



TEST REPORT

Report No. : CHTEW19080060

Report verification : 

Project No. : SHT1906061808EW

FCC ID : 2APQ9-S5-1

Applicant's name : Shenzhen JX ROBOT Technology Co., Ltd.

Address : 9th Floor, B Area, Building 1, Yulv Hanhaida Hi-Tech Park, Guangming New District

Manufacturer : Shenzhen JX ROBOT Technology Co., Ltd.

Address : 9th Floor, B Area, Building 1, Yulv Hanhaida Hi-Tech Park, Guangming New District

Test item description : Handheld 3-axis Gimbal Stabilizer

Trade Mark : -

Model/Type reference : S5B

Listed Model(s) : -

Standard : FCC CFR Title 47 Part 15 Subpart C Section 15.247

Date of receipt of test sample : Jun.28, 2019

Date of testing : Jun.28, 2019-Aug.08, 2019

Date of issue : Aug.13, 2019

Result : PASS

Compiled by

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Supervised by

(Position+Printed name+Signature): Project Engineer Edward Pan



Approved by

(Position+Printed name+Signature): RF Manager Hans Hu



Testing Laboratory Name : Shenzhen Huatongwei International Inspection Co., Ltd.

Address : 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

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The test report merely correspond to the test sample.

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1. TEST STANDARDS AND REPORT VERSION

1.1. Test Standards

The tests were performed according to following standards:

[FCC Rules Part 15.247](#): Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

[ANSI C63.10-2013](#): American National Standard for Testing Unlicensed Wireless Devices

[KDB 558074 D01 15.247 Meas Guidance v05r01](#): Guidance for Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating under Section 15.247 of The FCC Rules

1.2. Report version

Revision No.	Date of issue	Description
N/A	2019-08-13	Original

2. TEST DESCRIPTION

Test Item	Section in CFR 47	Result	Test Engineer
Antenna Requirement	15.203/15.247 (c)	PASS	Bruce Wong
AC Power Line Conducted Emissions	15.207	PASS	Kang Yang
Radiated Emissions	15.247(d)/15.209	PASS	Pan Xie

Note: The measurement uncertainty is not included in the test result.

3. SUMMARY

3.1. Client Information

Applicant:	Shenzhen JX ROBOT Technology Co., Ltd.
Address:	9th Floor, B Area, Building 1,Yulv Hanhaida Hi-Tech Park, Guangming New District
Manufacturer:	Shenzhen JX ROBOT Technology Co., Ltd.
Address:	9th Floor, B Area, Building 1,Yulv Hanhaida Hi-Tech Park, Guangming New District

3.2. Product Description

Name of EUT:	Handheld 3-axis Gimbal Stabilizer
Trade Mark:	-
Model No.:	S5B
Listed Model(s):	-
Power supply:	DC 3.7V
Adapter information:	-
Bluetooth	
Version:	Supported BT4.2+EDR
Modulation:	GFSK, $\pi/4$ DQPSK
Operation frequency:	2402MHz~2480MHz
Channel number:	79
Channel separation:	1MHz
Antenna type:	FPC
Antenna gain:	-0.68dBi

3.3. Operation state

➤ Test frequency list

According to section 15.31(m), regards to the operating frequency range over 10 MHz, must select three channel which were tested. the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, please see the above gray bottom.

Channel	Frequency (MHz)
00	2402
01	2403
:	:
39	2441
:	:
77	2479
78	2480

➤ TEST MODE

For RF test items:
The engineering test program was provided and enabled to make EUT continuous transmit
For AC power line conducted emissions:
The EUT was set to connect with the Bluetooth instrument under large package sizes transmission.
For Radiated suprious emissions test item:
The engineering test program was provided and enabled to make EUT continuous transmit. The EUT in each of three orthogonal axis emissions had been tested ,but only the worst case (X axis) data recorded in the report.

3.4. EUT configuration

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

- - supplied by the manufacturer
- - supplied by the lab

○ Adapter	Manufacturer:	Panasonic
	Model No.:	SAE00120
○ Mobile Phone	Manufacturer:	One Plus
	Model No.:	One Plus 5

3.5. Modifications

No modifications were implemented to meet testing criteria.

4. TEST ENVIRONMENT

4.1. Address of the test laboratory

Laboratory: Shenzhen Huatongwei International Inspection Co., Ltd.

Address: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

4.2. Test Facility

CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No.: 3902.01

Shenzhen Huatongwei International Inspection 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.

FCC-Registration No.: 762235

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files.

IC-Registration No.:5377A

Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No.: 5377A.

ACA

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

4.3. Environmental conditions

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

Temperature:	15~35°C
Relative Humidity:	30~60 %
Air Pressure:	950~1050mba

4.4. 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 in calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according 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 Huatongwei International Inspection Co., Ltd. quality system according to 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.

