# TEST REPORT

**Report Number:** 14982479-E3V2

| | | |
|---|---|---|
| **Applicant** | : | APPLE, INC.<br>1 APPLE PARK WAY<br>CUPERTINO, CA 95014, U.S.A. |
| **Model** | : | A3084 (Parent Model)<br>A3295, A3296, A3297 (Variant Models) |
| **Brand** | : | APPLE |
| **FCC ID** | : | BCG-E8684A (Parent Model)<br>BCG-E8685A, BCG-E8686A, BCG-E8687A (Variant Models) |
| **IC** | : | 579C-E8684A (Parent Model)<br>579C-E8685A, 579C-E8686A, 579C-E8687A (Variant Models) |
| **EUT Description** | : | Smartphone |
| **Test Standard(s)** | : | FCC 47 CFR PART 15 SUBPART C<br>ISED RSS-247 ISSUE 3<br>ISED RSS-GEN ISSUE 5 + A1 + A2 |

**Date Of Issue:**
2024/08/02

**Prepared by:**
UL Verification Services Inc.
47173 Benicia Street
Fremont, CA 94538 U.S.A.
TEL: (510) 319-4000
FAX: (510) 661-0888

CERT #0751.05

# REPORT REVISION HISTORY

| Rev. | Issue Date | Revisions | Revised By |
|---|---|---|---|
| V1 | 2024/07/31 | Initial Issue | Tony Li |
| V2 | 2024/08/02 | Addressed TCB Feedback on Sections 7 and 9 | Tony Li |



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

# TABLE OF CONTENTS





UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** APPLE INC.
1 APPLE PARK WAY
CUPERTINO, CA 95014, U.S.A

**EUT DESCRIPTION:** Smartphone

**MODEL:** A3084 (Parent Model)
A3295, A3296, A3297 (Variant Models)

**BRAND:** APPLE

**SERIAL NUMBER:** DP4Q0WG2LX

**SAMPLE RECEIPT DATE:** 2024/03/08

**DATE TESTED:** 2024/03/09 – 2024/07/12

| APPLICABLE STANDARDS | |
|---|---|
| **STANDARD** | **TEST RESULTS** |
| CFR 47 Part 15 Subpart C | Complies |
| ISED RSS-247 Issue 3 | Complies |
| ISED RSS-GEN Issue 5 + A1 + A2 | Complies |

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST, any agency of the Federal Government, or any agency of the U.S. government.



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

Approved & Released For
UL Verification Services Inc. By:

Chin Pang
Senior Lab Engineer
Consumer Technology Division
UL Verification Services Inc.

Prepared By:

David Collins
Senior Test Engineer
Consumer Technology Division
UL Verification Services Inc.



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

# 2. TEST SUMMARY

| FCC Clause | ISED Clause | Requirement | Result | Comment |
|---|---|---|---|---|
| See Comment | | Duty Cycle | Reporting purposes only | ANSI C63.10 Section 11.6. |
| - | RSS-GEN 6.7 | 99% OBW | Reporting purposes only | ANSI C63.10 Section 6.9.3. |
| 15.247 (a) (2) | RSS-247 5.2 (a) | 6dB BW | Complied | None. |
| 15.247 (b) (3) | RSS-247 5.4 (d) | Output Power | | None. |
| See Comment | | Average power | Reporting purposes only | Per ANSI C63.10, Section 11.9.2.3.2. |
| 15.247 (e) | RSS-247 5.2 (b) | PSD | Complied | None. |
| 15.247 (d) | RSS-247 5.5 | Conducted Spurious Emissions | Complied | None. |
| 15.209, 15.205 | RSS-GEN 8.9, 8.10 | Radiated Emissions | Complied | None. |
| 15.207 | RSS-Gen 8.8 | AC Mains Conducted Emissions | Complied | None. |

# 3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05r02, KDB 414788 D01 Radiated Test Site v01r01, KDB662911, RSS-GEN Issue 5 +A1 +A2, and RSS-247 Issue 3.



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

# 4. FACILITIES AND ACCREDITATION

UL Verification Services Inc. is accredited by A2LA, certification #0751.05, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

| | Address | ISED CABID | ISED Company Number | FCC Registration |
|---|---|---|---|---|
| ☐ | Building 1: 47173 Benicia Street, Fremont, CA 94538, USA | US0104 | 2324A | 550739 |
| ☒ | Building 2: 47266 Benicia Street, Fremont, CA 94538, USA | | | |
| ☐ | Building 3: 843 Auburn Court, Fremont, CA 94538 USA | | | |
| ☐ | Building 4: 47658 Kato Rd, Fremont, CA 94538 USA | | | |
| ☒ | Building 5: 47670 Kato Rd, Fremont, CA 94538 USA | | | |

# 5. DECISION RULES AND MEASUREMENT UNCERTAINTY

## 5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

## 5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

## 5.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| PARAMETER | $U_{LAB}$ |
|---|---|
| Conducted Antenna Port Emission Measurement | 1.94 |
| Power Spectral Density | 2.466 |
| Time Domain Measurements Using SA | 3.39 |
| RF Power Measurement Direct Method Using Power Meter | 0.450 (Peak), 1.3 (Ave) |
| Radio Frequency (Spectrum Analyzer) | 141.16 Hz |
| Occupied Bandwidth | 1.2% |
| Worst Case Conducted Disturbance, 9KHz to 0.15 MHz | 3.78 dB |
| Worst Case Conducted Disturbance, 0.15 to 30 MHz | 3.40 dB |
| Worst Case Radiated Disturbance, 9KHz to 30 MHz | 2.87 dB |
| Worst Case Radiated Disturbance, 30 to 1000 MHz | 6.01 dB |
| Worst Case Radiated Disturbance, 1000 to 18000 MHz | 4.73 dB |
| Worst Case Radiated Disturbance, 18000 to 26000 MHz | 4.51 dB |

Uncertainty figures are valid to a confidence level of 95%.



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

# 6. EQUIPMENT UNDER TEST

## 6.1. EUT DESCRIPTION

The Apple iPhone is a smartphone with cellular GSM, GPRS, EGPRS, WCDMA, LTE, 5GNR1, 5GNR2, IEEE 802.11a/b/g/n/ac/ax/be, Bluetooth (BT), Ultra-Wideband (UWB), Global Positioning System (GPS), Near-Field Communication (NFC), Narrow-Band (NB) UNII, 802.15.4, 802.15.4ab-Narrow Band (NB) and Mobile Satellite Service (MSS) technologies. The rechargeable battery is not user accessible. This device is not user-serviceable and requires special tools to disassemble.

## 6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

| Antenna | Configuration | Frequency Range (MHz) | Mode | Output Power (dBm) | Output Power (mW) |
|---|---|---|---|---|---|
| ANT4 | High Power | 2404 - 2476 | HDR4 | 15.53 | 35.73 |
| | Low Power | | | 8.14 | 6.52 |
| | High Power | | HDR8 | 16.03 | 40.09 |
| | Low Power | | | 8.51 | 7.10 |
| ANT3 | High Power | 2404 - 2476 | HDR4 | 15.65 | 36.73 |
| | Low Power | | | 7.12 | 5.15 |
| | High Power | | HDR8 | 15.99 | 39.72 |
| | Low Power | | | 7.55 | 5.69 |
| BF, ANT4+ ANT3 | High Power | 2404 - 2476 | HDR4 | 18.60 | 72.44 |
| | Low Power | | | 10.61 | 11.51 |
| | High Power | | HDR8 | 19.01 | 79.62 |
| | Low Power | | | 11.02 | 12.65 |

## 6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The antenna(s) type is IFA type.
The antenna(s) gains, as provided by the manufacturer, are as follows:

| Frequency Range (GHz) | ANT 4 (dBi) | ANT 3 (dBi) |
|---|---|---|
| 2.4 | -2.0 | -1.7 |

SMA Cable used for RF conducted testing has a loss as follows:

Loss used for Antenna 4 is 2.0 dB
Loss used for Antenna 3 is 2.2 dB

The cables were used for RF antenna port tests that had been offset to the test equipment during testing.



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

## 6.4. SOFTWARE AND FIRMWARE

The EUT firmware and software used during test was 22.1.93.334.

## 6.5. WORST-CASE CONFIGURATION AND MODE

The EUT was investigated in three orthogonal orientations X, Y and Z on ANT 4, ANT 3 and 2TX beamforming. It was determined that X (Flatbed) orientation was the worst-case orientation for beamforming 2TX and Y (Landscape) for ANT 4 and ANT 3.

Radiated band edge, harmonic and spurious emissions from 1GHz to 18GHz were performed with the EUT set to transmit at highest power on Low/Middle/High channels.

High power HDR4 and HDR8 TXBF harmonic spurious 1-18GHz were investigated to determine the worst case and results showed HDR4 was the worst case. Therefore, High Power Beamforming HDR4 mode was set to maximum power based on SISO to cover both SISO and MIMO modes to complies with radiated spurious emissions limits in the restricted bands between 1GHz and 18GHz low/mid/high channel (except the band edge).

Radiated emissions below 30MHz, 30-1000MHz, 18-26GHz and power line conducted emissions were performed with the EUT transmits at the channel with the highest output power as worst-case scenario. There were no emissions found below 30MHz within 20dB of the limit.

For below 1GHz tests were performed with EUT connected to AC power adapter as the worst case; and for above 1GHz, the worst-case configuration reported was tested with EUT only. For AC line conducted emission, test was investigated with AC power adapter and with laptop.

Note: In the Radiated Plots and emissions data, ANT0=ANT4 and ANT1=ANT3.



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

## 6.6. DESCRIPTION OF TEST SETUP

| SUPPORT TEST EQUIPMENT | | | | |
|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Serial Number** | **FCC ID/ DoC** |
| Laptop | Apple | Macbook Pro | C02VD7SAHV22 | BCGA1708 |
| Laptop AC/DC adapter | Liteon Technology | A1424 | NSW25679 | DoC |
| EUT AC/DC adapter | Apple | A1720 | C3D8417A7R93KVPA8 | DoC |
| Conducted Switch Box | UL | n/a | 208281 | N/A |

| I/O CABLES (RF CONDUCTED TEST) | | | | | | |
|---|---|---|---|---|---|---|
| **Cable No.** | **Port** | **# of Identical Ports** | **Connector Type** | **Cable Type** | **Cable Length (m)** | **Remarks** |
| 1 | SMA | 1 | SMA | Shielded | 0.75 | To spectrum Analyzer |
| 2 | Antenna | 2 | SMA | Un-shielded | 0.2 | To Conducted Switch Box |
| 3 | USB-C | 1 | USB-C | Shielded | 1.0 | N/A |
| 4 | AC | 1 | AC | Un-shielded | 2 | N/A |

| I/O CABLES (RF RADIATED TEST) | | | | | | |
|---|---|---|---|---|---|---|
| **Cable No.** | **Port** | **# of Identical Ports** | **Connector Type** | **Cable Type** | **Cable Length (m)** | **Remarks** |
| 1 | AC | 1 | AC | Un-shielded | 2 | N/A |
| 2 | USB | 1 | USB | Un-shielded | 1 | N/A |

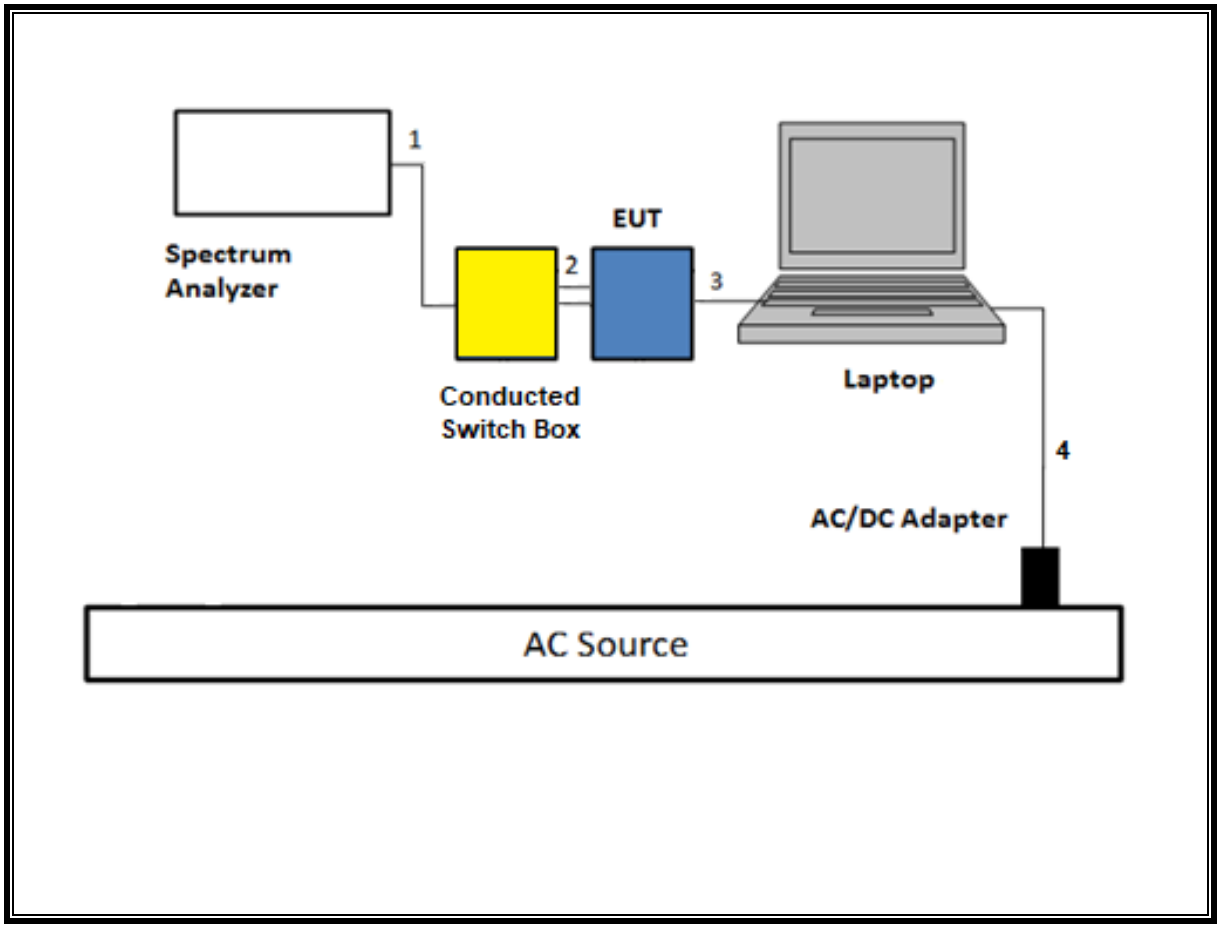
**TEST SETUP**

The EUT is connected to a test laptop during the tests. Test software exercised the radio card.



