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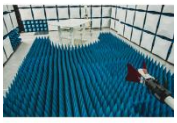

MEASUREMENT REPORT
LTE

Applicant Name:
Apple Inc.
One Apple Park Way
Cupertino, CA 95014
United States

Date of Testing:
11/09/2018-02/06/2019
Test Site/Location:
PCTEST Lab. Morgan Hill, CA, USA
Test Report Serial No.:
1C1811080028-03-R1.BCG

FCC ID:	**BCGA2153**
APPLICANT:	**Apple Inc.**

Application Type:	Certification
Model:	A2153
EUT Type:	Tablet Device
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule Part(s):	22, 24, & 27
Test Procedure(s):	ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01

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: 1C1811080028-03-R1.BCG) supersedes and replaces the previously issued test report (S/N: 1C1811080028-03.BCG) 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

ACCREDITED
TESTING CERT#2041.02

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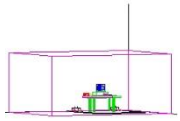
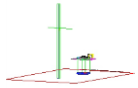


MEASUREMENT REPORT
FCC Part 22, 24, & 27



Mode	FCC Rule Part	Tx Frequency (MHz)	ERP		EIRP		Emission Designator	Modulation
			Max. Power (W)	Max. Power (dBm)	Max. Power (W)	Max. Power (dBm)		
LTE Band 71	27	665.5 - 695.5	0.057	17.58			4M54G7W	QPSK
LTE Band 71	27	665.5 - 695.5	0.050	16.95			4M54D7W	16QAM
LTE Band 71	27	665.5 - 695.5	0.038	15.84			4M55D7W	64QAM
LTE Band 71	27	668 - 693	0.056	17.49			9M04G7W	QPSK
LTE Band 71	27	668 - 693	0.048	16.82			9M05D7W	16QAM
LTE Band 71	27	668 - 693	0.038	15.78			9M03D7W	64QAM
LTE Band 71	27	670.5 - 690.5	0.057	17.58			13M6G7W	QPSK
LTE Band 71	27	670.5 - 690.5	0.047	16.70			13M6D7W	16QAM
LTE Band 71	27	670.5 - 690.5	0.039	15.87			13M6D7W	64QAM
LTE Band 71	27	673 - 688	0.057	17.58			18M1G7W	QPSK
LTE Band 71	27	673 - 688	0.050	16.97			18M1D7W	16QAM
LTE Band 71	27	673 - 688	0.038	15.85			18M0D7W	64QAM
LTE Band 12	27	699.7 - 715.3	0.207	23.17	0.340	25.32	1M11G7W	QPSK
LTE Band 12	27	699.7 - 715.3	0.182	22.59	0.298	24.74	1M11D7W	16QAM
LTE Band 12	27	699.7 - 715.3	0.136	21.33	0.223	23.48	1M11D7W	64QAM
LTE Band 12	27	700.5 - 714.5	0.208	23.18	0.341	25.33	2M73G7W	QPSK
LTE Band 12	27	700.5 - 714.5	0.181	22.57	0.296	24.72	2M73D7W	16QAM
LTE Band 12	27	700.5 - 714.5	0.140	21.45	0.229	23.60	2M73D7W	64QAM
LTE Band 12	27	701.5 - 713.5	0.208	23.19	0.342	25.34	4M54G7W	QPSK
LTE Band 12	27	701.5 - 713.5	0.178	22.51	0.292	24.66	4M54D7W	16QAM
LTE Band 12	27	701.5 - 713.5	0.145	21.60	0.237	23.75	4M55D7W	64QAM
LTE Band 12	27	704 - 711	0.208	23.19	0.342	25.34	9M05G7W	QPSK
LTE Band 12	27	704 - 711	0.180	22.56	0.296	24.71	9M05D7W	16QAM
LTE Band 12	27	704 - 711	0.142	21.52	0.233	23.67	9M06D7W	64QAM
LTE Band 17	27	706.5 - 713.5	0.208	23.19	0.342	25.34	4M54G7W	QPSK
LTE Band 17	27	706.5 - 713.5	0.181	22.57	0.296	24.72	4M54D7W	16QAM
LTE Band 17	27	706.5 - 713.5	0.144	21.57	0.236	23.72	4M55D7W	64QAM
LTE Band 17	27	709 - 711	0.208	23.19	0.342	25.34	9M05G7W	QPSK
LTE Band 17	27	709 - 711	0.179	22.52	0.293	24.67	9M05D7W	16QAM
LTE Band 17	27	709 - 711	0.141	21.49	0.231	23.64	9M06D7W	64QAM
LTE Band 13	27	779.5 - 784.5	0.208	23.19	0.342	25.34	4M54G7W	QPSK
LTE Band 13	27	779.5 - 784.5	0.181	22.57	0.296	24.72	4M55D7W	16QAM
LTE Band 13	27	779.5 - 784.5	0.144	21.58	0.236	23.73	4M55D7W	64QAM
LTE Band 13	27	782	0.208	23.19	0.342	25.34	9M04G7W	QPSK
LTE Band 13	27	782	0.174	22.41	0.286	24.56	9M03D7W	16QAM
LTE Band 13	27	782	0.132	21.22	0.217	23.37	9M02D7W	64QAM
LTE Band 5	22H	824.7 - 848.3	0.242	23.84	0.397	25.99	1M11G7W	QPSK
LTE Band 5	22H	824.7 - 848.3	0.207	23.15	0.339	25.30	1M10D7W	16QAM
LTE Band 5	22H	824.7 - 848.3	0.161	22.08	0.265	24.23	1M11D7W	64QAM
LTE Band 5	22H	825.5 - 847.5	0.236	23.73	0.387	25.88	2M72G7W	QPSK
LTE Band 5	22H	825.5 - 847.5	0.211	23.24	0.346	25.39	2M73D7W	16QAM
LTE Band 5	22H	825.5 - 847.5	0.161	22.06	0.264	24.21	2M73D7W	64QAM
LTE Band 5	22H	826.5 - 846.5	0.241	23.82	0.395	25.97	4M55G7W	QPSK
LTE Band 5	22H	826.5 - 846.5	0.208	23.18	0.341	25.33	4M55D7W	16QAM
LTE Band 5	22H	826.5 - 846.5	0.164	22.15	0.269	24.30	4M54D7W	64QAM
LTE Band 5	22H	829 - 844	0.242	23.84	0.397	25.99	9M06G7W	QPSK
LTE Band 5	22H	829 - 844	0.205	23.11	0.336	25.26	9M05D7W	16QAM
LTE Band 5	22H	829 - 844	0.161	22.06	0.264	24.21	9M05D7W	64QAM
LTE Band 26	22H	824.7 - 848.3	0.242	23.84	0.397	25.99	1M11G7W	QPSK
LTE Band 26	22H	824.7 - 848.3	0.207	23.17	0.340	25.32	1M10D7W	16QAM
LTE Band 26	22H	824.7 - 848.3	0.165	22.18	0.271	24.33	1M11D7W	64QAM
LTE Band 26	22H	825.5 - 847.5	0.236	23.72	0.386	25.87	2M72G7W	QPSK
LTE Band 26	22H	825.5 - 847.5	0.202	23.06	0.332	25.21	2M73D7W	16QAM
LTE Band 26	22H	825.5 - 847.5	0.157	21.97	0.258	24.12	2M73D7W	64QAM
LTE Band 26	22H	826.5 - 846.5	0.242	23.84	0.397	25.99	4M55G7W	QPSK
LTE Band 26	22H	826.5 - 846.5	0.207	23.17	0.340	25.32	4M55D7W	16QAM
LTE Band 26	22H	826.5 - 846.5	0.164	22.14	0.269	24.29	4M54D7W	64QAM
LTE Band 26	22H	829 - 844	0.242	23.84	0.397	25.99	9M06G7W	QPSK
LTE Band 26	22H	829 - 844	0.210	23.23	0.345	25.38	9M05D7W	16QAM
LTE Band 26	22H	829 - 844	0.162	22.09	0.265	24.24	9M05D7W	64QAM

EUT Overview (Low Bands)

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Mode	FCC Rule Part	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
			Max. Power (W)	Max. Power (dBm)		
LTE Band 4	27	1710.7 - 1754.3	0.262	24.19	1M11G7W	QPSK
LTE Band 4	27	1710.7 - 1754.3	0.220	23.42	1M11D7W	16QAM
LTE Band 4	27	1710.7 - 1754.3	0.177	22.49	1M11D7W	64QAM
LTE Band 4	27	1711.5 - 1753.5	0.261	24.17	2M73G7W	QPSK
LTE Band 4	27	1711.5 - 1753.5	0.221	23.44	2M72D7W	16QAM
LTE Band 4	27	1711.5 - 1753.5	0.173	22.39	2M73D7W	64QAM
LTE Band 4	27	1712.5 - 1752.5	0.262	24.19	4M55G7W	QPSK
LTE Band 4	27	1712.5 - 1752.5	0.226	23.55	4M54D7W	16QAM
LTE Band 4	27	1712.5 - 1752.5	0.173	22.39	4M55D7W	64QAM
LTE Band 4	27	1715 - 1750	0.262	24.19	9M07G7W	QPSK
LTE Band 4	27	1715 - 1750	0.224	23.50	9M09D7W	16QAM
LTE Band 4	27	1715 - 1750	0.177	22.49	9M08D7W	64QAM
LTE Band 4	27	1717.5 - 1747.5	0.262	24.19	13M6G7W	QPSK
LTE Band 4	27	1717.5 - 1747.5	0.217	23.37	13M6D7W	16QAM
LTE Band 4	27	1717.5 - 1747.5	0.169	22.29	13M6D7W	64QAM
LTE Band 4	27	1720 - 1745	0.262	24.19	18M1G7W	QPSK
LTE Band 4	27	1720 - 1745	0.220	23.43	18M1D7W	16QAM
LTE Band 4	27	1720 - 1745	0.173	22.39	18M1D7W	64QAM
LTE Band 66	27	1710.7 - 1779.3	0.262	24.19	1M11G7W	QPSK
LTE Band 66	27	1710.7 - 1779.3	0.218	23.39	1M11D7W	16QAM
LTE Band 66	27	1710.7 - 1779.3	0.166	22.19	1M11D7W	64QAM
LTE Band 66	27	1711.5 - 1778.5	0.262	24.19	2M73G7W	QPSK
LTE Band 66	27	1711.5 - 1778.5	0.215	23.33	2M72D7W	16QAM
LTE Band 66	27	1711.5 - 1778.5	0.166	22.19	2M73D7W	64QAM
LTE Band 66	27	1712.5 - 1777.5	0.262	24.19	4M55G7W	QPSK
LTE Band 66	27	1712.5 - 1777.5	0.223	23.48	4M54D7W	16QAM
LTE Band 66	27	1712.5 - 1777.5	0.169	22.29	4M55D7W	64QAM
LTE Band 66	27	1715 - 1775	0.262	24.19	9M07G7W	QPSK
LTE Band 66	27	1715 - 1775	0.218	23.39	9M09D7W	16QAM
LTE Band 66	27	1715 - 1775	0.169	22.29	9M08D7W	64QAM
LTE Band 66	27	1717.5 - 1772.5	0.262	24.19	13M6G7W	QPSK
LTE Band 66	27	1717.5 - 1772.5	0.218	23.38	13M6D7W	16QAM
LTE Band 66	27	1717.5 - 1772.5	0.173	22.39	13M6D7W	64QAM
LTE Band 66	27	1720 - 1770	0.262	24.19	18M1G7W	QPSK
LTE Band 66	27	1720 - 1770	0.218	23.38	18M1D7W	16QAM
LTE Band 66	27	1720 - 1770	0.182	22.59	18M1D7W	64QAM
LTE Band 2	24E	1850.7 - 1909.3	0.379	25.79	1M11G7W	QPSK
LTE Band 2	24E	1850.7 - 1909.3	0.327	25.14	1M11D7W	16QAM
LTE Band 2	24E	1850.7 - 1909.3	0.256	24.09	1M11D7W	64QAM
LTE Band 2	24E	1851.5 - 1908.5	0.379	25.79	2M73G7W	QPSK
LTE Band 2	24E	1851.5 - 1908.5	0.330	25.19	2M73D7W	16QAM
LTE Band 2	24E	1851.5 - 1908.5	0.256	24.09	2M72D7W	64QAM
LTE Band 2	24E	1852.5 - 1907.5	0.379	25.79	4M55G7W	QPSK
LTE Band 2	24E	1852.5 - 1907.5	0.323	25.09	4M55D7W	16QAM
LTE Band 2	24E	1852.5 - 1907.5	0.256	24.09	4M54D7W	64QAM
LTE Band 2	24E	1855 - 1905	0.379	25.79	9M05G7W	QPSK
LTE Band 2	24E	1855 - 1905	0.316	24.99	9M05D7W	16QAM
LTE Band 2	24E	1855 - 1905	0.251	23.99	9M06D7W	64QAM
LTE Band 2	24E	1857.5 - 1902.5	0.371	25.69	13M6G7W	QPSK
LTE Band 2	24E	1857.5 - 1902.5	0.323	25.09	13M6D7W	16QAM
LTE Band 2	24E	1857.5 - 1902.5	0.251	23.99	13M6D7W	64QAM
LTE Band 2	24E	1860 - 1900	0.379	25.79	18M1G7W	QPSK
LTE Band 2	24E	1860 - 1900	0.323	25.09	18M1D7W	16QAM
LTE Band 2	24E	1860 - 1900	0.269	24.29	18M1D7W	64QAM
LTE Band 25	24E	1850.7 - 1914.3	0.371	25.69	1M11G7W	QPSK
LTE Band 25	24E	1850.7 - 1914.3	0.323	25.09	1M11D7W	16QAM
LTE Band 25	24E	1850.7 - 1914.3	0.256	24.09	1M11D7W	64QAM
LTE Band 25	24E	1851.5 - 1913.5	0.379	25.79	2M73G7W	QPSK
LTE Band 25	24E	1851.5 - 1913.5	0.330	25.19	2M73D7W	16QAM
LTE Band 25	24E	1851.5 - 1913.5	0.259	24.14	2M72D7W	64QAM
LTE Band 25	24E	1852.5 - 1912.5	0.379	25.79	4M55G7W	QPSK
LTE Band 25	24E	1852.5 - 1912.5	0.330	25.19	4M55D7W	16QAM
LTE Band 25	24E	1852.5 - 1912.5	0.269	24.29	4M54D7W	64QAM
LTE Band 25	24E	1855 - 1910	0.379	25.79	9M05G7W	QPSK
LTE Band 25	24E	1855 - 1910	0.319	25.04	9M05D7W	16QAM
LTE Band 25	24E	1855 - 1910	0.254	24.04	9M06D7W	64QAM
LTE Band 25	24E	1857.5 - 1907.5	0.379	25.79	13M6G7W	QPSK
LTE Band 25	24E	1857.5 - 1907.5	0.328	25.16	13M6D7W	16QAM
LTE Band 25	24E	1857.5 - 1907.5	0.262	24.19	13M6D7W	64QAM
LTE Band 25	24E	1860 - 1905	0.379	25.79	18M1G7W	QPSK
LTE Band 25	24E	1860 - 1905	0.328	25.16	18M1D7W	16QAM
LTE Band 25	24E	1860 - 1905	0.255	24.06	18M1D7W	64QAM

EUT Overview (Mid Bands)

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Mode	FCC Rule Part	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
			Max. Power (W)	Max. Power (dBm)		
LTE Band 30	27	2307.5 - 2312.5	0.219	23.40	4M55G7W	QPSK
LTE Band 30	27	2307.5 - 2312.5	0.180	22.55	4M54D7W	16QAM
LTE Band 30	27	2307.5 - 2312.5	0.150	21.75	4M54D7W	64QAM
LTE Band 30	27	2310	0.211	23.25	9M04G7W	QPSK
LTE Band 30	27	2310	0.176	22.45	9M05D7W	16QAM
LTE Band 30	27	2310	0.146	21.65	9M06D7W	64QAM
LTE Band 7	27	2502.5 - 2567.5	0.339	25.30	4M55G7W	QPSK
LTE Band 7	27	2502.5 - 2567.5	0.282	24.51	4M55D7W	16QAM
LTE Band 7	27	2502.5 - 2567.5	0.234	23.69	4M55D7W	64QAM
LTE Band 7	27	2505 - 2565	0.347	25.40	9M06G7W	QPSK
LTE Band 7	27	2505 - 2565	0.280	24.47	9M06D7W	16QAM
LTE Band 7	27	2505 - 2565	0.228	23.57	9M06D7W	64QAM
LTE Band 7	27	2507.5 - 2562.5	0.347	25.40	13M6G7W	QPSK
LTE Band 7	27	2507.5 - 2562.5	0.285	24.55	13M6D7W	16QAM
LTE Band 7	27	2507.5 - 2562.5	0.230	23.61	13M6D7W	64QAM
LTE Band 7	27	2510 - 2560	0.347	25.40	18M1G7W	QPSK
LTE Band 7	27	2510 - 2560	0.292	24.66	18M1D7W	16QAM
LTE Band 7	27	2510 - 2560	0.233	23.67	18M1D7W	64QAM
LTE Band 41	27	2498.5 - 2687.5	0.468	26.70	4M60G7W	QPSK
LTE Band 41	27	2498.5 - 2687.5	0.407	26.10	4M59D7W	16QAM
LTE Band 41	27	2498.5 - 2687.5	0.245	23.90	4M60D7W	64QAM
LTE Band 41	27	2501 - 2685	0.490	26.90	9M18G7W	QPSK
LTE Band 41	27	2501 - 2685	0.407	26.10	9M24D7W	16QAM
LTE Band 41	27	2501 - 2685	0.295	24.70	9M18D7W	64QAM
LTE Band 41	27	2503.5 - 2682.5	0.457	26.60	13M8G7W	QPSK
LTE Band 41	27	2503.5 - 2682.5	0.398	26.00	13M7D7W	16QAM
LTE Band 41	27	2503.5 - 2682.5	0.309	24.90	13M7D7W	64QAM
LTE Band 41	27	2506 - 2680	0.468	26.70	18M2G7W	QPSK
LTE Band 41	27	2506 - 2680	0.389	25.90	18M2D7W	16QAM
LTE Band 41	27	2506 - 2680	0.309	24.90	18M2D7W	64QAM

EUT Overview (High Bands)

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1.0 INTRODUCTION

1.1 Scope

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

1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 18855 Adams Court, Morgan Hill, CA 95037. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014 and KDB 414788 D01 v01.

1.3 Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located in Morgan Hill, CA 95037, U.S.A.

- PCTEST is an ISO 17025-2005 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.02 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 (22831) test laboratory with the site description on file with ISED.

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Apple Tablet Device FCC ID: BCGA2153**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

Test Device Serial No.: DLXXT00ULT65, DLXXT00PLT64

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n WLAN, 802.11a/n/ac UNII, Bluetooth (HDR4, HDR8, 1x, EDR, LE)

LTE Band 12 (698 - 716 MHz) overlaps the entire frequency range of LTE Band 17 (704 - 716 MHz). Therefore, test data provided in this report covers Band 17 as well as Band 12.

LTE Band 26 (814.7 – 849 MHz) overlaps the entire frequency range of LTE Band 5 (824 – 849 MHz). Therefore, test data provided in this report covers Band 5 as well as Band 26.

LTE Band 66 (1710 - 1780 MHz) overlaps the entire frequency range of LTE Band 4 (1710 - 1755 MHz). Therefore, test data provided in this report covers Band 4 as well as Band 66.

LTE Band 25 (1850 - 1915 MHz) overlaps the entire frequency range of LTE Band 2 (1850 - 1910 MHz). Therefore, test data provided in this report covers Band 2 as well as Band 25.

2.3 Antenna Description

Following antenna was used for the testing.

Antennas	
Port A	**Port B**
WF3	WF5

Table 2-1. Antennas vs Ports

Frequency [MHz]	Antenna Gain (dBi)	
	Port A	**Port B**
650-700	-5.77	-3.75
700-800	-0.16	0.01
820-960	0.49	0.36
1700-1800	-1.31	-1.08
1820-2100	0.29	-0.61
2300-2520	-0.1	0.15
2540-2700	-0.81	0.56

Table 2-2. Antenna Peak Gain

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2.4 Test Support Equipment

1	Apple MacBook	Model:	A1398	S/N:	C2QKP008F6F3
	w/AC/DC Adapter	Model:	A1435	S/N:	C04325505K1F288BG
2	Apple Lightning Cable	Model:	Kanzi	S/N:	3252E9
3	USB Lightning Cable	Model:	N/A	S/N:	N/A
	w/ AC Adapter	Model:	A1385	S/N:	D292066H2NLDHLHAE
4	Apple Pencil	Model:	A1603	S/N:	G64TG0FEGWTJ
5	DC Power Supply	Model:	KPS3010D	S/N:	N/A

Table 2-3. Test Support Equipment Used

2.5 Test Configuration

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

There are two vendors of the WiFi/Bluetooth radio modules, variant 1 and variant 2. Both radio modules have the same mechanical outline, same on-board antenna matching circuit, identical antenna structure, and are built and tested to conform to the same specifications and to operate within the same tolerances. The worst case configuration was found between the two variants. The EUT was also investigated with and without charger.

The emissions below 1GHz and above 18GHz were tested with the highest transmitting power channel and the worst case configuration.

The EUT was manipulated through three orthogonal planes of X-orientation (flatbed), Y-orientation (landscape), and Z-orientation (portrait) during the testing. Only the worst case emissions were reported in this test report.

2.6 Software and Firmware

The test was conducted with firmware version 16E31520i installed on the EUT.

2.7 EMI Suppression Device(s)/Modifications

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

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3.0 DESCRIPTION OF TESTS

3.1 Measurement Procedure

The measurement procedures described in the document titled "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI/TIA-603-E-2016) and "Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems" (KDB 971168 D01 v03r01) were used in the measurement of the EUT**.**

3.2 Block C Frequency Range

Two paired channels of 11 megahertz each are available for assignment in Block C in the 746-757 MHz and 776-787 MHz bands. In the event that no licenses for two channels in this Block C are assigned based on the results of the first auction in which such licenses were offered because the auction results do not satisfy the applicable reserve price, the spectrum in the 746-757 MHz and 776-787 MHz bands will instead be made available for assignment at a subsequent auction as follows: (i) Two paired channels of 6 megahertz each available for assignment in Block C1 in the 746-752 MHz and 776-782 MHz bands. (ii) Two paired channels of 5 megahertz each available for assignment in Block C2 in the 752-757 MHz and 782-787 MHz bands.

3.3 Block A Frequency Range

698-746 MHz band. The following frequencies are available for licensing pursuant to this part in the 698-746 MHz band: (1) Three paired channel blocks of 12 megahertz each are available for assignment as follows:

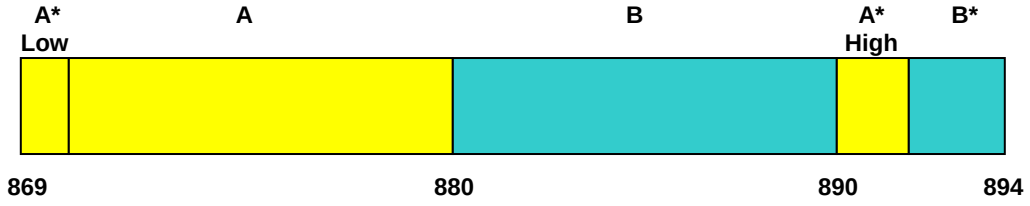
Block A: 698-704 MHz and 728-734 MHz;
Block B: 704-710 MHz and 734-740 MHz; and
Block C: 710-716 MHz and 740-746 MHz

3.4 600MHz Frequency Range

600MHz band. The following frequencies are available for licensing pursuant to this part in the 600 MHz band: (1) Seven paired channel blocks of 5 megahertz each are available for assignment as follows:

Block A: 617-622 MHz and 663-668 MHz;
Block B: 622-627 MHz and 668-673 MHz;
Block C: 627-632 MHz and 673-678 MHz;
Block D: 632-637 MHz and 678-683 MHz;
Block E: 637-642 MHz and 683-688 MHz;
Block F: 642-647 MHz and 688-693 MHz; and
Block G: 647-652 MHz and 693-698 MHz

3.5 Cellular - Base Frequency Blocks



BLOCK 1: 869 – 880 MHz (A* Low + A)
BLOCK 2: 880 – 890 MHz (B)
BLOCK 3: 890 – 891.5 MHz (A* High)
BLOCK 4: 891.5 – 894 MHz (B*)

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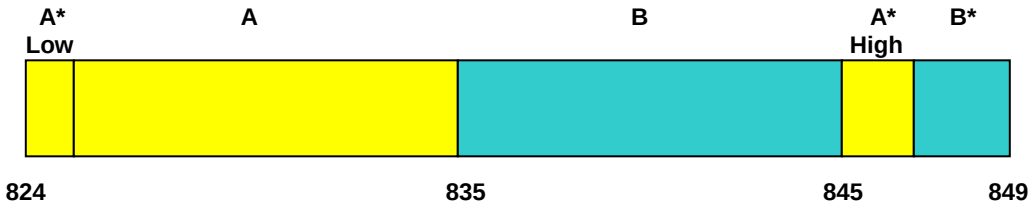
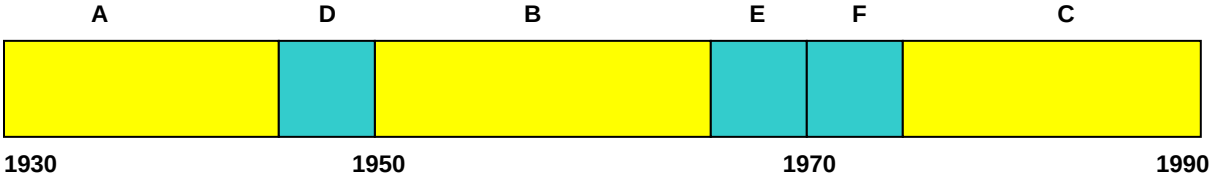
3.6 Cellular - Mobile Frequency Blocks



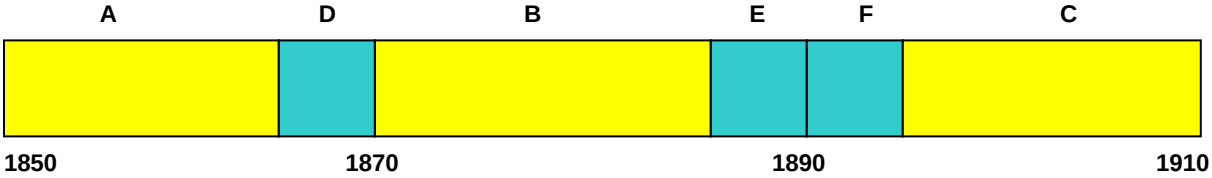
BLOCK 1: 824 – 835 MHz (A* Low + A)
BLOCK 2: 835 – 845 MHz (B)
BLOCK 3: 845 – 846.5 MHz (A* High)
BLOCK 4: 846.5 – 849 MHz (B*)

3.7 PCS - Base Frequency Blocks



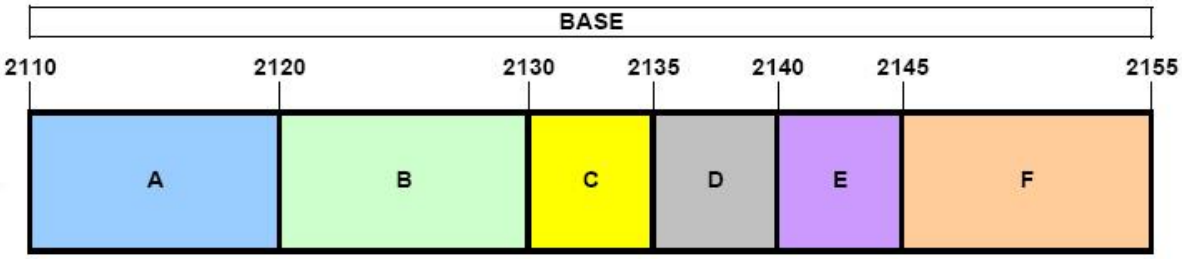
BLOCK 1: 1930 – 1945 MHz (A)
BLOCK 2: 1945 – 1950 MHz (D)
BLOCK 3: 1950 – 1965 MHz (B)
BLOCK 4: 1965 – 1970 MHz (E)
BLOCK 5: 1970 – 1975 MHz (F)
BLOCK 6: 1975 – 1990 MHz (C)

3.8 PCS - Mobile Frequency Blocks



BLOCK 1: 1850 – 1865 MHz (A)
BLOCK 2: 1865 – 1870 MHz (D)
BLOCK 3: 1870 – 1885 MHz (B)
BLOCK 4: 1885 – 1890 MHz (E)
BLOCK 5: 1890 – 1895 MHz (F)
BLOCK 6: 1895 – 1910 MHz (C)

3.9 AWS - Base Frequency Blocks



BLOCK 1: 2110 – 2120 MHz (A)
BLOCK 2: 2120 – 2130 MHz (B)
BLOCK 3: 2130 – 2135 MHz (C)
BLOCK 4: 2135 – 2140 MHz (D)
BLOCK 5: 2140 – 2145 MHz (E)
BLOCK 6: 2145 – 2155 MHz (F)

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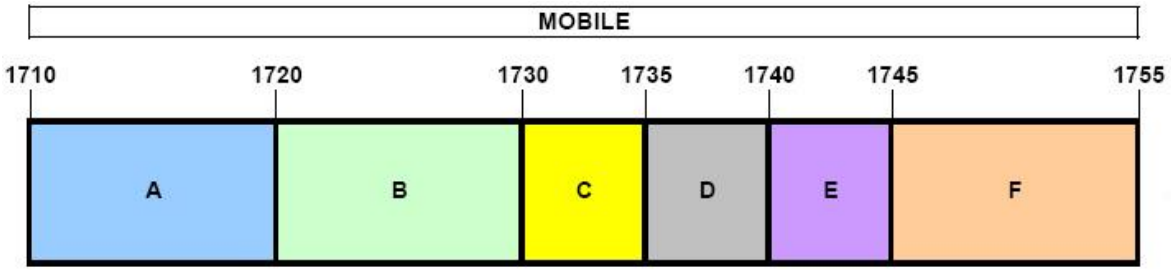
3.10 AWS - Mobile Frequency Blocks



BLOCK 1: 1710 – 1720 MHz (A)
BLOCK 2: 1720 – 1730 MHz (B)
BLOCK 3: 1730 – 1735 MHz (C)
BLOCK 4: 1735 – 1740 MHz (D)
BLOCK 5: 1740 – 1745 MHz (E)
BLOCK 6: 1745 – 1755 MHz (F)

3.11 WCS – Mobile/Base Frequency Blocks

The following frequencies are available for WCS in the 2305-2320 MHz and 2345-2360 MHz bands:

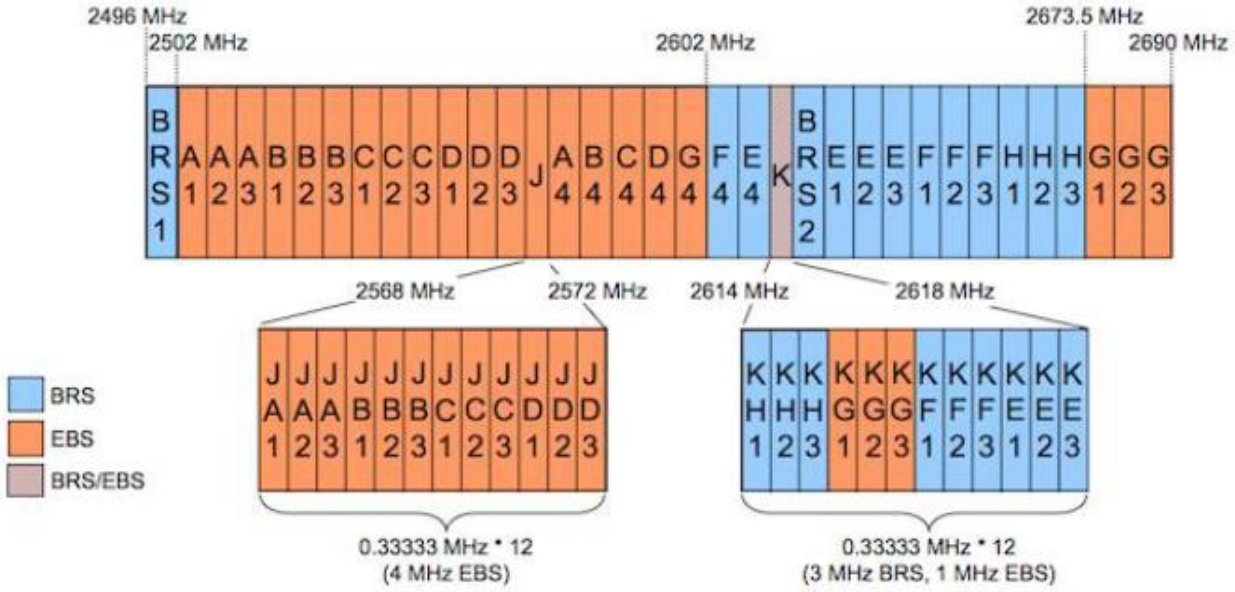
BLOCK 1: 2305-2310 and 2350-2355 MHz (A)

BLOCK 2: 2310-2315 and 2355-236 MHz (B)

BLOCK 3: 2315-2320 MHz (C)

BLOCK 4: 2345-2350 MHz (D)

3.12 BRS/EBS Frequency Block



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3.13 Radiated Power and Radiated Spurious Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. For measurements below 1GHz, the absorbers are removed. A raised turntable is used for radiated measurement. The turn table is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm tall test table made of Styrodur is placed on top of the turn table. A Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

The equipment under test was transmitting while connected to its integral antenna and is placed on a turntable 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Per the guidelines of KDB 412172 D01 v01r01, radiated power levels are measured using the following formula:

$$\text{ERP or EIRP} = P_T + G_T - L_C$$

Where P_T is the transmitter output power, expressed in dBm, G_T is the gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP), and L_C signal attenuation in the connecting cable between the transmitter and antenna in dB.

Per the guidance of ANSI/TIA-603-E-2016, a half-wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

$$P_{d\,[dBm]} = P_{g\,[dBm]} - \text{cable loss}_{\,[dB]} + \text{antenna gain}_{\,[dBd/dBi]}$$

Where, P_d is the dipole equivalent power, P_g is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to $P_{g\,[dBm]}$ – cable loss $_{[dB]}$.

The calculated P_d levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of 43 + $10\log_{10}$(Power $_{[Watts]}$). For Band 7 and 41, the calculated P_d levels are compared to the absolute spurious emission limit of -25dBm which is equivalent to the required minimum attenuation of 55 + $10\log_{10}$(Power $_{[Watts]}$). For Band 30 the calculated P_d levels are compared to the absolute spurious emission limit of -40dBm which is equivalent to the required minimum attenuation of 70 + $10\log_{10}$(Power $_{[Watts]}$).

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4.0 MEASUREMENT UNCERTAINTY

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

Contribution	Expanded Uncertainty (±dB)
Conducted Bench Top Measurements	1.29
Radiated Disturbance (<1GHz)	4.15
Radiated Disturbance (>1GHz)	4.70
Radiated Disturbance (>18GHz)	5.01
Temperature	0.01

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5.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
ATM	180-442A-KF	20dB Nominal Gain Horn Antenna	3/13/2018	Annual	3/13/2019	T058601-02
COM-POWER	LIN-120A	LISN	3/7/2018	Annual	3/7/2019	241296
ESPEC	SU-241	Temperature Chamber	8/10/2018	Annual	8/10/2019	92009574
Keysight Technologies	N9030A	3Hz-44GHz PXA Signal Analyzer	2/27/2018	Annual	2/27/2019	MY49430244
Rohde & Schwarz	FSV40	Signal Analyzer (10Hz-40GHz)	2/6/2018	Annual	2/6/2019	101619
Rohde & Schwarz	ESW26	EMI Test Receiver	7/19/2018	Annual	7/19/2019	101299
Rohde & Schwarz	ESW44	EMI Test Receiver	11/20/2018	Annual	11/20/2019	101570
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	6/11/2018	Annual	6/11/2019	161675
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	4/16/2018	Annual	4/16/2019	161617
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	11/16/2018	Annual	11/16/2019	164175
Rohde & Schwarz	TS-PR1840	Pre-Amplifier (18GHz - 40GHz)	6/11/2018	Annual	6/11/2019	100051
Rohde & Schwarz	TS-PR8	Pre-Amplifier (30MHz - 8GHz)	1/25/2018	Annual	1/25/2019	102333
Rohde & Schwarz	HL562E	Ultra Broadband Antenna (30MHz - 6GHz)	6/8/2018	Annual	6/8/2019	100810
Rohde & Schwarz	TC-TA18	Cross Polarized Vivaldi Antenna (400MHz-18GHz)	11/21/2018	Annual	11/21/2019	101057
Rohde & Schwarz	TC-TA18	Cross Polarized Vivaldi Antenna (400MHz-18GHz)	12/7/2018	Annual	12/7/2019	101063
Rohde & Schwarz	HFH2-Z2	Loop Antenna	3/13/2018	Annual	3/13/2019	100519

Table 5-1. Test Equipment

Notes:

1. For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.

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

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6.0 SAMPLE CALCULATIONS

Emission Designator

QPSK Modulation

Emission Designator = 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

Spurious Radiated Emission – LTE Band

Example: Middle Channel LTE Mode 2nd Harmonic (1564 MHz)

The average spectrum analyzer reading at 3 meters with the EUT on the turntable was –81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of –81.0 dBm on the spectrum analzyer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 1564 MHz. So 6.1 dB is added to the signal generator reading of –30.9 dBm yielding –24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm – (-24.80).

