



## MEASUREMENT REPORT

### Part 96 LTE

**Applicant Name:**

Samsung Electronics Co., Ltd.

129, Samsung-ro,

Yeongtong-gu, Suwon-si

Gyeonggi-do, 16677, Korea

**Date of Testing:**

7/1/2019-7/29/2019

**Test Site/Location:**

PCTEST Lab. Columbia, MD

**Test Report Serial No.:**

1M1907220128-01.

**FCC ID:**

**A3LMT6402-48A**

**APPLICANT:**

**Samsung Electronics Co., Ltd.**

**Application Type:**

Certification

**Model:**

MT6402-48A

**EUT Type:**

Massive MIMO CBSD

**FCC Classification:**

Citizens Band Category B Devices (CBD)

**FCC Rule Part(s):**

96

**Test Procedure(s):**

ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01,  
KDB 940660 D01 v01, KDB 662911 D01 v02r01

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947. Test results reported herein relate only to the item(s) tested.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.



Randy Ortanez  
President

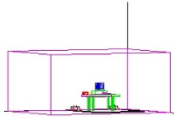


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| <b>FCC ID:</b> A3LMT6402-48A                |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> |  | <b>Approved by:</b><br>Quality Manager |
| <b>Test Report S/N:</b><br>1M1907220128-01. | <b>Test Dates:</b><br>7/1/2019-7/29/2019                                                                                          | <b>EUT Type:</b><br>Massive MIMO CBSD                                                 | Page 1 of 172                          |

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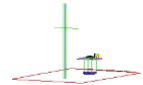
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## MEASUREMENT REPORT

### FCC Part 96



| Mode         | FCC Rule Part | Tx Frequency (MHz) | Total Power    |                  | Emission Designator | Modulation |
|--------------|---------------|--------------------|----------------|------------------|---------------------|------------|
|              |               |                    | Max. Power (W) | Max. Power (dBm) |                     |            |
| 16-User Beam | 96            | 3560 - 3690        | 26.730         | 44.27            | 8M98G7D             | QPSK       |
| Mode 10MHz   | 96            | 3560 - 3690        | 24.831         | 43.95            | 8M95W7D             | 16QAM      |
| Total        | 96            | 3560 - 3690        | 26.607         | 44.25            | 9M45W7D             | 64QAM      |
| Bandwidth    | 96            | 3560 - 3690        | 20.749         | 43.17            | 9M43W7D             | 256QAM     |
| 16-User Beam | 96            | 3560 - 3690        | 50.350         | 47.02            | 17M9G7D             | QPSK       |
| Mode 20MHz   | 96            | 3560 - 3690        | 49.545         | 46.95            | 17M9W7D             | 16QAM      |
| Total        | 96            | 3560 - 3690        | 52.481         | 47.20            | 17M9W7D             | 64QAM      |
| Bandwidth    | 96            | 3560 - 3690        | 50.933         | 47.07            | 17M9W7D             | 256QAM     |
| 16-User Beam | 96            | 3560 - 3690        | 76.560         | 48.84            | 28M8G7D             | QPSK       |
| Mode 30MHz   | 96            | 3560 - 3690        | 78.705         | 48.96            | 28M7W7D             | 16QAM      |
| Total        | 96            | 3560 - 3690        | 74.473         | 48.72            | 28M8W7D             | 64QAM      |
| Bandwidth    | 96            | 3560 - 3690        | 83.368         | 49.21            | 28M8W7D             | 256QAM     |
| 16-User Beam | 96            | 3560 - 3690        | 110.408        | 50.43            | 37M7G7D             | QPSK       |
| Mode 40MHz   | 96            | 3560 - 3690        | 111.173        | 50.46            | 37M7W7D             | 16QAM      |
| Total        | 96            | 3560 - 3690        | 111.173        | 50.46            | 37M7W7D             | 64QAM      |
| Bandwidth    | 96            | 3560 - 3690        | 111.173        | 50.46            | 37M7W7D             | 256QAM     |
| 16-User Beam | 96            | 3560 - 3690        | 123.880        | 50.93            | 48M2G7D             | QPSK       |
| Mode 50MHz   | 96            | 3560 - 3690        | 129.718        | 51.13            | 48M1W7D             | 16QAM      |
| Total        | 96            | 3560 - 3690        | 131.522        | 51.19            | 48M2W7D             | 64QAM      |
| Bandwidth    | 96            | 3560 - 3690        | 119.674        | 50.78            | 48M1W7D             | 256QAM     |
| 16-User Beam | 96            | 3560 - 3690        | 160.694        | 52.06            | 57M5G7D             | QPSK       |
| Mode 60MHz   | 96            | 3560 - 3690        | 161.436        | 52.08            | 57M5W7D             | 16QAM      |
| Total        | 96            | 3560 - 3690        | 160.694        | 52.06            | 57M5W7D             | 64QAM      |
| Bandwidth    | 96            | 3560 - 3690        | 138.038        | 51.40            | 57M5W7D             | 256QAM     |

#### EUT Overview (B48 LTE)

#### Notes:

EIRP levels shown in the table above are over the entire channel, they will appear on the Grant of Authorization.

|                                      |                                                                                     |                                       |                                                                                       |                                 |
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## 1.0 INTRODUCTION

### 1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission.

### 1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014.

### 1.3 Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21046, U.S.A.

- PCTEST is a CBRS Alliance (OnGo) Approved Test Lab
- PCTEST is a WinnForum Approved Test Lab
- PCTEST is an ISO 17025-2005 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for CBRS Alliance Certification Test Plan and WinnForum Conformance and Performance Test Technical Standard.
- PCTEST is an ISO 17025-2005 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISSED Standards (RSS).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISSED.

|                                      |                                                                                     |                                       |                                                                                       |                                 |
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## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Massive MIMO CBSD FCC ID: A3LMT6402-48A**. The test data contained in this report pertains only to the emissions due to the EUT's LTE Band 48 operation in the CBRS band. Per FCC Part 96, this device is evaluated under Citizens Band Category B Devices (CBD).

The EUT is a 64-port device which supports single, two, and three carrier configurations (1CC, 2CC, and 3CC). Each carrier operates using 10 or 20MHz bandwidth. It supports the following modulation schemes: QPSK, 16-QAM, 64-QAM and 256-QAM.

The EUT can operate with up to a maximum of 16 beams in the following modes:

1. User-Beam Operation:
  - a) 16-User Beam Mode :  
In this mode, all ports transmit at maximum power to form sixteen beams.
  - b) Single User Beam (UE0) Mode:  
All ports form one single user beam, and transmit power varies per port.
2. Common Beam Operation:  
This mode uses weighted beam forming technique. The transmit power per port is governed by a weighting factor.

**Test Device Serial No.:** S1904180020

### 2.2 Device Capabilities

This device contains the following capabilities: LTE B48

### 2.3 Test Configuration

The setup is as follows:

- a) The EUT ("MMU") and a Data Unit (DU) are each powered by 48V DC power supply.
- b) The DU is connected to a test laptop via an ethernet cable acting as backhaul.
- c) DU connects to the EUT through a fiber optic cable.
- d) An RF cable connects the signal analyzer and the EUT Ports for respective measurement.

The EUT was tested per the guidance of ANSI/TIA-603-E-2016 and KDB 971168 D01 v03r01. See Section 7.0 of this test report for a description of the antenna port conducted emissions tests.

### 2.4 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and no modifications were made during testing.

|                                             |                                                                                     |                                               |                                                                                       |                                        |
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## 3.0 DESCRIPTION OF TESTS

### 3.1 Measurement Procedures

The following measurements were performed with the guidance described:

#### EIRP:

KDB 971168 D01 v03r01 – Section 5.2.2

KDB 662911 D01 v02r01 – Section E)1) In-Band Power Measurements

#### Power Spectral Density:

KDB 971168 D01 v03r01 – Section 5.3

KDB 662911 D01 v02r01 – Section E)2) In-Band Power Spectral Density (PSD) Measurements

b) Measure and sum spectral maxima across the outputs.

c) Measure and add  $10 \log(N_{ANT})$  dB

#### Conducted Spurious Emissions:

KDB 971168 D01 v03r01 – Section 6

KDB 662911 D01 v02r01 – Section E)3) Out-of-Band and Spurious Emission Measurements

a) Absolute Emission Limits

(iii) Measure and add  $10 \log(N_{ANT})$  dB

#### Peak-to-Average Ratio:

KDB 971168 D01 v03r01- Section 5.7

#### Occupied Bandwidth:

KDB 971168 D01 v03r01 – Section 4.3

#### Frequency Stability:

ANSI/TIA-603-E-2016

|                                      |                                                                                     |                                       |                                                                                       |                                 |
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## 4.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of  $k = 2$  to indicate a 95% level of confidence. The measurement uncertainty shown below meets or exceeds the  $U_{\text{CISPR}}$  measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

| Contribution              | Expanded Uncertainty ( $\pm$ dB) |
|---------------------------|----------------------------------|
| Conducted RF Measurements | 1.13                             |

|                                      |                                                                                     |                                       |                                                                                       |                                 |
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## 5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

| Manufacturer    | Model        | Description                  | Cal Date   | Cal Interval | Cal Due    | Serial Number |
|-----------------|--------------|------------------------------|------------|--------------|------------|---------------|
| Agilent         | N9030A       | PXA Signal Analyzer (44GHz)  | 6/12/2019  | Annual       | 6/12/2020  | MY52350166    |
| Com-Power       | AL-130       | 9kHz - 30MHz Loop Antenna    | 10/10/2017 | Biennial     | 10/10/2019 | 121034        |
| Espec           | ESX-2CA      | Environmental Chamber        | 6/3/2019   | Annual       | 6/13/2020  | 17620         |
| ETS Lindgren    | 3164-08      | Quad Ridge Horn Antenna      | 3/28/2018  | Biennial     | 3/28/2020  | 128337        |
| Mini Circuits   | PWR-SEN-4GHS | USB Power Sensor             | 4/19/2019  | Annual       | 4/19/2020  | 11401010036   |
| Mini-Circuits   | SSG-4000HP   | Synthesized Signal Generator | N/A        |              |            | 11208010032   |
| Mini-Circuits   | PWR-SEN-4RMS | USB Power Sensor             | 4/20/2019  | Annual       | 4/20/2020  | 11210140001   |
| Rohde & Schwarz | SFUNIT-Rx    | Shielded Filter Unit         | 7/25/2018  | Annual       | 7/25/2019  | 102133        |
| Seekonk         | NC-100       | Torque Wrench (8" lb)        | 5/10/2018  | Biennial     | 5/10/2020  | N/A           |
| Rohde & Schwarz | FSW67        | Signal / Spectrum Analyzer   | 5/6/2019   | Annual       | 5/6/2020   | 103200        |
| Rohde & Schwarz | TS-PR1840    | TSPR-1840 Amplifier          | 7/24/2019  | Annual       | 7/24/2020  | 82738         |
| Rohde & Schwarz | TC-TA18      | Vivaldi Antenna              | 8/17/2018  | Biennial     | 8/17/2020  | 101072        |
| Rohde & Schwarz | 180-442-KF   | Horn (Small)                 | 8/21/2018  | Annual       | 8/21/2019  | U157403-01    |

**Table 5-1. Test Equipment**

### Notes:

- For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.
- Equipment with a calibration date of "N/A" shown in this list was not used to make direct calibrated measurements.

|                                      |                                                                                     |                                       |                                                                                       |                                 |
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## 6.0 SAMPLE CALCULATIONS

### Emission Designator

#### QPSK Modulation

**Emission Designator = 8M62G7D**

LTE BW = 8.62 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

#### QAM Modulation

**Emission Designator = 8M45W7D**

LTE BW = 8.45 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

|                                      |                                                                                     |                                       |                                                                                       |                                 |
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## 7.0 TEST RESULTS

### 7.1 Summary

Company Name: Samsung Electronics Co., Ltd.  
 FCC ID: A3LMT6402-48A  
 FCC Classification: Citizens Band Category B Devices (CBD)  
 Mode(s): LTE

| FCC Part Section(s) | Test Description                                               | Test Limit                                                                                                                                                                                                      | Test Condition | Test Result | Reference                    |
|---------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------|------------------------------|
| 2.1049              | Occupied Bandwidth                                             | N/A                                                                                                                                                                                                             | CONDUCTED      | PASS        | Section 7.2                  |
| 2.1046<br>96.41(b)  | Conducted Power and Equivalent Isotropic Radiated Power (EIRP) | 47 dBm/10MHz (EIRP)                                                                                                                                                                                             |                | PASS        | Section 7.3                  |
| 2.1051<br>96.41(e)  | Out of Band Emissions                                          | -13 dBm/MHz at frequencies within 0-10MHz of channel edge<br><br>-25 dBm/MHz at frequencies greater than 10MHz above and below channel edge<br><br>-40 dBm/MHz at frequencies below 3530 MHz and above 3720 MHz |                | PASS        | Section 7.6, 7.8             |
| 96.41(b)            | Peak Power Spectral Density                                    | 37 dBm/MHz                                                                                                                                                                                                      |                | PASS        | Section 7.4                  |
| 96.41(g)            | Peak-Average Ratio                                             | < 13 dB                                                                                                                                                                                                         |                | PASS        | Section 7.5                  |
| 2.1055              | Frequency Stability                                            | Fundamental emissions stay within authorized frequency block                                                                                                                                                    |                | PASS        | Section 7.9                  |
| 96.39, 96.45        | Additional Requirements for Category B CBSD's                  | Category B CBSD's must adhere to the requirements of 96.39 and 96.45 per KDB 940660                                                                                                                             |                | PASS        | Refer to Supplemental Report |

**Table 7-1. Summary of Conducted Test Results**

|                                      |                                                                                     |                                       |                                                                                       |                                 |
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# Notes:

1. All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
2. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used to test the EUT at all frequencies of interest.
3. All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
4. For conducted spurious emissions, automated test software was used to measure certain emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "LTE Automation," Version 4.8.
5. This unit was tested while powered by an DC power source.

|                                             |                                                                                     |                                               |                                                                                       |                                        |
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## 7.2 Occupied Bandwidth

### §2.1049

#### Test Overview

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. All modes of operation were investigated and the worst case configuration results are reported in this section.

#### Test Procedure Used

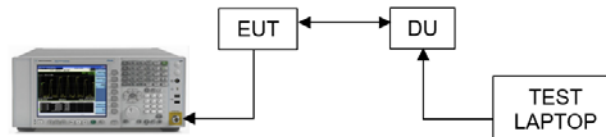
KDB 971168 D01 v03r01 – Section 4.2

#### Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW  $\geq 3 \times$  RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

#### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



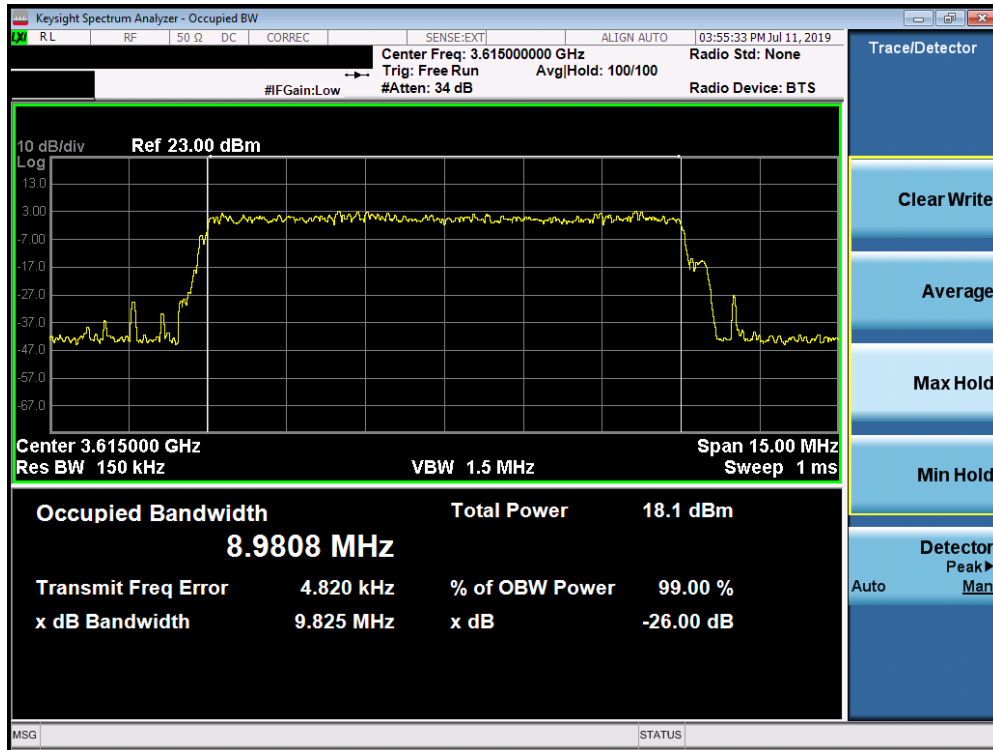
**Figure 7-1. Test Instrument & Measurement Setup**

#### Test Notes

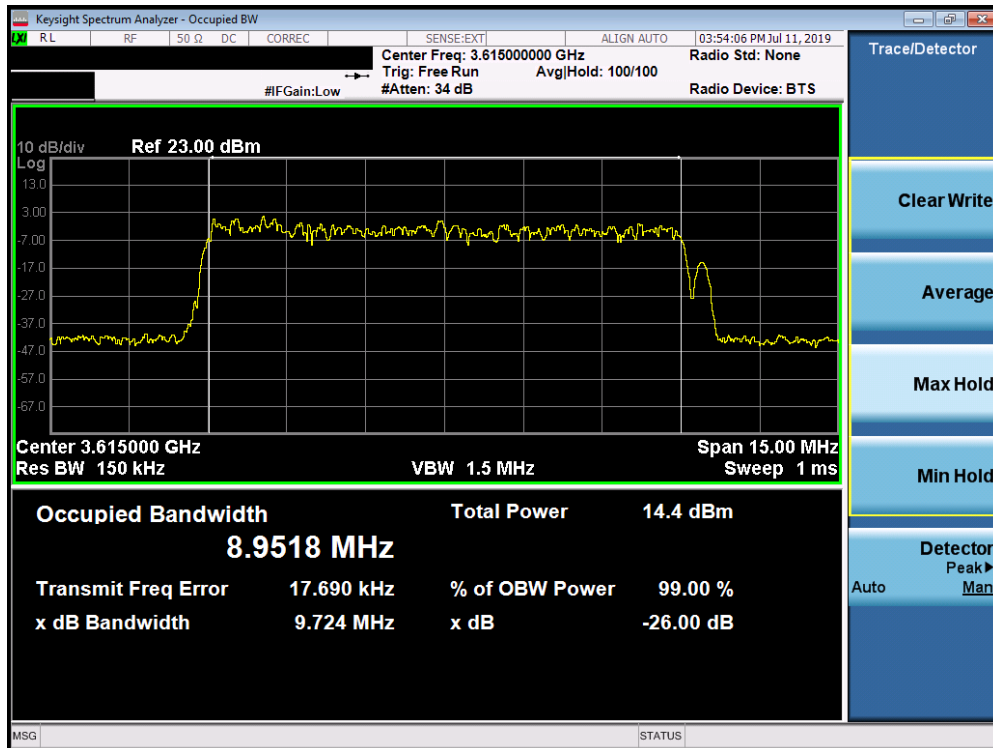
Occupied BW measurements were conducted for 16-User Beam, Single User Beam and Common Beam mode. The occupied bandwidth was not impacted by the selection of beam mode, so only the OBW of the 16-user beam mode was used as a representative set of data.

|                                      |                                               |                                       |                |                                 |
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## 16-User Beam Mode 1CC - 10MHz Total Bandwidth Configuration

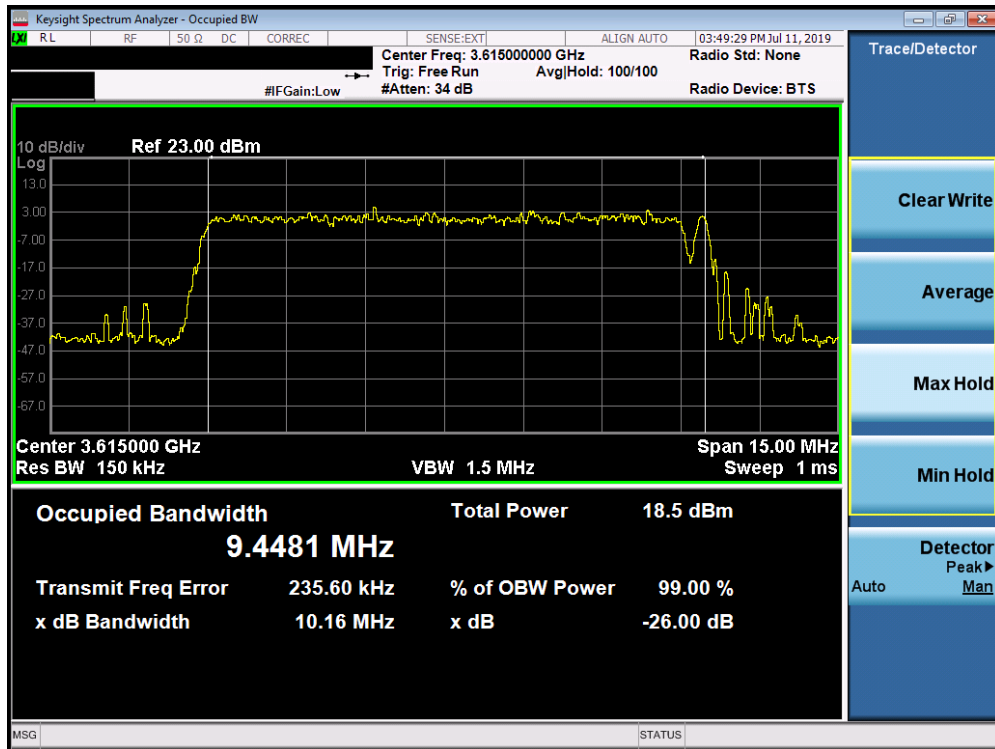


Plot 7-1. Occupied Bandwidth Plot (1CC Configuration - 10.0MHz Total Bandwidth QPSK)

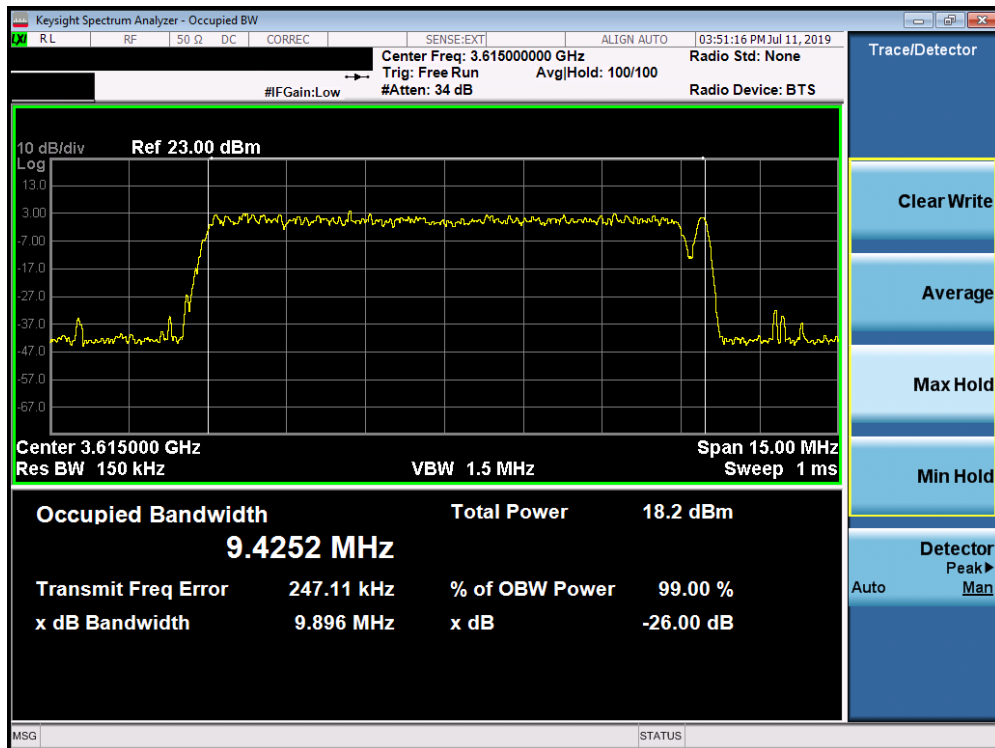


Plot 7-2. Occupied Bandwidth Plot(1CC Configuration - 10.0MHz Total Bandwidth 16QAM)

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 13 of 172                  |



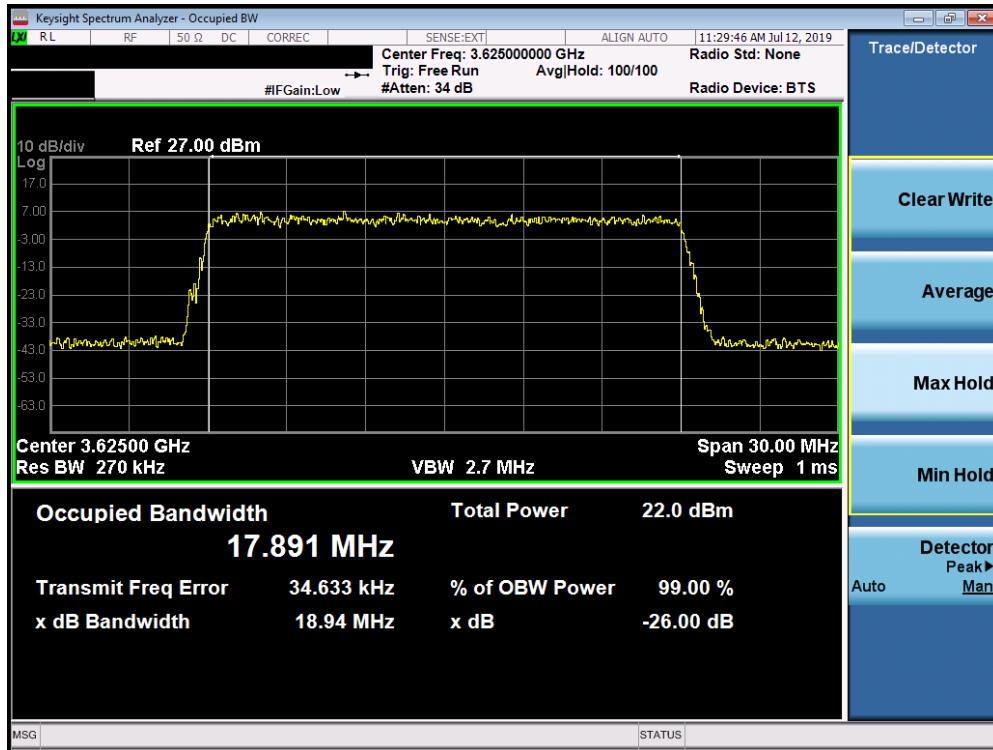
Plot 7-3. Occupied Bandwidth Plot(1CC Configuration - 10.0MHz Total Bandwidth 64QAM)



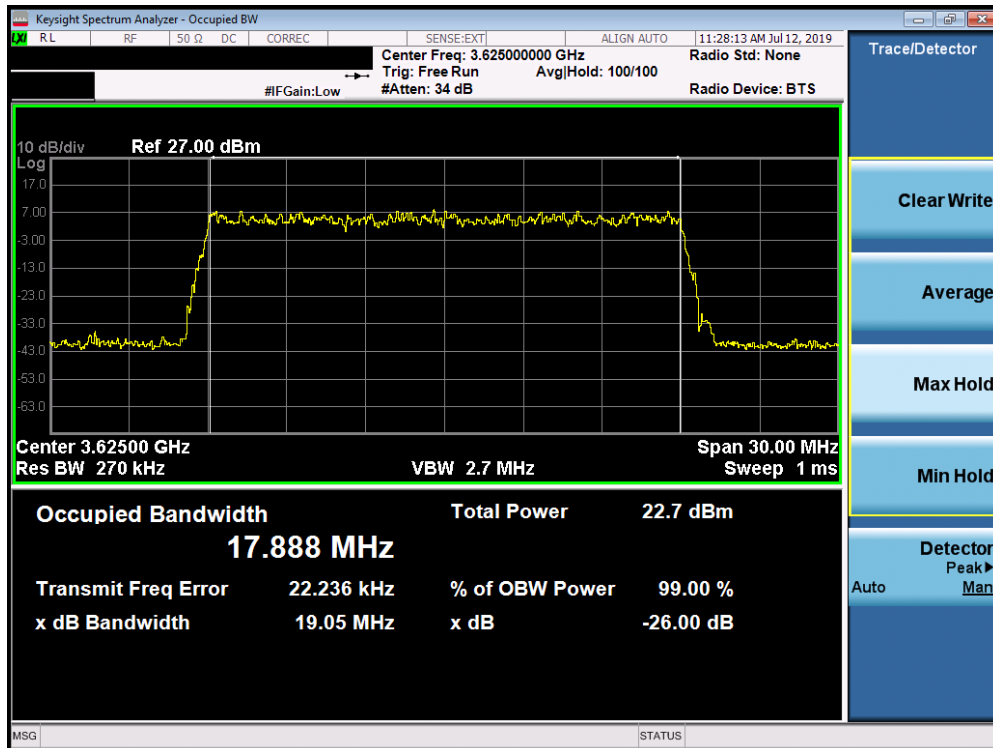
Plot 7-4. Occupied Bandwidth Plot(1CC Configuration - 10.0MHz Total Bandwidth 256QAM)

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 14 of 172                  |

## 16-User Beam Mode 1CC - 20MHz Total Bandwidth Configuration

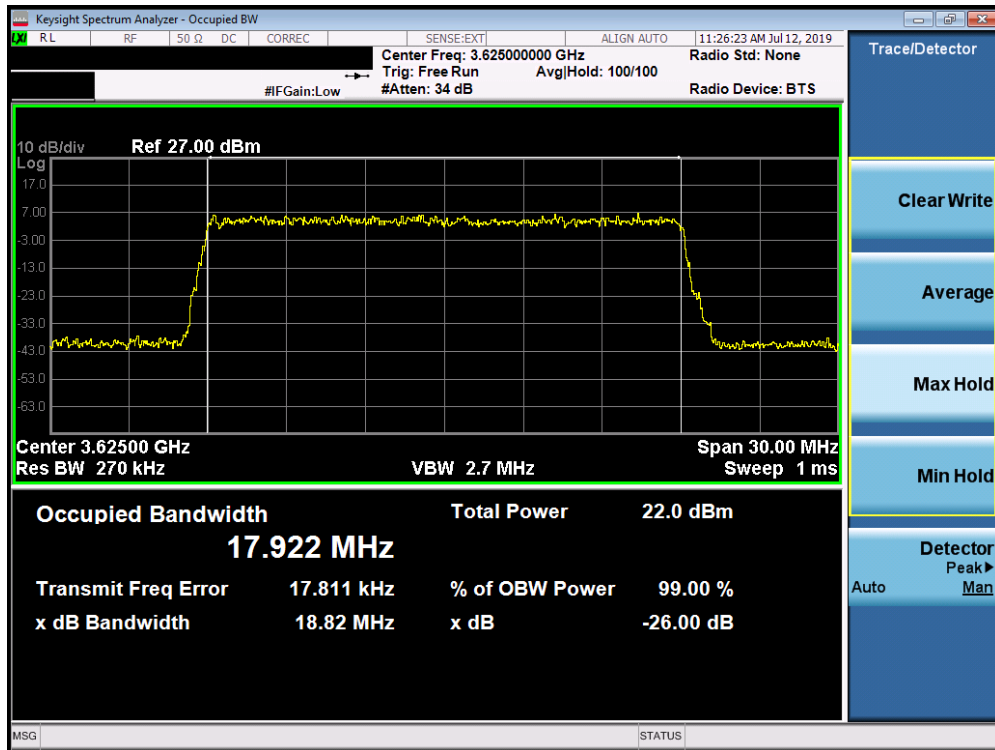


Plot 7-5. Occupied Bandwidth Plot (1CC Configuration - 20.0MHz Total Bandwidth QPSK)

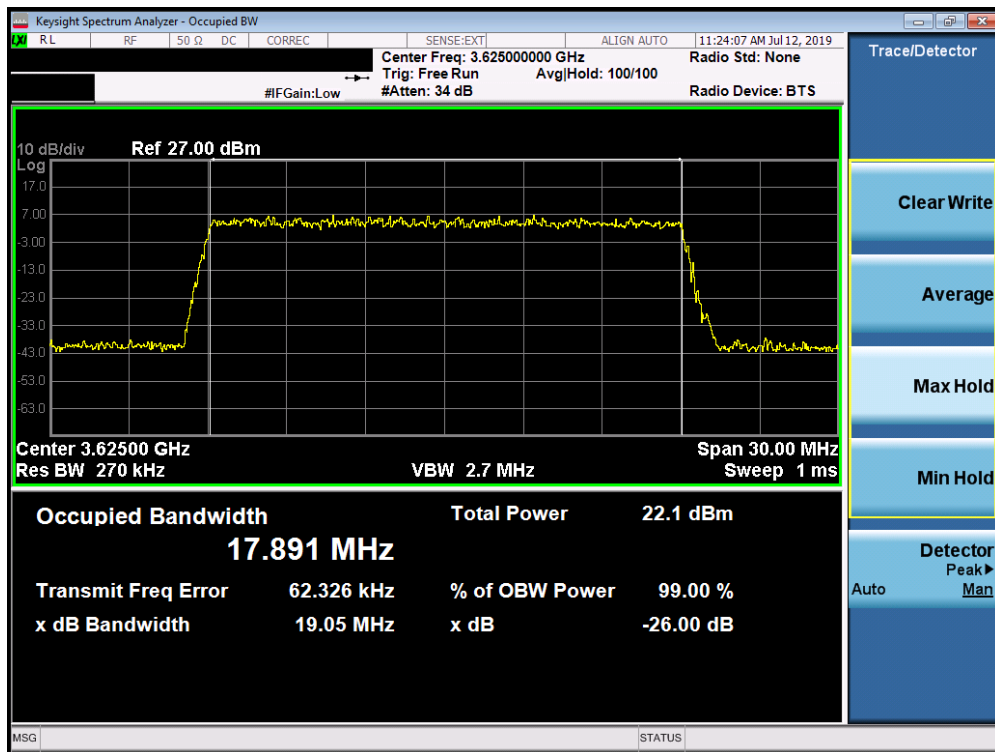


Plot 7-6. Occupied Bandwidth Plot(1CC Configuration - 20.0MHz Total Bandwidth 16QAM)

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 15 of 172                  |



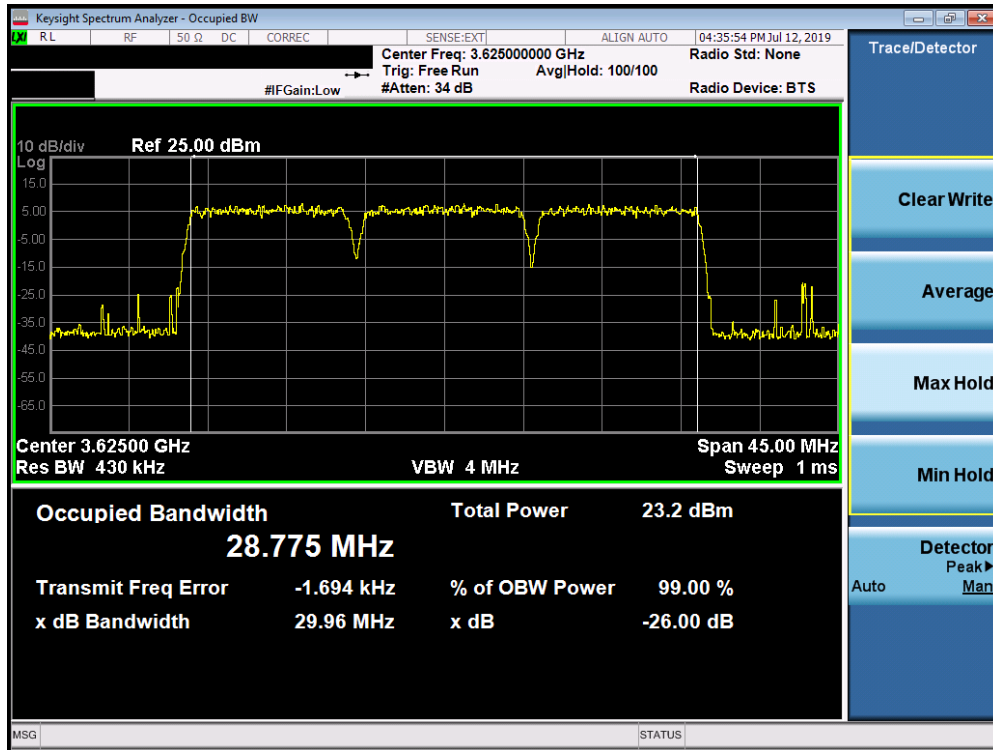
Plot 7-7. Occupied Bandwidth Plot(1CC Configuration - 20.0MHz Total Bandwidth 64QAM)



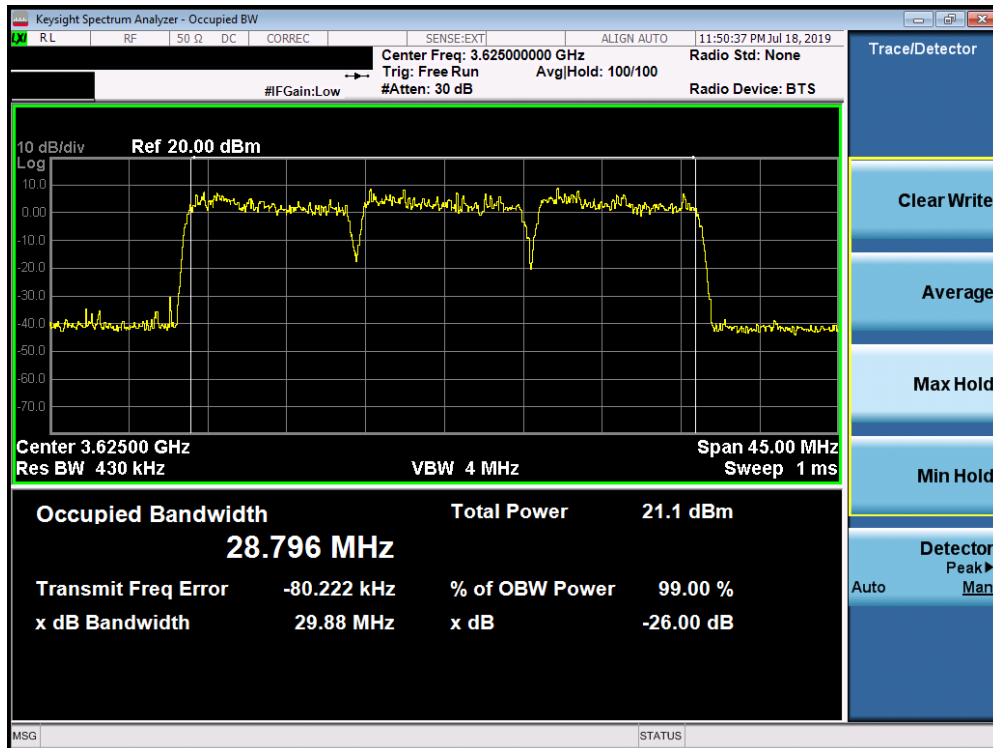
Plot 7-8. Occupied Bandwidth Plot(1CC Configuration - 20.0MHz Total Bandwidth 256QAM)

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 16 of 172                  |

## 16-User Beam Mode 3CC - 30MHz Total Bandwidth Configuration

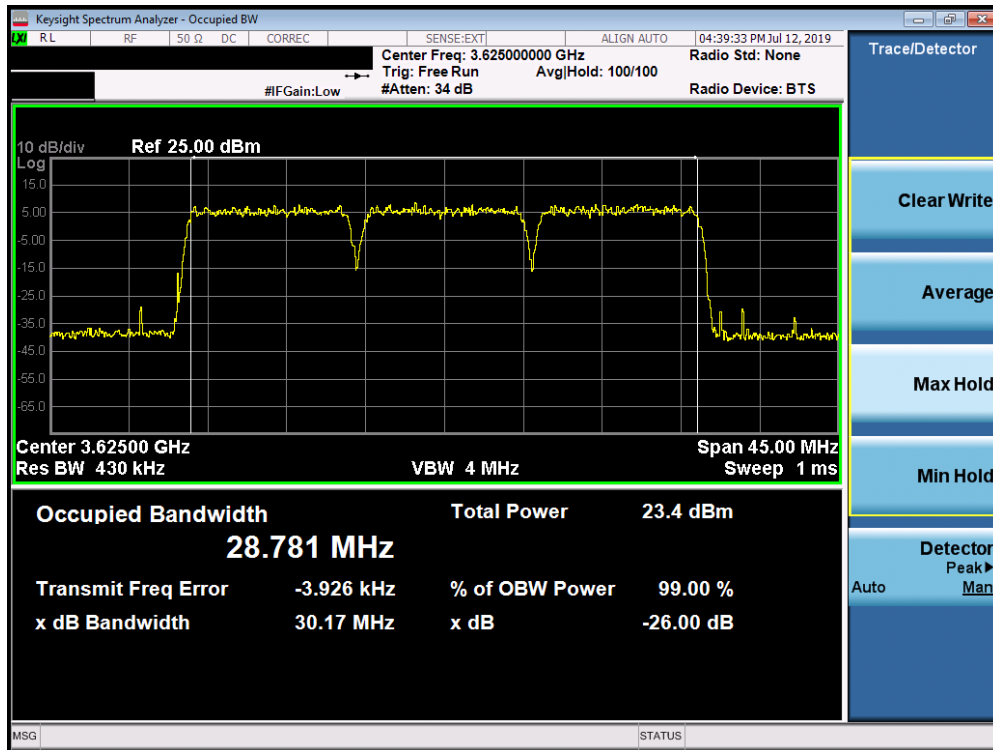


Plot 7-9. Occupied Bandwidth Plot (3CC Configuration - 30.0MHz Total Bandwidth QPSK)

