

FCC PART 15B

MEASUREMENT AND TEST REPORT

FOR

Hi Target Survey Instruments Company Ltd.

10th Floor, Chuangxin Building, Tian'an Technology Zone, No.555 the North of

Panyu Road, Panyu District, Guangzhou City, China

FCC ID: XXHRTK01

Report Concerns: Original Report	Equipment Type: RTK GNSS
Model:	<u>V30</u>
Report No.:	<u>STR10108163I-2</u>
Test Date:	<u>2010-10-25 to 2010-11-08</u>
Issue Date:	<u>2010-12-15</u>
Tested By:	<u>Susan Su / Engineer</u> <i>Susan Su</i>
Reviewed By:	<u>Lahm Peng / EMC Manager</u> <i>Lahm peng</i>
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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by SEM.Test Compliance Service Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Hi Target Survey Instruments Company Ltd.
Address of applicant: 10th Floor, Chuangxin Building, Tian'an Technology Zone,
No.555 the North of Panyu Road, Panyu District,
Guangzhou City, China

Manufacturer: Hi Target Survey Instruments Company Ltd.
Address of manufacturer: 10th Floor, Chuangxin Building, Tian'an Technology Zone,
No.555 the North of Panyu Road, Panyu District,
Guangzhou City, China

General Description of E.U.T

Items	Description
EUT Description:	RTK GNSS
Trade Name:	Hi-Target
Model No.:	V30
Rated Voltage:	DC 7.5V battery
Rated Current:	/
Packaging Size:	18.5X18.5X9.3 cm
For more information refer to the circuit diagram form and the user's manual.	

The test data is gathered from a production sample, provided by the manufacturer.

1.2 Test Standards

The following report is prepared on behalf of the Hi Target Survey Instruments Company Ltd. in accordance with Part 2, Subpart J, and Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15.107, and 15.109 rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which results in lowering the emission/immunity, should be checked to ensure compliance has been maintained.

1.3 Related Submittal(s)/Grant(s)

No Related Submittal(s).

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in

the range of 9 kHz to 40 GHz.

The equipment under test (EUT) was configured to measure its highest possible susceptibility against the tested phenomena. The test modes were adapted accordingly in reference to the Operating Instructions.

1.5 Test Facility

- **FCC – Registration No.: 994117**

SEM.Test Compliance Services 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 and the Registration is 994117.

- **Industry Canada (IC) Registration No.: 7673A**

The 3m Semi-anechoic chamber of SEM.Test Compliance Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 7673A.

- **CNAS Registration No.: L4062**

Shenzhen SEM.Test Electronics Service Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 3/F, Jinbao Commerce Building, Xin'an Fanshen Road, Bao'an District, Shenzhen, P.R.C (518101)

1.6 EUT Exercise Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the system components. The test software, provided by the customer, is started while the EUT is on to simulate the normal work. under the Windows XP terminal.

1.7 Accessories Equipment List and Details

Description	Manufacturer	Model	Serial Number
ASUS	Notebook	XR55	LV14893

1.8 EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
Charger Power Cable	0.9	Unshielded	Without Core
Data Cable	1.3	Unshielded	Without Core

2. SUMMARY OF TEST RESULTS

Description of Test	Result
§15.107 (a) Conducted Emission	Compliant
§15.109(a) Radiated Emission	Compliant

3. §15.107 (a)- CONDUCTED EMISSION

3.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is ± 2.88 dB.

3.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2010-08-12	2011-08-11
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2010-08-12	2011-08-11
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2010-08-12	2011-08-11

