# FCC PART 15, SUBPART C

# TEST REPORT

For

# Tesla Motors, Inc.

47400 Kato Rd.,
Fremont, CA 94538, USA

## FCC ID: 2AEIM-1616631-XX

| **Report Type:** Original Report | **Product Type:** Radar Sensor Module |
|---|---|

| | |
|---|---|
| **Prepared By:** | Libass Thiaw<br>RF Test Engineer |
| **Report Number:** | R2411251-255 |
| **Report Date:** | 2025-02-28 |
| **Reviewed By:** | Christian McCaig<br>RF Lead Engineer |

Bay Area Compliance Laboratories Corp.
1274 Anvilwood Ave.,
Sunnyvale, CA 94089, USA
Tel: +1 (408) 732-9162, Fax: +1 (408) 732-9164

ACCREDITED
CERTIFICATE #3297.02

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# DOCUMENT REVISION HISTORY

| Revision Number | Report Number | Description of Revision | Date of Revision |
|---|---|---|---|
| 0 | R2411251-255 | Original Report | 2025-02-28 |

# 1 General Description

## 1.1 Product Description for Equipment Under Test (EUT)

This test report was prepared on behalf of *Tesla Motors, Inc,* and their product model*: mmWave Radar Sensor, FCC ID: 2AEIM-1616631-XX,* or the "EUT" as referred to in this report. The equipment under test (EUT) was a Radar Sensor Module operating in 60 GHz band (60-64 GHz).

The EUT measures 8.4 cm (L) x 12.0 cm (W) x 5.2 cm (H) and approximately 0.3 kg

Serial Number ACP2412900000

## 1.2 Objective

This report was prepared on behalf of *Tesla Motors, Inc*, in accordance with Part 2, Subpart J, Part 15, Subpart C of the Federal Communication Commission's rules.

The objective was to determine compliance with FCC Part 15.255 for RF Exposure, Fundamental EIRP, Power, Timing Requirements, Bandwidth, Radiated Spurious Emissions, and Frequency Tolerance.

## 1.3 Related Submittal(s)/Grant(s)

N/A

## 1.4 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.10-2020, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

## 1.5 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

| Parameter | Measurement uncertainty |
|---|---|
| Occupied Channel Bandwidth | ±5 % |
| RF output power, conducted | ±0.57 dB |
| Power Spectral Density, conducted | ±1.48dB |
| Unwanted Emissions, conducted | ±1.57dB |
| All emissions, radiated | ±4.0 dB |
| AC power line Conducted Emission | ±2.0 dB |
| Temperature | ±2 º C |
| Humidity | ±5 % |
| DC and low frequency voltages | ±1.0 % |
| Time | ±2 % |
| Duty Cycle | ±3 % |

## 1.6 Test Facility Registrations

BACLs test facilities that are used to perform Radiated and Conducted Emissions tests are currently recognized by the Federal Communications Commission as Accredited with NIST Designation Number US1129.

BACL's test facilities that are used to perform Radiated and Conducted Emissions tests are currently registered with Industry Canada under Registration Numbers: 3062A.

BACL is a Chinese Taipei Bureau of Standards Metrology and Inspection (BSMI) validated Conformity Assessment Body (CAB), under Appendix B, Phase I Procedures of the APEC Mutual Recognition Arrangement (MRA). BACL's BSMI Lab Code Number is: SL2-IN-E-1002R

BACL's test facilities that are used to perform AC Line Conducted Emissions, Telecommunications Line Conducted Emissions, Radiated Emissions from 30 MHz to 1 GHz, and Radiated Emissions from 1 GHz to 6 GHz are currently recognized as Accredited in accordance with the Voluntary Control Council for Interference [VCCI] Article 15 procedures under Registration Number A-0428.

## 1.7 Test Facility Accreditations

Bay Area Compliance Laboratories Corp. (BACL) is:

**A-** ***An independent, 3rd-Party, Commercial Test Laboratory accredited to ISO/IEC 17025:2017 by A2LA (Test Laboratory Accreditation Certificate Number 3297.02),*** in the fields of: Electromagnetic Compatibility and Telecommunications. Unless noted by an Asterisk (*) in the Compliance Matrix (See Section 3 of this Test Report), BACL's ISO/IEC 17025:2017 Scope of Accreditation includes all of the Test Method Standards and/or the Product Family Standards detailed in this Test Report..

BACL's ISO/IEC 17025:2017 Scope of Accreditation includes a comprehensive suite of EMC Emissions, EMC Immunity, Radio, RF Exposure, Safety and wireline Telecommunications test methods applicable to a wide range of product categories. These product categories include Central Office Telecommunications Equipment [including NEBS - Network Equipment Building Systems], Unlicensed and Licensed Wireless and RF devices, Information Technology Equipment (ITE); Telecommunications Terminal Equipment (TTE); Medical Electrical Equipment; Industrial, Scientific and Medical Test Equipment; Professional Audio and Video Equipment; Industrial and Scientific Instruments and Laboratory Apparatus; Cable Distribution Systems, and Energy Efficient Lighting.

**B-** ***A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3297.03)*** to certify

- For the USA (Federal Communications Commission):
    1- All Unlicensed radio frequency devices within FCC Scopes A1, A2, A3, and A4;
    2- All Licensed radio frequency devices within FCC Scopes B1, B2, B3, and B4;
    3- All Telephone Terminal Equipment within FCC Scope C.
- For the Canada (Industry Canada):
    1 All Scope 1-Licence-Exempt Radio Frequency Devices;
    2 All Scope 2-Licensed Personal Mobile Radio Services;
    3 All Scope 3-Licensed General Mobile & Fixed Radio Services;
    4 All Scope 4-Licensed Maritime & Aviation Radio Services;
    5 All Scope 5-Licensed Fixed Microwave Radio Services
    6 All Broadcasting Technical Standards (BETS) in the Category I Equipment Standards List.
- For Singapore (Info-Communications Development Authority (IDA)):
    1 All Line Terminal Equipment: All Technical Specifications for Line Terminal Equipment – Table 1 of IDA MRA Recognition Scheme: 2011, Annex 2
    2. All Radio-Communication Equipment: All Technical Specifications for Radio-Communication Equipment – Table 2 of IDA MRA Recognition Scheme: 2011, Annex 2

- For the Hong Kong Special Administrative Region:
    1 All Radio Equipment, per KHCA 10XX-series Specifications;
    2 All GMDSS Marine Radio Equipment, per HKCA 12XX-series Specifications;
    3 All Fixed Network Equipment, per HKCA 20XX-series Specifications.
- For Japan:
    1 MIC Telecommunication Business Law (Terminal Equipment):
        - All Scope A1 - Terminal Equipment for the Purpose of Calls;
        - All Scope A2 - Other Terminal Equipment
    2 Radio Law (Radio Equipment):
        - All Scope B1 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 1 of the Radio Law
        - All Scope B2 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 2 of the Radio Law
        - All Scope B3 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 3 of the Radio Law

**C-** ***A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3297.01)*** to certify Products to USA's Environmental Protection Agency (EPA) ENERGY STAR Product Specifications for:

1 Electronics and Office Equipment:
- for Telephony (ver. 3.0)
- for Audio/Video (ver. 3.0)
- for Battery Charging Systems (ver. 1.1)
- for Set-top Boxes & Cable Boxes (ver. 4.1)
- for Televisions (ver. 6.1)
- for Computers (ver. 6.0)
- for Displays (ver. 6.0)
- for Imaging Equipment (ver. 2.0)
- for Computer Servers (ver. 2.0)

2 Commercial Food Service Equipment
- for Commercial Dishwashers (ver. 2.0)
- for Commercial Ice Machines (ver. 2.0)
- for Commercial Ovens (ver. 2.1)
- for Commercial Refrigerators and Freezers

3 Lighting Products
- For Decorative Light Strings (ver. 1.5)
- For Luminaires (including sub-components) and Lamps (ver. 1.2)
- For Compact Fluorescent Lamps (CFLs) (ver. 4.3)
- For Integral LED Lamps (ver. 1.4)

4 Heating, Ventilation, and AC Products
- for Residential Ceiling Fans (ver. 3.0)
- for Residential Ventilating Fans (ver. 3.2)

5 Other
- For Water Coolers (ver. 3.0)

**D-** ***A NIST Designated Phase-I and Phase-II Conformity Assessment Body (CAB) for the following economies and regulatory authorities under the terms of the stated MRAs/Treaties:***

- Australia: ACMA (Australian Communication and Media Authority) – APEC Tel MRA -Phase I;
- Canada: (Innovation, Science and Economic development Canada - ISED) Foreign Certification Body – FCB – APEC Tel MRA -Phase I & Phase II;
- Chinese Taipei (Republic of China – Taiwan):
    - BSMI (Bureau of Standards, Metrology and Inspection) APEC Tel MRA -Phase I;
    - NCC (National Communications Commission) APEC Tel MRA -Phase I;
- European Union:

  - EMC Directive 2014/30/EU US-EU EMC & Telecom MRA CAB (NB)
  - Radio Equipment (RE) Directive 2014/53/EU US-EU EMC & Telecom MRA CAB (NB)
  - Low Voltage Directive (LVD) 2014/35/EU
- Hong Kong Special Administrative Region: (Office of the Telecommunications Authority – OFTA) APEC Tel MRA -Phase I & Phase II
- Israel – US-Israel MRA Phase I
- Republic of Korea (Ministry of Communications - Radio Research Laboratory) APEC Tel MRA -Phase I
- Singapore: (Infocomm Media Development Authority - IMDA) APEC Tel MRA -Phase I & Phase II;
- Japan: VCCI - Voluntary Control Council for Interference US-Japan Telecom Treaty VCCI Side Letter-
- USA:
  - ENERGY STAR Recognized Test Laboratory – US EPA
  - Telecommunications Certification Body (TCB) – US FCC;
  - Nationally Recognized Test Laboratory (NRTL) – US OSHA

# 2 System Test Configuration

## 2.1 Justification

The EUT was configured for testing according ANSI C63.10-2020

The EUT was tested in a testing mode to represent worst-case results during the final qualification test.

## 2.2 EUT Exercise Software

The test firmware was provided by Tesla Motors, Inc. The device instantly transmits when turned on.

| Frequency (GHz) | Power Setting |
|---|---|
| 60-64 | Default |

## 2.3 Timing Requirement

According to FCC §15.255 (c)(2)(iii)(A), the sum of continuous transmitter off-times of at least two milliseconds shall equal at least 25.5 milliseconds within any contiguous interval of 33 milliseconds.

| Number of Pulses per 33ms | Pulse Width (ms) | Total ON Time (ms) | OFF Time (ms) | OFF Time Limit (ms) |
|---|---|---|---|---|
| 16 | 0.000801 | 0.0128 | 32.99 | ≥25.50 |

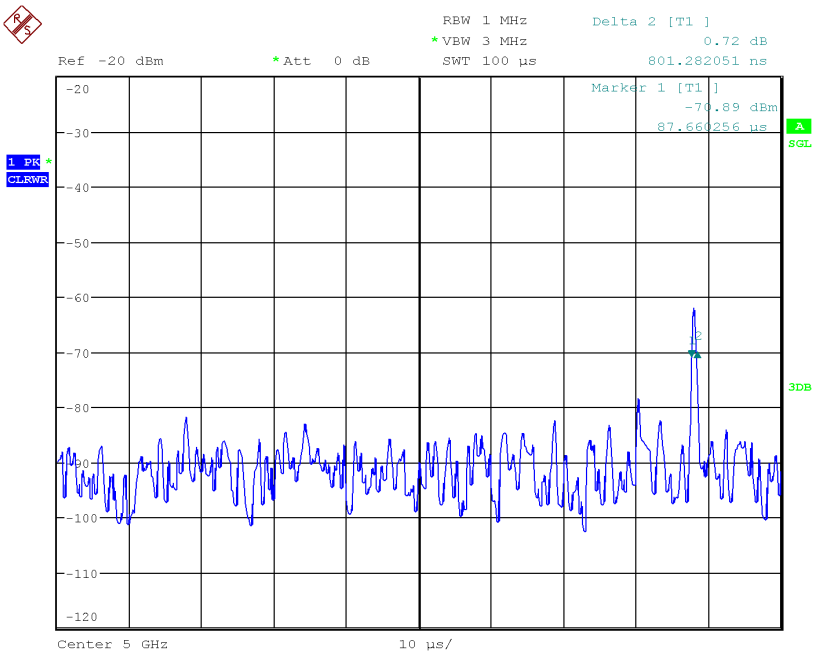
***Note:*** *Total ON Time (ms) = (Number of Pulses per 33ms) x (Pulse Width (ms))*

***Note:*** *OFF Time (ms) = 33 ms – Total ON Time (ms)*

The EUT met the requirements.

Please refer to the following plots for details.

