



# **Radio Test Report**

## **Blu Wireless Technology Ltd**

### **Degas Trackside Unit**

#### **DN201SC**

47 CFR Part 15.255 Effective Date 1st October 2020  
DXX: Part 15 Low Power Communication Device Transmitter  
Test Date: 27<sup>th</sup> January – 25<sup>th</sup> February 2022  
Report Number: 02-12967-1-22 Issue 03  
Supersedes report: 02-12967-1-22 Issue 02

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### Certificate of Test 12967-1

The equipment noted below has been fully tested by R.N. Electronics Limited and, where appropriate, conforms to the relevant subpart of 47 CFR Part 15C. This is a certificate of test only and should not be confused with an equipment authorisation. Other standards may also apply.

|                                                         |                                                                                                               |
|---------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Equipment:                                              | Degas Trackside Unit                                                                                          |
| Model Number:                                           | DN201SC-G                                                                                                     |
| Unique Serial Number:                                   | DN201G001065                                                                                                  |
| Applicant:                                              | Blu Wireless Technology Ltd<br>4th Floor<br>One Castlepark<br>Tower Hill<br>Bristol<br>BS2 0JA                |
| Proposed FCC ID                                         | 2A4BS-DN201SC-G                                                                                               |
| Full measurement results are detailed in Report Number: | 02-12967-1-22 Issue 03                                                                                        |
| Test Standards:                                         | 47 CFR Part 15.255 Effective Date 1st October 2020<br>DXX: Part 15 Low Power Communication Device Transmitter |

#### NOTE:

Certain tests were not performed based upon applicant's declarations. Certain other requirements are subject to applicant's declaration only and have not been tested/verified. For details refer to section 3 of this report.

#### DEVIATIONS:

No deviations have been applied.

This certificate relates only to the unit tested as identified by a unique serial number and in the condition at the time it was tested. It does not relate to any other similar equipment and performance of the product before or after the test cannot be guaranteed. Whilst every effort is made to assure quality of testing, type tests are not exhaustive and although no non-conformances may be found, this doesn't exclude the possibility of unit not meeting the intentions of the standard or the requirements of the Federal Regulations, particularly under different conditions to those during testing. Any compliance statements are made reliant on (a) the application of the product and use of the assigned band being acceptable to the FCC and (b) the modes of operation as instructed to us by the Customer based on their specific knowledge of the application and functionality of the EUT. Statements of compliance, where measurements were made, do not include the measurement uncertainty. The measurement uncertainty, where stated, is the expanded uncertainty based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95%.

Date Of Test: 27<sup>th</sup> January – 25<sup>th</sup> February 2022

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## 0 Revision History

| Issue Number | Revision History                                                                                               | Page Reference(s) |
|--------------|----------------------------------------------------------------------------------------------------------------|-------------------|
| 01           | First Issue                                                                                                    | -                 |
| 02           | Added further antenna details and a reference to low level radio behaviour document                            | 6                 |
|              | Added further detail on SSH software to gain access and control EUT in specific modes.                         | 7                 |
|              | Added pre-scan PK and AV EIRP results for each mod scheme/rate for highest power radio (shows worst case rate) | 22, 23            |
|              | Added further detail to the power tuning process and reference that software/firmware did not change           | 128               |
| 03           | Revised modulation types listed                                                                                | 5, 8              |

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## 2 Equipment under test (EUT)

### 2.1 Equipment specification

|                           |                                                                                                          |               |
|---------------------------|----------------------------------------------------------------------------------------------------------|---------------|
| Applicant                 | Blu Wireless Technology Ltd<br>4th Floor<br>One Castlepark<br>Tower Hill<br>Bristol<br>BS2 0JA           |               |
| Manufacturer of EUT       | Blu Wireless Technology Ltd                                                                              |               |
| Full Name of EUT          | Degas Trackside Unit                                                                                     |               |
| Model Number of EUT       | DN201SC-G                                                                                                |               |
| Serial Number of EUT      | DN201G001065                                                                                             |               |
| Date Received             | 24th January 2022                                                                                        |               |
| Date of Test:             | 27th January – 25th February 2022                                                                        |               |
| Purpose of Test           | To demonstrate design compliance to the relevant rules of Chapter 47 of the Code of Federal Regulations. |               |
| Date Report Issued        | 29 <sup>th</sup> July 2022                                                                               |               |
| Main Function             | Radio communications: Multi-Gigabit/s radio equipment operating in the 60GHz band.                       |               |
| Information Specification | Height                                                                                                   | 296 mm        |
|                           | Width                                                                                                    | 83 mm         |
|                           | Depth                                                                                                    | 170 mm        |
|                           | Weight                                                                                                   | 3.9 kg        |
|                           | Voltage                                                                                                  | 20 - 48 VDC   |
|                           | Current                                                                                                  | 5 Amp (max)   |
| EUT Supplied PSU          | Manufacturer                                                                                             | Puls Power    |
|                           | Model number                                                                                             | CP10.361      |
|                           | Serial number                                                                                            | -             |
|                           | Input voltage                                                                                            | 100 - 240 VAC |
|                           | Input current                                                                                            | 2.5 Amps      |
|                           | Output                                                                                                   | 36 - 42 VDC   |

### 2.2 Configurations for testing

|                                    |                                                                                                                                                    |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| TX Parameters                      |                                                                                                                                                    |
| Alignment range – transmitter      | 57.24 - 70.2 GHz                                                                                                                                   |
| EUT Declared Modulation Parameters | 802.11ad MCS0 up to MCS12<br>$\pi/2$ -DBPSK (MCS0), $\pi/2$ -BPSK (MCS1 to MCS5), $\pi/2$ -QPSK (MCS6 to MCS9) and $\pi/2$ -16QAM (MCS10 to MCS12) |
| EUT Declared Power level           | 40 dBm max                                                                                                                                         |
| EUT Declared Signal Bandwidths     | 2.16 GHz, 1.08 GHz and 0.54 GHz                                                                                                                    |
| EUT Declared Channel Spacing's     | 2.16 GHz                                                                                                                                           |
| EUT Declared Duty Cycle            | 99%                                                                                                                                                |
| Unmodulated carrier available?     | Yes                                                                                                                                                |
| Declared frequency stability       | +/- 2 ppm                                                                                                                                          |
| RX Parameters                      |                                                                                                                                                    |
| Alignment range – receiver         | 57.24 - 70.2 GHz                                                                                                                                   |
| EUT Declared RX Signal Bandwidth   | Full BW mode: 1 GHz baseband, 2 GHz at RF<br>Half BW mode: 0.5 GHz baseband, 1 GHz at RF<br>Quarter BW mode: 0.25 GHz baseband, 0.5 GHz at RF      |

| FCC Parameters        |                                                         |
|-----------------------|---------------------------------------------------------|
| FCC Transmitter Class | DXX: Part 15 Low Power Communication Device Transmitter |

## Fixed Link Configurations for Test

| General Parameters                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EUT Normal use position           | Positioned alongside a railway track                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Choice of model(s) for type tests | Sample                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Antenna details                   | There are two radio modules. Each module has independent Tx and Rx antenna arrays. So in total 2 Tx and 2 Rx arrays. Each array is a 16x4 array, made up of 16 RF paths and 1x4 sub-arrays with 23dBi gain. The antenna arrays are integral to the radio modules and are classified as "RFM Phased Array antenna". They are vertically polarised and offer 63 pencil beam widths of approximately 7 degrees each. Please refer to document "BW-000999-TD-3-Low Level Radio Behaviour.pdf" for further details. The antenna is permanently fixed and cannot be changed. |
| Antenna port                      | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Highest Signal generated in EUT   | 70.2 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Lowest Signal generated in EUT    | 25 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Hardware Version                  | DN201SC-G<br>(Batch B2104)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Software Version                  | Platform SW: R0.10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Firmware Version                  | RWM6050: R3.2, MPU: 0.5.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Type of Equipment                 | Multi-Gigabit/s radio equipment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Technology Type                   | IEEE 802.11ad                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Geo-location (yes/no)             | Yes (not used to configure radio parameters)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## 2.3 Functional description

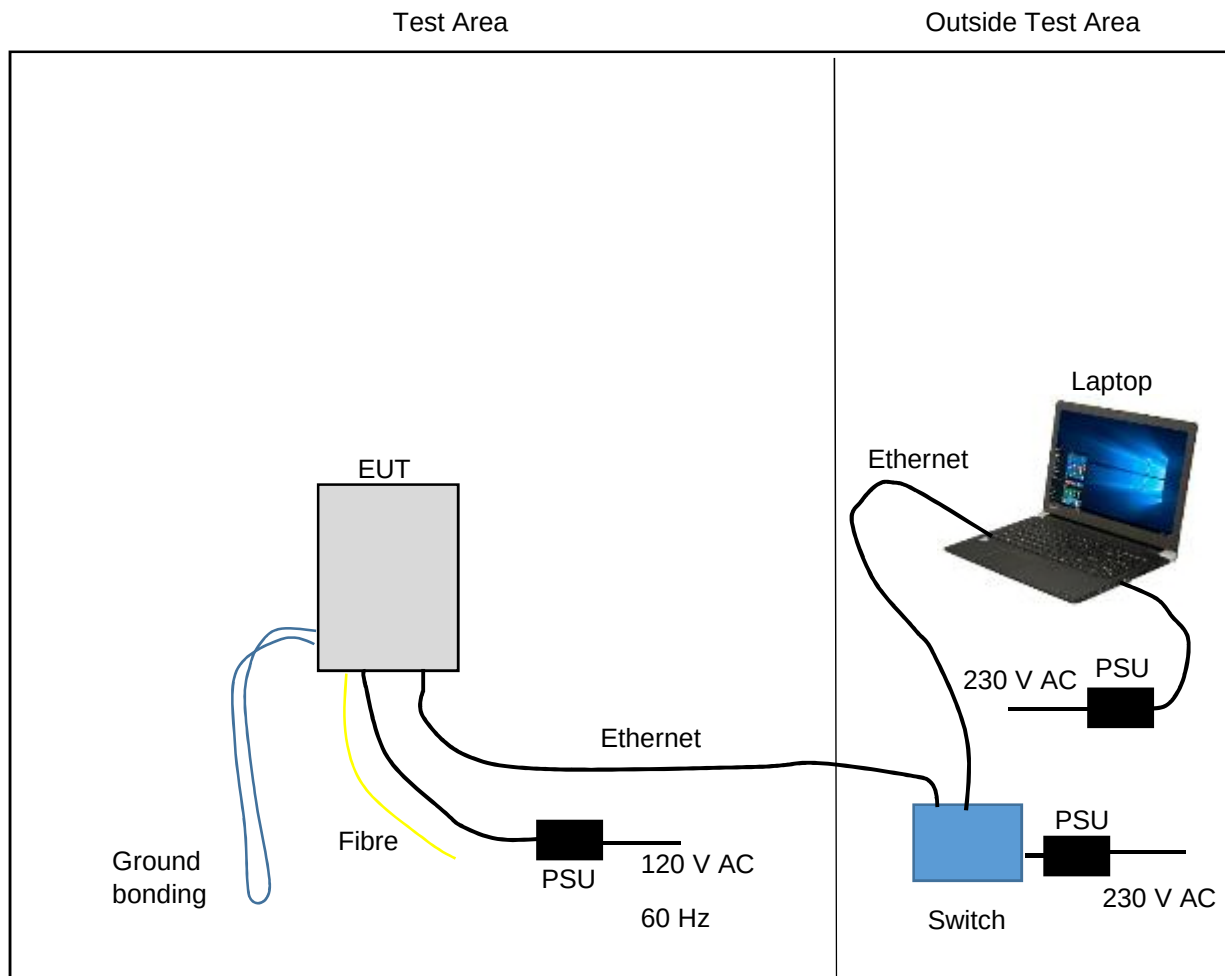
Provision of high-speed data communications to trains for internet access for a high number of users. Non-critical communications. Not used for mission critical or time sensitive applications. A system comprises of a train top unit (TTU) operating in the 57-71 GHz band which is connected to an NPU located in the roof space of the train carriage. The TTU communicates with this trackside unit operating in the 57-71 GHz band.

## 2.4 Modes of operation

| Mode Reference | Description                        | Used for testing |
|----------------|------------------------------------|------------------|
| TX1            | 58.32 GHz 39 dBm 2.16GHz bandwidth | Yes              |
| TX2            | 60.48 GHz 39 dBm 2.16GHz bandwidth | Yes              |
| TX3            | 62.64 GHz 39 dBm 2.16GHz bandwidth | Yes              |
| TX4            | 64.8 GHz 39 dBm 2.16GHz bandwidth  | Yes              |
| TX5            | 66.96 GHz 39 dBm 2.16GHz bandwidth | Yes              |
| TX6            | 69.12 GHz 39 dBm 2.16GHz bandwidth | Yes              |

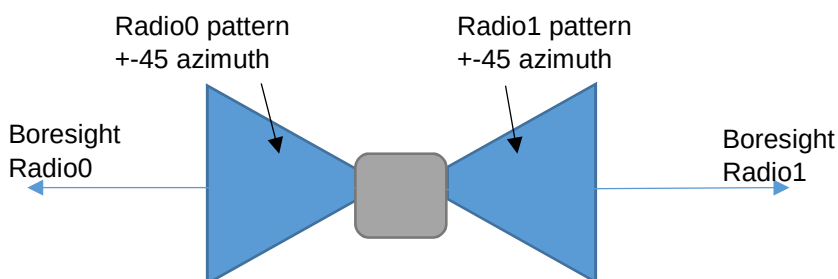
Note: Above modes were used in combination with Schemes MCS0 to MCS12 and Half Band and Quarter Band channel bandwidths for tests, Half and quarter bandwidths used the same centre frequency. Modes apply to both radio 0 and radio 1.

## 2.5 Emissions configuration



The unit was powered from 36 V DC via the applicant supplied power supply which was powered from a 120 V AC mains source. The unit was configured using a laptop PC and terminal software to allow permanent transmit modes of the 60 GHz function of the device on both of the EUT's 60 GHz radios with individual beam settings also settable. This was achieved using MobaXterm software which allowed an SSH connection to the EUT. Once logged in to the EUT a set of commands inputted a line at a time allowed setting of the radio parameters as required. This SSH terminal access also allowed the calibrated power levels to be adjusted/overwritten where required, in order to demonstrate compliance with the limits (see section 11.1 within this report). No EUT Software / Firmware was required to be changed in order to run these specific EUT commands from the command line prompt. The radios Antenna arrays point in opposite directions (180° apart) with each radio then covering approximately  $\pm 45^\circ$  from its boresight orientation with  $\pm 10^\circ$  elevation over the 64 settings of the beam book, each individual azimuth beam width is  $\pm 3.5^\circ$ . Therefore no radio power beam overlap can occur between the 2 radios.

### Aerial view



The power settings for each channel were as stated below: -

Channel 1 = 58.32 GHz, power level +39 dBm (all modulation schemes)  
Channel 2 = 60.48 GHz, power level +39 dBm (all modulation schemes)  
Channel 3 = 62.64 GHz, power level +39dBm (all modulation schemes)  
Channel 4 = 64.8 GHz, power level +39 dBm (all modulation schemes)  
Channel 5 = 66.96 GHz, power level +39 dBm (all modulation schemes)  
Channel 6 = 69.12 GHz, power level +39 dBm (all modulation schemes)

Modulation schemes available were  $\pi/2$ -DBPSK (MCS0),  $\pi/2$ -BPSK (MCS1 to MCS5),  $\pi/2$ -QPSK (MCS6 to MCS9) and  $\pi/2$ -16QAM (MCS10 to MCS12). Channel bandwidths available were: Full Band (2.16 GHz), Half Band (1.08 GHz) and Quarter Band (0.54 GHz).

Measured duty cycles for the schemes were as follows:-

MCS0 98.9 %  
MCS1 99.7 %  
MCS2 99.5 %  
MCS3 99.3 %  
MCS4 99.3 %  
MCS5 99.2 %  
MCS6 99.1 %  
MCS7 98.7 %  
MCS8 98.6 %  
MCS9 98.5 %  
MCS10 98.0 %  
MCS11 97.7 %  
MCS12 97.2 %

#### 2.5.1 Signal leads

| Port Name            | Cable Type   | Connected |
|----------------------|--------------|-----------|
| Power                | 4-core       | Yes       |
| Ethernet             | Cat 6a       | Yes       |
| SFP Fibre            | Single fibre | Yes       |
| Ground bonding point | Copper braid | Yes       |

### 3 Summary of test results

The Degas Trackside Unit, DN201SC-G was tested for compliance to the following standard :

47 CFR Part 15.255 Effective Date 1st October 2020  
DXX: Part 15 Low Power Communication Device Transmitter

Any compliance statements are made reliant on (a) the application of the product and use of the assigned band being acceptable to the FCC and (b) the modes of operation as instructed to us by the Customer based on their specific knowledge of the application and functionality of the EUT. Whilst every effort is made to assure quality of testing, type tests are not exhaustive and although no non-conformances may be found, this doesn't exclude the possibility of equipment not meeting the intentions of the standard or the essential requirements of the directive, particularly under different conditions to those during testing. Statements of compliance, where measurements were made, do not include the measurement uncertainty. The measurement uncertainty, where stated, is the expanded uncertainty based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

| Title                                  | References                                | Results                     |
|----------------------------------------|-------------------------------------------|-----------------------------|
| <b>Transmitter Tests</b>               |                                           |                             |
| 1. AC power line conducted emissions   | 47 CFR Part 15C Part 15.207               | PASSED                      |
| 2. Radiated emissions 9 - 150 kHz      | 47 CFR Part 15C Part 15.209               | NOT APPLICABLE <sup>1</sup> |
| 3. Radiated emissions 150 kHz - 30 MHz | 47 CFR Part 15C Part 15.209               | PASSED                      |
| 4. Radiated emissions 30 MHz -1 GHz    | 47 CFR Part 15C Part 15.255(d)(2)         | PASSED                      |
| 5. Radiated emissions above 1 GHz      | 47 CFR Part 15C Part 15.255(d)(2)/(3)/(4) | PASSED <sup>2</sup>         |
| 6. Frequency stability                 | 47 CFR Part 15C Part 15.255(f)            | PASSED                      |
| 7. Peak & Average EIRP                 | 47 CFR Part 15C Part 15.255(c)(1)(i)/(ii) | PASSED                      |
| 8. Peak Conducted Power                | 47 CFR Part 15C Part 15.255(c)(3)/(4)     | PASSED <sup>3</sup>         |
| 9. 6dB Occupied bandwidth              | 47 CFR Part 15C Part 15.255               | PASSED                      |

<sup>1</sup> Lowest frequency generated within the unit is declared as 25MHz

<sup>2</sup> Spectrum investigated started at a frequency of 150 kHz up to a frequency of 200GHz. The highest signal generated in the equipment is 70.2 GHz.

<sup>3</sup> EUT does not have a conducted RF port, however, calculation has been provided to determine conducted power against the limit from maximum EIRP measured and antenna gain.

## 4 Specifications

The tests were performed and operated in accordance with R.N. Electronics Ltd procedures and the relevant standards listed below.

### 4.1 Relevant standards

| Ref.  | Standard Number    | Version | Description                                                                                                                                                                                                      |
|-------|--------------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.1.1 | 47 CFR Part 15C    | 2020    | Federal Communications Commission PART 15 – RADIO FREQUENCY DEVICES                                                                                                                                              |
| 4.1.2 | ANSI C63.10        | 2013    | American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices                                                                                                                   |
| 4.1.3 | ANSI C63.4         | 2014    | American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz                                              |
| 4.1.4 | KDB 842590 D01 v01 | 2019    | Federal Communications Commission Office of Engineering and Technology Laboratory Division; Basic certification requirements and measurement procedures for Upper Microwave Flexible Use Service (UMFUS) devices |

### 4.2 Deviations

No deviations were applied

### 4.3 Tests at extremes of temperature & voltage

The following test conditions were used to simulate testing at nominal or extremes.

| Temperature Test Conditions |        | Voltage Test Conditions |         |
|-----------------------------|--------|-------------------------|---------|
| T nominal                   | 20 °C  | V nominal               | 120V AC |
| T minimum                   | -25 °C | V minimum               | 102V AC |
| T maximum                   | 50 °C  | V maximum               | 138V AC |

Extremes of voltage are based on nominal +/-15%.

Extremes of temperature are based upon manufacturer's declaration.

The ambient test conditions of humidity and pressure in the laboratory were as specified in each specific test section within this report

### 4.4 Test fixtures

In order to measure RF parameters at temperature extremes, the EUT was tested in a temperature controlled chamber as follows:

Tests were performed radiated. To allow the fundamental transmission to pass through the temperature controlled chamber the door was replaced with a Styrofoam sheet which sealed the chamber aperture.

## 5 Tests, methods and results

### 5.1 AC power line conducted emissions

#### 5.1.1 Test methods

|                    |                                                              |
|--------------------|--------------------------------------------------------------|
| Test Requirements: | 47 CFR Part 15C Part 15.207 [Reference 4.1.1 of this report] |
| Test Method:       | ANSI C63.10 Clause 6.2 [Reference 4.1.2 of this report]      |
| Limits:            | 47 CFR Part 15C Part 15.207 [Reference 4.1.1 of this report] |

#### 5.1.2 Configuration of EUT

The EUT was placed on a wooden table 0.8m above the ground plane and connected to a LISN via a 1m mains cable.

During the initial scan, no discernible difference in emissions could be observed when operating on different channels or modulation schemes. For final test the EUT was operated in TX4 mode (Radio 0 and Radio 1).

#### 5.1.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment listed in the 'Test Equipment' Section. Measurements were made on the live and neutral conductors using both average and quasi-peak detection.

At least 6 signals within 20dB and/or all signals within 10dB of the limit were investigated.

Tests were performed in Test Site F.

#### 5.1.4 Test equipment

E150, E035, ZSW1, E412, E411

See Section 9 for more details

#### 5.1.5 Test results

|                                 |        |
|---------------------------------|--------|
| Temperature of test environment | 18°C   |
| Humidity of test environment    | 50%    |
| Pressure of test environment    | 103kPa |

|                 |           |
|-----------------|-----------|
| Band            | 57-71 GHz |
| Power Level     | 39 dBm    |
| Channel Spacing | 2.16 GHz  |
| Mod Scheme      | MCS5      |
| Mid channel     | 64.8 GHz  |

|                                               |
|-----------------------------------------------|
| Plot refs                                     |
| 12967-1 Cond 1 AC Live 150k-30M Average       |
| 12967-1 Cond 1 AC Live 150k-30M Quasi-Peak    |
| 12967-1 Cond 1 AC Neutral 150k-30M Average    |
| 12967-1 Cond 1 AC Neutral 150k-30M Quasi-Peak |

**Table of signals measured for Cond 1 AC Live 150k-30M**

| Signal No. | Freq (MHz) | Peak Amp (dBuV) | QP Amp (dBuV) | QP -Lim (dB) | AV Amp (dBuV) | AV -Lim (dB) |
|------------|------------|-----------------|---------------|--------------|---------------|--------------|
| 1          | 0.247      | 48.0            | 47.4          | -15.6        | 45.5          | -7.7         |
| 2          | 0.372      | 50.3            | 48.4          | -10.6        | 42.5          | -7.2         |
| 3          | 0.625      | 41.4            | 39.7          | -16.3        | 34.2          | -11.8        |
| 4          | 1.125      | 43.1            | 39.1          | -16.9        | 28.4          | -17.6        |
| 5          | 1.392      | 42.2            | 36.7          | -19.3        | 23.3          | -22.7        |
| 6          | 2.123      | 41.0            | 36.2          | -19.8        | 20.4          | -25.6        |

**Table of signals measured for Cond 1 AC Neutral 150k-30M**

| Signal No. | Freq (MHz) | Peak Amp (dBuV) | QP Amp (dBuV) | QP -Lim (dB) | AV Amp (dBuV) | AV -Lim (dB) |
|------------|------------|-----------------|---------------|--------------|---------------|--------------|
| 1          | 0.247      | 49.8            | 48.8          | -44.2        | 46.7          | -6.5         |
| 2          | 0.371      | 51.2            | 49.7          | -9.4         | 44.3          | -5.4         |
| 3          | 0.624      | 44.2            | 41.9          | -14.1        | 35.7          | -10.3        |
| 4          | 0.881      | 44.8            | 41.6          | -14.4        | 32.6          | -13.4        |
| 5          | 1.370      | 42.8            | 38.1          | -17.9        | 24.1          | -21.9        |
| 6          | 1.641      | 42.3            | 37.4          | -18.6        | 24.0          | -22.0        |

Peak detector "Max held" Analyser plots against the Quasi-Peak / Average limit line(s) can be found in Section 6 of this report.

**LIMITS:**

15.207: as given in the above tables / drawn on the respective plots.

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows:

150kHz to 30MHz  $\pm 3.6$ dB

## **5.2 Radiated emissions 9 - 150 kHz**

NOT APPLICABLE: Lowest frequency generated within the unit is declared as 25 MHz

### 5.3 Radiated emissions 150 kHz - 30 MHz

#### 5.3.1 Test methods

Test Requirements: 47 CFR Part 15C Part 15.209 [Reference 4.1.1 of this report]  
Test Method: ANSI C63.10 Clause 6.4 & 6.6 [Reference 4.1.2 of this report]  
Limits: 47 CFR Part 15C Part 15.209/15.255(d)(2) [Reference 4.1.1 of this report]

#### 5.3.2 Configuration of EUT

The EUT was placed on a 0.8 metres high turntable. The front edge of the EUT was initially positioned facing the antenna. The EUT was measured at a distance of 3 metres. The EUT was examined in normal use position. Radiated Emissions testing was performed whilst powered from 120 VAC. During the initial scan, no discernible difference in emissions could be observed when operating on different channels or modulation schemes. The EUT was operated in TX4 mode (Radio 0 and Radio 1).

#### 5.3.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted below. Measurements were made in a semi-anechoic chamber (pre-scan) with any final measurements required performed on an OATS without a ground plane. The antenna was placed 1m above the ground. The equipment was rotated 360 degrees to record the worst case emissions. At least 6 signals within 20dB and all signals within 10dB of the limit were investigated. Tests were performed using Test Site M.

#### 5.3.4 Test equipment

TMS81, ZSW1, E624, E411

See Section 9 for more details

#### 5.3.5 Test results

Temperature of test environment 18°C  
Humidity of test environment 50%  
Pressure of test environment 103kPa

|                 |           |
|-----------------|-----------|
| Band            | 57-71 GHz |
| Power Level     | 39 dBm    |
| Channel Spacing | 2.16 GHz  |
| Mod Scheme      | MCS5      |
| Mid channel     | 64.8 GHz  |

|                               |
|-------------------------------|
| Plot refs                     |
| 12967-1 Rad 1 150k-30MHz Para |
| 12967-1 Rad 1 150k-30MHz Perp |

No emissions were observed within 20dB of limits.

Peak detector "Max held" Analyser plots against the Quasi-Peak / Average limit line(s) can be found in Section 6 of this report.

#### LIMITS:

15.209 limits are applicable in the restricted bands of 15.205 with the relevant detector.  
The general limits of 15.209 are as drawn on the respective plots.

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows:  
9kHz - 30MHz ±3.9dB

## 5.4 Radiated emissions 30 MHz -1 GHz

### 5.4.1 Test methods

|                    |                                                                    |
|--------------------|--------------------------------------------------------------------|
| Test Requirements: | 47 CFR Part 15C Part 15.255(d)(2) [Reference 4.1.1 of this report] |
| Test Method:       | ANSI C63.10 Clause 6.3 & 6.5 [Reference 4.1.2 of this report]      |
| Limits:            | 47 CFR Part 15C Part 15.255(d)(2) [Reference 4.1.1 of this report] |

### 5.4.2 Configuration of EUT

The EUT was placed on a 0.8 metres high turntable. The front edge of the EUT was initially positioned facing the antenna. The EUT was measured at a distance of 3 metres. The EUT was examined in normal use position. Radiated Emissions testing was performed whilst powered from 120 VAC. During the initial scan, no discernible difference in emissions could be observed when operating on different channels or modulation schemes. The EUT was operated in TX4 mode (Radio 0 and Radio 1).

### 5.4.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment listed below. The equipment was rotated 360 degrees and the antenna scanned 1 – 4 metres in both horizontal and vertical polarisations to record the worst case emissions.

At least 6 signals within 20dB and all signals within 10dB of the limit were investigated.

Tests were performed using Test Site M.

### 5.4.4 Test equipment

LPE364, E743, NSA-M, ZSW1, E624, E411

See Section 9 for more details

### 5.4.5 Test results

|                                 |        |
|---------------------------------|--------|
| Temperature of test environment | 18°C   |
| Humidity of test environment    | 50%    |
| Pressure of test environment    | 101kPa |

|                 |           |
|-----------------|-----------|
| Band            | 57-71 GHz |
| Power Level     | 39 dBm    |
| Channel Spacing | 2.16 GHz  |
| Mod Scheme      | MCS5      |
| Low channel     | 64.8 GHz  |

|                         |
|-------------------------|
| Plot refs               |
| 12967-1 Rad 1 VHF Horiz |
| 12967-1 Rad 1 VHF Vert  |
| 12967-1 Rad 1 UHF Horiz |
| 12967-1 Rad 1 UHF Vert  |

**Table of signals measured for Rad 1 Horizontal Sig List**

| Signal No. | Freq (MHz) | Peak Amp (dBuV/m) | QP Amp (dBuV/m) | QP -Lim (dB) |
|------------|------------|-------------------|-----------------|--------------|
| 1          | 81.531     | 25.7              | 20.8            | -19.2        |

**Table of signals measured for Rad 1 Vertical Sig List**

| Signal No. | Freq (MHz) | Peak Amp (dBuV/m) | QP Amp (dBuV/m) | QP -Lim (dB) |
|------------|------------|-------------------|-----------------|--------------|
| 1          | 44.665     | 27.9              | 22.8            | -17.2        |
| 2          | 81.668     | 24.0              | 19.4            | -20.6        |

Peak detector "Max held" Analyser plots against the Quasi-Peak / Average limit line(s) can be found in Section 6 of this report.

Whilst Low, Mid and High channels were tested, plots are for illustrative purposes only and only Mid channel plots are shown in this report.

**LIMITS:**

15.209 limits are applicable in the restricted bands of 15.205 with the relevant detector.

The general limits of 15.209 are as drawn on the respective plots.

15.255 (d)(3) between 40 GHz and 200 GHz the level of the emissions shall not exceed 90pW/cm<sup>2</sup> at a distance of 3m.

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows:  
30MHz - 1000MHz ±6.1dB

## 5.5 Radiated emissions above 1 GHz

### 5.5.1 Test methods

|                    |                                                                            |
|--------------------|----------------------------------------------------------------------------|
| Test Requirements: | 47 CFR Part 15C Part 15.255(d)(2)/(3)/(4) [Reference 4.1.1 of this report] |
| Test Method:       | ANSI C63.10 Clause 6.3 & 6.6 & 9.8 [Reference 4.1.2 of this report]        |
| Limits:            | 47 CFR Part 15C Part 15.255(d)(2)/(3)/(4) [Reference 4.1.1 of this report] |

### 5.5.2 Configuration of EUT

The EUT was placed on a 1.5 metres high turntable. The front edge of the EUT was initially positioned facing the antenna. The EUT was measured at a distance of 3 metres. The EUT was examined in normal use position. Radiated Emissions testing was performed whilst powered from 120 VAC. During the initial scan, no discernible difference in emissions could be observed when operating on different channels or modulation schemes. The EUT was operated in TX4 mode (Radio 0 and Radio 1).

### 5.5.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment listed below. Measurements were made in a semi-anechoic chamber with appropriate absorbing material for use in this range. Horn antennas were used at heights where the whole of the EUT was contained within the main beam. The EUT was rotated through 360 degrees to record the worst case emissions. A measurement distance of 3m was used between the test range 1 - 6GHz, 1.2m was used in the test range 6 - 18GHz, 0.3m was used in the test range 18 - 75GHz, 0.1m was used in the test range 75-110GHz and 0.03m was used in the test range 110-200 GHz. At least 6 signals within 20dB and all signals within 10dB of the limit were investigated.

Tests were performed using test Site M.

### 5.5.4 Test equipment

E296-2, E330, E485, E487, E580, E638, E717, E718, E719, E722, E755, E760, E777, E941, E942, F015, H070

See Section 9 for more details

### 5.5.5 Test results

|                                 |        |
|---------------------------------|--------|
| Temperature of test environment | 18°C   |
| Humidity of test environment    | 50%    |
| Pressure of test environment    | 103kPa |

Setup Table

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 0) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS5                |
| Mid channel     | 64.8 GHz            |

| Plots                                               |  |
|-----------------------------------------------------|--|
| 12967-1 Rad 1 1-2GHz Horiz                          |  |
| 12967-1 Rad 1 1-2GHz Vert                           |  |
| 12967-1 Rad 1 2-5GHz Horiz                          |  |
| 12967-1 Rad 1 2-5GHz Vert                           |  |
| 12967-1 Rad 1 5-6GHz Horiz                          |  |
| 12967-1 Rad 1 5-6GHz Vert                           |  |
| 12967-1 Rad 1 6upto10GHz Horiz                      |  |
| 12967-1 Rad 1 6upto10GHz Vert                       |  |
| 12967-1 Rad 1 10upto12_5GHz Horiz                   |  |
| 12967-1 Rad 1 10upto12_5GHz Vert                    |  |
| 12967-1 Radiated emissions 12.5 – 15 GHz horizontal |  |
| 12967-1 Radiated emissions 12.5 – 15 GHz vertical   |  |
| 12967-1 Radiated emissions 15 – 18 GHz horizontal   |  |

|                                                         |
|---------------------------------------------------------|
| 12967-1 Radiated emissions 15 – 18 GHz vertical         |
| 12967-1 Radiated emissions 18 – 22 GHz horizontal       |
| 12967-1 Radiated emissions 18 – 22 GHz vertical         |
| 12967-1 Radiated emissions 22 – 26.5 GHz horizontal     |
| 12967-1 Radiated emissions 22 – 26.5 GHz vertical       |
| 12967-1 Radiated emissions 26.5 – 30 GHz horizontal     |
| 12967-1 Radiated emissions 26.5 – 30 GHz vertical       |
| 12967-1 Radiated emissions 30 – 34 GHz horizontal       |
| 12967-1 Radiated emissions 30 – 34 GHz vertical         |
| 12967-1 Radiated emissions 34 – 38 GHz horizontal       |
| 12967-1 Radiated emissions 34 – 38 GHz vertical         |
| 12967-1 Radiated emissions 38 – 40 GHz horizontal       |
| 12967-1 Radiated emissions 38 – 40 GHz vertical         |
| 12967-1 TX Radiated Emissions 40 – 44 GHz Horizontal    |
| 12967-1 TX Radiated Emissions 40 – 44 GHz Vertical      |
| 12967-1 TX Radiated Emissions 44 – 48 GHz Horizontal    |
| 12967-1 TX Radiated Emissions 44 – 48 GHz Vertical      |
| 12967-1 TX Radiated Emissions 48 – 52 GHz Horizontal    |
| 12967-1 TX Radiated Emissions 48 – 52 GHz Vertical      |
| 12967-1 TX Radiated Emissions 52 – 56 GHz Horizontal    |
| 12967-1 TX Radiated Emissions 52 – 56 GHz Vertical      |
| 12967-1 TX Radiated Emissions 56 – 60 GHz Horizontal    |
| 12967-1 TX Radiated Emissions 56 – 60 GHz Vertical      |
| 12967-1 TX Radiated Emissions 60 – 64 GHz Horizontal    |
| 12967-1 TX Radiated Emissions 60 – 64 GHz Vertical      |
| 12967-1 TX Radiated Emissions 64 – 68 GHz Horizontal    |
| 12967-1 TX Radiated Emissions 64 – 68 GHz Vertical      |
| 12967-1 TX Radiated Emissions 68 – 72 GHz Horizontal    |
| 12967-1 TX Radiated Emissions 68 – 72 GHz Vertical      |
| 12967-1 TX Radiated Emissions 72 – 76 GHz Horizontal    |
| 12967-1 TX Radiated Emissions 72 – 76 GHz Vertical      |
| 12967-1 TX Radiated Emissions 76 – 80 GHz Horizontal    |
| 12967-1 TX Radiated Emissions 76 – 80 GHz Vertical      |
| 12967-1 TX Radiated Emissions 80 – 90 GHz Horizontal    |
| 12967-1 TX Radiated Emissions 80 – 90 GHz Vertical      |
| 12967-1 TX Radiated Emissions 90 – 100 GHz Horizontal   |
| 12967-1 TX Radiated Emissions 90 – 100 GHz Vertical     |
| 12967-1 TX Radiated Emissions 100 – 110 GHz Horizontal  |
| 12967-1 TX Radiated Emissions 100 – 110 GHz Vertical    |
| 102967-1 TX Radiated Emissions 110 – 120 GHz Horizontal |
| 12967-1 TX Radiated Emissions 110 – 120 GHz Vertical    |
| 12967-1 TX Radiated Emissions 120 – 130 GHz Horizontal  |
| 12967-1 TX Radiated Emissions 120 – 130 GHz Vertical    |
| 12967-1 TX Radiated Emissions 130 – 140 GHz Horizontal  |
| 12967-1 TX Radiated Emissions 130 – 140 GHz Vertical    |
| 12967-1 TX Radiated Emissions 140 – 150 GHz Horizontal  |
| 12967-1 TX Radiated Emissions 140 – 150 GHz Vertical    |
| 12967-1 TX Radiated Emissions 150 – 160 GHz Horizontal  |
| 12967-1 TX Radiated Emissions 150 – 160 GHz Vertical    |
| 12967-1 TX Radiated Emissions 160 – 170 GHz Horizontal  |
| 12967-1 TX Radiated Emissions 160 – 170 GHz Vertical    |
| 12967-1 TX Radiated Emissions 170 – 180 GHz Horizontal  |
| 12967-1 TX Radiated Emissions 170 – 180 GHz Vertical    |
| 12967-1 TX Radiated Emissions 180 – 190 GHz Horizontal  |
| 12967-1 TX Radiated Emissions 180 – 190 GHz Vertical    |
| 12967-1 TX Radiated Emissions 190 – 200 GHz Horizontal  |

12967-1 TX Radiated Emissions 190 – 200 GHz Vertical

Horizontal Signal List

| Signal No. | Freq (MHz) | Peak Amp (dBuV/m) | Pk –Lim (dB) | AV Amp (dBuV/m) | AV –Lim (dB) |
|------------|------------|-------------------|--------------|-----------------|--------------|
| 1          | 4999.743   | 43.9              | -30.1        | 33.5            | -20.5        |

Vertical Signal List

| Signal No. | Freq (MHz) | Peak Amp (dBuV/m) | Pk –Lim (dB) | AV Amp (dBuV/m) | AV –Lim (dB) |
|------------|------------|-------------------|--------------|-----------------|--------------|
| 1          | 4999.778   | 42.8              | -31.2        | 31.0            | -23.0        |

“Max held” Analyser plots against the Average limit line can be found in Section 6 of this report.

Note: Whilst Low, Mid and High channels were tested, plots are for illustrative purposes only and only Mid channel plots are shown in this report to minimise report size.

**LIMITS:**

15.209 limits are applicable in the restricted bands of 15.205 with the relevant detector.

15.255 (d)(3) between 40 GHz and 200 GHz the level of the emissions shall not exceed 90pW/cm<sup>2</sup> at a distance of 3m. This is equivalent to 85.1dBuV/m @ a distance of 3m. Calculations are based on ANSI C63.10 clauses 9.4 – 9.7.

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows:  
1 – 18 GHz ±3.5dB, 18 – 26.5 GHz ±3.9dB, 26.5 – 60 GHz ±3.9dB, 60 – 110 GHz ±4.4dB, 110 – 200 GHz ±5.9dB

## 5.6 Frequency stability

### 5.6.1 Test methods

|                    |                                                                 |
|--------------------|-----------------------------------------------------------------|
| Test Requirements: | 47 CFR Part 15C Part 15.255(f) [Reference 4.1.1 of this report] |
| Test Method:       | ANSI C63.10 Clause 6.8 / 9.14 [Reference 4.1.2 of this report]  |
| Limits:            | 47 CFR Part 15C Part 15.255(f) [Reference 4.1.1 of this report] |

### 5.6.2 Configuration of EUT

The EUT was placed in a temperature controlled chamber and the measurements were performed radiated, To allow the EUT's fundamental transmission to pass through the chamber the chamber door was removed and replaced with a Styrofoam sheet. The EUT was configured to generate a CW tone which had an offset from the centre frequency of 99.687 MHz. The EUT was operated in TX1, TX4 and TX6 modes for this test (Radio 0).

### 5.6.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment listed below. Temperature stability was achieved at each test temperature level before taking measurements using a counter function of a spectrum analyser. Tests were performed using Test Site A.

### 5.6.4 Test equipment

E434, E717, E755, E777, E781, E908, E920, E994, N579

See Section 9 for more details

### 5.6.5 Test results

|                                 |        |
|---------------------------------|--------|
| Temperature of test environment | 20°C   |
| Humidity of test environment    | 50%    |
| Pressure of test environment    | 101kPa |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 0) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | CW Tone             |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

| Test conditions                    |                     | Frequency Error (MHz)<br>Low channel | Frequency Error (MHz)<br>Mid channel | Frequency Error (MHz)<br>High channel |
|------------------------------------|---------------------|--------------------------------------|--------------------------------------|---------------------------------------|
| -25°C                              | Volts Nominal (120) | 58320.244445                         | 64800.271869                         | 69119.708336                          |
| -20°C                              | Volts Nominal (120) | 58320.230128                         | 64800.251847                         | 69119.733893                          |
| -10°C                              | Volts Nominal (120) | 58320.170235                         | 64800.195484                         | 69119.779901                          |
| 0°C                                | Volts Nominal (120) | 58320.135781                         | 64800.142233                         | 69119.852901                          |
| 10°C                               | Volts Nominal (120) | 58320.069456                         | 64800.078661                         | 69119.915213                          |
| 20°C                               | Volts Minimum (102) | 58320.010515                         | 64800.011878                         | 69119.987948                          |
|                                    | Volts Nominal (120) | 58320.010570                         | 64800.011775                         | 69119.988890                          |
|                                    | Volts Maximum       | 58320.010176                         | 64800.012165                         | 69119.987624                          |
| 30°C                               | Volts Nominal (120) | 58320.037001                         | 64800.037495                         | 69119.961624                          |
| 40°C                               | Volts Nominal (120) | 58320.014823                         | 64800.015582                         | 69119.983148                          |
| 50°C                               | Volts Nominal (120) | 58320.007030                         | 64800.006045                         | 69119.994259                          |
| Max Frequency Error per chan (Hz)  |                     | +244445 / 7030                       | +271869 / 6045                       | +5741 / -291664                       |
| Max Frequency Error observed (MHz) |                     | 0.244445                             | 0.271869                             | -0.291664                             |

Maximum variation observed was +5741 and -0.291664 MHz.

**LIMITS:**

15.255 (f) Fundamental emissions must be contained within the frequency band specified during all conditions of operation.