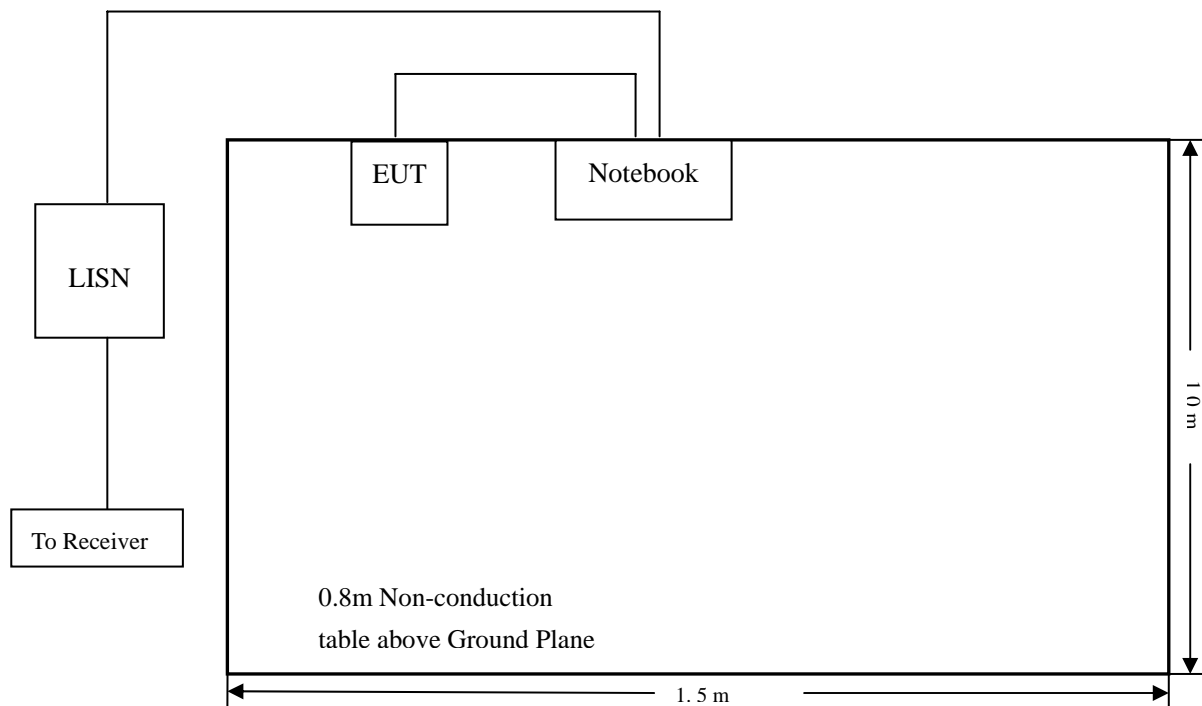
3.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.107 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

3.4 Basic Test Setup Block Diagram



3.5 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	42%
ATM Pressure:	1012 mbar

3.6 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency 150 kHz
Stop Frequency..... 30 MHz
Sweep Speed Auto
IF Bandwidth..... 10 kHz
Quasi-Peak Adapter Bandwidth 9 kHz
Quasi-Peak Adapter Mode Normal

3.7 Summary of Test Results/Plots

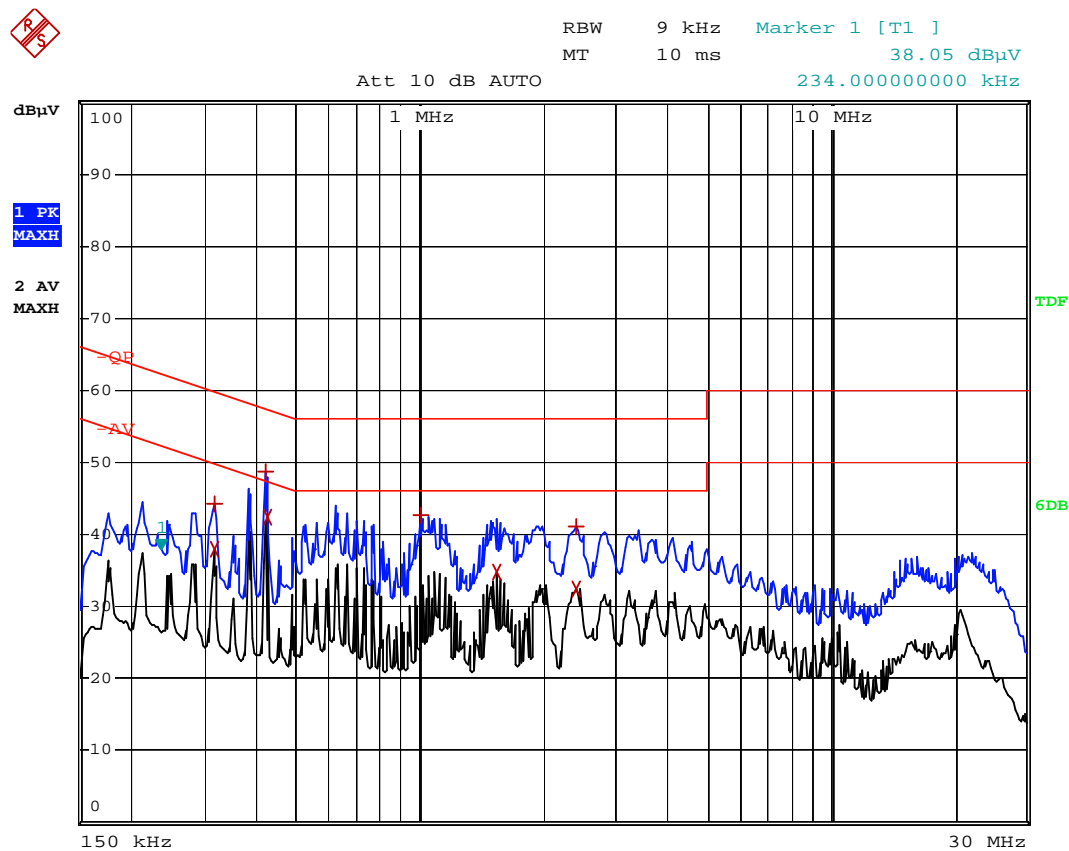
According to the data in section 3.8, the EUT complied with the FCC 15B Conducted margin for a Class B device, with the *worst* margin reading of:

-2.25 dBµV at 0.422 MHz in the **Neutral, Average** detector, 0.15-30MHz

3.8 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

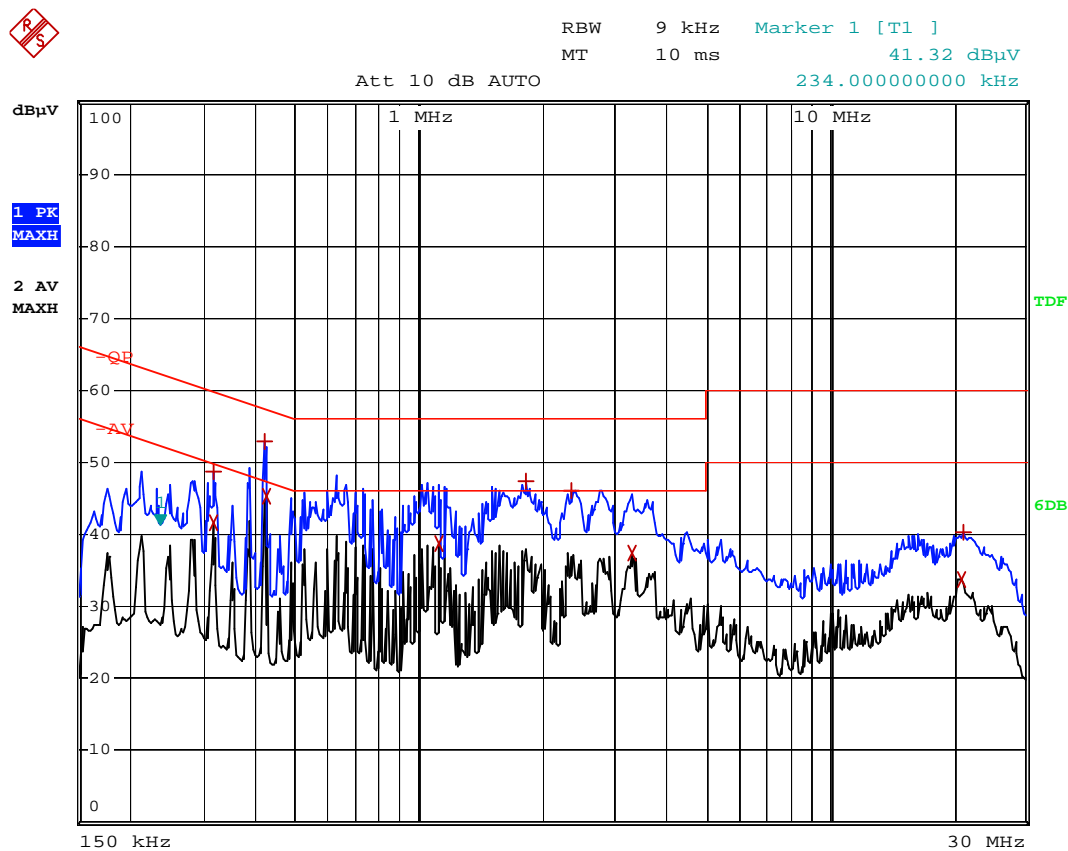
Conducted Disturbance
EUT: RTK GNSS
M/N: V30
Operating Condition: Reading
Test Specification: N
Comment: AC 120V/60Hz connect to PC, USB 5V



