



427 West 12800 South  
Draper, UT 84020

## Test Report Certification

|                                  |                              |
|----------------------------------|------------------------------|
| <b>FCC ID</b>                    | SWX-WAVEAP                   |
| <b>IC ID</b>                     | 6545A-WAVEAP                 |
| <b>Equipment Under Test</b>      | Wave-AP                      |
| <b>Test Report Serial Number</b> | TR5968_Wave-AP_FCC_15.255_01 |
| <b>Date of Test(s)</b>           | 3/12/2021 – 4/1/2021         |
| <b>Report Issue Date</b>         | 4/2/2021                     |

| Test Specification            | Applicant                                                         |
|-------------------------------|-------------------------------------------------------------------|
| 47 CFR FCC Part 15, Subpart C | Ubiquiti Inc.<br>685 Third Avenue<br>New York, NY 10019<br>U.S.A. |



NVLAP LAB CODE 600241-0

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## Certification of Engineering Report

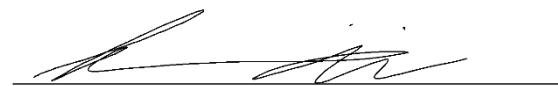
This report has been prepared by Unified Compliance Laboratory (UCL) to document compliance of the device described below with the requirement of Federal Communication Commissions (FCC) Part 15, Subpart C. This report may be reproduced in full. Partial reproduction of this report may only be made with 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-AP       |
| <b>FCC ID</b>       | SWX-WAVEAP    |
| <b>IC ID</b>        | 6545A-WAVEAP  |

On this 2<sup>nd</sup> day of April 2021, 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: Alex Macon



Reviewed By: Mark Feil

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| Revision History |                         |          |
|------------------|-------------------------|----------|
| Revision         | Description             | Date     |
| 01               | Original Report Release | 4/2/2021 |

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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-AP                            |
| <b>Serial Number</b>   | FCECDAFF9C57                       |
| <b>Dimensions (cm)</b> | 21.0      x    20.5      x    17.0 |

### 2.2 Description of EUT

The Wave-AP is a fixed point-to-point or point to multiple point transceiver, intended for outdoor use, operating in the 57 GHz to 71 GHz range. A Bluetooth LE transceiver is included for device management. An Ethernet port is used for transfer and to provide power using an Ubiquiti UPOE-at Power Supply.

This report covers the circuitry of the device subject to FCC Part 15, Subpart C. 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.

| <b>Brand Name<br/>Model Number<br/>Serial Number</b>     | <b>Description</b>        | <b>Name of Interface Ports /<br/>Interface Cables</b> |
|----------------------------------------------------------|---------------------------|-------------------------------------------------------|
| BN: airFiber<br>MN: Wave-AP (Note 1)<br>SN: FCECDAFF9C57 | 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<br>cable (Note 2)      |
| BN: Dell<br>MN: XPS 13<br>SN: N/A                        | Laptop Personal Computer  | Shielded or Un-shielded Cat 5e<br>cable (Note 2)      |

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.

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## 2.4 Interface Ports on EUT

| Name of Ports | No. of Ports Fitted to EUT | Cable Description/Length             |
|---------------|----------------------------|--------------------------------------|
| Ethernet/PoE  | 1                          | Shielded or Un-shielded Cat 5e cable |

## 2.5 Operating Environment

|                     |                 |
|---------------------|-----------------|
| Power Supply        | 120 VAC         |
| AC Mains Frequency  | 60 Hz           |
| Temperature         | 22.4 – 23.3 °C  |
| Humidity            | 17.81 – 24.36 % |
| Barometric Pressure | 1017 mBar       |

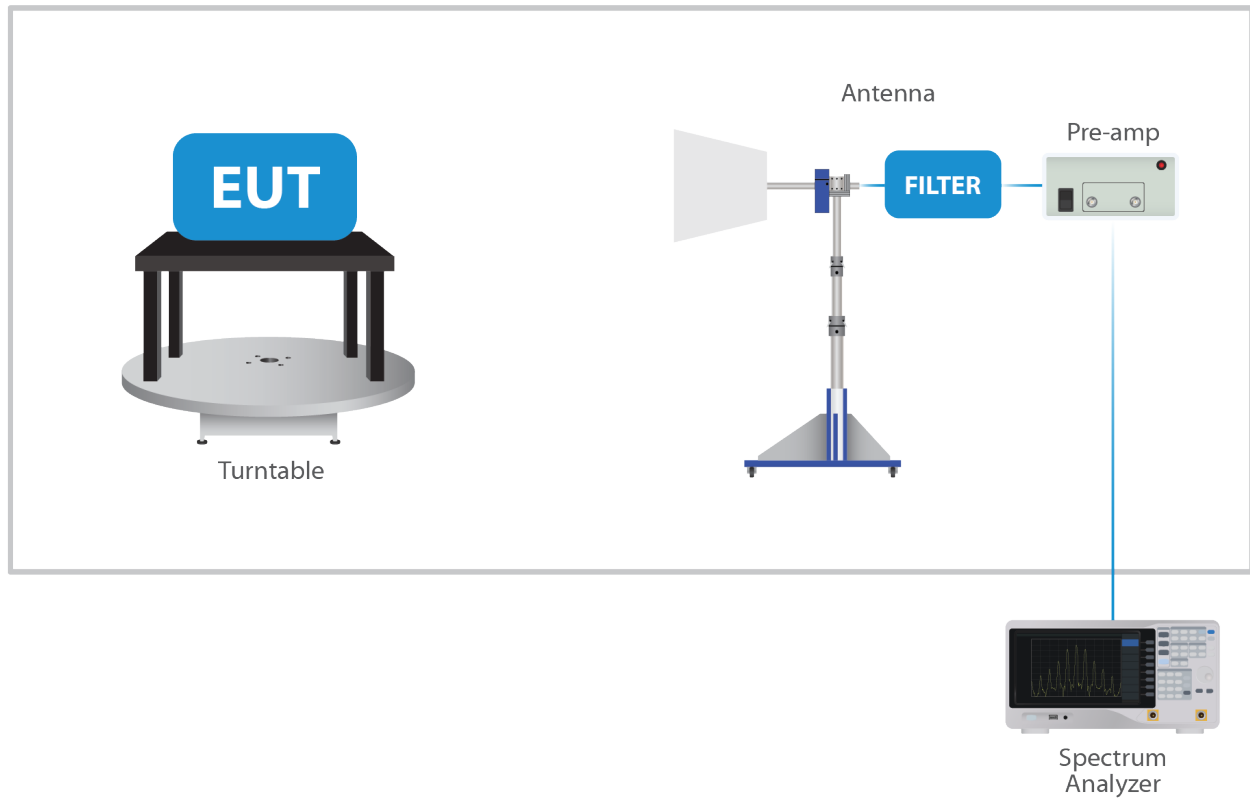
## 2.6 Operating Modes

The Wave-AP was connected to a personal computer laptop and tested using test software in order to enable to constant duty cycle greater or equal to 98% of the Bluetooth transceiver.

## 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 C<br>15.203, 15.207 and 15.255<br>Limits and methods of measurement of radio interference characteristics of radio frequency 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 15.203

See test standard for details.

#### 3.2.2 47 CFR FCC Part 15 Section 15.207

See test standard for details.

#### 3.2.3 47 CFR FCC Part 15 Section 15.255

See test standard for details.

### 3.3 FCC Part 15, Subpart C

#### 3.3.1 Summary of Tests

| FCC Section                                                                                               | ISED Section  | Environmental Phenomena              | Frequency Range (MHZ)  | Result    |
|-----------------------------------------------------------------------------------------------------------|---------------|--------------------------------------|------------------------|-----------|
| 15.203                                                                                                    | N/A           | Antenna requirements                 | Structural Requirement | Compliant |
| 15.207                                                                                                    | RSS-Gen       | Conducted Disturbance at Mains Port  | 0.15 to 30             | Compliant |
| 15.255 (e)                                                                                                | RSS-210 § J.4 | Bandwidth Requirement                | 57000 - 71000          | Compliant |
| 15.255 (c)                                                                                                | RSS-210 § J.4 | Peak Output Power                    | 57000 - 71000          | Compliant |
| 15.255 (d)                                                                                                | RSS-210 § J.3 | Antenna Conducted Spurious Emissions | 0.009 to 40000         | Compliant |
| 15.255 (d)                                                                                                | RSS-210 § J.3 | Radiated Spurious Emissions          | 0.009 to 200000        | Compliant |
| 15.255 (c)                                                                                                | RSS-210 § J.4 | Peak Power Spectral Density          | 57000 - 71000          | Compliant |
| 15.255 (f)                                                                                                | RSS-210 § J.6 | Frequency Stability                  | 57000 - 71000          | Compliant |
| The testing was performed according to the procedures in ANSI C63.10-2013, KDB 558074 and 47 CFR Part 15. |               |                                      |                        |           |

### **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 10-Meter chamber 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 2021. This site has also been registered with Innovations, Science and Economic Development (ISED) department and was accepted under Appendix B, Phase 1 procedures of the APEC Tel MRA for Canadian recognition. ISED No.: 25346, effective until June 30, 2021. 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-2500     | 9/18/2020                | 9/18/2021               |
| LISN              | AFJ                 | LS16C/10     | UCL-2512     | 5/26/2020                | 5/26/2021               |
| Cat6 ISN          | Teseq               | ISN T8-Cat6  | UCL-2971     | 5/18/2020                | 5/18/2021               |
| ISN               | Teseq               | ISN T800     | UCL-2974     | 6/1/2020                 | 6/1/2021                |
| LISN              | Com-Power           | LIN-120C     | UCL-2612     | 5/19/2020                | 5/19/2021               |
| 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

