PCTEST ENGINEERING LABORATORY, INC.
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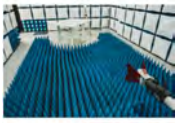

MEASUREMENT REPORT
Part 96 LTE

Applicant Name:
Samsung Electronics Co., Ltd.
129, Samsung-ro,
Yeongtong-gu, Suwon-si
Gyeonggi-do, 16677, Korea

Date of Testing:
01/23/2019 - 02/28/2019
Test Site/Location:
PCTEST Lab. Columbia, MD
Test Report Serial No.:
1M1901240015-01-R2.A3L

FCC ID:	**A3LMT3204-48A**
APPLICANT:	**Samsung Electronics Co., Ltd.**

Application Type:	Certification
Model:	MT3204-48A
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.

This revised Test Report (S/N: 1M1901240015-01-R2.A3L) supersedes and replaces the previously issued test report (S/N: 1M1901240015-01-R1.A3L) 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.

Randy Ortanez
President

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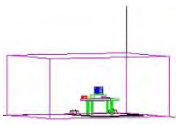
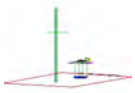


MEASUREMENT REPORT
FCC Part 96



Mode	FCC Rule Part	Tx Frequency (MHz)	Total Power		Emission Designator	Modulation
			Max. Power (W)	Max. Power (dBm)		
8-User Beam 1 Carrier	96	3560 - 3690	58.749	47.69	18M0G7D	QPSK
	96	3560 - 3690	59.429	47.74	18M1W7D	16QAM
	96	3560 - 3690	66.834	48.25	18M0W7D	64QAM
	96	3560 - 3690	62.230	47.94	18M0W7D	256QAM
8-User Beam 2 Carriers	96	3560 - 3690	133.045	51.24	38M0G7D	QPSK
	96	3560 - 3690	141.906	51.52	38M0W7D	16QAM
	96	3560 - 3690	133.045	51.24	37M9W7D	64QAM
	96	3560 - 3690	130.617	51.16	38M0W7D	256QAM
Single User Beam (UE0) 1 Carrier	96	3560 - 3690	72.444	48.60	18M0G7D	QPSK
	96	3560 - 3690	72.444	48.60	18M1W7D	16QAM
	96	3560 - 3690	73.282	48.65	18M0W7D	64QAM
	96	3560 - 3690	72.277	48.59	18M0W7D	256QAM
Single User Beam (UE0) 2 Carriers	96	3560 - 3690	146.893	51.67	38M0G7D	QPSK
	96	3560 - 3690	147.571	51.69	38M0W7D	16QAM
	96	3560 - 3690	153.462	51.86	37M9W7D	64QAM
	96	3560 - 3690	149.279	51.74	38M0W7D	256QAM
Common Beam 1 Carrier	96	3560 - 3690	54.828	47.39	18M0G7D	QPSK
	96	3560 - 3690	54.702	47.38	18M1W7D	16QAM
	96	3560 - 3690	55.335	47.43	18M0W7D	64QAM
	96	3560 - 3690	55.081	47.41	18M0W7D	256QAM
Common Beam 2 Carriers	96	3560 - 3690	114.815	50.60	38M0G7D	QPSK
	96	3560 - 3690	114.815	50.60	38M0W7D	16QAM
	96	3560 - 3690	116.681	50.67	37M9W7D	64QAM
	96	3560 - 3690	116.413	50.66	38M0W7D	256QAM

EUT Overview (B48 LTE)

Notes:

EIRP levels shown in the table above are the full channel power that will appear on the Grant of Authorization.

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 ISED Standards (RSS).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISED.

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Massive MIMO CBSD FCC ID: A3LMT3204-48A**. 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 32-port device which supports single and two carrier configurations (1CC and 2CC). Each carrier operates using 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 8 beams in the following modes:

1. User-Beam Operation:
   a) 8-User Beam Mode :
      In this mode, all ports transmit at maximum power to form eight 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.: 4816t

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 connectes 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.

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

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 (±dB)
Conducted Bench Top Measurements	1.13

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	E2377A	Multimeter	5/18/2018	Biennial	5/18/2020	3143J11849
Agilent	E4448A	PSA (3Hz-50GHz) Spectrum Analyzer	6/15/2018	Annual	6/15/2019	US42510244
Agilent	N9020A	MXA Signal Analyzer	4/24/2018	Annual	4/24/2019	US46470561
Agilent	N9030A	PXA Signal Analyzer (44GHz)	5/25/2018	Annual	5/25/2019	MY52350166
Agilent	N9038A	MXE EMI Receiver	6/11/2018	Annual	6/11/2019	MY51210133
Agilent	AT6032A	Power Supply	N/A			1146459
Agilent	AT6032A	Power Supply	N/A			1146462
Espec	ESL-4CA	Temperature Chamber	6/22/2017	Annual	6/22/2019	019721

Table 5-1. Test Equipment

Notes:

1. Equipment with a calibration date of "N/A" shown in this list was not used to make direct calibrated measurements.

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

7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.

FCC ID: A3LMT3204-48A

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 96.41(b)	Conducted Power and Equivalent Isotropic Radiated Power (EIRP)	47 dBm/10MHz (EIRP)		PASS	Section 7.3
2.1051 96.41(e)	Out of Band Emissions	-13 dBm/Mhz at frequencies within 0-10MHz of channel edge -25 dBm/MHz at frequencies greater than 10MHz above and below channel edge -40 dBm/MHz at frequencies below 3530 MHz and above 3720 MHz		PASS	Section 7.6, 7.7
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 7.8
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

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 a 48V DC power source.

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 ≥ 3 x 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.

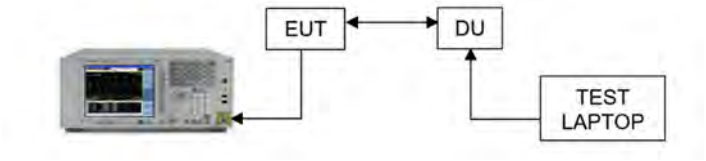


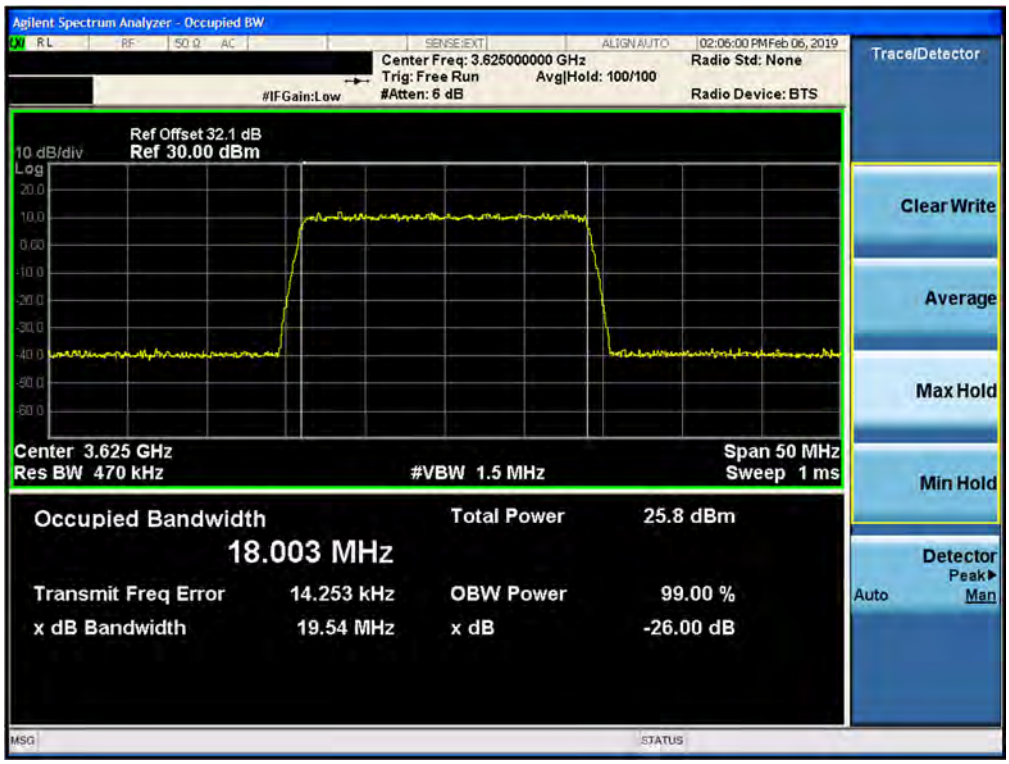
Figure 7-1. Test Instrument & Measurement Setup

Test Notes

Occupied BW measurements were conducted for 8-User Beam, UE0 and Common Beam mode. The occupied bandwidth was not impacted by the selection of beam mode, so only the OBW of the 8-user beam mode was used as a representative set of data.

8-User Beam Mode 1CC Configuration
QPSK

Plot 7-1. Occupied Bandwidth Plot (1CC Configuration– 3560MHz - 20.0MHz QPSK- Low Channel)



Plot 7-2. Occupied Bandwidth Plot (1CC Configuration– 3625 MHz - 20.0MHz QPSK- Mid Channel)

Plot 7-3. Occupied Bandwidth Plot(1CC Configuration– 3690 MHz - 20.0MHz QPSK- High Channel)

16 QAM

Plot 7-4. Occupied Bandwidth Plot (1CC Configuration– 3560MHz - 20.0MHz 16AM- Low Channel)

Plot 7-5. Occupied Bandwidth Plot(1CC Configuration– 3625 MHz- 20.0MHz 16QAM- Mid Channel)

Plot 7-6. Occupied Bandwidth Plot (1CC Configuration– 3690 MHz- 20.0MHz 16QAM- High Channel)

64 QAM

Plot 7-7. Occupied Bandwidth Plot(1CC Configuration–3560MHz - 20.0MHz 64QAM- Low Channel)

Plot 7-8. Occupied Bandwidth Plot(1CC Configuration–3625 MHz - 20.0MHz 64QAM- Mid Channel)

Plot 7-9. Occupied Bandwidth Plot(1CC Configuration–3690 MHz- 20.0MHz 64QAM- High Channel)

256 QAM

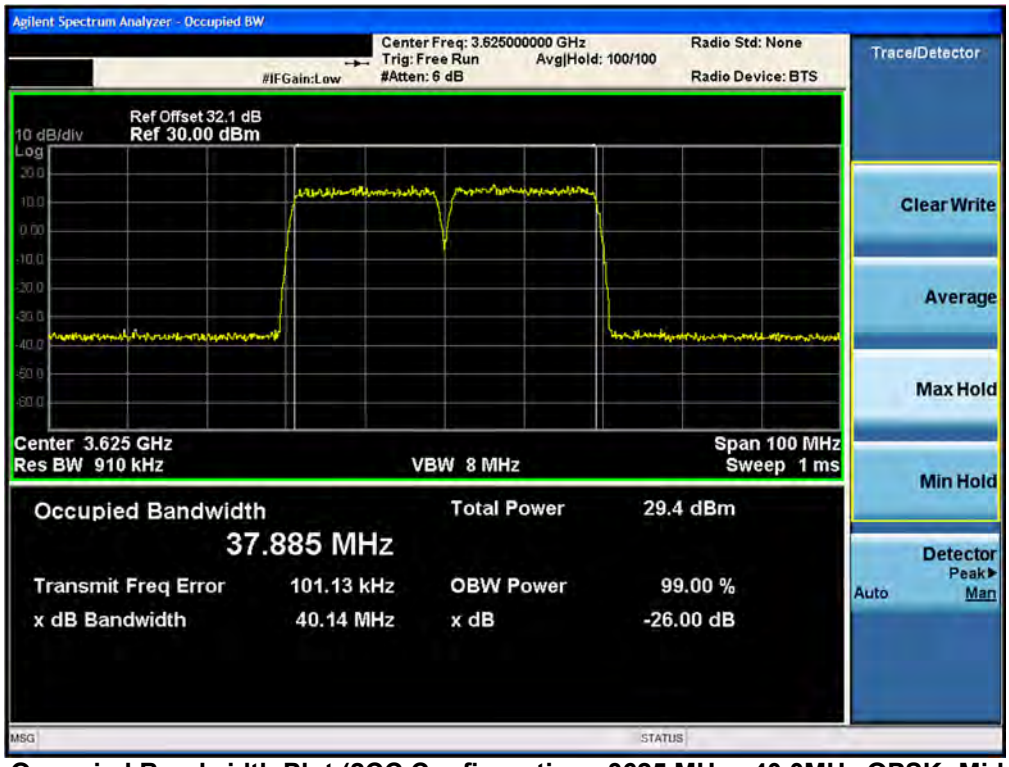
Plot 7-10. Occupied Bandwidth Plot (1CC Configuration– 3560MHz- 20.0MHz 256AM- Low Channel)

Plot 7-11. Occupied Bandwidth Plot(1CC Configuration– 3625 MHz- 20.0MHz 256QAM- Mid Channel)

Plot 7-12. Occupied Bandwidth Plot (1CC Configuration– 3690 MHz- 20.0MHz 256QAM- High Channel)

8-User Beam Mode 2CC Configuration
QPSK

Plot 7-13. Occupied Bandwidth Plot (2CC Configuration– 3560MHz - 40.0MHz QPSK- Low Channel)



Plot 7-14. Occupied Bandwidth Plot (2CC Configuration– 3625 MHz - 40.0MHz QPSK- Mid Channel)

Plot 7-15. Occupied Bandwidth Plot(2CC Configuration– 3690 MHz - 40.0MHz QPSK- High Channel)

16-QAM

Plot 7-16. Occupied Bandwidth Plot (2CC Configuration– 3560MHz - 40.0MHz 16AM- Low Channel)

Plot 7-17. Occupied Bandwidth Plot(2CC Configuration– 3625 MHz- 40.0MHz 16QAM- Mid Channel)

Plot 7-18. Occupied Bandwidth Plot (2CC Configuration– 3690 MHz- 40.0MHz 16QAM- High Channel)

64-QAM

Plot 7-19. Occupied Bandwidth Plot(2CC Configuration–3560MHz - 40.0MHz 64QAM- Low Channel)

Plot 7-20. Occupied Bandwidth Plot(CC Configuration–3625 MHz - 40.0MHz 64QAM- Mid Channel)

Plot 7-21. Occupied Bandwidth Plot(2CC Configuration–3690 MHz- 40.0MHz 64QAM- High Channel)

256-QAM

Plot 7-22. Occupied Bandwidth Plot (2CC Configuration– 3560MHz- 40.0MHz 256AM- Low Channel)

Plot 7-23. Occupied Bandwidth Plot(2CC Configuration– 3625 MHz- 40.0MHz 256QAM- Mid Channel)

Plot 7-24. Occupied Bandwidth Plot (2CC Configuration– 3690 MHz- 40.0MHz 256QAM- High Channel)

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 ≥ 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points ≥ 2 x 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.

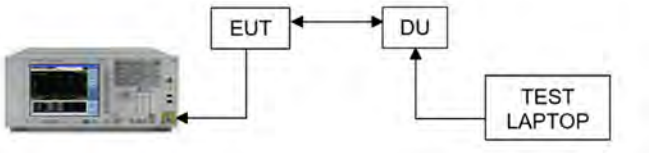


Figure 7-2. Test Instrument & Measurement Setup

Test Notes

1. The port with highest power i.e. worst case port per modulation has been highlighted in the following power tables.
2. Attenuations for the following ports were modified by the client for 1 carrier and 2 carrier measurement to get powers matching the target.
   -Low Channel Port #7
   -High Channel Port #7 and #30
3. Periodic trigger was used with gating ON. Gate sweeptime, 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 32 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*log (10 MHz / Occupied Bandwidth in MHz)

   Sample Calculation for an Occupied Bandwidth = 20MHz is shown as follows:
   Scaling Factor = 10* log (10 MHz /20 MHz) = 10* log(0.5) = -3.01 dB

7. 8- beam reduction:
   The 8-beam reduction is applicable in the 8-User Beam operating mode of the EUT. It is a logarithmic factor applied to account for maximum 8 spatially separated beams operate simultaneously.
   8-beam power reduction factor (dB) = 10* log (1 / 8) = -9.03 dB

8. 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 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 = 15 MHz
    c. Antenna Gain = 20 dBi

Factors			Value	Unit
Total MIMO Conducted Power (linear sum)			1500	mW
Total MIMO Conducted Power (dBm)	= 10 * log (1500)	=	31.76	dBm
Scaling Factor (OBW = 15 MHz)	=10 *log (10 / 15)	=	-1.76	dB
Applying Reductions:				
Antenna Gain		=	20	dBi
8- Beam Reduction	= 10 * log (1 / 8)	=	-9.03	dB
BF Gain	= 10 * log (2)	=	3.01	dB
MIMO EIRP = **Total MIMO Conducted Power** + Scaling Factor + Antenna Gain + 8- Beam Reduction + BF Gain			43.98	dBm/10MHz
FCC EIRP Limit			47	dBm/10MHz
Margin = FCC EIRP Limit – MIMO EIRP	= 47 – 43.98	=	3.02	dB

8- User Beam Configuration (1CC)

Port #	QPSK (dBm)	16-QAM (dBm)	64-QAM (dBm)	256-QAM (dBm)
3	16.54	17.24	17.15	17.09
2	17.13	16.75	16.97	17.06
1	17.15	16.76	17.09	16.95
0	17.12	16.74	17.10	16.96
16	17.02	16.60	17.00	16.89
17	16.97	16.56	16.99	16.84
18	17.24	16.84	17.24	17.12
19	16.71	16.38	16.77	16.65
7	17.24	17.29	17.81	17.53
6	16.81	16.43	16.83	16.72
5	16.84	16.44	16.83	16.73
4	16.79	16.39	16.80	16.63
20	16.94	16.55	16.94	16.83
21	17.03	16.66	17.05	16.95
22	16.85	16.46	16.83	16.70
23	16.81	16.40	16.83	16.85
11	16.82	16.46	16.85	16.78
10	16.67	16.41	16.79	16.69
9	16.80	16.40	16.79	16.67
8	16.65	16.25	16.64	16.55
24	16.63	16.24	16.62	16.51
25	16.54	16.11	16.50	16.38
26	16.68	16.26	16.67	16.54
27	16.81	16.38	16.78	16.66
15	16.73	16.32	16.67	16.57
14	16.88	16.47	16.79	16.69
13	16.95	16.51	16.91	16.76
12	16.66	16.31	16.63	16.52
28	16.89	16.44	16.86	16.75
29	16.69	16.26	16.64	16.52
30	**18.01**	**17.65**	**18.04**	**17.92**
31	16.90	16.49	16.86	16.72

Table 7-2. 8-User Beam 1CC Low Channel Conducted Powers (LTE Band 48 – 20.0MHz)

Low Channel 1CC	QPSK	16-QAM	64-QAM	256-QAM
Total MIMO Conducted Power (mW)	1567.150	1448.545	1576.825	1536.865
Total MIMO Conducted Power (dBm)	31.95	31.61	31.98	31.87
OBW (MHz)	17.98	18.10	17.98	18.03
Scaling factor (dB)	-2.55	-2.58	-2.55	-2.56
Ant. Gain(dBi)	21.50	21.50	21.50	21.50
8 beam reduction (dB)	-9.03	-9.03	-9.03	-9.03
BF Gain (dB)	3.01	3.01	3.01	3.01
MIMO EIRP (dBm/10 MHz)	44.88	44.51	44.91	44.79
FCC EIRP Limit (dBm/10MHz)	47.00	47.00	47.00	47.00
Margin (dB)	-2.12	-2.49	-2.09	-2.21

Table 7-3. 8-User Beam 1CC Low Channel MIMO Power (LTE Band 48 – 20.0MHz)

Port #	QPSK (dBm)	16-QAM (dBm)	64-QAM (dBm)	256-QAM (dBm)
3	16.72	16.84	17.29	17.01
2	17.14	17.18	17.59	17.40
1	17.07	17.15	17.60	17.35
0	17.21	17.25	17.69	17.46
16	17.03	17.09	17.57	17.30
17	17.01	17.07	17.54	17.27
18	17.35	17.42	17.89	17.64
19	16.70	16.73	16.95	17.01
7	16.65	16.75	17.24	17.01
6	17.47	17.50	17.94	17.63
5	17.59	17.62	18.08	17.26
4	**17.69**	**17.74**	**18.18**	17.58
20	17.26	17.30	17.73	17.48
21	17.20	17.29	17.70	17.51
22	16.88	16.87	17.38	17.13
23	16.84	16.85	17.32	17.06
11	16.89	16.96	17.42	17.20
10	16.93	16.99	17.45	17.19
9	17.07	17.13	17.58	17.35
8	17.12	17.18	17.61	17.36
24	17.24	17.27	17.73	17.46
25	17.11	17.25	17.72	17.48
26	17.03	17.59	17.07	17.37
27	16.88	16.94	17.37	17.10
15	17.06	17.10	17.55	17.32
14	17.02	17.06	17.54	17.30
13	17.19	17.25	17.71	17.46
12	17.31	17.36	17.83	17.55
28	17.32	17.35	17.83	17.56
29	16.80	16.85	17.34	17.09
30	17.43	17.47	17.89	**17.64**
31	17.06	17.11	17.58	17.32

Table 7-4. 8-User Beam 1CC Mid Channel Conducted Powers (LTE Band 48 – 20.0MHz)

Mid Channel 1CC	QPSK	16-QAM	64-QAM	256-QAM
Total MIMO Conducted Power (mW)	1644.626	1671.493	1841.026	1735.687
Total MIMO Conducted Power (dBm)	32.16	32.23	32.65	32.39
OBW (MHz)	18.00	18.08	18.00	18.01
Scaling factor (dB)	-2.55	-2.57	-2.55	-2.55
Ant. Gain(dBi)	21.50	21.50	21.50	21.50
8 beam reduction (dB)	-9.03	-9.03	-9.03	-9.03
BF Gain (dB)	3.01	3.01	3.01	3.01
MIMO EIRP (dBm/10 MHz)	45.09	45.14	45.58	45.32
FCC EIRP Limit (dBm/10MHz)	47.00	47.00	47.00	47.00
Margin (dB)	-1.91	-1.86	-1.42	-1.68

Table 7-5. 8-User Beam 1CC Mid Channel MIMO Power (LTE Band 48 – 20.0MHz)

Port #	QPSK (dBm)	16-QAM (dBm)	64-QAM (dBm)	256-QAM (dBm)
3	17.03	17.08	17.54	17.28
2	17.19	17.23	17.77	17.48
1	17.07	17.09	17.57	17.24
0	17.16	17.22	17.69	17.39
16	16.99	17.04	17.53	17.20
17	17.26	17.29	17.83	17.48
18	**17.53**	**17.55**	**18.07**	17.73
19	17.31	17.38	17.91	17.49
7	16.74	16.78	17.34	17.03
6	17.23	17.26	17.79	17.48
5	17.08	17.11	17.61	17.29
4	17.09	17.20	17.74	17.42
20	17.11	17.15	17.67	17.35
21	17.02	17.05	17.61	17.28
22	16.94	17.11	17.60	17.22
23	17.33	17.40	17.91	17.54
11	17.06	17.11	17.62	17.34
10	17.22	17.27	17.82	17.51
9	17.28	17.33	17.82	**17.99**
8	17.17	17.24	17.74	17.44
24	17.09	17.12	17.62	17.31
25	16.93	16.97	17.47	17.16
26	16.97	17.01	17.51	17.16
27	17.31	17.36	17.87	17.54
15	17.28	17.25	17.77	17.45
14	17.14	17.21	17.72	17.51
13	16.91	16.92	17.47	17.13
12	17.32	17.34	17.88	17.55
28	17.14	17.21	17.74	17.40
29	17.18	17.23	17.75	17.44
30	17.42	17.43	17.94	17.64
31	17.35	17.40	17.92	17.59

Table 7-6. 8-User Beam 1CC High Channel Conducted Powers (LTE Band 48 – 20.0MHz)

High Channel 1CC	QPSK	16-QAM	64-QAM	256-QAM
Total MIMO Conducted Power (mW)	1661.948	1679.802	1891.590	1763.512
Total MIMO Conducted Power (dBm)	32.21	32.25	32.77	32.46
OBW (MHz)	18.02	17.98	17.97	17.95
Scaling factor (dB)	-2.56	-2.55	-2.55	-2.54
Ant. Gain(dBi)	21.50	21.50	21.50	21.50
8 beam reduction (dB)	-9.03	-9.03	-9.03	-9.03
BF Gain (dB)	3.01	3.01	3.01	3.01
MIMO EIRP (dBm/10 MHz)	45.13	45.19	45.70	45.40
FCC EIRP Limit (dBm/10MHz)	47.00	47.00	47.00	47.00
Margin (dB)	-1.87	-1.81	-1.30	-1.60

Table 7-7. 8-User Beam 1CC High Channel MIMO Power (LTE Band 48 – 20.0MHz)

8- User Beam Configuration (2CC)

Port #	QPSK (dBm)	16-QAM (dBm)	64-QAM (dBm)	256-QAM (dBm)
3	20.43	20.42	20.37	20.38
2	20.27	19.90	20.28	20.34
1	20.25	19.83	20.24	20.23
0	20.34	20.18	20.42	20.44
16	20.18	19.77	20.20	20.20
17	20.30	19.87	20.27	20.28
18	20.74	20.37	20.73	20.78
19	20.35	19.96	20.38	20.33
7	20.00	19.62	20.05	20.01
6	20.44	20.05	20.43	20.47
5	20.50	20.10	20.48	20.52
4	20.39	20.01	20.46	20.45
20	20.64	20.08	20.49	20.47
21	20.54	20.15	20.52	20.58
22	20.37	19.93	20.33	20.37
23	20.36	20.06	20.42	20.45
11	20.54	20.13	20.54	20.50
10	20.38	19.91	20.34	20.37
9	20.35	19.94	20.36	20.38
8	20.28	19.83	20.26	20.23
24	20.30	19.91	20.29	20.33
25	20.21	19.82	20.22	20.24
26	20.17	19.75	20.20	20.21
27	20.33	20.00	20.40	20.35
15	20.45	20.05	20.46	20.44
14	20.36	19.93	20.37	20.39
13	20.46	20.07	20.45	20.50
12	20.25	19.88	20.30	20.31
28	20.37	20.02	20.44	20.50
29	20.37	19.93	20.39	20.42
30	**21.33**	**20.91**	**21.30**	**21.35**
31	20.48	20.04	20.46	20.47

Table 7-8. 8-User Beam 2CC Low Channel Conducted Powers (LTE Band 48 – 40.0MHz)

Low Channel 2CC	QPSK	16-QAM	64-QAM	256-QAM
Total MIMO Conducted Power (mW)	3511.549	3214.274	3514.022	3525.658
Total MIMO Conducted Power (dBm)	35.45	35.07	35.46	35.47
OBW (MHz)	37.86	37.85	37.87	37.97
Scaling factor (dB)	-5.78	-5.78	-5.78	-5.79
Ant. Gain(dBi)	21.50	21.50	21.50	21.50
8 beam reduction (dB)	-9.03	-9.03	-9.03	-9.03
BF Gain (dB)	3.01	3.01	3.01	3.01
MIMO EIRP (dBm/10 MHz)	45.15	44.77	45.15	45.16
FCC EIRP Limit (dBm/10MHz)	47.00	47.00	47.00	47.00
Margin (dB)	-1.85	-2.23	-1.85	-1.84

Table 7-9. 8-User Beam 2CC Low Channel MIMO Power (LTE Band 48 – 40.0MHz)

Port #	QPSK (dBm)	16-QAM (dBm)	64-QAM (dBm)	256-QAM (dBm)
3	20.69	20.99	20.73	20.53
2	20.68	21.04	20.74	20.63
1	20.70	20.97	20.69	20.66
0	20.79	20.99	20.72	20.65
16	20.48	20.73	20.44	20.47
17	20.68	20.95	20.65	20.58
18	20.99	**21.19**	21.06	20.86
19	20.59	20.92	20.63	20.48
7	20.10	20.49	20.16	20.03
6	20.80	21.09	20.80	20.66
5	20.87	21.11	20.86	20.81
4	20.95	21.15	20.89	20.83
20	20.77	20.99	20.71	20.68
21	20.84	21.08	20.77	20.75
22	20.70	21.05	20.76	20.67
23	20.61	20.98	20.64	20.51
11	20.55	20.97	20.63	20.51
10	20.69	20.98	20.72	20.59
9	20.87	20.87	20.60	20.60
8	20.67	20.91	20.62	20.56
24	20.77	20.99	20.72	20.67
25	20.77	20.96	20.66	20.60
26	20.62	20.98	20.68	20.59
27	20.54	20.94	20.62	20.43
15	20.52	20.93	20.65	20.49
14	20.67	20.99	20.69	20.58
13	20.84	21.05	20.79	20.78
12	20.86	21.08	20.73	20.78
28	20.72	20.95	20.67	20.62
29	20.81	21.07	20.78	20.74
30	**21.08**	21.16	**21.12**	**20.99**
31	20.65	21.06	20.73	20.58

Table 7-10. 8-User Beam 2CC Mid Channel Conducted Powers (LTE Band 48 – 40.0MHz)

Mid Channel 2CC	QPSK	16-QAM	64-QAM	256-QAM
Total MIMO Conducted Power (mW)	3775.411	4018.941	3769.220	3695.500
Total MIMO Conducted Power (dBm)	35.77	36.04	35.76	35.68
OBW (MHz)	37.89	37.99	37.88	38.01
Scaling factor (dB)	-5.78	-5.80	-5.78	-5.80
Ant. Gain(dBi)	21.50	21.50	21.50	21.50
8 beam reduction (dB)	-9.03	-9.03	-9.03	-9.03
BF Gain (dB)	3.01	3.01	3.01	3.01
MIMO EIRP (dBm/10 MHz)	45.46	45.72	45.46	45.36
FCC EIRP Limit (dBm/10MHz)	47.00	47.00	47.00	47.00
Margin (dB)	-1.54	-1.28	-1.54	-1.64

Table 7-11. 8-User Beam 2CC Mid Channel MIMO Power (LTE Band 48 – 40.0MHz)

Port #	QPSK (dBm)	16-QAM (dBm)	64-QAM (dBm)	256-QAM (dBm)
3	20.56	20.92	20.59	20.44
2	20.71	21.07	20.78	20.65
1	19.68	19.72	19.91	19.92
0	20.40	20.37	20.54	20.63
16	20.08	20.12	20.23	20.19
17	19.78	19.82	20.02	20.26
18	**21.01**	**21.37**	**21.03**	**20.92**
19	20.66	21.01	20.73	20.64
7	19.53	19.89	19.54	19.40
6	20.78	21.14	20.82	20.68
5	19.78	19.96	20.16	20.21
4	20.40	20.44	20.52	20.57
20	20.38	20.43	20.53	20.58
21	20.20	20.02	20.14	20.22
22	20.65	20.99	20.68	20.50
23	20.75	21.12	20.85	20.68
11	20.62	20.95	20.62	20.43
10	20.66	20.99	20.71	20.54
9	20.53	20.51	20.63	20.29
8	20.34	20.49	20.53	20.52
24	20.27	20.32	20.46	20.52
25	20.24	20.20	20.39	20.43
26	20.50	20.86	20.53	20.36
27	20.58	20.98	20.72	20.58
15	20.74	21.02	20.73	20.55
14	20.62	21.03	20.68	20.54
13	20.29	20.25	20.45	20.49
12	20.48	20.54	20.63	20.64
28	20.45	20.50	20.58	20.62
29	20.40	20.42	20.58	20.60
30	20.73	20.99	20.76	20.56
31	20.68	21.02	20.71	20.57

