PCTEST
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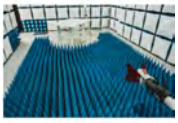


MEASUREMENT REPORT
LTE

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

Date of Testing:
5/5 – 7/15/2020
Test Site/Location:
PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
1M2005050082-03.A3L

FCC ID:	**A3LSMN981W**
APPLICANT:	**Samsung Electronics Co., Ltd.**

Application Type:	Certification
Model:	SM-N981W
EUT Type:	Portable Handset
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	22, 24, & 27
Test Procedure(s):	ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01, KDB 648474 D03 v01r04

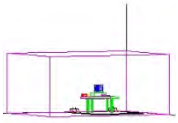
This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947. Test results reported herein relate only to the item(s) tested.

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.

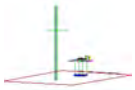
Randy Ortanez
President

ACCREDITED
TESTING CERT#2041.01

TABLE OF CONTENTS



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	0.067	18.26			4M56G7D	QPSK
LTE Band 71	27	665.5 - 695.5	0.050	17.03			4M53W7D	16QAM
LTE Band 71	27	665.5 - 695.5	0.040	15.99			4M51W7D	64QAM
LTE Band 71	27	665.5 - 695.5	0.017	12.31			4M50W7D	256QAM
LTE Band 71	27	668 - 693	0.062	17.96			9M02G7D	QPSK
LTE Band 71	27	668 - 693	0.050	17.01			9M01W7D	16QAM
LTE Band 71	27	668 - 693	0.040	16.02			8M99W7D	64QAM
LTE Band 71	27	668 - 693	0.019	12.71			8M96W7D	256QAM
LTE Band 71	27	670.5 - 690.5	0.062	17.96			13M5G7D	QPSK
LTE Band 71	27	670.5 - 690.5	0.050	17.01			13M5W7D	16QAM
LTE Band 71	27	670.5 - 690.5	0.040	16.02			13M5W7D	64QAM
LTE Band 71	27	670.5 - 690.5	0.019	12.71			13M4W7D	256QAM
LTE Band 71	27	673 - 688	0.062	17.96			18M0G7D	QPSK
LTE Band 71	27	673 - 688	0.050	17.01			18M0W7D	16QAM
LTE Band 71	27	673 - 688	0.040	16.02			17M9W7D	64QAM
LTE Band 71	27	673 - 688	0.019	12.71			17M9W7D	256QAM
LTE Band 12	27	699.7 - 715.3	0.052	17.17	0.086	19.32	1M11G7D	QPSK
LTE Band 12	27	699.7 - 715.3	0.041	16.13	0.067	18.28	1M10W7D	16QAM
LTE Band 12	27	699.7 - 715.3	0.035	15.46	0.058	17.61	1M11W7D	64QAM
LTE Band 12	27	699.7 - 715.3	0.017	12.25	0.028	14.40	1M09W7D	256QAM
LTE Band 12	27	700.5 - 714.5	0.054	17.29	0.088	19.44	2M72G7D	QPSK
LTE Band 12	27	700.5 - 714.5	0.048	16.78	0.078	18.93	2M71W7D	16QAM
LTE Band 12	27	700.5 - 714.5	0.033	15.12	0.053	17.27	2M70W7D	64QAM
LTE Band 12	27	700.5 - 714.5	0.017	12.28	0.028	14.43	2M70W7D	256QAM
LTE Band 12	27	701.5 - 713.5	0.054	17.33	0.089	19.48	4M54G7D	QPSK
LTE Band 12	27	701.5 - 713.5	0.047	16.68	0.076	18.83	4M53W7D	16QAM
LTE Band 12	27	701.5 - 713.5	0.034	15.37	0.056	17.52	4M52W7D	64QAM
LTE Band 12	27	701.5 - 713.5	0.017	12.30	0.028	14.45	4M50W7D	256QAM
LTE Band 12	27	704 - 711	0.052	17.16	0.085	19.31	8M99G7D	QPSK
LTE Band 12	27	704 - 711	0.040	16.04	0.066	18.19	9M03W7D	16QAM
LTE Band 12	27	704 - 711	0.031	14.93	0.051	17.08	8M97W7D	64QAM
LTE Band 12	27	704 - 711	0.021	13.27	0.035	15.42	8M94W7D	256QAM
LTE Band 13	27	779.5 - 784.5	0.079	18.95	0.129	21.10	4M54G7D	QPSK
LTE Band 13	27	779.5 - 784.5	0.063	18.01	0.104	20.16	4M52W7D	16QAM
LTE Band 13	27	779.5 - 784.5	0.050	17.00	0.082	19.15	4M54W7D	64QAM
LTE Band 13	27	779.5 - 784.5	0.035	15.41	0.057	17.56	4M52W7D	256QAM
LTE Band 13	27	782	0.086	19.35	0.141	21.50	9M01G7D	QPSK
LTE Band 13	27	782	0.070	18.45	0.115	20.60	9M00W7D	16QAM
LTE Band 13	27	782	0.053	17.26	0.087	19.41	9M00W7D	64QAM
LTE Band 13	27	782	0.043	16.31	0.070	18.46	8M96W7D	256QAM
LTE Band 5	22H	824.7 - 848.3	0.100	20.02	0.165	22.17	1M09G7D	QPSK
LTE Band 5	22H	824.7 - 848.3	0.070	18.45	0.115	20.60	1M10W7D	16QAM
LTE Band 5	22H	824.7 - 848.3	0.055	17.41	0.090	19.56	1M11W7D	64QAM
LTE Band 5	22H	824.7 - 848.3	0.046	16.60	0.075	18.75	1M12W7D	256QAM
LTE Band 5	22H	825.5 - 847.5	0.100	19.98	0.163	22.13	2M71G7D	QPSK
LTE Band 5	22H	825.5 - 847.5	0.069	18.41	0.114	20.56	2M70W7D	16QAM
LTE Band 5	22H	825.5 - 847.5	0.055	17.44	0.091	19.59	2M71G7D	64QAM
LTE Band 5	22H	825.5 - 847.5	0.045	16.54	0.074	18.69	2M70W7D	256QAM
LTE Band 5	22H	826.5 - 846.5	0.101	20.04	0.166	22.19	4M54G7D	QPSK
LTE Band 5	22H	826.5 - 846.5	0.074	18.71	0.122	20.86	4M51W7D	16QAM
LTE Band 5	22H	826.5 - 846.5	0.051	17.09	0.084	19.24	4M52G7D	64QAM
LTE Band 5	22H	826.5 - 846.5	0.044	16.39	0.071	18.54	4M50W7D	256QAM
LTE Band 5	22H	829 - 844	0.100	20.02	0.165	22.17	8M99G7D	QPSK
LTE Band 5	22H	829 - 844	0.076	18.82	0.125	20.97	9M00W7D	16QAM
LTE Band 5	22H	829 - 844	0.050	16.99	0.082	19.14	9M02W7D	64QAM
LTE Band 5	22H	829 - 844	0.045	16.56	0.074	18.71	8M99W7D	256QAM

EUT Overview (<1 GHz)

Mode	FCC Rule Part	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
			Max. Power (W)	Max. Power (dBm)		
LTE Band 66/4	27	1710.7 - 1779.3	0.205	23.11	1M09G7D	QPSK
LTE Band 66/4	27	1710.7 - 1779.3	0.170	22.31	1M10W7D	16QAM
LTE Band 66/4	27	1710.7 - 1779.3	0.121	20.82	1M10W7D	64QAM
LTE Band 66/4	27	1710.7 - 1779.3	0.066	18.21	1M09W7D	256QAM
LTE Band 66/4	27	1711.5 - 1778.5	0.205	23.11	2M70G7D	QPSK
LTE Band 66/4	27	1711.5 - 1778.5	0.169	22.27	2M71W7D	16QAM
LTE Band 66/4	27	1711.5 - 1778.5	0.125	20.96	2M71W7D	64QAM
LTE Band 66/4	27	1711.5 - 1778.5	0.066	18.21	2M70W7D	256QAM
LTE Band 66/4	27	1712.5 - 1777.5	0.204	23.09	4M49G7D	QPSK
LTE Band 66/4	27	1712.5 - 1777.5	0.167	22.23	4M50W7D	16QAM
LTE Band 66/4	27	1712.5 - 1777.5	0.126	21.02	4M52W7D	64QAM
LTE Band 66/4	27	1712.5 - 1777.5	0.063	18.02	4M50W7D	256QAM
LTE Band 66/4	27	1715 - 1775	0.198	22.96	9M07G7D	QPSK
LTE Band 66/4	27	1715 - 1775	0.163	22.13	8M98W7D	16QAM
LTE Band 66/4	27	1715 - 1775	0.125	20.98	9M00W7D	64QAM
LTE Band 66/4	27	1715 - 1775	0.064	18.03	8M99W7D	256QAM
LTE Band 66/4	27	1717.5 - 1772.5	0.204	23.10	13M5G7D	QPSK
LTE Band 66/4	27	1717.5 - 1772.5	0.169	22.27	13M5W7D	16QAM
LTE Band 66/4	27	1717.5 - 1772.5	0.124	20.94	13M5W7D	64QAM
LTE Band 66/4	27	1717.5 - 1772.5	0.068	18.30	13M5W7D	256QAM
LTE Band 66/4	27	1720 - 1770	0.213	23.28	18M0G7D	QPSK
LTE Band 66/4	27	1720 - 1770	0.168	22.24	18M0W7D	16QAM
LTE Band 66/4	27	1720 - 1770	0.131	21.18	18M0W7D	64QAM
LTE Band 66/4	27	1720 - 1770	0.090	19.52	18M0W7D	256QAM
LTE Band 25/2	24E	1850.7 - 1914.3	0.213	23.28	1M09G7D	QPSK
LTE Band 25/2	24E	1850.7 - 1914.3	0.169	22.28	1M08W7D	16QAM
LTE Band 25/2	24E	1850.7 - 1914.3	0.137	21.38	1M10W7D	64QAM
LTE Band 25/2	24E	1850.7 - 1914.3	0.107	20.28	1M09W7D	256QAM
LTE Band 25/2	24E	1851.5 - 1913.5	0.207	23.16	2M71G7D	QPSK
LTE Band 25/2	24E	1851.5 - 1913.5	0.169	22.28	2M70W7D	16QAM
LTE Band 25/2	24E	1851.5 - 1913.5	0.138	21.39	2M70W7D	64QAM
LTE Band 25/2	24E	1851.5 - 1913.5	0.104	20.18	2M70W7D	256QAM
LTE Band 25/2	24E	1852.5 - 1912.5	0.211	23.24	4M52G7D	QPSK
LTE Band 25/2	24E	1852.5 - 1912.5	0.169	22.28	4M51W7D	16QAM
LTE Band 25/2	24E	1852.5 - 1912.5	0.112	20.48	4M52W7D	64QAM
LTE Band 25/2	24E	1852.5 - 1912.5	0.085	19.28	4M50W7D	256QAM
LTE Band 25/2	24E	1855 - 1910	0.208	23.18	8M99G7D	QPSK
LTE Band 25/2	24E	1855 - 1910	0.164	22.15	9M02W7D	16QAM
LTE Band 25/2	24E	1855 - 1910	0.128	21.06	9M00W7D	64QAM
LTE Band 25/2	24E	1855 - 1910	0.104	20.15	8M97W7D	256QAM
LTE Band 25/2	24E	1857.5 - 1907.5	0.207	23.16	13M5G7D	QPSK
LTE Band 25/2	24E	1857.5 - 1907.5	0.164	22.15	13M5W7D	16QAM
LTE Band 25/2	24E	1857.5 - 1907.5	0.138	21.39	13M5W7D	64QAM
LTE Band 25/2	24E	1857.5 - 1907.5	0.100	19.99	13M5W7D	256QAM
LTE Band 25/2	24E	1860 - 1905	0.215	23.33	18M0G7D	QPSK
LTE Band 25/2	24E	1860 - 1905	0.172	22.36	18M0W7D	16QAM
LTE Band 25/2	24E	1860 - 1905	0.140	21.45	18M0W7D	64QAM
LTE Band 25/2	24E	1860 - 1905	0.106	20.26	18M0W7D	256QAM

EUT Overview (Mid Bands)

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	0.211	23.23	4M51G7D	QPSK
LTE Band 30	27	2307.5 - 2312.5	0.168	22.25	4M51W7D	16QAM
LTE Band 30	27	2307.5 - 2312.5	0.130	21.15	4M50W7D	64QAM
LTE Band 30	27	2307.5 - 2312.5	0.064	18.08	4M50W7D	256QAM
LTE Band 30	27	2310	0.214	23.31	9M00G7D	QPSK
LTE Band 30	27	2310	0.170	22.30	9M00W7D	16QAM
LTE Band 30	27	2310	0.125	20.99	9M00W7D	64QAM
LTE Band 30	27	2310	0.069	18.38	8M97W7D	256QAM
LTE Band 7	27	2502.5 - 2567.5	0.134	21.28	4M51G7D	QPSK
LTE Band 7	27	2502.5 - 2567.5	0.107	20.31	4M51W7D	16QAM
LTE Band 7	27	2502.5 - 2567.5	0.085	19.29	4M51W7D	64QAM
LTE Band 7	27	2502.5 - 2567.5	0.052	17.18	4M51W7D	256QAM
LTE Band 7	27	2505 - 2565	0.128	21.07	9M05G7D	QPSK
LTE Band 7	27	2505 - 2565	0.107	20.28	8M99W7D	16QAM
LTE Band 7	27	2505 - 2565	0.085	19.29	9M00W7D	64QAM
LTE Band 7	27	2505 - 2565	0.054	17.29	9M00W7D	256QAM
LTE Band 7	27	2507.5 - 2562.5	0.134	21.27	13M5G7D	QPSK
LTE Band 7	27	2507.5 - 2562.5	0.107	20.31	13M5W7D	16QAM
LTE Band 7	27	2507.5 - 2562.5	0.085	19.29	13M5W7D	64QAM
LTE Band 7	27	2507.5 - 2562.5	0.052	17.15	13M5W7D	256QAM
LTE Band 7	27	2510 - 2560	0.136	21.33	18M0G7D	QPSK
LTE Band 7	27	2510 - 2560	0.108	20.32	18M0W7D	16QAM
LTE Band 7	27	2510 - 2560	0.086	19.34	18M0W7D	64QAM
LTE Band 7	27	2510 - 2560	0.066	18.17	18M0W7D	256QAM
LTE Band 41 (PC3)	27	2498.5 - 2687.5	0.203	23.07	4M51G7D	QPSK
LTE Band 41 (PC3)	27	2498.5 - 2687.5	0.164	22.15	4M52W7D	16QAM
LTE Band 41 (PC3)	27	2498.5 - 2687.5	0.127	21.05	4M52W7D	64QAM
LTE Band 41 (PC3)	27	2498.5 - 2687.5	0.080	19.04	4M50W7D	256QAM
LTE Band 41 (PC3)	27	2501 - 2685	0.202	23.05	9M01G7D	QPSK
LTE Band 41 (PC3)	27	2501 - 2685	0.166	22.19	9M00W7D	16QAM
LTE Band 41 (PC3)	27	2501 - 2685	0.121	20.84	8M96W7D	64QAM
LTE Band 41 (PC3)	27	2501 - 2685	0.082	19.16	8M77W7D	256QAM
LTE Band 41 (PC3)	27	2503.5 - 2682.5	0.164	22.15	13M5G7D	QPSK
LTE Band 41 (PC3)	27	2503.5 - 2682.5	0.140	21.45	13M5W7D	16QAM
LTE Band 41 (PC3)	27	2503.5 - 2682.5	0.107	20.28	13M5W7D	64QAM
LTE Band 41 (PC3)	27	2503.5 - 2682.5	0.076	18.83	13M5W7D	256QAM
LTE Band 41 (PC3)	27	2506 - 2680	0.207	23.16	17M9G7D	QPSK
LTE Band 41 (PC3)	27	2506 - 2680	0.103	20.14	17M9W7D	16QAM
LTE Band 41 (PC3)	27	2506 - 2680	0.089	19.51	18M0W7D	64QAM
LTE Band 41 (PC3)	27	2506 - 2680	0.079	18.95	18M0W7D	256QAM

EUT Overview (High Bands)

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	ERP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n71	20 MHz	π/2 BPSK	673.0 - 688.0	0.054	17.33	18M1G7D
		QPSK	673.0 - 688.0	0.037	15.74	19M0G7D
		16QAM	673.0 - 688.0	0.030	14.71	19M1W7D
		64QAM	673.0 - 688.0	0.024	13.79	19M0W7D
		256QAM	673.0 - 688.0	0.019	12.85	19M0W7D
	15 MHz	π/2 BPSK	670.5 - 690.5	0.053	17.28	13M4G7D
		QPSK	670.5 - 690.5	0.037	15.72	14M2G7D
		16QAM	670.5 - 690.5	0.029	14.60	14M2W7D
		64QAM	670.5 - 690.5	0.024	13.79	14M2W7D
		256QAM	670.5 - 690.5	0.019	12.87	14M2W7D
	10 MHz	π/2 BPSK	668.0 - 693.0	0.054	17.32	9M00G7D
		QPSK	668.0 - 693.0	0.037	15.73	9M36G7D
		16QAM	668.0 - 693.0	0.028	14.42	9M37W7D
		64QAM	668.0 - 693.0	0.021	13.29	9M37W7D
		256QAM	668.0 - 693.0	0.023	13.58	9M34W7D
	5 MHz	π/2 BPSK	665.5 - 695.5	0.054	17.33	4M55G7D
		QPSK	665.5 - 695.5	0.039	15.89	4M51G7D
		16QAM	665.5 - 695.5	0.030	14.73	4M52W7D
		64QAM	665.5 - 695.5	0.025	13.92	4M51W7D
		256QAM	665.5 - 695.5	0.027	14.37	4M53W7D

EUT Overview (n71)

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n66	20 MHz	π/2 BPSK	1720 - 1770	0.164	22.16	18M0G7D
		QPSK	1720 - 1770	0.146	21.64	19M0G7D
		16QAM	1720 - 1770	0.111	20.44	19M0W7D
		64QAM	1720 - 1770	0.085	19.29	19M0W7D
		256QAM	1720 - 1770	0.053	17.28	18M9W7D
	15 MHz	π/2 BPSK	1717.5 - 1772.5	0.168	22.25	13M5G7D
		QPSK	1717.5 - 1772.5	0.151	21.79	14M5G7D
		16QAM	1717.5 - 1772.5	0.114	20.57	14M2W7D
		64QAM	1717.5 - 1772.5	0.118	20.71	14M2W7D
		256QAM	1717.5 - 1772.5	0.086	19.34	14M2W7D
	10 MHz	π/2 BPSK	1715 - 1775	0.172	22.36	9M02G7D
		QPSK	1715 - 1775	0.150	21.77	9M39G7D
		16QAM	1715 - 1775	0.111	20.46	9M33W7D
		64QAM	1715 - 1775	0.114	20.58	9M35W7D
		256QAM	1715 - 1775	0.090	19.54	9M34W7D
	5 MHz	π/2 BPSK	1712.5 - 1777.5	0.167	22.22	4M52G7D
		QPSK	1712.5 - 1777.5	0.147	21.67	4M55G7D
		16QAM	1712.5 - 1777.5	0.109	20.39	4M51W7D
		64QAM	1712.5 - 1777.5	0.109	20.36	4M51W7D
		256QAM	1712.5 - 1777.5	0.089	19.49	4M51W7D

EUT Overview (n66)

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n41	100 MHz	π/2 BPSK	2546.0 - 2640.0	0.166	22.210	96M2G7D
		QPSK	2546.0 - 2640.0	0.135	21.290	97M9G7D
		16QAM	2546.0 - 2640.0	0.109	20.390	97M2W7D
		64QAM	2546.0 - 2640.0	0.091	19.570	97M3W7D
		256QAM	2546.0 - 2640.0	0.060	17.770	97M5W7D
	90 MHz	π/2 BPSK	2541.0 - 2645.0	0.166	22.190	88M4G7D
		QPSK	2541.0 - 2645.0	0.133	21.240	87M4G7D
		16QAM	2541.0 - 2645.0	0.101	20.060	87M4W7D
		64QAM	2541.0 - 2645.0	0.083	19.180	87M6W7D
		256QAM	2541.0 - 2645.0	0.055	17.400	87M3W7D
	80 MHz	π/2 BPSK	2536.0 - 2650.0	0.177	22.490	77M1G7D
		QPSK	2536.0 - 2650.0	0.133	21.240	77M2G7D
		16QAM	2536.0 - 2650.0	0.109	20.390	77M5W7D
		64QAM	2536.0 - 2650.0	0.091	19.580	77M1W7D
		256QAM	2536.0 - 2650.0	0.058	17.660	77M4W7D
	60 MHz	π/2 BPSK	2526.0 - 2660.0	0.161	22.060	58M1G7D
		QPSK	2526.0 - 2660.0	0.132	21.220	57M8G7D
		16QAM	2526.0 - 2660.0	0.106	20.270	57M9W7D
		64QAM	2526.0 - 2660.0	0.089	19.470	57M8W7D
		256QAM	2526.0 - 2660.0	0.058	17.650	57M9W7D
	50 MHz	π/2 BPSK	2521.0 - 2665.0	0.160	22.050	48M8G7D
		QPSK	2521.0 - 2665.0	0.128	21.070	44M7G7D
		16QAM	2521.0 - 2665.0	0.109	20.370	44M8W7D
		64QAM	2521.0 - 2665.0	0.089	19.470	44M7W7D
		256QAM	2521.0 - 2665.0	0.059	17.720	44M8W7D
	40 MHz	π/2 BPSK	2516.0 - 2670.0	0.175	22.420	35M8G7D
		QPSK	2516.0 - 2670.0	0.140	21.460	35M7G7D
		16QAM	2516.0 - 2670.0	0.119	20.760	35M6W7D
		64QAM	2516.0 - 2670.0	0.099	19.970	35M6W7D
		256QAM	2516.0 - 2670.0	0.063	17.970	35M8W7D
	20 MHz	π/2 BPSK	2506.0 - 2680.0	0.157	21.970	17M9G7D
		QPSK	2506.0 - 2680.0	0.133	21.230	17M9G7D
		16QAM	2506.0 - 2680.0	0.096	19.840	17M9W7D
		64QAM	2506.0 - 2680.0	0.074	18.710	17M9W7D
		256QAM	2506.0 - 2680.0	0.047	16.710	17M9W7D

EUT Overview (n41)

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 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 located in Columbia, MD 21046, U.S.A.

- 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 Portable Handset FCC ID: A3LSMN981W**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

Test Device Serial No.: 1825M, 1827M, 0514M, 0516M, 0290M, 0497M, 1799M

2.2 Device Capabilities

This device contains the following capabilities:

850 CDMA/EvDO Rev0/A, 1x Advanced (BC0), 850/1900 GSM/GPRS/EDGE, 850/1700/1900, WCDMA/HSPA, Multi-band LTE, 5G NR (n71, n41, n66), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII, Bluetooth (1x, EDR, LE), NFC, Wireless Power Transfer

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 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.

This device supports wireless charging capability and, thus, is subject to the test requirements of KDB 648474 D03 v01r04. Additional radiated spurious emission measurements were performed with the EUT lying flat on an authorized wireless charging pad (WCP) Model: EP-N5100 while operating under normal conditions in a simulated call or data transmission configuration. The worst case radiated emissions data is shown in this report.

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 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 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. Radiated power levels are also investigated with the receive antenna horizontally and vertically polarized. The maximized power level is recorded using the spectrum analyzer "Channel Power" function with the integration band set to the emissions' occupied bandwidth, a RMS detector, RBW = 100kHz, VBW = 300kHz, and a 1 second sweep time over a minimum of 10 sweeps, per the guidelines of KDB 971168 D01 v03r01.

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, 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 $_{[Watts]}$).

All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4-2014. Additionally, radiated emissions below 30MHz are also validated on an Open Area Test Site to assert correlation with the chamber measurements per the requirements of KDB 474788 D01.

4.0 MEASUREMENT UNCERTAINTY

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

Contribution	Expanded Uncertainty (±dB)
Conducted Bench Top Measurements	1.13
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

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
-	LTx2	Licensed Transmitter Cable Set	4/9/2020	Annual	4/9/2021	LTx2
-	LTx3	Licensed Transmitter Cable Set	10/30/2019	Annual	10/30/2020	LTx3
Agilent	N9038A	MXE EMI Receiver	7/17/2019	Annual	7/17/2020	MY51210133
Anritsu	MT8821C	Radio Communication Analyzer	3/10/2020	Annual	3/10/2021	6200901190
Anritsu	MS46322A	Vector Network Analyzer	8/19/2019	Annual	8/19/2020	1521001
Anritsu	36585K-2F	Precision Autocal 2-Port	7/16/2019	Annual	7/16/2020	1628014
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2019	Biennial	10/10/2021	121034
EMCO	3160-09	Small Horn (18 - 26.5GHz)	8/9/2018	Biennial	8/9/2020	135427
Espec	ESX-2CA	Environmental Chamber	6/13/2019	Annual	6/13/2020	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	2/14/2019	Biennial	2/14/2021	125518
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/12/2020	Biennial	3/12/2022	128337
ETS-Lindgren	3115	Double Ridged Guide Horn 750MHz - 18GHz	3/12/2020	Biennial	3/12/2022	150693
Mini Circuits	TVA-11-422	RF Power Amp	N/A			QA1317001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11403100002
Rohde & Schwarz	CMU200	Base Station Simulator	N/A			107826
Rohde & Schwarz	CMU200	Base Station Simulator	N/A			836536/0005
Rohde & Schwarz	CMW500	Radio Communication Tester	8/26/2019	Annual	8/26/2020	100976
Rohde & Schwarz	CMW500	Radio Communication Tester	6/26/2019	Annual	6/26/2020	112347
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	11/1/2019	Annual	11/1/2020	100040
Rohde & Schwarz	TC-TA18	Cross-Pol Antenna 400MHz-18GHz	12/12/2018	Biennial	12/12/2020	101058
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/11/2019	Annual	7/11/2020	102134
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/8/2019	Annual	7/8/2020	102133
Sunol	DRH-118	Horn Antenna (1-18GHz)	10/3/2019	Biennial	10/3/2021	A050307
Sunol	DRH-118	Horn Antenna (1-18 GHz)	8/27/2019	Biennial	8/27/2021	A042511

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

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).

7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.

FCC ID: A3LSMN981W

FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)

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 22.917(a) 24.238(a) 27.53(c) 27.53(g) 27.53(h)	Out of Band Emissions	> 43 + 10 $\log_{10}$ (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	Peak-Average Ratio	< 13 dB			Section 7.5
2.1046	Transmitter Conducted Output Power	N/A			See RF Exposure Report
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 7.9

Table 7-1. Summary of Conducted Test Results

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 5)	< 7 Watts max. ERP	RADIATED	PASS	Section 0
27.50(b)(10) 27.50(c)(10)	Effective Radiated Power / Equivalent Isotropic Radiated Power (Band 71, 12, 13)	< 3 Watts max. ERP			Section 0
24.232(c) 27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 2/25, 7/38)	< 2 Watts max. EIRP			Section 0
27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 4/66)	< 1 Watts max. EIRP			Section 0
27.50(a)(3)	Equivalent Isotropic Radiated Power (Band 30)	< 0.25 Watts max. EIRP			Section 0
2.1053 22.917(a) 24.238(a) 27.53(c) 27.53(g) 27.53(h)	Undesirable Emissions (Band 12, 13, 5, 66/4, 25/2)	> 43 + 10 $\log_{10}$ (P[Watts]) for all out-of-band emissions			Section 7.7
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 7.7
27.53(a)	Undesirable Emissions (Band 30)	> 70 + 10 $\log_{10}$ (P[Watts])			Section 7.7
27.53(m)	Undesirable Emissions (Band 7/38)	Undesirable emissions must meet the limits detailed in 27.53(m)			Section 7.7
27.53(m)	Uplink Carrier Aggregation	Undesirable emissions must meet the limits detailed in 27.53(m)			Section 7.7

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 5.3.
5) For operation <1GHz, the EIRP limits in the table above are referenced to the specifications written in the relevant Radio Standards Specifications for Innovation, Science, and Economic Development Canada.

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

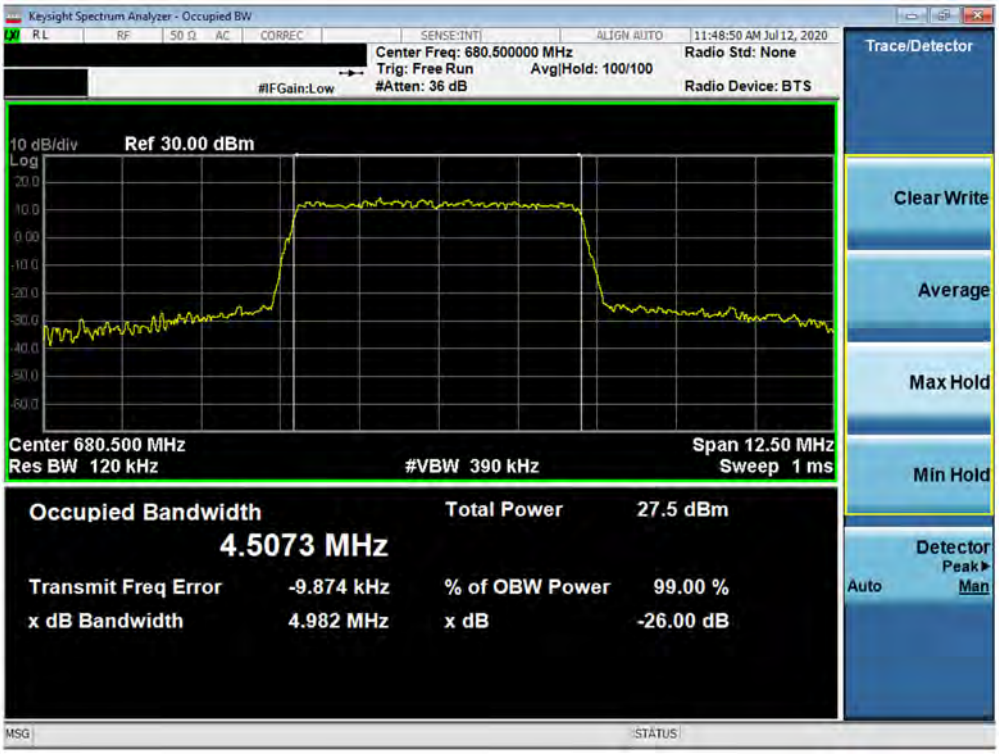
Test Notes

None.

