

FCC Part 15B TEST REPORT

Product Name : GNSS receiver

Model Name : N72 WXYZ

Prepared for:

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Report Number : UL41320150312CE/FCC003-1

Date of Report : 05-11-2015

Date of Test : 05-11-2015

Notes :

The test results only relate to these samples which have been tested.
Partly using this report will not be admitted unless been allowed by Unilab.
Unilab is only responsible for the complete report with the reported stamp of Unilab.

Applicant: Shanghai Huace Navigation Technology LTD
Building C,599 Gaojing Road,Qingpu District,Shanghai

Manufacturer: Shanghai Huace Navigation Technology LTD
Building C,599 Gaojing Road,Qingpu District,Shanghai

Product Name: GNSS receiver

Brand Name:



Model Name: N72 WXYZ

Model Description: See Part1.6

FCC ID: SY4-A02003

EUT Voltage: Extreme Low:12V, Nominal:12V, Extreme High:36V

Date of Receipt: 03-12-2015

Test Standard: FCC CFR Title 47 Part 15 Subpart B

Test Result: Pass

Date of Test 05-11-2015

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1. TECHNICAL SUMMARY

1.1 SUMMARY OF STANDARDS AND TEST RESULTS

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

Test Item	FCC	Result
Conducted disturbance	FCC 15.107	P*
Radiated disturbance	FCC 15.109	P

Note: P means pass, F means failure, N/A means not applicable

1.2 TEST UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT 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	3.4
Radiated disturbance	4.2

1.3 TEST EQUIPMENT LIST

Equipment	Manufacturer	Model	Serial No.	Due Date	Cal interval
Receiver	Agilent	N9038A	MY51210142	11/11/2015	1 year
LISN	R&S	NNBM 8126F	1035	22/08/2015	1 year
3m Chamber & Accessory Equipment	ETS-LINDGREN	FACT-3	CT-0000336	26/11/2017	3 years
Biconilog Antenna	SCHWARZBECK	VULB 9160	3316	19/09/2016	2 years
Horn Antenna	SCHWARZBECK	BBHA9120D	942	19/09/2016	2 years
Microwave Preamplifier	EM Electronics	EM30180	3008A02425	27/02/2016	1 year

1.4 SUPPORT EQUIPMENT AND CABLE

Equipment	Manufacturer	Model	Serial No.	Due Date
PC	DELL	VOSTRO 260	7JXLB3X	/
Displayer	DELL	E1910Hc	CN-0CD1MT-64180-OC7-06TS	/
Mouse	DELL	MS111-P	CN-0MF3JY-71581-2C7-05GB	/
Keyboard	DELL	KB212-B	CN-0Y88XT-65890-22L-01MG-A01	/

1.5 CABLE OF TEST

No.	Cable Type	Quantity	Provider	Length(m)	Specification	Note
1	AC Cable	2	Unilab	1.5	Unshielded	None
2	USB cable	1	Queclink	1.0	Unshielded	None
3	VGA Cable	1	Unilab	1.5	Unshielded	None

1.6 TEST MODE AND DESCRIPTION

Test mode	Data exchange with USB cable,
Description	The EUT connect to PC with a USB cable, then the command "AT+EADC=1" was sent through the hyperterminal to achieve data exchange between PC and EUT. Model N72 WXYZ, W is variable, it indicated A-Z or 0-9 or blank , X is variable, it indicated A-Z or 0-9 or blank , Y is variable, it indicated A-Z, 0-9 or blank. Z is variable, it indicated A-Z, 0-9 or blank. due to sales purpose in different countries or regions. The internal PCB design are no difference , but only distinct in colours and model names. The test model name is N72.

1.7 TEST FACILITY

All test facilities used to collect the test data are located at No. 1350, Lianxi Rd. Pudong New District, Shanghai, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4: 2009, CISPR 16-1-1 and other equivalent standards. The laboratory is compliance with the requirements of the ISO/IEC/EN17025.

