

FCC REPORT

Applicant: Shanghai Huace Navigation Technology LTD

Address of Applicant: Building C, 599 Gaojing Road, Qingpu District

Equipment Under Test (EUT)

Product Name: Handheld GNSS Data Collector

Model No.: HCE300

Trade mark: CHC

FCC ID: SY4-B01006

Applicable standards: FCC CFR Title 47 Part 15 Subpart B

Date of sample receipt: 21 Mar., 2016

Date of Test: 21 Mar., to 08 Jun., 2016

Date of report issued: 12 Jun., 2016

Test Result: Pass *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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2 Version

Version No.	Date	Description
00	12 Jun., 2016	Original

Tested by:

Viki zhu

Date:

12 Jun., 2016

Test Engineer

Reviewed by:

M. Liang

Date:

12 Jun., 2016

Project Engineer

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4 Test Summary

Test Item	Section in CFR 47	Result
Conducted Emission	Part 15.107	Pass
Radiated Emission	Part 15.109	Pass

Pass: The EUT complies with the essential requirements in the standard.

5 General Information

5.1 Client Information

Applicant:	Shanghai Huace Navigation Technology LTD
Address of Applicant:	Building C, 599 Gaojing Road, Qingpu District
Manufacturer/Factory:	Shanghai Huace Navigation Technology LTD
Address of Manufacturer/ Factory:	Building C, 599 Gaojing Road, Qingpu District

5.2 General Description of E.U.T.

Product Name:	Handheld GNSS Data Collector
Model No.:	HCE300
Power supply:	Rechargeable Li-ion Battery DC3.7V-6300mAh
AC adapter :	Input: AC100-240V 50/60Hz 0.5A Output: DC 5.0V, 2.1A
Remark:	Item No.: HCE300 (Model HCE300WXYZ , W, X, Y and Z is variable, it indicated A-Z or 0-9 or blank), were identical inside, the electrical circuit design, layout, components used and internal wiring, with only difference being model name and exterior colours.

5.3 Test Mode

Operating mode	Detail description
PC mode	Keep the EUT in Downloading mode(Worst case)
Charging+Recording mode	Keep the EUT in Charging+Recording mode
Charging+Playing mode	Keep the EUT in Charging+Playing mode
FM mode	Keep the EUT in FM receiver mode
GPS mode	Keep the EUT in GPS receiver mode

The sample was placed 0.8m above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

5.4 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC ID/DoC
DELL	PC	OPTIPLEX745	N/A	DoC
DELL	MONITOR	E178FPC	N/A	DoC
DELL	KEYBOARD	SK-8115	N/A	DoC
DELL	MOUSE	MOC5UO	N/A	DoC
HP	Printer	CB495A	05257893	DoC
MERCURY	Wireless router	MW150R	12922104015	FCC ID
NAKAMICHI	Bluetooth earphone	T8	N/A	FCC ID

5.5 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC - Registration No.: 817957**

Shenzhen Zhongjian Nanfang Testing 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 out files. Registration 817957, February 27, 2012.

- **IC - Registration No.: 10106A-1**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

5.6 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755-23118282
Fax: +86-755-23116366

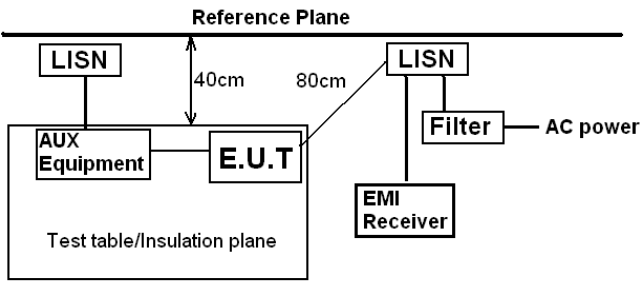
5.7 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
1	3m SAC	SAEMC	9(L)*6(W)* 6(H)	CCIS0001	08-23-2014	08-22-2017
2	BiConiLog Antenna	SCHWARZBECK	VULB9163	CCIS0005	03-25-2016	03-25-2017
3	Horn Antenna	SCHWARZBECK	BBHA9120D	CCIS0006	03-25-2016	03-25-2017
4	Pre-amplifier (10kHz-1.3GHz)	HP	8447D	CCIS0003	04-01-2016	03-31-2017
5	Pre-amplifier (1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	04-01-2016	03-31-2017
6	Spectrum analyzer 9k-30GHz	Rohde & Schwarz	FSP30	CCIS0023	03-28-2016	03-28-2017
7	EMI Test Receiver	Rohde & Schwarz	ESRP7	CCIS0167	03-28-2016	03-28-2017