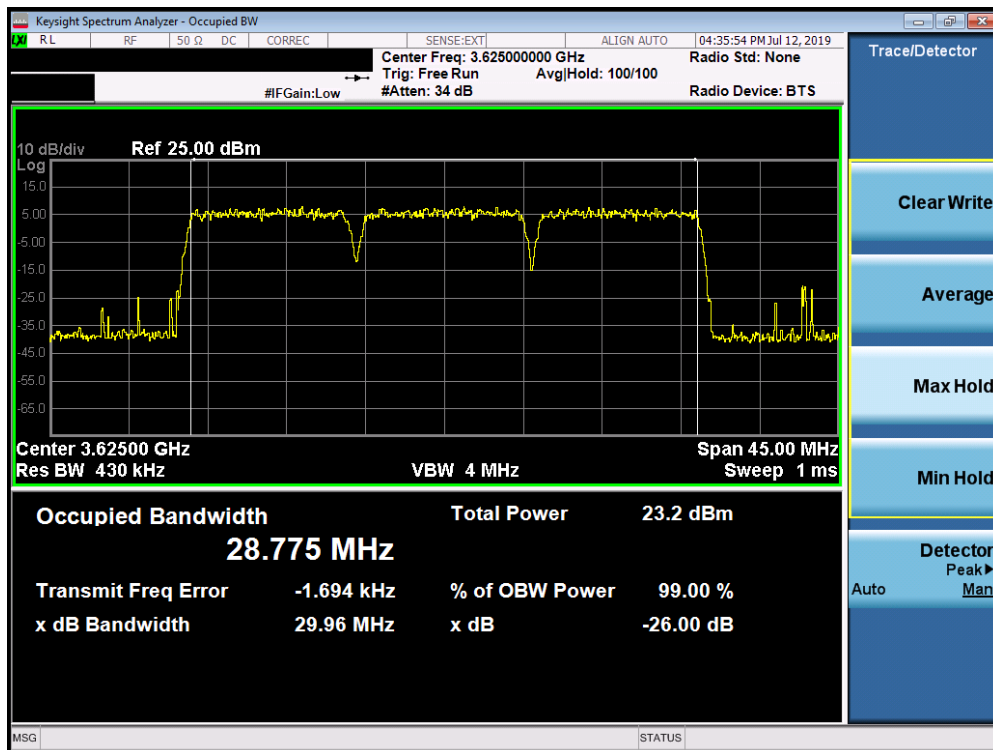


Plot 7-10. Occupied Bandwidth Plot(3CC Configuration - 30.0MHz Total Bandwidth 16QAM)

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 17 of 172                  |



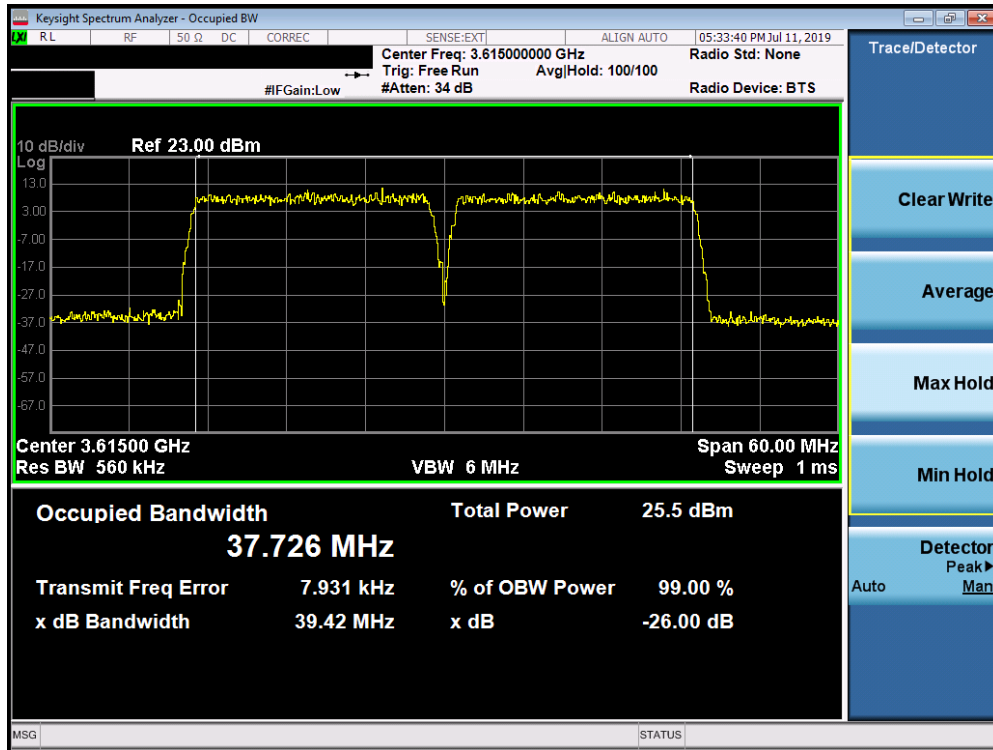
Plot 7-11. Occupied Bandwidth Plot(3CC Configuration - 30.0MHz Total Bandwidth 64QAM)



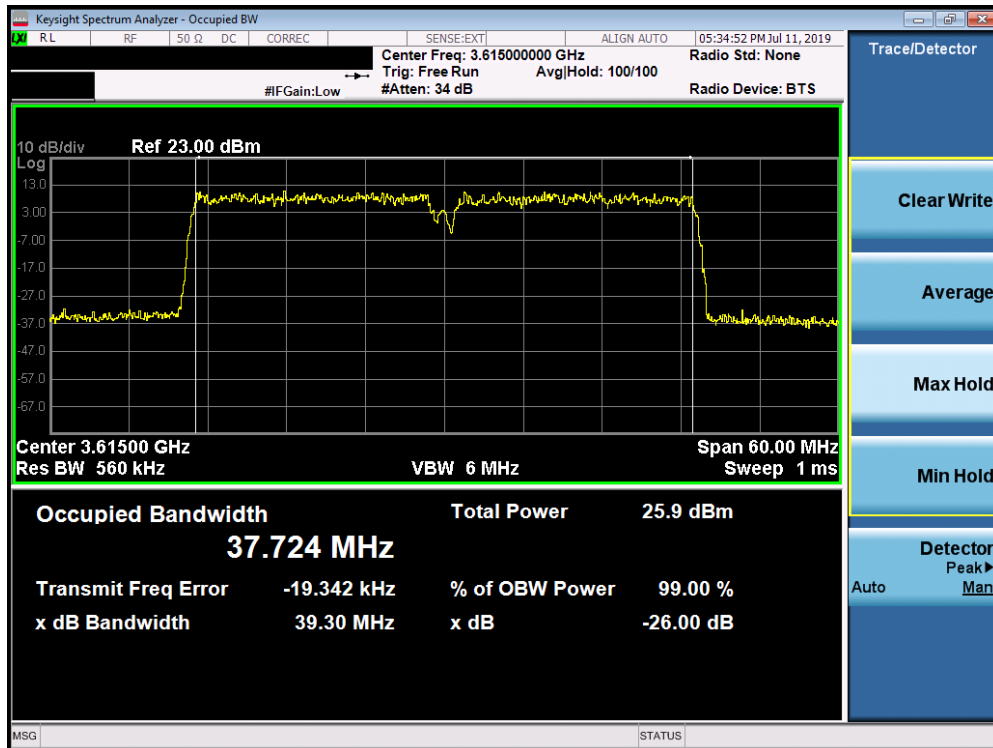
Plot 7-12. Occupied Bandwidth Plot(3CC Configuration - 30.0MHz Total Bandwidth 256QAM)

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 18 of 172                  |

## 16-User Beam Mode 2CC - 40MHz Total Bandwidth Configuration

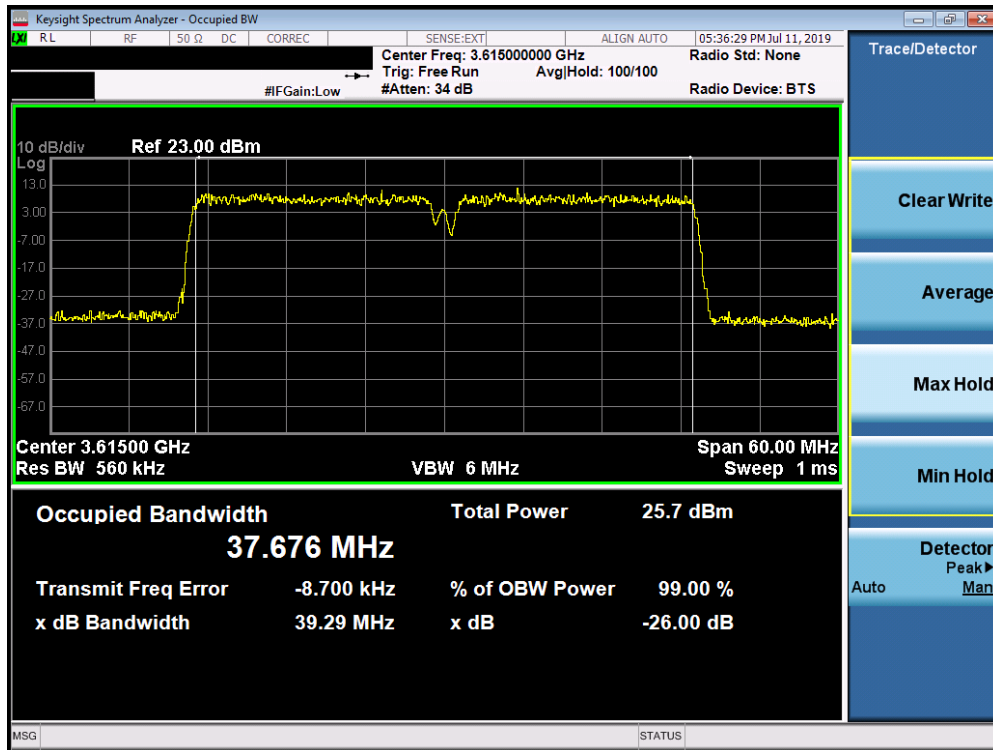


Plot 7-13. Occupied Bandwidth Plot (2CC Configuration - 40.0MHz Total Bandwidth QPSK)

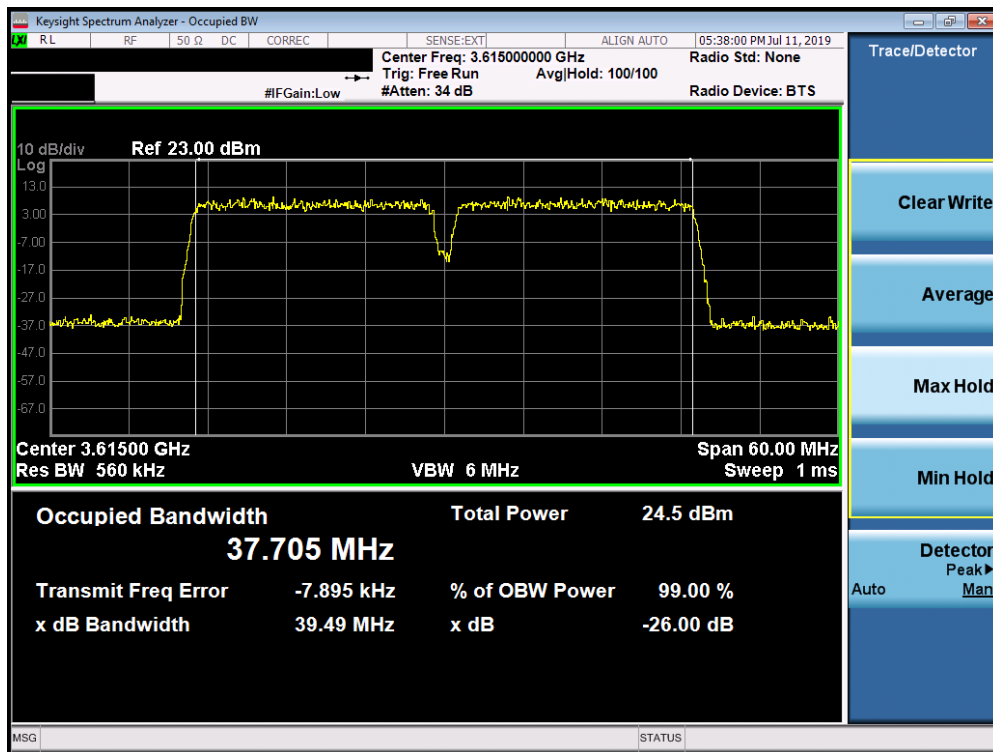


Plot 7-14. Occupied Bandwidth Plot(2CC Configuration - 40.0MHz Total Bandwidth 16QAM)

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 19 of 172                  |



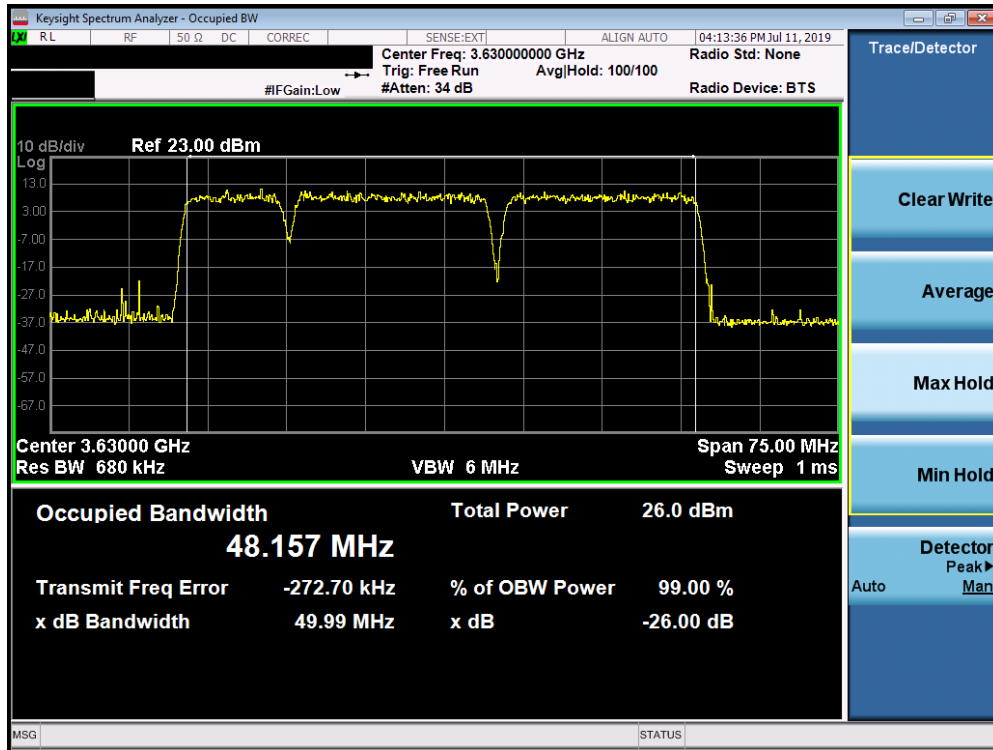
Plot 7-15. Occupied Bandwidth Plot(2CC Configuration - 40.0MHz Total Bandwidth 64QAM)



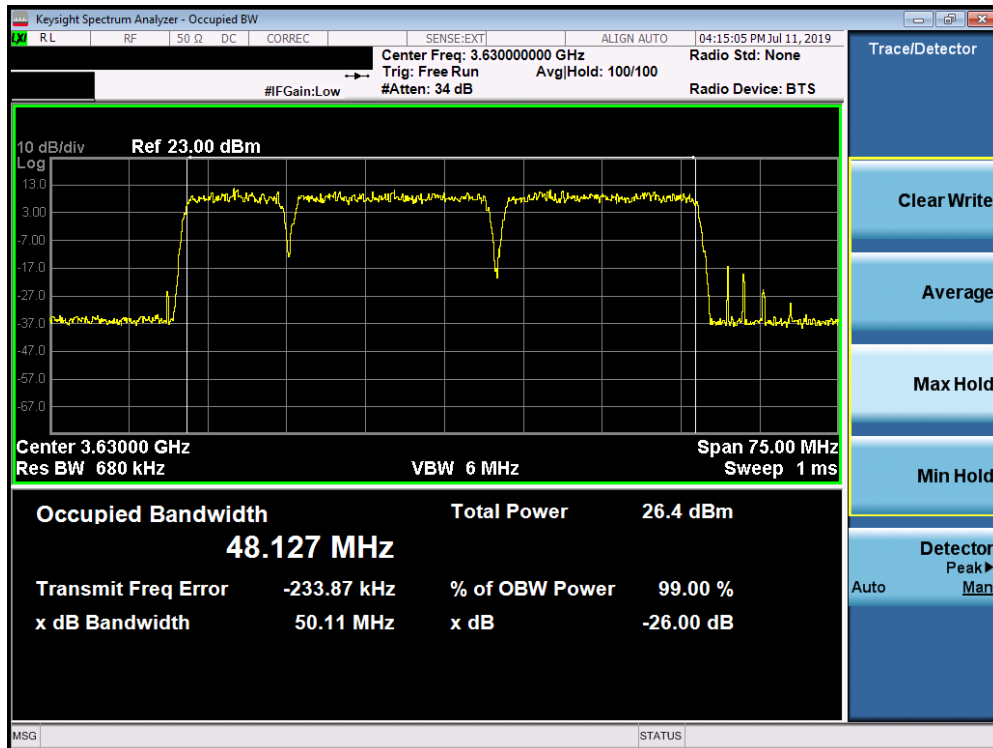
Plot 7-16. Occupied Bandwidth Plot(2CC Configuration - 40.0MHz Total Bandwidth 256QAM)

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 20 of 172                  |

## 16-User Beam Mode 3CC - 50MHz Total Bandwidth Configuration

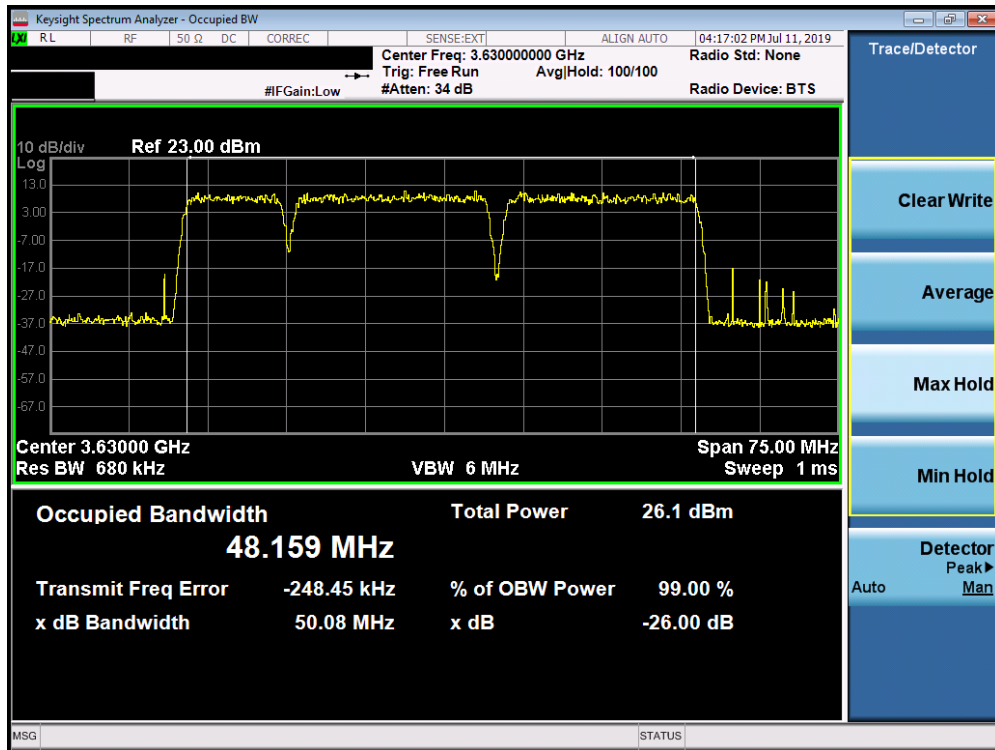


Plot 7-17. Occupied Bandwidth Plot (3CC Configuration - 50.0MHz Total Bandwidth QPSK)

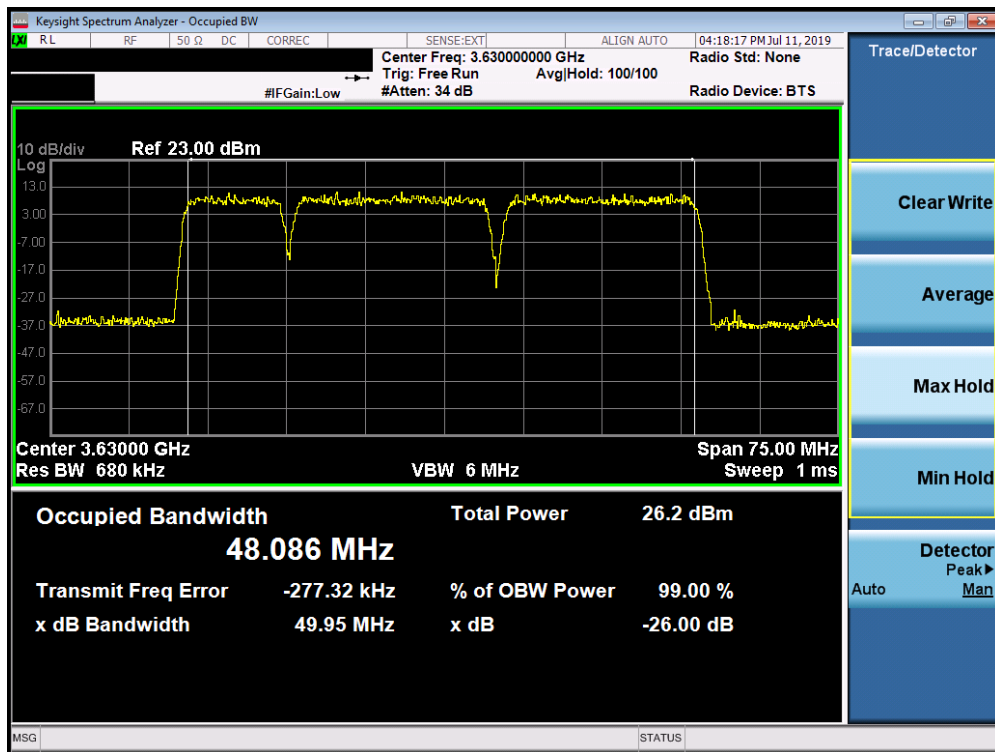


Plot 7-18. Occupied Bandwidth Plot(3CC Configuration - 50.0MHz Total Bandwidth 16QAM)

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 21 of 172                  |



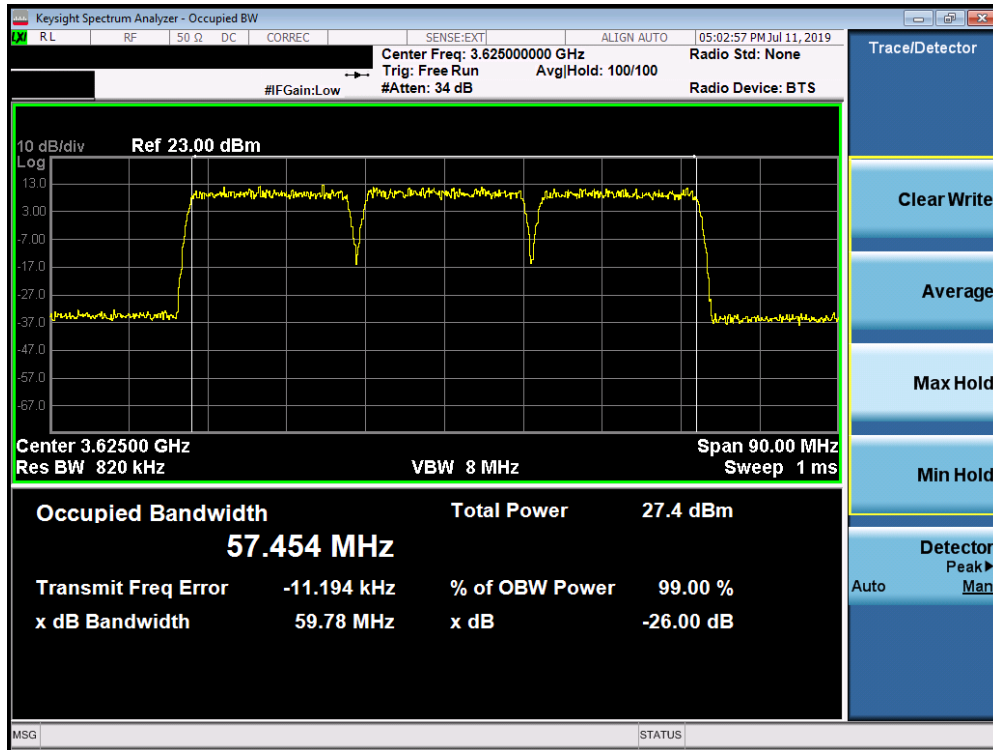
Plot 7-19. Occupied Bandwidth Plot(3CC Configuration - 50.0MHz Total Bandwidth 64QAM)



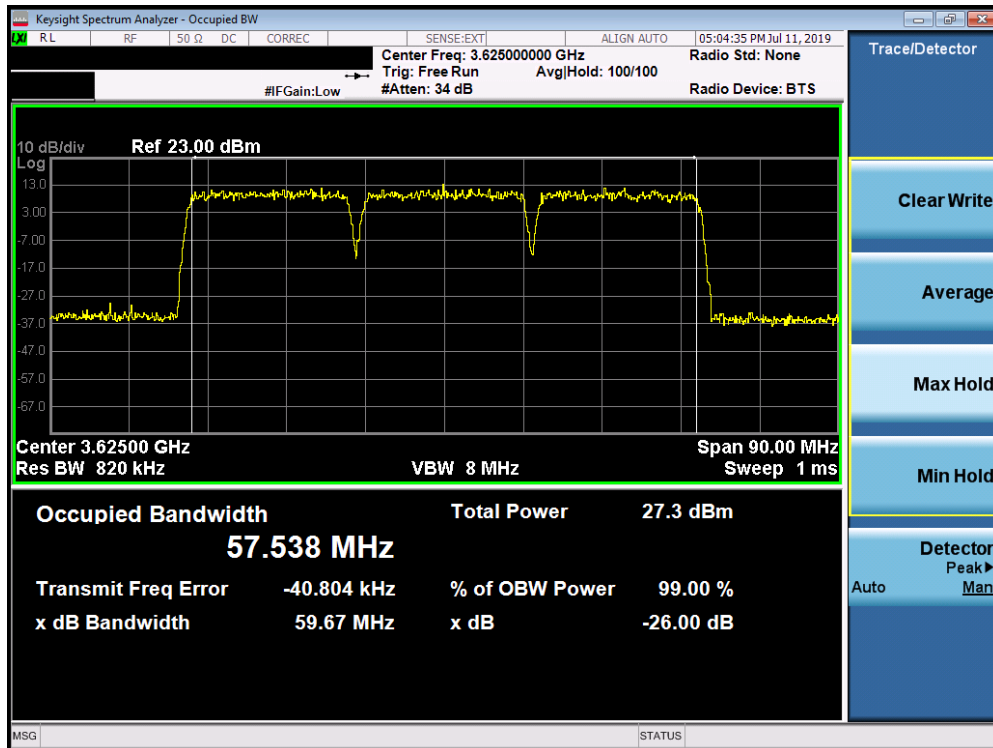
Plot 7-20. Occupied Bandwidth Plot(3CC Configuration - 50.0MHz Total Bandwidth 256QAM)

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 22 of 172                  |

## 16-User Beam Mode 3CC - 60MHz Total Bandwidth Configuration

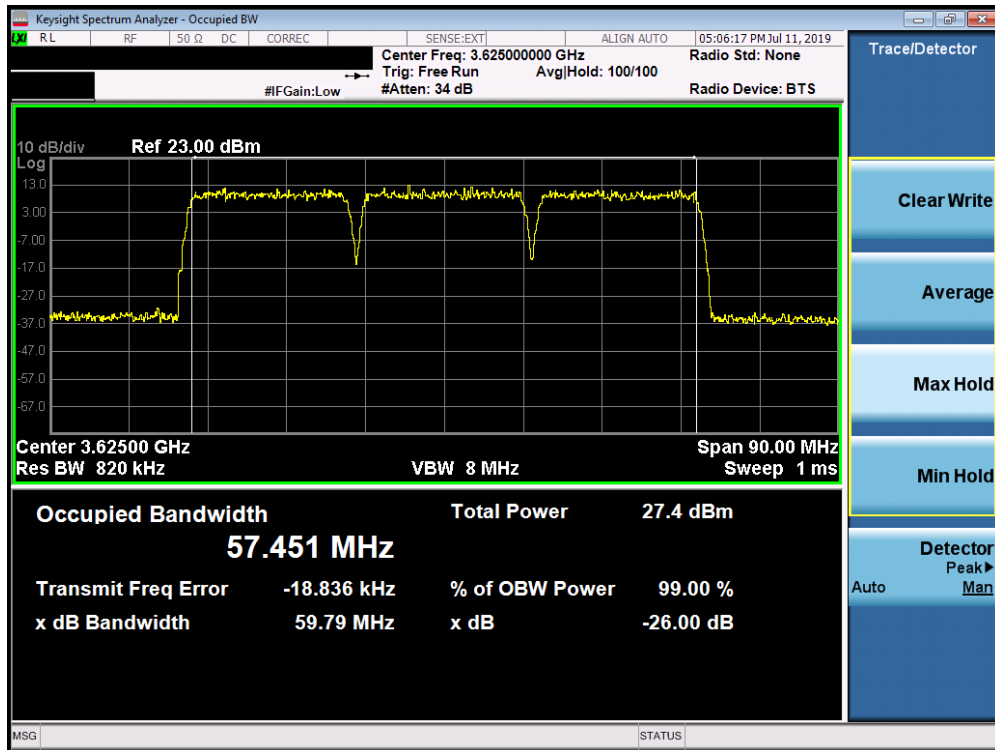


Plot 7-21. Occupied Bandwidth Plot (3CC Configuration - 60.0MHz Total Bandwidth QPSK)

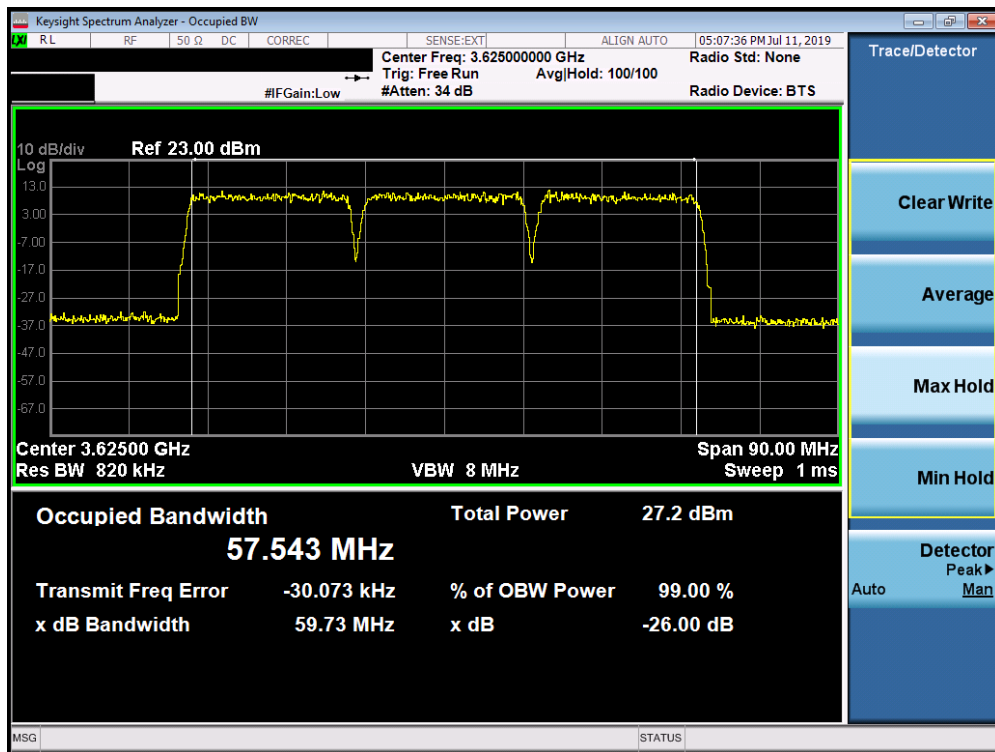


Plot 7-22. Occupied Bandwidth Plot(3CC Configuration - 60.0MHz Total Bandwidth 16QAM)

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 23 of 172                  |



Plot 7-23. Occupied Bandwidth Plot(3CC Configuration - 60.0MHz Total Bandwidth 64QAM)



Plot 7-24. Occupied Bandwidth Plot(3CC Configuration - 60.0MHz Total Bandwidth 256QAM)

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 24 of 172                  |

## 7.3 Conducted Power Measurement and EIRP

### 2.1046, §96.41(b)

#### Test Overview

A transmitter port of EUT is connected to the input of a signal analyzer. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

#### Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.2.2

ANSI/TIA-603-E-2016 – Section 2.2.17

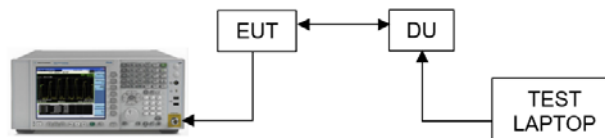
KDB 662911 D01 v02r01 – Section E)1) In-Band Power Measurements

#### Test Settings

1. Conducted power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW  $\geq 3 \times$  RBW
4. Span = 1.5 times the OBW
5. No. of sweep points  $\geq 2 \times$  span / RBW
6. Detector = RMS
7. Trigger Settings is set to "periodic" for signals with non-continuous operation with the sweep times set to "auto". Refer test note 3 for details.
8. The integration bandwidth was set equal to transmission bandwidth i.e. 20MHz for 1CC and 40MHz for 2CC measurements.
9. Trace mode = Trace-Averaging (RMS) set to average over 100 sweeps
10. The trace was allowed to stabilize

#### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



**Figure 7-2. Test Instrument & Measurement Setup**

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBS         |                | Page 25 of 172                  |

## Test Notes

1. The port with highest power i.e. worst case port per modulation has been highlighted in the following power tables.
2. Both 16 and single user beam configurations were checked. 16 user beam power was found to be significantly higher than the single user beam, and hence was reported.
3. Periodic trigger was used with gating ON. Gate sweep time, Gate delay and gate length were set accordingly to capture ON time of the transmission.
4. MIMO Calculations are done considering output channel power for all ports and respective margins are calculated.
5. Consider the following factors for MIMO Power:
  - a) Conducted power for each port is measured in dBm.
  - b) Powers are summed up in linear using the measure-and-sum technique defined in KDB 971168 D01 v03r01-Section D.
  - c) Conducted power per port (dBm) is converted to a linear value (mW). A summation of linear powers for all 64 ports gives us the total MIMO conducted power in milliWatts (mW). We convert this back to logarithmic scale for further EIRP calculations.

6. The total MIMO conducted power is measured for the signal with respect to the Occupied Bandwidth (OBW) in MHz. This value has to be scaled to per 10MHz in order to compare it with the FCC EIRP Limit defined in units dBm/10MHz. Scaling Factor (dB) =  $10 \cdot \log(10 \text{ MHz} / \text{Occupied Bandwidth in MHz})$

Sample Calculation for an Occupied Bandwidth = 20MHz is shown as follows:

Scaling Factor =  $10 \cdot \log(10 \text{ MHz} / 20 \text{ MHz}) = 10 \cdot \log(0.5) = -3.01 \text{ dB}$

7. 16- beam reduction:  
The 16-beam reduction is applicable in the 16-User Beam operating mode of the EUT. It is a logarithmic factor applied to account for maximum 16 spatially separated beams operate simultaneously.  
16-beam power reduction factor (dB) =  $10 \cdot \log(1 / 16) = -12.04 \text{ dB}$
8. Beamforming (BF) Gain:  
This logarithmic factor accounts for the gain if two spatially different beams overlap in real-time.  
BF Gain =  $10 \cdot \log(2) = 3.01 \text{ dB}$
9. Antenna Gains (dBi) are provided by the client.
10. Sample Calculation:  
Let us assume the following numbers:
  - a. Total MIMO Conducted Power as 1500 milliWatts.
  - b. Occupied Bandwidth = 20 MHz
  - c. Antenna Gain = 23.5 dBi

| Factors                                     |                            | Value    | Unit      |
|---------------------------------------------|----------------------------|----------|-----------|
| Total MIMO Conducted Power (linear sum)     |                            | 1500     | mW        |
| Total MIMO Conducted Power (dBm)            | $= 10 \cdot \log(1500)$    | = 31.76  | dBm       |
| Scaling Factor (OBW = 20 MHz)               | $= 10 \cdot \log(10 / 20)$ | = -3.01  | dB        |
| <b>Applying Reductions:</b>                 |                            |          |           |
| Antenna Gain                                |                            | = 23.5   | dBi       |
| 16- Beam Reduction                          | $= 10 \cdot \log(1 / 16)$  | = -12.04 | dB        |
| BF Gain                                     | $= 10 \cdot \log(2)$       | = 3.01   | dB        |
| <b>MIMO EIRP =</b>                          |                            | 43.22    | dBm/10MHz |
| <b>Total MIMO Conducted Power + Scaling</b> |                            |          |           |
| Factor + Antenna Gain + 16- Beam            |                            |          |           |
| Reduction + BF Gain                         |                            |          |           |
| <b>FCC EIRP Limit</b>                       |                            | 47       | dBm/10MHz |
| <b>Margin = MIMO EIRP - FCC EIRP Limit</b>  | $= 43.22 - 47$             | = -3.78  | dB        |

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBS         |                                                                                       | Page 26 of 172                  |

## 16- User Beam Configuration (1CC – 10MHz Total Bandwidth)

| Port # | QPSK<br>(dBm) | 16-QAM<br>(dBm) | 64-QAM<br>(dBm) | 256-QAM<br>(dBm) |
|--------|---------------|-----------------|-----------------|------------------|
| 0      | 11.88         | 11.57           | 11.87           | 10.79            |
| 1      | 12.07         | 11.75           | 12.04           | 10.97            |
| 2      | 11.88         | 11.57           | 11.86           | 10.79            |
| 3      | 11.67         | 11.35           | 11.64           | 10.57            |
| 4      | 11.92         | 11.61           | 11.89           | 10.83            |
| 5      | 12.07         | 11.75           | 12.04           | 10.97            |
| 6      | 11.46         | 11.19           | 11.48           | 10.41            |
| 7      | 11.55         | 11.24           | 11.53           | 10.46            |
| 8      | 11.66         | 11.31           | 11.63           | 10.53            |
| 9      | 11.87         | 11.54           | 11.84           | 10.76            |
| 10     | 11.84         | 11.52           | 11.81           | 10.74            |
| 11     | 11.56         | 11.25           | 11.54           | 10.47            |
| 12     | 11.90         | 11.57           | 11.86           | 10.79            |
| 13     | 11.58         | 11.27           | 11.55           | 10.49            |
| 14     | 11.73         | 11.42           | 11.71           | 10.64            |
| 15     | 11.53         | 11.22           | 11.51           | 10.44            |
| 16     | 11.79         | 11.47           | 11.76           | 10.69            |
| 17     | 11.92         | 11.58           | 11.90           | 10.80            |
| 18     | 11.90         | 11.56           | 11.87           | 10.78            |
| 19     | 11.79         | 11.47           | 11.76           | 10.69            |
| 20     | 12.01         | 11.69           | 11.98           | 10.91            |
| 21     | 11.78         | 11.45           | 11.75           | 10.67            |
| 22     | 11.59         | 11.29           | 11.58           | 10.51            |
| 23     | 11.62         | 11.30           | 11.60           | 10.53            |
| 24     | 11.78         | 11.47           | 11.76           | 10.69            |
| 25     | 11.86         | 11.54           | 11.83           | 10.77            |
| 26     | 11.71         | 11.36           | 11.66           | 10.59            |
| 27     | 11.50         | 11.19           | 11.48           | 10.41            |
| 28     | 11.64         | 11.32           | 11.61           | 10.54            |
| 29     | 11.83         | 11.51           | 11.80           | 10.70            |
| 30     | 11.79         | 11.49           | 11.77           | 10.69            |
| 31     | 11.54         | 11.23           | 11.52           | 10.45            |
| 32     | 11.68         | 11.36           | 11.65           | 10.58            |
| 33     | 11.89         | 11.57           | 11.86           | 10.79            |
| 34     | 11.78         | 11.46           | 11.78           | 10.72            |
| 35     | 11.60         | 11.28           | 11.59           | 10.52            |
| 36     | 11.73         | 11.41           | 11.70           | 10.63            |
| 37     | 12.12         | 11.80           | 12.09           | 11.02            |
| 38     | 11.87         | 11.55           | 11.85           | 10.75            |
| 39     | 11.54         | 11.22           | 11.52           | 10.44            |
| 40     | 11.65         | 11.41           | 11.70           | 10.63            |
| 41     | 11.96         | 11.64           | 11.93           | 10.86            |
| 42     | 11.51         | 11.19           | 11.48           | 10.41            |
| 43     | 11.73         | 11.42           | 11.70           | 10.64            |
| 44     | 11.67         | 11.35           | 11.64           | 10.57            |
| 45     | 11.82         | 11.50           | 11.79           | 10.72            |
| 46     | 11.74         | 11.43           | 11.72           | 10.65            |
| 47     | 11.56         | 11.22           | 11.54           | 10.47            |
| 48     | 11.60         | 11.26           | 11.57           | 10.51            |
| 49     | 11.79         | 11.48           | 11.77           | 10.70            |
| 50     | 11.63         | 11.31           | 11.60           | 10.53            |
| 51     | 11.67         | 11.34           | 11.64           | 10.57            |
| 52     | 11.79         | 11.47           | 11.76           | 10.66            |
| 53     | 11.62         | 11.30           | 11.59           | 10.51            |
| 54     | 11.55         | 11.23           | 11.52           | 10.45            |
| 55     | 11.62         | 11.30           | 11.60           | 10.53            |
| 56     | 11.63         | 11.31           | 11.60           | 10.53            |
| 57     | 11.77         | 11.45           | 11.74           | 10.68            |
| 58     | 11.66         | 11.34           | 11.63           | 10.56            |
| 59     | 11.75         | 11.42           | 11.71           | 10.64            |
| 60     | 11.67         | 11.35           | 11.64           | 10.57            |
| 61     | 11.88         | 11.57           | 11.85           | 10.79            |
| 62     | 11.71         | 11.39           | 11.68           | 10.61            |
| 63     | 11.76         | 11.47           | 11.76           | 10.69            |