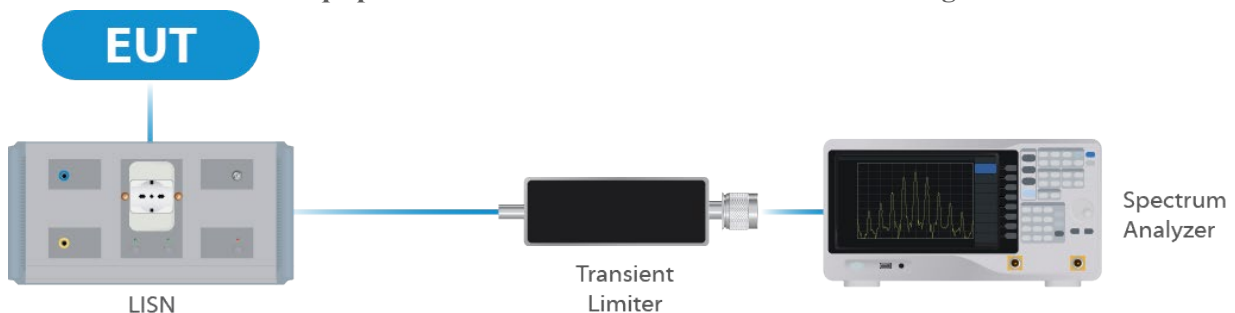


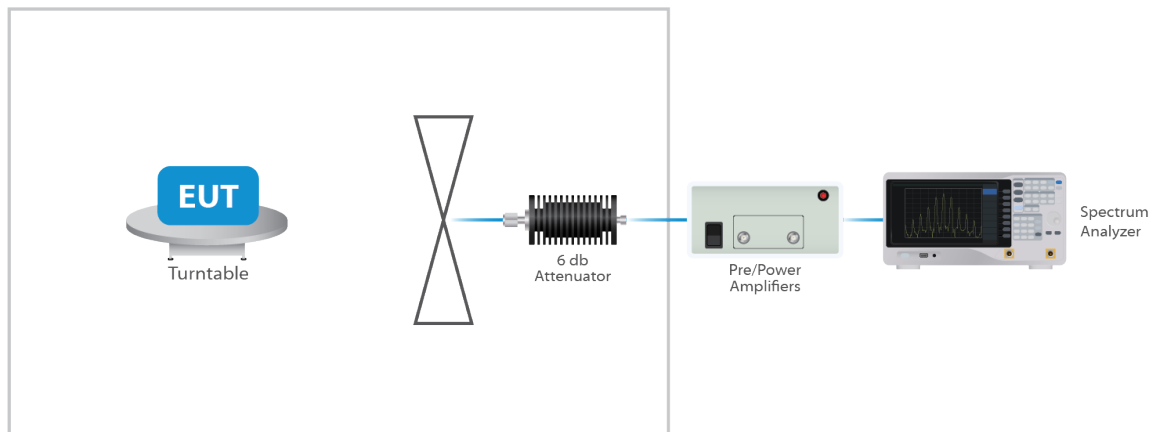
Figure 1: Conducted Emissions Test

### 4.2 Radiated Emissions

| Type of Equipment              | Manufacturer       | Model Number  | Asset Number | Date of Last Calibration | Due Date of Calibration |
|--------------------------------|--------------------|---------------|--------------|--------------------------|-------------------------|
| EMI Receiver                   | Keysight           | N9038A        | UCL-2778     | 6/1/2020                 | 6/1/2021                |
| Pre-Amplifier<br>9 kHz – 1 GHz | Sonoma Instruments | 310N          | UCL-2889     | 9/10/2020                | 9/10/2021               |
| Double Ridge<br>Horn Antenna   | Scwarzbeck         | BBHA<br>9120D | UCL-3065     | 7/8/2020                 | 7/8/2021                |
| Log Periodic                   | Scwarzbeck         | STLP 9129     | UCL-3068     | 5/20/2020                | 5/20/2021               |
| 15 - 40 GHz<br>Horn Antenna    | Scwarzbeck         | BBHA 9170     | UCL-2487     | 5/21/2020                | 5/21/2021               |
| 1 – 18 GHz<br>Amplifier        | Com-Power          | PAM 118A      | UCL-3833     | 9/29/2020                | 9/29/2021               |
| Test Software                  | UCL                | Revision 1    | UCL-3108     | N/A                      | N/A                     |

|                                    |          |         |          |           |           |
|------------------------------------|----------|---------|----------|-----------|-----------|
| Conical Horn Antenna               | VDI      | WR15CH  | UCL-5774 | N/A       | N/A       |
| Conical Horn Antenna               | VDI      | WR12CH  | UCL-4869 | N/A       | N/A       |
| Conical Horn Antenna               | VDI      | WR19CH  | UCL-4873 | N/A       | N/A       |
| Conical Horn Antenna               | VDI      | WR5.1CH | UCL-4880 | N/A       | N/A       |
| Conical Horn Antenna               | VDI      | WR8.0CH | UCL-4886 | N/A       | N/A       |
| Spectrum Analyzer Extension Module | VDI      | SAX 705 | UCL-4887 | N/A       | N/A       |
| Spectrum Analyzer Extension Module | VDI      | SAX 706 | UCL-4883 | N/A       | N/A       |
| USB Switch                         | Keysight | U1816C  | UCL-4957 | N/A       | N/A       |
| Spectrum Analyzer                  | Keysight | N9041B  | UCL-4964 | 7/22/2020 | 7/22/2021 |

**Table 2: List of equipment used for Radiated Emissions**



**Figure 2: Radiated Emissions Test**

### 4.3 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.

### 4.4 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

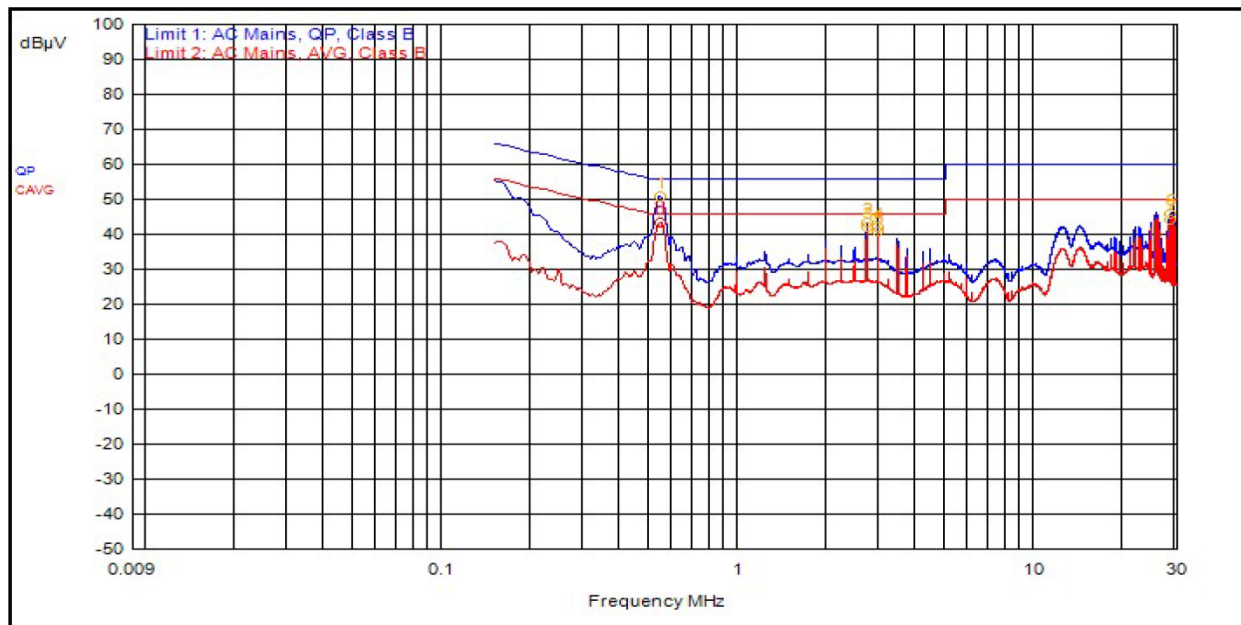
### 5.1 §15.203 Antenna Requirements

The EUT uses a integral antenna The Maximum gain of the antenna is 24 dBi. The antenna is not user replaceable.