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows:  
<± 0.7 ppm

## 5.7 Peak & Average EIRP

### 5.7.1 Test methods

|                    |                                                                            |
|--------------------|----------------------------------------------------------------------------|
| Test Requirements: | 47 CFR Part 15C Part 15.255(c)(1)(i)/(ii) [Reference 4.1.1 of this report] |
| Test Method:       | ANSI C63.10 Clause 9.10 & 9.11 [Reference 4.1.2 of this report]            |
| Limits:            | 47 CFR Part 15C Part 15.255(c)(1)(i)/(ii) [Reference 4.1.1 of this report] |

### 5.7.2 Configuration of EUT

The EUT was placed on a 1.5 metres high turntable. The EUT antenna was positioned and aligned with the measuring antenna. The EUT was measured at a distance of 60 centimetres. During the initial scan modulation scheme MCS5 was found to be the worst case mode of operation along with the stated beams for maximum EIRP, therefore MCS5 and the beam settings stated below were used for full test. The EUT was operated in TX1 and TX4 and TX6 modes. The test was repeated with the EUT configured for Half Band and Quarter Band channel bandwidths.

### 5.7.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment listed below. Measurements were made in a semi-anechoic chamber with appropriate absorbing material for use in this range. A Horn antenna was used to align with and measure the radiated power from the EUT. A wideband RF detector was used with a digital oscilloscope to measure the Peak and Average power. A measurement distance of 60 cm was used to maintain the far field condition at the frequency of interest whilst maintaining enough EUT transmitted signal into the mixer. Substitution was performed to determine results. Vertical measuring polarisation provided highest EIRP results. Tests were performed using test Site A.

### 5.7.4 Test equipment

E503, E577, E755, E768, E777, E781, E908, E920, F042, F136, H074

See Section 9 for more details

### 5.7.5 Test results

|                                 |        |
|---------------------------------|--------|
| Temperature of test environment | 18°C   |
| Humidity of test environment    | 40%    |
| Pressure of test environment    | 102kPa |

Pre-scan worst case checks (radio 0 provided highest power):

| Full Band       |                       | Beam setting | 29                | 21                | 32                 |
|-----------------|-----------------------|--------------|-------------------|-------------------|--------------------|
| Mod scheme/rate | RF parameter          |              | Low channel (dBm) | Mid channel (dBm) | High channel (dBm) |
| MCS0            | Peak EIRP measured    |              | 38.6              | 40.40             | 40.30              |
|                 | Average EIRP measured |              | 37.9              | 39.8              | 39.60              |
| MCS1            | Peak EIRP measured    |              | 38.7              | 40.40             | 40.20              |
|                 | Average EIRP measured |              | 38                | 39.8              | 39.50              |
| MCS2            | Peak EIRP measured    |              | 38.7              | 40.30             | 40.10              |
|                 | Average EIRP measured |              | 38                | 39.7              | 39.40              |
| MCS3            | Peak EIRP measured    |              | 38.7              | 40.50             | 40.30              |
|                 | Average EIRP measured |              | 38                | 39.9              | 39.60              |
| MCS4            | Peak EIRP measured    |              | 38.7              | 40.50             | 40.30              |
|                 | Average EIRP measured |              | 38                | 39.9              | 39.60              |
| MCS5            | Peak EIRP measured    |              | 38.7              | 40.50             | 40.30              |
|                 | Average EIRP measured |              | 38                | 39.9              | 39.60              |
| MCS6            | Peak EIRP measured    |              | 38.7              | 40.50             | 40.30              |
|                 | Average EIRP measured |              | 37.70             | 39.20             | 38.80              |

|       |                       |       |       |       |
|-------|-----------------------|-------|-------|-------|
| MCS7  | Peak EIRP measured    | 38.7  | 40.50 | 40.30 |
|       | Average EIRP measured | 37.10 | 39.20 | 38.50 |
| MCS8  | Peak EIRP measured    | 38.7  | 40.50 | 40.30 |
|       | Average EIRP measured | 37.10 | 39.20 | 38.60 |
| MCS9  | Peak EIRP measured    | 38.7  | 40.50 | 40.30 |
|       | Average EIRP measured | 37.10 | 39.20 | 38.50 |
| MCS10 | Peak EIRP measured    | 38.7  | 40.50 | 40.30 |
|       | Average EIRP measured | 37.10 | 38.70 | 38.30 |
| MCS11 | Peak EIRP measured    | 38.7  | 40.50 | 40.30 |
|       | Average EIRP measured | 37.10 | 38.90 | 38.30 |
| MCS12 | Peak EIRP measured    | 38.6  | 40.50 | 40.30 |
|       | Average EIRP measured | 37.00 | 38.80 | 38.30 |

Final test Results Radio 0 (MCS5)

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 0) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS5                |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

| Full Band             | Beam setting | 29                | 21                | 32                 |
|-----------------------|--------------|-------------------|-------------------|--------------------|
|                       |              | Low channel (dBm) | Mid channel (dBm) | High channel (dBm) |
| Peak EIRP measured    |              | 38.7              | 40.5              | 40.3               |
| Peak Margin (dB)      |              | -4.3              | -2.5              | -2.7               |
| Average EIRP measured |              | 38.0              | 39.9              | 39.6               |
| Average Margin (dB)   |              | -2.0              | -0.1              | -0.4               |

| Half Band             | Beam setting | 29                | 21                | 32                 |
|-----------------------|--------------|-------------------|-------------------|--------------------|
|                       |              | Low channel (dBm) | Mid channel (dBm) | High channel (dBm) |
| Peak EIRP measured    |              | 38.3              | 40.5              | 40.2               |
| Peak Margin (dB)      |              | -4.7              | -2.5              | -2.8               |
| Average EIRP measured |              | 37.6              | 39.7              | 39.6               |
| Average Margin (dB)   |              | -2.4              | -0.3              | -0.4               |

| Quarter Band          | Beam setting | 29                | 21                | 32                 |
|-----------------------|--------------|-------------------|-------------------|--------------------|
|                       |              | Low channel (dBm) | Mid channel (dBm) | High channel (dBm) |
| Peak EIRP measured    |              | 38.4              | 40.4              | 40.3               |
| Peak Margin (dB)      |              | -4.6              | -2.6              | -2.7               |
| Average EIRP measured |              | 37.7              | 39.7              | 39.6               |
| Average Margin (dB)   |              | -2.3              | -0.3              | -0.4               |

Final test Results Radio 1 (MCS5)

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 1) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS5                |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

| Full Band             | Beam Setting | 29                | 52                | 51                 |
|-----------------------|--------------|-------------------|-------------------|--------------------|
|                       |              | Low channel (dBm) | Mid channel (dBm) | High channel (dBm) |
| Peak EIRP measured    |              | 38.8              | 40.4              | 40.4               |
| Peak Margin (dB)      |              | -4.2              | -2.6              | -2.6               |
| Average EIRP measured |              | 38.1              | 39.9              | 39.5               |
| Average Margin (dB)   |              | -1.9              | -0.1              | -0.5               |

Half Band

|                       | Low channel (dBm) | Mid channel (dBm) | High channel (dBm) |
|-----------------------|-------------------|-------------------|--------------------|
| Peak EIRP measured    | 39.6              | 40.2              | 40.3               |
| Peak Margin (dB)      | -3.4              | -2.8              | -2.7               |
| Average EIRP measured | 39.1              | 39.6              | 39.7               |
| Average Margin (dB)   | -0.9              | -0.4              | -0.3               |

Quarter Band

|                       | Low channel (dBm) | Mid channel (dBm) | High channel (dBm) |
|-----------------------|-------------------|-------------------|--------------------|
| Peak EIRP measured    | 39.7              | 39.2              | 40.4               |
| Peak Margin (dB)      | -3.3              | -3.8              | -2.6               |
| Average EIRP measured | 39.1              | 38.6              | 39.6               |
| Average Margin (dB)   | -0.9              | -1.4              | -0.4               |

Example of EIRP calculation from measured dBuV/m at 0.6m. using ANSI C63.10:2013 equation 22:

Using 148.77 dBuV/m PK @0.6m as highest measured E field (radio 0 middle channel):

(22):  $EIRP = E_{Meas} + 20\log(d_{Meas}) - 104.7$ ,  $= 148.77 + (-4.44) - 104.7 = +40.5$  dBm.

**LIMITS:**

15.255 (c)(i) the average power of any emission shall not exceed 40 dBm and the peak power of any emission shall not exceed 43 dBm .

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows:  
<± 4.6 dB

## 5.8 Peak Conducted Power

### 5.8.1 Test methods

Test Requirements: 47 CFR Part 15C Part 15.255© [Reference 4.1.1 of this report]  
Test Method: ANSI C63.10 Clause 9.7 [Reference 4.1.2 of this report]  
Limits: 47 CFR Part 15C Part 15.255© [Reference 4.1.1 of this report]

### 5.8.2 Configuration of EUT

The results from the EIRP tests in section 5.7 above were used.

### 5.8.3 Test procedure

A calculation was performed in accordance with ANSI C63.10:2013 clause 9.7. Equation 27 using the following formula:

$$P_{COND} = EIRP_{LINEAR} / G_{EUT}$$

Where:

$P_{COND}$  is conducted power in Watts.

$EIRP_{LINEAR}$  is equivalent isotropically radiated power in Watts

$G_{EUT}$  is numeric gain of EUT radiating element (Antenna)

### 5.8.4 Test equipment

Not required

### 5.8.5 Test results

|                 |                  |
|-----------------|------------------|
| Band            | 57-71 GHz (rad0) |
| Power Level     | 40 dBm (EIRP)    |
| Channel Spacing | 2.16 GHz         |
| Mod Scheme      | mcs5             |
| Low channel     | 58.32 GHz        |
| Mid channel     | 64.8 GHz         |
| High channel    | 69.12 GHz        |

#### Full Bandwidth

| Test conditions                     | Low channel | Mid channel | High channel |
|-------------------------------------|-------------|-------------|--------------|
| Peak EIRP measured (dBm)            | 38.7        | 40.5        | 40.3         |
| Beam setting for maximum            | 29          | 21          | 32           |
| Peak EIRP measured in Watts         | 7.413       | 11.22       | 10.715       |
| Calculated Peak conducted power (W) | 0.037152    | 0.056232    | 0.053701     |

#### Half Bandwidth

| Test conditions                     | Low channel | Mid channel | High channel |
|-------------------------------------|-------------|-------------|--------------|
| Peak EIRP measured (dBm)            | 38.3        | 40.5        | 40.2         |
| Beam setting for maximum            | 29          | 21          | 32           |
| Peak EIRP measured in Watts         | 6.76        | 11.22       | 10.471       |
| Calculated Peak conducted power (W) | 0.03388     | 0.056232    | 0.052478     |

#### Quarter Bandwidth

| Test conditions                     | Low channel | Mid channel | High channel |
|-------------------------------------|-------------|-------------|--------------|
| Peak EIRP measured (dBm)            | 38.4        | 40.4        | 40.3         |
| Beam setting for maximum            | 29          | 21          | 32           |
| Peak EIRP measured in Watts         | 6.918       | 10.965      | 10.715       |
| Calculated Peak conducted power (W) | 0.034671    | 0.054954    | 0.053701     |

|                 |                  |
|-----------------|------------------|
| Band            | 57-71 GHz (rad1) |
| Power Level     | 40 dBm (EIRP)    |
| Channel Spacing | 2.16 GHz         |
| Mod Scheme      | mcs5             |
| Low channel     | 58.32 GHz        |
| Mid channel     | 64.8 GHz         |
| High channel    | 69.12 GHz        |

#### Full Bandwidth

| Test conditions                     | Low channel | Mid channel | High channel |
|-------------------------------------|-------------|-------------|--------------|
| Peak EIRP measured (dBm)            | 38.8        | 40.4        | 40.4         |
| Beam setting for maximum            | 29          | 52          | 51           |
| Peak EIRP measured in Watts         | 7.585       | 10.965      | 10.965       |
| Calculated Peak conducted power (W) | 0.038014    | 0.054954    | 0.054954     |

#### Half Bandwidth

| Test conditions                     | Low channel | Mid channel | High channel |
|-------------------------------------|-------------|-------------|--------------|
| Peak EIRP measured (dBm)            | 39.6        | 40.2        | 40.3         |
| Beam setting for maximum            | 29          | 52          | 51           |
| Peak EIRP measured in Watts         | 9.12        | 10.471      | 10.715       |
| Calculated Peak conducted power (W) | 0.045707    | 0.052478    | 0.053701     |

#### Quarter Bandwidth

| Test conditions                     | Low channel | Mid channel | High channel |
|-------------------------------------|-------------|-------------|--------------|
| Peak EIRP measured (dBm)            | 39.7        | 39.2        | 40.4         |
| Beam setting for maximum            | 29          | 52          | 51           |
| Peak EIRP measured in Watts         | 9.333       | 8.318       | 10.965       |
| Calculated Peak conducted power (W) | 0.046775    | 0.041688    | 0.054954     |

Antenna gain is declared as 23dBi (numeric gain is therefore 199.53)

15.255 © the peak transmitter conducted output power shall not exceed 500 mW.

These results show that the EUT has PASSED this test.

## 5.9 6dB Occupied bandwidth

### 5.9.1 Test methods

|                    |                                                                  |
|--------------------|------------------------------------------------------------------|
| Test Requirements: | 47 CFR Part 15C Part 15.215 [Reference 4.1.1 of this report]     |
| Test Method:       | ANSI C63.10 Clause 9.3 [Reference 4.1.2 of this report]          |
| Limits:            | 47 CFR Part 15C Part 15.255©(1) [Reference 4.1.1 of this report] |

### 5.9.2 Configuration of EUT

The EUT was placed on a 1.5 metres high turntable. The front edge of the EUT was initially positioned facing the antenna. The EUT was measured at a distance of 60 centimetres. The EUT was operated in TX1, TX4 and TX6 modes and each modulation scheme was assessed in turn.

### 5.9.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment listed below. A 100 kHz RBW, 3x VBW, auto sweep time and max hold settings were used for the 6 dB bandwidth. All schemes were tested in Full bandwidth mode for both radio 0 and radio 1 and the test repeated with the EUT configured for Half Band and Quarter Band channels in the worst case scheme (widest bandwidth) only (MCS4) on radio 0.

Tests were performed using test Site A.

### 5.9.4 Test equipment

E717, E755, E777, E781, E908, E920

See Section 9 for more details

### 5.9.5 Test results

|                                 |        |
|---------------------------------|--------|
| Temperature of test environment | 20°C   |
| Humidity of test environment    | 40%    |
| Pressure of test environment    | 102kPa |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 0) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS0                |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel | Mid channel | High channel |
|--------------------------------------|-------------|-------------|--------------|
| 6dB Bandwidth (GHz)                  | 1.472       | 1.678       | 1.334        |
| 99% Bandwidth (GHz)                  | 1.8827      | 1.8758      | 1.8506       |
| Frequency Error (MHz) (include sign) | 40.256      | 37.304      | -25.261      |
| Operating frequency (GHz)            | 58.32       | 64.8        | 69.12        |
| 6dB BW FLOW Worst case (GHz)         | 57.624256   | 63.998304   | 68.427739    |
| 6dB BW FHIGH Worst case (GHz)        | 59.096256   | 65.676304   | 69.761739    |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 1) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS0                |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|  | Low channel | Mid channel | High channel |
|--|-------------|-------------|--------------|
|--|-------------|-------------|--------------|

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|                                      |                              |                              |                               |
|--------------------------------------|------------------------------|------------------------------|-------------------------------|
| 6dB Bandwidth (GHz)                  | 1.581                        | 1.554                        | 1.458                         |
| Plot of 6dB Bandwidth (GHz)          | 12967-1 Radio 1 Low<br>mcs 0 | 12967-1 Radio 1 Mid<br>mcs 0 | 12967-1 Radio 1<br>High mcs 0 |
| 99% Bandwidth (GHz)                  | 1.825                        | 1.8164                       | 1.8237                        |
| Frequency Error (MHz) (include sign) | 35.752                       | 34.097                       | -33.938                       |
| Operating frequency (GHz)            | 58.32                        | 64.8                         | 69.12                         |
| 6dB BW FLOW Worst case (GHz)         | 57.565252                    | 64.057097                    | 68.357062                     |
| 6dB BW FHIGH Worst case (GHz)        | 59.146252                    | 65.611097                    | 69.815062                     |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 0) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS1                |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                  | Mid channel                  | High channel                  |
|--------------------------------------|------------------------------|------------------------------|-------------------------------|
| 6dB Bandwidth (GHz)                  | 1.547                        | 1.643                        | 1.485                         |
| Plot of 6dB Bandwidth (GHz)          | 12967-1 Radio 0 Low<br>mcs 1 | 12967-1 Radio 0 Mid<br>mcs 1 | 12967-1 Radio 0<br>High mcs 1 |
| 99% Bandwidth (GHz)                  | 1.9009                       | 1.8866                       | 1.8737                        |
| Frequency Error (MHz) (include sign) | 18.137                       | 15.648                       | -8.1626                       |
| Operating frequency (GHz)            | 58.32                        | 64.8                         | 69.12                         |
| 6dB BW FLOW Worst case (GHz)         | 57.564637                    | 63.994148                    | 68.3693374                    |
| 6dB BW FHIGH Worst case (GHz)        | 59.111637                    | 65.637148                    | 69.8543374                    |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 1) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS1                |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                  | Mid channel                  | High channel                  |
|--------------------------------------|------------------------------|------------------------------|-------------------------------|
| 6dB Bandwidth (GHz)                  | 1.647                        | 1.495                        | 1.437                         |
| Plot of 6dB Bandwidth (GHz)          | 12967-1 Radio 1 Low<br>mcs 1 | 12967-1 Radio 1 Mid<br>mcs 1 | 12967-1 Radio 1<br>High mcs 1 |
| 99% Bandwidth (GHz)                  | 1.8378                       | 1.8414                       | 1.8479                        |
| Frequency Error (MHz) (include sign) | 17.609                       | 13.48                        | -8.4134                       |
| Operating frequency (GHz)            | 58.32                        | 64.8                         | 69.12                         |
| 6dB BW FLOW Worst case (GHz)         | 57.514109                    | 64.06598                     | 68.3930866                    |
| 6dB BW FHIGH Worst case (GHz)        | 59.161109                    | 65.56098                     | 69.8300866                    |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 0) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS2                |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                  | Mid channel                  | High channel                  |
|--------------------------------------|------------------------------|------------------------------|-------------------------------|
| 6dB Bandwidth (GHz)                  | 1.667                        | 1.664                        | 1.365                         |
| Plot of 6dB Bandwidth (GHz)          | 12967-1 Radio 0 Low<br>mcs 2 | 12967-1 Radio 0 Mid<br>mcs 2 | 12967-1 Radio 0<br>High mcs 2 |
| 99% Bandwidth (GHz)                  | 1.9016                       | 1.8896                       | 1.8732                        |
| Frequency Error (MHz) (include sign) | 18.667                       | 15.553                       | -8.5693                       |
| Operating frequency (GHz)            | 58.32                        | 64.8                         | 69.12                         |
| 6dB BW FLOW Worst case (GHz)         | 57.505167                    | 63.983553                    | 68.4289307                    |
| 6dB BW FHIGH Worst case (GHz)        | 59.172167                    | 65.647553                    | 69.7939307                    |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 1) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS2                |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                  | Mid channel                  | High channel                  |
|--------------------------------------|------------------------------|------------------------------|-------------------------------|
| 6dB Bandwidth (GHz)                  | 1.654                        | 1.348                        | 1.413                         |
| Plot of 6dB Bandwidth (GHz)          | 12967-1 Radio 1 Low<br>mcs 2 | 12967-1 Radio 1 Mid<br>mcs 2 | 12967-1 Radio 1<br>High mcs 2 |
| 99% Bandwidth (GHz)                  | 1.8377                       | 1.8439                       | 1.8442                        |
| Frequency Error (MHz) (include sign) | 16.488                       | 11.955                       | -9.0727                       |
| Operating frequency (GHz)            | 58.32                        | 64.8                         | 69.12                         |
| 6dB BW FLOW Worst case (GHz)         | 57.509488                    | 64.137955                    | 68.4044273                    |
| 6dB BW FHIGH Worst case (GHz)        | 59.163488                    | 65.485955                    | 69.8174273                    |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 0) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS3                |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                  | Mid channel                  | High channel                  |
|--------------------------------------|------------------------------|------------------------------|-------------------------------|
| 6dB Bandwidth (GHz)                  | 1.592                        | 1.671                        | 1.361                         |
| Plot of 6dB Bandwidth (GHz)          | 12967-1 Radio 0 Low<br>mcs 3 | 12967-1 Radio 0 Mid<br>mcs 3 | 12967-1 Radio 0<br>High mcs 3 |
| 99% Bandwidth (GHz)                  | 1.9032                       | 1.8897                       | 1.8738                        |
| Frequency Error (MHz) (include sign) | 17.649                       | 14.979                       | -8.1115                       |
| Operating frequency (GHz)            | 58.32                        | 64.8                         | 69.12                         |
| 6dB BW FLOW Worst case (GHz)         | 57.541649                    | 63.979479                    | 68.4313885                    |
| 6dB BW FHIGH Worst case (GHz)        | 59.133649                    | 65.650479                    | 69.7923885                    |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 1) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS3                |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                  | Mid channel                  | High channel                  |
|--------------------------------------|------------------------------|------------------------------|-------------------------------|
| 6dB Bandwidth (GHz)                  | 1.619                        | 1.44                         | 1.489                         |
| Plot of 6dB Bandwidth (GHz)          | 12967-1 Radio 1 Low<br>mcs 3 | 12967-1 Radio 1 Mid<br>mcs 3 | 12967-1 Radio 1<br>High mcs 3 |
| 99% Bandwidth (GHz)                  | 1.8409                       | 1.8399                       | 1.8459                        |
| Frequency Error (MHz) (include sign) | 17.988                       | 16.615                       | -7.4651                       |
| Operating frequency (GHz)            | 58.32                        | 64.8                         | 69.12                         |
| 6dB BW FLOW Worst case (GHz)         | 57.528488                    | 64.096615                    | 68.3680349                    |
| 6dB BW FHIGH Worst case (GHz)        | 59.147488                    | 65.536615                    | 69.8570349                    |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 0) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS4                |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                  | Mid channel                  | High channel                  |
|--------------------------------------|------------------------------|------------------------------|-------------------------------|
| 6dB Bandwidth (GHz)                  | 1.678                        | 1.671                        | 1.406                         |
| Plot of 6dB Bandwidth (GHz)          | 12967-1 Radio 0 Low<br>mcs 4 | 12967-1 Radio 0 Mid<br>mcs 4 | 12967-1 Radio 0<br>High mcs 4 |
| 99% Bandwidth (GHz)                  | 1.9909                       | 1.8894                       | 1.8731                        |
| Frequency Error (MHz) (include sign) | 18.704                       | 15.864                       | -8.2585                       |
| Operating frequency (GHz)            | 58.32                        | 64.8                         | 69.12                         |
| 6dB BW FLOW Worst case (GHz)         | 57.499704                    | 63.980364                    | 68.4087415                    |
| 6dB BW FHIGH Worst case (GHz)        | 59.177704                    | 65.651364                    | 69.8147415                    |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 1) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS4                |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                  | Mid channel                  | High channel                  |
|--------------------------------------|------------------------------|------------------------------|-------------------------------|
| 6dB Bandwidth (GHz)                  | 1.527                        | 1.451                        | 1.372                         |
| Plot of 6dB Bandwidth (GHz)          | 12967-1 Radio 1 Low<br>mcs 4 | 12967-1 Radio 1 Mid<br>mcs 4 | 12967-1 Radio 1<br>High mcs 4 |
| 99% Bandwidth (GHz)                  | 1.8399                       | 1.8412                       | 1.8468                        |
| Frequency Error (MHz) (include sign) | 18.261                       | 12.205                       | -9.1264                       |
| Operating frequency (GHz)            | 58.32                        | 64.8                         | 69.12                         |
| 6dB BW FLOW Worst case (GHz)         | 57.574761                    | 64.086705                    | 68.4248736                    |
| 6dB BW FHIGH Worst case (GHz)        | 59.101761                    | 65.537705                    | 69.7968736                    |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 0) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS5                |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                  | Mid channel                  | High channel                  |
|--------------------------------------|------------------------------|------------------------------|-------------------------------|
| 6dB Bandwidth (GHz)                  | 1.664                        | 1.661                        | 1.406                         |
| Plot of 6dB Bandwidth (GHz)          | 12967-1 Radio 0 Low<br>mcs 5 | 12967-1 Radio 0 Mid<br>mcs 5 | 12967-1 Radio 0<br>High mcs 5 |
| 99% Bandwidth (GHz)                  | 1.901                        | 1.8924                       | 1.8735                        |
| Frequency Error (MHz) (include sign) | 18.089                       | 16.447                       | -8.5656                       |
| Operating frequency (GHz)            | 58.32                        | 64.8                         | 69.12                         |
| 6dB BW FLOW Worst case (GHz)         | 57.506089                    | 63.985947                    | 68.4084344                    |
| 6dB BW FHIGH Worst case (GHz)        | 59.170089                    | 65.646947                    | 69.8144344                    |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 1) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS5                |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                  | Mid channel                  | High channel                  |
|--------------------------------------|------------------------------|------------------------------|-------------------------------|
| 6dB Bandwidth (GHz)                  | 1.64                         | 1.444                        | 1.313                         |
| Plot of 6dB Bandwidth (GHz)          | 12967-1 Radio 1 Low<br>mcs 5 | 12967-1 Radio 1 Mid<br>mcs 5 | 12967-1 Radio 1<br>High mcs 5 |
| 99% Bandwidth (GHz)                  | 1.8358                       | 1.8411                       | 1.8462                        |
| Frequency Error (MHz) (include sign) | 17.052                       | 10.989                       | -8.3008                       |
| Operating frequency (GHz)            | 58.32                        | 64.8                         | 69.12                         |
| 6dB BW FLOW Worst case (GHz)         | 57.517052                    | 64.088989                    | 68.4551992                    |
| 6dB BW FHIGH Worst case (GHz)        | 59.157052                    | 65.532989                    | 69.7681992                    |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 0) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS6                |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                  | Mid channel                  | High channel                  |
|--------------------------------------|------------------------------|------------------------------|-------------------------------|
| 6dB Bandwidth (GHz)                  | 1.475                        | 1.678                        | 1.365                         |
| Plot of 6dB Bandwidth (GHz)          | 12967-1 Radio 0 Low<br>mcs 6 | 12967-1 Radio 0 Mid<br>mcs 6 | 12967-1 Radio 0<br>High mcs 6 |
| 99% Bandwidth (GHz)                  | 1.9108                       | 1.914                        | 1.8937                        |
| Frequency Error (MHz) (include sign) | 17.94                        | 16.217                       | -7.8452                       |
| Operating frequency (GHz)            | 58.32                        | 64.8                         | 69.12                         |
| 6dB BW FLOW Worst case (GHz)         | 57.60044                     | 63.977217                    | 68.4296548                    |
| 6dB BW FHIGH Worst case (GHz)        | 59.07544                     | 65.655217                    | 69.7946548                    |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 1) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS6                |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                  | Mid channel                  | High channel                  |
|--------------------------------------|------------------------------|------------------------------|-------------------------------|
| 6dB Bandwidth (GHz)                  | 1.513                        | 1.444                        | 1.434                         |
| Plot of 6dB Bandwidth (GHz)          | 12967-1 Radio 1 Low<br>mcs 6 | 12967-1 Radio 1 Mid<br>mcs 6 | 12967-1 Radio 1<br>High mcs 6 |
| 99% Bandwidth (GHz)                  | 1.8671                       | 1.8687                       | 1.8887                        |
| Frequency Error (MHz) (include sign) | 19.041                       | 11.986                       | -6.8799                       |
| Operating frequency (GHz)            | 58.32                        | 64.8                         | 69.12                         |
| 6dB BW FLOW Worst case (GHz)         | 57.582541                    | 64.089986                    | 68.3961201                    |
| 6dB BW FHIGH Worst case (GHz)        | 59.095541                    | 65.533986                    | 69.8301201                    |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 0) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS7                |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                  | Mid channel                  | High channel                  |
|--------------------------------------|------------------------------|------------------------------|-------------------------------|
| 6dB Bandwidth (GHz)                  | 1.523                        | 1.674                        | 1.361                         |
| Plot of 6dB Bandwidth (GHz)          | 12967-1 Radio 0 Low<br>mcs 7 | 12967-1 Radio 0 Mid<br>mcs 7 | 12967-1 Radio 0<br>High mcs 7 |
| 99% Bandwidth (GHz)                  | 1.9142                       | 1.9133                       | 1.893                         |
| Frequency Error (MHz) (include sign) | 19.096                       | 16.03                        | -6.1545                       |
| Operating frequency (GHz)            | 58.32                        | 64.8                         | 69.12                         |
| 6dB BW FLOW Worst case (GHz)         | 57.577596                    | 63.97903                     | 68.4333455                    |
| 6dB BW FHIGH Worst case (GHz)        | 59.100596                    | 65.65303                     | 69.7943455                    |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 1) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS7                |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                  | Mid channel                  | High channel                  |
|--------------------------------------|------------------------------|------------------------------|-------------------------------|
| 6dB Bandwidth (GHz)                  | 1.647                        | 1.368                        | 1.355                         |
| Plot of 6dB Bandwidth (GHz)          | 12967-1 Radio 1 Low<br>mcs 7 | 12967-1 Radio 1 Mid<br>mcs 7 | 12967-1 Radio 1<br>High mcs 7 |
| 99% Bandwidth (GHz)                  | 1.8628                       | 1.8678                       | 1.8841                        |
| Frequency Error (MHz) (include sign) | 17.511                       | 11.231                       | -6.5681                       |
| Operating frequency (GHz)            | 58.32                        | 64.8                         | 69.12                         |
| 6dB BW FLOW Worst case (GHz)         | 57.514011                    | 64.127231                    | 68.4359319                    |
| 6dB BW FHIGH Worst case (GHz)        | 59.161011                    | 65.495231                    | 69.7909319                    |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 0) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS8                |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                  | Mid channel                  | High channel                  |
|--------------------------------------|------------------------------|------------------------------|-------------------------------|
| 6dB Bandwidth (GHz)                  | 1.667                        | 1.664                        | 1.372                         |
| Plot of 6dB Bandwidth (GHz)          | 12967-1 Radio 0 Low<br>mcs 8 | 12967-1 Radio 0 Mid<br>mcs 8 | 12967-1 Radio 0<br>High mcs 8 |
| 99% Bandwidth (GHz)                  | 1.9146                       | 1.9141                       | 1.8931                        |
| Frequency Error (MHz) (include sign) | 18.987                       | 15.665                       | -7.1855                       |
| Operating frequency (GHz)            | 58.32                        | 64.8                         | 69.12                         |
| 6dB BW FLOW Worst case (GHz)         | 57.505487                    | 63.983665                    | 68.4268145                    |
| 6dB BW FHIGH Worst case (GHz)        | 59.172487                    | 65.647665                    | 69.7988145                    |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 1) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS8                |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                  | Mid channel                  | High channel                  |
|--------------------------------------|------------------------------|------------------------------|-------------------------------|
| 6dB Bandwidth (GHz)                  | 1.599                        | 1.454                        | 1.272                         |
| Plot of 6dB Bandwidth (GHz)          | 12967-1 Radio 1 Low<br>mcs 8 | 12967-1 Radio 1 Mid<br>mcs 8 | 12967-1 Radio 1<br>High mcs 8 |
| 99% Bandwidth (GHz)                  | 1.8629                       | 1.8666                       | 1.8862                        |
| Frequency Error (MHz) (include sign) | 17.56                        | 11.834                       | -8.0962                       |
| Operating frequency (GHz)            | 58.32                        | 64.8                         | 69.12                         |
| 6dB BW FLOW Worst case (GHz)         | 57.53806                     | 64.084834                    | 68.4759038                    |
| 6dB BW FHIGH Worst case (GHz)        | 59.13706                     | 65.538834                    | 69.7479038                    |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 0) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS9                |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                  | Mid channel                  | High channel                  |
|--------------------------------------|------------------------------|------------------------------|-------------------------------|
| 6dB Bandwidth (GHz)                  | 1.664                        | 1.66                         | 1.427                         |
| Plot of 6dB Bandwidth (GHz)          | 12967-1 Radio 0 Low<br>mcs 9 | 12967-1 Radio 0 Mid<br>mcs 9 | 12967-1 Radio 0<br>High mcs 9 |
| 99% Bandwidth (GHz)                  | 1.9137                       | 1.9138                       | 1.8939                        |
| Frequency Error (MHz) (include sign) | 19.969                       | 16.375                       | -6.2777                       |
| Operating frequency (GHz)            | 58.32                        | 64.8                         | 69.12                         |
| 6dB BW FLOW Worst case (GHz)         | 57.507969                    | 63.986375                    | 68.4002223                    |
| 6dB BW FHIGH Worst case (GHz)        | 59.171969                    | 65.646375                    | 69.8272223                    |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 1) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS9                |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                  | Mid channel                  | High channel                  |
|--------------------------------------|------------------------------|------------------------------|-------------------------------|
| 6dB Bandwidth (GHz)                  | 1.602                        | 1.523                        | 1.441                         |
| Plot of 6dB Bandwidth (GHz)          | 12967-1 Radio 1 Low<br>mcs 9 | 12967-1 Radio 1 Mid<br>mcs 9 | 12967-1 Radio 1<br>High mcs 9 |
| 99% Bandwidth (GHz)                  | 1.8651                       | 1.8688                       | 1.8873                        |
| Frequency Error (MHz) (include sign) | 18.125                       | 10.098                       | -8.3295                       |
| Operating frequency (GHz)            | 58.32                        | 64.8                         | 69.12                         |
| 6dB BW FLOW Worst case (GHz)         | 57.537125                    | 64.048598                    | 68.3911705                    |
| 6dB BW FHIGH Worst case (GHz)        | 59.139125                    | 65.571598                    | 69.8321705                    |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 0) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS10               |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                   | Mid channel                   | High channel                   |
|--------------------------------------|-------------------------------|-------------------------------|--------------------------------|
| 6dB Bandwidth (GHz)                  | 1.657                         | 1.671                         | 1.379                          |
| Plot of 6dB Bandwidth (GHz)          | 12967-1 Radio 0 Low<br>mcs 10 | 12967-1 Radio 0 Mid<br>mcs 10 | 12967-1 Radio 0<br>High mcs 10 |
| 99% Bandwidth (GHz)                  | 1.9123                        | 1.9156                        | 1.8989                         |
| Frequency Error (MHz) (include sign) | 19.954                        | 15.751                        | -6.213                         |
| Operating frequency (GHz)            | 58.32                         | 64.8                          | 69.12                          |
| 6dB BW FLOW Worst case (GHz)         | 57.511454                     | 63.980251                     | 68.424287                      |
| 6dB BW FHIGH Worst case (GHz)        | 59.168454                     | 65.651251                     | 69.803287                      |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 1) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS10               |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                   | Mid channel                   | High channel                   |
|--------------------------------------|-------------------------------|-------------------------------|--------------------------------|
| 6dB Bandwidth (GHz)                  | 1.599                         | 1.372                         | 1.434                          |
| Plot of 6dB Bandwidth (GHz)          | 12967-1 Radio 1 Low<br>mcs 10 | 12967-1 Radio 1 Mid<br>mcs 10 | 12967-1 Radio 1<br>High mcs 10 |
| 99% Bandwidth (GHz)                  | 1.8663                        | 1.8682                        | 1.8894                         |
| Frequency Error (MHz) (include sign) | 18.88                         | 12.424                        | -7.2827                        |
| Operating frequency (GHz)            | 58.32                         | 64.8                          | 69.12                          |
| 6dB BW FLOW Worst case (GHz)         | 57.53938                      | 64.126424                     | 68.3957173                     |
| 6dB BW FHIGH Worst case (GHz)        | 59.13838                      | 65.498424                     | 69.8297173                     |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 0) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS11               |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                | Mid channel                | High channel                |
|--------------------------------------|----------------------------|----------------------------|-----------------------------|
| 6dB Bandwidth (GHz)                  | 1.448                      | 1.654                      | 1.341                       |
| Plot of 6dB Bandwidth (GHz)          | 12967-1 Radio 0 Low mcs 11 | 12967-1 Radio 0 Mid mcs 11 | 12967-1 Radio 0 High mcs 11 |
| 99% Bandwidth (GHz)                  | 1.9124                     | 1.916                      | 1.899                       |
| Frequency Error (MHz) (include sign) | 18.153                     | 15.793                     | -6.5282                     |
| Operating frequency (GHz)            | 58.32                      | 64.8                       | 69.12                       |
| 6dB BW FLOW Worst case (GHz)         | 57.614153                  | 63.988793                  | 68.4429718                  |
| 6dB BW FHIGH Worst case (GHz)        | 59.062153                  | 65.642793                  | 69.7839718                  |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 1) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS11               |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                | Mid channel                | High channel                |
|--------------------------------------|----------------------------|----------------------------|-----------------------------|
| 6dB Bandwidth (GHz)                  | 1.437                      | 1.358                      | 1.423                       |
| Plot of 6dB Bandwidth (GHz)          | 12967-1 Radio 1 Low mcs 11 | 12967-1 Radio 1 Mid mcs 11 | 12967-1 Radio 1 High mcs 11 |
| 99% Bandwidth (GHz)                  | 1.8646                     | 1.8672                     | 1.8914                      |
| Frequency Error (MHz) (include sign) | 16.473                     | 12.253                     | -6.8619                     |
| Operating frequency (GHz)            | 58.32                      | 64.8                       | 69.12                       |
| 6dB BW FLOW Worst case (GHz)         | 57.617973                  | 64.133253                  | 68.4016381                  |
| 6dB BW FHIGH Worst case (GHz)        | 59.054973                  | 65.491253                  | 69.8246381                  |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 0) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS12               |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                | Mid channel                | High channel                |
|--------------------------------------|----------------------------|----------------------------|-----------------------------|
| 6dB Bandwidth (GHz)                  | 1.506                      | 1.674                      | 1.364                       |
| Plot of 6dB Bandwidth (GHz)          | 12967-1 Radio 0 Low mcs 12 | 12967-1 Radio 0 Mid mcs 12 | 12967-1 Radio 0 High mcs 12 |
| 99% Bandwidth (GHz)                  | 1.9129                     | 1.9164                     | 1.8962                      |
| Frequency Error (MHz) (include sign) | 18.549                     | 16.389                     | -4.773                      |
| Operating frequency (GHz)            | 58.32                      | 64.8                       | 69.12                       |
| 6dB BW FLOW Worst case (GHz)         | 57.585549                  | 63.979389                  | 68.433227                   |
| 6dB BW FHIGH Worst case (GHz)        | 59.091549                  | 65.653389                  | 69.797227                   |

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 1) |
| Power Level     | 39 dBm              |
| Channel Spacing | 2.16 GHz            |
| Mod Scheme      | MCS12               |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                   | Mid channel                   | High channel                   |
|--------------------------------------|-------------------------------|-------------------------------|--------------------------------|
| 6dB Bandwidth (GHz)                  | 1.602                         | 1.293                         | 1.365                          |
| Plot of 6dB Bandwidth (GHz)          | 12967-1 Radio 1 Low<br>mcs 12 | 12967-1 Radio 1 Mid<br>mcs 12 | 12967-1 Radio 1<br>High mcs 12 |
| 99% Bandwidth (GHz)                  | 1.8621                        | 1.8678                        | 1.8906                         |
| Frequency Error (MHz) (include sign) | 18.074                        | 11.207                        | -7.7346                        |
| Operating frequency (GHz)            | 58.32                         | 64.8                          | 69.12                          |
| 6dB BW FLOW Worst case (GHz)         | 57.537074                     | 64.164707                     | 68.4297654                     |
| 6dB BW FHIGH Worst case (GHz)        | 59.139074                     | 65.457707                     | 69.7947654                     |

#### Half Band

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 0) |
| Power Level     | 39 dBm              |
| Channel Spacing | 1.08 GHz            |
| Mod Scheme      | MCS4                |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                        | Mid channel                        | High channel                       |
|--------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| 6dB Bandwidth (GHz)                  | 0.8596                             | 0.8406                             | 0.784                              |
| Plot of 6dB Bandwidth (GHz)          | 12967-2 Radio 0 High<br>mcs 4 half | 12967-2 Radio 0 High<br>mcs 4 half | 12967-2 Radio 0<br>High mcs 4 half |
| 99% Bandwidth (GHz)                  | 0.96474                            | 0.972                              | 0.949                              |
| Frequency Error (MHz) (include sign) | 2.8467                             | 1.6239                             | -1.6881                            |
| Operating frequency (GHz)            | 58.32                              | 64.8                               | 69.12                              |
| 6dB BW FLOW Worst case (GHz)         | 57.89305                           | 64.38132                           | 68.72631                           |
| 6dB BW FHIGH Worst case (GHz)        | 58.75265                           | 65.22192                           | 69.51031                           |

#### Quarter Band

|                 |                     |
|-----------------|---------------------|
| Band            | 57-71 GHz (Radio 0) |
| Power Level     | 39 dBm              |
| Channel Spacing | 0.54 GHz            |
| Mod Scheme      | MCS4                |
| Low channel     | 58.32 GHz           |
| Mid channel     | 64.8 GHz            |
| High channel    | 69.12 GHz           |

|                                      | Low channel                          | Mid channel                          | High channel                          |
|--------------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|
| 6dB Bandwidth (GHz)                  | 0.4022                               | 0.4091                               | 0.4402                                |
| Plot of 6dB Bandwidth (GHz)          | 12967-2 Radio 0 Low<br>mcs 4 quarter | 12967-2 Radio 0 Mid<br>mcs 4 quarter | 12967-2 Radio 0<br>High mcs 4 quarter |
| 99% Bandwidth (GHz)                  | 0.4779                               | 0.4872                               | 0.4799                                |
| Frequency Error (MHz) (include sign) | 1.336                                | -0.31                                | -1.6729                               |
| Operating frequency (GHz)            | 58.32                                | 64.8                                 | 69.12                                 |
| 6dB BW FLOW Worst case (GHz)         | 58.12024                             | 64.59514                             | 68.89823                              |
| 6dB BW FHIGH Worst case (GHz)        | 58.52244                             | 65.00424                             | 69.33843                              |

Analyser plots for the 6dB bandwidth can be found in Section 6 of this report.

Applying frequency stability results from Section 5.6 of +271.869 kHz or -291.664 kHz to the above results for FLOW and FHIGH shows that all emissions remain within the 57-71 GHz band.

**LIMITS:**

15.255©1 & 15.255(f) The 6dB bandwidth of the emission must be contained within the designated frequency band.