1.8 TEST SETUP CONFIGURATION

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

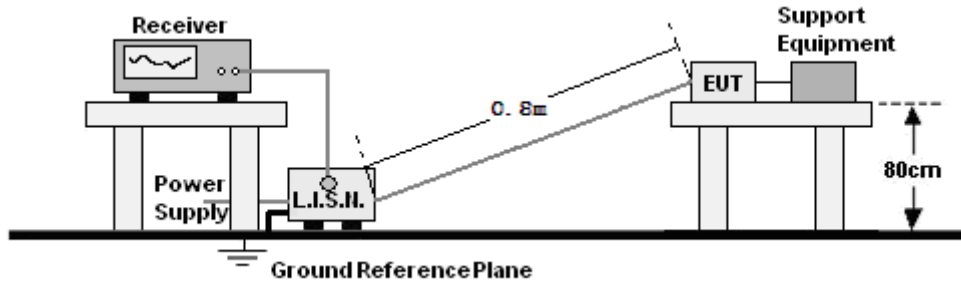
Notes:

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.
3. All the tests were carried out with the EUT in normal operation. Which was shown in this test report is the worst test mode.

2. CONDUCTED DISTURBANCE

2.1 TEST SETUP

For mains port:



2.2 LIMITS

Limits for Class B digital devices

Frequency range (MHz)	Limits dB(μ V)	
	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.

2.3 TEST PROCEDURE

For mains port:

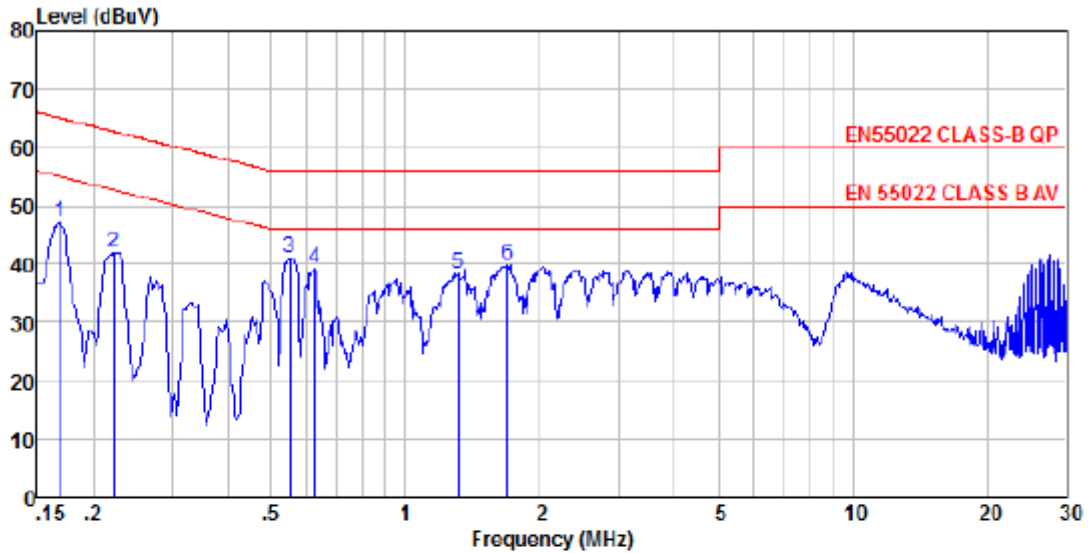
- The EUT and support equipment were placed on a nonconductive table 0.8m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane. The EUT connected to the main through Line Impedance Stability Network (L.I.S.N) to provide a $50 \Omega/50\mu\text{H}$ coupling impedance for the measuring equipment. The support equipment is also connected to the main power through a LISN that provides a $50 \Omega/50\mu\text{H}$ coupling impedance with 50Ω terminations. Both sides of AC line (Line & Neutral) were checked to find out the maximum conducted emission.
- The RBW of the receiver was set at 9 kHz. The frequency range from 150 kHz to 30 MHz was checked. Run the receiver's pre-scan to record the maximum disturbance generated from EUT 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.