#### Results

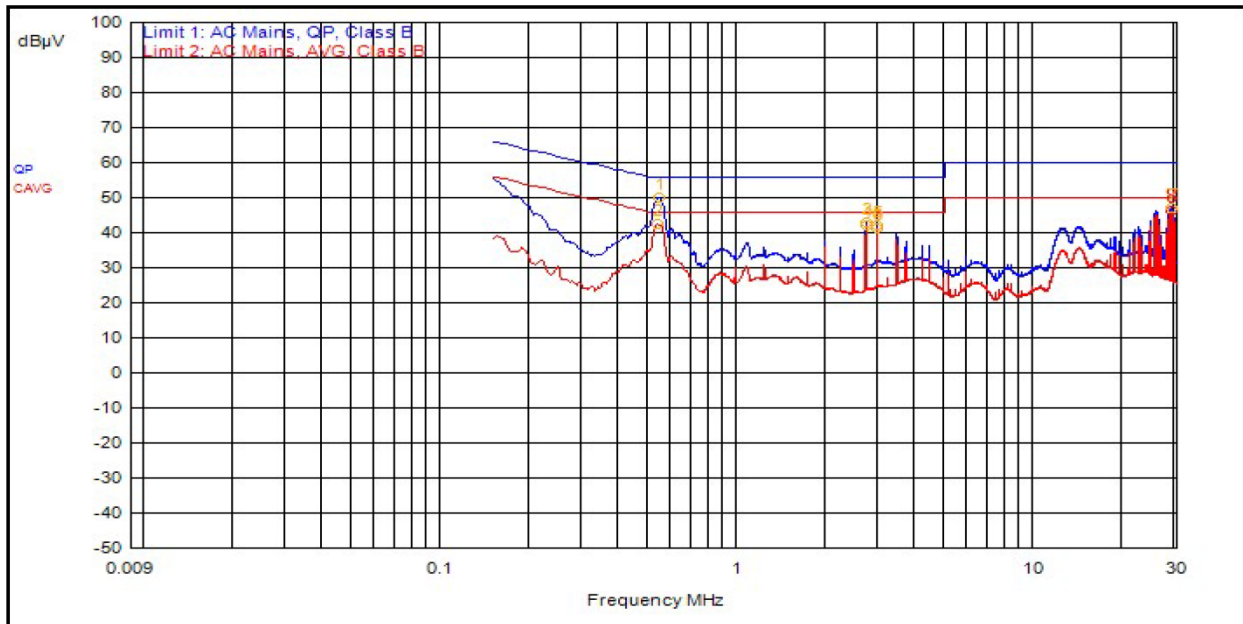
The EUT complied with the specification

### 5.2 Conducted Emissions at Mains Ports Data



| ID | Frequency  | Probe | Cable | Atten. | Detector | Meter Read | Meas Level | Limit | Limit Dist. |
|----|------------|-------|-------|--------|----------|------------|------------|-------|-------------|
| 8  | 540.000kHz | 12.4  | 0.0   |        | C_AVG    | 30.8       | 43.2       | 46.0  | -2.8        |
| 3  | 2.691MHz   | 12.3  | 0.1   |        | C_AVG    | 29.8       | 42.2       | 46.0  | -3.8        |
| 5  | 2.934MHz   | 12.3  | 0.1   |        | C_AVG    | 28.4       | 40.8       | 46.0  | -5.2        |
| 1  | 540.000kHz | 12.4  | 0.0   |        | QPeak    | 38.3       | 50.7       | 56.0  | -5.3        |
| 7  | 28.407MHz  | 12.9  | 0.2   |        | C_AVG    | 30.9       | 44.0       | 50.0  | -6.0        |
| 2  | 2.691MHz   | 12.3  | 0.1   |        | QPeak    | 31.0       | 43.4       | 56.0  | -12.6       |
| 4  | 2.934MHz   | 12.3  | 0.1   |        | QPeak    | 29.8       | 42.2       | 56.0  | -13.8       |
| 6  | 28.410MHz  | 12.9  | 0.2   |        | QPeak    | 32.8       | 45.8       | 60.0  | -14.2       |

Graph 1: Conducted Emissions Plot - Neutral



| ID | Frequency  | Probe | Cable | Atten. | Detector | Meter Read | Meas Level | Limit | Limit Dist. |
|----|------------|-------|-------|--------|----------|------------|------------|-------|-------------|
| 2  | 531.000kHz | 12.4  | 0.0   |        | C_AVG    | 30.1       | 42.5       | 46.0  | -3.5        |
| 4  | 2.688MHz   | 12.3  | 0.1   |        | C_AVG    | 29.8       | 42.2       | 46.0  | -3.8        |
| 8  | 28.827MHz  | 12.9  | 0.2   |        | C_AVG    | 33.0       | 46.1       | 50.0  | -3.9        |
| 6  | 2.934MHz   | 12.3  | 0.1   |        | C_AVG    | 28.7       | 41.1       | 46.0  | -4.9        |
| 1  | 540.000kHz | 12.4  | 0.0   |        | QPeak    | 37.5       | 49.9       | 56.0  | -6.1        |
| 3  | 2.691MHz   | 12.3  | 0.1   |        | QPeak    | 30.7       | 43.1       | 56.0  | -12.9       |
| 7  | 28.827MHz  | 12.9  | 0.2   |        | QPeak    | 34.0       | 47.1       | 60.0  | -12.9       |
| 5  | 2.934MHz   | 12.3  | 0.1   |        | QPeak    | 29.8       | 42.2       | 56.0  | -13.8       |

**Graph 2: Conducted Emissions Plot – Line**

## Result

The EUT complied with the specification limit.

### 5.3 Emissions Bandwidth

| Channel Width<br>(GHz) | Frequency<br>(MHz) | Emissions 99%<br>Bandwidth (MHz) |
|------------------------|--------------------|----------------------------------|
| 1.06                   | 58320              | 1562.6                           |
|                        | 63720              | 968.2                            |
|                        | 70200              | 1082.1                           |
| 2.12                   | 58320              | 2577.3                           |
|                        | 63720              | 1949.7                           |
|                        | 69120              | 1890.5                           |

#### Result

In the configuration tested, the 99% bandwidth was greater than 500 kHz; therefore, the EUT complied with the requirements of the specification (see spectrum analyzer plot within the Annex).

## 5.4 §15.255(c)(1)(i) Maximum Average Output Power

The maximum average RF EIRP measured for this device was 39.91dBm or 9.794 Watts . The limit is 40 dBm or 10 Watts. The antenna has a gain of 24 dBi.

| Nominal BW | Frequency (MHz) | Air Path Loss (dB) | Total Correction | Peak SA Reading | Conducted Peak | Peak Conducted Limit | EIRP Peak | Peak EIRP Limit |
|------------|-----------------|--------------------|------------------|-----------------|----------------|----------------------|-----------|-----------------|
| 1.08       | 58320           | -86.4              | 67.75            | -24.9           | 16.35          | 27                   | 42.85     | 43              |
|            | 63720           | -87.1              | 68.52            | -26             | 16.02          | 27                   | 42.52     | 43              |
|            | 70200           | -88.0              | 69.36            | -26.6           | 16.26          | 27                   | 42.76     | 43              |
| 2.12       | 58320           | -86.4              | 67.75            | -25             | 16.25          | 27                   | 42.75     | 43              |
|            | 63720           | -87.1              | 68.52            | -25.8           | 16.22          | 27                   | 42.72     | 43              |
|            | 69120           | -87.8              | 69.23            | -26.3           | 16.43          | 27                   | 42.93     | 43              |

| Nominal BW | Frequency (MHz) | Air Path Loss (dB) | Total Correction | AvG SA Reading | EIRP Avg | Avg EIRP Limit | Avg Delta |
|------------|-----------------|--------------------|------------------|----------------|----------|----------------|-----------|
| 1.08       | 58320           | -86.4              | 67.75            | -27.84         | 39.91    | 40             | 0.09      |
|            | 63720           | -87.1              | 68.52            | -29.85         | 38.67    | 40             | 1.33      |
|            | 70200           | -88.0              | 69.36            | -30.09         | 39.27    | 40             | 0.73      |
| 2.12       | 58320           | -86.4              | 67.75            | -28.21         | 39.54    | 40             | 0.46      |
|            | 63720           | -87.1              | 68.52            | -29.11         | 39.41    | 40             | 0.59      |
|            | 69120           | -87.8              | 69.23            | -29.72         | 39.51    | 40             | 0.49      |

### Result

In the configuration tested, the maximum average RF EIRP was less than 40 dBm; therefore, the EUT complied with the requirements of the specification. Please see Annex

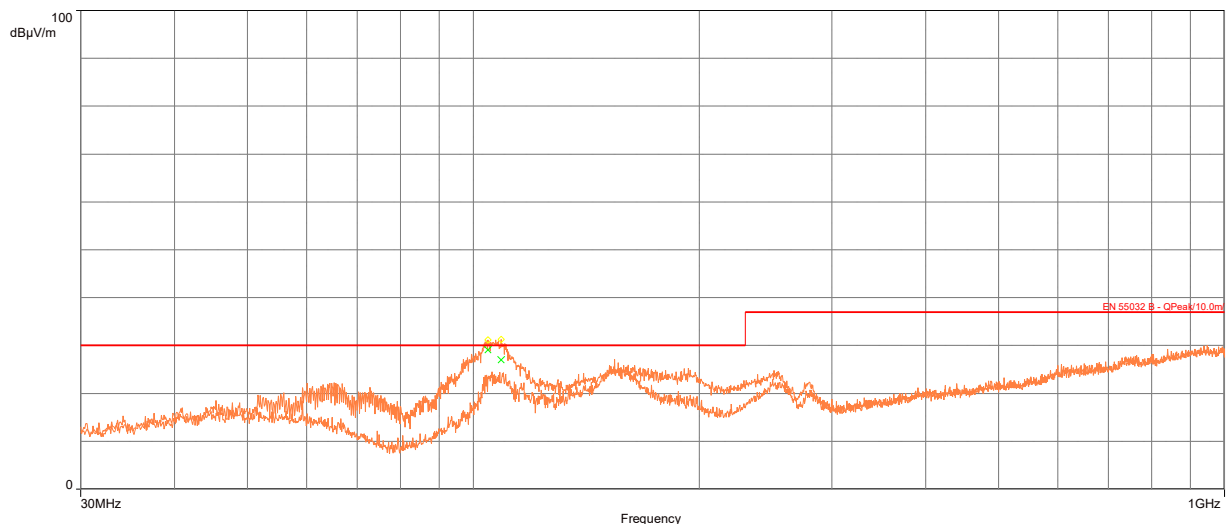
## 5.5 §15.255(d) Spurious Emissions

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

The frequency range from the lowest frequency generated or used in the device to the tenth harmonic of the highest fundamental emissions was investigated to measure any radiated emissions in the restricted bands. The following tables show measurements of any emissions that fell into the restricted bands of §15.205. The tables show the worst-case emissions measured from the EUT. For frequencies between 18.0 and 40 GHz, a measurement distance of 1 meter was used. The noise floor was a minimum of 6 dB below the limits. The emissions in the restricted bands must meet the limits specified in §15.209. Tabular data for each of the spurious emissions is shown below for each of the units. The BLE radio and 60 GHz radio are active during all plots. The limit above 40 GHz is 90pW/cm<sup>2</sup>. The measurement distance above 40 GHz was 3 meters.

