



**Technical Report to the FCC and ISED Regarding  
Gentex Corporation - HomeLink® V**

**Model: UAHL5H  
FCC ID: NZLUAHL5H  
ISED: 4112A-UAHL5H**

**Emission Designator:23K8L1D  
11/13/2023**

A report concerning approval for Gentex Corporation Homelink® model UAHL5H  
Please issue grant immediately upon review.

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### Test Report Revision

| REV Number | Date       | Author             | Description |
|------------|------------|--------------------|-------------|
| 1          | 11/13/2023 | Patricia Klawitter |             |
|            |            |                    |             |
|            |            |                    |             |
|            |            |                    |             |

Results relate only to the items tested as received.

Compliance has been evaluated based on the Lab Manual section 7.6.2. The decision rule used regarding measurement uncertainty was to determine results solely on whether the measured values met the defined acceptance criteria without factoring in measurement uncertainty values.

## **1. General Information**

### **1.1. Product Description**

The Gentex Corporation HomeLink® HLV Universal Garage Door Opener is a low-power transceiver OEM device that is installed into the rearview mirror of an automobile. The installation is provided by trained technicians during the course of the manufacture of the automobile. It is powered by the 12 Volt system of the automobile.

This Universal Garage Door Opener has the capability to

1. Learn the frequency and bit code format of the user's existing garage door remote control devices and
2. Reproduce and transmit the frequency and bit code format to remotely operate the user's garage door.

The unit is designed for the periodic operation of a control signal, which typically activates a garage door opener receiver.

The unit is supplied to the automobile manufacturer without harness. For testing purposes, a typical assembly and 2-conductor cable harness were used to power the unit.

The unit is only operational when the user presses the control button. It becomes inactive after the release of the control button.

The three-button HomeLink® unit replaces up to three hand-held transmitters. In addition to the typical operation of the garage door, the unit will learn the radio frequency codes of other transmitter types to activate entry door locks, estate gates, security systems, and home or office lighting.

The antenna system is an integral part of the unit. It cannot be altered nor replaced by the user. The service of this system is only available from the Automobile Manufacturer's Dealerships and Gentex Corporation.

### **1.2. Related Grants**

This device will have functionality that is covered under 47 CFR 15.247 and 15B. The device will have FCC ID # of NZLUAHL5H and ISED ID # of 4112A-UAHL5H under both rule parts. A separate report is submitted for functionality covered under 47 CFR 15.247 and 15B.

### **1.3. Test Methodology**

Radiated Emissions testing was performed according to ANSI C63.10:2013. The power source for this product is a 12V automotive vehicle battery, thus conducted emissions measurements are not required.

The unit is supplied to the automobile manufacturer without harness. For testing purposes, a 2-conductor cable harness was used to interface to the unit.

## 1.4. Test Facility

The 3-meter semi-anechoic chamber where these measurements were taken is located on the grounds of Gentex Corporation's Corporate Labs, in the city of Zeeland, county of Ottawa, state of Michigan, United States of America.

For radiated measurements above 1 GHz, RF absorbing material is placed between the antenna and EUT in accordance with ANSI C63.4:2014 Section 5.5 and chamber manufacturer's instructions.

Tabletop testing was conducted on a 3m turntable described in the site recertification report. The 3m chamber has been added to our A2LA scope of accreditation on 05/20/2016 and includes accreditation to ANSI C63.4:2014 and ANSI C63.10:2013. The report filed with ISED, dated February 11, 2015, was accepted via a letter dated February 11, 2015. Our 3m chamber is registered with the ISED under Site# 4112A-2 and FCC under registration number 357351.

Corporate Mailing/Shipping Address

Gentex Corporation  
600 N. Centennial Street  
Zeeland, MI 49464

Site Address

Gentex Corporation  
380 Riley Street  
Zeeland, MI 49464

## 1.5. Accreditation

The Gentex Corporate EMC Lab is accredited to ISO/IEC 17025 by the American Association for Laboratory Accreditation (A2LA). Our laboratory scope and accreditation certificate #[2529.01](#) are available from their web site [www.a2la.org](http://www.a2la.org). Our scope of accreditation covers ANSI C63.4:2014, ANSI C63.10:2013, and Radiated Emissions at 3m, FCC 47 CFR Part 15, ISED RSS-210.

## 2. Product Labeling

### 2.1. Identifiers

The FCC Identifier assigned is FCC ID: NZLUAHL5H. The ISED certification number is 4112A-UAHL5H. These identifiers will be labeled on the product housing.

The label will be imprinted on the exterior of the mirror housing using a molding tool that will permanently affix the label.

Because of the small size of the device and because the installation is inside a portion of the automobile, the following statements will appear in the user's manual.

"This device complies with FCC rules Part 15 and with ISED RSS-210. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference,
- (2) This device must accept any interference that may be received including interference that may cause undesired operation.

WARNING: The transmitter has been tested and complies with FCC and ISED rules. Changes or modifications not expressly approved by the party responsible for the compliance could void the user's authority to operate the device."

The term "ISED:" before the certification/registration number only signifies that ISED technical specifications were met.

ISED: 4112A-UAHL5H

FCC ID: NZLUAHL5H

MODEL: UAHL5H

## 2.2. Label Drawing and Location on Product

The label drawing is included in the "Label.pdf" attachment.

A diagram showing the location of the label on the assembly is included in the "Label Location.pdf" attachment.

## 3. Test Configuration

Radiated Emission measurements presented in the report were made in accordance with ANSI C63.10-2013. The EUT was placed on a 1 x 1.5m non-metallic table elevated 80cm above a conducting ground plane for measurements below 1GHz and elevated to 1.5m for measurements above 1GHz. The harness was run down the edge of the table to a power supply connection on the turntable. The power supply is located beneath the floor of the turntable.

For radiated measurements above 1 GHz, RF absorbing material is placed between the antenna and EUT in accordance with ANSI C63.4:2014 Section 5.5 and chamber manufacturer's instructions.

## 4. Block Diagram

For system block diagram please refer to attachment named "Block Diagram.pdf"

## 5. Conducted Emissions Measurements

Conducted Measurements are not required for this product.

## 6. Radiated Emissions Data

**6.1. Date(s) Tested:** 10/30/2023-11/2/2023

**6.2. Test Method Deviations:** None

**6.3. Temperature and Humidity conditions**

|             | Measured Value | Unit  |
|-------------|----------------|-------|
| Temperature | 21.3-22.8      | °C    |
| Humidity    | 39.5-44.7      | %R.H. |

## 6.4. Summary of Results

| Measurement                                          |              | Margin    | Frequency - Duty Cycle |
|------------------------------------------------------|--------------|-----------|------------------------|
| Worst Case Peak Emission                             | 84.10 dBuV/m | 14.10 dB  | 365MHz - 30%           |
| Worst Case Average Emission                          | 73.6 dBuV/m  | 4.55 dB   | 365MHz - 30%           |
| Worst Case Harmonic                                  | 51.28 dBuV/m | 22.7 dB   | 3010MHz - (430MHz-30%) |
| Worst Case Restricted Band Emission                  | 43.7 dBuV/m  | 10.3 dB   | 3650MHz - (365MHz-80%) |
| Maximum -20 dB Occupied BW                           | 7.85kHz      | 712.15kHz | 288MHz - 30%           |
| Maximum 99% Occupied BW                              | 23.80kHz     | 696.20kHz | 288MHz - 30MHz         |
| Delta of Field Strength with Supply Voltage of 6-18V | 0.58 dB      | N/A       | 365MHz - 30%           |

- This module exhibits pulsed operation characteristics.
- The device does not operate when the input voltage is below 6V, and power reduced to 83.59 dBuV/m at 6V.
- The device was found to be incapable of operating in restricted bands.
- The device deactivated in less than 5 seconds after the activation button was released.
- **Measurement Uncertainty:** The standard uncertainty of measurement has been determined in accordance with the ISO Guide to the Expression of Uncertainty in Measurements. The estimation of measurement uncertainty reported is the expanded uncertainty for a coverage factor of k=2.26 and confidence interval of approximately 95%.

