Nomad Goods, Inc.

EMC TEST REPORT

Report Type:
FCC Part 15C

Model:
NM01838685

REPORT NUMBER:
210102258SHA-002

ISSUE DATE:
January 15, 2021

DOCUMENT CONTROL NUMBER:
TTRF15c_V1 © 2018 Intertek

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TEST REPORT

Report no.: 210102258SHA-002

Applicant:	Nomad Goods, Inc.
Address of Applicant:	1187 Coast Village Rd. #638 Suite 1 Santa Barbara, CA 93108, United State
Manufacturer:	Nomad Goods, Inc.
Address of Manufacturer:	1187 Coast Village Rd. #638 Suite 1 Santa Barbara, CA 93108, United State
FCC ID:	2AJYRNM01838685

SUMMARY:

The equipment complies with the requirements according to the following standard(s) or Specification:
47CFR Part 15 (2017): Radio Frequency Devices (Subpart C) **ANSI C63.10 (2013):** American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

TESTED, PREPARED AND CHECKED BY :	**REVIEWED AND APPROVED BY :**
Wade zhang	Daniel.
Project Engineer Wade Zhang Intertek Testing Services Shanghai	Reviewer Daniel Zhao Intertek Testing Services Shanghai

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TEST REPORT

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Revision History

Report No.	Version	Description	Issued Date
210102258SHA-002	Rev. 01	Initial issue of report	January 15, 2021

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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

TEST REPORT

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product name:	Base Station Compact
Type/Model:	NM01838685
Description of EUT:	Base Station Compact
Rating:	Power the by AC adapter
EUT type:	☒ Table top ☐ Floor standing
Operating Frequency Range:	127.8 KHz
Antenna Type:	Coil antenna
Sample received date:	December 8, 2020
Date of test:	December 9, 2020 December 17, 2020

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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: CN1175
	IC Registration Lab CAB identifier.: CN0051
	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: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China 518109

Telephone: +86 (0) 755 2823 0888

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Tested, Prepared and Checked by Kieron Luo from Shenzhen UnionTrust Quality and Technology Co., Ltd.

Reviewed and Approved by Daniel Zhao 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

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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 (2017)
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.

Test Item	EMI Test Modes
Conducted emission	Mode 1 :Operating with Max. Power Output Mode 2: Standby
Radiated emission	Mode 1: Operating with Max. Power Output Mode 2: Standby

2.3 Test software list

Test Items	Software	Manufacturer	Version
Conducted emission	e3	Audix	9.160323
Radiated emission	e3	Audix	9.160333

2.4 Test peripherals list

Item No.	Name	Band and Model	Note
1	Wireless charging load	102-03	(15W, 18Ω)*2
2	Adapter	NATIVE UNION	N/A
3	USB-C Cable	N/A	N/A

2.5 Test environment condition:

Test items	Temperature	Humidity
Power line conducted emission	24.8°C	45% RH
Radiated Emissions	25.3°C	57% RH

2.6 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)**
☒	3M Chamber & Accessory Equipment	ETS-LINDGREN	3M	N/A	Dec. 03, 2018	Dec. 03, 2021
☒	Receiver	R&S	ESIB26	100114	Nov. 18, 2020	Nov. 17, 2021
☒	Loop Antenna	ETS-LINDGREN	6502	00202525	Nov. 14 2019	Nov. 13, 2022
☒	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Nov. 14 2019	Nov. 13, 2022
☒	6dB Attenuator	Talent	RA6A5-N-18	18103001	Nov. 10, 2020	Nov. 09, 2021
☒	EXA Signal Analyzer	KEYSIGHT	N9010A	MY51440197	Nov. 10, 2020	Nov. 09, 2021
☒	Preamplifier	HP	8447F	2805A02960	Nov. 10, 2020	Nov. 09, 2021

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. 18, 2020	Nov. 17, 2021
☒	Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	Nov. 18, 2020	Nov. 17, 2021
☒	LISN	R&S	ESH2-Z5	860014/024	Nov. 18, 2020	Nov. 17, 2021

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2.7 Measurement uncertainty

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

Test item	Measurement uncertainty
Radiated Emissions in restricted frequency bands below 1GHz	± 4.6dB
Radiated Emissions in restricted frequency bands above 1GHz	± 4.4 dB
Power line conducted emission	± 3.2dB

3 Radiated Emissions

Test result: **Pass**

3.1 Limit

3.1.1 The field strength of any emissions appearing outside of the 127.8 kHz band shall not exceed the general radiated emission limits in §15.209.