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7.0 TEST RESULTS

7.1 Summary

Company Name: Apple Inc.

FCC ID: BCGA2153

FCC Classification: PCS Licensed Transmitter (PCB)

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
2.1051 2.917(a) 24.238(a) 27.53(c) 27.53(g) 27.53(h)	Out of Band Emissions	> 43 + 10log$_{10}$ (P[Watts]) at Band Edge and for all out-of-band emissions			Section 7.3, 7.4
27.53(m)	Out of Band Emissions	Undesirable emissions must meet the limits detailed in 27.53(m)			Section 7.3, 7.4
27.53(a)	Out of Band Emissions	Undesirable emissions must meet the limits detailed in 27.53(a)			Section 7.3, 7.4
24.232(d) 27.50(d)(5)	Peak-Average Ratio	< 13 dB			Section 7.5
2.1046	Transmitter Conducted Output Power	N/A			See RF Exposure Report
2.1046	Additional Maximum Power Reduction (A-MPR)	N/A			Section 7.6
27.53(m)	Uplink Carrier Aggregation	Undesirable emissions much meet the limits pdetailed in 27.53(m)			Section 7.7, 7.10
2.1055 22.355 24.235 27.54	Frequency Stability	< 2.5 ppm (Part 22) and fundamental emissions stay within authorized frequency block (Part 24, 27)			Section 7.11

Table 7-1. Summary of Conducted Test Results

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FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
22.913(a)(5)	Effective Radiated Power / Equivalent Isotropic Radiated Power (Band 26/5)	< 7 Watts max. ERP	RADIATED	PASS	Section 7.8
27.50(b)(10) 27.50(c)(10)	Effective Radiated Power / Equivalent Isotropic Radiated Power (Band 71, 12/17, 13)	< 3 Watts max. ERP			Section 7.8
24.232(c) 27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 25/2, 7, 41)	< 2 Watts max. EIRP			Section 7.8
27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 66/4)	< 1 Watts max. EIRP			Section 7.8
27.50(a)(3) 27.50(d)(5)	Equivalent Isotropic Radiated Power (Band 30)	< 0.25 Watts max. EIRP			Section 7.8
2.1053 22.917(a) 24.238(a) 27.53(c) 27.53(g) 27.53(h)	Undesirable Emissions	> 43 + $10\log_{10}$ (P[Watts]) for all out-of-band emissions			Section 7.9
27.53(f)	Undesirable Emissions (Band 13)	< -70 dBW/MHz (for wideband signals) < -80 dBW (for discrete emissions less than 700Hz BW) For all emissions in the band 1559 – 1610 MHz			Section 7.9
27.53(a)	Undesirable Emissions (Band 30)	> 70 + $10\log_{10}$ (P[Watts])			Section 7.9
27.53(m)	Undesirable Emissions	Undesirable emissions must meet the limits detailed in 27.53(m)			Section 7.9

Table 7-2. Summary of Radiated 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 analyzer plots (Sections 7.2, 7.3, 7.4, 7.5) were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and 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 emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "LTE Automation," Version 4.8.

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7.2 Occupied Bandwidth

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.

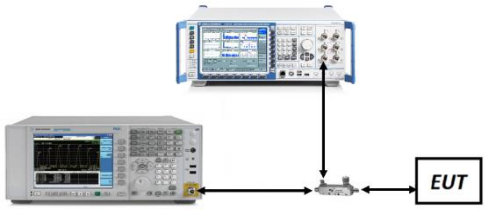

Figure 7-1. Test Instrument & Measurement Setup

Test Notes

None.

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Mode	BW (MHz)	Modulation	Occupied BW (kHz)
LTE Band 71	5	QPSK	4540.9
LTE Band 71	5	16QAM	4544.7
LTE Band 71	5	64QAM	4549.9
LTE Band 71	10	QPSK	9040.4
LTE Band 71	10	16QAM	9053.6
LTE Band 71	10	64QAM	9028.0
LTE Band 71	15	QPSK	13611.8
LTE Band 71	15	16QAM	13610.2
LTE Band 71	15	64QAM	13595.1
LTE Band 71	20	QPSK	18060.4
LTE Band 71	20	16QAM	18097.6
LTE Band 71	20	64QAM	18047.3
LTE Band 12	1	QPSK	1105.5
LTE Band 12	1	16QAM	1110.4
LTE Band 12	1	64QAM	1110.1
LTE Band 12	3	QPSK	2728.5
LTE Band 12	3	16QAM	2729.6
LTE Band 12	3	64QAM	2728.8
LTE Band 12	5	QPSK	4541.7
LTE Band 12	5	16QAM	4544.0
LTE Band 12	5	64QAM	4549.3
LTE Band 12	10	QPSK	9050.2
LTE Band 12	10	16QAM	9052.8
LTE Band 12	10	64QAM	9064.1
LTE Band 17	5	QPSK	4542.1
LTE Band 17	5	16QAM	4547.2
LTE Band 17	5	64QAM	4537.3
LTE Band 17	10	QPSK	9043.0
LTE Band 17	10	16QAM	9054.0
LTE Band 17	10	64QAM	9060.0
LTE Band 13	5	QPSK	4544.6
LTE Band 13	5	16QAM	4548.3
LTE Band 13	5	64QAM	4552.9
LTE Band 13	10	QPSK	9043.7
LTE Band 13	10	16QAM	9027.2
LTE Band 13	10	64QAM	9017.9
LTE Band 5	1	QPSK	1108.9
LTE Band 5	1	16QAM	1112.6
LTE Band 5	1	64QAM	1112.5
LTE Band 5	3	QPSK	2728.7
LTE Band 5	3	16QAM	2731.8
LTE Band 5	3	64QAM	2729.2
LTE Band 5	5	QPSK	4546.9
LTE Band 5	5	16QAM	4539.7
LTE Band 5	5	64QAM	4549.7
LTE Band 5	10	QPSK	9051.8
LTE Band 5	10	16QAM	9052.6
LTE Band 5	10	64QAM	9070.4
LTE Band 26	1	QPSK	1109.3
LTE Band 26	1	16QAM	1103.3
LTE Band 26	1	64QAM	1113.6
LTE Band 26	3	QPSK	2715.0
LTE Band 26	3	16QAM	2734.0
LTE Band 26	3	64QAM	2728.5
LTE Band 26	5	QPSK	4547.0
LTE Band 26	5	16QAM	4545.5
LTE Band 26	5	64QAM	4544.6
LTE Band 26	10	QPSK	9059.9
LTE Band 26	10	16QAM	9049.6
LTE Band 26	10	64QAM	9048.7

Table 7-3. Occupied Bandwidth (Low Bands)

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Mode	BW (MHz)	Modulation	Occupied BW (kHz)
LTE Band 4	1.4	QPSK	1108.1
LTE Band 4	1.4	16QAM	1113.5
LTE Band 4	1.4	64QAM	1108.2
LTE Band 4	3	QPSK	2726.6
LTE Band 4	3	16QAM	2727.0
LTE Band 4	3	64QAM	2725.4
LTE Band 4	5	QPSK	4555.8
LTE Band 4	5	16QAM	4530.4
LTE Band 4	5	64QAM	4542.4
LTE Band 4	10	QPSK	9063.6
LTE Band 4	10	16QAM	9079.3
LTE Band 4	10	64QAM	9056.1
LTE Band 4	15	QPSK	13589.0
LTE Band 4	15	16QAM	13650.0
LTE Band 4	15	64QAM	13588.0
LTE Band 4	20	QPSK	18106.0
LTE Band 4	20	16QAM	18068.0
LTE Band 4	20	64QAM	18087.0
LTE Band 66	1.4	QPSK	1109.3
LTE Band 66	1.4	16QAM	1111.2
LTE Band 66	1.4	64QAM	1111.1
LTE Band 66	3	QPSK	2727.0
LTE Band 66	3	16QAM	2722.8
LTE Band 66	3	64QAM	2731.1
LTE Band 66	5	QPSK	4546.5
LTE Band 66	5	16QAM	4541.3
LTE Band 66	5	64QAM	4546.1
LTE Band 66	10	QPSK	9071.7
LTE Band 66	10	16QAM	9091.1
LTE Band 66	10	64QAM	9075.5
LTE Band 66	15	QPSK	13607.0
LTE Band 66	15	16QAM	13604.0
LTE Band 66	15	64QAM	13614.0
LTE Band 66	20	QPSK	18108.0
LTE Band 66	20	16QAM	18101.0
LTE Band 66	20	64QAM	18095.0
LTE Band 2	1.4	QPSK	1105.3
LTE Band 2	1.4	16QAM	1107.1
LTE Band 2	1.4	64QAM	1109.4
LTE Band 2	3	QPSK	2732.1
LTE Band 2	3	16QAM	2728
LTE Band 2	3	64QAM	2726.1
LTE Band 2	5	QPSK	4549.6
LTE Band 2	5	16QAM	4549.7
LTE Band 2	5	64QAM	4541
LTE Band 2	10	QPSK	9067.4
LTE Band 2	10	16QAM	9065.5
LTE Band 2	10	64QAM	9057.5
LTE Band 2	15	QPSK	13639.0
LTE Band 2	15	16QAM	13612.0
LTE Band 2	15	64QAM	13608.0
LTE Band 2	20	QPSK	18067.0
LTE Band 2	20	16QAM	18106.0
LTE Band 2	20	64QAM	18078.0
LTE Band 25	1.4	QPSK	1114.1
LTE Band 25	1.4	16QAM	1108.4
LTE Band 25	1.4	64QAM	1112.7
LTE Band 25	3	QPSK	2733.9
LTE Band 25	3	16QAM	2729.3
LTE Band 25	3	64QAM	2720.9
LTE Band 25	5	QPSK	4549.9
LTE Band 25	5	16QAM	4549.3
LTE Band 25	5	64QAM	4544.7
LTE Band 25	10	QPSK	9052.7
LTE Band 25	10	16QAM	9051.2
LTE Band 25	10	64QAM	9061.9
LTE Band 25	15	QPSK	13602.0
LTE Band 25	15	16QAM	13591.0
LTE Band 25	15	64QAM	13605.0
LTE Band 25	20	QPSK	18095.0
LTE Band 25	20	16QAM	18083.0
LTE Band 25	20	64QAM	18103.0

Table 7-4. Occupied Bandwidth (Mid Bands)

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Mode	BW (MHz)	Modulation	Occupied BW (kHz)
LTE Band 30	5	QPSK	4548.7
LTE Band 30	5	16QAM	4538.4
LTE Band 30	5	64QAM	4541.0
LTE Band 30	10	QPSK	9043.0
LTE Band 30	10	16QAM	9046.4
LTE Band 30	10	64QAM	9055.7
LTE Band 7	5	QPSK	4552.4
LTE Band 7	5	16QAM	4548.1
LTE Band 7	5	64QAM	4554.5
LTE Band 7	10	QPSK	9064.7
LTE Band 7	10	16QAM	9060.8
LTE Band 7	10	64QAM	9062.5
LTE Band 7	15	QPSK	13637.9
LTE Band 7	15	16QAM	13623.3
LTE Band 7	15	64QAM	13613.4
LTE Band 7	20	QPSK	18091.0
LTE Band 7	20	16QAM	18076.8
LTE Band 7	20	64QAM	18086.5
LTE Band 41	5	QPSK	4600.0
LTE Band 41	5	16QAM	4593.0
LTE Band 41	5	64QAM	4597.1
LTE Band 41	10	QPSK	9177.5
LTE Band 41	10	16QAM	9239.0
LTE Band 41	10	64QAM	9181.1
LTE Band 41	15	QPSK	13829.3
LTE Band 41	15	16QAM	13724.9
LTE Band 41	15	64QAM	13710.2
LTE Band 41	20	QPSK	18231.8
LTE Band 41	20	16QAM	18209.1
LTE Band 41	20	64QAM	18183.9

Table 7-5. Occupied Bandwidth (High Bands)

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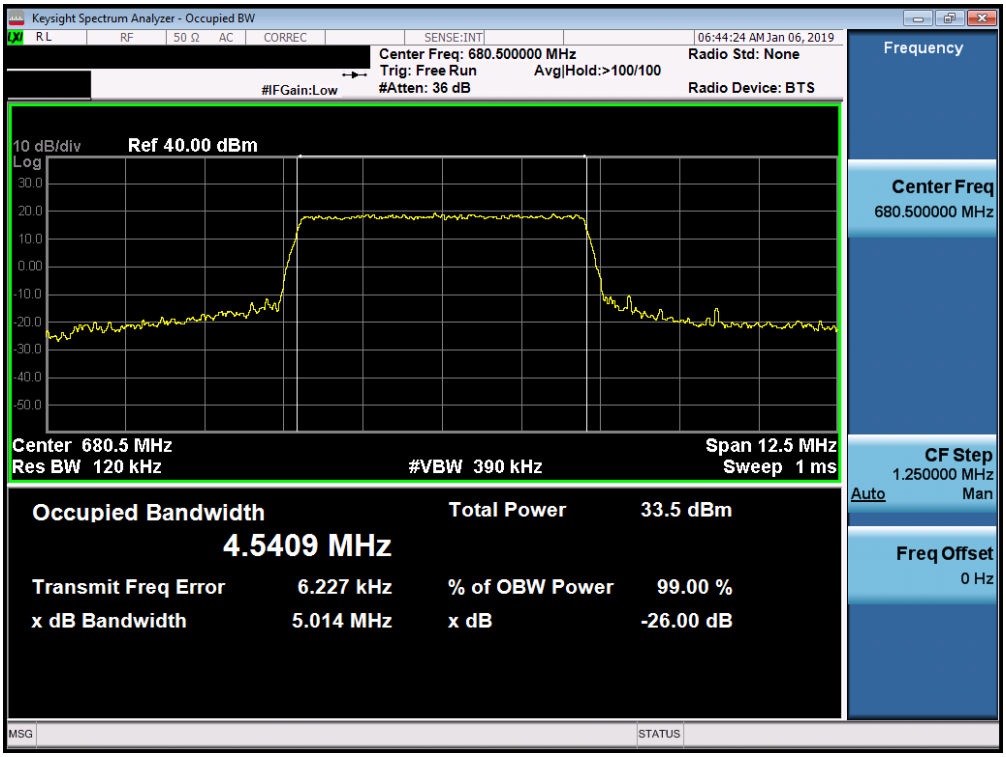
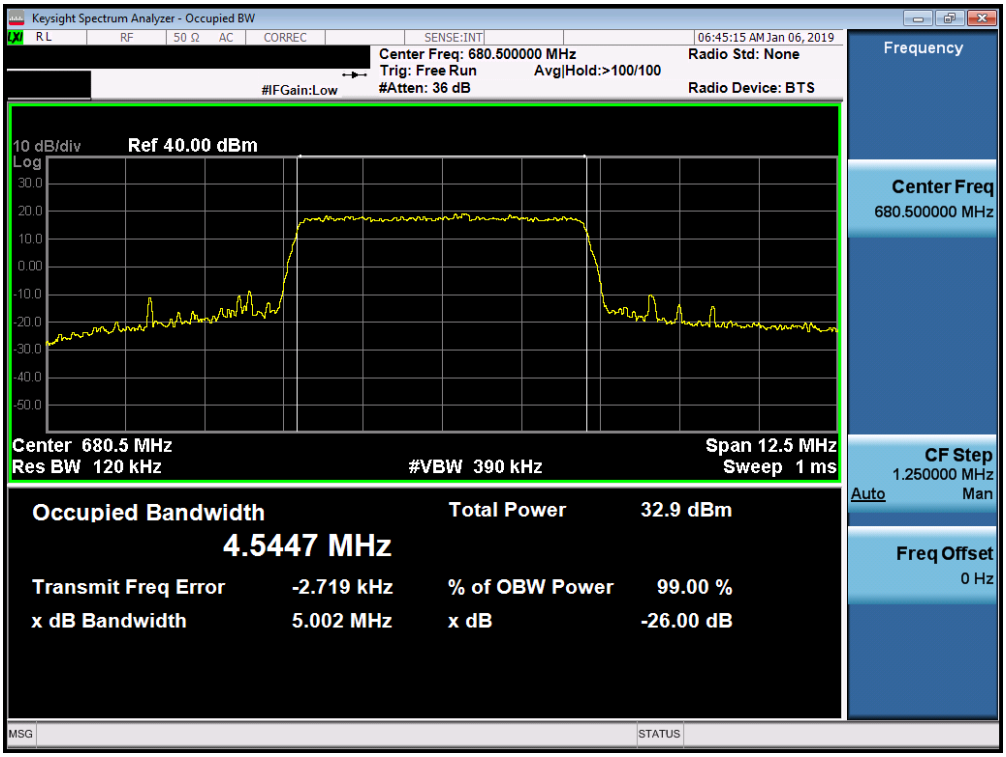
Band 71



Plot 7-1. Occupied Bandwidth Plot (Band 71 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-2. Occupied Bandwidth Plot (Band 71 - 5.0MHz 16-QAM - Full RB Configuration)

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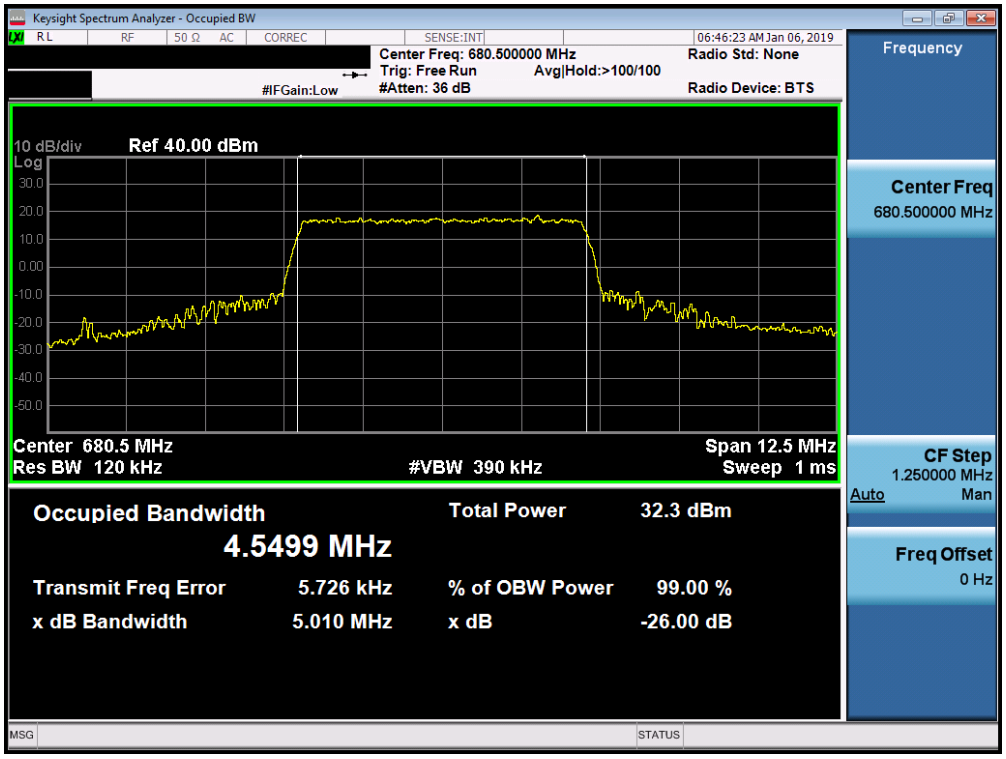
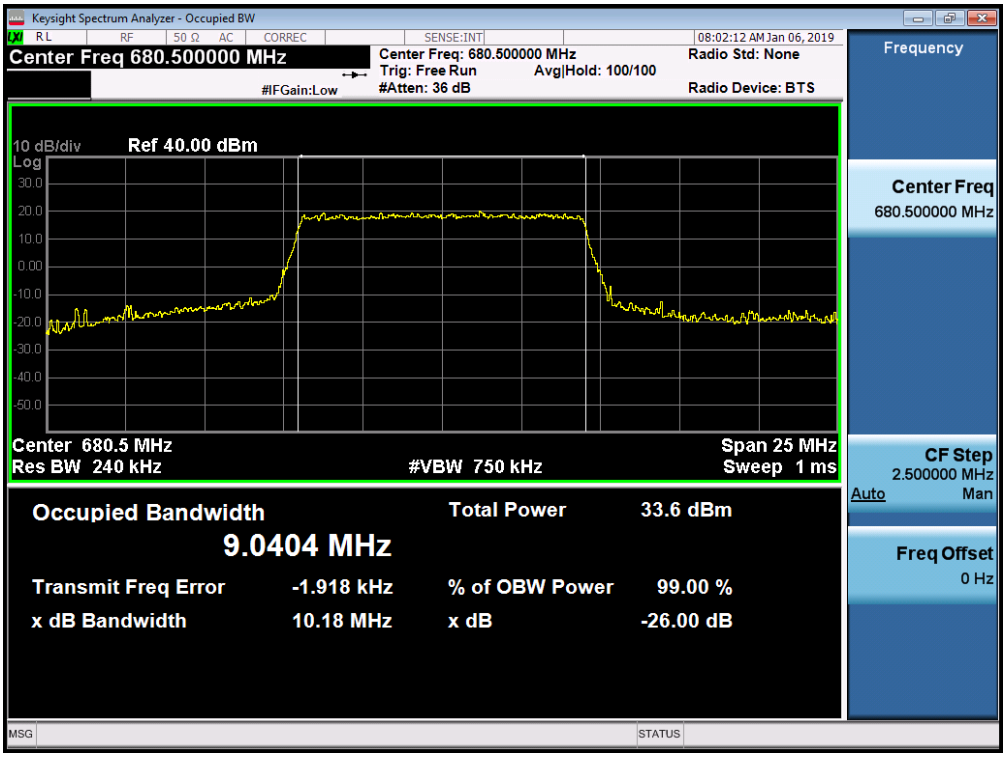


Plot 7-3. Occupied Bandwidth Plot (Band 71 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-4. Occupied Bandwidth Plot (Band 71 - 10.0MHz QPSK - Full RB Configuration)

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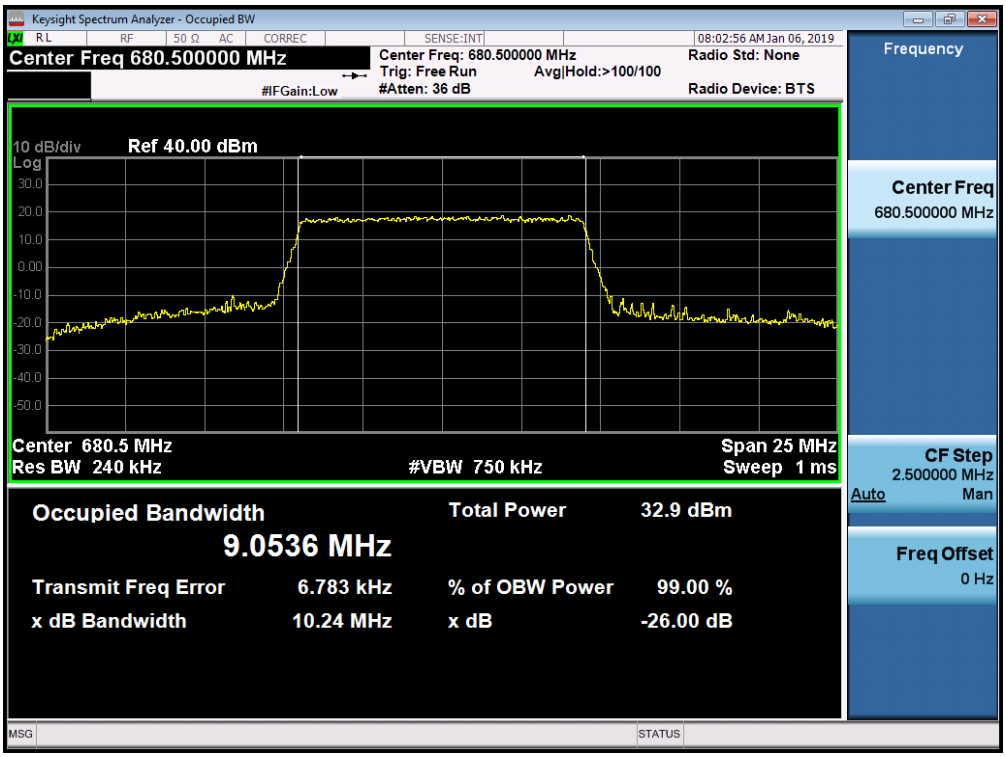
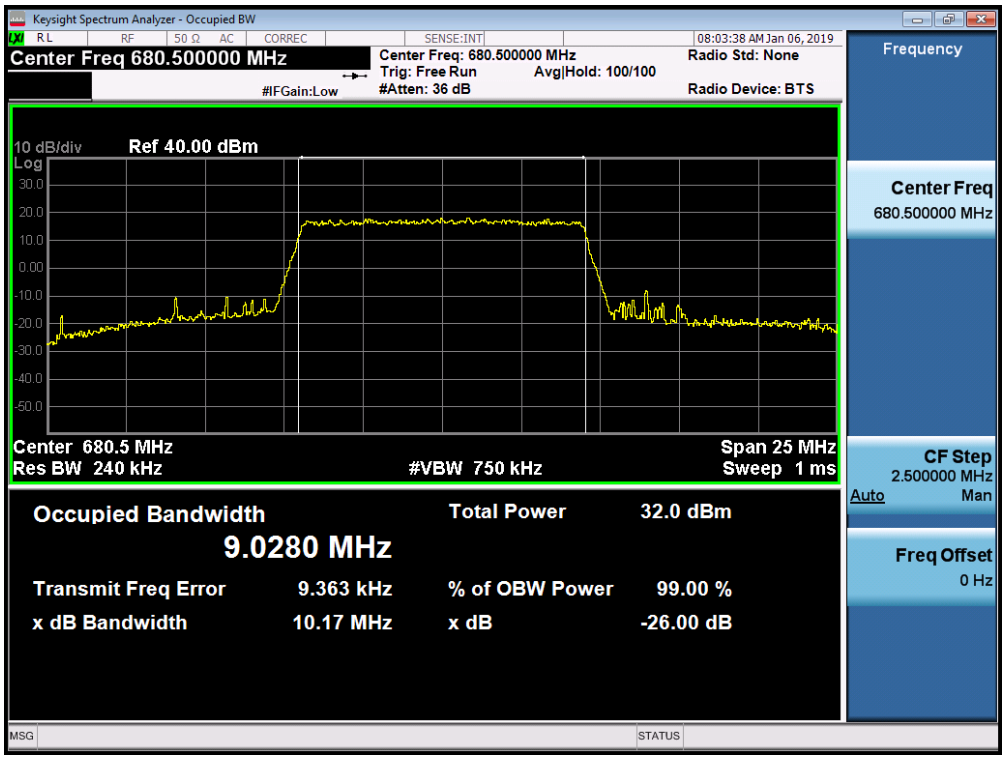


Plot 7-5. Occupied Bandwidth Plot (Band 71 - 10.0MHz 16-QAM - Full RB Configuration)



Plot 7-6. Occupied Bandwidth Plot (Band 71 - 10.0MHz 64-QAM - Full RB Configuration)

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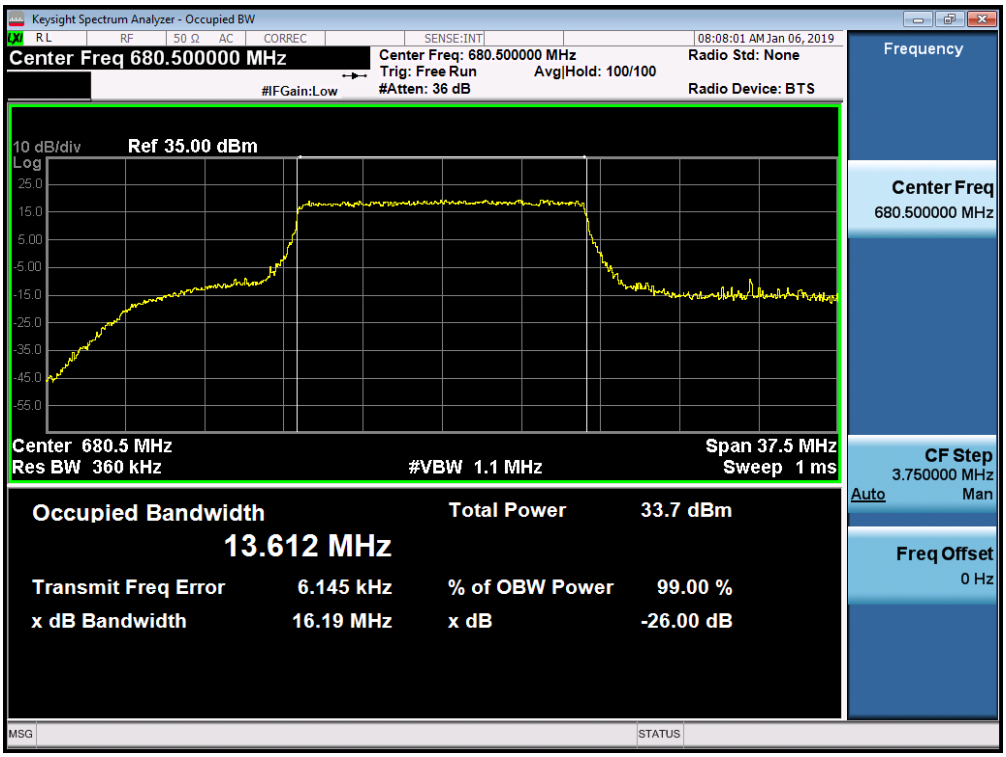
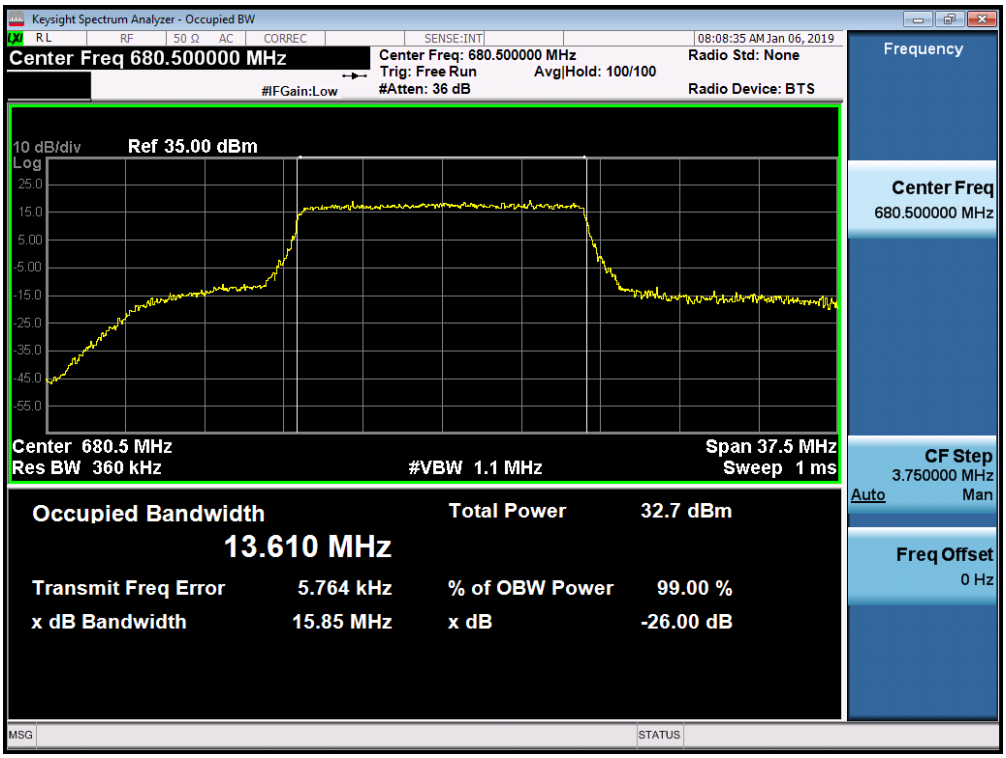


Plot 7-7. Occupied Bandwidth Plot (Band 71 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-8. Occupied Bandwidth Plot (Band 71 - 15.0MHz 16-QAM - Full RB Configuration)

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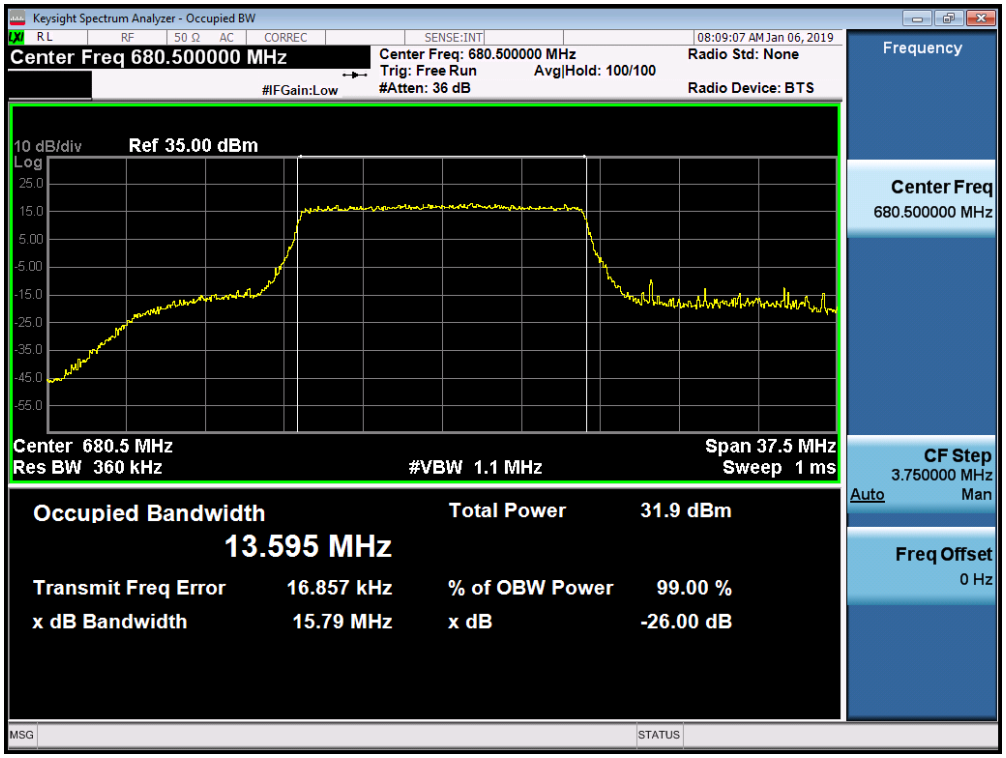
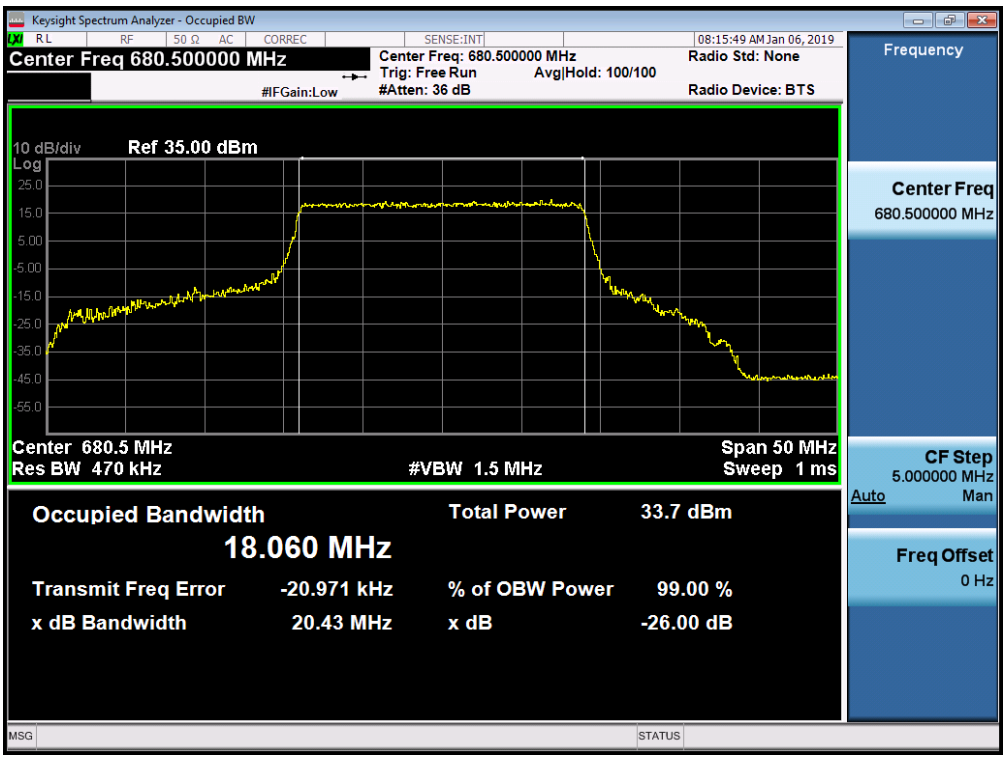