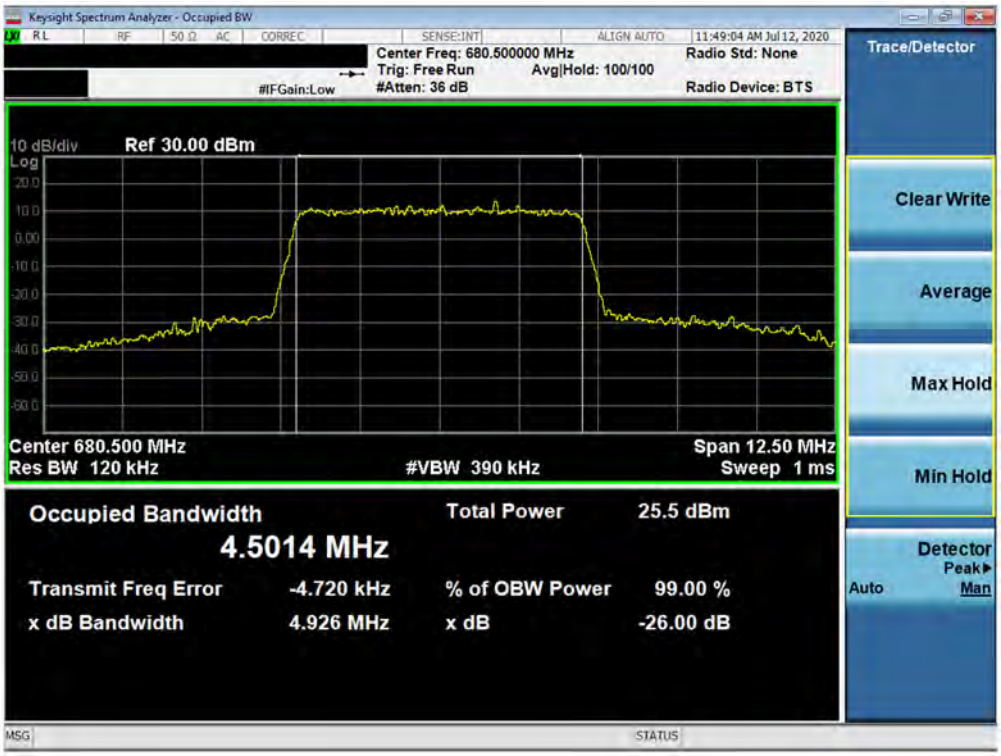
Band 71

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)

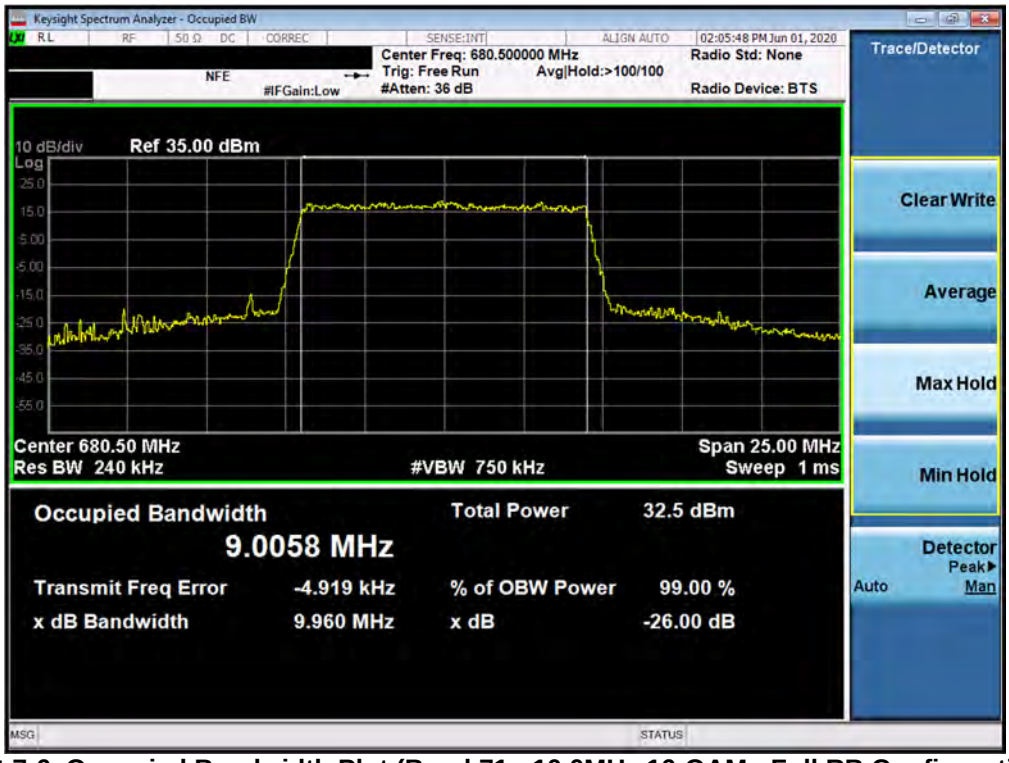


Plot 7-3. Occupied Bandwidth Plot (Band 71 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-4. Occupied Bandwidth Plot (Band 71 - 5.0MHz 256-QAM - Full RB Configuration)

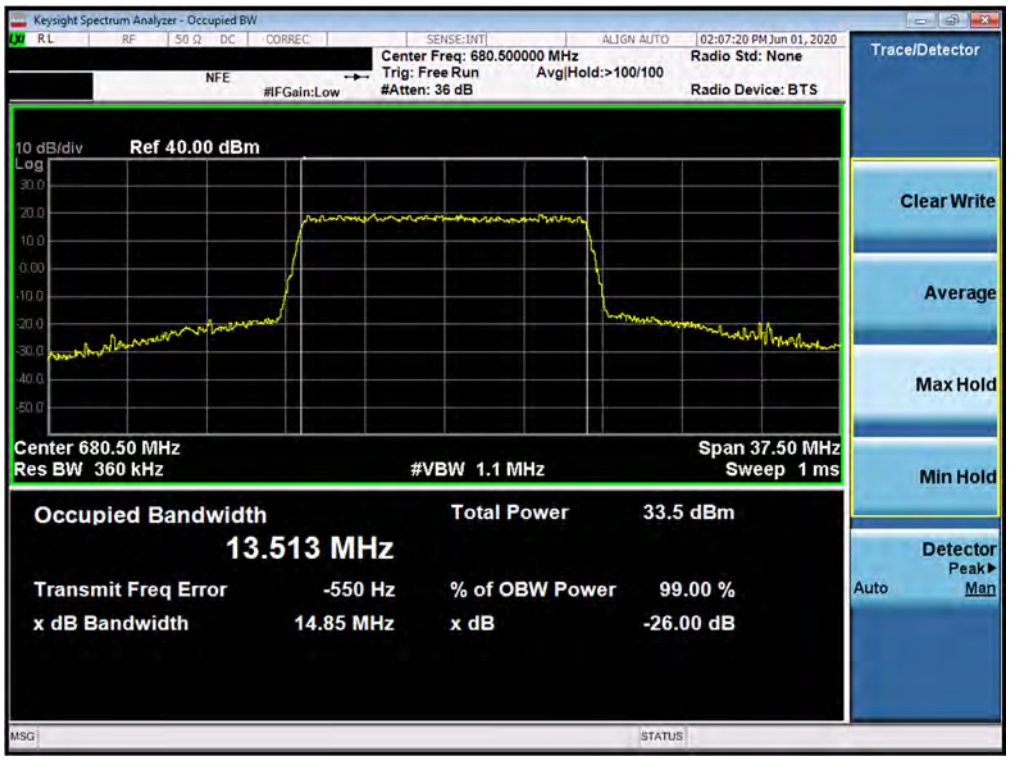
Plot 7-5. Occupied Bandwidth Plot (Band 71 - 10.0MHz QPSK - Full RB Configuration)



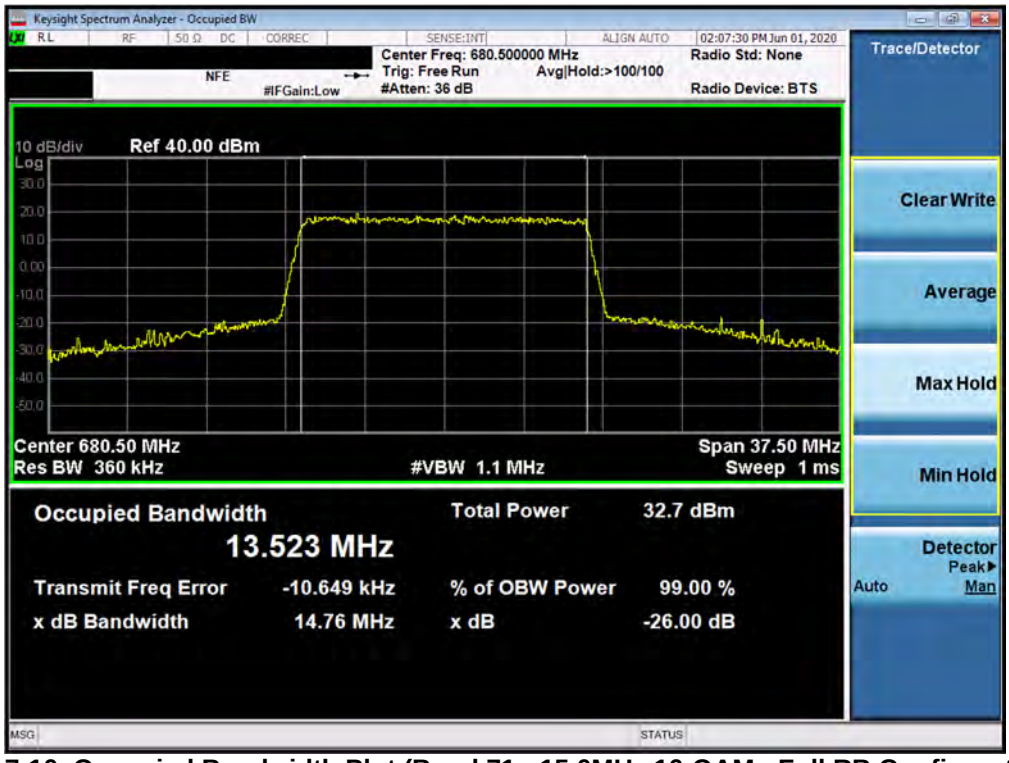
Plot 7-6. Occupied Bandwidth Plot (Band 71 - 10.0MHz 16-QAM - Full RB Configuration)

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

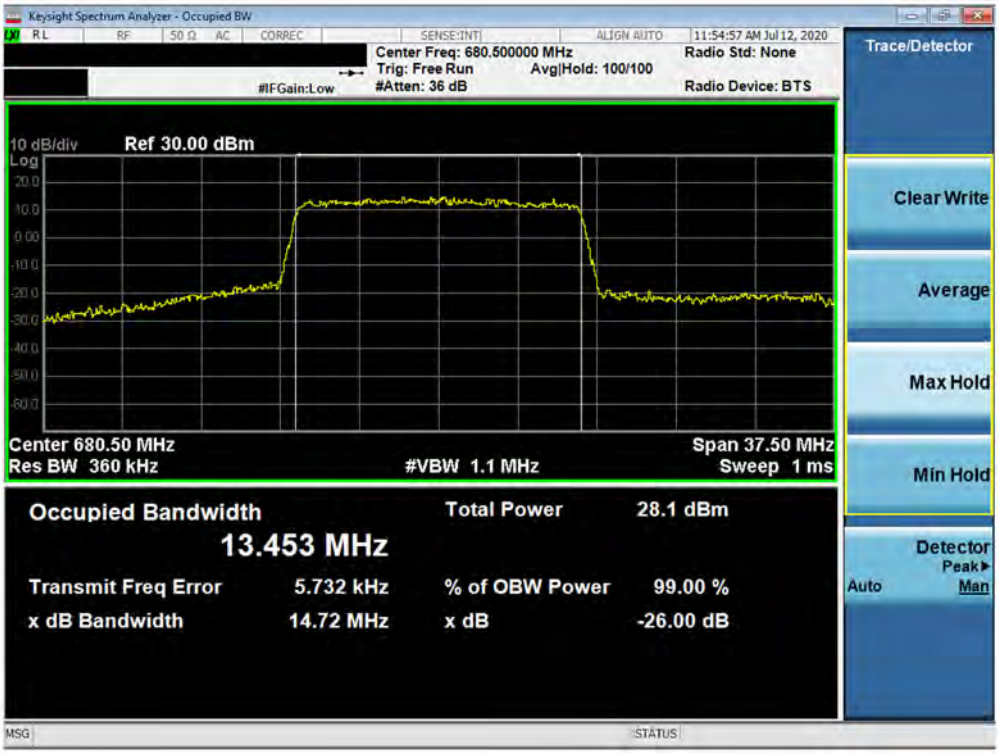
Plot 7-8. Occupied Bandwidth Plot (Band 71 - 10.0MHz 256-QAM - Full RB Configuration)



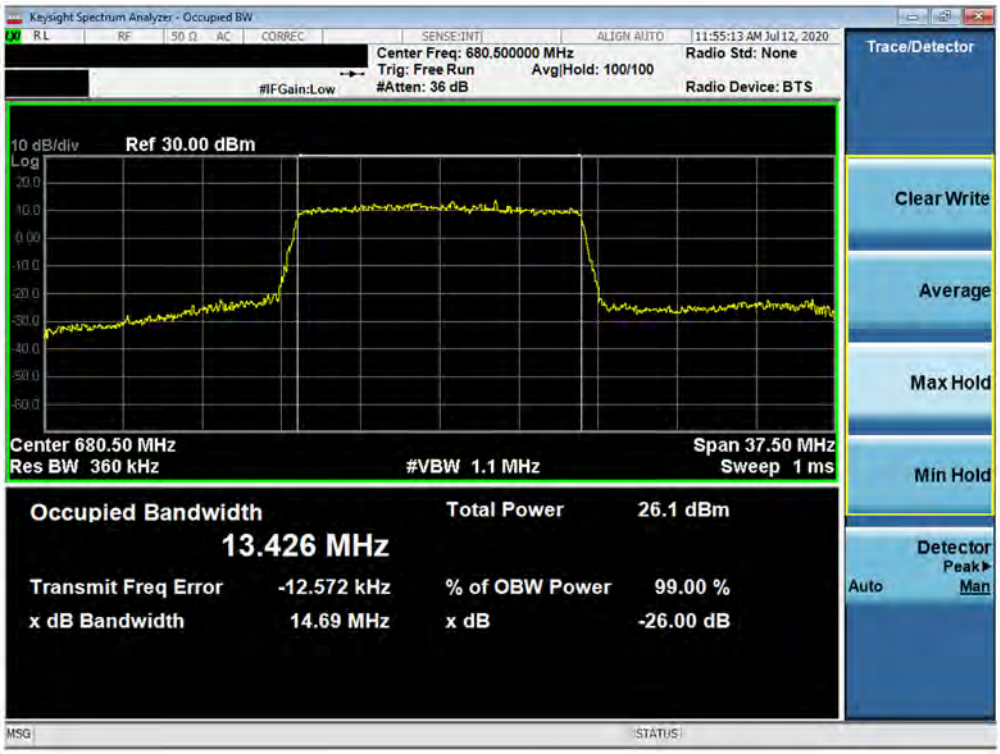
Plot 7-9. Occupied Bandwidth Plot (Band 71 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-10. Occupied Bandwidth Plot (Band 71 - 15.0MHz 16-QAM - Full RB Configuration)

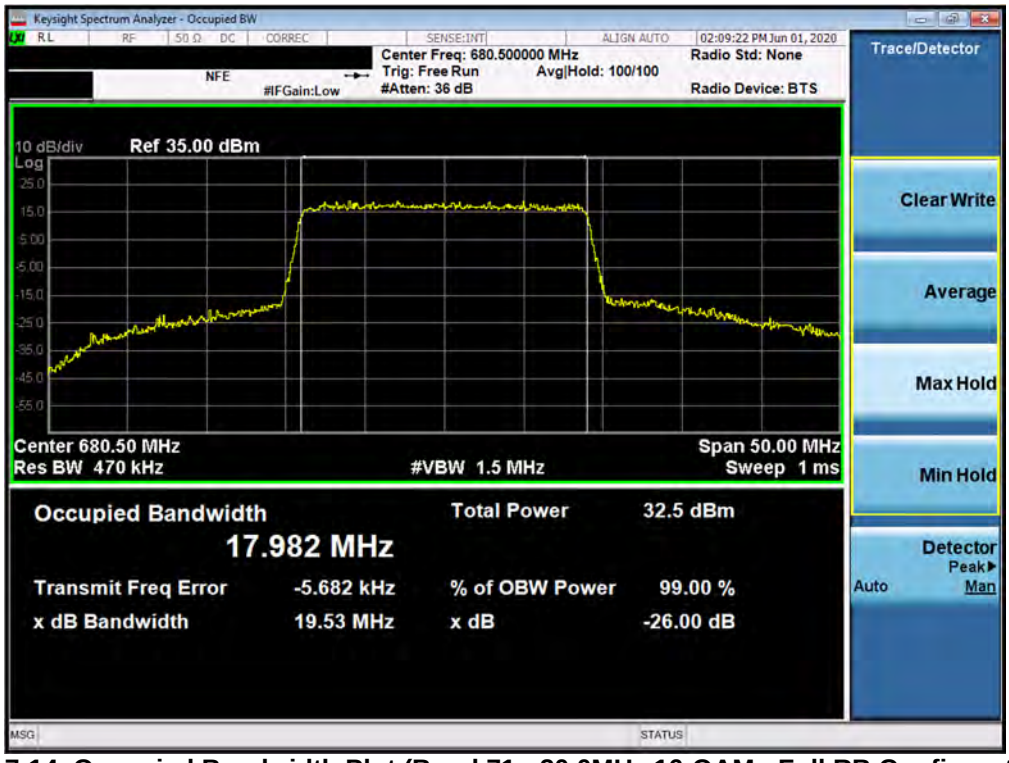


Plot 7-11. Occupied Bandwidth Plot (Band 71 - 15.0MHz 64-QAM - Full RB Configuration)

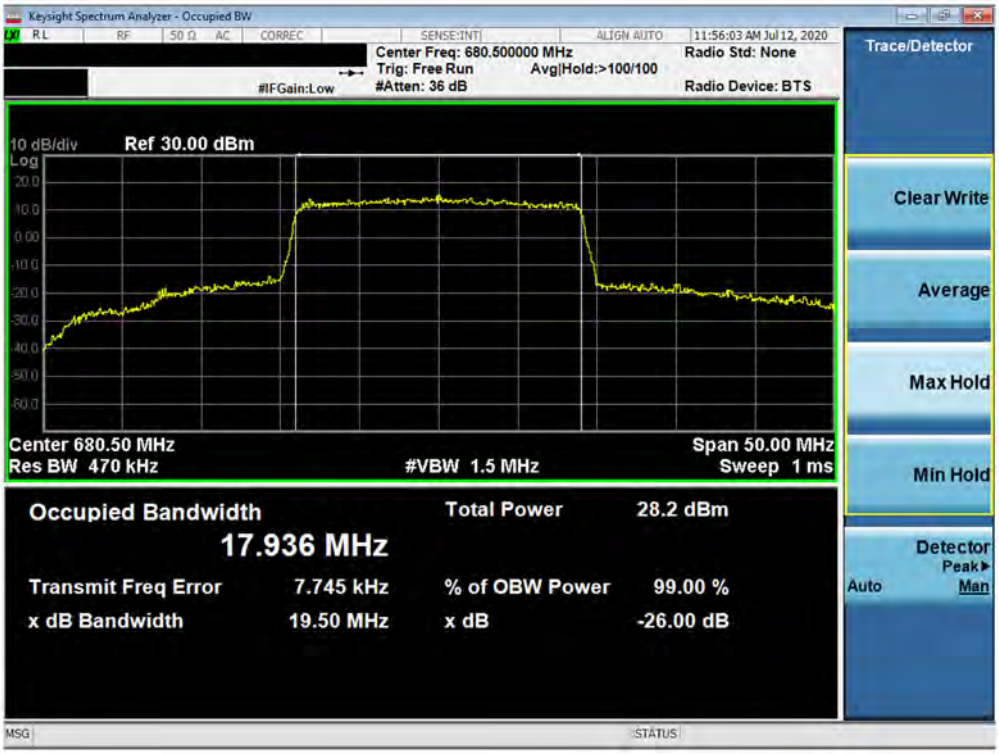


Plot 7-12. Occupied Bandwidth Plot (Band 71 - 15.0MHz 256-QAM - Full RB Configuration)

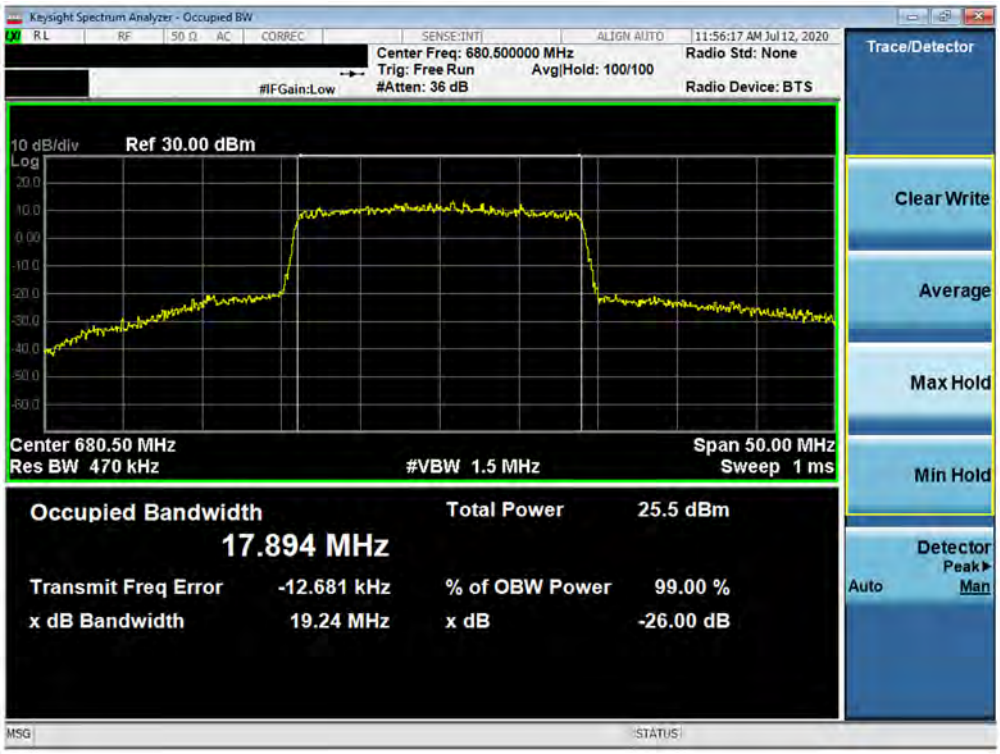
Plot 7-13. Occupied Bandwidth Plot (Band 71 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-14. Occupied Bandwidth Plot (Band 71 - 20.0MHz 16-QAM - Full RB Configuration)

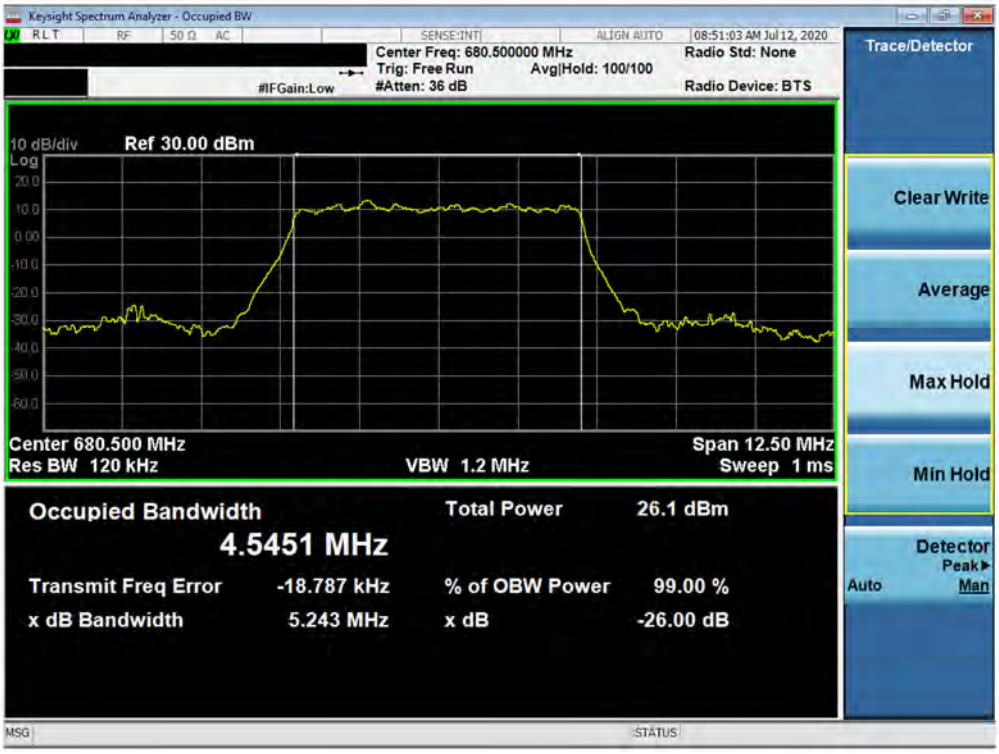


Plot 7-15. Occupied Bandwidth Plot (Band 71 - 20.0MHz 64-QAM - Full RB Configuration)

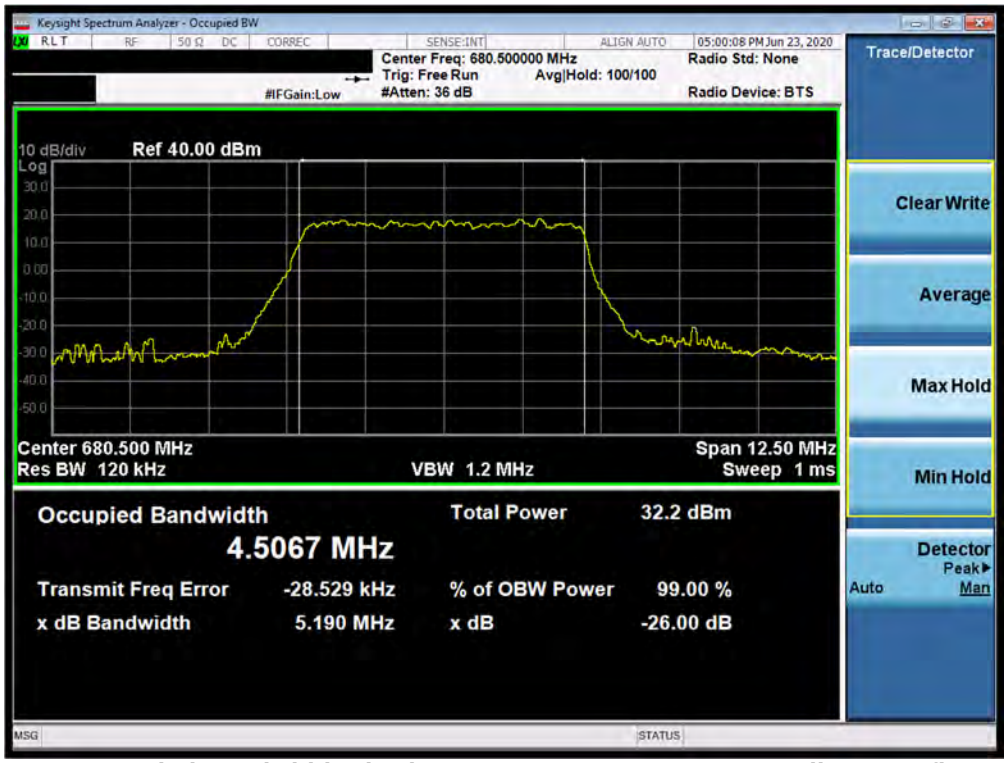


Plot 7-16. Occupied Bandwidth Plot (Band 71 - 20.0MHz 256-QAM - Full RB Configuration)

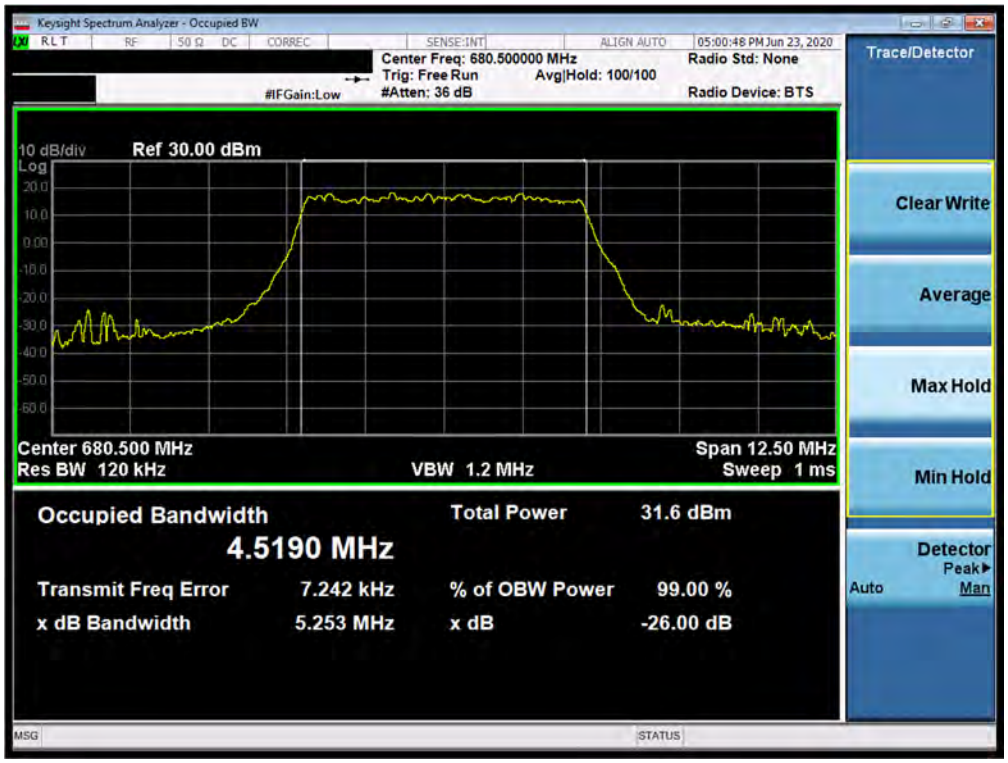
NR Band n71



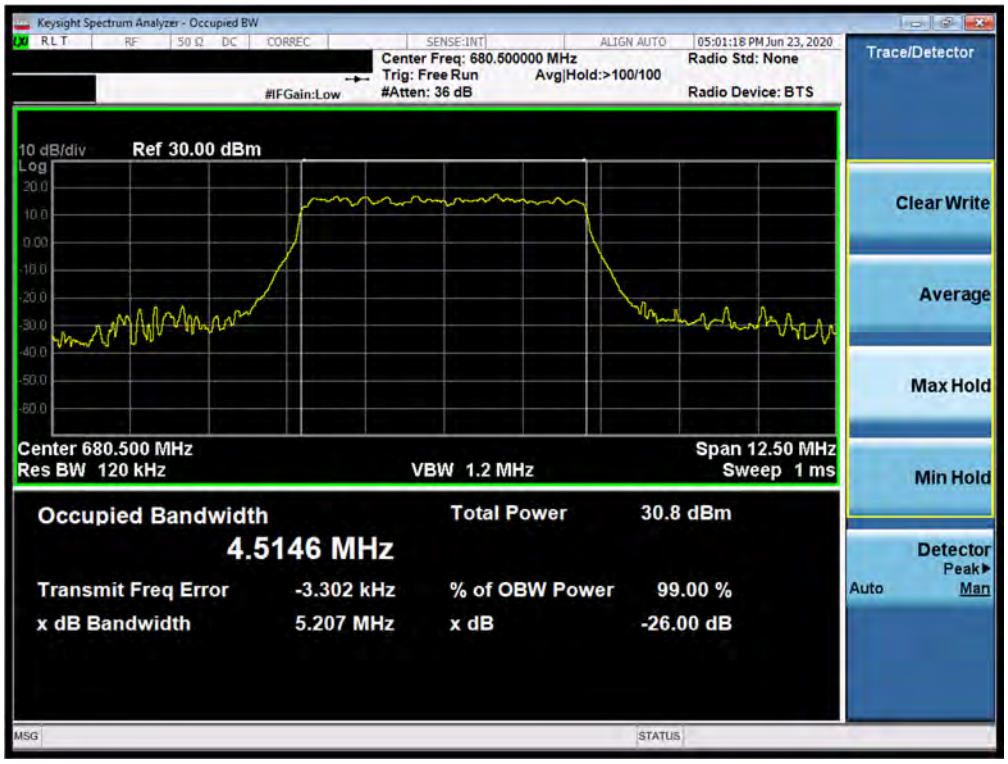
Plot 7-17. Occupied Bandwidth Plot (n71 5MHz BPSK-DFT-s-OFDM- Full RB Configuration)



