

## FCC TEST REPORT

**Product** : GNSS RTK  
**Trade mark** : **HI-TARGET**  
**Model/Type reference** : V30 Pro  
**Serial Number** : N/A  
**Ratings** : GNSS RTK : DC 7.4V by Battery  
Charger: AC110-240V 50/60Hz  
**FCC ID** : O39ZHDV30PRO  
**Report Number** : EESZF02180004  
**Date** : Feb. 28, 2013  
**Regulations** : See below

Test Standards	Results
<input checked="" type="checkbox"/> 47 CFR FCC Part 15 Subpart B:2011	PASS

Prepared for:

**Hi-Target Surveying Instrument Co., Ltd**  
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Prepared by:

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Date:

Feb. 28, 2013

Jimmy Li  
Lab manager



Check No.: 16315243

## TABLE OF CONTENTS

Description	Page
<b>1. GENERAL INFORMATION .....</b>	<b>3</b>
<b>2. TEST SUMMARY .....</b>	<b>3</b>
<b>3. MEASUREMENT UNCERTAINTY .....</b>	<b>4</b>
<b>4. PRODUCT INFORMATION AND TEST SETUP .....</b>	<b>4</b>
<b>5. FACILITIES AND ACCREDITATIONS .....</b>	<b>5</b>
5.1 TEST FACILITY.....	5
5.2 TEST EQUIPMENT LIST.....	5
<b>6. SYSTEM TEST CONFIGURATION .....</b>	<b>6</b>
6.1. JUSTIFICATION.....	6
6.2. PRODUCT EXERCISING SOFTWARE.....	6
<b>7. CONDUCTED EMISSION TEST .....</b>	<b>7</b>
7.1. LIMITS.....	7
7.2. BLOCK DIAGRAM OF TEST SETUP .....	7
7.3. PROCEDURE OF CONDUCTED EMISSION TEST .....	7
7.4. TEST GRAPHS AND TEST DATA .....	8
<b>8. RADIATED EMISSION TEST .....</b>	<b>10</b>
8.1. LIMITS.....	10
8.2. BLOCK DIAGRAM OF TEST SETUP .....	10
8.3. PROCEDURE OF RADIATED EMISSION TEST .....	10
8.4. TEST GRAPHS AND TEST DATA .....	11
<b>APPENDIX 1 PHOTOGRAPHS OF TEST SETUP.....</b>	<b>13</b>
<b>APPENDIX 2 EXTERNAL PHOTOGRAPHS OF PRODUCT.....</b>	<b>14</b>

(Note: N/A means not applicable)

## 1. GENERAL INFORMATION

**Applicant:** Hi-Target Surveying Instrument Co., Ltd  
10th Floor, Chuangxin Building, Tian'an Technology Zone,  
No.555, the North of Panyu Road, Panyu District, Guangzhou  
City

**Manufacturer:** Hi-Target Surveying Instrument Co., Ltd  
10th Floor, Chuangxin Building, Tian'an Technology Zone,  
No.555, the North of Panyu Road, Panyu District, Guangzhou  
City

**Equipment Authorization:** Certification

**FCC ID:** O39ZHDV30PRO

**Product:** GNSS RTK

**Trade mark:** **HI-TARGET**

**Model/Type reference:** V30 Pro

**Serial Number:** N/A

**Report Number:** EESZF02180004

**Sample Received Date:** Feb. 18, 2013

**Sample tested Date:** Feb. 18, 2013 to Feb. 28, 2013

## 2. TEST SUMMARY

The Product has been tested according to the following specifications:

Standard	Test Item	Test
FCC 15.107	Conducted Emission	Yes
FCC 15.109	Radiated Emission	Yes

### 3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

Test item	Value (dB)
Conducted disturbance	3.2
Radiated disturbance (30MHz to 1GHz)	4.5
Radiated disturbance (1GHz to 6GHz)	4.8

### 4. PRODUCT INFORMATION AND TEST SETUP

#### 4.1. PRODUCT INFORMATION

##### Ratings:

GNSS RTK : DC 7.4V by Battery

Charger: AC110-240V 50/60Hz

##### Cable of Product

No.	Cable Type	Quantity	Provider	Length (m)	Specification	Note
1	USB & Serial Port Line	1	Applicant	1.2	Shielded	N/A
2	Charger Cable	1	Applicant	0.8	Unshielded	N/A

#### 4.2. TEST SETUP CONFIGURATION

See test photographs attached in Appendix 1 for the actual connections between Product and support equipment.

#### 4.3. SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	Data Cable	Power Cord
1.	PC	DELL	380MT	06054E	N/A	Unshielded 1.4m
2.	Monitor	DELL	3100C	CN-OHD5WY-74261-167-14KC	VGA: Shielded	Unshielded 1.4m
3.	Keyboard	Lselection	KB-101A	B0829008487LEXL	Shielded 1.2m	N/A
4..	Mouse	Lselection	OP-200	B0820010665DBDN	Shielded 1.2m	N/A

##### Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

## 5. FACILITIES AND ACCREDITATIONS

### 5.1 TEST FACILITY

All test facilities used to collect the test data are located at Hongwei Industrial Zone, Bao'an 70 District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4, CISPR 16-1-1 and other equivalent standards.

### 5.2 TEST EQUIPMENT LIST

**Instrumentation:** The following list contains equipments used at CTI for testing.

The calibrations of the measuring instruments, including any accessories that may effect such calibration, are checked frequently to assure their accuracy. Adjustments are made and correction factors applied in accordance with instructions contained in the manual for the measuring instrument.