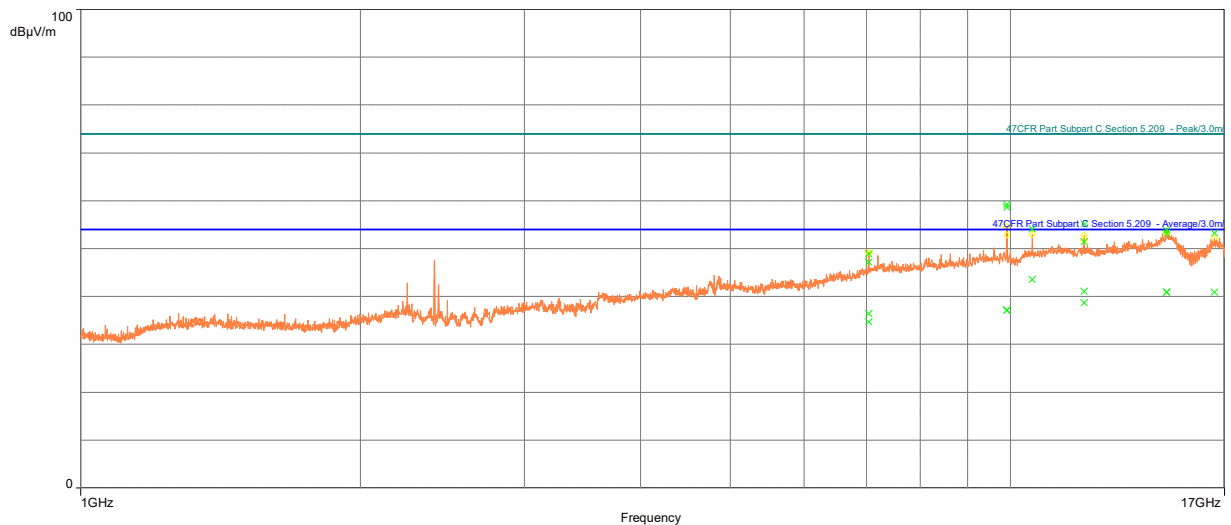
#### Result

All emissions in the restricted bands of §15.205 met the limits specified in §15.209. All emissions met the limits set out in 15.255(d) therefore, the EUT complies with the specification.



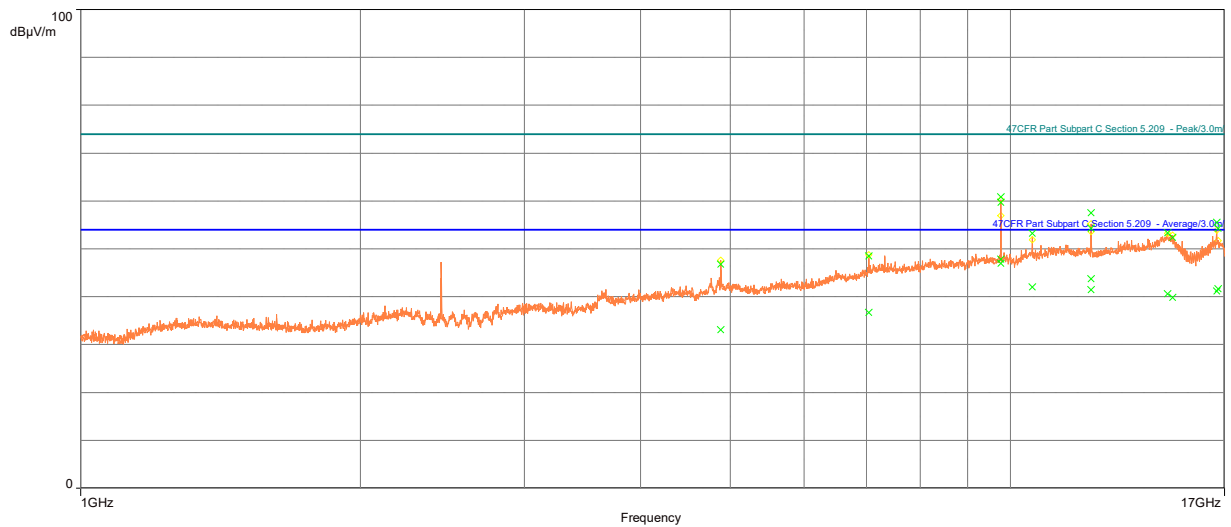
| Frequency (MHz) | Det. | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Azimuth (°) | Height (m) | Polarization | Correction (dB) |
|-----------------|------|----------------|----------------|-------------|-------------|------------|--------------|-----------------|
| 104.58          | QP   | 29.08          | 30.00          | -0.92       | 141.00      | 2.77       | Vertical     | -13.80          |
| 108.84          | QP   | 27.04          | 30.00          | -2.96       | 123.00      | 1.87       | Vertical     | -14.15          |

Table 3: 30 – 1000 MHz (worst case)



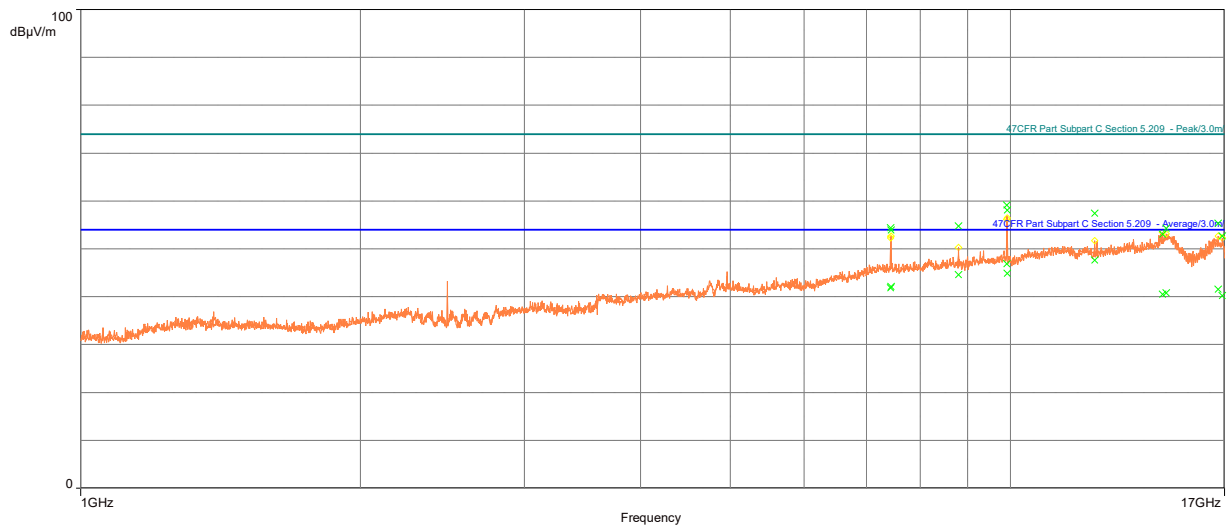
| Frequency (MHz) | Det. | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Polarization | Correction (dB) |
|-----------------|------|----------------|----------------|-------------|-------------|------------|--------------|-----------------|
| 7039.9          | A    | 34.73          | 54.00          | -19.27      | 128.00      | 2.01       | Vertical     | 8.72            |
| 9918.8          | A    | 37.19          | 54.00          | -16.81      | 288.00      | 1.99       | Vertical     | 11.75           |
| 12010           | A    | 38.66          | 54.00          | -15.34      | 357.00      | 2.24       | Vertical     | 14.79           |
| 14737           | A    | 40.84          | 54.00          | -13.16      | 31.00       | 3.35       | Vertical     | 18.32           |
| 16592           | A    | 40.86          | 54.00          | -13.14      | 342.00      | 2.13       | Vertical     | 18.74           |
| 7039.9          | A    | 36.39          | 54.00          | -17.61      | 56.00       | 3.82       | Horizontal   | 8.72            |
| 9918.7          | A    | 37.12          | 54.00          | -16.88      | 50.00       | 3.58       | Horizontal   | 11.75           |
| 10560           | A    | 43.59          | 54.00          | -10.41      | 74.00       | 3.46       | Horizontal   | 14.03           |
| 12009           | A    | 41.08          | 54.00          | -12.92      | 54.00       | 3.45       | Horizontal   | 14.79           |
| 14724           | A    | 40.89          | 54.00          | -13.11      | 127.00      | 2.74       | Horizontal   | 18.35           |
| 7039.9          | P    | 47.14          | 74.00          | -26.86      | 128.00      | 2.01       | Vertical     | 8.72            |
| 9918.8          | P    | 59.23          | 74.00          | -14.77      | 288.00      | 1.99       | Vertical     | 11.75           |
| 12010           | P    | 51.43          | 74.00          | -22.57      | 357.00      | 2.24       | Vertical     | 14.79           |
| 14737           | P    | 53.83          | 74.00          | -20.17      | 31.00       | 3.35       | Vertical     | 18.32           |
| 16592           | P    | 53.29          | 74.00          | -20.71      | 342.00      | 2.13       | Vertical     | 18.74           |
| 7039.9          | P    | 48.89          | 74.00          | -25.11      | 56.00       | 3.82       | Horizontal   | 8.72            |
| 9918.7          | P    | 58.69          | 74.00          | -15.31      | 50.00       | 3.58       | Horizontal   | 11.75           |
| 10560           | P    | 54.12          | 74.00          | -19.88      | 74.00       | 3.46       | Horizontal   | 14.03           |
| 12009           | P    | 55.10          | 74.00          | -18.90      | 54.00       | 3.45       | Horizontal   | 14.79           |
| 14724           | P    | 53.15          | 74.00          | -20.85      | 127.00      | 2.74       | Horizontal   | 18.35           |

