FCC TEST REPORT

On Behalf of

FCC ID: SY4-A01024

Shanghai Huace Navigation Technology LTD.

Geodetic GNSS Receiver (X900)

Model No.: 1192110016

Prepared for	:	Shanghai Huace Navigation Technology LTD.
Address	:	Building C, 599 Gaojing Road, Qingpu District, Shanghai, China

Prepared By	:	Shenzhen Alpha Product Testing Co., Ltd.
Address	:	Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

Report Number	:	T1880947 07
Date of Receipt	:	June 19, 2018
Date of Test	:	June 19, 2018- August 23, 2018
Date of Report	:	August 27, 2018
Version Number	:	REV0

TABLE OF CONTENTS

Description Page

1. General Information 5
1.1. Description of Device (EUT) 5
1.2. Accessories of Device (EUT) 5
1.3. Tested Supporting System Details. 6
1.4. Block Diagram of connection between EUT and simulators 6
2. Summary Of Standards And Results 7
2.1. Description of Standards and Results 7
2.2. Test Mode Description 8
2.3. Test Equipment List 9
2.4. Test Facility 10
2.5. Measurement Uncertainty 10
3. Power Line Conducted Emission Test 11
3.1. Test Limits 11
3.2. Block Diagram of Test Setup 11
3.3. Configuration of EUT on Test 12
3.4. Operating Condition of EUT 12
3.5. Test Procedure 12
3.6. Test Results 13
4. Radiated Emission Test 16
4.1. Test Limit 16
4.2. Block Diagram of Test Setup 17
4.3. Configuration of EUT on Test 18
4.4. Operating Condition of EUT 18
4.5. Test Procedure 18
4.6. Test Results 19
5. Photograph 25
5.1. Photo of Radiated Emission Test (In Semi Anechoic Chamber) 25
5.2. Photo of Power Line Conducted Emission Test 26
6. Photos Of The EUT 27

TEST REPORT DECLARATION

Applicant	:	Shanghai Huace Navigation Technology LTD.
Address	:	Building C, 599 Gaojing Road, Qingpu District, Shanghai, China
Manufacturer	:	Shanghai Huace Navigation Technology LTD.
Address	:	Building C, 599 Gaojing Road, Qingpu District, Shanghai, China
EUT Description	:	Geodetic GNSS Receiver (X900)
	(A) Model No.	: 1192110016
	(B) Trademark	: CHCNAV

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart B Class B 2017, ANSI C63.4:2014

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the FCC Part15 requirements.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....…..:	Reak Yang Project Engineer	Reak Yang ……
Approved by (name + signature)…....:	Simple Guan Project Manager	……
Date of issue…… ……..:	August 27, 2018	

Revision History

Revision	Issue Date	Revisions	Revised By
REV0	August 27, 2018	Initial released Issue	Simple Guan

1. General Information

1.1.Description of Device (EUT)

Product Name : Geodetic GNSS Receiver (X900)

Model Number : 1192110016

1. The model name “1192110016” information not listed on marking plate at testing & certification stage, but will be listed in white rectangular frame of marking plate at MP stage.
2. The model name “1192110016” corresponding client’s internal model is “Geodetic GNSS Receiver (X900)Un-RT4”.

Highest Frequency : 2480MHz

Test Voltage : DC 7.4V from battery or 9-13.6VDC, DC 12V From adapter

Software version : 8.43

Hardware version : V2.4

1.2. Accessories of Device (EUT)

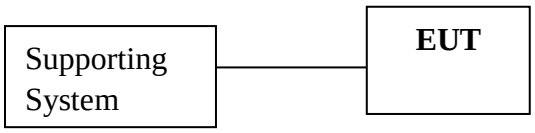
AC/DC Adapter	:	Model: DPS-40AB-11 Input: AC100-240V, 50-60Hz, 1.2A Output: DC 12V, 3.3A Max.

1.3.Tested Supporting System Details.

No.	Description	Manufacturer	Model	Serial Number	Certification or DOC
1	Personal Computer	ACER	ASPIRE M1830	PTSF90C00305005CAC3000	DOC
2.	Monitor	ACER	G205HV	SNID:10306738385	DOC
3.	USB Keyboard	ACER	SK-9625	KBUSB1580500037E0100	DOC
4.	USB Mouse	ACER	MS.11200.014	M-UAY-ACR2	DOC
5.	Printer	HP	HP1020	CNCJ410726	DOC

1.4.Block Diagram of connection between EUT and simulators

For Test
GNSS Mode/Data Transmitting



EUT: Geodetic GNSS Receiver (X900)

Signal Cable Description of the above Support Units

No.	Port Name	Cable	Length	Shielded (Yes or No)	Detachable (Yes or No)
/	/	/	/	/	/
/	/	/	/	/	/

2. Summary Of Standards And Results

2.1.Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

EMISSION			
Description of Test Item	**Standard**	**Limits**	**Results**
Power Line Conducted Emission Test	FCC Part 15:2017 ANSI C63.4:2014	Class B	**P**
Radiated Emission Test	FCC Part 15:2017 ANSI C63.4:2014	Class B	**P**

Note: 1. P is an abbreviation for Pass.

2. F is an abbreviation for Fail.

3. N/A is an abbreviation for Not Applicable.

2.2.Test Mode Description

For Radiated Emission Test		
Mode No.	Test Mode	Test Voltage
1.	GNSS Mode	DC 12V From adapter
※2.	Data Transmitting	DC 12V From adapter

Note: ※2 is worst case mode tests, so this report only reflected the worst mode in each part.

For Power Line Conducted Emission Test		
Mode No.	Test Mode	Test Voltage
1.	GNSS Mode	DC 12V From adapter
※2.	Data Transmitting	DC 12V From adapter

Note: ※1 is worst case mode tests, so this report only reflected the worst mode in each part.

2.3.Test Equipment List

For Power Line Conducted Emission Test Equipment:						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	101165	2017.09.22	1 Year
2.	L.I.S.N.#1	Schwarz beck	NSLK8126	8126466	2017.09.22	1 Year
3.	L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	101043	2017.09.22	1 Year
4.	Pulse Limiter	Schwarz beck	9516F	9618	2017.09.22	1 Year

For Frequency Range 30MHz~1GHz Radiated Emission Test Equipment:						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Test Receiver	Rohde&Schwarz	ESR	1316.3003K03-102082-Wa	2017.09.22	1 Year
3	Bilog Antenna	Schwarz beck	VULB 9168	9168-627	2016.09.30	2 Year

For Frequency Range above 1GHz Radiated Emission Test Equipment:						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum analyzer	ROHDE&SCHWARZ	FSU	1166.1660.26	2017.09.23	1 Year
2	Horn Antenna	Schwarz beck	BBHA 9120 D	BBHA 9120 D(1201)	2016.09.30	2 Year
3	Amplifier	Agilent	8449B	3008A02664	2017.09.23	1 Year

2.4.Test Facility

Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission
Registration Number: 293631

July 25, 2017 Certificated by IC
Registration Number: 12135A

2.5.Measurement Uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test	2.74dB
Uncertainty for Radiation Emission test (<1G)	3.77 dB (Distance: 3m Polarize: V)
	3.80 dB (Distance: 3m Polarize: H)
Uncertainty for Radiation Emission test (>1G)	4.13 dB (Distance: 3m Polarize: V)
	4.16 dB (Distance: 3m Polarize: H)
(95% confidence levels, k=2)	

3. Power Line Conducted Emission Test

3.1.Test Limits

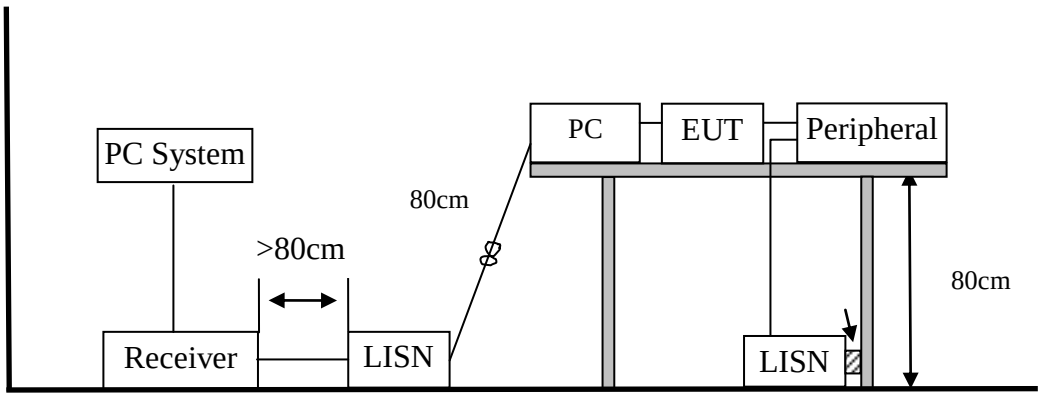
Frequency			Maximum RF Line Voltage	
			Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz	~	500kHz	66 ~ 56*	56 ~ 46*
500kHz	~	5MHz	56	46
5MHz	~	30MHz	60	50

Notes: 1. Emission level=Read level + LISN factor-Preamp factor + Cable loss

2. * Decreasing linearly with logarithm of frequency.

3. The lower limit shall apply at the transition frequencies.

3.2.Block Diagram of Test Setup



3.3.Configuration of EUT on Test

The following equipment are installed on Power Line Conducted Emission Test to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

3.4.Operating Condition of EUT

（1） Setup the EUT as shown as Section 3.2.

（2） Turn on the power of all equipment.

（3） Let the EUT work in test mode and 15 minutes before taking the test.

3.5.Test Procedure

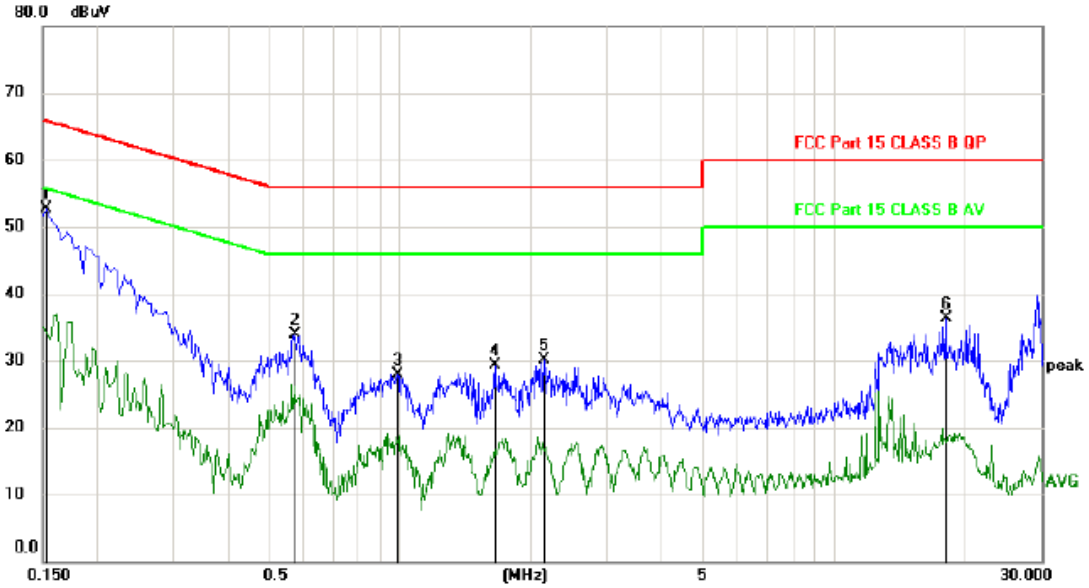
（1） The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power connected to the power mains through a line impedance stabilization network (L.I.S.N. 1#). This provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N.#2). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4:2014 on conducted Emission test.