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

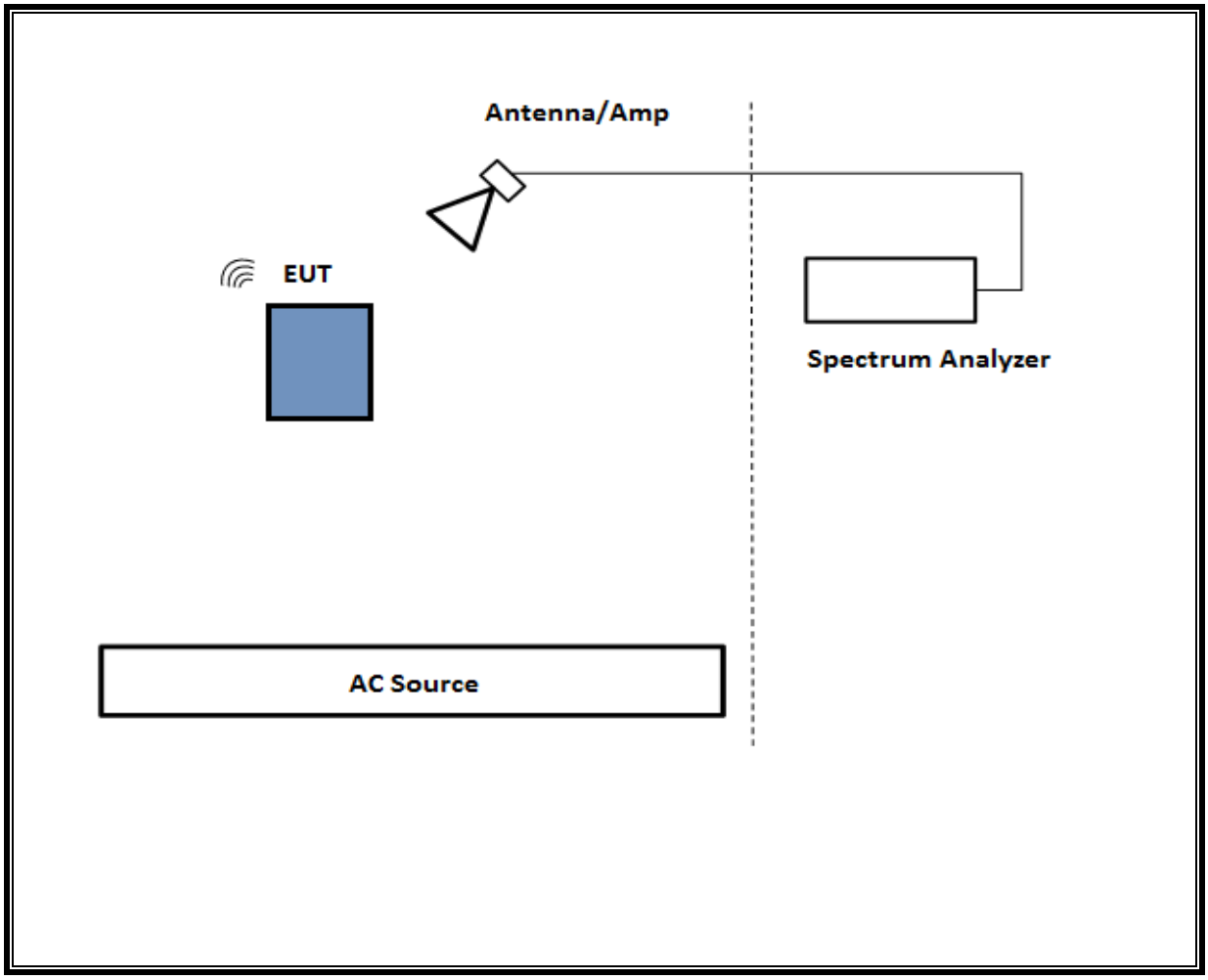
**SETUP DIAGRAM FOR CONDUCTED TESTS**






UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

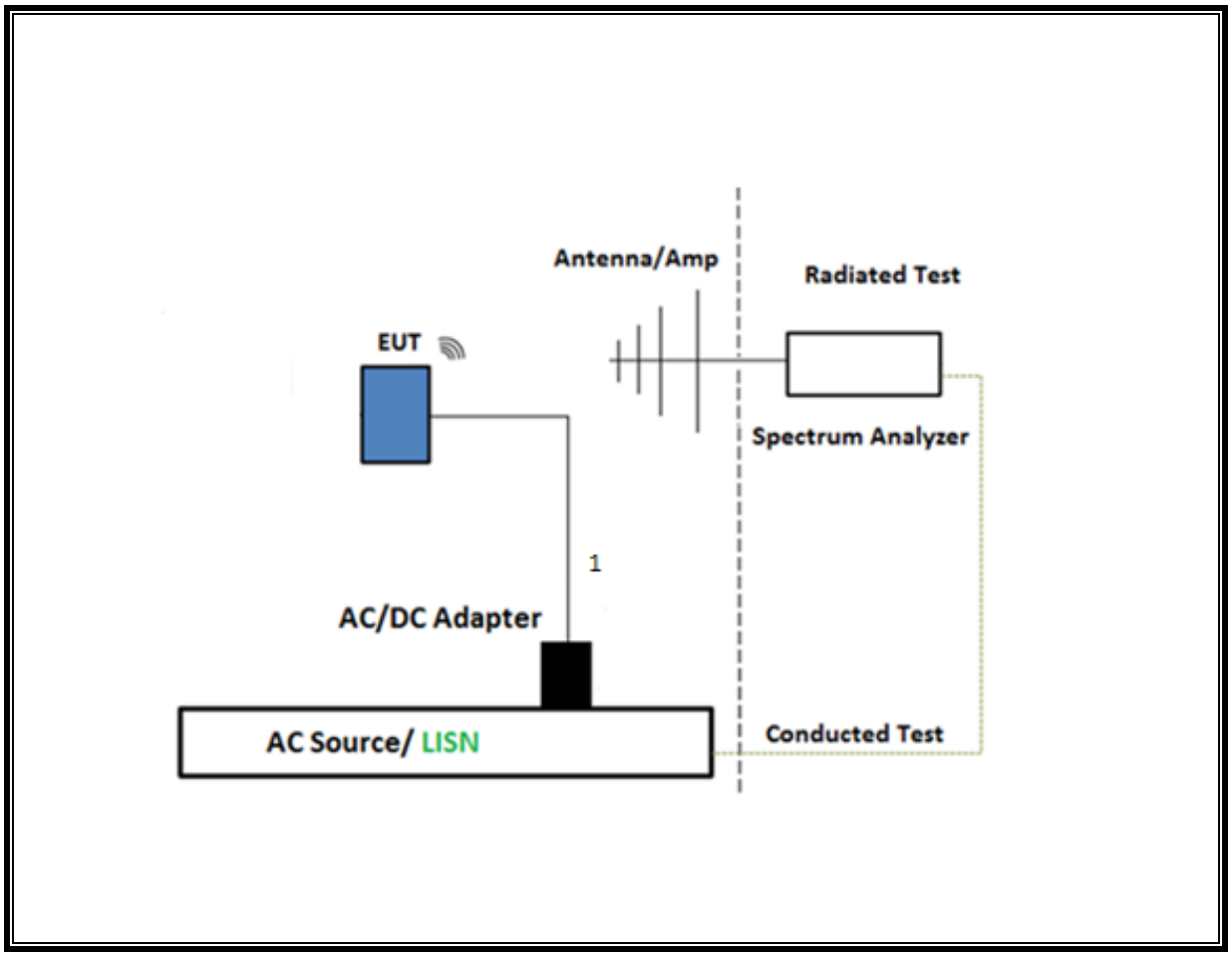
**SETUP DIAGRAM FOR RADIATED TESTS Above 1 GHz (1 to 26.5GHz )**






UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

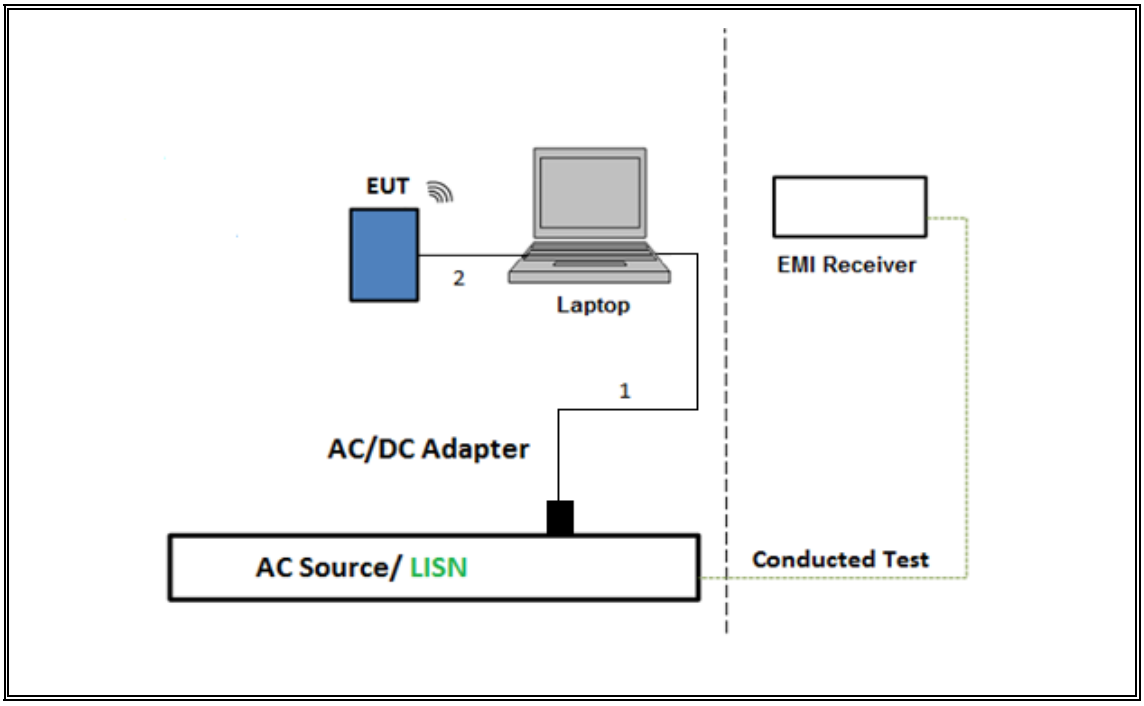
**SETUP DIAGRAM FOR below 1GHz and AC LINE CONDUCTED TEST**






UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

**TEST SETUP- AC LINE CONDUCTED: LAPTOP CONFIGURATION**






UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

# 7. MEASUREMENT METHOD

On Time and Duty Cycle: KDB 558074 D01 v05r02, Section 6.

6 dB BW: ANSI C63.10 Subclause -11.8.1 RBW ≥ DTS BW

Occupied BW (99%): ANSI C63.10-2013 Section 6.9.3

Output Power: ANSI C63.10 Subclause -11.9.1.3 Method PKPM1 Peak-reading power meter

Output Power: ANSI C63.10 Subclause -11.9.2.3.2 Measurement using gated average power meter.

PSD: ANSI C63.10 Subclause -11.10.2 Method PKPSD (peak PSD)

Radiated emissions restricted frequency bands: ANSI C63.10 Subclause -11.12.1 & Clause 13

Conducted emissions in restricted frequency bands: ANSI C63.10 Subclause -11.12.2

Band-edge: ANSI C63.10 Subclause -11.13.3.2 & Clause 13: Integration method -Peak detection

Band-edge: ANSI C63.10 Subclause -11.13.3.3 & Clause 13: Integration method -Trace averaging with continuous transmission at full power

AC Power Line Conducted Emissions: ANSI C63.10-2013, Section 6.2.

Radiated emissions non-restricted frequency bands ANSI C63.10 Subclause – 11.11 & Clause 13

Radiated Spurious Emissions Below 30MHz: ANSI C63.10-2013 Section 6.4 & 13

**NOTE**: All conducted antenna port tests for Beamforming applied the same test procedures as HDR normal modes.



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

# 8. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

| Description | Manufacturer | Model | ID Num | Cal Due |
|---|---|---|---|---|
| Antenna, Horn 1-18GHz | ETS-Lindgren | 3117 | 200896 | 2025/04/24 |
| RF Filter Box, 1-18GHz, 17 Ports | UL-FR1 | RATS 2 | 225474 | 2025/04/30 |
| EMI TEST RECEIVER | Rohde & Schwarz | ESW44 | 170063 | 2024/11/30 |
| Antenna, Horn 1-18GHz | ETS-Lindgren | 3117 | 206808 | 2025/03/31 |
| EMI TEST RECEIVER | Rohde & Schwarz | ESW44 | 230547 | 2025/02/28 |
| *Antenna, Broadband Hybrid, 30MHz to 2000MHz | Sunol Sciences Corp. | JB3 | 85151 | 2024/04/30 |
| Link File, @3m, 9kHz-1000MHz Hybrid Path Loss | UL-FR1 | Port 0 Factors | 232001 | 2025/02/28 |
| *Antenna, Horn 18 to 26.5GHz | A.R.A | MWH-1826/B | 172353 | 2024/06/30 |
| RF Amplifier Assembly, 18-26.5GHz, 60dB Gain | AMPLICAL | AMP18G26.5-60 | 171583 | 2025/03/31 |
| EMI TEST RECEIVER | Rohde & Schwarz | ESW44 | 223461 | 2024/08/29 |
| RF Filter Box, 1-18GHz, 12 Port | UL-FR1 | Frankenstein | 216812 | 2025/01/30 |
| Antenna, Passive Loop 30Hz to 1MHz | Electro-Metrics | EM-6871 | 170014 | 2024/08/31 |
| Antenna, Passive Loop 100KHz - 30MHz | ELECTRO-METRICS | EM-6872 | 170016 | 2024/08/31 |
| Power Meter, P-series single channel | Keysight Technologies Inc | N1911A | 90731 | 2025/01/31 |
| Power Sensor, P - series, 50MHz to 18GHz, Wideband | Keysight Technologies Inc | N1921A | 80120 | 2025/01/31 |
| Power Meter, P-series single channel | Keysight Technologies Inc | N1911A | 90719 | 2025/01/31 |
| Power Sensor, P - series, 50MHz to 18GHz, Wideband | Keysight Technologies Inc | N1921A | 90389 | 2025/01/31 |
| 10dB Fixed Attenuator | Pasternack Enterprises | PE7087-10 | 178557 | Verified Before Use |
| 10dB Fixed Attenuator | Pasternack Enterprises | PE7087-10 | 178557 | Verified Before Use |
| Spectrum Analyzer, PXA, 3Hz to 44GHz | Keysight Technologies Inc | N9030A | 80397 | 2025/01/31 |
| Spectrum Analyzer, PXA, 3Hz to 50GHz w/Ext. Mixer | Keysight Technologies Inc | N9030A | 80400 | 2025/02/02 |
| Spectrum Analyzer, PXA, 3Hz to 44GHz | Keysight Technologies Inc | N9030A | 125178 | 2025/01/31 |
| *Conducted Switch Box | N/A | CSB | 208281 | 2024/04/30 |
| Conducted Switch Box | N/A | CSB | 208281 | 2025/05/08 |



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

| AC Line Conducted | | | | |
|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **ID Num** | **Cal Due** |
| EMI Test Receiver 9kHz-7GHz | Rohde & Schwarz | ESR | 93091 | 2025/02/28 |
| LISN for Conducted Emissions CISPR-16 | FISCHER CUSTOM COMMUNICATIONS | FCC-LISN-50/250-25-2-01-480V | 175765 | 2025/01/31 |
| Transient Limiter | TE | TBFL1 | 207996 | 2024/08/31 |
| **UL AUTOMATION SOFTWARE** | | | | |
| Radiated Software | UL | UL EMC | Ver 9.5, May 1, 2023 | |
| Conducted Software | UL | UL EMC | 2023.2.23 | |
| AC Line Conducted Software | UL | UL EMC | Ver 9.5, Mar 3, 2023 | |

*Testing is completed before equipment expiration date.



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

# 9. ANTENNA PORT TEST RESULTS

## 9.1. ON TIME AND DUTY CYCLE

**LIMITS**

None; for reporting purposes only.

**PROCEDURE**

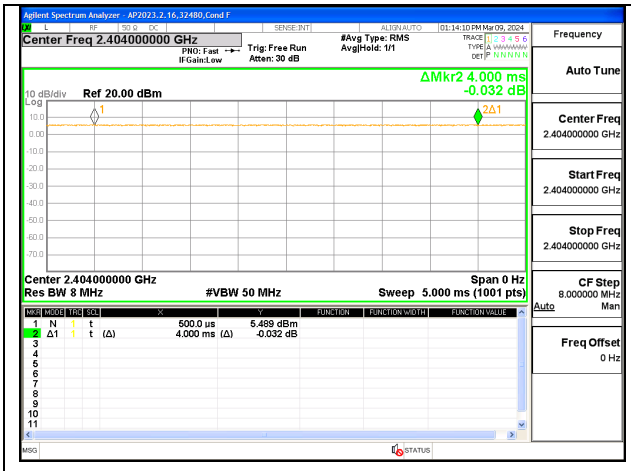
KDB 558074 Zero-Span Spectrum Analyzer Method.

**ON TIME AND DUTY CYCLE RESULTS**

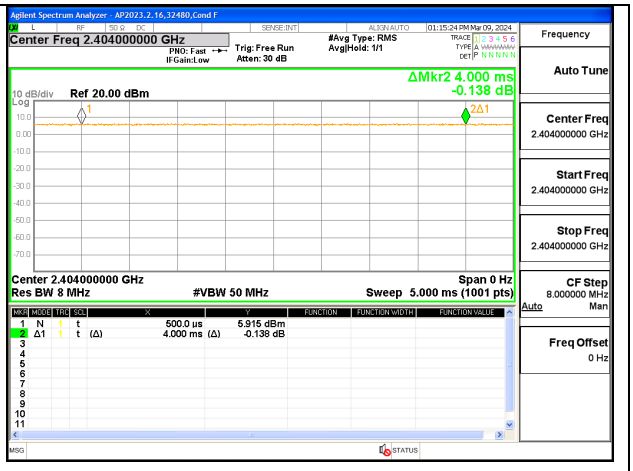
| Mode | ON Time B (msec) | Period (msec) | Duty Cycle x (linear) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) | 1/B Minimum VBW (kHz) |
|---|---|---|---|---|---|---|
| **2.4GHz Band** | | | | | | |
| HDR4 | 4.000 | 4.000 | 1.000 | 100.00% | 0.00 | 0.010 |
| HDR8 | 4.000 | 4.000 | 1.000 | 100.00% | 0.00 | 0.010 |

Note: There is the same DC factor on 1TX and 2TX.

**DUTY CYCLE PLOTS**




**DUTY CYCLE HDR4**




**DUTY CYCLE HDR8**



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

## 9.2. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**RESULTS**

Only High-Power modes result is reported, it covers all Low Power modes. Only Mid channel plot is reported to show setting parameter complies with testing method/procedure.

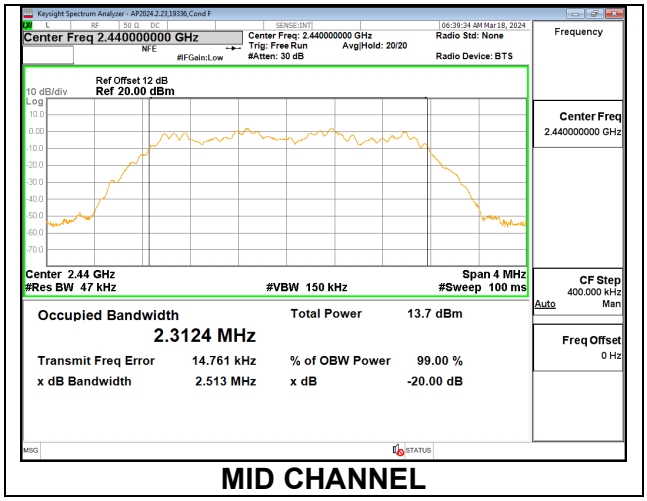


UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

### 9.2.1. HIGH POWER HDR (HDR4)

**ANT 4**

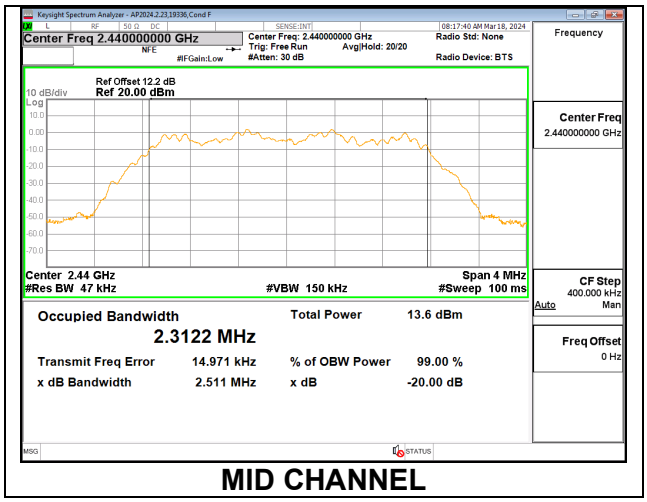
| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---|---|---|
| Low | 2404 | 2.3108 |
| Middle | 2441 | 2.3124 |
| High | 2476 | 2.3132 |




MID CHANNEL

**ANT 3**

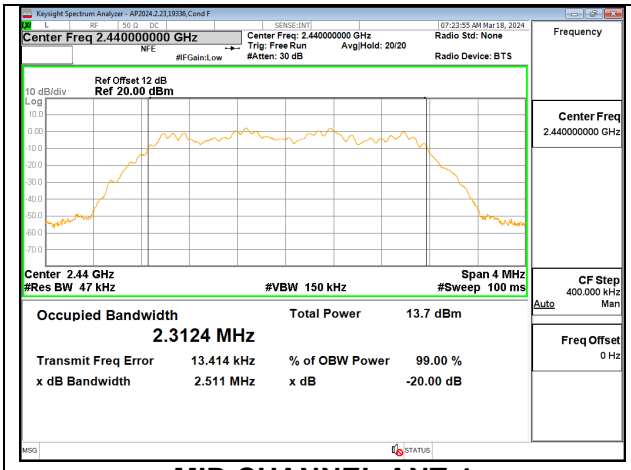
| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---|---|---|
| Low | 2404 | 2.3096 |
| Middle | 2441 | 2.3122 |
| High | 2476 | 2.3142 |



