

MEASUREMENT REPORT

Part 96 LTE

Applicant Name:

EUCAST Co., Ltd.
(13595) 4th FL Sungok Bldg, 262,
Hwangsaeul-ro Bundang-Gu, Seongnam-si,
Gyeonggi-do, Korea

Date of Testing:

9/21 ~ 10/27/2020

Test Site/Location:

PCTEST Lab. Yongin-si, Gyeonggi-do, Korea

Test Report Serial No.:

8K20091701-01-R3.2AXTR

FCC ID:

2AXTR-ECL2248-2723

APPLICANT:

EUCAST Co., Ltd.

Application Type:

Certification

Model:

ECL2248-2723

EUT Type:

LTE enterprise small cell base station

FCC Classification:

Citizens Band Category A 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 v02, 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.

This revised Test Report (S/N: 8K20091701-01-R3.2AXTR) supersedes and replaces the previously issued test report (S/N: 8K20091701-01-R2.2AXTR) on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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.

Prepared by
KI SUNG KIM

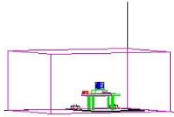
Reviewed by
JAE CHUL SHIN

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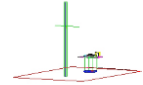
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FCC Part 96



Mode	FCC Rule Part	TX Frequency (MHz)	EIRP		Emission Designator	Modulation
			Max. Power (W)	Max. Power (dBm)		
10 MHz Total Bandwidth	96	3555 - 3695	0.531	27.25	9M04G7D	QPSK
	96	3555 - 3695	0.534	27.27	9M03W7D	16QAM
	96	3555 - 3695	0.461	26.63	9M03W7D	64QAM
20 MHz Total Bandwidth	96	3560 - 3690	1.196	30.78	18M1G7D	QPSK
	96	3560 - 3690	1.280	31.07	18M0W7D	16QAM
	96	3560 - 3690	1.168	30.68	18M0W7D	64QAM

EUT Overview

Notes: EIRP levels shown in the table above are measured over the entire channel bandwidth. These values 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 and the Innovation, Science and Economic Development Canada.

1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST KOREA CO., LTD. facility located at (#1407) 13, Heungdeok 1-ro, Giheung-gu, Yongin-si, Gyeonggi-do 16954, Korea.

1.3 Test Facility / Accreditations

Measurements were performed at PCTEST KOREA Lab located in Yongin, Gyeonggi, South Korea.

- PCTEST KOREA is an ISO 17025:2005 accredited test facility under the National Institute of Standards and Technology (NIST) with Certificate number 600143-0 for Specific Absorption Rate (SAR), where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- PCTEST KOREA facility is accredited and designated in accordance with the provision of Radio Wave Act and International Standard ISO/IEC 17025:2017 under the National Radio Research Agency.
 - Designation Number: KR0169
 - Test Firm Registration Number: 417945

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **EUCAST Co., Ltd. CBSD FCC ID: 2AXTR-ECL2248-2723**. 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 A Devices (CBD).

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

Test Device Serial No.: EE0E0100207010001

2.2 Device Capabilities

This device contains the following capabilities: LTE B48

2.3 Test Configuration

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.

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_{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	2.51
Radiated Disturbance (<1 GHz)	3.29
Radiated Disturbance (>1 GHz)	4.94

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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 Data	Cal Interval	Cal Due	Serial Number
Agilent	N9030A	PXA Signal Analyzer (26.5GHz)	06/29/2020	Annual	06/28/2021	MY49432391
Rohde & Schwarz	FSW43	Signal & Spectrum Analyzer (43GHz)	09/17/2020	Annual	09/16/2021	101250
Rohde & Schwarz	ESW	EMI Test Receiver (44GHz)	06/29/2020	Annual	06/28/2021	101761
Schwarzbeck	VULB9162	Broadband TRILOG Antenna	07/09/2019	Biennial	07/08/2021	9162-217
Sunol sciences	DRH-118	Horn Antenna (1 - 18GHz)	08/09/2019	Biennial	08/08/2021	A102416-1
Schwarzbeck	BBHA 9170	Horn Antenna (18 - 40GHz)	08/02/2020	Biennial	08/01/2022	1037
Rohde & Schwarz	TS-SFUNIT-Rx	Shielded Filter Unit	02/21/2020	Annual	02/20/2021	102131
Rohde & Schwarz	TS-PR1840	18 – 40 GHz Pre-Amplifier	06/29/2020	Annual	06/28/2021	100049
KIKUSUI	PWR1201ML	DC Power Supply	05/20/2020	Annual	05/19/2021	ZL000972
SUKSAN TECHNOLOGY	SE-CT-10	Temperature Chamber	09/17/2020	Annual	09/16/2021	191021
CENTRIC RF	C411-20	ATTENUATOR	05/20/2020	Annual	05/19/2021	0001

Table 5-1. Test Equipment

Notes:

1. 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.
2. 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 = 9M04G7D

LTE BW = 9.04 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

QAM Modulation

Emission Designator = 9M03W7D

LTE BW = 9.03 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: EUCAST Co., Ltd.
 FCC ID: 2AXTR-ECL2248-2723
 FCC Classification: Citizens Band Category A 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 96.41(b)	Conducted Power and Equivalent Isotropic Radiated Power (EIRP)	30 dBm/10 MHz (EIRP)		PASS	Section 7.3
2.1051 96.41(e)	Out of Band Emissions	-13 dBm/MHz at frequencies within 0-10 MHz of channel edge -25 dBm/MHz at frequencies greater than 10 MHz above and below channel edge -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	20 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

Table 7-1. Summary of Conducted Test Results

FCC ID: 2AXTR-ECL2248-2723	 PCTEST® Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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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 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 and attenuators.
4. For conducted spurious emissions, automated test software was used to measure certain emissions and capture the corresponding plots necessary to show compliance.

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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.

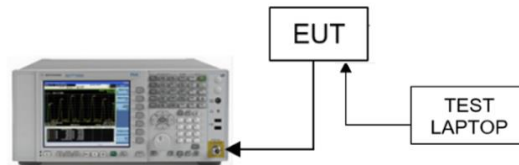


Figure 7-1. Test Instrument & Measurement Setup

Test Notes

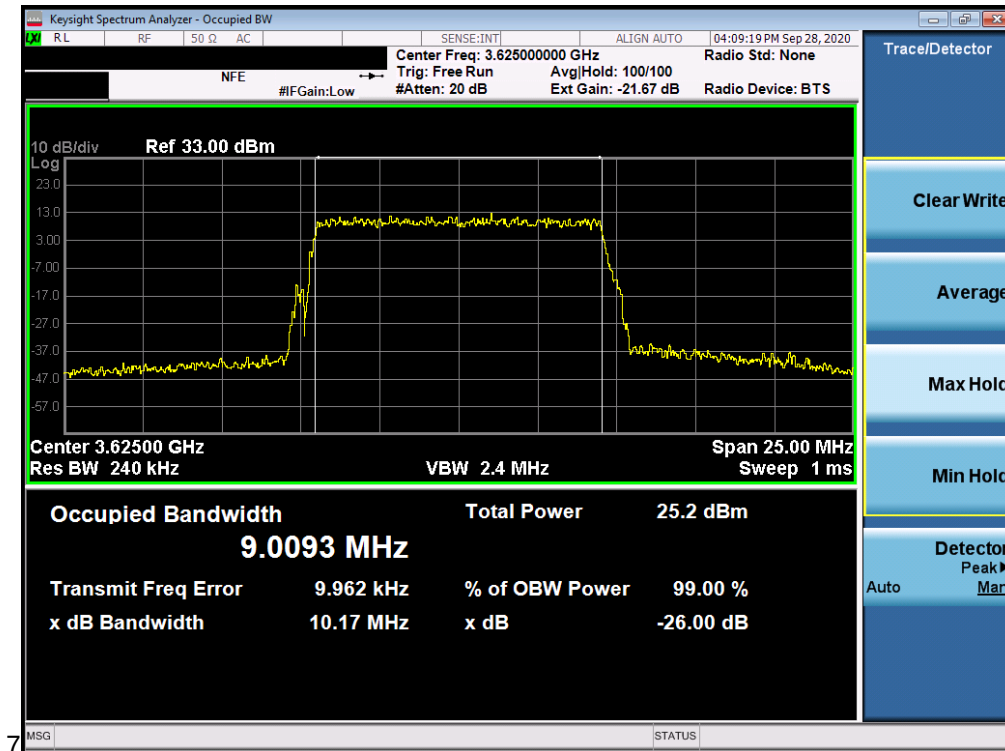
N/A

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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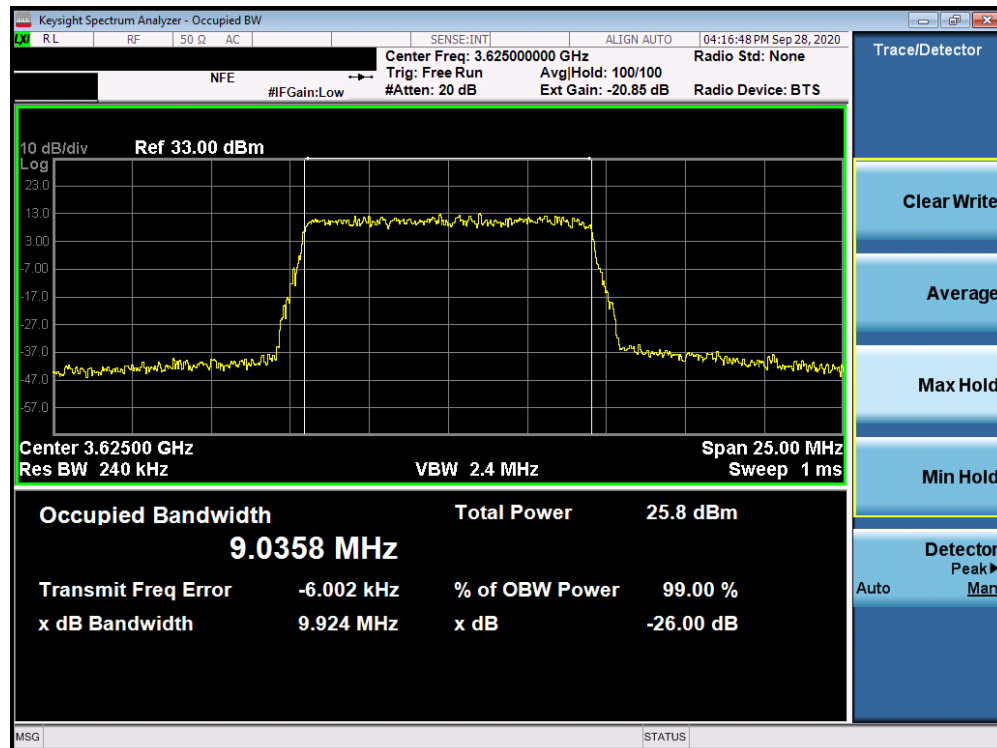
Bandwidth	Port #	Test Results (MHz)					
		OBW			26dB		
		QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
10 MHz	0	9.01	9.02	9.03	10.17	9.82	9.97
	1	9.04	9.03	9.01	9.92	10.04	10.04
20 MHz	0	18.07	17.94	18.00	19.09	19.13	19.34
	1	17.93	18.00	17.94	19.15	19.23	19.09

Table 7-2. Occupied Bandwidth Summary Data

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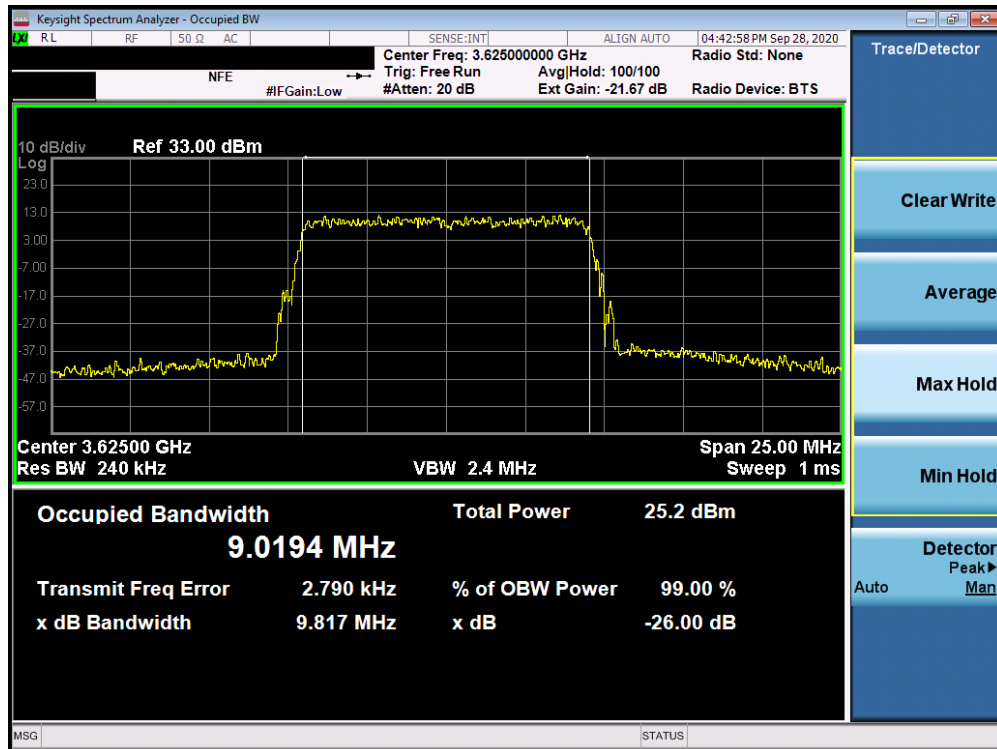


Plot 7-1. Occupied Bandwidth Plot (10 MHz Channel Bandwidth, QPSK, Port 0)

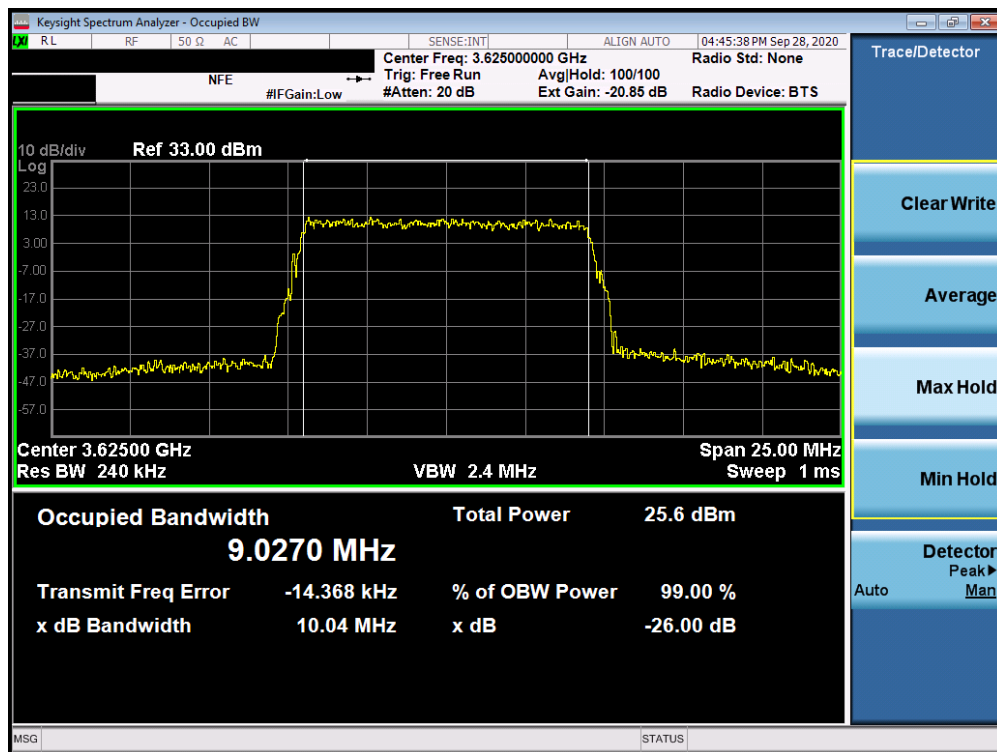


Plot 7-2. Occupied Bandwidth Plot (10 MHz Channel Bandwidth, QPSK, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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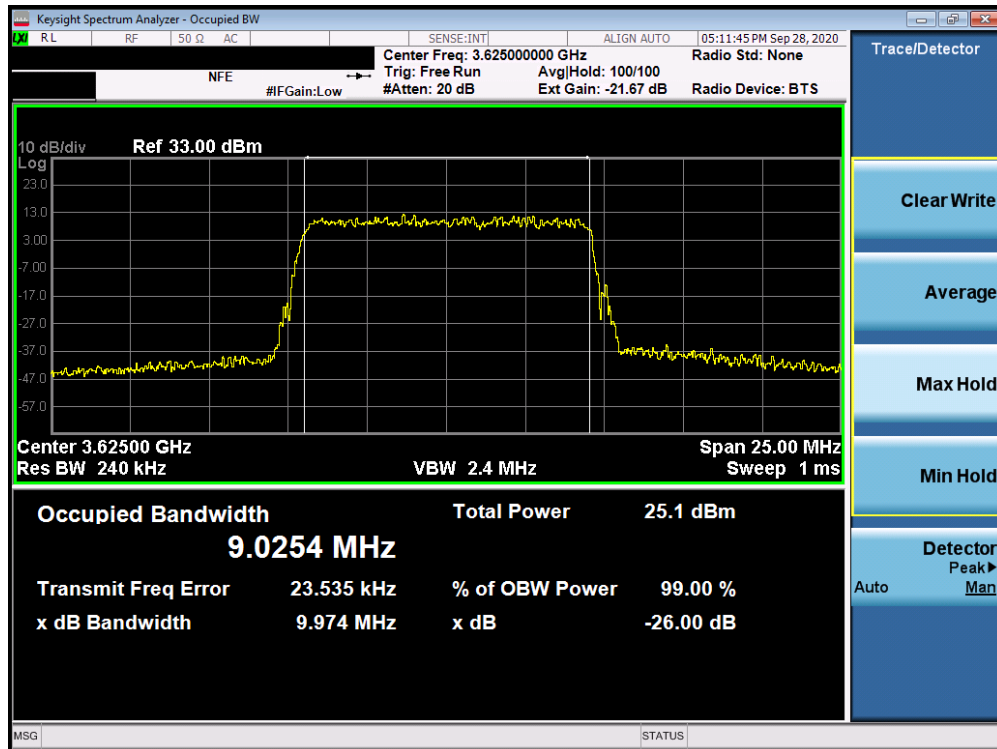


Plot 7-3. Occupied Bandwidth Plot(10 MHz Channel Bandwidth, 16QAM, Port 0)

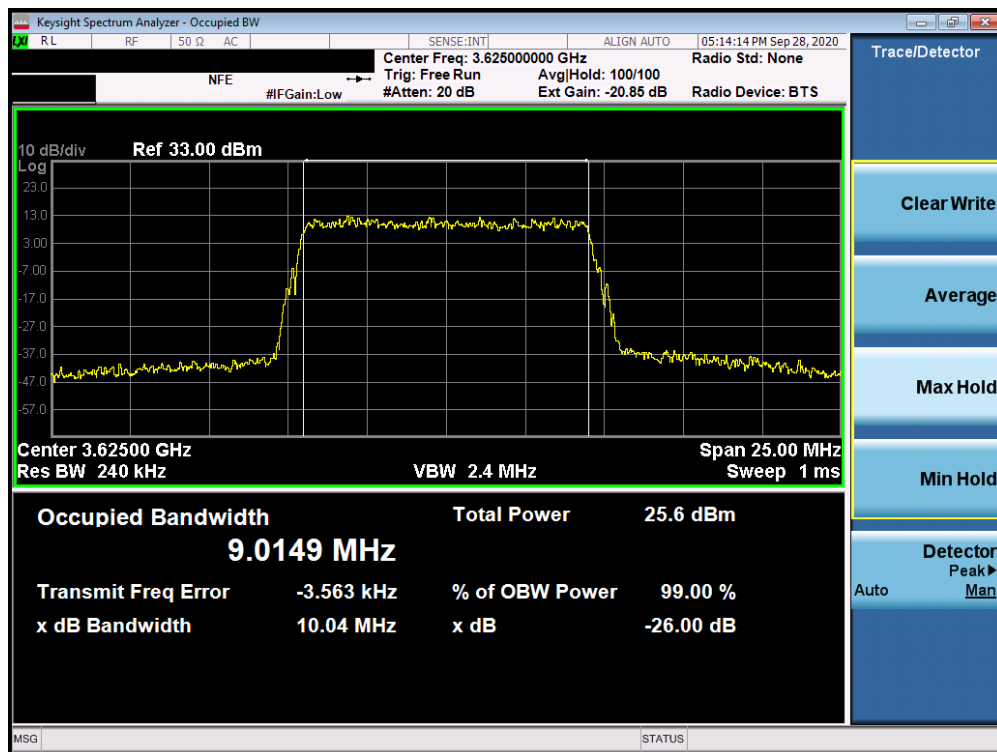


Plot 7-4. Occupied Bandwidth Plot(10 MHz Channel Bandwidth, 16QAM, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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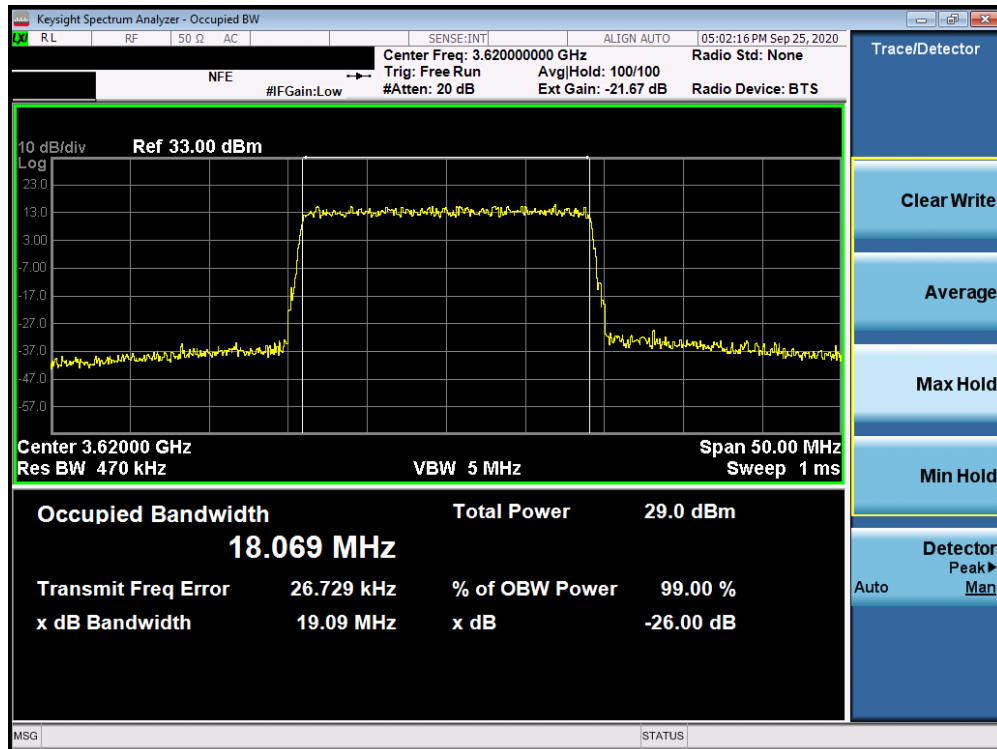


Plot 7-5. Occupied Bandwidth Plot(10 MHz Channel Bandwidth, 64QAM, Port 0)

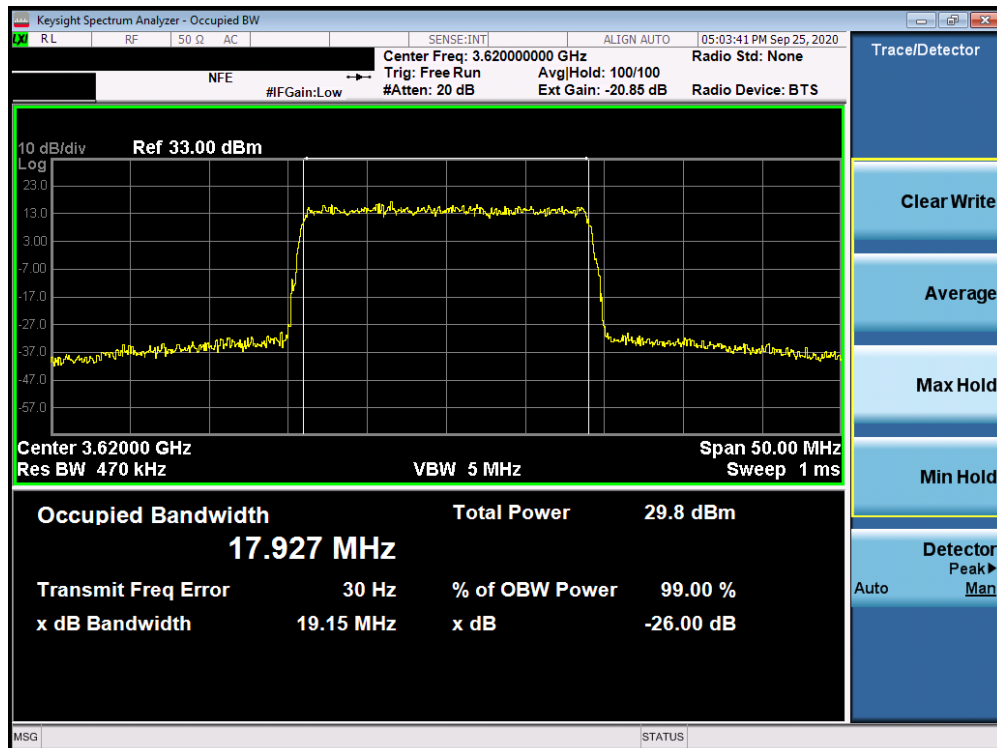


Plot 7-6. Occupied Bandwidth Plot(10 MHz Channel Bandwidth, 64QAM, Port 0)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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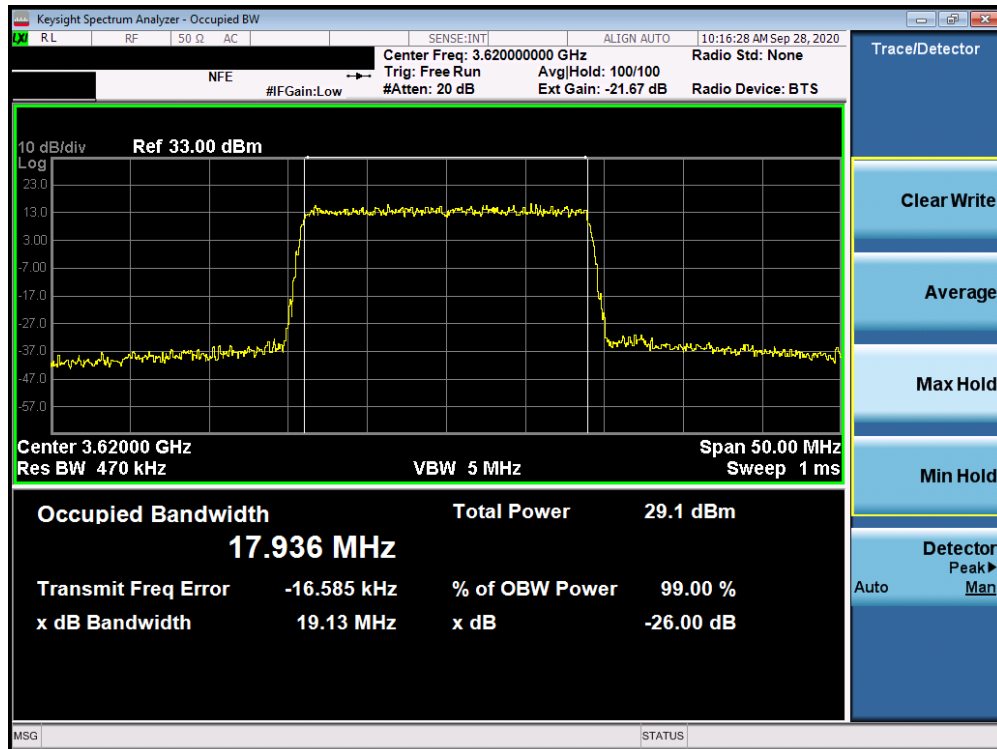


Plot 7-7. Occupied Bandwidth Plot(20 MHz Channel Bandwidth, QPSK, Port 0)

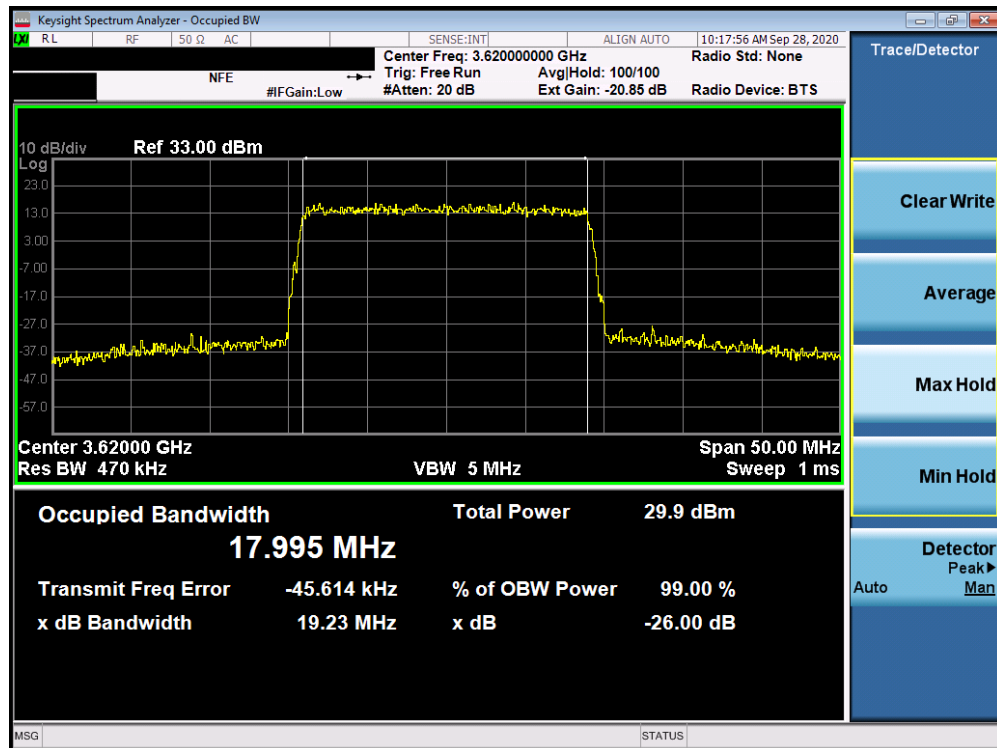


Plot 7-8. Occupied Bandwidth Plot(20 MHz Channel Bandwidth, QPSK, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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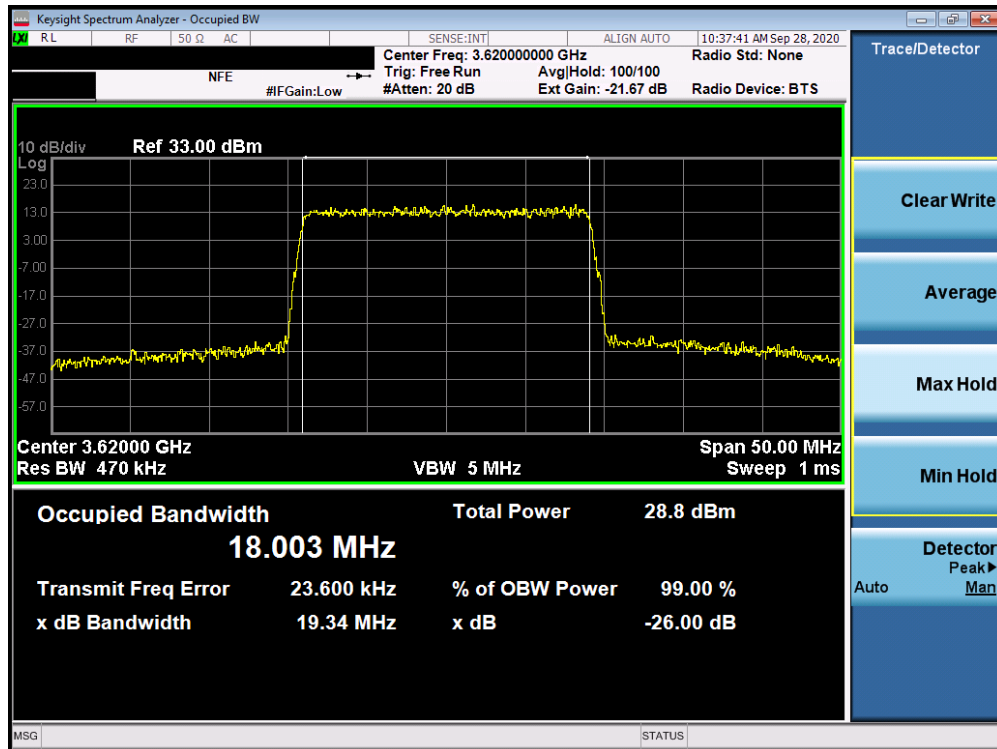


Plot 7-9. Occupied Bandwidth Plot(20 MHz Channel Bandwidth, 16QAM, Port 0)

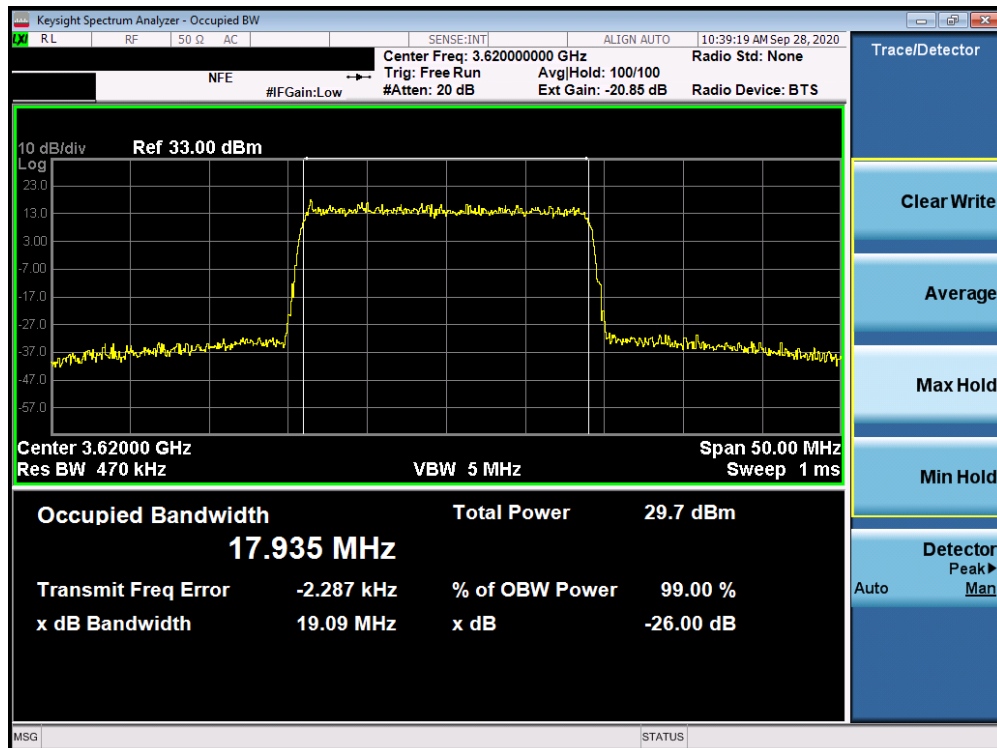


Plot 7-10. Occupied Bandwidth Plot(20 MHz Channel Bandwidth, 16QAM, Port 1)

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Plot 7-11. Occupied Bandwidth Plot(20 MHz Channel Bandwidth, 64QAM, Port 0)



Plot 7-12. Occupied Bandwidth Plot(20 MHz Channel Bandwidth, 64QAM, Port 1)

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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. 10 MHz and 20 MHz for 1CC 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.

