FCC RADIO TEST REPORT
FCC ID : O39ZHDV90PLUS

Product：	GNSS RTK
Trade Name：	HI-TARGET
Model Name：	V90 Plus
Serial Model：	N/A
Report No.：	STUEMO015052603635RF5

Prepared for

Hi-Target Surveying Instrument Co., Ltd

Plant 202, BLDG 13, Tian'An HQ Center, No.555 North Panyu RD.
Donghuan Block, Panyu District, 511400 Guangzhou, China.

Prepared by

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TEST RESULT CERTIFICATION

Applicant's name	:	Hi-Target Surveying Instrument Co., Ltd
Address	:	Plant 202, BLDG 13, Tian'An HQ Center, No.555 North Panyu RD. Donghuan Block, Panyu District, 511400 Guangzhou, China.
Manufacture's Name	:	Hi-Target Surveying Instrument Co., Ltd
Address	:	Plant 202, BLDG 13, Tian'An HQ Center, No.555 North Panyu RD. Donghuan Block, Panyu District, 511400 Guangzhou, China.

Product description

Product name	:	GNSS RTK
Trademark	:	HI-TARGET
Model and/or type reference	:	V90 Plus
Serial Model	:	N/A
Standards	:	FCC PART15B

This device described above has been tested by STU, and the test results show that the equipment under test (EUT) is in compliance with FCC PART15B requirements. And it is applicable only to the tested sample identified in the report.

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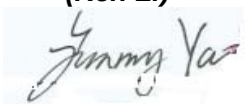
Date of Test	:	
Date (s) of performance of tests	:	Jun. 02, 2015 to Jun. 15, 2015
Date of Issue	:	Jun. 15, 2015
Test Result	:	**Pass**

Tested By: _____ ***Date:*** ***Jun. 02, 2015~ Jun. 15, 2015***

(Ken Li)



Check By: _____ ***Date:*** ***Jun. 15, 2015***

(Jimmy Yao)

Approved By: _____ ***Date:*** ***Jun. 15, 2015***

(Terry Yang)

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1. TEST SUMMARY

Test procedures according to the technical standards:

EMC Emission				
Standard	Test Item	Limit	Judgment	Remark
FCC Part15B:2013 ANSI C63.4: 2003	Conducted Emission	Class B	PASS	
	Radiated Emission	Class B	PASS	

1.1 TEST FACILITY

BZT Testing Technology Co., Ltd
Add.: Buliding 17,Xinghua Road Xingwei industrial Park Fuyong,Baoan District, Shenzhen, Guangdong,China
FCC Registration No.: 701733

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ± **U**，where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95** %。

A. Conducted Measurement :

Test Site	Method	Measurement Frequency Range	U，(dB)	NOTE
BZTC01	ANSI	150 KHz ~ 30MHz	3.2	

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	U，(dB)	NOTE
BZTA01	ANSI	30MHz ~ 1000MHz	4.7	
		1GHz ~6GHz	5.0	

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	GNSS RTK
Brand Name	HI-TARGET
Model Name.	V90 Plus
Serial No	N/A
Model Difference	N/A
Product Description	The EUT is a GNSS RTK.. Connecting I/O port: USB Port Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.
Adapter	Model:GM26-120200-D Input: AC 100-240V, 50/60Hz, 1.0A Output:DC 12V, 2.0A
Battery Charger	Model:CL-8410 Input: DC 12V, 2.0A Output:DC 8.4V, 1.0A
Battery	Model: BL-5000 Rated Voltage: 7.4V,5000mAh Max Chargeing Voltage:8.4V
Hardware Version:	PCBA-ZHD20130066【D】
Software Version:	Hi-Survey V1.1.6

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

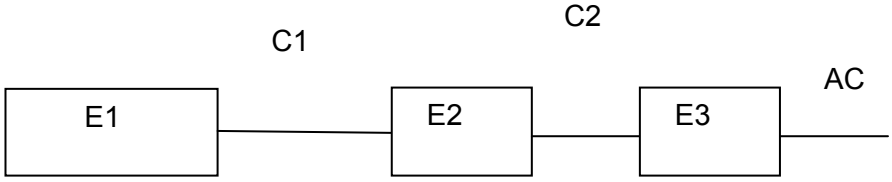
Pretest Mode	Description
Mode 1	USB Mode

