# C2PC TEST REPORT

**Report Number:** 14790372-E6V2

| | | |
|---|---|---|
| **Applicant** | : | APPLE, INC<br>1 APPLE PARK WAY<br>CUPERTINO, CA 95014, U.S.A. |
| **Model** | : | A2481 (Parent Model, Full Test)<br>A2626, A2628, A2629, A2630 (Variant Models) |
| **Brand** | : | APPLE |
| **FCC ID** | : | BCG-E3994A (Parent Model)<br>BCG-E3996A, BCG-E4029A, BCG-E4030A (Variant Models) |
| **EUT Description** | : | SMARTPHONE |
| **Test Standard(s)** | : | FCC CFR47 PART 2, PART 96 |

**Date Of Issue:**
JUNE 22, 2023

**Prepared by:**
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CERT #0751.05

## Revision History

| Rev. | Issue Date | Revisions | Revised By |
|---|---|---|---|
| V1 | 6/21/2023 | Initial Review | Mengistu Mekuria |
| V2 | 6/22/2023 | Addressed All TCB Questions at Section 5.4, 6.3, and 6.8 | Mengistu Mekuria |

# TABLE OF CONTENTS

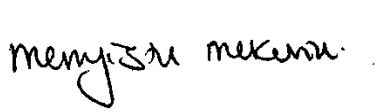
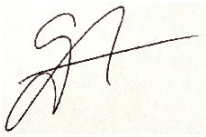
# 1. ATTESTATION OF TEST RESULTS

| | |
|---|---|
| Applicant Name and Address | APPLE, INC<br>1 APPLE PARK WAY<br>CUPERTINO, CA 95014, U.S.A. |
| Model | A2481 (Parent Model)<br>A2626, A2628, A2629, A2630 (Variant Models) |
| Brand | APPLE |
| FCC ID | BCG-E3994A (Parent Model)<br>BCG-E3996A, BCG-E4029A, BCG-E4030A (Variant Models) |
| EUT Description | SMARTPHONE |
| Serial Number | C7H1233003P0MMN5A (Conducted) AND N433JJJ3K0 (Radiated) |
| Sample Receipt Date | FEBRUARY 14, 2021 |
| Date Tested | MAY 14, 2021 to JULY 24, 2021 |
| Applicable Standards | FCC CFR47 PART 2, PART 96 |
| Test Results | 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.

| Approved & Released By: | Reviewed By: | Prepared By: |
|---|---|---|
|  |  |  |
| Mengistu Mekuria<br>Senior Test Engineer<br>UL Verification Services Inc. | John Thompson<br>Laboratory Engineer<br>UL Vérification Services Inc. | Sintia Andrean<br>Laboratory Engineer<br>UL Verification Services Inc. |

# 2. SUMMARY OF TEST RESULTS

This report contains data provided by the customer which can impact the validity of results. UL Verification Services Inc. is only responsible for the validity of results after the integration of the data provided by the customer.

| Requirement Description | Band | Requirement Clause Number (FCC) | Result | Remarks |
|---|---|---|---|---|
| Equivalent Isotropic Radiated | 48 | 96.41 (b) | Complies | |

| Requirement Description | Requirement Clause Number (FCC) | Result | Remarks |
|---|---|---|---|
| Occupied Bandwidth | 2.1049 | Complies | |
| Band Edge and Emission Mask | 96.41(e) | Complies | |
| Out of Band Emissions | 96.41(e) | Complies | |
| Frequency Stability | 2.1055 | Complies | |
| Peak-to-Average Ratio | 96.41 (g) | Complies | |
| Field Strength of Spurious Radiation | 96.41(e) | Complies | |

# 3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with the following:

- ANSI C63.26:2015
- FCC CFR 47 Part 2, Part 96
- FCC KDB 971168 D01 v03r01: Power Meas License Digital Systems
- FCC KDB 971168 D02 v02r01: Misc Rev Approv License Devices
- FCC KDB 412172 D01 v01r01. Determining ERP and EIRP

# 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 | 208313 |
| ☒ | Building 2: 47266 Benicia Street, Fremont, CA 94538, USA | US0104 | 22541 | 208313 |
| ☐ | Building 4: 47658 Kato Rd, Fremont, CA 94538, USA | US0104 | 2324B | 208313 |

# 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.)

## 5.3. MEASUREMENT UNCERTAINTY

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

| PARAMETER | $U_{Lab}$ |
|---|---|
| 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 |
| Worst Case Radiated Disturbance, 26000 to 40000 MHz | 5.29 dB |
| Occupied Channel Bandwidth | ±1.22 % |
| Temperature | ±2.26% |
| Supply voltages | ±0.57 % |
| Time | ±3.39 % |

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

## 5.4. SAMPLE CALCULATION

**RADIATED EMISSIONS**

Where relevant, the following sample calculation is provided:
Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

# 6. EQUIPMENT UNDER TEST

## 6.1. DESCRIPTION OF EUT

The Apple iPhone is a smartphone with multimedia functions (music, application support, and video), cellular GSM, GPRS, EGPRS, UMTS, LTE, 5G, CDMA, IEEE 802.11a/b/g/n/ac/ax, Bluetooth, Ultra-Wideband, GPS and NFC. All models support at least one UICC based SIM. The second SIM is either an UICC based p-SIM (physical SIM) or e-SIM (electronic SIM). The device supports a built-in inductive charging transmitter and receiver. The rechargeable battery is not user accessible.

Testing was performed on the parent model and is used to support the application for the parent and variants identified in this report based on the test plan submitted and approved via KDB inquiry by the FCC.

## 6.2. INTRODUCTION

This application for certification is leveraging the data reuse procedures from KDB 484596 D01 based on reference FCC ID: BCG-E3994A to cover variant model FCC ID: BCG-E3996A, FCC ID: BCG-E4029A, and FCC ID: BCG-E4030A. The major difference between the parent/reference model and the variant model is the depopulation in the variant model of the mmWave transmitter, and some LTE and 5G NR Bands. All other circuitry and features are identical. The data reuse test plan was approved via manufacturer KDB inquiry.

## 6.3. MODEL DIFFERENCES

The manufacturer hereby declares the following for models A2481, A2626, A2628, A2629, A2630.

A2481, A2626, A2628, A2629, and A2630 are highly similar, with the only differences being listed on the table below:

| Model | FCC ID | Model Changes |
|---|---|---|
| A2481 | BCG-E3994A | Reference model |
| A2626 | BCG-E3996A | Variant model. Removed FR2 from the reference model |
| A2628 | BCG-E4029A | Variant model. Removed FR2, LTE B11/14/21/29/71, and 5G n71 from the reference model |
| A2629/A2630 | BCG-E4030A | Variant model. Removed FR2, LTE B11/14/21/29/53/71, MSS, and 5G NR n53/n71 from the reference Model. |

*Note:

They have the same PCB layout, design, common components, antennas, antenna locations and housing cases.

More specifically, their cellular modem, Wi-Fi, BT, NFC, WPT and UWB transmitters are identical, and removal of cellular bands is done by software and depopulation of band-specific components associated with the removed bands.

Spot check verification has been done on models A2626, A2628, A2629 and A2630 in accordance with the test plan approved via KDB inquiry. Comparison of the models, upper deviation is within 0.5dB range, and all tests are under FCC Technical Limits. The results documented for model A2481 may be applied as representative to models A2626, A2628, A2629 and A2630.

## 6.4. MAXIMUM OUTPUT POWER

**EIRP/ERP TEST PROCEDURE**
ANSI C63.26:2015
KDB 971168 D01 Section 5.6

ERP/EIRP = PMeas + GT − LC
where: ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm);
PMeas = measured transmitter output power or PSD, in dBm or dBW;
GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);
LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation.

EUT includes different power levels for head use configuration and body use configuration and the below tables contain the highest of all configurations average conducted and ERP/EIRP output powers as follows:

**5G NR n48 (Ant 7)**

| Part 96 (Ant 7) | |
|---|---|
| EIRP Limit (W) | 0.20 |
| Antenna Gain (dBi) | -3.50 |

| Bandwidth (MHz) | Modulation | Low Frequency (MHz) | Upper Frequency (MHz) | Conducted Average (dBm) | EIRP Average (dBm) | EIRP Average (W) | 99% BW (kHz) | Emission Designator |
|---|---|---|---|---|---|---|---|---|
| 10.0 | BPSK | 3555.0 | 3695.0 | 25.62 | 22.12 | 0.163 | 8566 | 8M57G7W |
| | QPSK | | | 25.70 | 22.20 | 0.166 | 8592 | 8M59G7W |
| | 16QAM | | | 24.62 | 21.12 | 0.129 | 8570 | 8M57D7W |
| 20.0 | BPSK | 3560.0 | 3690.0 | 25.70 | 22.20 | 0.166 | 17947 | 17M9G7W |
| | QPSK | | | 25.61 | 22.11 | 0.163 | 17838 | 17M8G7W |
| | 16QAM | | | 24.56 | 21.06 | 0.128 | 17870 | 17M9D7W |
| 40.0 | BPSK | 3570.0 | 3680.0 | 25.70 | 22.20 | 0.166 | 35744 | 35M7G7W |
| | QPSK | | | 25.60 | 22.10 | 0.162 | 35568 | 35M6G7W |
| | 16QAM | | | 24.81 | 21.31 | 0.135 | 35579 | 35M6D7W |

## 6.5. SPOT CHECK VERIFICATION RESULTS SUMMARY FOR A2626

| A2626 SPOT CHECK RESULTS | | | | | | | |
|---|---|---|---|---|---|---|---|
| Technology | Worst Mode | Test Item | Measured | Original Model: A2481 | Sub Model: A2626 | Delta (dB) | Remarks |
| | | | Frequency (MHz) | FCC ID: BCG-E3994A Power (dBm) | FCC ID: BCG-E3996A Power (dBm) | | |
| 5G NR n48 | QPSK @ 40 MHz BW | Cond Power | 3550-3700 | 25.70 | 25.70 | 0.00 | Ant9 |

## 6.6. SPOT CHECK VERIFICATION RESULTS SUMMARY FOR A2628

| A2628 SPOT CHECK RESULTS | | | | | | | |
|---|---|---|---|---|---|---|---|
| Technology | Worst Mode | Test Item | Measured | Original Model: A2481 | Sub Model: A2628 | Delta (dB) | Remarks |
| | | | Frequency (MHz) | FCC ID: BCG-E3994A Power (dBm) | FCC ID: BCG-E4029A Power (dBm) | | |
| 5G NR n48 | QPSK @ 40 MHz BW | Cond Power | 3550-3700 | 25.70 | 25.70 | 0.00 | Ant9 |

## 6.7. SPOT CHECK VERIFICATION RESULTS SUMMARY FOR A2629 AND A2630

| A2629 SPOT CHECK RESULTS | | | | | | | |
|---|---|---|---|---|---|---|---|
| Technology | Worst Mode | Test Item | Measured | Original Model: A2481 | Sub Model: A2629/A2630 | Delta (dB) | Remarks |
| | | | Frequency (MHz) | FCC ID: BCG-E3994A Power (dBm) | FCC ID: BCG-E4030A Power (dBm) | | |
| 5G NR n48 | QPSK @ 40 MHz BW | Cond Power | 3550-3700 | 25.70 | 25.70 | 0.00 | Ant9 |

## 6.8. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version 0.21.02-1.

## 6.9. MAXIMUM ANTENNA GAIN

The antenna(s) gain and type, as provided by the manufacturer' are as follows:

| LTE Bands | ANT 1 Antenna Gain (dBi) | ANT 2 Antenna Gain (dBi) | ANT 3 Antenna Gain (dBi) | ANT 4 Antenna Gain (dBi) | ANT 7 Antenna Gain (dBi) | ANT 8 Antenna Gain (dBi) | ANT 9 Antenna Gain (dBi) |
|---|---|---|---|---|---|---|---|
| 5G NR n48, 3550 – 3700 MHz | | | | -3.2 | -3.5 | -2.6 | -4.8 |

## 6.10. WORST-CASE CONFIGURATION AND MODE

The EUT supports the different LTE and 5G NR Bands. However, this report only applied to 5G NR n48.

BPSK modulation applied only for 5G NR frequencies and has the same tune up power as QPSK modulations.

The DFT-s-OFDM and CP-OFDM waveforms were investigated, and DFT-s-OFDM was found to be the worst case.

For 5G NRs, conducted spurious emission tests were conducted on wider bandwidth with inner 1RB since this is the worst bandwidth and the highest output power.

The worst-case scenario for all measurements is based on an engineering evaluation and QPSK was observed as the worst one and set for all conducted and radiated. Output power measurements were measured on QPSK, 16QAM, 64QAM, 256QAM, and BPSK, modulations. For testing purposes emissions on sections 8 and 9 were measured while QPSK was set at or above target power for all bands. Conducted tests were performed on the worst-case antenna because it has the highest conducted power. For bands 48 ANT7 is the worst-case antenna.

The EUT was investigated in three orthogonal orientations X/Y/Z on all ANT4, ANT7, ANT8 and ANT 9 antennas to determine the worst-case orientation. The following table exabit the worst-case orientation for different frequency bands. The full tests of the EUT have made upon the orientations that shown in the table below.

| Frequency Bands | ANT1 | ANT2 | ANT3 | ANT4 | ANT7 | ANT8 | ANT9 |
|---|---|---|---|---|---|---|---|
| 3300 – 3980 MHz | N/A | N/A | N/A | X | X | X | Y |

Radiated spurious emissions were investigated from 9kHz to 30MHz, 30MHz-1GHz and above 1GHz. There were no emissions found with less than 20dB of margin from 9kHz to 1GHz.

For simultaneous transmission of multiple channels in the 2.4GHz/5GH WLAN, UWB, and Cellular bands, tests were conducted for various configurations having the highest power, least separation in frequencies and widest operation bandwidths. No noticeable new emission was found.

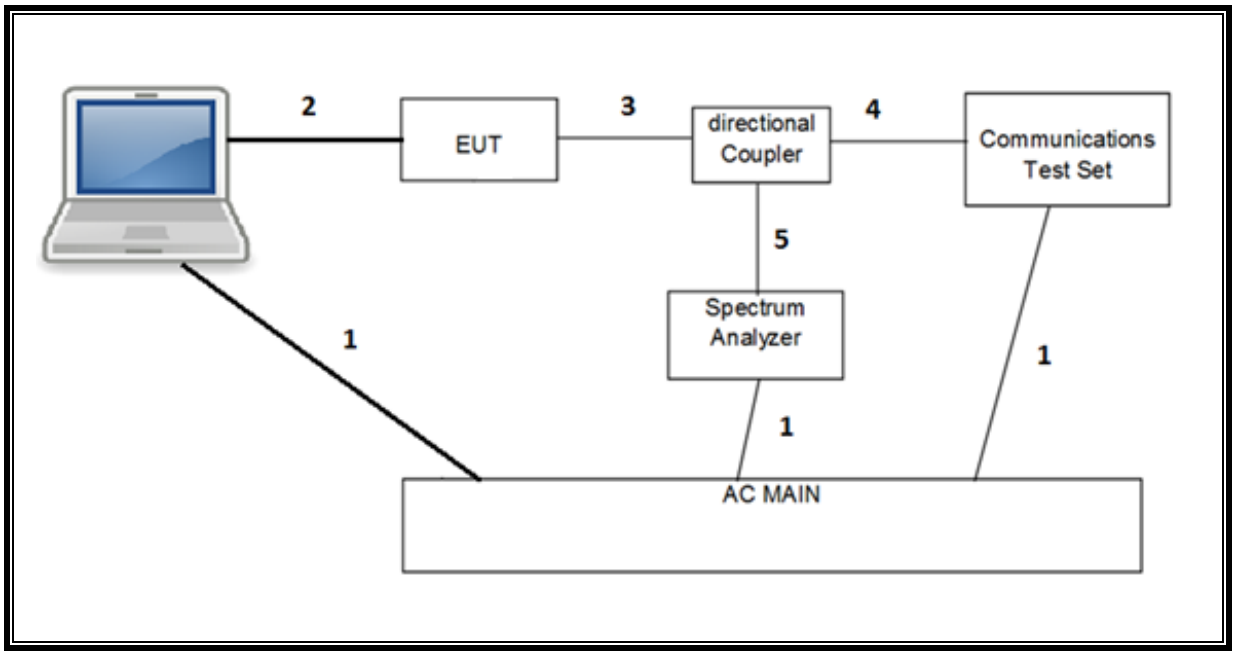
## 6.11. DESCRIPTION OF TEST SETUP

| SUPPORT TEST EQUIPMENT | | | | | |
|---|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Serial Number** | | **FCC ID/ DoC** |
| Laptop | A1398 | C02PM012G3QD | QDS-BRCM1069 | | A1398 |
| AC/DC adapter | PA-1450-BA1 | B123 | N/A | | PA-1450-BA1 |