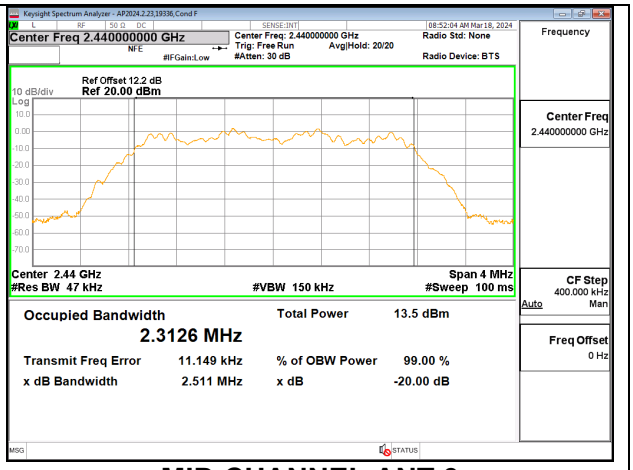

MID CHANNEL

### 9.2.2. HIGH POWER HDR TXBF (HDR4)

| Channel | Frequency (MHz) | 99% Bandwidth ANT 4 (MHz) | 99% Bandwidth ANT 3 (MHz) |
|---|---|---|---|
| Low | 2404 | 2.3102 | 2.3098 |
| Middle | 2441 | 2.3124 | 2.3126 |
| High | 2476 | 2.3131 | 2.3139 |




MID CHANNEL ANT 4




MID CHANNEL ANT 3

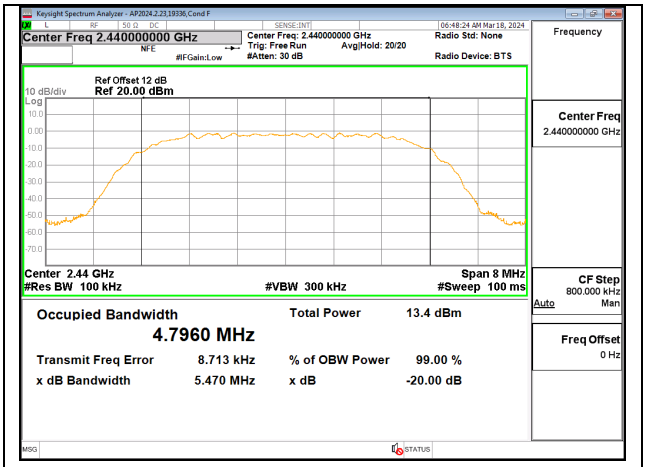


UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

### 9.2.3. HIGH POWER HDR (HDR8)

**ANT 4**

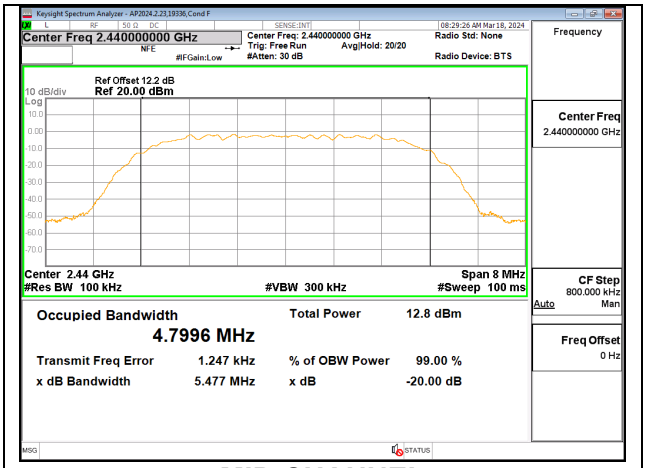
| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---|---|---|
| Low | 2404 | 4.7899 |
| Middle | 2441 | 4.7960 |
| High | 2476 | 4.7956 |




**MID CHANNEL**

**ANT 3**

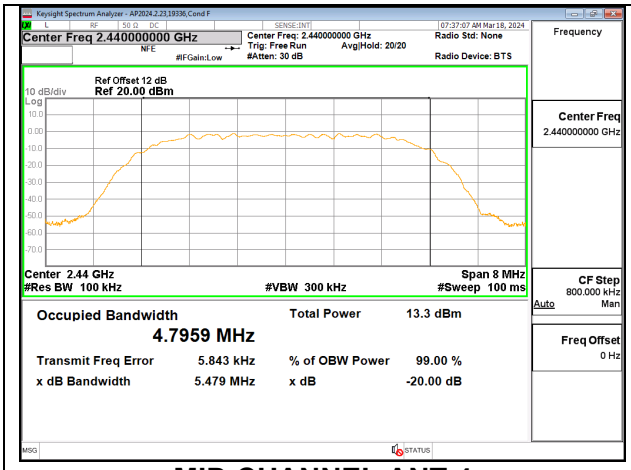
| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---|---|---|
| Low | 2404 | 4.7830 |
| Middle | 2441 | 4.7996 |
| High | 2476 | 4.8057 |



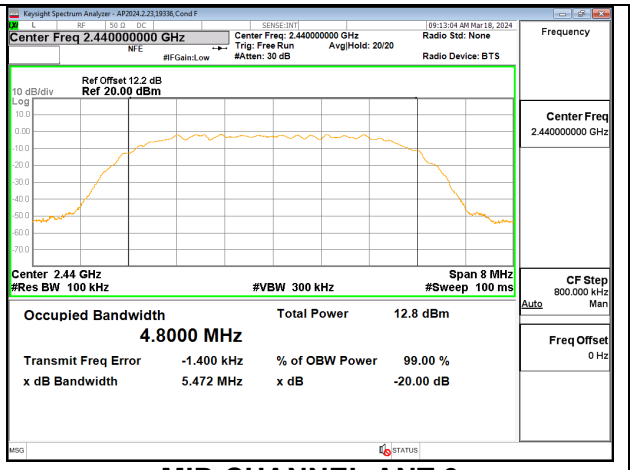

**MID CHANNEL**

### 9.2.4. HIGH POWER HDR TXBF (HDR8)

| Channel | Frequency (MHz) | 99% Bandwidth ANT 4 (MHz) | 99% Bandwidth ANT 3 (MHz) |
|---|---|---|---|
| Low | 2404 | 4.7880 | 4.7834 |
| Middle | 2441 | 4.7959 | 4.8000 |
| High | 2476 | 4.7958 | 4.8050 |




MID CHANNEL ANT 4




MID CHANNEL ANT 3



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

## 9.3. 6 dB BANDWIDTH

**LIMITS**

FCC §15.407 (e)

RSS-247 5.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

**RESULTS**

The 6dB bandwidth was measured for the narrowest bandwidth mode, HDR4, to demonstrate compliance with the minimum required bandwidth of 500 kHz. Other modes were not tested as their bandwidth is greater than the HDR4 mode, as demonstrated by the 99% bandwidth measurements performed on all modes.

Only Mid channel plot is reported to show setting parameter complies with testing method/procedure.

Only High-Power modes result is reported, it covers all Low Power modes.



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

### 9.3.1. HIGH POWER HDR (HDR4)

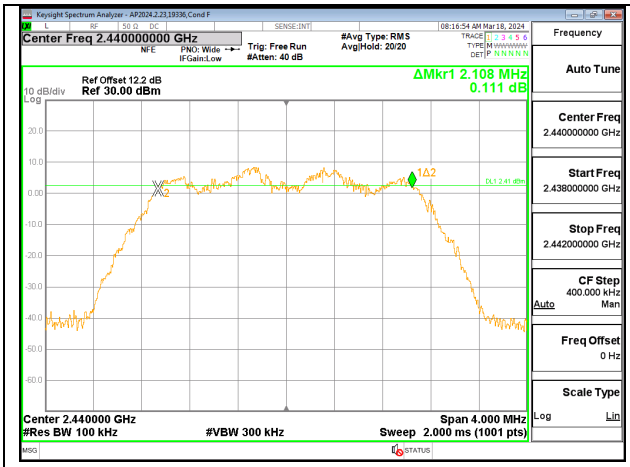
**ANT 4**

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) |
|---|---|---|---|
| Low | 2404 | 2.092 | 0.5 |
| Middle | 2441 | 2.108 | 0.5 |
| High | 2476 | 2.092 | 0.5 |


**MID CHANNEL**

**ANT 3**

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) |
|---|---|---|---|
| Low | 2404 | 2.152 | 0.5 |
| Middle | 2441 | 2.108 | 0.5 |
| High | 2476 | 2.084 | 0.5 |




**MID CHANNEL**

## 9.4. OUTPUT POWER

**LIMITS**

FCC §15.247 (b) (3)

RSS-247 5.4 (d)

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

**TEST PROCEDURE**

Measurements perform using a wideband RF power meter.

The power output was measured on the EUT antenna port using SMA cable with 10dB attenuator connected to a power meter via wideband peak power sensor. Peak output power was read directly from the power meter.

**DIRECTIONAL ANTENNA GAIN**

For 1 TX:
There is only one transmitter output therefore the directional gain is equal to the antenna gain.

For 2 TX:
Tx chains are correlated for power and PSD due to the device supporting Beamforming mode. The directional gains are as follows:

| Band (GHz) | ANT 4 Antenna Gain (dBi) | ANT 3 Antenna Gain (dBi) | Uncorrelated Chains Directional Gain (dBi) | Correlated Chains Directional Gain (dBi) |
|---|---|---|---|---|
| 2.4 | -2.00 | -1.70 | -1.85 | 1.16 |

**Directional Gain Calculation:**

ANSI C63.10-2013 section 14.4.3

Uncorrelated directional gain=10*LOG((10^(Ant1/10)+10^(Ant2/10))/2)
Correlated directional Gain=10*LOG(((10^(Ant1/20)+10^(Ant2/20))^2)/2)

Sample Calculation:

Ant1=-2.0, Ant2=-1.7

Uncorrelated Antenna gain=10log[(10^(-2.0/10)+10^(-1.7/10))/2]=-1.85dBi

Correlated Antenna gain=10log[(10^(-2.0/20)+10^(-1.7/20))^2)/2]=1.16dBi

**RESULTS**



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

### 9.4.1. HIGH POWER HDR (HDR4)

**ANT 4**

| | |
|---|---|
| **Tested By:** | 12491 GM |
| **Date:** | 7/12/2024 |

| Channel | Frequency (MHz) | Peak Power Reading (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| Low | 2404 | 15.53 | 30 | -14.47 |
| Middle | 2441 | 15.52 | 30 | -14.48 |
| High | 2476 | 15.47 | 30 | -14.53 |

**ANT 3**

| | |
|---|---|
| **Tested By:** | 12491 GM |
| **Date:** | 7/12/2024 |

| Channel | Frequency (MHz) | Peak Power Reading (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| Low | 2404 | 15.65 | 30 | -14.35 |
| Middle | 2441 | 15.56 | 30 | -14.44 |
| High | 2476 | 15.57 | 30 | -14.43 |

### 9.4.2. HIGH POWER HDR TXBF (HDR4)

| | |
|---|---|
| **Tested By:** | 12491 GM |
| **Date:** | 7/12/2024 |

| Channel | Frequency (MHz) | Peak Power Reading ANT 4 (dBm) | Peak Power Reading ANT 3 (dBm) | Total Corr'd Power (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 2404 | 15.50 | 15.47 | 18.50 | 30.00 | -11.50 |
| Middle | 2441 | 15.69 | 15.49 | 18.60 | 30.00 | -11.40 |
| High | 2476 | 15.48 | 15.48 | 18.49 | 30.00 | -11.51 |

### 9.4.3. HIGH POWER HDR (HDR8)

**ANT 4**

| | |
|---|---|
| **Tested By:** | 12491 GM |
| **Date:** | 7/12/2024 |

| Channel | Frequency (MHz) | Peak Power Reading (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| Low | 2404 | 15.79 | 30 | -14.21 |
| Middle | 2441 | 15.92 | 30 | -14.08 |
| High | 2476 | 16.03 | 30 | -13.97 |

**ANT 3**

| | |
|---|---|
| **Tested By:** | 12491 GM |
| **Date:** | 7/12/2024 |

| Channel | Frequency (MHz) | Peak Power Reading (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| Low | 2404 | 15.79 | 30 | -14.21 |
| Middle | 2441 | 15.79 | 30 | -14.21 |
| High | 2476 | 15.99 | 30 | -14.01 |

### 9.4.4. HIGH POWER HDR TXBF (HDR8)

| | |
|---|---|
| **Tested By:** | 12491 GM |
| **Date:** | 7/12/2024 |

| Channel | Frequency (MHz) | Peak Power Reading ANT 4 (dBm) | Peak Power Reading ANT 3 (dBm) | Total Corr'd Power (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 2404 | 15.88 | 15.80 | 18.85 | 30.00 | -11.15 |
| Middle | 2441 | 15.86 | 15.80 | 18.84 | 30.00 | -11.16 |
| High | 2476 | 15.94 | 16.05 | 19.01 | 30.00 | -10.99 |



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

### 9.4.5. LOW POWER HDR (HDR4)

**ANT 4**

| | |
|---|---|
| **Tested By:** | 12491 GM |
| **Date:** | 7/12/2024 |

| Channel | Frequency (MHz) | Peak Power Reading (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| Low | 2404 | 8.14 | 30 | -21.86 |
| Middle | 2441 | 7.94 | 30 | -22.06 |
| High | 2476 | 8.01 | 30 | -21.99 |

**ANT 3**

| | |
|---|---|
| **Tested By:** | 12491 GM |
| **Date:** | 7/12/2024 |

| Channel | Frequency (MHz) | Peak Power Reading (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| Low | 2404 | 7.11 | 30 | -22.89 |
| Middle | 2441 | 6.93 | 30 | -23.07 |
| High | 2476 | 7.12 | 30 | -22.88 |

### 9.4.6. LOW POWER HDR TXBF (HDR4)

| | |
|---|---|
| **Tested By:** | 12491 GM |
| **Date:** | 7/12/2024 |

| Channel | Frequency (MHz) | Peak Power Reading ANT 4 (dBm) | Peak Power Reading ANT 3 (dBm) | Total Corr'd Power (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 2404 | 8.04 | 7.11 | 10.61 | 30.00 | -19.39 |
| Middle | 2441 | 8.00 | 7.03 | 10.55 | 30.00 | -19.45 |
| High | 2476 | 7.94 | 6.81 | 10.42 | 30.00 | -19.58 |



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

## 9.4.7. LOW POWER HDR (HDR8)

**ANT 4**

| | |
|---|---|
| **Tested By:** | 12491 GM |
| **Date:** | 7/12/2024 |

| Channel | Frequency (MHz) | Peak Power Reading (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| Low | 2404 | 8.29 | 30 | -21.71 |
| Middle | 2441 | 8.51 | 30 | -21.49 |
| High | 2476 | 8.28 | 30 | -21.72 |

**ANT 3**

| | |
|---|---|
| **Tested By:** | 12491 GM |
| **Date:** | 7/12/2024 |

| Channel | Frequency (MHz) | Peak Power Reading (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| Low | 2404 | 7.55 | 30 | -22.45 |
| Middle | 2441 | 7.37 | 30 | -22.63 |
| High | 2476 | 7.41 | 30 | -22.59 |

## 9.4.8. LOW POWER HDR TXBF (HDR8)

| | |
|---|---|
| **Tested By:** | 12491 GM |
| **Date:** | 7/12/2024 |

| Channel | Frequency (MHz) | Peak Power Reading ANT 4 (dBm) | Peak Power Reading ANT 3 (dBm) | Total Corr'd Power (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 2404 | 8.47 | 7.40 | 10.98 | 30.00 | -19.02 |
| Middle | 2441 | 8.49 | 7.48 | 11.02 | 30.00 | -18.98 |
| High | 2476 | 8.30 | 7.55 | 10.95 | 30.00 | -19.05 |



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

## 9.5. AVERAGE POWER

**LIMITS**

None; for reporting purposes only.

**TEST PROCEDURE**

Measurements perform using a wideband RF power meter.

The power output was measured on the EUT antenna port using SMA cable with 10dB attenuator connected to a power meter via wideband average power sensor. Gated average output power was read directly from power meter.

**RESULTS**



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

### 9.5.1. HIGH POWER HDR (HDR4)

**ANT 4**

| | |
|---|---|
| **Tested By:** | 12491 GM |
| **Date:** | 7/12/2024 |

| Channel | Frequency (MHz) | AV power (dBm) |
|---|---|---|
| Low | 2404 | 12.94 |
| Middle | 2441 | 12.97 |
| High | 2476 | 12.86 |

**ANT 3**

| | |
|---|---|
| **Tested By:** | 12491 GM |
| **Date:** | 7/12/2024 |

| Channel | Frequency (MHz) | AV power (dBm) |
|---|---|---|
| Low | 2404 | 12.95 |
| Middle | 2441 | 12.95 |
| High | 2476 | 12.87 |

### 9.5.2. HIGH POWER HDR TXBF (HDR4)

| | |
|---|---|
| **Tested By:** | 12491 GM |
| **Date:** | 7/12/2024 |

| Channel | Frequency (MHz) | Average Power ANT 4 (dBm) | Average Power ANT 3 (dBm) | Total Power (dBm) |
|---|---|---|---|---|
| Low | 2404 | 12.84 | 12.88 | 15.87 |
| Middle | 2441 | 12.99 | 12.94 | 15.98 |
| High | 2476 | 12.78 | 12.83 | 15.82 |



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

### 9.5.3. HIGH POWER HDR (HDR8)

**ANT 4**

| | |
|---|---|
| **Tested By:** | 12491 GM |
| **Date:** | 7/12/2024 |

| Channel | Frequency (MHz) | AV power (dBm) |
|---|---|---|
| Low | 2404 | 12.83 |
| Middle | 2441 | 12.88 |
| High | 2476 | 12.94 |

**ANT 3**

| | |
|---|---|
| **Tested By:** | 12491 GM |
| **Date:** | 7/12/2024 |

| Channel | Frequency (MHz) | AV power (dBm) |
|---|---|---|
| Low | 2404 | 12.81 |
| Middle | 2441 | 12.83 |
| High | 2476 | 12.99 |

### 9.5.4. HIGH POWER HDR TXBF (HDR8)

| | |
|---|---|
| **Tested By:** | 12491 GM |
| **Date:** | 7/12/2024 |

| Channel | Frequency (MHz) | Average Power ANT 4 (dBm) | Average Power ANT 3 (dBm) | Total Power (dBm) |
|---|---|---|---|---|
| Low | 2404 | 12.91 | 12.83 | 15.88 |
| Middle | 2441 | 12.84 | 12.78 | 15.82 |
| High | 2476 | 12.84 | 12.95 | 15.91 |



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

### 9.5.5. LOW POWER HDR (HDR4)

**ANT 4**

| | |
|---|---|
| **Tested By:** | 12491 GM |
| **Date:** | 7/12/2024 |

| Channel | Frequency (MHz) | AV power (dBm) |
|---|---|---|
| Low | 2404 | 5.48 |
| Middle | 2441 | 5.39 |
| High | 2476 | 5.32 |

**ANT 3**

| | |
|---|---|
| **Tested By:** | 12491 GM |
| **Date:** | 7/12/2024 |

| Channel | Frequency (MHz) | AV power (dBm) |
|---|---|---|
| Low | 2404 | 4.47 |
| Middle | 2441 | 4.33 |
| High | 2476 | 4.45 |

### 9.5.6. LOW POWER HDR TXBF (HDR4)

| | |
|---|---|
| **Tested By:** | 12491 GM |
| **Date:** | 7/12/2024 |

| Channel | Frequency (MHz) | Average Power ANT 4 (dBm) | Average Power ANT 3 (dBm) | Total Power (dBm) |
|---|---|---|---|---|
| Low | 2404 | 5.41 | 4.48 | 7.98 |
| Middle | 2441 | 5.45 | 4.48 | 8.00 |
| High | 2476 | 5.39 | 4.26 | 7.87 |



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

### 9.5.7. LOW POWER HDR (HDR8)

**ANT 4**

| | |
|---|---|
| **Tested By:** | 12491 GM |
| **Date:** | 7/12/2024 |

| Channel | Frequency (MHz) | AV power (dBm) |
|---|---|---|
| Low | 2404 | 5.31 |
| Middle | 2441 | 5.46 |
| High | 2476 | 5.32 |

**ANT 3**

| | |
|---|---|
| **Tested By:** | 12491 GM |
| **Date:** | 7/12/2024 |

| Channel | Frequency (MHz) | AV power (dBm) |
|---|---|---|
| Low | 2404 | 4.45 |
| Middle | 2441 | 4.31 |
| High | 2476 | 4.35 |

### 9.5.8. LOW POWER HDR TXBF (HDR8)

| | |
|---|---|
| **Tested By:** | 12491 GM |
| **Date:** | 7/12/2024 |

| Channel | Frequency (MHz) | Average Power ANT 4 (dBm) | Average Power ANT 3 (dBm) | Total Power (dBm) |
|---|---|---|---|---|
| Low | 2404 | 5.38 | 4.31 | 7.89 |
| Middle | 2441 | 5.50 | 4.49 | 8.03 |
| High | 2476 | 5.22 | 4.47 | 7.87 |



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

## 9.6. POWER SPECTRAL DENSITY

**LIMITS**

FCC §15.247 (e)

RSS-247 (5.2) (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

**RESULTS**

Only High-Power modes result is reported, it covers all Low Power modes.

