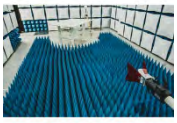
PCTEST ENGINEERING LABORATORY, INC.
7185 Oakland Mills Road, Columbia, MD 21046 USA
Tel. 410.290.6652 / Fax 410.290.6654
http://www.pctest.com



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:
12/2/2019 - 12/13/2019
Test Site/Location:
PCTEST Lab. Columbia, MD
Test Report Serial No.:
8K19110701-01R01.A3L

FCC ID:	**A3LRT4401-48A**
APPLICANT:	**Samsung Electronics Co., Ltd.**

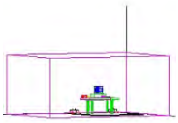
Application Type:	Class II Permissive Change
Model:	RT4401-48A
EUT Type:	RRU(RT4401)
FCC Classification:	Citizens Band Category B Devices (CBD)
FCC Rule Part(s):	96
Purpose:	Class II Permissive Change
Change Description	Reference Change Description Document
Test Procedure(s):	ANSI C63.26-2015, ANSI/TIA-603-E-2016, 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.

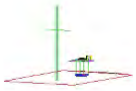
I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking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

Randy Ortanez
President

TABLE OF CONTENTS



MEASUREMENT REPORT
FCC Part 96



Mode	FCC Rule Part	Tx Freqeuency (MHz)	Total Power		Emission Designator	Modulation
			Max. Power (W)	Max. Power (dBm)		
5MHz Total Bandwidth	96	3552.5 - 3697.5	14.75	41.69	4M49G7D	QPSK
	96	3552.5 - 3697.5	15.28	41.84	4M47W7D	16QAM
	96	3552.5 - 3697.5	14.85	41.72	4M49W7D	64QAM
	96	3552.5 - 3697.5	14.30	41.55	4M49W7D	256QAM
15MHz Total Bandwidth	96	3557.5 - 3692.5	43.92	46.43	13M4G7D	QPSK
	96	3557.5 - 3692.5	45.51	46.58	13M5W7D	16QAM
	96	3557.5 - 3692.5	45.96	46.62	13M5W7D	64QAM
	96	3557.5 - 3692.5	41.56	46.19	13M4W7D	256QAM
15MHz Total Bandwidth	96	3552.5 - 3697.5	43.20	46.35	14M3G7D	QPSK
	96	3552.5 - 3697.5	46.92	46.71	14M4W7D	16QAM
	96	3552.5 - 3697.5	45.73	46.60	14M4W7D	64QAM
	96	3552.5 - 3697.5	40.19	46.04	14M4W7D	256QAM
20MHz Total Bandwidth	96	3552.5 - 3697.5	65.84	48.19	19M4G7D	QPSK
	96	3552.5 - 3697.5	61.42	47.88	19M3W7D	16QAM
	96	3552.5 - 3697.5	57.32	47.58	19M4W7D	64QAM
	96	3552.5 - 3697.5	57.29	47.58	19M4W7D	256QAM
25MHz Total Bandwidth	96	3552.5 - 3695	77.66	48.90	24M1G7D	QPSK
	96	3552.5 - 3695	73.18	48.64	24M2W7D	16QAM
	96	3552.5 - 3695	75.51	48.78	24M1W7D	64QAM
	96	3552.5 - 3695	76.01	48.81	24M1W7D	256QAM
30MHz Total Bandwidth	96	3552.5 - 3692.5	88.48	49.47	28M9G7D	QPSK
	96	3552.5 - 3692.5	94.09	49.74	28M7W7D	16QAM
	96	3552.5 - 3692.5	88.46	49.47	28M9W7D	64QAM
	96	3552.5 - 3692.5	86.37	49.36	28M8W7D	256QAM
35MHz Total Bandwidth	96	3552.5 - 3690	103.04	50.13	33M4G7D	QPSK
	96	3552.5 - 3690	104.14	50.18	33M5W7D	16QAM
	96	3552.5 - 3690	103.37	50.14	33M5W7D	64QAM
	96	3552.5 - 3690	99.55	49.98	33M6W7D	256QAM

EUT Overview (B48 LTE) – Continued.

40MHz Total Bandwidth	96	3552.5 - 3690	118.25	50.73	38M4G7D	QPSK
	96	3552.5 - 3690	114.79	50.60	38M4W7D	16QAM
	96	3552.5 - 3690	119.08	50.76	38M5W7D	64QAM
	96	3552.5 - 3690	115.92	50.64	38M6W7D	256QAM
45MHz Total Bandwidth	96	3552.5 - 3690	139.92	51.46	43M4G7D	QPSK
	96	3552.5 - 3690	135.74	51.33	43M3W7D	16QAM
	96	3552.5 - 3690	136.45	51.35	43M4W7D	64QAM
	96	3552.5 - 3690	134.35	51.28	43M5W7D	256QAM
50MHz Total Bandwidth	96	3552.5 - 3690	153.47	51.86	48M4G7D	QPSK
	96	3552.5 - 3690	150.06	51.76	48M2W7D	16QAM
	96	3552.5 - 3690	148.65	51.72	48M4W7D	64QAM
	96	3552.5 - 3690	148.43	51.72	48M4W7D	256QAM
55MHz Total Bandwidth	96	3552.5 - 3690	174.87	52.43	53M4G7D	QPSK
	96	3552.5 - 3690	168.01	52.25	53M3W7D	16QAM
	96	3552.5 - 3690	174.13	52.41	53M4W7D	64QAM
	96	3552.5 - 3690	165.83	52.20	53M4W7D	256QAM
60MHz Total Bandwidth	96	3552.5 - 3690	196.17	52.93	58M4G7D	QPSK
	96	3552.5 - 3690	181.60	52.59	58M2W7D	16QAM
	96	3552.5 - 3690	183.90	52.65	58M3W7D	64QAM
	96	3552.5 - 3690	187.62	52.73	58M5W7D	256QAM
65MHz Total Bandwidth	96	3552.5 - 3690	213.08	53.29	63M3G7D	QPSK
	96	3552.5 - 3690	205.38	53.13	63M3W7D	16QAM
	96	3552.5 - 3690	200.73	53.03	63M4W7D	64QAM
	96	3552.5 - 3690	207.61	53.17	63M3W7D	256QAM
70MHz Total Bandwidth	96	3557.5 - 3690	231.55	53.65	67M7G7D	QPSK
	96	3557.5 - 3690	229.69	53.61	67M7W7D	16QAM
	96	3557.5 - 3690	252.42	54.02	67M8W7D	64QAM
	96	3557.5 - 3690	223.48	53.49	67M8W7D	256QAM
75MHz Total Bandwidth	96	3557.5 - 3690	247.53	53.94	72M7G7D	QPSK
	96	3557.5 - 3690	243.21	53.86	72M9W7D	16QAM
	96	3557.5 - 3690	231.18	53.64	72M8W7D	64QAM
	96	3557.5 - 3690	256.72	54.09	72M8W7D	256QAM

EUT Overview (B48 LTE)

Notes:

EIRP level shown in the table above are over the entire aggregated BW using various CC combinations with 5M and 15MHz BWs.

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 CBSD FCC ID: A3LRT4401-48A**. 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 4-port device which supports single, two, three and four carrier configurations (1CC, 2CC, 3CC and 4CC). Each carrier operates using 5MHz, 10MHz, 15MHz or 20MHz bandwidth. It supports the following modulation schemes: QPSK, 16-QAM, 64-QAM and 256-QAM.

The EUT input power is either 48V DC or 110-240V 50/60 Hz.

The EUT's antenna supports for 4 TX MIMO of all correlated and 2 port co-polarized(Cross-Pol).

The Original Equipment Manufacturer (OEM) vendor of the radio states that the use of the listed external antennas meet all requirements for Part 96 operations.
However, this case is not used listed antenna gain because the EUT will allow this radio to meet the appropriate Part 96 requirements for Maximum EIRP by lowering output power.

- 47 dBm/10 MHz EIRP (for Category B operations).

Sample calculation:

EUT Attenuator setting(dB)	Antenna Gain(dBi)	Conducted Power (dBm/10MHz)	EIRP (dBm/10MHz)	EIRP limit (dBm/10MHz)
0	8.50	38.50	47.00	47.00
3	11.50	35.50	47.00	

This report includes measurements to cover the 5MHz and 15MHz Channel BW operation.

Test Device Serial No.: S1810230015

2.2 Device Capabilities

This device contains the following capabilities: LTE B48

2.3 Test Configuration

The setup is as follows:

a) The EUT ("RRU") is powered by 110V AC power supply, but Freqeuncy statbility test case is proceed to 48V DC.
b) The Data Unit (DU) is powered by 48V DC power supply.
c) The DU is connected to a test laptop via an ethernet cable acting as backhaul.
d) DU connectes to the EUT through a fiber optic cable.
e) 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.

Band / Test Case	3550MHz ~ 3700MHz	No.CC	Bandwidth				Total Output per path (dBm)	IBW
			1C	2C	3C	4C		
1	1	1	5				25.04	5
2	3	1	15				29.81	15
3	5	3	5	5	5		29.78	15
4	8	4	5	5	5	5	31.02	20
5	13	4	5	5	5	10	31.99	25
6	18	4	5	5	5	15	32.80	30
7	25	4	5	5	5	20	33.44	35
8	30	4	5	5	10	20	34.02	40
9	36	4	5	5	15	20	34.54	45
10	41	4	5	5	20	20	34.98	50
11	46	4	5	10	20	20	35.40	55
12	49	4	5	15	20	20	35.79	60
13	52	4	5	20	20	20	36.12	65
14	53	4	15	15	20	20	36.46	70
15	54	4	15	20	20	20	36.75	75

Declared of EUT test case (B48 LTE)

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 RF 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	N9030A	PXA Signal Analyzer (44GHz)	5-22-2019	Annual	5-22-2020	MY49430494
Agilnet	AT6032A	Power Supply	N/A			1146459
Rohde & Schwarz	ESU26	EMI Test Receiver(26.5GHz)	6-5-2019	Annual	6-5-2020	100342
Rohde & Schwarz	FSW67	Signal / Spectrum Analyzer	5-6-2019	Annual	5-6-2020	103200
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	4-19-2018	Biennial	4-19-2020	A051107
Emco	3115	Horn Antenna (1-18GHz)	3-18-2018	Biennial	3-18-2020	9704-5182
Rohde & Schwarz	3160-09	Small Horn (18 - 26.5GHz)	8-9-2019	Biennial	8-9-2021	00135427
Rohde & Schwarz	3160-10	Small Horn (26.5 - 40GHz)	8-9-2019	Biennial	8-9-2021	00130993
Rohde & Schwarz	SFUNIT-Rx	shielded Filter Unit	7-8-2019	Annual	7-8-2020	102133
Rohde & Schwarz	SFUNIT-Rx	shielded Filter Unit	7-11-2019	Annual	7-11-2020	102134
Rohde & Schwarz	TS-PR40	26.5-40 GHz Pre-Amplifier	9-19-2019	Annual	9-19-2020	100037
ESPEC	ESX-2CA	Temperature Chamber	6-13-2019	Annual	6-13-2020	17620

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.

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: A3LRT4401-48A

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, 7.8
96.41(b)	Peak Power Spectral Density	37 dBm/MHz		PASS	Section 7.4
96.41(g)	Peak-Average Ratio	< 13 dB		PASS	Section 7.5
2.1055	Frequency Stability	Fundamental emissions stay within authorized frequency block		PASS	Section 7.9
96.39, 96.45	Additional Requirements for Category B CBSD's	Category B CBSD's must adhere to the requirements of 96.39 and 96.45 per KDB 940660		PASS	Refer to Supplemental Report

Table 7-1. Summary of Conducted Test Results

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, RF switch matrix, 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 RF switch matrix.
4. For conducted spurious emissions, automated test software was used to measure certain emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "LTE Automation," Version 4.8.
5. This unit was tested while powered by an DC power source but AC power source used while Frequency Stability test.

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.

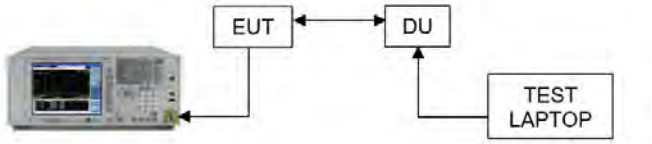
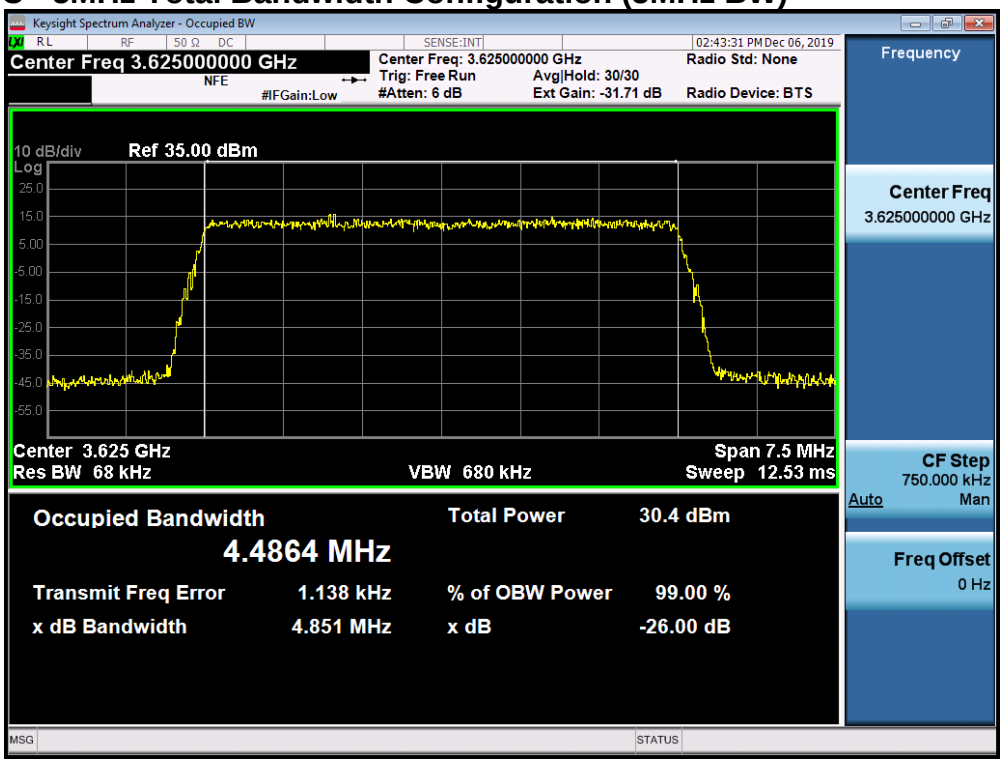


Figure 7-1. Test Instrument & Measurement Setup

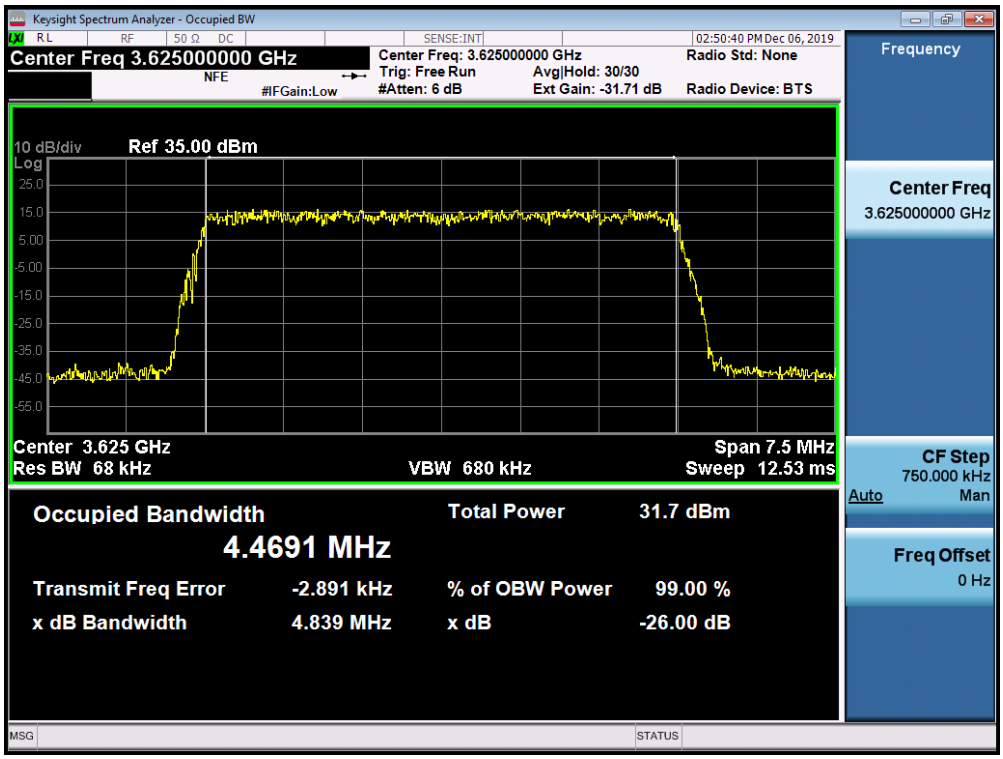
Test Notes

N/A

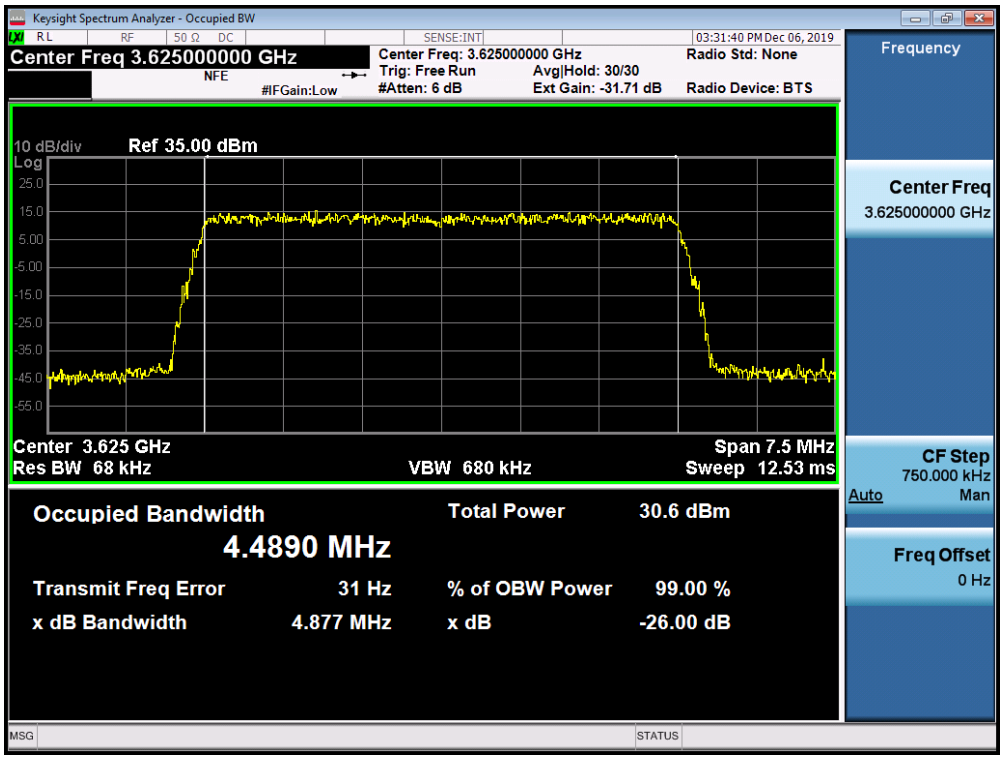
Case01. 1CC - 5MHz Total Bandwidth Configuration (5MHz BW)



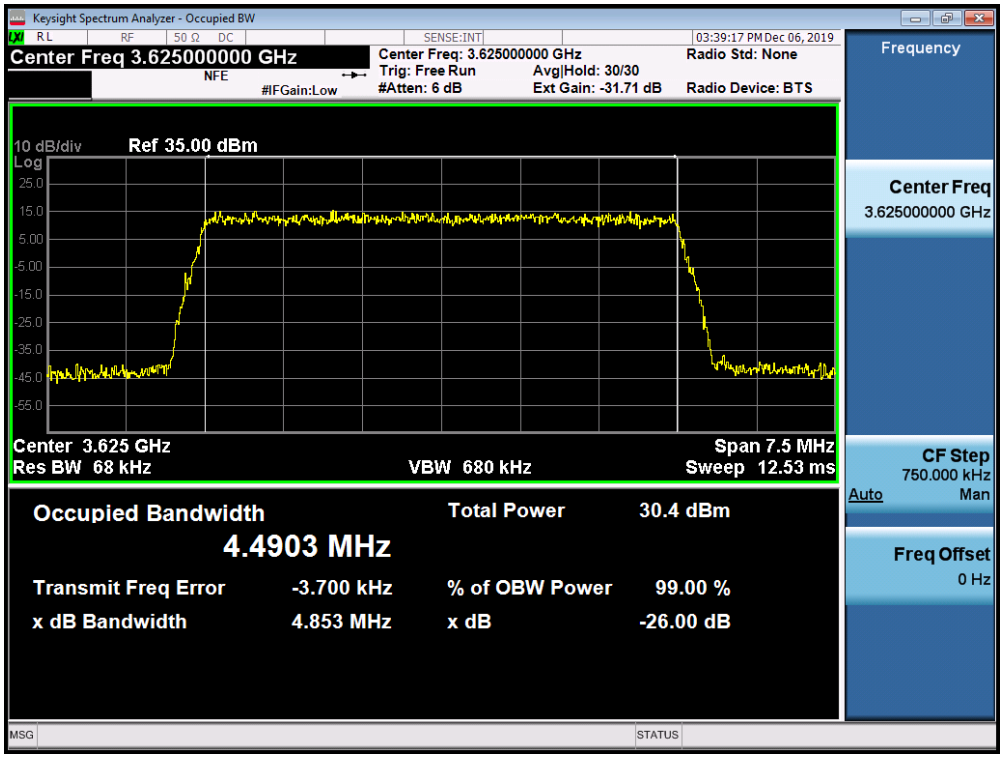
Plot 7-1. Occupied Bandwidth Plot (1CC Configuration - 5MHz Total Bandwidth QPSK)



Plot 7-2. Occupied Bandwidth Plot(1CC Configuration - 5MHz Total Bandwidth 16QAM)

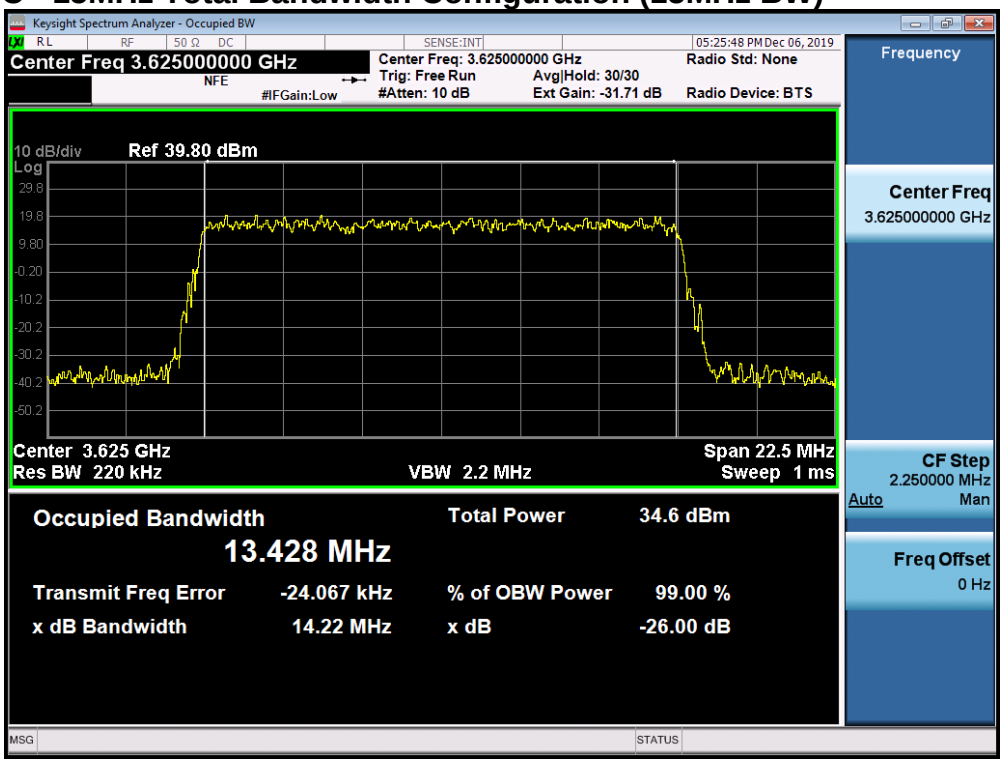


Plot 7-3. Occupied Bandwidth Plot(1CC Configuration - 5MHz Total Bandwidth 64QAM)

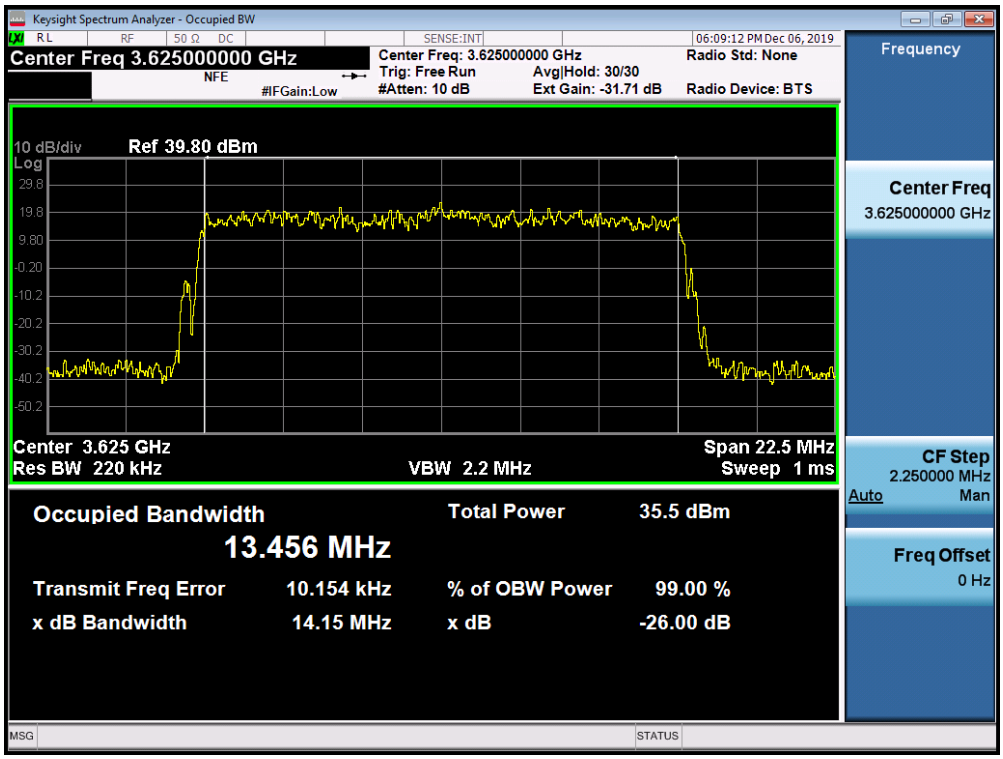


Plot 7-4. Occupied Bandwidth Plot(1CC Configuration - 5MHz Total Bandwidth 256QAM)