Expanded Uncertainty  $U_{(k=2.26)}$  is as follows:

- Radiated Emissions – Bicon (30-250 MHz): 4.7 dB
- Radiated Emissions – LPA (250-1000 MHz): 5.6 dB
- Radiated Emissions – DRWG (26.5 GHz): 4.9 dB
- Frequency: 0.12ppm

## 6.5. Test Equipment Setup and Procedure

### 6.5.1. Test Equipment Used

| Description                                       | Model #            | ID Number  | Cal Due    |
|---------------------------------------------------|--------------------|------------|------------|
| EMCO LPA Antenna<br>[250-1000MHz]                 | 3148               | H6192      | 5/3/2024   |
| Com-Power Double<br>Ridged Waveguide<br>[1-18GHz] | AHA-118            | 8893       | 12/16/2025 |
| Rohde & Schwarz ESW<br>Receiver                   | ESW26              | 9860       | 1/18/2024  |
| Cables, attenuator and<br>port feed through       | various            | CF GCL     | 4/30/2024  |
| 3m Chamber SW                                     | N/A                | SW30       | 3/31/2024  |
| HomeLink5 Diagnostic<br>Application               | N/A                | SW44       | 3/31/2024  |
| ETS-Lindgren Boresight<br>Tower                   | 2171B              | Tower 2    | VBU        |
| ETS-Lindgren Shielded<br>Enclosure                | 3M Chamber         | PJ2246     | 12/30/2023 |
| Omega Environmental<br>Conditions                 | iBTHX-W<br>Virtual | 8292       | 10/2/2024  |
| Stanley Tape Measure                              | N/A                | 6539       | 6/19/2026  |
| Fluke Multimeter                                  | 87                 | H4554      | 1/5/2024   |
| ETS-Lindgren Absorber<br>Material                 | EHP-12PCL          | Absorber 1 | VBU        |

ESW Receiver Settings Emissions:

Detector Function: Peak

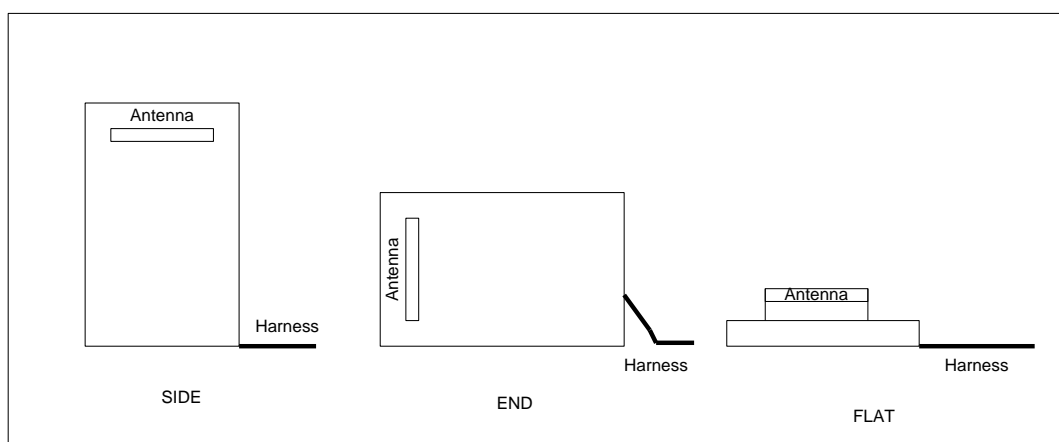
Resolution Bandwidth: 120 kHz (below 1GHz)  
1MHz (above 1GHz)

ESW Receiver (in Spectrum Analyzer mode) Settings Occupied Bandwidth:

Detector: Peak  
Resolution Bandwidth: 1 MHz (to determine peak level)  
1 kHz (to determine occupied bandwidth)  
Video Bandwidth: 3 MHz (to determine peak level)  
3 kHz (to determine occupied bandwidth)

For the testing, the EUT was placed at the center of a non-conducting table 80cm above the ground plane pursuant to ANSI C63.10:2013 for stand-alone equipment. The 2-conductor harness was run down the edge of the table to a power supply sitting connection on the turntable. The power supply is located beneath the floor of the turntable.

Equipment is placed in one of the three orthogonal orientations, End, Side, and Flat. These orientations are described below in Figure 6.2.1.



**Figure 6.2.1 EUT Orthogonal Orientations**

While in the prescribed orientation, the vertical antenna positioner sweeps in elevation from 1 to 4m in height until the operator finds the peak. The 3m turntable is then rotated through 360 degrees until a peak is found. The table is stopped at the peak location and the peak in elevation re-verified. Procedure is repeated for applicable orientations/measurement antenna polarizations. Radiated testing was performed in all three orientations or the in-vehicle position only.

## 6.6. Measured Data – See Appendix A

## 7. Verification of Non-Operation in Restricted Bands

An exercise was undergone by the product Software Design team to verify that the device was not able to learn and thereby transmit in a restricted band. During this exercise, it was found that the device firmware prevents the device from learning any frequency within 1MHz of any restricted band listed in RSS-210 Issue 9, Table 1 and 47 CFR 15.205.

This exercise is described as follows:

### HomeLink Operating Frequencies

HomeLink is designed to transmit from 286 – 440 MHz, with the exception of two regions:

- 321 – 336.4 MHz
- 398.9 – 411 MHz

HomeLink will only transmit at frequencies it is able to train to therefore, to verify HomeLink does not **transmit** outside the designated regions, it must be verified that HomeLink does not **train** to signals outside the designated regions.

To verify this, the Agilent E4421B signal generator was set up to output a 400 Hz square wave with 100% modulation depth and amplitude -5.00 dBm. It was then verified that HomeLink would train to this signal only when it was transmitted at the proper frequencies. Specifically, the various frequencies in the vicinity of the banned region boundaries were tested and verified that HomeLink trained when it saw a signal at a valid frequency and did not train when it saw a signal at a banned frequency. In the instances where HomeLink trained to a valid frequency, it was then verified that HomeLink transmitted at that same frequency.

One thing that should be noted: HomeLink margin of error is approximately 100 kHz. Therefore, HomeLink may not adhere to the specified limits with absolute precision. This is why the FCC banned frequencies are guard-banded by 1MHz. For example, the FCC bans transmissions below 285MHz. By setting HomeLink's lower limit to 286 MHz, it guarantees that HomeLink will not operate below 285 MHz, and in all likelihood, HomeLink will not operate below 285.8MHz.

In addition to the banned frequencies, there also exists certain “harmonic avoidance frequency regions” which HomeLink will train to but will shift the transmit frequency so as not to generate harmonics at particular frequencies. All these frequency regions are listed below, and the table on the following pages shows the exact frequencies tested.

| FCC Banned Regions                                                                                            | Harmonic Avoidance Regions                                                                                        |
|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| (HomeLink does not train to the following frequencies)<br>240 – 285 MHz<br>322 – 335.4 MHz<br>399.9 – 410 MHz | (HomeLink trains to the following frequencies but transmits on the edges of these bands)<br>303.5 MHz – 307.5 MHz |

| Frequency (MHz) | Part 15 Status                 | Result          | Pass/Fail | Comments                       |
|-----------------|--------------------------------|-----------------|-----------|--------------------------------|
| 285.0           | banned                         | would not train | Pass      |                                |
| 285.5           | allowed<br>(guard band region) | would not train | Pass      |                                |
| 286.0           | allowed<br>(guard band region) | trained         | Pass      |                                |
| 287.0           | allowed                        | trained         | Pass      |                                |
| 303.5           | allowed                        | trained         | Pass      |                                |
| 304.0           | allowed                        | trained         | Pass      | Frequency shifted to 303.5 MHz |
| 304.5           | allowed                        | trained         | Pass      | Frequency shifted to 303.5 MHz |
| 305.0           | allowed                        | trained         | Pass      | Frequency shifted to 303.5 MHz |
| 305.5           | allowed                        | trained         | Pass      | Frequency shifted to 303.5 MHz |
| 306.0           | allowed                        | trained         | Pass      | Frequency shifted to 307.5 MHz |
| 306.5           | allowed                        | trained         | Pass      | Frequency shifted to 307.5 MHz |
| 307.0           | allowed                        | trained         | Pass      | Frequency shifted to 307.5 MHz |