#### Equipment used during the tests:

Shielding Room No. 1 - Conducted Emission Test				
Equipment	Manufacturer	Model	Serial No.	Due Date
Receiver	R&S	ESCI	100009	07/19/2013
LISN	R&S	ENV216	100098	07/19/2013

3M Semi-anechoic Chamber - Radiated disturbance Test				
Equipment	Manufacturer	Model	Serial No.	Due Date
3M Chamber & Accessory Equipment	ETS-LINDGREN	FACT-3	3510	07/09/2013
Spectrum Analyzer	Agilent	E4440A	MY46185649	03/07/2013
Receiver	R&S	ESCI	100435	07/19/2013
TRILOG Broadband Antenna	schwarzbeck	VULB 9163	401	07/21/2013
Multi device Controller	ETS-LINGREN	2090	00057230	N/A
Horn Antenna	ETS-LINGREN	3117	00057407	07/19/2013
Microwave Preamplifier	Agilent	8449B	3008A02425	03/29/2013

## **6. SYSTEM TEST CONFIGURATION**

### **6.1. JUSTIFICATION**

The system was configured for testing in a typical fashion (as a customer would normally use it), The Product was placed on a turn table, which enabled the engineer to maximize emissions through its placement as outlined in ANSI C63.4 (2003).

The Product was powered by DC 7.4V during test.

For maximizing emissions, the Product was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. The rear of unit shall be flushed with the rear of the table / placed in the center of the table.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

### **6.2. PRODUCT EXERCISING SOFTWARE**

No Software was used during testing.



## 7. CONDUCTED EMISSION TEST

### 7.1. LIMITS

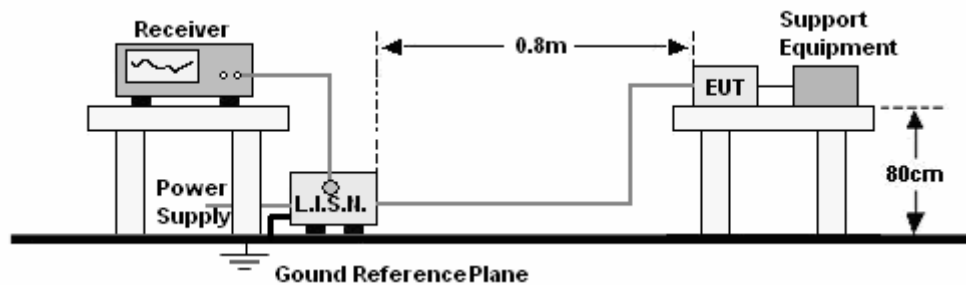
Limits for Class B digital devices

Frequency range (MHz)	Limits dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

**NOTE:** 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

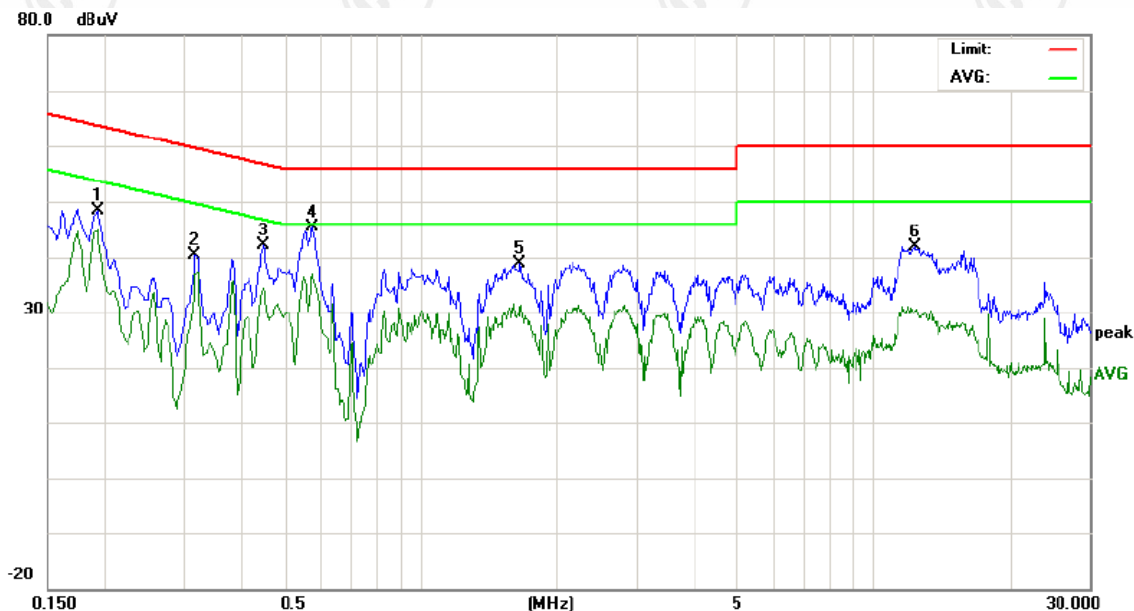
### 7.2. BLOCK DIAGRAM OF TEST SETUP



### 7.3. PROCEDURE OF CONDUCTED EMISSION TEST

- The Product was placed on a nonconductive table above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).
- The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.
- For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

## 7.4. TEST GRAPHS AND TEST DATA



Site site #1

Phase: **L1**

Temperature: 22

Limit: FCC Class B CE (QP)