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

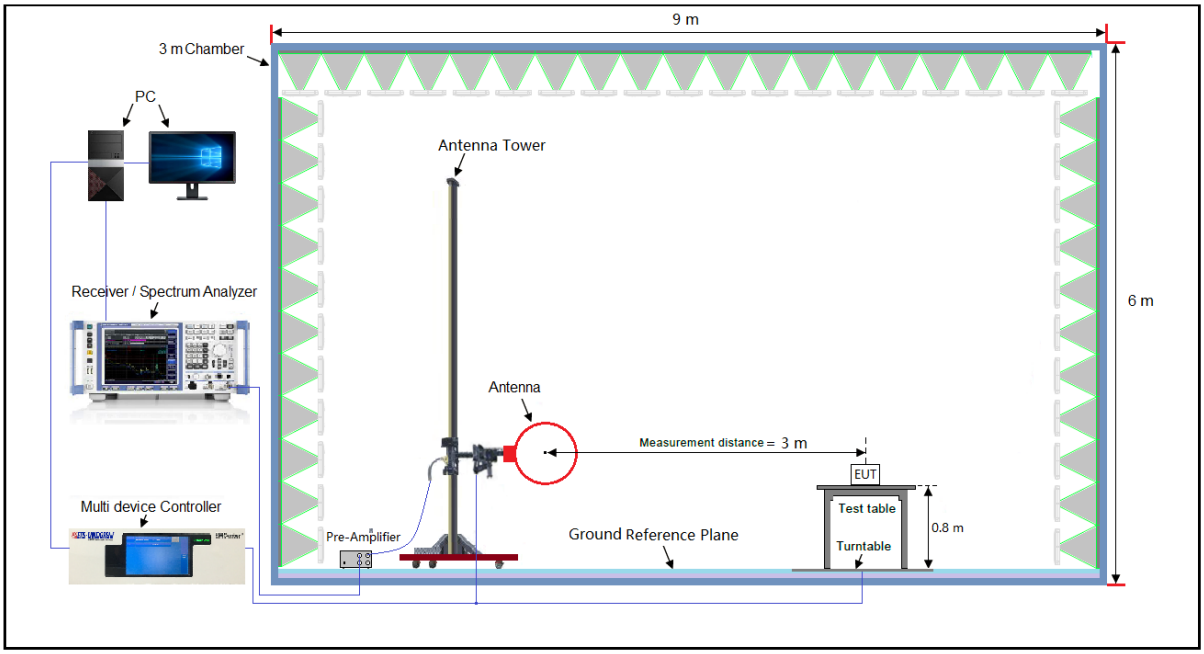
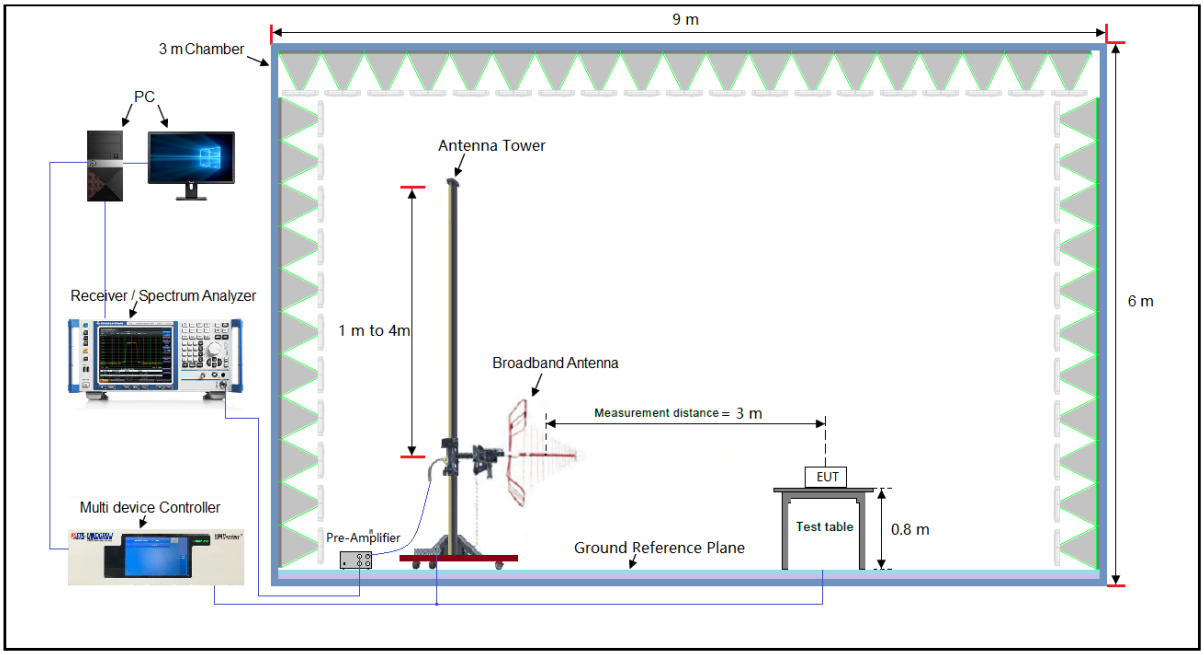