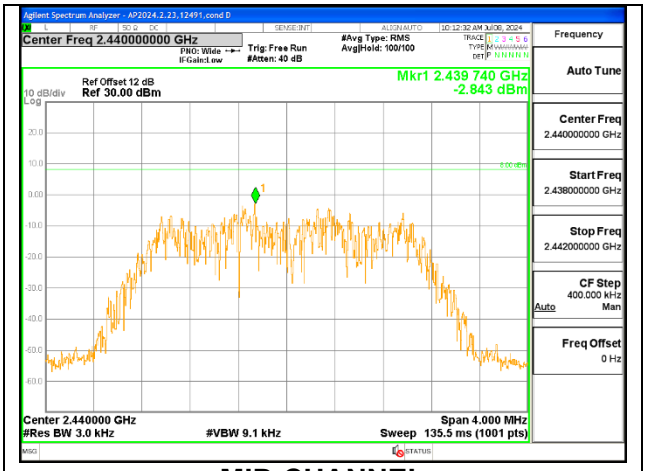


UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

### 9.6.1. HIGH POWER HDR (HDR4)

**ANT 4**

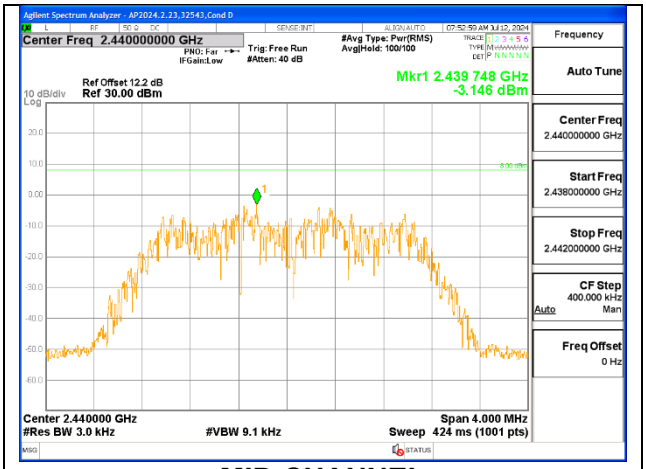
| Channel | Frequency (MHz) | PSD (dBm/3kHz) | Limit (dBm/3kHz) | Margin (dB) |
|---|---|---|---|---|
| Low | 2404 | -2.621 | 8 | -10.62 |
| Middle | 2441 | -2.843 | 8 | -10.84 |
| High | 2476 | -2.773 | 8 | -10.77 |




**MID CHANNEL**

**ANT 3**

| Channel | Frequency (MHz) | PSD (dBm/3kHz) | Limit (dBm/3kHz) | Margin (dB) |
|---|---|---|---|---|
| Low | 2404 | -3.141 | 8 | -11.14 |
| Middle | 2441 | -3.146 | 8 | -11.15 |
| High | 2476 | -3.307 | 8 | -11.31 |



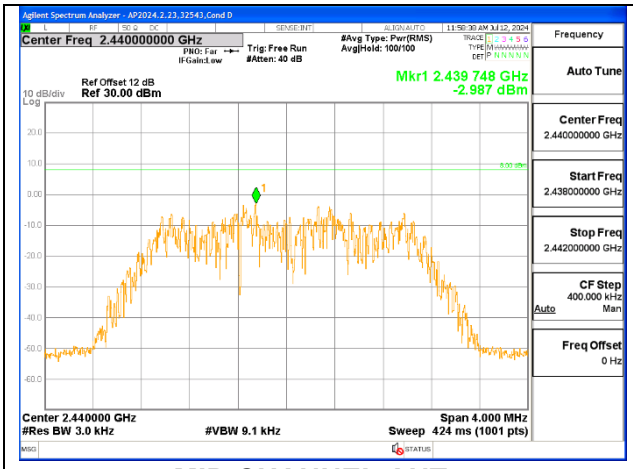

**MID CHANNEL**

### 9.6.2. HIGH POWER HDR TXBF (HDR4)

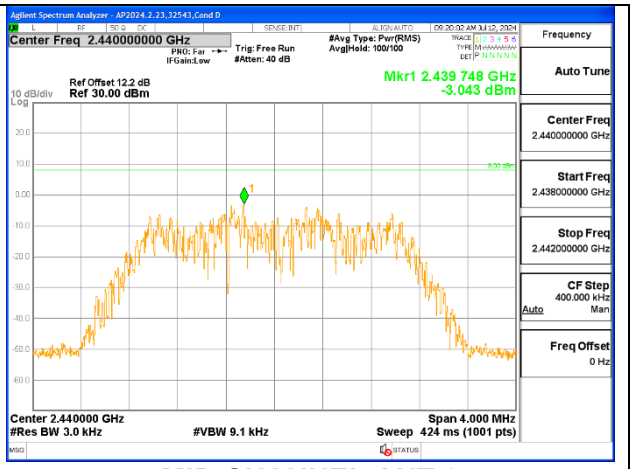
Note: Test procedures and setting are same as HDR normal mode.

**PSD Results**

| Channel | Frequency (MHz) | ANT 4 Meas (dBm/ 3kHz) | ANT 3 Meas (dBm/ 3kHz) | Total Corr'd PSD (dBm/ 3kHz) | Limit (dBm/ 3kHz) | Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 2404 | -3.320 | -3.148 | -0.22 | 8.0 | -8.2 |
| Mid | 2441 | -2.987 | -3.043 | 0.00 | 8.0 | -8.0 |
| High | 2476 | -3.429 | -3.246 | -0.33 | 8.0 | -8.3 |




MID CHANNEL ANT 4




MID CHANNEL ANT 3

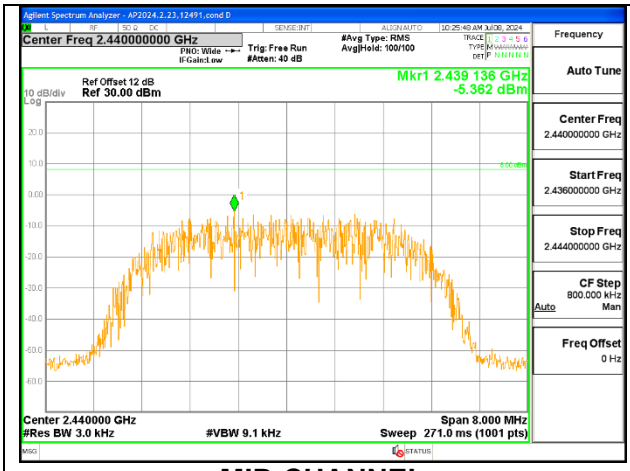


UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

### 9.6.3. HIGH POWER HDR (HDR8)

**ANT 4**

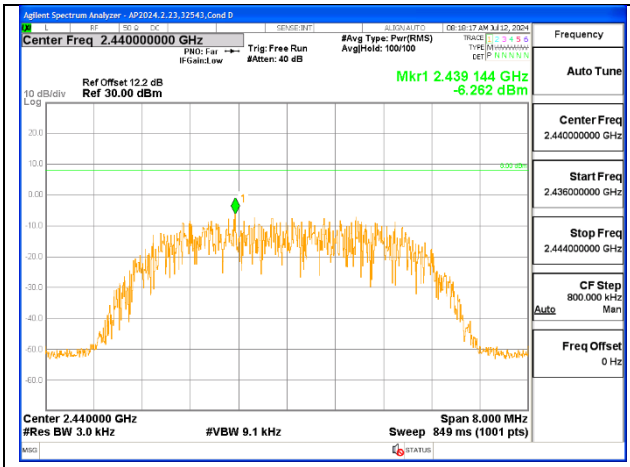
| Channel | Frequency (MHz) | PSD (dBm/3kHz) | Limit (dBm/3kHz) | Margin (dB) |
|---|---|---|---|---|
| Low | 2404 | -5.459 | 8 | -13.46 |
| Middle | 2441 | -5.362 | 8 | -13.36 |
| High | 2476 | -5.240 | 8 | -13.24 |




**MID CHANNEL**

**ANT 3**

| Channel | Frequency (MHz) | PSD (dBm/3kHz) | Limit (dBm/3kHz) | Margin (dB) |
|---|---|---|---|---|
| Low | 2404 | -6.386 | 8 | -14.39 |
| Middle | 2441 | -6.262 | 8 | -14.26 |
| High | 2476 | -5.838 | 8 | -13.84 |



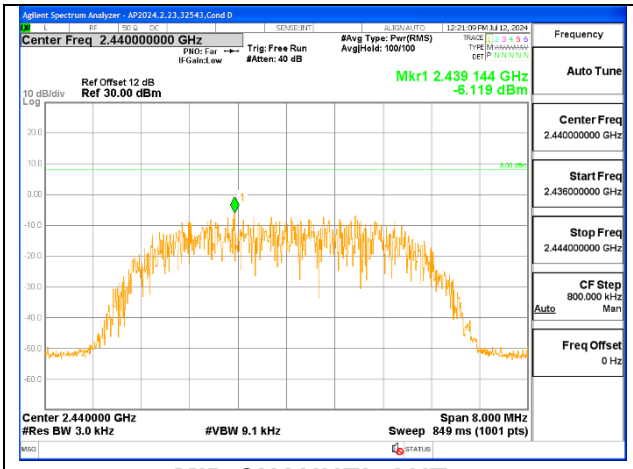

**MID CHANNEL**

### 9.6.4. HIGH POWER HDR TXBF (HDR8)

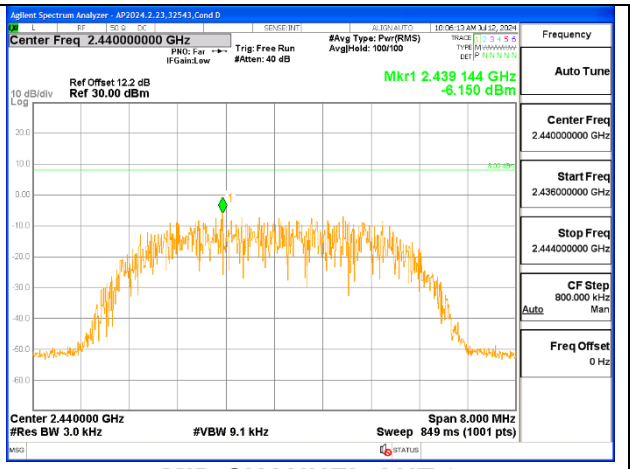
Note: Test procedures and setting are same as HDR normal mode.

**PSD Results**

| Channel | Frequency (MHz) | ANT 4 Meas (dBm/ 3kHz) | ANT 3 Meas (dBm/ 3kHz) | Total Corr'd PSD (dBm/ 3kHz) | Limit (dBm/ 3kHz) | Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 2404 | -5.990 | -6.245 | -3.11 | 8.0 | -11.1 |
| Mid | 2441 | -6.119 | -6.150 | -3.12 | 8.0 | -11.1 |
| High | 2476 | -6.107 | -5.917 | -3.00 | 8.0 | -11.0 |




MID CHANNEL ANT 4




MID CHANNEL ANT 3



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

## 9.7. CONDUCTED SPURIOUS EMISSIONS

**LIMITS**

FCC §15.247 (d)

RSS-247 5.5

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dBc.

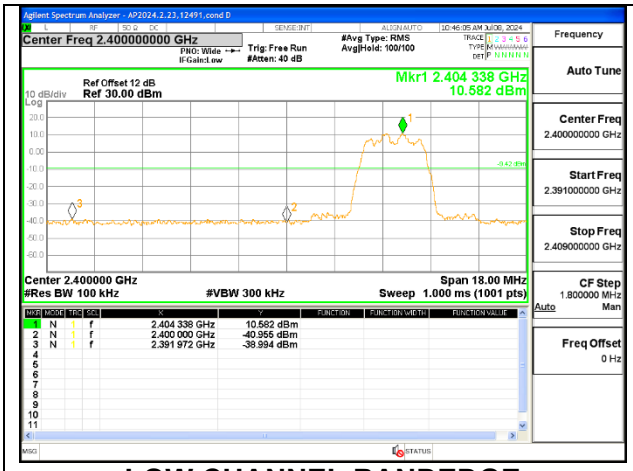
**RESULTS**



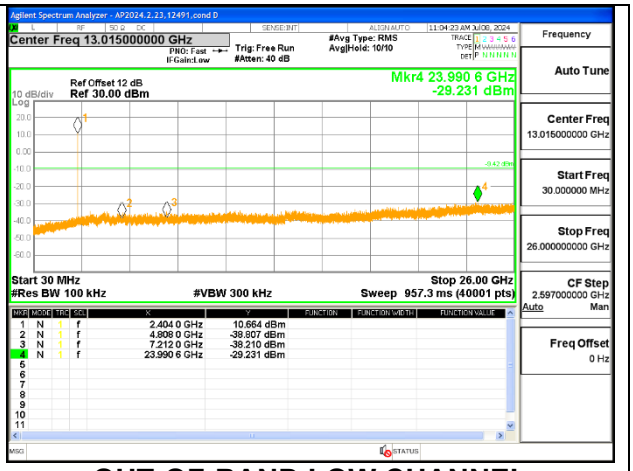
UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