Table 7-12. 8-User Beam 2CC High Channel Conducted Powers (LTE Band 48 – 40.0MHz)

High Channel 2CC	QPSK	16-QAM	64-QAM	256-QAM
Total MIMO Conducted Power (mW)	3536.360	3700.216	3618.932	3564.211
Total MIMO Conducted Power (dBm)	35.49	35.68	35.59	35.52
OBW (MHz)	37.95	37.97	37.84	37.86
Scaling factor (dB)	-5.79	-5.79	-5.78	-5.78
Ant. Gain(dBi)	21.50	21.50	21.50	21.50
8 beam reduction (dB)	-9.03	-9.03	-9.03	-9.03
BF Gain (dB)	3.01	3.01	3.01	3.01
MIMO EIRP (dBm/10 MHz)	45.17	45.37	45.29	45.22
FCC EIRP Limit (dBm/10MHz)	47.00	47.00	47.00	47.00
Margin (dB)	-1.83	-1.63	-1.71	-1.78

Table 7-13. 8-User Beam 2CC High Channel MIMO Power (LTE Band 48 – 40.0MHz)

Single User Beam (UE0) Configuration(1CC)

Port #	QPSK (dBm)	16-QAM (dBm)	64-QAM (dBm)	256-QAM (dBm)
3	11.77	11.75	12.16	12.09
2	11.96	11.63	11.95	11.92
1	11.80	11.75	11.64	11.67
0	11.97	11.91	12.23	11.59
16	11.83	11.77	11.74	11.50
17	11.74	11.78	12.08	12.14
18	12.16	12.23	12.42	12.25
19	11.85	11.83	12.14	11.93
7	11.50	11.38	11.65	11.51
6	11.75	11.99	12.13	12.04
5	11.98	11.92	11.95	12.09
4	11.66	11.70	12.14	11.93
20	12.18	12.02	12.26	11.93
21	12.06	12.29	12.19	12.27
22	11.81	11.75	11.70	11.94
23	11.88	11.87	11.87	12.03
11	12.13	12.06	12.33	12.53
10	12.27	12.15	12.06	12.18
9	11.94	11.96	12.13	12.00
8	12.02	11.88	11.98	12.01
24	11.78	11.77	12.04	11.86
25	11.75	11.91	12.05	11.91
26	11.69	11.75	11.93	11.78
27	12.20	12.29	12.38	12.17
15	11.29	11.38	11.37	11.74
14	11.87	11.70	12.04	11.80
13	12.07	12.14	12.39	12.21
12	11.77	11.87	11.99	12.00
28	12.03	12.08	12.29	11.90
29	7.62	7.69	8.09	7.79
30	**13.06**	**13.13**	**13.23**	**13.04**
31	11.97	12.05	12.28	12.29

Table 7-14. UE0 Beam 1CC Low Channel Conducted Powers (LTE Band 48 – 20.0MHz)

Low Channel 1CC	QPSK	16-QAM	64-QAM	256-QAM
Total MIMO Conducted Power (mW)	490.048	490.113	509.233	499.414
Total MIMO Conducted Power (dBm)	26.90	26.90	27.07	26.98
OBW (MHz)	17.98	18.10	17.98	18.03
Scaling factor (dB)	-2.55	-2.58	-2.55	-2.56
Ant. Gain(dBi)	21.50	21.50	21.50	21.50
MIMO EIRP (dBm/10 MHz)	45.85	45.83	46.02	45.92
FCC EIRP Limit (dBm/10MHz)	47.00	47.00	47.00	47.00
Margin (dB)	-1.15	-1.17	-0.98	-1.08

Table 7-15. UE0 Beam 1CC Low Channel MIMO Power (LTE Band 48 – 20.0MHz)

Port #	QPSK (dBm)	16-QAM (dBm)	64-QAM (dBm)	256-QAM (dBm)
3	11.89	12.02	12.21	12.16
2	11.96	12.17	12.22	12.13
1	11.30	11.20	11.43	11.07
0	12.36	12.38	12.56	12.54
16	11.14	11.18	11.21	11.04
17	12.19	12.27	12.14	12.02
18	11.79	11.92	12.21	11.69
19	11.55	11.78	12.10	12.00
7	11.33	11.60	11.55	11.73
6	12.18	12.07	12.08	12.16
5	12.43	12.15	12.27	12.17
4	12.29	12.32	12.36	12.15
20	12.40	12.32	12.40	12.23
21	12.46	**12.53**	12.46	12.47
22	12.14	12.22	12.20	12.25
23	12.06	11.91	12.13	11.96
11	8.16	7.89	8.19	8.20
10	12.03	11.97	12.04	12.00
9	12.12	12.02	11.99	11.95
8	12.19	12.12	12.11	12.21
24	12.19	12.12	12.24	12.20
25	12.31	12.18	12.12	12.08
26	12.13	12.15	12.18	12.01
27	11.62	11.63	11.85	11.89
15	12.00	11.58	11.44	11.45
14	11.16	11.09	11.22	11.29
13	12.22	12.27	**12.66**	12.64
12	12.32	12.38	12.31	12.10
28	11.66	12.08	11.40	11.46
29	12.22	12.13	12.09	12.12
30	**12.64**	12.48	12.63	**12.73**
31	11.83	11.88	11.64	11.60

Table 7-16. UE0 Beam 1CC Mid Channel Conducted Powers (LTE Band 48 – 20.0MHz)

Mid Channel 1CC	QPSK	16-QAM	64-QAM	256-QAM
Total MIMO Conducted Power (mW)	500.158	499.565	505.181	498.171
Total MIMO Conducted Power (dBm)	26.99	26.99	27.03	26.97
OBW (MHz)	18.00	18.08	18.00	18.01
Scaling factor (dB)	-2.55	-2.57	-2.55	-2.55
Ant. Gain(dBi)	21.50	21.50	21.50	21.50
MIMO EIRP (dBm/10 MHz)	45.94	45.91	45.98	45.92
FCC EIRP Limit (dBm/10MHz)	47.00	47.00	47.00	47.00
Margin (dB)	-1.06	-1.09	-1.02	-1.08

Table 7-17. UE0 Beam 1CC Mid Channel MIMO Power (LTE Band 48 – 20.0MHz)

Port #	QPSK (dBm)	16-QAM (dBm)	64-QAM (dBm)	256-QAM (dBm)
3	11.94	11.72	11.85	11.86
2	11.87	12.08	12.10	11.92
1	11.41	11.59	11.03	10.47
0	10.88	10.97	10.98	10.89
16	10.97	10.83	11.01	10.67
17	12.50	12.47	12.58	12.23
18	12.11	12.11	12.24	11.90
19	11.01	11.80	11.63	11.96
7	10.65	10.80	11.01	10.60
6	12.18	12.13	12.43	12.13
5	12.34	12.34	12.51	12.33
4	12.07	12.14	12.46	12.24
20	12.54	12.47	12.42	12.49
21	12.16	12.15	12.16	12.23
22	12.07	12.10	12.13	11.82
23	12.24	12.46	12.29	12.09
11	12.16	12.12	12.16	12.18
10	12.12	12.19	12.21	12.16
9	12.50	12.41	12.49	12.54
8	12.30	12.35	12.51	12.52
24	12.43	12.48	12.25	12.42
25	12.10	12.04	12.11	12.30
26	12.06	12.32	12.23	12.16
27	12.30	12.24	12.15	12.34
15	12.08	11.57	11.46	11.88
14	11.58	11.04	11.23	11.14
13	12.04	11.97	12.09	12.15
12	12.36	12.37	12.66	12.58
28	11.73	11.54	11.56	12.17
29	12.32	12.30	12.28	12.35
30	**13.44**	**13.43**	**13.54**	**13.53**
31	11.90	11.95	11.94	11.62

Table 7-18. UE0 Beam 1CC High Channel Conducted Powers (LTE Band 48 – 20.0MHz)

High Channel 1CC	QPSK	16-QAM	64-QAM	256-QAM
Total MIMO Conducted Power (mW)	512.420	512.798	517.665	511.856
Total MIMO Conducted Power (dBm)	27.10	27.10	27.14	27.09
OBW (MHz)	18.02	17.98	17.97	17.95
Scaling factor (dB)	-2.56	-2.55	-2.55	-2.54
Ant. Gain(dBi)	21.50	21.50	21.50	21.50
MIMO EIRP (dBm/10 MHz)	46.04	46.05	46.10	46.05
FCC EIRP Limit (dBm/10MHz)	47.00	47.00	47.00	47.00
Margin (dB)	-0.96	-0.95	-0.90	-0.95

Table 7-19. UE0 Beam 1CC High Channel MIMO Power (LTE Band 48 – 20.0MHz)

Single User Beam (UE0) Configuration(2CC)

Port #	QPSK (dBm)	16-QAM (dBm)	64-QAM (dBm)	256-QAM (dBm)
3	15.23	15.26	15.28	15.29
2	11.64	14.76	14.87	14.71
1	15.03	14.91	15.04	15.09
0	15.31	15.37	15.29	15.10
16	14.76	14.70	15.16	14.87
17	15.05	15.12	15.31	15.29
18	15.48	15.50	15.44	15.42
19	14.60	14.64	14.70	14.89
7	15.33	15.40	15.01	14.85
6	14.90	14.97	15.12	15.14
5	15.13	15.70	16.05	16.13
4	15.16	15.18	15.24	15.27
20	15.33	15.40	15.35	15.45
21	15.35	15.31	15.52	15.51
22	14.94	14.97	15.05	15.08
23	15.43	15.36	15.17	15.29
11	15.45	15.44	15.20	15.30
10	14.99	15.09	15.21	15.31
9	15.15	15.34	15.46	15.50
8	14.04	12.66	12.20	10.86
24	10.84	10.88	10.92	10.95
25	15.00	15.12	15.39	15.10
26	14.86	14.90	15.08	14.98
27	14.99	14.99	15.57	15.17
15	15.05	15.12	15.18	15.22
14	15.02	15.09	15.23	15.30
13	15.28	15.35	15.58	15.24
12	9.02	8.13	8.36	8.23
28	7.15	7.21	7.60	7.35
29	15.73	15.86	15.45	15.02
30	**16.29**	**16.31**	**16.41**	**16.20**
31	15.24	15.46	15.21	15.21

Table 7-20. UE0 Beam 2CC Low Channel Conducted Powers (LTE Band 48 – 40.0MHz)

Low Channel 2CC	QPSK	16-QAM	64-QAM	256-QAM
Total MIMO Conducted Power (mW)	959.402	980.533	994.458	976.714
Total MIMO Conducted Power (dBm)	29.82	29.91	29.98	29.90
OBW (MHz)	37.86	37.85	37.87	37.97
Scaling factor (dB)	-5.78	-5.78	-5.78	-5.79
Ant. Gain(dBi)	21.50	21.50	21.50	21.50
MIMO EIRP (dBm/10 MHz)	45.54	45.63	45.69	45.60
FCC EIRP Limit (dBm/10MHz)	47.00	47.00	47.00	47.00
Margin (dB)	-1.46	-1.37	-1.31	-1.40

Table 7-21. UE0 Beam 2CC Low Channel MIMO Power (LTE Band 48 – 40.0MHz)

Port #	QPSK (dBm)	16-QAM (dBm)	64-QAM (dBm)	256-QAM (dBm)
3	14.94	14.91	15.31	15.25
2	15.15	15.15	15.35	15.19
1	15.28	15.27	15.38	15.20
0	15.48	15.52	15.61	15.48
16	14.96	14.98	15.27	15.05
17	15.27	15.35	15.46	15.20
18	15.37	15.47	15.65	15.37
19	15.18	14.98	15.08	14.95
7	14.69	14.69	14.76	14.40
6	15.26	15.29	15.45	15.44
5	15.27	15.35	15.56	15.69
4	8.12	8.09	8.10	8.15
20	**15.55**	15.51	15.65	15.57
21	15.31	15.33	15.63	15.58
22	15.34	15.24	15.53	15.17
23	15.19	14.90	15.05	15.23
11	14.92	15.02	15.27	15.31
10	15.20	15.04	15.34	15.38
9	15.11	15.21	15.41	15.19
8	15.40	15.34	15.34	15.32
24	15.48	15.61	15.72	15.50
25	15.33	15.31	15.51	15.35
26	15.18	15.51	15.44	15.29
27	15.08	15.12	15.28	15.39
15	14.98	14.99	15.10	15.07
14	15.11	15.12	15.33	14.82
13	15.46	15.36	15.49	15.34
12	15.48	15.52	15.70	15.64
28	15.40	15.35	15.56	15.51
29	15.28	15.32	15.50	15.32
30	15.40	**15.69**	**15.74**	**15.78**
31	15.10	15.16	15.52	15.17

Table 7-22. UE0 Beam 2CC Mid Channel Conducted Powers (LTE Band 48 – 40.0MHz)

Mid Channel 2CC	QPSK	16-QAM	64-QAM	256-QAM
Total MIMO Conducted Power (mW)	1041.292	1045.200	1087.367	1057.689
Total MIMO Conducted Power (dBm)	30.18	30.19	30.36	30.24
OBW (MHz)	37.89	37.99	37.88	38.01
Scaling factor (dB)	-5.78	-5.80	-5.78	-5.80
Ant. Gain(dBi)	21.50	21.50	21.50	21.50
MIMO EIRP (dBm/10 MHz)	45.89	45.90	46.08	45.94
FCC EIRP Limit (dBm/10MHz)	47.00	47.00	47.00	47.00
Margin (dB)	-1.11	-1.10	-0.92	-1.06

Table 7-23. UE0 Beam 2CC Mid Channel MIMO Power (LTE Band 48 – 40.0MHz)

Port #	QPSK (dBm)	16-QAM (dBm)	64-QAM (dBm)	256-QAM (dBm)
3	15.36	15.52	15.37	15.27
2	15.36	15.29	15.39	15.40
1	14.99	15.30	14.90	14.81
0	14.67	14.86	14.88	14.70
16	13.94	13.86	13.81	13.67
17	15.11	15.34	15.61	15.36
18	15.39	15.56	15.82	15.45
19	15.35	15.36	15.44	15.33
7	14.09	14.21	14.27	14.16
6	15.31	15.06	15.68	15.35
5	15.07	15.16	15.05	15.09
4	7.41	7.37	7.60	7.23
20	15.09	15.00	15.11	14.94
21	14.98	14.87	15.29	15.24
22	14.96	15.13	15.15	15.10
23	15.44	15.48	15.55	15.47
11	15.12	15.33	15.38	15.30
10	11.59	11.87	11.68	11.74
9	15.17	15.26	15.44	15.32
8	14.92	15.09	14.98	14.91
24	14.79	14.74	15.07	14.91
25	14.87	14.91	15.10	15.02
26	14.90	15.21	15.30	11.70
27	15.56	15.43	15.29	15.40
15	15.36	15.32	15.37	15.55
14	15.02	15.11	15.49	15.53
13	14.80	14.83	14.97	15.03
12	15.03	14.97	15.11	15.01
28	14.81	14.66	14.73	14.74
29	15.02	15.18	15.50	15.19
30	**16.35**	**16.37**	**16.39**	**16.32**
31	15.33	15.38	15.36	15.34

Table 7-24. UE0 Beam 2CC High Channel Conducted Powers (LTE Band 48 – 40.0MHz)

High Channel 2CC	QPSK	16-QAM	64-QAM	256-QAM
Total MIMO Conducted Power (mW)	989.025	1002.317	1025.315	986.117
Total MIMO Conducted Power (dBm)	29.95	30.01	30.11	29.94
OBW (MHz)	37.95	37.97	37.84	37.86
Scaling factor (dB)	-5.79	-5.79	-5.78	-5.78
Ant. Gain(dBi)	21.50	21.50	21.50	21.50
MIMO EIRP (dBm/10 MHz)	45.66	45.72	45.83	45.66
FCC EIRP Limit (dBm/10MHz)	47.00	47.00	47.00	47.00
Margin (dB)	-1.34	-1.28	-1.17	-1.34

Table 7-25. UE0 Beam 2CC High Channel MIMO Power (LTE Band 48 – 40.0MHz)

Common Beam Configuration (1CC)

Port #	QPSK (dBm)	16-QAM (dBm)	64-QAM (dBm)	256-QAM (dBm)
3	15.72	15.69	16.00	15.90
2	16.57	16.27	16.35	16.30
1	11.77	11.87	11.99	10.86
0	6.77	6.54	6.80	6.58
16	7.81	7.96	8.08	7.62
17	17.04	17.02	17.19	17.13
18	14.69	14.92	14.18	14.87
19	-0.28	-0.19	-0.11	-0.24
7	16.67	16.44	16.46	16.76
6	17.02	16.99	16.74	16.93
5	17.50	17.29	17.40	17.38
4	17.46	17.08	17.43	17.14
20	17.21	17.37	17.29	17.15
21	17.56	17.49	17.70	17.53
22	17.02	17.01	16.99	16.86
23	16.97	17.18	17.12	17.26
11	16.98	16.56	17.02	16.86
10	17.04	17.19	17.24	17.10
9	17.21	17.26	17.29	17.35
8	17.12	17.11	17.04	17.03
24	17.13	17.23	17.01	17.28
25	16.86	16.73	16.90	16.97
26	16.74	16.81	17.06	16.90
27	17.01	17.04	17.06	17.01
15	3.25	3.08	3.20	3.13
14	10.73	10.98	10.71	10.70
13	17.14	17.42	17.45	17.38
12	16.76	16.83	16.66	16.73
28	7.85	7.88	7.91	7.82
29	15.91	15.99	16.23	16.12
30	**18.08**	**18.16**	**18.24**	**18.40**
31	13.38	13.43	13.53	13.59

Table 7-26. Common Beam 1CC Low Channel Conducted Powers (LTE Band 48 – 20.0MHz)

Low Channel 1CC	QPSK	16-QAM	64-QAM	256-QAM
Total MIMO Conducted Power (mW)	1254.475	1251.849	1266.752	1262.480
Total MIMO Conducted Power (dBm)	30.98	30.98	31.03	31.01
OBW (MHz)	17.98	18.10	17.98	18.03
Scaling factor (dB)	-2.55	-2.58	-2.55	-2.56
Ant. Gain(dBi)	16.40	16.40	16.40	16.40
MIMO EIRP (dBm/10 MHz)	44.84	44.80	44.88	44.85
FCC EIRP Limit (dBm/10MHz)	47.00	47.00	47.00	47.00
Margin (dB)	-2.16	-2.20	-2.12	-2.15

Table 7-27. Common Beam 1CC Low Channel MIMO Power (LTE Band 48 – 20.0MHz)

Port #	QPSK (dBm)	16-QAM (dBm)	64-QAM (dBm)	256-QAM (dBm)
3	15.07	15.35	15.48	15.39
2	15.96	15.87	15.97	15.87
1	11.94	12.01	12.14	12.15
0	6.60	6.74	6.92	6.75
16	7.68	7.77	7.66	7.77
17	17.27	17.21	17.36	17.32
18	14.19	14.45	14.40	14.46
19	-0.79	-0.87	-0.46	-0.79
7	16.30	16.28	16.31	16.23
6	17.12	16.93	16.88	16.86
5	17.34	17.49	17.61	17.47
4	17.37	17.54	**17.76**	17.51
20	17.32	17.34	17.62	17.52
21	17.40	17.45	17.58	**17.65**
22	16.83	16.94	17.15	17.05
23	16.68	16.52	16.89	16.65
11	16.56	16.52	16.42	16.46
10	16.65	16.82	16.89	17.03
9	17.38	17.34	17.52	17.24
8	17.11	17.24	17.28	17.33
24	17.09	17.29	17.41	17.48
25	**17.58**	17.33	17.45	17.34
26	17.12	17.13	17.16	17.09
27	16.49	16.58	16.68	16.48
15	2.60	2.50	2.73	2.59
14	11.04	11.25	11.21	11.11
13	17.53	17.47	17.40	17.35
12	17.02	16.97	16.99	17.13
28	8.22	7.99	8.14	8.16
29	16.35	16.36	16.30	16.18
30	17.50	**17.59**	17.57	17.54
31	12.70	12.84	13.13	13.06

Table 7-28. Common Beam 1CC Mid Channel Conducted Powers (LTE Band 48 – 20.0MHz)

Mid Channel 1CC	QPSK	16-QAM	64-QAM	256-QAM
Total MIMO Conducted Power (mW)	1232.985	1241.363	1268.418	1250.714
Total MIMO Conducted Power (dBm)	30.91	30.94	31.03	30.97
OBW (MHz)	18.00	18.08	18.00	18.01
Scaling factor (dB)	-2.55	-2.57	-2.55	-2.55
Ant. Gain(dBi)	16.40	16.40	16.40	16.40
MIMO EIRP (dBm/10 MHz)	44.76	44.77	44.88	44.82
FCC EIRP Limit (dBm/10MHz)	47.00	47.00	47.00	47.00
Margin (dB)	-2.24	-2.23	-2.12	-2.18

Table 7-29. Common Beam 1CC Mid Channel MIMO Power (LTE Band 48 – 20.0MHz)

Port #	QPSK (dBm)	16-QAM (dBm)	64-QAM (dBm)	256-QAM (dBm)
3	15.58	15.38	15.46	15.53
2	16.16	16.28	16.09	16.23
1	11.47	11.30	11.43	11.46
0	6.07	6.15	6.28	6.30
16	6.40	6.46	6.46	6.35
17	17.23	17.01	17.17	17.13
18	14.53	14.60	14.57	14.40
19	-0.56	-0.53	-0.63	-0.29
7	15.51	15.39	15.34	15.43
6	16.67	16.85	16.69	16.44
5	17.07	16.83	16.92	16.99
4	17.09	16.87	17.17	17.05
20	16.77	16.92	16.98	17.04
21	16.84	16.82	16.88	16.93
22	16.66	16.70	16.54	16.49
23	17.00	16.95	16.90	16.98
11	16.43	16.33	16.60	16.59
10	16.72	16.61	16.83	16.77
9	16.99	17.12	17.16	17.08
8	17.10	17.07	17.11	17.04
24	17.06	16.88	17.05	16.99
25	16.67	16.71	16.64	16.91
26	16.45	16.24	16.30	16.46
27	16.89	16.84	16.86	16.52
15	3.09	2.85	2.86	2.90
14	10.47	10.54	10.68	10.53
13	16.67	16.84	16.90	16.74
12	16.63	16.59	16.77	16.62
28	7.63	7.73	7.44	7.57
29	15.64	15.85	15.92	15.80
30	**17.81**	**18.01**	**17.95**	**17.91**
31	13.19	13.34	13.26	13.42

Table 7-30. Common Beam 1CC High Channel Conducted Powers (LTE Band 48 – 20.0MHz)

High Channel 1CC	QPSK	16-QAM	64-QAM	256-QAM
Total MIMO Conducted Power (mW)	1170.264	1166.030	1178.537	1171.311
Total MIMO Conducted Power (dBm)	30.68	30.67	30.71	30.69
OBW (MHz)	18.02	17.98	17.97	17.95
Scaling factor (dB)	-2.56	-2.55	-2.55	-2.54
Ant. Gain(dBi)	16.40	16.40	16.40	16.40
MIMO EIRP (dBm/10 MHz)	44.53	44.52	44.57	44.55
FCC EIRP Limit (dBm/10MHz)	47.00	47.00	47.00	47.00
Margin (dB)	-2.47	-2.48	-2.43	-2.45

Table 7-31. Common Beam 1CC High Channel MIMO Power (LTE Band 48 – 20.0MHz)

Common Beam Configuration (2CC)

Port #	QPSK (dBm)	16-QAM (dBm)	64-QAM (dBm)	256-QAM (dBm)
3	18.94	19.17	19.00	19.34
2	19.13	19.35	19.43	19.21
1	14.93	15.05	14.86	15.09
0	9.57	9.34	9.78	9.69
16	10.76	10.89	10.93	10.71
17	19.89	19.97	20.14	20.03
18	17.31	17.79	17.91	17.82
19	2.75	3.03	2.88	2.79
7	19.61	19.78	19.42	19.67
6	20.01	19.98	19.85	20.11
5	20.16	20.22	20.19	20.34
4	20.24	20.19	20.42	20.39
20	20.48	20.78	20.19	20.26
21	20.39	20.51	20.26	20.34
22	19.83	20.19	20.17	19.90
23	20.01	20.11	20.21	20.18
11	20.22	20.09	20.18	20.36
10	20.04	19.89	20.16	20.18
9	20.29	20.17	20.23	20.51
8	20.42	20.73	20.45	20.27
24	20.17	20.24	20.39	20.54
25	20.11	19.73	20.03	19.87
26	20.04	19.94	19.87	19.78
27	19.91	19.76	20.04	20.16
15	6.09	6.36	6.18	6.22
14	14.04	13.98	14.12	14.22
13	20.34	20.42	20.11	20.64
12	19.91	19.63	19.56	19.78
28	11.07	10.91	11.10	10.95
29	19.24	19.05	19.34	19.16
30	**20.96**	**20.99**	**21.01**	**20.94**
31	16.30	16.21	16.17	16.09

Table 7-32. Common Beam 2CC Low Channel Conducted Powers (LTE Band 48 – 40.0MHz)

Low Channel 2CC	QPSK	16-QAM	64-QAM	256-QAM
Total MIMO Conducted Power (mW)	2512.293	2532.616	2526.657	2556.898
Total MIMO Conducted Power (dBm)	34.00	34.04	34.03	34.08
OBW (MHz)	37.86	37.85	37.87	37.97
Scaling factor (dB)	-5.78	-5.78	-5.78	-5.79
Ant. Gain(dBi)	16.40	16.40	16.40	16.40
MIMO EIRP (dBm/10 MHz)	44.62	44.66	44.64	44.68
FCC EIRP Limit (dBm/10MHz)	47.00	47.00	47.00	47.00
Margin (dB)	-2.38	-2.34	-2.36	-2.32

Table 7-33. Common Beam 2CC Low Channel MIMO Power (LTE Band 48 – 40.0MHz)

Port #	QPSK (dBm)	16-QAM (dBm)	64-QAM (dBm)	256-QAM (dBm)
3	19.05	19.18	19.10	19.31
2	19.44	19.17	19.59	19.24
1	14.99	15.17	15.08	14.89
0	9.43	9.26	9.57	9.32
16	10.18	9.87	10.09	9.99
17	20.23	20.08	19.93	20.15
18	17.85	17.39	17.57	17.88
19	2.82	2.54	2.77	2.68
7	19.58	19.34	19.76	19.68
6	20.27	20.44	20.24	20.03
5	20.35	20.25	20.07	20.58
4	20.08	19.99	20.18	20.26
20	20.10	19.49	20.04	19.95
21	20.17	20.26	20.41	20.22
22	20.09	20.11	20.34	20.17
23	20.19	20.02	20.27	20.13
11	19.78	20.01	19.98	19.68
10	20.16	20.35	19.99	20.46
9	19.99	20.07	20.20	20.21
8	20.43	20.37	20.53	20.52
24	20.24	20.60	20.48	20.34
25	19.87	20.18	19.95	20.01
26	20.16	20.49	20.27	20.18
27	20.01	19.98	19.88	20.12
15	6.23	6.18	5.98	6.06
14	14.13	13.97	14.22	14.02
13	20.12	19.97	20.30	20.19
12	19.81	19.59	19.88	20.01
28	10.74	10.88	11.07	10.89
29	19.08	18.78	19.13	18.92
30	**20.45**	**20.72**	**20.56**	**20.66**
31	16.47	16.56	16.34	16.88

Table 7-34. Common Beam 2CC Mid Channel Conducted Powers (LTE Band 48 – 40.0MHz)

Mid Channel 2CC	QPSK	16-QAM	64-QAM	256-QAM
Total MIMO Conducted Power (mW)	2499.994	2495.427	2530.242	2537.037
Total MIMO Conducted Power (dBm)	33.98	33.97	34.03	34.04
OBW (MHz)	37.89	37.99	37.88	38.01
Scaling factor (dB)	-5.78	-5.80	-5.78	-5.80
Ant. Gain(dBi)	16.40	16.40	16.40	16.40
MIMO EIRP (dBm/10 MHz)	44.59	44.58	44.65	44.64
FCC EIRP Limit (dBm/10MHz)	47.00	47.00	47.00	47.00
Margin (dB)	-2.41	-2.42	-2.35	-2.36

Table 7-35. Common Beam 2CC Mid Channel MIMO Power (LTE Band 48 – 40.0MHz)

Port #	QPSK (dBm)	16-QAM (dBm)	64-QAM (dBm)	256-QAM (dBm)
3	18.98	19.08	19.24	19.10
2	19.31	19.43	19.58	19.53
1	15.14	15.01	15.05	14.96
0	9.85	9.44	9.86	9.78
16	10.55	10.33	10.72	10.61
17	20.61	20.47	20.55	20.51
18	17.88	17.74	17.84	17.90
19	3.01	3.05	3.04	3.24
7	19.26	19.34	19.26	19.35
6	20.28	20.11	20.44	20.13
5	20.45	20.44	20.25	20.63
4	20.70	20.56	20.66	20.69
20	20.44	20.34	20.72	20.53
21	20.65	20.43	20.56	20.66
22	20.28	20.33	20.39	20.22
23	20.39	20.25	20.43	20.36
11	20.19	20.24	20.23	20.04
10	20.53	20.45	20.33	20.51
9	20.48	20.59	20.75	20.69
8	20.13	20.67	20.57	20.48
24	20.47	20.44	20.53	20.57
25	20.30	20.34	20.29	20.37
26	20.33	20.19	20.22	20.12
27	20.14	20.19	20.22	20.35
15	6.25	6.26	6.32	6.21
14	14.30	14.14	14.28	14.49
13	20.12	20.21	20.23	20.18
12	19.99	20.10	19.96	20.05
28	11.02	10.99	11.12	10.94
29	19.60	19.72	19.62	19.70
30	**21.13**	**21.27**	**21.43**	**21.34**
31	16.34	16.46	16.38	16.54

Table 7-36. Common Beam 2CC High Channel Conducted Powers (LTE Band 48 – 40.0MHz)

High Channel 2CC	QPSK	16-QAM	64-QAM	256-QAM
Total MIMO Conducted Power (mW)	2631.018	2635.601	2672.559	2665.860
Total MIMO Conducted Power (dBm)	34.20	34.21	34.27	34.26
OBW (MHz)	37.95	37.97	37.84	37.86
Scaling factor (dB)	-5.79	-5.79	-5.78	-5.78
Ant. Gain(dBi)	16.40	16.40	16.40	16.40
MIMO EIRP (dBm/10 MHz)	44.81	44.81	44.89	44.88
FCC EIRP Limit (dBm/10MHz)	47.00	47.00	47.00	47.00
Margin (dB)	-2.19	-2.19	-2.11	-2.12

Table 7-37. Common Beam 2CC High Channel MIMO Power (LTE Band 48 – 40.0MHz)

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.