Figure 2. 30MHz to 1GHz



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.

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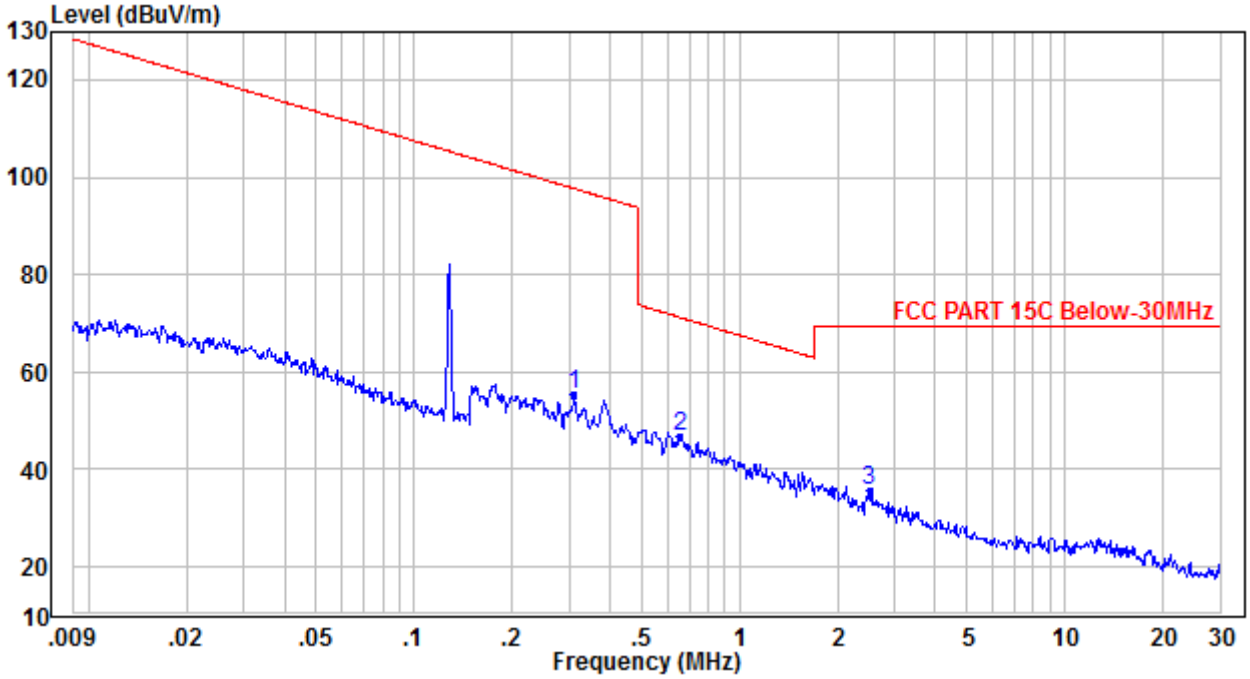
3.4 Test Results of Radiated Emissions