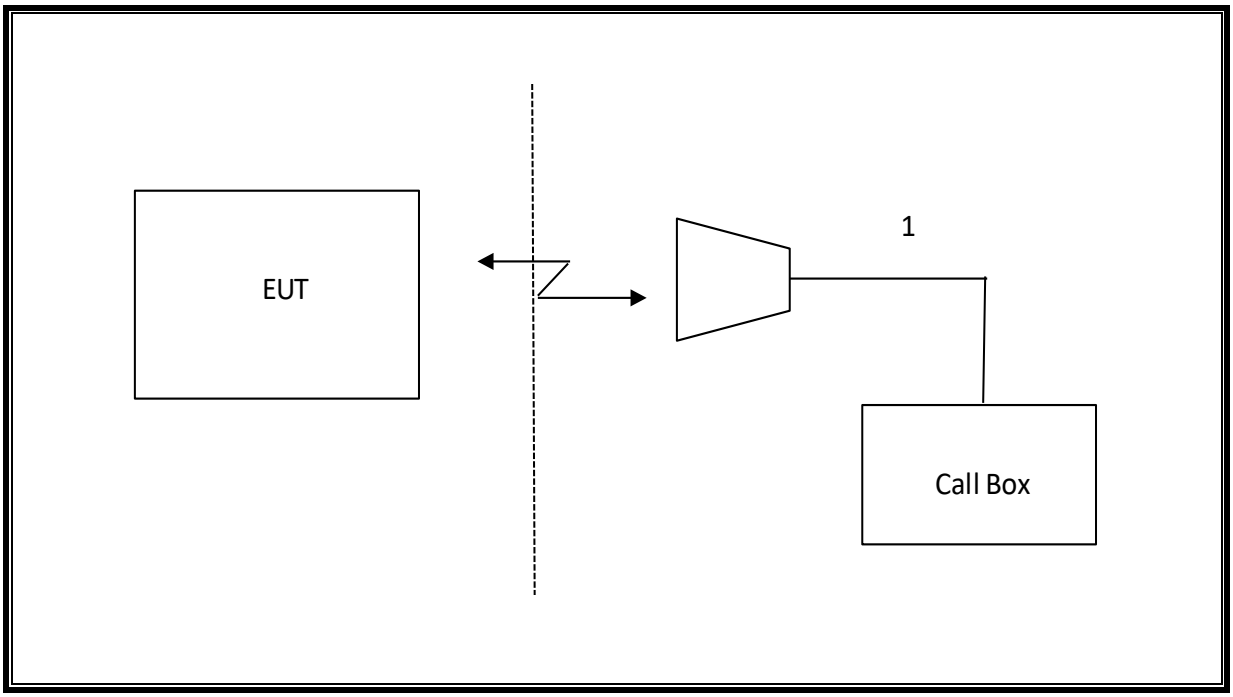
| I/O CABLES (RF CONDUCTED TEST) | | | | | | |
|---|---|---|---|---|---|---|
| **Cable No.** | **Port** | **# of Identical Ports** | **Connector Type** | **Cable Type** | **Cable Length (m)** | **Remarks** |
| 1 | AC | 3 | US 115V | Un-shielded | 2.0 | N/A |
| 2 | USB | 1 | DC | Un-shielded | 1.0 | N/A |
| 3 | RF In/Out | 1 | EUT | Un-shielded | 0.6 | N/A |
| 4 | RF In/Out | 1 | Communication Test Set | Un-shielded | 1.2 | N/A |
| 5 | RF In/Out | 1 | Barrel | N/A | N/A | N/A |

| I/O CABLES (RF RADIATED TEST) | | | | | | |
|---|---|---|---|---|---|---|
| **Cable No.** | **Port** | **# of Identical Ports** | **Connector Type** | **Cable Type** | **Cable Length (m)** | **Remarks** |
| 1 | RF In/Out | 1 | Antenna | Un-shielded | 5.0 | N/A |

**CONDUCTED SETUP**




**RADIATED SETUP**



# 7. TEST AND MEASUREMENT EQUIPMENT

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

| TEST EQUIPMENT LIST | | | | |
|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Asset** | **Cal Due** |
| Antenna, Horn 1-18GHz | ETS Lindgren | 3117 | T136 | 7/21/2022 |
| Antenna, Broadband Hybrid, 30MHz to 2000MHz | Sunol Sciences Corp. | JB3 | T899 | 9/14/2021 |
| RF Amplifier, 1-18GHz | MITEQ | AFS42-00101800-25-S-42 | T1165 | 6/12/2022 |
| Amplifier, 100KHz to 1GHz, 32dB | Keysight Technologies Inc | 8447D | T15 | 1/14/2022 |
| Spectrum Analyzer, PXA, 3Hz to 44GHz | Keysight Technologies Inc | N9030A | T1450 | 1/21/2022 |
| Antenna, Horn 1-18GHz | ETS Lindgren | 3117 | 80403 | 5/26/2022 |
| RF Device, Active, Amplifier | AMPLICAL | AMP1G18-35 | 205885 | 6/1/2022 |
| Spectrum Analyzer, PXA, 3Hz to 44GHz | Keysight Technologies Inc | N9030A | T907 | 1/27/2022 |
| Antenna, Horn 1-18GHz | ETS-Lindgren (Cedar Park, Texas) | 3117 | PRE0213833 | 2/16/2022 |
| RF Device, Active, Amplifier | AMPLICAL | AMP0.1G18-47-20 | 206055 | 5/13/2022 |
| EMI TEST RECEIVER | Rohde & Schwarz | ESW44 | 201500 | 2/26/2022 |
| Chamber, Environmental | Cincinnati Sub Zero | ZPHS-8-3.5-SCT/WC | T754 | 6/21/2022 |
| Filter, BRF 3400 to 3800MHz | MICRO-TRONICS | BRM50711-02 | T1792 | 6/23/2022 |
| Antenna, Horn 18 to 26.5GHz | ARA | MWH-1826/B | T449 | 4/22/2022 |
| Amplifier, 1 to 26.5GHz, 23.5dB Gain minimum | Keysight Technologies Inc | 8449B | T404 | 4/19/2022 |
| Antenna, Horn 26.5 to 40GHz | A.R.A. | MWH-2640/B | PRE0182201 | 4/22/2022 |
| Amplifier, 26 - 40GHz | MITEQ | TTA2640-35-HG | T1864 | 4/19/2022 |
| Spectrum Analyzer, PXA, 3Hz to 44GHz | Keysight Technologies Inc | N9030A | T1454 | 1/27/2022 |
| Power Meter, P-series single channel | Keysight Technologies Inc | N1911A | T1271 | 1/20/2022 |
| Power Sensor, P - series, 50MHz to 18GHz, Wideband | Keysight Technologies Inc | N1921A | T1228 | 4/13/2022 |
| Power Meter, P-series single channel | Keysight Technologies Inc | N1912A | T1245 | 1/21/2022 |
| Power Sensor, P - series, 50MHz to 18GHz, Wideband | Keysight Technologies Inc | N1921A | T1226 | 2/19/2022 |
| Antenna, Active Loop 9KHz to 30MHz | EMCO | 6502 | T35 | 11/23/2021 |
| **UL AUTOMATION SOFTWARE** | | | | |
| CLT Software | UL | UL RF | Ver 3.2.5, 4/13/2021 | |
| Power Measurement Software | UL | UL RF | Ver 3.1.2 5/17/2021 | |
| Radiated test software | UL | UL RF | Ver 9.5, 4/14/2021 | |

**NOTES:**

* Testing is completed before equipment expiration date.

# 8. RF OUTPUT POWER VERIFICATION

## CONDUCTED OUTPUT POWER MEASUREMENT PROCEDURE

All LTE bands conducted average power is obtained from the CMW500 telecommunication test set.

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS136.101 specification.

UE Power Class: 3 (23 +/- 2dBm). Band 41 UE Power Class: 2 (26 +/-2 dBm).The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS136.101.

**Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3**

| Modulation | Channel bandwidth / Transmission bandwidth ($N_{RB}$) | | | | | | MPR (dB) |
|---|---|---|---|---|---|---|---|
| | 1.4 MHz | 3.0 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | |
| QPSK | > 5 | > 4 | > 8 | > 12 | > 16 | > 18 | ≤ 1 |
| 16 QAM | ≤ 5 | ≤ 4 | ≤ 8 | ≤ 12 | ≤ 16 | ≤ 18 | ≤ 1 |
| 16 QAM | > 5 | > 4 | > 8 | > 12 | > 16 | > 18 | ≤ 2 |
| 64 QAM | ≤ 5 | ≤ 4 | ≤ 8 | ≤ 12 | ≤ 16 | ≤ 18 | ≤ 2 |
| 64 QAM | > 5 | > 4 | > 8 | > 12 | > 16 | > 18 | ≤ 3 |
| 256 QAM | ≥ 1 | | | | | | ≤ 5 |

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS138.521-1 specification.

The allowed MPR for SRS, PUCCH formats 0, 1, 3 and 4, and PRACH shall be as specified for QPSK modulated DFTs-
OFDM of equivalent RB allocation. The allowed MPR for PUCCH format 2 shall be as specified for QPSK modulated CP-OFDM of equivalent RB allocation.

**Table 6.2.2.3-1: Maximum power reduction (MPR) for power class 3**

| Modulation | | MPR (dB) | | |
|---|---|---|---|---|
| | | Edge RB allocations | Outer RB allocations | Inner RB allocations |
| DFT-s-OFDM | Pi/2 BPSK | ≤ 3.5[1] | ≤ 1.2[1] | ≤ 0.2[1] |
| | | ≤ 0.5[2] | | 0[2] |
| | Pi/2 BPSK w Pi/2 BPSK DMRS | ≤ 0.5[2] | | 0[2] |
| | QPSK | ≤ 1 | | 0 |
| | 16 QAM | ≤ 2 | | ≤ 1 |
| | 64 QAM | ≤ 2.5 | | |
| | 256 QAM | ≤ 4.5 | | |
| CP-OFDM | QPSK | ≤ 3 | | ≤ 1.5 |
| | 16 QAM | ≤ 3 | | ≤ 2 |
| | 64 QAM | ≤ 3.5 | | |
| | 256 QAM | ≤ 6.5 | | |

NOTE 1: Applicable for UE operating in TDD mode with Pi/2 BPSK modulation and UE indicates support for UE capability *powerBoosting-pi2BPSK* and if the IE *powerBoostPi2BPSK* is set to 1 and 40 % or less slots in radio frame are used for UL transmission for bands n40, n41, n77, n78 and n79. The reference power of 0dB MPR is 26dBm.

NOTE 2: Applicable for UE operating in FDD mode, or in TDD mode in bands other than n40, n41, n77, n78 and n79 with Pi/2 BPSK modulation and if the IE *powerBoostPi2BPSK* is set to 0 and if more than 40% of slots in radio frame are used for UL transmission for bands n40, n41, n77, n78 and n79.

**Table 6.2.2.3-2: Maximum power reduction (MPR) for power class 2**

| Modulation | | MPR (dB) | | |
|---|---|---|---|---|
| | | Edge RB allocations | Outer RB allocations | Inner RB allocations |
| DFT-s-OFDM | Pi/2 BPSK | ≤ 3.5 | ≤ 0.5 | 0 |
| | QPSK | ≤ 3.5 | ≤ 1 | 0 |
| | 16 QAM | ≤ 3.5 | ≤ 2 | ≤ 1 |
| | 64 QAM | ≤ 3.5 | ≤ 2.5 | |
| | 256 QAM | ≤ 4.5 | | |
| CP-OFDM | QPSK | ≤ 3.5 | ≤ 3 | ≤ 1.5 |
| | 16 QAM | ≤ 3.5 | ≤ 3 | ≤ 2 |
| | 64 QAM | ≤ 3.5 | | |
| | 256 QAM | ≤ 6.5 | | |

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS136.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of “NS_01”.

**Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)**

| Network Signalling value | Requirements (subclause) | E-UTRA Band | Channel bandwidth (MHz) | Resources Blocks ($N_{RB}$) | A-MPR (dB) |
|---|---|---|---|---|---|
| NS_01 | 6.6.2.1.1 | Table 5.5-1 | 1.4, 3, 5, 10, 15, 20 | Table 5.6-1 | N/A |
| NS_03 | 6.6.2.2.1 | 2, 4,10, 23, 25, 35, 36, 66, 70 | 3 | >5 | ≤ 1 |
| | | | 5 | >6 | ≤ 1 |
| | | | 10 | >6 | ≤ 1 |
| | | | 15 | >8 | ≤ 1 |
| | | | 20 | >10 | ≤ 1 |
| NS_04 | 6.6.2.2.2, 6.6.3.3.19 | 41 | 5, 10, 15, 20 | Table 6.2.4-4, Table 6.2.4-4a | |

The allowed A-MPR values specified below in Table 6.2.3.3.1-1 of 3GPP TS 38.521-1 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of “NS_01”.

**Table 6.2.3.3.1-1: Additional maximum power reduction (A-MPR)**

| Network signalling label | Requirements (subclause) | NR Band | Channel bandwidth (MHz) | Resources blocks ($N_{RB}$) | A-MPR (dB) |
|---|---|---|---|---|---|
| NS_01 | | Table 5.2-1 | 5, 10, 15, 20, 25, 30, 40, 50, 60, 80, 90, 100 | Table 5.3.2-1 | N/A |
| NS_03 | 6.5.2.3.3.3 | n2, n25, n66, n70, n86 | | | Clause 6.2.3.3.7 |
| NS_03U | 6.5.2.3.3.3, 6.5.2.4.2.3 | n2, n25, n66, n86 | | | Clause 6.2.3.3.7 |
| NS_04 | 6.5.2.3.3.2, 6.5.3.3.3.1 | n41 | 10, 15, 20, 40, 50, 60, 80, 90, 100 | | Clause 6.2.3.3.2 |

**RESULTS**

EUT includes different power levels for head use configuration and body use configuration and the below tables contain the highest of all configurations average conducted output powers as follows:

## 8.1. 5G NR n48

| Test Engineer ID: | 24875 | Test Date: | 6/23/2021 |
|---|---|---|---|

**OUTPUT POWER FOR 5G NR n48 (10.0 MHz)**

| Bandwidth (MHz) | Modulation | RB Allocation | RB Offset | Conducted Average (dBm) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ANT 7 | | | ANT 8 | | | ANT 9 | | | ANT 4 | | |
| | | | | 637000 | 641666 | 646333 | 637000 | 641666 | 646333 | 637000 | 641666 | 646333 | 637000 | 641666 | 646333 |
| | | | | 3555.0 | 3625.0 | 3695.0 | 3555.0 | 3625.0 | 3695.0 | 3555.0 | 3625.0 | 3695.0 | 3555.0 | 3625.0 | 3695.0 |
| 10.0 | BPSK | 1 | 0 | 24.25 | 24.12 | 24.92 | 22.47 | 22.48 | 22.10 | 24.23 | 25.00 | 25.30 | 21.65 | 21.87 | 21.45 |
| | | 1 | 1 | 24.81 | 24.88 | 25.05 | 23.04 | 22.99 | 22.93 | 25.32 | 25.37 | **25.53** | 22.42 | 22.26 | 21.84 |
| | | 1 | 22 | 25.25 | 25.46 | **25.62** | 22.78 | **23.12** | 22.61 | 25.04 | 25.33 | 24.61 | **22.47** | 22.18 | 21.80 |
| | | 1 | 23 | 24.86 | 24.95 | 25.09 | 22.19 | 22.72 | 22.19 | 24.73 | 24.74 | 25.29 | 21.54 | 21.85 | 21.62 |
| | | 12 | 6 | 24.87 | 25.05 | 25.30 | 22.76 | 23.00 | 22.57 | 25.29 | 25.32 | 24.70 | 22.29 | 22.23 | 21.75 |
| | | 24 | 0 | 24.22 | 24.57 | 24.83 | 22.39 | 22.49 | 22.06 | 24.75 | 25.48 | 24.38 | 21.77 | 21.81 | 21.54 |
| | QPSK | 1 | 0 | 23.44 | 23.84 | 24.27 | 21.98 | 21.89 | 21.91 | 24.48 | 24.47 | 24.86 | 21.47 | 21.35 | 21.25 |
| | | 1 | 1 | 24.71 | 24.76 | 25.25 | 22.93 | 22.80 | 22.97 | 25.35 | 25.50 | **25.70** | 22.39 | **22.70** | 22.02 |
| | | 1 | 22 | 25.26 | 25.29 | **25.70** | 22.80 | 22.96 | 22.48 | 25.28 | 25.23 | 24.92 | 22.43 | 22.45 | 21.77 |
| | | 1 | 23 | 23.99 | 24.58 | 24.70 | 21.75 | 22.01 | 21.74 | 24.40 | 24.34 | 24.48 | 21.33 | 21.45 | 20.97 |
| | | 12 | 6 | 24.90 | 24.94 | 25.21 | 22.88 | **23.20** | 22.72 | 25.27 | 25.29 | 24.83 | 22.29 | 22.14 | 22.08 |
| | | 24 | 0 | 23.84 | 24.06 | 24.28 | 21.84 | 21.99 | 21.61 | 24.27 | 25.05 | 23.90 | 21.30 | 21.22 | 20.76 |
| | 16QAM | 1 | 0 | 22.61 | 23.04 | 23.72 | 20.77 | 20.80 | 20.47 | 23.52 | 23.74 | 23.82 | 20.36 | 20.19 | 20.08 |
| | | 1 | 1 | 23.81 | 23.75 | 24.15 | 21.76 | 21.75 | 21.58 | 24.14 | 24.43 | **24.82** | **21.40** | 21.36 | 21.16 |
| | | 1 | 22 | 24.25 | **24.62** | 24.61 | 21.79 | 21.84 | 21.44 | 24.14 | 24.58 | 23.75 | 21.33 | 21.39 | 21.12 |
| | | 1 | 23 | 23.21 | 23.72 | 23.94 | 20.63 | 21.02 | 20.34 | 23.39 | 23.70 | 23.61 | 20.31 | 20.34 | 20.14 |
| | | 12 | 6 | 23.73 | 24.00 | 24.31 | 21.74 | **22.01** | 21.66 | 24.31 | 24.36 | 23.92 | 21.23 | 21.34 | 21.00 |
| | | 24 | 0 | 22.82 | 23.10 | 23.37 | 20.87 | 21.15 | 20.64 | 23.33 | 24.14 | 23.03 | 20.40 | 19.88 | 19.97 |
| | 64QAM | 1 | 0 | 22.28 | 22.61 | 23.30 | 20.16 | 20.41 | 20.01 | 22.92 | 23.04 | 23.27 | 20.03 | 19.87 | 19.54 |
| | | 1 | 1 | 22.32 | 22.67 | 22.89 | 20.23 | 20.52 | 20.25 | 22.87 | 23.12 | 23.43 | 20.06 | 19.62 | 19.73 |
| | | 1 | 22 | 23.18 | 22.96 | 23.21 | 20.57 | **20.65** | 20.01 | 22.97 | 23.04 | 22.56 | 19.78 | 19.98 | 19.60 |
| | | 1 | 23 | 23.06 | 23.32 | **23.44** | 20.27 | 20.43 | 19.98 | 22.95 | 22.86 | 23.09 | 19.58 | **20.07** | 19.50 |
| | | 12 | 6 | 22.34 | 22.49 | 22.80 | 20.22 | 20.47 | 20.15 | 22.76 | 22.85 | 22.44 | 19.74 | 19.74 | 19.52 |
| | | 24 | 0 | 22.31 | 22.60 | 22.88 | 20.24 | 20.34 | 19.91 | 22.70 | **23.46** | 22.41 | 19.57 | 19.73 | 19.37 |
| | 256QAM | 1 | 0 | 20.10 | 20.30 | 20.67 | 18.31 | 18.34 | 18.10 | 20.57 | 20.92 | 21.06 | 17.72 | 17.33 | 17.44 |
| | | 1 | 1 | 20.22 | 20.43 | 20.46 | 18.26 | 18.37 | 18.17 | 20.64 | 20.76 | 21.13 | 17.73 | 17.76 | 17.36 |
| | | 1 | 22 | 20.72 | 20.76 | 21.27 | 18.23 | 18.40 | 17.96 | 20.61 | 20.70 | 20.33 | 17.79 | 17.69 | 17.19 |
| | | 1 | 23 | 20.68 | 21.07 | **21.35** | 17.78 | 18.51 | 18.05 | 20.68 | 20.78 | 20.96 | **17.80** | 17.59 | 16.85 |
| | | 12 | 6 | 20.29 | 20.50 | 20.90 | 18.38 | **18.57** | 18.19 | 20.74 | 20.80 | 20.43 | 17.78 | 17.39 | 17.18 |
| | | 24 | 0 | 20.27 | 20.56 | 20.76 | 18.38 | **18.57** | 18.27 | 20.79 | **21.51** | 20.40 | 17.58 | 17.69 | 17.03 |