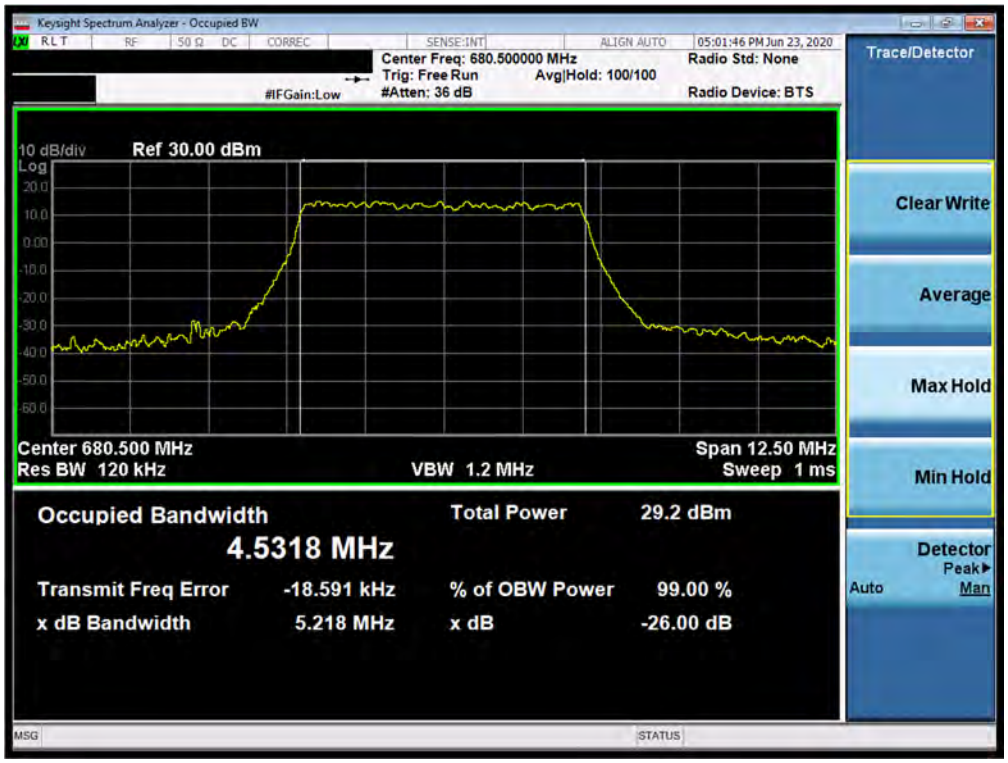
Plot 7-18. Occupied Bandwidth Plot (n71 5MHz QPSK-CP-OFDM - Full RB Configuration)



Plot 7-19. Occupied Bandwidth Plot (n71 5MHz 16QAM-CP-OFDM - Full RB Configuration)

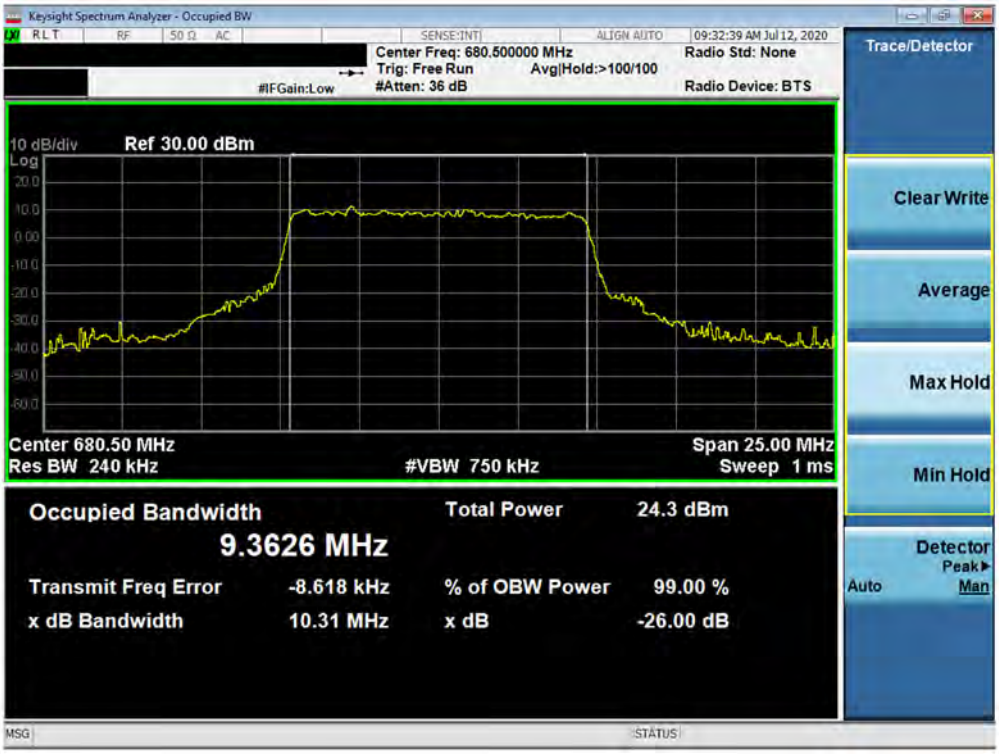


Plot 7-20. Occupied Bandwidth Plot (n71 5MHz 64QAM-CP-OFDM- Full RB Configuration)

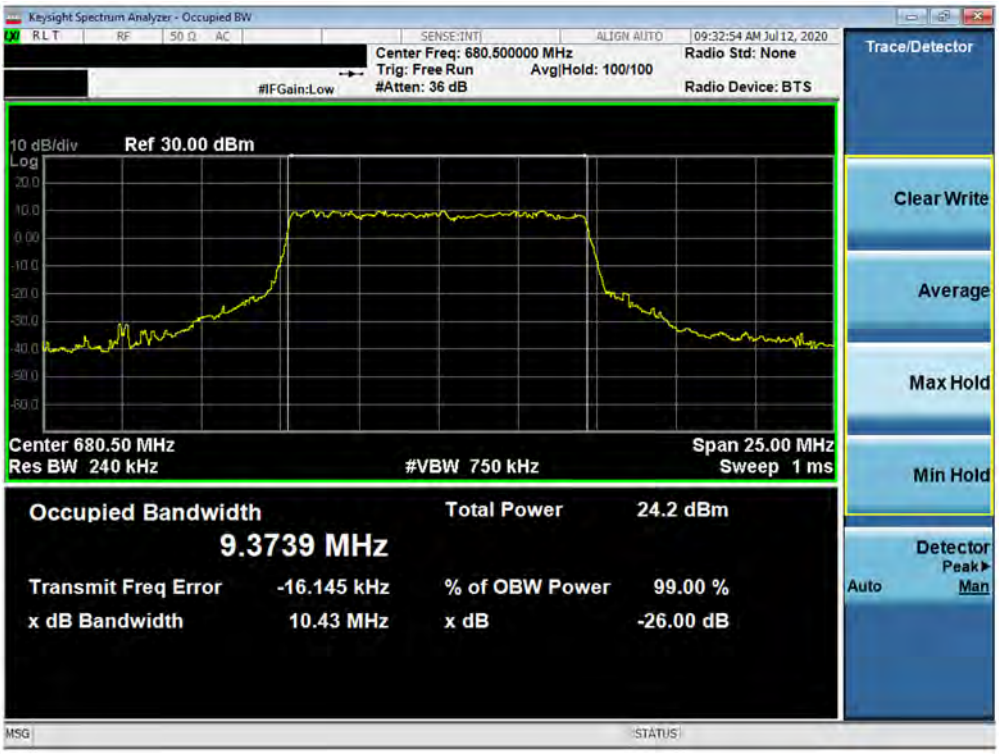


Plot 7-21. Occupied Bandwidth Plot (n71 5MHz 256QAM-CP-OFDM- Full RB Configuration)

Plot 7-22. Occupied Bandwidth Plot (n71 10MHz BPSK-DFT-s-OFDM - Full RB Configuration)

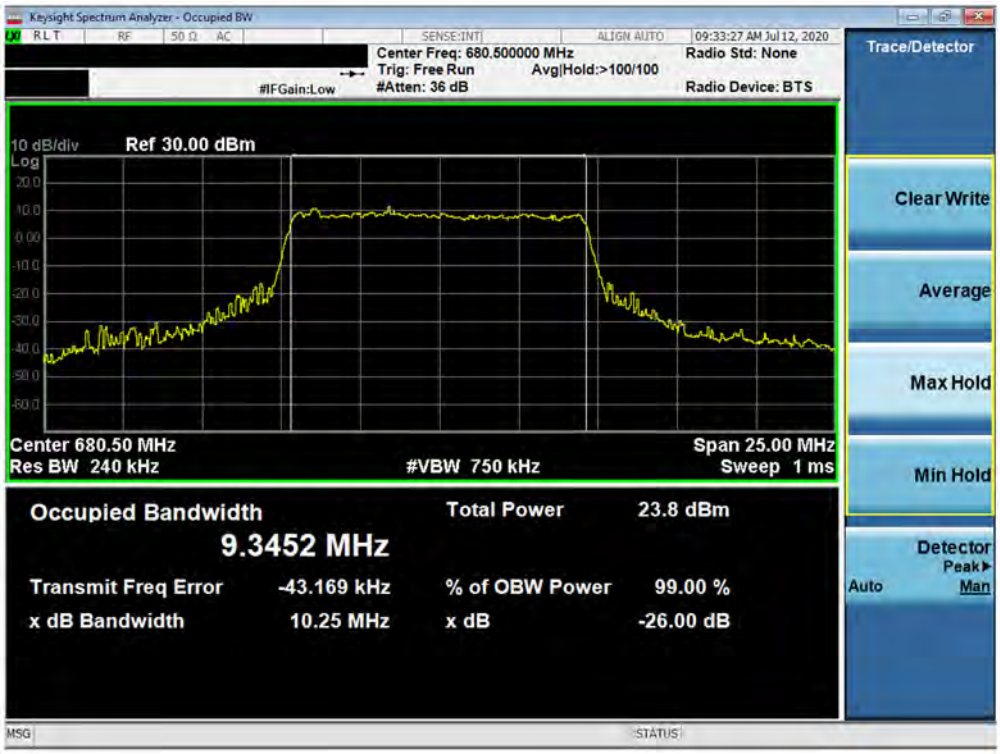


Plot 7-23. Occupied Bandwidth Plot (n71 10MHz QPSK-CP-OFDM - Full RB Configuration)



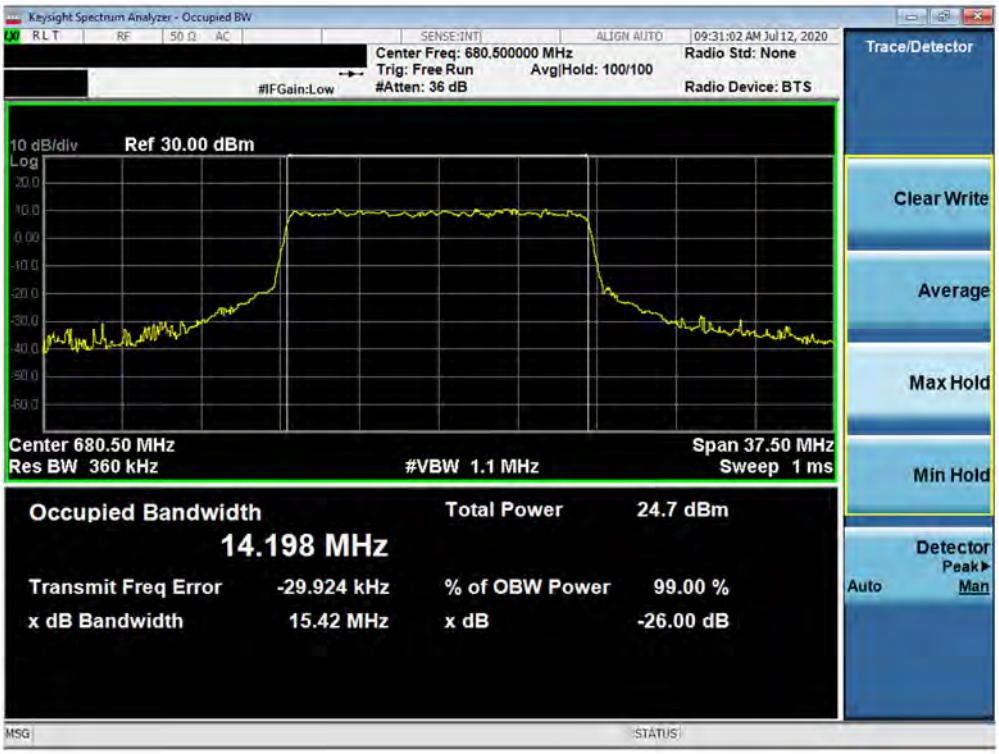
Plot 7-24. Occupied Bandwidth Plot (n71 10MHz 16QAM-CP-OFDM - Full RB Configuration)

Plot 7-25. Occupied Bandwidth Plot (n71 10MHz 64QAM-CP-OFDM- Full RB Configuration)

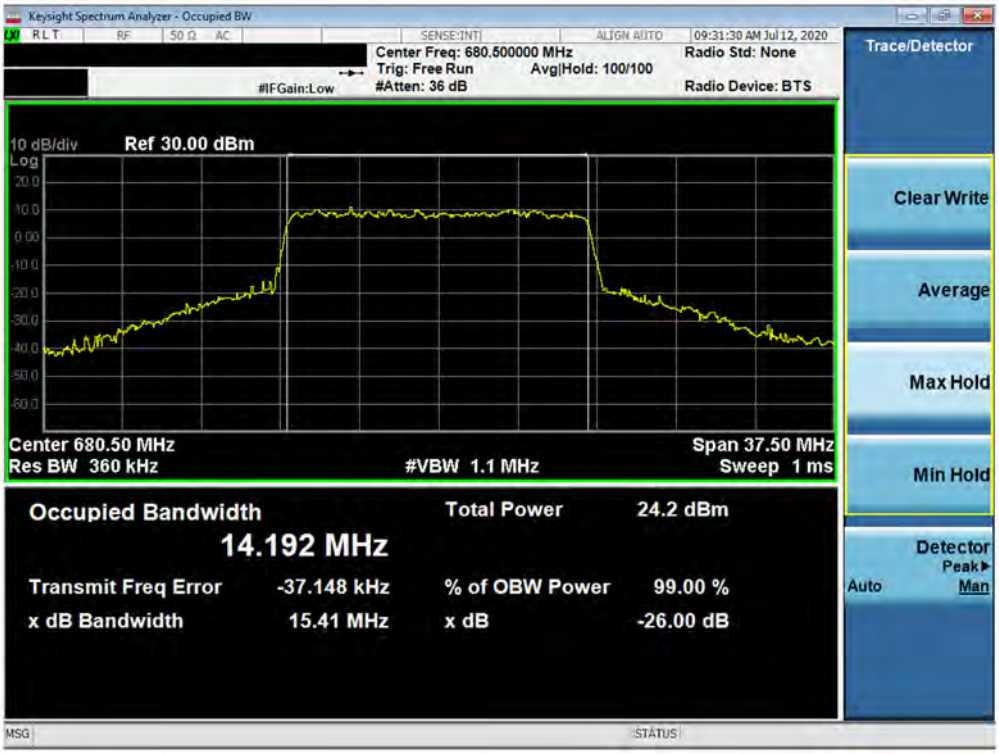


Plot 7-26. Occupied Bandwidth Plot (n71 10MHz 256QAM-CP-OFDM- Full RB Configuration)

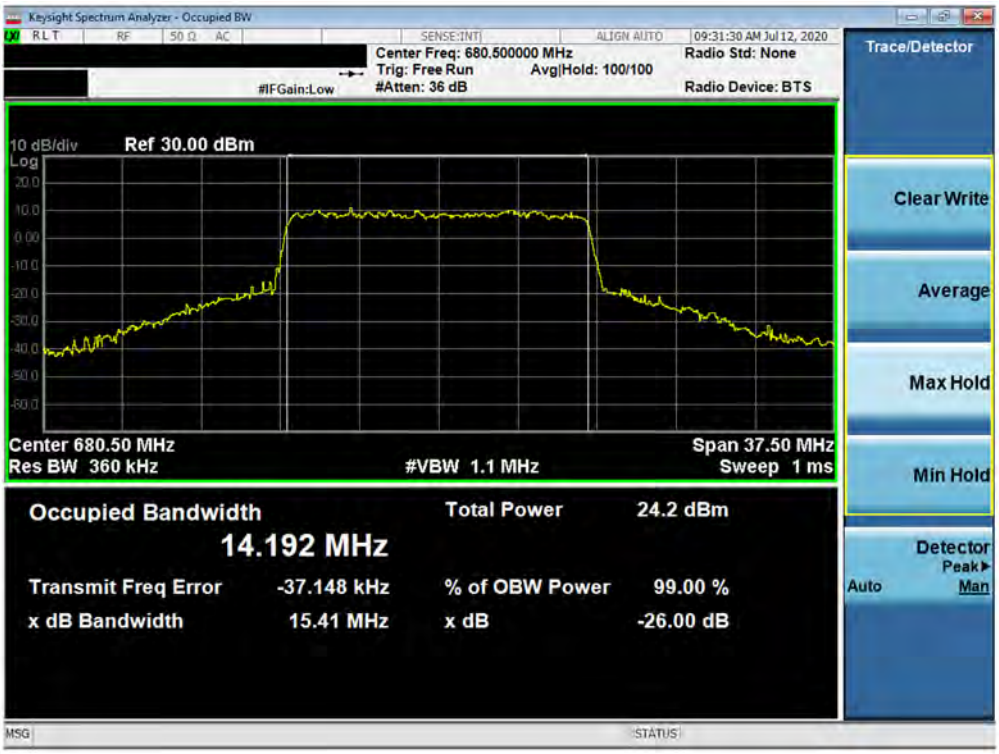
Plot 7-27. Occupied Bandwidth Plot (n71 15MHz BPSK-DFT-s-OFDM - Full RB Configuration)



Plot 7-28. Occupied Bandwidth Plot (n71 15MHz QPSK-CP-OFDM - Full RB Configuration)

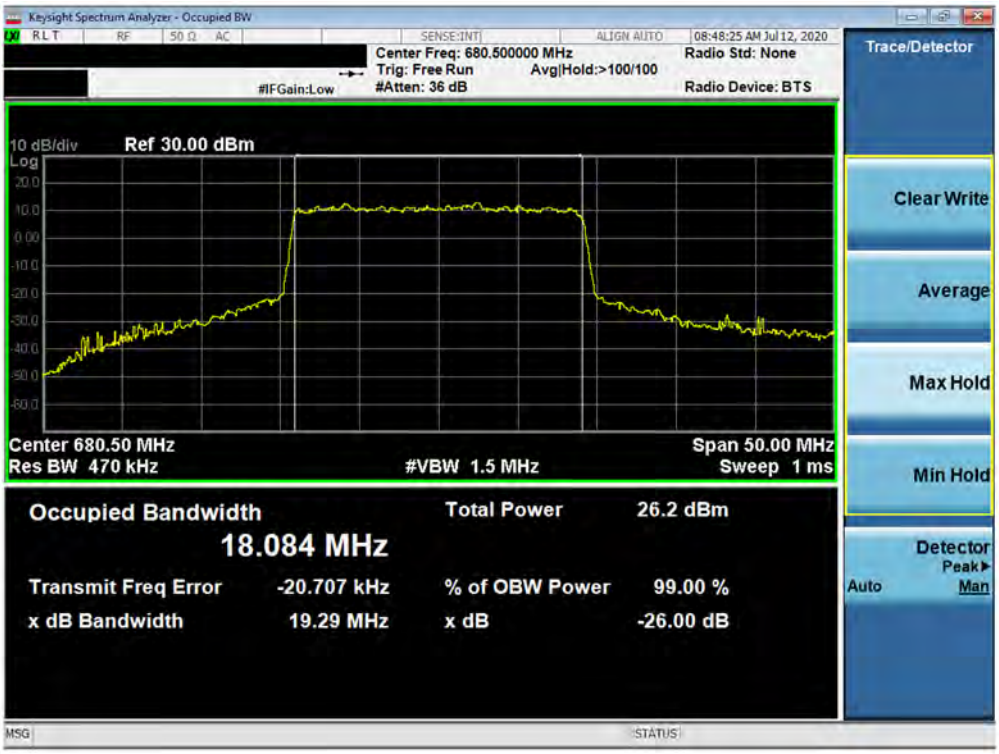


Plot 7-29. Occupied Bandwidth Plot (n71 15MHz 16QAM-CP-OFDM - Full RB Configuration)

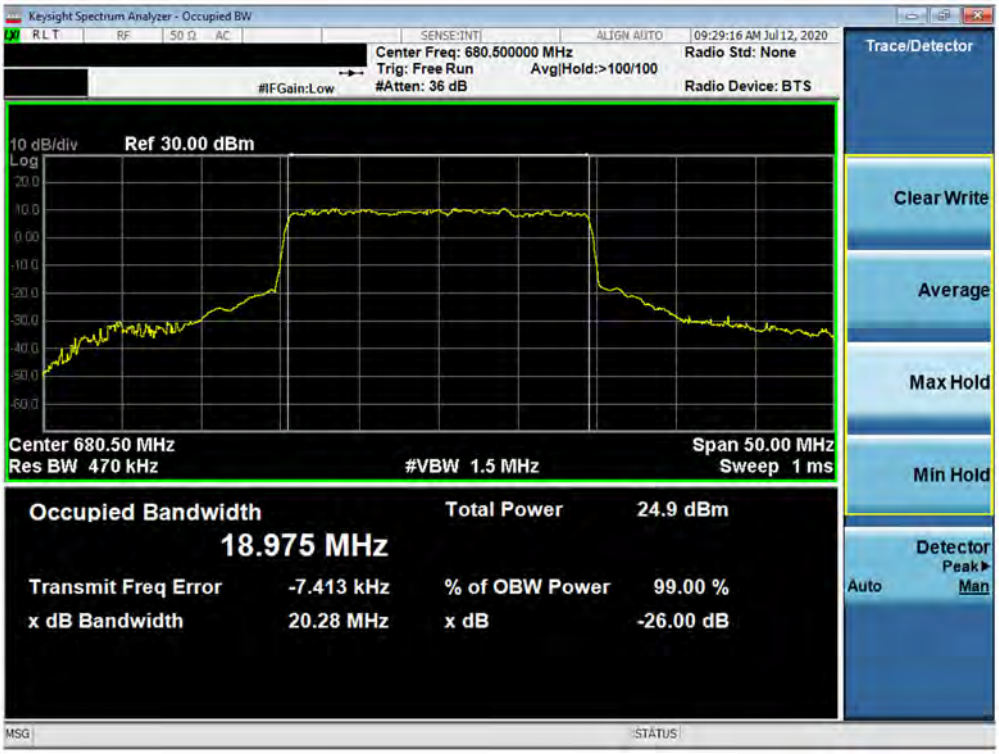


Plot 7-30. Occupied Bandwidth Plot (n71 15MHz 64QAM-CP-OFDM- Full RB Configuration)

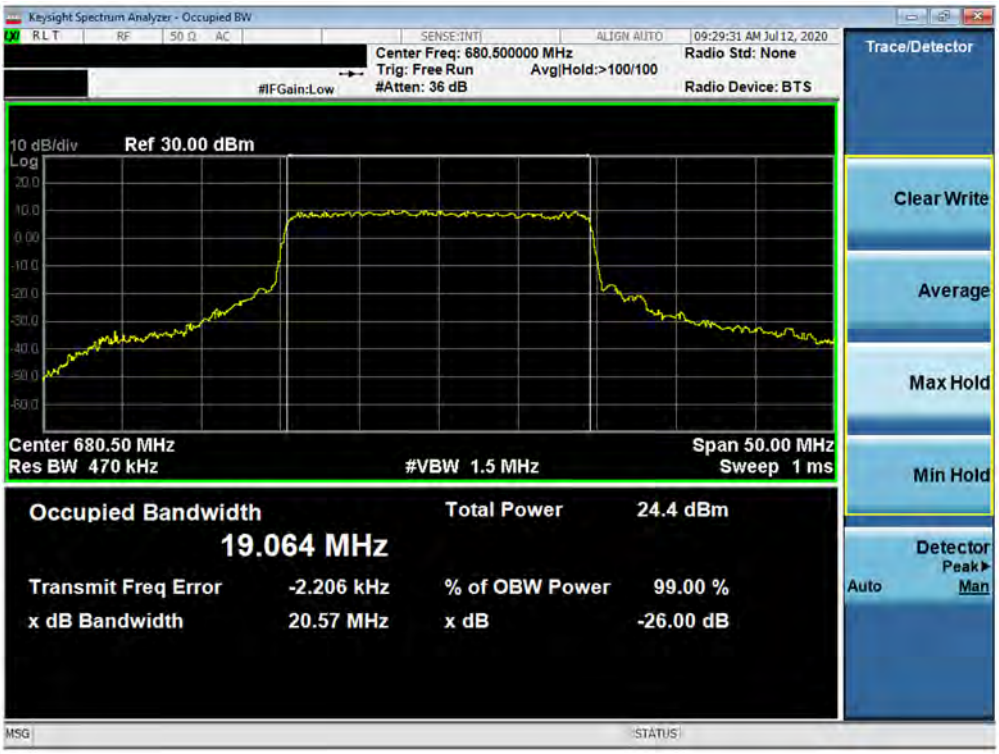
Plot 7-31. Occupied Bandwidth Plot (n71 15MHz 256QAM-CP-OFDM- Full RB Configuration)



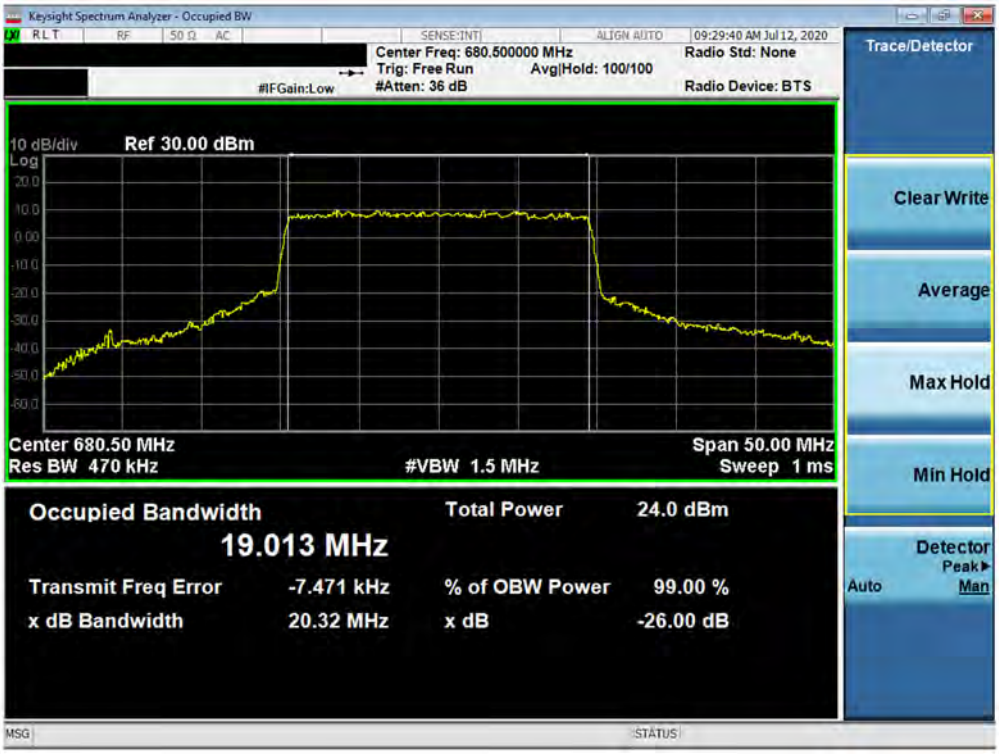
Plot 7-32. Occupied Bandwidth Plot (n71 20MHz BPSK-DFT-s-OFDM - Full RB Configuration)



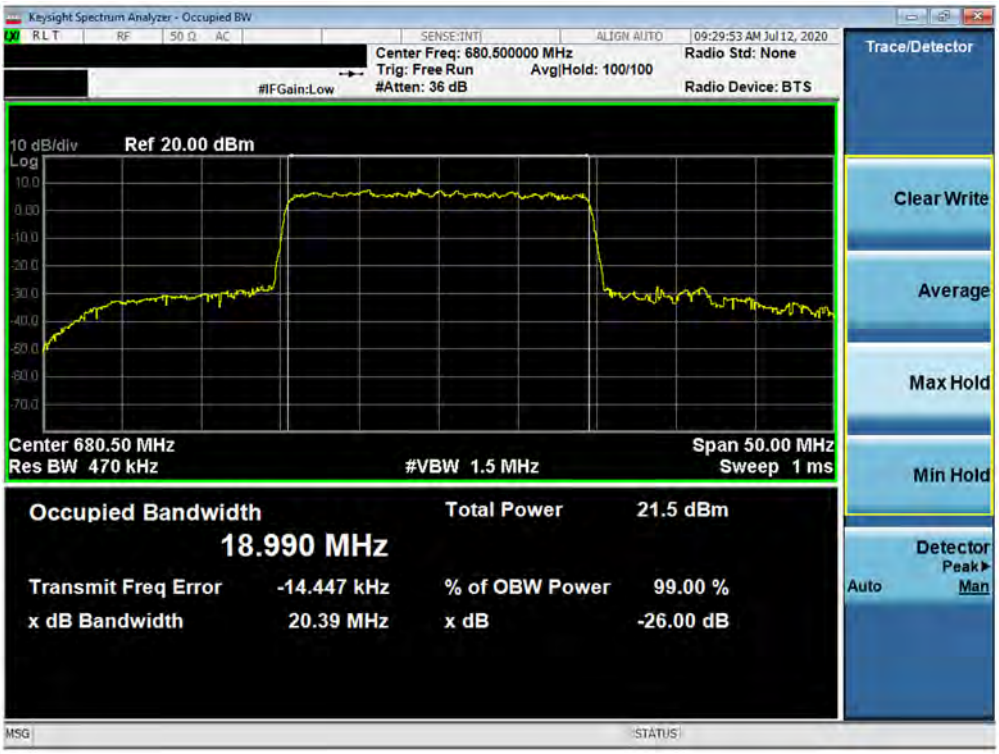
Plot 7-33. Occupied Bandwidth Plot (n71 20MHz QPSK-CP-OFDM - Full RB Configuration)



Plot 7-34. Occupied Bandwidth Plot (n71 20MHz 16QAM-CP-OFDM - Full RB Configuration)



Plot 7-35. Occupied Bandwidth Plot (n71 20MHz 64QAM-CP-OFDM- Full RB Configuration)