**Table 4: Transmitting at the Lowest Frequency**



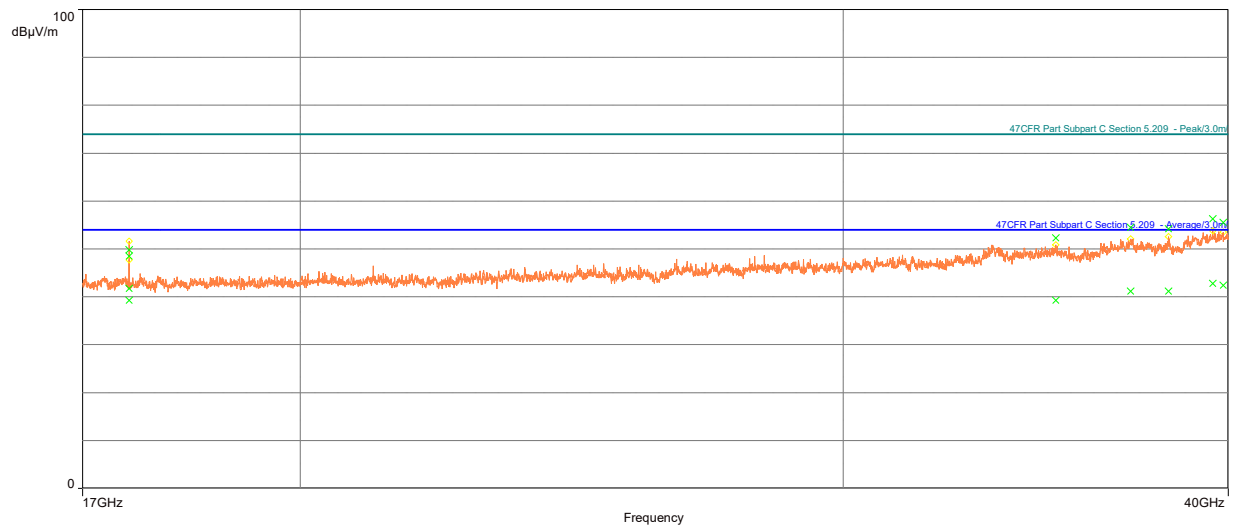
| Frequency (MHz) | Det. | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Polarization | Correction (dB) |
|-----------------|------|----------------|----------------|-------------|-------------|------------|--------------|-----------------|
| 9768.9          | A    | 47.85          | 54.00          | -6.15       | 255.00      | 1.89       | Vertical     | 11.70           |
| 12211           | A    | 43.77          | 54.00          | -10.23      | 356.00      | 1.99       | Vertical     | 15.04           |
| 14946           | A    | 39.79          | 54.00          | -14.21      | 24.00       | 2.98       | Vertical     | 17.84           |
| 16732           | A    | 41.67          | 54.00          | -12.33      | 337.00      | 2.85       | Vertical     | 19.72           |
| 4883.3          | A    | 33.12          | 54.00          | -20.88      | 113.00      | 3.93       | Horizontal   | 2.72            |
| 7040.1          | A    | 36.71          | 54.00          | -17.29      | 261.00      | 3.82       | Horizontal   | 8.72            |
| 9766.7          | A    | 46.96          | 54.00          | -7.04       | 42.00       | 3.93       | Horizontal   | 11.70           |
| 10560           | A    | 42.04          | 54.00          | -11.96      | 295.00      | 3.70       | Horizontal   | 14.03           |
| 12209           | A    | 41.42          | 54.00          | -12.58      | 44.00       | 3.46       | Horizontal   | 15.03           |
| 14760           | A    | 40.62          | 54.00          | -13.38      | 233.00      | 3.70       | Horizontal   | 18.22           |
| 16672           | A    | 41.16          | 54.00          | -12.84      | 327.00      | 1.50       | Horizontal   | 19.56           |
| 9768.9          | P    | 60.88          | 74.00          | -13.12      | 255.00      | 1.89       | Vertical     | 11.70           |
| 12211           | P    | 57.50          | 74.00          | -16.50      | 356.00      | 1.99       | Vertical     | 15.04           |
| 14946           | P    | 52.43          | 74.00          | -21.57      | 24.00       | 2.98       | Vertical     | 17.84           |
| 16732           | P    | 54.28          | 74.00          | -19.72      | 337.00      | 2.85       | Vertical     | 19.72           |
| 4883.3          | P    | 46.77          | 74.00          | -27.23      | 113.00      | 3.93       | Horizontal   | 2.72            |
| 7040.1          | P    | 48.46          | 74.00          | -25.54      | 261.00      | 3.82       | Horizontal   | 8.72            |
| 9766.7          | P    | 59.67          | 74.00          | -14.33      | 42.00       | 3.93       | Horizontal   | 11.70           |
| 10560           | P    | 53.20          | 74.00          | -20.80      | 295.00      | 3.70       | Horizontal   | 14.03           |
| 12209           | P    | 54.28          | 74.00          | -19.72      | 44.00       | 3.46       | Horizontal   | 15.03           |
| 14760           | P    | 53.33          | 74.00          | -20.67      | 233.00      | 3.70       | Horizontal   | 18.22           |
| 16672           | P    | 55.51          | 74.00          | -18.49      | 327.00      | 1.50       | Horizontal   | 19.56           |

**Table 5: Transmitting at the Middle Frequency**



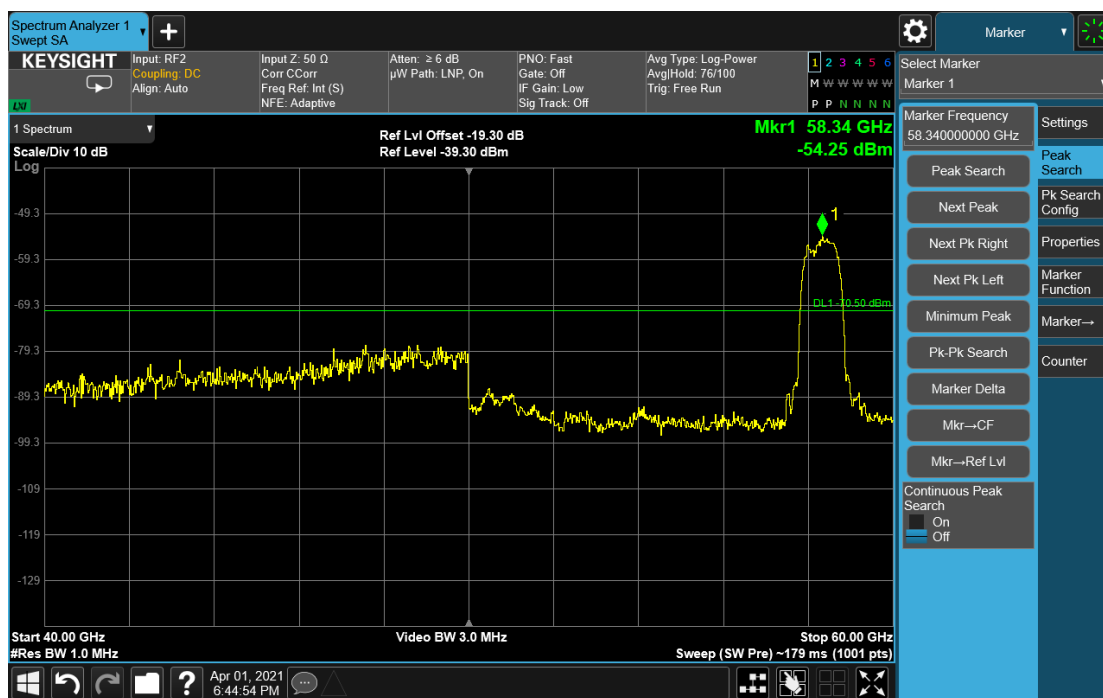
| Frequency (MHz) | Det. | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Polarization | Correction (dB) |
|-----------------|------|----------------|----------------|-------------|-------------|------------|--------------|-----------------|
| 7439.1          | A    | 41.81          | 54.00          | -12.19      | 356.00      | 3.45       | Vertical     | 9.80            |
| 8800            | A    | 44.55          | 54.00          | -9.45       | 5.00        | 3.34       | Vertical     | 12.12           |
| 9918.9          | A    | 46.86          | 54.00          | -7.14       | 30.00       | 2.13       | Vertical     | 11.75           |
| 14587           | A    | 40.53          | 54.00          | -13.47      | 135.00      | 2.24       | Vertical     | 18.20           |
| 16902           | A    | 40.19          | 54.00          | -13.81      | 335.00      | 2.36       | Vertical     | 20.55           |
| 7439.3          | A    | 42.14          | 54.00          | -11.86      | 104.00      | 3.70       | Horizontal   | 9.80            |
| 9921            | A    | 44.90          | 54.00          | -9.10       | 61.00       | 2.85       | Horizontal   | 11.75           |
| 12320           | A    | 47.62          | 54.00          | -6.38       | 243.00      | 2.37       | Horizontal   | 14.86           |
| 14717           | A    | 40.75          | 54.00          | -13.25      | 158.00      | 2.24       | Horizontal   | 18.34           |
| 16730           | A    | 41.52          | 54.00          | -12.48      | 14.00       | 3.10       | Horizontal   | 19.71           |
| 7439.1          | P    | 54.38          | 74.00          | -19.62      | 356.00      | 3.45       | Vertical     | 9.80            |
| 8800            | P    | 54.76          | 74.00          | -19.24      | 5.00        | 3.34       | Vertical     | 12.12           |
| 9918.9          | P    | 59.18          | 74.00          | -14.82      | 30.00       | 2.13       | Vertical     | 11.75           |
| 14587           | P    | 53.01          | 74.00          | -20.99      | 135.00      | 2.24       | Vertical     | 18.20           |
| 16902           | P    | 52.70          | 74.00          | -21.30      | 335.00      | 2.36       | Vertical     | 20.55           |
| 7439.3          | P    | 53.88          | 74.00          | -20.12      | 104.00      | 3.70       | Horizontal   | 9.80            |
| 9921            | P    | 58.06          | 74.00          | -15.94      | 61.00       | 2.85       | Horizontal   | 11.75           |
| 12320           | P    | 57.42          | 74.00          | -16.58      | 243.00      | 2.37       | Horizontal   | 14.86           |
| 14717           | P    | 54.25          | 74.00          | -19.75      | 158.00      | 2.24       | Horizontal   | 18.34           |
| 16730           | P    | 55.37          | 74.00          | -18.63      | 14.00       | 3.10       | Horizontal   | 19.71           |