## Pulse Width

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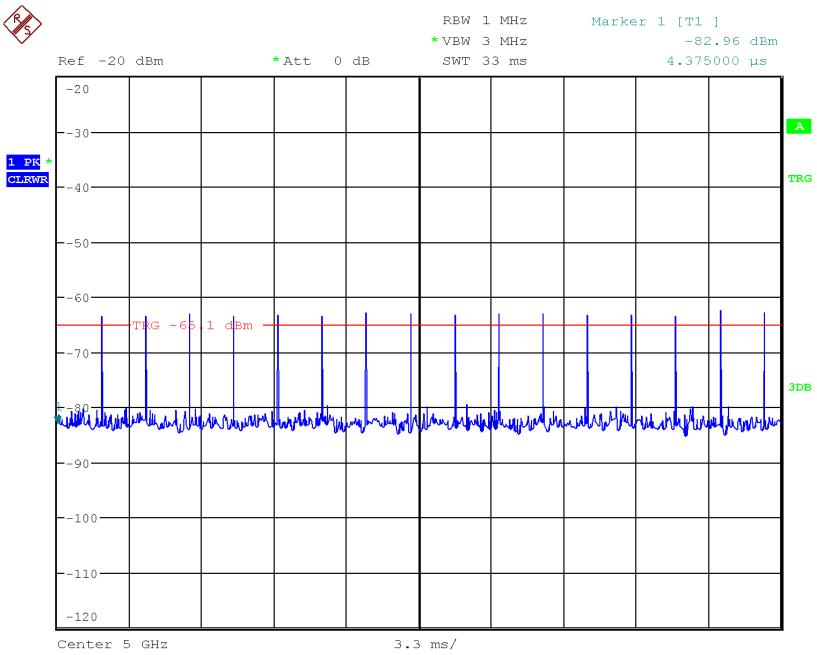
## Amount of pulses per 33ms period

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## 2.4 Equipment Modifications

No equipment modifications were made to the EUT

## 2.5 Local Support Equipment

| Manufacturer | Description | Model | Serial Number |
|---|---|---|---|
| Volteq | Power Supply | HY5003D | 180100168 |

## 2.6 Remote Support Equipment

N/A

## 2.7 Interface Ports and Cabling

| Cable Description | Length (m) | To | From |
|---|---|---|---|
| Power cord | < 1 | EUT | Power Supply |

# 3 Summary of Test Results

Results reported relate only to the product tested.

| FCC Rules | Description of Test | Results |
|---|---|---|
| §15.203 | Antenna Requirement | Compliant |
| §2.1091, §15.255(g) | RF Exposure | Compliant |
| §2.1053, §15.205, §15.209, §15.255(d) | Radiated Spurious Emissions | Compliant |
| §15.215 | Emission Bandwidth | Compliant |
| §15.255(c)(2)(iii)(A), §15.255(e) | Fundamental EIRP Output Power | Compliant |
| FCC §15.255 (c)(2)(iii)(A) | Timing Requirements | Compliant |
| §15.255(f) | Frequency Stability | Compliant |

*BACL is responsible for all the information provided in this report, except when information is provided by the customer as identified in this report. Information provided by the customer, e.g., antenna gain, can affect the validity of results.*

# 4 FCC §15.203 - Antenna Requirements

## 4.1 Applicable Standards

According to FCC §15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

## 4.2 Antenna Description

| Antenna usage | Band of Operation (GHz) | Maximum Antenna Gain (dBi) |
|---|---|---|
| Integral antenna within the Integrated Circuit package | 60-64 | 8.6 dBi |

***Note**: The maximum antenna gain was provided by the manufacturer*

# 5 FCC §2.1091 & §15.255(g) - RF Exposure

## 5.1 Applicable Standards

As per FCC §1.1310(d) (3), At operating frequencies above 6 GHz, the MPE limits listed in Table 1 in paragraph (e)(1) of this section shall be used in all cases to evaluate the environmental impact of human exposure to RF radiation as specified in §1.1307(b) of this part.

**TABLE 1 TO §1.1310(E)(1)—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

| Frequency Range (MHz) | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density ($mW/cm^2$) | Averaging Time (minutes) |
|---|---|---|---|---|
| **(i) Limits for Occupational/Controlled Exposure** | | | | |
| 0.3-3.0 | 614 | 1.63 | *(100) | ≤6 |
| 3.0-30 | 1842/f | 4.89/f | *($900/f^2$) | <6 |
| 30-300 | 61.4 | 0.163 | 1.0 | <6 |
| 300-1,500 | | | f/300 | <6 |
| 1,500-100,000 | | | 5 | <6 |
| **(ii) Limits for General Population/Uncontrolled Exposure** | | | | |
| 0.3-1.34 | 614 | 1.63 | *(100) | <30 |
| 1.34-30 | 824/f | 2.19/f | *($180/f^2$) | <30 |
| 30-300 | 27.5 | 0.073 | 0.2 | <30 |
| 300-1,500 | | | f/1500 | <30 |
| 1,500-100,000 | | | 1.0 | <30 |

f = frequency in MHz
* = Plane-wave equivalent power density

## 5.2 MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density
P = power input to antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

### 5.3 MPE Results

| | |
|---|---|
| Maximum E.I.R.P (dBm): | 2.06 |
| Maximum E.I.R.P (mW): | 1.61 |
| Prediction distance (cm): | 20 |
| Prediction frequency (GHz): | 60-64 |
| Power density of prediction frequency at 20.0 cm ($mW/cm^2$): | 0.00032 |
| FCC MPE limit for uncontrolled exposure at prediction frequency ($mW/cm^2$): | 1.0 |

The device is compliant with the FCC requirement MPE limit for uncontrolled exposure. The maximum power density at the distance of 20 cm is 0.00032 $mW/cm^2$. Limit is 1.0 $mW/cm^2$.

# 6 FCC §15.209 & §15.255(d) - Spurious Radiated Emissions

## 6.1 Applicable Standards

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz.

As Per FCC §15.205(a) except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.090 – 0.110<br>0.495 – 0.505<br>2.1735 – 2.1905<br>4.125 – 4.128<br>4.17725 – 4.17775<br>4.20725 – 4.20775<br>6.215 – 6.218<br>6.26775 – 6.26825<br>6.31175 – 6.31225<br>8.291 – 8.294<br>8.362 – 8.366<br>8.37625 – 8.38675<br>8.41425 – 8.41475<br>12.29 – 12.293<br>12.51975 – 12.52025<br>12.57675 – 12.57725<br>13.36 – 13.41 | 16.42 – 16.423<br>16.69475 – 16.69525<br>25.5 – 25.67<br>37.5 – 38.25<br>73 – 74.6<br>74.8 – 75.2<br>108 – 121.94<br>123 – 138<br>149.9 – 150.05<br>156.52475 – 156.52525<br>156.7 – 156.9<br>162.0125 –167.17<br>167.72 – 173.2<br>240 – 285<br>322 – 335.4<br>399.9 – 410<br>608 – 614 | 960 – 1240<br>1300 – 1427<br>1435 – 1626.5<br>1645.5 – 1646.5<br>1660 – 1710<br>1718.8 – 1722.2<br>2200 – 2300<br>2310 – 2390<br>2483.5 – 2500<br>2690 – 2900<br>3260 – 3267<br>3.332 – 3.339<br>3 3458 – 3 358<br>3.600 – 4.400 | 4. 5 – 5. 15<br>5. 35 – 5. 46<br>7.25 – 7.75<br>8.025 – 8.5<br>9.0 – 9.2<br>9.3 – 9.5<br>10.6 – 12.7<br>13.25 – 13.4<br>14.47 – 14.5<br>15.35 – 16.2<br>17.7 – 21.4<br>22.01 – 23.12<br>23.6 – 24.0<br>31.2 – 31.8<br>36.43 – 36.5<br>Above 38.6 |

As per FCC §15.209(a): Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table

| Frequency (MHz) | Field Strength (micro volts/meter) | Measurement Distance (meters) |
|---|---|---|
| 0.009 - 0.490 | 2400/F(kHz) | 300 |
| 0.490 - 1.705 | 24000/F(kHz) | 30 |
| 1.705 - 30.0 | 30 | 30 |
| 30 - 88 | 100** | 3 |
| 88 - 216 | 150** | 3 |
| 216 - 960 | 200** | 3 |
| Above 960 | 500 | 3 |

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

As per FCC §15.255(d):

(1) The power density of any emissions outside the 57-71 GHz band shall consist solely of spurious emissions.
(2) Radiated emissions below 40 GHz shall not exceed the general limits in §15.209.
(3) Between 40 GHz and 200 GHz, the level of these emissions shall not exceed 90 $pW/cm^2$ at a distance of 3 meters.
(4) The levels of the spurious emissions shall not exceed the level of the fundamental emission.

## 6.2 Test Setup

The radiated emissions tests were performed in the 5-meter Chamber, using the setup in accordance with ANSI C63.10-2020. The specification used was the FCC 15 Subpart C.

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundle when necessary.

## 6.3 Test Procedure

The EUT was connected to DC power supply, and all support equipment power cords were connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT was placed on a turntable, which was 0.8 meter (for measurements below 1 GHz and above 40 GHz) or 1.5 meters (for measurements between 1 GHz and 40 GHz) in height, and 3 meters (for measurements below 40 GHz) or < 1 meter (for measurements above 40 GHz) away from measurement antenna. To find the highest emission, the antenna height was varied between 1 and 4 meters, and the turntable was rotated for 360 degrees. The measurement antenna's polarity was also changed between horizontal and vertical.

The spectrum analyzer or receiver was set as:

Below 1000 MHz:

(1) CISPR Quasi-Peak detector and the related measurement bandwidths

Above 1000 MHz:

(2) Peak: RBW = 1MHz / VBW = 3MHz / Sweep = 100 ms
(3) Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto

## 6.4 Corrected Amplitude and Margin Calculation

For the emissions from 30 MHz to 40 GHz:

The Corrected Amplitude (CA) is calculated by adding the Correction Factor to the S.A. Reading. The basic equation is as follows:

$$CA = S.A.\ Reading + Correction\ Factor$$

For example, a corrected amplitude of 40.3 dBuV/m = S.A. Reading (32.5 dBuV) + Correction Factor (7.8 dB/m)

The Correction Factor is calculated by adding the Antenna Factor (AF), the Cable Loss (CL), the Attenuator Factor (Atten) and subtracting the Amplifier Gain (Ga) together. This calculation is done in the measurement software, and reported in the test result section. The basic equation is as follows:

$$Correction\ Factor = AF + CL + Atten - Ga$$

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

$$Margin = Corrected\ Amplitude - Limit$$

For the emissions from 40 GHz to 200 GHz:

The Corrected Amplitude (CA) is calculated by adding the Antenna Factor (AF), the Cable Loss (CL), the Attenuator Factor (Atten) and subtracting the Amplifier Gain (Ga) to indicated Amplitude (Ai) reading. The basic equation is as follows:

$$CA = Ai + AF + CL + Atten - Ga$$

For example, a corrected amplitude of 40.3 dBuV/m = Indicated Reading (32.5 dBuV) + Antenna Factor (+23.5dB) + Cable Loss (3.7 dB) + Attenuator (10 dB) - Amplifier Gain (29.4 dB)

The e.i.r.p. is calculated from the corrected field strength by using the following formula,

$$EIRP = E\text{-}meas + 20\log(d\text{-}meas) - 104.7$$

Where:
EIRP: is the equivalent isotropically radiated power in dBm
E-meas: is the field strength of the emission at the measurement distance, in dBuV/m
d-meas: is the measurement distance, in m

Finally, use the formula below to calculate the power density and compare the result with the limit.

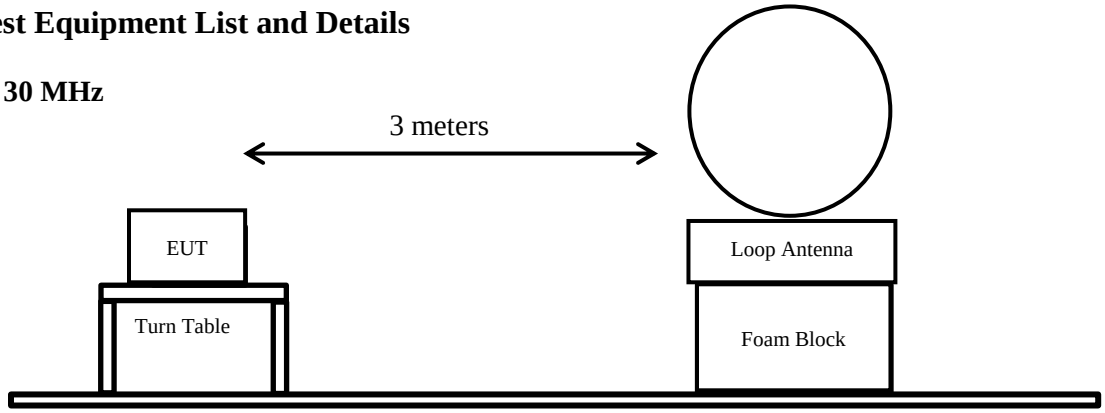
$$PD = EIRP_{Linear}/4\pi d^2$$

Where:
PD: is the power density at the distance specified by the limit, in $W/m^2$
$EIRP_{linear}$: is the equivalent isotropically radiated power, in watts
d: is the distance at which the power density limit is specified, in m

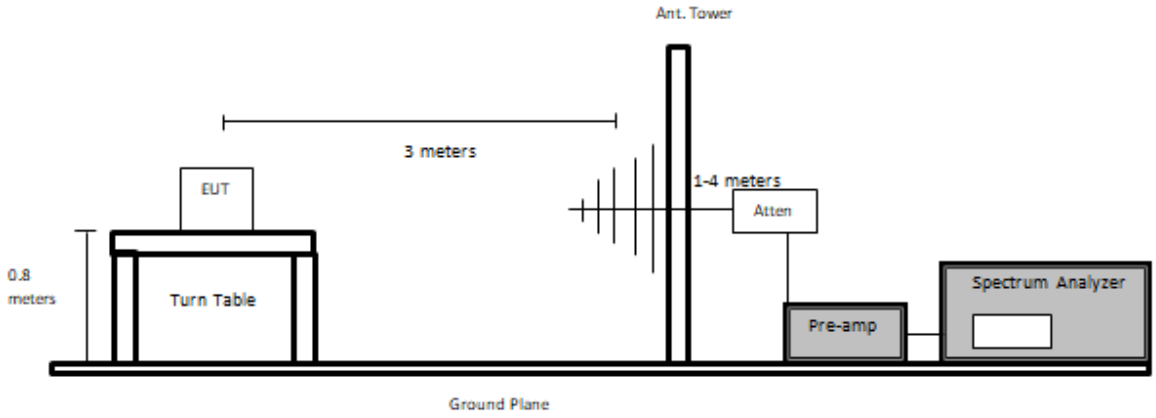
The specified distance is 3m.