Here after the best measurement capability for Shenzhen Huatongwei International Inspection Co., Ltd. is reported:

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.51 dB	(1)
Conducted spurious emissions 9kHz~40GHz	0.51 dB	(1)
Conducted Disturbance 150kHz~30MHz	3.02 dB	(1)
Radiated Emissions below 1GHz	4.90 dB	(1)
Radiated Emissions above 1GHz	4.96 dB	(1)
Occupied Bandwidth	70 Hz	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=1.96$

4.5. Equipments Used during the Test

● Radiated Emission-6th test site						
Used	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Semi-Anechoic Chamber	Albatross projects	SAC-3m-02	N/A	2018/09/30	2021/09/29
●	EMI Test Receiver	R&S	ESCI	100900	2018/10/28	2019/10/27
●	Loop Antenna	R&S	HFH2-Z2	100020	2017/11/20	2020/11/19
●	Ultra-Broadband Antenna	SCHWARZBECK	VULB9163	546	2017/04/05	2020/04/04
●	Pre-Amplifier	SCHWARZBECK	BBV 9742	N/A	2018/11/15	2019/11/14
●	RF Connection Cable	HUBER+SUHNER	N/A	N/A	2018/09/28	2019/09/27
●	RF Connection Cable	HUBER+SUHNER	SUCOFLEX104	501184/4	2018/09/28	2019/09/27
●	Test Software	R&S	ES-K1	N/A	N/A	N/A
●	Turntable	Maturo Germany	TT2.0-1T	N/A	N/A	N/A
●	Antenna Mast	Maturo Germany	CAM-4.0-P-12	N/A	N/A	N/A

● RF Conducted Method						
Used	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Signal and spectrum Analyzer	R&S	FSV40	100048	2018/10/28	2019/10/27
●	Spectrum Analyzer	Agilent	N9020A	MY50510187	2018/09/29	2019/09/28
○	Radio communication tester	R&S	CMW500	137688-Lv	2018/09/29	2019/09/28
○	Test software	Tonscend	JS1120-1(LTE)	N/A	N/A	N/A
○	Test software	Tonscend	JS1120-2(WIFI)	N/A	N/A	N/A
○	Test software	Tonscend	JS1120-3(WCDMA)	N/A	N/A	N/A
○	Test software	Tonscend	JS1120-4(GSM)	N/A	N/A	N/A

5. TEST CONDITIONS AND RESULTS

5.1. Antenna requirement

Requirement

FCC CFR Title 47 Part 15 Subpart C 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.

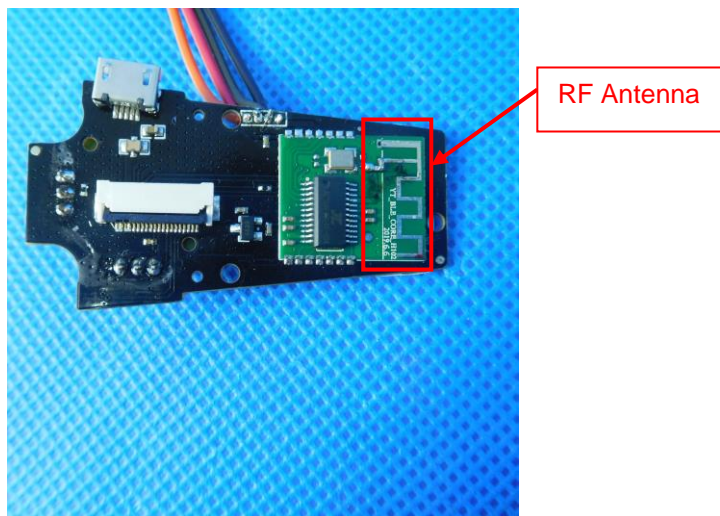
FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):

(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 6 dBi 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 6 dBi.

Test Result:

☒ **Passed** ☐ **Not Applicable**

The directional gain of the antenna less than 6 dBi, please refer to the below antenna photo.



5.2. Conducted Emissions (AC Main)

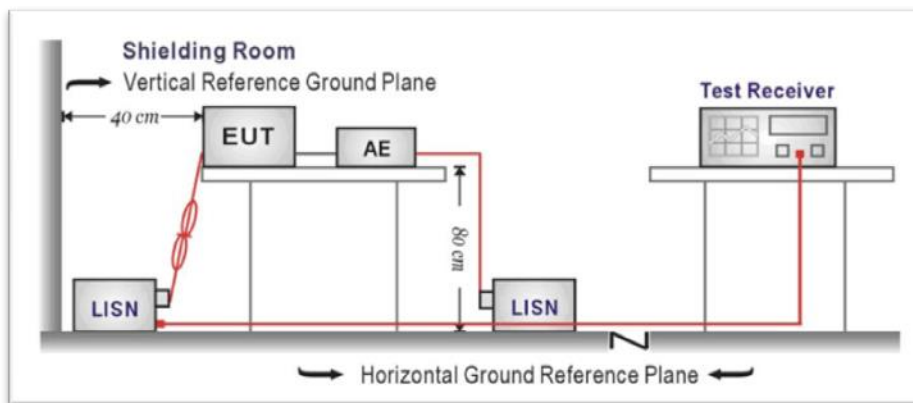
LIMIT

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 EUT was setup according to ANSI C63.10:2013 requirements.
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment.
4. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
8. During the above scans, the emissions were maximized by cable manipulation.