EDIT PEAK LIST (Prescan Results)			
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Max Peak	314 kHz	48.71	-11.15
2 Average	314 kHz	41.53	-8.32
1 Max Peak	418 kHz	52.95	-4.52
2 Average	422 kHz	45.15	-2.25
2 Average	1.118 MHz	38.78	-7.21
1 Max Peak	1.818 MHz	47.49	-8.50
1 Max Peak	2.342 MHz	46.17	-9.82
2 Average	3.322 MHz	37.52	-8.47
2 Average	21.002 MHz	33.82	-16.17
1 Max Peak	21.038 MHz	40.19	-19.80

Plot of Conducted Emissions Test Data

Conducted Disturbance
EUT: RTK GNSS
M/N: V30
Operating Condition: Reading
Test Specification: L
Comment: AC 120V/60Hz connect to PC, USB 5V



EDIT PEAK LIST (Prescan Results)			
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Max Peak	314 kHz	44.24	-15.61
2 Average	314 kHz	37.99	-11.86
1 Max Peak	418 kHz	48.67	-8.81
2 Average	422 kHz	42.28	-5.12
1 Max Peak	1.01 MHz	42.69	-13.30
2 Average	1.538 MHz	34.89	-11.11
1 Max Peak	2.402 MHz	41.02	-14.97
2 Average	2.41 MHz	32.31	-13.68

4. §15.109(a)- RADIATED EMISSION

4.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any radiation emissions measurement is ± 5.10 dB.

4.2 Test Equipment List and Details

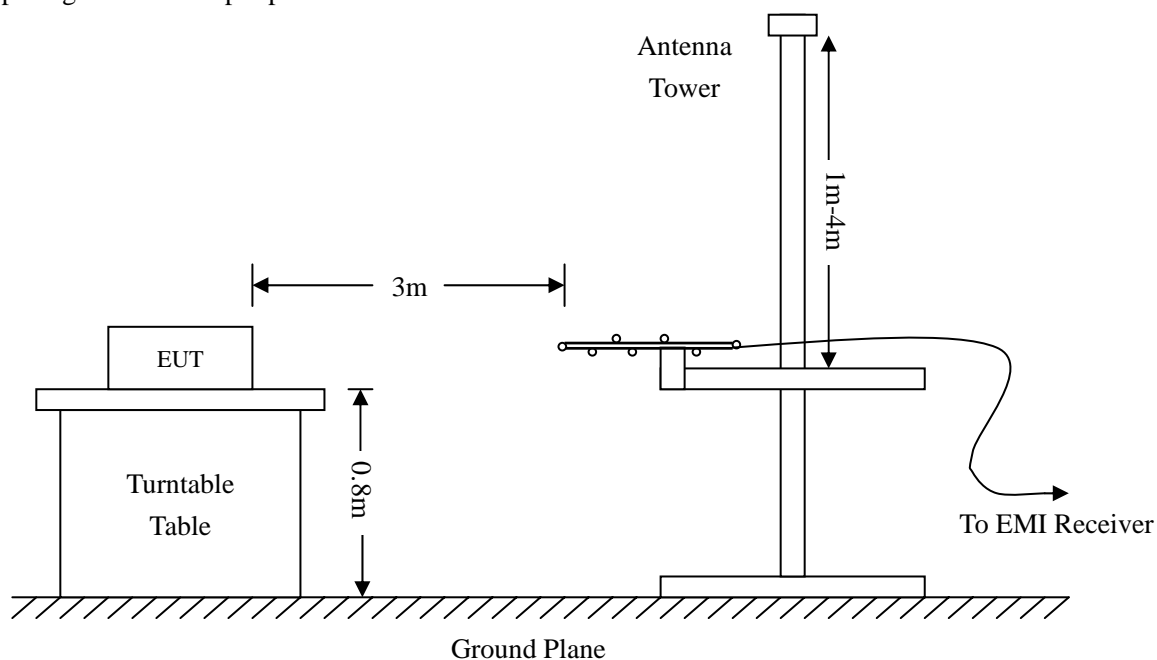
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2010-04-16	2011-04-15
EMI Test Receiver	R&S	ESVB	825471/005	2010-08-12	2011-08-11
Positioning Controller	C&C	CC-C-1F	N/A	2010-08-12	2011-08-11
RF Switch	EM	EMSW18	SW060023	2010-08-12	2011-08-11
Pre-amplifier	Agilent	8447F	3113A06717	2010-08-12	2011-08-11
Pre-amplifier	Compliance Direction	PAP-0118	24002	2010-08-12	2011-08-11
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2010-07-21	2011-07-20
Horn Antenna	ETS	3117	00086197	2010-07-21	2011-07-20

