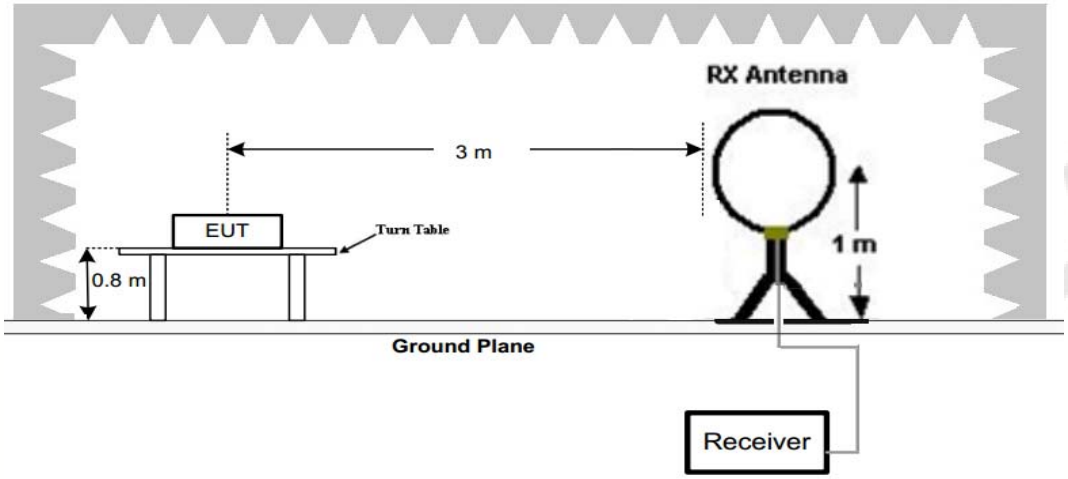
FCC PART 15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.
In addition, radiated emissions which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

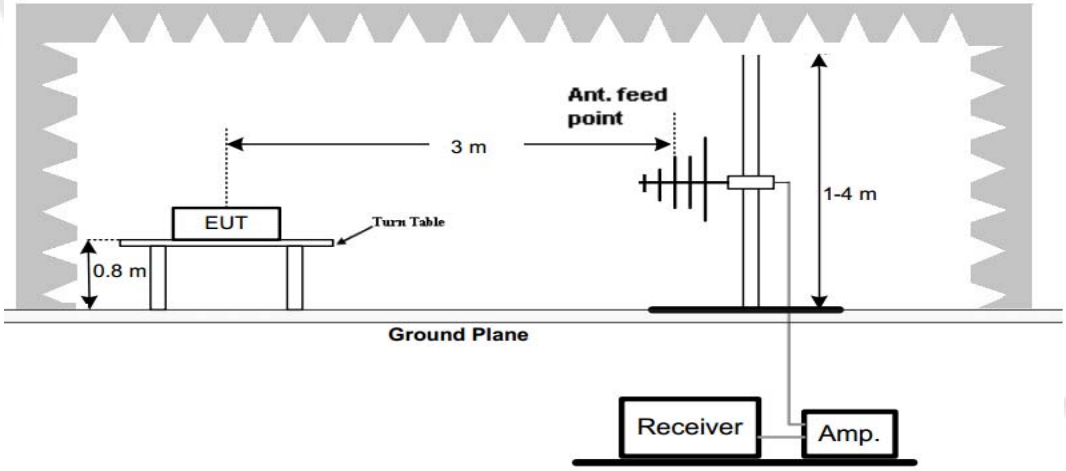
Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST CONFIGURATION

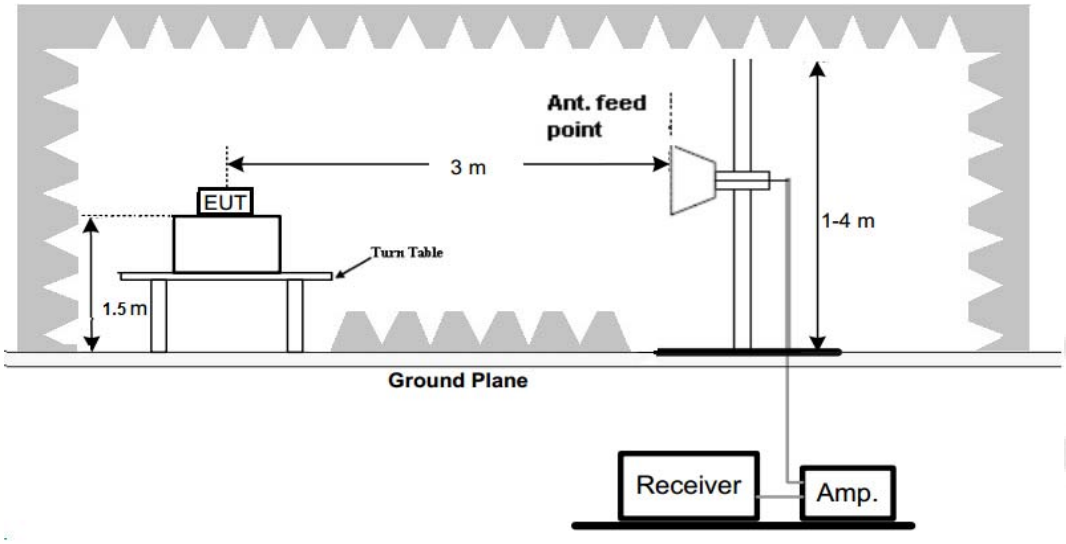
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