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

Worse Mode:Mode 1

Vertical (worst orientation)



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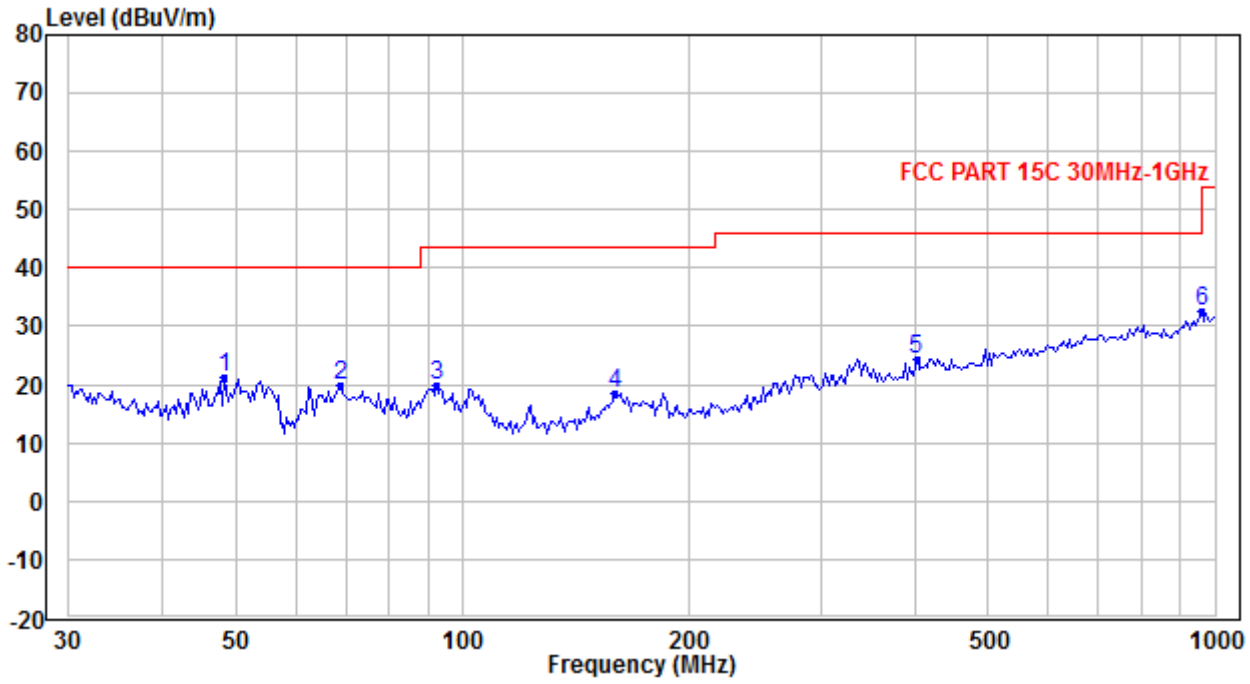
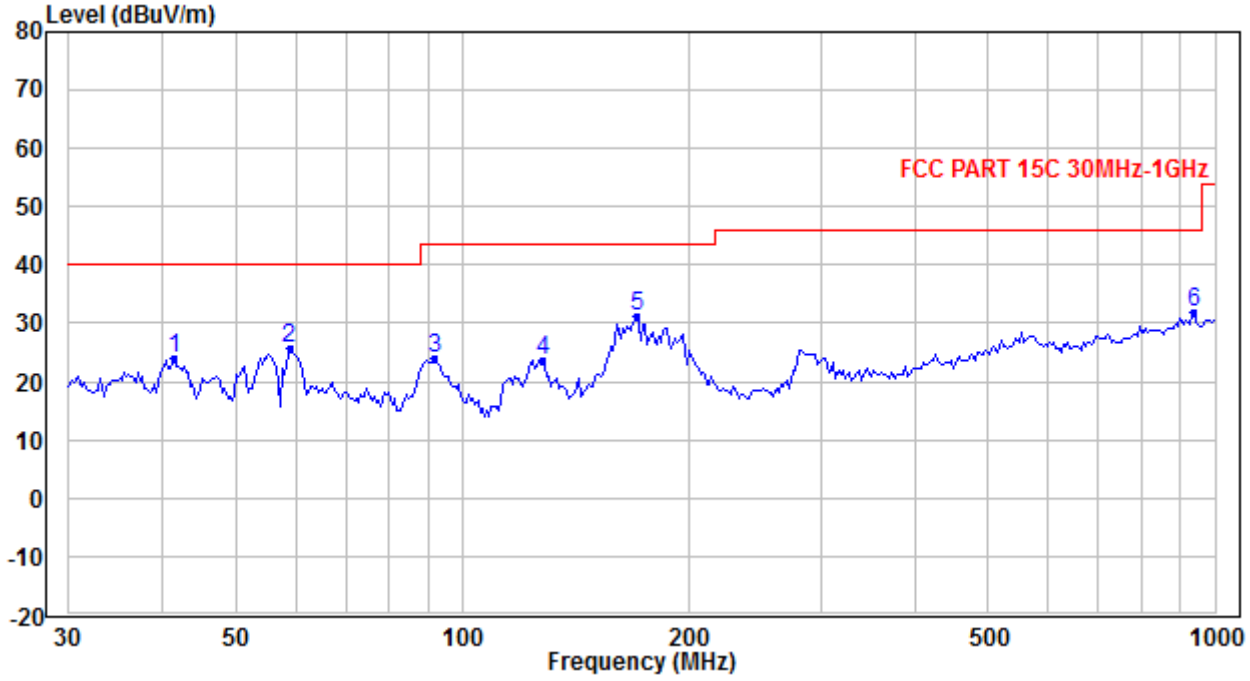
Radiated Emission Test Data (30 MHz ~ 1 GHz):
Worse Mode:Mode 1