## 6.5 Test Equipment List and Details

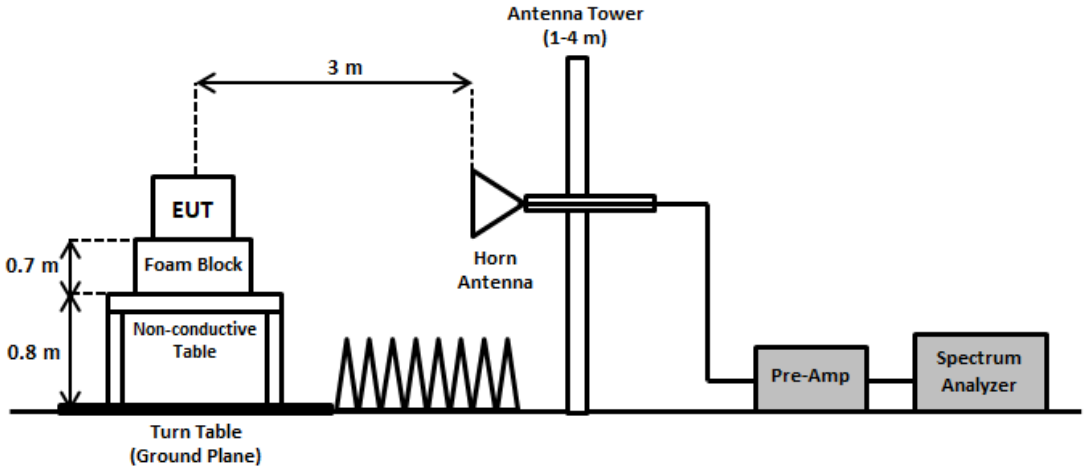
### 9 kHz to 30 MHz



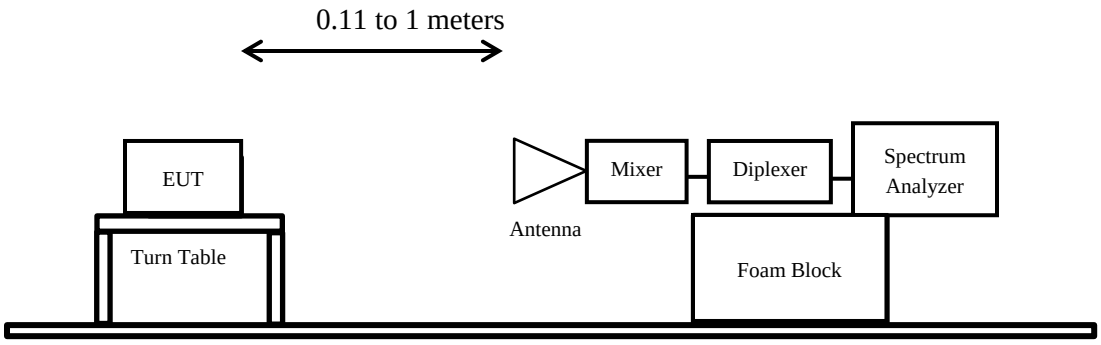

### 30 MHz to 1 GHz




### 1 GHz to 40 GHz



**Above 40 GHz**


0.11 to 1 meters
EUT
Turn Table
Antenna
Mixer
Diplexer
Spectrum Analyzer
Foam Block

## 6.6 Test Equipment List and Details

| BACL No. | Manufacturer | Description | Model No. | Serial No. | Calibration Date | Calibration Interval |
|---|---|---|---|---|---|---|
| 327 | Sunol Sciences | System Controller | SC110V | 122303-1 | N/R | N/A |
| 1075 | Sunol Sciences | Boresight Tower | TLT3 | 050119-7 | N/R | N/A |
| 1388 | Sunol Sciences | Flush Mount Turntable | FM | 112005-2 | N/R | N/A |
| 316 | Sonoma Instruments | Preamplifier 10 kHz - 2.5 GHz | 317 | 260406 | 2024-08-30 | 6 months |
| 1432 | Keysight Technologies | MXE EMI Receiver, Multi-touch | N9038B | MY60180008 | 2024-01-15 | 1 year |
| 624 | Agilent | Spectrum Analyzer | E4446A | MY48250238 | 2024-06-14 | 1 year |
| 321 | Sunol Sciences | Biconilog Antenna | JB3 | A020106-2; 1504 | 2023-12-18 | 2 years |
| 1245 | - | 6dB Attenuator | PE7390-6 | 01182018A | 2023-12-18 | 2 years |
| 1246 | Hewlet Packard | RF Limiter | 11867A | 01734 | 2024-04-09 | 1 year |
| 1248 | Pasternack | RG214 COAX Cable | PE3062 | - | 2024-04-09 | 1 year |
| 393 | Com-Power | Antenna, Loop Active | AL-130 | 17043 | 2023-05-26 | 2 years |
| 1249 | Time microwave | LMR-400 Cable Dc-3 GHz | AE13684 | 2k80612-5 6fts | 2024-04-09 | 1 year |
| 1295 | Carlisle Interconnected Technologies | 10m Coaxial Cable | UFB142A-1-3937-200200 | 64639890912-001 | 2024-10-16 | 1 year |
| 1359 | Pasternack | N 600in RF Cable | PE3496LF-600 | - | 2024-07-26 | 6 months |
| 1192 | ETS Lindgren | Horn Antenna | 3117 | 00218973 | 2024-10-23 | 2 years |
| 1397 | Mini Circuit | CBL ASSY 2.92 MM PLUG TO PLUG 12" | FL086-12KM+ | QN2318110-2318 | 2024-08-16 | 6 months |
| 1394 | Mini Circuit | CBL ASSY 2.92 MM PLUG TO PLUG 12" | FL086-12KM+ | QN2318110-2318 | 2024-08-16 | 6 months |
| 1449 | BACL | Preamplifier | BACL1313-A100M18G | 4052472 | 2024-08-19 | 6 months |
| 91 | Wisewave | Horn Antenna | ARH-4223-02 | 10555-02 | 2024-03-14 | 2 years |
| 92 | Wisewave | Horn Antenna | ARH-2823-02 | 10555-01 | 2024-06-26 | 2 years |
| - | OML, Inc. | 40-60GHz Antenna | M19RH | 1706 1501 | N/R | N/A |
| - | OML, Inc. | 60-90GHz Antenna | M12RH | 2108 0401 | N/R | N/A |
| - | OML, Inc. | 90-140GHz Antenna | M12RH | 2108 0401 | N/R | N/A |
| - | OML, Inc. | 140-220GHz Antenna | M05RH | 1706-1501 | N/R | N/A |
| - | OML, Inc. | Harmonic Mixer | WR19 | 170615-1 | N/R | N/A |
| - | OML, Inc. | Harmonic Mixer | WR12 | 170615-1 | N/R | N/A |

| | | | | | | |
|---|---|---|---|---|---|---|
| - | OML, Inc. | Harmonic Mixer | WR08 | 170615-1 | N/R | N/A |
| - | OML, Inc. | Harmonic Mixer | WR05 | 170615-1 | N/R | N/A |
| - | OML, Inc. | Diplexer | DPL26 | 170615-1 | N/R | N/A |
| 1451 | BACL | Preamplifier | BACL-1313-A1840 | 4052432 | 2024-08-16 | 6 months |

Note[1]: cables included in the test set-up will be checked each time before testing.
***Statement of Traceability: BACL Corp.*** *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 "A2LA Policy on Metrological Traceability".*

## 6.7 Test Environmental Conditions

| | |
|---|---|
| **Temperature:** | 22 ºC |
| **Relative Humidity:** | 57 % |
| **ATM Pressure:** | 102.1 kPa |

*The testing was performed by Michael Papa, and Libass Thiaw from 2024-12-09 to 2024-12-20 in 5m chamber 3.*

## 6.8 Summary of Test Results

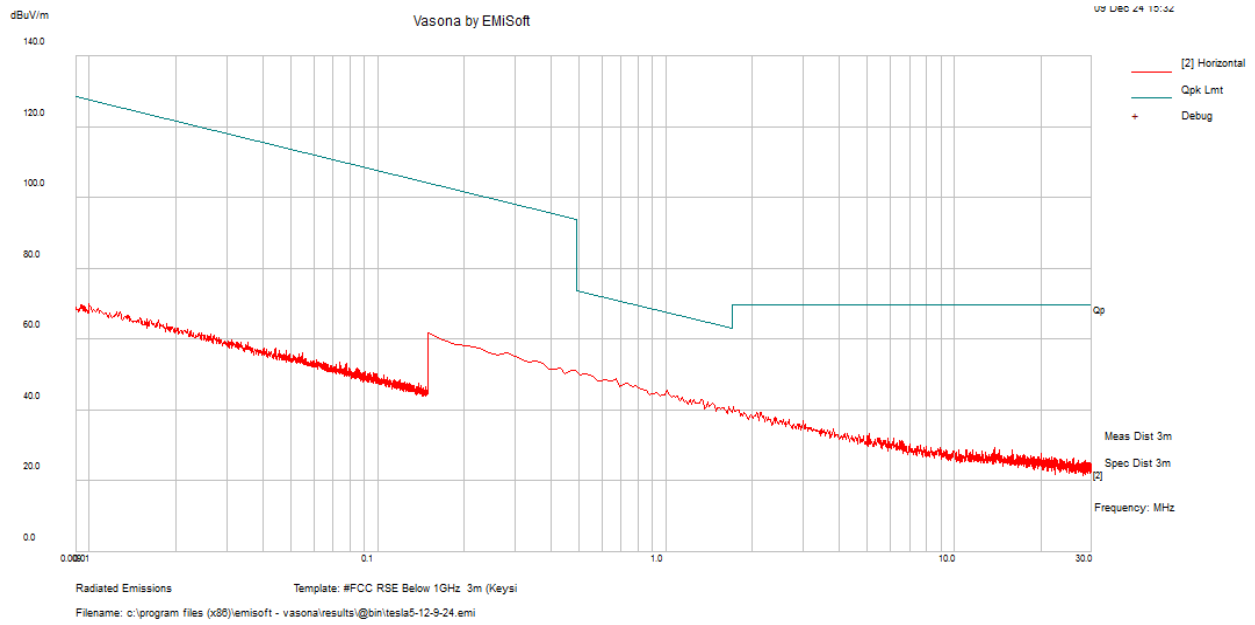
According to the data hereinafter, the EUT complied with FCC Title 47, Part 15C's standard's radiated emissions limits, and had the worst margin of:

| Margin (dB) | Frequency (MHz) | Polarization |
|---|---|---|
| -0.65 | 14398.125 | Vertical |

Please refer to the tables and plots in the next section for detailed test results.