**OUTPUT POWER FOR 5G NR n48 (20.0 MHz)**

| Bandwidth (MHz) | Modulation | RB Allocation | RB Offset | Conducted Average (dBm) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ANT 7 | | | ANT 8 | | | ANT 9 | | | ANT 4 | | |
| | | | | 637333 | 641666 | 646000 | 637333 | 641666 | 646000 | 637333 | 641666 | 646000 | 637333 | 641666 | 646000 |
| | | | | 3560.0 | 3625.0 | 3690.0 | 3560.0 | 3625.0 | 3690.0 | 3560.0 | 3625.0 | 3690.0 | 3560.0 | 3625.0 | 3690.0 |
| 20.0 | BPSK | 1 | 0 | 22.86 | 23.17 | 25.59 | 22.22 | 22.67 | 22.11 | 25.12 | 25.10 | 24.89 | 22.15 | 22.09 | 21.33 |
| | | 1 | 1 | 23.92 | 23.78 | 23.97 | 22.85 | **23.17** | 22.93 | **25.66** | 25.55 | 24.83 | 22.37 | 22.20 | 22.05 |
| | | 1 | 49 | **25.70** | 25.33 | 24.74 | 23.03 | 22.94 | 22.41 | 25.41 | 25.36 | 24.92 | 22.18 | **22.55** | 22.25 |
| | | 1 | 50 | 25.03 | 24.88 | 24.46 | 22.17 | 22.46 | 22.01 | 24.89 | 24.98 | 24.37 | 21.82 | 22.09 | 21.75 |
| | | 25 | 12 | 24.62 | 24.38 | 24.26 | 22.89 | 23.01 | 22.61 | 25.41 | 25.46 | 24.63 | 22.33 | 22.38 | 22.02 |
| | | 50 | 0 | 23.72 | 23.88 | 23.93 | 20.89 | 22.27 | 22.13 | 23.18 | 24.92 | 22.96 | 20.61 | 22.08 | 21.73 |
| | QPSK | 1 | 0 | 22.10 | 22.62 | 23.12 | 21.96 | 22.19 | 21.85 | 24.65 | 24.60 | 24.32 | 21.53 | 21.65 | 21.23 |
| | | 1 | 1 | 24.02 | 22.76 | 23.96 | 22.99 | 23.14 | 22.76 | **25.70** | 25.68 | 25.00 | 22.47 | 22.25 | 21.92 |
| | | 1 | 49 | **25.61** | 25.30 | 24.89 | 23.00 | **23.20** | 22.57 | 25.47 | 25.53 | 24.76 | **22.70** | 22.11 | 21.66 |
| | | 1 | 50 | 24.55 | 23.71 | 23.88 | 21.54 | 22.21 | 21.64 | 24.45 | 24.55 | 23.63 | 21.17 | 21.35 | 21.21 |
| | | 25 | 12 | 24.56 | 23.30 | 24.37 | 22.90 | 23.05 | 22.62 | 25.44 | 25.46 | 24.64 | 22.23 | 22.46 | 21.97 |
| | | 50 | 0 | 23.67 | 23.71 | 23.69 | 20.90 | 21.78 | 21.61 | 23.21 | 24.45 | 23.17 | 20.63 | 20.81 | 21.34 |
| | 16QAM | 1 | 0 | 21.70 | 21.98 | 22.00 | 20.76 | 21.32 | 20.83 | 23.49 | 23.52 | 23.21 | 20.73 | 20.92 | 20.37 |
| | | 1 | 1 | 23.20 | 22.33 | 23.22 | 22.22 | 22.07 | 21.93 | 24.55 | **24.58** | 23.85 | **21.87** | 21.75 | 21.28 |
| | | 1 | 49 | **24.56** | 24.29 | 24.02 | 22.05 | **22.27** | 21.74 | 24.52 | 24.48 | 24.09 | 21.82 | 21.81 | 21.55 |
| | | 1 | 50 | 22.99 | 22.98 | 23.11 | 20.64 | 21.14 | 20.76 | 23.45 | 23.22 | 22.35 | 20.84 | 20.62 | 20.46 |
| | | 25 | 12 | 23.64 | 23.14 | 23.45 | 21.89 | 21.99 | 21.68 | 24.33 | 24.52 | 23.66 | 21.53 | 21.51 | 20.86 |
| | | 50 | 0 | 23.81 | 22.42 | 23.43 | 20.91 | 20.81 | 20.65 | 23.24 | 23.45 | 22.63 | 20.52 | 20.33 | 20.15 |
| | 64QAM | 1 | 0 | 19.90 | 21.54 | 21.76 | 20.21 | **20.42** | 20.05 | 23.08 | **23.29** | 22.75 | 20.17 | 19.25 | 19.99 |
| | | 1 | 1 | 21.92 | 21.42 | 21.74 | 20.22 | 20.39 | 20.16 | 23.06 | 23.04 | 22.78 | 20.20 | **20.44** | 19.74 |
| | | 1 | 49 | 23.11 | 22.89 | 22.76 | 20.24 | 20.38 | 19.80 | 22.75 | 23.17 | 22.25 | 20.29 | 19.96 | 19.82 |
| | | 1 | 50 | **23.38** | 22.24 | 22.56 | 20.07 | 20.33 | 19.85 | 22.93 | 22.90 | 22.30 | 20.22 | 20.17 | 19.77 |
| | | 25 | 12 | 22.08 | 21.80 | 21.68 | 20.28 | 20.31 | 19.97 | 22.83 | 22.85 | 21.79 | 19.73 | 19.81 | 19.67 |
| | | 50 | 0 | 23.21 | 21.87 | 22.89 | 20.31 | 20.33 | 20.05 | 22.83 | 22.92 | 21.92 | 20.10 | 19.96 | 19.77 |
| | 256QAM | 1 | 0 | 19.57 | 19.31 | 19.62 | 18.36 | **18.50** | 18.02 | 20.94 | 20.94 | 20.15 | 17.91 | 18.01 | 17.70 |
| | | 1 | 1 | 19.35 | 19.27 | 19.57 | 18.36 | 18.47 | 18.29 | 20.95 | 20.58 | 20.33 | 17.57 | 17.85 | 17.47 |
| | | 1 | 49 | **21.11** | 20.76 | 20.50 | 18.18 | 18.28 | 17.99 | 20.83 | 20.86 | 19.87 | 18.02 | 17.81 | 17.47 |
| | | 1 | 50 | 20.91 | 20.57 | 20.39 | 17.91 | 18.30 | 18.11 | 20.75 | **21.04** | 19.92 | 17.89 | 17.93 | 17.21 |
| | | 25 | 12 | 20.07 | 19.87 | 19.88 | 18.33 | 18.27 | 18.10 | 20.88 | 20.92 | 20.04 | 17.62 | **18.03** | 17.91 |
| | | 50 | 0 | 20.16 | 19.91 | 19.90 | 18.27 | 18.45 | 18.03 | 20.82 | 20.89 | 20.42 | 17.97 | 17.86 | 17.35 |

## OUTPUT POWER FOR 5G NR n48 (40.0 MHz)

| Bandwidth (MHz) | Modulation | RB Allocation | RB Offset | Conducted Average (dBm) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ANT 7 | | | ANT 8 | | | ANT 9 | | | ANT 4 | | |
| | | | | 638000 | 641666 | 645333 | 638000 | 641666 | 645333 | 638000 | 641666 | 645333 | 638000 | 641666 | 645333 |
| | | | | 3570.0 | 3625.0 | 3680.0 | 3570.0 | 3625.0 | 3680.0 | 3570.0 | 3625.0 | 3680.0 | 3570.0 | 3625.0 | 3680.0 |
| 40.0 | BPSK | 1 | 0 | 22.94 | 22.33 | 23.94 | 22.72 | 22.81 | 22.71 | 25.05 | 25.03 | 24.67 | 21.80 | 22.16 | 21.98 |
| | | 1 | 1 | 23.32 | 22.97 | 24.46 | 23.08 | 22.99 | 23.17 | 25.39 | **25.70** | 25.63 | **22.70** | 22.56 | 22.53 |
| | | 1 | 104 | 24.68 | **25.70** | 24.32 | **23.20** | 23.19 | 23.00 | 25.29 | 25.36 | 25.31 | 22.43 | 22.54 | 22.30 |
| | | 1 | 105 | 24.25 | 25.11 | 23.67 | 22.55 | 22.49 | 22.43 | 24.45 | 24.85 | 24.42 | 21.91 | 22.07 | 21.69 |
| | | 50 | 25 | 24.71 | 23.50 | 23.30 | 23.03 | 23.13 | 22.90 | 25.50 | 25.27 | 25.22 | 22.20 | 21.95 | 22.07 |
| | | 100 | 0 | 21.05 | 23.35 | 21.15 | 18.98 | 22.65 | 19.98 | 20.69 | 25.05 | 20.79 | 18.65 | 21.76 | 19.14 |
| | QPSK | 1 | 0 | 22.44 | 22.11 | 23.45 | 22.11 | 22.44 | 22.10 | 24.38 | 24.14 | 24.66 | 21.53 | 21.65 | 21.51 |
| | | 1 | 1 | 23.53 | 21.99 | 24.49 | **23.19** | 23.12 | 23.17 | 25.60 | 25.63 | 25.56 | 22.50 | **22.55** | 22.15 |
| | | 1 | 104 | 24.72 | **25.60** | 24.19 | 23.18 | 23.17 | 22.93 | **25.64** | 25.36 | 25.38 | 22.44 | 21.94 | 22.25 |
| | | 1 | 105 | 23.83 | 24.45 | 23.34 | 22.19 | 22.20 | 21.77 | 24.44 | 24.33 | 24.16 | 21.41 | 21.48 | 21.01 |
| | | 50 | 25 | 24.75 | 23.46 | 23.32 | 22.95 | 23.13 | 22.95 | 25.34 | 25.54 | 25.23 | 22.12 | 21.85 | 21.78 |
| | | 100 | 0 | 21.07 | 22.83 | 21.12 | 19.00 | 22.19 | 19.99 | 20.68 | 24.35 | 20.58 | 18.63 | 21.45 | 18.86 |
| | 16QAM | 1 | 0 | 21.55 | 21.10 | 22.69 | 21.33 | 21.45 | 21.31 | 23.62 | 23.43 | 23.59 | 21.00 | 20.81 | 20.68 |
| | | 1 | 1 | 22.63 | 20.93 | 23.61 | 22.15 | 22.19 | 22.19 | **24.62** | 24.37 | 24.61 | 21.51 | **21.91** | 21.70 |
| | | 1 | 104 | 24.01 | **24.81** | 23.47 | **22.40** | 22.38 | 22.05 | 23.98 | 24.54 | 23.98 | 21.60 | 21.12 | 21.45 |
| | | 1 | 105 | 22.80 | 23.47 | 22.72 | 21.22 | 21.27 | 20.99 | 23.24 | 23.09 | 23.04 | 20.21 | 20.96 | 20.51 |
| | | 50 | 25 | 23.71 | 22.57 | 22.38 | 22.03 | 21.20 | 21.99 | 24.48 | 24.33 | 24.08 | 21.08 | 21.11 | 21.23 |
| | | 100 | 0 | 21.09 | 21.78 | 21.14 | 18.98 | 21.15 | 19.94 | 20.68 | 23.66 | 20.71 | 18.48 | 20.28 | 19.20 |
| | 64QAM | 1 | 0 | 21.11 | 21.02 | 22.49 | 20.44 | 20.45 | 20.48 | 23.07 | 23.20 | 23.15 | **20.21** | 20.04 | 20.15 |
| | | 1 | 1 | 21.21 | 20.83 | 22.18 | 20.58 | 20.53 | 20.56 | 22.63 | 23.16 | **23.35** | 20.00 | 20.13 | 20.06 |
| | | 1 | 104 | 22.33 | 23.20 | 21.96 | 20.27 | 20.50 | 20.09 | 23.13 | 23.21 | 22.71 | 19.94 | 20.06 | 19.71 |
| | | 1 | 105 | 22.36 | **23.29** | 22.10 | 20.37 | 20.50 | 20.40 | 22.59 | 23.17 | 22.95 | 19.92 | 19.87 | 19.77 |
| | | 50 | 25 | 22.24 | 21.01 | 20.82 | 20.39 | 20.58 | 20.35 | 22.93 | 22.96 | 22.47 | 19.40 | 19.75 | 19.53 |
| | | 100 | 0 | 21.02 | 21.32 | 20.46 | 18.97 | **20.61** | 20.03 | 20.73 | 22.85 | 20.67 | 18.66 | 19.65 | 18.70 |
| | 256QAM | 1 | 0 | 18.90 | 18.70 | 19.93 | 18.35 | **18.95** | 18.55 | 20.75 | 21.19 | 21.07 | **18.04** | 17.99 | 17.54 |
| | | 1 | 1 | 18.96 | 18.76 | 19.64 | 18.64 | 18.46 | 18.40 | 20.88 | 20.29 | **21.83** | 17.96 | 17.96 | 18.01 |
| | | 1 | 104 | 20.28 | 20.74 | 19.78 | 18.38 | 18.64 | 18.63 | 20.68 | 20.92 | 20.27 | 17.45 | 17.41 | 17.48 |
| | | 1 | 105 | 20.08 | **20.93** | 20.05 | 18.59 | 18.36 | 18.29 | 20.22 | 20.92 | 20.64 | 17.71 | 17.45 | 17.33 |
| | | 50 | 25 | 20.25 | 18.98 | 18.82 | 18.35 | 18.53 | 18.40 | 20.87 | 21.01 | 20.67 | 17.57 | 17.32 | 17.73 |
| | | 100 | 0 | 20.04 | 19.29 | 19.08 | 18.49 | 18.66 | 18.50 | 21.02 | 21.03 | 20.53 | 17.83 | 17.92 | 17.64 |

# 9. CONDUCTED TEST RESULTS

## 9.1. OCCUPIED BANDWIDTH

**RULE PART(S)**

FCC: §2.1049

**LIMITS**

For reporting purposes only.

**TEST PROCEDURE**

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the middle channel in each band. The 99% and -26dB bandwidths was also measured and recorded.

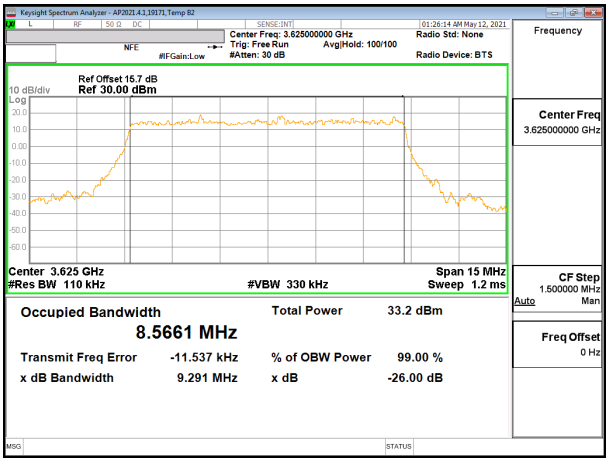
**RESULTS**

There is no limit required and power is the same for low, middle and high channel; therefore, only middle channel was tested. Worst-case plots (highest bandwidth) are reported only.

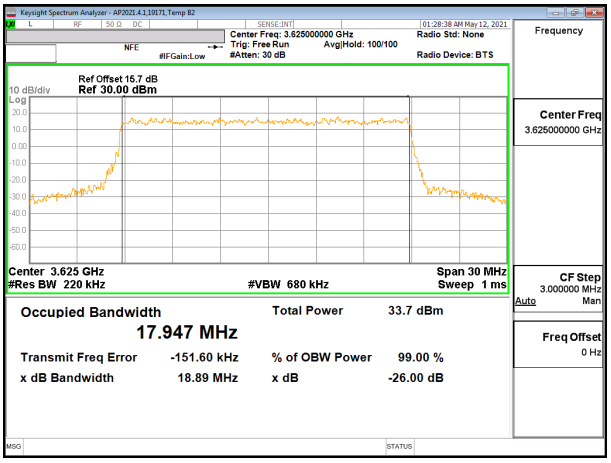
**5G NR n48**

| Band | Mode | RB Allocation/RB Offset | f(MHz) | 99% BW (MHz) | -26dB BW (MHz) |
|---|---|---|---|---|---|
| 5G NR n48 | 10MHz, BPSK | 24/0 | 3625.0 | 8.566 | 9.29 |
| | 10MHz, QPSK | | | 8.592 | 9.46 |
| | 10MHz, 16QAM | | | 8.570 | 9.24 |
| | 20MHz, BPSK | 50/0 | | 17.947 | 18.89 |
| | 20MHz, QPSK | | | 17.838 | 19.05 |
| | 20MHz, 16QAM | | | 17.870 | 19.09 |
| | 40MHz, BPSK | 100/0 | | 35.744 | 37.39 |
| | 40MHz, QPSK | | | 35.568 | 37.26 |
| | 40MHz, 16QAM | | | 35.579 | 37.36 |
| | 40MHz, BPSK | 1/0 | | 0.530 | 0.92 |

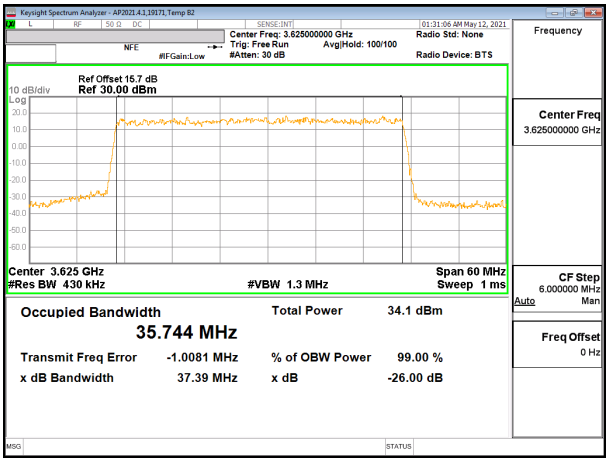
## 9.1.1. 5G NR n48



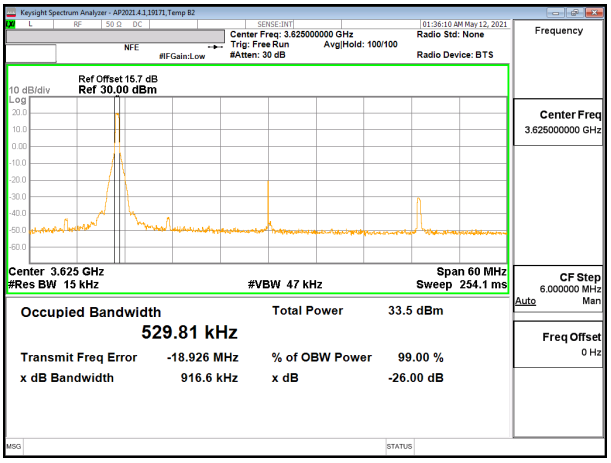

5G NR n48 10MHz BPSK Middle Channel RB24-0




5G NR n48 20MHz BPSK Middle Channel RB50-0




5G NR n48 40MHz BPSK Middle Channel RB100-0




5G NR n48 40MHz BPSK Middle Channel RB1-0

## 9.2. EMISSION MASK AND ADJACENT CHANNEL POWER

**TEST PROCEDURE (5G NR n48)**

(i) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's authorized frequency channel, a resolution bandwidth of no less than one percent of the fundamental emission bandwidth may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full reference bandwidth (i.e., 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

(ii) When measuring unwanted emissions to demonstrate compliance with the limits, the CBSD and End User Device nominal carrier frequency/channel shall be adjusted as close to the licensee's authorized frequency block edges, both upper and lower, as the design permits.