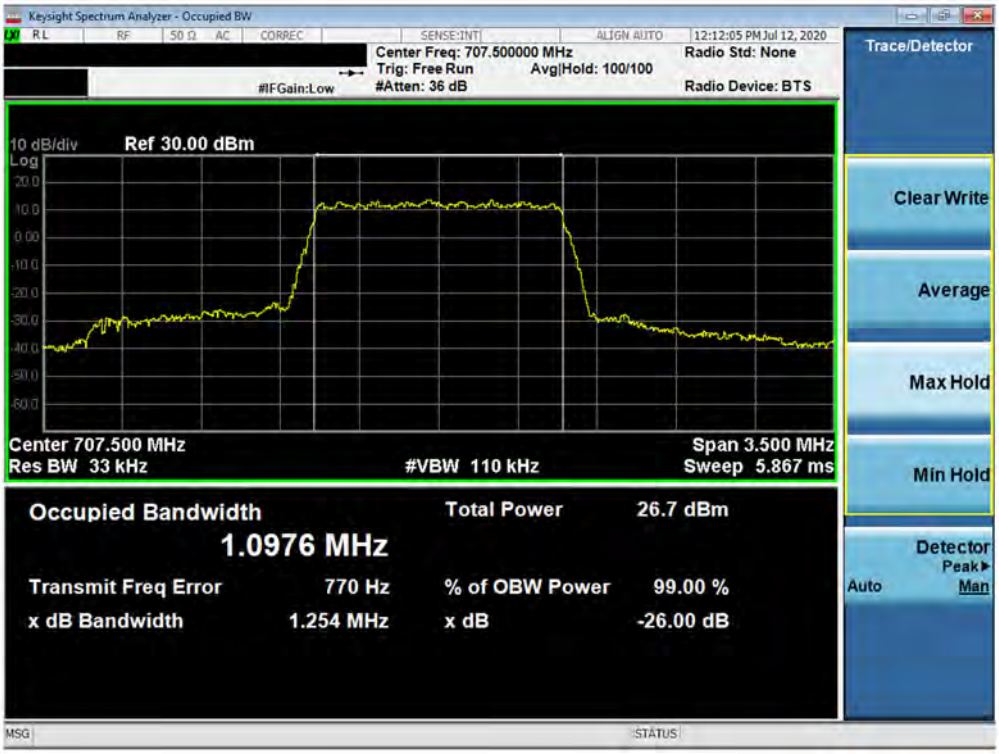


Plot 7-36. Occupied Bandwidth Plot (n71 20MHz 256QAM-CP-OFDM- Full RB Configuration)

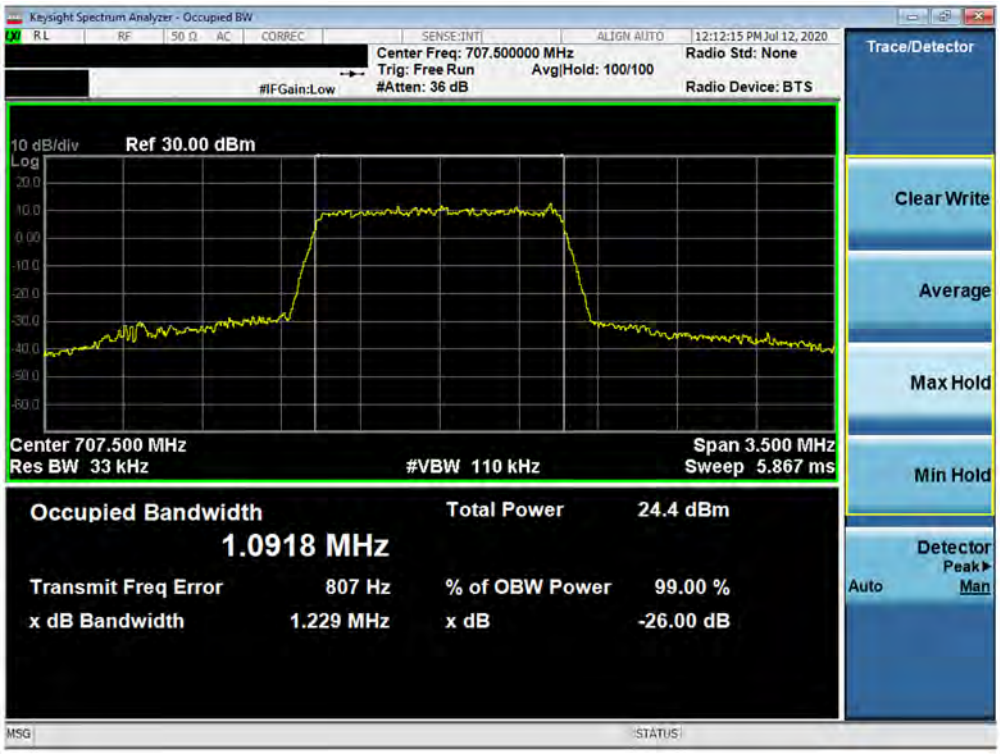
Band 12

Plot 7-37. Occupied Bandwidth Plot (Band 12 - 1.4MHz QPSK - Full RB Configuration)

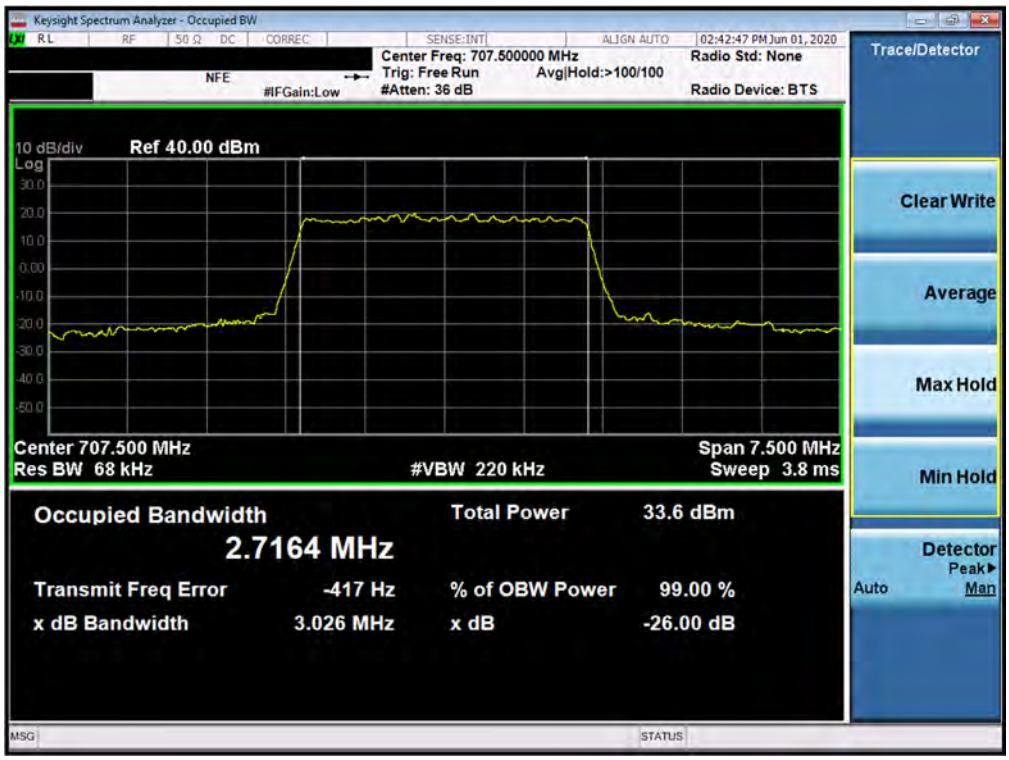
Plot 7-38. Occupied Bandwidth Plot (Band 12 - 1.4MHz 16-QAM - Full RB Configuration)



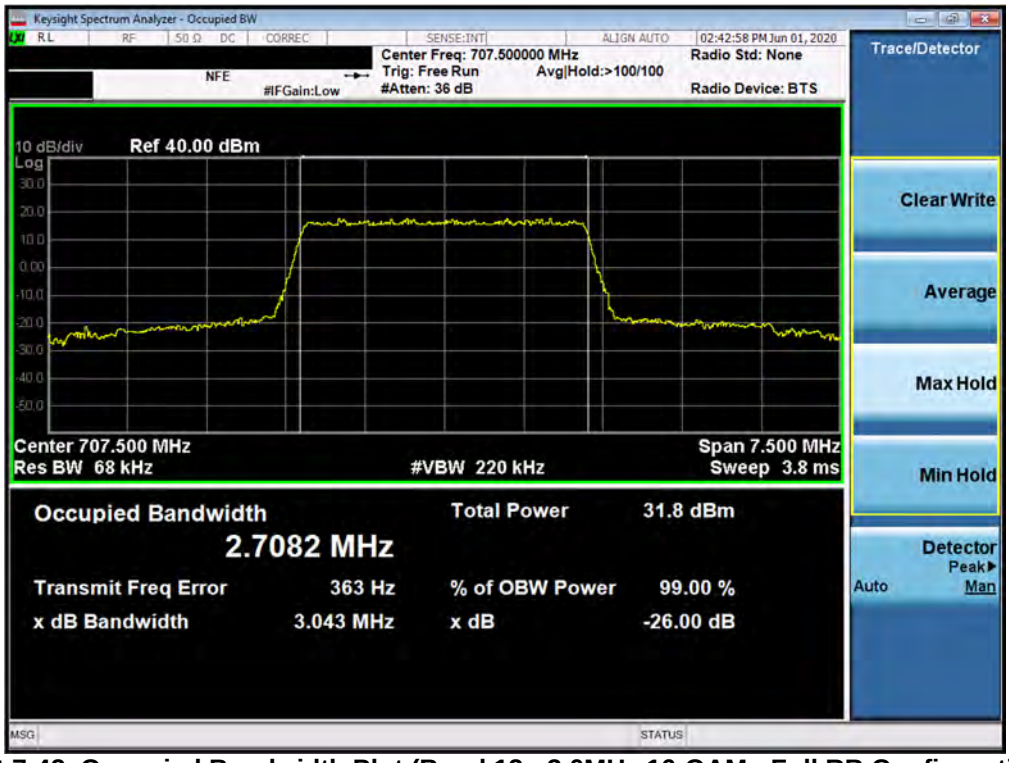
Plot 7-39. Occupied Bandwidth Plot (Band 12 - 1.4MHz 64-QAM - Full RB Configuration)



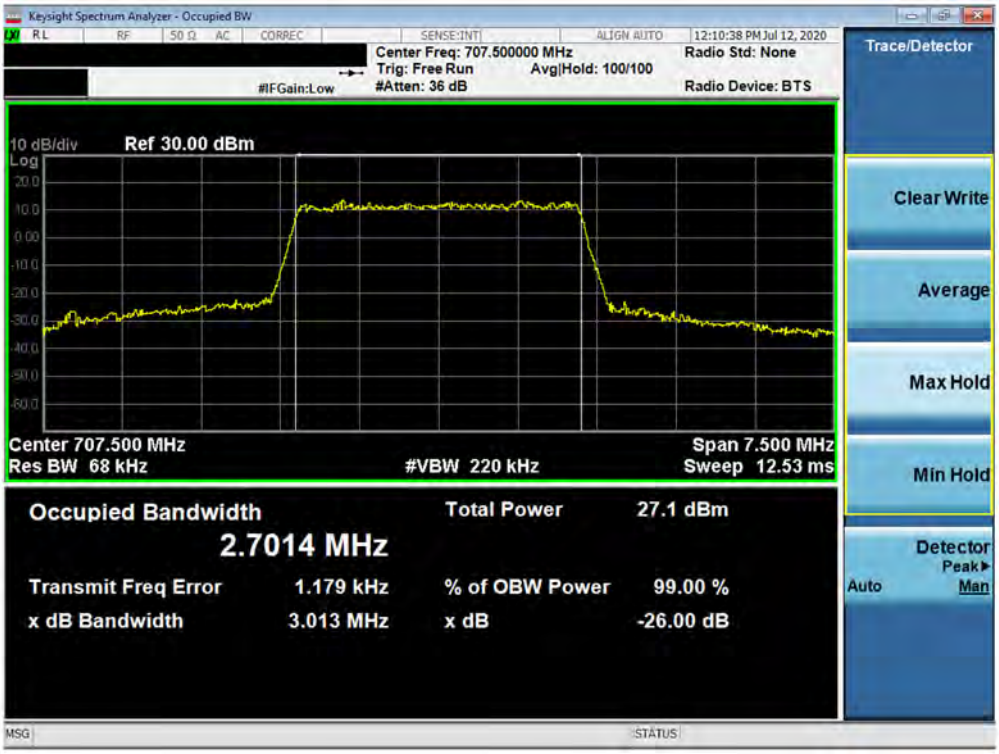
Plot 7-40. Occupied Bandwidth Plot (Band 12 - 1.4MHz 256-QAM - Full RB Configuration)



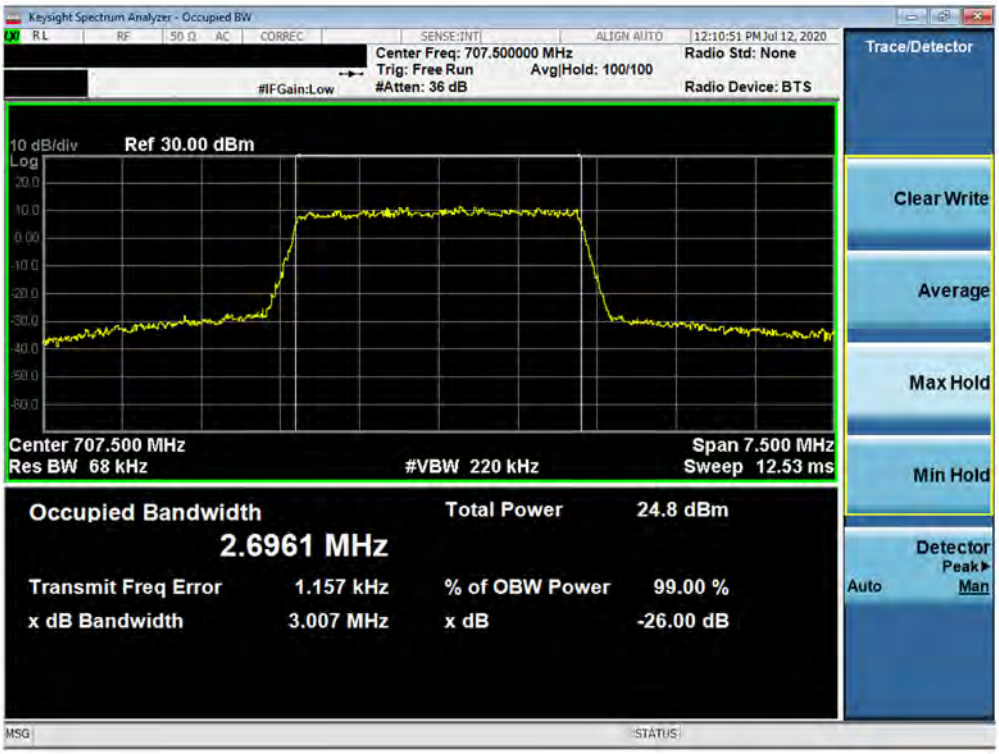
Plot 7-41. Occupied Bandwidth Plot (Band 12 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-42. Occupied Bandwidth Plot (Band 12 - 3.0MHz 16-QAM - Full RB Configuration)

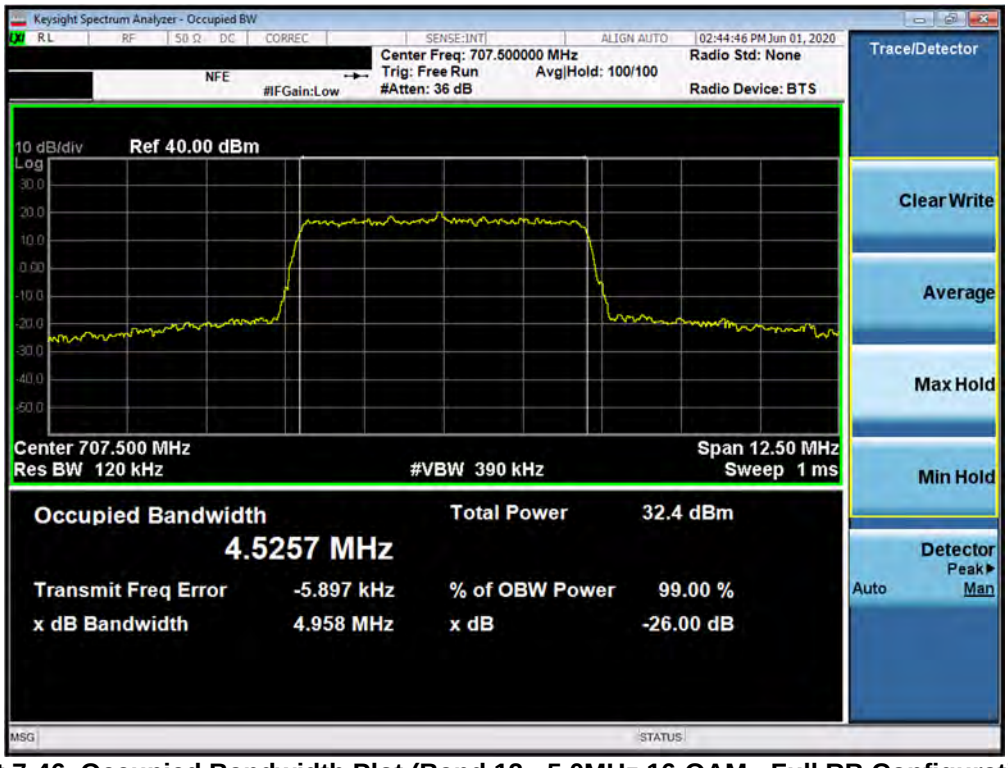


Plot 7-43. Occupied Bandwidth Plot (Band 12 - 3.0MHz 64-QAM - Full RB Configuration)



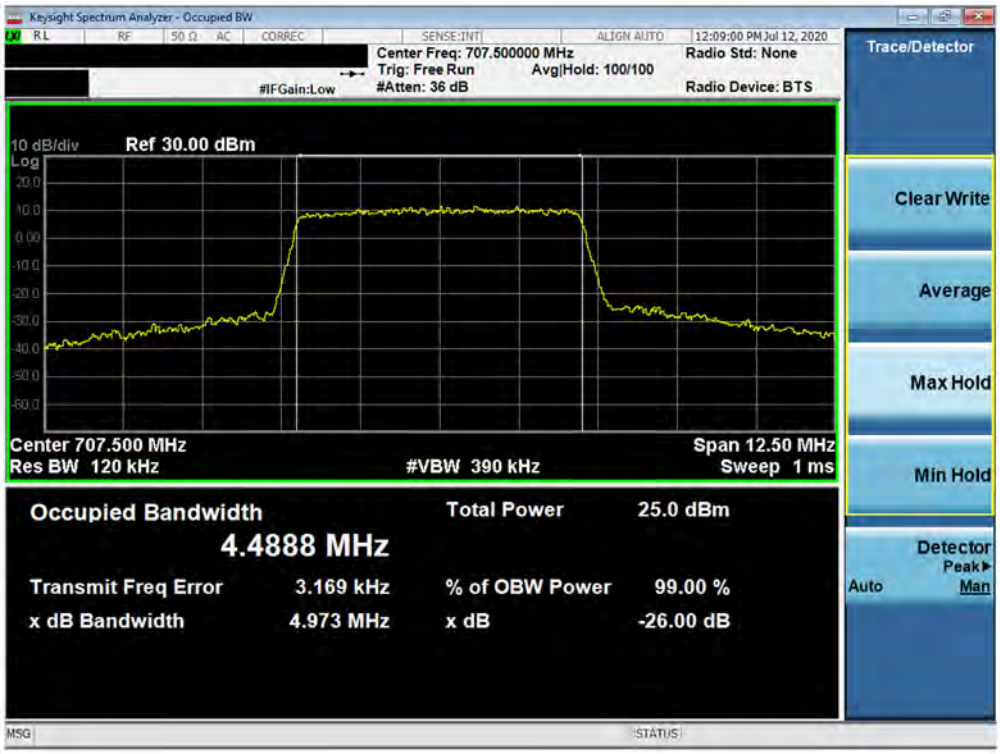
Plot 7-44. Occupied Bandwidth Plot (Band 12 - 3.0MHz 256-QAM - Full RB Configuration)

Plot 7-45. Occupied Bandwidth Plot (Band 12 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-46. Occupied Bandwidth Plot (Band 12 - 5.0MHz 16-QAM - Full RB Configuration)

Plot 7-47. Occupied Bandwidth Plot (Band 12 - 5.0MHz 64-QAM - Full RB Configuration)

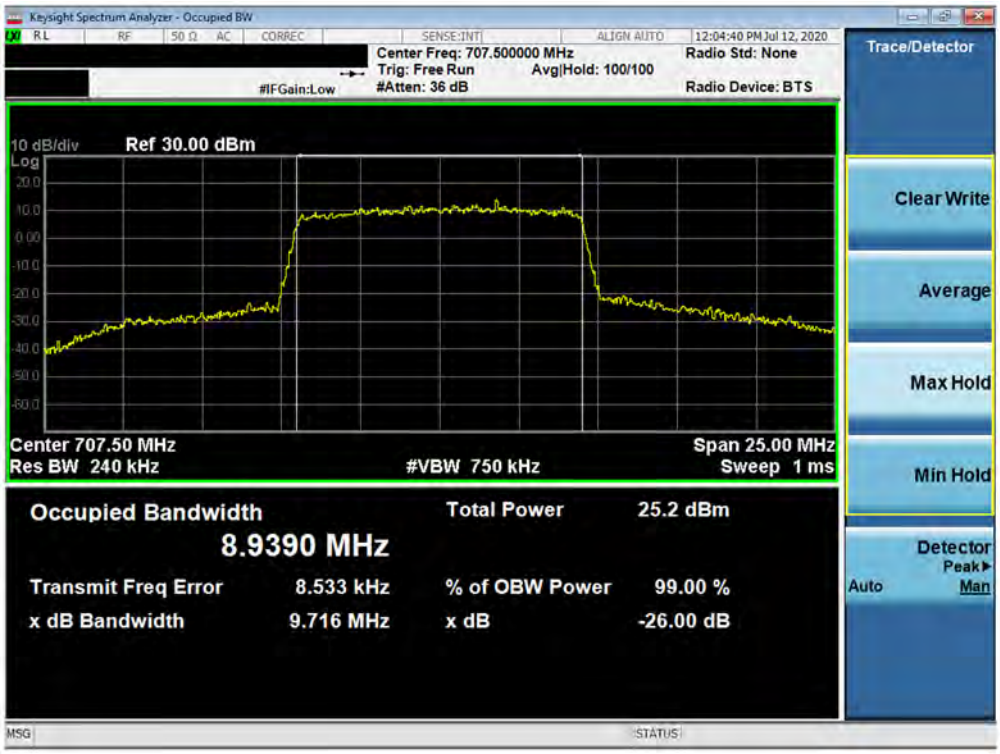


Plot 7-48. Occupied Bandwidth Plot (Band 12 - 5.0MHz 256-QAM - Full RB Configuration)

Plot 7-49. Occupied Bandwidth Plot (Band 12 - 10.0MHz QPSK - Full RB Configuration)

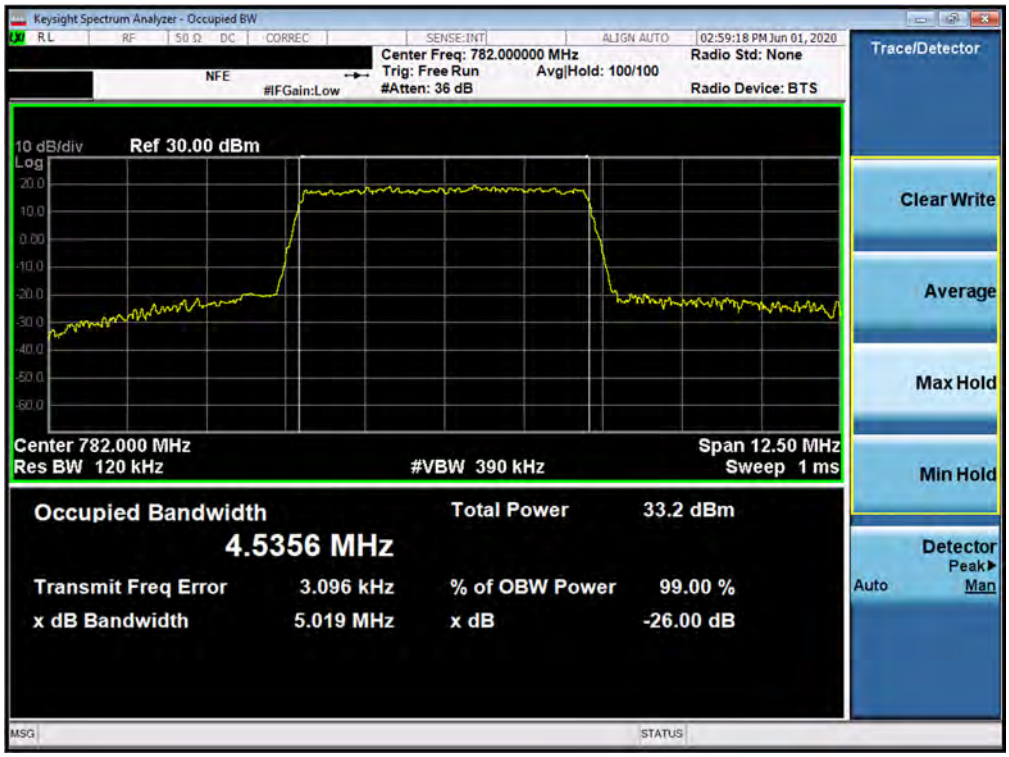
Plot 7-50. Occupied Bandwidth Plot (Band 12 - 10.0MHz 16-QAM - Full RB Configuration)

Plot 7-51. Occupied Bandwidth Plot (Band 12 - 10.0MHz 64-QAM - Full RB Configuration)



Plot 7-52. Occupied Bandwidth Plot (Band 12 - 10.0MHz 256-QAM - Full RB Configuration)

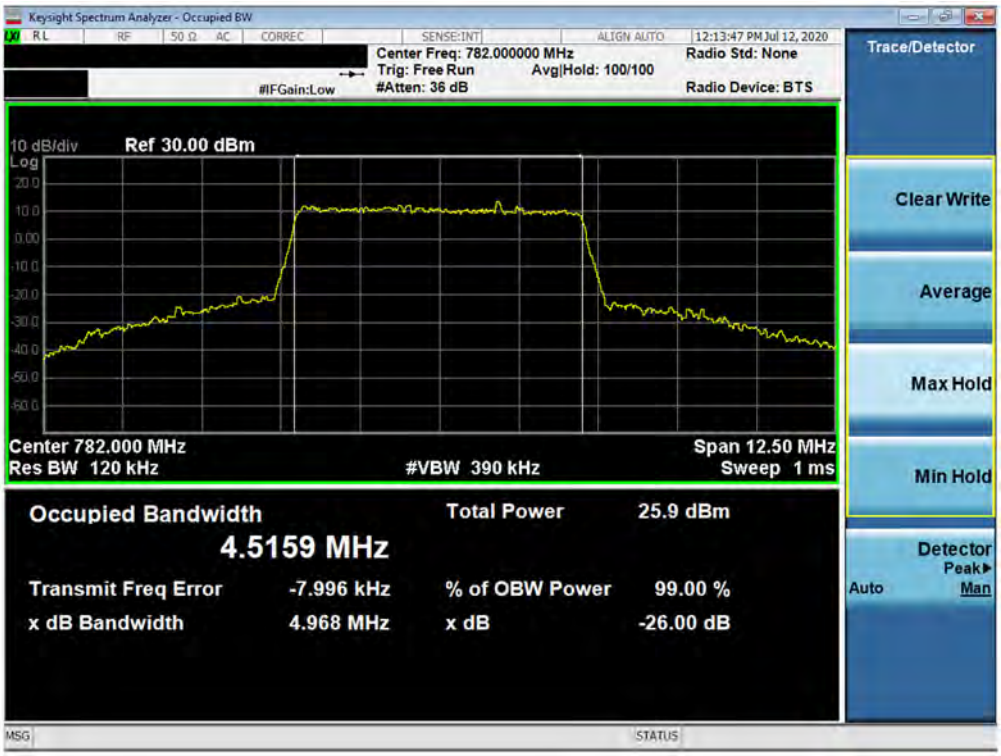
Band 13



Plot 7-53. Occupied Bandwidth Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)

Plot 7-54. Occupied Bandwidth Plot (Band 13 - 5.0MHz 16-QAM - Full RB Configuration)

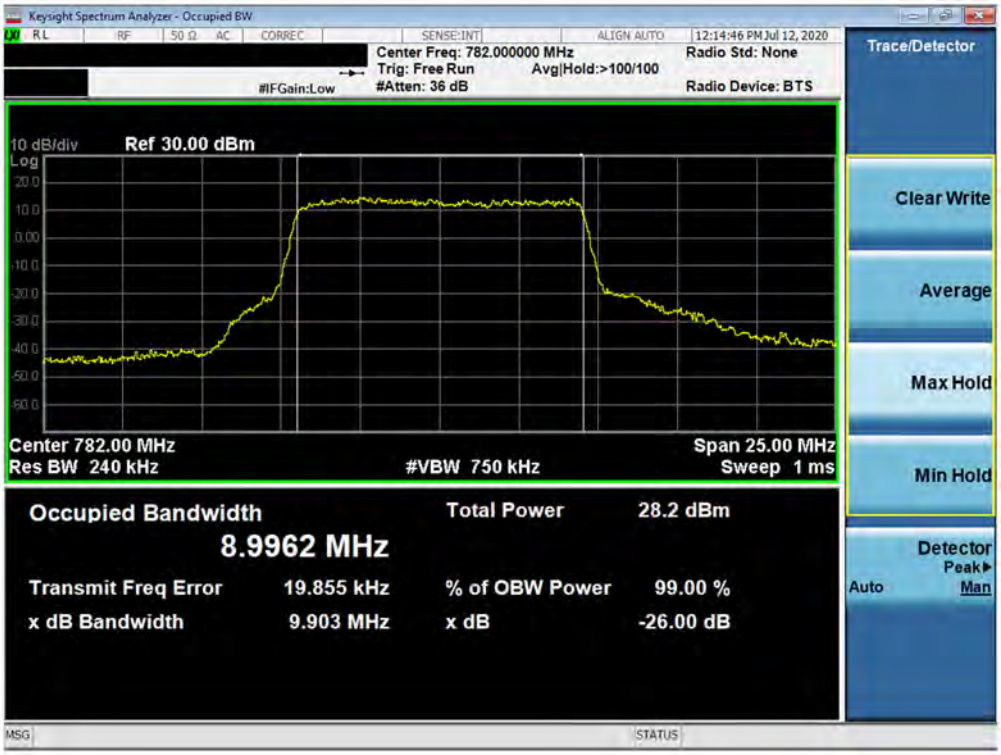
Plot 7-55. Occupied Bandwidth Plot (Band 13 - 5.0MHz 64-QAM - Full RB Configuration)