2.4 TEST RESULT

For mains port:

Test mode: Data exchange by USB cable

LISN: Positive

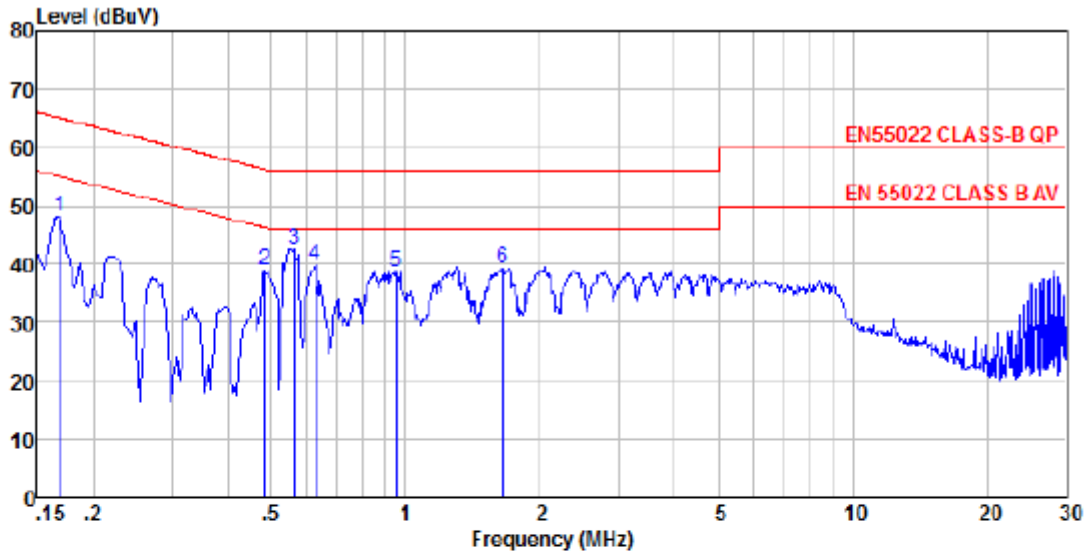


Site : chamber
 Condition : EN55022 CLASS-B QP ENV216(L)-20120730 LINE
 EUT :
 Model Name : N72
 Temp/Humi : 22 °C / 53 %
 Power Rating: AC 230V/50Hz
 Mode : data exchange with usb cable
 Memo :

	Freq	ReadAntenna Level	Cable Factor	Preamp Loss	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	0.17	36.55	10.49	0.09	0.00	47.13	65.00	-17.95	Peak
2	0.22	31.34	10.44	0.22	0.00	42.00	62.74	-20.74	Peak
3 pp	0.55	30.53	10.52	0.11	0.00	41.16	56.00	-14.84	Peak
4	0.62	28.73	10.45	0.11	0.00	39.29	56.00	-16.71	Peak
5	1.31	27.78	10.52	0.14	0.00	38.44	56.00	-17.56	Peak
6	1.69	29.20	10.52	0.15	0.00	39.87	56.00	-16.13	Peak

Test mode: Data exchange by USB cable

LISN: Neutral



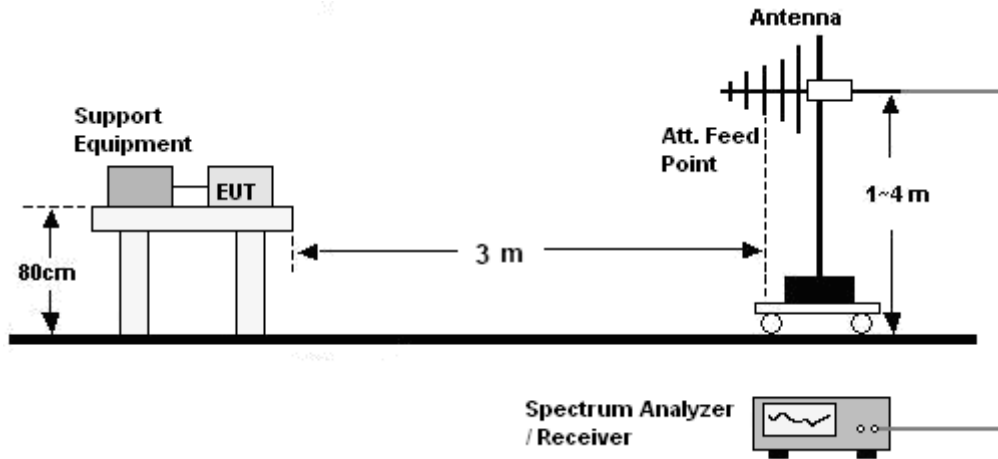
Site : chamber
 Condition : EN55022 CLASS-B QP ENV216(N)-20120730 NEUTRAL
 EUT :
 Model Name : N72
 Temp/Humi : 22 °C / 53 %
 Power Rating: AC 230V/50Hz
 Mode : data exchange with usb cable
 Memo :