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| Frequency (MHz) | Part 15 Status                 | Result          | Pass/Fail | Comments                                                                                                 |
|-----------------|--------------------------------|-----------------|-----------|----------------------------------------------------------------------------------------------------------|
| 307.5           | allowed                        | trained         | Pass      |                                                                                                          |
| 319.0           | allowed                        | trained         | Pass      |                                                                                                          |
| 320.0           | allowed                        | trained         | Pass      |                                                                                                          |
| 320.5           | allowed                        | trained         | Pass      |                                                                                                          |
| 321.0           | allowed<br>(guard band region) | trained         | Pass      |                                                                                                          |
| 322.0           | banned                         | would not train | Pass      |                                                                                                          |
| 323.0           | banned                         | would not train | Pass      |                                                                                                          |
| 324.0           | banned                         | would not train | Pass      |                                                                                                          |
| 325.0           | banned                         | would not train | Pass      |                                                                                                          |
| 326.0           | banned                         | would not train | Pass      |                                                                                                          |
| 327.0           | banned                         | would not train | Pass      |                                                                                                          |
| 328.0           | banned                         | would not train | Pass      |                                                                                                          |
| 329.0           | banned                         | would not train | Pass      |                                                                                                          |
| 330.0           | banned                         | would not train | Pass      |                                                                                                          |
| 331.0           | banned                         | would not train | Pass      |                                                                                                          |
| 332.0           | banned                         | would not train | Pass      |                                                                                                          |
| 333.0           | banned                         | would not train | Pass      |                                                                                                          |
| 334.0           | banned                         | would not train | Pass      |                                                                                                          |
| 335.0           | banned                         | would not train | Pass      |                                                                                                          |
| 336.0           | allowed<br>(guard band region) | would not train | Pass      |                                                                                                          |
| 337.0           | allowed<br>(guard band region) | trained         | Pass      |                                                                                                          |
| 338.0           | allowed                        | trained         | Pass      |                                                                                                          |
| 398.0           | allowed                        | trained         | Pass      |                                                                                                          |
| 399.0           | allowed<br>(guard band region) | would not train | Pass      | While this is a valid frequency, HomeLink guardbands this region to ensure it doesn't train to 399.9 MHz |
| 399.5           | allowed<br>(guard band region) | would not train | Pass      | While this is a valid frequency, HomeLink guardbands this region to ensure it doesn't train to 399.9 MHz |
| 400.0           | banned                         | would not train | Pass      |                                                                                                          |
| 401.0           | banned                         | would not train | Pass      |                                                                                                          |
| 402.0           | banned                         | would not train | Pass      |                                                                                                          |
| 403.0           | banned                         | would not train | Pass      |                                                                                                          |
| 404.0           | banned                         | would not train | Pass      |                                                                                                          |
| 405.0           | banned                         | would not train | Pass      |                                                                                                          |
| 406.0           | banned                         | would not train | Pass      |                                                                                                          |
| 407.0           | banned                         | would not train | Pass      |                                                                                                          |
| 408.0           | banned                         | would not train | Pass      |                                                                                                          |
| 409.0           | banned                         | would not train | Pass      |                                                                                                          |
| 410.0           | banned                         | would not train | Pass      |                                                                                                          |
| 410.5           | allowed<br>(guard band region) | would not train | Pass      |                                                                                                          |

| Frequency (MHz) | Part 15 Status              | Result          | Pass/Fail | Comments                             |
|-----------------|-----------------------------|-----------------|-----------|--------------------------------------|
| 411.0           | allowed (guard band region) | would not train | Pass      |                                      |
| 411.5           | allowed                     | trained         | Pass      |                                      |
| 412.0           | allowed                     | trained         | Pass      |                                      |
| 439.0           | allowed                     | trained         | Pass      |                                      |
| 440.0           | allowed                     | trained         | Pass      |                                      |
| 440.5           | allowed                     | would not train | Pass      | HomeLink only operates up to 440 MHz |
| 441.0           | allowed                     | would not train | Pass      | HomeLink only operates up to 440 MHz |
| 442.0           | allowed                     | would not train | Pass      | HomeLink only operates up to 440 MHz |

## 8. Verification of De-activation after 5 seconds

An exercise was undergone by the product Software Design team to verify that the device was deactivated appropriately. This device stops transmitting after 1.099s once the activation button is depressed.

## 9. Formulas and Sample Calculations

### 9.1. Adjustment to account for duty cycle

The EMI Receiver used for making the measurements in this report automatically corrects for cable correction and antenna factors using values stored in memory taken from the most recent calibration (in the case of antenna factors), periodic cable loss measurements, and preamplifier gain.

Formula 1:  $FS \text{ (dBuV/m)} = M \text{ (dBuV)} + AF \text{ (dB/m)} + CF \text{ (dB)} - AG \text{ (dB)}$

The presented field strength is computed by the EMI Receiver by taking the measured level and adding to it the antenna factor and cable loss corrections. The measurements presented were gathered using the EMI Receiver's peak-hold capability.

Formula 2:  $\text{Average Level (dBuV/m)} = \text{Peak Level (dBuV/m)} + \text{duty cycle factor (dB)}$ .

The peak measurement is adjusted to an average level by a duty cycle described below.

The duty cycle factor to apply is determined for the duty cycles of 30%, 50%, and 80% as follows:

For 30% (0.30):                      duty cycle factor (dB) =  $20 * \text{Log} (0.3) = -10.46$   
 For 50% (0.50):                      duty cycle factor (dB) =  $20 * \text{Log} (0.5) = -6.02$   
 For 80% (0.80):                      duty cycle factor (dB) =  $20 * \text{Log} (0.8) = -1.94$

Example calculation:

With the EUT programmed with a 30% duty cycle a measurement of 74 dBuV/m is taken (about 5000 uV/m), the adjusted level would be:

$$74 + (-10.46) = 63.54 \text{ dBuV/m (example)}$$

## 9.2. Calculation of ISED Limits from Table 4, RSS-210 and 47 CFR Part 15.231

The prescribed limit in the range of 260 MHz to 470 MHz is stated as a linear interpolation between 3750 uV/m and 12500 uV/m. The equation used to calculate the limit using this criterion is:

$$\text{FCC limit} = 41.67 * f - 7083.33$$

(Where 'f' is the measurement frequency in MHz.)

The limit in dBuV/m is then:

$$\text{dB limit} = 20 * \log_{10}(\text{FCC limit dBuV/m}) = 20 * \log_{10}(41.67 * f - 7083.33)$$

(log10 is used to indicate the use of a base 10 logarithm)

This results in the following limits for the fundamentals:

|        |                           |               |
|--------|---------------------------|---------------|
| 288MHz | $20 * \log_{10}(4917.6)$  | = 73.8 dBuV/m |
| 310MHz | $20 * \log_{10}(5834.4)$  | = 75.3 dBuV/m |
| 390MHz | $20 * \log_{10}(9168.0)$  | = 79.2 dBuV/m |
| 433MHz | $20 * \log_{10}(10959.8)$ | = 80.8 dBuV/m |

## 9.3 Antenna Gain

All measurements were performed radiated and therefore additional antenna gain documentation is not required.



## Appendix A

### A. Measurements of Fundamentals and Harmonics

Measurements described in this section were taken according to ANSI C63.10-2013 on the Gentex Corporation 3m test table.

\* Measurements include Cable corrections and Antenna Factors

**Measurement Settings:**

Measurement Frequency: Below 1GHz  
 Span: 500kHz or greater  
 RBW: 100/120kHz      VBW: 300kHz or 3 x RBW  
 Sweep Time: 25ms  
 Attenuation: Auto

Measurement Frequency: Above 1GHz  
 Span: 500kHz or greater  
 RBW: 1MHz      VBW: 3MHz or 3 x RBW  
 Sweep Time: 25ms  
 Attenuation: Auto

#### 1. DUT Tuned to Fund 288MHz

| Frequency<br>(MHz) | Orientation<br>(Flat/End/Side) | Measurement Polarization<br>(H/V) | Duty Cycle<br>(%) | Measurement*<br>(dBuV/m) | FCC Peak Limit<br>(dBuV/m) | Margin-Peak<br>(dB) | Duty Cycle Correction<br>(dB) | Average Level<br>(dBuV/m) | FCC Average Limit<br>(dBuV/m) | Margin-Average<br>(dB) |
|--------------------|--------------------------------|-----------------------------------|-------------------|--------------------------|----------------------------|---------------------|-------------------------------|---------------------------|-------------------------------|------------------------|
| 288                | Side                           | H                                 | 30                | 78.92                    | 93.8                       | 14.91               | -10.5                         | 68.5                      | 73.8                          | 5.37                   |
| 288                | Side                           | H                                 | 50                | 75.24                    | 93.8                       | 18.59               | -6.0                          | 69.2                      | 73.8                          | 4.61                   |
| 288                | Side                           | H                                 | 80                | 68.80                    | 93.8                       | 25.03               | -1.9                          | 66.9                      | 73.8                          | 6.97                   |