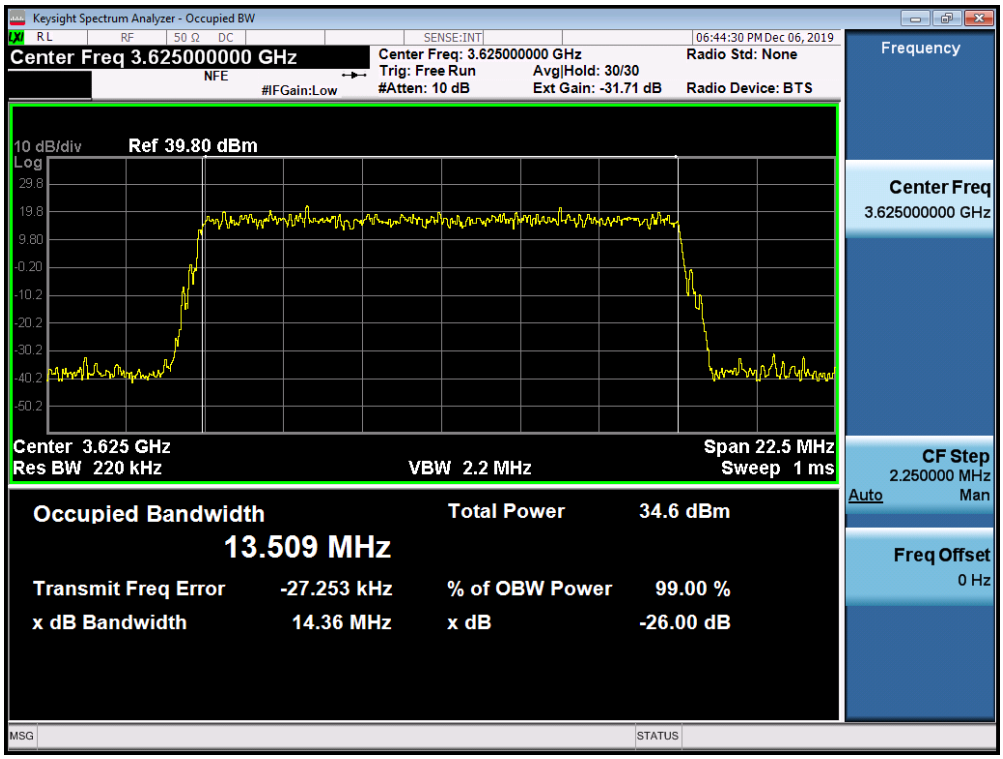
Case02. 1CC - 15MHz Total Bandwidth Configuration (15MHz BW)



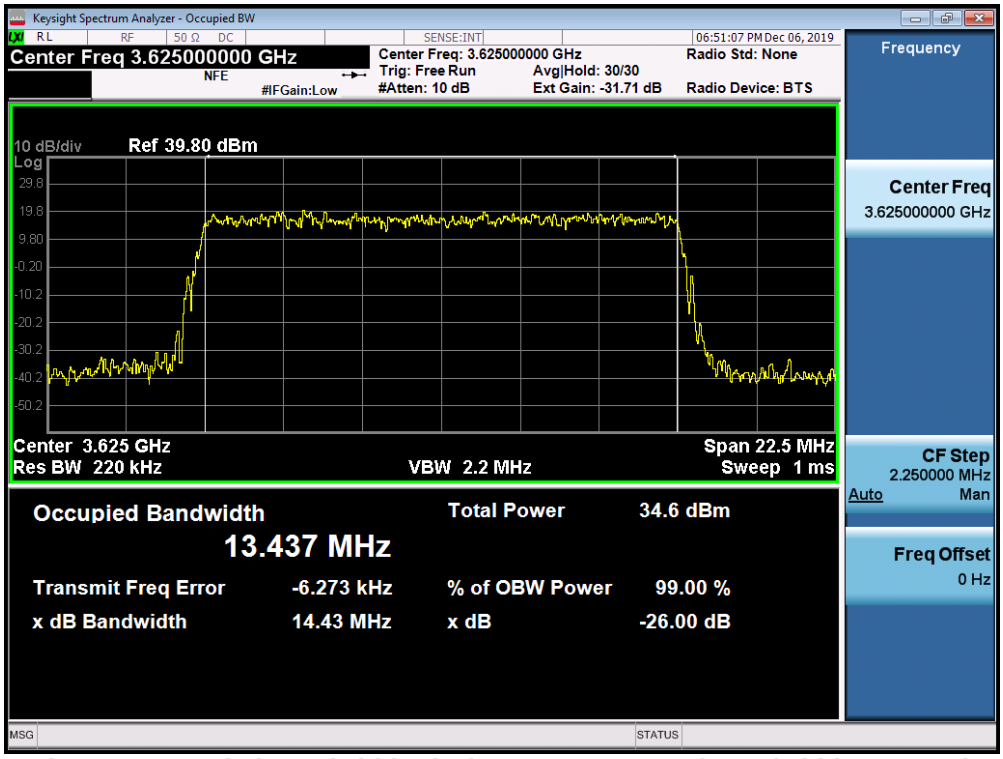
Plot 7-5. Occupied Bandwidth Plot(1CC - 15MHz Total Bandwidth QPSK)



Plot 7-6. Occupied Bandwidth Plot(1CC - 15MHz Total Bandwidth 16QAM)

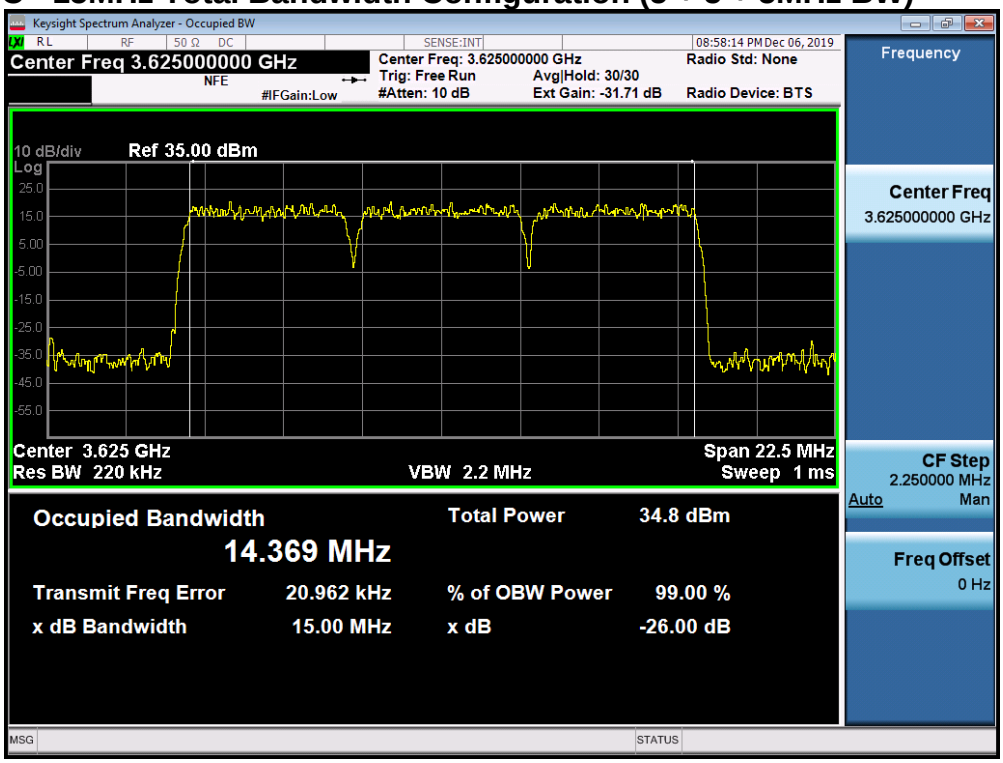


Plot 7-7. Occupied Bandwidth Plot(1CC - 15MHz Total Bandwidth 64QAM)

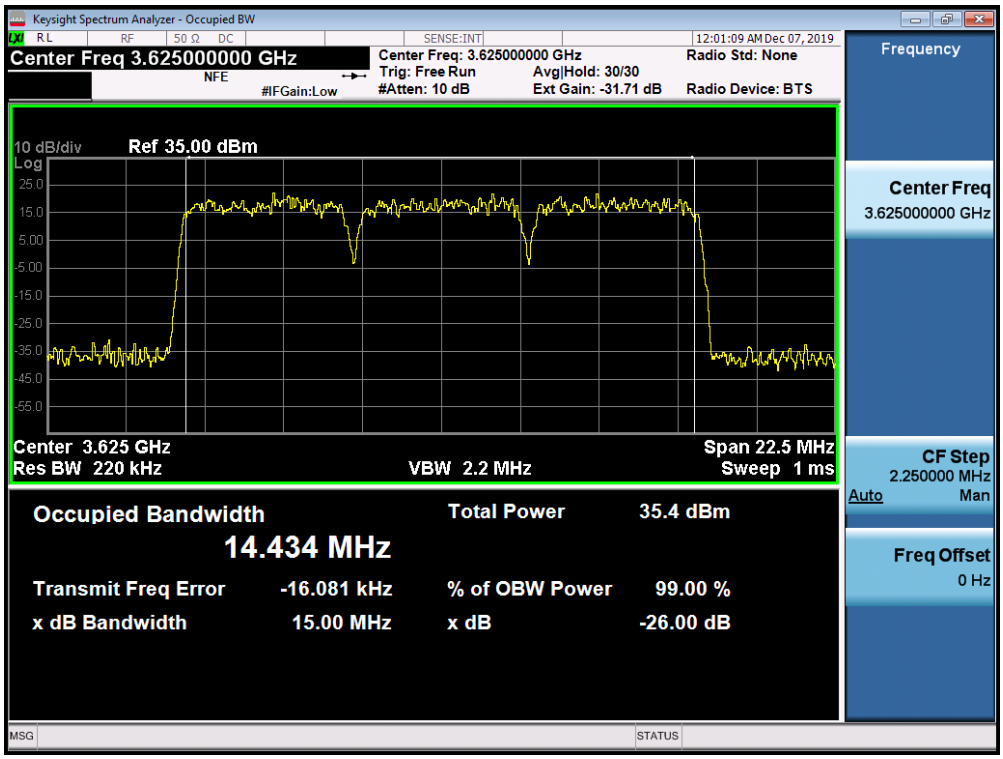


Plot 7-8. Occupied Bandwidth Plot(1CC - 15MHz Total Bandwidth 256QAM)

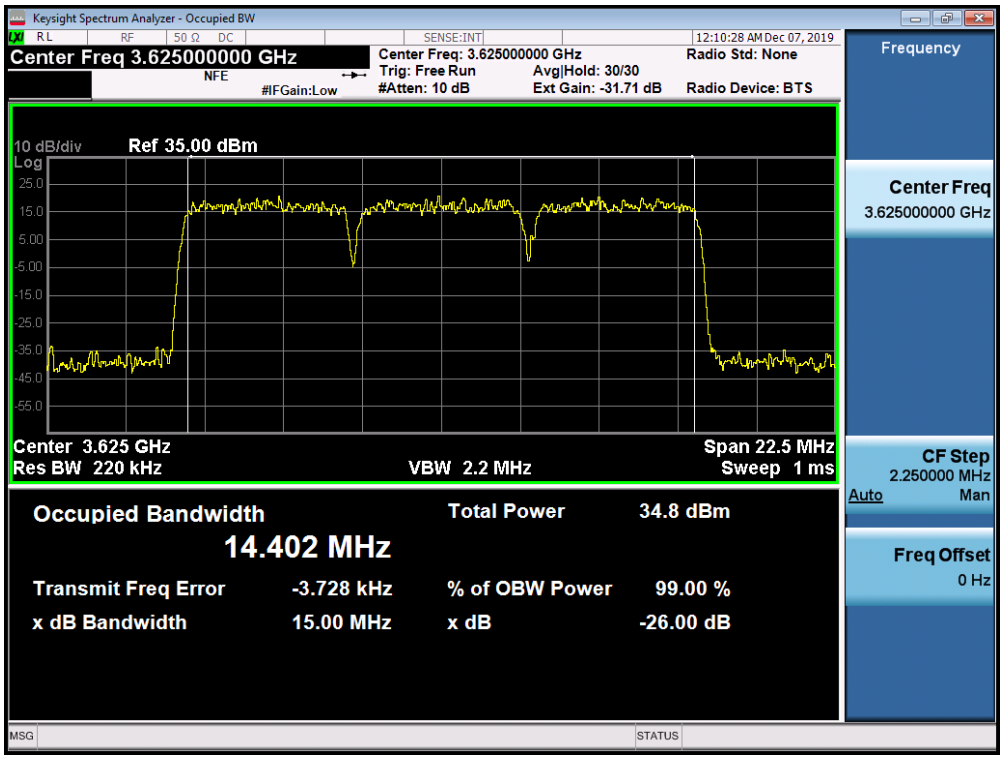
Case03. 3CC - 15MHz Total Bandwidth Configuration (5 + 5 + 5MHz BW)



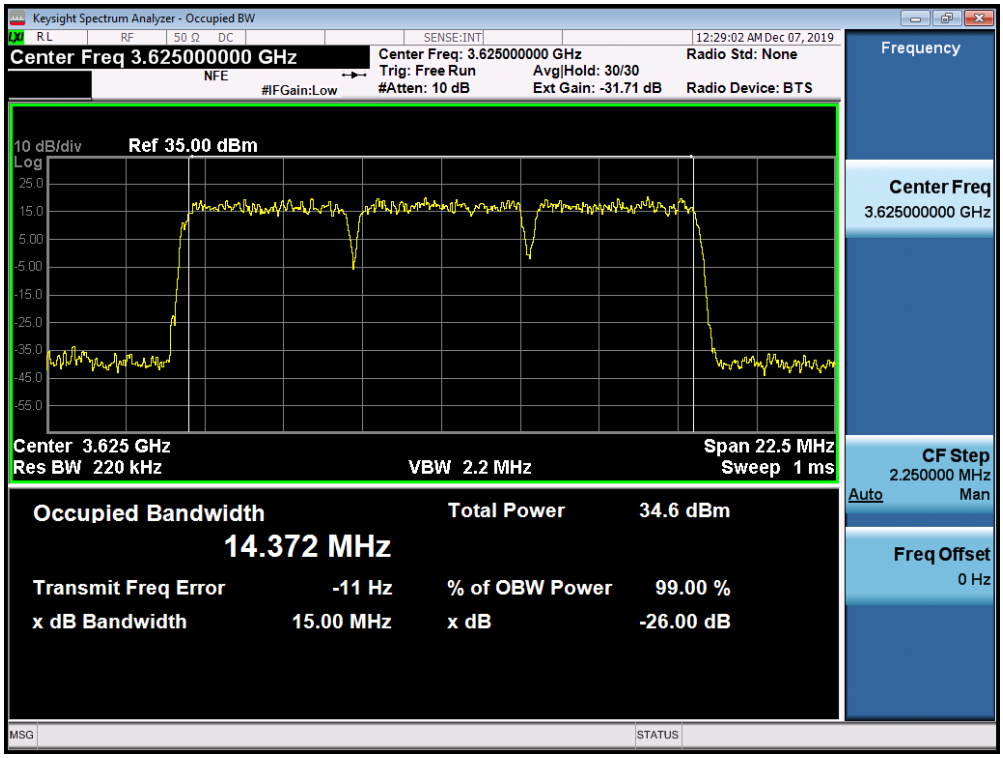
Plot 7-9. Occupied Bandwidth Plot(3CC Configuration - 15MHz Total Bandwidth QPSK)



Plot 7-10. Occupied Bandwidth Plot(3CC Configuration - 15MHz Total Bandwidth 16QAM)

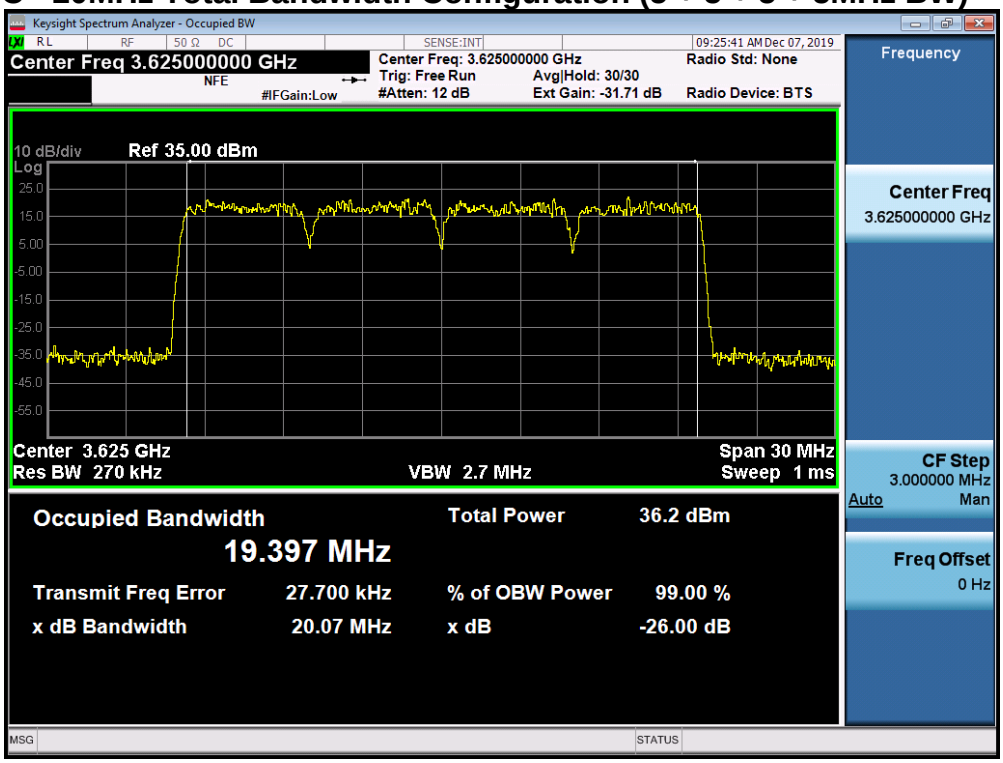


Plot 7-11. Occupied Bandwidth Plot(3CC Configuration - 15MHz Total Bandwidth 64QAM)

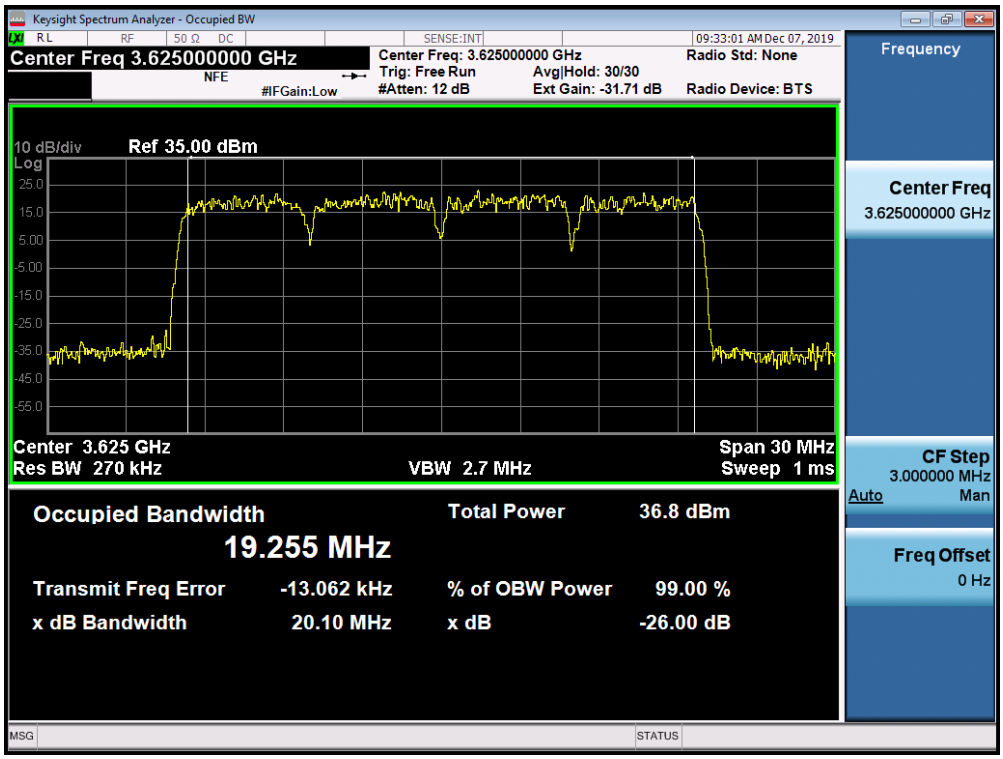


Plot 7-12. Occupied Bandwidth Plot(3CC Configuration - 15MHz Total Bandwidth 256QAM)

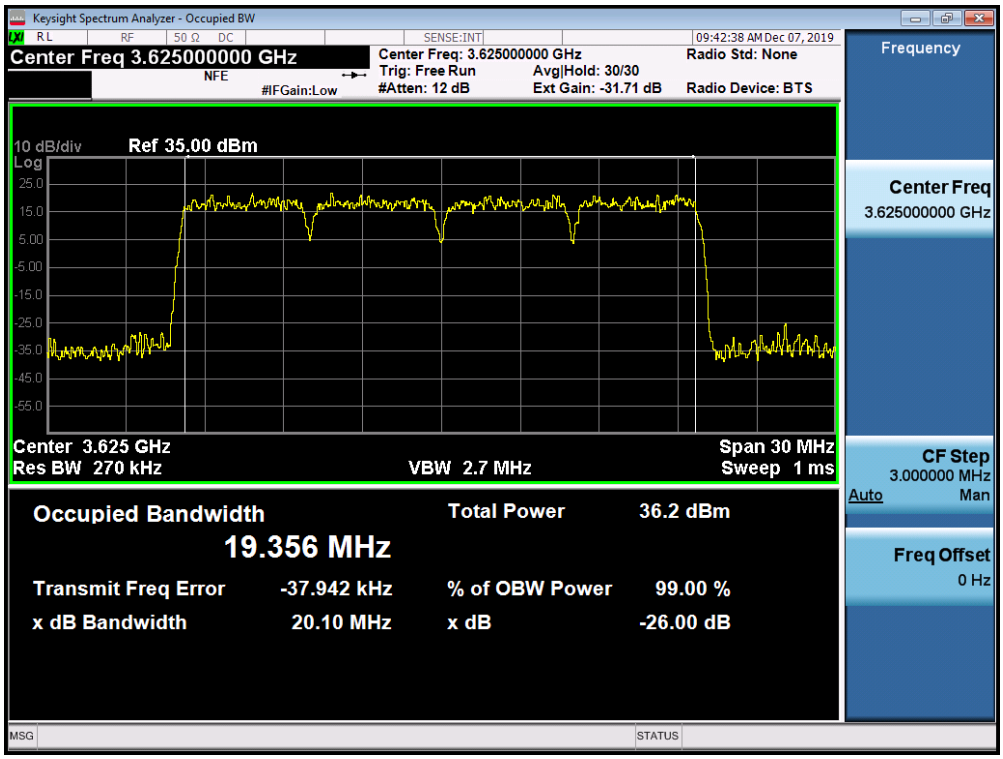
Case04. 4CC - 20MHz Total Bandwidth Configuration (5 + 5 + 5 + 5MHz BW)



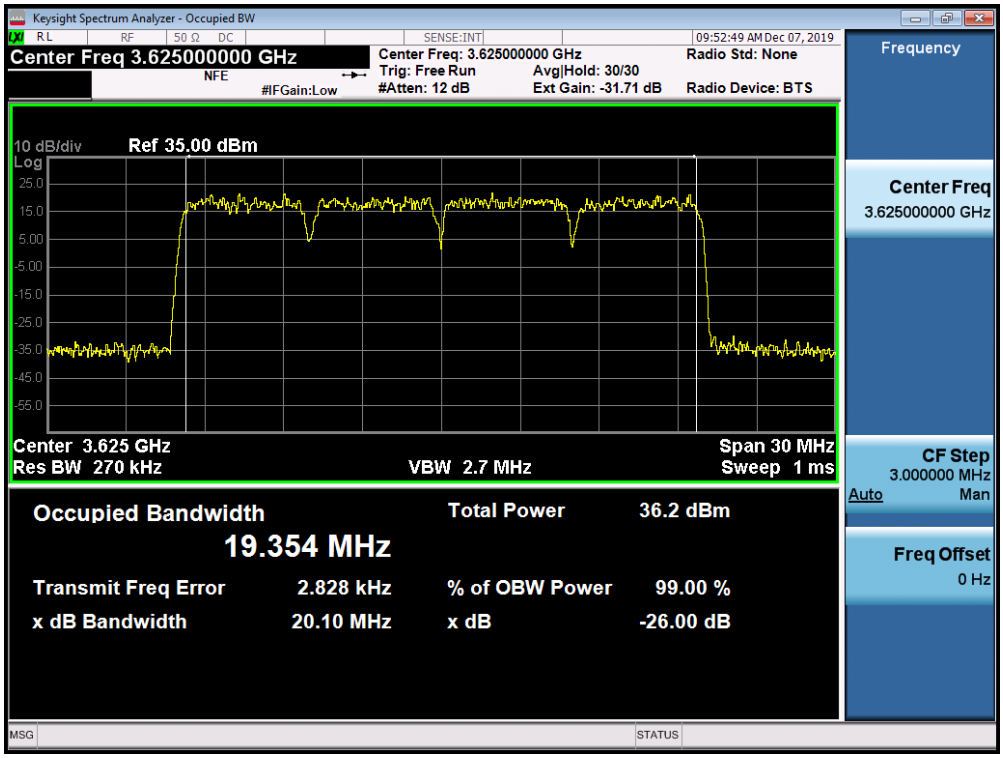
Plot 7-13. Occupied Bandwidth Plot (4CC Configuration - 20MHz Total Bandwidth QPSK)



Plot 7-14. Occupied Bandwidth Plot (4CC Configuration - 20MHz Total Bandwidth 16QAM)