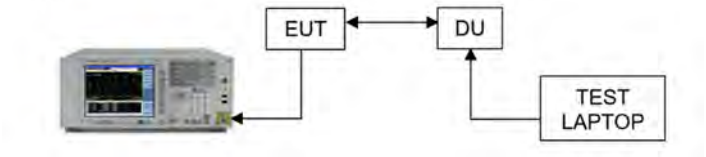


Figure 7-3. Test Instrument & Measurement Setup

Test Notes

1. The channel power measurements are done with a Reference Level offset at 32.1 dB which includes corrections 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. Attenuations for the following ports were modified by the client for 1 carrier and 2 carrier measurement to get powers matching the target.
    a. -Low Channel Port #7
    b. -High Channel Port #7 and #30
4. There is a jitter observed in 16-QAM plots for all ports. The PPSD plots for all other modulations are smooth.
5. The sweeptime was increased to 5 seconds for 16QAM Mid channel and High channel plots.
6. The 8 User Beam configuration has the highest power amongst all modes. PSDs for this mode were found to be the worst case. The 8-User Beam PSD MIMO calculation and plots are included in the report.
7. 8 User Beam PSDs were found to be higher with 1CC compared to 2CC so 1CC was determined to be the worst case for PSD.

8. 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).
9. PSD per port (dBm / MHz) is converted to a linear value (mW). A summation of linear powers for all 32 ports gives us the total MIMO conducted PSD (mW). We convert this back to logarithmic scale for further PSD calculations.

10. 8- beam reduction:
    The 8-beam reduction is applicable in the 8-User Beam operating mode of the EUT. It is a logarithmic factor applied to account for maximum 8 spatially separated beams operate simultaneously.
    8-beam power reduction factor (dB) = 10* log (1 / 8) = -9.03 dB

11. 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 dB

12. Antenna Gains (dBi) are provided by the client.

13. Sample Calculation:
    Let us assume the following numbers:
    a. Total MIMO PSD = 15 dBm / MHz.
    b. Antenna Gain = 20 dBi

Factors			Value	Unit
Total MIMO PSD			15	dBm /MHz
Applying Reductions:				
Antenna Gain			20	dBi
8- Beam Reduction	= 10 * log (1 / 8)	=	-9.03	dB
BF Gain	= 10 * log (2)	=	3.01	dB
Total MIMO Radiated PSD = Total MIMO PSD + Antenna Gain + 8- Beam Reduction + BF Gain	=		28.98	dBm/ MHz
FCC PSD Limit			37	dBm/ MHz
Margin = FCC EIRP Limit – MIMO EIRP	= 37 – 28.98		8.02	dB

8- User Beam Configuration

Port #	QPSK (dBm/MHz)	16-QAM (dBm/MHz)	64-QAM (dBm/MHz)	256-QAM (dBm/MHz)
3	4.96	6.57	5.08	5.06
2	4.88	6.50	5.01	4.89
1	4.76	6.07	4.98	4.94
0	5.16	6.33	5.23	5.10
16	4.96	6.07	5.13	5.06
17	4.79	5.98	4.90	4.80
18	5.21	6.91	5.43	5.39
19	5.04	6.64	5.16	5.10
7	4.55	6.18	4.75	4.72
6	4.94	6.55	5.05	5.00
5	4.94	6.12	5.08	4.99
4	5.08	6.21	5.11	5.01
20	5.06	6.32	5.35	5.23
21	5.16	6.38	5.30	5.19
22	4.85	6.50	5.06	5.03
23	5.03	6.73	5.18	5.13
11	5.04	6.71	5.23	5.18
10	5.03	6.64	5.16	5.02
9	4.96	6.26	5.17	5.03
8	4.89	6.02	5.02	4.87
24	4.84	6.14	5.05	4.98
25	4.77	6.00	4.91	4.83
26	4.70	6.30	4.83	4.79
27	5.01	5.19	5.13	5.12
15	4.96	6.54	5.10	5.07
14	5.00	6.62	4.94	5.00
13	5.13	6.42	5.38	5.29
12	4.82	6.04	4.99	4.90
28	5.05	6.33	5.24	5.16
29	4.86	6.02	4.98	4.89
30	**6.11**	**7.73**	**6.31**	**6.27**
31	5.16	6.78	5.29	5.14

Table 7-38. 8-User Beam 1CC Low Channel Peak Power Spectral Density (LTE Band 48 – 20.0MHz)

Low Channel 1CC	QPSK	16-QAM	64-QAM	256-QAM
Total MIMO PSD (dBm/MHz)	20.05	21.44	20.20	20.13
Ant. Gain (dBi)	21.50	21.50	21.50	21.50
8-beam Multiplexing Reduction(dB)	-9.03	-9.03	-9.03	-9.03
Beamforming Gain (dB)	3.00	3.00	3.00	3.00
Total MIMO Radiated PSD (dBm/MHz)	35.52	36.91	35.67	35.60
FCC Maximum PSD Limit (dBm/MHz)	37.00	37.00	37.00	37.00
Margin (dB)	-1.48	-0.09	-1.33	-1.40

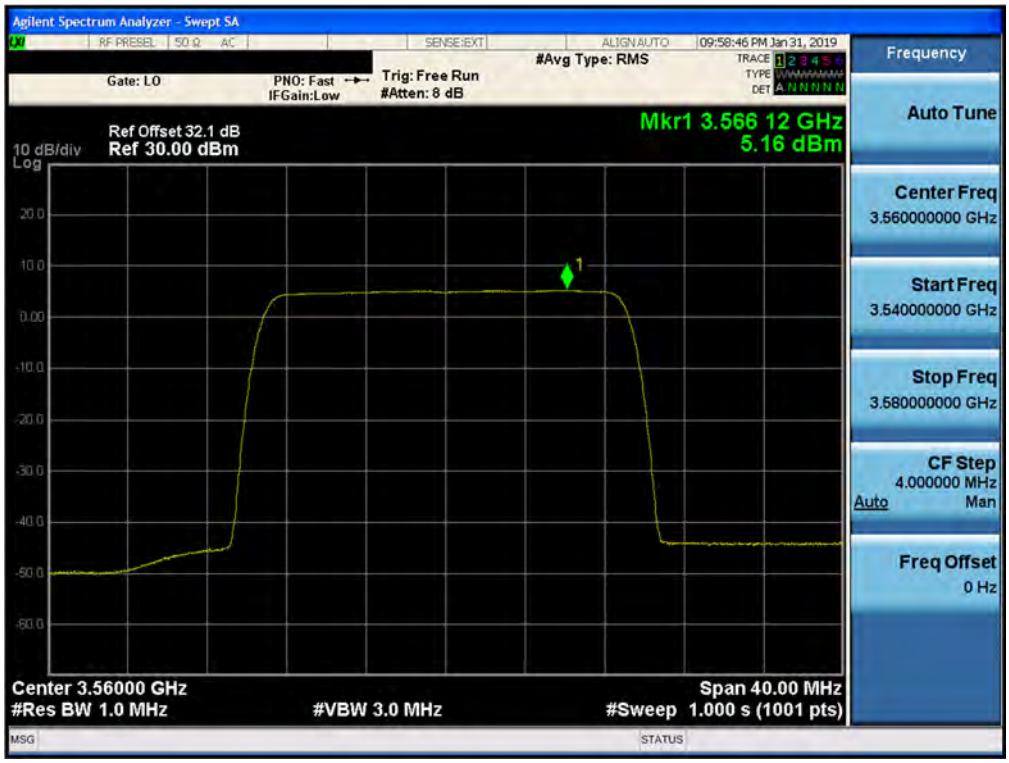
Table 7-39. 8-User Beam 1CC Low Channel MIMO Peak Power Spectral Density (LTE Band 48 – 20.0MHz)

8- User Beam 1CC Low Channel QPSK

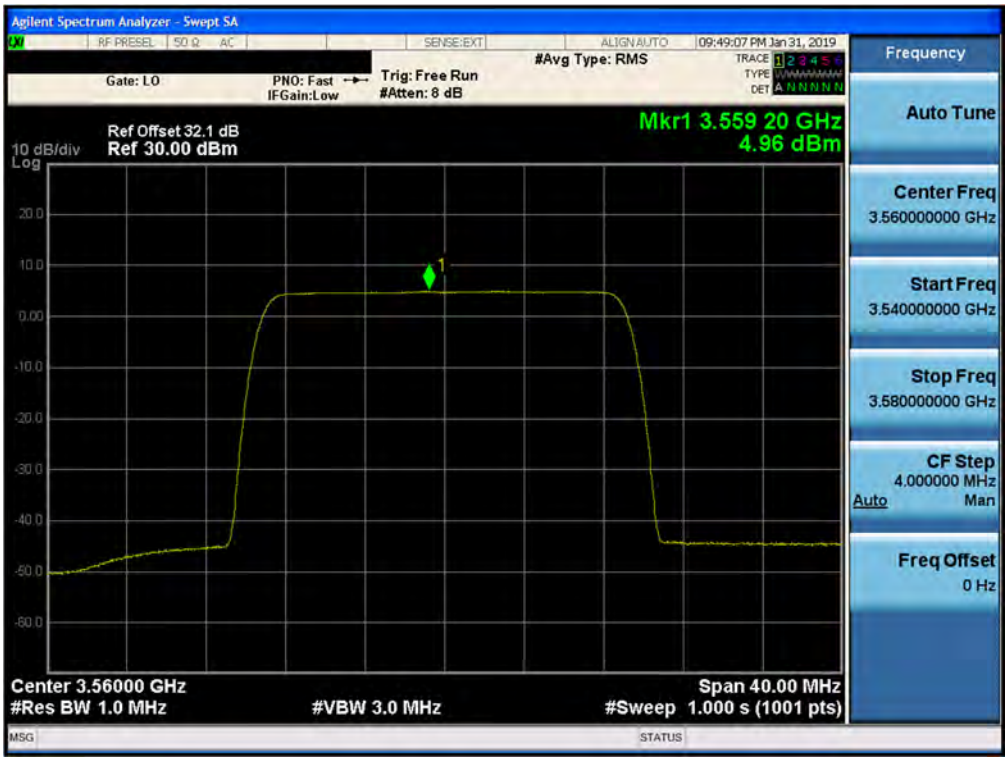
Plot 7-25. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 03

Plot 7-26. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 02

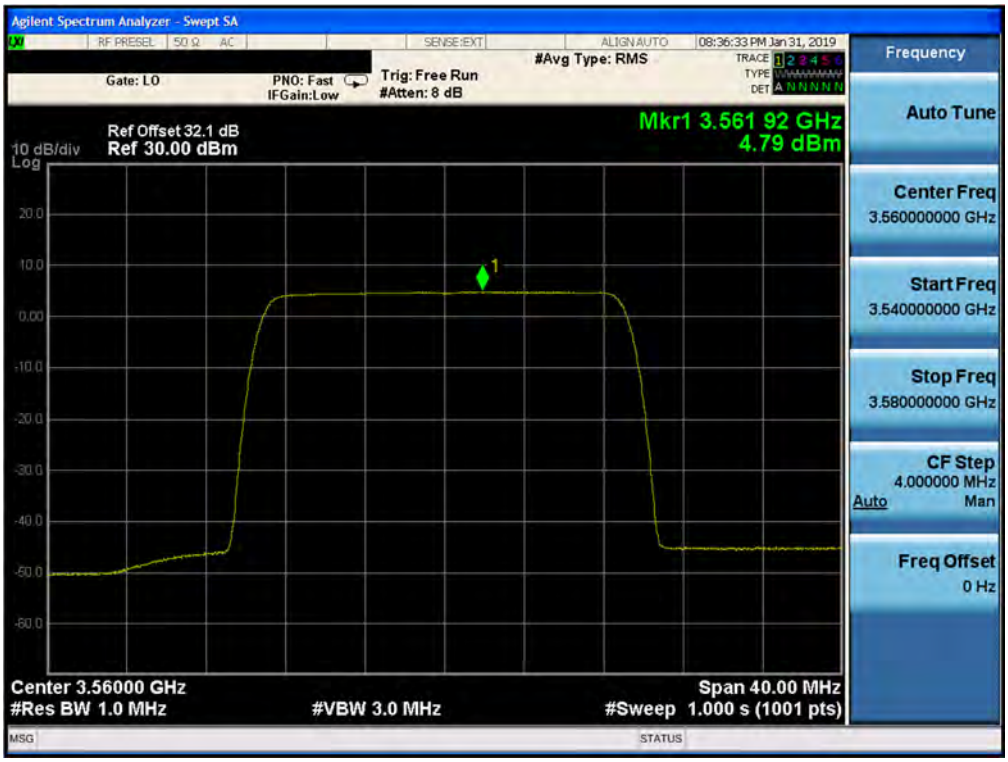
Plot 7-27. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 01



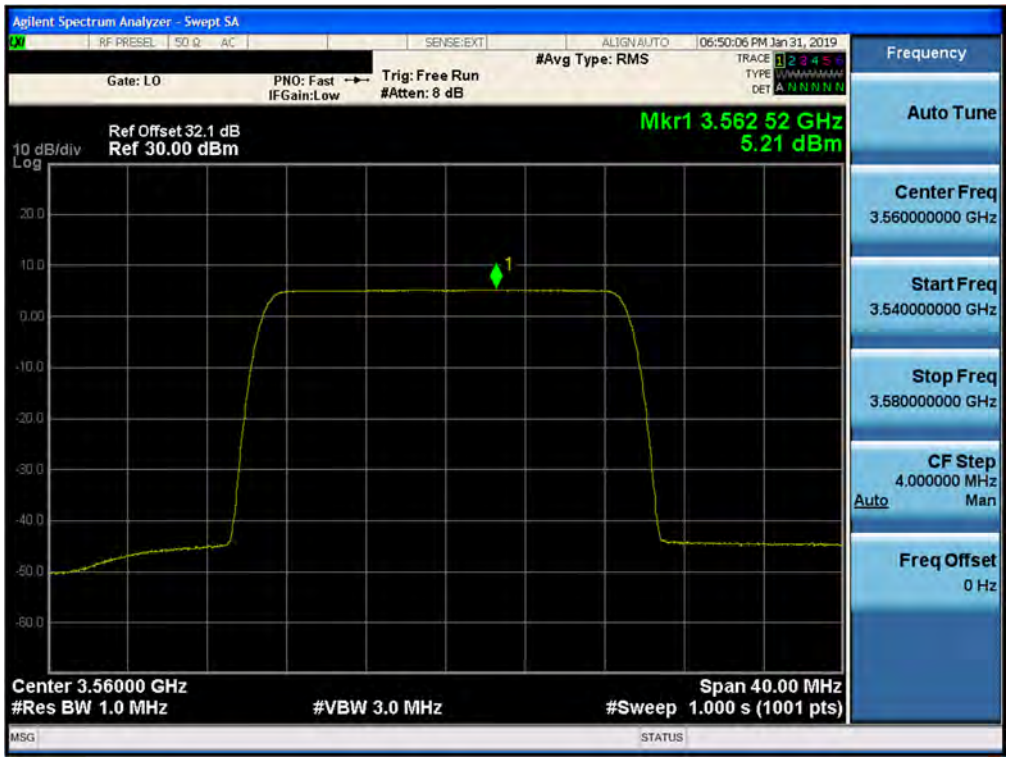
Plot 7-28. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 00



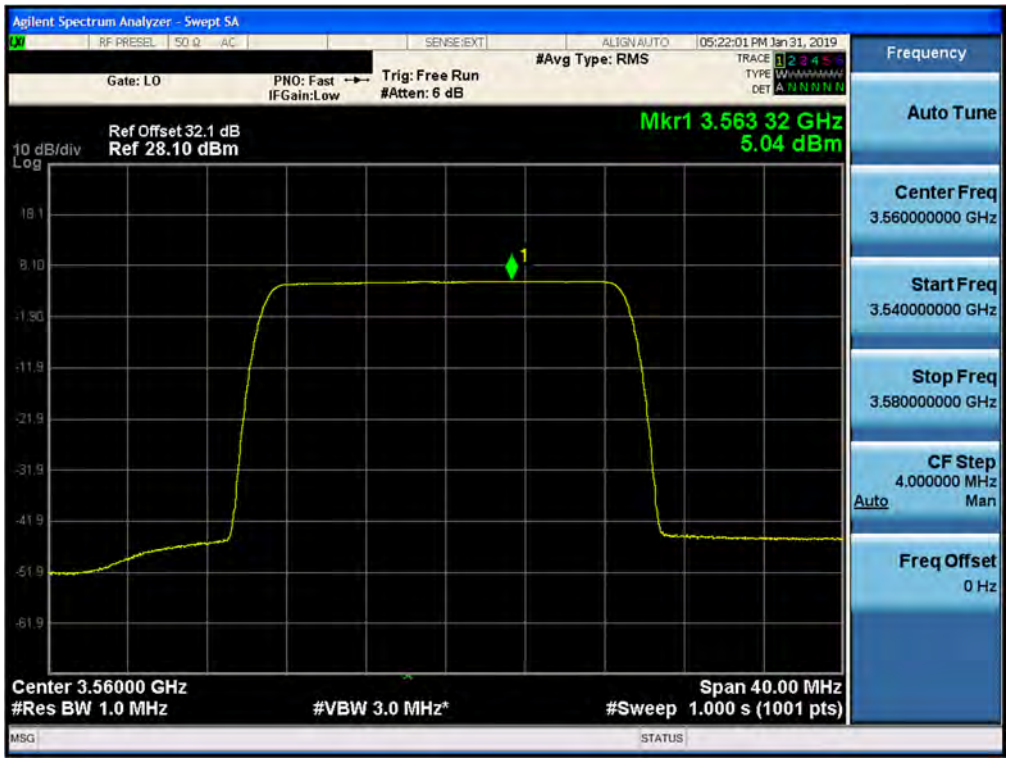
Plot 7-29. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 16



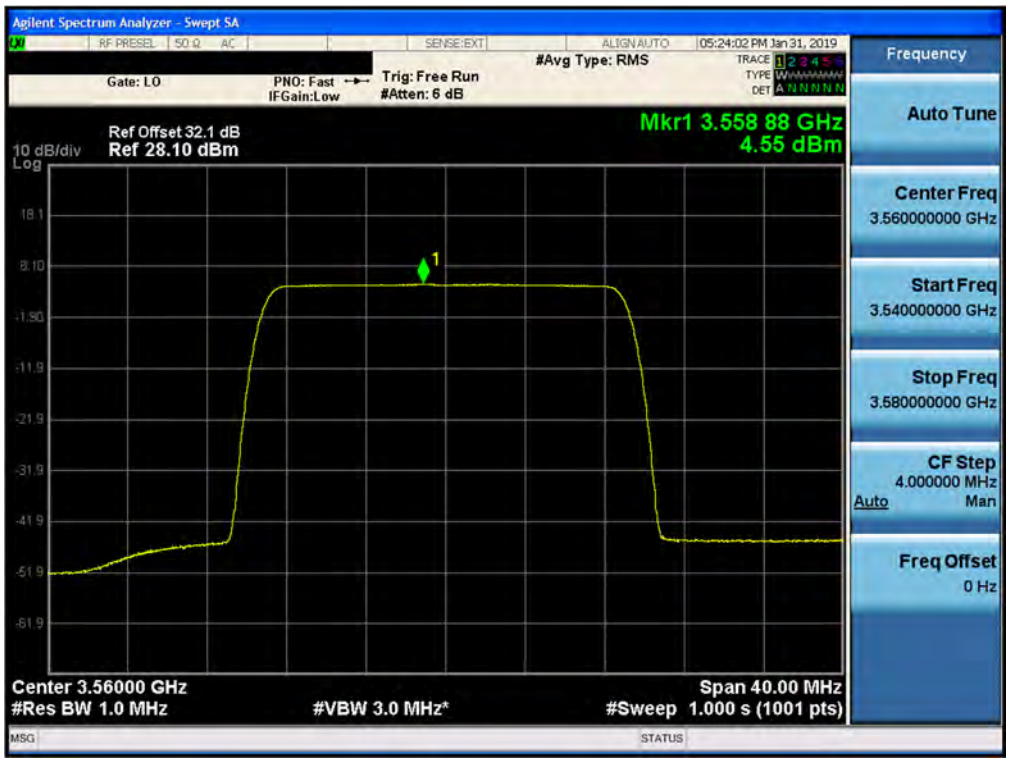
Plot 7-30. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 17



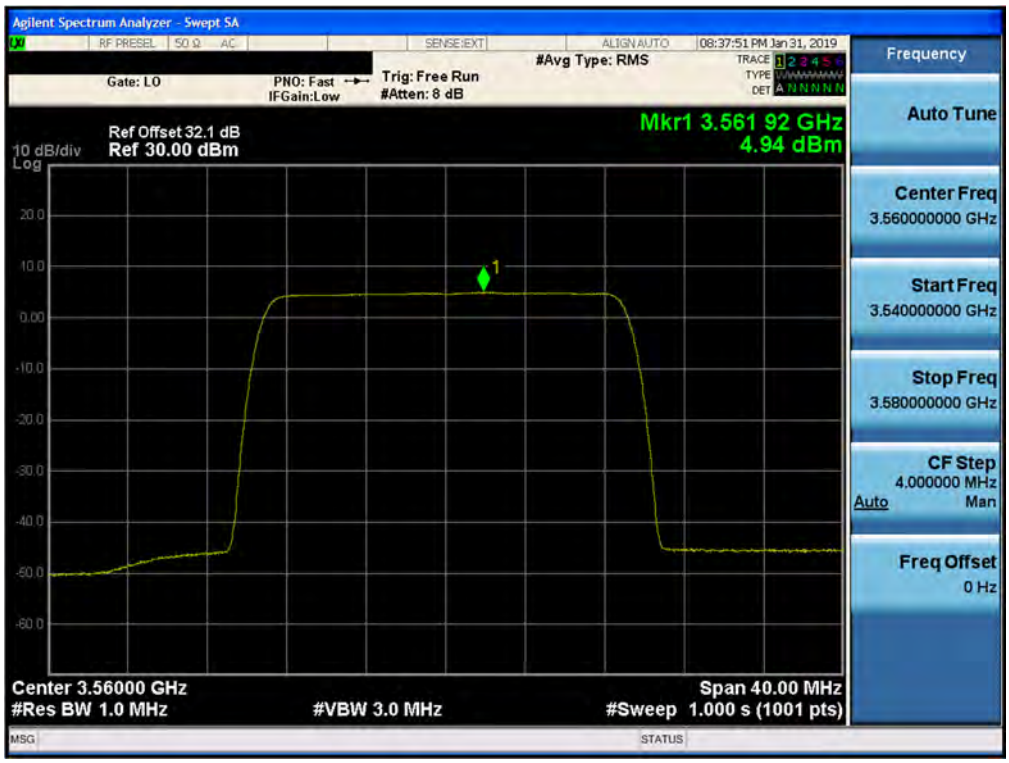
Plot 7-31. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 18



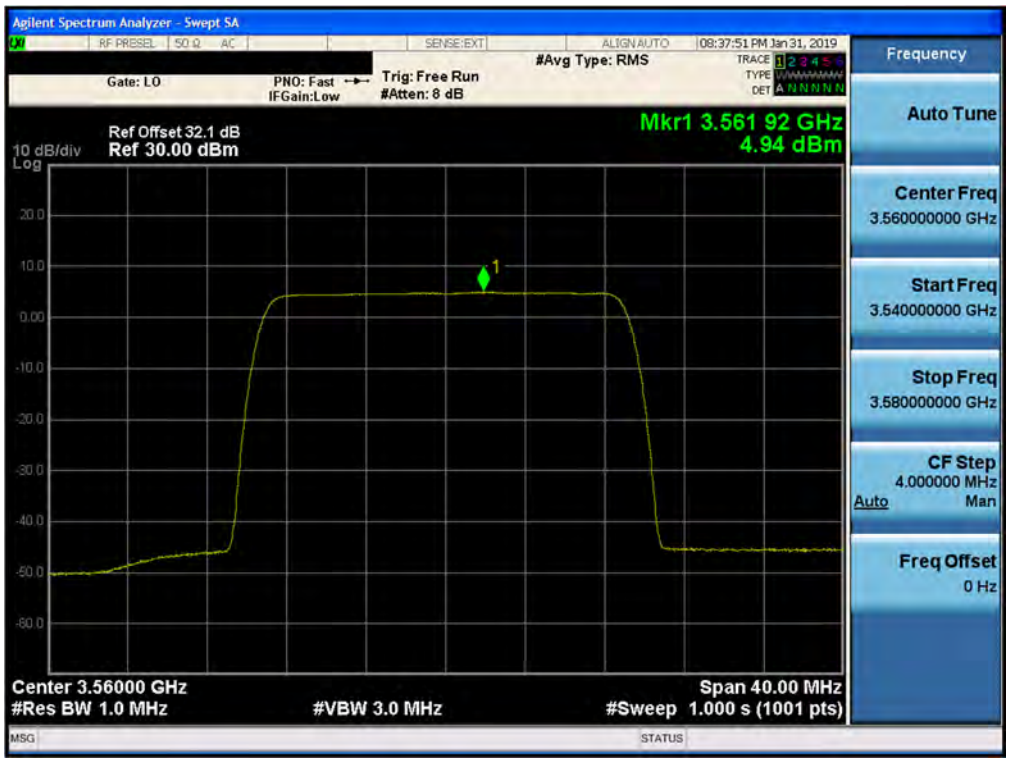
Plot 7-32. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 19



Plot 7-33. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 07



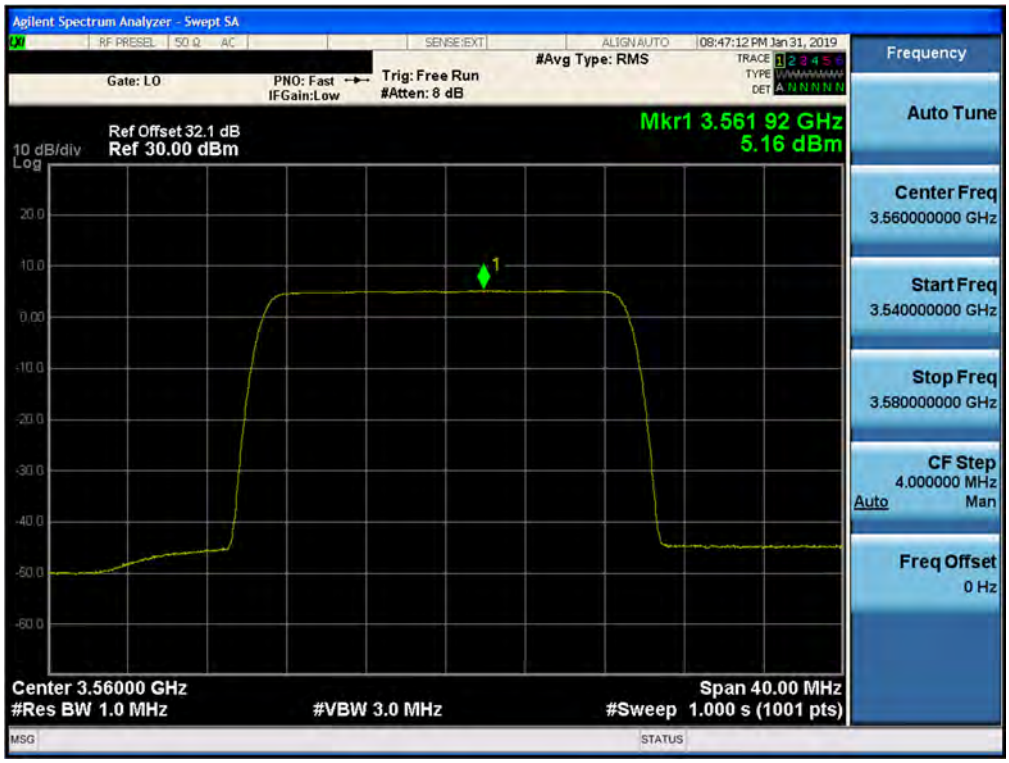
Plot 7-34. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 06



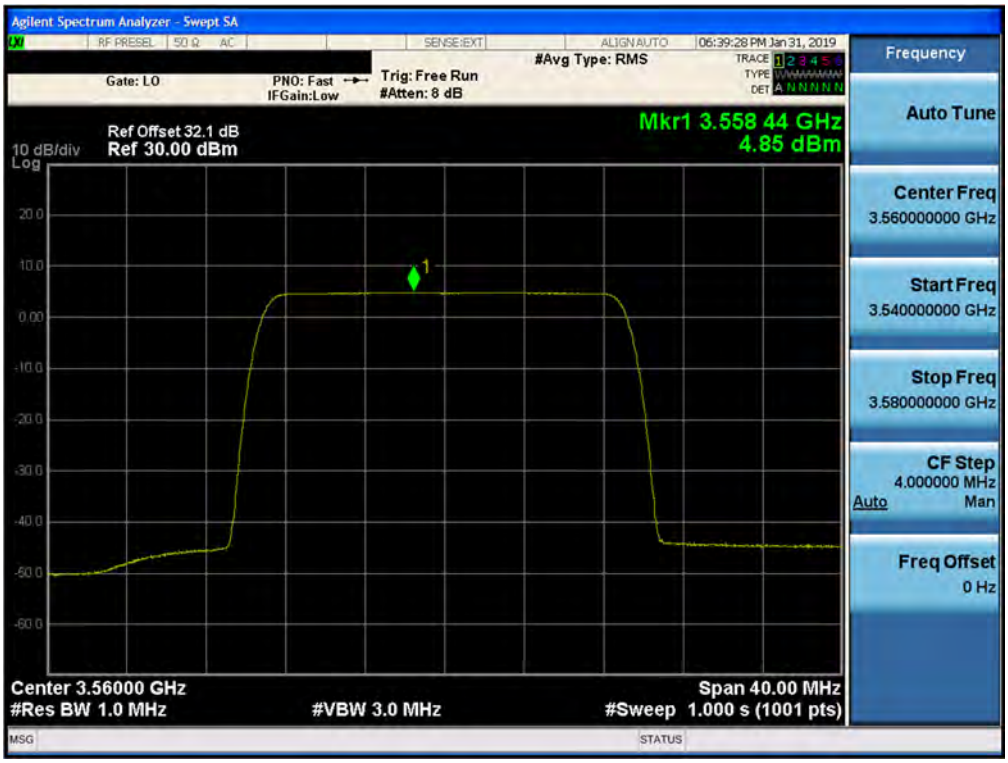
Plot 7-35. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 05