（2） The frequency range from 150kHz to 30MHz is checked, the bandwidth of test receiver (R&S TEST RECEIVER ESCI) is set at 9kHz.

3.6.Test Results

Test Date	:	2018.06.25	Temperature	:	23.9℃
Test Engineer	:	Reak Yang	Humidity	:	46%
Test Mode	:	Data Transmitting			
Test Results	:	**Pass**			
Note:	1. The test results are listed in next pages.				
	1. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector and quasi-peak detector need not be carried out.				
	2. If the limits for the measurement with the average detector are met when using a receiver with a quasi-peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.				

Polarity: L

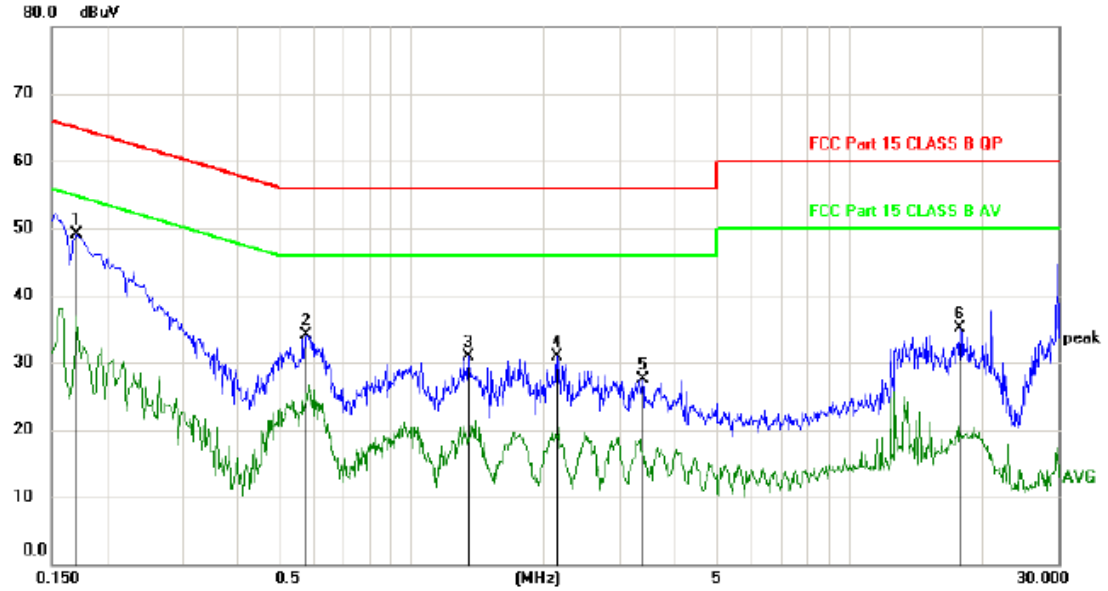


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1530	43.01	9.66	52.67	65.84	-13.17	peak	
2		0.5730	24.16	9.72	33.88	56.00	-22.12	peak	
3		0.9840	18.17	9.77	27.94	56.00	-28.06	peak	
4		1.6500	19.47	9.84	29.31	56.00	-26.69	peak	
5		2.1510	20.18	9.89	30.07	56.00	-25.93	peak	
6		18.0810	25.85	10.43	36.28	60.00	-23.72	peak	

*:Maximum data x:Over limit !:over margin

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

Polarity: N



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1710	39.42	9.66	49.08	64.91	-15.83	peak	
2		0.5760	24.39	9.72	34.11	56.00	-21.89	peak	
3		1.3500	21.09	9.81	30.90	56.00	-25.10	peak	
4		2.1510	21.00	9.89	30.89	56.00	-25.11	peak	
5		3.3750	17.57	10.02	27.59	56.00	-28.41	peak	
6		17.8560	24.69	10.44	35.13	60.00	-24.87	peak	

*:Maximum data x:Over limit !:over margin

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

4. RADIATED EMISSION TEST

4.1.Test Limit

Frequency MHz			Distance (Meters)	Distance (Meters)
30	~	88	3	40.0
88	~	216	3	43.5
216	~	960	3	46.0
960	~	1000	3	54.0
Above 1GHz			3	74(Peak) 54(Average)

Notes: 1. The smaller limit shall apply at the cross point between two frequency bands.

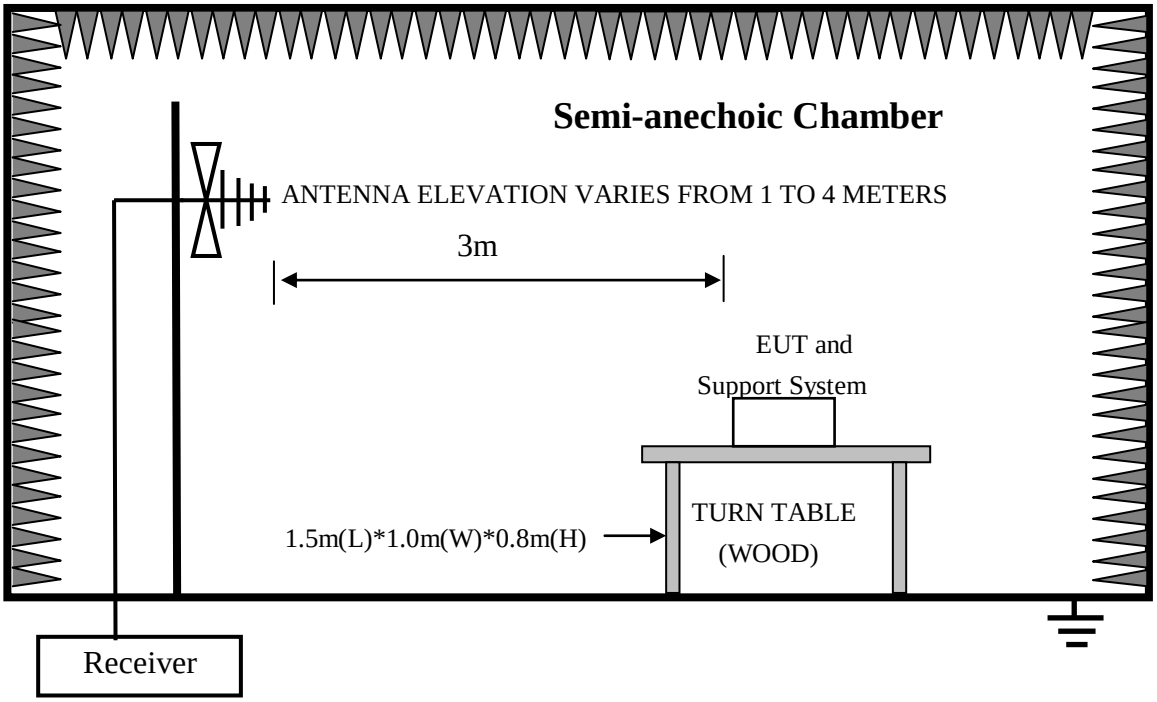
2. Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

3. Frequency range of radiated measurements:

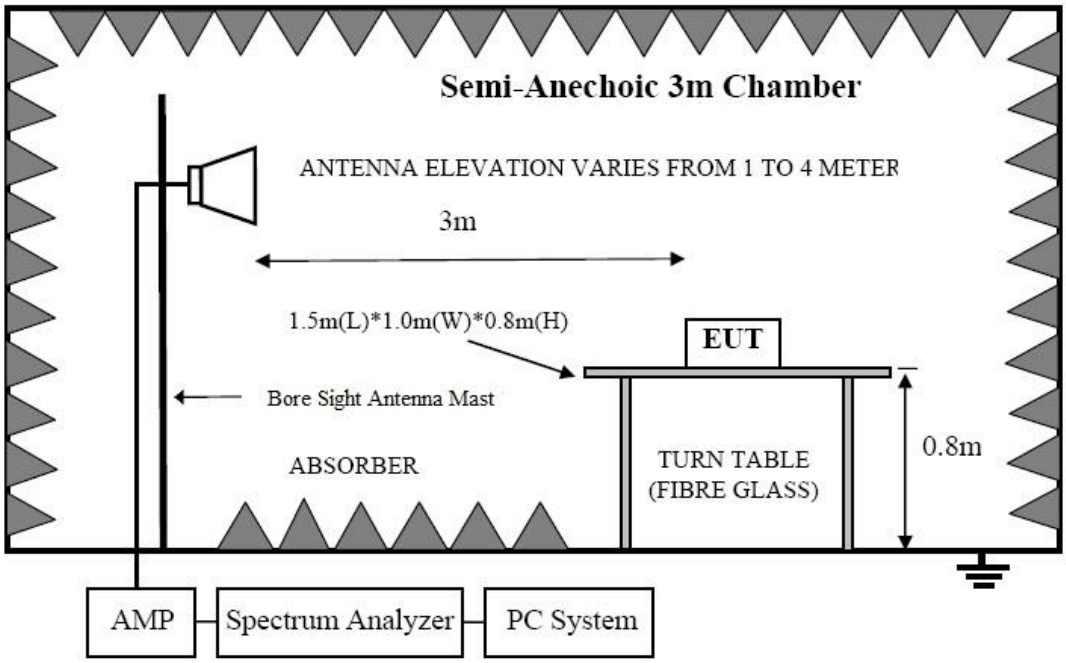
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705-108	1000
108-500	2000
500-1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

4.2.Block Diagram of Test Setup

In Semi Anechoic Chamber (3m) Test Setup Diagram for 30MHz~1000MHz



In Semi Anechoic Chamber (3m) Test Setup Diagram for Above 1GHz



4.3.Configuration of EUT on Test

The following equipment are installed on Radiated Emission Test to meet the commission requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

4.4.Operating Condition of EUT

（1） Setup the EUT as shown as Section 4.2.

（2） Turn on the power of all equipment.

（3） Let the EUT work in test mode and 15 minutes before taking the test.

4.5.Test Procedure

（1） The EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber. An antenna was located 3m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4:2014 on Radiated Emission test.

（2） For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

（3） The frequency range from 30MHz to 1000MHz is checked, the bandwidth of test receiver (R&S TEST RECEIVER ESR) is set at 120kHz.

（4） The frequency range from above 1GHz is checked, the bandwidth of spectrum analyzer (Spectrum Analyzer FSU) is set at 1MHz.

（5） The frequency range from 30MHz to 1000MHz was pre-scanned with a peak detector and all final readings of measurement from Test Receiver are Quasi-Peak values, the frequency range from 1GHz to 6GHz was pre-scanned with a peak detector and all final readings of measurement from Spectrum Analyzer are peak and average values checked, all measurement distance is 3m in 3m semi anechoic chamber.

（6） The test results are reported on Section 4.7.