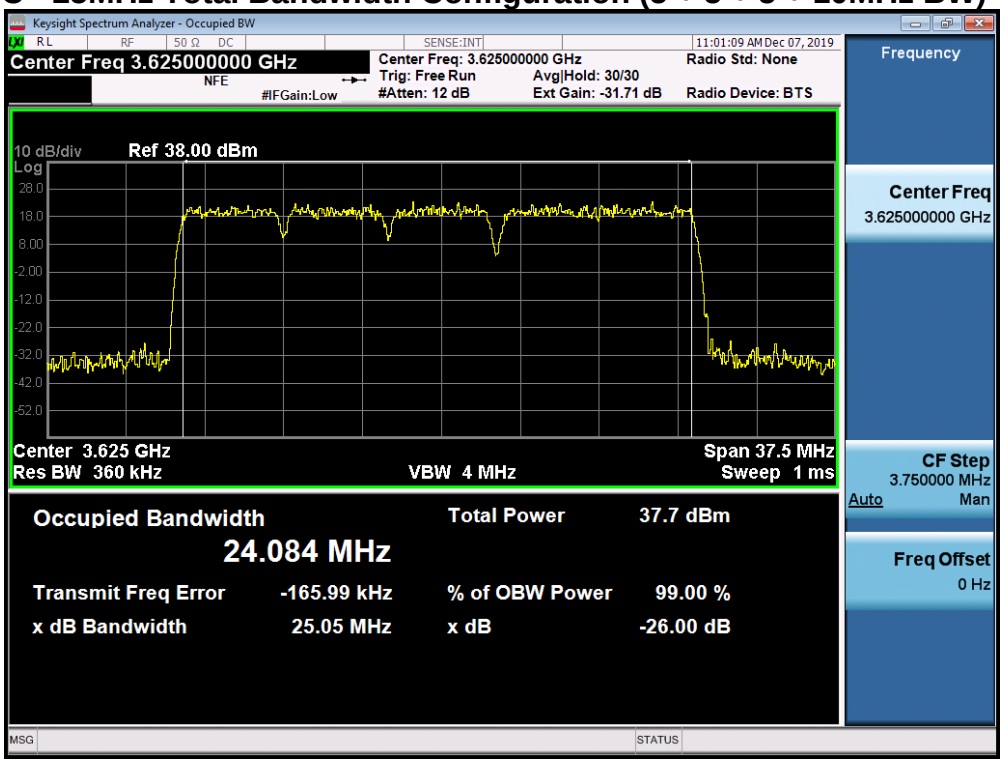


Plot 7-15. Occupied Bandwidth Plot (4CC Configuration - 20MHz Total Bandwidth 64QAM)

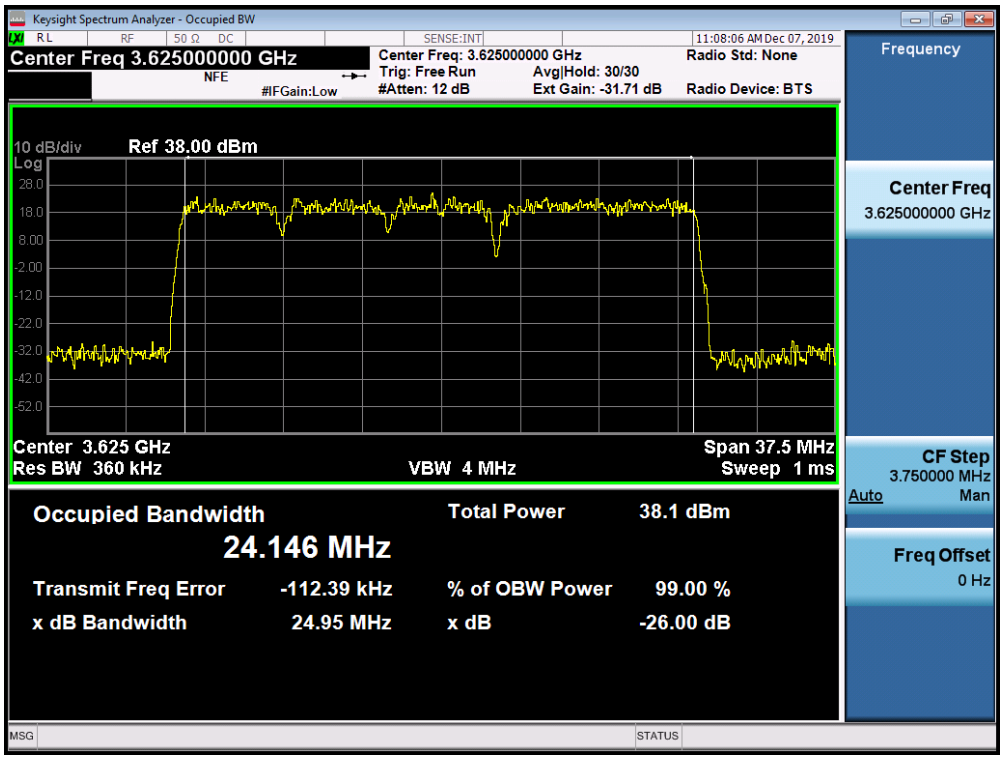


Plot 7-16. Occupied Bandwidth Plot (4CC Configuration - 20MHz Total Bandwidth 256QAM)

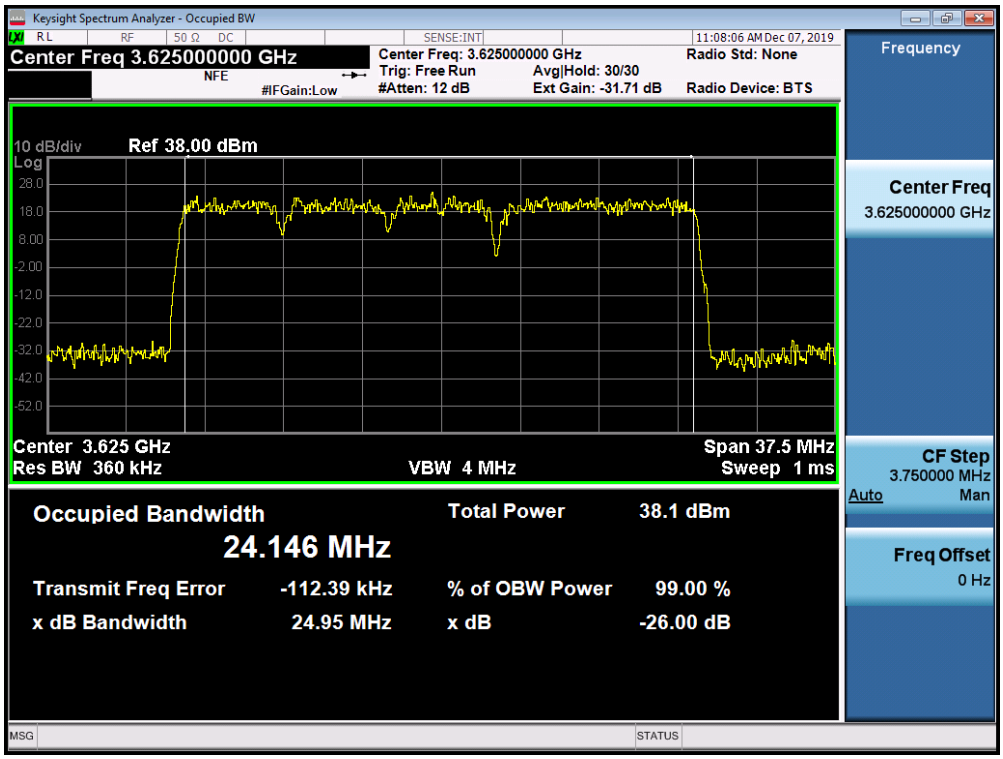
Case05. 4CC - 25MHz Total Bandwidth Configuration (5 + 5 + 5 + 10MHz BW)



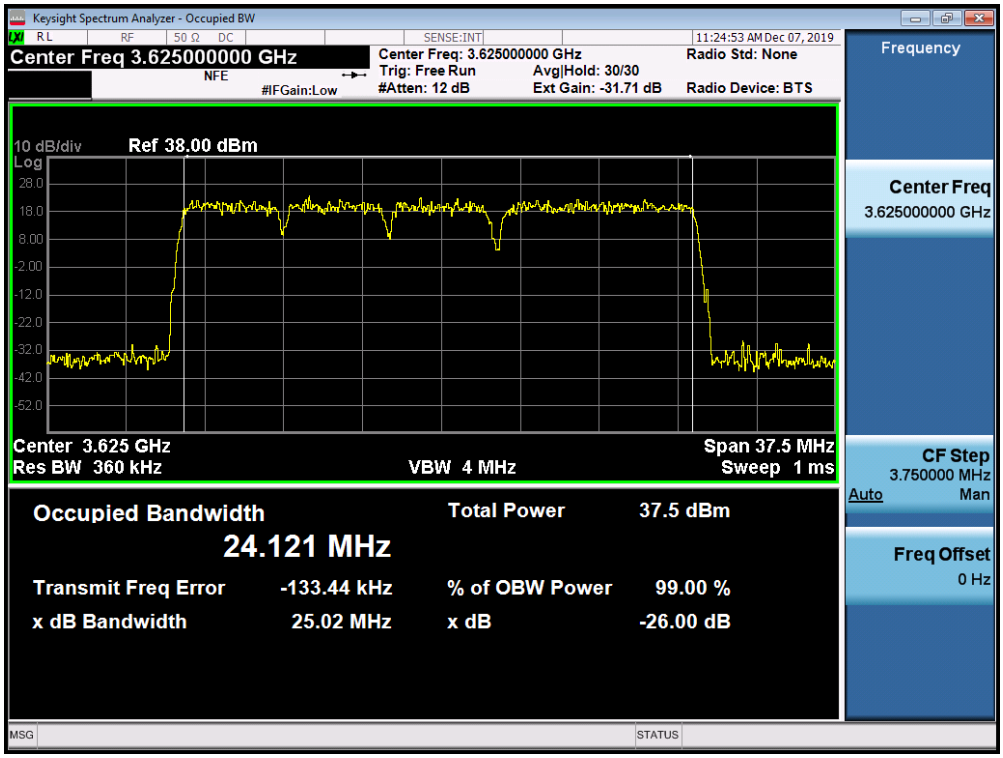
Plot 7-17. Occupied Bandwidth Plot (4CC Configuration - 25MHz Total Bandwidth QPSK)



Plot 7-18. Occupied Bandwidth Plot (4CC Configuration - 25MHz Total Bandwidth 16QAM)

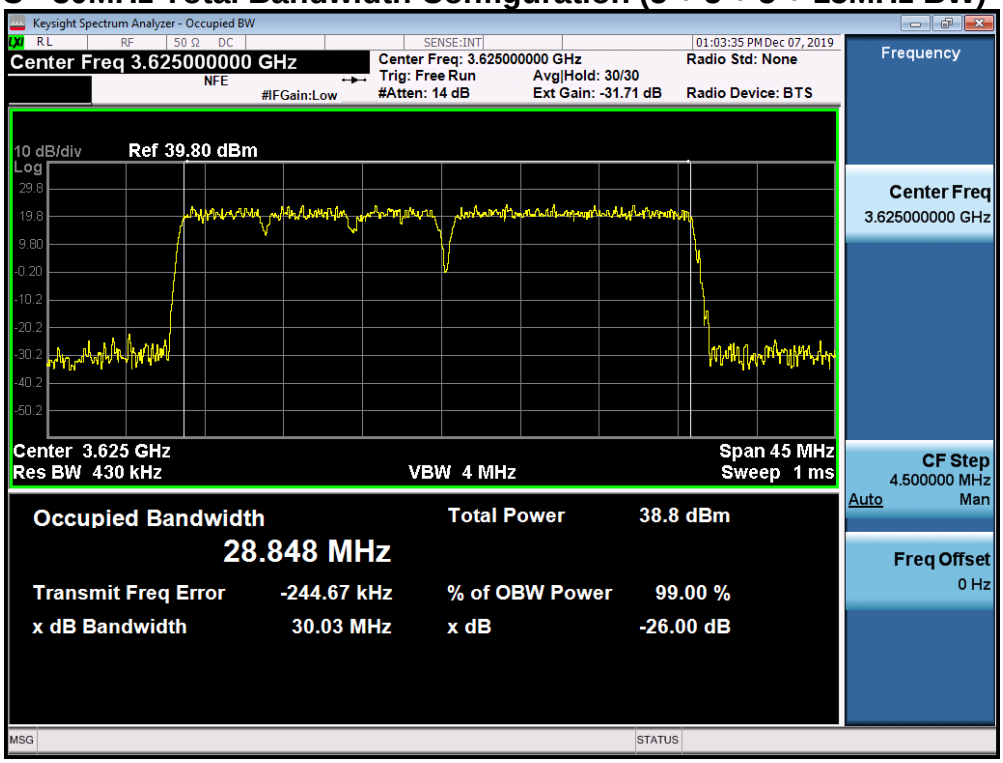


Plot 7-19. Occupied Bandwidth Plot (4CC Configuration - 25MHz Total Bandwidth 64QAM)

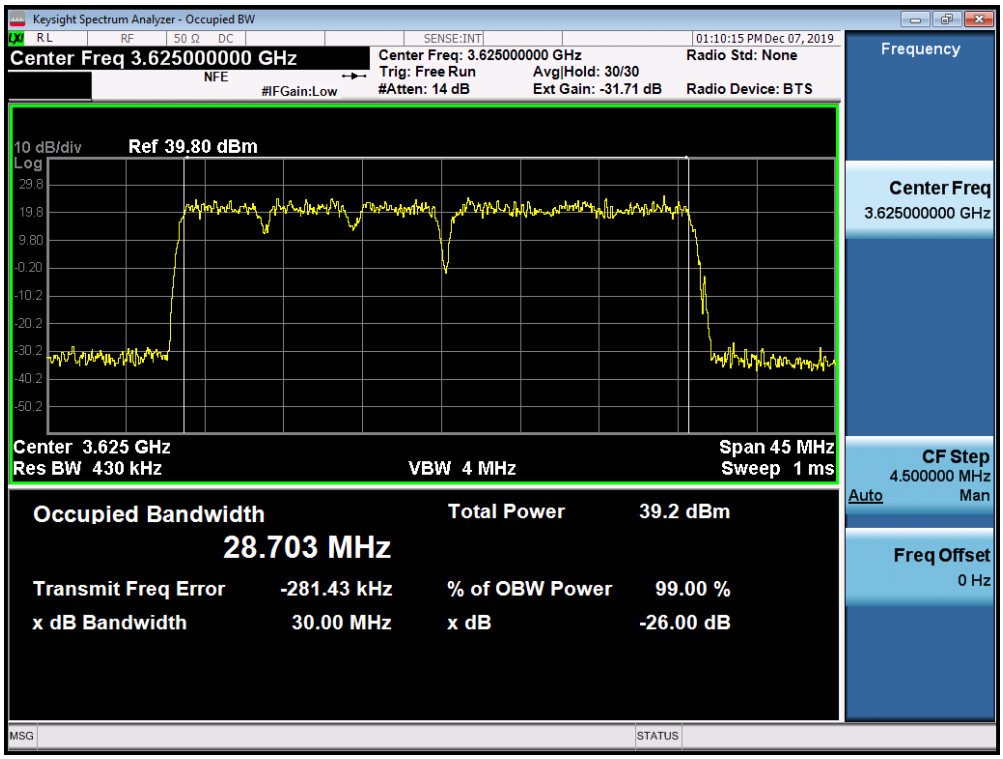


Plot 7-20. Occupied Bandwidth Plot (4CC Configuration - 25MHz Total Bandwidth 256QAM)

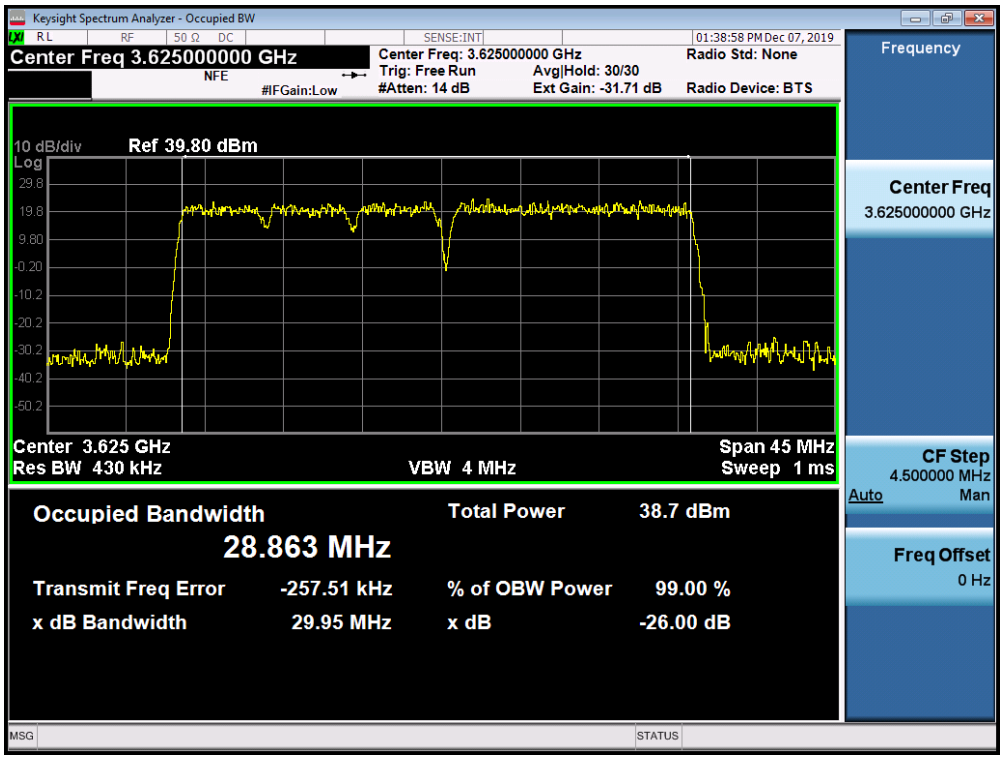
Case06. 4CC - 30MHz Total Bandwidth Configuration (5 + 5 + 5 + 15MHz BW)



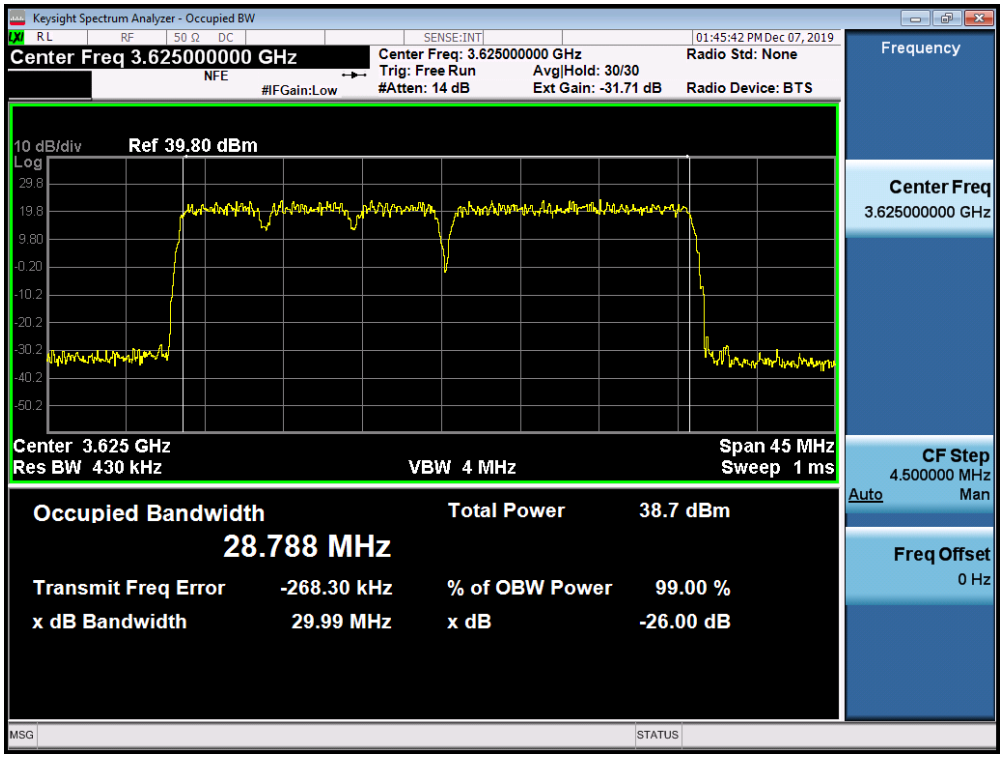
Plot 7-21. Occupied Bandwidth Plot (4CC Configuration - 30MHz Total Bandwidth QPSK)



Plot 7-22. Occupied Bandwidth Plot(4CC Configuration - 30MHz Total Bandwidth 16QAM)

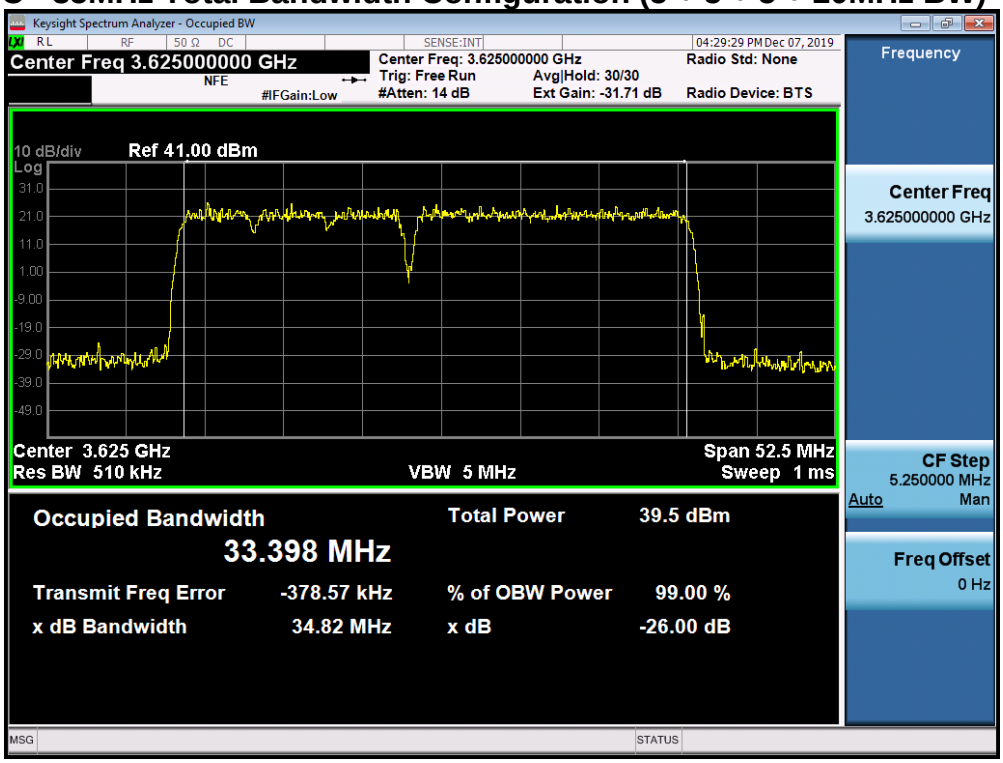


Plot 7-23. Occupied Bandwidth Plot(4CC Configuration - 30MHz Total Bandwidth 64QAM)

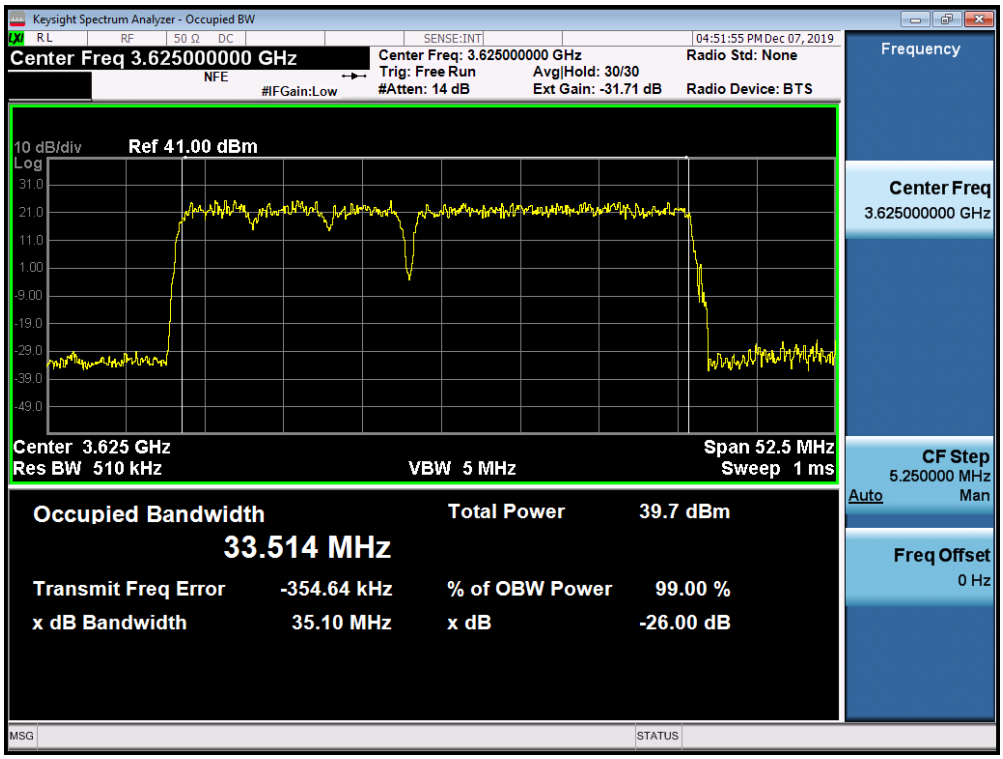


Plot 7-24. Occupied Bandwidth Plot(4CC Configuration - 30MHz Total Bandwidth 256QAM)