#### 2. DUT Tuned to Fund 310MHz

| Frequency<br>(MHz) | Orientation<br>(Flat/End/Side) | Measurement Polarization<br>(H/V) | Duty Cycle<br>(%) | Measurement*<br>(dBuV/m) | FCC Peak Limit<br>(dBuV/m) | Margin-Peak<br>(dB) | Duty Cycle Correction<br>(dB) | Average Level<br>(dBuV/m) | FCC Average Limit<br>(dBuV/m) | Margin-Average<br>(dB) |
|--------------------|--------------------------------|-----------------------------------|-------------------|--------------------------|----------------------------|---------------------|-------------------------------|---------------------------|-------------------------------|------------------------|
| 310                | Side                           | H                                 | 30                | 80.12                    | 95.3                       | 15.20               | -10.5                         | 69.7                      | 75.3                          | 5.66                   |
| 310                | Side                           | H                                 | 50                | 76.34                    | 95.3                       | 18.98               | -6.0                          | 70.3                      | 75.3                          | 5.00                   |
| 310                | Side                           | H                                 | 80                | 70.14                    | 95.3                       | 25.18               | -1.9                          | 68.2                      | 75.3                          | 7.12                   |

### 3. DUT Tuned to Fund 365MHz

| Frequency | Orientation     | Measurement Polarization | Duty Cycle | Measurement* | FCC Peak Limit | Margin-Peak  | Duty Cycle Correction | Average Level | FCC Average Limit | Margin-Average |
|-----------|-----------------|--------------------------|------------|--------------|----------------|--------------|-----------------------|---------------|-------------------|----------------|
| (MHz)     | (Flat/End/Side) | (H/V)                    | (%)        | (dBuV/m)     | (dBuV/m)       | (dB)         | (dB)                  | (dBuV/m)      | (dBuV/m)          | (dB)           |
| 365       | Side            | H                        | 30         | 84.10        | 98.2           | <b>14.10</b> | -10.5                 | 73.6          | 78.2              | <b>4.55</b>    |
| 365       | Side            | H                        | 50         | 79.07        | 98.2           | 19.13        | -6.0                  | 73.0          | 78.2              | 5.15           |
| 365       | Side            | H                        | 80         | 74.19        | 98.2           | 24.01        | -1.9                  | 72.3          | 78.2              | 5.94           |

### 4. DUT Tuned to Fund 430MHz

| Frequency | Orientation     | Measurement Polarization | Duty Cycle | Measurement* | FCC Peak Limit | Margin-Peak | Duty Cycle Correction | Average Level | FCC Average Limit | Margin-Average |
|-----------|-----------------|--------------------------|------------|--------------|----------------|-------------|-----------------------|---------------|-------------------|----------------|
| (MHz)     | (Flat/End/Side) | (H/V)                    | (%)        | (dBuV/m)     | (dBuV/m)       | (dB)        | (dB)                  | (dBuV/m)      | (dBuV/m)          | (dB)           |
| 430       | Side            | H                        | 30         | 85.55        | 100.7          | 15.15       | -10.5                 | 75.1          | 80.7              | 5.60           |
| 430       | Side            | H                        | 50         | 80.51        | 100.7          | 20.19       | -6.0                  | 74.5          | 80.7              | 6.21           |
| 430       | Side            | H                        | 80         | 76.99        | 100.7          | 23.71       | -1.9                  | 75.1          | 80.7              | 5.64           |

### 5. DUT Tuned to Har\_288MHz

| Frequency<br>(MHz) | Orientation<br>(Flat/End/Side) | Measurement<br>Polarization<br>(H/V) | Duty Cycle<br>(%) | Measurement*<br>(dBuV/m) | FCC Peak<br>Limit<br>(dBuV/m) | Margin-<br>Peak<br>(dB) | Duty Cycle<br>Correction<br>(dB) | Average Level<br>(dBuV/m) | FCC Average<br>Limit<br>(dBuV/m) | Margin-<br>Average<br>(dB) |
|--------------------|--------------------------------|--------------------------------------|-------------------|--------------------------|-------------------------------|-------------------------|----------------------------------|---------------------------|----------------------------------|----------------------------|
| 576                | Side                           | V                                    | 30                | 46.85                    | 73.8                          | 26.95                   | -10.5                            | 36.4                      | 53.8                             | 17.41                      |
| 576                | Side                           | V                                    | 50                | 44.14                    | 73.8                          | 29.69                   | -6.0                             | 38.1                      | 53.8                             | 15.71                      |
| 576                | Side                           | H                                    | 80                | 43.79                    | 73.8                          | 30.04                   | -1.9                             | 41.9                      | 53.8                             | 11.98                      |
| 864                | Side                           | H                                    | 30                | 42.15                    | 73.8                          | 31.68                   | -10.5                            | 31.7                      | 53.8                             | 22.14                      |
| 864                | Side                           | H                                    | 50                | 42.36                    | 73.8                          | 31.47                   | -6.0                             | 36.3                      | 53.8                             | 17.49                      |
| 864                | Side                           | H                                    | 80                | 42.15                    | 73.8                          | 31.68                   | -1.9                             | 40.2                      | 53.8                             | 13.62                      |
| 1152               | Side                           | H                                    | 30                | 33.65                    | 74.0                          | 40.35                   | -10.5                            | 23.2                      | 54.0                             | 30.81                      |
| 1152               | Side                           | H                                    | 50                | 34.26                    | 74.0                          | 39.74                   | -6.0                             | 28.2                      | 54.0                             | 25.76                      |
| 1152               | Side                           | H                                    | 80                | 34.12                    | 74.0                          | 39.88                   | -1.9                             | 32.2                      | 54.0                             | 21.82                      |
| 1440               | Side                           | H                                    | 30                | 36.21                    | 74.0                          | 37.79                   | -10.5                            | 25.8                      | 54.0                             | 28.25                      |
| 1440               | Side                           | H                                    | 50                | 35.47                    | 74.0                          | 38.53                   | -6.0                             | 29.4                      | 54.0                             | 24.55                      |
| 1440               | Side                           | H                                    | 80                | 34.77                    | 74.0                          | 39.23                   | -1.9                             | 32.8                      | 54.0                             | 21.17                      |
| 1728               | Side                           | V                                    | 30                | 35.26                    | 74.0                          | 38.74                   | -10.5                            | 24.8                      | 54.0                             | 29.20                      |
| 1728               | Side                           | V                                    | 50                | 34.78                    | 74.0                          | 39.22                   | -6.0                             | 28.8                      | 54.0                             | 25.24                      |
| 1728               | Side                           | H                                    | 80                | 34.26                    | 74.0                          | 39.74                   | -1.9                             | 32.3                      | 54.0                             | 21.68                      |
| 2016               | Side                           | V                                    | 30                | 40.9                     | 73.8                          | 32.93                   | -10.5                            | 30.4                      | 53.8                             | 23.39                      |
| 2016               | Side                           | V                                    | 50                | 39.88                    | 73.8                          | 33.95                   | -6.0                             | 33.9                      | 53.8                             | 19.97                      |
| 2016               | Side                           | V                                    | 80                | 38.56                    | 73.8                          | 35.27                   | -1.9                             | 36.6                      | 53.8                             | 17.21                      |
| 2304               | Side                           | H                                    | 30                | 36.02                    | 74.0                          | 37.98                   | -10.5                            | 25.6                      | 54.0                             | 28.44                      |
| 2304               | Side                           | H                                    | 50                | 35.65                    | 74.0                          | 38.35                   | -6.0                             | 29.6                      | 54.0                             | 24.37                      |
| 2304               | Side                           | H                                    | 80                | 35.89                    | 74.0                          | 38.11                   | -1.9                             | 34.0                      | 54.0                             | 20.05                      |
| 2592               | Side                           | H                                    | 30                | 36.34                    | 74.0                          | 37.66                   | -10.5                            | 25.9                      | 54.0                             | 28.12                      |
| 2592               | Side                           | H                                    | 50                | 36.54                    | 74.0                          | 37.46                   | -6.0                             | 30.5                      | 54.0                             | 23.48                      |
| 2592               | Side                           | H                                    | 80                | 35.24                    | 74.0                          | 38.76                   | -1.9                             | 33.3                      | 54.0                             | 20.70                      |
| 2880               | Side                           | V                                    | 30                | 38.92                    | 74.0                          | 35.08                   | -10.5                            | 28.5                      | 54.0                             | 25.54                      |
| 2880               | Side                           | V                                    | 50                | 37.56                    | 74.0                          | 36.44                   | -6.0                             | 31.5                      | 54.0                             | 22.46                      |
| 2880               | Side                           | V                                    | 80                | 38.02                    | 74.0                          | 35.98                   | -1.9                             | 36.1                      | 54.0                             | 17.92                      |