For Conducted Test	
Final Test Mode	Description
Mode 1	USB Mode

For Radiated Test	
Final Test Mode	Description
Mode 1	USB Mode

2.3 DESCRIPTION OF TEST SETUP

USB Mode:



2.4 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E1	GNSS RTK	N/A	V90 Plus	--	--
E2	PC	IBM	2366		
E3	Adapter(PC)	IBM	08K8202		

Item	Shielded Type	Ferrite Core	Length	Note
C1	No	No	1.5M	
C2	No	No	1.0M	

Note:

(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in『Length』column.
(3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

2.5 MEASUREMENT INSTRUMENTS LIST

2.5.1 CONDUCTED TEST SITE

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	LISN	R&S	ENV216	101313	Jul. 06, 2016
2	LISN	EMCO	3816/2	00042990	Jul. 06, 2016
3	50Ω Switch	ANRITSU CORP	MP59B	6200983704	Jul. 06, 2016
4	Test Cable	N/A	C01	N/A	Jul. 06, 2016
5	Test Cable	N/A	C02	N/A	Jul. 06, 2016
6	Test Cable	N/A	C03	N/A	Jul. 06, 2016
7	EMI Test Receiver	R&S	ESCI	101160	Jul. 06, 2016
8	Passive Voltage Probe	ESH2-Z3	R&S	100196	Jul. 06, 2016
9	Triple-Loop Antenna	EVERFINE	LIA-2	11020003	Jul. 06, 2016
10	Absorbing Clamp	R&S	MDS-21	100423	Jul. 06, 2016

2.5.2 RADIATED TEST SITE

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Bilog Antenna	TESEQ	CBL6111D	31216	Jul. 06, 2016
2	Test Cable	N/A	R-01	N/A	Jul. 06, 2016
3	Test Cable	N/A	R-02	N/A	Jul. 06, 2016
4	EMI Test Receiver	R&S	ESCI-7	101318	Jul. 06, 2016
5	Antenna Mast	EM	SC100_1	N/A	N/A
6	Turn Table	EM	SC100	060531	N/A
7	50Ω Switch	Anritsu Corp	MP59B	6200983705	Jul. 06, 2016
8	Spectrum Analyzer	Aglient	E4407B	MY45108040	Jul. 06, 2016
9	Horn Antenna	EM	EM-AH-10180	2011071402	Jul. 06, 2016
10	Amplifier	EM	EM-30180	060538	Jul. 06, 2016

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

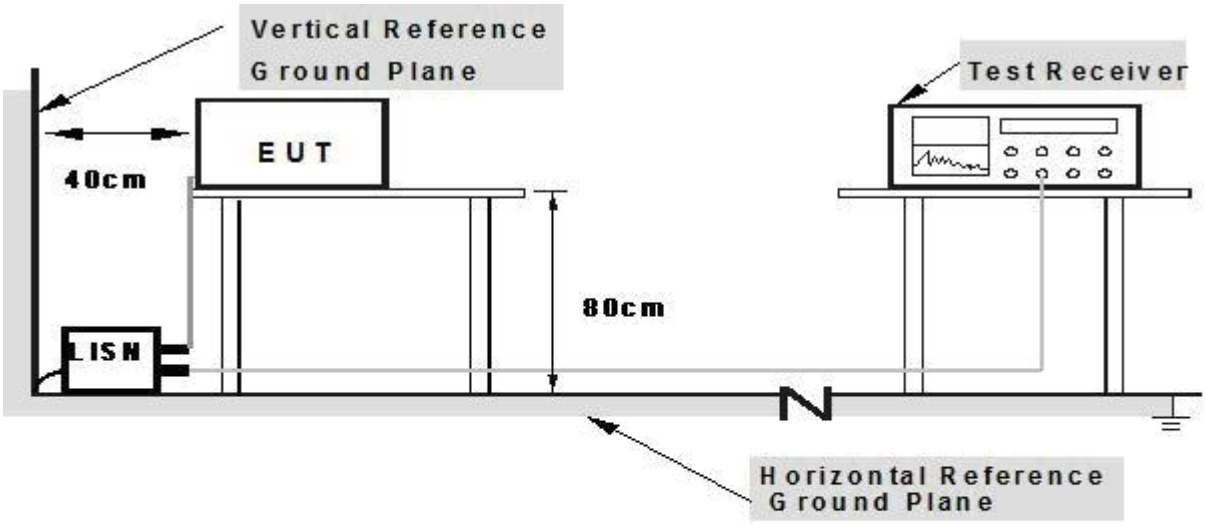
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.2 TEST PROCEDURE