Power: AC 120V/60Hz

Humidity: 53 %

EUT: GNSS RTK

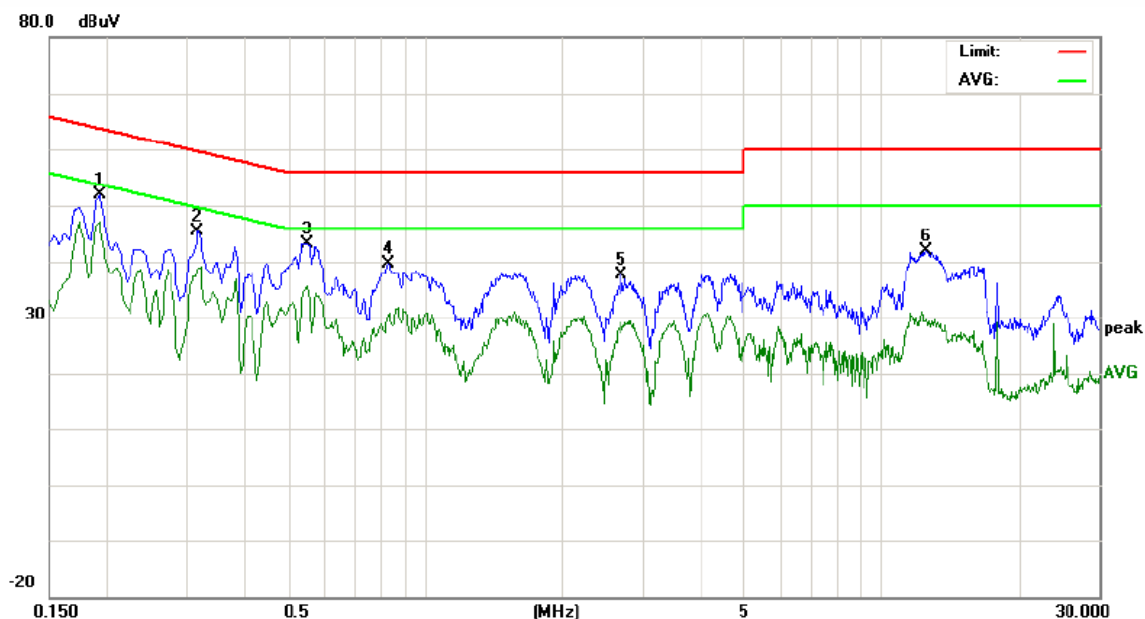
M/N: V30 Pro

Mode: Data Transmission

Note:

No.	Freq. MHz	Reading_Level (dBuV)			Correct Factor dB	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1940	38.37	37.15	35.02	9.90	48.27	47.05	44.92	63.86	53.86	-16.81	-8.94	P	
2	0.3200	35.66	33.16	21.95	9.90	45.56	43.06	31.85	59.70	49.70	-16.64	-17.85	P	
3	0.4500	32.32	30.44	24.55	9.90	42.22	40.34	34.45	56.87	46.87	-16.53	-12.42	P	
4	0.5780	35.54	31.74	26.89	9.90	45.44	41.64	36.79	56.00	46.00	-14.36	-9.21	P	
5	1.6620	29.10	26.81	21.09	9.90	39.00	36.71	30.99	56.00	46.00	-19.29	-15.01	P	
6	12.3940	31.64	27.55	20.25	10.24	41.88	37.79	30.49	60.00	50.00	-22.21	-19.51	P	





Site site #1

Phase: **N**

Temperature: 22

Limit: FCC Class B CE (QP)

Power: AC 120V/60Hz

Humidity: 53 %

EUT: GNSS RTK

M/N: V30 Pro

Mode: Data Transmission

Note:

No.	Freq. MHz	Reading_Level (dBuV)			Correct Factor dB	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1940	41.92	39.22	37.20	9.90	51.82	49.12	47.10	63.86	53.86	-14.74	-6.76	P	
2	0.3180	35.59	33.14	28.83	9.90	45.49	43.04	38.73	59.76	49.76	-16.72	-11.03	P	
3	0.5540	33.23	30.88	25.73	9.90	43.13	40.78	35.63	56.00	46.00	-15.22	-10.37	P	
4	0.8340	29.73	27.61	20.49	9.90	39.63	37.51	30.39	56.00	46.00	-18.49	-15.61	P	
5	2.6940	27.66	25.72	19.14	9.92	37.58	35.64	29.06	56.00	46.00	-20.36	-16.94	P	
6	12.5620	31.55	28.16	19.28	10.25	41.80	38.41	29.53	60.00	50.00	-21.59	-20.47	P	

## 8. RADIATED EMISSION TEST

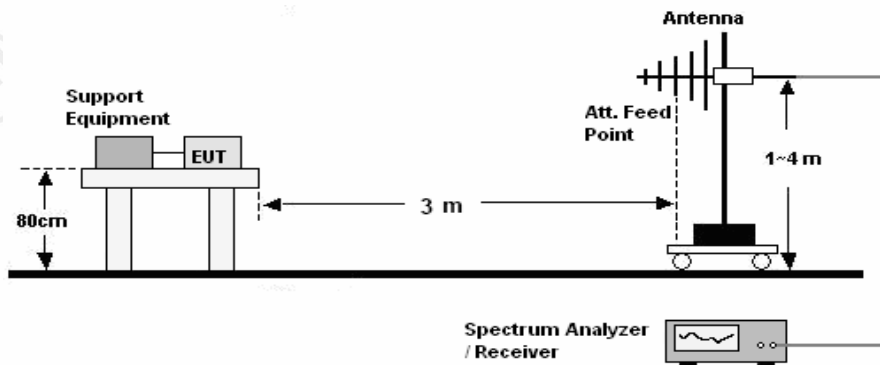
### 8.1. LIMITS

Limits for Class B digital devices

Frequency (MHz)	limits at 3m dB( $\mu$ V/m)
30-88	40.0
88-216	43.5
216-960	46.0
Above 960	54.0

- NOTE:**
1. The lower limit shall apply at the transition frequency.
  2. The limits shown above are based on measuring equipment employing a CISPR quasi-peak detector function for frequencies below or equal to 1000MHz.
  3. The limits shown above are based on measuring equipment employing an average detector function for frequencies above 1000MHz.

