PCTEST
18855 Adams Court, Morgan Hill, CA 95037 USA
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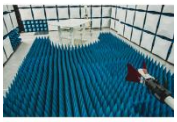

PART 27 MEASUREMENT REPORT

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

Date of Testing:
11/29/2021 – 2/12/2022
Test Site/Location:
PCTEST Morgan Hill, CA, USA
Test Report Serial No.:
1C2111150079-03.BCG

FCC ID:	**BCGA2589**
APPLICANT:	**Apple Inc.**

Application Type:	Certification
Model:	A2589(A2591)
EUT Type:	Tablet Device
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule Part:	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.

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.

RJ Ortanez
Executive Vice President

ACCREDITED
CERT #2041.02

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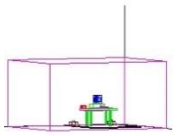
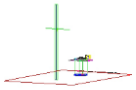


MEASUREMENT REPORT
FCC Part 27



Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	OBW [MHz]	ERP		EIRP		Emission Designator
					Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]	
LTE Band 71	5 MHz	QPSK	665.5 - 695.5	4.5231	0.122	20.88	0.201	23.03	4M52G7W
		16QAM	665.5 - 695.5	4.5204	0.099	19.94	0.162	22.09	4M52D7W
		64QAM	665.5 - 695.5	4.5376	0.081	19.09	0.133	21.24	4M54D7W
		256QAM	665.5 - 695.5	4.5484	0.041	16.13	0.067	18.28	4M55D7W
	10 MHz	QPSK	668.0 - 693.0	9.0356	0.125	20.97	0.205	23.12	9M04G7W
		16QAM	668.0 - 693.0	9.0353	0.100	20.02	0.165	22.17	9M04D7W
		64QAM	668.0 - 693.0	9.0170	0.080	19.01	0.131	21.16	9M02D7W
		256QAM	668.0 - 693.0	9.0198	0.040	15.98	0.065	18.13	9M02D7W
	15 MHz	QPSK	670.5 - 690.5	13.5362	0.127	21.03	0.208	23.18	13M5G7W
		16QAM	670.5 - 690.5	13.5334	0.103	20.13	0.169	22.28	13M5D7W
		64QAM	670.5 - 690.5	13.5157	0.082	19.11	0.134	21.26	13M5D7W
		256QAM	670.5 - 690.5	13.5070	0.038	15.85	0.063	18.00	13M5D7W
	20 MHz	QPSK	673.0 - 688.0	18.0203	0.124	20.92	0.203	23.07	18M0G7W
		16QAM	673.0 - 688.0	17.9614	0.100	19.99	0.164	22.14	18M0D7W
		64QAM	673.0 - 688.0	18.0154	0.080	19.02	0.131	21.17	18M0D7W
		256QAM	673.0 - 688.0	18.0341	0.040	15.97	0.065	18.12	18M0D7W
LTE Band 12	1.4 MHz	QPSK	699.7 - 715.3	1.0923	0.134	21.27	0.220	23.42	1M09G7W
		16QAM	699.7 - 715.3	1.0947	0.110	20.43	0.181	22.58	1M09D7W
		64QAM	699.7 - 715.3	1.0899	0.088	19.44	0.144	21.59	1M09D7W
		256QAM	699.7 - 715.3	1.0950	0.043	16.29	0.070	18.44	1M09D7W
	3 MHz	QPSK	700.5 - 714.5	2.7127	0.132	21.19	0.216	23.34	2M71G7W
		16QAM	700.5 - 714.5	2.7087	0.115	20.59	0.188	22.74	2M71D7W
		64QAM	700.5 - 714.5	2.7111	0.090	19.52	0.147	21.67	2M71D7W
		256QAM	700.5 - 714.5	2.7130	0.043	16.37	0.071	18.52	2M71D7W
	5 MHz	QPSK	701.5 - 713.5	4.5292	0.133	21.25	0.219	23.40	4M53G7W
		16QAM	701.5 - 713.5	4.5094	0.111	20.46	0.183	22.61	4M51D7W
		64QAM	701.5 - 713.5	4.5233	0.091	19.57	0.149	21.72	4M52D7W
		256QAM	701.5 - 713.5	4.5290	0.043	16.34	0.071	18.49	4M53D7W
	10 MHz	QPSK	704.0 - 711.0	8.9752	0.131	21.18	0.215	23.33	8M98G7W
		16QAM	704.0 - 711.0	8.9928	0.111	20.45	0.182	22.60	8M99D7W
		64QAM	704.0 - 711.0	8.9691	0.087	19.41	0.143	21.56	8M97D7W
		256QAM	704.0 - 711.0	8.9763	0.046	16.60	0.075	18.75	8M98D7W
LTE Band 17	5 MHz	QPSK	706.5 - 713.5	4.5292	0.135	21.29	0.221	23.44	4M53G7W
		16QAM	706.5 - 713.5	4.5094	0.111	20.45	0.182	22.60	4M51D7W
		64QAM	706.5 - 713.5	4.5233	0.092	19.66	0.152	21.81	4M52D7W
		256QAM	706.5 - 713.5	4.5290	0.044	16.44	0.072	18.59	4M53D7W
	10 MHz	QPSK	709.0 - 711.0	8.9752	0.133	21.24	0.218	23.39	8M98G7W
		16QAM	709.0 - 711.0	8.9928	0.111	20.46	0.182	22.61	8M99D7W
		64QAM	709.0 - 711.0	8.9691	0.090	19.54	0.148	21.69	8M97D7W
		256QAM	709.0 - 711.0	8.9763	0.058	17.67	0.096	19.82	8M98D7W
LTE Band 13	5 MHz	QPSK	779.5 - 784.5	4.5286	0.153	21.86	0.252	24.01	4M53G7W
		16QAM	779.5 - 784.5	4.5134	0.132	21.22	0.217	23.37	4M51D7W
		64QAM	779.5 - 784.5	4.5273	0.102	20.07	0.167	22.22	4M53D7W
		256QAM	779.5 - 784.5	4.5322	0.052	17.20	0.086	19.35	4M53D7W
	10 MHz	QPSK	782.0	9.0352	0.152	21.81	0.249	23.96	9M04G7W
		16QAM	782.0	9.0168	0.124	20.92	0.203	23.07	9M02D7W
		64QAM	782.0	8.9982	0.100	19.99	0.164	22.14	9M00D7W
		256QAM	782.0	8.9913	0.055	17.39	0.090	19.54	8M99D7W
NR Band n71	5 MHz	π/2 BPSK	665.5 - 695.5	4.5025	0.120	20.78	0.197	22.93	4M50G7W
		QPSK	665.5 - 695.5	4.5285	0.125	20.99	0.206	23.14	4M53G7W
		16QAM	665.5 - 695.5	4.4949	0.098	19.91	0.161	22.06	4M49D7W
		64QAM	665.5 - 695.5	4.5028	0.065	18.14	0.107	20.29	4M50D7W
		256QAM	665.5 - 695.5	4.5110	0.039	15.96	0.065	18.11	4M51D7W
	10 MHz	π/2 BPSK	668.0 - 693.0	8.9992	0.123	20.90	0.202	23.05	9M00G7W
		QPSK	668.0 - 693.0	9.3506	0.118	20.74	0.194	22.89	9M35G7W
		16QAM	668.0 - 693.0	9.3376	0.099	19.95	0.162	22.10	9M34D7W
		64QAM	668.0 - 693.0	9.3855	0.069	18.41	0.114	20.56	9M39D7W
		256QAM	668.0 - 693.0	9.3711	0.042	16.27	0.070	18.42	9M37D7W
	15 MHz	π/2 BPSK	670.5 - 690.5	13.5305	0.130	21.15	0.214	23.30	13M5G7W
		QPSK	670.5 - 690.5	14.1968	0.125	20.98	0.206	23.13	14M2G7W
		16QAM	670.5 - 690.5	14.2026	0.101	20.03	0.165	22.18	14M2D7W
		64QAM	670.5 - 690.5	14.1798	0.069	18.41	0.114	20.56	14M2D7W
		256QAM	670.5 - 690.5	14.2073	0.040	15.97	0.065	18.12	14M2D7W
	20 MHz	π/2 BPSK	673.0 - 688.0	18.0073	0.128	21.07	0.210	23.22	18M0G7W
		QPSK	673.0 - 688.0	19.0583	0.124	20.94	0.204	23.09	19M1G7W
		16QAM	673.0 - 688.0	19.0195	0.100	20.01	0.164	22.16	19M0D7W
		64QAM	673.0 - 688.0	19.0446	0.067	18.27	0.110	20.42	19M0D7W
		256QAM	673.0 - 688.0	18.9741	0.039	15.96	0.065	18.11	19M0D7W
NR Band n12	5 MHz	π/2 BPSK	701.5 - 713.5	4.4812	0.145	21.61	0.238	23.76	4M48G7W
		QPSK	701.5 - 713.5	4.5168	0.138	21.40	0.226	23.55	4M52G7W
		16QAM	701.5 - 713.5	4.5032	0.117	20.68	0.192	22.83	4M50D7W
		64QAM	701.5 - 713.5	4.4986	0.079	19.00	0.130	21.15	4M50D7W
		256QAM	701.5 - 713.5	4.5326	0.050	17.02	0.083	19.17	4M53D7W
	10 MHz	π/2 BPSK	704.0 - 711.0	8.9906	0.141	21.48	0.231	23.63	8M99G7W
		QPSK	704.0 - 711.0	9.3199	0.146	21.64	0.239	23.79	9M32G7W
		16QAM	704.0 - 711.0	9.3352	0.120	20.79	0.197	22.94	9M34D7W
		64QAM	704.0 - 711.0	9.3176	0.081	19.07	0.132	21.22	9M32D7W
		256QAM	704.0 - 711.0	9.3204	0.049	16.94	0.081	19.09	9M32D7W
	15 MHz	π/2 BPSK	706.5 - 708.5	13.4751	0.142	21.53	0.233	23.68	13M5G7W
		QPSK	706.5 - 708.5	14.1442	0.138	21.41	0.227	23.56	14M1G7W
		16QAM	706.5 - 708.5	14.2085	0.124	20.93	0.203	23.08	14M2D7W
		64QAM	706.5 - 708.5	14.1714	0.082	19.16	0.135	21.31	14M2D7W
		256QAM	706.5 - 708.5	14.1980	0.049	16.94	0.081	19.09	14M2D7W