Plot 7-36. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 04

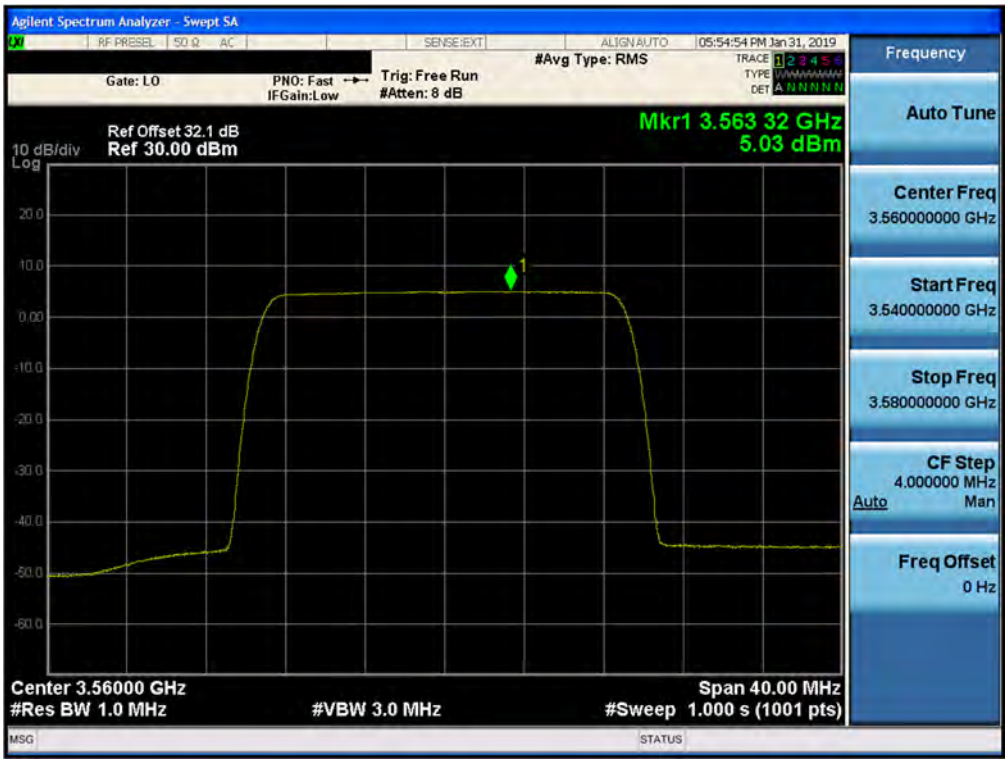
Plot 7-37. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 20



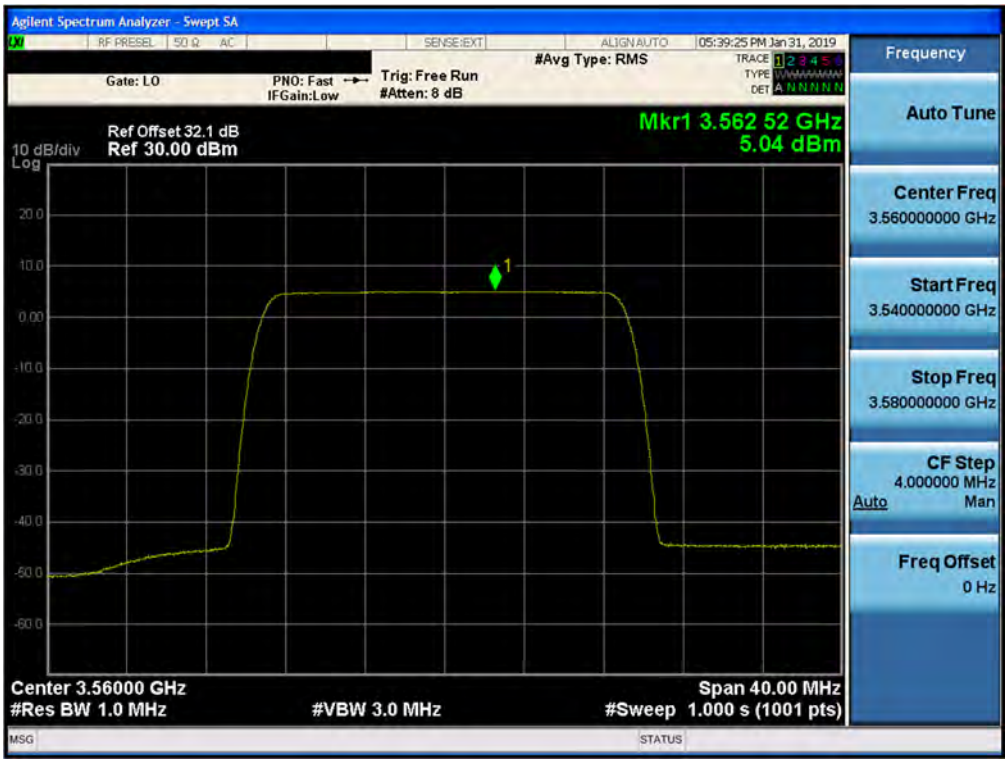
Plot 7-38. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 21



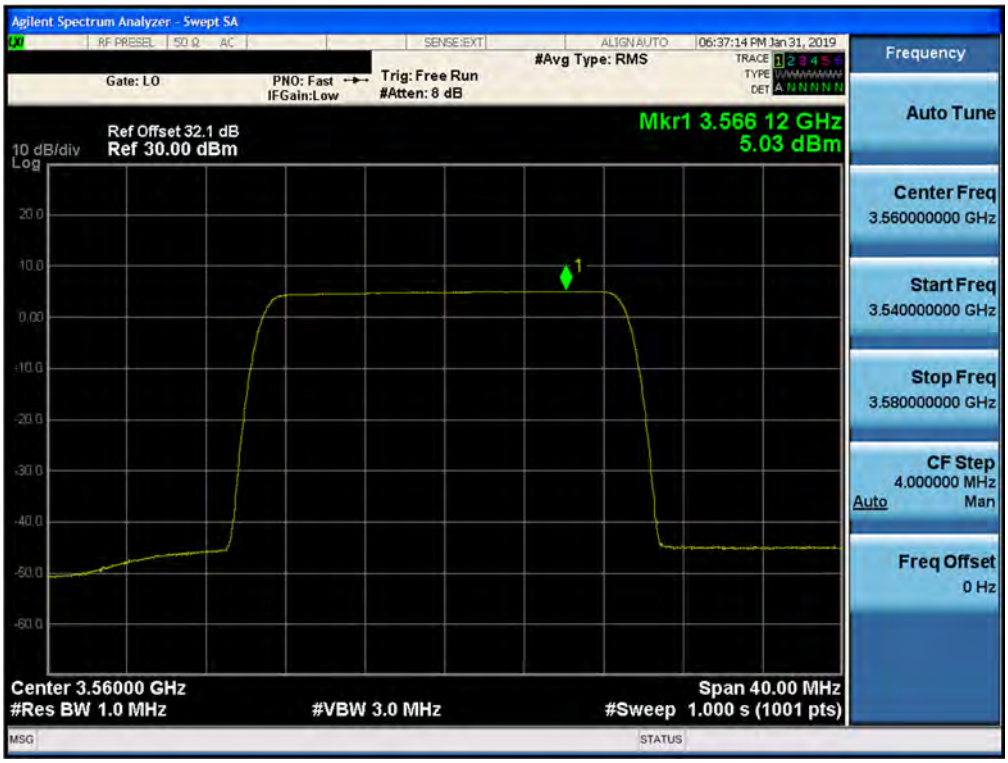
Plot 7-39. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 22



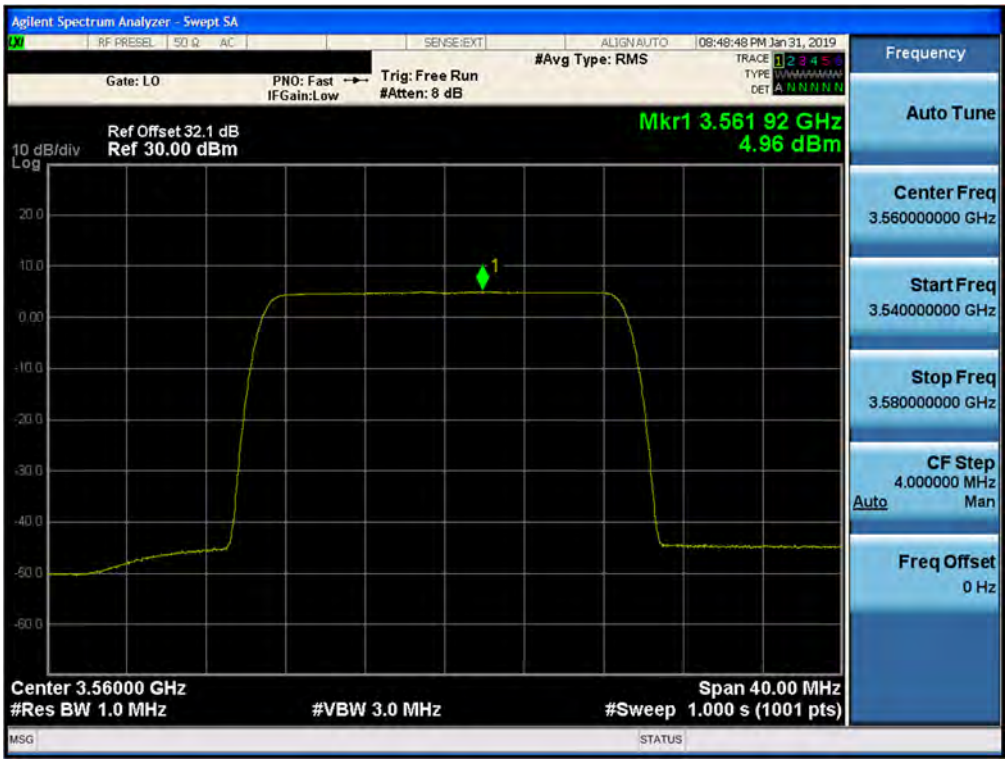
Plot 7-40. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 23



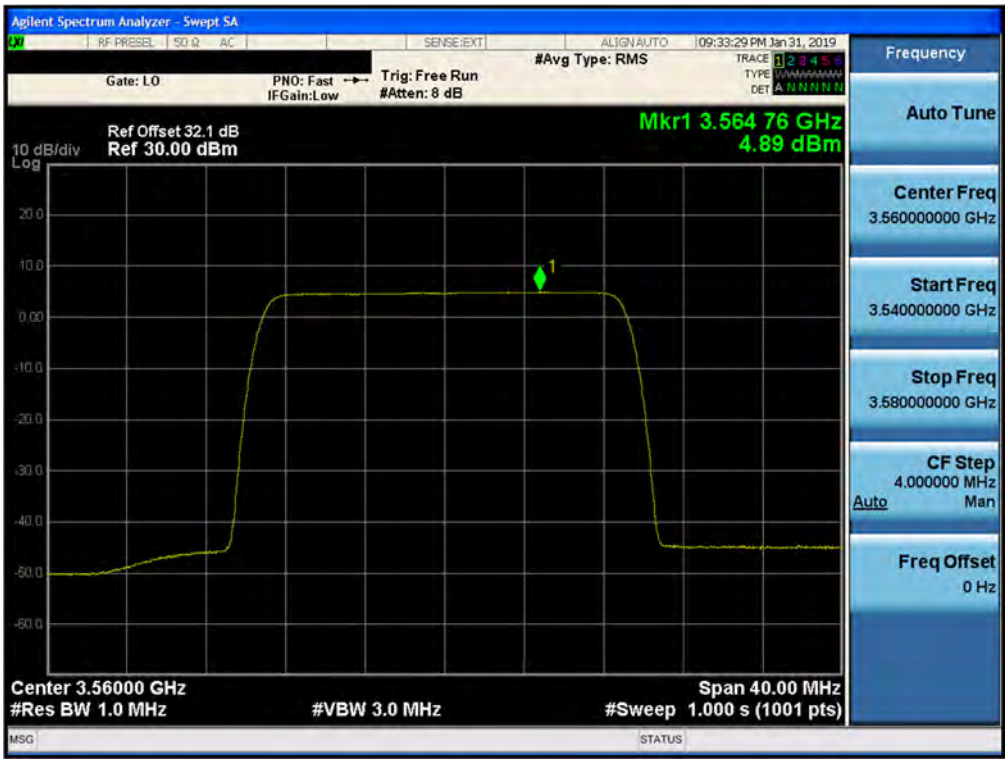
Plot 7-41. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 11



Plot 7-42. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 10



Plot 7-43. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 09

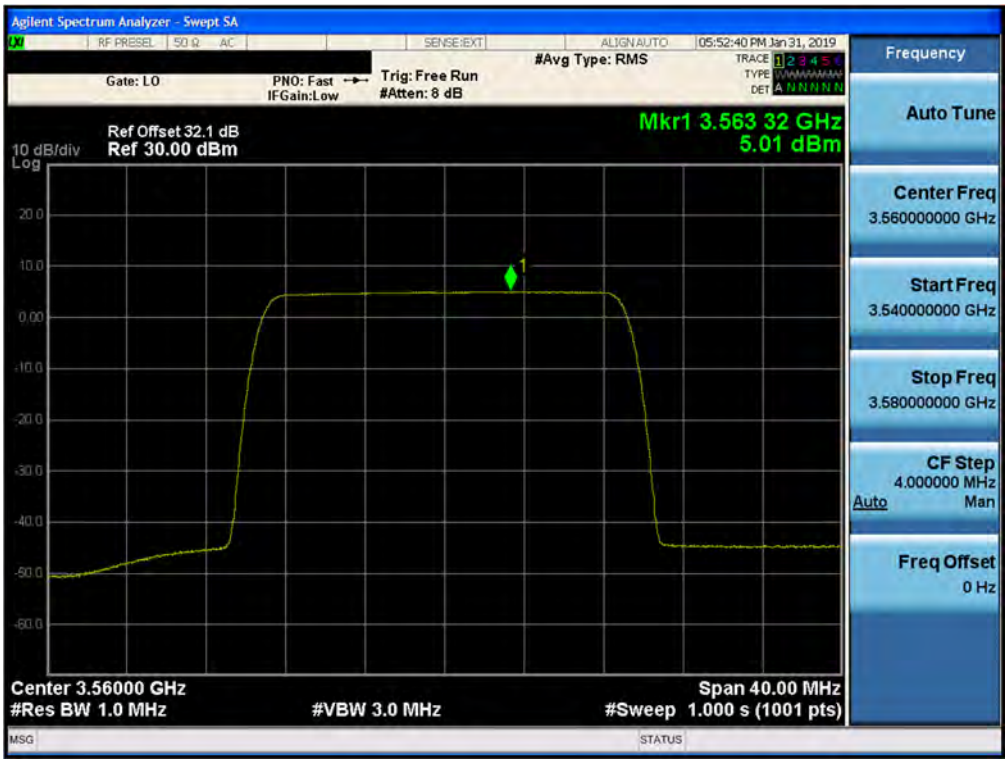


Plot 7-44. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 08

Plot 7-45. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 24

Plot 7-46. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 25

Plot 7-47. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 26



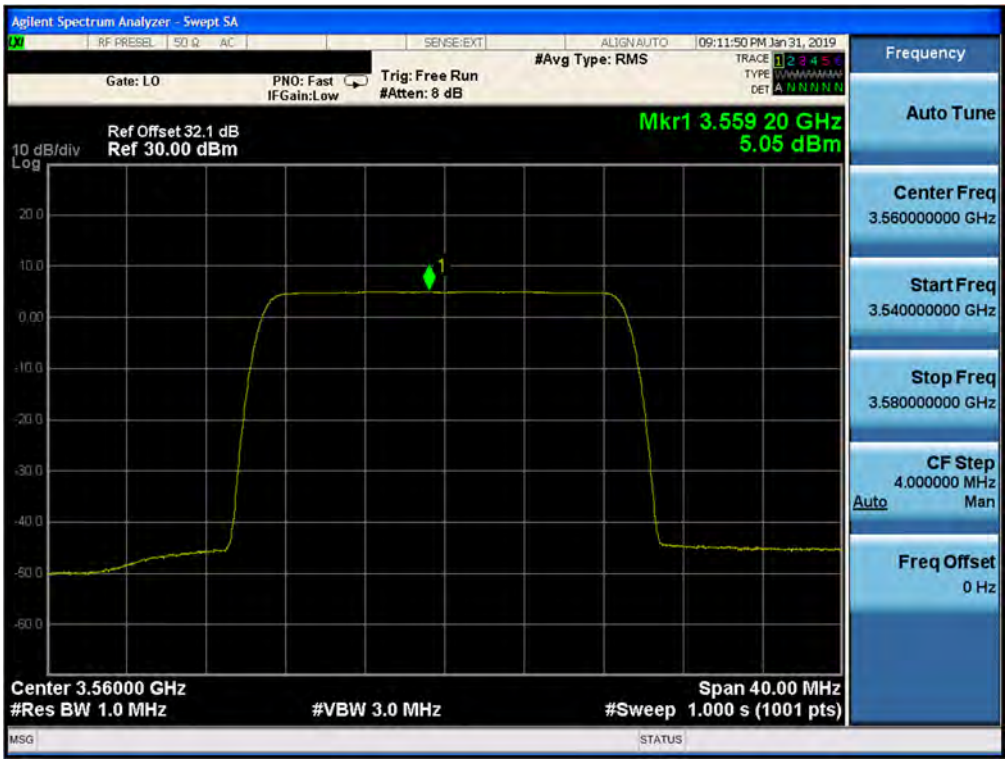
Plot 7-48. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 27

Plot 7-49. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 15

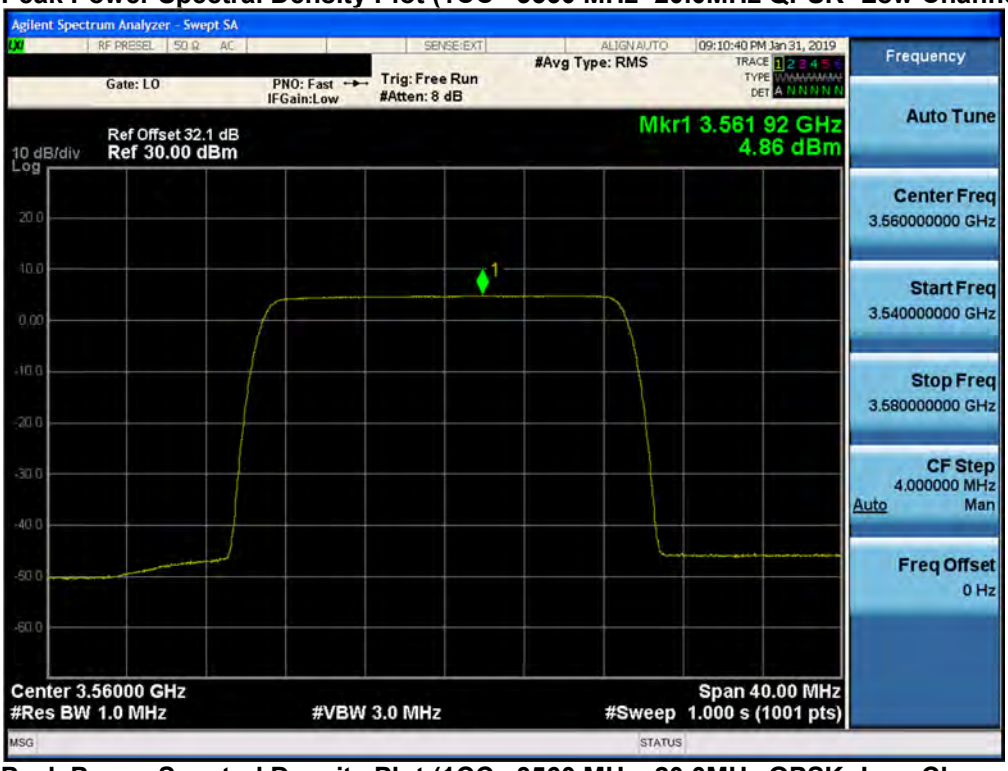
Plot 7-50. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 14

Plot 7-51. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 13

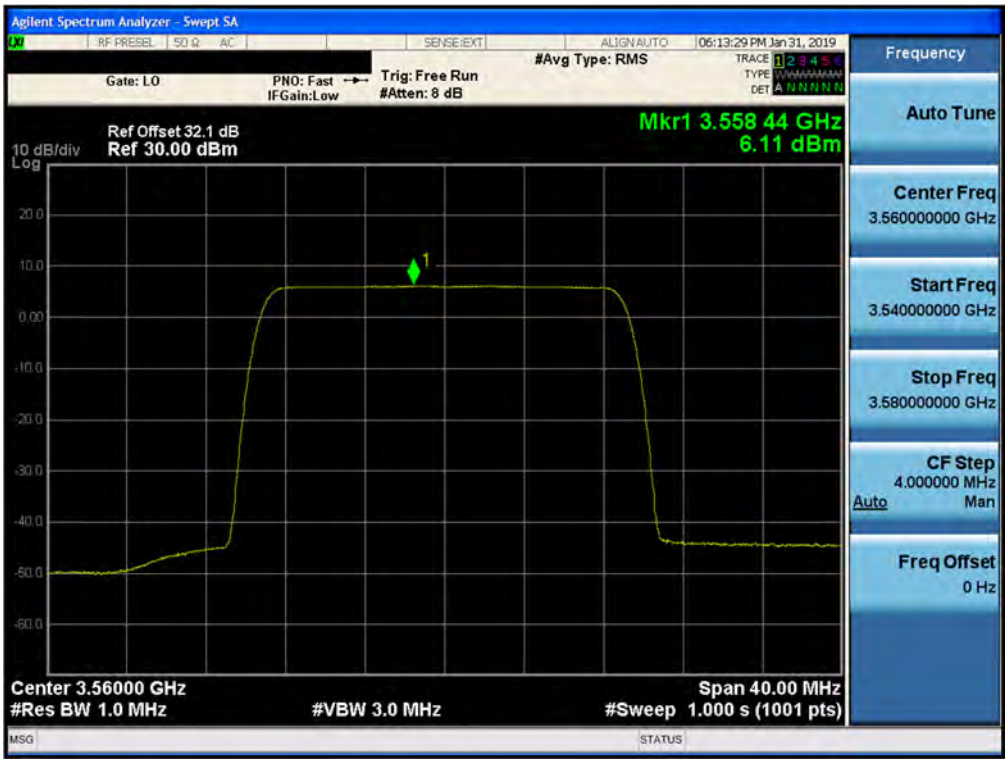
Plot 7-52. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 12



Plot 7-53. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 28



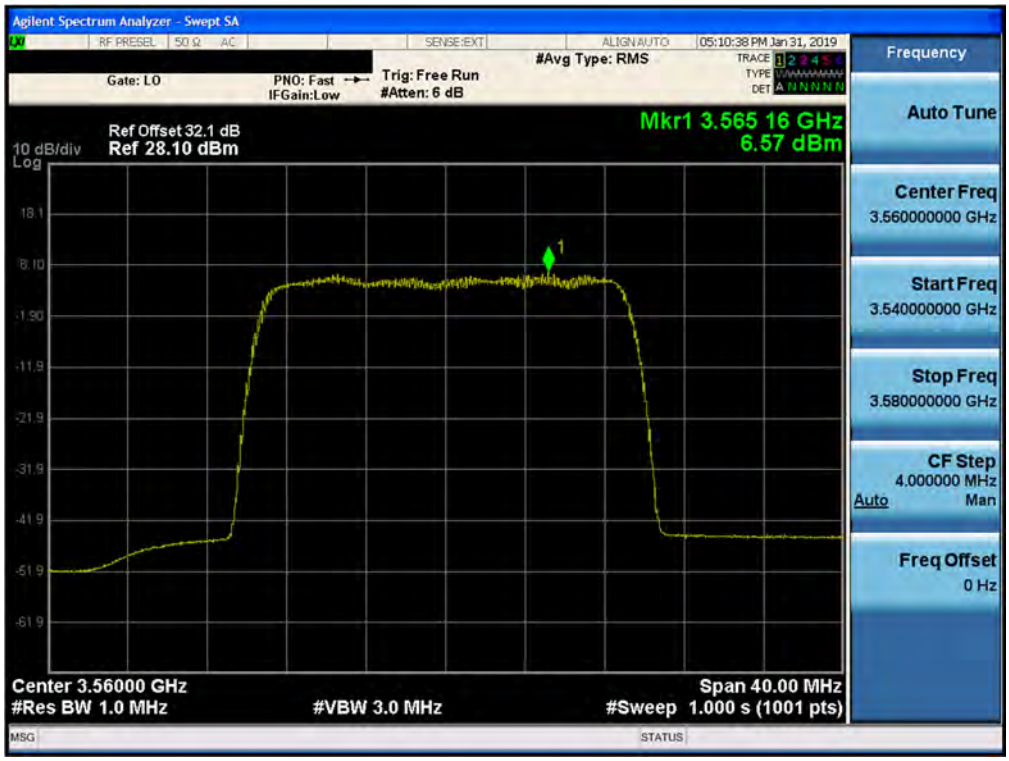
Plot 7-54. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 29



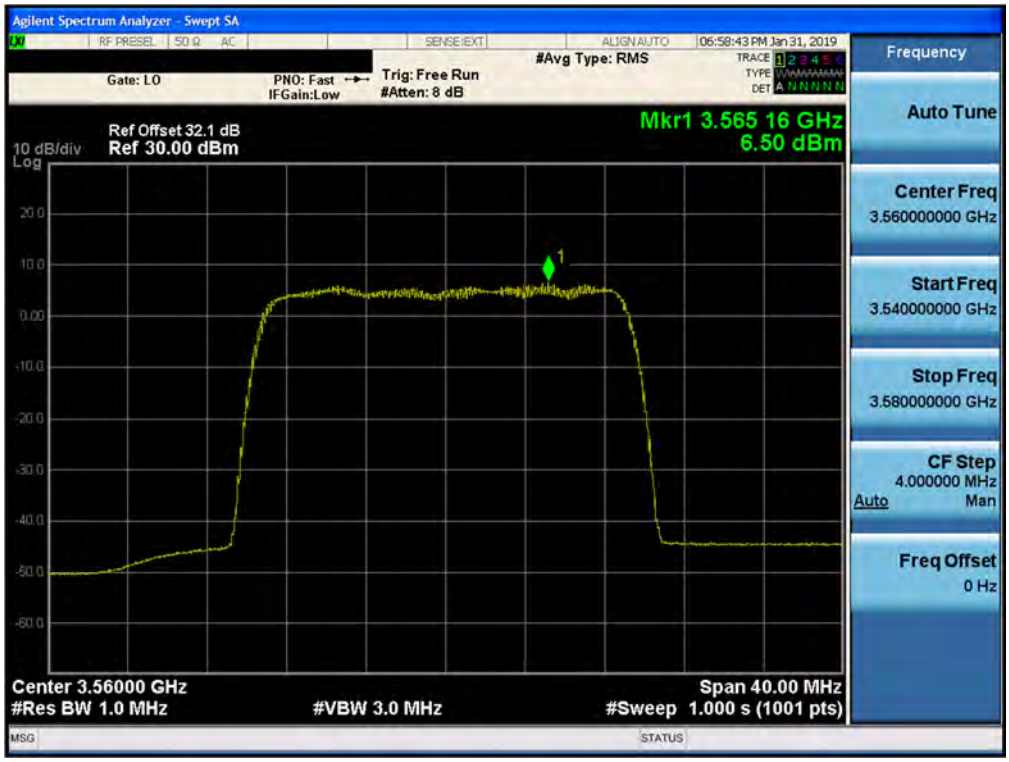
Plot 7-55. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 30

Plot 7-56. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz QPSK- Low Channel) Port 31