### 8.2. BLOCK DIAGRAM OF TEST SETUP

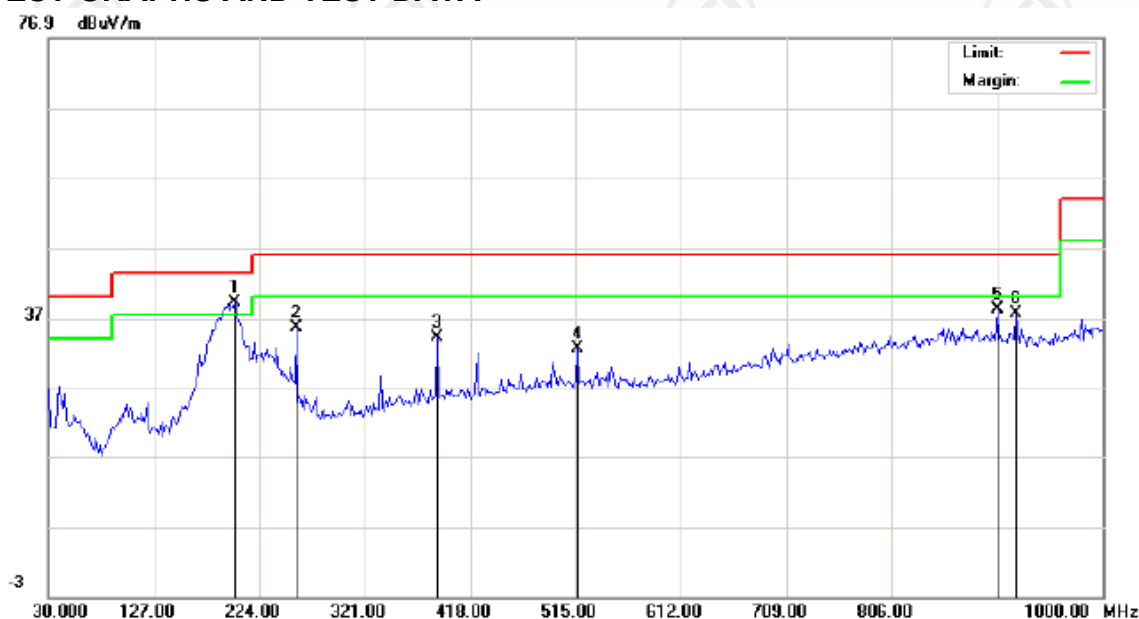


### 8.3. PROCEDURE OF RADIATED EMISSION TEST

#### 30MHz ~ 1GHz:

- a. The Product was placed on the non-conductive turntable 0.8m above the ground at a chamber.
- b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
- c. For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.

## 8.4. TEST GRAPHS AND TEST DATA



Site site #1

Polarization: **Horizontal**

Temperature: 22

Limit: FCC PART15 B

Power: DC 7.4V

Humidity: 57 %

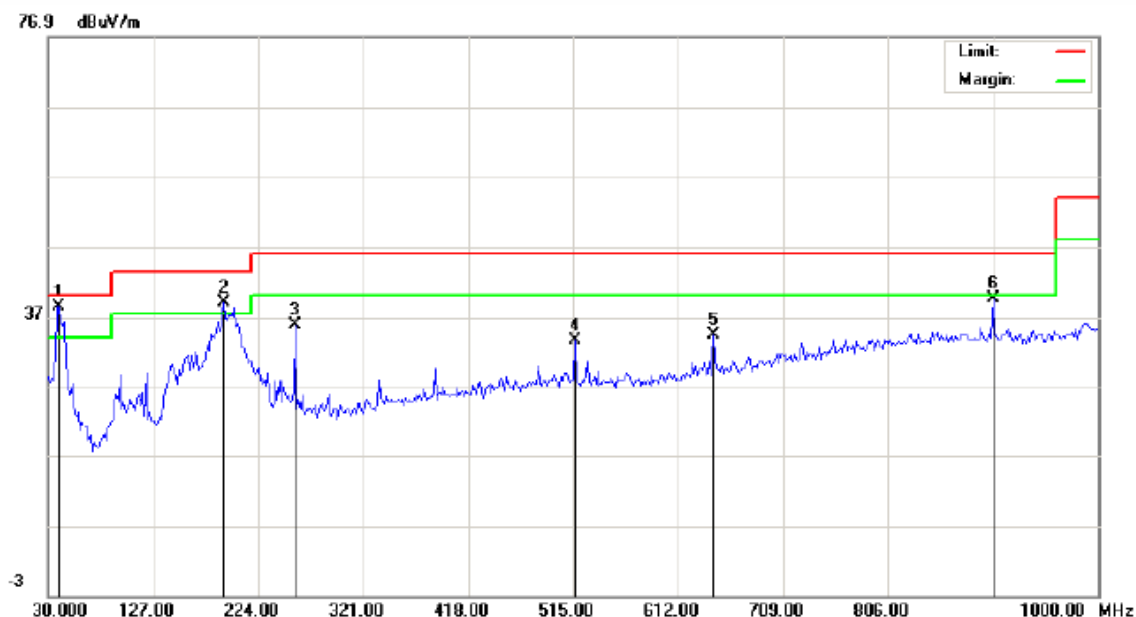
EUT: GNSS RTK

M/N: V30 Pro

Mode: Data Transmission

Note:

No.	Freq. MHz	Reading_Level (dBuV)			Correct Factor dB	Measurement (dBuV/m)			Limit (dBuV/m)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		peak	QP	AVG	QP	AVG	QP	AVG		
1	201.3667	25.54	23.69		13.59	39.13	37.28		43.50		-6.22		P	
2	257.9500	20.64	18.69		15.04	35.68	33.73		46.00		-12.27		P	
3	387.2833	16.27	15.45		18.00	34.27	33.45		46.00		-12.55		P	
4	516.6167	12.70	11.33		19.91	32.61	31.24		46.00		-14.76		P	
5	903.0000	12.23	10.84		25.99	38.22	36.83		46.00		-9.17		P	
6	920.7833	11.74	10.47		25.78	37.52	36.25		46.00		-9.75		P	



Site site #1 Polarization: **Vertical** Temperature: 22  
Limit: FCC PART15 B Power: DC 7.4V Humidity: 57 %  
EUT: GNSS RTK  
M/N: V30 Pro  
Mode: Data Transmission  
Note:

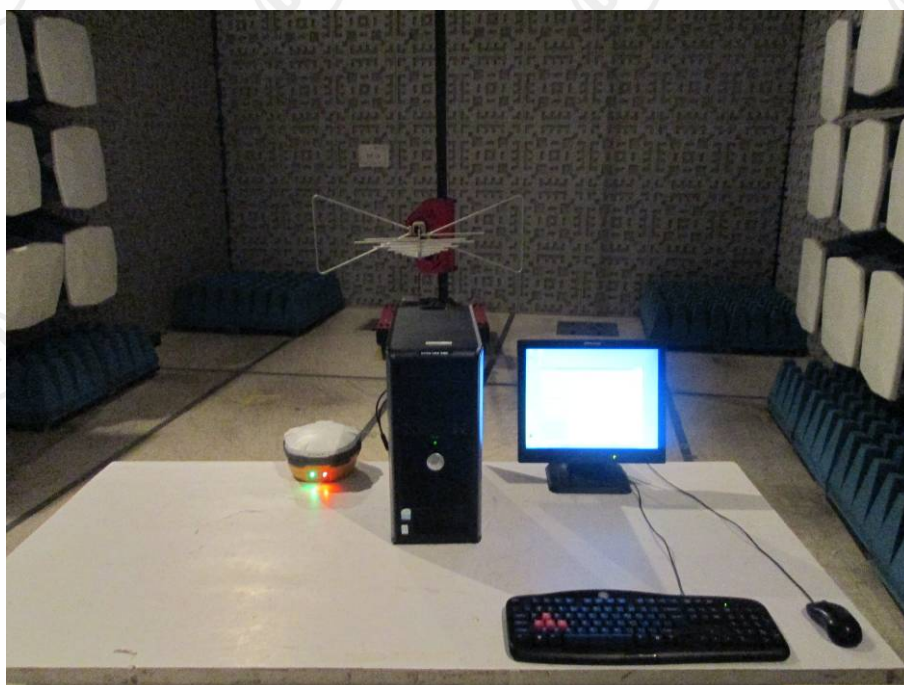
No.	Freq. MHz	Reading_Level (dBuV)			Correct Factor dB	Measurement (dBuV/m)			Limit (dBuV/m)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		peak	QP	AVG	QP	AVG	QP	AVG		
1	39.7000	23.44	17.69		15.01	38.45	32.70		40.00		-7.30		P	
2	191.6667	25.84	23.27		13.13	38.97	36.40		43.50		-7.10		P	
3	257.9500	20.86	19.88		15.04	35.90	34.92		46.00		-11.08		P	
4	516.6167	13.68	12.35		19.91	33.59	32.26		46.00		-13.74		P	
5	644.3333	12.86	12.02		21.48	34.34	33.50		46.00		-12.50		P	
6	903.0000	13.58	11.05		25.99	39.57	37.04		46.00		-8.96		P	

**Note:** The correct factor = cable loss+ antenna factor.  
Final Emission\_QP = Reading\_Level\_QP+ correct factor.  
For example: The cable loss of 903.00MHz is 1.62dB and the antenna factor is 24.37dB. So, the correct factor=1.62 dB +24.37 dB =25.99 dB