Horizontal



Vertical



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Test data: 9 KHz ~ 30 MHz:

Frequency (MHz)	Measured level (dBμV/m)	Factor (dB)	Limits (dBμV/m)	Margin (dB)	Detector
0.311	55.42	-16.89	97.74	42.32	Peak
0.658	46.85	-16.82	71.23	24.38	Peak
2.508	35.54	-16.74	69.50	33.96	Peak

Test data :30MHz~1GHz:

Polarization	Frequency (MHz)	Measured level (dBμV/m)	Factor (dB)	Limits (dBμV/m)	Margin (dB)	Detector
H	48.378	21.11	-13.89	40.00	18.89	Peak
	68.745	19.73	-14.38	40.00	20.27	Peak
	92.346	19.85	-13.25	43.50	23.65	Peak
	159.759	18.58	-10.60	43.50	24.92	Peak
	401.105	24.49	-2.71	46.00	21.51	Peak
	958.714	32.65	5.73	46.00	13.35	Peak
V	41.448	23.96	-12.19	40.00	16.04	Peak
	58.898	25.63	-14.73	40.00	14.37	Peak
	91.700	24.07	-13.30	43.50	19.43	Peak
	127.586	23.73	-12.82	43.50	19.77	Peak
	170.189	31.04	-11.25	43.50	12.46	Peak
	938.714	31.86	4.37	46.00	14.14	Peak

Remark:

1. Factor= Antenna Factor + Cable Loss (-Amplifier, is employed)
2. Measured level= Original Receiver Reading + Factor
3. Margin = Limit – Measured level

