



427 West 12800 South  
 Draper, UT 84020

## Test Report Certification

|                                  |                                    |
|----------------------------------|------------------------------------|
| <b>FCC ID</b>                    | SWX-WAVENANO                       |
| <b>ISED ID</b>                   | 6545A-WAVENANO                     |
| <b>Equipment Under Test</b>      | Wave-Nano                          |
| <b>Test Report Serial Number</b> | TR7237_01                          |
| <b>Date of Test(s)</b>           | 1 March; 8, 9, 14 and 15 June 2022 |
| <b>Report Issue Date</b>         | 16 June 2022                       |

| Test Specification            | Applicant   |
|-------------------------------|---|
| 47 CFR FCC Part 15, Subpart E | Ubiquiti Inc.<br>685 Third Avenue<br>New York, NY 10017<br>U.S.A. |



NVLAP LAB CODE 600241-0

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## Certification of Engineering Report

This report has been prepared by Unified Compliance Laboratory (UCL) to document compliance of the device described below with the requirement of Federal Communication Commissions (FCC) Part 15, Subpart E. This report may be reproduced in full. Partial reproduction of this report may only be made with the written consent of the laboratory. The results in this report apply only to the sample tested.

|                     |                |
|---------------------|----------------|
| <b>Applicant</b>    | Ubiquiti Inc.  |
| <b>Manufacturer</b> | Ubiquiti Inc.  |
| <b>Brand Name</b>   | airFiber       |
| <b>Model Number</b> | Wave-Nano      |
| <b>FCC ID</b>       | SWX-WAVENANO   |
| <b>ISED ID</b>      | 6545A-WAVENANO |

On this 16<sup>th</sup> day of June 2022, I individually and for Unified Compliance Laboratory certify that the statements made in this engineering report are true, complete and correct to the best of my knowledge and are made in good faith.

Although NVLAP has accredited the Unified Compliance Laboratory testing facilities, this report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the U.S. federal government.

Unified Compliance Laboratory



Written By: Joseph W. Jackson



Reviewed By: Richard L. Winter

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| <b>Revision History</b> |                         |              |
|-------------------------|-------------------------|--------------|
| <b>Revision</b>         | <b>Description</b>      | <b>Date</b>  |
| 01                      | Original Report Release | 16 June 2022 |

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# 1 Client Information

## 1.1 Applicant

|                     |   |
|---------------------|---|
| <b>Company</b>      | Ubiquiti Inc.<br>685 Third Avenue<br>New York, NY 10017<br>U.S.A. |
| <b>Contact Name</b> | Mark Feil   |
| <b>Title</b>        | Compliance Manager  |

## 1.2 Manufacturer

|                     |   |
|---------------------|---|
| <b>Company</b>      | Ubiquiti Inc.<br>685 Third Avenue<br>New York, NY 10017<br>U.S.A. |
| <b>Contact Name</b> | Mark Feil   |
| <b>Title</b>        | Compliance Manager  |

## 2 Equipment Under Test (EUT)

### 2.1 Identification of EUT

|                        |                    |
|------------------------|--------------------|
| <b>Brand Name</b>      | airFiber           |
| <b>Model Number</b>    | Wave-Nano          |
| <b>Serial Number</b>   | A2527F             |
| <b>Dimensions (cm)</b> | 25.7 x 25.7 x 11.4 |

### 2.2 Description of EUT

The 60 GHz Wave Nano (Wave Nano) is a CPE device that connects to a Wave AP functioning as a base station. The Wave Nano has a 1.2+ Gbps throughput rate and can sustain its connection over 5 kilometers. The Wave Nano is also equipped with a 5 GHz WiFi 6 backup radio to sustain connectivity during 60 GHz link disruptions. This easy-to-deploy CPE device can be set up in minutes with the UISP™ application using Bluetooth-powered setup and tracked from anywhere with its built-in GPS antenna.

The table below show the channels used within the different modulation bandwidths.

| Band   | WiFi Mode | Modulation Bandwidth | Modulation Type | Frequency (MHz)  |
|--------|-----------|----------------------|-----------------|------------------|
| UNII-3 | ax        | 20 MHz               | HE              | 5740, 5790, 5835 |
|        | ax        | 40 MHz               | HE              | 5750, 5790, 5825 |
|        | ax        | 80 MHz               | HE              | 5770, 5790, 5805 |

This report covers the circuitry of the device subject to FCC Part 15, Subpart E. The circuitry of the device subject to FCC Part 15 Subpart B was found to be compliant and is covered under a separate Unified Compliance Laboratory test report.

### 2.3 EUT and Support Equipment

The EUT and support equipment used during the test are listed below.

| Brand Name<br>Model Number<br>Serial Number   | Description               | Name of Interface Ports / Interface Cables    |
|---|---------------------------|---|
| BN: airFiber<br>MN: Wave-Nano<br>SN: A2527F   | Wireless Access Point     | See Section 2.4                               |
| BN: Ubiquiti, Inc.<br>MN: U-POE-at<br>SN: N/A | PoE Injector Power Supply | Shielded or Un-shielded Cat 5e cable (Note 2) |
| BN: Dell<br>MN: XPS 13                        | Laptop Computer           | Shielded or Un-shielded Cat 5e cable (Note 2) |

|         |  |  |
|---------|--|--|
| SN: N/A |  |  |
|---------|--|--|

Notes: (1) EUT

(2) Interface port connected to EUT (See Section 2.4)

The support equipment listed above was not modified in order to achieve compliance with this standard.