Overview Table (<1GHz Band)

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	OBW [MHz]	PAR at 0.1% [dB]	EIRP		Emission Designator
						Max. Power [W]	Max. Power [dBm]	
WCDMA1700	5 MHz	Spread Spectrum	1712.4 - 1752.6	4.1596	2.88	0.394	25.96	4M16F9W
LTE Band 4	1.4 MHz	QPSK	1710.7 - 1754.3	1.0951	5.50	0.391	25.92	1M10G7W
		16QAM	1710.7 - 1754.3	1.1077	5.77	0.313	24.95	1M11D7W
		64QAM	1710.7 - 1754.3	1.0902	6.79	0.272	24.34	1M09D7W
		256QAM	1710.7 - 1754.3	1.0924	6.73	0.137	21.37	1M09D7W
	3 MHz	QPSK	1711.5 - 1753.5	2.7208	5.29	0.380	25.80	2M72G7W
		16QAM	1711.5 - 1753.5	2.7105	6.23	0.333	25.23	2M71D7W
		64QAM	1711.5 - 1753.5	2.7187	6.70	0.278	24.44	2M72D7W
		256QAM	1711.5 - 1753.5	2.7125	6.77	0.139	21.44	2M71D7W
	5 MHz	QPSK	1712.5 - 1752.5	4.5374	5.41	0.391	25.92	4M54G7W
		16QAM	1712.5 - 1752.5	4.5108	6.11	0.327	25.15	4M51D7W
		64QAM	1712.5 - 1752.5	4.5505	6.71	0.265	24.23	4M55D7W
		256QAM	1712.5 - 1752.5	4.5169	6.71	0.134	21.26	4M52D7W
	10MHz	QPSK	1715.0 - 1750.0	8.9802	5.32	0.380	25.80	8M98G7W
		16QAM	1715.0 - 1750.0	8.9914	6.10	0.318	25.02	8M99D7W
		64QAM	1715.0 - 1750.0	8.9911	6.75	0.276	24.41	8M99D7W
		256QAM	1715.0 - 1750.0	9.0205	6.66	0.136	21.35	9M02D7W
	15 MHz	QPSK	1717.5 - 1747.5	13.5157	5.57	0.386	25.87	13M5G7W
		16QAM	1717.5 - 1747.5	13.5275	6.24	0.319	25.04	13M5D7W
		64QAM	1717.5 - 1747.5	13.5405	6.69	0.279	24.46	13M5D7W
		256QAM	1717.5 - 1747.5	13.5193	6.70	0.138	21.41	13M5D7W
	20 MHz	QPSK	1720.0 - 1745.0	17.9736	5.33	0.392	25.93	18M0G7W
		16QAM	1720.0 - 1745.0	17.9791	6.10	0.330	25.18	18M0D7W
		64QAM	1720.0 - 1745.0	17.9976	6.74	0.291	24.64	18M0D7W
		256QAM	1720.0 - 1745.0	18.0113	6.72	0.136	21.34	18M0D7W
LTE Band 66	1.4 MHz	QPSK	1710.7 - 1779.3	1.0951	5.41	0.359	25.55	1M10G7W
		16QAM	1710.7 - 1779.3	1.1077	6.28	0.284	24.53	1M11D7W
		64QAM	1710.7 - 1779.3	1.0902	6.82	0.249	23.96	1M09D7W
		256QAM	1710.7 - 1779.3	1.0924	6.85	0.121	20.83	1M09D7W
	3 MHz	QPSK	1711.5 - 1778.5	2.7208	5.22	0.364	25.61	2M72G7W
		16QAM	1711.5 - 1778.5	2.7105	6.15	0.295	24.70	2M71D7W
		64QAM	1711.5 - 1778.5	2.7187	6.71	0.256	24.08	2M72D7W
		256QAM	1711.5 - 1778.5	2.7125	6.92	0.127	21.04	2M71D7W
	5 MHz	QPSK	1712.5 - 1777.5	4.5374	5.30	0.361	25.57	4M54G7W
		16QAM	1712.5 - 1777.5	4.5108	6.03	0.296	24.71	4M51D7W
		64QAM	1712.5 - 1777.5	4.5505	6.65	0.236	23.73	4M55D7W
		256QAM	1712.5 - 1777.5	4.5169	6.92	0.121	20.81	4M52D7W
	10 MHz	QPSK	1715.0 - 1775.0	8.9802	5.36	0.356	25.52	8M98G7W
		16QAM	1715.0 - 1775.0	8.9914	6.04	0.298	24.74	8M99D7W
		64QAM	1715.0 - 1775.0	8.9911	6.61	0.251	23.99	8M99D7W
		256QAM	1715.0 - 1775.0	9.0205	6.74	0.127	21.04	9M02D7W
	15 MHz	QPSK	1717.5 - 1772.5	13.5157	5.54	0.361	25.58	13M5G7W
		16QAM	1717.5 - 1772.5	13.5275	6.19	0.294	24.69	13M5D7W
		64QAM	1717.5 - 1772.5	13.5405	6.65	0.253	24.03	13M5D7W
		256QAM	1717.5 - 1772.5	13.5193	6.75	0.126	20.99	13M5D7W
	20 MHz	QPSK	1720.0 - 1770.0	17.9736	5.34	0.367	25.65	18M0G7W
		16QAM	1720.0 - 1770.0	17.9791	6.04	0.296	24.72	18M0D7W
		64QAM	1720.0 - 1770.0	17.9976	6.64	0.253	24.03	18M0D7W
		256QAM	1720.0 - 1770.0	18.0113	6.77	0.122	20.85	18M0D7W
ULCA Band 66	20 + 20 MHz	QPSK	1720.0 - 1770.0	37.7544	-	0.410	26.13	37M8G7W
		16QAM	1720.0 - 1770.0	37.7360	-	0.211	23.25	37M7D7W
		64QAM	1720.0 - 1770.0	37.7545	-	0.214	23.30	37M8D7W
		256QAM	1720.0 - 1770.0	37.6859	-	0.133	21.24	37M7D7W
NR Band n66	5 MHz	π/2 BPSK	1712.5 - 1777.5	4.5248	4.16	0.365	25.62	4M52G7W
		QPSK	1712.5 - 1777.5	4.5119	5.32	0.376	25.75	4M51G7W
		16QAM	1712.5 - 1777.5	4.5414	6.49	0.297	24.73	4M54D7W
		64QAM	1712.5 - 1777.5	4.5052	6.73	0.216	23.34	4M51D7W
		256QAM	1712.5 - 1777.5	4.5063	6.67	0.127	21.03	4M51D7W
	10 MHz	π/2 BPSK	1715.0 - 1775.0	8.9877	3.97	0.398	26.00	8M99G7W
		QPSK	1715.0 - 1775.0	9.3467	5.41	0.396	25.98	9M35G7W
		16QAM	1715.0 - 1775.0	9.3018	6.38	0.306	24.86	9M30D7W
		64QAM	1715.0 - 1775.0	9.3349	6.37	0.221	23.45	9M33D7W
		256QAM	1715.0 - 1775.0	9.3451	6.64	0.127	21.03	9M35D7W
	15 MHz	π/2 BPSK	1717.5 - 1772.5	13.4643	4.14	0.397	25.99	13M5G7W
		QPSK	1717.5 - 1772.5	14.1800	5.45	0.398	26.00	14M2G7W
		16QAM	1717.5 - 1772.5	14.1925	6.35	0.307	24.87	14M2D7W
		64QAM	1717.5 - 1772.5	14.2154	6.60	0.204	23.10	14M2D7W
		256QAM	1717.5 - 1772.5	14.1696	6.71	0.124	20.93	14M2D7W
	20 MHz	π/2 BPSK	1720.0 - 1770.0	17.8496	3.90	0.385	25.85	17M8G7W
		QPSK	1720.0 - 1770.0	19.0503	5.40	0.362	25.59	19M1G7W
		16QAM	1720.0 - 1770.0	19.0240	6.32	0.309	24.90	19M0D7W
		64QAM	1720.0 - 1770.0	19.0339	6.54	0.219	23.40	19M0D7W
		256QAM	1720.0 - 1770.0	19.0162	6.61	0.133	21.24	19M0D7W
	30 MHz	π/2 BPSK	1725.0 - 1765.0	28.7206	3.98	0.386	25.86	28M7G7W
		QPSK	1725.0 - 1765.0	28.7202	5.49	0.398	26.00	28M7G7W
		16QAM	1725.0 - 1765.0	28.6453	6.40	0.319	25.03	28M6D7W
		64QAM	1725.0 - 1765.0	28.7292	6.57	0.219	23.41	28M7D7W
		256QAM	1725.0 - 1765.0	28.6277	6.68	0.130	21.13	28M6D7W
	40 MHz	π/2 BPSK	1730.0 - 1760.0	38.7790	3.85	0.384	25.84	38M8G7W
		QPSK	1730.0 - 1760.0	38.6635	5.35	0.394	25.95	38M7G7W
		16QAM	1730.0 - 1760.0	38.8358	6.23	0.291	24.63	38M8D7W
		64QAM	1730.0 - 1760.0	38.6752	6.50	0.216	23.35	38M7D7W
		256QAM	1730.0 - 1760.0	38.6355	6.49	0.129	21.12	38M6D7W

Overview Table (>1GHz Bands)

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 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 v01r01.

1.3 Test Facility / Accreditations

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

- PCTEST is an ISO 17025-2017 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.