**Table 6: Transmitting at the Highest Frequency**

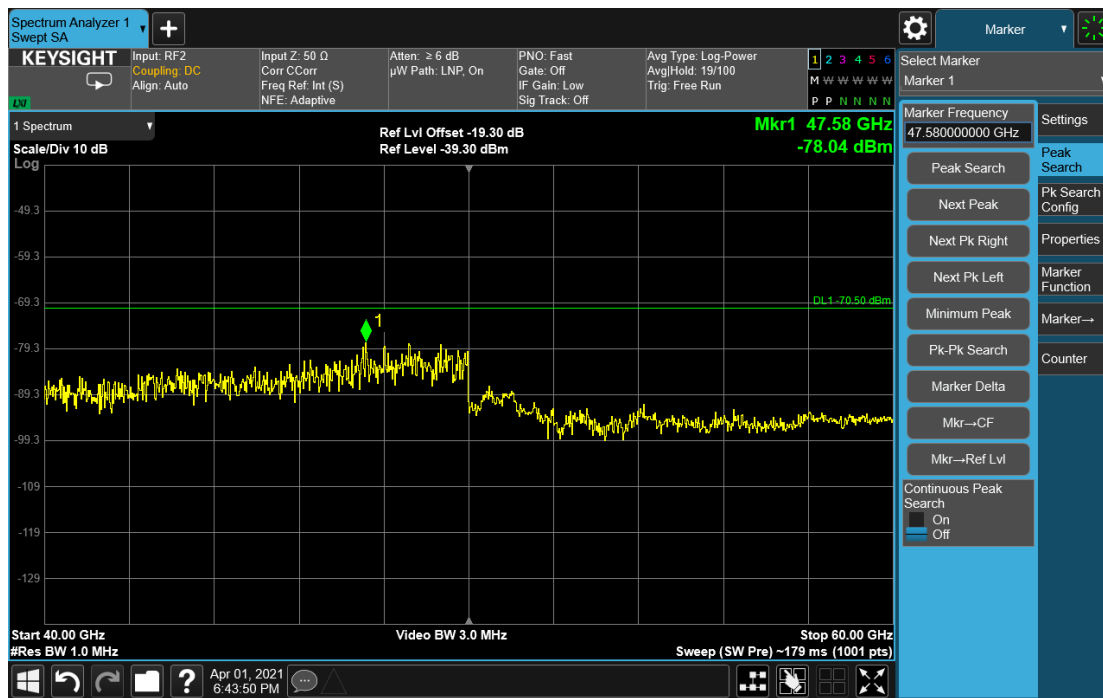


| Frequency (MHz) | Det. | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Pol.       | Correction (dB) |
|-----------------|------|----------------|----------------|-------------|-------------|------------|-----------------|
| 17600           | A    | 41.73          | 54.00          | -12.27      | 1.00        | Vertical   | -6.17           |
| 35170           | A    | 39.27          | 54.00          | -14.73      | 123.00      | Vertical   | 0.97            |
| 37188           | A    | 41.16          | 54.00          | -12.84      | 30.00       | Vertical   | 1.28            |
| 38254           | A    | 41.14          | 54.00          | -12.86      | 134.00      | Vertical   | 1.30            |
| 39846           | A    | 42.36          | 54.00          | -11.64      | 159.00      | Vertical   | 3.55            |
| 17600           | A    | 39.29          | 54.00          | -14.71      | 9.00        | Horizontal | -6.17           |
| 39545           | A    | 42.82          | 54.00          | -11.18      | 235.00      | Horizontal | 3.23            |
| 17600           | P    | 49.84          | 74.00          | -24.16      | 1.00        | Vertical   | -6.17           |
| 35170           | P    | 52.32          | 74.00          | -21.68      | 123.00      | Vertical   | 0.97            |
| 37188           | P    | 54.44          | 74.00          | -19.56      | 30.00       | Vertical   | 1.28            |
| 38254           | P    | 54.22          | 74.00          | -19.78      | 134.00      | Vertical   | 1.30            |
| 39846           | P    | 55.54          | 74.00          | -18.46      | 159.00      | Vertical   | 3.55            |
| 17600           | P    | 48.49          | 74.00          | -25.51      | 9.00        | Horizontal | -6.17           |
| 39545           | P    | 56.27          | 74.00          | -17.73      | 235.00      | Horizontal | 3.23            |

