intertek
Total Quality. Assured.

# Nomad Goods, Inc.

# TEST REPORT

**Report Type:**
FCC Part 15C

**Model:**
NM01017585

**REPORT NUMBER:**
210902965SHA-002

**ISSUE DATE:**
November 17, 2021

**DOCUMENT CONTROL NUMBER:**
TTRF15c_V1 © 2018 Intertek

Intertek Testing Services Shanghai
Building No.86, 1198 Qinzhou Road (North)
Caohejing Development Zone
Shanghai 200233, China

Telephone: 86 21 6127 8200
www.intertek.com

Total Quality. Assured.

# TEST REPORT

Report no.: 210902965SHA-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 |
| **Factory:** | Zhongshan Zen Factory Ltd. |
| **Address of Factory:** | 6th.Industrial Area, Nanlang Town, Zhongshan City, Guangdong, China |
| **FCC ID:** | 2AJYRNM01017585 |

**SUMMARY:**

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

| **PREPARED BY:** | **REVIEWED BY:** |
|---|---|
| Project Engineer<br>Sky Yang | Reviewer<br>Wakeyou Wang |

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

# 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 ..... 9
2.4 TEST PERIPHERALS LIST ..... 9
2.5 SUPPORT CABLE LIST ..... 9
2.6 TEST ENVIRONMENT CONDITION: ..... 10
2.7 INSTRUMENT LIST ..... 10
2.8 MEASUREMENT UNCERTAINTY ..... 10

**3 RADIATED EMISSIONS** ..... **11**

3.1 LIMIT ..... 11
*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.* ..... *11*
3.2 BLOCK DIAGRAM AND TEST SET UP ..... 12
3.3 MEASUREMENT PROCEDURE ..... 13
3.4 TEST RESULTS OF RADIATED EMISSIONS ..... 14

**4 POWER LINE CONDUCTED EMISSION** ..... **17**

4.1 LIMIT ..... 17
*4.1.1 Limits for conducted disturbance voltage at the mains ports of class B device* ..... *17*
4.2 BLOCK DIAGRAM AND TEST SET UP ..... 18
4.3 MEASUREMENT PROCEDURE ..... 19
4.4 TEST RESULTS OF POWER LINE CONDUCTED EMISSION ..... 20

**5 MEASURED BANDWIDTH** ..... **22**

**6 ANTENNA REQUIREMENT** ..... **23**

**APPENDIX I: PHOTOGRAPH OF TEST SETUP** ..... **24**

**APPENDIX II: PHOTOGRAPH OF EQUIPMENT UNDER TEST** ..... **24**

# Revision History

| Report No. | Version | Description | Issued Date |
|---|---|---|---|
| 210902965SHA-002 | Rev. 01 | Initial issue of report | November 17, 2021 |
| | | | |
| | | | |

# Measurement result summary

| TEST ITEM | FCC REFERENCE | 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 Mini MagSafe |
| Type/Model: | NM01017585 |
| Description of EUT: | Base Station Mini MagSafe |
| Rating: | Max output power 15W |
| EUT type: | ☒ Table top ☐ Floor standing |
| Operating Frequency: | 127.8 kHz |
| Antenna Type: | Coil antenna |
| Sample received date: | September 10, 2021 |
| Date of test: | September 17, 2021 to September 20, 2021 |

## 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<br>Registration No. CNAS L0139 |
| | FCC Accredited Lab<br>Designation Number: CN1175 |
| | IC Registration Lab<br>CAB identifier.: CN0051 |
| | VCCI Registration Lab<br>Registration No.: R-14243, G-10845, C-14723, T-12252 |
| | A2LA Accreditation Lab<br>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.

| Test Item | EMI Test Modes |
|---|---|
| Radiated emission | Mode 1 :Operating with Max. Power Output |

## 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 | Wireless charge | PMA, Wl453A | N/A | 15W |
| 2 | Adapter | NATIVE UNION | N/A | AC100-240V 50/60Hz 0.5A |

## 2.5 Support Cable list

| Item No | Description | Length (m) | Cable Type |
|---|---|---|---|
| 1 | USB Cable | 2.0 | Shielded without ferrite |