Plot 7-9. Occupied Bandwidth Plot (Band 71 - 15.0MHz 64-QAM - Full RB Configuration)



Plot 7-10. Occupied Bandwidth Plot (Band 71 - 20.0MHz QPSK - Full RB Configuration)

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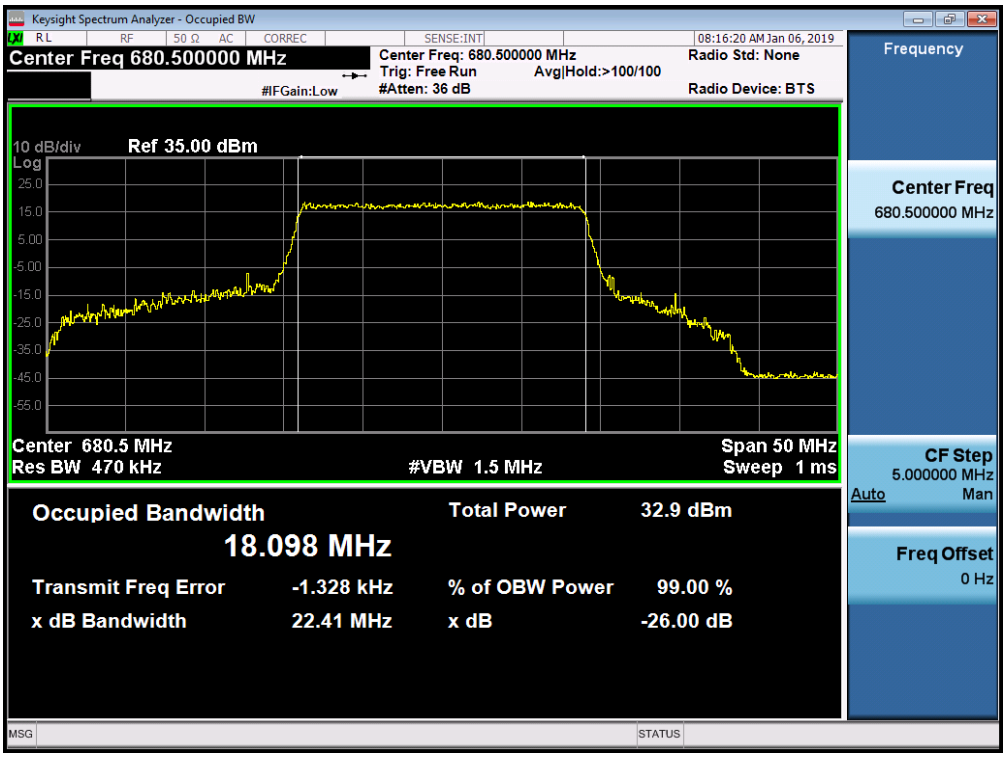
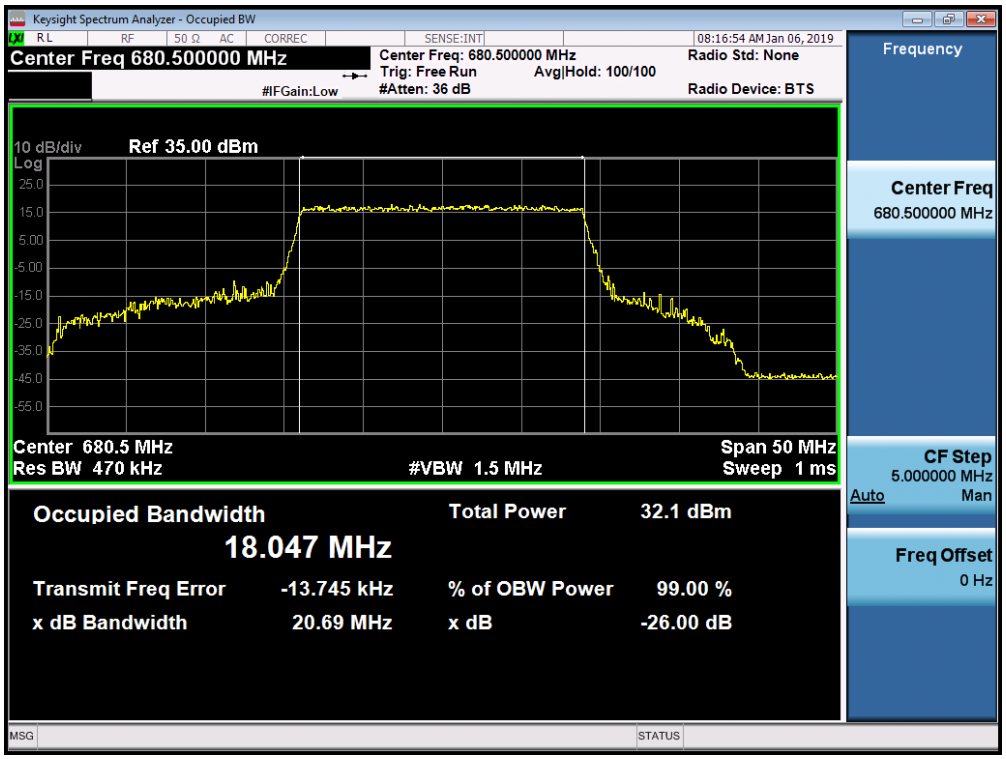


Plot 7-11. Occupied Bandwidth Plot (Band 71 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-12. Occupied Bandwidth Plot (Band 71 - 20.0MHz 16-QAM - Full RB Configuration)

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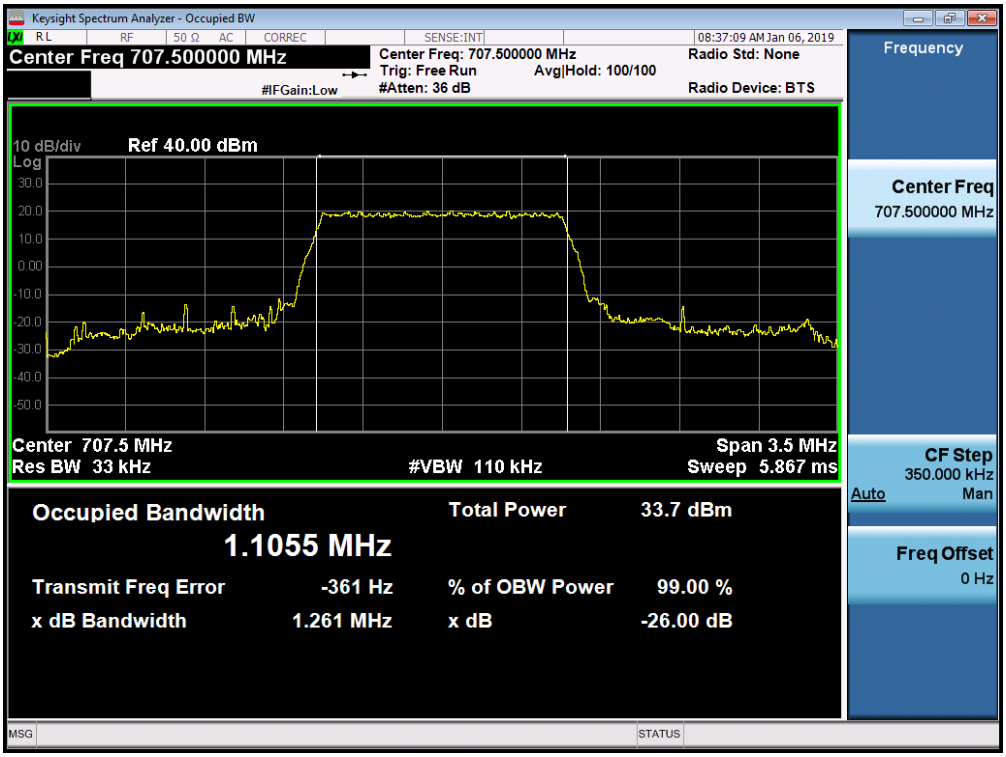
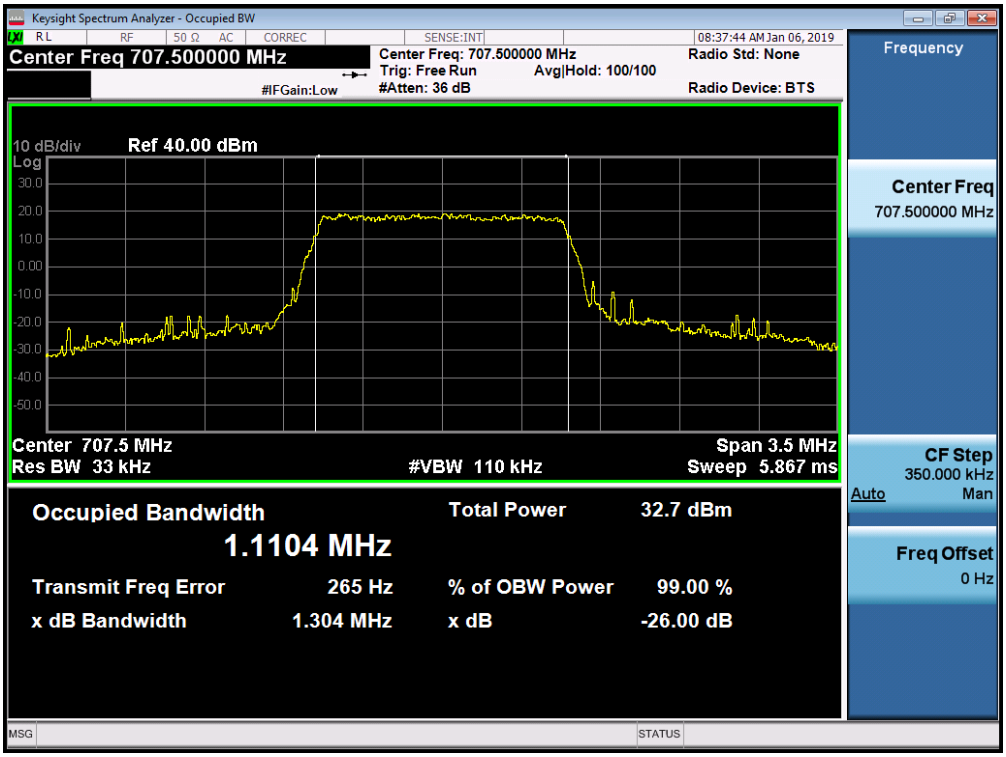
Band 12/17



Plot 7-13. Occupied Bandwidth Plot (Band 12 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-14. Occupied Bandwidth Plot (Band 12 - 1.4MHz 16-QAM - Full RB Configuration)

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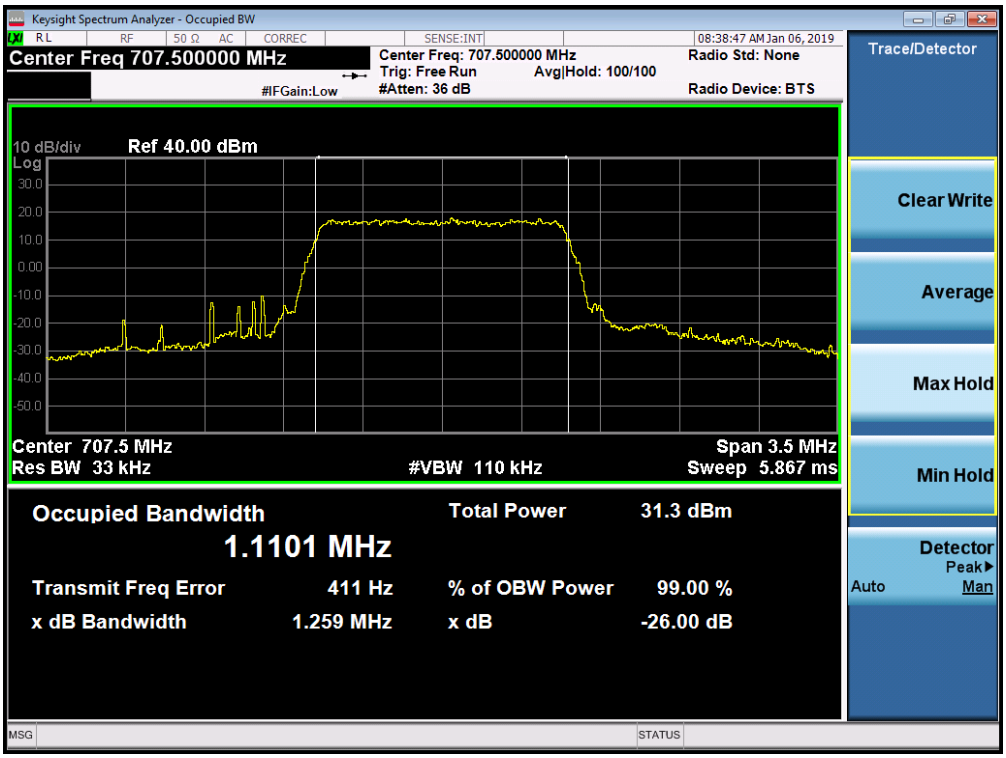
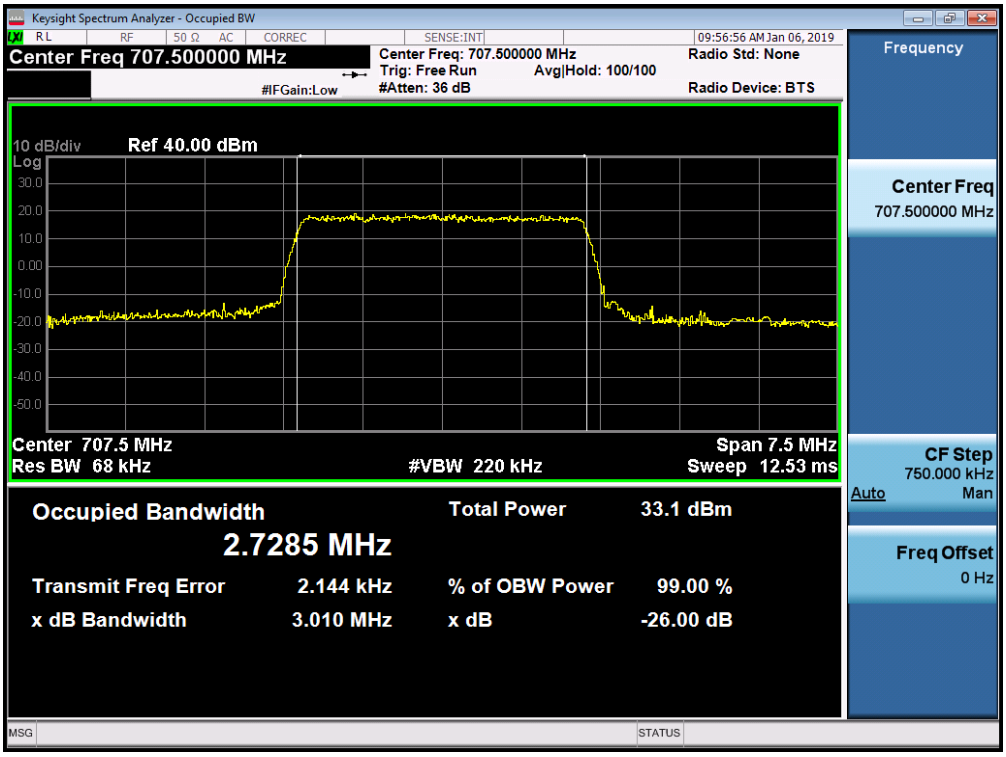


Plot 7-15. Occupied Bandwidth Plot (Band 12 - 1.4MHz 64-QAM - Full RB Configuration)



Plot 7-16. Occupied Bandwidth Plot (Band 12 - 3.0MHz QPSK - Full RB Configuration)

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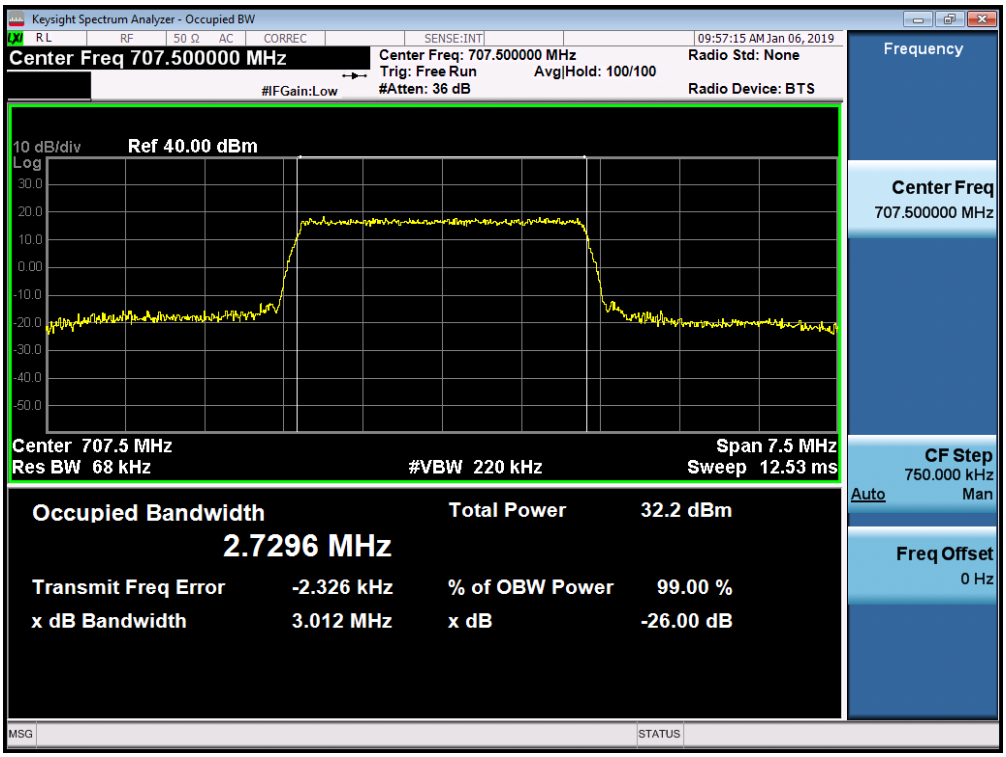
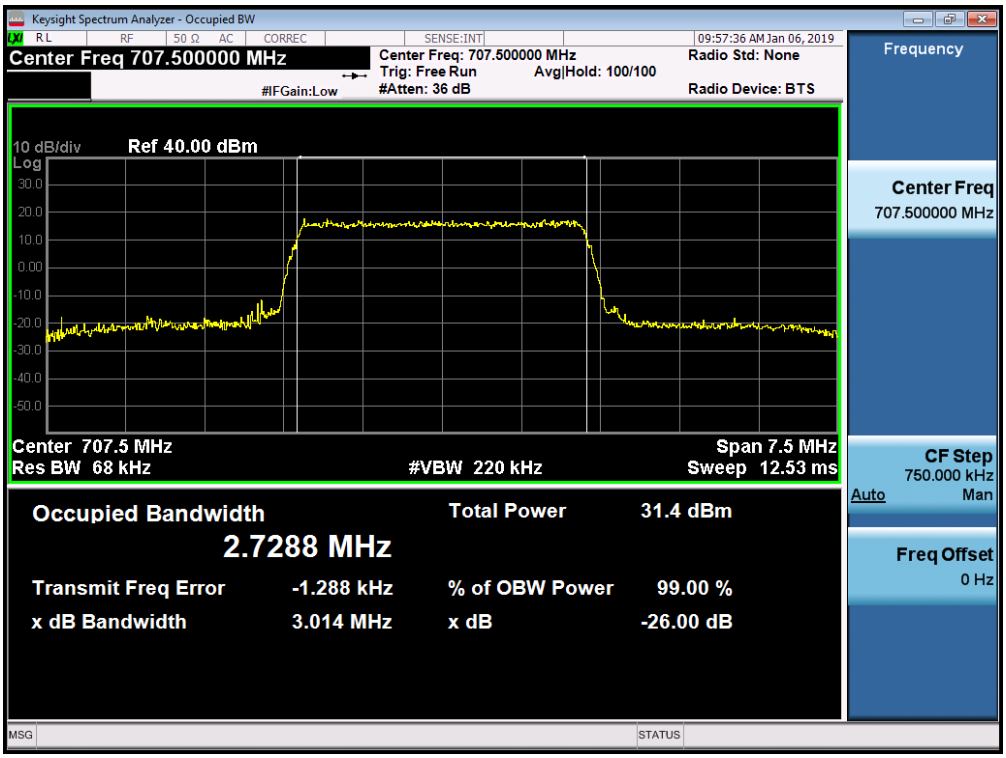


Plot 7-17. Occupied Bandwidth Plot (Band 12 - 3.0MHz 16-QAM - Full RB Configuration)



Plot 7-18. Occupied Bandwidth Plot (Band 12 - 3.0MHz 64-QAM - Full RB Configuration)

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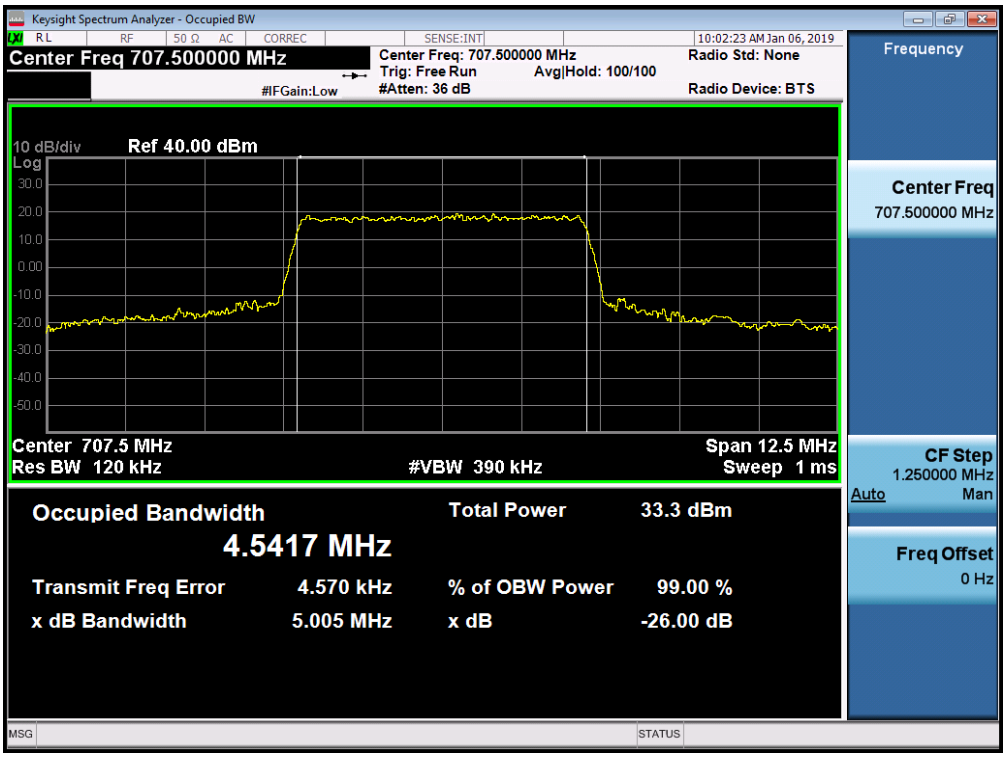
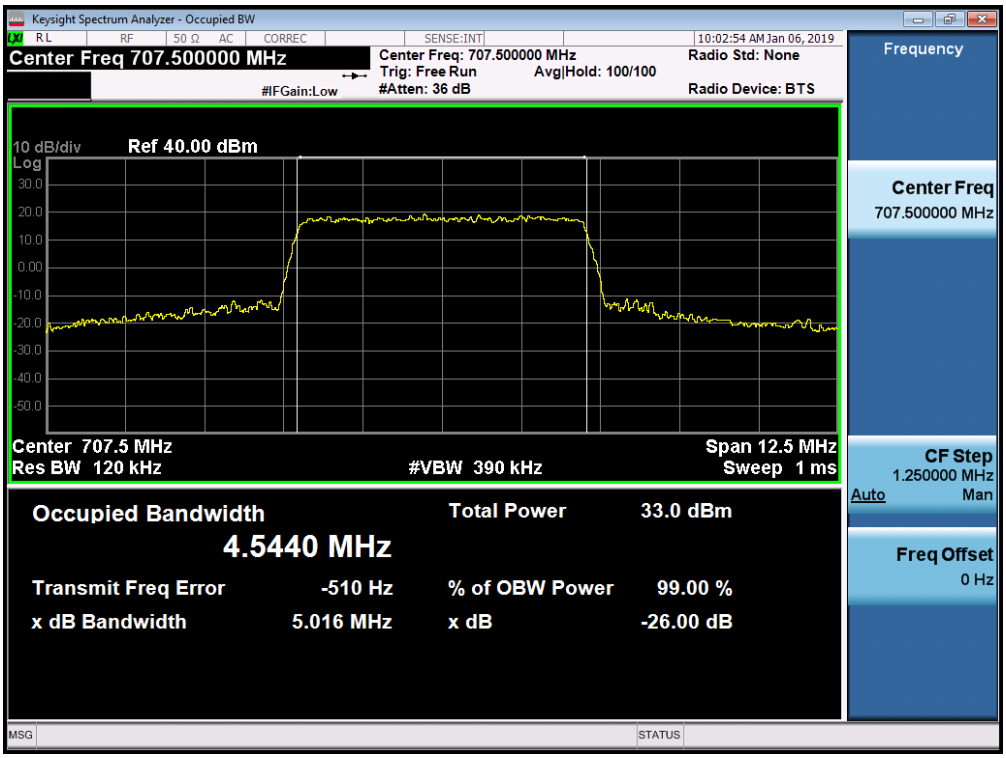


Plot 7-19. Occupied Bandwidth Plot (Band 12/17 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-20. Occupied Bandwidth Plot (Band 12/17 - 5.0MHz 16-QAM - Full RB Configuration)

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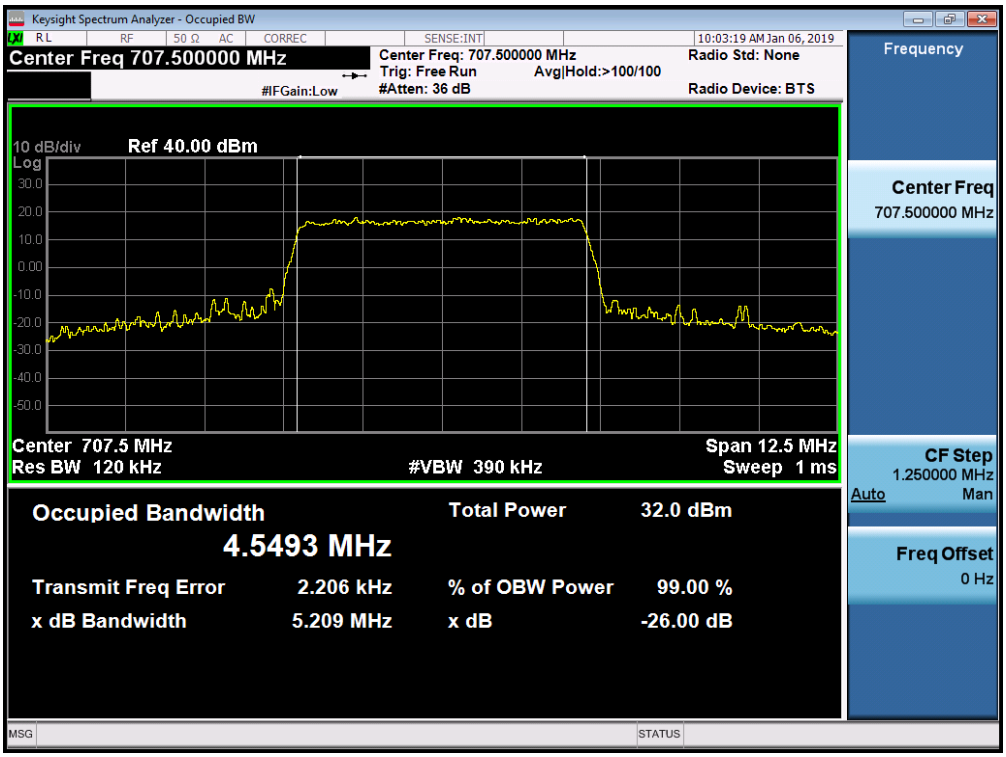
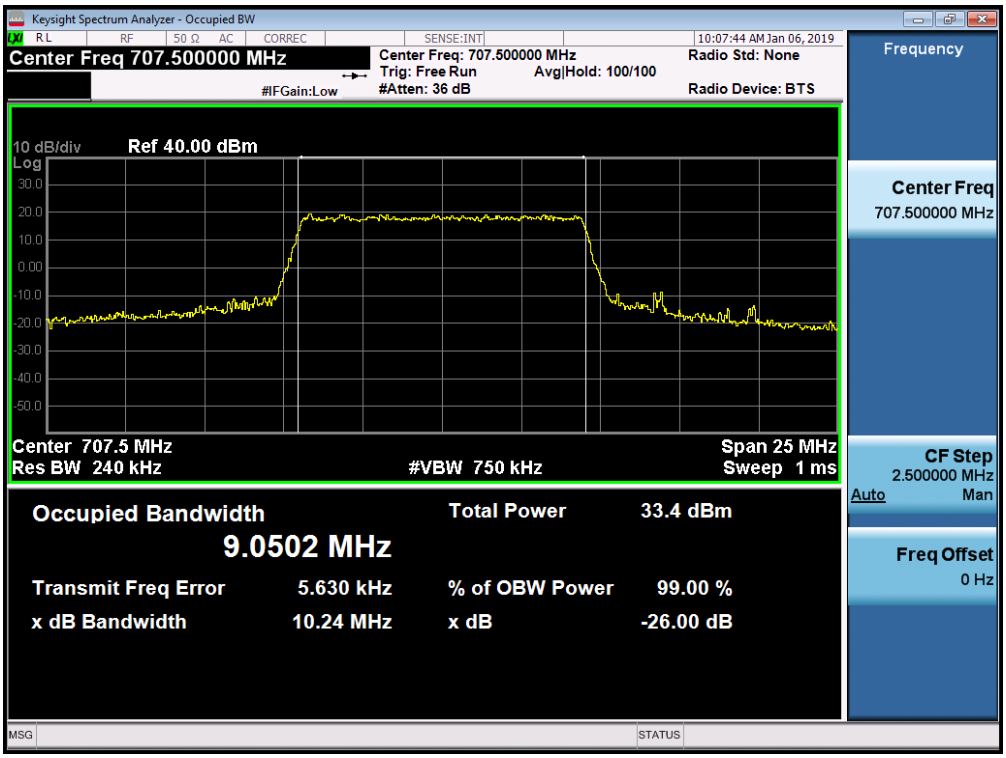


Plot 7-21. Occupied Bandwidth Plot (Band 12/17 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-22. Occupied Bandwidth Plot (Band 12/17 - 10.0MHz QPSK - Full RB Configuration)

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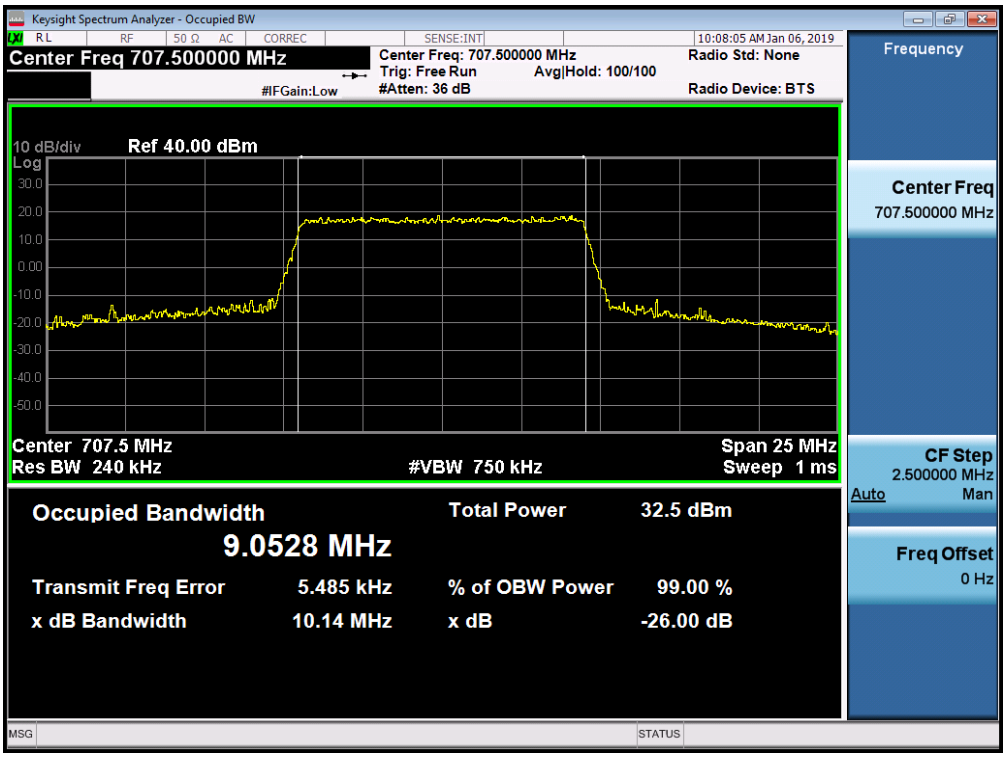
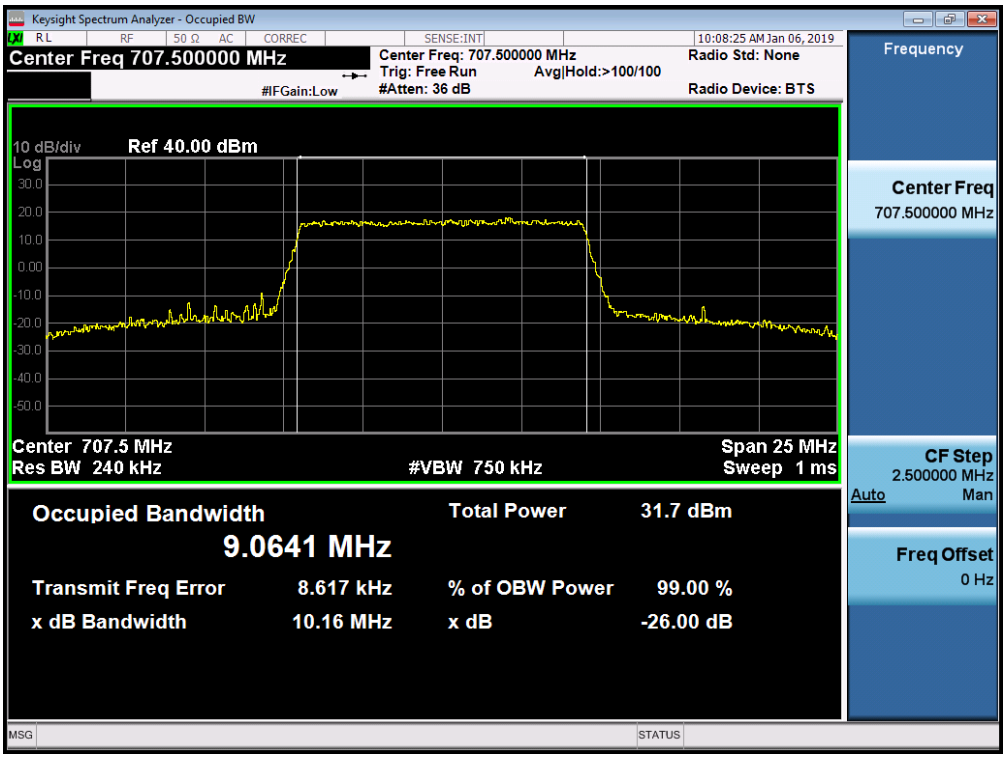