a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.4 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **2.3** Unless otherwise a special operating condition is specified in the follows during the testing.

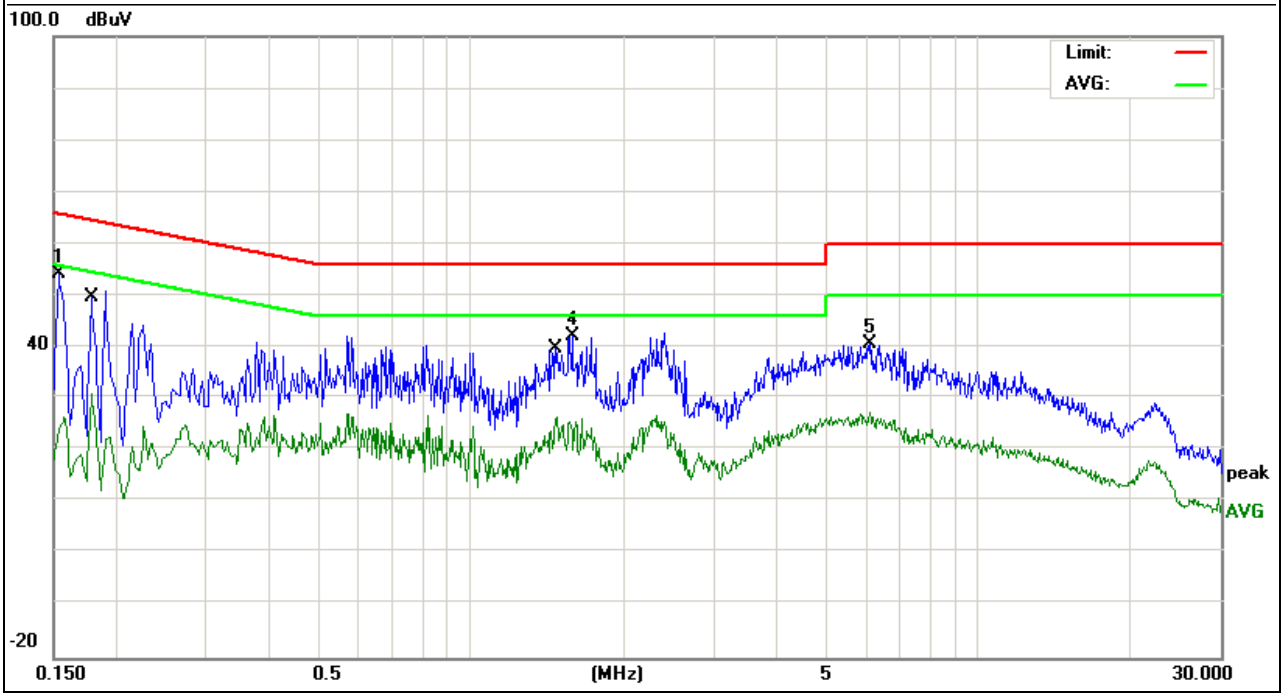
3.1.5 TEST RESULTS

EUT：	GNSS RTK	Model Name. ：	V90 Plus
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010hPa	Phase：	L
Test Voltage ：	AC120V/60Hz	Test Mode：	Mode 1

