



# Emissions Test Report

**EUT Name: Freestyle Libre 2 Reader**

**Model No.: Freestyle Libre 2**

**CFR 47 Part 15.247: 2017, RSS 247 Issue 2, 2017**

*Prepared for:*

|                       |                         |
|-----------------------|-------------------------|
| <b>Client</b>         | Abbott Diabetes Care    |
| <b>Address</b>        | 1360 South Loop Road    |
| <b>Address</b>        | Alameda, CA 94502       |
| <b>Contact Person</b> | Richard Ries            |
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*Prepared by:*

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Report# 31863002.001

## Revisions

| Revision No. | Date MM/DD/YYYY | Reason for Change             | Author    |
|--------------|-----------------|-------------------------------|-----------|
| 1            | 07/31/2018      | Initial                       | D. Foster |
| 2            | 08/14/2018      | Add data and photos           | D. Foster |
| 3            | 08/29/2018      | Make corrections per review   | D. Foster |
| 4            | 12/06/2018      | Add reader to cover           | D. Foster |
| 5            | 12/11/2018      | Add ID's FCC and IC           | D. Foster |
| 6            | 2/26/2021       | Model name: Freestyle Libre 2 | RD        |
|              |                 |                               |           |
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Note: Latest revision report will replace all previous reports.

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Report# 31863002.001

## Statement of compliance

Manufacturer: Abbott Diabetes Care  
Requester / Applicant: Richard Ries  
Name of Equipment: Freestyle Libre 2  
Model No. 22175  
Type of Equipment: Patch reader  
Application of Regulations: CFR47 part 15.247:2018 and RSS247:  
2017  
Test Dates: 07/27/2018, 8/19/20

### Guidance Documents:

Emissions: ANSI C63.10-2013 CFR47 part 15.247:2018 and RSS247: 2017

### Test Methods:

Emissions:

The electromagnetic compatibility test and documented data described in this report has been performed and recorded by TUV Rheinland, in accordance with the standards and procedures listed herein. As the responsible authorized agent of the EMC laboratory, I hereby declare that the equipment described above has been shown to be compliant with the EMC requirements of the stated regulations and standards based on these results. If any special accessories and/or modifications were required for compliance, they are listed in the of this report.

This report must not be used to claim product endorsement by A2LA or any agency of the U.S. Government. This report shall not be reproduced except in full, without the written authorization of TUV Rheinland of North America.

Rachana Khanduri February 26, 2021

Test Engineer

Date

Richard Decker February 26, 2021

Laboratory Signature

Date



**INDUSTRY  
CANADA**

**Testing Cert #3331.02 US1131**

**2932M-1**

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# 1 Executive Summary

## 1.1 Scope

The purpose of the following report is to demonstrate compliance of the Freestyle Libre 2 to the various regulatory requirements further listed in this Report.

It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components. This report is further intended to document changes and modifications to the EUT throughout its life cycle. Test data was verified before latest revision. All documentation will be included as a supplement.

## 1.2 Purpose

Testing was performed to evaluate the EMC performance of the EUT in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report.

### 1.3 Summary of Test Results

**Table 1:** Summary of Test Results

| Test                          | Test Method                                     | Test Parameters | Result |
|-------------------------------|-------------------------------------------------|-----------------|--------|
| Duty Cycle                    | CFR 47 Part 15.247: 2018, RSS 247 Issue 2, 2017 | Limits          | Pass   |
| Occupied Bandwidth            | CFR 47 Part 15.247: 2018, RSS 247 Issue 2, 2017 | Limits          | Pass   |
| Output power                  | CFR 47 Part 15.247: 2018, RSS 247 Issue 2, 2017 | Limits          | Pass   |
| PSD                           | CFR 47 Part 15.247: 2018, RSS 247 Issue 2, 2017 | Limits          | Pass   |
| Non-restricted band emissions | CFR 47 Part 15.247: 2018, RSS 247 Issue 2, 2017 | Limits          | Pass   |
| Restricted band edge          | CFR 47 Part 15.247: 2018, RSS 247 Issue 2, 2017 | Limits          | Pass   |
| Restricted band emissions     | CFR 47 Part 15.247: 2018, RSS 247 Issue 2, 2017 | Limits          | Pass   |
| AC conducted emissions        | CFR 47 Part 15.207: 2018, RSS Gen               | Limits          | Pass   |

Note:

### 1.4 Special Accessories

No special accessories were necessary in order to achieve compliance.

### 1.5 Equipment Modifications

None

## 2 Laboratory Information

### 2.1 Accreditations & Endorsements

#### 2.1.1 US Federal Communications Commission



TUV Rheinland of North America at 1279 Quarry Ln, Pleasanton, CA 94566 is recognized by the commission for performing testing services for the general public on a fee basis. These laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (US1131). The laboratory scope of accreditation includes: Title 47 CFR Parts 15, 18, and 90. The accreditation is updated every 3 years.

#### 2.1.2 NIST / A2LA



TUV Rheinland of North America is accredited by the National Voluntary Laboratory Accreditation Program, which is administered under the auspices of the National Institute of Standards and Technology. The laboratory has been assessed and accredited in accordance with ISO Guide 17025:2005 and ISO 9002 (Lab Code 3331.02). The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

#### 2.1.3 Canada – Industry Canada



TUV Rheinland of North America at the 1279 Quarry Ln, Pleasanton, CA 94566 address is accredited by Industry Canada for performing testing services for the general public on a fee basis. This laboratory test facilities have been fully described in reports submitted to and accepted by Industry Canada (File Number 2932M). The accreditation is updated every 3 years.

#### 2.1.4 Japan – VCCI



The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) is a group that consists of Information Technology Equipment (ITE) manufacturers and EMC test laboratories. The purpose of the Council is to take voluntary control measures against electromagnetic interference from Information Technology Equipment, and thereby contribute to the development of a socially beneficial and responsible state of affairs in the realm of Information Technology Equipment in Japan. TUV Rheinland of North America at 1279 Quarry Ln, Pleasanton, CA 94566 has been assessed and approved in accordance with the Regulations for Voluntary Control Measures.

VCCI Registration No. for Pleasanton: A-0268

#### 2.1.5 Acceptance by Mutual Recognition Arrangement



The United States has an established agreement with specific countries under the Asia Pacific Laboratory Accreditation Corporation (APLAC) Mutual Recognition Arrangement. Under this agreement, all TUV Rheinland at 1279 Quarry Ln, Pleasanton, CA 94566 test results and test reports within the scope of the laboratory NIST / A2LA accreditation will be accepted by each member country.

### 2.2 Test Facilities

All of the test facilities are located at 1279 Quarry Lane, Pleasanton, California 94566, USA.

### **2.2.1 Emission Test Facility**

The Semi-Anechoic chamber and AC Line Conducted measurement facility used to collect the radiated and conducted data has been constructed in accordance with ANSI C63.7:1992. The site has been measured in accordance with and verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4-2014, at a test distance of 3 and 5 meters. The site is listed with the FCC and accredited by A2LA (Lab Code 3331.02). The 3/5-meter semi-anechoic chamber used to collect the radiated data has been verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4-2014, at a test distance of 3 meter and 5 meters. A report detailing this site can be obtained from TUV Rheinland of North America.

## 2.3 Measurement Uncertainty

Two types of measurement uncertainty are expressed in this report, per *ISO Guide To The Expression Of Uncertainty In Measurement*, 1<sup>st</sup> Edition, 1995.

The *Combined Standard Uncertainty* is the standard uncertainty of the result of a measurement when that result is obtained from the values of a number of other quantities; it is equal to the positive square root of the sum of the variances or co-variances of these other quantities, weighted according to how the measurement result varies with changes in these quantities. The term *standard uncertainty* is the result of a measurement expressed as a standard deviation.

### 2.3.1 Sample Calculation – radiated & conducted emissions

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

$$\text{Field Strength (dB}\mu\text{V/m)} = \text{RAW} - \text{AMP} + \text{CBL} + \text{ACF}$$

Where: RAW = Measured level before correction (dBμV)

AMP = Amplifier Gain (dB)

CBL = Cable Loss (dB)

ACF = Antenna Correction Factor (dB/m)

$$\mu\text{V/m} = 10^{\frac{\text{dB}\mu\text{V} / \text{m}}{20}}$$

#### Sample radiated emissions calculation @ 30 MHz

Measurement +Antenna Factor–Amplifier Gain+Cable loss=Radiated Emissions (dBuV/m)

$$25 \text{ dBuV/m} + 17.5 \text{ dB} - 20 \text{ dB} + 1.0 \text{ dB} = 23.5 \text{ dBuV/m}$$

### 2.3.2 Measurement Uncertainty Emissions

| Per CISPR 16-4-2                               | U <sub>lab</sub> | U <sub>cispr</sub> |
|------------------------------------------------|------------------|--------------------|
| <b>Radiated Disturbance @ 10 meters</b>        |                  |                    |
| 30 – 1,000 MHz                                 | 2.25 dB          | 4.51 dB            |
| <b>Radiated Disturbance @ 3 meters</b>         |                  |                    |
| 30 – 1,000 MHz                                 | 2.26 dB          | 4.52 dB            |
| 1 – 6 GHz                                      | 2.12 dB          | 4.25 dB            |
| 6 – 18 GHz                                     | 2.47 dB          | 4.93 dB            |
| <b>Conducted Disturbance @ Mains Terminals</b> |                  |                    |
| 150 kHz – 30 MHz                               | 1.09 dB          | 2.18 dB            |
| <b>Disturbance Power</b>                       |                  |                    |
| 30 MHz – 300 MHz                               | 3.92 dB          | 4.3 dB             |

**Measurement Uncertainty – Radio Testing**

|                                                                                                              |
|--------------------------------------------------------------------------------------------------------------|
| The estimated combined standard uncertainty for frequency error measurements is $\pm 3.88$ Hz                |
| The estimated combined standard uncertainty for carrier power measurements is $\pm 0.7$ dB.                  |
| The estimated combined standard uncertainty for adjacent channel power measurements is $\pm 1.47$ dB.        |
| The estimated combined standard uncertainty for modulation frequency response measurements is $\pm 0.46$ dB. |
| The estimated combined standard uncertainty for transmitter conducted emission measurements is $\pm 2.06$ dB |

The expanded uncertainty at a level of 95% confidence is obtained by multiplying the combined standard uncertainty by a coverage factor of 2. Compliance criteria are not based on measurement uncertainty.

**2.3.3 Calibration Traceability**

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSS Z540-1-1994 and ISO Standard 17025:2005.

**3 Product Information****3.1 Product Description**

The Glucose Monitoring System E is a unique sensor-based system that has two main parts: a disposable glucose Sensor, which is worn on your body, and the Reader, a handheld device that displays information from the Sensor. The Reader is used to wirelessly scan the Sensor to gather glucose readings. The Reader also receives glucose information for the Sensor via BLE.

**3.2 Equipment Configuration**

A description of the equipment configuration is given in the Test Plan Section. The EUT was tested as called for in the test standard and was configured and operated in a manner consistent with its intended use. The EUT was controlled from the support laptop used to configure the various modes of operation. The placement of the EUT system components was guided by the test standard and selected to represent typical installation conditions.

**3.3 Operating Mode**

A description of the operation mode is given in the Test Plan Section.

The final operating mode was selected to produce the worst case radiation for emissions testing.

**3.4 Unique Antenna Connector**

The Freestyle Libre 2 has an internal fixed antenna which is not removable.

## 4 Duty Cycle

### Test Method

The ANSI C63.10-2013 Section 11.6 Conducted method was used to measure the duty cycle. The preliminary investigation was not necessary to determine the highest power output for each mode the unit has only one mode and one power level. The system was powered on and port 1 connected to the Spectrum analyzer. A diag program was used to set the AP in continuous Tx mode and also to set the channel, channel power and data rate. This test was conducted on 3 channels. The analyzer was configured as follows.

Cable loss was entered as an offset

RBW=8MHz

VBW= 50MHz

Span = 0Hz

Reference level= as needed to maintain headroom

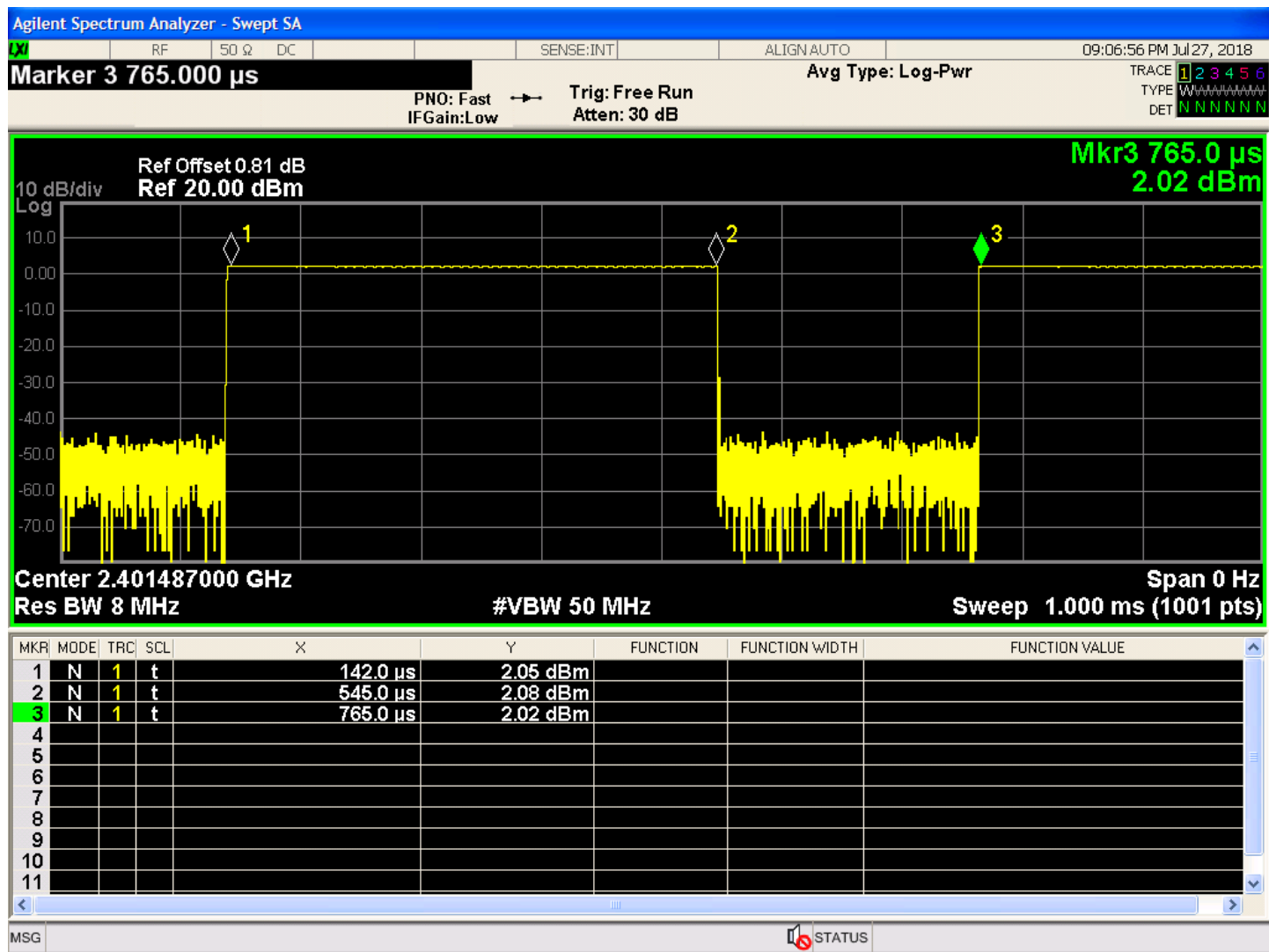
SWT= 5ms adjusted as needed to capture approx. 1.5 cycles

The off time and cycle time were captured using the marker functions and the duty cycle calculated.

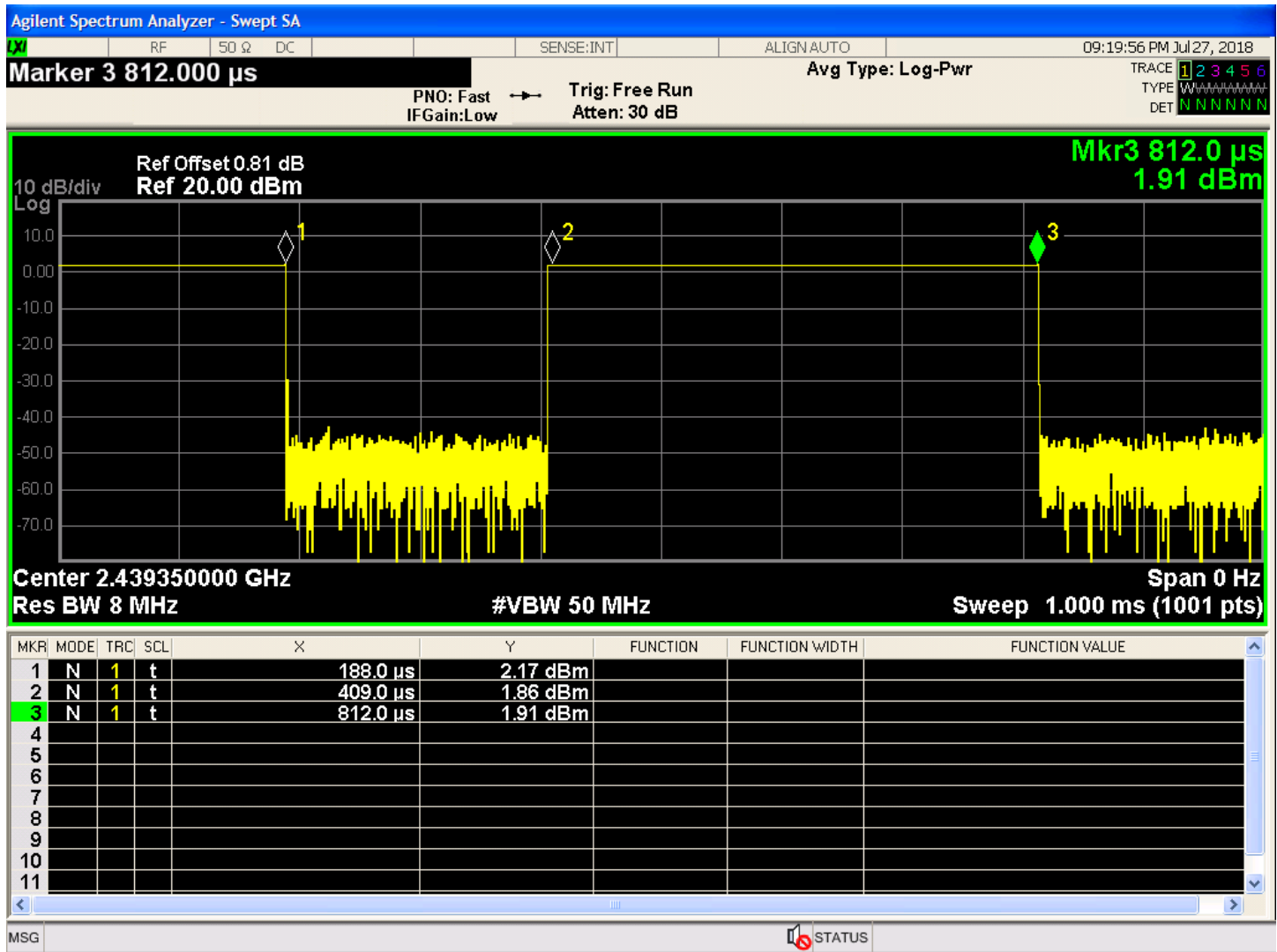
|                                                                        |                           |
|------------------------------------------------------------------------|---------------------------|
| <b>Test Conditions:</b> Conducted Measurement (SA), Normal Temperature | <b>Date:</b> 07/27/2018   |
| <b>Antenna Type:</b>                                                   | Integrated PIFA antenna   |
| <b>Duty cycle correction:</b> table below                              | Data Rate: GFSK           |
| <b>Ambient Temp.:</b> 24° C                                            | Relative Humidity: 39 %RH |

| Duty cycle      |                 |          |
|-----------------|-----------------|----------|
| Mode            | % of 100% cycle | DCCF dbm |
| GFSK channel 0  | 64              | 1.9      |
| GFSK channel 39 | 65              | 1.9      |
| GFSK channel 80 | 65              | 1.9      |
|                 |                 |          |

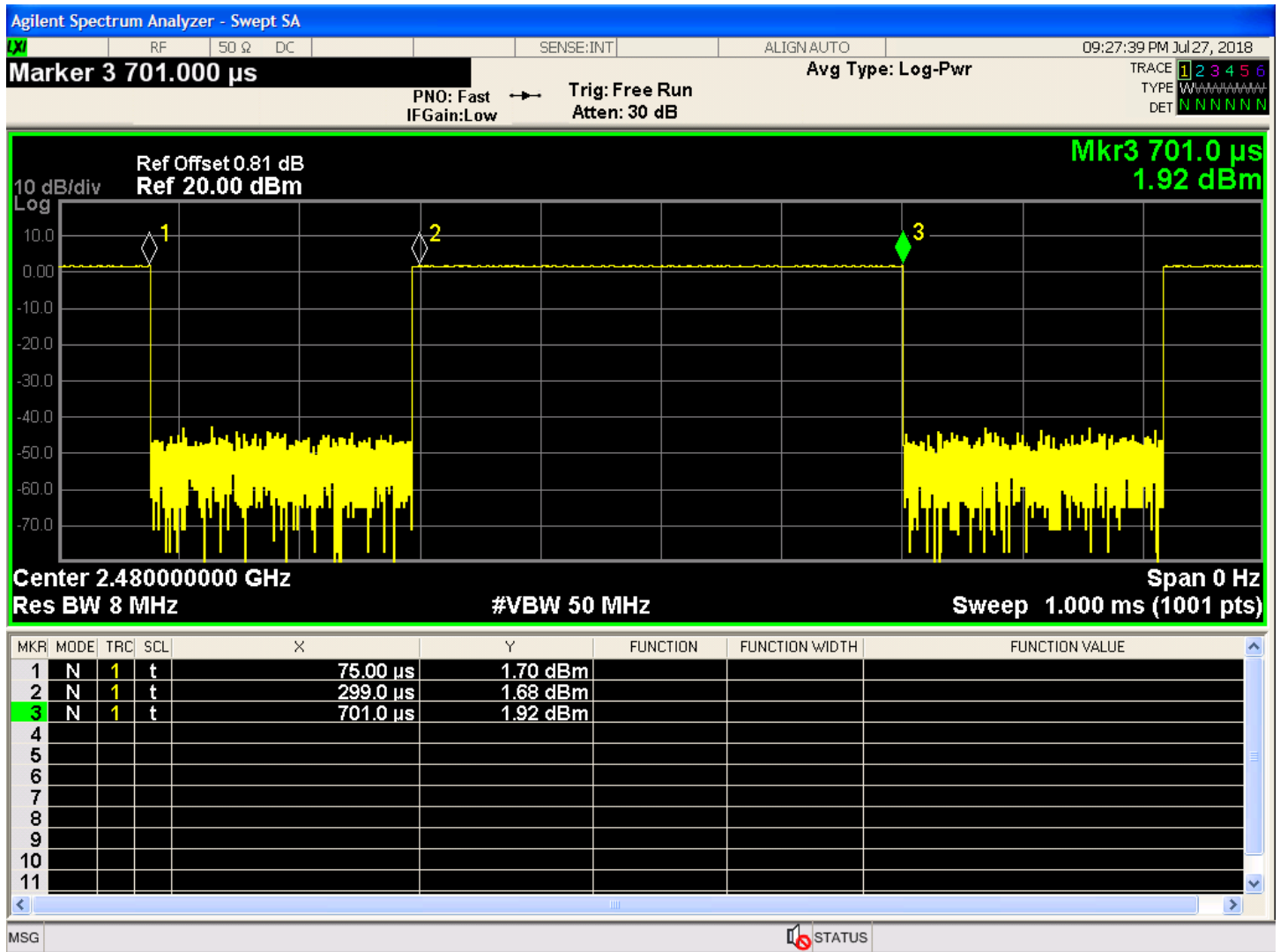
## 4.1 Results



Duty Cycle channel 0



Duty Cycle channel 19



Duty Cycle channel 39

## 6 Output Power Requirements

The maximum output power requirement is the maximum equivalent isotropic radiated power delivering at the transmitting antenna under specified conditions of measurements in the presence of modulation.

The maximum output power and harmonics shall not exceed CFR47 Part 15.247 (b):2018 and RSS 247: 2017 Sect. 5.4.4.

The maximum allowable transmitted power in the band 2400-2483.5 MHz: 1 W . The analyzer was configured as follows

### 6.1 Test Method

The ANSI C63.10-2013 Section 11.9.1.1. Conducted method was used to measure the channel power output. The preliminary investigation was not needed as the BT runs only one modulation and one power setting. This test was conducted on 3 channels. The result indicated in the tables below.

RBW= 1 MHz

VBW= 3 MHz

Span= 3 MHz

SWP= Auto

Trace= Max hold

\Detector= Peak

### 6.2 Test Setup

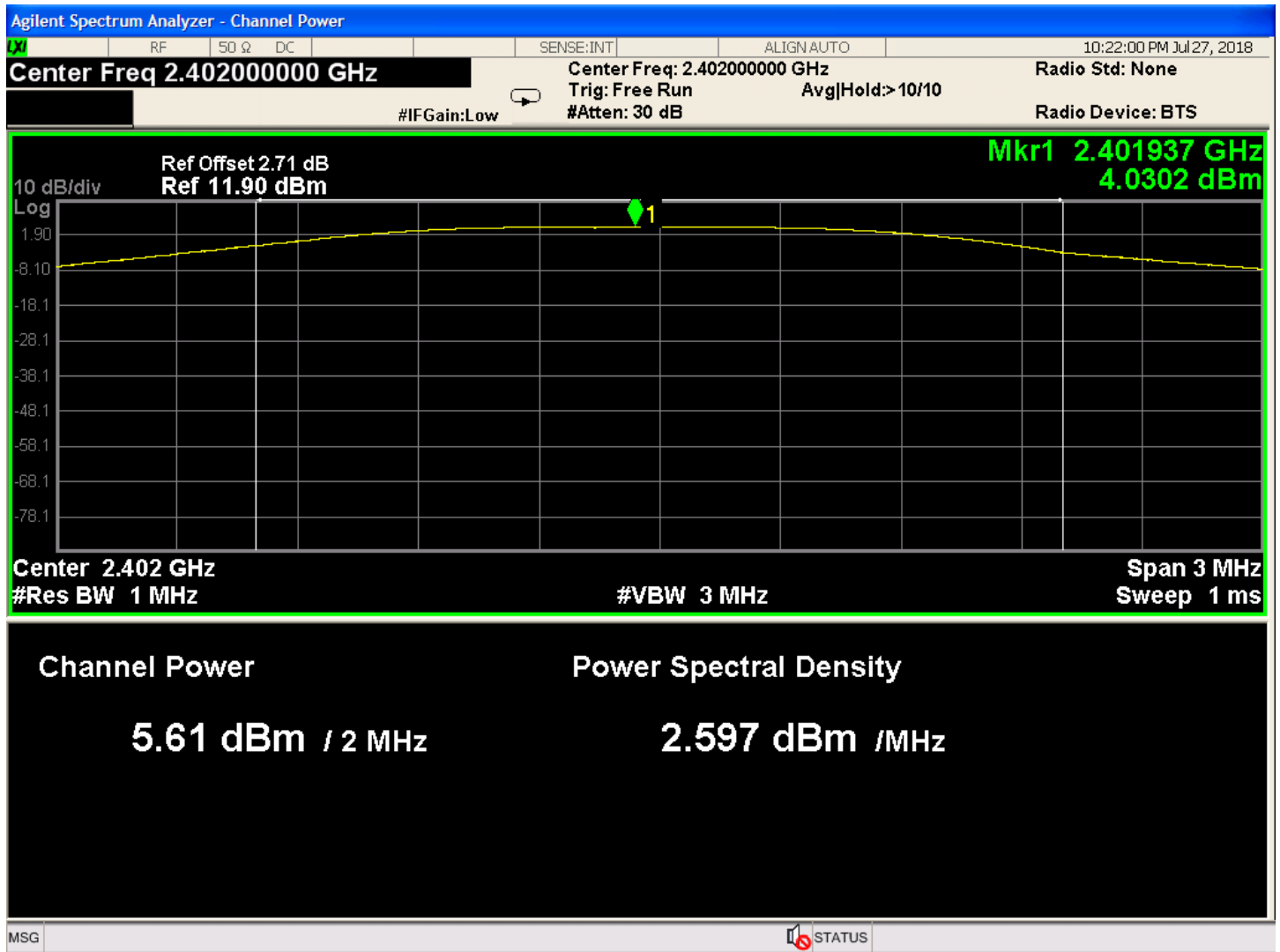
A diagram of the configuration of this test is found in the test plan.

## 6.2.1 Results

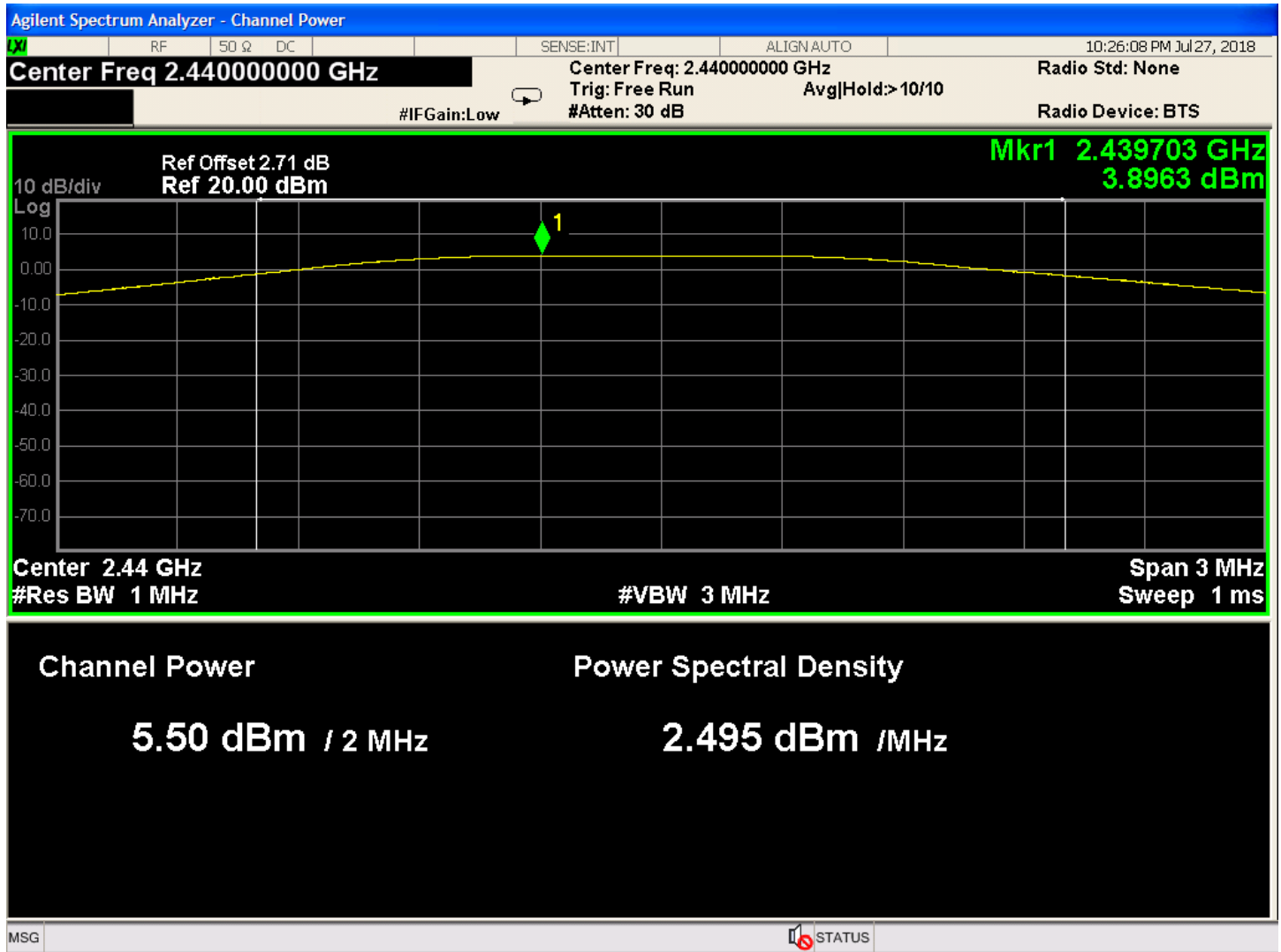
As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

**Table 2: RF Output Power at the Antenna Port – Test Results**

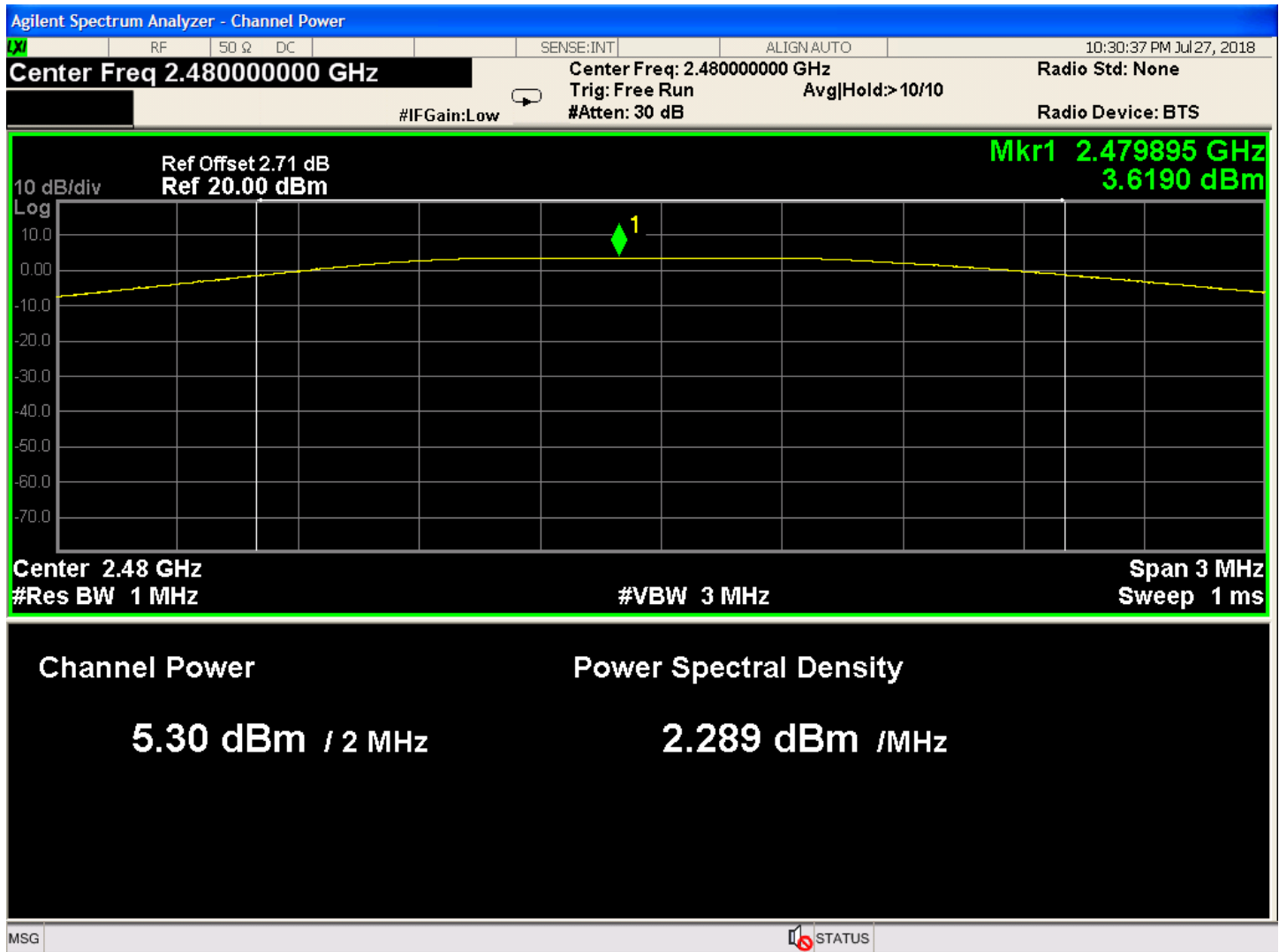
|                                                                   |                   |                                  |             |          |
|-------------------------------------------------------------------|-------------------|----------------------------------|-------------|----------|
| <b>Test Conditions:</b> Conducted Measurement, Normal Temperature |                   | <b>Date:</b> 07/27/2018          |             |          |
| <b>Antenna Type:</b> Integrated Antenna                           |                   | <b>Power Setting:</b> Fixed      |             |          |
| <b>Max. Antenna Gain:</b> 5.0 dbi                                 |                   | <b>Signal State:</b> Modulated   |             |          |
| <b>Duty Cycle:</b> see section 4                                  |                   | <b>Data Rate:</b> BLE            |             |          |
| <b>Ambient Temp.:</b> 24° C                                       |                   | <b>Relative Humidity:</b> 39 %RH |             |          |
| Results                                                           |                   |                                  |             |          |
| Mode                                                              | Operating Channel | Limit [dBm]                      | Power [dBm] | Comments |
| BLE                                                               | 2402 MHz          | +30.00                           | 5.61        |          |
|                                                                   | 2438 MHz          | +30.00                           | 5.50        |          |
|                                                                   | 2480 MHz          | +30.00                           | 5.30        |          |



Channel power BLE mode 2402 MHz.