Test Procedure

1. Below 1GHz measurement the EUT is placed on a turntable which is 0.8m above ground plane, and above 1GHz measurement EUT was placed on a low permittivity and low loss tangent turn table which is 1.5m above ground plane.
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. Radiated emission test frequency band from 9KHz to 25GHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance (m)
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Bilog Antenna	3
1GHz-18GHz	Horn Antenna	3
18GHz-25GHz	Horn Anternna	1

7. 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	PK,AV
150KHz-30MHz	RBW=9KHz/VBW=100KHz,Sweep time=Auto	PK,AV,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

TEST RESULTS

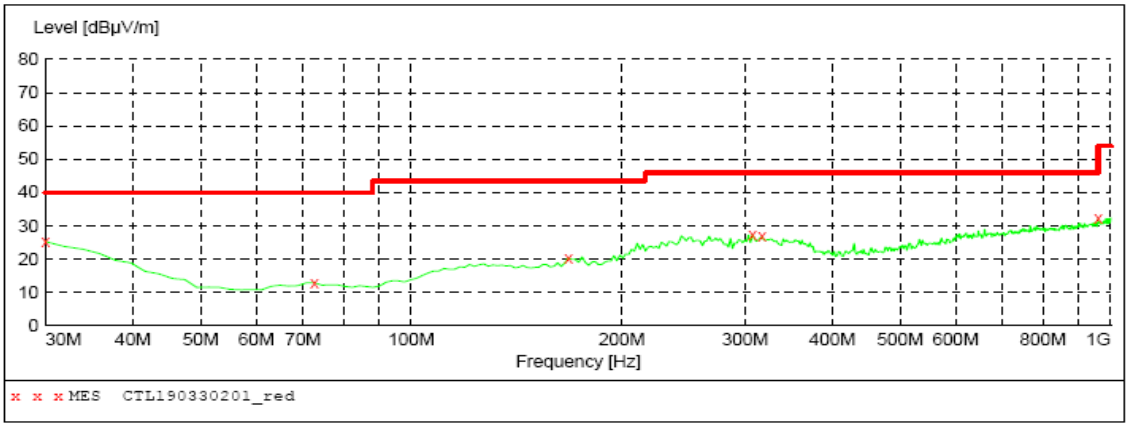
Remark:
1. We measured Radiated Emission at GFSK mode from 9 KHz to 25GHz and recorded worst case.
2. For below 1GHz testing recorded worst at GFSK low channel.
3. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.

For 30MHz-1GHz

Horizontal

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	100 kHz	JB1



MEASUREMENT RESULT: "CTL190330201_red"