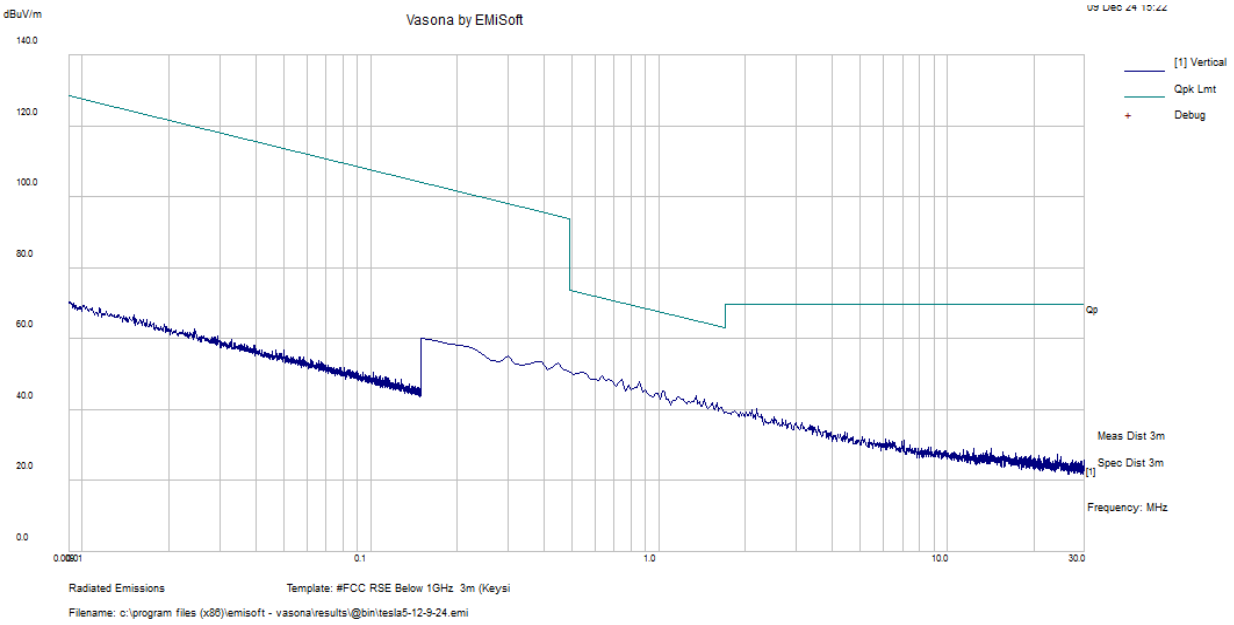
## 6.9 Spurious Emissions Test Results

### 1) 9kHz to 30MHz measured at 3 meters (Parallel)



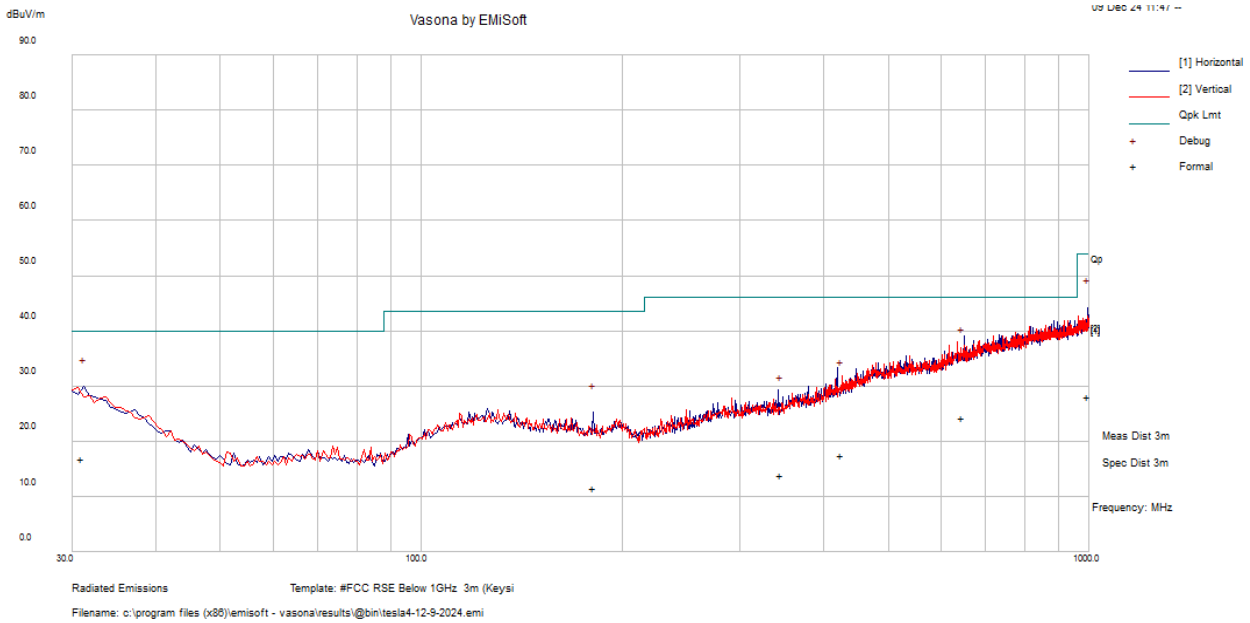

*Note: Only noise floor were observed and all emissions were more than 20dB from applicable limits*

### 2) 9kHz to 30MHz measured at 3 meters (Perpendicular)




*Note: Only noise floor were observed and all emissions were more than 20dB from applicable limits.*

### 3) 30 MHz to 1GHz measured at 3 meters



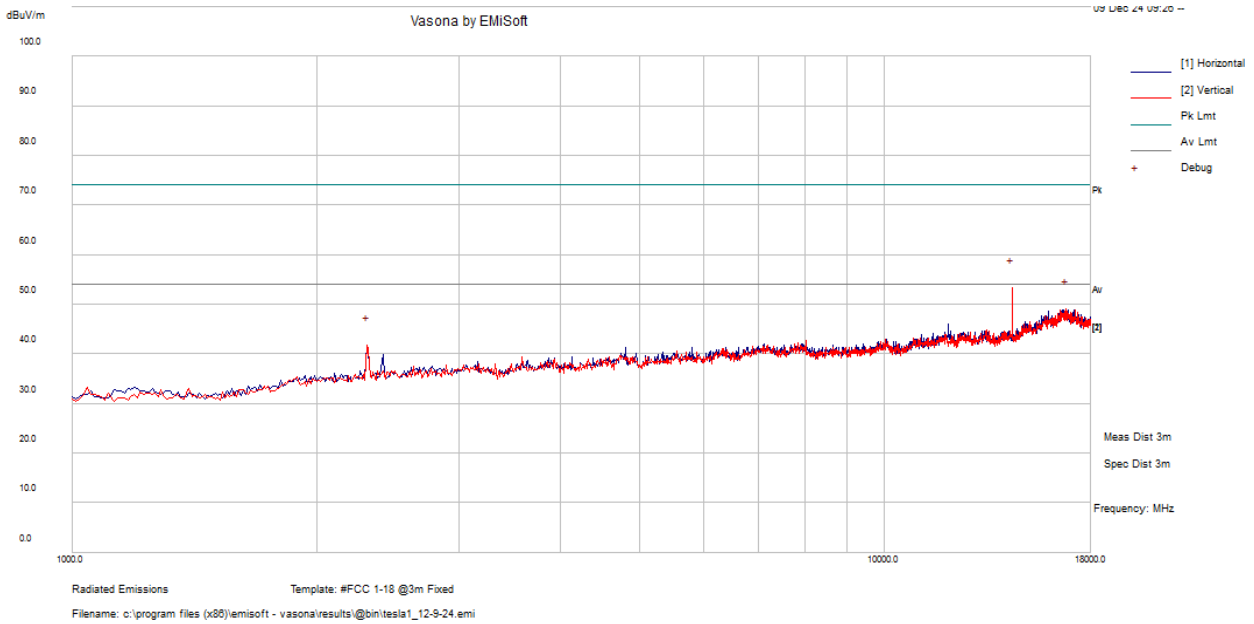

| Frequency (MHz) | S.A. Reading (dBuV) | Correction Factor (dB/m) | Corrected Amplitude (dBµV/m) | Detector | Antenna Polarity (H/V) | Antenna Height (cm) | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| 996.4859 | 20.21 | 7.77 | 27.98 | Quasi Max | H | 115 | 186 | 54 | -26.02 |
| 30.96469 | 18.27 | -1.35 | 16.92 | Quasi Max | H | 116 | 7 | 40 | -23.08 |
| 645.2446 | 20.87 | 3.3 | 24.17 | Quasi Max | H | 226 | 215 | 46 | -21.83 |
| 425.018 | 19.37 | -1.96 | 17.41 | Quasi Max | H | 267 | 142 | 46 | -28.59 |
| 180.8676 | 20.1 | -8.69 | 11.41 | Quasi Max | H | 166 | 283 | 43.5 | -32.09 |
| 345.1244 | 18.69 | -4.75 | 13.95 | Quasi Max | H | 264 | 162 | 46 | -32.05 |

| FCC Limits for 1 GHz to 40 GHz | | | |
|---|---|---|---|
| **Applicability** | **(dBm)** | **(uV/m at 3meters)** | **(dBuV/m at 3meters)** |
| Restricted Band Average Limit | - | 500 | 54[2] |
| Restricted Band Peak Limit[1] | - | - | 74 |

Note 1: Restricted Band Peak Limit is defined to be 20dB higher than Average Limit.
Note 2: Above 1GHz limit calculation:
dBuV/m = 20*log(V/m) + 120 = 20*log((500 [uV/m]/1000000)) + 120 = 54 [dBuV/m]

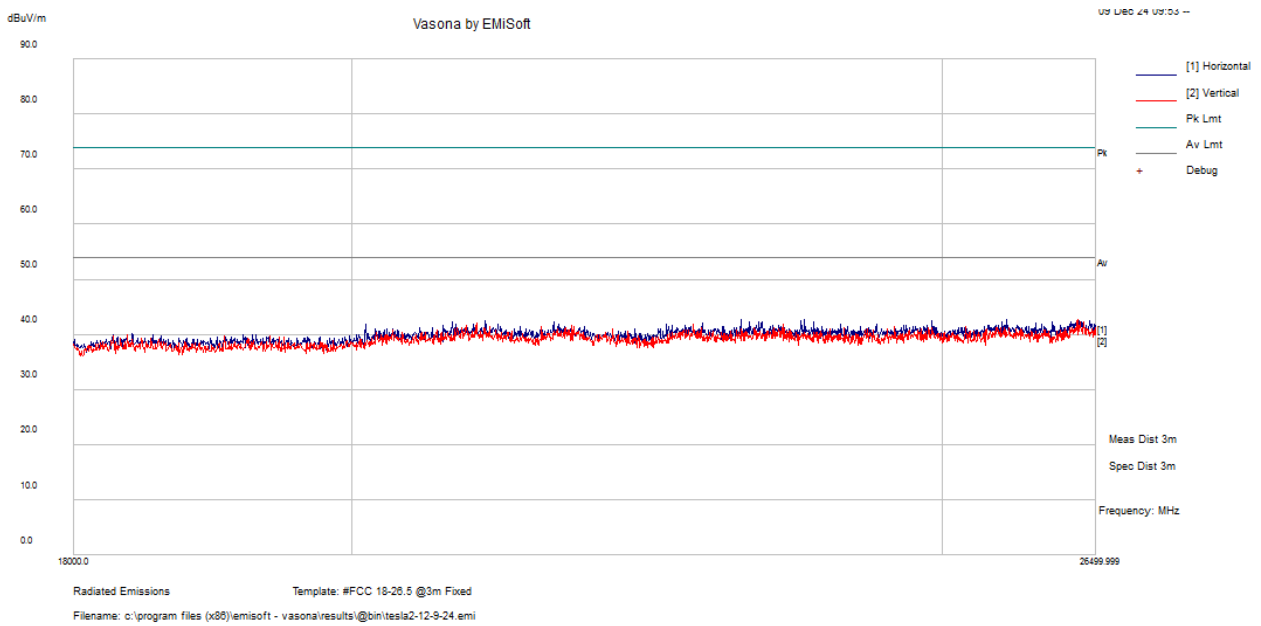
### 4) 1–18 GHz Measured at 3 meters

**Note:** According to ANSI C63.10, clause 6.6.4.3, where limits are specified by regulations for both average and peak detection, if the maximized peak measured value complies with the average limit, then it is unnecessary to perform an average measurement. The Results below show the Peak emission values to fall below the average emission limits.