TEST RESULTS

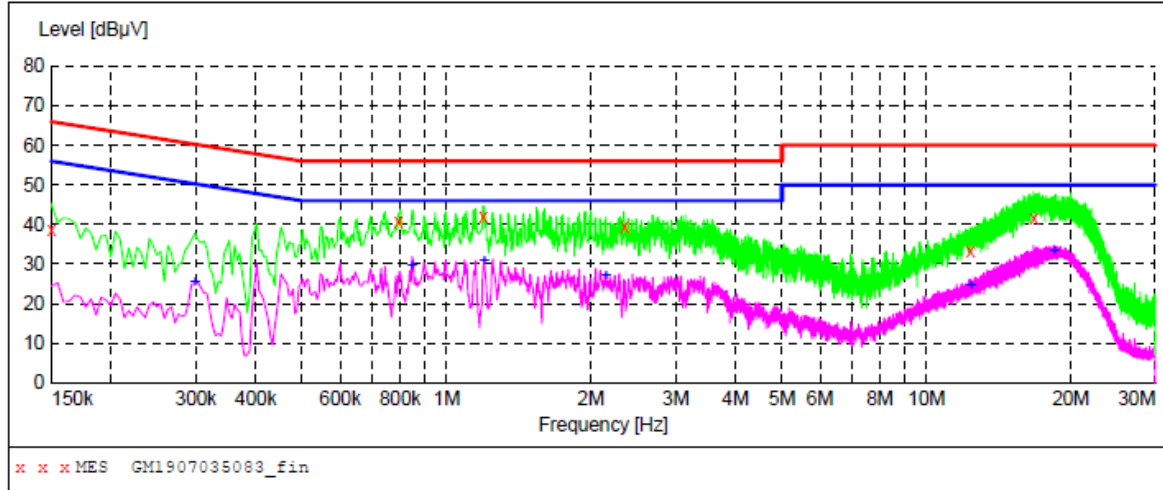
☒ Passed ☐ Not Applicable

Note:

- 1) Transd= Cable lose + Pulse Limiter Factor + Artificial Mains Factor
- 2) Margin= Limit - Level

Test Line:

L

**MEASUREMENT RESULT: "GM1907035083_fin"**

7/3/2019 9:08PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.150000	38.50	9.9	66	27.5	QP	L1	GND
0.793500	40.60	9.9	56	15.4	QP	L1	GND
1.194000	42.10	9.9	56	13.9	QP	L1	GND
2.346000	39.40	9.9	56	16.6	QP	L1	GND
12.336000	33.30	10.1	60	26.7	QP	L1	GND
16.759500	41.60	10.2	60	18.4	QP	L1	GND

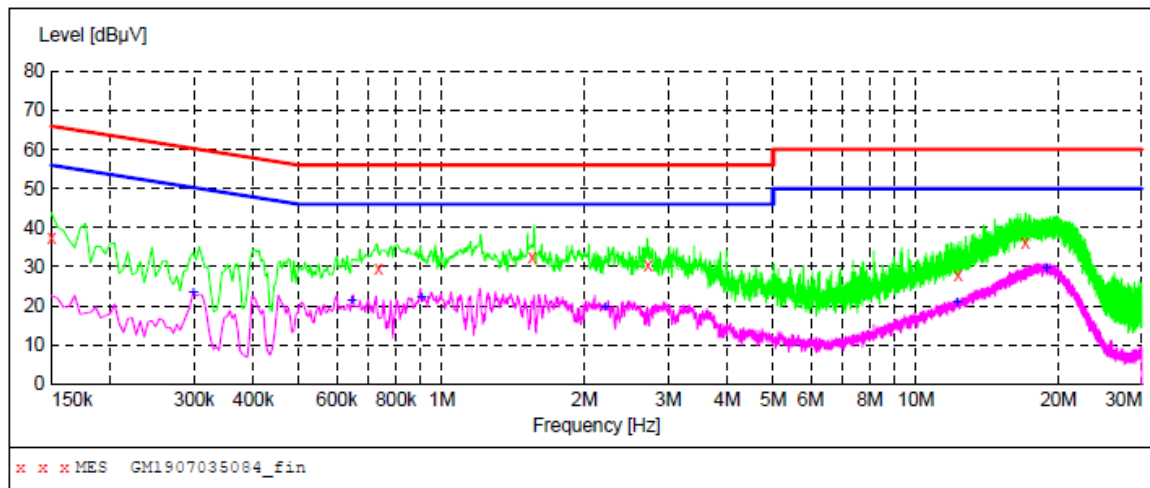
MEASUREMENT RESULT: "GM1907035083_fin2"

7/3/2019 9:08PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.298500	25.40	9.9	50	24.9	AV	L1	GND
0.847500	29.50	9.9	46	16.5	AV	L1	GND
1.198500	31.00	9.9	46	15.0	AV	L1	GND
2.143500	27.10	9.9	46	18.9	AV	L1	GND
12.376500	24.40	10.1	50	25.6	AV	L1	GND
18.447000	33.10	10.2	50	16.9	AV	L1	GND

Test Line:

N

**MEASUREMENT RESULT: "GM1907035084_fin"**

7/3/2019 9:11PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.150000	37.60	9.9	66	28.4	QP	N	GND
0.735000	29.40	9.9	56	26.6	QP	N	GND
1.549500	32.50	9.9	56	23.5	QP	N	GND
2.719500	30.30	9.9	56	25.7	QP	N	GND
12.286500	27.70	10.1	60	32.3	QP	N	GND
17.016000	36.20	10.2	60	23.8	QP	N	GND

MEASUREMENT RESULT: "GM1907035084_fin2"

7/3/2019 9:11PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.298500	23.50	9.9	50	26.8	AV	N	GND
0.645000	21.20	9.9	46	24.8	AV	N	GND
0.906000	22.20	9.9	46	23.8	AV	N	GND
2.211000	19.70	9.9	46	26.3	AV	N	GND
12.201000	20.80	10.1	50	29.2	AV	N	GND
18.870000	29.50	10.2	50	20.5	AV	N	GND

5.3. Spurious Emissions (radiated)

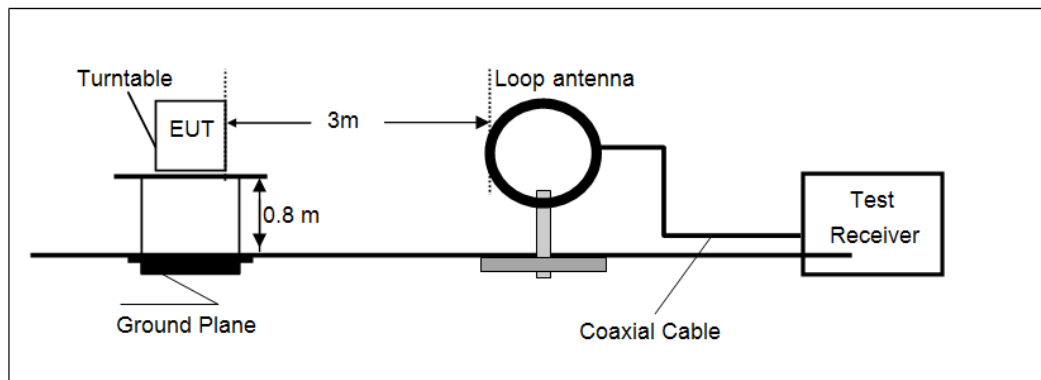
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.209

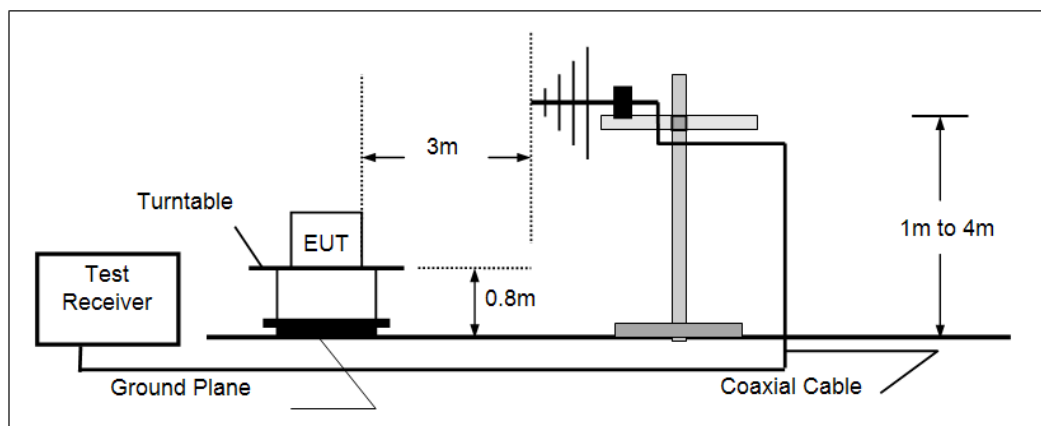
Frequency	Limit (dBuV/m @3m)	Value
30 MHz ~ 88 MHz	40.00	Quasi-peak
88 MHz ~ 216 MHz	43.50	Quasi-peak
216 MHz ~ 960 MHz	46.00	Quasi-peak
960 MHz ~ 1 GHz	54.00	Quasi-peak
Above 1 GHz	54.00	Average
	74.00	Peak