### 9.7.1. HIGH POWER HDR (HDR4)

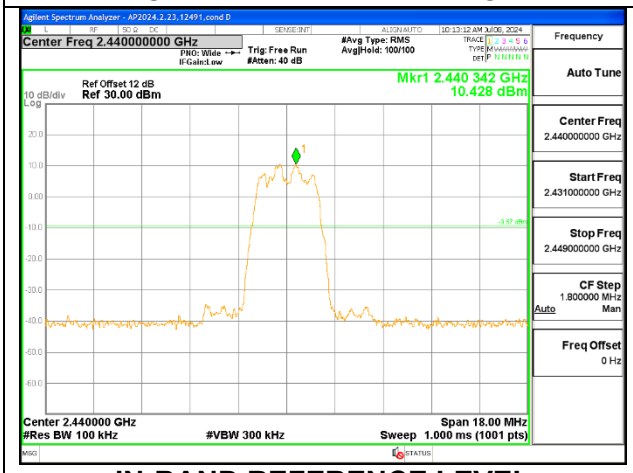
**ANT 4**



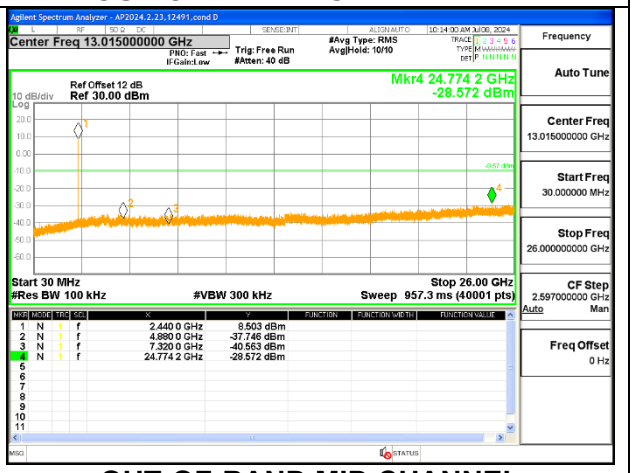

**LOW CHANNEL BANDEDGE**



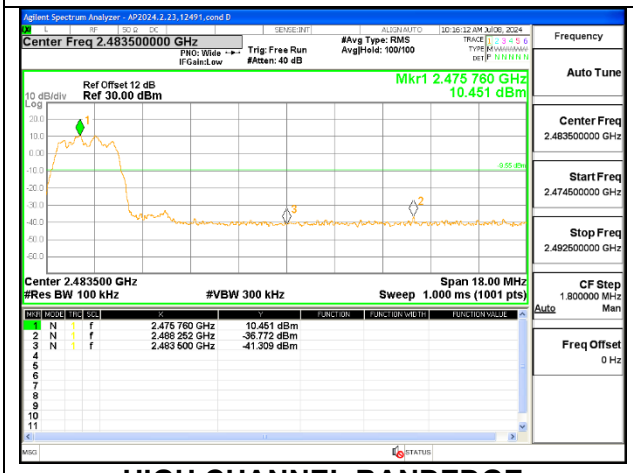

**OUT-OF-BAND LOW CHANNEL**



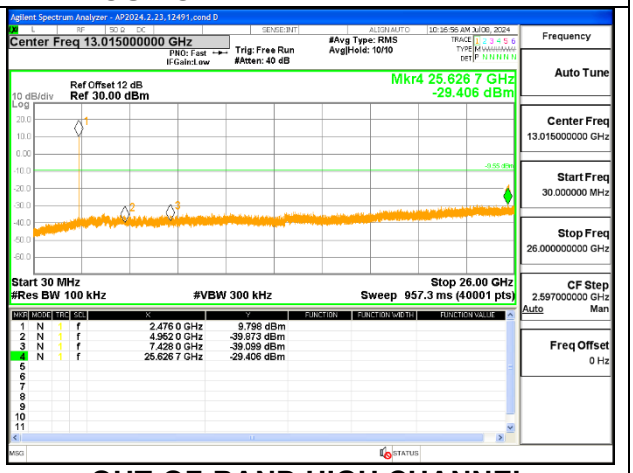

**IN-BAND REFERENCE LEVEL**




**OUT-OF-BAND MID CHANNEL**

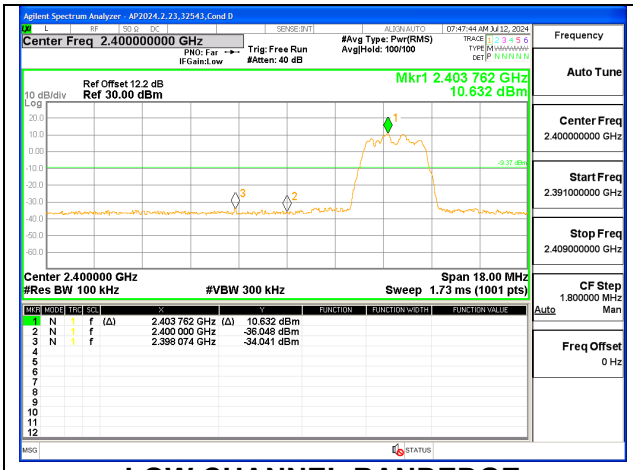



**HIGH CHANNEL BANDEDGE**

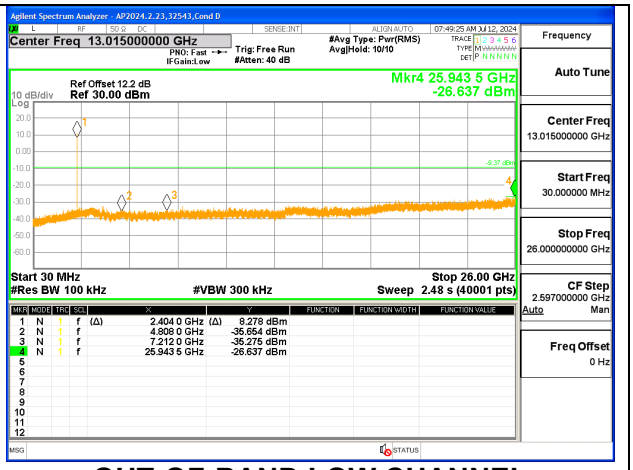



**OUT-OF-BAND HIGH CHANNEL**

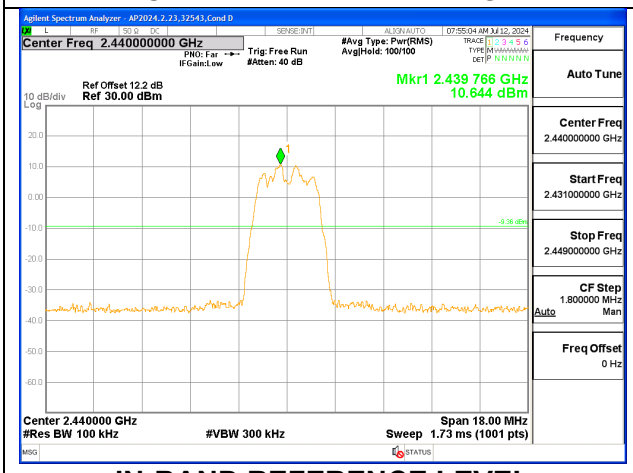
## ANT 3



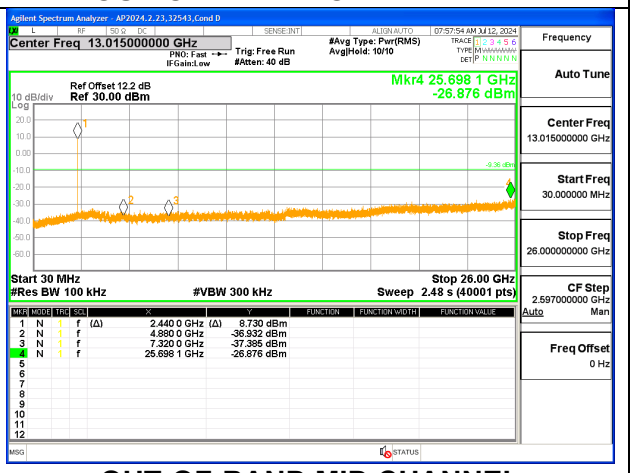

**LOW CHANNEL BANDEDGE**



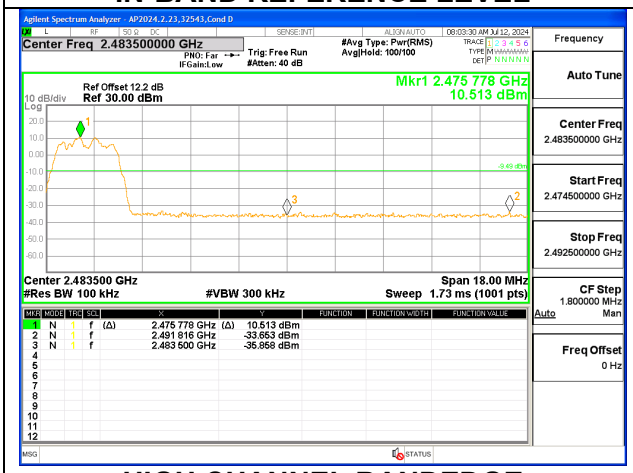

**OUT-OF-BAND LOW CHANNEL**



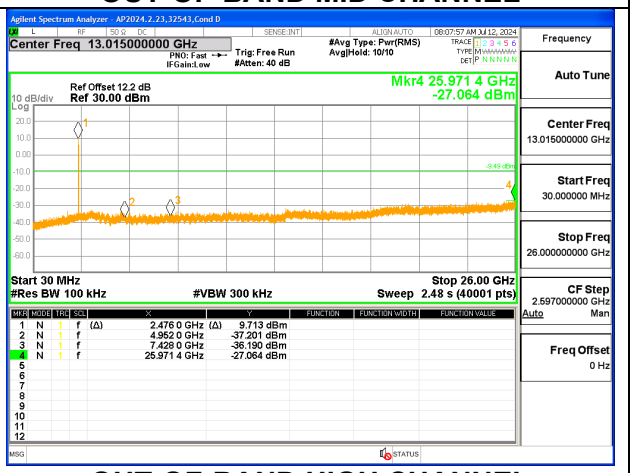

**IN-BAND REFERENCE LEVEL**




**OUT-OF-BAND MID CHANNEL**



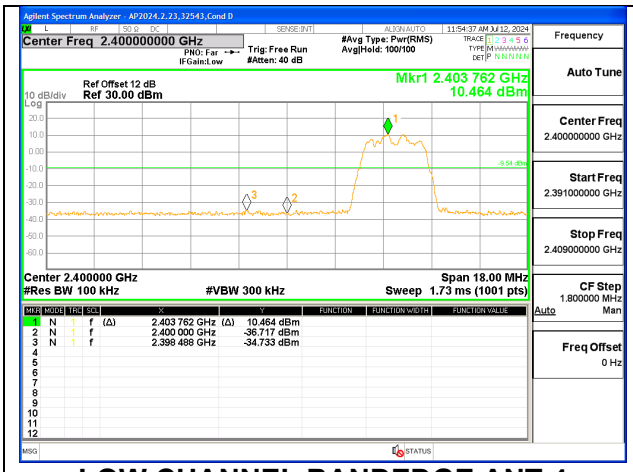

**HIGH CHANNEL BANDEDGE**



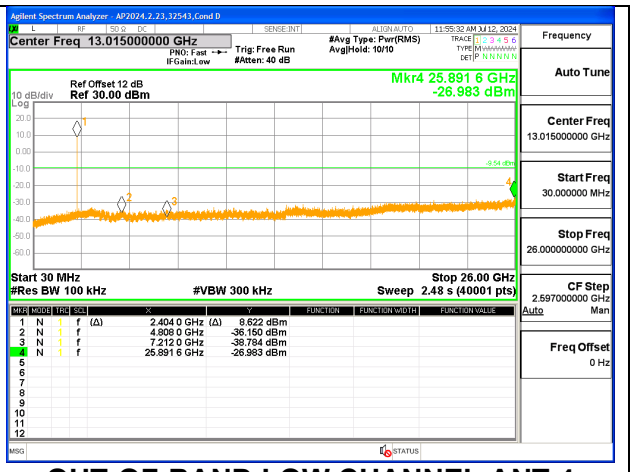

**OUT-OF-BAND HIGH CHANNEL**

## 9.7.2. HIGH POWER HDR TXBF (HDR4)

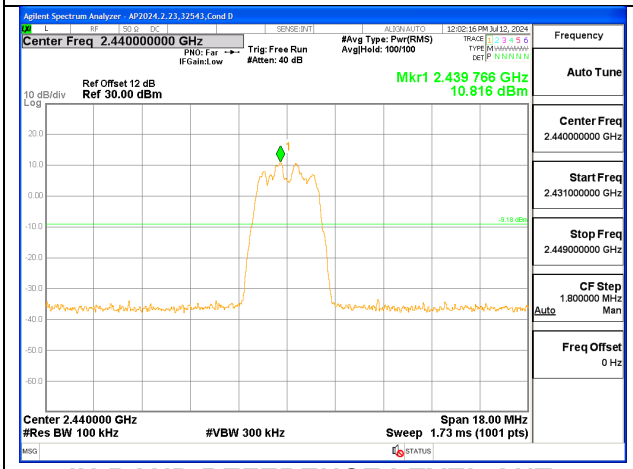
**ANT 4**



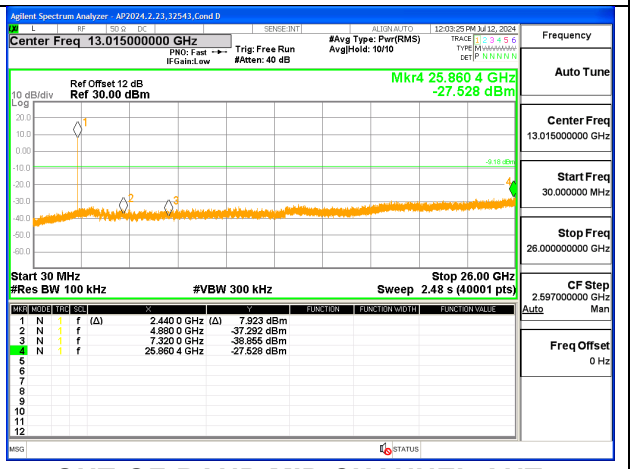

**LOW CHANNEL BANDEDGE ANT 4**



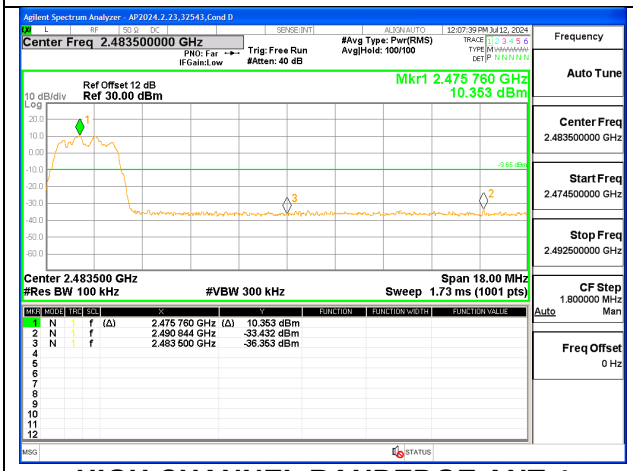

**OUT-OF-BAND LOW CHANNEL ANT 4**



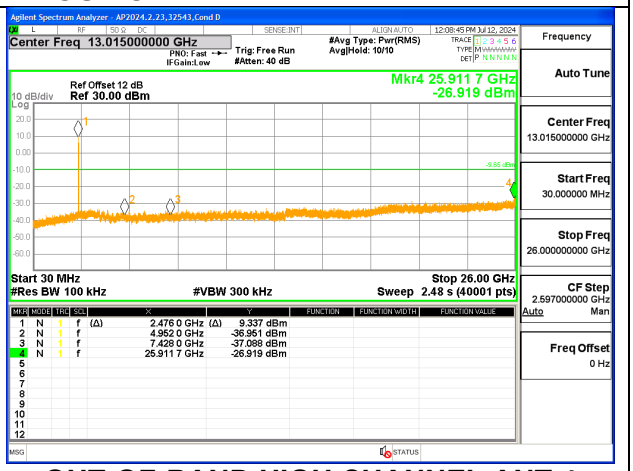

**IN-BAND REFERENCE LEVEL ANT 4**




**OUT-OF-BAND MID CHANNEL ANT 4**




**HIGH CHANNEL BANDEDGE ANT 4**

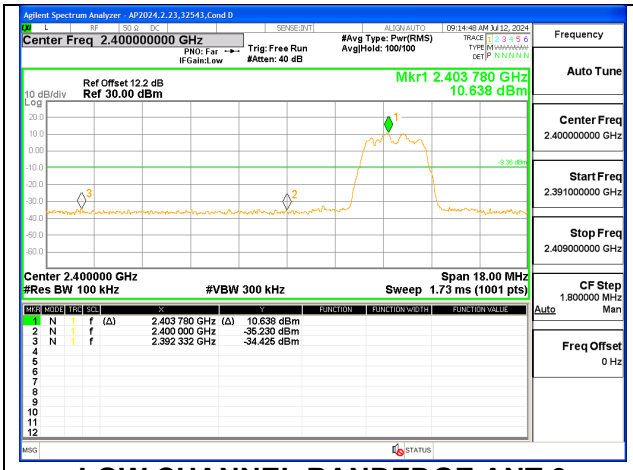



**OUT-OF-BAND HIGH CHANNEL ANT 4**

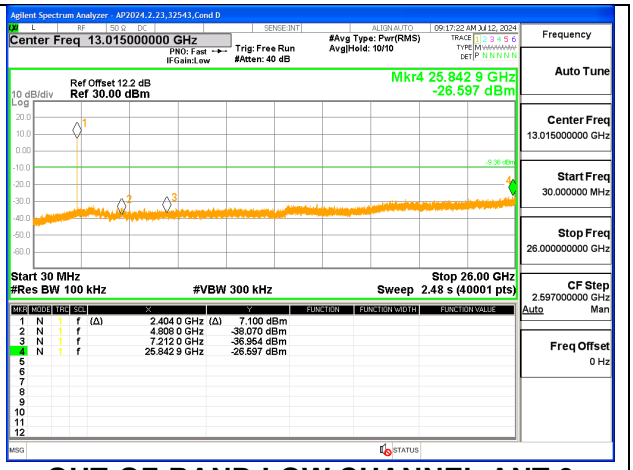


UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

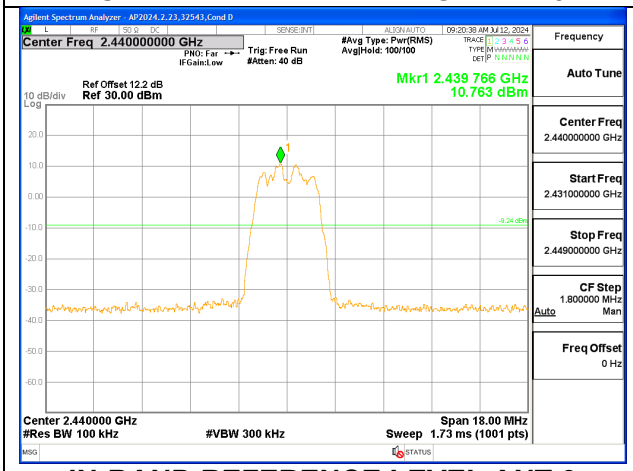
## ANT 3



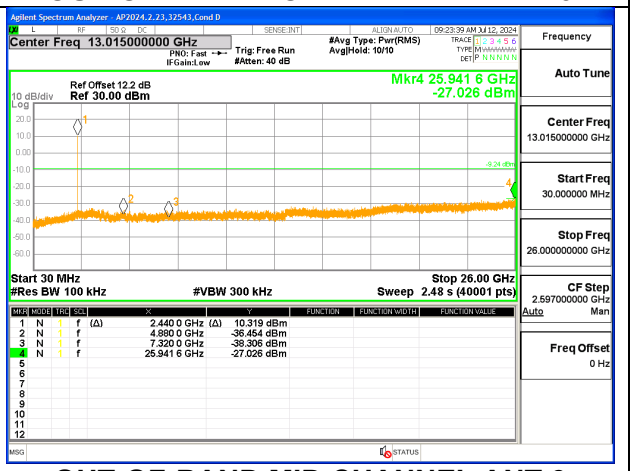

**LOW CHANNEL BANDEDGE ANT 3**



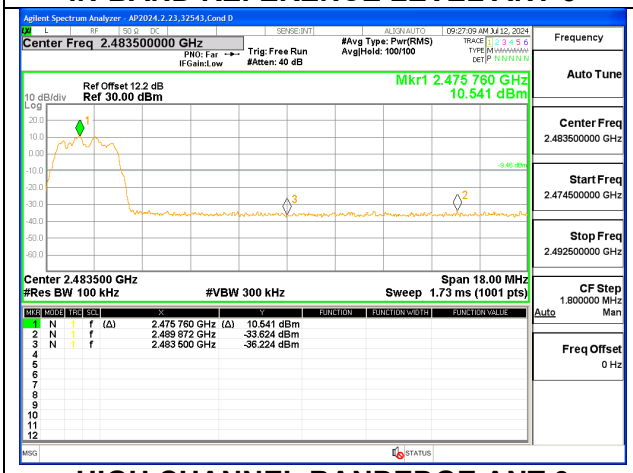

**OUT-OF-BAND LOW CHANNEL ANT 3**



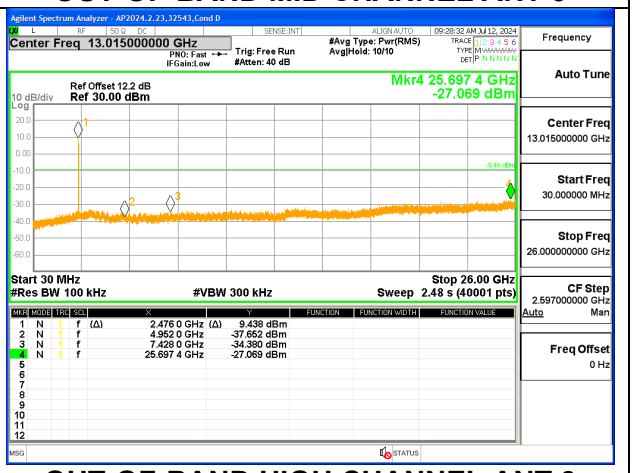

**IN-BAND REFERENCE LEVEL ANT 3**




**OUT-OF-BAND MID CHANNEL ANT 3**




**HIGH CHANNEL BANDEDGE ANT 3**



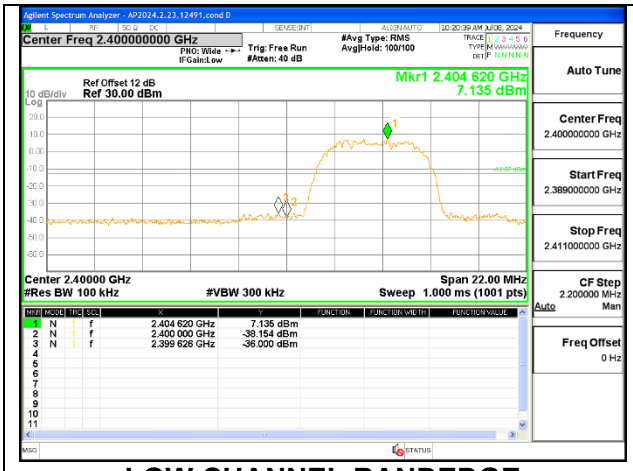

**OUT-OF-BAND HIGH CHANNEL ANT 3**



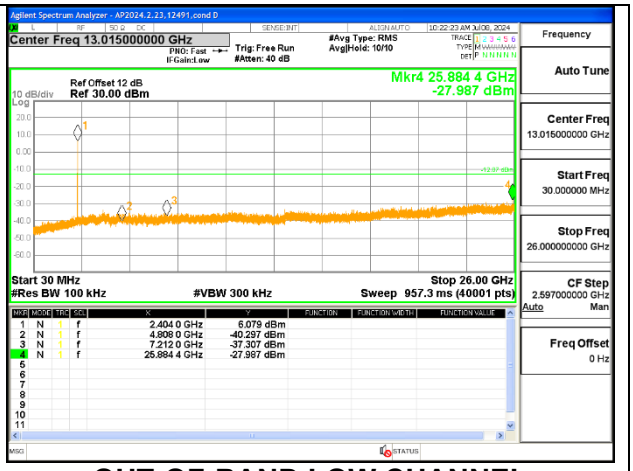
UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