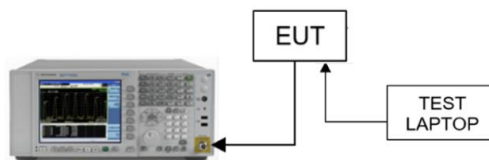


Figure 7-2. Test Instrument & Measurement Setup

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Test Notes

1. 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.
2. Consider the following factors for EIRP(dBm/10 MHz):
 - a) Conducted power for each port is measured in dBm.
 - b) Conducted power per port (dBm) is converted to a linear value (mW).
 - c) This value has to be scaled to per 10 MHz in order to compare it with the FCC EIRP Limit defined in units dBm/10 MHz.
 Scaling Factor (dB) = $10 \cdot \log(10 \text{ MHz} / \text{Occupied Bandwidth in MHz})$
 Scaling Factor (OBW $\leq$ 10 MHz) = $10 \cdot \log(10/10) = 0 \text{ dB}$
 Scaling Factor (OBW > 10 MHz, 17.93 MHz) = $10 \cdot \log(10/17.93) = -2.53 \text{ dB}$
 - d) Antenna Gains (dBi) are provided by the client.
 Antenna Gain = Port #0: 5.79 dBi, Port #1: 5.98 dBi
 - e) EIRP (dBm/10 MHz) = Conducted Power (dBm) + Scaling Factor + Antenna Gain
 = 21.60 dBm - 2.53 dB + 5.79 dBi = 24.89 dBm
3. MIMO Calculations are done considering output channel power for all ports and respective margins are calculated.
 - a) Powers are summed up in linear using the measure-and-sum technique defined in KDB 662911 D01 v02r01- Section D.
 - b) The EIRP per port (dBm) is converted to a linear value (mW). A summation of linear powers for all two ports gives us the total MIMO EIRP in milliWatts (mW). The Summation EIRP (mW) is converted to a dBm unit.
4. Sample Calculation:
 Let us assume the following Calculation.
 - a. Path #0 Conducted Power as 21.60 dBm
 - b. Path #0 Occupied Bandwidth = 18.07 MHz
 - c. Scaling Factor = $10 \cdot \log(10/18.07) = -2.57 \text{ dB}$
 - d. Port #0 Antenna Gain = 5.79 dBi
 - e. Port #0 EIRP = **24.85 dBm/10 MHz**
 - f. Path #1 Conducted Power as 21.26 dBm
 - g. Path #1 Occupied Bandwidth = 17.93 MHz
 - h. Scaling Factor = $10 \cdot \log(10/18.07) = -2.53 \text{ dB}$
 - i. Port #1 Antenna Gain = 5.98 dBi
 - j. Port #1 EIRP = **24.74 dBm/10 MHz**
 - k. Total MIMO EIRP = 24.85 dBm + 24.74 dBm = $10^{(24.85/10)} \text{ mW} + 10^{(24.74/10)} \text{ mW} = 305.49 \text{ mW} + 297.85 \text{ mW} = 603.34 \text{ mW} = 10 \cdot \log(603.34) = 27.81 \text{ dBm/10 MHz}$
 - l. Total MIMO EIRP = **27.81 dBm/10 MHz**
 - m. FCC EIRP Limit = 30 dBm/10 MHz
 - n. Margin = MIMO EIRP - FCC EIRP Limit = 27.81 - 30 = **-2.19 dB**

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Port #0	Test Results								
	Low Channel			Middle Channel			High Channel		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
Conducted Power (dBm)	17.66	18.10	17.64	18.13	18.13	17.62	17.06	17.37	16.88
OBW (MHz)	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Scaling factor (dB)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ant. Gain (dBi)	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79
EIRP (dBm/10 MHz)	23.45	23.89	23.43	23.92	23.93	23.42	22.85	23.16	22.67

Table 7-3. Conducted Powers & EIRP Summary Data (10 MHz Channel Bandwidth, Port 0)

Port #1	Test Results								
	Low Channel			Middle Channel			High Channel		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
Conducted Power (dBm)	18.16	18.60	17.83	18.56	18.55	18.10	17.45	17.83	17.71
OBW (MHz)	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Scaling factor (dB)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ant. Gain (dBi)	5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98
EIRP (dBm/10 MHz)	24.14	24.58	23.81	24.53	24.52	24.07	23.42	23.81	23.68

Table 7-4. Conducted Powers & EIRP Summary Data (10 MHz Channel Bandwidth, Port 1)

Bandwidth	Test Results Summation for two ports								
	Low Channel			Middle Channel			High Channel		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
10 MHz									
Total MIMO EIRP (dBm/10 MHz)	26.82	27.26	26.63	27.25	27.25	26.77	26.16	26.51	26.22
MIMO EIRP Limit (dBm/10 MHz)	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Margin (dB)	-3.18	-2.74	-3.37	-2.75	-2.75	-3.23	-3.84	-3.49	-3.78

Table 7-5. Conducted Powers & EIRP Summary Data (10 MHz Channel Bandwidth, Summation)

FCC ID: 2AXTR-ECL2248-2723	 MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Port #0	Test Results								
	Low Channel			Middle Channel			High Channel		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
Conducted Power (dBm)	21.60	21.72	21.52	21.38	21.64	21.52	21.93	21.63	20.89
OBW (MHz)	18.07	17.94	18.00	18.07	17.94	18.00	18.07	17.94	18.00
Scaling factor (dB)	-2.57	-2.54	-2.55	-2.57	-2.54	-2.55	-2.57	-2.54	-2.55
Ant. Gain (dBi)	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79
EIRP (dBm/10 MHz)	24.85	25.00	24.79	24.63	24.92	24.79	25.18	24.91	24.16

Table 7-6. Conducted Powers & EIRP Summary Data (20 MHz Channel Bandwidth, Port 0)

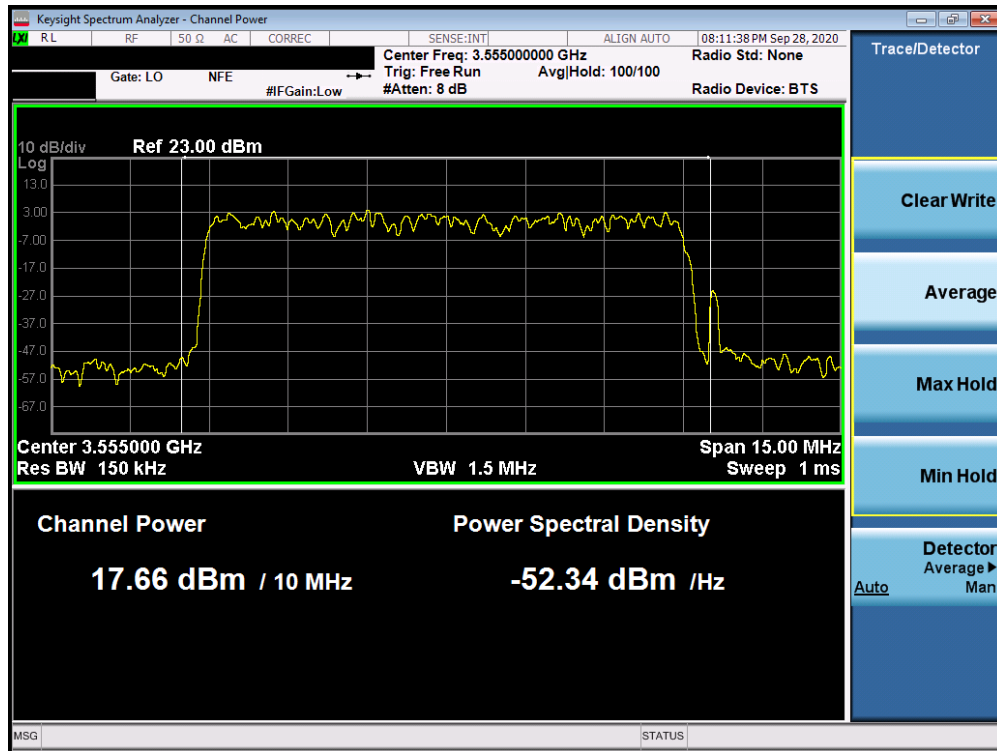
Port #1	Test Results								
	Low Channel			Middle Channel			High Channel		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
Conducted Power (dBm)	21.26	21.40	21.04	22.06	22.64	22.02	21.84	21.59	21.71
OBW (MHz)	17.93	17.99	17.94	17.93	17.99	17.94	17.93	17.99	17.94
Scaling factor (dB)	-2.53	-2.55	-2.54	-2.53	-2.55	-2.54	-2.53	-2.55	-2.54
Ant. Gain (dBi)	5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98
EIRP (dBm/10 MHz)	24.74	24.86	24.51	25.53	26.09	25.48	25.31	25.04	25.18

Table 7-7. Conducted Powers & EIRP Summary Data (20 MHz Channel Bandwidth, Port 1)

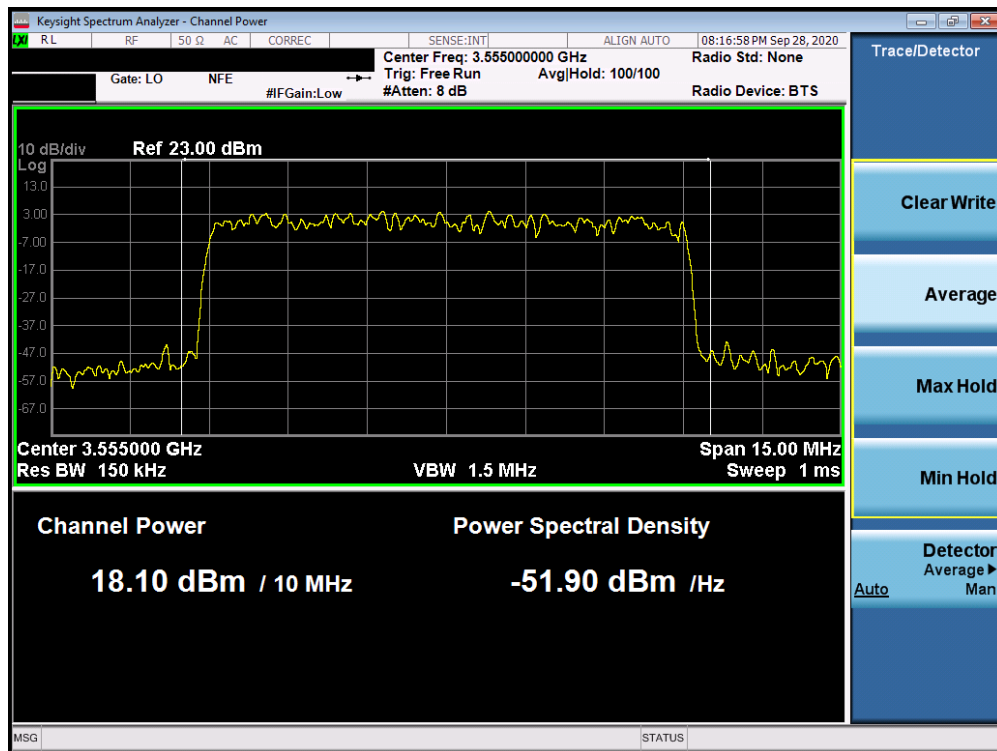
Bandwidth	Test Results - Summation for two ports								
	Low Channel			Middle Channel			High Channel		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
20 MHz									
Total MIMO EIRP (dBm/10 MHz)	27.81	27.94	27.66	28.12	28.55	28.16	28.25	27.99	27.71
FCC EIRP Limit (dBm/10 MHz)	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Margin	-2.19	-2.06	-2.34	-1.88	-1.45	-1.84	-1.75	-2.01	-2.29

Table 7-8. Conducted Powers & EIRP Summary Data (20 MHz Channel Bandwidth, Summation)

FCC ID: 2AXTR-ECL2248-2723	 MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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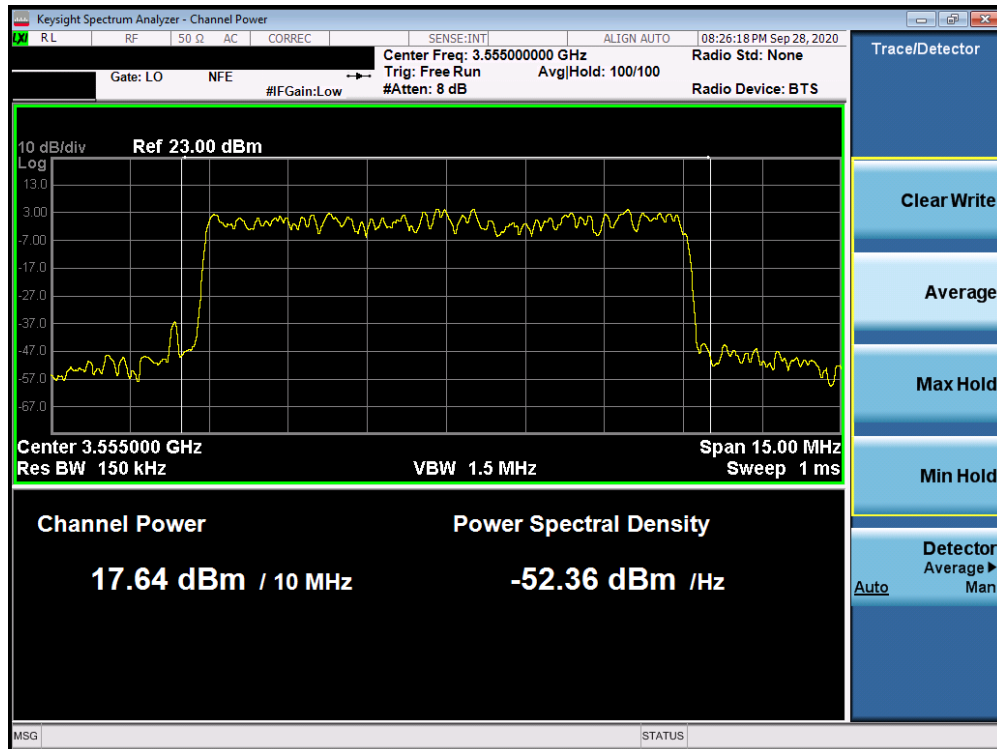


Plot 7-1. Conducted Power Plot(10 MHz Channel Bandwidth, Low Channel, QPSK, Port 0)

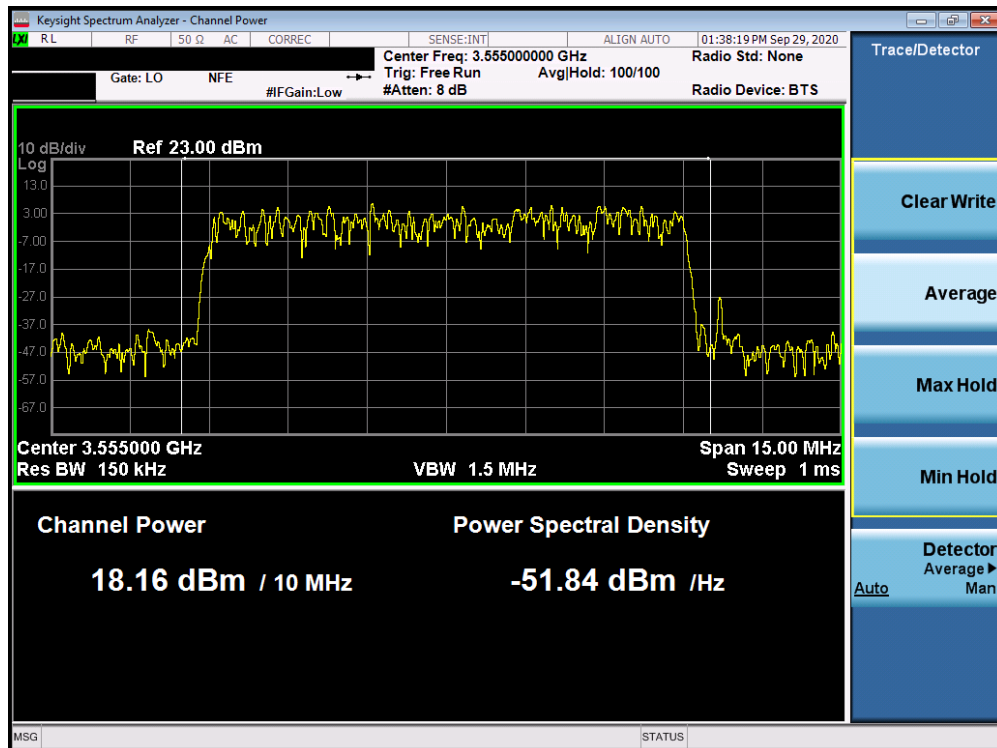


Plot 7-2. Conducted Power Plot(10 MHz Channel Bandwidth, Low Channel, 16QAM, Port 0)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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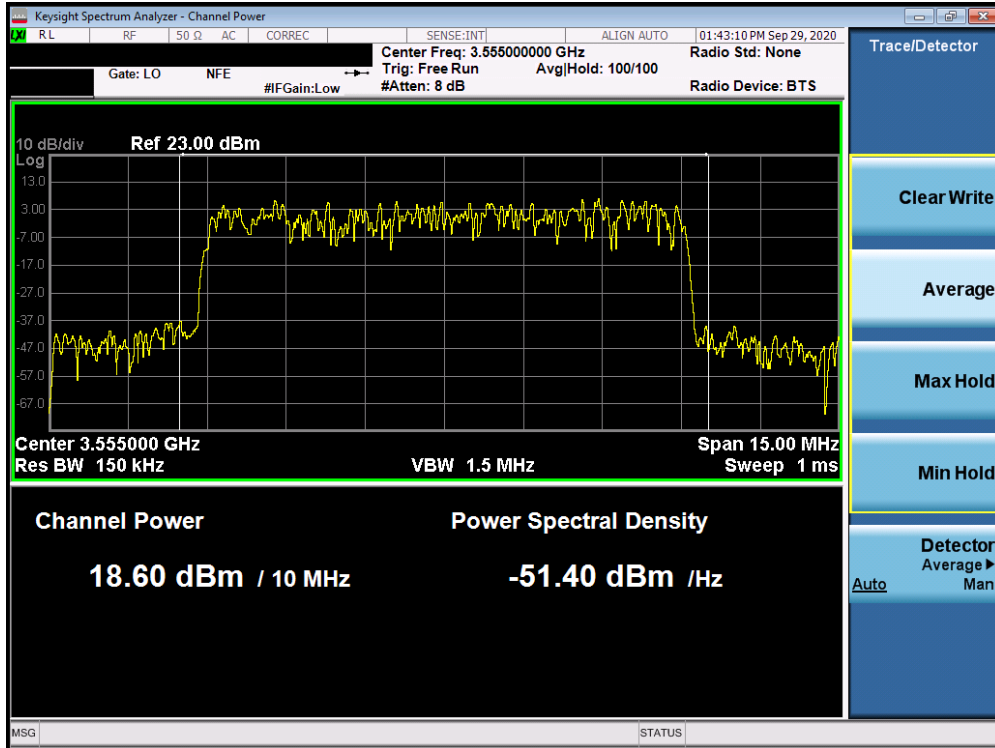


Plot 7-3. Conducted Power Plot(10 MHz Channel Bandwidth, Low Channel, 64QAM, Port 0)

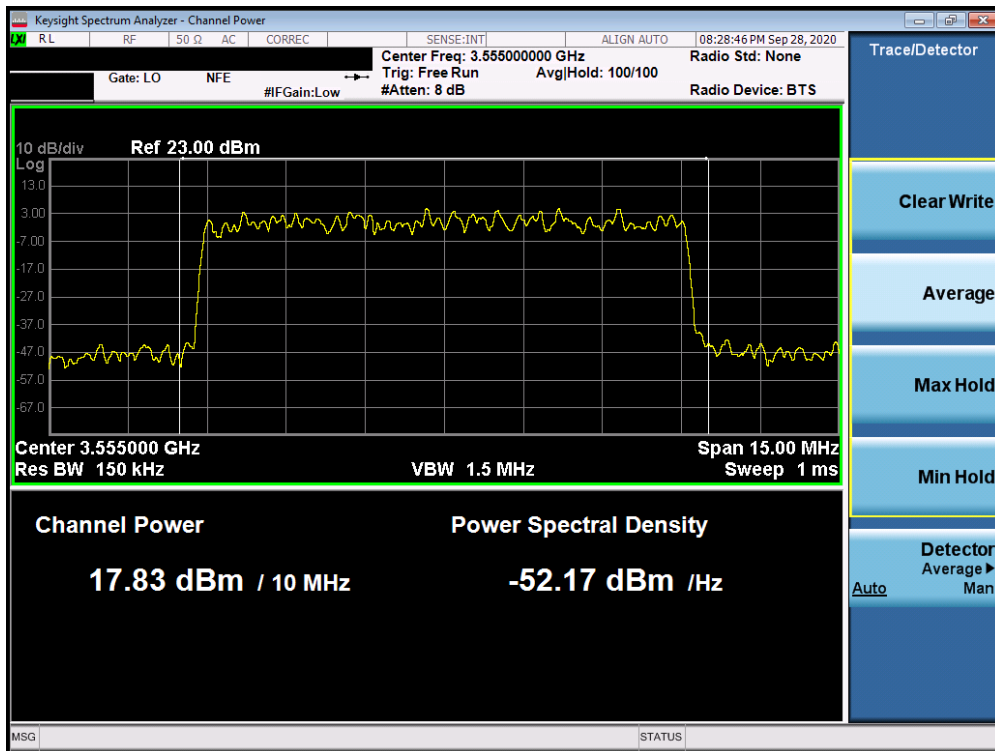


Plot 7-4. Conducted Power Plot(10 MHz Channel Bandwidth, Low Channel, QPSK, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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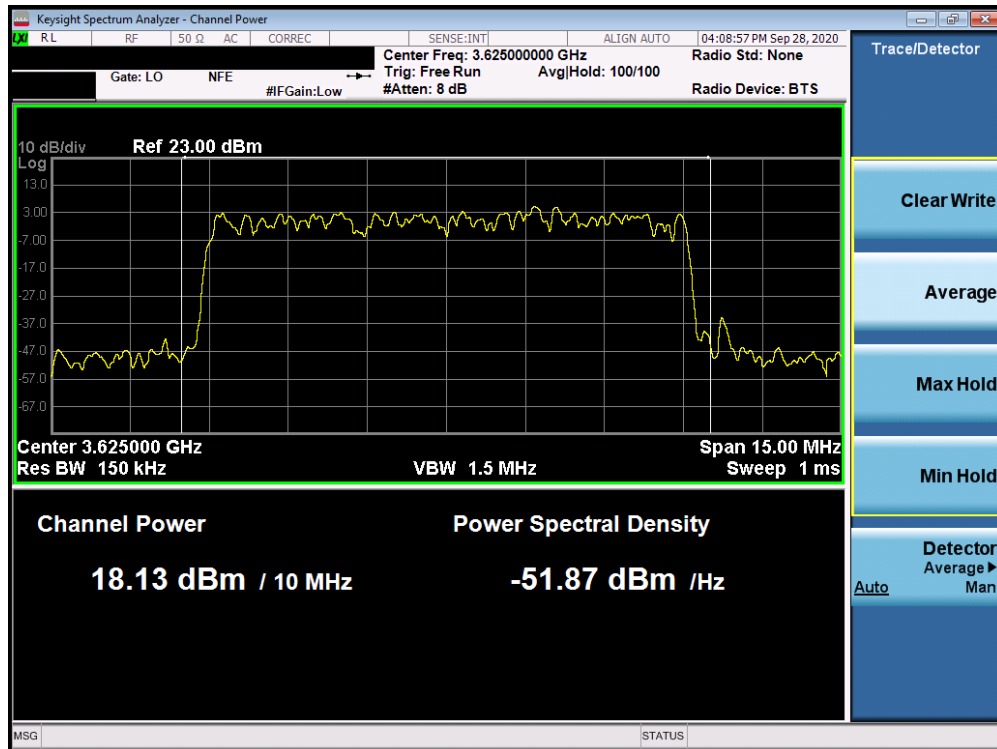


Plot 7-5. Conducted Power Plot(10 MHz Channel Bandwidth, Low Channel, 16QAM, Port 1)

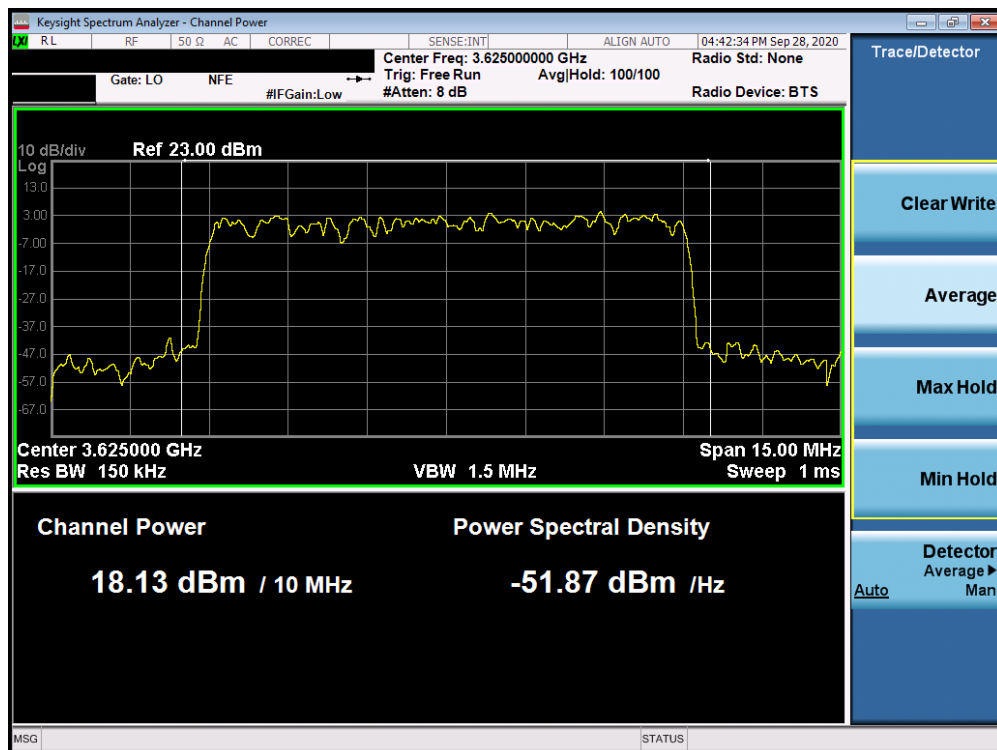


Plot 7-6. Conducted Power Plot(10 MHz Channel Bandwidth, Low Channel, 64QAM, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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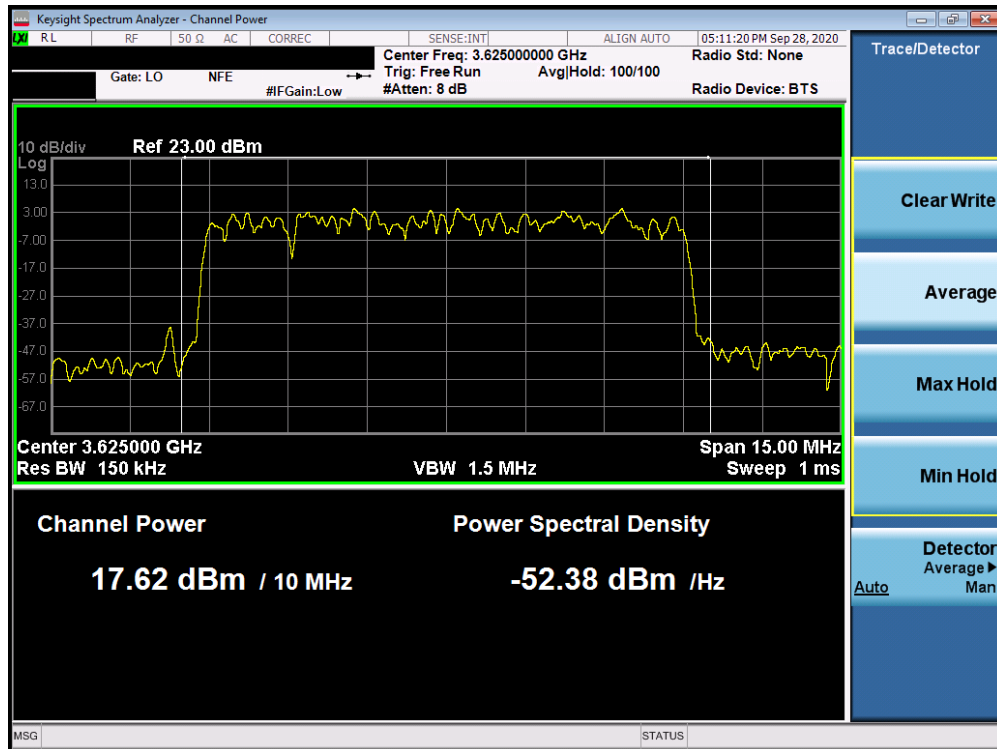


Plot 7-7. Conducted Power Plot(10 MHz Channel Bandwidth, Middle Channel, QPSK, Port 0)