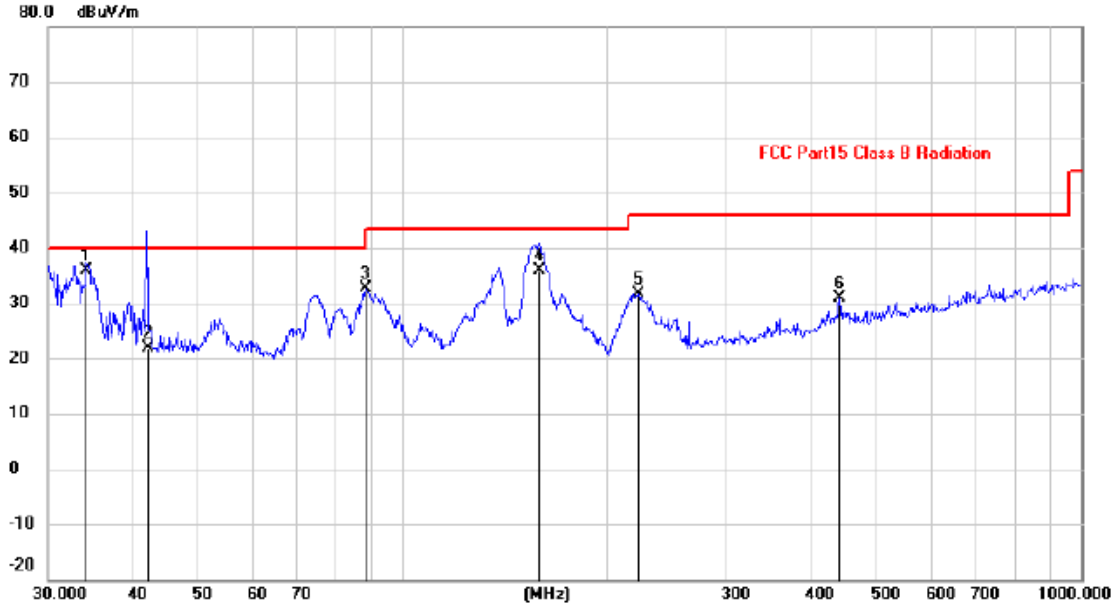
4.6.Test Results

Frequency Range	:	**30MHz~1000MHz**			
Test Date	:	2018.08.22	Temperature	:	24.2℃
Test Engineer	:	Reak Yang	Humidity	:	53%
Test Mode	:	Data Transmitting			
Test Results	:	**PASS**			

Note: 1. The test results are listed in next pages.

2. If the limits for the measurement with the quasi-peak detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the quasi-peak detector need not be carried out.

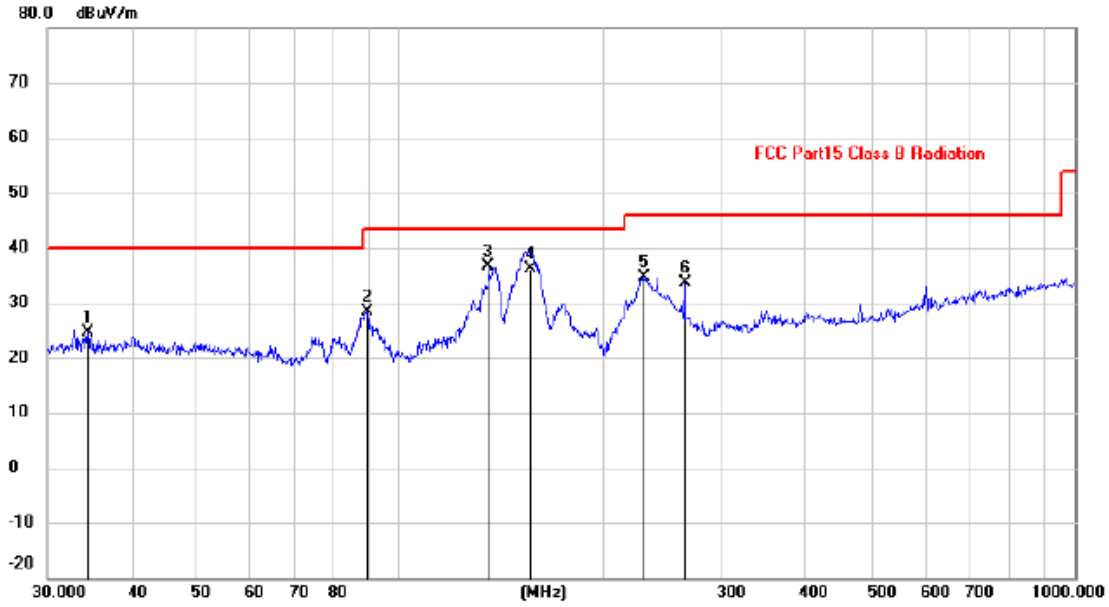
Antenna polarity: Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	34.1561	22.39	13.46	35.85	40.00	-4.15	QP			
2		42.0082	7.73	14.12	21.85	40.00	-18.15	QP	100	251	
3		88.0329	23.02	9.73	32.75	43.50	-10.75	peak			
4		158.6677	21.28	14.57	35.85	43.50	-7.65	QP			
5		222.1698	20.21	11.41	31.62	46.00	-14.38	peak			
6		441.7426	14.10	16.67	30.77	46.00	-15.23	peak			

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Antenna polarity: Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		34.3964	11.12	13.47	24.59	40.00	-15.41	peak			
2		89.5899	18.61	9.78	28.39	43.50	-15.11	peak			
3	*	135.5062	23.15	13.56	36.71	43.50	-6.79	peak			
4		155.9101	21.48	14.57	36.05	43.50	-7.45	QP			
5		229.2931	22.99	11.76	34.75	46.00	-11.25	peak			
6		263.8190	21.11	12.51	33.62	46.00	-12.38	peak			

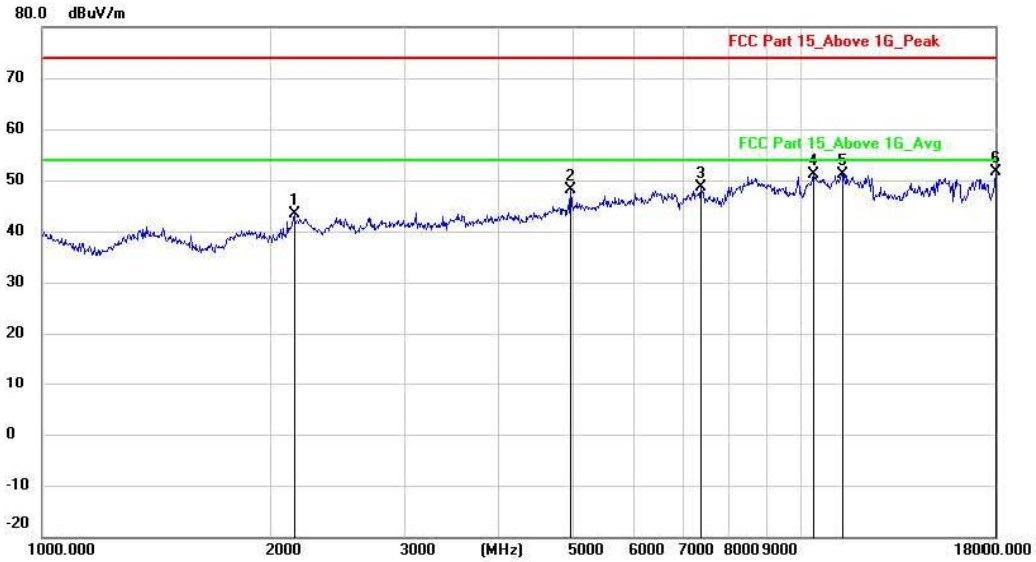
Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Frequency Range	:	**Above 1GHz**			
Test Date	:	2018.08.22	Temperature	:	24.2℃
Test Engineer	:	Reak Yang	Humidity	:	53%
Test Mode	:	Data Transmitting			
Test Results	:	**Pass**			

Note: 1. The data is shown in the next page.

2. If the limits for the measurement with the quasi-peak detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the quasi-peak detector need not be carried out.

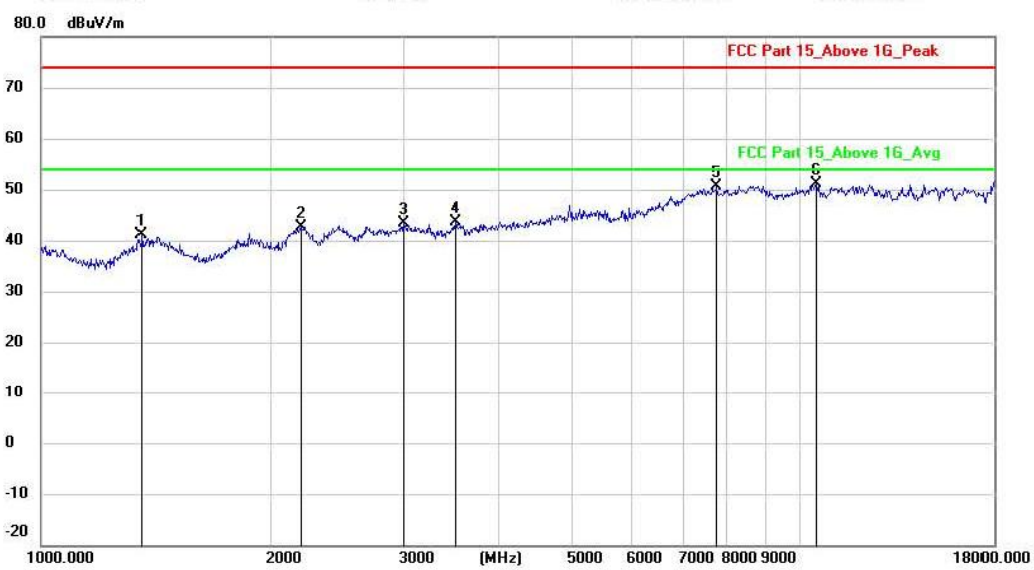
Antenna polarity: Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2144.825	47.08	-3.77	43.31	74.00	-30.69	peak			
2		4959.307	50.81	-2.58	48.23	74.00	-25.77	peak			
3		7368.741	45.08	3.44	48.52	74.00	-25.48	peak			
4		10393.71	46.16	5.05	51.21	74.00	-22.79	peak			
5		11335.19	45.27	5.76	51.03	74.00	-22.97	peak			
6	*	18000.00	38.85	12.88	51.73	74.00	-22.27	peak			

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Antenna polarity: Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		1354.577	48.25	-7.15	41.10	74.00	-32.90	peak			
2		2194.998	46.12	-3.37	42.75	74.00	-31.25	peak			
3		2999.187	45.67	-2.31	43.36	74.00	-30.64	peak			
4		3515.957	50.08	-6.36	43.72	74.00	-30.28	peak			
5		7762.260	47.24	3.28	50.52	74.00	-23.48	peak			
6	*	10514.57	45.92	5.20	51.12	74.00	-22.88	peak			

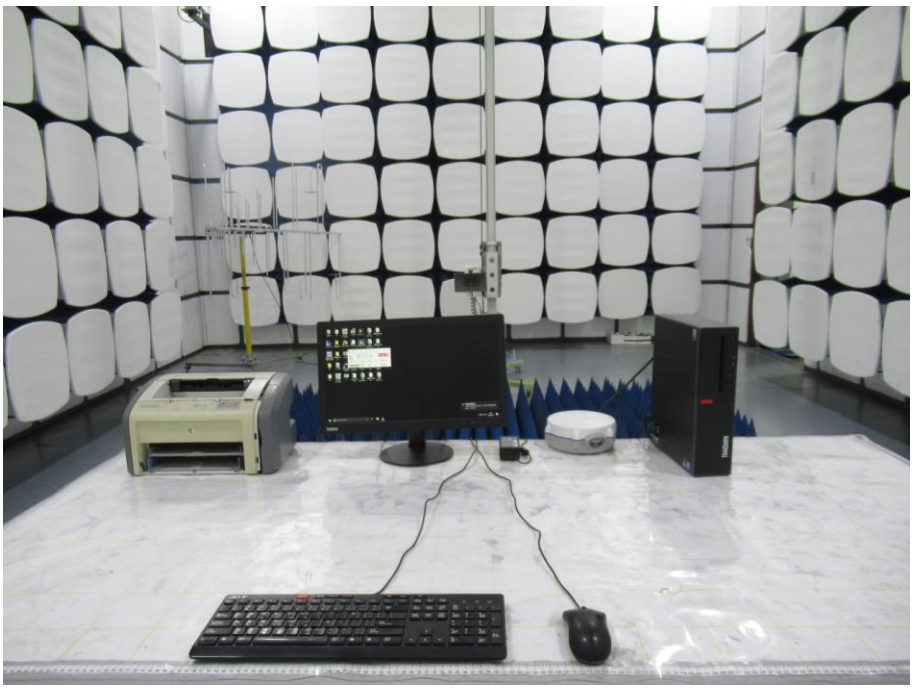
Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