## 2.6 Test environment condition:

| Test items | Temperature | Humidity |
|---|---|---|
| Power line conducted emission | 23.8°C | 50% RH |
| Radiated Emissions | 25.3°C | 53% 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. 18, 2020 | Nov. 17, 2021 |
| ☒ | Loop Antenna | ETS-LINDGREN | 6502 | 00202525 | Nov. 14, 2020 | Nov. 13, 2022 |
| ☒ | Broadband Antenna | ETS-LINDGREN | 3142E | 00201566 | Nov. 14, 2019 | Nov. 13, 2022 |
| ☒ | 6dB Attenuator | Talent | RA6A5-N-18 | 18103001 | Nov. 14, 2020 | Nov. 13, 2022 |
| ☒ | Preamplifier | HP | 8447F | 2805A02960 | Nov. 10, 2020 | Nov. 9, 2021 |
| ☒ | EXA Spectrum Analyzer | KEYSIGHT | N9010A | MY51440197 | Nov. 10, 2020 | Nov. 9, 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 |

## 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 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**

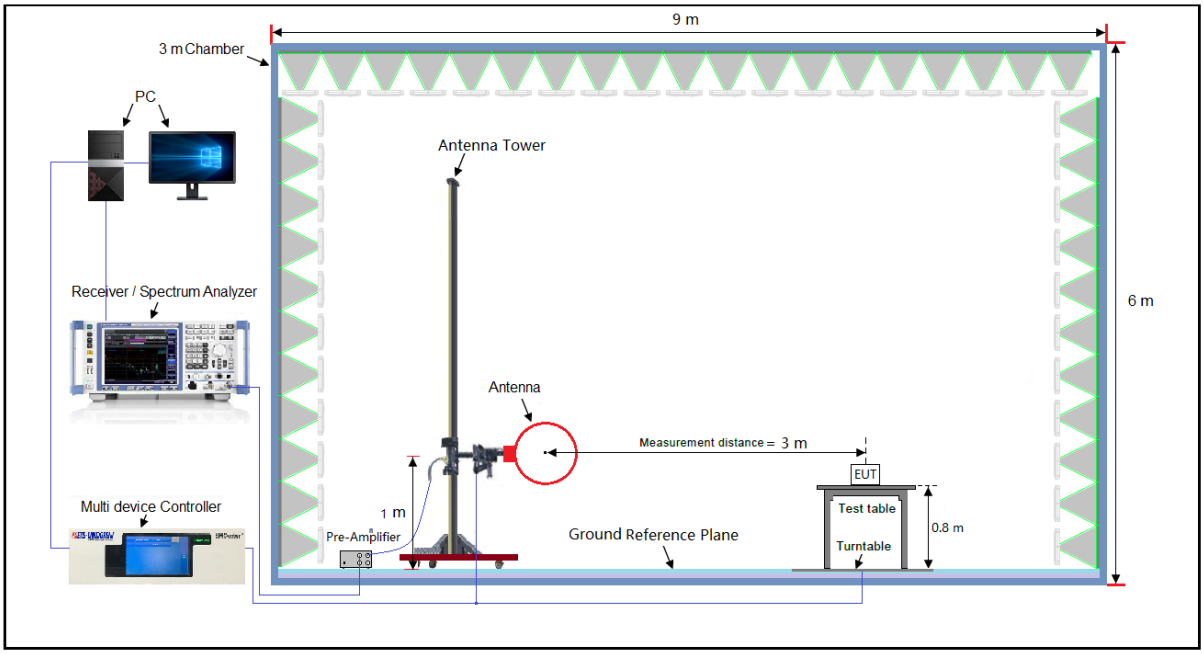
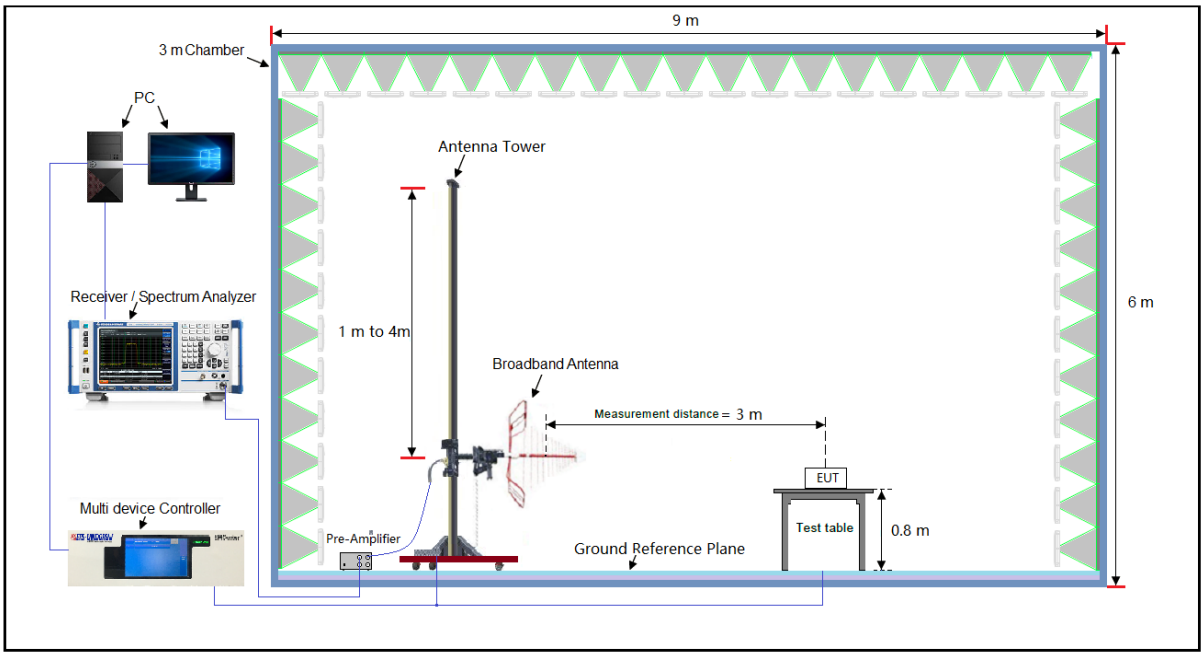