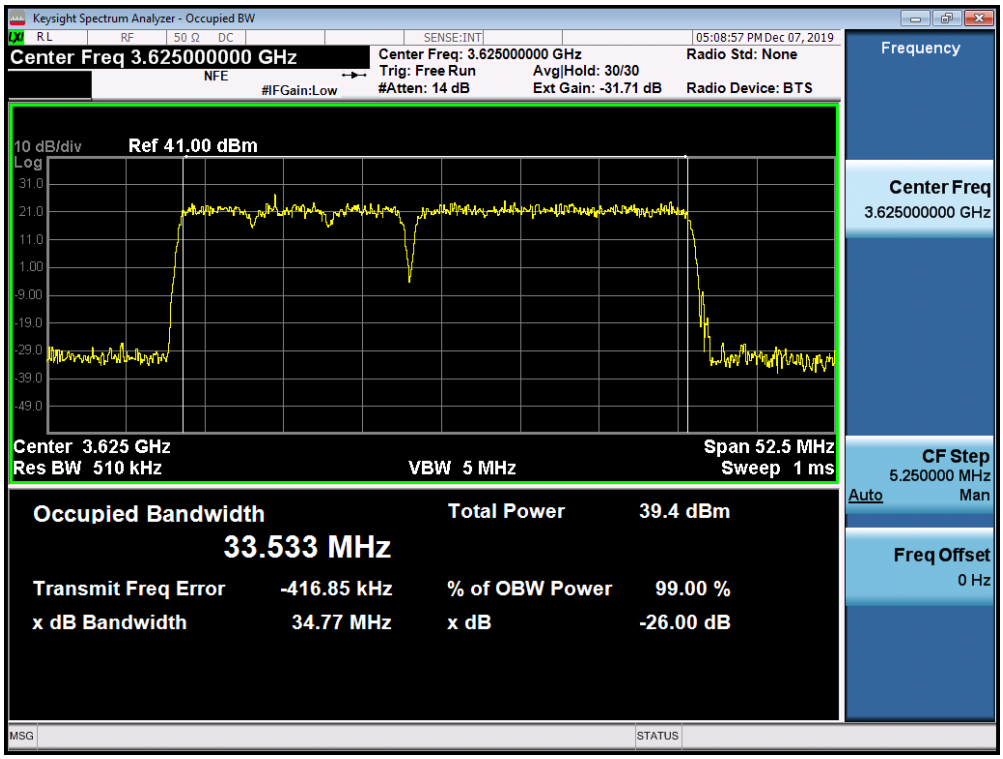
Case07. 4CC - 35MHz Total Bandwidth Configuration (5 + 5 + 5 + 20MHz BW)



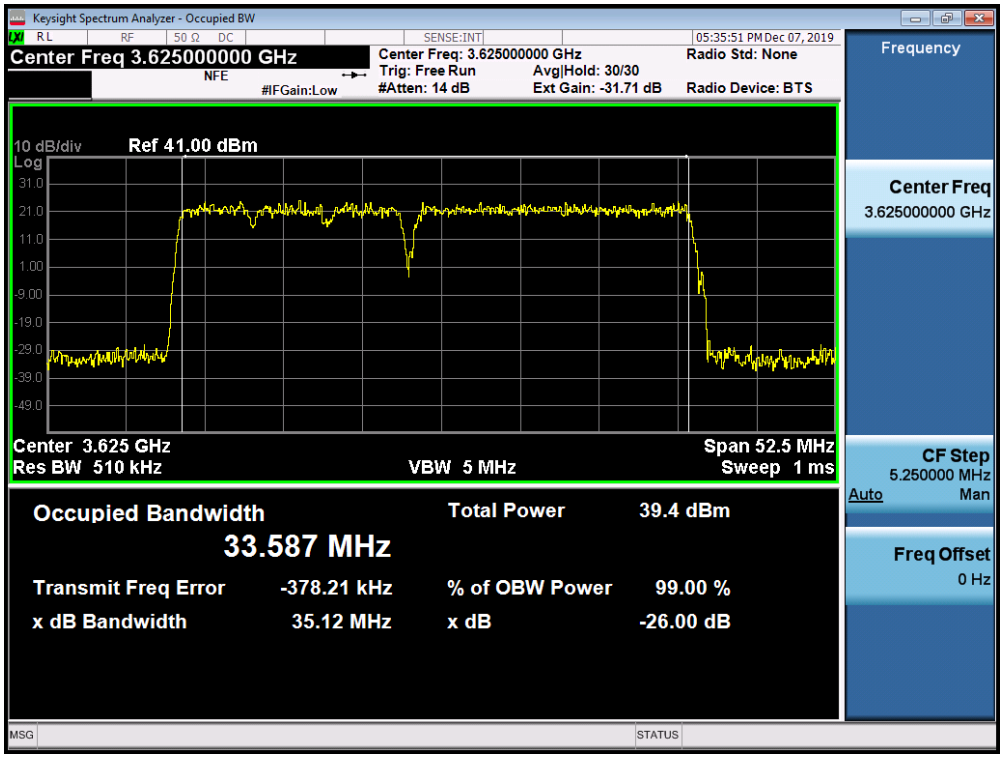
Plot 7-25. Occupied Bandwidth Plot (4CC Configuration - 35MHz Total Bandwidth QPSK)



Plot 7-266. Occupied Bandwidth Plot(4CC Configuration - 35MHz Total Bandwidth 16QAM)

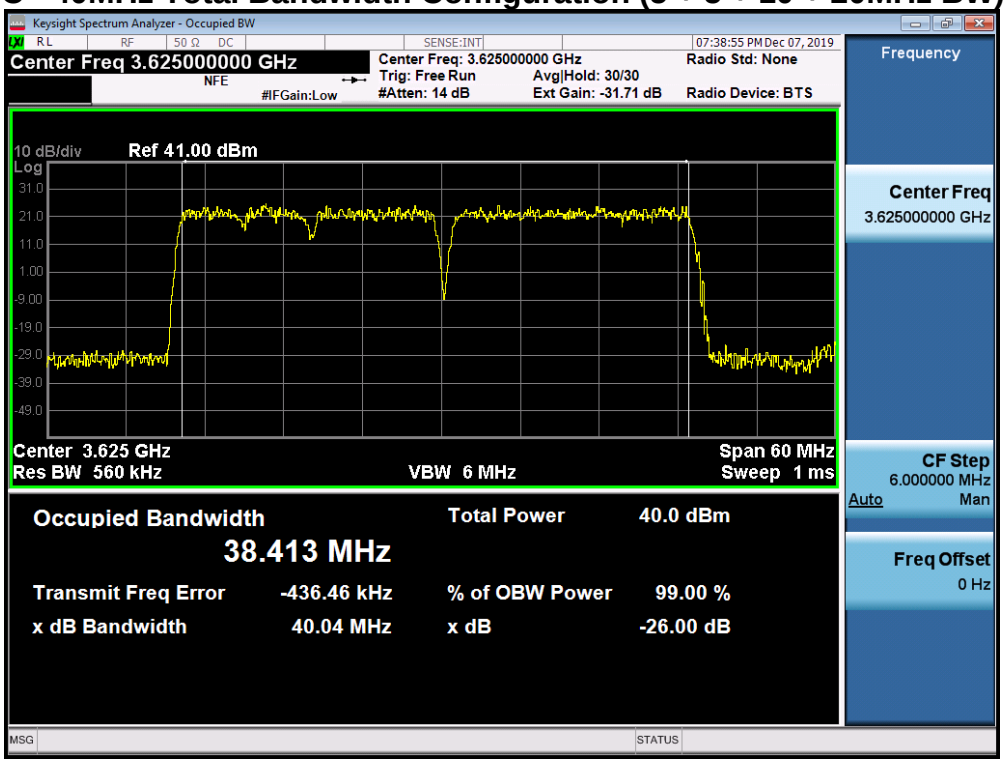


Plot 7-27. Occupied Bandwidth Plot(4CC Configuration - 35MHz Total Bandwidth 64QAM)

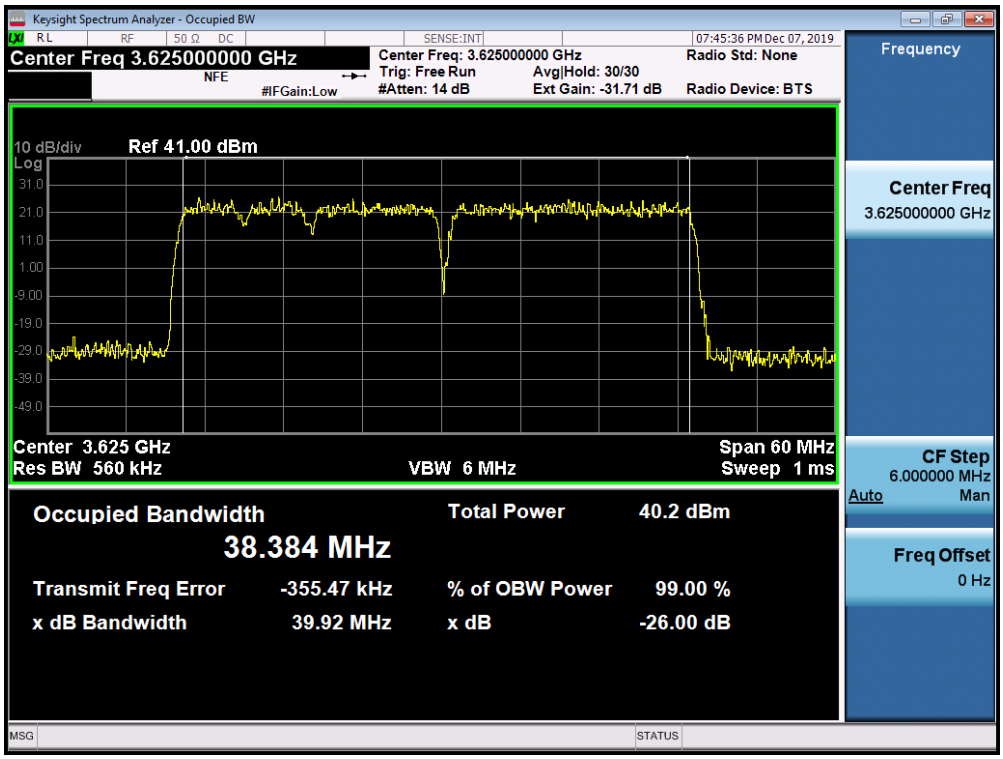


Plot 7-28. Occupied Bandwidth Plot(4CC Configuration - 35MHz Total Bandwidth 256QAM)

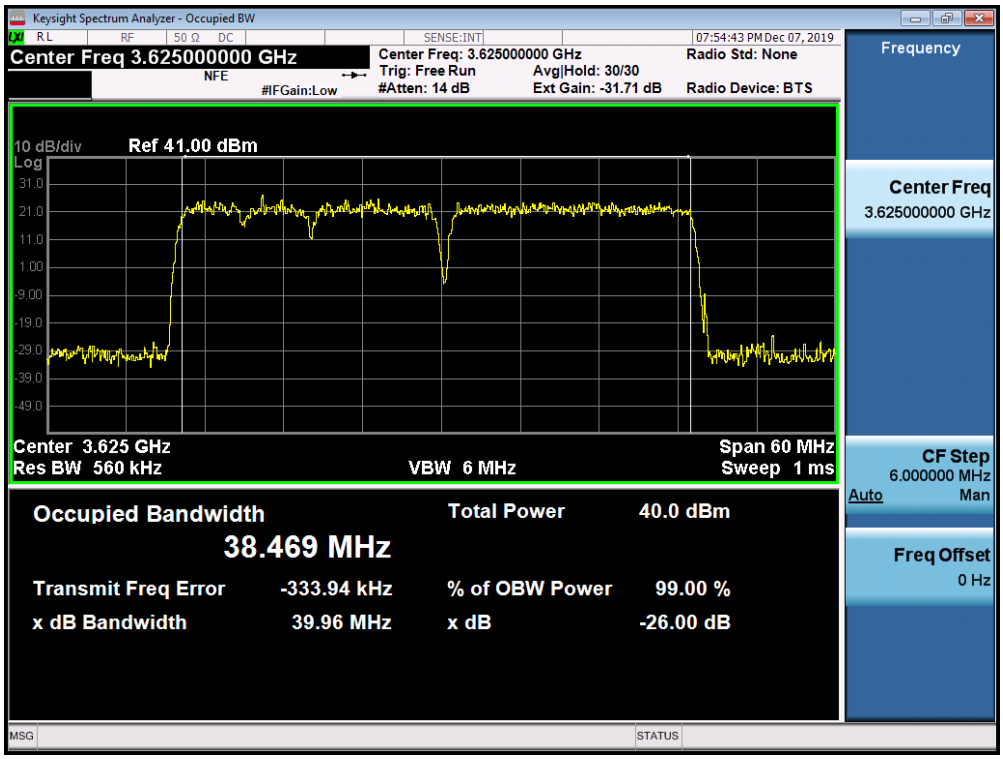
Case08. 4CC - 40MHz Total Bandwidth Configuration (5 + 5 + 10 + 20MHz BW)



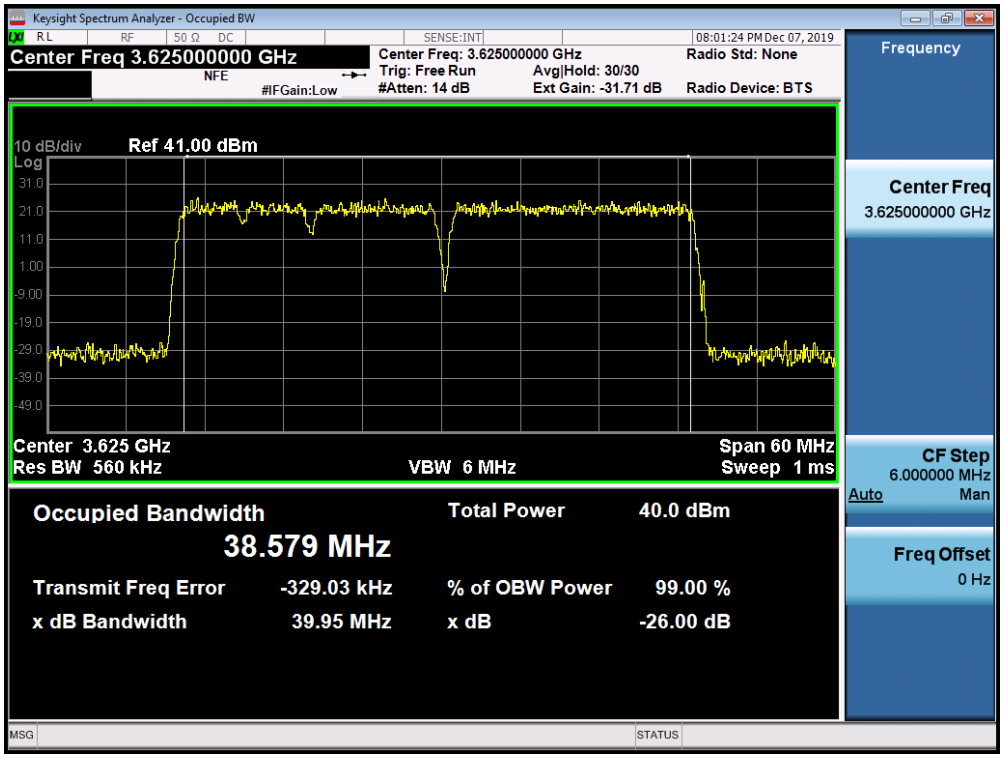
Plot 7-29. Occupied Bandwidth Plot (4CC Configuration - 40MHz Total Bandwidth QPSK)



Plot 7-30. Occupied Bandwidth Plot(4CC Configuration - 40MHz Total Bandwidth 16QAM)

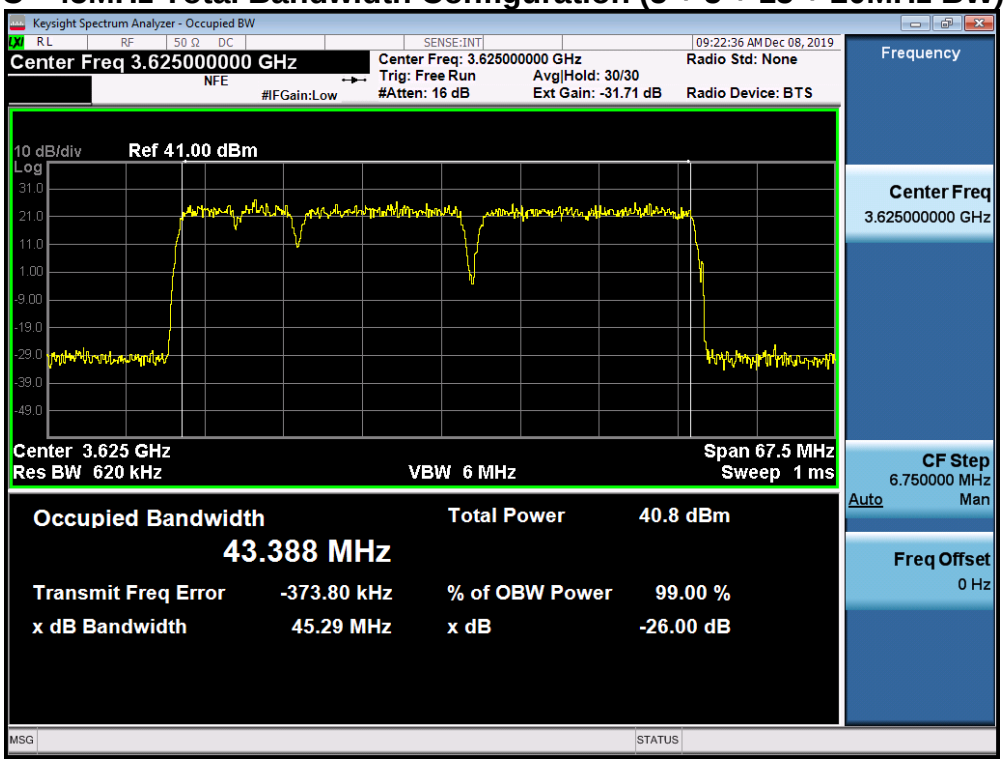


Plot 7-271. Occupied Bandwidth Plot(4CC Configuration - 40MHz Total Bandwidth 64QAM)

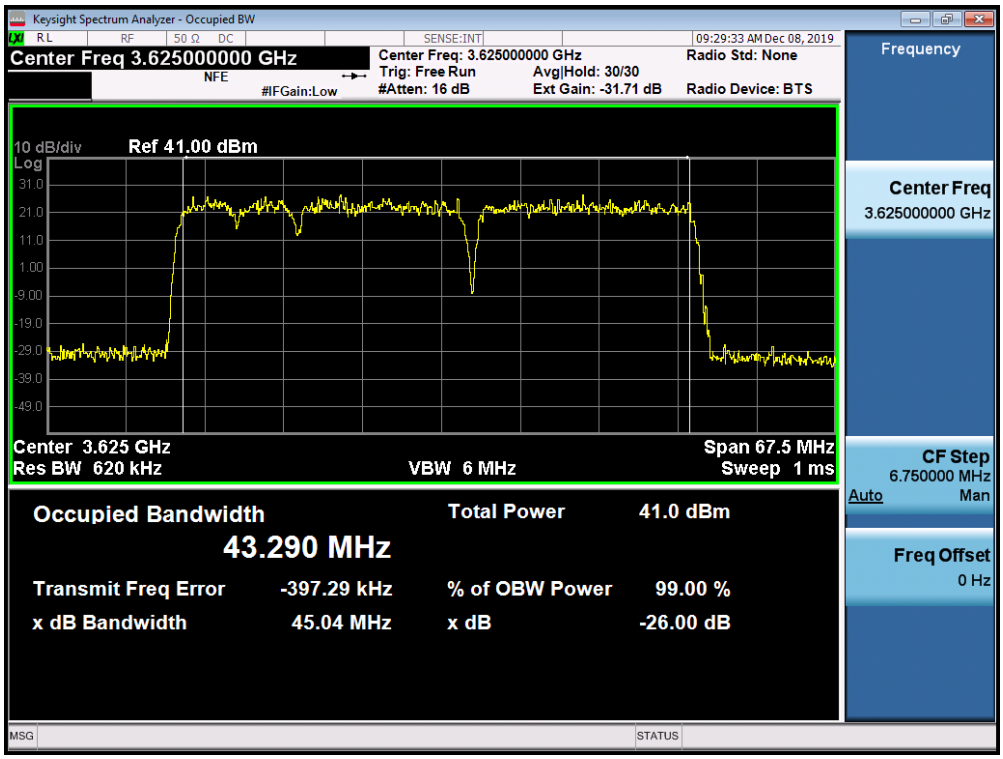


Plot 7-32. Occupied Bandwidth Plot(4CC Configuration - 40MHz Total Bandwidth 256QAM)

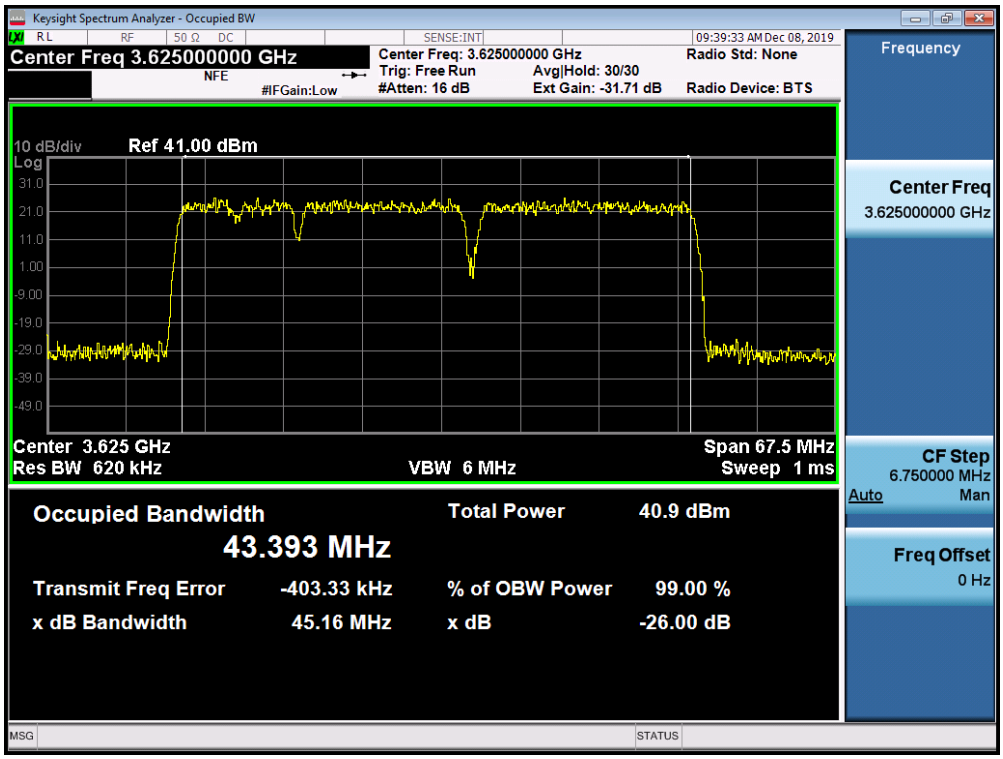
Case09. 4CC - 45MHz Total Bandwidth Configuration (5 + 5 + 15 + 20MHz BW)



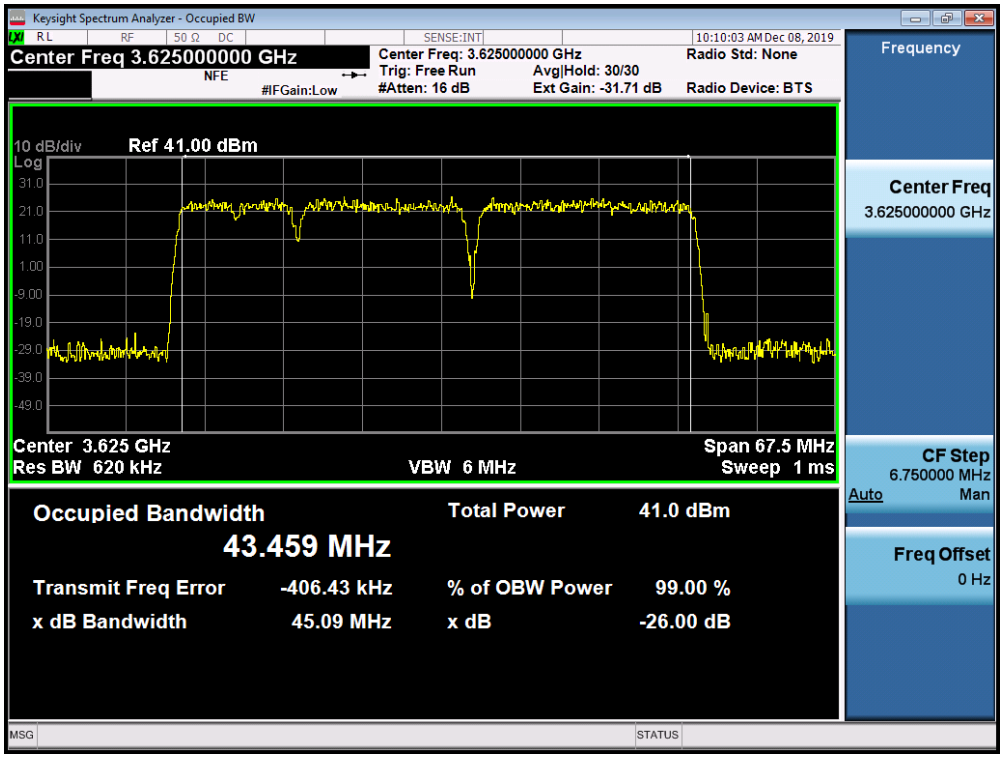
Plot 7-33. Occupied Bandwidth Plot (4CC Configuration - 45MHz Total Bandwidth QPSK)



Plot 7-34. Occupied Bandwidth Plot(4CC Configuration - 45MHz Total Bandwidth 16QAM)

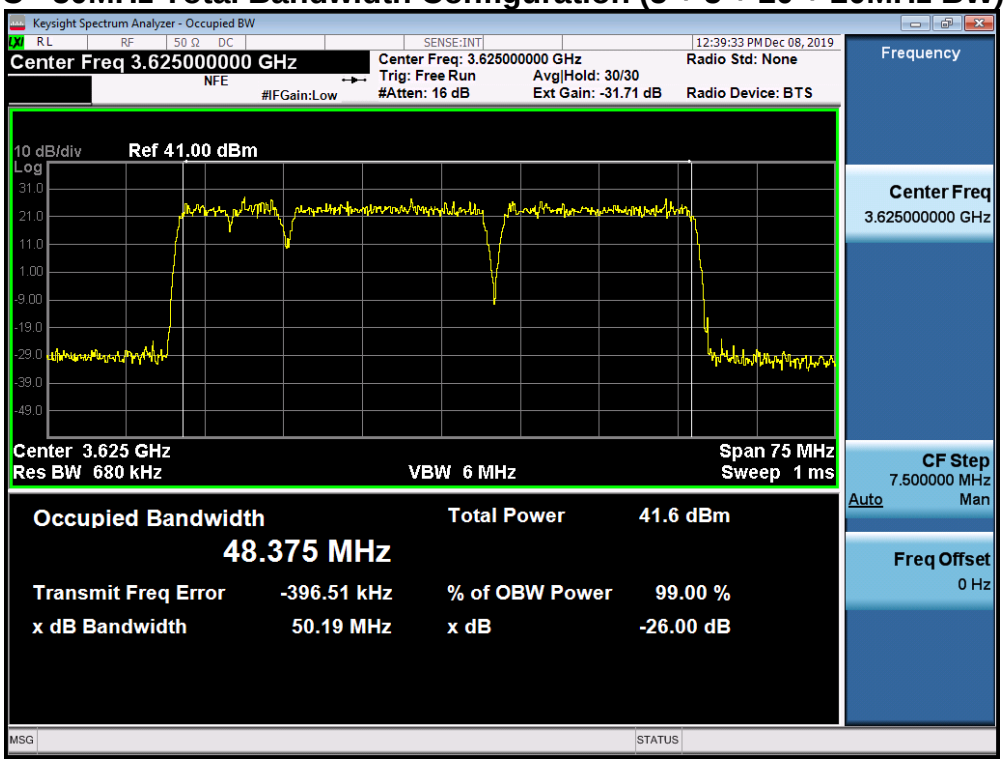


Plot 7-35. Occupied Bandwidth Plot(4CC Configuration - 45MHz Total Bandwidth 64QAM)