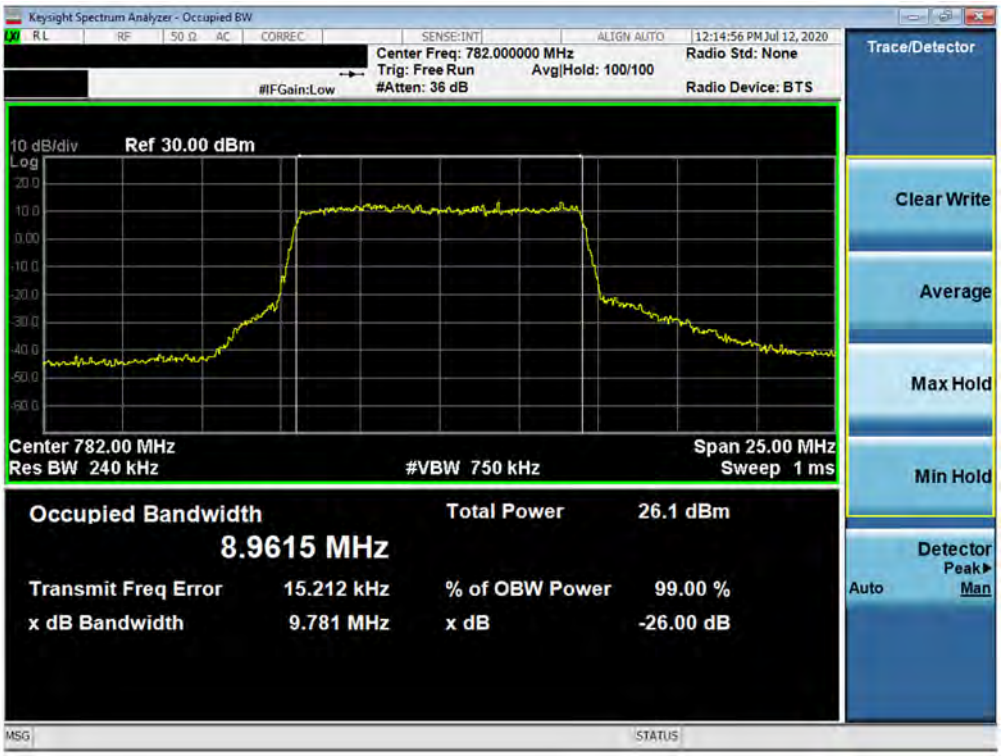
Plot 7-56. Occupied Bandwidth Plot (Band 13 - 5.0MHz 256-QAM - Full RB Configuration)

Plot 7-57. Occupied Bandwidth Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)

Plot 7-58. Occupied Bandwidth Plot (Band 13 - 10.0MHz 16-QAM - Full RB Configuration)

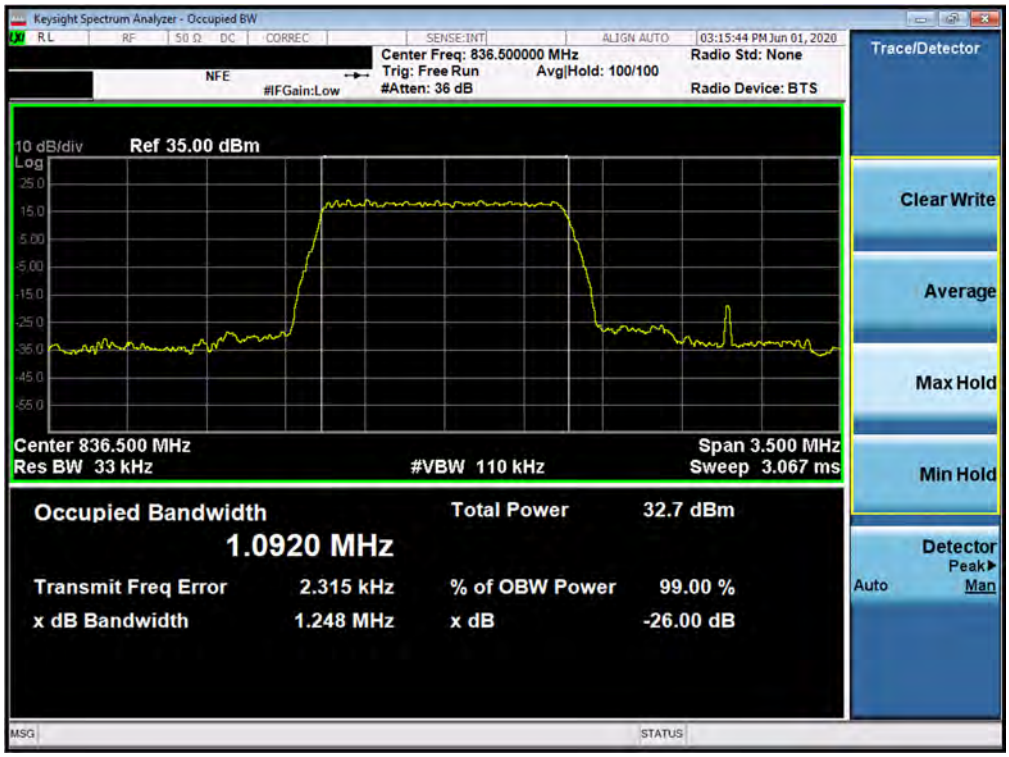


Plot 7-59. Occupied Bandwidth Plot (Band 13 - 10.0MHz 64-QAM - Full RB Configuration)



Plot 7-60. Occupied Bandwidth Plot (Band 13 - 10.0MHz 256-QAM - Full RB Configuration)

Band 5



Plot 7-61. Occupied Bandwidth Plot (Band 5 - 1.4MHz QPSK - Full RB Configuration)

Plot 7-62. Occupied Bandwidth Plot (Band 5 - 1.4MHz 16-QAM - Full RB Configuration)

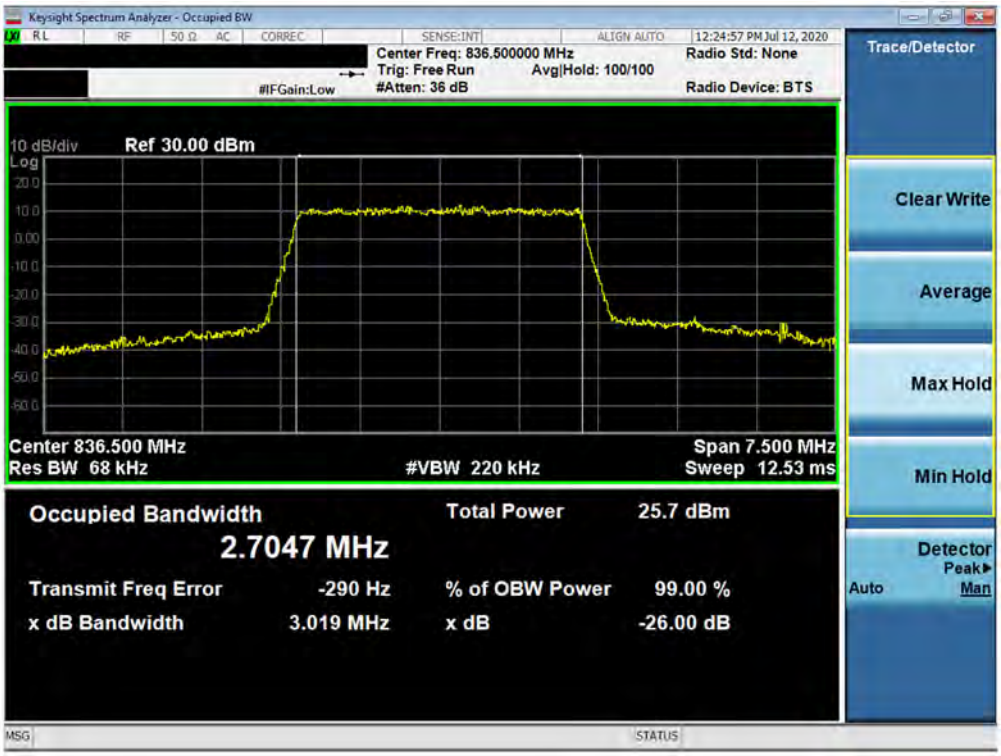
Plot 7-63. Occupied Bandwidth Plot (Band 5 - 1.4MHz 64-QAM - Full RB Configuration)

Plot 7-64. Occupied Bandwidth Plot (Band 5 - 1.4MHz 256-QAM - Full RB Configuration)

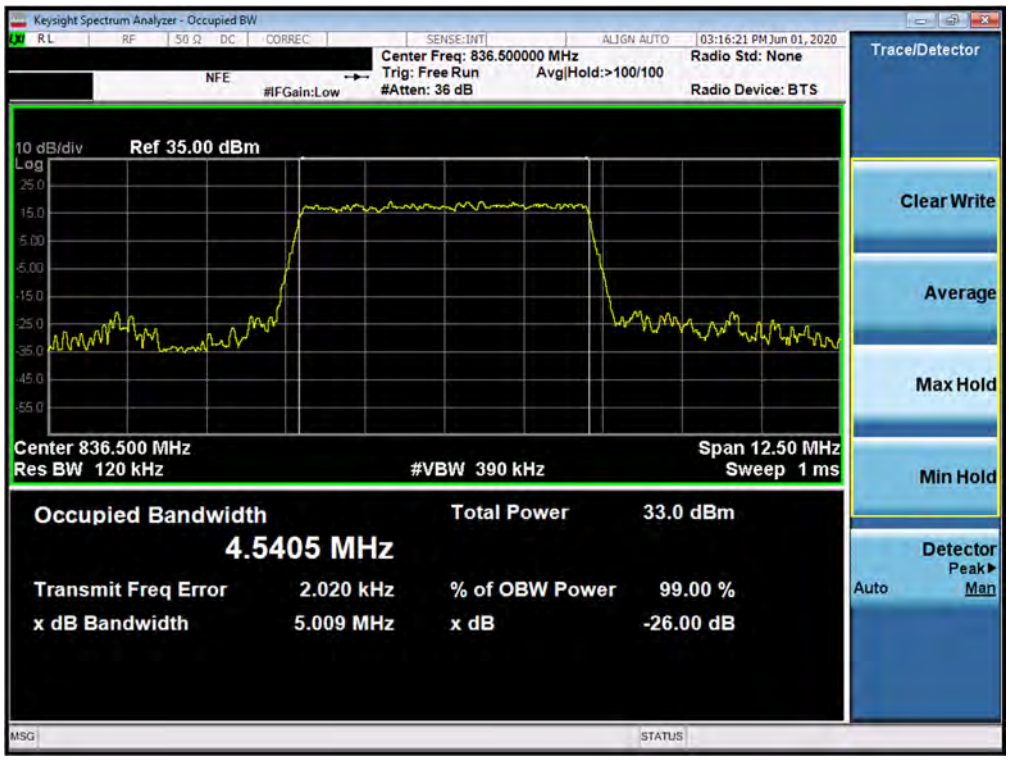
Plot 7-65. Occupied Bandwidth Plot (Band 5 - 3.0MHz QPSK - Full RB Configuration)

Plot 7-66. Occupied Bandwidth Plot (Band 5 - 3.0MHz 16-QAM - Full RB Configuration)

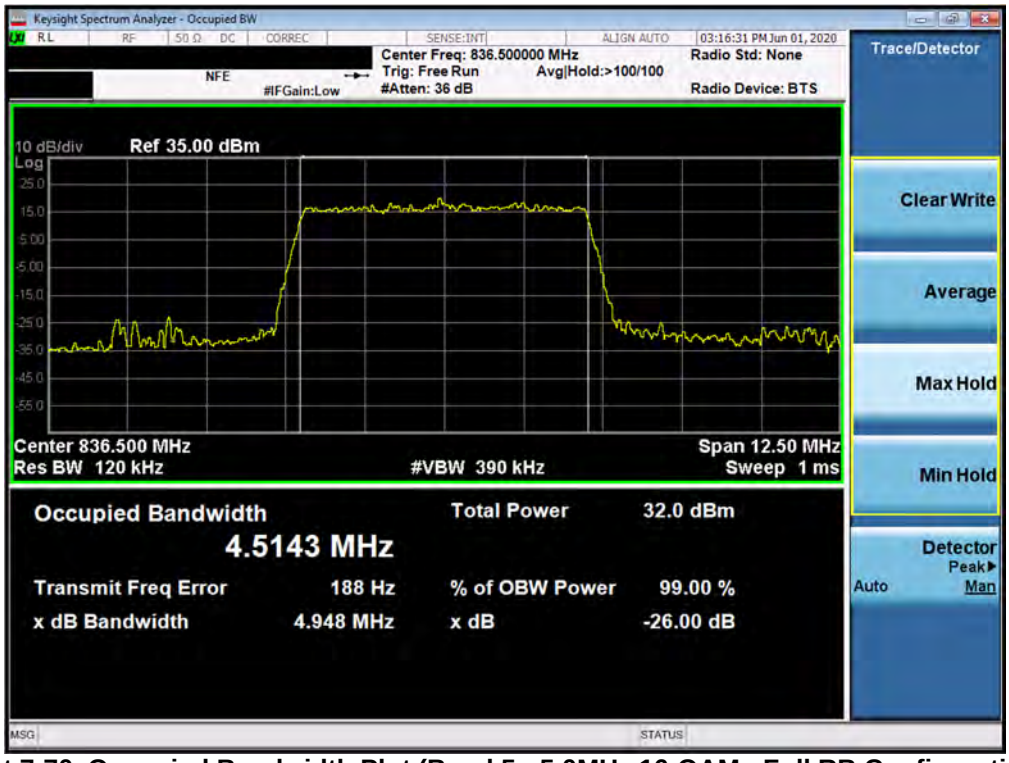
Plot 7-67. Occupied Bandwidth Plot (Band 5 - 3.0MHz 64-QAM - Full RB Configuration)



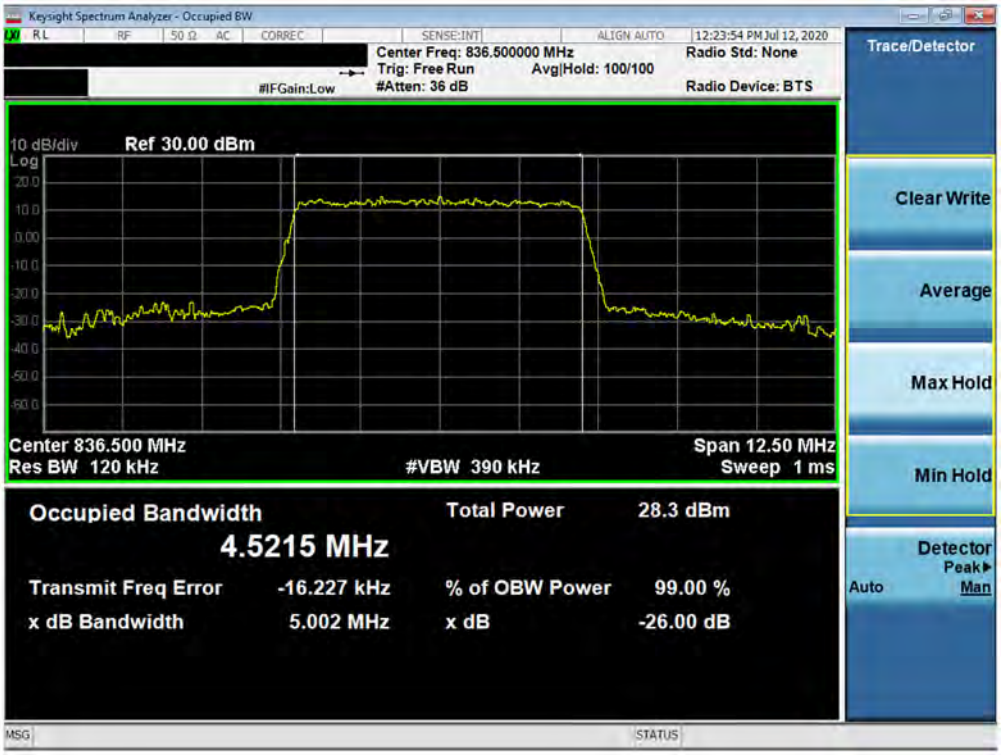
Plot 7-68. Occupied Bandwidth Plot (Band 5 - 3.0MHz 256-QAM - Full RB Configuration)



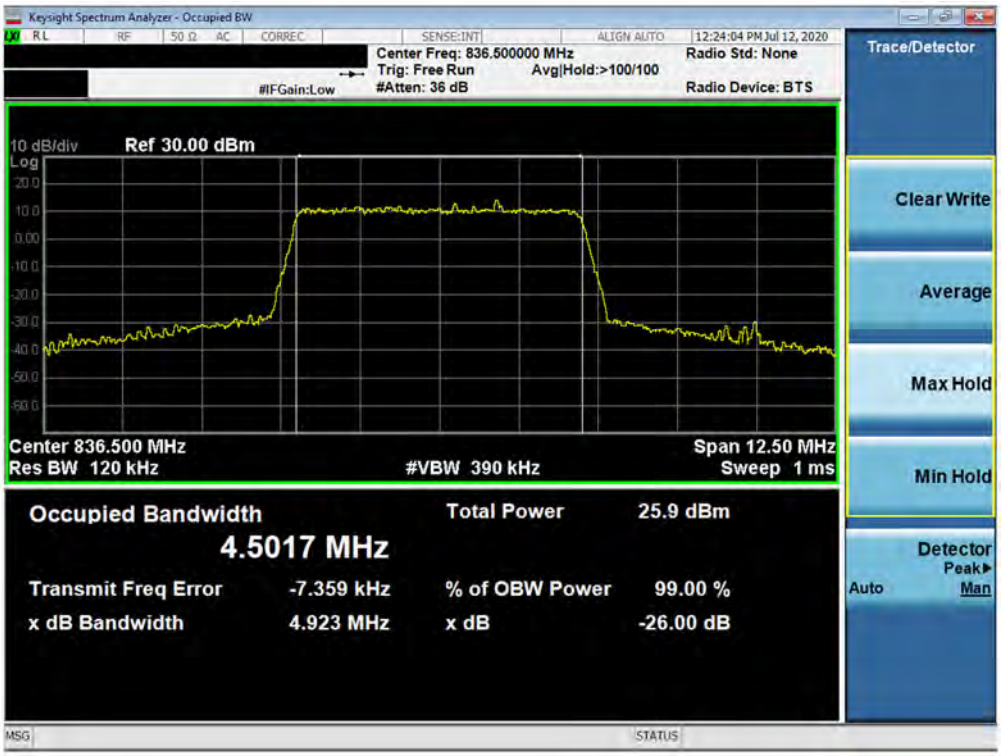
Plot 7-69. Occupied Bandwidth Plot (Band 5 - 5.0MHz QPSK - Full RB Configuration)



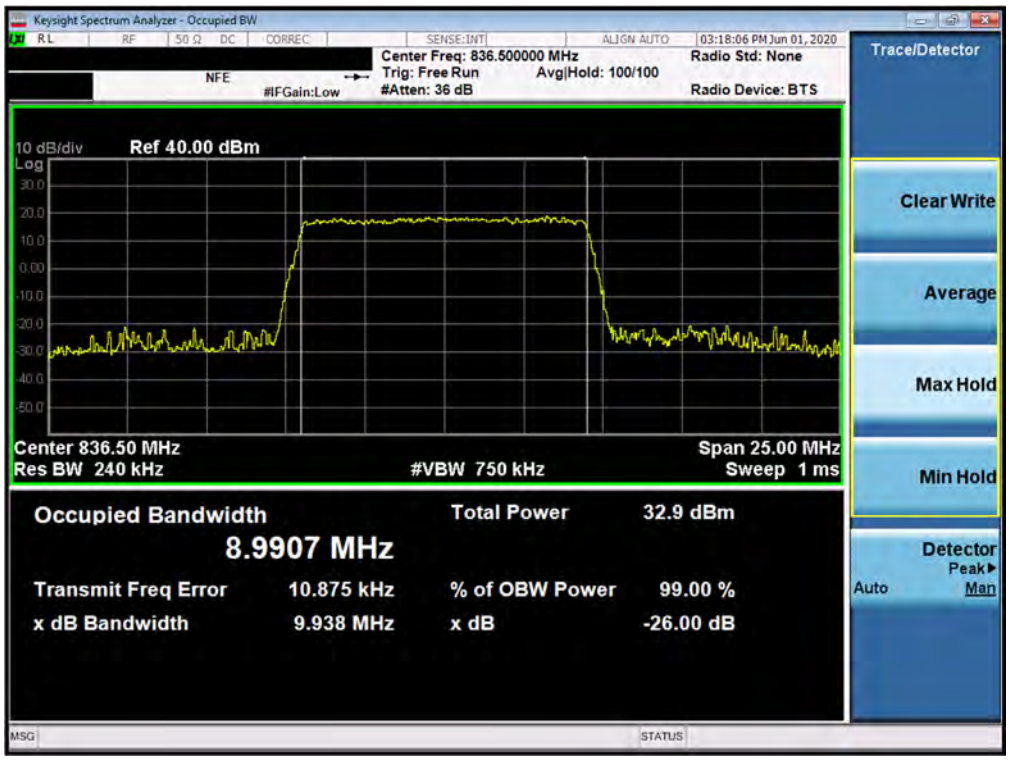
Plot 7-70. Occupied Bandwidth Plot (Band 5 - 5.0MHz 16-QAM - Full RB Configuration)



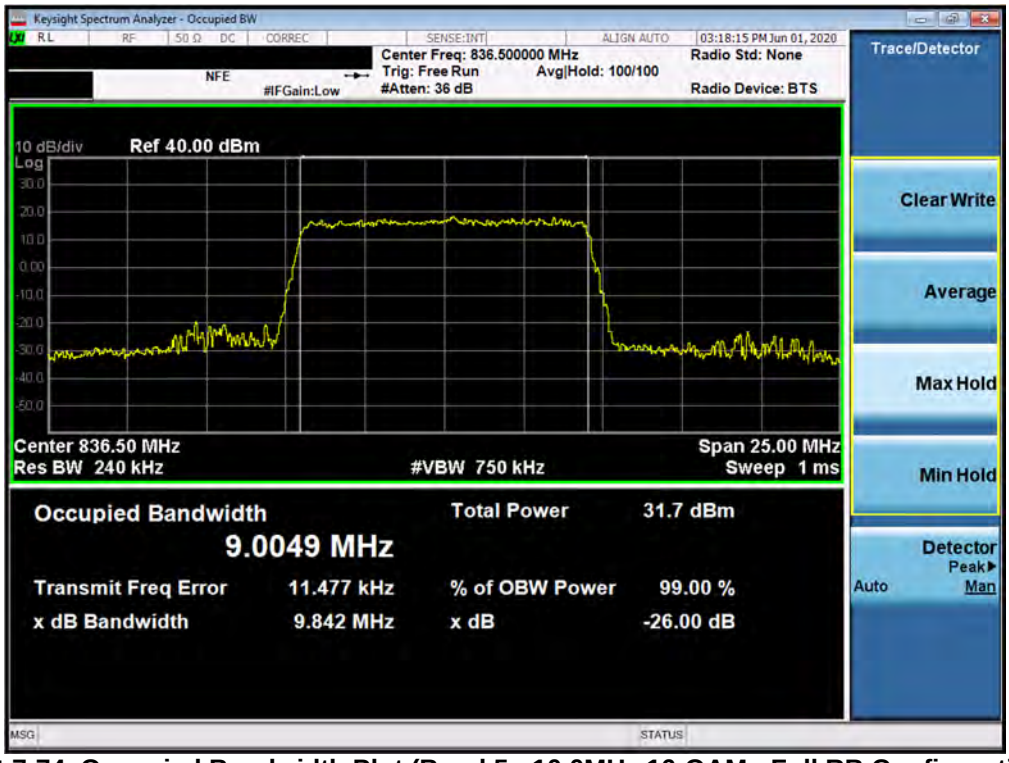
Plot 7-71. Occupied Bandwidth Plot (Band 5 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-72. Occupied Bandwidth Plot (Band 5 - 5.0MHz 256-QAM - Full RB Configuration)

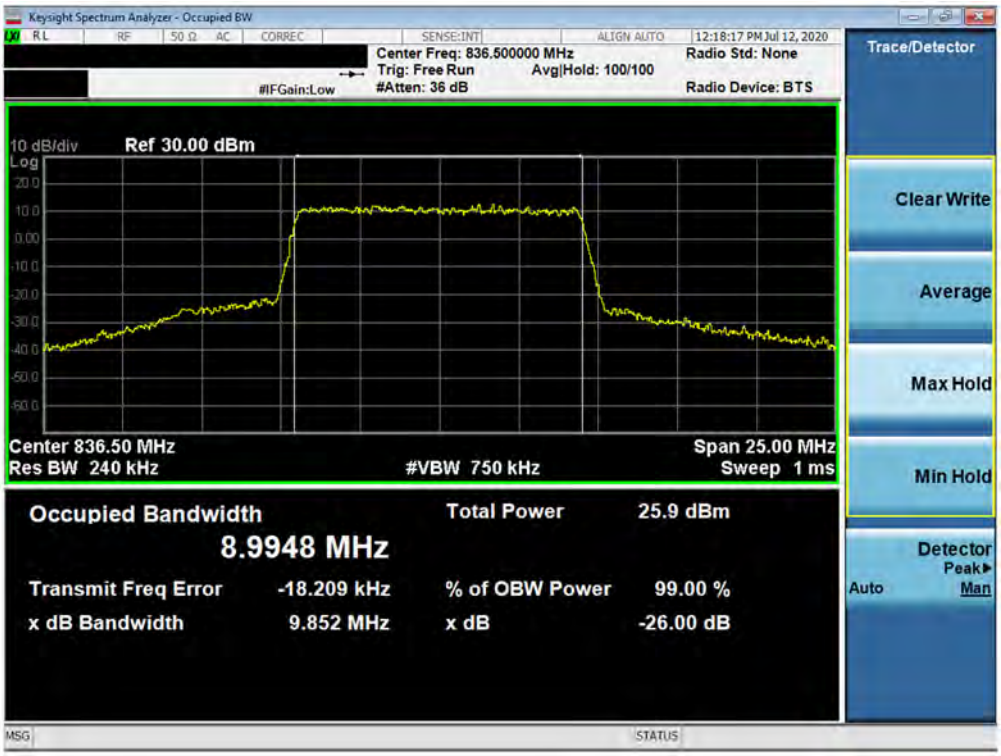


Plot 7-73. Occupied Bandwidth Plot (Band 5 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-74. Occupied Bandwidth Plot (Band 5 - 10.0MHz 16-QAM - Full RB Configuration)

Plot 7-75. Occupied Bandwidth Plot (Band 5 - 10.0MHz 64-QAM - Full RB Configuration)



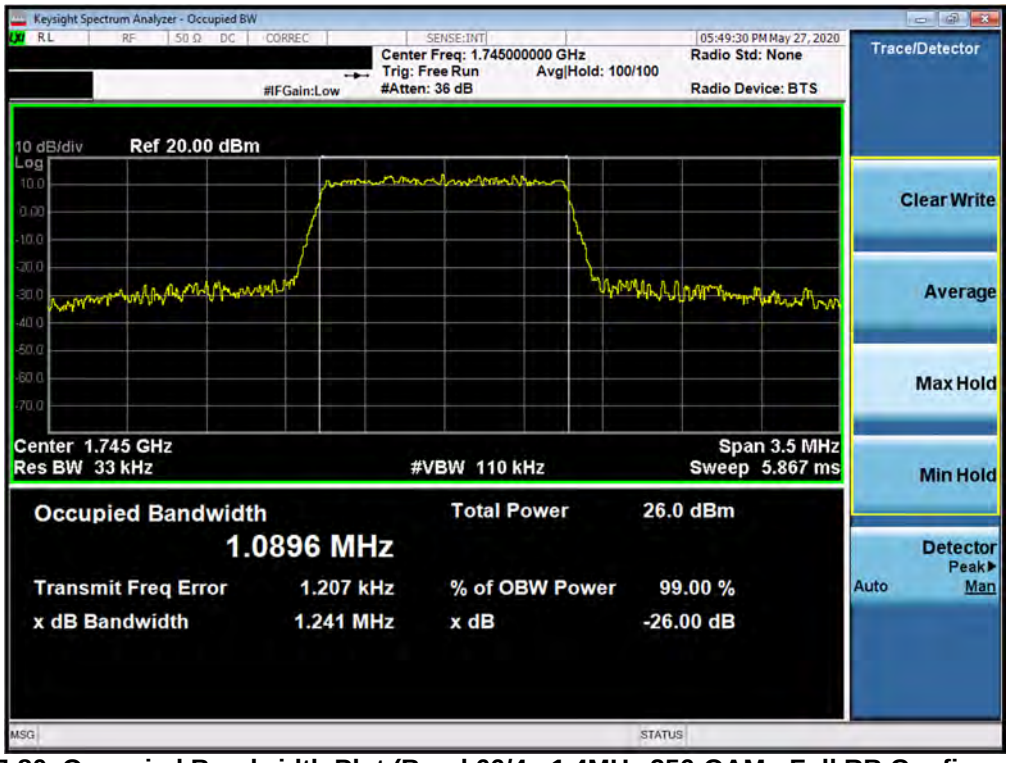
Plot 7-76. Occupied Bandwidth Plot (Band 5 - 10.0MHz 256-QAM - Full RB Configuration)

Band 66/4

Plot 7-77. Occupied Bandwidth Plot (Band 66/4 - 1.4MHz QPSK - Full RB Configuration)

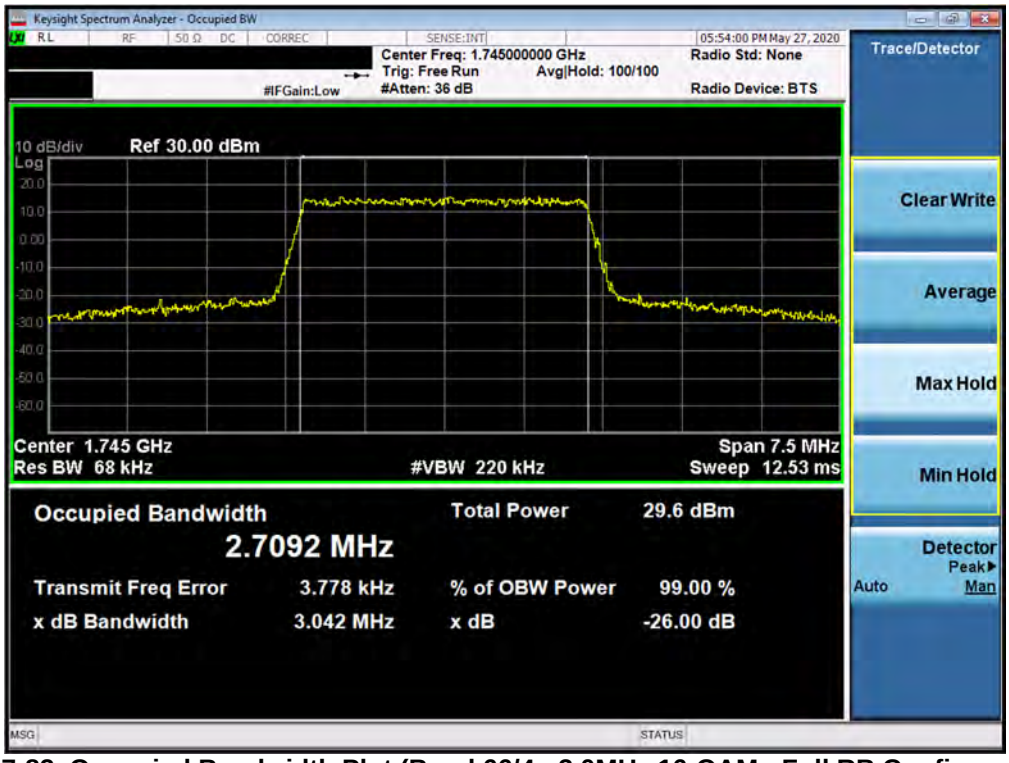
Plot 7-78. Occupied Bandwidth Plot (Band 66/4 - 1.4MHz 16-QAM - Full RB Configuration)

Plot 7-79. Occupied Bandwidth Plot (Band 66/4 - 1.4MHz 64-QAM - Full RB Configuration)