TEST CONFIGURATION

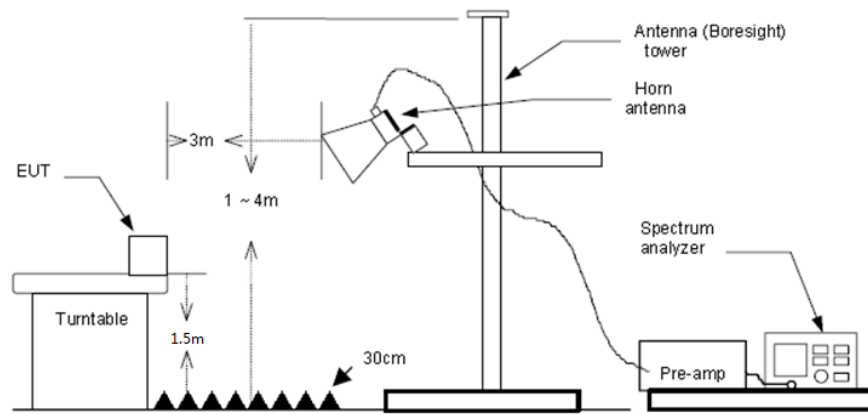
➤ Below 30 MHz



➤ 30 MHz ~1000 MHz



➤ Above 1 GHz



TEST PROCEDURE

1. The EUT was tested according to ANSI C63.10:2013.
2. The EUT is placed on a turn table with 0.8 meter above ground for below 1GHz, 1.5 meter above ground for above 1GHz.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Use the following spectrum analyzer settings
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Below 1 GHz:
RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;
If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
 - (3) From 1 GHz to 10th harmonic:
RBW=1 MHz, VBW=3 MHz Peak detector for Peak value
RBW=1 MHz, VBW=10 Hz Peak detector for Average value.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☒ Passed ☐ Not Applicable

Note:

- 1) Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
- 2) The emission levels of other frequencies are very lower than the limit and not show in test report.
- 3) Below 1 GHz, Have pre-scan all modulation mode, found the $\pi/4$ DQPSK modulation middle channel which it was worst case, so only the worst case's data on the test report.
- 4) Above 1 GHz, Have pre-scan all modulation mode, found the $\pi/4$ DQPSK modulation which it was worst case, so only the worst case's data on the test report
- 5) The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.

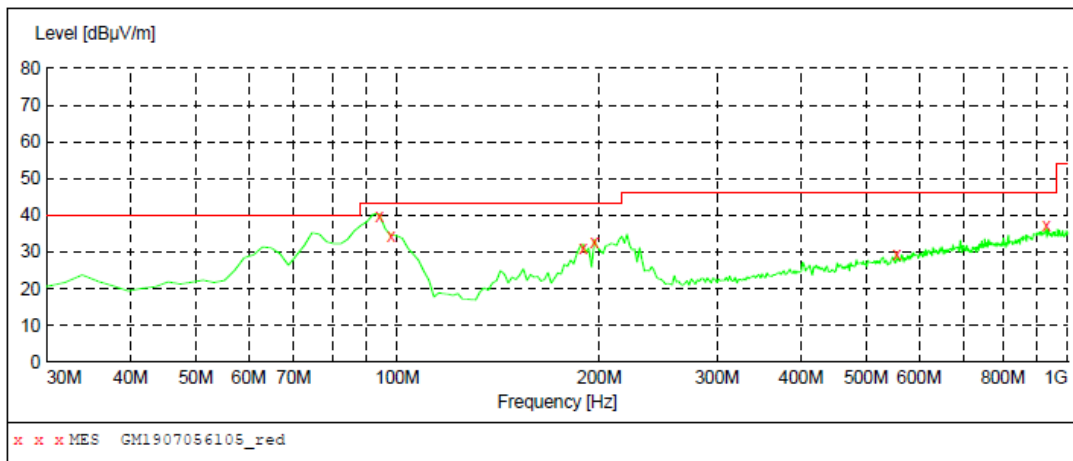
➤ 9 kHz ~ 30 MHz

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

➤ 30 MHz ~ 1 GHz

Polarization:

Vertical

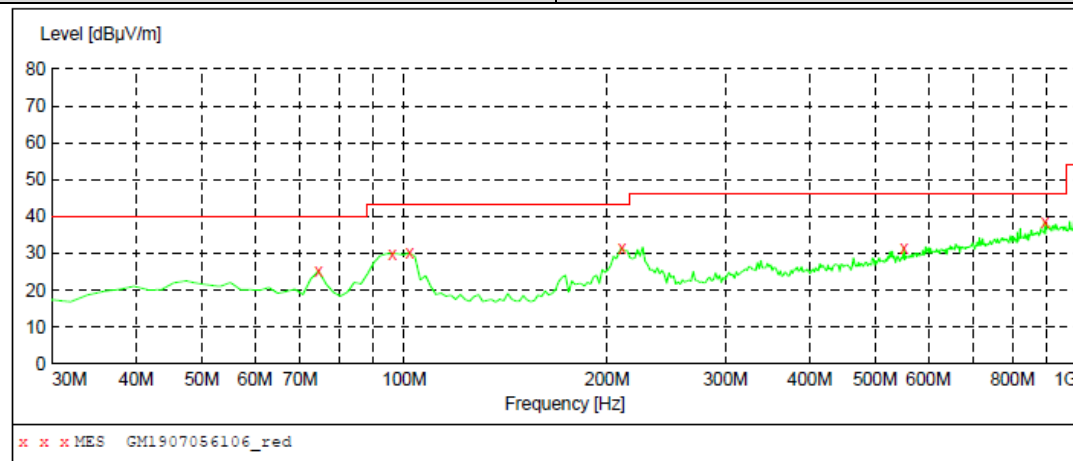
**MEASUREMENT RESULT: "GM1907056105_red"**