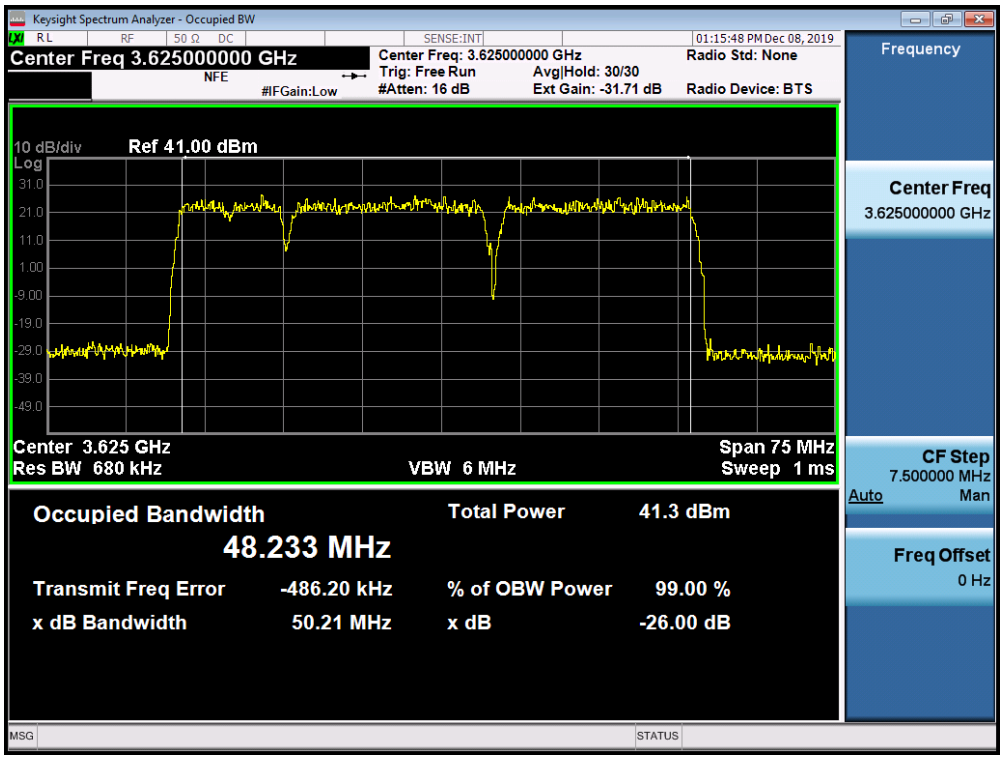


Plot 7-36. Occupied Bandwidth Plot(4CC Configuration - 45MHz Total Bandwidth 256QAM)

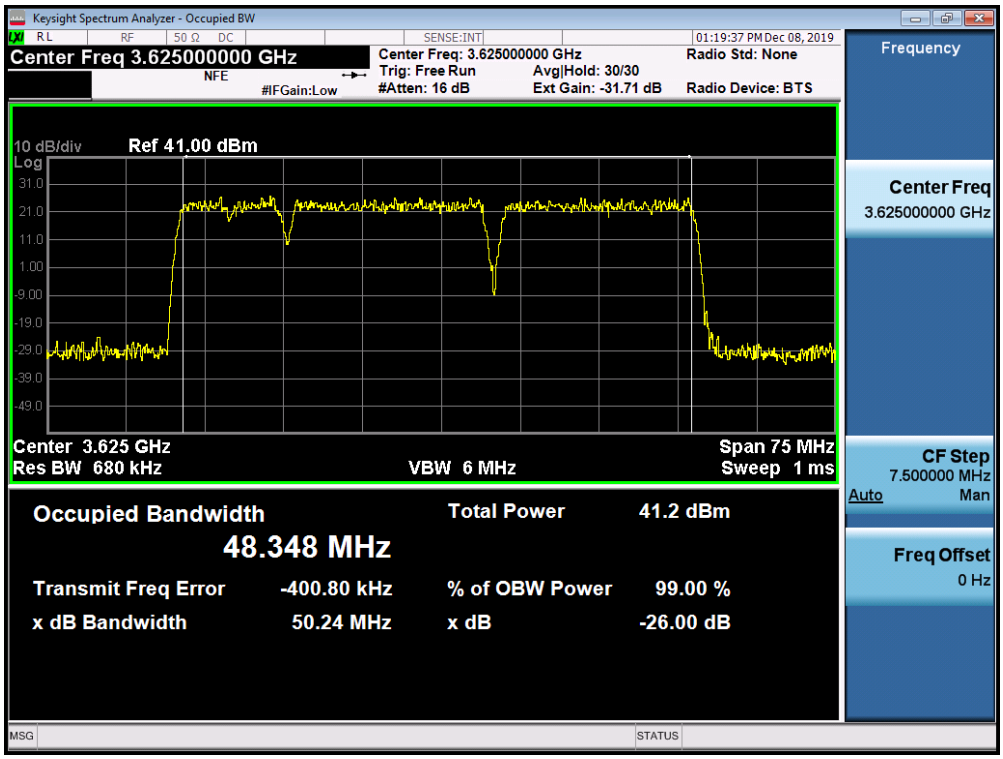
Case10. 4CC - 50MHz Total Bandwidth Configuration (5 + 5 + 20 + 20MHz BW)



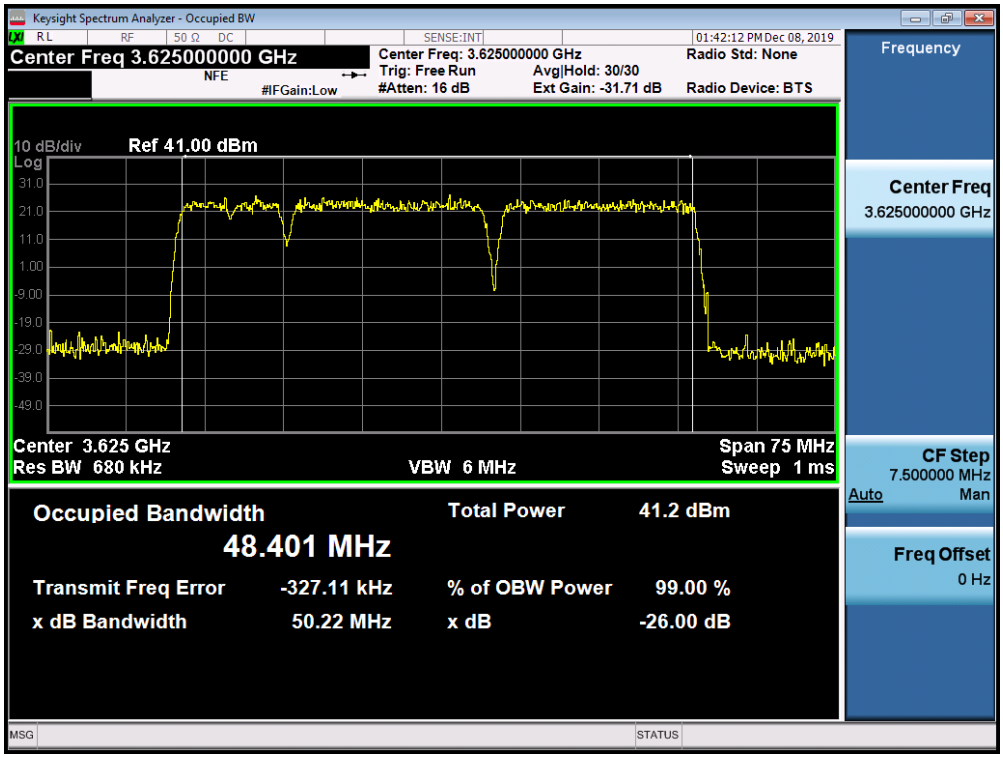
Plot 7-37. Occupied Bandwidth Plot (4CC Configuration - 50MHz Total Bandwidth QPSK)



Plot 7-38. Occupied Bandwidth Plot(4CC Configuration - 50MHz Total Bandwidth 16QAM)

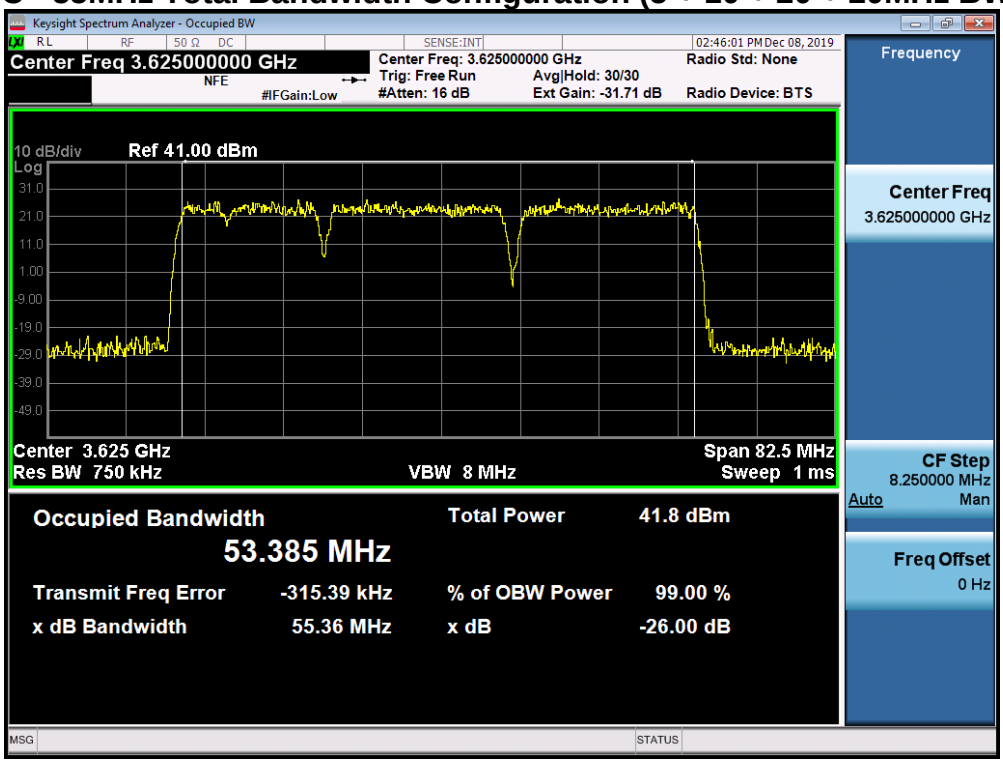


Plot 7-39. Occupied Bandwidth Plot(4CC Configuration - 50MHz Total Bandwidth 64QAM)

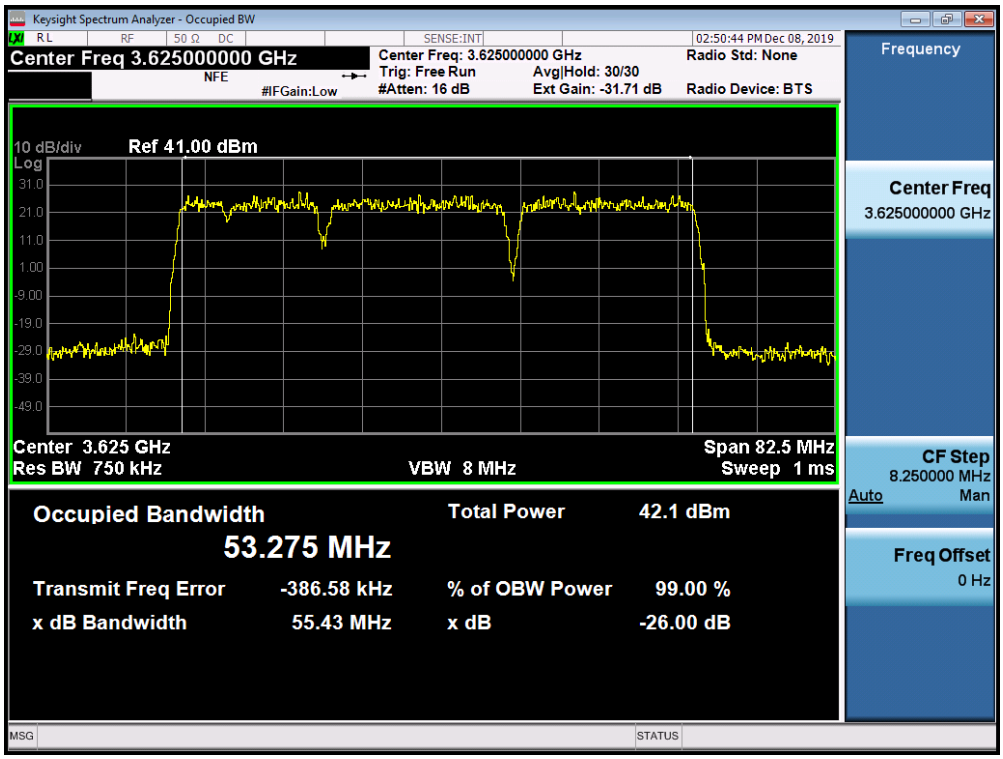


Plot 7-40. Occupied Bandwidth Plot(4CC Configuration - 50MHz Total Bandwidth 256QAM)

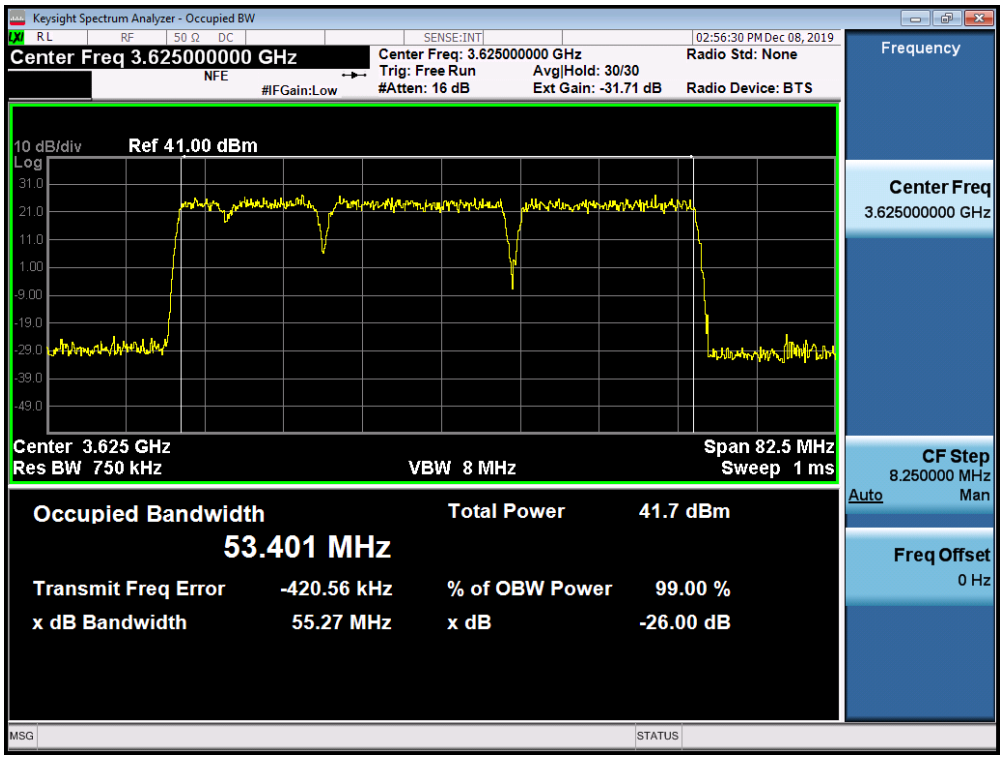
Case11. 4CC - 55MHz Total Bandwidth Configuration (5 + 10 + 20 + 20MHz BW)



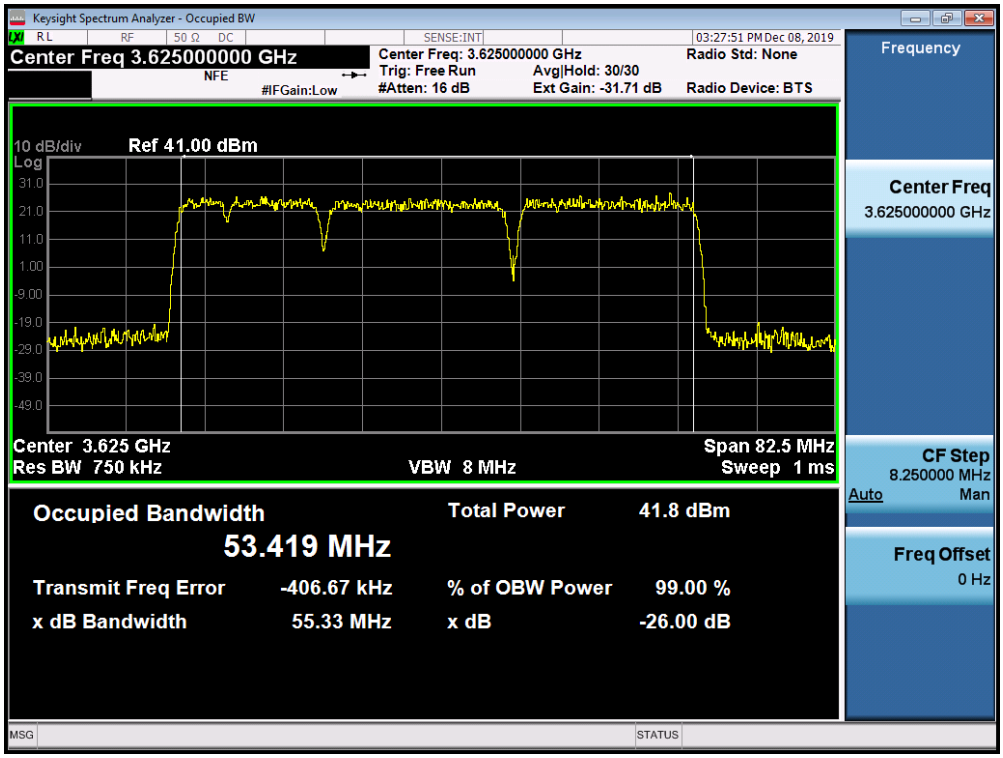
Plot 7-41. Occupied Bandwidth Plot (4CC Configuration - 55MHz Total Bandwidth QPSK)



Plot 7-42. Occupied Bandwidth Plot(4CC Configuration - 55MHz Total Bandwidth 16QAM)

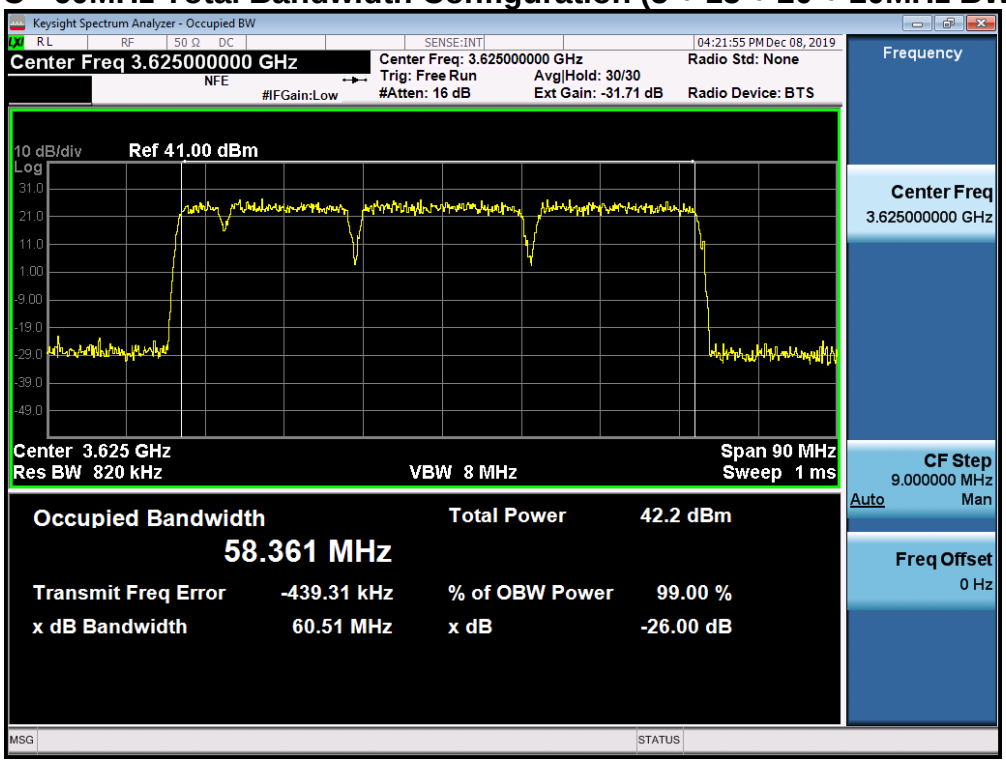


Plot 7-43. Occupied Bandwidth Plot(4CC Configuration - 55MHz Total Bandwidth 64QAM)

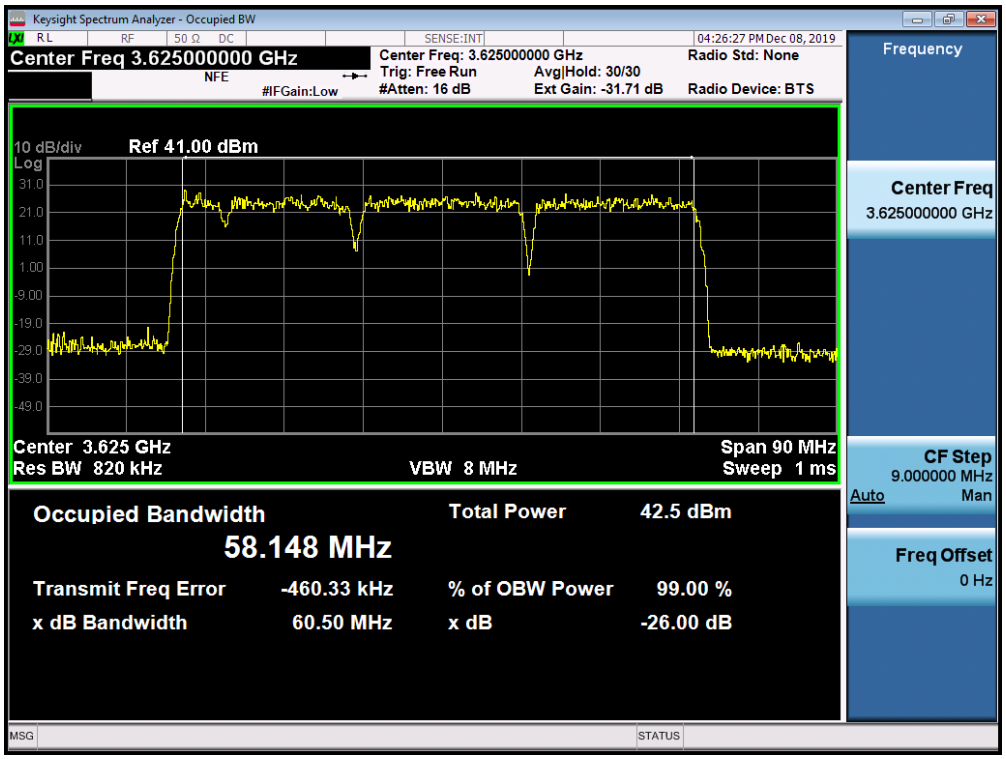


Plot 7-44. Occupied Bandwidth Plot(4CC Configuration - 55MHz Total Bandwidth 256QAM)

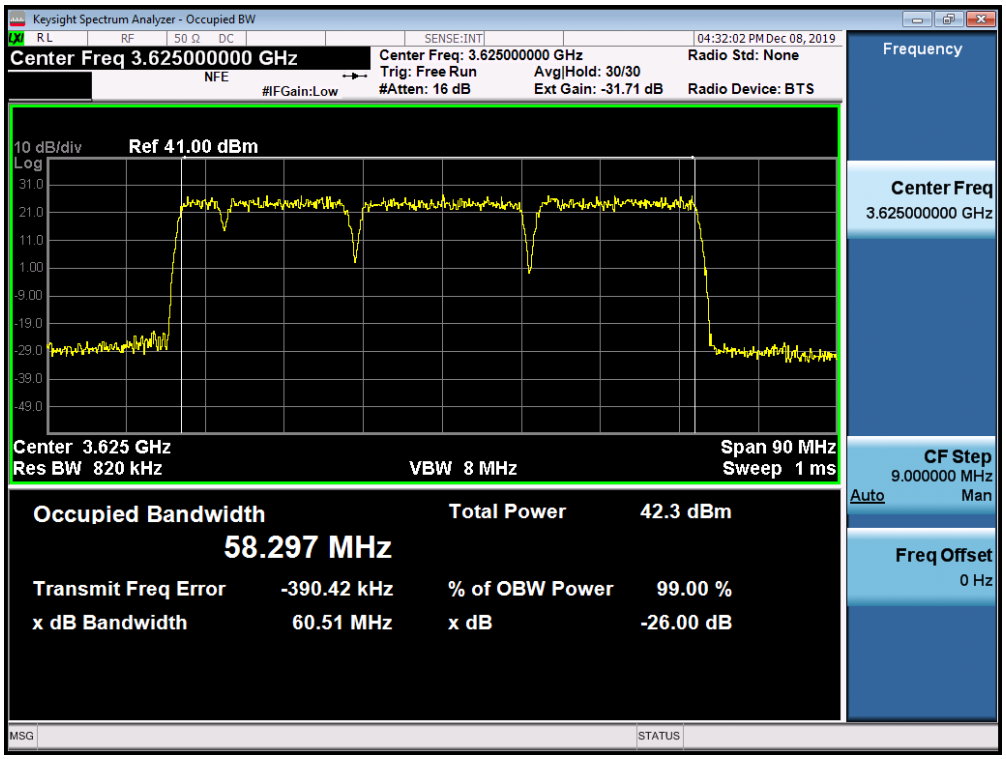
Case12. 4CC - 60MHz Total Bandwidth Configuration (5 + 15 + 20 + 20MHz BW)