Table 7-2. 16-User Beam 1CC Low Channel Conducted Powers (LTE Band 48 – 10MHz)

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBSD        |                                                                                       | Page 27 of 172                  |

| Low Channel 1CC                  | QPSK    | 16-QAM  | 64-QAM  | 256-QAM |
|----------------------------------|---------|---------|---------|---------|
| Total MIMO Conducted Power (mW)  | 955.115 | 887.542 | 950.005 | 741.733 |
| Total MIMO Conducted Power (dBm) | 29.80   | 29.48   | 29.78   | 28.70   |
| Ant. Gain(dBi)                   | 23.50   | 23.50   | 23.50   | 23.50   |
| 16 beam reduction (dB)           | -12.04  | -12.04  | -12.04  | -12.04  |
| BF Gain (dB)                     | 3.01    | 3.01    | 3.01    | 3.01    |
| MIMO EIRP (dBm/10 MHz)           | 44.27   | 43.95   | 44.25   | 43.17   |
| FCC EIRP Limit (dBm/10MHz)       | 47.00   | 47.00   | 47.00   | 47.00   |
| Margin (dB)                      | -2.73   | -3.05   | -2.75   | -3.83   |

**Table 7-3. 16-User Beam 1CC Low Channel MIMO Power (LTE Band 48 – 10MHz)**

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBS         |                                                                                       | Page 28 of 172                  |

| Port # | QPSK<br>(dBm) | 16-QAM<br>(dBm) | 64-QAM<br>(dBm) | 256-QAM<br>(dBm) |
|--------|---------------|-----------------|-----------------|------------------|
| 0      | 11.04         | 10.67           | 10.97           | 9.96             |
| 1      | 11.66         | 11.29           | 11.60           | 10.58            |
| 2      | 11.46         | 11.10           | 11.40           | 10.39            |
| 3      | 11.41         | 11.04           | 11.36           | 10.33            |
| 4      | 11.50         | 11.13           | 11.44           | 10.43            |
| 5      | 11.29         | 10.92           | 11.23           | 10.21            |
| 6      | 11.28         | 10.88           | 11.22           | 10.20            |
| 7      | 11.31         | 10.93           | 11.25           | 10.23            |
| 8      | 11.10         | 10.73           | 11.05           | 10.02            |
| 9      | 11.47         | 11.10           | 11.41           | 10.36            |
| 10     | 11.53         | 11.16           | 11.47           | 10.43            |
| 11     | 11.31         | 10.95           | 11.25           | 10.23            |
| 12     | 11.34         | 10.97           | 11.27           | 10.26            |
| 13     | 11.45         | 11.08           | 11.39           | 10.36            |
| 14     | 11.49         | 11.13           | 11.43           | 10.41            |
| 15     | 11.30         | 10.93           | 11.24           | 10.22            |
| 16     | 11.11         | 10.74           | 11.05           | 10.03            |
| 17     | 11.40         | 11.03           | 11.34           | 10.33            |
| 18     | 11.38         | 10.98           | 11.29           | 10.30            |
| 19     | 11.35         | 10.97           | 11.28           | 10.27            |
| 20     | 11.34         | 10.97           | 11.28           | 10.26            |
| 21     | 11.25         | 10.88           | 11.19           | 10.14            |
| 22     | 11.42         | 11.05           | 11.36           | 10.34            |
| 23     | 11.23         | 10.87           | 11.18           | 10.16            |
| 24     | 11.10         | 10.73           | 11.04           | 9.99             |
| 25     | 11.40         | 11.03           | 11.34           | 10.30            |
| 26     | 11.46         | 11.09           | 11.40           | 10.38            |
| 27     | 11.31         | 10.94           | 11.25           | 10.23            |
| 28     | 11.32         | 10.95           | 11.26           | 10.23            |
| 29     | 11.51         | 11.15           | 11.46           | 10.43            |
| 30     | 11.45         | 11.08           | 11.39           | 10.37            |
| 31     | 11.22         | 10.85           | 11.16           | 10.14            |
| 32     | 11.03         | 10.66           | 10.98           | 9.96             |
| 33     | 11.47         | 11.07           | 11.41           | 10.39            |
| 34     | 11.38         | 10.99           | 11.32           | 10.30            |
| 35     | 11.30         | 10.93           | 11.24           | 10.22            |
| 36     | 11.46         | 11.09           | 11.40           | 10.35            |
| 37     | 11.54         | 11.16           | 11.49           | 10.46            |
| 38     | 11.40         | 11.03           | 11.34           | 10.32            |
| 39     | 11.19         | 10.83           | 11.13           | 10.11            |
| 40     | 11.00         | 10.63           | 10.94           | 9.89             |
| 41     | 11.42         | 11.05           | 11.36           | 10.33            |
| 42     | 11.39         | 11.02           | 11.33           | 10.28            |
| 43     | 11.21         | 10.81           | 11.15           | 10.11            |
| 44     | 11.20         | 10.82           | 11.14           | 10.12            |
| 45     | 11.38         | 11.01           | 11.29           | 10.30            |
| 46     | 11.42         | 11.05           | 11.35           | 10.33            |
| 47     | 11.21         | 10.84           | 11.15           | 10.13            |
| 48     | 11.22         | 10.86           | 11.16           | 10.14            |
| 49     | 11.50         | 11.13           | 11.44           | 10.42            |
| 50     | 11.18         | 10.81           | 11.13           | 10.11            |
| 51     | 11.24         | 10.87           | 11.18           | 10.16            |
| 52     | 11.44         | 11.07           | 11.39           | 10.36            |
| 53     | 11.59         | 11.23           | 11.53           | 10.51            |
| 54     | 11.34         | 10.97           | 11.28           | 10.23            |
| 55     | 11.20         | 10.83           | 11.14           | 10.12            |
| 56     | 11.09         | 10.72           | 11.03           | 10.01            |
| 57     | 11.50         | 11.10           | 11.44           | 10.42            |
| 58     | 11.11         | 10.72           | 11.02           | 10.00            |
| 59     | 11.23         | 10.86           | 11.16           | 10.14            |
| 60     | 11.20         | 10.83           | 11.14           | 10.12            |
| 61     | 11.45         | 11.07           | 11.39           | 10.37            |
| 62     | 11.39         | 10.99           | 11.33           | 10.31            |
| 63     | 11.16         | 10.74           | 11.11           | 10.09            |

**Table 7-4. 16-User Beam 1CC Mid Channel Conducted Powers (LTE Band 48 – 10MHz)**

|                                      |                                                                                                                                                                                                                         |                                |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b>  |                                | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                                                                                                                                                       | EUT Type:<br>Massive MIMO CBSD | Page 29 of 172                  |

| Mid Channel 1CC                  | QPSK    | 16-QAM  | 64-QAM  | 256-QAM |
|----------------------------------|---------|---------|---------|---------|
| Total MIMO Conducted Power (mW)  | 869.531 | 797.456 | 856.936 | 677.121 |
| Total MIMO Conducted Power (dBm) | 29.39   | 29.02   | 29.33   | 28.31   |
| Ant. Gain(dBi)                   | 23.50   | 23.50   | 23.50   | 23.50   |
| 16 beam reduction (dB)           | -12.04  | -12.04  | -12.04  | -12.04  |
| BF Gain (dB)                     | 3.01    | 3.01    | 3.01    | 3.01    |
| MIMO EIRP (dBm/10 MHz)           | 43.86   | 43.49   | 43.80   | 42.78   |
| FCC EIRP Limit (dBm/10MHz)       | 47.00   | 47.00   | 47.00   | 47.00   |
| Margin (dB)                      | -3.14   | -3.51   | -3.20   | -4.22   |

**Table 7-5. 16-User Beam 1CC Mid Channel MIMO Power (LTE Band 48 – 10MHz)**

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBS         |                                                                                       | Page 30 of 172                  |

| Port # | QPSK<br>(dBm) | 16-QAM<br>(dBm) | 64-QAM<br>(dBm) | 256-QAM<br>(dBm) |
|--------|---------------|-----------------|-----------------|------------------|
| 0      | 11.04         | 10.71           | 11.05           | 9.91             |
| 1      | 11.48         | 11.15           | 11.49           | 10.35            |
| 2      | 11.26         | 10.90           | 11.24           | 10.13            |
| 3      | 11.30         | 10.96           | 11.30           | 10.14            |
| 4      | 11.36         | 11.03           | 11.37           | 10.23            |
| 5      | 11.50         | 11.17           | 11.51           | 10.38            |
| 6      | 11.49         | 11.16           | 11.50           | 10.33            |
| 7      | 11.44         | 11.12           | 11.46           | 10.29            |
| 8      | 11.28         | 10.95           | 11.29           | 10.12            |
| 9      | 11.41         | 11.08           | 11.42           | 10.27            |
| 10     | 11.39         | 11.06           | 11.40           | 10.26            |
| 11     | 11.24         | 10.91           | 11.25           | 10.11            |
| 12     | 11.52         | 11.20           | 11.54           | 10.39            |
| 13     | 11.24         | 10.91           | 11.25           | 10.12            |
| 14     | 11.56         | 11.24           | 11.58           | 10.43            |
| 15     | 11.32         | 10.99           | 11.33           | 10.19            |
| 16     | 11.35         | 11.02           | 11.36           | 10.22            |
| 17     | 11.37         | 11.04           | 11.38           | 10.24            |
| 18     | 11.33         | 10.99           | 11.33           | 10.19            |
| 19     | 11.40         | 11.07           | 11.40           | 10.26            |
| 20     | 11.36         | 11.03           | 11.37           | 10.23            |
| 21     | 11.39         | 11.06           | 11.40           | 10.26            |
| 22     | 11.32         | 11.00           | 11.33           | 10.19            |
| 23     | 11.23         | 10.90           | 11.25           | 10.11            |
| 24     | 11.25         | 10.93           | 11.26           | 10.12            |
| 25     | 11.56         | 11.23           | 11.57           | 10.43            |
| 26     | 11.44         | 11.11           | 11.42           | 10.28            |
| 27     | 11.34         | 10.98           | 11.34           | 10.20            |
| 28     | 11.55         | 11.21           | 11.56           | 10.42            |
| 29     | 11.68         | 11.32           | 11.69           | 10.55            |
| 30     | 11.41         | 11.06           | 11.41           | 10.28            |
| 31     | 11.22         | 10.89           | 11.23           | 10.06            |
| 32     | 11.13         | 10.80           | 11.14           | 10.00            |
| 33     | 11.48         | 11.14           | 11.49           | 10.36            |
| 34     | 11.53         | 11.20           | 11.55           | 10.37            |
| 35     | 11.41         | 11.08           | 11.42           | 10.26            |
| 36     | 11.56         | 11.23           | 11.57           | 10.42            |
| 37     | 11.41         | 11.09           | 11.42           | 10.28            |
| 38     | 11.55         | 11.22           | 11.56           | 10.42            |
| 39     | 11.35         | 11.03           | 11.36           | 10.22            |
| 40     | 11.10         | 10.77           | 11.12           | 9.98             |
| 41     | 11.16         | 10.83           | 11.17           | 10.03            |
| 42     | 11.26         | 10.93           | 11.27           | 10.13            |
| 43     | 11.17         | 10.85           | 11.18           | 10.04            |
| 44     | 11.55         | 11.22           | 11.56           | 10.42            |
| 45     | 11.48         | 11.15           | 11.50           | 10.36            |
| 46     | 11.47         | 11.15           | 11.48           | 10.34            |
| 47     | 11.15         | 10.79           | 11.16           | 10.02            |
| 48     | 11.08         | 10.74           | 11.10           | 9.95             |
| 49     | 11.33         | 10.97           | 11.31           | 10.17            |
| 50     | 11.67         | 11.32           | 11.67           | 10.54            |
| 51     | 11.48         | 11.15           | 11.49           | 10.36            |
| 52     | 11.29         | 10.96           | 11.30           | 10.13            |
| 53     | 11.39         | 11.05           | 11.40           | 10.24            |
| 54     | 11.64         | 11.31           | 11.66           | 10.51            |
| 55     | 11.41         | 11.08           | 11.42           | 10.28            |
| 56     | 11.32         | 10.99           | 11.33           | 10.19            |
| 57     | 11.47         | 11.15           | 11.48           | 10.31            |
| 58     | 11.64         | 11.31           | 11.65           | 10.50            |
| 59     | 11.30         | 10.97           | 11.31           | 10.17            |
| 60     | 11.47         | 11.14           | 11.48           | 10.34            |
| 61     | 11.42         | 11.10           | 11.44           | 10.29            |
| 62     | 11.35         | 11.02           | 11.36           | 10.23            |
| 63     | 11.15         | 10.82           | 11.16           | 10.02            |

**Table 7-6. 16-User Beam 1CC High Channel Conducted Powers (LTE Band 48 – 10MHz)**

|                                      |                                                                                                                                                                                                                         |                                |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b>  |                                | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                                                                                                                                                       | EUT Type:<br>Massive MIMO CBSD | Page 31 of 172                  |

| High Channel 1CC                 | QPSK    | 16-QAM  | 64-QAM  | 256-QAM |
|----------------------------------|---------|---------|---------|---------|
| Total MIMO Conducted Power (mW)  | 879.505 | 814.394 | 880.908 | 676.906 |
| Total MIMO Conducted Power (dBm) | 29.44   | 29.11   | 29.45   | 28.31   |
| Ant. Gain(dBi)                   | 23.50   | 23.50   | 23.50   | 23.50   |
| 16 beam reduction (dB)           | -12.04  | -12.04  | -12.04  | -12.04  |
| BF Gain (dB)                     | 3.01    | 3.01    | 3.01    | 3.01    |
| MIMO EIRP (dBm/10 MHz)           | 43.91   | 43.58   | 43.92   | 42.77   |
| FCC EIRP Limit (dBm/10MHz)       | 47.00   | 47.00   | 47.00   | 47.00   |
| Margin (dB)                      | -3.09   | -3.42   | -3.08   | -4.23   |

**Table 7-7. 16-User Beam 1CC High Channel MIMO Power (LTE Band 48 – 10MHz)**

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBS         |                                                                                       | Page 32 of 172                  |

## 16- User Beam Configuration (1CC – 20MHz Total Bandwidth)

| Port # | QPSK (dBm) | 16-QAM (dBm) | 64-QAM (dBm) | 256-QAM (dBm) |
|--------|------------|--------------|--------------|---------------|
| 0      | 14.53      | 14.41        | 14.70        | 14.49         |
| 1      | 14.85      | 14.79        | 15.08        | 14.87         |
| 2      | 14.56      | 14.78        | 14.79        | 14.61         |
| 3      | 14.88      | 14.40        | 14.60        | 14.45         |
| 4      | 14.35      | 14.38        | 14.68        | 14.51         |
| 5      | 14.78      | 14.67        | 14.94        | 14.79         |
| 6      | 14.27      | 14.21        | 14.45        | 14.77         |
| 7      | 14.31      | 14.05        | 14.38        | 14.24         |
| 8      | 14.53      | 14.38        | 14.65        | 14.48         |
| 9      | 14.73      | 14.54        | 14.86        | 14.66         |
| 10     | 14.56      | 14.48        | 14.73        | 14.58         |
| 11     | 14.40      | 14.24        | 14.50        | 14.38         |
| 12     | 14.55      | 14.39        | 14.66        | 14.61         |
| 13     | 14.41      | 14.39        | 14.67        | 14.48         |
| 14     | 14.34      | 14.43        | 14.67        | 14.51         |
| 15     | 13.85      | 14.17        | 14.40        | 14.25         |
| 16     | 14.55      | 14.35        | 14.66        | 14.36         |
| 17     | 14.35      | 14.32        | 14.59        | 14.39         |
| 18     | 14.62      | 14.54        | 14.74        | 14.54         |
| 19     | 14.48      | 14.37        | 14.67        | 14.47         |
| 20     | 14.56      | 14.45        | 14.72        | 14.55         |
| 21     | 14.31      | 14.14        | 14.43        | 14.23         |
| 22     | 14.51      | 14.40        | 14.69        | 14.54         |
| 23     | 14.50      | 14.65        | 14.66        | 14.51         |
| 24     | 14.69      | 14.61        | 14.81        | 14.64         |
| 25     | 14.76      | 14.59        | 14.89        | 14.74         |
| 26     | 14.46      | 14.36        | 14.63        | 14.95         |
| 27     | 14.41      | 14.27        | 14.51        | 14.37         |
| 28     | 14.44      | 14.30        | 14.55        | 14.38         |
| 29     | 14.55      | 14.55        | 14.81        | 14.61         |
| 30     | 14.31      | 14.37        | 14.64        | 14.49         |
| 31     | 14.12      | 14.39        | 14.67        | 14.55         |
| 32     | 14.35      | 14.15        | 14.42        | 14.99         |
| 33     | 14.52      | 14.49        | 14.81        | 14.63         |
| 34     | 14.70      | 14.52        | 14.77        | 14.56         |
| 35     | 14.57      | 14.47        | 14.73        | 14.52         |
| 36     | 14.57      | 14.41        | 14.68        | 14.47         |
| 37     | 14.55      | 14.48        | 14.76        | 14.58         |
| 38     | 14.77      | 14.74        | 14.98        | 14.84         |
| 39     | 14.38      | 14.31        | 14.54        | 14.48         |
| 40     | 14.58      | 14.39        | 14.70        | 14.54         |
| 41     | 14.69      | 14.55        | 14.82        | 14.72         |
| 42     | 14.36      | 14.24        | 14.53        | 14.33         |
| 43     | 14.61      | 14.42        | 14.71        | 14.51         |
| 44     | 14.38      | 14.48        | 14.49        | 14.32         |
| 45     | 14.47      | 14.53        | 14.73        | 14.53         |
| 46     | 14.47      | 14.50        | 14.80        | 14.50         |
| 47     | 13.91      | 14.19        | 14.46        | 14.19         |
| 48     | 14.50      | 14.37        | 14.61        | 14.40         |
| 49     | 14.56      | 14.54        | 14.80        | 14.81         |
| 50     | 14.50      | 14.40        | 14.67        | 14.58         |
| 51     | 14.45      | 14.36        | 14.63        | 14.51         |
| 52     | 14.30      | 14.17        | 14.46        | 14.29         |
| 53     | 14.46      | 14.29        | 14.58        | 14.37         |
| 54     | 14.43      | 14.60        | 14.61        | 14.62         |
| 55     | 14.55      | 14.51        | 14.71        | 14.62         |
| 56     | 14.57      | 14.39        | 14.69        | 14.57         |
| 57     | 14.57      | 14.43        | 14.70        | 14.53         |
| 58     | 14.54      | 14.47        | 14.71        | 14.27         |
| 59     | 14.52      | 14.31        | 14.62        | 14.48         |
| 60     | 14.50      | 14.34        | 14.61        | 14.46         |
| 61     | 14.47      | 14.53        | 14.73        | 14.57         |
| 62     | 14.39      | 14.42        | 14.72        | 14.58         |
| 63     | 14.24      | 14.49        | 14.79        | 14.72         |

Table 7-8. 16-User Beam 1CC Low Channel Conducted Powers (LTE Band 48 – 20MHz)

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBSD        |                                                                                       | Page 33 of 172                  |

| Low Channel 1CC                  | QPSK     | 16-QAM   | 64-QAM   | 256-QAM  |
|----------------------------------|----------|----------|----------|----------|
| Total MIMO Conducted Power (mW)  | 1798.509 | 1771.767 | 1877.520 | 1818.729 |
| Total MIMO Conducted Power (dBm) | 32.55    | 32.48    | 32.74    | 32.60    |
| OBW (MHz)                        | 17.89    | 17.88    | 17.92    | 17.89    |
| Scaling factor (dB)              | -2.53    | -2.52    | -2.53    | -2.53    |
| Ant. Gain(dBi)                   | 23.50    | 23.50    | 23.50    | 23.50    |
| 16 beam reduction (dB)           | -12.04   | -12.04   | -12.04   | -12.04   |
| BF Gain (dB)                     | 3.01     | 3.01     | 3.01     | 3.01     |
| MIMO EIRP (dBm/10 MHz)           | 44.49    | 44.43    | 44.67    | 44.54    |
| FCC EIRP Limit (dBm/10MHz)       | 47.0     | 47.0     | 47.0     | 47.0     |
| Margin (dB)                      | -2.508   | -2.571   | -2.329   | -2.460   |

**Table 7-9. 16-User Beam 1CC Low Channel MIMO Power (LTE Band 48 – 20MHz)**

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBSD        |                                                                                       | Page 34 of 172                  |

| Port # | QPSK  | 16-QAM | 64-QAM | 256-QAM |
|--------|-------|--------|--------|---------|
| 0      | 14.46 | 14.39  | 14.75  | 14.42   |
| 1      | 14.06 | 13.97  | 14.25  | 14.14   |
| 2      | 14.97 | 14.86  | 15.16  | 15.12   |
| 3      | 14.13 | 13.96  | 14.28  | 14.33   |
| 4      | 13.75 | 13.82  | 13.90  | 13.71   |
| 5      | 13.92 | 13.85  | 14.04  | 14.03   |
| 6      | 14.15 | 14.05  | 14.38  | 14.43   |
| 7      | 14.07 | 13.97  | 14.30  | 14.43   |
| 8      | 14.55 | 14.45  | 14.27  | 14.50   |
| 9      | 13.82 | 13.73  | 14.15  | 13.91   |
| 10     | 14.87 | 14.75  | 15.03  | 14.72   |
| 11     | 14.16 | 14.04  | 14.45  | 13.97   |
| 12     | 13.94 | 13.84  | 14.13  | 13.90   |
| 13     | 13.85 | 13.71  | 14.04  | 13.93   |
| 14     | 14.25 | 14.08  | 14.40  | 14.32   |
| 15     | 14.05 | 13.93  | 14.20  | 14.04   |
| 16     | 14.62 | 14.77  | 14.75  | 14.61   |
| 17     | 13.92 | 14.12  | 14.09  | 13.89   |
| 18     | 14.51 | 14.52  | 14.61  | 14.51   |
| 19     | 14.11 | 13.94  | 14.28  | 14.15   |
| 20     | 13.80 | 13.72  | 13.92  | 13.93   |
| 21     | 13.62 | 13.48  | 14.17  | 13.57   |
| 22     | 14.67 | 14.60  | 14.78  | 14.74   |
| 23     | 13.87 | 13.73  | 14.11  | 13.86   |
| 24     | 14.60 | 14.53  | 14.75  | 14.59   |
| 25     | 13.93 | 13.85  | 13.94  | 13.90   |
| 26     | 14.85 | 14.78  | 15.04  | 14.85   |
| 27     | 14.00 | 14.11  | 14.23  | 13.99   |
| 28     | 13.92 | 13.80  | 14.12  | 13.91   |
| 29     | 13.97 | 13.85  | 14.13  | 13.91   |
| 30     | 14.29 | 14.17  | 14.53  | 14.46   |
| 31     | 14.07 | 14.00  | 14.34  | 14.12   |
| 32     | 14.16 | 14.07  | 14.32  | 14.15   |
| 33     | 13.94 | 13.86  | 14.06  | 13.96   |
| 34     | 14.14 | 13.97  | 14.02  | 14.10   |
| 35     | 14.09 | 14.16  | 14.21  | 14.06   |
| 36     | 13.98 | 13.91  | 14.17  | 13.96   |
| 37     | 14.06 | 13.96  | 14.22  | 14.04   |
| 38     | 14.17 | 14.07  | 14.35  | 14.21   |
| 39     | 13.92 | 13.82  | 14.08  | 14.05   |
| 40     | 14.23 | 14.13  | 14.49  | 14.28   |
| 41     | 13.89 | 13.75  | 14.10  | 13.88   |
| 42     | 15.06 | 14.97  | 15.34  | 15.08   |
| 43     | 13.99 | 13.85  | 14.28  | 13.95   |
| 44     | 13.79 | 13.80  | 14.34  | 13.76   |
| 45     | 13.89 | 13.72  | 14.00  | 13.87   |
| 46     | 14.12 | 14.04  | 14.36  | 14.27   |
| 47     | 14.02 | 13.85  | 14.17  | 14.22   |
| 48     | 14.37 | 14.25  | 14.38  | 14.33   |
| 49     | 14.09 | 14.24  | 14.28  | 14.16   |
| 50     | 14.69 | 14.89  | 14.92  | 14.68   |
| 51     | 13.99 | 14.00  | 14.19  | 13.94   |
| 52     | 13.93 | 13.76  | 14.26  | 14.02   |
| 53     | 14.17 | 14.09  | 14.72  | 14.02   |
| 54     | 14.07 | 13.94  | 14.24  | 13.88   |
| 55     | 14.01 | 13.86  | 14.13  | 14.14   |
| 56     | 14.50 | 14.40  | 14.73  | 14.45   |
| 57     | 13.94 | 13.89  | 14.17  | 13.93   |
| 58     | 14.68 | 14.67  | 14.40  | 14.35   |
| 59     | 13.94 | 14.10  | 14.27  | 14.01   |
| 60     | 13.89 | 13.76  | 14.05  | 13.95   |
| 61     | 14.05 | 13.90  | 14.23  | 14.05   |
| 62     | 14.19 | 14.09  | 14.42  | 14.20   |
| 63     | 14.00 | 13.95  | 14.20  | 14.13   |

**Table 7-10. 16-User Beam 1CC Mid Channel Conducted Powers (LTE Band 48 – 20MHz)**

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBSD        |                                                                                       | Page 35 of 172                  |

| Mid Channel 1CC                  | QPSK     | 16-QAM   | 64-QAM   | 256-QAM  |
|----------------------------------|----------|----------|----------|----------|
| Total MIMO Conducted Power (mW)  | 1669.222 | 1642.330 | 1742.074 | 1676.837 |
| Total MIMO Conducted Power (dBm) | 32.23    | 32.15    | 32.41    | 32.24    |
| OBW (MHz)                        | 17.89    | 17.88    | 17.92    | 17.89    |
| Scaling factor (dB)              | -2.53    | -2.52    | -2.53    | -2.53    |
| Ant. Gain(dBi)                   | 23.50    | 23.50    | 23.50    | 23.50    |
| 16 beam reduction (dB)           | -12.04   | -12.04   | -12.04   | -12.04   |
| BF Gain (dB)                     | 3.01     | 3.01     | 3.01     | 3.01     |
| MIMO EIRP (dBm/10 MHz)           | 44.17    | 44.10    | 44.35    | 44.19    |
| FCC EIRP Limit (dBm/10MHz)       | 47.0     | 47.0     | 47.0     | 47.0     |
| Margin (dB)                      | -2.832   | -2.900   | -2.654   | -2.812   |

Table 7-11. 16-User Beam 1CC Mid Channel MIMO Power (LTE Band 48 – 20MHz)

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBSD        |                                                                                       | Page 36 of 172                  |

| Port # | QPSK  | 16-QAM | 64-QAM | 256-QAM |
|--------|-------|--------|--------|---------|
| 0      | 13.96 | 13.86  | 13.96  | 13.97   |
| 1      | 14.72 | 14.63  | 14.90  | 14.71   |
| 2      | 14.00 | 13.97  | 14.17  | 14.05   |
| 3      | 14.39 | 14.21  | 14.51  | 14.36   |
| 4      | 15.07 | 14.92  | 15.30  | 15.13   |
| 5      | 14.57 | 14.52  | 14.80  | 14.65   |
| 6      | 14.56 | 14.37  | 14.28  | 14.60   |
| 7      | 14.02 | 14.18  | 14.35  | 14.21   |
| 8      | 14.40 | 14.30  | 14.56  | 14.39   |
| 9      | 14.84 | 14.61  | 15.02  | 14.82   |
| 10     | 14.05 | 13.98  | 14.21  | 14.06   |
| 11     | 14.10 | 14.01  | 14.36  | 14.24   |
| 12     | 15.10 | 14.99  | 15.31  | 15.06   |
| 13     | 14.49 | 14.48  | 14.77  | 14.57   |
| 14     | 14.02 | 14.18  | 14.31  | 14.17   |
| 15     | 14.08 | 14.24  | 14.37  | 14.28   |
| 16     | 14.31 | 14.21  | 14.50  | 14.27   |
| 17     | 14.75 | 14.66  | 14.94  | 14.82   |
| 18     | 13.85 | 13.80  | 14.00  | 13.84   |
| 19     | 14.34 | 14.20  | 14.49  | 14.33   |
| 20     | 15.16 | 15.09  | 15.28  | 15.13   |
| 21     | 14.83 | 14.75  | 15.04  | 14.83   |
| 22     | 14.35 | 14.28  | 14.38  | 14.39   |
| 23     | 14.19 | 14.30  | 14.41  | 14.32   |
| 24     | 14.89 | 14.77  | 14.96  | 14.84   |
| 25     | 14.90 | 14.78  | 15.06  | 14.89   |
| 26     | 14.50 | 14.38  | 14.61  | 14.17   |
| 27     | 14.33 | 14.26  | 14.54  | 14.40   |
| 28     | 14.88 | 14.79  | 15.09  | 14.94   |
| 29     | 15.18 | 15.10  | 15.34  | 15.18   |
| 30     | 14.42 | 14.38  | 14.66  | 14.52   |
| 31     | 14.18 | 14.27  | 14.45  | 14.38   |
| 32     | 14.08 | 13.95  | 14.24  | 14.03   |
| 33     | 15.00 | 14.83  | 15.12  | 14.89   |
| 34     | 14.13 | 14.00  | 14.01  | 14.16   |
| 35     | 14.09 | 14.01  | 14.21  | 14.18   |
| 36     | 15.26 | 15.15  | 15.45  | 15.25   |
| 37     | 14.62 | 14.50  | 14.77  | 14.61   |
| 38     | 14.45 | 14.28  | 14.52  | 14.39   |
| 39     | 14.23 | 14.30  | 14.52  | 14.40   |
| 40     | 14.08 | 14.01  | 13.56  | 14.13   |
| 41     | 14.45 | 14.35  | 14.62  | 14.44   |
| 42     | 13.90 | 13.80  | 14.13  | 13.92   |
| 43     | 14.23 | 14.13  | 14.40  | 14.19   |
| 44     | 15.02 | 14.88  | 15.20  | 14.99   |
| 45     | 14.84 | 14.75  | 15.00  | 14.82   |
| 46     | 14.26 | 14.12  | 14.38  | 14.24   |
| 47     | 13.98 | 13.89  | 14.16  | 14.10   |
| 48     | 13.93 | 13.81  | 14.09  | 13.93   |
| 49     | 14.52 | 14.40  | 14.64  | 14.54   |
| 50     | 14.22 | 14.12  | 14.35  | 14.15   |
| 51     | 14.40 | 14.26  | 14.57  | 14.37   |
| 52     | 15.00 | 14.83  | 15.10  | 14.93   |
| 53     | 14.72 | 14.60  | 14.83  | 14.63   |
| 54     | 14.37 | 14.52  | 14.63  | 14.48   |
| 55     | 14.28 | 14.48  | 14.61  | 14.56   |
| 56     | 14.43 | 14.44  | 14.98  | 14.79   |
| 57     | 14.78 | 14.61  | 14.89  | 14.73   |
| 58     | 14.10 | 14.02  | 14.34  | 14.19   |
| 59     | 14.46 | 14.33  | 14.61  | 14.31   |
| 60     | 15.13 | 14.98  | 15.14  | 14.94   |
| 61     | 14.80 | 14.70  | 14.99  | 14.84   |
| 62     | 14.44 | 14.39  | 14.67  | 14.45   |
| 63     | 14.17 | 14.28  | 14.37  | 14.30   |

**Table 7-12. 16-User Beam 1CC High Channel Conducted Powers (LTE Band 48 – 20MHz)**

|                                      |                                                                                                                                                                                                                         |                                |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b>  |                                | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                                                                                                                                                       | EUT Type:<br>Massive MIMO CBSD | Page 37 of 172                  |

| High Channel 1CC                 | QPSK     | 16-QAM   | 64-QAM   | 256-QAM  |
|----------------------------------|----------|----------|----------|----------|
| Total MIMO Conducted Power (mW)  | 1796.267 | 1765.772 | 1864.342 | 1805.712 |
| Total MIMO Conducted Power (dBm) | 32.54    | 32.47    | 32.71    | 32.57    |
| OBW (MHz)                        | 17.89    | 17.88    | 17.92    | 17.89    |
| Scaling factor (dB)              | -2.53    | -2.52    | -2.53    | -2.53    |
| Ant. Gain(dBi)                   | 23.50    | 23.50    | 23.50    | 23.50    |
| 16 beam reduction (dB)           | -12.04   | -12.04   | -12.04   | -12.04   |
| BF Gain (dB)                     | 3.01     | 3.01     | 3.01     | 3.01     |
| MIMO EIRP (dBm/10 MHz)           | 44.49    | 44.41    | 44.64    | 44.51    |
| FCC EIRP Limit (dBm/10MHz)       | 47.0     | 47.0     | 47.0     | 47.0     |
| Margin (dB)                      | -2.514   | -2.585   | -2.360   | -2.491   |

Table 7-13. 16-User Beam 1CC High Channel MIMO Power (LTE Band 48 – 20MHz)

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBS         |                                                                                       | Page 38 of 172                  |

## 16- User Beam Configuration (3CC – 30MHz Total Bandwidth)

| Port # | QPSK<br>(dBm) | 16-QAM<br>(dBm) | 64-QAM (dBm) | 256-QAM<br>(dBm) |
|--------|---------------|-----------------|--------------|------------------|
| 0      | 16.71         | 16.97           | 16.99        | 16.86            |
| 1      | 16.66         | 16.72           | 16.48        | 17.00            |
| 2      | 16.39         | 16.47           | 16.23        | 16.78            |
| 3      | 16.25         | 16.38           | 16.14        | 16.62            |
| 4      | 16.36         | 16.51           | 16.27        | 16.78            |
| 5      | 16.63         | 16.80           | 16.56        | 16.97            |
| 6      | 16.07         | 16.17           | 15.93        | 16.47            |
| 7      | 16.01         | 16.07           | 15.83        | 16.40            |
| 8      | 16.28         | 16.42           | 16.18        | 16.63            |
| 9      | 16.52         | 16.67           | 16.43        | 16.93            |
| 10     | 16.35         | 16.45           | 16.21        | 16.72            |
| 11     | 16.14         | 16.26           | 16.02        | 16.53            |
| 12     | 16.25         | 16.32           | 16.08        | 16.65            |
| 13     | 16.26         | 16.32           | 16.08        | 16.59            |
| 14     | 16.34         | 16.49           | 16.25        | 16.69            |
| 15     | 16.08         | 16.24           | 16.00        | 16.47            |
| 16     | 16.35         | 16.52           | 16.28        | 16.77            |
| 17     | 16.17         | 16.26           | 16.02        | 16.60            |
| 18     | 16.34         | 16.44           | 16.20        | 16.68            |
| 19     | 16.33         | 16.47           | 16.23        | 16.66            |
| 20     | 16.32         | 16.40           | 16.16        | 16.65            |
| 21     | 16.06         | 16.18           | 15.94        | 16.38            |
| 22     | 16.34         | 16.47           | 16.23        | 16.74            |
| 23     | 16.34         | 16.50           | 16.26        | 16.73            |
| 24     | 16.50         | 16.67           | 16.43        | 16.85            |
| 25     | 16.48         | 16.54           | 16.30        | 16.89            |
| 26     | 16.24         | 16.29           | 16.05        | 16.61            |
| 27     | 16.13         | 16.23           | 15.99        | 16.48            |
| 28     | 16.16         | 16.25           | 16.01        | 16.50            |
| 29     | 16.46         | 16.62           | 16.38        | 16.85            |
| 30     | 16.29         | 16.43           | 16.19        | 16.66            |
| 31     | 16.29         | 16.39           | 16.15        | 16.71            |
| 32     | 16.04         | 16.14           | 15.90        | 16.47            |
| 33     | 16.39         | 16.45           | 16.21        | 16.73            |
| 34     | 16.38         | 16.46           | 16.22        | 16.71            |
| 35     | 16.38         | 16.51           | 16.27        | 16.78            |
| 36     | 16.35         | 16.50           | 16.26        | 16.74            |
| 37     | 16.45         | 16.62           | 16.38        | 16.80            |
| 38     | 16.57         | 16.67           | 16.43        | 16.98            |
| 39     | 16.11         | 16.17           | 15.93        | 16.48            |
| 40     | 16.36         | 16.50           | 16.26        | 16.75            |
| 41     | 16.49         | 16.64           | 16.40        | 16.89            |
| 42     | 16.15         | 16.25           | 16.01        | 16.48            |
| 43     | 16.36         | 16.48           | 16.24        | 16.71            |
| 44     | 16.08         | 16.15           | 15.91        | 16.47            |
| 45     | 16.31         | 16.37           | 16.13        | 16.73            |
| 46     | 16.47         | 16.62           | 16.38        | 16.90            |
| 47     | 16.14         | 16.30           | 16.06        | 16.48            |
| 48     | 16.31         | 16.48           | 16.24        | 16.64            |
| 49     | 16.41         | 16.50           | 16.26        | 16.73            |
| 50     | 16.29         | 16.39           | 16.15        | 16.69            |
| 51     | 16.29         | 16.43           | 16.19        | 16.68            |
| 52     | 16.03         | 16.11           | 15.87        | 16.38            |
| 53     | 16.21         | 16.33           | 16.09        | 16.56            |
| 54     | 16.26         | 16.39           | 16.15        | 16.60            |
| 55     | 16.39         | 16.55           | 16.31        | 16.78            |
| 56     | 16.38         | 16.55           | 16.31        | 16.75            |
| 57     | 16.29         | 16.35           | 16.11        | 16.71            |
| 58     | 16.28         | 16.33           | 16.09        | 16.71            |
| 59     | 16.24         | 16.34           | 16.10        | 16.58            |
| 60     | 16.22         | 16.31           | 16.07        | 16.55            |
| 61     | 16.42         | 16.58           | 16.34        | 16.74            |
| 62     | 16.38         | 16.52           | 16.28        | 16.78            |
| 63     | 16.41         | 16.57           | 16.27        | 16.80            |

Table 7-14. 16-User Beam 3CC Low Channel Conducted Powers (LTE Band 48 – 30MHz)

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBSD        |                                                                                       | Page 39 of 172                  |

| Low Channel 3CC                  | QPSK     | 16-QAM   | 64-QAM   | 256-QAM  |
|----------------------------------|----------|----------|----------|----------|
| Total MIMO Conducted Power (mW)  | 2737.573 | 2813.423 | 2664.376 | 2981.073 |
| Total MIMO Conducted Power (dBm) | 34.37    | 34.49    | 34.26    | 34.74    |
| OBW (MHz)                        | 28.78    | 28.71    | 28.78    | 28.85    |
| Scaling factor (dB)              | -4.59    | -4.58    | -4.59    | -4.60    |
| Ant. Gain(dBi)                   | 23.50    | 23.50    | 23.50    | 23.50    |
| 16 beam reduction (dB)           | -12.04   | -12.04   | -12.04   | -12.04   |
| BF Gain (dB)                     | 3.01     | 3.01     | 3.01     | 3.01     |
| MIMO EIRP (dBm/10 MHz)           | 44.25    | 44.38    | 44.13    | 44.61    |
| FCC EIRP Limit (dBm/10MHz)       | 47.0     | 47.0     | 47.0     | 47.0     |
| Margin (dB)                      | -2.747   | -2.619   | -2.866   | -2.389   |

Table 7-15. 16-User Beam 3CC Low Channel MIMO Power (LTE Band 48 – 30MHz)