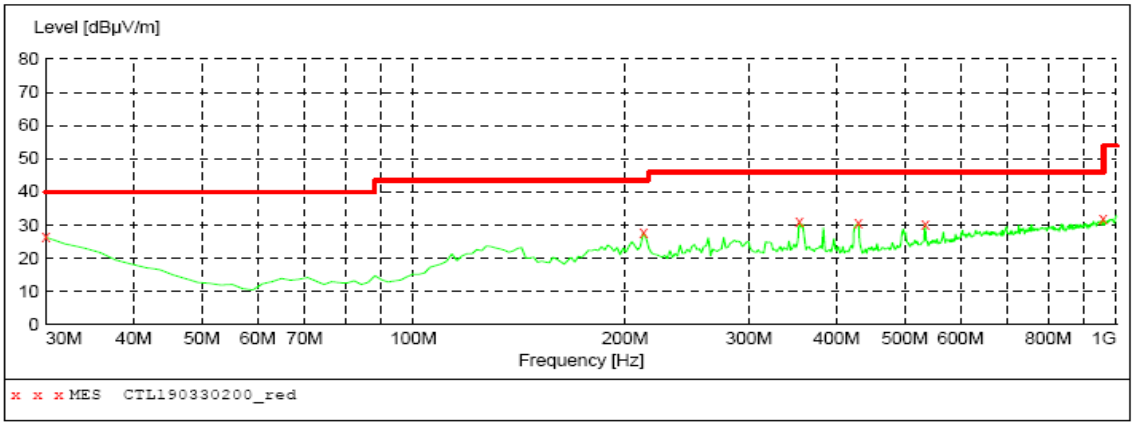
30/03/2019 09:39

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	25.30	22.1	40.0	14.7	---	0.0	0.00	HORIZONTAL
72.680000	12.90	9.0	40.0	27.1	---	0.0	0.00	HORIZONTAL
167.740000	20.40	14.5	43.5	23.1	---	0.0	0.00	HORIZONTAL
307.420000	27.40	16.3	46.0	18.6	---	0.0	0.00	HORIZONTAL
317.120000	26.70	16.5	46.0	19.3	---	0.0	0.00	HORIZONTAL
959.260000	32.10	27.5	46.0	13.9	---	0.0	0.00	HORIZONTAL

Vertical

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	100 kHz	JB1



MEASUREMENT RESULT: "CTL190330200_red"

30/03/2019 09:38

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	26.40	22.1	40.0	13.6	---	0.0	0.00	VERTICAL
212.360000	27.70	14.5	43.5	15.8	---	0.0	0.00	VERTICAL
353.980000	30.90	17.3	46.0	15.1	---	0.0	0.00	VERTICAL
429.640000	30.50	19.0	46.0	15.5	---	0.0	0.00	VERTICAL
534.400000	30.30	21.4	46.0	15.7	---	0.0	0.00	VERTICAL
957.320000	31.90	27.4	46.0	14.1	---	0.0	0.00	VERTICAL

For 1GHz to 25GHz

GFSK Mode (above 1GHz)

Frequency(MHz):				2402		Polarity:			HORIZONTAL	
No.	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)
1	2402.00	90.42	PK	114	23.58	57.02	28.78	4.61	0.00	33.40
1	2402.00	84.54	AV	94	9.46	51.14	28.78	4.61	0.00	33.40
2	2390.00	45.56	PK	74	28.44	12.24	28.72	4.60	0.00	33.32
2	2390.00	--	AV	54	--	--	--	--	--	--
3	2400.00	52.44	PK	74	21.56	19.05	28.78	4.61	0.00	33.39
3	2400.00	--	AV	54	--	--	--	--	--	--
4	4804.00	51.16	PK	74	22.84	46.65	33.49	6.91	35.89	4.51
4	4804.00	--	AV	54	--	--	--	--	--	--
5	5103.00	44.70	PK	74	29.30	37.54	34.34	7.09	34.27	7.16
5	5103.00	--	AV	54	--	--	--	--	--	--
6	7206.00	47.39	PK	74	26.61	36.28	36.95	9.18	35.03	11.11
6	7206.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):				2402		Polarity:			VERTICAL	
No.	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)
1	2402.00	89.20	PK	114	24.80	55.80	28.78	4.61	0.00	33.40
1	2402.00	83.45	AV	94	10.55	50.05	28.78	4.61	0.00	33.40
2	2390.00	45.17	PK	74	28.83	11.85	28.72	4.60	0.00	33.32
2	2390.00	--	AV	54	--	--	--	--	--	--
3	2400.00	51.86	PK	74	22.14	18.47	28.78	4.61	0.00	33.39
3	2400.00	--	AV	54	--	--	--	--	--	--
4	4804.00	52.52	PK	74	21.48	48.01	33.49	6.91	35.89	4.51
4	4804.00	--	AV	54	--	--	--	--	--	--
5	6028.00	46.61	PK	74	27.39	38.44	35.14	7.63	34.60	8.17
5	6028.00	--	AV	54	--	--	--	--	--	--
6	7206.00	48.78	PK	74	25.22	37.67	36.95	9.18	35.03	11.11
6	7206.00	--	AV	54	--	--	--	--	--	--

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 Factor
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.
6. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.
7. For fundamental frequency, RBW 3MHz VBW 3MHz Peak detector is for PK Value ; RMS detector is for AV value.