**6. DUT Tuned to Har\_310MHz**

| Frequency<br>(MHz) | Orientation<br>(Flat/End/Side) | Measurement<br>Polarization<br>(H/V) | Duty Cycle<br>(%) | Measurement*<br>(dBuV/m) | FCC Peak<br>Limit<br>(dBuV/m) | Margin-<br>Peak<br>(dB) | Duty Cycle<br>Correction<br>(dB) | Average Level<br>(dBuV/m) | FCC Average<br>Limit<br>(dBuV/m) | Margin-<br>Average<br>(dB) |
|--------------------|--------------------------------|--------------------------------------|-------------------|--------------------------|-------------------------------|-------------------------|----------------------------------|---------------------------|----------------------------------|----------------------------|
| 620                | Side                           | V                                    | 30                | 46.82                    | 75.3                          | 28.48                   | -10.5                            | 36.4                      | 55.3                             | 18.94                      |
| 620                | Side                           | H                                    | 50                | 45.01                    | 75.3                          | 30.29                   | -6.0                             | 39.0                      | 55.3                             | 16.31                      |
| 620                | Side                           | H                                    | 80                | 44.96                    | 75.3                          | 30.34                   | -1.9                             | 43.0                      | 55.3                             | 12.28                      |
| 930                | Side                           | H                                    | 30                | 50.23                    | 74.0                          | 23.77                   | -10.5                            | 39.8                      | 54.0                             | 14.23                      |
| 930                | Side                           | H                                    | 50                | 47.26                    | 74.0                          | 26.74                   | -6.0                             | 41.2                      | 54.0                             | 12.76                      |
| 930                | Side                           | H                                    | 80                | 45.22                    | 74.0                          | 28.78                   | -1.9                             | 43.3                      | 54.0                             | 10.72                      |
| 1240               | Side                           | V                                    | 30                | 33.97                    | 74.0                          | 40.03                   | -10.5                            | 23.5                      | 54.0                             | 30.49                      |
| 1240               | Side                           | V                                    | 50                | 33.24                    | 74.0                          | 40.76                   | -6.0                             | 27.2                      | 54.0                             | 26.78                      |
| 1240               | Side                           | V                                    | 80                | 33.47                    | 74.0                          | 40.53                   | -1.9                             | 31.5                      | 54.0                             | 22.47                      |
| 1550               | Side                           | H                                    | 30                | 38.82                    | 74.0                          | 35.18                   | -10.5                            | 28.4                      | 54.0                             | 25.64                      |
| 1550               | Side                           | H                                    | 50                | 36.88                    | 74.0                          | 37.12                   | -6.0                             | 30.9                      | 54.0                             | 23.14                      |
| 1550               | Side                           | H                                    | 80                | 34.26                    | 74.0                          | 39.74                   | -1.9                             | 32.3                      | 54.0                             | 21.68                      |
| 1860               | Side                           | V                                    | 30                | 38.24                    | 75.3                          | 37.06                   | -10.5                            | 27.8                      | 55.3                             | 27.52                      |
| 1860               | Side                           | V                                    | 50                | 35.66                    | 75.3                          | 39.64                   | -6.0                             | 29.6                      | 55.3                             | 25.66                      |
| 1860               | Side                           | V                                    | 80                | 34.85                    | 75.3                          | 40.45                   | -1.9                             | 32.9                      | 55.3                             | 22.39                      |
| 2170               | Side                           | V                                    | 30                | 43.28                    | 74.0                          | 30.72                   | -10.5                            | 32.8                      | 54.0                             | 21.18                      |
| 2170               | Side                           | V                                    | 50                | 42.01                    | 74.0                          | 31.99                   | -6.0                             | 36.0                      | 54.0                             | 18.01                      |
| 2170               | Side                           | V                                    | 80                | 39.98                    | 74.0                          | 34.02                   | -1.9                             | 38.0                      | 54.0                             | 15.96                      |
| 2480               | Side                           | V                                    | 30                | 39.55                    | 74.0                          | 34.45                   | -10.5                            | 29.1                      | 54.0                             | 24.91                      |
| 2480               | Side                           | H                                    | 50                | 38.78                    | 74.0                          | 35.22                   | -6.0                             | 32.8                      | 54.0                             | 21.24                      |
| 2480               | Side                           | H                                    | 80                | 37.68                    | 74.0                          | 36.32                   | -1.9                             | 35.7                      | 54.0                             | 18.26                      |
| 2790               | Side                           | V                                    | 30                | 41.06                    | 74.0                          | 32.94                   | -10.5                            | 30.6                      | 54.0                             | 23.40                      |
| 2790               | Side                           | V                                    | 50                | 40.66                    | 74.0                          | 33.34                   | -6.0                             | 34.6                      | 54.0                             | 19.36                      |
| 2790               | Side                           | V                                    | 80                | 39.78                    | 74.0                          | 34.22                   | -1.9                             | 37.8                      | 54.0                             | 16.16                      |
| 3100               | Side                           | V                                    | 30                | 42.45                    | 75.3                          | 32.85                   | -10.5                            | 32.0                      | 55.3                             | 23.31                      |
| 3100               | Side                           | V                                    | 50                | 41.66                    | 75.3                          | 33.64                   | -6.0                             | 35.6                      | 55.3                             | 19.66                      |
| 3100               | Side                           | V                                    | 80                | 40.87                    | 75.3                          | 34.43                   | -1.9                             | 38.9                      | 55.3                             | 16.37                      |



**7. DUT Tuned to Har\_365MHz**

| Frequency (MHz) | Orientation (Flat/End/Side) | Measurement Polarization (H/V) | Duty Cycle (%) | Measurement* (dBuV/m) | FCC Peak Limit (dBuV/m) | Margin-Peak (dB) | Duty Cycle Correction (dB) | Average Level (dBuV/m) | FCC Average Limit (dBuV/m) | Margin-Average (dB) |
|-----------------|-----------------------------|--------------------------------|----------------|-----------------------|-------------------------|------------------|----------------------------|------------------------|----------------------------|---------------------|
| 730             | Side                        | V                              | 30             | 47.86                 | 78.2                    | 30.34            | -10.5                      | 37.4                   | 58.2                       | 20.80               |
| 730             | Side                        | V                              | 50             | 45.57                 | 78.2                    | 32.63            | -6.0                       | 39.5                   | 58.2                       | 18.65               |
| 730             | Side                        | H                              | 80             | 44.86                 | 78.2                    | 33.34            | -1.9                       | 42.9                   | 58.2                       | 15.28               |
| 1095            | Side                        | H                              | 30             | 38.79                 | 74.0                    | 35.21            | -10.5                      | 28.3                   | 54.0                       | 25.67               |
| 1095            | Side                        | H                              | 50             | 35.66                 | 74.0                    | 38.34            | -6.0                       | 29.6                   | 54.0                       | 24.36               |
| 1095            | Side                        | H                              | 80             | 33.28                 | 74.0                    | 40.72            | -1.9                       | 31.3                   | 54.0                       | 22.66               |
| 1460            | Side                        | H                              | 30             | 35.11                 | 74.0                    | 38.89            | -10.5                      | 24.7                   | 54.0                       | 29.35               |
| 1460            | Side                        | H                              | 50             | 34.23                 | 74.0                    | 39.77            | -6.0                       | 28.2                   | 54.0                       | 25.79               |
| 1460            | Side                        | H                              | 80             | 33.21                 | 74.0                    | 40.79            | -1.9                       | 31.3                   | 54.0                       | 22.73               |
| 1825            | Side                        | V                              | 30             | 47.81                 | 74.0                    | 26.19            | -10.5                      | 37.4                   | 54.0                       | 16.65               |
| 1825            | Side                        | V                              | 50             | 43.83                 | 74.0                    | 30.17            | -6.0                       | 37.8                   | 54.0                       | 16.19               |
| 1825            | Side                        | V                              | 80             | 40.75                 | 74.0                    | 33.25            | -1.9                       | 38.8                   | 54.0                       | 15.19               |
| 2190            | Side                        | V                              | 30             | 40.96                 | 74.0                    | 33.04            | -10.5                      | 30.5                   | 54.0                       | 23.50               |
| 2190            | Side                        | V                              | 50             | 40.22                 | 74.0                    | 33.78            | -6.0                       | 34.2                   | 54.0                       | 19.80               |
| 2190            | Side                        | V                              | 80             | 39.54                 | 74.0                    | 34.46            | -1.9                       | 37.6                   | 54.0                       | 16.40               |
| 2555            | Side                        | V                              | 30             | 49.52                 | 74.0                    | 24.48            | -10.5                      | 39.1                   | 54.0                       | 14.94               |
| 2555            | Side                        | V                              | 50             | 45.49                 | 74.0                    | 28.51            | -6.0                       | 39.5                   | 54.0                       | 14.53               |
| 2555            | Side                        | V                              | 80             | 42.51                 | 74.0                    | 31.49            | -1.9                       | 40.6                   | 54.0                       | 13.43               |
| 2920            | Side                        | H                              | 30             | 43.77                 | 74.0                    | 30.23            | -10.5                      | 33.3                   | 54.0                       | 20.69               |
| 2920            | Side                        | H                              | 50             | 42.17                 | 74.0                    | 31.83            | -6.0                       | 36.1                   | 54.0                       | 17.85               |
| 2920            | Side                        | H                              | 80             | 40.7                  | 74.0                    | 33.30            | -1.9                       | 38.8                   | 54.0                       | 15.24               |
| 3285            | Side                        | H                              | 30             | 40.92                 | 74.0                    | 33.08            | -10.5                      | 30.5                   | 54.0                       | 23.54               |
| 3285            | Side                        | H                              | 50             | 40.22                 | 74.0                    | 33.78            | -6.0                       | 34.2                   | 54.0                       | 19.80               |
| 3285            | Side                        | H                              | 80             | 38.54                 | 74.0                    | 35.46            | -1.9                       | 36.6                   | 54.0                       | 17.40               |
| 3650            | Side                        | H                              | 30             | 46.02                 | 74.0                    | 27.98            | -10.5                      | 35.6                   | 54.0                       | 18.44               |
| 3650            | Side                        | H                              | 50             | 45.66                 | 74.0                    | 28.34            | -6.0                       | 39.6                   | 54.0                       | 14.36               |
| 3650            | Side                        | H                              | 80             | 45.65                 | 74.0                    | 28.35            | -1.9                       | 43.7                   | 54.0                       | <b>10.29</b>        |