5. PHOTOGRAPH

5.1.Photo of Radiated Emission Test (In Semi Anechoic Chamber)

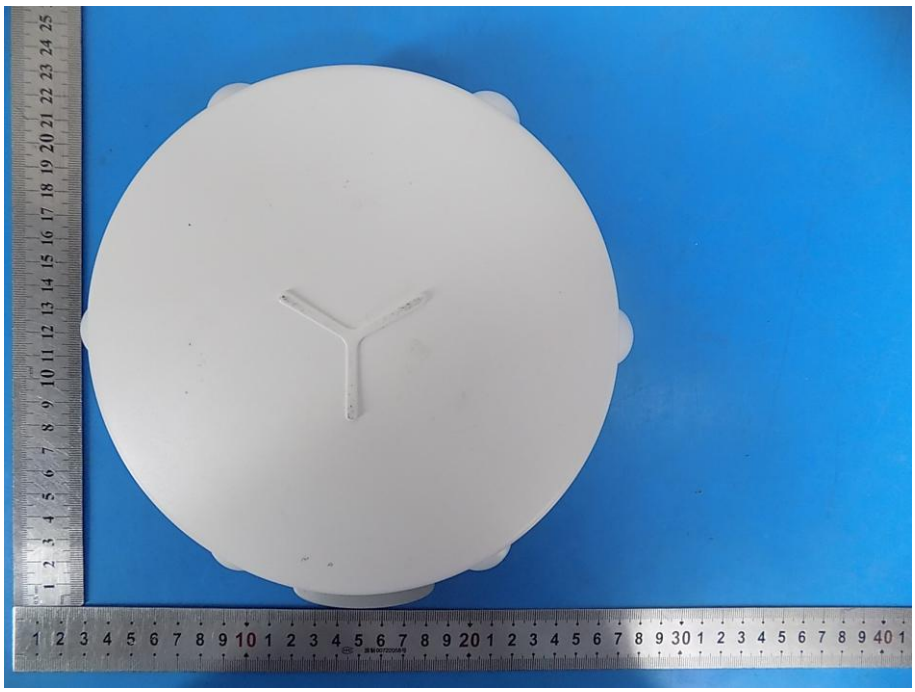
30M-1000MHz

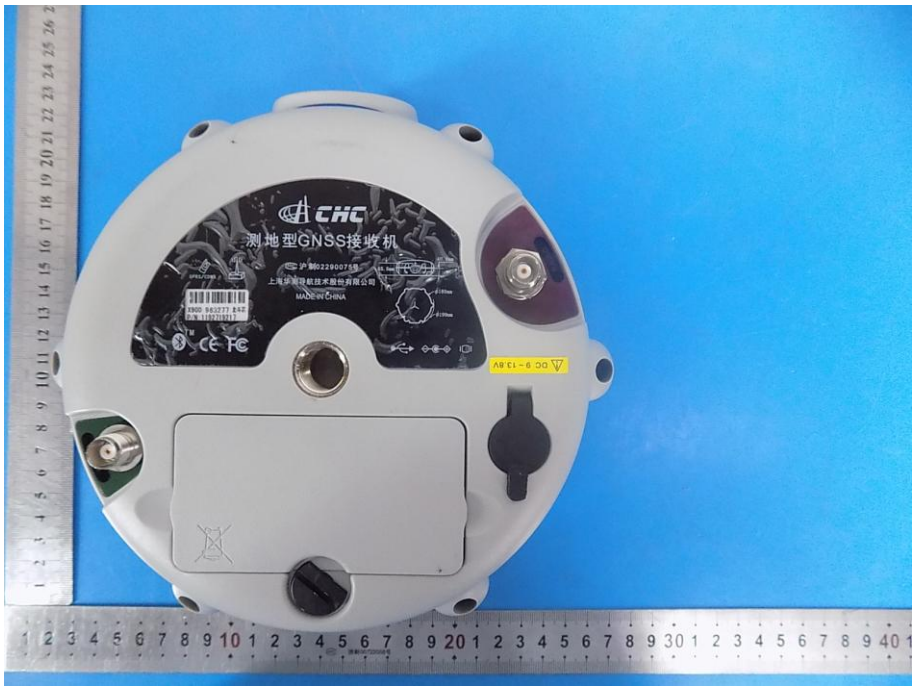
Above 1GHz

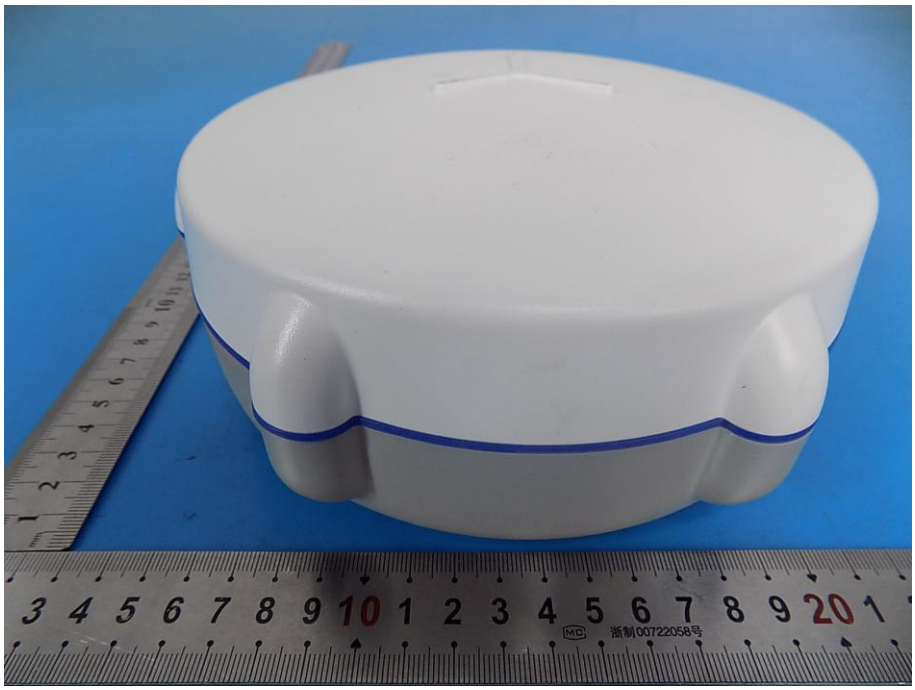


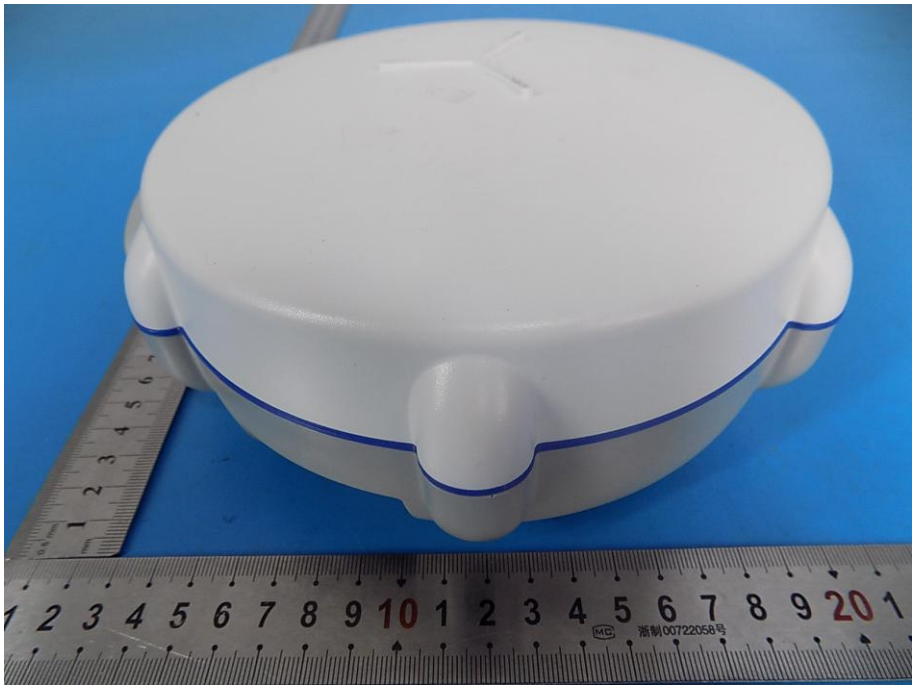
5.2.Photo of Power Line Conducted Emission Test