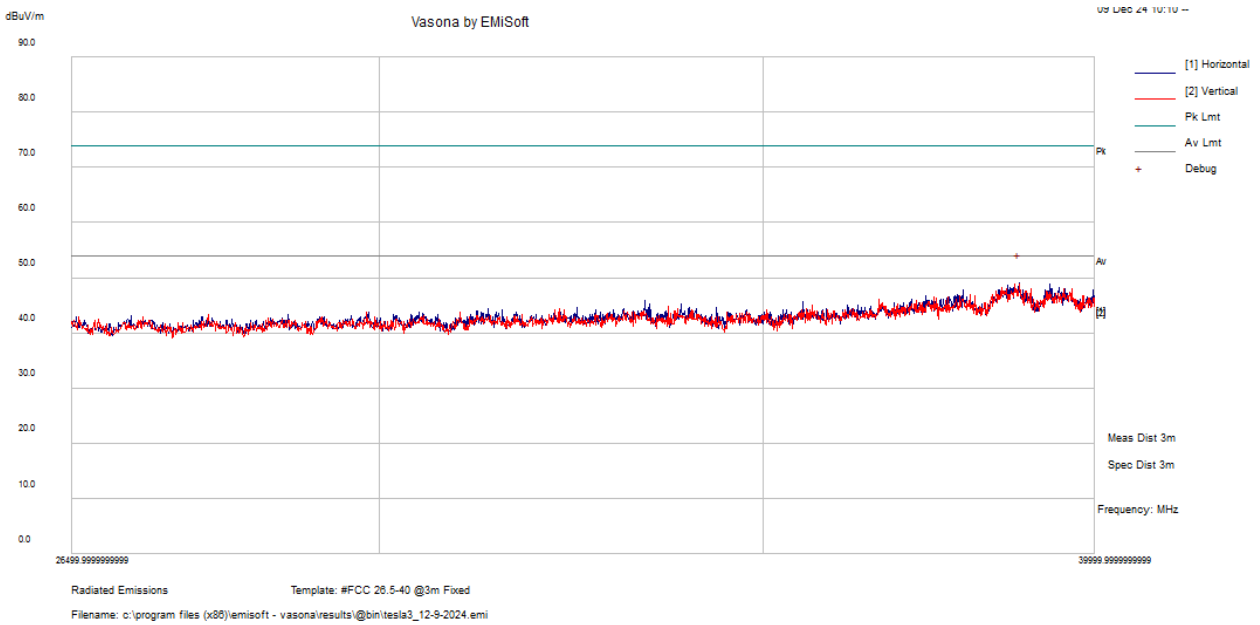

| Frequency (MHz) | S.A. Reading (dBuV) | Correction Factor (dB/m) | Corrected Amplitude (dBµV/m) | Detector | Antenna Polarity (H/V) | Antenna Height (cm) | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| **14398.125** | **43.07** | **10.28** | **53.35** | **Peak** | **V** | **100** | **0** | **54** | **-0.65** |
| 16788.75 | 33.47 | 15.59 | 49.06 | Peak | V | 300 | 0 | 54 | -4.94 |
| 2306.875 | 46.68 | -4.96 | 41.73 | Peak | V | 300 | 0 | 54 | -12.27 |

### 5) 18-26.5 GHz Measured at 3 meters



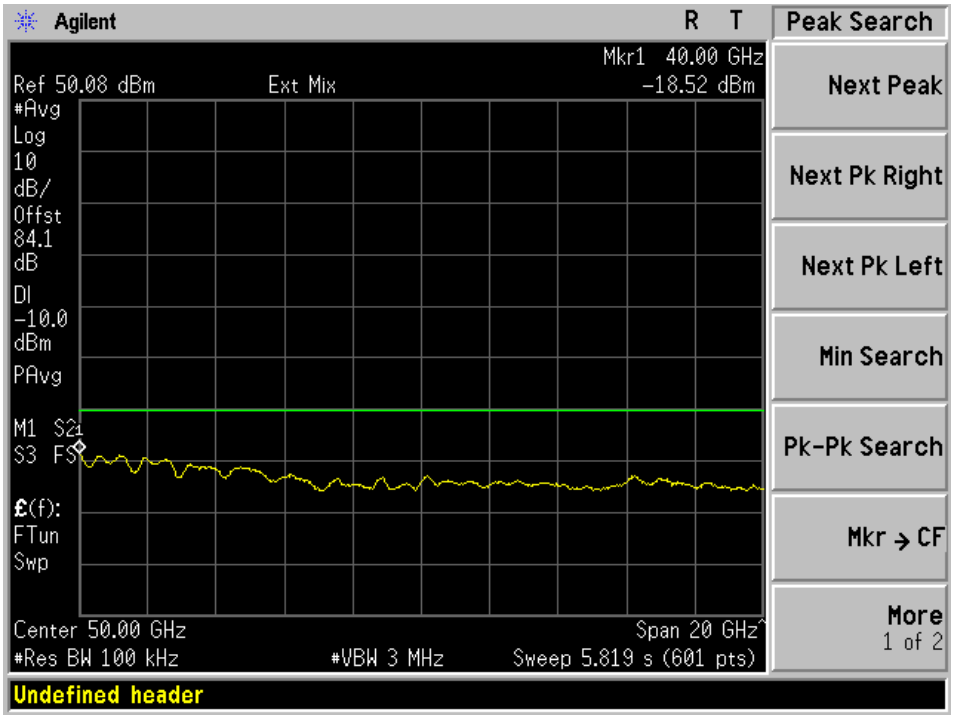

| Frequency (MHz) | S.A. Reading (dBuV) | Correction Factor (dB/m) | Corrected Amplitude (dBµV/m) | Detector | Antenna Polarity (H/V) | Antenna Height (cm) | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| 22483.15 | 39.64 | -0.33 | 39.31 | Peak | V | 200 | 7 | 54 | -14.69 |

### 6) 26.5 – 40GHz Measured at 3 meters




| Frequency (MHz) | S.A. Reading (dBuV) | Correction Factor (dB/m) | Corrected Amplitude (dBµV/m) | Detector | Antenna Polarity (H/V) | Antenna Height (cm) | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| 38801.88 | 38.72 | 10.33 | 49.05 | Peak | H | 100 | 0 | 54 | -4.95 |

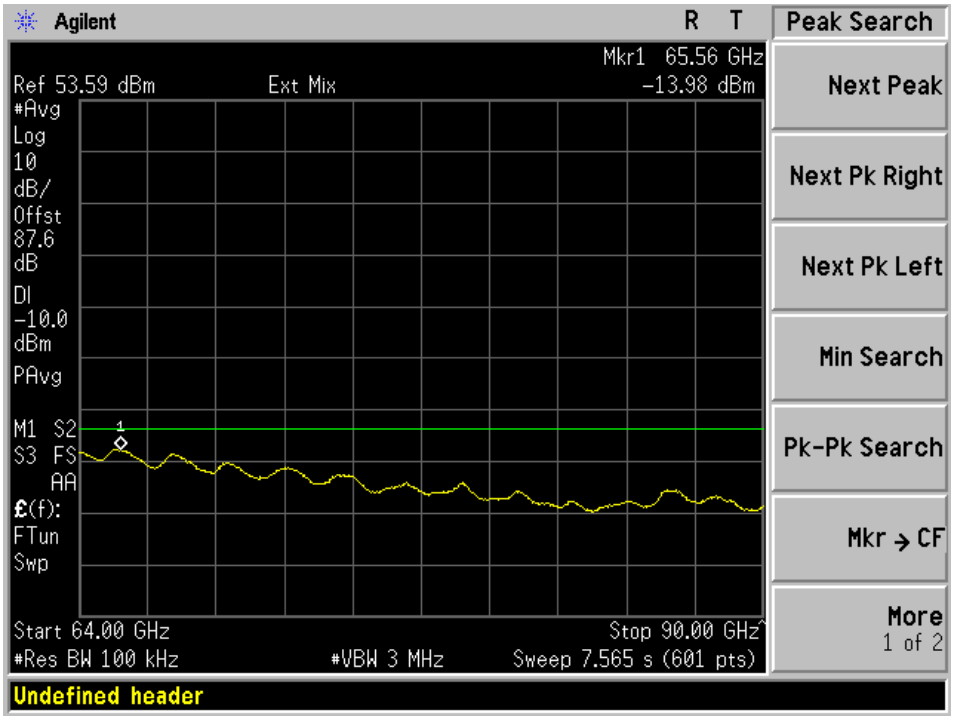
**8) 40 GHz to 60 GHz Measured at 1 meter**




***Note:*** *Offset = [20log(D) + 106.99 dB + Equipment Factor] – 104.76dB*

***Note:*** *Reduced RBW was used to show that no emissions appear below the noise floor under the required limit.*

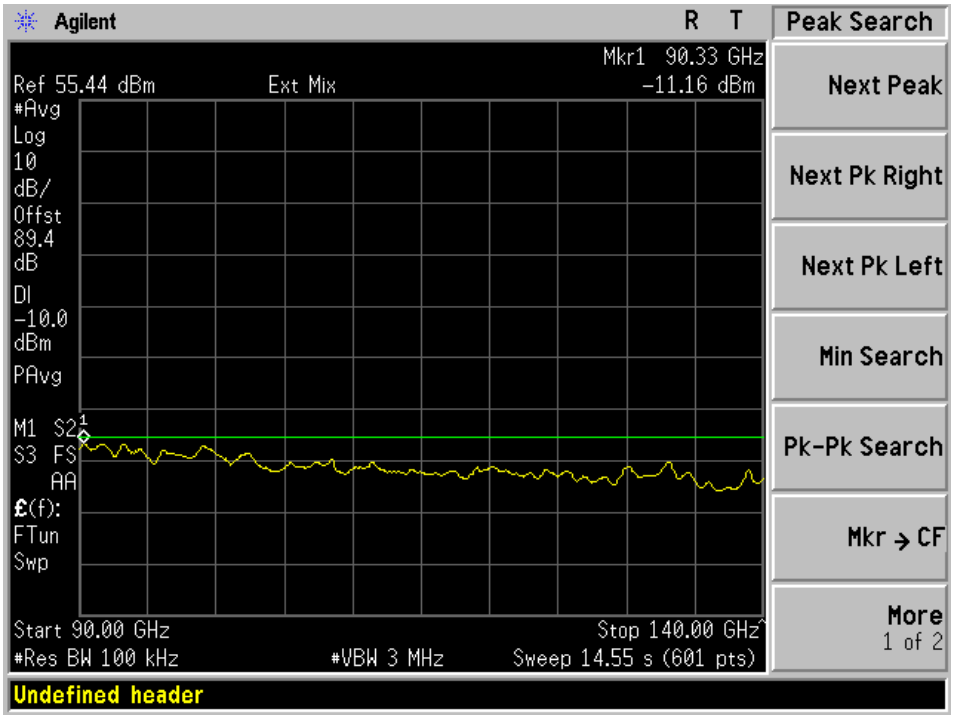
**10) 64 GHz to 90 GHz Measured at 0.5 meter**




***Note:*** *Offset = [20log(D) + 106.99 dB + Equipment Factor] – 104.76dB*

***Note:*** *Reduced RBW was used to show that no emissions appear below the noise floor under the required limit.*

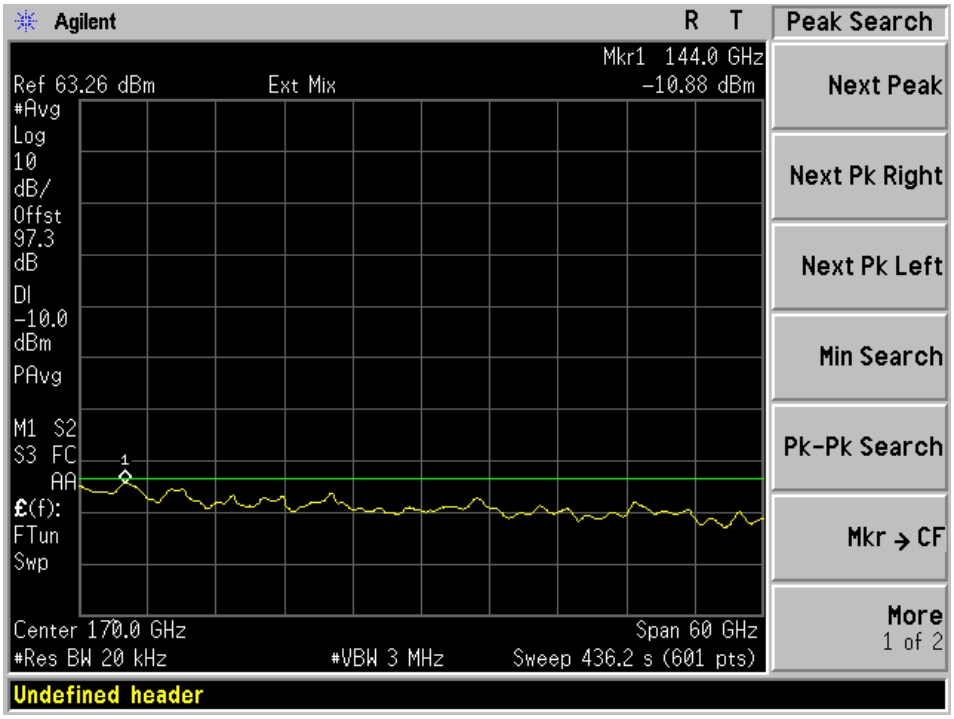
**12) 90 GHz to 140 GHz Measured at 0.2 meter**




***Note:*** *Offset = [20log(D) + 106.99 dB + Equipment Factor] – 104.76dB*

***Note:*** *Reduced RBW was used to show that no emissions appear below the noise floor under the required limit.*

**14) 140 GHz to 200 GHz Measured at 0.11 meter**




***Note:*** *Offset = [20log(D) + 106.99 dB + Equipment Factor] – 104.76dB*

***Note:*** *Reduced RBW was used to show that no emissions appear below the noise floor under the required limit.*

# 7 FCC §15.215 - Emission Bandwidth

## 7.1 Applicable Standards

According to ECFR §15.215 Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, 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.

## 7.2 Measurement Procedure

1. EUT was set to Sweeping mode.
   - PSA setting:
   - RBW = 1 MHz
   - VBW = 3 MHz
   - Detector: Peak
   - Trace: Max Hold
2. 99% OBW function of the PSA was applied.