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.1539	44.35	9.82	54.17	65.78	-11.61	QP
0.178	21.06	9.79	30.85	54.57	-23.72	AV
1.474	16.01	10.19	26.2	46	-19.8	AV
1.578	32.06	10.2	42.26	56	-13.74	QP
6.118	30.28	10.41	40.69	60	-19.31	QP
6.118	16.75	10.41	27.16	50	-22.84	AV

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

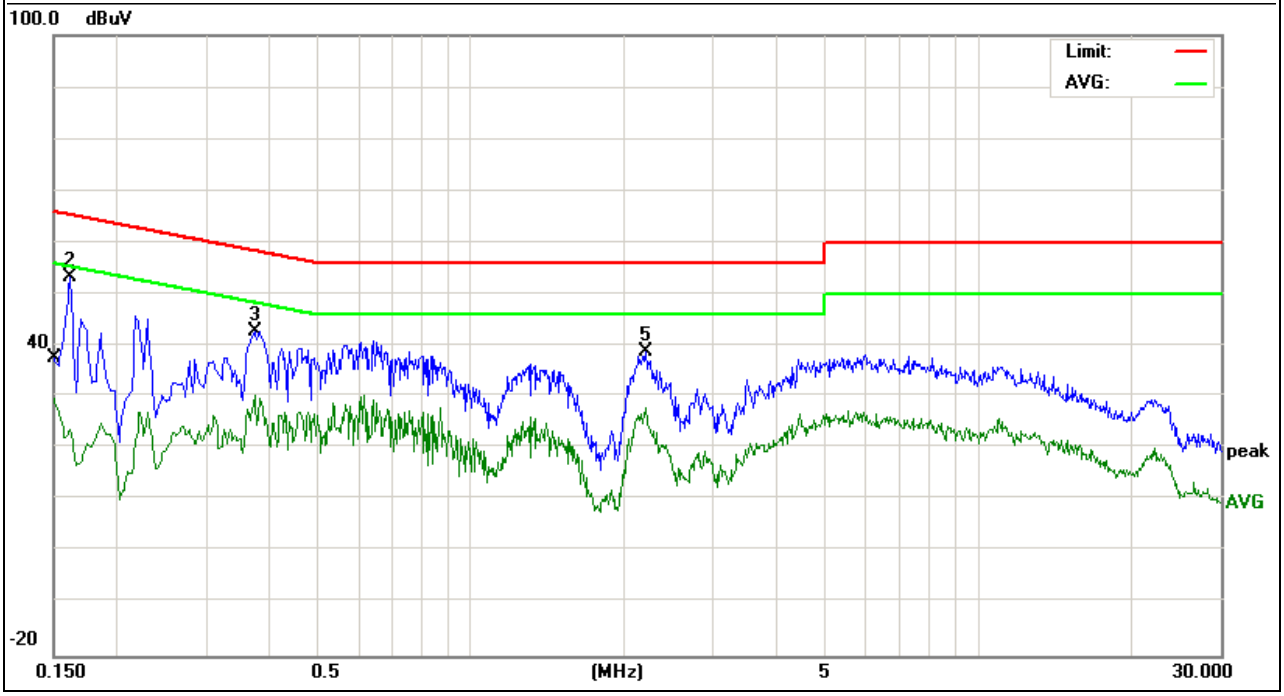


EUT：	GNSS RTK	Model Name. ：	V90 Plus
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010hPa	Phase：	N
Test Voltage ：	AC120V/60Hz	Test Mode：	Mode 1

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.15	19.83	9.82	29.65	55.99	-26.34	AV
0.162	43.67	9.81	53.48	65.36	-11.88	QP
0.374	32.96	10.02	42.98	58.41	-15.43	QP
0.374	20.31	10.02	30.33	48.41	-18.08	AV
2.21	28.62	10.26	38.88	56	-17.12	QP
2.21	17.51	10.26	27.77	46	-18.23	AV

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 3m)
	dBuV/m	dBuV/m
30 ~ 88	39.0	40.0
88 ~ 216	43.5	43.5
216 ~ 960	46.5	46.0
Above 960	49.5	54.0