Plot 7-23. Occupied Bandwidth Plot (Band 12/17 - 10.0MHz 16-QAM - Full RB Configuration)



Plot 7-24. Occupied Bandwidth Plot (Band 12/17 - 10.0MHz 64-QAM - Full RB Configuration)

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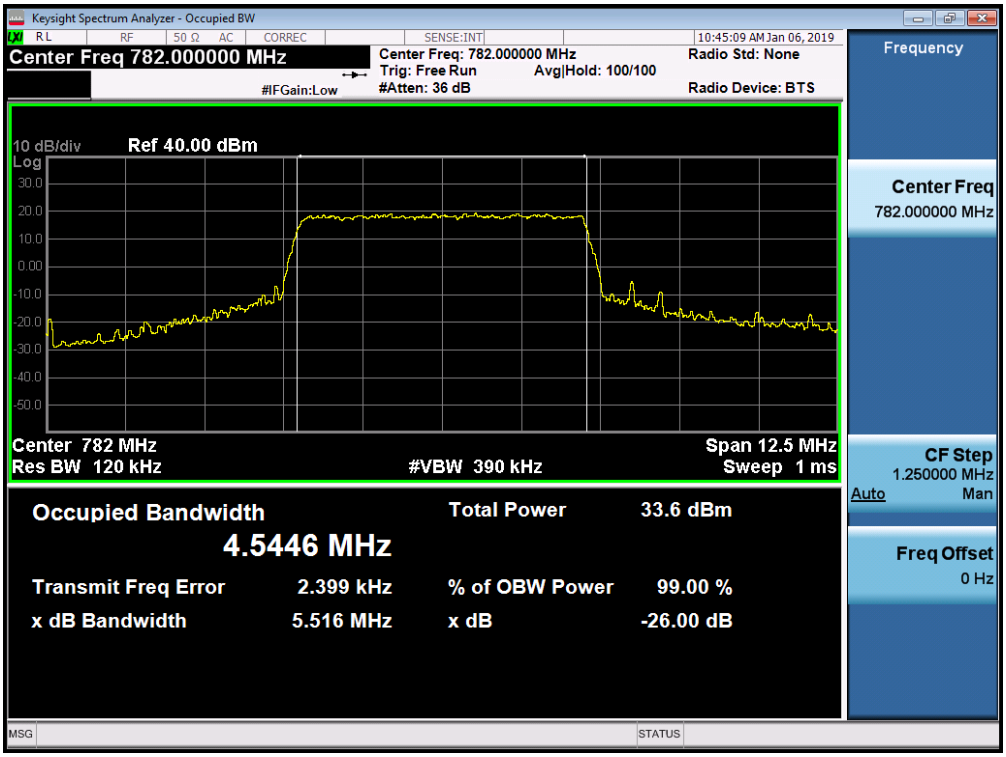
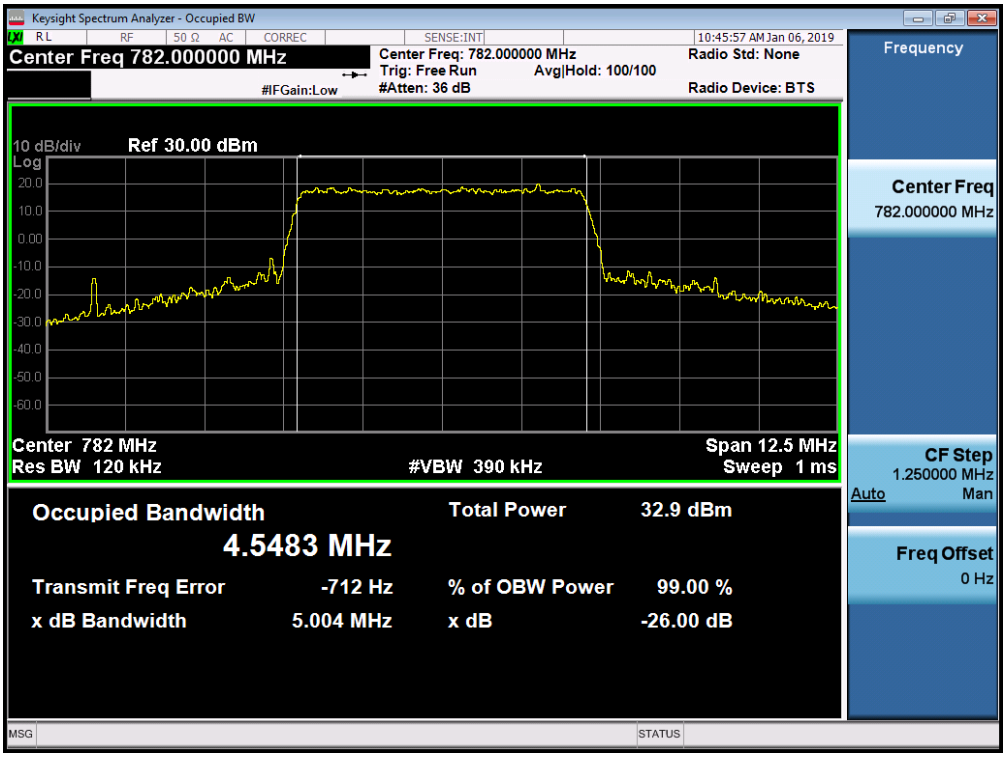
Band 13



Plot 7-25. Occupied Bandwidth Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-26. Occupied Bandwidth Plot (Band 13 - 5.0MHz 16-QAM - Full RB Configuration)

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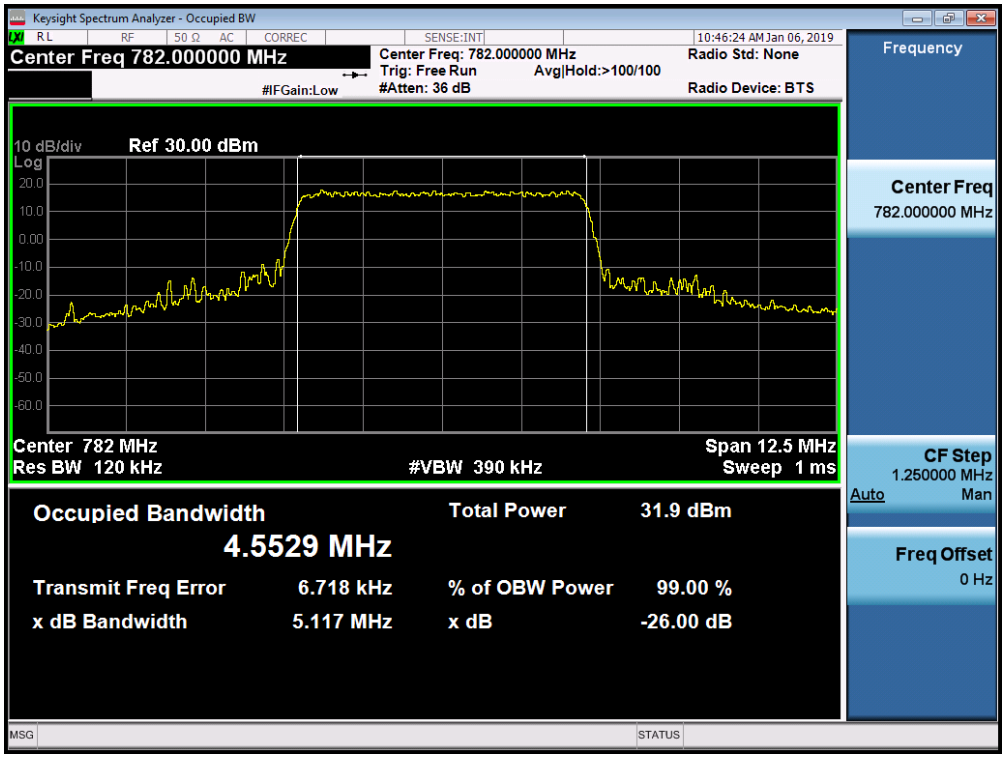
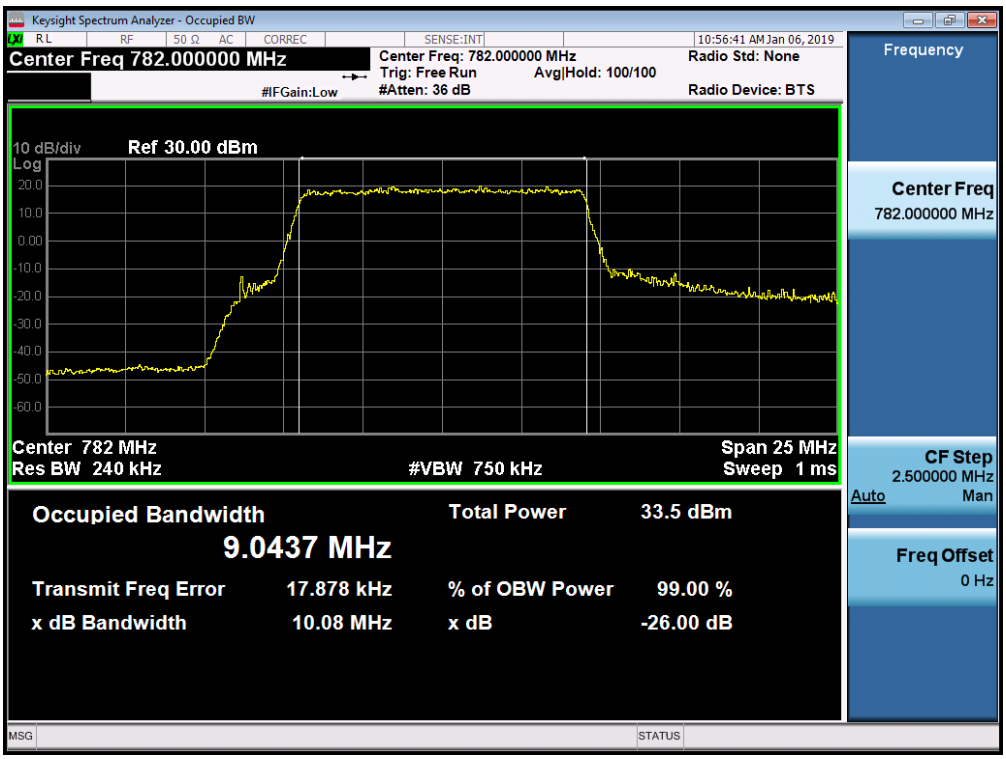


Plot 7-27. Occupied Bandwidth Plot (Band 13 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-28. Occupied Bandwidth Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)

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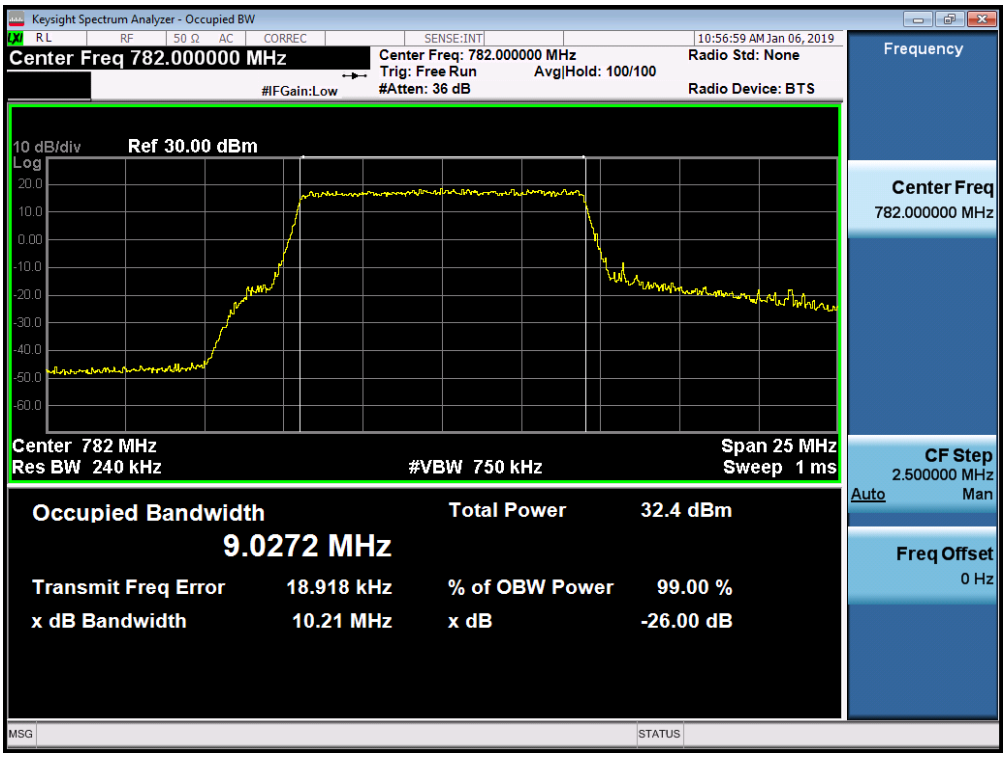
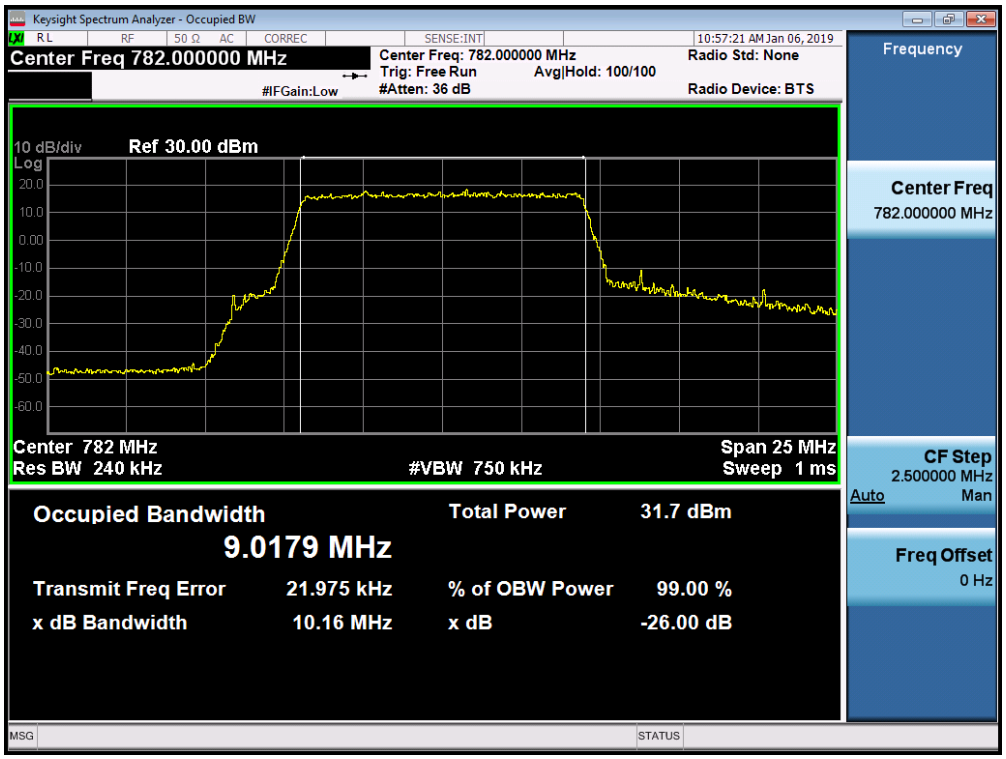


Plot 7-29. Occupied Bandwidth Plot (Band 13 - 10.0MHz 16-QAM - Full RB Configuration)



Plot 7-30. Occupied Bandwidth Plot (Band 13 - 10.0MHz 64-QAM - Full RB Configuration)

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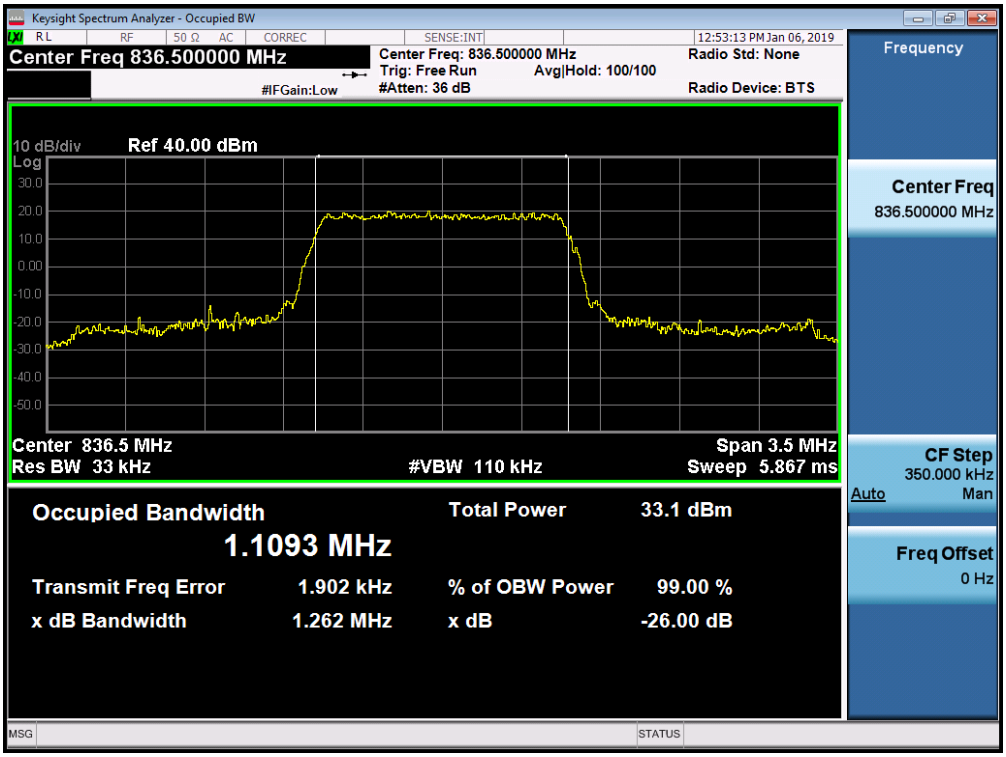
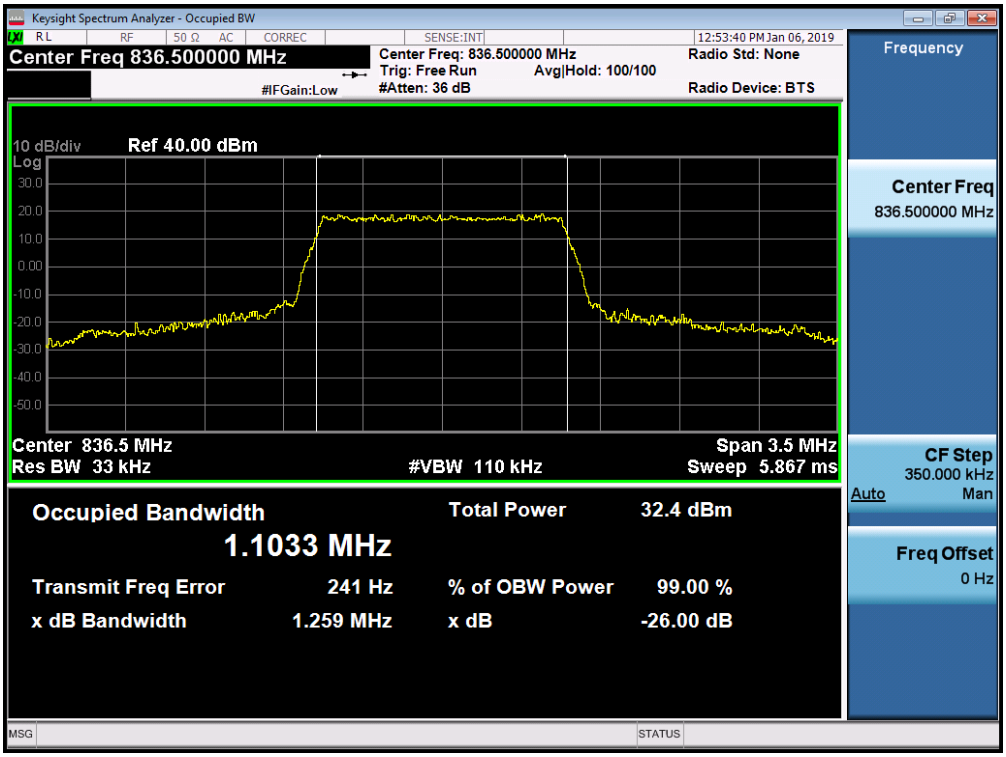
Band 26/5



Plot 7-31. Occupied Bandwidth Plot (Band 26/5 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-32. Occupied Bandwidth Plot (Band 26/5 - 1.4MHz 16-QAM - Full RB Configuration)

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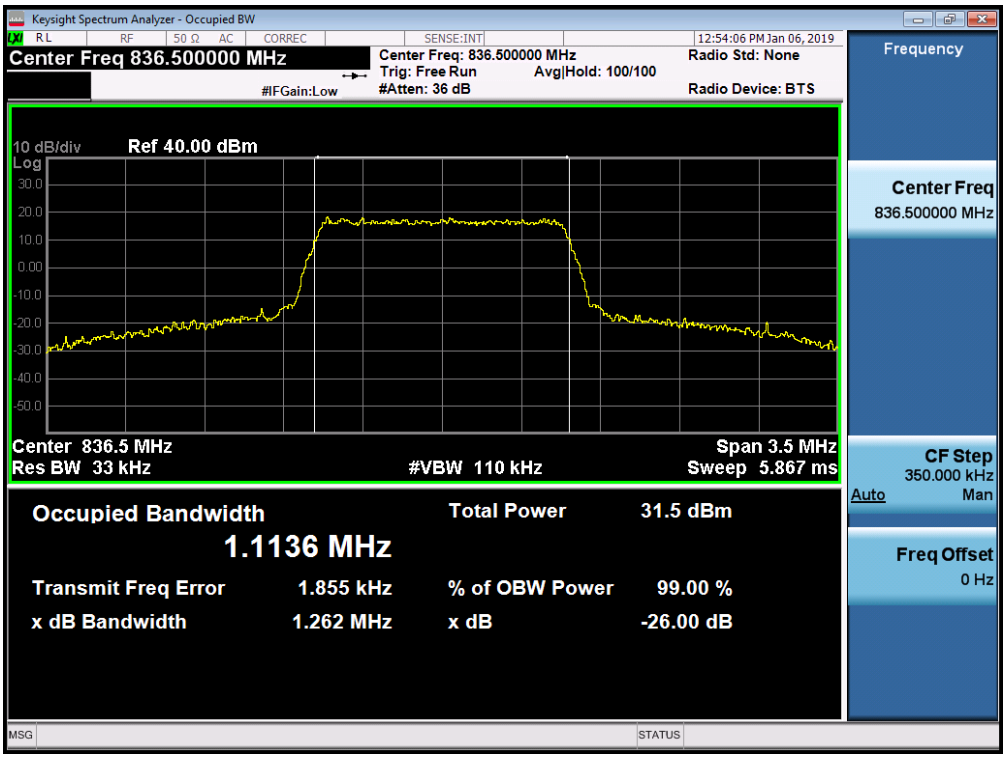
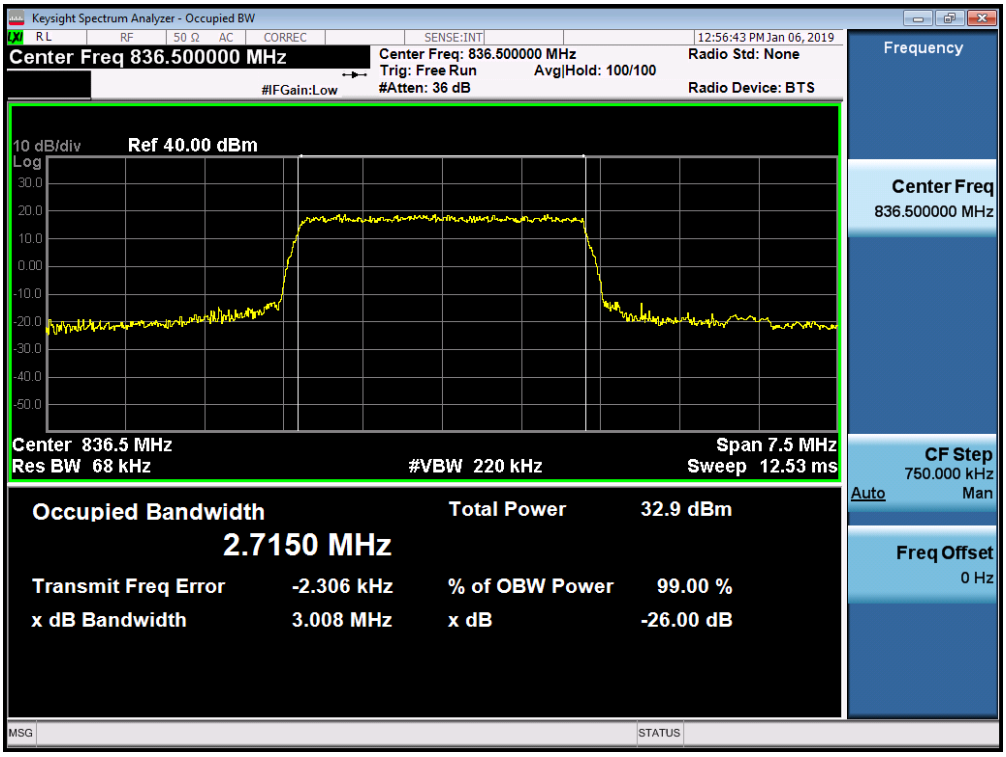


Plot 7-33. Occupied Bandwidth Plot (Band 26/5 - 1.4MHz 64-QAM - Full RB Configuration)



Plot 7-34. Occupied Bandwidth Plot (Band 26/5 - 3.0MHz QPSK - Full RB Configuration)

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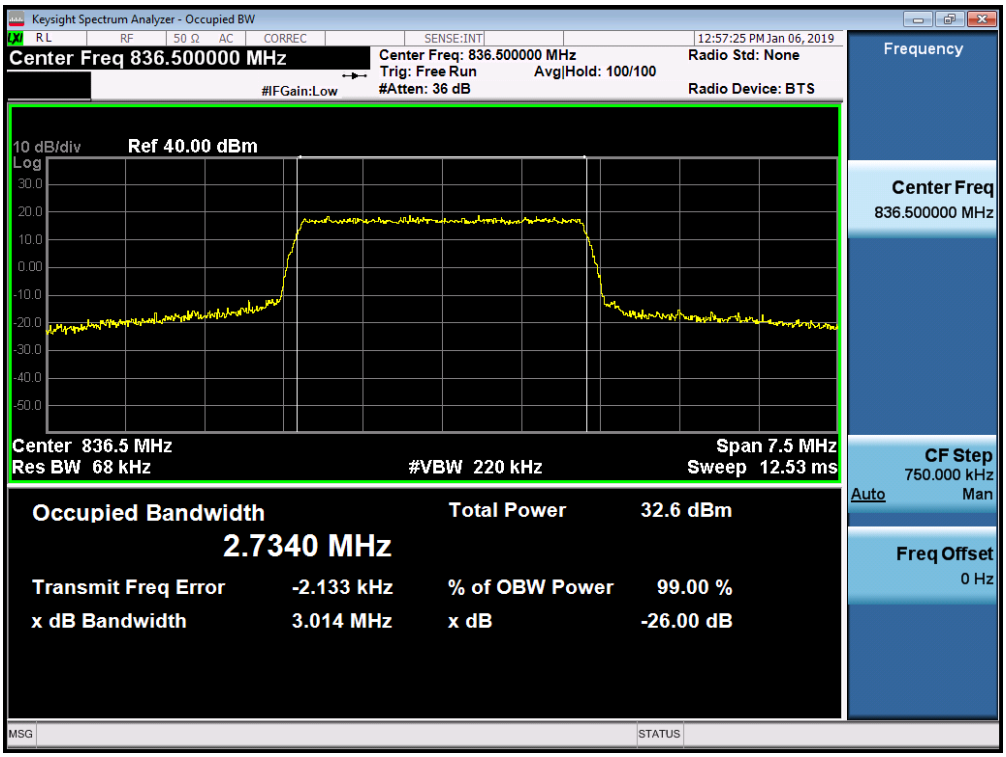
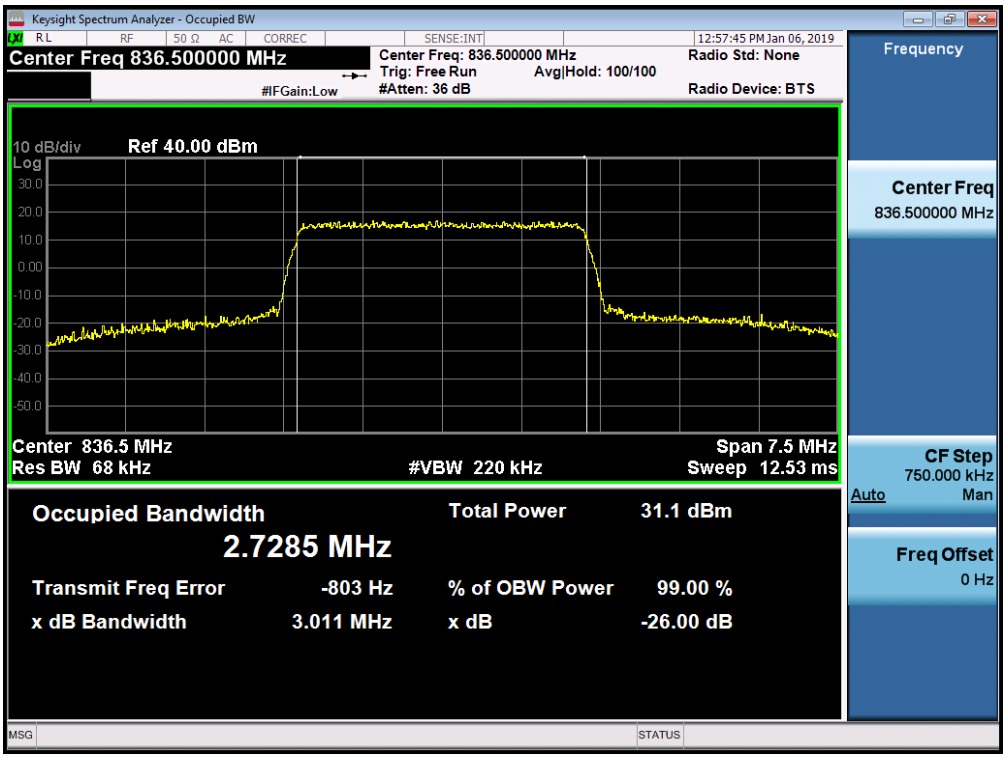


Plot 7-35. Occupied Bandwidth Plot (Band 26/5 - 3.0MHz 16-QAM - Full RB Configuration)



Plot 7-36. Occupied Bandwidth Plot (Band 26/5 - 3.0MHz 64-QAM - Full RB Configuration)

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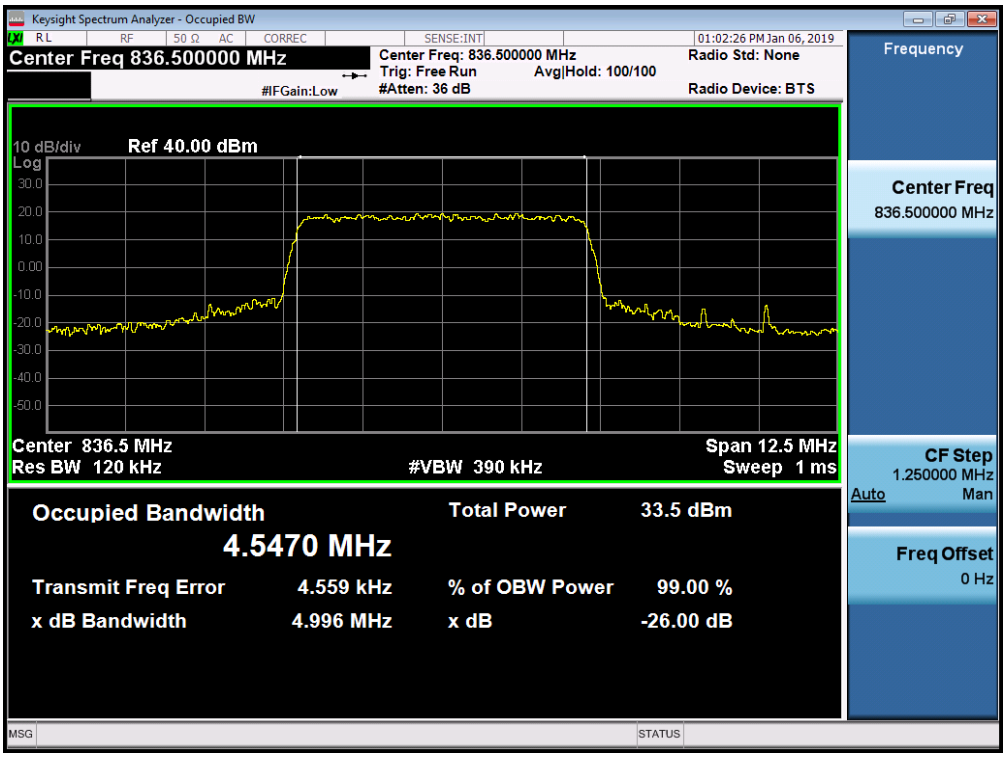
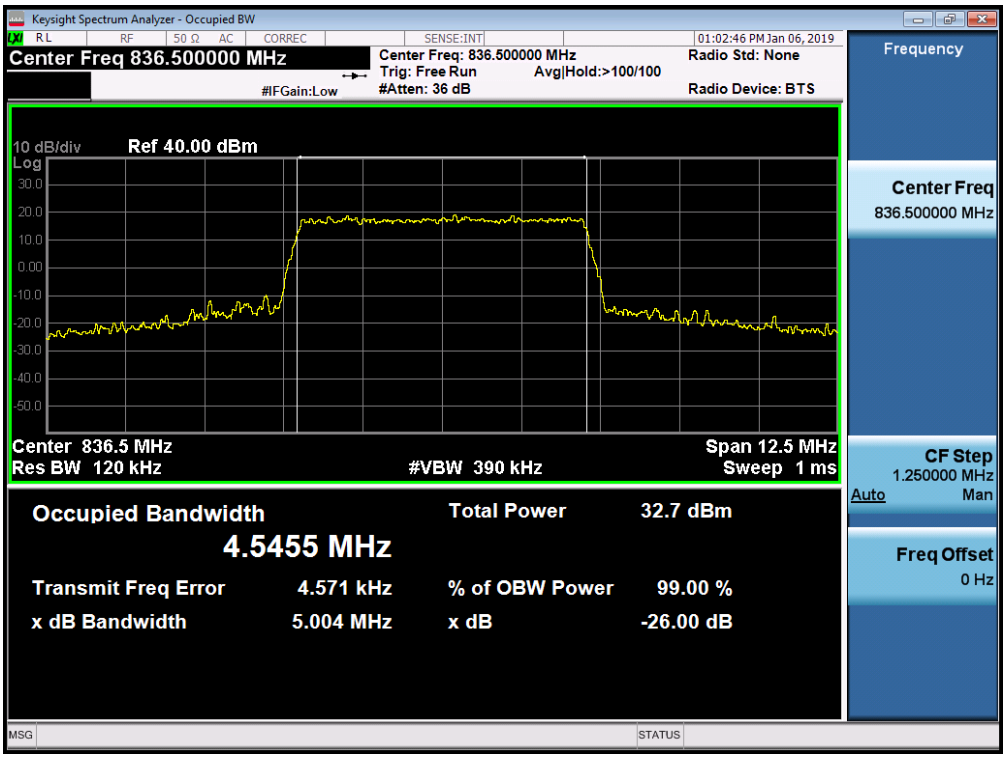


Plot 7-37. Occupied Bandwidth Plot (Band 26/5 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-38. Occupied Bandwidth Plot (Band 26/5 - 5.0MHz 16-QAM - Full RB Configuration)