## 7.3 Test Equipment List and Details

| BACL Number | Manufacturers | Descriptions | Models | Serial Numbers | Calibration Dates | Calibration Interval |
|---|---|---|---|---|---|---|
| - | - | RF Cable | - | - | Each Time[1] | Each Time[1] |
| - | - | RF Cable | - | - | Each Time[1] | Each Time[1] |
| 1391 | Volteq | DC Power Supply | HY620EX | 220401167 | N/R | N/R |
| 1462 | Virginia Diodes, Inc. | Frequency Extender for Up and Down conversion | WR12SAX-UP | VDI SAX 061 | Each Time[1] | Each Time[1] |
| 1461 | Rohde & Schwarz | Signal Analyzer | FSQ26 | 200103 | 2024-08-06 | 1 year |
| 1130 | Agilent | MXG Vector Signal Generator | N5183A | MY50140453 | 2024-11-07 | 1 year |
| - | OML, Inc. | 60-90GHz Antenna | M12RH | 2108 0401 | Each Time[1] | Each Time[1] |

Note[1]: cable included in the test set-up will be checked each time before testing.
***Statement of Traceability: BACL Corp.*** *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 "A2LA Policy on Metrological Traceability".*

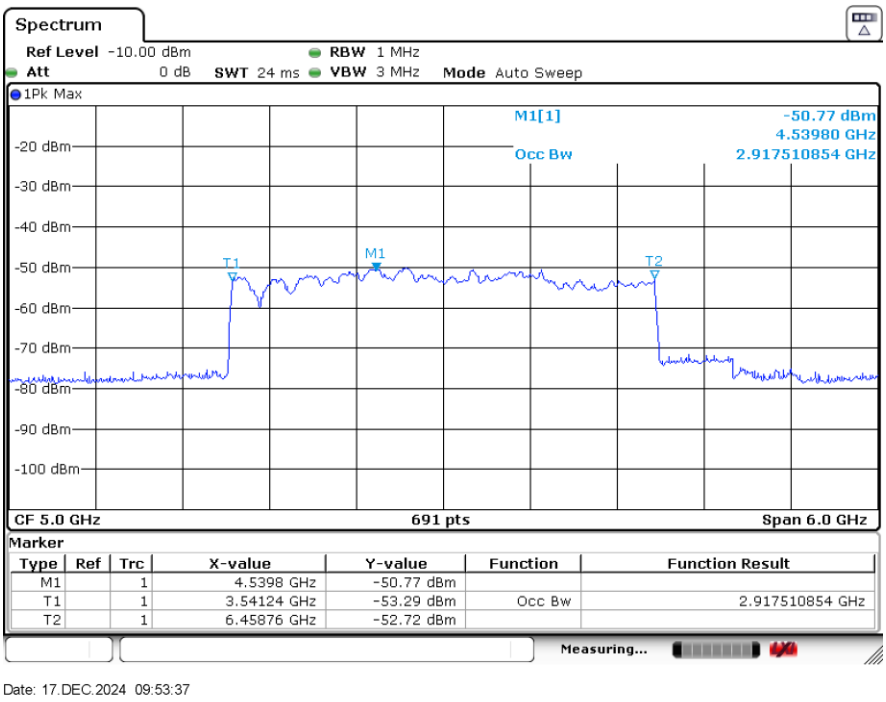
## 7.4 Test Environmental Conditions

| | |
|---|---|
| **Temperature:** | 22 ºC |
| **Relative Humidity:** | 55 % |
| **ATM Pressure:** | 101.9 kPa |

*The testing was performed by Libass Thiaw on 2024-12-17 at RF site.*

## 7.5 Test Results

The 99% emission bandwidth is 2.918 GHz.



# 8 FCC §15.255(c) - Fundamental EIRP Output Power Measurement

## 8.1 Applicable Standards

According to FCC §15.255 (c)(2)(iii)(A within the 57-71 GHz band, emission levels shall not exceed the following equivalent isotropically radiated power (EIRP):

***57.0-64.0 GHz:***

(A) The peak EIRP shall not exceed 14 dBm, and the sum of continuous transmitter off-times of at least two milliseconds shall equal at least 25.5 milliseconds within any contiguous interval of 33 milliseconds, except as specific in paragraph (c)(2)(iii)(B) of this section;

## 8.2 Measurement Procedure

The measurements for Fundamental E.I.R.P Output Power where done by following the procedure ANSI C63.10-2020 Clause 9.8 Measurement of the fundamental emission using a spectrum analyzer.

The Test procedure was performed as follows:

1) Place the measurement antenna at a measurement distance that is in the far-field of the measurement antenna, in the far-field of the EUT antenna, and meets the measurement distance requirements for final radiated measurements as specified in 9.1.4.

2) Place the measurement antenna in the main beam of the EUT then maximize the fundamental emission using the procedures of 9.7, noting that multiple peaks can be found at different beam orientations and/or polarizations.

3) Correct the power reading from the spectrum analyzer for any external gain and/or attenuation between the measurement antenna and the spectrum analyzer. This is the power at the output of the measurement antenna

4) Calculate the EIRP from the power at the output of the measurement antenna using Equation (22), and then convert to linear form using Equation (24).

5) Where applicable, calculate conducted output power from the EIRP using Equation (27).

## 8.3 Test Equipment List and Details

| BACL Number | Manufacturers | Descriptions | Models | Serial Numbers | Calibration Dates | Calibration Interval |
|---|---|---|---|---|---|---|
| - | - | RF Cable | - | - | Each Time[1] | Each Time[1] |
| - | - | RF Cable | - | - | Each Time[1] | Each Time[1] |
| 1391 | Volteq | DC Power Supply | HY620EX | 220401167 | N/R | N/R |
| 1462 | Virginia Diodes, Inc. | Frequency Extender for Up and Down conversion | WR12SAX-UP | VDI SAX 061 | Each Time[1] | Each Time[1] |
| 1461 | Rohde & Schwarz | Signal Analyzer | FSQ26 | 200103 | 2024-08-06 | 1 year |
| 1130 | Agilent | MXG Vector Signal Generator | N5183A | MY50140453 | 2024-11-07 | 1 year |
| - | OML, Inc. | 60-90GHz Antenna | M12RH | 2108 0401 | Each Time[1] | Each Time[1] |

Note[1]: cable included in the test set-up will be checked each time before testing.
***Statement of Traceability: BACL Corp.*** *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 "A2LA Policy on Metrological Traceability".*

## 8.4 Test Environmental Conditions

| | |
|---|---|
| **Temperature:** | 22º C |
| **Relative Humidity:** | 50 % |
| **ATM Pressure:** | 102.1 kPa |

*The testing was performed by Libass Thiaw on 2024-12-17 at RF site.*

## 8.5 Test Results

The fundamental was measured at 0.36 meter.

$$\text{EIRP} = E_{\text{Meas}} + 20\log\left(d_{\text{Meas}}\right) - 104.7 \qquad (22)$$

where

| | |
|---|---|
| EIRP | is the equivalent isotropically radiated power, in dBm |
| $E_{\text{Meas}}$ | is the field strength of the emission at the measurement distance, in dBμV/m |
| $d_{\text{Meas}}$ | is the measurement distance, in m |

NOTE—Because this equation yields the identical result whether the field strength is extrapolated using the default 20 dB/decade of distance extrapolation factor, or the field strength is not extrapolated for distance, this equation can generally be applied directly (with no further correction) to determine EIRP. In some cases, a different distance correction factor may be required; see 9.1.

**Fundamental EIRP Output Power Measured with PSA measured at 0.36meters**

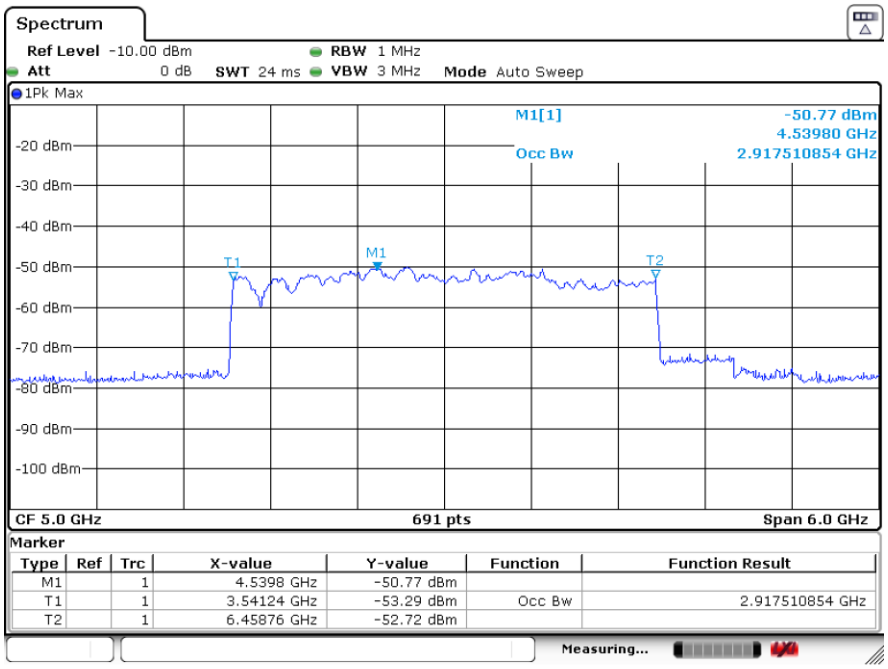
| Raw Measure (dBm) | Down Conv. Loss (dB) | AF (dB/m) | Unit Conv. Constant (dB) | Distance Correction Factor (dB) | Cable Loss (dB) | Uncorrected peak power (dBm) | Peak Desens Factor (dB) | Corrected peak power (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| -50.77 | 10.28 | 43.6 | 2.23 | -8.87 | 2.16 | -1.375 | 3.435 | 2.06 | 14 | -11.94 |

Note: Down Conv Loss is the characterized loss from down converter used in measurement
AF is antenna factor
Unit Conv Constant is 106.99 – 104.76 = 2.23dB per necessary unit conversions in making radiated measurement
Distance Correction Factor is 20*log(Distance=0.36m)
Cable Loss is to account for cable from down converter to PSA.
Peak Desens Factor = -20log(α)

$$\alpha = \frac{1}{\sqrt[4]{1 + \left(\frac{2\ln(2)}{\pi}\right)^2 \left(\frac{BW_{Chirp}}{T_{Chirp}B^2}\right)^2}}$$

BW Chirp (Hz)= 147000000
TChirp (us)= 0.000033
B (Hz)= 1000000

The BW Chirp and T Chirp values were provided by Tesla Motors, Inc.


Spectrum
Ref Level -10.00 dBm
RBW 1 MHz
Att 0 dB
SWT 24 ms
VBW 3 MHz
Mode Auto Sweep
1Pk Max
M1[1]
-50.77 dBm
4.53980 GHz
Occ Bw
2.917510854 GHz
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
-100 dBm
T1
M1
T2
CF 5.0 GHz
691 pts
Span 6.0 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 4.5398 GHz -50.77 dBm
T1 1 3.54124 GHz -53.29 dBm Occ Bw 2.917510854 GHz
T2 1 6.45876 GHz -52.72 dBm
Measuring...
Date: 17.DEC.2024 09:53:37

# 9 FCC §15.255(f) - Frequency Stability

## 9.1 Applicable Standards

According to FCC §15.255(f) *Frequency stability.* Fundamental emissions must be contained within the frequency bands specified in this section during all conditions of operation. Equipment is presumed to operate over the temperature range −20 to + 50 degrees Celsius with an input voltage variation of 85% to 115% of rated input voltage, unless justification is presented to demonstrate otherwise.

## 9.2 Measurement Procedure

The measurements are based on ANSI C63.10-2020

3. Frequency of the marker on the left side of the peak point was recorded as Low Frequency.
4. Frequency of the marker on the right side of the peak point was recorded as High Frequency.
5. Compare the Low Frequency and High Frequency of the spectrum with the allocated frequency range.