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Apple Tablet Device FCC ID: BCGA2589**. The test data contained in this report pertains only to the emissions due to the EUT's licensed transmitters that operate under the provisions of Part 27.

Test Device Serial No.: Y257GJ4FH2, MK616422XY, CM9FQFPG4G, DLX1462005314921G

2.2 Device Capabilities

This device contains the following capabilities:

850/1700/1900 WCDMA/HSPA, Multi-band LTE, 5G NR (FR1), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII, Bluetooth (1x, EDR, LE1M, LE2M, HDR4, HDR8), WPT

This device supports BT Beamforming

This device supports simultaneous transmission operations, which allows for multiple transmitters to transmit simultaneously on the same antenna. The table below shows all configurations possible.

Antenna	Simultaneous Tx Config	WLAN	Bluetooth	WCDMA / LTE / FR1 NR	LTE / FR1 NR		UNII
		802.11 b/g/n/ax	BDR, EDR, HDR4/8, LE1/2M	Mid Band	High Band	Ultra High Band	802.11 a/n/ac/ax
3A	Config 1	×	✓	×	×	×	✓
3A	Config 2	✓	×	×	✓	×	×
3A	Config 3	×	✓	×	✓	×	×
3A	Config 4	×	✓	×	✓	×	✓
3A	Config 5	×	×	×	✓	×	✓
3A	Config 6	✓	×	✓	×	×	×
3A	Config 7	×	✓	✓	×	×	×
3A	Config 8	×	✓	✓	×	×	✓
3A	Config 9	×	×	✓	×	×	✓
1A	Config 10	✓	×	×	✓	×	×
1A	Config 11	×	✓	×	✓	×	×
1A	Config 12	✓	×	✓	×	×	×
1A	Config 13	×	✓	✓	×	×	×
1B	Config 14	×	×	×	×	✓	✓
2B	Config 15	×	×	×	×	✓	✓

Table 2-1. Simultaneous Transmission Configurations

✓ = Support; × = Not Support

Note:

All the above simultaneous transmission configurations have been tested and the worst case configuration was found to be Config 4 and reported in Bluetooth, UNII OFDM, and Part 27b RF test reports.

Wi-Fi 2.4GHz and Bluetooth 2.4 GHz can transmit simultaneously on separate antennas. 2.4 GHz WLAN Antenna 3a can only transmit simultaneously with 2.4GHz Bluetooth Antenna 1a. In this scenario Wi-Fi max power will not exceed minimum of (13.5dBm, SAR max cap, Regulatory max cap) power.

2.3 Antenna Description

Following antenna gains provided by manufacturer were used for testing.

Band	Antenna Gain (dBi)				
	Antenna 4	Antenna 3b	Antenna 2a	Antenna 3a	Antenna 1a
LTE Band 71	-2.2	-4.4	N/A	N/A	N/A
NR Band n71					
LTE Band 12/17	-1.9	-4.8			
NR Band n12					
LTE Band 13	-1.3	-2.3			
LTE Band 4/66	0.6	N/A	-2.7	-0.6	-0.2
NR Band n66					
WCDMA1700					

Table 2-2. Highest Antenna Gain

2.4 Test Support Equipment

1	Apple MacBook Pro	Model:	A2141	S/N:	C02DV7VKMD6T
	w/AC/DC Adapter	Model:	A2166	S/N:	N/A
2	Apple USB-C Cable	Model:	Chimp	S/N:	420A57
3	Apple USB-C Cable	Model:	Spartan	S/N:	000MKTR02U
4	USB-C Cable	Model:	A146	S/N:	N/A
	w/ AC Adapter	Model:	A2305	S/N:	N/A
5	Apple Pencil	Model:	N/A	S/N:	GQXGSXBJKM9
6	DC Power Supply	Model:	KPS3010D	S/N:	N/A

Table 2-3. Test Support Equipment

2.5 Test Configuration

The EUT was tested per the guidance of ANSI C63.26 2015, 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.

For emissions from 1GHz – 18GHz, low, mid, and high channels were tested with highest power and worst case configuration. The emissions below 1GHz and above 18GHz were tested with the highest transmitting power and the worst case channel.

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 19E11500Q 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.

3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

The measurement procedures described in the document titled "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI C63.26-2015/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 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.

For radiated spurious emissions measurements and calculations, conversion method is used per the formulas in KDB 971168 Section 5.8.4. Field Strength (EIRP) is calculated using the following formulas:

$$E_{[dB\mu V/m]} = \text{Measured amplitude level}_{[dBm]} + 107 + \text{Cable Loss}_{[dB]} + \text{Antenna Factor}_{[dB/m]}$$

And

$$EIRP_{[dBm]} = E_{[dB\mu V/m]} + 20\log D - 104.8;\ \text{where D is the measurement distance in meters.}$$

All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4-2014.

Per KDB 414788 D01 v01r01, radiated emission test sites other than open-field test sites (e.g., shielded anechoic chambers), may be employed for emission measurements below 30MHz if characterized so that the measurements correspond to those obtained at an open-field test site. To determine test site equivalency, a reference sample transmitting at 149kHz was measured on an open field test site (asphalt with no ground plane) and then measured in the 3m semi-anechoic chamber. A calibrated 60cm loop antenna was used while the reference device was rotated through the X, Y and Z axis in order to capture the worst case level. A maximum deviation of 2.77dB at 149kHz was measured when comparing the 3 meter semi-anechoic chamber to the open field site.

Radiated spurious emission levels are investigated with the receive antenna horizontally and vertically polarized per ANSI C63.26-2015 and TIA-603-E-2016.

4.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.23-2012. 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	1.65
Radiated Disturbance (<30MHz)	4.06
Radiated Disturbance (30MHz-1GHz)	4.30
Radiated Disturbance (1-18GHz)	4.78
Radiated Disturbance (>18GHz)	4.79

5.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent Technologies	N9030A	3Hz-44GHz PXA Signal Analyzer	3/31/2021	Annual	3/31/2022	MY49430244
ATM	180-442A-KF	20dB Nominal Gain Horn Antenna	8/13/2021	Annual	8/13/2022	T058701-01
ESPEC	SU-241	Tabletop Temperature Chamber	10/26/2021	Annual	10/26/2022	92009574
ETS-Lindgren	3142E	BiConiLog Antenna (30MHz - 6GHz)	10/21/2021	Annual	10/21/2022	208204
ETS-Lindgren	3117	Double Ridged Guide Antenna (1-18 GHz)	10/25/2021	Annual	10/25/2022	227597
Keysight Technology	N9040B	UXA Signal Analyzer	2/8/2022	Annual	2/8/2023	MY57212015
Rohde & Schwarz	TS-PR8	Pre-Amplifier (30MHz - 8GHz)	1/6/2022	Annual	1/6/2023	102327
Rohde & Schwarz	TS-PR18	Pre-Amplifier (1GHz - 18GHz)	1/6/2022	Annual	1/6/2023	101639
Rohde & Schwarz	FSV40	Signal Analyzer (10Hz-40GHz)	3/16/2021	Annual	3/16/2022	101619
Rohde & Schwarz	ESW26	EMI Test Receiver	6/11/2021	Annual	6/11/2022	101299
Rohde & Schwarz	ESW44	EMI Test Receiver	12/2/2021	Annual	12/2/2022	101570
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	10/11/2021	Annual	10/11/2022	161616
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	3/15/2021	Annual	3/15/2022	161617
Rohde & Schwarz	TS-PR1840	Pre-Amplifier (18GHz - 40GHz)	4/29/2021	Annual	4/29/2022	100051
Rohde & Schwarz	HFH2-Z2	Loop Antenna	4/5/2021	Annual	4/5/2022	100519
Rohde & Schwarz	FSVA3030	Signal Analyzer (up to 30 GHz)	4/19/2021	Annual	4/19/2022	100823
Rohde & Schwarz	FSVA3044	Signal Analyzer (up to 44 GHz)	4/26/2021	Annual	4/26/2022	101098

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

WCDMA Emission Designator

Emission Designator = 4M16F9W
WCDMA BW = 4.16 MHz
F = Frequency Modulation
9 = Composite Digital Info
W = Combination (Audio/Data)

π/2 BPSK / QPSK Modulation

Emission Designator = 8M62G7W
BW = 8.62 MHz
G = Phase Modulation
7 = Quantized/Digital Info
W = Combination of Any

QAM Modulation

Emission Designator = 8M45D7W
LTE BW = 8.45 MHz
D = Amplitude/Angle Modulated
7 = Quantized/Digital Info
W = Combination of Any

Spurious Radiated Emission

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: Apple Inc.

FCC ID: BCGA2589

FCC Classification: PCS Licensed Transmitter (PCB)

Mode(s): WCDMA/NR/LTE/UL-CA

Test Condition	Test Description	FCC Part Section(s)	Test Limit	Test Result	Reference
CONDUCTED	Occupied Bandwidth	2.1049	N/A	N/A	Section 7.2
	Conducted Band Edge / Spurious Emissions	2.1051, 27.53	-13 dBm at Band Edge and for all out-of-band emissions	PASS	Sections 7.3, 7.4
	Peak-Average Ratio	27.50(d)(5)	< 13 dB	PASS	Section 7.5
	Transmitter Conducted Output Power	2.1046	N/A	N/A	See RF Exposure Report
	Frequency Stability	2.1055, 27.54	Fundamental emissions stay within authorized frequency block over the temperature and voltage range as tested	PASS	Section 7.8
	Effective Radiated Power / Equivalent Isotropic Radiated Power (LTE Band 71)	27.50(b)(10)	< 3 Watts max. ERP	PASS	Section 7.6
	Effective Radiated Power / Equivalent Isotropic Radiated Power (NR Band n71)			PASS	Section 7.6
	Effective Radiated Power / Equivalent Isotropic Radiated Power (LTE Band 12/17)			PASS	Section 7.6
	Effective Radiated Power / Equivalent Isotropic Radiated Power (NR Band 12)			PASS	Section 7.6
	Effective Radiated Power / Equivalent Isotropic Radiated Power (LTE Band 13)	27.50(c)(10)	< 3 Watts max. ERP	PASS	Section 7.6
	Equivalent Isotropic Radiated Power (WCDMA)	27.50(d)(4)	< 1 Watts max. EIRP	PASS	Section 7.6
	Equivalent Isotropic Radiated Power (NR Band n66)			PASS	Section 7.6
	Equivalent Isotropic Radiated Power (LTE Band 4/66)			PASS	Section 7.6
RADIATED	Radiated Spurious Emissions (LTE Band 13)	2.1053, 27.53(f)	< -70 dBW/MHz (for wideband signals) < -80 dBW (for discrete emissions less than 700Hz BW) For all emissions in the band 1559 - 1610 MHz	PASS	Section 7.7
	Radiated Spurious Emissions	2.1053, 27.53	-13 dBm for all out-of-band emissions	PASS	Section 7.7

Table 7-1. Summary of 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 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. All conducted emissions measurements are performed with automated test software to capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST EMC Software Tool 1.1.