Frequency(MHz):				2440		Polarity:			HORIZONTAL	
No.	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)
1	2440.00	88.85	PK	114	25.15	55.34	28.85	4.65	0.00	33.51
1	2440.00	81.56	AV	94	12.44	48.05	28.85	4.65	0.00	33.51
2	3590.00	43.84	PK	74	30.16	41.52	32.01	5.93	35.62	2.32
2	3590.00	--	AV	54	--	--	--	--	--	--
3	4880.00	49.30	PK	74	24.70	42.94	33.60	6.95	34.19	6.36
3	4880.00	--	AV	54	--	--	--	--	--	--
4	5366.00	47.04	PK	74	26.96	39.46	34.71	7.24	34.36	7.58
4	5366.00	--	AV	54	--	--	--	--	--	--
5	7320.00	47.69	PK	74	26.31	36.00	37.46	9.23	35.00	11.69
5	7320.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):				2440		Polarity:			VERTICAL	
No.	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)
1	2440.00	89.68	PK	114	24.32	56.17	28.85	4.65	0.00	33.51
1	2440.00	81.12	AV	94	12.88	47.61	28.85	4.65	0.00	33.51
2	2712.00	46.15	PK	74	27.85	47.28	29.35	4.94	35.43	-1.13
2	2712.00	--	AV	54	--	--	--	--	--	--
3	4880.00	48.53	PK	74	25.47	42.17	33.60	6.95	34.19	6.36
3	4880.00	--	AV	54	--	--	--	--	--	--
4	5750.00	45.67	PK	74	28.33	37.93	34.80	7.45	34.50	7.75
4	5750.00	--	AV	54	--	--	--	--	--	--
5	7320.00	49.60	PK	74	24.40	37.91	37.46	9.23	35.00	11.69
5	7320.00	--	AV	54	--	--	--	--	--	--

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 Factor
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.
6. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.
7. For fundamental frequency, RBW 3MHz VBW 3MHz Peak detector is for PK Value; RMS detector is for AV value.

Frequency(MHz):				2480		Polarity:			HORIZONTAL	
No.	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)
1	2480.00	87.23	PK	114	26.77	53.61	28.92	4.70	0.00	33.62
1	2480.00	79.01	AV	94	14.99	45.39	28.92	4.70	0.00	33.62
2	2483.50	45.82	PK	74	28.18	12.19	28.93	4.70	0.00	33.63
2	2483.50	--	AV	54	--	--	--	--	--	--
3	2500.00	42.57	PK	74	31.43	8.89	28.96	4.72	0.00	33.68
3	2500.00	--	AV	54	--	--	--	--	--	--
4	4960.00	47.50	PK	74	26.50	40.80	33.84	7.00	34.14	6.70
4	4960.00	--	AV	54	--	--	--	--	--	--
5	7278.00	46.22	PK	74	27.78	34.71	37.30	9.21	35.01	11.51
5	7278.00	--	AV	54	--	--	--	--	--	--
6	7440.00	45.95	PK	74	28.05	34.00	37.64	9.28	34.97	11.95
6	7440.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):				2480		Polarity:			VERTICAL	
No.	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)
1	2480.00	88.06	PK	114	25.94	54.44	28.92	4.70	0.00	33.62
1	2480.00	80.42	AV	94	13.58	46.80	28.92	4.70	0.00	33.62
2	2483.50	46.41	PK	74	27.59	12.78	28.93	4.70	0.00	33.63
2	2483.50	--	AV	54	--	--	--	--	--	--
3	2500.00	42.10	PK	74	31.90	8.42	28.96	4.72	0.00	33.68
3	2500.00	--	AV	54	--	--	--	--	--	--
4	4960.00	48.30	PK	74	25.70	41.60	33.84	7.00	34.14	6.70
4	4960.00	--	AV	54	--	--	--	--	--	--
5	6815.00	45.25	PK	74	28.75	35.41	36.02	8.81	34.99	9.84
5	6815.00	--	AV	54	--	--	--	--	--	--
6	7440.00	45.57	PK	74	28.43	33.62	37.64	9.28	34.97	11.95
6	7440.00	--	AV	54	--	--	--	--	--	--

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 Factor
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.
6. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.
7. For fundamental frequency, RBW 3MHz VBW 3MHz Peak detector is for PK Value; RMS detector is for AV value.

3.3. Occupied Bandwidth Measurement

Limit

N/A

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 30 KHz RBW and 100 KHz VBW.

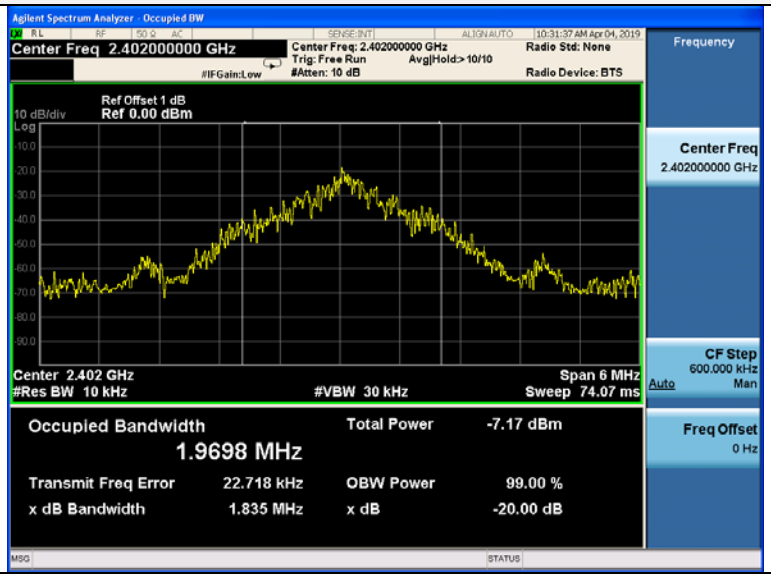
The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