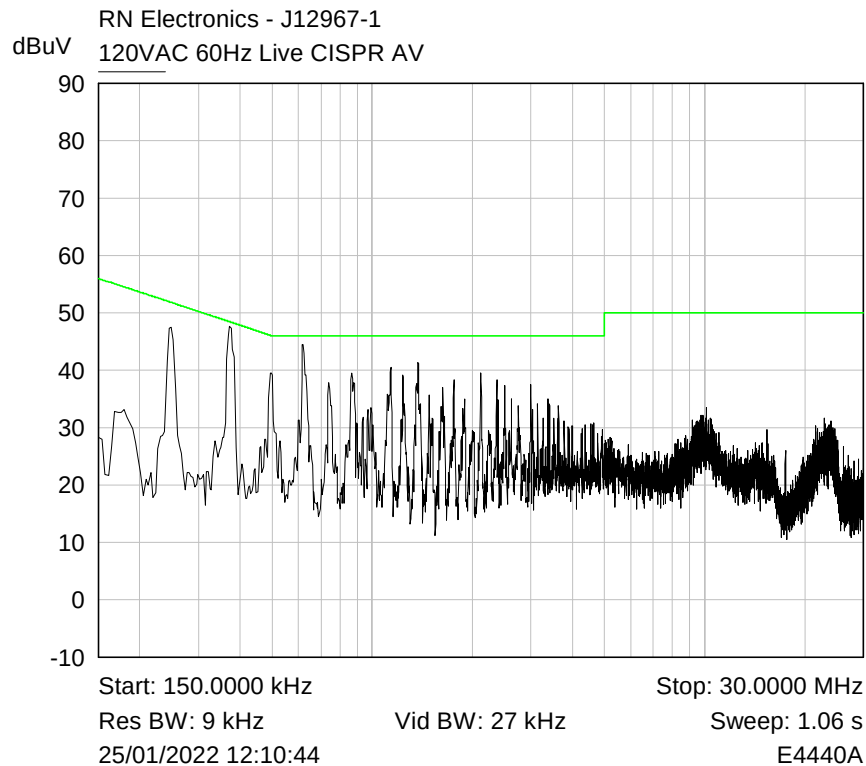
These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows:  
<± 1.9 %

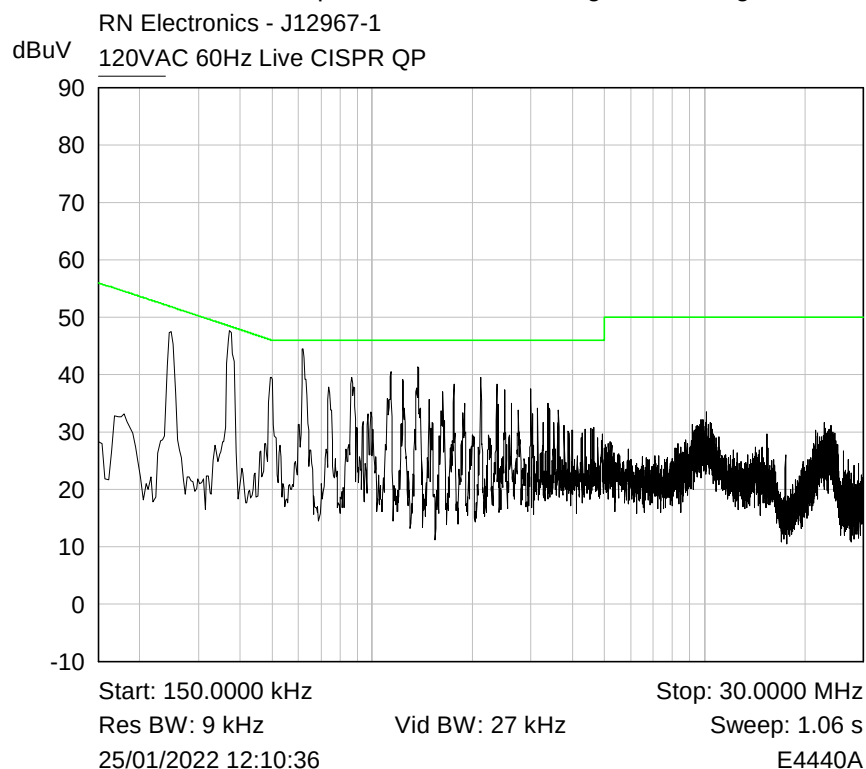
## 6 Plots/Graphical results

### 6.1 AC power line conducted emissions

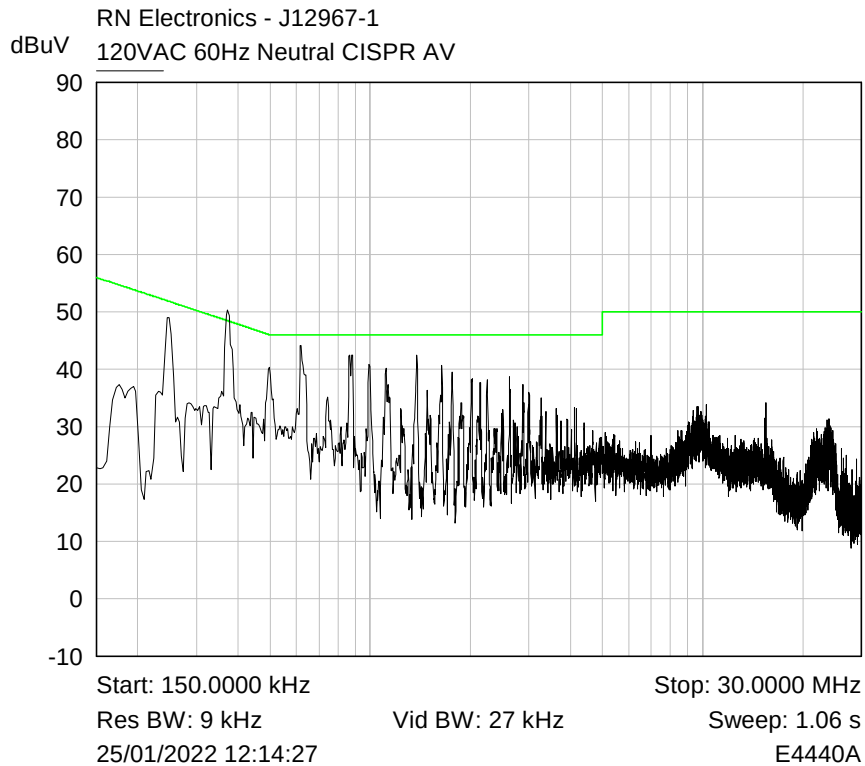
RF Parameters: Band 57-71 GHz, Power 39 dBm, Channel Spacing 2.16 GHz, Modulation MCS5, Channel 58.32 GHz



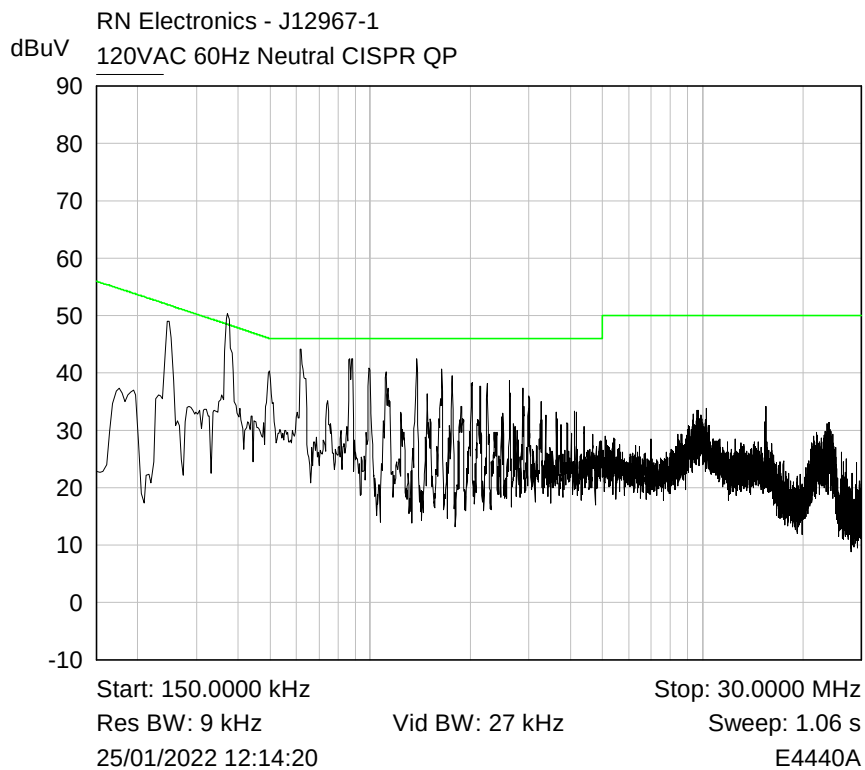
Max-held Peak plot of Live150k-30M against Average limit



Max-held Peak plot of Live150k-30M against Quasi-Peak limit



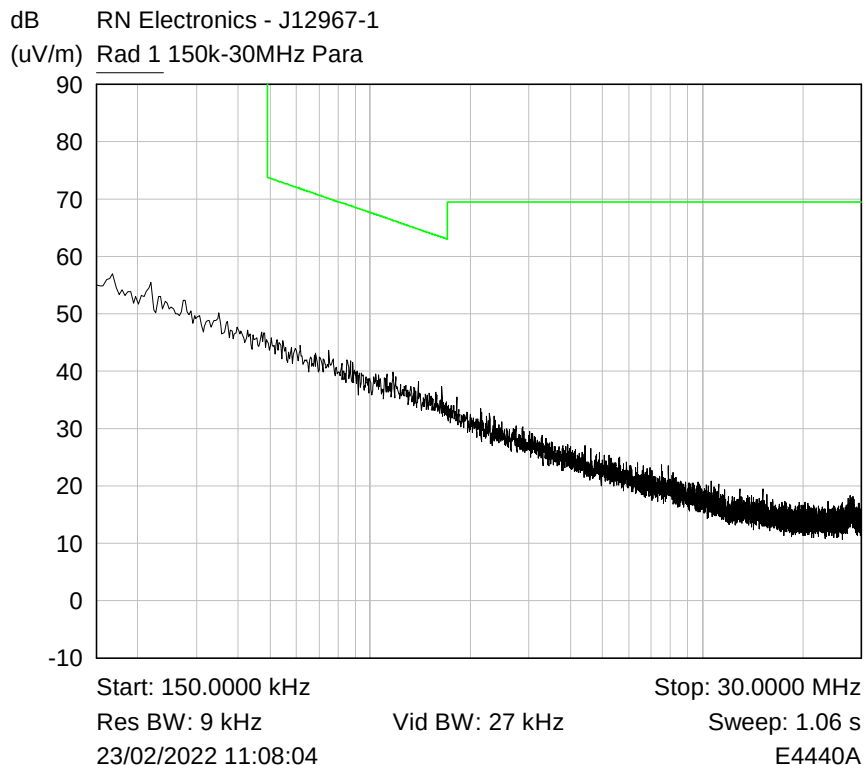
Max-held Peak plot of Neutral150k-30M against Average limit



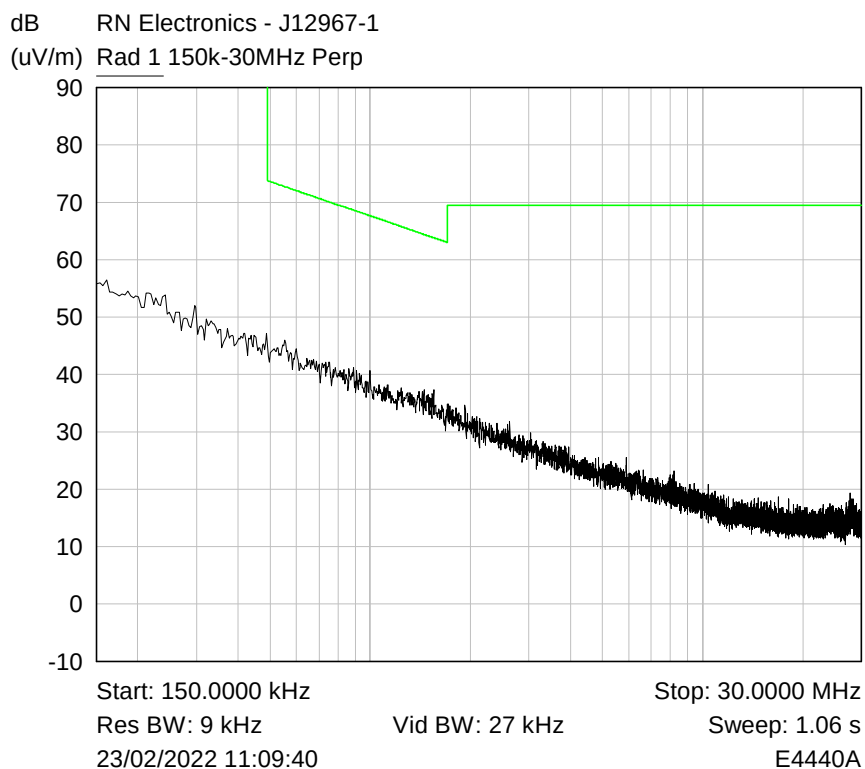
Max-held Peak plot of Neutral150k-30M against Quasi-Peak limit

## 6.2 Radiated emissions 150 kHz – 30 MHz

RF Parameters: Band 57-71 GHz, Power 39 dBm, Channel Spacing 2.16 GHz, Modulation MCS5, Channel 58.32 GHz



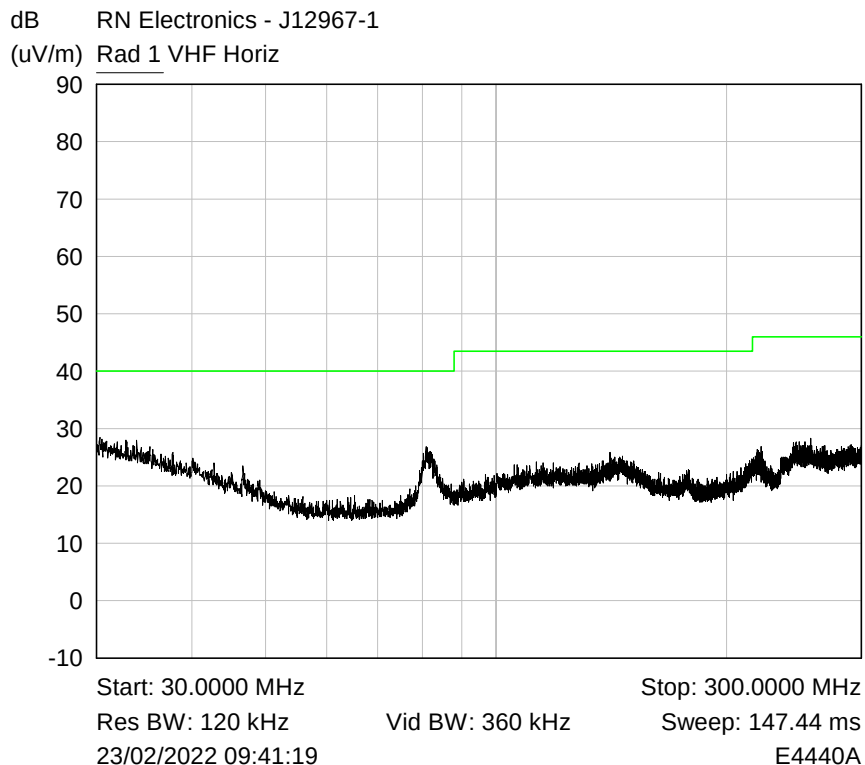
Plot of 150kHz-30MHz Parallel



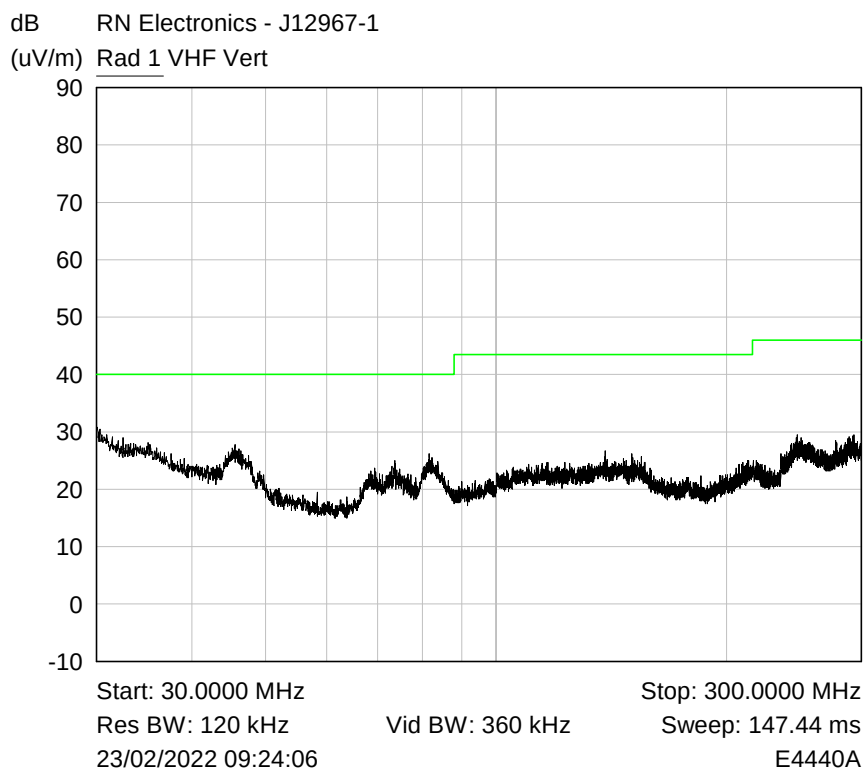
Plot of 150kHz-30MHz Perpendicular

### 6.3 Radiated emissions 30 MHz -1 GHz

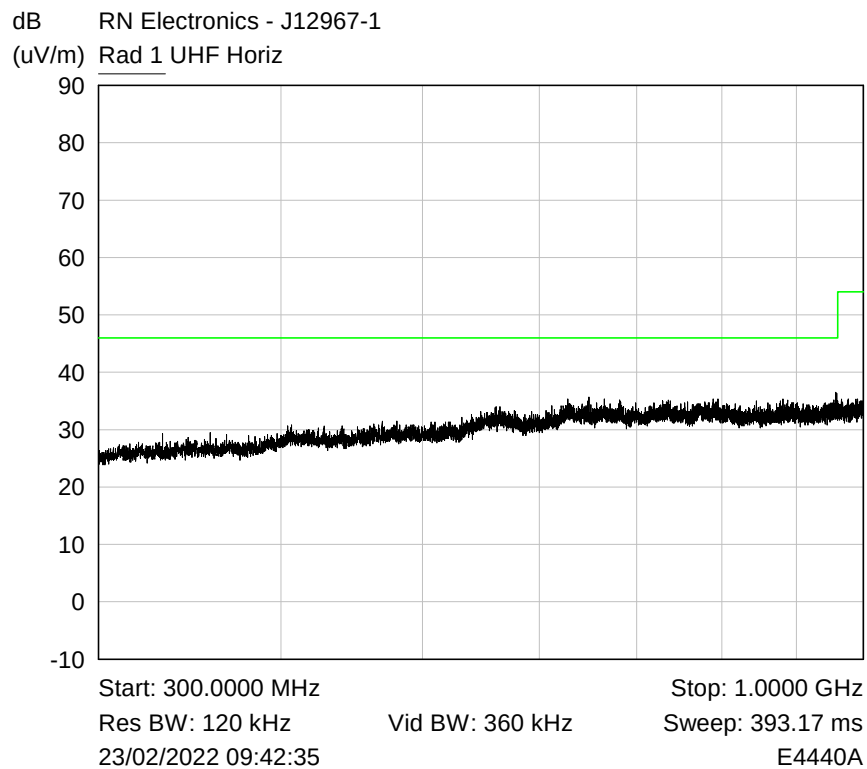
RF Parameters: Band 57-71 GHz, Power 39 dBm, Channel Spacing 2.16 GHz, Modulation MCS5, Channel 58.32 GHz



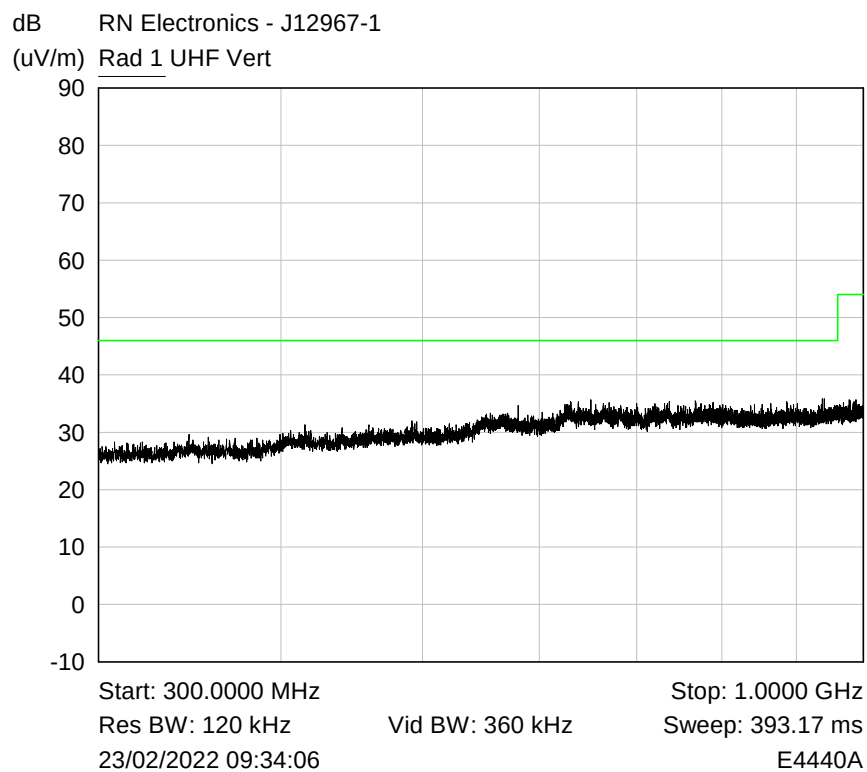
Plot of Peak emissions for VHF Horizontal against the QP limit line.



Plot of Peak emissions for VHF Vertical against the QP limit line.



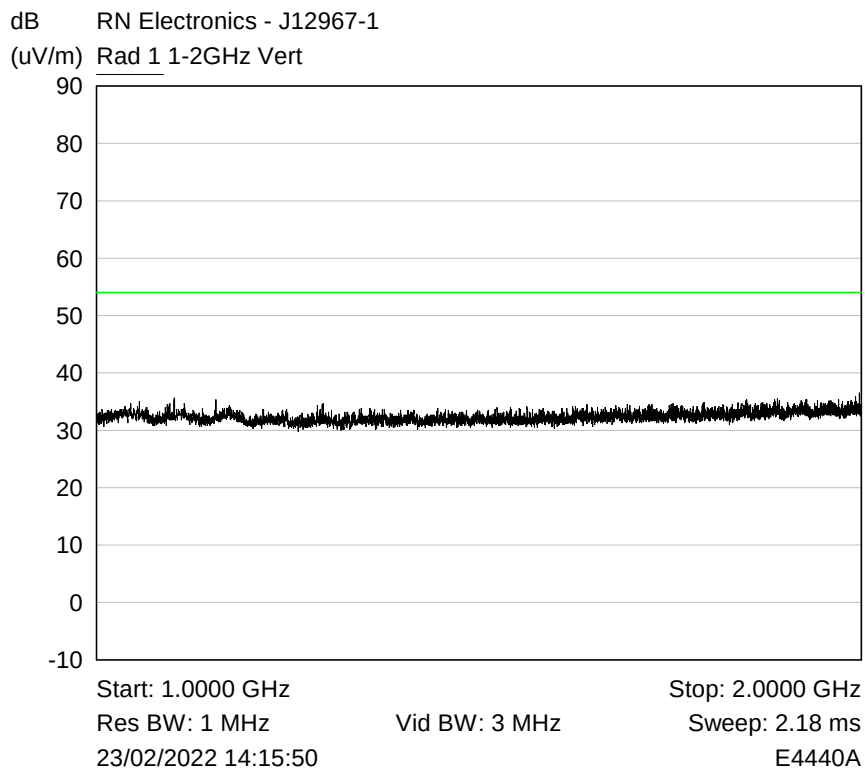
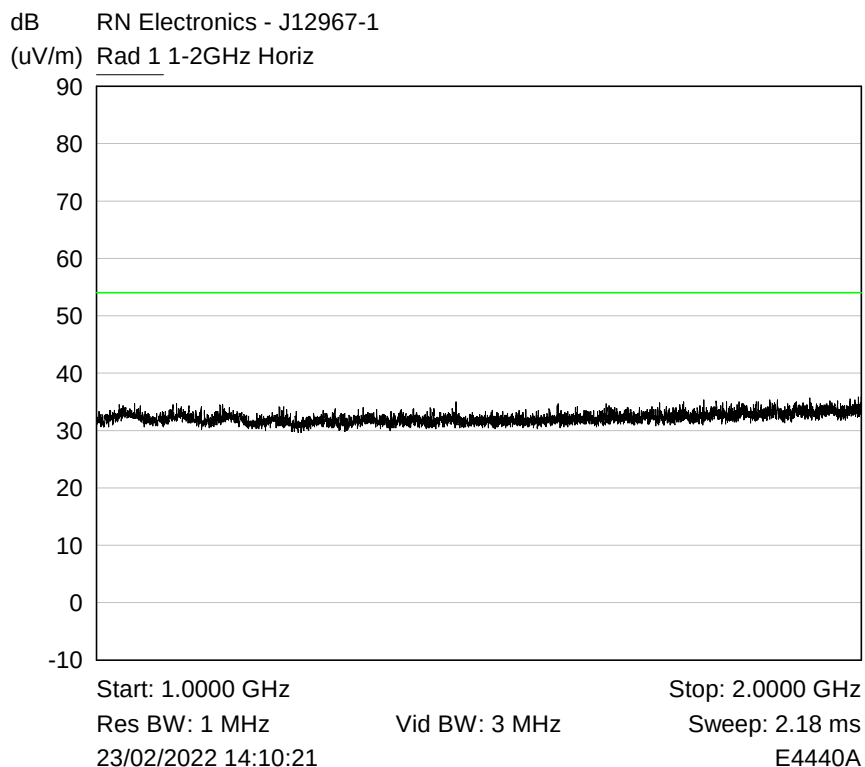
Plot of Peak emissions for UHF Horizontal against the QP limit line.

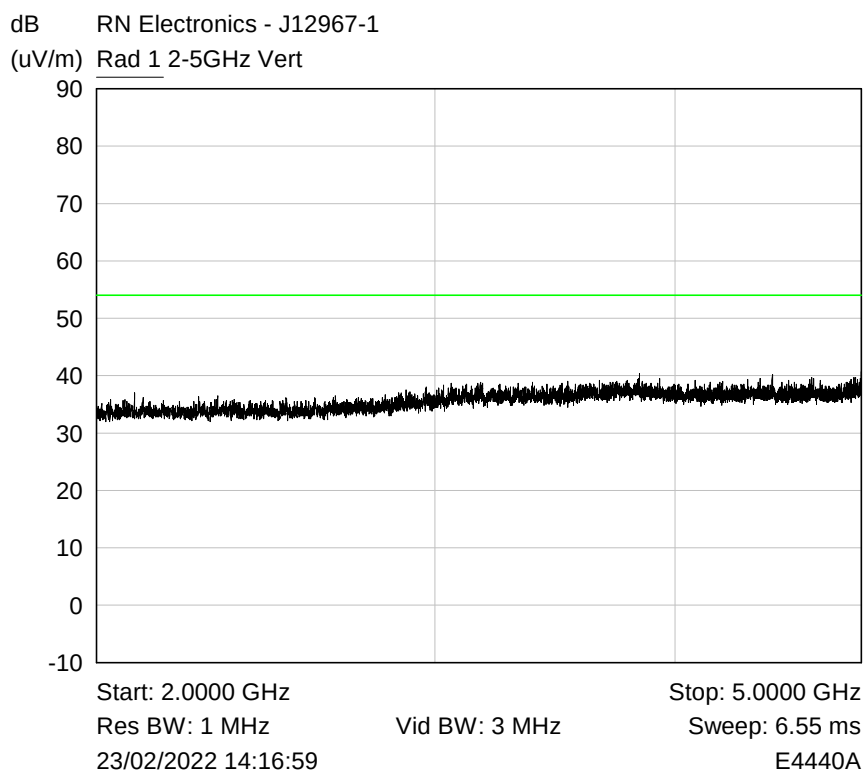
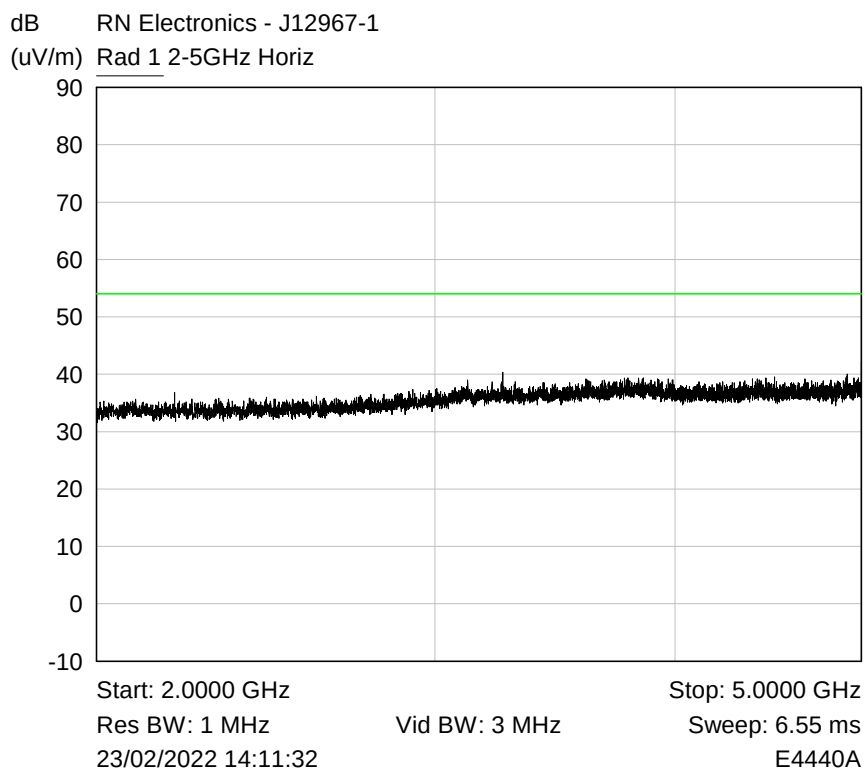


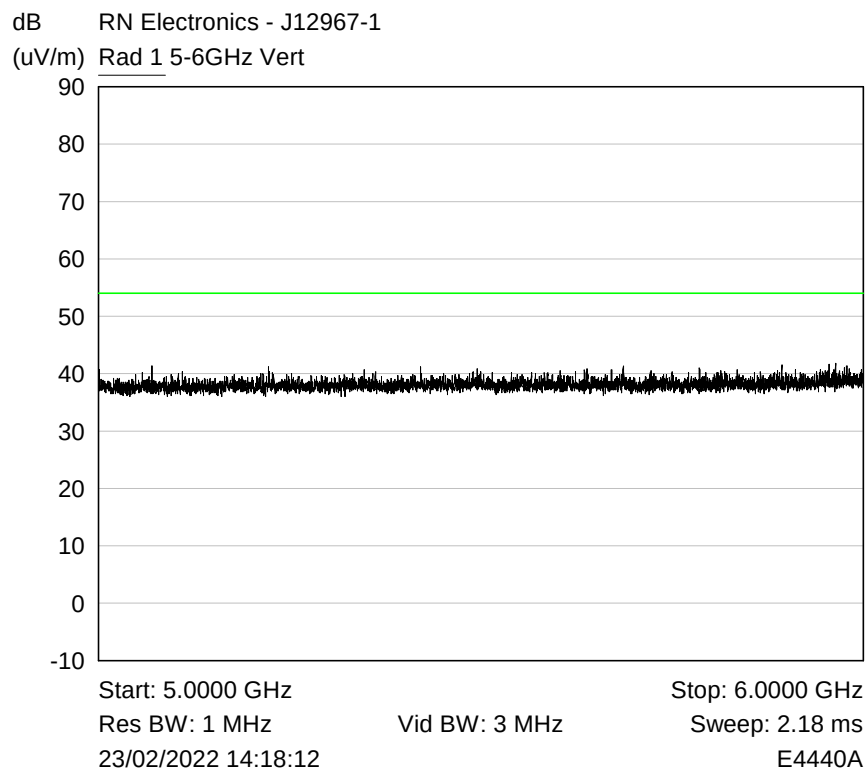
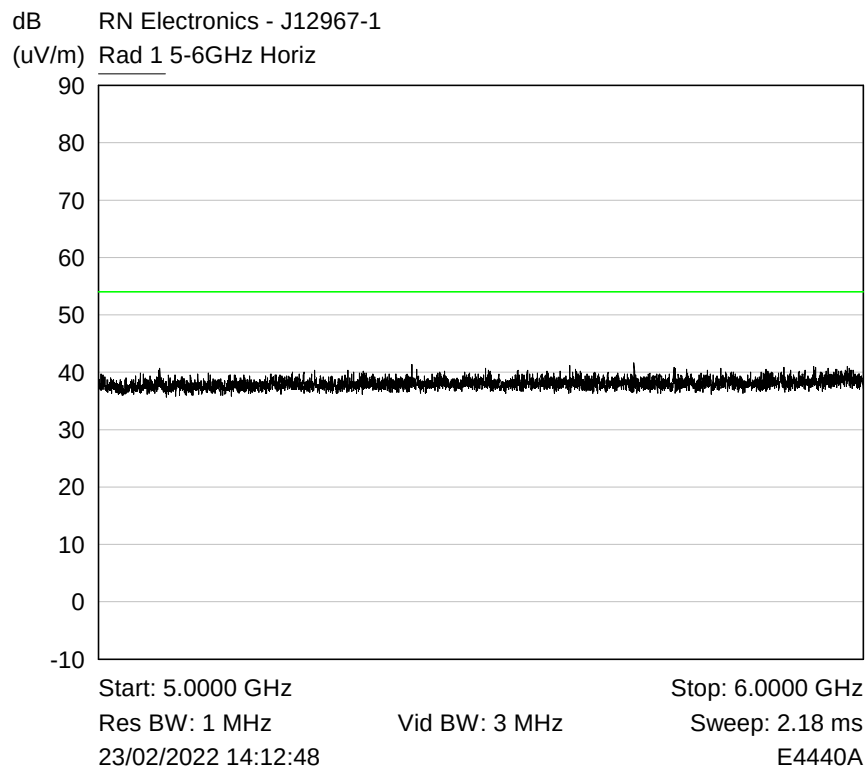
Plot of Peak emissions for UHF Vertical against the QP limit line.

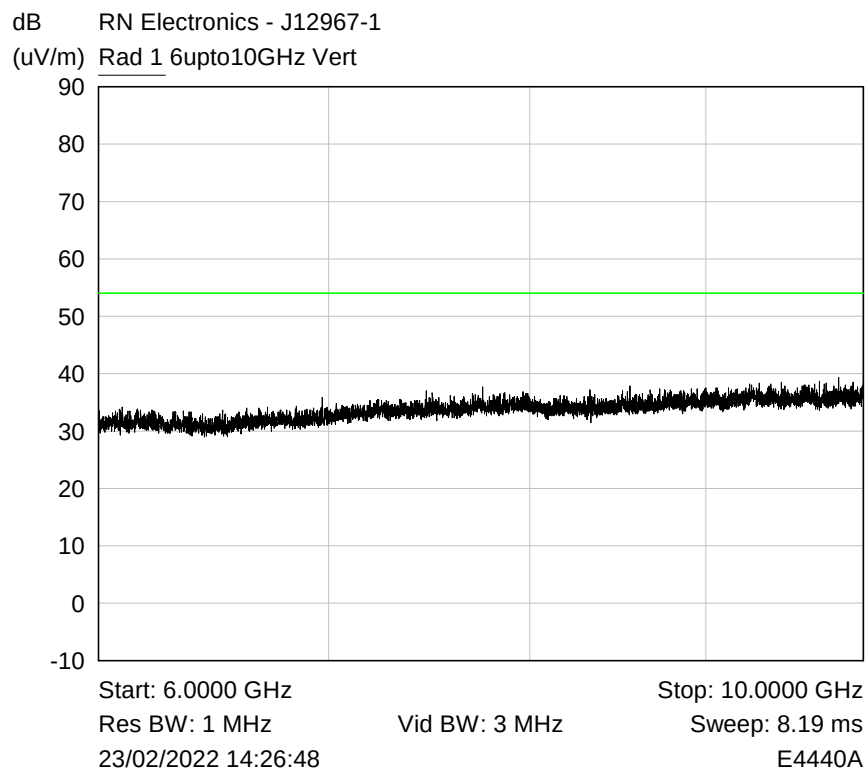
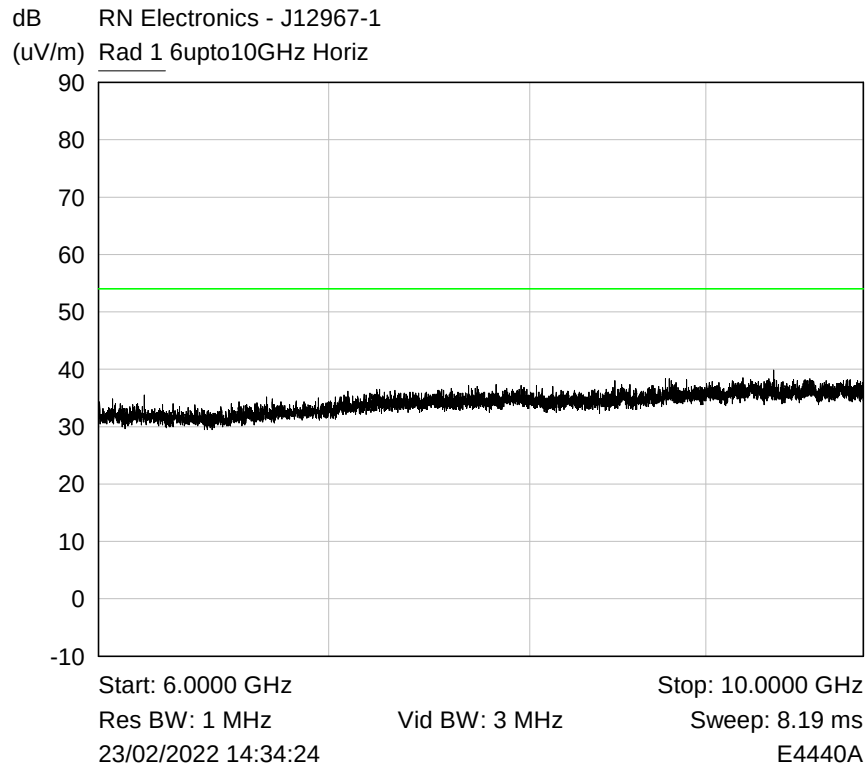
## 6.4 Radiated emissions above 1 GHz

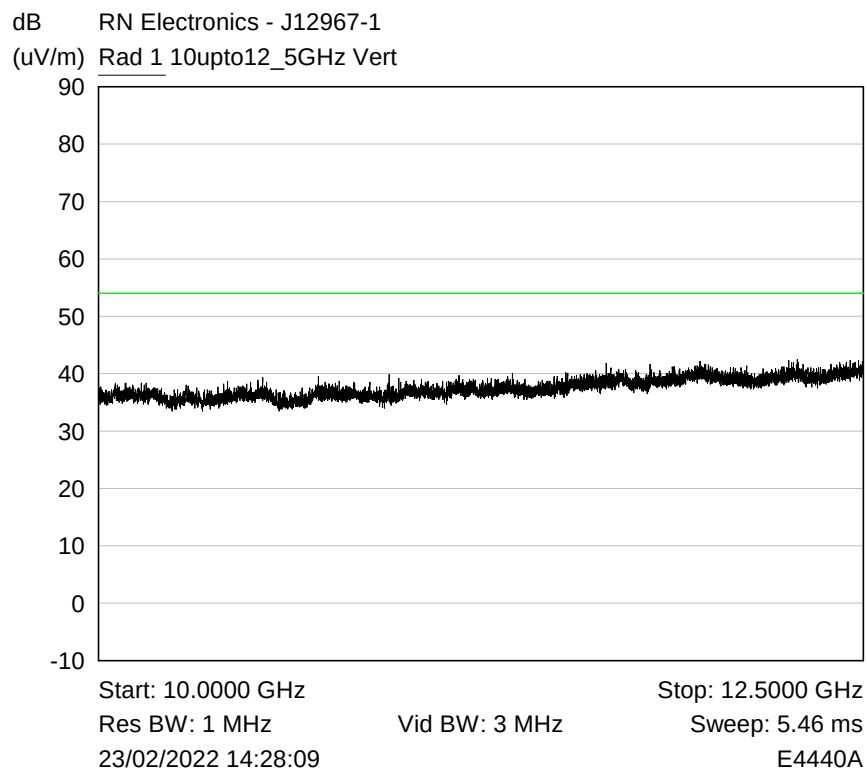
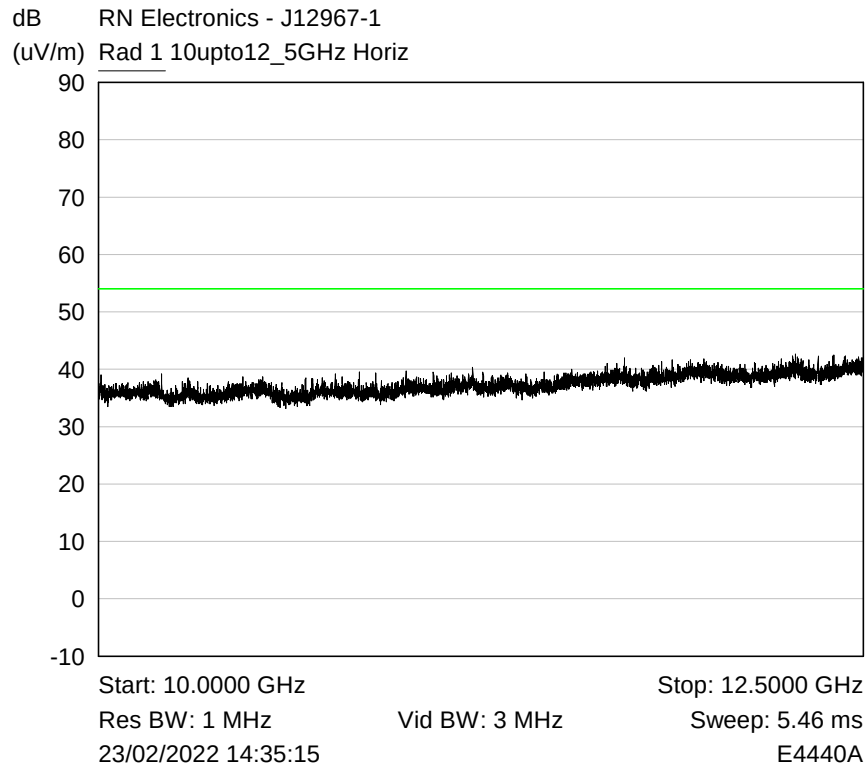
RF Parameters: Band 57-71 GHz, Power 39 dBm, Channel Spacing 2.16 GHz, Modulation MCS5, Channel 58.32 GHz