7/5/2019 8:39PM

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
94.020000	39.70	-7.7	43.5	3.8	QP	100.0	242.00	VERTICAL
97.900000	33.40	-6.9	43.5	10.1	QP	100.0	114.00	VERTICAL
189.080000	32.70	-7.4	43.5	8.8	QP	100.0	289.00	VERTICAL
196.840000	35.10	-5.9	43.5	8.4	QP	100.0	289.00	VERTICAL
555.740000	30.60	3.1	46.0	15.4	QP	100.0	13.00	VERTICAL
928.220000	38.40	10.7	46.0	7.6	QP	100.0	360.00	VERTICAL

Polarization:

Horizontal

**MEASUREMENT RESULT: "GM1907056106_red"**

7/5/2019 8:42PM

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
74.620000	25.30	-10.9	40.0	14.7	QP	100.0	206.00	HORIZONTAL
95.960000	29.90	-7.3	43.5	13.6	QP	100.0	220.00	HORIZONTAL
101.780000	30.20	-6.6	43.5	13.3	QP	100.0	206.00	HORIZONTAL
210.420000	31.50	-6.6	43.5	12.0	QP	100.0	235.00	HORIZONTAL
551.860000	31.50	3.0	46.0	14.5	QP	100.0	296.00	HORIZONTAL
893.300000	38.40	10.3	46.0	7.6	QP	100.0	249.00	HORIZONTAL

6. TEST SETUP PHOTOS

Conducted Emissions (AC Mains)

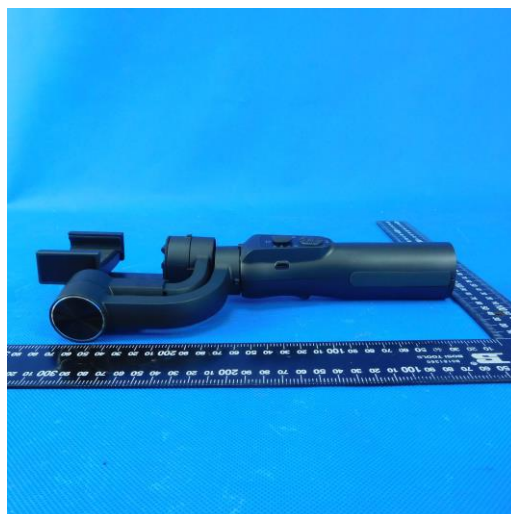
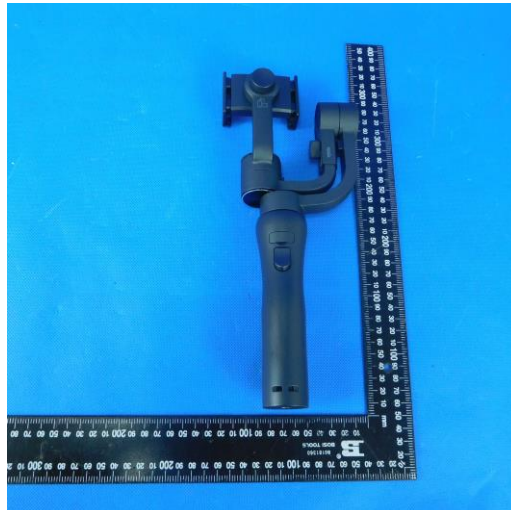
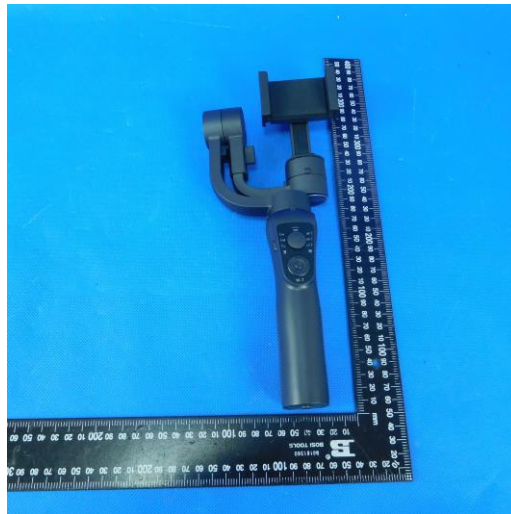