Test Results

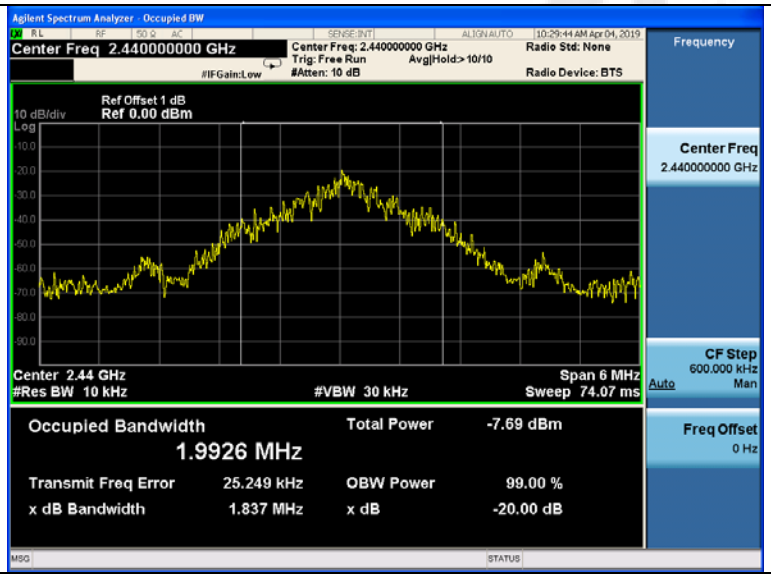
Modulation	Channel	99% OBW (MHz)	20dB bandwidth (MHz)	Result
GFSK	CH00	1.9698	1.835	Pass
	CH19	1.9926	1.837	
	CH39	2.0089	2.002	

Test plot as follows:

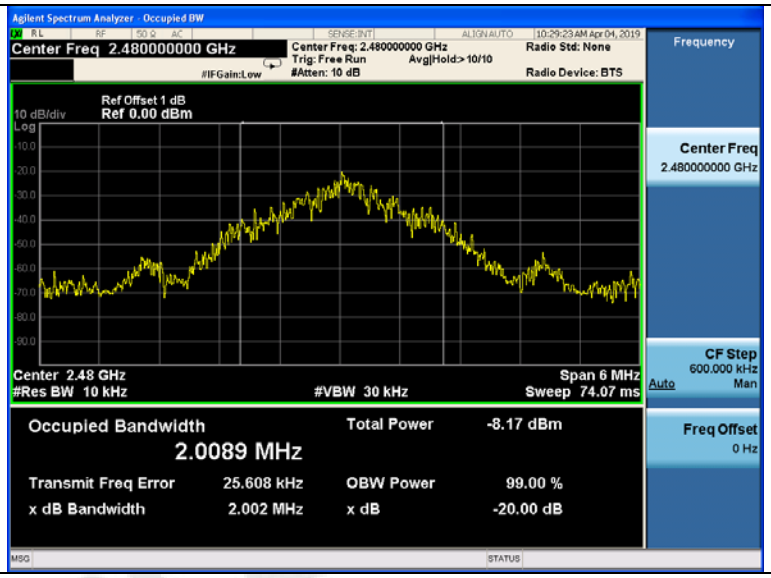
GFSK Modulation



CH00


Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.440000000 GHz
Center Freq: 2.440000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 10 dB
Radio Std: None
Radio Device: BTS
10:29:44 AM Apr 04, 2019
Ref Offset 1 dB
10 dB/div
Ref 0.00 dBm
Center 2.44 GHz
#Res BW 10 kHz
#VBW 30 kHz
Span 6 MHz
Sweep 74.07 ms
Occupied Bandwidth
1.9926 MHz
Total Power -7.69 dBm
Transmit Freq Error 25.249 kHz
OBW Power 99.00 %
x dB Bandwidth 1.837 MHz
x dB -20.00 dB
Frequency
Center Freq
2.440000000 GHz
CF Step
600.000 kHz
Auto Man
Freq Offset
0 Hz

CH19


Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 10 dB
Radio Std: None
Radio Device: BTS
10:29:23 AM Apr 04, 2019
Ref Offset 1 dB
10 dB/div
Ref 0.00 dBm
Center 2.48 GHz
#Res BW 10 kHz
#VBW 30 kHz
Span 6 MHz
Sweep 74.07 ms
Occupied Bandwidth
2.0089 MHz
Total Power -8.17 dBm
Transmit Freq Error 25.608 kHz
OBW Power 99.00 %
x dB Bandwidth 2.002 MHz
x dB -20.00 dB
Frequency
Center Freq
2.480000000 GHz
CF Step
600.000 kHz
Auto Man
Freq Offset
0 Hz