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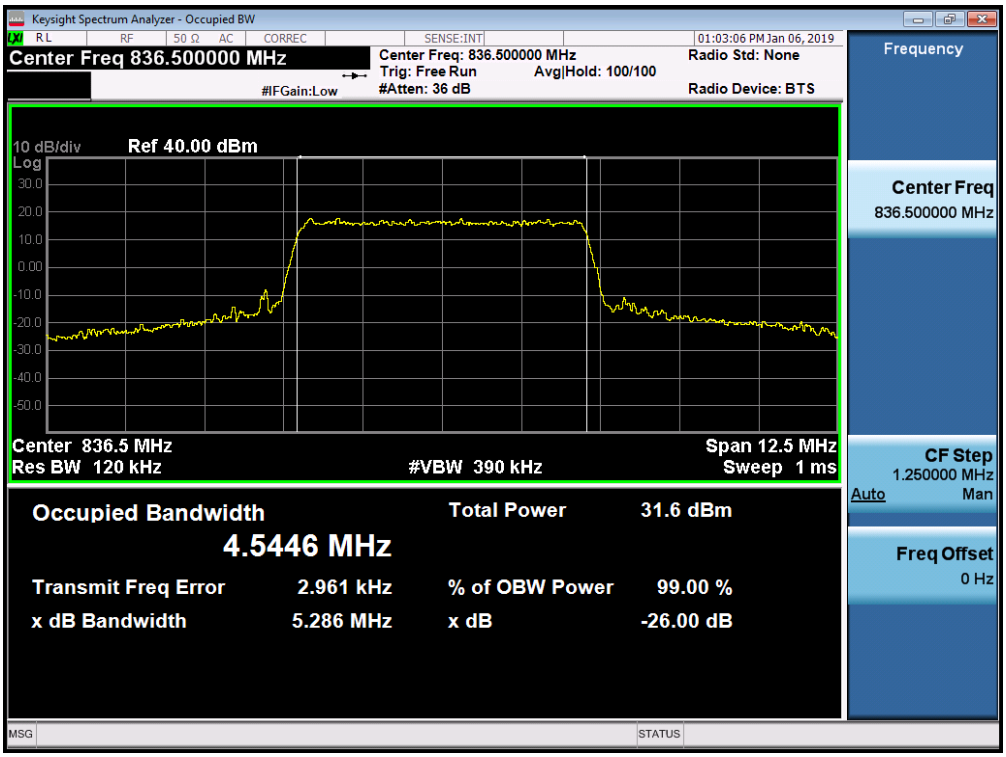
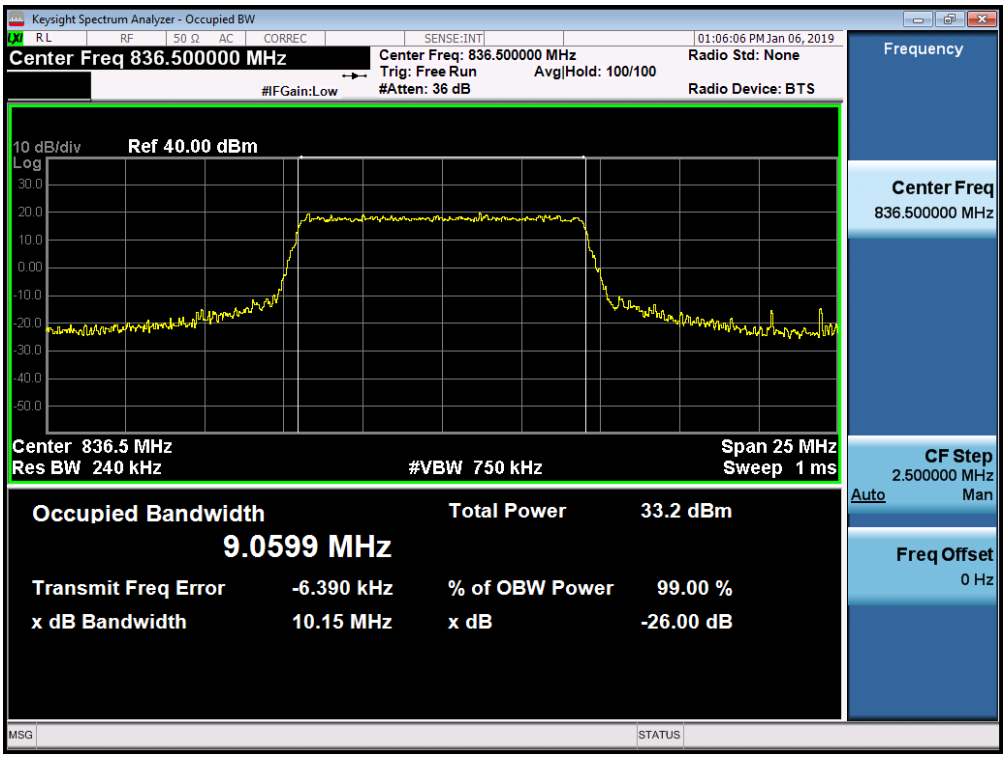


Plot 7-39. Occupied Bandwidth Plot (Band 26/5 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-40. Occupied Bandwidth Plot (Band 26/5 - 10.0MHz QPSK - Full RB Configuration)

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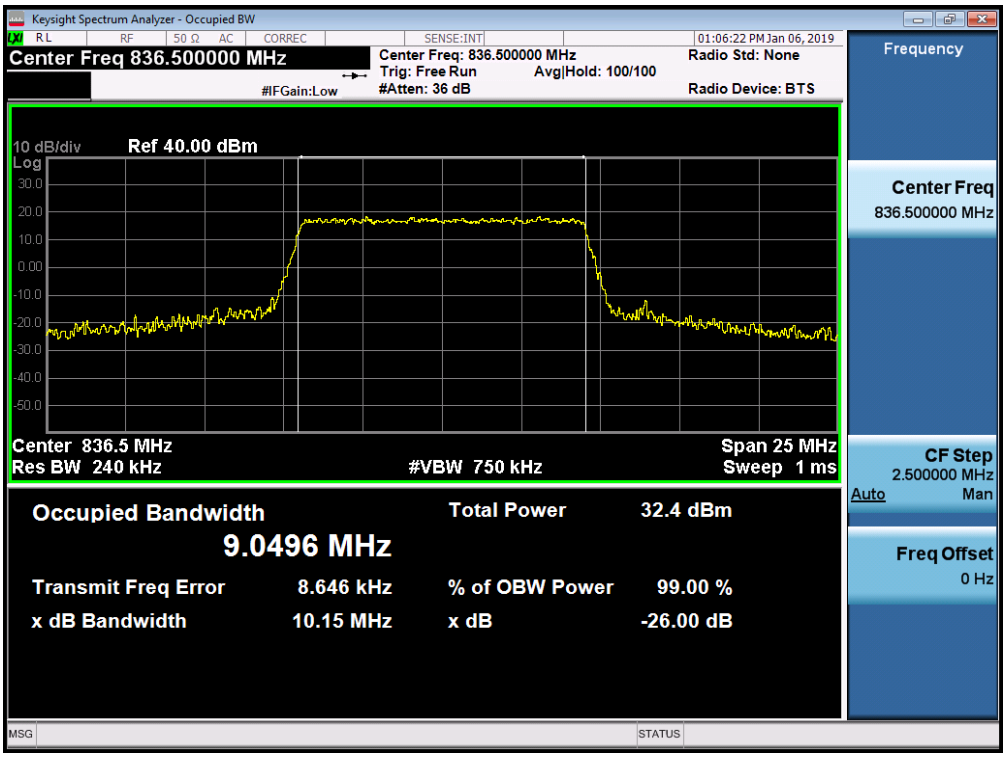
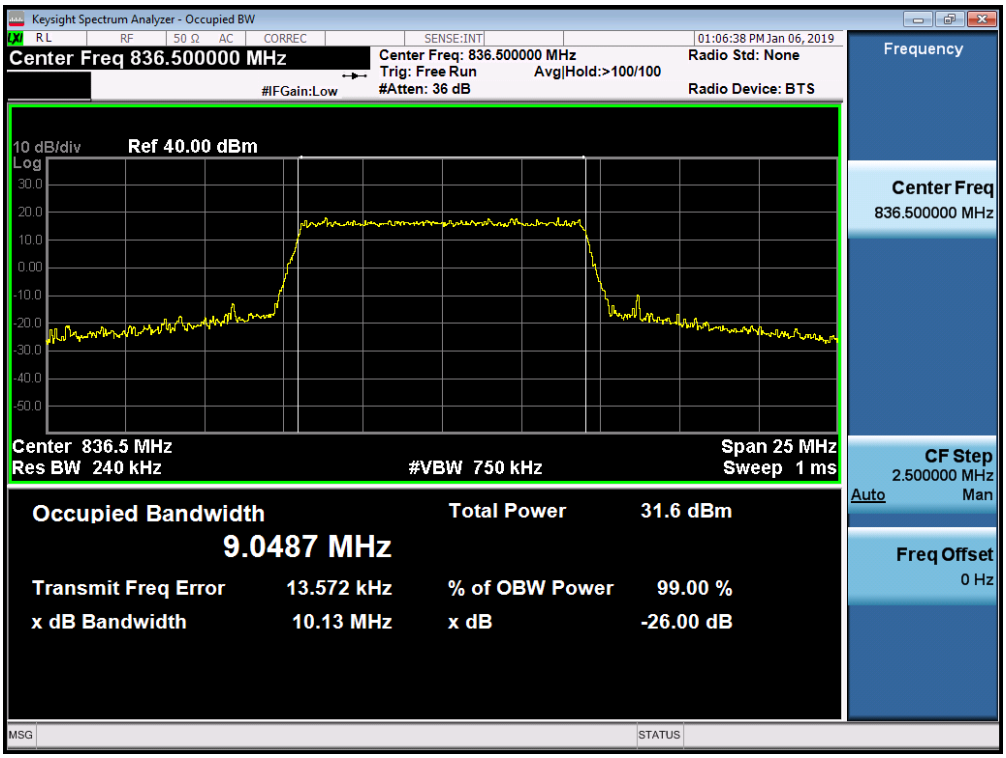


Plot 7-41. Occupied Bandwidth Plot (Band 26/5 - 10.0MHz 16-QAM - Full RB Configuration)



Plot 7-42. Occupied Bandwidth Plot (Band 26/5 - 10.0MHz 64-QAM - Full RB Configuration)

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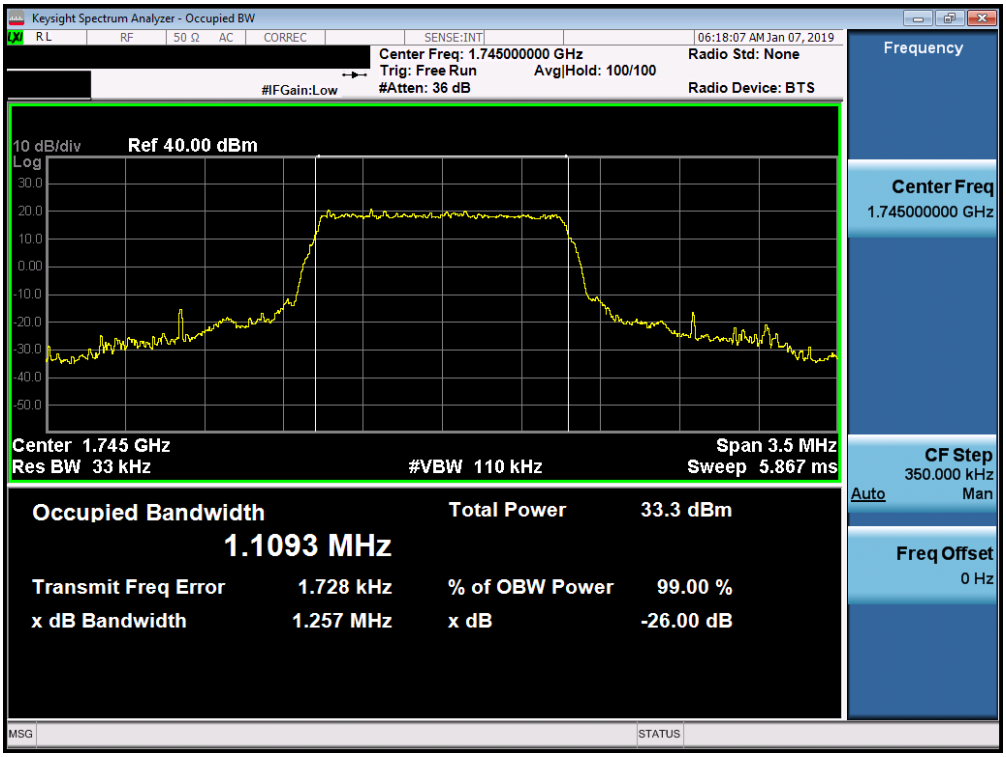
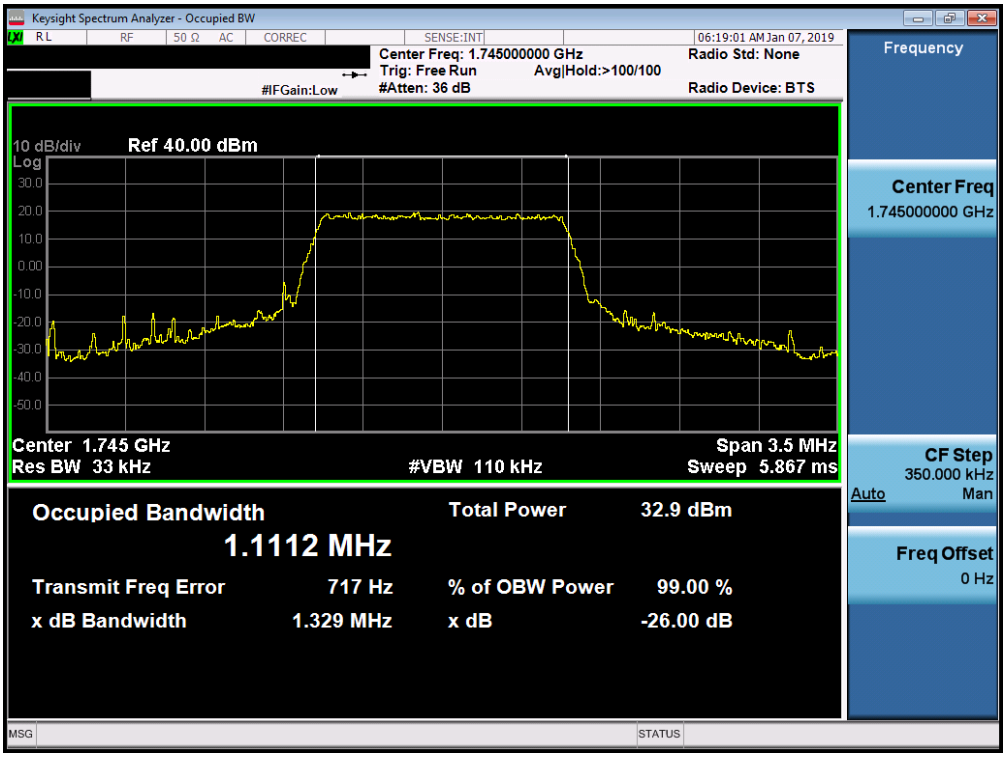
Band 66/4



Plot 7-43. Occupied Bandwidth Plot (Band 66/4 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-44. Occupied Bandwidth Plot (Band 66/4 - 1.4MHz 16-QAM - Full RB Configuration)

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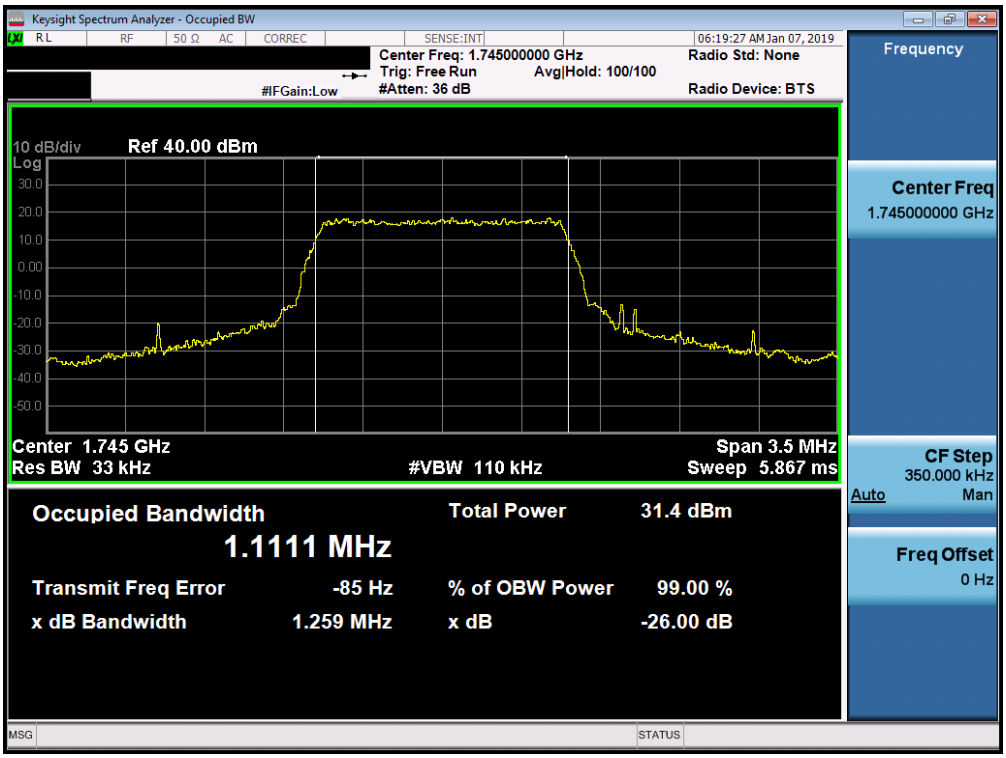
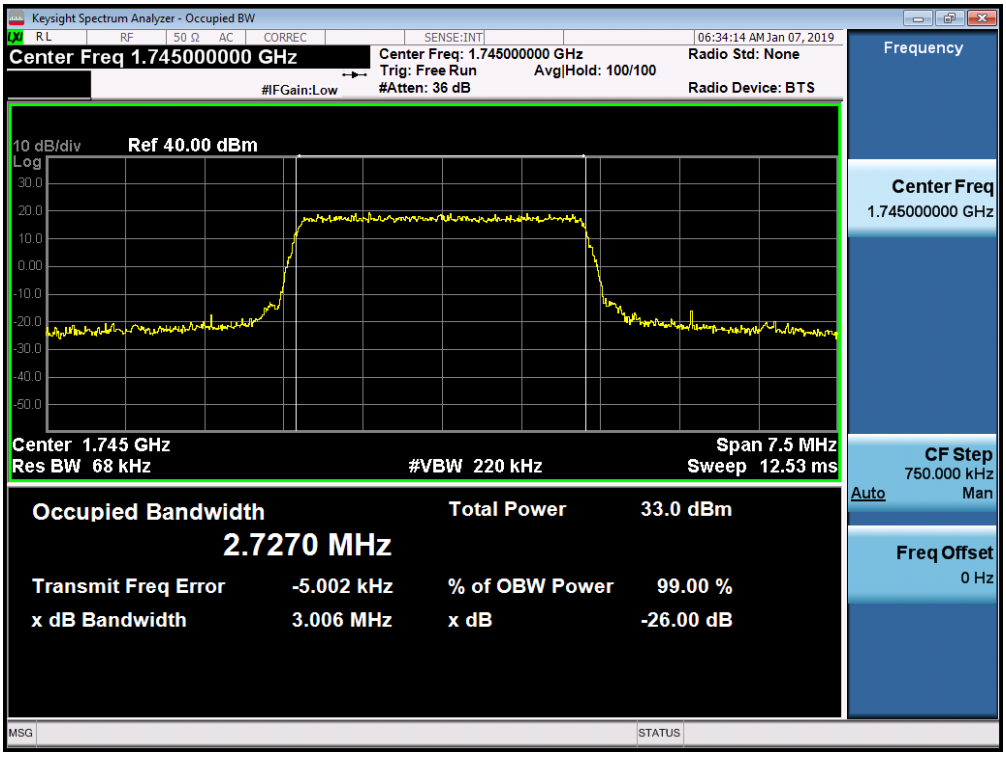


Plot 7-45. Occupied Bandwidth Plot (Band 66/4 - 1.4MHz 64-QAM - Full RB Configuration)



Plot 7-46. Occupied Bandwidth Plot (Band 66/4 - 3.0MHz QPSK - Full RB Configuration)

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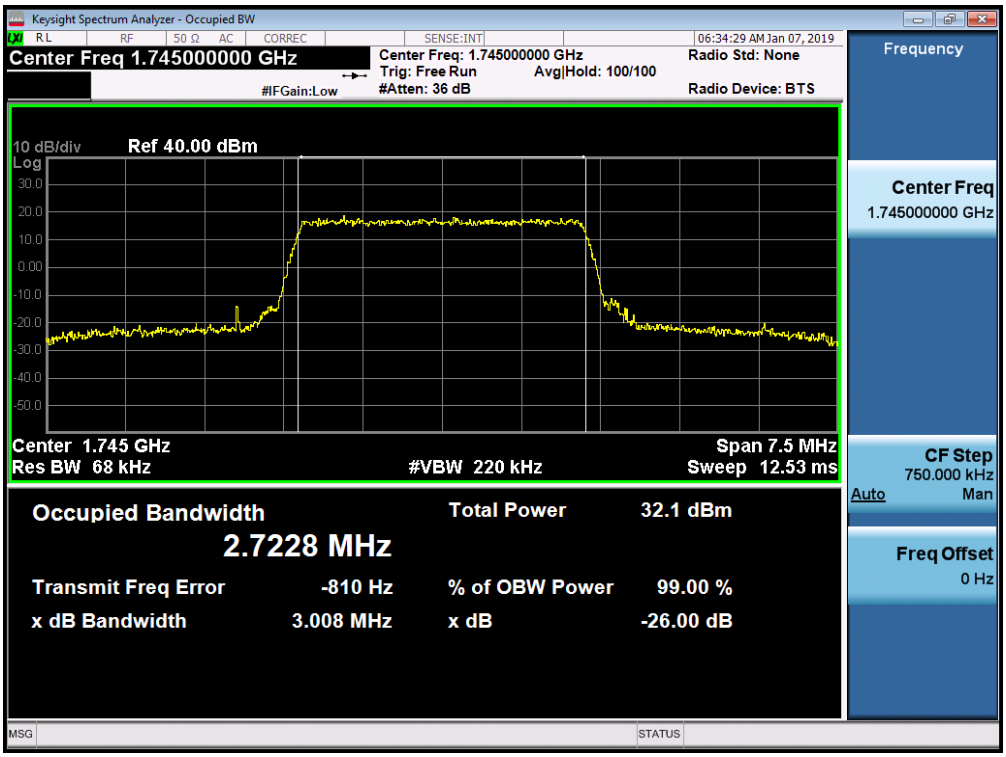
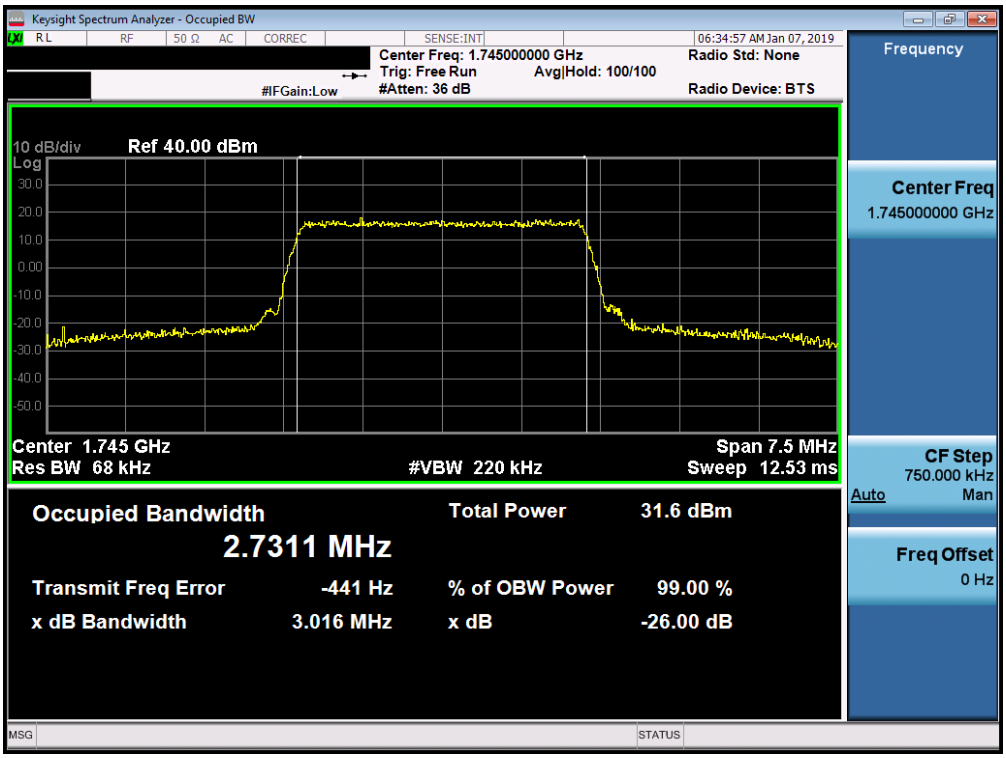


Plot 7-47. Occupied Bandwidth Plot (Band 66/4 - 3.0MHz 16-QAM - Full RB Configuration)



Plot 7-48. Occupied Bandwidth Plot (Band 66/4 - 3.0MHz 64-QAM - Full RB Configuration)

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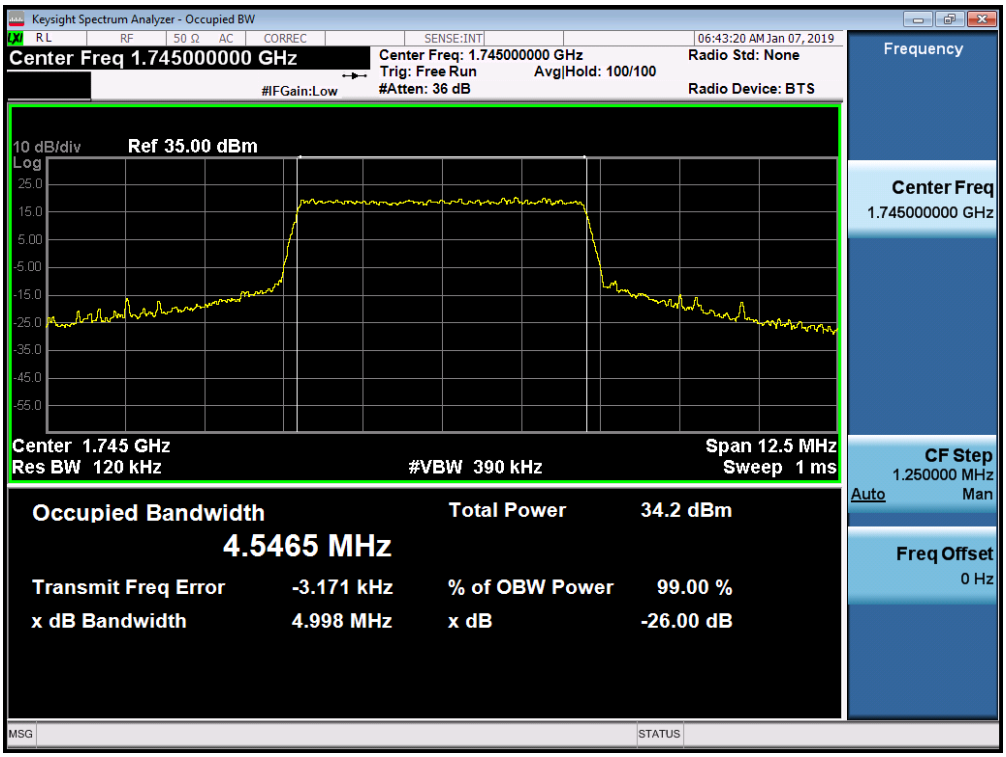
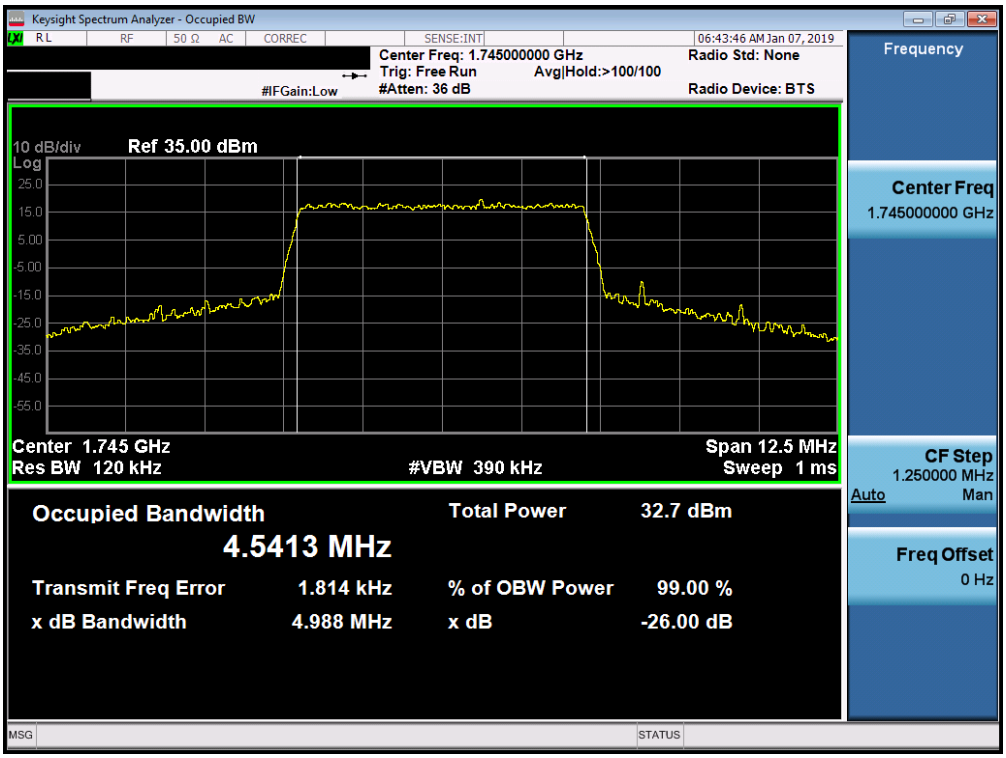


Plot 7-49. Occupied Bandwidth Plot (Band 66/4 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-50. Occupied Bandwidth Plot (Band 66/4 - 5.0MHz 16-QAM - Full RB Configuration)

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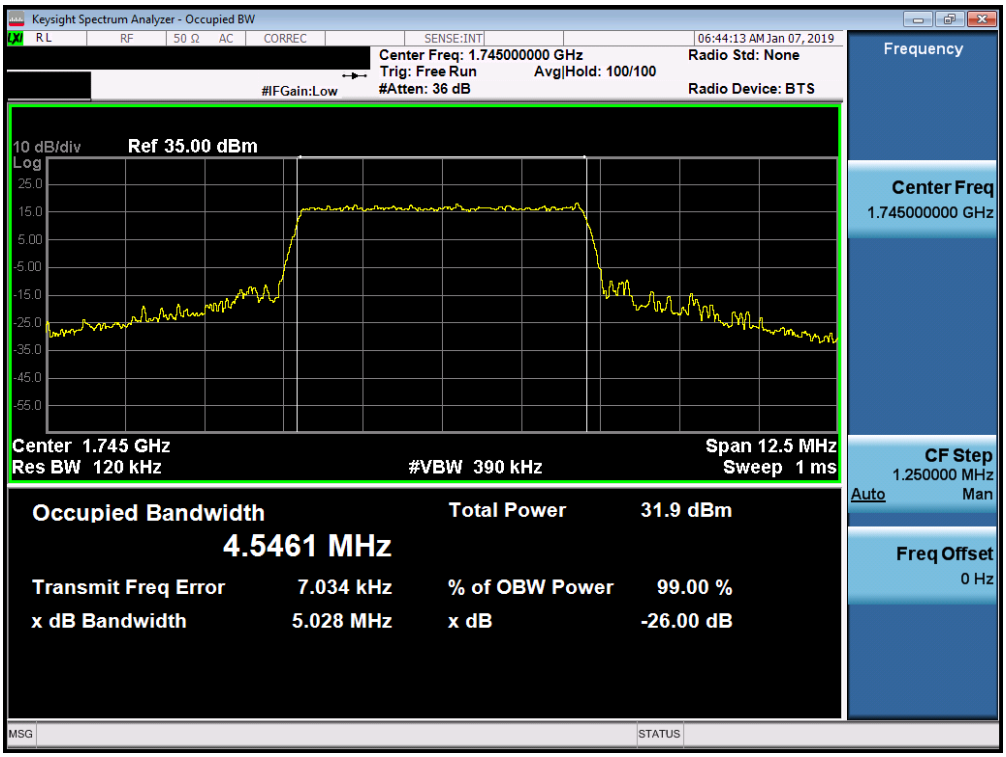
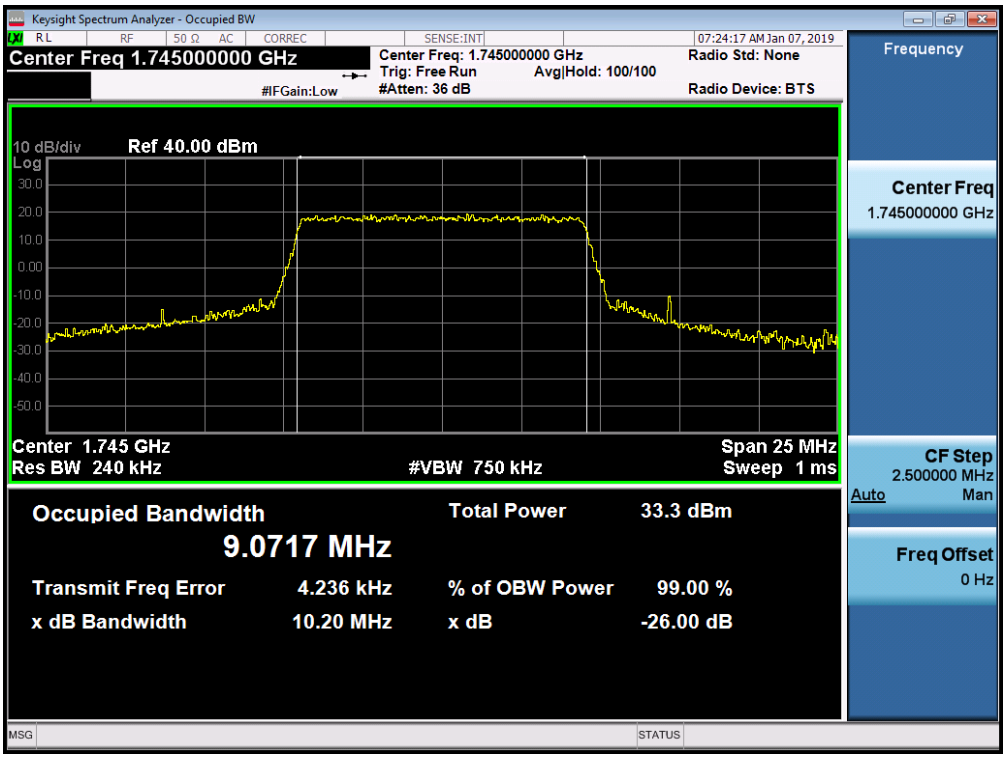


Plot 7-51. Occupied Bandwidth Plot (Band 66/4 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-52. Occupied Bandwidth Plot (Band 66/4 - 10.0MHz QPSK - Full RB Configuration)