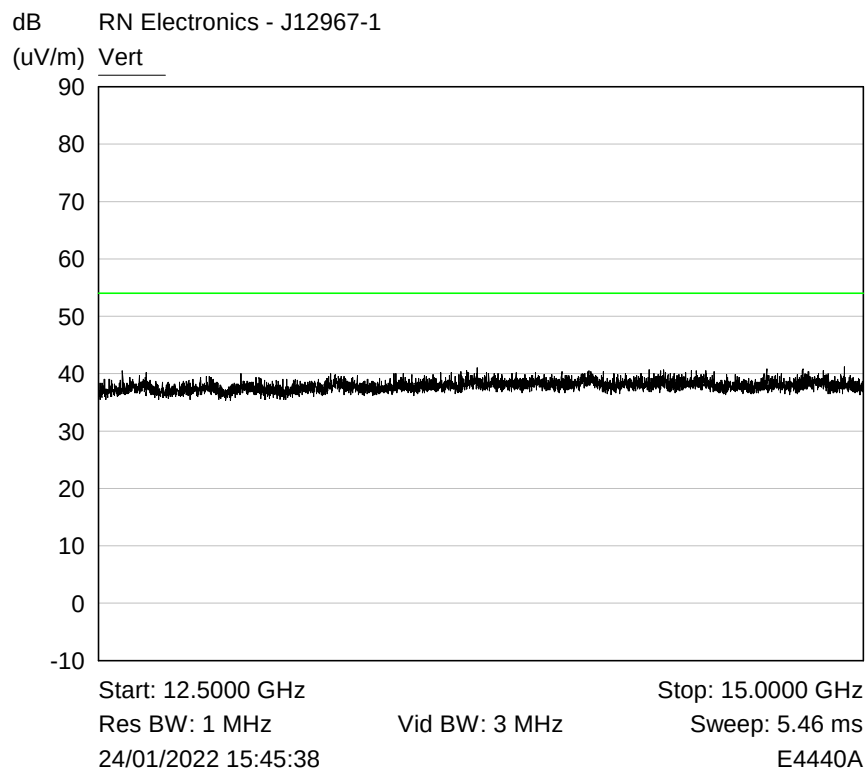
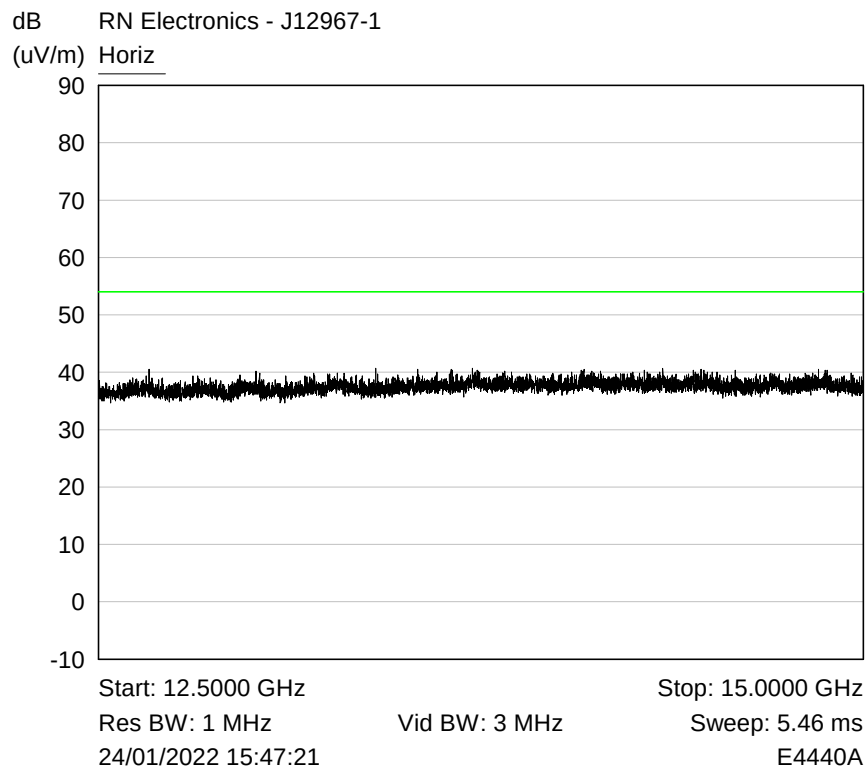


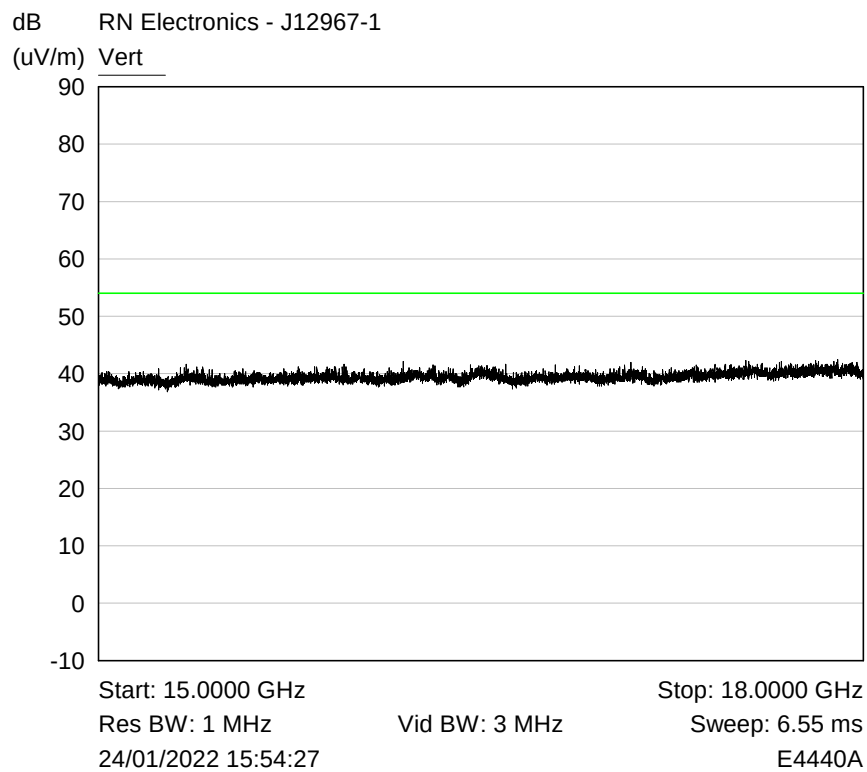
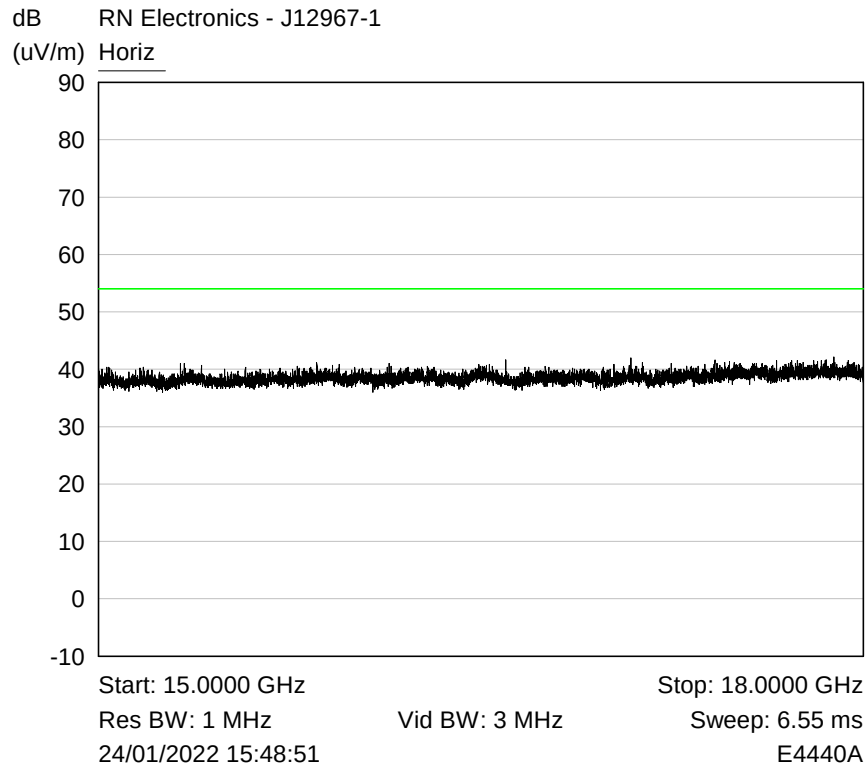


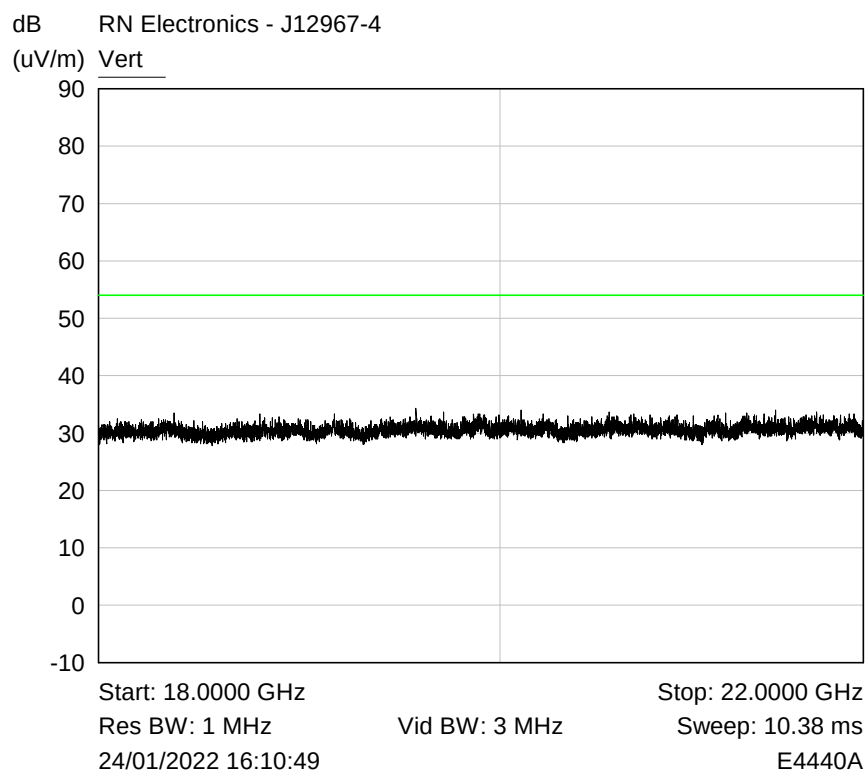
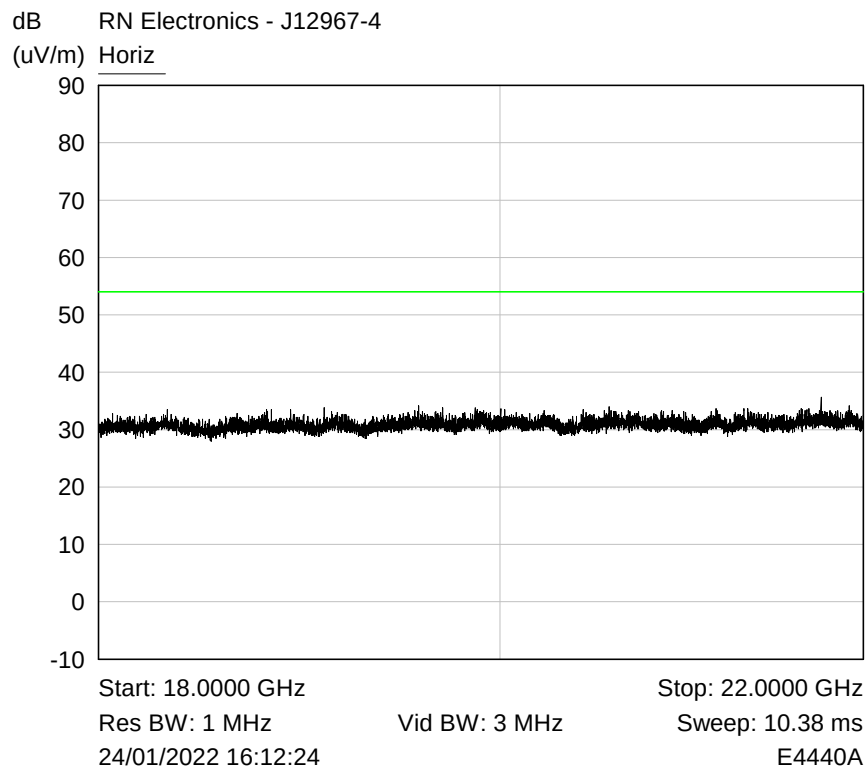


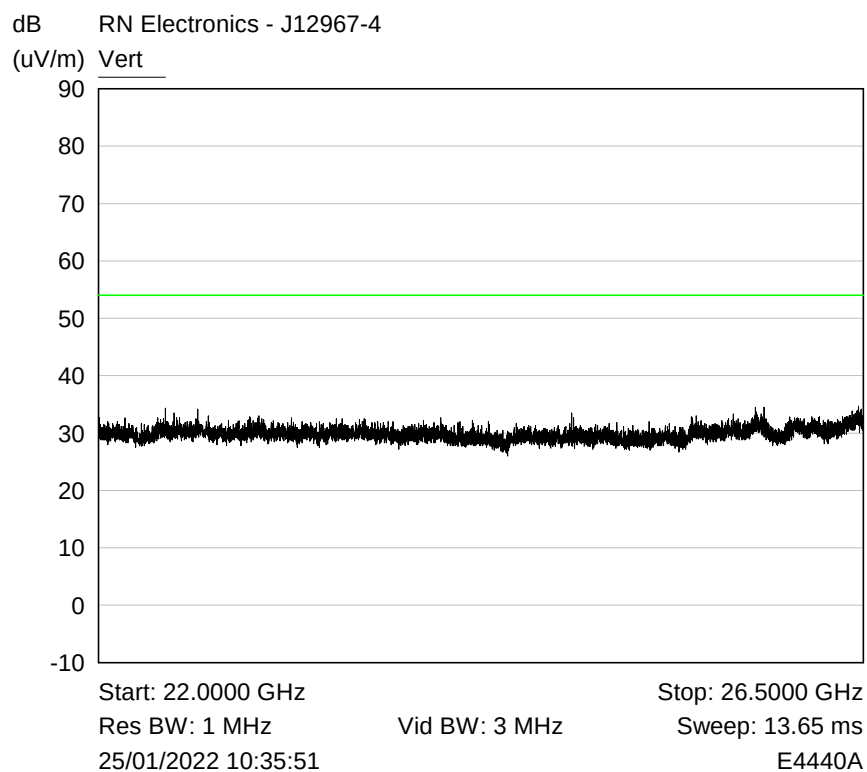
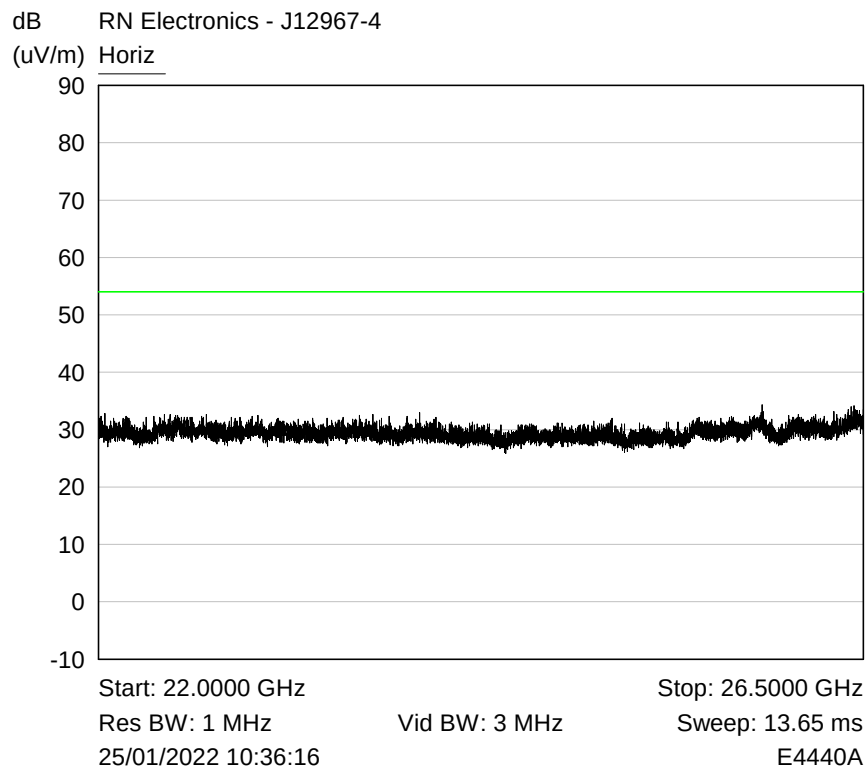


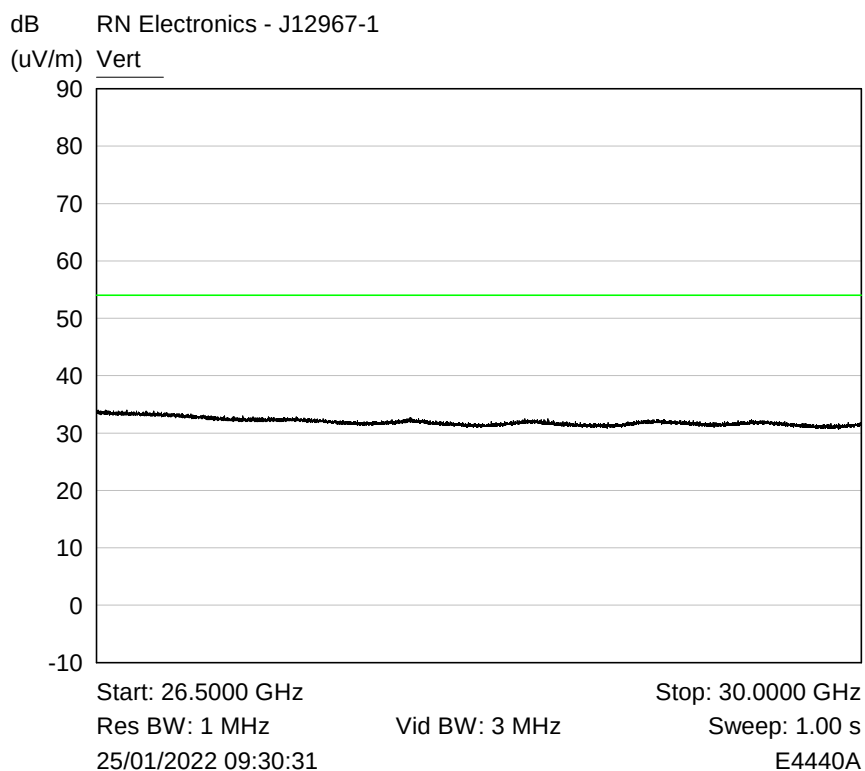
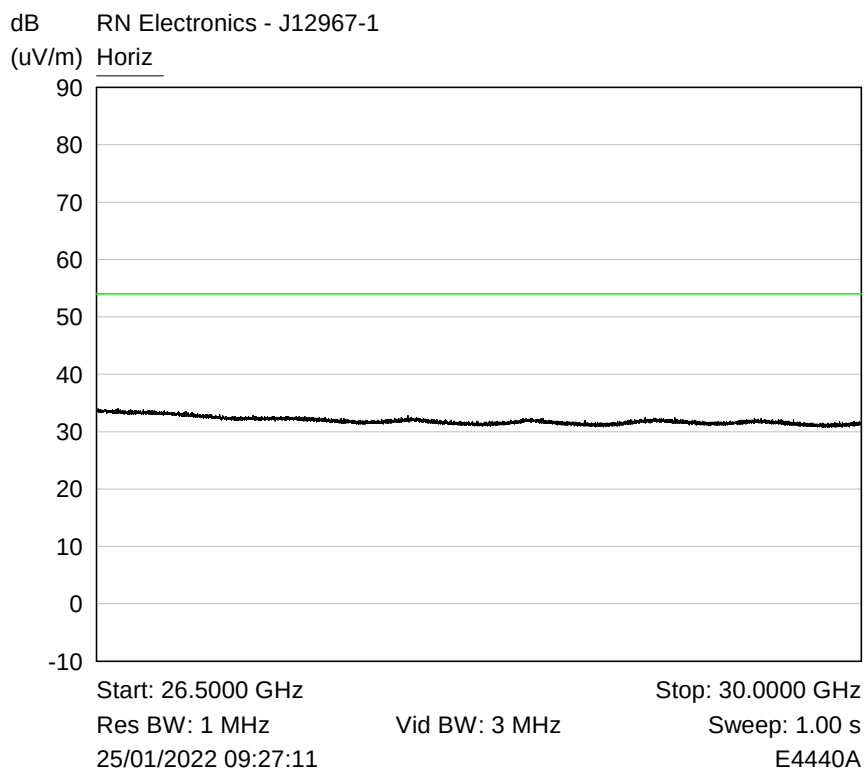


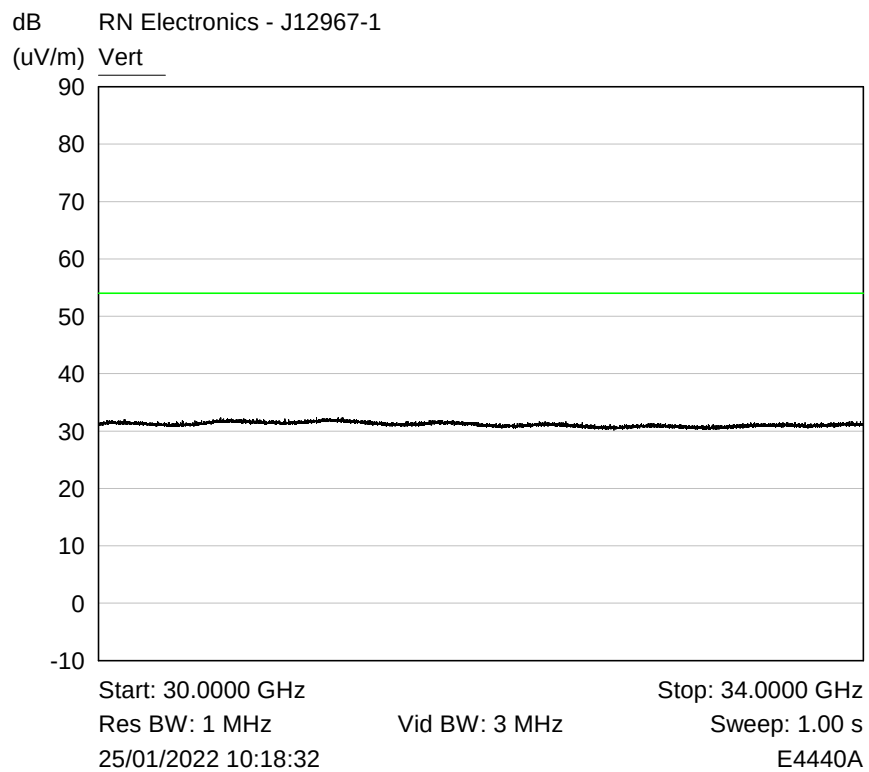
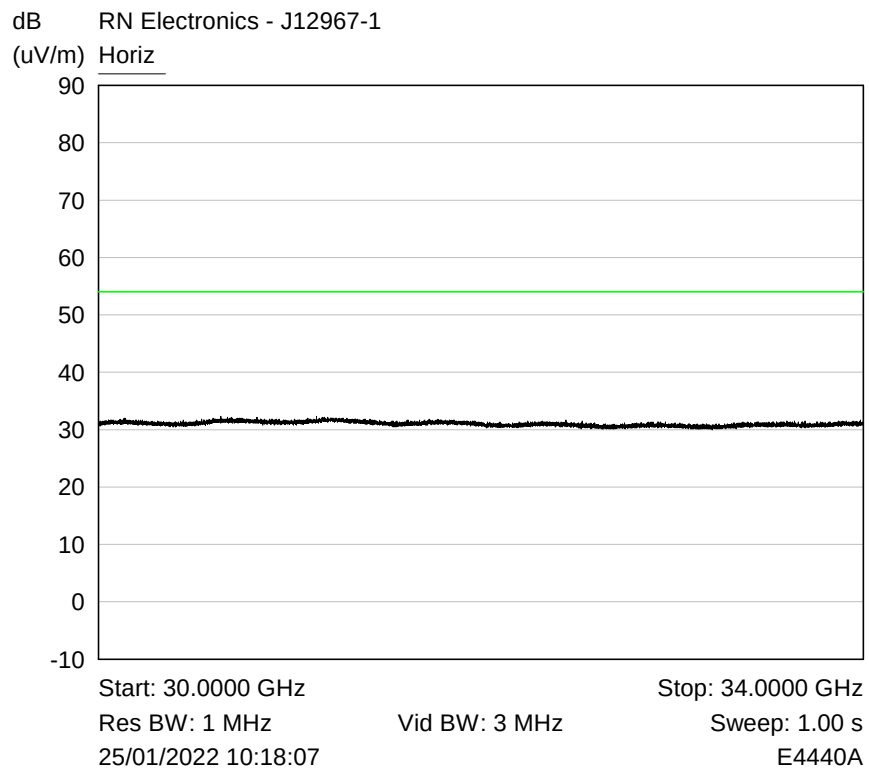


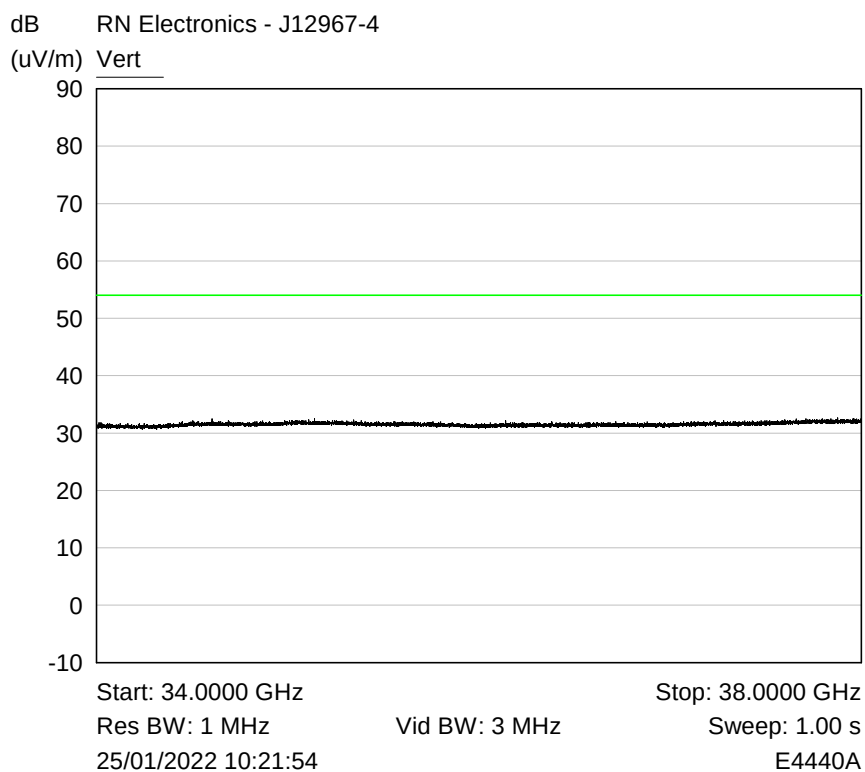
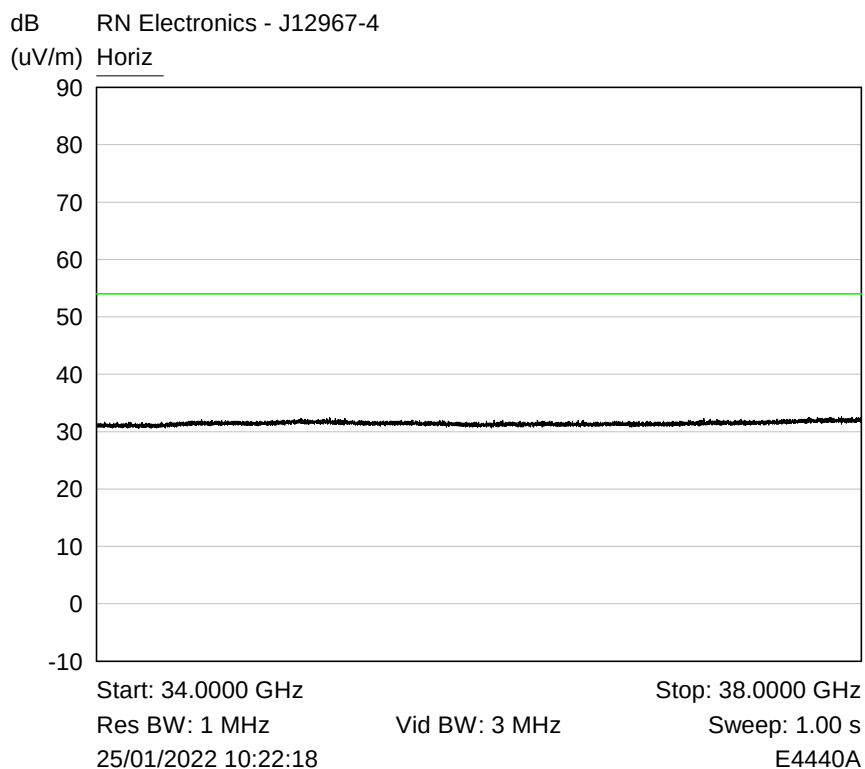


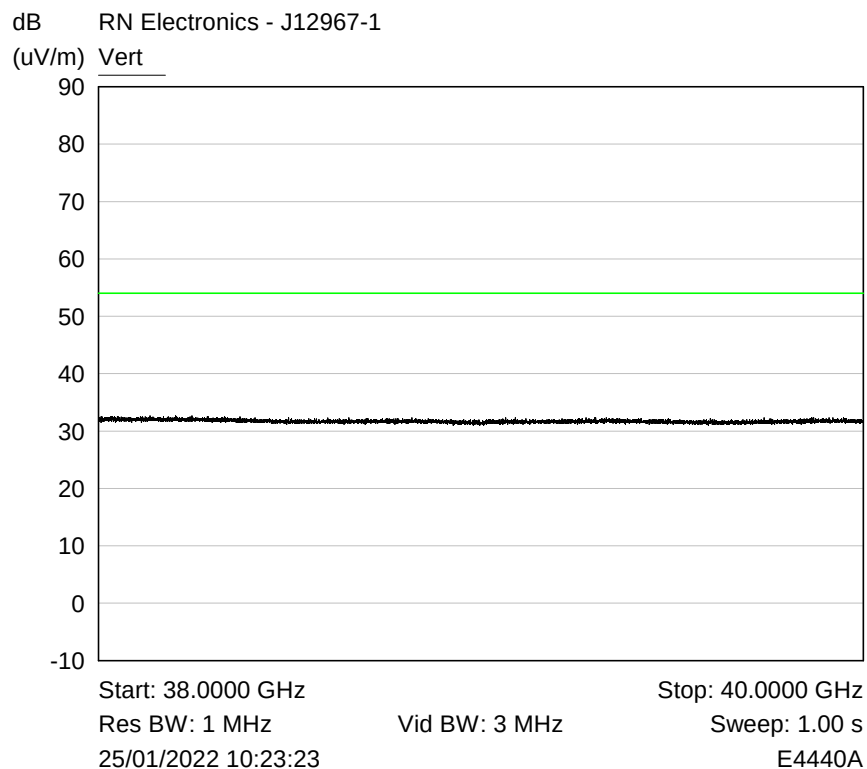
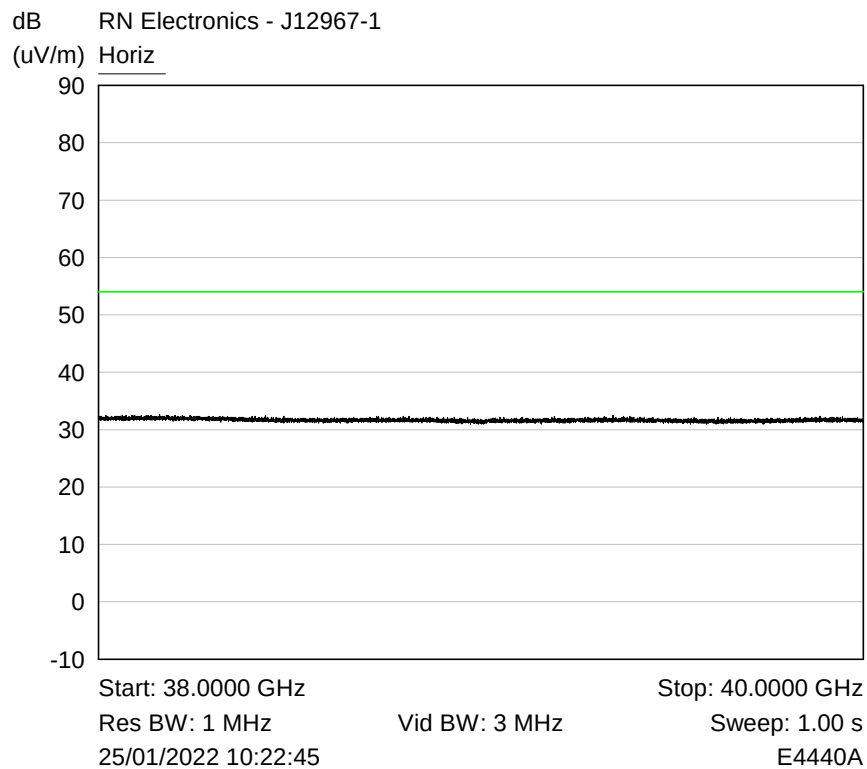


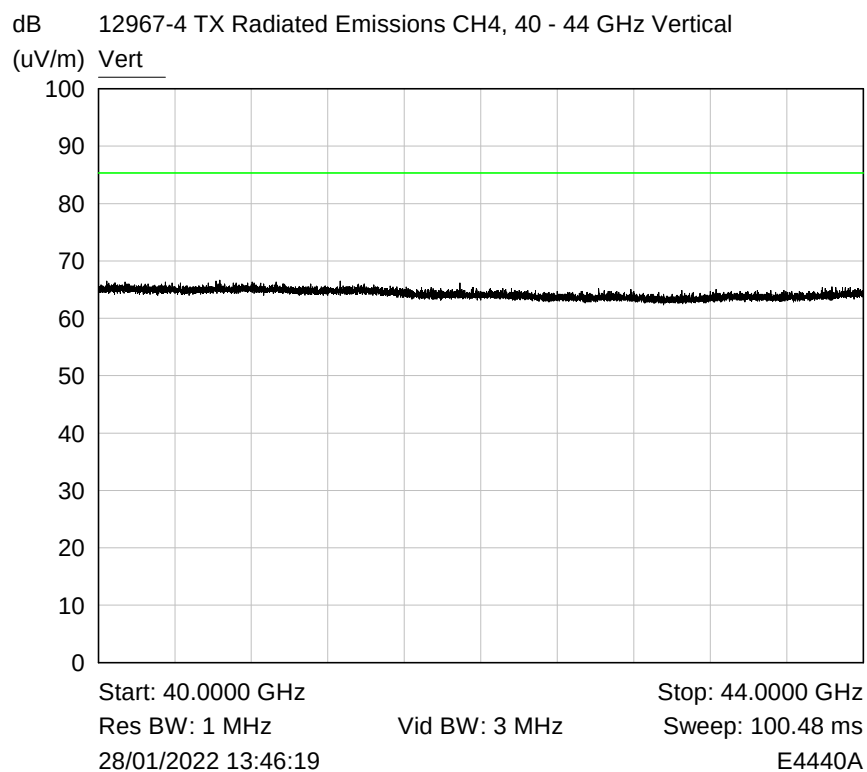
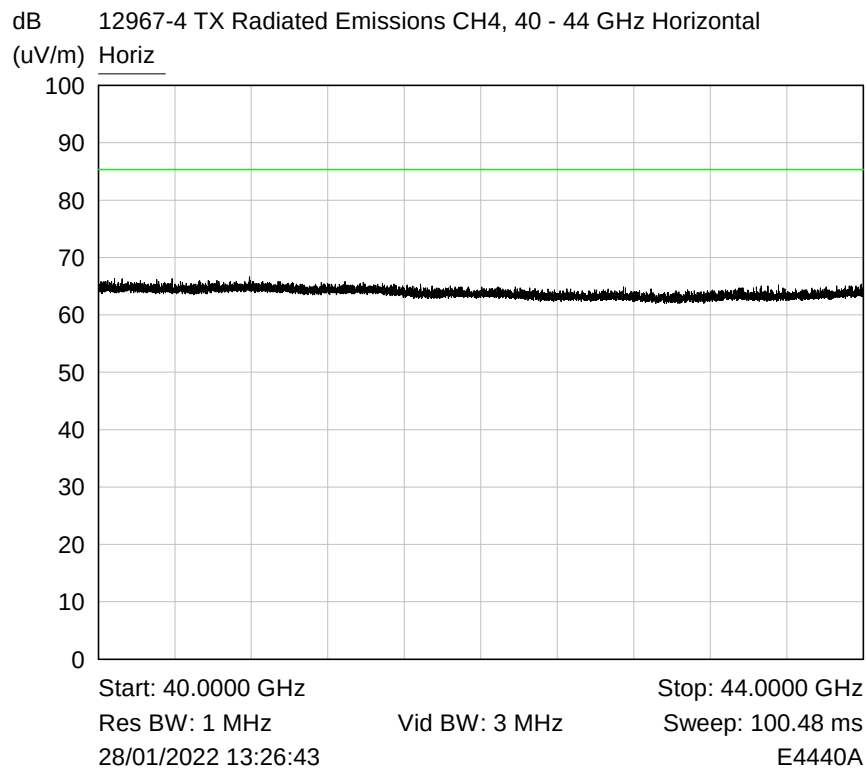


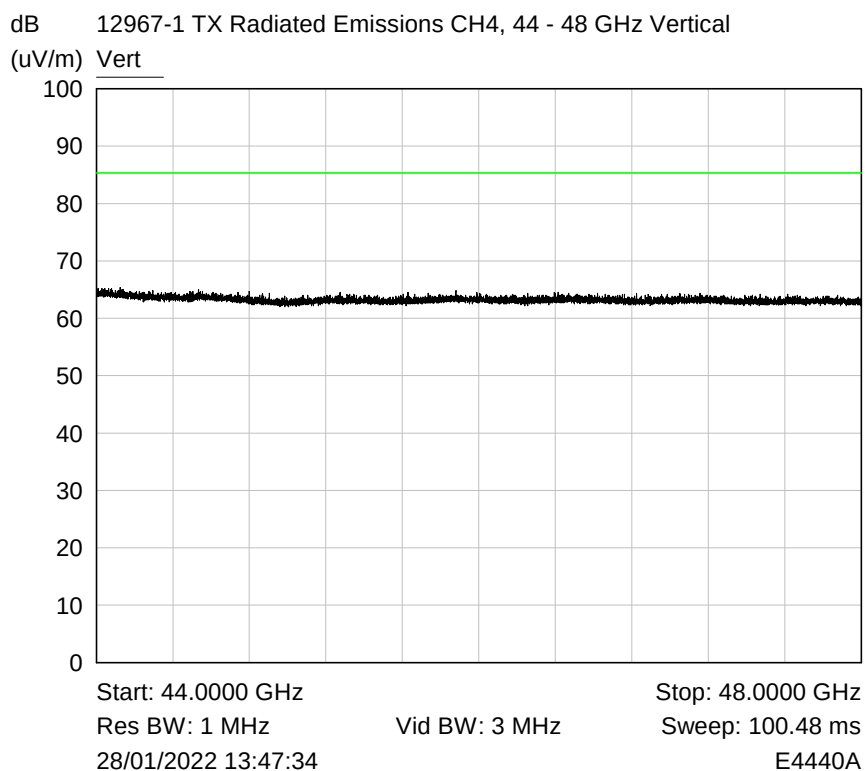
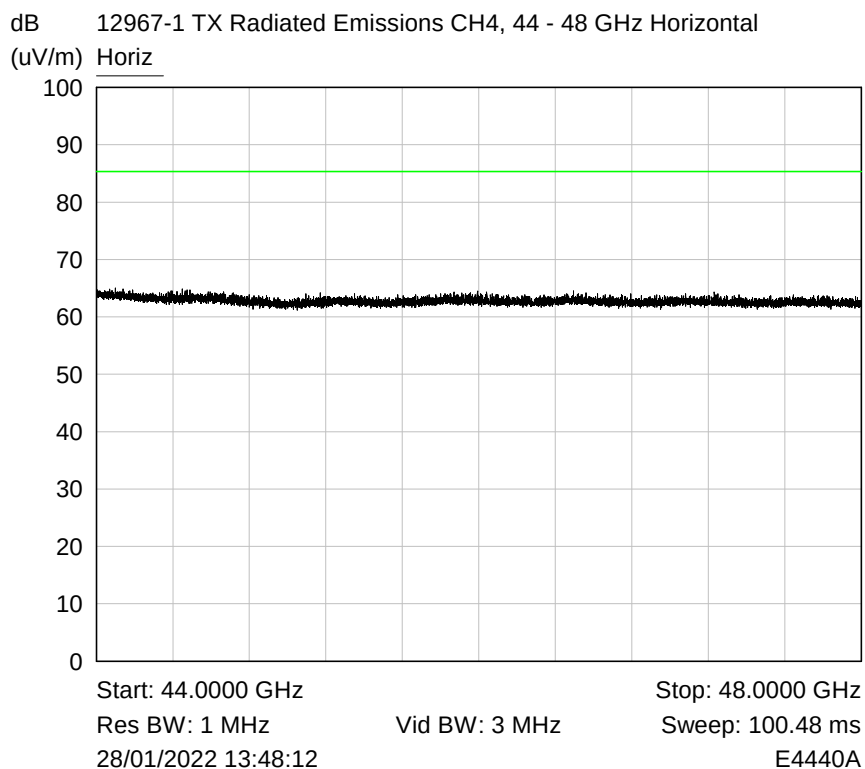