CH39

3.4. Antenna Requirement

Standard Applicable

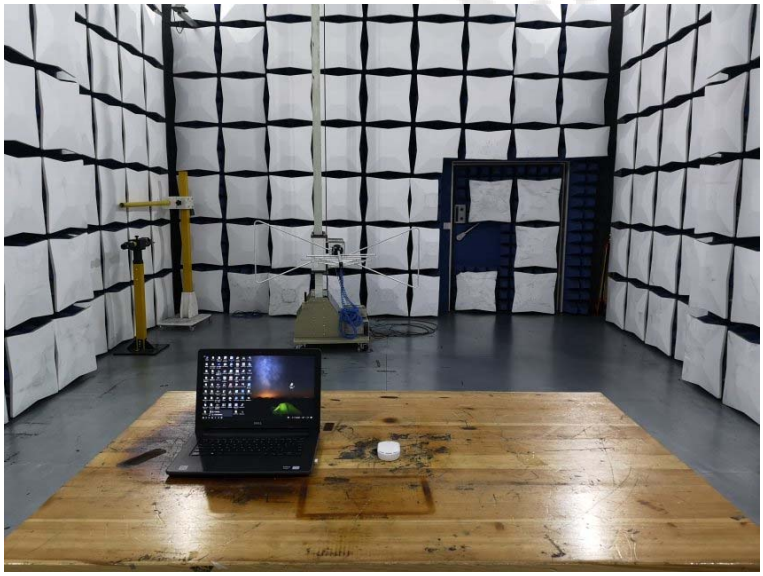
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Refer to statement below for compliance.
The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Antenna Connected Construction

The antenna used in this product is a PCB Antenna, The directional gains of antenna used for transmitting is 0dBi.

4. Test Setup Photos of the EUT

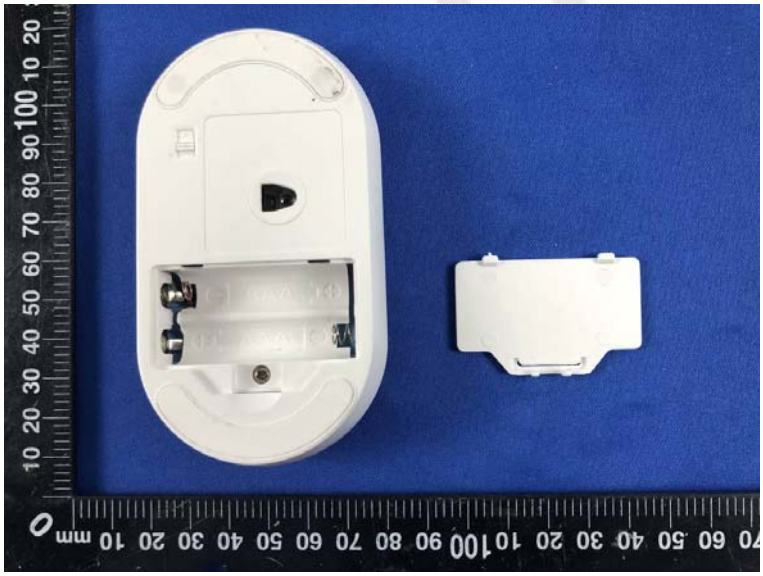


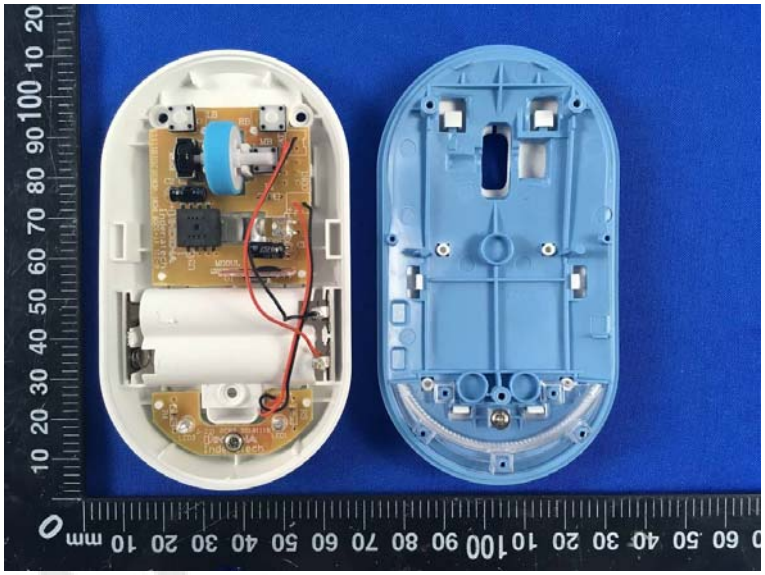
5. External and Internal Photos of the EUT