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBSD        |                                                                                       | Page 40 of 172                  |

| Port # | QPSK (dBm) | 16-QAM (dBm) | 64-QAM (dBm) | 256-QAM (dBm) |
|--------|------------|--------------|--------------|---------------|
| 0      | 15.80      | 15.92        | 15.66        | 16.15         |
| 1      | 16.41      | 16.57        | 16.23        | 16.75         |
| 2      | 16.30      | 16.44        | 16.14        | 16.69         |
| 3      | 16.26      | 16.35        | 16.15        | 16.63         |
| 4      | 16.36      | 16.43        | 16.27        | 16.78         |
| 5      | 16.07      | 16.12        | 16.00        | 16.50         |
| 6      | 16.07      | 16.19        | 15.93        | 16.47         |
| 7      | 16.14      | 16.30        | 15.96        | 16.53         |
| 8      | 15.93      | 16.01        | 15.83        | 16.28         |
| 9      | 16.24      | 16.31        | 16.15        | 16.65         |
| 10     | 16.34      | 16.46        | 16.20        | 16.71         |
| 11     | 16.12      | 16.22        | 16.00        | 16.51         |
| 12     | 16.10      | 16.25        | 15.93        | 16.50         |
| 13     | 16.20      | 16.36        | 16.02        | 16.53         |
| 14     | 16.33      | 16.40        | 16.24        | 16.68         |
| 15     | 16.15      | 16.21        | 16.07        | 16.54         |
| 16     | 15.95      | 16.00        | 15.88        | 16.37         |
| 17     | 16.26      | 16.39        | 16.11        | 16.69         |
| 18     | 16.17      | 16.29        | 16.03        | 16.51         |
| 19     | 16.10      | 16.18        | 16.00        | 16.43         |
| 20     | 16.17      | 16.31        | 16.01        | 16.50         |
| 21     | 16.09      | 16.19        | 15.97        | 16.41         |
| 22     | 16.21      | 16.30        | 16.10        | 16.61         |
| 23     | 16.04      | 16.10        | 15.96        | 16.43         |
| 24     | 15.86      | 15.91        | 15.79        | 16.21         |
| 25     | 16.14      | 16.30        | 15.96        | 16.55         |
| 26     | 16.25      | 16.42        | 16.06        | 16.62         |
| 27     | 16.12      | 16.24        | 15.98        | 16.47         |
| 28     | 16.08      | 16.21        | 15.93        | 16.42         |
| 29     | 16.26      | 16.32        | 16.18        | 16.65         |
| 30     | 16.29      | 16.37        | 16.19        | 16.66         |
| 31     | 16.07      | 16.19        | 15.93        | 16.49         |
| 32     | 15.89      | 16.01        | 15.75        | 16.32         |
| 33     | 16.25      | 16.41        | 16.07        | 16.59         |
| 34     | 16.23      | 16.37        | 16.07        | 16.56         |
| 35     | 16.16      | 16.25        | 16.05        | 16.56         |
| 36     | 16.24      | 16.31        | 16.15        | 16.63         |
| 37     | 16.33      | 16.38        | 16.26        | 16.68         |
| 38     | 16.23      | 16.35        | 16.09        | 16.64         |
| 39     | 15.96      | 16.12        | 15.78        | 16.33         |
| 40     | 15.85      | 15.93        | 15.75        | 16.24         |
| 41     | 16.27      | 16.34        | 16.18        | 16.67         |
| 42     | 16.23      | 16.35        | 16.09        | 16.56         |
| 43     | 16.06      | 16.16        | 15.94        | 16.41         |
| 44     | 16.05      | 16.20        | 15.88        | 16.44         |
| 45     | 16.24      | 16.40        | 16.06        | 16.66         |
| 46     | 16.20      | 16.27        | 16.11        | 16.63         |
| 47     | 15.96      | 16.02        | 15.88        | 16.30         |
| 48     | 15.96      | 16.01        | 15.89        | 16.29         |
| 49     | 16.29      | 16.42        | 16.14        | 16.61         |
| 50     | 15.96      | 16.08        | 15.82        | 16.36         |
| 51     | 16.09      | 16.17        | 15.99        | 16.48         |
| 52     | 16.27      | 16.41        | 16.11        | 16.62         |
| 53     | 16.38      | 16.48        | 16.26        | 16.73         |
| 54     | 16.15      | 16.24        | 16.04        | 16.49         |
| 55     | 15.96      | 16.02        | 15.88        | 16.35         |
| 56     | 15.84      | 15.89        | 15.77        | 16.21         |
| 57     | 16.34      | 16.50        | 16.16        | 16.76         |
| 58     | 15.96      | 16.13        | 15.77        | 16.39         |
| 59     | 16.09      | 16.21        | 15.95        | 16.43         |
| 60     | 15.98      | 16.11        | 15.83        | 16.31         |
| 61     | 16.24      | 16.30        | 16.16        | 16.56         |
| 62     | 16.22      | 16.30        | 16.12        | 16.62         |
| 63     | 15.93      | 16.05        | 15.79        | 16.32         |

**Table 7-16. 16-User Beam 3CC Mid Channel Conducted Powers (LTE Band 48 – 30MHz)**

|                                      |                                                                                                                                                                                                                         |                                |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b>  |                                | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                                                                                                                                                       | EUT Type:<br>Massive MIMO CBSD | Page 41 of 172                  |

| Mid Channel 3CC                  | QPSK     | 16-QAM   | 64-QAM   | 256-QAM  |
|----------------------------------|----------|----------|----------|----------|
| Total MIMO Conducted Power (mW)  | 2630.339 | 2695.323 | 2555.318 | 2867.403 |
| Total MIMO Conducted Power (dBm) | 34.20    | 34.31    | 34.07    | 34.57    |
| OBW (MHz)                        | 28.78    | 28.71    | 28.78    | 28.85    |
| Scaling factor (dB)              | -4.59    | -4.58    | -4.59    | -4.60    |
| Ant. Gain(dBi)                   | 23.50    | 23.50    | 23.50    | 23.50    |
| 16 beam reduction (dB)           | -12.04   | -12.04   | -12.04   | -12.04   |
| BF Gain (dB)                     | 3.01     | 3.01     | 3.01     | 3.01     |
| MIMO EIRP (dBm/10 MHz)           | 44.08    | 44.19    | 43.95    | 44.44    |
| FCC EIRP Limit (dBm/10MHz)       | 47.0     | 47.0     | 47.0     | 47.0     |
| Margin (dB)                      | -2.921   | -2.805   | -3.048   | -2.558   |

Table 7-17. 16-User Beam 3CC Mid Channel MIMO Power (LTE Band 48 – 30MHz)

|                                      |                                                                                                                                                                                                                         |                                |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b>  |                                | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                                                                                                                                                       | EUT Type:<br>Massive MIMO CBSD | Page 42 of 172                  |

| Port # | QPSK<br>(dBm) | 16-QAM<br>(dBm) | 64-QAM (dBm) | 256-QAM<br>(dBm) |
|--------|---------------|-----------------|--------------|------------------|
| 0      | 15.31         | 15.43           | 15.17        | 15.72            |
| 1      | 15.74         | 15.90           | 15.56        | 16.16            |
| 2      | 15.61         | 15.75           | 15.45        | 15.98            |
| 3      | 15.66         | 15.75           | 15.55        | 16.05            |
| 4      | 15.73         | 15.80           | 15.64        | 16.07            |
| 5      | 15.79         | 15.84           | 15.72        | 16.12            |
| 6      | 15.79         | 15.91           | 15.65        | 16.15            |
| 7      | 15.78         | 15.94           | 15.60        | 16.15            |
| 8      | 15.62         | 15.70           | 15.52        | 16.03            |
| 9      | 15.69         | 15.76           | 15.60        | 16.04            |
| 10     | 15.71         | 15.83           | 15.57        | 16.10            |
| 11     | 15.56         | 15.66           | 15.44        | 15.93            |
| 12     | 15.79         | 15.94           | 15.62        | 16.15            |
| 13     | 15.50         | 15.66           | 15.32        | 15.93            |
| 14     | 15.91         | 15.98           | 15.82        | 16.32            |
| 15     | 15.68         | 15.74           | 15.60        | 16.05            |
| 16     | 15.70         | 15.75           | 15.63        | 16.04            |
| 17     | 15.74         | 15.87           | 15.59        | 16.07            |
| 18     | 15.63         | 15.75           | 15.49        | 16.05            |
| 19     | 15.66         | 15.74           | 15.56        | 16.09            |
| 20     | 15.70         | 15.84           | 15.54        | 16.13            |
| 21     | 15.74         | 15.84           | 15.62        | 16.18            |
| 22     | 15.62         | 15.71           | 15.51        | 15.98            |
| 23     | 15.55         | 15.61           | 15.47        | 15.92            |
| 24     | 15.52         | 15.57           | 15.45        | 15.93            |
| 25     | 15.81         | 15.97           | 15.63        | 16.16            |
| 26     | 15.74         | 15.91           | 15.55        | 16.13            |
| 27     | 15.66         | 15.78           | 15.52        | 16.07            |
| 28     | 15.82         | 15.95           | 15.67        | 16.24            |
| 29     | 15.94         | 16.00           | 15.86        | 16.31            |
| 30     | 15.76         | 15.84           | 15.66        | 16.15            |
| 31     | 15.58         | 15.70           | 15.44        | 15.92            |
| 32     | 15.50         | 15.62           | 15.36        | 15.83            |
| 33     | 15.77         | 15.93           | 15.59        | 16.19            |
| 34     | 15.89         | 16.03           | 15.73        | 16.32            |
| 35     | 15.78         | 15.87           | 15.67        | 16.14            |
| 36     | 15.85         | 15.92           | 15.76        | 16.22            |
| 37     | 15.71         | 15.76           | 15.64        | 16.12            |
| 38     | 15.89         | 16.01           | 15.75        | 16.24            |
| 39     | 15.63         | 15.79           | 15.45        | 16.02            |
| 40     | 15.46         | 15.54           | 15.36        | 15.83            |
| 41     | 15.52         | 15.59           | 15.43        | 15.88            |
| 42     | 15.61         | 15.73           | 15.47        | 16.04            |
| 43     | 15.53         | 15.63           | 15.41        | 15.94            |
| 44     | 15.91         | 16.06           | 15.74        | 16.28            |
| 45     | 15.85         | 16.01           | 15.67        | 16.19            |
| 46     | 15.76         | 15.83           | 15.67        | 16.09            |
| 47     | 15.41         | 15.47           | 15.33        | 15.83            |
| 48     | 15.33         | 15.38           | 15.26        | 15.76            |
| 49     | 15.63         | 15.76           | 15.48        | 16.07            |
| 50     | 15.96         | 16.08           | 15.82        | 16.32            |
| 51     | 15.84         | 15.92           | 15.74        | 16.21            |
| 52     | 15.63         | 15.77           | 15.47        | 16.04            |
| 53     | 15.69         | 15.79           | 15.57        | 16.10            |
| 54     | 15.96         | 16.05           | 15.85        | 16.38            |
| 55     | 15.68         | 15.74           | 15.60        | 16.05            |
| 56     | 15.58         | 15.63           | 15.51        | 15.97            |
| 57     | 15.82         | 15.98           | 15.64        | 16.16            |
| 58     | 16.00         | 16.17           | 15.81        | 16.33            |
| 59     | 15.67         | 15.79           | 15.53        | 16.09            |
| 60     | 15.76         | 15.89           | 15.61        | 16.19            |
| 61     | 15.72         | 15.78           | 15.64        | 16.16            |
| 62     | 15.69         | 15.77           | 15.59        | 16.05            |
| 63     | 15.43         | 15.55           | 15.29        | 15.80            |

**Table 7-18. 16-User Beam 3CC High Channel Conducted Powers (LTE Band 48 – 30MHz)**

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBSD        |                                                                                       | Page 43 of 172                  |

| High Channel 3CC                 | QPSK     | 16-QAM   | 64-QAM   | 256-QAM  |
|----------------------------------|----------|----------|----------|----------|
| Total MIMO Conducted Power (mW)  | 2376.645 | 2435.410 | 2308.812 | 2597.060 |
| Total MIMO Conducted Power (dBm) | 33.76    | 33.87    | 33.63    | 34.14    |
| OBW (MHz)                        | 28.78    | 28.71    | 28.78    | 28.85    |
| Scaling factor (dB)              | -4.59    | -4.58    | -4.59    | -4.60    |
| Ant. Gain(dBi)                   | 23.50    | 23.50    | 23.50    | 23.50    |
| 16 beam reduction (dB)           | -12.04   | -12.04   | -12.04   | -12.04   |
| BF Gain (dB)                     | 3.01     | 3.01     | 3.01     | 3.01     |
| MIMO EIRP (dBm/10 MHz)           | 43.64    | 43.75    | 43.51    | 44.01    |
| FCC EIRP Limit (dBm/10MHz)       | 47.0     | 47.0     | 47.0     | 47.0     |
| Margin (dB)                      | -3.361   | -3.246   | -3.488   | -2.988   |

Table 7-19. 16-User Beam 3CC High Channel MIMO Power (LTE Band 48 – 30MHz)

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBSD        |                                                                                       | Page 44 of 172                  |

## 16- User Beam Configuration (2CC – 40MHz Total Bandwidth)

| Port # | QPSK<br>(dBm) | 16-QAM<br>(dBm) | 64-QAM (dBm) | 256-QAM<br>(dBm) |
|--------|---------------|-----------------|--------------|------------------|
| 0      | 17.90         | 17.88           | 18.22        | 17.76            |
| 1      | 18.26         | 18.24           | 18.59        | 18.11            |
| 2      | 17.98         | 17.96           | 18.26        | 17.91            |
| 3      | 18.33         | 18.31           | 18.63        | 18.15            |
| 4      | 17.81         | 17.79           | 18.06        | 17.62            |
| 5      | 18.13         | 18.11           | 18.37        | 17.99            |
| 6      | 17.61         | 17.59           | 17.88        | 17.43            |
| 7      | 17.70         | 17.68           | 17.98        | 17.61            |
| 8      | 17.91         | 17.89           | 18.23        | 17.83            |
| 9      | 18.18         | 18.16           | 18.44        | 18.10            |
| 10     | 17.99         | 17.97           | 18.29        | 17.92            |
| 11     | 17.79         | 17.77           | 18.07        | 17.64            |
| 12     | 17.91         | 17.89           | 18.18        | 17.81            |
| 13     | 17.76         | 17.74           | 18.10        | 17.60            |
| 14     | 17.78         | 17.76           | 18.10        | 17.66            |
| 15     | 17.30         | 17.28           | 17.58        | 17.19            |
| 16     | 18.01         | 17.99           | 18.26        | 17.93            |
| 17     | 17.73         | 17.71           | 17.97        | 17.54            |
| 18     | 18.01         | 17.99           | 18.34        | 17.87            |
| 19     | 17.91         | 17.89           | 18.25        | 17.83            |
| 20     | 17.93         | 17.91           | 18.27        | 17.85            |
| 21     | 17.72         | 17.70           | 18.07        | 17.55            |
| 22     | 17.93         | 17.91           | 18.20        | 17.75            |
| 23     | 17.87         | 17.85           | 18.15        | 17.78            |
| 24     | 18.10         | 18.08           | 18.42        | 18.02            |
| 25     | 18.18         | 18.16           | 18.44        | 18.11            |
| 26     | 17.91         | 17.89           | 18.21        | 17.73            |
| 27     | 17.87         | 17.85           | 18.19        | 17.68            |
| 28     | 17.79         | 17.77           | 18.12        | 17.65            |
| 29     | 17.89         | 17.87           | 18.17        | 17.73            |
| 30     | 17.70         | 17.68           | 18.00        | 17.58            |
| 31     | 17.50         | 17.48           | 17.75        | 17.39            |
| 32     | 17.80         | 17.78           | 18.04        | 17.72            |
| 33     | 17.95         | 17.93           | 18.28        | 17.88            |
| 34     | 18.09         | 18.07           | 18.43        | 17.91            |
| 35     | 17.94         | 17.92           | 18.21        | 17.84            |
| 36     | 17.99         | 17.97           | 18.27        | 17.83            |
| 37     | 17.99         | 17.97           | 18.31        | 17.87            |
| 38     | 18.23         | 18.21           | 18.49        | 18.12            |
| 39     | 17.77         | 17.75           | 18.07        | 17.69            |
| 40     | 17.93         | 17.91           | 18.21        | 17.86            |
| 41     | 18.12         | 18.10           | 18.39        | 17.97            |
| 42     | 17.80         | 17.78           | 18.14        | 17.62            |
| 43     | 17.96         | 17.94           | 18.28        | 17.77            |
| 44     | 17.72         | 17.70           | 18.00        | 17.58            |
| 45     | 17.86         | 17.84           | 18.11        | 17.71            |
| 46     | 17.85         | 17.83           | 18.09        | 17.77            |
| 47     | 17.36         | 17.34           | 17.69        | 17.26            |
| 48     | 17.93         | 17.91           | 18.27        | 17.79            |
| 49     | 17.95         | 17.93           | 18.30        | 17.78            |
| 50     | 17.86         | 17.84           | 18.13        | 17.68            |
| 51     | 17.80         | 17.78           | 18.08        | 17.71            |
| 52     | 17.74         | 17.72           | 18.06        | 17.66            |
| 53     | 17.91         | 17.89           | 18.23        | 17.84            |
| 54     | 17.89         | 17.87           | 18.22        | 17.74            |
| 55     | 17.93         | 17.91           | 18.21        | 17.79            |
| 56     | 17.96         | 17.94           | 18.26        | 17.86            |
| 57     | 18.00         | 17.98           | 18.25        | 17.84            |
| 58     | 17.91         | 17.89           | 18.15        | 17.79            |
| 59     | 17.93         | 17.91           | 18.26        | 17.83            |
| 60     | 17.89         | 17.87           | 18.23        | 17.82            |
| 61     | 17.85         | 17.83           | 18.20        | 17.67            |
| 62     | 17.84         | 17.82           | 18.11        | 17.65            |
| 63     | 17.67         | 17.65           | 17.95        | 17.53            |

Table 7-20. 16-User Beam 2CC Low Channel Conducted Powers (LTE Band 48 – 40MHz)

|                                      |                                                                                                                                                                                                                         |                                |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b>  |                                | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                                                                                                                                                       | EUT Type:<br>Massive MIMO CBSD | Page 45 of 172                  |

| Low Channel 2CC                  | QPSK     | 16-QAM   | 64-QAM   | 256-QAM  |
|----------------------------------|----------|----------|----------|----------|
| Total MIMO Conducted Power (mW)  | 3938.421 | 3920.325 | 4215.659 | 3825.367 |
| Total MIMO Conducted Power (dBm) | 35.95    | 35.93    | 36.25    | 35.83    |
| OBW (MHz)                        | 37.73    | 37.72    | 37.68    | 37.71    |
| Scaling factor (dB)              | -5.77    | -5.77    | -5.76    | -5.76    |
| Ant. Gain(dBi)                   | 23.50    | 23.50    | 23.50    | 23.50    |
| 16 beam reduction (dB)           | -12.04   | -12.04   | -12.04   | -12.04   |
| BF Gain (dB)                     | 3.01     | 3.01     | 3.01     | 3.01     |
| MIMO EIRP (dBm/10 MHz)           | 44.66    | 44.64    | 44.96    | 44.53    |
| FCC EIRP Limit (dBm/10MHz)       | 47.0     | 47.0     | 47.0     | 47.0     |
| Margin (dB)                      | -2.344   | -2.364   | -2.043   | -2.468   |

Table 7-21. 16-User Beam 2CC Low Channel MIMO Power (LTE Band 48 – 40MHz)

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBSD        |                                                                                       | Page 46 of 172                  |

| Port # | QPSK (dBm) | 16-QAM (dBm) | 64-QAM (dBm) | 256-QAM (dBm) |
|--------|------------|--------------|--------------|---------------|
| 0      | 17.81      | 17.66        | 17.87        | 17.62         |
| 1      | 17.42      | 17.23        | 17.49        | 17.22         |
| 2      | 18.26      | 18.09        | 18.37        | 18.14         |
| 3      | 17.41      | 17.29        | 17.46        | 17.18         |
| 4      | 17.10      | 17.00        | 17.19        | 16.86         |
| 5      | 17.25      | 17.17        | 17.35        | 17.06         |
| 6      | 17.39      | 17.24        | 17.52        | 17.16         |
| 7      | 17.36      | 17.17        | 17.50        | 17.22         |
| 8      | 17.83      | 17.72        | 17.86        | 17.70         |
| 9      | 17.17      | 17.07        | 17.19        | 17.04         |
| 10     | 18.20      | 18.05        | 18.23        | 18.08         |
| 11     | 17.45      | 17.32        | 17.47        | 17.25         |
| 12     | 17.20      | 17.02        | 17.27        | 17.05         |
| 13     | 17.10      | 16.91        | 17.16        | 16.89         |
| 14     | 17.59      | 17.49        | 17.72        | 17.42         |
| 15     | 17.40      | 17.31        | 17.51        | 17.24         |
| 16     | 17.98      | 17.90        | 18.05        | 17.85         |
| 17     | 17.20      | 17.04        | 17.24        | 16.96         |
| 18     | 17.80      | 17.65        | 17.83        | 17.61         |
| 19     | 17.44      | 17.33        | 17.56        | 17.31         |
| 20     | 17.15      | 16.98        | 17.28        | 17.02         |
| 21     | 16.98      | 16.85        | 17.12        | 16.76         |
| 22     | 17.96      | 17.84        | 18.02        | 17.73         |
| 23     | 17.15      | 17.06        | 17.22        | 17.01         |
| 24     | 17.95      | 17.87        | 18.06        | 17.82         |
| 25     | 17.26      | 17.07        | 17.31        | 17.14         |
| 26     | 18.20      | 18.00        | 18.29        | 17.97         |
| 27     | 17.35      | 17.20        | 17.42        | 17.11         |
| 28     | 17.28      | 17.12        | 17.34        | 17.09         |
| 29     | 17.22      | 17.13        | 17.35        | 17.01         |
| 30     | 17.53      | 17.42        | 17.64        | 17.36         |
| 31     | 17.36      | 17.21        | 17.43        | 17.20         |
| 32     | 17.44      | 17.29        | 17.48        | 17.31         |
| 33     | 17.29      | 17.10        | 17.32        | 17.17         |
| 34     | 17.47      | 17.30        | 17.59        | 17.24         |
| 35     | 17.38      | 17.26        | 17.51        | 17.23         |
| 36     | 17.24      | 17.14        | 17.38        | 17.03         |
| 37     | 17.31      | 17.23        | 17.37        | 17.14         |
| 38     | 17.52      | 17.37        | 17.55        | 17.36         |
| 39     | 17.28      | 17.09        | 17.30        | 17.15         |
| 40     | 17.52      | 17.41        | 17.59        | 17.40         |
| 41     | 17.17      | 17.07        | 17.23        | 16.97         |
| 42     | 18.41      | 18.26        | 18.54        | 18.18         |
| 43     | 17.32      | 17.19        | 17.43        | 17.08         |
| 44     | 17.03      | 16.85        | 17.10        | 16.84         |
| 45     | 17.18      | 16.99        | 17.22        | 16.98         |
| 46     | 17.47      | 17.37        | 17.50        | 17.34         |
| 47     | 17.38      | 17.29        | 17.50        | 17.23         |
| 48     | 17.62      | 17.54        | 17.75        | 17.43         |
| 49     | 17.44      | 17.28        | 17.58        | 17.22         |
| 50     | 18.05      | 17.90        | 18.11        | 17.82         |
| 51     | 17.28      | 17.17        | 17.35        | 17.14         |
| 52     | 17.21      | 17.04        | 17.32        | 17.08         |
| 53     | 17.52      | 17.39        | 17.57        | 17.40         |
| 54     | 17.40      | 17.28        | 17.49        | 17.20         |
| 55     | 17.27      | 17.18        | 17.38        | 17.08         |
| 56     | 17.75      | 17.67        | 17.82        | 17.60         |
| 57     | 17.28      | 17.09        | 17.35        | 17.07         |
| 58     | 18.03      | 17.83        | 18.06        | 17.86         |
| 59     | 17.30      | 17.15        | 17.37        | 17.15         |
| 60     | 17.18      | 17.09        | 17.24        | 17.06         |
| 61     | 17.33      | 17.25        | 17.46        | 17.10         |
| 62     | 17.54      | 17.45        | 17.65        | 17.30         |
| 63     | 17.33      | 17.25        | 17.40        | 17.14         |

**Table 7-22. 16-User Beam 2CC Mid Channel Conducted Powers (LTE Band 48 – 40MHz)**

|                                      |                                                                                                                                                                                                                         |                                |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b>  |                                | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                                                                                                                                                       | EUT Type:<br>Massive MIMO CBSD | Page 47 of 172                  |

| Mid Channel 2CC                  | QPSK     | 16-QAM   | 64-QAM   | 256-QAM  |
|----------------------------------|----------|----------|----------|----------|
| Total MIMO Conducted Power (mW)  | 3579.150 | 3471.230 | 3645.964 | 3436.680 |
| Total MIMO Conducted Power (dBm) | 35.54    | 35.40    | 35.62    | 35.36    |
| OBW (MHz)                        | 37.73    | 37.72    | 37.68    | 37.71    |
| Scaling factor (dB)              | -5.77    | -5.77    | -5.76    | -5.76    |
| Ant. Gain(dBi)                   | 23.50    | 23.50    | 23.50    | 23.50    |
| 16 beam reduction (dB)           | -12.04   | -12.04   | -12.04   | -12.04   |
| BF Gain (dB)                     | 3.01     | 3.01     | 3.01     | 3.01     |
| MIMO EIRP (dBm/10 MHz)           | 44.24    | 44.11    | 44.33    | 44.07    |
| FCC EIRP Limit (dBm/10MHz)       | 47.0     | 47.0     | 47.0     | 47.0     |
| Margin (dB)                      | -2.760   | -2.892   | -2.673   | -2.933   |

Table 7-23. 16-User Beam 2CC Mid Channel MIMO Power (LTE Band 48 – 40MHz)

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBSD        |                                                                                       | Page 48 of 172                  |

| Port # | QPSK<br>(dBm) | 16-QAM<br>(dBm) | 64-QAM (dBm) | 256-QAM<br>(dBm) |
|--------|---------------|-----------------|--------------|------------------|
| 0      | 17.40         | 17.42           | 17.18        | 17.37            |
| 1      | 18.17         | 18.20           | 18.27        | 18.16            |
| 2      | 17.45         | 17.52           | 17.44        | 17.46            |
| 3      | 17.85         | 17.86           | 17.83        | 17.91            |
| 4      | 18.42         | 18.47           | 18.45        | 18.50            |
| 5      | 17.91         | 17.97           | 17.90        | 18.01            |
| 6      | 17.95         | 18.04           | 18.03        | 17.98            |
| 7      | 17.46         | 17.56           | 17.55        | 17.45            |
| 8      | 17.85         | 17.84           | 17.94        | 17.92            |
| 9      | 18.29         | 18.27           | 18.39        | 18.37            |
| 10     | 17.51         | 17.50           | 17.53        | 17.54            |
| 11     | 17.45         | 17.43           | 17.52        | 17.50            |
| 12     | 18.44         | 18.47           | 18.45        | 18.44            |
| 13     | 17.88         | 17.90           | 17.93        | 17.87            |
| 14     | 17.43         | 17.52           | 17.49        | 17.51            |
| 15     | 17.50         | 17.57           | 17.59        | 17.59            |
| 16     | 17.76         | 17.79           | 17.74        | 17.86            |
| 17     | 18.14         | 18.14           | 18.17        | 18.16            |
| 18     | 17.23         | 17.22           | 17.32        | 17.26            |
| 19     | 17.80         | 17.88           | 17.89        | 17.87            |
| 20     | 18.51         | 18.60           | 18.51        | 18.52            |
| 21     | 18.17         | 18.27           | 18.16        | 18.22            |
| 22     | 17.74         | 17.76           | 17.82        | 17.80            |
| 23     | 17.54         | 17.57           | 17.63        | 17.63            |
| 24     | 18.33         | 18.40           | 18.43        | 18.43            |
| 25     | 18.35         | 18.36           | 18.34        | 18.34            |
| 26     | 17.95         | 18.00           | 17.93        | 17.93            |
| 27     | 17.67         | 17.70           | 17.70        | 17.70            |
| 28     | 18.32         | 18.34           | 18.33        | 18.34            |
| 29     | 18.63         | 18.72           | 18.68        | 18.72            |
| 30     | 17.87         | 17.94           | 17.93        | 17.94            |
| 31     | 17.64         | 17.67           | 17.73        | 17.67            |
| 32     | 17.43         | 17.43           | 17.53        | 17.46            |
| 33     | 18.34         | 18.33           | 18.33        | 18.33            |
| 34     | 17.52         | 17.60           | 17.59        | 17.53            |
| 35     | 17.48         | 17.57           | 17.49        | 17.54            |
| 36     | 18.64         | 18.74           | 18.69        | 18.72            |
| 37     | 18.08         | 18.10           | 18.14        | 18.18            |
| 38     | 17.80         | 17.79           | 17.89        | 17.83            |
| 39     | 17.57         | 17.55           | 17.67        | 17.56            |
| 40     | 17.47         | 17.50           | 17.49        | 17.54            |
| 41     | 17.80         | 17.82           | 17.79        | 17.88            |
| 42     | 17.34         | 17.43           | 17.32        | 17.37            |
| 43     | 17.68         | 17.75           | 17.71        | 17.73            |
| 44     | 18.47         | 18.50           | 18.49        | 18.47            |
| 45     | 18.28         | 18.28           | 18.37        | 18.27            |
| 46     | 17.71         | 17.70           | 17.78        | 17.79            |
| 47     | 17.43         | 17.51           | 17.46        | 17.52            |
| 48     | 17.39         | 17.48           | 17.39        | 17.49            |
| 49     | 17.87         | 17.97           | 17.86        | 17.89            |
| 50     | 17.56         | 17.58           | 17.64        | 17.59            |
| 51     | 17.79         | 17.82           | 17.88        | 17.86            |
| 52     | 18.46         | 18.53           | 18.56        | 18.47            |
| 53     | 18.07         | 18.08           | 18.09        | 18.12            |
| 54     | 17.71         | 17.76           | 17.74        | 17.77            |
| 55     | 17.67         | 17.74           | 17.74        | 17.76            |
| 56     | 17.78         | 17.81           | 17.79        | 17.88            |
| 57     | 18.22         | 18.25           | 18.27        | 18.21            |
| 58     | 17.55         | 17.54           | 17.62        | 17.53            |
| 59     | 17.91         | 17.94           | 18.01        | 17.94            |
| 60     | 18.59         | 18.61           | 18.58        | 18.61            |
| 61     | 18.15         | 18.24           | 18.13        | 18.24            |
| 62     | 17.78         | 17.85           | 17.81        | 17.85            |
| 63     | 17.56         | 17.59           | 17.59        | 17.59            |

**Table 7-24. 16-User Beam 2CC High Channel Conducted Powers (LTE Band 48 – 40MHz)**

|                                      |                                                                                                                                                                                                                         |                                |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b>  |                                | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                                                                                                                                                       | EUT Type:<br>Massive MIMO CBSD | Page 49 of 172                  |

| High Channel 2CC                 | QPSK     | 16-QAM   | 64-QAM   | 256-QAM  |
|----------------------------------|----------|----------|----------|----------|
| Total MIMO Conducted Power (mW)  | 3934.149 | 3971.115 | 3970.303 | 3973.562 |
| Total MIMO Conducted Power (dBm) | 35.95    | 35.99    | 35.99    | 35.99    |
| OBW (MHz)                        | 37.73    | 37.72    | 37.68    | 37.71    |
| Scaling factor (dB)              | -5.77    | -5.77    | -5.76    | -5.76    |
| Ant. Gain(dBi)                   | 23.50    | 23.50    | 23.50    | 23.50    |
| 16 beam reduction (dB)           | -12.04   | -12.04   | -12.04   | -12.04   |
| BF Gain (dB)                     | 3.01     | 3.01     | 3.01     | 3.01     |
| MIMO EIRP (dBm/10 MHz)           | 44.65    | 44.69    | 44.70    | 44.70    |
| FCC EIRP Limit (dBm/10MHz)       | 47.0     | 47.0     | 47.0     | 47.0     |
| Margin (dB)                      | -2.349   | -2.308   | -2.303   | -2.303   |

Table 7-25. 16-User Beam 2CC High Channel MIMO Power (LTE Band 48 – 40MHz)

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBSD        |                                                                                       | Page 50 of 172                  |

## 16- User Beam Configuration (3CC – 50MHz Total Bandwidth)

| Port # | QPSK<br>(dBm) | 16-QAM<br>(dBm) | 64-QAM<br>(dBm) | 256-QAM<br>(dBm) |
|--------|---------------|-----------------|-----------------|------------------|
| 0      | 18.35         | 18.62           | 18.63           | 18.22            |
| 1      | 18.70         | 18.96           | 18.99           | 18.56            |
| 2      | 18.50         | 18.72           | 18.83           | 18.41            |
| 3      | 18.74         | 19.02           | 19.01           | 18.63            |
| 4      | 18.21         | 18.45           | 18.52           | 18.15            |
| 5      | 18.58         | 18.81           | 18.90           | 18.53            |
| 6      | 18.02         | 18.22           | 18.37           | 17.94            |
| 7      | 18.20         | 18.39           | 18.56           | 18.11            |
| 8      | 18.42         | 18.72           | 18.67           | 18.29            |
| 9      | 18.69         | 19.00           | 18.93           | 18.62            |
| 10     | 18.51         | 18.81           | 18.76           | 18.40            |
| 11     | 18.23         | 18.54           | 18.47           | 18.14            |
| 12     | 18.40         | 18.66           | 18.69           | 18.32            |
| 13     | 18.19         | 18.46           | 18.47           | 18.04            |
| 14     | 18.25         | 18.45           | 18.60           | 18.12            |
| 15     | 17.78         | 18.00           | 18.11           | 17.69            |
| 16     | 18.52         | 18.78           | 18.81           | 18.46            |
| 17     | 18.13         | 18.42           | 18.39           | 18.08            |
| 18     | 18.46         | 18.76           | 18.71           | 18.32            |
| 19     | 18.42         | 18.63           | 18.76           | 18.27            |
| 20     | 18.44         | 18.64           | 18.79           | 18.29            |
| 21     | 18.14         | 18.33           | 18.50           | 17.98            |
| 22     | 18.34         | 18.61           | 18.62           | 18.26            |
| 23     | 18.37         | 18.63           | 18.66           | 18.28            |
| 24     | 18.61         | 18.83           | 18.94           | 18.48            |
| 25     | 18.70         | 18.98           | 18.97           | 18.63            |
| 26     | 18.32         | 18.56           | 18.63           | 18.21            |
| 27     | 18.27         | 18.53           | 18.56           | 18.14            |
| 28     | 18.24         | 18.51           | 18.52           | 18.10            |
| 29     | 18.32         | 18.52           | 18.67           | 18.23            |
| 30     | 18.17         | 18.39           | 18.50           | 18.06            |
| 31     | 17.98         | 18.24           | 18.27           | 17.92            |
| 32     | 18.31         | 18.60           | 18.57           | 18.26            |
| 33     | 18.47         | 18.77           | 18.72           | 18.33            |
| 34     | 18.50         | 18.71           | 18.84           | 18.35            |
| 35     | 18.43         | 18.63           | 18.78           | 18.35            |
| 36     | 18.42         | 18.61           | 18.78           | 18.33            |
| 37     | 18.46         | 18.73           | 18.74           | 18.33            |
| 38     | 18.71         | 19.01           | 18.96           | 18.64            |
| 39     | 18.28         | 18.59           | 18.52           | 18.17            |
| 40     | 18.45         | 18.71           | 18.74           | 18.36            |
| 41     | 18.56         | 18.83           | 18.84           | 18.48            |
| 42     | 18.21         | 18.41           | 18.56           | 18.06            |
| 43     | 18.36         | 18.58           | 18.69           | 18.23            |
| 44     | 18.17         | 18.43           | 18.46           | 18.08            |
| 45     | 18.30         | 18.59           | 18.56           | 18.24            |
| 46     | 18.36         | 18.66           | 18.61           | 18.31            |
| 47     | 17.85         | 18.06           | 18.19           | 17.71            |
| 48     | 18.38         | 18.58           | 18.73           | 18.23            |
| 49     | 18.37         | 18.56           | 18.73           | 18.21            |
| 50     | 18.27         | 18.54           | 18.55           | 18.19            |
| 51     | 18.30         | 18.56           | 18.59           | 18.21            |
| 52     | 18.25         | 18.47           | 18.58           | 18.12            |
| 53     | 18.43         | 18.71           | 18.70           | 18.30            |
| 54     | 18.33         | 18.57           | 18.64           | 18.19            |
| 55     | 18.38         | 18.60           | 18.71           | 18.29            |
| 56     | 18.45         | 18.71           | 18.74           | 18.34            |
| 57     | 18.43         | 18.69           | 18.72           | 18.37            |
| 58     | 18.38         | 18.68           | 18.63           | 18.33            |
| 59     | 18.42         | 18.68           | 18.71           | 18.28            |
| 60     | 18.41         | 18.68           | 18.69           | 18.26            |
| 61     | 18.26         | 18.46           | 18.61           | 18.10            |
| 62     | 18.24         | 18.46           | 18.57           | 18.16            |
| 63     | 18.12         | 18.38           | 18.41           | 18.03            |

Table 7-26. 16-User Beam 3CC Low Channel Conducted Powers (LTE Band 48 – 50MHz)

|                                      |                                                                                                                                                                                                                         |                                |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b>  |                                | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                                                                                                                                                       | EUT Type:<br>Massive MIMO CBSD | Page 51 of 172                  |

| Low Channel 3CC                  | QPSK     | 16-QAM   | 64-QAM   | 256-QAM  |
|----------------------------------|----------|----------|----------|----------|
| Total MIMO Conducted Power (mW)  | 4382.008 | 4641.988 | 4695.412 | 4277.184 |
| Total MIMO Conducted Power (dBm) | 36.42    | 36.67    | 36.72    | 36.31    |
| OBW (MHz)                        | 48.16    | 48.13    | 48.16    | 48.09    |
| Scaling factor (dB)              | -6.83    | -6.82    | -6.83    | -6.82    |
| Ant. Gain(dBi)                   | 23.50    | 23.50    | 23.50    | 23.50    |
| 16 beam reduction (dB)           | -12.04   | -12.04   | -12.04   | -12.04   |
| BF Gain (dB)                     | 3.01     | 3.01     | 3.01     | 3.01     |
| MIMO EIRP (dBm/10 MHz)           | 44.06    | 44.31    | 44.36    | 43.96    |
| FCC EIRP Limit (dBm/10MHz)       | 47.0     | 47.0     | 47.0     | 47.0     |
| Margin (dB)                      | -2.941   | -2.688   | -2.641   | -3.040   |

Table 7-27. 16-User Beam 3CC Low Channel MIMO Power (LTE Band 48 – 50MHz)

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBSD        |                                                                                       | Page 52 of 172                  |

| Port # | QPSK<br>(dBm) | 16-QAM<br>(dBm) | 64-QAM<br>(dBm) | 256-QAM<br>(dBm) |
|--------|---------------|-----------------|-----------------|------------------|
| 0      | 18.26         | 18.55           | 18.31           | 18.11            |
| 1      | 17.86         | 18.16           | 17.90           | 17.72            |
| 2      | 18.66         | 19.00           | 18.66           | 18.47            |
| 3      | 17.87         | 18.15           | 17.93           | 17.70            |
| 4      | 17.52         | 17.84           | 17.54           | 17.30            |
| 5      | 17.66         | 17.99           | 17.67           | 17.43            |
| 6      | 17.77         | 18.13           | 17.75           | 17.57            |
| 7      | 17.73         | 18.10           | 17.70           | 17.54            |
| 8      | 18.31         | 18.57           | 18.39           | 18.16            |
| 9      | 17.66         | 17.91           | 17.75           | 17.45            |
| 10     | 18.23         | 18.49           | 18.31           | 18.06            |
| 11     | 17.94         | 18.19           | 18.03           | 17.75            |
| 12     | 17.64         | 17.94           | 17.68           | 17.44            |
| 13     | 17.55         | 17.84           | 17.60           | 17.42            |
| 14     | 17.97         | 18.33           | 17.95           | 17.82            |
| 15     | 17.80         | 18.14           | 17.80           | 17.61            |
| 16     | 18.42         | 18.72           | 18.46           | 18.20            |
| 17     | 17.67         | 17.94           | 17.74           | 17.44            |
| 18     | 18.28         | 18.54           | 18.36           | 18.14            |
| 19     | 17.83         | 18.18           | 17.82           | 17.70            |
| 20     | 17.53         | 17.89           | 17.51           | 17.40            |
| 21     | 17.35         | 17.72           | 17.32           | 17.23            |
| 22     | 18.41         | 18.70           | 18.46           | 18.21            |
| 23     | 17.59         | 17.89           | 17.63           | 17.40            |
| 24     | 18.35         | 18.69           | 18.35           | 18.20            |
| 25     | 17.72         | 18.00           | 17.78           | 17.51            |
| 26     | 18.62         | 18.94           | 18.64           | 18.45            |
| 27     | 17.79         | 18.09           | 17.83           | 17.64            |
| 28     | 17.73         | 18.02           | 17.78           | 17.59            |
| 29     | 17.60         | 17.96           | 17.58           | 17.41            |
| 30     | 17.93         | 18.27           | 17.93           | 17.76            |
| 31     | 17.80         | 18.10           | 17.84           | 17.58            |
| 32     | 17.91         | 18.18           | 17.98           | 17.68            |
| 33     | 17.77         | 18.03           | 17.85           | 17.63            |
| 34     | 17.86         | 18.21           | 17.85           | 17.73            |
| 35     | 17.76         | 18.12           | 17.74           | 17.56            |
| 36     | 17.61         | 17.98           | 17.58           | 17.42            |
| 37     | 17.76         | 18.05           | 17.81           | 17.61            |
| 38     | 18.00         | 18.26           | 18.08           | 17.79            |
| 39     | 17.77         | 18.02           | 17.86           | 17.60            |
| 40     | 17.96         | 18.26           | 18.00           | 17.77            |
| 41     | 17.62         | 17.91           | 17.67           | 17.42            |
| 42     | 18.79         | 19.15           | 18.77           | 18.66            |
| 43     | 17.72         | 18.06           | 17.72           | 17.57            |
| 44     | 17.47         | 17.77           | 17.51           | 17.28            |
| 45     | 17.65         | 17.92           | 17.72           | 17.43            |
| 46     | 17.95         | 18.21           | 18.03           | 17.72            |
| 47     | 17.77         | 18.12           | 17.76           | 17.63            |
| 48     | 18.00         | 18.36           | 17.98           | 17.87            |
| 49     | 17.81         | 18.18           | 17.78           | 17.69            |
| 50     | 18.50         | 18.79           | 18.55           | 18.30            |
| 51     | 17.72         | 18.02           | 17.76           | 17.53            |
| 52     | 17.61         | 17.95           | 17.61           | 17.46            |
| 53     | 17.98         | 18.26           | 18.04           | 17.83            |
| 54     | 17.82         | 18.14           | 17.84           | 17.68            |
| 55     | 17.67         | 18.01           | 17.67           | 17.48            |
| 56     | 18.19         | 18.49           | 18.23           | 18.02            |
| 57     | 17.72         | 18.02           | 17.76           | 17.50            |
| 58     | 18.51         | 18.77           | 18.59           | 18.28            |
| 59     | 17.74         | 18.04           | 17.78           | 17.60            |
| 60     | 17.63         | 17.92           | 17.68           | 17.50            |
| 61     | 17.71         | 18.07           | 17.69           | 17.59            |
| 62     | 17.94         | 18.28           | 17.94           | 17.74            |
| 63     | 17.77         | 18.07           | 17.81           | 17.58            |

