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Nomad Goods, Inc.

TEST REPORT

Report Type:
FCC Part 15C

Model:
NM01216285, NM01290285

REPORT NUMBER:
230201520SHA-002

ISSUE DATE:
April 3, 2023

DOCUMENT CONTROL NUMBER:
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TEST REPORT

Report no.: 230201520SHA-002

Applicant:	Nomad Goods, Inc.
Address of Applicant:	1187 Coast Village Rd. #638 Santa Barbara, CA 93108, United States
Manufacturer:	Nomad Goods, Inc.
Address of Manufacturer:	1187 Coast Village Rd. #638 Santa Barbara, CA 93108, United States
Factory:	Zhongshan Zen Factory Ltd.
Address of Factory:	6th.Industrial Area, Nanlang Town, Zhongshan City, Guangdong, China
FCC ID:	2AJYRNM01216285

SUMMARY:

The equipment complies with the requirements according to the following standard(s) or Specification:
47CFR Part 15 (2019): Radio Frequency Devices (Subpart C) **ANSI C63.10 (2013):** American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

PREPARED BY:	**REVIEWED BY:**
Project Engineer Damon Ding	Reviewer Wakeyou Wang

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Content

REVISION HISTORY **4**

MEASUREMENT RESULT SUMMARY **5**

1 GENERAL INFORMATION **6**

1.1 DESCRIPTION OF EQUIPMENT UNDER TEST (EUT) 6
1.2 DESCRIPTION OF TEST FACILITY 7

2 TEST SPECIFICATIONS **9**

2.1 STANDARDS OR SPECIFICATION 9
2.2 MODE OF OPERATION DURING THE TEST 9
2.3 TEST SOFTWARE LIST 10
2.4 TEST PERIPHERALS LIST 10
2.5 SUPPORT CABLE LIST 10
2.6 TEST ENVIRONMENT CONDITION: 10
2.7 INSTRUMENT LIST 11
2.8 MEASUREMENT UNCERTAINTY 11

3 RADIATED EMISSIONS **12**

3.1 LIMIT 12
3.1.1 the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table 12
3.2 BLOCK DIAGRAM AND TEST SET UP 13
3.3 MEASUREMENT PROCEDURE 14
3.4 TEST RESULTS OF RADIATED EMISSIONS 15

4 POWER LINE CONDUCTED EMISSION **18**

4.1 LIMIT 18
4.1.1 Limits for conducted disturbance voltage at the mains ports of class B device 18
4.2 BLOCK DIAGRAM AND TEST SET UP 19
4.3 MEASUREMENT PROCEDURE 20
4.4 TEST RESULTS OF POWER LINE CONDUCTED EMISSION 21

5 MEASURED BANDWIDTH **23**

6 ANTENNA REQUIREMENT **24**

APPENDIX I: PHOTOGRAPH OF TEST SETUP **25**

APPENDIX II: PHOTOGRAPH OF EQUIPMENT UNDER TEST **25**

Revision History

Report No.	Version	Description	Issued Date
230201520SHA-002	Rev. 01	Initial issue of report	April 3, 2023

Measurement result summary

TEST ITEM	FCC REFERANCE	RESULT
Antenna Requirement	15.203	Pass
Power line conducted emission	15.207	Pass
Radiated emission	15.209	Pass
20dB bandwidth	15.215	Pass

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product name:	Base Station - Hub Edition | Global
Type/Model:	NM01216285, NM01290285
Description of EUT:	The EUT is Base Station - Hub Edition | Global. The additional model NM01290285 is identical with the test model NM01216285 except the model number and color for marketing purpose.
Rating:	Input:12V/3.3A
EUT type:	☒ Table top ☐ Floor standing
Operating Frequency:	127kHz
Type of Modulation:	ASK
Antenna Type:	Coil antenna
Sample received date:	January 30, 2023
Date of test:	February 18, 2023 to March 02, 2023

1.2 Description of Test Facility

Name:	Intertek Testing Services Shanghai
Address:	Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China
Telephone:	86 21 61278200
Telefax:	86 21 54262353

The test facility is recognized, certified, or accredited by these organizations:	CNAS Accreditation Lab Registration No. CNAS L0139
	FCC Accredited Lab Designation Number: CN0175
	IC Registration Lab CAB identifier.: CN0014
	VCCI Registration Lab Registration No.: R-14243, G-10845, C-14723, T-12252
	A2LA Accreditation Lab Certificate Number: 3309.02

All tests were sub-contracted.

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng Science and Technology Park, Longhua District, Shenzhen, China 518109

Telephone: +86 (0) 755 2823 0888

Fax: +86 (0) 755 2823 0886

All tests were sub-contracted at Shenzhen UnionTrust Quality and Technology Co., Ltd, and conducted by Kieron Luo

Reviewed and approved by Wakeyou Wang from Intertek Testing Services Shanghai.

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

CNAS-Lab Code: L9069

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC/EN 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

IC-Registration No.: 21600-1

The 3m Semi-anechoic chamber of Shenzhen UnionTrust Quality and Technology Co., Ltd. has

been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 21600-1.