Conducted Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongShuo Electron	11.0(L)x4.0(W)x3.0(H)	CCIS0061	08-23-2014	08-22-2017
2	EMI Test Receiver	Rohde & Schwarz	ESCI	CCIS0002	03-24-2016	03-24-2017
3	LISN	CHASE	MN2050D	CCIS0074	03-26-2016	03-26-2017
4	Coaxial Cable	CCIS	N/A	CCIS0086	04-01-2016	03-31-2017

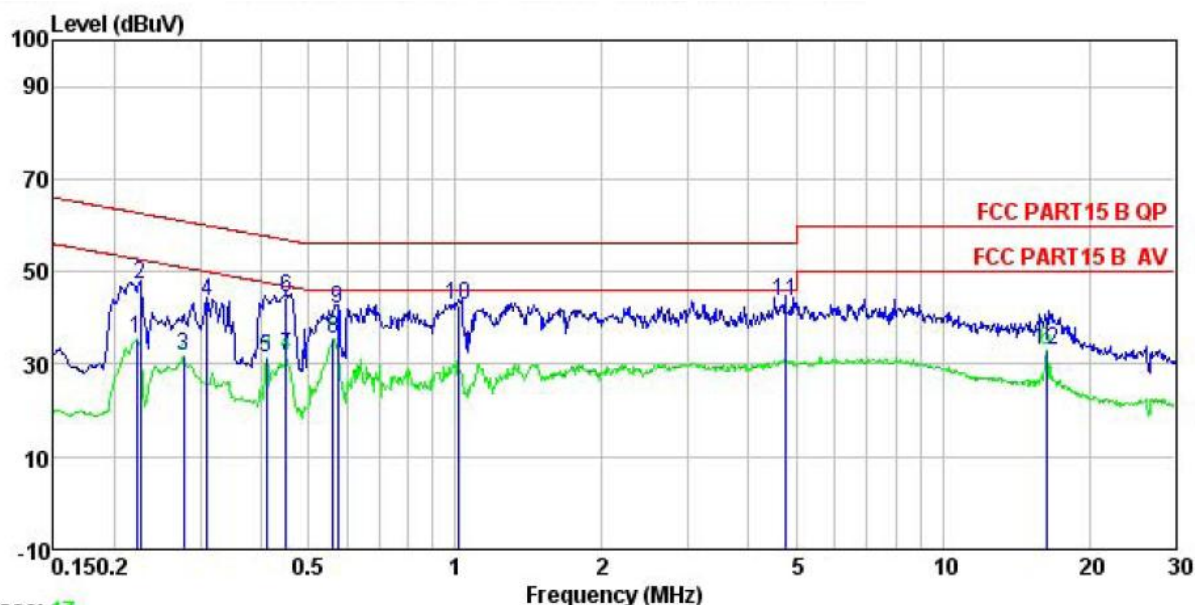
6 Test results and Measurement Data

6.1 Conducted Emission

Test Requirement:	FCC Part 15 B Section 15.107		
Test Method:	ANSI C63.4:2014		
Test Frequency Range:	150kHz to 30MHz		
Class / Severity:	Class B		
Receiver setup:	RBW=9kHz, VBW=30kHz		
Limit:	Frequency range (MHz)	Limit (dBμV)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	0.5-30	60	50
* Decreases with the logarithm of the frequency.			
Test setup:	 Remark: E.U.T.: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m		
Test procedure	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.		
Test environment:	Temp.:	23 °C	Humid.: 56% Press.: 101kPa
Measurement Record:	Uncertainty: ±3.28dB		
Test Instruments:	Refer to section 5.7 for details		
Test mode:	Refer to section 5.3 for details		
Test results:	Pass		

Measurement data:

Line:



Trace: 17

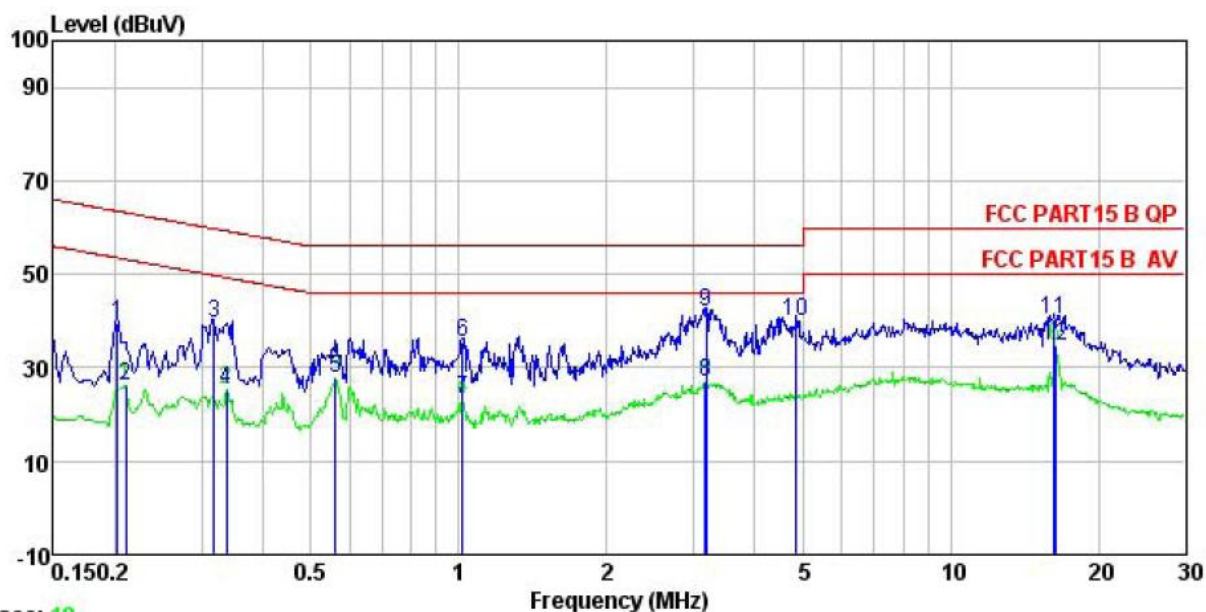
Site : CCIS Shielding Room
 Condition : FCC PART15 B QP LISN LINE
 EUT : Handheld GNSS Data Collector
 Model : HCE300
 Test Mode : PC mode
 Power Rating : AC120/60Hz
 Environment : Temp: 23 °C Humi:56% Atmos:101KPa
 Test Engineer: Wiki
 Remark :

	Freq	Read	LISN	Cable	Level	Limit	Over	
	MHz	Level	Factor	Loss	Level	Line	Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.222	24.51	0.26	10.75	35.52	52.74	-17.22	Average
2	0.226	36.13	0.26	10.75	47.14	62.61	-15.47	QP
3	0.277	20.81	0.26	10.74	31.81	50.90	-19.09	Average
4	0.310	32.39	0.26	10.74	43.39	59.97	-16.58	QP
5	0.410	20.29	0.26	10.72	31.27	47.64	-16.37	Average
6	0.449	33.51	0.27	10.74	44.52	56.89	-12.37	QP
7	0.449	20.84	0.27	10.74	31.85	46.89	-15.04	Average
8	0.561	24.57	0.27	10.77	35.61	46.00	-10.39	Average
9	0.573	30.92	0.27	10.77	41.96	56.00	-14.04	QP
10	1.016	31.65	0.29	10.87	42.81	56.00	-13.19	QP
11	4.746	32.34	0.41	10.86	43.61	56.00	-12.39	QP
12	16.312	21.15	0.85	10.91	32.91	50.00	-17.09	Average

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss.

Neutral:



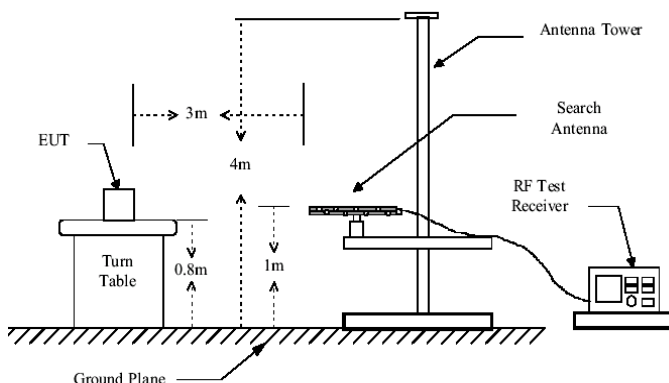
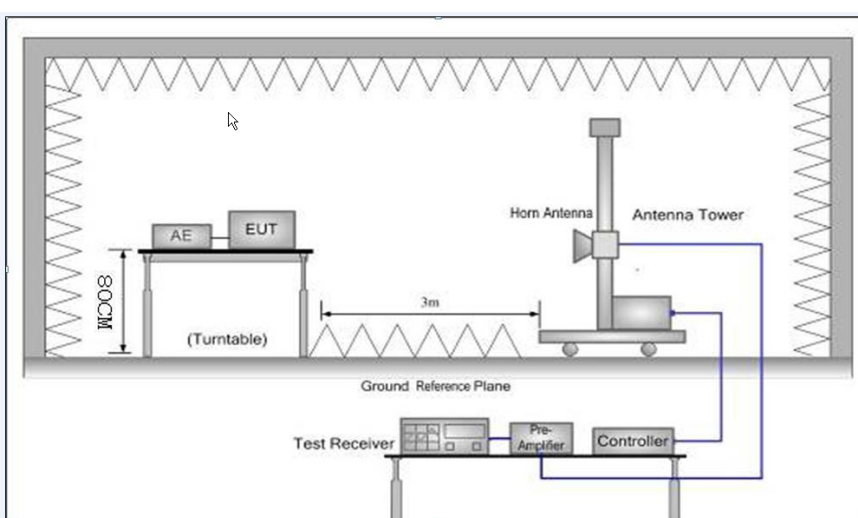
Site : CCIS Shielding Room
 Condition : FCC PART15 B QP LISN NEUTRAL
 EUT : Handheld GNSS Data Collector
 Model : HCE300
 Test Mode : PC mode
 Power Rating : AC120/60Hz
 Environment : Temp: 23 °C Humi:56% Atmos:101KPa
 Test Engineer: Viki
 Remark :

	Freq	Read	LISN	Cable	Level	Limit	Over	
	MHz	Level	Factor	Loss	Level	Line	Limit	Remark
		dBuV	dB	dB	dBuV	dBuV	dB	
1	0.202	28.77	0.16	10.76	39.69	63.54	-23.85	QP
2	0.211	15.26	0.16	10.76	26.18	53.18	-27.00	Average
3	0.318	28.49	0.16	10.74	39.39	59.75	-20.36	QP
4	0.337	14.39	0.16	10.73	25.28	49.27	-23.99	Average
5	0.561	16.67	0.17	10.77	27.61	46.00	-18.39	Average
6	1.016	24.43	0.17	10.87	35.47	56.00	-20.53	QP
7	1.016	12.27	0.17	10.87	23.31	46.00	-22.69	Average
8	3.173	15.61	0.23	10.91	26.75	46.00	-19.25	Average
9	3.190	30.77	0.23	10.91	41.91	56.00	-14.09	QP
10	4.848	28.97	0.28	10.86	40.11	56.00	-15.89	QP
11	16.226	29.00	0.60	10.91	40.51	60.00	-19.49	QP
12	16.312	22.96	0.60	10.91	34.47	50.00	-15.53	Average

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss.