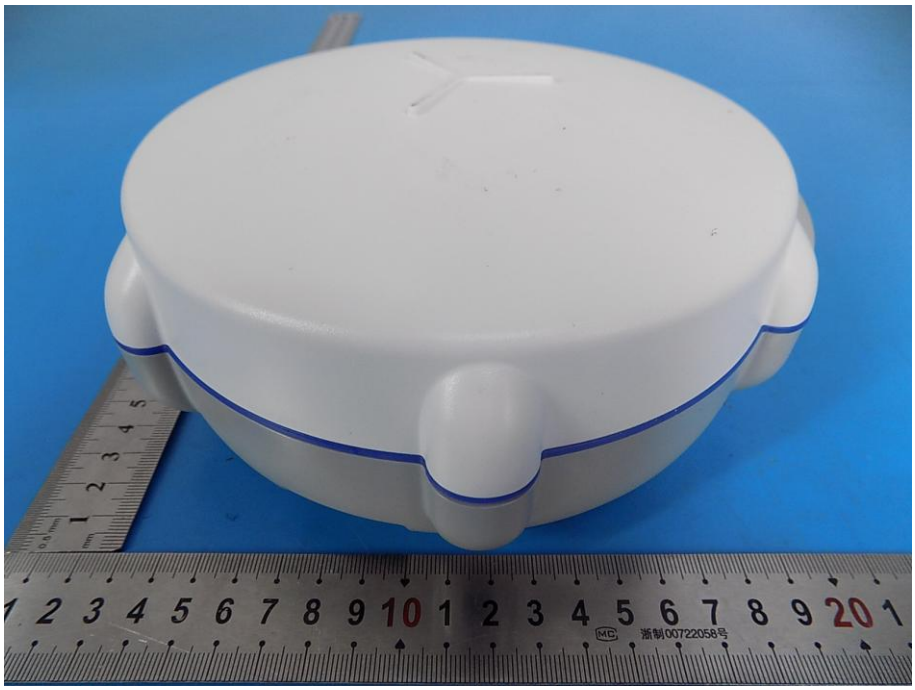
6. PHOTOS OF THE EUT

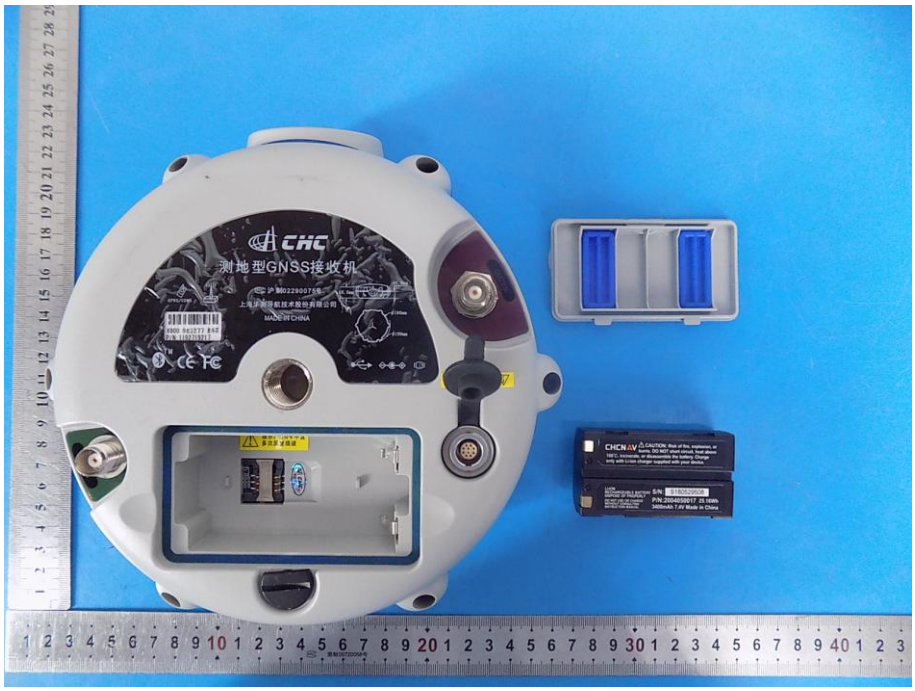



CHC
测地型GNSS接收机
MADE IN CHINA
DC 9~13.8V

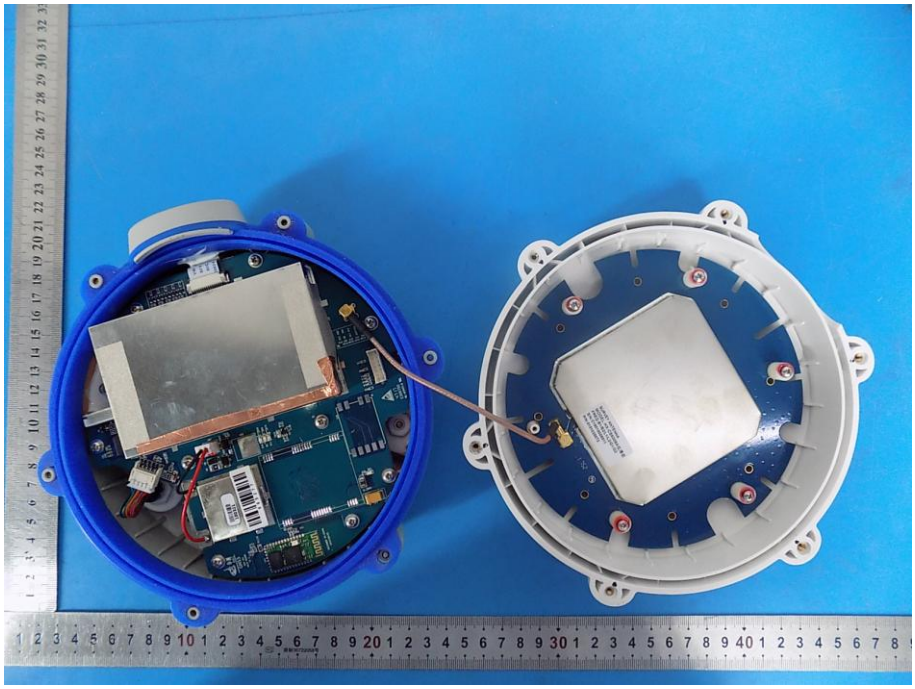


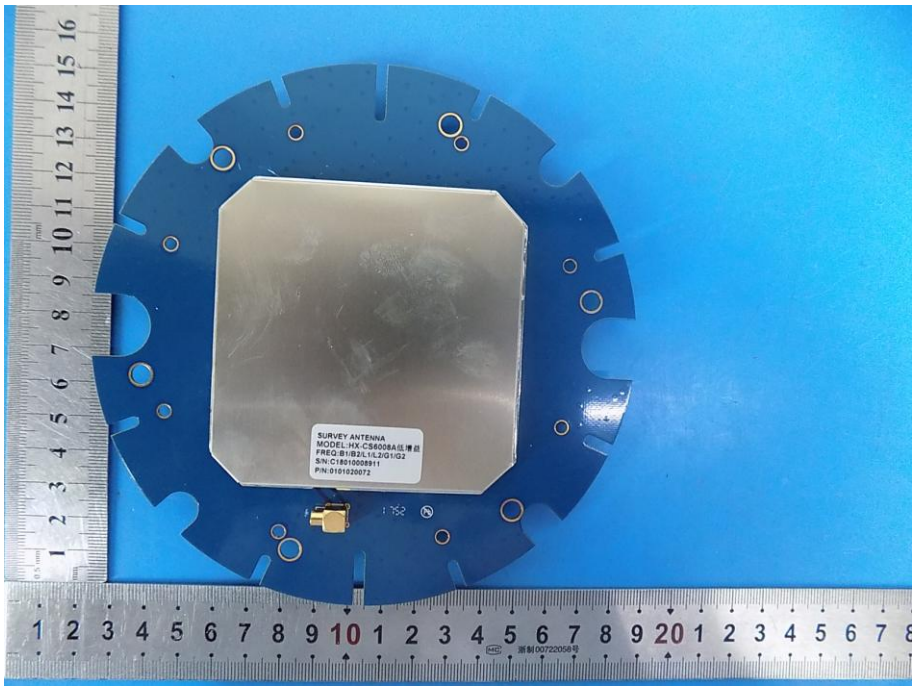


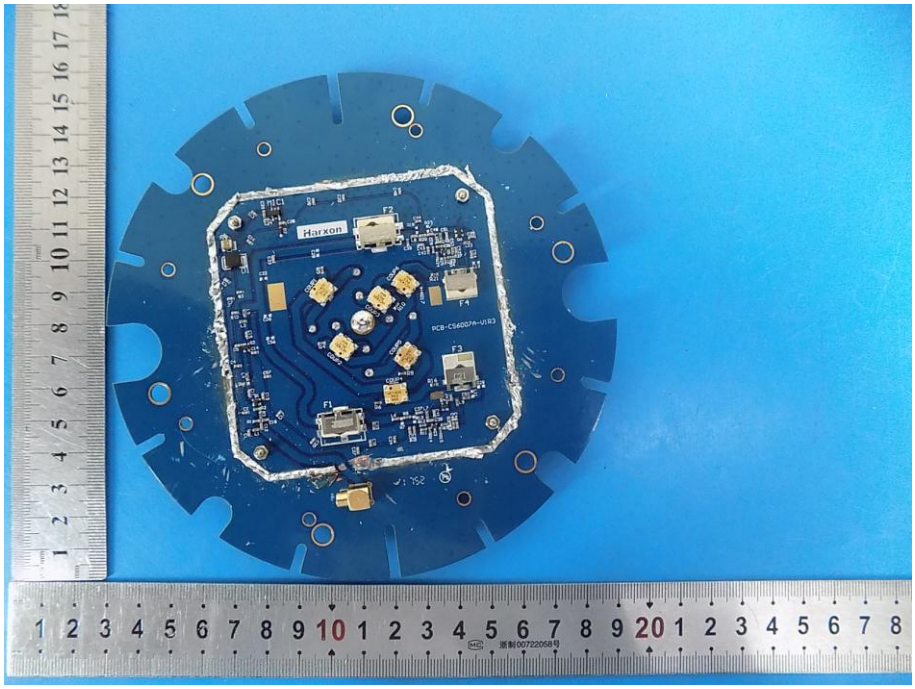


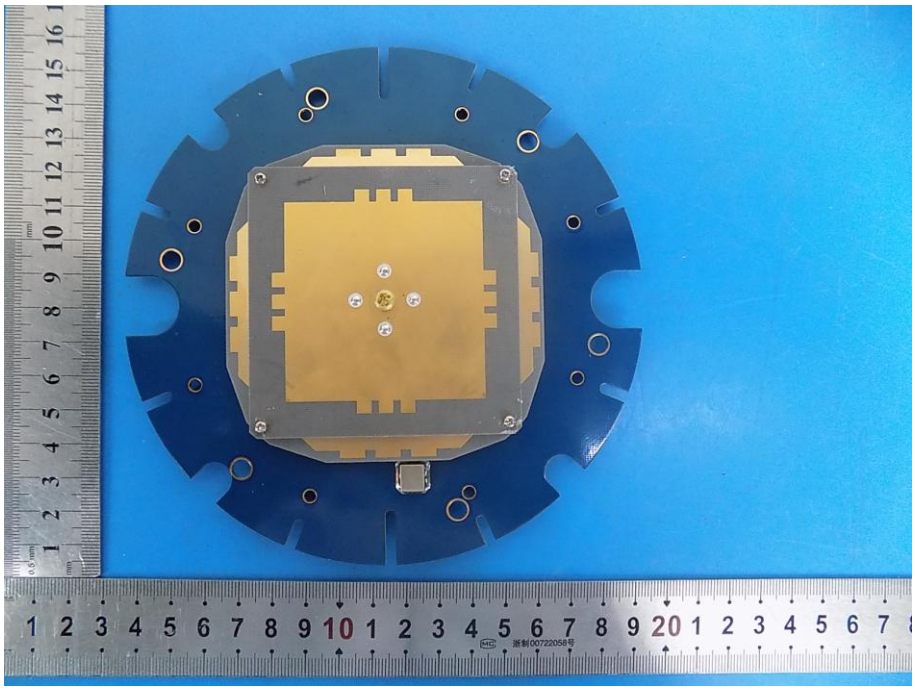

CHC
测地型GNSS接收机
MADE IN CHINA
CHCNAV

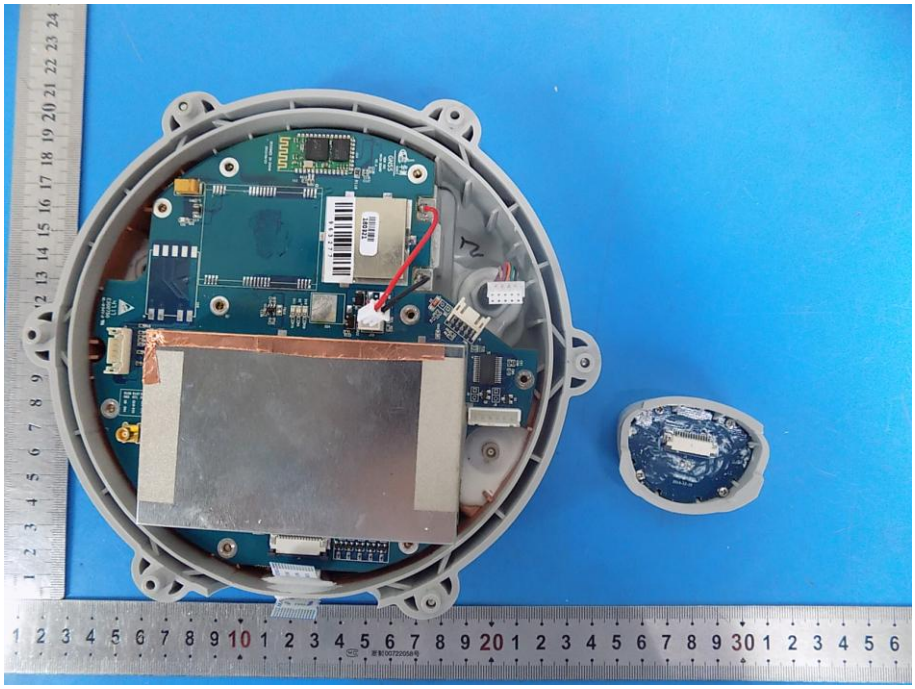

CHCNAV
CAUTION: Risk of fire, explosion, or burns. DO NOT short circuit, heat above 100°C, incinerate, or disassemble the battery. Charge only with Li-ion charger supplied with your device.
LI-ION RECHARGEABLE BATTERY
DISPOSE OF PROPERLY
DO NOT USE OR CHARGE WITHOUT CONSULTING INSTRUCTION MANUAL
S/N: S180529508
P/N:2004050017 25.16Wh
3400mAh 7.4V Made in China