### 9.7.3. HIGH POWER HDR (HDR8)

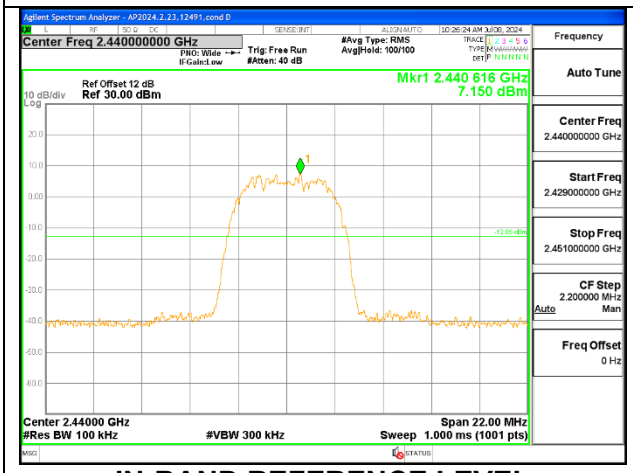
**ANT 4**



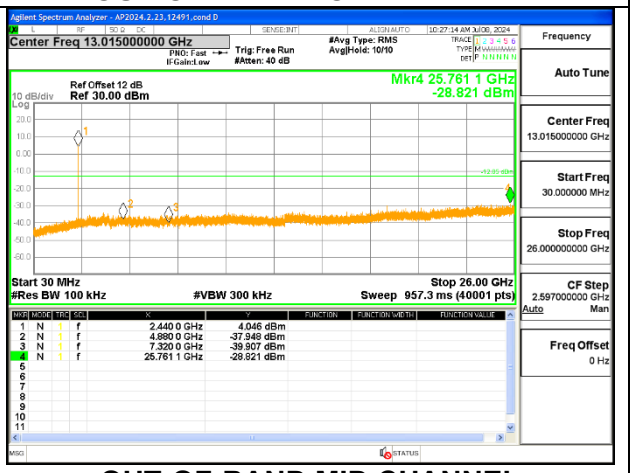

**LOW CHANNEL BANDEDGE**



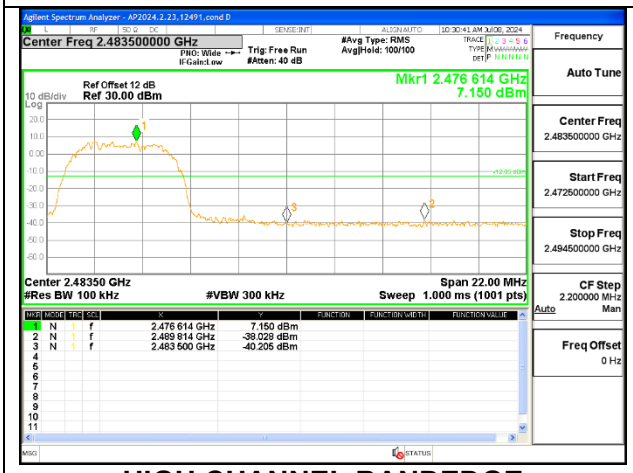

**OUT-OF-BAND LOW CHANNEL**



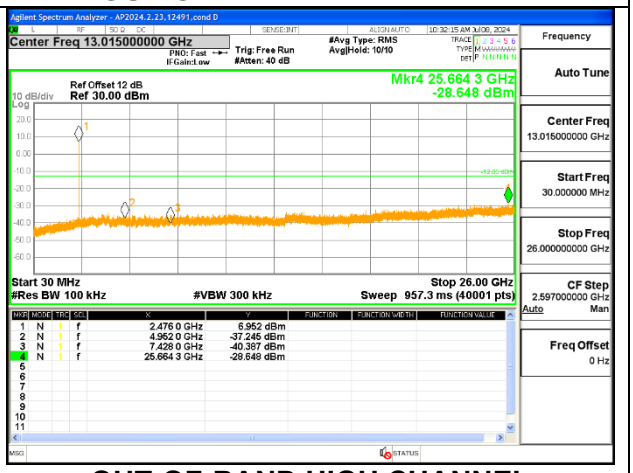

**IN-BAND REFERENCE LEVEL**




**OUT-OF-BAND MID CHANNEL**




**HIGH CHANNEL BANDEDGE**

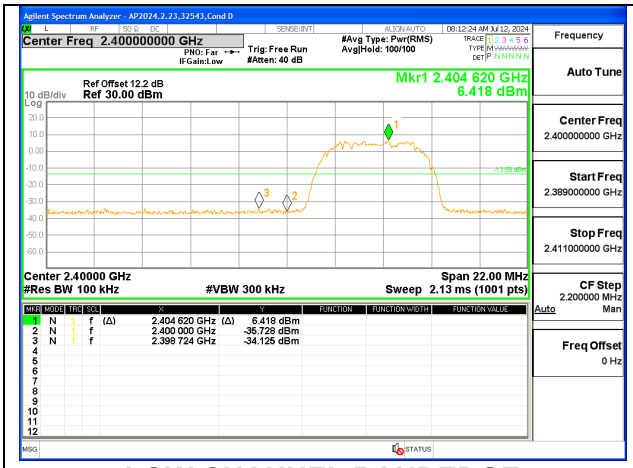



**OUT-OF-BAND HIGH CHANNEL**

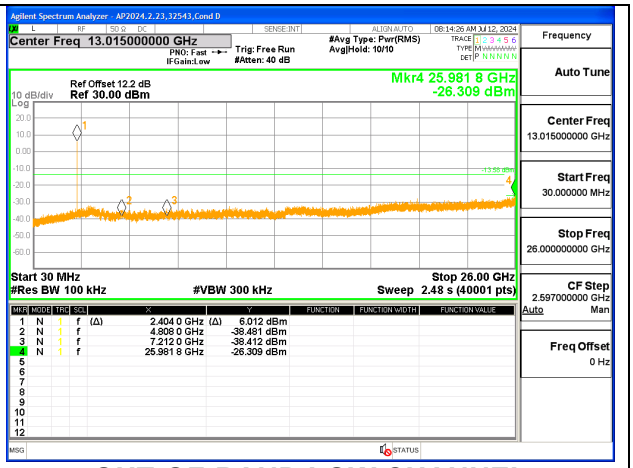


UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

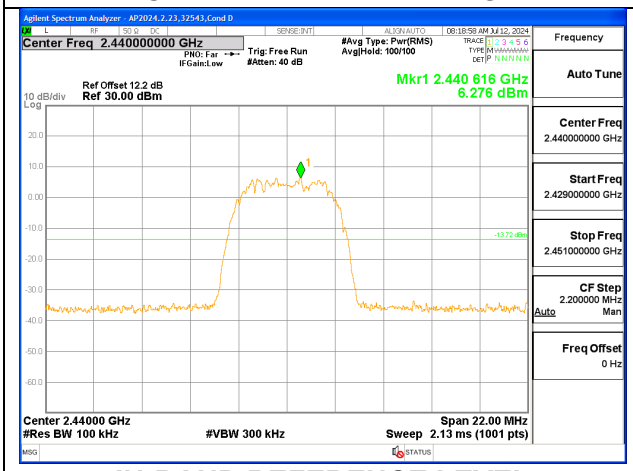
## ANT 3



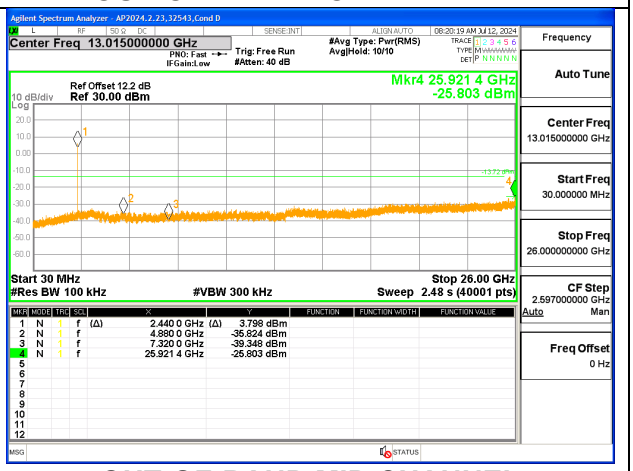

**LOW CHANNEL BANDEDGE**



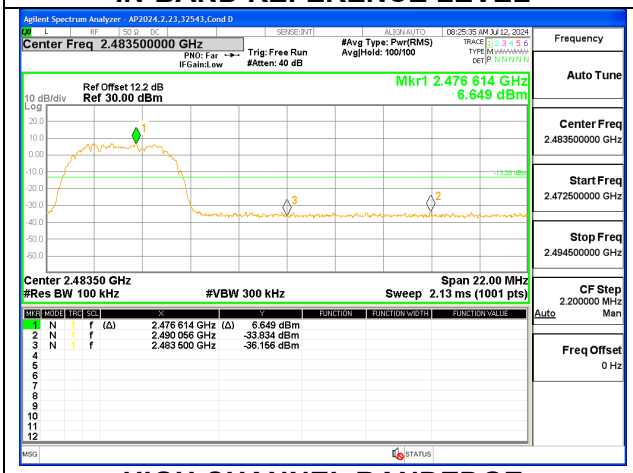

**OUT-OF-BAND LOW CHANNEL**



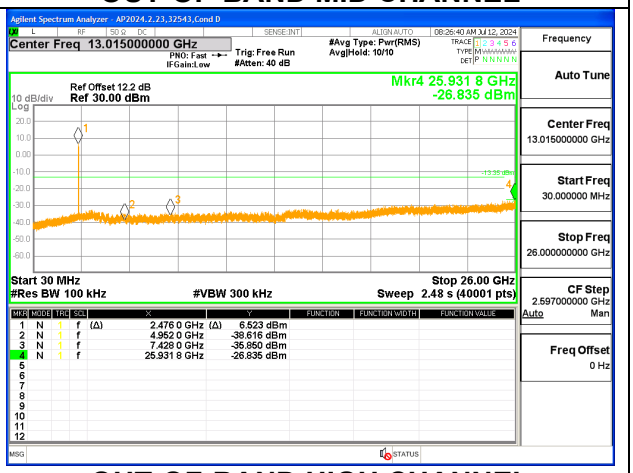

**IN-BAND REFERENCE LEVEL**




**OUT-OF-BAND MID CHANNEL**



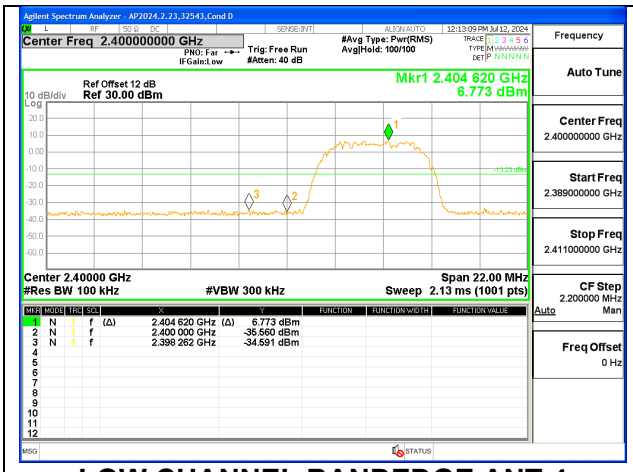

**HIGH CHANNEL BANDEDGE**



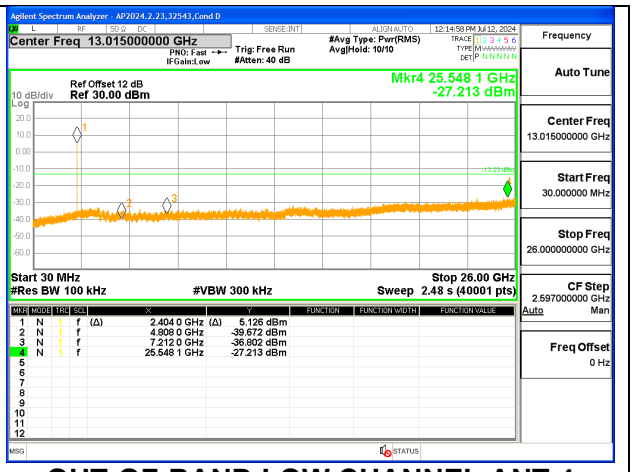

**OUT-OF-BAND HIGH CHANNEL**

## 9.7.4. HIGH POWER HDR TXBF (HDR8)

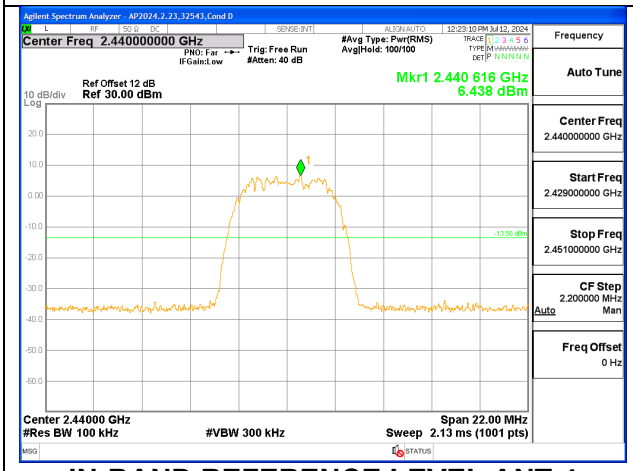
**ANT 4**



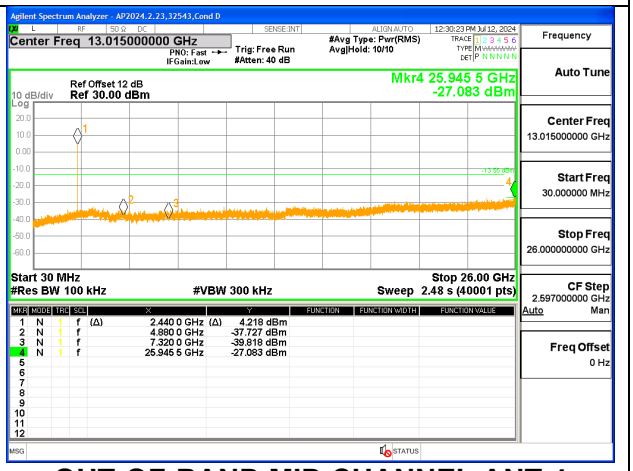

**LOW CHANNEL BANDEDGE ANT 4**



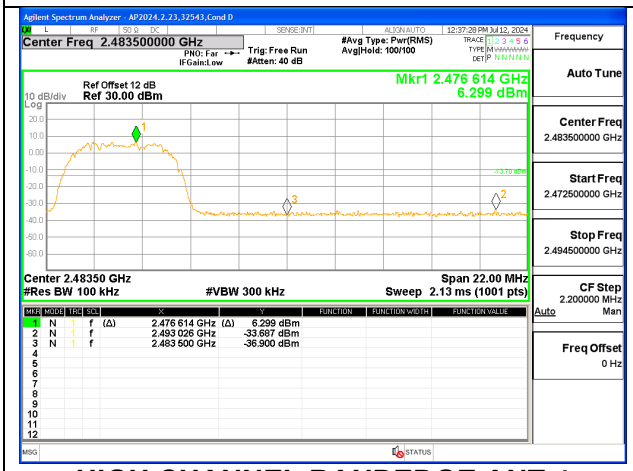

**OUT-OF-BAND LOW CHANNEL ANT 4**



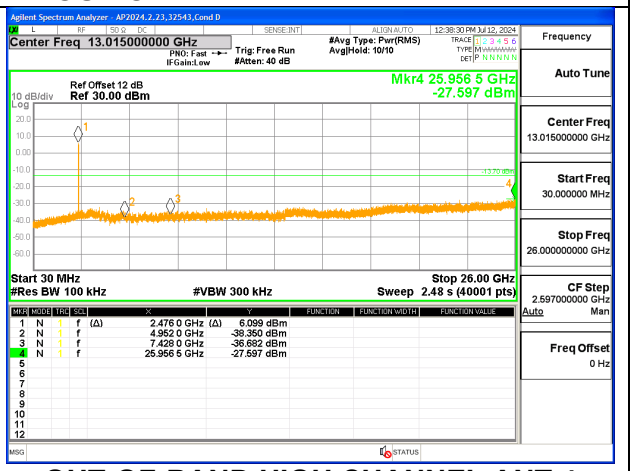

**IN-BAND REFERENCE LEVEL ANT 4**




**OUT-OF-BAND MID CHANNEL ANT 4**




**HIGH CHANNEL BANDEDGE ANT 4**

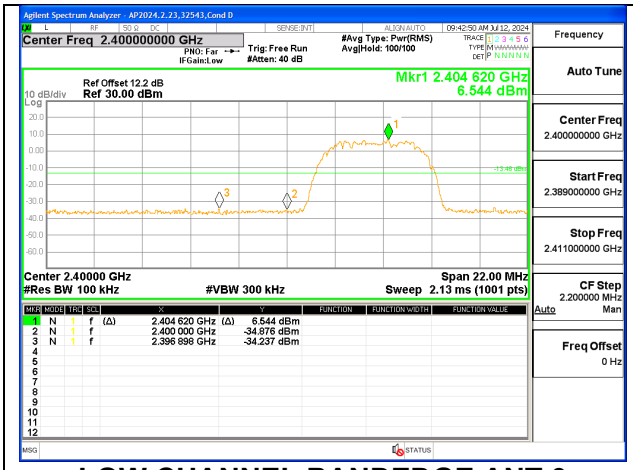



**OUT-OF-BAND HIGH CHANNEL ANT 4**

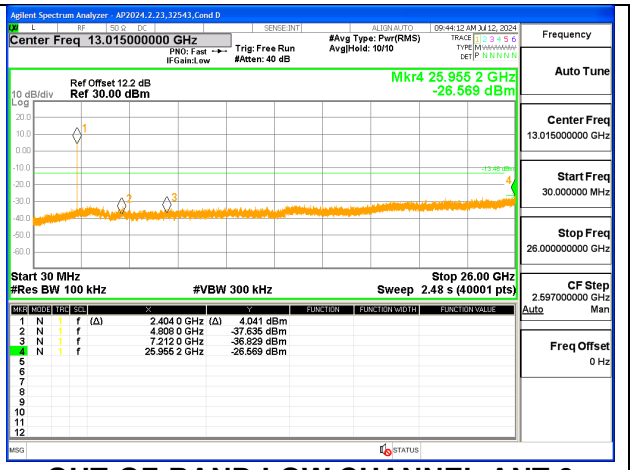


UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