**Table 7-28. 16-User Beam 3CC Mid Channel Conducted Powers (LTE Band 48 – 50MHz)**

|                                      |                                                                                                                                                                                                                         |                                |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b>  |                                | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                                                                                                                                                       | EUT Type:<br>Massive MIMO CBSD | Page 53 of 172                  |

| Mid Channel 3CC                  | QPSK     | 16-QAM   | 64-QAM   | 256-QAM  |
|----------------------------------|----------|----------|----------|----------|
| Total MIMO Conducted Power (mW)  | 3944.392 | 4236.333 | 3971.927 | 3788.965 |
| Total MIMO Conducted Power (dBm) | 35.96    | 36.27    | 35.99    | 35.79    |
| OBW (MHz)                        | 48.16    | 48.13    | 48.16    | 48.09    |
| Scaling factor (dB)              | -6.83    | -6.82    | -6.83    | -6.82    |
| Ant. Gain(dBi)                   | 23.50    | 23.50    | 23.50    | 23.50    |
| 16 beam reduction (dB)           | -12.04   | -12.04   | -12.04   | -12.04   |
| BF Gain (dB)                     | 3.01     | 3.01     | 3.01     | 3.01     |
| MIMO EIRP (dBm/10 MHz)           | 43.60    | 43.92    | 43.63    | 43.43    |
| FCC EIRP Limit (dBm/10MHz)       | 47.0     | 47.0     | 47.0     | 47.0     |
| Margin (dB)                      | -3.398   | -3.085   | -3.368   | -3.566   |

Table 7-29. 16-User Beam 3CC Mid Channel MIMO Power (LTE Band 48 – 50MHz)

|                                      |                                                                                                                                                                                                                         |                                |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b>  |                                | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                                                                                                                                                       | EUT Type:<br>Massive MIMO CBSD | Page 54 of 172                  |

| Port # | QPSK<br>(dBm) | 16-QAM<br>(dBm) | 64-QAM<br>(dBm) | 256-QAM<br>(dBm) |
|--------|---------------|-----------------|-----------------|------------------|
| 0      | 17.92         | 18.10           | 17.84           | 17.74            |
| 1      | 18.70         | 18.89           | 18.61           | 18.51            |
| 2      | 17.90         | 18.09           | 17.81           | 17.71            |
| 3      | 18.41         | 18.61           | 18.31           | 18.21            |
| 4      | 18.99         | 19.08           | 19.00           | 18.90            |
| 5      | 18.43         | 18.51           | 18.45           | 18.35            |
| 6      | 18.51         | 18.64           | 18.48           | 18.38            |
| 7      | 17.93         | 18.11           | 17.85           | 17.75            |
| 8      | 18.31         | 18.50           | 18.22           | 18.12            |
| 9      | 18.75         | 18.94           | 18.66           | 18.56            |
| 10     | 17.96         | 18.16           | 17.86           | 17.76            |
| 11     | 17.98         | 18.07           | 17.99           | 17.89            |
| 12     | 18.92         | 19.00           | 18.94           | 18.84            |
| 13     | 18.42         | 18.55           | 18.39           | 18.29            |
| 14     | 17.93         | 18.08           | 17.88           | 17.78            |
| 15     | 17.99         | 18.15           | 17.93           | 17.83            |
| 16     | 18.22         | 18.41           | 18.13           | 18.03            |
| 17     | 18.71         | 18.84           | 18.68           | 18.58            |
| 18     | 17.75         | 17.87           | 17.73           | 17.63            |
| 19     | 18.26         | 18.46           | 18.16           | 18.06            |
| 20     | 18.97         | 19.06           | 18.98           | 18.88            |
| 21     | 18.72         | 18.80           | 18.74           | 18.64            |
| 22     | 18.30         | 18.43           | 18.27           | 18.17            |
| 23     | 18.01         | 18.10           | 18.02           | 17.92            |
| 24     | 18.79         | 18.97           | 18.71           | 18.61            |
| 25     | 18.80         | 18.99           | 18.71           | 18.61            |
| 26     | 18.51         | 18.70           | 18.42           | 18.32            |
| 27     | 18.24         | 18.32           | 18.26           | 18.16            |
| 28     | 18.84         | 19.02           | 18.76           | 18.66            |
| 29     | 19.17         | 19.36           | 19.08           | 18.98            |
| 30     | 18.37         | 18.56           | 18.28           | 18.18            |
| 31     | 18.13         | 18.33           | 18.03           | 17.93            |
| 32     | 17.89         | 17.98           | 17.90           | 17.80            |
| 33     | 18.79         | 18.87           | 18.81           | 18.71            |
| 34     | 18.08         | 18.21           | 18.05           | 17.95            |
| 35     | 17.96         | 18.09           | 17.93           | 17.83            |
| 36     | 19.18         | 19.30           | 19.16           | 19.06            |
| 37     | 18.58         | 18.78           | 18.48           | 18.38            |
| 38     | 18.29         | 18.38           | 18.30           | 18.20            |
| 39     | 18.03         | 18.11           | 18.05           | 17.95            |
| 40     | 17.92         | 18.05           | 17.89           | 17.79            |
| 41     | 18.33         | 18.42           | 18.34           | 18.24            |
| 42     | 17.90         | 18.08           | 17.82           | 17.72            |
| 43     | 18.25         | 18.44           | 18.16           | 18.06            |
| 44     | 18.99         | 19.18           | 18.90           | 18.80            |
| 45     | 18.81         | 18.99           | 18.73           | 18.63            |
| 46     | 18.17         | 18.36           | 18.08           | 17.98            |
| 47     | 17.91         | 18.10           | 17.82           | 17.72            |
| 48     | 17.91         | 18.11           | 17.81           | 17.71            |
| 49     | 18.42         | 18.51           | 18.43           | 18.33            |
| 50     | 18.12         | 18.20           | 18.14           | 18.04            |
| 51     | 18.26         | 18.39           | 18.23           | 18.13            |
| 52     | 18.92         | 19.12           | 18.82           | 18.72            |
| 53     | 18.52         | 18.61           | 18.53           | 18.43            |
| 54     | 18.24         | 18.32           | 18.26           | 18.16            |
| 55     | 18.19         | 18.32           | 18.16           | 18.06            |
| 56     | 18.26         | 18.35           | 18.27           | 18.17            |
| 57     | 18.76         | 18.94           | 18.68           | 18.58            |
| 58     | 18.05         | 18.24           | 17.96           | 17.86            |
| 59     | 18.39         | 18.58           | 18.30           | 18.20            |
| 60     | 19.04         | 19.24           | 18.94           | 18.84            |
| 61     | 18.71         | 18.80           | 18.72           | 18.62            |
| 62     | 18.35         | 18.43           | 18.37           | 18.27            |
| 63     | 18.08         | 18.21           | 18.05           | 17.95            |

**Table 7-30. 16-User Beam 3CC High Channel Conducted Powers (LTE Band 48 – 50MHz)**

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBSD        |                                                                                       | Page 55 of 172                  |

| High Channel 3CC                 | QPSK     | 16-QAM   | 64-QAM   | 256-QAM  |
|----------------------------------|----------|----------|----------|----------|
| Total MIMO Conducted Power (mW)  | 4421.218 | 4571.539 | 4375.941 | 4276.333 |
| Total MIMO Conducted Power (dBm) | 36.46    | 36.60    | 36.41    | 36.31    |
| OBW (MHz)                        | 48.16    | 48.13    | 48.16    | 48.09    |
| Scaling factor (dB)              | -6.83    | -6.82    | -6.83    | -6.82    |
| Ant. Gain(dBi)                   | 23.50    | 23.50    | 23.50    | 23.50    |
| 16 beam reduction (dB)           | -12.04   | -12.04   | -12.04   | -12.04   |
| BF Gain (dB)                     | 3.01     | 3.01     | 3.01     | 3.01     |
| MIMO EIRP (dBm/10 MHz)           | 44.10    | 44.25    | 44.05    | 43.96    |
| FCC EIRP Limit (dBm/10MHz)       | 47.0     | 47.0     | 47.0     | 47.0     |
| Margin (dB)                      | -2.902   | -2.754   | -2.947   | -3.040   |

Table 7-31. 16-User Beam 3CC High Channel MIMO Power (LTE Band 48 – 50MHz)

|                                      |                                                                                                                                                                                                                         |                                |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b>  |                                | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                                                                                                                                                       | EUT Type:<br>Massive MIMO CBSD | Page 56 of 172                  |

## 16- User Beam Configuration (3CC – 60MHz Total Bandwidth)

| Port # | QPSK (dBm) | 16-QAM (dBm) | 64-QAM (dBm) | 256-QAM (dBm) |
|--------|------------|--------------|--------------|---------------|
| 0      | 19.10      | 19.18        | 19.02        | 18.85         |
| 1      | 19.46      | 19.50        | 19.34        | 19.20         |
| 2      | 19.18      | 19.24        | 19.08        | 18.97         |
| 3      | 19.53      | 19.64        | 19.48        | 19.30         |
| 4      | 19.01      | 19.14        | 18.98        | 18.83         |
| 5      | 19.33      | 19.48        | 19.32        | 19.16         |
| 6      | 18.81      | 18.89        | 18.73        | 18.61         |
| 7      | 18.90      | 18.94        | 18.78        | 18.69         |
| 8      | 19.11      | 19.23        | 19.07        | 18.86         |
| 9      | 19.38      | 19.51        | 19.35        | 19.19         |
| 10     | 19.19      | 19.27        | 19.11        | 18.96         |
| 11     | 18.99      | 19.09        | 18.93        | 18.78         |
| 12     | 19.11      | 19.16        | 19.00        | 18.91         |
| 13     | 18.96      | 19.00        | 18.84        | 18.69         |
| 14     | 18.98      | 19.11        | 18.95        | 18.73         |
| 15     | 18.50      | 18.64        | 18.48        | 18.29         |
| 16     | 19.21      | 19.36        | 19.20        | 19.03         |
| 17     | 18.93      | 19.00        | 18.84        | 18.76         |
| 18     | 19.21      | 19.29        | 19.13        | 18.95         |
| 19     | 19.11      | 19.23        | 19.07        | 18.84         |
| 20     | 19.13      | 19.19        | 19.03        | 18.86         |
| 21     | 18.92      | 19.02        | 18.86        | 18.64         |
| 22     | 19.13      | 19.24        | 19.08        | 18.93         |
| 23     | 19.07      | 19.21        | 19.05        | 18.86         |
| 24     | 19.30      | 19.45        | 19.29        | 19.05         |
| 25     | 19.38      | 19.42        | 19.26        | 19.19         |
| 26     | 19.11      | 19.14        | 18.98        | 18.88         |
| 27     | 19.07      | 19.15        | 18.99        | 18.82         |
| 28     | 18.99      | 19.06        | 18.90        | 18.73         |
| 29     | 19.09      | 19.23        | 19.07        | 18.88         |
| 30     | 18.90      | 19.02        | 18.86        | 18.67         |
| 31     | 18.70      | 18.78        | 18.62        | 18.52         |
| 32     | 19.00      | 19.08        | 18.92        | 18.83         |
| 33     | 19.15      | 19.19        | 19.03        | 18.89         |
| 34     | 19.29      | 19.35        | 19.19        | 19.02         |
| 35     | 19.14      | 19.25        | 19.09        | 18.94         |
| 36     | 19.19      | 19.32        | 19.16        | 18.98         |
| 37     | 19.19      | 19.34        | 19.18        | 18.94         |
| 38     | 19.43      | 19.51        | 19.35        | 19.24         |
| 39     | 18.97      | 19.01        | 18.85        | 18.74         |
| 40     | 19.13      | 19.25        | 19.09        | 18.92         |
| 41     | 19.32      | 19.45        | 19.29        | 19.12         |
| 42     | 19.00      | 19.08        | 18.92        | 18.73         |
| 43     | 19.16      | 19.26        | 19.10        | 18.91         |
| 44     | 18.92      | 18.97        | 18.81        | 18.71         |
| 45     | 19.06      | 19.10        | 18.94        | 18.88         |
| 46     | 19.05      | 19.18        | 19.02        | 18.88         |
| 47     | 18.56      | 18.70        | 18.54        | 18.30         |
| 48     | 19.13      | 19.28        | 19.12        | 18.86         |
| 49     | 19.15      | 19.22        | 19.06        | 18.87         |
| 50     | 19.06      | 19.14        | 18.98        | 18.86         |
| 51     | 19.00      | 19.12        | 18.96        | 18.79         |
| 52     | 18.94      | 19.00        | 18.84        | 18.69         |
| 53     | 19.11      | 19.21        | 19.05        | 18.86         |
| 54     | 19.09      | 19.20        | 19.04        | 18.83         |
| 55     | 19.13      | 19.27        | 19.11        | 18.92         |
| 56     | 19.16      | 19.31        | 19.15        | 18.93         |
| 57     | 19.20      | 19.24        | 19.08        | 19.02         |
| 58     | 19.11      | 19.14        | 18.98        | 18.94         |
| 59     | 19.13      | 19.21        | 19.05        | 18.87         |
| 60     | 19.09      | 19.16        | 19.00        | 18.82         |
| 61     | 19.05      | 19.19        | 19.03        | 18.77         |
| 62     | 19.04      | 19.16        | 19.00        | 18.84         |
| 63     | 18.87      | 18.95        | 18.79        | 18.66         |

Table 7-32. 16-User Beam 3CC Low Channel Conducted Powers (LTE Band 48 – 60MHz)

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBSD        |                                                                                       | Page 57 of 172                  |

| Low Channel 3CC                  | QPSK     | 16-QAM   | 64-QAM   | 256-QAM  |
|----------------------------------|----------|----------|----------|----------|
| Total MIMO Conducted Power (mW)  | 5191.850 | 5306.098 | 5114.171 | 4929.527 |
| Total MIMO Conducted Power (dBm) | 37.15    | 37.25    | 37.09    | 36.93    |
| OBW (MHz)                        | 57.45    | 57.54    | 57.45    | 57.54    |
| Scaling factor (dB)              | -7.59    | -7.60    | -7.59    | -7.60    |
| Ant. Gain(dBi)                   | 23.50    | 23.50    | 23.50    | 23.50    |
| 16 beam reduction (dB)           | -12.04   | -12.04   | -12.04   | -12.04   |
| BF Gain (dB)                     | 3.01     | 3.01     | 3.01     | 3.01     |
| MIMO EIRP (dBm/10 MHz)           | 44.03    | 44.12    | 43.96    | 43.80    |
| FCC EIRP Limit (dBm/10MHz)       | 47.0     | 47.0     | 47.0     | 47.0     |
| Margin (dB)                      | -2.971   | -2.883   | -3.036   | -3.203   |

Table 7-33. 16-User Beam 3CC Low Channel MIMO Power (LTE Band 48 – 60MHz)

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBSD        |                                                                                       | Page 58 of 172                  |

| Port # | QPSK (dBm) | 16-QAM (dBm) | 64-QAM (dBm) | 256-QAM (dBm) |
|--------|------------|--------------|--------------|---------------|
| 0      | 18.8       | 18.99        | 18.87        | 18.61         |
| 1      | 18.39      | 18.62        | 18.45        | 18.19         |
| 2      | 19.37      | 19.58        | 19.48        | 19.22         |
| 3      | 18.54      | 18.70        | 18.63        | 18.37         |
| 4      | 18.09      | 18.23        | 18.23        | 17.97         |
| 5      | 18.28      | 18.40        | 18.43        | 18.17         |
| 6      | 18.60      | 18.79        | 18.72        | 18.46         |
| 7      | 18.47      | 18.70        | 18.58        | 18.32         |
| 8      | 18.96      | 19.11        | 19.03        | 18.77         |
| 9      | 18.16      | 18.30        | 18.29        | 18.03         |
| 10     | 19.23      | 19.42        | 19.32        | 19.06         |
| 11     | 18.56      | 18.73        | 18.67        | 18.41         |
| 12     | 18.37      | 18.59        | 18.49        | 18.23         |
| 13     | 18.29      | 18.52        | 18.34        | 18.08         |
| 14     | 18.60      | 18.74        | 18.67        | 18.41         |
| 15     | 18.39      | 18.52        | 18.50        | 18.24         |
| 16     | 18.95      | 19.07        | 19.09        | 18.83         |
| 17     | 18.33      | 18.53        | 18.48        | 18.22         |
| 18     | 18.91      | 19.10        | 18.97        | 18.71         |
| 19     | 18.47      | 18.62        | 18.52        | 18.26         |
| 20     | 18.14      | 18.35        | 18.19        | 17.93         |
| 21     | 18.26      | 18.43        | 18.30        | 18.04         |
| 22     | 19.07      | 19.23        | 19.19        | 18.93         |
| 23     | 18.28      | 18.41        | 18.39        | 18.13         |
| 24     | 18.94      | 19.06        | 19.01        | 18.75         |
| 25     | 18.29      | 18.52        | 18.42        | 18.16         |
| 26     | 19.19      | 19.43        | 19.28        | 19.02         |
| 27     | 18.34      | 18.53        | 18.41        | 18.15         |
| 28     | 18.25      | 18.45        | 18.31        | 18.05         |
| 29     | 18.41      | 18.54        | 18.52        | 18.26         |
| 30     | 18.74      | 18.89        | 18.83        | 18.57         |
| 31     | 18.47      | 18.66        | 18.61        | 18.35         |
| 32     | 18.57      | 18.76        | 18.72        | 18.46         |
| 33     | 18.28      | 18.51        | 18.34        | 18.08         |
| 34     | 18.50      | 18.71        | 18.55        | 18.29         |
| 35     | 18.49      | 18.65        | 18.61        | 18.35         |
| 36     | 18.41      | 18.55        | 18.52        | 18.26         |
| 37     | 18.50      | 18.62        | 18.57        | 18.31         |
| 38     | 18.51      | 18.70        | 18.64        | 18.38         |
| 39     | 18.25      | 18.48        | 18.34        | 18.08         |
| 40     | 18.63      | 18.78        | 18.74        | 18.48         |
| 41     | 18.30      | 18.44        | 18.42        | 18.16         |
| 42     | 19.40      | 19.59        | 19.45        | 19.19         |
| 43     | 18.35      | 18.52        | 18.42        | 18.16         |
| 44     | 18.24      | 18.46        | 18.35        | 18.09         |
| 45     | 18.29      | 18.52        | 18.43        | 18.17         |
| 46     | 18.46      | 18.60        | 18.61        | 18.35         |
| 47     | 18.35      | 18.48        | 18.41        | 18.15         |
| 48     | 18.81      | 18.93        | 18.86        | 18.60         |
| 49     | 18.43      | 18.63        | 18.47        | 18.21         |
| 50     | 19.02      | 19.21        | 19.14        | 18.88         |
| 51     | 18.39      | 18.54        | 18.50        | 18.24         |
| 52     | 18.34      | 18.55        | 18.41        | 18.15         |
| 53     | 18.51      | 18.68        | 18.58        | 18.32         |
| 54     | 18.43      | 18.59        | 18.49        | 18.23         |
| 55     | 18.44      | 18.57        | 18.55        | 18.29         |
| 56     | 18.94      | 19.06        | 19.03        | 18.77         |
| 57     | 18.29      | 18.52        | 18.43        | 18.17         |
| 58     | 19.02      | 19.26        | 19.17        | 18.91         |
| 59     | 18.27      | 18.46        | 18.33        | 18.07         |
| 60     | 18.29      | 18.49        | 18.34        | 18.08         |
| 61     | 18.46      | 18.59        | 18.50        | 18.24         |
| 62     | 18.53      | 18.68        | 18.65        | 18.39         |
| 63     | 18.36      | 18.55        | 18.47        | 18.21         |

**Table 7-34. 16-User Beam 3CC Mid Channel Conducted Powers (LTE Band 48 – 60MHz)**

|                                      |                                                                                                                                                                                                                         |                                |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b>  |                                | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                                                                                                                                                       | EUT Type:<br>Massive MIMO CBSD | Page 59 of 172                  |

| Mid Channel 3CC                  | QPSK     | 16-QAM   | 64-QAM   | 256-QAM  |
|----------------------------------|----------|----------|----------|----------|
| Total MIMO Conducted Power (mW)  | 4578.498 | 4767.546 | 4679.499 | 4407.572 |
| Total MIMO Conducted Power (dBm) | 36.61    | 36.78    | 36.70    | 36.44    |
| OBW (MHz)                        | 57.45    | 57.54    | 57.45    | 57.54    |
| Scaling factor (dB)              | -7.59    | -7.60    | -7.59    | -7.60    |
| Ant. Gain(dBi)                   | 23.50    | 23.50    | 23.50    | 23.50    |
| 16 beam reduction (dB)           | -12.04   | -12.04   | -12.04   | -12.04   |
| BF Gain (dB)                     | 3.01     | 3.01     | 3.01     | 3.01     |
| MIMO EIRP (dBm/10 MHz)           | 43.48    | 43.65    | 43.58    | 43.31    |
| FCC EIRP Limit (dBm/10MHz)       | 47.0     | 47.0     | 47.0     | 47.0     |
| Margin (dB)                      | -3.517   | -3.347   | -3.422   | -3.689   |

Table 7-35. 16-User Beam 3CC Mid Channel MIMO Power (LTE Band 48 – 60MHz)

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBSD        |                                                                                       | Page 60 of 172                  |

| Port # | QPSK<br>(dBm) | 16-QAM<br>(dBm) | 64-QAM (dBm) | 256-QAM<br>(dBm) |
|--------|---------------|-----------------|--------------|------------------|
| 0      | 18.97         | 19.15           | 19.10        | 18.91            |
| 1      | 19.72         | 19.91           | 19.84        | 18.19            |
| 2      | 19.00         | 19.10           | 19.12        | 19.22            |
| 3      | 19.38         | 19.47           | 19.49        | 18.37            |
| 4      | 20.17         | 19.89           | 19.39        | 17.97            |
| 5      | 19.68         | 19.84           | 19.91        | 18.17            |
| 6      | 19.62         | 19.77           | 19.80        | 18.46            |
| 7      | 19.03         | 19.14           | 19.16        | 18.32            |
| 8      | 19.40         | 19.51           | 19.52        | 18.77            |
| 9      | 19.84         | 19.67           | 19.96        | 18.03            |
| 10     | 19.04         | 19.17           | 19.15        | 19.06            |
| 11     | 19.20         | 19.33           | 19.42        | 18.41            |
| 12     | 20.21         | 19.97           | 19.44        | 18.23            |
| 13     | 19.55         | 19.74           | 19.73        | 18.08            |
| 14     | 19.06         | 19.16           | 19.22        | 18.41            |
| 15     | 19.11         | 19.20           | 19.26        | 18.24            |
| 16     | 19.31         | 19.41           | 19.43        | 18.83            |
| 17     | 19.81         | 19.89           | 19.99        | 18.22            |
| 18     | 18.92         | 19.07           | 19.11        | 18.71            |
| 19     | 19.33         | 19.52           | 19.44        | 18.26            |
| 20     | 20.26         | 19.39           | 19.48        | 17.93            |
| 21     | 19.94         | 19.73           | 19.14        | 18.04            |
| 22     | 19.41         | 19.56           | 19.59        | 18.93            |
| 23     | 19.29         | 19.42           | 19.51        | 18.13            |
| 24     | 19.90         | 19.88           | 19.03        | 18.75            |
| 25     | 19.90         | 19.96           | 19.02        | 18.16            |
| 26     | 19.50         | 19.65           | 19.62        | 19.02            |
| 27     | 19.44         | 19.57           | 19.67        | 18.15            |
| 28     | 19.89         | 19.48           | 19.83        | 18.05            |
| 29     | 20.18         | 19.67           | 19.87        | 18.26            |
| 30     | 19.42         | 19.52           | 19.54        | 18.57            |
| 31     | 19.17         | 19.26           | 19.28        | 18.35            |
| 32     | 19.18         | 19.26           | 19.40        | 18.46            |
| 33     | 20.11         | 19.68           | 19.87        | 18.08            |
| 34     | 19.19         | 19.28           | 19.37        | 18.29            |
| 35     | 19.15         | 19.23           | 19.33        | 18.35            |
| 36     | 20.33         | 19.97           | 19.86        | 18.26            |
| 37     | 19.61         | 19.76           | 19.72        | 18.31            |
| 38     | 19.55         | 19.66           | 19.77        | 18.38            |
| 39     | 19.34         | 19.51           | 19.57        | 18.08            |
| 40     | 19.14         | 19.23           | 19.32        | 18.48            |
| 41     | 19.55         | 19.64           | 19.77        | 18.16            |
| 42     | 18.91         | 19.01           | 19.04        | 19.19            |
| 43     | 19.23         | 19.32           | 19.35        | 18.16            |
| 44     | 20.02         | 19.31           | 19.76        | 18.09            |
| 45     | 19.85         | 19.93           | 19.98        | 18.17            |
| 46     | 19.26         | 19.42           | 19.38        | 18.35            |
| 47     | 18.98         | 19.17           | 19.10        | 18.15            |
| 48     | 18.92         | 19.12           | 19.03        | 18.60            |
| 49     | 19.62         | 19.77           | 19.84        | 18.21            |
| 50     | 19.33         | 19.49           | 19.56        | 18.88            |
| 51     | 19.46         | 19.55           | 19.64        | 18.24            |
| 52     | 19.99         | 19.87           | 19.56        | 18.15            |
| 53     | 19.82         | 19.97           | 19.64        | 18.32            |
| 54     | 19.48         | 19.61           | 19.71        | 18.23            |
| 55     | 19.34         | 19.52           | 19.52        | 18.29            |
| 56     | 19.53         | 19.72           | 19.75        | 18.77            |
| 57     | 19.79         | 19.89           | 19.92        | 18.17            |
| 58     | 19.10         | 19.19           | 19.22        | 18.91            |
| 59     | 19.46         | 19.54           | 19.58        | 18.07            |
| 60     | 20.12         | 19.93           | 19.78        | 18.08            |
| 61     | 19.90         | 19.88           | 19.73        | 18.24            |
| 62     | 19.55         | 19.66           | 19.78        | 18.39            |
| 63     | 19.23         | 19.40           | 19.41        | 18.21            |

**Table 7-36. 16-User Beam 3CC High Channel Conducted Powers (LTE Band 48 – 60MHz)**

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBSD        |                                                                                       | Page 61 of 172                  |

| High Channel 3CC                 | QPSK     | 16-QAM   | 64-QAM   | 256-QAM  |
|----------------------------------|----------|----------|----------|----------|
| Total MIMO Conducted Power (mW)  | 5740.388 | 5766.878 | 5742.684 | 4412.765 |
| Total MIMO Conducted Power (dBm) | 37.59    | 37.61    | 37.59    | 36.45    |
| OBW (MHz)                        | 57.45    | 57.54    | 57.45    | 57.54    |
| Scaling factor (dB)              | -7.59    | -7.60    | -7.59    | -7.60    |
| Ant. Gain(dBi)                   | 23.50    | 23.50    | 23.50    | 23.50    |
| 16 beam reduction (dB)           | -12.04   | -12.04   | -12.04   | -12.04   |
| BF Gain (dB)                     | 3.01     | 3.01     | 3.01     | 3.01     |
| MIMO EIRP (dBm/10 MHz)           | 44.47    | 44.48    | 44.47    | 43.32    |
| FCC EIRP Limit (dBm/10MHz)       | 47.0     | 47.0     | 47.0     | 47.0     |
| Margin (dB)                      | -2.534   | -2.521   | -2.533   | -3.684   |

Table 7-37. 16-User Beam 3CC High Channel MIMO Power (LTE Band 48 – 60MHz)

|                                      |                                                                                                                                                                                                                         |                                |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b>  |                                | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                                                                                                                                                       | EUT Type:<br>Massive MIMO CBSD | Page 62 of 172                  |

## 7.4 Peak Power Spectral Density Measurement

§96.41(b)

### Test Overview and Limit

The peak power density is measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated and the worst case configuration results are reported in this section.

***The maximum permissible power spectral density is 37 dBm in any 1 MHz band.***

### Test Procedure Used

KDB 971168 D01 v03r01 – Section 5.2.2

ANSI/TIA-603-E-2016 – Section 2.2.17

KDB 662911 D01 v02r01

– Section E)2) In-Band Power Spectral Density (PSD) Measurements

b) Measure and sum spectral maxima across the outputs.

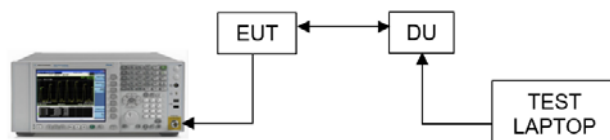
c) Measure and add 10 log(NANT) dB

### Test Settings

1. Analyzer was set to center frequency of the B48 Channel.
2. RBW = 1 MHz
3. VBW = 3 MHz
4. Detector = Average (RMS) and Trace mode = Clear write  
Refer test note 5 for additional details.
5. Sweep time = 1 second.  
Refer test note 5 for additional details.
6. Number of points > 2\*Span/RBW
7. The trace was allowed to stabilize

### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



**Figure 7-3. Test Instrument & Measurement Setup**

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBSD        |                                                                                       | Page 63 of 172                  |

## Test Notes

1. The channel power measurements are done with a Reference Level offset at 0.55 dB which consists of the test jig used in the measurement path. Additional corrections were added for the cable, connectors and attenuators used in the measurement.
2. The port with highest power i.e. worst case port per modulation has been highlighted in the following tables.
3. 16QAM was observed to be the worst case modulation. The port producing the highest PSD includes other supported modulation schemes for comparison.
4. The 16 User Beam configuration has the highest power amongst all modes. PSDs for this mode were found to be the worst case. The 16-User Beam PSD MIMO calculation and plots are included in the report.
5. 16 User Beam PSDs were found to be higher with 1CC compared to 2CC and 3CC so 1CC was determined to be the worst case for PSD. Both 10MHz and 20MHz 1CC configurations were checked with 20MHz being the worst case and therefore reported.
6. Consider the following factors for MIMO Power Spectral Density:  
The power spectral density is measured as dBm / MHz, with the resolution bandwidth of 1 MHz. PSDs are summed up in linear using the measure-and-sum technique defined in KDB 971168 D01 v03r01-Section E) 2).
7. PSD per port (dBm / MHz) is converted to a linear value (mW). A summation of linear powers for all 64 ports gives us the total MIMO conducted PSD (mW). We convert this back to logarithmic scale for further PSD calculations.
8. 16- beam reduction:  
The 16-beam reduction is applicable in the 16-User Beam operating mode of the EUT. It is a logarithmic factor applied to account for maximum 16 spatially separated beams operate simultaneously.  
16-beam power reduction factor (dB) =  $10 * \log (1 / 16) = -12.04 \text{ dB}$
9. Beamforming (BF) Gain:  
This logarithmic factor accounts for the gain if two spatially different beams overlap in real-time.  
BF Gain =  $10 * \log (2) = 3.01 \text{ dB}$
10. Antenna Gains (dBi) are provided by the client.
11. Sample Calculation:  
Let us assume the following numbers:
  - a. Total MIMO PSD = 15 dBm / MHz.
  - b. Antenna Gain = 23.5 dBi

| Factors                                           | Value                  | Unit           |
|---------------------------------------------------|------------------------|----------------|
| <b>Total MIMO PSD</b>                             | 15                     | dBm /MHz       |
| Applying Reductions:                              |                        |                |
| Antenna Gain                                      | 23.5                   | dBi            |
| 16 - Beam Reduction                               | $= 10 * \log (1 / 16)$ | -12.04 dB      |
|                                                   | $=$                    |                |
| BF Gain                                           | $= 10 * \log (2)$      | = 3.01 dB      |
| <b>Total MIMO Radiated PSD</b>                    | $=$                    | 29.47 dBm/ MHz |
| $= \text{Total MIMO PSD} + \text{Antenna Gain} +$ |                        |                |
| $16 + \text{Beam Reduction} + \text{BF Gain}$     |                        |                |
| FCC PSD Limit                                     | 37                     | dBm/ MHz       |
| <b>Margin = FCC EIRP Limit – MIMO EIRP</b>        | $= 29.47-37$           | -7.53 dB       |

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBSD        | Page 64 of 172                                                                        |                                 |

| Port # | QPSK<br>(dBm) | 16-QAM<br>(dBm) | 64-QAM<br>(dBm) | 256-QAM<br>(dBm) |
|--------|---------------|-----------------|-----------------|------------------|
| 0      |               | 3.75            |                 |                  |
| 1      |               | 4.04            |                 |                  |
| 2      |               | 4.22            |                 |                  |
| 3      |               | 4.11            |                 |                  |
| 4      |               | 4.24            |                 |                  |
| 5      |               | 3.79            |                 |                  |
| 6      |               | 4.20            |                 |                  |
| 7      |               | 3.96            |                 |                  |
| 8      |               | 3.95            |                 |                  |
| 9      |               | 3.84            |                 |                  |
| 10     | 2.84          | 4.42            | 2.98            | 2.81             |
| 11     |               | 4.24            |                 |                  |
| 12     |               | 4.17            |                 |                  |
| 13     |               | 3.85            |                 |                  |
| 14     |               | 4.22            |                 |                  |
| 15     |               | 3.74            |                 |                  |
| 16     |               | 3.85            |                 |                  |
| 17     |               | 4.01            |                 |                  |
| 18     |               | 4.16            |                 |                  |
| 19     |               | 3.94            |                 |                  |
| 20     |               | 3.96            |                 |                  |
| 21     |               | 3.68            |                 |                  |
| 22     |               | 4.23            |                 |                  |
| 23     |               | 3.80            |                 |                  |
| 24     |               | 3.83            |                 |                  |
| 25     |               | 3.95            |                 |                  |
| 26     |               | 4.41            |                 |                  |
| 27     |               | 3.78            |                 |                  |
| 28     |               | 4.00            |                 |                  |
| 29     |               | 4.07            |                 |                  |
| 30     |               | 4.29            |                 |                  |
| 31     |               | 3.93            |                 |                  |
| 32     |               | 3.77            |                 |                  |
| 33     |               | 3.80            |                 |                  |
| 34     |               | 4.33            |                 |                  |
| 35     |               | 4.05            |                 |                  |
| 36     |               | 4.12            |                 |                  |
| 37     |               | 3.87            |                 |                  |
| 38     |               | 4.34            |                 |                  |
| 39     |               | 3.86            |                 |                  |
| 40     |               | 3.61            |                 |                  |
| 41     |               | 3.72            |                 |                  |
| 42     |               | 4.40            |                 |                  |
| 43     |               | 3.90            |                 |                  |
| 44     |               | 3.86            |                 |                  |
| 45     |               | 3.75            |                 |                  |
| 46     |               | 4.27            |                 |                  |
| 47     |               | 3.73            |                 |                  |
| 48     |               | 3.81            |                 |                  |
| 49     |               | 4.03            |                 |                  |
| 50     |               | 4.06            |                 |                  |
| 51     |               | 3.90            |                 |                  |
| 52     |               | 4.07            |                 |                  |
| 53     |               | 3.98            |                 |                  |
| 54     |               | 4.26            |                 |                  |
| 55     |               | 3.90            |                 |                  |
| 56     |               | 3.85            |                 |                  |
| 57     |               | 3.81            |                 |                  |
| 58     |               | 4.29            |                 |                  |
| 59     |               | 3.79            |                 |                  |
| 60     |               | 3.78            |                 |                  |
| 61     |               | 3.99            |                 |                  |
| 62     |               | 4.12            |                 |                  |
| 63     |               | 3.67            |                 |                  |

**Table 7-38. 16-User Beam 1CC Mid Channel Peak Power Spectral Density (LTE Band 48 – 20MHz)**

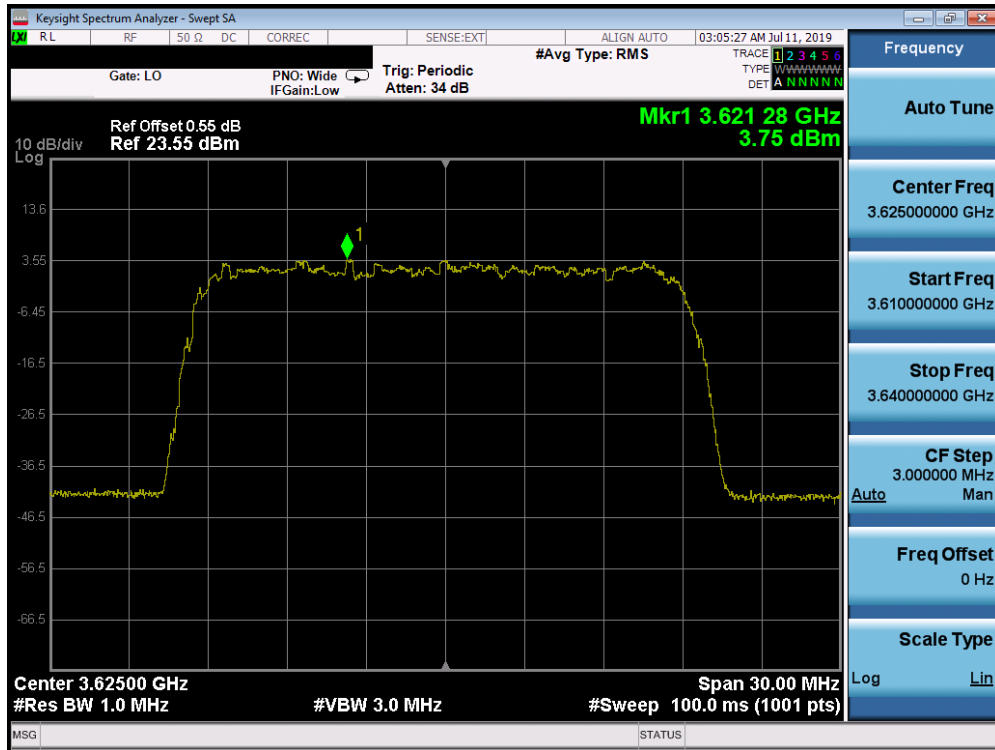
|                                      |                                                                                                                                                                                                                         |                                |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b>  |                                | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                                                                                                                                                       | EUT Type:<br>Massive MIMO CBSD | Page 65 of 172                  |

| Mid Channel<br>1CC 20MHz                 | QPSK   | 16-QAM | 64-QAM | 256-QAM |
|------------------------------------------|--------|--------|--------|---------|
| Total MIMO<br>PSD<br>(mW/MHz)            | 64.92  | 160.55 | 64.99  | 64.91   |
| Total MIMO<br>PSD<br>(dBm/MHz)           | 18.12  | 22.06  | 18.13  | 18.12   |
| Ant. Gain<br>(dBi)                       | 23.50  | 23.50  | 23.50  | 23.50   |
| 16-beam<br>Multiplexing<br>Reduction(dB) | -12.04 | -12.04 | -12.04 | -12.04  |
| Beamforming<br>Gain (dB)                 | 3.01   | 3.01   | 3.01   | 3.01    |
| Total MIMO<br>Radiated PSD<br>(dBm/MHz)  | 32.59  | 36.53  | 32.60  | 32.59   |
| FCC Maximum<br>PSD Limit<br>(dBm/MHz)    | 37.00  | 37.00  | 37.00  | 37.00   |
| Margin (dB)                              | -4.41  | -0.47  | -4.40  | -4.41   |

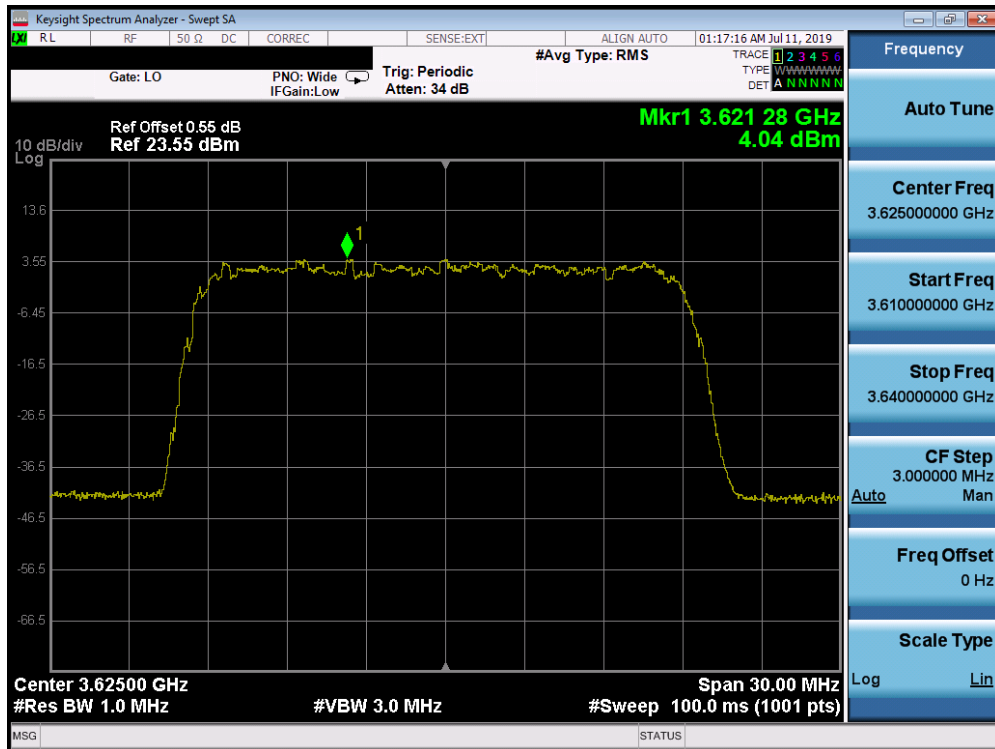
Table 7-39. 16-User Beam 1CC Mid Channel MIMO Peak Power Spectral Density (LTE Band 48 – 20MHz)

|                                      |                                                                                     |                                       |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: A3LMT6402-48A                |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019                                                   | EUT Type:<br>Massive MIMO CBSD        |                                                                                       | Page 66 of 172                  |