(iii) Compliance with emission limits shall be demonstrated using either average (RMS)-detected or peak-detected power measurement techniques.

**RESULTS**

## 9.2.1. 5G NR n48 ADJACENT CHANNEL POWER

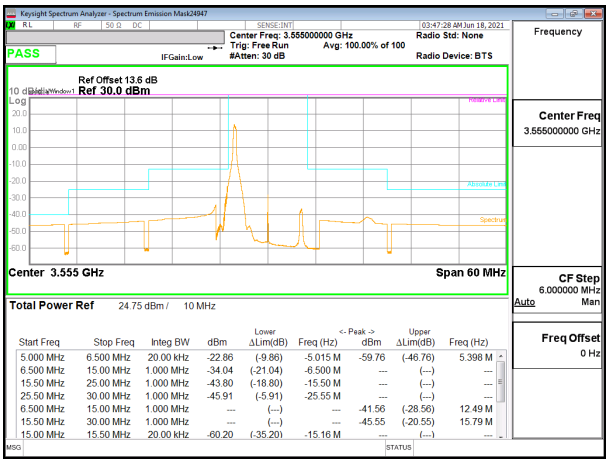
**LIMITS**

FCC: §96.41

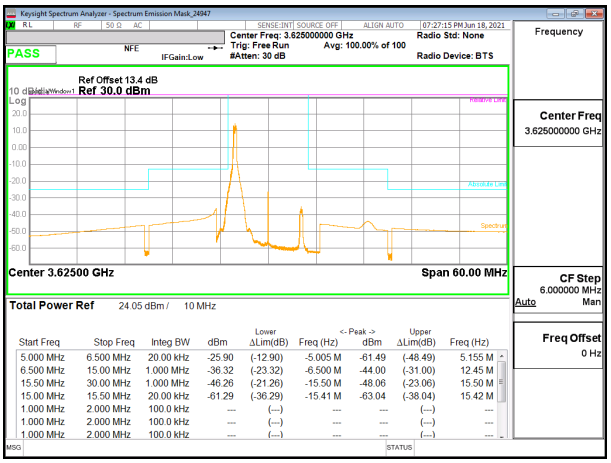
(e) 3.5 GHz Emissions and Interference Limits—
(1) General protection levels
(ii) Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by a CBSD to End User Devices, the conducted power of any End User Device emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed −13 dBm/MHz within 0 to B megahertz (where B is the bandwidth in megahertz of the assigned channel or multiple contiguous channels of the End User Device) above the upper CBSD-assigned channel edge and within 0 to B megahertz below the lower CBSD-assigned channel edge. At all frequencies greater than B megahertz above the upper CBSD assigned channel edge and less than B megahertz below the lower CBSD-assigned channel edge, the conducted power of any End User Device emission shall not exceed −25 dBm/MHz. Notwithstanding the emission limits in this paragraph, the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB.

(2) Additional protection levels. Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed −25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz.