7.2 Occupied Bandwidth

§2.1049

Test Overview

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. All modes of operation were investigated and the worst case configuration results are reported in this section. All ports were tested and only the worst case data were reported.

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.

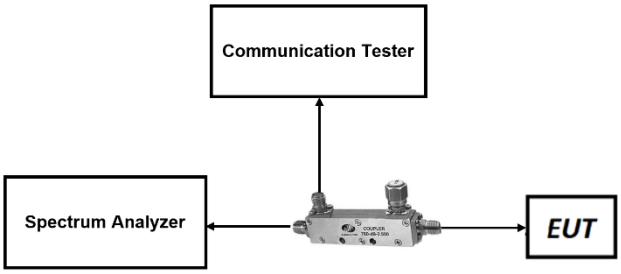
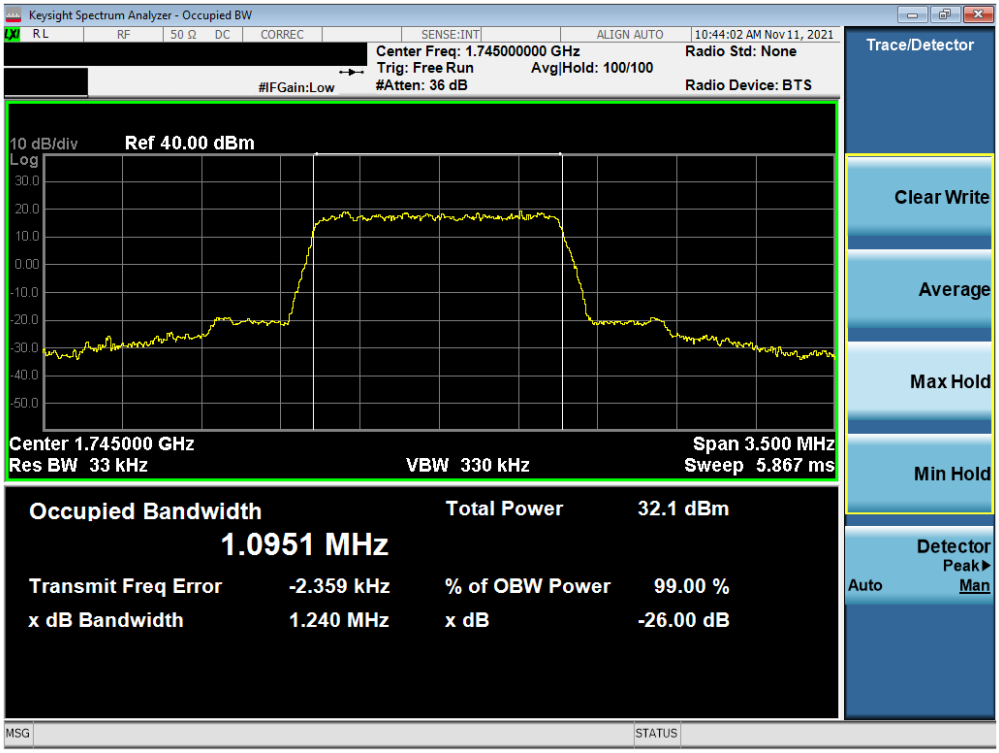


Figure 7-1. Test Instrument & Measurement Setup

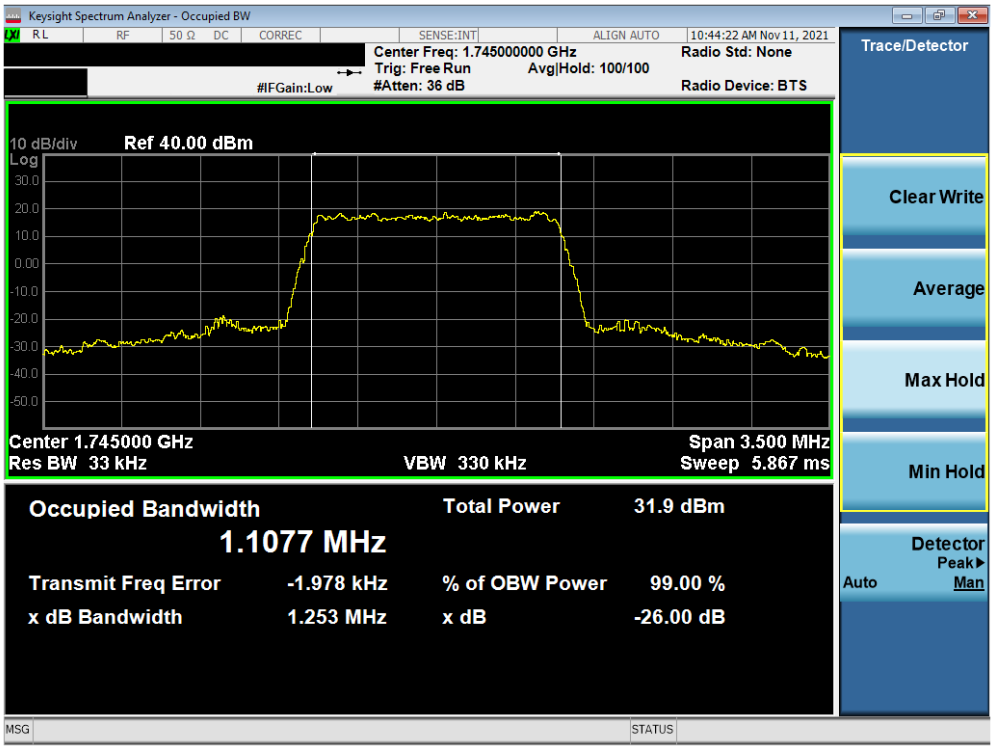
Test Notes

None.