**Figure 2. 30MHz to 1GHz**



## 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.

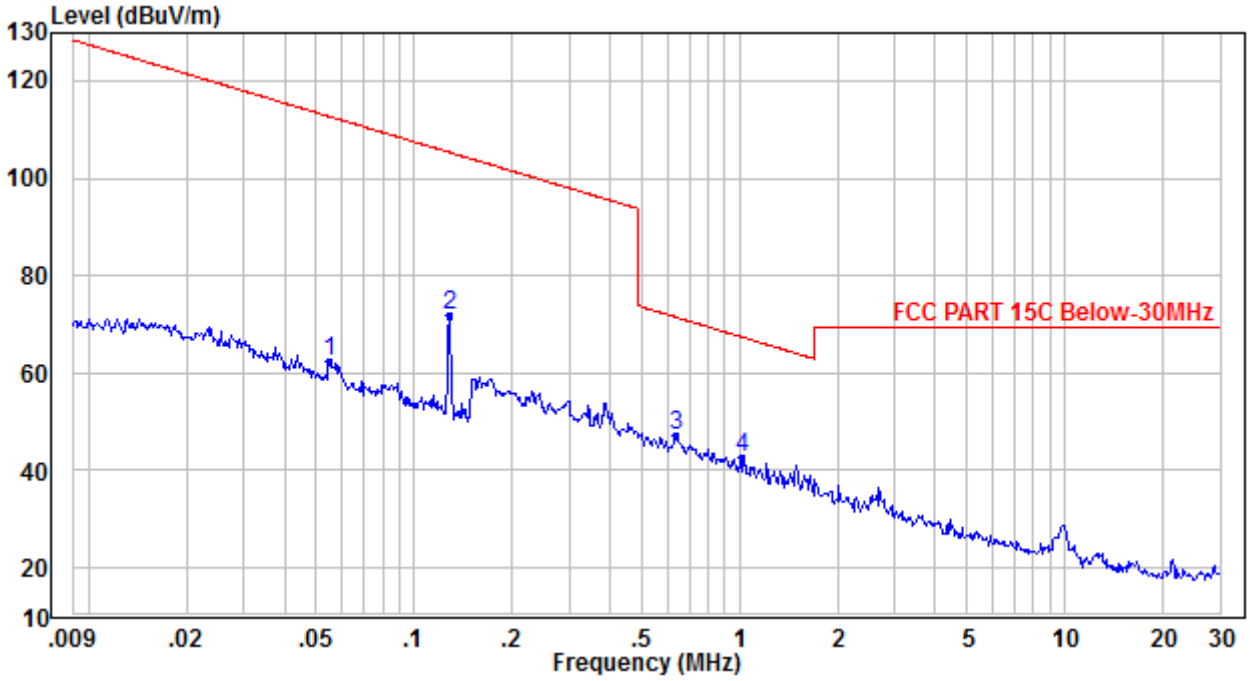
7) The system was investigated from 9 kHz to 1 GHz. During the radiated emission test, the EMI test Receiver was set with the following configurations:

| Frequency Range | RBW | VBW | Measurement |
|---|---|---|---|
| 9 kHz – 150 kHz | 1kHz | 3 kHz | Peak |
| 150 kHz – 30 MHz | 9kHz | 100 kHz | Peak |
| 30 MHz – 1000 MHz | 120 kHz | 300 kHz | Peak |

## 3.4 Test Results of Radiated Emissions

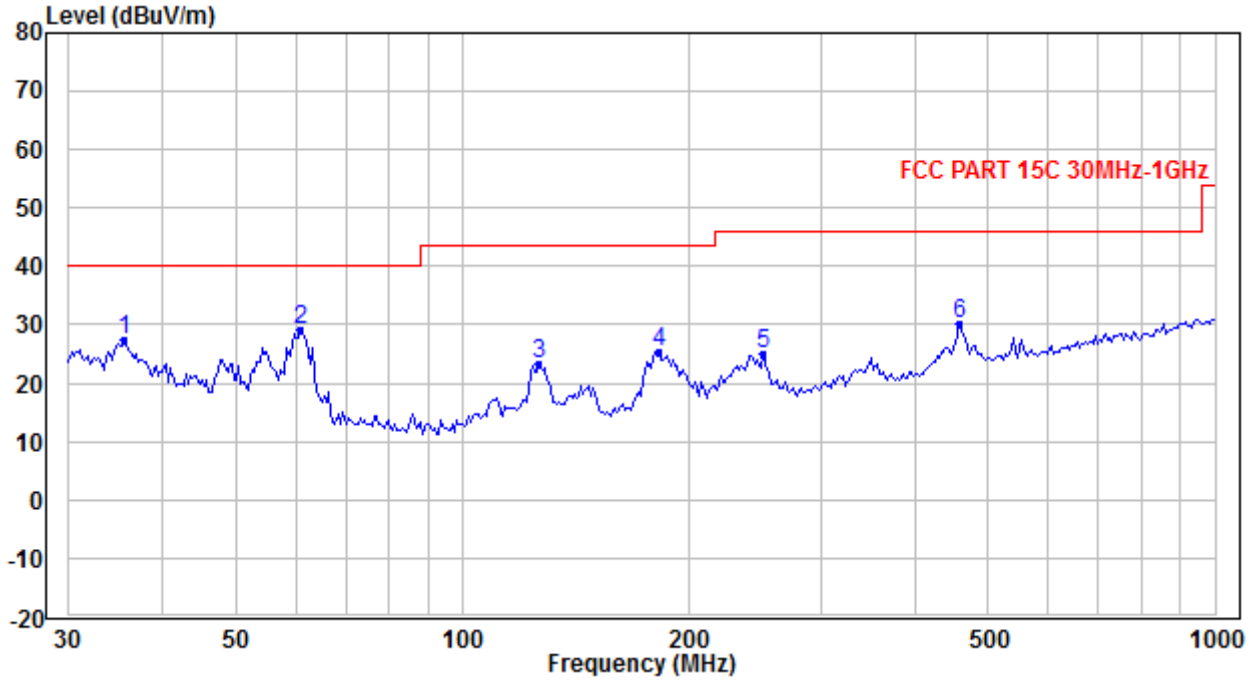
**Radiated Emission Test Data (9 KHz ~ 30 MHz):**