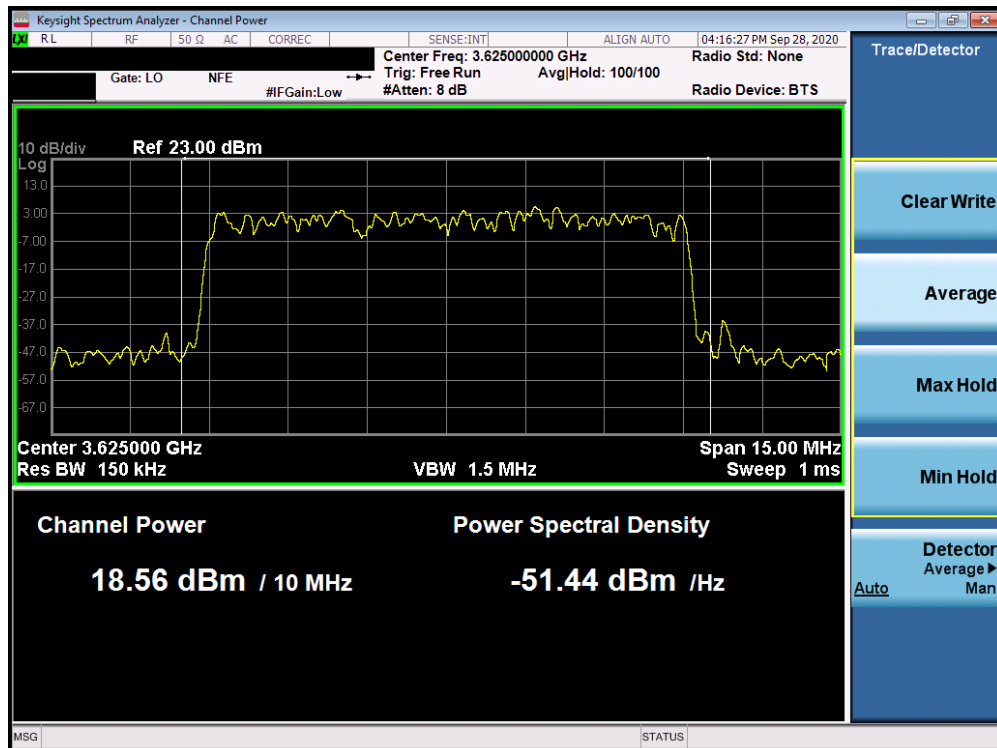


Plot 7-8. Conducted Power Plot(10 MHz Channel Bandwidth, Middle Channel, 16QAM, Port 0)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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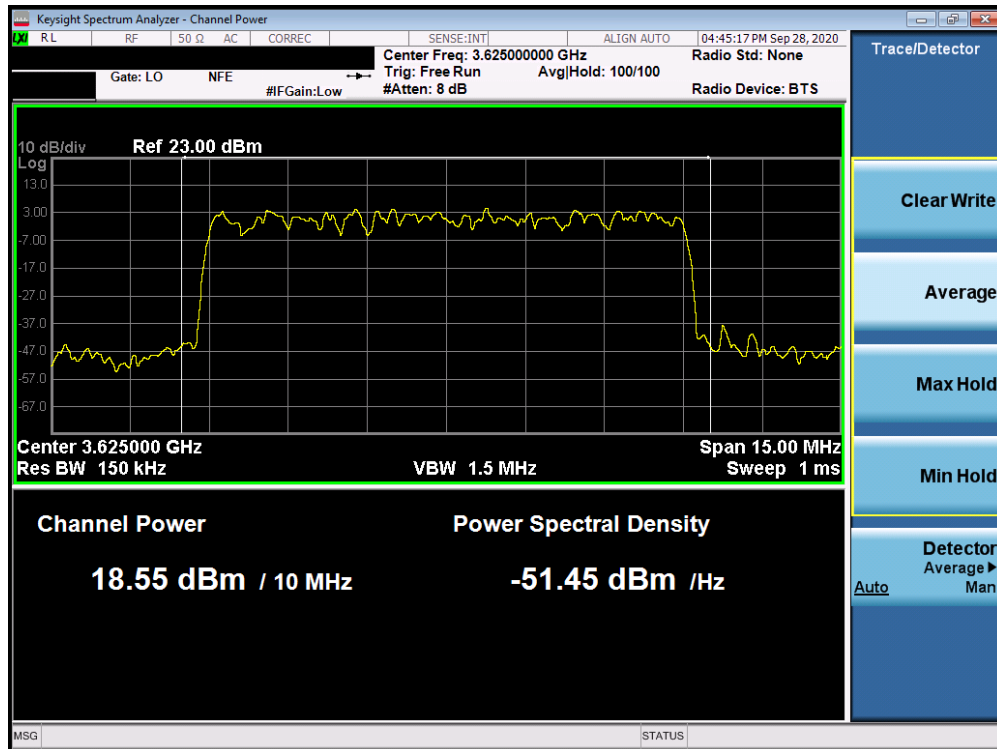


Plot 7-9. Conducted Power Plot(10 MHz Channel Bandwidth, Middle Channel, 64QAM, Port 0)

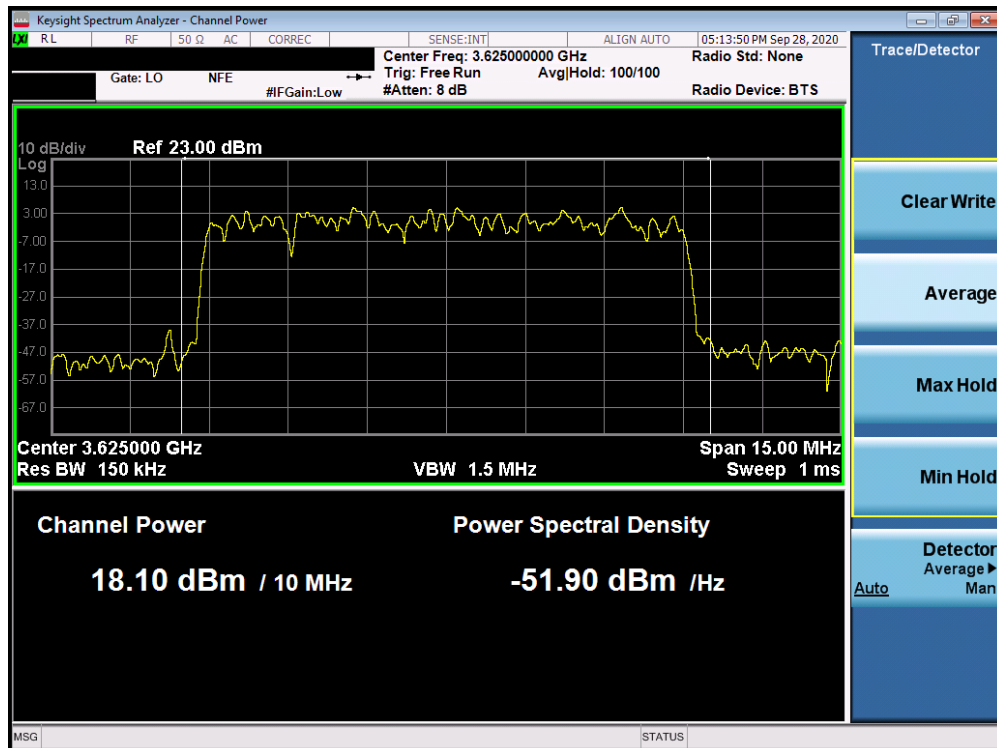


Plot 7-10. Conducted Power Plot(10 MHz Channel Bandwidth, Middle Channel, QPSK, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 8K20091701-01-R3.2AXTR	Test Dates: 9/17/2020 - 10/27/2020	EUT Type: LTE enterprise small cell base station	Page 28 of 143

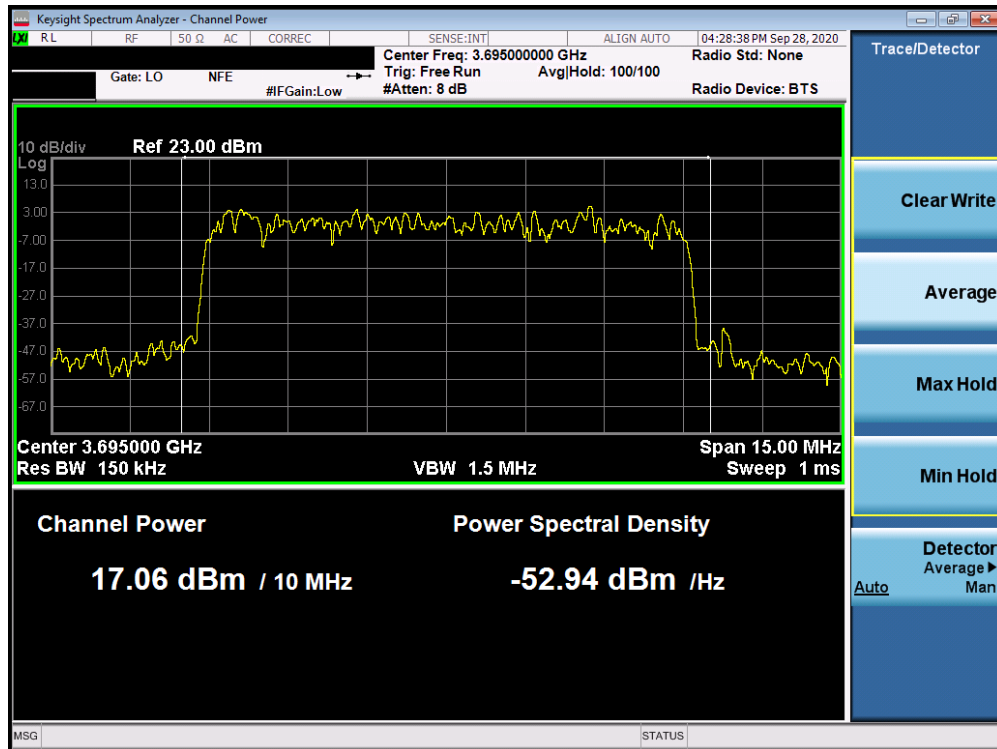


Plot 7-11. Conducted Power Plot(10 MHz Channel Bandwidth, Middle Channel, 16QAM, Port 1)

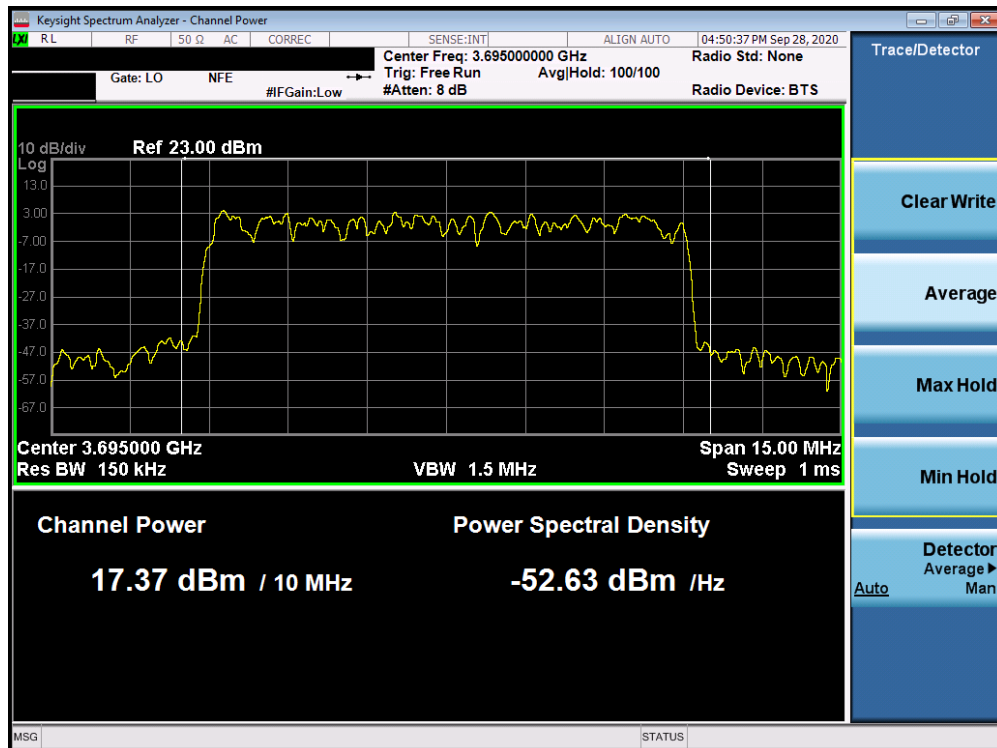


Plot 7-12. Conducted Power Plot(10 MHz Channel Bandwidth, Middle Channel, 64QAM, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 8K20091701-01-R3.2AXTR	Test Dates: 9/17/2020 - 10/27/2020	EUT Type: LTE enterprise small cell base station	Page 29 of 143

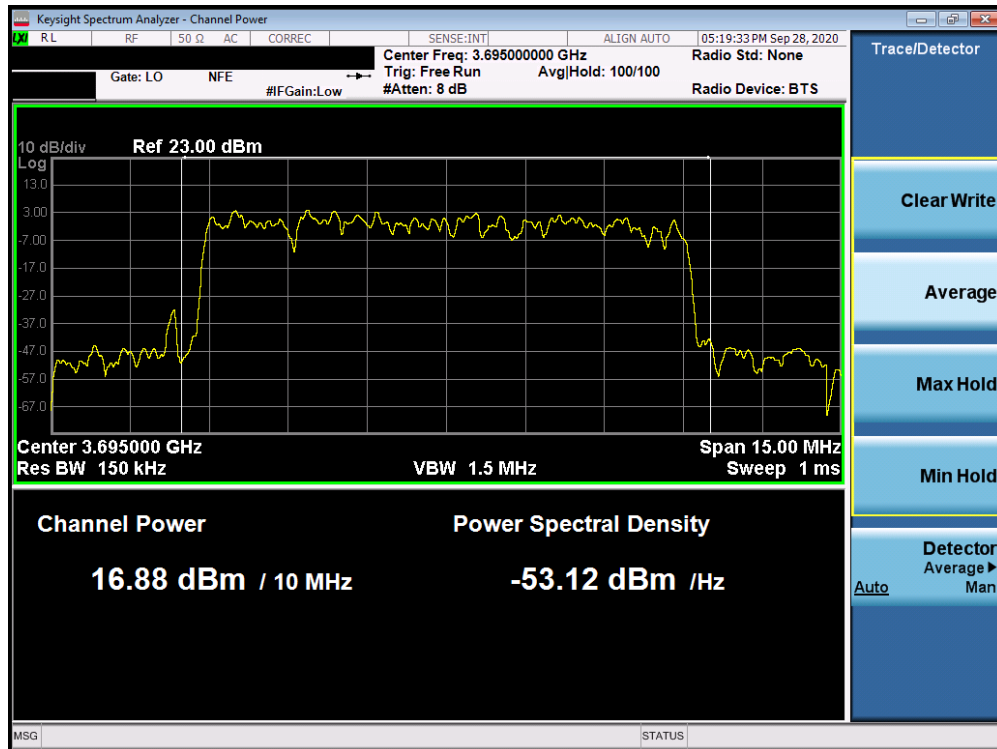


Plot 7-13. Conducted Power Plot(10 MHz Channel Bandwidth, High Channel, QPSK, Port 0)

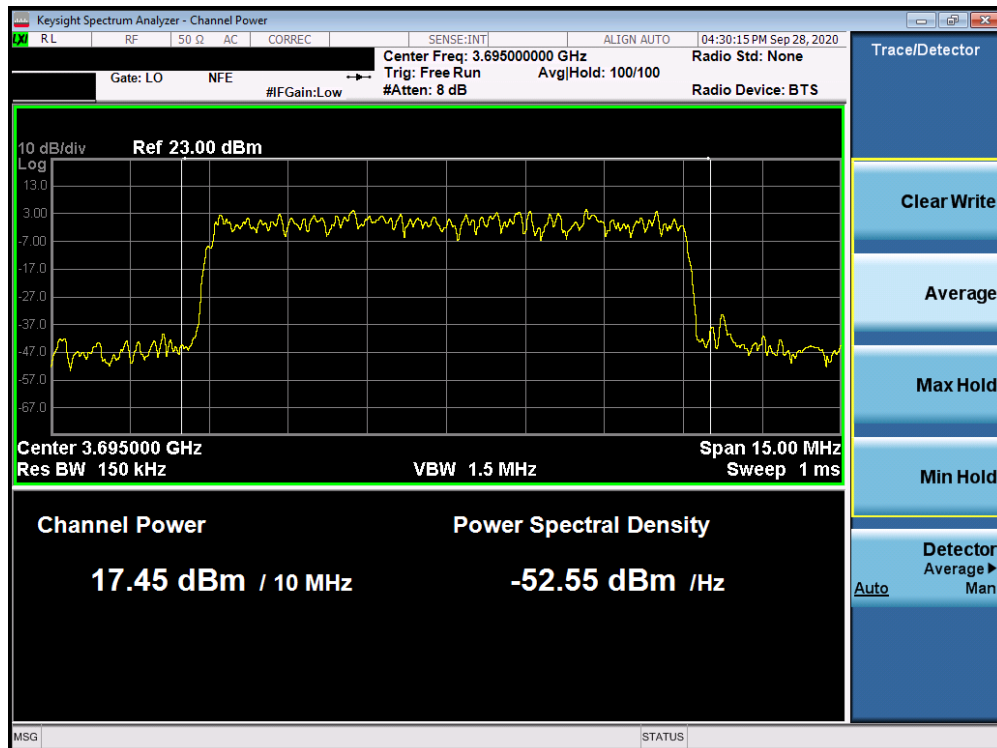


Plot 7-14. Conducted Power Plot(10 MHz Channel Bandwidth, High Channel, 16QAM, Port 0)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 8K20091701-01-R3.2AXTR	Test Dates: 9/17/2020 - 10/27/2020	EUT Type: LTE enterprise small cell base station	Page 30 of 143

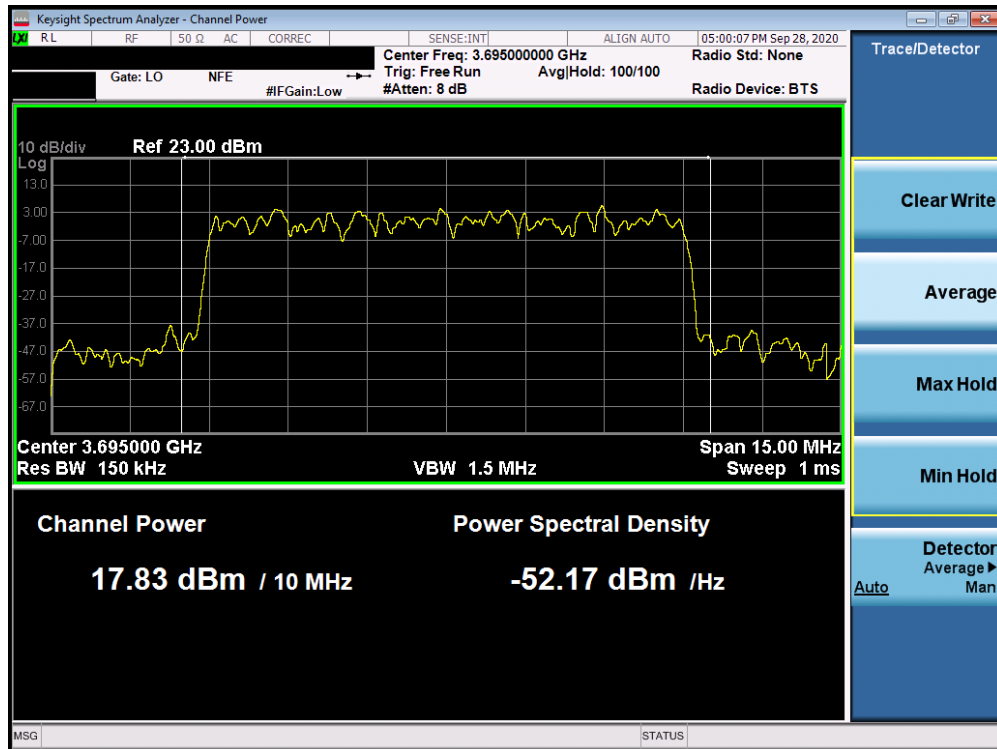


Plot 7-15. Conducted Power Plot(10 MHz Channel Bandwidth, High Channel, 64QAM, Port 0)

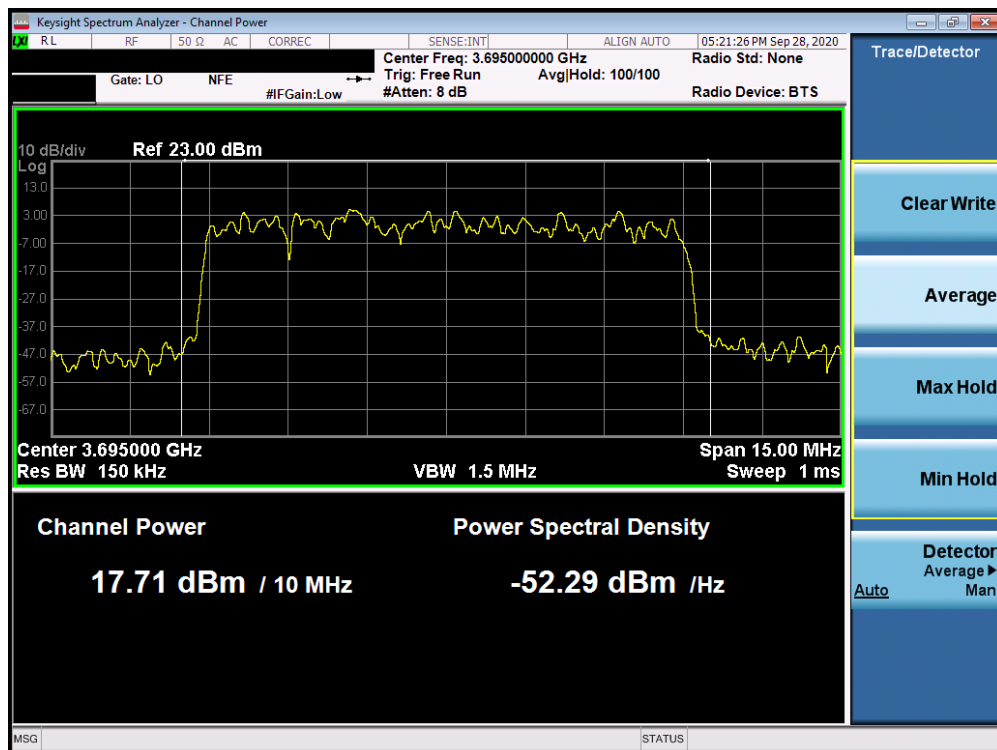


Plot 7-16. Conducted Power Plot(10 MHz Channel Bandwidth, High Channel, QPSK, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 8K20091701-01-R3.2AXTR	Test Dates: 9/17/2020 - 10/27/2020	EUT Type: LTE enterprise small cell base station	Page 31 of 143

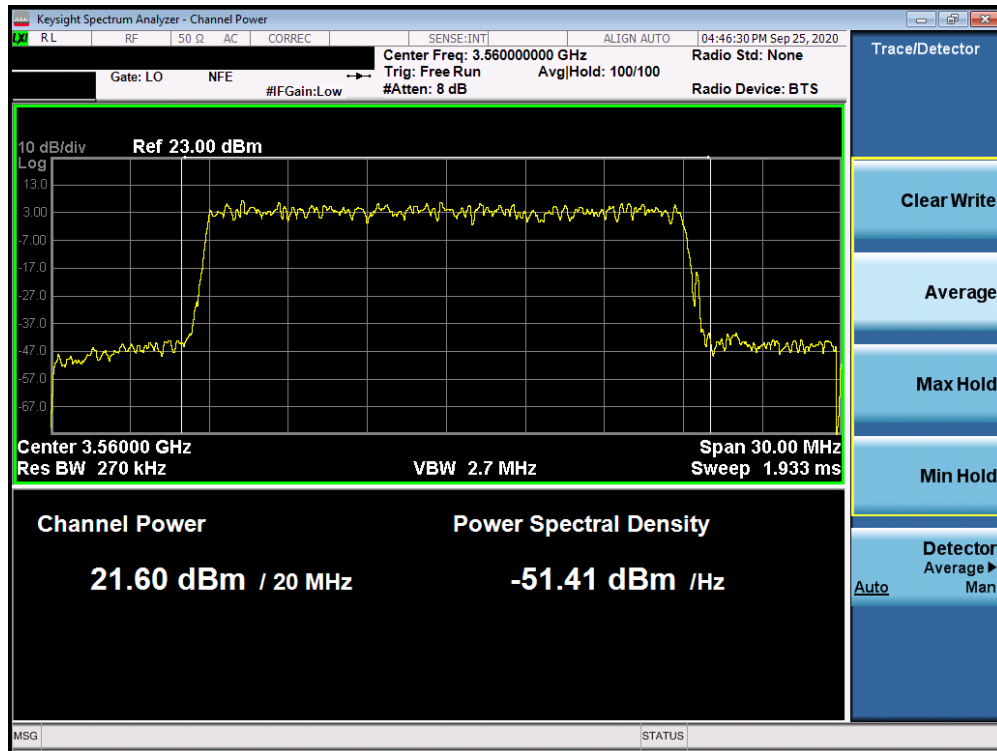


Plot 7-17. Conducted Power Plot(10 MHz Channel Bandwidth, High Channel, 16QAM, Port 1)

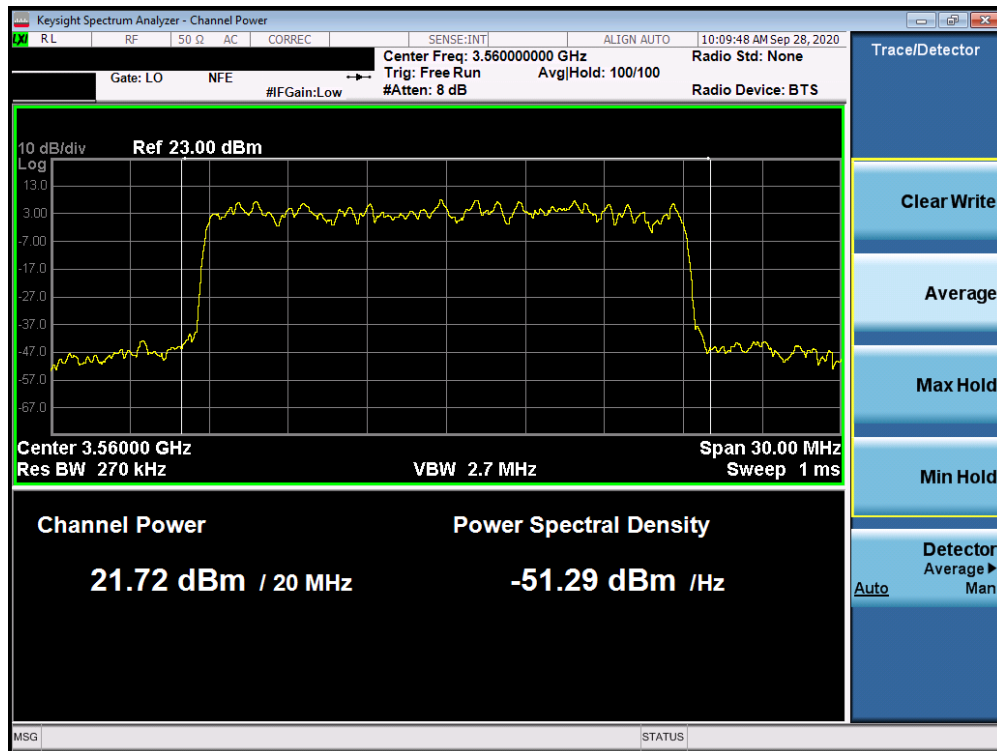


Plot 7-18. Conducted Power Plot(10 MHz Channel Bandwidth, High Channel, 64QAM, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 8K20091701-01-R3.2AXTR	Test Dates: 9/17/2020 - 10/27/2020	EUT Type: LTE enterprise small cell base station	Page 32 of 143

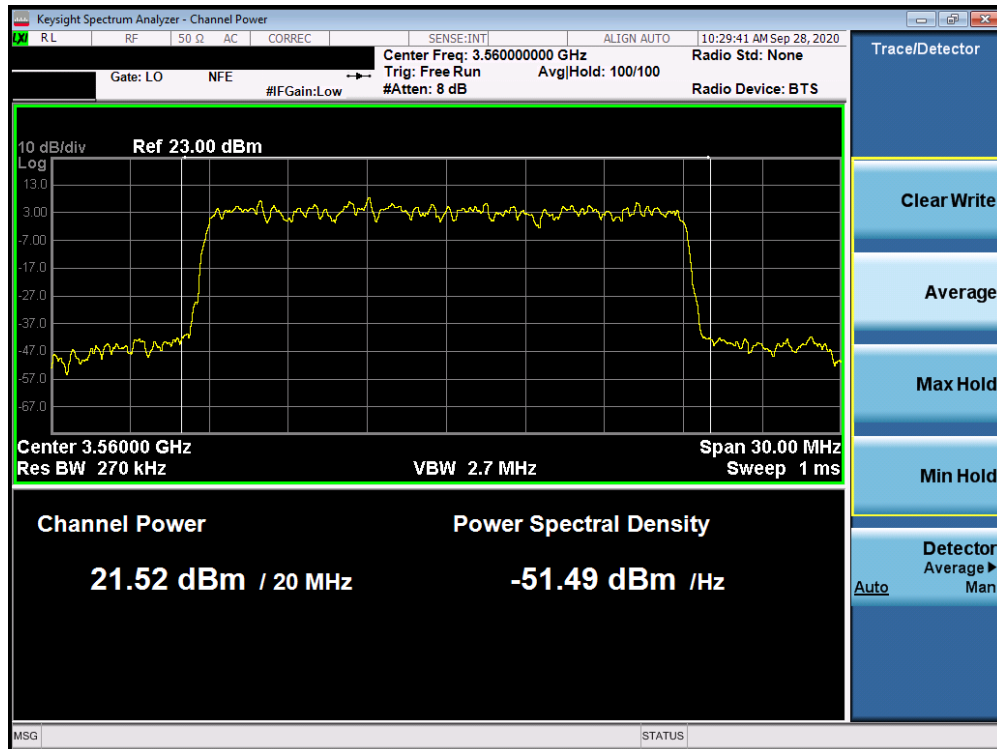


Plot 7-1. Conducted Power Plot(20 MHz Channel Bandwidth, Low Channel, QPSK, Port 0)

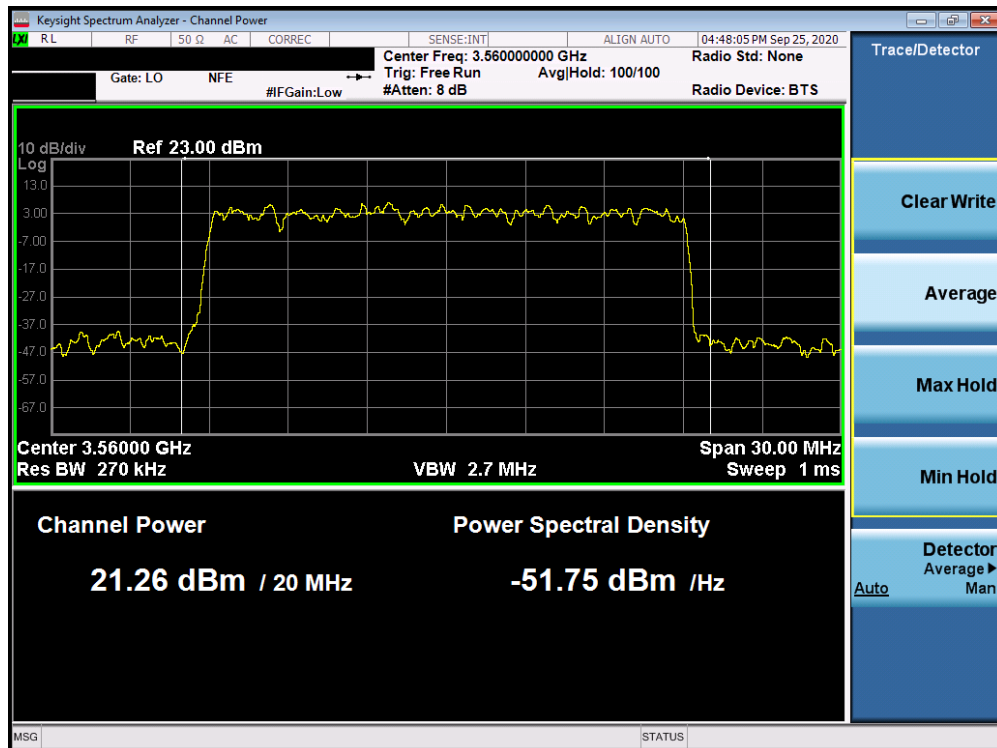


Plot 7-2. Conducted Power Plot(20 MHz Channel Bandwidth, Low Channel, 16QAM, Port 0)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 8K20091701-01-R3.2AXTR	Test Dates: 9/17/2020 - 10/27/2020	EUT Type: LTE enterprise small cell base station	Page 33 of 143