Channel power BLE mode 2440 MHz.



Channel power BLE mode 2480 MHz.

## 7 Occupied Bandwidth

*The occupied bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency.*

*The 99% bandwidth is the bandwidth in which 99% of the transmitted power occupied.*

*20 dB bandwidth was performed by coupling the output of the EUT to the input of a spectrum analyzer.*

*The 6dB bandwidth is defined the bandwidth of 6dBr from highest transmitted level of the fundamental frequency.*

*The minimum 6 dB bandwidth shall be at least 500 kHz per Section CFR47 15.247(a2) 2017 and RSS-247 Sect. 5.3(a) Issue 2, 2017.*

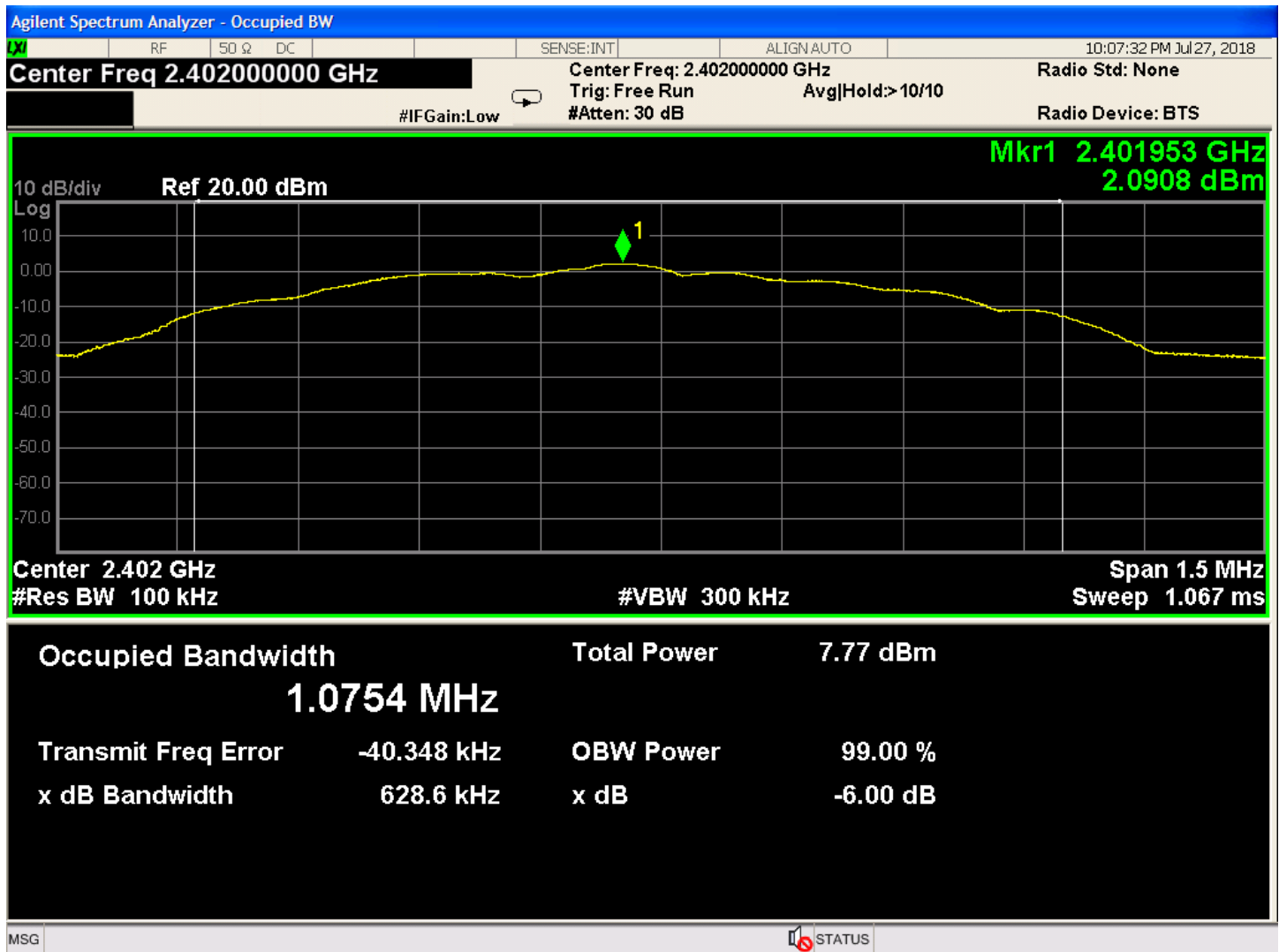
### 7.1.1 Test Method

The conducted method was used to measure the occupied bandwidth according to ANSI C63.10:2013 Section 11.8. The measurement was performed with modulation per CFR47 15.247 (a) (2) 2017 and RSS 247: 2017. This test was conducted on 3 channels. The result indicated below.

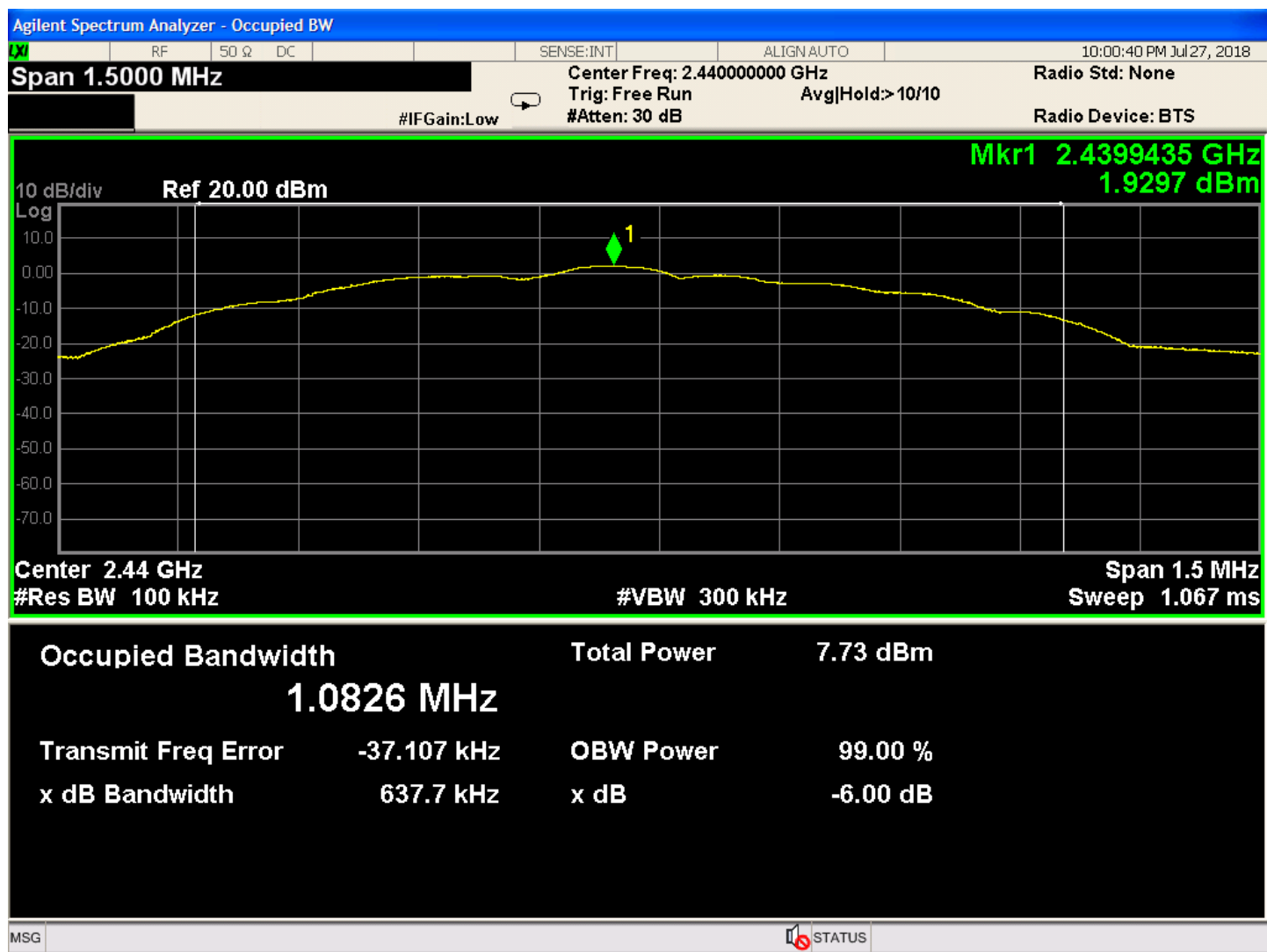
Test setup: A diagram of the test setup can be found in the test plan

## Results

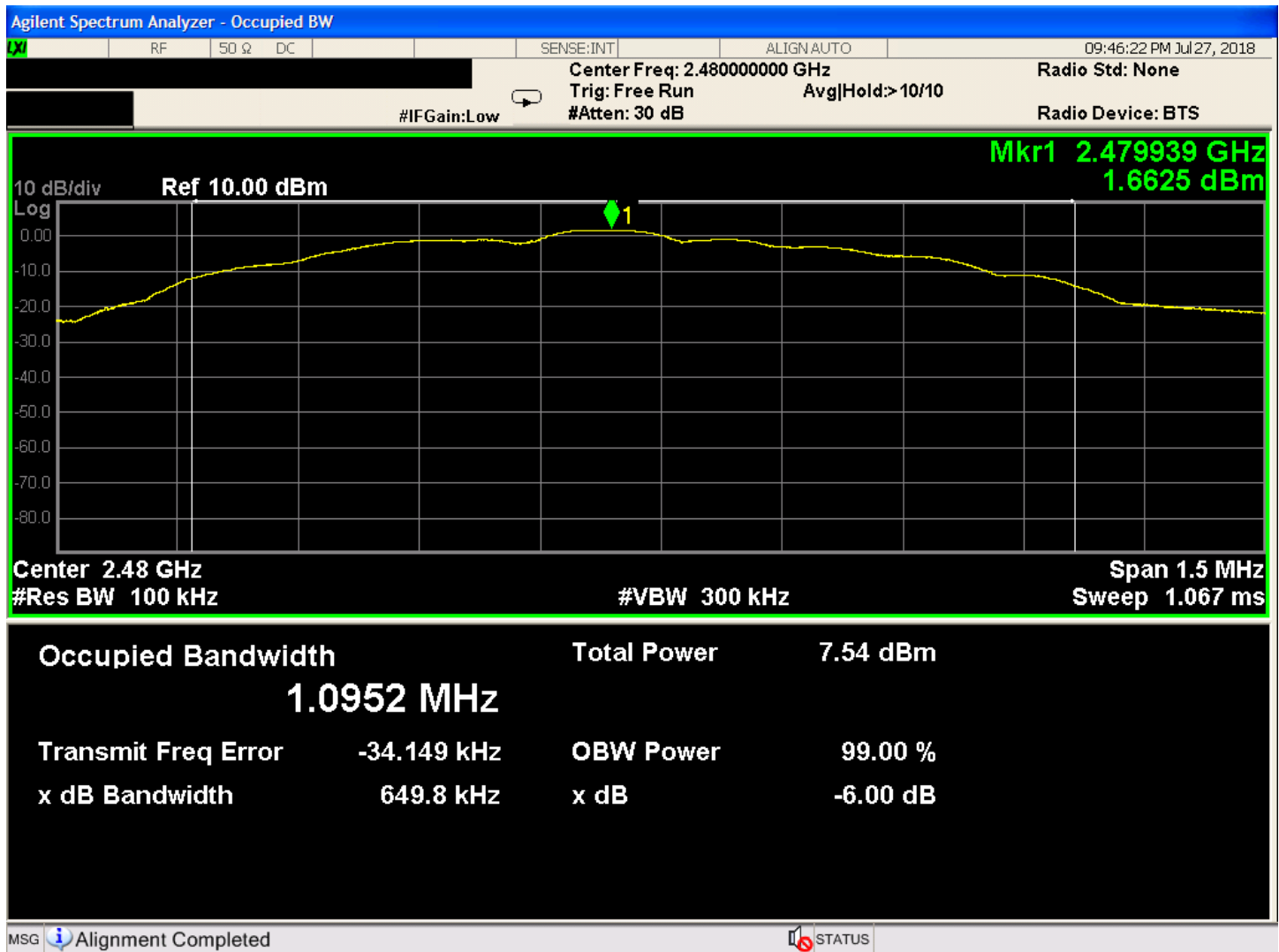
|                                                                   |                   |         |                                  |             |
|-------------------------------------------------------------------|-------------------|---------|----------------------------------|-------------|
| <b>Test Conditions:</b> Conducted Measurement, Normal Temperature |                   |         | <b>Date:</b> 07/27/2018          |             |
| <b>Antenna Type:</b> Integrated Antenna                           |                   |         | <b>Power Setting:</b> Fixed      |             |
| <b>Max. Antenna Gain:</b> 5.0 dbi                                 |                   |         | <b>Signal State:</b> Modulated   |             |
| <b>Duty Cycle:</b> : see section 4                                |                   |         | <b>Data Rate:</b> BLE            |             |
| <b>Ambient Temp.:</b> 24° C                                       |                   |         | <b>Relative Humidity:</b> 39 %RH |             |
| Results                                                           |                   |         |                                  |             |
| Mode                                                              | Operating Channel | Limit   | 99% OBW MHz                      | -6db BW MHz |
| BLE                                                               | 2402 MHz          | >500khz | 1.07                             | 0.628       |
|                                                                   | 2440 MHz          | >500khz | 1.08                             | 0.637       |
|                                                                   | 2480 MHz          | >500khz | 1.09                             | 0.649       |



OBW BLE mode 2402 MHz.



OBW BLE mode 2438



OBW BLE mode 2480 MHz.

## 8 Peak Power Spectral Density

According to the CFR47 Part 15.247 (e) and RSS 247 Sect.5.2 (b), the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

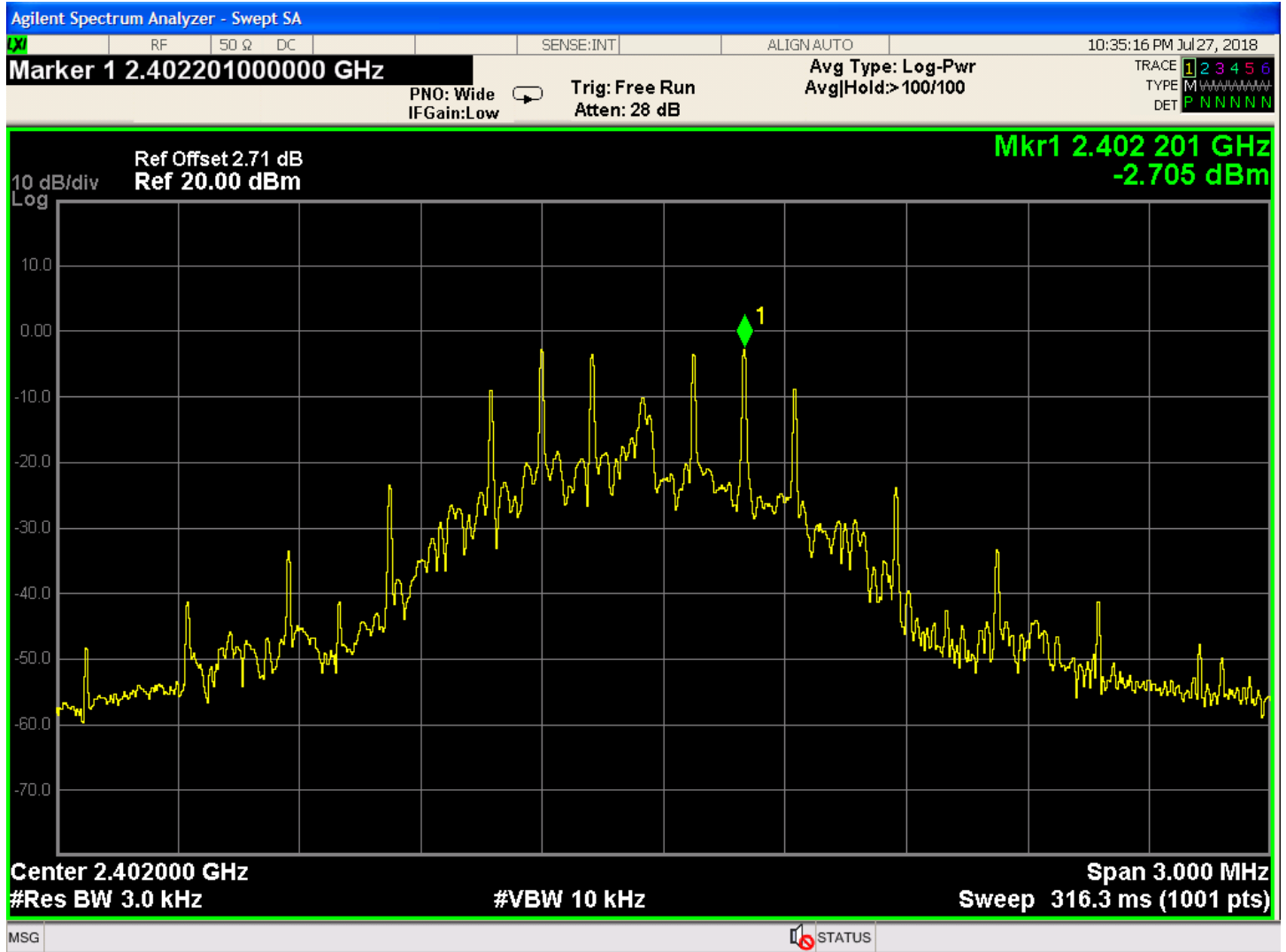
### 8.1.1 Test Method

The conducted method was used to measure the channel power output per ANSI C63.10-2013 Section 11.10.2. The measurement was performed with modulation per CFR47 Part 15.247 (e) and RSS 247 Sect.5.2 (b).

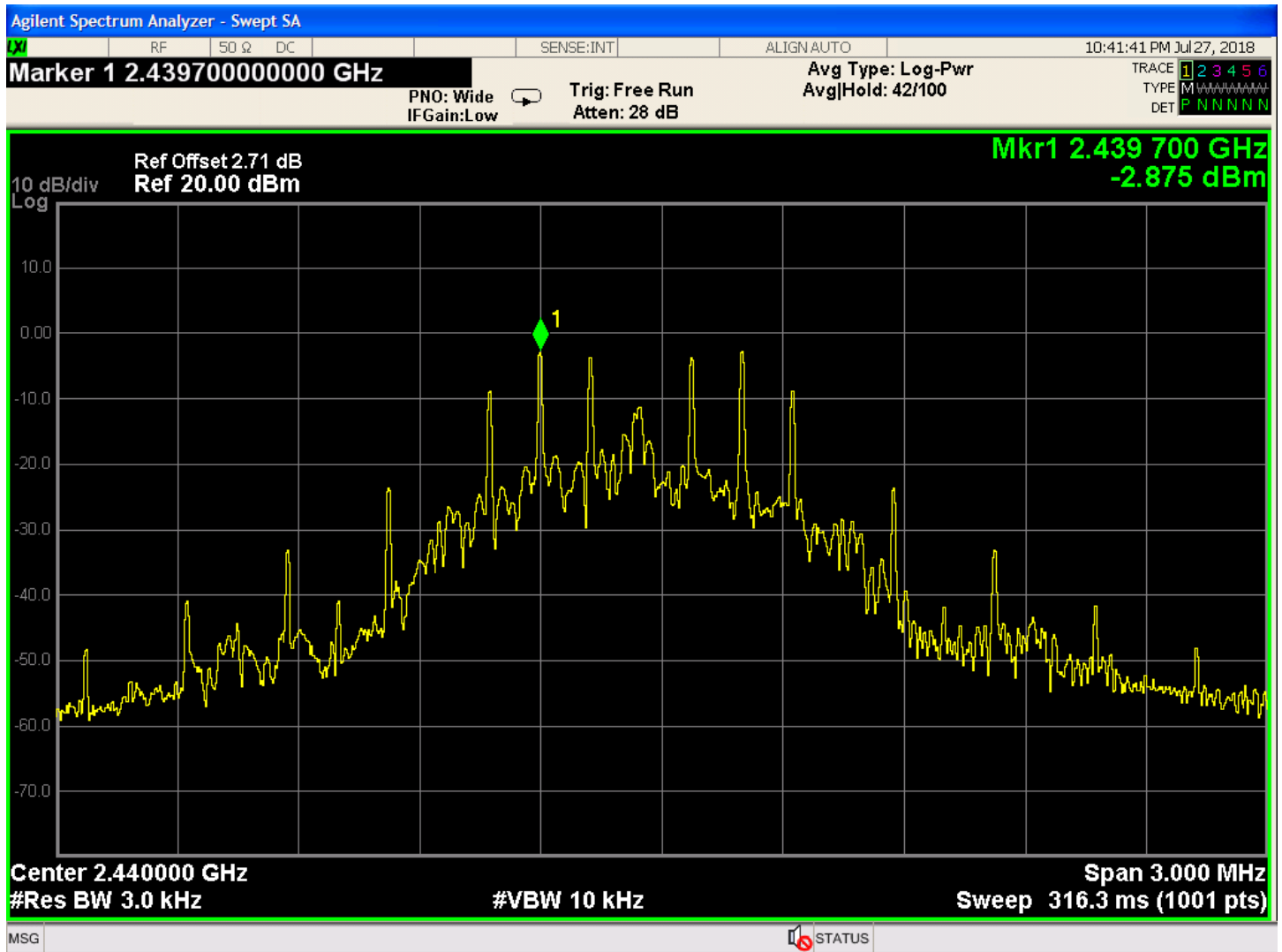
Will demonstrate compliance to the rules required for DTS per KDB 453039

Test setup: A diagram of the test setup can be found in the test plan

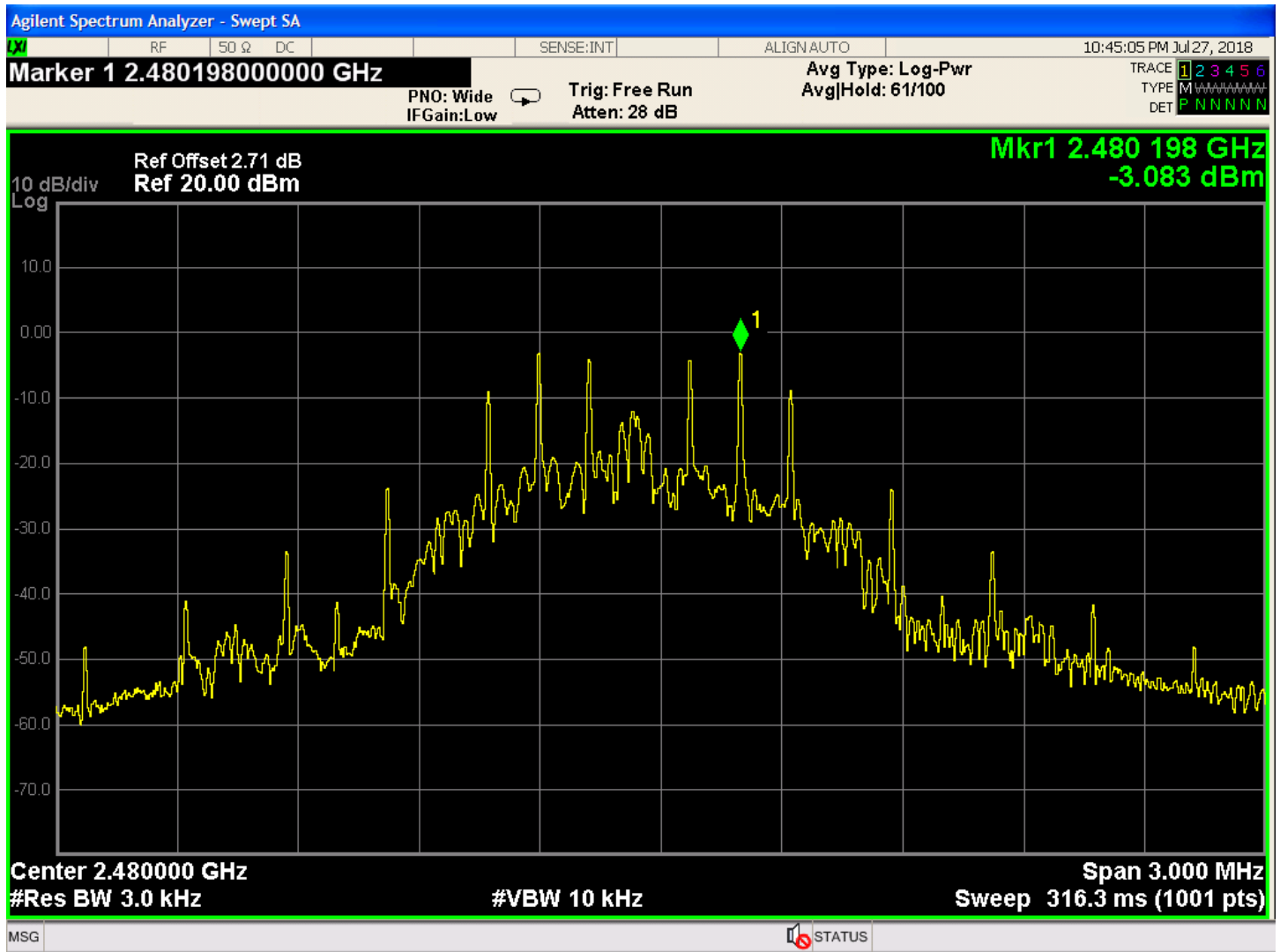
|                                                                   |                   |             |                                  |          |
|-------------------------------------------------------------------|-------------------|-------------|----------------------------------|----------|
| <b>Test Conditions:</b> Conducted Measurement, Normal Temperature |                   |             | <b>Date:</b> 07/27/2018          |          |
| <b>Antenna Type:</b> Integrated PIFA Antenna                      |                   |             | <b>Power Setting:</b> Fixed      |          |
| <b>Max. Antenna Gain:</b> 5.0 dbi                                 |                   |             | <b>Signal State:</b> Modulated   |          |
| <b>Duty Cycle:</b> see section 4                                  |                   |             | <b>Data Rate:</b> BLE            |          |
| <b>Ambient Temp.:</b> 24° C                                       |                   |             | <b>Relative Humidity:</b> 39 %RH |          |
| Results                                                           |                   |             |                                  |          |
| Mode                                                              | Operating Channel | Limit [dBm] | PPSD [dBm]                       | Comments |
| BLE                                                               | 2402 MHz          | 8           | -2.70                            |          |
|                                                                   | 2440 MHz          | 8           | -2.87                            |          |
|                                                                   | 2480 MHz          | 8           | -3.08                            |          |



Power Spectral Density BLE mode 2402 MHz.



Power Spectral Density BLE mode 2440 MHz.



Power Spectral Density BLE mode 2480 MHz.