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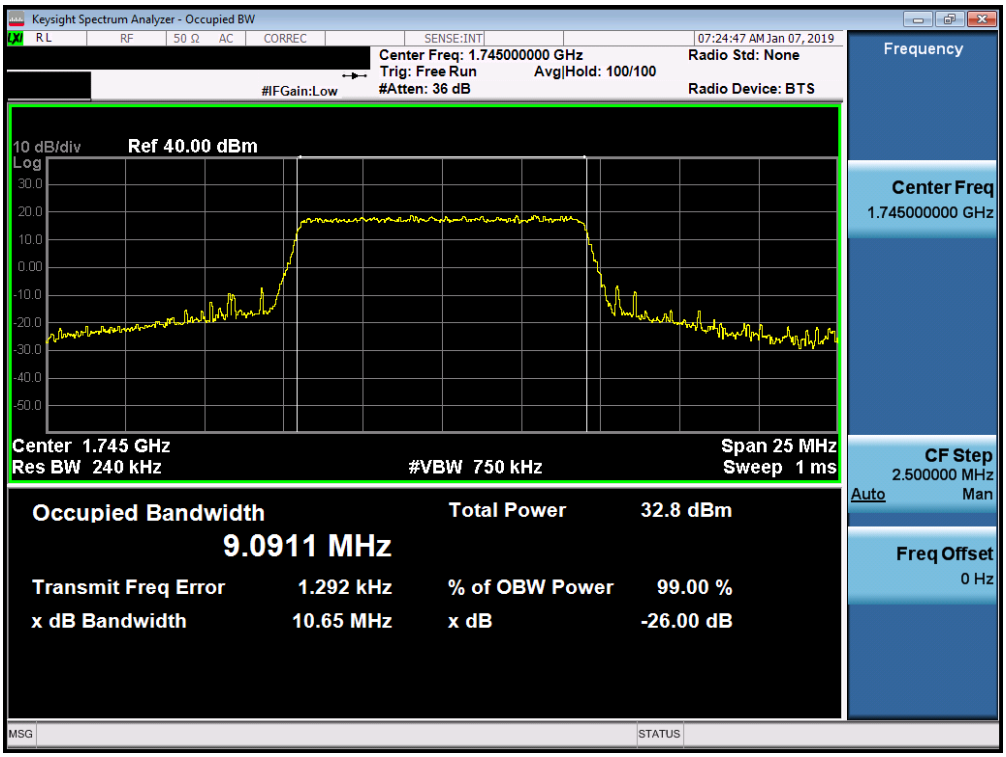

Plot 7-53. Occupied Bandwidth Plot (Band 66/4 - 10.0MHz 16-QAM - Full RB Configuration)

Plot 7-54. Occupied Bandwidth Plot (Band 66/4 - 10.0MHz 64-QAM - Full RB Configuration)

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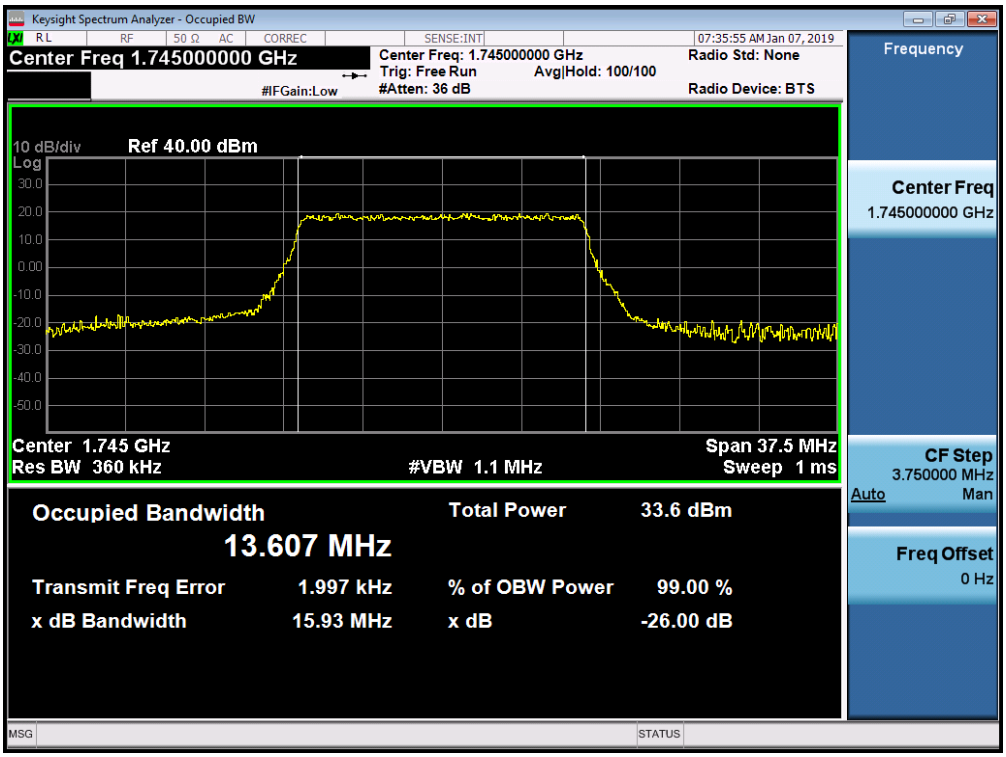
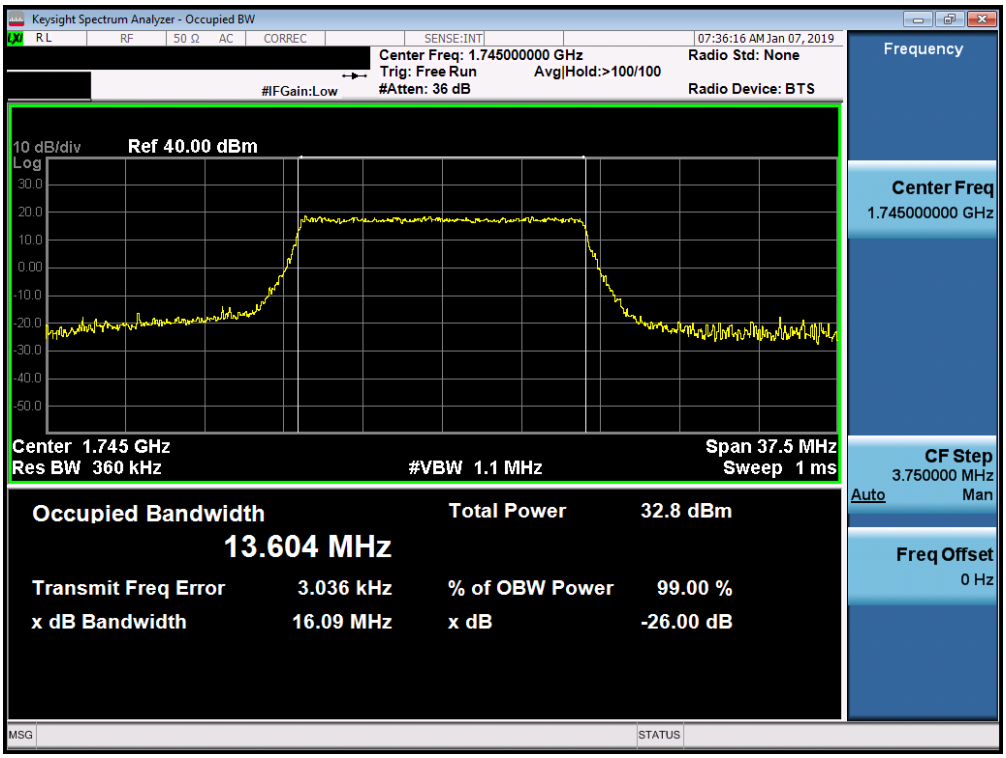


Plot 7-55. Occupied Bandwidth Plot (Band 66/4 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-56. Occupied Bandwidth Plot (Band 66/4 - 15.0MHz 16-QAM - Full RB Configuration)

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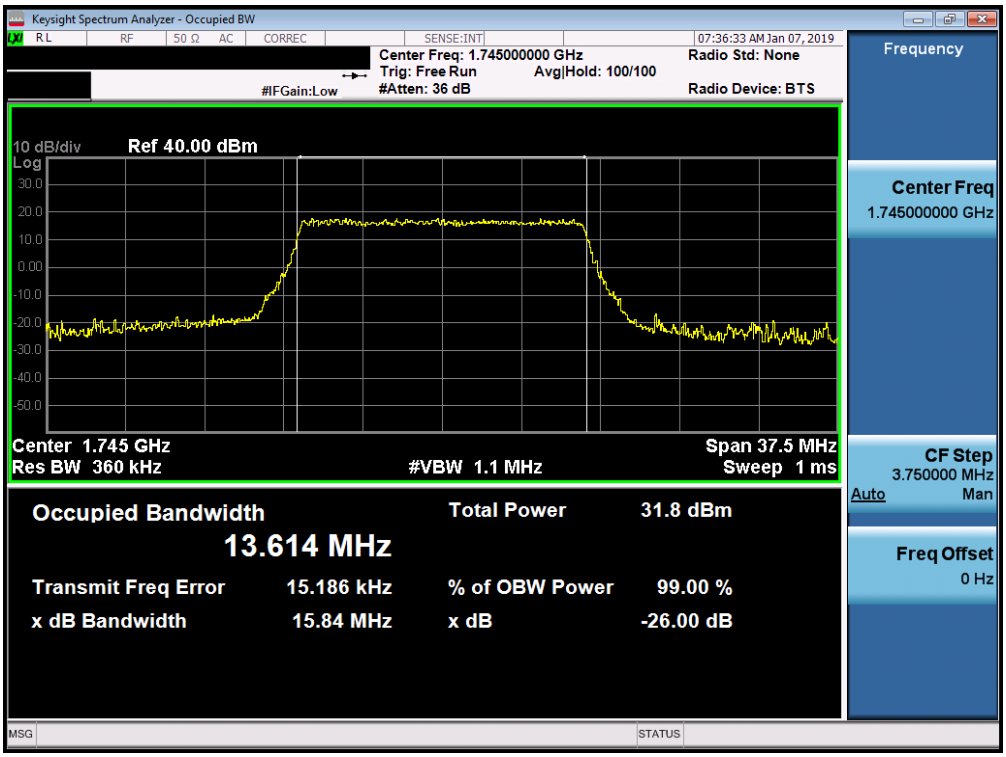
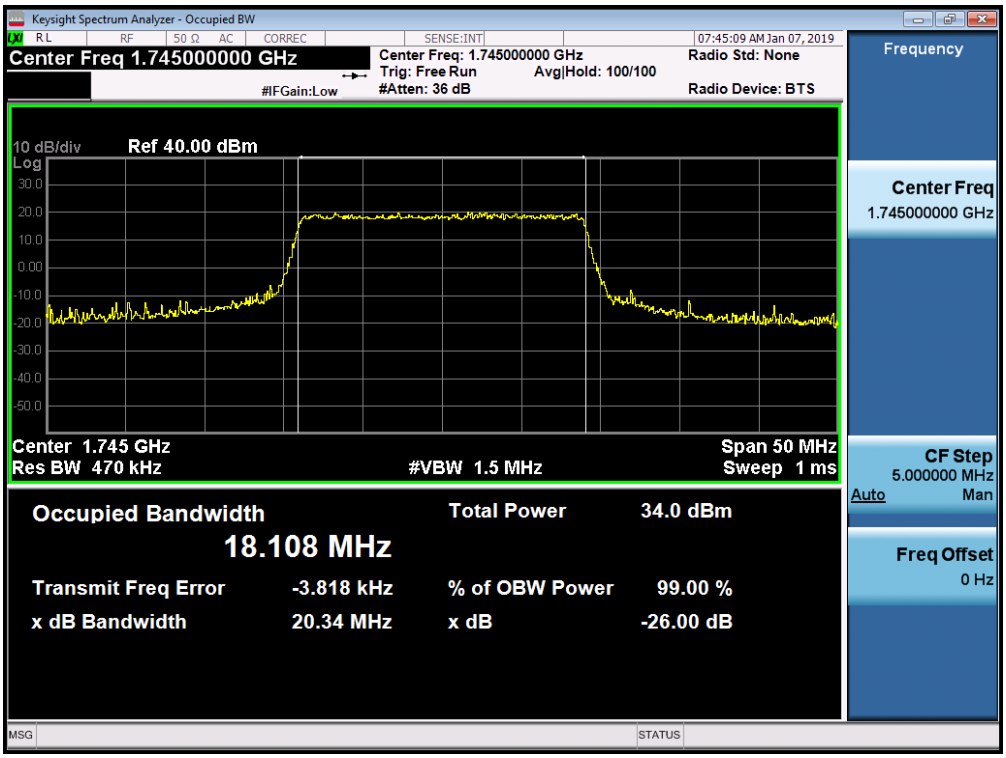


Plot 7-57. Occupied Bandwidth Plot (Band 66/4 - 15.0MHz 64-QAM - Full RB Configuration)



Plot 7-58. Occupied Bandwidth Plot (Band 66/4 - 20.0MHz QPSK - Full RB Configuration)

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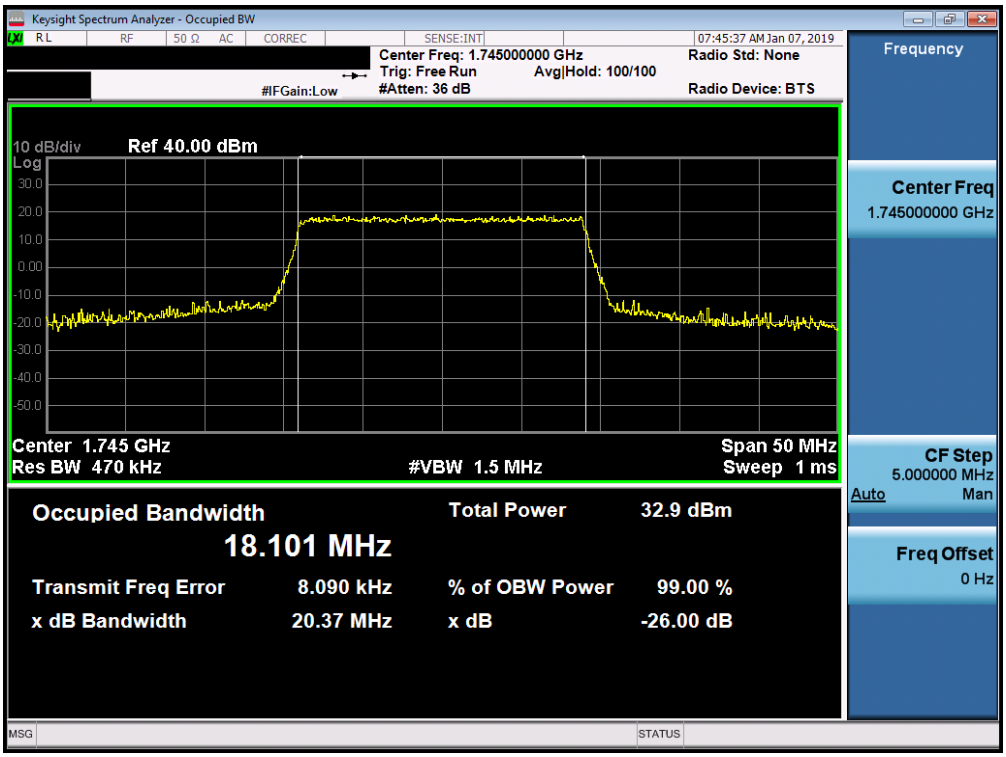
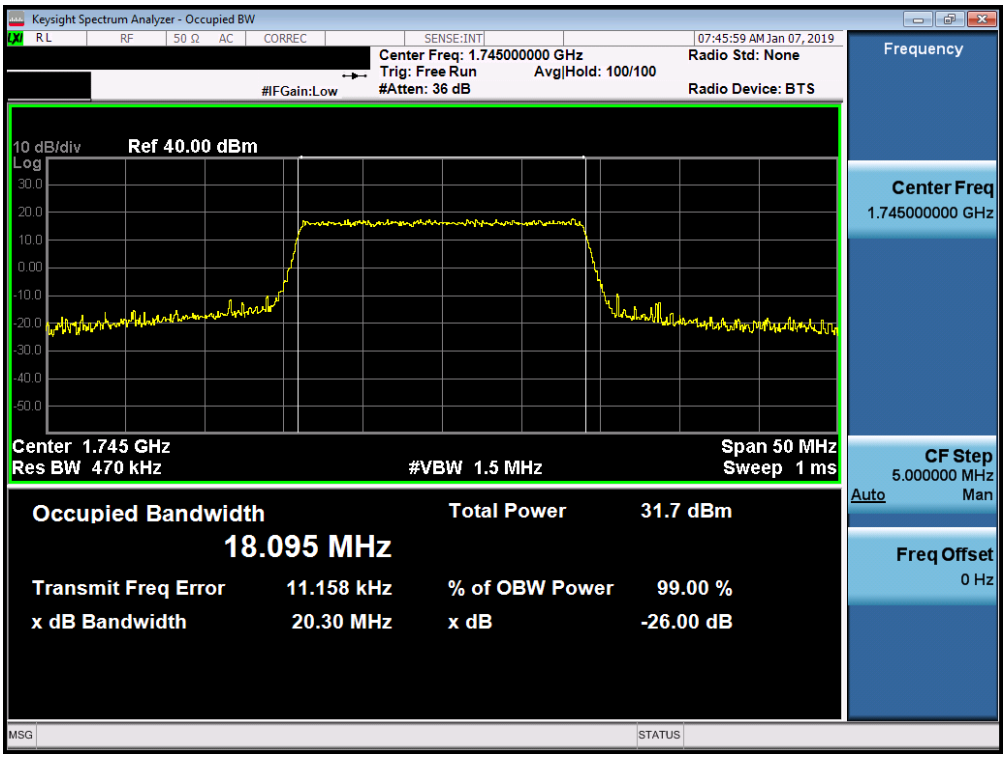


Plot 7-59. Occupied Bandwidth Plot (Band 66/4 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-60. Occupied Bandwidth Plot (Band 66/4 - 20.0MHz 64-QAM - Full RB Configuration)

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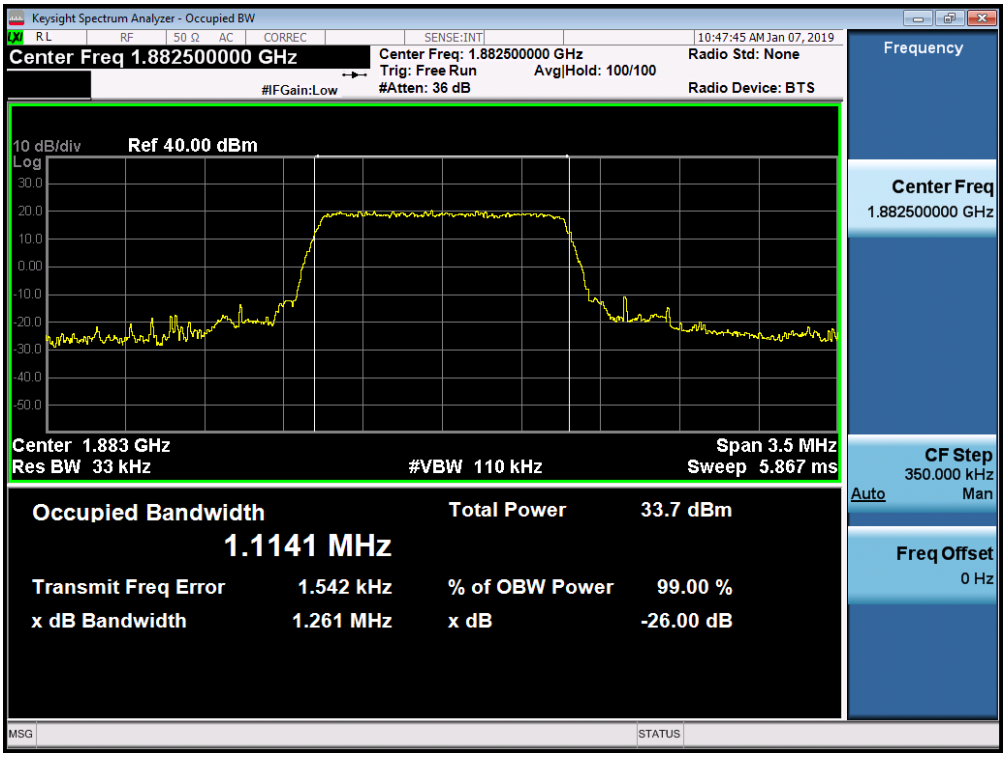
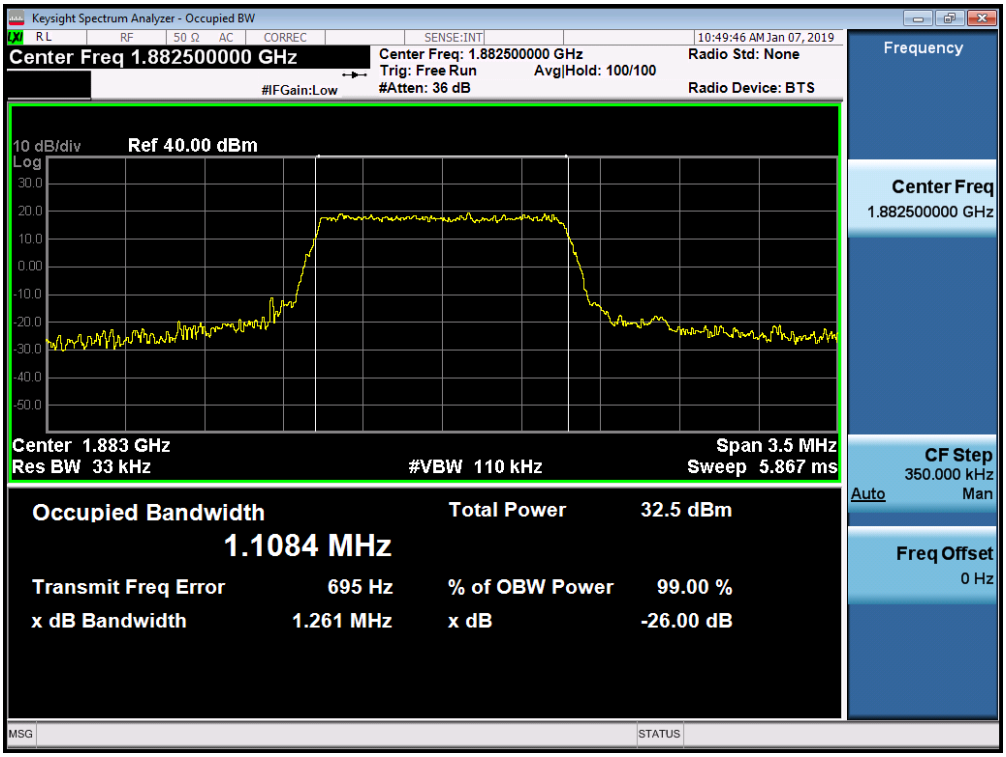
Band 25/2



Plot 7-61. Occupied Bandwidth Plot (Band 25/2 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-62. Occupied Bandwidth Plot (Band 25/2 - 1.4MHz 16-QAM - Full RB Configuration)

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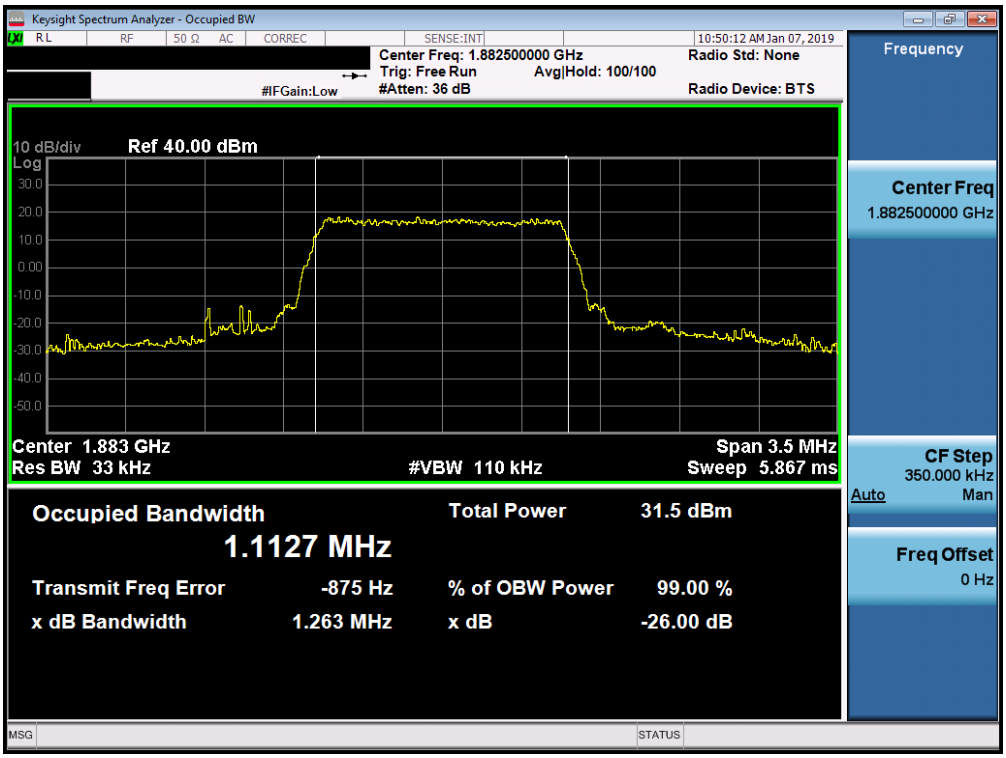

Plot 7-63. Occupied Bandwidth Plot (Band 25/2 - 1.4MHz 64-QAM - Full RB Configuration)

Plot 7-64. Occupied Bandwidth Plot (Band 25/2 - 3.0MHz QPSK - Full RB Configuration)

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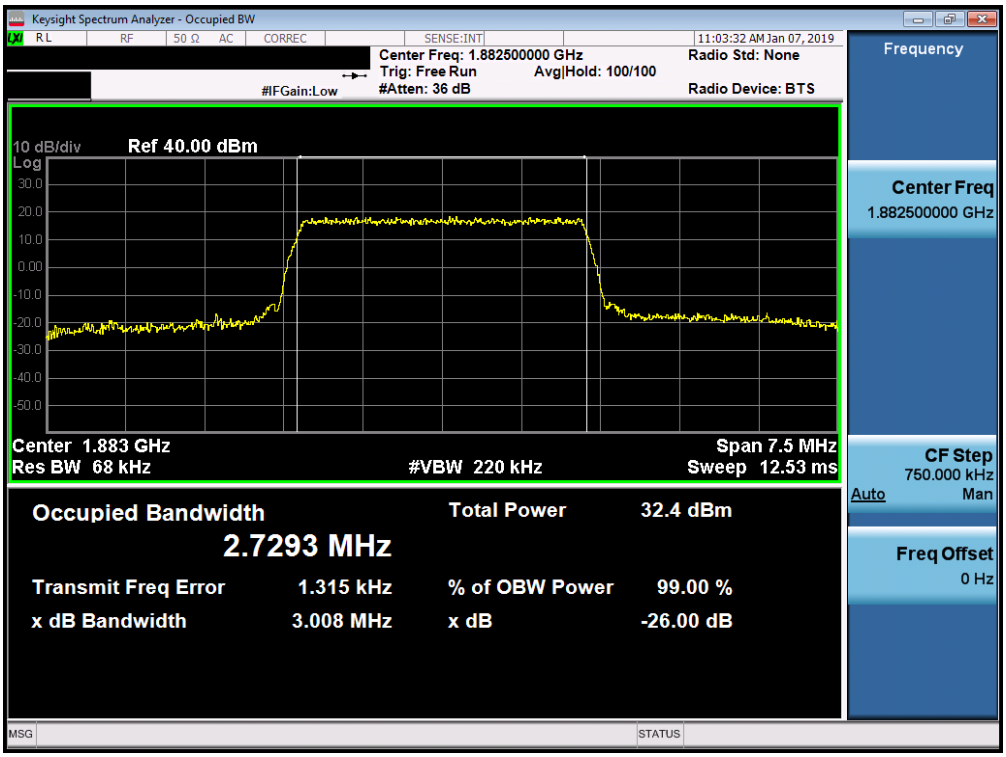

Plot 7-65. Occupied Bandwidth Plot (Band 25/2 - 3.0MHz 16-QAM - Full RB Configuration)

Plot 7-66. Occupied Bandwidth Plot (Band 25/2 - 3.0MHz 64-QAM - Full RB Configuration)

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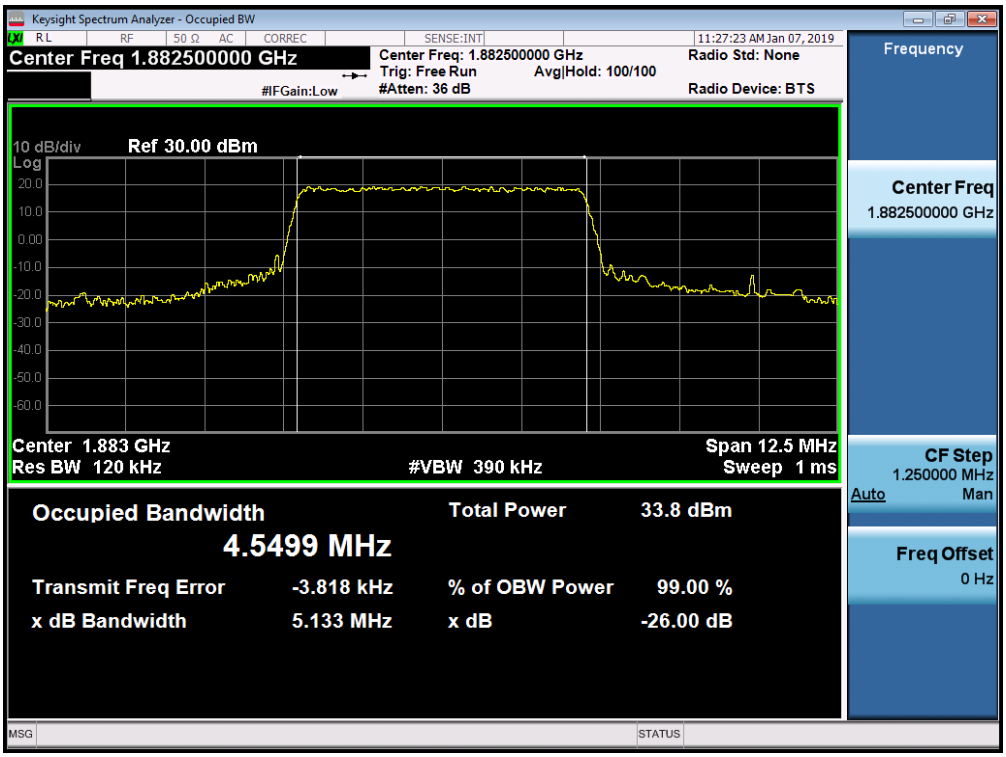
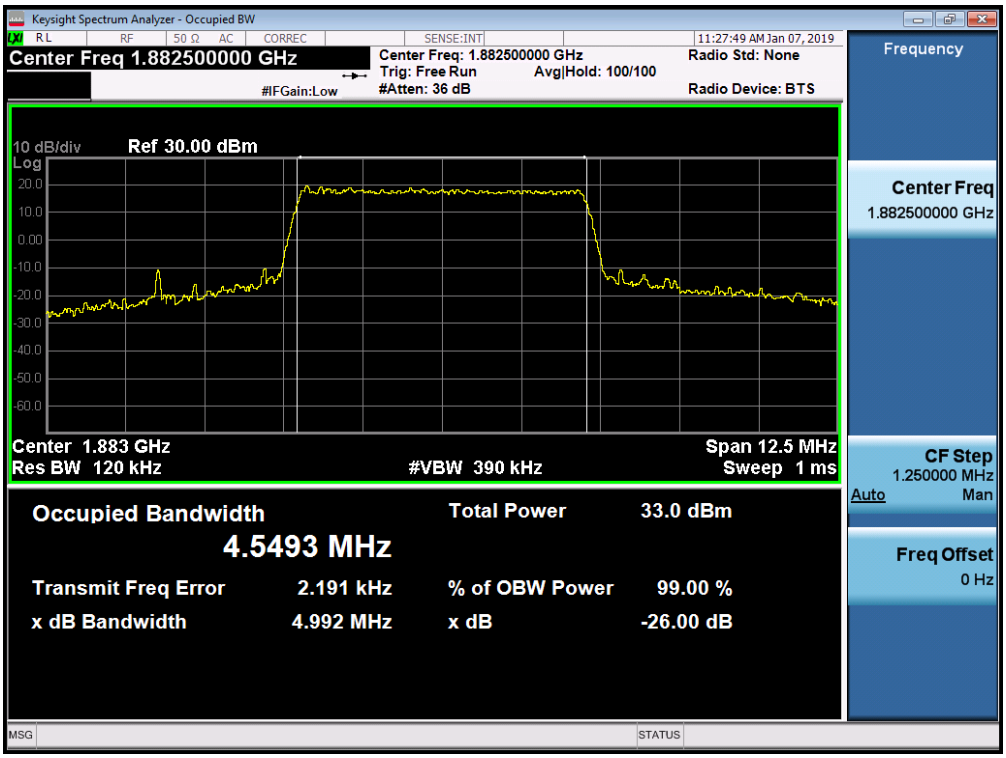


Plot 7-67. Occupied Bandwidth Plot (Band 25/2 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-68. Occupied Bandwidth Plot (Band 25/2 - 5.0MHz 16-QAM - Full RB Configuration)

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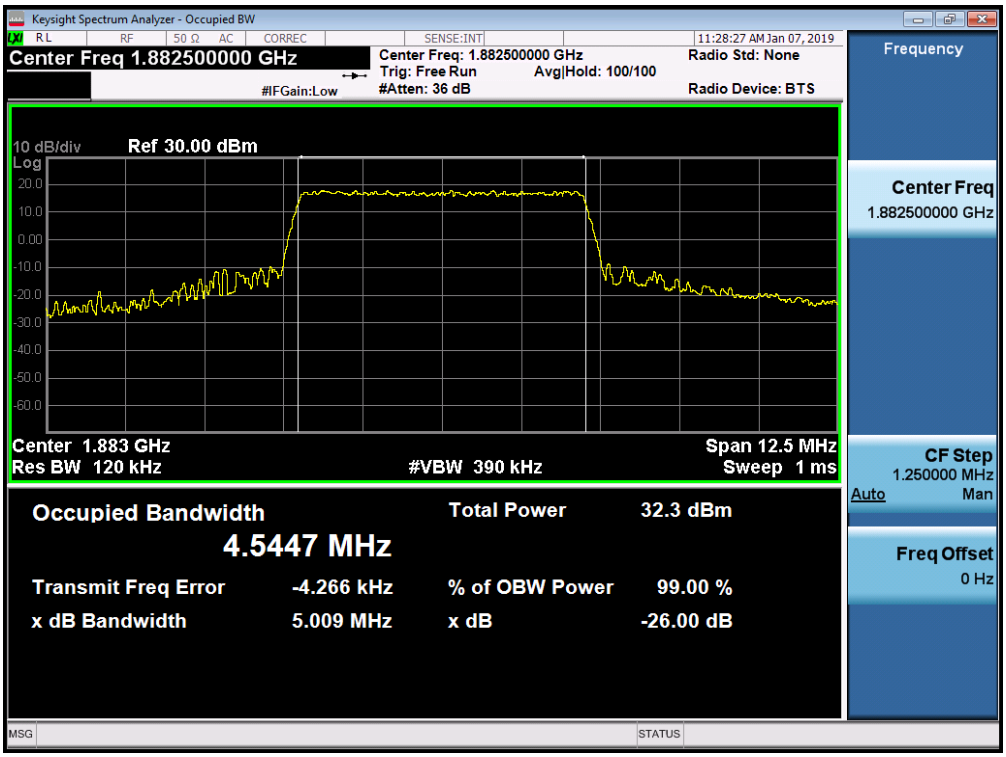
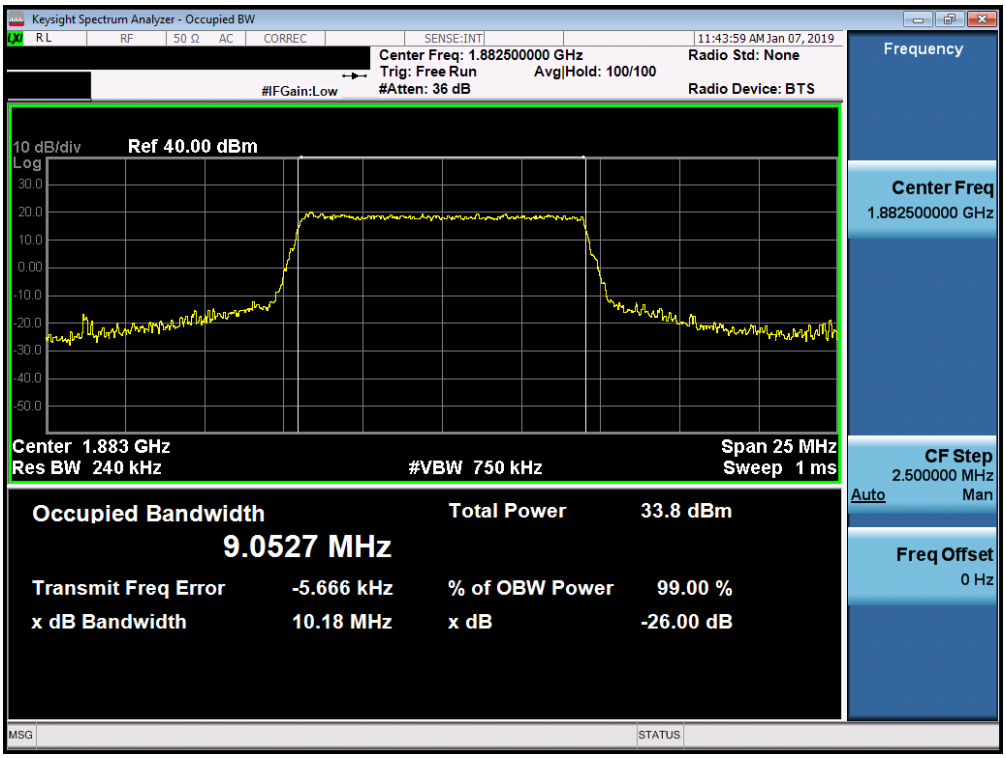