**worst case test data:** X axes

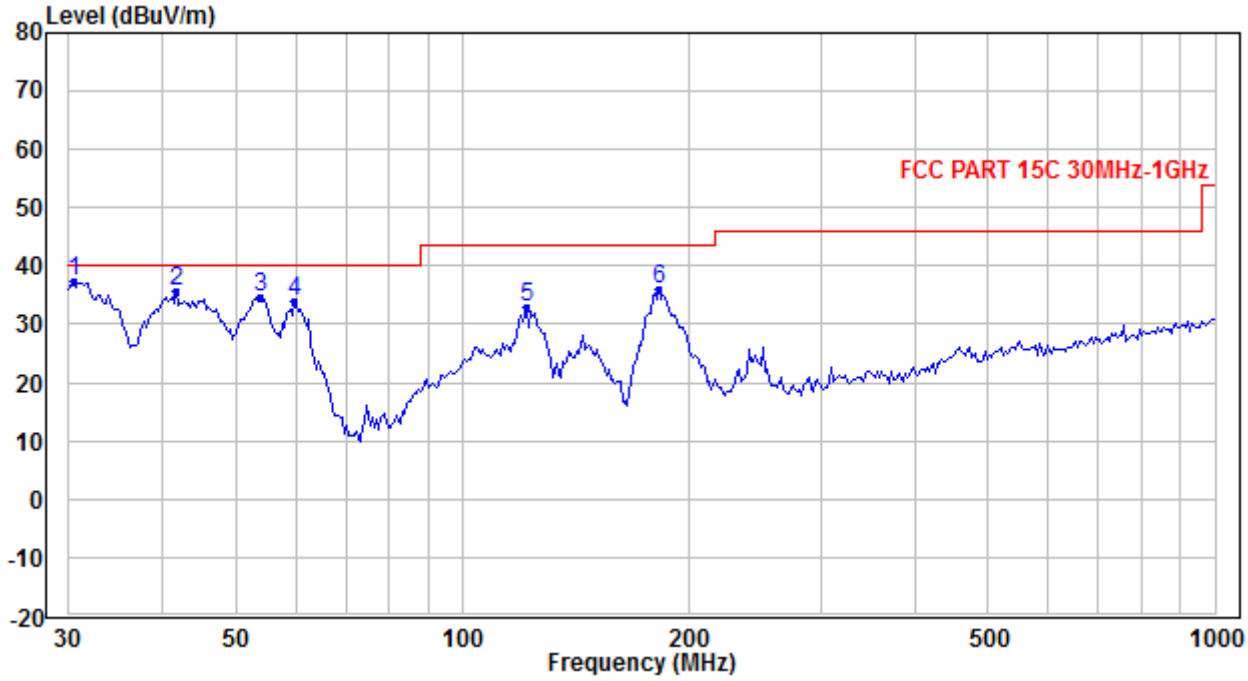


**Radiated Emission Test Data (30 MHz ~ 1 GHz):**
**worst case test data**

Horizontal




Vertical



**Test data 9 KHz ~ 30 MHz:**

| Frequency (MHz) | Measured level (dBμV/m) | Factor (dB) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|
| 0.055 | 62.30 | -15.60 | 112.84 | 50.54 | Peak |
| 0.128 | 71.94 | -16.81 | 105.45 | 33.51 | Peak |
| 0.642 | 47.04 | -18.14 | 71.43 | 24.39 | Peak |
| 1.025 | 42.72 | -17.95 | 67.35 | 24.63 | Peak |

**Test data 30MHz~1GHz:**

| Polarization | Frequency (MHz) | Measured level (dBμV/m) | Factor (dB) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|
| H | 35.511 | 27.52 | -5.35 | 40.00 | 12.48 | Peak |
| | 61.004 | 29.26 | -17.50 | 40.00 | 10.74 | Peak |
| | 126.693 | 23.15 | -15.86 | 43.50 | 20.35 | Peak |
| | 182.578 | 25.31 | -10.46 | 43.50 | 18.19 | Peak |
| | 250.486 | 24.89 | -8.93 | 46.00 | 21.11 | Peak |
| | 458.399 | 30.24 | -3.64 | 46.00 | 15.76 | Peak |
| V | 30.425 | 37.44 | -4.45 | 40.00 | 2.56 | Peak |
| | 41.741 | 35.50 | -9.12 | 40.00 | 4.50 | Peak |
| | 53.756 | 34.59 | -16.79 | 40.00 | 5.41 | Peak |
| | 59.732 | 33.84 | -17.49 | 40.00 | 6.16 | Peak |
| | 121.462 | 32.99 | -15.99 | 43.50 | 10.51 | Peak |
| | 182.578 | 36.03 | -10.46 | 43.50 | 7.47 | 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