## 9 Non-Restricted Band Emission requirements

The setup was identical to RF output power measurement. Intentional radiators operating under the alternative provisions to the general emission limits, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If the frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

*Any frequency outside the band of 2400 MHz to 2483.5 MHz, the power output level must be below 20 dB from the in-band transmitting signal; CFR 47 Part 15.215, 15.247(d) and RSS 247 Sect.5.5.*

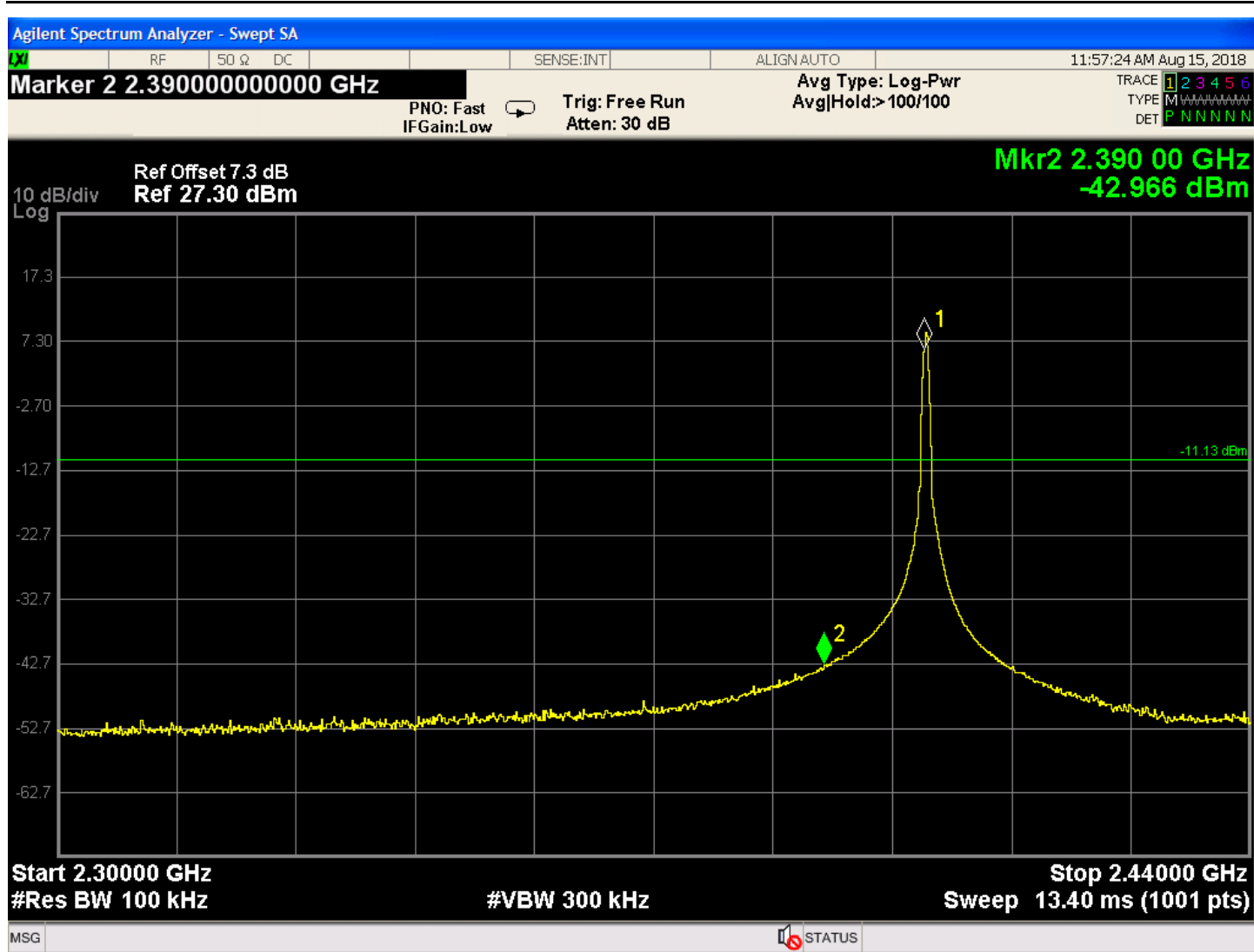
Note: Will demonstrate compliance to the rules required for DTS per KDB 453039

### 9.4.1 Results

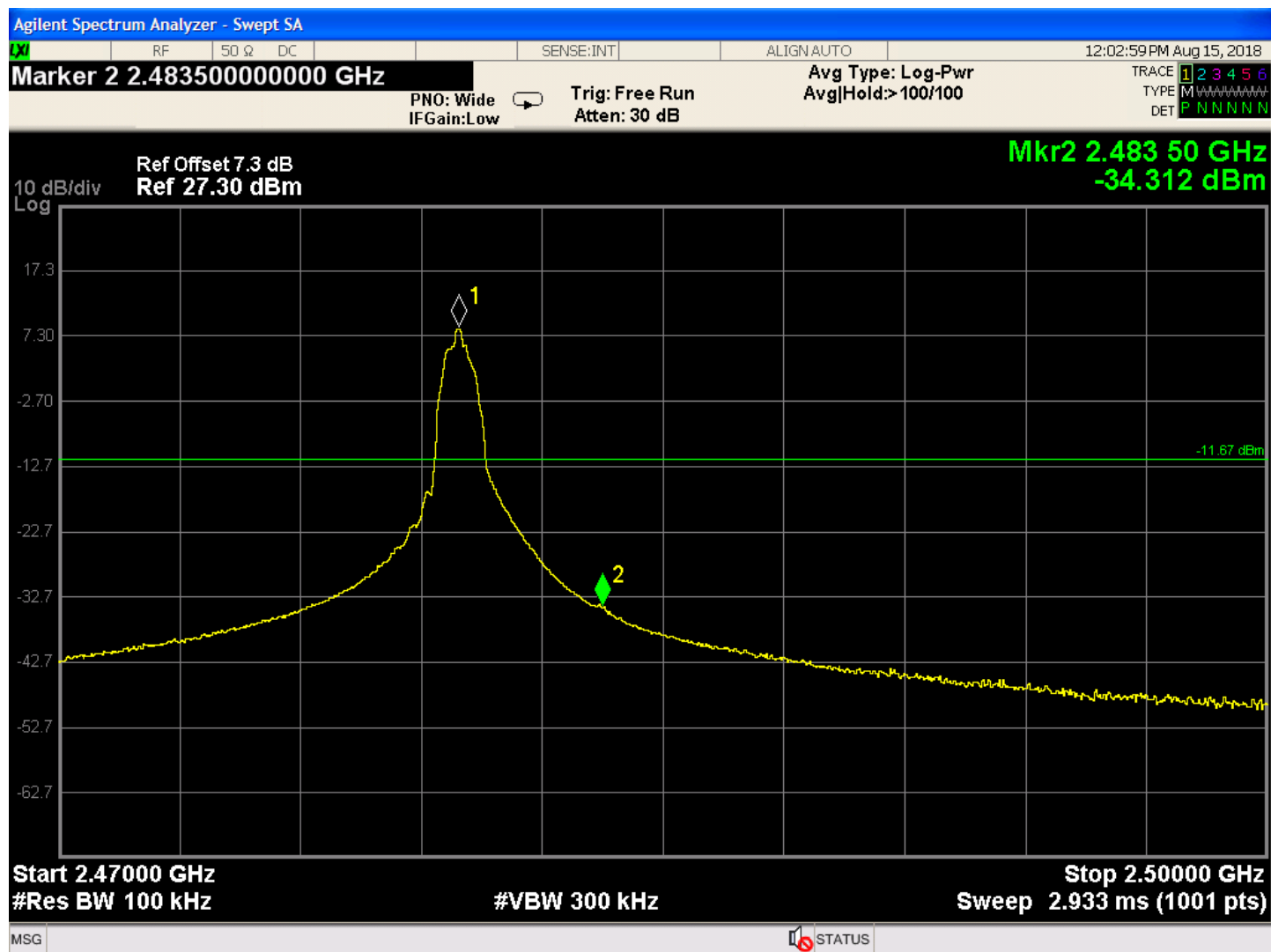
As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

## Non-Restricted band emissions

|                                                                   |                   |             |                                  |          |
|-------------------------------------------------------------------|-------------------|-------------|----------------------------------|----------|
| <b>Test Conditions:</b> Conducted Measurement, Normal Temperature |                   |             | <b>Date:</b> 07/27/2018          |          |
| <b>Antenna Type:</b> Integrated Antenna                           |                   |             | <b>Power Setting:</b> Fixed      |          |
| <b>Max. Antenna Gain:</b> 5.0 dbi                                 |                   |             | <b>Signal State:</b> Modulated   |          |
| <b>Duty Cycle:</b> see section 4                                  |                   |             | <b>Data Rate:</b> BLE            |          |
| <b>Ambient Temp.:</b> 234° C                                      |                   |             | <b>Relative Humidity:</b> 39 %RH |          |
| Results                                                           |                   |             |                                  |          |
| Mode                                                              | Operating Channel | Limit [dBm] | Final Result                     | Comments |
| BLE                                                               | 2402 MHz          | -11.13      | Pass                             |          |
|                                                                   | 2480 MHz          | -11.67      | Pass                             |          |



Channel 2402 MHz.



Channel 2480 MHz.

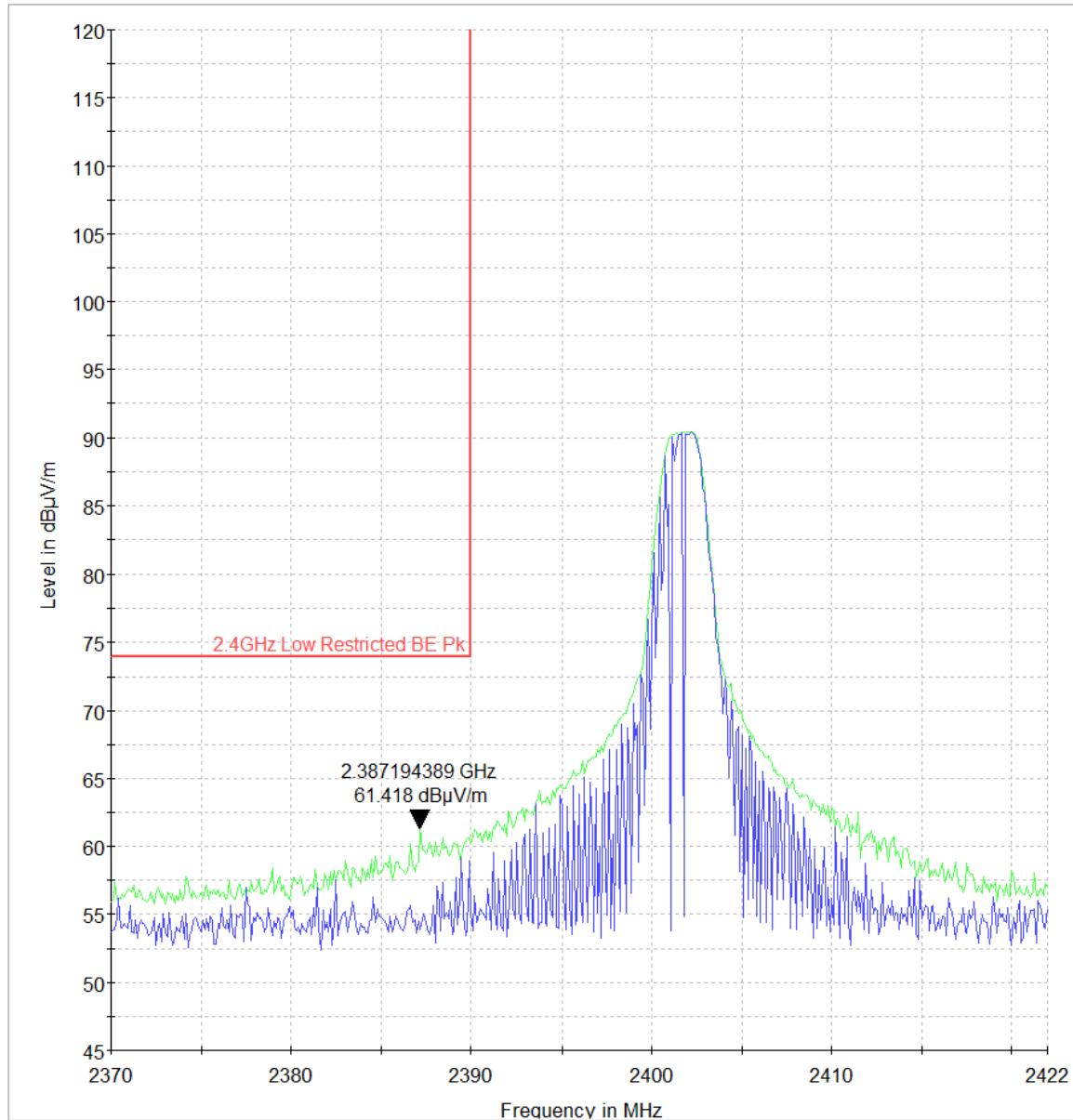
## 10 Restricted Band edges

### 10.1.1 Peak Band edge Emissions

#### Test Method

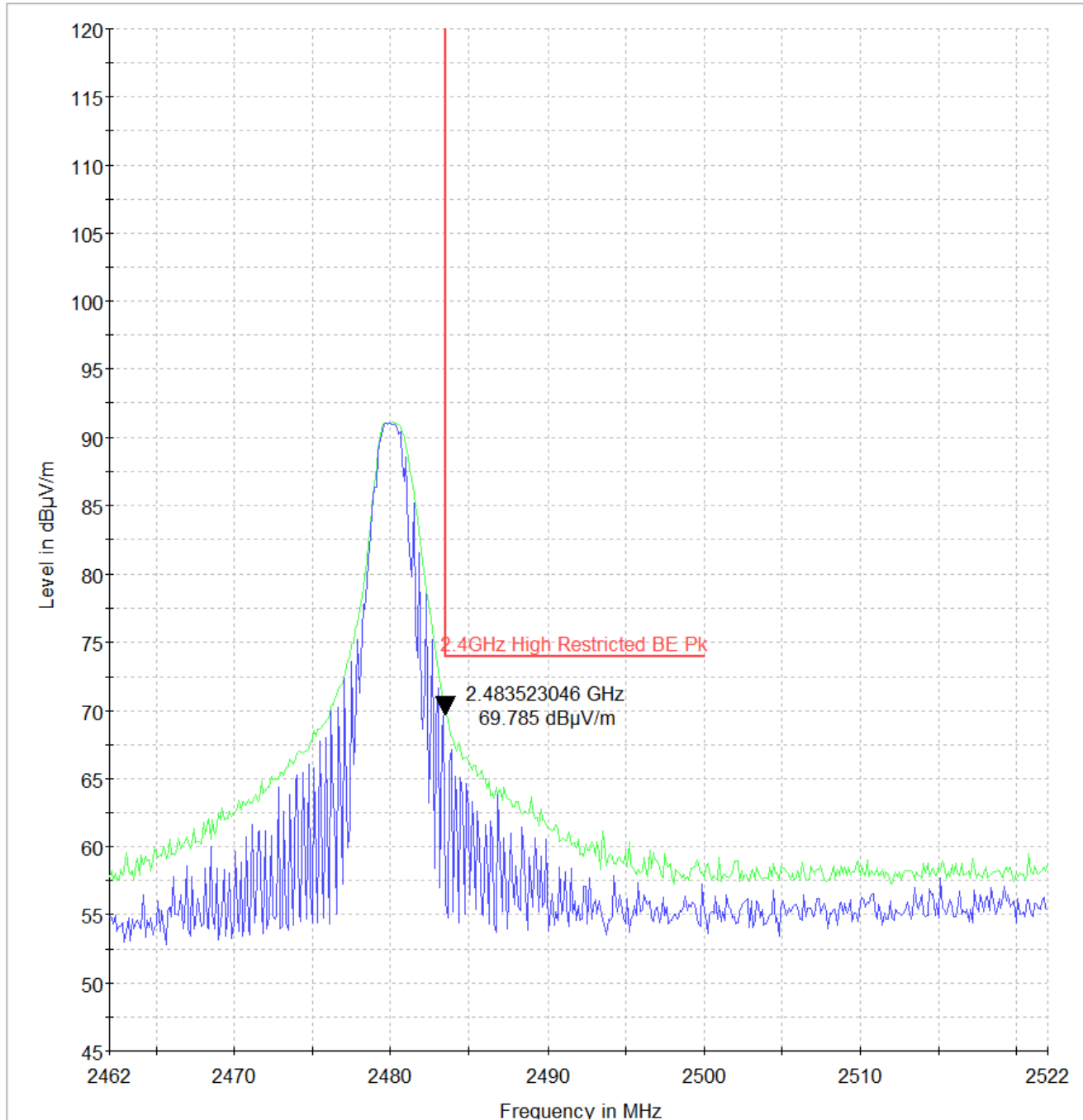
The ANSI C63.10-2013 Section 11.13.3.5 and 6.10.5 the procedure described was followed testing in an anechoic chamber. The preliminary investigation was not needed as the interface supports only one modulation and one power setting. A diag program was used to set the BT in continuous Tx mode and also to set the channel, channel power and data rate. This test was conducted on the edge channels.

| Mode | Operating Channel | Limit dbuV | Max Emission dbuV | Comments |
|------|-------------------|------------|-------------------|----------|
| BLE  | 2402 MHz.         | 74         | 61.4              |          |
|      | 2480 MHz.         | 74         | 69.7              |          |



PK+\_MAXH PK+\_CLRWR 2.4GHz Low Restricted BE Pk

Peak BLE band edge 2402 MHz.



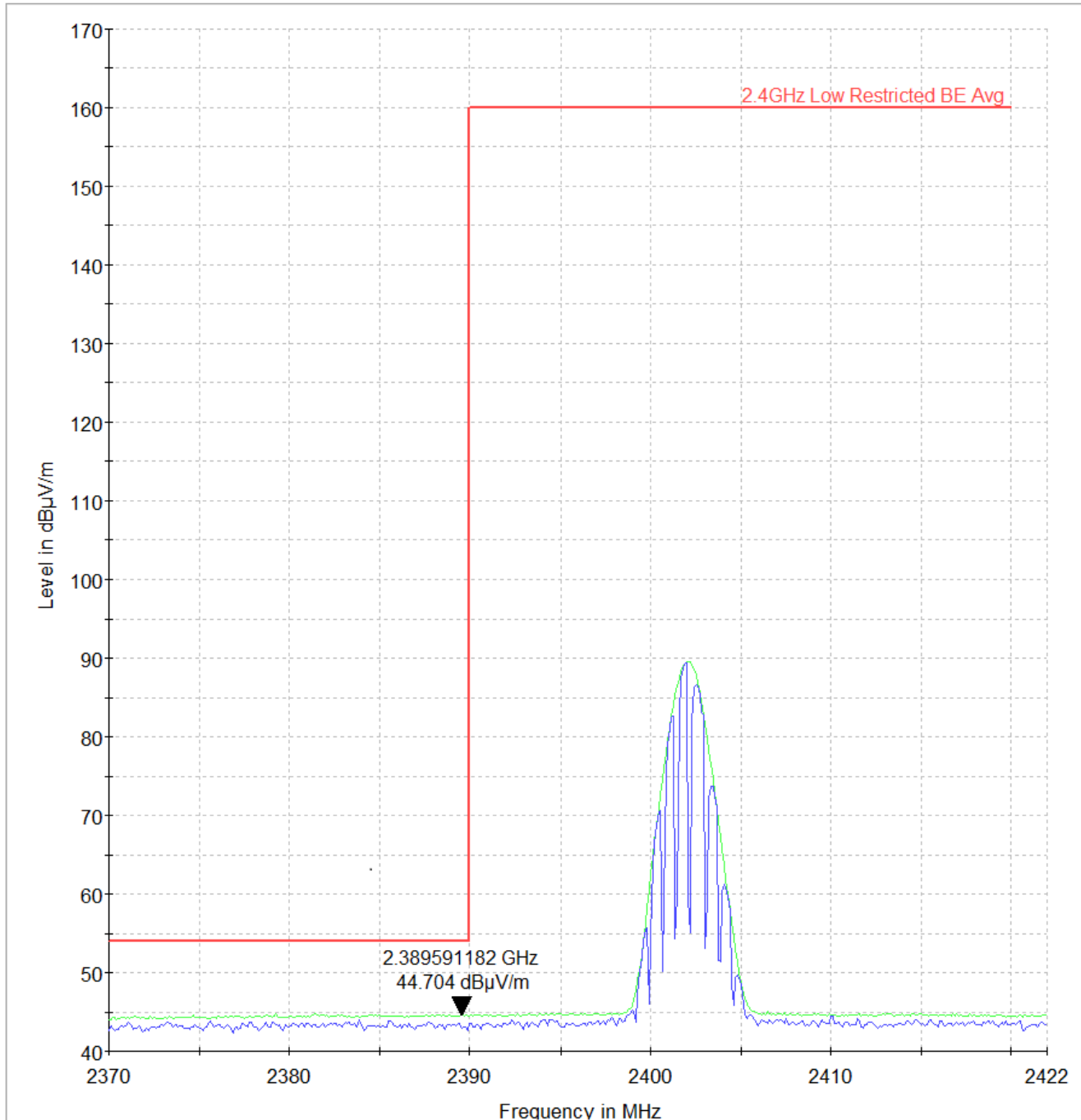
Peak BLE band edge 2480 MHz.

### 10.1.2 Average Band Edge Emissions

#### Test Method

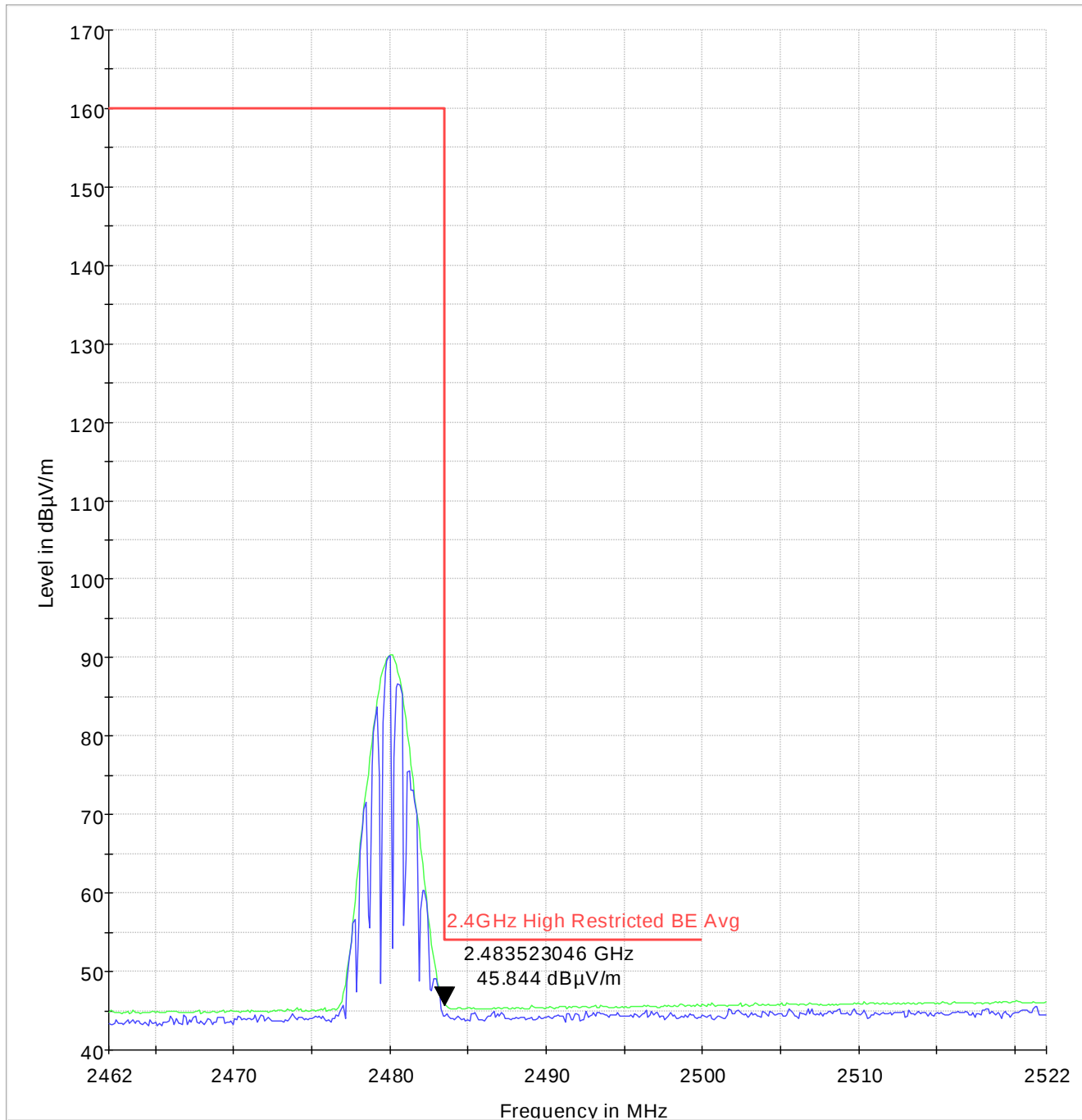
The ANSI C63.10-2013 Section 11.13.3.5 and 6.10.5 the procedure described was followed testing in an anechoic chamber. The preliminary investigation was not needed as the interface supports only one modulation and one power setting. A diag program was used to set the BT in continuous Tx mode and also to set the channel, channel power and data rate. This test was conducted on the edge channels.

| Mode | Operating Channel | Limit dbuV | Max Emission dbuV | Comments |
|------|-------------------|------------|-------------------|----------|
| BLE  | 2402              | 54         | 44.7              |          |
|      | 2480              | 54         | 45.8              |          |



PK+\_MAXH PK+\_CLRWR 2.4GHz Low Restricted BE Avg

Average BLE band edge 2402 MHz



PK+\_MAXH PK+\_CLRWR 2.4GHz High Restricted BE Avg

Average BLE band edge 2480 MHz.

## 11 Restricted Band Emissions

The system was tested in accordance CFR47 part 15.209 and RSS 247: sec 6.2. The emissions in the restricted band are required to meet the limits given for intentional radiators. For the frequency range 30-1000 MHz the test was run at a 5 meter distance. The conditions in the rule parts listed in 15.209(e) were met and the relevant text is listed below. For the purpose of accommodating the software with a negative correction factor the 3 meter spec limit was extrapolated out to 10 meters and this limit was used. A factor of -6db was added to all the result frequencies by the software. This factor corrects the 5 meter results when they are compared to the limit at 10 meters.

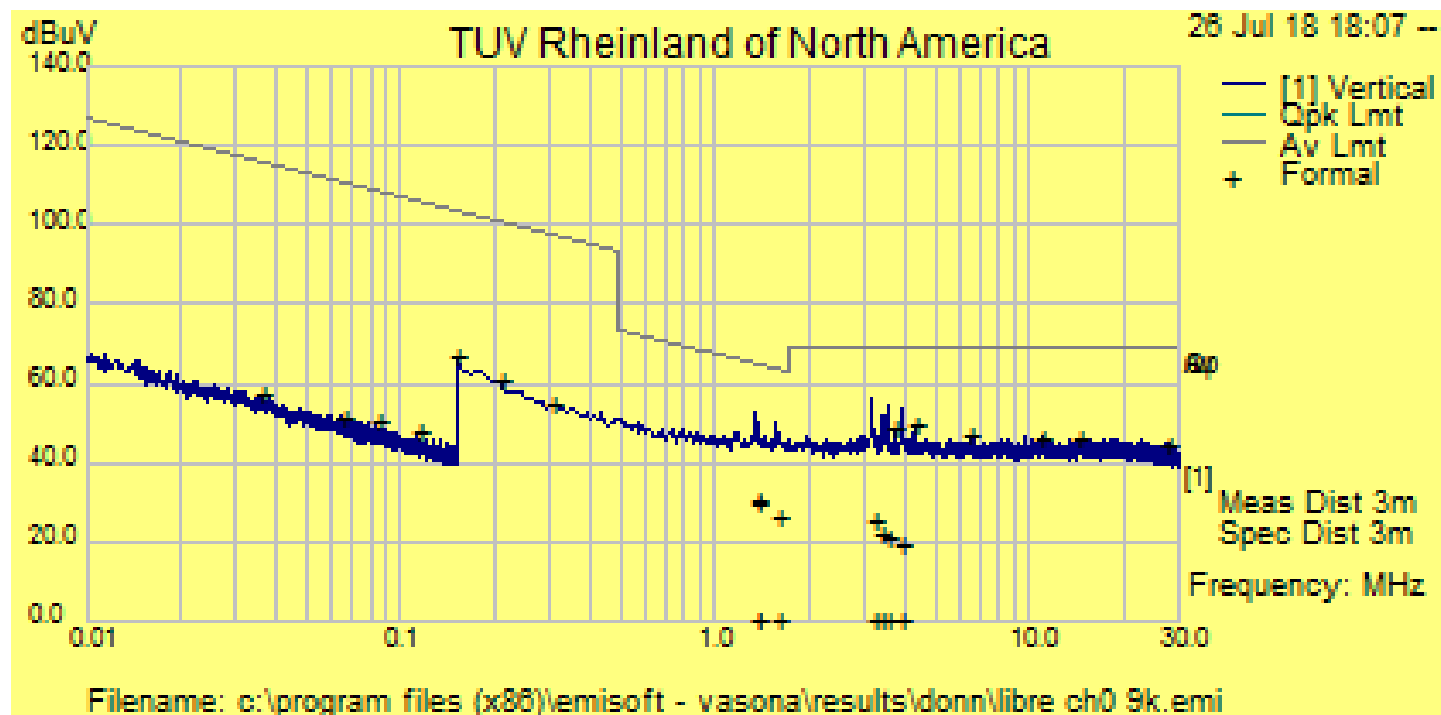
### 15.209

(e) The provisions in §§15.31, 15.33, and 15.35 for measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this part.

### 15.31f

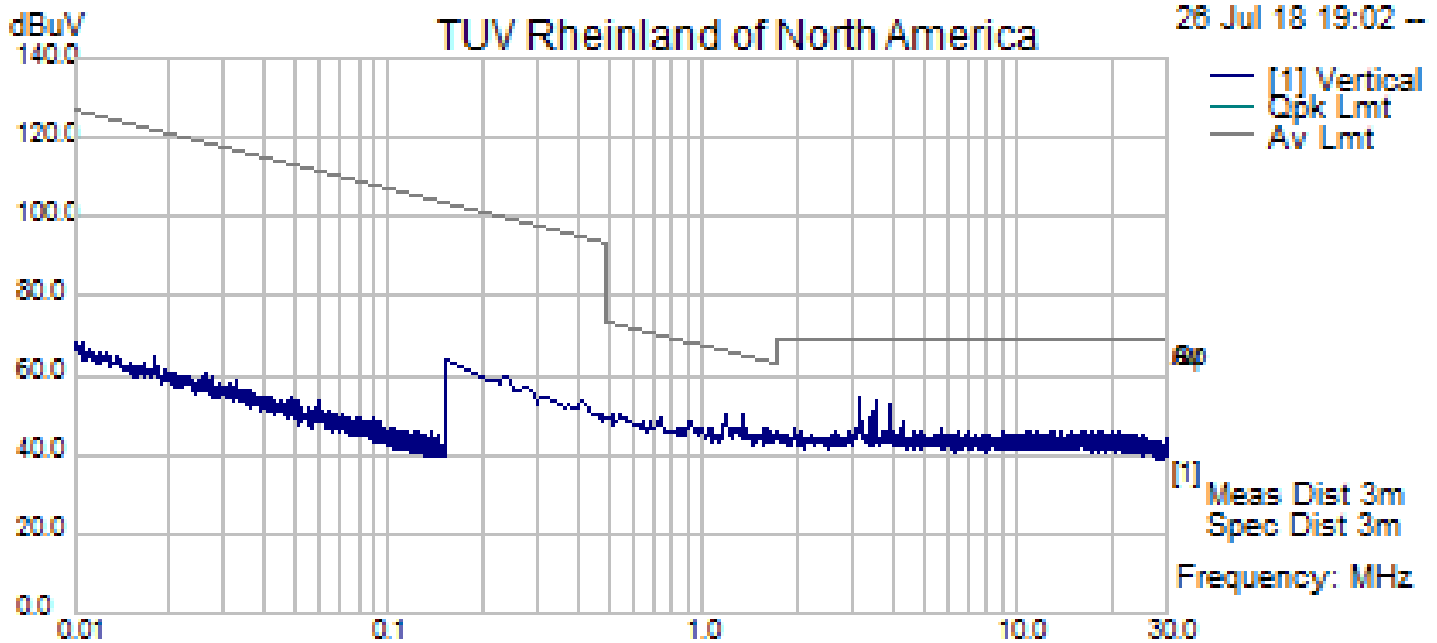
1) At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

## 9 kHz to 30 MHz



Channel 0 Horizontal unit in vertical orientation

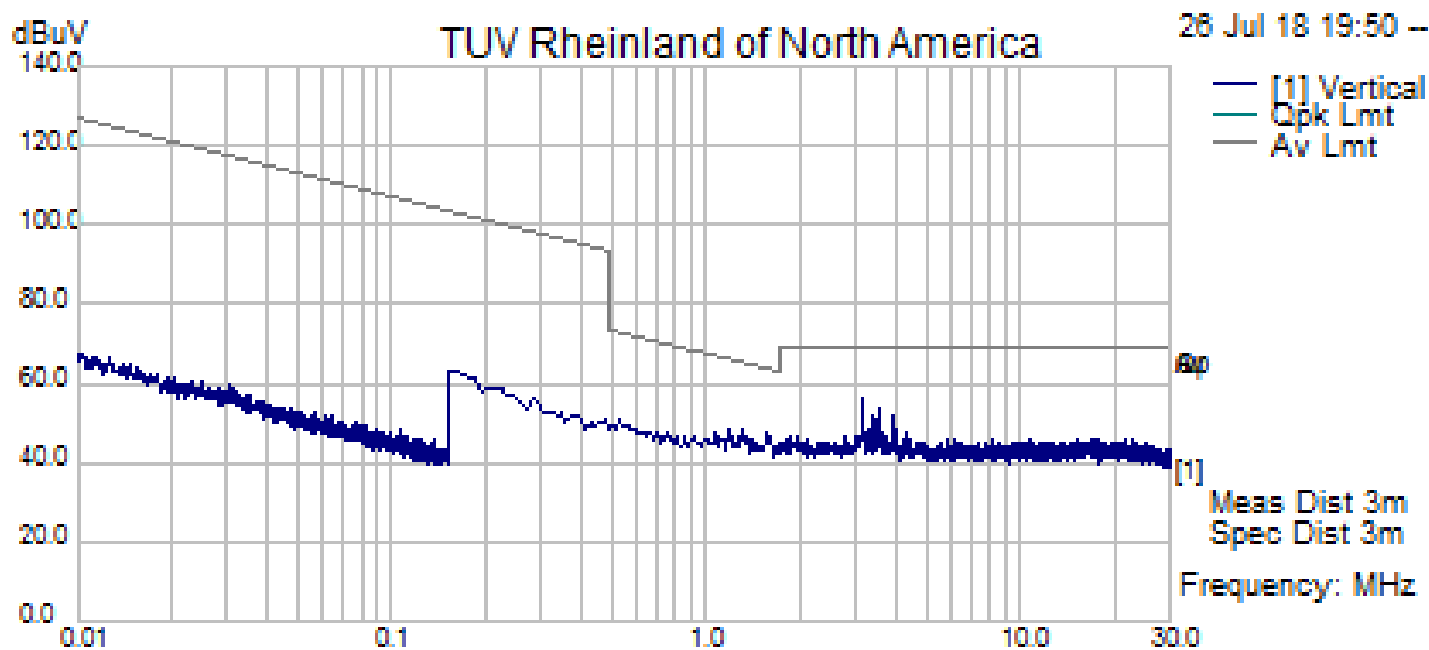
| Frequency | Raw           | Cable Loss | AF         | Level  | Detector   | Polarity         | Height | Azimuth | Limit   | Margin     | Result    | Comments   |
|-----------|---------------|------------|------------|--------|------------|------------------|--------|---------|---------|------------|-----------|------------|
| MHz       | dBuV/m        | dB         | dB         | dBuV/m |            | H/V              | cm     | deg     | dBuV/m  | dB         |           |            |
| No        | Frequency MHz | Raw dBuV   | Cable Loss | AF dB  | Level dBuV | Measurement Type | Pol    | Hgt cm  | Azt Deg | Limit dBuV | Margin dB | Pass /Fail |
| 1 (21)    | 1.35          | 40.11      | 2.31       | 10.60  | 53.03      | Peak [Scan]      | H      | 125     | 52.00   | 65.01      | -11.99    | Pass       |
| 2 (22)    | 3.15          | 43.50      | 2.36       | 10.53  | 56.4       | Peak [Scan]      | H      | 125     | 116.00  | 69.50      | -13.1     | Pass       |
| 3 (23)    | 1.57          | 37.00      | 2.32       | 10.60  | 49.92      | Peak [Scan]      | H      | 125     | 205.00  | 63.68      | -13.76    | Pass       |
| 4 (24)    | 1.37          | 37.30      | 2.31       | 10.60  | 50.22      | Peak [Scan]      | H      | 125     | 222.00  | 64.89      | -14.68    | Pass       |
| 5 (25)    | 3.52          | 41.63      | 2.37       | 10.61  | 54.61      | Peak [Scan]      | H      | 125     | 222.00  | 69.50      | -14.89    | Pass       |
| 6 (26)    | 3.92          | 40.48      | 2.37       | 10.69  | 53.54      | Peak [Scan]      | H      | 125     | 194.00  | 69.50      | -15.96    | Pass       |