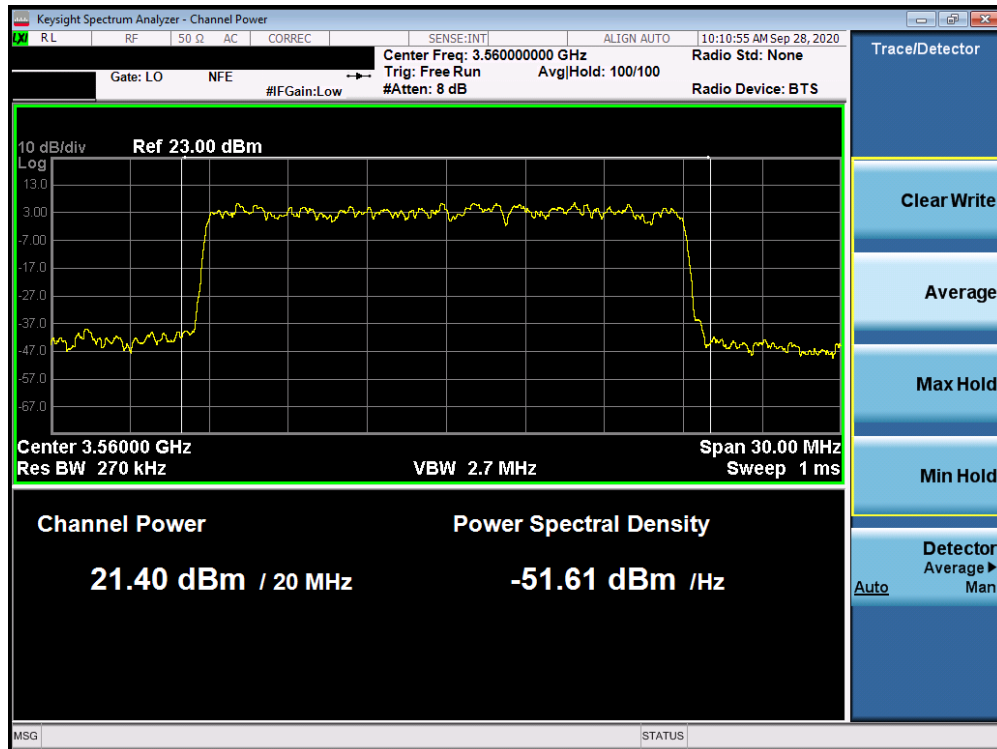


Plot 7-3. Conducted Power Plot(20 MHz Channel Bandwidth, Low Channel, 64QAM, Port 0)

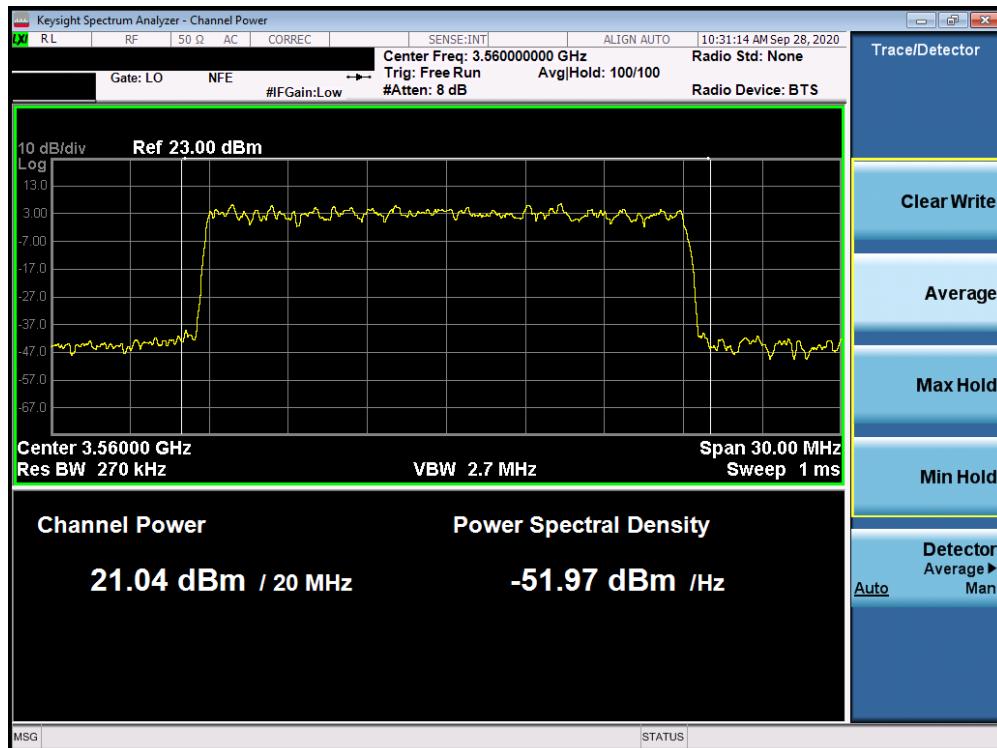


Plot 7-4. Conducted Power Plot(20 MHz Channel Bandwidth, Low Channel, QPSK, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 8K20091701-01-R3.2AXTR	Test Dates: 9/17/2020 - 10/27/2020	EUT Type: LTE enterprise small cell base station	Page 34 of 143

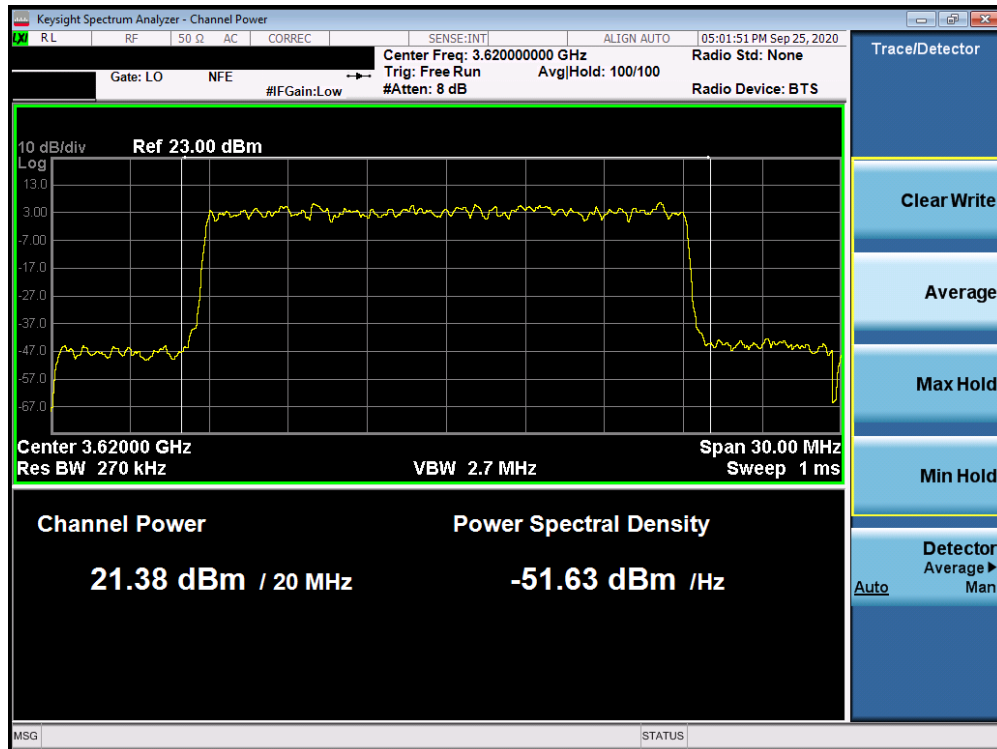


Plot 7-5. Conducted Power Plot(20 MHz Channel Bandwidth, Low Channel, 16QAM, Port 1)

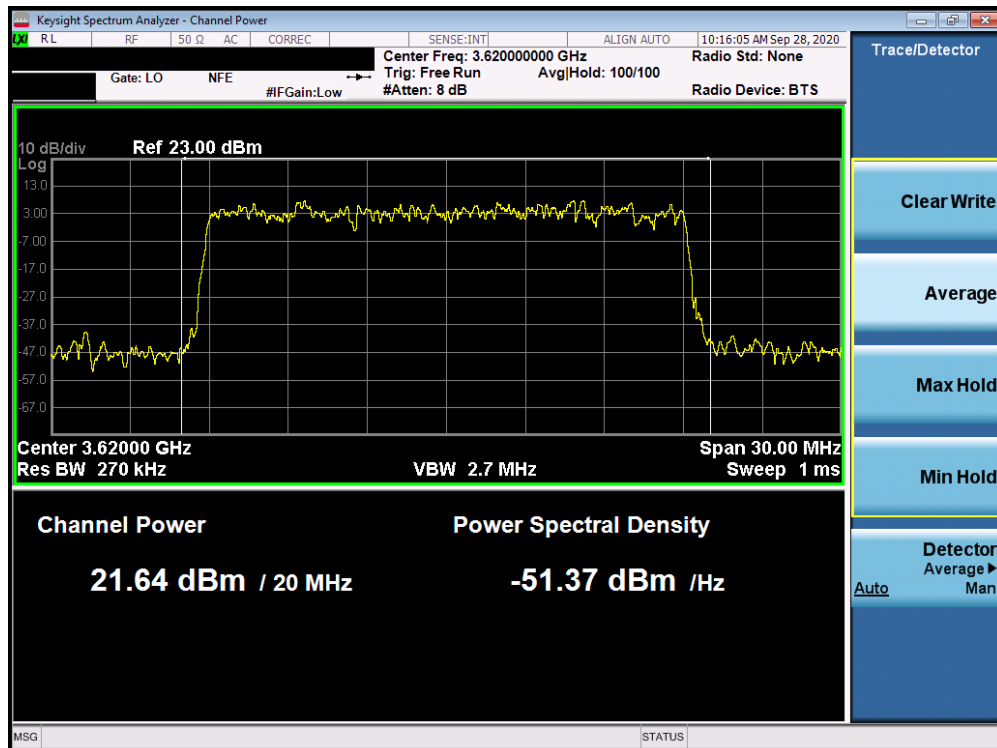


Plot 7-6. Conducted Power Plot(20 MHz Channel Bandwidth, Low Channel, 64QAM, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 8K20091701-01-R3.2AXTR	Test Dates: 9/17/2020 - 10/27/2020	EUT Type: LTE enterprise small cell base station	Page 35 of 143

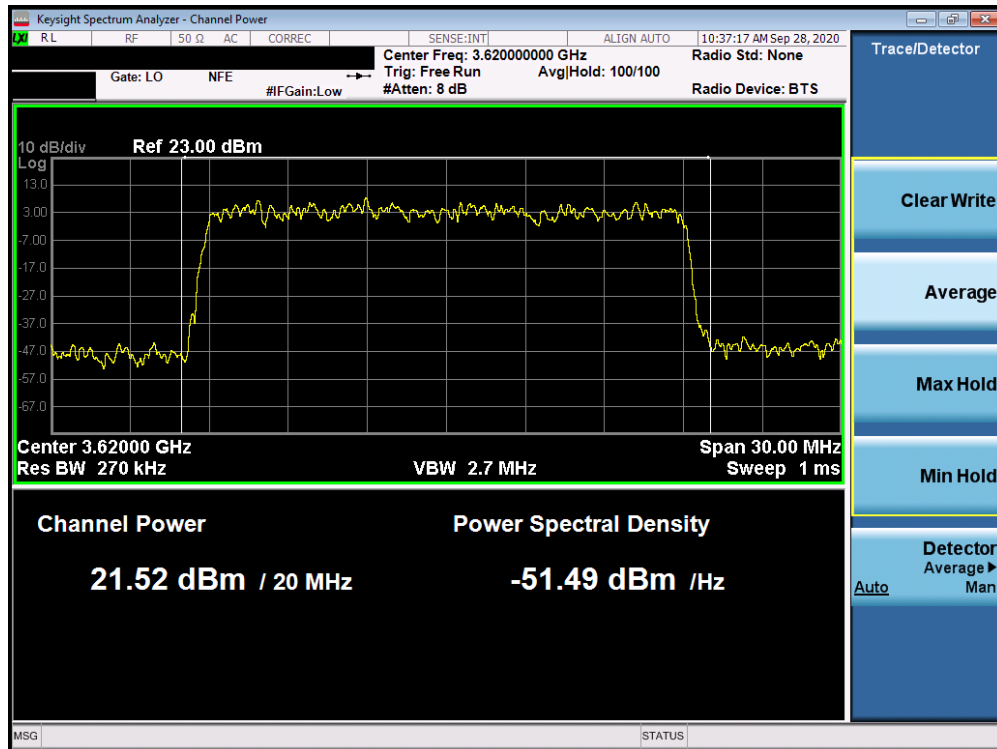


Plot 7-7. Conducted Power Plot(20 MHz Channel Bandwidth, Middle Channel, QPSK, Port 0)

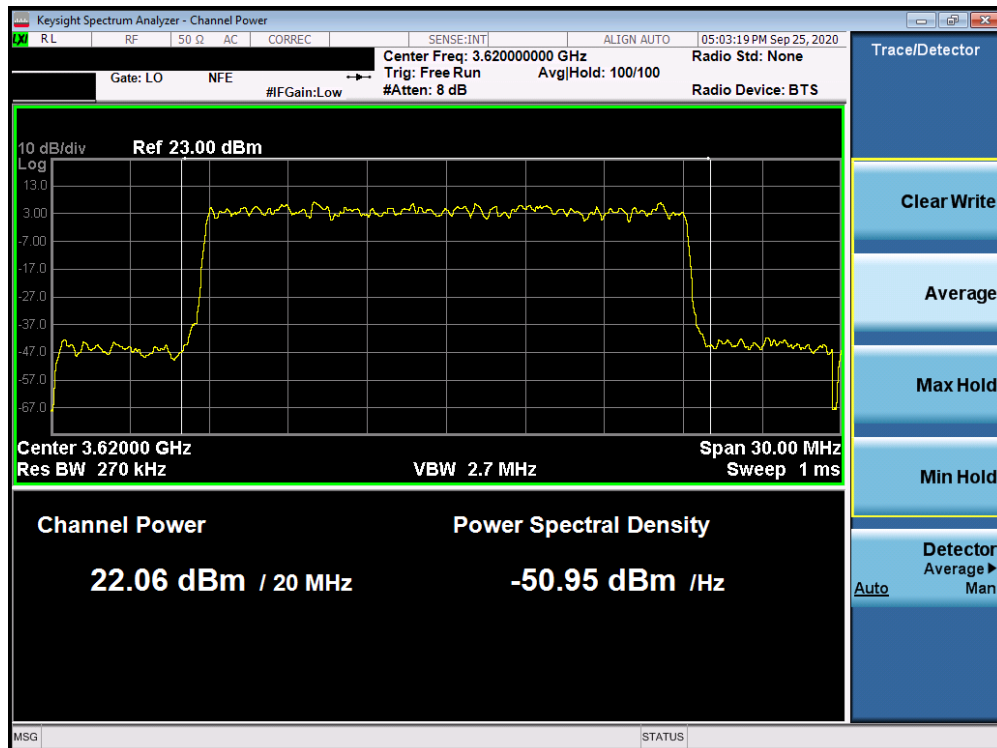


Plot 7-8. Conducted Power Plot(20 MHz Channel Bandwidth, Middle Channel, 16QAM, Port 0)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 8K20091701-01-R3.2AXTR	Test Dates: 9/17/2020 - 10/27/2020	EUT Type: LTE enterprise small cell base station	Page 36 of 143

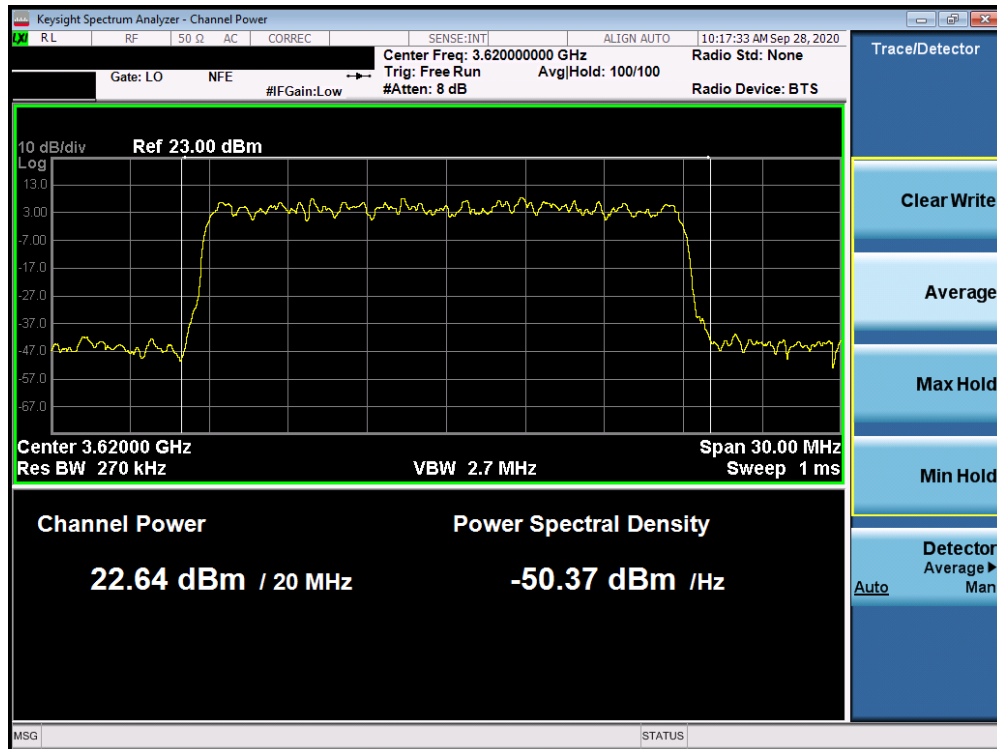


Plot 7-9. Conducted Power Plot(20 MHz Channel Bandwidth, Middle Channel, 64QAM, Port 0)

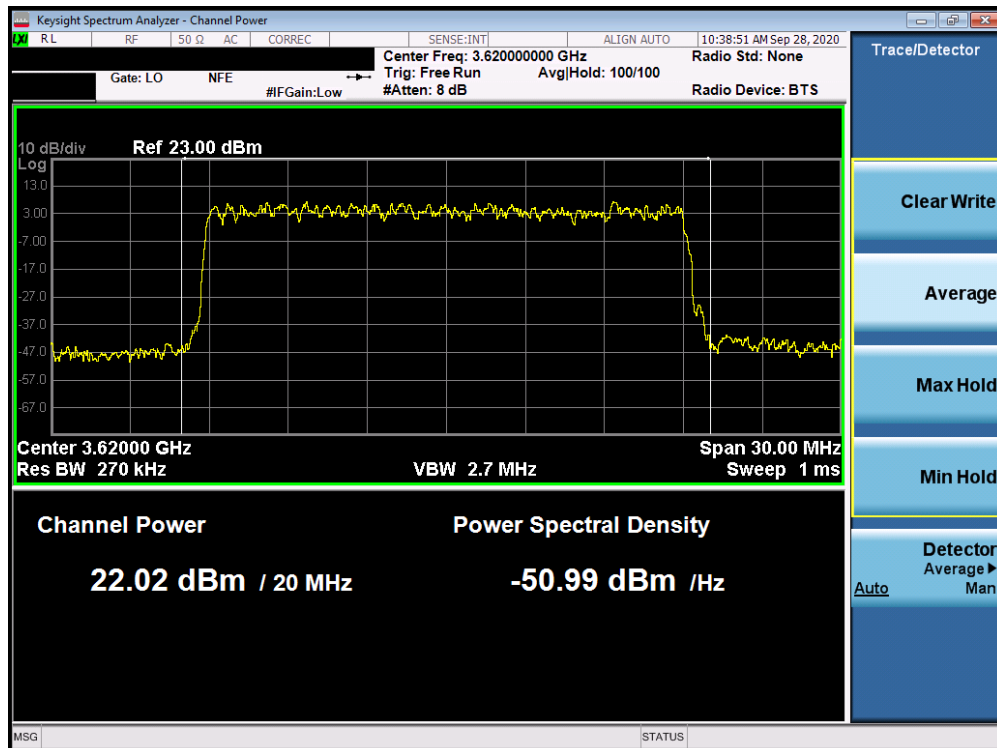


Plot 7-10. Conducted Power Plot(20 MHz Channel Bandwidth, Middle Channel, QPSK, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 8K20091701-01-R3.2AXTR	Test Dates: 9/17/2020 - 10/27/2020	EUT Type: LTE enterprise small cell base station	Page 37 of 143

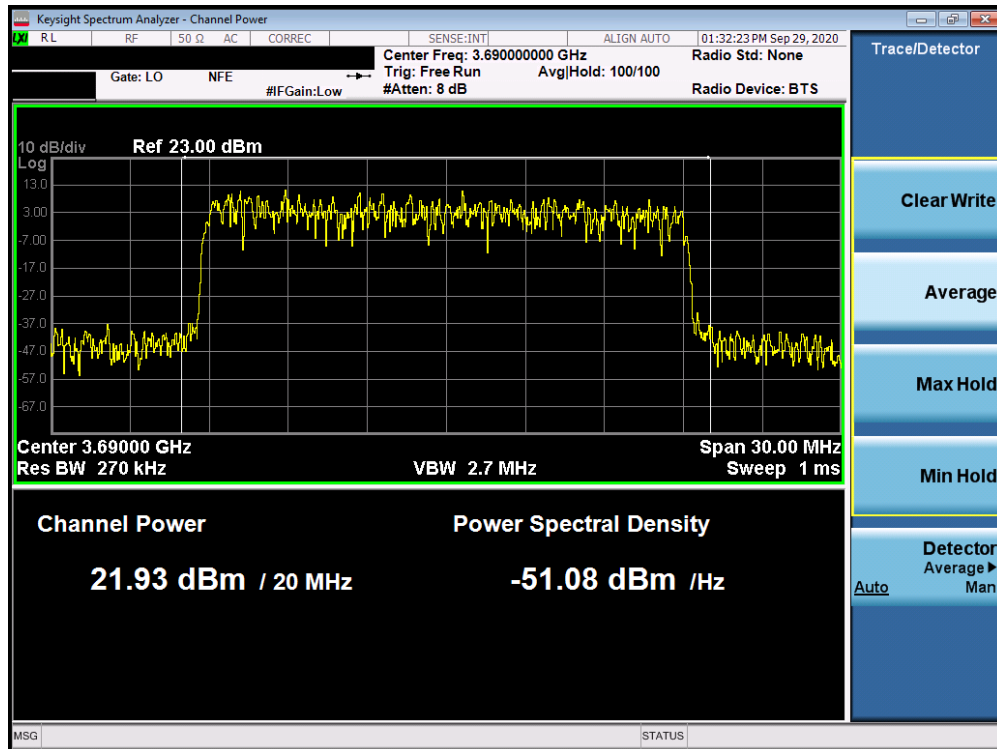


Plot 7-11. Conducted Power Plot(20 MHz Channel Bandwidth, Middle Channel, 16QAM, Port 1)

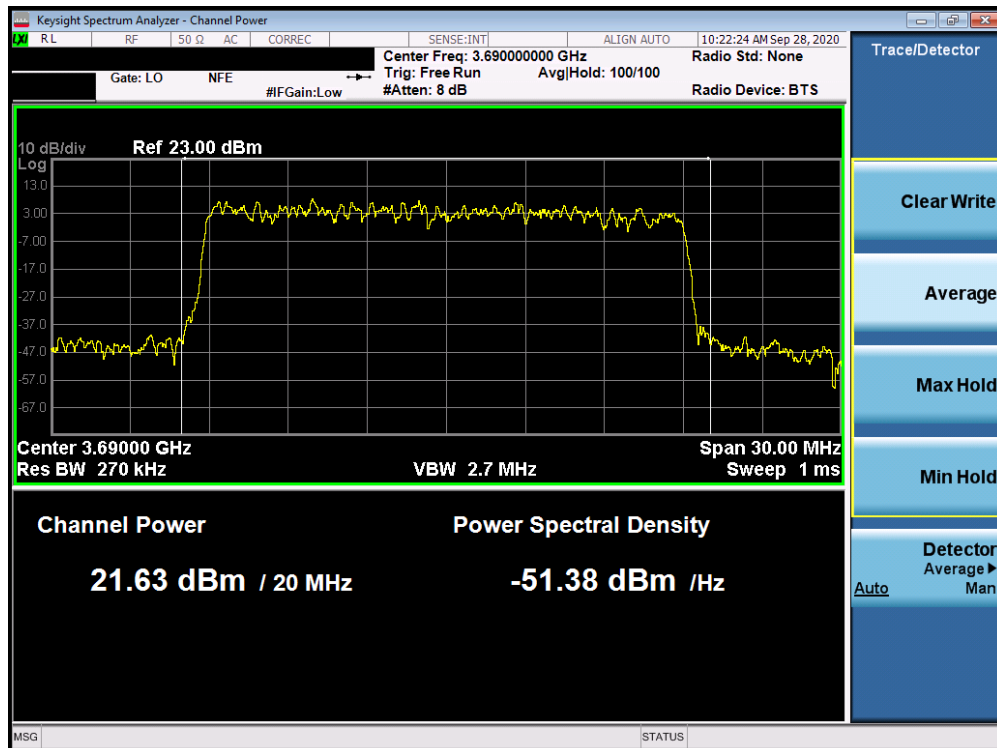


Plot 7-12. Conducted Power Plot(20 MHz Channel Bandwidth, Middle Channel, 64QAM, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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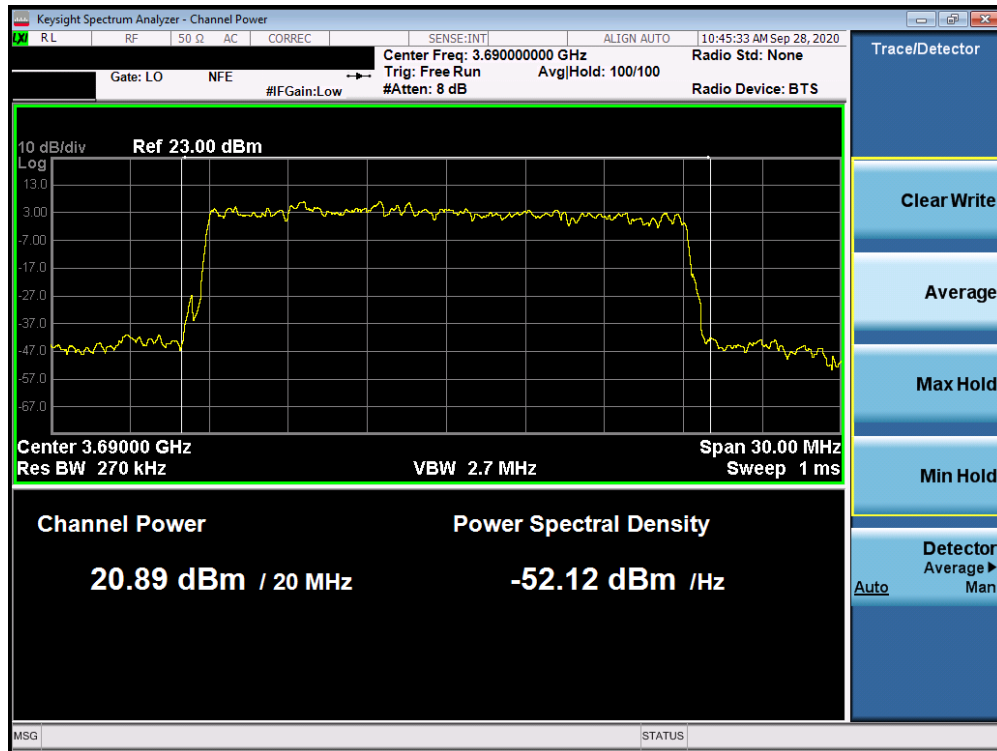


Plot 7-13. Conducted Power Plot(20 MHz Channel Bandwidth, High Channel, QPSK, Port 0)

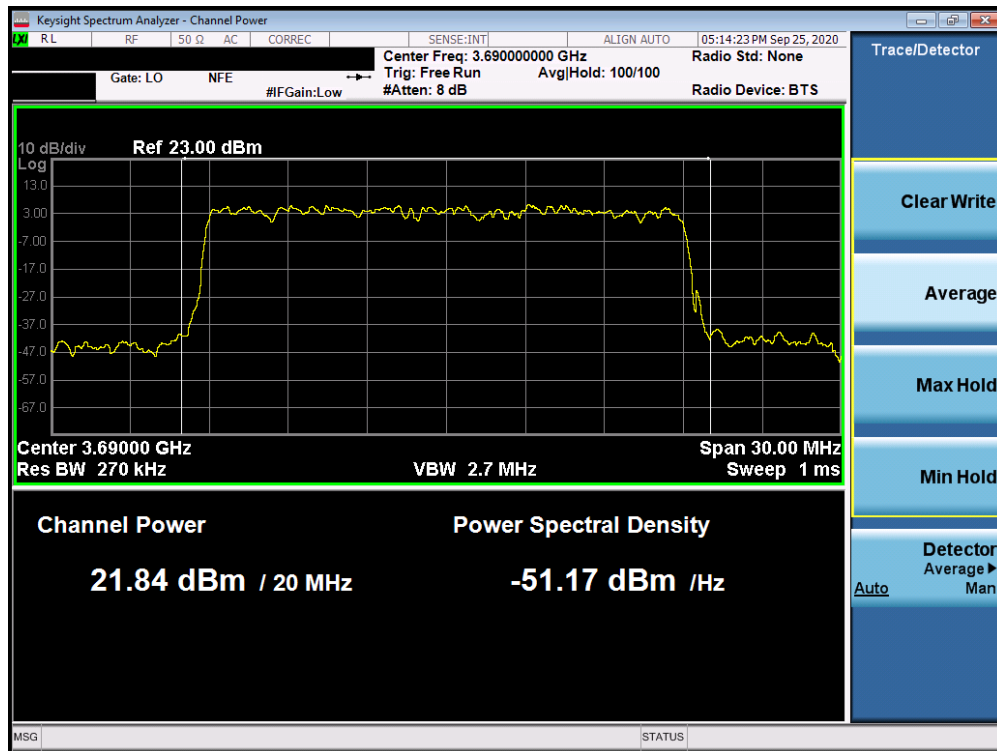


Plot 7-14. Conducted Power Plot(20 MHz Channel Bandwidth, High Channel, 16QAM, Port 0)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 8K20091701-01-R3.2AXTR	Test Dates: 9/17/2020 - 10/27/2020	EUT Type: LTE enterprise small cell base station	Page 39 of 143

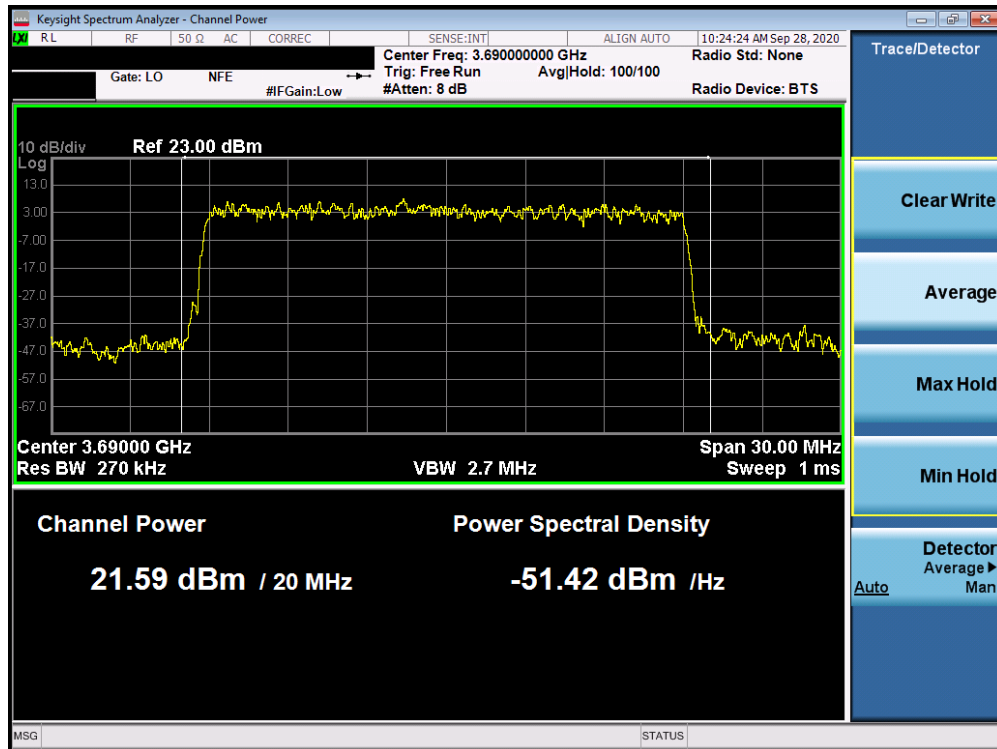


Plot 7-15. Conducted Power Plot(20 MHz Channel Bandwidth, High Channel, 64QAM, Port 0)

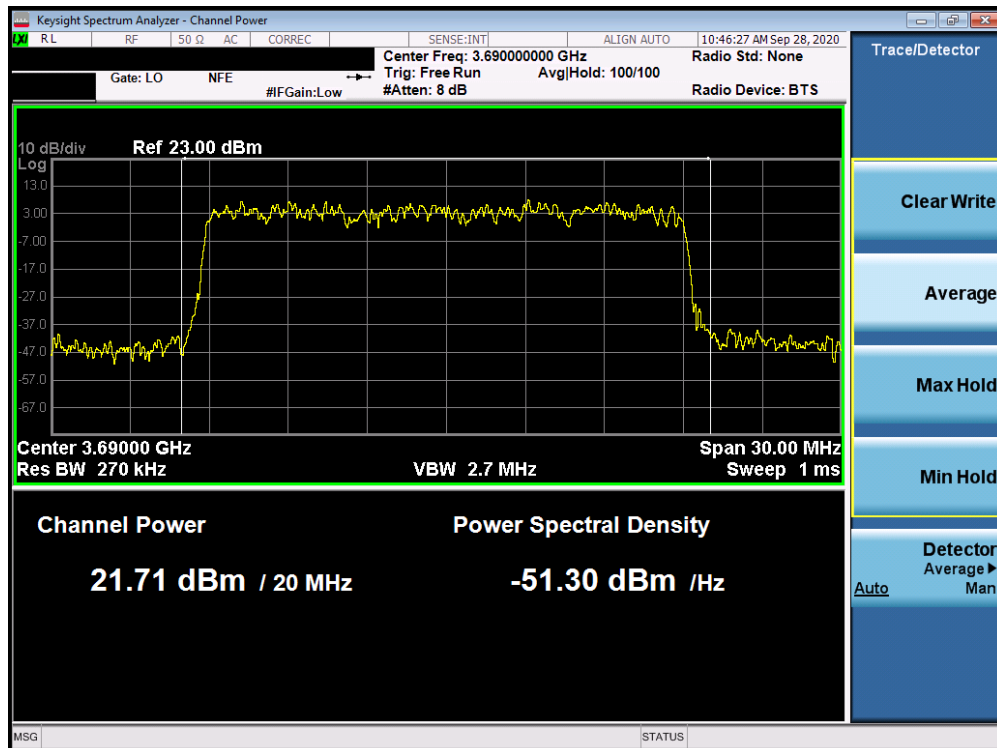


Plot 7-16. Conducted Power Plot(20 MHz Channel Bandwidth, High Channel, QPSK, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-17. Conducted Power Plot(20 MHz Channel Bandwidth, High Channel, 16QAM, Port 1)



Plot 7-18. Conducted Power Plot(20 MHz Channel Bandwidth, High Channel, 64QAM, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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7.5 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 20 dBm in any 1 MHz band.