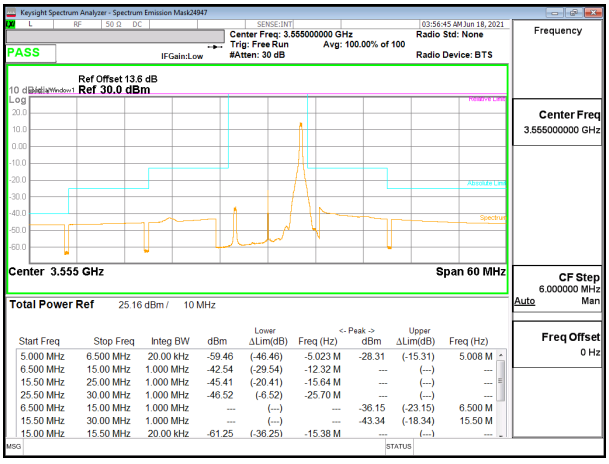
## 5G NR n48 EMISSION MASK



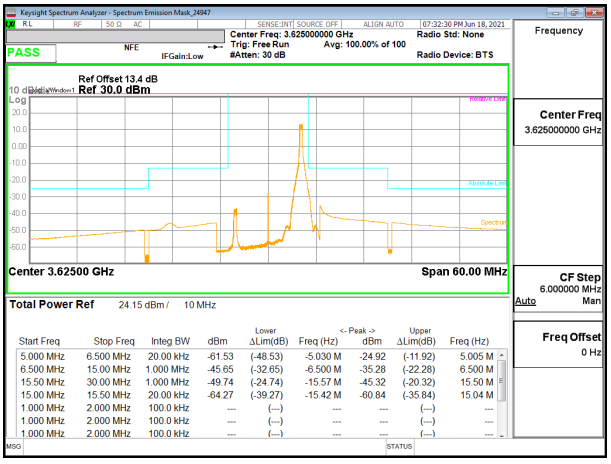

5G NR n48 10MHz BPSK Low Channel RB1-0



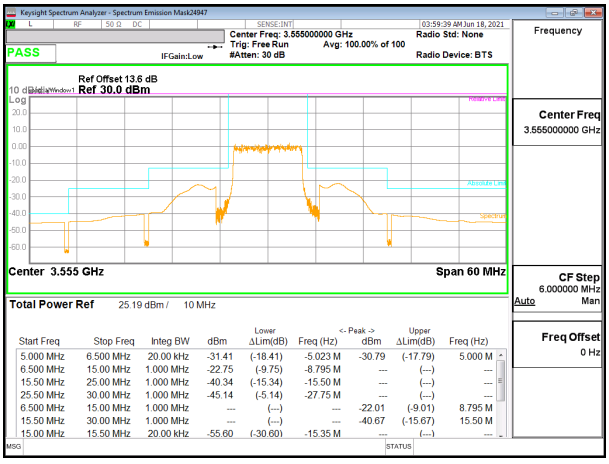

5G NR n48 10MHz BPSK Middle Channel RB1-0



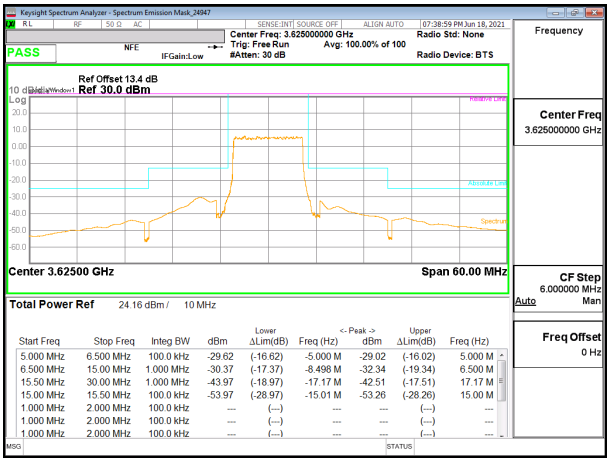

5G NR n48 10MHz BPSK Low Channel RB1-23



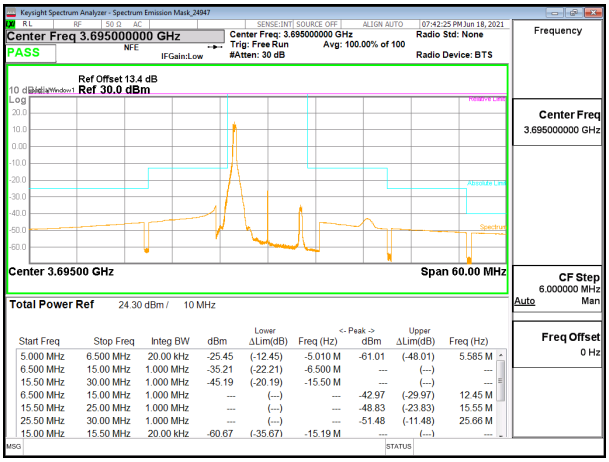

5G NR n48 10MHz BPSK Middle Channel RB1-23



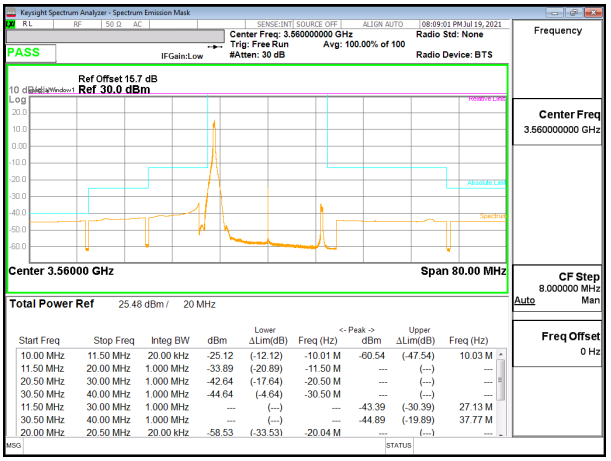

5G NR n48 10MHz BPSK Low Channel RB24-0



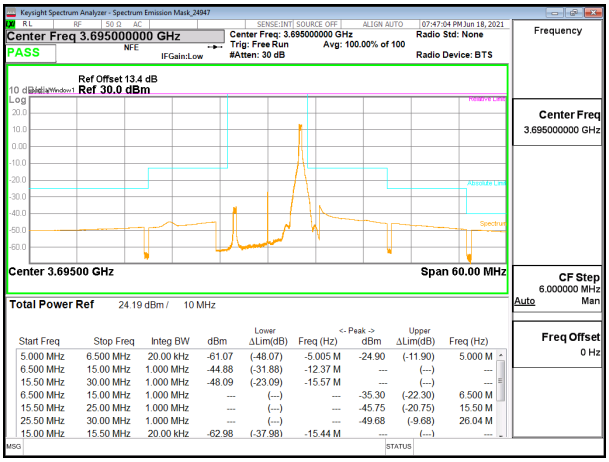

5G NR n48 10MHz BPSK Middle Channel RB24-0



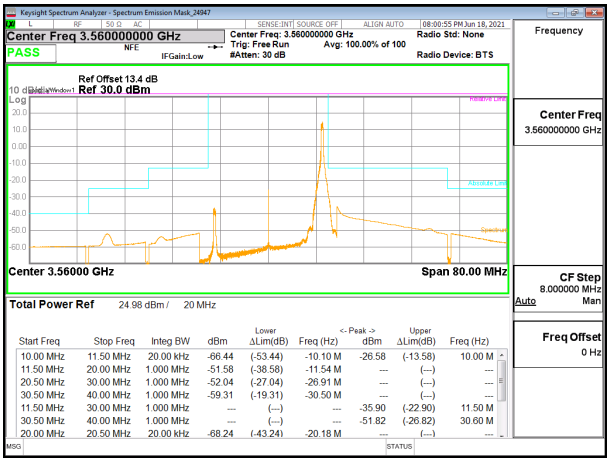

5G NR n48 10MHz BPSK High Channel RB1-0



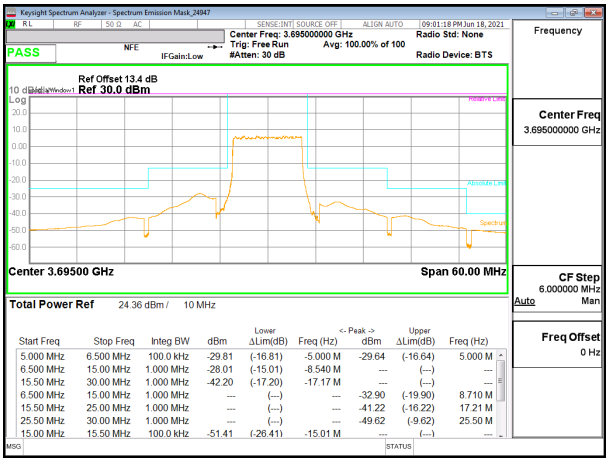

5G NR n48 20MHz BPSK Low Channel RB1-0, ID:24947



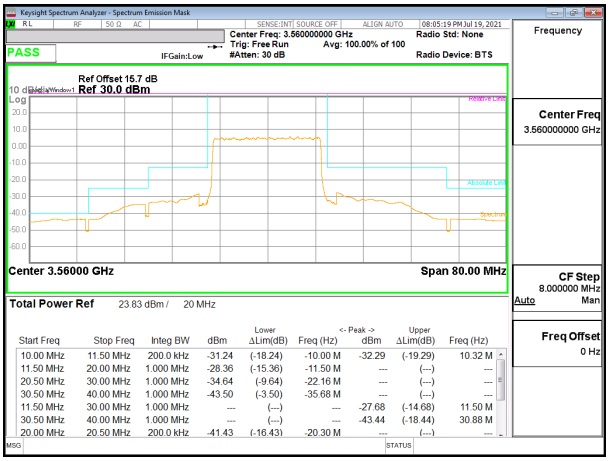

5G NR n48 10MHz BPSK High Channel RB1-23



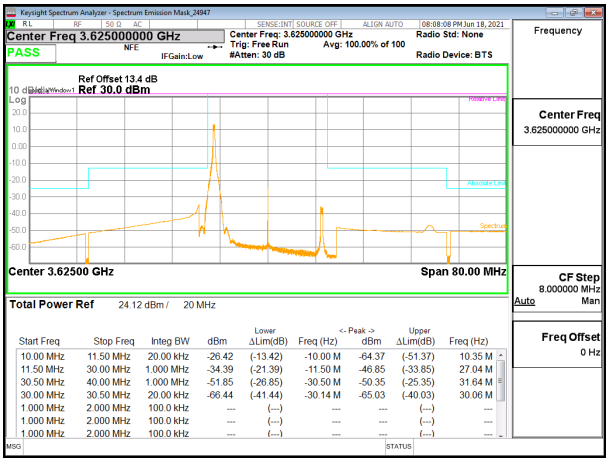

5G NR n48 20MHz BPSK Low Channel RB1-50



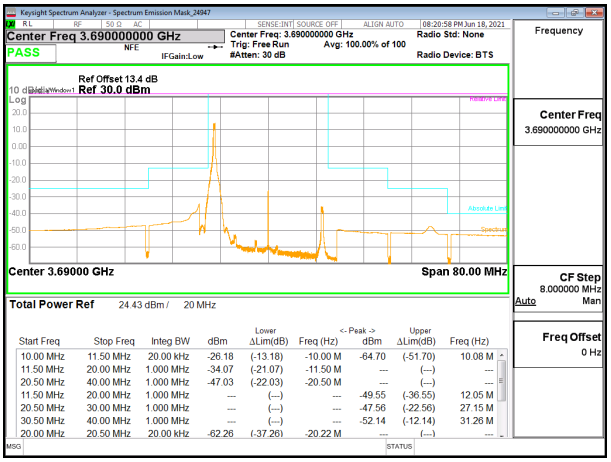

5G NR n48 10MHz BPSK High Channel RB24-0



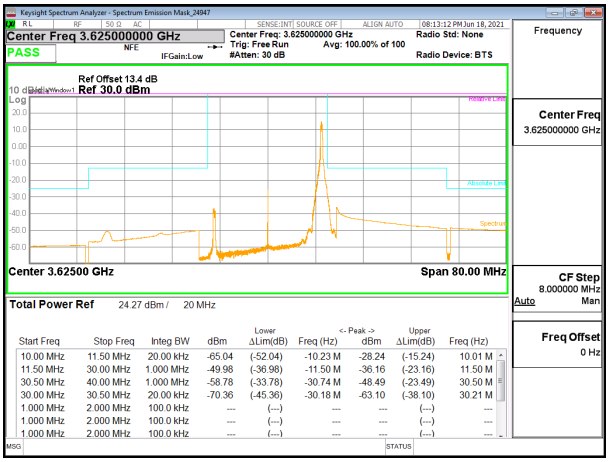

5G NR n48 20MHz BPSK Low Channel RB50-0, ID:24947



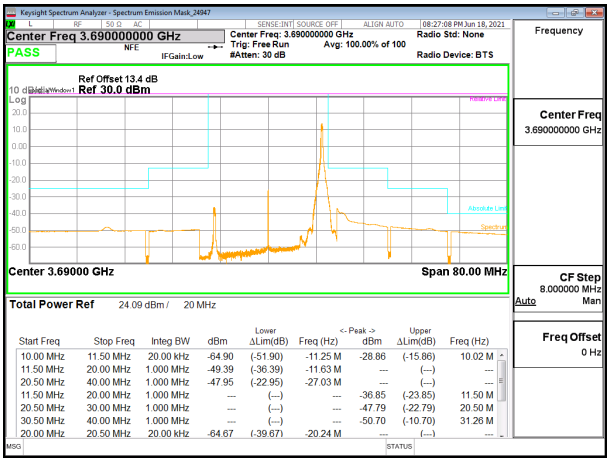

5G NR n48 20MHz BPSK Middle Channel RB1-0



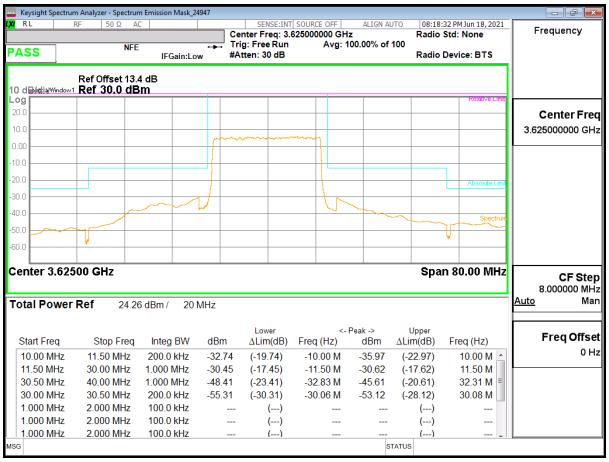

5G NR n48 20MHz BPSK High Channel RB1-0



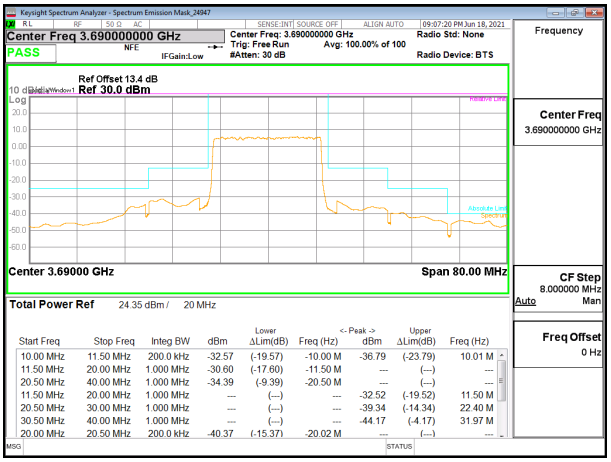

5G NR n48 20MHz BPSK Middle Channel RB1-50



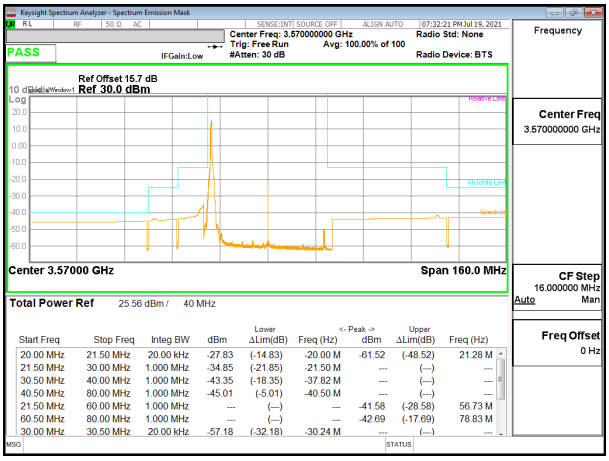

5G NR n48 20MHz BPSK High Channel RB1-50



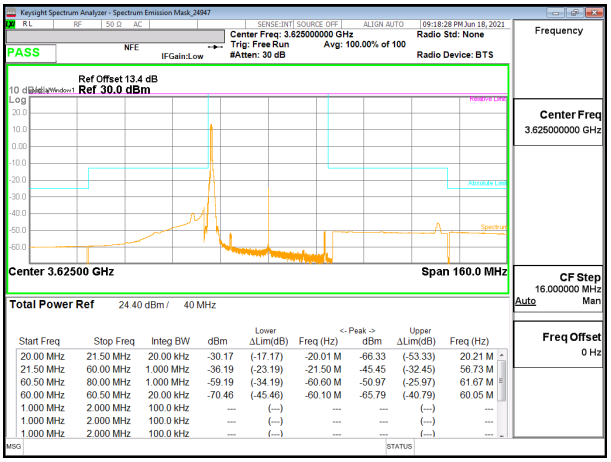

5G NR n48 20MHz BPSK Middle Channel RB50-0



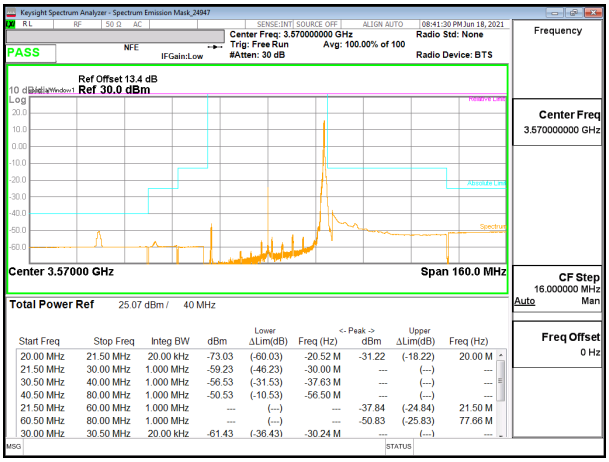

5G NR n48 20MHz BPSK High Channel RB50-0



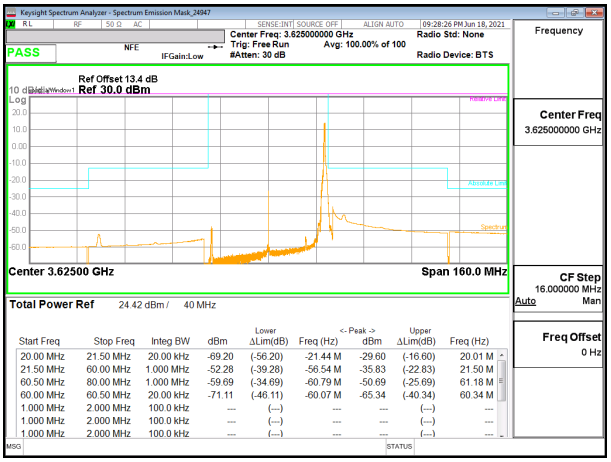

5G NR n48 40MHz BPSK Low Channel RB1-0, ID:24947



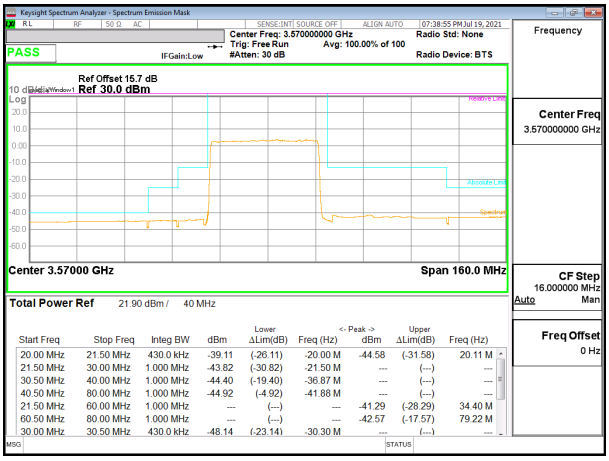

5G NR n48 40MHz BPSK Middle Channel RB1-0



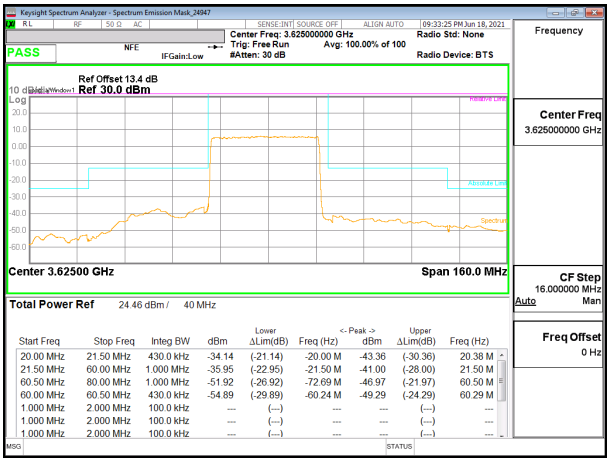

5G NR n48 40MHz BPSK Low Channel RB1-105



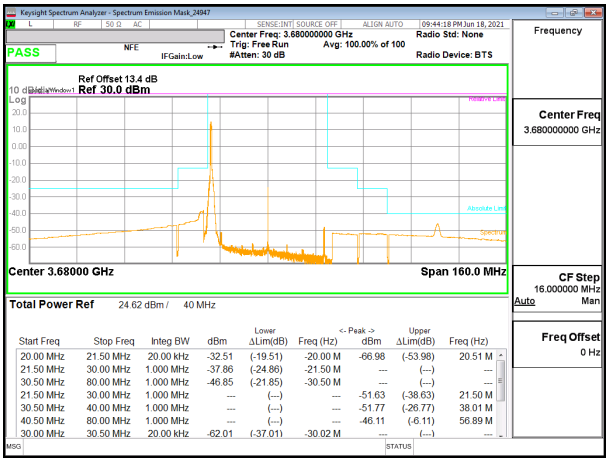

5G NR n48 40MHz BPSK Middle Channel RB1-105



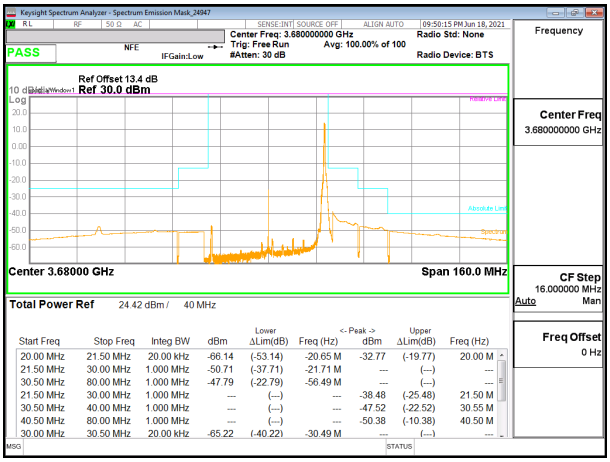

5G NR n48 40MHz BPSK Low Channel RB100-0, ID:24947



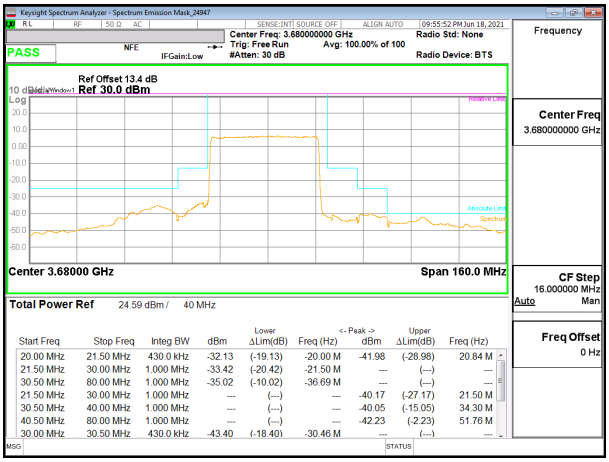

5G NR n48 40MHz BPSK Middle Channel RB100-0




5G NR n48 40MHz BPSK High Channel RB1-0



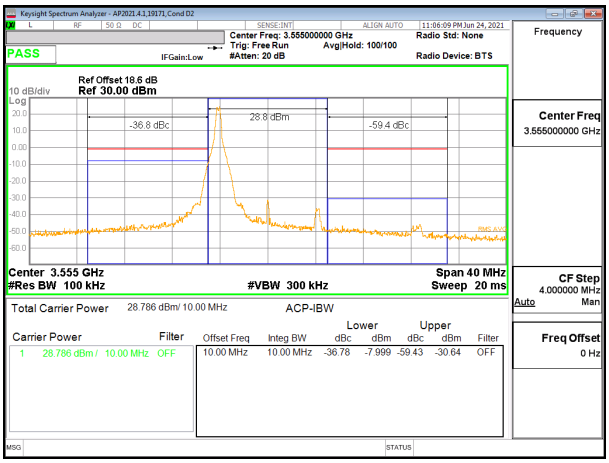

5G NR n48 40MHz BPSK High Channel RB1-105



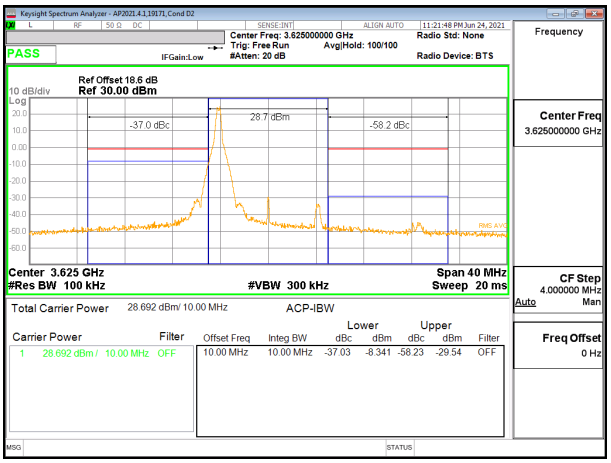

5G NR n48 40MHz BPSK High Channel RB100-0

Intentionally Blank

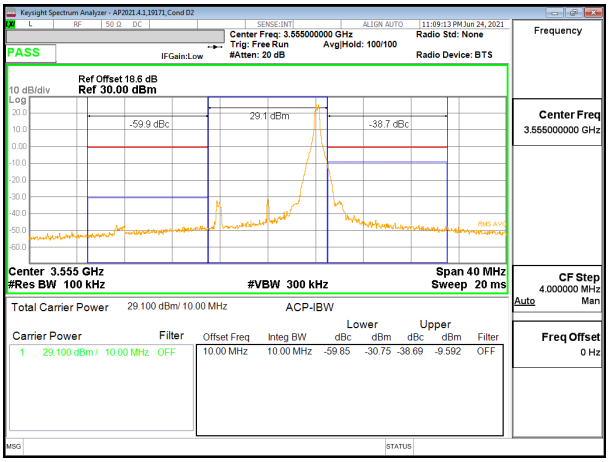
## 5G NR n48 ADJACENT CHANNEL POWER



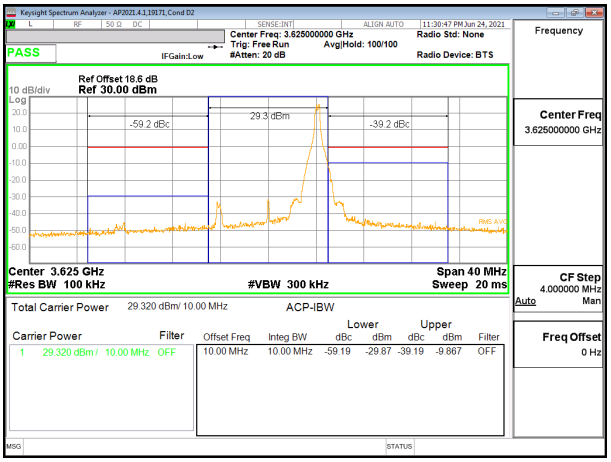

5G NR n48 10MHz BPSK Low Channel RB1-0



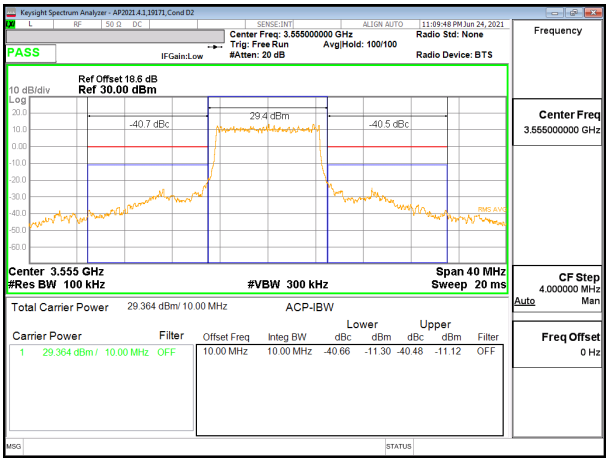

5G NR n48 10MHz BPSK Middle Channel RB1-0