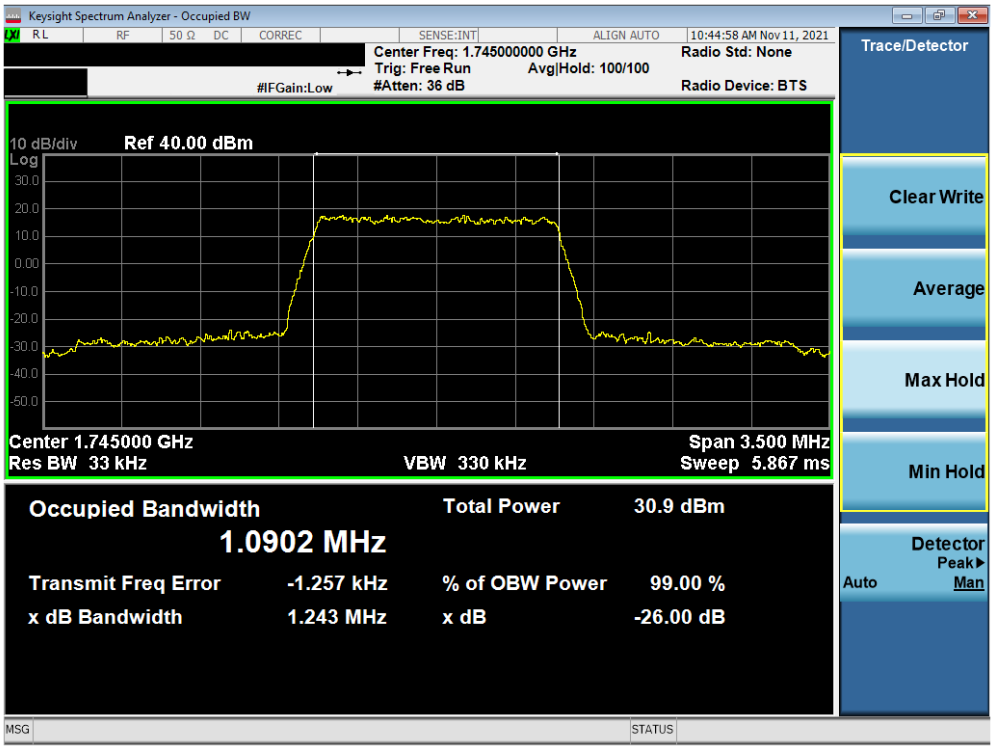
LTE Band 66/4



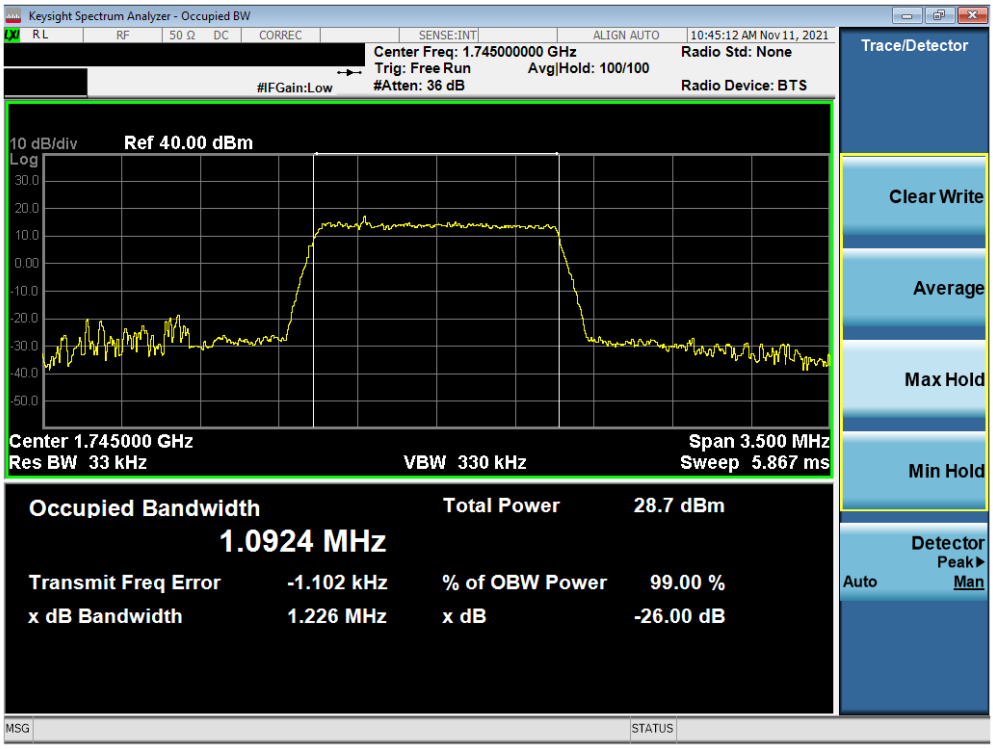
Plot 7-1. Occupied Bandwidth Plot (LTE Band 66/4 - 1.4MHz QPSK - Full RB)



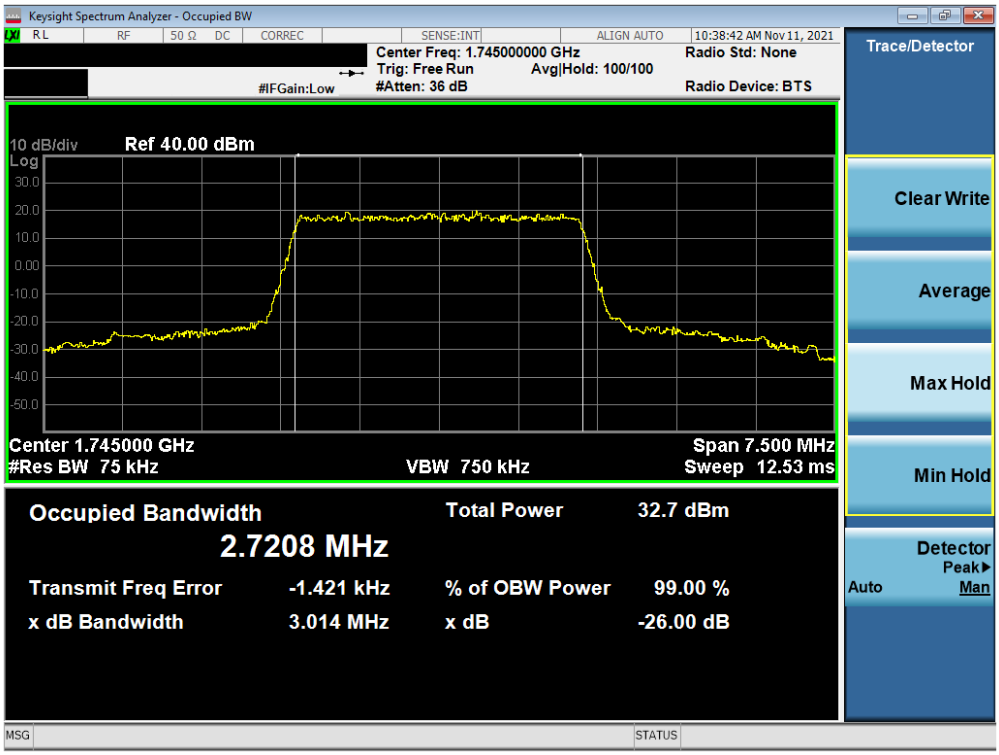
Plot 7-2. Occupied Bandwidth Plot (LTE Band 66/4 - 1.4MHz 16-QAM - Full RB)



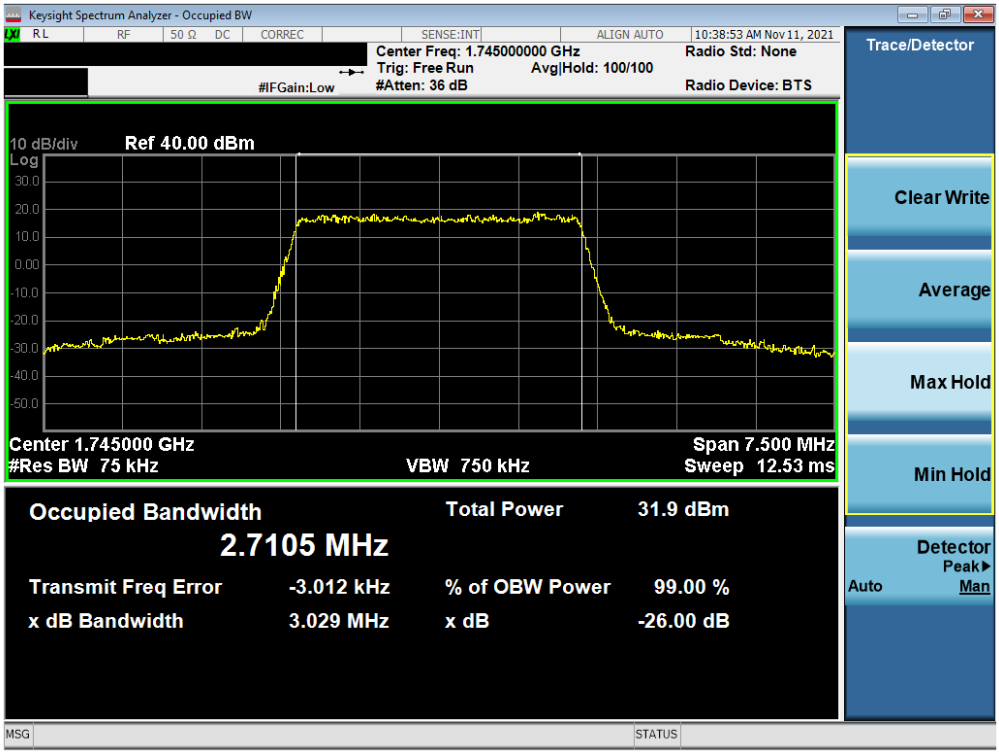
Plot 7-3. Occupied Bandwidth Plot (LTE Band 66/4 - 1.4MHz 64-QAM - Full RB)



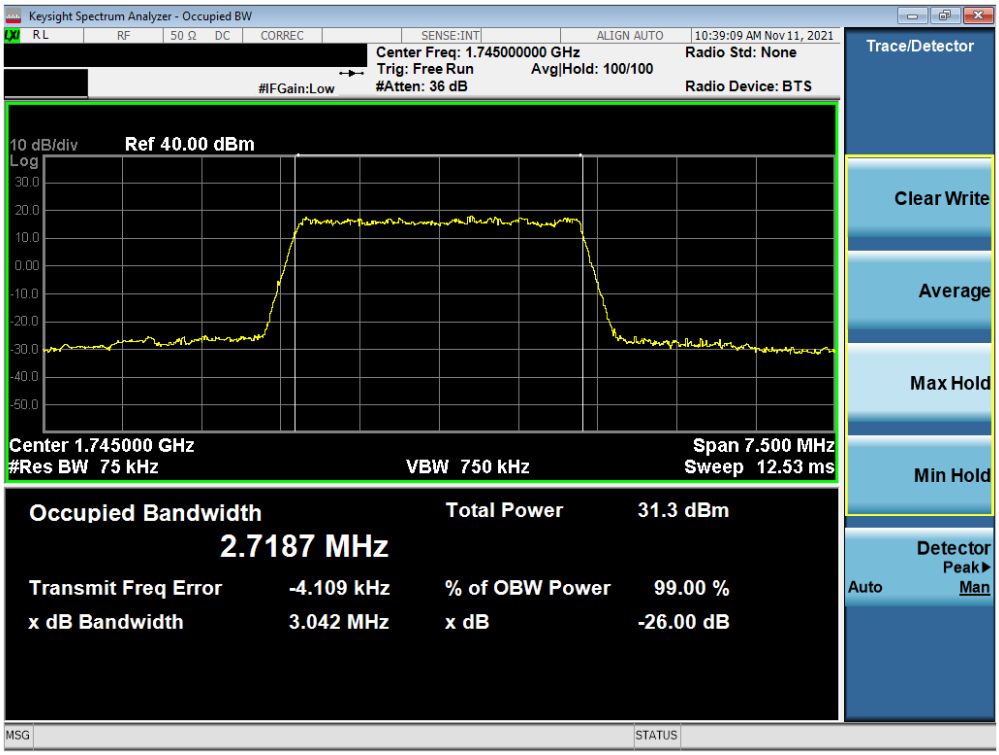
Plot 7-4. Occupied Bandwidth Plot (LTE Band 66/4 - 1.4MHz 256-QAM - Full RB)