Notes:

(1) The limit for radiated test was performed according to as following: FCC PART 15B /ICES-003.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

3.2.2 TEST PROCEDURE

a. The measuring distance of at 10 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.

b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

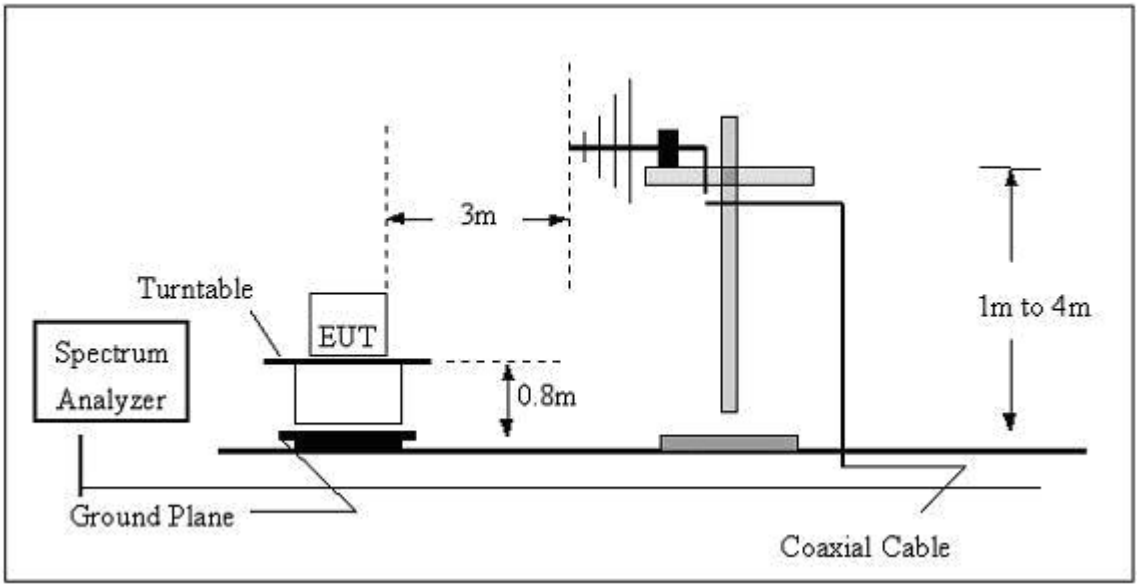
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured, above 1G Average detector mode will be instead.

e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP(AV) Limits and then no additional QP Mode measurement performed.

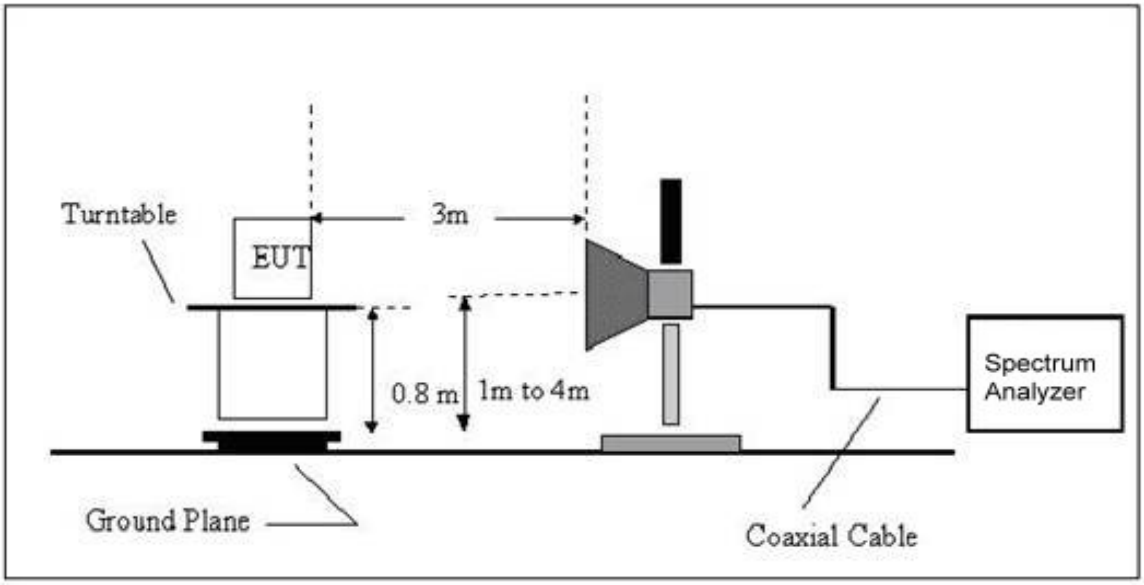
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.2.3 TEST SETUP