Test Procedure Used

KDB 971168 D01 v03r01 – Section 5.3

ANSI/TIA-603-E-2016 – Section 2.2.17 5.2.3.3

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 $10 \log(N_{\text{ANT}})$ 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
5. Sweep time = 1 second.
6. Number of points > $2 \times \text{Span} / \text{RBW}$
7. The trace was allowed to stabilize

Test Setup

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

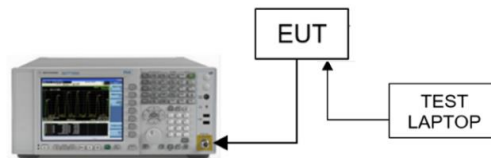


Figure 7-3. Test Instrument & Measurement Setup

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Test Notes

1. The channel power measurements are adopted for the cable, connectors and attenuators used in the measurement.
2. All kinds of modulation was observed. The port producing the highest PSD includes other supported modulation schemes for comparison.
3. 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 662911 D01 v02r01-Section E) 2).
4. PSD per port (dBm / MHz) is converted to a linear value (mW). A summation of linear powers for all two ports gives us the total MIMO conducted PSD (mW). We convert this back to logarithmic scale for further PSD calculations.
5. Antenna Gains (dBi) are provided by the client.
6. Sample Calculation:
Let us assume the following Calculation.
 - a. Path #0 Conducted PSD as 9.79 dBm
 - b. Port #0 Antenna Gain = 5.79 dBi
 - c. Port #0 PSD = **15.58 dBm/MHz**
 - d. Path #1 Conducted PSD as 9.97 dBm
 - e. Port #1 Antenna Gain = 5.98 dBi
 - f. Port #1 PSD = **15.95 dBm/MHz**
 - g. Total MIMO PSD = 15.58 dBm + 15.95 dBm = $10^{(15.58/10)} \text{ mW} + 10^{(15.95/10)} \text{ mW} = 36.14 \text{ mW} + 39.36 \text{ mW} = 75.50 \text{ mW} = 10 \cdot \log(75.50) = 18.78 \text{ dBm/MHz}$
 - h. Total MIMO PSD = **18.78 dBm/MHz**
 - i. FCC EIRP Limit = 20 dBm/MHz
 - j. Margin = MIMO PSD - FCC EIRP Limit = 18.78 - 20 = **-1.22 dB**

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Port #0	Test Results								
	Low Channel			Middle Channel			High Channel		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
Conducted PSD (dBm)	9.79	8.74	8.72	8.66	8.26	8.45	8.67	8.48	8.69
Ant. Gain (dB)	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79
PSD (dBm/MHz)	15.58	14.53	14.51	14.45	14.06	14.24	14.47	14.28	14.49

Table 7-9. Peak Power Spectral Density Summary Data (10 MHz Channel Bandwidth, Port #0)

Port #1	Test Results								
	Low Channel			Middle Channel			High Channel		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
Conducted PSD (dBm)	9.97	8.69	8.73	9.00	8.78	8.88	8.56	8.41	8.64
Ant. Gain (dB)	5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98
PSD (dBm/MHz)	15.95	14.67	14.70	14.97	14.75	14.85	14.54	14.38	14.62

Table 7-10. Peak Power Spectral Density Summary Data (10 MHz Channel Bandwidth, Port #1)

Bandwidth	Test Results								
	Low Channel			Middle Channel			High Channel		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
10 MHz									
MIMO PSD (dBm/MHz)	18.78	17.61	17.62	17.73	17.43	17.57	17.51	17.34	17.56
FCC PSD Limit (dBm/MHz)	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Margin	-1.22	-2.39	-2.38	-2.27	-2.57	-2.43	-2.49	-2.66	-2.44

Table 7-11. Peak Power Spectral Density Summary Data (10 MHz Channel Bandwidth, Summation)

FCC ID: 2AXTR-ECL2248-2723	 MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Port #0	Test Results (dBm)								
	Low Channel			Middle Channel			High Channel		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
Conducted PSD (dBm)	9.39	9.56	9.46	9.26	8.86	8.77	10.41	10.15	9.82
Ant. Gain (dB)	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79
PSD (dBm/MHz)	15.19	15.35	15.25	15.06	14.65	14.56	16.20	15.94	15.61

Table 7-12. Peak Power Spectral Density Summary Data (20 MHz Channel Bandwidth, Port #0)

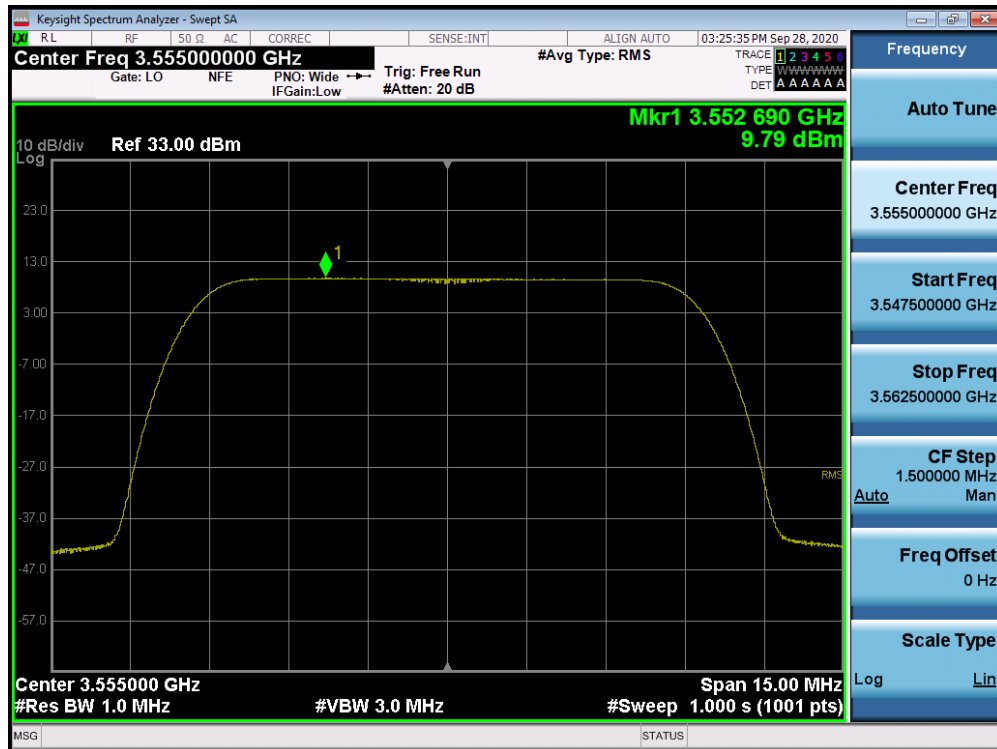
Port #1	Test Results (dBm)								
	Low Channel			Middle Channel			High Channel		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
Conducted PSD (dBm)	9.24	9.27	9.16	10.13	9.76	9.50	9.86	9.43	9.38
Ant. Gain (dB)	5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98	5.98
PSD (dBm/MHz)	15.21	15.25	15.13	16.11	15.73	15.47	15.83	15.40	15.36

Table 7-13. Peak Power Spectral Density Summary Data (20 MHz Channel Bandwidth, Port #1)

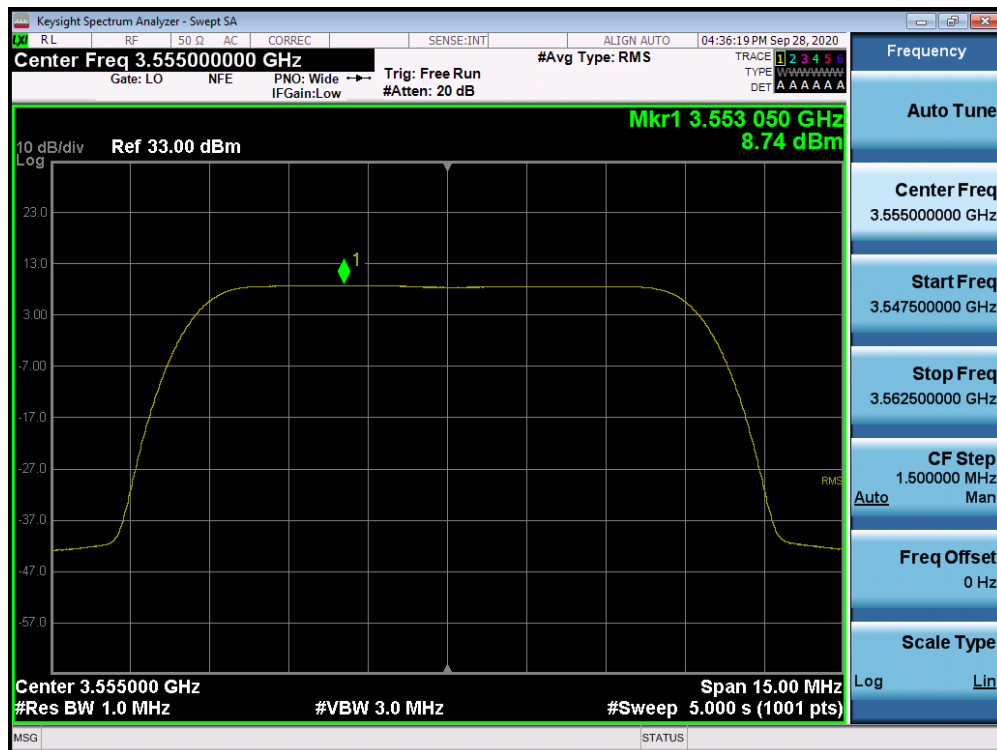
Bandwidth	Test Results								
	Low Channel			Middle Channel			High Channel		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
20 MHz									
MIMO PSD (dBm/MHz)	18.21	18.31	18.20	18.62	18.23	18.05	19.03	18.69	18.49
FCC PSD Limit (dBm/MHz)	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Margin	-1.79	-1.69	-1.80	-1.38	-1.77	-1.95	-0.97	-1.31	-1.51

Table 7-14. Peak Power Spectral Density Summary Data (20 MHz Channel Bandwidth, Summation)

FCC ID: 2AXTR-ECL2248-2723	 MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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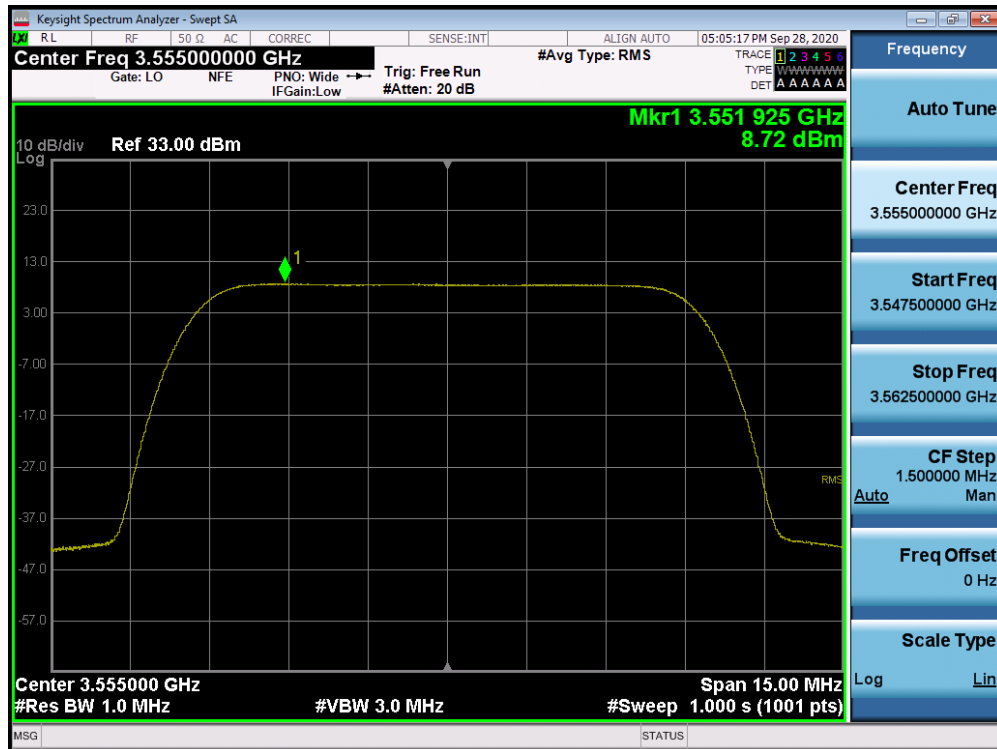


Plot 7-19. Peak Power Spectral Density Plot (10 MHz Channel Bandwidth, Low Channel, QPSK, Port 0)

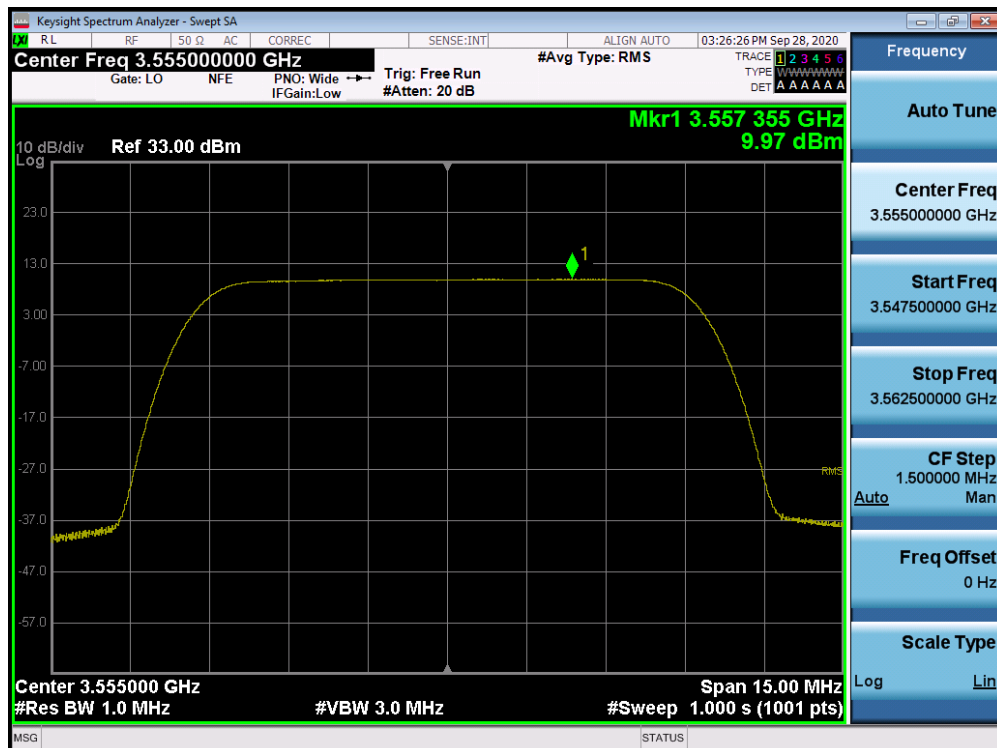


Plot 7-20. Peak Power Spectral Density Plot (10 MHz Channel Bandwidth, Low Channel, 16QAM, Port 0)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-21. Peak Power Spectral Density Plot (10 MHz Channel Bandwidth, Low Channel, 64QAM, Port 0)

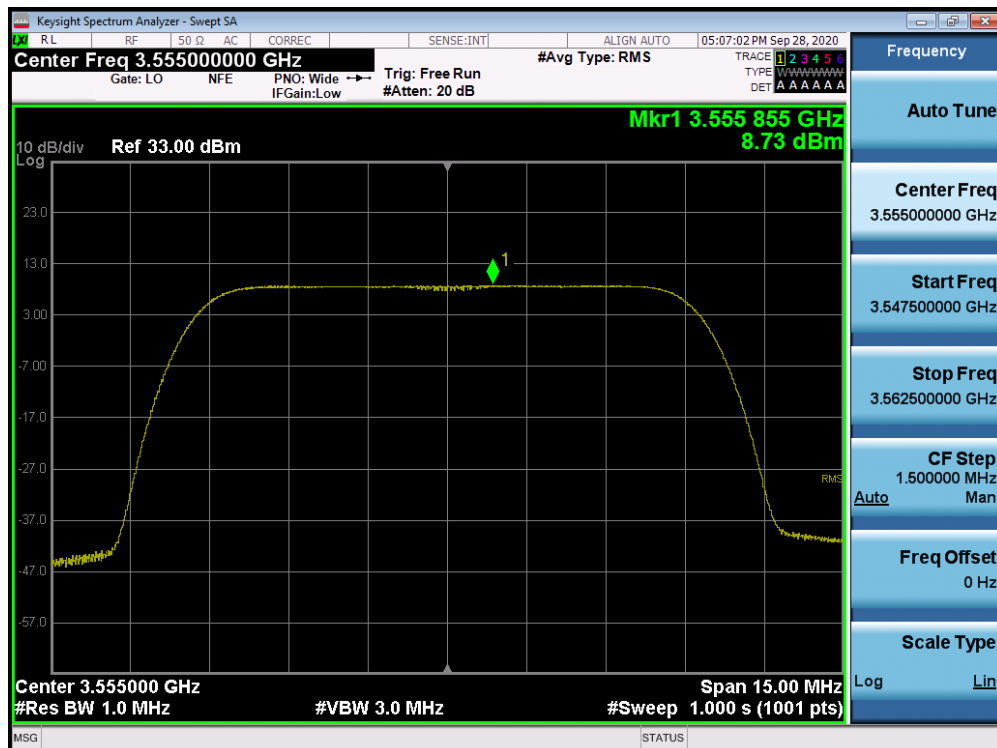


Plot 7-22. Peak Power Spectral Density Plot (10 MHz Channel Bandwidth, Low Channel, QPSK, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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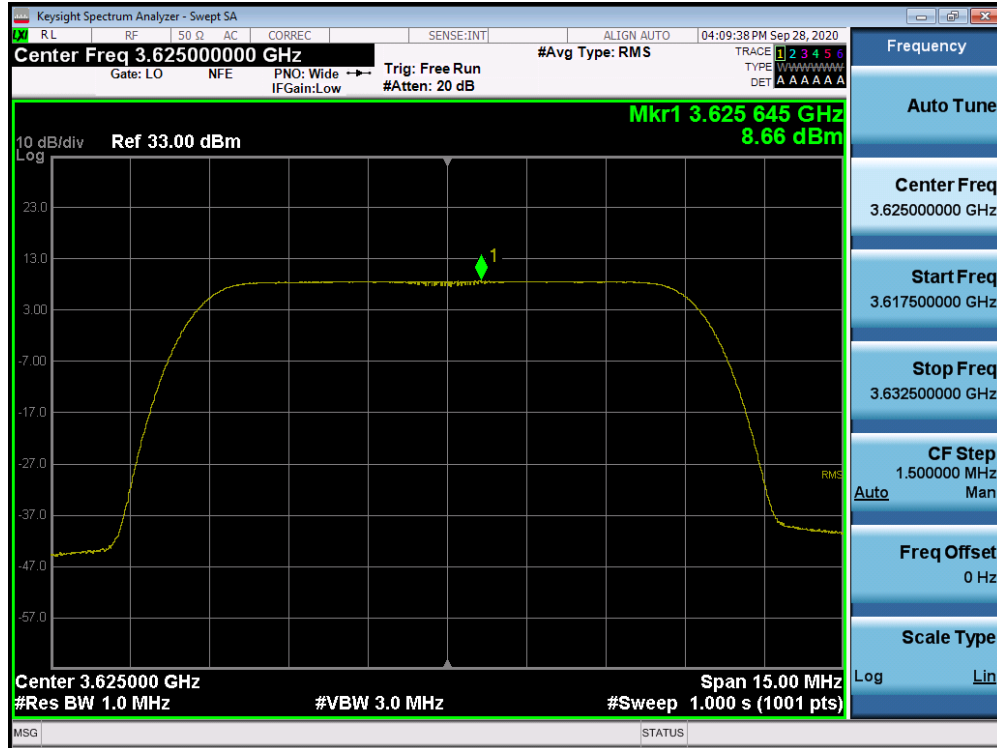


Plot 7-23. Peak Power Spectral Density Plot (10 MHz Channel Bandwidth, Low Channel, 16QAM, Port 1)

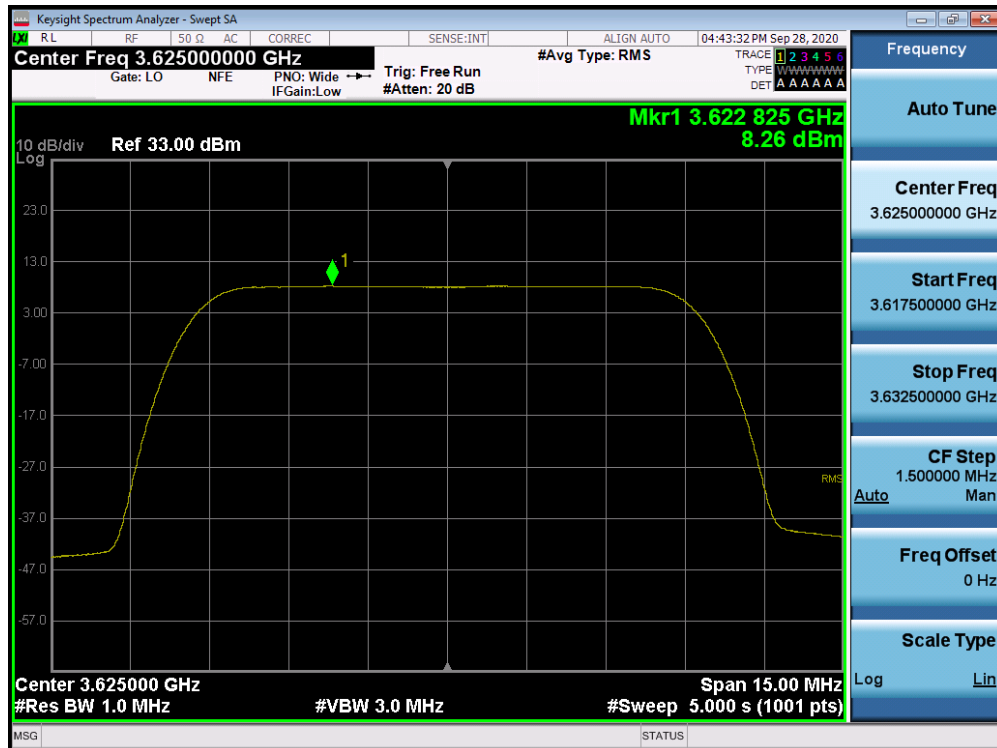


Plot 7-24. Peak Power Spectral Density Plot (10 MHz Channel Bandwidth, Low Channel, 64QAM, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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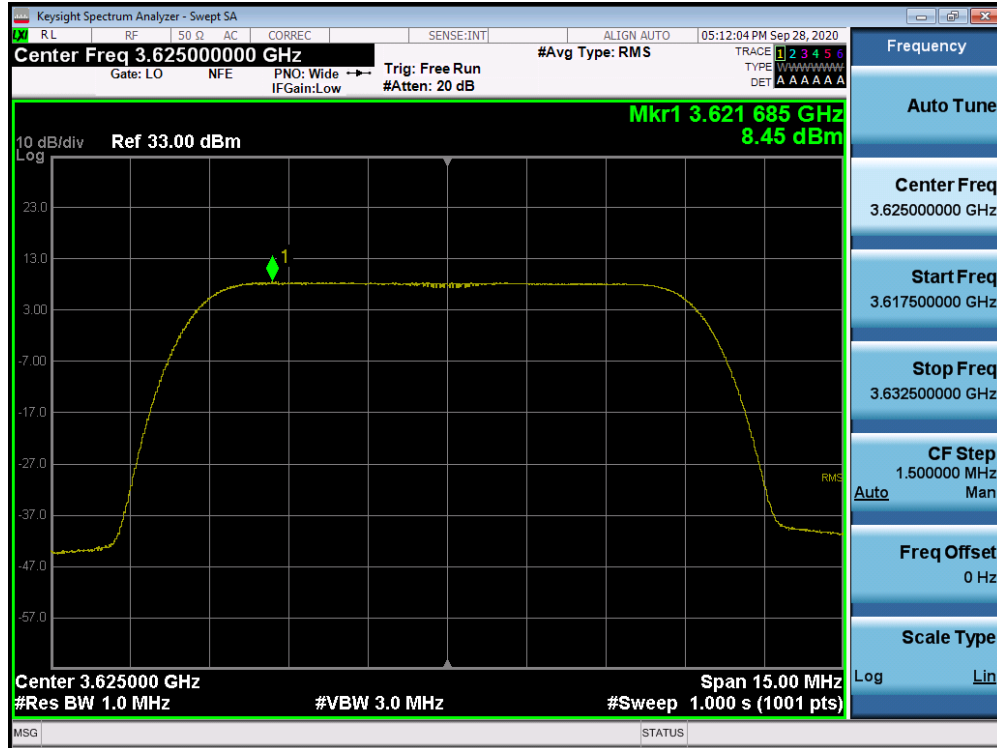


Plot 7-25. Peak Power Spectral Density Plot (10 MHz Channel Bandwidth, Middle Channel, QPSK, Port 0)

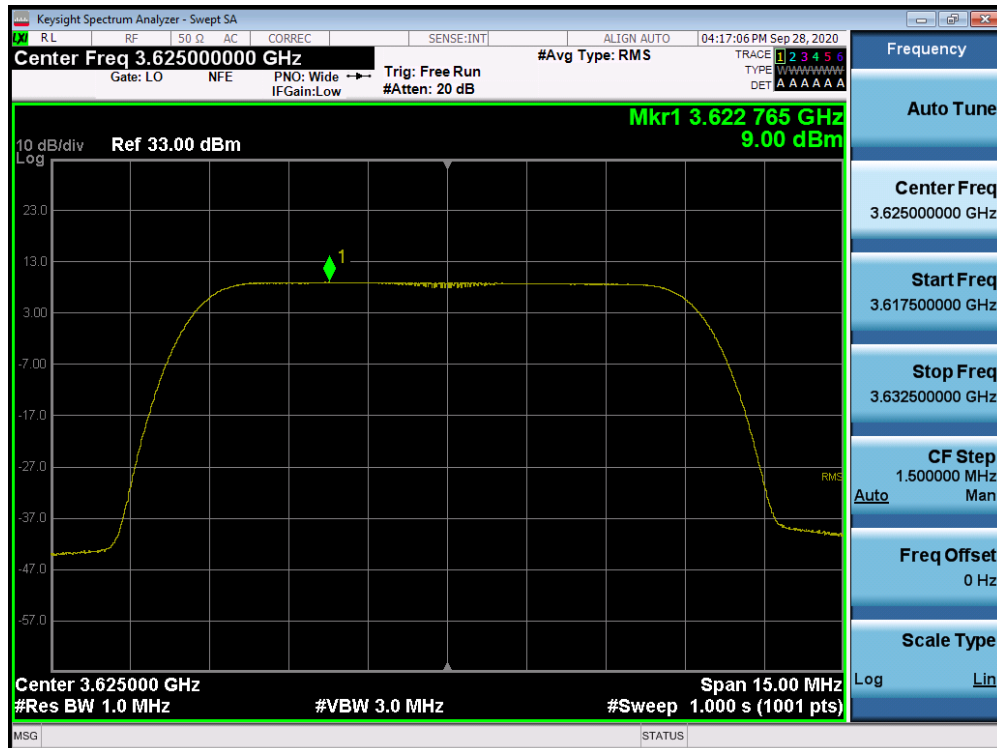


Plot 7-26. Peak Power Spectral Density Plot (10 MHz Channel Bandwidth, Middle Channel, 16QAM, Port 0)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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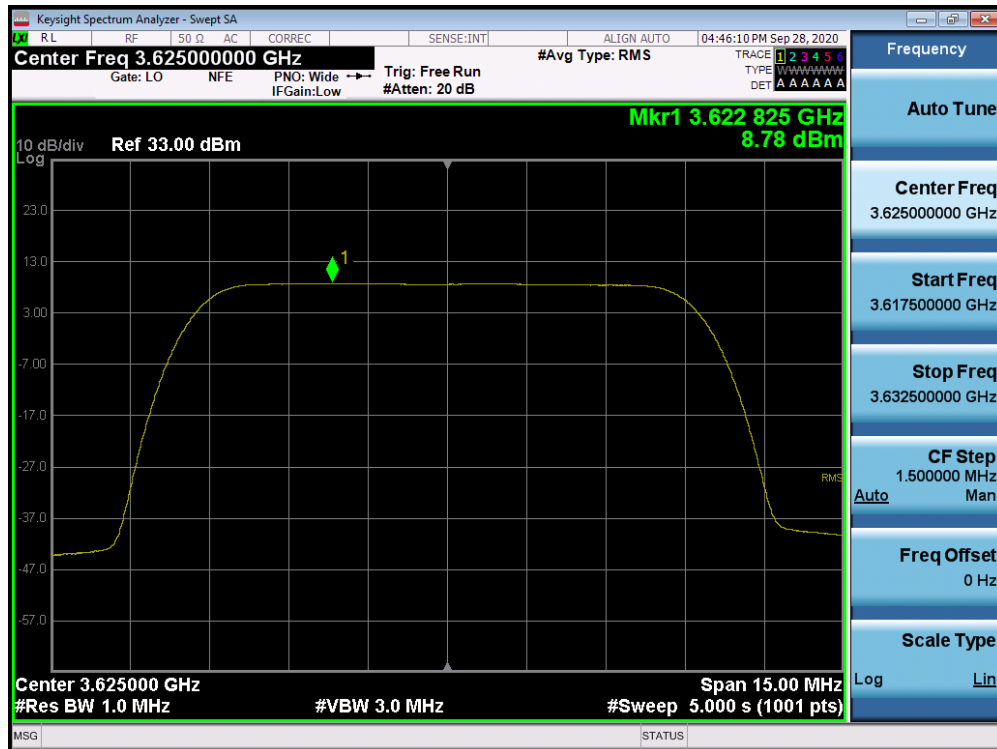