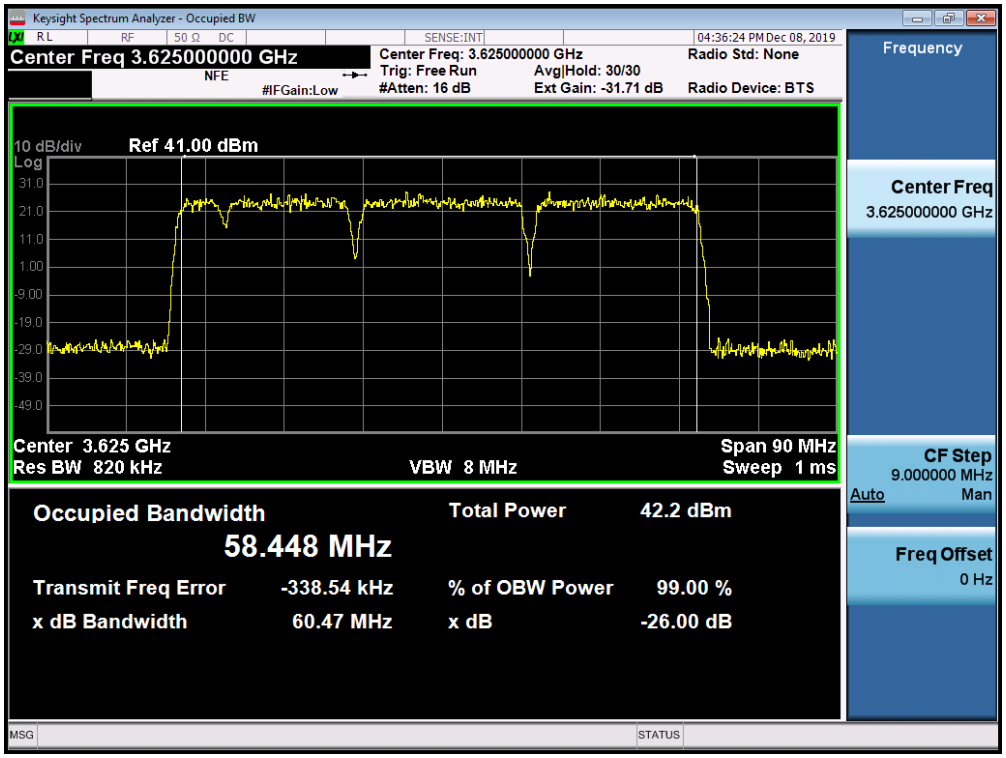
Plot 7-45. Occupied Bandwidth Plot (4CC Configuration - 60MHz Total Bandwidth QPSK)



Plot 7-46. Occupied Bandwidth Plot(4CC Configuration - 60MHz Total Bandwidth 16QAM)

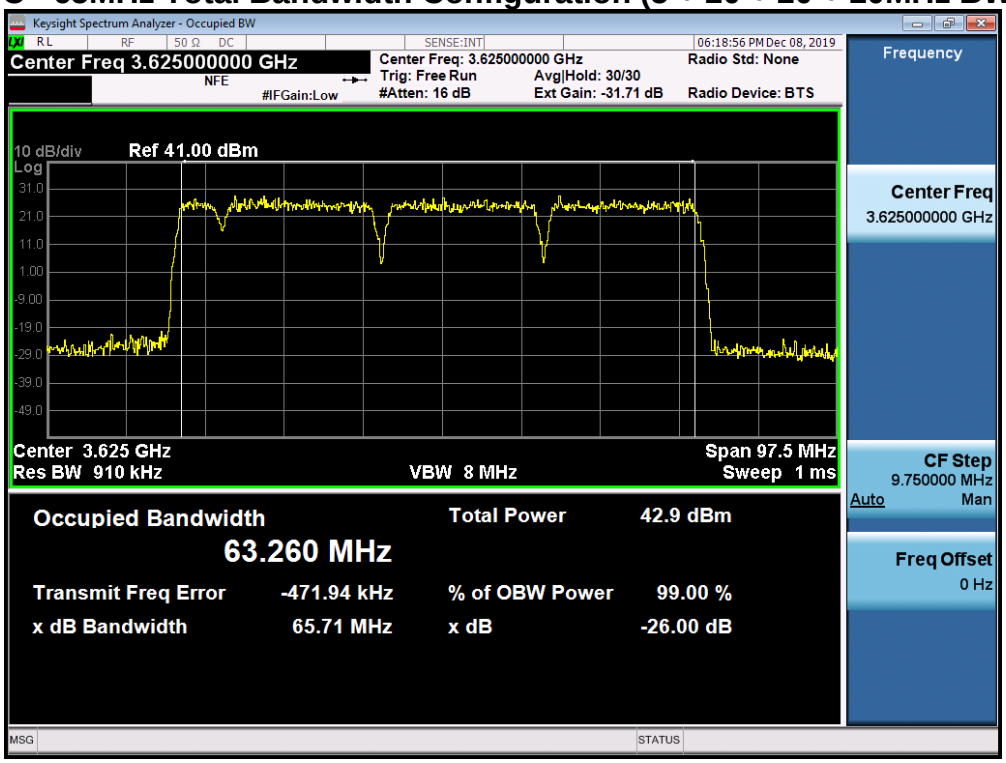


Plot 7-47. Occupied Bandwidth Plot(4CC Configuration - 60MHz Total Bandwidth 64QAM)

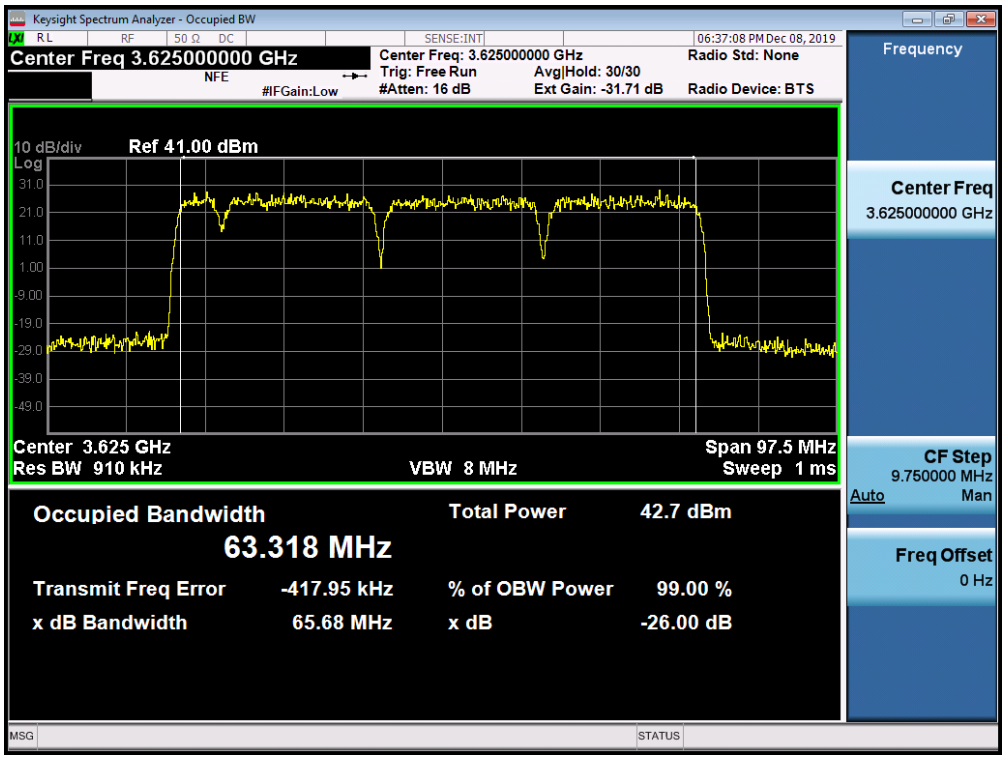


Plot 7-48. Occupied Bandwidth Plot(4CC Configuration - 60MHz Total Bandwidth 256QAM)

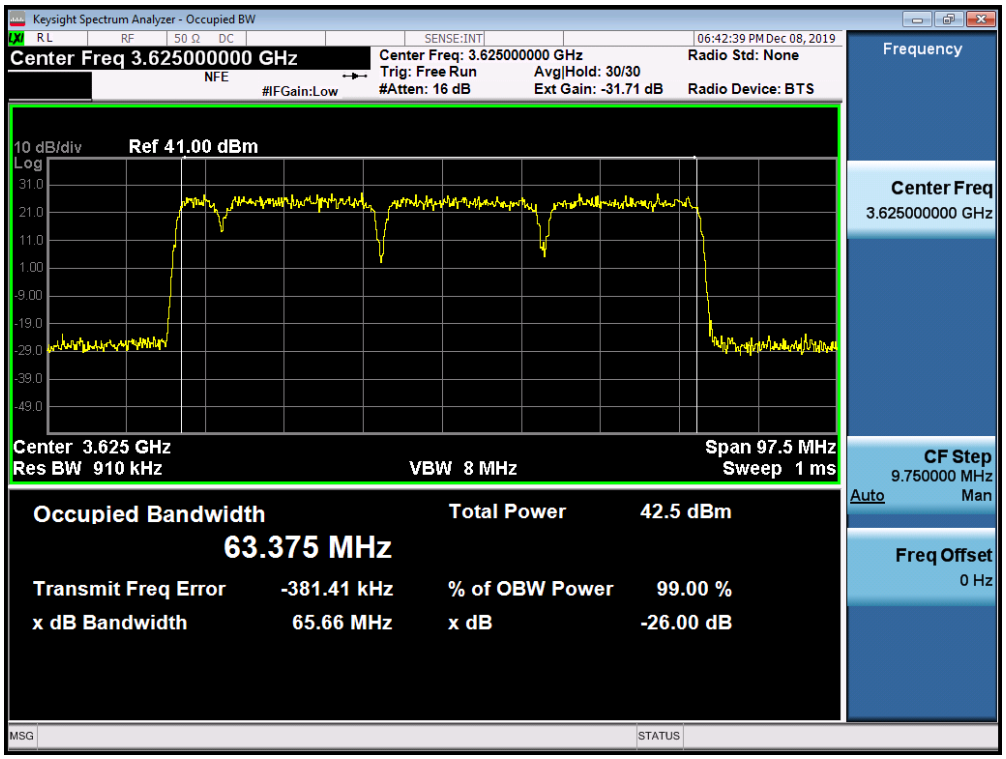
Case13. 4CC - 65MHz Total Bandwidth Configuration (5 + 20 + 20 + 20MHz BW)



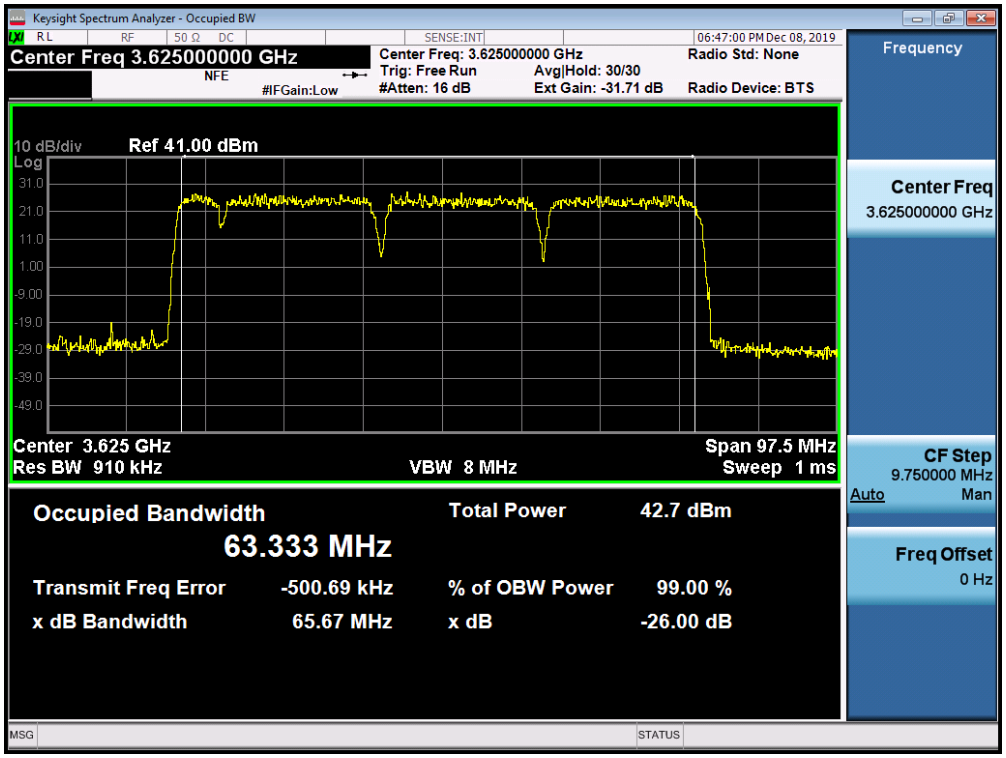
Plot 7-49. Occupied Bandwidth Plot (4CC Configuration - 65MHz Total Bandwidth QPSK)



Plot 7-50. Occupied Bandwidth Plot(4CC Configuration - 65MHz Total Bandwidth 16QAM)

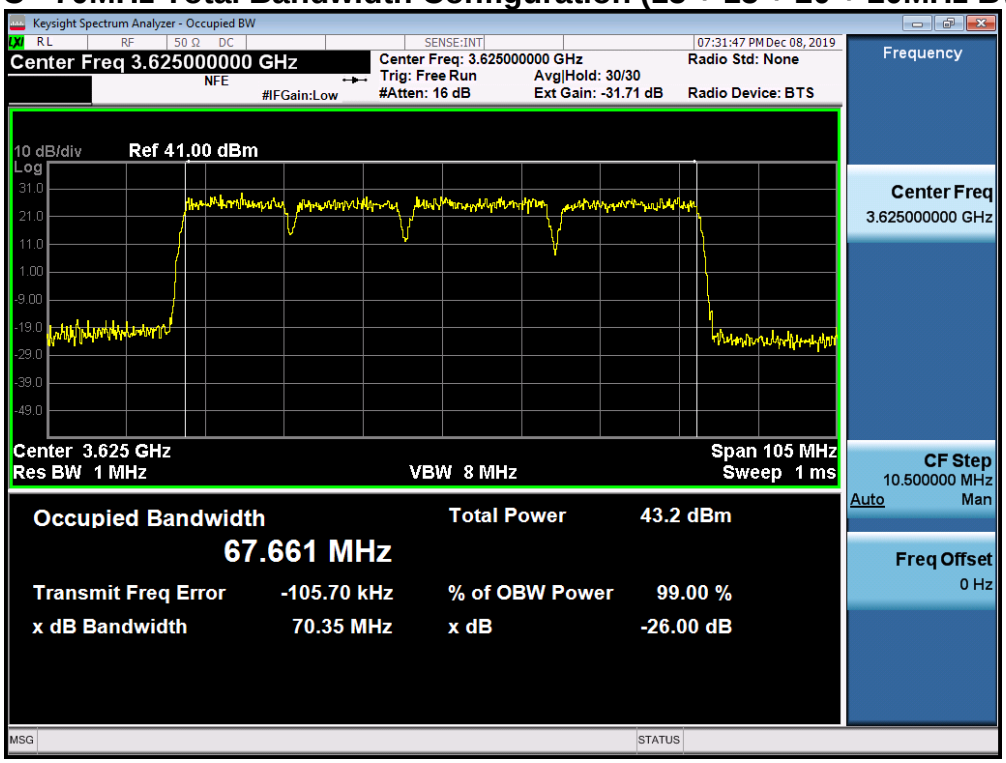


Plot 7-51. Occupied Bandwidth Plot(4CC Configuration - 65MHz Total Bandwidth 64QAM)

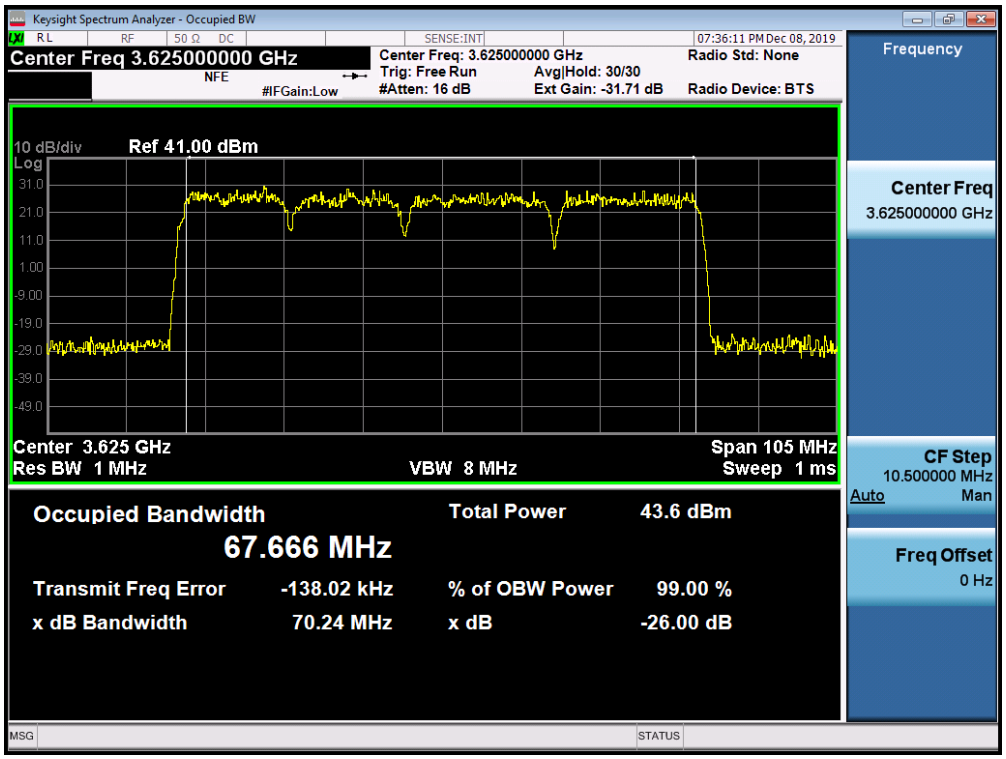


Plot 7-52. Occupied Bandwidth Plot(4CC Configuration - 65MHz Total Bandwidth 256QAM)

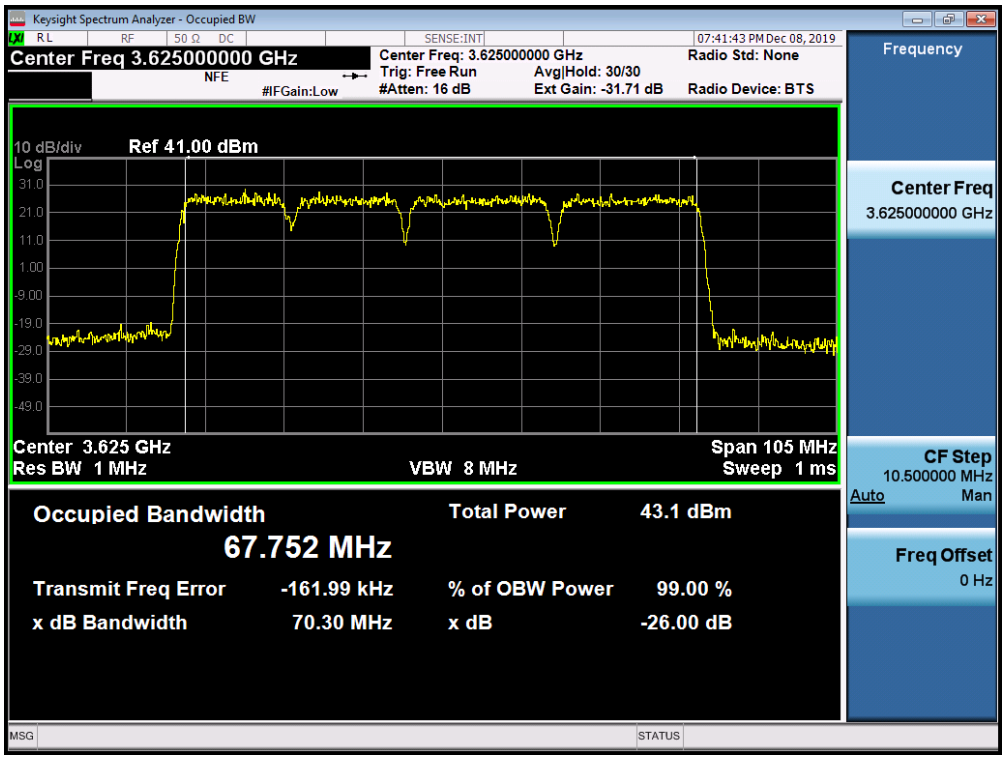
Case14. 4CC - 70MHz Total Bandwidth Configuration (15 + 15 + 20 + 20MHz BW)



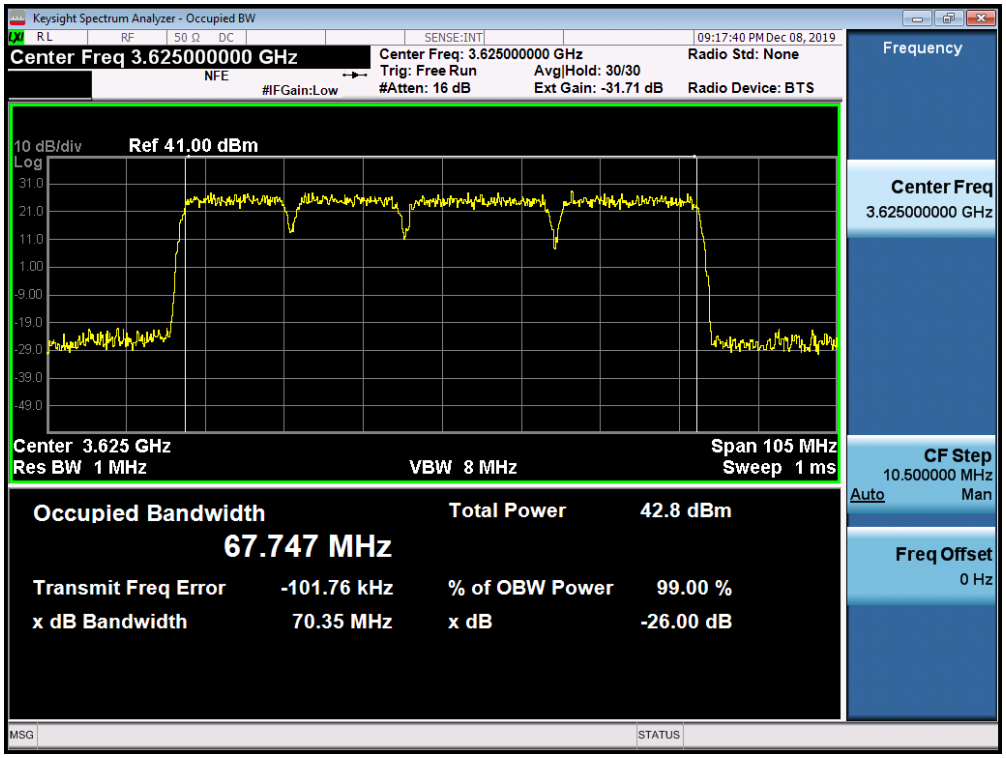
Plot 7-53. Occupied Bandwidth Plot (4CC Configuration - 70MHz Total Bandwidth QPSK)



Plot 7-54. Occupied Bandwidth Plot(4CC Configuration - 70MHz Total Bandwidth 16QAM)

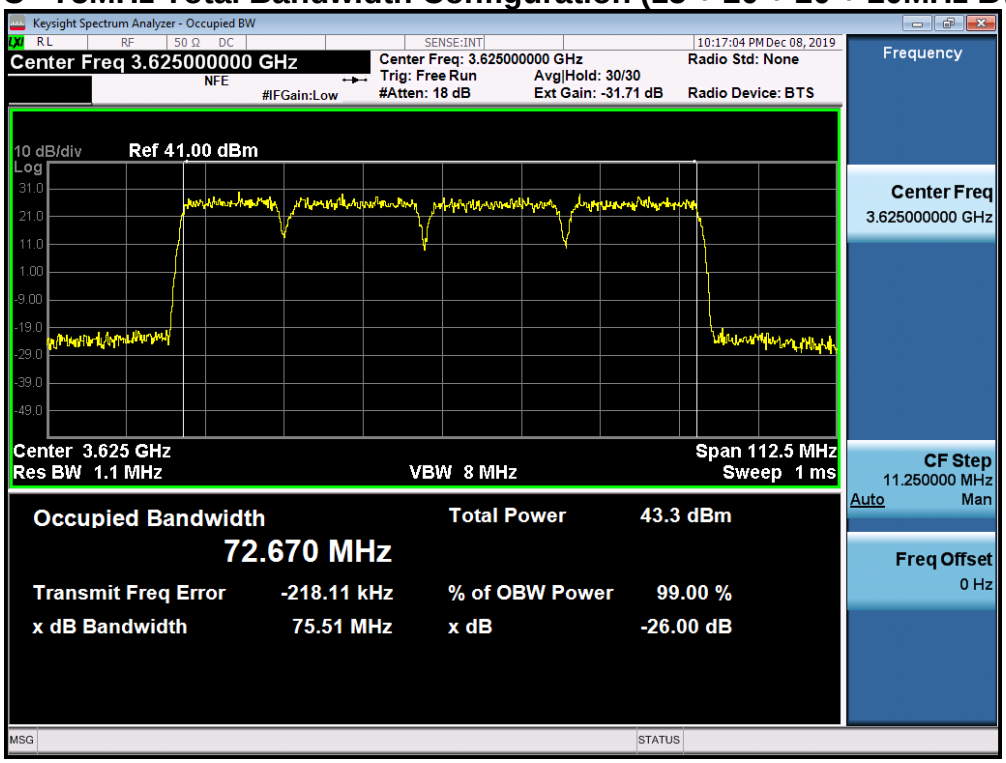


Plot 7-55. Occupied Bandwidth Plot(4CC Configuration - 70MHz Total Bandwidth 64QAM)