4.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.205 and FCC Part 15.109 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.



4.4 Test Receiver Setup

During the radiated emission test, the test receiver was set with the following configurations:

Start Frequency 30 MHz
 Stop Frequency..... 1000 MHz
 Sweep Speed Auto
 IF Bandwidth..... 100 kHz
 Quasi-Peak Adapter Bandwidth 120 kHz
 Quasi-Peak Adapter Mode Normal

4.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} - \text{Corr. Factor}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB μ V means the emission is 6dB μ V below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15B Limit}$$

4.6 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	43%
ATM Pressure:	1011 mbar

4.7 Summary of Test Results/Plots

According to the data, the EUT complied with the FCC 15B Class B standards, and had the worst margin of:

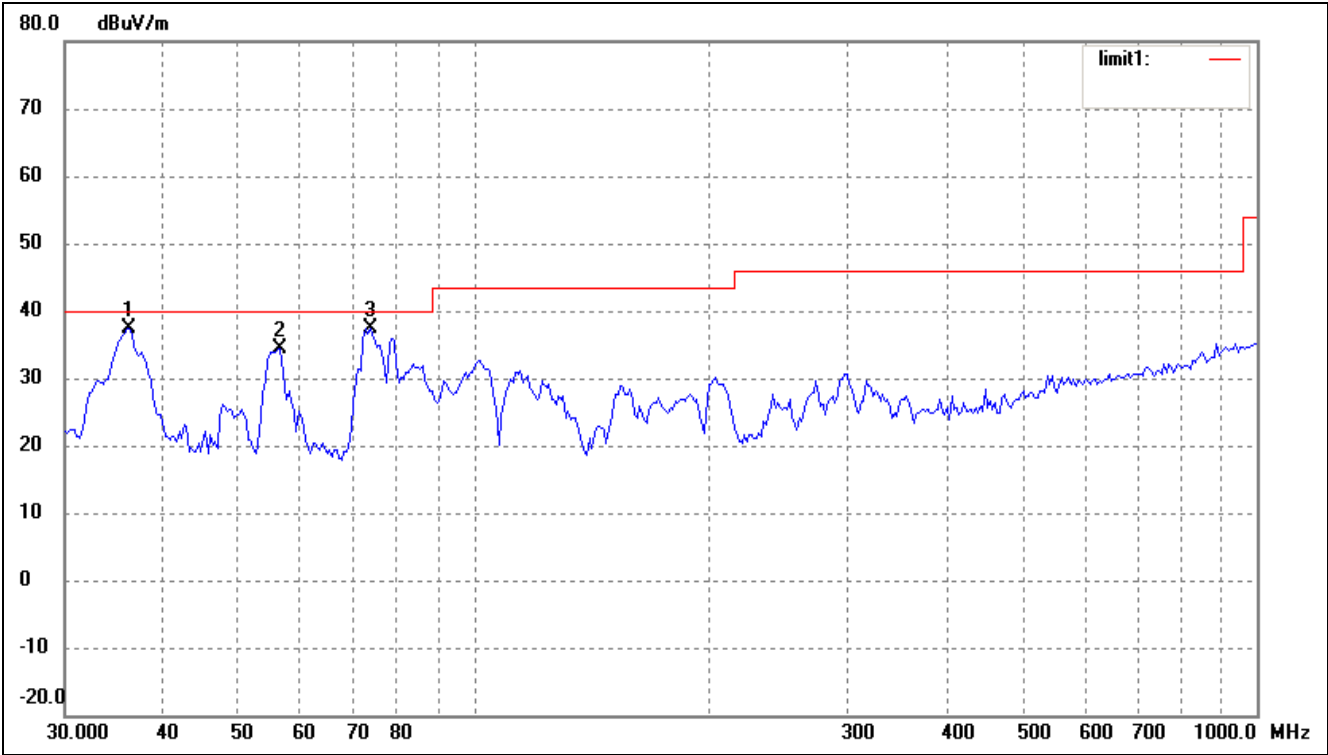
-1.75 dB μ V at 35.2512 MHz in the Horizontal polarization, Charging mode, 30 MHz to 1 GHz, 3Meters