Plot 7-27. Peak Power Spectral Density Plot (10 MHz Channel Bandwidth, Middle Channel, 64QAM, Port 0)

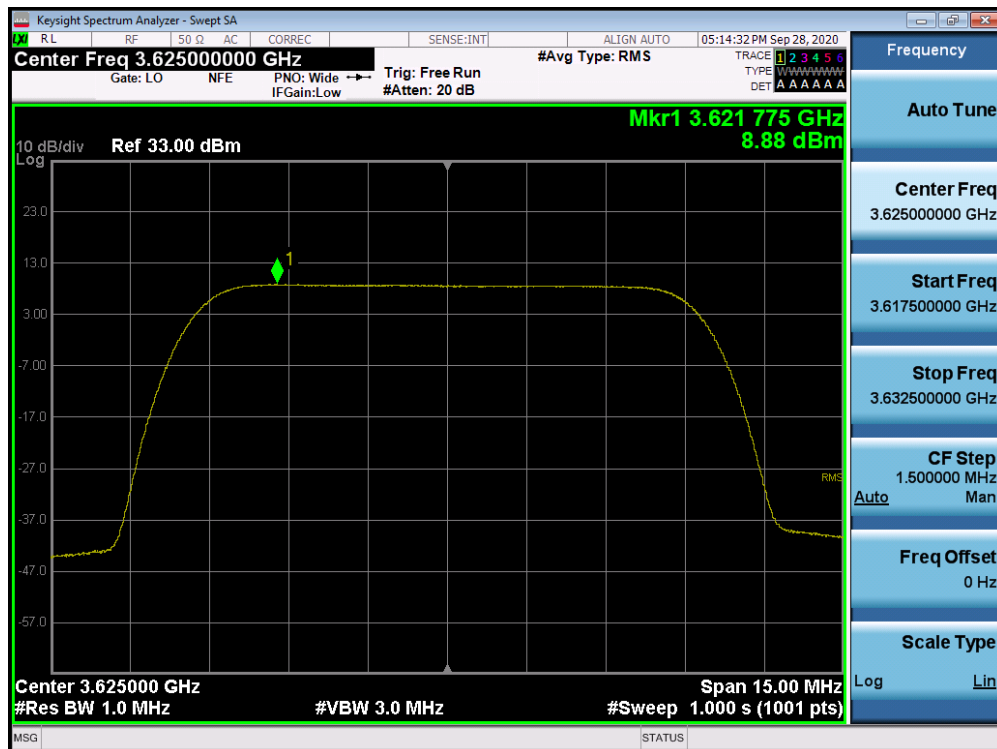


Plot 7-28. Peak Power Spectral Density Plot (10 MHz Channel Bandwidth, Middle Channel, QPSK, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-29. Peak Power Spectral Density Plot (10 MHz Channel Bandwidth, Middle Channel, 16QAM, Port 1)



Plot 7-30. Peak Power Spectral Density Plot (10 MHz Channel Bandwidth, Middle Channel, 64QAM, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-31. Peak Power Spectral Density Plot (10 MHz Channel Bandwidth, High Channel, QPSK, Port 0)



Plot 7-32. Peak Power Spectral Density Plot (10 MHz Channel Bandwidth, High Channel, 16QAM, Port 0)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 8K20091701-01-R3.2AXTR	Test Dates: 9/17/2020 - 10/27/2020	EUT Type: LTE enterprise small cell base station	Page 52 of 143

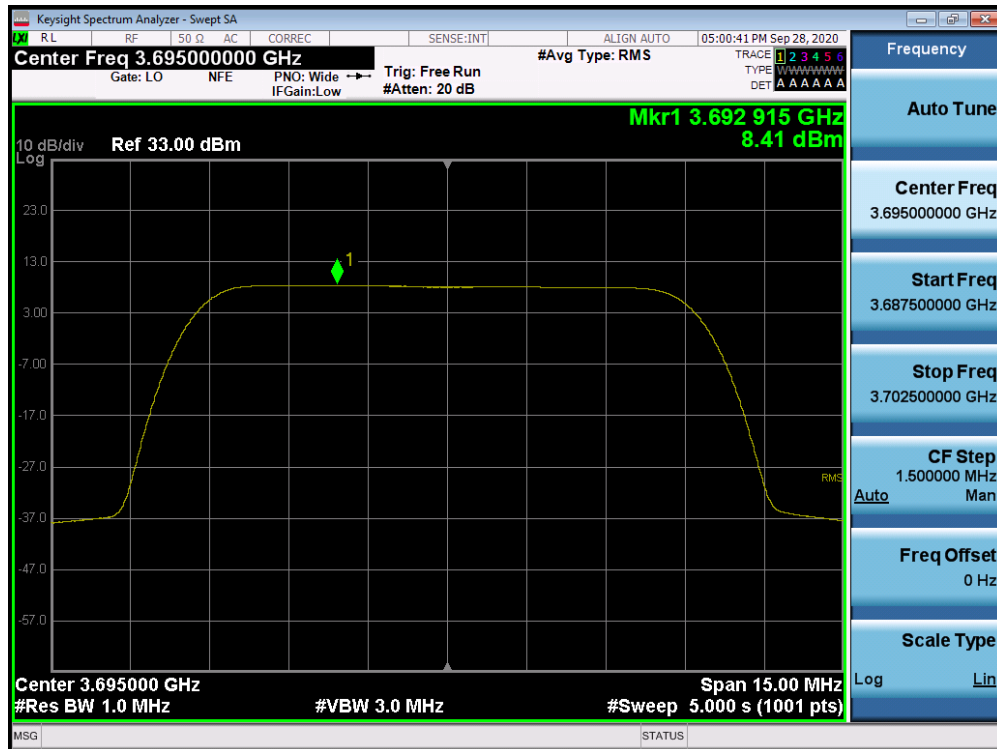


Plot 7-33. Peak Power Spectral Density Plot (10 MHz Channel Bandwidth, High Channel, 64QAM, Port 0)



Plot 7-34. Peak Power Spectral Density Plot (10 MHz Channel Bandwidth, High Channel, QPSK, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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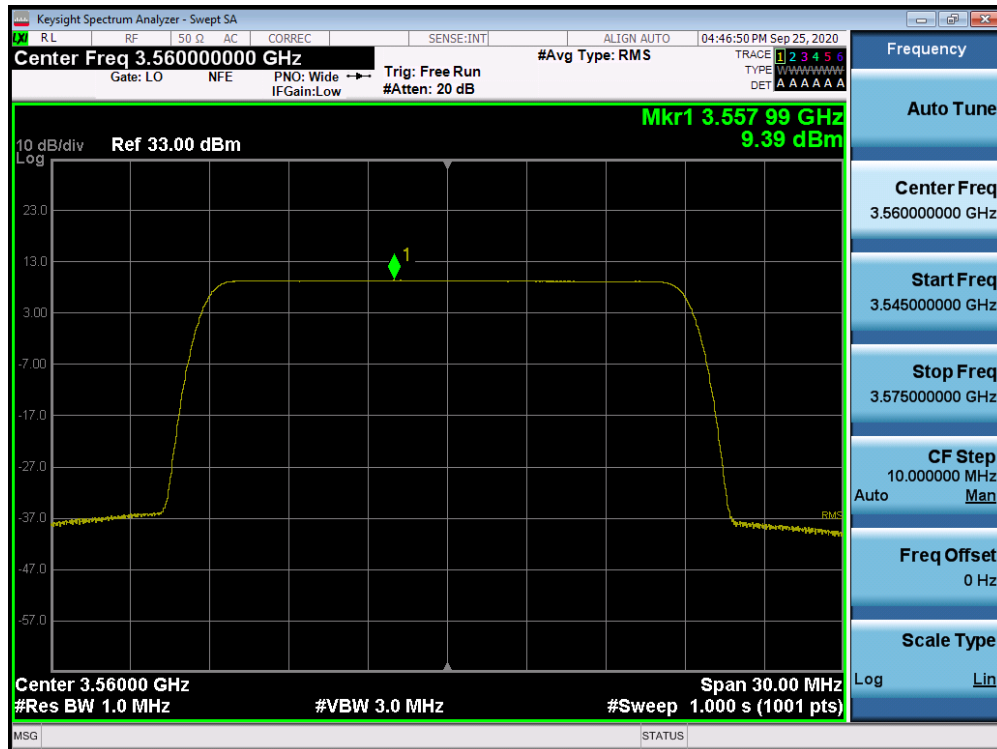


Plot 7-35. Peak Power Spectral Density Plot (10 MHz Channel Bandwidth, High Channel, 16QAM, Port 1)

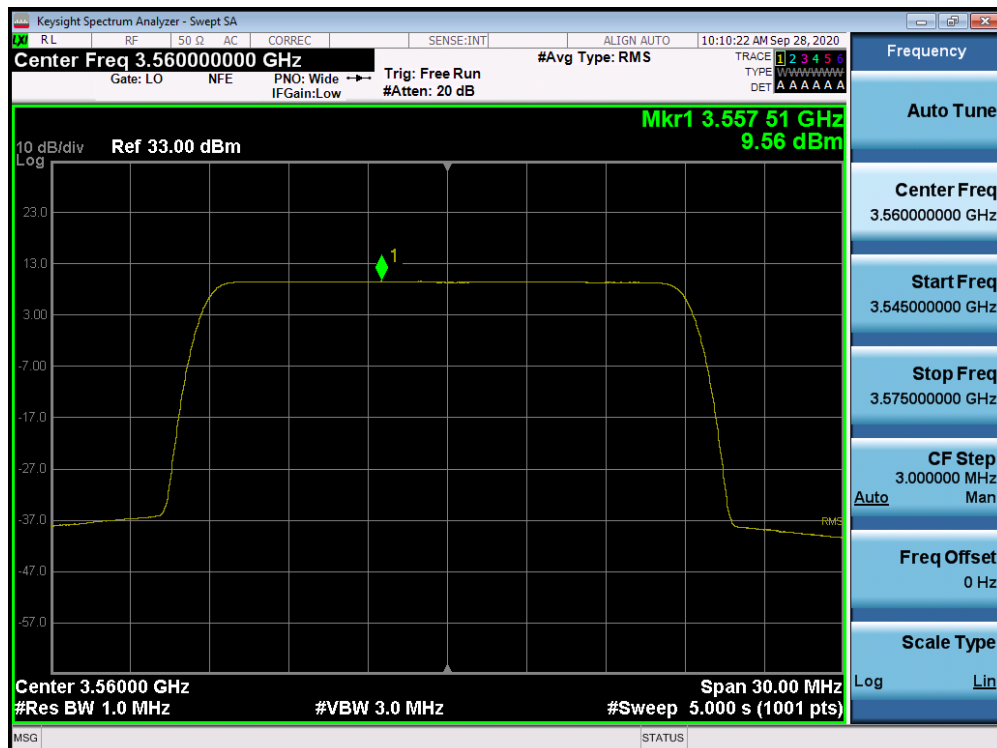


Plot 7-36. Peak Power Spectral Density Plot (10 MHz Channel Bandwidth, High Channel, 64QAM, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 8K20091701-01-R3.2AXTR	Test Dates: 9/17/2020 - 10/27/2020	EUT Type: LTE enterprise small cell base station	Page 54 of 143

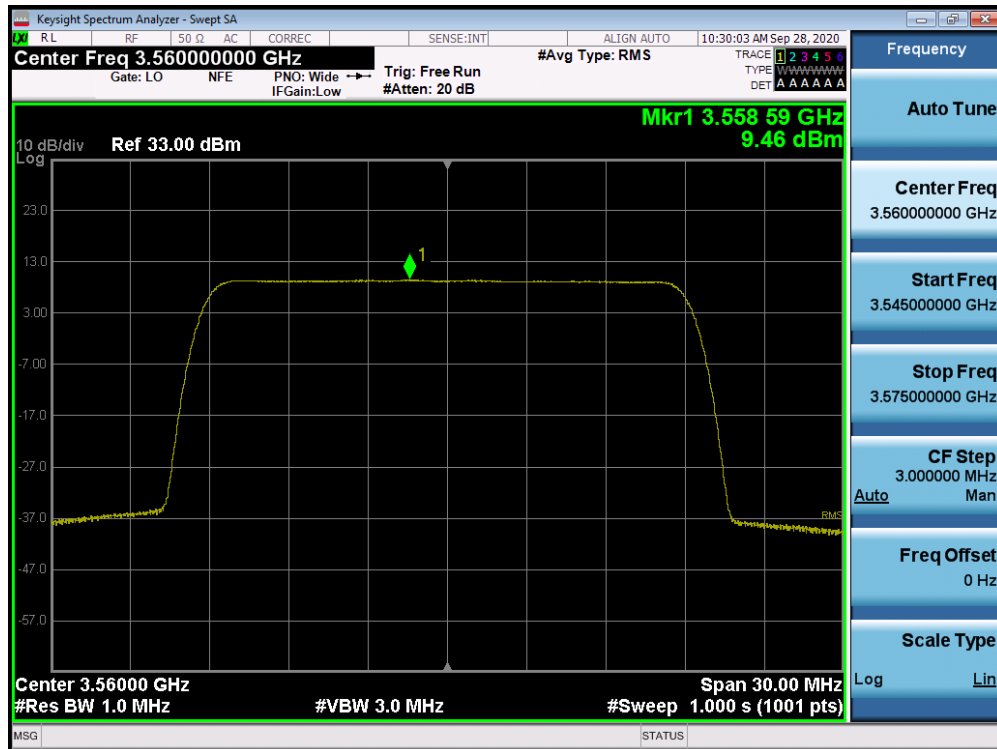


Plot 7-37. Peak Power Spectral Density Plot (20 MHz Channel Bandwidth, Low Channel, QPSK, Port 0)



Plot 7-38. Peak Power Spectral Density Plot (20 MHz Channel Bandwidth, Low Channel, 16QAM, Port 0)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 8K20091701-01-R3.2AXTR	Test Dates: 9/17/2020 - 10/27/2020	EUT Type: LTE enterprise small cell base station	Page 55 of 143

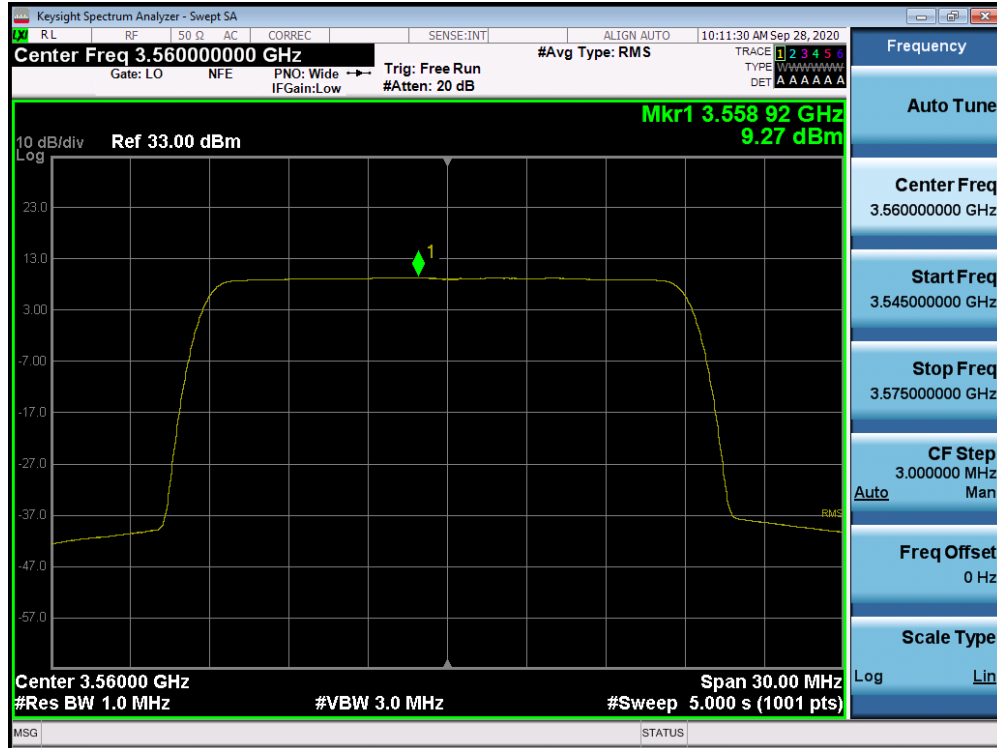


Plot 7-39. Peak Power Spectral Density Plot (20 MHz Channel Bandwidth, Low Channel, 64QAM, Port 0)



Plot 7-40. Peak Power Spectral Density Plot (20 MHz Channel Bandwidth, Low Channel, QPSK, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 8K20091701-01-R3.2AXTR	Test Dates: 9/17/2020 - 10/27/2020	EUT Type: LTE enterprise small cell base station	Page 56 of 143

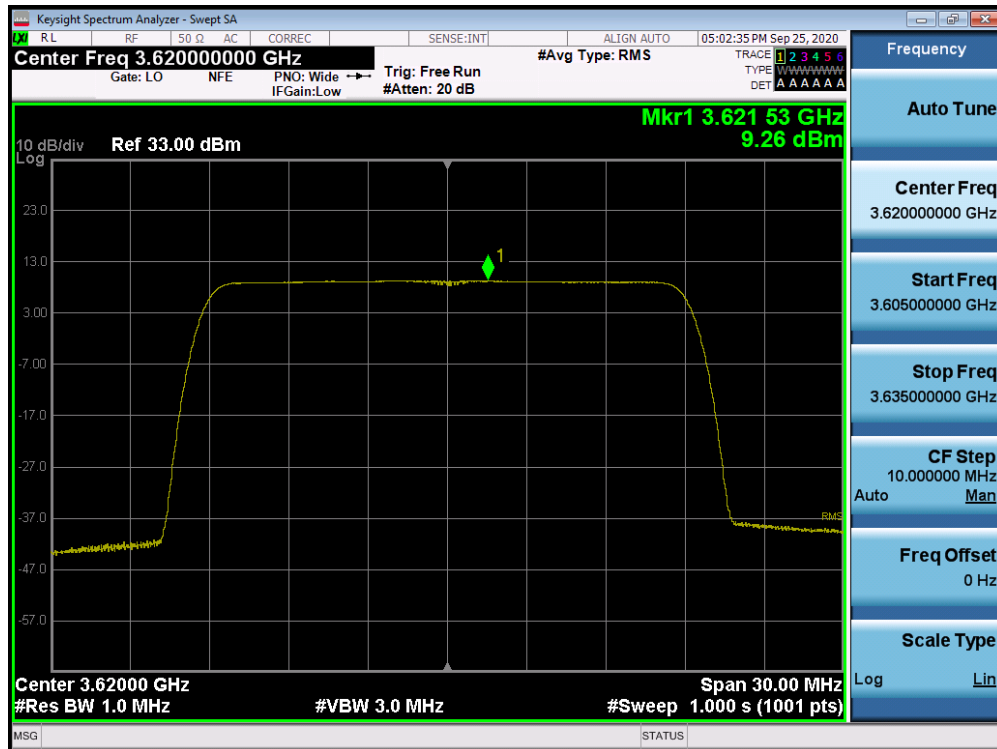


Plot 7-41. Peak Power Spectral Density Plot (20 MHz Channel Bandwidth, Low Channel, 16QAM, Port 1)

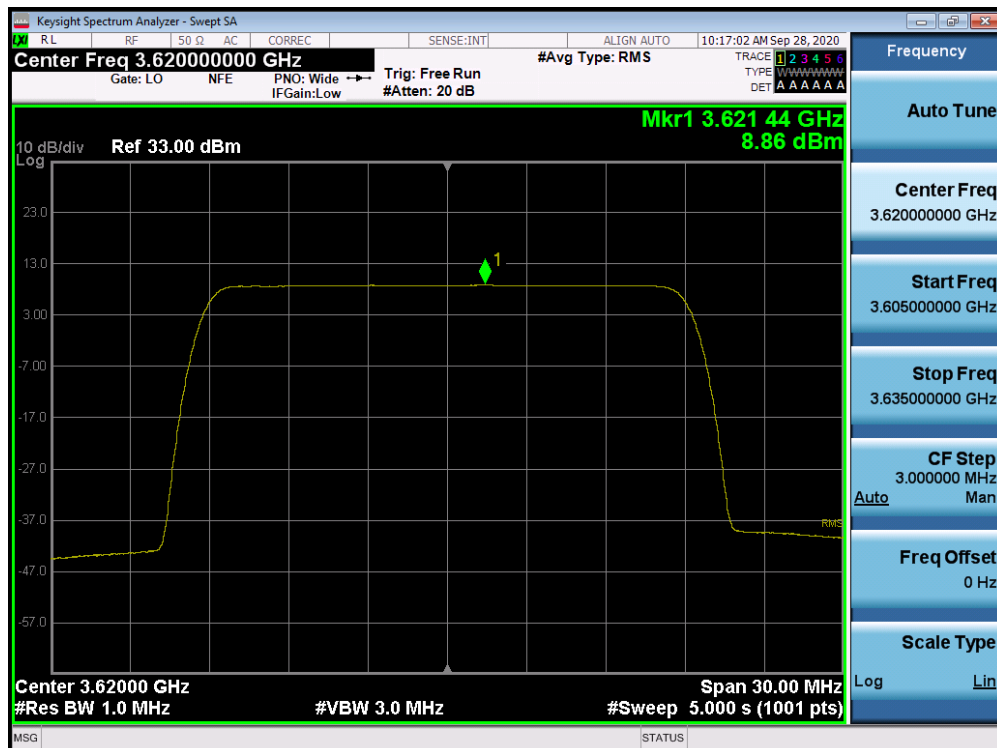


Plot 7-42. Peak Power Spectral Density Plot (20 MHz Channel Bandwidth, Low Channel, 64QAM, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 8K20091701-01-R3.2AXTR	Test Dates: 9/17/2020 - 10/27/2020	EUT Type: LTE enterprise small cell base station	Page 57 of 143

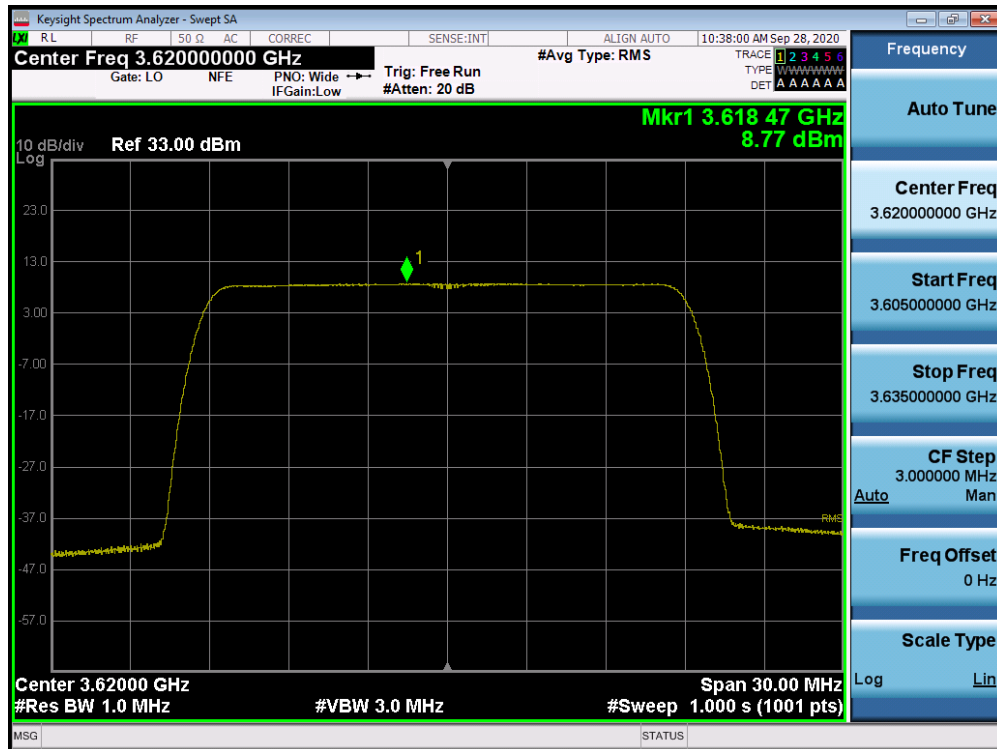


Plot 7-43. Peak Power Spectral Density Plot (20 MHz Channel Bandwidth, Middle Channel, QPSK, Port 0)

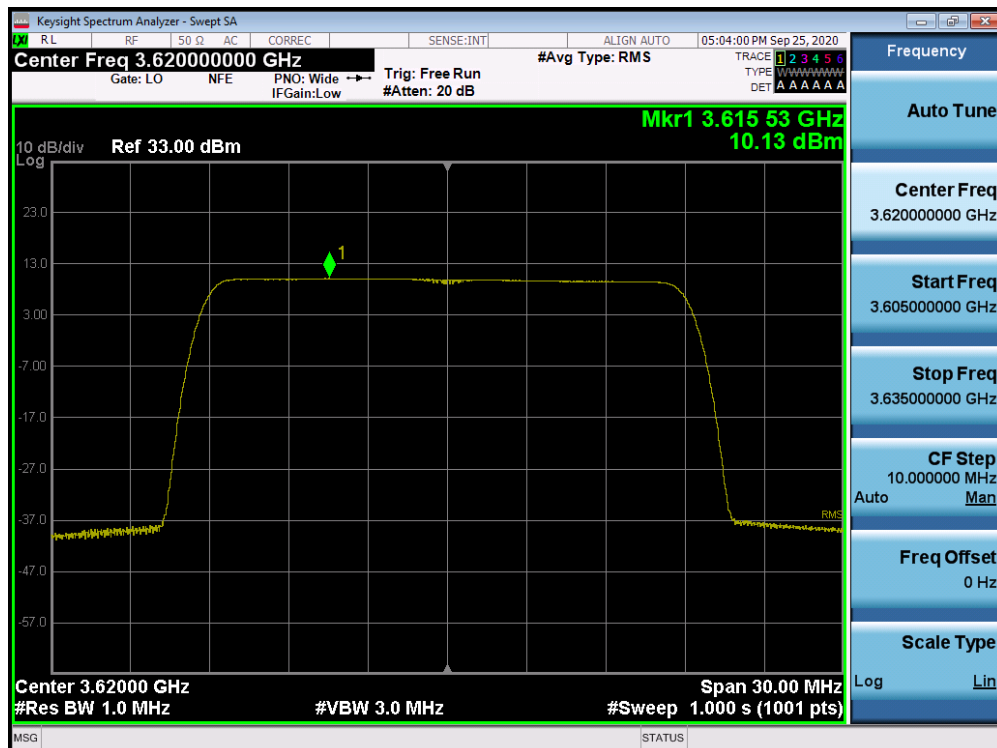


Plot 7-44. Peak Power Spectral Density Plot (20 MHz Channel Bandwidth, Middle Channel, 16QAM, Port 0)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 8K20091701-01-R3.2AXTR	Test Dates: 9/17/2020 - 10/27/2020	EUT Type: LTE enterprise small cell base station	Page 58 of 143

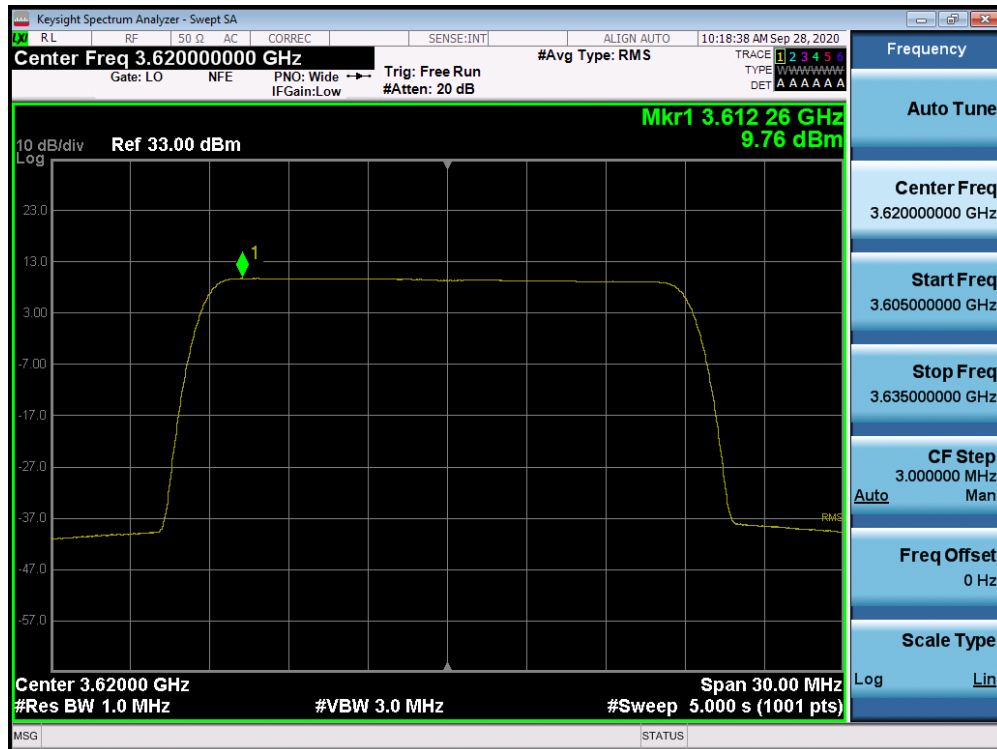


Plot 7-45. Peak Power Spectral Density Plot (20 MHz Channel Bandwidth, Middle Channel, 64QAM, Port 0)



Plot 7-46. Peak Power Spectral Density Plot (20 MHz Channel Bandwidth, Middle Channel, QPSK, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-47. Peak Power Spectral Density Plot (20 MHz Channel Bandwidth, Middle Channel, 16QAM, Port 1)



Plot 7-48. Peak Power Spectral Density Plot (20 MHz Channel Bandwidth, Middle Channel, 64QAM, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 8K20091701-01-R3.2AXTR	Test Dates: 9/17/2020 - 10/27/2020	EUT Type: LTE enterprise small cell base station	Page 60 of 143



Plot 7-49. Peak Power Spectral Density Plot (20 MHz Channel Bandwidth, High Channel, QPSK, Port 0)

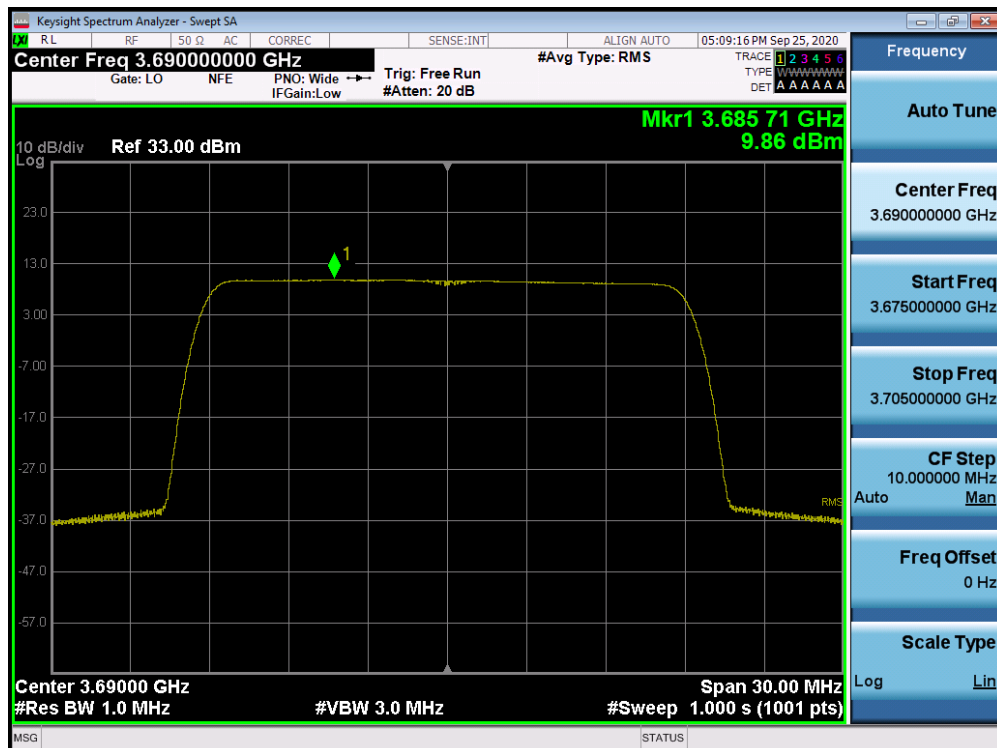


Plot 7-50. Peak Power Spectral Density Plot (20 MHz Channel Bandwidth, High Channel, 16QAM, Port 0)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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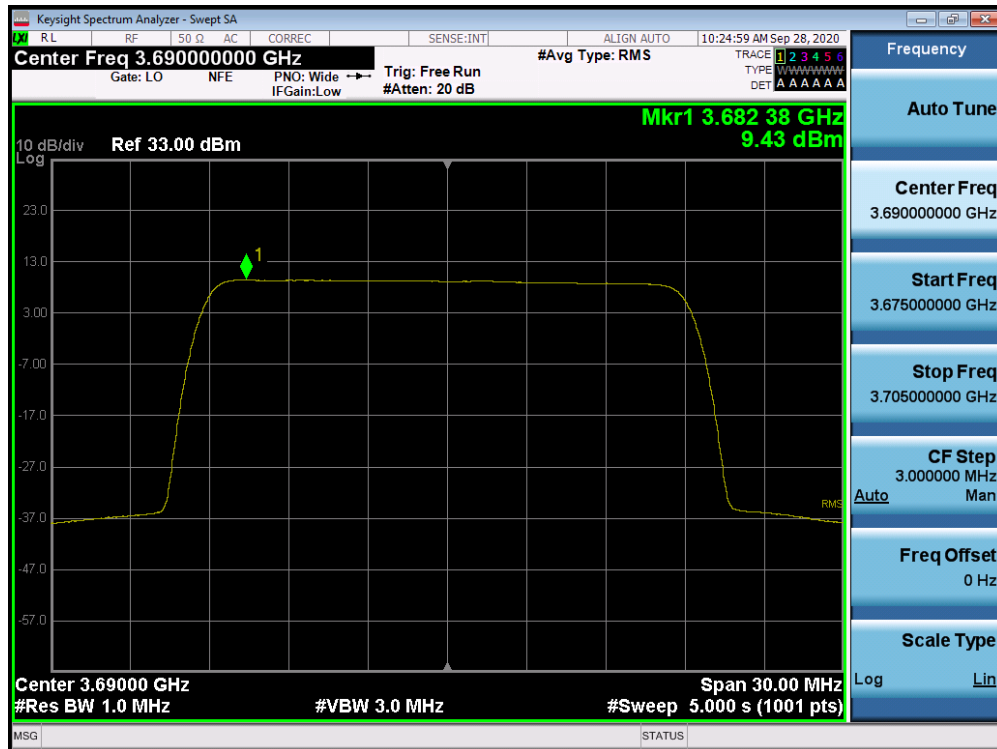


Plot 7-51. Peak Power Spectral Density Plot (20 MHz Channel Bandwidth, High Channel, 64QAM, Port 0)



Plot 7-52. Peak Power Spectral Density Plot (20 MHz Channel Bandwidth, High Channel, QPSK, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-53. Peak Power Spectral Density Plot (20 MHz Channel Bandwidth, High Channel, 16QAM, Port 1)



Plot 7-54. Peak Power Spectral Density Plot (20 MHz Channel Bandwidth, High Channel, 64QAM, Port 1)

Plot 7-55.