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

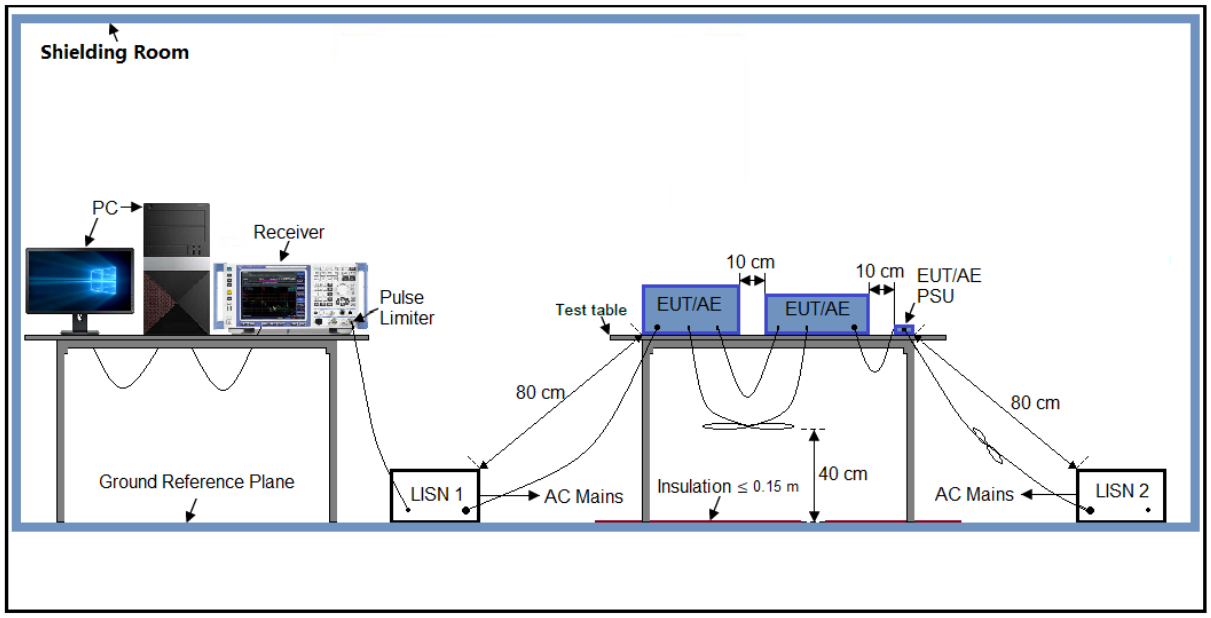
Frequency range (MHz)	Limits dB(μV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 ~ 56 *	56 ~ 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

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



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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.

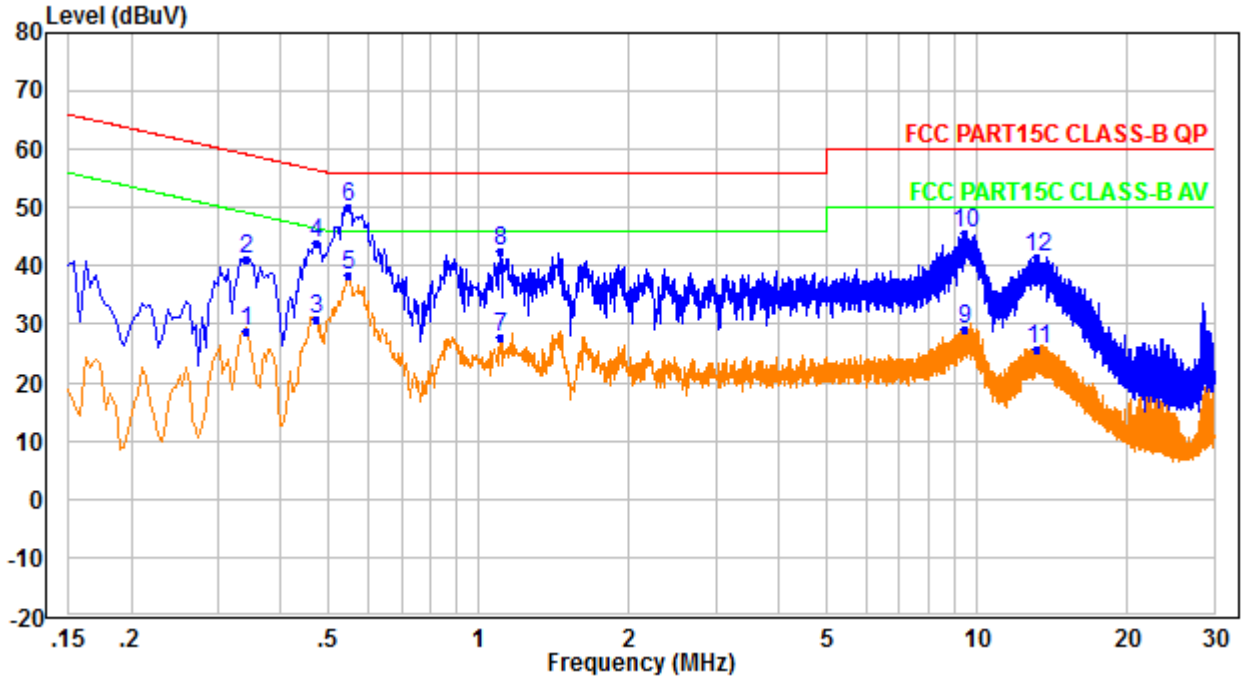
Tabletop devices shall be placed on a platform of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screened) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on 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