Filename: c:\program files (x86)\emisoft - vasona\results\donn\9k run.emi

Channel 0 Horizontal unit in horizontal orientation

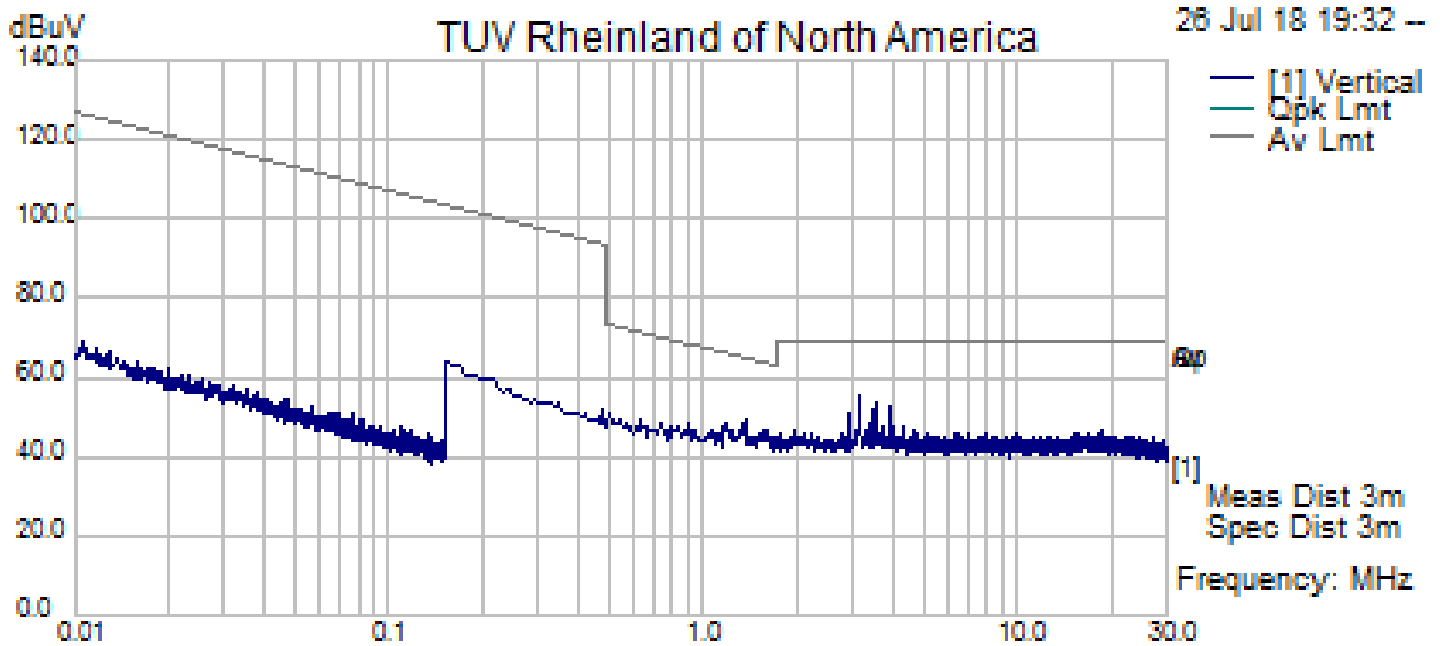
| Frequency | Raw           | Cable Loss | AF         | Level  | Detector   | Polarity         | Height | Azimuth | Limit   | Margin     | Result    | Comments   |
|-----------|---------------|------------|------------|--------|------------|------------------|--------|---------|---------|------------|-----------|------------|
| MHz       | dBuV/m        | dB         | dB         | dBuV/m |            | H/V              | cm     | deg     | dBuV/m  | dB         |           |            |
| No        | Frequency MHz | Raw dBuV   | Cable Loss | AF dB  | Level dBuV | Measurement Type | Pol    | Hgt cm  | Azt Deg | Limit dBuV | Margin dB | Pass /Fail |
| 1 (13)    | 3.13          | 41.45      | 2.36       | 10.53  | 54.34      | Peak [Scan]      | H      | 125     | 274.00  | 69.50      | -15.16    | Pass       |
| 2 (14)    | 3.55          | 40.65      | 2.37       | 10.62  | 53.63      | Peak [Scan]      | H      | 125     | 18.00   | 69.50      | -15.87    | Pass       |
| 3 (15)    | 1.17          | 36.88      | 2.31       | 10.60  | 49.79      | Peak [Scan]      | H      | 125     | 221.00  | 66.23      | -16.45    | Pass       |
| 4 (16)    | 3.93          | 39.32      | 2.37       | 10.69  | 52.38      | Peak [Scan]      | H      | 125     | 302.00  | 69.50      | -17.12    | Pass       |
| 5 (17)    | 3.39          | 35.91      | 2.37       | 10.59  | 48.86      | Peak [Scan]      | H      | 125     | 12.00   | 69.50      | -20.64    | Pass       |
| 6 (18)    | 4.32          | 35.16      | 2.38       | 10.70  | 48.25      | Peak [Scan]      | H      | 125     | 116.00  | 69.50      | -21.26    | Pass       |



Filename: c:\program files (x86)\emisoft - vasona\results\donn\what.emi

Channel 0 Vertical unit in vertical orientation

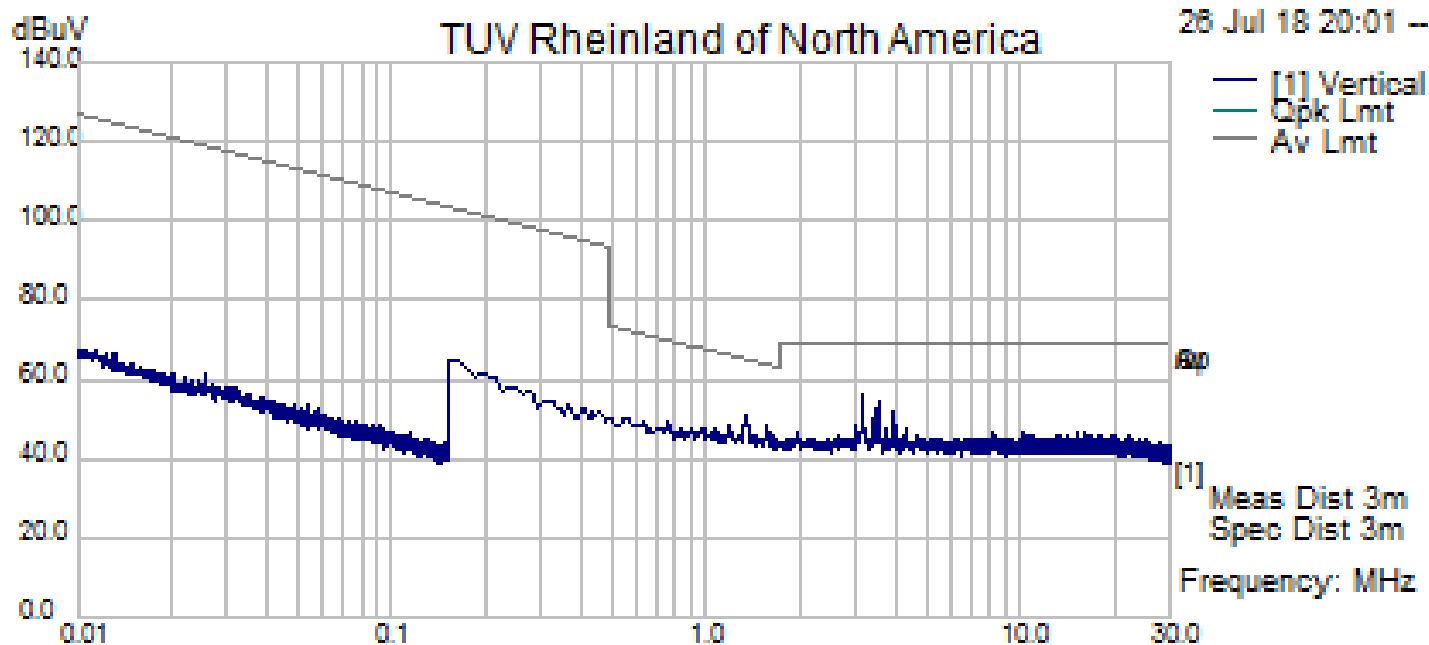
| Frequency | Raw           | Cable Loss | AF         | Level  | Detector   | Polarity         | Height | Azimuth | Limit   | Margin     | Result    | Comments   |
|-----------|---------------|------------|------------|--------|------------|------------------|--------|---------|---------|------------|-----------|------------|
| MHz       | dBuV/m        | dB         | dB         | dBuV/m |            | H/V              | cm     | deg     | dBuV/m  | dB         |           |            |
| No        | Frequency MHz | Raw dBuV   | Cable Loss | AF dB  | Level dBuV | Measurement Type | Pol    | Hgt cm  | Azt Deg | Limit dBuV | Margin dB | Pass /Fail |
| 1 (16)    | 3.14          | 43.02      | 2.36       | 10.53  | 55.92      | Peak [Scan]      | V      | 125     | 34.00   | 69.50      | -13.59    | Pass       |
| 2 (17)    | 3.52          | 40.77      | 2.37       | 10.61  | 53.75      | Peak [Scan]      | V      | 125     | 257.00  | 69.50      | -15.75    | Pass       |
| 3 (18)    | 3.94          | 39.02      | 2.37       | 10.69  | 52.08      | Peak [Scan]      | V      | 125     | 69.00   | 69.50      | -17.42    | Pass       |
| 4 (19)    | 3.38          | 38.84      | 2.37       | 10.58  | 51.79      | Peak [Scan]      | V      | 125     | 314.00  | 69.50      | -17.71    | Pass       |
| 5 (20)    | 1.18          | 35.43      | 2.31       | 10.60  | 48.34      | Peak [Scan]      | V      | 125     | 11.00   | 66.16      | -17.83    | Pass       |
| 6 (21)    | 4.04          | 35.61      | 2.38       | 10.70  | 48.69      | Peak [Scan]      | V      | 125     | 344.00  | 69.50      | -20.81    | Pass       |



Filename: c:\program files (x86)\emisoft - vasona\results\donn\Skruna.emi

Channel 0 Vertical unit in horizontal orientation

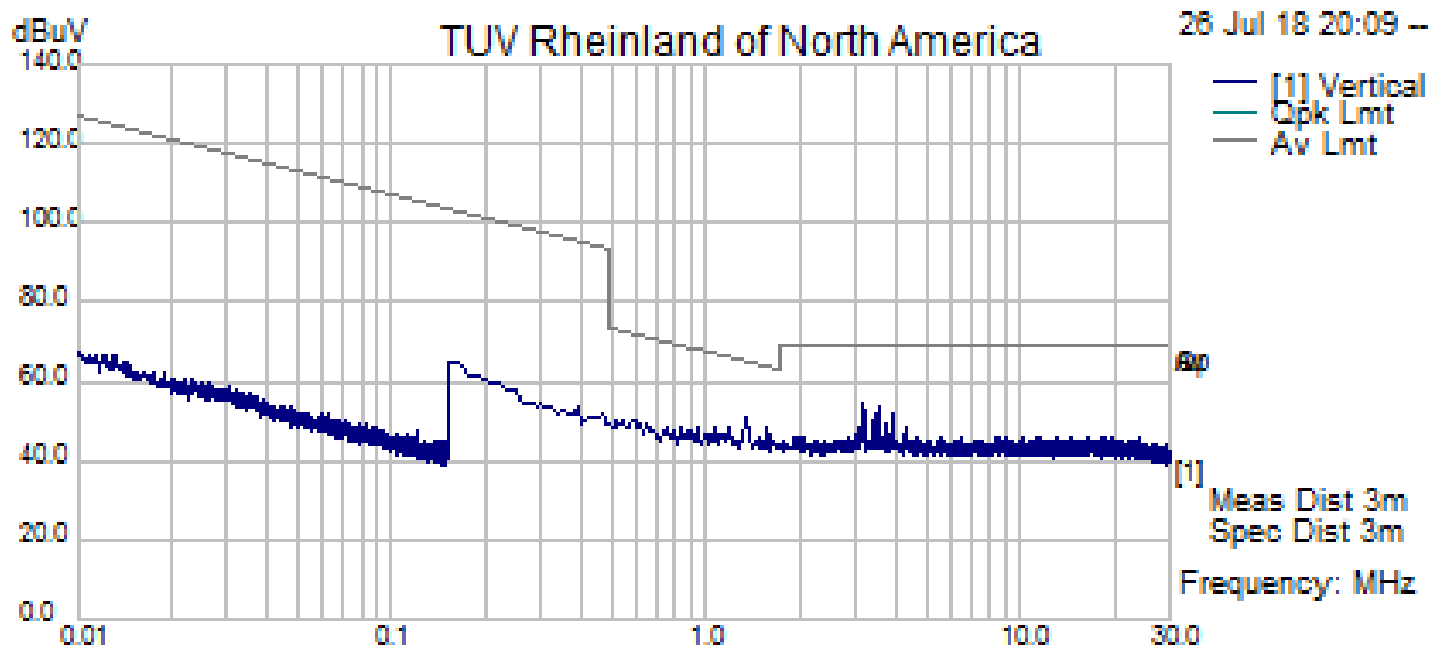
| Frequency | Raw           | Cable Loss | AF         | Level  | Detector   | Polarity         | Height | Azimuth | Limit   | Margin     | Result    | Comments   |
|-----------|---------------|------------|------------|--------|------------|------------------|--------|---------|---------|------------|-----------|------------|
| MHz       | dBuV/m        | dB         | dB         | dBuV/m |            | H/V              | cm     | deg     | dBuV/m  | dB         |           |            |
| No        | Frequency MHz | Raw dBuV   | Cable Loss | AF dB  | Level dBuV | Measurement Type | Pol    | Hgt cm  | Azt Deg | Limit dBuV | Margin dB | Pass /Fail |
| 1 (16)    | 3.15          | 42.07      | 2.36       | 10.53  | 54.97      | Peak [Scan]      | V      | 125     | 204.00  | 69.50      | -14.53    | Pass       |
| 2 (17)    | 1.36          | 36.63      | 2.31       | 10.60  | 49.55      | Peak [Scan]      | V      | 125     | 181.00  | 64.95      | -15.41    | Pass       |
| 3 (18)    | 3.53          | 40.74      | 2.37       | 10.61  | 53.72      | Peak [Scan]      | V      | 125     | 198.00  | 69.50      | -15.78    | Pass       |
| 4 (19)    | 3.92          | 39.40      | 2.37       | 10.69  | 52.46      | Peak [Scan]      | V      | 125     | 234.00  | 69.50      | -17.04    | Pass       |
| 5 (20)    | 2.89          | 37.92      | 2.36       | 10.51  | 50.79      | Peak [Scan]      | V      | 125     | 198.00  | 69.50      | -18.71    | Pass       |
| 6 (21)    | 3.35          | 35.10      | 2.37       | 10.58  | 48.04      | Peak [Scan]      | V      | 125     | 6.00    | 69.50      | -21.46    | Pass       |



Filename: c:\program files (x86)\emisoft - vasona\results\donn\bb.emi

Channel 19 Vertical unit in vertical orientation

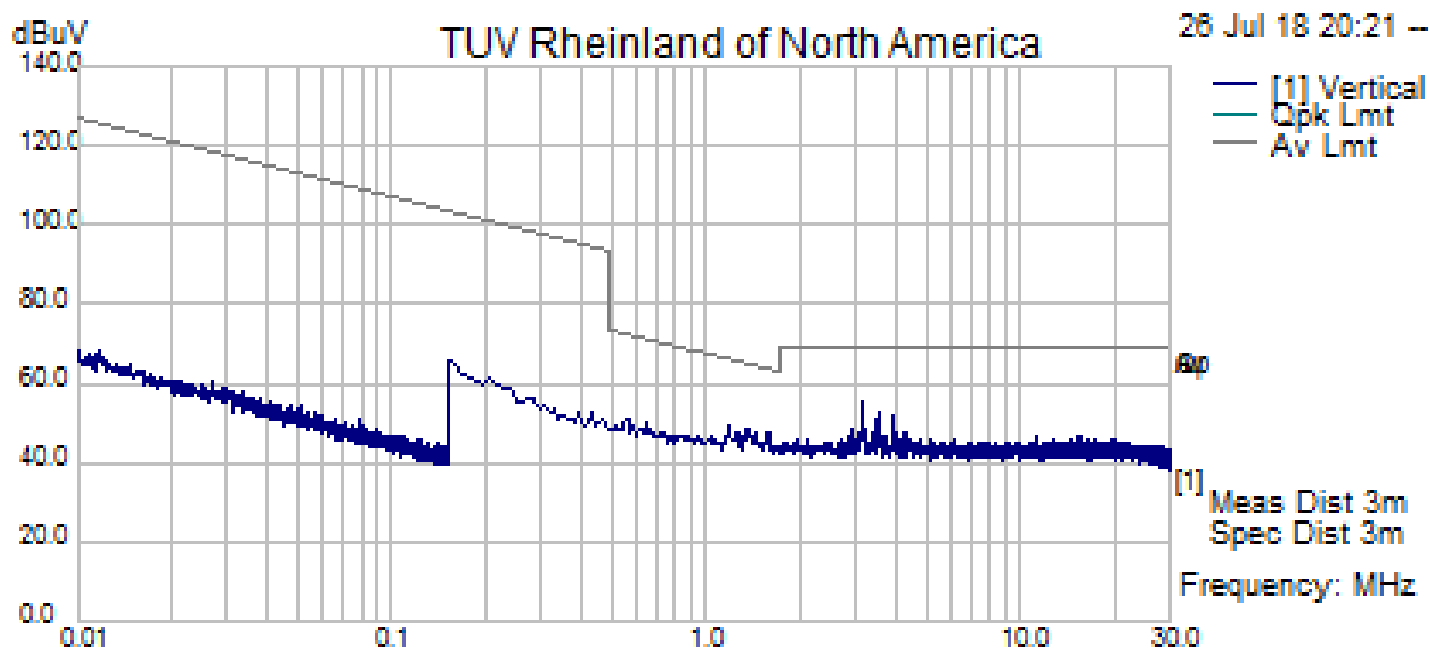
| Frequency | Raw           | Cable Loss | AF         | Level  | Detector   | Polarity         | Height | Azimuth | Limit   | Margin     | Result    | Comments   |
|-----------|---------------|------------|------------|--------|------------|------------------|--------|---------|---------|------------|-----------|------------|
| MHz       | dBuV/m        | dB         | dB         | dBuV/m |            | H/V              | cm     | deg     | dBuV/m  | dB         |           |            |
| No        | Frequency MHz | Raw dBuV   | Cable Loss | AF dB  | Level dBuV | Measurement Type | Pol    | Hgt cm  | Azt Deg | Limit dBuV | Margin dB | Pass /Fail |
| 1 (15)    | 3.14          | 42.89      | 2.36       | 10.53  | 55.78      | Peak [Scan]      | V      | 125     | 104.00  | 69.50      | -13.72    | Pass       |
| 2 (16)    | 1.34          | 37.92      | 2.31       | 10.60  | 50.84      | Peak [Scan]      | V      | 125     | 232.00  | 65.07      | -14.24    | Pass       |
| 3 (17)    | 3.53          | 41.04      | 2.37       | 10.61  | 54.02      | Peak [Scan]      | V      | 125     | 314.00  | 69.50      | -15.48    | Pass       |
| 4 (18)    | 1.57          | 35.22      | 2.32       | 10.60  | 48.14      | Peak [Scan]      | V      | 125     | 127.00  | 63.68      | -15.54    | Pass       |
| 5 (19)    | 3.92          | 39.13      | 2.37       | 10.69  | 52.19      | Peak [Scan]      | V      | 125     | 243.00  | 69.50      | -17.31    | Pass       |
| 6 (20)    | 3.37          | 37.59      | 2.37       | 10.58  | 50.53      | Peak [Scan]      | V      | 125     | 122.00  | 69.50      | -18.97    | Pass       |



Filename: c:\program files (x86)\emisoft - vasona\results\donn\c.emi

Channel 19 Vertical unit in horizontal orientation

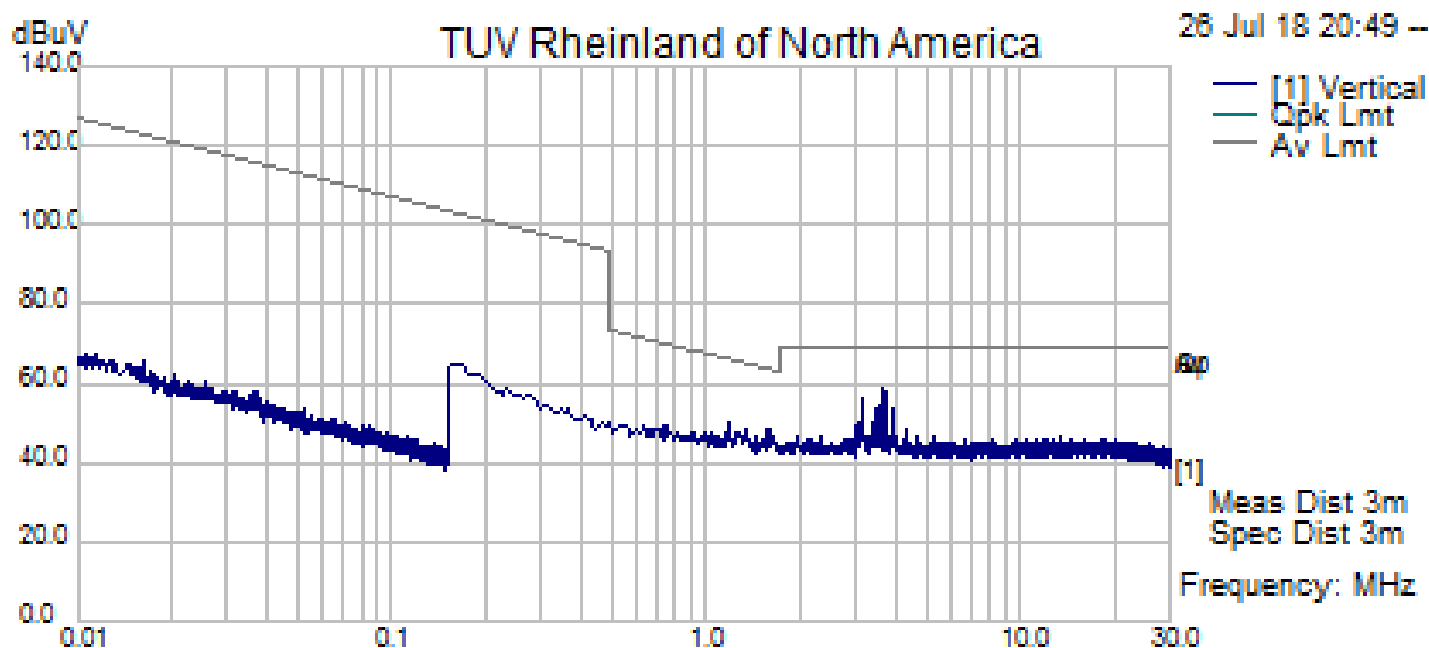
| Frequency | Raw           | Cable Loss | AF         | Level  | Detector   | Polarity         | Height | Azimuth | Limit   | Margin     | Result    | Comments   |
|-----------|---------------|------------|------------|--------|------------|------------------|--------|---------|---------|------------|-----------|------------|
| MHz       | dBuV/m        | dB         | dB         | dBuV/m |            | H/V              | cm     | deg     | dBuV/m  | dB         |           |            |
| No        | Frequency MHz | Raw dBuV   | Cable Loss | AF dB  | Level dBuV | Measurement Type | Pol    | Hgt cm  | Azt Deg | Limit dBuV | Margin dB | Pass /Fail |
| 1 (17)    | 1.33          | 38.12      | 2.31       | 10.60  | 51.03      | Peak [Scan]      | V      | 136     | 344.00  | 65.13      | -14.1     | Pass       |
| 2 (18)    | 3.13          | 41.91      | 2.36       | 10.53  | 54.8       | Peak [Scan]      | V      | 136     | 240.00  | 69.50      | -14.7     | Pass       |
| 3 (19)    | 1.57          | 35.27      | 2.32       | 10.60  | 48.19      | Peak [Scan]      | V      | 136     | 6.00    | 63.68      | -15.49    | Pass       |
| 4 (20)    | 3.53          | 40.69      | 2.37       | 10.61  | 53.67      | Peak [Scan]      | V      | 136     | 198.00  | 69.50      | -15.83    | Pass       |
| 5 (21)    | 3.20          | 39.46      | 2.36       | 10.54  | 52.37      | Peak [Scan]      | V      | 136     | 81.00   | 69.50      | -17.13    | Pass       |
| 6 (22)    | 3.92          | 39.12      | 2.37       | 10.69  | 52.18      | Peak [Scan]      | V      | 136     | 256.00  | 69.50      | -17.32    | Pass       |



Filename: c:\program files (x86)\emisoft - vasona\results\donn\d.emi

Channel 19 Horizontal unit in horizontal orientation

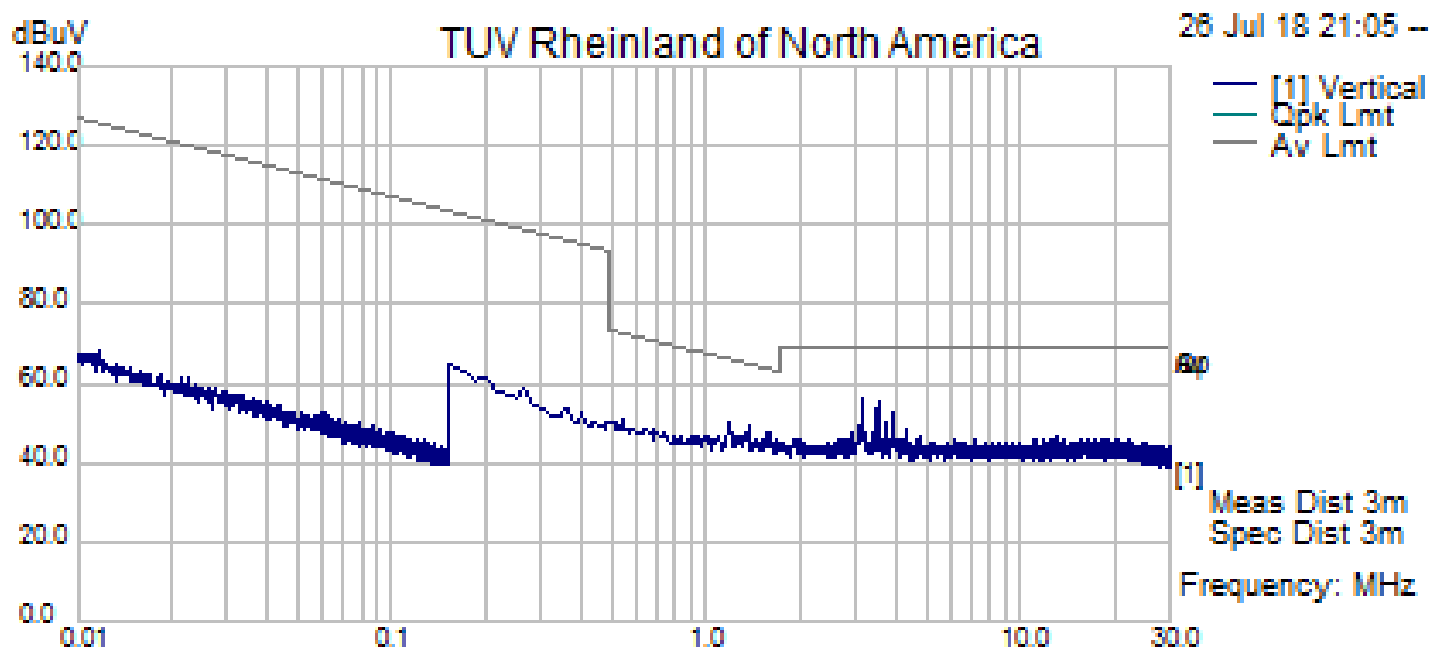
| Frequency | Raw           | Cable Loss | AF         | Level  | Detector   | Polarity         | Height | Azimuth | Limit   | Margin     | Result    | Comments   |
|-----------|---------------|------------|------------|--------|------------|------------------|--------|---------|---------|------------|-----------|------------|
| MHz       | dBuV/m        | dB         | dB         | dBuV/m |            | H/V              | cm     | deg     | dBuV/m  | dB         |           |            |
| No        | Frequency MHz | Raw dBuV   | Cable Loss | AF dB  | Level dBuV | Measurement Type | Pol    | Hgt cm  | Azt Deg | Limit dBuV | Margin dB | Pass /Fail |
| 1 (15)    | 3.14          | 42.37      | 2.36       | 10.53  | 55.26      | Peak [Scan]      | V      | 136     | 0.00    | 69.50      | -14.24    | Pass       |
| 2 (16)    | 1.58          | 34.89      | 2.32       | 10.60  | 47.82      | Peak [Scan]      | V      | 136     | 52.00   | 63.63      | -15.82    | Pass       |
| 3 (17)    | 3.54          | 40.02      | 2.37       | 10.61  | 53.01      | Peak [Scan]      | V      | 136     | 94.00   | 69.50      | -16.5     | Pass       |
| 4 (18)    | 1.18          | 36.47      | 2.31       | 10.60  | 49.38      | Peak [Scan]      | V      | 136     | 0.00    | 66.16      | -16.79    | Pass       |
| 5 (19)    | 3.92          | 38.58      | 2.37       | 10.69  | 51.64      | Peak [Scan]      | V      | 136     | 279.00  | 69.50      | -17.86    | Pass       |
| 6 (20)    | 2.90          | 35.71      | 2.36       | 10.51  | 48.57      | Peak [Scan]      | V      | 136     | 233.00  | 69.50      | -20.93    | Pass       |