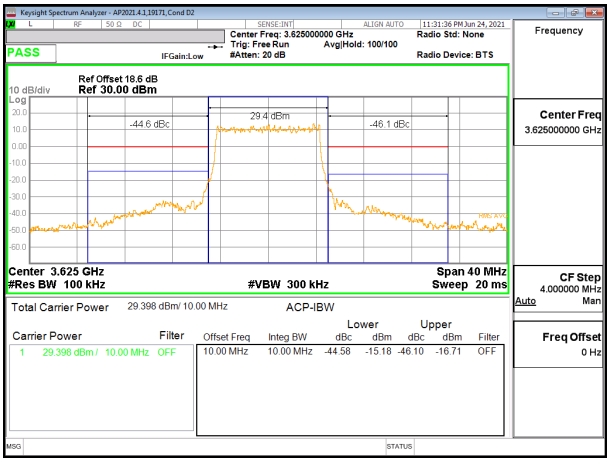

5G NR n48 10MHz BPSK Low Channel RB1-23



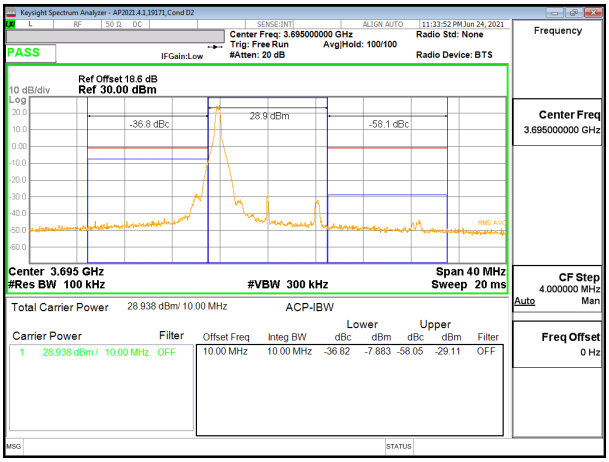

5G NR n48 10MHz BPSK Middle Channel RB1-23



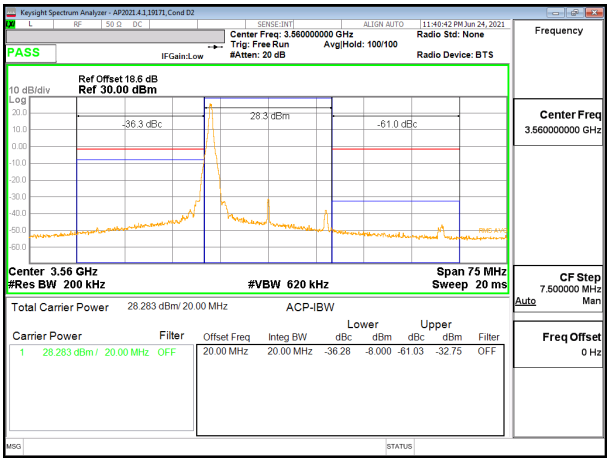

5G NR n48 10MHz BPSK Low Channel RB24-0



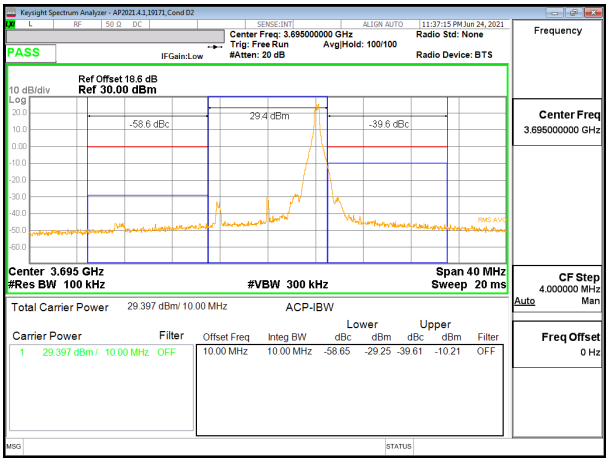

5G NR n48 10MHz BPSK Middle Channel RB24-0



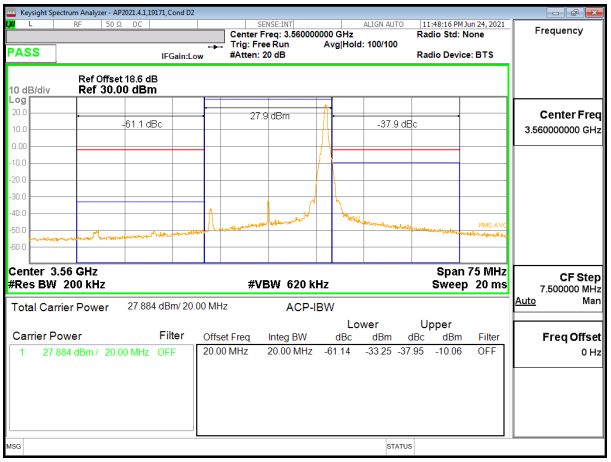

5G NR n48 10MHz BPSK High Channel RB1-0



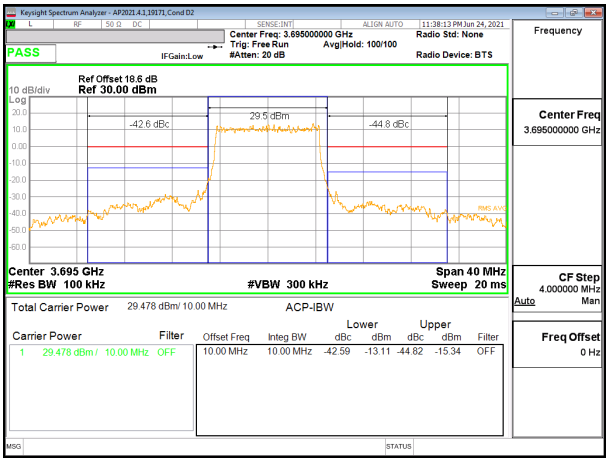

5G NR n48 20MHz BPSK Low Channel RB1-0



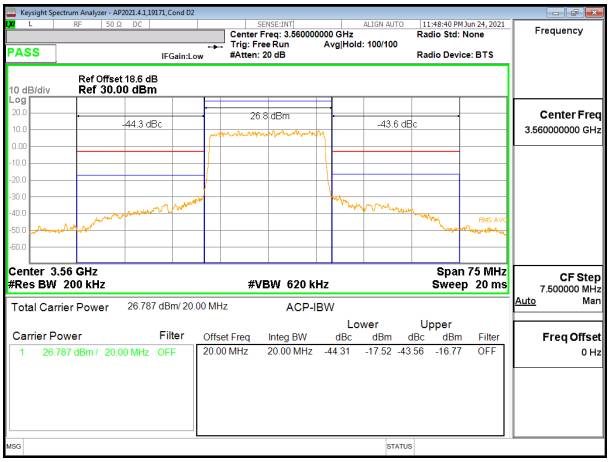

5G NR n48 10MHz BPSK High Channel RB1-23



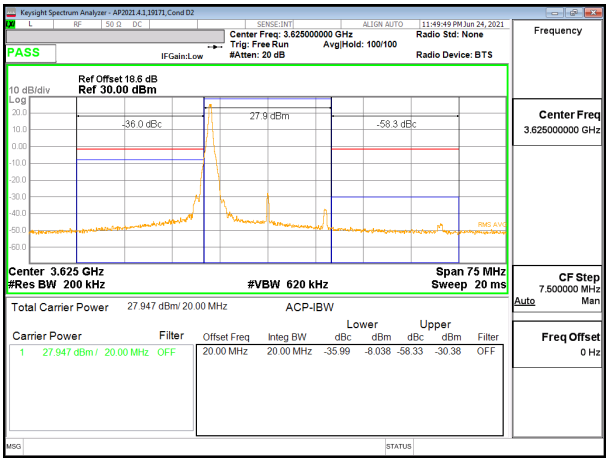

5G NR n48 20MHz BPSK Low Channel RB1-50



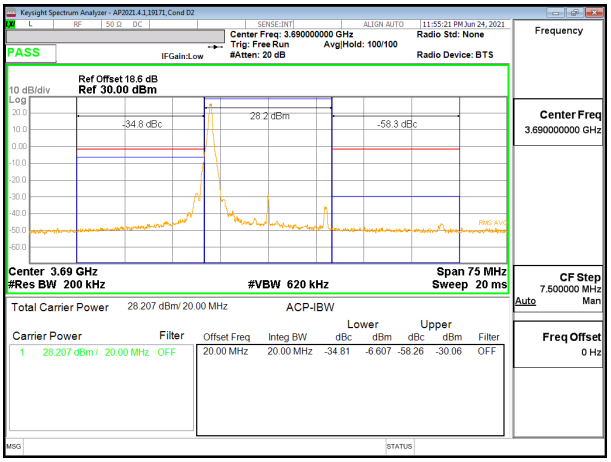

5G NR n48 10MHz BPSK High Channel RB24-0



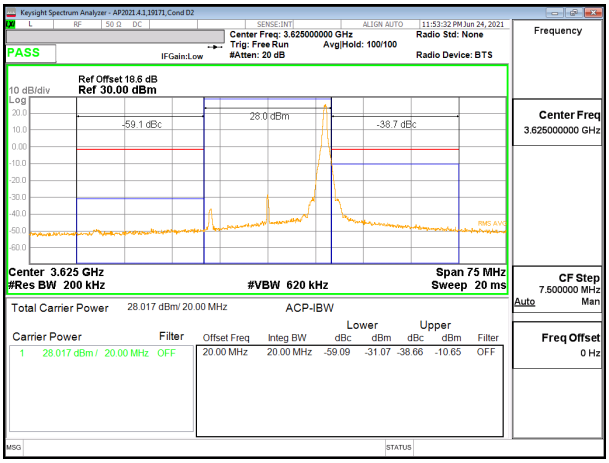

5G NR n48 20MHz BPSK Low Channel RB50-0



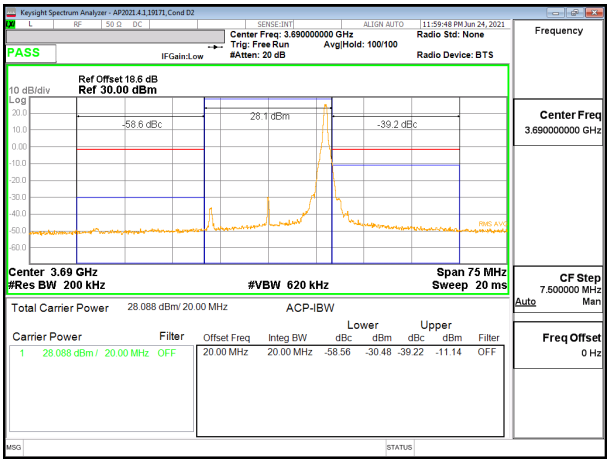

5G NR n48 20MHz BPSK Middle Channel RB1-0



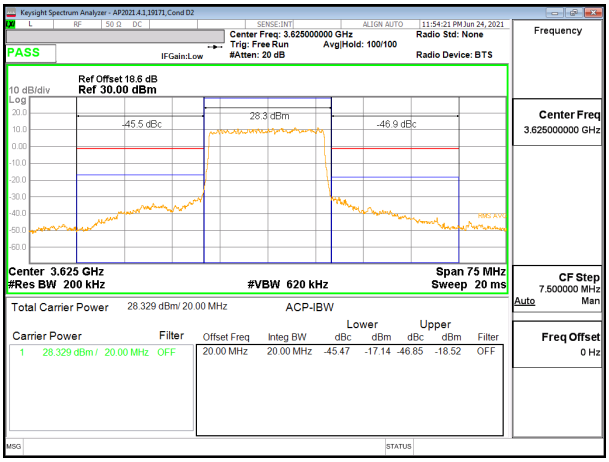

5G NR n48 20MHz BPSK High Channel RB1-0



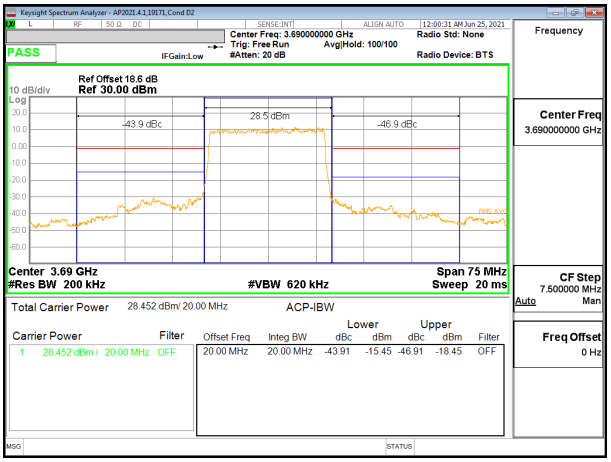

5G NR n48 20MHz BPSK Middle Channel RB1-50



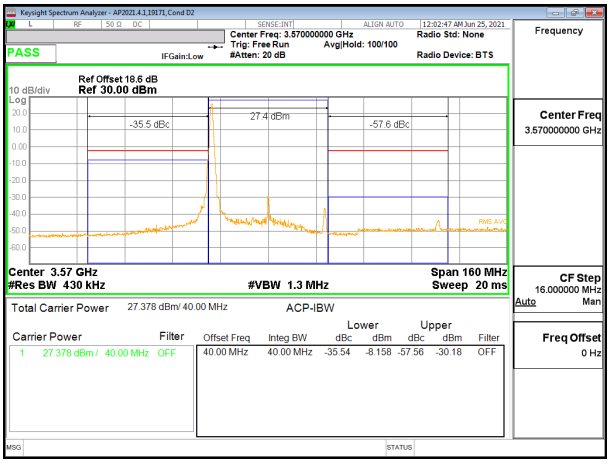

5G NR n48 20MHz BPSK High Channel RB1-50



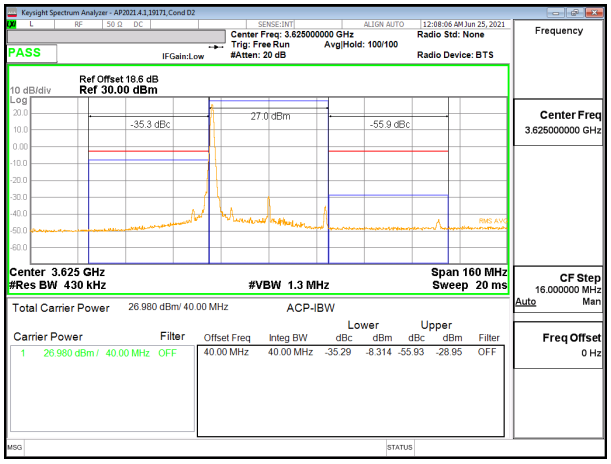

5G NR n48 20MHz BPSK Middle Channel RB50-0



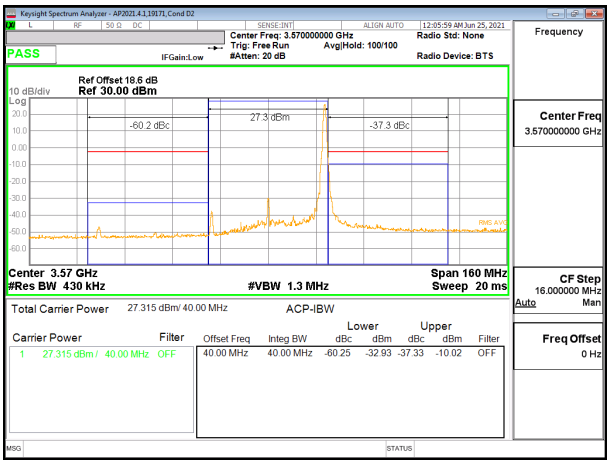

5G NR n48 20MHz BPSK High Channel RB50-0



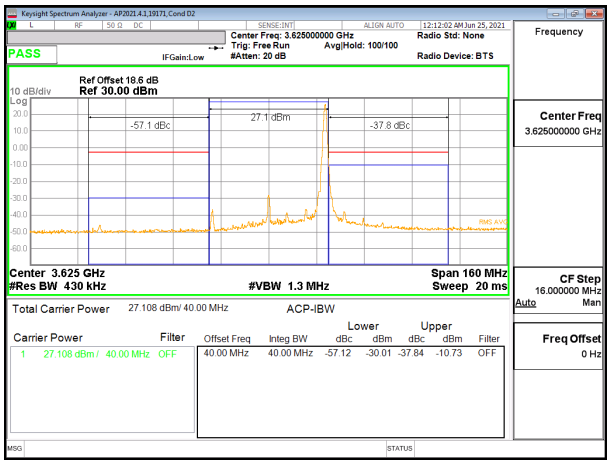

5G NR n48 40MHz BPSK Low Channel RB1-0



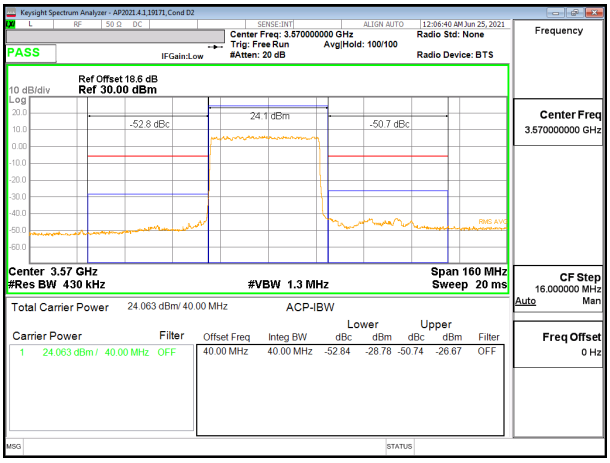

5G NR n48 40MHz BPSK Middle Channel RB1-0



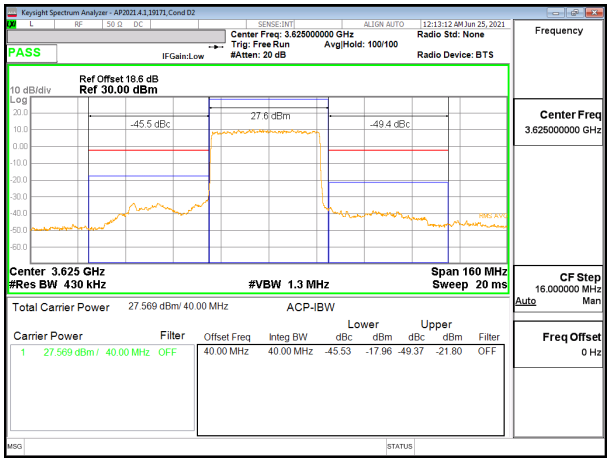

5G NR n48 40MHz BPSK Low Channel RB1-105



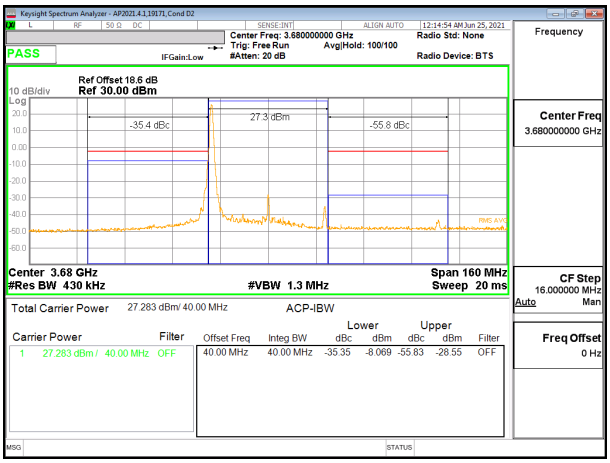

5G NR n48 40MHz BPSK Middle Channel RB1-105



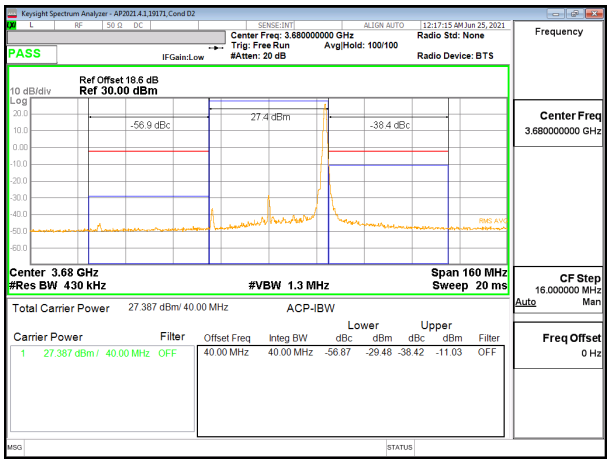

5G NR n48 40MHz BPSK Low Channel RB100-0



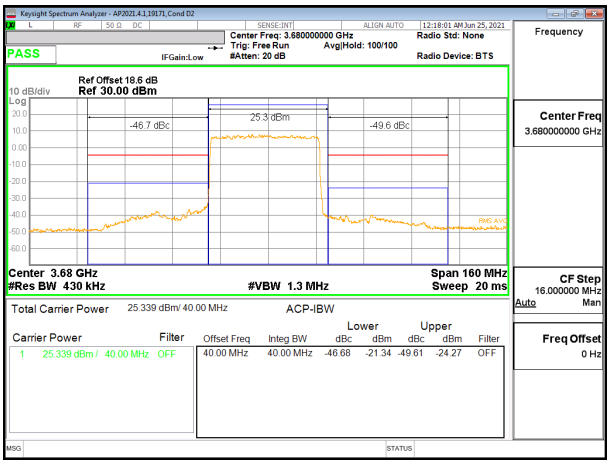

5G NR n48 40MHz BPSK Middle Channel RB100-0




5G NR n48 40MHz BPSK High Channel RB1-0




5G NR n48 40MHz BPSK High Channel RB1-105




5G NR n48 40MHz BPSK High Channel RB100-0

Intentionally Blank

## 9.3. OUT OF BAND EMISSIONS

**TEST PROCEDURE**

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

For each out of band emissions measurement:

- Set display line at -40dBm according to the band Limit
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz. (NOTE: Worst case set RBW/VBW to 1MHz/3MHz)

**RESULTS**

## 9.3.1. 5G NR n48

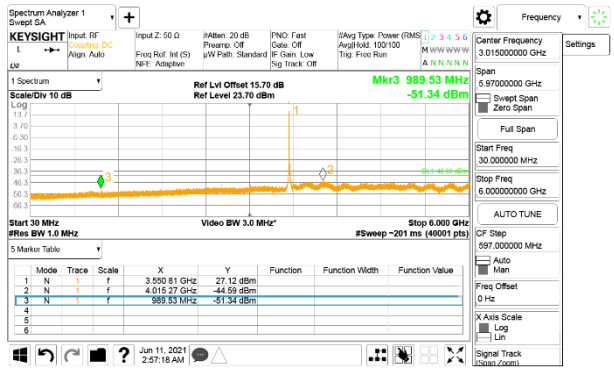
**LIMITS**

FCC: §96.41

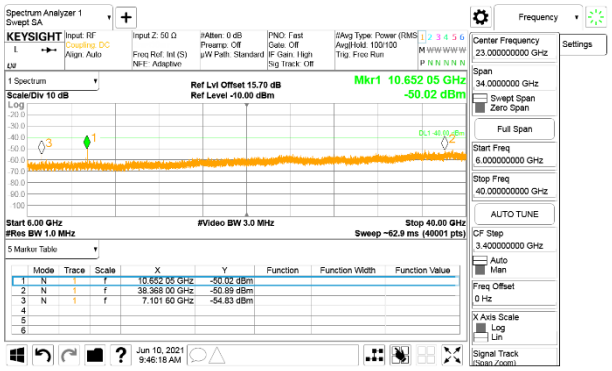
(e) 3.5 GHz Emissions and Interference Limits—

(2) Additional protection levels. Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed −25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz.