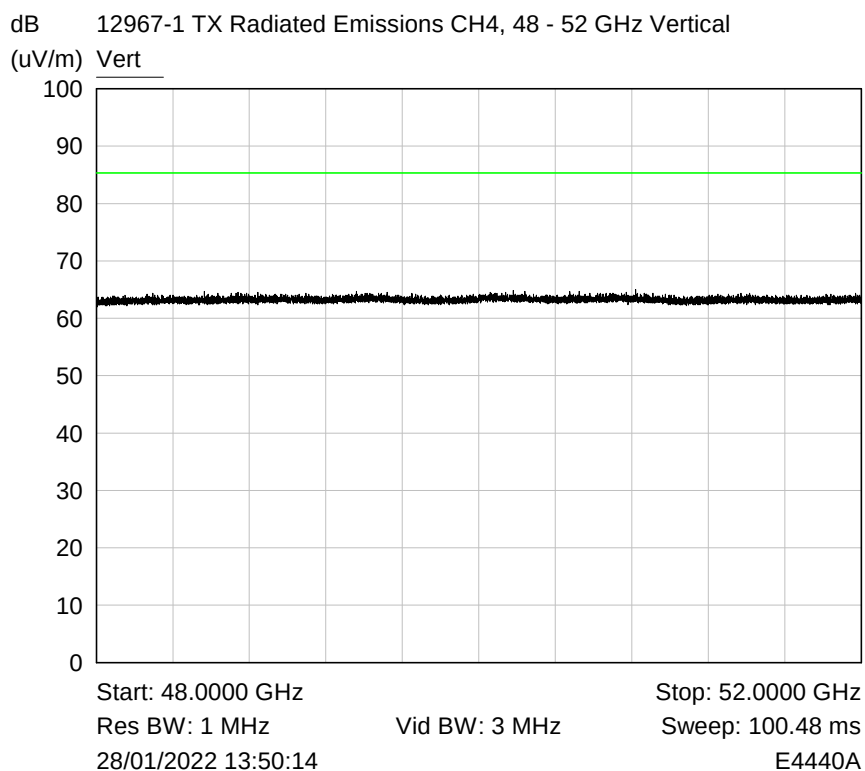
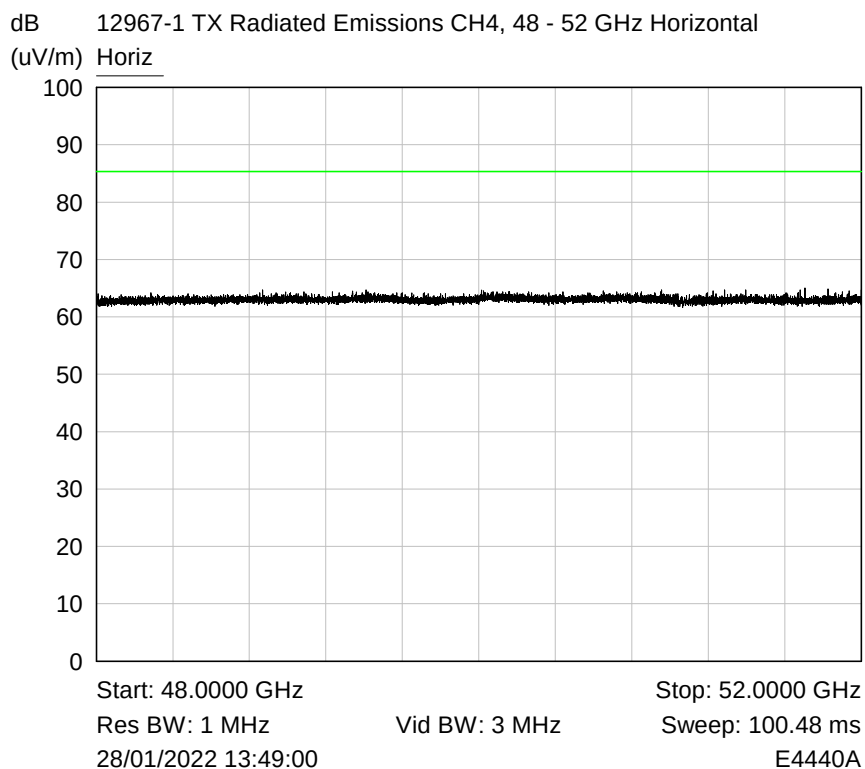


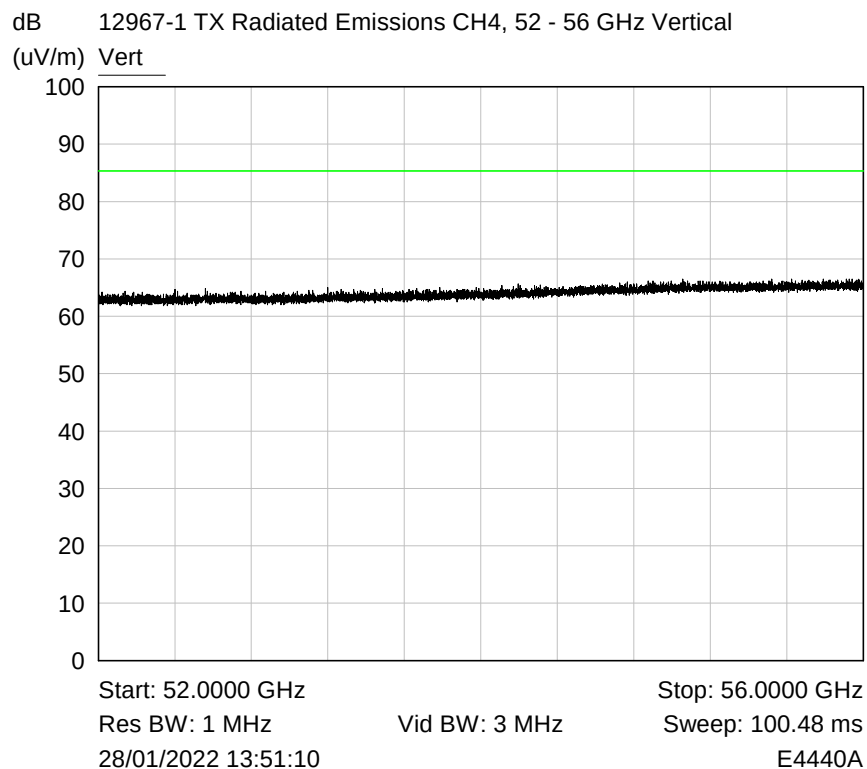
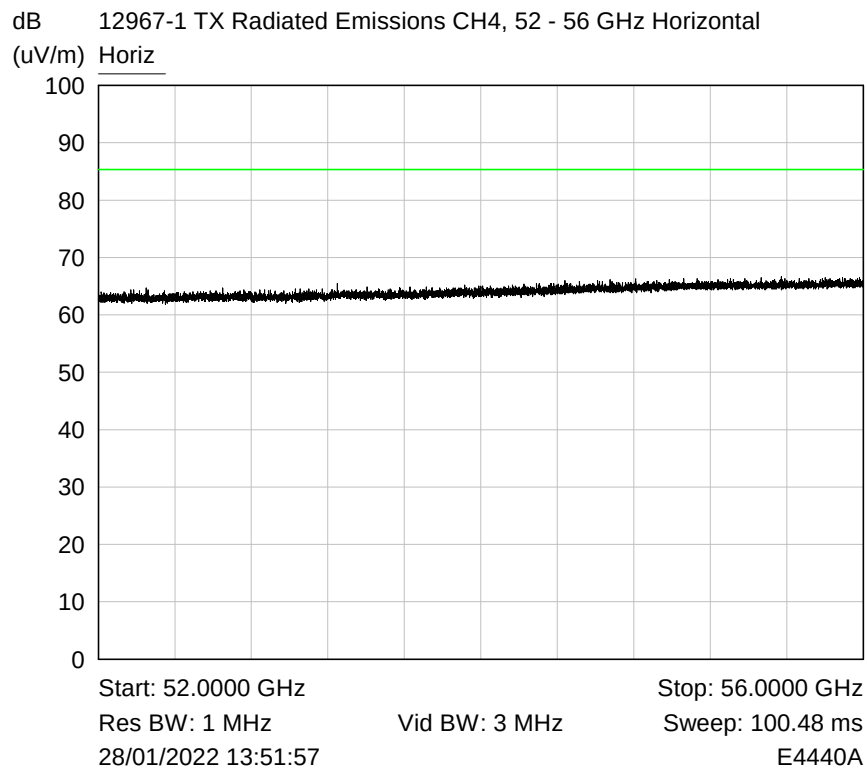


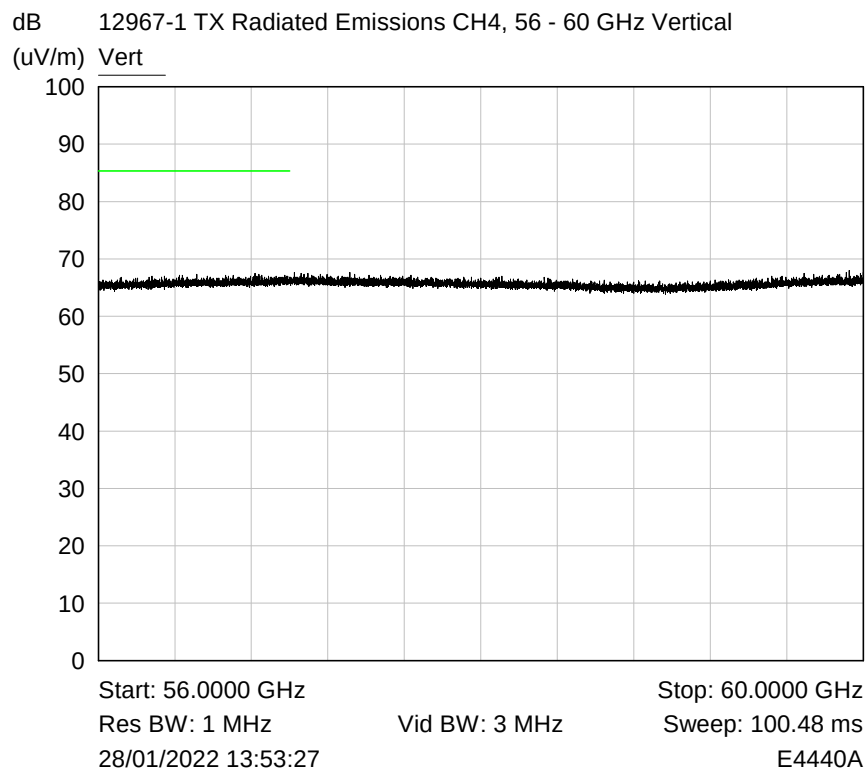
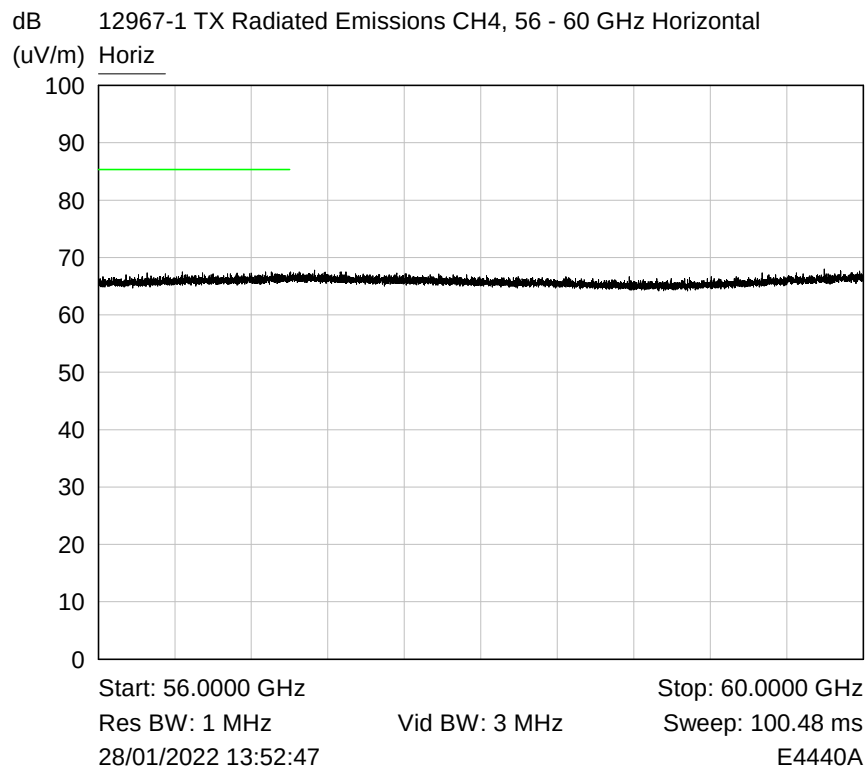


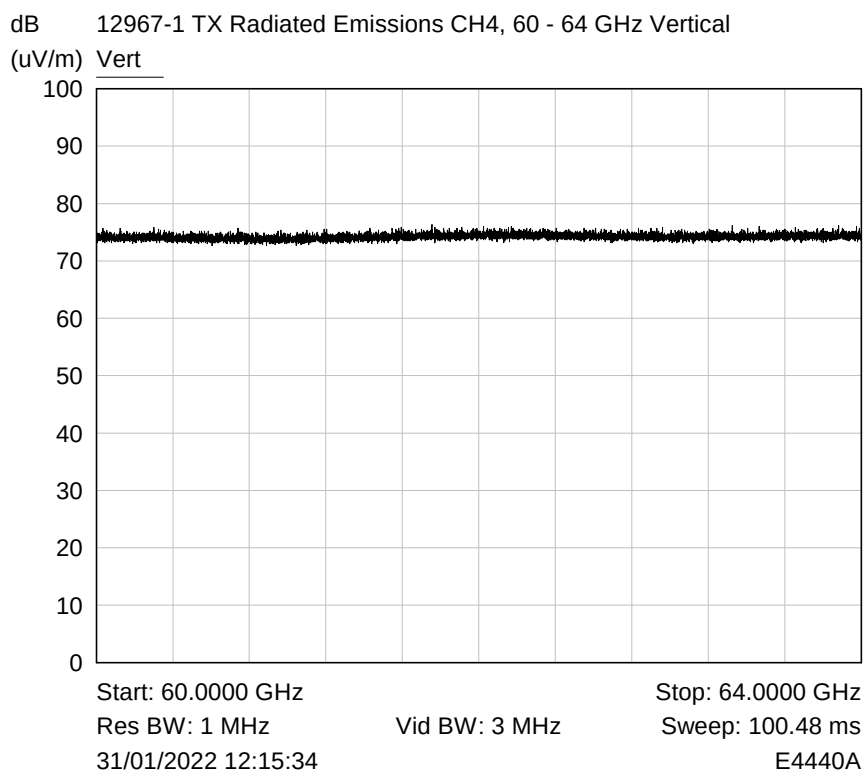
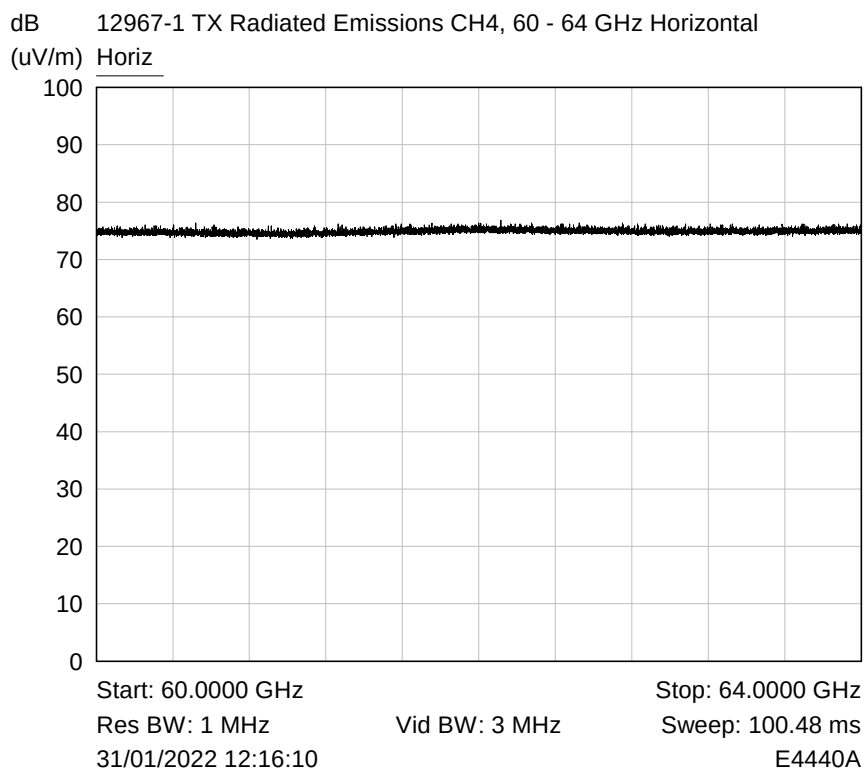


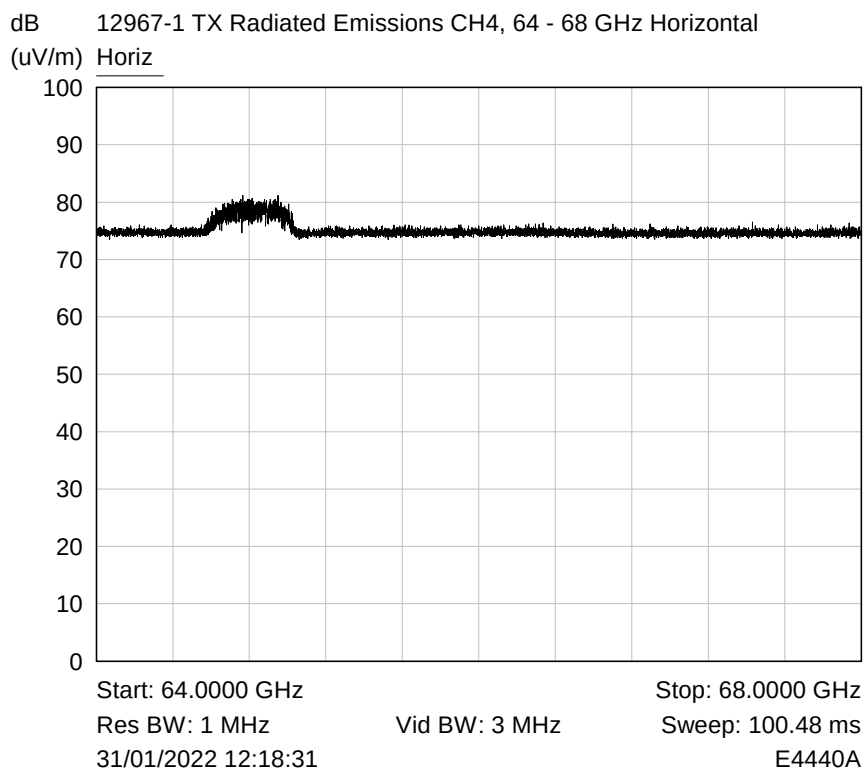




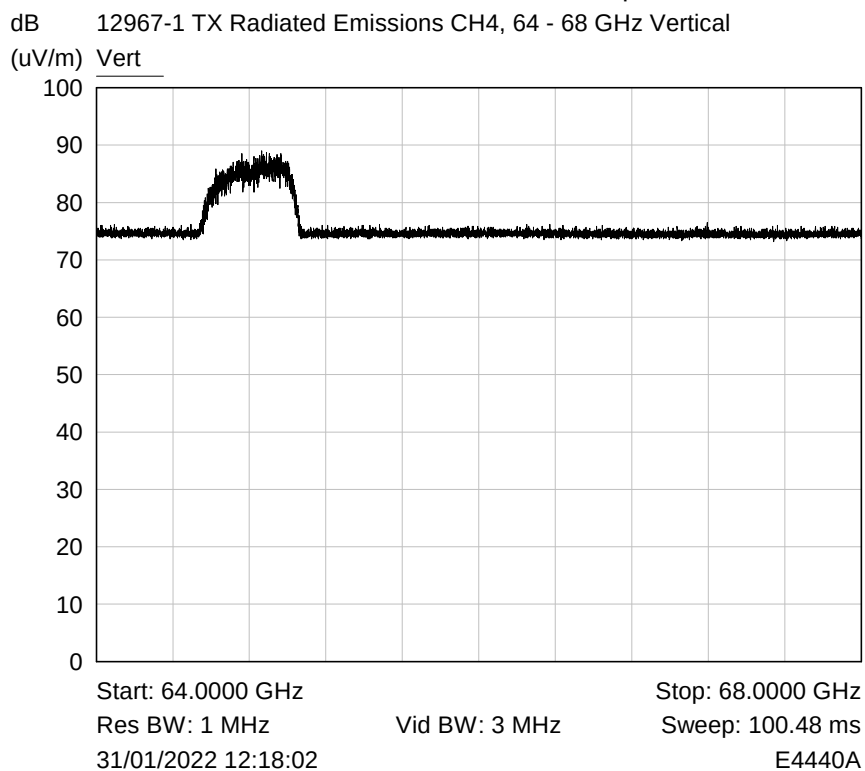




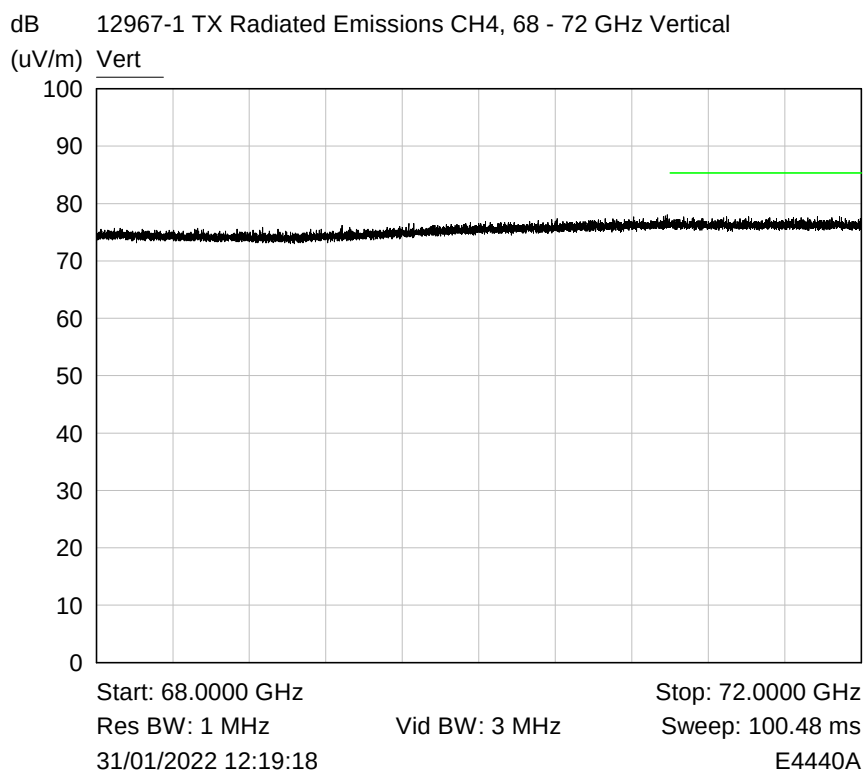
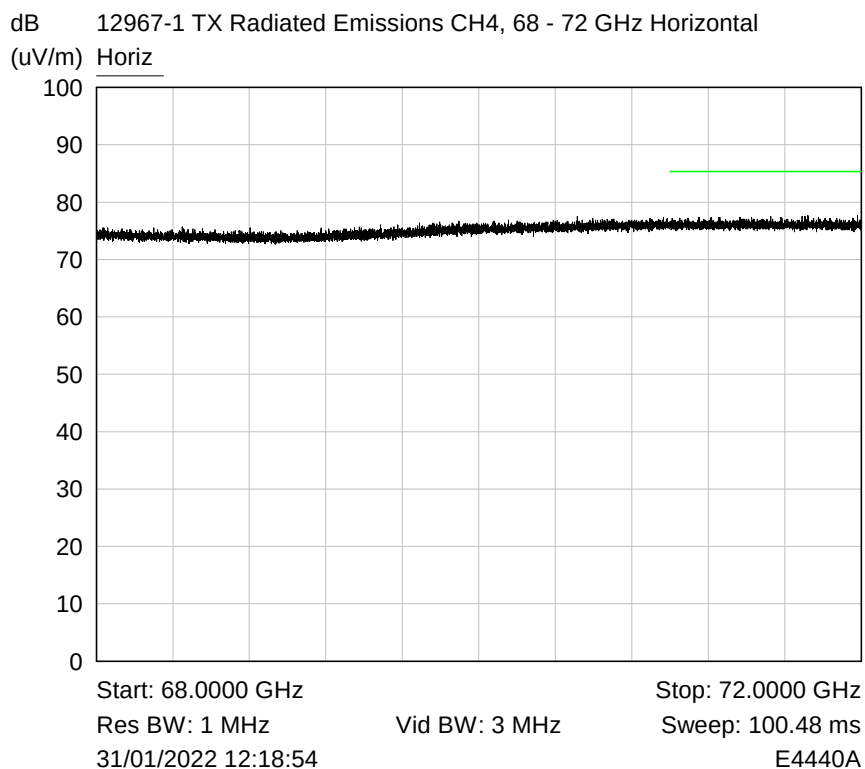


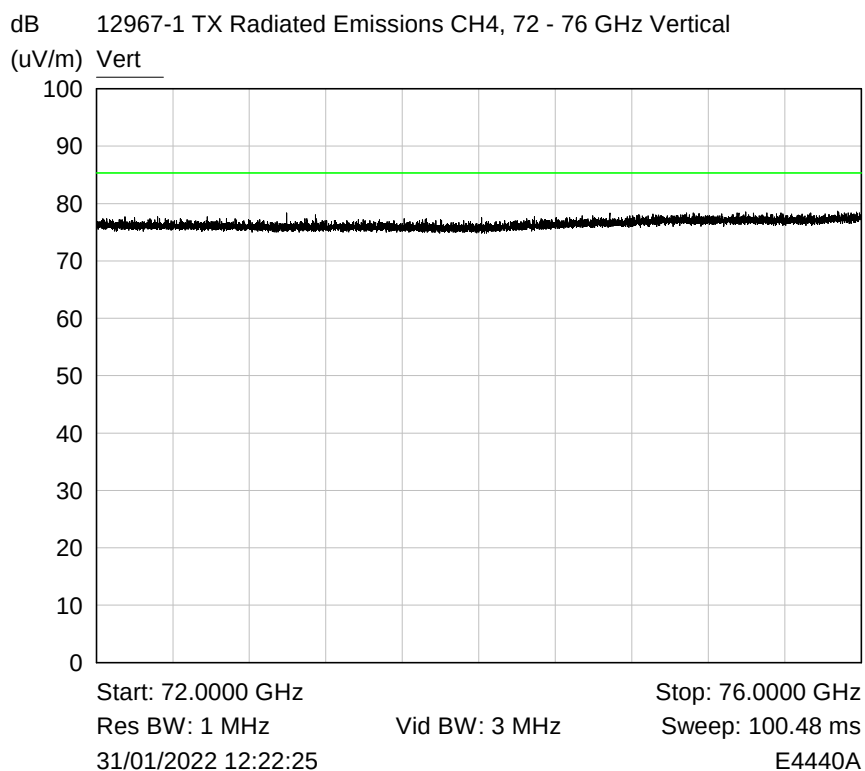
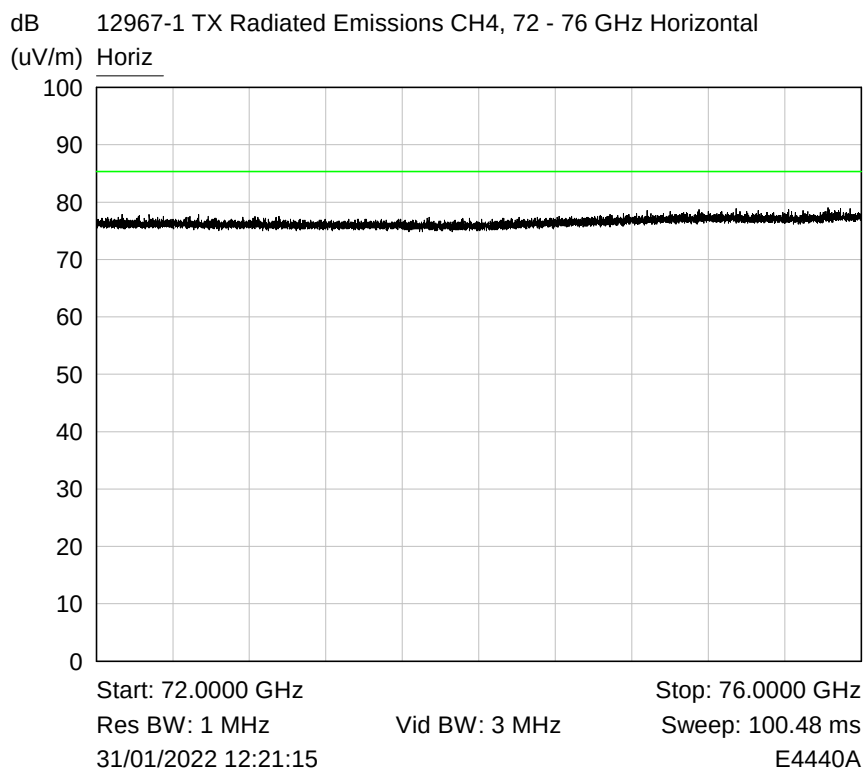


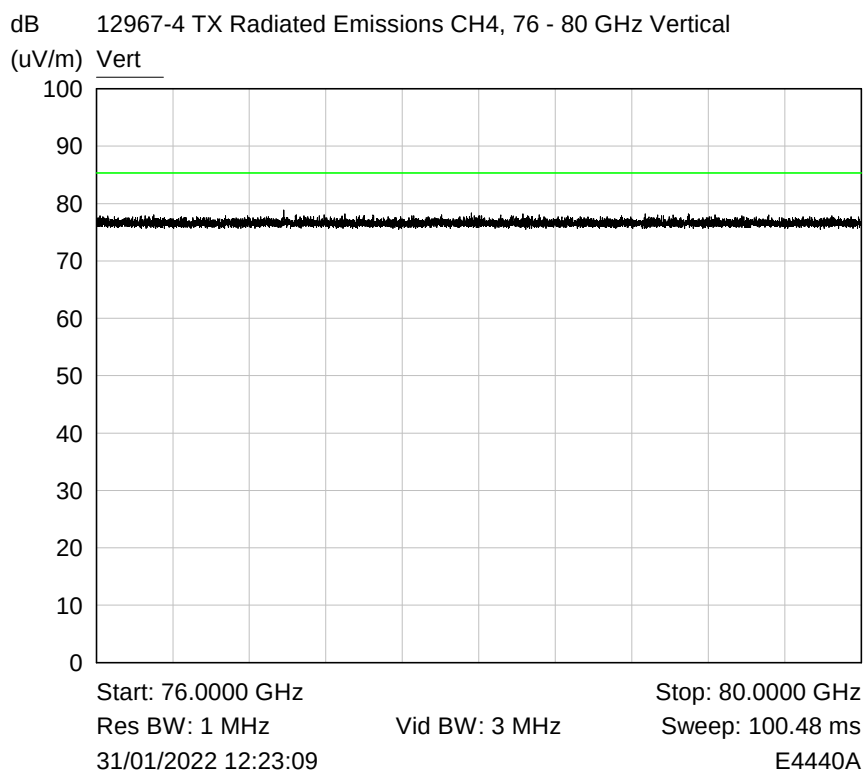
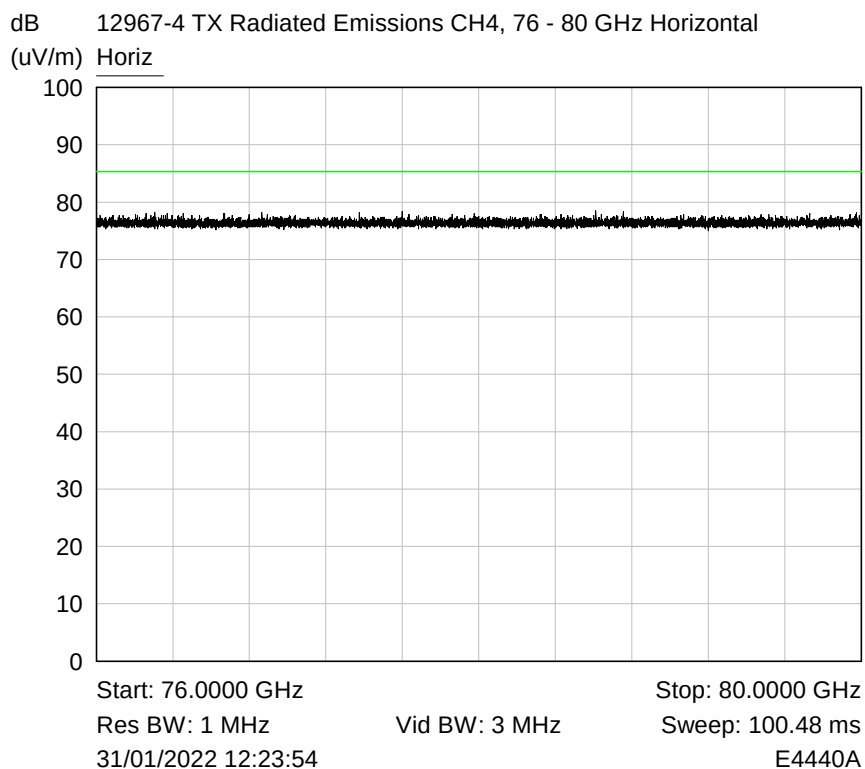
Note: fundamental shown on plot.

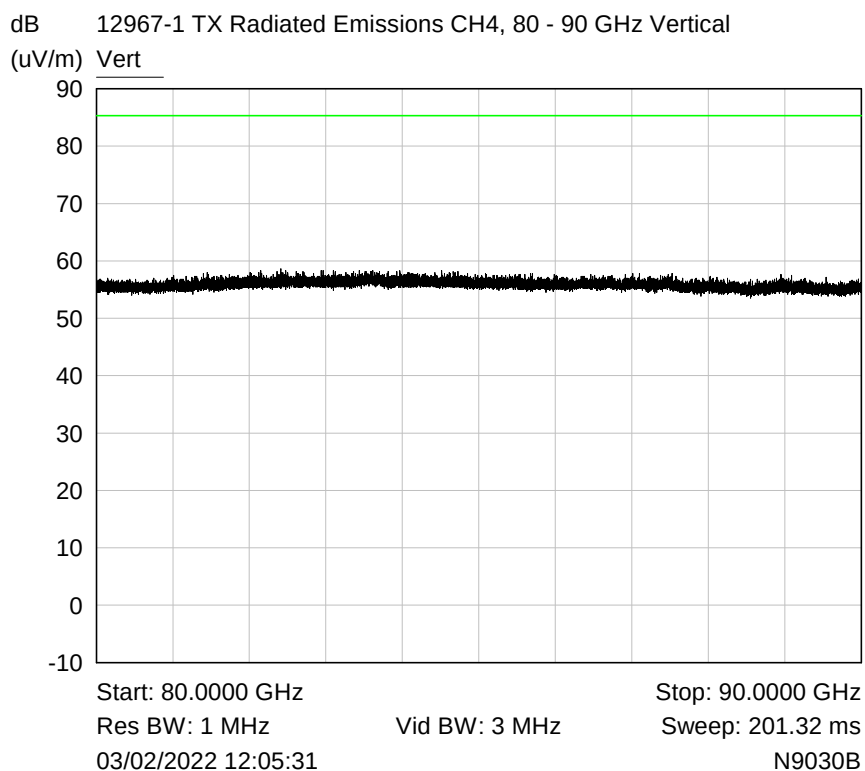
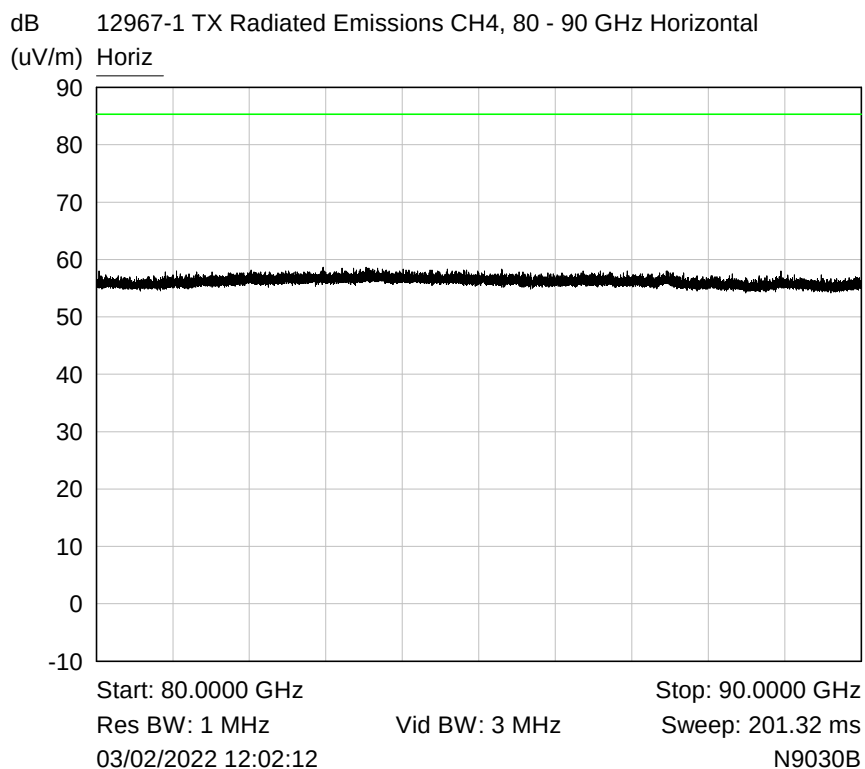


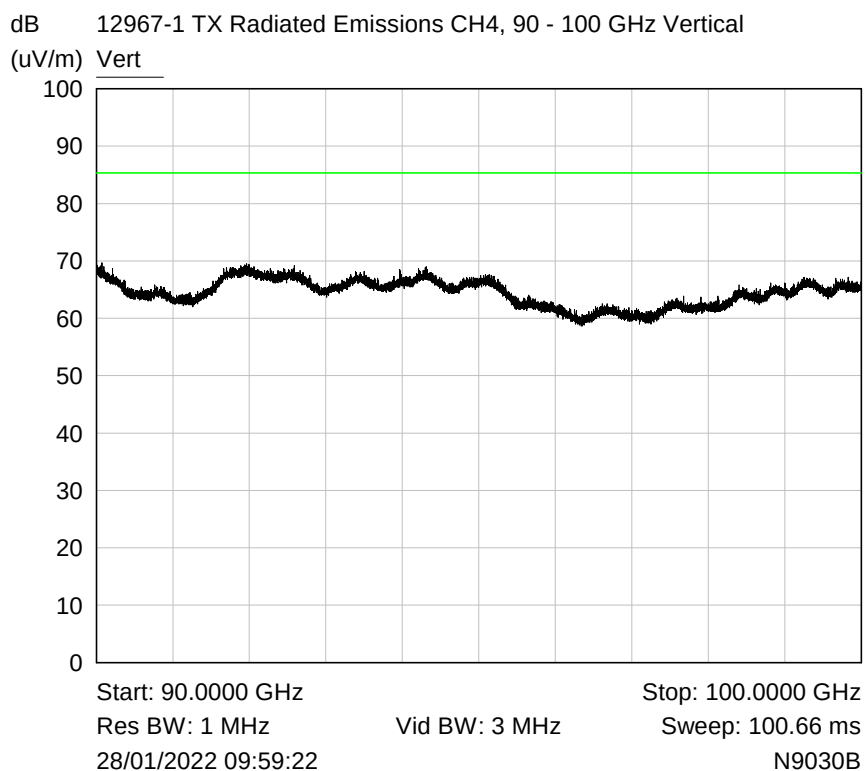
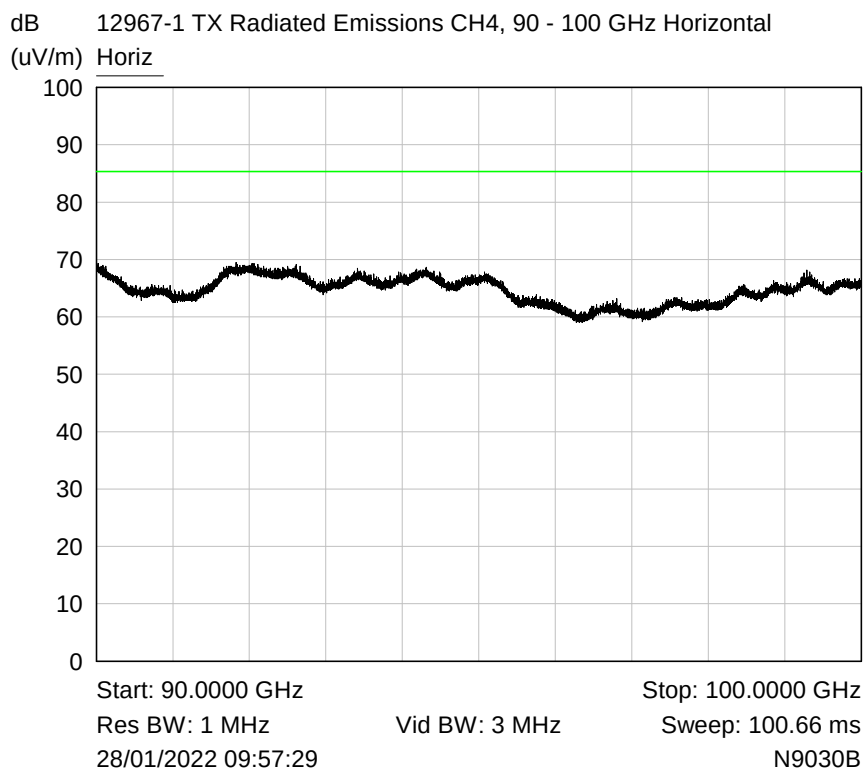
Note: fundamental shown on plot.