A2LA-Lab Certificate No.: 4312.01

Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC Accredited Lab.

Designation Number: CN1194

Test Firm Registration Number: 259480

2 TEST SPECIFICATIONS

2.1 Standards or specification

47CFR Part 15 (2019)
ANSI C63.10 (2013)

2.2 Mode of operation during the test

Within this test report, EUT was tested under all available operation modes and tested under its rating voltage and frequency. The below test modes in boldface were the worst cases, only the test data of these modes were reported.

Test Item	EMI Test Modes
Radiated emission	Test Mode 1: Wireless charging mode with phone (7.5W) Test Mode 2: Wireless charging mode with phone (7.5W) + Wireless charging mode with phone (7.5W) Test Mode 3: Wireless charging mode with phone (7.5W) + Wireless charging mode with Air Pods(5W) Test Mode 4: Wireless charging mode with Air Pods(5W) Test Mode 5: Wireless charging mode with Air Pods(5W) + Wireless charging mode with Air Pods(5W) Test Mode 6: Standby
Conducted emission	Test Mode 1: Wireless charging mode with phone (7.5W) Test Mode 2: Wireless charging mode with phone (7.5W) + Wireless charging mode with phone (7.5W) Test Mode 3: Wireless charging mode with phone (7.5W) + Wireless charging mode with Air Pods(5W) Test Mode 4: Wireless charging mode with Air Pods(5W) Test Mode 5: Wireless charging mode with Air Pods(5W) + Wireless charging mode with Air Pods(5W) Test Mode 6: Standby

2.3 Test software list

Test Items	Software	Manufacturer	Version
Radiated emission	e3	Audix	9.160333
Conducted emission	e3	Audix	9.160333

2.4 Test peripherals list

Item No	Description	Band and Model	S/No	rating
1	Mobile phone	Apple, iphone12	G0NZQLVGN746	15W
2	Adapter	NOMΛD, JZB302-1203300IX	G37895210J75R09	Input:AC100-240V 50/60Hz 1.5A, Output:12V/3.3A
3	Air Pods	Apple, air pods 3	A9KJ65P7W569	5W
4	Mobile phone	MI, Mi 11s	31404/21WW05204	15W

2.5 Support Cable list

Item No	Description	Length (m)	Cable Type
2	Type-C Cable	2.0	Shielded without ferrite

2.6 Test environment condition:

Test items	Temperature	Humidity
Power line conducted emission	22.9°C	45% RH
Radiated Emissions	25.2°C	52% RH

2.7 Instrument list

Radiated Emission Test Equipment List						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm dd, yyyy)**	**Cal. Due date (mm dd, yyyy)**
☒	3 m SAC	ETS-LINDGREN	3m	N/A	Jan. 22, 2021	Jan. 21, 2024
☒	Receiver	R&S	ESIB26	100114	Nov. 03, 2022	Nov. 02, 2023
☒	Loop Antenna	ETS-LINDGREN	6502	00202525	Nov. 21, 2022	Nov. 20, 2023
☒	Broadband Antenna	ETS-LINDGREN	3142E-PA	00201891	Apr. 30, 2022	Apr. 29, 2023
☒	6dB Attenuator	Talent	RA6A5-N-18	18103001	Nov. 03, 2022	Nov. 02, 2023
☒	Preamplifier	HP	8447F	2805A02960	Nov. 1, 2022	Oct. 31, 2023
☒	Spectrum analyzer	R&S	FSV40-N	101653	Apr. 15, 2022	Apr. 14, 2023

Conducted Emission Test Equipment List						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm dd, yyyy)**	**Cal. Due date (mm dd, yyyy)**
☒	Receiver	R&S	ESR7	1316.3003K07-101181-K3	Nov. 01, 2022	Oct. 31, 2023
☒	Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	Nov. 01, 2022	Oct. 31, 2023
☒	LISN	R&S	ESH2-Z5	860014/024	Nov. 01, 2022	Oct. 31, 2023
☒	Test Software	Audix	e3	Software Version: 9 20151119i		

2.8 Measurement uncertainty

The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	Frequency	Expanded Uncertainty (k=2)
Conducted emission at mains ports	9kHz ~ 150kHz	±3.2 dB
	150kHz ~ 30MHz	±2.7 dB
Radiated Emissions	9kHz ~ 30MHz	± 4.7 dB
	30MHz ~ 1GHz	± 4.6 dB
	1GHz ~ 18GHz	± 4.4 dB
	18GHz~26 GHz	± 4.4 dB
	26 GHz~40 GHz	± 4.6 dB

3 Radiated Emissions

Test result: **Pass**

3.1 Limit

3.1.1 the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table

Frequency	Field strength (microvolt/meter)	Limit (dBµV/m)	Remark	Measurement distance (m)
0.009 MHz-0.490 MHz	2400/F(kHz)	--	--	300
0.490 MHz-1.705 MHz	24000/F(kHz)	--	--	30
1.705 MHz-30 MHz	30	--	--	30
30 MHz-88 MHz	100	40.0	Quasi-peak	3
88 MHz-216 MHz	150	43.5	Quasi-peak	3
216 MHz-960 MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1 GHz	500	54.0	Average	3