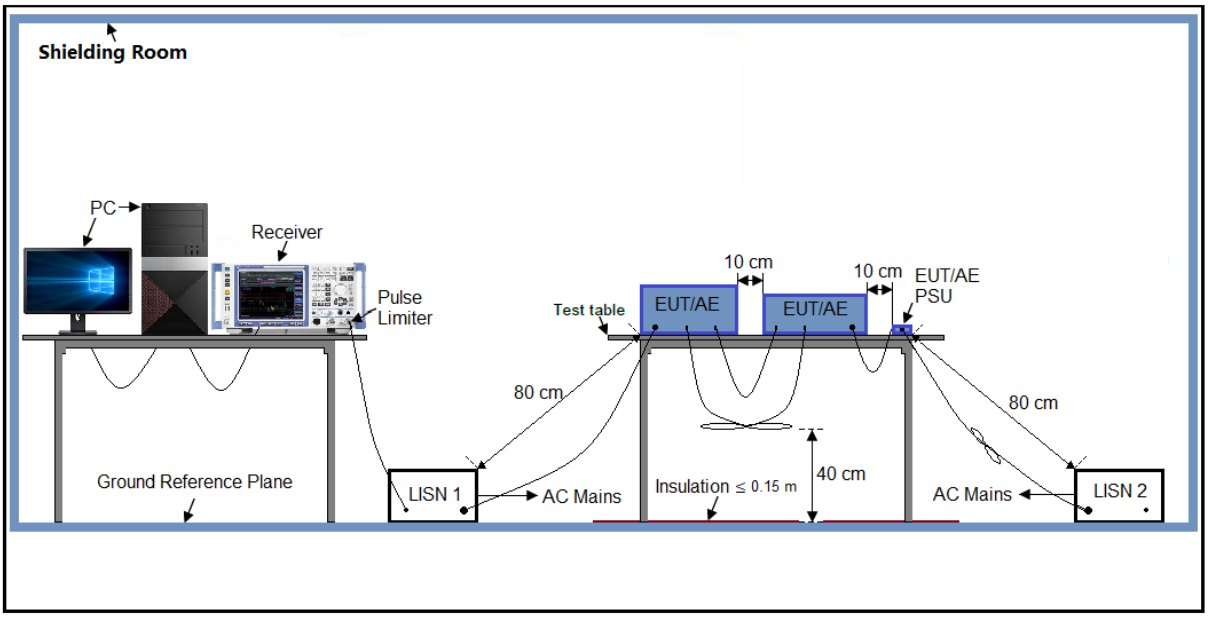
4.1.1 Limits for conducted disturbance voltage at the mains ports of class B device

| 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



## 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.

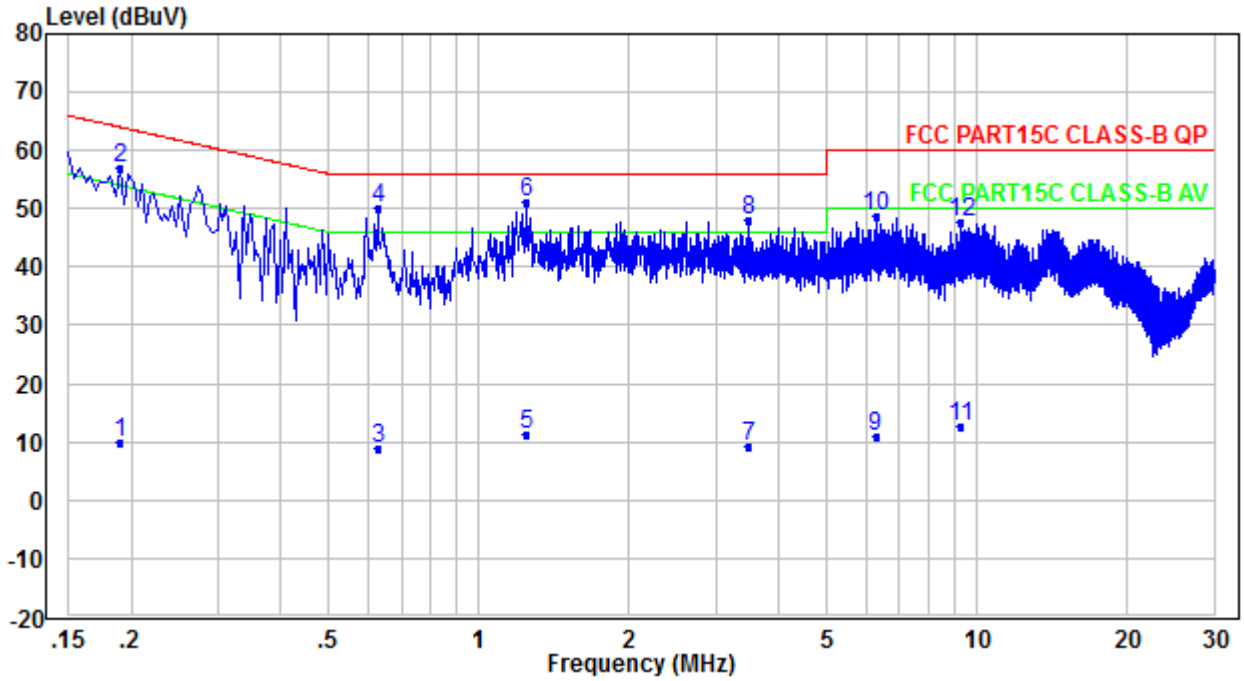
Tabletop devices shall be placed on a platform of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screened) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on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