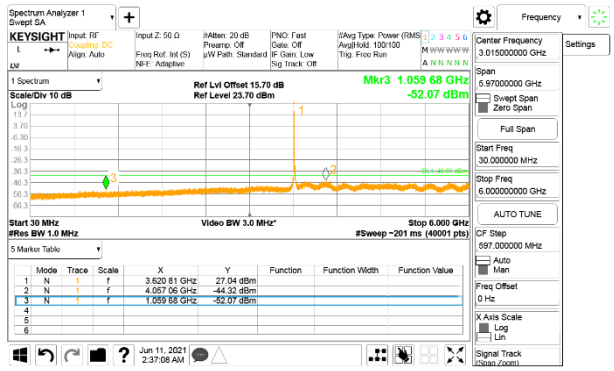
**5G NR n48**



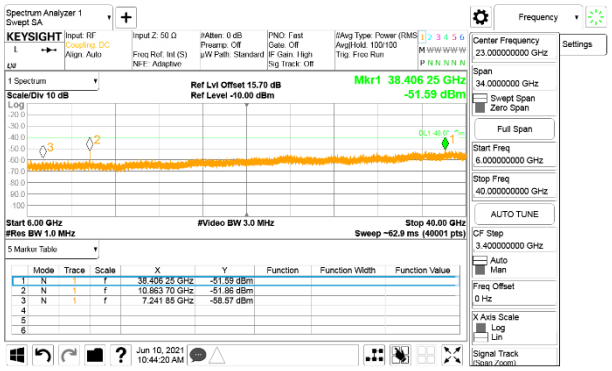

5G NR n48 10MHz BPSK Low Channel RB1-0 (30M to 6G), ID:19171



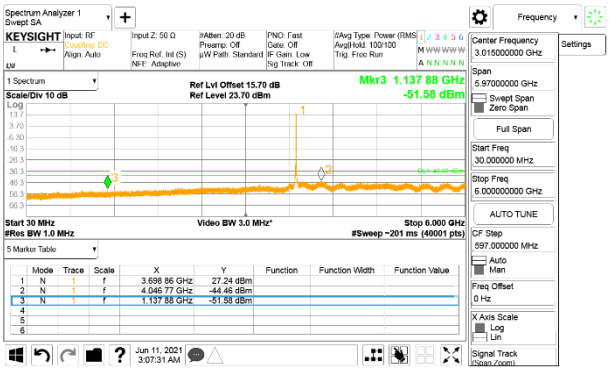

5G NR n48 10MHz BPSK Low Channel RB1-0 (6G to 40G), ID:19171



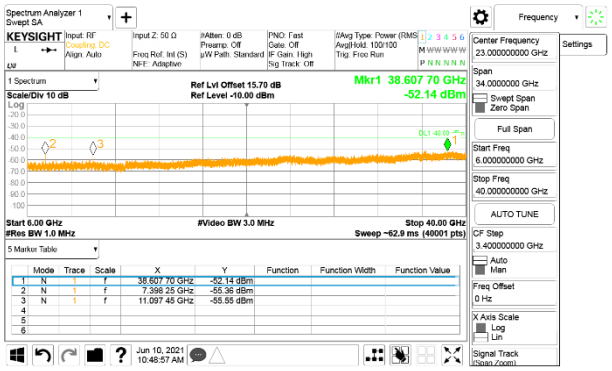

5G NR n48 10MHz BPSK Mid Channel RB1-1 (30M to 6G), ID:19171



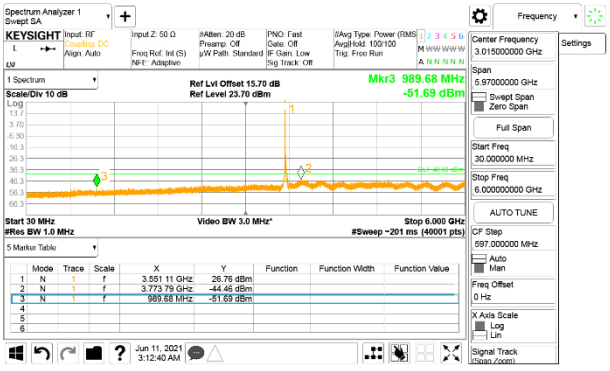

5G NR n48 10MHz BPSK Mid Channel RB1-1 (6GHz to 40G), ID:19171



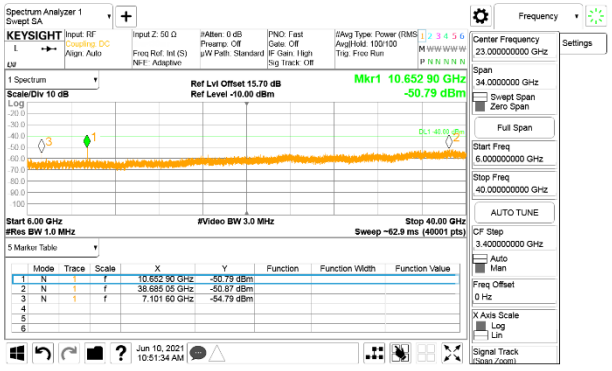

5G NR n48 10MHz BPSK High Channel RB1-23 (30M to 6G), ID:19171



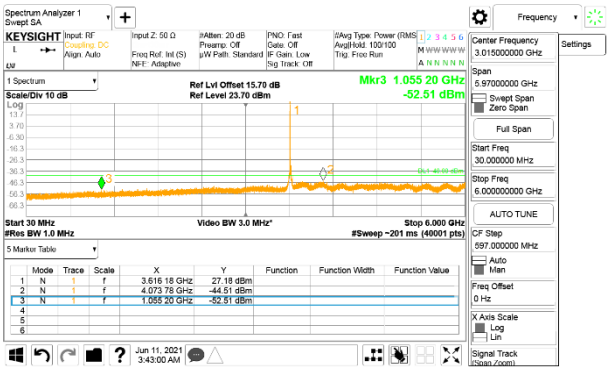

5G NR n48 10MHz BPSK High Channel RB1-23 (6G to 40G), ID:19171



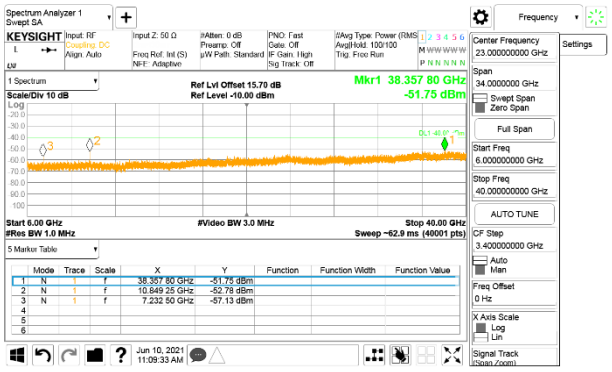

5G NR n48 20MHz BPSK Low Channel RB1-0 (30M to 6G), ID:19171



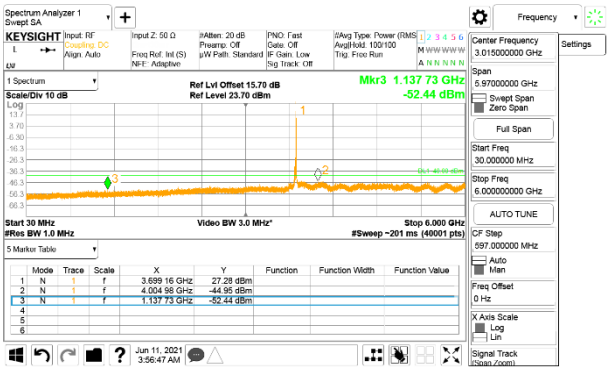

5G NR n48 20MHz BPSK Low Channel RB1-0 (6G to 40G), ID:19171



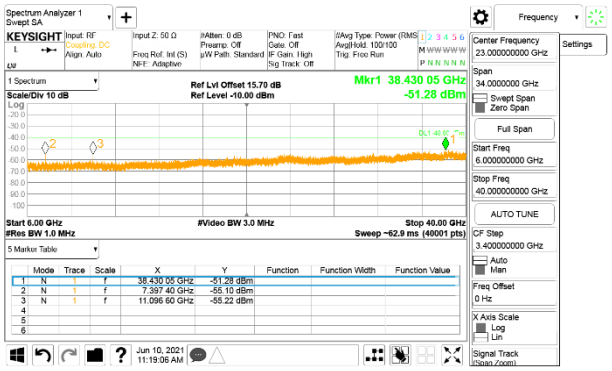

5G NR n48 20MHz BPSK Mid Channel RB1-1 (30M to 6G), ID:19171



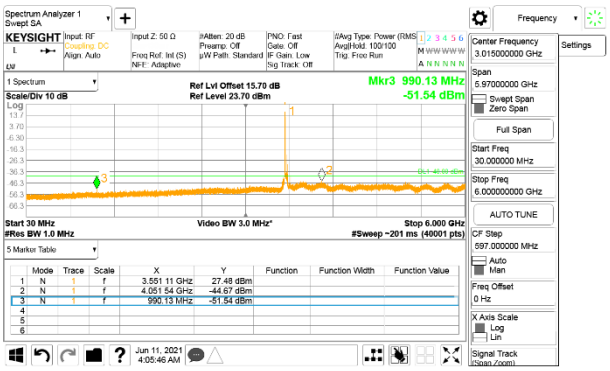

5G NR n48 20MHz BPSK Mid Channel RB1-1 (6G to 40G), ID:19171



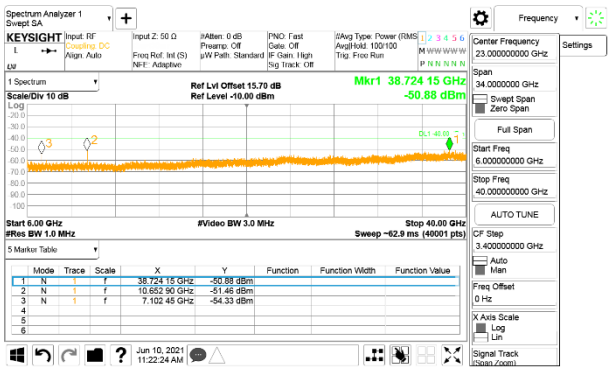

5G NR n48 20MHz BPSK High Channel RB1-50 (30M to 6G), ID:19171



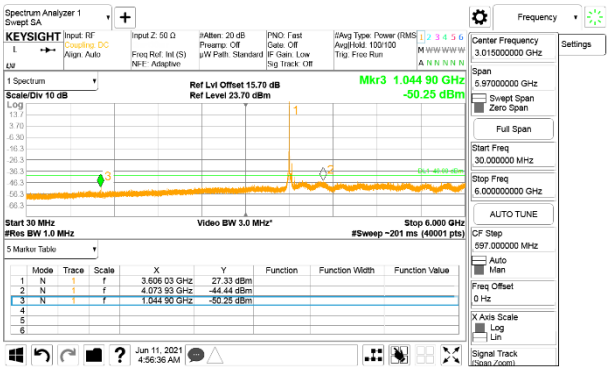

5G NR n48 20MHz BPSK High Channel RB1-50 (6G to 40G), ID:19171



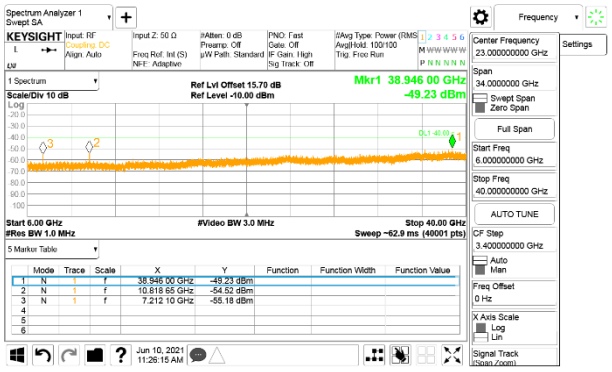

5G NR n48 40MHz BPSK Low Channel RB1-0 (30M to 6G), ID:19171



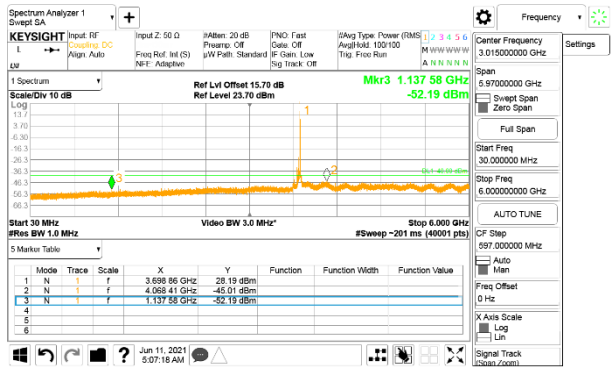

5G NR n48 40MHz BPSK Low Channel RB1-0 (6G to 40G), ID:19171



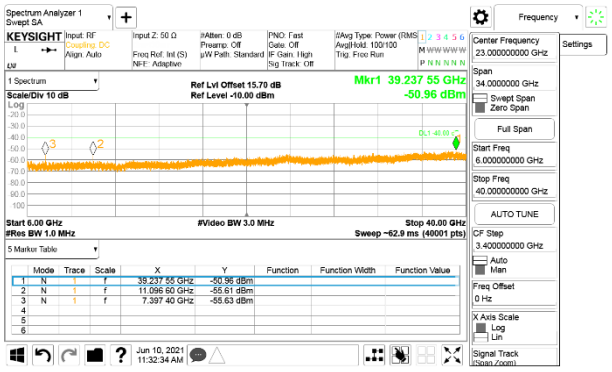

5G NR n48 40MHz BPSK Mid Channel RB1-1 (30M to 6G), ID:19171




5G NR n48 40MHz BPSK Mid Channel RB1-1 (6G to 40G), ID:19171




5G NR n48 40MHz BPSK High Channel RB1-105 (30M to 6G), ID:19171




5G NR n48 40MHz BPSK High Channel RB1-105 (6G to 40G), ID:19171

## 9.4. FREQUENCY STABILITY

**TEST PROCEDURE**

Use CMW 500 with Frequency Error measurement capability.

- Temp. = −30°C to +50°C
- Voltage = (85% - 115%)

  Low voltage, 3.23VDC, Normal, 3.8VDC and High voltage, 4.37VDC.
  End Voltage, 3.2VDC.

**Frequency Stability vs Temperature:**

The EUT is place inside a temperature chamber. The temperature is set to 20ºC and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until +50ºC is reached.

**Frequency Stability vs Voltage:**

The peak frequency error is recorded (worst-case).

**RESULTS**

### 9.4.1. 5G NR n48

| Test Engineer ID: | 39006 | Test Date: | 5/23/2021 |
|---|---|---|---|

**5G NR n48 QPSK (40MHz BANDWIDTH)**

| Limit | | 3550 | 3700 | Delta (Hz) | Frequency Stability (ppm) |
|---|---|---|---|---|---|
| Condition | | F low @ -13dBm | F high @ -13dBm | | |
| Temperature | Voltage | (MHz) | (MHz) | | |
| Normal (20C) | Normal | 3551.0506 | 3696.7981 | | |
| Extreme (50C) | | 3551.0506 | 3696.7980 | -26.4 | -0.007 |
| Extreme (40C) | | 3551.0506 | 3696.7980 | -32.2 | -0.009 |
| Extreme (30C) | | 3551.0506 | 3696.7980 | -22.3 | -0.006 |
| Extreme (10C) | | 3551.0506 | 3696.7980 | -22.6 | -0.006 |
| Extreme (0C) | | 3551.0506 | 3696.7980 | -26.4 | -0.007 |
| Extreme (-10C) | | 3551.0506 | 3696.7980 | -32.0 | -0.009 |
| Extreme (-20C) | | 3551.0506 | 3696.7980 | -27.6 | -0.008 |
| Extreme (-30C) | | 3551.0506 | 3696.7980 | -44.5 | -0.012 |
| | | | | | |
| 20C | 15% | 3551.0506 | 3696.7980 | -28.3 | -0.008 |
| | -15% | 3551.0506 | 3696.7980 | -28.0 | -0.008 |
| | End Point | 3551.0506 | 3696.7980 | -25.9 | -0.007 |

## 9.5. PEAK-TO-AVERAGE POWER RATIO

**LIMIT**

In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

**RESULT**

Antenna 1 was used to measure as the worst case; full resource block (FRB) for each bandwidth was used to measure as the worst case. The results from all CCDF measurements are passed with 13dB peak-to-average power ratio criteria.