## 2.4 Interface Ports on EUT

| Name of Ports      | No. of Ports Fitted to EUT | Cable Description/Length                     |
|--------------------|----------------------------|--|
| AC (PoE Injector)  | 1                          | 3 conductor power cord/80cm                  |
| LAN (PoE Injector) | 1                          | Shielded or Un-shielded cat 5e cable/1 meter |
| Data               | 1                          | Shielded or Un-shielded cat 5e cable/1 meter |

## 2.5 Operating Environment

|                            |                              |
|----------------------------|------------------------------|
| <b>Power Supply</b>        | 120 Volts AC to 48 Volts PoE |
| <b>AC Mains Frequency</b>  | 60 Hz                        |
| <b>Temperature</b>         | 22.1 – 23.3 °C               |
| <b>Humidity</b>            | 19.7 – 25.7 %                |
| <b>Barometric Pressure</b> | 1019 mBar                    |

## 2.6 Operating Modes

The Wave-Nano was tested using test software in order to enable a constant transmission. The measurements within this report are corrected to reference a 100% duty cycle. All emission modes of 802.11 ax were investigated. All measurements are reported with the worst-case mode (802.11ax) unless otherwise stated.

## 2.7 EUT Exercise Software

EUT firmware version 1.0 was used to operate the transmitter using a constant transmit mode.

## 2.8 Block Diagram of Test Configuration

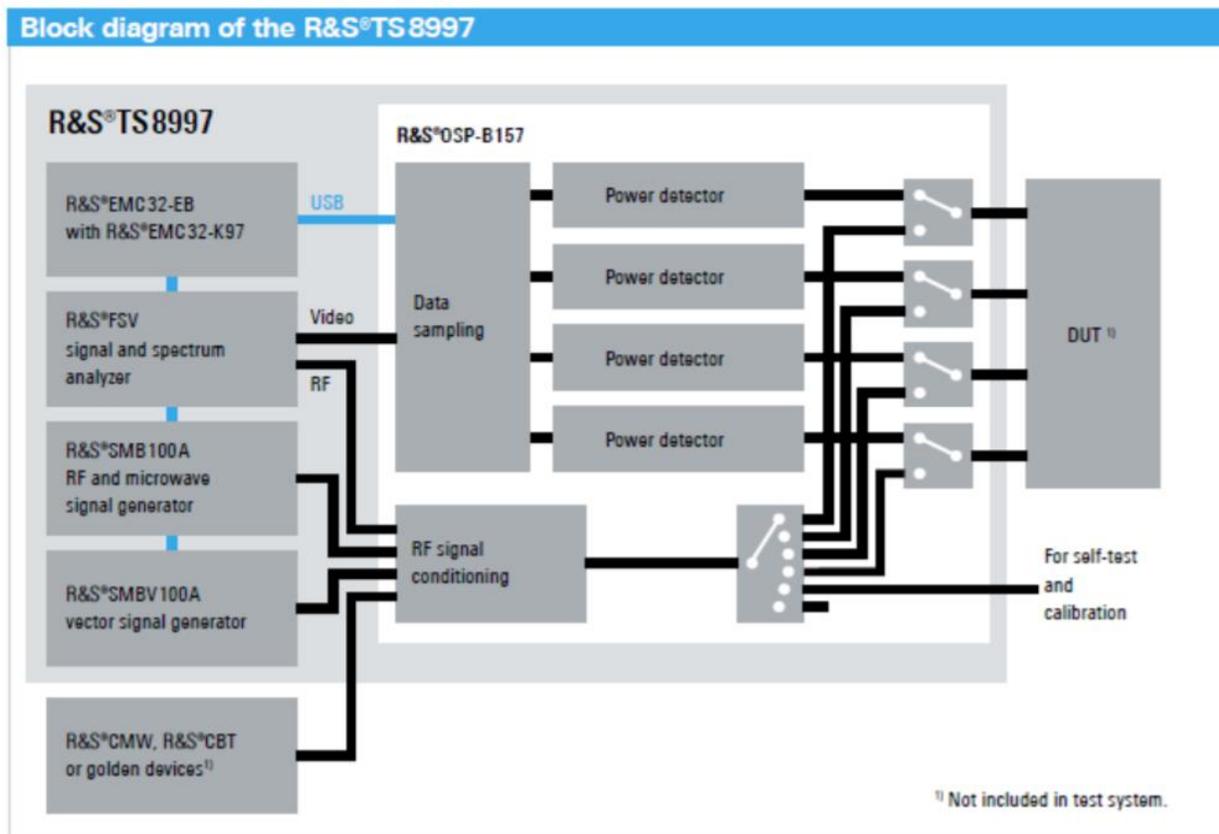


Diagram 1: Test Configuration Block Diagram

## 2.9 Modification Incorporated/Special Accessories on EUT

There were no modifications made to the EUT during testing to comply with the specification.

## 2.10 Deviation, Opinions Additional Information or Interpretations from Test Standard

There were no deviations, opinions, additional information or interpretations from the test specification.

## 3 Test Specification, Method and Procedures

### 3.1 Test Specification

|                        |  |
|------------------------|--|
| <b>Title</b>           | 47 CFR FCC Part 15, Subpart E, Section 15.407<br>Limits and methods of measurement of radio interference characteristics of Unlicensed National Information Infrastructure Devices |
| <b>Purpose of Test</b> | The tests were performed to demonstrate initial compliance   |

### 3.2 Methods & Procedures

#### 3.2.1 47 CFR FCC Part 15 Section 15.407

See test standard for details.

### 3.3 FCC Part 15, Subpart E

#### 3.3.1 Summary of Tests

| FCC Section | ISED Section           | Environmental Phenomena              | Frequency Range (MHZ)  | Result    |
|-------------|------------------------|--------------------------------------|------------------------|-----------|
| 15.407(a)   | N/A                    | Antenna requirements                 | Structural Requirement | Compliant |
| 15.407(b)   | RSS-Gen                | Conducted Disturbance at Mains Port  | 0.15 to 30             | Compliant |
| 15.407(c)   | RSS-247 §6.2.2, §6.2.3 | Bandwidth Requirement                | 5725 to 5850           | Compliant |
| 15.407(e)   | RSS-247 §6.2.2, §6.2.3 | Peak Output Power                    | 5725 to 5850           | Compliant |
| 15.407(f)   | RSS-247 §6.2.2, §6.2.3 | Antenna Conducted Spurious Emissions | 0.009 to 40000         | N/A       |
| 15.407(g)   | RSS-247 §6.2.2, §6.2.3 | Radiated Spurious Emissions          | 0.009 to 40000         | Compliant |
| 15.407(h)   | RSS-247 §6.2.2, §6.2.3 | Peak Power Spectral Density          | 5725 to 5850           | Compliant |

The testing was performed according to the procedures in ANSI C63.10-2013, KDB 789033 and 47 CFR Part 15. Where applicable, KDB 662911 was followed to sum required measurements.