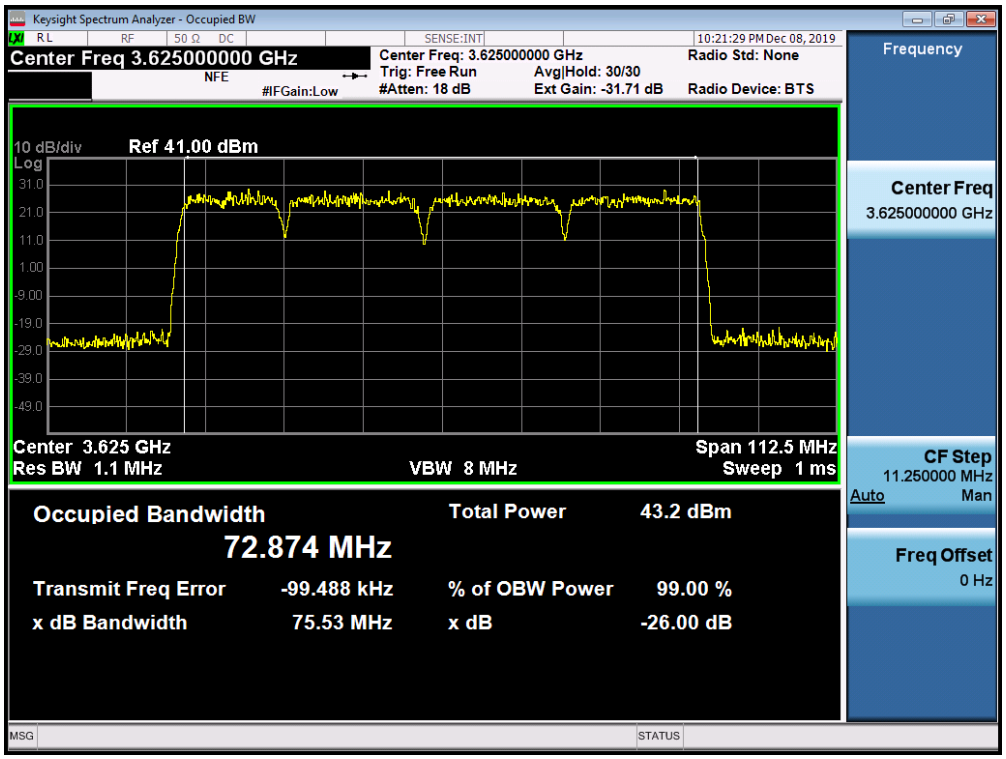


Plot 7-56. Occupied Bandwidth Plot(4CC Configuration - 70MHz Total Bandwidth 256QAM)

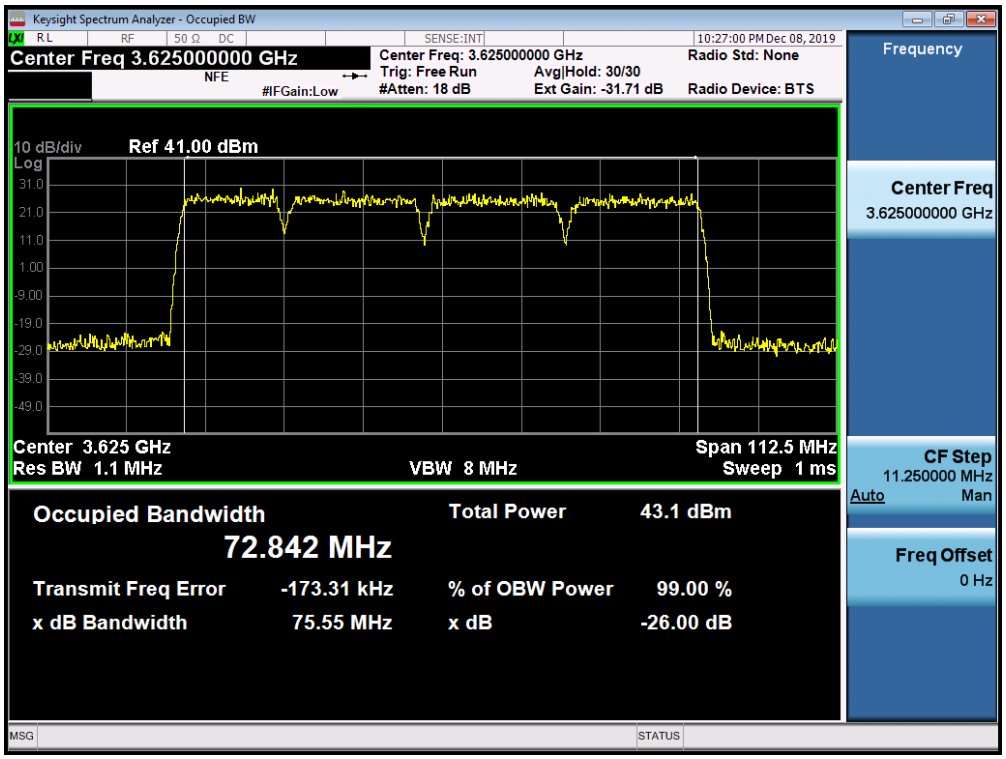
Case15. 4CC - 75MHz Total Bandwidth Configuration (15 + 20 + 20 + 20MHz BW)



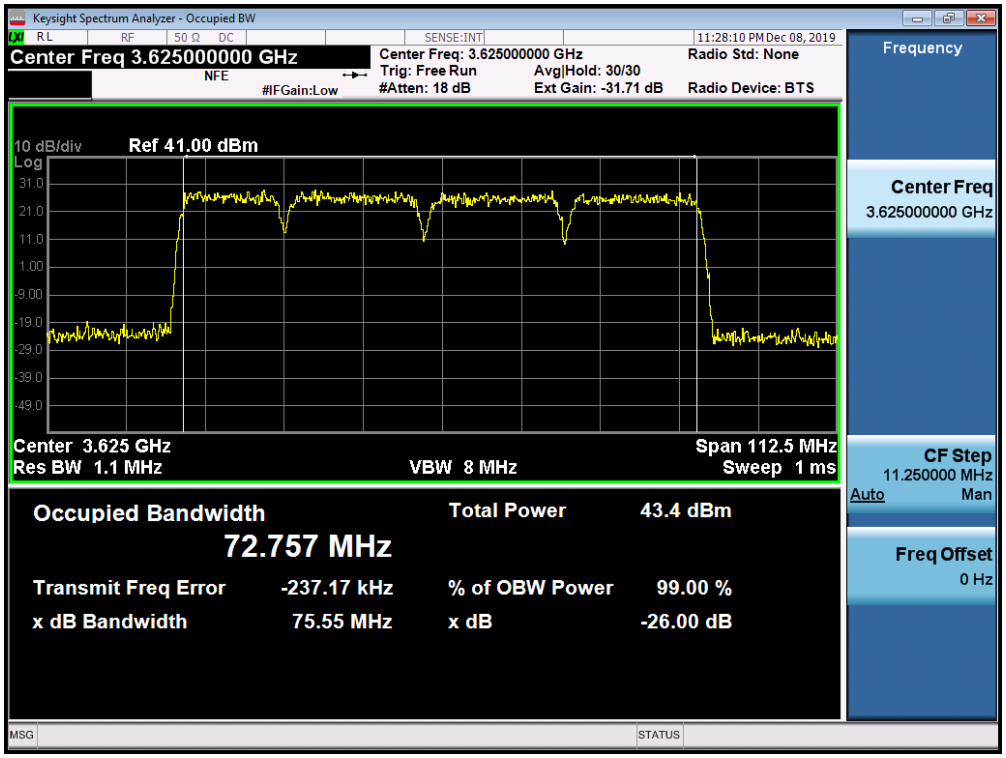
Plot 7-57. Occupied Bandwidth Plot (4CC Configuration - 75MHz Total Bandwidth QPSK)



Plot 7-58. Occupied Bandwidth Plot(4CC Configuration - 75MHz Total Bandwidth 16QAM)



Plot 7-59. Occupied Bandwidth Plot(4CC Configuration - 75MHz Total Bandwidth 64QAM)



Plot 7-60. Occupied Bandwidth Plot(4CC Configuration - 75MHz Total Bandwidth 256QAM)

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.

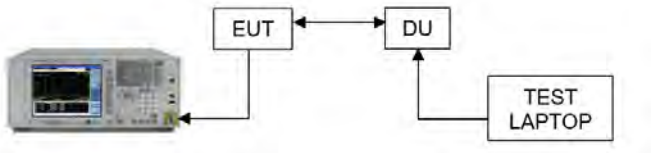


Figure 7-2. Test Instrument & Measurement Setup

Test Notes

1. The port with highest power i.e. worst case per port per modulation has been highlighted in the following power tables. Common mode data was reported.

2. Periodic trigger was used with gating ON. Gate sweeptime, Gate delay and gate length were set accordingly to capture ON time of the transmission.

3. MIMO Calculations are done considering output channel power for all ports and respective margins are calculated.

4. Consider the following factors for MIMO Power:
   a) Conducted power for each port is measured in dBm.
   b) Powers are summed up in linear using the measure-and-sum technique defined in KDB 971168 D01 v03r01-Section D.
   c) Conducted power per port (dBm) is converted to a linear value (mW). A summation of linear powers for all 64 ports gives us the total MIMO conducted power in milliWatts (mW). We convert this back to logarithmic scale for further EIRP calculations.

5. Beamforming (BF) Gain - 2 Port Co-Polarized (Cross-Pol) data is adopted:
   This logarithmic factor accounts for the gain if two spatially different beams overlap in real-time.
   BF Gain = 10* log (2) = 3.01 dB

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

7. Sample Calculation:
   Let us assume the following numbers:
   a. Total MIMO Conducted Power as 1500 milliWatts.
   b. Occupied Bandwidth = 20 MHz
   c. Antenna Gain = 8.5 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 = 20 MHz)	=10 *log (10 / 20)	=	-3.01	dB
Applying Reductions:				
Antenna Gain		=	8.5	dBi
BF Gain	= 10 * log (2)	=	3.01	dB
MIMO EIRP = **Total MIMO Conducted Power** + Scaling Factor + Antenna Gain + BF Gain			43.22	dBm/10MHz
FCC EIRP Limit			47	dBm/10MHz
Margin = MIMO EIRP - FCC EIRP Limit	= 43.22 -47	=	-3.78	dB

Case01. 1CC - 5MHz Total Bandwidth Configuration (5MHz BW)

EIRP													
Test Case	Port #	Test Results (dBm) Low Ch				Test Results (dBm) Middle Ch				Test Results (dBm) High Ch			
		QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
1	0	23.86	23.87	23.60	23.66	24.23	24.31	24.19	23.76	24.24	24.32	24.25	23.95
	1	23.66	23.69	23.71	23.43	24.16	24.18	24.05	23.62	23.96	24.33	24.17	24.03
	2	23.83	24.13	23.94	24.03	24.29	24.10	24.01	23.83	23.96	24.38	24.20	24.06
	3	23.98	24.00	23.91	23.82	23.94	24.19	24.12	23.81	24.04	24.22	24.12	24.05
Total Power (mW)		967.00	987.81	957.70	946.78	1041.67	1051.54	1026.81	949.90	1016.99	1079.25	1049.01	1009.88
Total Power (dBm)		29.85	29.95	29.81	29.76	30.18	30.22	30.11	29.78	30.07	30.33	30.21	30.04
OBW (MHz)		4.49	4.47	4.49	4.49	4.49	4.47	4.49	4.49	4.49	4.47	4.49	4.49
Scaling factor (dB)		3.48	3.50	3.48	3.48	3.48	3.50	3.48	3.48	3.48	3.50	3.48	3.48
Ant. Gain (dBi)		8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50
BF Gain (dB)		3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01
MIMO EIRP (dBm/10MHz)		44.84	44.95	44.80	44.75	45.17	45.23	45.10	44.76	45.06	45.34	45.20	45.03
FCC EIRP Limit (dBm/10MHz)		47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00
Margin (dB)		-2.16	-2.05	-2.20	-2.25	-1.83	-1.77	-1.90	-2.24	-1.94	-1.66	-1.80	-1.97

Table 7-1. Common mode 1CC All Channel Conducted Powers (LTE Band 48 – 5MHz)

Case02. 1C - 15MHz Total Bandwidth Configuration (15MHz BW)

EIRP													
Test Case	Port #	Test Results (dBm) Low Ch				Test Results (dBm) Middle Ch				Test Results (dBm) High Ch			
		QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
2	0	28.63	28.72	28.83	28.42	28.75	29.04	28.95	28.56	28.99	29.11	29.21	28.62
	1	28.60	28.77	28.93	28.51	28.70	28.87	28.98	28.53	28.87	29.02	29.11	28.62
	2	28.65	28.73	28.96	28.47	28.67	28.91	28.90	28.50	28.89	29.05	29.04	28.72
	3	28.53	28.79	28.71	28.37	28.59	28.82	28.94	28.73	28.84	29.01	29.01	28.66
Total Power (mW)		2900.02	3000.92	3076.35	2794.86	2950.58	3112.61	3135.85	2885.96	3102.13	3214.07	3245.84	2935.60
Total Power (dBm)		34.62	34.77	34.88	34.46	34.70	34.93	34.96	34.60	34.92	35.07	35.11	34.68
OBW (MHz)		13.43	13.46	13.51	13.44	13.43	13.46	13.51	13.44	13.43	13.46	13.51	13.44
Scaling factor (dB)		-1.28	-1.29	-1.31	-1.28	-1.28	-1.29	-1.31	-1.28	-1.28	-1.29	-1.31	-1.28
Ant. Gain (dBi)		8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50
BF Gain (dB)		3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01
MIMO EIRP (dBm/10MHz)		44.85	44.99	45.08	44.69	44.93	45.15	45.17	44.83	45.15	45.29	45.32	44.90
FCC EIRP Limit (dBm/10MHz)		47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00
Margin (dB)		-2.15	-2.01	-1.92	-2.31	-2.07	-1.85	-1.83	-2.17	-1.85	-1.71	-1.68	-2.10

Table 7-2. Common mode 1CC All Channel Conducted Powers (LTE Band 48 – 15MHz)

Case03. 3CC - 15MHz Total Bandwidth Configuration (5 + 5 + 5MHz BW)

EIRP													
Test Case	Port #	Test Results (dBm) Low Ch				Test Results (dBm) Middle Ch				Test Results (dBm) High Ch			
		QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
3	0	28.67	29.05	28.90	28.04	28.96	29.28	29.02	28.42	28.63	29.16	29.08	28.26
	1	28.66	28.41	28.81	28.52	28.91	29.06	29.05	28.71	28.80	29.25	29.23	28.42
	2	28.63	29.16	29.05	28.17	28.83	28.68	28.95	28.26	28.72	29.22	28.97	28.62
	3	28.59	28.58	28.86	28.65	28.58	29.21	28.97	28.16	28.80	29.10	29.01	28.73
Total Power (mW)		2922.75	3042.29	3111.46	2736.24	3051.06	3225.35	3175.88	2761.91	2991.35	3313.50	3229.77	2838.32
Total Power (dBm)		34.66	34.83	34.93	34.37	34.84	35.09	35.02	34.41	34.76	35.20	35.09	34.53
OBW (MHz)		14.37	14.43	14.40	14.37	14.37	14.43	14.40	14.37	14.37	14.43	14.40	14.37
Scaling factor (dB)		-1.57	-1.59	-1.58	-1.58	-1.57	-1.59	-1.58	-1.58	-1.57	-1.59	-1.58	-1.58
Ant. Gain (dBi)		8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50
BF Gain (dB)		3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01
MIMO EIRP (dBm/10MHz)		44.59	44.75	44.86	44.31	44.78	45.00	44.94	44.35	44.69	45.12	45.02	44.47
FCC EIRP Limit (dBm/10MHz)		47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00
Margin (dB)		-2.41	-2.25	-2.14	-2.69	-2.22	-2.00	-2.06	-2.65	-2.31	-1.88	-1.98	-2.53

Table 7-3. Common mode 3CC All Channel Conducted Powers (LTE Band 48 – 15MHz)

Case04. 4CC - 20MHz Total Bandwidth Configuration (5 + 5 + 5 + 5MHz BW)

EIRP													
Test Case	Port #	Test Results (dBm) Low Ch				Test Results (dBm) Middle Ch				Test Results (dBm) High Ch			
		QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
4	0	30.34	30.15	29.96	30.03	30.48	30.19	30.14	29.89	30.54	30.28	30.22	30.07
	1	30.55	30.29	29.65	30.00	30.56	30.25	30.14	29.88	30.61	30.31	30.11	30.08
	2	30.46	30.29	29.88	29.92	30.44	30.24	30.03	29.83	30.80	30.46	30.00	30.05
	3	30.65	30.34	29.78	29.99	30.27	30.23	29.89	29.96	30.66	30.35	29.77	29.99
Total Power (mW)		4491.15	4256.68	3836.07	3985.70	4425.08	4216.00	4048.19	3901.55	4650.34	4337.57	4026.52	4046.26
Total Power (dBm)		36.52	36.29	35.84	36.01	36.46	36.25	36.07	35.91	36.67	36.37	36.05	36.07
OBW (MHz)		19.40	19.25	19.36	19.35	19.40	19.25	19.36	19.35	19.40	19.25	19.36	19.35
Scaling factor (dB)		-2.88	-2.85	-2.87	-2.87	-2.88	-2.85	-2.87	-2.87	-2.88	-2.85	-2.87	-2.87
Ant. Gain (dBi)		8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50
BF Gain (dB)		3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01
MIMO EIRP (dBm/10MHz)		45.16	44.96	44.48	44.65	45.09	44.91	44.71	44.55	45.31	45.04	44.69	44.71
FCC EIRP Limit (dBm/10MHz)		47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00
Margin (dB)		-1.84	-2.04	-2.52	-2.35	-1.91	-2.09	-2.29	-2.45	-1.69	-1.96	-2.31	-2.29

Table 7-4. Common mode 4CC All Channel Conducted Powers (LTE Band 48 – 20MHz)

Case05. 4CC - 25MHz Total Bandwidth Configuration (5 + 5 + 5 + 10MHz BW)

EIRP													
Test Case	Port #	Test Results (dBm) Low Ch				Test Results (dBm) Middle Ch				Test Results (dBm) High Ch			
		QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
5	0	31.40	30.95	31.18	31.10	31.32	30.97	31.15	31.21	31.33	31.09	31.04	31.01
	1	31.03	30.88	31.36	31.47	31.30	30.94	31.09	31.20	31.17	31.09	31.30	31.19
	2	31.29	30.92	31.06	31.21	31.24	30.87	30.87	30.72	31.52	31.17	31.39	31.39
	3	30.98	30.97	31.17	31.32	31.18	30.86	31.06	30.82	31.45	31.11	31.25	31.38
Total Power (mW)		5245.54	4955.02	5267.49	5368.22	5347.39	4930.09	5090.66	5027.64	5484.64	5168.68	5333.11	5331.45
Total Power (dBm)		37.20	36.95	37.22	37.30	37.28	36.93	37.07	37.01	37.39	37.13	37.27	37.27
OBW (MHz)		24.08	24.15	24.10	24.12	24.08	24.15	24.10	24.12	24.08	24.15	24.10	24.12
Scaling factor (dB)		-3.82	-3.83	-3.82	-3.82	-3.82	-3.83	-3.82	-3.82	-3.82	-3.83	-3.82	-3.82
Ant. Gain (dBi)		8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50
BF Gain (dB)		3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01
MIMO EIRP (dBm/10MHz)		44.89	44.63	44.91	44.98	44.97	44.61	44.76	44.70	45.08	44.82	44.96	44.95
FCC EIRP Limit (dBm/10MHz)		47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00
Margin (dB)		-2.11	-2.37	-2.09	-2.02	-2.03	-2.39	-2.24	-2.30	-1.92	-2.18	-2.04	-2.05

Table 7-5. Common mode 4CC All Channel Conducted Powers (LTE Band 48 – 25MHz)

Case06. 4CC - 30MHz Total Bandwidth Configuration (5 + 5 + 5 + 15MHz BW)

EIRP													
Test Case	Port #	Test Results (dBm) Low Ch				Test Results (dBm) Middle Ch				Test Results (dBm) High Ch			
		QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
6	0	31.98	32.00	31.66	32.00	31.82	32.22	32.09	31.77	31.65	32.16	31.94	31.63
	1	32.04	31.92	32.14	31.80	31.79	32.23	32.16	31.82	31.75	32.21	31.66	31.71
	2	32.01	32.26	31.83	31.76	31.87	32.05	31.73	31.72	31.80	32.21	31.80	31.89
	3	31.72	32.08	31.69	31.77	32.01	32.11	31.76	31.78	31.91	32.24	31.83	31.71
Total Power (mW)		6249.24	6441.57	6098.80	6100.17	6158.93	6566.35	6247.72	6018.32	6024.25	6645.37	6068.47	5966.03
Total Power (dBm)		37.96	38.09	37.85	37.85	37.90	38.17	37.96	37.79	37.80	38.23	37.83	37.76
OBW (MHz)		28.85	28.70	28.86	28.79	28.85	28.70	28.86	28.79	28.85	28.70	28.86	28.79
Scaling factor (dB)		-4.60	-4.58	-4.60	-4.59	-4.60	-4.58	-4.60	-4.59	-4.60	-4.58	-4.60	-4.59
Ant. Gain (dBi)		8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50
BF Gain (dB)		3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01
MIMO EIRP (dBm/10MHz)		44.87	45.02	44.76	44.77	44.80	45.10	44.86	44.71	44.71	45.16	44.74	44.68
FCC EIRP Limit (dBm/10MHz)		47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00
Margin (dB)		-2.13	-1.98	-2.24	-2.23	-2.20	-1.90	-2.14	-2.29	-2.29	-1.84	-2.26	-2.32

Table 7-6. Common mode 4CC All Channel Conducted Powers (LTE Band 48 – 30MHz)

Case07. 4CC - 35MHz Total Bandwidth Configuration (5 + 5 + 5 + 20MHz BW)

EIRP													
Test Case	Port #	Test Results (dBm) Low Ch				Test Results (dBm) Middle Ch				Test Results (dBm) High Ch			
		QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
7	0	32.45	32.42	32.61	32.37	32.47	32.46	32.65	32.38	32.67	32.75	32.50	32.41
	1	32.49	32.40	32.56	32.58	32.52	32.48	32.60	32.40	32.61	32.64	32.54	32.48
	2	32.36	32.64	32.70	32.38	32.26	32.54	32.47	32.46	32.53	32.54	32.74	32.47
	3	32.43	32.53	32.58	32.47	32.29	32.63	32.61	32.33	32.58	32.64	32.62	32.44
Total Power (mW)		7003.94	7110.47	7300.35	7030.67	6926.92	7160.66	7252.17	6940.21	7277.15	7354.82	7281.99	7028.27
Total Power (dBm)		38.45	38.52	38.63	38.47	38.41	38.55	38.60	38.41	38.62	38.67	38.62	38.47
OBW (MHz)		33.40	33.51	33.53	33.59	33.40	33.51	33.53	33.59	33.40	33.51	33.53	33.59
Scaling factor (dB)		-5.24	-5.25	-5.25	-5.26	-5.24	-5.25	-5.25	-5.26	-5.24	-5.25	-5.25	-5.26
Ant. Gain (dBi)		8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50
BF Gain (dB)		3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01
MIMO EIRP (dBm/10MHz)		44.73	44.78	44.89	44.72	44.68	44.81	44.86	44.66	44.89	44.92	44.88	44.72
FCC EIRP Limit (dBm/10MHz)		47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00
Margin (dB)		-2.27	-2.22	-2.11	-2.28	-2.32	-2.19	-2.14	-2.34	-2.11	-2.08	-2.12	-2.28

Table 7-7. Common mode 4CC All Channel Conducted Powers (LTE Band 48 – 35MHz)

Case08. 4CC - 40MHz Total Bandwidth Configuration (5 + 5 + 10 + 20MHz BW)

EIRP													
Test Case	Port #	Test Results (dBm) Low Ch				Test Results (dBm) Middle Ch				Test Results (dBm) High Ch			
		QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
8	0	32.95	32.95	33.15	33.12	33.01	32.86	33.16	33.12	33.14	33.01	33.23	33.06
	1	32.99	33.05	33.21	32.94	33.04	32.90	33.10	33.09	33.06	32.93	33.15	32.90
	2	32.99	32.91	33.09	33.14	32.93	32.96	33.11	32.98	33.26	33.19	33.25	33.26
	3	32.93	32.98	33.28	32.88	33.13	32.96	32.99	33.12	33.32	33.13	33.28	33.21
Total Power (mW)		7915.56	7929.87	8327.31	8017.17	8031.12	7837.14	8149.84	8123.96	8351.87	8107.56	8409.98	8186.79
Total Power (dBm)		38.98	38.99	39.21	39.04	39.05	38.94	39.11	39.10	39.22	39.09	39.25	39.13
OBW (MHz)		38.41	38.38	38.47	38.58	38.41	38.38	38.47	38.58	38.41	38.38	38.47	38.58
Scaling factor (dB)		-5.84	-5.84	-5.85	-5.86	-5.84	-5.84	-5.85	-5.86	-5.84	-5.84	-5.85	-5.86
Ant. Gain (dBi)		8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50
BF Gain (dB)		3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01
MIMO EIRP (dBm/10MHz)		44.65	44.66	44.86	44.69	44.71	44.61	44.77	44.74	44.88	44.76	44.91	44.78
FCC EIRP Limit (dBm/10MHz)		47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00
Margin (dB)		-2.35	-2.34	-2.14	-2.31	-2.29	-2.39	-2.23	-2.26	-2.12	-2.24	-2.09	-2.22

Table 7-8. Common mode 4CC All Channel Conducted Powers (LTE Band 48 – 40MHz)

Case09. 4CC - 45MHz Total Bandwidth Configuration (5 + 5 + 15 + 20MHz BW)

EIRP													
Test Case	Port #	Test Results (dBm) Low Ch				Test Results (dBm) Middle Ch				Test Results (dBm) High Ch			
		QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
9	0	33.57	33.70	33.69	33.44	33.64	33.60	33.82	33.78	33.90	33.69	33.82	33.58
	1	33.74	33.66	33.65	33.55	33.64	33.72	33.73	33.86	34.00	33.82	33.82	33.78
	2	33.52	33.55	33.71	33.56	33.68	33.79	33.76	33.60	33.90	33.79	33.87	33.66
	3	33.63	33.62	33.60	33.51	33.66	33.82	33.76	33.76	33.91	33.89	33.76	33.74
Total Power (mW)		9195.55	9232.88	9299.32	8979.54	9283.78	9450.06	9517.36	9488.39	9882.29	9587.17	9637.11	9354.49
Total Power (dBm)		39.64	39.65	39.68	39.53	39.68	39.75	39.79	39.77	39.95	39.82	39.84	39.71
OBW (MHz)		43.39	43.29	43.39	43.46	43.39	43.29	43.39	43.46	43.39	43.29	43.39	43.46
Scaling factor (dB)		-6.37	-6.36	-6.37	-6.38	-6.37	-6.36	-6.37	-6.38	-6.37	-6.36	-6.37	-6.38
Ant. Gain (dBi)		8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50
BF Gain (dB)		3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01
MIMO EIRP (dBm/10MHz)		44.77	44.80	44.82	44.66	44.81	44.90	44.92	44.90	45.09	44.96	44.98	44.84
FCC EIRP Limit (dBm/10MHz)		47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00
Margin (dB)		-2.23	-2.20	-2.18	-2.34	-2.19	-2.10	-2.08	-2.10	-1.91	-2.04	-2.02	-2.16