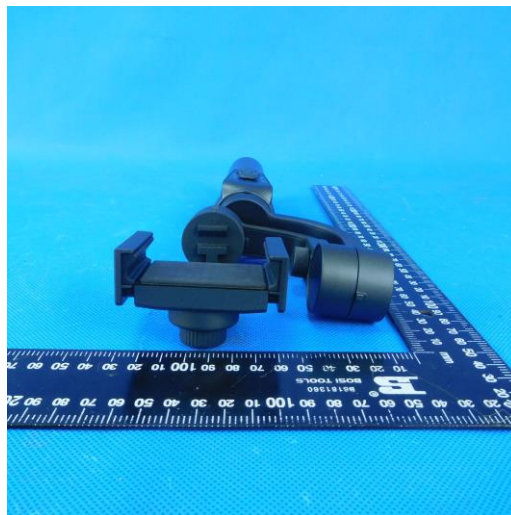
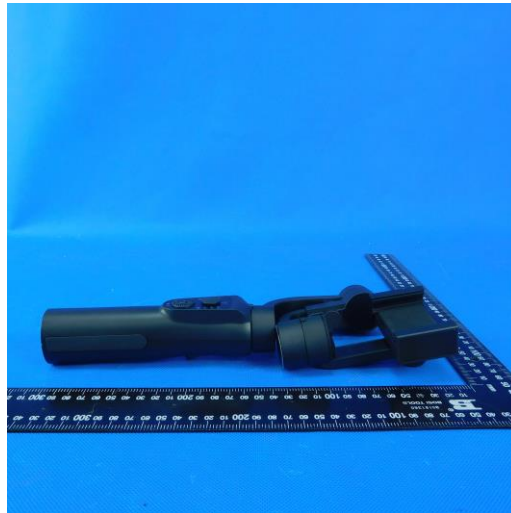
Radiated Emissions

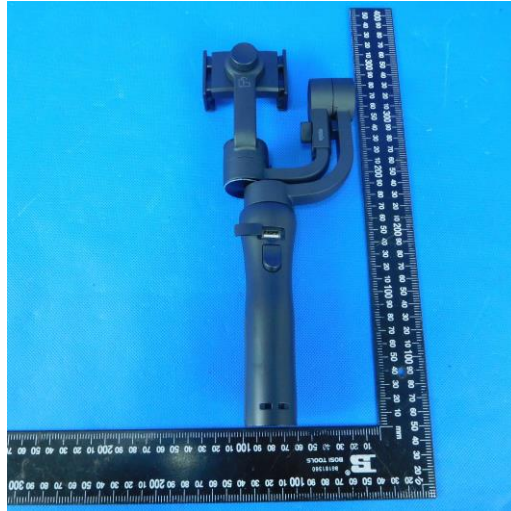


7. EXTERNAL AND INTERNAL PHOTOS

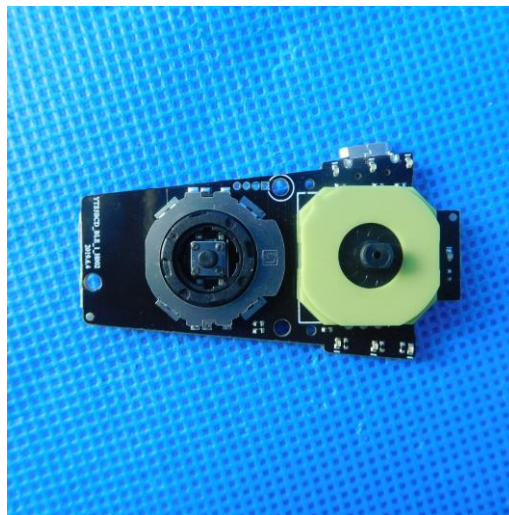
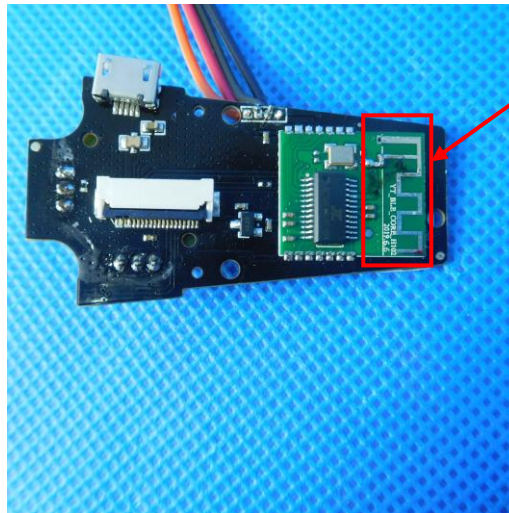
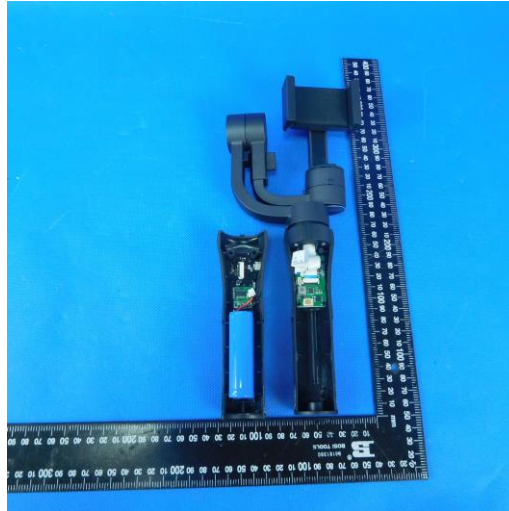
External Photos