Remark:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBµV/m) = 20 log Emission level (µV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.
4. For Below 30MHz, the measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

   Example:

   Field strength limit for 13.56MHz = 15848 µV/m at 30m
   = 84 dBµV/m at 30m
   = 84 dBµV/m + 40log (30/3) dB at 3m
   = 124 dBµV/m at 3m

3.2 Block diagram and test set up

For table top equipment

Figure 1. Below 30MHz

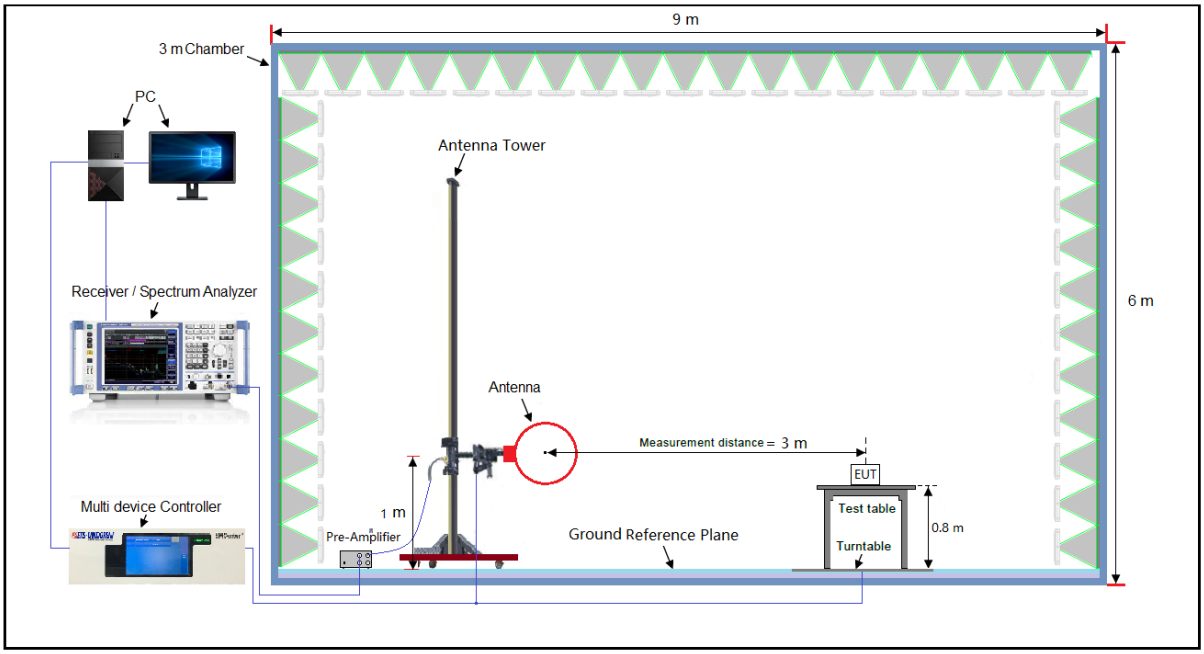
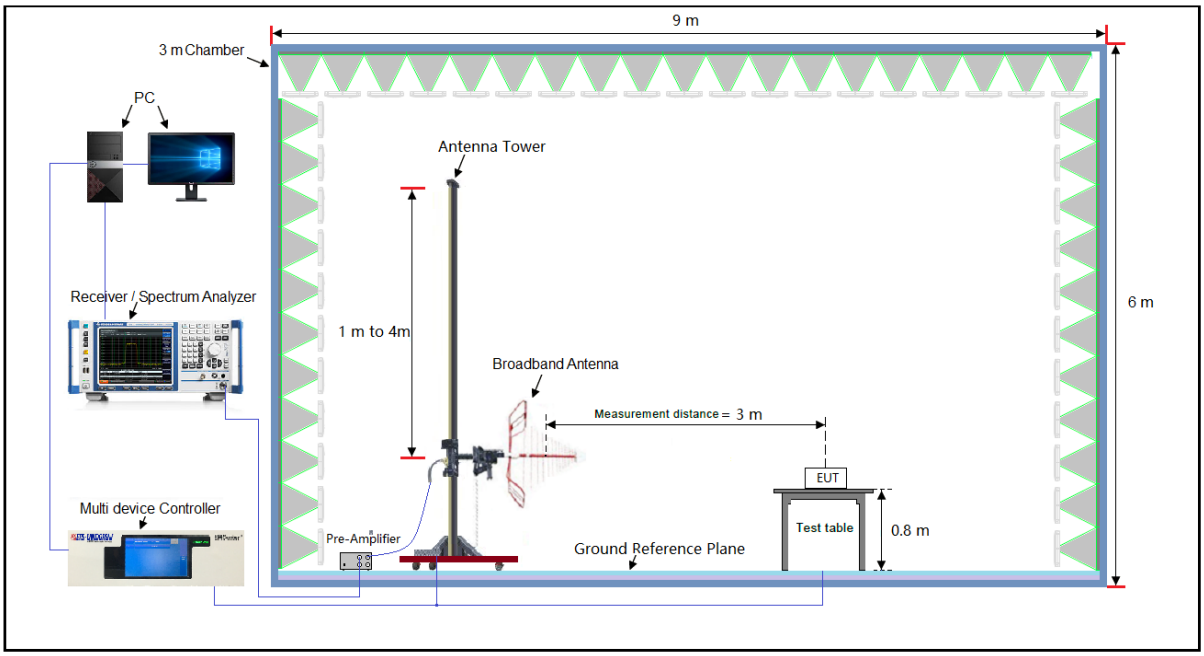