### 9.5.1. 5G NR n48

| Test Engineer ID: | 10646 | Test Date: | 3/16/2021 |
|---|---|---|---|

| Band | Bandwidth (MHz) | Frequency (MHz) | RB Allocation | RB OffSet | Modulation | Conducted Power (dBm) | | Peak-to-Average Power Ratio (dB) |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Peak | Average | |
| LTE 5G NR n48 | 10MHz | | 24 | 0 | BPSK | 30.19 | 25.59 | 4.60 |
| | | | | | 16QAM | 30.86 | 24.13 | 6.73 |
| | 20MHz | | 50 | 0 | BPSK | 30.08 | 25.56 | 4.52 |
| | | | | | 16QAM | 30.43 | 23.95 | 6.48 |
| | 40MHz | | 100 | 0 | BPSK | 30.19 | 26.23 | 3.96 |
| | | | | | 16QAM | 30.89 | 24.7 | 6.19 |
| *Duty Cycle Correction Factor (dB) = | | | 0.00 | | | | | |
| Peak-to-Average Power Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor | | | | | | | | |

# 10. RADIATED TEST RESULTS

**Radiated measurement using the Field Strength Method**

Using the test configuration shown in Figure 6 below, We measure the radiated emissions directly from the EUT and convert the measured field strength or received power to ERP or EIRP, as required, for comparison to the applicable limits. As stated in 5.5.1 of ANSI C63.26-2015, the field strength measurement method using a test site validated to the requirements of ANSI C63.4 is an alternative to the substitution measurement method.

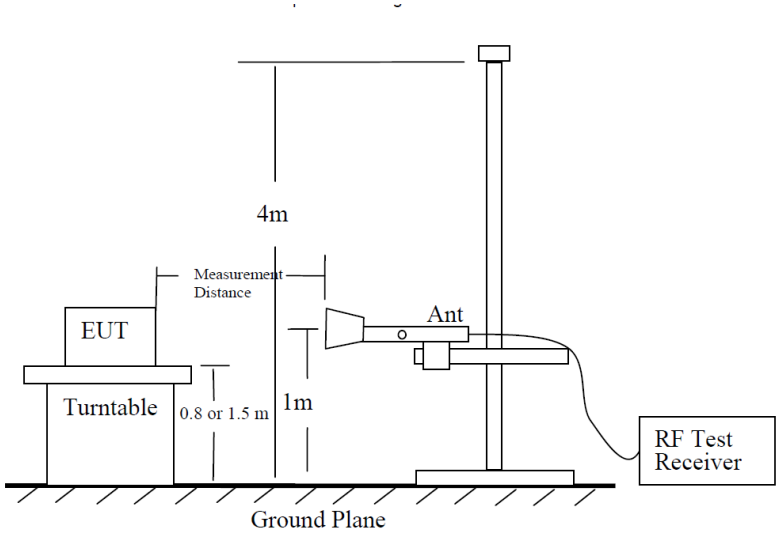



**Figure 6—Test site-up for radiated ERP and/or EIRP measurements**

**Radiated Power Measurement Calculation According to ANSI C63.26-2015**

a) E (dBµV/m) = Measured amplitude level (dBµV) + Cable Loss (dB) + Antenna Factor (dB/m).

b) E (dBµV/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m).

c) E (dBµV/m) = EIRP (dBm) − 20log(D) + 104.8; where D is the measurement distance (in the far field region) in m.

d) EIRP (dBm) = E (dBµV/m) + 20log(D) − 104.8; where D is the measurement distance (in the far field region) in m.

So, from d)

The measuring distance is usually at 3m, then 20*Log(3)=9.5424

Then, EIRP (dBm) = E (dBµV/m) + 9.5424 − 104.8 = E (dBµV/m) – 95.2576

Note that: we do confidence check to our chambers every day to see if any degradation from expected/normal reading reference data. Also we do ambient check to all our chambers every month.

**TEST PROCEDURE**

KDB 971168 D01 v03r01/D02 v02/r01

All tests above 1GHz were done with a Resolution Bandwidth of 1MHz, and a Video Bandwidth of 3MHz.

**LIMITS**

FCC: §96.41

(e) 3.5 GHz Emissions and Interference Limits—
(2) Additional protection levels. Notwithstanding paragraph (d)(1) of this section, the conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz.

**RESULTS**

# 10.1. FIELD STRENGTH OF SPURIOUS RADIATION, ANT 4

**BPSK 5G NR n48 (40.0MHZ BANDWIDTH)**

| | |
|---|---|
| Project #: | 13573777 |
| Date: | 5/3/2021 |
| Test Engineer: | 45258 |
| Configuration: | EUT only |
| Mode | n48 BPSK 40MHz |
| Chamber #: | Chamber B |

| Frequency (GHz) | Meter Reading (dBuV) | Det | AF T348 (dB/m) | Amp/Cbl (dB) | T1792 3400-3800MHz BRF | EIRP CF | Corrected Reading (dBm) | Harmonics limit | Margin (dB) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|
| **Low Channel, 3600MHz** | | | | | | | | | | |
| 7.10184 | 24 | RMS | 36.7 | -21.2 | .5 | -95.2 | -55.2 | -40 | -15.2 | V |
| 7.10203 | 24.25 | RMS | 36.7 | -21.2 | .5 | -95.2 | -54.95 | -40 | -14.95 | H |
| 10.71068 | 22.07 | RMS | 39.3 | -17.4 | .5 | -95.2 | -50.73 | -40 | -10.73 | V |
| 10.71084 | 21.22 | RMS | 39.3 | -17.4 | .5 | -95.2 | -51.58 | -40 | -11.58 | H |
| 14.28081 | 21.8 | RMS | 41.2 | -18.4 | .7 | -95.2 | -49.9 | -40 | -9.9 | V |
| 14.28083 | 21.97 | RMS | 41.2 | -18.4 | **.7** | -95.2 | -49.73 | -40 | -9.73 | H |
| **Mid Channel, 3625MHz** | | | | | | | | | | |
| 7.24934 | 22.83 | RMS | 37.2 | -21.4 | .6 | -95.2 | -55.97 | -40 | -15.97 | V |
| 7.24957 | 24 | RMS | 37.2 | -21.4 | .6 | -95.2 | -54.8 | -40 | -14.8 | H |
| 10.87583 | 21.67 | RMS | 39.3 | -17 | .5 | -95.2 | -50.73 | -40 | -10.73 | V |
| 10.87597 | 22 | RMS | 39.3 | -17 | .5 | -95.2 | -50.4 | -40 | -10.4 | H |
| 14.5005 | 22.35 | RMS | 41.4 | -18.9 | .8 | -95.2 | -49.55 | -40 | -9.55 | H |
| 14.50072 | 22.9 | RMS | 41.4 | -18.9 | .8 | -95.2 | -49 | -40 | -9 | V |
| **High Channel, 3650MHz** | | | | | | | | | | |
| 14.71946 | 21.26 | RMS | 42 | -18.9 | .9 | -95.2 | -49.94 | -40 | -9.94 | H |
| 7.35871 | 22.5 | RMS | 36.9 | -21.2 | .7 | -95.2 | -56.3 | -40 | -16.3 | H |
| 11.04064 | 21.35 | RMS | 39.4 | -17.2 | .6 | -95.2 | -51.05 | -40 | -11.05 | H |
| 7.36263 | 23.44 | RMS | 37 | -21.3 | .7 | -95.2 | -55.36 | -40 | -15.36 | V |
| 11.04087 | 21.66 | RMS | 39.4 | -17.2 | .6 | -95.2 | -50.74 | -40 | -10.74 | V |
| 14.72014 | 21.69 | RMS | 42 | -18.9 | .9 | -95.2 | -49.51 | -40 | -9.51 | V |

# 10.2. FIELD STRENGTH OF SPURIOUS RADIATION, ANT 7

**BPSK 5G NR n48 (40.0MHZ BANDWIDTH)**

| | |
|---|---|
| Project #: | 13571607 |
| Date: | 5/3/2021 |
| Test Engineer: | 45258 |
| Configuration: | EUT only |
| Mode | n48 BPSK 40MHz |
| Chamber #: | Chamber B |

| Frequency (GHz) | Meter Reading (dBuV) | Det | AF T348 (dB/m) | Amp/Cbl (dB) | T1792 3400-3800MHz BRF | EIRP CF | Corrected Reading (dBm) | Harmonics limit | Margin (dB) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|
| **Low Channel, 3600MHz** | | | | | | | | | | |
| 7.13934 | 22.25 | RMS | 36.9 | -21.3 | .6 | -95.2 | -56.75 | -40 | -16.75 | V |
| 7.13942 | 22.09 | RMS | 36.9 | -21.3 | .6 | -95.2 | -56.91 | -40 | -16.91 | H |
| 10.71035 | 21.25 | RMS | 39.3 | -17.4 | .5 | -95.2 | -51.55 | -40 | -11.55 | H |
| 10.71042 | 20.82 | RMS | 39.3 | -17.4 | .5 | -95.2 | -51.98 | -40 | -11.98 | V |
| 14.28009 | 22.48 | RMS | 41.2 | -18.4 | .7 | -95.2 | -49.22 | -40 | -9.22 | H |
| 14.28023 | 22.03 | RMS | 41.2 | -18.4 | .7 | -95.2 | -49.67 | -40 | -9.67 | V |
| **Mid Channel, 3625MHz** | | | | | | | | | | |
| 7.24777 | 22.55 | RMS | 37.2 | -21.4 | .6 | -95.2 | -56.25 | -40 | -16.25 | H |
| 10.87554 | 21.31 | RMS | 39.3 | -17 | .5 | -95.2 | -51.09 | -40 | -11.09 | H |
| 14.50063 | 22.13 | RMS | 41.4 | -18.9 | .8 | -95.2 | -49.77 | -40 | -9.77 | H |
| 7.24821 | 22.45 | RMS | 37.2 | -21.4 | .6 | -95.2 | -56.35 | -40 | -16.35 | V |
| 10.87566 | 22.11 | RMS | 39.3 | -17 | .5 | -95.2 | -50.29 | -40 | -10.29 | V |
| 14.5004 | 22.08 | RMS | 41.4 | -18.9 | .8 | -95.2 | -49.82 | -40 | -9.82 | V |
| **High Channel, 3650MHz** | | | | | | | | | | |
| 14.71946 | 21.26 | RMS | 42 | -18.9 | .9 | -95.2 | -49.94 | -40 | -9.94 | H |
| 7.35871 | 22.5 | RMS | 36.9 | -21.2 | .7 | -95.2 | -56.3 | -40 | -16.3 | H |
| 11.04064 | 21.35 | RMS | 39.4 | -17.2 | .6 | -95.2 | -51.05 | -40 | -11.05 | H |
| 7.36263 | 23.44 | RMS | 37 | -21.3 | .7 | -95.2 | -55.36 | -40 | -15.36 | V |
| 11.04087 | 21.66 | RMS | 39.4 | -17.2 | .6 | -95.2 | -50.74 | -40 | -10.74 | V |
| 14.72014 | 21.69 | RMS | 42 | -18.9 | .9 | -95.2 | -49.51 | -40 | -9.51 | V |

# 10.3. FIELD STRENGTH OF SPURIOUS RADIATION, ANT 8

**BPSK 5G NR n48 (40.0MHZ BANDWIDTH)**

| | |
|---|---|
| Project #: | 13571607 |
| Date: | 5/3/2021 |
| Test Engineer: | 45258 |
| Configuration: | EUT only |
| Mode | n48 BPSK 40MHz |
| Chamber #: | Chamber B |

| Frequency (GHz) | Meter Reading (dBuV) | Det | AF T348 (dB/m) | Amp/Cbl (dB) | T1792 3400-3800MHz BRF | EIRP CF | Corrected Reading (dBm) | Harmonics limit | Margin (dB) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|
| **Low Channel, 3600MHz** | | | | | | | | | | |
| 7.14031 | 22.56 | RMS | 36.9 | -21.3 | .6 | -95.2 | -56.44 | -40 | -16.44 | V |
| 7.14038 | 21.78 | RMS | 36.9 | -21.3 | .6 | -95.2 | -57.22 | -40 | -17.22 | H |
| 10.71037 | 21.25 | RMS | 39.3 | -17.4 | .5 | -95.2 | -51.55 | -40 | -11.55 | V |
| 10.71045 | 21.45 | RMS | 39.3 | -17.4 | .5 | -95.2 | -51.35 | -40 | -11.35 | H |
| 14.28005 | 22.1 | RMS | 41.2 | -18.4 | .7 | -95.2 | -49.6 | -40 | -9.6 | H |
| 14.28079 | 21.38 | RMS | 41.2 | -18.4 | .7 | -95.2 | -50.32 | -40 | -10.32 | V |
| **Mid Channel, 3625MHz** | | | | | | | | | | |
| 7.24734 | 23.33 | RMS | 37.2 | -21.4 | .6 | -95.2 | -55.47 | -40 | -15.47 | V |
| 7.24884 | 23.67 | RMS | 37.2 | -21.4 | .6 | -95.2 | -55.13 | -40 | -15.13 | H |
| 10.87504 | 22.77 | RMS | 39.3 | -17 | .5 | -95.2 | -49.63 | -40 | -9.63 | V |
| 10.87518 | 22.07 | RMS | 39.3 | -17 | .5 | -95.2 | -50.33 | -40 | -10.33 | H |
| 14.50044 | 22.74 | RMS | 41.4 | -18.9 | .8 | -95.2 | -49.16 | -40 | -9.16 | H |
| 14.50047 | 22.61 | RMS | 41.4 | -18.9 | .8 | -95.2 | -49.29 | -40 | -9.29 | V |
| **High Channel, 3650MHz** | | | | | | | | | | |
| 11.04046 | 20.76 | RMS | 39.4 | -17.2 | .6 | -95.2 | -51.64 | -40 | -11.64 | H |
| 14.72057 | 21.67 | RMS | 42 | -18.8 | .9 | -95.2 | -49.43 | -40 | -9.43 | H |
| 7.36308 | 23.45 | RMS | 37 | -21.3 | .7 | -95.2 | -55.35 | -40 | -15.35 | V |
| 11.04015 | 20.5 | RMS | 39.4 | -17.2 | .6 | -95.2 | -51.9 | -40 | -11.9 | V |
| 14.72037 | 21.9 | RMS | 42 | -18.9 | .9 | -95.2 | -49.3 | -40 | -9.3 | V |
| 7.3623 | 22.39 | RMS | 37 | -21.3 | .7 | -95.2 | -56.41 | -40 | -16.41 | H |

# 10.4. FIELD STRENGTH OF SPURIOUS RADIATION, ANT 9

**BPSK 5G NR n48 (40.0MHZ BANDWIDTH)**

| | |
|---|---|
| Project #: | 13571607 |
| Date: | 5/3/2021 |
| Test Engineer: | 45258 |
| Configuration: | EUT only |
| Mode | n48 BPSK 40MHz |
| Chamber #: | Chamber B |

| Frequency (GHz) | Meter Reading (dBuV) | Det | AF T348 (dB/m) | Amp/Cbl (dB) | T1792 3400-3800MHz BRF | EIRP CF | Corrected Reading (dBm) | Harmonics limit | Margin (dB) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|
| **Low Channel, 3600MHz** | | | | | | | | | | |
| 7.14052 | 22.34 | RMS | 36.9 | -21.3 | .6 | -95.2 | -56.66 | -40 | -16.66 | V |
| 7.14228 | 23.06 | RMS | 36.9 | -21.2 | .6 | -95.2 | -55.84 | -40 | -15.84 | H |
| 10.71014 | 22.11 | RMS | 39.3 | -17.4 | .5 | -95.2 | -50.69 | -40 | -10.69 | H |
| 10.71028 | 21.43 | RMS | 39.3 | -17.4 | .5 | -95.2 | -51.37 | -40 | -11.37 | V |
| 14.28008 | 22.55 | RMS | 41.2 | -18.4 | .7 | -95.2 | -49.15 | -40 | -9.15 | V |
| 14.28026 | 22.37 | RMS | 41.2 | -18.4 | .7 | -95.2 | -49.33 | -40 | -9.33 | H |
| **Mid Channel, 3625MHz** | | | | | | | | | | |
| 7.24839 | 22.86 | RMS | 37.2 | -21.4 | .6 | -95.2 | -55.94 | -40 | -15.94 | H |
| 7.25094 | 22.67 | RMS | 37.2 | -21.4 | .6 | -95.2 | -56.13 | -40 | -16.13 | V |
| 10.87402 | 21.22 | RMS | 39.3 | -17 | .5 | -95.2 | -51.18 | -40 | -11.18 | V |
| 10.87412 | 21.12 | RMS | 39.3 | -17 | .5 | -95.2 | -51.28 | -40 | -11.28 | H |
| 14.50008 | 22.29 | RMS | 41.4 | -18.9 | .8 | -95.2 | -49.61 | -40 | -9.61 | V |
| 14.5002 | 21.61 | RMS | 41.4 | -18.9 | .8 | -95.2 | -50.29 | -40 | -10.29 | H |
| **High Channel, 3650MHz** | | | | | | | | | | |
| 7.35928 | 23.84 | RMS | 37 | -21.2 | .7 | -95.2 | -54.86 | -40 | -14.86 | H |
| 7.3615 | 23.39 | RMS | 37 | -21.3 | .7 | -95.2 | -55.41 | -40 | -15.41 | V |
| 11.03975 | 20.51 | RMS | 39.4 | -17.2 | .6 | -95.2 | -51.89 | -40 | -11.89 | H |
| 11.04006 | 21.12 | RMS | 39.4 | -17.2 | .6 | -95.2 | -51.28 | -40 | -11.28 | V |
| 14.72077 | 21.62 | RMS | 42 | -18.8 | .9 | -95.2 | -49.48 | -40 | -9.48 | V |
| 14.72106 | 21.83 | RMS | 42 | -18.8 | .9 | -95.2 | -49.27 | -40 | -9.27 | H |

# 11. SETUP PHOTOS

Please refer to 14790372-EP3V1 FCC Setup Photo for setup photos

# END OF REPORT