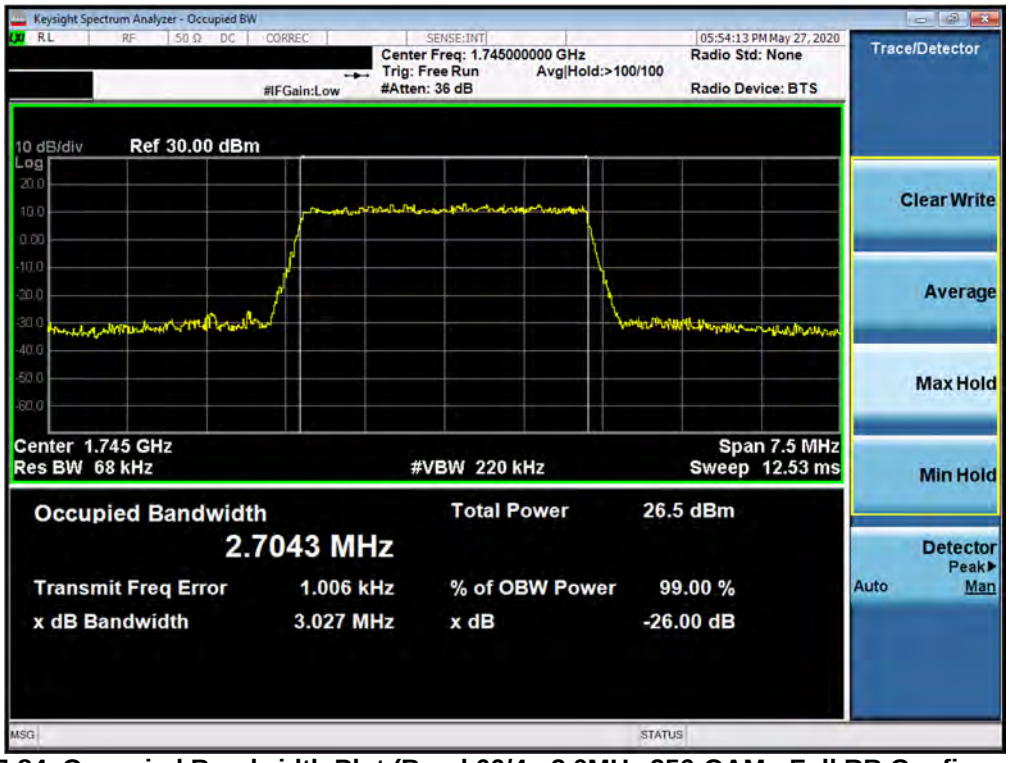
Plot 7-80. Occupied Bandwidth Plot (Band 66/4 - 1.4MHz 256-QAM - Full RB Configuration)

Plot 7-81. Occupied Bandwidth Plot (Band 66/4 - 3.0MHz QPSK - Full RB Configuration)

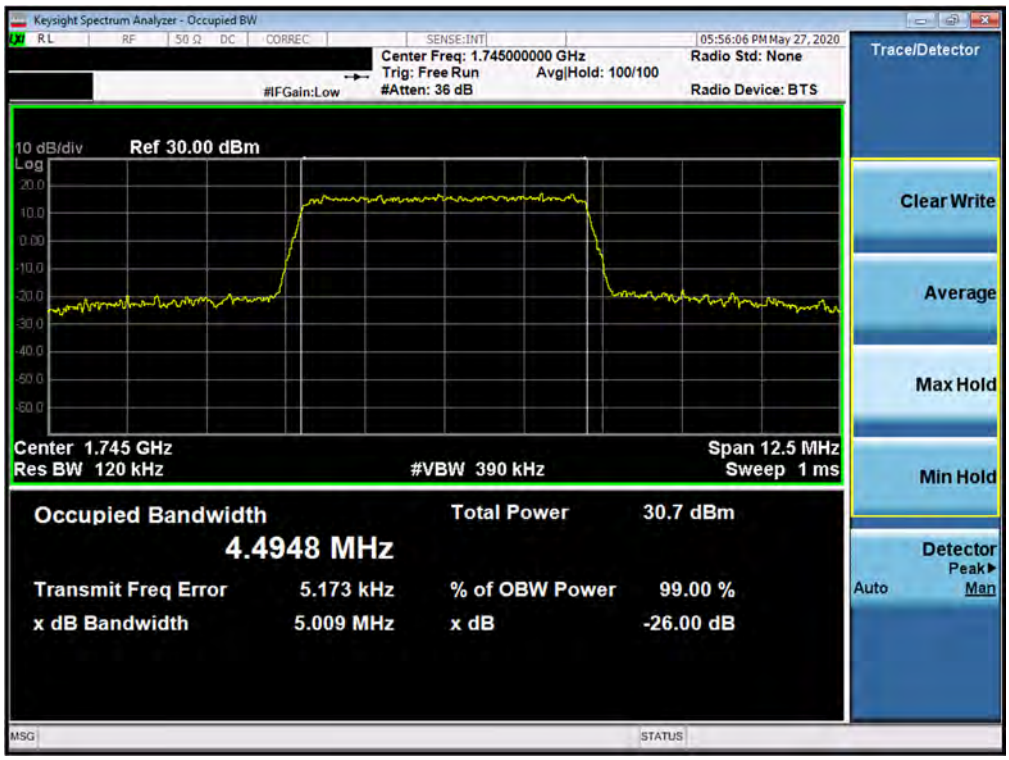


Plot 7-82. Occupied Bandwidth Plot (Band 66/4 - 3.0MHz 16-QAM - Full RB Configuration)

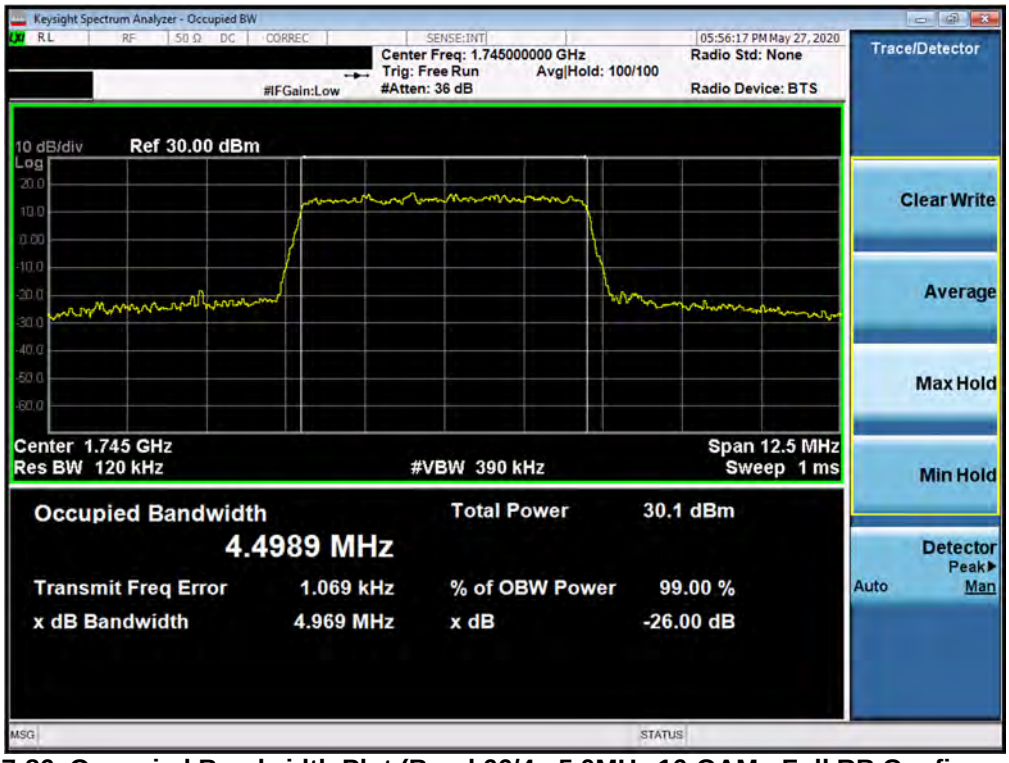
Plot 7-83. Occupied Bandwidth Plot (Band 66/4 - 3.0MHz 64-QAM - Full RB Configuration)



Plot 7-84. Occupied Bandwidth Plot (Band 66/4 - 3.0MHz 256-QAM - Full RB Configuration)

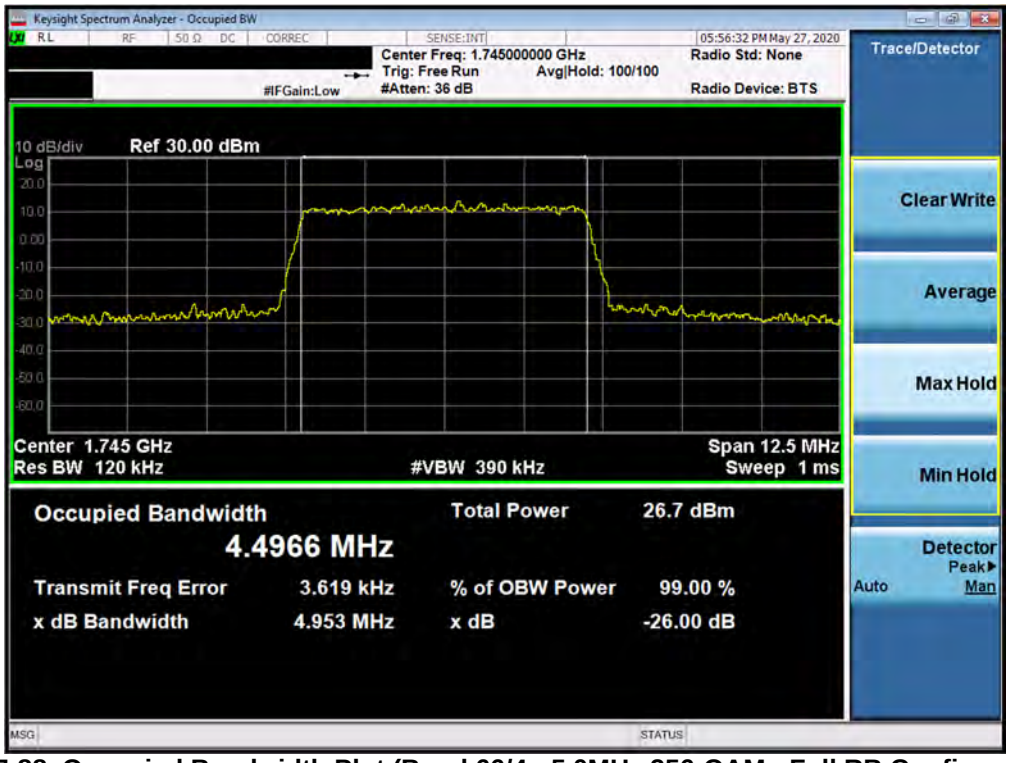


Plot 7-85. Occupied Bandwidth Plot (Band 66/4 - 5.0MHz QPSK - Full RB Configuration)



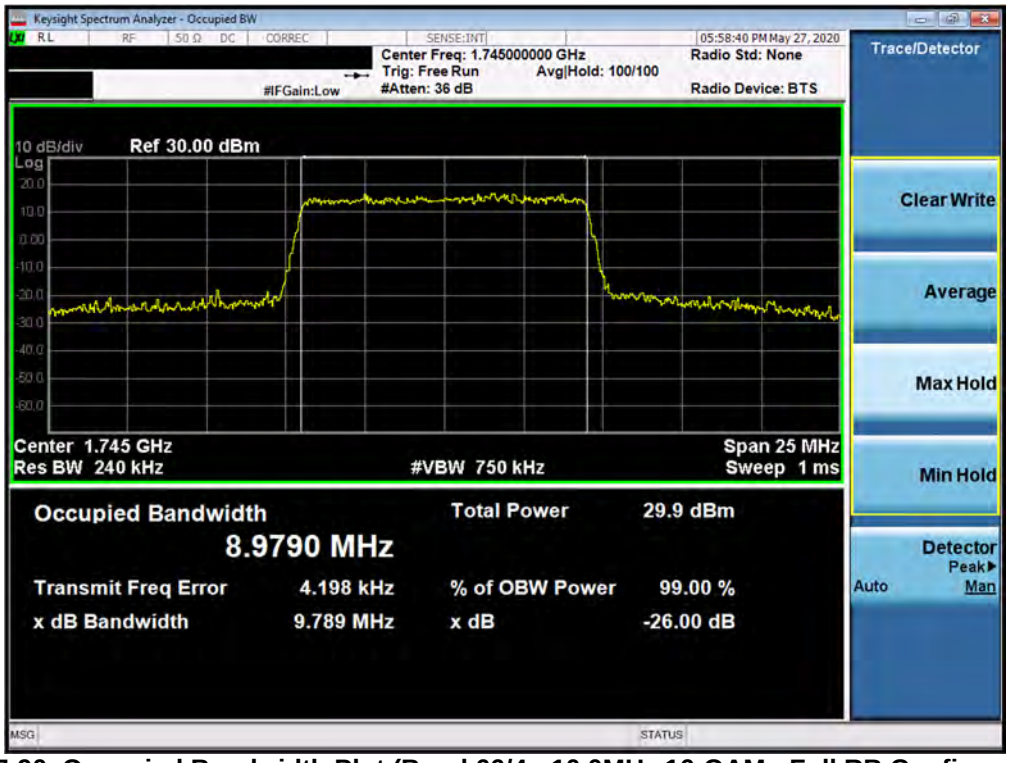
Plot 7-86. Occupied Bandwidth Plot (Band 66/4 - 5.0MHz 16-QAM - Full RB Configuration)

Plot 7-87. Occupied Bandwidth Plot (Band 66/4 - 5.0MHz 64-QAM - Full RB Configuration)



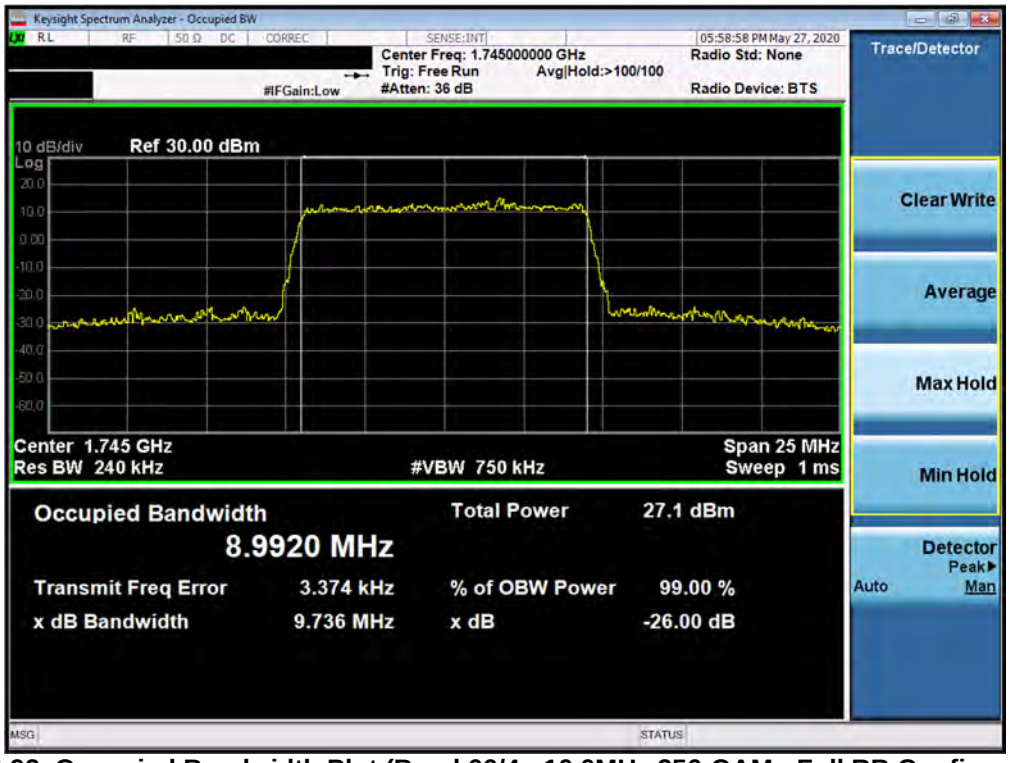
Plot 7-88. Occupied Bandwidth Plot (Band 66/4 - 5.0MHz 256-QAM - Full RB Configuration)

Plot 7-89. Occupied Bandwidth Plot (Band 66/4 - 10.0MHz QPSK - Full RB Configuration)



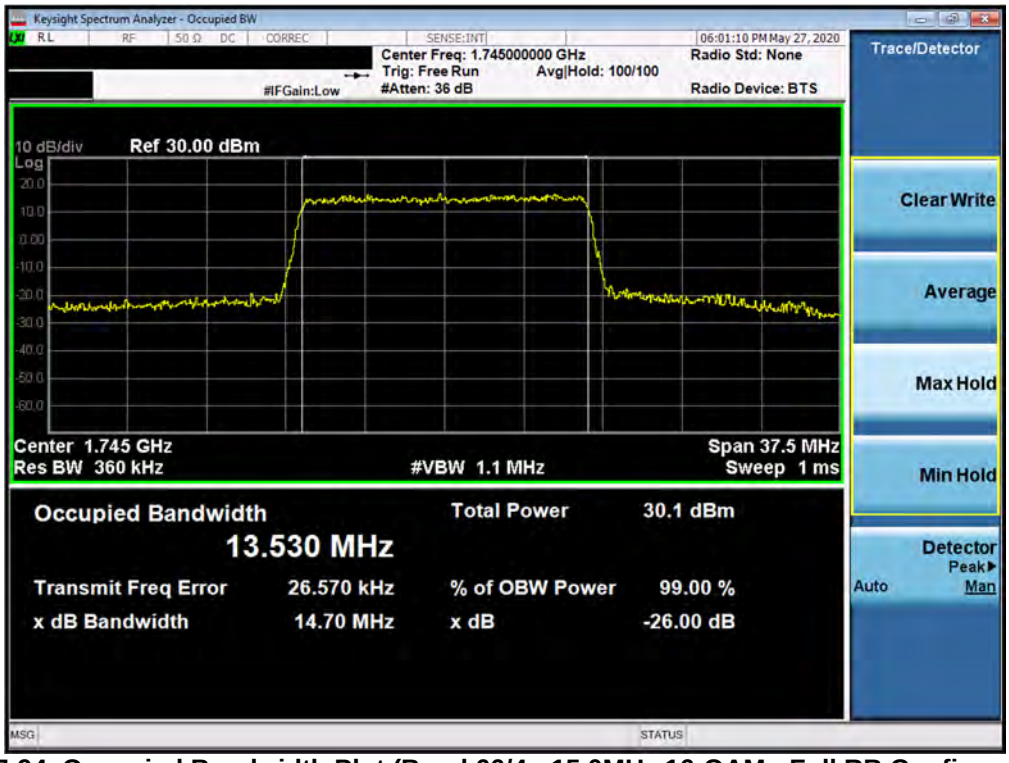
Plot 7-90. Occupied Bandwidth Plot (Band 66/4 - 10.0MHz 16-QAM - Full RB Configuration)

Plot 7-91. Occupied Bandwidth Plot (Band 66/4 - 10.0MHz 64-QAM - Full RB Configuration)

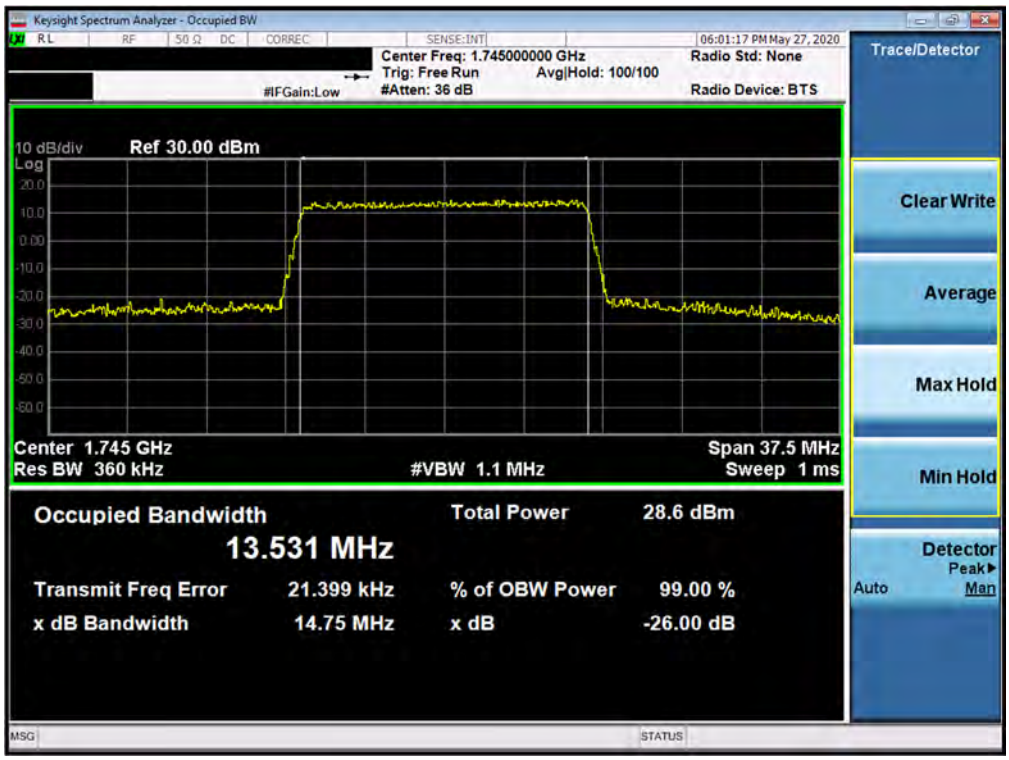


Plot 7-92. Occupied Bandwidth Plot (Band 66/4 - 10.0MHz 256-QAM - Full RB Configuration)

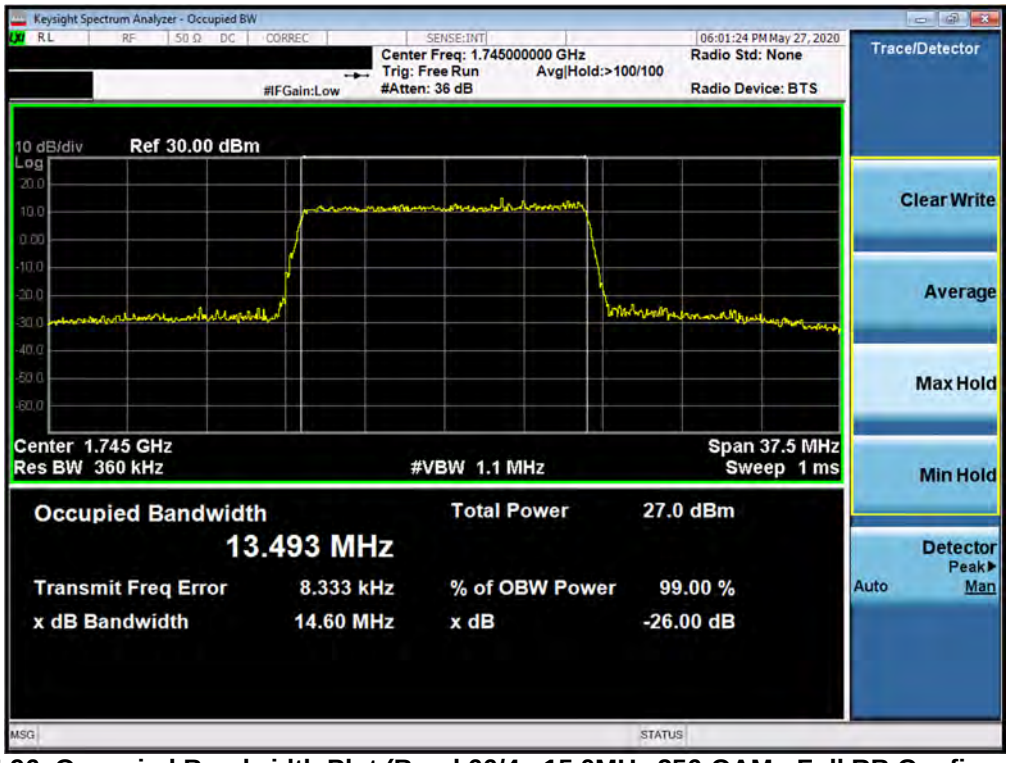
Plot 7-93. Occupied Bandwidth Plot (Band 66/4 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-94. Occupied Bandwidth Plot (Band 66/4 - 15.0MHz 16-QAM - Full RB Configuration)

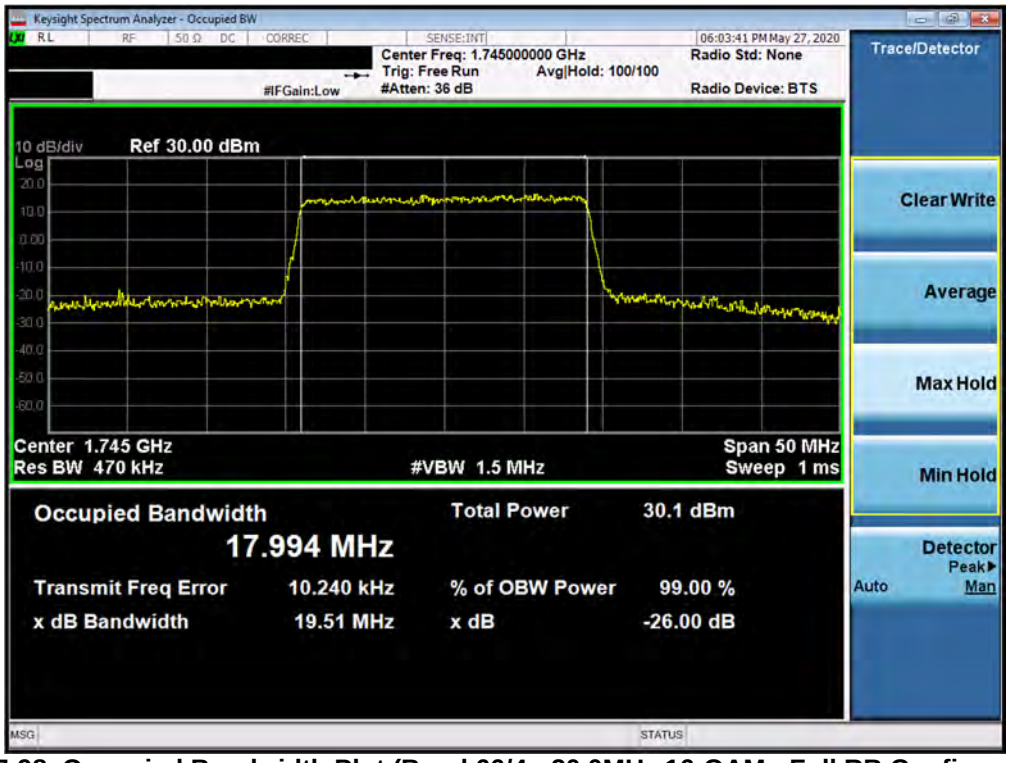


Plot 7-95. Occupied Bandwidth Plot (Band 66/4 - 15.0MHz 64-QAM - Full RB Configuration)

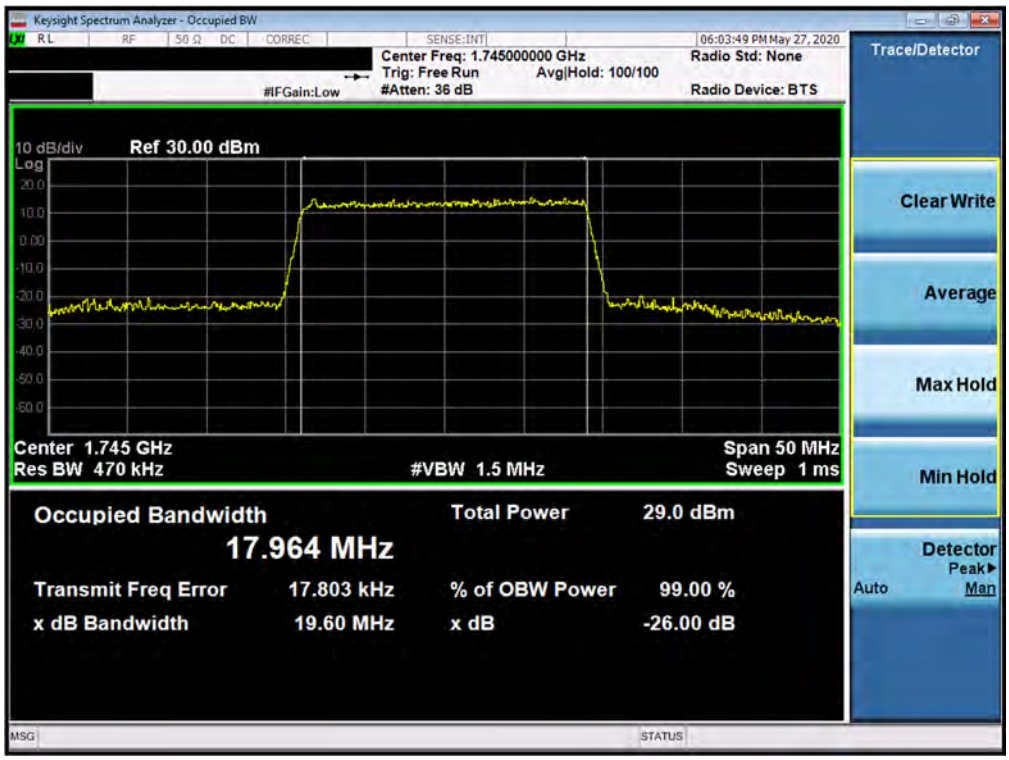


Plot 7-96. Occupied Bandwidth Plot (Band 66/4 - 15.0MHz 256-QAM - Full RB Configuration)

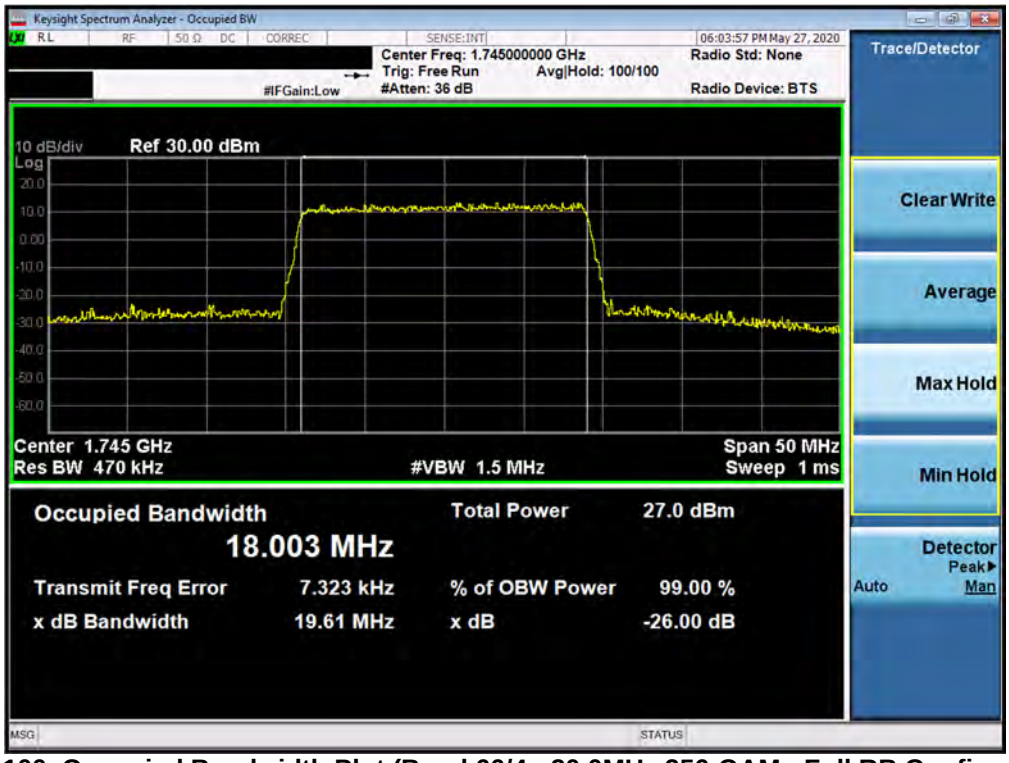
Plot 7-97. Occupied Bandwidth Plot (Band 66/4 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-98. Occupied Bandwidth Plot (Band 66/4 - 20.0MHz 16-QAM - Full RB Configuration)