Figure 2. 30MHz to 1GHz



3.3 Measurement 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 camber. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rota table 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.

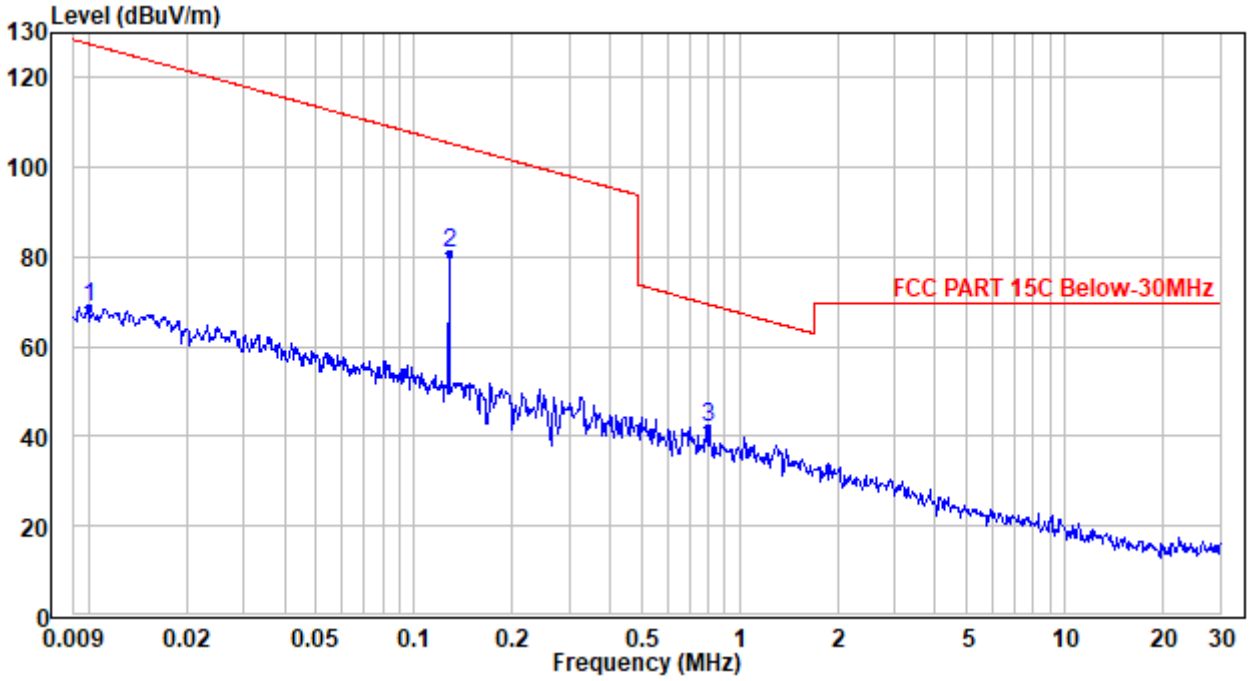
7) The system was investigated from 9 kHz to 1 GHz. During the radiated emission test, the EMI test Receiver was set with the following configurations:

Frequency Range	RBW	VBW	Measurement
9 kHz – 150 kHz	1kHz	3 kHz	Peak
150 kHz – 30 MHz	9kHz	30 kHz	Peak
30 MHz – 1000 MHz	120 kHz	300 kHz	Peak