Plot 7-69. Occupied Bandwidth Plot (Band 25/2 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-70. Occupied Bandwidth Plot (Band 25/2 - 10.0MHz QPSK - Full RB Configuration)

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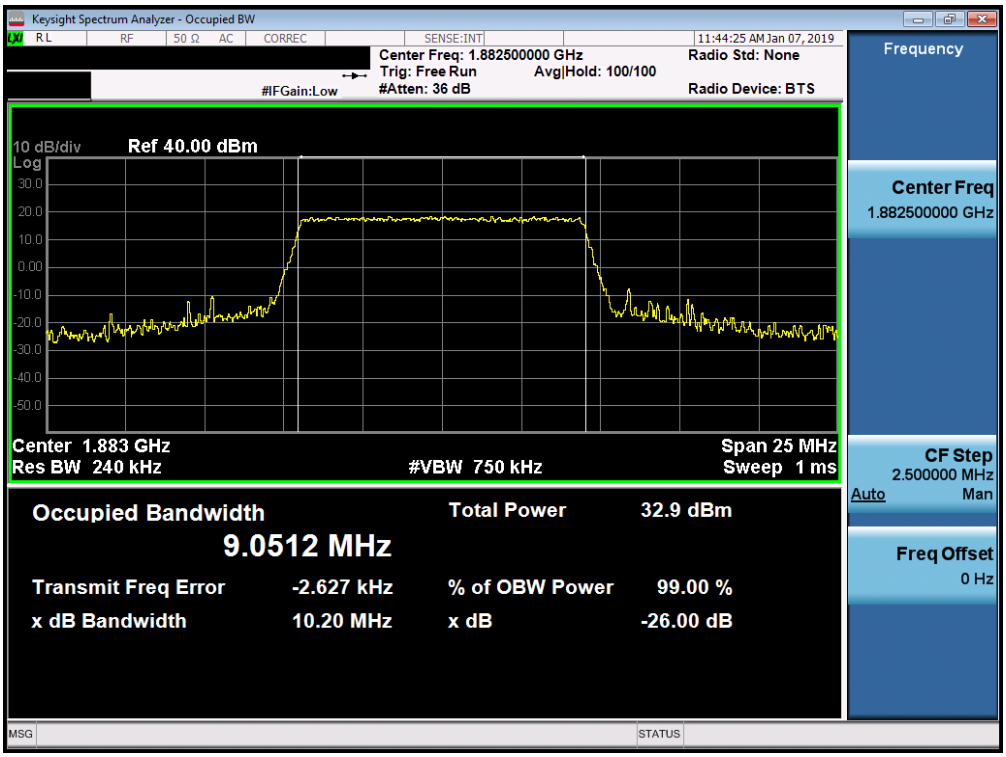

Plot 7-71. Occupied Bandwidth Plot (Band 25/2 - 10.0MHz 16-QAM - Full RB Configuration)

Plot 7-72. Occupied Bandwidth Plot (Band 25/2 - 10.0MHz 64-QAM - Full RB Configuration)

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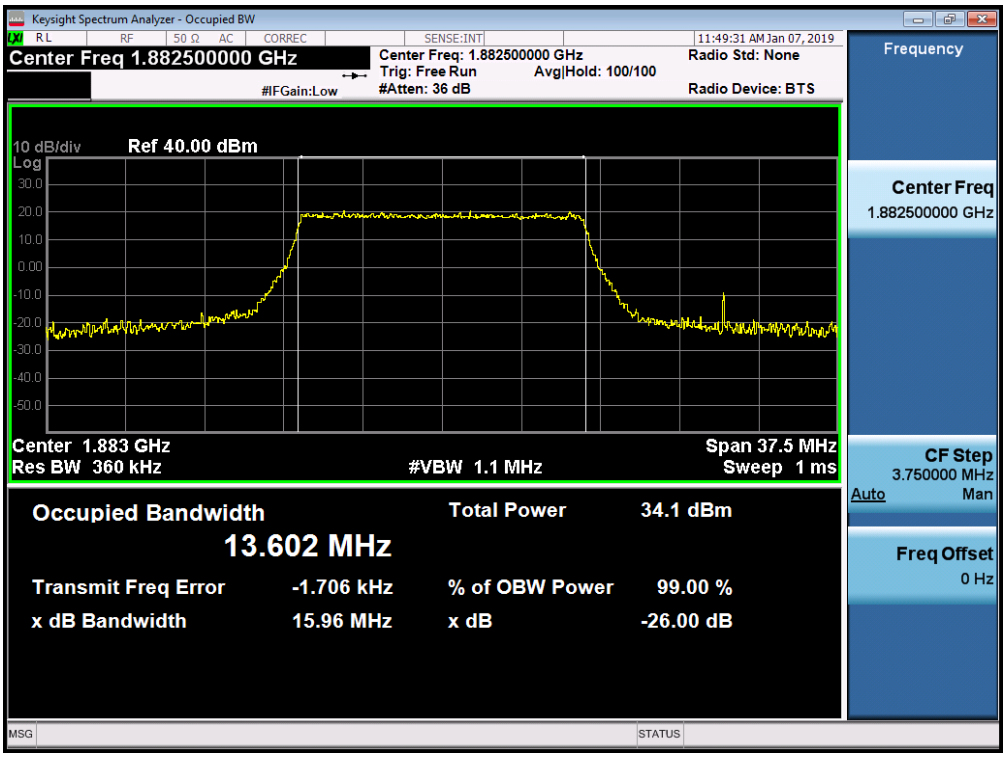
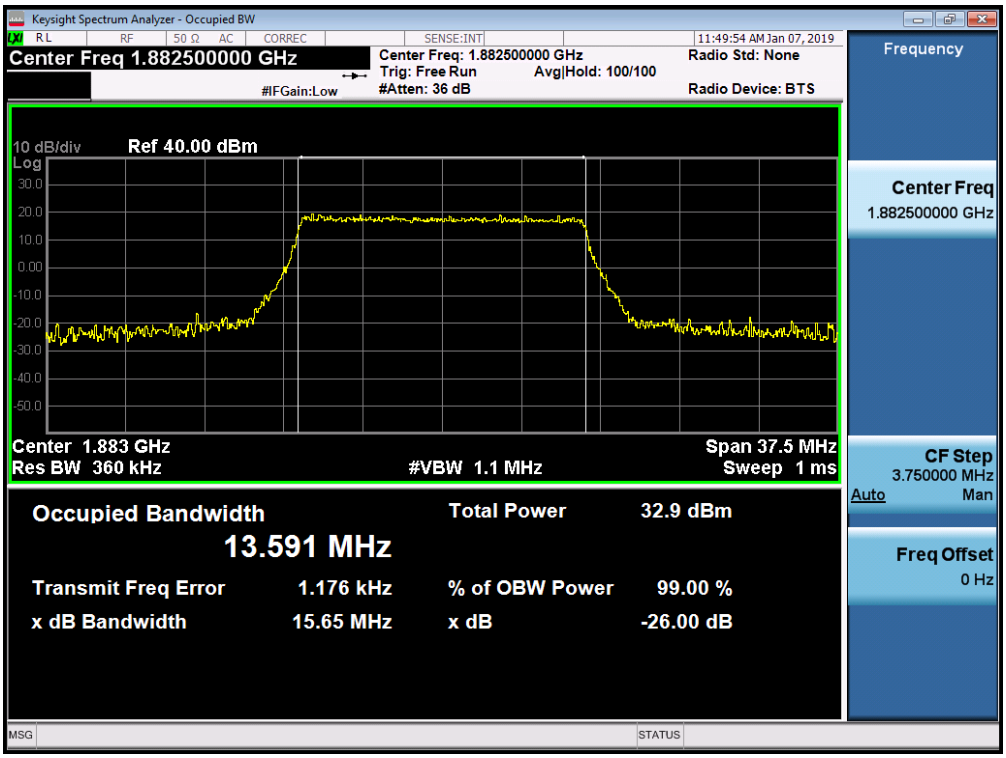


Plot 7-73. Occupied Bandwidth Plot (Band 25/2 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-74. Occupied Bandwidth Plot (Band 25/2 - 15.0MHz 16-QAM - Full RB Configuration)

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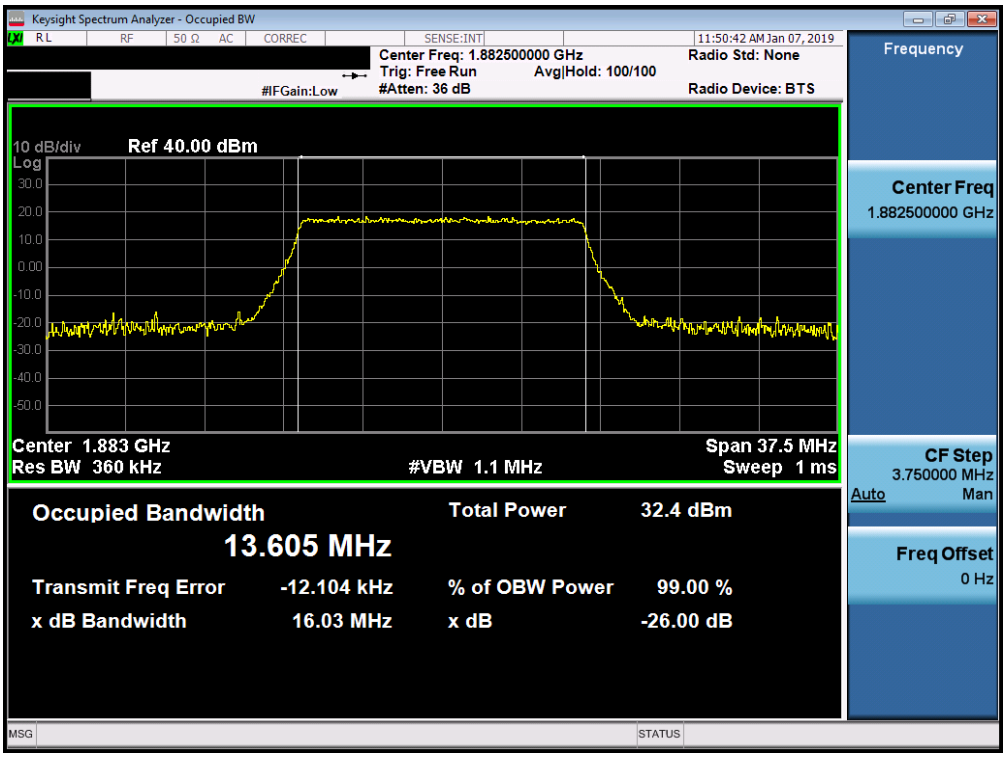
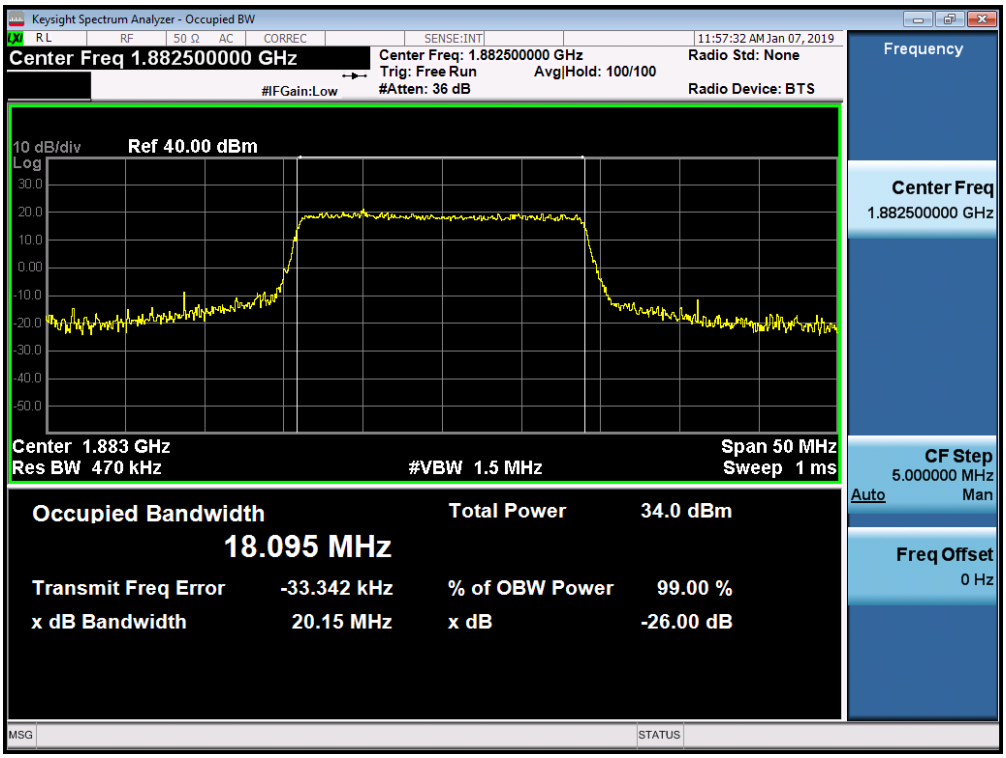


Plot 7-75. Occupied Bandwidth Plot (Band 25/2 - 15.0MHz 64-QAM - Full RB Configuration)



Plot 7-76. Occupied Bandwidth Plot (Band 25/2 - 20.0MHz QPSK - Full RB Configuration)

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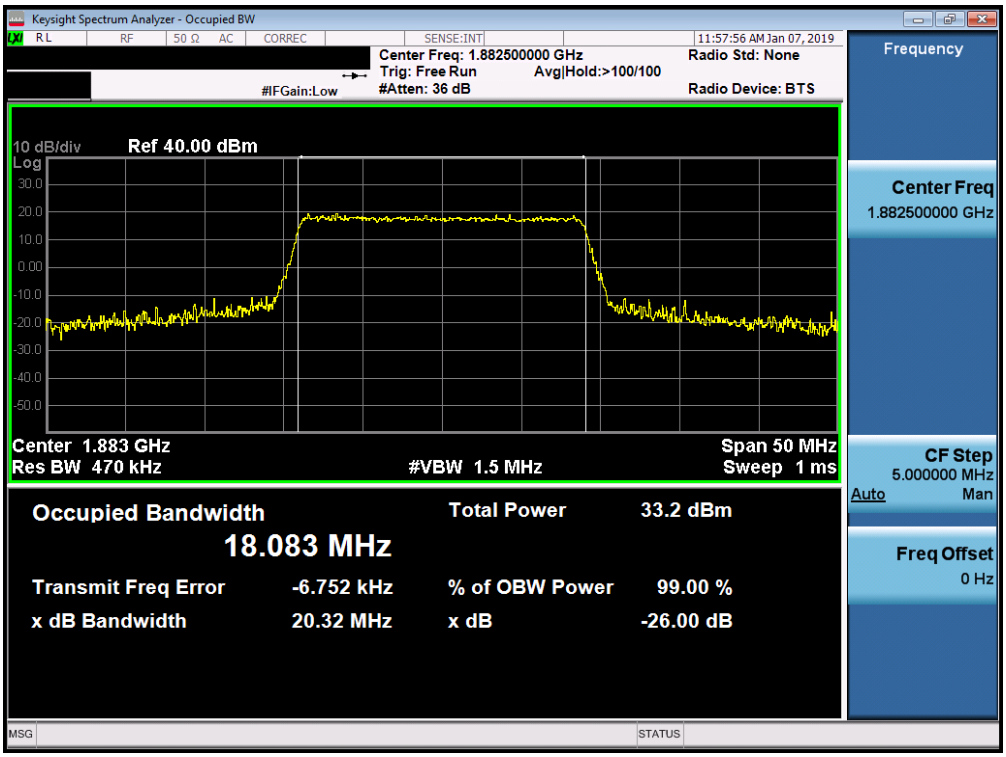
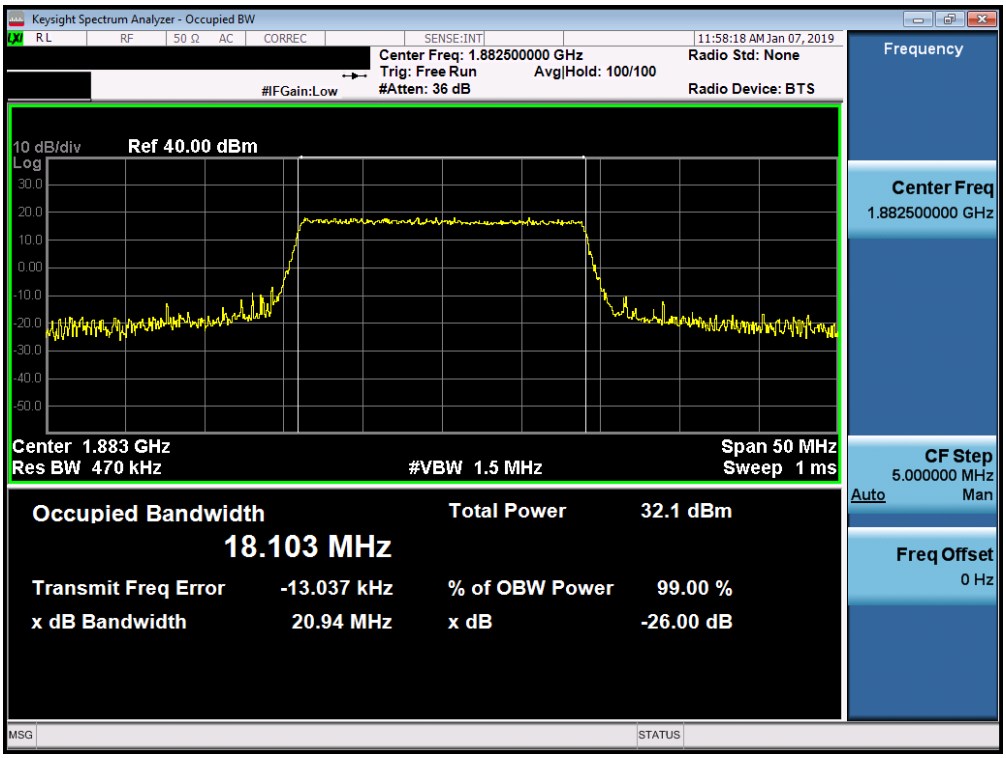


Plot 7-77. Occupied Bandwidth Plot (Band 25/2 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-78. Occupied Bandwidth Plot (Band 25/2 - 20.0MHz 64-QAM - Full RB Configuration)

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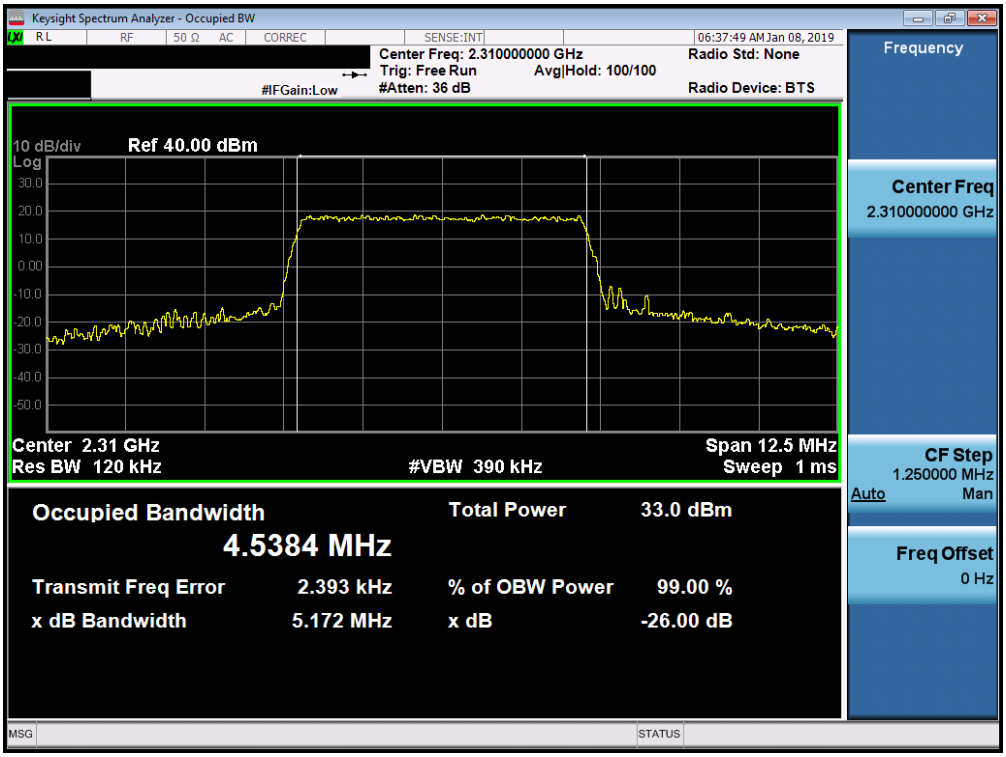
Band 30

Plot 7-79. Occupied Bandwidth Plot (Band 30 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-80. Occupied Bandwidth Plot (Band 30 - 5.0MHz 16-QAM - Full RB Configuration)

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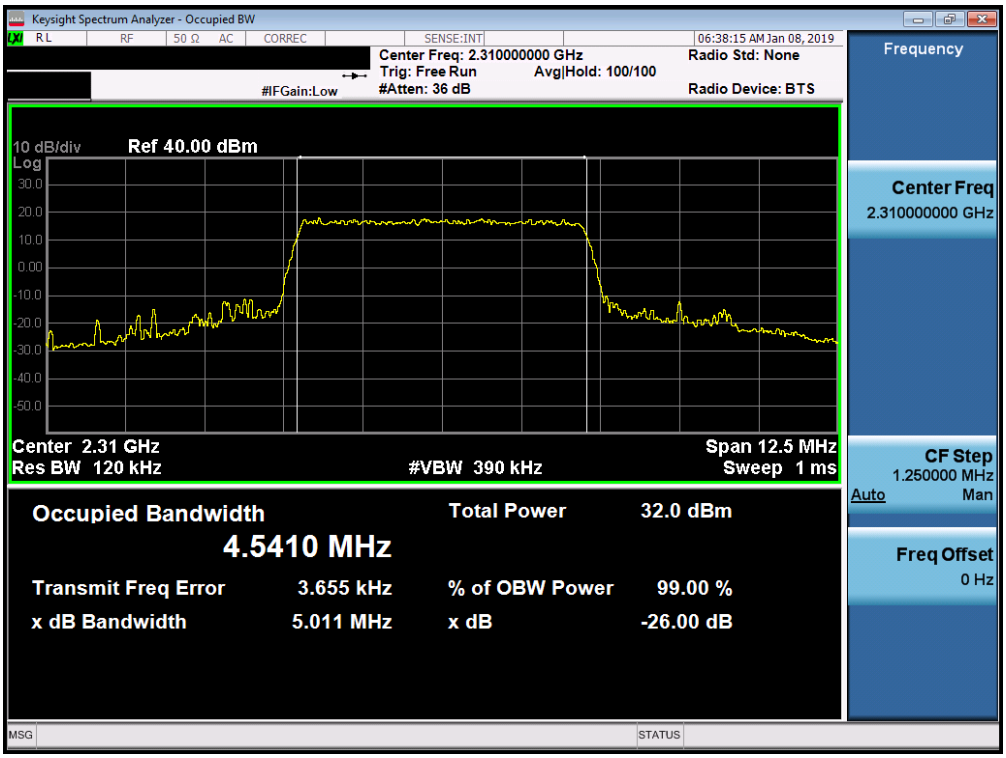
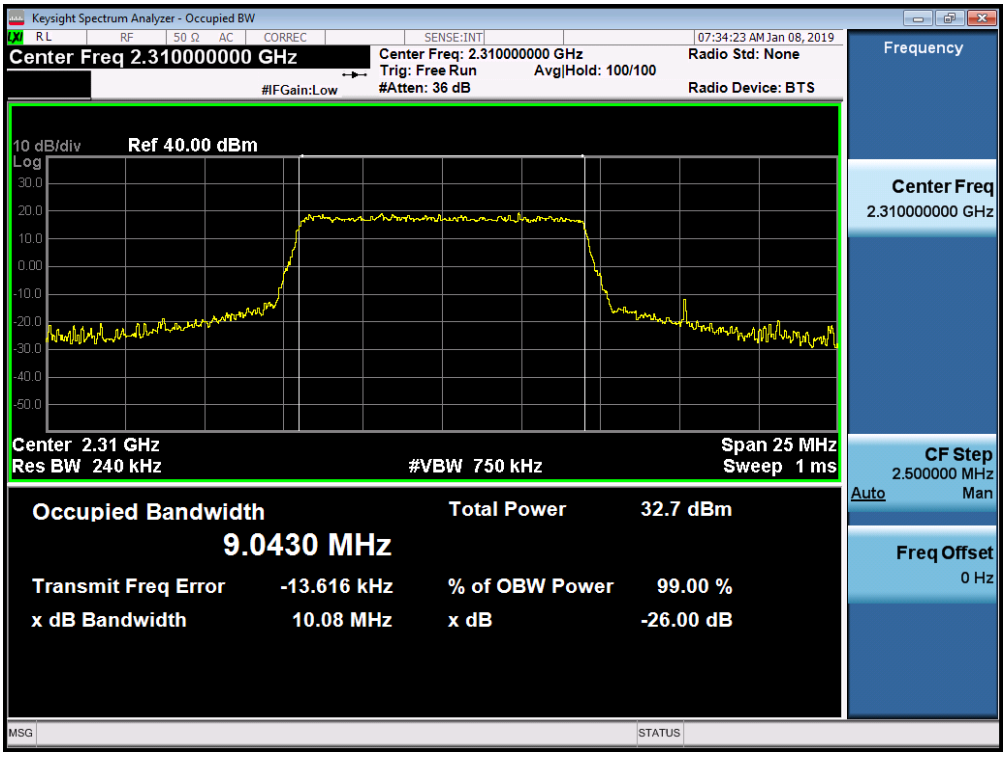


Plot 7-81. Occupied Bandwidth Plot (Band 30 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-82. Occupied Bandwidth Plot (Band 30 - 10.0MHz QPSK - Full RB Configuration)

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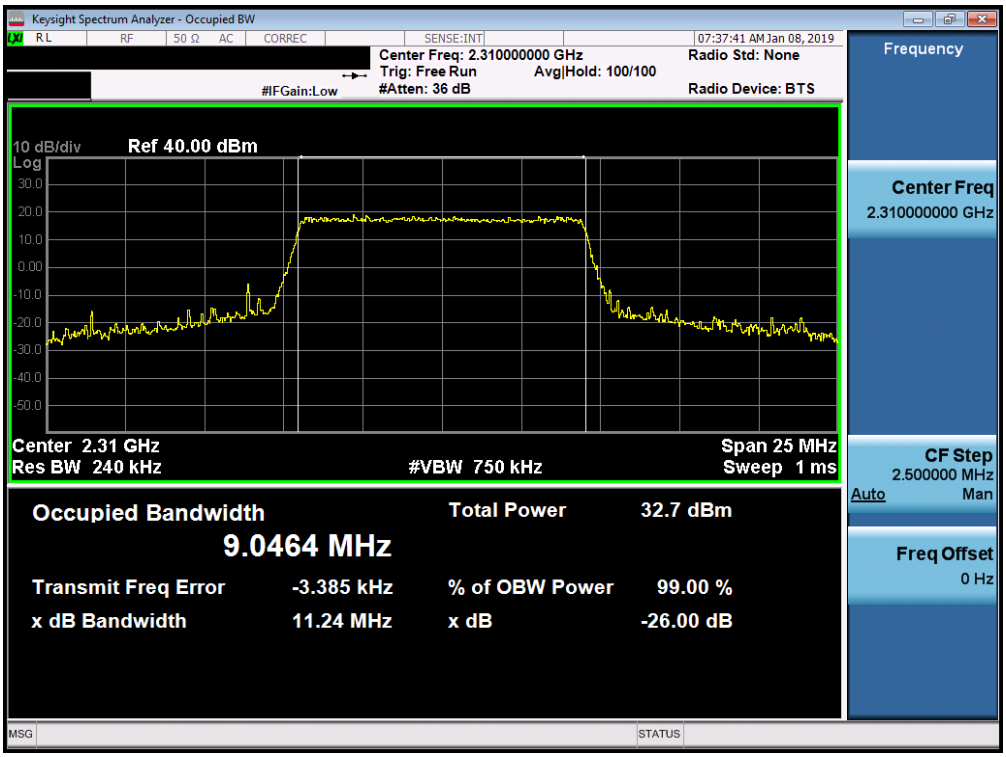

Plot 7-83. Occupied Bandwidth Plot (Band 30 - 10.0MHz 16-QAM - Full RB Configuration)

Plot 7-84. Occupied Bandwidth Plot (Band 30 - 10.0MHz 64-QAM - Full RB Configuration)

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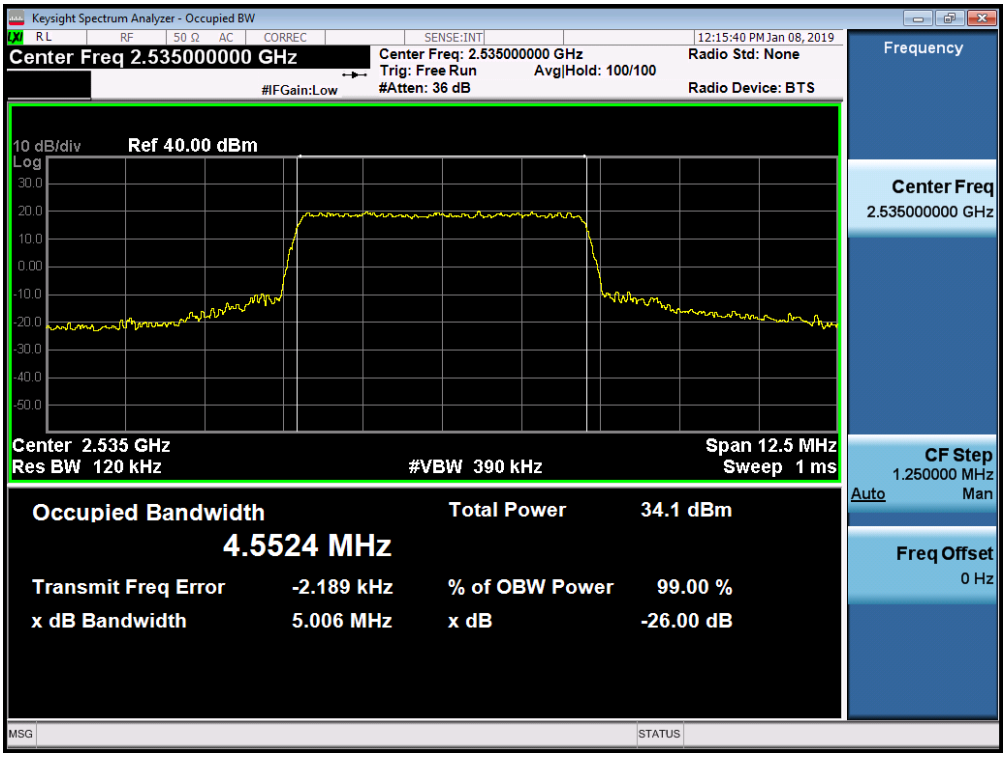
Band 7



Plot 7-85. Occupied Bandwidth Plot (Band 7 - 5.0MHz QPSK - Full RB Configuration)

Plot 7-86. Occupied Bandwidth Plot (Band 7 - 5.0MHz 16-QAM - Full RB Configuration)

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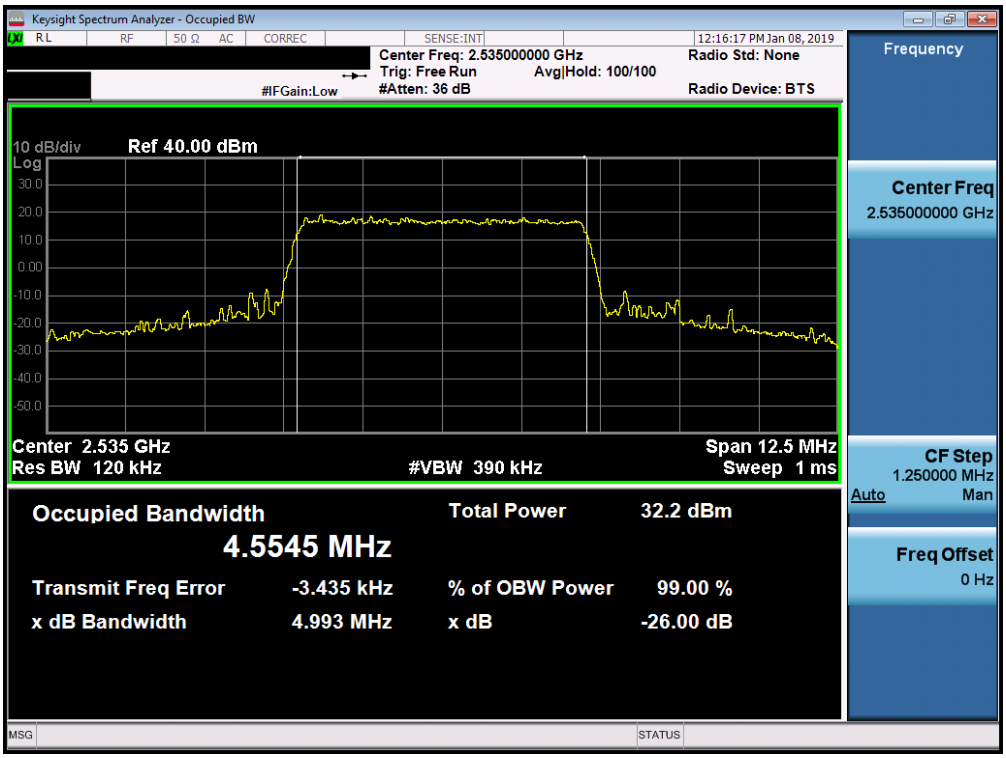
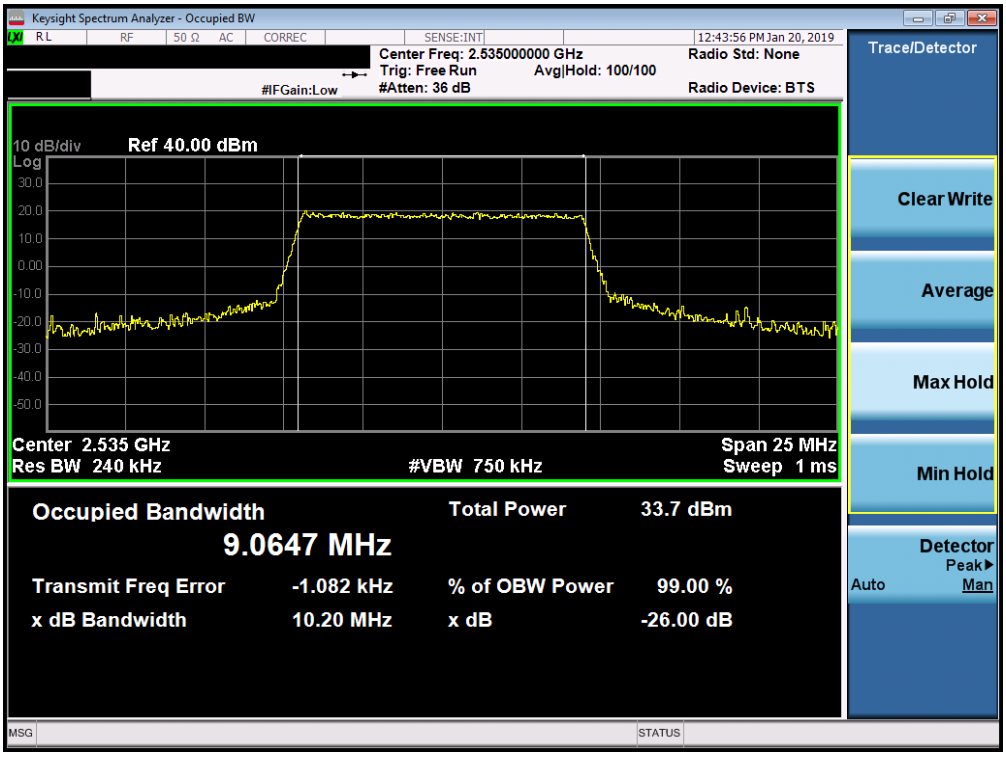