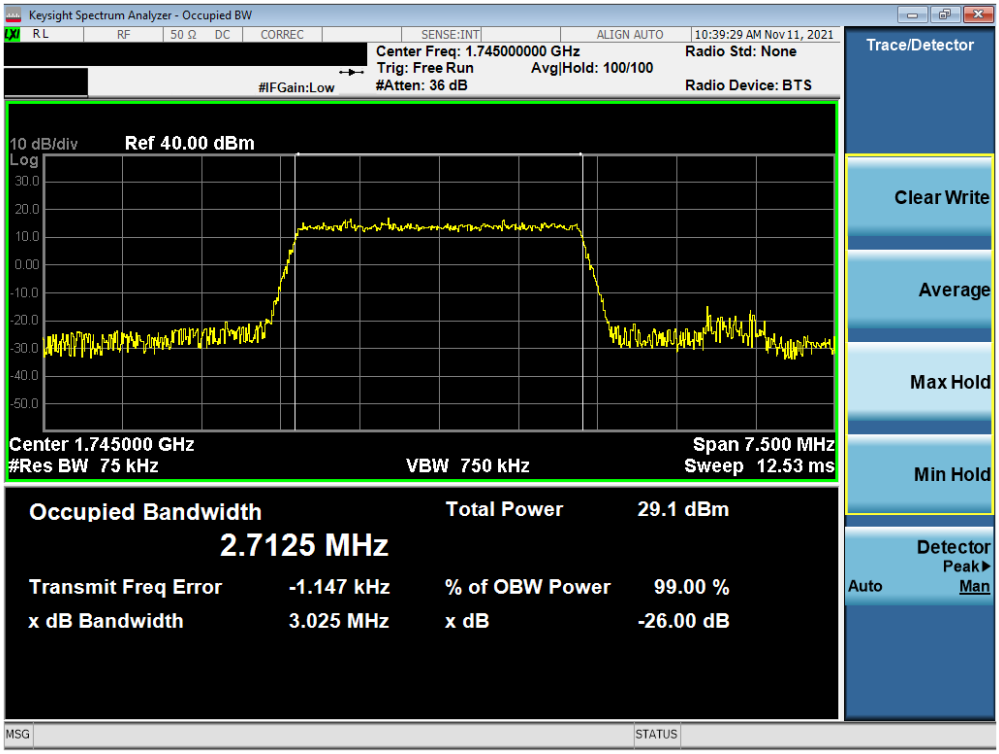
Plot 7-5. Occupied Bandwidth Plot (LTE Band 66/4 - 3MHz QPSK - Full RB)



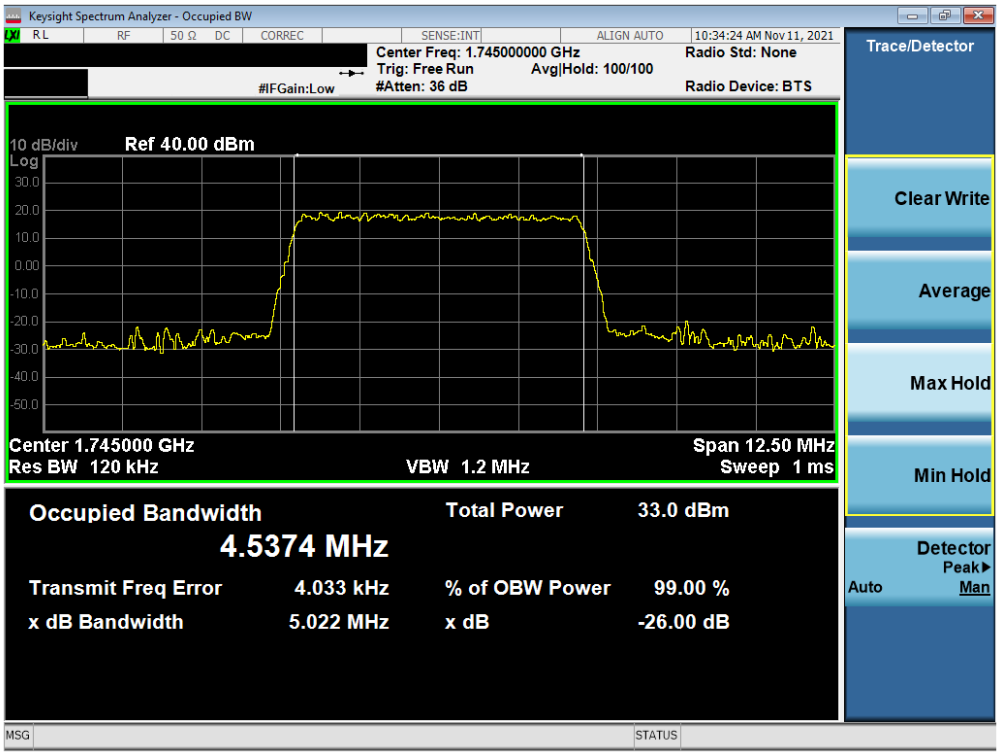
Plot 7-6. Occupied Bandwidth Plot (LTE Band 66/4 - 3MHz 16-QAM - Full RB)



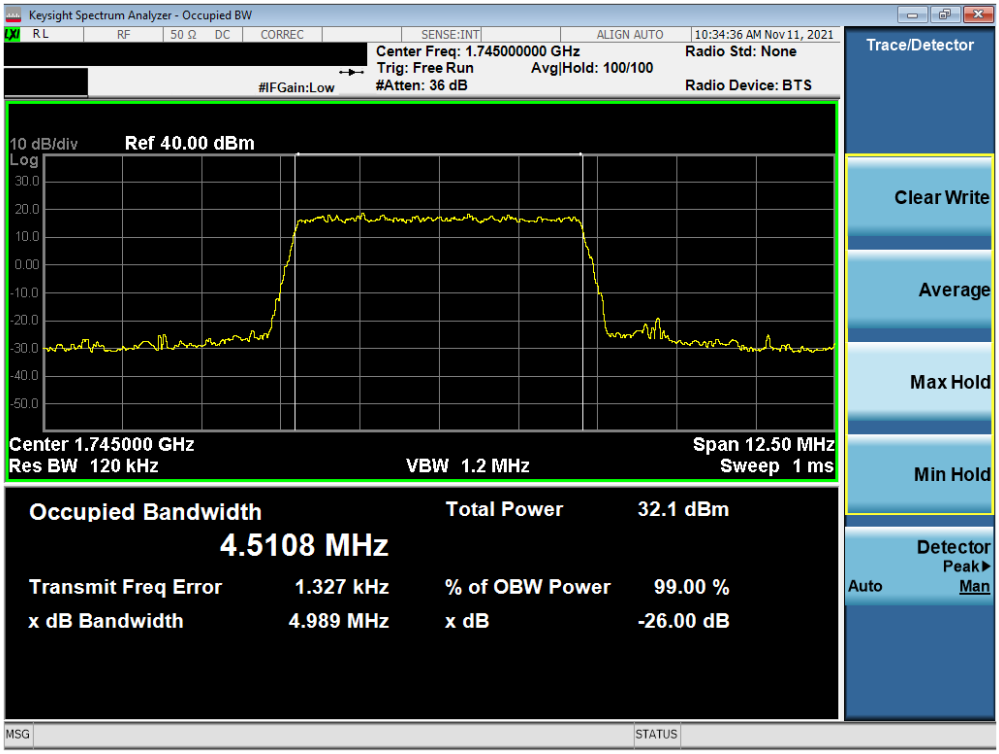
Plot 7-7. Occupied Bandwidth Plot (LTE Band 66/4 - 3MHz 64-QAM - Full RB)



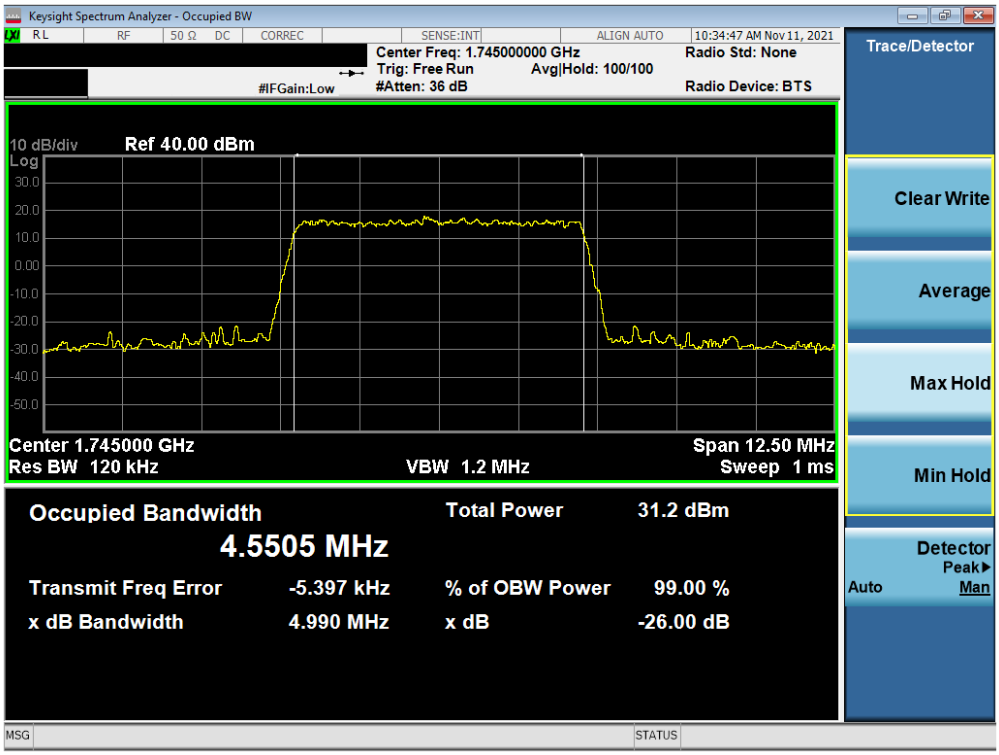
Plot 7-8. Occupied Bandwidth Plot (LTE Band 66/4 - 3MHz 256-QAM - Full RB)