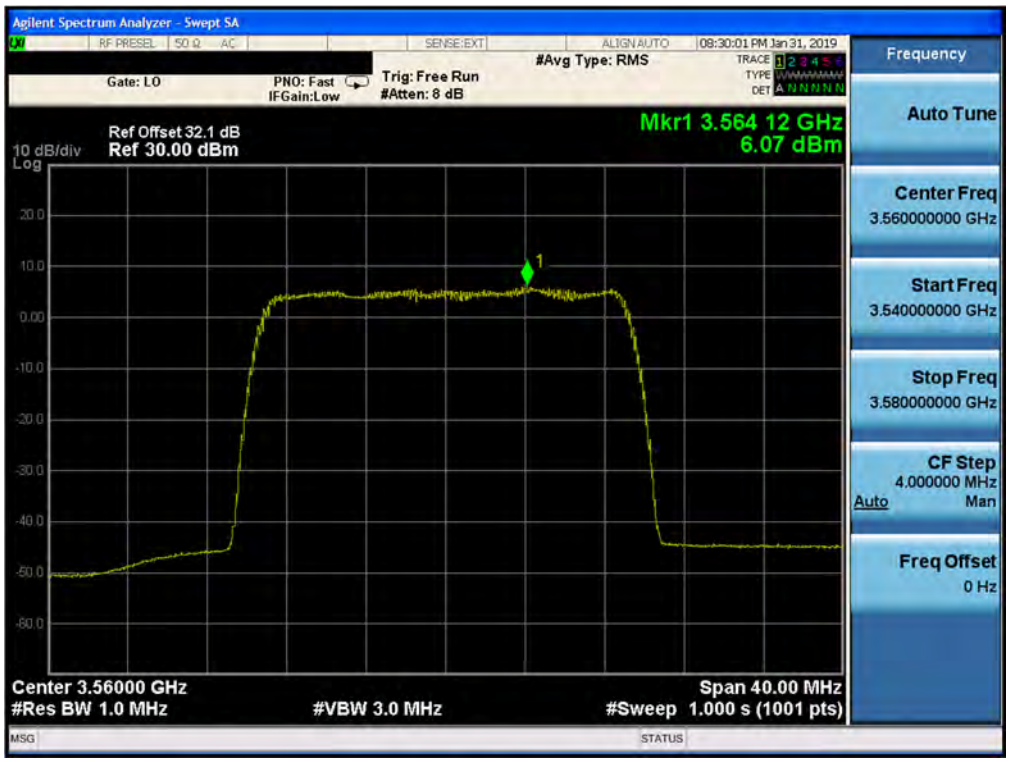
8- User Beam 1CC Low Channel 16QAM



Plot 7-57. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 03

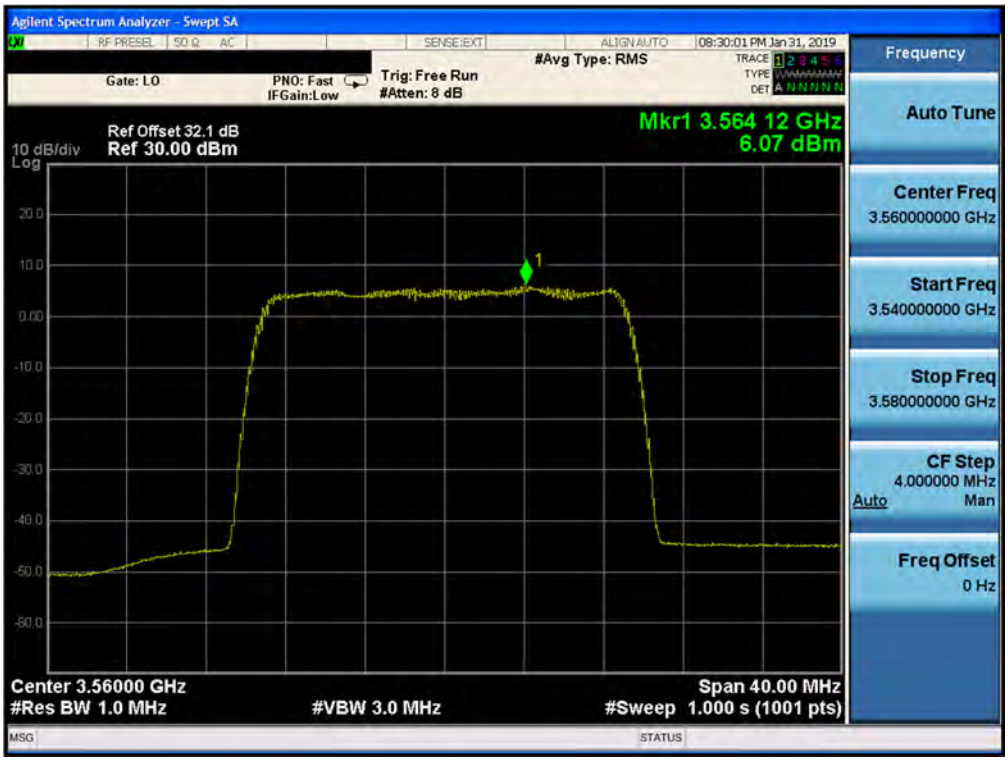


Plot 7-58. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 02

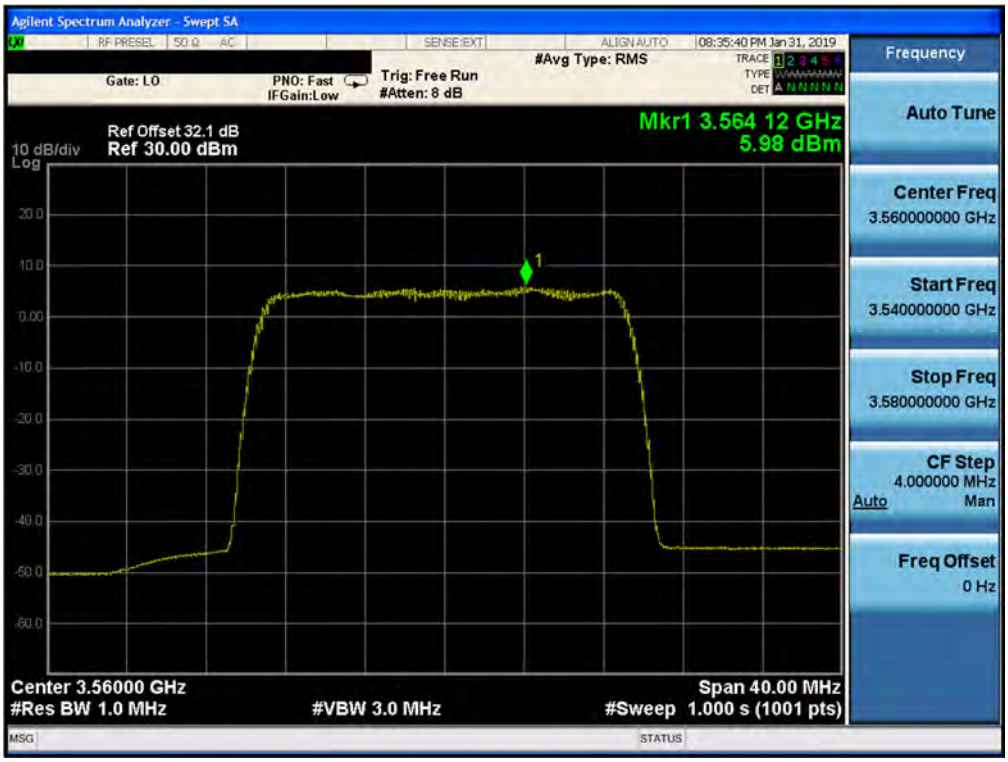


Plot 7-59. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 01

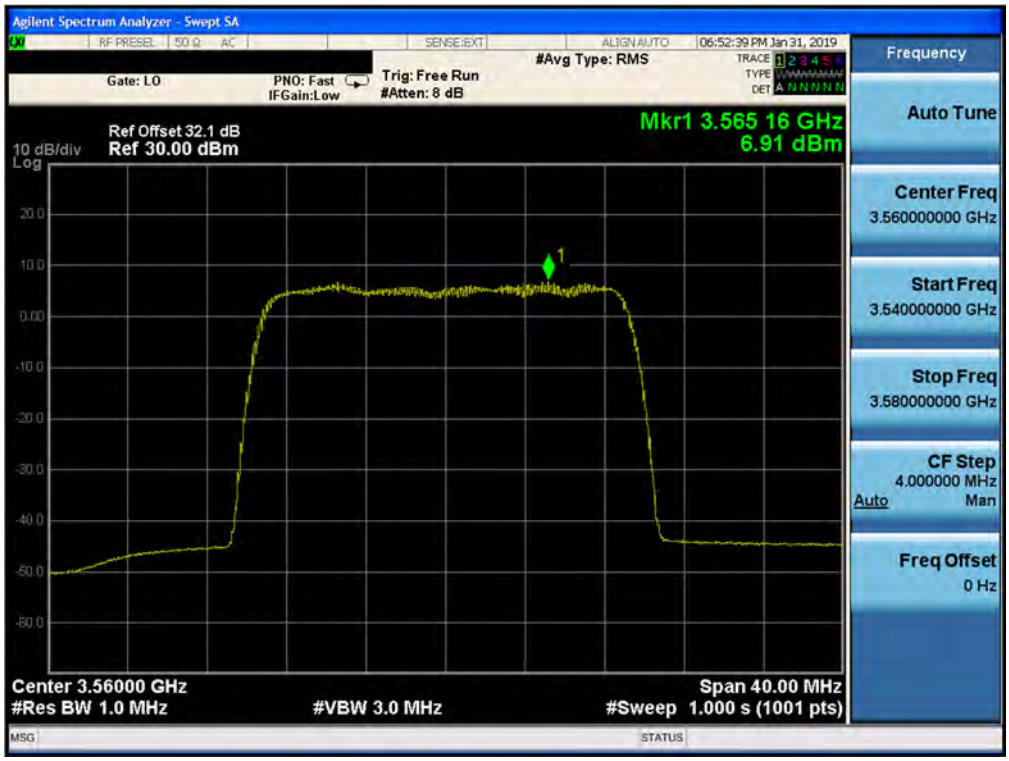
Plot 7-60. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 00



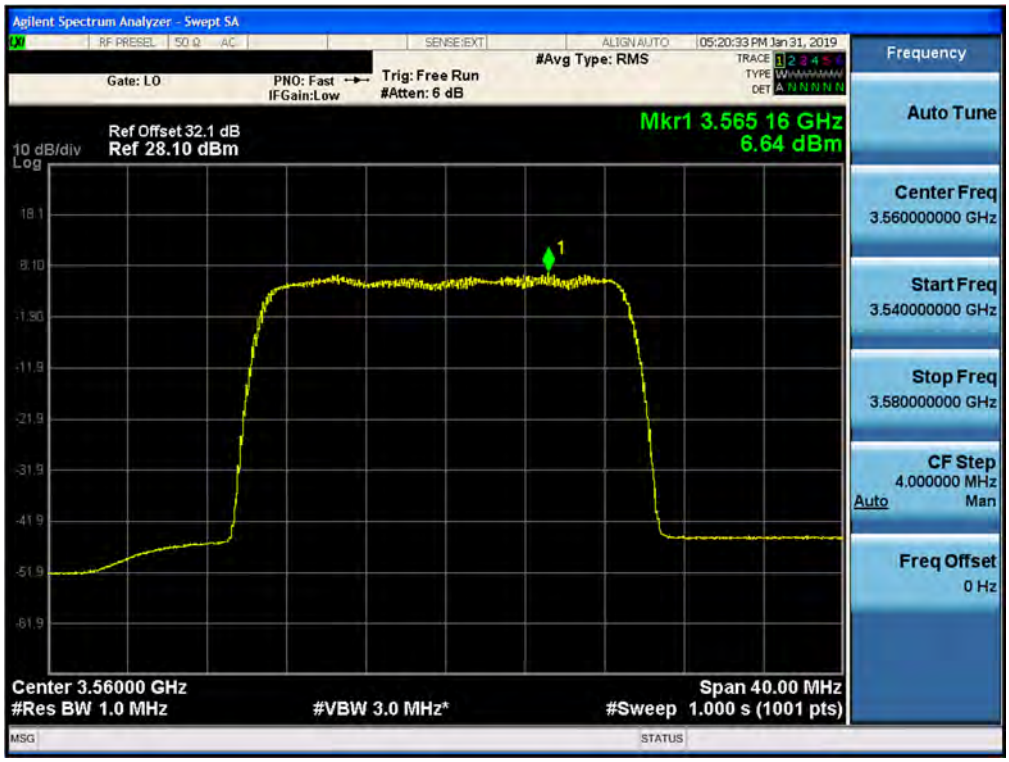
Plot 7-61. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 16



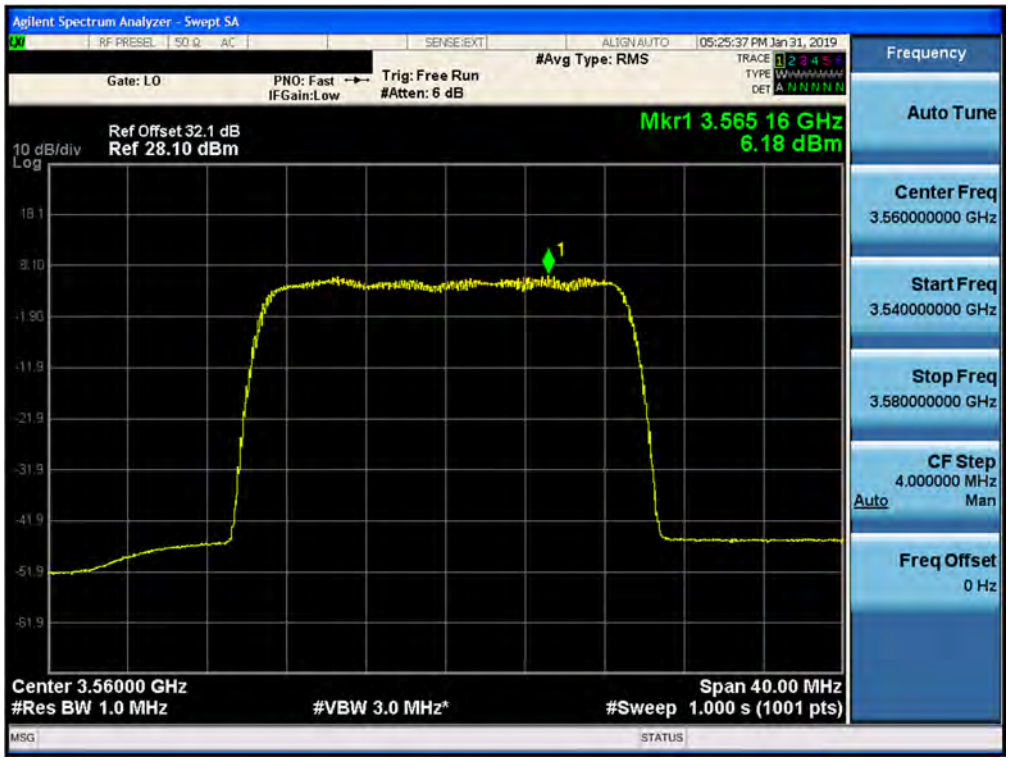
Plot 7-62. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 17



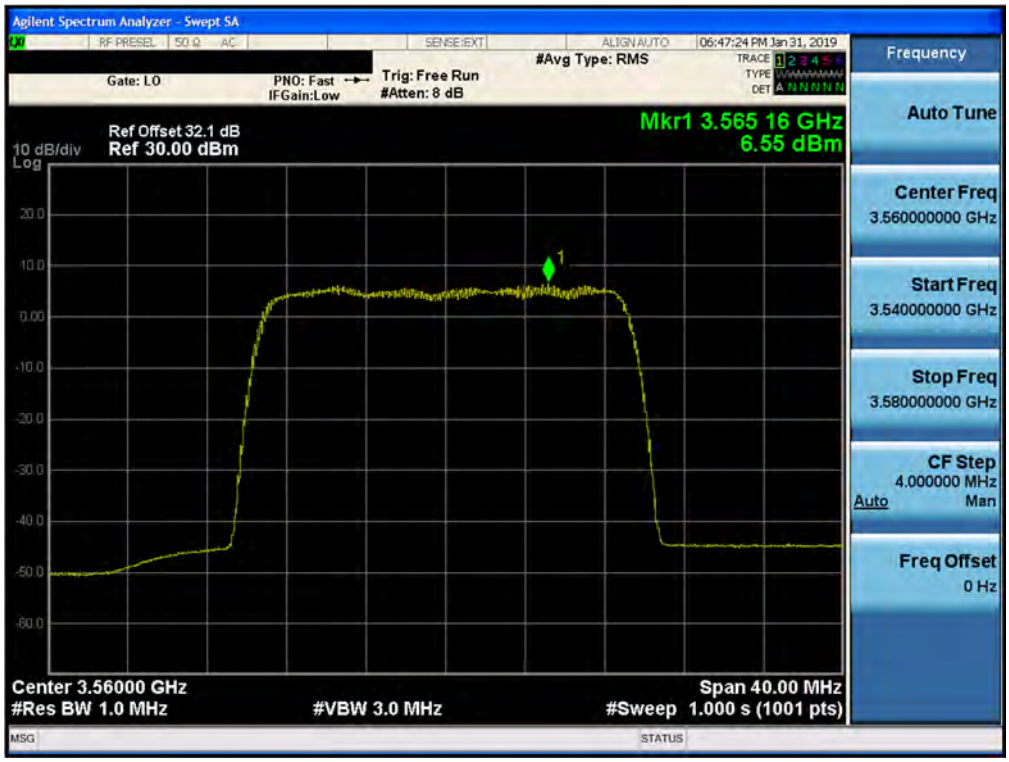
Plot 7-63. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 18



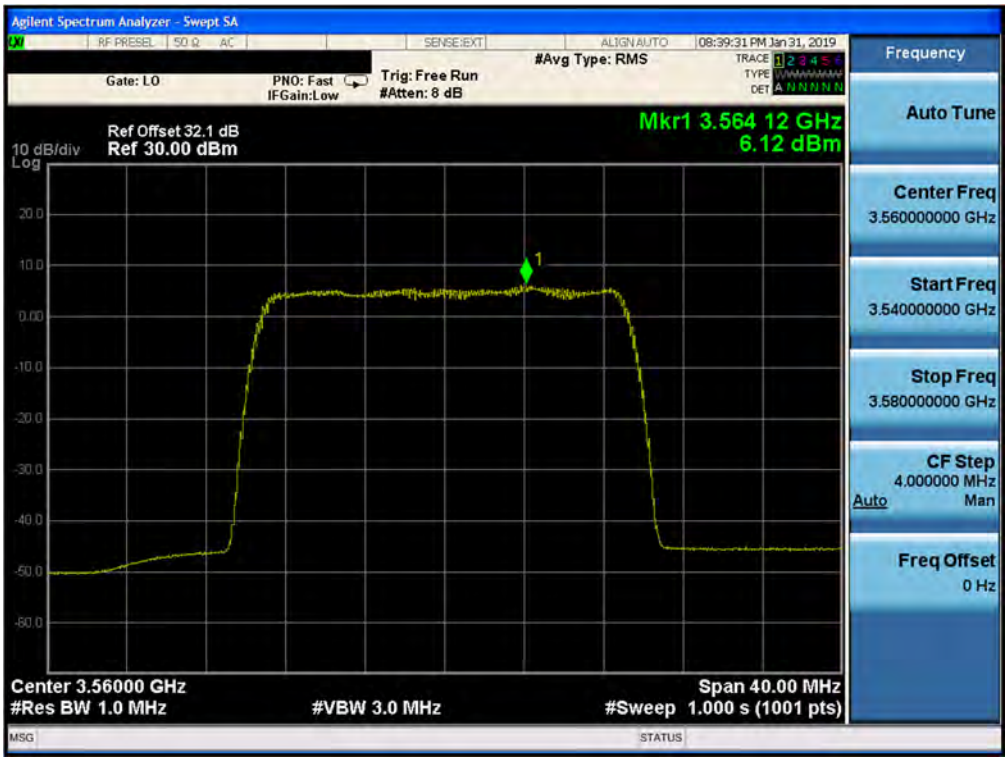
Plot 7-64. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 19



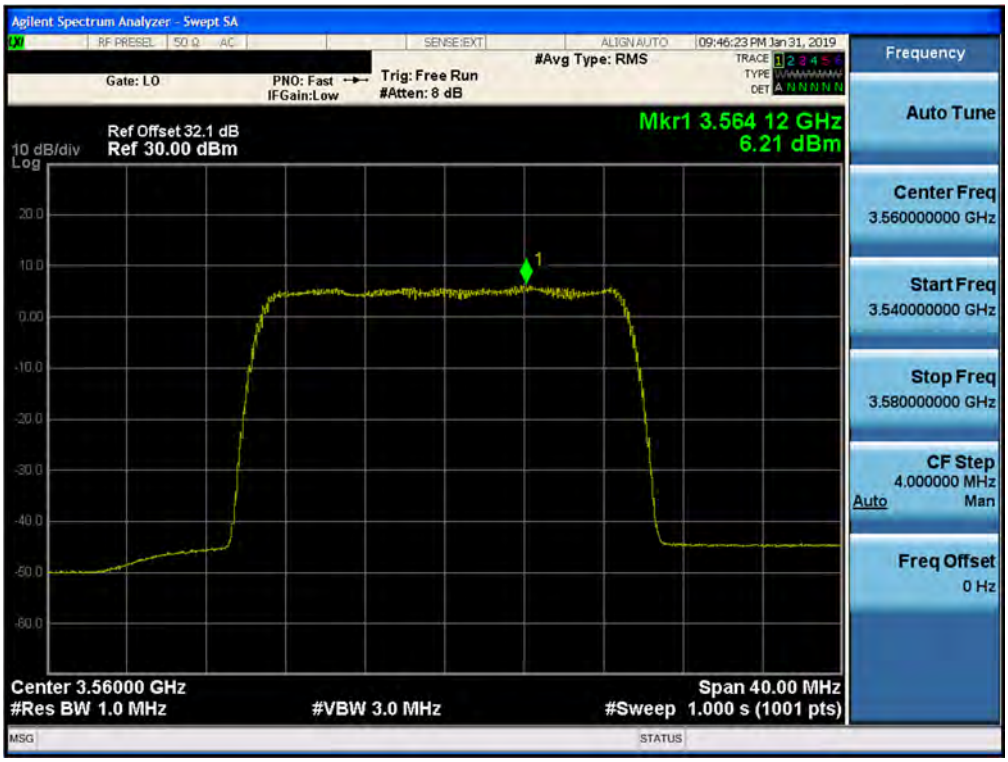
Plot 7-65. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 07



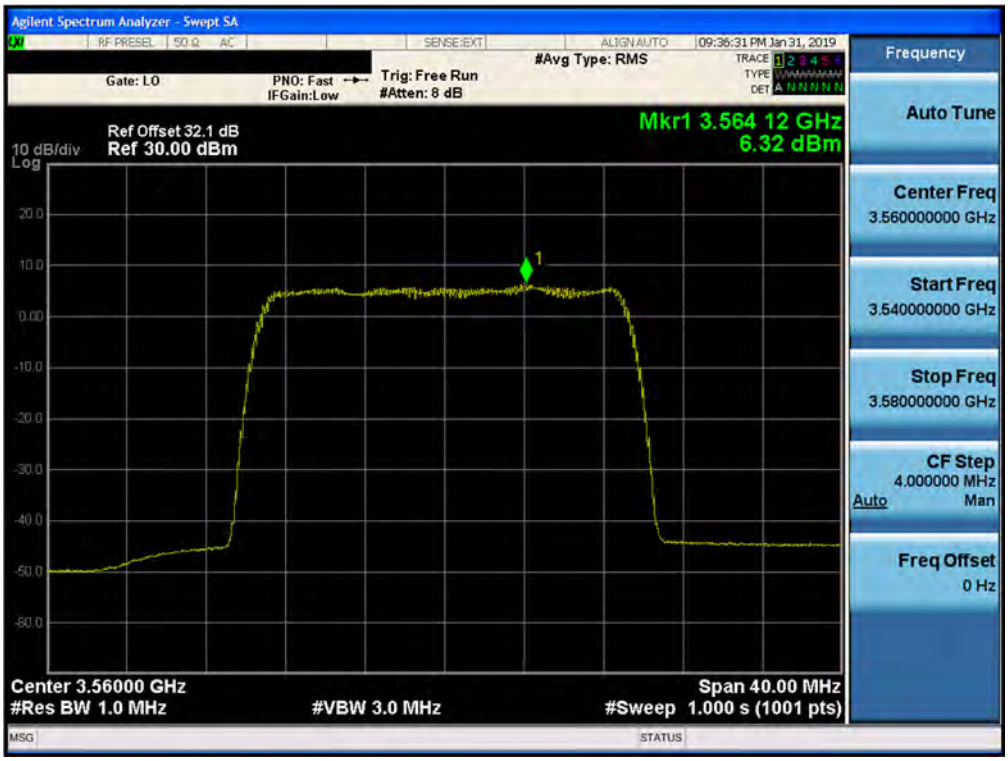
Plot 7-66. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 06



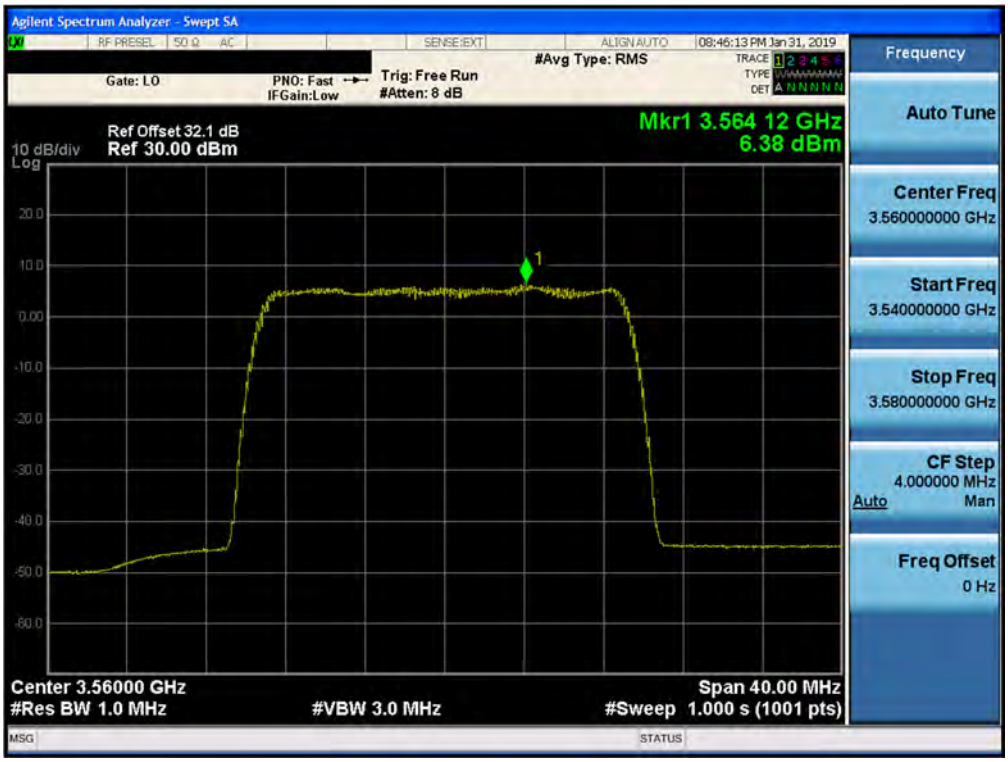
Plot 7-67. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 05



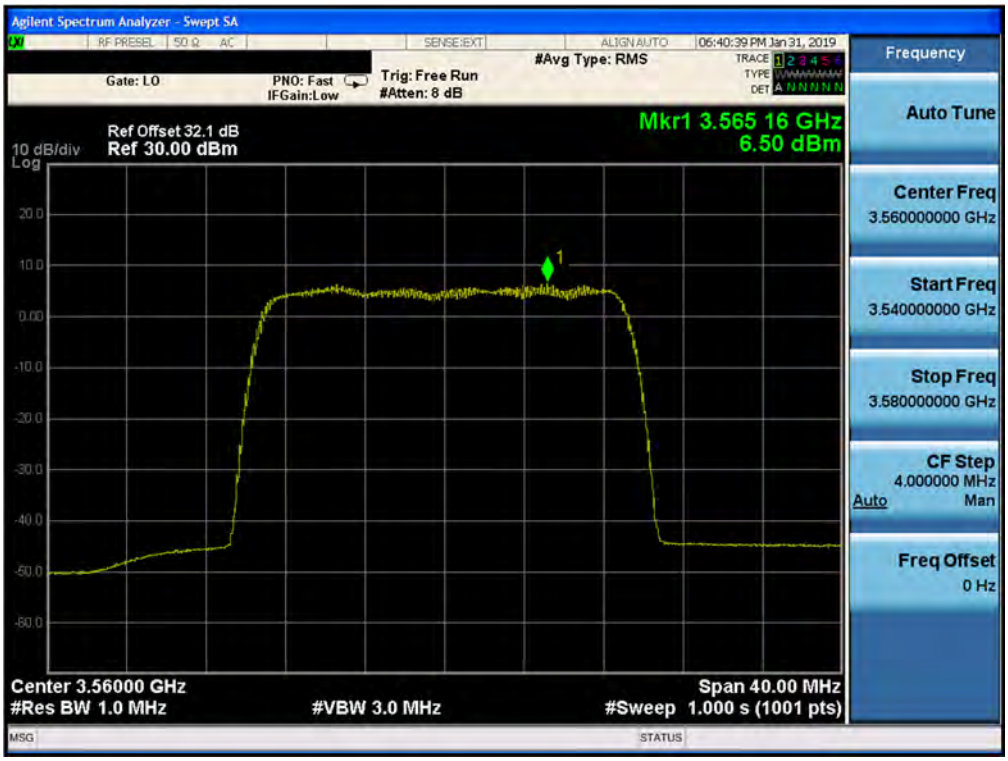
Plot 7-68. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 04



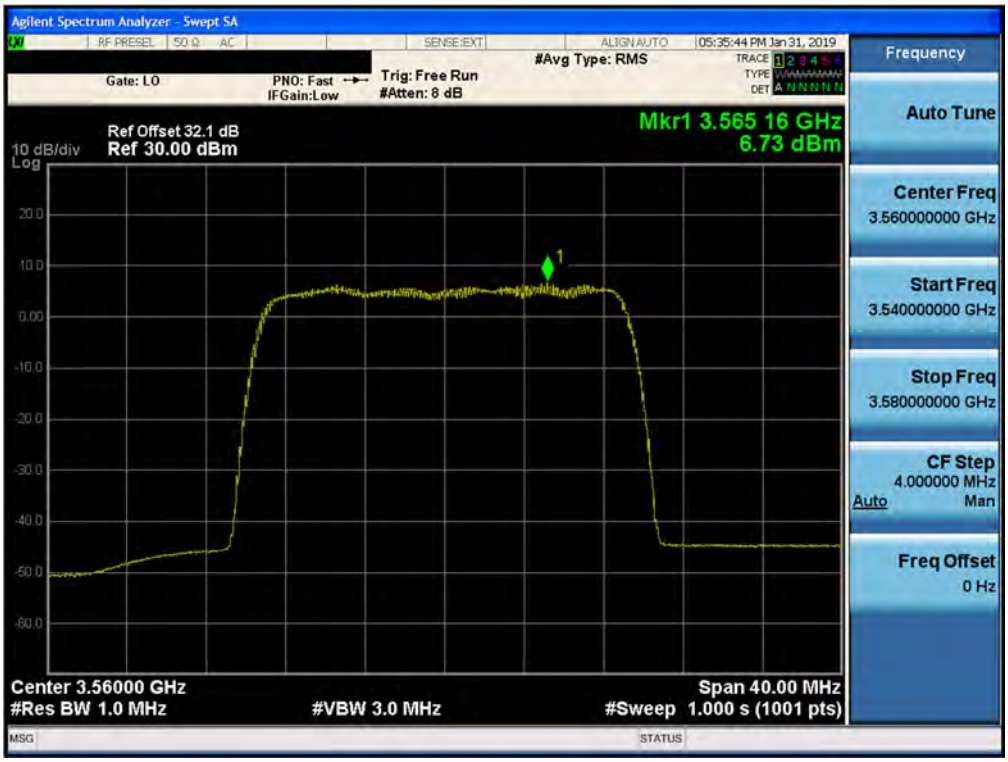
Plot 7-69. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 20



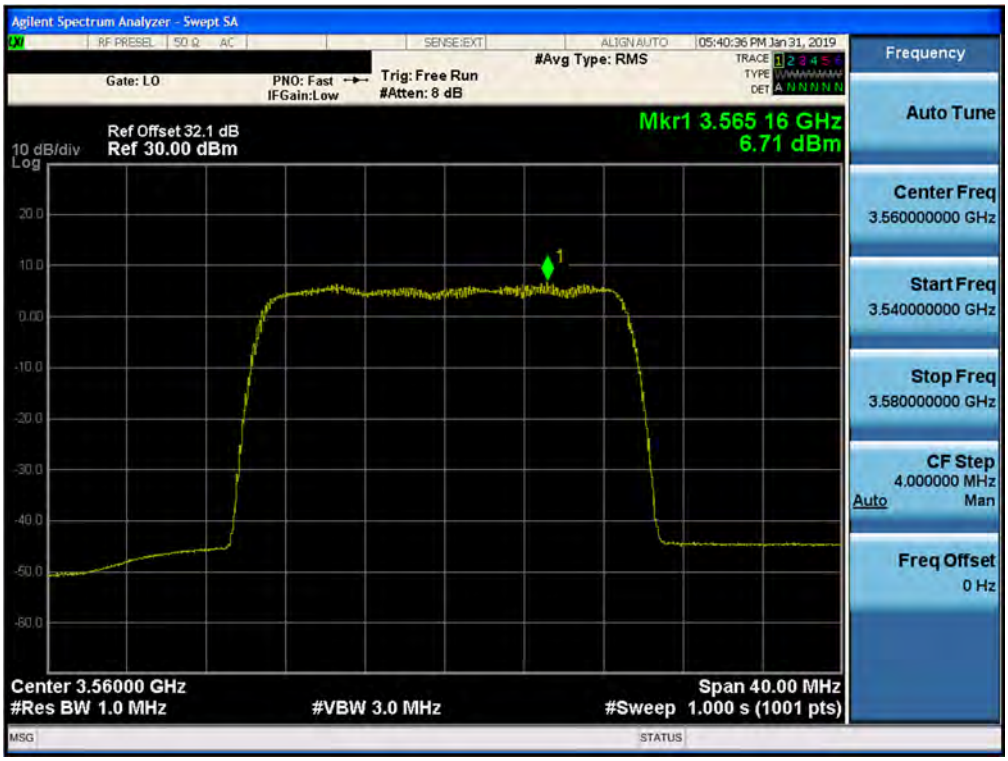
Plot 7-70. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 21