Plot 7-87. Occupied Bandwidth Plot (Band 7 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-88. Occupied Bandwidth Plot (Band 7 - 10.0MHz QPSK - Full RB Configuration)

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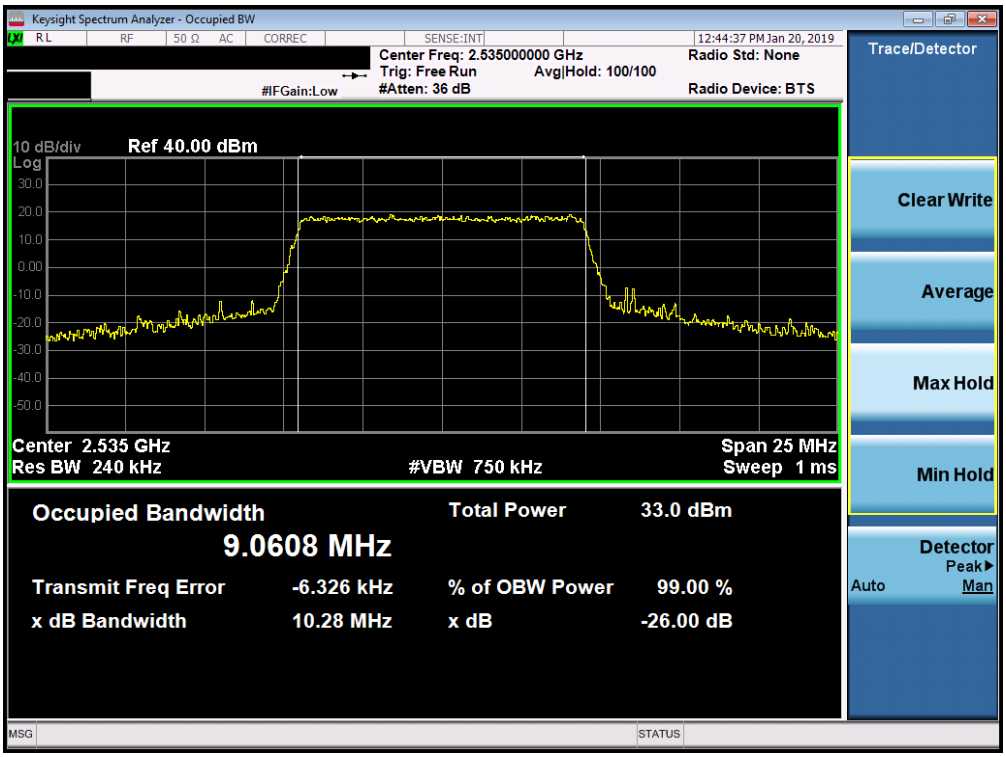
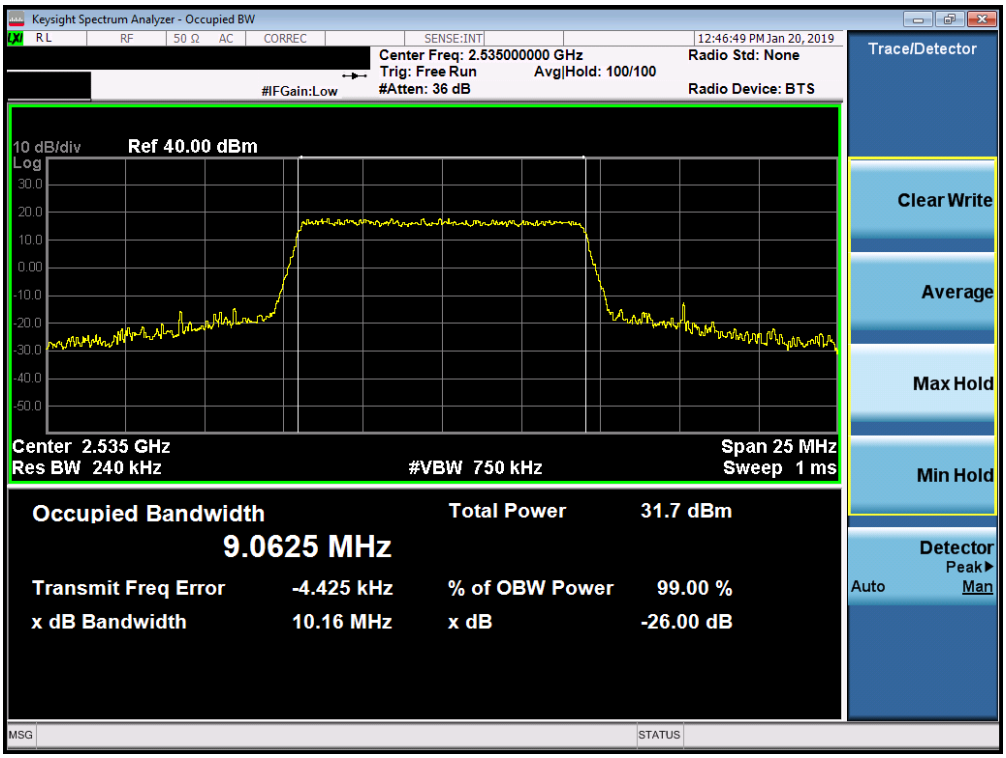


Plot 7-89. Occupied Bandwidth Plot (Band 7 - 10.0MHz 16-QAM - Full RB Configuration)



Plot 7-90. Occupied Bandwidth Plot (Band 7 - 10.0MHz 64-QAM - Full RB Configuration)

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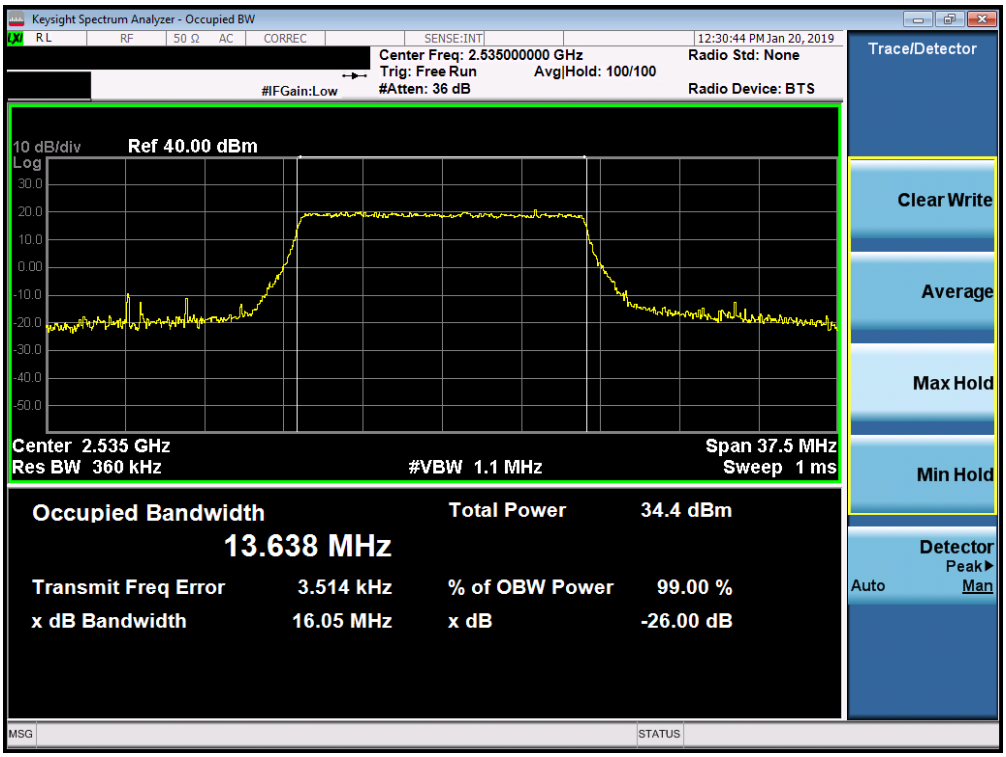
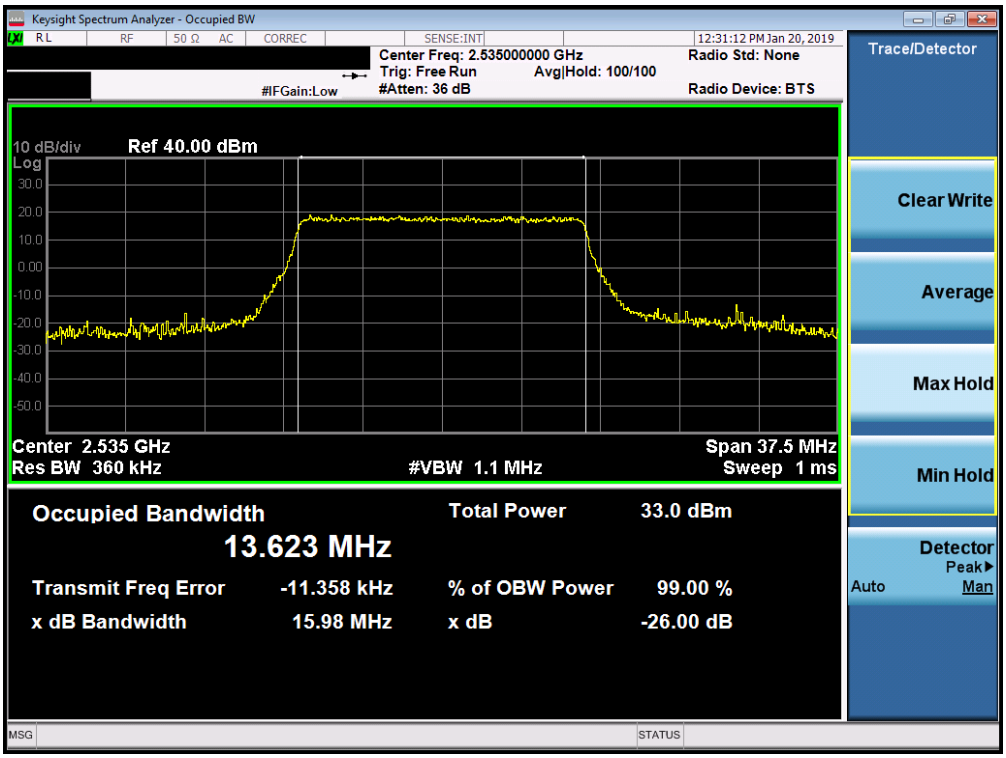


Plot 7-91. Occupied Bandwidth Plot (Band 7 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-92. Occupied Bandwidth Plot (Band 7 - 15.0MHz 16-QAM - Full RB Configuration)

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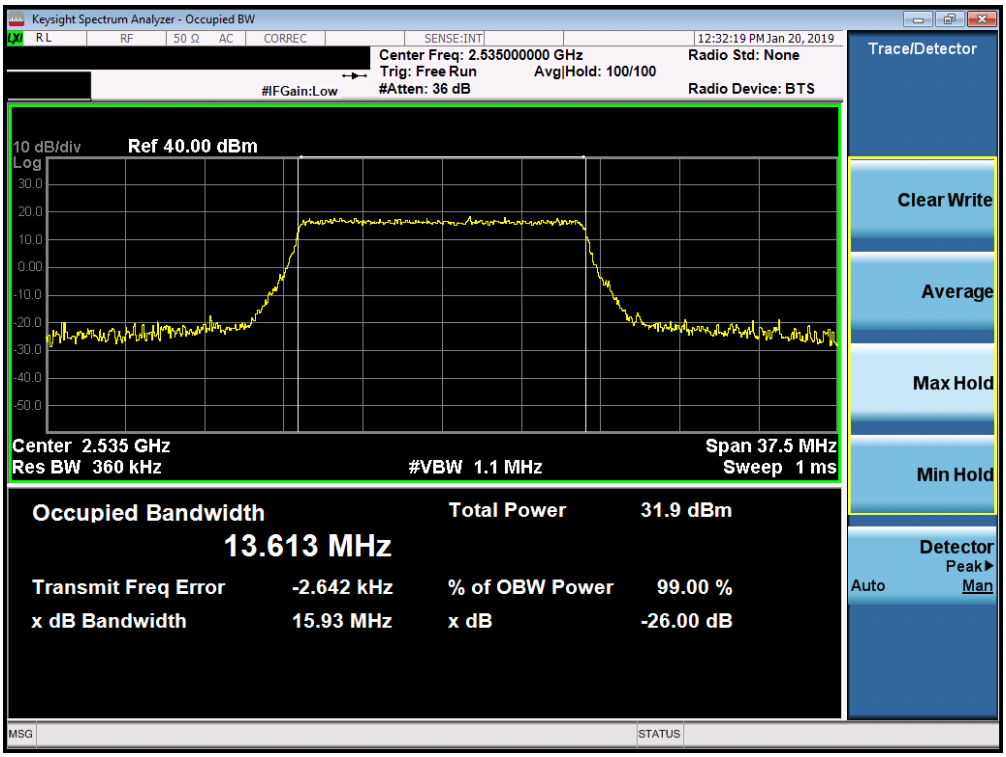
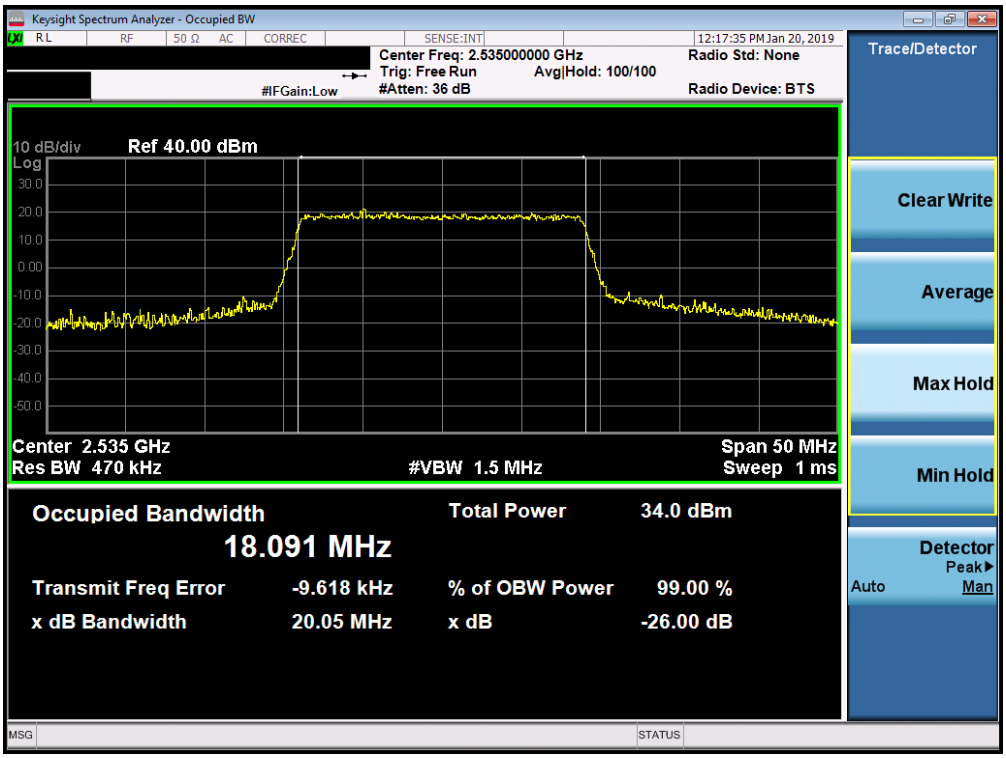


Plot 7-93. Occupied Bandwidth Plot (Band 7 - 15.0MHz 64-QAM - Full RB Configuration)



Plot 7-94. Occupied Bandwidth Plot (Band 7 - 20.0MHz QPSK - Full RB Configuration)

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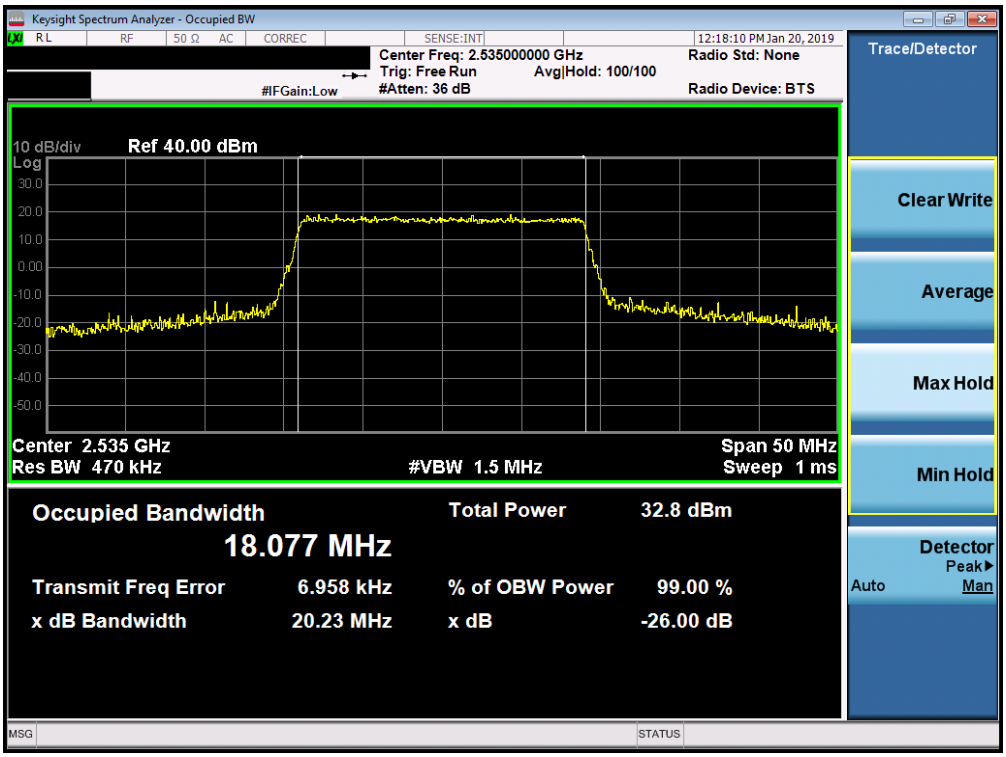
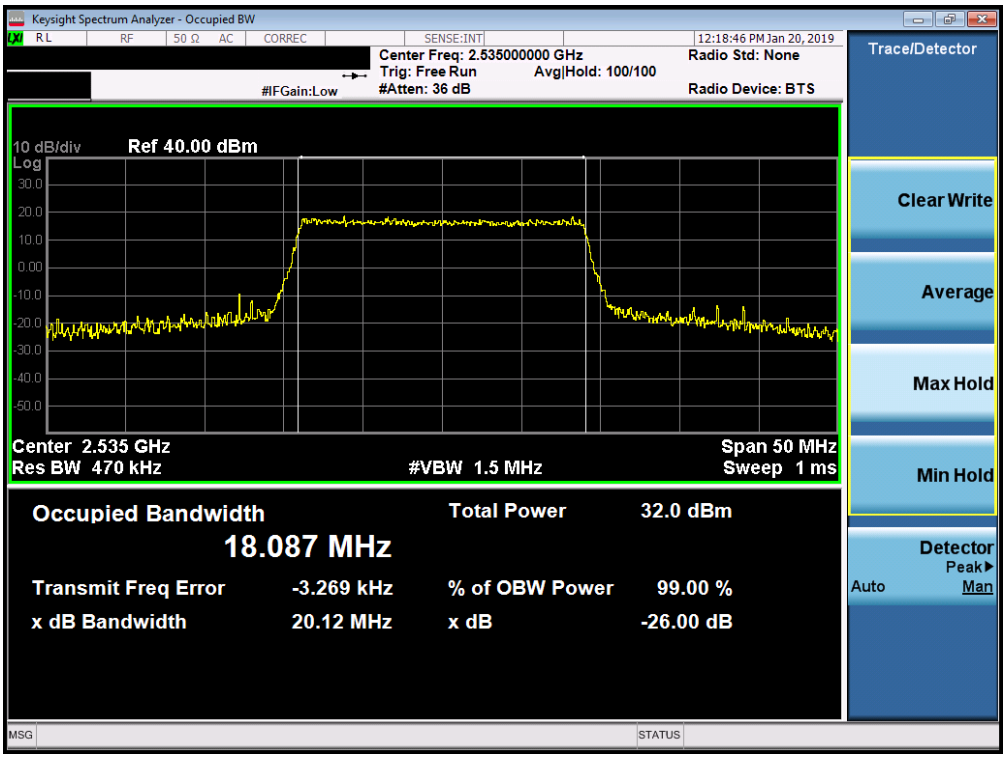


Plot 7-95. Occupied Bandwidth Plot (Band 7 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-96. Occupied Bandwidth Plot (Band 7 - 20.0MHz 64-QAM - Full RB Configuration)

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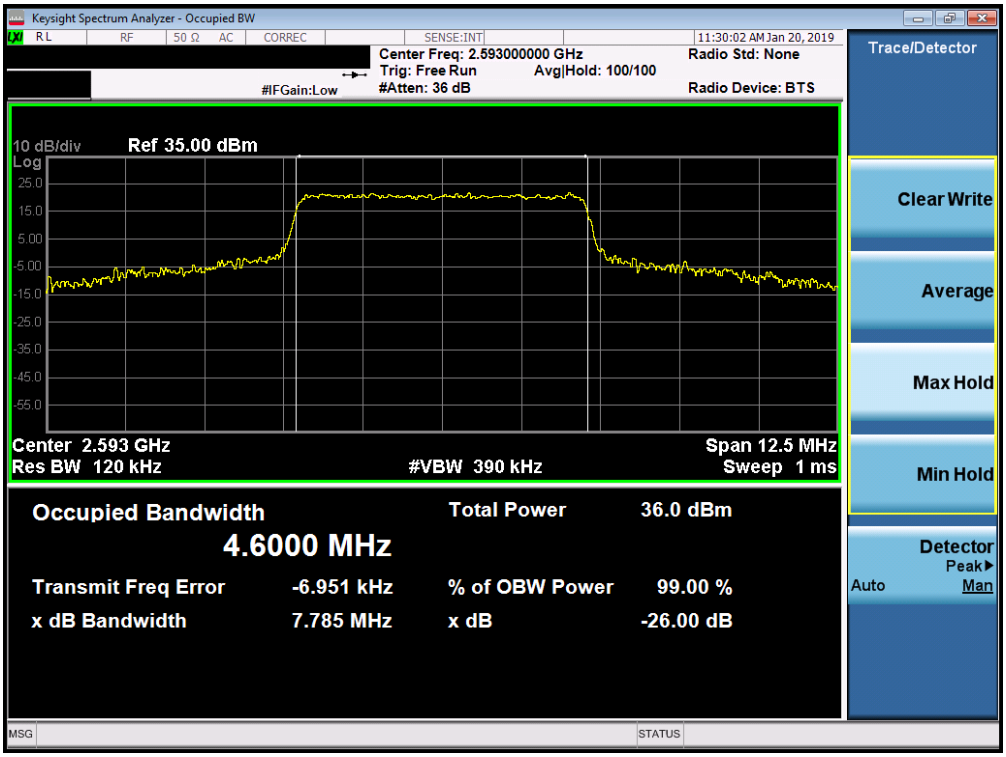
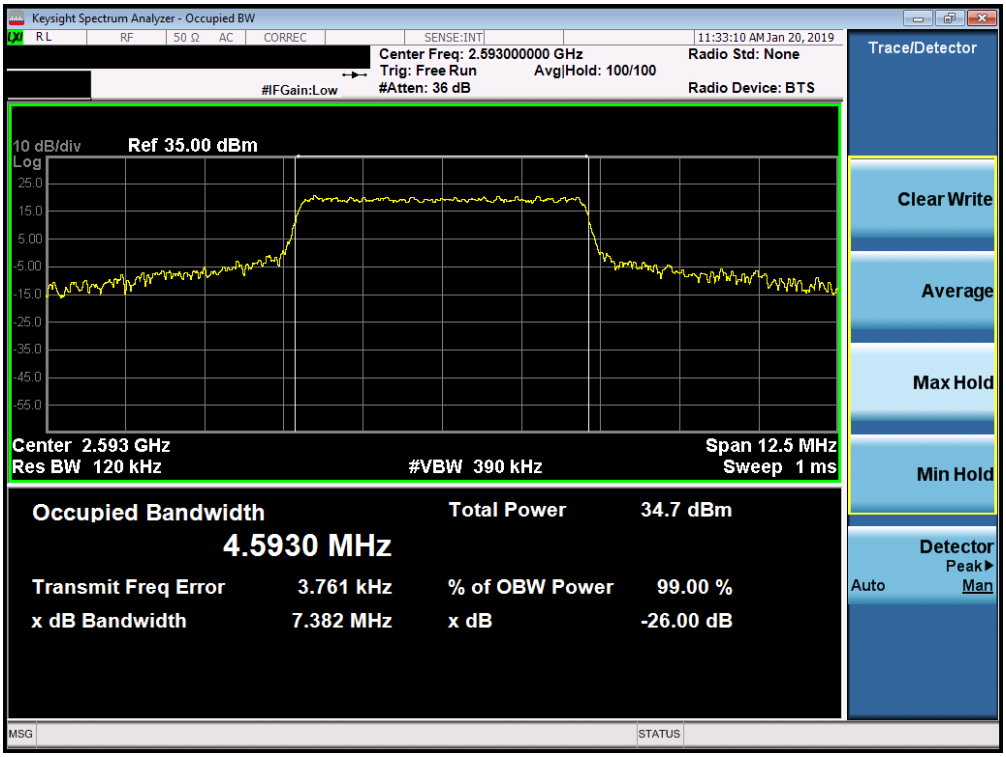
Band 41



Plot 7-97. Occupied Bandwidth Plot (Band 41 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-98. Occupied Bandwidth Plot (Band 41 - 5.0MHz 16-QAM - Full RB Configuration)

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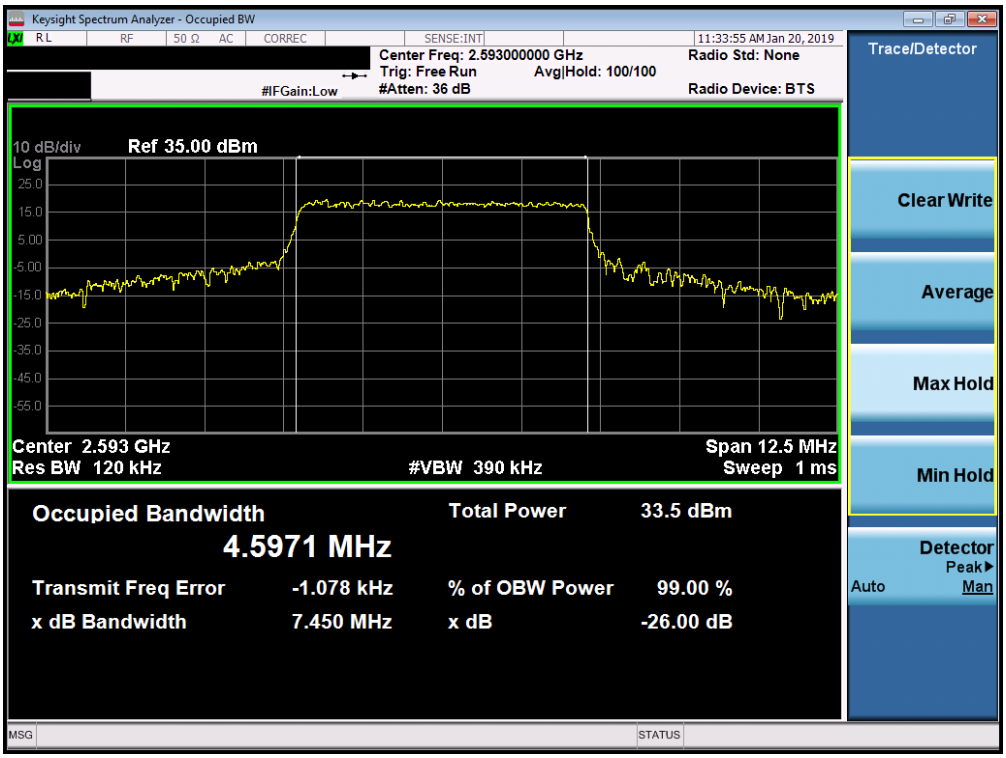
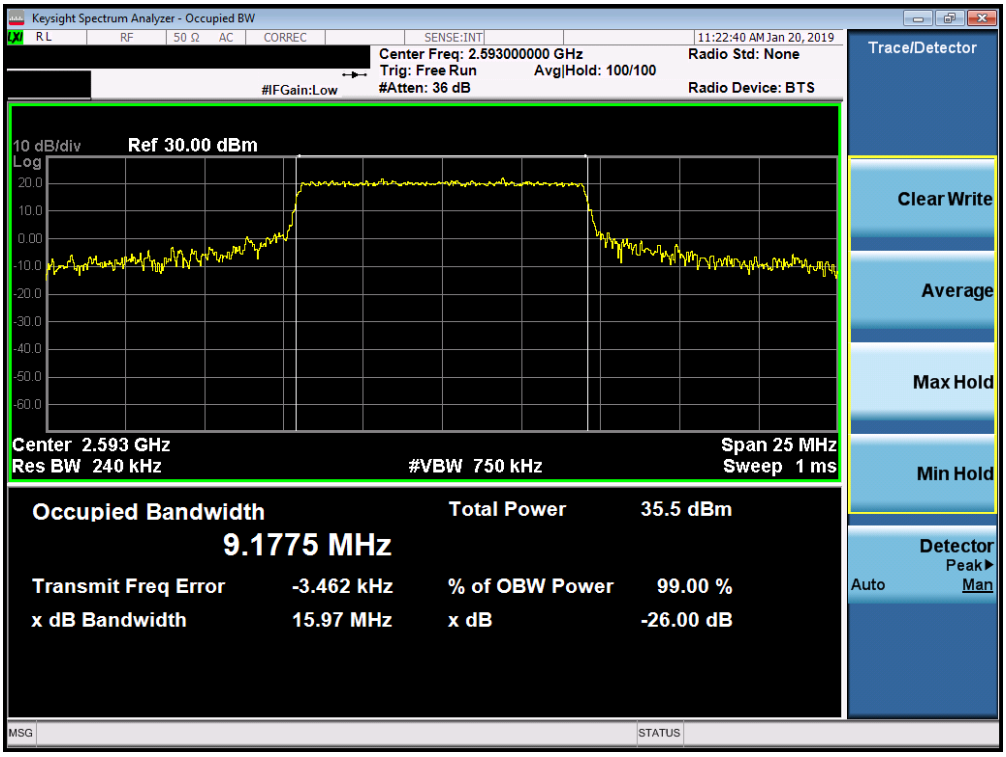


Plot 7-99. Occupied Bandwidth Plot (Band 41 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-100. Occupied Bandwidth Plot (Band 41 - 10.0MHz QPSK - Full RB Configuration)

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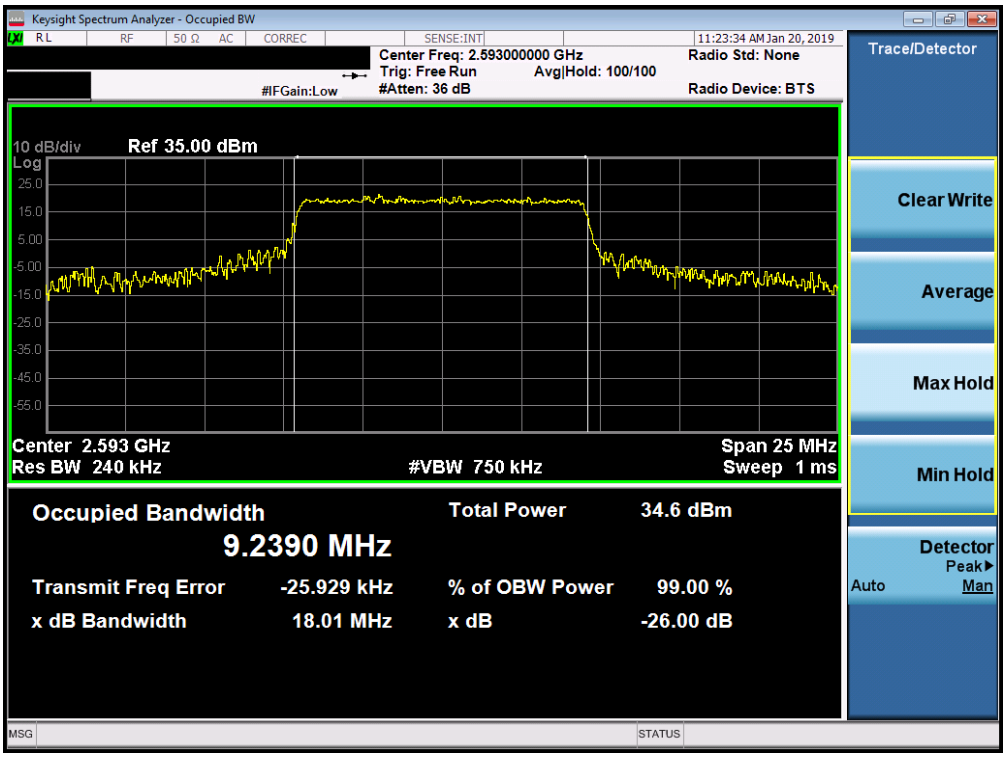
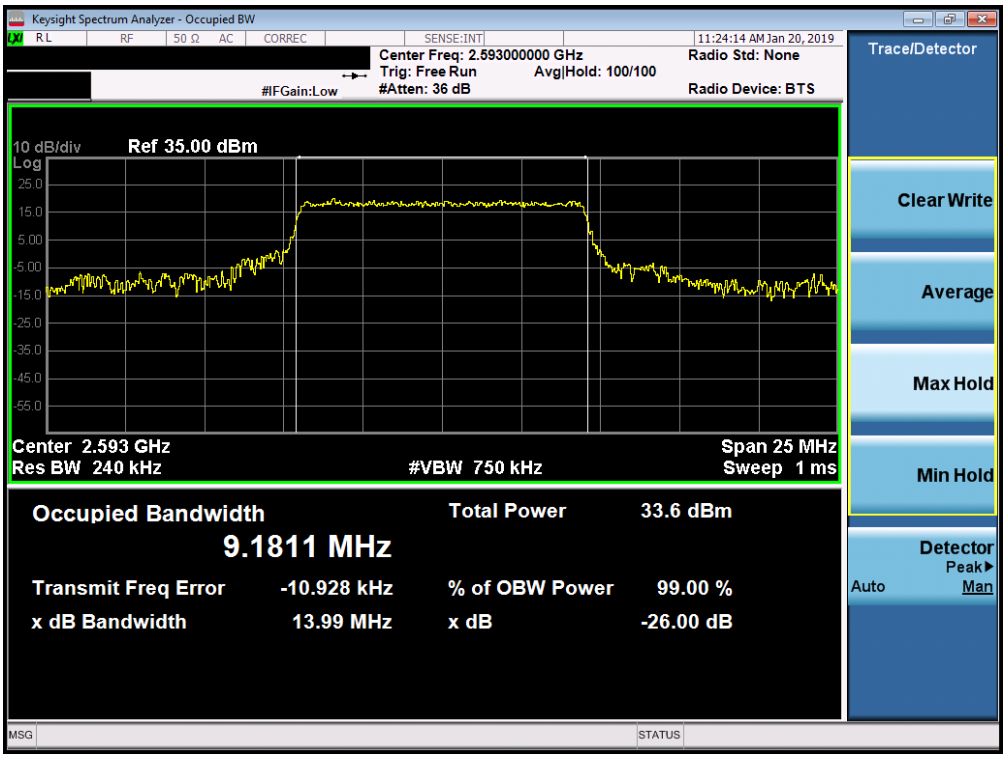


Plot 7-101. Occupied Bandwidth Plot (Band 41 - 10.0MHz 16-QAM - Full RB Configuration)



Plot 7-102. Occupied Bandwidth Plot (Band 41 - 10.0MHz 64-QAM - Full RB Configuration)

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