Filename: c:\program files (x86)\emisoft - vasona\results\donn\1.f.emi

Channel 19 Horizontal unit in vertical orientation

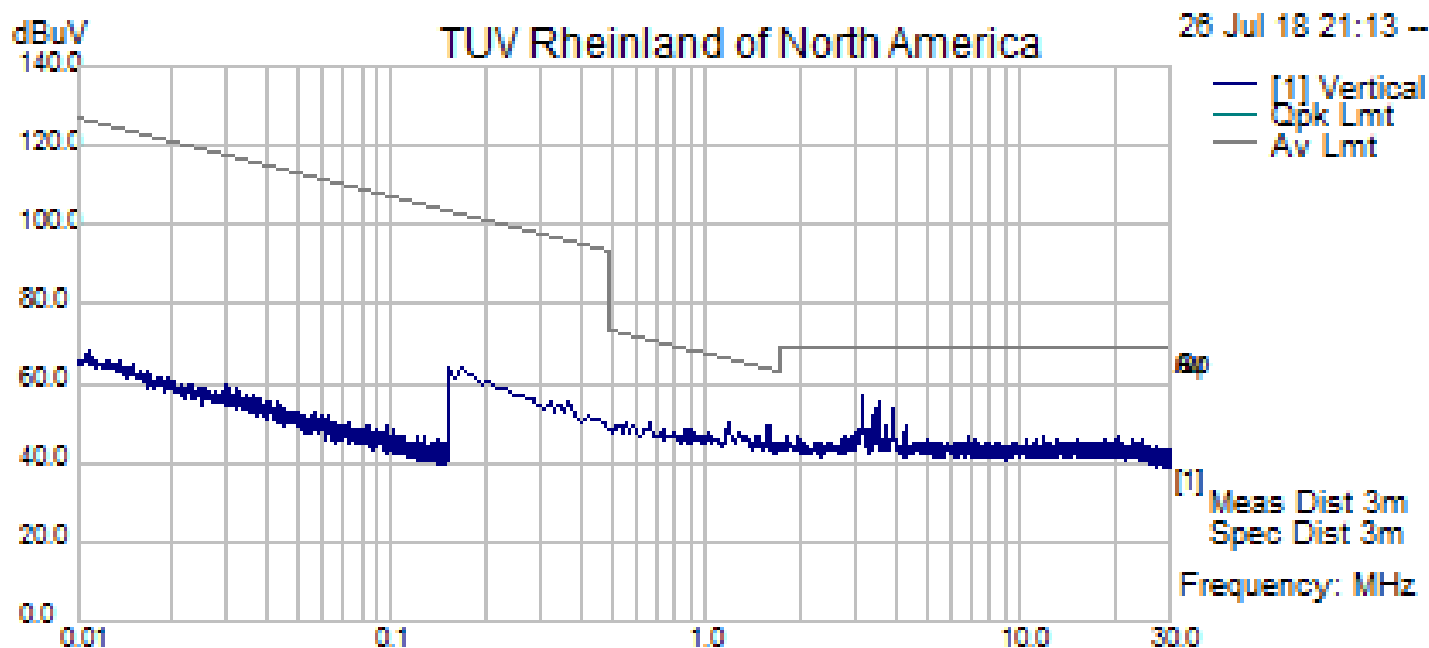
| Frequency | Raw           | Cable Loss | AF         | Level  | Detector   | Polarity         | Height | Azimuth | Limit   | Margin     | Result    | Comments   |
|-----------|---------------|------------|------------|--------|------------|------------------|--------|---------|---------|------------|-----------|------------|
| MHz       | dBuV/m        | dB         | dB         | dBuV/m |            | H/V              | cm     | deg     | dBuV/m  | dB         |           |            |
| No        | Frequency MHz | Raw dBuV   | Cable Loss | AF dB  | Level dBuV | Measurement Type | Pol    | Hgt cm  | Azt Deg | Limit dBuV | Margin dB | Pass /Fail |
| 1 (15)    | 3.69          | 45.73      | 2.37       | 10.64  | 58.75      | Peak [Scan]      | V      | 125     | 3.00    | 69.50      | -10.75    | Pass       |
| 2 (16)    | 3.15          | 42.94      | 2.36       | 10.53  | 55.83      | Peak [Scan]      | V      | 125     | 239.00  | 69.50      | -13.67    | Pass       |
| 3 (17)    | 3.52          | 41.14      | 2.37       | 10.61  | 54.12      | Peak [Scan]      | V      | 125     | 181.00  | 69.50      | -15.38    | Pass       |
| 4 (18)    | 1.58          | 35.19      | 2.32       | 10.60  | 48.12      | Peak [Scan]      | V      | 125     | 135.00  | 63.63      | -15.51    | Pass       |
| 5 (19)    | 1.17          | 37.51      | 2.31       | 10.60  | 50.41      | Peak [Scan]      | V      | 125     | 0.00    | 66.23      | -15.82    | Pass       |
| 6 (20)    | 3.92          | 40.39      | 2.37       | 10.69  | 53.45      | Peak [Scan]      | V      | 125     | 118.00  | 69.50      | -16.05    | Pass       |



Filename: c:\program files (x86)\emisoft - vasona\results\donn\g.emi

Channel 19 Horizontal unit in vertical orientation

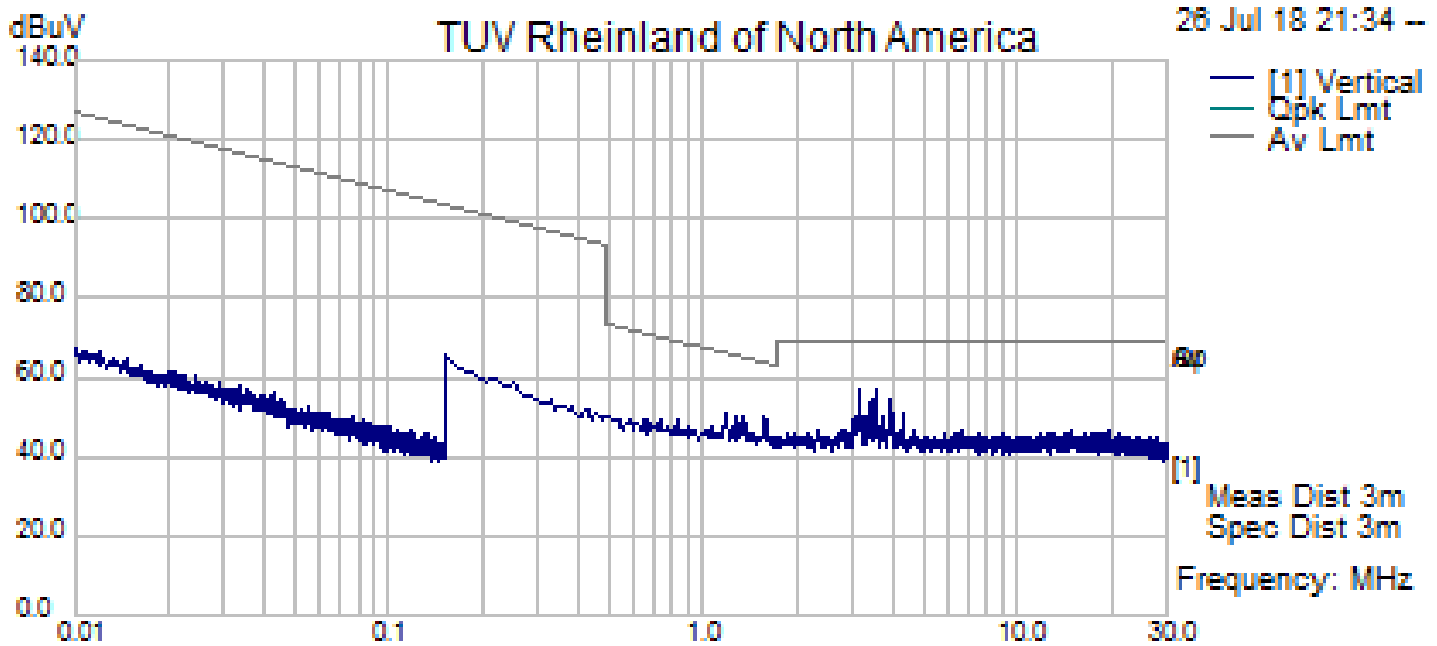
| Frequency | Raw           | Cable Loss | AF         | Level  | Detector   | Polarity         | Height | Azimuth | Limit   | Margin     | Result    | Comments   |
|-----------|---------------|------------|------------|--------|------------|------------------|--------|---------|---------|------------|-----------|------------|
| MHz       | dBuV/m        | dB         | dB         | dBuV/m |            | H/V              | cm     | deg     | dBuV/m  | dB         |           |            |
| No        | Frequency MHz | Raw dBuV   | Cable Loss | AF dB  | Level dBuV | Measurement Type | Pol    | Hgt cm  | Azt Deg | Limit dBuV | Margin dB | Pass /Fail |
| 1 (16)    | 3.14          | 43.28      | 2.36       | 10.53  | 56.17      | Peak [Scan]      | V      | 136     | 134.00  | 69.50      | -13.33    | Pass       |
| 2 (17)    | 3.53          | 42.34      | 2.37       | 10.61  | 55.32      | Peak [Scan]      | V      | 136     | 268.00  | 69.50      | -14.18    | Pass       |
| 3 (18)    | 1.36          | 36.29      | 2.31       | 10.60  | 49.21      | Peak [Scan]      | V      | 136     | 204.00  | 64.95      | -15.74    | Pass       |
| 4 (19)    | 1.57          | 34.70      | 2.32       | 10.60  | 47.62      | Peak [Scan]      | V      | 136     | 140.00  | 63.68      | -16.07    | Pass       |
| 5 (20)    | 1.18          | 37.09      | 2.31       | 10.60  | 50         | Peak [Scan]      | V      | 136     | 262.00  | 66.16      | -16.17    | Pass       |
| 6 (21)    | 3.92          | 39.69      | 2.37       | 10.69  | 52.76      | Peak [Scan]      | V      | 136     | 337.00  | 69.50      | -16.75    | Pass       |



Filename: c:\program files (x86)\emisoft - vasona\results\donn\k.s.emi

Channel 19 Horizontal unit in horizontal orientation

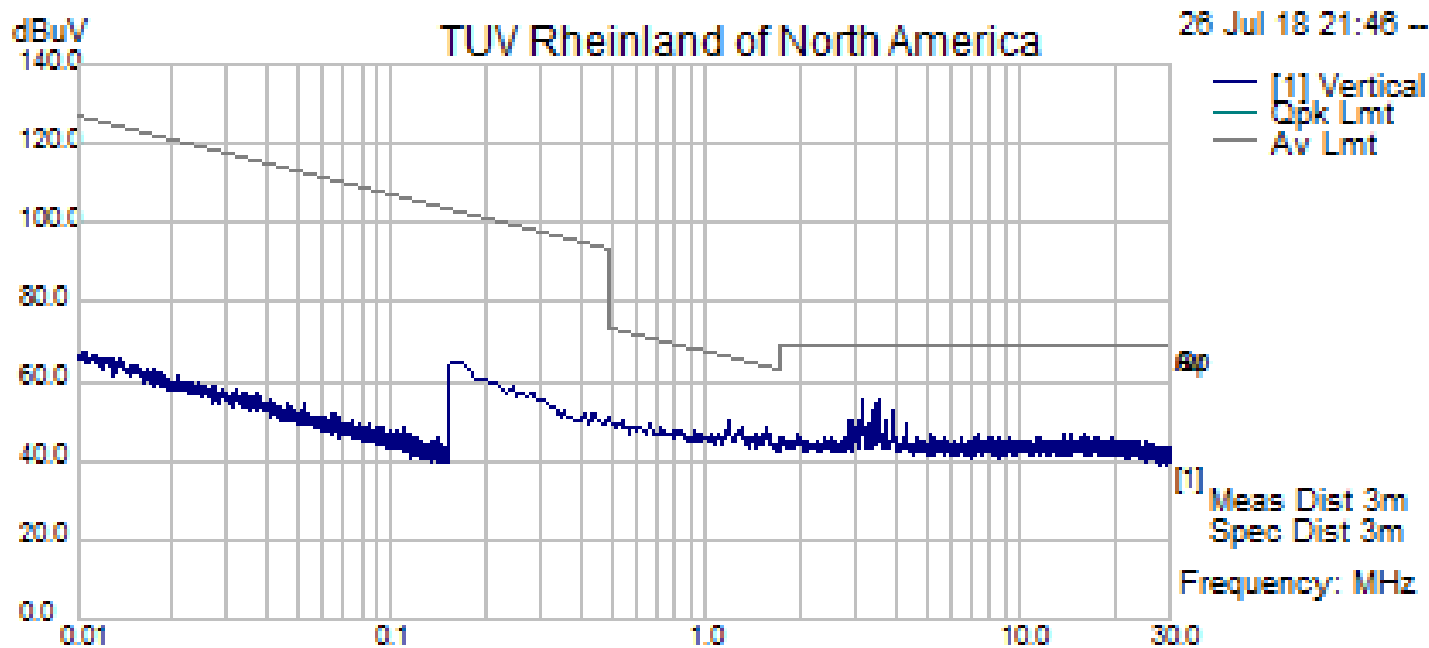
| Frequency | Raw           | Cable Loss | AF         | Level  | Detector   | Polarity         | Height | Azimuth | Limit   | Margin     | Result    | Comments   |
|-----------|---------------|------------|------------|--------|------------|------------------|--------|---------|---------|------------|-----------|------------|
| MHz       | dBuV/m        | dB         | dB         | dBuV/m |            | H/V              | cm     | deg     | dBuV/m  | dB         |           |            |
| No        | Frequency MHz | Raw dBuV   | Cable Loss | AF dB  | Level dBuV | Measurement Type | Pol    | Hgt cm  | Azt Deg | Limit dBuV | Margin dB | Pass /Fail |
| 1 (14)    | 3.14          | 43.77      | 2.36       | 10.53  | 56.67      | Peak [Scan]      | V      | 125     | 128.00  | 69.50      | -12.83    | Pass       |
| 2 (15)    | 3.53          | 42.73      | 2.37       | 10.61  | 55.71      | Peak [Scan]      | V      | 125     | 256.00  | 69.50      | -13.79    | Pass       |
| 3 (16)    | 1.57          | 36.47      | 2.32       | 10.60  | 49.4       | Peak [Scan]      | V      | 125     | 40.00   | 63.68      | -14.29    | Pass       |
| 4 (17)    | 3.92          | 40.21      | 2.37       | 10.69  | 53.27      | Peak [Scan]      | V      | 125     | 337.00  | 69.50      | -16.23    | Pass       |
| 5 (18)    | 1.17          | 37.07      | 2.31       | 10.60  | 49.98      | Peak [Scan]      | V      | 125     | 128.00  | 66.23      | -16.25    | Pass       |
| 6 (19)    | 3.36          | 38.78      | 2.37       | 10.58  | 51.73      | Peak [Scan]      | V      | 125     | 238.00  | 69.50      | -17.77    | Pass       |



Filename: c:\program files (x86)\emisoft - vasona\results\donn\asa.emi

Channel 39 Vertical unit in horizontal orientation

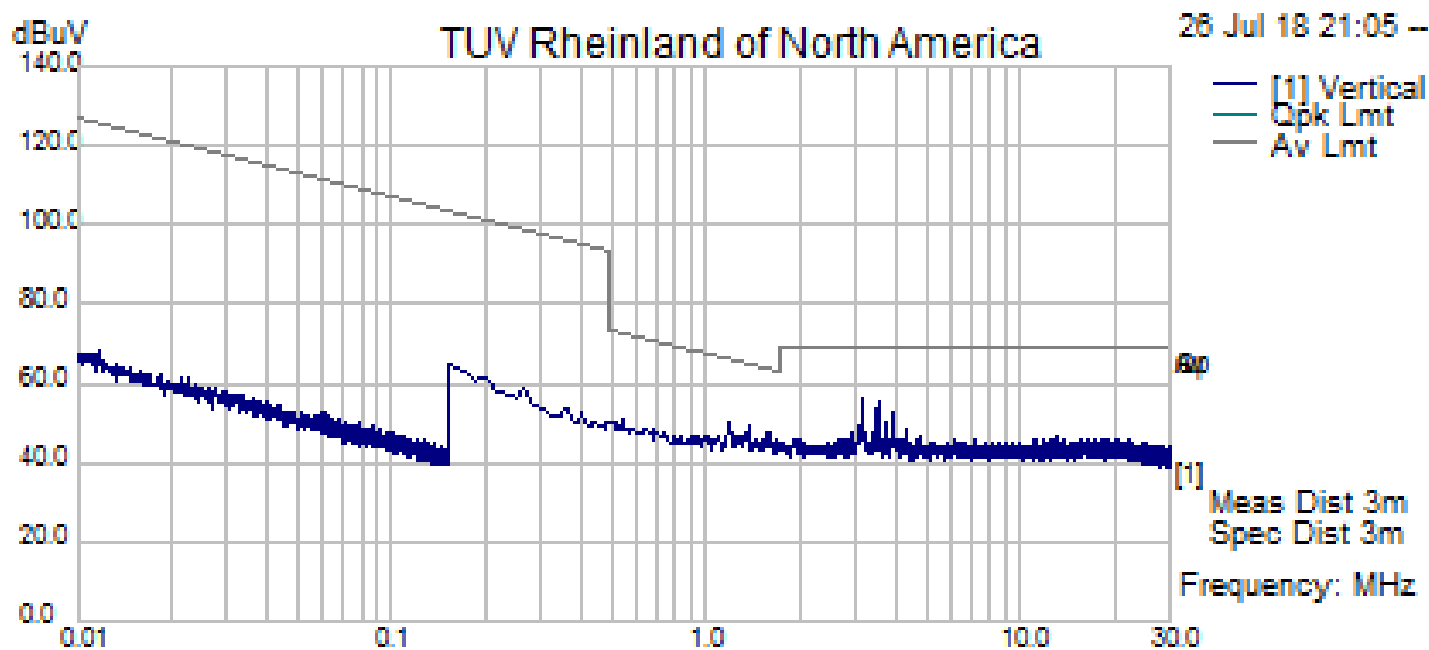
| Frequency | Raw           | Cable Loss | AF         | Level  | Detector   | Polarity         | Height | Azimuth | Limit   | Margin     | Result    | Comments   |
|-----------|---------------|------------|------------|--------|------------|------------------|--------|---------|---------|------------|-----------|------------|
| MHz       | dBuV/m        | dB         | dB         | dBuV/m |            | H/V              | cm     | deg     | dBuV/m  | dB         |           |            |
| No        | Frequency MHz | Raw dBuV   | Cable Loss | AF dB  | Level dBuV | Measurement Type | Pol    | Hgt cm  | Azt Deg | Limit dBuV | Margin dB | Pass /Fail |
| 1 (18)    | 3.13          | 44.17      | 2.36       | 10.53  | 57.06      | Peak [Scan]      | V      | 136     | 128.00  | 69.50      | -12.44    | Pass       |
| 2 (19)    | 3.55          | 44.05      | 2.37       | 10.62  | 57.03      | Peak [Scan]      | V      | 136     | 320.00  | 69.50      | -12.47    | Pass       |
| 3 (20)    | 1.57          | 36.93      | 2.32       | 10.60  | 49.85      | Peak [Scan]      | V      | 136     | 309.00  | 63.68      | -13.84    | Pass       |
| 4 (21)    | 3.91          | 41.54      | 2.37       | 10.68  | 54.6       | Peak [Scan]      | V      | 136     | 320.00  | 69.50      | -14.91    | Pass       |
| 5 (22)    | 1.28          | 37.33      | 2.31       | 10.60  | 50.24      | Peak [Scan]      | V      | 136     | 192.00  | 65.44      | -15.21    | Pass       |
| 6 (23)    | 1.18          | 38.05      | 2.31       | 10.60  | 50.96      | Peak [Scan]      | V      | 136     | 11.00   | 66.16      | -15.21    | Pass       |



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Channel 39 Vertical unit in vertical orientation

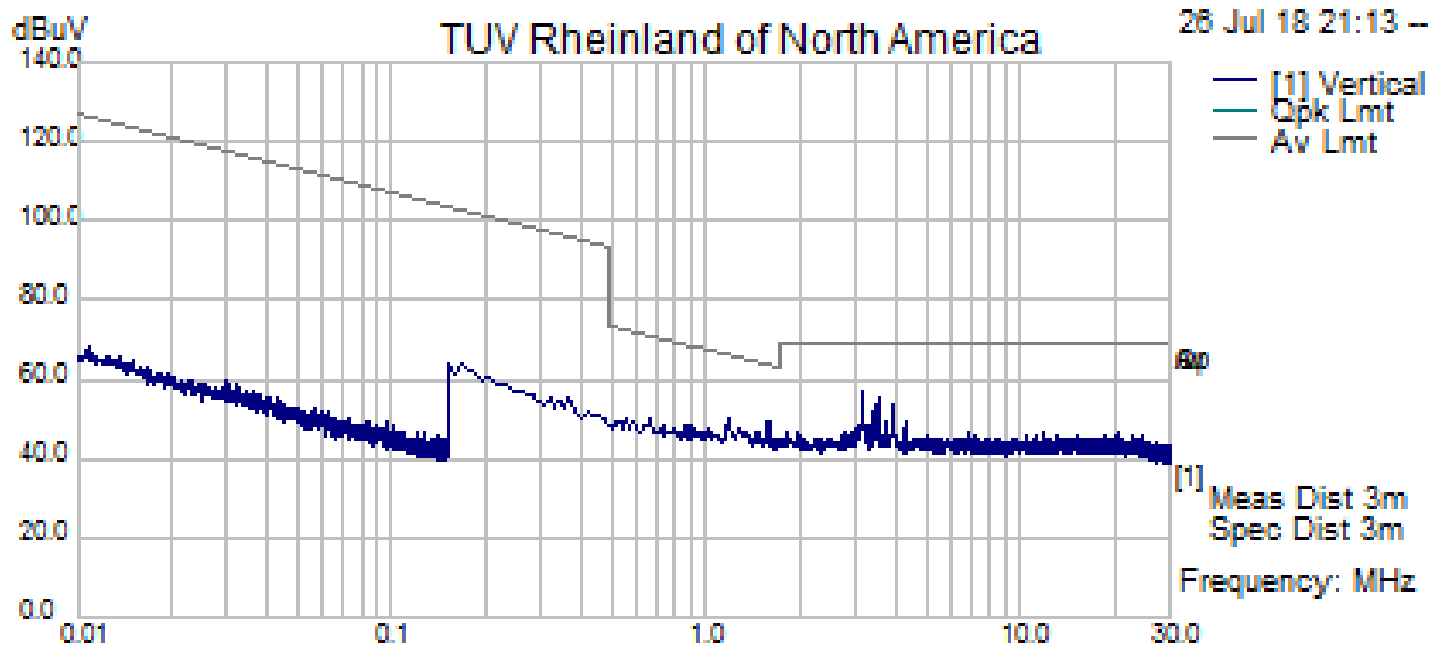
| Frequency | Raw           | Cable Loss | AF         | Level  | Detector   | Polarity         | Height | Azimuth | Limit   | Margin     | Result    | Comments   |
|-----------|---------------|------------|------------|--------|------------|------------------|--------|---------|---------|------------|-----------|------------|
| MHz       | dBuV/m        | dB         | dB         | dBuV/m |            | H/V              | cm     | deg     | dBuV/m  | dB         |           |            |
| No        | Frequency MHz | Raw dBuV   | Cable Loss | AF dB  | Level dBuV | Measurement Type | Pol    | Hgt cm  | Azt Deg | Limit dBuV | Margin dB | Pass /Fail |
| 1 (19)    | 3.13          | 42.77      | 2.36       | 10.53  | 55.66      | Peak [Scan]      | V      | 125     | 349.00  | 69.50      | -13.84    | Pass       |
| 2 (20)    | 3.55          | 42.33      | 2.37       | 10.62  | 55.32      | Peak [Scan]      | V      | 125     | 192.00  | 69.50      | -14.19    | Pass       |
| 3 (21)    | 1.57          | 35.53      | 2.32       | 10.60  | 48.45      | Peak [Scan]      | V      | 125     | 262.00  | 63.68      | -15.23    | Pass       |
| 4 (22)    | 1.18          | 37.00      | 2.31       | 10.60  | 49.91      | Peak [Scan]      | V      | 125     | 256.00  | 66.16      | -16.25    | Pass       |
| 5 (23)    | 3.94          | 39.98      | 2.37       | 10.69  | 53.04      | Peak [Scan]      | V      | 125     | 46.00   | 69.50      | -16.46    | Pass       |
| 6 (24)    | 3.37          | 39.89      | 2.37       | 10.58  | 52.83      | Peak [Scan]      | V      | 125     | 214.00  | 69.50      | -16.67    | Pass       |



Filename: c:\program files (x86)\emisoft - vasona\results\donn\g.emi

Channel 39 Horizontal unit in vertical orientation

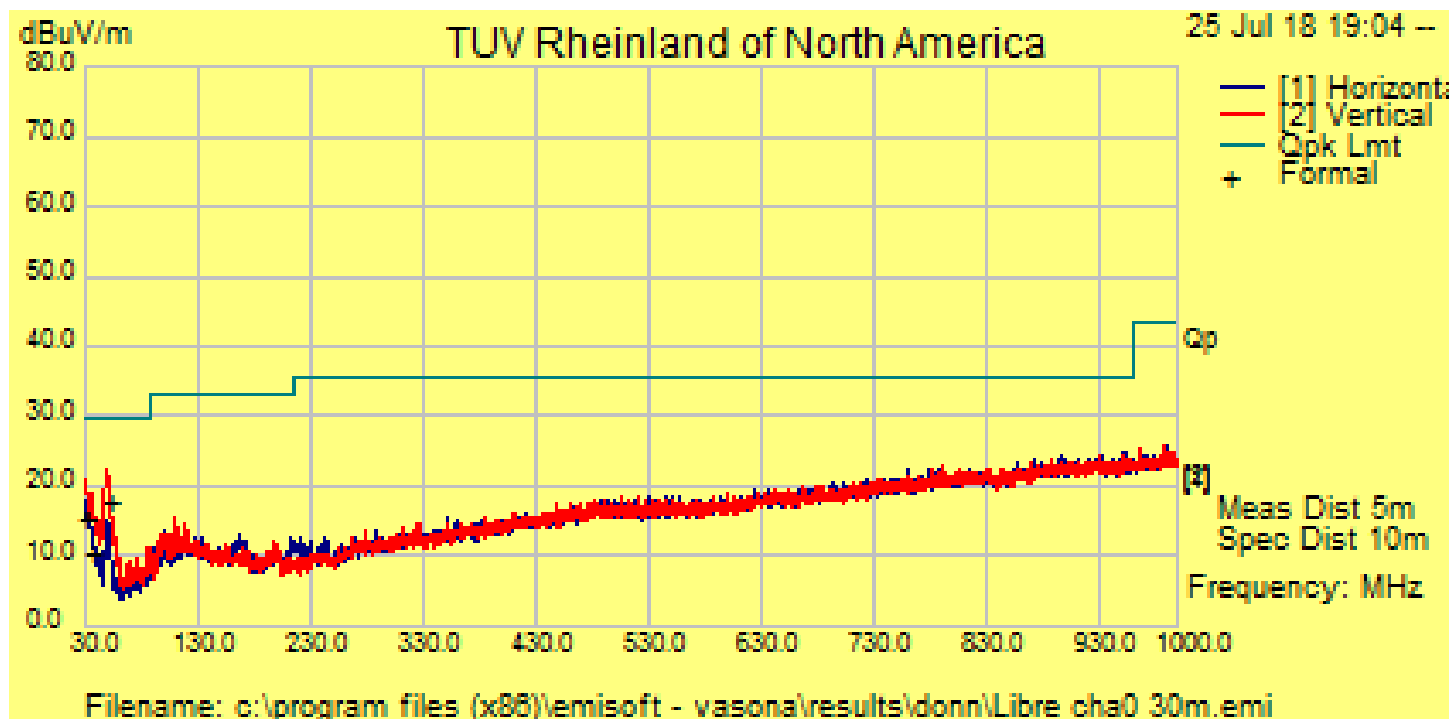
| Frequency | Raw           | Cable Loss | AF         | Level  | Detector   | Polarity         | Height | Azimuth | Limit   | Margin     | Result    | Comments   |
|-----------|---------------|------------|------------|--------|------------|------------------|--------|---------|---------|------------|-----------|------------|
| MHz       | dBuV/m        | dB         | dB         | dBuV/m |            | H/V              | cm     | deg     | dBuV/m  | dB         |           |            |
| No        | Frequency MHz | Raw dBuV   | Cable Loss | AF dB  | Level dBuV | Measurement Type | Pol    | Hgt cm  | Azt Deg | Limit dBuV | Margin dB | Pass /Fail |
| 1 (16)    | 3.14          | 43.28      | 2.36       | 10.53  | 56.17      | Peak [Scan]      | V      | 136     | 134.00  | 69.50      | -13.33    | Pass       |
| 2 (17)    | 3.53          | 42.34      | 2.37       | 10.61  | 55.32      | Peak [Scan]      | V      | 136     | 268.00  | 69.50      | -14.18    | Pass       |
| 3 (18)    | 1.36          | 36.29      | 2.31       | 10.60  | 49.21      | Peak [Scan]      | V      | 136     | 204.00  | 64.95      | -15.74    | Pass       |
| 4 (19)    | 1.57          | 34.70      | 2.32       | 10.60  | 47.62      | Peak [Scan]      | V      | 136     | 140.00  | 63.68      | -16.07    | Pass       |
| 5 (20)    | 1.18          | 37.09      | 2.31       | 10.60  | 50         | Peak [Scan]      | V      | 136     | 262.00  | 66.16      | -16.17    | Pass       |
| 6 (21)    | 3.92          | 39.69      | 2.37       | 10.69  | 52.76      | Peak [Scan]      | V      | 136     | 337.00  | 69.50      | -16.75    | Pass       |



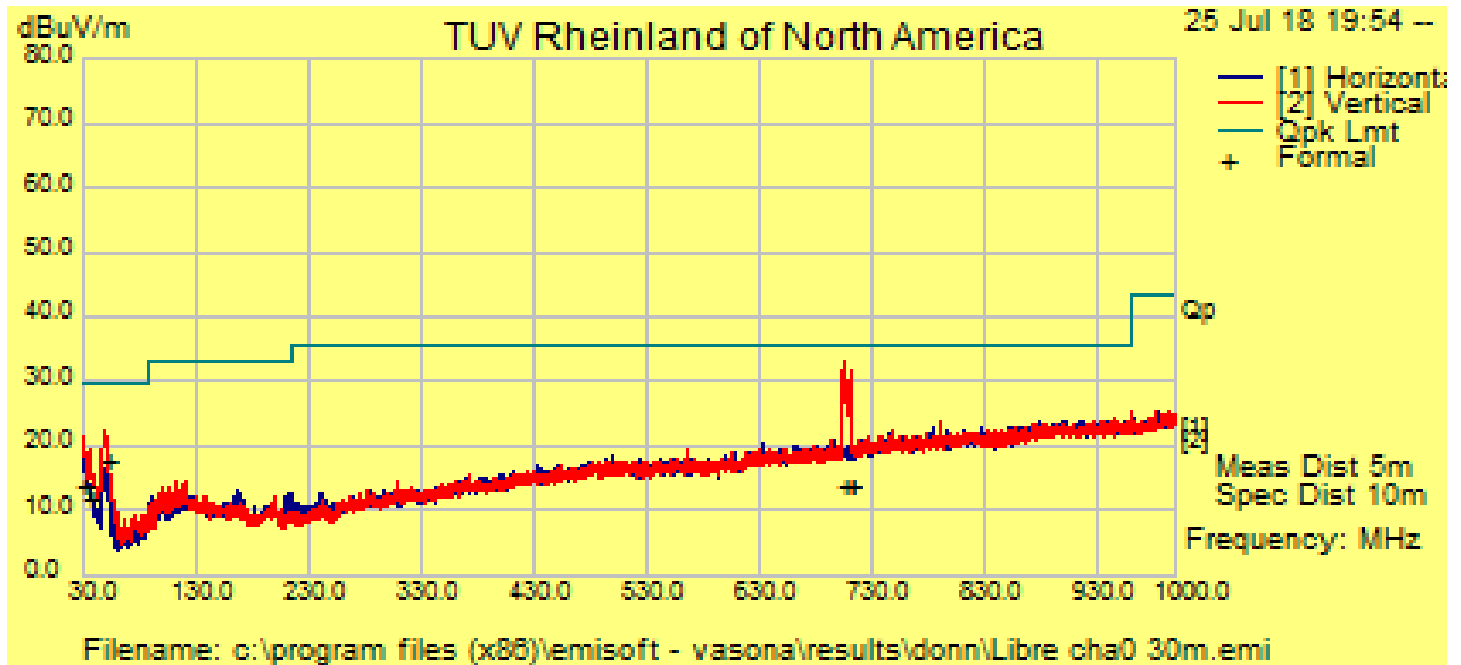
Filename: c:\program files (x86)\emisoft - vasona\results\donn\5.emi

Channel 39 Horizontal unit in horizontal orientation

| Frequency | Raw           | Cable Loss | AF         | Level  | Detector   | Polarity         | Height | Azimuth | Limit   | Margin     | Result    | Comments   |
|-----------|---------------|------------|------------|--------|------------|------------------|--------|---------|---------|------------|-----------|------------|
| MHz       | dBuV/m        | dB         | dB         | dBuV/m |            | H/V              | cm     | deg     | dBuV/m  | dB         |           |            |
| No        | Frequency MHz | Raw dBuV   | Cable Loss | AF dB  | Level dBuV | Measurement Type | Pol    | Hgt cm  | Azt Deg | Limit dBuV | Margin dB | Pass /Fail |
| 1 (14)    | 3.14          | 43.77      | 2.36       | 10.53  | 56.67      | Peak [Scan]      | V      | 125     | 128.00  | 69.50      | -12.83    | Pass       |
| 2 (15)    | 3.53          | 42.73      | 2.37       | 10.61  | 55.71      | Peak [Scan]      | V      | 125     | 256.00  | 69.50      | -13.79    | Pass       |
| 3 (16)    | 1.57          | 36.47      | 2.32       | 10.60  | 49.4       | Peak [Scan]      | V      | 125     | 40.00   | 63.68      | -14.29    | Pass       |
| 4 (17)    | 3.92          | 40.21      | 2.37       | 10.69  | 53.27      | Peak [Scan]      | V      | 125     | 337.00  | 69.50      | -16.23    | Pass       |
| 5 (18)    | 1.17          | 37.07      | 2.31       | 10.60  | 49.98      | Peak [Scan]      | V      | 125     | 128.00  | 66.23      | -16.25    | Pass       |
| 6 (19)    | 3.36          | 38.78      | 2.37       | 10.58  | 51.73      | Peak [Scan]      | V      | 125     | 238.00  | 69.50      | -17.77    | Pass       |