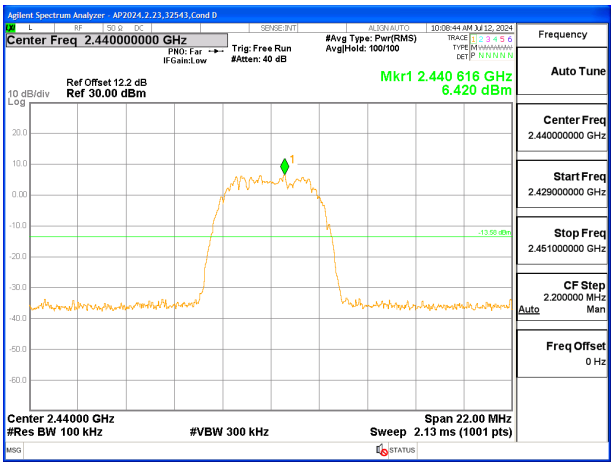
## ANT 3



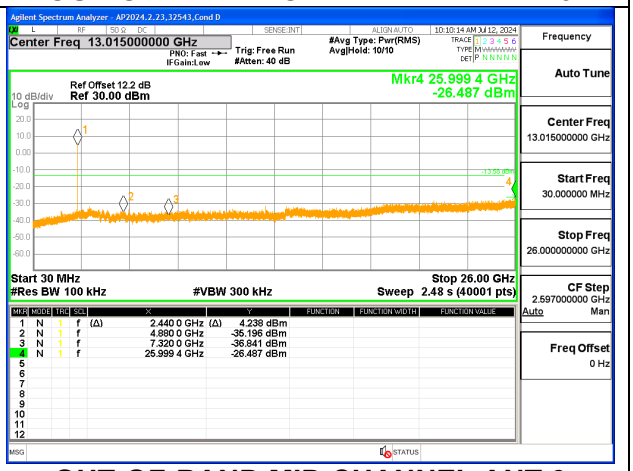

**LOW CHANNEL BANDEDGE ANT 3**



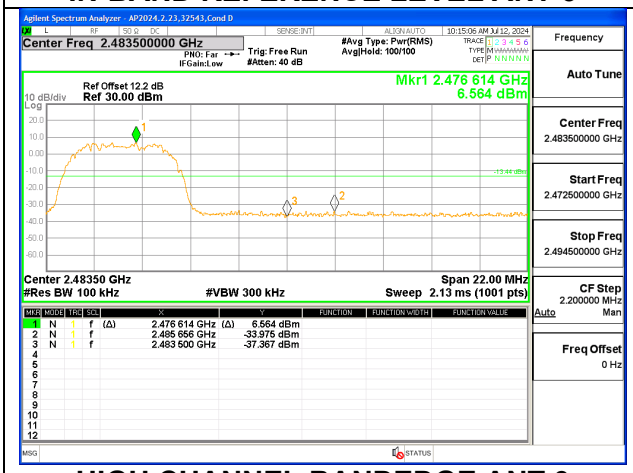

**OUT-OF-BAND LOW CHANNEL ANT 3**



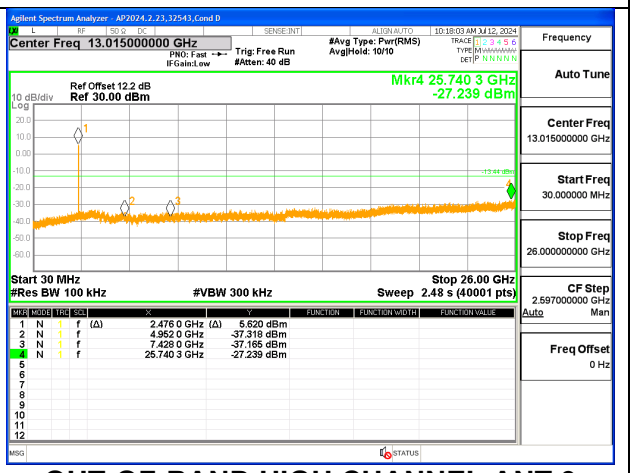

**IN-BAND REFERENCE LEVEL ANT 3**




**OUT-OF-BAND MID CHANNEL ANT 3**




**HIGH CHANNEL BANDEDGE ANT 3**



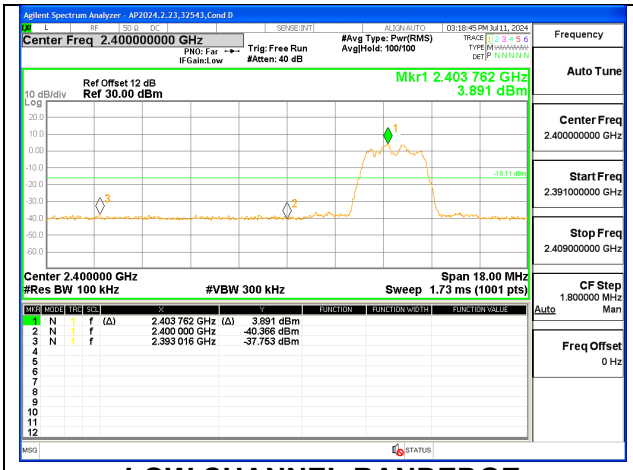

**OUT-OF-BAND HIGH CHANNEL ANT 3**



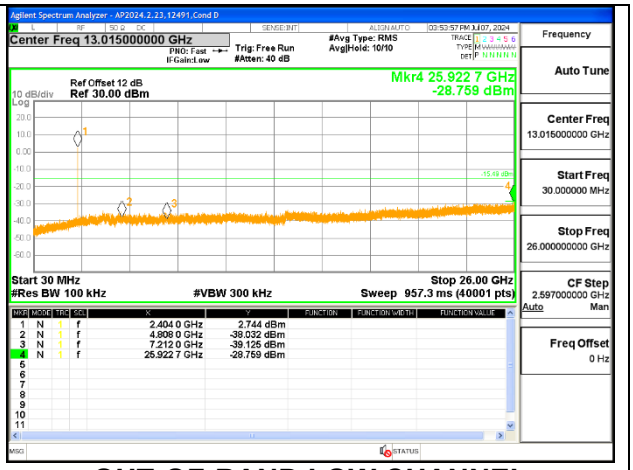
UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

## 9.7.5. LOW POWER HDR (HDR4)

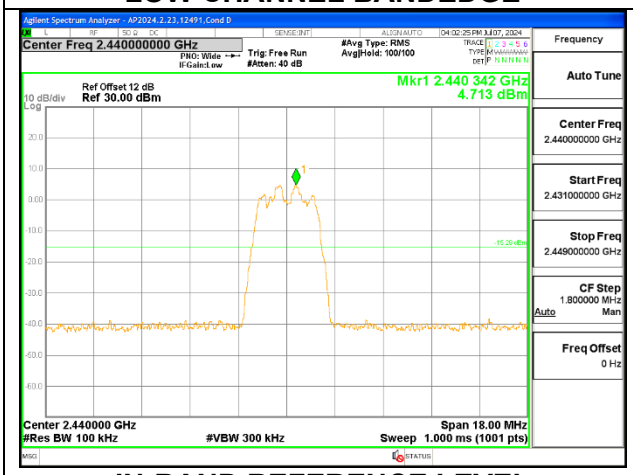
**ANT 4**



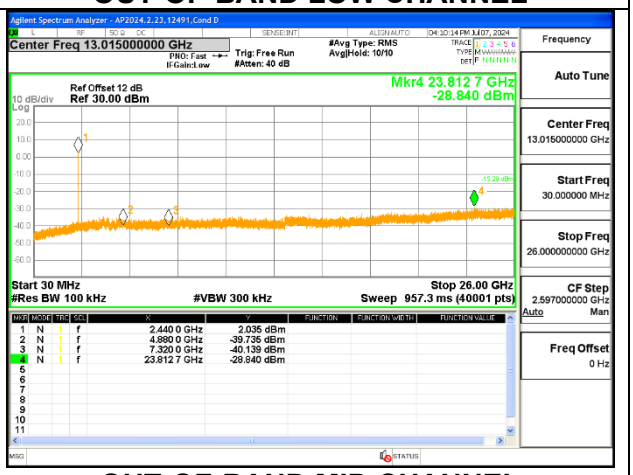

**LOW CHANNEL BANDEDGE**



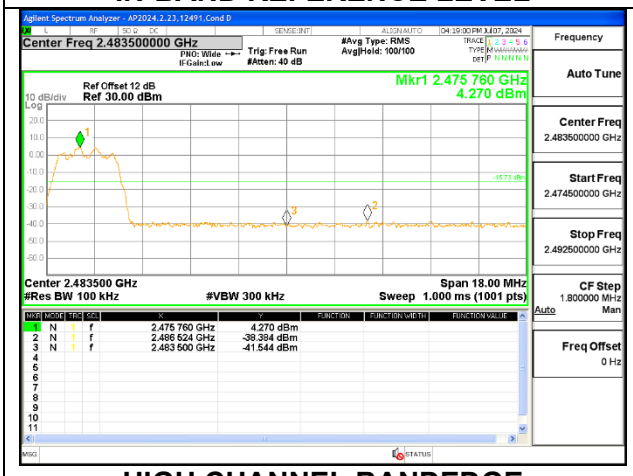

**OUT-OF-BAND LOW CHANNEL**



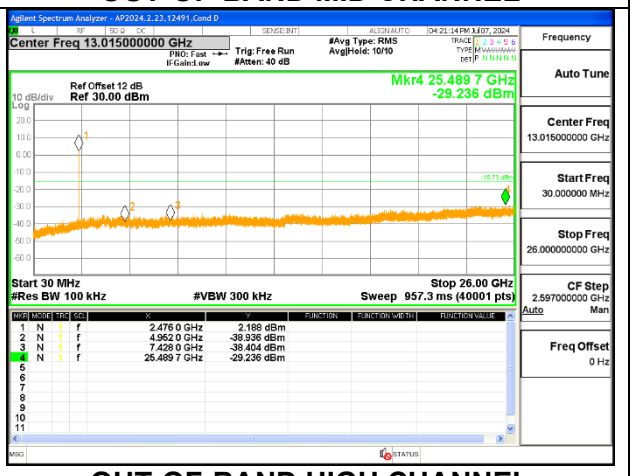

**IN-BAND REFERENCE LEVEL**




**OUT-OF-BAND MID CHANNEL**

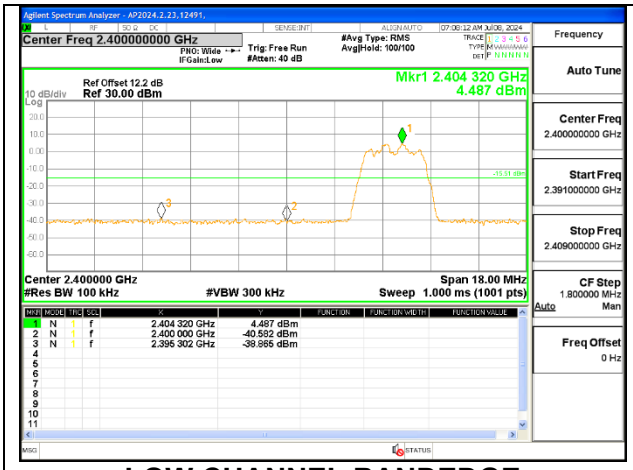



**HIGH CHANNEL BANDEDGE**

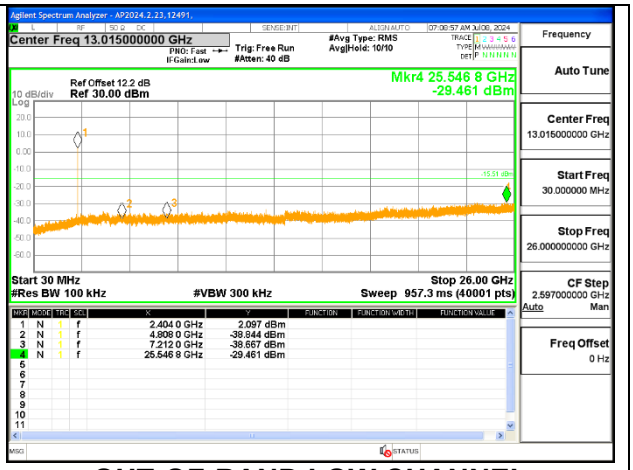



**OUT-OF-BAND HIGH CHANNEL**

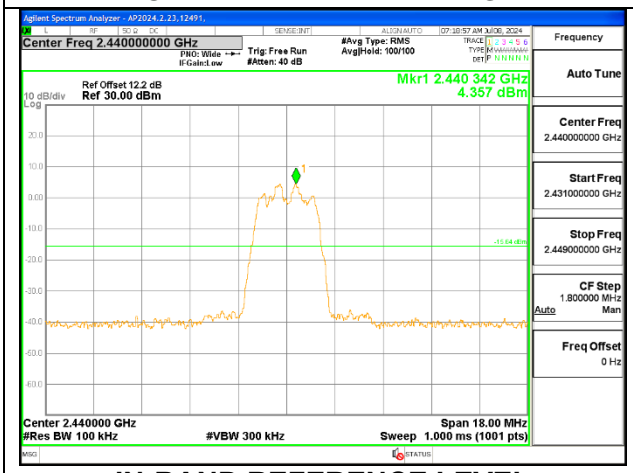
**ANT 3**



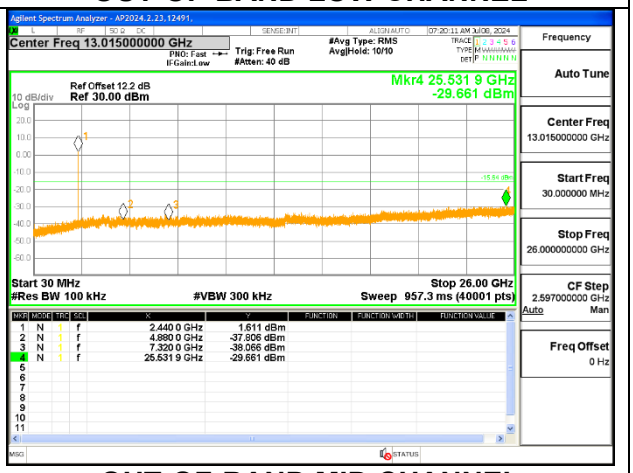

**LOW CHANNEL BANDEDGE**



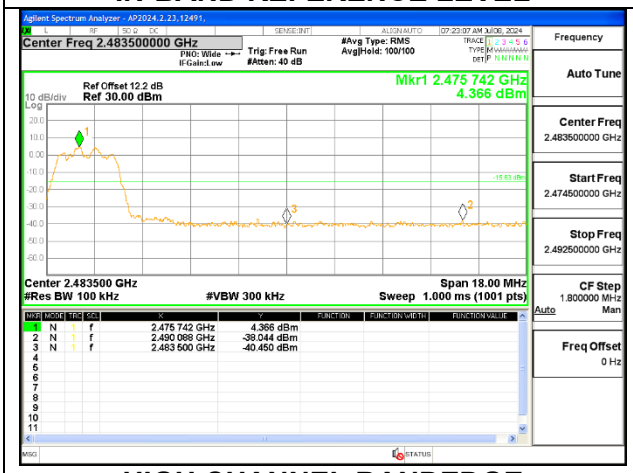

**OUT-OF-BAND LOW CHANNEL**



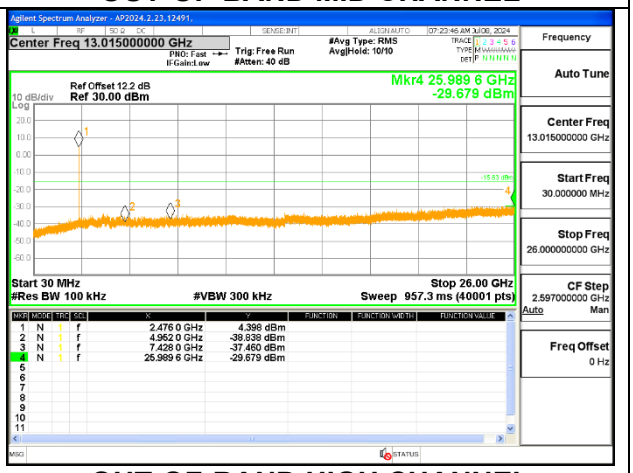

**IN-BAND REFERENCE LEVEL**




**OUT-OF-BAND MID CHANNEL**




**HIGH CHANNEL BANDEDGE**



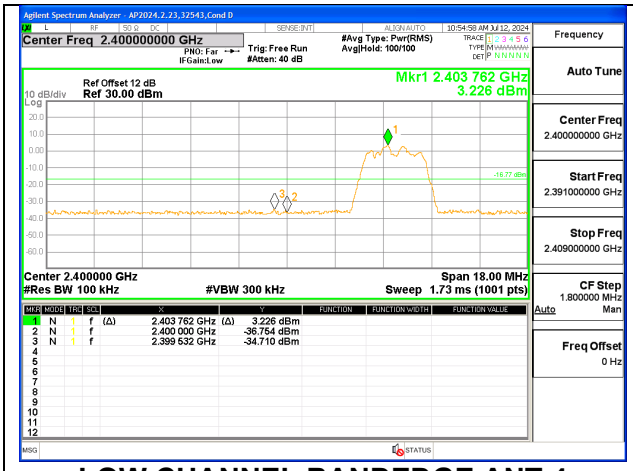

**OUT-OF-BAND HIGH CHANNEL**



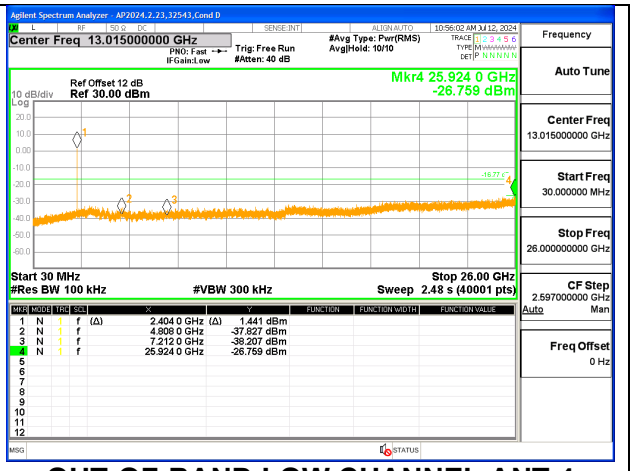
UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