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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7.6 Peak-Average Ratio §96.41(g)

Test Overview

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

Test Procedure Used

KDB 971168 D01 v03r01 – Section 5.7

Test Settings

1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW $\geq$ OBW or specified reference bandwidth
4. The signal analyzer was set to collect two million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed.
6. An RF-Burst triggering method ensured measurement in the on time of the signal.

Test Setup

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

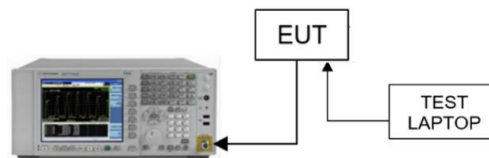


Figure 7-4. Test Instrument & Measurement Setup

Test Notes

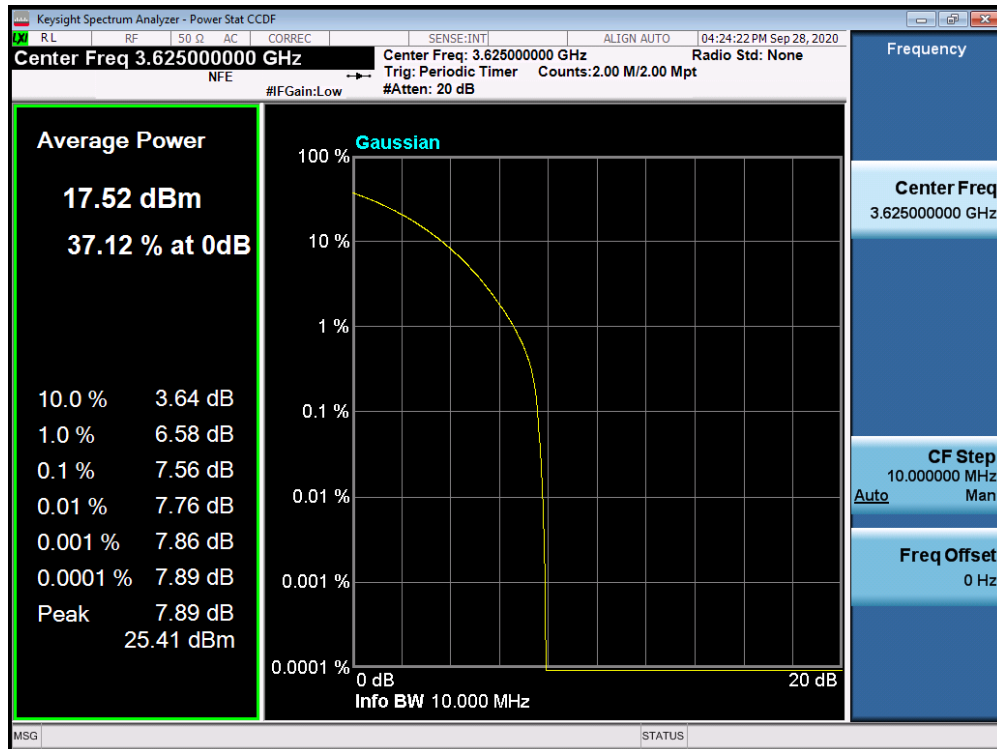
The PAR data is taken from the power with the highest output power on the mid channel.

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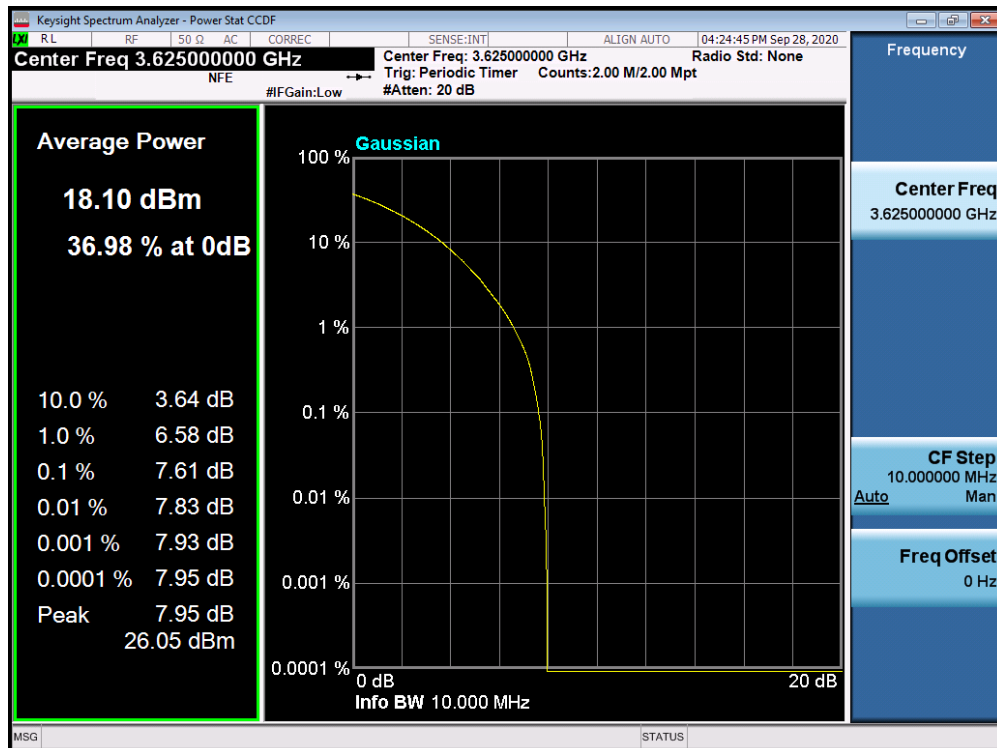
Bandwidth	Port #	Middle_Test Results (dB)		
		QPSK	16QAM	64QAM
10 MHz	0	7.56	7.53	7.56
	1	7.61	7.56	7.60
20 MHz	0	7.13	7.11	7.09
	1	7.18	7.17	7.14

Table 7-15. Peak-Average ratio Summary Data

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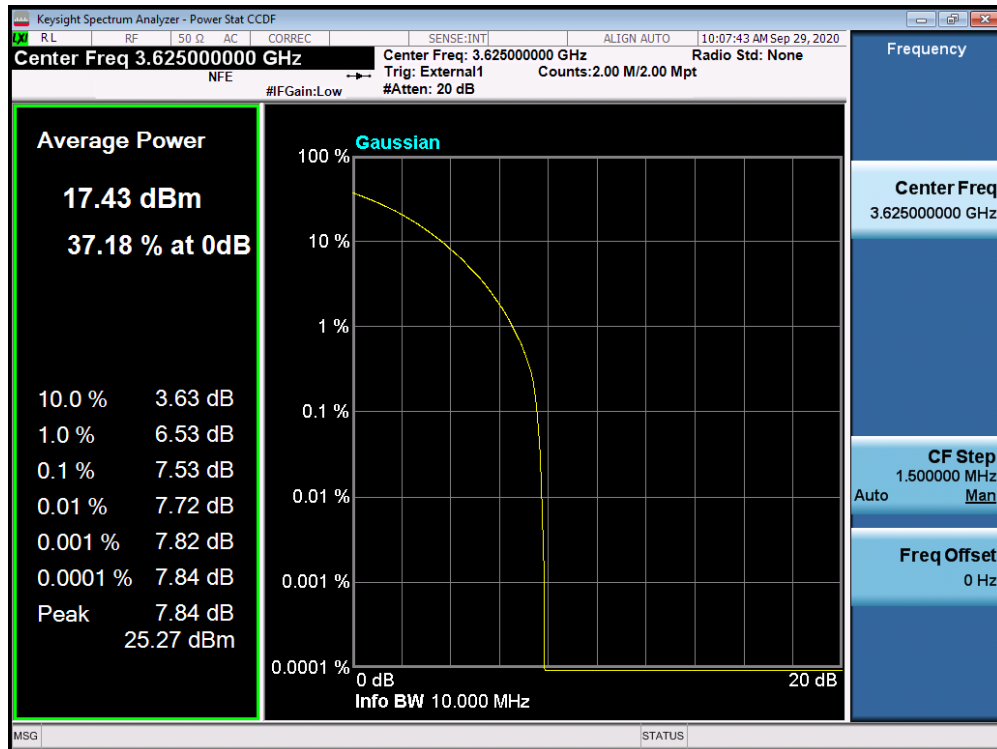


Plot 7-56. PAR Plot (10 MHz Channel Bandwidth, QPSK, Mid Channel, Port 0)

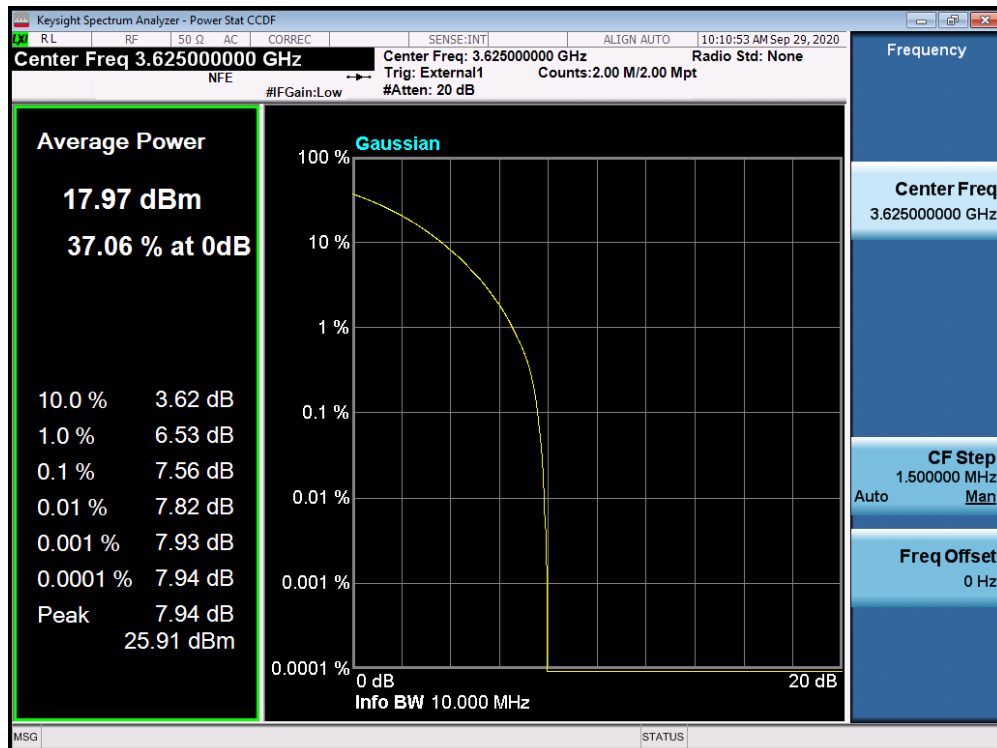


Plot 7-57. Plot (10 MHz Channel Bandwidth, QPSK, Mid Channel, Port1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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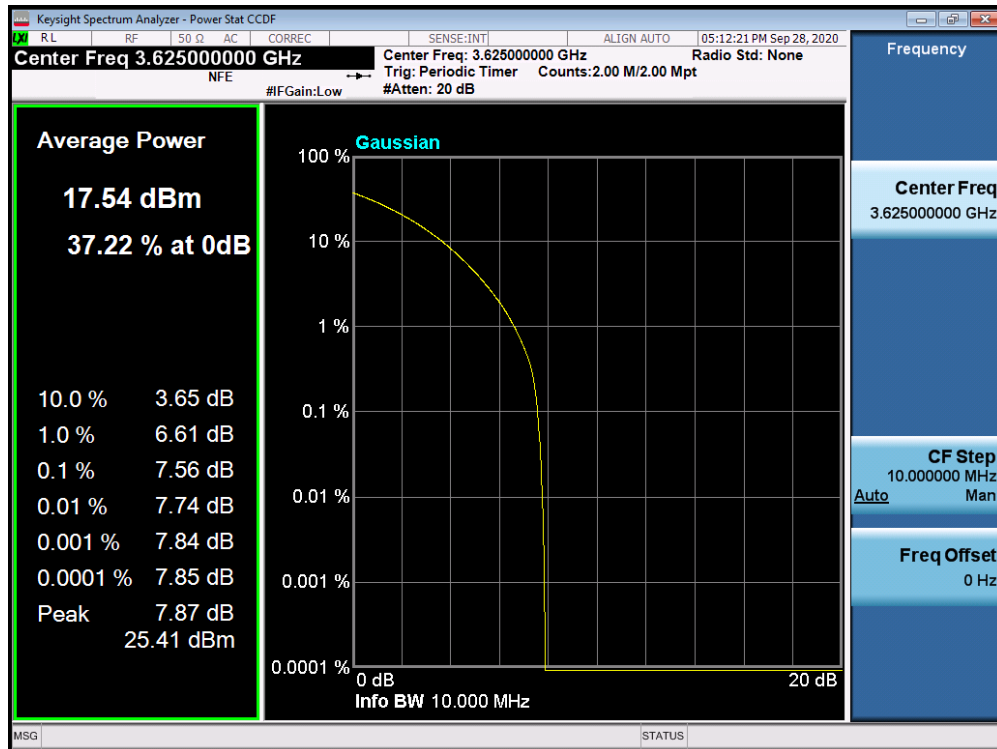


Plot 7-58. PAR Plot (10 MHz Channel Bandwidth, 16QAM, Mid Channel, Port 0)

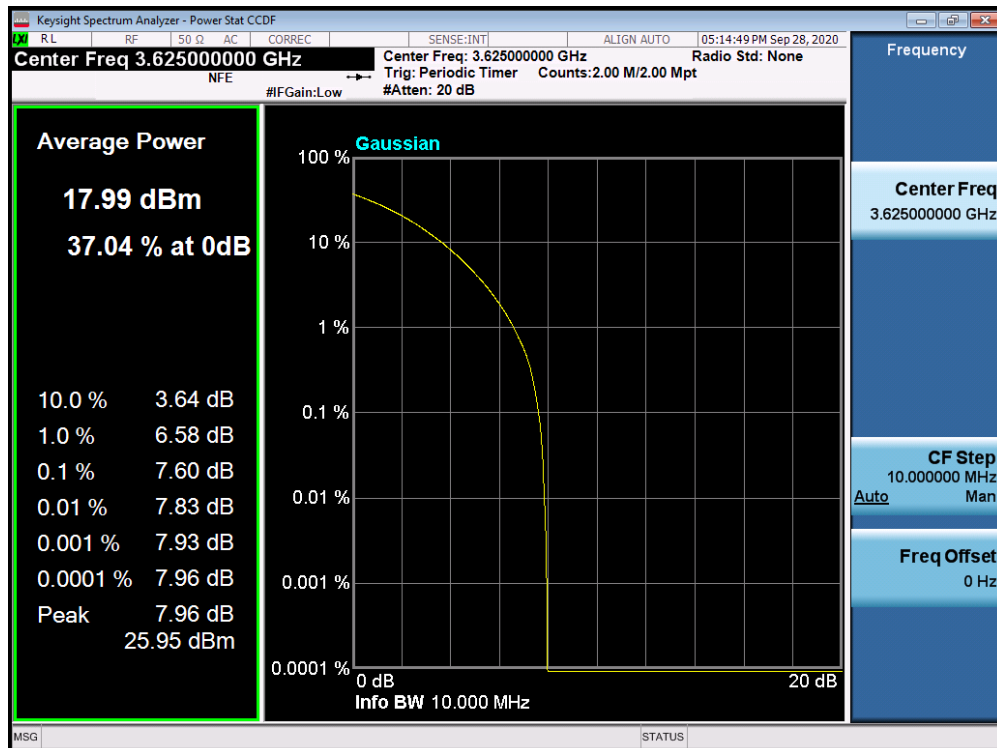


Plot 7-59. PAR Plot (10 MHz Channel Bandwidth, 16QAM, Mid Channel, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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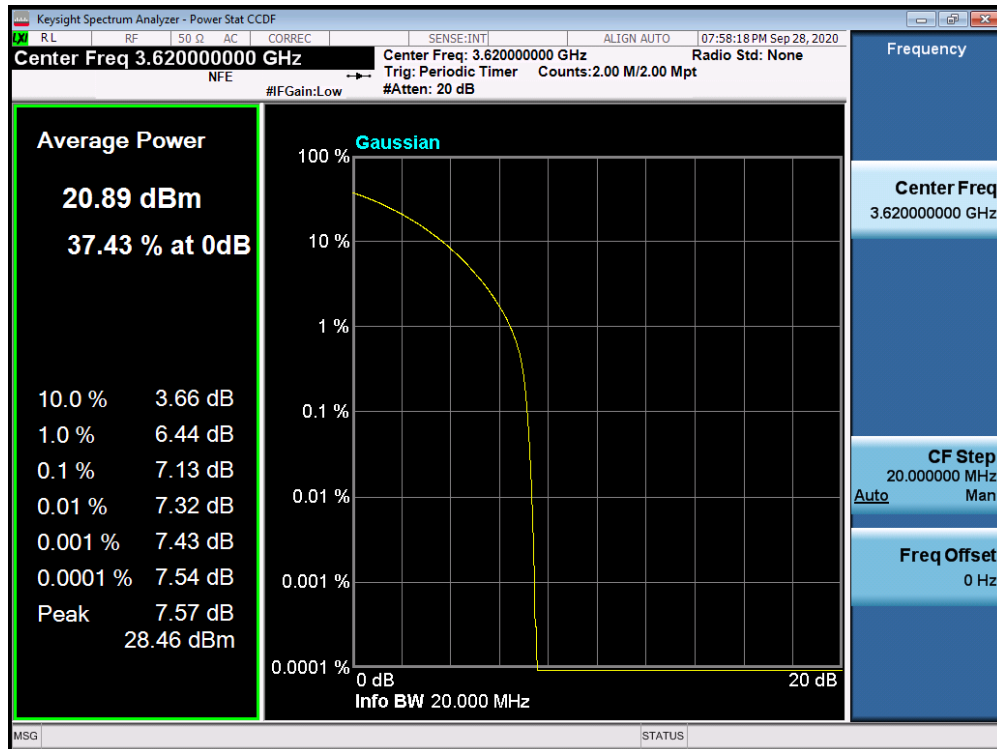


Plot 7-60. PAR Plot (10 MHz Channel Bandwidth, 64QAM, Mid Channel, Port 0)

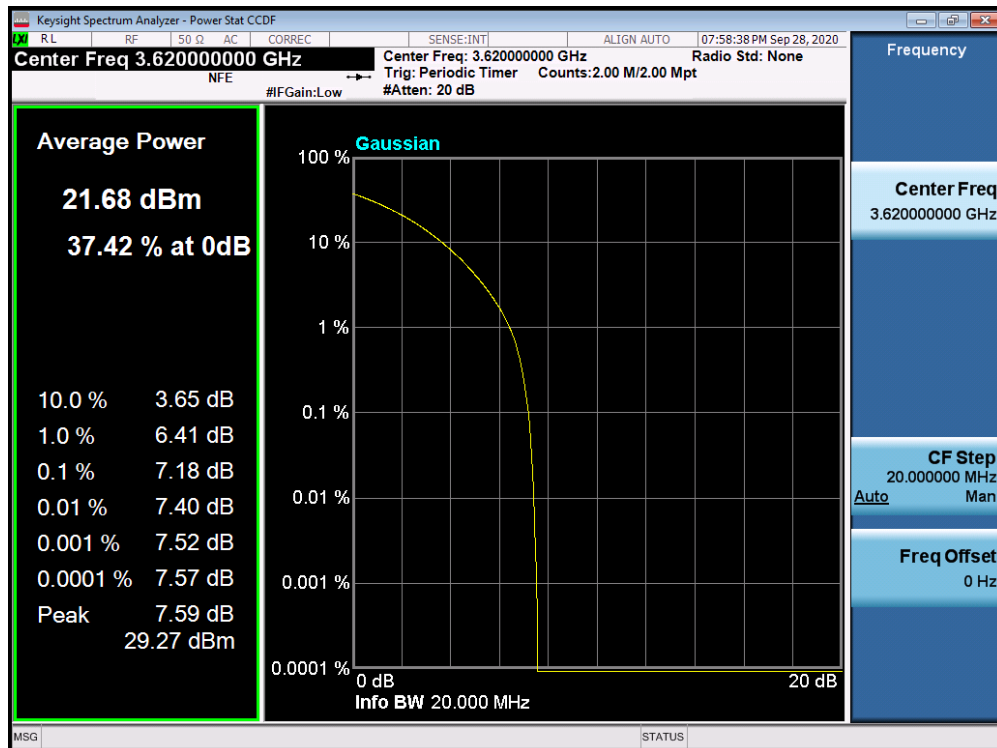


Plot 7-61. PAR Plot (10 MHz Channel Bandwidth, 64QAM, Mid Channel, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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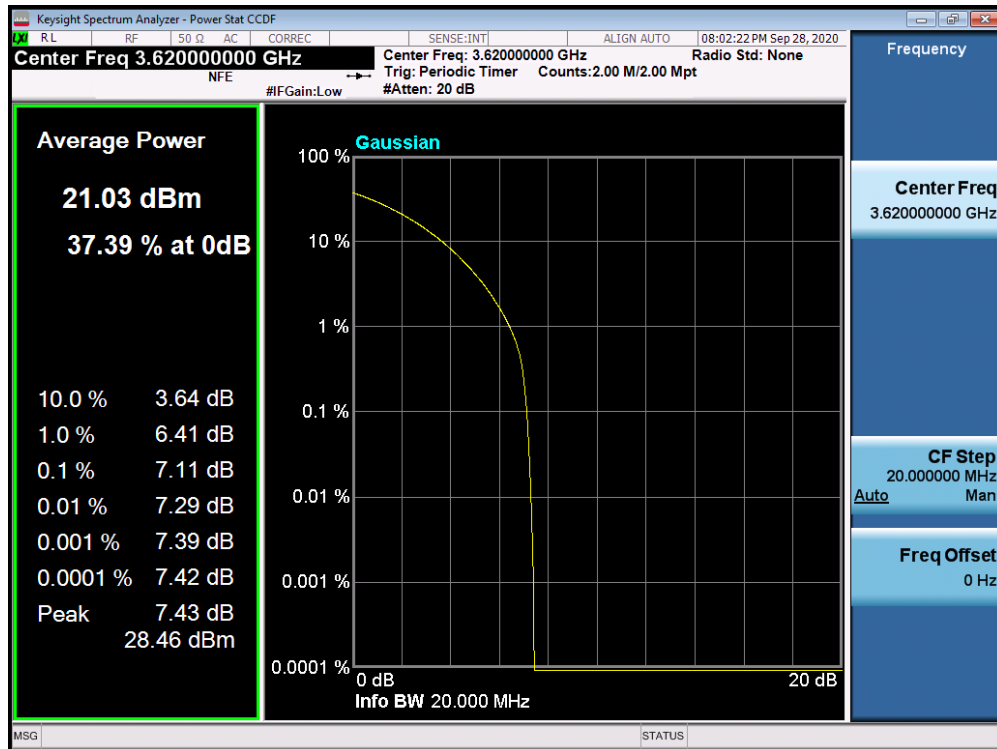


Plot 7-62. PAR Plot (20 MHz Channel Bandwidth, QPSK, Mid Channel, Port 0)

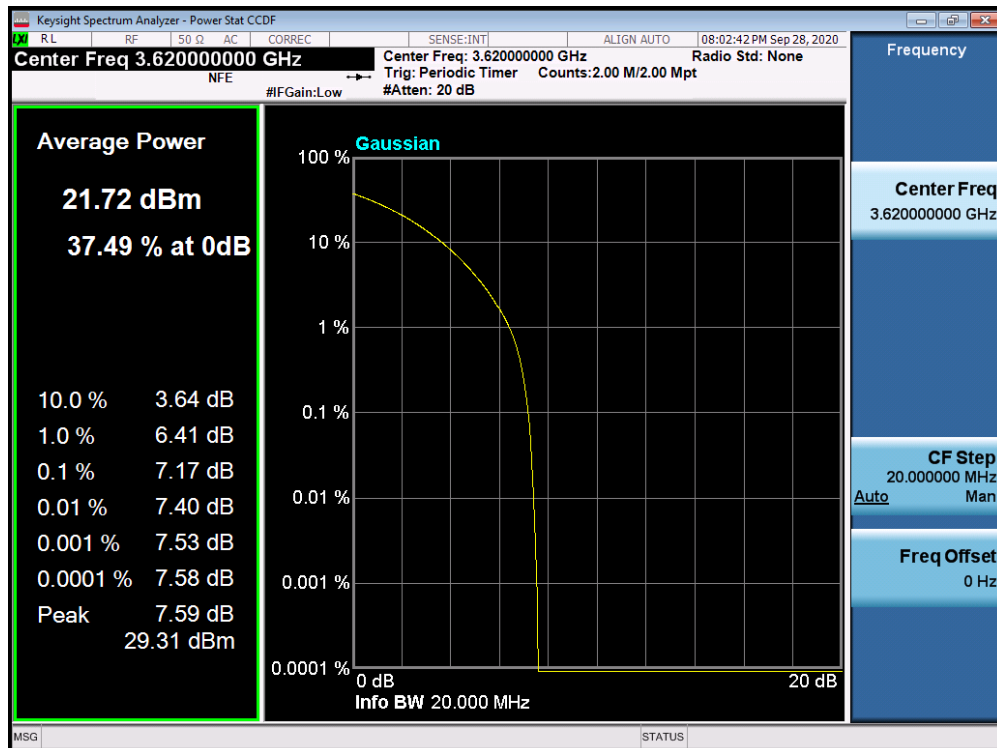


Plot 7-63. PAR Plot (20 MHz Channel Bandwidth, QPSK, Mid Channel, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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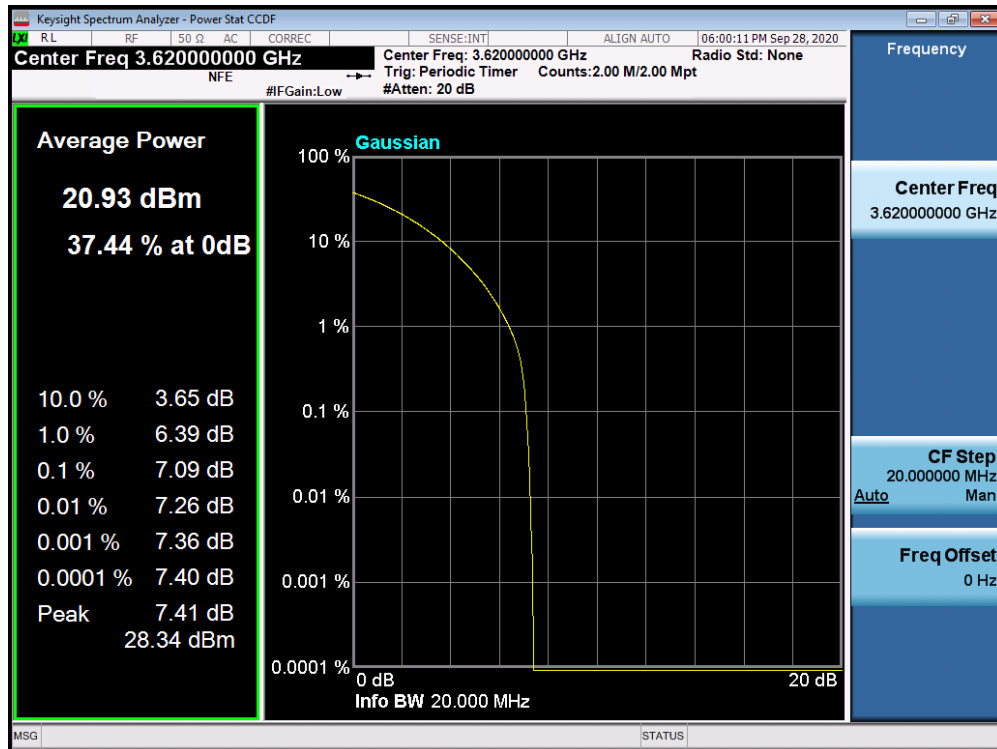


Plot 7-64. PAR Plot (20 MHz Channel Bandwidth, 16QAM, Mid Channel, Port 0)

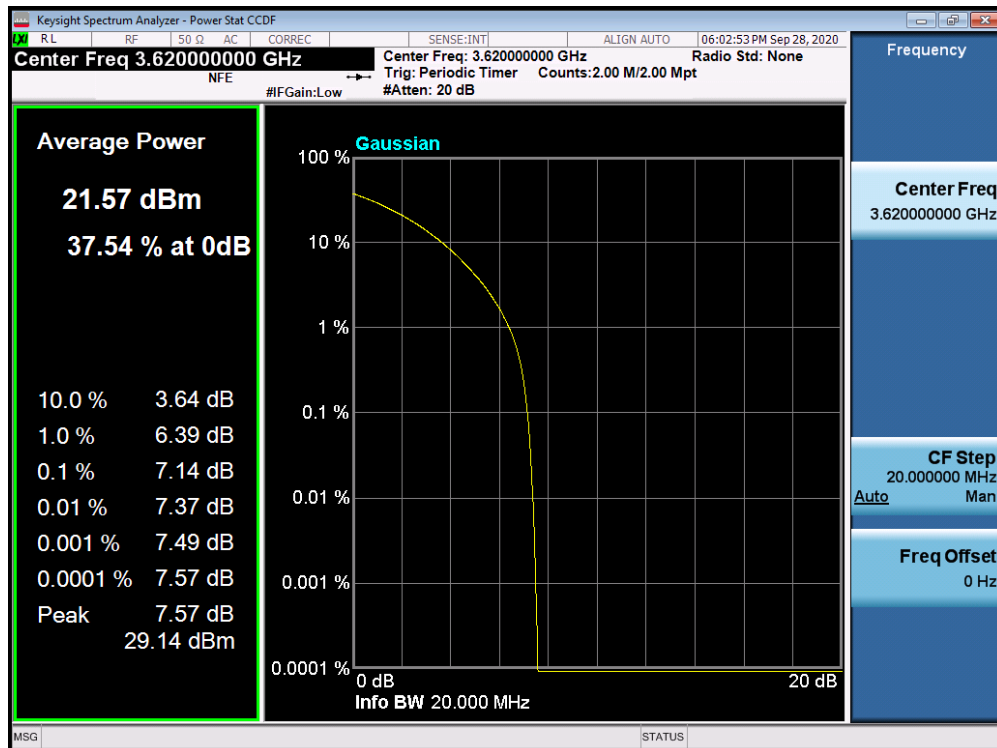


Plot 7-65. PAR Plot (20 MHz Channel Bandwidth, 16QAM, Mid Channel, Port 1)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-66. PAR Plot (20 MHz Channel Bandwidth, 64QAM, Mid Channel, Port 0)



Plot 7-67. PAR Plot (20 MHz Channel Bandwidth, 64QAM, Mid Channel, Port 1)

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7.7 Spurious and Harmonic Emissions at Antenna Terminal

§2.1051 §96.41(e)

Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are 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 to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40 dBm/Mhz.