### 3.4 Results

In the configuration tested, the EUT complied with the requirements of the specification.

### **3.5 Test Location**

Testing was performed at the Unified Compliance Laboratory 3-Meter and 10-Meter chambers located at 427 West 12800 South, Draper, UT 84020. Unified Compliance Laboratory is accredited by National Voluntary Laboratory Accreditation Program (NVLAP); NVLAP Code 600241-0 which is effective until 30 June 2022. This site has also been registered with Innovations, Science and Economic Development (ISED) department as was accepted under Appendix B, Phase 1 procedures of the APEC Tel MRA for Canadian recognition. ISED No.: 25346, effective until 30 June 2022. Unified Compliance Laboratory has been assigned Conformity Assessment Number US0223 by ISED.

## 4 Test Equipment

### 4.1 Conducted Emissions at Mains Ports

| Type of Equipment | Manufacturer        | Model Number | Asset Number | Date of Last Calibration | Due Date of Calibration |
|-------------------|---------------------|--------------|--------------|--------------------------|-------------------------|
| EMI Receiver      | AFJ                 | FFT3010      | UCL-6754     | 12/8/2021                | 12/8/2022               |
| LISN              | AFJ                 | LS16C/10     | UCL-6749     | 12/6/2021                | 12/6/2023               |
| Cat6 ISN          | Teseq               | ISN T8-Cat6  | UCL-2971     | 1/30/2022                | 1/30/2023               |
| ISN               | Teseq               | ISN T800     | UCL-2974     | 6/4/2021                 | 6/4/2022                |
| LISN              | Com-Power           | LIN-120C     | UCL-2612     | 1/6/2022                 | 1/6/2023                |
| AC Power Source   | Laplace Instruments | AC1000A      | UCL-2857     | N/A                      | N/A                     |
| Test Software     | UCL                 | Revision 1   | UCL-3107     | N/A                      | N/A                     |

Table 1: List of equipment used for Conducted Emissions Testing at Mains Port

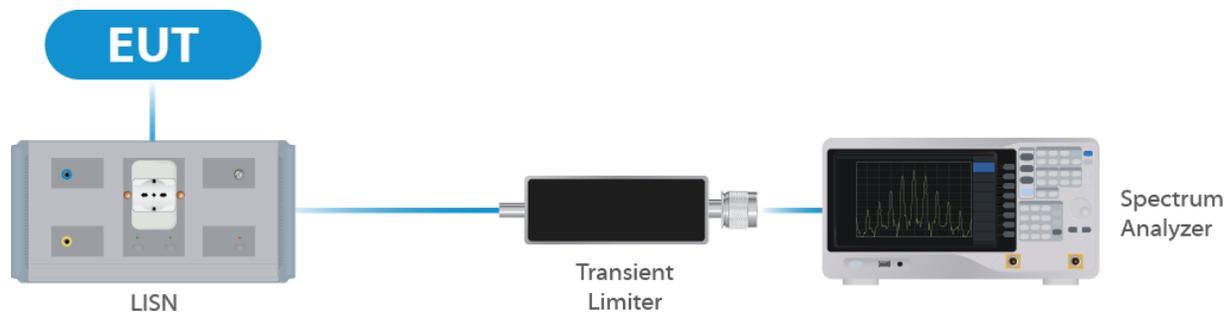


Figure 1: Conducted Emissions Test

### 4.2 Direct Connect at the Antenna Port Tests

| Type of Equipment       | Manufacturer | Model Number | Asset Number | Date of Last Calibration | Due Date of Calibration |
|-------------------------|--------------|--------------|--------------|--------------------------|-------------------------|
| Spectrum Analyzer       | R&S          | FSV40        | UCL-2861     | 1/03/2022                | 1/03/2023               |
| Signal Generator        | R&S          | SMB100A      | UCL-2864     | N/A                      | N/A                     |
| Vector Signal Generator | R&S          | SMBV100A     | UCL-2873     | N/A                      | N/A                     |
| Switch Extension        | R&S          | OSP-B157WX   | UCL-2867     | 1/03/2022                | 1/03/2023               |
| Switch Extension        | R&S          | OSP-150W     | UCL-2870     | 1/03/2022                | 1/03/2023               |