L Line

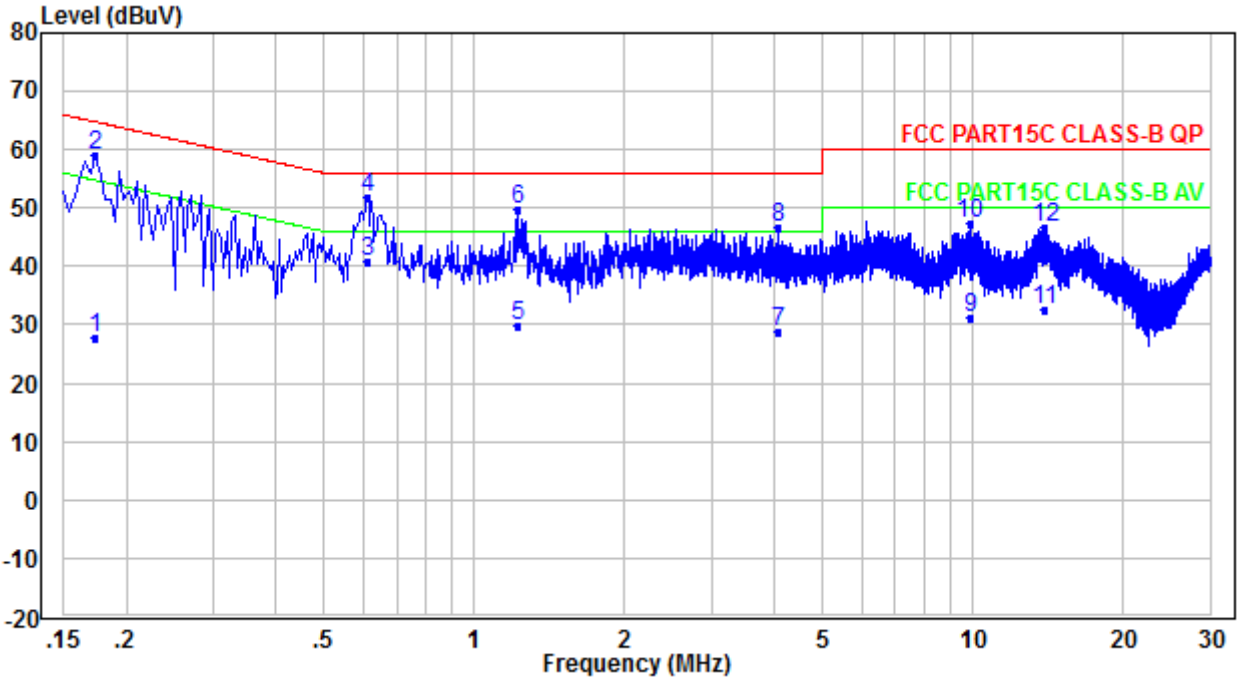



**Test Data:**

| Frequency (MHz) | Quasi-peak | | | Average | | |
|---|---|---|---|---|---|---|
| | Level dB(μV) | Limit dB(μV) | Margin (dB) | Level dB(μV) | Limit dB(μV) | Margin (dB) |
| 0.190 | 56.86 | 64.04 | 7.18 | 9.86 | 54.04 | 44.18 |
| 0.626 | 49.97 | 56.00 | 6.03 | 8.97 | 46.00 | 37.03 |
| 1.246 | 51.19 | 56.00 | 4.81 | 11.19 | 46.00 | 34.81 |
| 3.470 | 48.04 | 56.00 | 7.96 | 9.04 | 46.00 | 36.96 |
| 6.270 | 48.87 | 60.00 | 11.13 | 10.87 | 50.00 | 39.13 |
| 9.261 | 47.70 | 60.00 | 12.30 | 12.70 | 50.00 | 37.30 |

**Test Curve:**

N Line




**Test Data:**

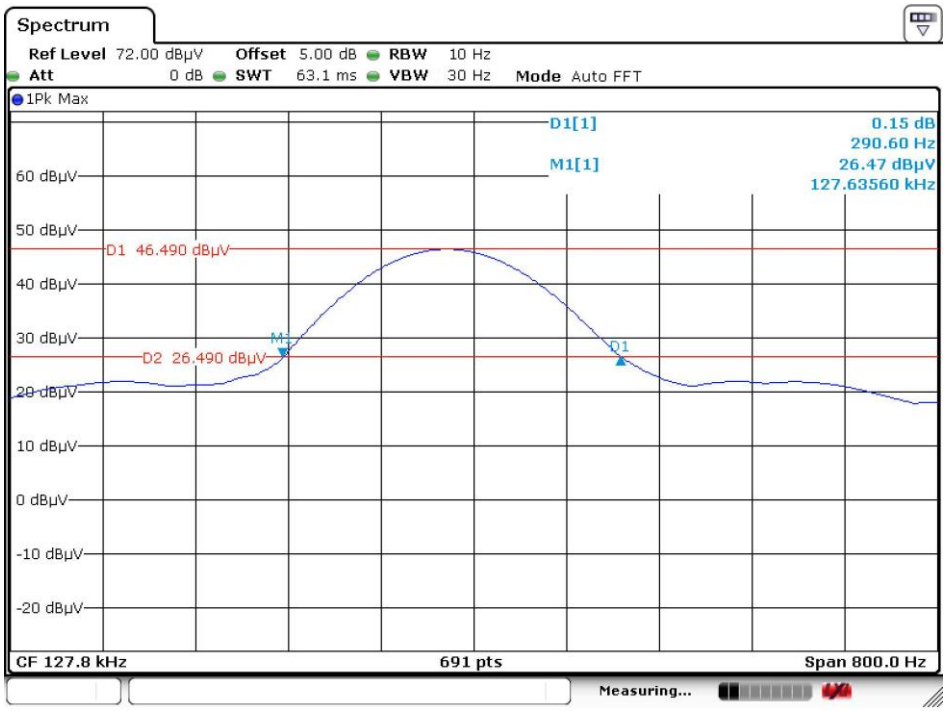
| Frequency (MHz) | Quasi-peak | | | Average | | |
|---|---|---|---|---|---|---|
| | Level dB(μV) | Limit dB(μV) | Margin (dB) | Level dB(μV) | Limit dB(μV) | Margin (dB) |
| 0.174 | 58.90 | 64.77 | 5.87 | 27.90 | 54.77 | 26.87 |
| 0.610 | 51.76 | 56.00 | 4.24 | 40.76 | 46.00 | 5.24 |
| 1.218 | 49.74 | 56.00 | 6.26 | 29.74 | 46.00 | 16.26 |
| 4.066 | 46.66 | 56.00 | 9.34 | 28.66 | 46.00 | 17.34 |
| 9.873 | 47.20 | 60.00 | 12.80 | 31.20 | 50.00 | 18.80 |
| 13.965 | 46.57 | 60.00 | 13.43 | 32.57 | 50.00 | 17.43 |

*Remark: 1. Correct Factor = LISN Factor + Cable Loss, the value was added to Original Receiver Reading by the software automatically.*
*2. Level = Original Receiver Reading + Correct Factor*
*3. Margin = Limit - Level*

# 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.

127.8 kHz



# 6 ANTENNA REQUIREMENT

| Standard Requirement |
|---|
| **15.203 requirement:**<br>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 **********