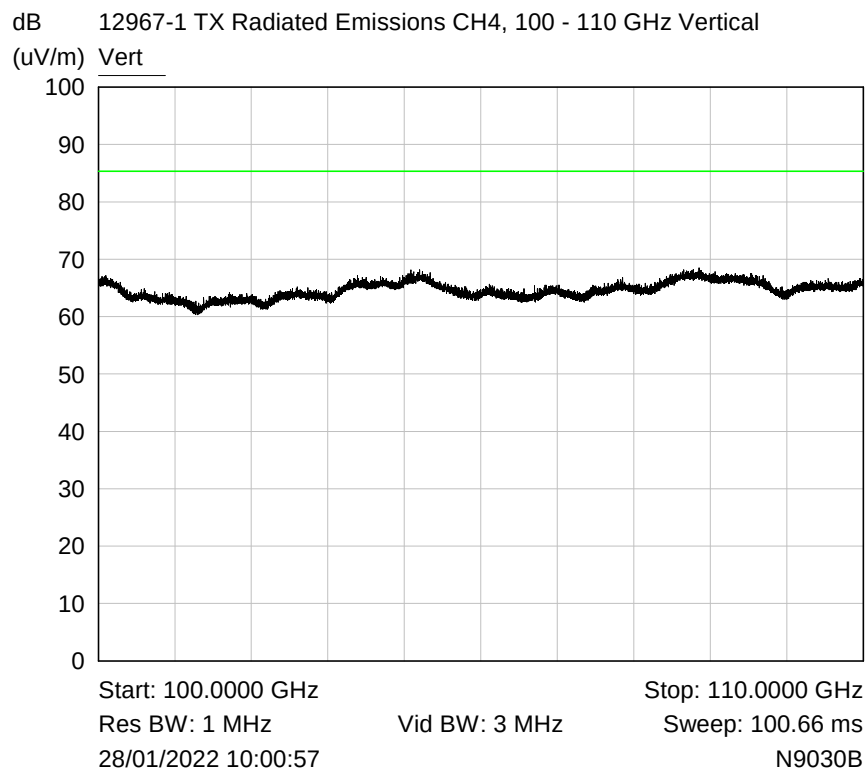
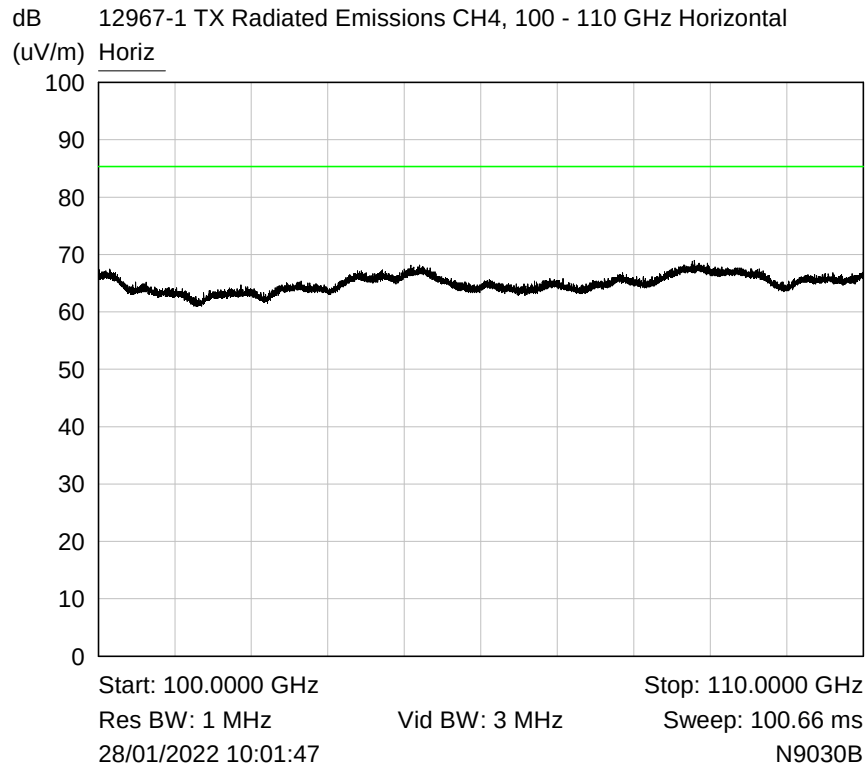


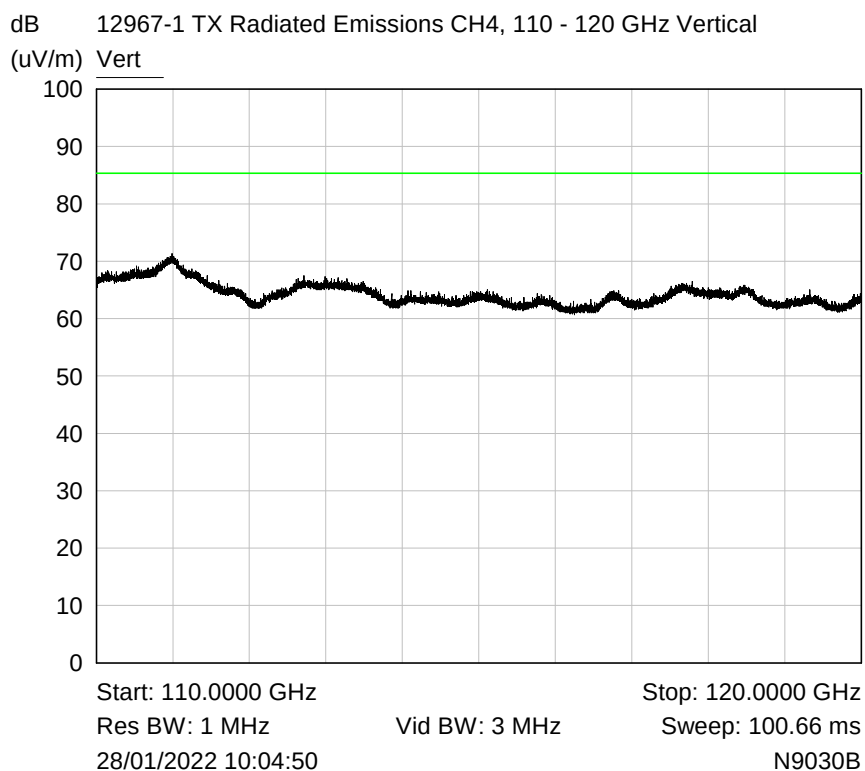
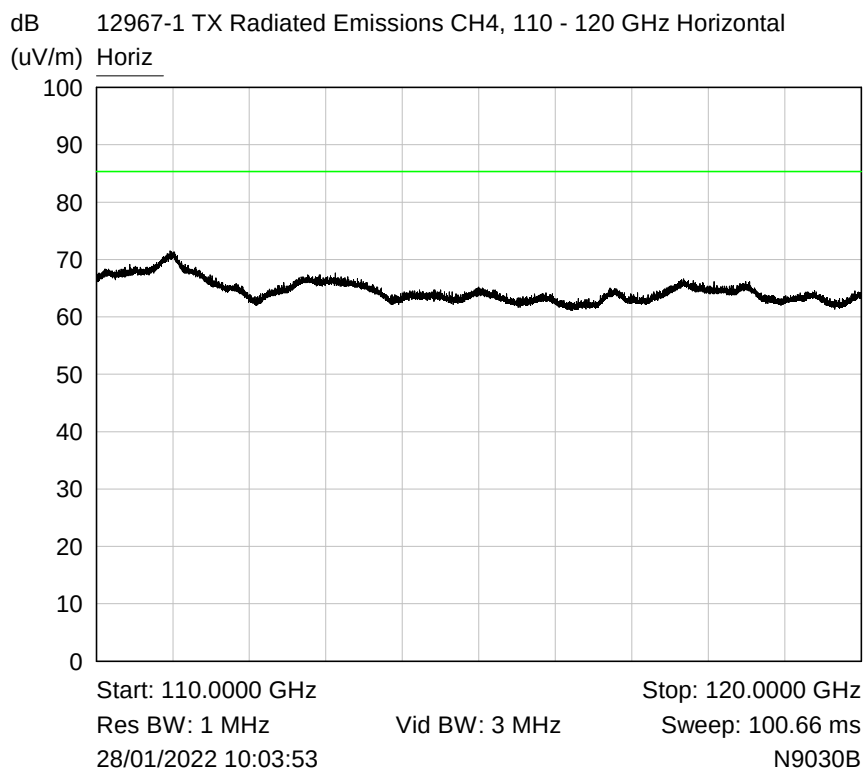


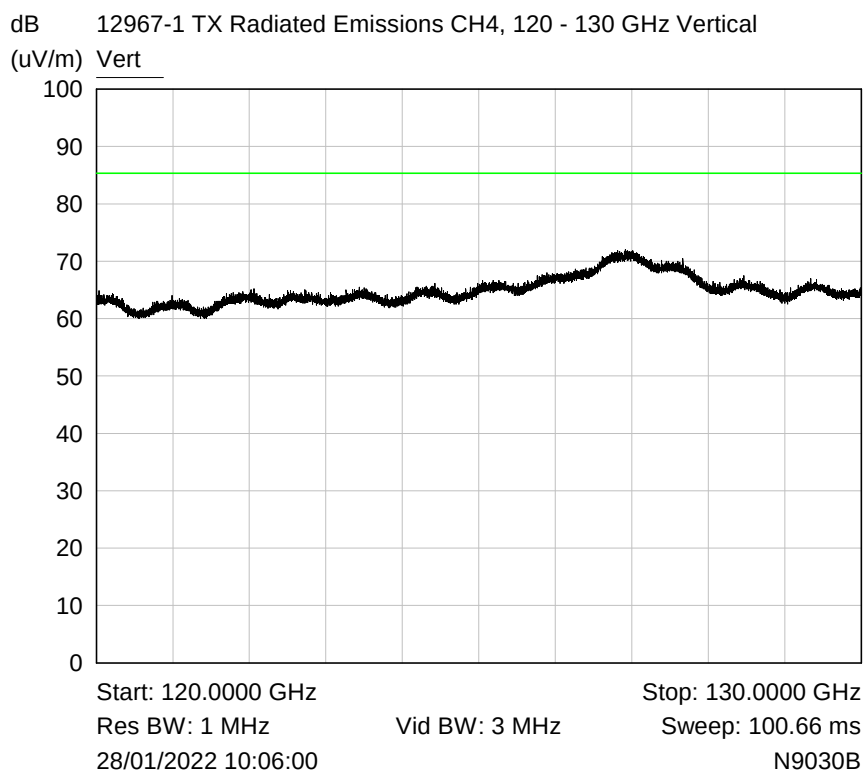
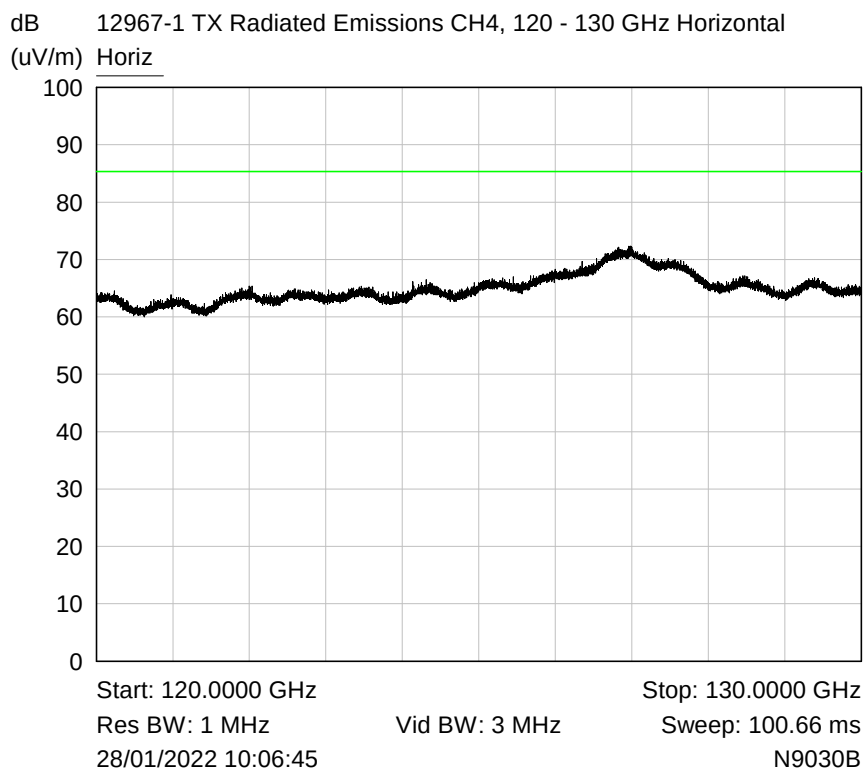


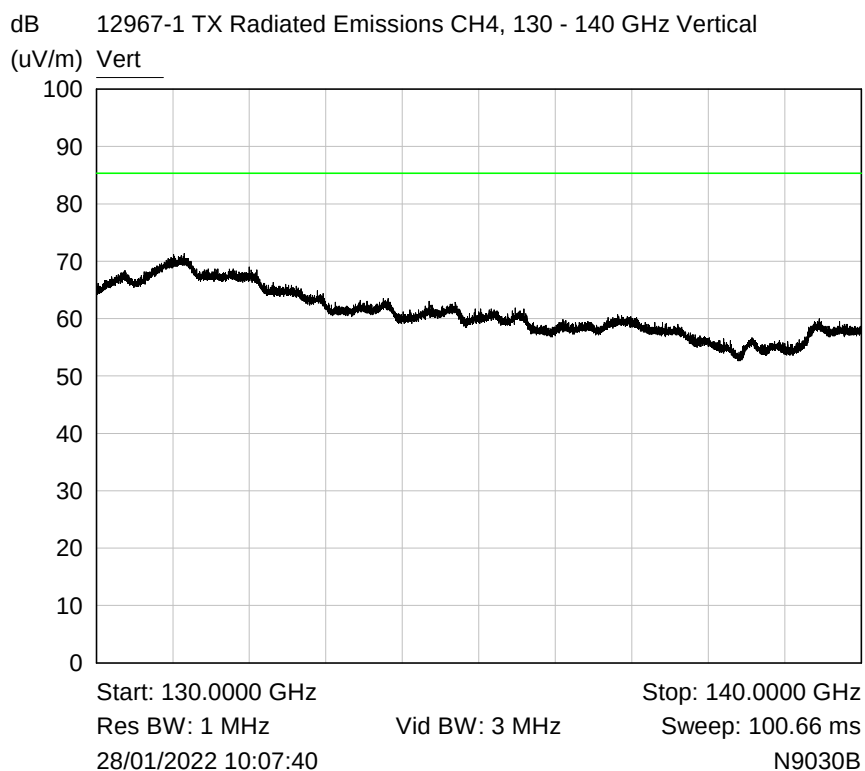
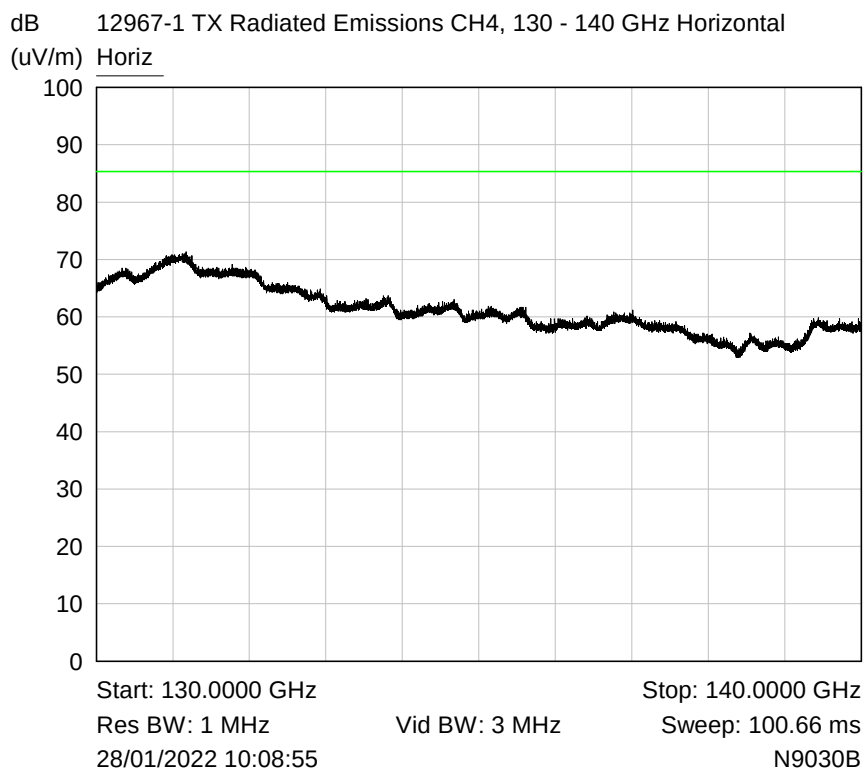


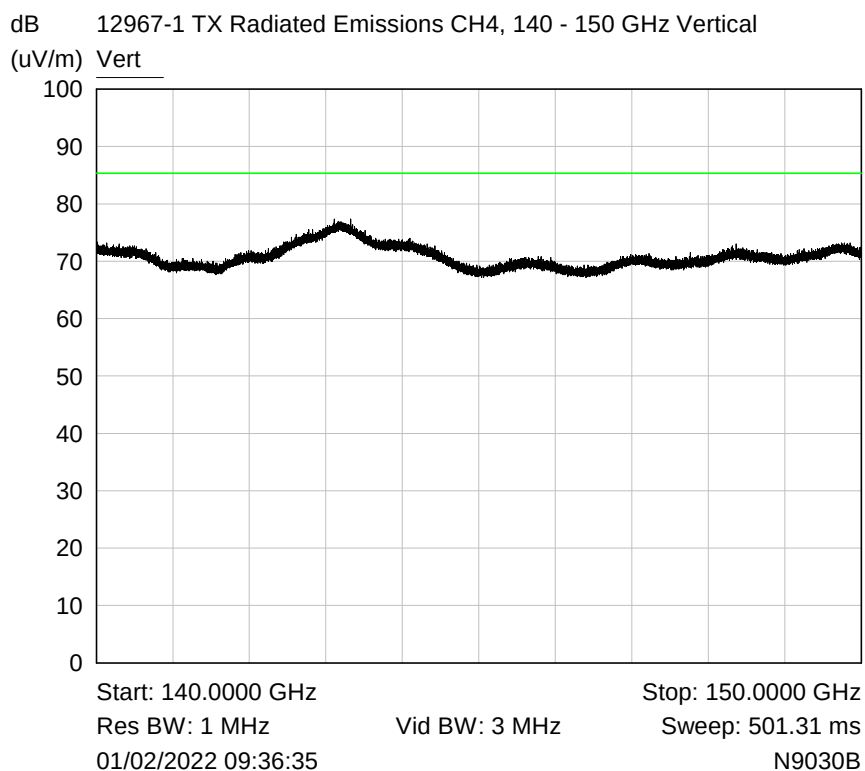
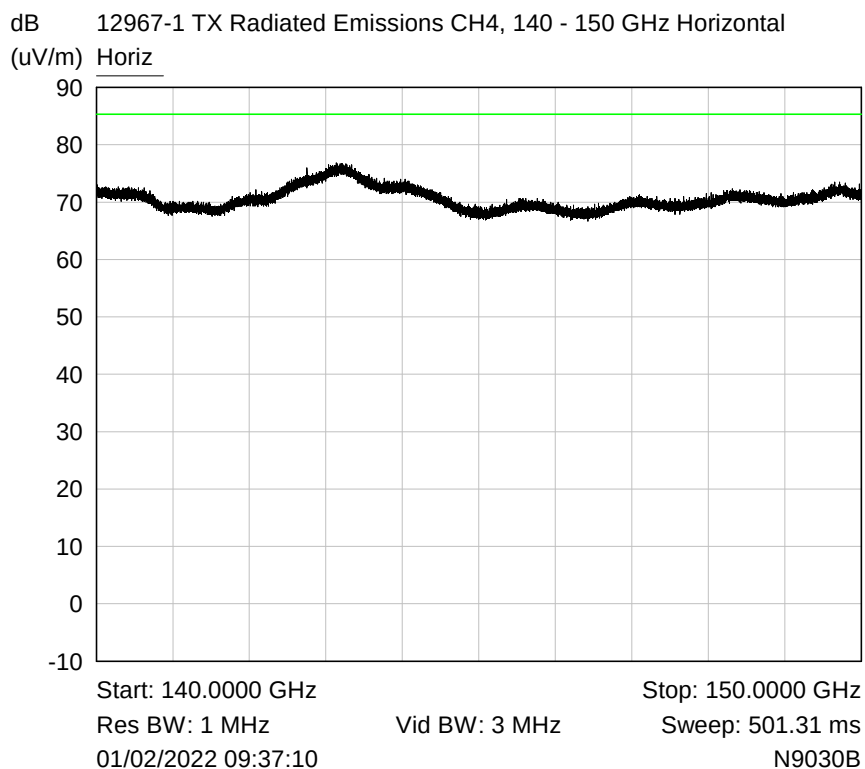


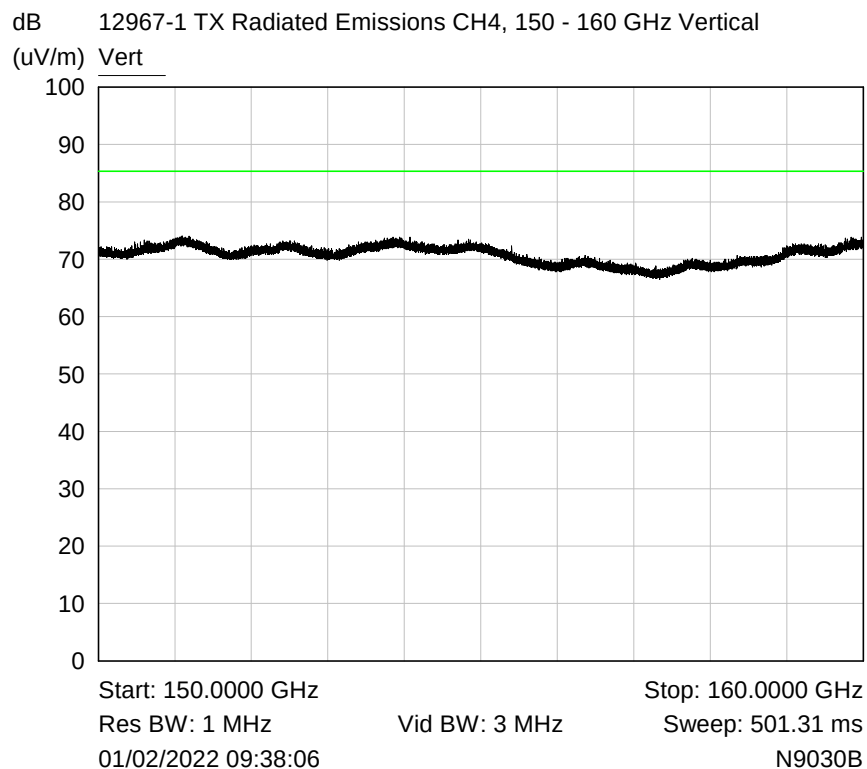
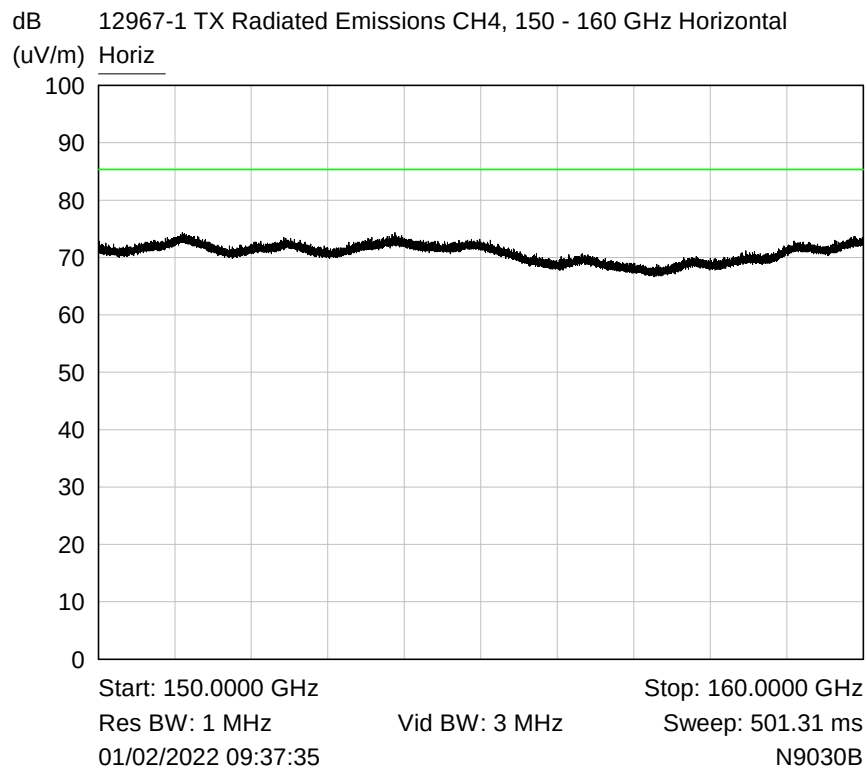


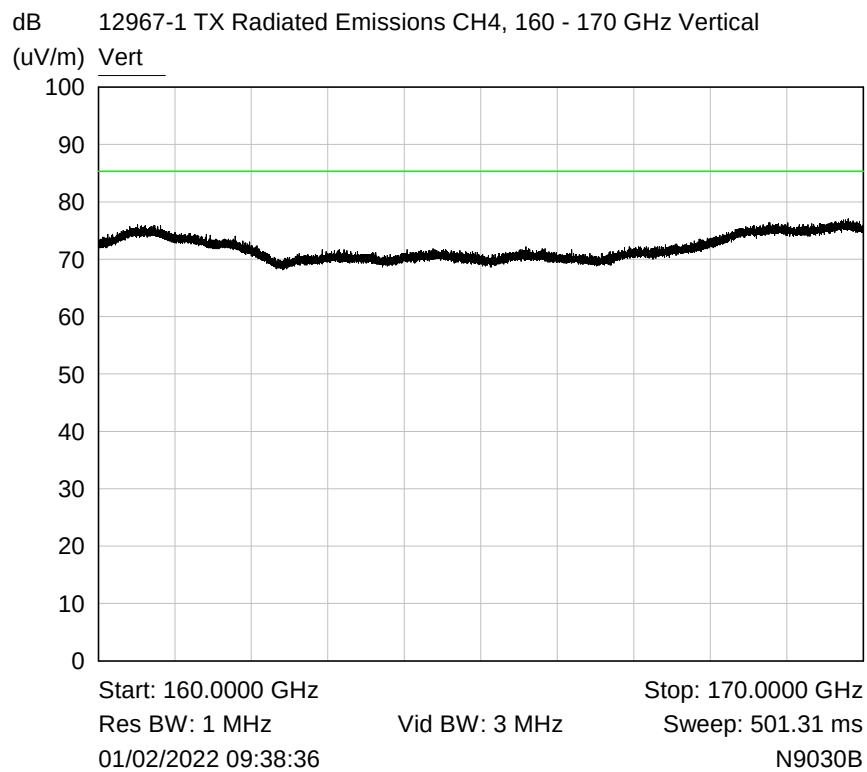
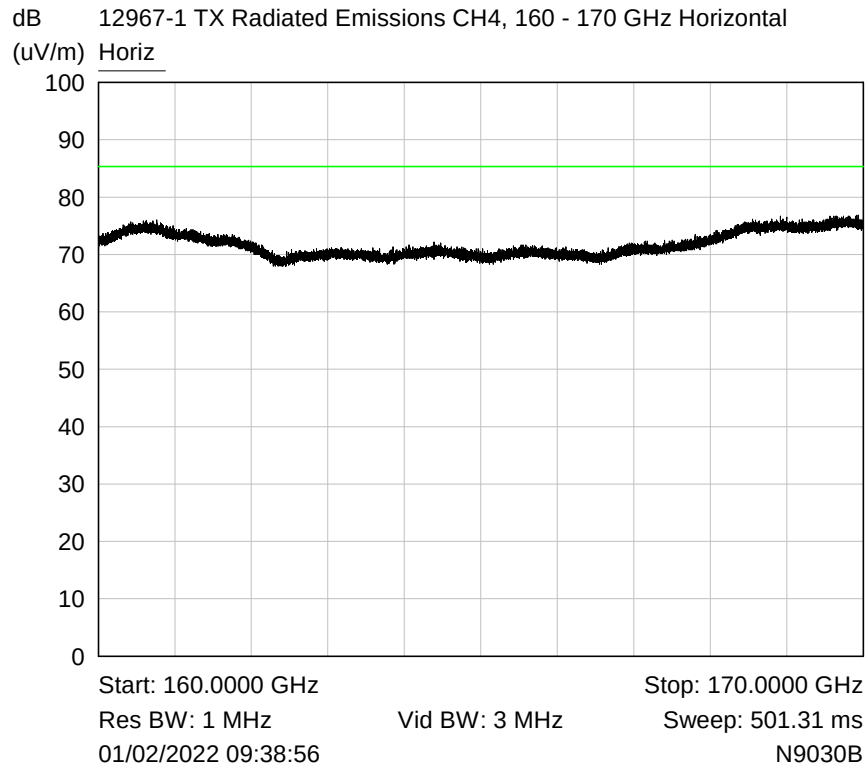


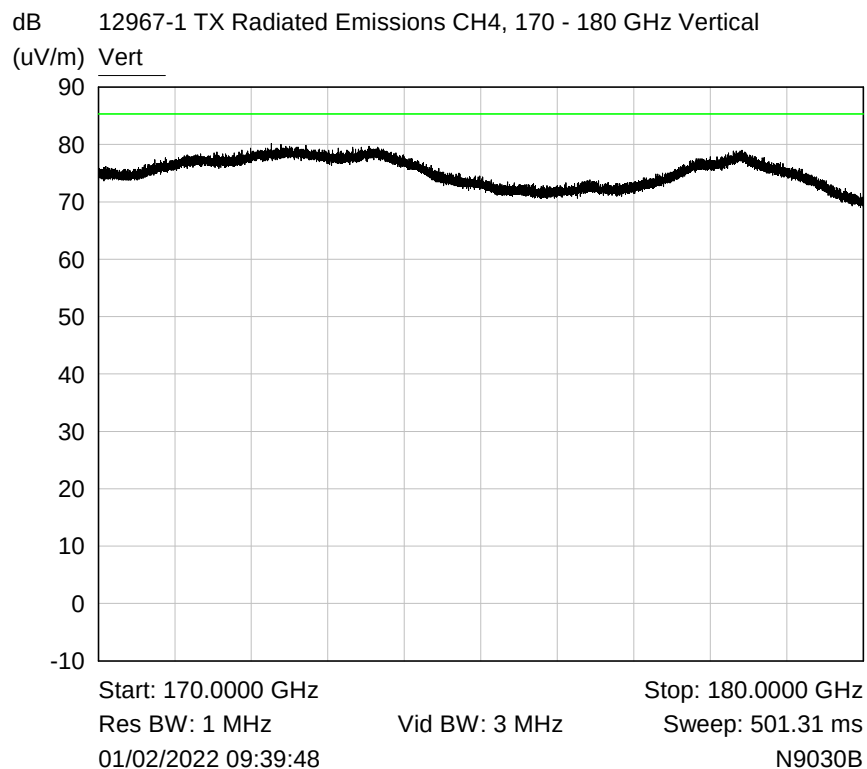
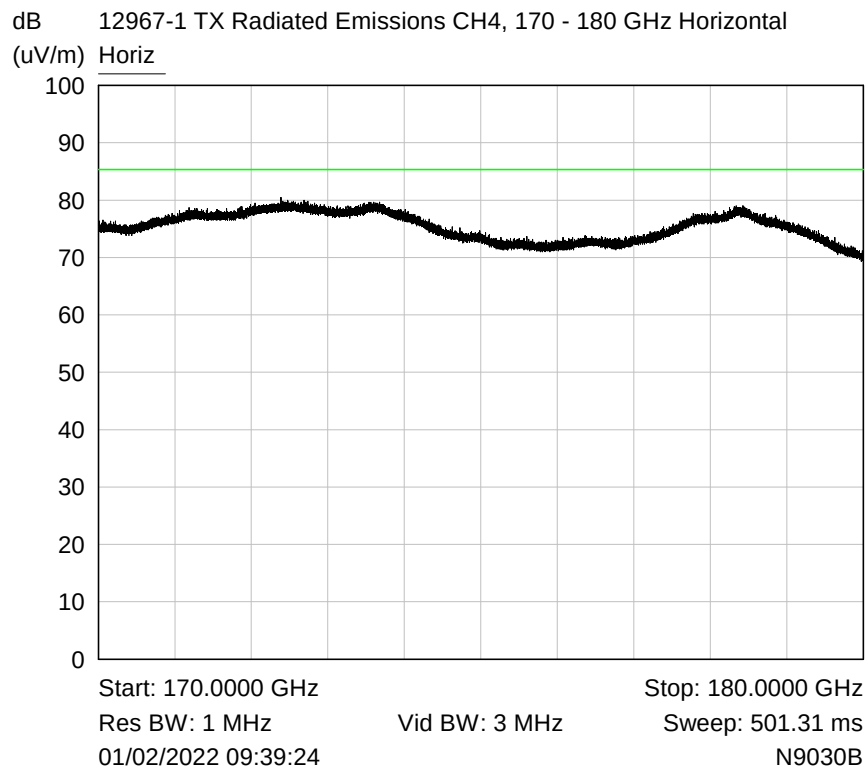


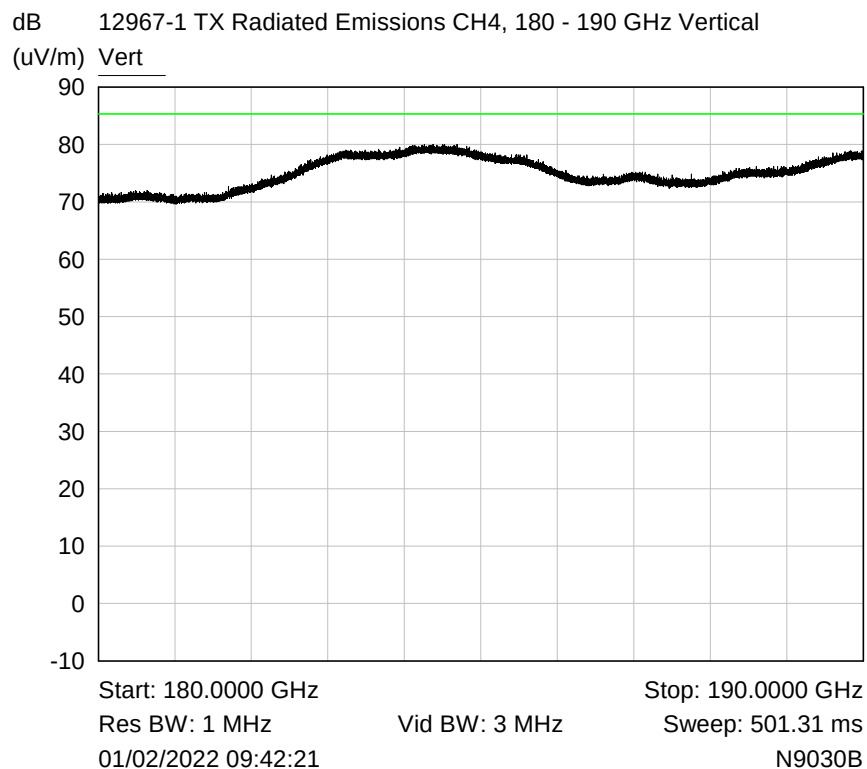
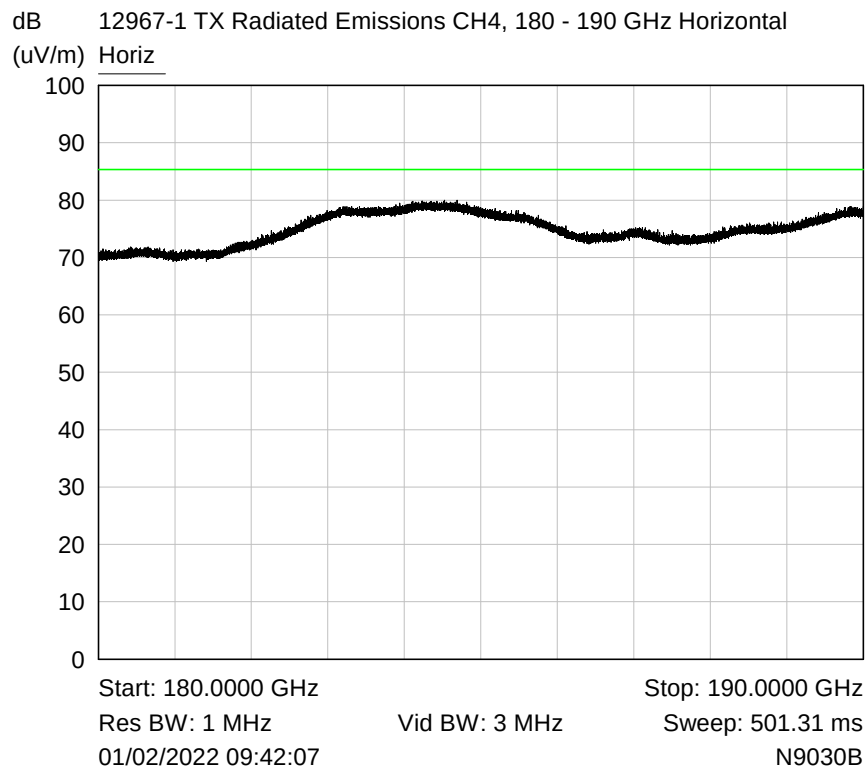


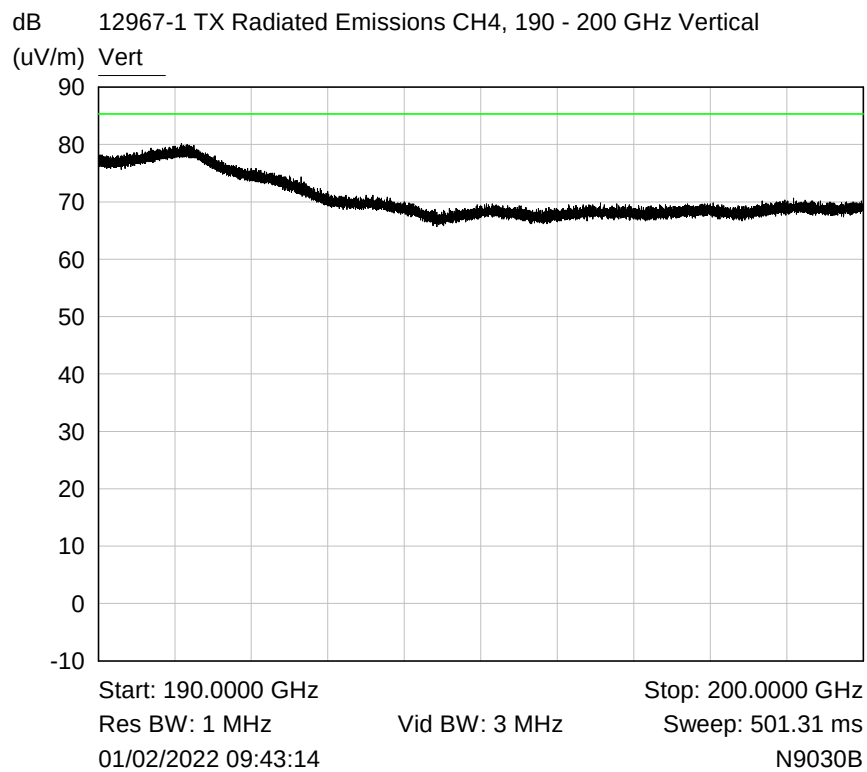
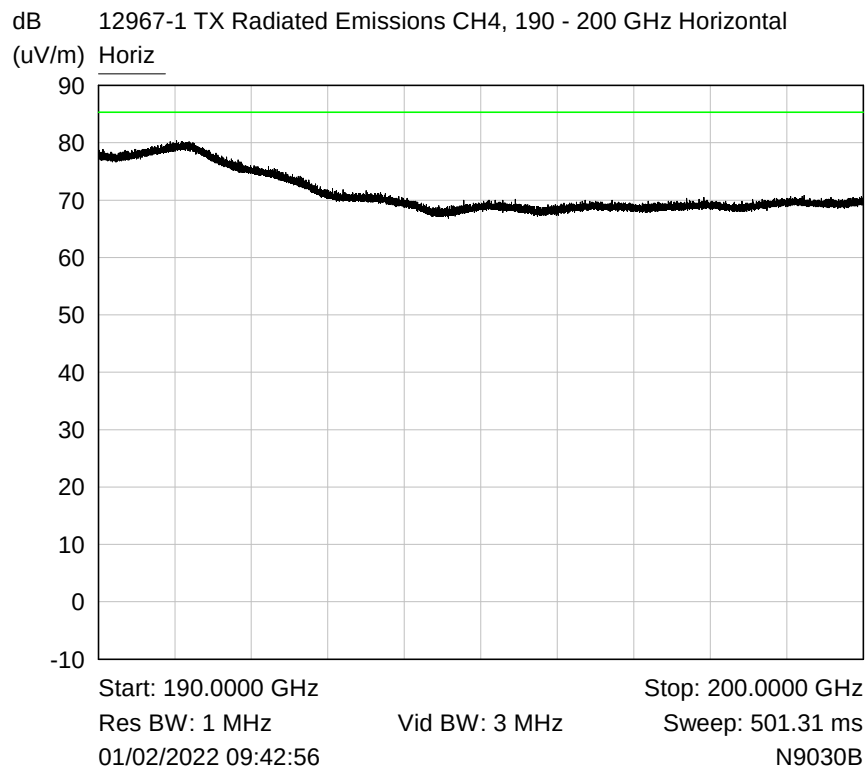