3.4 Test Results of Radiated Emissions

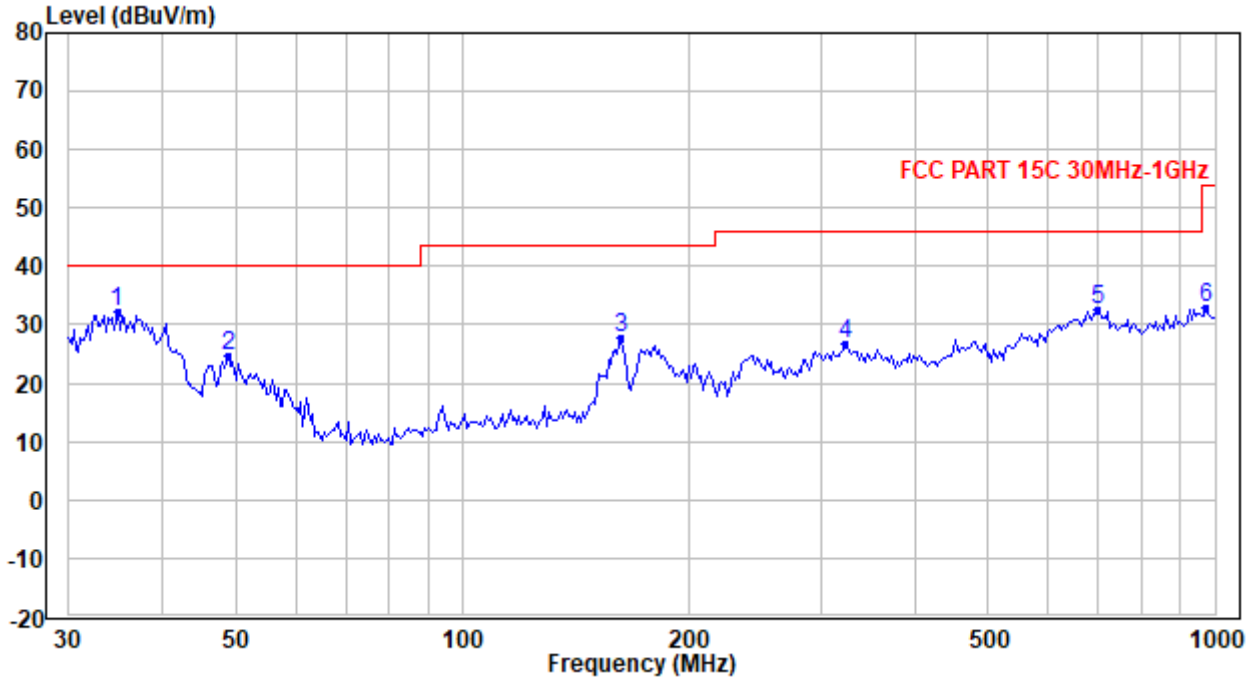
Radiated Emission Test Data (9 KHz ~ 30 MHz):

Worst case Test Mode 2: X axes

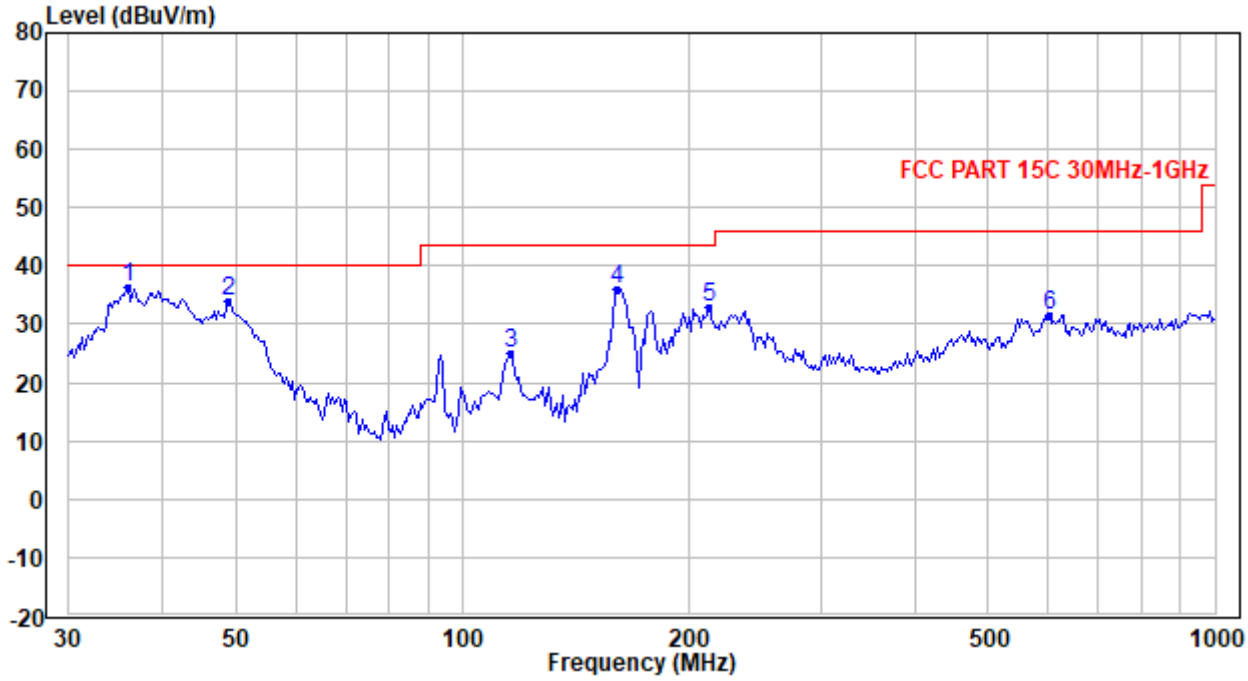


Radiated Emission Test Data (30 MHz ~ 1 GHz):
Worst case Test Mode 2

Horizontal



Vertical



Test data 9 KHz ~ 30 MHz:

Frequency (MHz)	Measured level (dBμV/m)	Factor (dB)	Limits (dBμV/m)	Margin (dB)	Detector
0.010	68.95	-8.32	127.62	58.67	AV
0.128	80.66	-16.65	105.45	24.79	AV
0.803	41.99	-17.96	69.48	27.49	Peak

Test data 30MHz~1GHz:

Polarization	Frequency (MHz)	Measured level (dBμV/m)	Factor (dB)	Limits (dBμV/m)	Margin (dB)	Detector
H	34.770	32.19	-5.52	40.00	7.81	Peak
	48.719	24.73	-14.11	40.00	15.27	Peak
	162.020	27.78	-13.4	43.50	15.72	Peak
	322.59	26.79	-5.71	46.00	19.21	Peak
	698.804	32.75	1.87	46.00	13.25	Peak
	972.283	33.02	4.68	54.00	20.98	Peak
V	36.014	36.34	-5.73	40.00	3.66	Peak
	48.719	33.84	-14.11	40.00	6.16	Peak
	115.632	24.93	-16.04	43.50	18.57	Peak
	160.885	36.07	-13.62	43.50	7.43	Peak
	213.103	32.79	-10.69	43.50	10.71	Peak
	602.929	31.71	-0.16	46.00	14.29	Peak

Remark:
1. Factor= Antenna Factor + Cable Loss (-Amplifier, is employed)
2. Measured level= Original Receiver Reading + Factor
3. Margin = Limit – Measured level
4. All possible modes of operation were investigated, only the worst-case emissions reported.

4 Power line conducted emission

Test result: **PASS**

4.1 Limit

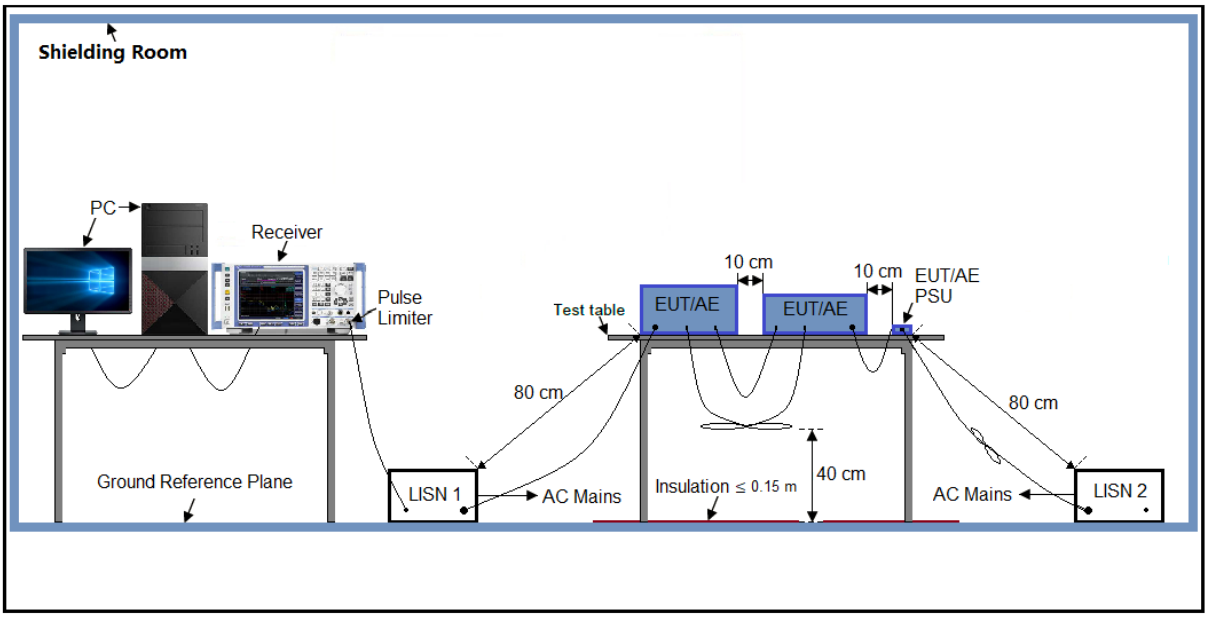
4.1.1 Limits for conducted disturbance voltage at the mains ports of class B device

Frequency range (MHz)	Limits dB(μV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 ~ 56 *	56 ~ 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

Note: 1. * Means the limit decreasing linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz
2. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out.

4.2 Block diagram and test set up

For table top equipment



4.3 Measurement Procedure

Measured levels of ac power-line conducted emission shall be the emission voltages from the voltage probe, where permitted, or across the 50 Ω LISN port (to which the EUT is connected), where permitted, terminated into a 50 Ω measuring instrument. All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the manufacturer and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer. For those measurements using a LISN, the 50 Ω measuring port is terminated by a measuring instrument having 50 Ω input impedance. All other ports are terminated in 50 Ω loads.