Table 7-9. Common mode 4CC All Channel Conducted Powers (LTE Band 48 – 45MHz)

Case10. 4CC - 50MHz Total Bandwidth Configuration (5 + 5 + 20 + 20MHz BW)

EIRP													
Test Case	Port #	Test Results (dBm) Low Ch				Test Results (dBm) Middle Ch				Test Results (dBm) High Ch			
		QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
10	0	33.95	34.14	34.32	34.15	34.46	34.12	34.09	34.11	34.27	34.17	34.04	34.02
	1	34.08	33.89	34.07	34.13	34.10	34.23	34.03	34.08	34.30	34.16	34.11	34.14
	2	34.26	34.24	34.19	34.20	34.42	34.33	34.19	34.19	34.22	34.09	34.17	34.19
	3	34.21	34.26	34.18	34.26	34.33	34.24	34.28	34.13	34.27	34.19	34.03	34.10
Total Power (mW)		10347.24	10366.03	10498.40	10483.20	10838.78	10598.56	10401.75	10354.11	10678.22	10407.80	10249.82	10315.11
Total Power (dBm)		40.15	40.16	40.21	40.20	40.35	40.25	40.17	40.15	40.28	40.17	40.11	40.13
OBW (MHz)		48.38	48.23	48.35	48.40	48.38	48.23	48.35	48.40	48.38	48.23	48.35	48.40
Scaling factor (dB)		-6.85	-6.83	-6.84	-6.85	-6.85	-6.83	-6.84	-6.85	-6.85	-6.83	-6.84	-6.85
Ant. Gain (dBi)		8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50
BF Gain (dB)		3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01
MIMO EIRP (dBm/10MHz)		44.81	44.83	44.88	44.87	45.01	44.93	44.84	44.81	44.95	44.85	44.77	44.80
FCC EIRP Limit (dBm/10MHz)		47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00
Margin (dB)		-2.19	-2.17	-2.12	-2.13	-1.99	-2.07	-2.16	-2.19	-2.05	-2.15	-2.23	-2.20

Table 7-10. Common mode 4CC All Channel Conducted Powers (LTE Band 48 – 50MHz)

Case11. 4CC - 55MHz Total Bandwidth Configuration (5 + 10 + 20 + 20MHz BW)

EIRP													
Test Case	Port #	Test Results (dBm) Low Ch				Test Results (dBm) Middle Ch				Test Results (dBm) High Ch			
		QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
11	0	34.63	34.59	34.78	34.53	34.74	34.63	34.73	34.58	34.91	34.67	34.79	34.61
	1	34.88	34.59	34.77	34.51	35.04	34.77	34.74	34.58	34.87	34.71	34.89	34.68
	2	34.83	34.65	35.00	34.70	34.75	34.63	34.78	34.59	34.84	34.69	34.86	34.73
	3	34.82	34.63	34.81	34.58	34.79	34.60	34.82	34.42	34.97	34.82	34.97	34.64
Total Power (mW)		12052.12	11578.04	12199.94	11483.99	12168.62	11692.07	11984.97	11386.21	12350.21	11866.32	12298.27	11711.86
Total Power (dBm)		40.81	40.64	40.86	40.60	40.85	40.68	40.79	40.56	40.92	40.74	40.90	40.69
OBW (MHz)		53.39	53.28	53.40	53.42	53.39	53.28	53.40	53.42	53.39	53.28	53.40	53.42
Scaling factor (dB)		-7.27	-7.27	-7.28	-7.28	-7.27	-7.27	-7.28	-7.28	-7.27	-7.27	-7.28	-7.28
Ant. Gain (dBi)		8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50
BF Gain (dB)		3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01
MIMO EIRP (dBm/10MHz)		45.05	44.88	45.10	44.83	45.09	44.92	45.02	44.80	45.15	44.99	45.13	44.92
FCC EIRP Limit (dBm/10MHz)		47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00
Margin (dB)		-1.95	-2.12	-1.90	-2.17	-1.91	-2.08	-1.98	-2.20	-1.85	-2.01	-1.87	-2.08

Table 7-11. Common mode 4CC All Channel Conducted Powers (LTE Band 48 – 55MHz)

Case12. 4CC - 60MHz Total Bandwidth Configuration (5 + 15 + 20 + 20MHz BW)

EIRP													
Test Case	Port #	Test Results (dBm) Low Ch				Test Results (dBm) Middle Ch				Test Results (dBm) High Ch			
		QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
12	0	35.15	35.00	35.07	35.12	35.35	34.97	35.10	35.19	35.34	35.10	34.94	35.02
	1	35.26	35.06	35.06	35.23	35.22	34.96	34.92	35.10	35.45	34.99	34.85	35.02
	2	35.23	35.14	35.10	35.20	35.23	35.12	35.09	35.29	35.46	35.12	35.12	35.13
	3	35.24	35.04	35.22	35.26	35.23	34.95	34.99	35.07	35.33	34.86	34.95	35.24
Total Power (mW)		13306.35	12825.59	12988.00	13250.96	13416.60	12646.00	12720.93	13136.69	13854.74	12696.93	12546.79	12951.21
Total Power (dBm)		41.24	41.08	41.14	41.22	41.28	41.02	41.05	41.18	41.42	41.04	40.99	41.12
OBW (MHz)		58.36	58.15	58.30	58.45	58.36	58.15	58.30	58.45	58.36	58.15	58.30	58.45
Scaling factor (dB)		-7.66	-7.65	-7.66	-7.67	-7.66	-7.65	-7.66	-7.67	-7.66	-7.65	-7.66	-7.67
Ant. Gain (dBi)		8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50
BF Gain (dB)		3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01
MIMO EIRP (dBm/10MHz)		45.09	44.95	44.99	45.07	45.13	44.88	44.90	45.03	45.27	44.90	44.84	44.97
FCC EIRP Limit (dBm/10MHz)		47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00
Margin (dB)		-1.91	-2.05	-2.01	-1.93	-1.87	-2.12	-2.10	-1.97	-1.73	-2.10	-2.16	-2.03

Table 7-12. Common mode 4CC All Channel Conducted Powers (LTE Band 48 – 60MHz)

Case13. 4CC - 65MHz Total Bandwidth Configuration (5 + 20 + 20 + 20MHz BW)

EIRP													
Test Case	Port #	Test Results (dBm) Low Ch				Test Results (dBm) Middle Ch				Test Results (dBm) High Ch			
		QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
13	0	35.55	35.50	35.32	35.67	35.69	35.51	35.34	35.59	35.64	35.56	35.47	35.64
	1	35.64	35.57	35.44	35.65	35.80	35.44	35.56	35.53	35.76	35.55	35.42	35.57
	2	35.53	35.55	35.68	35.65	35.76	35.47	35.39	35.57	35.64	35.44	35.44	35.41
	3	35.65	35.76	35.53	35.60	35.77	35.55	35.42	35.62	35.56	35.37	35.37	35.39
Total Power (mW)		14504.13	14505.40	14177.14	14662.80	15048.98	14170.25	13958.82	14449.87	14686.15	14136.12	13943.78	14206.15
Total Power (dBm)		41.61	41.62	41.52	41.66	41.78	41.51	41.45	41.60	41.67	41.50	41.44	41.52
OBW (MHz)		63.26	63.32	63.38	63.33	63.26	63.32	63.38	63.33	63.26	63.32	63.38	63.33
Scaling factor (dB)		-8.01	-8.02	-8.02	-8.02	-8.01	-8.02	-8.02	-8.02	-8.01	-8.02	-8.02	-8.02
Ant. Gain (dBi)		8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50
BF Gain (dB)		3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01
MIMO EIRP (dBm/10MHz)		45.11	45.11	45.01	45.16	45.27	45.01	44.94	45.09	45.17	45.00	44.93	45.02
FCC EIRP Limit (dBm/10MHz)		47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00
Margin (dB)		-1.89	-1.89	-1.99	-1.84	-1.73	-1.99	-2.06	-1.91	-1.83	-2.00	-2.07	-1.98

Table 7-13. Common mode 4CC All Channel Conducted Powers (LTE Band 48 – 65MHz)

Case14. 4CC - 70MHz Total Bandwidth Configuration (15 + 15 + 20 + 20MHz BW)

EIRP													
Test Case	Port #	Test Results (dBm) Low Ch				Test Results (dBm) Middle Ch				Test Results (dBm) High Ch			
		QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
14	0	36.11	35.96	36.00	35.91	36.16	36.16	35.88	35.83	35.96	35.81	35.91	35.71
	1	35.93	35.98	36.01	36.02	36.08	36.08	35.99	35.74	35.99	35.66	35.73	35.67
	2	36.02	35.92	36.03	35.94	36.19	36.07	37.73	35.89	35.90	35.83	35.87	35.98
	3	35.89	36.09	35.95	35.99	36.03	36.01	36.08	35.73	35.96	35.88	35.87	35.68
Total Power (mW)		15882.69	15881.26	15911.00	15783.75	16353.68	16222.47	17827.41	15193.70	15751.08	15192.33	15369.81	15074.96
Total Power (dBm)		42.01	42.01	42.02	41.98	42.14	42.10	42.51	41.82	41.97	41.82	41.87	41.78
OBW (MHz)		67.66	67.67	67.75	67.75	67.66	67.67	67.75	67.75	67.66	67.67	67.75	67.75
Scaling factor (dB)		-8.30	-8.30	-8.31	-8.31	-8.30	-8.30	-8.31	-8.31	-8.30	-8.30	-8.31	-8.31
Ant. Gain (dBi)		8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50
BF Gain (dB)		3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01
MIMO EIRP (dBm/10MHz)		45.22	45.22	45.22	45.18	45.34	45.31	45.71	45.02	45.18	45.02	45.07	44.98
FCC EIRP Limit (dBm/10MHz)		47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00
Margin (dB)		-1.78	-1.78	-1.78	-1.82	-1.66	-1.69	-1.29	-1.98	-1.82	-1.98	-1.93	-2.02

Table 7-14. Common mode 4CC All Channel Conducted Powers (LTE Band 48 – 70MHz)

Case15. 4CC - 75MHz Total Bandwidth Configuration (15 + 20 + 20 + 20MHz BW)

EIRP													
Test Case	Port #	Test Results (dBm) Low Ch				Test Results (dBm) Middle Ch				Test Results (dBm) High Ch			
		QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
15	0	36.37	36.30	36.13	36.23	36.33	36.21	36.04	36.52	36.36	36.20	36.01	37.38
	1	36.45	36.28	36.16	36.28	36.55	36.08	36.09	36.48	36.44	36.32	36.15	36.31
	2	36.35	36.46	36.05	36.55	36.44	36.35	36.10	36.43	36.36	36.35	36.09	36.19
	3	36.29	36.28	36.09	36.16	36.24	36.17	36.10	36.30	36.46	36.23	36.08	36.26
Total Power (mW)		17327.19	17177.12	16327.60	17088.74	17424.60	16692.72	16227.48	17583.19	17482.42	16970.91	16224.30	18131.10
Total Power (dBm)		42.39	42.35	42.13	42.33	42.41	42.23	42.10	42.45	42.43	42.30	42.10	42.58
OBW (MHz)		72.67	72.87	72.84	72.76	72.67	72.87	72.84	72.76	72.67	72.87	72.84	72.76
Scaling factor (dB)		-8.61	-8.63	-8.62	-8.62	-8.61	-8.63	-8.62	-8.62	-8.61	-8.63	-8.62	-8.62
Ant. Gain (dBi)		8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50
BF Gain (dB)		3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01
MIMO EIRP (dBm/10MHz)		45.28	45.23	45.02	45.22	45.31	45.11	44.99	45.34	45.32	45.18	44.99	45.48
FCC EIRP Limit (dBm/10MHz)		47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00
Margin (dB)		-1.72	-1.77	-1.98	-1.78	-1.69	-1.89	-2.01	-1.66	-1.68	-1.82	-2.01	-1.52

Table 7-15. Common mode 4CC All Channel Conducted Powers (LTE Band 48 – 75MHz)

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.

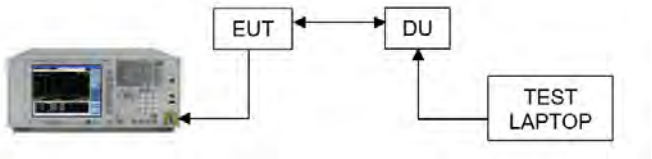


Figure 7-3. Test Instrument & Measurement Setup

Test Notes

1. The channel power measurements are adopted for the cable, connectors and attenuators used in the measurement

2. The port with highest power i.e. worst case per port per modulation has been highlighted in the following tables.

3. All kinds of modulation was observed. The port producing the highest PSD includes other supported modulation schemes for comparison.

4. The common mode configuration has the highest power amongst all modes. PSDs for this mode were found to be the worst case. The Common mode PSD MIMO calculation and plots are included in the report.

5. 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).

6. PSD per port (dBm / MHz) is converted to a linear value (mW). A summation of linear powers for all 4 ports gives us the total MIMO conducted PSD (mW). We convert this back to logarithmic scale for further PSD calculations.

7. 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

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

9. Sample Calculation:
   Let us assume the following numbers:
   a. Total MIMO PSD = 15 dBm / MHz.
   b. Antenna Gain = 23.5 dBi

Factors			Value	Unit
Total MIMO PSD			15	dBm /MHz
Applying Reductions:				
Antenna Gain			23.5	dBi
BF Gain	= 10 * log (2)	=	3.01	dB
Total MIMO Radiated PSD = Total MIMO PSD + Antenna Gain + BF Gain	=		38.50	dBm/ MHz
FCC PSD Limit			37	dBm/ MHz
Margin = FCC EIRP Limit – MIMO EIRP	= 29.47-37		-7.53	dB

Case01. 1CC - 5MHz Total Bandwidth Configuration (5MHz BW)

PSD													
Test Case	Port #	Test Results (dBm)				Test Results (dBm)				Test Results (dBm)			
		Low Ch				Middle Ch				High Ch			
		QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
1	0	17.39	17.92	17.35	17.43	17.95	18.58	18.04	18.03	17.96	18.53	18.03	18.11
	1	17.30	18.11	17.45	17.50	17.89	18.41	17.92	17.94	17.93	18.48	18.08	18.13
	2	17.62	18.39	17.70	17.75	17.94	18.43	17.96	18.00	17.89	18.79	18.02	17.99
	3	17.62	18.18	17.65	17.82	17.92	18.43	17.96	17.96	17.92	18.44	18.00	17.94
Total PSD (mW/MHz)		224.12	261.37	226.80	231.73	248.05	280.70	250.73	251.26	248.17	287.30	254.46	254.91
Total PSD (dBm/MHz)		23.50	24.17	23.56	23.65	23.95	24.48	23.99	24.00	23.95	24.58	24.06	24.06
Ant. Gain (dBi)		8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50
BF Gain (dB)		3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01
MIMO PSD (dBm/MHz)		35.02	35.68	35.07	35.16	35.46	35.99	35.50	35.51	35.46	36.09	35.57	35.57
FCC PSD Limit (dBm/MHz)		37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00
Margin (dB)		-1.98	-1.32	-1.93	-1.84	-1.54	-1.01	-1.50	-1.49	-1.54	-0.91	-1.43	-1.43

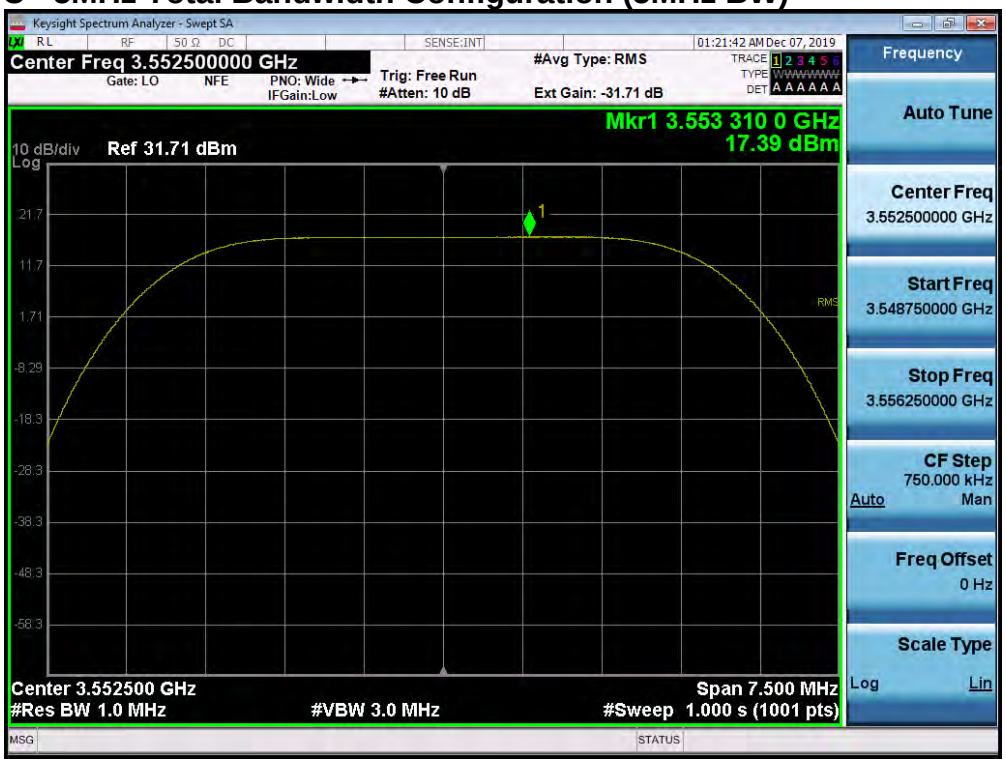
Table 7-16. Common mode 1CC Mid Channel Peak Power Spectral Density (LTE Band 48 – 5MHz)

Case02. 1CC - 15MHz Total Bandwidth Configuration (15MHz BW)

PSD													
Test Case	Port #	Test Results (dBm)				Test Results (dBm)				Test Results (dBm)			
		Low Ch				Middle Ch				High Ch			
		QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
2	0	17.90	19.21	17.93	18.00	17.99	18.91	17.98	18.01	18.17	19.51	18.20	18.14
	1	17.93	18.67	17.99	17.96	17.80	19.29	17.99	18.07	18.04	19.48	18.15	18.07
	2	17.85	19.06	17.97	17.95	17.91	18.79	17.98	17.94	18.12	19.45	18.18	18.16
	3	17.79	19.06	17.92	17.94	17.92	19.74	17.97	18.02	18.17	19.41	18.18	18.10
Total PSD (mW/MHz)		244.66	317.99	249.72	249.99	246.81	332.54	251.11	253.02	259.65	353.25	262.84	259.22
Total PSD (dBm/MHz)		23.89	25.02	23.97	23.98	23.92	25.22	24.00	24.03	24.14	25.48	24.20	24.14
Ant. Gain (dBi)		8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50
BF Gain (dB)		3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01
MIMO PSD (dBm/MHz)		35.40	36.53	35.48	35.49	35.43	36.73	35.51	35.54	35.65	36.99	35.71	35.65
FCC PSD Limit (dBm/MHz)		37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00	37.00
Margin (dB)		-1.60	-0.47	-1.52	-1.51	-1.57	-0.27	-1.49	-1.46	-1.35	-0.01	-1.29	-1.35

Table 7-17. Common mode 1CC Mid Channel Peak Power Spectral Density (LTE Band 48 – 15MHz)

Case01. 1CC - 5MHz Total Bandwidth Configuration (5MHz BW)



Plot 7-61. Peak Power Spectral Density Plot (1CC Configuration 5MHz QPSK - Low Channel) Port 00

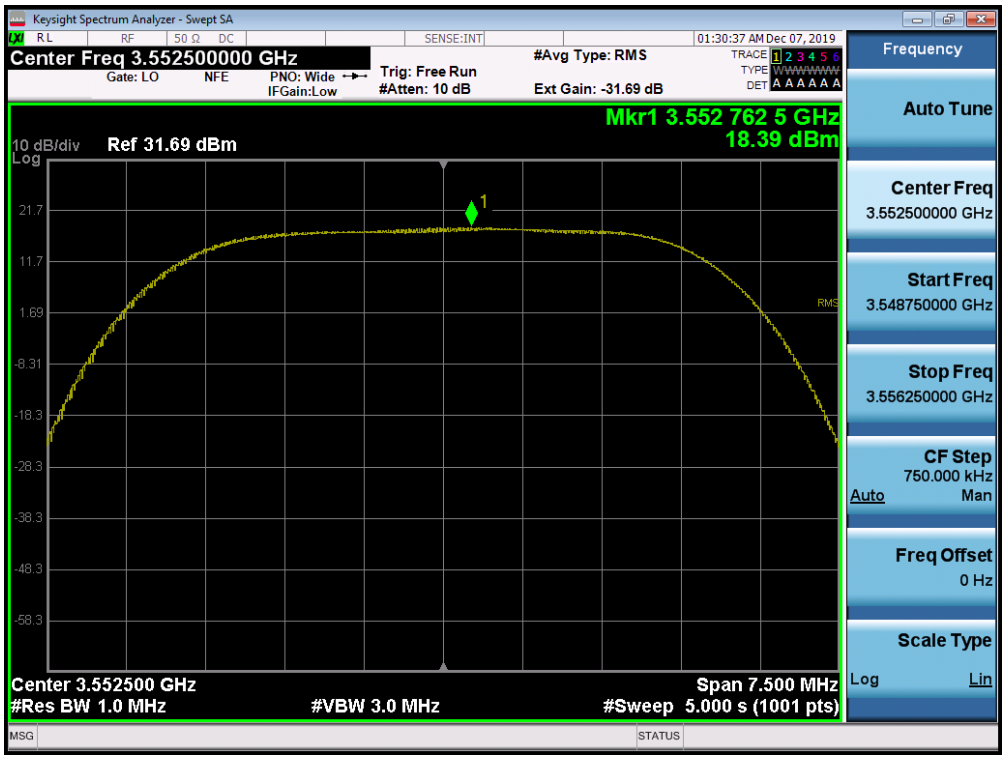
Plot 7-62. Peak Power Spectral Density Plot (1CC Configuration 5MHz QPSK - Low Channel) Port 01

Plot 7-63. Peak Power Spectral Density Plot (1CC Configuration 5MHz QPSK - Low Channel) Port 02

Plot 7-64. Peak Power Spectral Density Plot (1CC Configuration 5MHz QPSK - Low Channel) Port 03

Plot 7-65. Peak Power Spectral Density Plot (1CC Configuration 5MHz 16QAM - Low Channel) Port 00

Plot 7-66. Peak Power Spectral Density Plot (1CC Configuration 5MHz 16QAM - Low Channel) Port 01



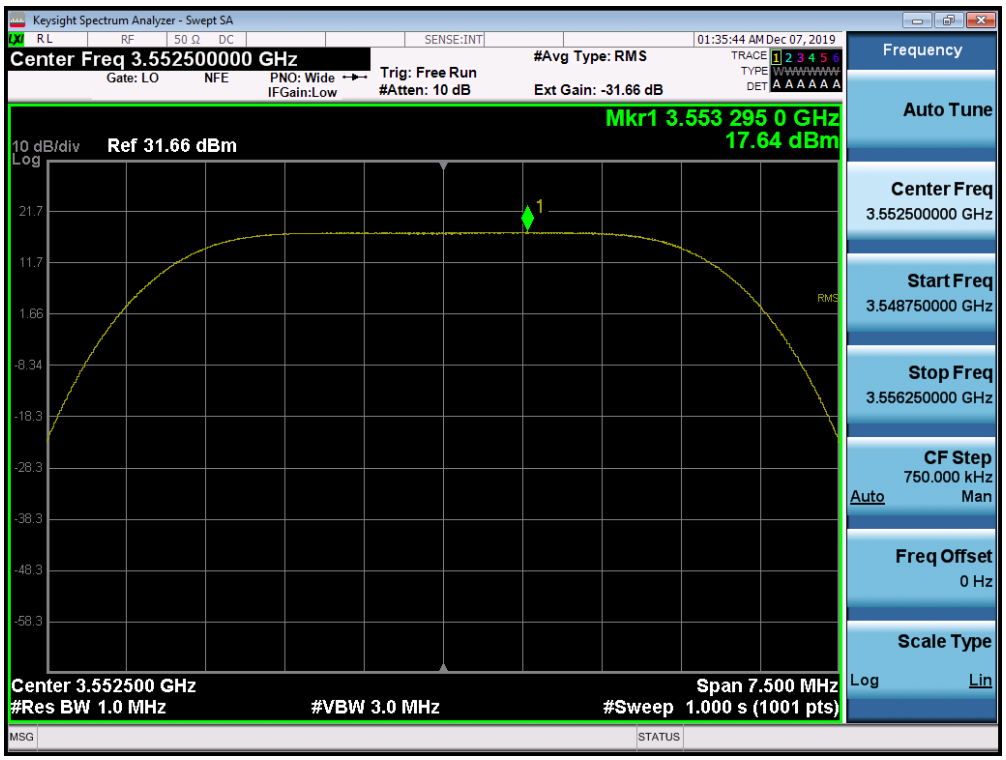
Plot 7-67. Peak Power Spectral Density Plot (1CC Configuration 5MHz 16QAM - Low Channel) Port 02

Plot 7-68. Peak Power Spectral Density Plot (1CC Configuration 5MHz 16QAM - Low Channel) Port 03

Plot 7-69. Peak Power Spectral Density Plot (1CC Configuration 5MHz 64QAM - Low Channel) Port 00

Plot 7-70. Peak Power Spectral Density Plot (1CC Configuration 5MHz 64QAM - Low Channel) Port 01

Plot 7-71. Peak Power Spectral Density Plot (1CC Configuration 5MHz 64QAM - Low Channel) Port 02



Plot 7-72. Peak Power Spectral Density Plot (1CC Configuration 5MHz 64QAM - Low Channel) Port 03

Plot 7-73. Peak Power Spectral Density Plot (1CC Configuration 5MHz 256QAM - Low Channel) Port 00

Plot 7-74. Peak Power Spectral Density Plot (1CC Configuration 5MHz 256QAM - Low Channel) Port 01

Plot 7-75. Peak Power Spectral Density Plot (1CC Configuration 5MHz 256QAM - Low Channel) Port 02

Plot 7-76. Peak Power Spectral Density Plot (1CC Configuration 5MHz 256QAM - Low Channel) Port 03