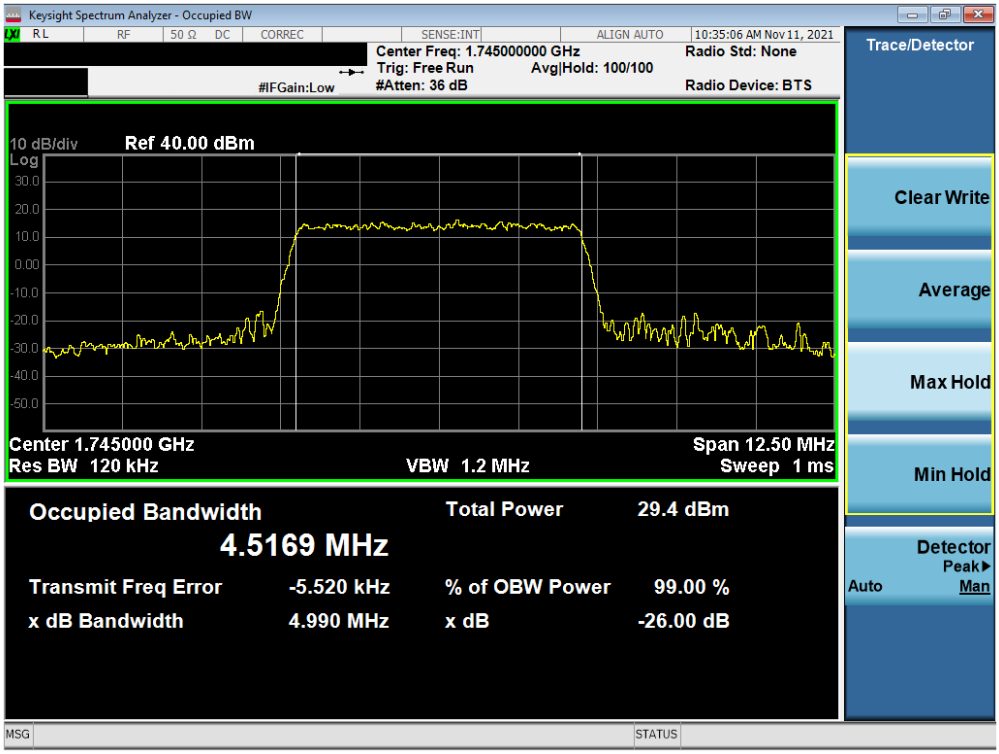
Plot 7-9. Occupied Bandwidth Plot (LTE Band 66/4 - 5MHz QPSK - Full RB)



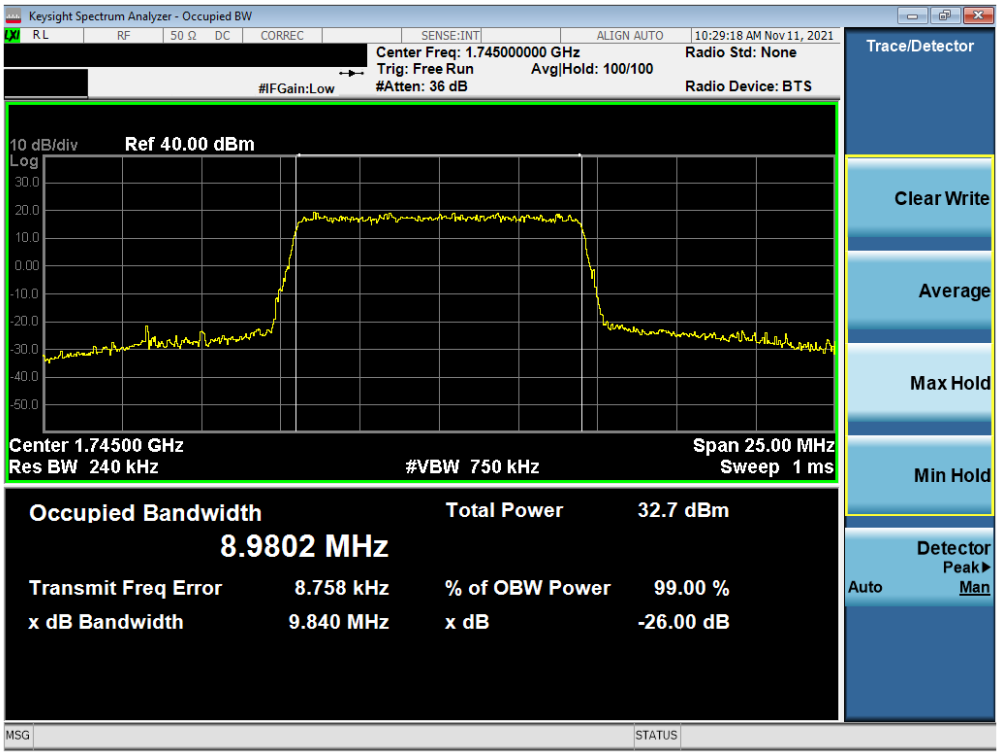
Plot 7-10. Occupied Bandwidth Plot (LTE Band 66/4 - 5MHz 16-QAM - Full RB)



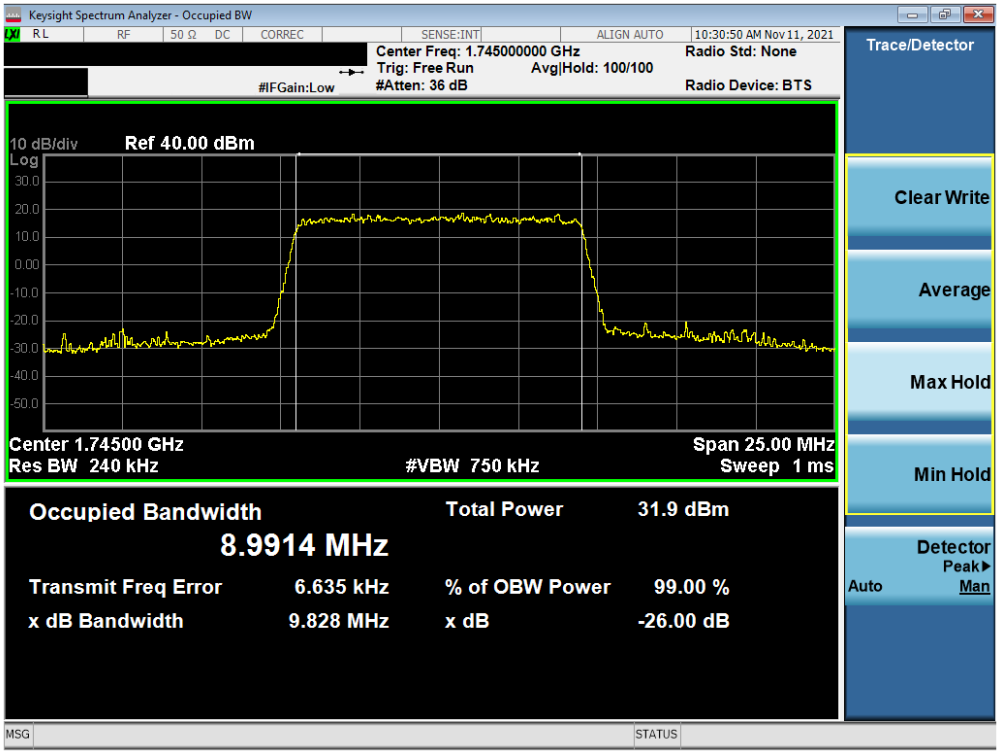
Plot 7-11. Occupied Bandwidth Plot (LTE Band 66/4 - 5MHz 64-QAM - Full RB)



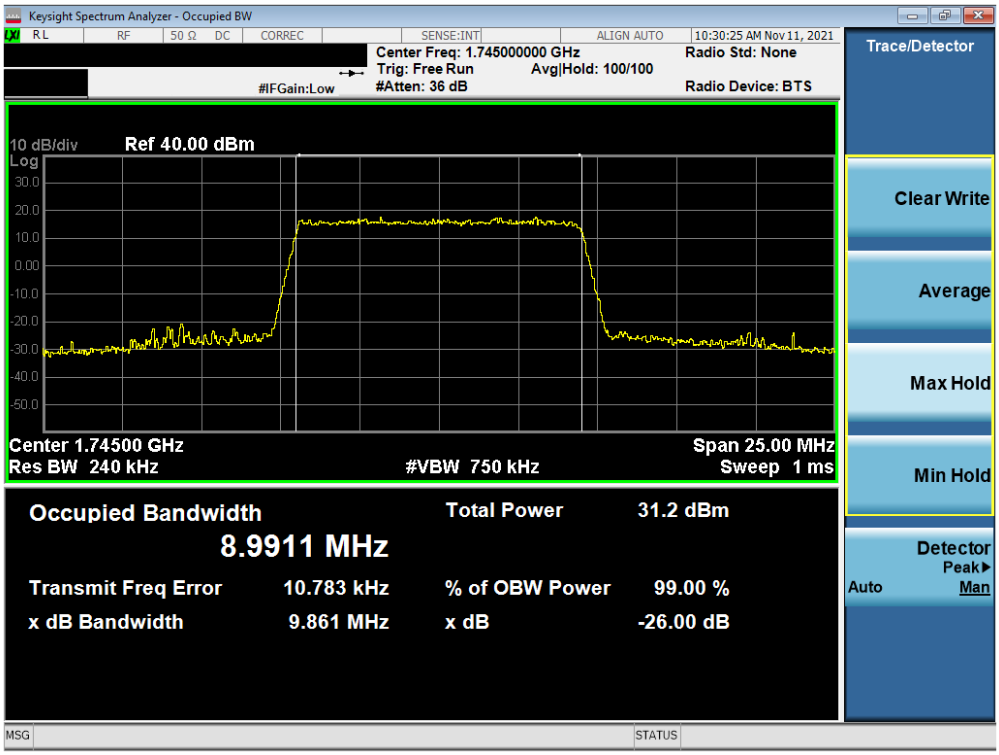
Plot 7-12. Occupied Bandwidth Plot (LTE Band 66/4 - 5MHz 256-QAM - Full RB)