Table 2: List of equipment used for Direct Connect at the Antenna Port

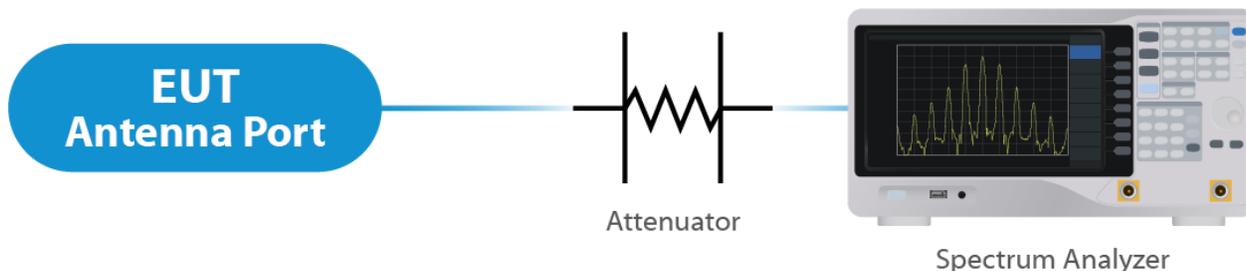


Figure 2: Direct Connect at the Antenna Port Test

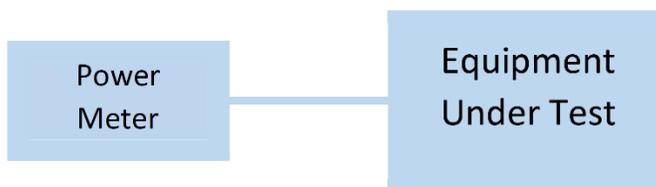
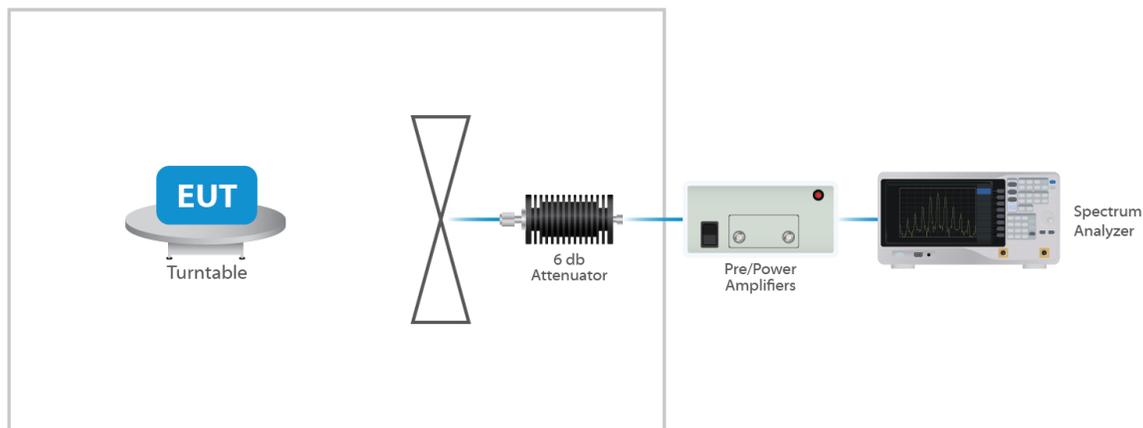


Figure 3: Output Power Measurement

### 4.3 Radiated Emissions

| Type of Equipment                           | Manufacturer       | Model Number           | Asset Number | Date of Last Calibration | Due Date of Calibration |
|---|--------------------|------------------------|--------------|--------------------------|-------------------------|
| EMI Receiver                                | Keysight           | N9038A                 | UCL-2778     | 6/21/2021                | 6/21/2022               |
| Pre-Amplifier<br>9 kHz – 1 GHz              | Sonoma Instruments | 310N                   | UCL-2889     | 10/7/2021                | 10/7/2022               |
| Pre-Amplifier<br>9 kHz – 1 GHz              | Sonoma Instruments | 310N                   | UCL-4793     | 10/7/2021                | 10/7/2022               |
| Pre-Amplifier<br>1 – 18 GHz                 | Com-Power          | PAM 118A               | UCL-3833     | 10/7/2021                | 10/7/2022               |
| Pre-Amplifier<br>1 – 18 GHz                 | The EMC Shop       | PA18G                  | UCL-5896     | 3/11/3022                | 3/11/2023               |
| Pre-Amplifier<br>15 – 40 GHz                | L3 Harris          | LNA-40-18004000-40-15P | UCL-4465     | 11/3/2021                | 11/3/2022               |
| Broadband Antenna                           | Scwarzbeck         | VULB 9163              | UCL-3062     | 8/28/2020                | 8/27/2022               |
| Broadband Antenna                           | Scwarzbeck         | VULB 9163              | UCL-3062     | 8/28/2020                | 8/28/2022               |
| Double Ridge Horn Antenna                   | Scwarzbeck         | BBHA 9120D             | UCL-3065     | 7/8/2021                 | 7/8/2022                |
| Log Periodic<br>15 - 40 GHz<br>Horn Antenna | Scwarzbeck         | STLP 9129              | UCL-3068     | 11/16/2020               | 11/16/2022              |
|   | ETS-Lindgren       | 3116C                  | UCL-7209     | 6/1/2022                 | 6/6/2024                |

|               |     |            |          |     |     |
|---------------|-----|------------|----------|-----|-----|
| Test Software | UCL | Revision 1 | UCL-3108 | N/A | N/A |
|---------------|-----|------------|----------|-----|-----|

**Table 3: List of equipment used for Radiated Emissions**

**Figure 4: Radiated Emissions Test**

## 4.4 Equipment Calibration

All applicable equipment is calibrated using either an independent calibration laboratory or Unified Compliance Laboratory personnel at intervals defined in ANSI C63.4:2014 following outlined calibration procedures. All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and is available for examination upon request.

## 4.5 Measurement Uncertainty

| Test                                  | Uncertainty ( $\pm$ dB) | Confidence (%) |
|---------------------------------------|-------------------------|----------------|
| Conducted Emissions                   | 1.44                    | 95             |
| Radiated Emissions (9 kHz to 30 MHz)  | 2.50                    | 95             |
| Radiated Emissions (30 MHz to 1 GHz)  | 4.38                    | 95             |
| Radiated Emissions (1 GHz to 18 GHz)  | 4.37                    | 95             |
| Radiated Emissions (18 GHz to 40 GHz) | 3.93                    | 95             |
| <b>Direct Connect Tests</b>           | <b>K Factor</b>         | <b>Value</b>   |
| Emissions Bandwidth                   | 2                       | 2.0%           |
| Output Power                          | 2                       | 1.0 dB         |
| Peak Power Spectral Density           | 2                       | 1.3 dB         |
| Band Edge                             | 2                       | 0.8 dB         |
| Transmitter Spurious Emissions        | 2                       | 1.8 dB         |

## 5 Test Results

### 5.1 §15.203 Antenna Requirements

The EUT uses an integral folding antenna structure. The maximum gain of the antenna per chain is 18.2 dBi. This is an 802.11 device and utilizes CDD as described in KDB 662911 D01. The antenna is not user replaceable.