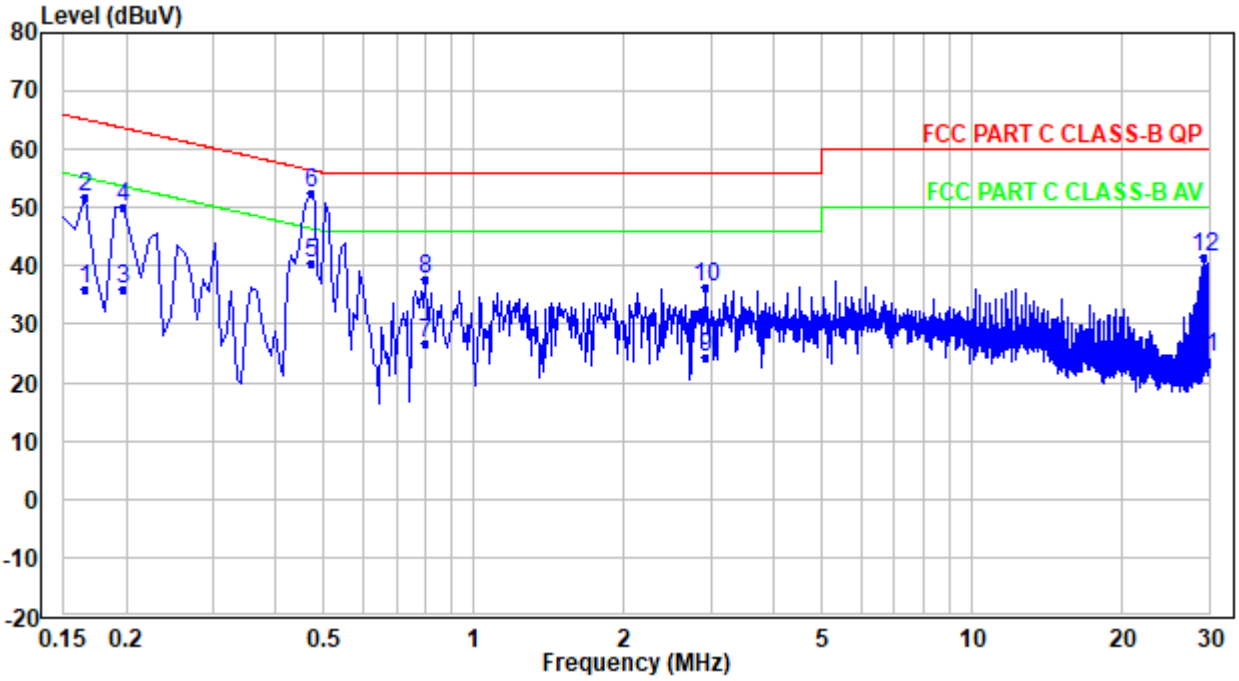
Tabletop devices shall be placed on a platform of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screened) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on the reference ground-plane or on insulating material as described in ANSI C63.10. All other surfaces of tabletop or floor-standing EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs.

The bandwidth of the test receiver is set at 9 kHz.

4.4 Test Results of Power line conducted emission

Worst case Test Mode 2
Test Curve:

L Line

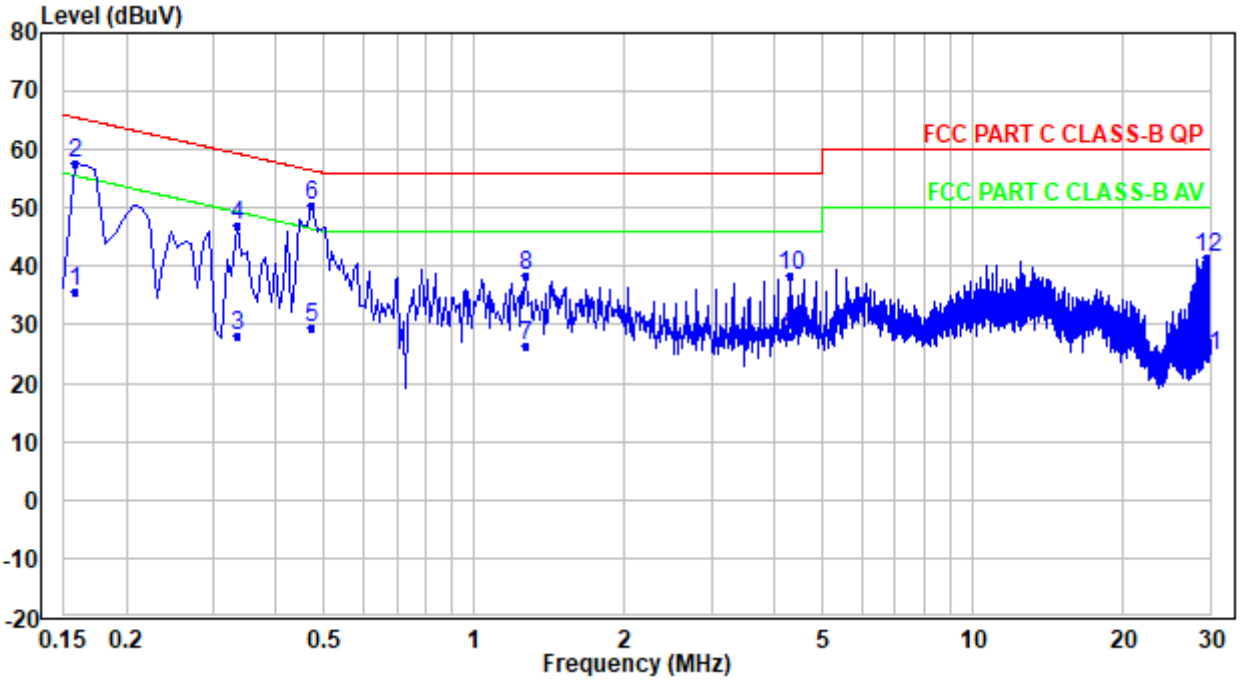


Test Data:

Frequency (MHz)	Quasi-peak			Average		
	level dB(μV)	Limit dB(μV)	Margin (dB)	level dB(μV)	limit dB(μV)	Margin (dB)
0.166	51.93	65.16	13.23	35.93	55.16	19.23
0.198	50.17	63.69	13.52	36.17	53.69	17.52
0.470	52.65	56.52	3.87	40.65	46.52	5.87
0.798	37.66	56.00	18.34	26.66	46.00	19.34
2.925	36.37	56.00	19.63	24.37	46.00	21.63
29.384	41.41	60.00	18.59	24.41	50.00	25.59

Test Curve:

N Line



Test Data:

Frequency (MHz)	Quasi-peak			Average		
	level dB(μV)	Limit dB(μV)	Margin (dB)	level dB(μV)	limit dB(μV)	Margin (dB)
0.158	57.81	65.57	7.76	35.81	55.57	19.76
0.334	47.15	59.35	12.2	28.15	49.35	21.2
0.470	50.54	56.52	5.98	29.54	46.52	16.98
1.270	38.54	56.00	17.46	26.54	46.00	19.46
4.325	38.28	56.00	17.72	28.28	46.00	17.72
29.616	41.61	60.00	18.39	24.61	50.00	25.39

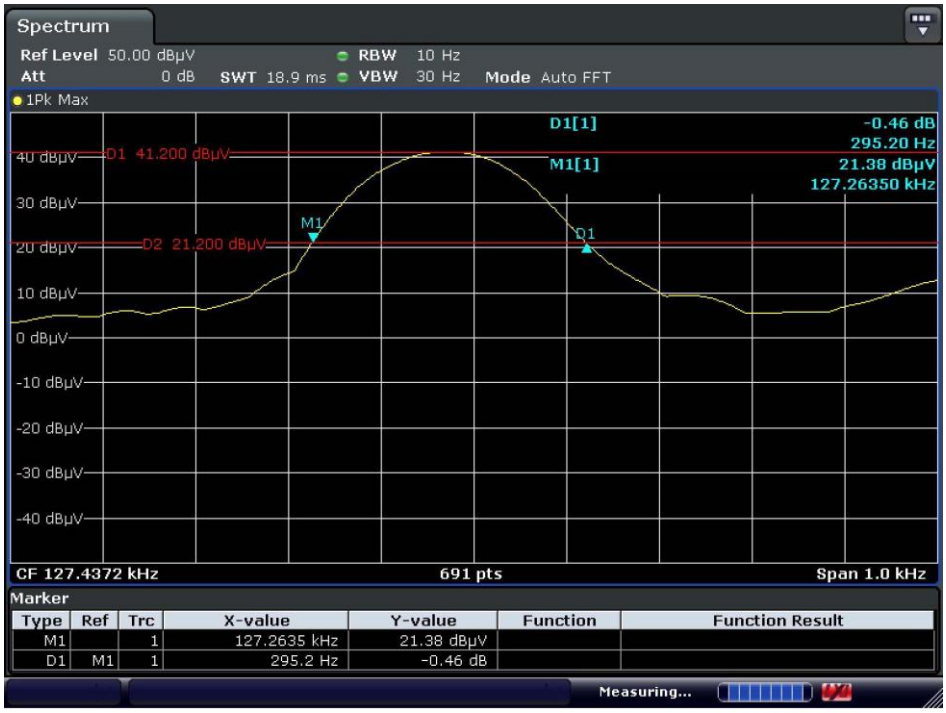
Remark: 1. Correct Factor = LISN Factor + Cable Loss, the value was added to Original Receiver Reading by the software automatically.
2. Corrected Reading = Original Receiver Reading + Correct Factor
3. Margin = Limit - Corrected Reading
4. All possible modes of operation were investigated, only the worst-case emissions reported.

5 Measured Bandwidth

Pursuant to FCC Part 15 Section 15.215(c), the 20dB bandwidth of the emission was contained within the frequency band designed (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over expected variations in temperature and supply voltage were considered.

Worst case Test Mode 2

127 kHz



Date: 2.MAR.2023 11:46:21

6 ANTENNA REQUIREMENT

Standard Requirement
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.
EUT Antenna:
This product has a permanent antenna, fulfill the requirement of this section.

Appendix I: Photograph of test setup

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

Appendix II: Photograph of equipment under test

Refer to Appendix 2 for EUT external and internal photos.

********** END **********