## 16- User Beam 1CC Mid Channel

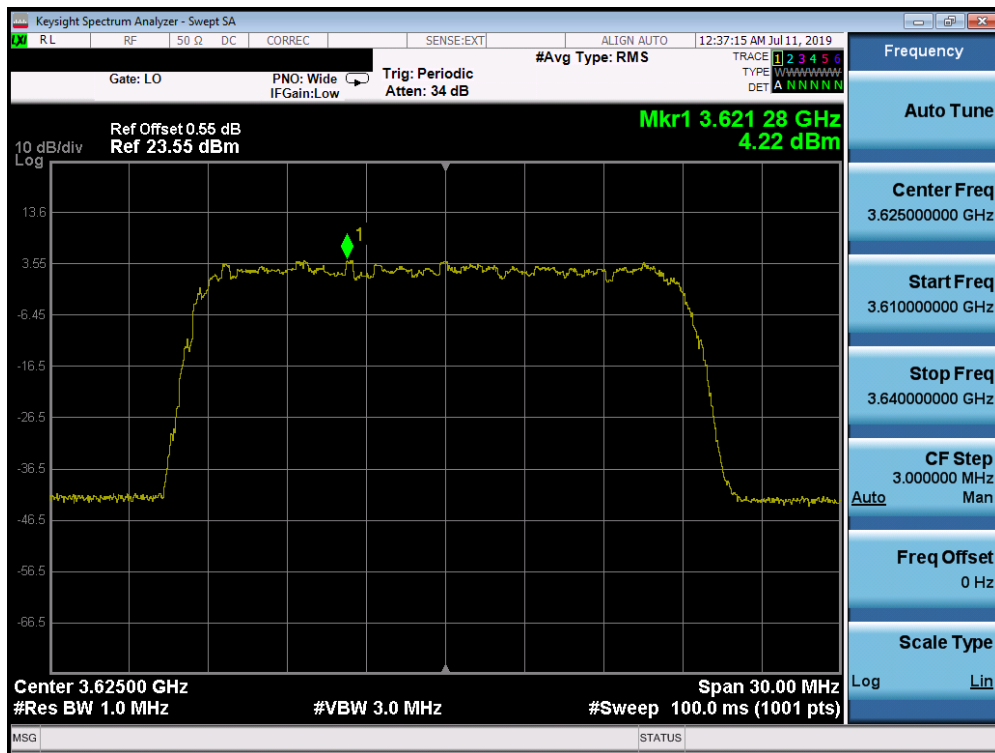


Plot 7-25. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 00

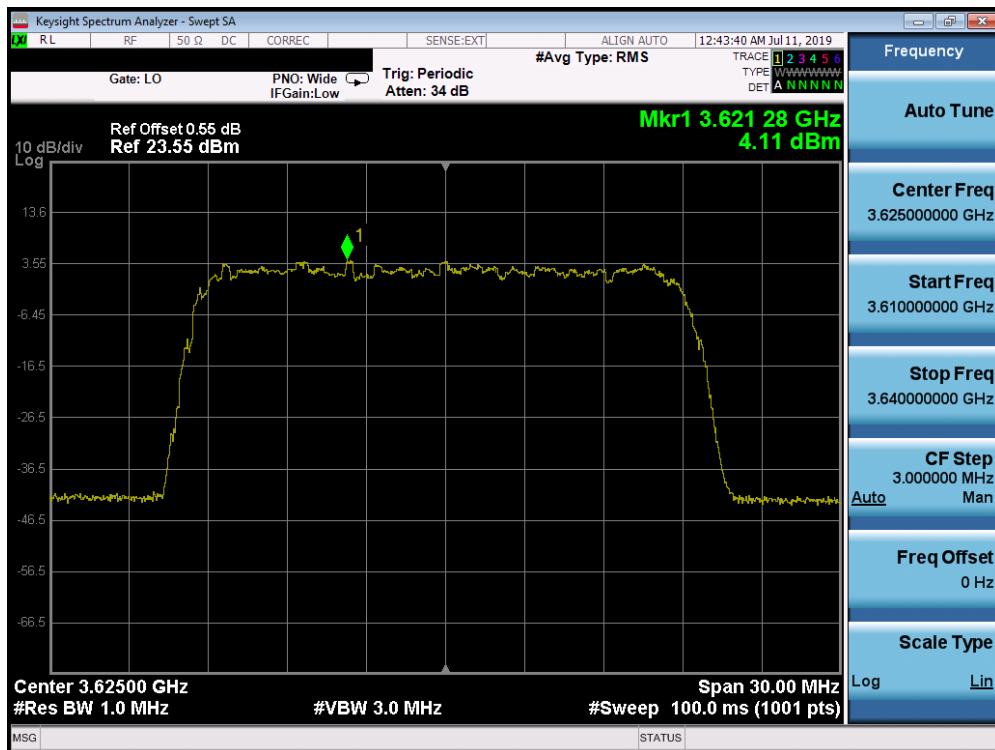


Plot 7-26. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 01

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 67 of 172                  |

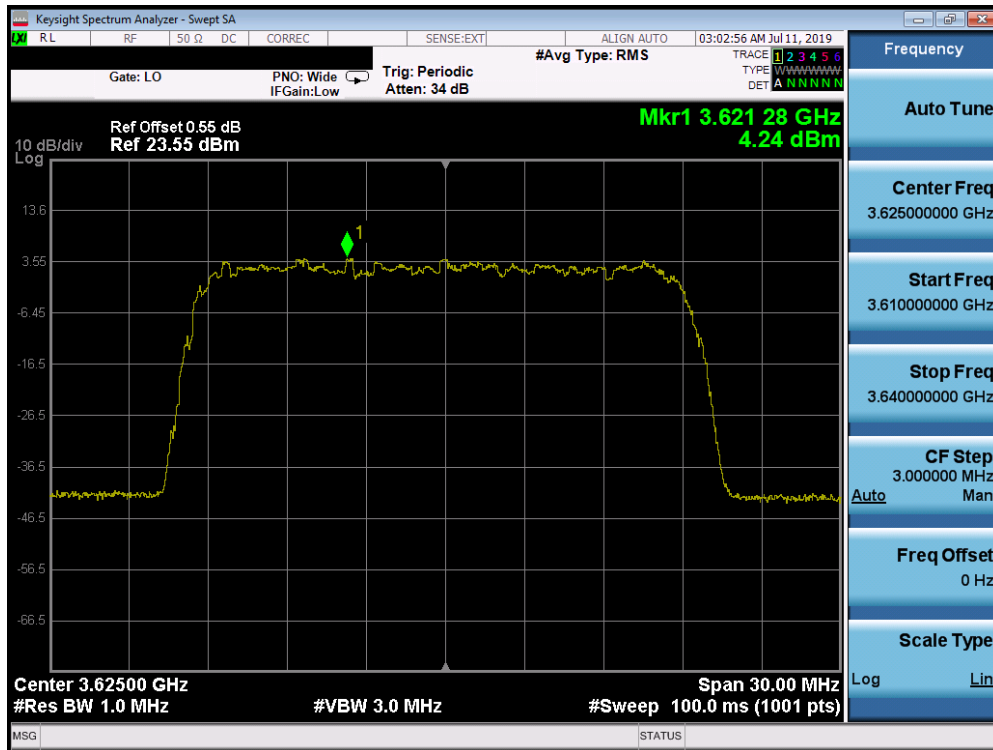


Plot 7-27. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 02

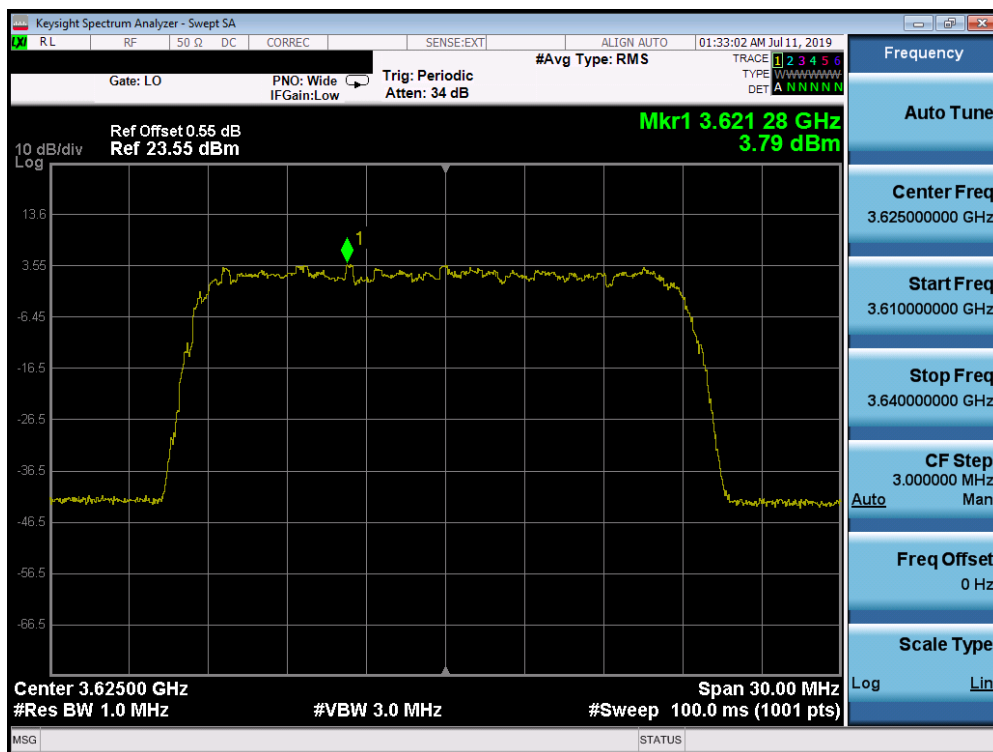


Plot 7-28. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 03

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 68 of 172                  |

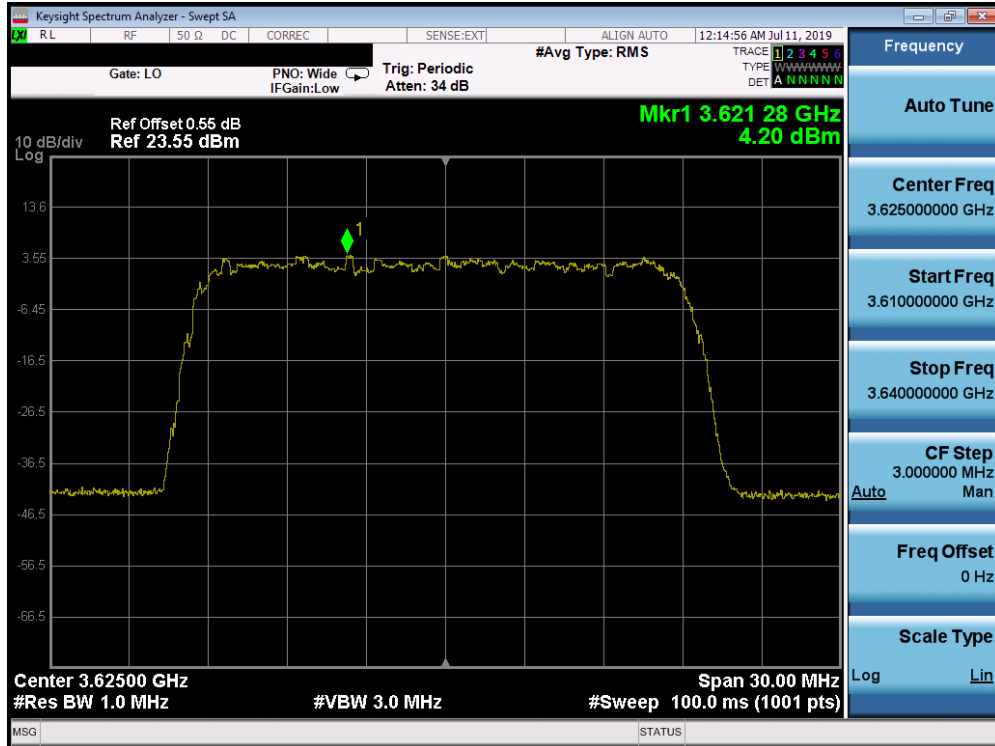


Plot 7-29. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 04

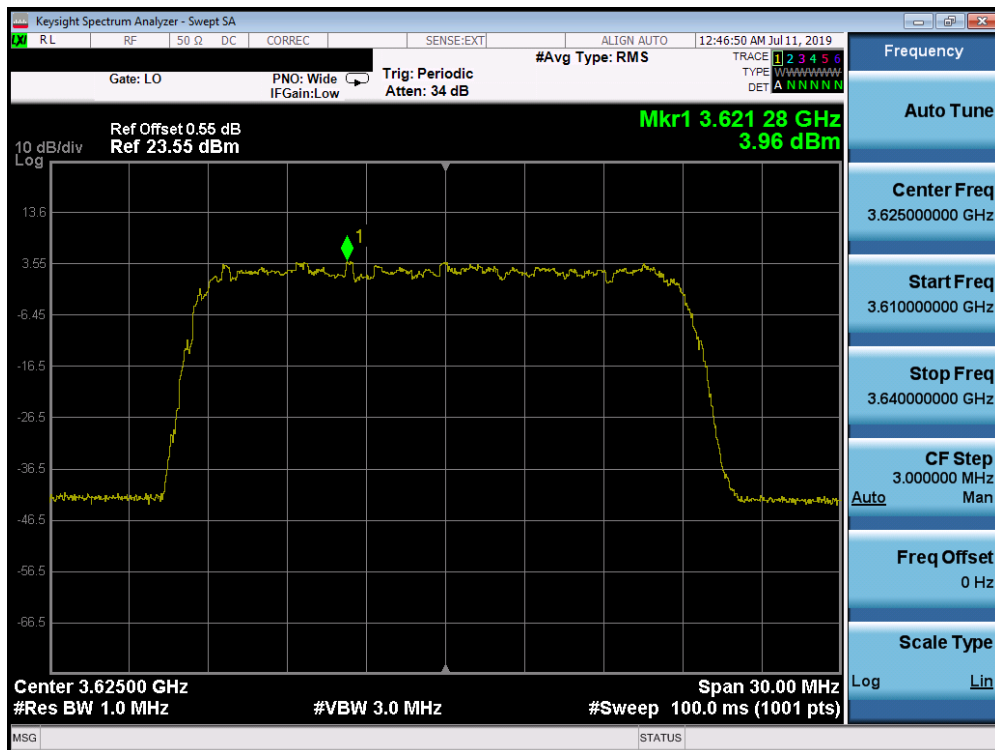


Plot 7-30. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 05

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 69 of 172                  |

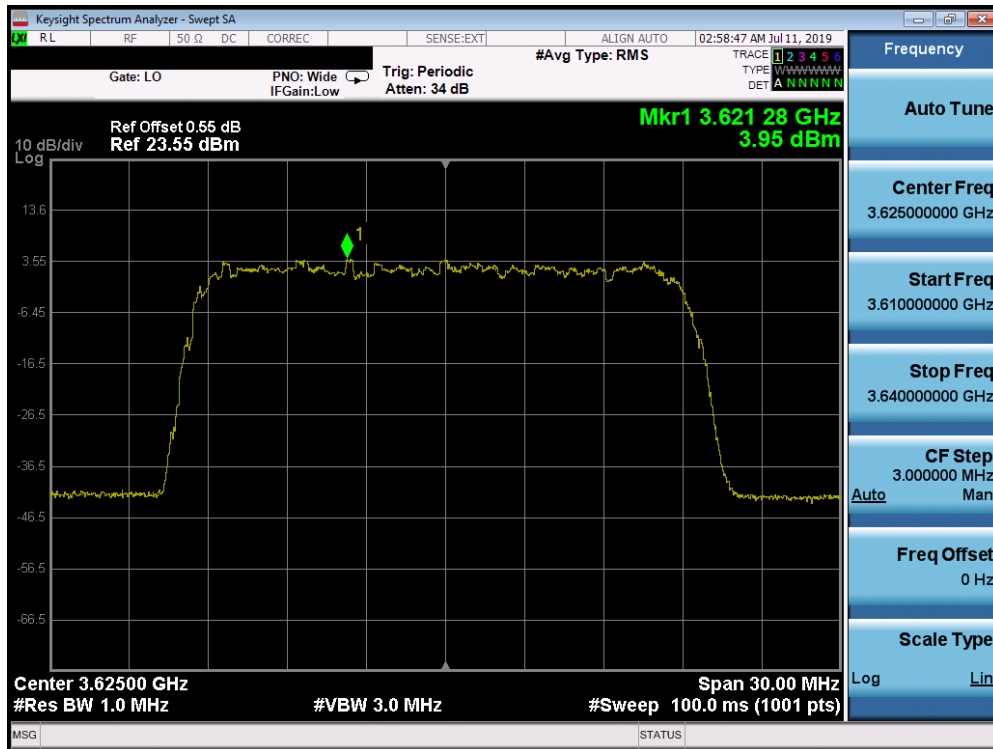


Plot 7-31. Peak Power Spectral Density Plot (1CC– 20.0MHz 16QAM- Mid Channel) Port 06

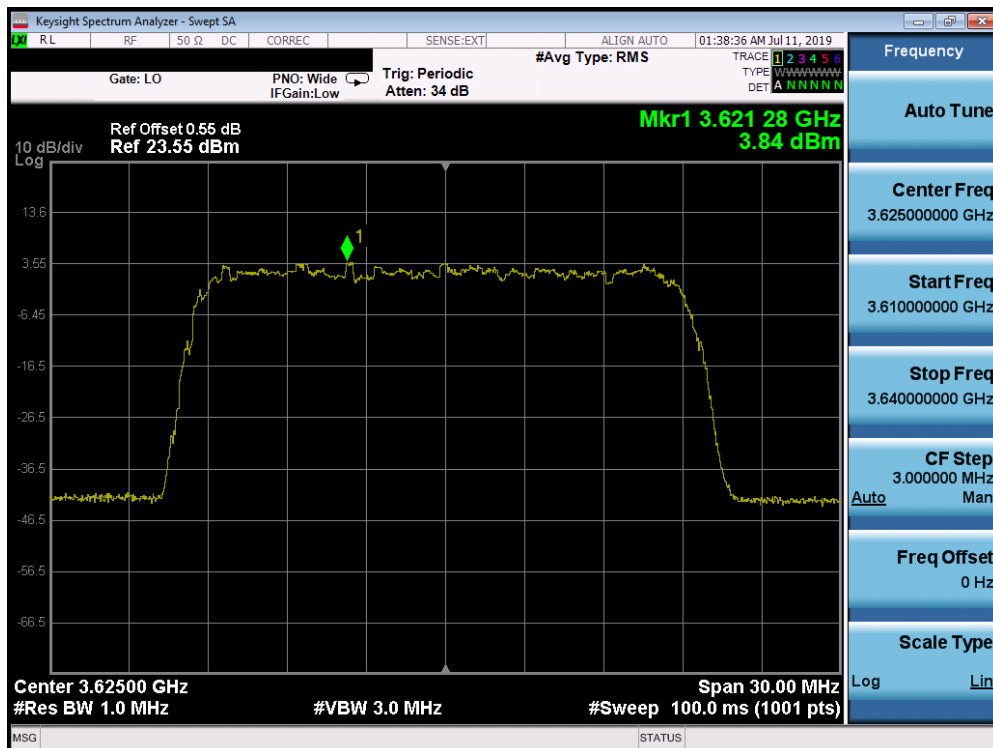


Plot 7-32. Peak Power Spectral Density Plot (1CC– 20.0MHz 16QAM- Mid Channel) Port 07

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 70 of 172                  |

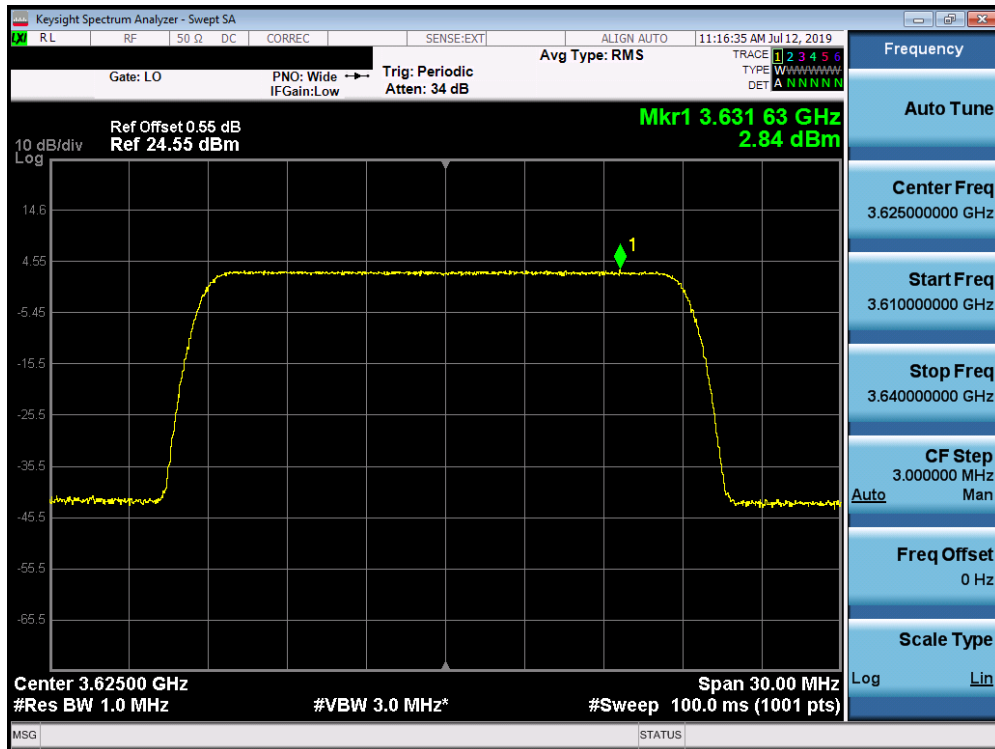


Plot 7-33. Peak Power Spectral Density Plot (1CC– 20.0MHz 16QAM- Mid Channel) Port 08

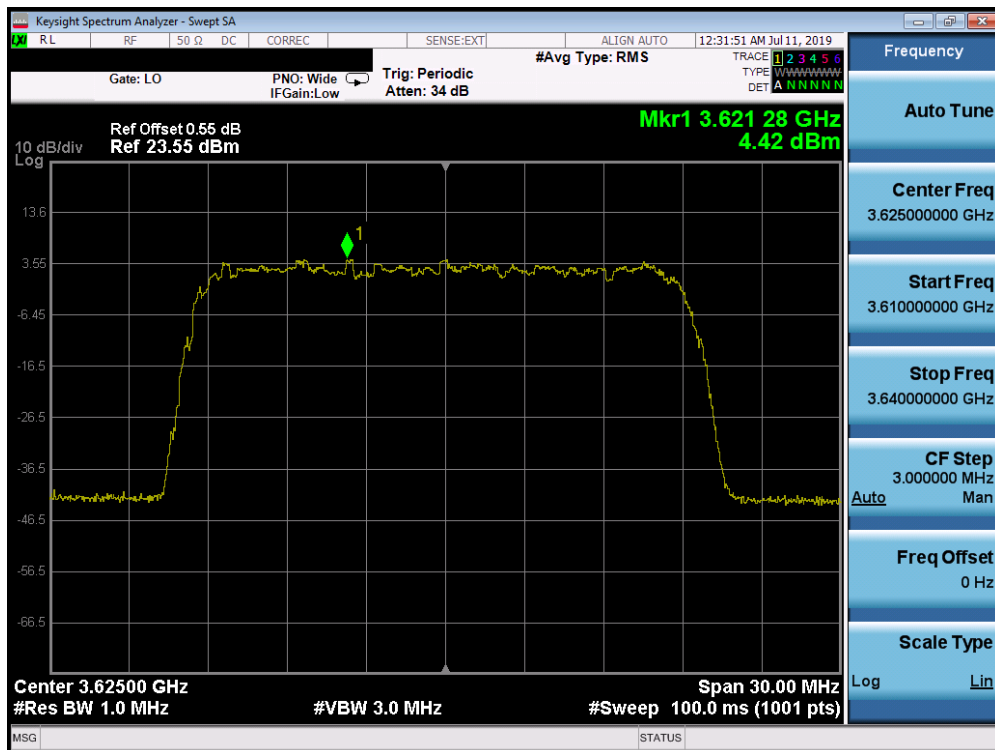


Plot 7-34. Peak Power Spectral Density Plot (1CC– 20.0MHz 16QAM- Mid Channel) Port 09

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 71 of 172                  |

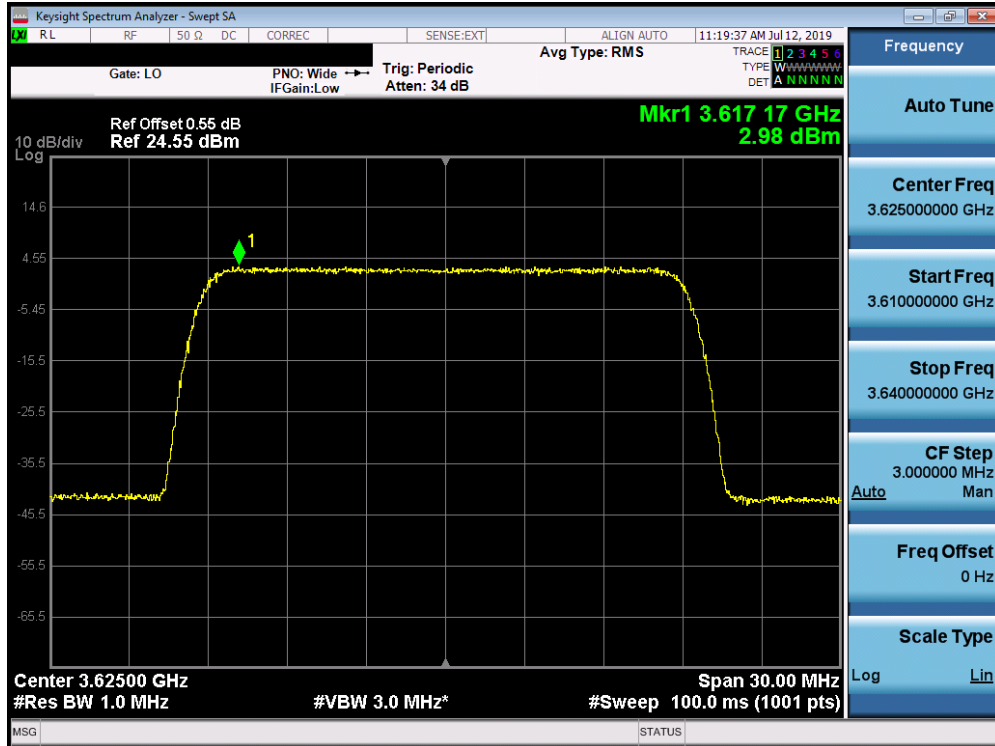


Plot 7-35. Peak Power Spectral Density Plot (1CC- 20.0MHz QPSK- Mid Channel) Port 10

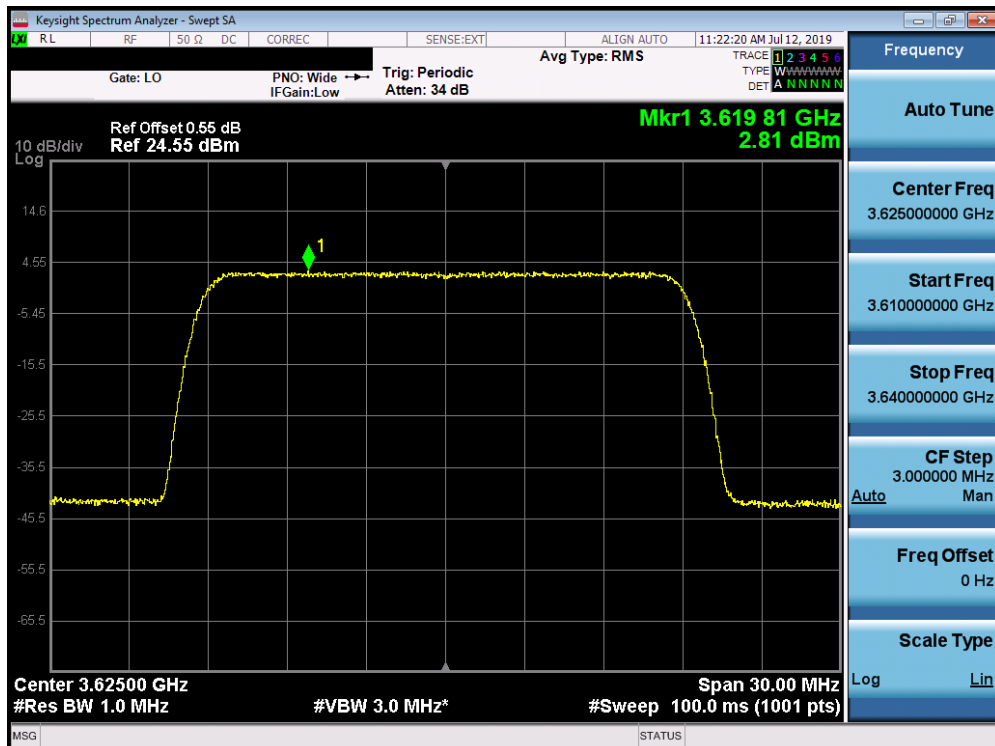


Plot 7-36. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 10

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 72 of 172                  |

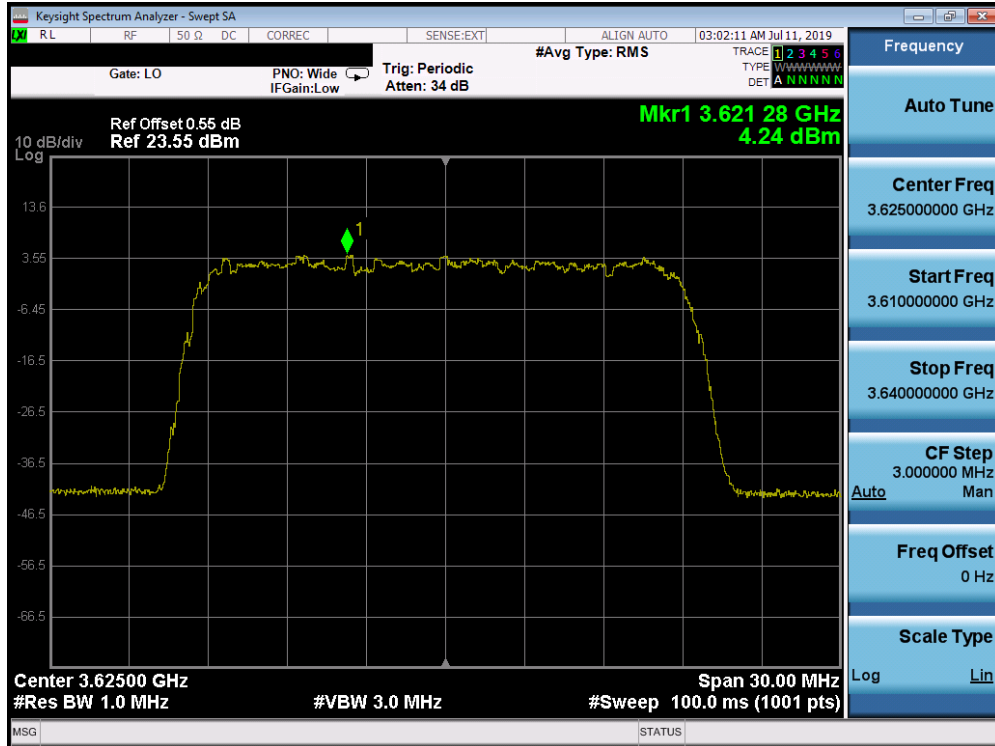


Plot 7-37. Peak Power Spectral Density Plot (1CC- 20.0MHz 64QAM- Mid Channel) Port 10

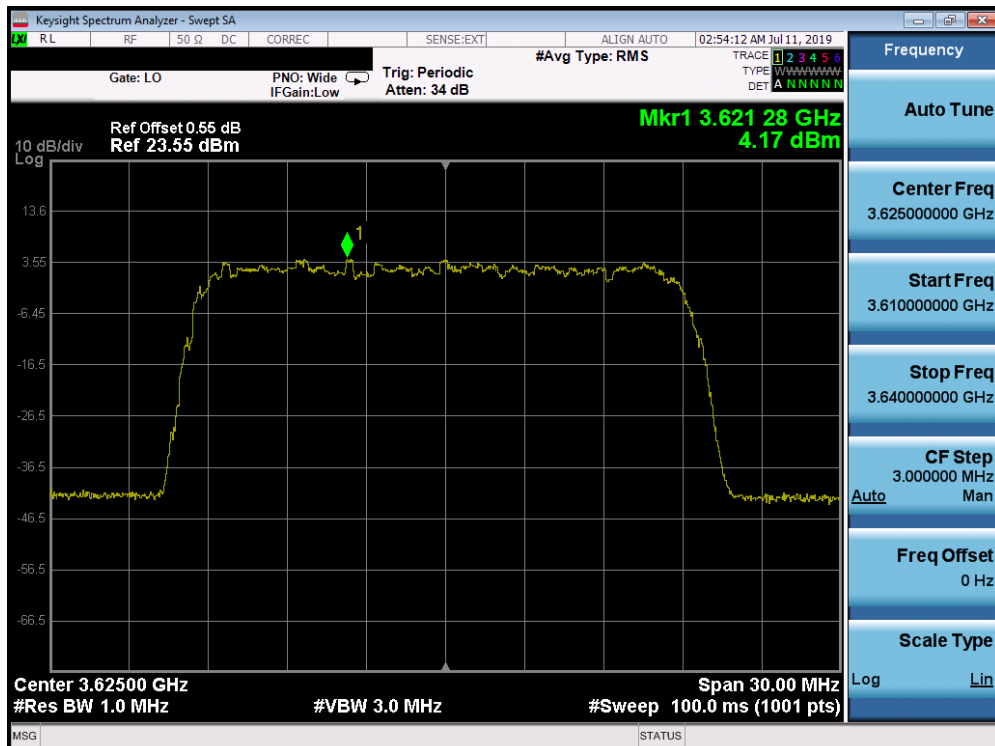


Plot 7-38. Peak Power Spectral Density Plot (1CC- 20.0MHz 256QAM- Mid Channel) Port 10

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBS         |                | Page 73 of 172                  |

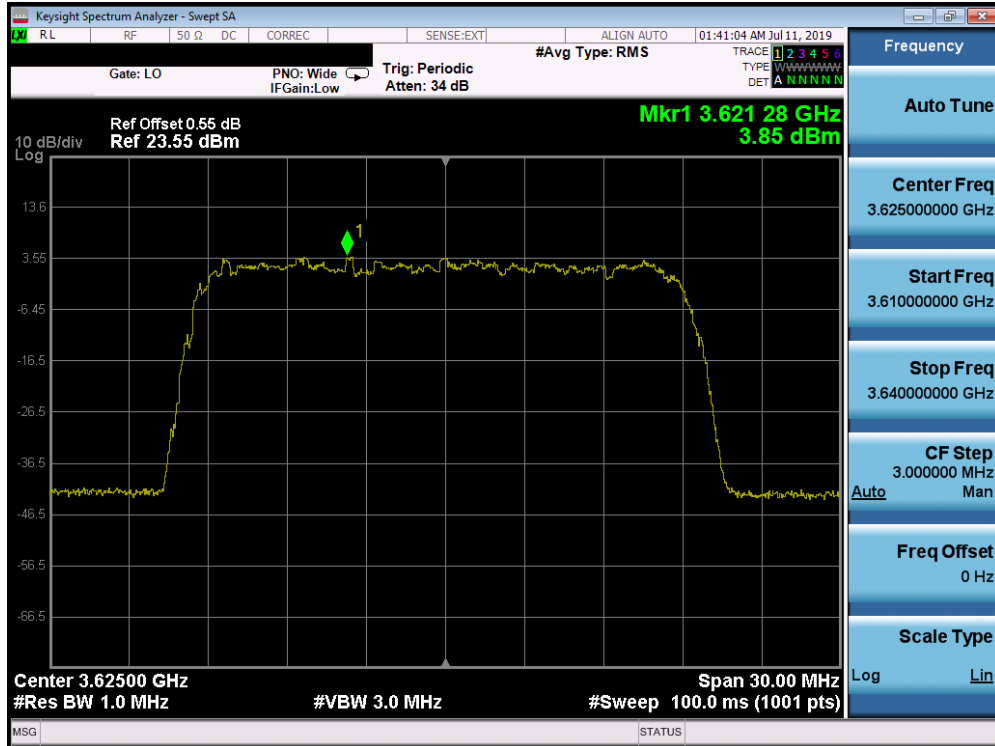


Plot 7-39. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 11

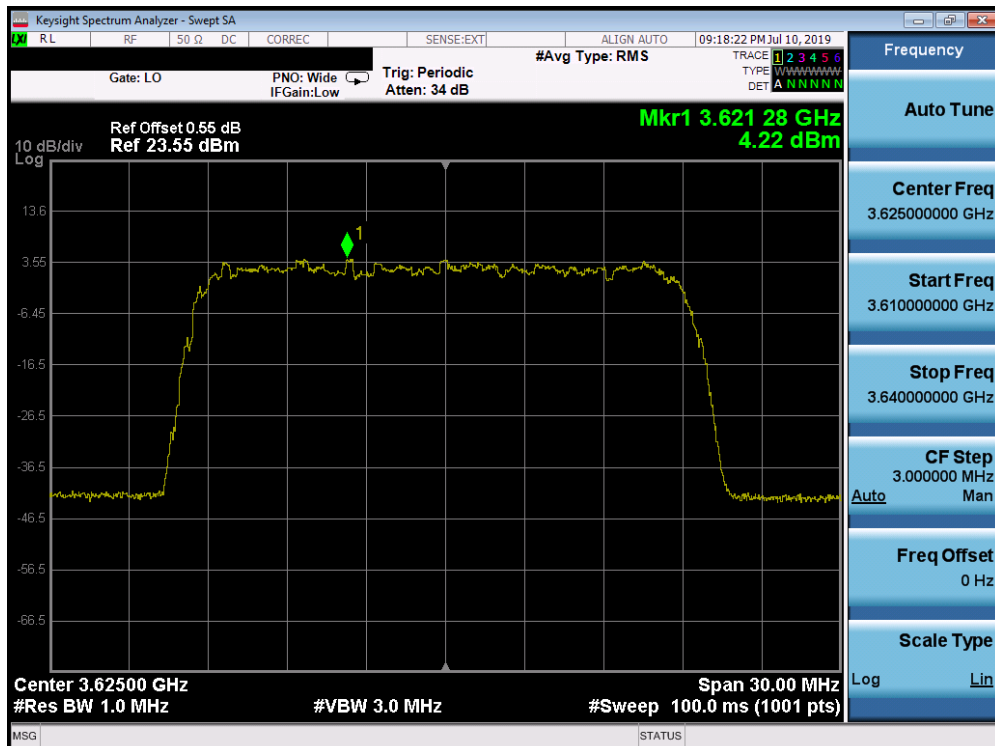


Plot 7-40. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 12

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 74 of 172                  |

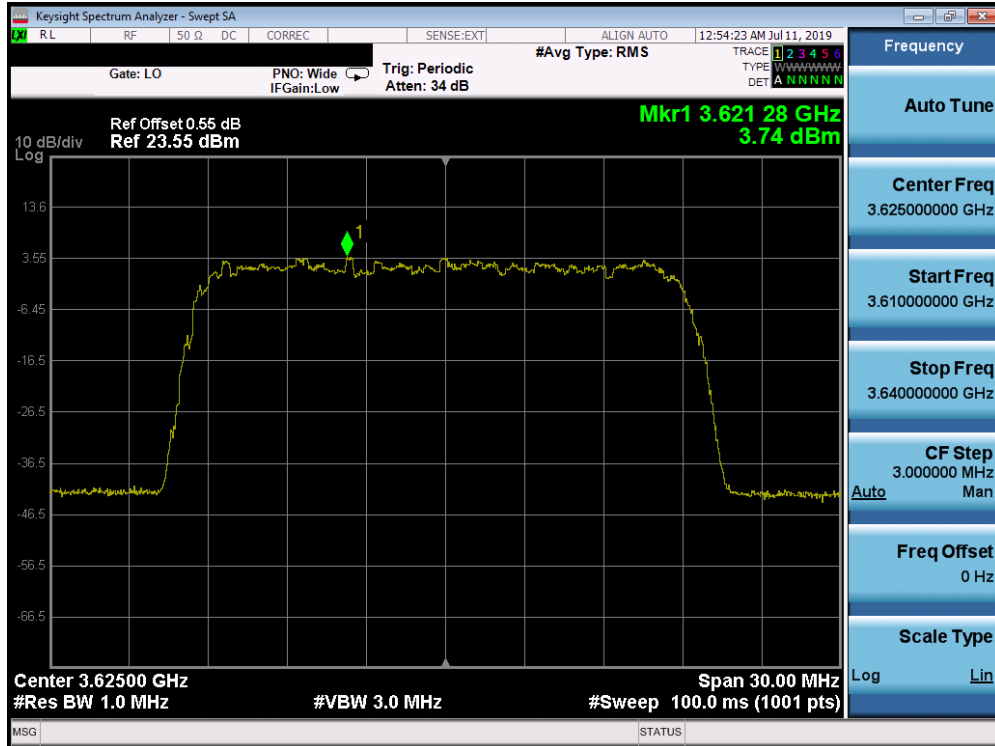


Plot 7-41. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 13

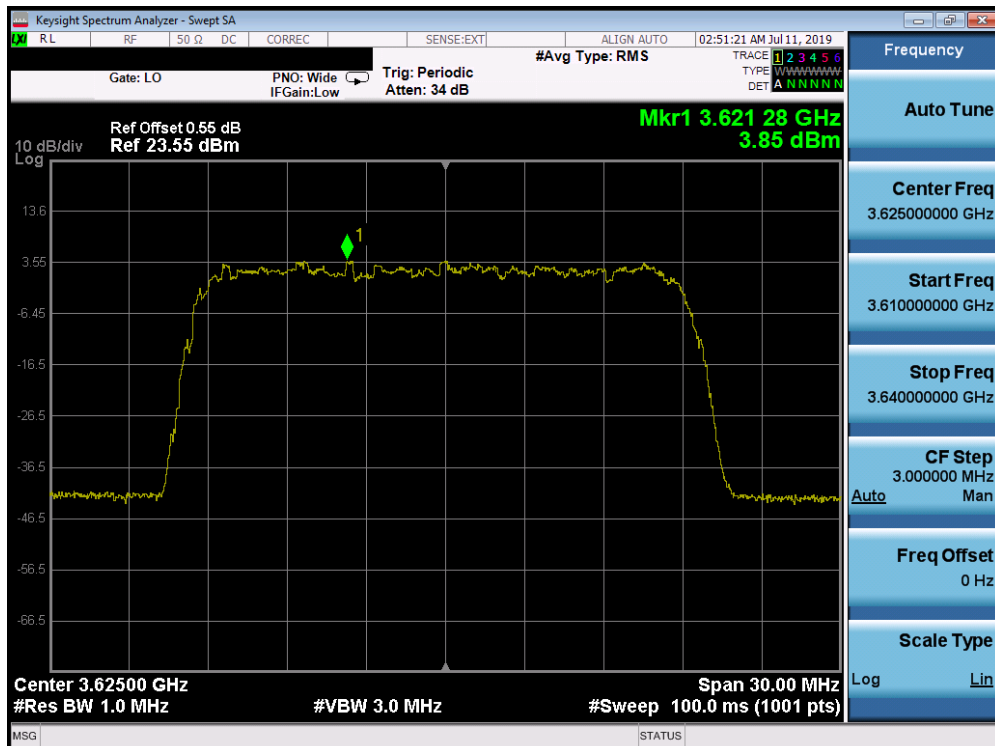


Plot 7-42. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 14

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 75 of 172                  |