For power measurements on IEEE 802.11 devices, Array Gain = 0 dB for NANT ≤ 4;

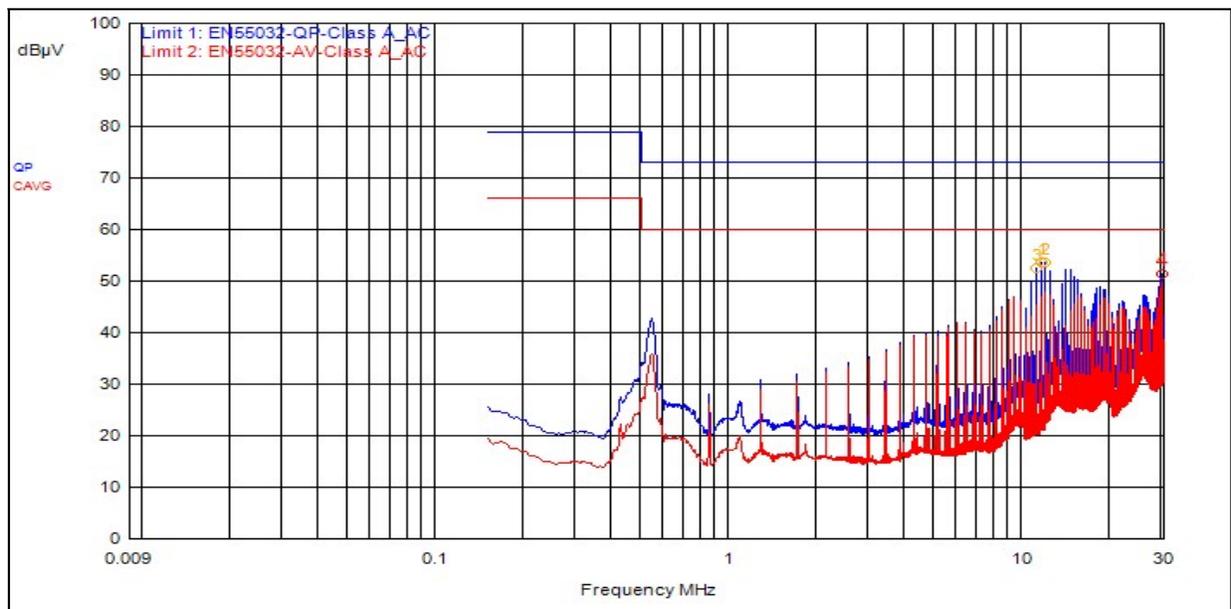
For PSD measurements when Nss=1: Array Gain = 10 log(NANT/NSS) dB = 6.02dB

#### Results

The EUT complied with the specification

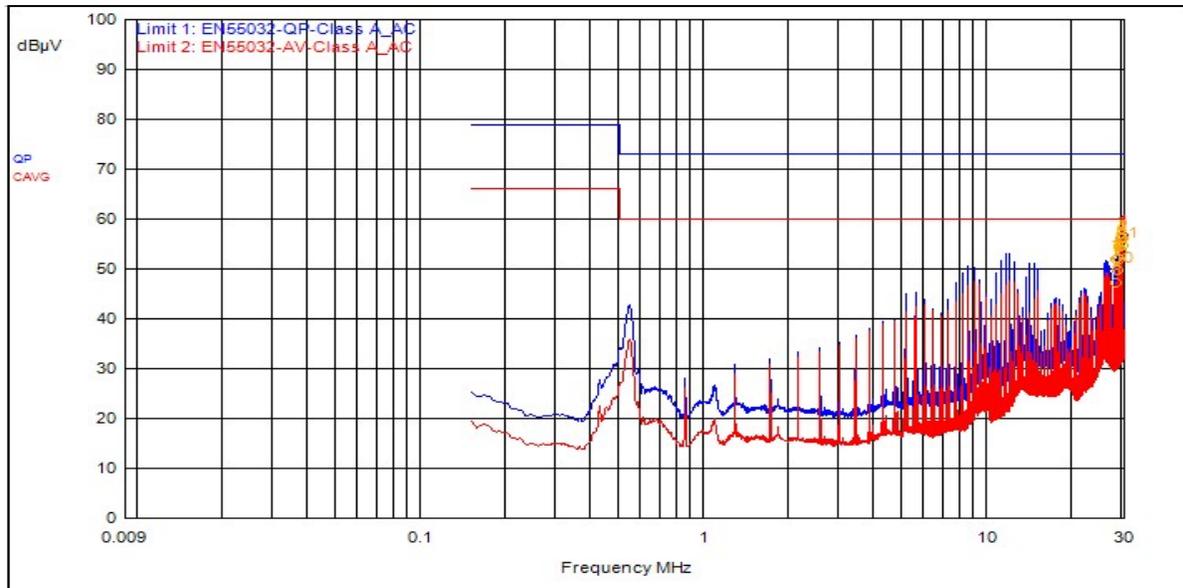
### 5.2 Conducted Emissions at Mains Ports Data

#### 5.2.1 Line



| ID | Frequency | Probe | Cable | Atten. | Detector | Meter Read | Meas Level | Limit 1 | Limit 1 Dist. | Limit 2 | Limit 2 Dist. |
|----|-----------|-------|-------|--------|----------|------------|------------|---------|---------------|---------|---------------|
| 1  | 11.427MHz | 9.6   | 0.3   |        | QPeak    | 43.8       | 53.7       | 73.0    | -19.3         |         |               |
| 2  | 11.850MHz | 9.6   | 0.3   |        | QPeak    | 43.8       | 53.7       | 73.0    | -19.3         |         |               |
| 3  | 11.004MHz | 9.6   | 0.3   |        | QPeak    | 42.6       | 52.5       | 73.0    | -20.5         |         |               |
| 4  | 29.613MHz | 10.1  | 0.3   |        | QPeak    | 41.1       | 51.5       | 73.0    | -21.5         |         |               |