-1.23 dB μ V at 385.2805 MHz in the Vertical polarization, Reading mode, 30 MHz to 1 GHz, 3Meters

Plot of Radiation Emissions Test Data

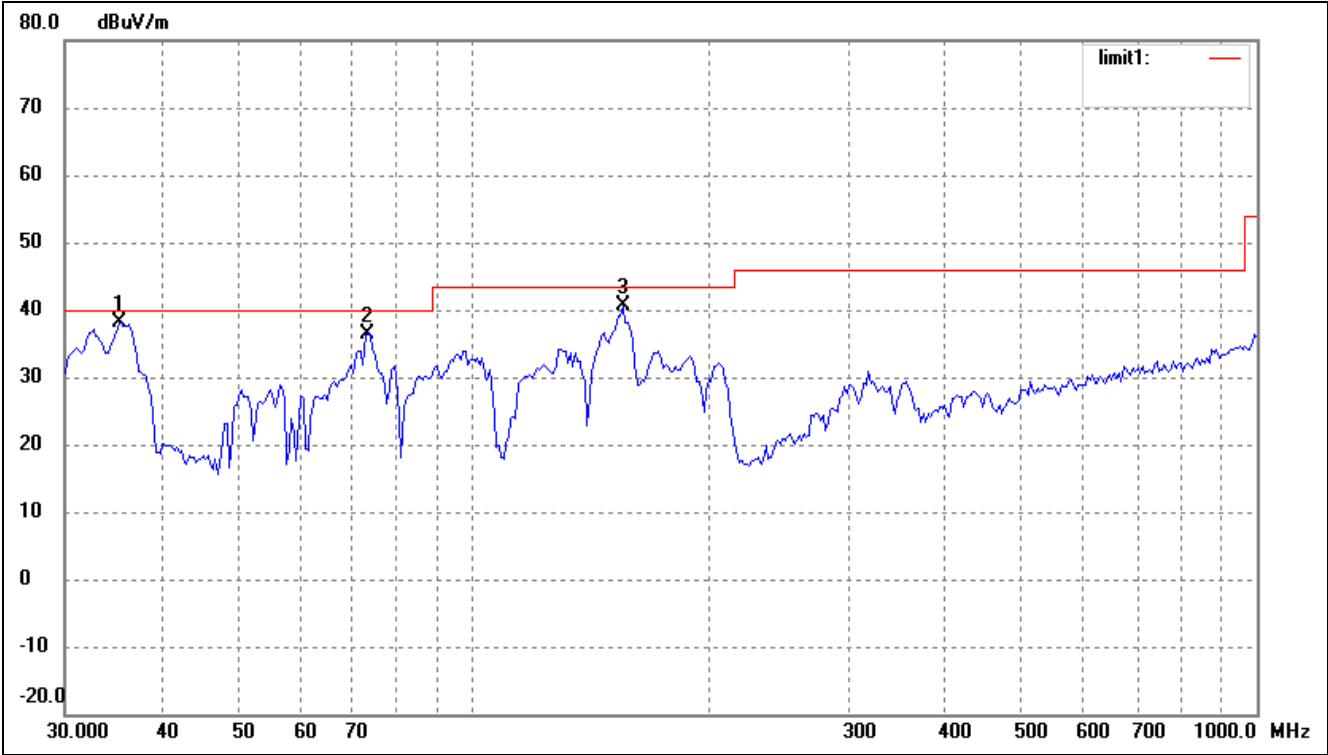
Radiated Disturbance
EUT: RTK GNSS
M/N: V30
Operating Condition: Charging
Test Specification: Horizontal & Vertical
Comment: AC 120V/60Hz