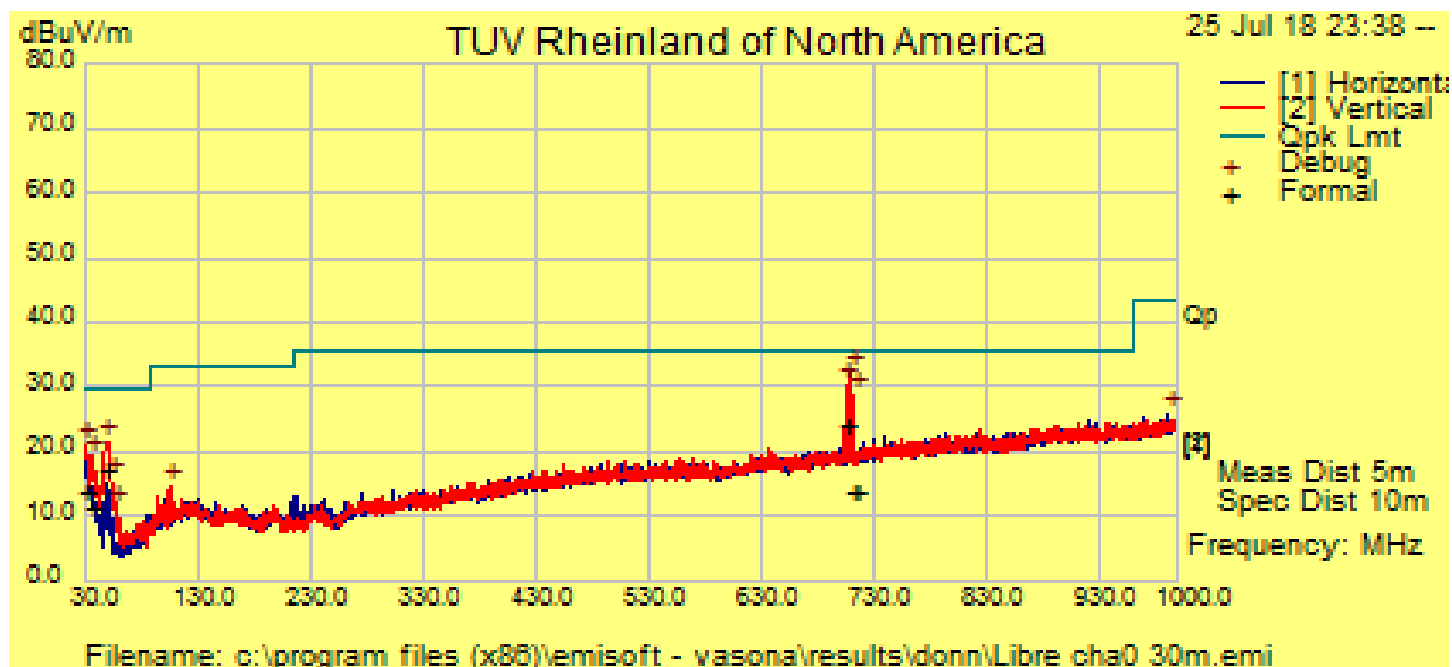
**30 to 1000 MHz****Channel 0 unit Vertical orientation**

| Frequency | Raw           | Cable Loss | AF         | Level  | Detector     | Polarity         | Height | Azimuth | Limit   | Margin       | Result    | Comments   |
|-----------|---------------|------------|------------|--------|--------------|------------------|--------|---------|---------|--------------|-----------|------------|
| MHz       | dBuV/m        | dB         | dB         | dBuV/m |              | H/V              | cm     | deg     | dBuV/m  | dB           |           |            |
| No        | Frequency MHz | Raw dBuV   | Cable Loss | AF dB  | Level dBuV/m | Measurement Type | Pol    | Hgt cm  | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
| 1 (8)     | 50.07         | 41.15      | 2.62       | -26.01 | 17.76        | Quasi Max        | V      | 140     | 0.00    | 29.50        | -11.74    | Pass       |
| 2 (9)     | 31.27         | 26.17      | 2.49       | -13.22 | 15.44        | Quasi Max        | V      | 115     | 222.00  | 29.50        | -14.06    | Pass       |
| 3 (10)    | 36.49         | 25.15      | 2.53       | -17.19 | 10.48        | Quasi Max        | V      | 258     | 302.00  | 29.50        | -19.02    | Pass       |



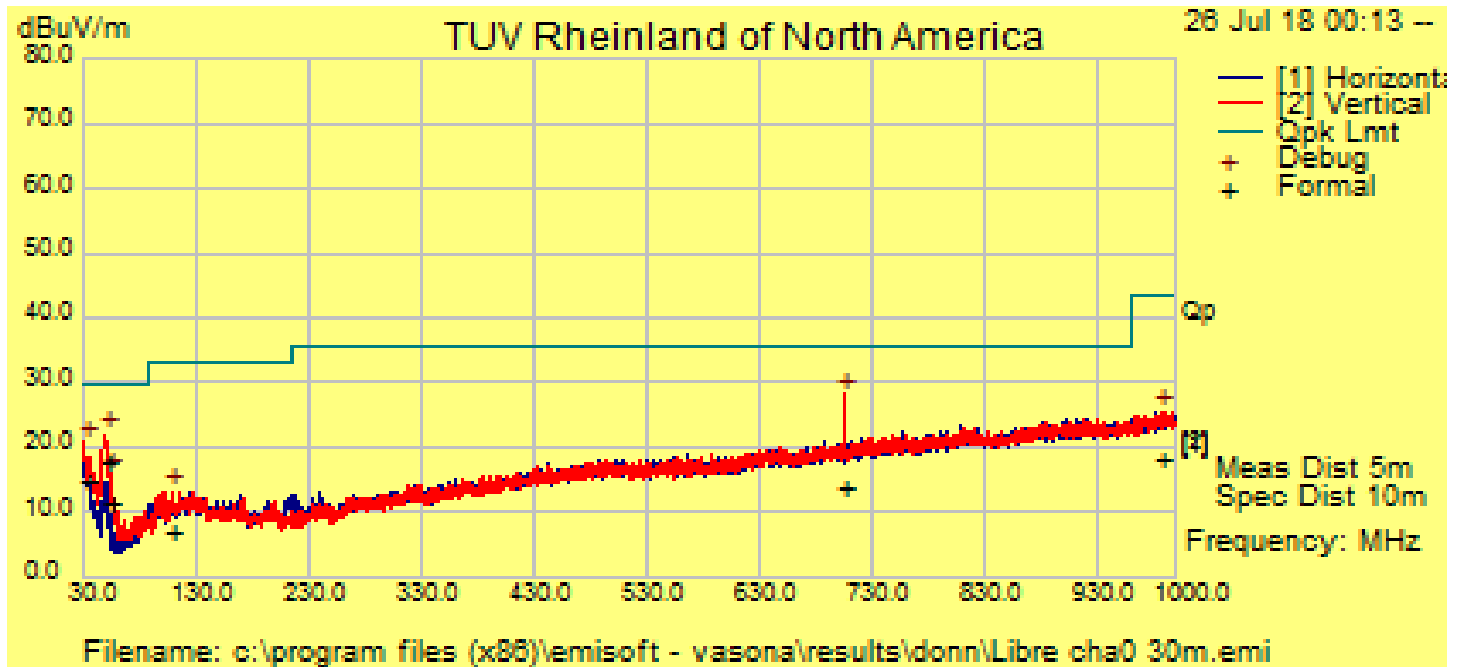
### Channel 0 unit in Horizontal orientation

| Vasona Data : List of Debug Frequencies |               |          |            |        |              |                  |     |        |         |              |           |            |
|-----------------------------------------|---------------|----------|------------|--------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| No                                      | Frequency MHz | Raw dBuV | Cable Loss | AF dB  | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
| 1 (24)                                  | 705.665625    | 42.1     | 4.58       | -13.44 | 33.23        | Peak [Scan]      | V   | 100    | 55      | 35.5         | -2.27     | Pass       |
| 2 (25)                                  | 711.728125    | 40.38    | 4.6        | -13.23 | 31.75        | Peak [Scan]      | V   | 100    | 302     | 35.5         | -3.75     | Pass       |
| 3 (26)                                  | 709.909375    | 38.9     | 4.59       | -13.26 | 30.23        | Peak [Scan]      | V   | 200    | 318     | 35.5         | -5.27     | Pass       |
| 4 (27)                                  | 50.309375     | 45.59    | 2.63       | -26.08 | 22.13        | Peak [Scan]      | V   | 100    | 241     | 29.5         | -7.37     | Pass       |
| 5 (28)                                  | 30.909375     | 31.95    | 2.49       | -12.93 | 21.51        | Peak [Scan]      | V   | 100    | 234     | 29.5         | -7.99     | Pass       |
| 6 (29)                                  | 36.365625     | 34.15    | 2.53       | -17.1  | 19.59        | Peak [Scan]      | V   | 100    | 1       | 29.5         | -9.91     | Pass       |
| 7 (30)                                  | 54.85625      | 37.7     | 2.66       | -26.69 | 13.67        | Peak [Scan]      | V   | 100    | 196     | 29.5         | -15.83    | Pass       |
| 8 (31)                                  | 111.540625    | 32.54    | 2.93       | -20.73 | 14.73        | Peak [Scan]      | V   | 200    | 360     | 33           | -18.27    | Pass       |
| 9 (32)                                  | 984.84375     | 28.96    | 5.1        | -8.84  | 25.22        | Peak [Scan]      | H   | 100    | 268     | 43.5         | -18.28    | Pass       |



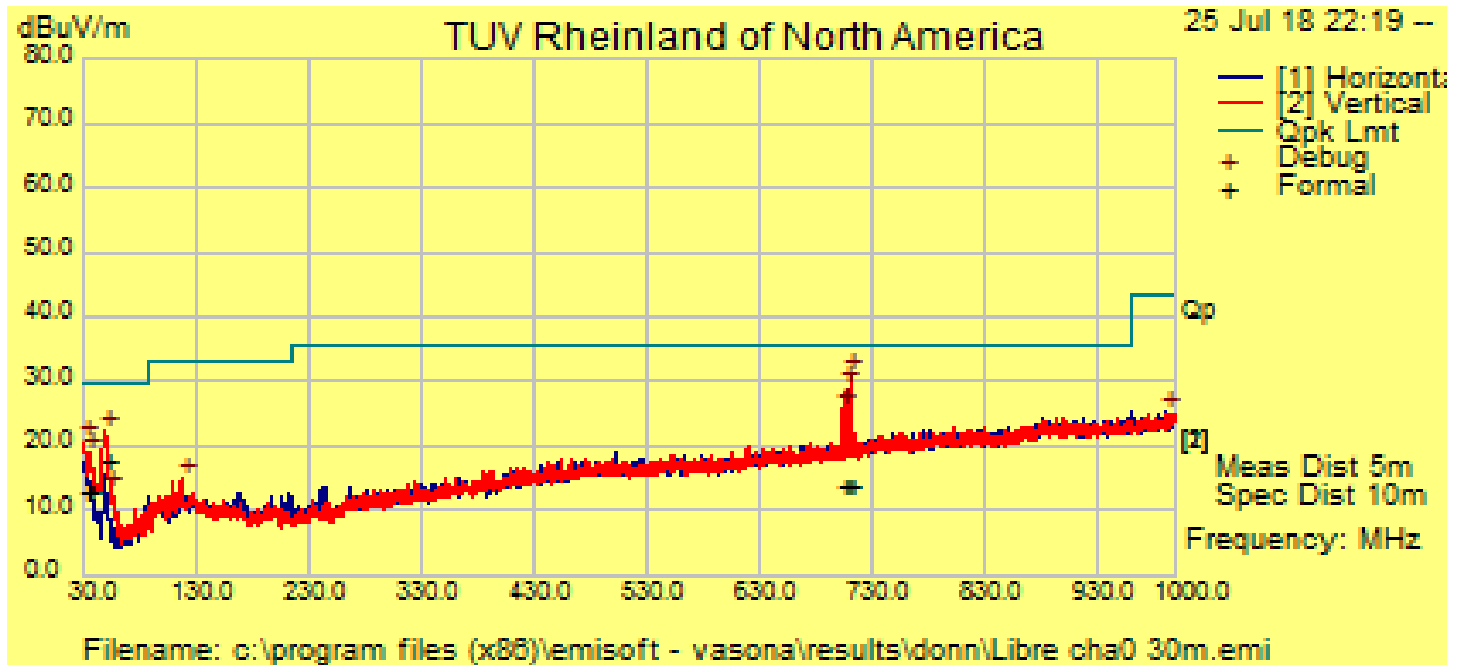
### Channel 19 unit in Vertical orientation

| Frequency<br>MHz | Raw<br>dBuV/m | Cable Loss<br>dB | AF<br>dB   | Level<br>dBuV/m | Detector     | Polarity<br>H/V  | Height<br>cm | Azimuth<br>deg | Limit<br>dBuV/m | Margin<br>dB | Result    | Comments   |
|------------------|---------------|------------------|------------|-----------------|--------------|------------------|--------------|----------------|-----------------|--------------|-----------|------------|
| No               | Frequency MHz | Raw dBuV         | Cable Loss | AF dB           | Level dBuV/m | Measurement Type | Pol          | Hgt cm         | Azt Deg         | Limit dBuV/m | Margin dB | Pass /Fail |
| 1 (115)          | 710.10        | 22.56            | 4.59       | -13.26          | 13.89        | Quasi Max        | V            | 204            | 76.00           | 35.50        | -21.61    | Pass       |
| 2 (116)          | 705.75        | 33.09            | 4.58       | -13.44          | 24.23        | Quasi Max        | V            | 224            | 78.00           | 35.50        | -11.27    | Pass       |
| 3 (117)          | 713.40        | 22.52            | 4.60       | -13.19          | 13.93        | Quasi Max        | V            | 186            | 248.00          | 35.50        | -21.57    | Pass       |
| 4 (118)          | 48.97         | 40.16            | 2.61       | -25.58          | 17.2         | Quasi Max        | V            | 125            | 30.00           | 29.50        | -12.31    | Pass       |
| 5 (119)          | 30.00         | 23.24            | 2.49       | -12.20          | 13.53        | Quasi Max        | V            | 238            | 142.00          | 29.50        | -15.98    | Pass       |
| 6 (120)          | 36.14         | 25.47            | 2.52       | -16.92          | 11.07        | Quasi Max        | V            | 224            | 84.00           | 29.50        | -18.43    | Pass       |



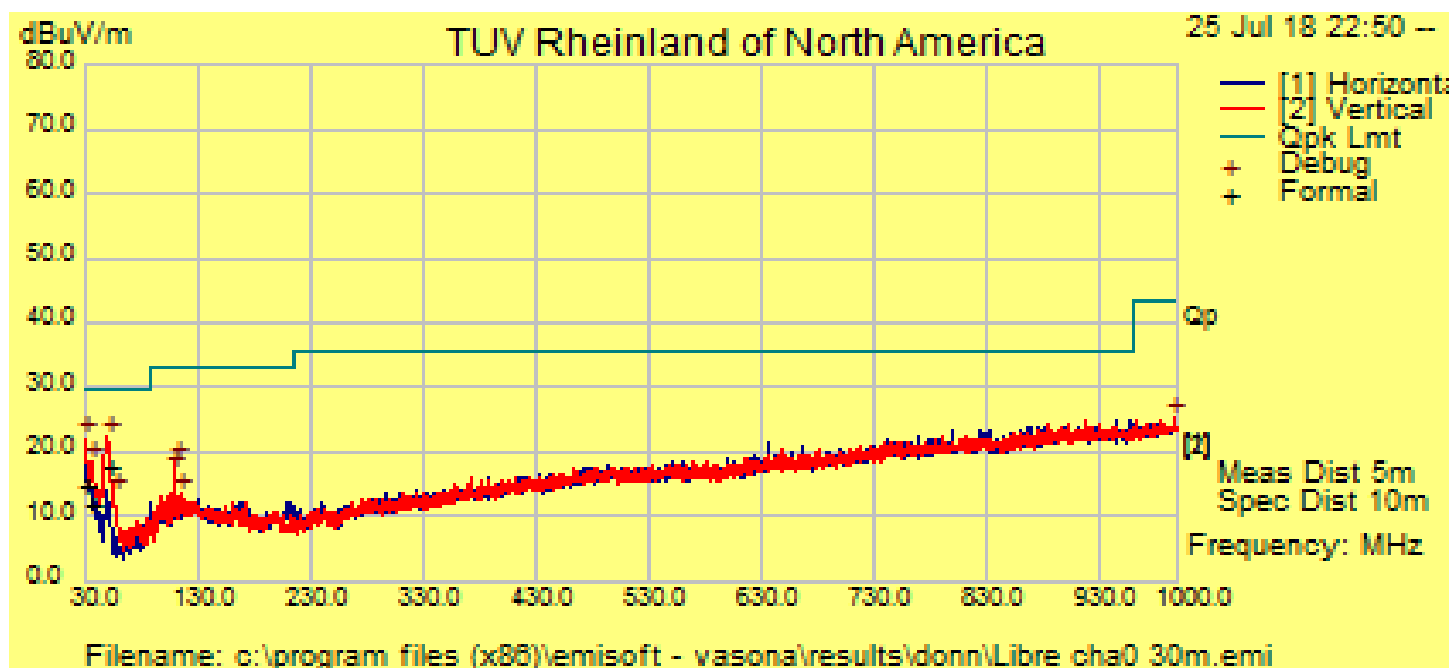
### Channel 19 unit in Horizontal orientation

| Frequency<br>MHz | Raw<br>dBuV/m | Cable Loss<br>dB | AF<br>dB   | Level<br>dBuV/m | Detector     | Polarity<br>H/V  | Height<br>cm | Azimuth<br>deg | Limit<br>dBuV/m | Margin<br>dB | Result    | Comments   |
|------------------|---------------|------------------|------------|-----------------|--------------|------------------|--------------|----------------|-----------------|--------------|-----------|------------|
| No               | Frequency MHz | Raw dBuV         | Cable Loss | AF dB           | Level dBuV/m | Measurement Type | Pol          | Hgt cm         | Azt Deg         | Limit dBuV/m | Margin dB | Pass /Fail |
| 1 (131)          | 706.70        | 22.55            | 4.58       | -13.40          | 13.73        | Quasi Max        | V            | 237            | 226.00          | 35.50        | -21.77    | Pass       |
| 2 (132)          | 50.30         | 41.27            | 2.63       | -26.08          | 17.81        | Quasi Max        | V            | 115            | 0.00            | 29.50        | -11.69    | Pass       |
| 3 (133)          | 31.57         | 25.91            | 2.49       | -13.46          | 14.94        | Quasi Max        | V            | 144            | 236.00          | 29.50        | -14.56    | Pass       |
| 4 (134)          | 53.84         | 35.16            | 2.66       | -26.67          | 11.14        | Quasi Max        | V            | 131            | 192.00          | 29.50        | -18.36    | Pass       |
| 5 (135)          | 988.39        | 21.54            | 5.13       | -8.73           | 17.94        | Quasi Max        | V            | 292            | 284.00          | 43.50        | -25.56    | Pass       |
| 6 (136)          | 108.90        | 24.91            | 2.92       | -21.17          | 6.66         | Quasi Max        | V            | 113            | 148.00          | 33.00        | -26.34    | Pass       |



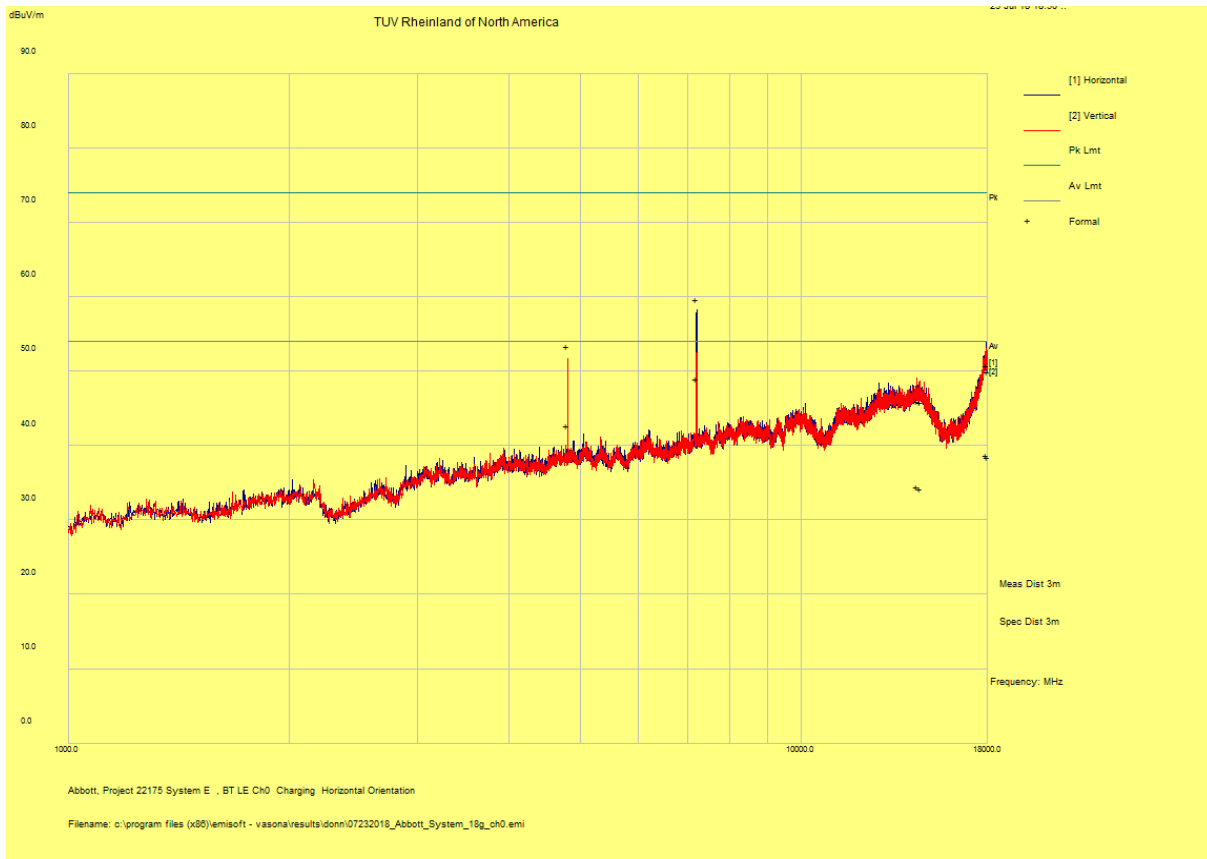
### Channel 39 unit in Vertical orientation

| Frequency | Raw           | Cable Loss | AF         | Level  | Detector     | Polarity         | Height | Azimuth | Limit   | Margin       | Result    | Comments   |
|-----------|---------------|------------|------------|--------|--------------|------------------|--------|---------|---------|--------------|-----------|------------|
| MHz       | dBuV/m        | dB         | dB         | dBuV/m |              | H/V              | cm     | deg     | dBuV/m  | dB           |           |            |
| No        | Frequency MHz | Raw dBuV   | Cable Loss | AF dB  | Level dBuV/m | Measurement Type | Pol    | Hgt cm  | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
| 1 (81)    | 49.90         | 40.79      | 2.62       | -25.95 | 17.46        | Quasi Max        | V      | 175     | 306.00  | 29.50        | -12.04    | Pass       |
| 2 (83)    | 32.35         | 24.45      | 2.49       | -14.05 | 12.89        | Quasi Max        | V      | 191     | 360.00  | 29.50        | -16.61    | Pass       |
| 3 (84)    | 36.75         | 27.41      | 2.54       | -17.40 | 12.54        | Quasi Max        | V      | 112     | 360.00  | 29.50        | -16.96    | Pass       |
| 4 (80)    | 712.19        | 22.50      | 4.60       | -13.22 | 13.89        | Quasi Max        | V      | 250     | 324.00  | 35.50        | -21.62    | Pass       |
| 5 (82)    | 708.67        | 22.57      | 4.59       | -13.32 | 13.84        | Quasi Max        | V      | 363     | 360.00  | 35.50        | -21.66    | Pass       |
| 6 (85)    | 704.77        | 22.50      | 4.58       | -13.47 | 13.61        | Quasi Max        | V      | 207     | 56.00   | 35.50        | -21.89    | Pass       |

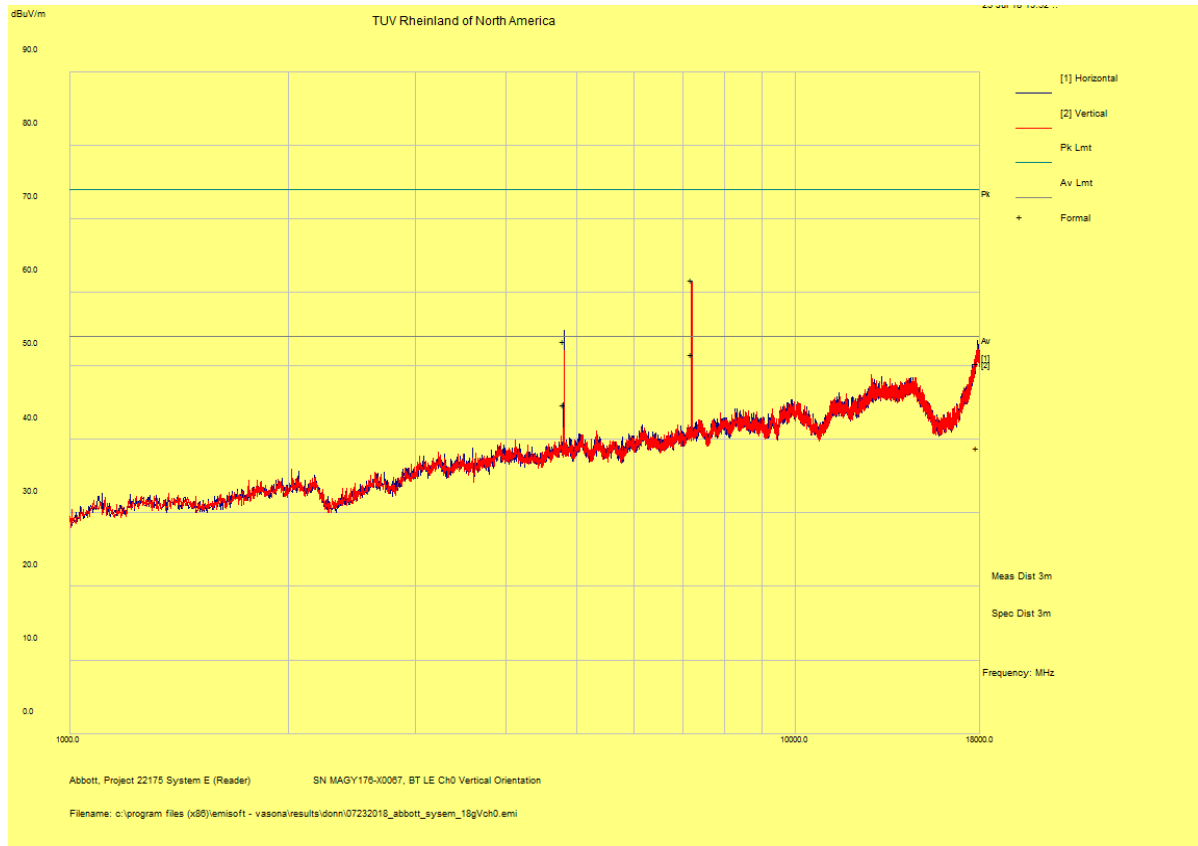


### Channel 39 unit in Horizontal orientation

| Frequency | Raw           | Cable Loss | AF         | Level  | Detector     | Polarity         | Height | Azimuth | Limit   | Margin       | Result    | Comments   |
|-----------|---------------|------------|------------|--------|--------------|------------------|--------|---------|---------|--------------|-----------|------------|
| MHz       | dBuV/m        | dB         | dB         | dBuV/m |              | H/V              | cm     | deg     | dBuV/m  | dB           |           |            |
| No        | Frequency MHz | Raw dBuV   | Cable Loss | AF dB  | Level dBuV/m | Measurement Type | Pol    | Hgt cm  | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
| 1 (97)    | 50.21         | 41.03      | 2.62       | -26.06 | 17.6         | Quasi Max        | V      | 160     | 292.00  | 29.50        | -11.9     | Pass       |
| 2 (98)    | 30.52         | 25.05      | 2.49       | -12.62 | 14.93        | Quasi Max        | V      | 107     | 352.00  | 29.50        | -14.58    | Pass       |
| 3 (99)    | 36.07         | 25.96      | 2.52       | -16.85 | 11.62        | Quasi Max        | V      | 155     | 146.00  | 29.50        | -17.88    | Pass       |

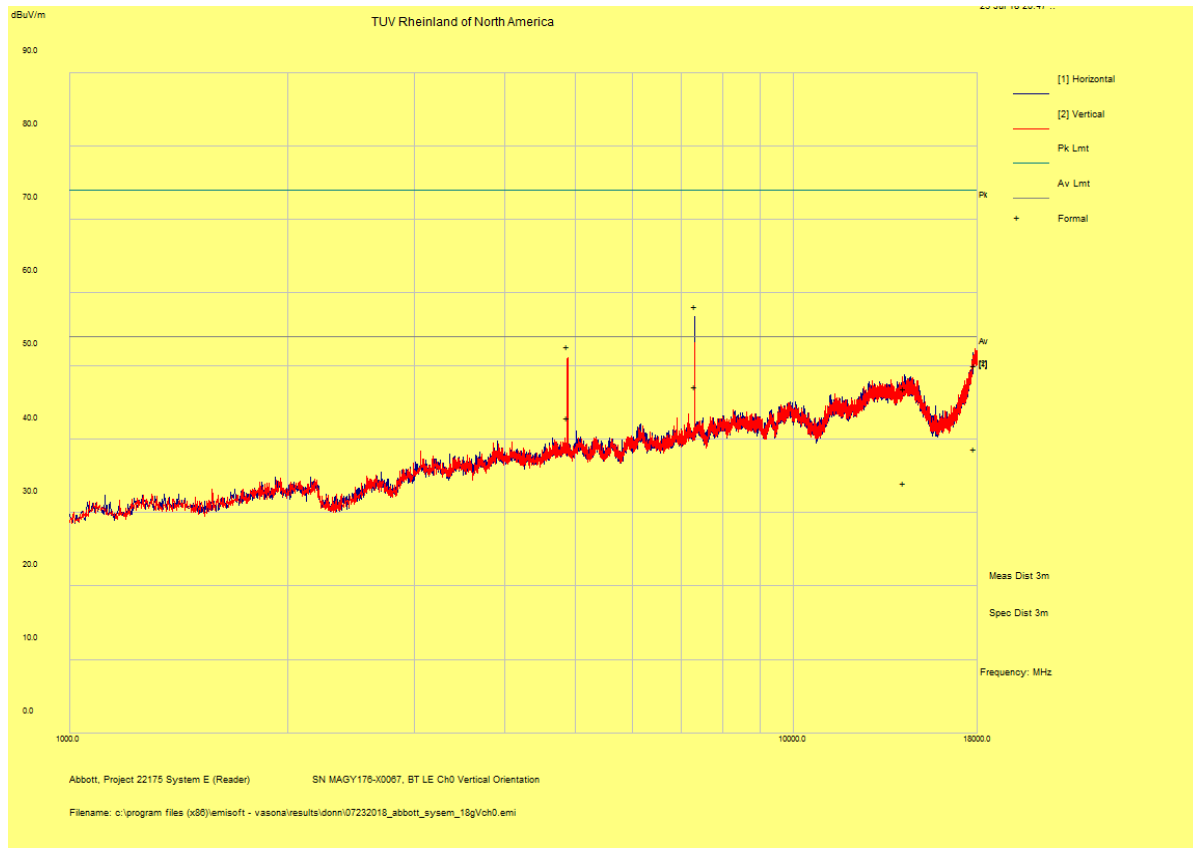
**1 to 18 GHz.****Channel 0 1 to 18GHz. Unit in Horizontal orientation**

| Vasona Data : Formally Assessed Peaks |           |         |           |        |           |                  |     |        |         |           |           |            |
|---------------------------------------|-----------|---------|-----------|--------|-----------|------------------|-----|--------|---------|-----------|-----------|------------|
| No                                    | Frequency | Raw dBu | Cable Los | AF dB  | Level dBu | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBu | Margin dB | Pass /Fail |
| 1 (36)                                | 7206.659  | 71.08   | 2.64      | -14.12 | 59.61     | Peak Max         | H   | 104    | 144     | 74        | -14.39    | Pass       |
| 2 (37)                                | 17929.75  | 49.88   | 4.22      | -3.33  | 50.76     | Peak Max         | H   | 206    | 124     | 74        | -23.24    | Pass       |
| 3 (38)                                | 17996.25  | 48.97   | 4.2       | -3.19  | 49.99     | Peak Max         | V   | 239    | 66      | 74        | -24.01    | Pass       |
| 4 (39)                                | 4804.553  | 69.24   | 2.14      | -17.97 | 53.41     | Peak Max         | V   | 116    | 76      | 74        | -20.59    | Pass       |
| 5 (40)                                | 14410.64  | 51.87   | 3.67      | -9.6   | 45.95     | Peak Max         | V   | 117    | 144     | 74        | -28.05    | Pass       |
| 6 (41)                                | 14555.41  | 51.72   | 3.79      | -9.64  | 45.87     | Peak Max         | V   | 161    | 228     | 74        | -28.13    | Pass       |
| 7 (36)                                | 7206.659  | 60.49   | 2.64      | -14.12 | 49.02     | Average Max      | H   | 104    | 144     | 54        | -4.98     | Pass       |
| 8 (37)                                | 17929.75  | 37.82   | 4.22      | -3.33  | 38.71     | Average Max      | H   | 206    | 124     | 54        | -15.29    | Pass       |
| 9 (38)                                | 17996.25  | 37.46   | 4.2       | -3.19  | 38.48     | Average Max      | V   | 239    | 66      | 54        | -15.52    | Pass       |
| 10 (39)                               | 4804.553  | 58.55   | 2.14      | -17.97 | 42.72     | Average Max      | V   | 116    | 76      | 54        | -11.28    | Pass       |
| 11 (40)                               | 14410.64  | 40.36   | 3.67      | -9.6   | 34.43     | Average Max      | V   | 117    | 144     | 54        | -19.57    | Pass       |
| 12 (41)                               | 14555.41  | 40.03   | 3.79      | -9.64  | 34.18     | Average Max      | V   | 161    | 228     | 54        | -19.82    | Pass       |