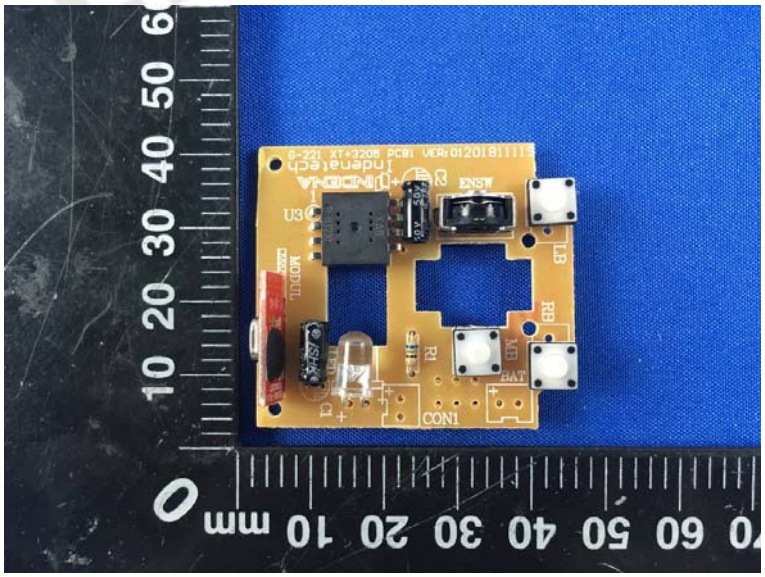
External Photos of EUT

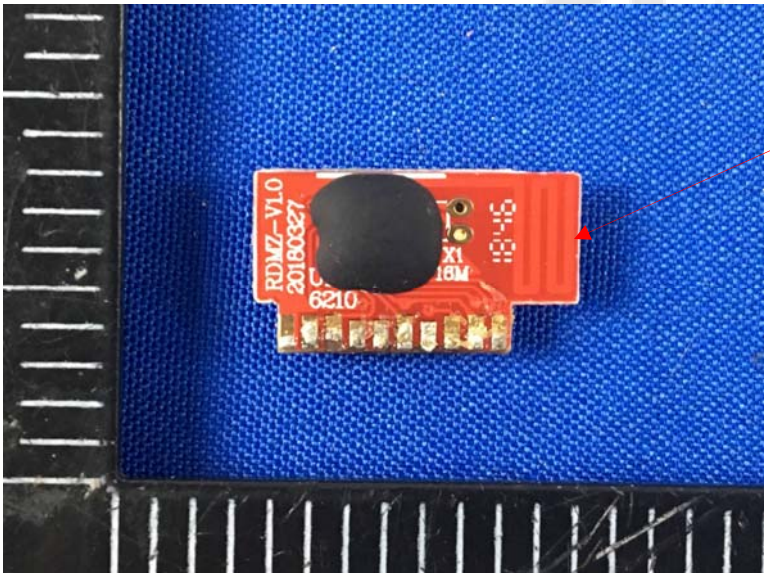
0 mm
10 20 30 40 50 60 70 80 90 100
100 90 80 70 60 50 40 30 20 10