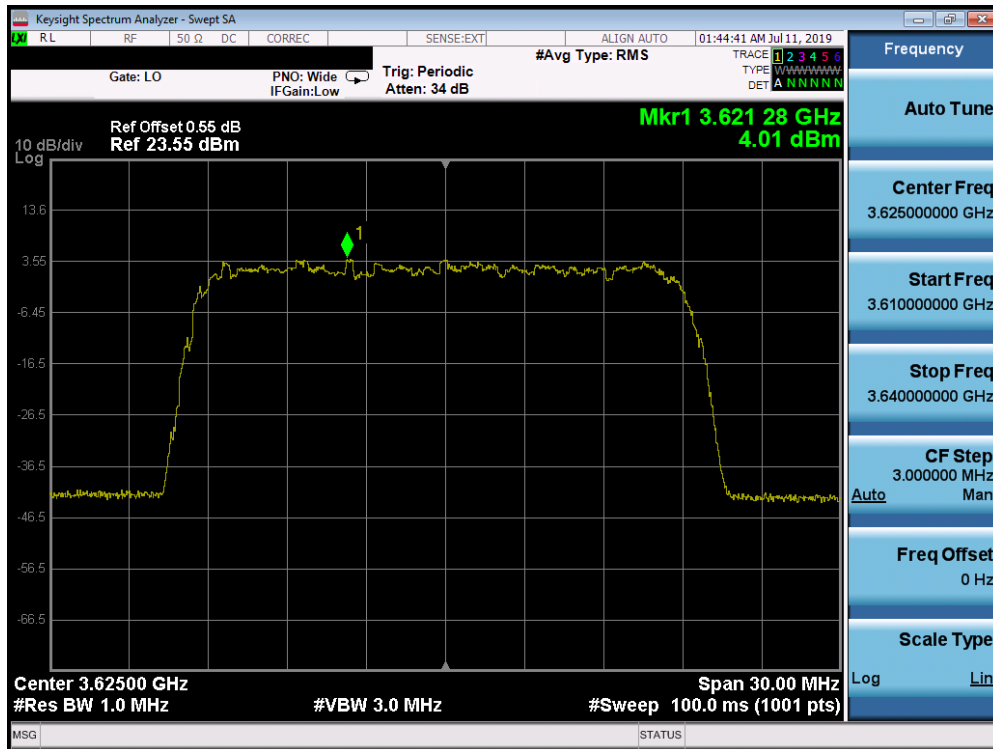


Plot 7-43. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 15

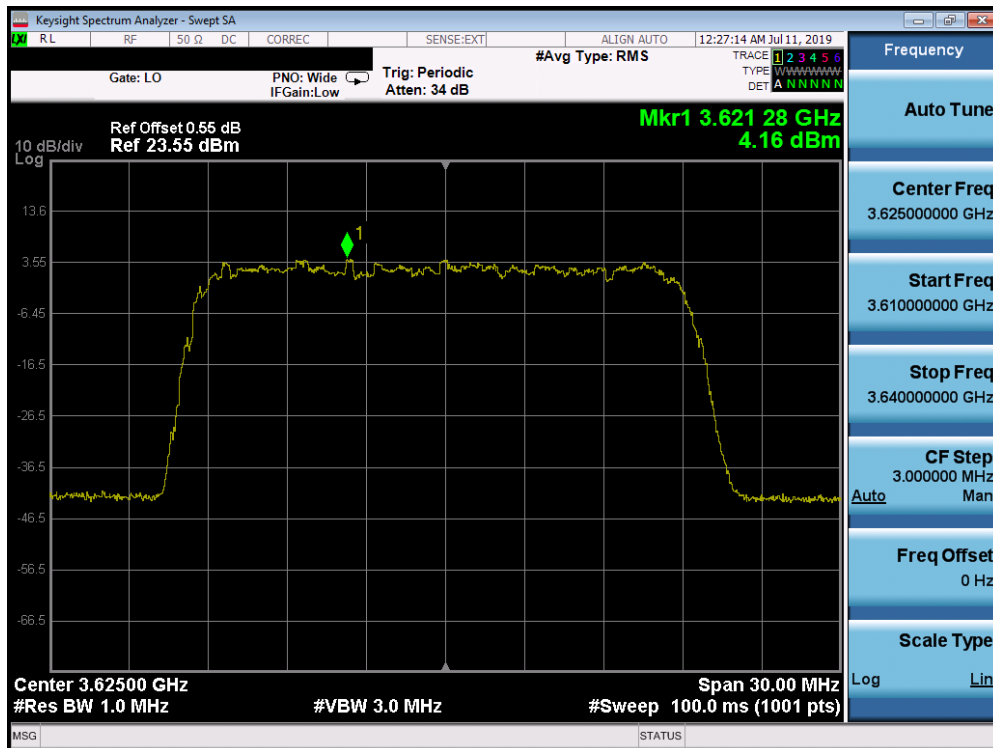


Plot 7-44. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 16

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 76 of 172                  |

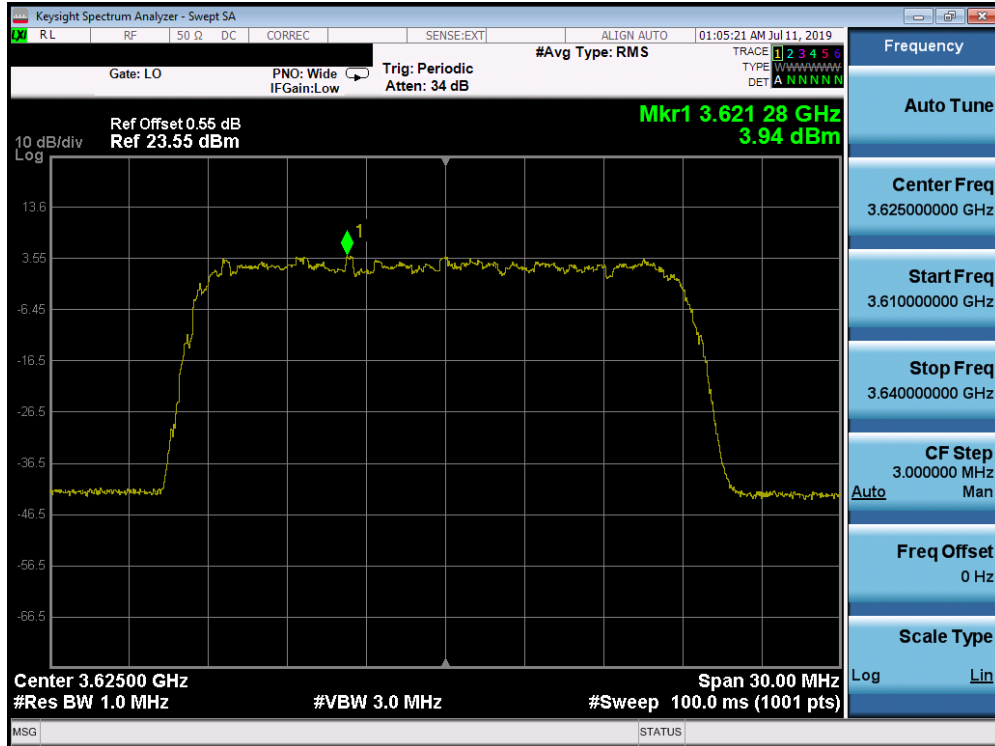


Plot 7-45. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 17

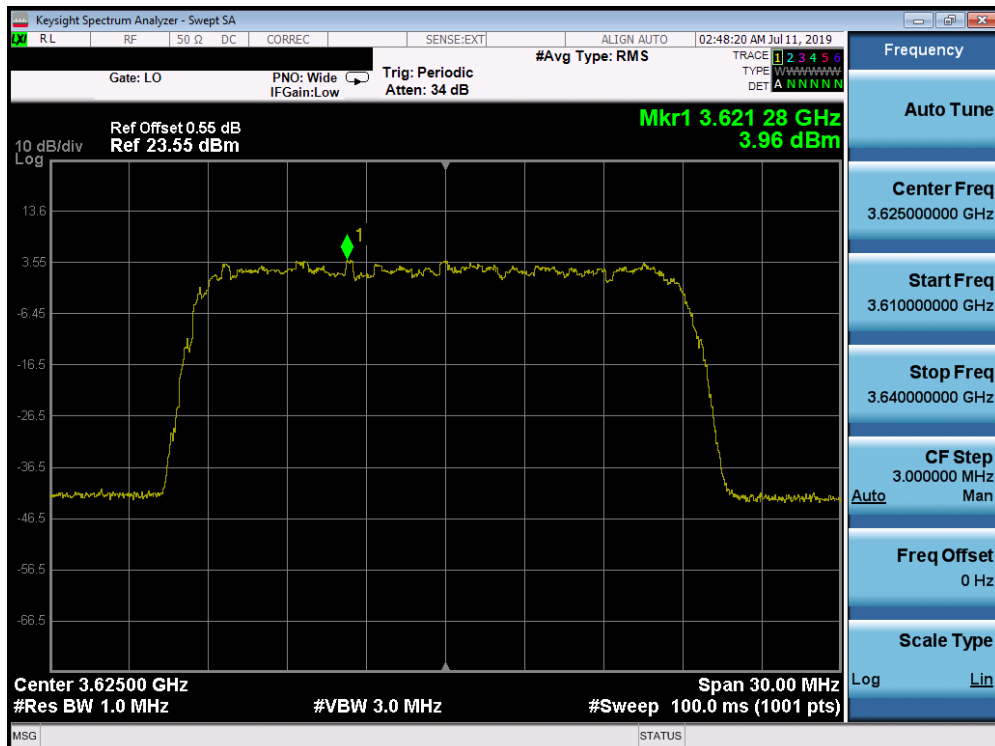


Plot 7-46. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 18

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 77 of 172                  |

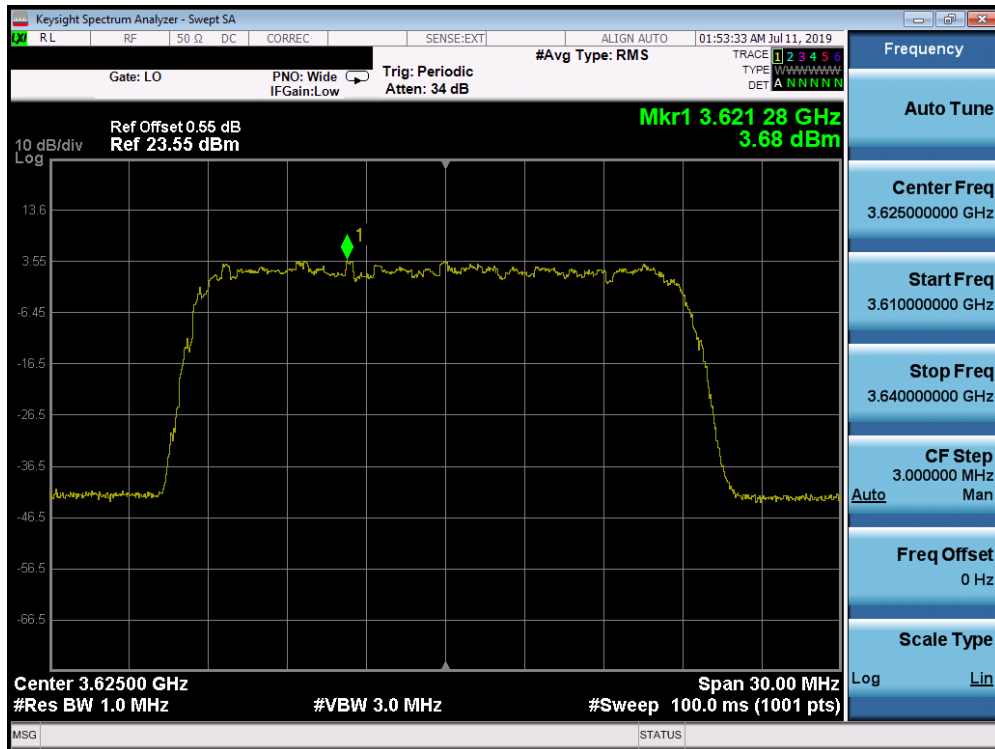


Plot 7-47. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 19

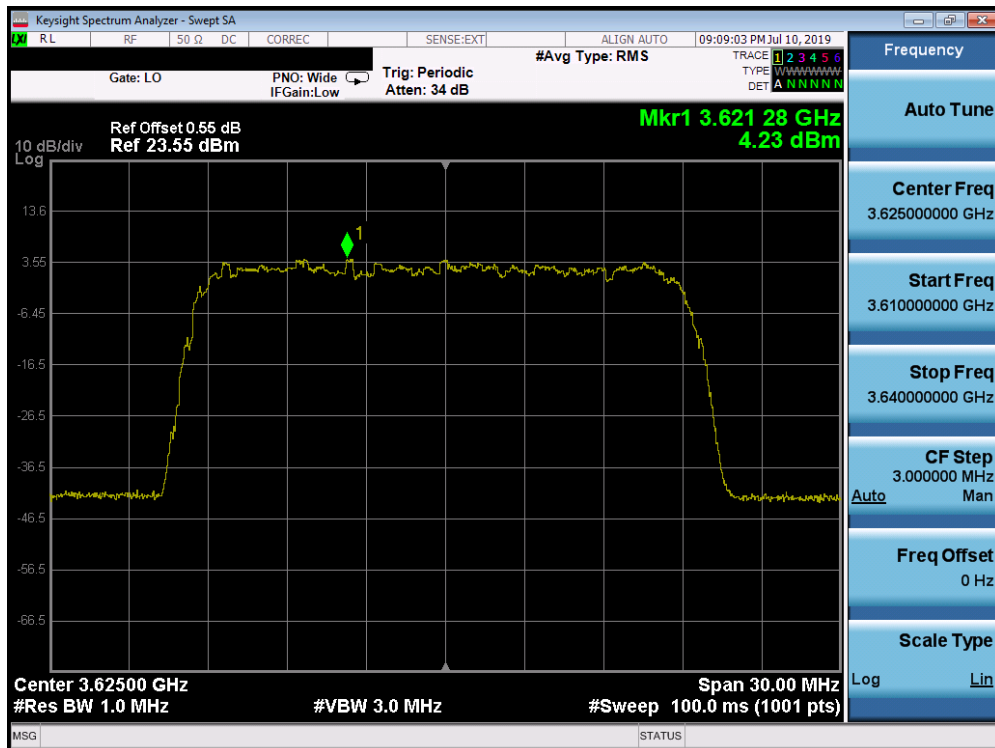


Plot 7-48. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 20

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 78 of 172                  |

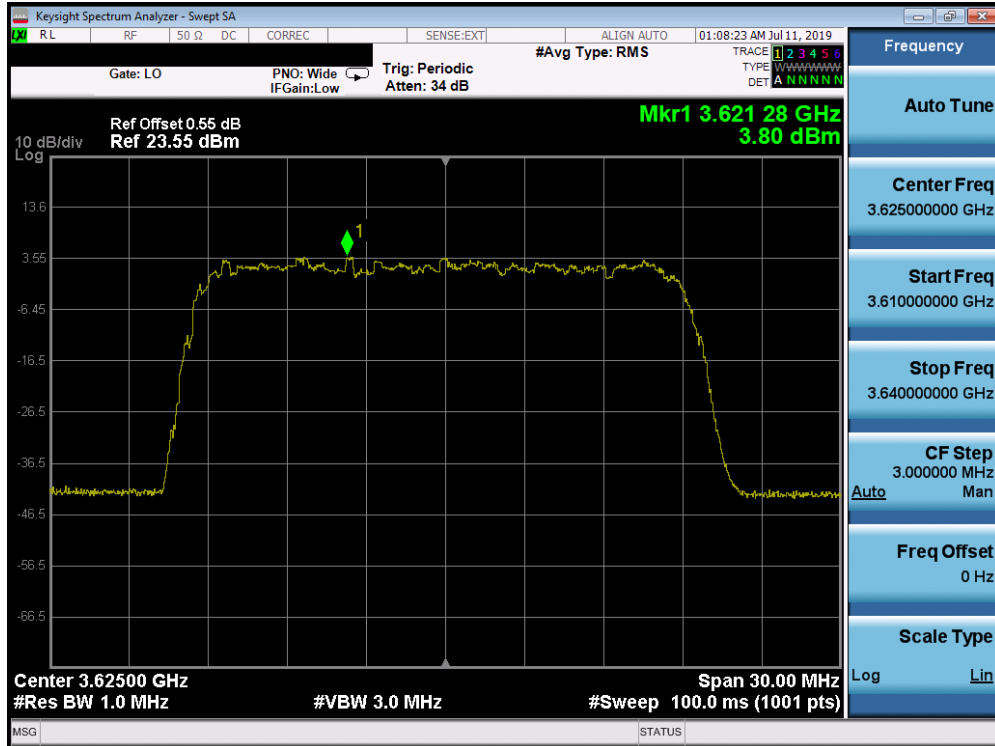


Plot 7-49. Peak Power Spectral Density Plot (1CC– 20.0MHz 16QAM- Mid Channel) Port 21

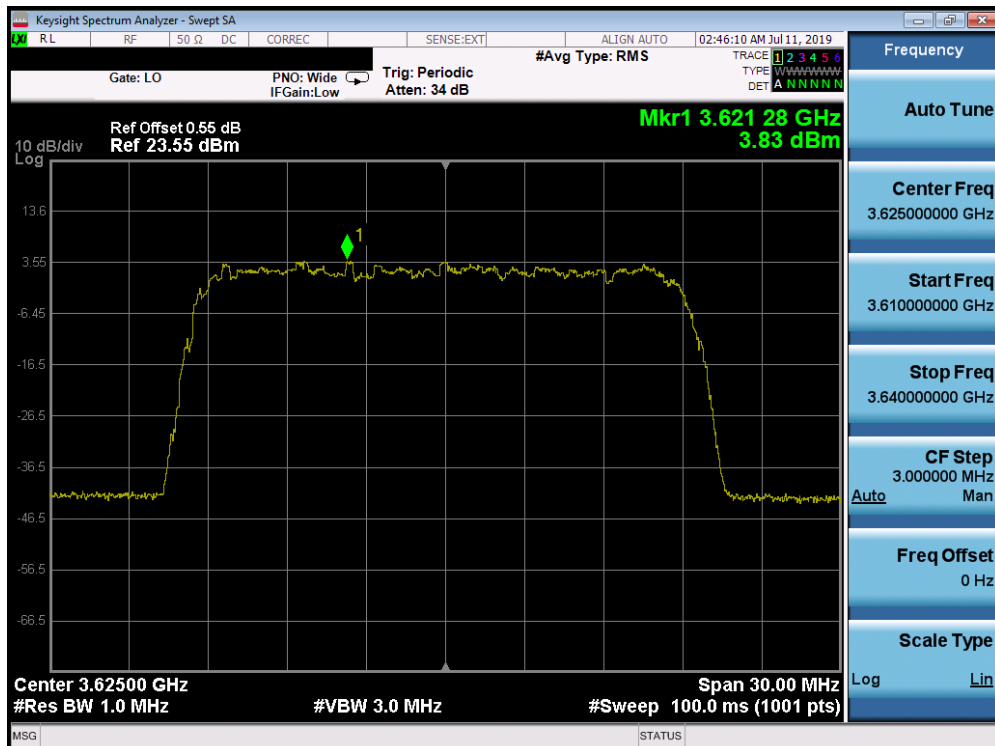


Plot 7-50. Peak Power Spectral Density Plot (1CC– 20.0MHz 16QAM- Mid Channel) Port 22

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 79 of 172                  |

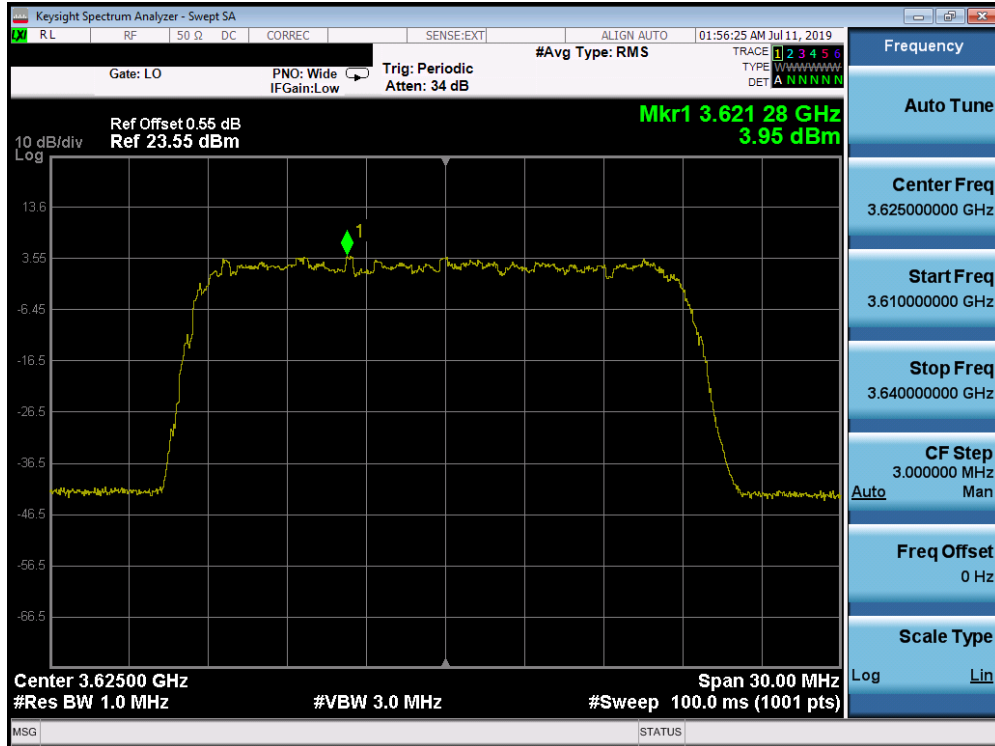


Plot 7-51. Peak Power Spectral Density Plot (1CC– 20.0MHz 16QAM- Mid Channel) Port 23

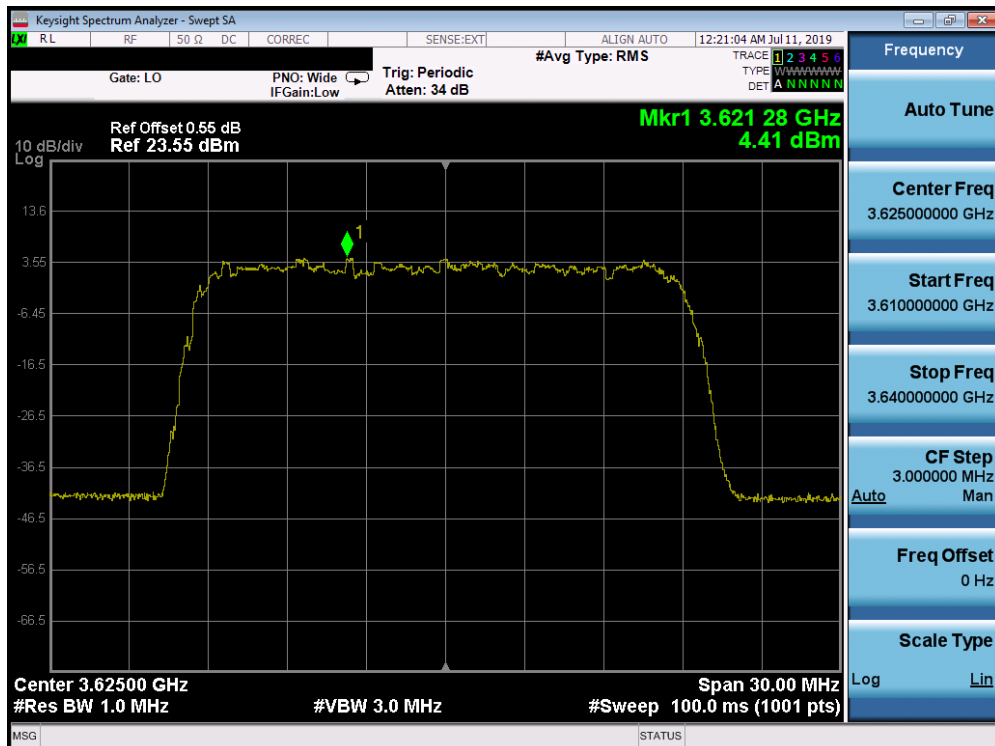


Plot 7-52. Peak Power Spectral Density Plot (1CC– 20.0MHz 16QAM- Mid Channel) Port 24

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 80 of 172                  |

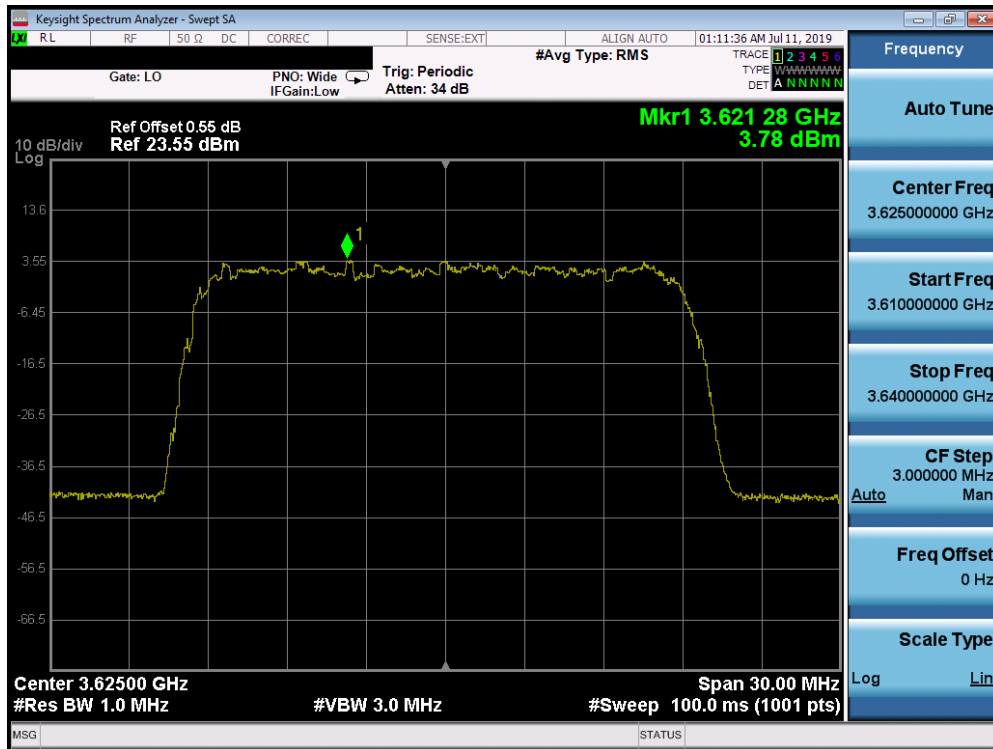


Plot 7-53. Peak Power Spectral Density Plot (1CC– 20.0MHz 16QAM- Mid Channel) Port 25

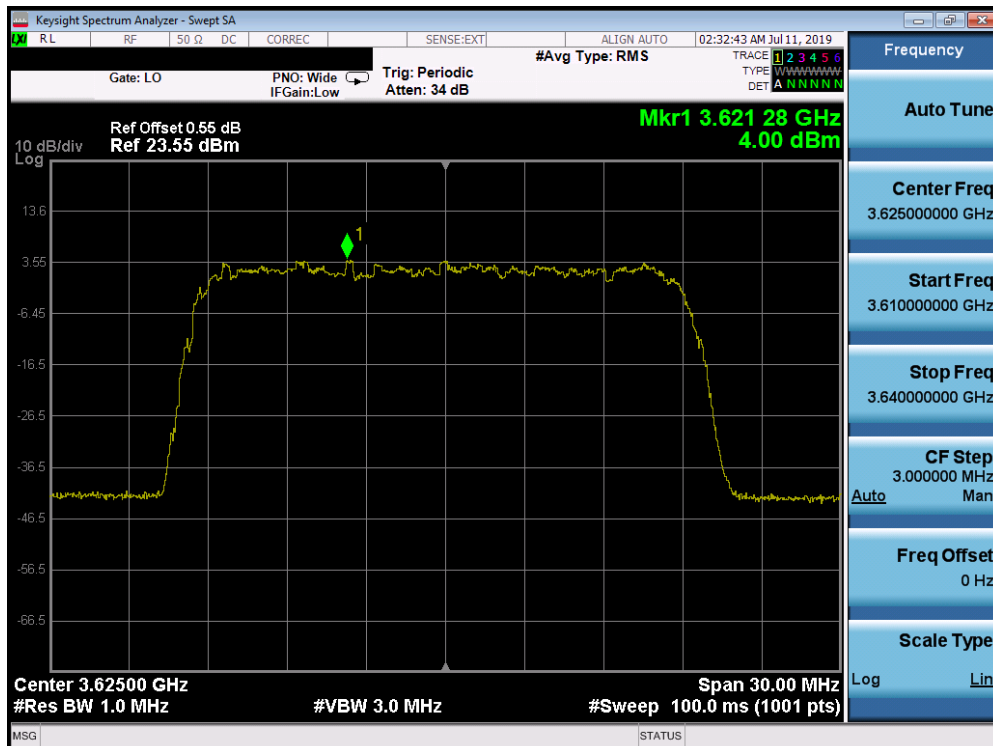


Plot 7-54. Peak Power Spectral Density Plot (1CC– 20.0MHz 16QAM- Mid Channel) Port 26

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 81 of 172                  |

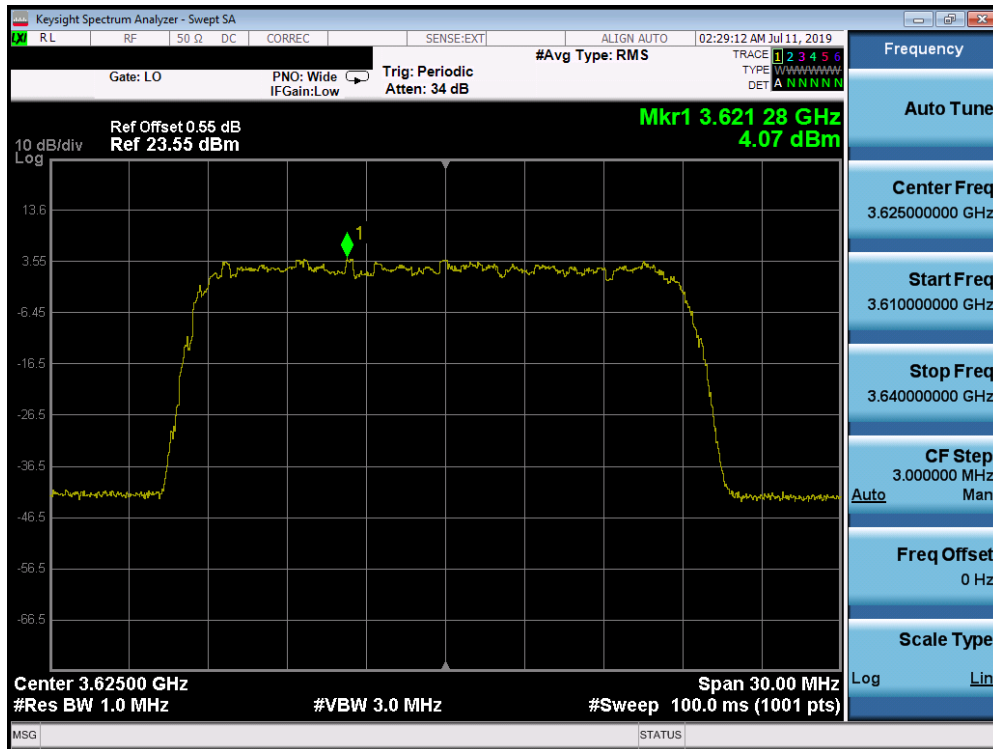


Plot 7-55. Peak Power Spectral Density Plot (1CC– 20.0MHz 16QAM- Mid Channel) Port 27

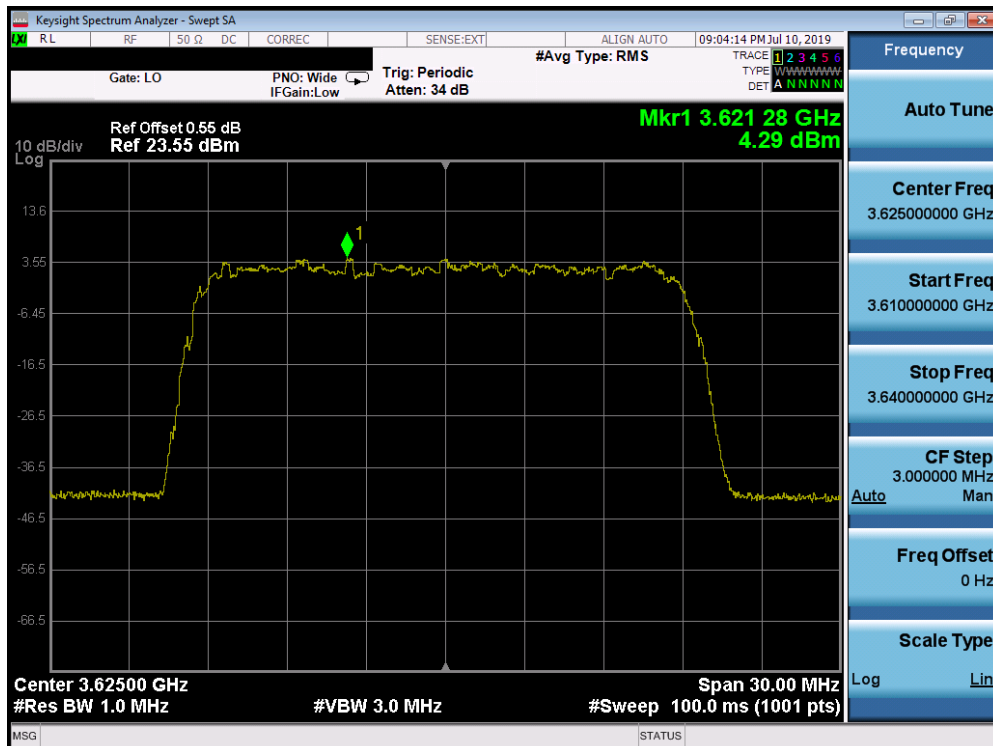


Plot 7-56. Peak Power Spectral Density Plot (1CC– 20.0MHz 16QAM- Mid Channel) Port 28

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 82 of 172                  |

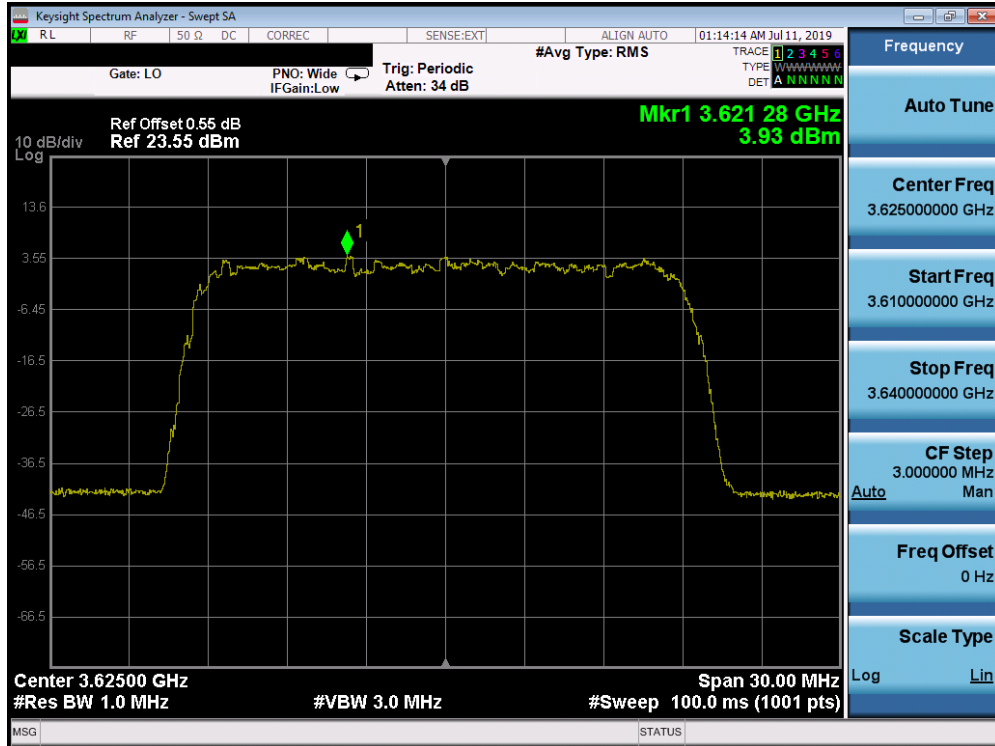


Plot 7-57. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 29

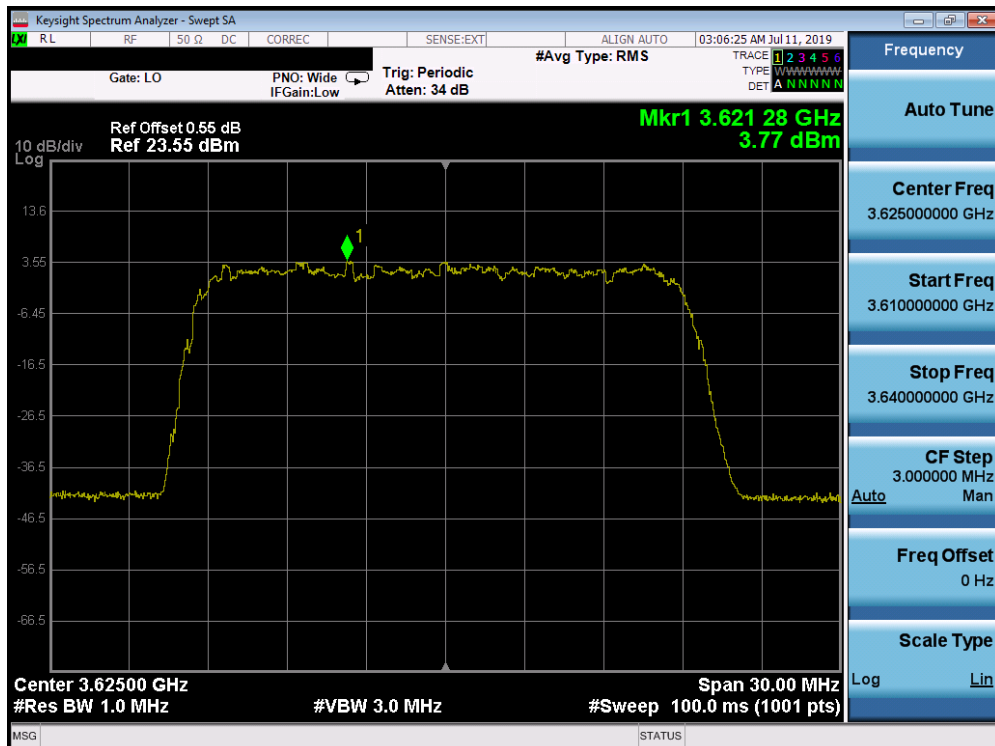


Plot 7-58. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 30

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 83 of 172                  |

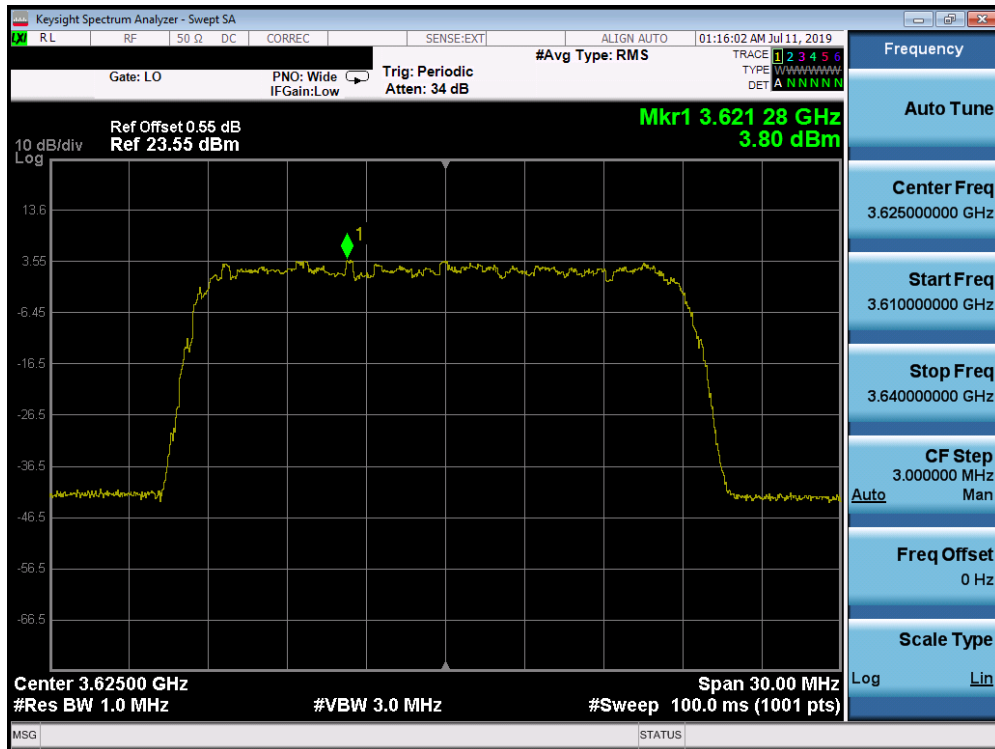


Plot 7-59. Peak Power Spectral Density Plot (1CC– 20.0MHz 16QAM- Mid Channel) Port 31