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	36.2541	30.50	6.93	37.43	40.00	-2.57	100	100	QP
2	56.3948	26.88	7.38	34.26	40.00	-5.74	26	100	QP
3	73.6170	34.84	2.63	37.47	40.00	-2.53	59	100	QP

Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	35.2512	31.59	6.66	38.25	40.00	-1.75	305	100	QP
2	73.1025	33.74	2.70	36.44	40.00	-3.56	97	100	QP
3	154.8205	37.00	3.52	40.52	43.50	-2.98	261	100	QP

Radiated Disturbance

EUT: RTK GNSS

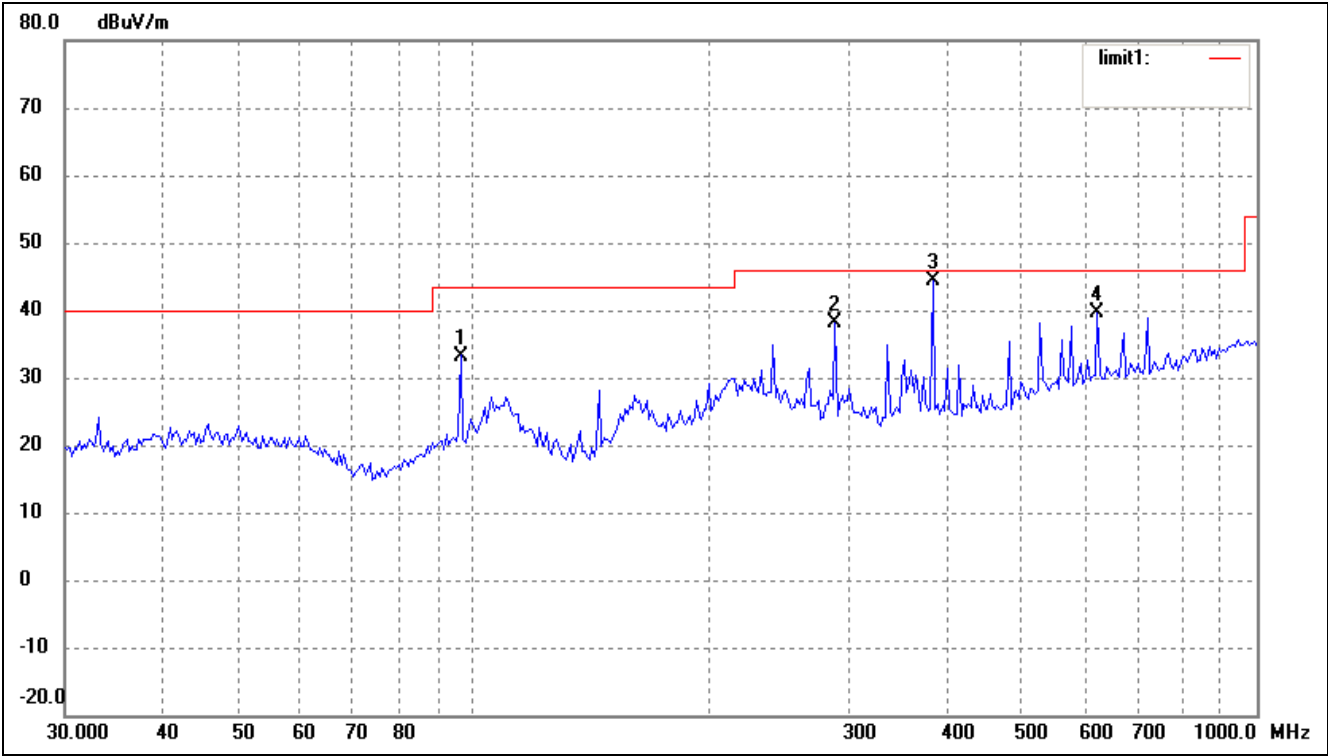
M/N: V30

Operating Condition: Reading

Test Specification: Horizontal & Vertical

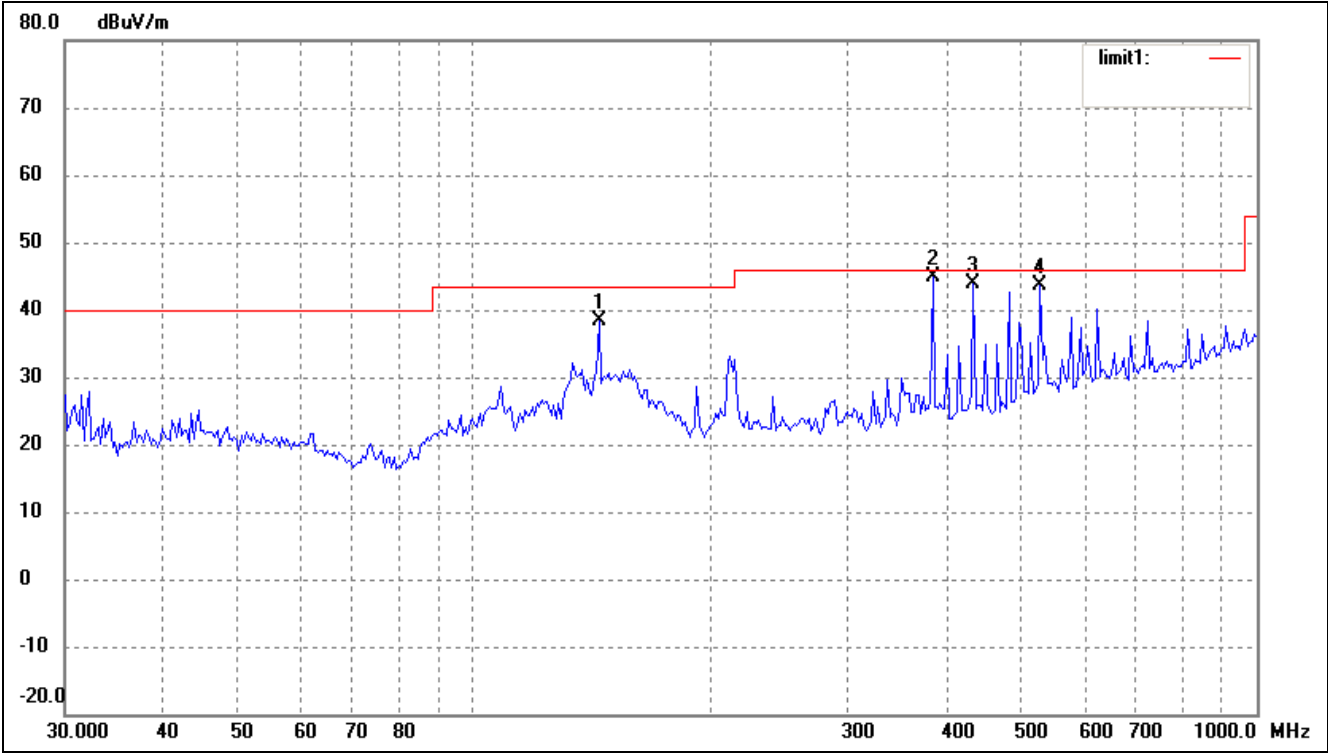
Comment: AC 120V/60Hz connected to PC USB 5V

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	96.0986	25.71	7.54	33.25	43.50	-10.25	305	100	peak
2	289.0021	29.51	8.54	38.05	46.00	-7.95	84	100	peak
3	385.2805	34.41	9.96	44.37	46.00	-1.63	74	100	QP
4	625.0780	24.42	15.19	39.61	46.00	-6.39	68	100	peak

Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	144.3348	35.19	3.26	38.45	43.50	-5.05	105	100	QP
2	385.2805	34.81	9.96	44.77	46.00	-1.23	78	100	QP
3	434.0651	33.24	10.56	43.80	46.00	-2.20	321	100	QP
4	528.2458	30.08	13.53	43.61	46.00	-2.39	68	100	QP

***** END OF REPORT *****