Test Curve:
Worse Mode:Mode 1

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)
0.342	41.27	59.15	17.88	28.79	49.15	20.36
0.470	44.01	56.51	12.50	30.73	46.51	15.78
0.546	50.10	56.00	5.90	38.43	46.00	7.57
1.106	42.59	56.00	13.41	27.77	46.00	18.23
9.445	45.54	60.00	14.46	29.19	50.00	20.81
13.269	41.50	60.00	18.50	25.87	50.00	24.13

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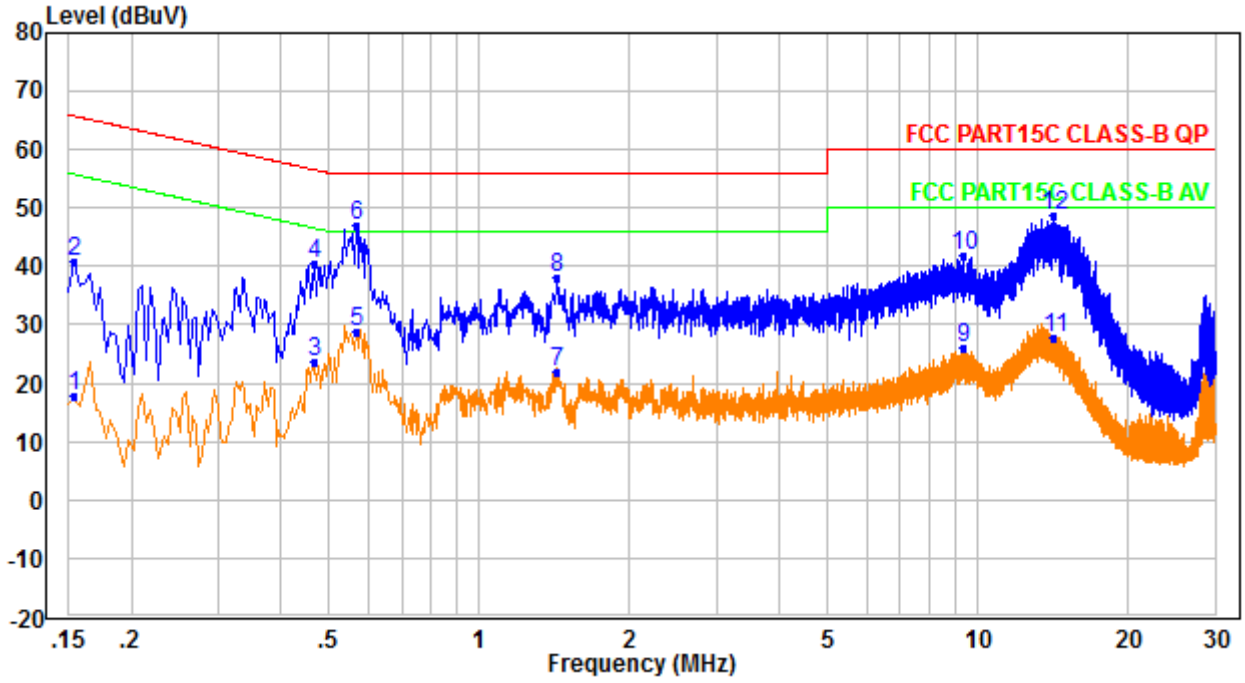
Test Curve:

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)
0.298	46.52	60.30	13.78	46.24	50.30	4.06
0.497	38.37	56.06	17.69	33.99	46.06	12.07
2.779	34.16	56.00	21.84	30.30	46.00	15.70
4.862	35.34	56.00	20.66	29.71	46.00	16.29
9.784	49.04	60.00	10.96	43.65	50.00	6.35
14.462	41.76	60.00	18.24	36.17	50.00	13.83

Remark: 1. Correct Factor = LISN Factor + Cable Loss, the value was added to Original Receiver Reading by the software automatically.