	ReadAntenna	Cable	Preamp	Limit	Over				
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark	
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	0.17	37.70	10.27	0.09	0.00	48.06	65.08	-17.02 Peak	
2	0.48	28.42	10.42	0.10	0.00	38.94	56.27	-17.33 Peak	
3 pp	0.56	32.08	10.38	0.11	0.00	42.57	56.00	-13.43 Peak	
4	0.63	29.45	10.34	0.11	0.00	39.90	56.00	-16.10 Peak	
5	0.95	28.32	10.31	0.14	0.00	38.77	56.00	-17.23 Peak	
6	1.65	28.91	10.31	0.15	0.00	39.37	56.00	-16.63 Peak	

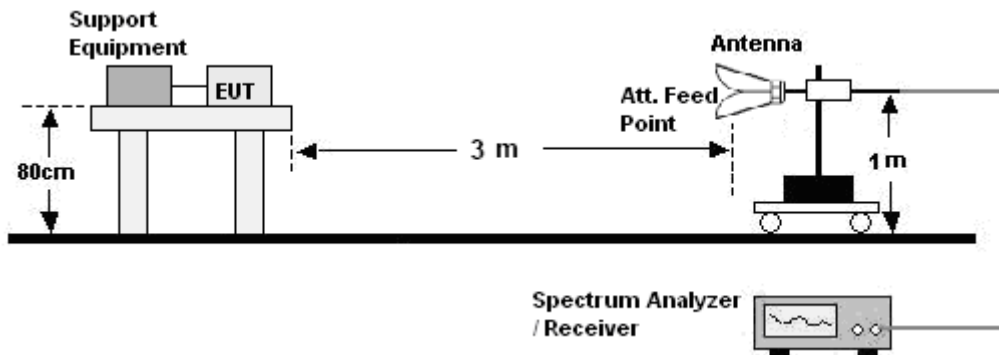
3. RADIATED DISTURBANCE (RE)

3.1 TEST SETUP

30MHz ~ 1GHz:



Above 1GHz:



3.2 LIMITS

Limits for Class B digital devices

Frequency (MHz)	limits at 3m dB(μV/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.

3.3 TEST PROCEDURE

30MHz ~ 1GHz:

- a. The EUT and support equipment were placed on the non-conductive turntable 0.8m above the horizontal metal ground plane at a chamber. The EUT was set 3 meters away from the receiving antenna, which was mounted on an antenna tower. Broadband antenna (Calibrated Bilog Antenna) was used as receiving antenna.
- b. The frequency range from 30MHz to 1GHz was checked. The RBW of the receiver was set at 120kHz. Set the receiver in Peak detector, Max Hold mode. 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 EUT radiated the maximum emission, then set the test frequency receiver to QP Detector and record the maximum value.

Above 1GHz:

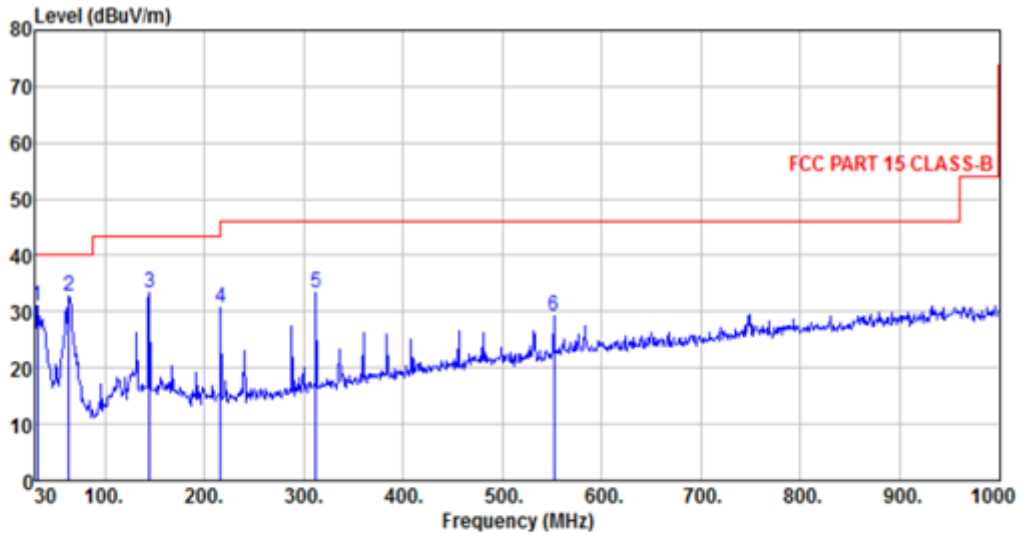
- a. The EUT and support equipment were placed on the non-conductive turntable 0.8m above the ground at a chamber. The EUT was set 3 meters away from the receiving antenna, which was mounted on an antenna tower. Horn antenna was used as receiving antenna.
- b. The frequency range above 1GHz was checked. The RBW of the receiver was set at 1MHz. Set the receiver in Peak detector, Max Hold mode. Record the maximum field strength of all the pre-scan process in the full band when the antenna is 1m and varied 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 Average value: rotate the turntable from 0 to 360 degrees to find the degree where EUT radiated the maximum emission, then set the test frequency receiver to EMI Average Detector and record the maximum value.

3.4 TEST RESULT

30MHz ~ 1GHz:

Test mode: Data exchange by USB cable

Antenna Polarity: Horizontal

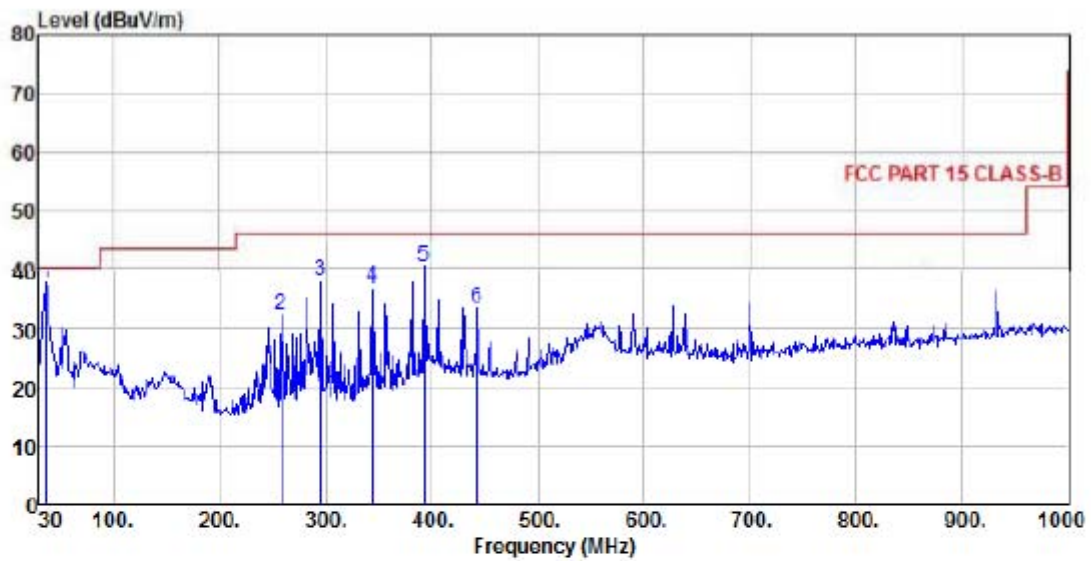


Site : chamber
 Condition : FCC PART 15 CLASS-B 3m VULB9160 HORIZONTAL
 EUT :
 Model Name : N72
 Temp/Humi : 22 °C / 53 %
 Power Rating: AC 230V/50Hz
 Mode : data exchange with usb cable
 Memo :