## 9.3 Test Equipment List and Details

| BACL Number | Manufacturers | 8.5.1.1.1 Descriptions | Models | Serial Numbers | Calibration Dates | Calibration Interval |
|---|---|---|---|---|---|---|
| - | - | RF Cable | - | - | Each Time[1] | Each Time[1] |
| - | - | RF Cable | - | - | Each Time[1] | Each Time[1] |
| 274 | Espec | Chamber, Humidity | ESL-4CA | 18010 | 2024-02-28 | 1 year |
| 1391 | Volteq | DC Power Supply | HY620EX | 220401167 | N/R | N/R |
| 1462 | Virginia Diodes, Inc. | Frequency Extender for Up and Down conversion | WR12SAX-UP | VDI SAX 061 | Each Time[1] | Each Time[1] |
| 1461 | Rohde & Schwarz | Signal Analyzer | FSQ26 | 200103 | 2024-08-06 | 1 year |
| 1130 | Agilent | MXG Vector Signal Generator | N5183A | MY50140453 | 2023-10-31 | 1 year |
| - | OML, Inc. | 60-90GHz Antenna | M12RH | 2108 0401 | Each Time[1] | Each Time[1] |

Note[1]: cable included in the test set-up will be checked each time before testing.
***Statement of Traceability: BACL Corp.*** *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 "A2LA Policy on Metrological Traceability".*

## 9.4 Test Environmental Conditions

| | |
|---|---|
| **Temperature:** | 22º C |
| **Relative Humidity:** | 55 % |
| **ATM Pressure:** | 101.9 KPa |

*The testing was performed by Libass Thiaw from 2024-12-17 to 2024-12-18 in temperature chamber.*

## 9.5 Test Results

BACL characterized the downconverter to prove that the following conversions were confirmed:
i. 60GHz = 7.07 GHz
ii. 64GHz= 3.046GHz

Consequently the frequencies were calculated as such:
For exemple for -20degrees Celsius:
-Lower Limit: 7.07GHz- **Low Frequency Downconvertd (GHz)** = 0.61124GHz ->
60GHz+ **Low Frequency Delta (GHz)** = **60.61124GHz**
-Upper Limit: **High Frequency Downconverted (GHz)**-3.046GHz = **High Frequency Delta (GHz)**-> 64GHz-0.49524GHz = **63.50476GHz**

Extreme Temperature

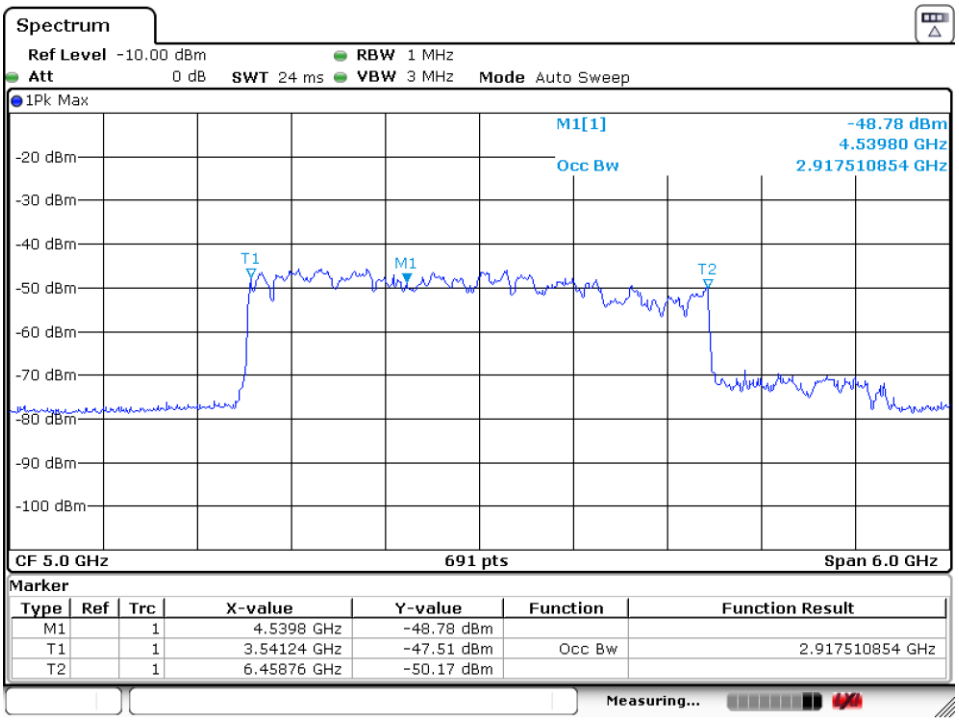
| Voltage ($V_{DC}$) | Temperature (°C) | High Frequency Downconverted (GHz) | High Frequency Delta (GHz) | High Frequency (GHz) | Low Frequency Downconverted (GHz) | Low Frequency Delta (GHz) | Low Frequency (GHz) | Limit (GHz) | Results |
|---|---|---|---|---|---|---|---|---|---|
| 16 V | -20 | 3.54124 | 0.49524 | 63.50476 | 6.45876 | 0.61124 | 60.61124 | 57-64 | pass |
| | -10 | 3.53256 | 0.48656 | 63.51344 | 6.45007 | 0.61993 | 60.61993 | | pass |
| | 0 | 3.53256 | 0.48656 | 63.51344 | 6.45007 | 0.61993 | 60.61993 | | pass |
| | 10 | 3.54124 | 0.49524 | 63.50476 | 6.45007 | 0.61993 | 60.61993 | | pass |
| | 20 | 3.54993 | 0.50393 | 63.49607 | 6.45876 | 0.61124 | 60.61124 | | pass |
| | 30 | 3.54124 | 0.49524 | 63.50476 | 6.45876 | 0.61124 | 60.61124 | | pass |
| | 40 | 3.54124 | 0.49524 | 63.50476 | 6.45876 | 0.61124 | 60.61124 | | pass |
| | 50 | 3.54993 | 0.50393 | 63.49607 | 6.46744 | 0.60256 | 60.60256 | | pass |

Extreme Voltage

| Temperature (°C) | Voltage ($V_{DC}$) | High Frequency Downconverted (GHz) | High Frequency Delta (GHz) | High Frequency (GHz) | Low Frequency Downconverted (GHz) | Low Frequency Delta (GHz) | Low Frequency (GHz) | Limit (GHz) | Results |
|---|---|---|---|---|---|---|---|---|---|
| 20 | 10.2 | 3.5288 | 0.4828 | 63.5172 | 6.4615 | 0.6085 | 60.6085 | 57-64 | pass |
| | 13.8 | 3.5288 | 0.4828 | 63.5172 | 6.4615 | 0.6085 | 60.6085 | | pass |

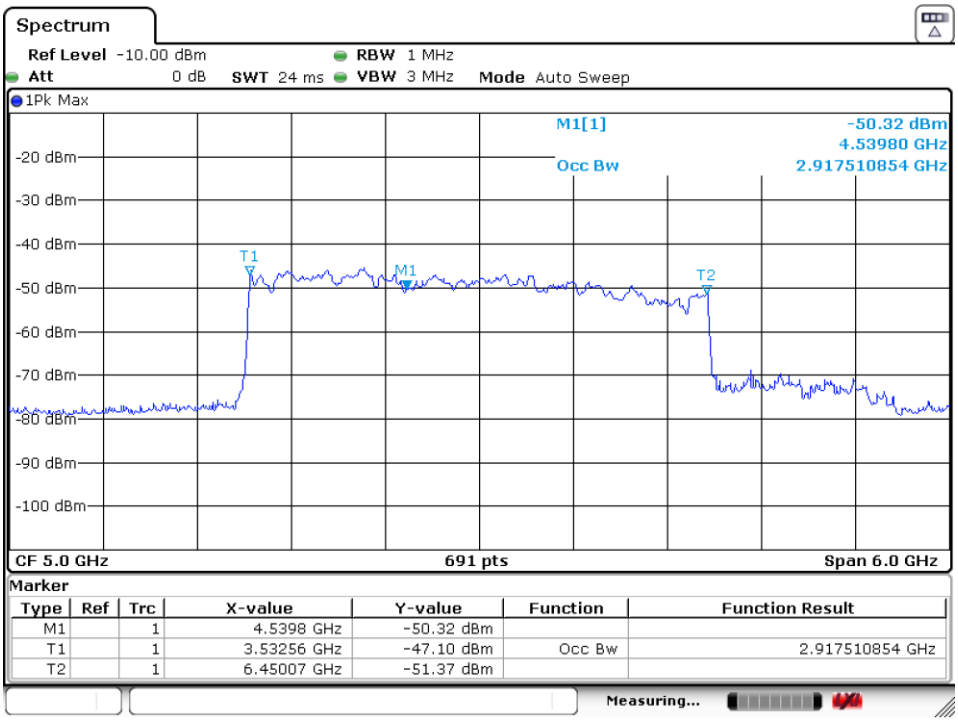
Please refer to the following plots for details