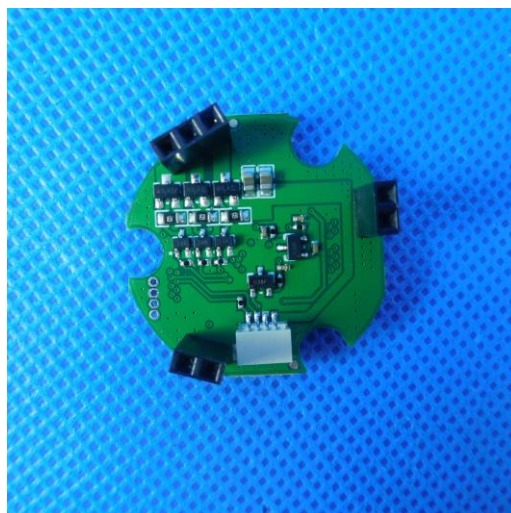
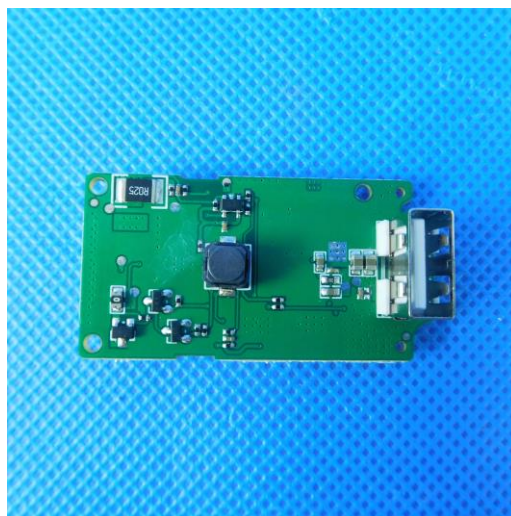


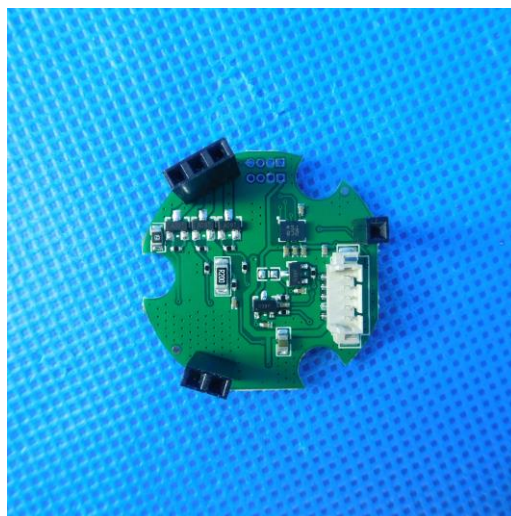
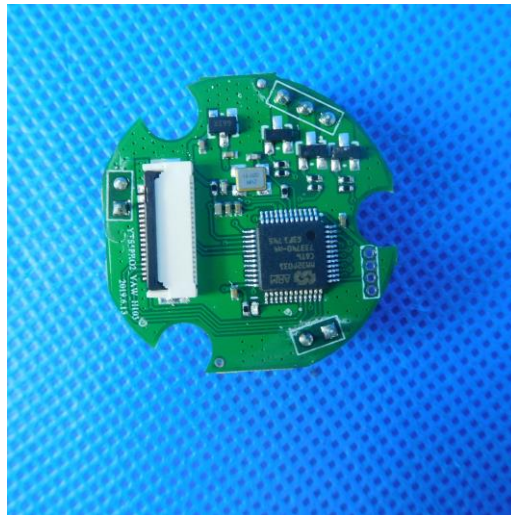


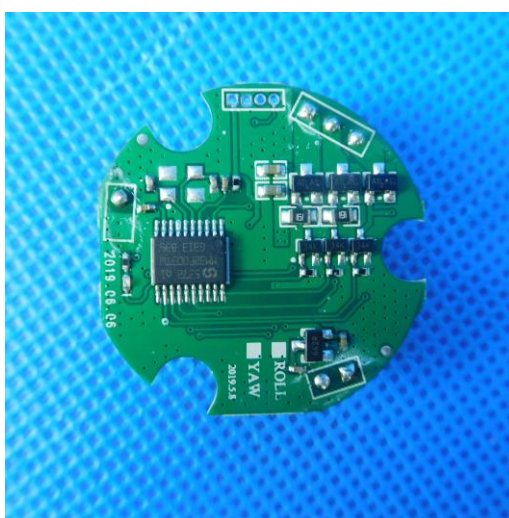
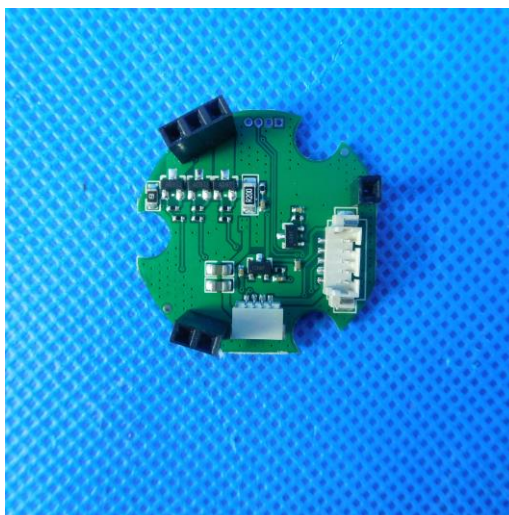


Internal Photos









-----End of Report-----