## 5.2.2 Neutral



| ID | Frequency | Probe | Cable | Atten. | Detector | Meter Read | Meas Level | Limit 1 | Limit 1 Dist. | Limit 2 | Limit 2 Dist. |
|----|-----------|-------|-------|--------|----------|------------|------------|---------|---------------|---------|---------------|
| 1  | 29.613MHz | 9.9   | 0.3   |        | QPeak    | 46.6       | 56.7       | 73.0    | -16.3         |         |               |
| 2  | 29.610MHz | 9.9   | 0.3   |        | QPeak    | 45.9       | 56.1       | 73.0    | -16.9         |         |               |
| 4  | 29.190MHz | 9.9   | 0.3   |        | QPeak    | 45.9       | 56.0       | 73.0    | -17.0         |         |               |
| 5  | 28.767MHz | 9.9   | 0.3   |        | QPeak    | 44.3       | 54.5       | 73.0    | -18.5         |         |               |
| 9  | 28.359MHz | 9.8   | 0.3   |        | QPeak    | 42.2       | 52.3       | 73.0    | -20.7         |         |               |
| 7  | 27.933MHz | 9.8   | 0.3   |        | QPeak    | 41.8       | 52.0       | 73.0    | -21.0         |         |               |
| 3  | 29.190MHz | 9.9   | 0.3   |        | C_AVG    | 43.5       | 53.7       |         |               | 60.0    | -6.3          |
| 6  | 28.767MHz | 9.9   | 0.3   |        | C_AVG    | 41.8       | 52.0       |         |               | 60.0    | -8.0          |
| 8  | 27.921MHz | 9.8   | 0.3   |        | C_AVG    | 37.2       | 47.3       |         |               | 60.0    | -12.7         |
| 10 | 28.344MHz | 9.8   | 0.3   |        | C_AVG    | 39.5       | 49.7       |         |               | 60.0    | -10.3         |
| 11 | 29.613MHz | 9.9   | 0.3   |        | C_AVG    | 44.4       | 54.6       |         |               | 60.0    | -5.4          |

### Result

The EUT complied with the specification limit.

### 5.3 §15.403(i) 26 dB Emissions Bandwidth

All chains were measured under the guidance of KDB 789033 Section II.C. and KDB 66291 D01. Please see associated annex for details on instrument settings.

| Nominal BW (MHz) | Frequency (MHz) | 99% Bandwidth (MHz) | 26 dB Bandwidth (MHz) |
|------------------|-----------------|---------------------|-----------------------|
| 20               | 5740            | 18.8                | 20.5                  |
| 20               | 5790            | 18.8                | 20.5                  |
| 20               | 5835            | 18.7                | 20.7                  |
| 40               | 5750            | 37.5                | 39.9                  |
| 40               | 5790            | 37.5                | 39.9                  |
| 40               | 5825            | 37.5                | 40.1                  |
| 80               | 5770            | 76.5                | 82.5                  |
| 80               | 5790            | 76.5                | 82.5                  |
| 80               | 5805            | 76.5                | 82.5                  |

#### Result

All chains were tested and the highest bandwidth per chain is reported above.

The 26 dB bandwidths are reported for information purposes. Please see Annex for all bandwidth measurements.

## 5.4 §15.407(a)(3) Maximum Average Output Power

All chains were measured and summed under the guidance of KDB 789033 Section II. E.2. and KDB 66291 D01. Please see associated annex for details on instrument settings.

The maximum average RF conducted output power measured for this device was 19.60 dBm or 91.2 mW. The limit is 30 dBm, or 1 Watt when using antennas with 6 dBi or less gain. The antenna has a gain of 18.2 dBi.

| Modulation (BW) | Frequency (MHz) | Data Rate | TP Setting | Conducted Output Power * | Measured EIRP | Measured PSD |
|-----------------|-----------------|-----------|------------|--------------------------|---------------|--------------|
| HE 20           | 5740            | Mcs0      | 36         | 19.21                    | 37.41         | 2.80         |
| HE 20           | 5790            | Mcs0      | 34         | 18.71                    | 36.91         | 2.31         |
| HE 20           | 5835            | Mcs0      | 35         | 18.80                    | 37.00         | 1.97         |
| HE 40           | 5750            | Mcs0      | 36         | 19.60                    | 37.80         | 0.30         |
| HE 40           | 5790            | Mcs0      | 34         | 18.99                    | 37.19         | -0.03        |
| HE 40           | 5825            | Mcs0      | 35         | 19.14                    | 37.34         | -0.39        |
| HE 80           | 5770            | Mcs0      | 36         | 19.43                    | 37.63         | -2.16        |
| HE 80           | 5790            | Mcs0      | 34         | 18.78                    | 36.98         | -2.70        |
| HE 80           | 5805            | Mcs0      | 35         | 19.26                    | 37.46         | -2.31        |

### Result

In the configuration tested, the maximum summed average RF output power was less than 1 watt; therefore, the EUT complied with the requirements of the specification (see spectrum analyzer plots in attached Annex).

\* Gated EIRP shown in the Annex is the conducted measurement

## 5.5 §15.407(b)(7) Spurious Emissions

### 5.5.1 Conducted Spurious Emissions

The frequency ranges from the lowest frequency generated or used in the device to the tenth harmonic of the highest fundamental frequency was investigated to measure any antenna-conducted emissions. The graphs show the measurement data from spurious emissions noted across the frequency range when transmitting at the lowest frequency, middle frequency and upper frequency. Shown within the annex below are plots with the EUT turned to the upper and lower channels with the antenna gain of 18.2 dBi accounted for. These demonstrate compliance with the provisions of this section at the band edges.

All emissions shall be limited to a level of  $-27$  dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

#### Result

Conducted spurious emissions were attenuated below the limit; therefore, the EUT complies with the specification.