## 9.7.6. LOW POWER HDR TXBF (HDR4)

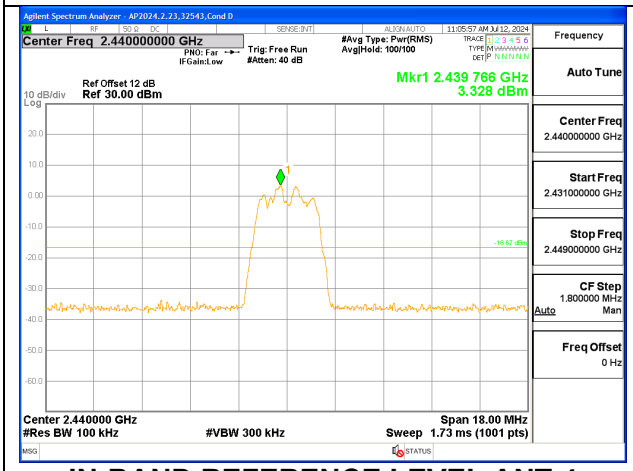
**ANT 4**



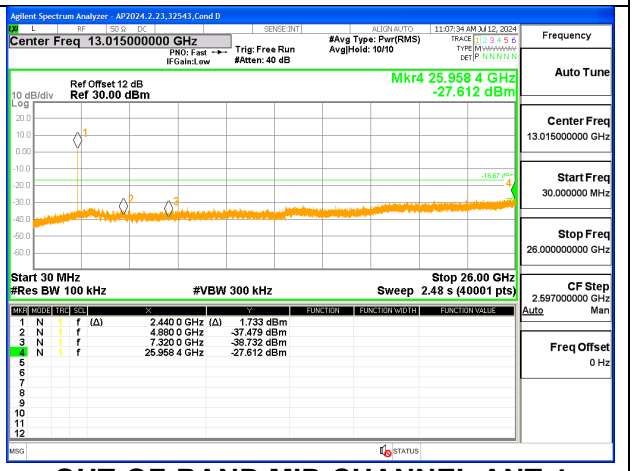

**LOW CHANNEL BANDEDGE ANT 4**



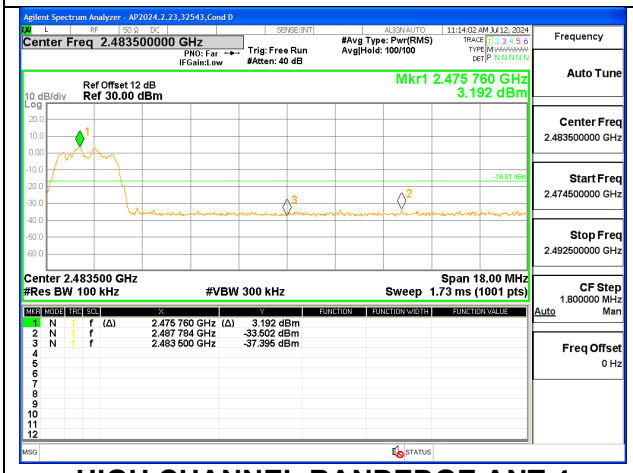

**OUT-OF-BAND LOW CHANNEL ANT 4**



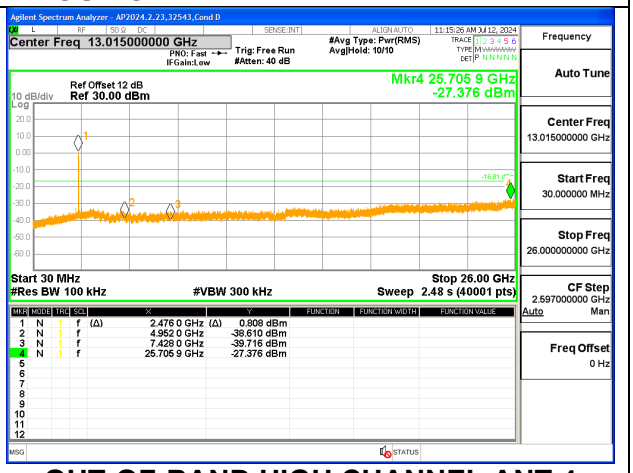

**IN-BAND REFERENCE LEVEL ANT 4**




**OUT-OF-BAND MID CHANNEL ANT 4**

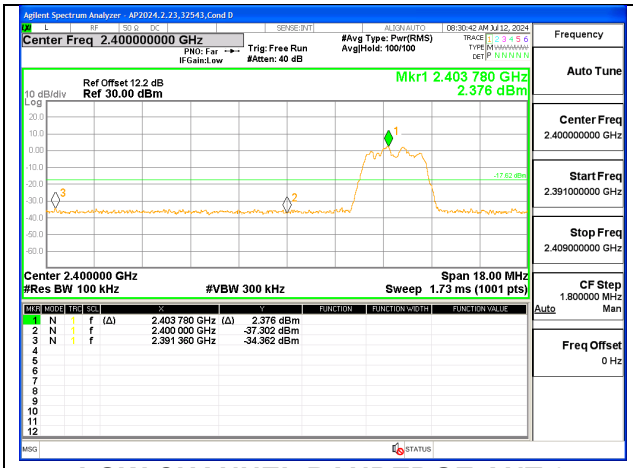



**HIGH CHANNEL BANDEDGE ANT 4**

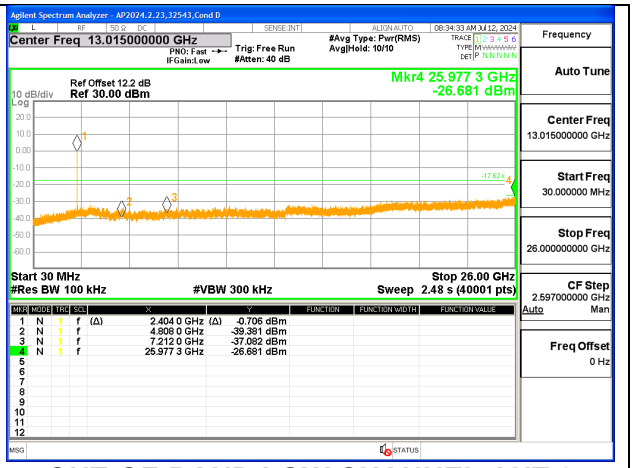



**OUT-OF-BAND HIGH CHANNEL ANT 4**

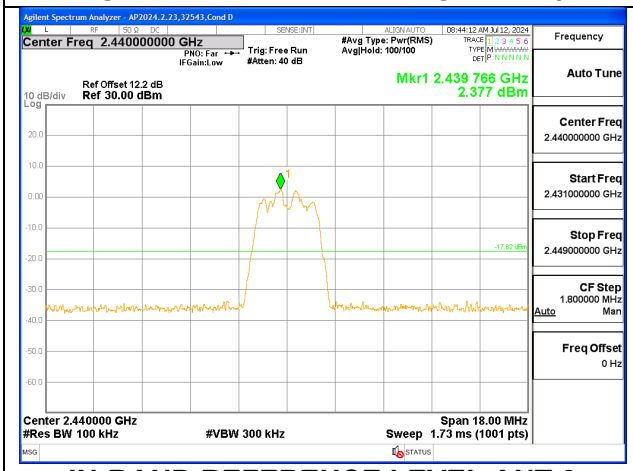
## ANT 3



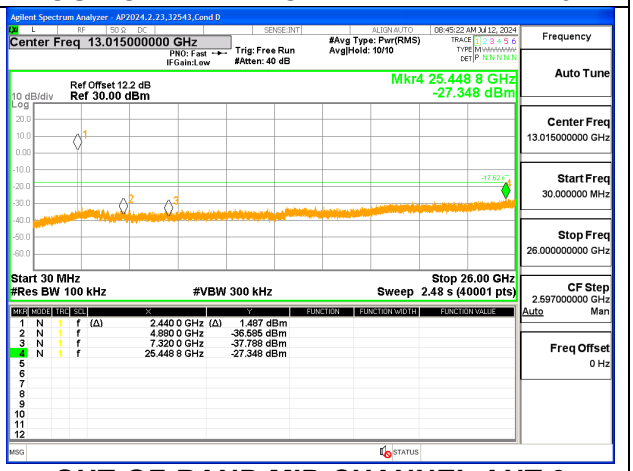

**LOW CHANNEL BANDEDGE ANT 3**



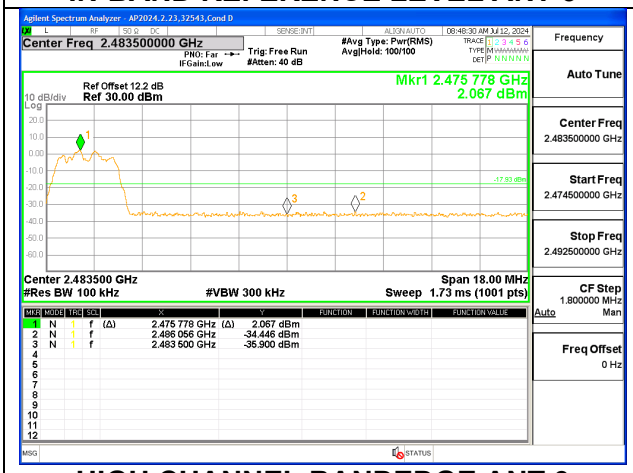

**OUT-OF-BAND LOW CHANNEL ANT 3**



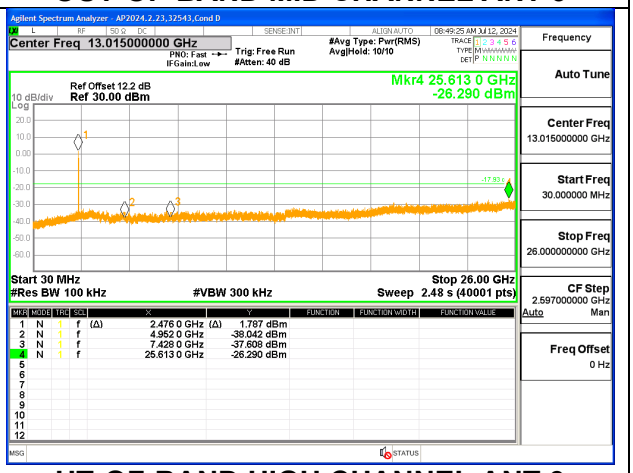

**IN-BAND REFERENCE LEVEL ANT 3**




**OUT-OF-BAND MID CHANNEL ANT 3**




**HIGH CHANNEL BANDEDGE ANT 3**



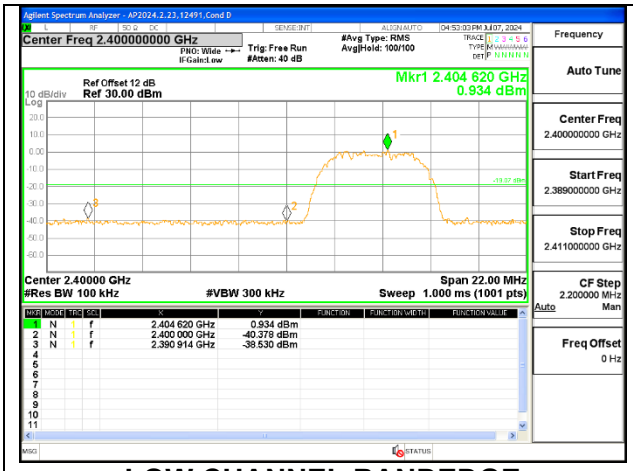

**UT-OF-BAND HIGH CHANNEL ANT 3**



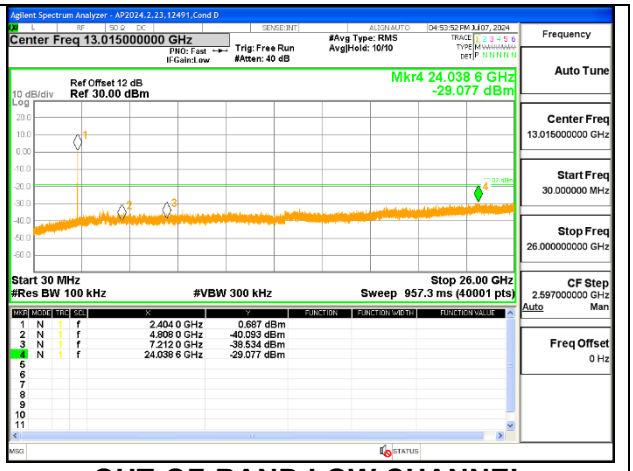
UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

## 9.7.7. LOW POWER HDR (HDR8)

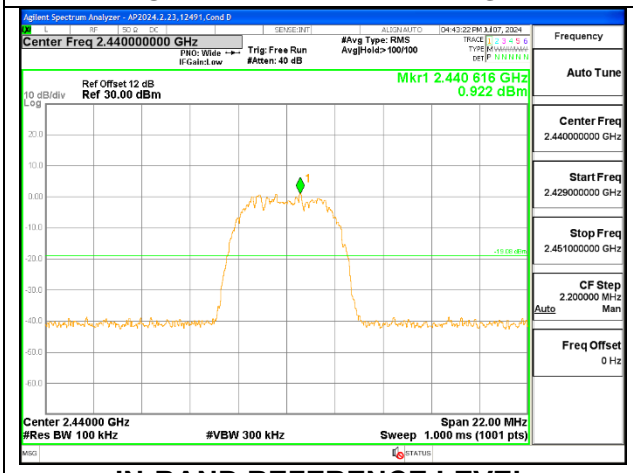
**ANT 4**



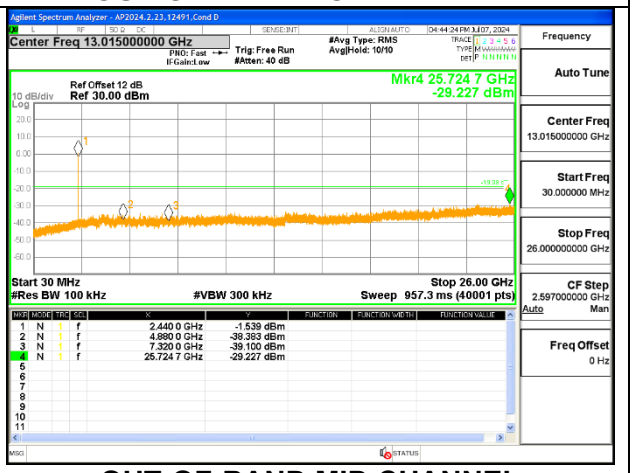

**LOW CHANNEL BANDEDGE**



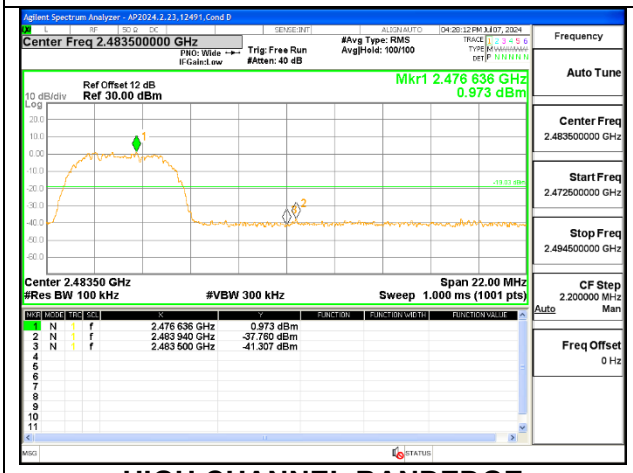

**OUT-OF-BAND LOW CHANNEL**



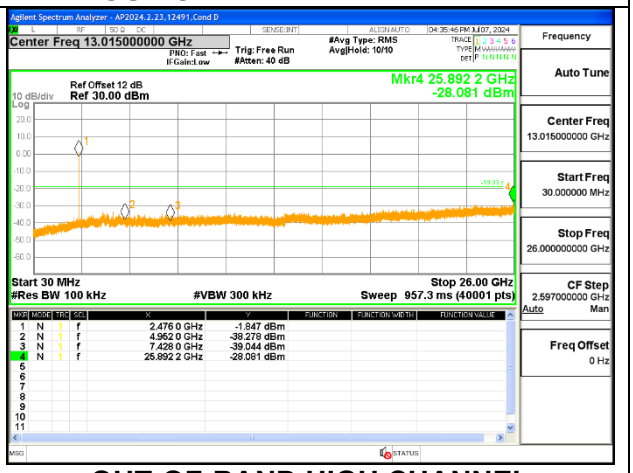

**IN-BAND REFERENCE LEVEL**




**OUT-OF-BAND MID CHANNEL**




**HIGH CHANNEL BANDEDGE**




**OUT-OF-BAND HIGH CHANNEL**



UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888