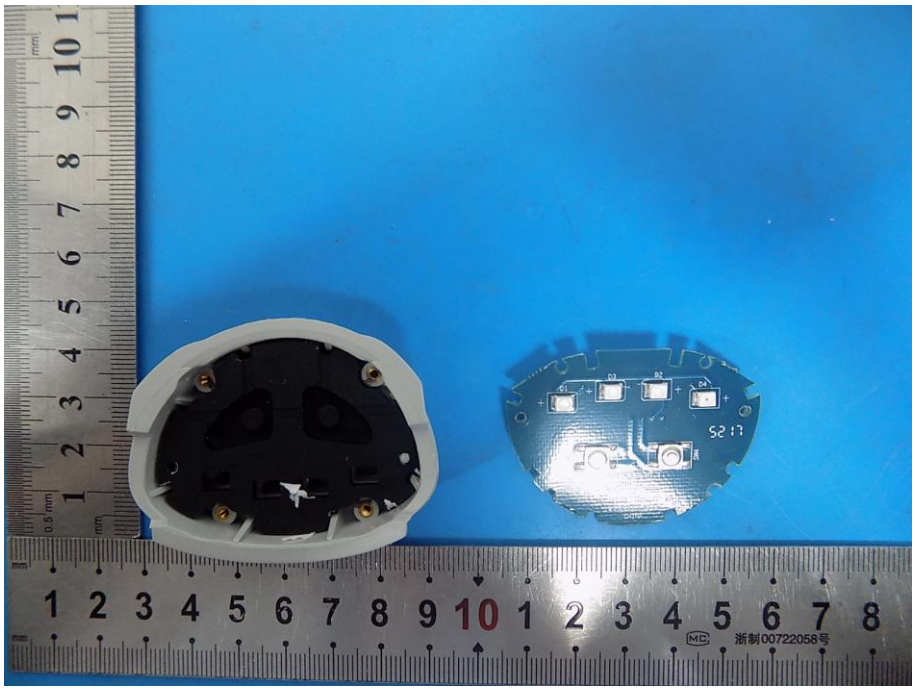


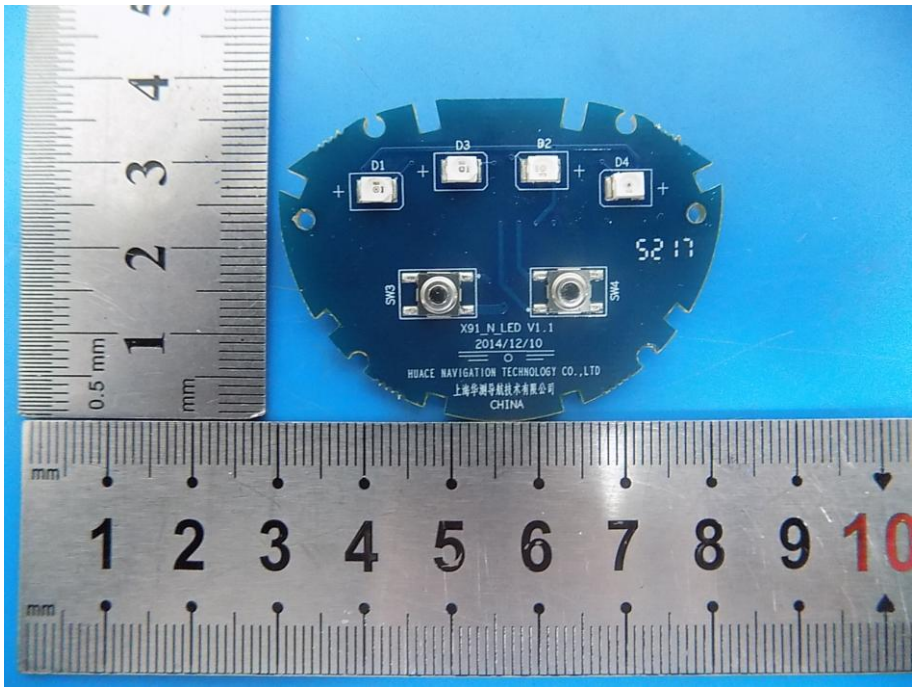

SURVEY ANTENNA
MODEL:HX-CS6008A
FREQ:B1/B2L1/L2/G1/G2
S/N:C1801000811
P/N:0101020072

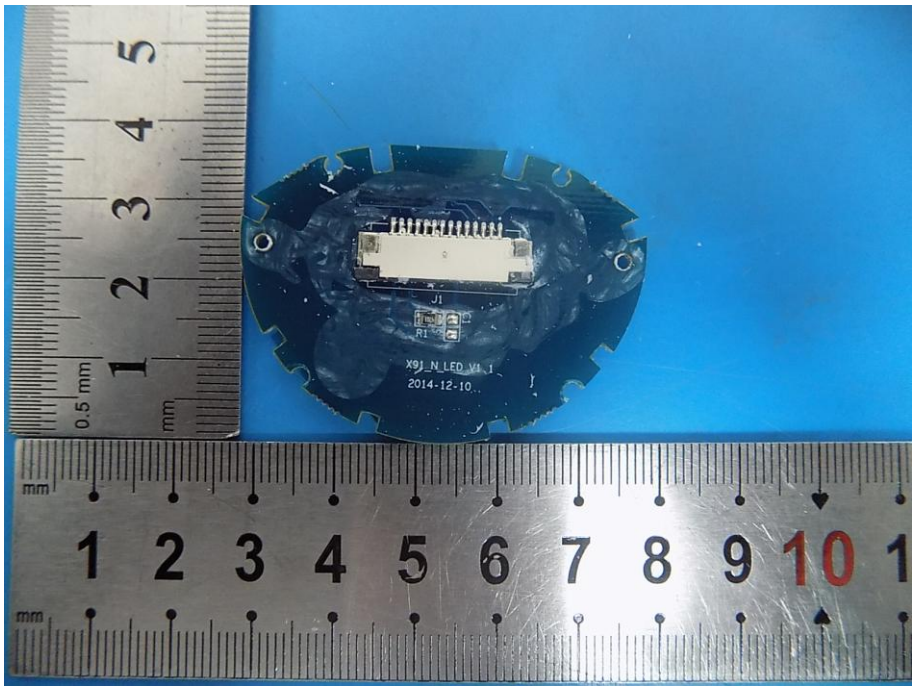

Harxon
PCB-CS6008A-V1R3

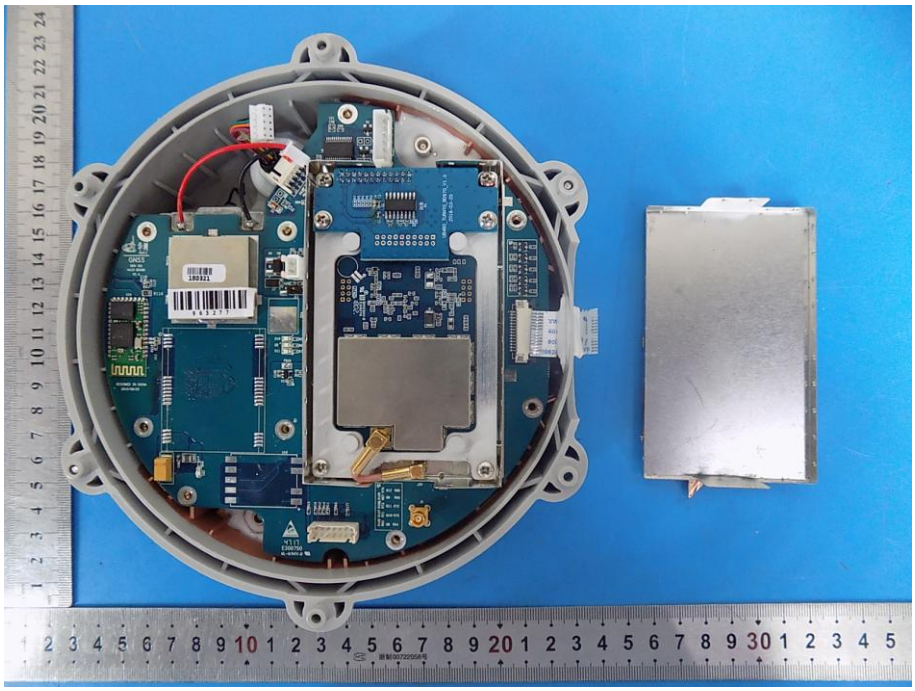


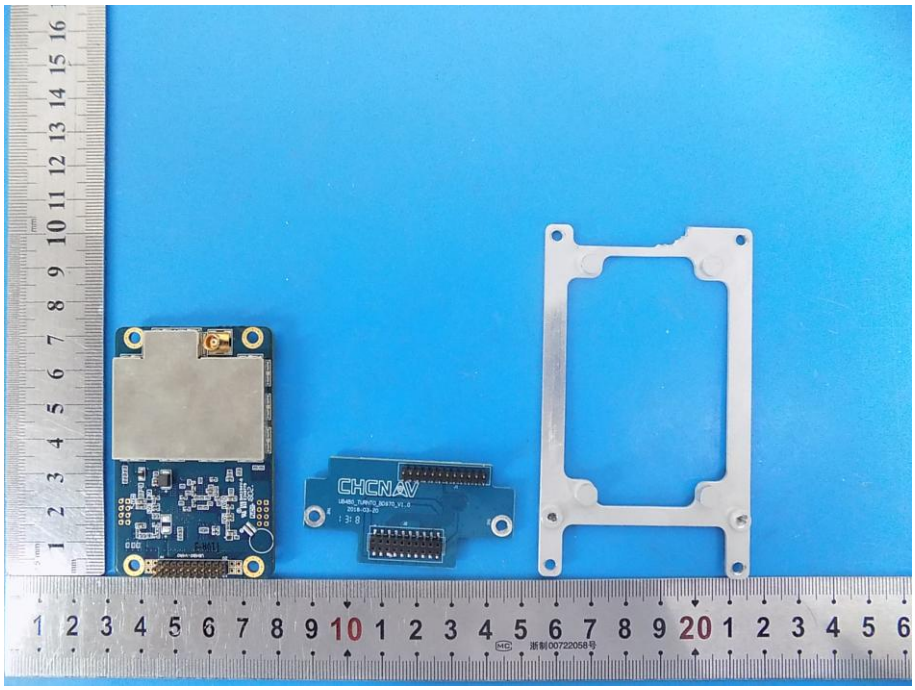


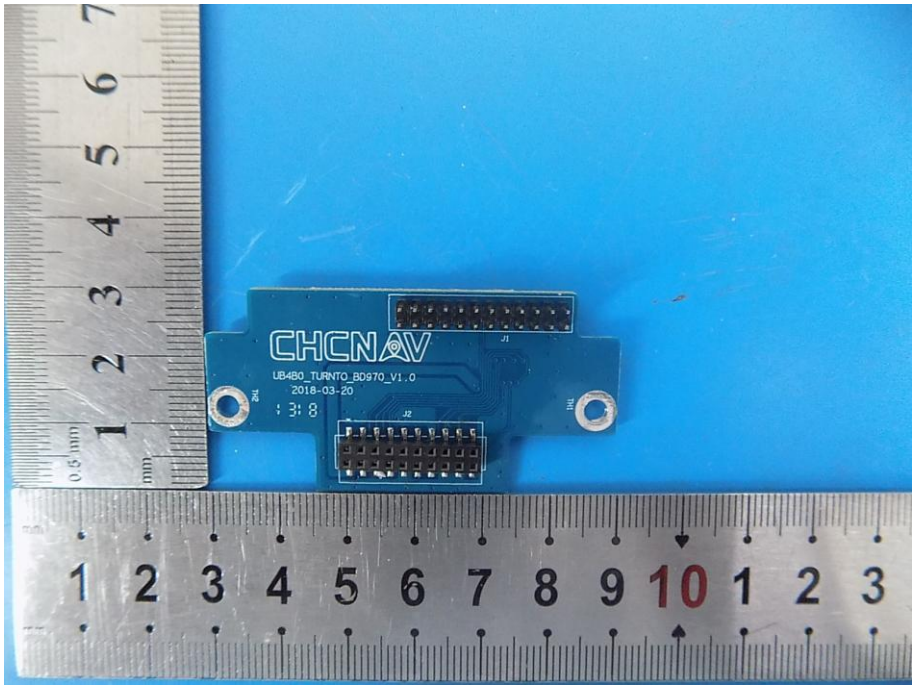