## APPENDIX 1 PHOTOGRAPHS OF TEST SETUP



**CONDUCTED EMISSION TEST SETUP**



**RADIATED EMISSION TEST SETUP**



## APPENDIX 2 EXTERNAL PHOTOGRAPHS OF PRODUCT



View of product-1

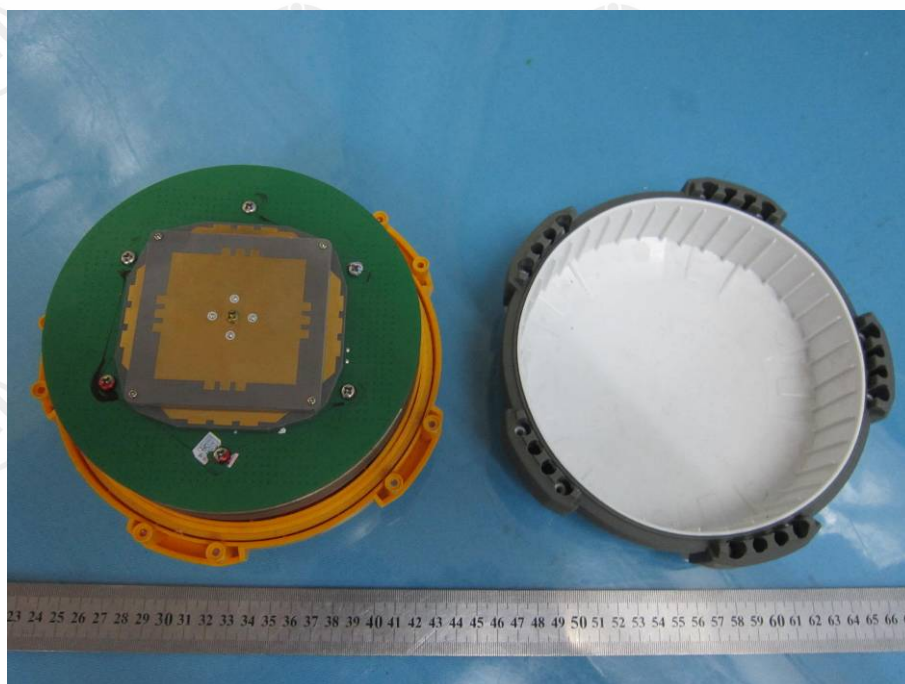


View of product-2

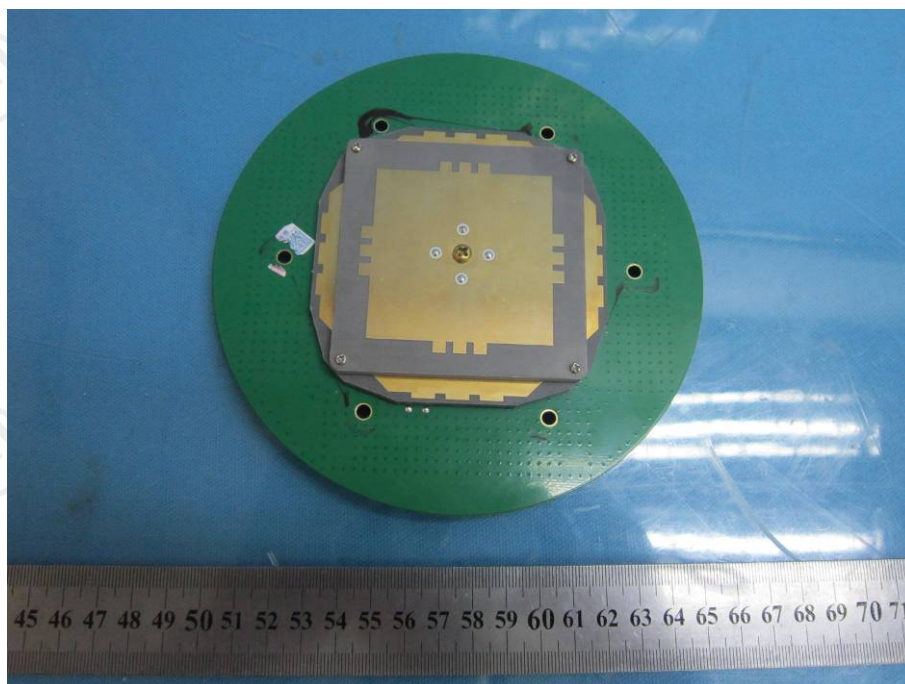




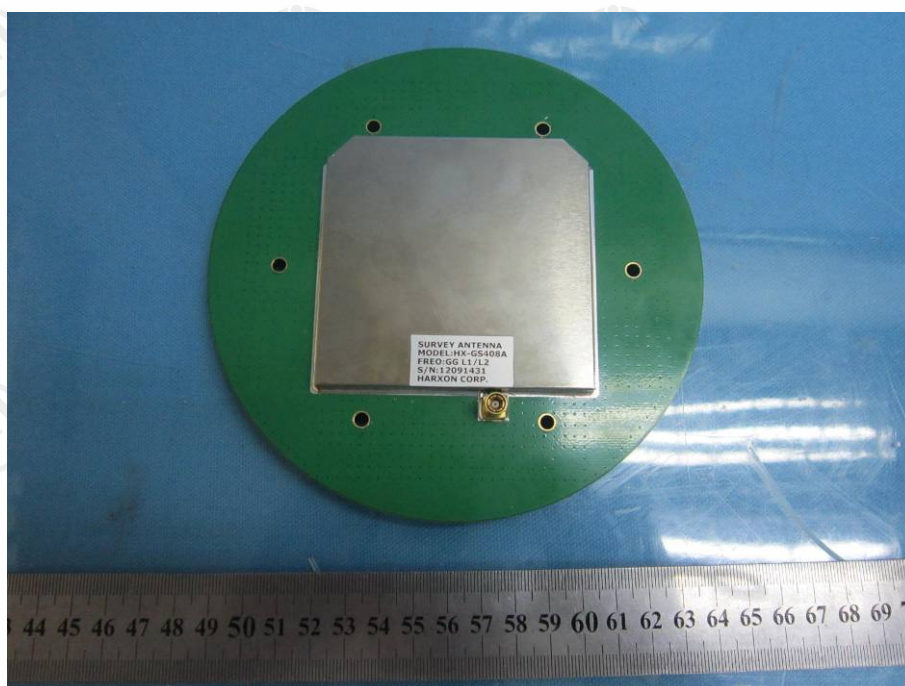
View of product-3



View of product-4

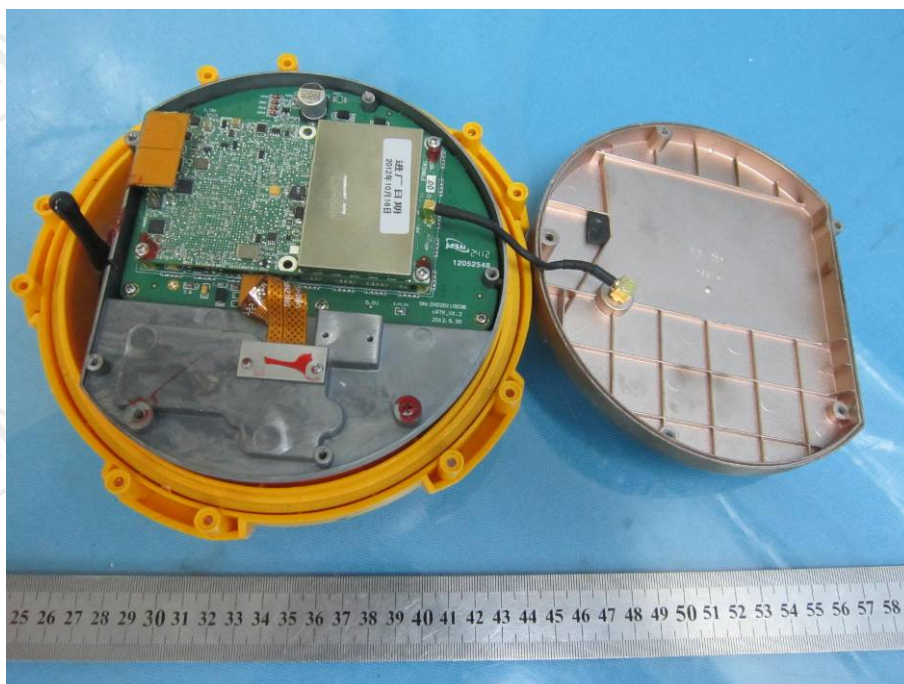