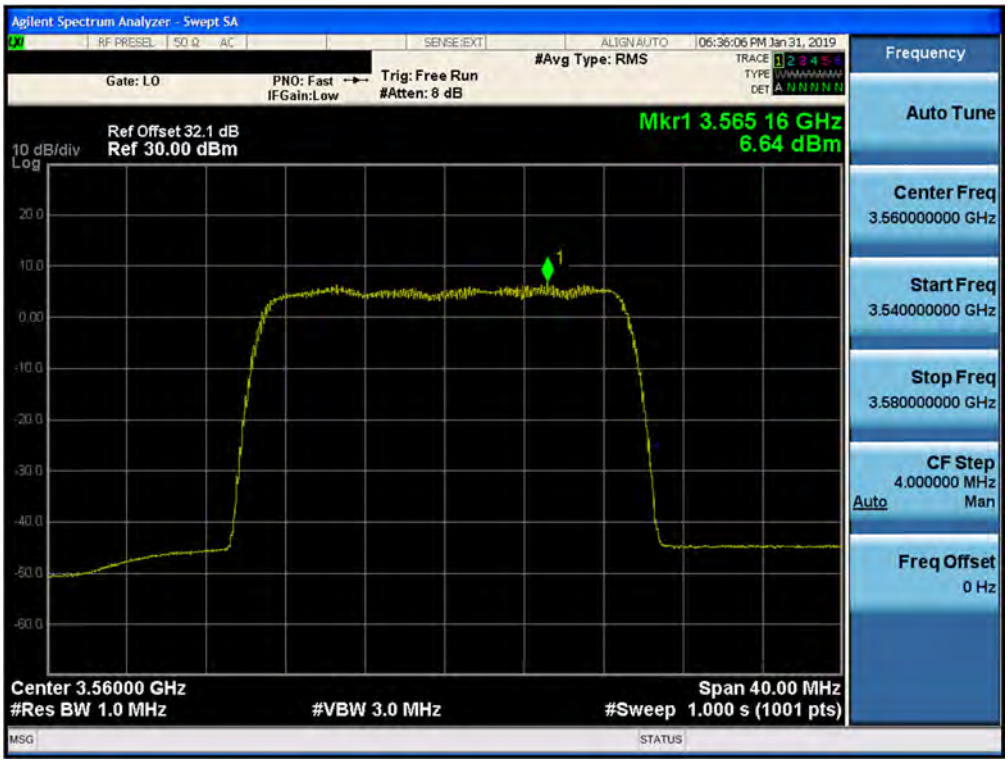
Plot 7-71. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 22



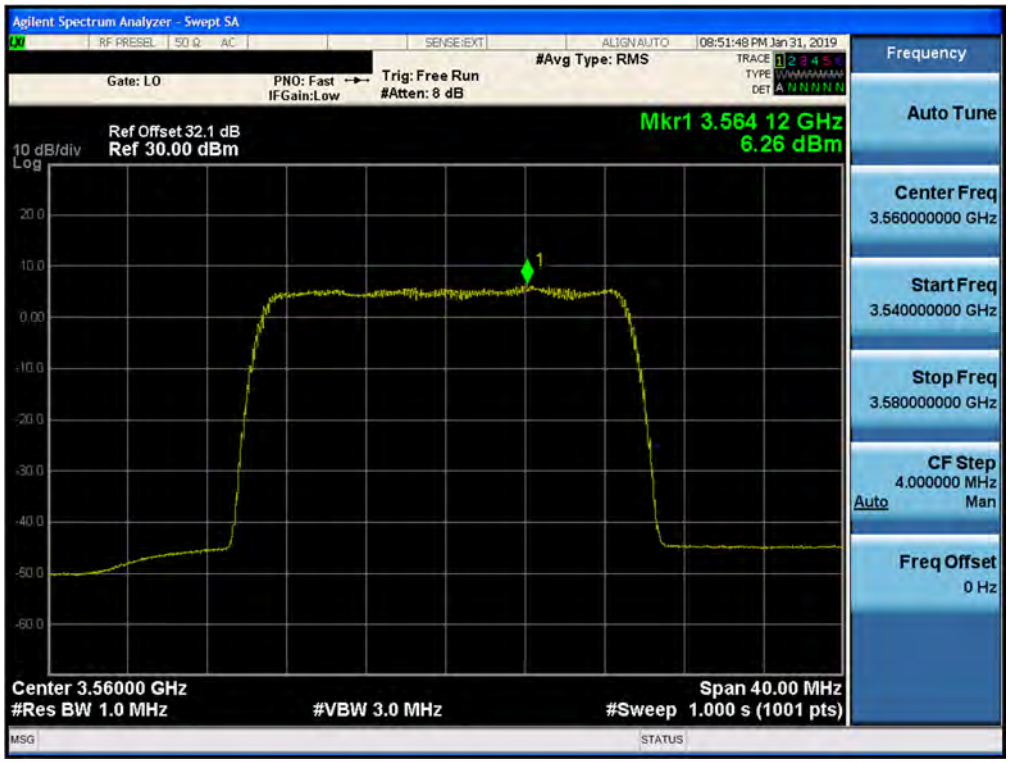
Plot 7-72. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 23



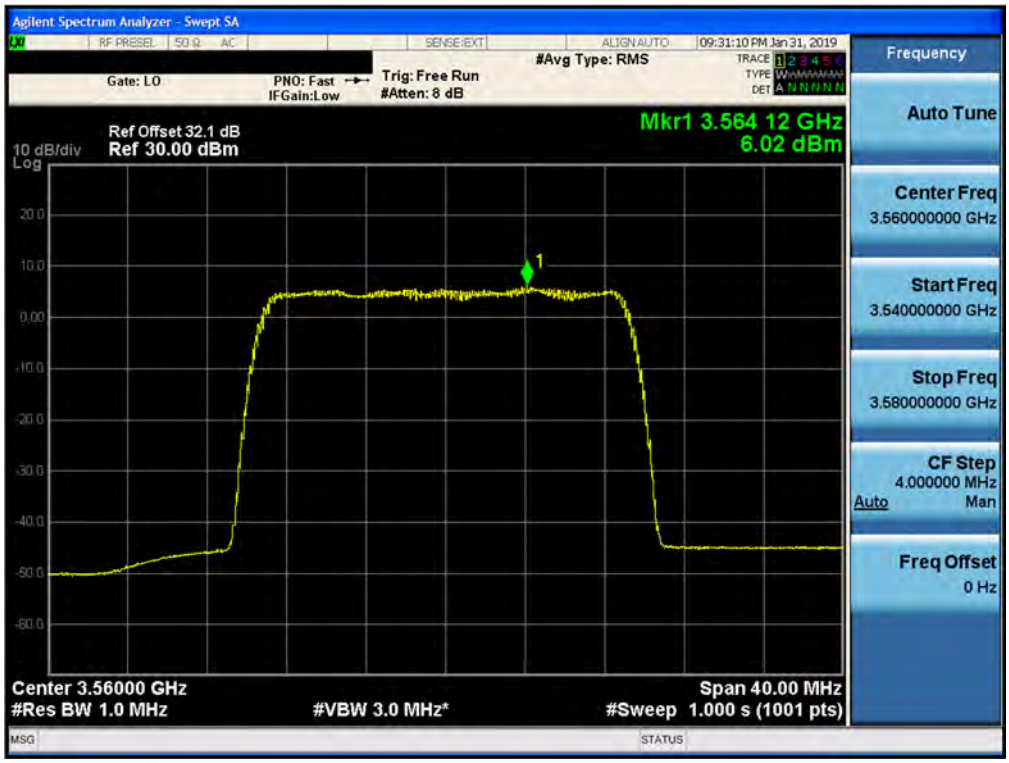
Plot 7-73. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 11



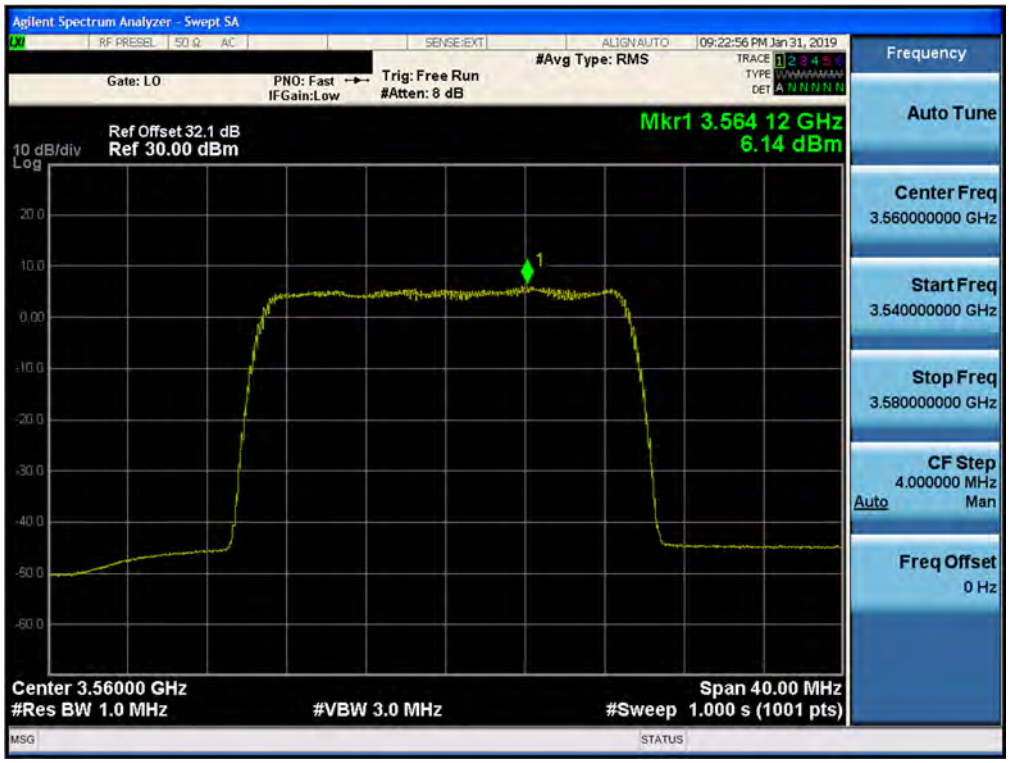
Plot 7-74. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 10



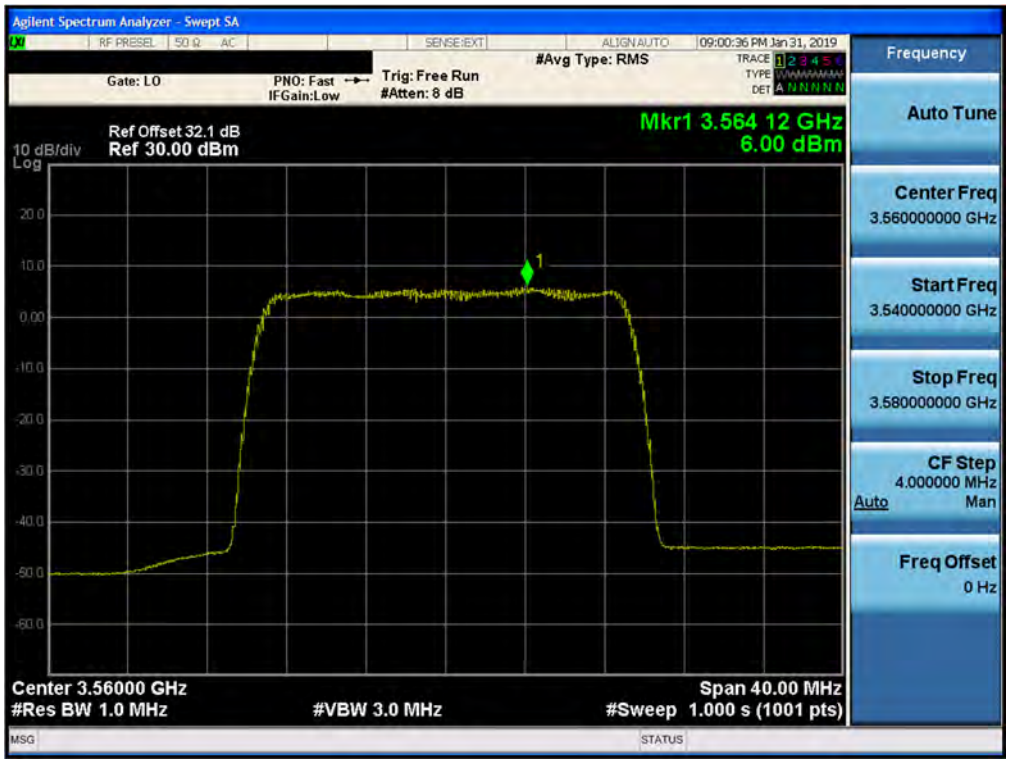
Plot 7-75. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 09



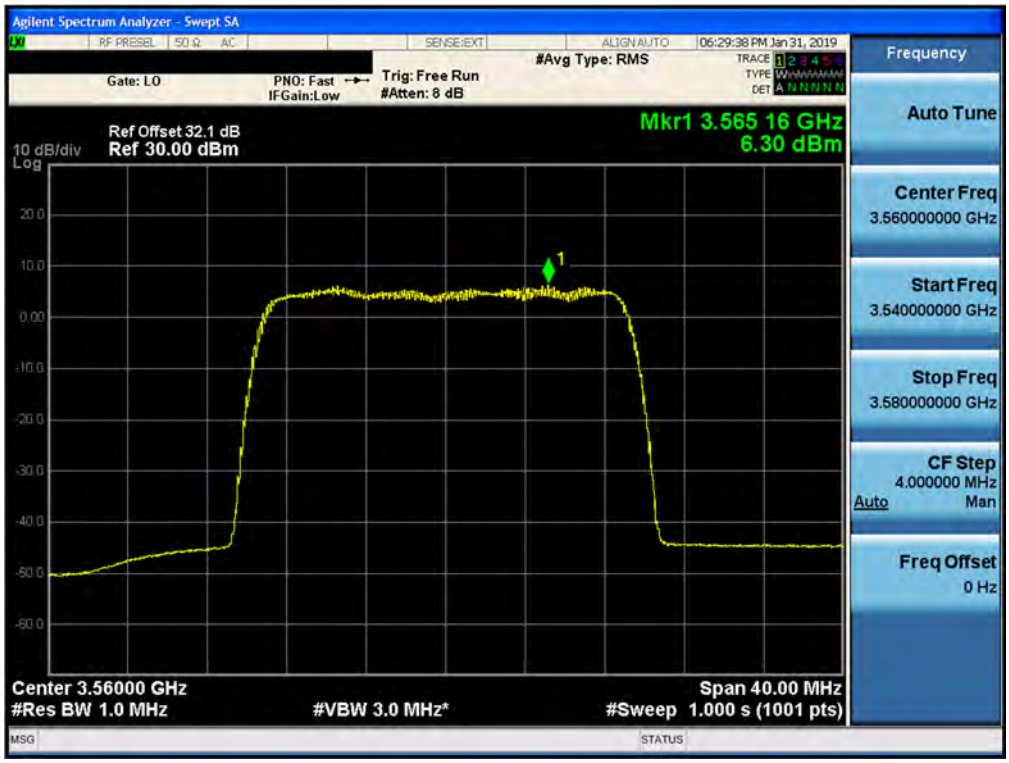
Plot 7-76. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 08



Plot 7-77. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 24



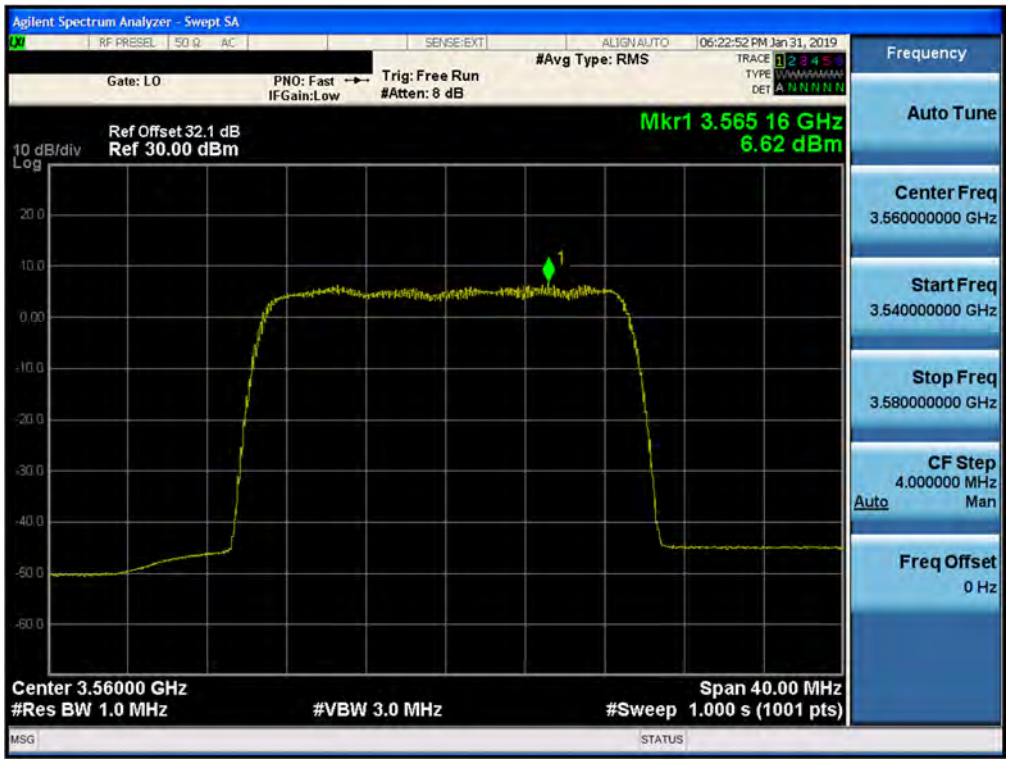
Plot 7-78. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 25



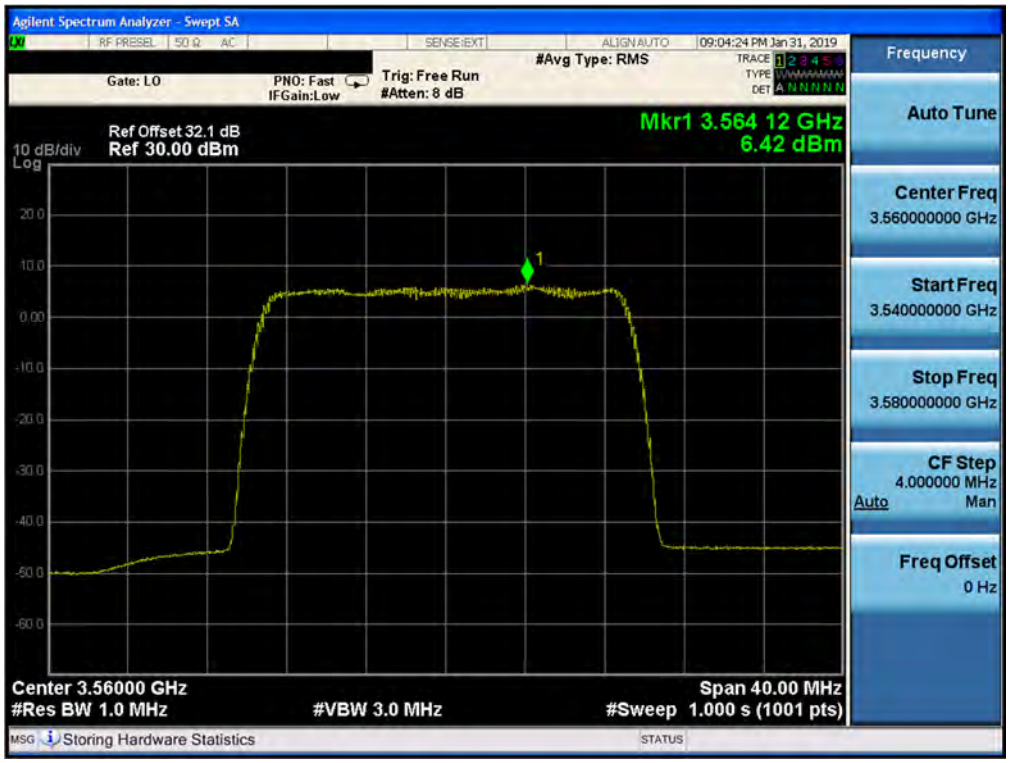
Plot 7-79. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 26

Plot 7-80. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 27

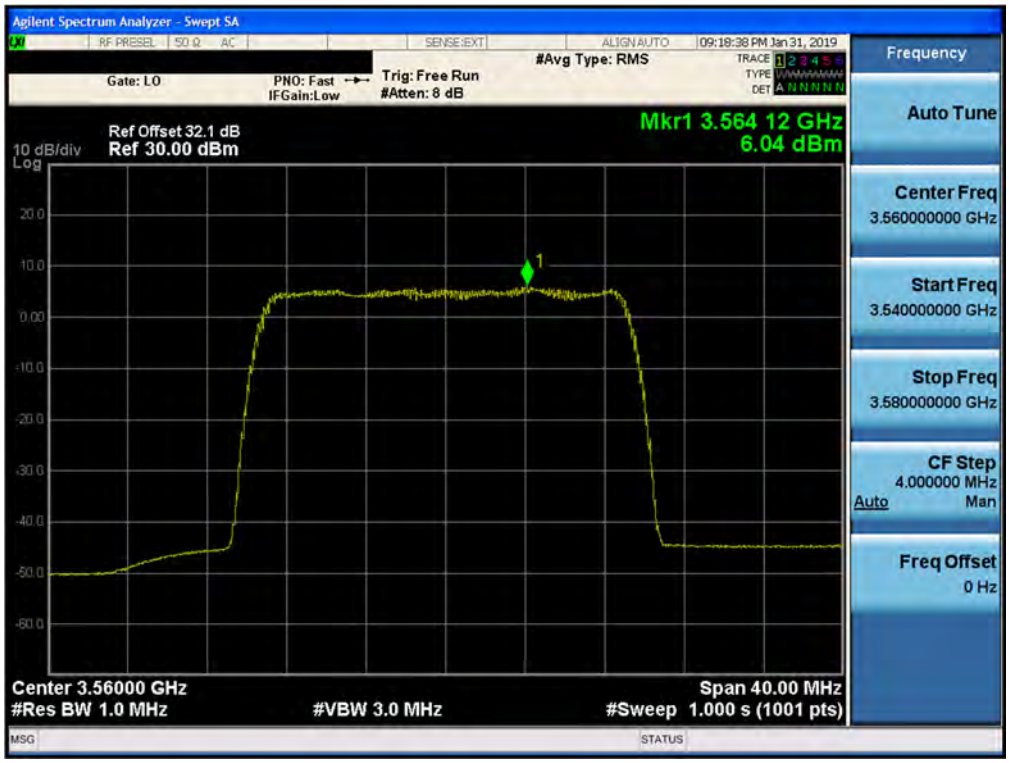
Plot 7-81. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 15



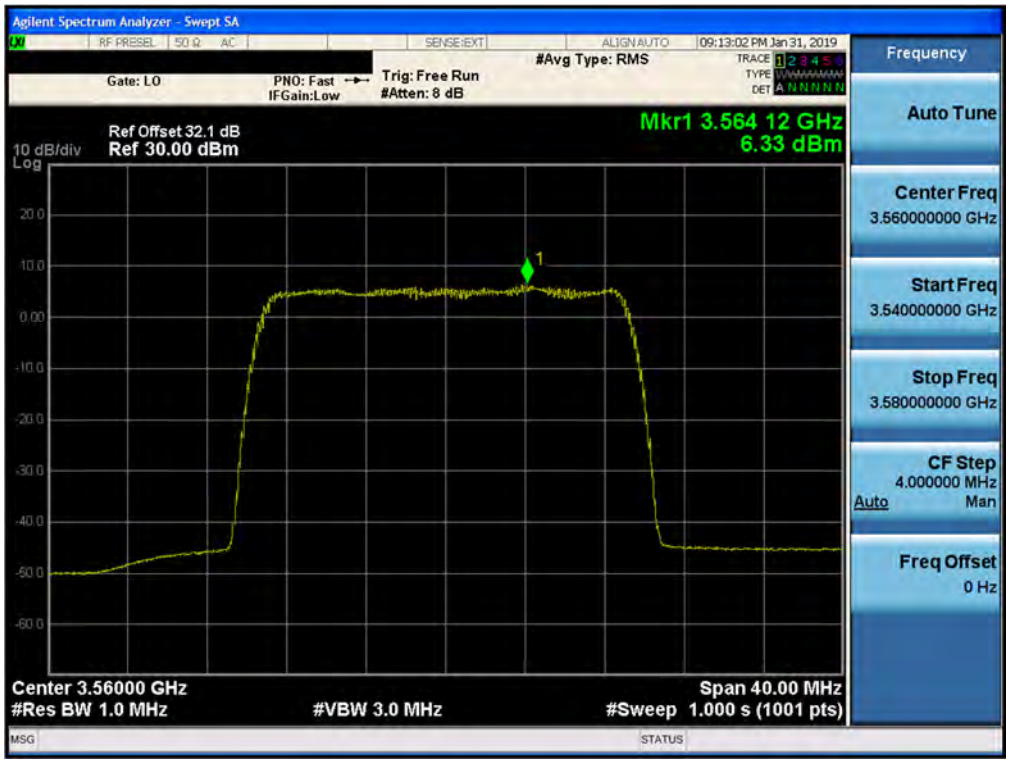
Plot 7-82. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 14



Plot 7-83. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 13

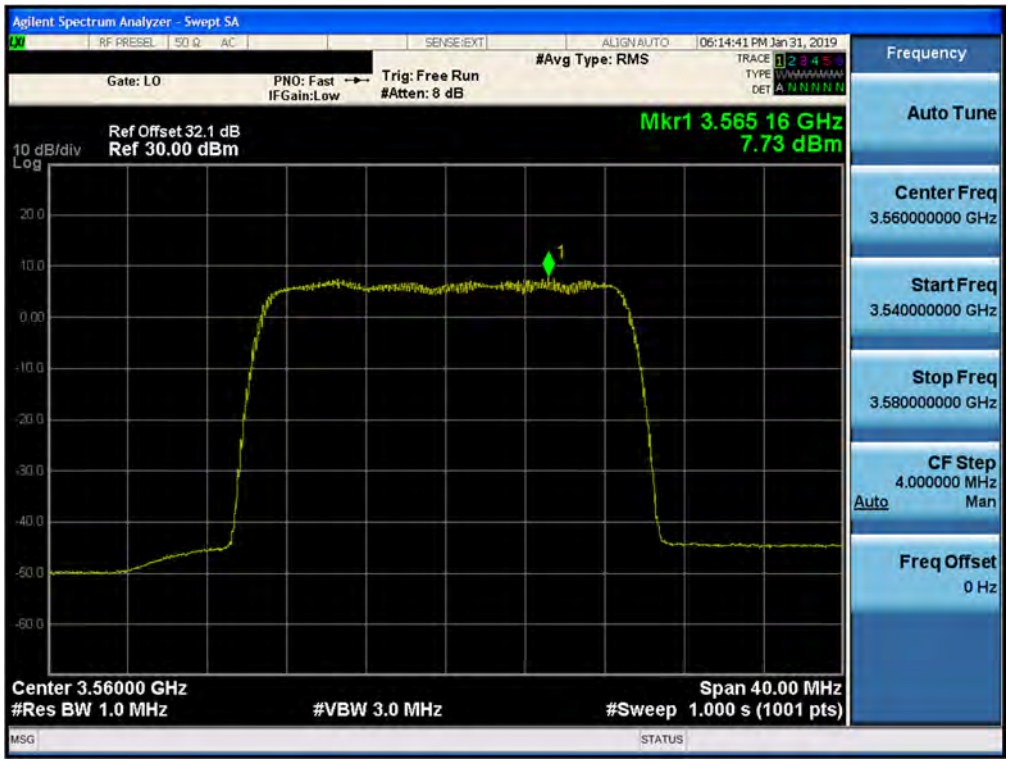


Plot 7-84. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 12

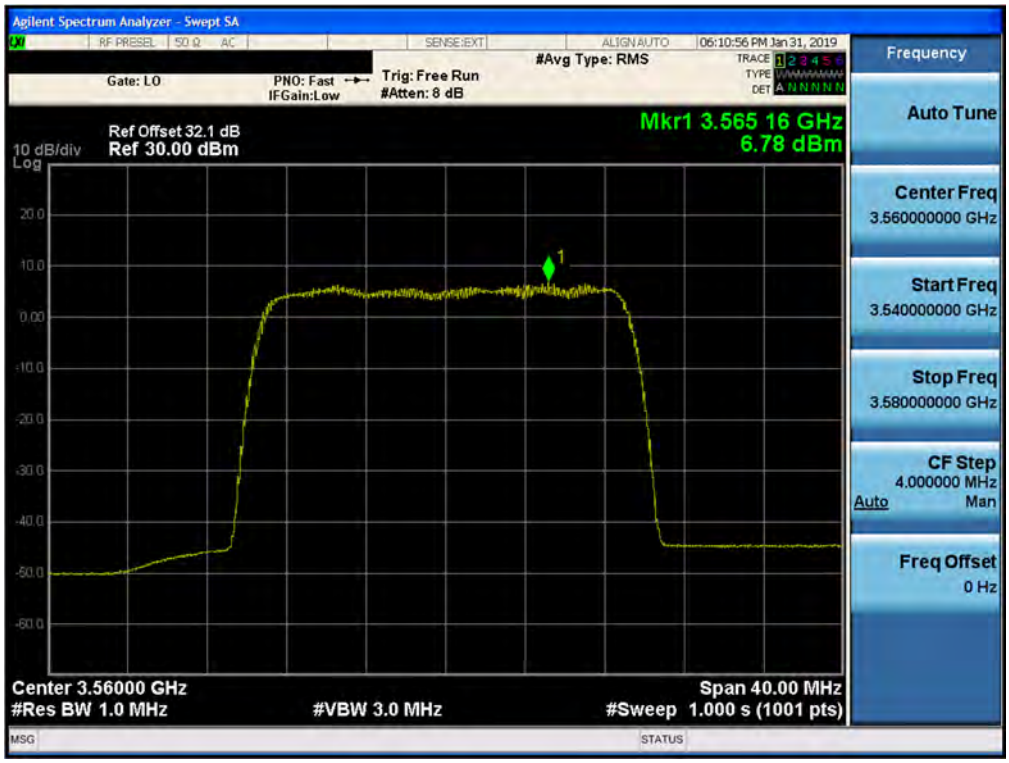


Plot 7-85. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 28

Plot 7-86. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 29

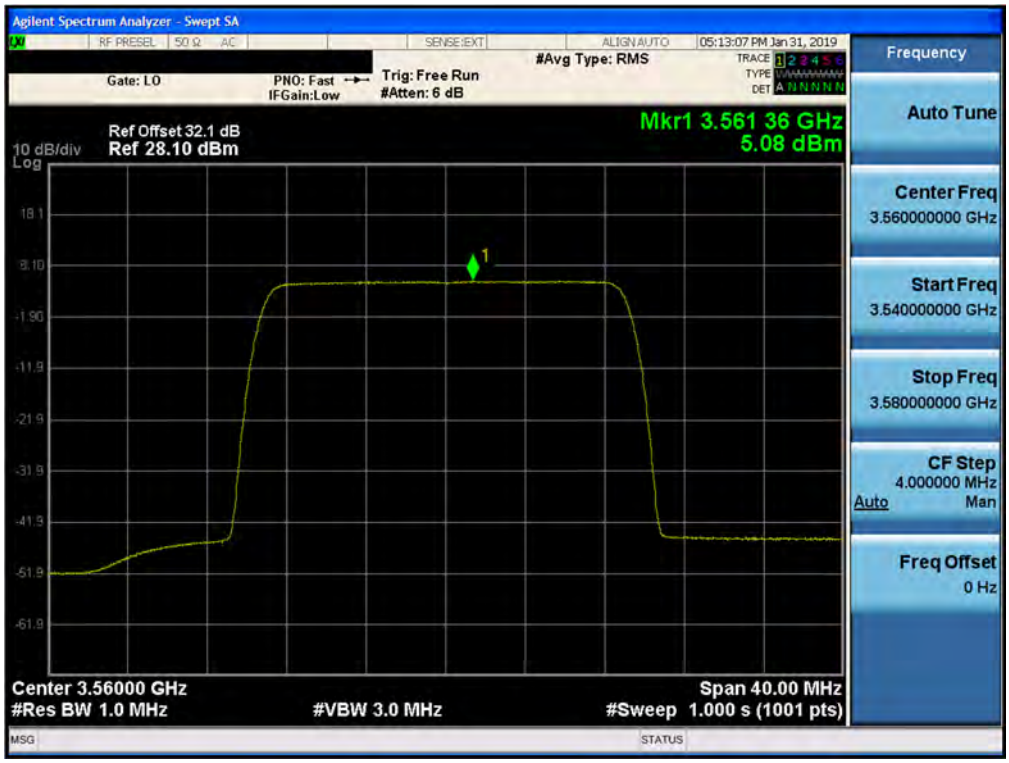


Plot 7-87. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 30



Plot 7-88. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 16QAM- Low Channel) Port 31