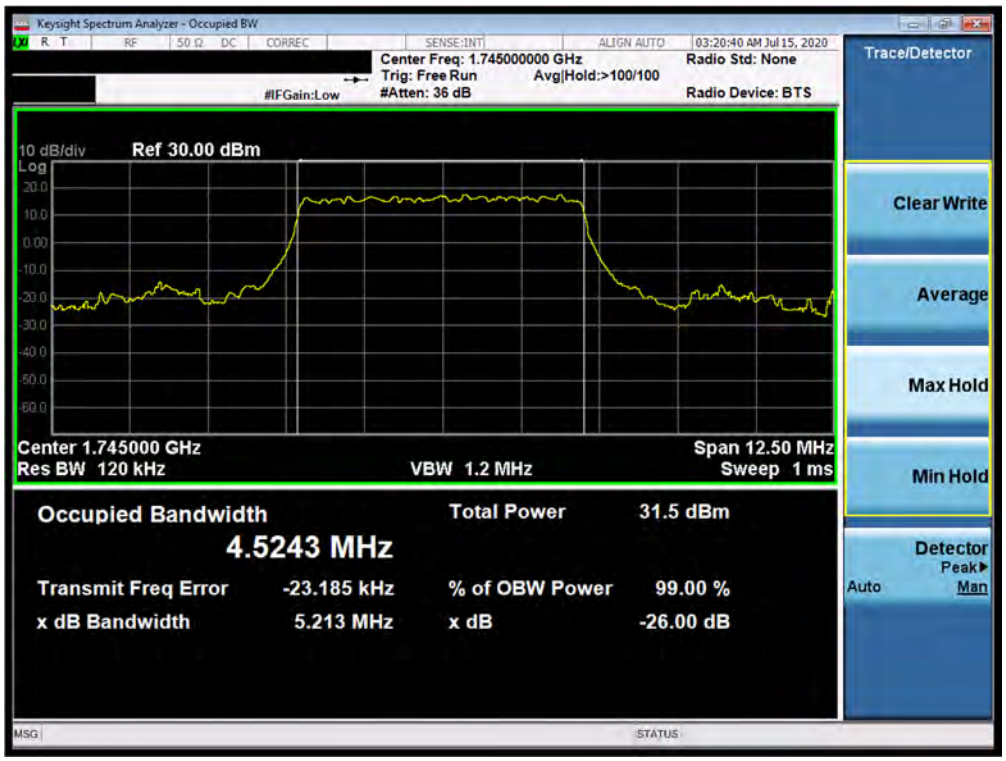


Plot 7-99. Occupied Bandwidth Plot (Band 66/4 - 20.0MHz 64-QAM - Full RB Configuration)

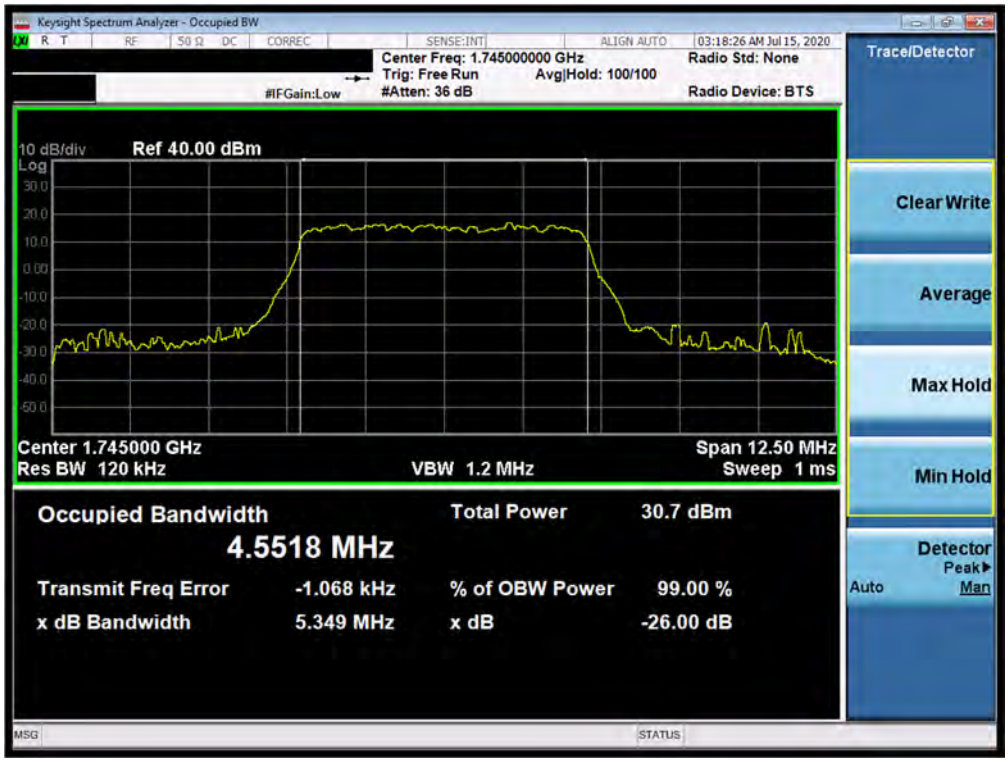


Plot 7-100. Occupied Bandwidth Plot (Band 66/4 - 20.0MHz 256-QAM - Full RB Configuration)

NR Band n66

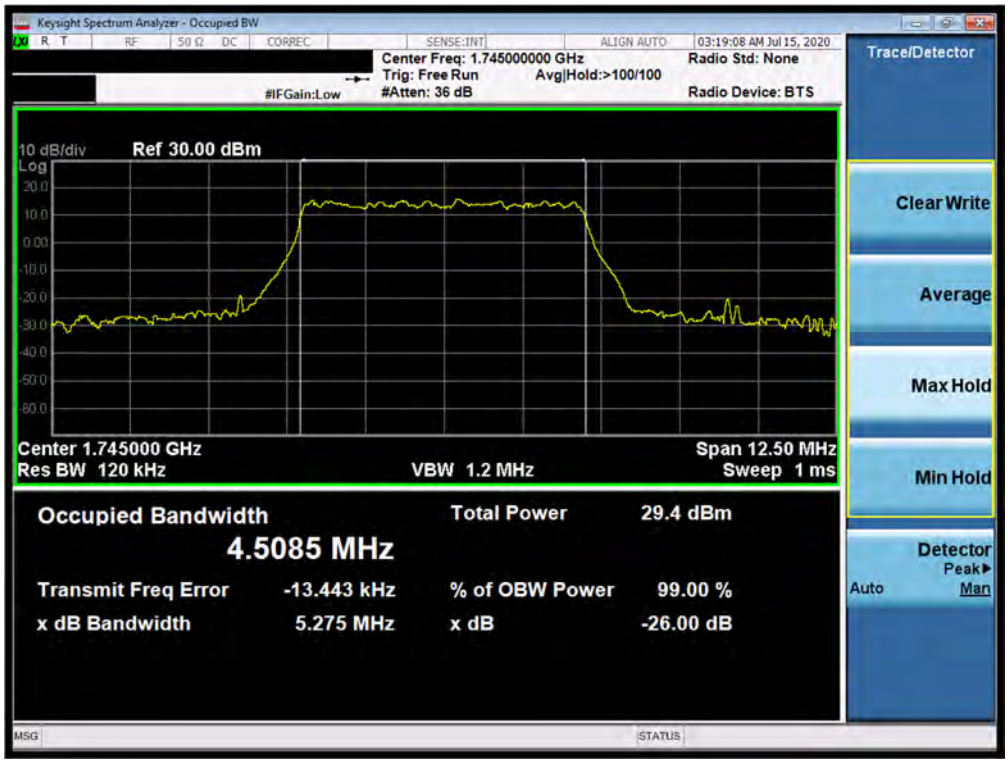


Plot 7-101. Occupied Bandwidth Plot (n66 5MHz BPSK-DFT-s-OFDM - Full RB Configuration)

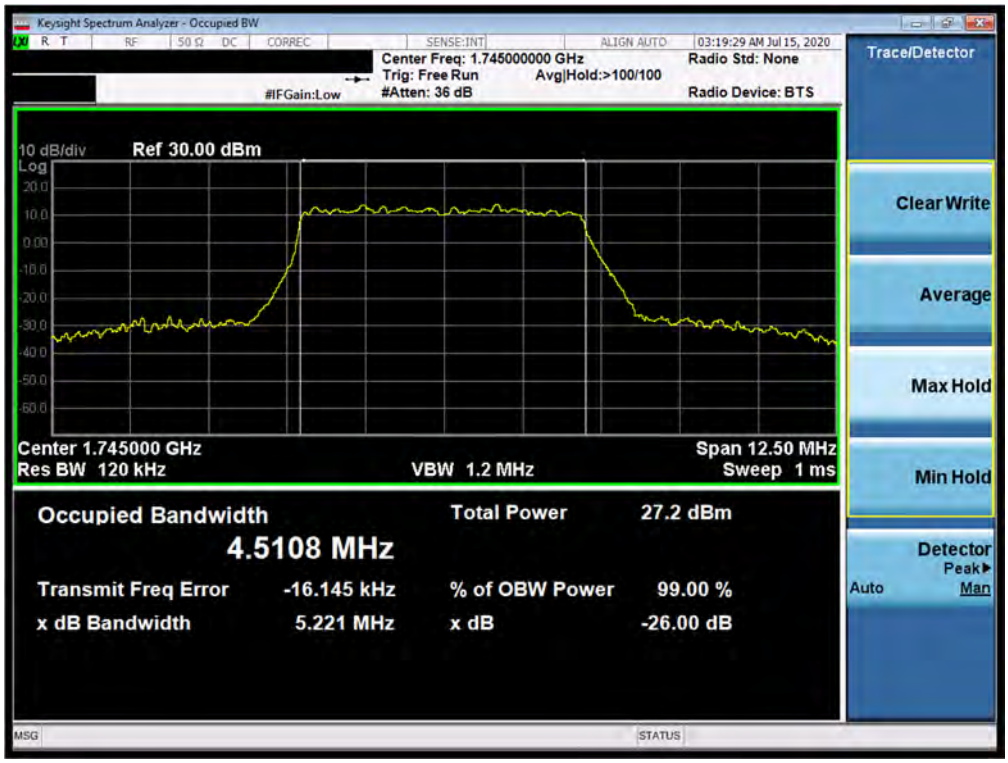


Plot 7-102. Occupied Bandwidth Plot (n66 5MHz QPSK-CP-OFDM - Full RB Configuration)

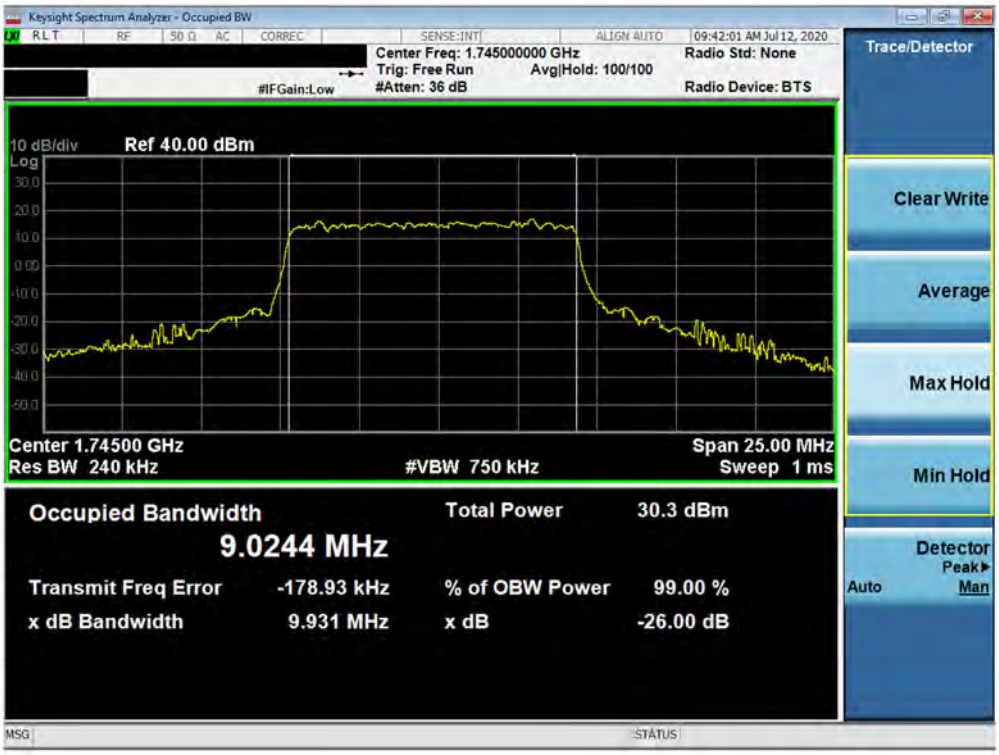
Plot 7-103. Occupied Bandwidth Plot (n66 5MHz 16QAM-CP-OFDM - Full RB Configuration)



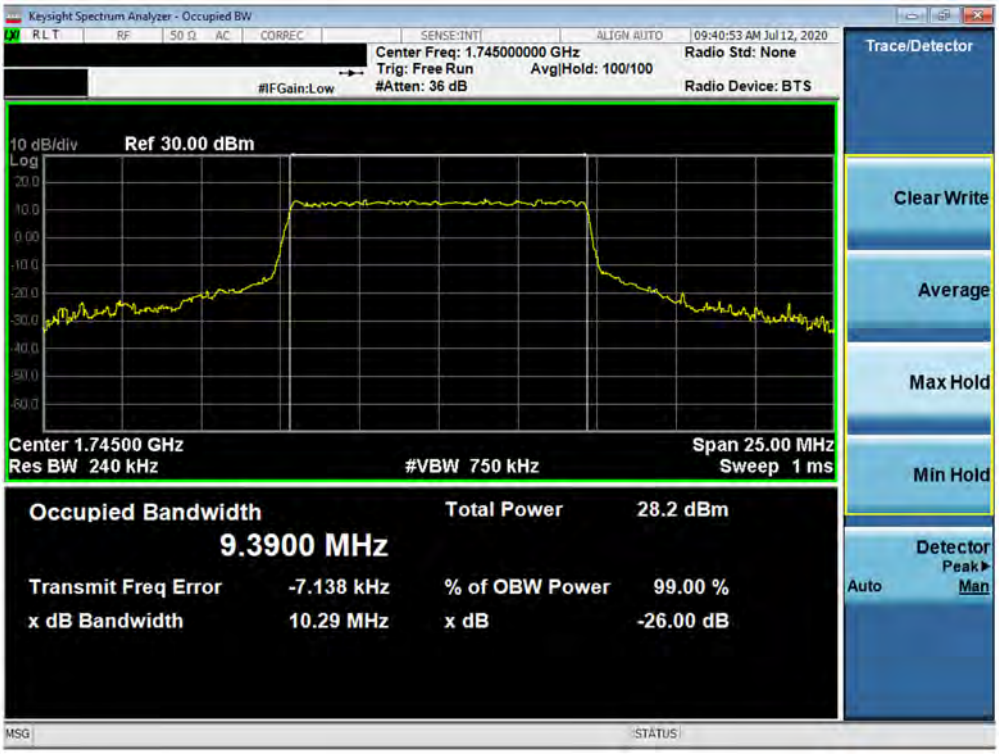
Plot 7-104. Occupied Bandwidth Plot (n66 5MHz 64QAM-CP-OFDM- Full RB Configuration)



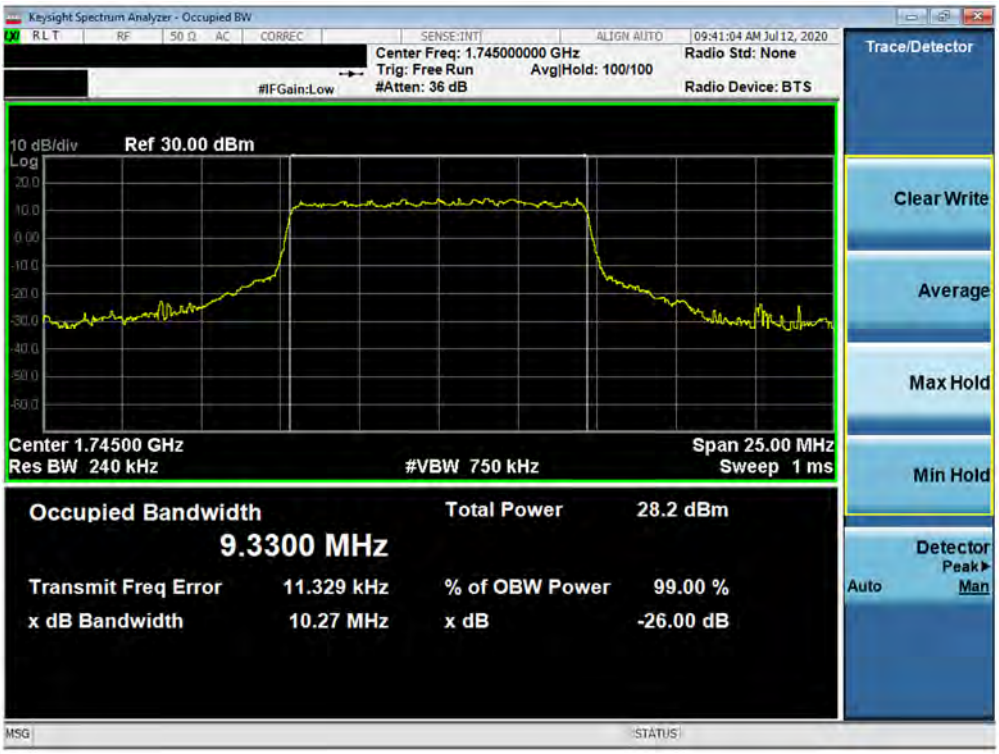
Plot 7-105. Occupied Bandwidth Plot (n66 5MHz 256QAM-CP-OFDM - Full RB Configuration)



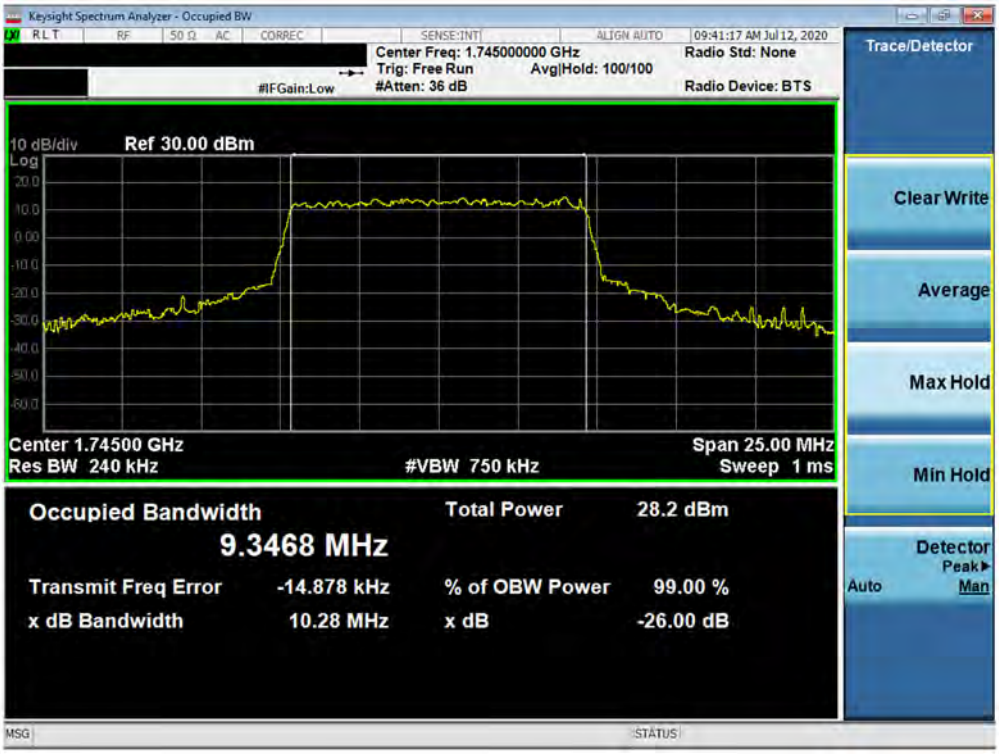
Plot 7-106. Occupied Bandwidth Plot (n66 10MHz BPSK-DFT-s-OFDM - Full RB Configuration)



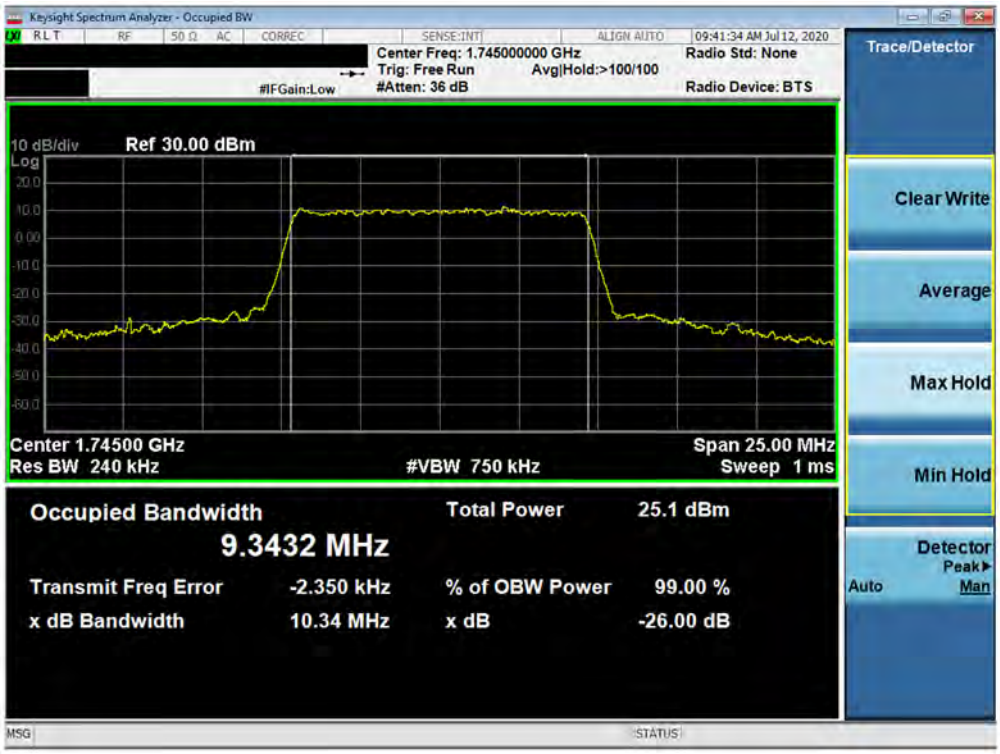
Plot 7-107. Occupied Bandwidth Plot (n66 10MHz QPSK-CP-OFDM - Full RB Configuration)



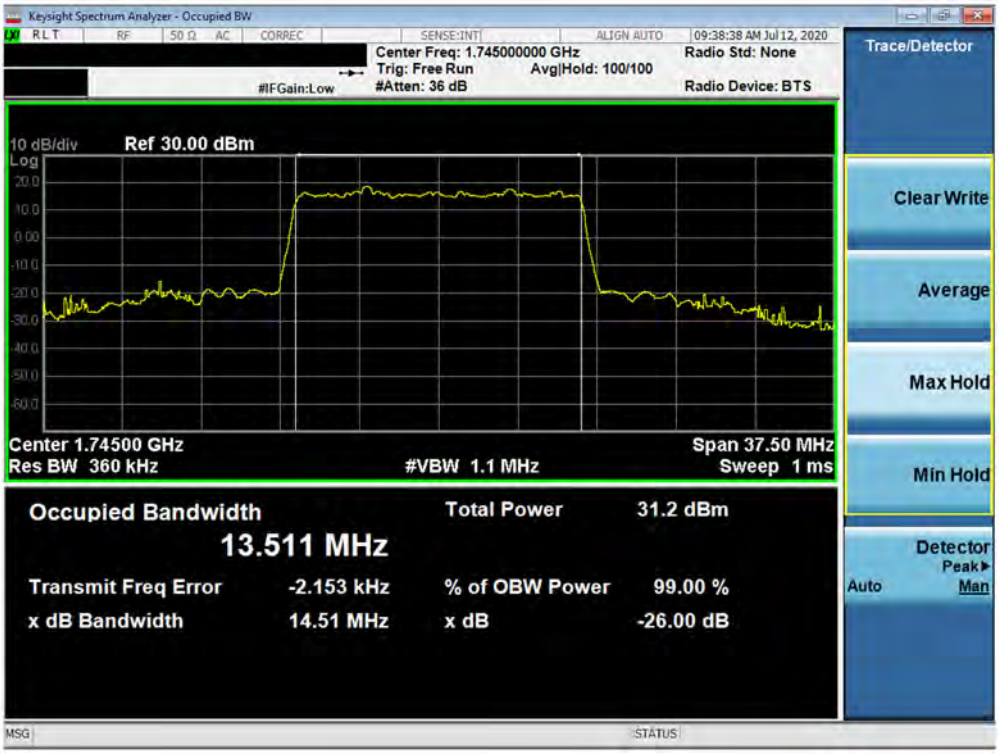
Plot 7-108. Occupied Bandwidth Plot (n66 10MHz 16QAM-CP-OFDM - Full RB Configuration)



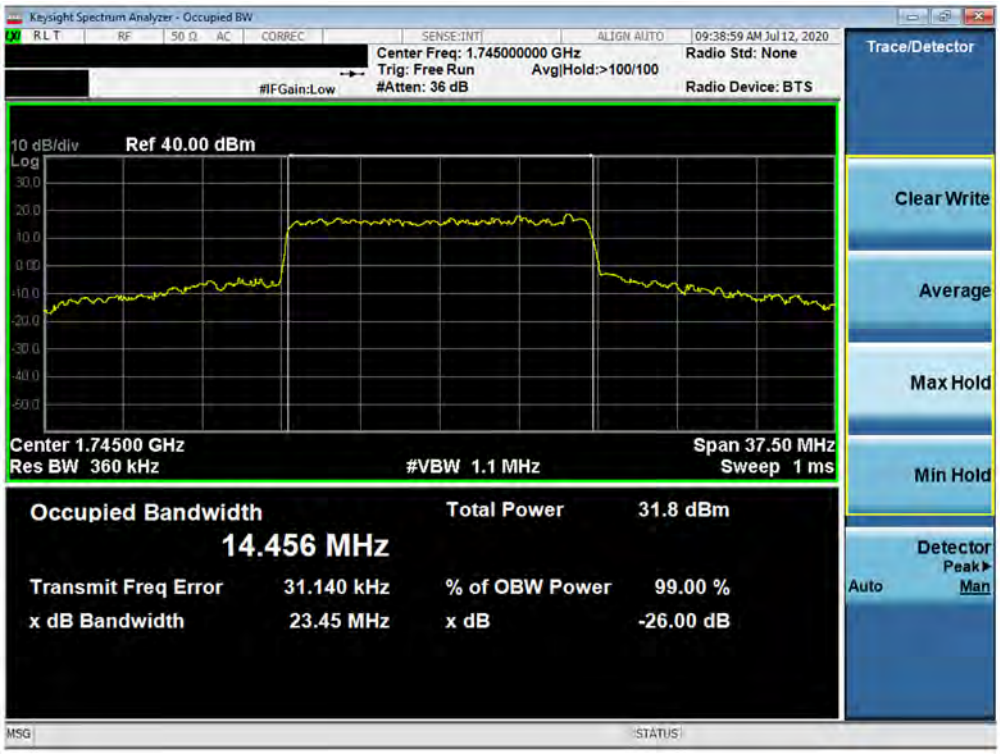
Plot 7-109. Occupied Bandwidth Plot (n66 10MHz 64QAM-CP-OFDM- Full RB Configuration)



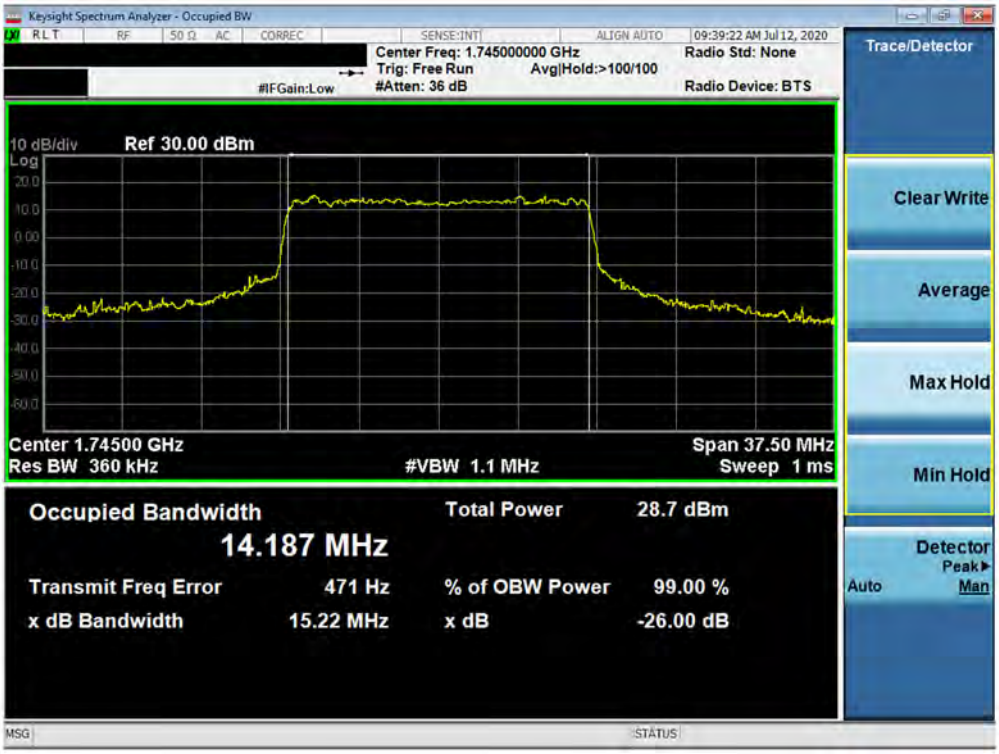
Plot 7-110. Occupied Bandwidth Plot (n66 10MHz 256QAM-CP-OFDM - Full RB Configuration)