### 5.5.2 Radiated Spurious Emissions in the Restricted Bands of § 15.205

The EUT uses various power settings based on the channel in use. In order to reduce test time, the radiated spurious emissions at the lowest, middle, and highest channel were measured at the maximum power of TP36.

Correction Factor = Antenna Factor + Cable Loss - Pre-Amplifier Gain, and is added to the Receiver reading.

#### Result

All emissions in the restricted bands of § 15.205 met the limits specified in § 15.209; therefore, the EUT complies with the specification. See Annex for Conducted Band edge plots.

| Frequency  | Level (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin  | Azimuth (°) | Height | Pol.       | Correction (dB) |
|------------|----------------------|----------------------|---------|-------------|--------|------------|-----------------|
| 35.483 MHz | 30.648               | 40                   | -9.352  | 255         | 1.038  | Vertical   | -14.486         |
| 58.092 MHz | 23.539               | 40                   | -16.461 | 150         | 1.985  | Vertical   | -12.898         |
| 287.98 MHz | 33.097               | 47                   | -13.903 | 349         | 0.999  | Vertical   | -11.568         |
| 671.99 MHz | 40.174               | 47                   | -6.826  | 98          | 2.441  | Vertical   | -4.319          |
| 318.82 MHz | 30.182               | 47                   | -16.818 | 35          | 2.459  | Horizontal | -11.184         |
| 671.98 MHz | 43.86                | 47                   | -3.14   | 23          | 1.201  | Horizontal | -4.319          |

**Table 4: Radiated Emissions 30 – 1000 MHz**

Peak

| Frequency  | Level (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | Correction (dB) |
|------------|----------------------|----------------------|-------------|-------------|------------|------------|-----------------|
| 1.6322 GHz | 53.35                | 74                   | -20.65      | 143         | 1.5        | Vertical   | -20.467         |
| 4.8001 GHz | 51.061               | 74                   | -22.939     | 66          | 1.632      | Vertical   | -11.774         |
| 11.483 GHz | 54.7                 | 74                   | -19.3       | 307         | 3.149      | Vertical   | 3.213           |
| 4.7998 GHz | 44.379               | 74                   | -29.621     | 38          | 1.5        | Horizontal | -11.769         |
| 11.48 GHz  | 56.859               | 74                   | -17.141     | 340         | 1.632      | Horizontal | 3.27            |
| 16.776 GHz | 53.885               | 74                   | -20.115     | 198         | 3.652      | Horizontal | 8.798           |

**Avg**

| Frequency  | Level (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | Correction (dB) |
|------------|----------------------|----------------------|-------------|-------------|------------|------------|-----------------|
| 1.6322 GHz | 50.881               | 54                   | -3.119      | 143         | 1.5        | Vertical   | -20.467         |
| 4.8001 GHz | 45.993               | 54                   | -8.007      | 66          | 1.632      | Vertical   | -11.774         |
| 11.483 GHz | 40.709               | 54                   | -13.291     | 307         | 3.149      | Vertical   | 3.213           |
| 4.7998 GHz | 35.173               | 54                   | -18.827     | 38          | 1.5        | Horizontal | -11.769         |
| 11.48 GHz  | 44.071               | 54                   | -9.929      | 340         | 1.632      | Horizontal | 3.27            |
| 16.776 GHz | 39.266               | 54                   | -14.734     | 198         | 3.652      | Horizontal | 8.798           |

**Table 5: Transmitting on the Lowest Frequency 5740 MHz 1 – 17 GHz**
**Peak**

| Frequency  | Level (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | Correction (dB) |
|------------|----------------------|----------------------|-------------|-------------|------------|------------|-----------------|
| 1.632 GHz  | 53.762               | 74                   | -20.238     | 197         | 2.14       | Vertical   | -20.471         |
| 4.7998 GHz | 51.694               | 74                   | -22.306     | 59          | 1.637      | Vertical   | -11.769         |
| 11.58 GHz  | 56.186               | 74                   | -17.814     | 305         | 1.634      | Vertical   | 3.076           |
| 1.44 GHz   | 50.102               | 74                   | -23.898     | 295         | 2.142      | Horizontal | -19.523         |
| 4.7997 GHz | 46.782               | 74                   | -27.218     | 44          | 1.638      | Horizontal | -11.768         |
| 11.582 GHz | 56.69                | 74                   | -17.31      | 343         | 2.139      | Horizontal | 3.053           |

**Avg**

| Frequency  | Level (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | Correction (dB) |
|------------|----------------------|----------------------|-------------|-------------|------------|------------|-----------------|
| 1.632 GHz  | 52.088               | 54                   | -1.912      | 197         | 2.14       | Vertical   | -20.471         |
| 4.7998 GHz | 38.767               | 54                   | -15.233     | 59          | 1.637      | Vertical   | -11.769         |
| 11.58 GHz  | 42.397               | 54                   | -11.603     | 305         | 1.634      | Vertical   | 3.076           |
| 1.44 GHz   | 47.971               | 54                   | -6.029      | 295         | 2.142      | Horizontal | -19.523         |
| 4.7997 GHz | 33.957               | 54                   | -20.043     | 44          | 1.638      | Horizontal | -11.768         |
| 11.582 GHz | 37.385               | 54                   | -16.615     | 343         | 2.139      | Horizontal | 3.053           |

**Table 6: Transmitting on the Middle Frequency 5790 MHz 1 – 17 GHz**

**Peak**

| Frequency  | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | Correction (dB) |
|------------|----------------|----------------|-------------|-------------|------------|------------|-----------------|
| 1.632 GHz  | 53.301         | 74             | -20.699     | 193         | 1.634      | Vertical   | -20.471         |
| 4.7996 GHz | 49             | 74             | -25         | 59          | 1.632      | Vertical   | -11.766         |
| 11.672 GHz | 64.185         | 74             | -9.815      | 305         | 1.632      | Vertical   | 2.773           |
| 11.671 GHz | 62.529         | 74             | -11.471     | 293         | 1.822      | Horizontal | 2.775           |
| 15.021 GHz | 51.769         | 74             | -22.231     | 245         | 1.633      | Horizontal | 7.053           |
| 16.89 GHz  | 52.118         | 74             | -21.882     | 55          | 2.137      | Horizontal | 9.292           |