8- User Beam 1CC Low Channel 64QAM



Plot 7-89. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 03

Plot 7-90. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 02

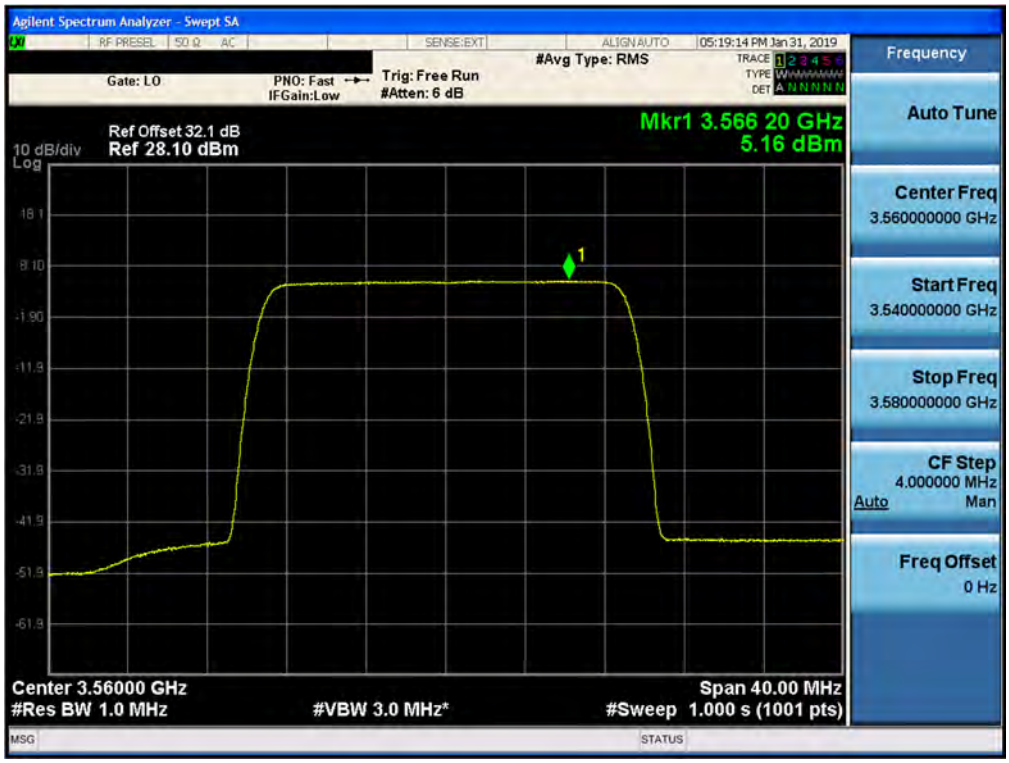
Plot 7-91. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 01

Plot 7-92. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 00

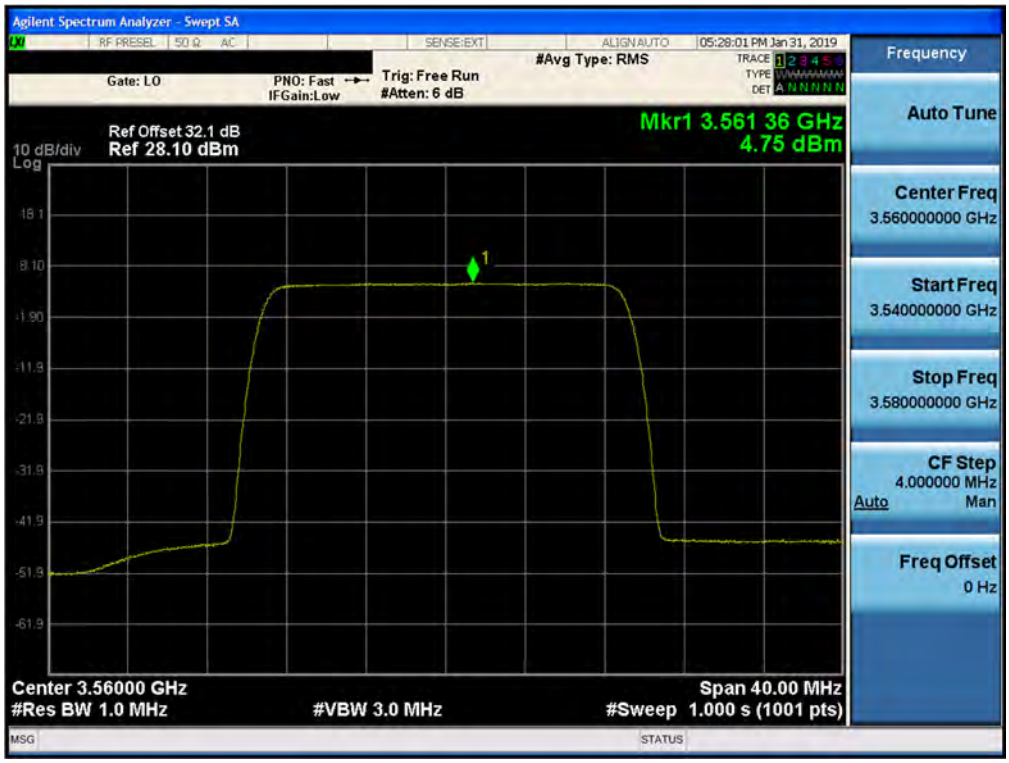
Plot 7-93. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 16

Plot 7-94. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 17

Plot 7-95. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 18



Plot 7-96. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 19

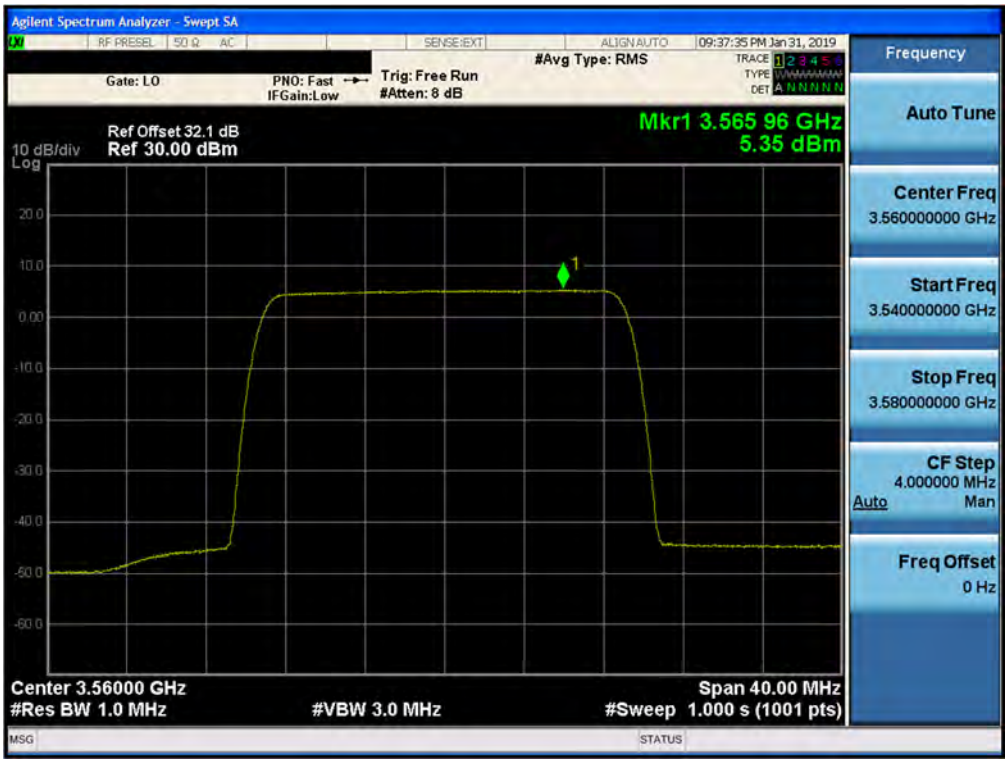


Plot 7-97. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 07

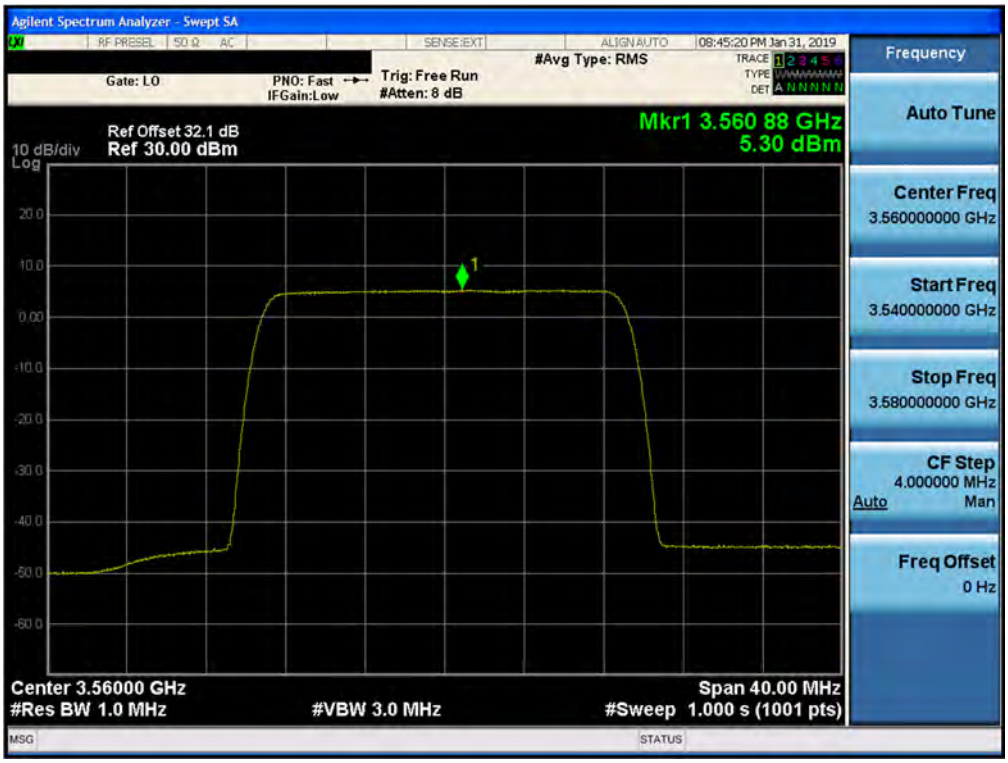
Plot 7-98. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 06

Plot 7-99. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 05

Plot 7-100. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 04

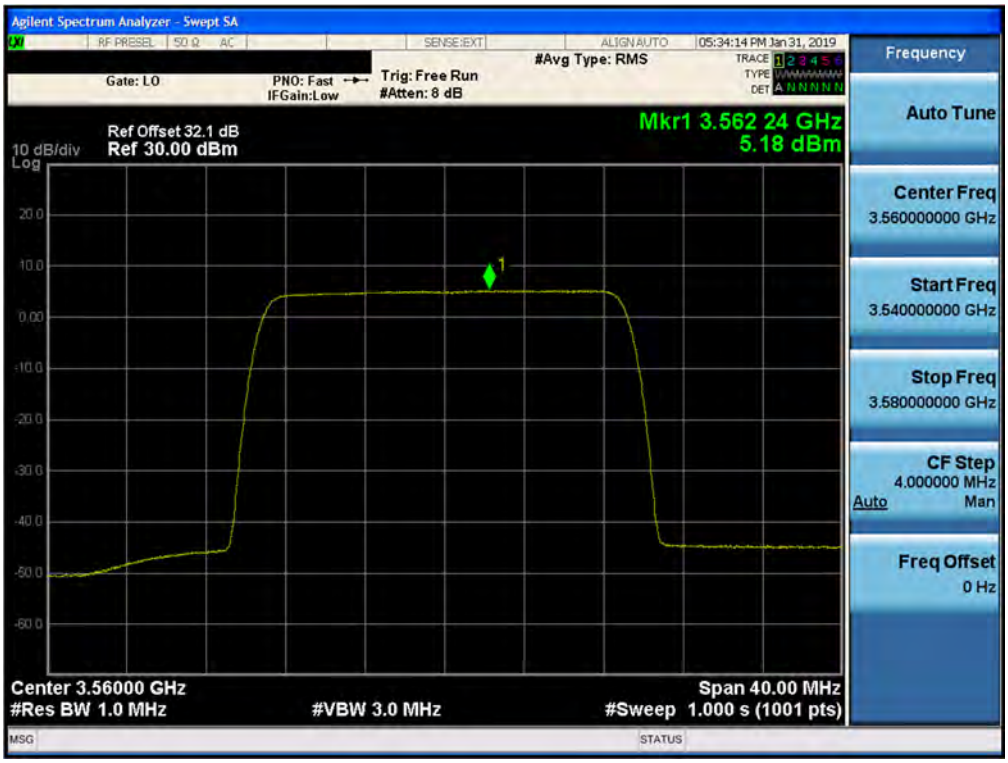


Plot 7-101. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 20

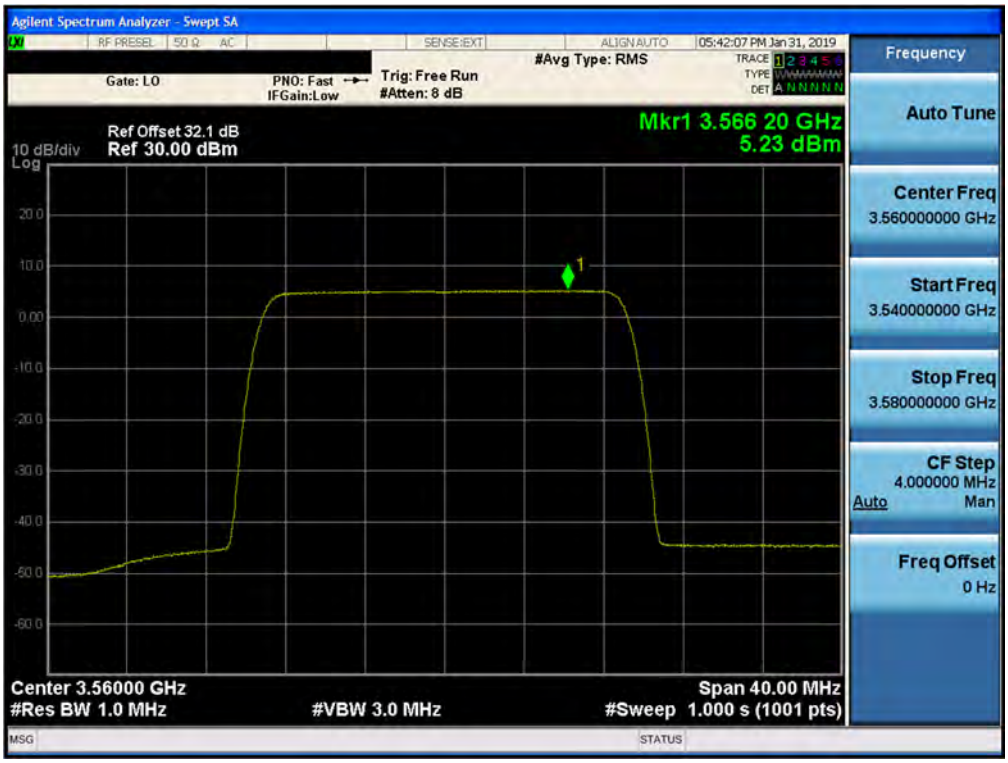


Plot 7-102. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 21

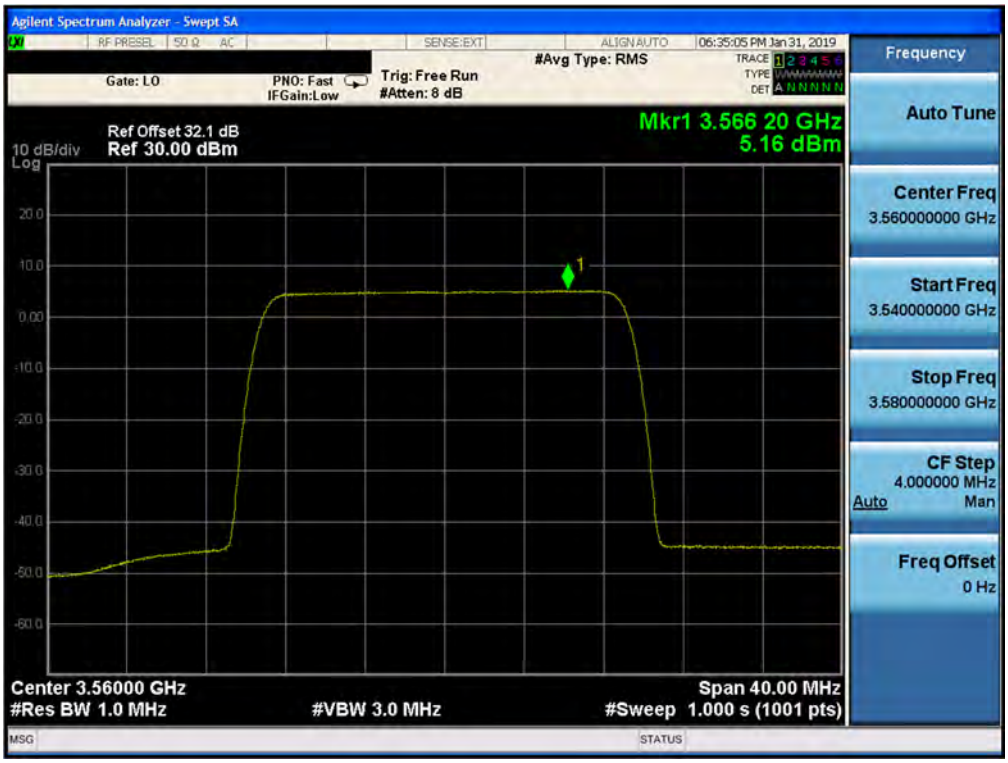
Plot 7-103. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 22



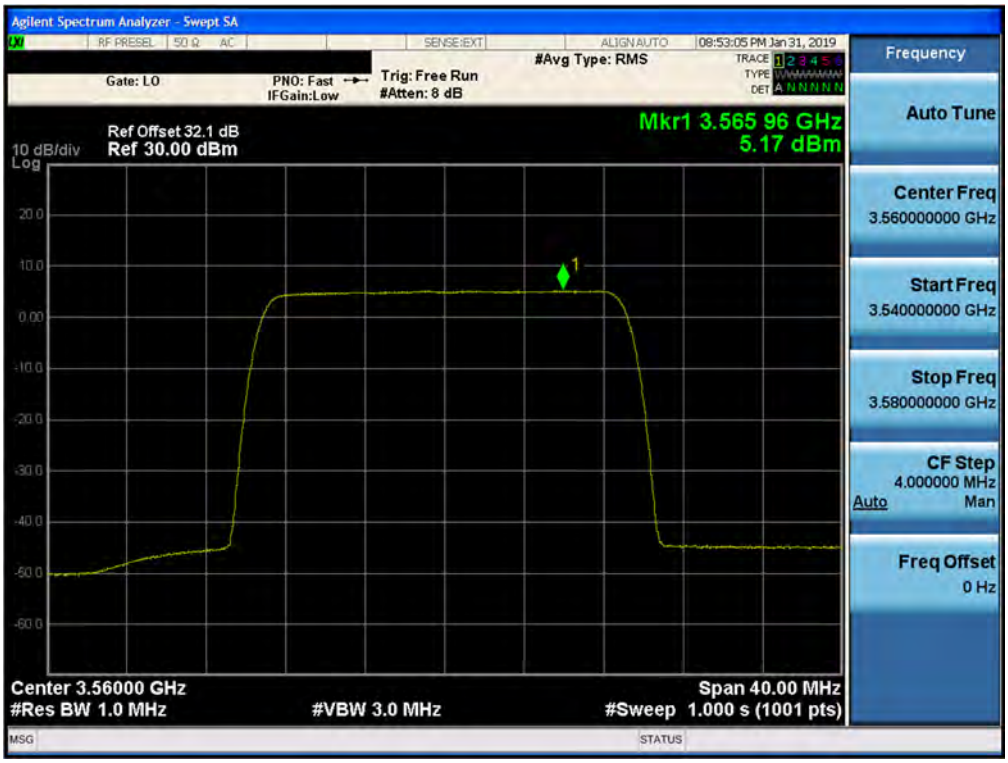
Plot 7-104. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 23



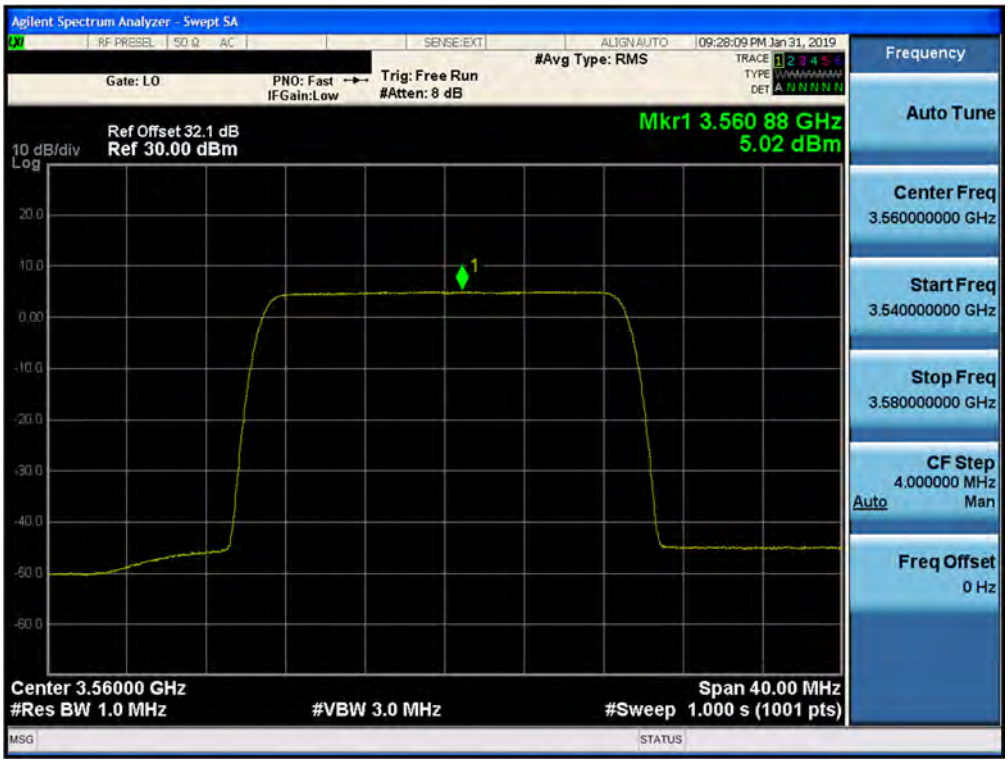
Plot 7-105. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 11



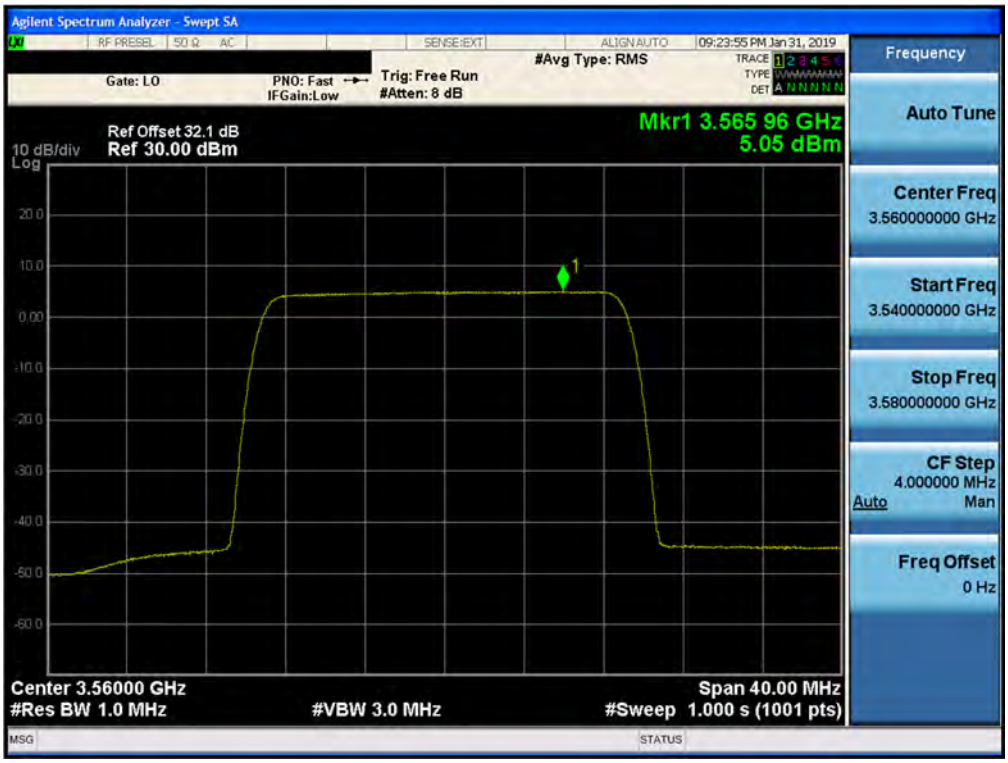
Plot 7-106. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 10



Plot 7-107. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 09



Plot 7-108. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 08

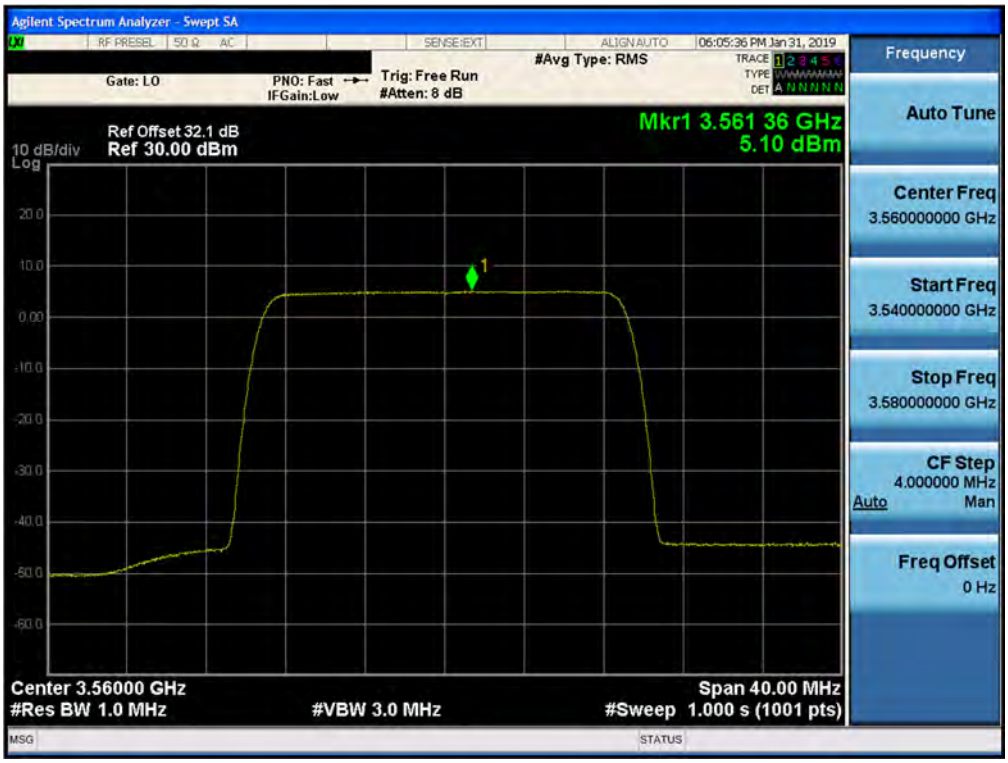


Plot 7-109. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 24

Plot 7-110. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 25

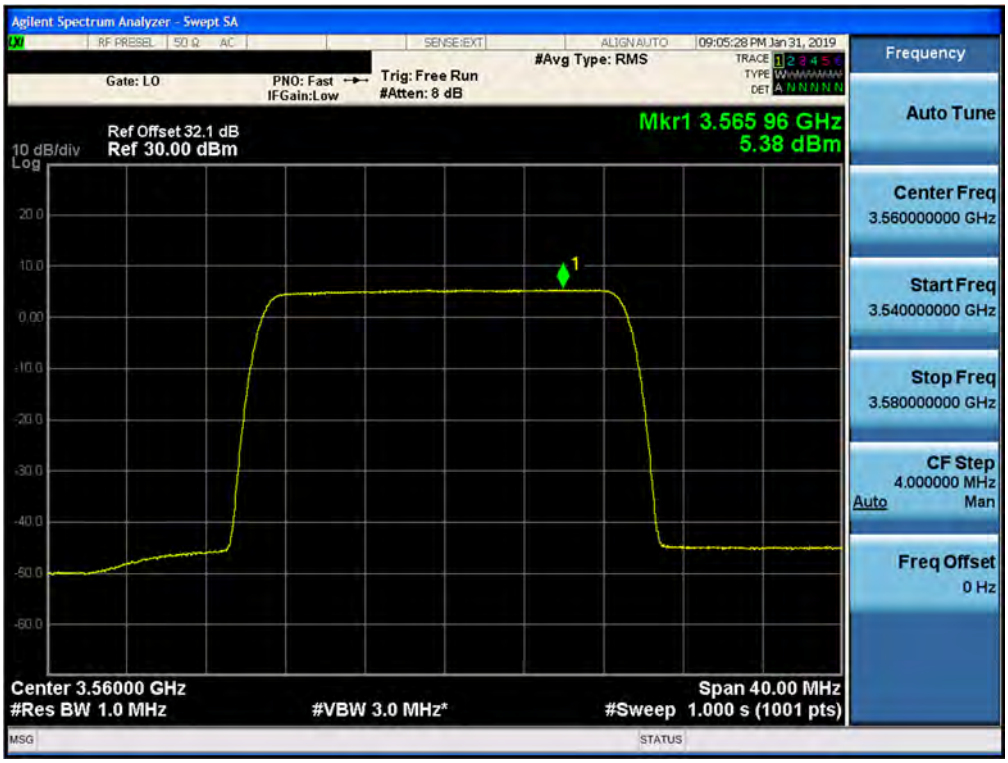
Plot 7-111. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 26