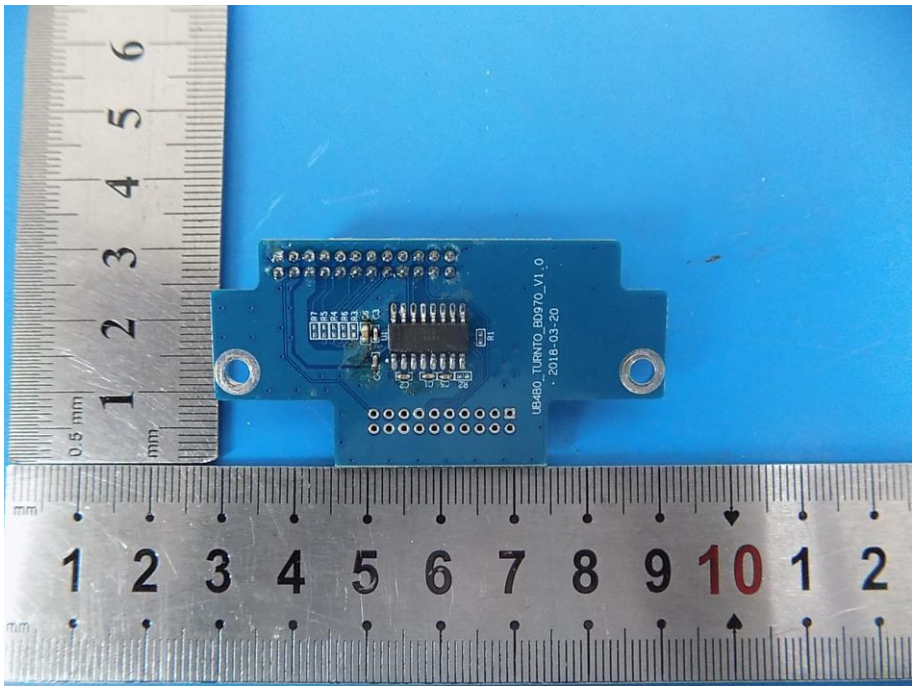

D1
D3
D2
D4
SW3
SW4
X91_N_LED V1.1
2014/12/10
HUACE NAVIGATION TECHNOLOGY CO.,LTD
上海华测导航技术有限公司
CHINA

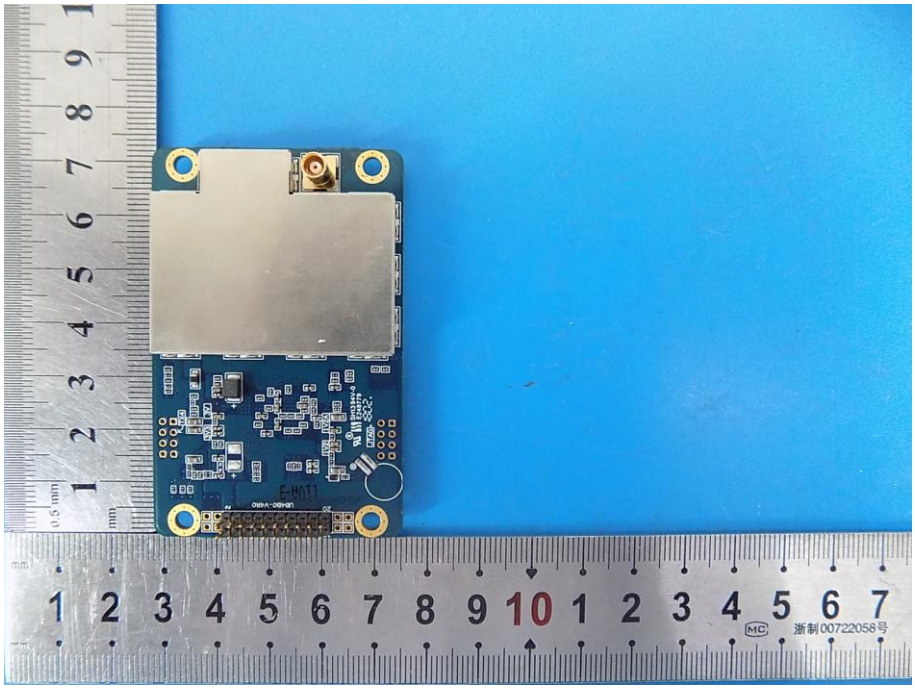

J1
R1
X9J_N_LED_V1.1
2014-12-10

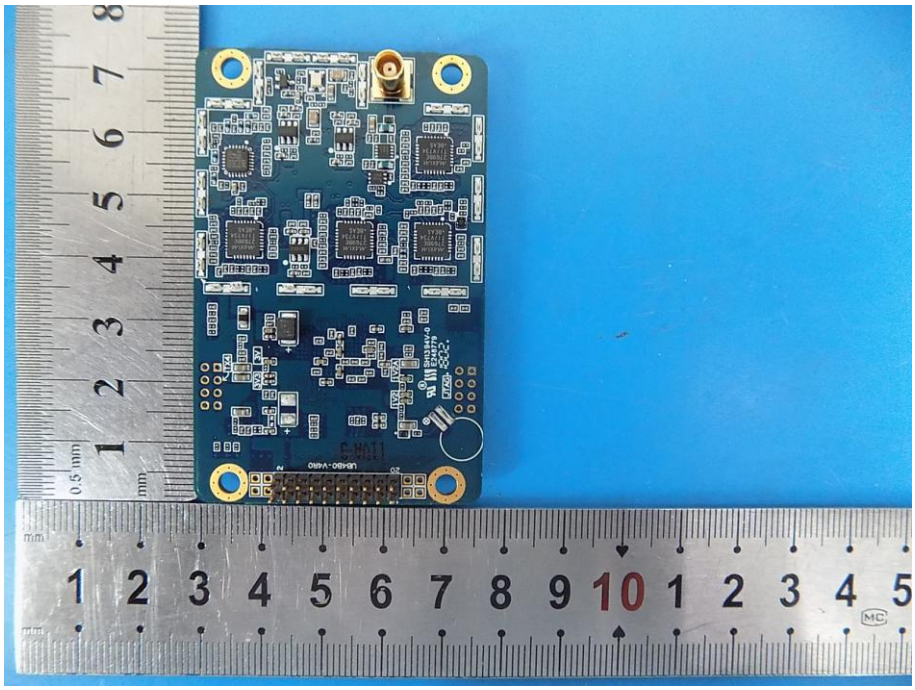


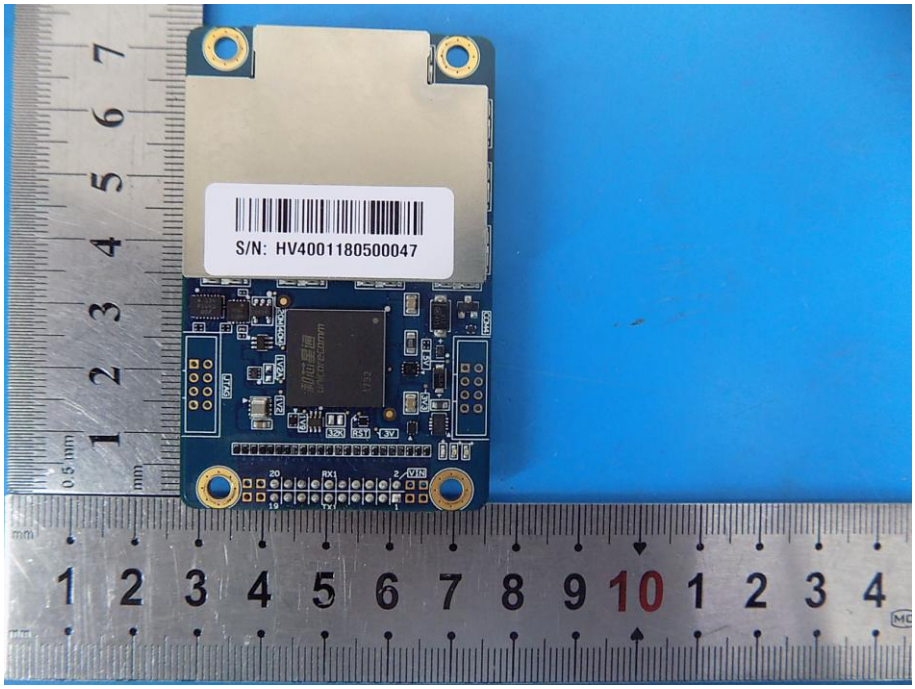


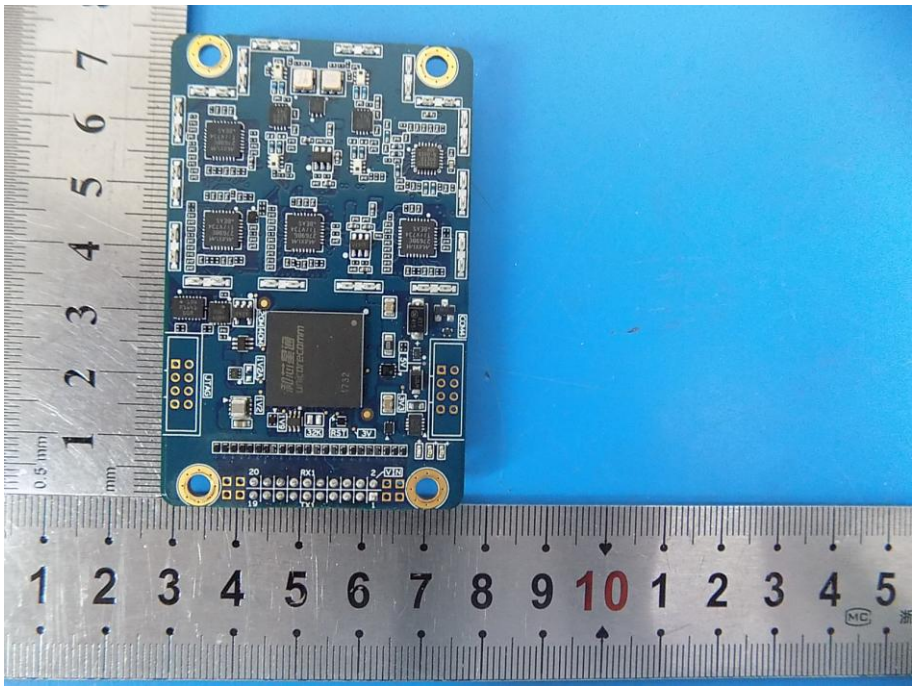

CHCNAV