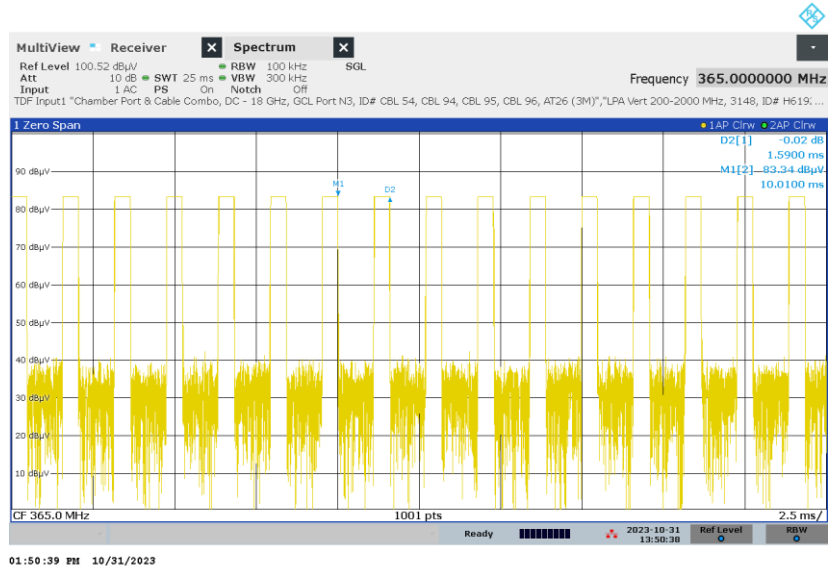
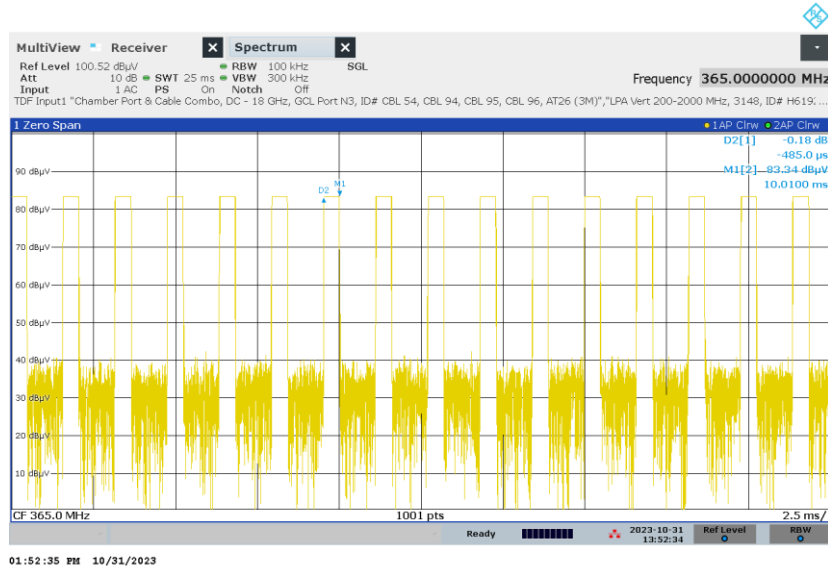
**8. DUT Tuned to Har\_430MHz**

| Frequency<br>(MHz) | Orientation<br>(Flat/End/Side) | Measurement<br>Polarization<br>(H/V) | Duty Cycle<br>(%) | Measurement*<br>(dBuV/m) | FCC Peak<br>Limit<br>(dBuV/m) | Margin-<br>Peak<br>(dB) | Duty Cycle<br>Correction<br>(dB) | Average Level<br>(dBuV/m) | FCC Limit<br>(dBuV/m) | Margin<br>(dB) |
|--------------------|--------------------------------|--------------------------------------|-------------------|--------------------------|-------------------------------|-------------------------|----------------------------------|---------------------------|-----------------------|----------------|
| 860                | Side                           | H                                    | 30                | 48.8                     | 80.8                          | 32.00                   | -10.5                            | 38.3                      | 60.8                  | 22.46          |
| 860                | Side                           | H                                    | 50                | 47.52                    | 80.8                          | 33.28                   | -6.0                             | 41.5                      | 60.8                  | 19.30          |
| 860                | Side                           | V                                    | 80                | 47.7                     | 80.8                          | 33.10                   | -1.9                             | 45.8                      | 60.8                  | 15.04          |
| 1290               | Side                           | H                                    | 30                | 38.29                    | 74.0                          | 35.71                   | -10.5                            | 27.8                      | 54.0                  | 26.17          |
| 1290               | Side                           | H                                    | 50                | 36.39                    | 74.0                          | 37.61                   | -6.0                             | 30.4                      | 54.0                  | 23.63          |
| 1290               | Side                           | H                                    | 80                | 34.69                    | 74.0                          | 39.31                   | -1.9                             | 32.8                      | 54.0                  | 21.25          |
| 1720               | Side                           | V                                    | 30                | 35.86                    | 74.0                          | 38.14                   | -10.5                            | 25.4                      | 54.0                  | 28.60          |
| 1720               | Side                           | V                                    | 50                | 34.22                    | 74.0                          | 39.78                   | -6.0                             | 28.2                      | 54.0                  | 25.80          |
| 1720               | Side                           | H                                    | 80                | 33.74                    | 74.0                          | 40.26                   | -1.9                             | 31.8                      | 54.0                  | 22.20          |
| 2150               | Side                           | V                                    | 30                | 53.1                     | 80.8                          | 27.70                   | -10.5                            | 42.6                      | 60.8                  | 18.16          |
| 2150               | Side                           | V                                    | 50                | 48.78                    | 80.8                          | 32.02                   | -6.0                             | 42.8                      | 60.8                  | 18.04          |
| 2150               | Side                           | V                                    | 80                | 46.94                    | 80.8                          | 33.86                   | -1.9                             | 45.0                      | 60.8                  | 15.80          |
| 2580               | Side                           | V                                    | 30                | 44.34                    | 74.0                          | 29.66                   | -10.5                            | 33.9                      | 54.0                  | 20.12          |
| 2580               | Side                           | V                                    | 50                | 42.33                    | 74.0                          | 31.67                   | -6.0                             | 36.3                      | 54.0                  | 17.69          |
| 2580               | Side                           | V                                    | 80                | 40.23                    | 74.0                          | 33.77                   | -1.9                             | 38.3                      | 54.0                  | 15.71          |
| 3010               | Side                           | H                                    | 30                | 51.28                    | 74.0                          | <b>22.72</b>            | -10.5                            | 40.8                      | 54.0                  | 13.18          |
| 3010               | Side                           | H                                    | 50                | 46.07                    | 74.0                          | 27.93                   | -6.0                             | 40.0                      | 54.0                  | 13.95          |
| 3010               | Side                           | H                                    | 80                | 43.16                    | 74.0                          | 30.84                   | -1.9                             | 41.2                      | 54.0                  | 12.78          |
| 3440               | Side                           | V                                    | 30                | 44.73                    | 74.0                          | 29.27                   | -10.5                            | 34.3                      | 54.0                  | 19.73          |
| 3440               | Side                           | V                                    | 50                | 44.26                    | 74.0                          | 29.74                   | -6.0                             | 38.2                      | 54.0                  | 15.76          |
| 3440               | Side                           | V                                    | 80                | 42.14                    | 74.0                          | 31.86                   | -1.9                             | 40.2                      | 54.0                  | 13.80          |
| 3870               | Side                           | V                                    | 30                | 43.62                    | 74.0                          | 30.38                   | -10.5                            | 33.2                      | 54.0                  | 20.84          |
| 3870               | Side                           | H                                    | 50                | 40.32                    | 74.0                          | 33.68                   | -6.0                             | 34.3                      | 54.0                  | 19.70          |
| 3870               | Side                           | H                                    | 80                | 41.65                    | 74.0                          | 32.35                   | -1.9                             | 39.7                      | 54.0                  | 14.29          |
| 4300               | Side                           | H                                    | 30                | 43.08                    | 74.0                          | 30.92                   | -10.5                            | 32.6                      | 54.0                  | 21.38          |
| 4300               | Side                           | H                                    | 50                | 42.65                    | 74.0                          | 31.35                   | -6.0                             | 36.6                      | 54.0                  | 17.37          |
| 4300               | Side                           | H                                    | 80                | 41.6                     | 74.0                          | 32.40                   | -1.9                             | 39.7                      | 54.0                  | 14.34          |