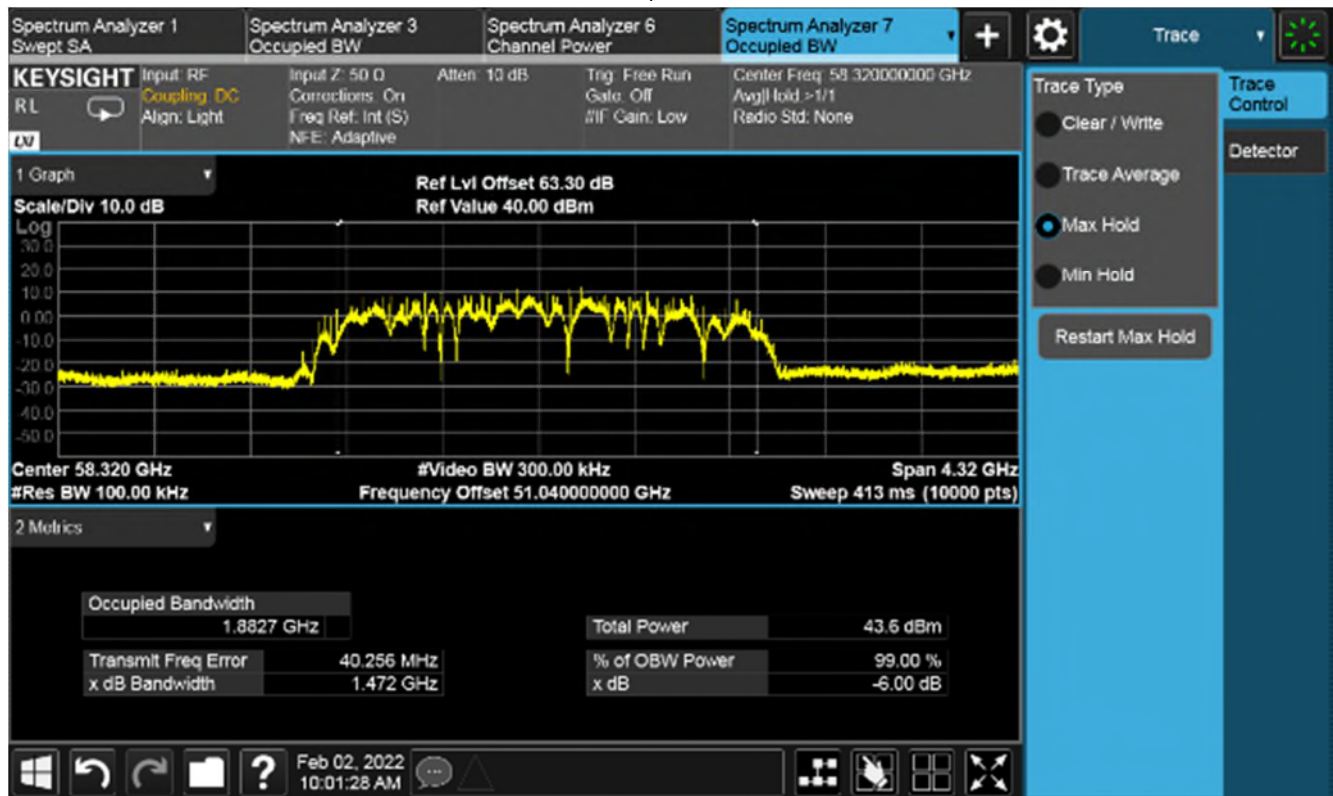






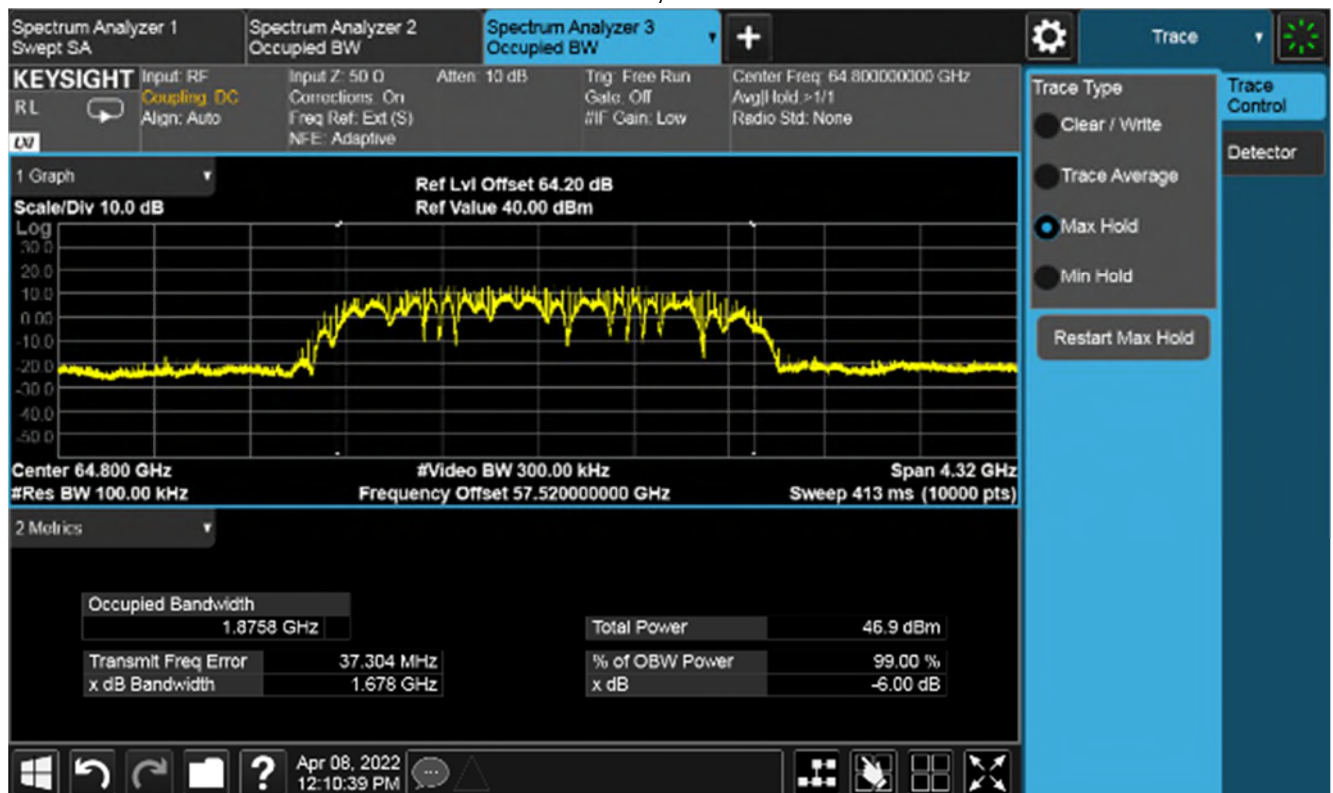
## 6.5 6dB Occupied bandwidth

RF Parameters: Band 57-71 GHz (Radio 0), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS0, Channel 58.32 GHz



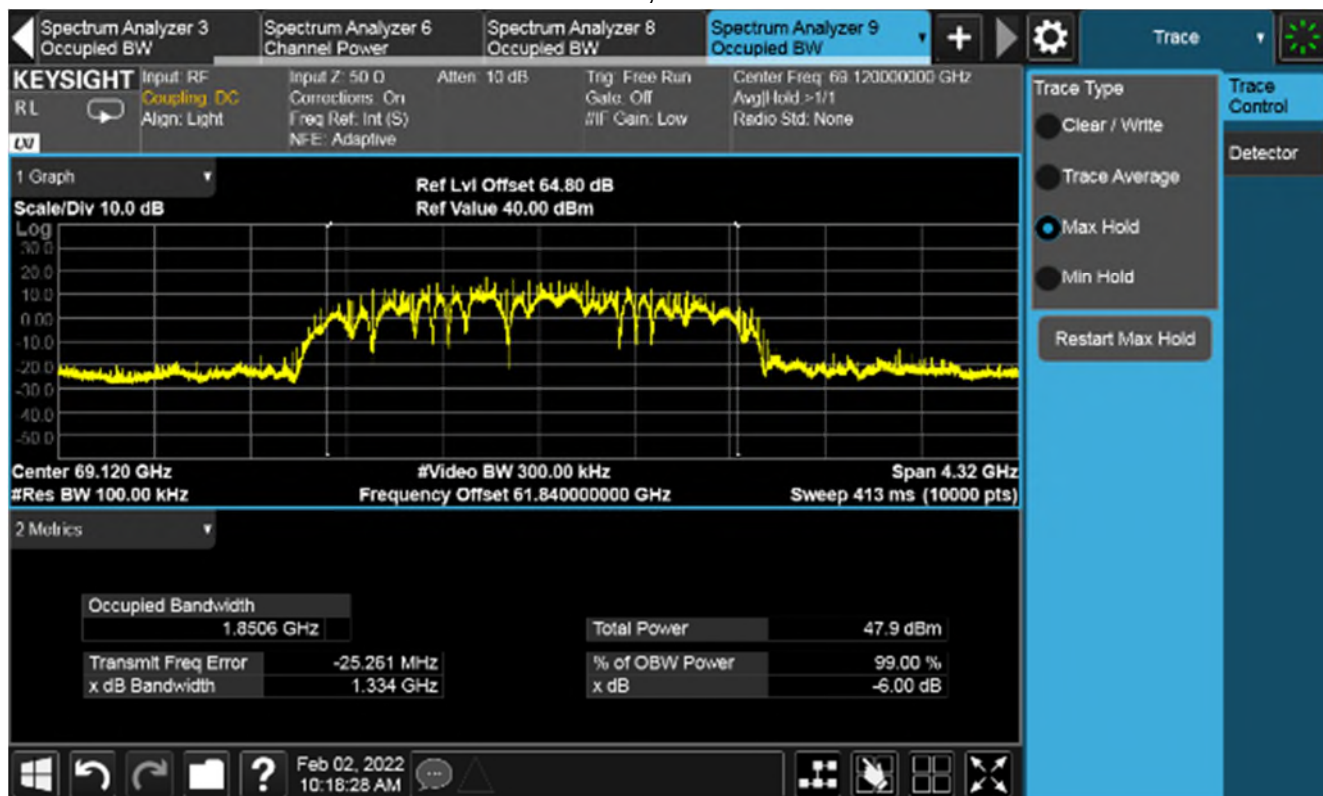
Plot for 6 dB Bandwidth (MHz) Nominal Temp & Volts

RF Parameters: Band 57-71 GHz (Radio 0), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS0, Channel 64.8 GHz



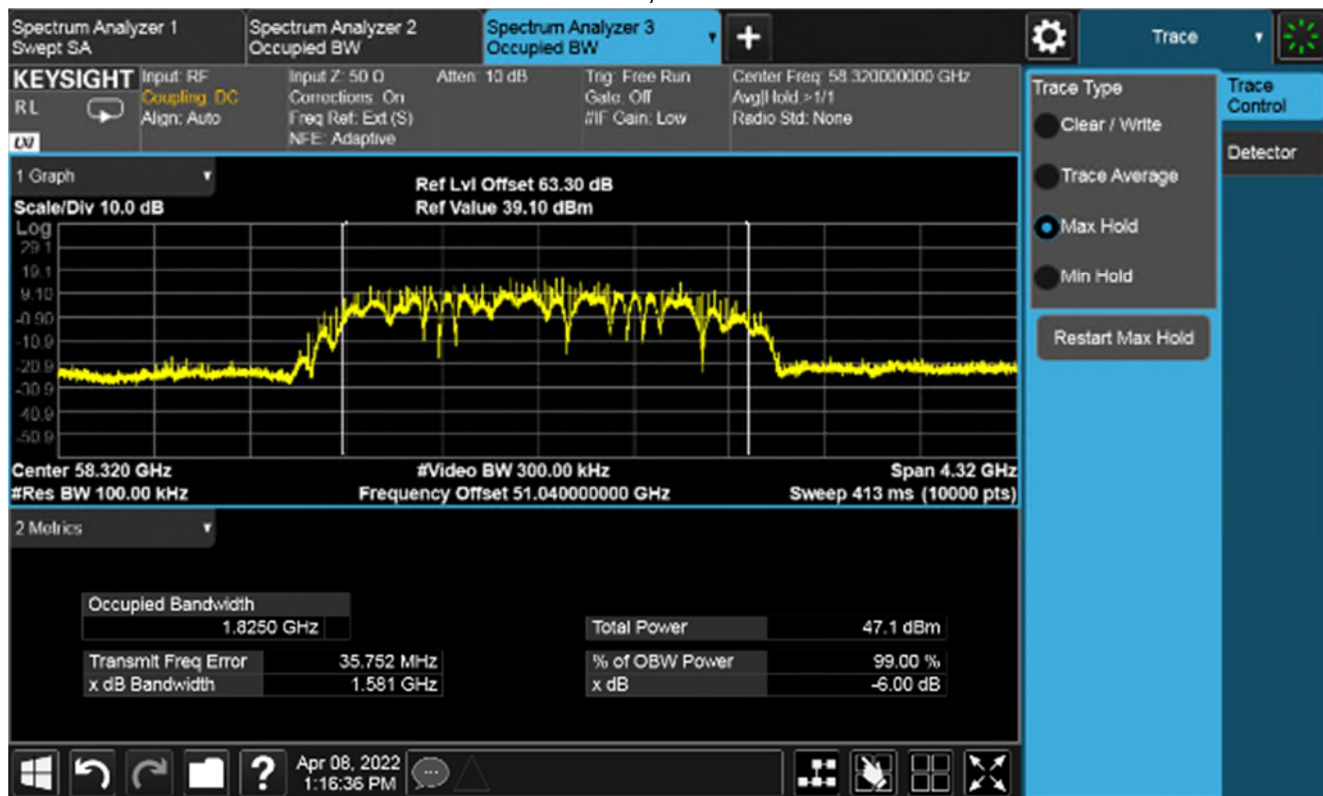
Plot for 6 dB Bandwidth (MHz) Nominal Temp & Volts

RF Parameters: Band 57-71 GHz (Radio 0), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS0, Channel 69.12 GHz



Plot for 6 dB Bandwidth (MHz) Nominal Temp & Volts

RF Parameters: Band 57-71 GHz (Radio 1), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS0, Channel 58.32 GHz



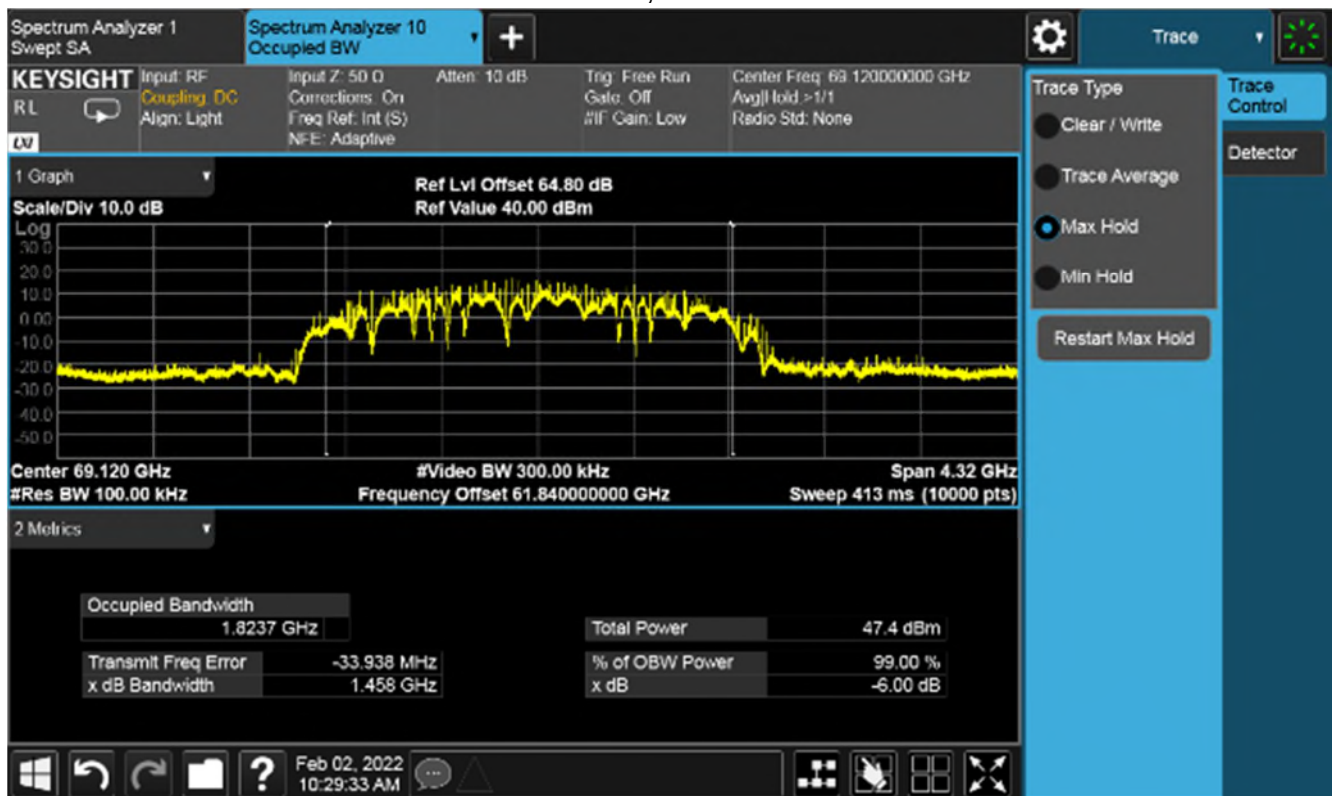
Plot for 6 dB Bandwidth (MHz) Nominal Temp & Volts

RF Parameters: Band 57-71 GHz (Radio 1), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS0, Channel 64.8 GHz



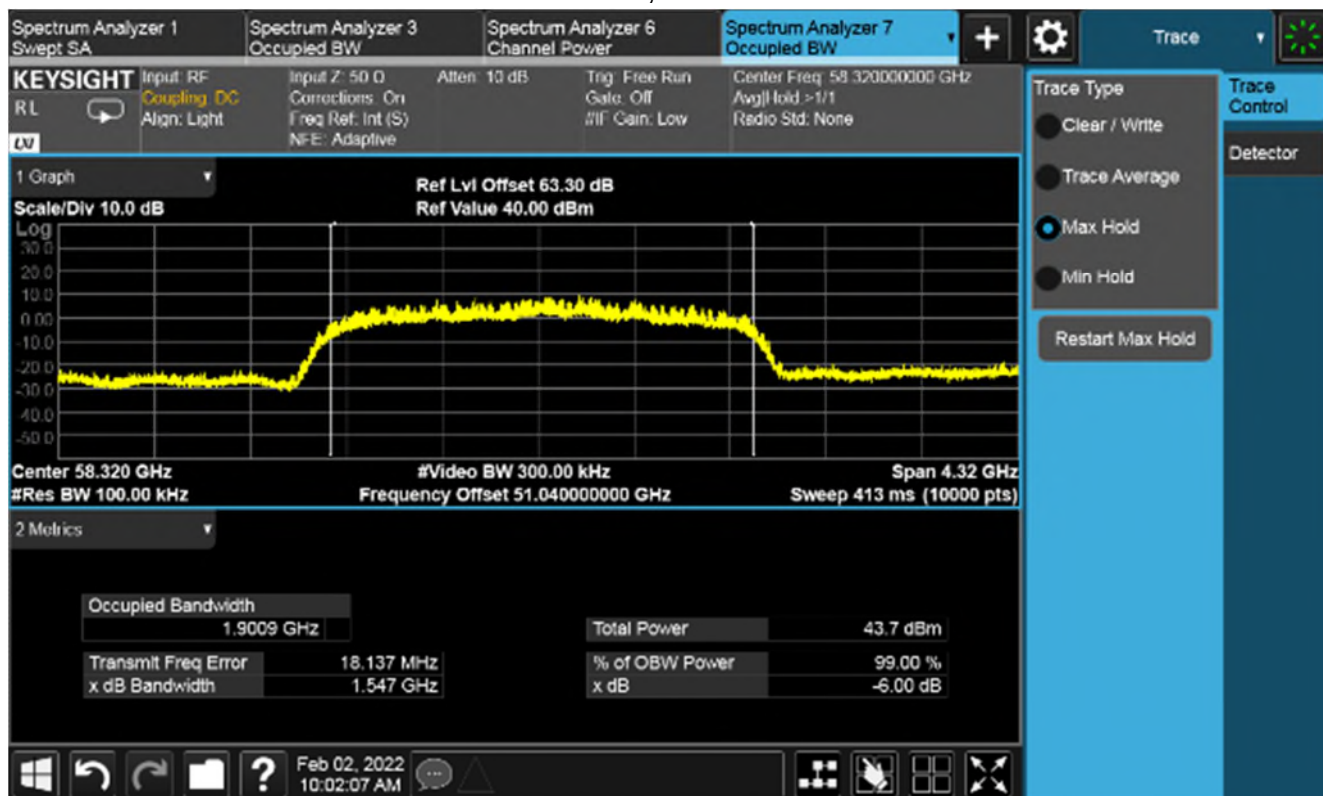
Plot for 6 dB Bandwidth (MHz) Nominal Temp & Volts

RF Parameters: Band 57-71 GHz (Radio 1), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS0, Channel 69.12 GHz



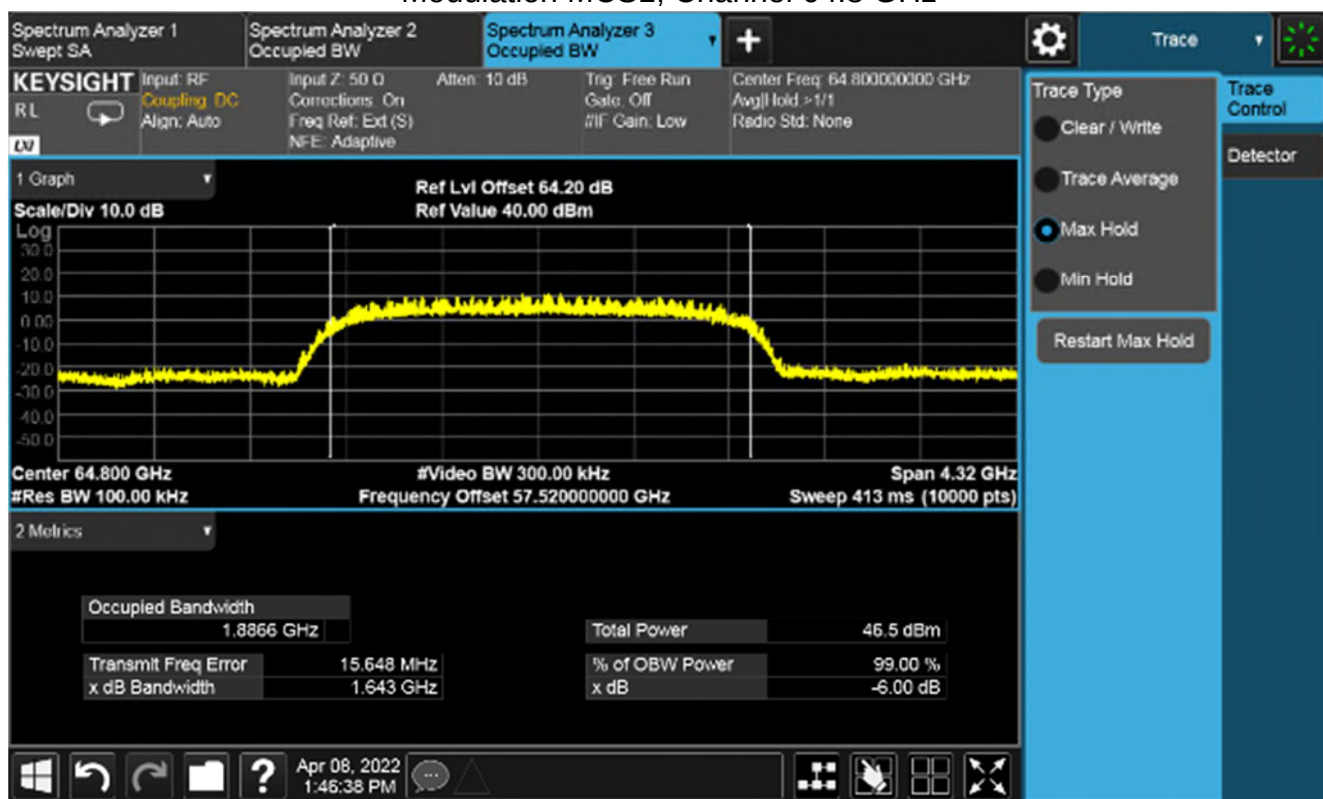
Plot for 6 dB Bandwidth (MHz) Nominal Temp & Volts

RF Parameters: Band 57-71 GHz (Radio 0), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS1, Channel 58.32 GHz



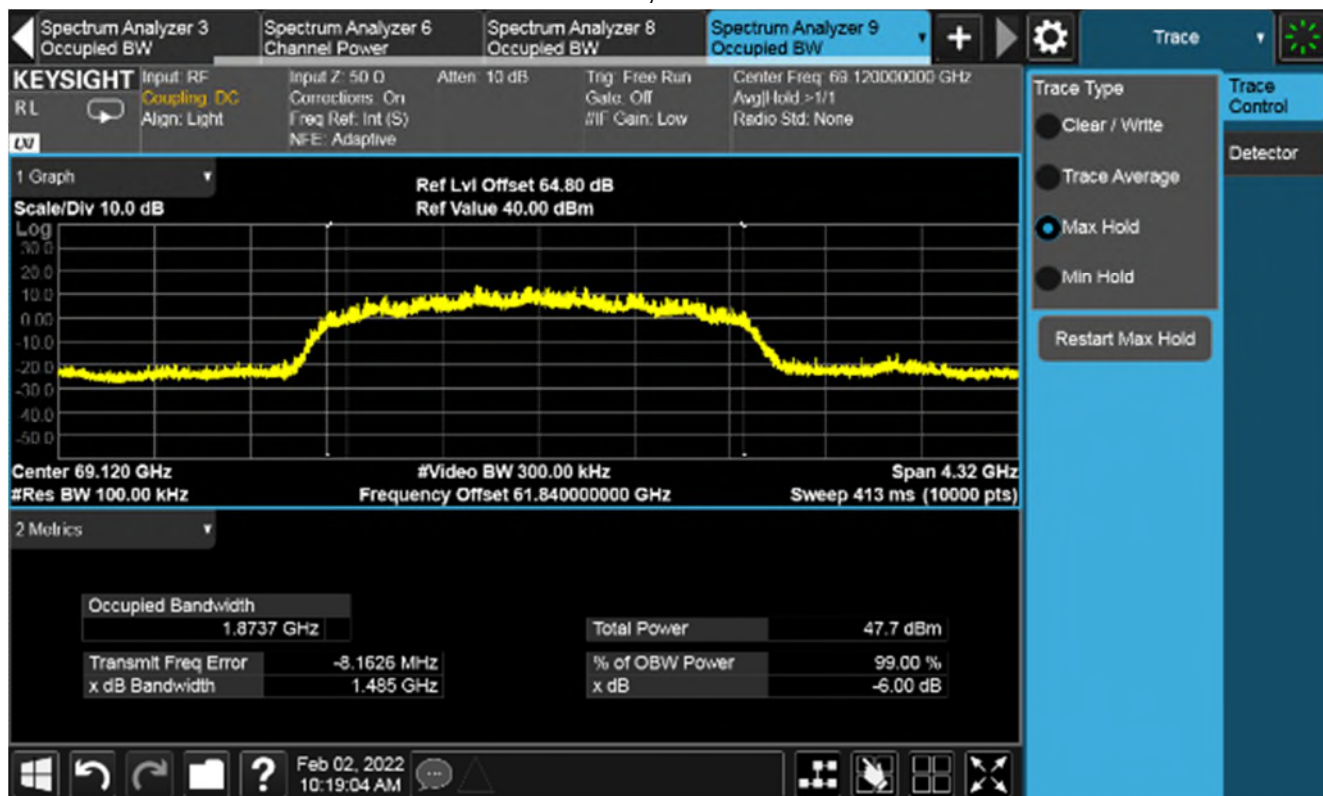
Plot for 6 dB Bandwidth (MHz) Nominal Temp & Volts

RF Parameters: Band 57-71 GHz (Radio 0), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS1, Channel 64.8 GHz



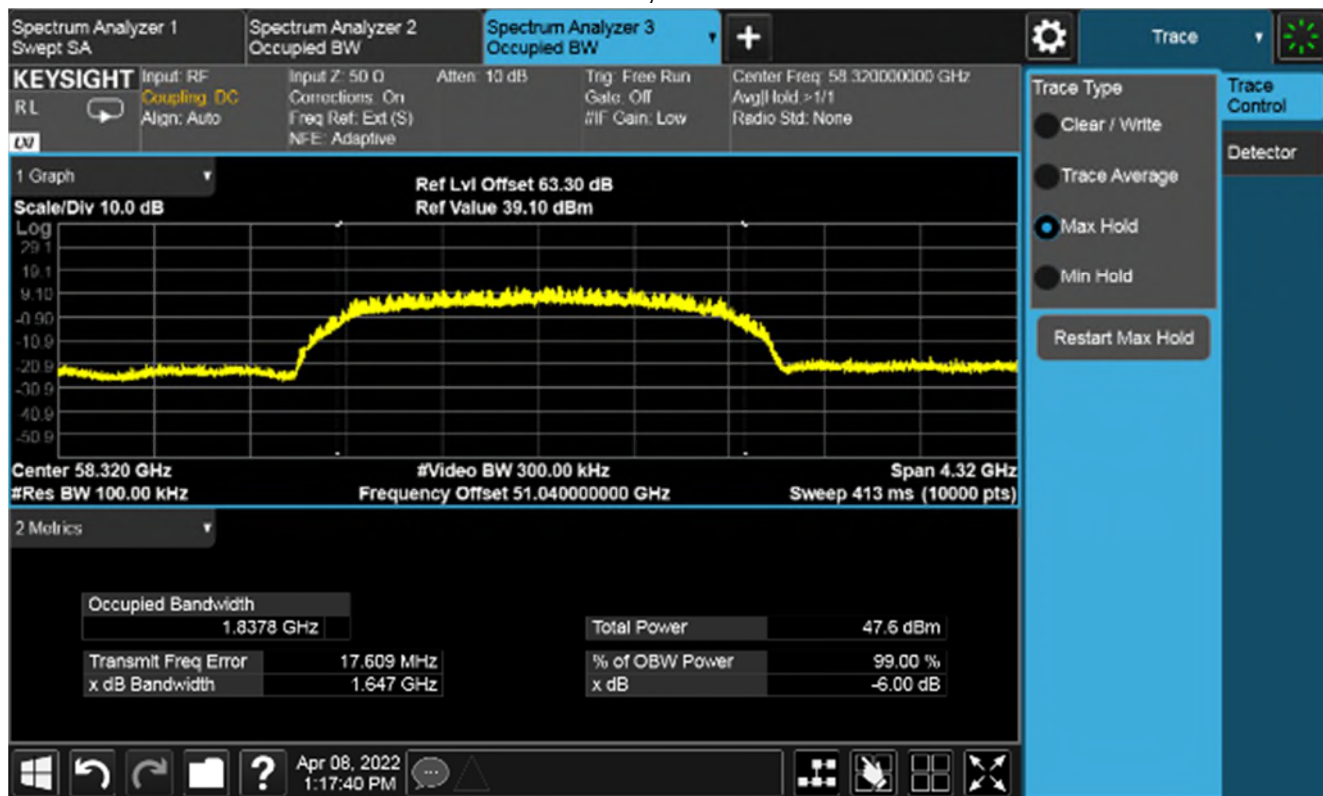
Plot for 6 dB Bandwidth (MHz) Nominal Temp & Volts

RF Parameters: Band 57-71 GHz (Radio 0), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS1, Channel 69.12 GHz



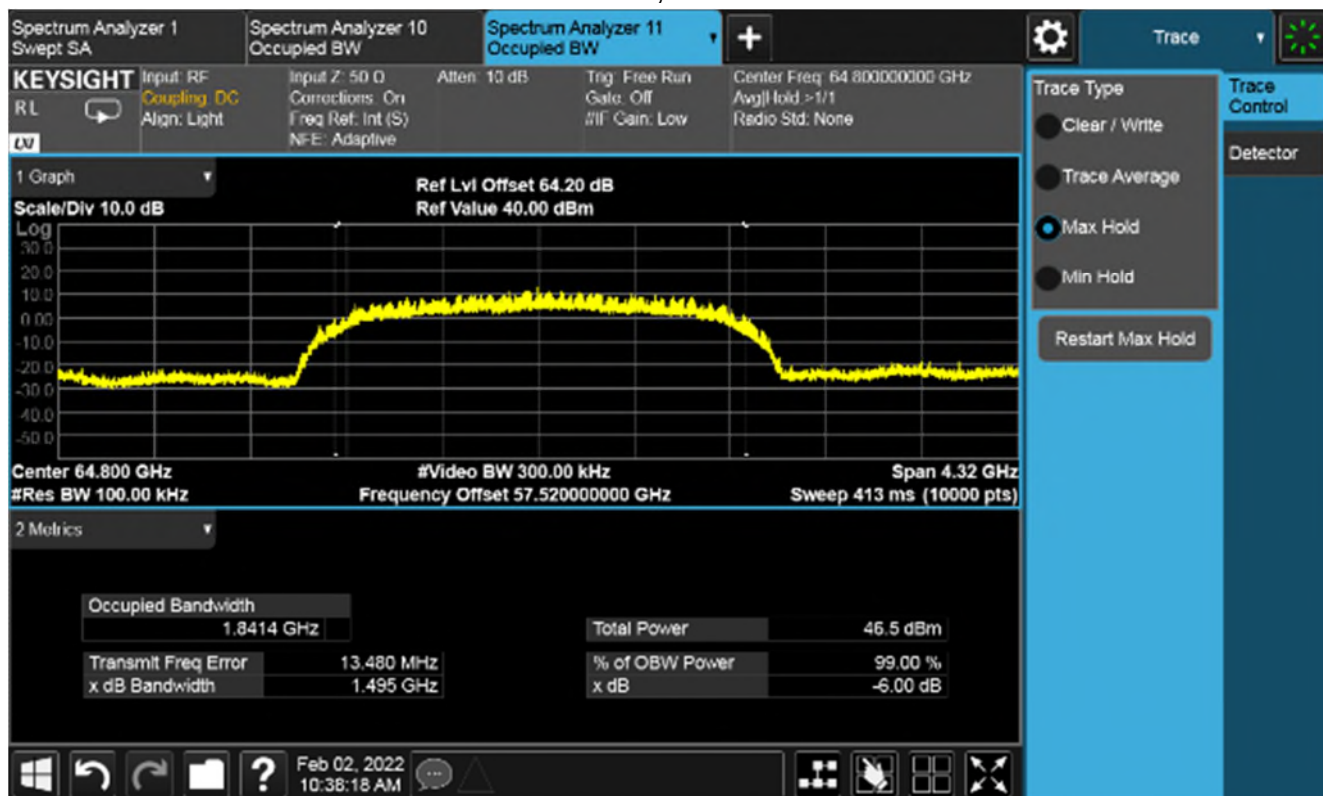
Plot for 6 dB Bandwidth (MHz) Nominal Temp & Volts

RF Parameters: Band 57-71 GHz (Radio 1), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS1, Channel 58.32 GHz

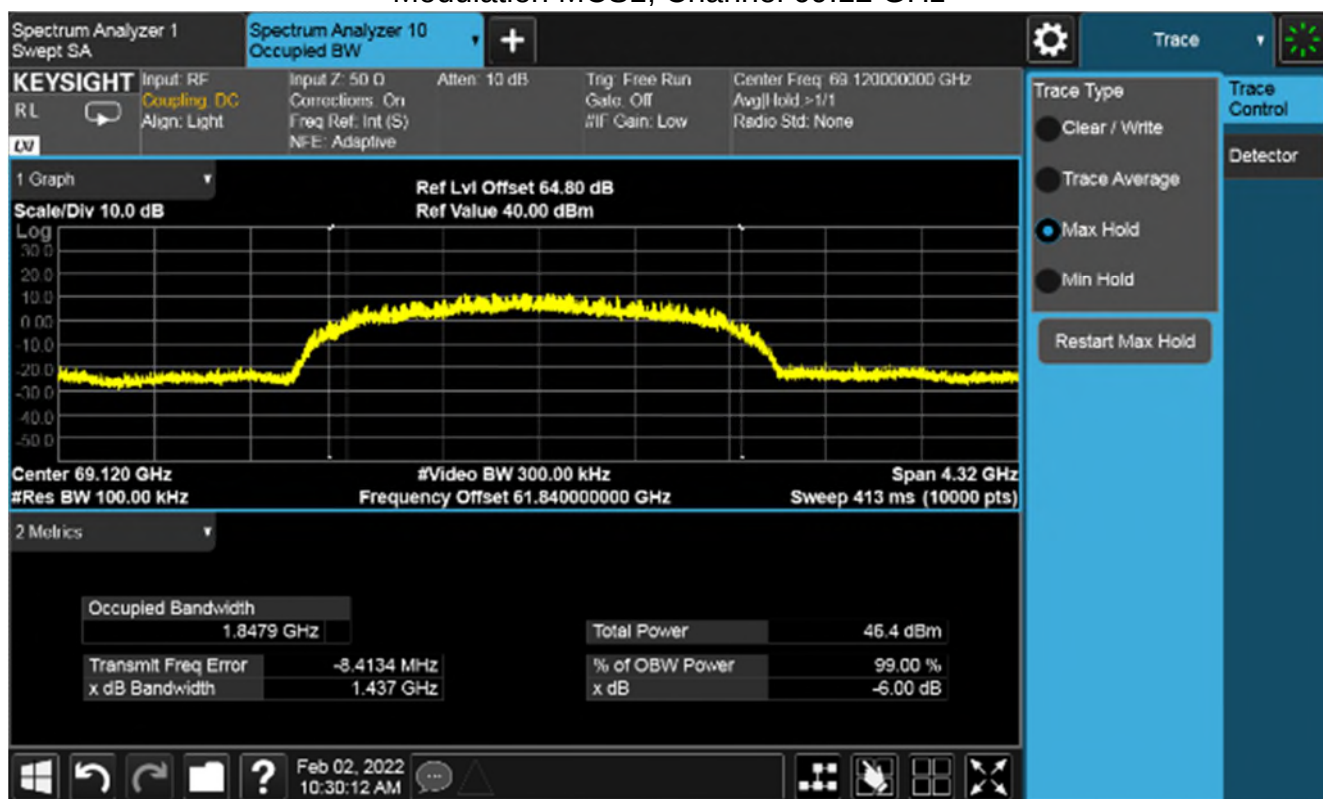


Plot for 6 dB Bandwidth (MHz) Nominal Temp & Volts

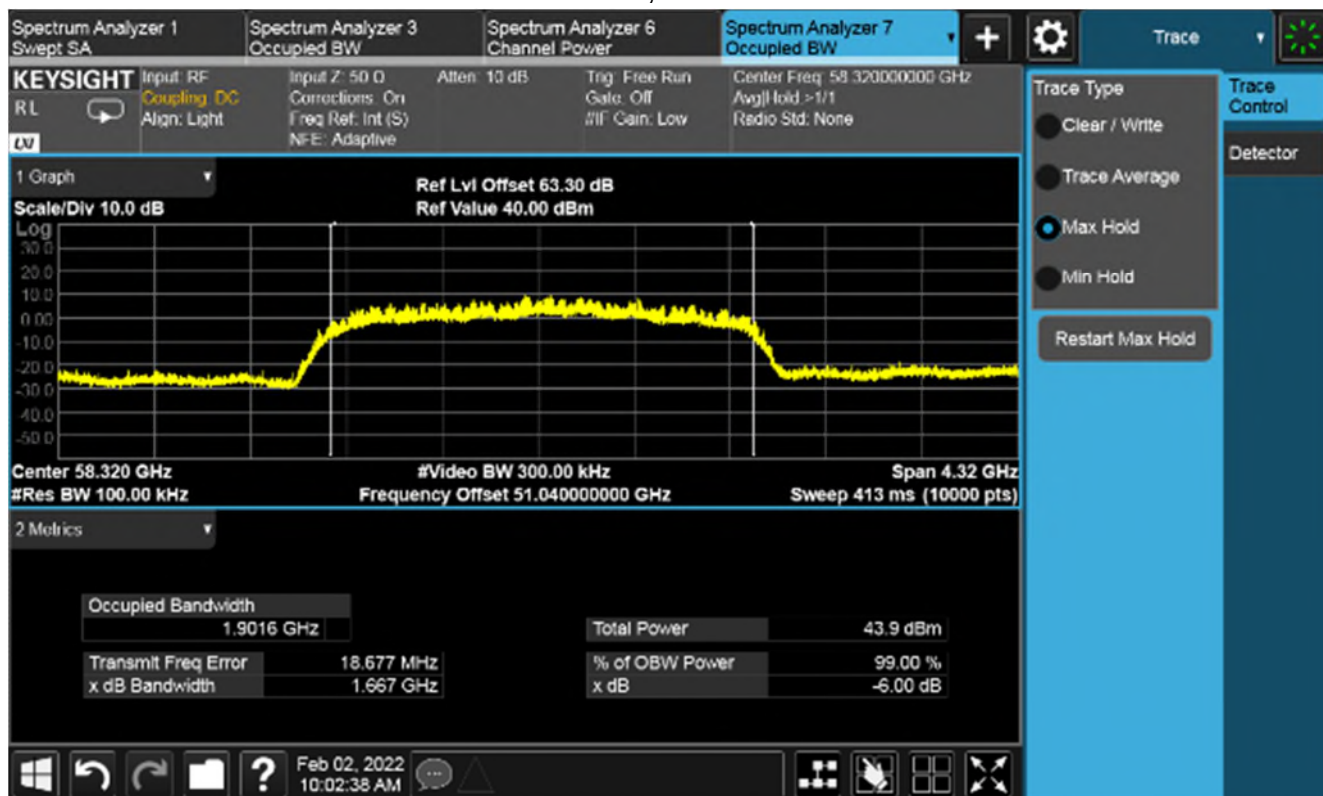
RF Parameters: Band 57-71 GHz (Radio 1), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS1, Channel 64.8 GHz



RF Parameters: Band 57-71 GHz (Radio 1), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS1, Channel 69.12 GHz

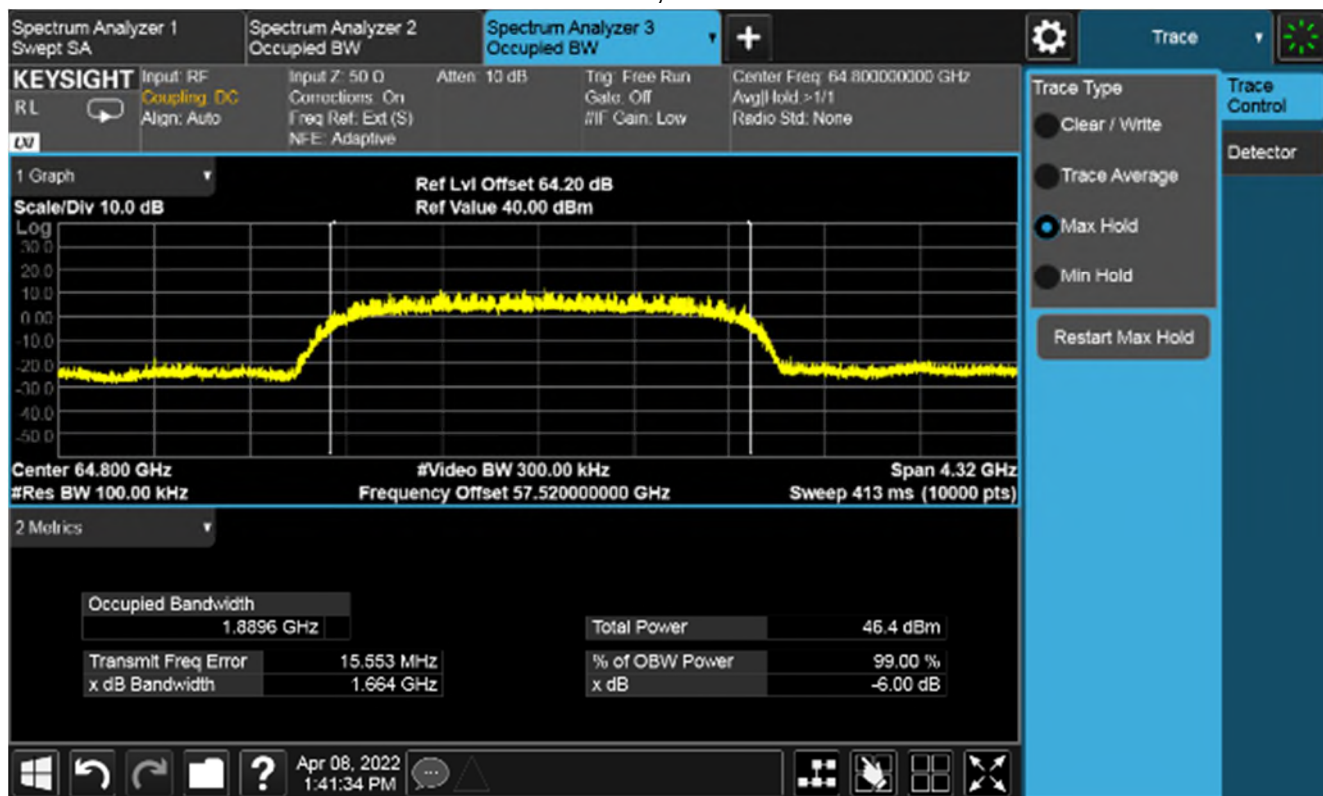


RF Parameters: Band 57-71 GHz (Radio 0), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS2, Channel 58.32 GHz