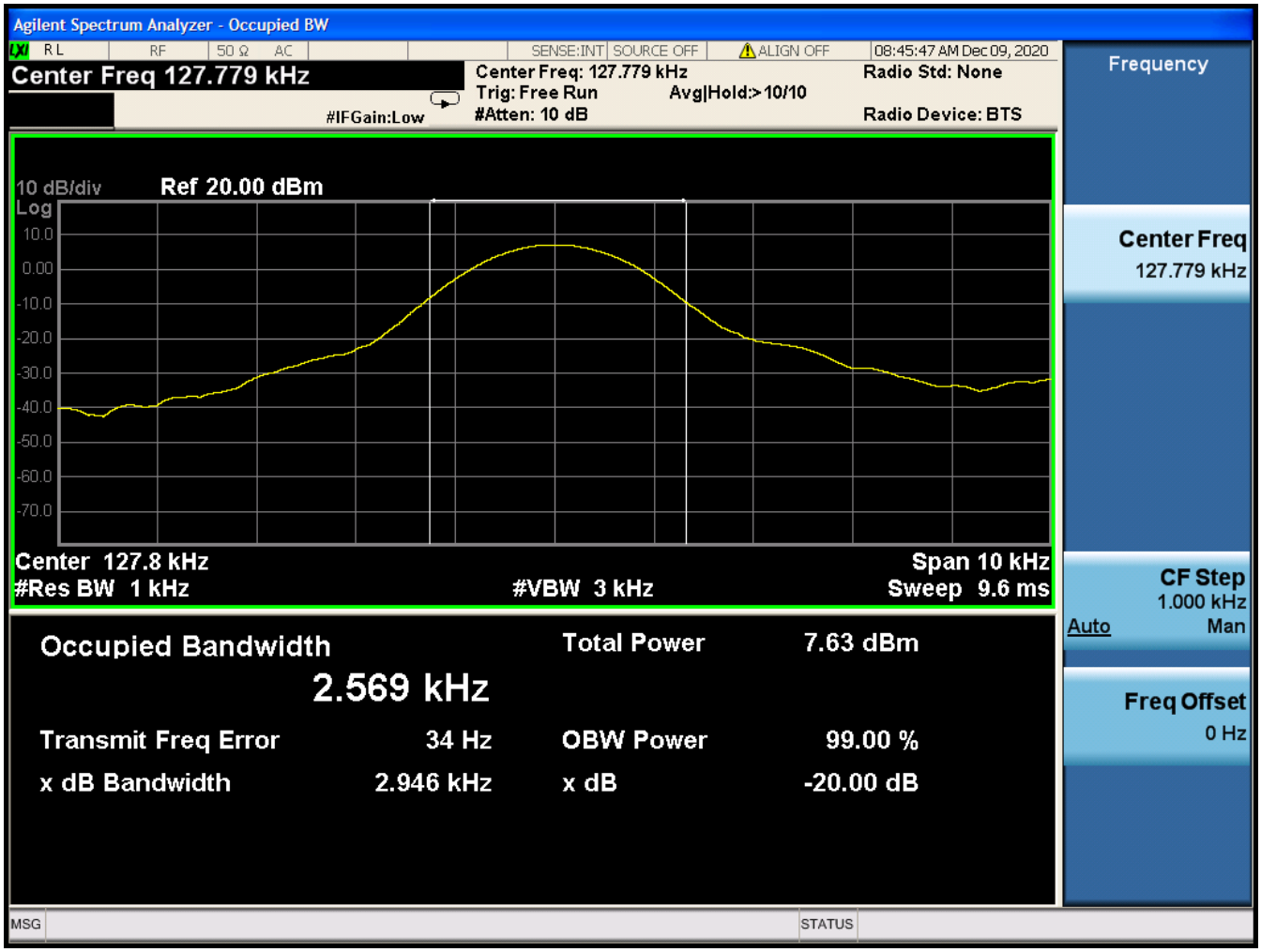
2. Corrected Reading = Original Receiver Reading + Correct Factor

3. Margin = Limit - Corrected Reading

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.

127.8kHz



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 **********