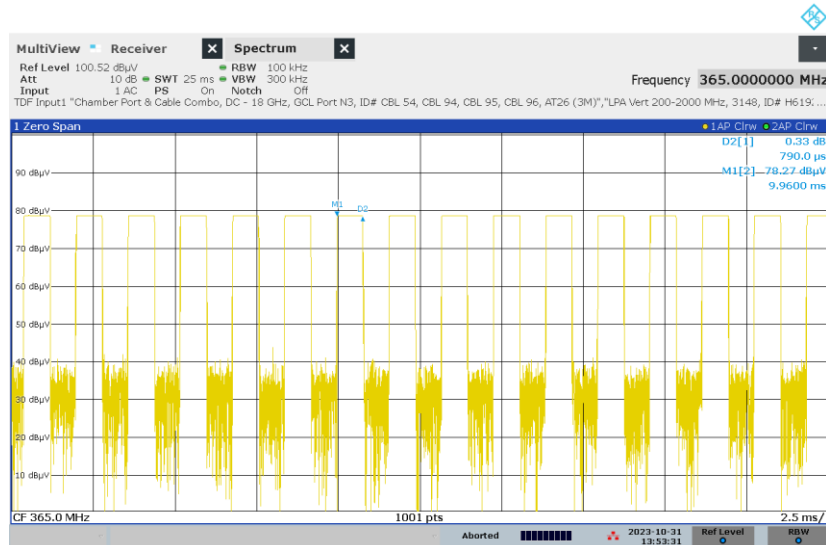
### 9. Pulsed Operation

The Homelink® transmitter tested here transmits pulses using amplitude modulation with varying duty cycle. Verification of pulse operation at 30, 50 and 80% duty cycles are provided here. Measurements were taken at 365 MHz with the span set to zero on the R&S ESR26 EMI Receiver. The modulation frequency is 500Hz.

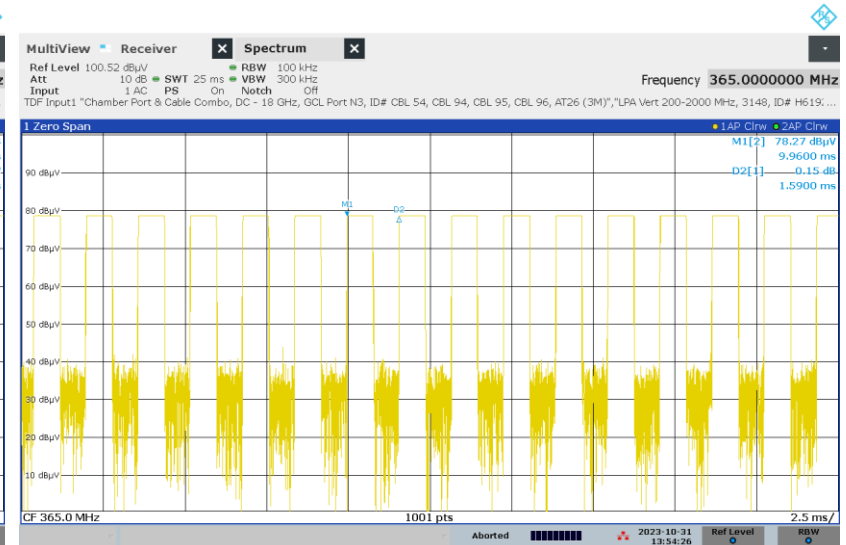
#### a. 30% Duty Cycle



## 50% Duty Cycle



01:53:32 PM 10/31/2023

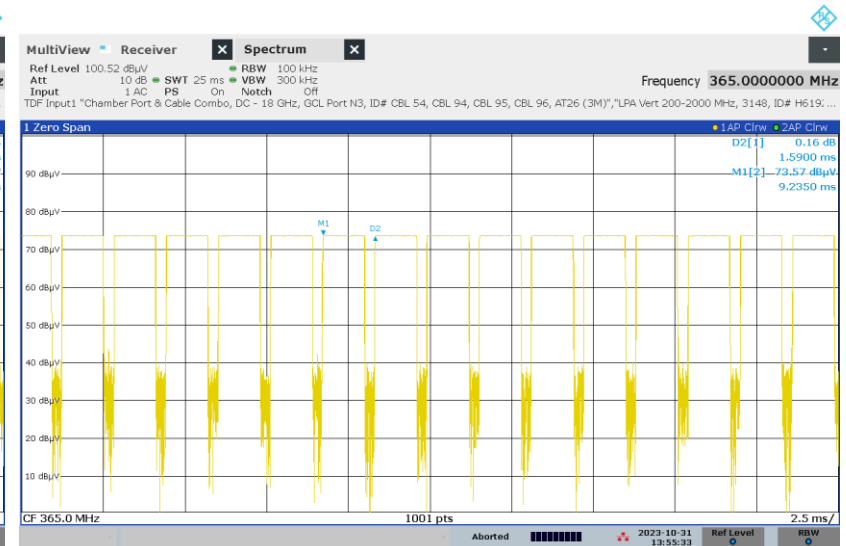


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**b. 80% Duty Cycle**



01:55:10 PM 10/31/2023



01:55:33 PM 10/31/2023

## 10. Occupied Bandwidth

Occupied bandwidth measurements were taken at 288, 310, 365 and 430MHz. The occupied bandwidth was determined using the -20dB and 99% measurement methods.