(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(B) Radiated Emission Test Set-Up Frequency Above 1GHz



3.2.4 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **2.3** Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.5 TEST RESULTS(Blow 30MHZ)

EUT：	GNSS RTK	Model Name ：	V90 Plus
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	AC120V
Test Mode ：	Mode 1	Polarization :	--

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

NOTE:

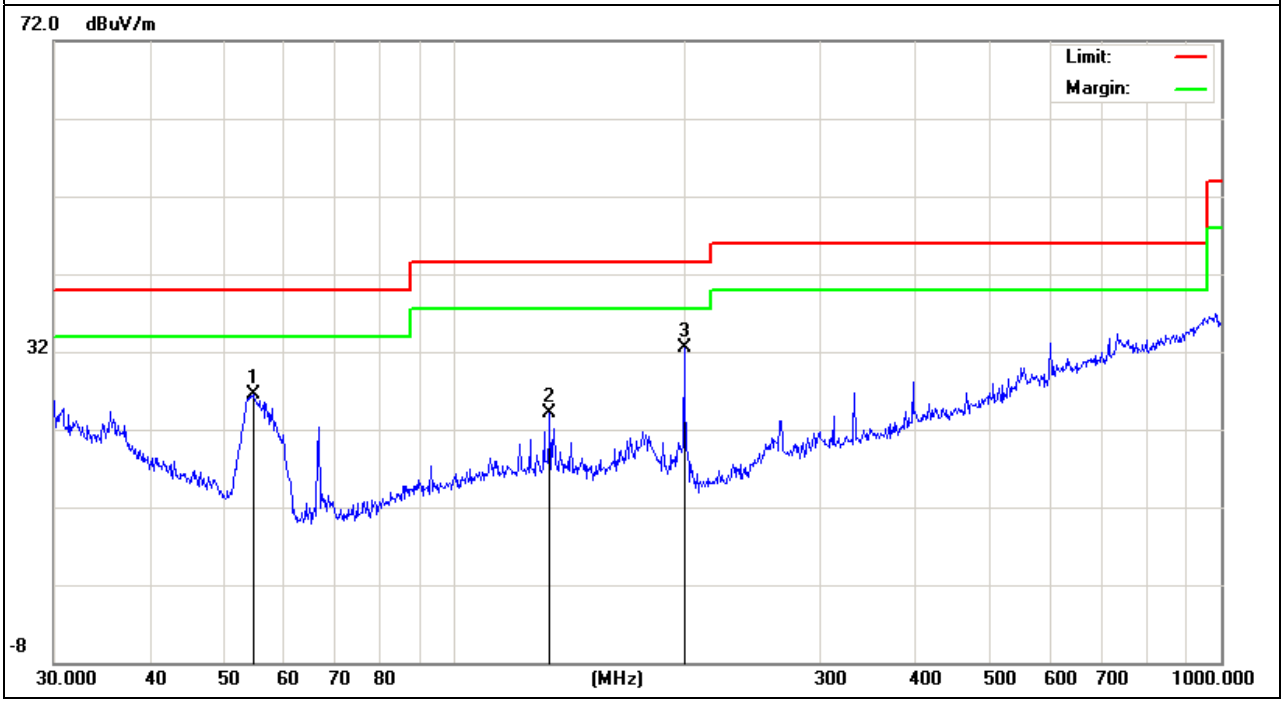
1.The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
2.Distance extrapolation factor =20 log (specific distance/test distance)(dB);
3.Limit line = specific limits(dBuv) + distance extrapolation factor.