View of product-5



View of product-6

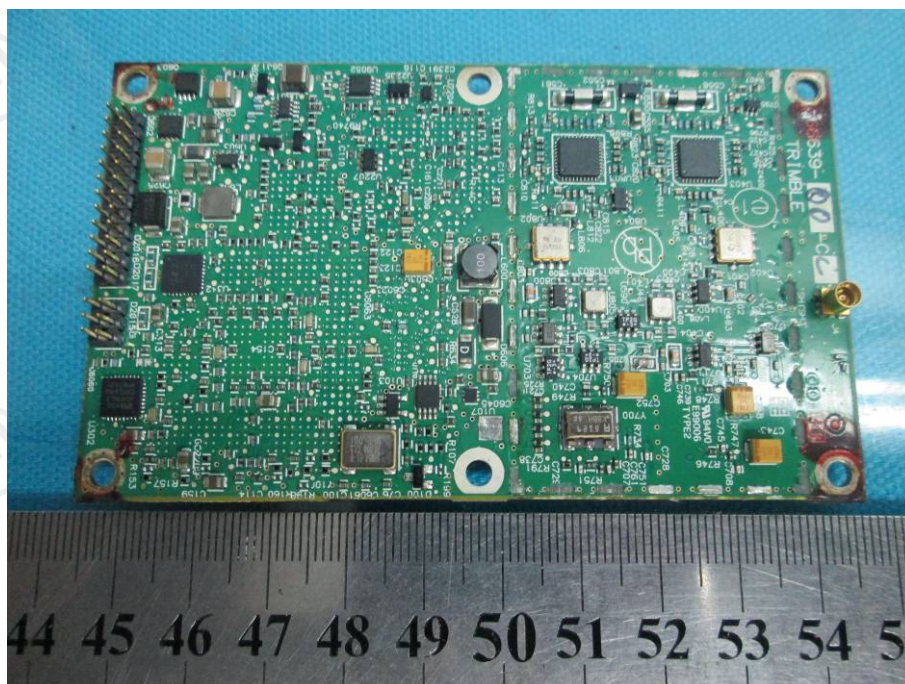




View of product-7



View of product-8



View of product-9



View of product-10

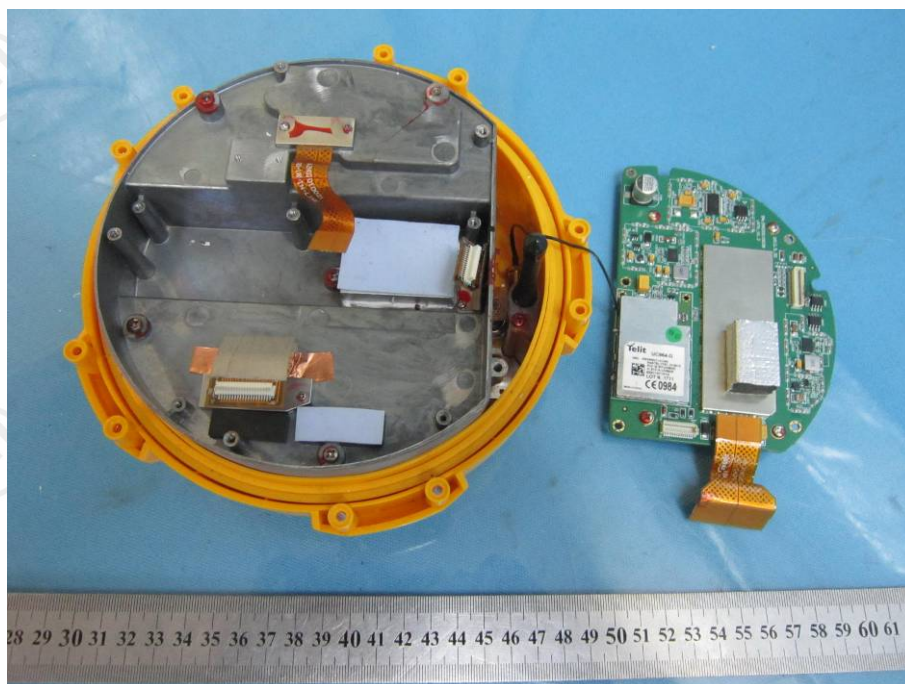




View of product-11



View of product-12



View of product-13

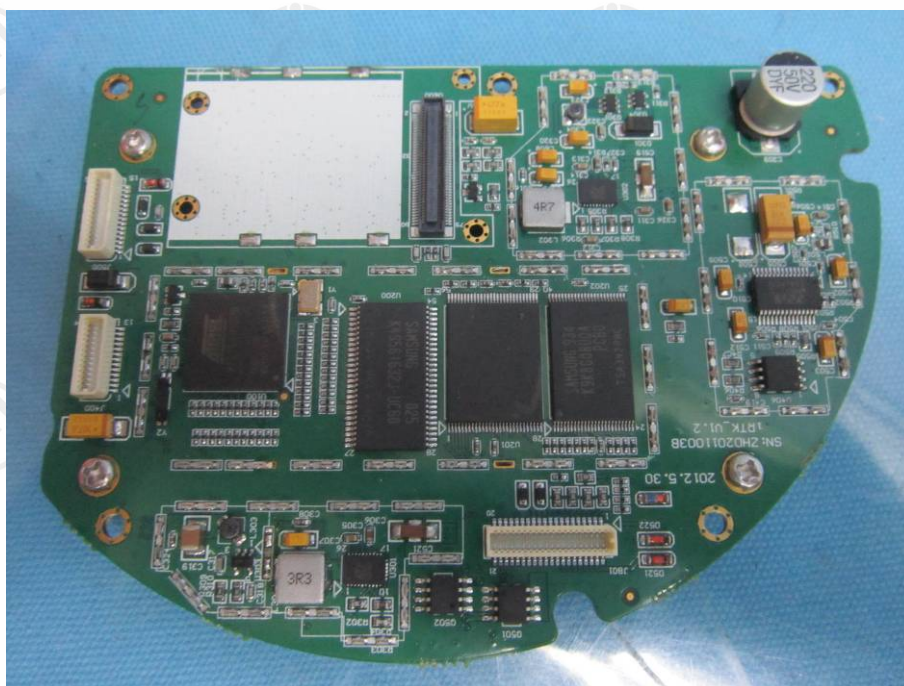


View of product-14





View of product-15



View of product-16



View of product-17