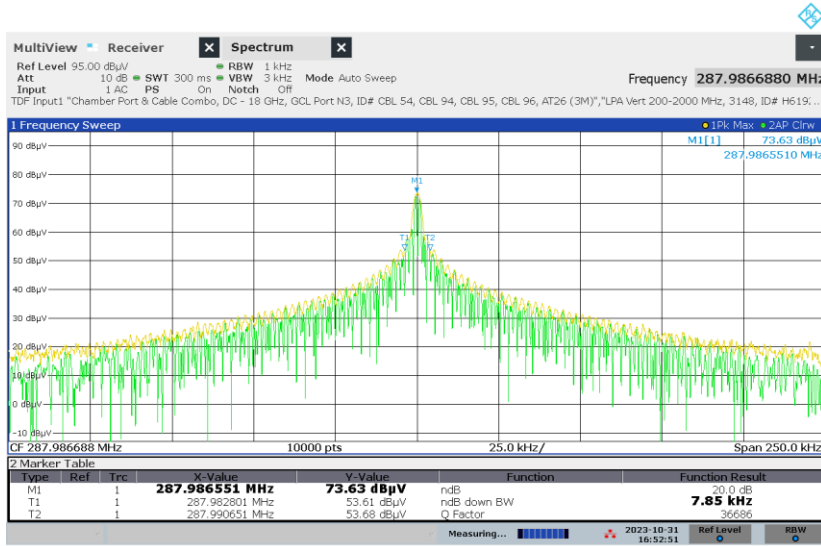
### a. -20dB Occupied Bandwidth Measurement

| <b>-20dB Occupied Bandwidth</b> |                |                          |             |               |
|---------------------------------|----------------|--------------------------|-------------|---------------|
| Frequency (MHz)                 | Duty Cycle (%) | Occupied Bandwidth (kHz) | Limit (kHz) | Margin        |
| 288                             | 30             | 7.85                     | 720         | <b>712.15</b> |
|                                 | 50             | 5.58                     | 720         | 714.42        |
|                                 | 80             | 5.35                     | 720         | 714.65        |
| 310                             | 30             | 7.83                     | 775         | 767.17        |
|                                 | 50             | 5.63                     | 775         | 769.37        |
|                                 | 80             | 5.40                     | 775         | 769.60        |
| 365                             | 30             | 7.80                     | 912.5       | 904.70        |
|                                 | 50             | 5.63                     | 912.5       | 906.87        |
|                                 | 80             | 5.40                     | 912.5       | 907.10        |
| 430                             | 30             | 7.88                     | 1082.5      | 1074.62       |
|                                 | 50             | 5.63                     | 1082.5      | 1076.87       |
|                                 | 80             | 5.40                     | 1082.5      | 1077.10       |

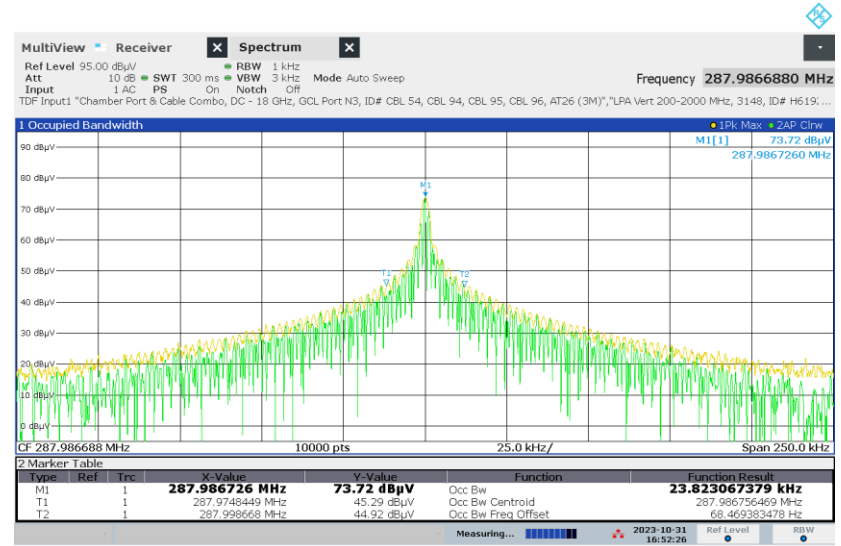
**b. 99% Occupied Bandwidth Measurement**

| 99% Occupied Bandwidth |                |                          |             |               |
|------------------------|----------------|--------------------------|-------------|---------------|
| Frequency (MHz)        | Duty Cycle (%) | Occupied Bandwidth (kHz) | Limit (kHz) | Margin        |
| 288                    | 30             | 23.80                    | 720         | <b>696.20</b> |
|                        | 50             | 15.45                    | 720         | 704.55        |
|                        | 80             | 20.60                    | 720         | 699.40        |
| 310                    | 30             | 23.35                    | 775         | 751.65        |
|                        | 50             | 15.08                    | 775         | 759.92        |
|                        | 80             | 20.13                    | 775         | 754.87        |
| 365                    | 30             | 23.08                    | 912.5       | 889.42        |
|                        | 50             | 15.08                    | 912.5       | 897.42        |
|                        | 80             | 18.51                    | 912.5       | 893.99        |
| 430                    | 30             | 23.09                    | 1082.5      | 1059.41       |
|                        | 50             | 15.08                    | 1082.5      | 1067.42       |
|                        | 80             | 17.93                    | 1082.5      | 1064.57       |

## C. Occupied Bandwidth Worst-Case Screenshot



**20dB BW**



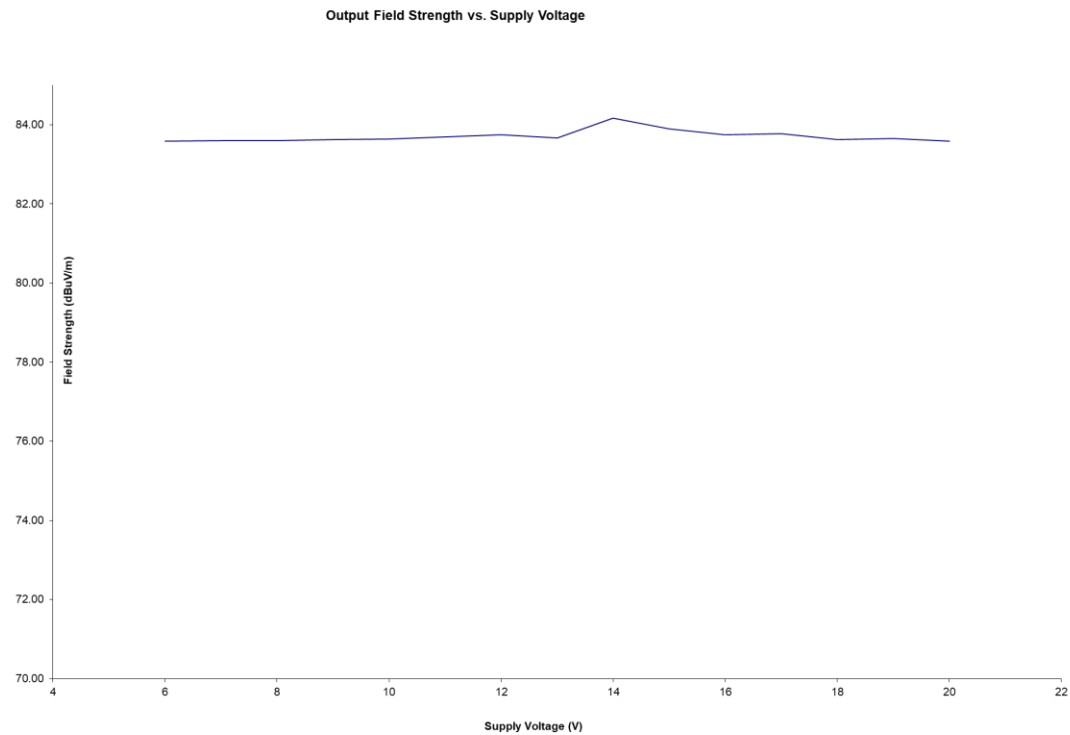
**99% BW**



## 11. Variation of Supply Voltage

Measurements of the variation in output field strength due to variation in the supply voltage were taken in accordance with 15.231(e). The DUT was configured to transmit at the peak frequency, 365MHz, 30% Duty Cycle. Values presented are not corrected for duty cycle.

### a. Plot of output power over supply voltage



**b. Output Power as a Function of Supply Voltage**

| Voltage | Field Strength (dBuV/m) | Frequency (MHz) |
|---------|-------------------------|-----------------|
| 6       | 83.59                   | 365             |
| 7       | 83.60                   |                 |
| 8       | 83.60                   |                 |
| 9       | 83.62                   |                 |
| 10      | 83.64                   |                 |
| 11      | 83.69                   |                 |
| 12      | 83.74                   |                 |
| 13      | 83.66                   |                 |
| 14      | 84.16                   |                 |
| 15      | 83.89                   |                 |
| 16      | 83.75                   |                 |
| 17      | 83.77                   |                 |
| 18      | 83.62                   |                 |
| 19      | 83.65                   |                 |
| 20      | 83.58                   |                 |