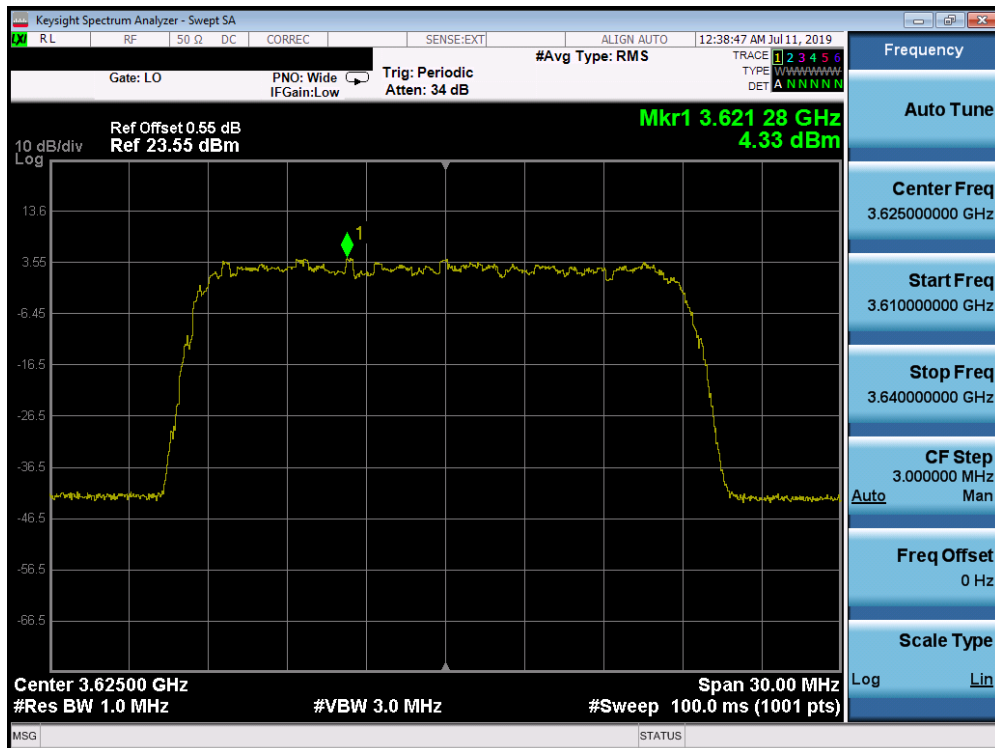


Plot 7-60. Peak Power Spectral Density Plot (1CC– 20.0MHz 16QAM- Mid Channel) Port 32

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 84 of 172                  |

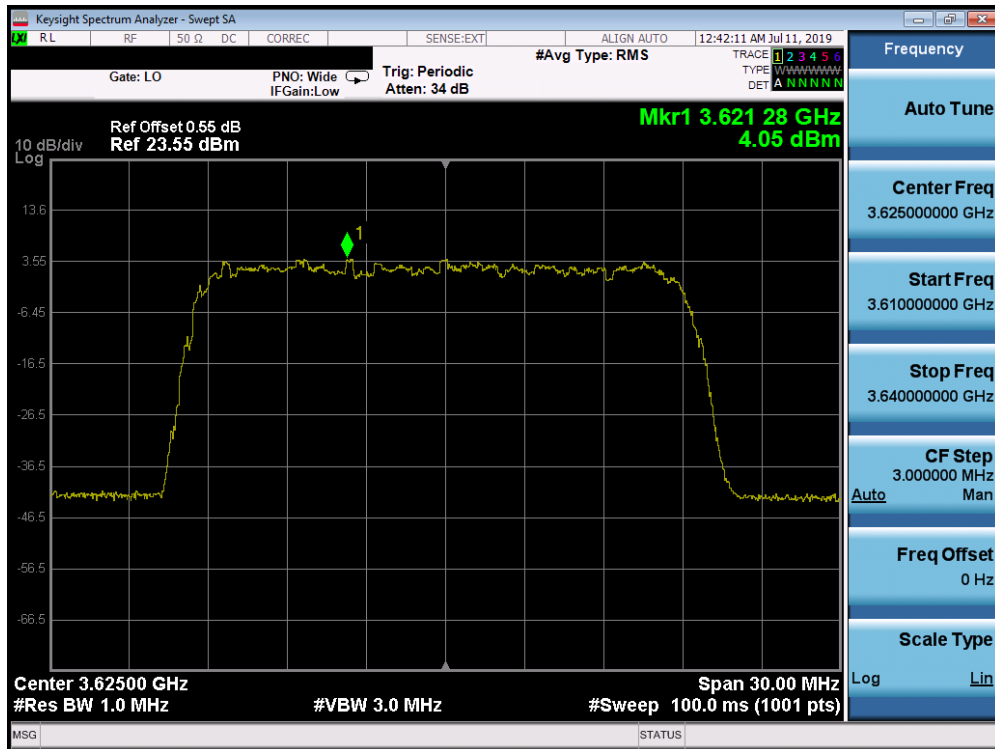


Plot 7-61. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 33

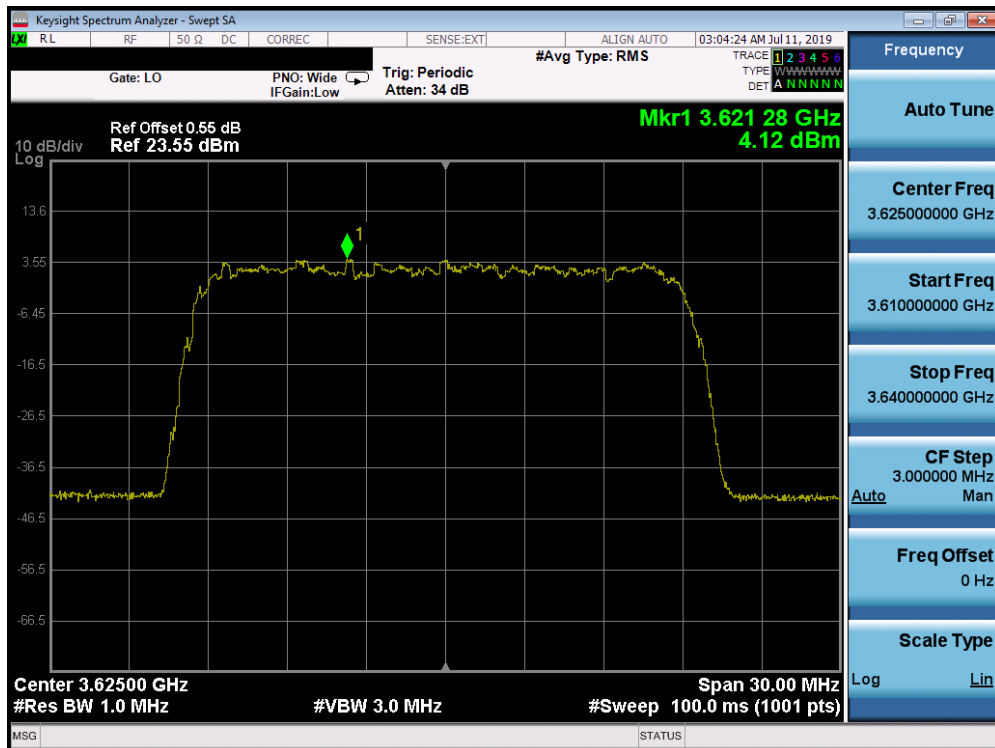


Plot 7-62. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 34

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 85 of 172                  |

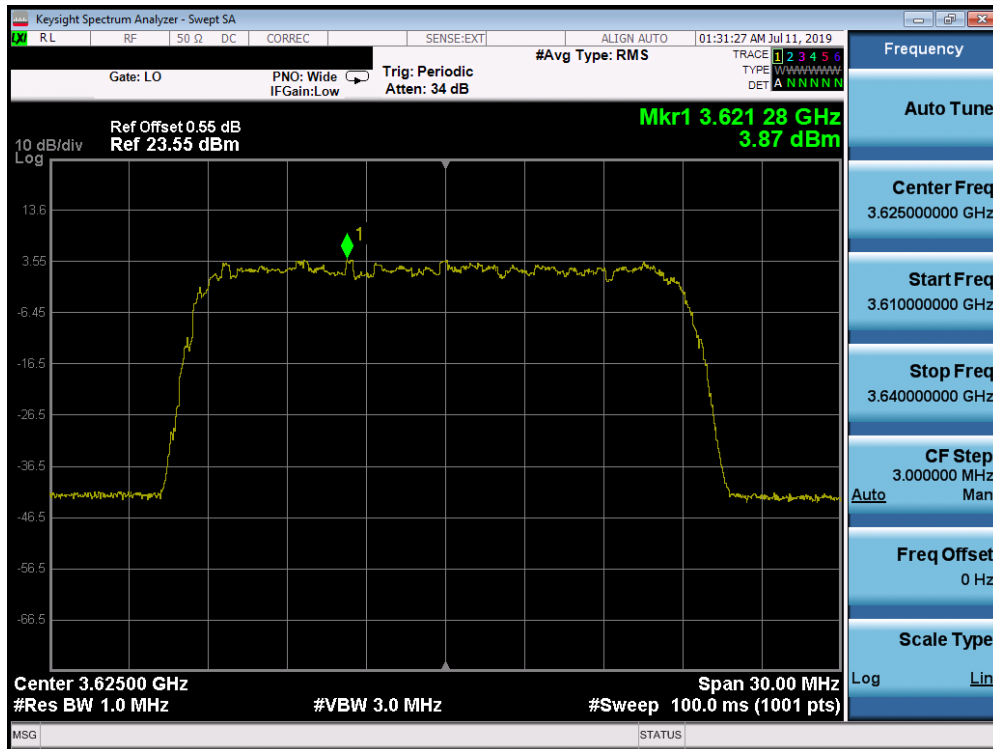


Plot 7-63. Peak Power Spectral Density Plot (1CC– 20.0MHz 16QAM- Mid Channel) Port 35

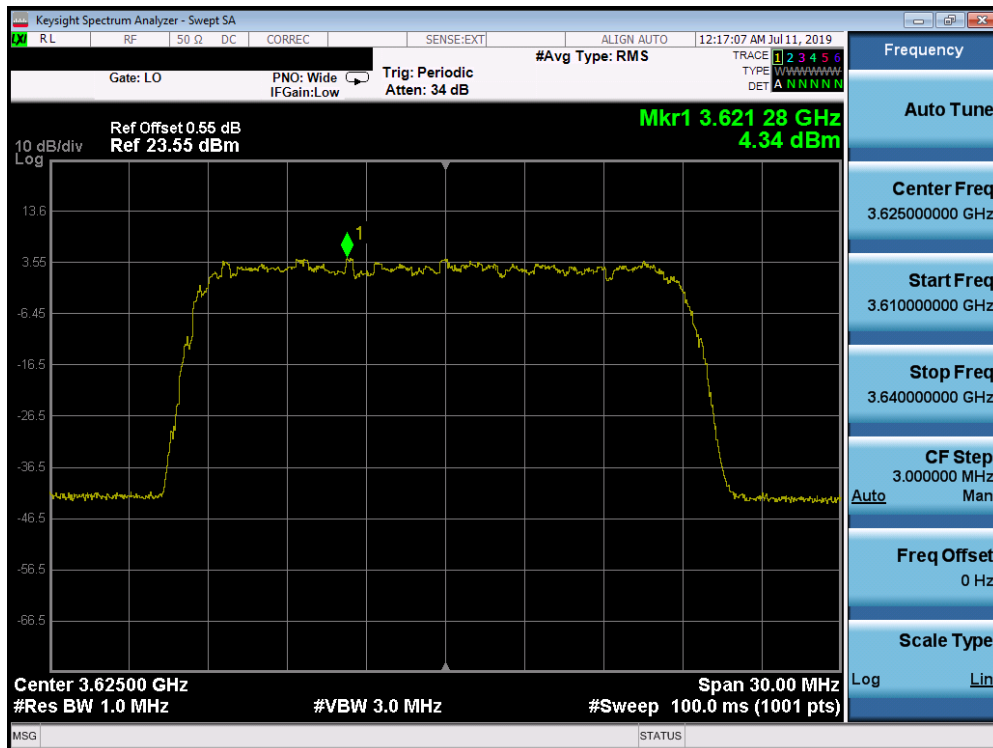


Plot 7-64. Peak Power Spectral Density Plot (1CC– 20.0MHz 16QAM- Mid Channel) Port 36

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 86 of 172                  |

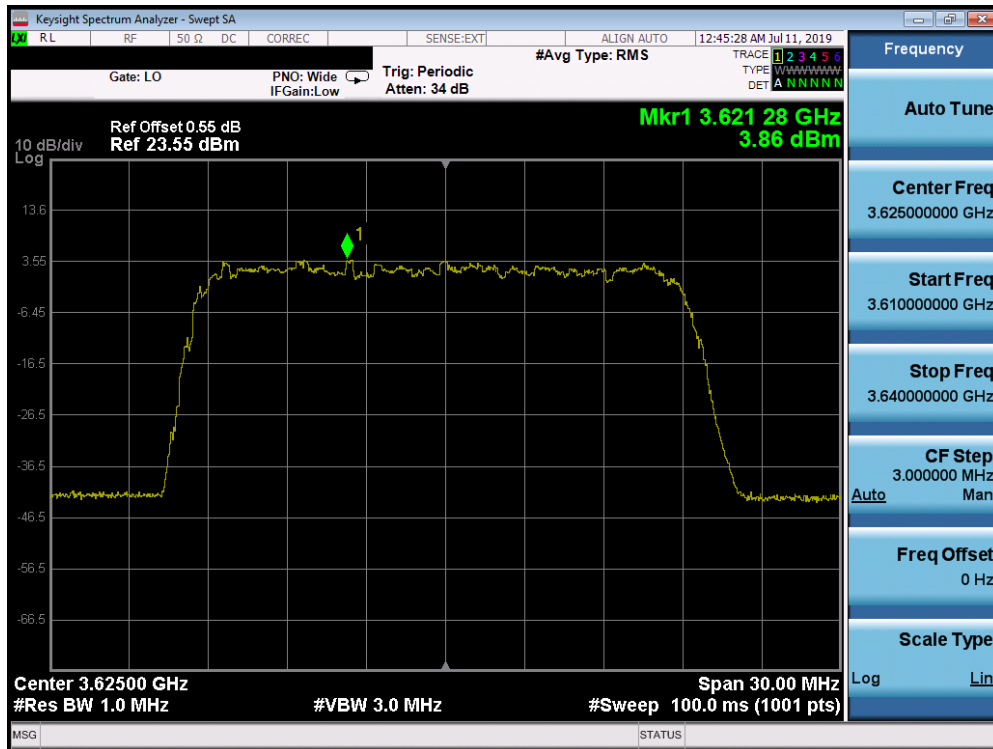


Plot 7-65. Peak Power Spectral Density Plot (1CC– 20.0MHz 16QAM- Mid Channel) Port 37

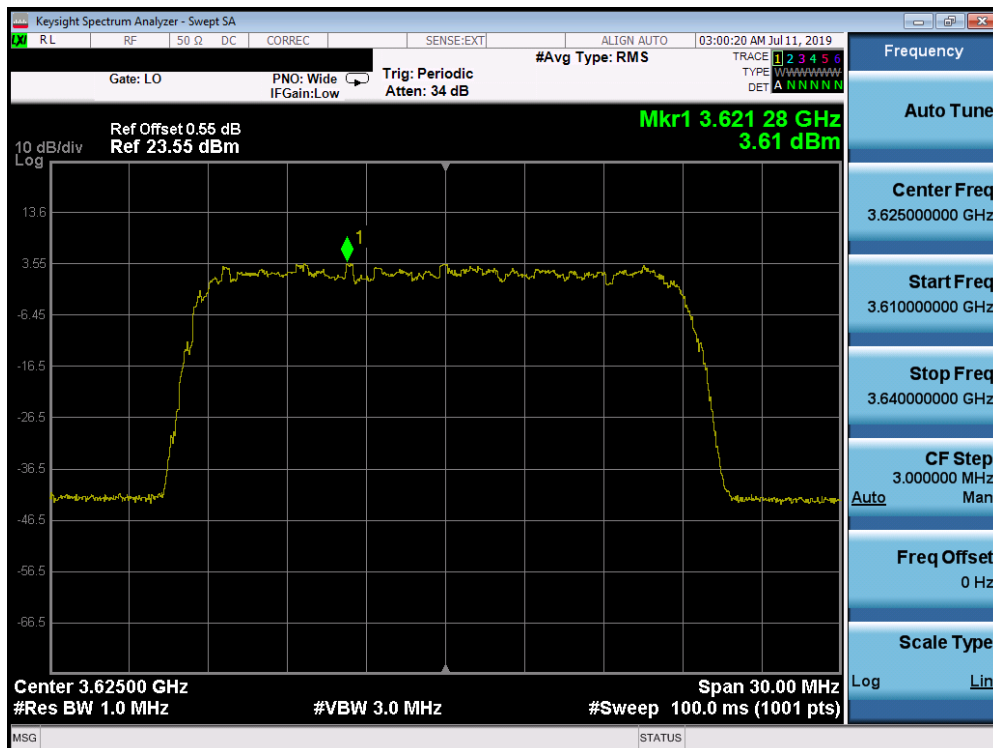


Plot 7-66. Peak Power Spectral Density Plot (1CC– 20.0MHz 16QAM- Mid Channel) Port 38

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 87 of 172                  |

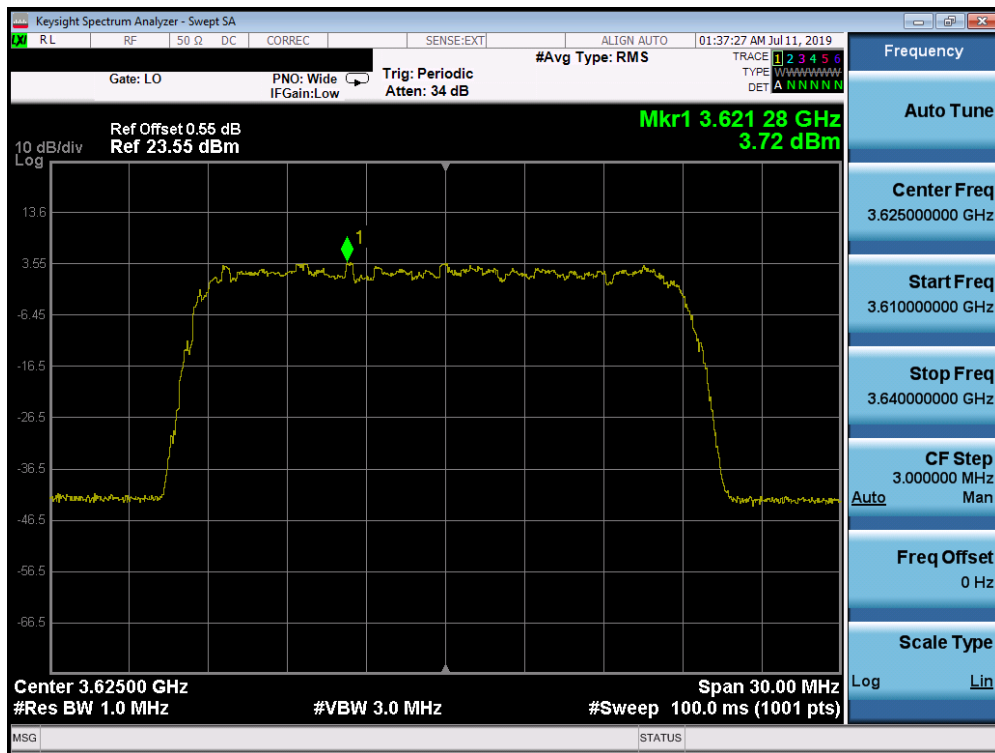


Plot 7-67. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 39

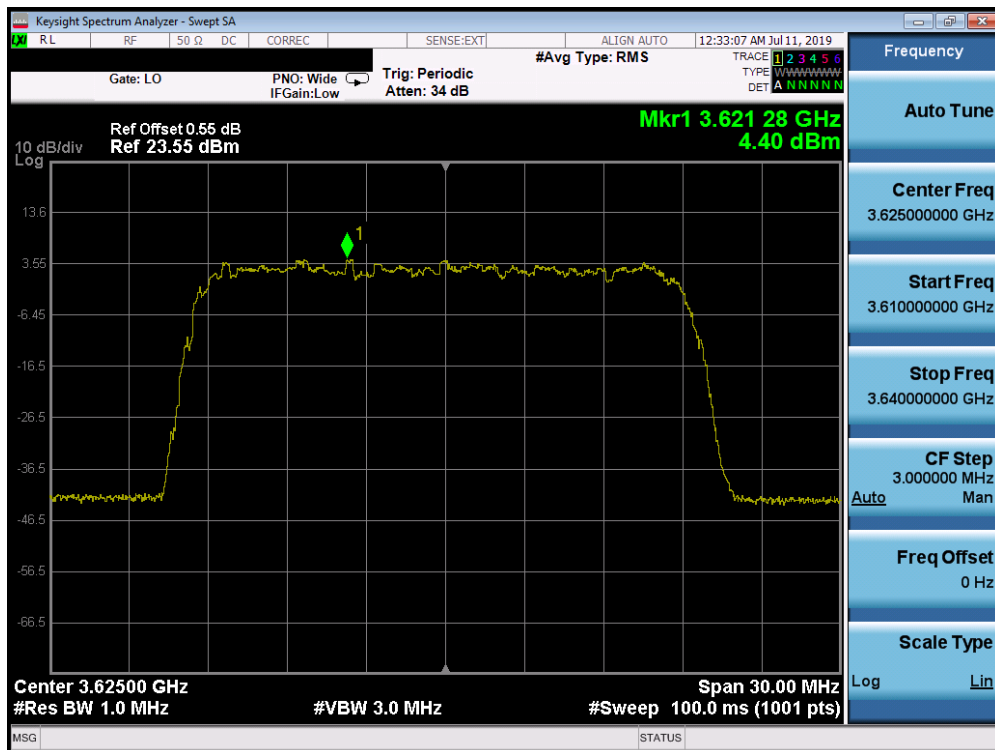


Plot 7-68. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 40

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBS         |                | Page 88 of 172                  |

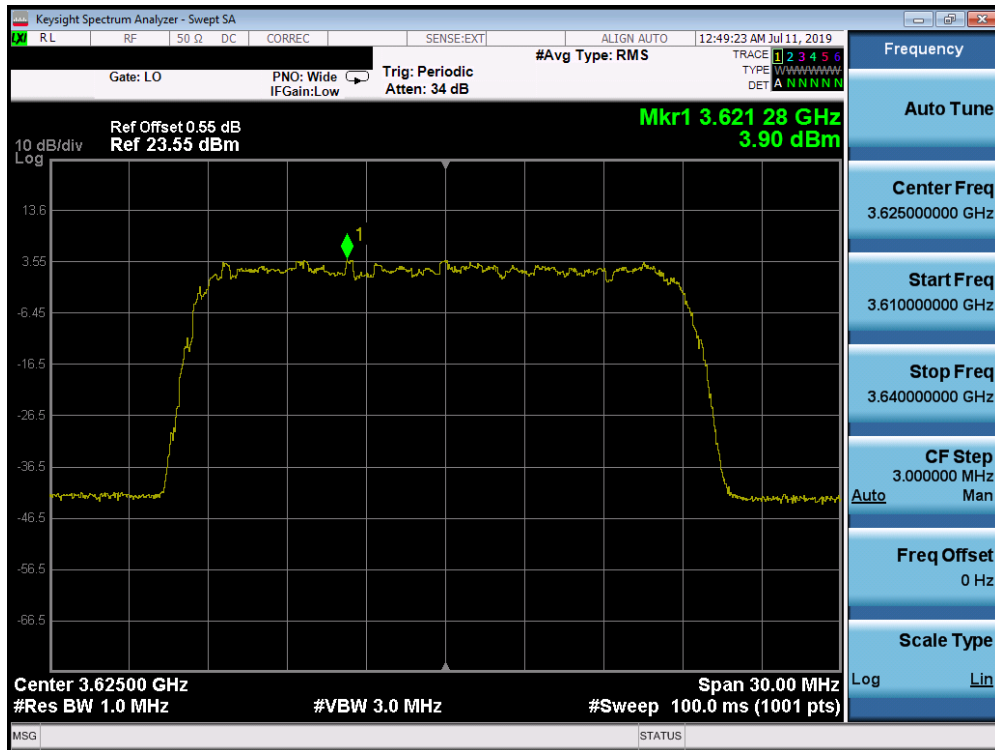


Plot 7-69. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 41

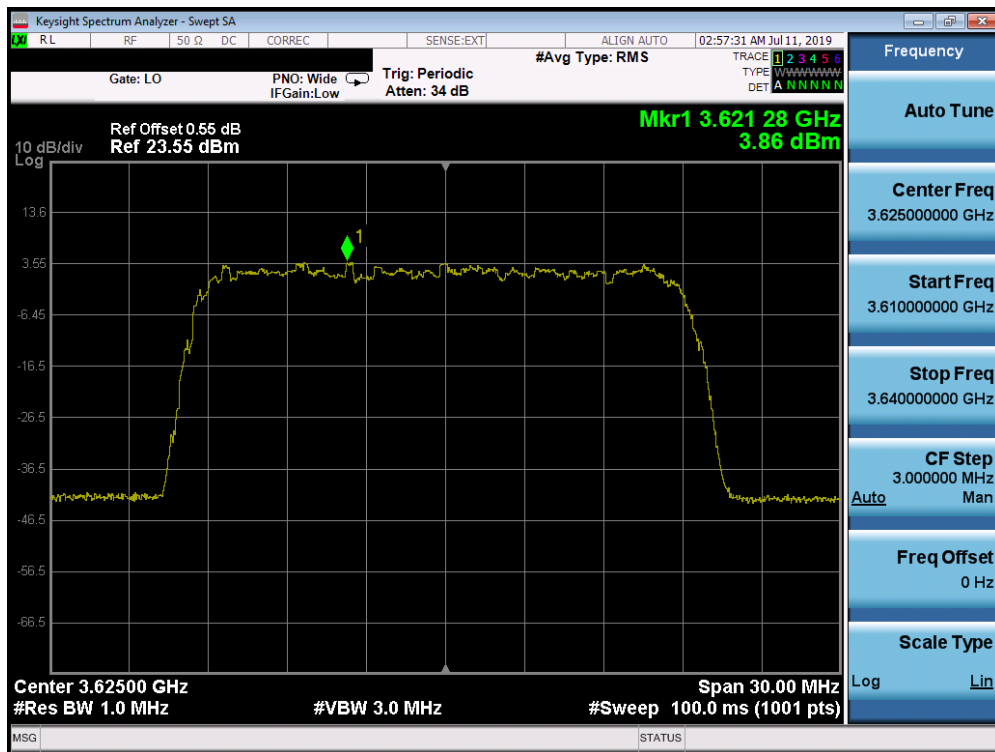


Plot 7-70. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 42

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 89 of 172                  |

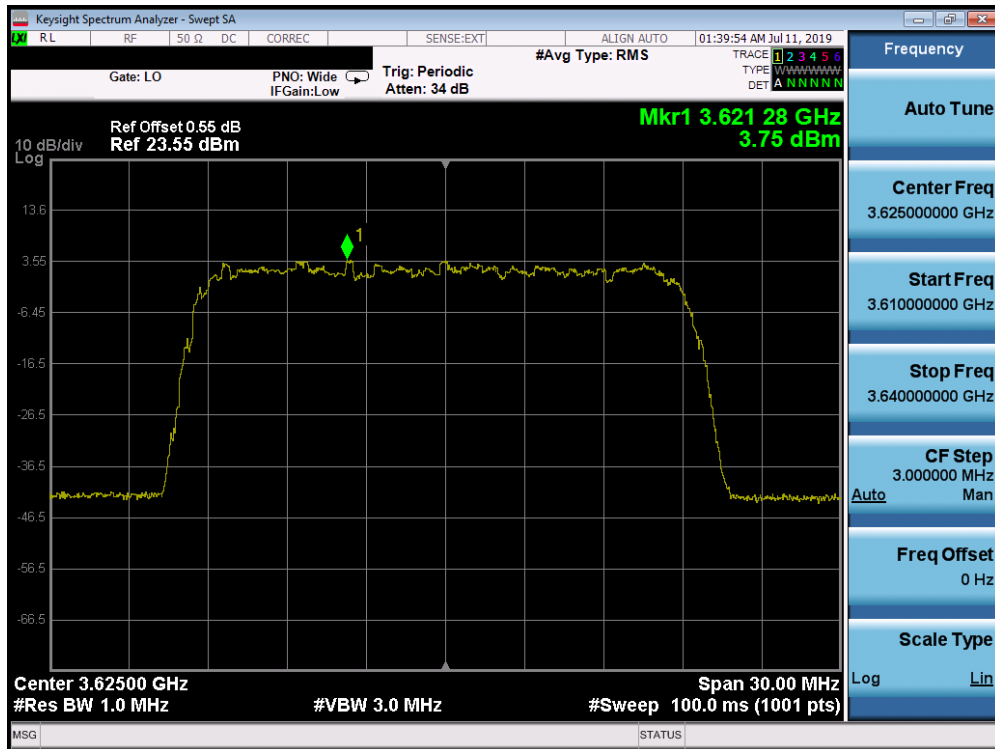


Plot 7-71. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 43

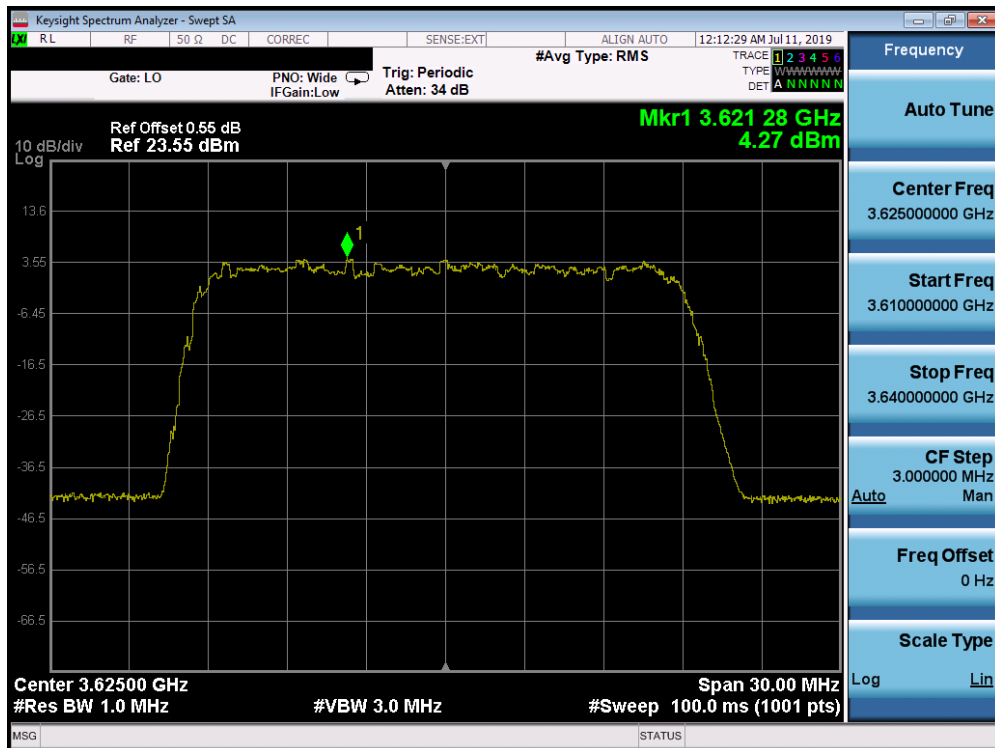


Plot 7-72. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 44

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 90 of 172                  |

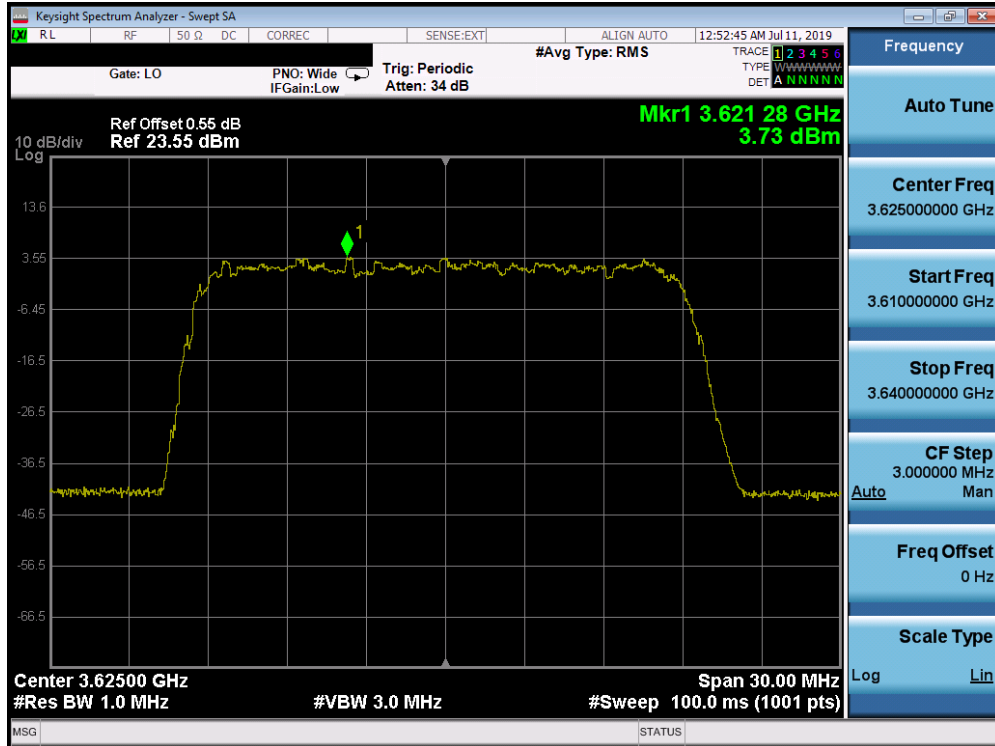


Plot 7-73. Peak Power Spectral Density Plot (1CC– 20.0MHz 16QAM- Mid Channel) Port 45

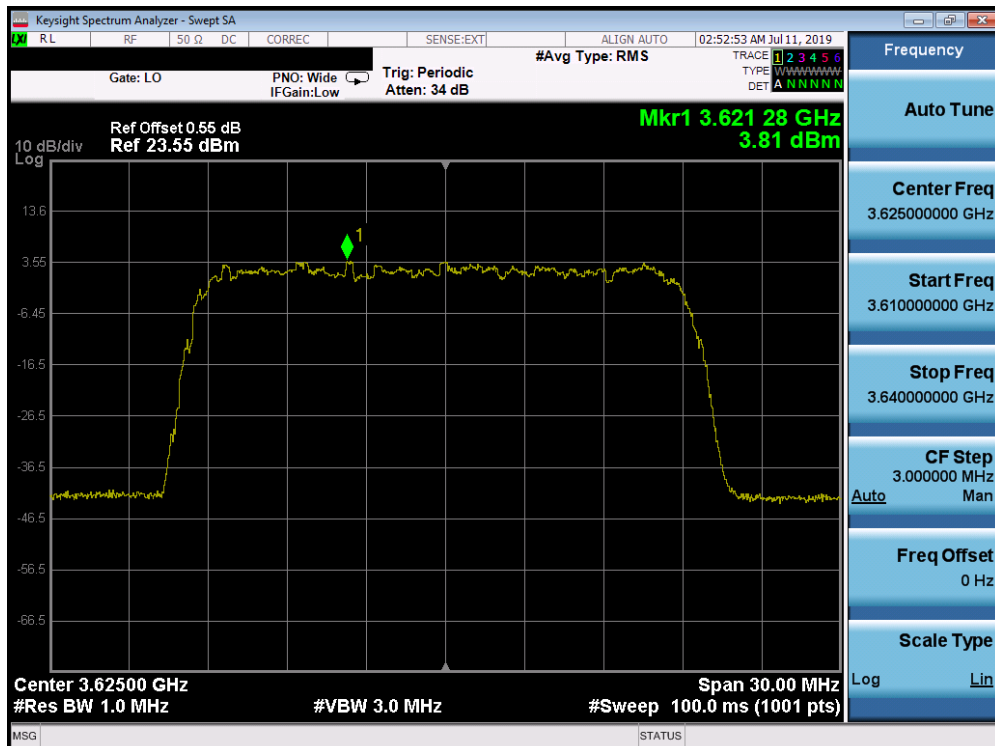


Plot 7-74. Peak Power Spectral Density Plot (1CC– 20.0MHz 16QAM- Mid Channel) Port 46

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 91 of 172                  |

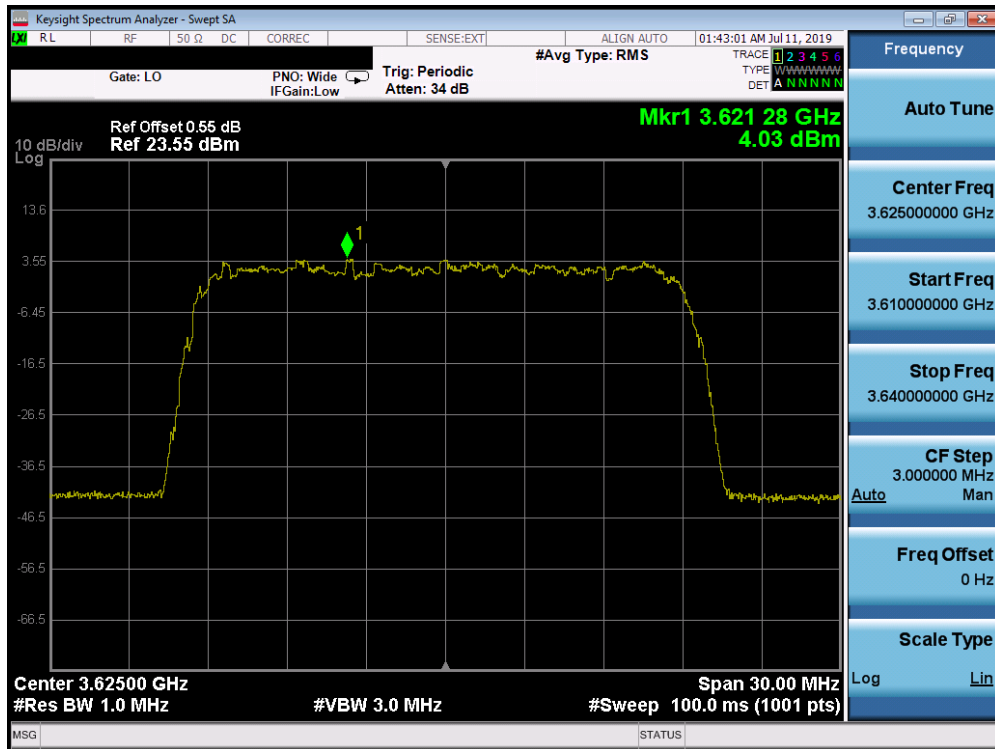


Plot 7-75. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 47

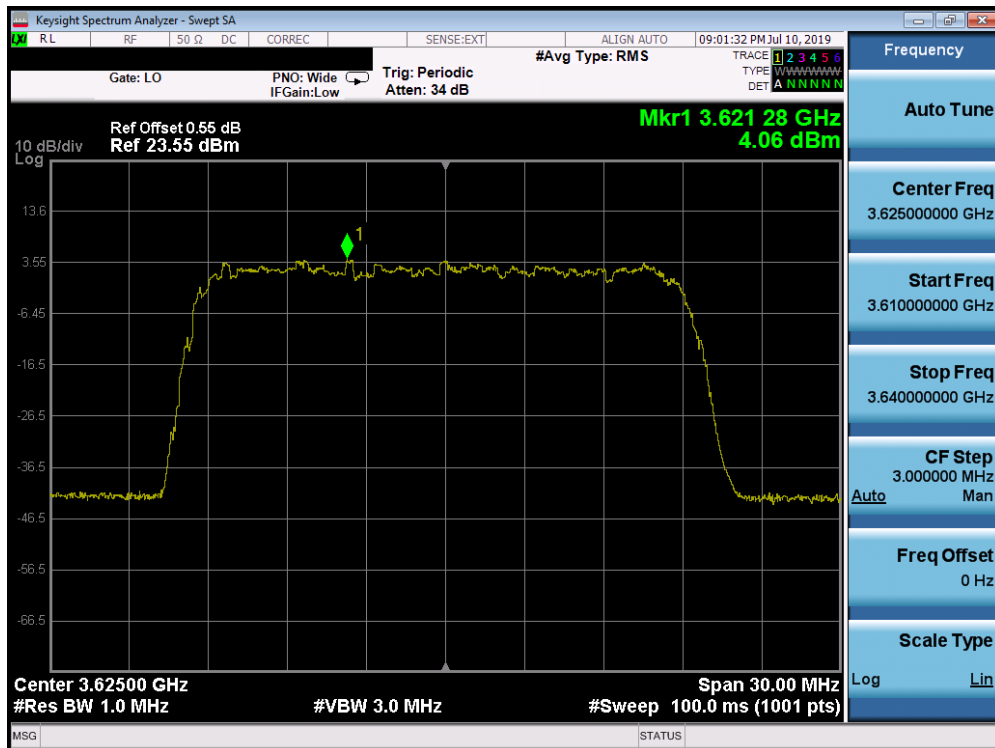


Plot 7-76. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 48

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 92 of 172                  |



Plot 7-77. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 49



Plot 7-78. Peak Power Spectral Density Plot (1CC- 20.0MHz 16QAM- Mid Channel) Port 50

|                                      |                                               |                                       |                |                                 |
|--------------------------------------|-----------------------------------------------|---------------------------------------|----------------|---------------------------------|
| FCC ID: A3LMT6402-48A                | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1907220128-01. | Test Dates:<br>7/1/2019-7/29/2019             | EUT Type:<br>Massive MIMO CBSD        |                | Page 93 of 172                  |