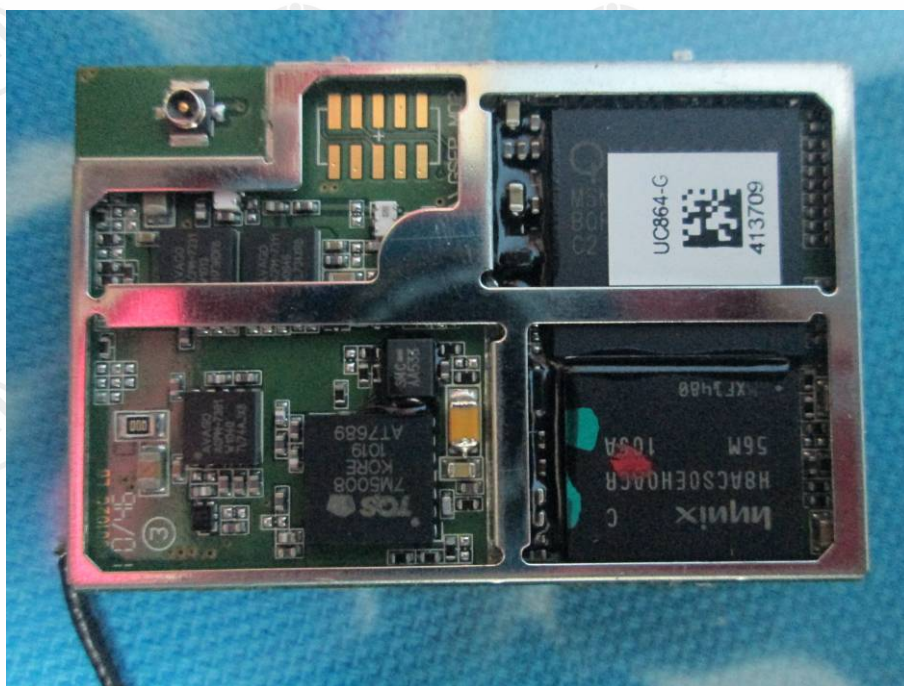


View of product-18





View of product-19



View of product-20



View of product-21



View of product-22





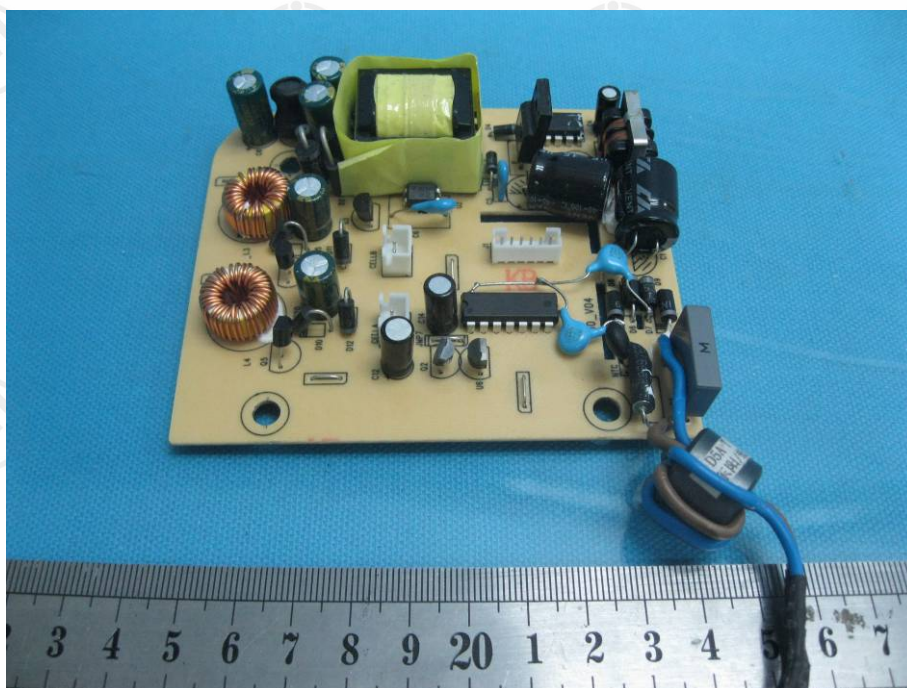
View of product-23



View of product-24

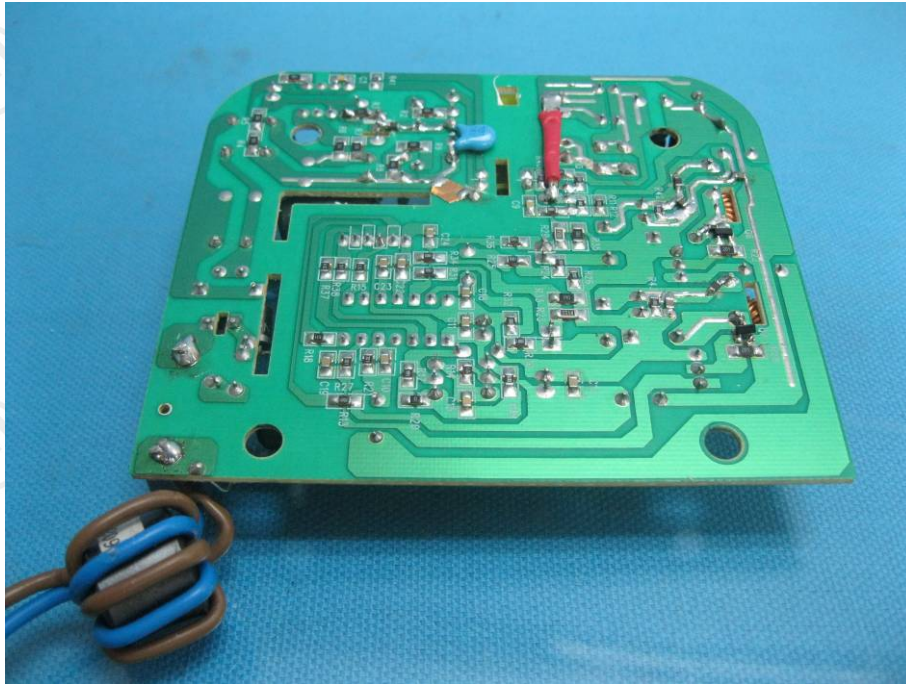


View of product-25



View of product-26





View of product-27

\*\*\* End of report \*\*\*

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