Plot 7-112. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 27



Plot 7-113. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 15

Plot 7-114. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 14

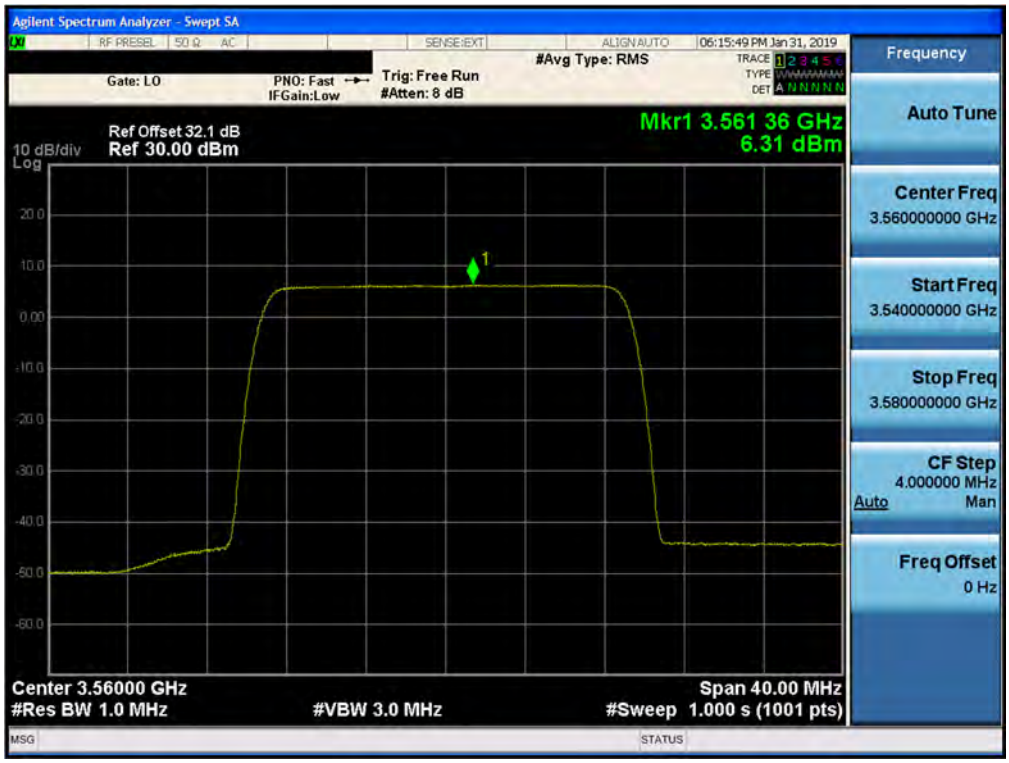


Plot 7-115. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 13

Plot 7-116. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 12

Plot 7-117. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 28

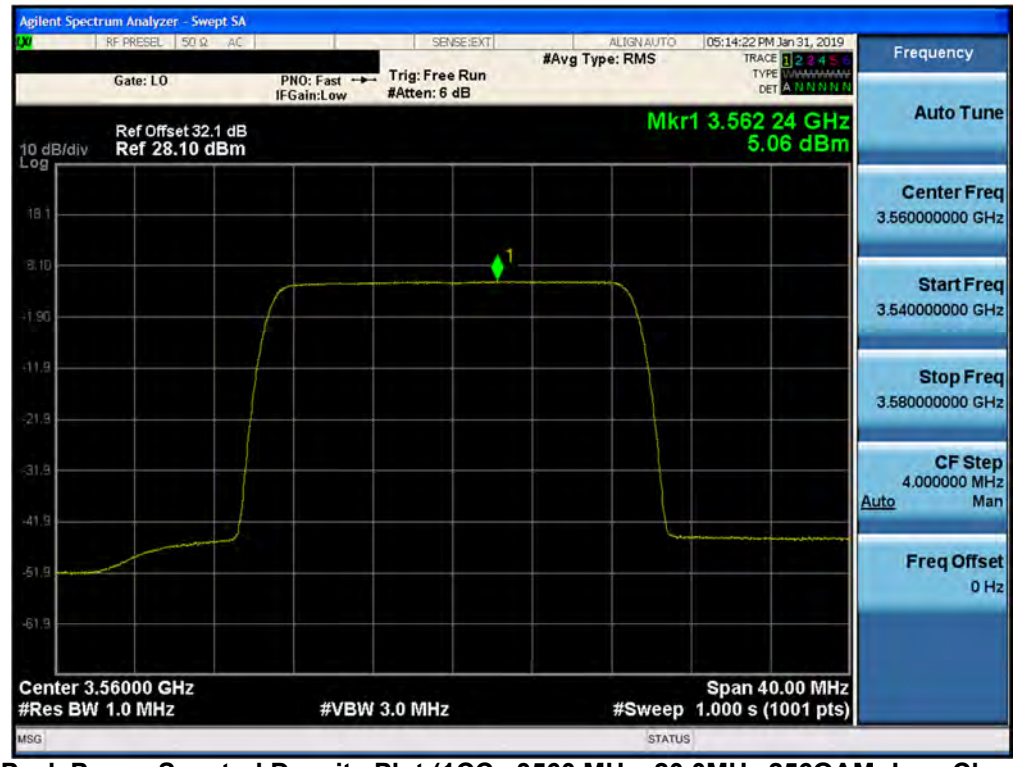
Plot 7-118. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 29



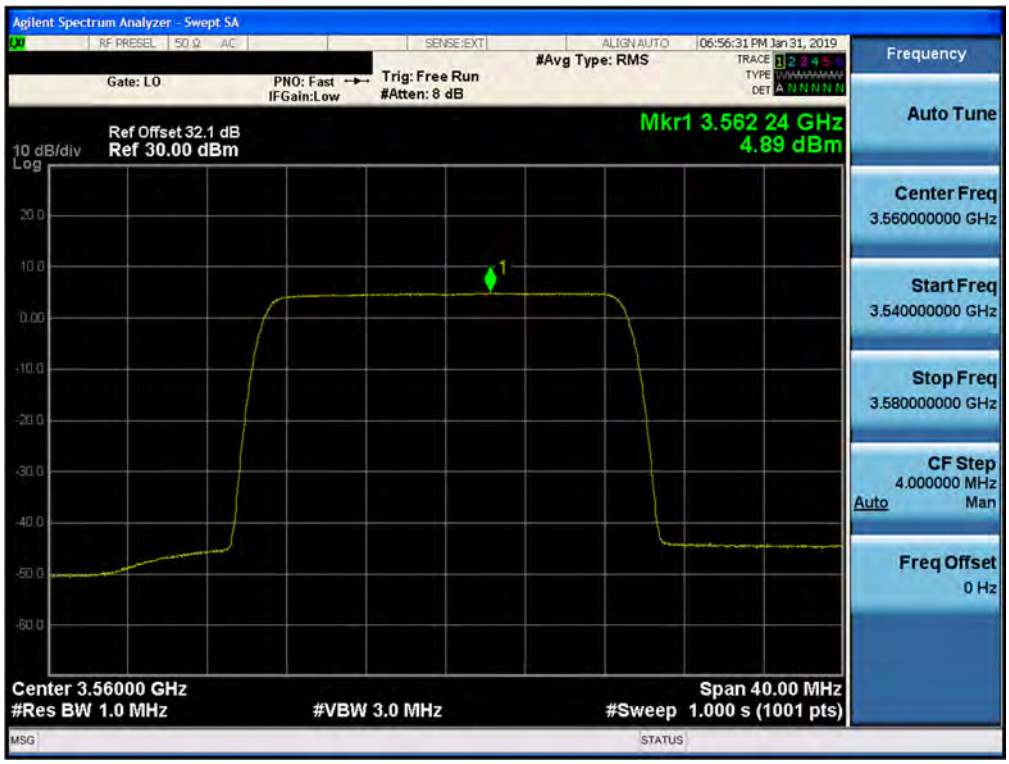
Plot 7-119. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 30

Plot 7-120. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 64QAM- Low Channel) Port 31

8- User Beam 1CC Low Channel 256QAM



Plot 7-121. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 03



Plot 7-122. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 02

Plot 7-123. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 01

Plot 7-124. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 00

Plot 7-125. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 16

Plot 7-126. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 17

Plot 7-127. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 18

Plot 7-128. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 19

Plot 7-129. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 07

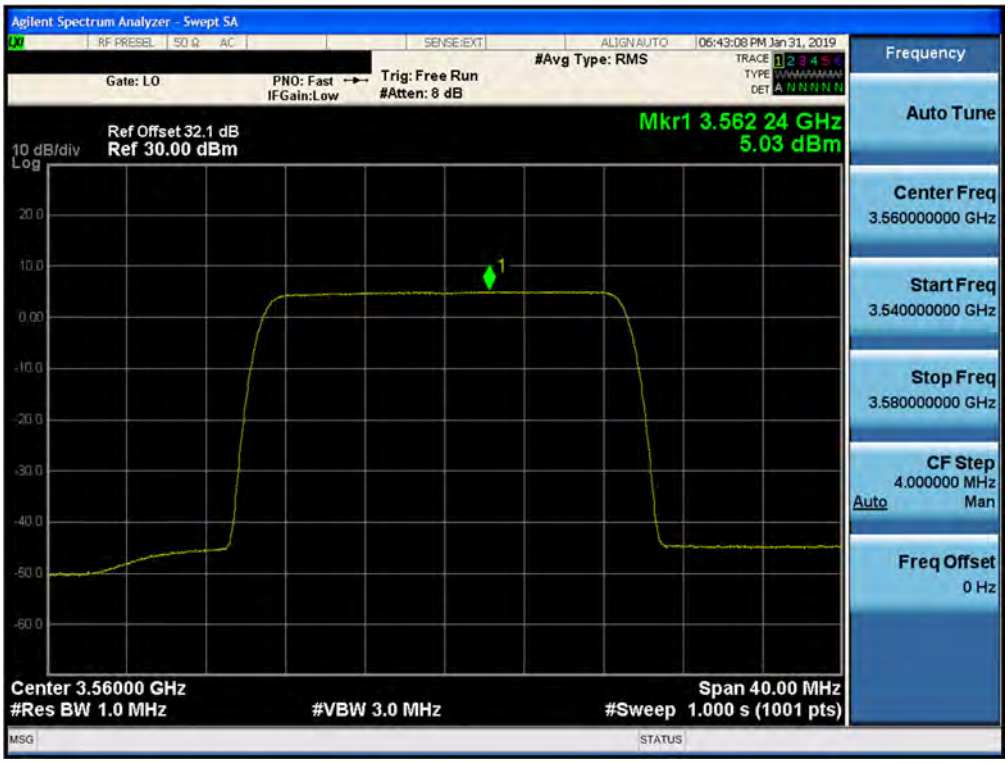
Plot 7-130. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 06

Plot 7-131. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 05

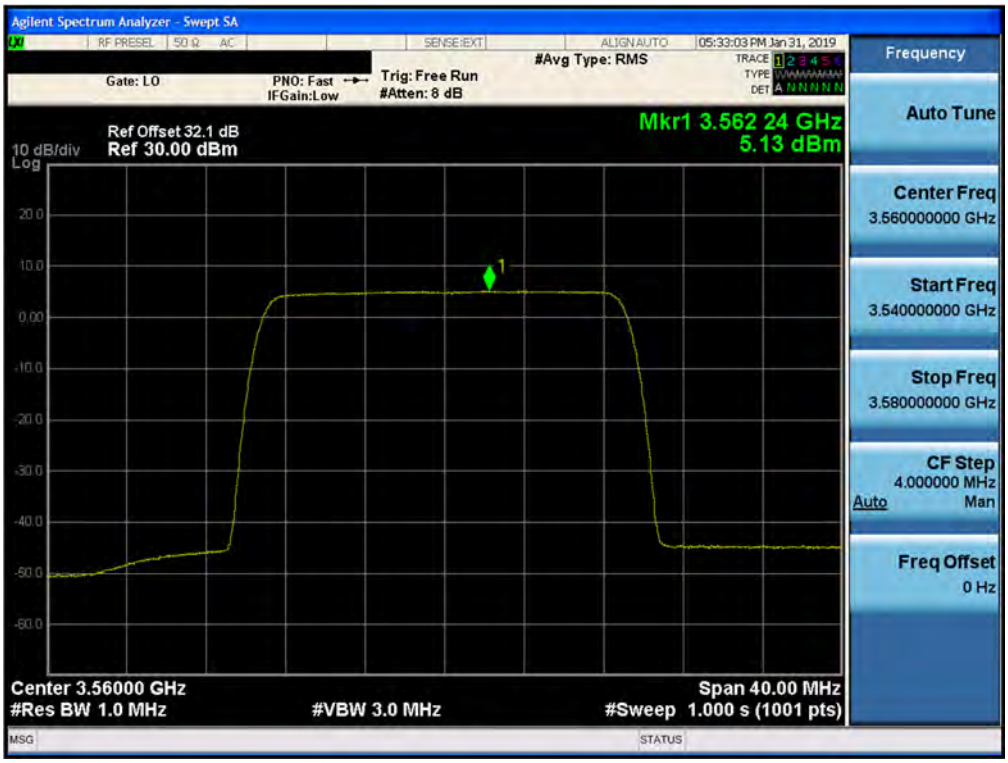
Plot 7-132. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 04

Plot 7-133. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 20

Plot 7-134. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 21

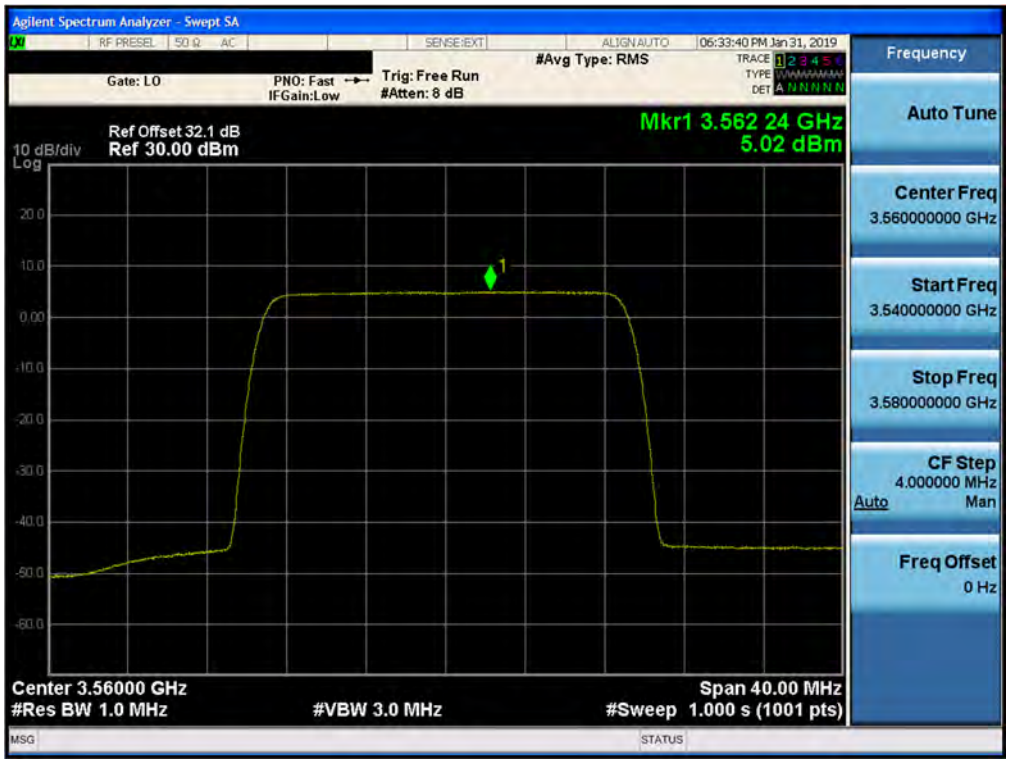


Plot 7-135. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 22



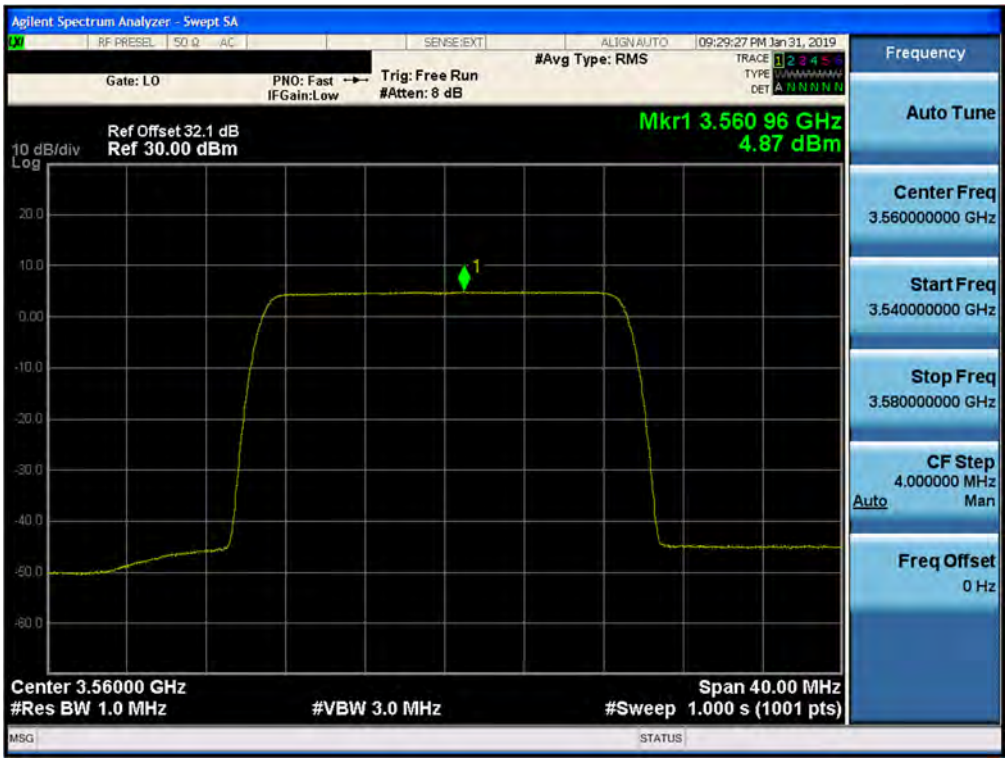
Plot 7-136. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 23

Plot 7-137. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 11



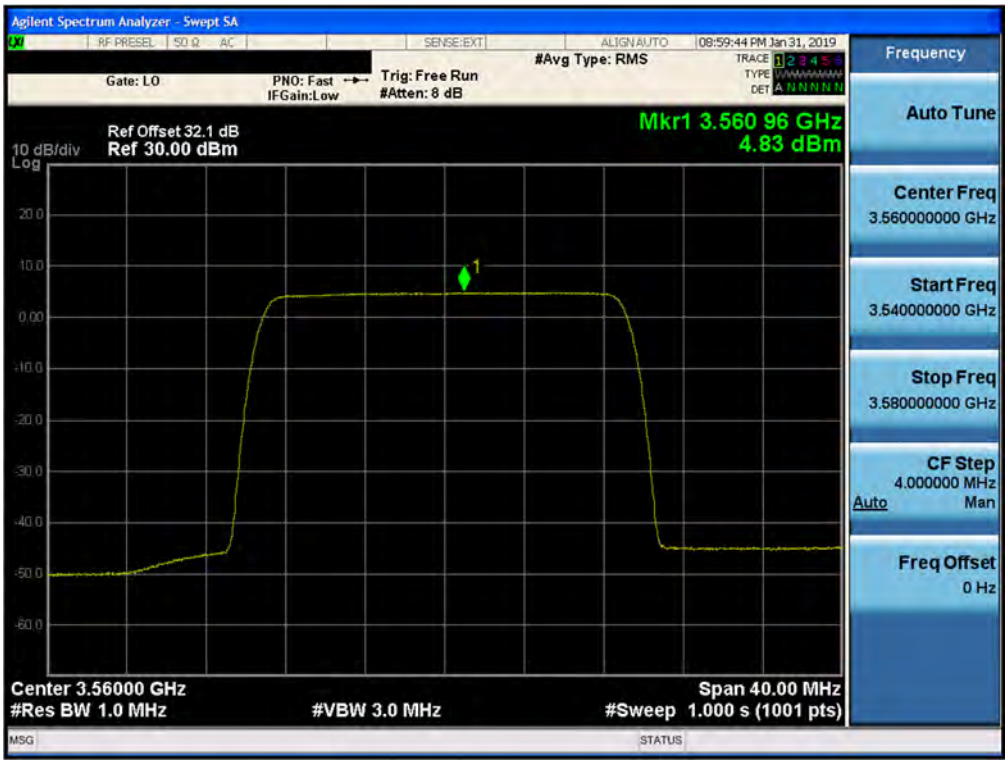
Plot 7-138. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 10

Plot 7-139. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 09

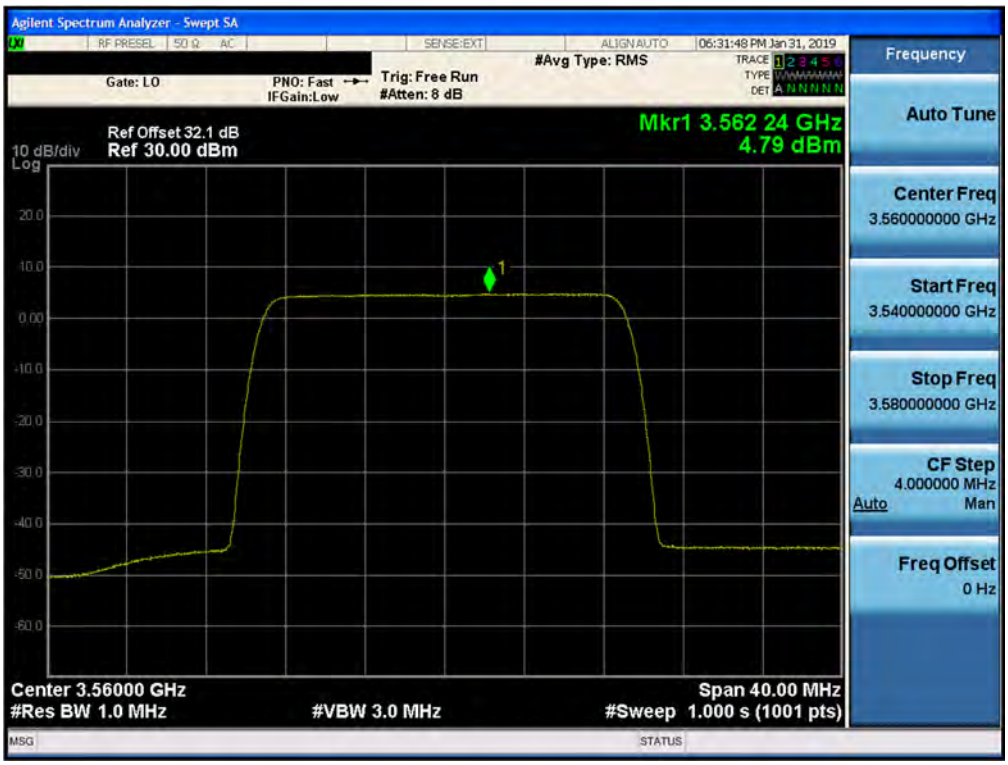


Plot 7-140. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 08

Plot 7-141. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 24

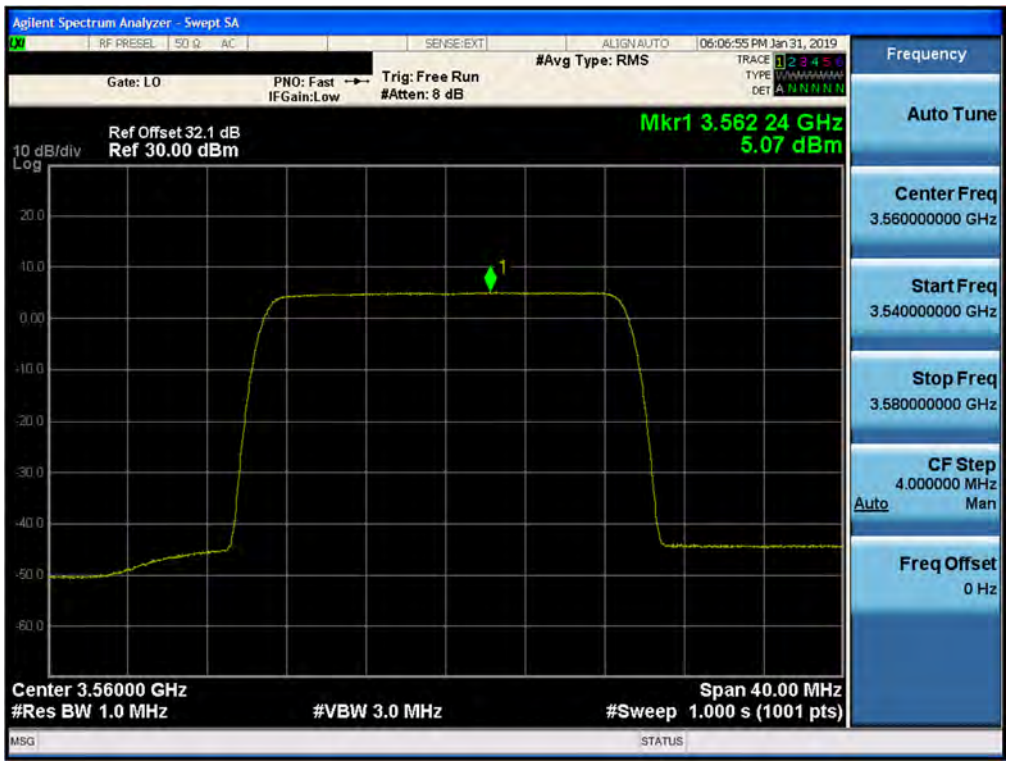


Plot 7-142. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 25

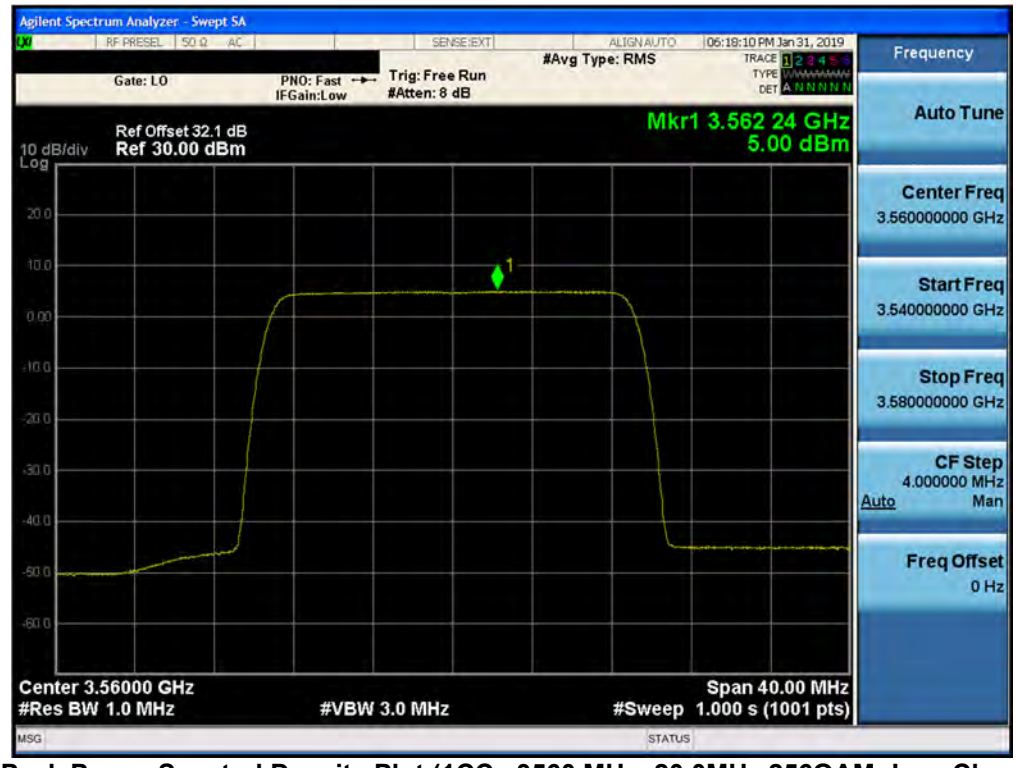


Plot 7-143. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 26

Plot 7-144. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 27



Plot 7-145. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 15



Plot 7-146. Peak Power Spectral Density Plot (1CC– 3560 MHz- 20.0MHz 256QAM- Low Channel) Port 14