3.2.6 TEST RESULTS(30MHZ-1GHZ)

EUT：	GNSS RTK	Model Name ：	V90 Plus
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	AC120V
Test Mode ：	Mode 1	Polarization：	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
54.6429	20.12	6.39	26.51	40	-13.49	QP
133.1511	11.93	12.23	24.16	43.5	-19.34	QP
199.2855	23.48	9.01	32.49	43.5	-11.01	QP

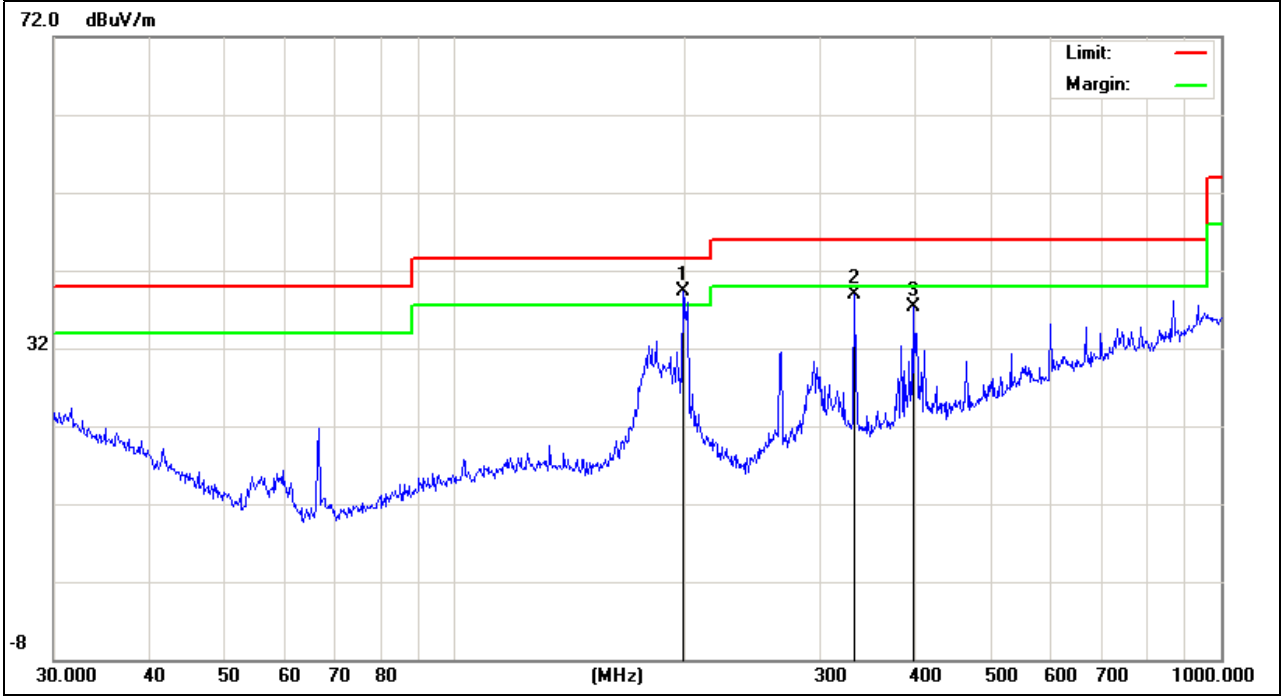
Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	GNSS RTK	Model Name ：	V90 Plus
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	AC120V
Test Mode ：	Mode 1	Polarization：	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
198.5877	30.31	8.99	39.3	43.5	-4.2	QP
332.5187	23.04	15.92	38.96	46	-7.04	QP
396.2412	19.22	18.05	37.27	46	-8.73	QP

Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



3.2.7 TEST RESULTS(Above 1GHz)

EUT：	GNSS RTK	Model Name ：	V90 Plus
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	AC120V
Test Mode ：	Mode1	Polarization :	N/A

Note: No emission is detected above 1GHz