6.2 Radiated Emission

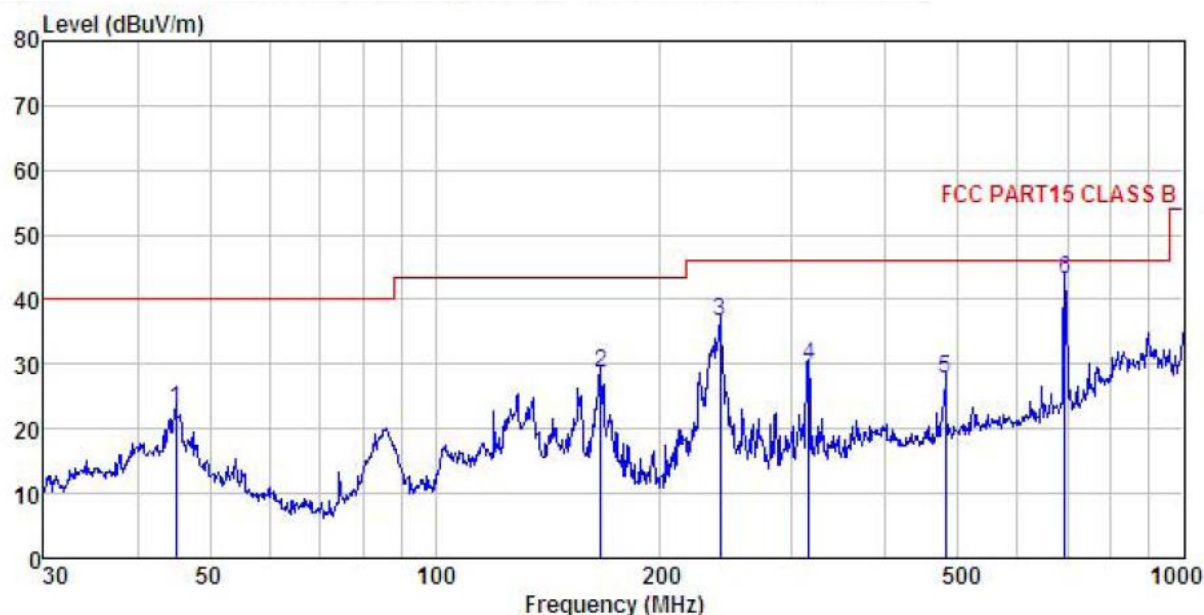
Test Requirement:	FCC Part 15 B Section 15.109				
Test Method:	ANSI C63.4:2014				
Test Frequency Range:	30MHz to 6000MHz				
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
RMS		1MHz	3MHz	Average Value	
Limit:	Frequency		Limit (dBuV/m @3m)		Remark
	30MHz-88MHz		40.0		Quasi-peak Value
	88MHz-216MHz		43.5		Quasi-peak Value
	216MHz-960MHz		46.0		Quasi-peak Value
	960MHz-1GHz		54.0		Quasi-peak Value
	Above 1GHz		54.0		Average Value
74.0			Peak Value		
Test setup:	Below 1GHz				
					
Test setup:	Above 1GHz				
					

Test Procedure:	1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.					
Test environment:	Temp.:	25 °C	Humid.:	55%	Press.:	1 01kPa
Measurement Record:	Uncertainty: ±4.88dB					
Test Instruments:	Refer to section 5.7 for details					
Test mode:	Refer to section 5.3 for details					
Test results:	Passed					

Measurement Data:

Below 1GHz

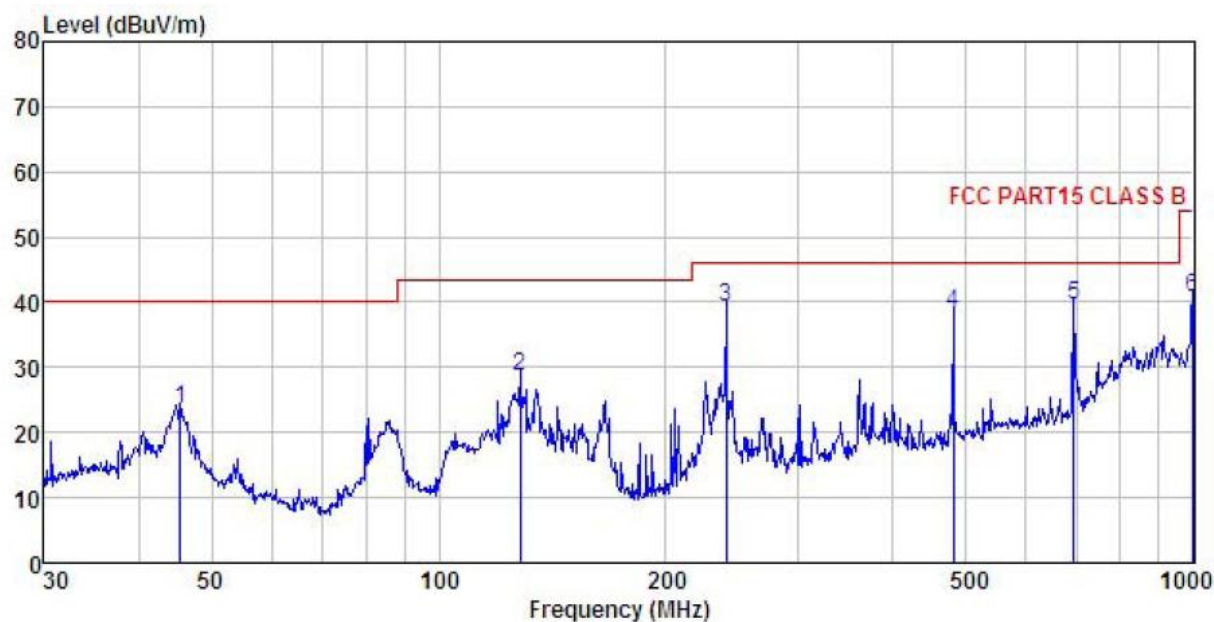
Horizontal:



Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163(30M3G) HORIZONTAL
 EUT : Handheld GNSS Data Collector
 Model : HCE300
 Test mode : PC Mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Viki
 REMARK :

	Freq	ReadAntenna	Cable	Preamp	Level	Limit	Over	
	MHz	Level	Factor	Loss	Factor	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	45.058	34.25	17.40	1.29	29.86	23.08	40.00	-16.92 QP
2	166.651	45.18	9.84	2.64	29.08	28.58	43.50	-14.92 QP
3	239.987	50.61	11.80	2.82	28.59	36.64	46.00	-9.36 QP
4	315.481	42.05	13.17	2.99	28.49	29.72	46.00	-16.28 QP
5	480.528	36.59	16.57	3.46	28.92	27.70	46.00	-18.30 QP
6	694.417	48.40	19.15	4.14	28.68	43.01	46.00	-2.99 QP

Vertical:

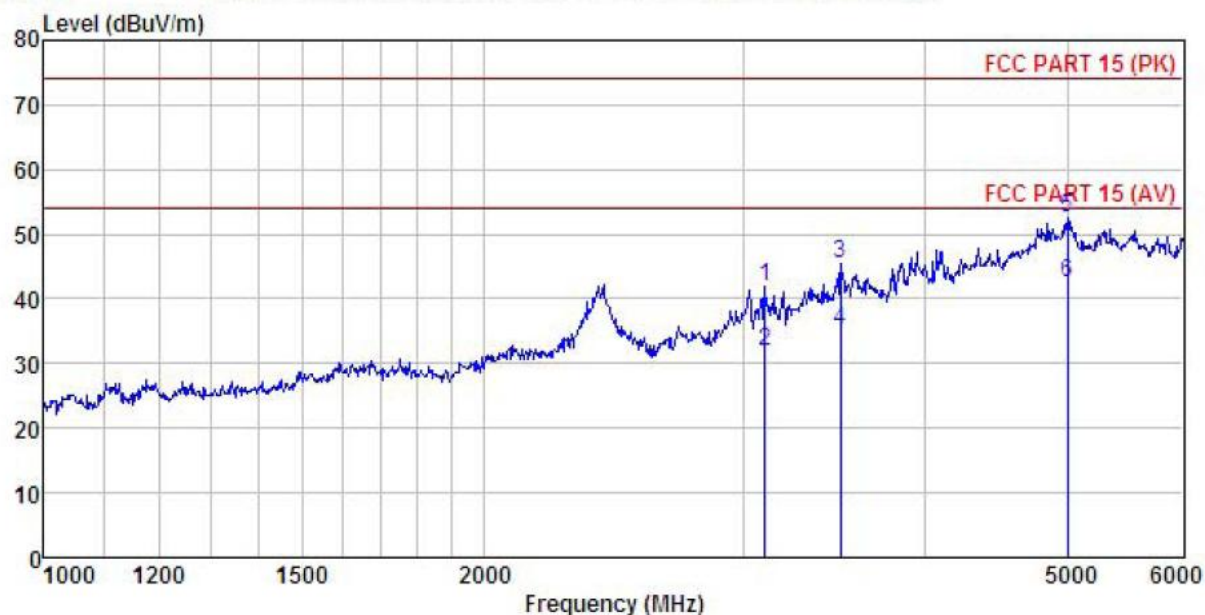


Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163(30M3G) VERTICAL
 EUT : Handheld GNSS Data Collector
 Model : HCE300
 Test mode : PC Mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Wiki
 REMARK :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	45.375	34.81	17.32	1.29	29.86	23.56	40.00	-16.44	QP
2	128.113	43.47	12.21	2.26	29.34	28.60	43.50	-14.90	QP
3	239.987	53.16	11.80	2.82	28.59	39.19	46.00	-6.81	QP
4	480.528	47.22	16.57	3.46	28.92	38.33	46.00	-7.67	QP
5	694.417	44.86	19.15	4.14	28.68	39.47	46.00	-6.53	QP
6	996.500	40.98	22.90	4.45	27.45	40.88	54.00	-13.12	QP