UB4B0_TURNTO_BD970_V1.0
2018-03-20

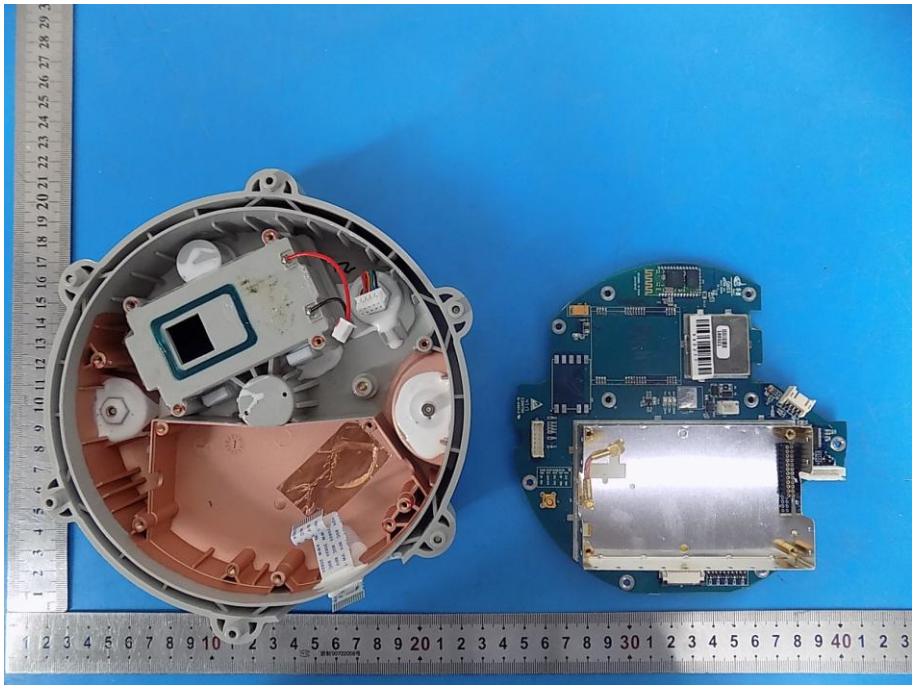

LB480_TURNTO_BD970_V1.0
2018-03-20

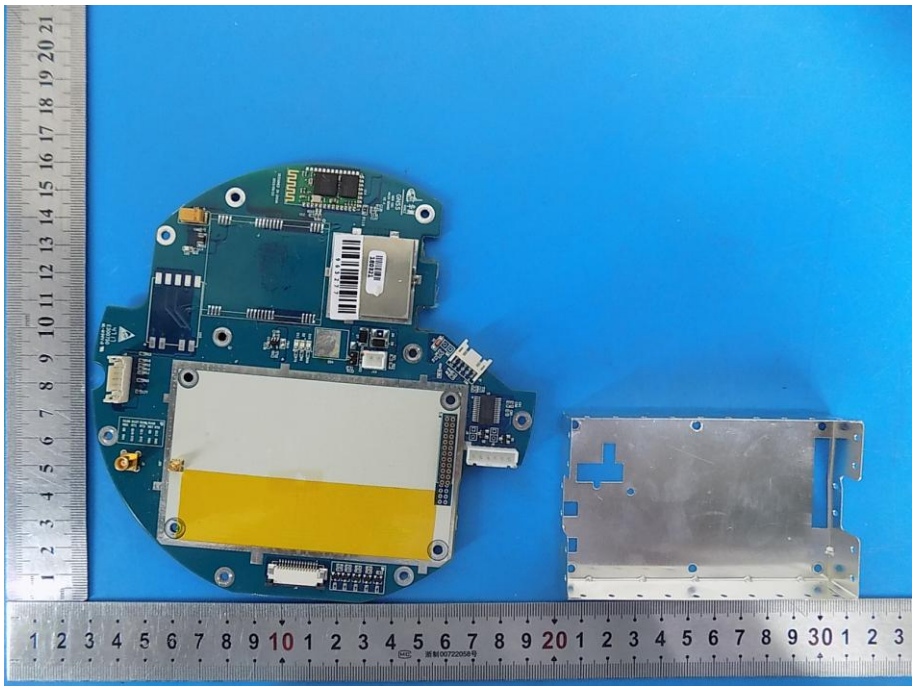

浙制00722058号

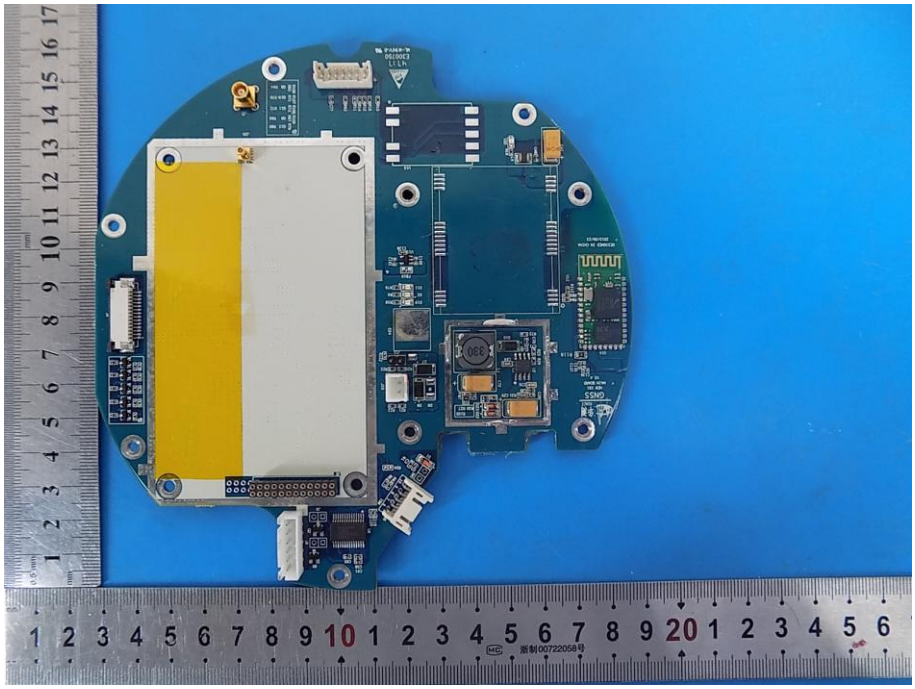


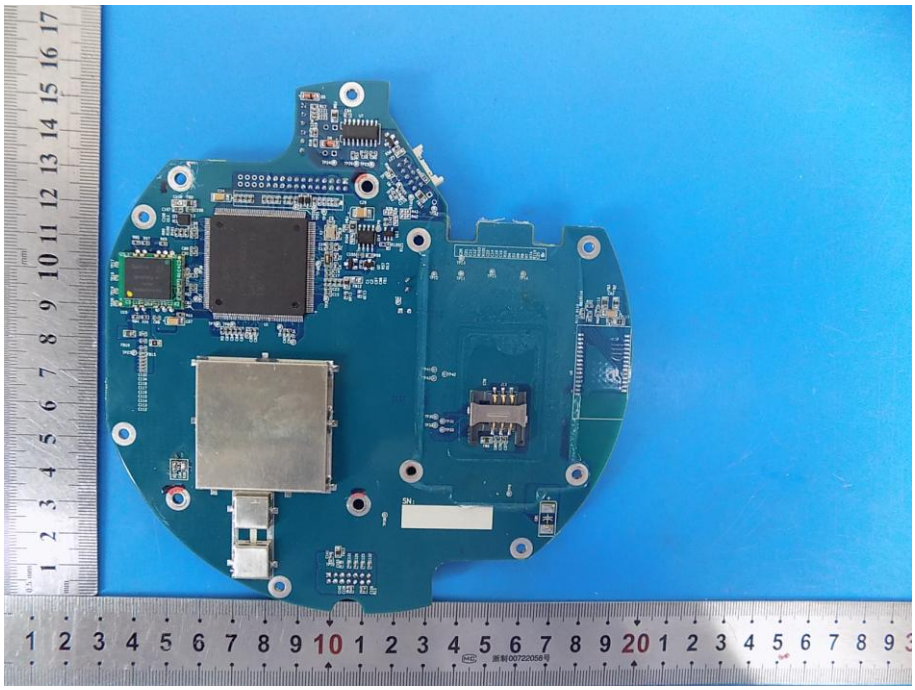

S/N: HV40011180500047

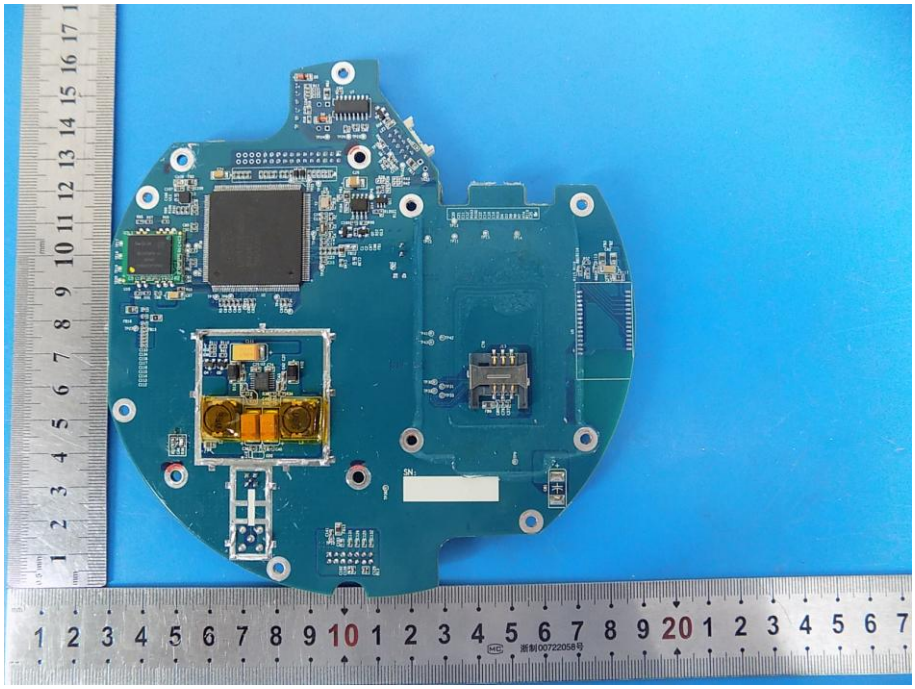












-------End of report-------