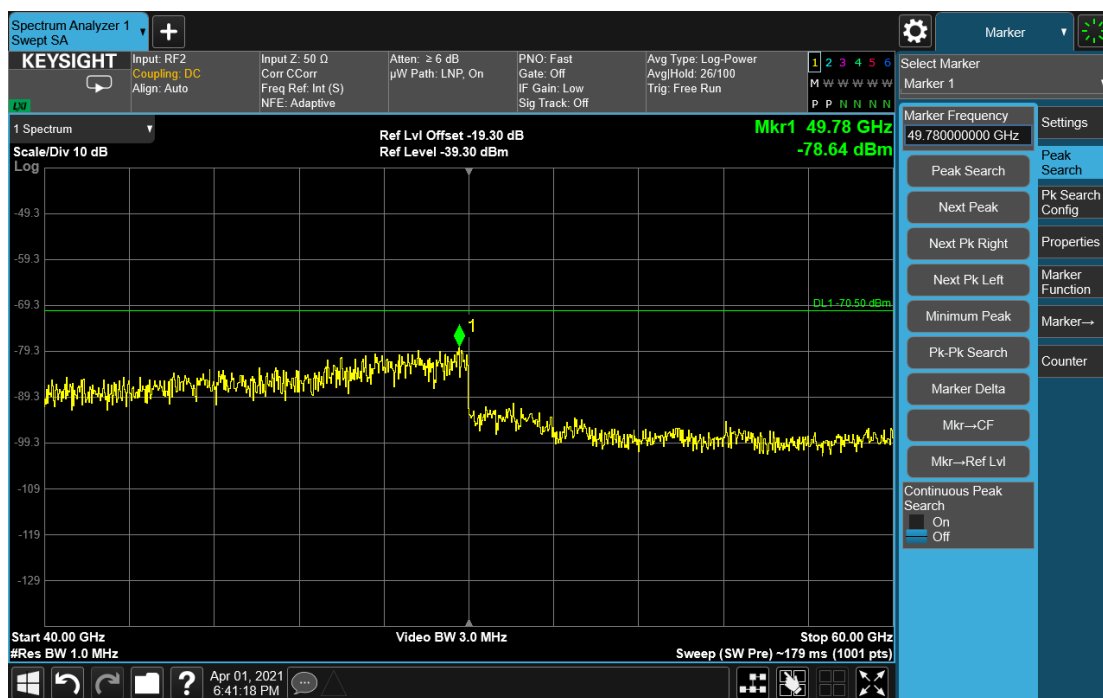
**Table 7: 17 – 40 GHz (worst case)**



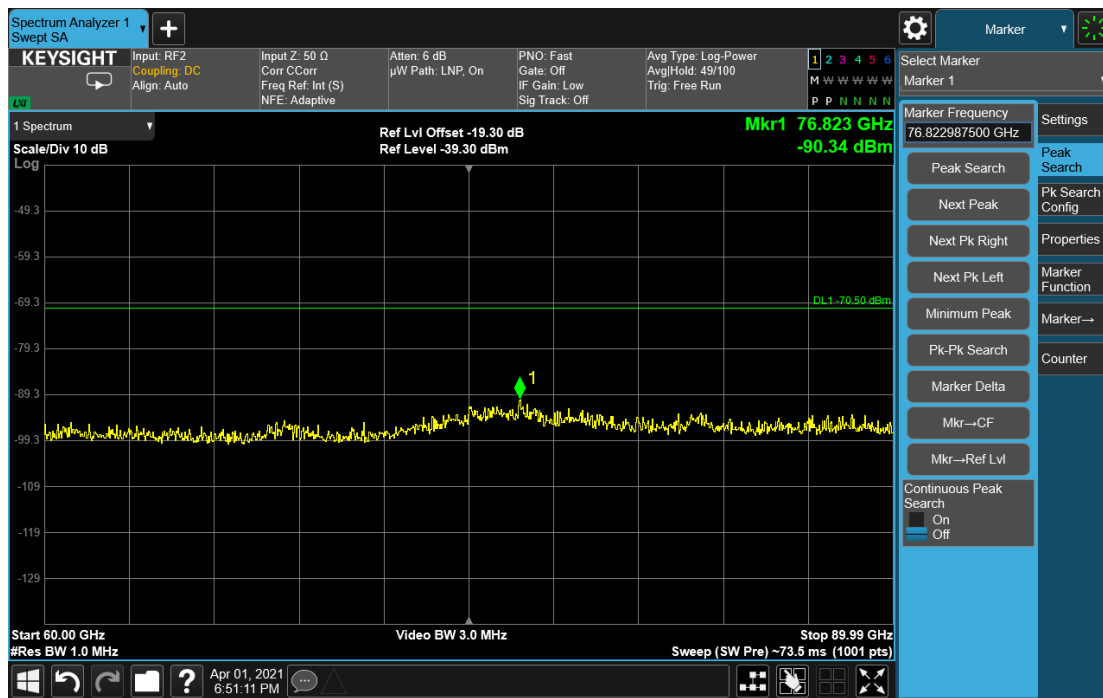
Low Channel\_40 – 60 GHz



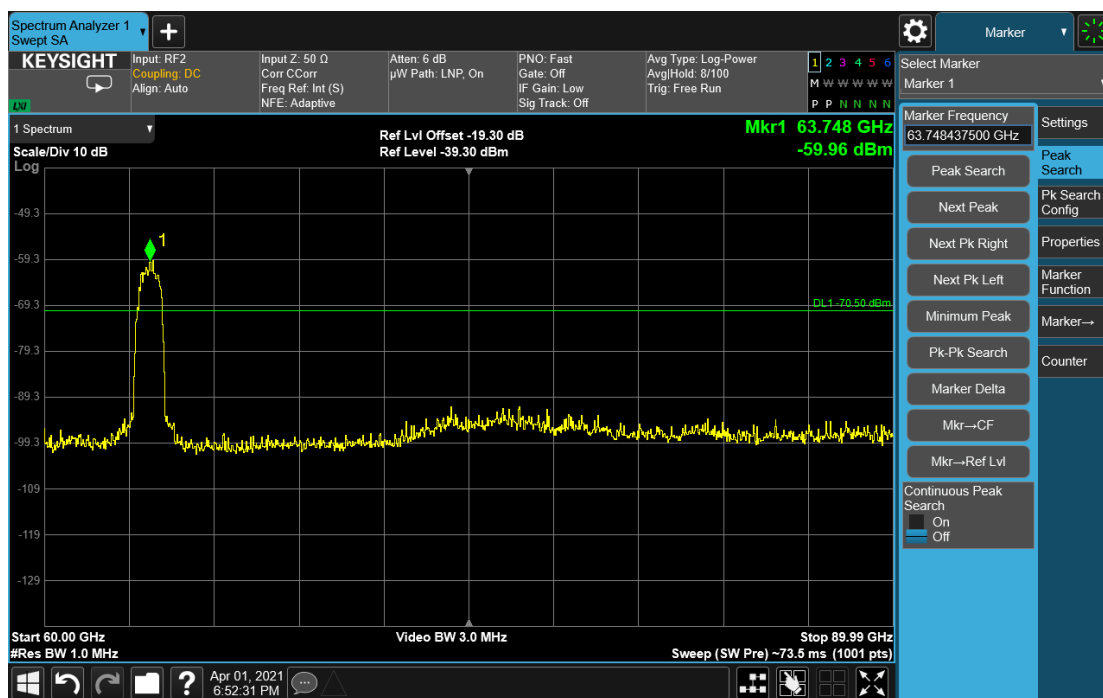
Mid Channel\_40 – 60 GHz



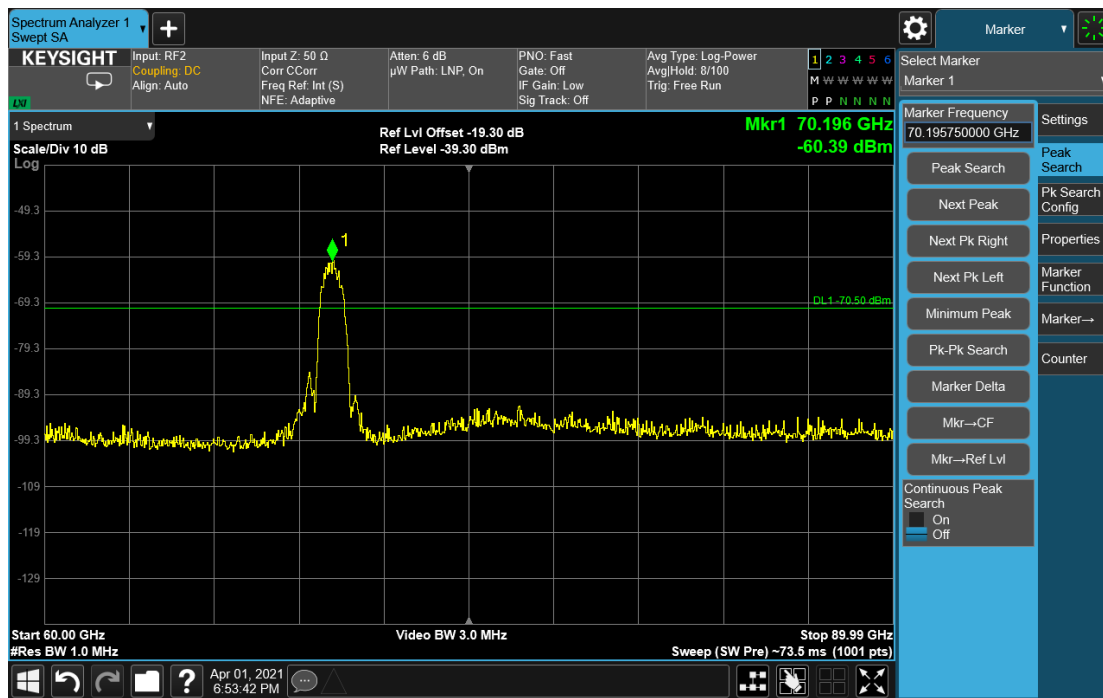
**High Channel\_40 – 60 GHz**



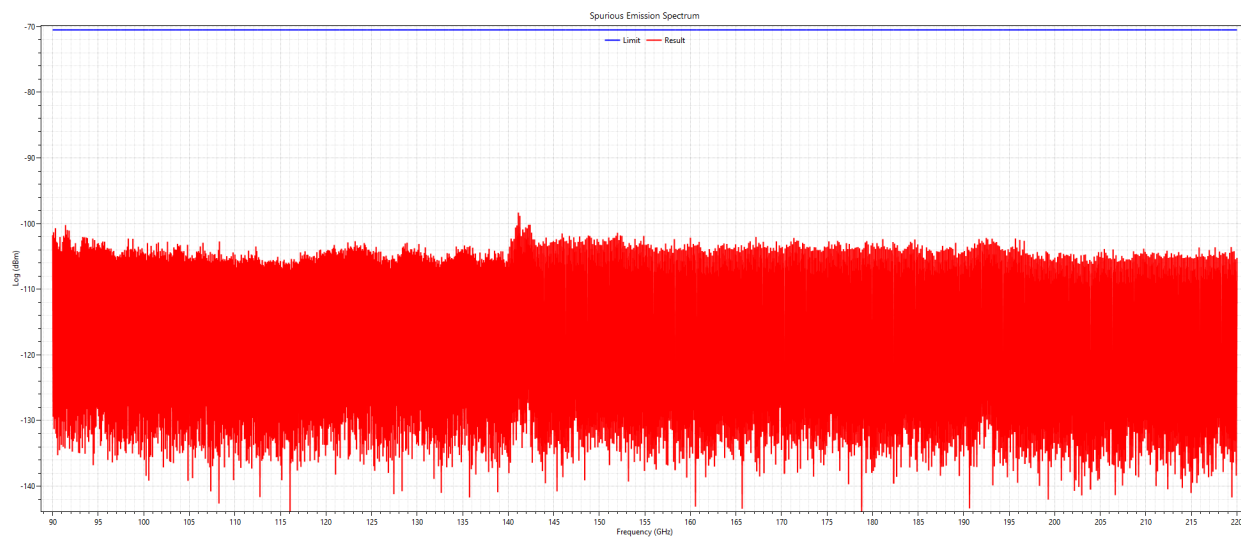
**Low Channel\_60 – 90 GHz**



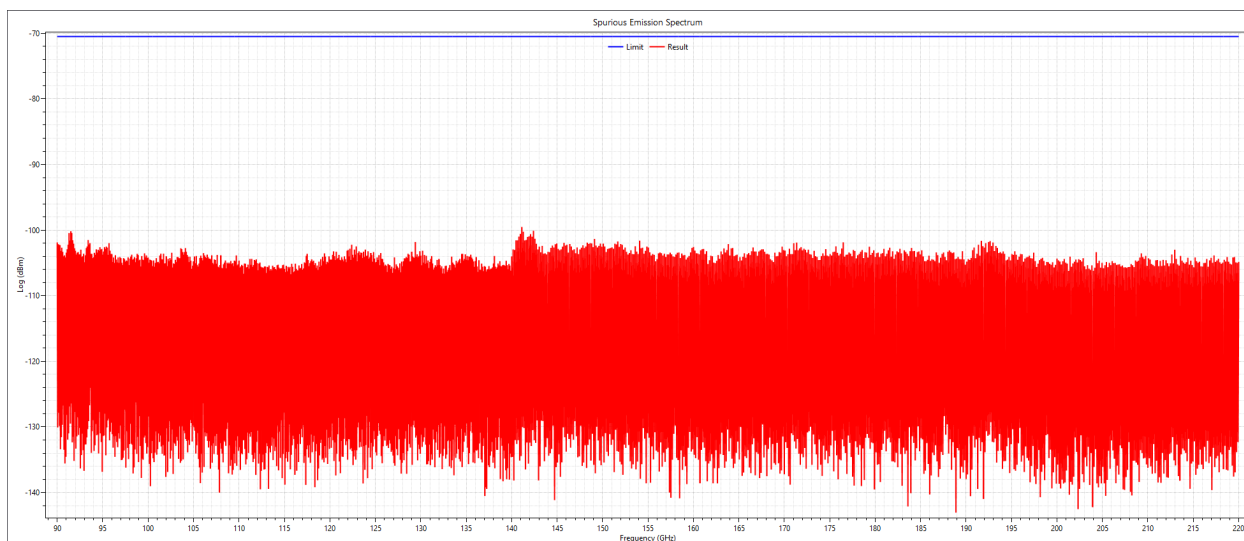
Mid Channel\_60 – 90 GHz



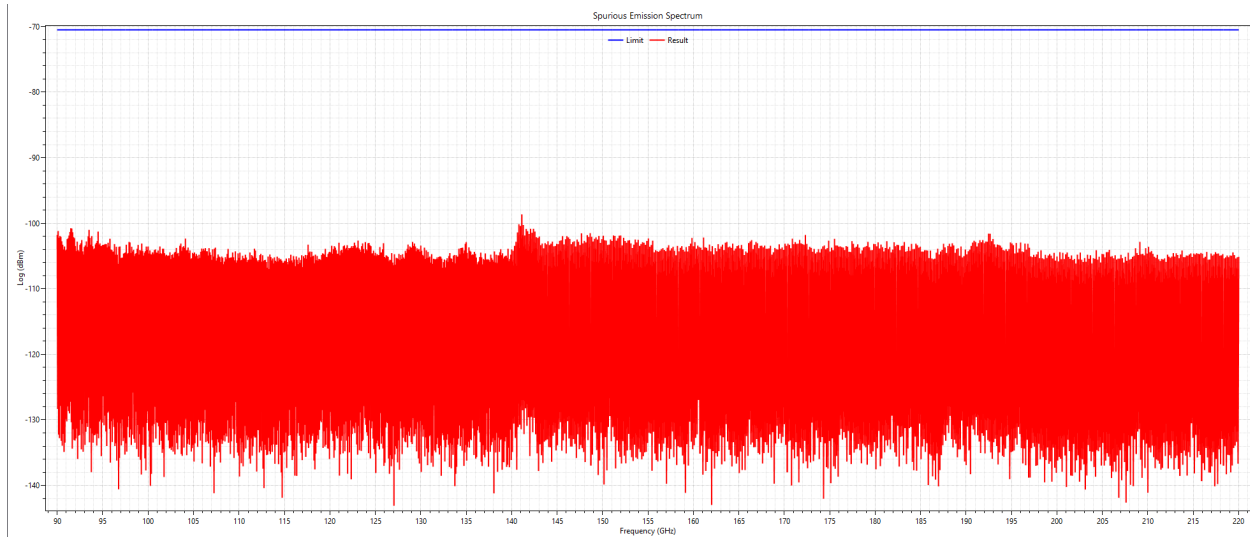