**Avg**

| Frequency  | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | Correction (dB) |
|------------|----------------|----------------|-------------|-------------|------------|------------|-----------------|
| 1.632 GHz  | 51.576         | 54             | -2.424      | 193         | 1.634      | Vertical   | -20.471         |
| 4.7996 GHz | 42.79          | 54             | -11.21      | 59          | 1.632      | Vertical   | -11.766         |
| 11.672 GHz | 47.867         | 54             | -6.133      | 305         | 1.632      | Vertical   | 2.773           |
| 11.671 GHz | 44.694         | 54             | -9.306      | 293         | 1.822      | Horizontal | 2.775           |
| 15.021 GHz | 38.076         | 54             | -15.924     | 245         | 1.633      | Horizontal | 7.053           |
| 16.89 GHz  | 39.198         | 54             | -14.802     | 55          | 2.137      | Horizontal | 9.292           |

**Table 7: Transmitting on the Highest Frequency 5835 MHz 1 – 17 GHz**
**Peak**

| Frequency  | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Azimuth (°) | Pol.       | Correction (dB) |
|------------|----------------|----------------|-------------|-------------|------------|-----------------|
| 17.501 GHz | 71.264         | 74             | -2.736      | 250         | Vertical   | 1.137           |
| 20.697 GHz | 52.48          | 74             | -21.52      | 101         | Vertical   | 2.089           |
| 24.685 GHz | 53.523         | 74             | -20.477     | 29          | Vertical   | 1.67            |
| 33.808 GHz | 56.669         | 74             | -17.331     | 141         | Vertical   | 7.485           |
| 36.197 GHz | 56.592         | 74             | -17.408     | 275         | Vertical   | 5.257           |
| 39.979 GHz | 58.141         | 74             | -15.859     | 69          | Vertical   | 7.543           |
| 17.488 GHz | 67.237         | 74             | -6.763      | 280         | Horizontal | 1.151           |
| 17.511 GHz | 72.866         | 74             | -1.134      | 292         | Horizontal | 1.127           |
| 21.287 GHz | 52.533         | 74             | -21.467     | 333         | Horizontal | 2.483           |
| 24.965 GHz | 52.699         | 74             | -21.301     | 315         | Horizontal | 1.649           |
| 33.097 GHz | 57.575         | 74             | -16.425     | 136         | Horizontal | 8.449           |
| 35.296 GHz | 56.636         | 74             | -17.364     | 219         | Horizontal | 6.242           |
| 37.885 GHz | 56.517         | 74             | -17.483     | 8           | Horizontal | 5.956           |

**Avg**

| Frequency  | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Azimuth (°) | Pol.       | Correction (dB) |
|------------|----------------|----------------|-------------|-------------|------------|-----------------|
| 17.501 GHz | 47.176         | 54             | -6.824      | 250         | Vertical   | 1.137           |
| 20.697 GHz | 38.826         | 54             | -15.174     | 101         | Vertical   | 2.089           |
| 24.685 GHz | 38.789         | 54             | -15.211     | 29          | Vertical   | 1.67            |
| 33.808 GHz | 41.668         | 54             | -12.332     | 141         | Vertical   | 7.485           |
| 36.197 GHz | 40.223         | 54             | -13.777     | 275         | Vertical   | 5.257           |
| 39.979 GHz | 40.895         | 54             | -13.105     | 69          | Vertical   | 7.543           |
| 17.488 GHz | 43.025         | 54             | -10.975     | 280         | Horizontal | 1.151           |
| 17.511 GHz | 48.251         | 54             | -5.749      | 292         | Horizontal | 1.127           |
| 21.287 GHz | 38.729         | 54             | -15.271     | 333         | Horizontal | 2.483           |
| 24.965 GHz | 38.835         | 54             | -15.165     | 315         | Horizontal | 1.649           |
| 33.097 GHz | 42.288         | 54             | -11.712     | 136         | Horizontal | 8.449           |
| 35.296 GHz | 41.138         | 54             | -12.862     | 219         | Horizontal | 6.242           |
| 37.885 GHz | 40.761         | 54             | -13.239     | 8           | Horizontal | 5.956           |

**Table 8: Transmitting on the Highest Frequency 5835 MHz 17 – GHz (worse-case)**

## 5.6 §15.407(a) Maximum Power Spectral Density

All chains were measured and summed under the guidance of KDB 789033 Section II. F. and KDB 66291 D01. Please see associated annex for details on instrument settings.

The maximum average power spectral density conducted from the intentional radiator of the antenna shall not be greater than 30 dBm in any 500 kHz band during any time interval of continuous transmission. Results of this testing are summarized.

| Modulation (BW) | Frequency (MHz) | Data Rate | TP Setting | Measured PSD |
|-----------------|-----------------|-----------|------------|--------------|
| HE 20           | 5740            | Mcs0      | 36         | 2.80         |
| HE 20           | 5790            | Mcs0      | 34         | 2.31         |
| HE 20           | 5835            | Mcs0      | 35         | 1.97         |
| HE 40           | 5750            | Mcs0      | 36         | 0.30         |
| HE 40           | 5790            | Mcs0      | 34         | -0.03        |
| HE 40           | 5825            | Mcs0      | 35         | -0.39        |
| HE 80           | 5770            | Mcs0      | 36         | -2.16        |
| HE 80           | 5790            | Mcs0      | 34         | -2.70        |
| HE 80           | 5805            | Mcs0      | 35         | -2.31        |

### Result

The maximum summed average power spectral density was less than the limit of 30 dBm; therefore, the EUT complies with the specification.

-- End of Test Report --