-20 °C



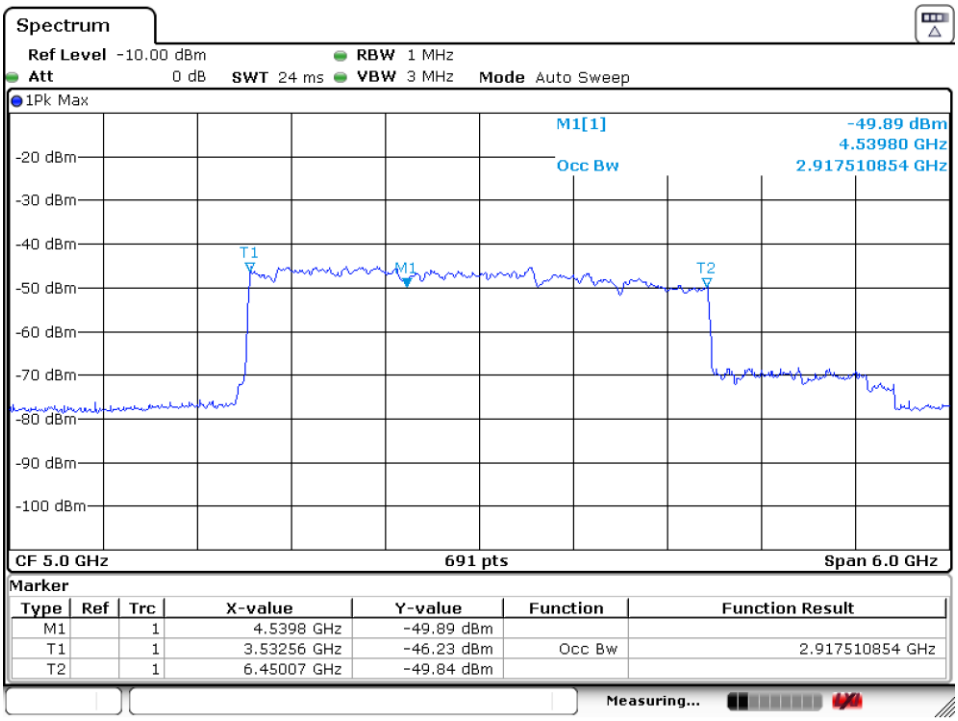

Date: 17.DEC.2024 11:03:53

-10 °C



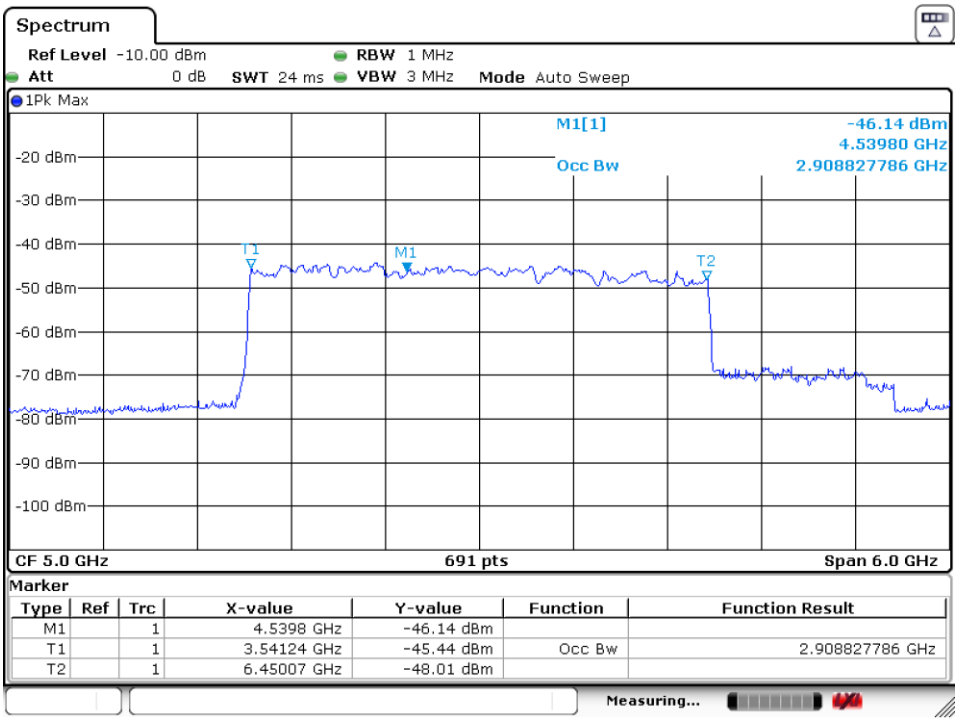

Date: 17.DEC.2024 10:57:35

0 °C



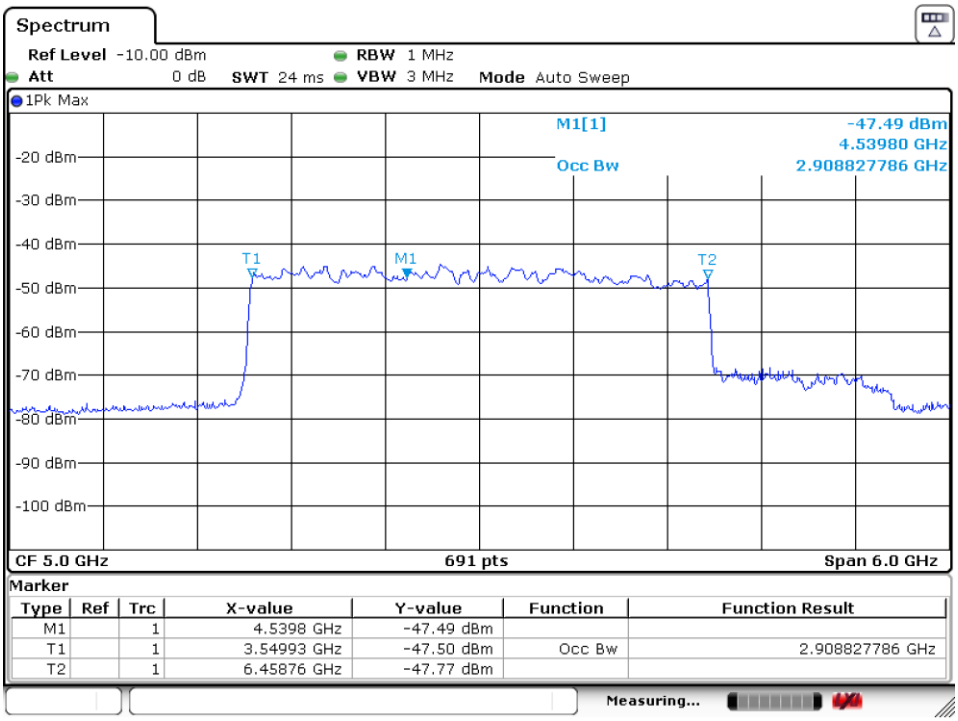

Date: 17.DEC.2024 10:52:16

10 °C



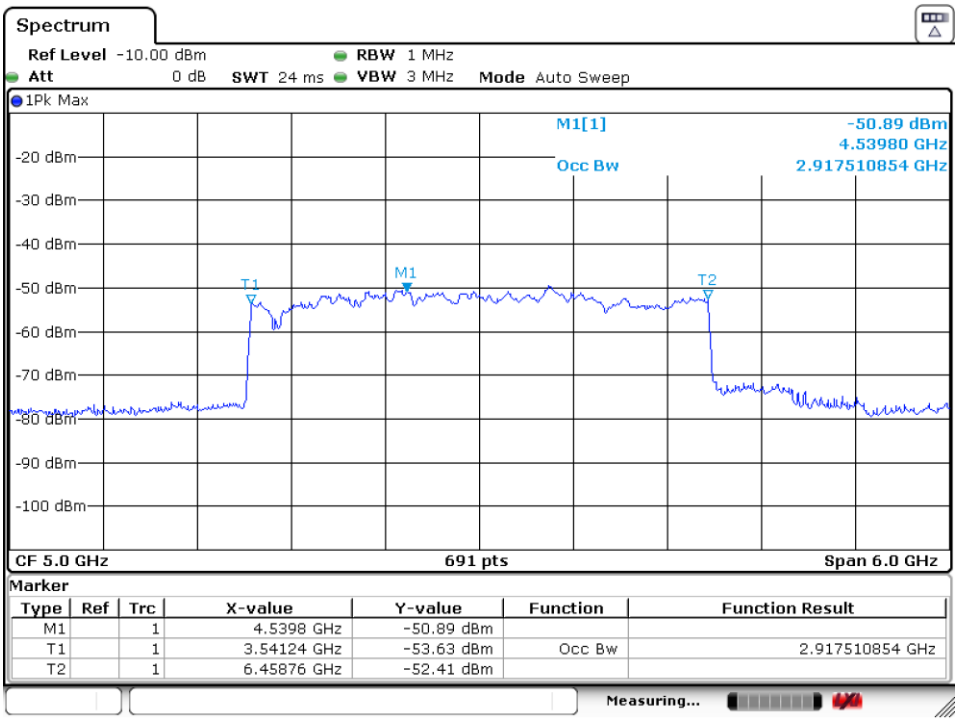

Date: 17.DEC.2024 10:46:45

20 °C



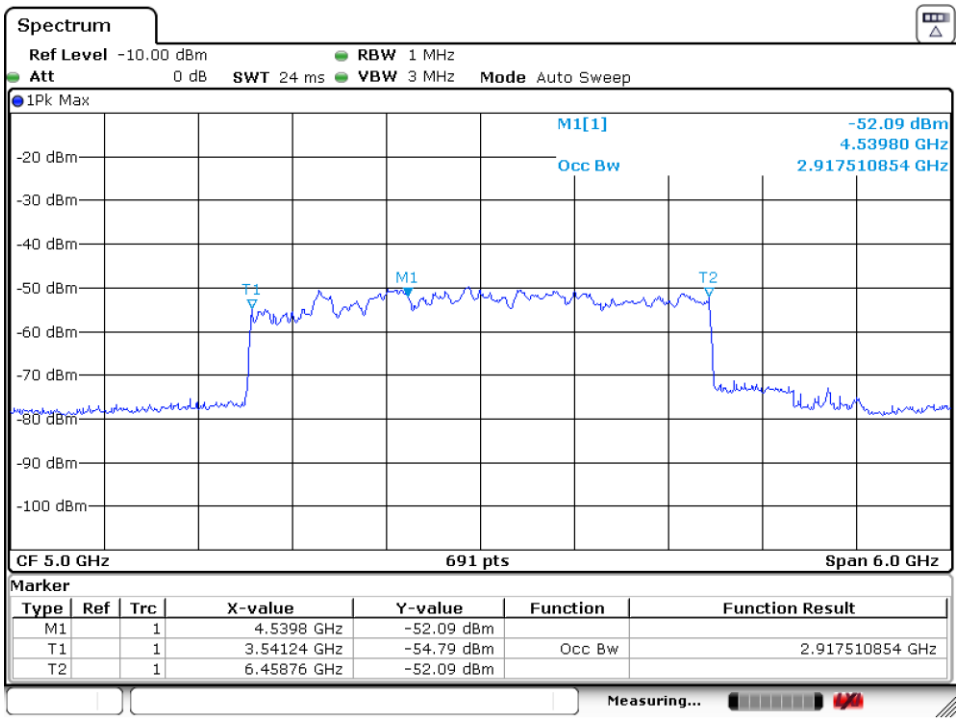

Date: 17.DEC.2024 10:42:32

30 °C



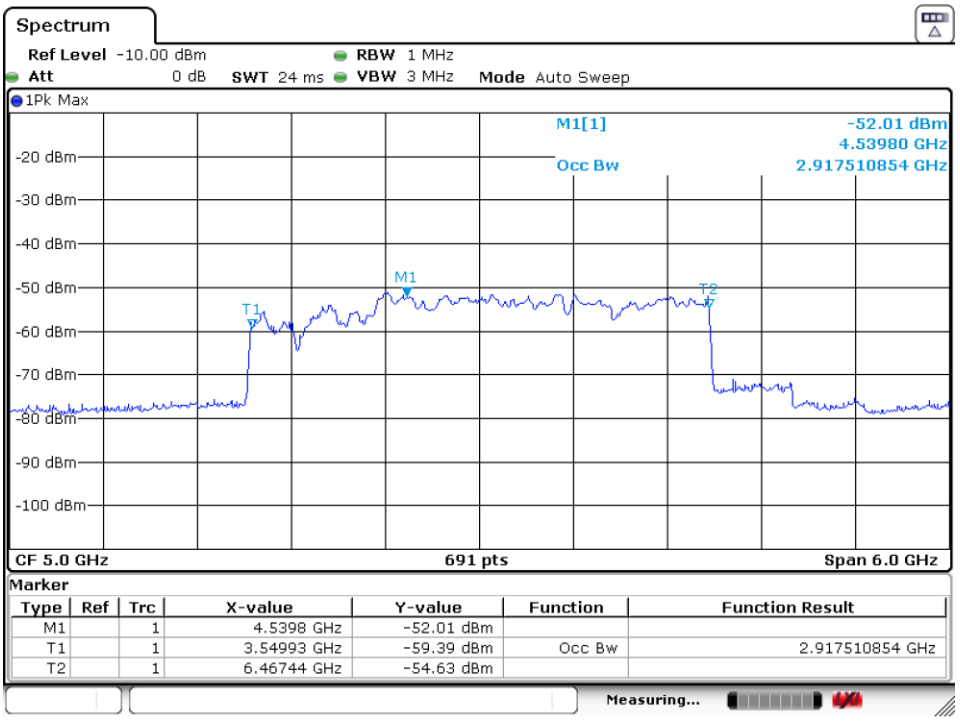

Date: 17.DEC.2024 10:01:59

40 °C



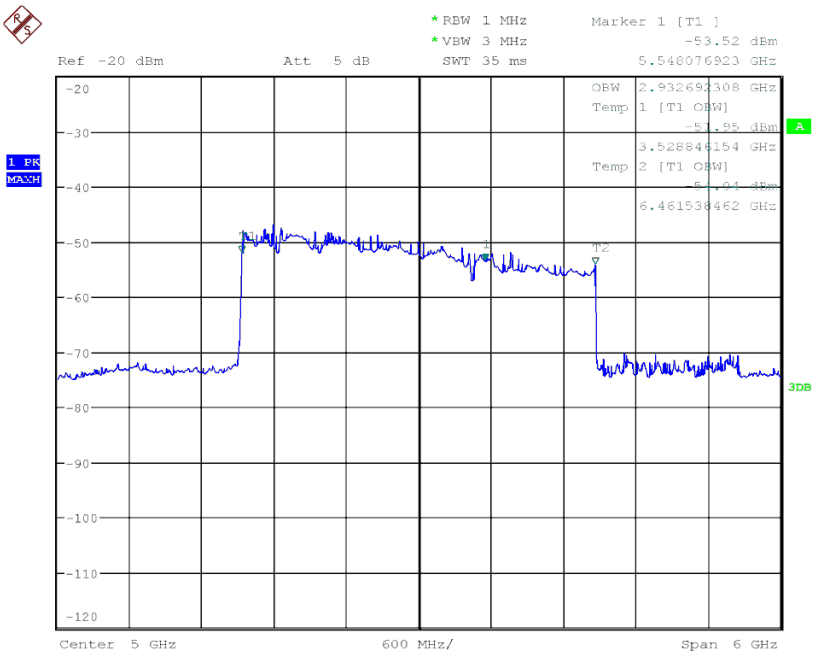

Date: 17.DEC.2024 10:06:57

50 °C



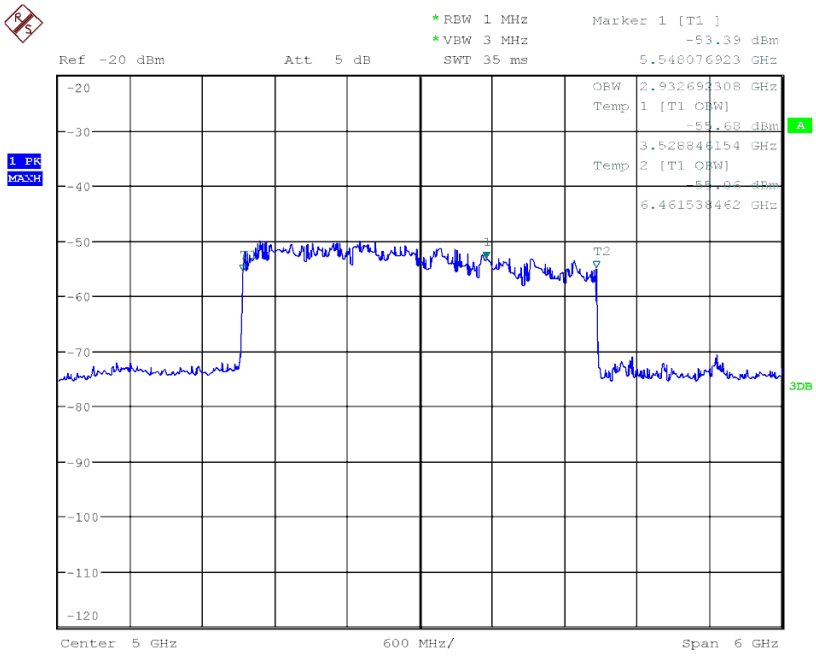

Date: 17.DEC.2024 10:12:23

## 10.2 $V_{DC}$




Date: 19.DEC.2024 15:29:14

## 13.8 $V_{DC}$




Date: 19.DEC.2024 15:31:31

# 10 Annex A - EUT External Photographs

Please refer to the attachment.

# 11 Annex B - EUT Internal Photographs

Please refer to the attachment.

# 12 Annex C - EUT Test Setup Photographs

Please refer to the attachment.

# 13 Annex D (Normative) - A2LA Electrical Testing Certificate

Accredited Laboratory

A2LA has accredited

BAY AREA COMPLIANCE LABORATORIES CORP.

Sunnyvale, CA

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets A2LA R222 - Specific Requirements EPA ENERGY STAR Accreditation Program. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 13th day of September 2024.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3297.02
Valid to September 30, 2026

*For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.*

Please follow the web link below for a full ISO 17025 scope

https://www.a2la.org/scopepdf/3297-02.pdf

**--- END OF REPORT ---**