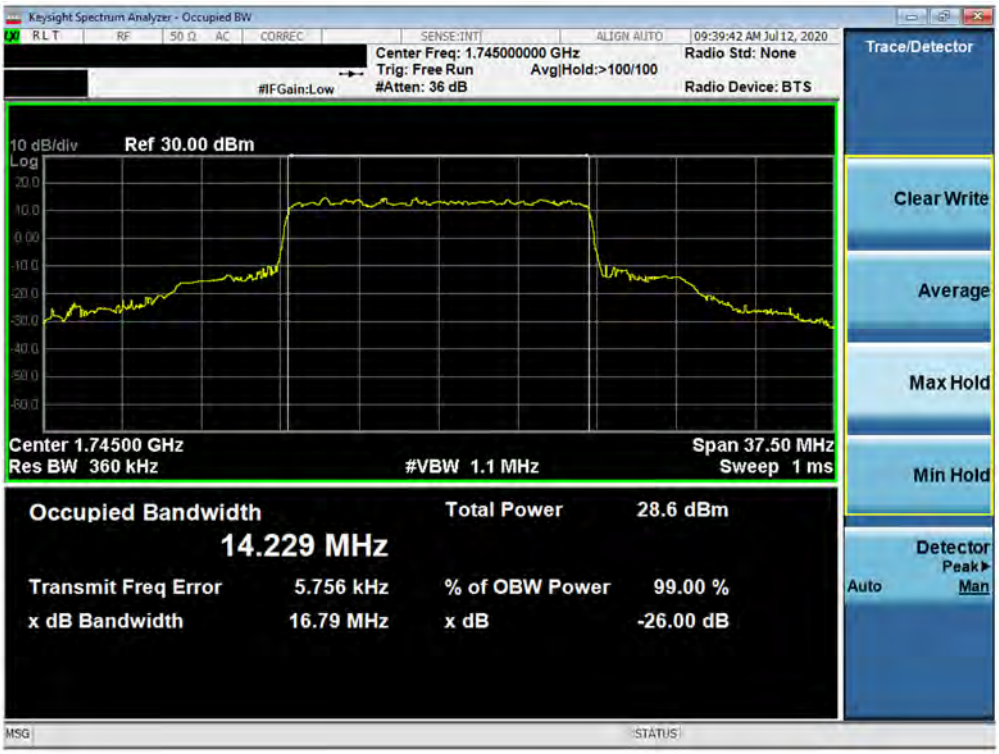
Plot 7-111. Occupied Bandwidth Plot (n66 15MHz BPSK-DFT-s-OFDM - Full RB Configuration)



Plot 7-112. Occupied Bandwidth Plot (n66 15MHz QPSK-CP-OFDM - Full RB Configuration)

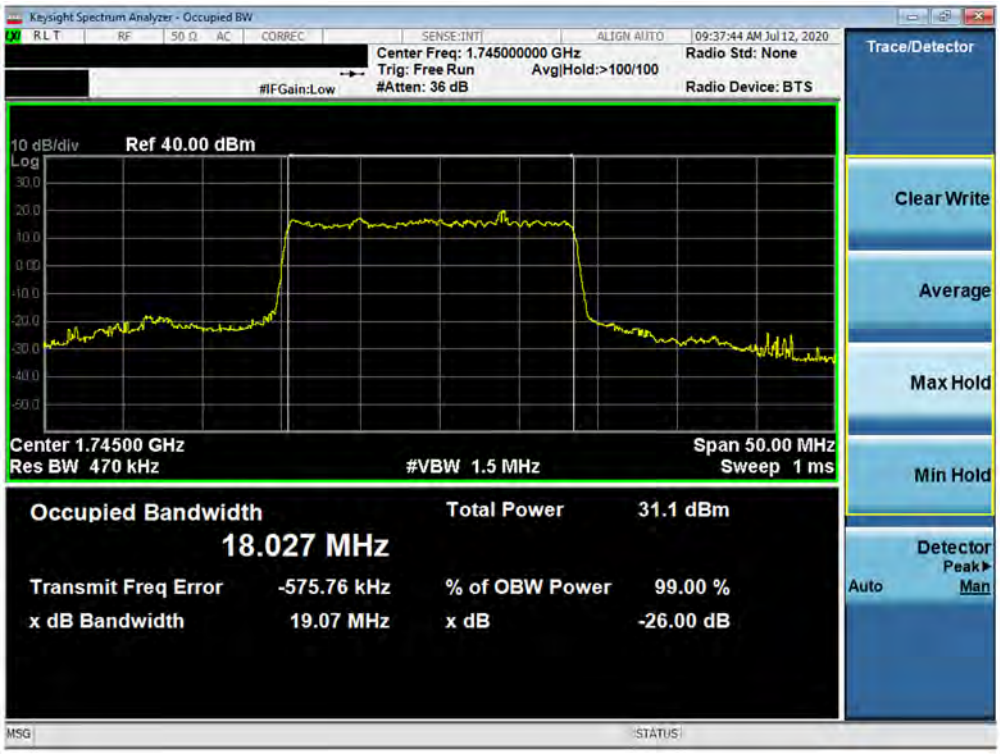


Plot 7-113. Occupied Bandwidth Plot (n66 15MHz 16QAM-CP-OFDM - Full RB Configuration)

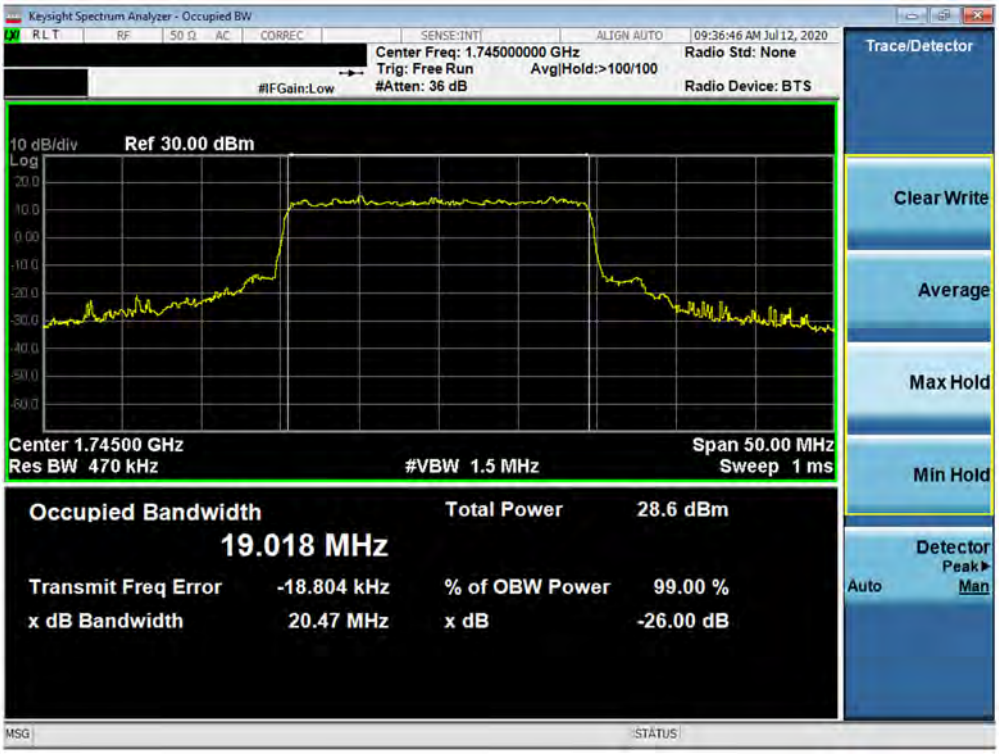


Plot 7-114. Occupied Bandwidth Plot (n66 15MHz 64QAM-CP-OFDM- Full RB Configuration)

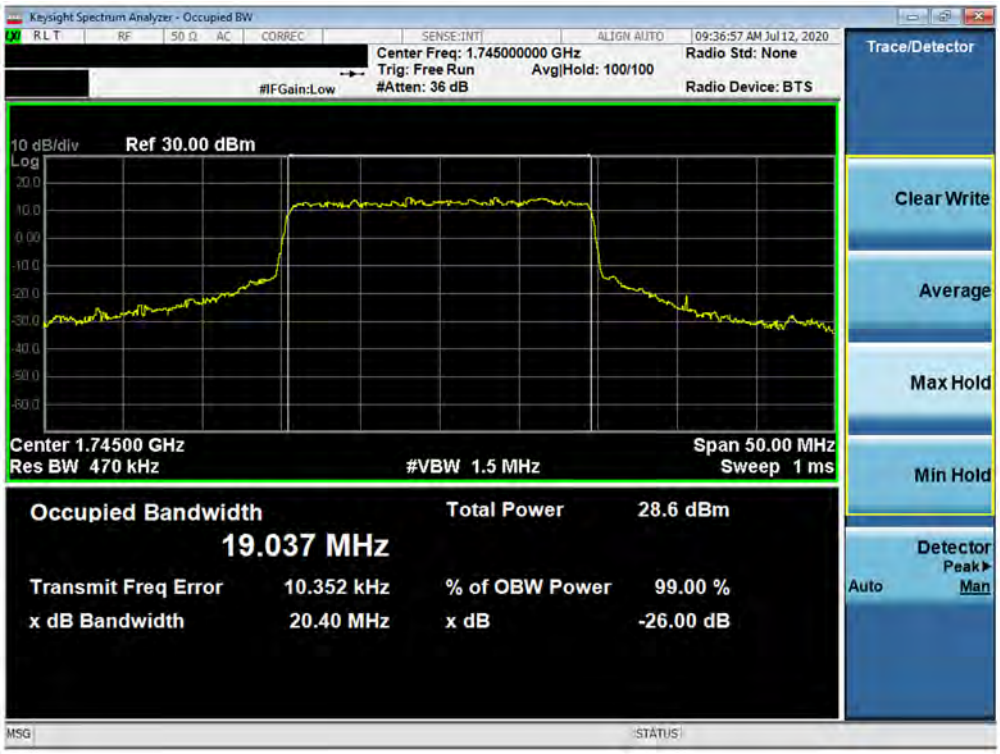
Plot 7-115. Occupied Bandwidth Plot (n66 15MHz 256QAM-CP-OFDM - Full RB Configuration)



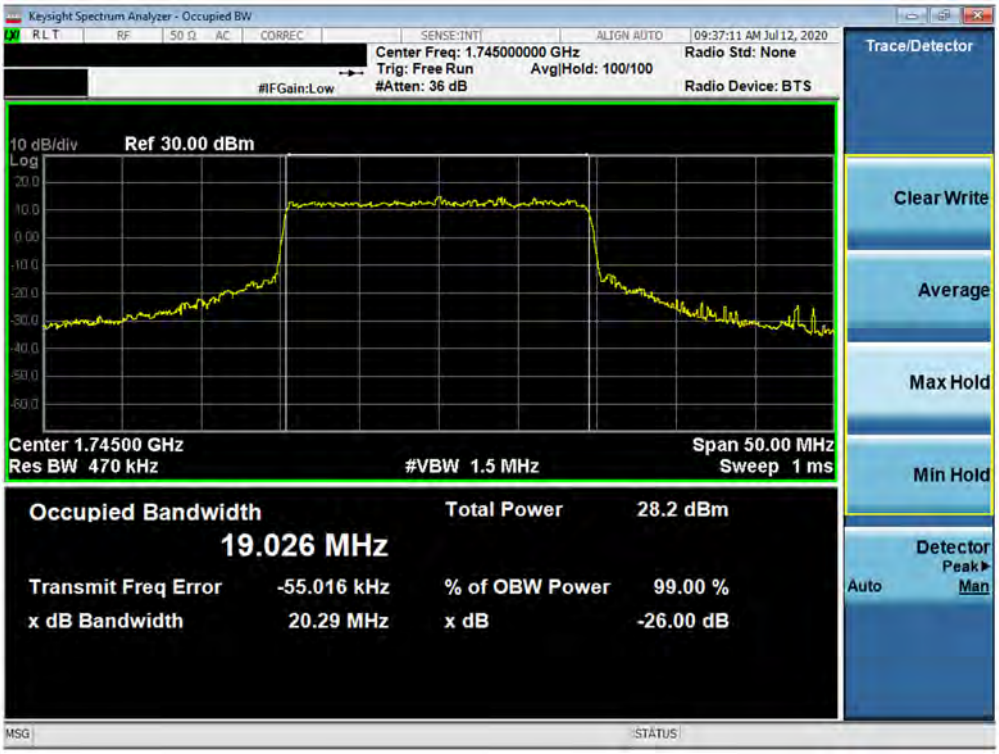
Plot 7-116. Occupied Bandwidth Plot (n66 20MHz BPSK-DFT-s-OFDM - Full RB Configuration)



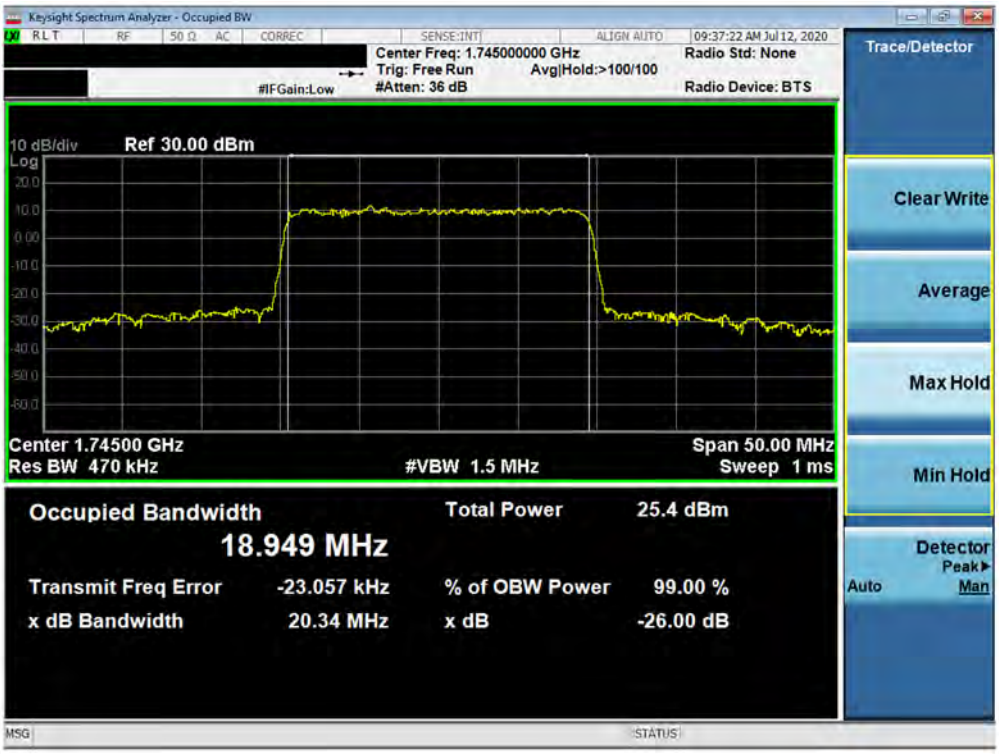
Plot 7-117. Occupied Bandwidth Plot (n66 20MHz QPSK-CP-OFDM - Full RB Configuration)



Plot 7-118. Occupied Bandwidth Plot (n66 20MHz 16QAM-CP-OFDM - Full RB Configuration)



Plot 7-119. Occupied Bandwidth Plot (n66 20MHz 64QAM-CP-OFDM- Full RB Configuration)

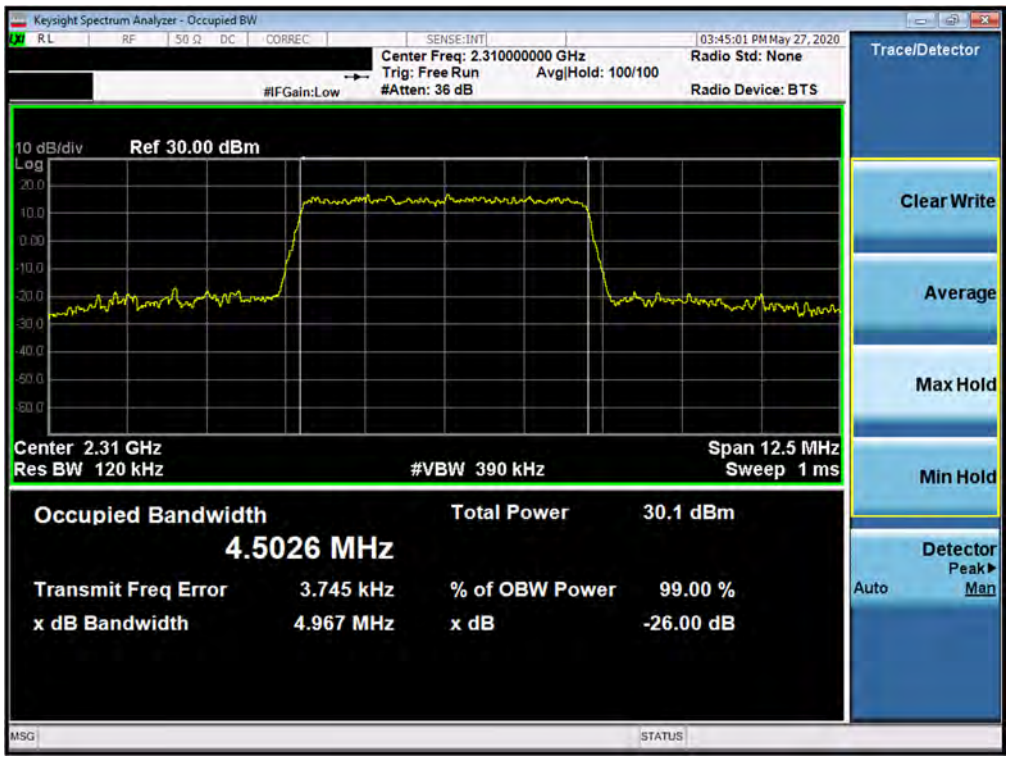


Plot 7-120. Occupied Bandwidth Plot (n66 20MHz 256QAM-CP-OFDM - Full RB Configuration)

Band 30

Plot 7-121. Occupied Bandwidth Plot (Band 30 - 5.0MHz QPSK - Full RB Configuration)

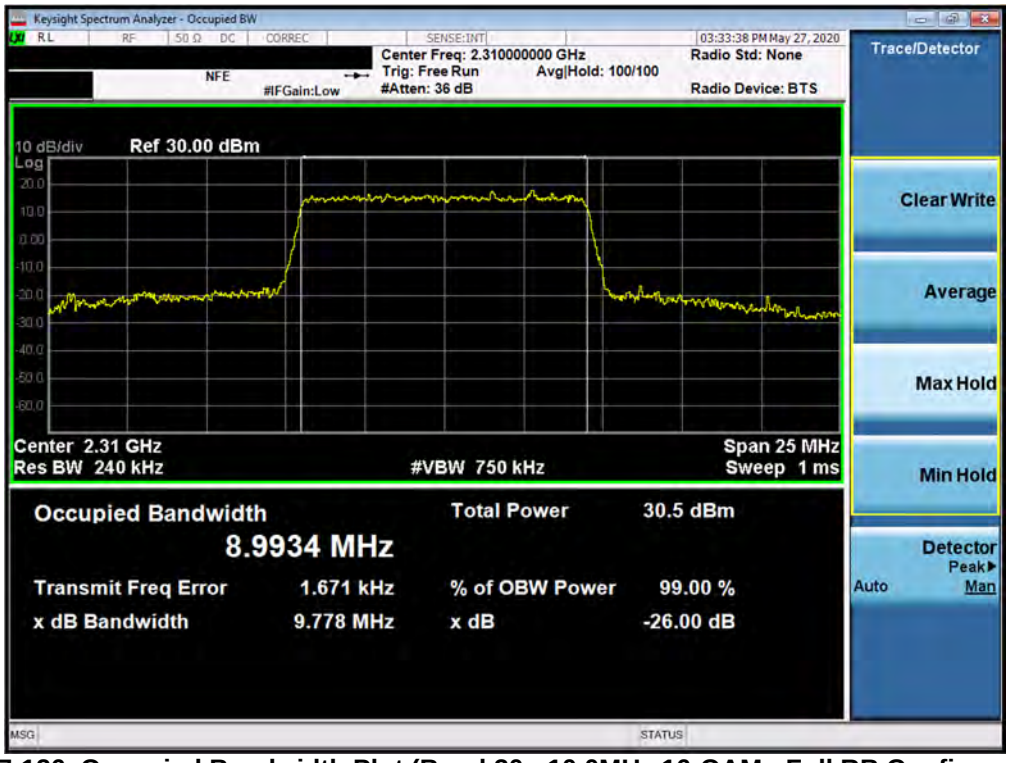
Plot 7-122. Occupied Bandwidth Plot (Band 30 - 5.0MHz 16-QAM - Full RB Configuration)



Plot 7-123. Occupied Bandwidth Plot (Band 30 - 5.0MHz 64-QAM - Full RB Configuration)

Plot 7-124. Occupied Bandwidth Plot (Band 30 - 5.0MHz 256-QAM - Full RB Configuration)

Plot 7-125. Occupied Bandwidth Plot (Band 30 - 10.0MHz QPSK - Full RB Configuration)

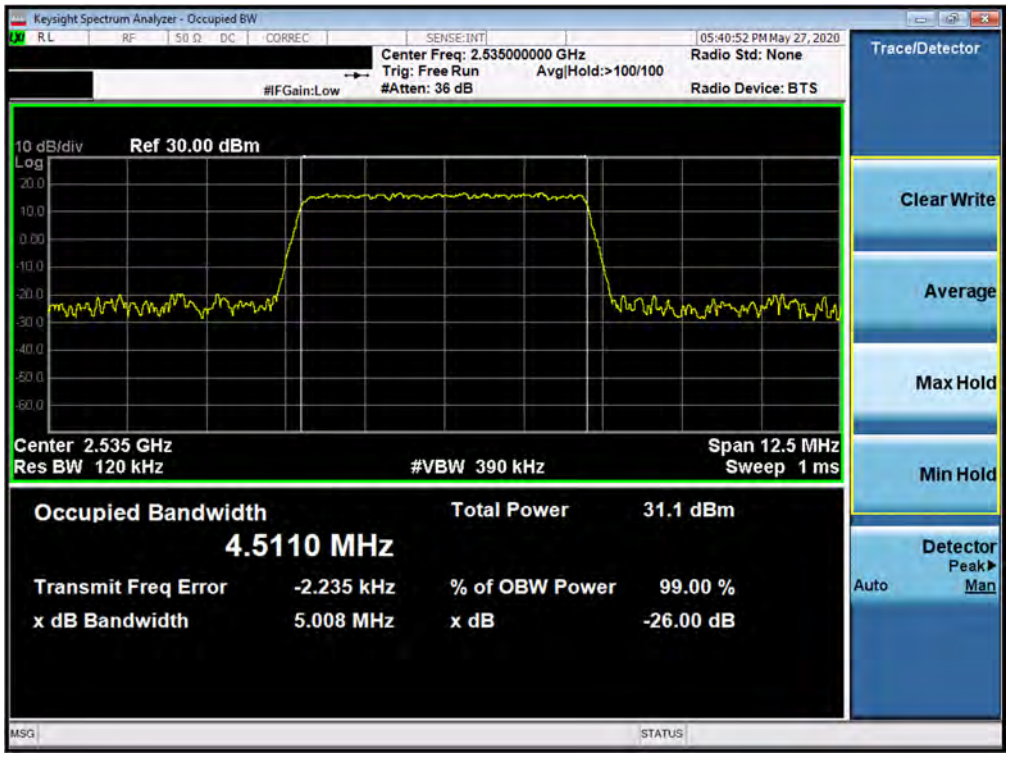


Plot 7-126. Occupied Bandwidth Plot (Band 30 - 10.0MHz 16-QAM - Full RB Configuration)

Plot 7-127. Occupied Bandwidth Plot (Band 30 - 10.0MHz 64-QAM - Full RB Configuration)

Plot 7-128. Occupied Bandwidth Plot (Band 30 - 10.0MHz 256-QAM - Full RB Configuration)

Band 7

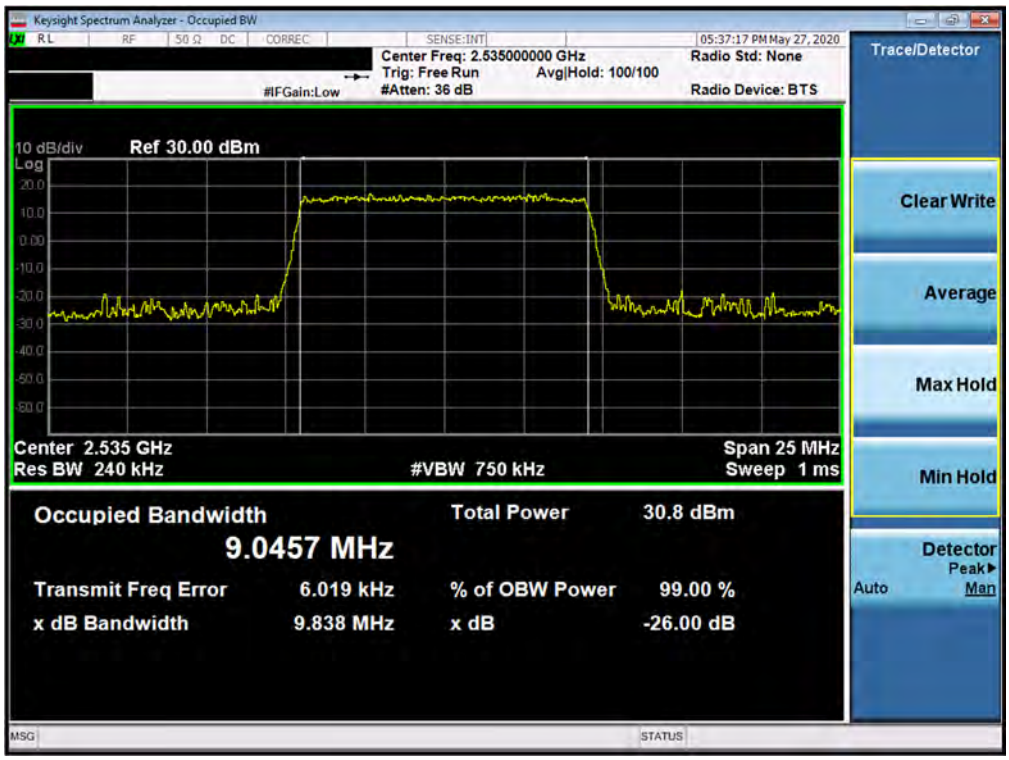


Plot 7-129. Occupied Bandwidth Plot (Band 7 - 5.0MHz QPSK - Full RB Configuration)

Plot 7-130. Occupied Bandwidth Plot (Band 7 - 5.0MHz 16-QAM - Full RB Configuration)

Plot 7-131. Occupied Bandwidth Plot (Band 7 - 5.0MHz 64-QAM - Full RB Configuration)

Plot 7-132. Occupied Bandwidth Plot (Band 7 - 5.0MHz 256-QAM - Full RB Configuration)

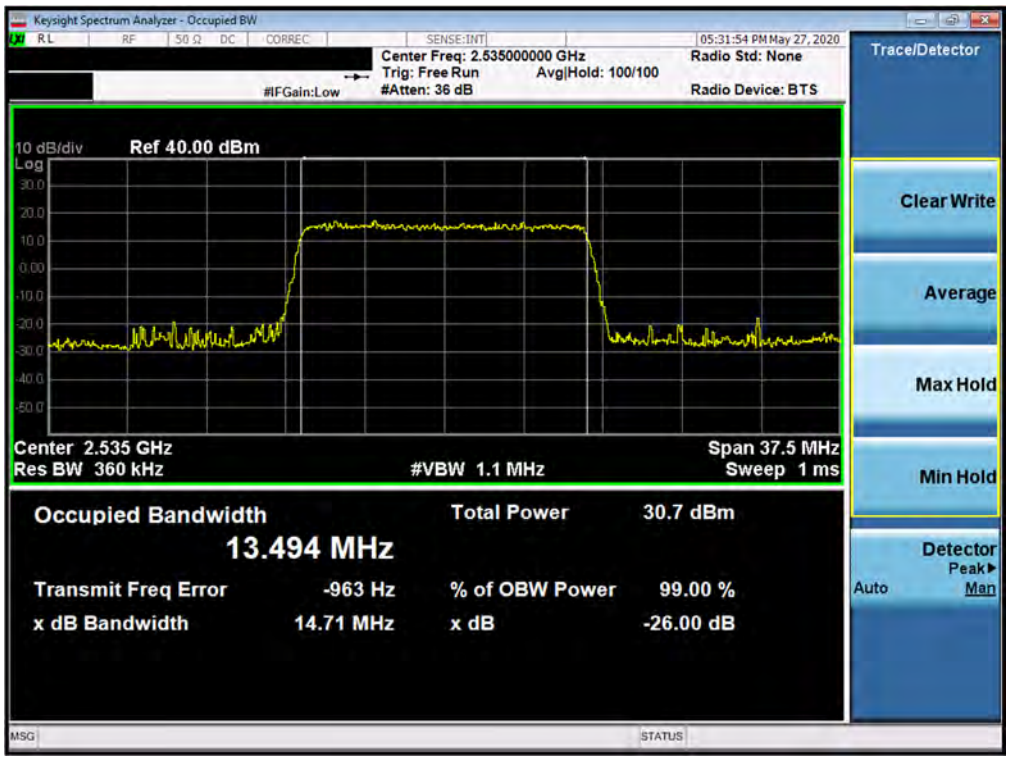


Plot 7-133. Occupied Bandwidth Plot (Band 7 - 10.0MHz QPSK - Full RB Configuration)

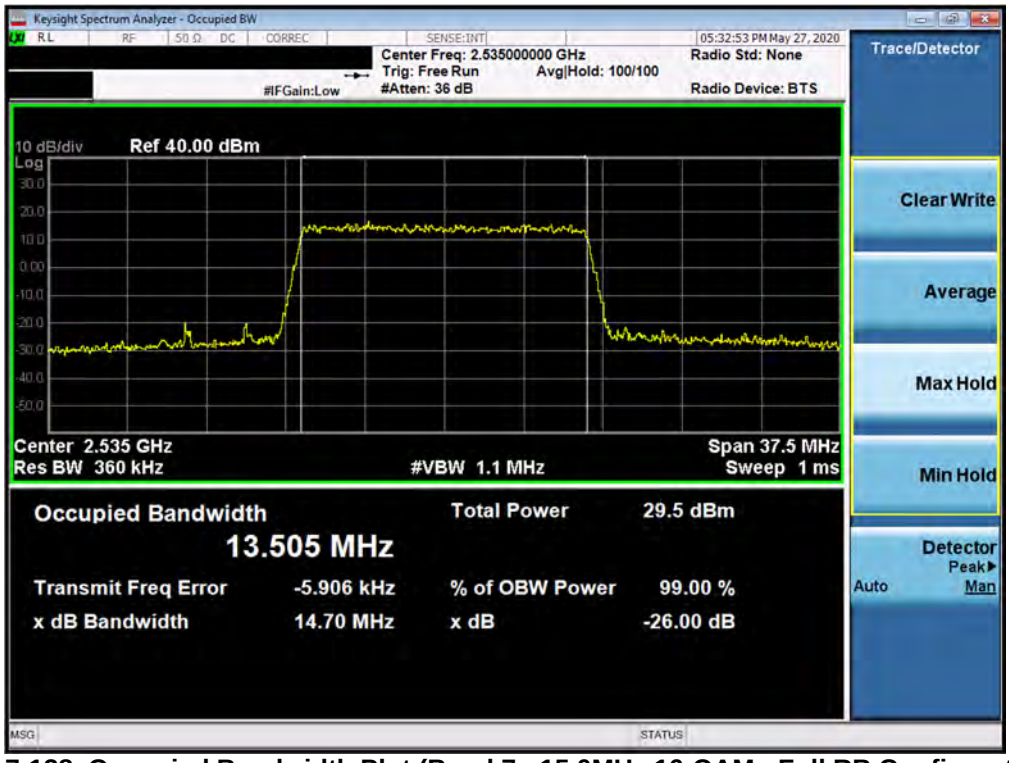
Plot 7-134. Occupied Bandwidth Plot (Band 7 - 10.0MHz 16-QAM - Full RB Configuration)

Plot 7-135. Occupied Bandwidth Plot (Band 7 - 10.0MHz 64-QAM - Full RB Configuration)

Plot 7-136. Occupied Bandwidth Plot (Band 7 - 10.0MHz 256-QAM - Full RB Configuration)



Plot 7-137. Occupied Bandwidth Plot (Band 7 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-138. Occupied Bandwidth Plot (Band 7 - 15.0MHz 16-QAM - Full RB Configuration)