### Channel 0 1 to 18GHz. Unit in Vertical orientation

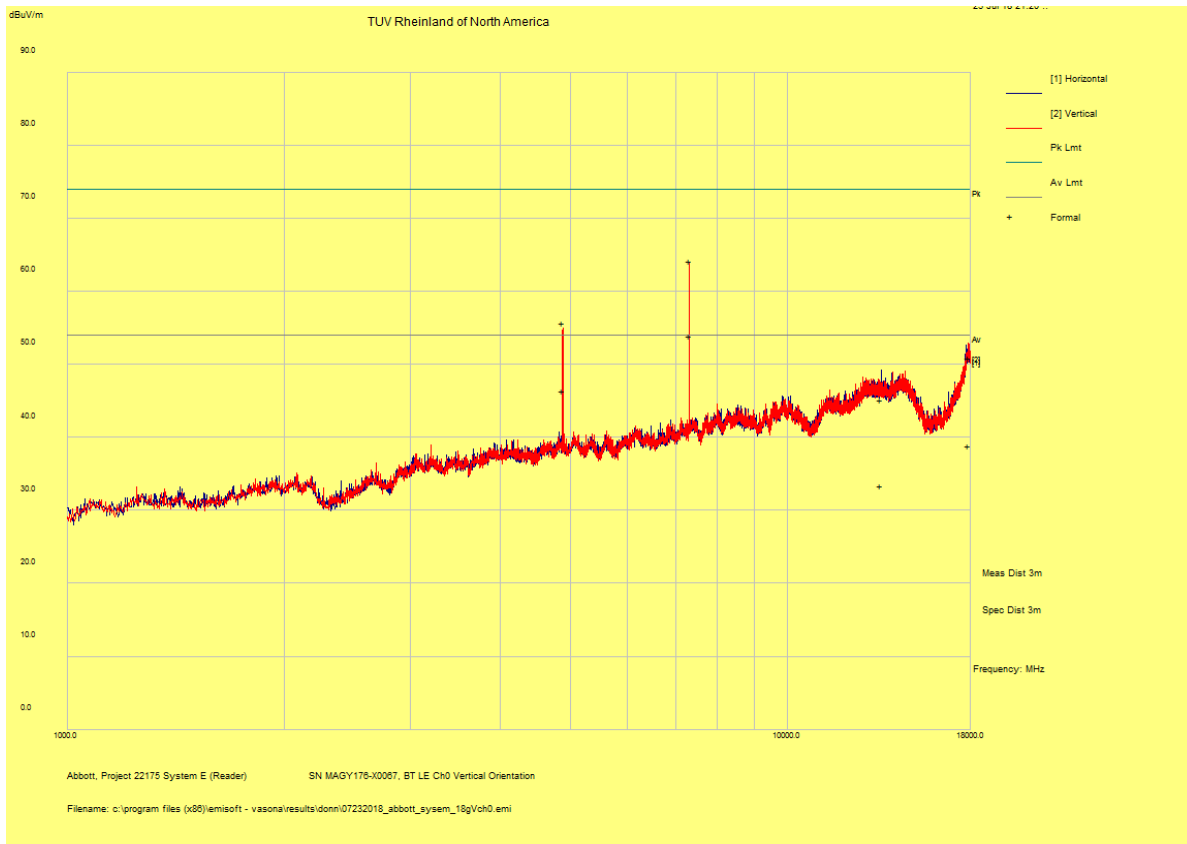
| Vasona Data : Formally Assessed Peaks |           |         |           |        |           |                  |     |        |         |           |           |            |
|---------------------------------------|-----------|---------|-----------|--------|-----------|------------------|-----|--------|---------|-----------|-----------|------------|
| No                                    | Frequency | Raw dBu | Cable Los | AF dB  | Level dBu | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBu | Margin dB | Pass /Fail |
| 1 (31)                                | 4803.558  | 69.18   | 2.14      | -17.97 | 53.35     | Peak Max         | H   | 311    | 54      | 74        | -20.65    | Pass       |
| 2 (31)                                | 4803.558  | 60.54   | 2.14      | -17.97 | 44.71     | Average Max      | H   | 311    | 54      | 54        | -9.29     | Pass       |
| 3 (30)                                | 7205.16   | 63.13   | 2.65      | -14.13 | 51.65     | Average Max      | V   | 255    | 18      | 54        | -2.36     | Pass       |
| 4 (30)                                | 7205.16   | 73.26   | 2.65      | -14.13 | 61.77     | Peak Max         | V   | 255    | 18      | 74        | -12.23    | Pass       |
| 5 (32)                                | 17849.27  | 38.23   | 4.23      | -3.65  | 38.82     | Average Max      | H   | 241    | 112     | 54        | -15.18    | Pass       |
| 6 (32)                                | 17849.27  | 49.82   | 4.23      | -3.65  | 50.41     | Peak Max         | H   | 241    | 112     | 74        | -23.59    | Pass       |



### Channel 19 1 to 18GHz. Unit in Horizontal orientation

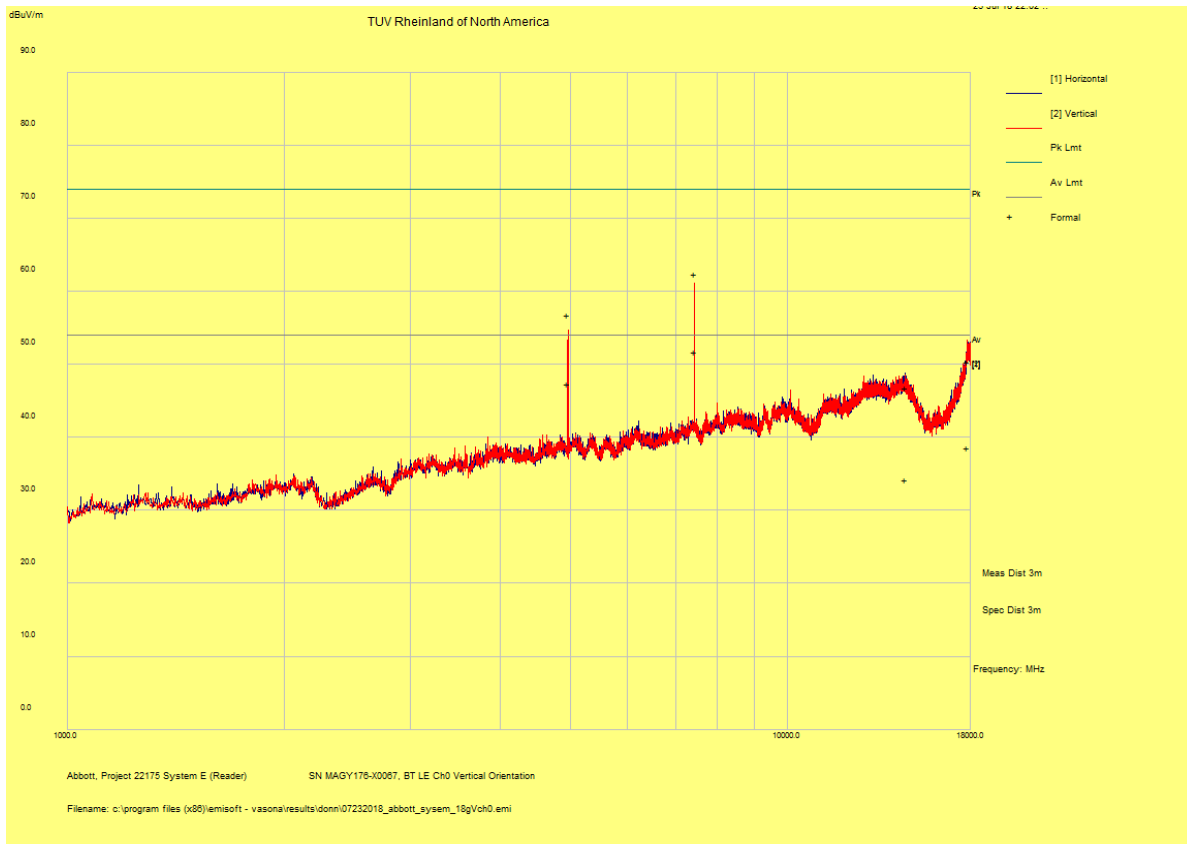
#### Vasona Data : Formally Assessed Peaks

| No     | Frequency | Raw dBu | Cable Loss | AF dB  | Level dBu | Measure  | Pol | Hgt cm | Azt Deg | Limit dBu | Margin dB | Pass /Fail |
|--------|-----------|---------|------------|--------|-----------|----------|-----|--------|---------|-----------|-----------|------------|
| 1 (60) | 7320.693  | 68.9    | 2.63       | -13.39 | 58.14     | Peak Max | H   | 102    | 46      | 74        | -15.86    | Pass       |
| 2 (61) | 17843.7   | 49.57   | 4.24       | -3.68  | 50.13     | Peak Max | V   | 263    | 22      | 74        | -23.87    | Pass       |
| 3 (62) | 4880.374  | 68.32   | 2.24       | -17.86 | 52.7      | Peak Max | V   | 109    | 64      | 74        | -21.3     | Pass       |
| 4 (63) | 14252.45  | 53.14   | 3.69       | -9.87  | 46.96     | Peak Max | H   | 332    | 268     | 74        | -27.04    | Pass       |
| 5 (60) | 7320.693  | 57.93   | 2.63       | -13.39 | 47.17     | Average  | H   | 102    | 46      | 54        | -6.83     | Pass       |
| 6 (61) | 17843.7   | 38.24   | 4.24       | -3.68  | 38.8      | Average  | V   | 263    | 22      | 54        | -15.2     | Pass       |
| 7 (62) | 4880.374  | 58.54   | 2.24       | -17.86 | 42.92     | Average  | V   | 109    | 64      | 54        | -11.08    | Pass       |
| 8 (63) | 14252.45  | 40.26   | 3.69       | -9.87  | 34.08     | Average  | H   | 332    | 268     | 54        | -19.92    | Pass       |



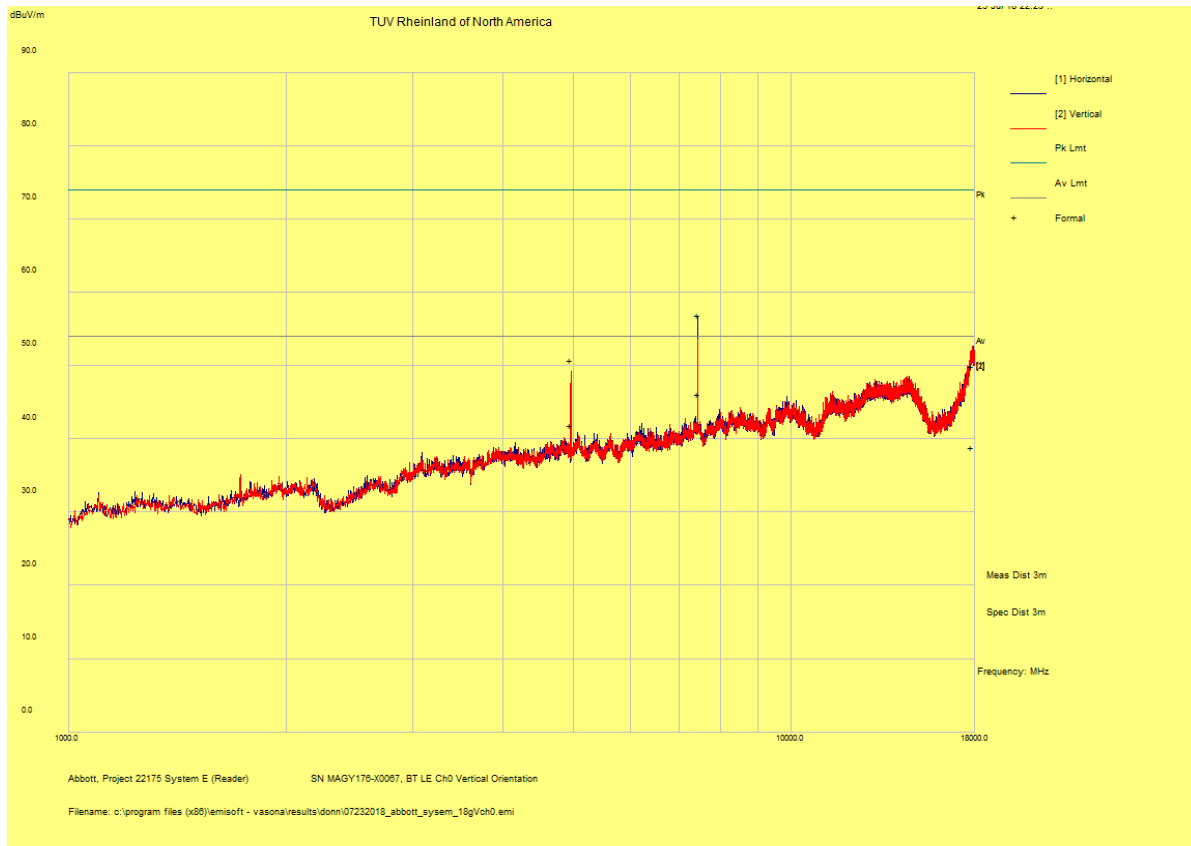
### Channel 19 1 to 18GHz. unit in Vertical orientation

| Vasona Data : Formally Assessed Peaks |           |         |            |        |           |          |     |        |         |           |           |            |  |
|---------------------------------------|-----------|---------|------------|--------|-----------|----------|-----|--------|---------|-----------|-----------|------------|--|
| No                                    | Frequency | Raw dBu | Cable Loss | AF dB  | Level dBu | Measure  | Pol | Hgt cm | Azt Deg | Limit dBu | Margin dB | Pass /Fail |  |
| 1 (90)                                | 7319.086  | 74.88   | 2.64       | -13.4  | 64.12     | Peak Max | V   | 133    | 14      | 74        | -9.89     | Pass       |  |
| 2 (91)                                | 4880.394  | 71.39   | 2.24       | -17.86 | 55.77     | Peak Max | V   | 313    | 360     | 74        | -18.23    | Pass       |  |
| 3 (92)                                | 17866.13  | 50.29   | 4.22       | -3.55  | 50.95     | Peak Max | V   | 346    | 30      | 74        | -23.05    | Pass       |  |
| 4 (93)                                | 13517.98  | 52.69   | 3.66       | -11.22 | 45.14     | Peak Max | H   | 247    | 264     | 74        | -28.86    | Pass       |  |
| 5 (90)                                | 7319.086  | 64.66   | 2.64       | -13.4  | 53.9      | Average  | V   | 133    | 14      | 54        | -0.1      | Pass       |  |
| 6 (91)                                | 4880.394  | 62.07   | 2.24       | -17.86 | 46.45     | Average  | V   | 313    | 360     | 54        | -7.55     | Pass       |  |
| 7 (92)                                | 17866.13  | 38.16   | 4.22       | -3.55  | 38.83     | Average  | V   | 346    | 30      | 54        | -15.17    | Pass       |  |
| 8 (93)                                | 13517.98  | 40.98   | 3.66       | -11.22 | 33.43     | Average  | H   | 247    | 264     | 54        | -20.57    | Pass       |  |



### Channel 39 1 to 18GHz. unit in Vertical orientation

| Vasona Data : Formally Assessed Peaks |           |         |            |        |           |          |     |        |         |           |           |            |  |
|---------------------------------------|-----------|---------|------------|--------|-----------|----------|-----|--------|---------|-----------|-----------|------------|--|
| No                                    | Frequency | Raw dBu | Cable Loss | AF dB  | Level dBu | Measure  | Pol | Hgt cm | Azt Deg | Limit dBu | Margin dB | Pass /Fail |  |
| 1 (120)                               | 7440.663  | 72.81   | 2.7        | -13.1  | 62.41     | Peak Max | V   | 108    | 14      | 74        | -11.59    | Pass       |  |
| 2 (121)                               | 4960.404  | 72.72   | 2.16       | -18.08 | 56.79     | Peak Max | V   | 321    | 20      | 74        | -17.21    | Pass       |  |
| 3 (122)                               | 17821.04  | 49.98   | 4.26       | -3.81  | 50.42     | Peak Max | V   | 146    | 360     | 74        | -23.58    | Pass       |  |
| 4 (123)                               | 14604.01  | 52.44   | 3.87       | -9.53  | 46.78     | Peak Max | H   | 281    | 158     | 74        | -27.22    | Pass       |  |
| 5 (120)                               | 7440.663  | 62.1    | 2.7        | -13.1  | 51.7      | Average  | V   | 108    | 14      | 54        | -2.3      | Pass       |  |
| 6 (121)                               | 4960.404  | 63.28   | 2.16       | -18.08 | 47.36     | Average  | V   | 321    | 20      | 54        | -6.64     | Pass       |  |
| 7 (122)                               | 17821.04  | 38.19   | 4.26       | -3.81  | 38.63     | Average  | V   | 146    | 360     | 54        | -15.37    | Pass       |  |
| 8 (123)                               | 14604.01  | 39.82   | 3.87       | -9.53  | 34.16     | Average  | H   | 281    | 158     | 54        | -19.84    | Pass       |  |

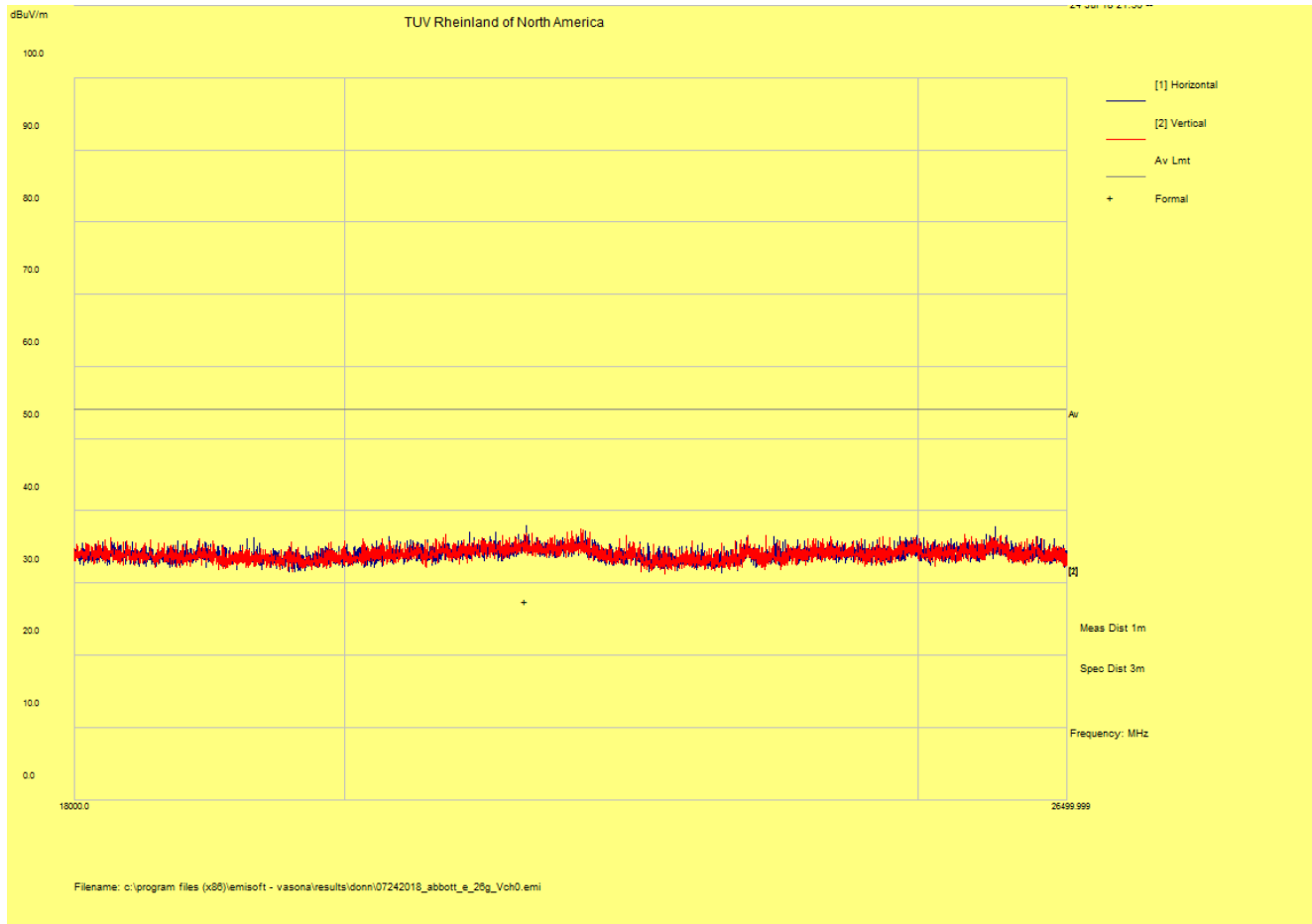


### Channel 39 1 to 18GHz. Horizontal orientation

#### Vasona Data : Formally Assessed Peaks

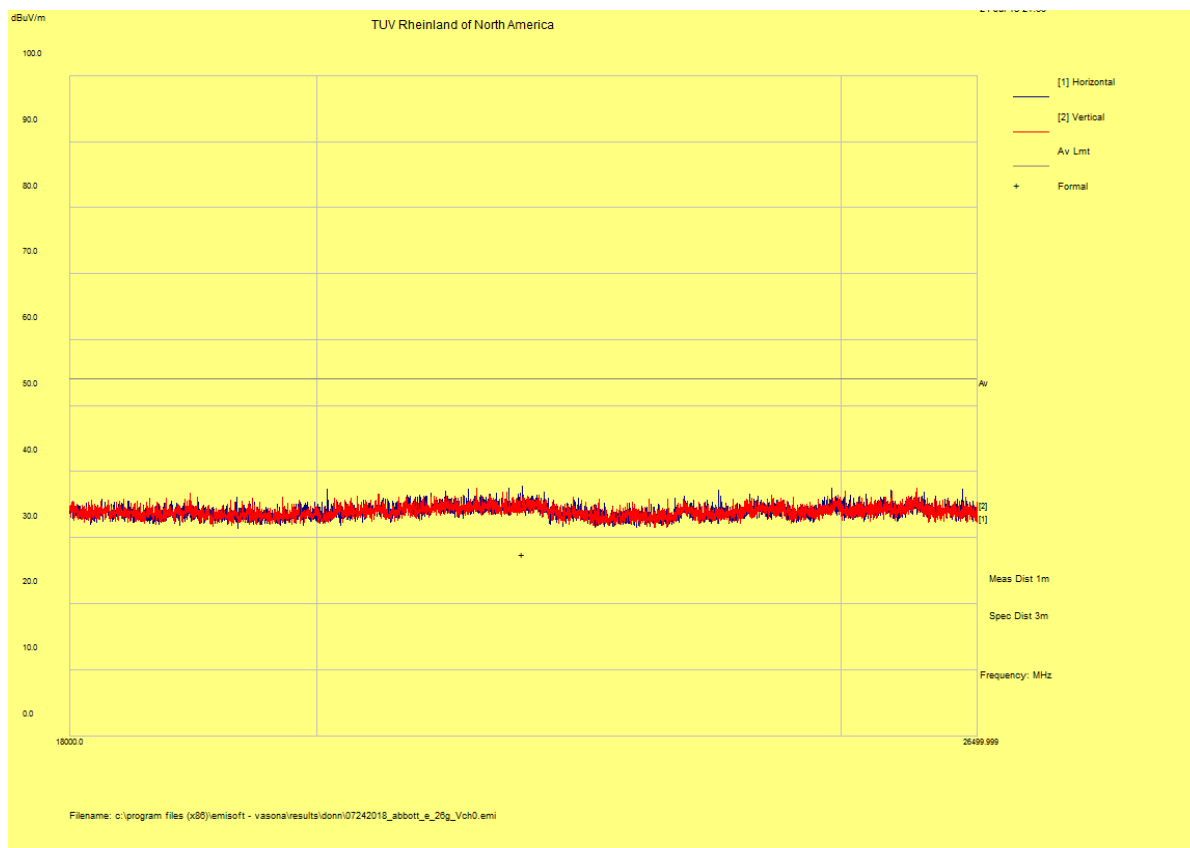
| No      | Frequency | Raw dBu | Cable Los | AF dB  | Level dBuV/m | Measure  | Pol | Hgt cm | Azt Deg | Limit dBu | Margin dB | Pass /Fail |
|---------|-----------|---------|-----------|--------|--------------|----------|-----|--------|---------|-----------|-----------|------------|
| 1 (152) | 7439.01   | 67.32   | 2.7       | -13.11 | 56.91        | Peak Max | H   | 111    | 144     | 74        | -17.09    | Pass       |
| 2 (153) | 17834.35  | 49.39   | 4.25      | -3.73  | 49.9         | Peak Max | V   | 157    | 80      | 74        | -24.1     | Pass       |
| 3 (154) | 4959.971  | 66.74   | 2.16      | -18.08 | 50.81        | Peak Max | V   | 337    | 54      | 74        | -23.19    | Pass       |
| 4 (152) | 7439.01   | 56.52   | 2.7       | -13.11 | 46.11        | Average  | H   | 111    | 144     | 54        | -7.89     | Pass       |
| 5 (153) | 17834.35  | 38.34   | 4.25      | -3.73  | 38.85        | Average  | V   | 157    | 80      | 54        | -15.15    | Pass       |
| 6 (154) | 4959.971  | 57.87   | 2.16      | -18.08 | 41.94        | Average  | V   | 337    | 54      | 54        | -12.06    | Pass       |

## 18 to 26 GHz.



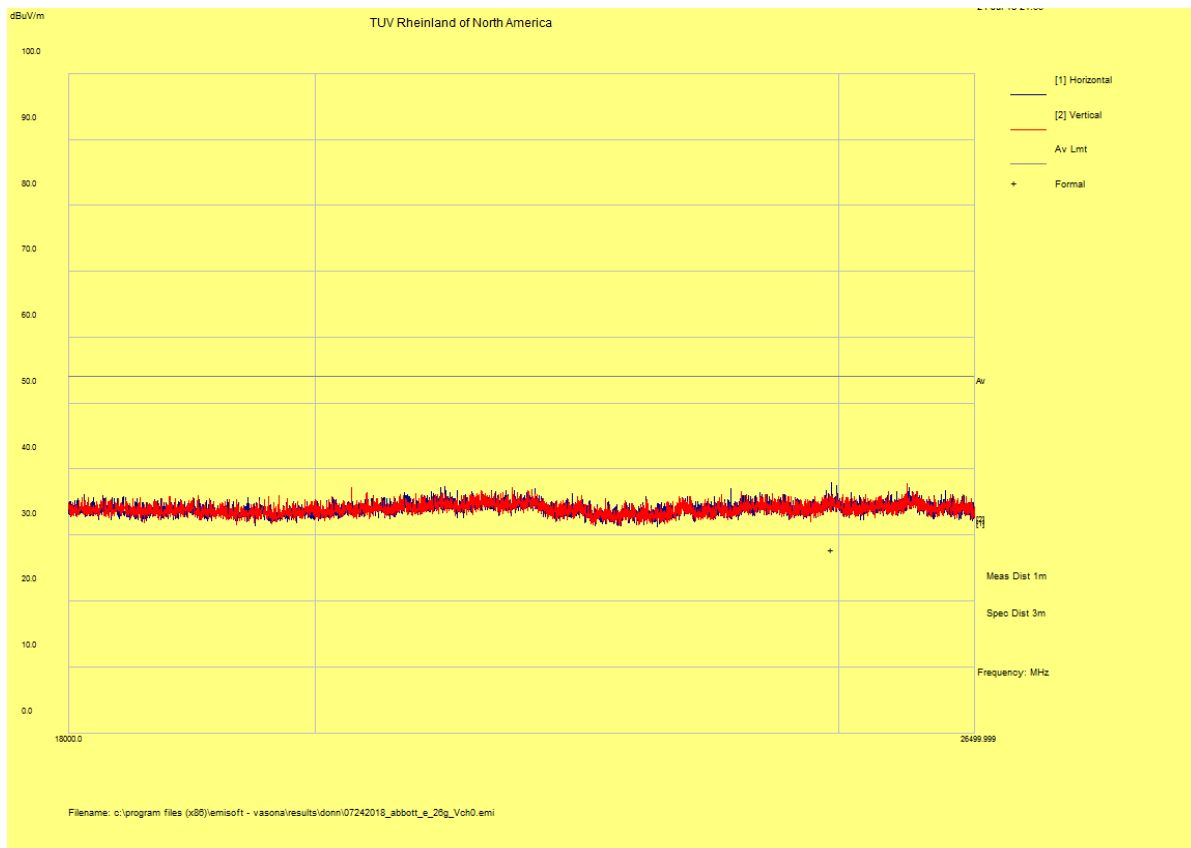
Channel 0 18 to 26GHz unit in Vertical orientation

| Frequency | Raw    | Cable Loss | AF    | Level  | Detector    | Polarity | Height | Azimuth | Limit  | Margin | Result | Comments |
|-----------|--------|------------|-------|--------|-------------|----------|--------|---------|--------|--------|--------|----------|
| MHz       | dBuV/m | dB         | dB    | dBuV/m |             | H/V      | cm     | deg     | dBuV/m | dB     |        |          |
| 21459.40  | 29.29  | 7.70       | -9.54 | 27.46  | Average Max | H        | 150    | 158     | 54.00  | -26.54 | Pass   |          |



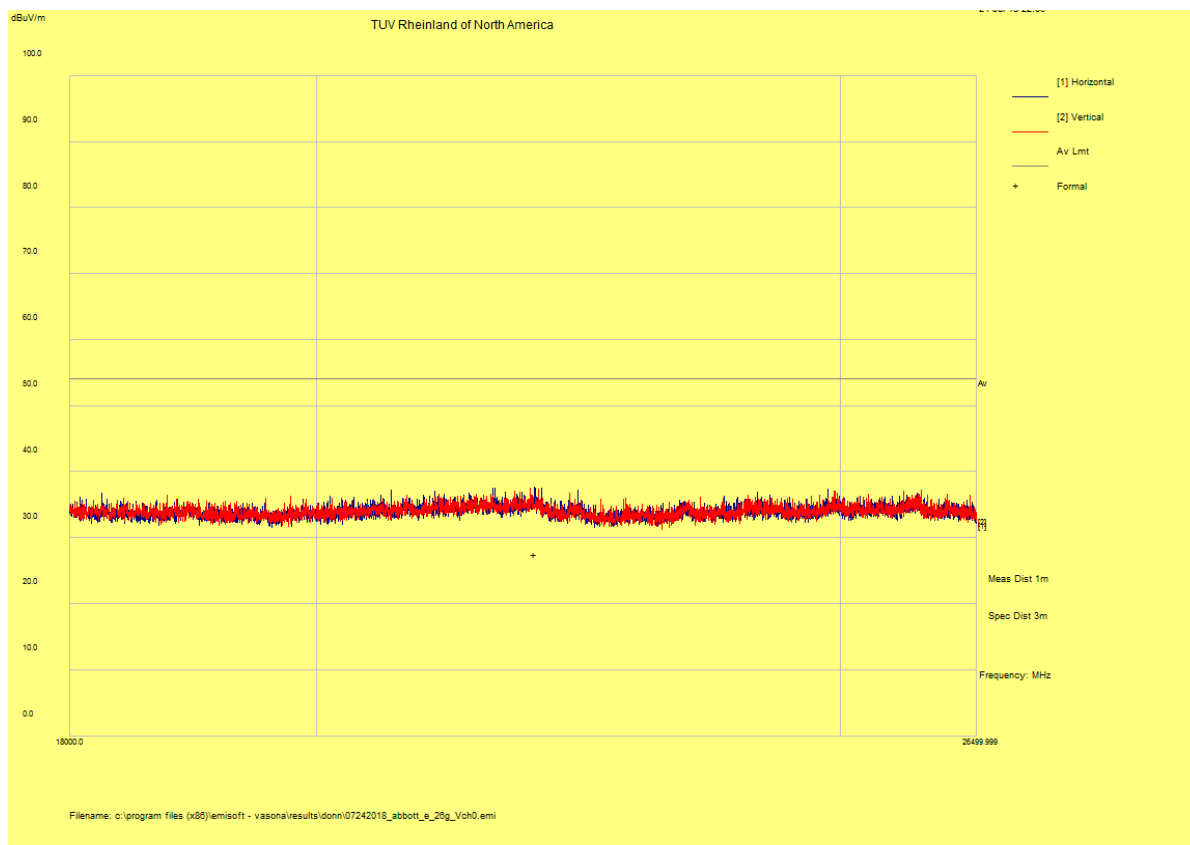
### Channel 0 18 to 26GHz. unit in Horizontal orientation

| Frequency | Raw    | Cable Loss | AF    | Level  | Detector   | Polarity | Height | Azimuth | Limit  | Margin | Result | Comments |
|-----------|--------|------------|-------|--------|------------|----------|--------|---------|--------|--------|--------|----------|
| MHz       | dBuV/m | dB         | dB    | dBuV/m |            | H/V      | cm     | deg     | dBuV/m | dB     |        |          |
| 21828.45  | 29.82  | 7.64       | -9.97 | 27.49  | average Ma | H        | 150    | 260     | 54.00  | -26.51 | Pass   |          |