High Channel\_60 – 90 GHz



**Low Channel 90 – 220 GHz**

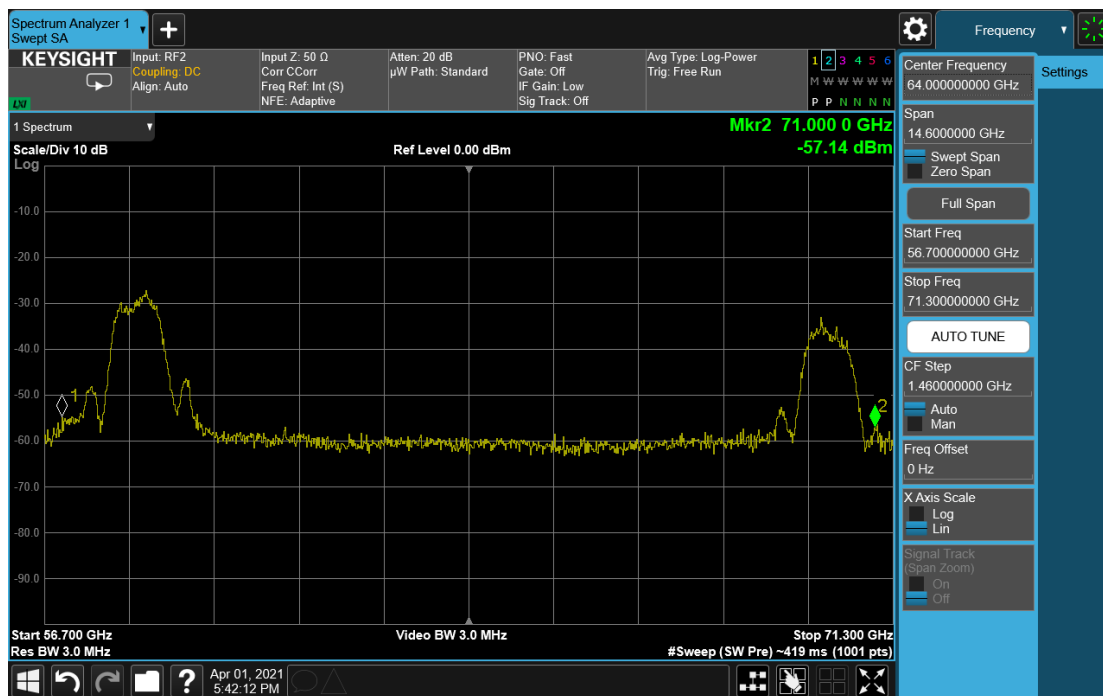


**Mid Channel 90 – 220 GHz**

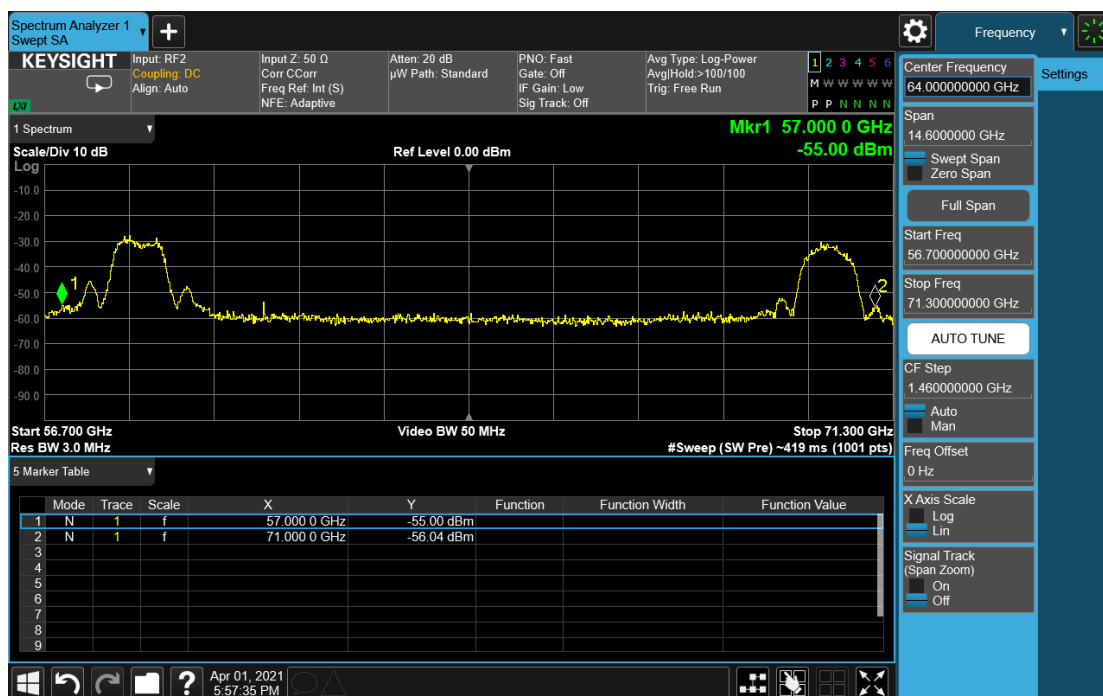


**High Channel 90 – 220 GHz**

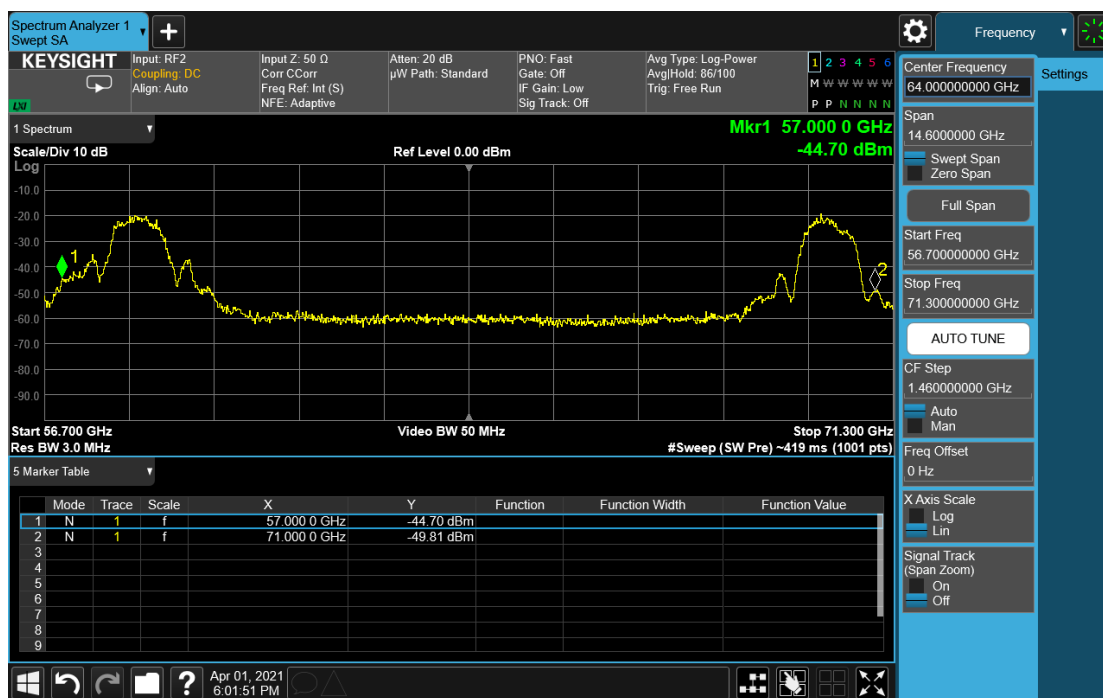
## 5.6 §15.255(f) Frequency Stability



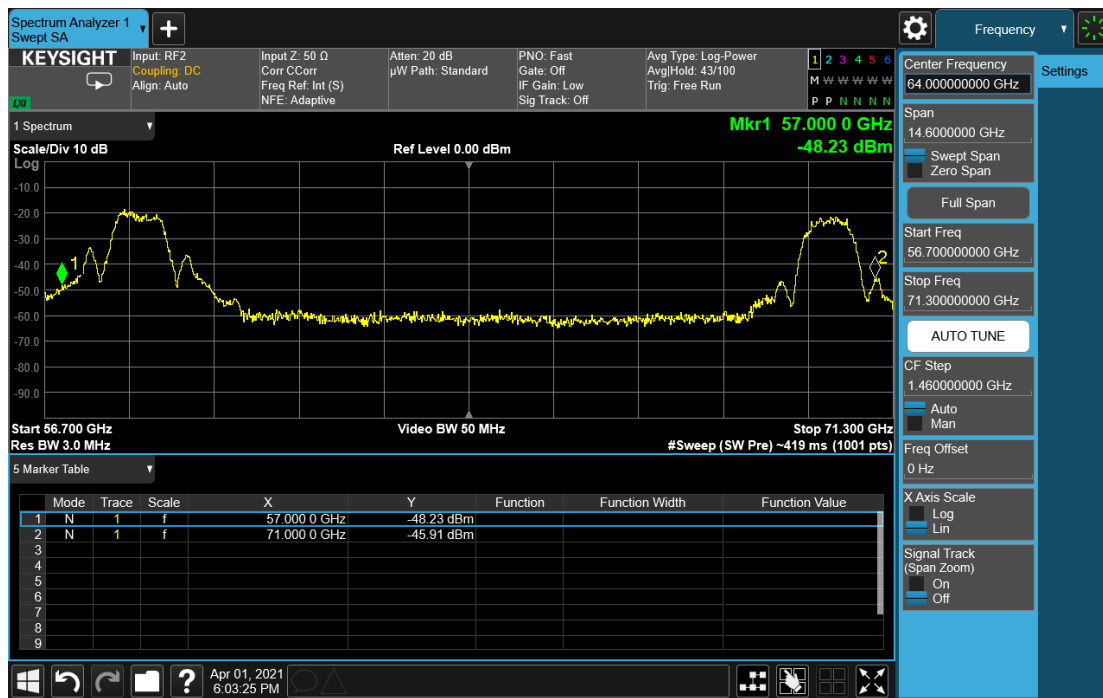
Frequency Stability -20 degrees



Frequency Stability +50 degrees



Frequency Stability Low Voltage



Frequency Stability High Voltage

-- End of Test Report --