	ReadAntenna	Cable	Preamp	Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	31.94	18.07	12.22	0.70	0.00	30.99	40.00	-9.01 Peak
2	63.95	19.22	12.34	1.07	0.00	32.63	40.00	-7.37 Peak
3	144.46	18.23	13.58	1.63	0.00	33.44	43.50	-10.06 Peak
4	216.24	18.04	10.68	2.05	0.00	30.77	46.00	-15.23 Peak
5	312.27	17.51	13.47	2.51	0.00	33.49	46.00	-12.51 Peak
6	551.86	8.16	17.97	3.18	0.00	29.31	46.00	-16.69 Peak

Test mode: Data exchange by USB cable

Antenna Polarity: Vertical



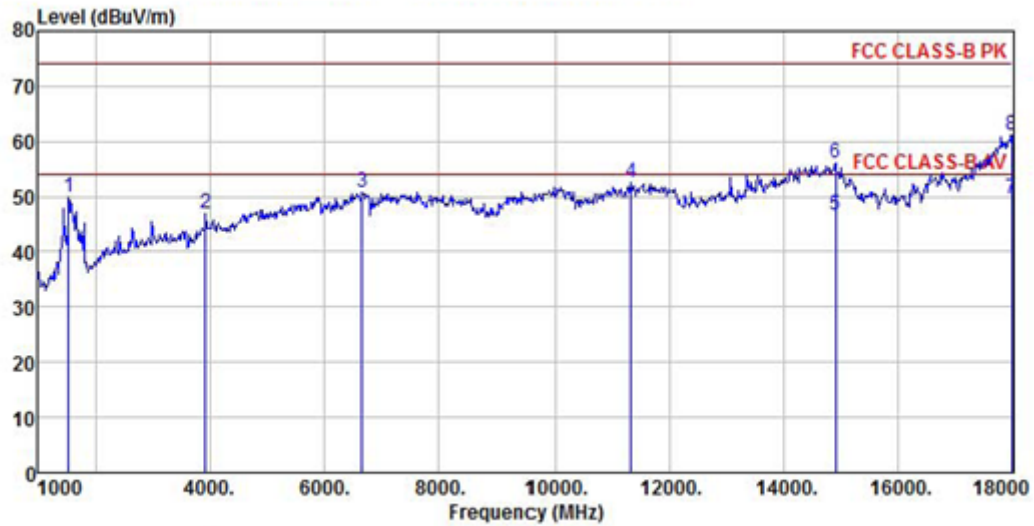
Site : chamber
 Condition : FCC PART 15 CLASS-B 3m VULB9160 VERTICAL
 EUT :
 Model Name : N72
 Temp/Humi : 22 °C / 53 %
 Power Rating: AC 230V/50Hz
 Mode : data exchange with usb cable
 Memo :

	Freq	ReadAntenna 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	pp	35.82	24.99	12.40	0.76	0.00	38.15	40.00	-1.85 Peak
2		257.95	18.18	12.09	2.18	0.00	32.45	47.00	-14.55 Peak
3		294.81	22.53	13.11	2.40	0.00	38.04	47.00	-8.96 Peak
4		344.28	20.31	14.17	2.54	0.00	37.02	47.00	-9.98 Peak
5		392.78	22.66	15.14	2.69	0.00	40.49	47.00	-6.51 Peak
6		442.25	14.59	16.24	2.86	0.00	33.69	47.00	-13.31 Peak

Above 1GHz:

Test mode: Data exchange by USB cable

Antenna Polarity: Horizontal

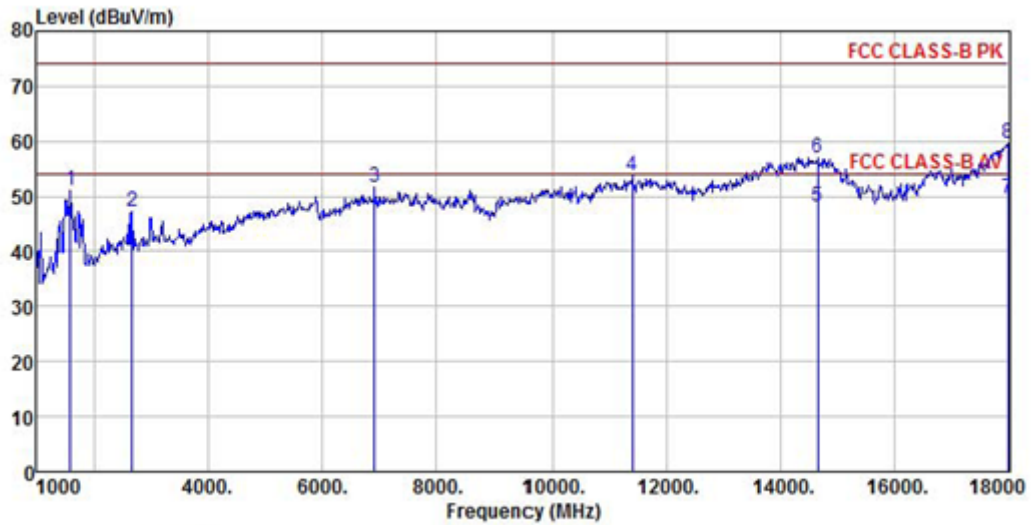


Site : chamber
 Condition : FCC CLASS-B PK 3m BBHA9120D(942) HORIZONTAL
 EUT :
 Model Name : N72
 Temp/Humi : 22 °C / 53 %
 Power Rating: AC 230V/50Hz
 Mode : data exchange with usb cable
 Memo :

	ReadAntenna	Cable	Preamp		Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit
MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB
1	1527.00	57.37	25.17	5.74	38.45	49.83	74.00 -24.17 Peak
2	3924.00	45.70	29.77	9.10	37.54	47.03	74.00 -26.97 Peak
3	6661.00	40.30	34.49	12.35	36.47	50.67	74.00 -23.33 Peak
4	11336.00	35.31	40.04	16.14	39.07	52.42	74.00 -21.58 Peak
5	14906.00	24.16	41.45	18.85	37.80	46.66	54.00 -7.34 Average
6	14906.00	33.45	41.45	18.85	37.80	55.95	74.00 -18.05 Peak
7 pp	17983.00	19.86	47.82	18.74	36.73	49.69	54.00 -4.31 Average
8 pk	17983.00	31.29	47.82	18.74	36.73	61.12	74.00 -12.88 Peak

Test mode: Data exchange by USB cable

Antenna Polarity: Vertical



Site : chamber
 Condition : FCC CLASS-B PK 3m BBHA9120D(942) VERTICAL
 EUT :
 Model Name : N72
 Temp/Humi : 22 °C / 53 %
 Power Rating: AC 230V/50Hz
 Mode : data exchange with usb cable
 Memo :

	ReadAntenna	Cable	Preamp	Limit	Over			
Freq	Level	Factor	Loss	Line	Limit	Remark		
MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	1595.00	58.87	24.98	5.71	38.46	51.10	74.00	-22.90 Peak
2	2666.00	49.96	27.92	7.49	38.24	47.13	74.00	-26.87 Peak
3	6916.00	40.43	35.14	12.49	36.34	51.72	74.00	-22.28 Peak
4	11404.00	36.63	40.14	16.10	39.10	53.77	74.00	-20.23 Peak
5	14651.00	25.48	42.33	18.38	38.06	48.13	54.00	-5.87 Average
6	14651.00	34.41	42.33	18.38	38.06	57.06	74.00	-16.94 Peak
7 pp	17983.00	19.62	47.82	18.74	36.73	49.45	54.00	-4.55 Average
8 pk	17983.00	29.85	47.82	18.74	36.73	59.68	74.00	-14.32 Peak

APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

Please refer to the file named "N72 WXYZ_Part15B Setup Photos".

APPENDIX 2 PHOTOGRAPHS OF EUT

Please refer to the files named "N72 WXYZ _EUT External Photos" and "N72 WXYZ _EUT Internal Photos".

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