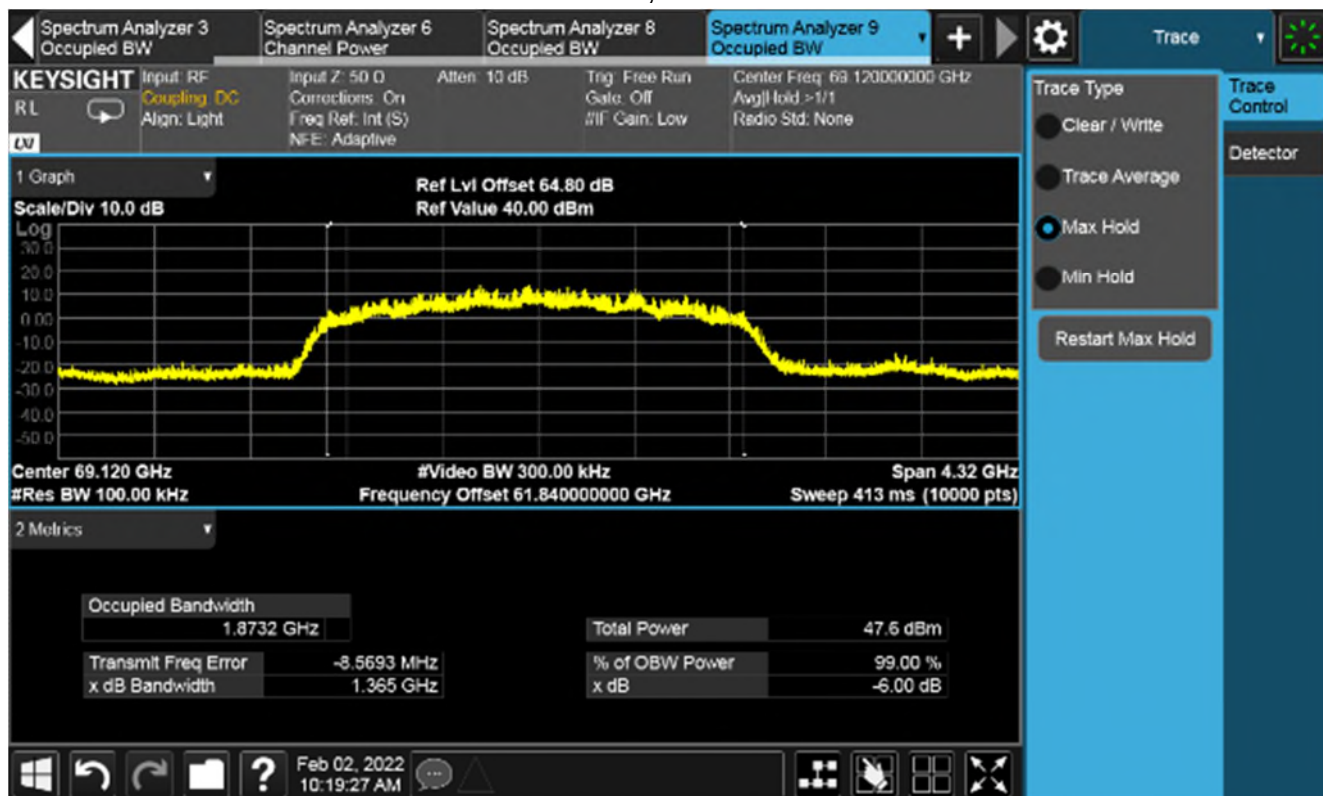
Plot for 6 dB Bandwidth (MHz) Nominal Temp & Volts

RF Parameters: Band 57-71 GHz (Radio 0), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS2, Channel 64.8 GHz



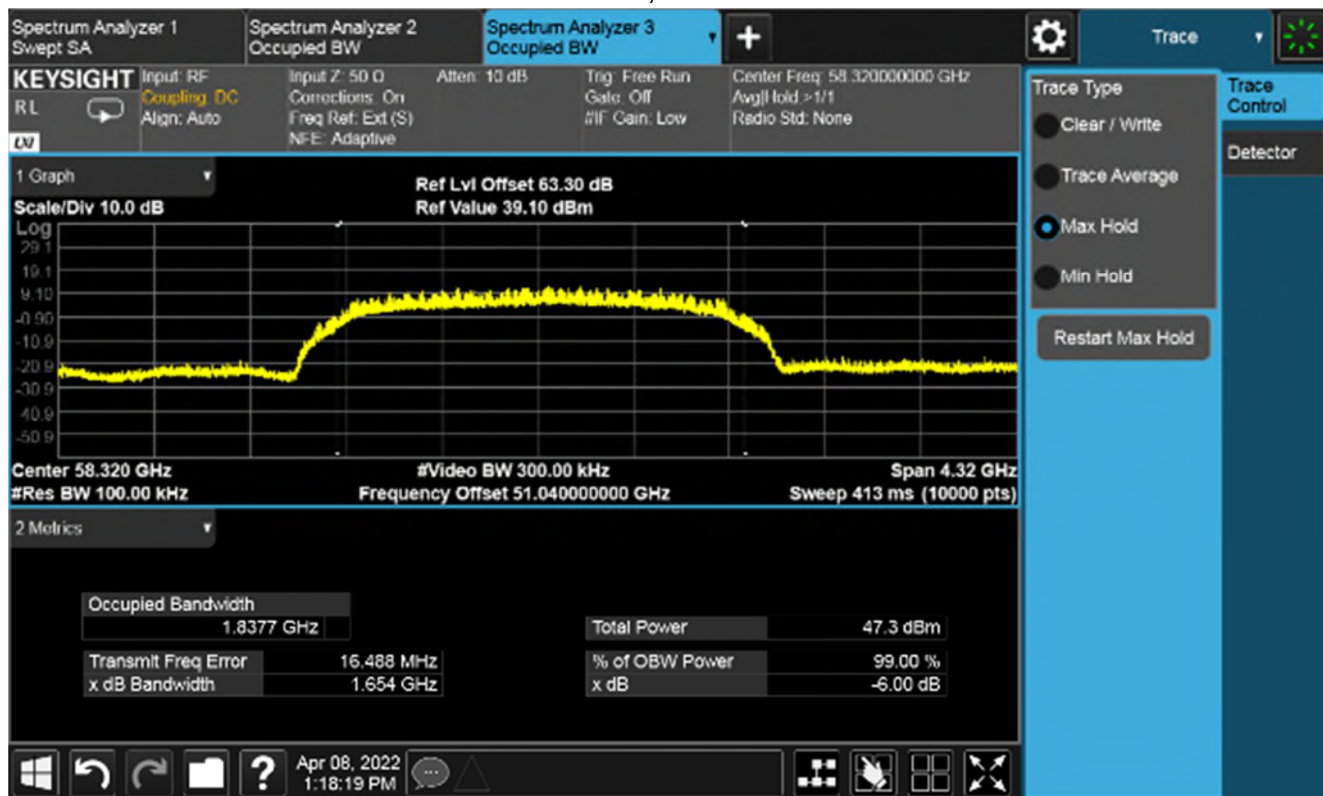
Plot for 6 dB Bandwidth (MHz) Nominal Temp & Volts

RF Parameters: Band 57-71 GHz (Radio 0), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS2, Channel 69.12 GHz



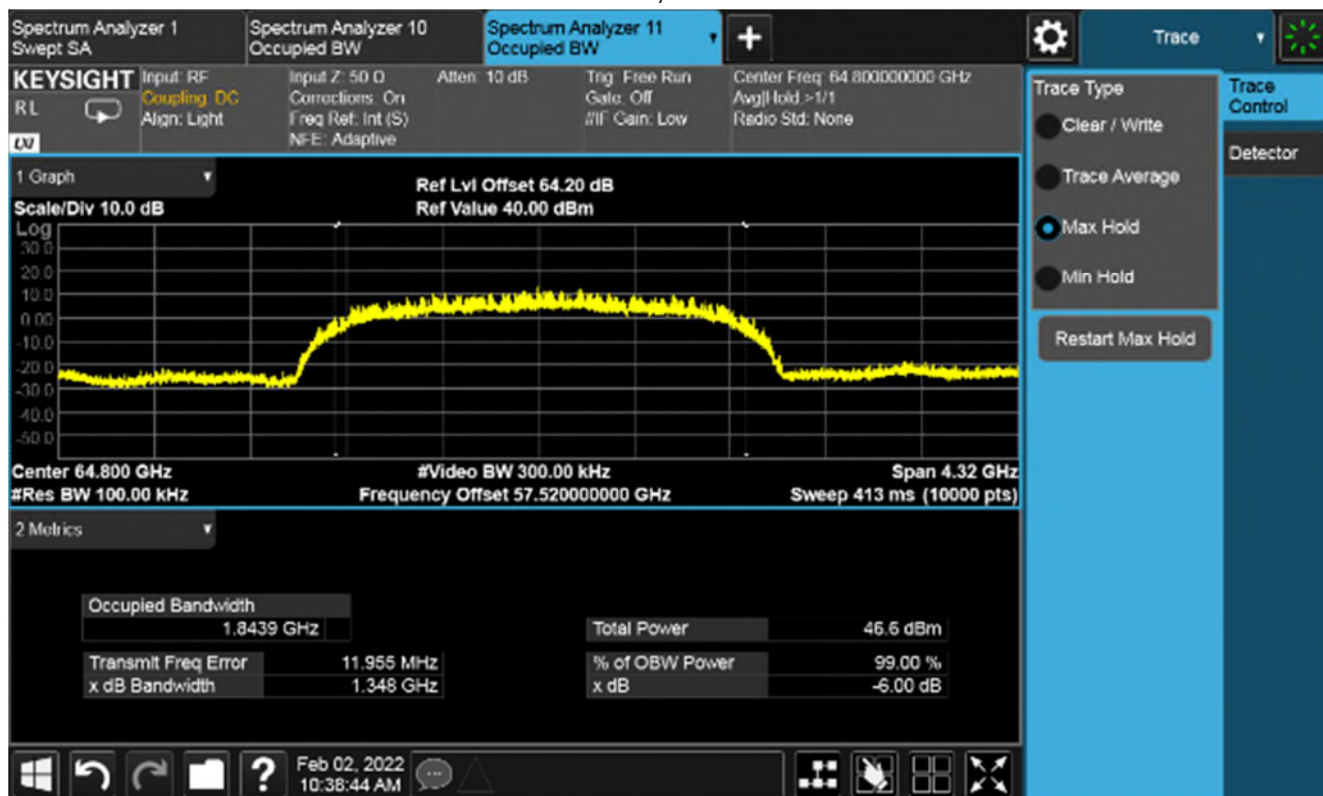
Plot for 6 dB Bandwidth (MHz) Nominal Temp & Volts

RF Parameters: Band 57-71 GHz (Radio 1), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS2, Channel 58.32 GHz



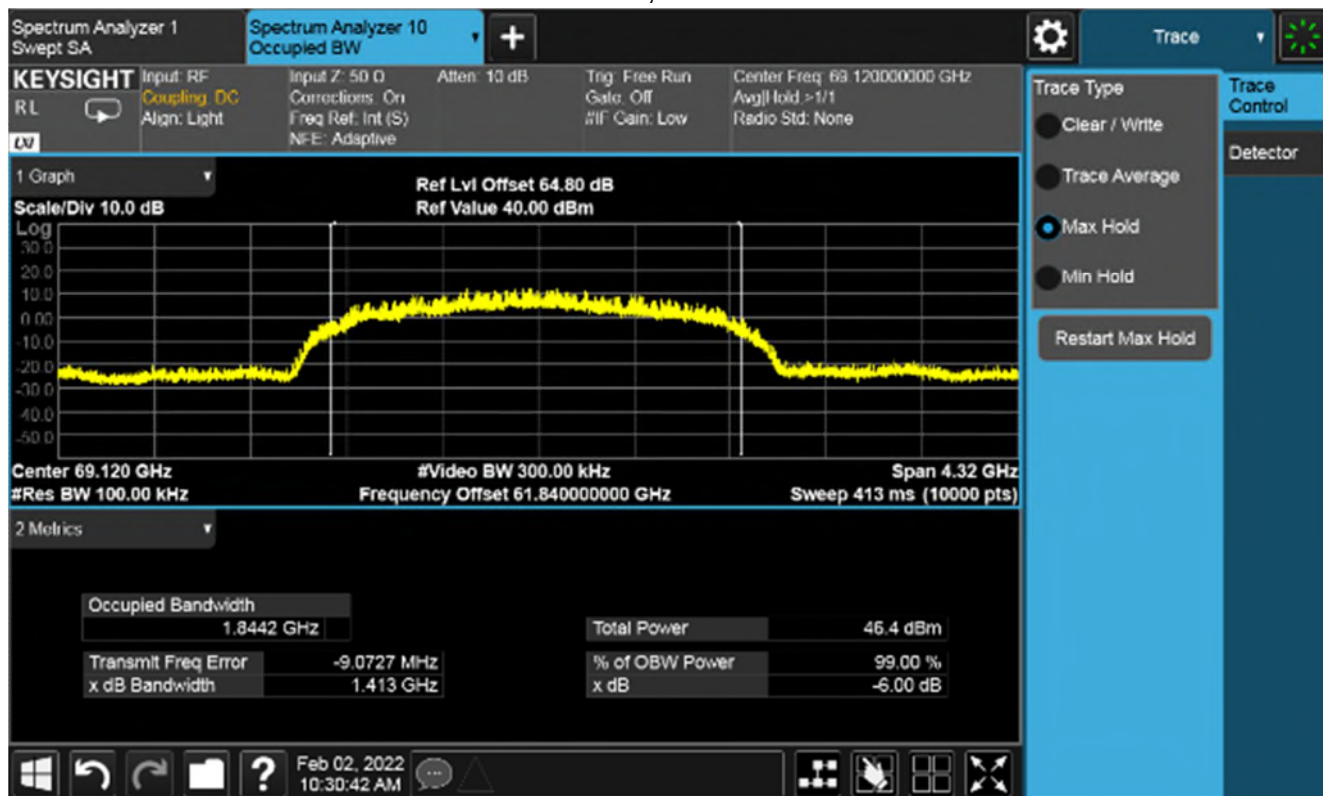
Plot for 6 dB Bandwidth (MHz) Nominal Temp & Volts

RF Parameters: Band 57-71 GHz (Radio 1), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS2, Channel 64.8 GHz



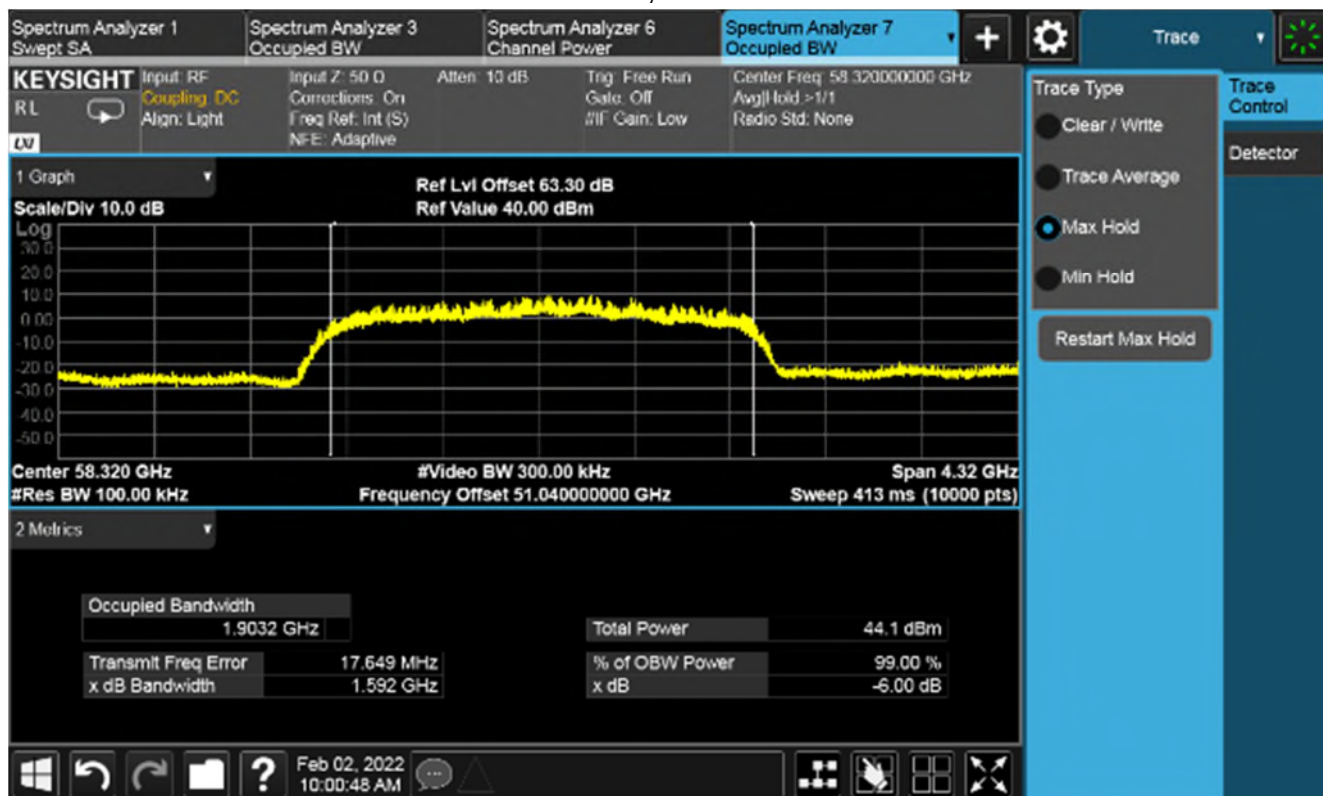
Plot for 6 dB Bandwidth (MHz) Nominal Temp & Volts

RF Parameters: Band 57-71 GHz (Radio 1), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS2, Channel 69.12 GHz



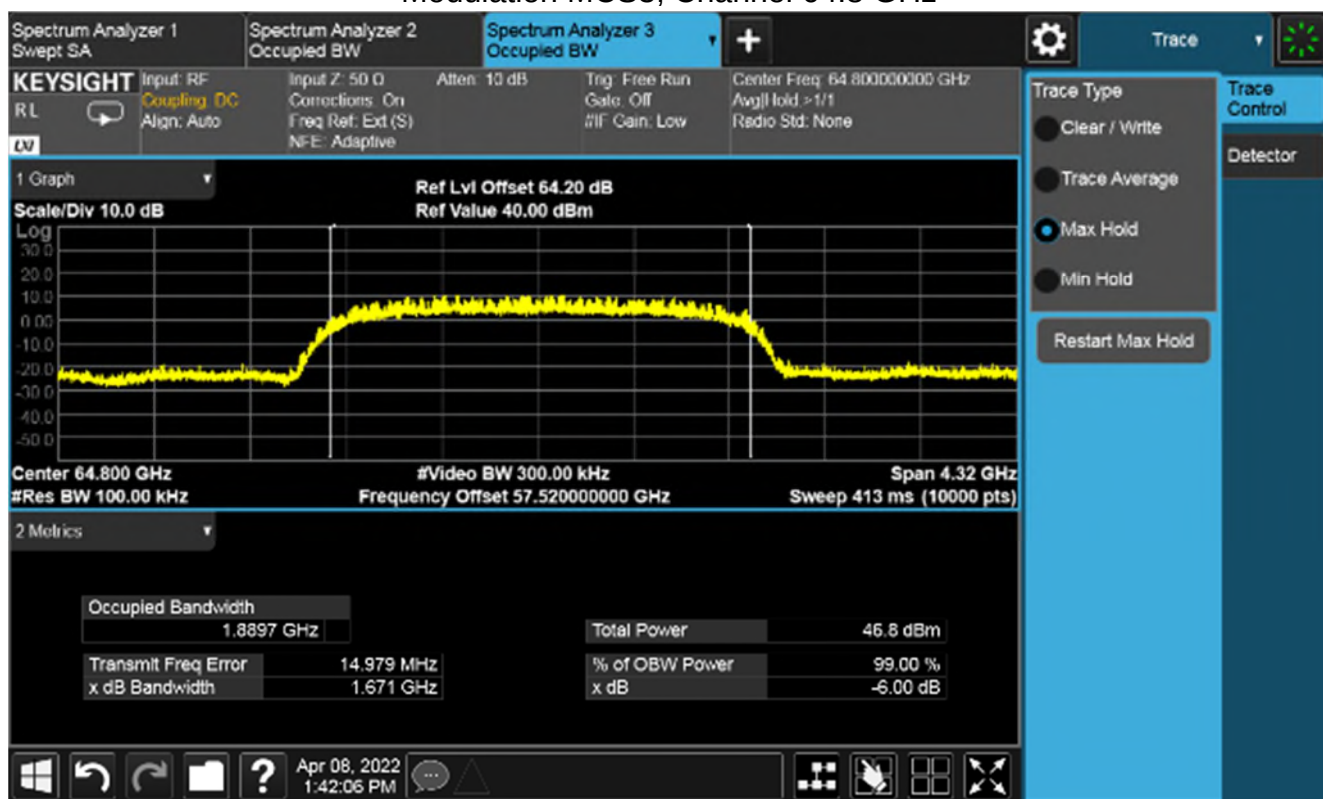
Plot for 6 dB Bandwidth (MHz) Nominal Temp & Volts

RF Parameters: Band 57-71 GHz (Radio 0), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS3, Channel 58.32 GHz



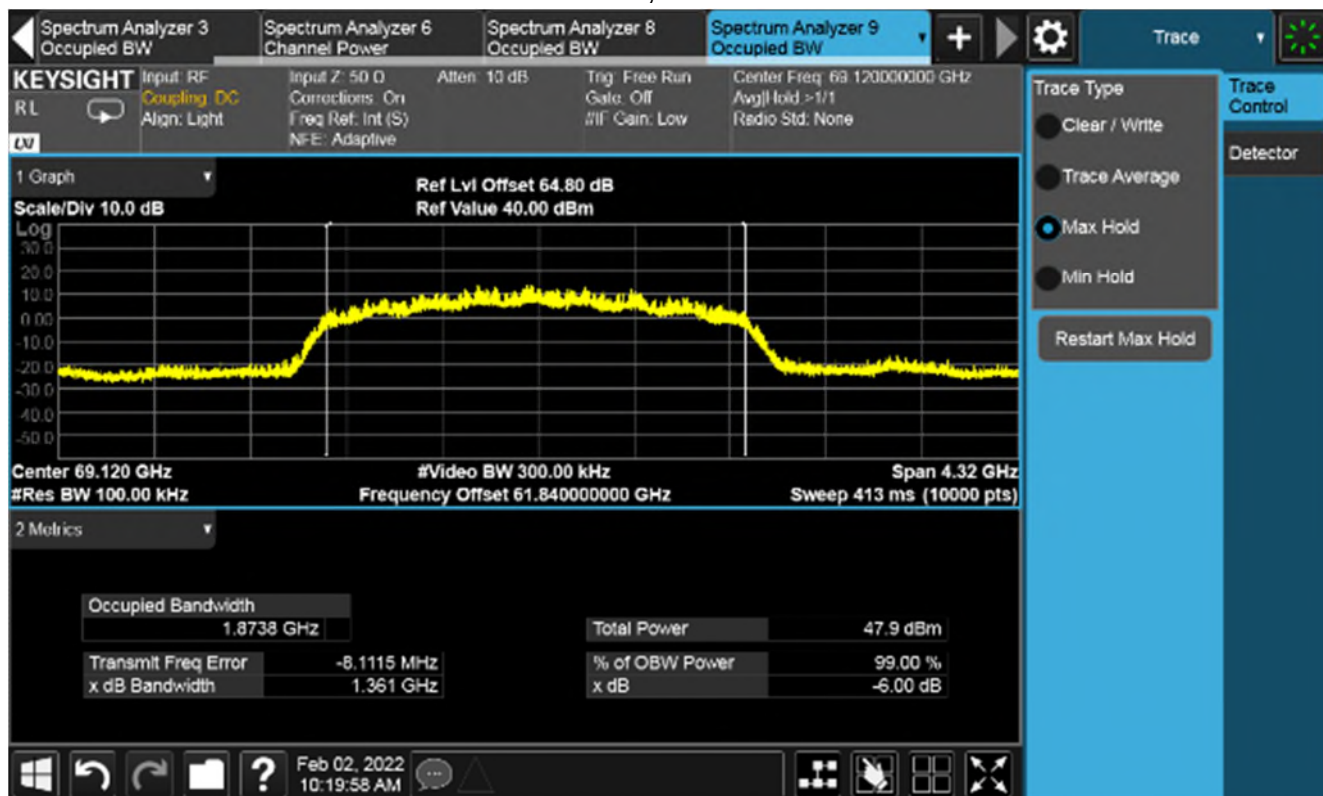
Plot for 6 dB Bandwidth (MHz) Nominal Temp & Volts

RF Parameters: Band 57-71 GHz (Radio 0), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS3, Channel 64.8 GHz



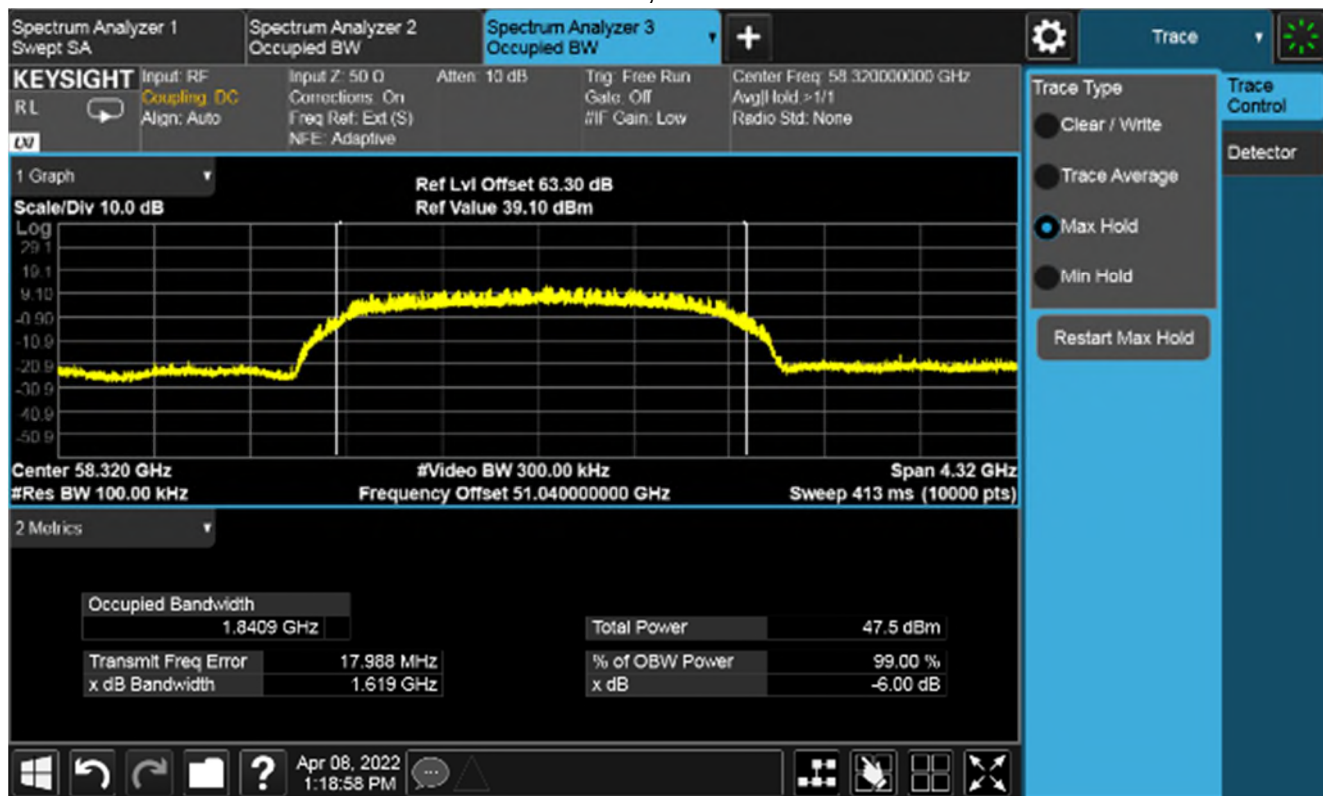
Plot for 6 dB Bandwidth (MHz) Nominal Temp & Volts

RF Parameters: Band 57-71 GHz (Radio 0), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS3, Channel 69.12 GHz



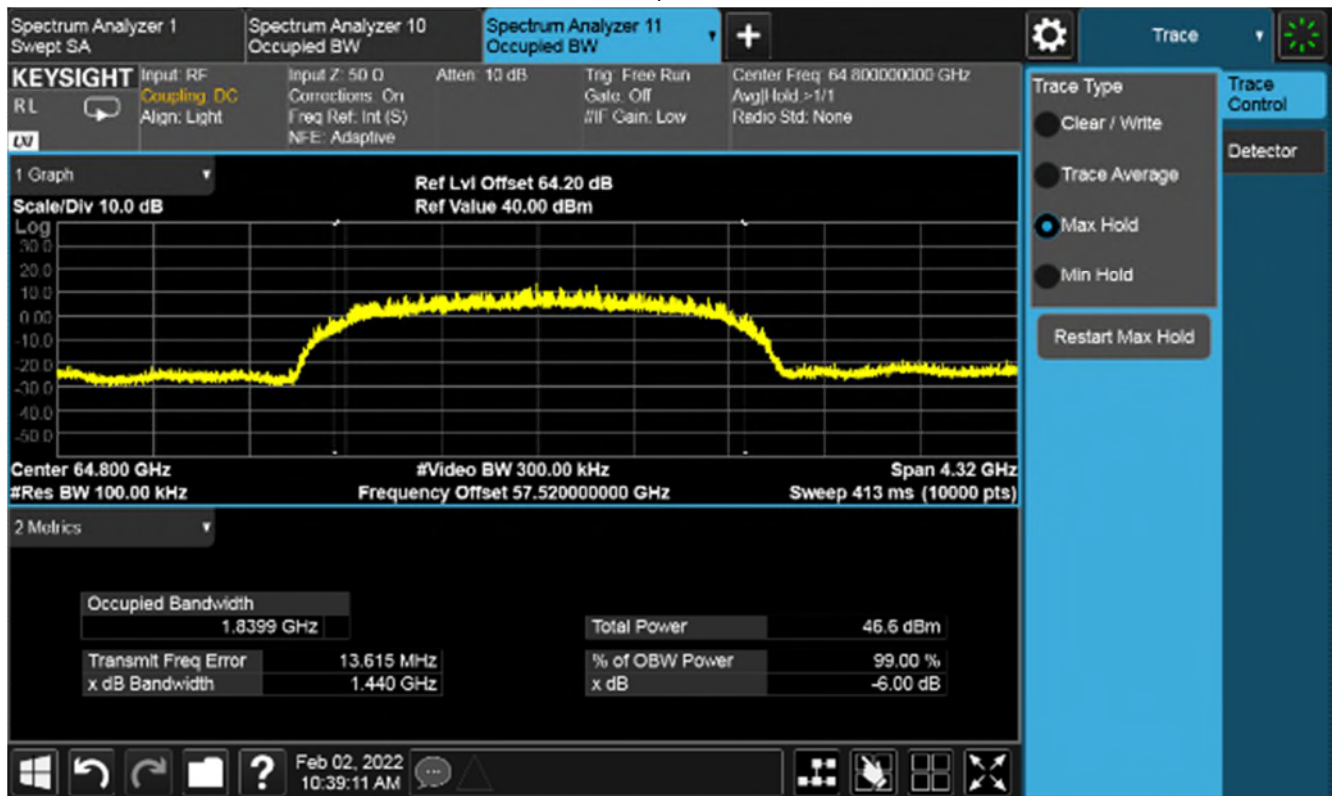
Plot for 6 dB Bandwidth (MHz) Nominal Temp & Volts

RF Parameters: Band 57-71 GHz (Radio 1), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS3, Channel 58.32 GHz



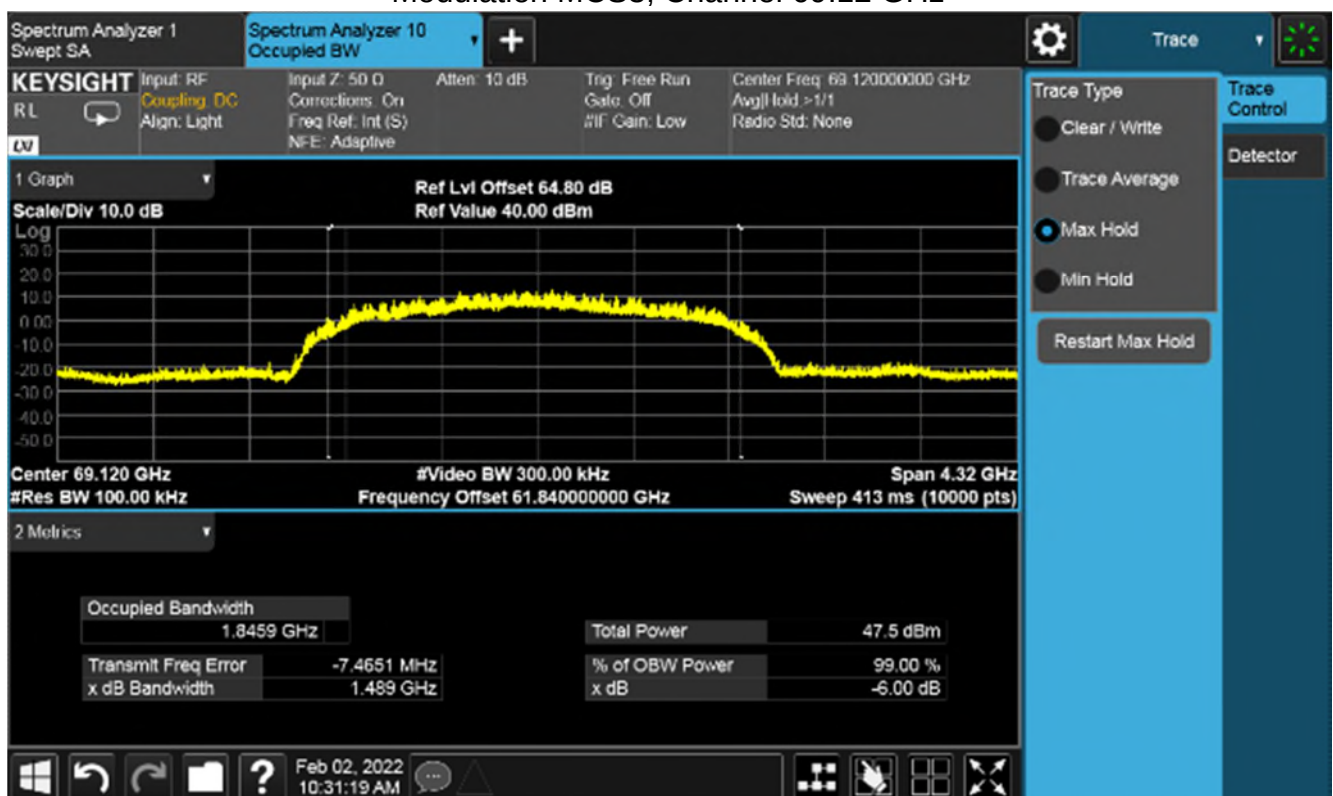
Plot for 6 dB Bandwidth (MHz) Nominal Temp & Volts

RF Parameters: Band 57-71 GHz (Radio 1), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS3, Channel 64.8 GHz



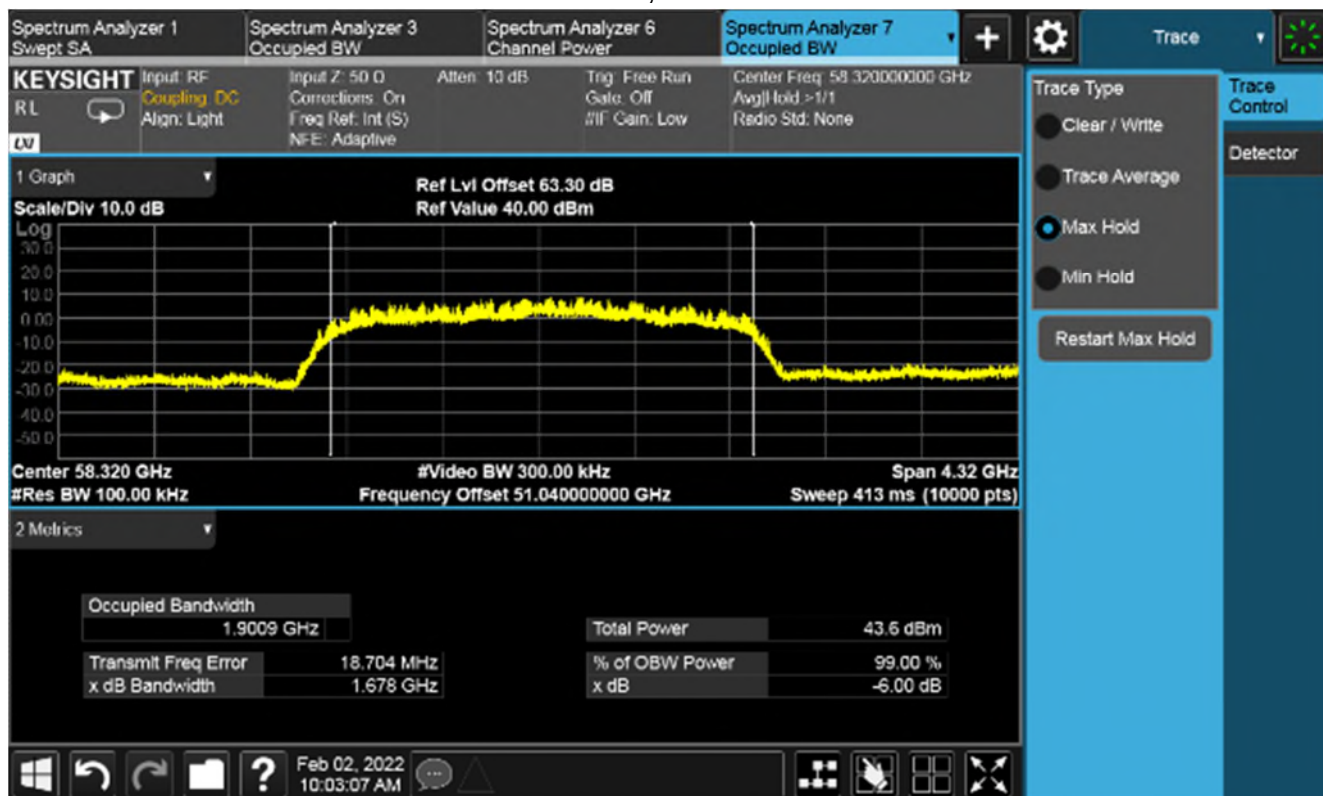
Plot for 6 dB Bandwidth (MHz) Nominal Temp & Volts

RF Parameters: Band 57-71 GHz (Radio 1), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS3, Channel 69.12 GHz



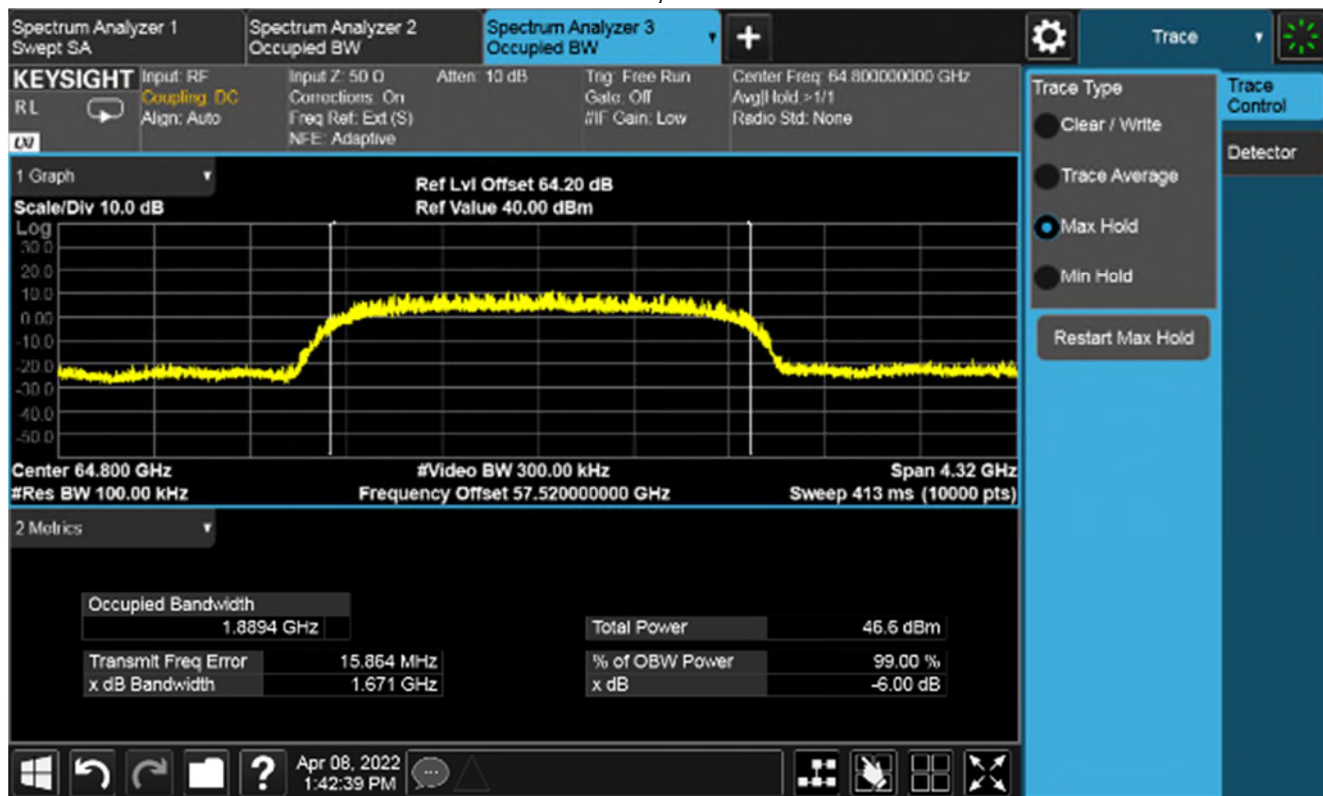
Plot for 6 dB Bandwidth (MHz) Nominal Temp & Volts

RF Parameters: Band 57-71 GHz (Radio 0), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS4, Channel 58.32 GHz



Plot for 6 dB Bandwidth (MHz) Nominal Temp & Volts

RF Parameters: Band 57-71 GHz (Radio 0), Power 39 dBm, Channel Spacing 2.16 GHz,  
Modulation MCS4, Channel 64.8 GHz



Plot for 6 dB Bandwidth (MHz) Nominal Temp & Volts