Above 1GHz

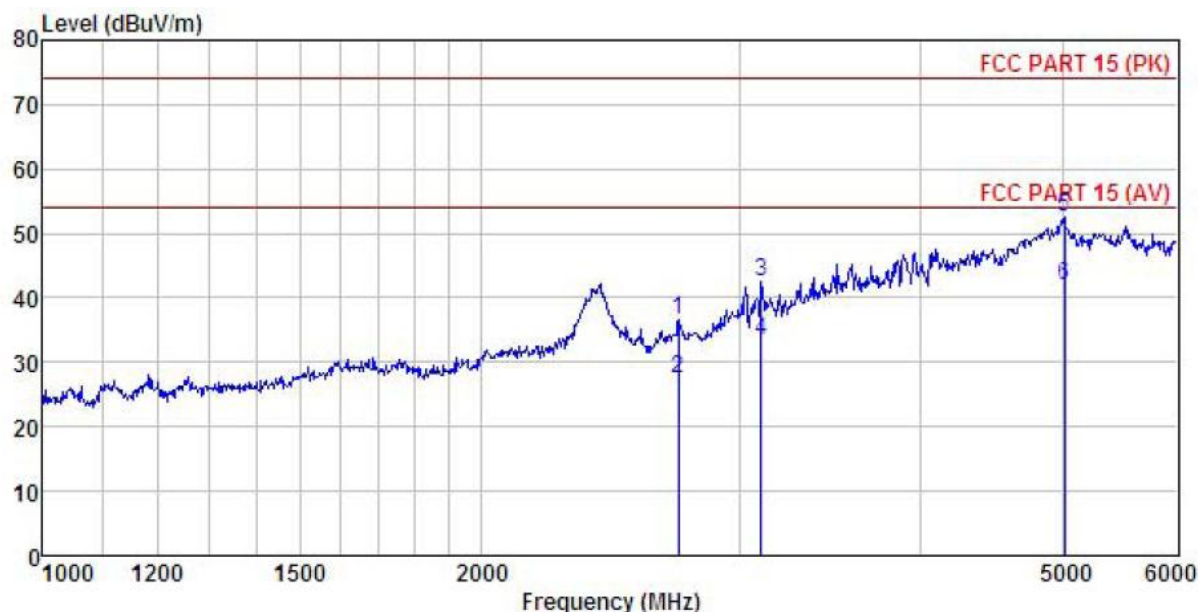
Horizontal:



Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) HORIZONTAL
 EUT : Handheld GNSS Data Collector
 Model : HCE300
 Test mode : PC Mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Viki
 REMARK :

	Freq	ReadLevel	AntennaFactor	CableLoss	PreampFactor	Level	Limit	OverLimit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	3108.635	48.52	26.10	8.04	40.62	42.04	74.00	-31.96	Peak
2	3108.635	38.27	26.10	8.04	40.62	31.79	54.00	-22.21	Average
3	3498.869	48.48	27.80	8.77	39.58	45.47	74.00	-28.53	Peak
4	3498.869	38.02	27.80	8.77	39.58	35.01	54.00	-18.99	Average
5	4997.811	44.99	36.90	10.78	39.98	52.69	74.00	-21.31	Peak
6	4997.811	34.88	36.90	10.78	39.98	42.58	54.00	-11.42	Average

Vertical:



Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) VERTICAL
 EUT : Handheld GNSS Data Collector
 Model : HCE300
 Test mode : PC Mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Viki
 REMARK :

	Freq	ReadLevel	AntennaFactor	CableLoss	PreampFactor	Level	LimitLine	OverLimit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2727.500	45.03	24.60	7.32	40.49	36.46	74.00	-37.54	Peak
2	2727.500	35.94	24.60	7.32	40.49	27.37	54.00	-26.63	Average
3	3108.635	49.12	26.10	8.04	40.62	42.64	74.00	-31.36	Peak
4	3108.635	39.74	26.10	8.04	40.62	33.26	54.00	-20.74	Average
5	5015.753	44.85	36.83	10.80	39.99	52.49	74.00	-21.51	Peak
6	5015.753	34.21	36.83	10.80	39.99	41.85	54.00	-12.15	Average