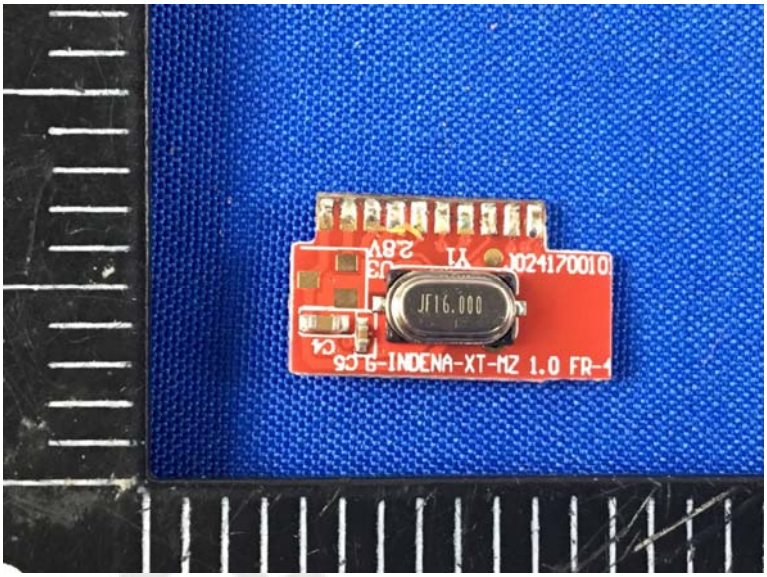
Internal Photos of EUT

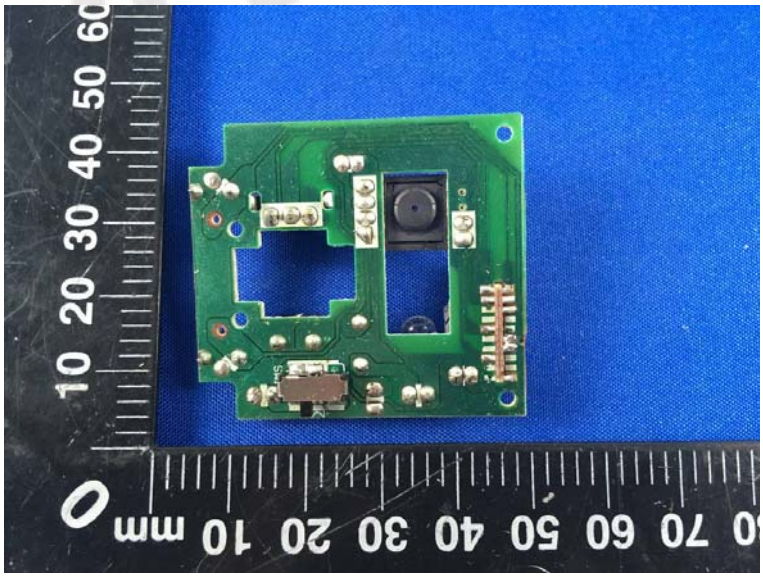


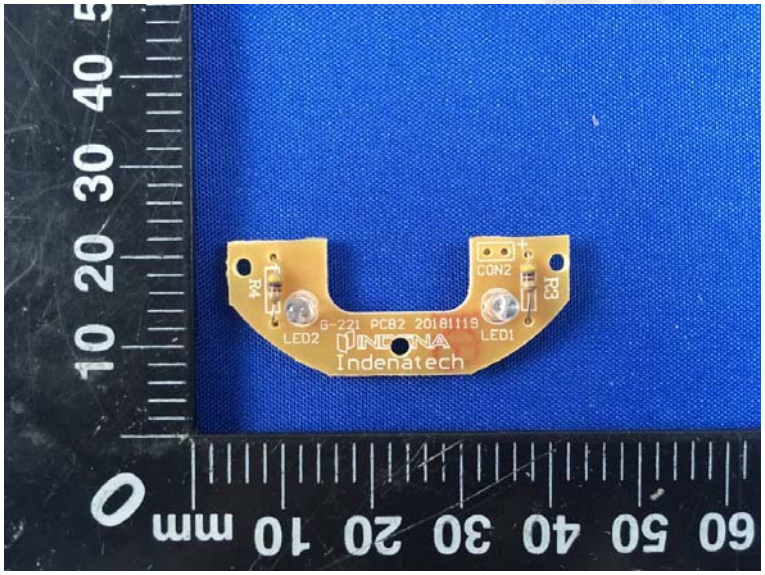


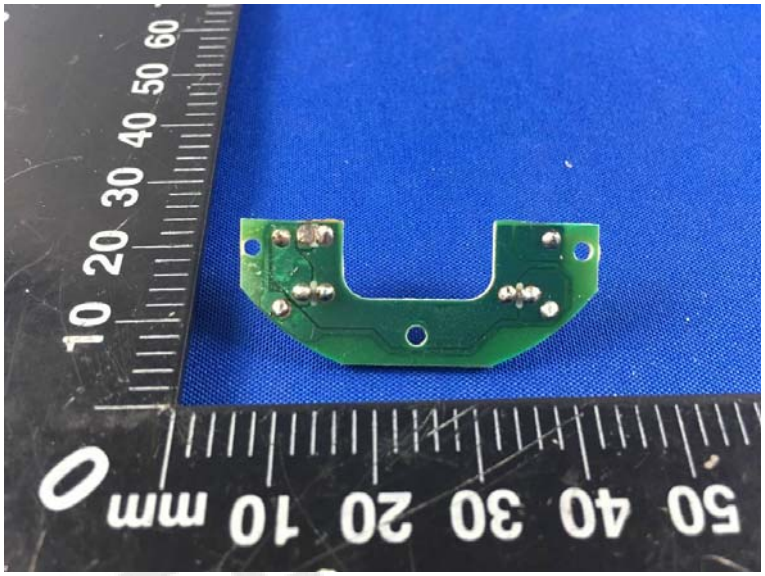



Antenna
RDMZ-V1.0
20180327
6210


JF16.000
INDENA-XT-MZ 1.0 FR-4


mm





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