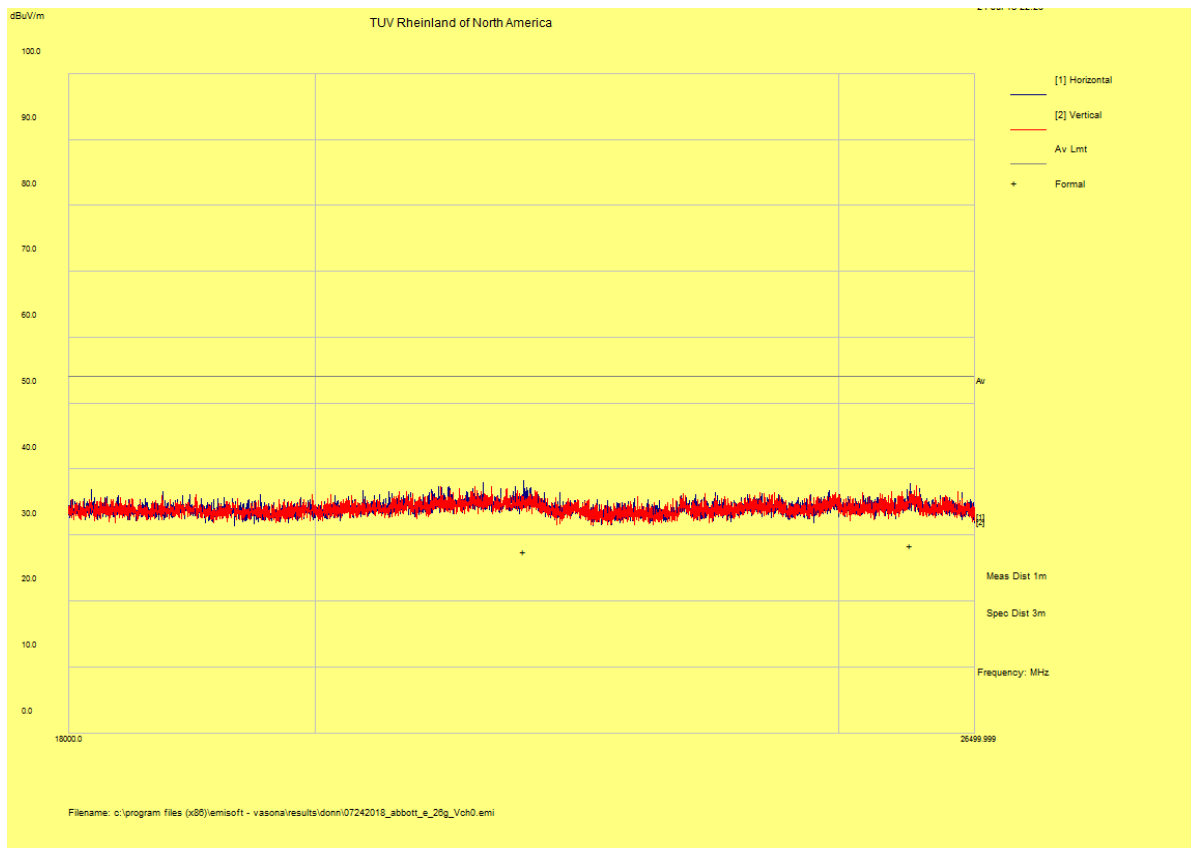
### Channel 19 18 to 26GHz unit in Vertical orientation

| Frequency | Raw    | Cable Loss | AF     | Level  | Detector    | Polarity | Height | Azimuth | Limit  | Margin | Result | Comments |
|-----------|--------|------------|--------|--------|-------------|----------|--------|---------|--------|--------|--------|----------|
| MHz       | dBuV/m | dB         | dB     | dBuV/m |             | H/V      | cm     | deg     | dBuV/m | dB     |        |          |
| 24928.29  | 32.70  | 8.17       | -12.98 | 27.88  | Average Max | H        | 150    | 192     | 54.00  | -26.12 | Pass   |          |



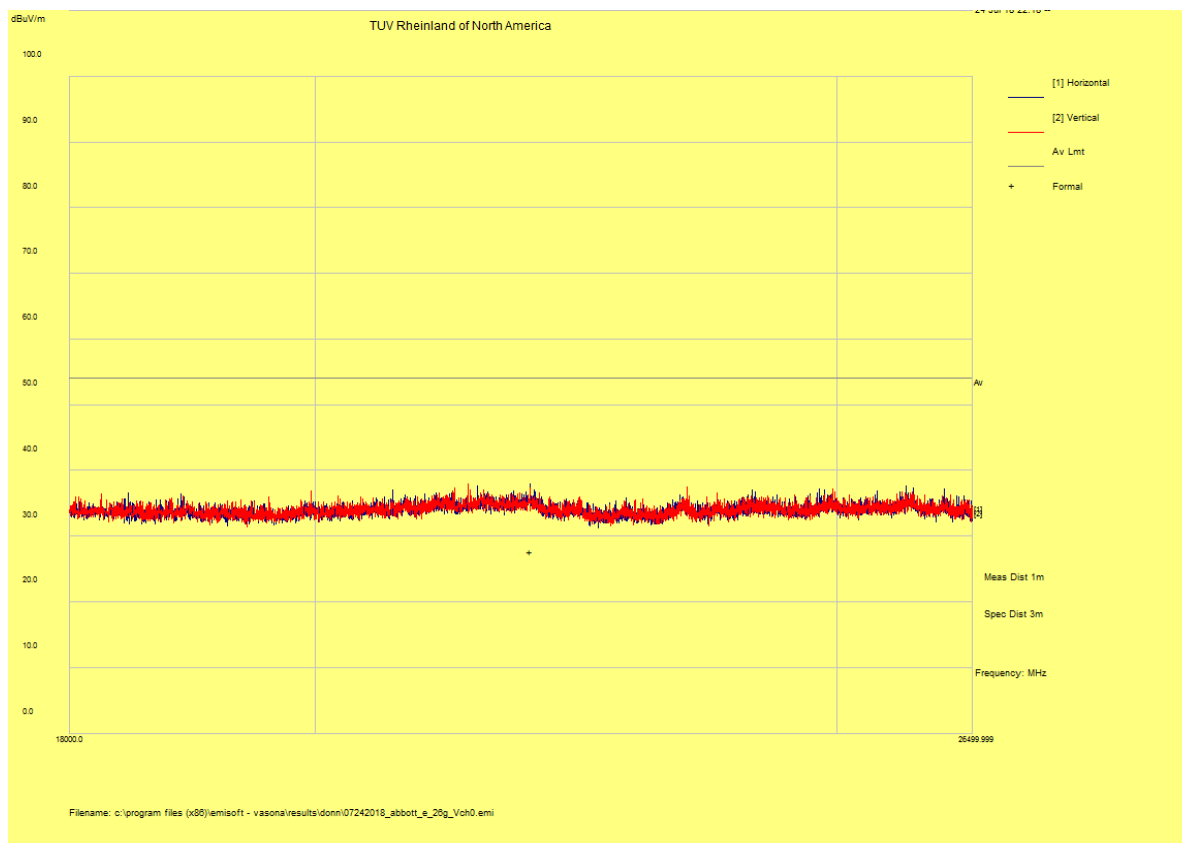
### Channel 19 unit in Horizontal orientation

| Frequency | Raw    | Cable Loss | AF     | Level  | Detector    | Polarity | Height | Azimuth | Limit  | Margin | Result | Comments |
|-----------|--------|------------|--------|--------|-------------|----------|--------|---------|--------|--------|--------|----------|
| MHz       | dBuV/m | dB         | dB     | dBuV/m |             | H/V      | cm     | deg     | dBuV/m | dB     |        |          |
| 21949.25  | 30.01  | 7.70       | -10.11 | 27.60  | Average Max | H        | 150    | 0       | 54.00  | -26.40 | Pass   |          |



### Channel 39 18 to 26GHz unit in Vertical orientation

| Frequency | Raw    | Cable Loss | AF     | Level  | Detector    | Polarity | Height | Azimuth | Limit  | Margin | Result | Comments |
|-----------|--------|------------|--------|--------|-------------|----------|--------|---------|--------|--------|--------|----------|
| MHz       | dBuV/m | dB         | dB     | dBuV/m |             | H/V      | cm     | deg     | dBuV/m | dB     |        |          |
| 21863.64  | 29.99  | 7.63       | -10.01 | 27.61  | Average Max | H        | 150    | 220     | 54.00  | -26.39 | Pass   |          |
| 25778.16  | 33.17  | 8.11       | -12.87 | 28.41  | Average Max | H        | 150    | 358     | 54.00  | -25.59 | Pass   |          |



### Channel 39 18 to 26GHz unit in Horizontal orientation

| Frequency | Raw    | Cable Loss | AF     | Level  | Detector    | Polarity | Height | Azimuth | Limit  | Margin | Result | Comments |
|-----------|--------|------------|--------|--------|-------------|----------|--------|---------|--------|--------|--------|----------|
| MHz       | dBuV/m | dB         | dB     | dBuV/m |             | H/V      | cm     | deg     | dBuV/m | dB     |        |          |
| 21926.00  | 30.12  | 7.70       | -10.08 | 27.74  | Average Max | H        | 150    | 0       | 54.00  | -26.26 | Pass   |          |

## **11.6 Conducted Emissions**

Testing was performed in accordance with ANSI C63.10: 2013. These test methods are listed under the laboratory's A2LA Scope of Accreditation.

This test measures the levels emanating from the EUT's AC input port, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices.

The AC conducted emissions of equipment under test shall not exceed the values in CFR47 Part 15.207 and RSS247

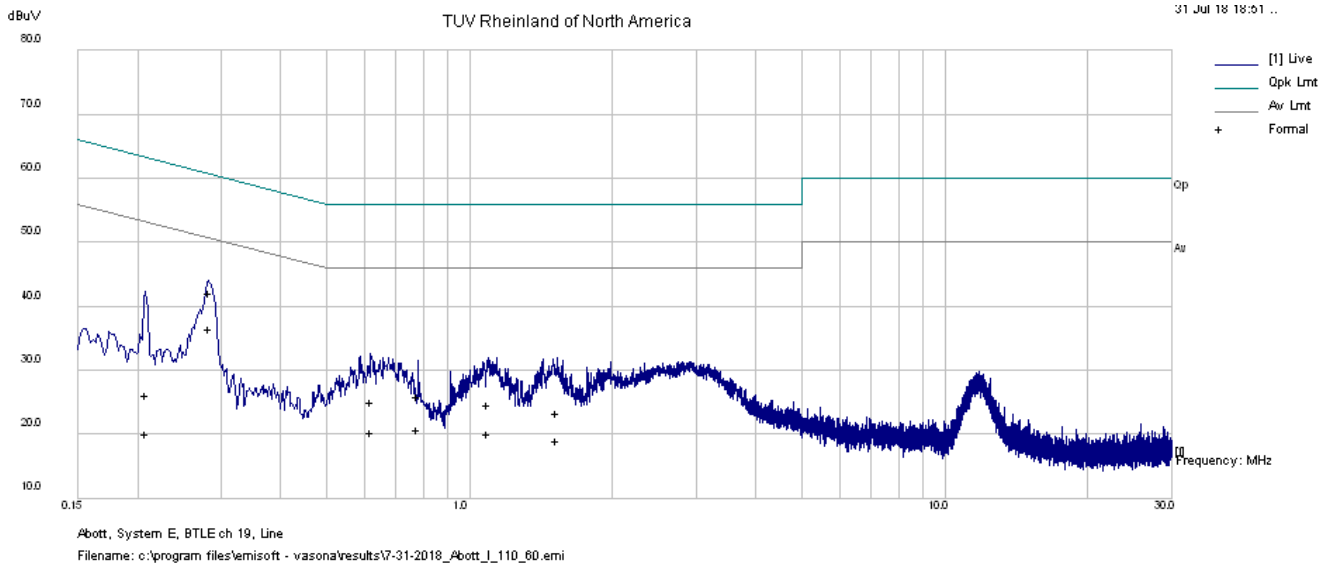
### **11.6.1 Test Methodology**

A test program that controls instrumentation and data logging was used to automate the AC Power Line Conducted emission test procedure. The frequency range of interest was divided into sub-ranges such as to yield a frequency resolution of 9 kHz. Each phase and neutral of the AC power line were measured with respect to ground. Measurements were performed using a 50 $\mu$ H / 50 $\Omega$  LISNs.

#### **11.6.1.1 Deviations**

There were no deviations from this test methodology.

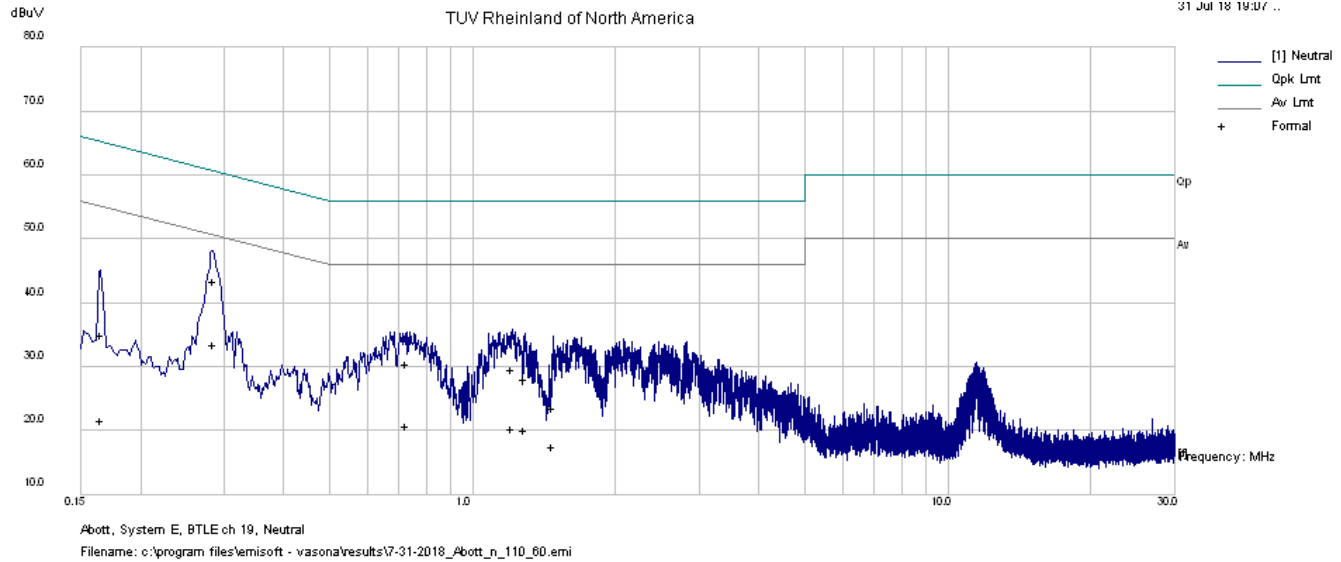
## Test Results



Conducted emissions channel 19 line

### Vasona Data : Formally Assessed Peaks

| No     | Frequency | Raw dBu | Cable Los | Factors d | Level dBu | Measurem  | Line | Limit dBu | Margin dE | Pass /Fail |
|--------|-----------|---------|-----------|-----------|-----------|-----------|------|-----------|-----------|------------|
| 1 (1)  | 0.282752  | 32.21   | 9.83      | 0.03      | 42.08     | Quasi Pea | Live | 60.73     | -18.66    | Pass       |
| 2 (2)  | 0.207962  | 16.33   | 9.83      | 0.04      | 26.2      | Quasi Pea | Live | 63.29     | -37.08    | Pass       |
| 3 (3)  | 0.619305  | 15.28   | 9.85      | 0.03      | 25.16     | Quasi Pea | Live | 56        | -30.84    | Pass       |
| 4 (4)  | 1.094218  | 14.77   | 9.87      | 0.03      | 24.68     | Quasi Pea | Live | 56        | -31.32    | Pass       |
| 5 (5)  | 1.526128  | 13.42   | 9.88      | 0.03      | 23.32     | Quasi Pea | Live | 56        | -32.68    | Pass       |
| 6 (6)  | 0.778232  | 16.02   | 9.87      | 0.03      | 25.92     | Quasi Pea | Live | 56        | -30.08    | Pass       |
| 7 (1)  | 0.282752  | 26.64   | 9.83      | 0.03      | 36.51     | Average   | Live | 50.73     | -14.23    | Pass       |
| 8 (2)  | 0.207962  | 10.31   | 9.83      | 0.04      | 20.18     | Average   | Live | 53.29     | -33.1     | Pass       |
| 9 (3)  | 0.619305  | 10.44   | 9.85      | 0.03      | 20.32     | Average   | Live | 46        | -25.68    | Pass       |
| 10 (4) | 1.094218  | 10.14   | 9.87      | 0.03      | 20.04     | Average   | Live | 46        | -25.96    | Pass       |
| 11 (5) | 1.526128  | 9.08    | 9.88      | 0.03      | 18.98     | Average   | Live | 46        | -27.02    | Pass       |
| 12 (6) | 0.778232  | 10.96   | 9.87      | 0.03      | 20.86     | Average   | Live | 46        | -25.14    | Pass       |



## Conducted Emissions channel 19 Neutral

| Vasona Data : Formally Assessed Peaks |           |       |           |      |         |         |         |         |          |        |       |      |        |    |      |       |
|---------------------------------------|-----------|-------|-----------|------|---------|---------|---------|---------|----------|--------|-------|------|--------|----|------|-------|
| No                                    | Frequency | Raw   | dBu\Cable | Los  | Factors | d       | Level   | dBu     | Measurem | Line   | Limit | dBu\ | Margin | dE | Pass | /Fail |
| 1 (29)                                | 0.284621  | 33.6  | 9.83      | 0.03 | 43.46   | Quasi   | Pea     | Neutral | 60.68    | -17.22 | Pass  |      |        |    |      |       |
| 2 (30)                                | 0.164958  | 25.09 | 9.82      | 0.05 | 34.96   | Quasi   | Pea     | Neutral | 65.21    | -30.25 | Pass  |      |        |    |      |       |
| 3 (31)                                | 1.212012  | 19.78 | 9.87      | 0.03 | 29.68   | Quasi   | Pea     | Neutral | 56       | -26.32 | Pass  |      |        |    |      |       |
| 4 (32)                                | 0.72588   | 20.59 | 9.86      | 0.03 | 30.48   | Quasi   | Pea     | Neutral | 56       | -25.52 | Pass  |      |        |    |      |       |
| 5 (33)                                | 1.284932  | 18.12 | 9.87      | 0.03 | 28.03   | Quasi   | Pea     | Neutral | 56       | -27.97 | Pass  |      |        |    |      |       |
| 6 (34)                                | 1.475645  | 13.61 | 9.88      | 0.03 | 23.52   | Quasi   | Pea     | Neutral | 56       | -32.48 | Pass  |      |        |    |      |       |
| 7 (29)                                | 0.284621  | 23.63 | 9.83      | 0.03 | 33.49   | Average | Neutral | 50.68   | -17.19   | Pass   |       |      |        |    |      |       |
| 8 (30)                                | 0.164958  | 11.85 | 9.82      | 0.05 | 21.72   | Average | Neutral | 55.21   | -33.49   | Pass   |       |      |        |    |      |       |
| 9 (31)                                | 1.212012  | 10.42 | 9.87      | 0.03 | 20.32   | Average | Neutral | 46      | -25.68   | Pass   |       |      |        |    |      |       |
| 10 (32)                               | 0.72588   | 10.83 | 9.86      | 0.03 | 20.73   | Average | Neutral | 46      | -25.27   | Pass   |       |      |        |    |      |       |
| 11 (33)                               | 1.284932  | 10.28 | 9.87      | 0.03 | 20.18   | Average | Neutral | 46      | -25.82   | Pass   |       |      |        |    |      |       |
| 12 (34)                               | 1.475645  | 7.68  | 9.88      | 0.03 | 17.59   | Average | Neutral | 46      | -28.41   | Pass   |       |      |        |    |      |       |

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## 12 Test Equipment Use List

### 12.1 Equipment List

| Equipment           | Manufacturer          | Model #       | Serial/Inst # | Last Cal<br>mm/dd/yyyy | Next Cal<br>mm/dd/yyyy |
|---------------------|-----------------------|---------------|---------------|------------------------|------------------------|
| Bilog Antenna       | Sunol Sciences        | JB3           | A102606       | 11/20/2017             | 11/20/2019             |
| Horn Antenna        | Sunol Science         | DRH118        | A040806       | 11/11/2016             | 11/11/2018             |
| Horn Antenna        | Com-Power             | AHA-840       | 105005        | 05/26/2017             | 05/26/2019             |
| Amplifier           | Sonoma<br>Instruments | 310           | 165516        | 01/25/2018             | 01/25/2019             |
| Spectrum Analyzer   | Agilent               | MXE           | 52260210      | 1/22/2018              | 1/22/2019              |
| Spectrum Analyzer   | Agilent               | PXA           | US513358291   | 01/22/2019             | 01/22/2019             |
| LISN                | Compower              | n/a           | 12100         | 01/24/2018             | 01/24/2019             |
| Spectrum Analyzer   | Rohde & Schwarz       | ESI           | 1088.7490     | 01/22/2018             | 01/22/2019             |
| Active loop antenna | Emco                  | 6502          | 00062531      | 06/08/2018             | 06/08/2019             |
| Preamplifier        | Miteq                 | TTA1800-30-HG | 2020728       | 01/23/2018             | 01/23/2019             |
|                     |                       |               |               |                        |                        |
|                     |                       |               |               |                        |                        |
|                     |                       |               |               |                        |                        |
|                     |                       |               |               |                        |                        |

\* Calibration of equipment past due for re-calibration will be performed expeditiously. If any equipment is found to be out of tolerance at that time, affected customers will be notified accordingly.

## 13 EMC Test Plan

### 13.1 Introduction

This section provides a description of the Equipment Under Test (EUT), configurations, operating conditions, and performance acceptance criteria. It is an overview of information provided by the manufacturer so that the test laboratory may perform the requested testing.

### 13.2 Customer

#### Customer Information

|                         |                      |
|-------------------------|----------------------|
| <b>Company Name</b>     | Abbott Diabetes Care |
| <b>Address</b>          | 1360 South Loop Road |
| <b>City, State, Zip</b> | Alameda, CA 94502    |
| <b>Country</b>          | USA                  |

#### Technical Contact Information

|                |                         |
|----------------|-------------------------|
| <b>Contact</b> | Richard Ries            |
| <b>E-mail</b>  | Richard.ries@abbott.com |
| <b>Phone</b>   |                         |

### 13.3 Test configurations

The reader will be set to continuously transmit at low, mid, and high channel of the BLE 2.4GHz. band

- 1 The meter will be placed in the chamber on the table and tested lying flat on the table which will be referred to as horizontal and scanned for emissions. The meter will then be placed on its long dimension edge which will be referred to as vertical and scanned for emissions per the manufacturers test documentation.
- 2 The reader will be connected to a spectrum analyzer directly from its antenna port.

### 13.4 Equipment Under Test (EUT)

**Table 3:** EUT Specifications

| EUT Specifications                            |                                                                                     |
|-----------------------------------------------|-------------------------------------------------------------------------------------|
| Dimensions                                    | 95 mm x 60 mm x 16 mm                                                               |
| AC Input                                      | 3.7VDC or 110VAC- USB charger                                                       |
| Environment                                   | Indoor/Outdoor                                                                      |
| Operating Temperature Range:                  | 10 / 45 C                                                                           |
| Multiple Feeds:                               | <input type="checkbox"/> Yes and how many<br><input checked="" type="checkbox"/> No |
| Product Marketing Name (PMN)                  | Freestyle Libre 2                                                                   |
| Hardware Version Identification Number (HVIN) | 22175                                                                               |
| Firmware Version Identification Number (FVIN) | n/a                                                                                 |
| Bluetooth Radio                               |                                                                                     |
| Operating Mode                                | BLE                                                                                 |
| Transmitter Frequency Band                    | 2402 MHz to 2480 MHz                                                                |
| Operating Bandwidth                           | 1 MHz                                                                               |
| Max. Power Output                             | 5.6 dbm                                                                             |
| Power Setting @ Operating Channel             | Max                                                                                 |
| Antenna Type                                  | 1 integrated PIFA antenna                                                           |
| Antenna Gain                                  | 5.0dbi                                                                              |
| Modulation Type                               | GFSK                                                                                |
| Data Rate                                     | 1 Mbps                                                                              |
|                                               |                                                                                     |

**Table 4:** Antenna Information

| Number    | Antenna Type    | Description               | Max Gain (dBi) |
|-----------|-----------------|---------------------------|----------------|
| Antenna 1 | Integrated PIFA | Max. peak gain at 2.4 GHz | 5.0            |

**Table 5:** Interface Specifications

| Interface Type | Cabled with what type of cable? | Is the cable shielded?      | Maximum potential length of the cable? | Metallic (M), Coax (C), Fiber (F), or Not Applicable? |
|----------------|---------------------------------|-----------------------------|----------------------------------------|-------------------------------------------------------|
| USB serial     | USB to mini USB                 | <input type="checkbox"/> No | 37"                                    | <input checked="" type="checkbox"/> M                 |

**Table 6:** Support Equipment

| Equipment          | Manufacturer | Model       | Serial      | Used for                 |
|--------------------|--------------|-------------|-------------|--------------------------|
| Laptop             | Lenovo       | Thinkpad    | None listed | Communication with meter |
| USB charging block | Phihong      | PSMCA 050-Q | None listed | Charging the meter       |
|                    |              |             |             |                          |
|                    |              |             |             |                          |

**Note:** None.

**Table 7:** Description of Sample used for Testing

| Device            | Serial         | RF Connection      | CFR47 Part 15.247               |
|-------------------|----------------|--------------------|---------------------------------|
| Freestyle Libre 2 | MAGY17 6-X0056 | Integrated Antenna | TX Emissions, RSE, band edge    |
|                   | MAGY17 6-X0060 | Direct connection  | TX power,OBW, NR band emissions |
|                   |                |                    |                                 |

**Table 8:** Description of Test Configuration used for Radiated Measurement.

| Device            | Antenna    | Mode     | Setup Photo (X-Axis) | Setup Photo (Y-Axis) | Setup Photo (Z-Axis) |
|-------------------|------------|----------|----------------------|----------------------|----------------------|
| Freestyle Libre 2 | Integrated | Transmit | N/A                  | See photos           | N/A                  |

**Note:**

1279 Quarry Lane, Ste. A, Pleasanton, CA 95466

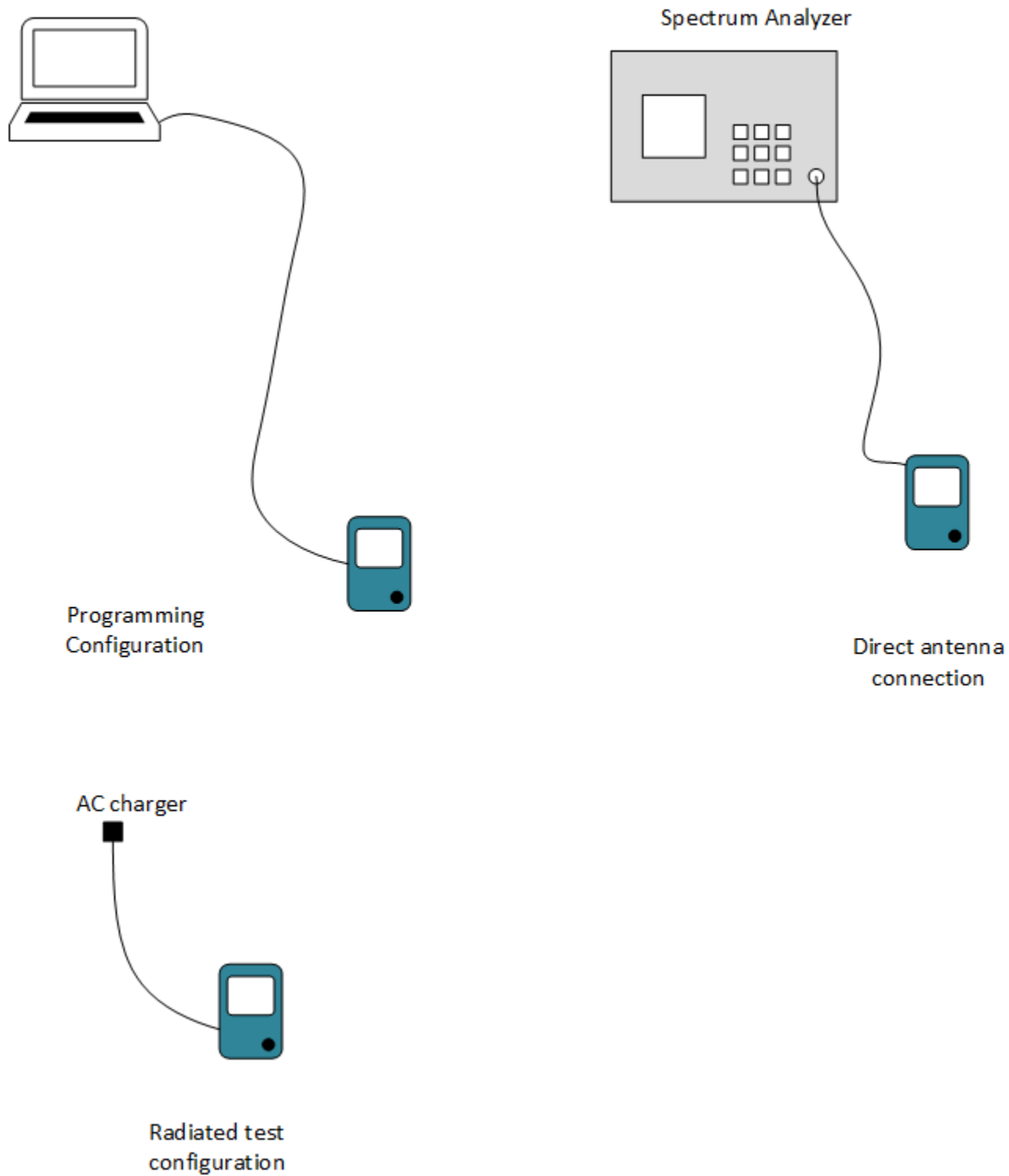
Report# 31863002.001

Tel: (925) 249-9123, Fax: (925) 249-9124

**Table 9: Final Test Mode for 2402 MHz to 2480MHz Channels**

| Test                                                                                           | 802.15.4                          |
|------------------------------------------------------------------------------------------------|-----------------------------------|
| Occupied Bandwidth<br>CFR 47 15.247(a1), RSS247:2017                                           | 2402, 2438, 2480 MHz BLE          |
| Output Power<br>CFR47 15.247 (b1), RSS247:2017                                                 | 2402, 2438, 2480 MHz BLE          |
| Out of Band Emission<br>CFR47 15.247 (d), RSS247:2017                                          | 2402, 2438, 2480 MHz BLE          |
| Band-Edge<br>FCC Part 15.205, 15.209 RSS247:2017                                               | 2402, 2480 MHz BLE                |
| Transmitted Spurious Emission<br>(30 MHz – 1GHz)<br>FCC Part 15.205, 15.209 RSS247:2017        | 2402, 2438, 2480 MHz BLE          |
| Transmitted Spurious Emission<br>(Above 1GHz)<br>FCC Part 15.205, FCC Part 15.209, RSS247:2017 | 2402, 2438, 2480 MHz BLE          |
| AC Conducted Emission<br>FCC Part 15.207 RSS-GEN                                               | 3.7 VDC out USB to 110VAC charger |
| <b>Note:</b>                                                                                   |                                   |

### 13.5 Block Diagram



### **13.6 Test Specifications**

#### Testing requirements

| <b>Emissions</b>                                      |                                       |
|-------------------------------------------------------|---------------------------------------|
| Standard                                              | Requirement                           |
| CFR 47 Part 15.247: 2018, RSS 247 Issue 2, 2017       | OBW, PSD, Output power, Tx emissions, |
| CFR 47 Part 15.207: 2018, CFR 47 Part 15.205, RSS Gen | AC conducted emissions, Band edge     |