Test Procedure Used

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

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to at least 10 * the fundamental frequency (separated into at least two plots per channel)
1. Trace mode and Detector= RMS
2. Sweep time = auto couple
3. The trace was allowed to stabilize
4. Please see test notes below for RBW and VBW settings

Test Setup

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

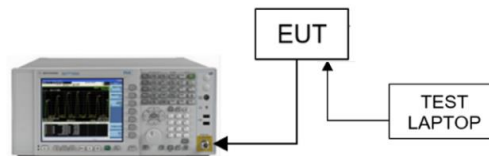


Figure 7-5. Test Instrument & Measurement Setup

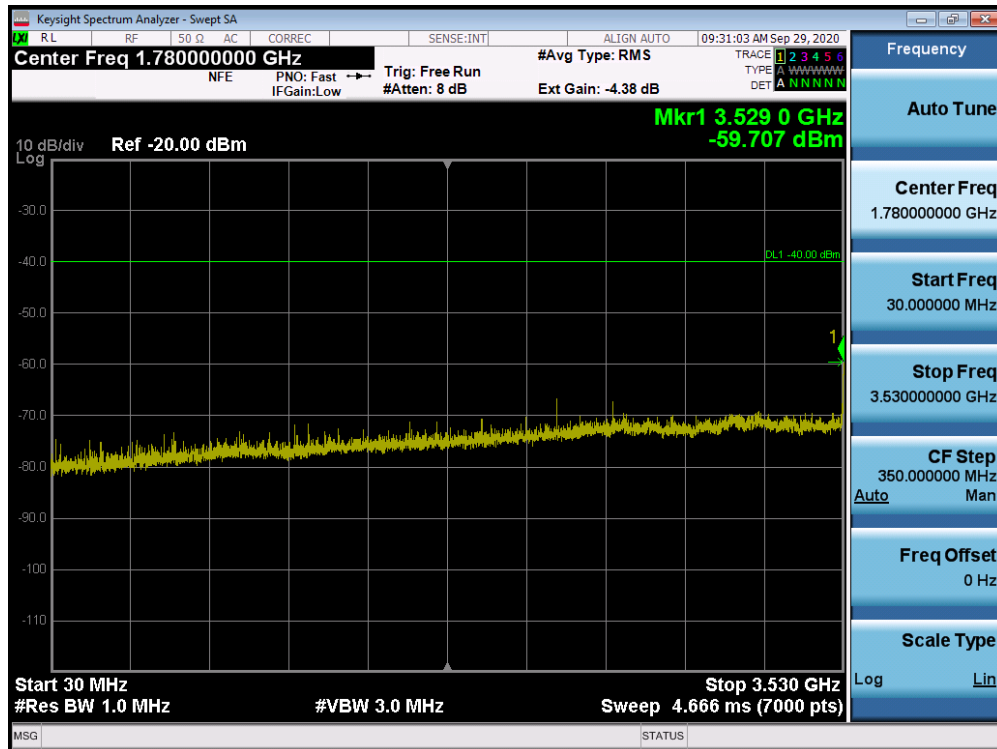
FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: 8K20091701-01-R3.2AXTR	Test Dates: 9/17/2020 - 10/27/2020	EUT Type: LTE enterprise small cell base station	Page 72 of 143

Test Notes

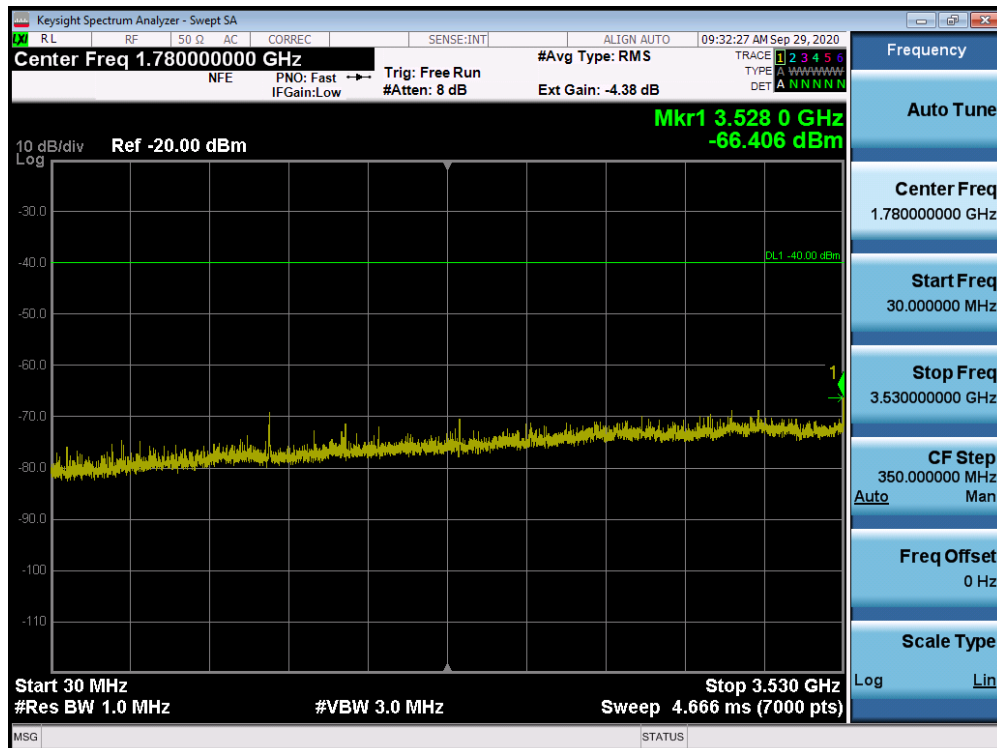
1. Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.
2. If the device cannot be configured to transmit continuously (duty cycle < 98%) and a freerunning sweep must be used, set the sweep time so that the averaging is performed over multiple on/off cycles by setting the sweep time > (number of points in sweep) × (transmitter period) (i.e., the transmit on-time + the off-time). The spectrum analyzer readings shall subsequently be corrected by $[10 \log (1/\text{duty cycle})]$. This assumes that the transmission period and duty cycle is relatively constant (duty cycle variation $\leq \pm 2\%$).
A duty cycle correction factor was applied.
Duty cycle = transmit on-time / transmitter period = 3.64 ms / 5 ms = 0.73
Duty cycle correction factor = $10 \cdot \log(1/\text{duty cycle}) = 10 \cdot \log(1/0.73) = 1.38 \text{ dB}$
This value has been applied in the spectrum analyzer.
3. Consider the following factors for multiple outputs of a transmitter
All limits were adjusted by a factor of $[10 \cdot \log(2)] \text{ dB}$ to account for the device operation as a 2 port MIMO transmitter, as per FCC KDB 622911 D01 v02r01 – Section E)3)c) for details.

Applied additional Signal Analyzer offset = Duty cycle correction factor + 2 port MIMO factor = 1.38 + 3.00 = 4.38 dB

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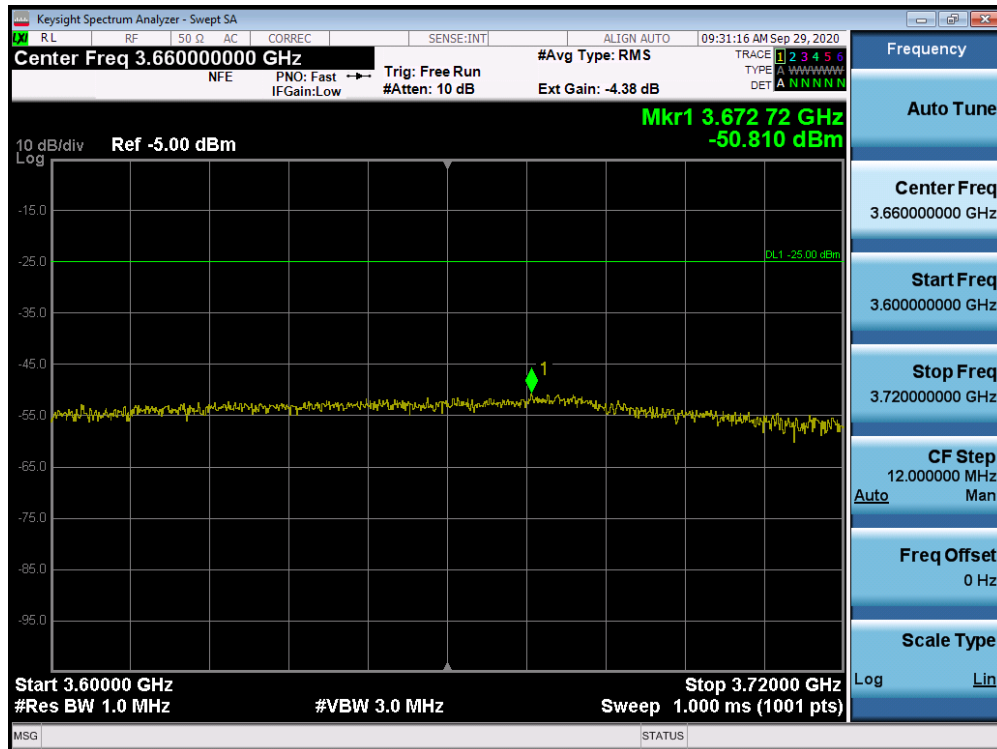


Plot 7-68. Conducted Spurious Emission Plot (10 MHz BW, Low Channel, Port 0, 30 MHz to 3530 MHz)

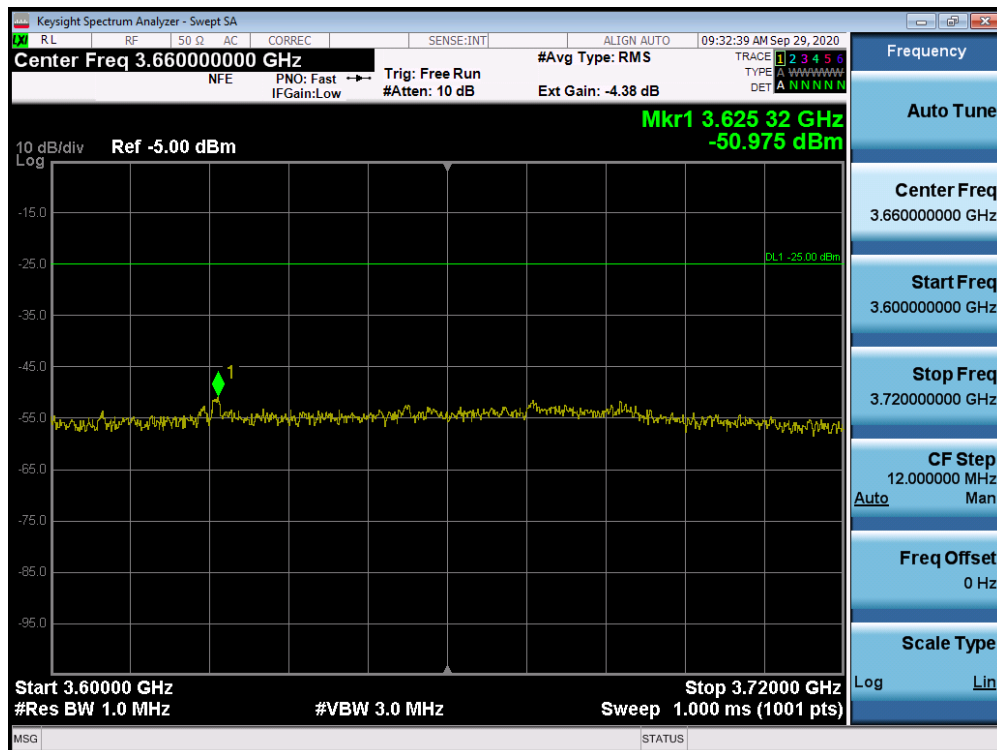


Plot 7-69. Conducted Spurious Emission Plot (10 MHz BW, Low Channel, Port 1, 30 MHz to 3530 MHz)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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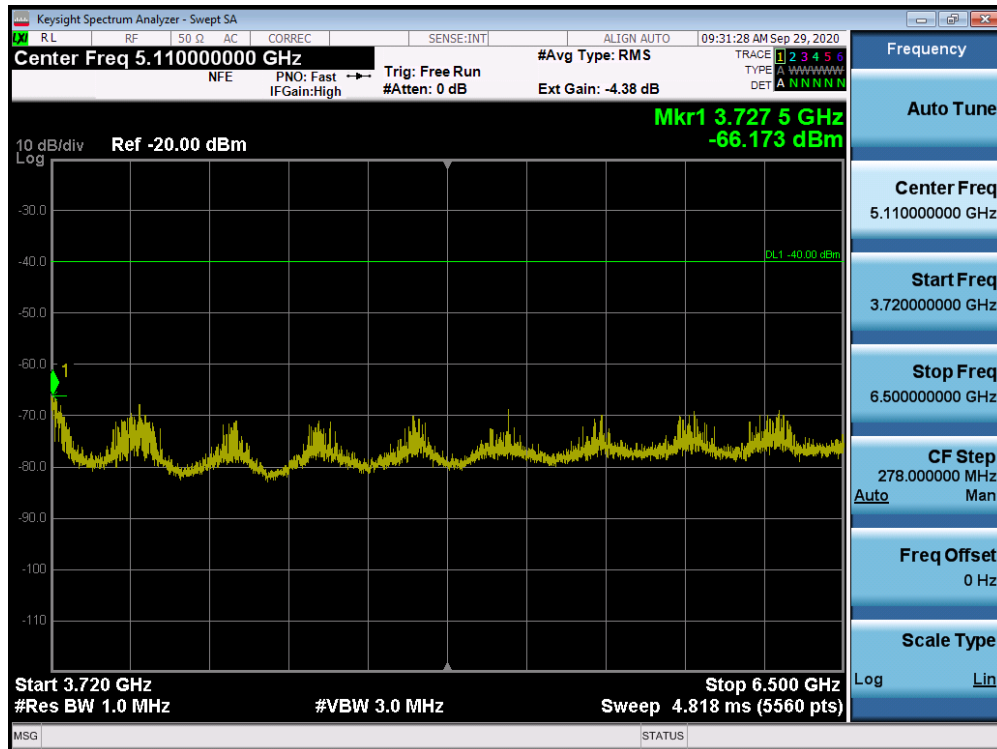


Plot 7-70. Conducted Spurious Emission Plot (10 MHz BW, Low Channel, Port 0, 3600 MHz to 3720 MHz)

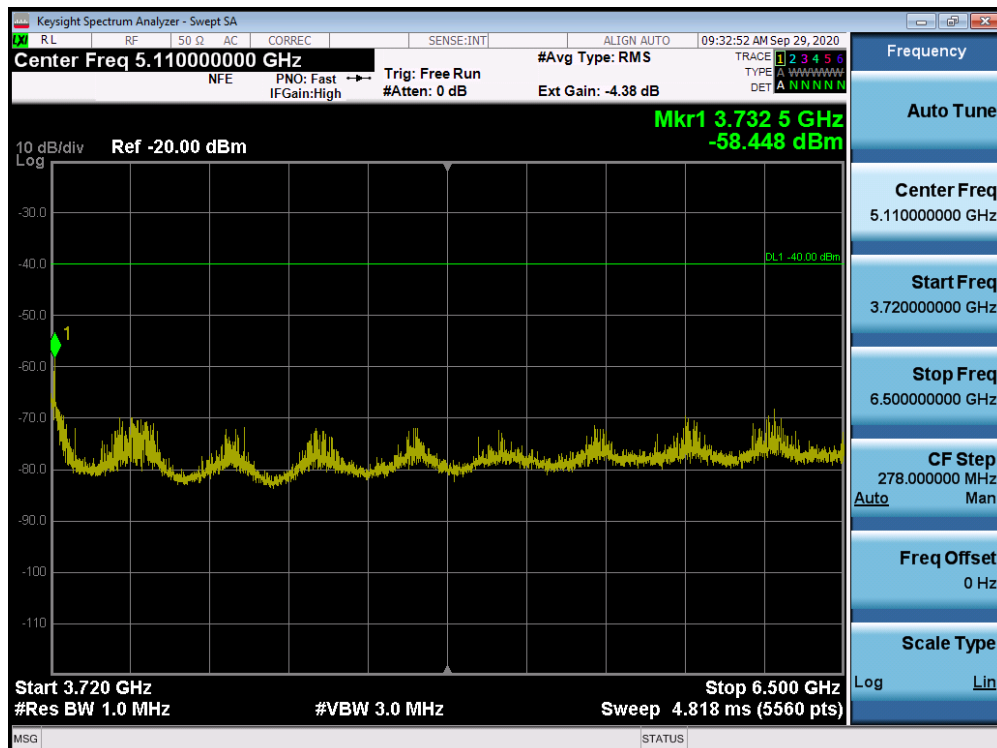


Plot 7-71. Conducted Spurious Emission Plot (10 MHz BW, Low Channel, Port 1, 3600 MHz to 3720 MHz)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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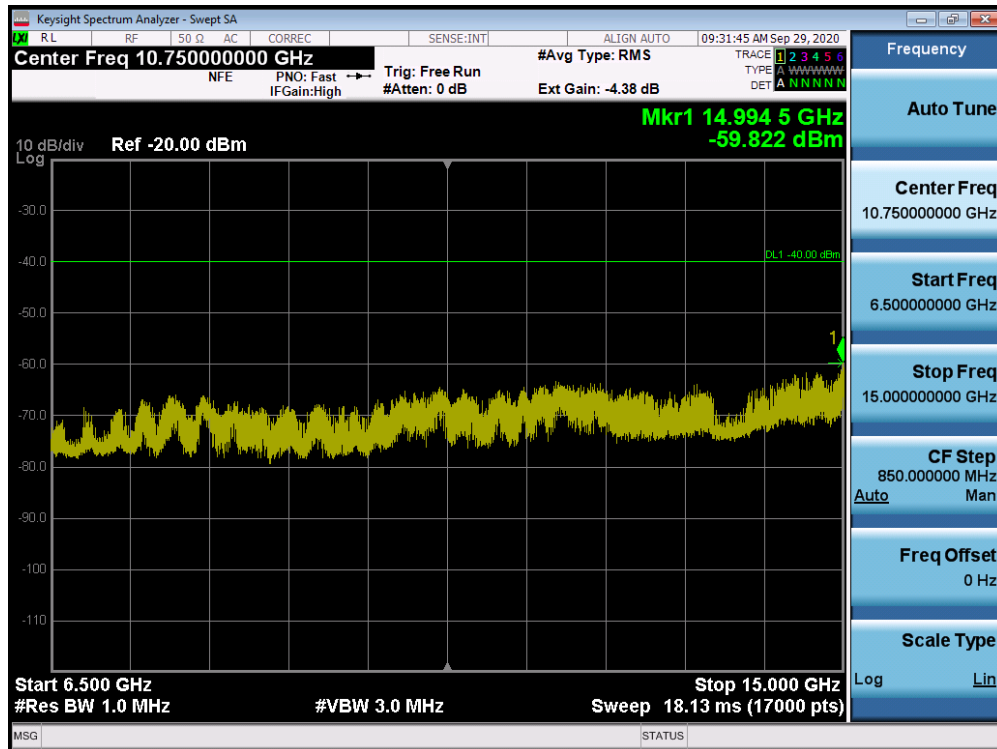


Plot 7-72. Conducted Spurious Emission Plot (10 MHz BW, Low Channel, Port 0, 3720 MHz to 6.5 GHz)

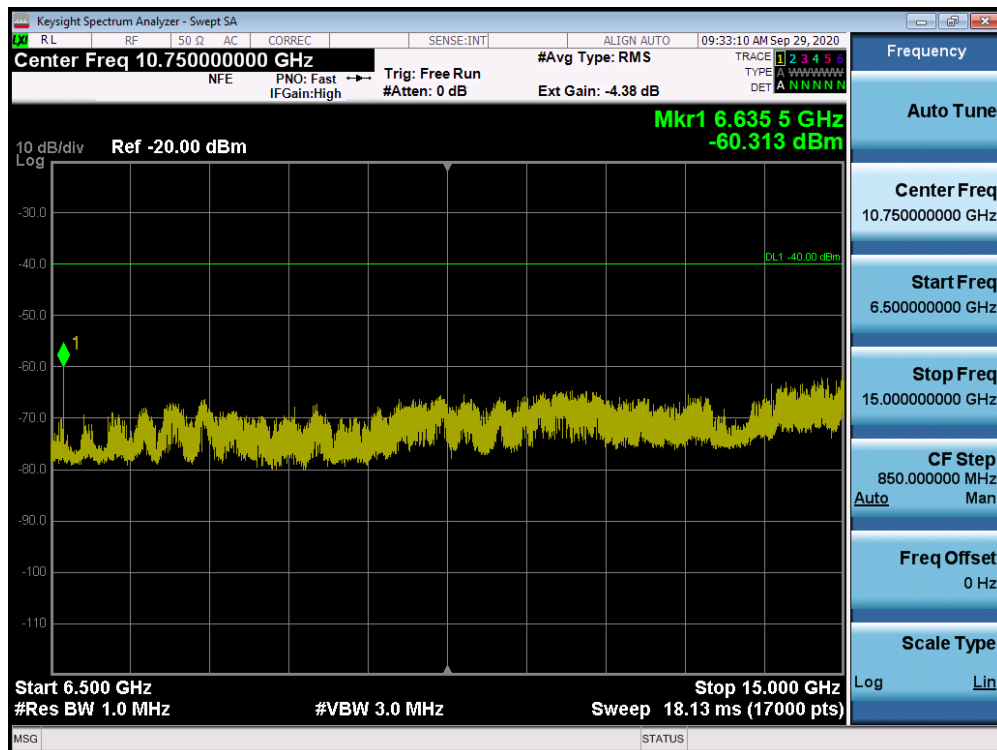


Plot 7-73. Conducted Spurious Emission Plot (10 MHz BW, Low Channel, Port 1, 3720 MHz to 6.5 GHz)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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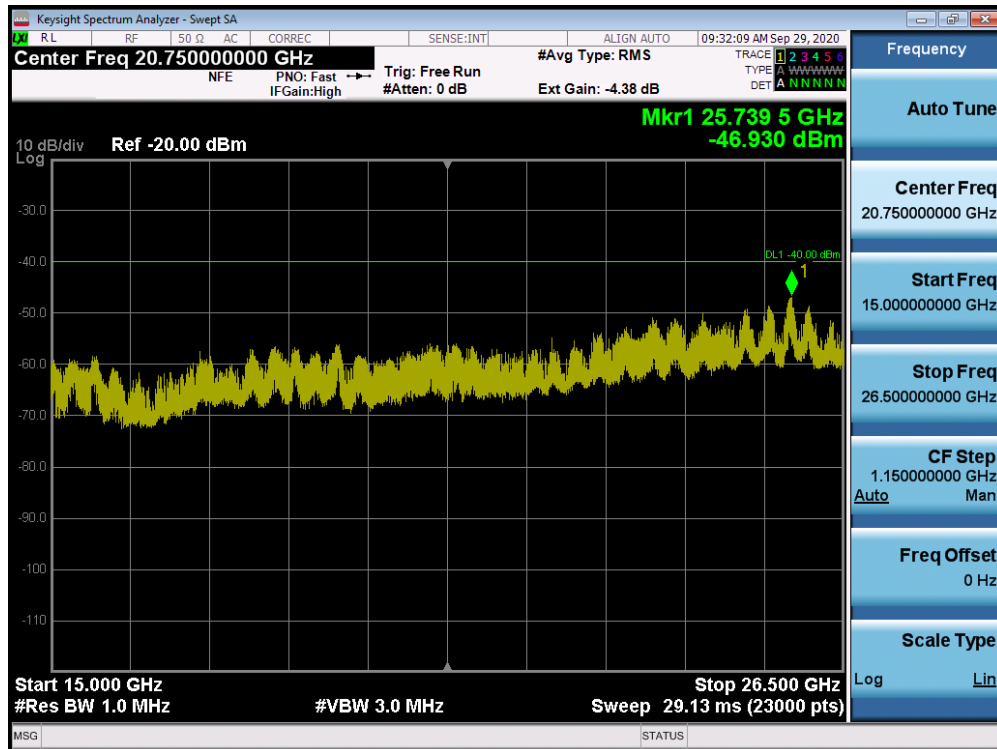


Plot 7-74. Conducted Spurious Emission Plot (10 MHz BW, Low Channel, Port 0, 6.5 GHz to 15 GHz)

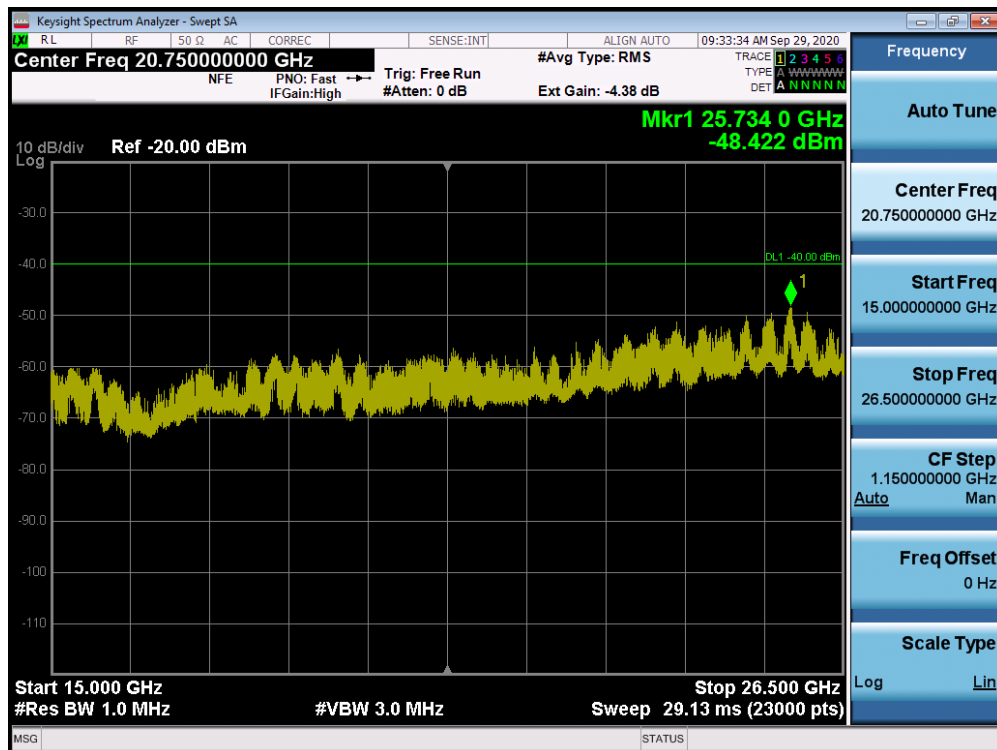


Plot 7-75. Conducted Spurious Emission Plot (10 MHz BW, Low Channel, Port 1, 6.5 GHz to 15 GHz)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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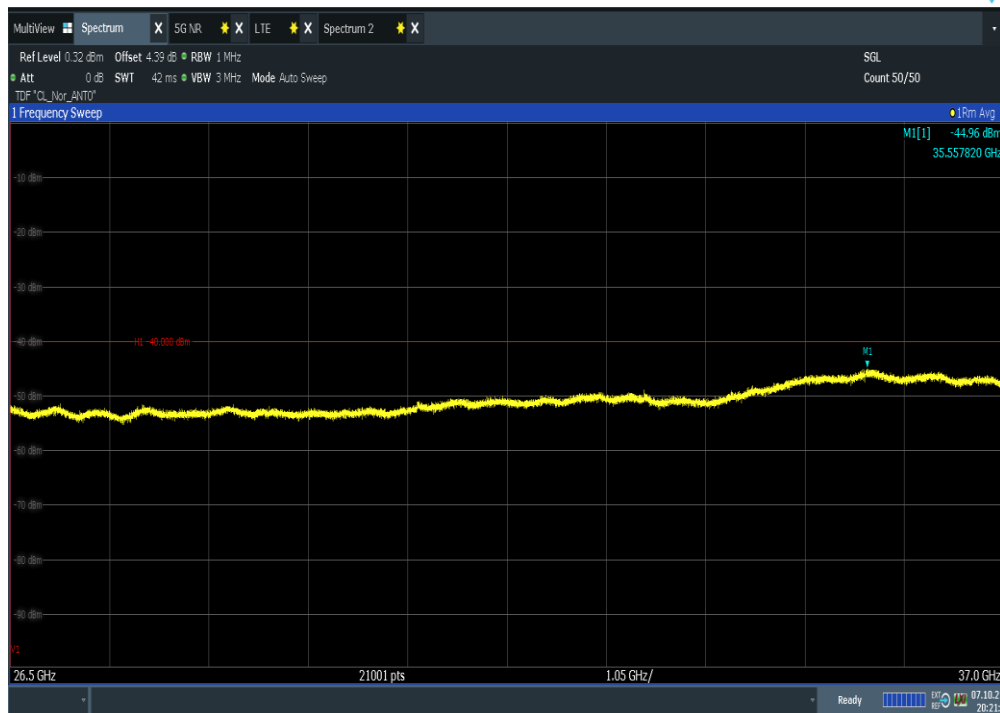


Plot 7-76. Conducted Spurious Emission Plot (10 MHz BW, Low Channel, Port 0, 15 GHz to 26.5 GHz)

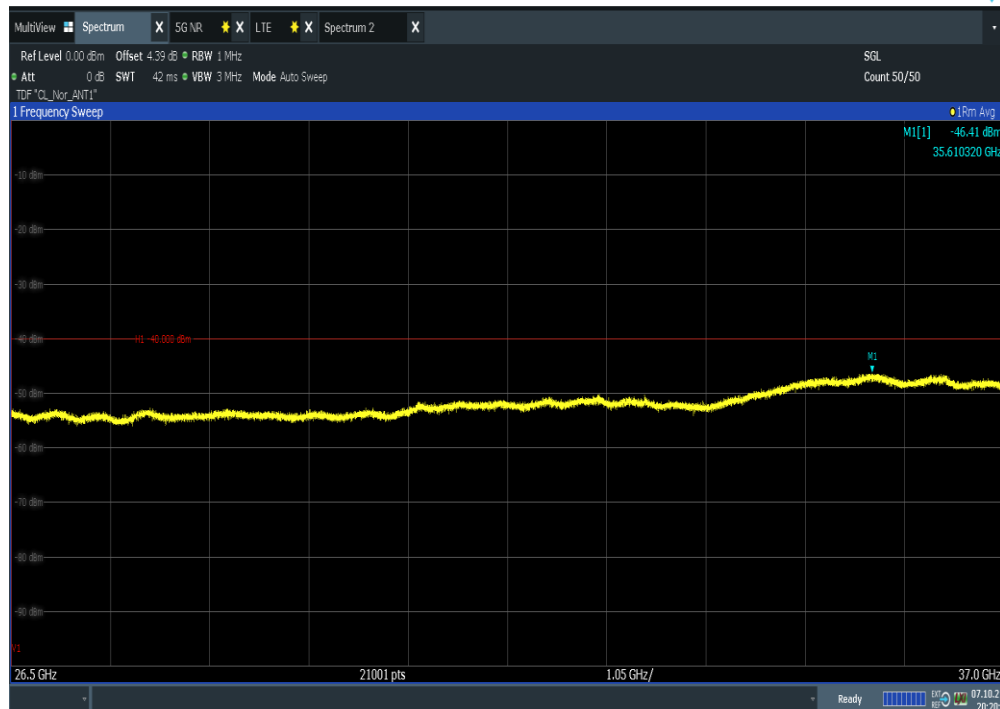


Plot 7-77. Conducted Spurious Emission Plot (10 MHz BW, Low Channel, Port 1, 15 GHz to 26.5 GHz)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-78. Conducted Spurious Emission Plot (10 MHz BW, Low Channel, Port 0, 26.5 GHz to 37 GHz)



Plot 7-79. Conducted Spurious Emission Plot (10 MHz BW, Low Channel, Port 1, 26.5 GHz to 37 GHz)

FCC ID: 2AXTR-ECL2248-2723	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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