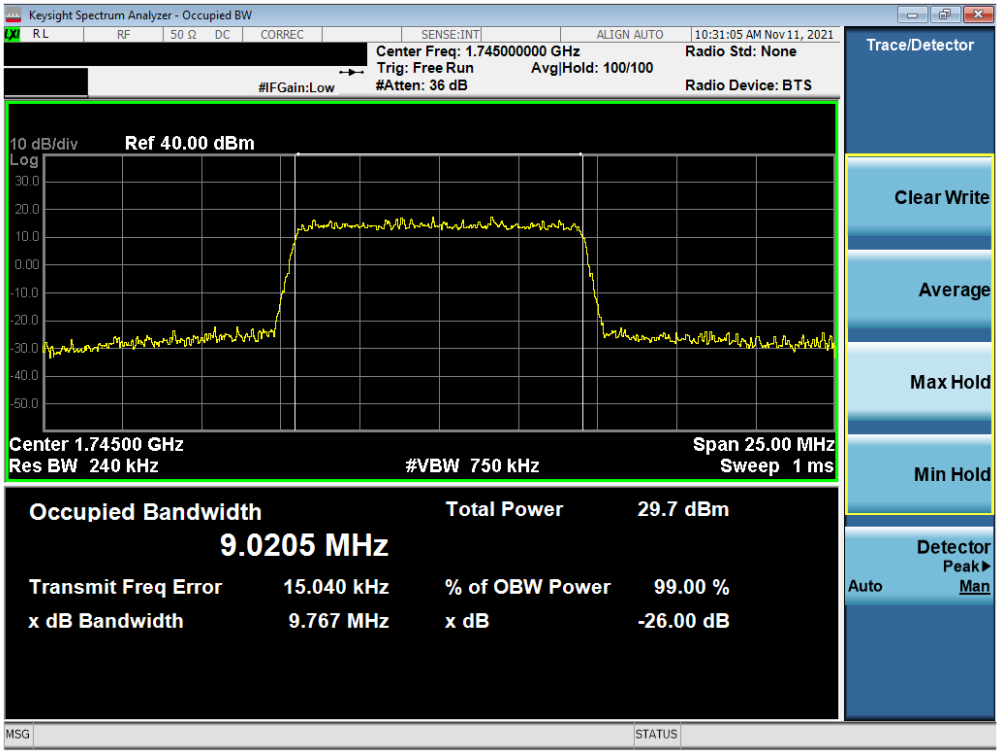
Plot 7-13. Occupied Bandwidth Plot (LTE Band 66/4 - 10MHz QPSK - Full RB)



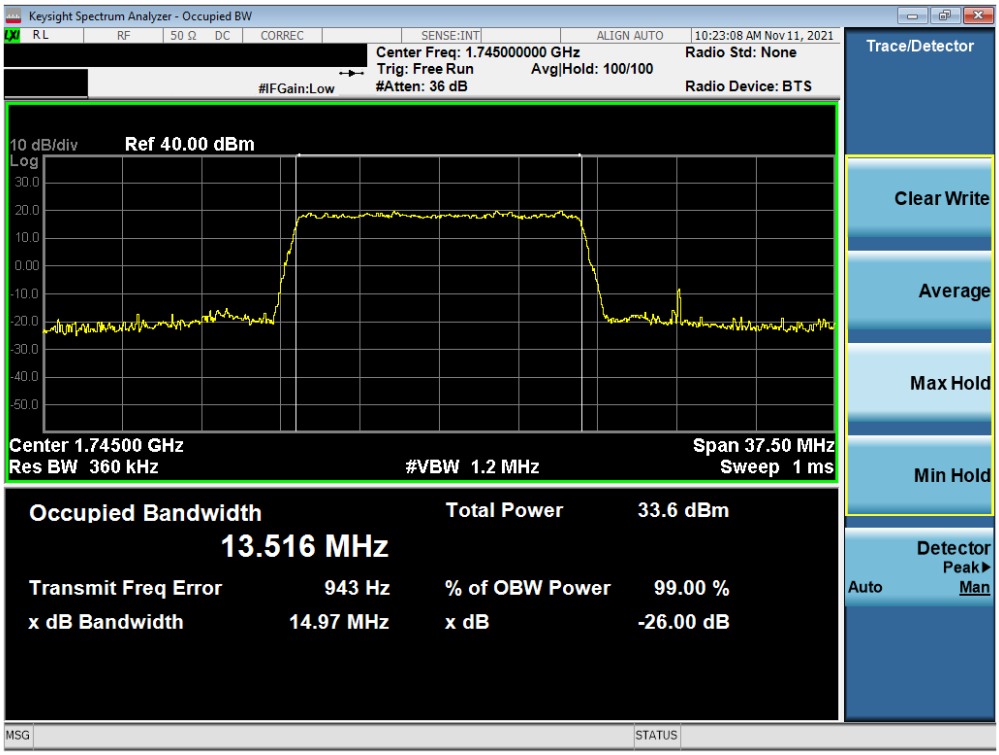
Plot 7-14. Occupied Bandwidth Plot (LTE Band 66/4 - 10MHz 16-QAM - Full RB)



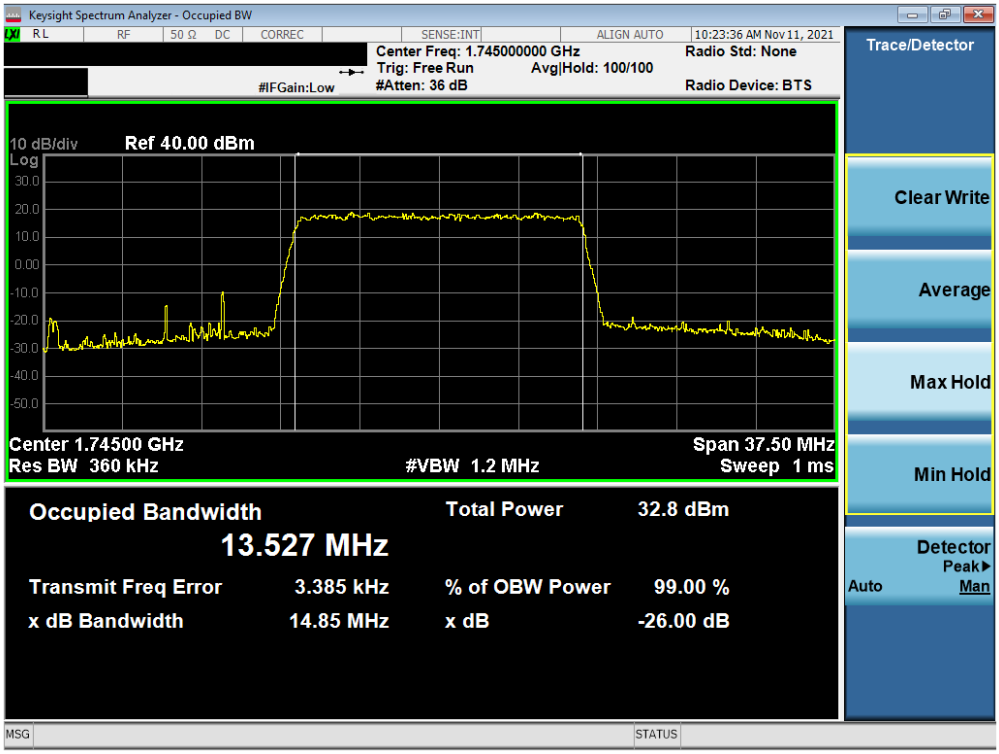
Plot 7-15. Occupied Bandwidth Plot (LTE Band 66/4 - 10MHz 64-QAM - Full RB)



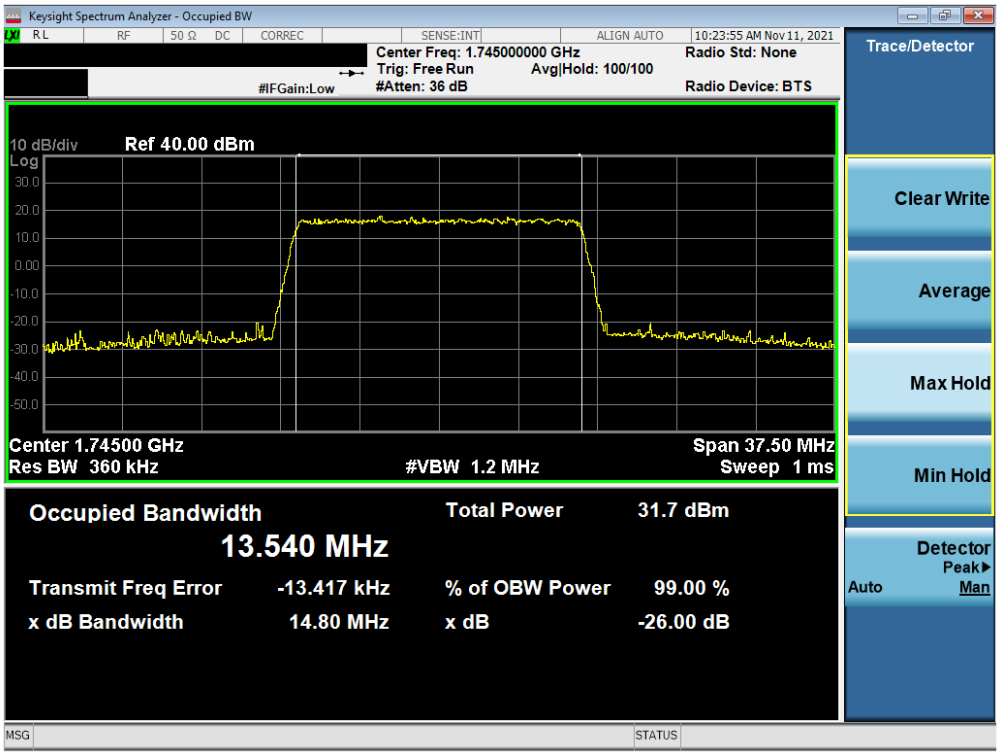
Plot 7-16. Occupied Bandwidth Plot (LTE Band 66/4 - 10MHz 256-QAM - Full RB)



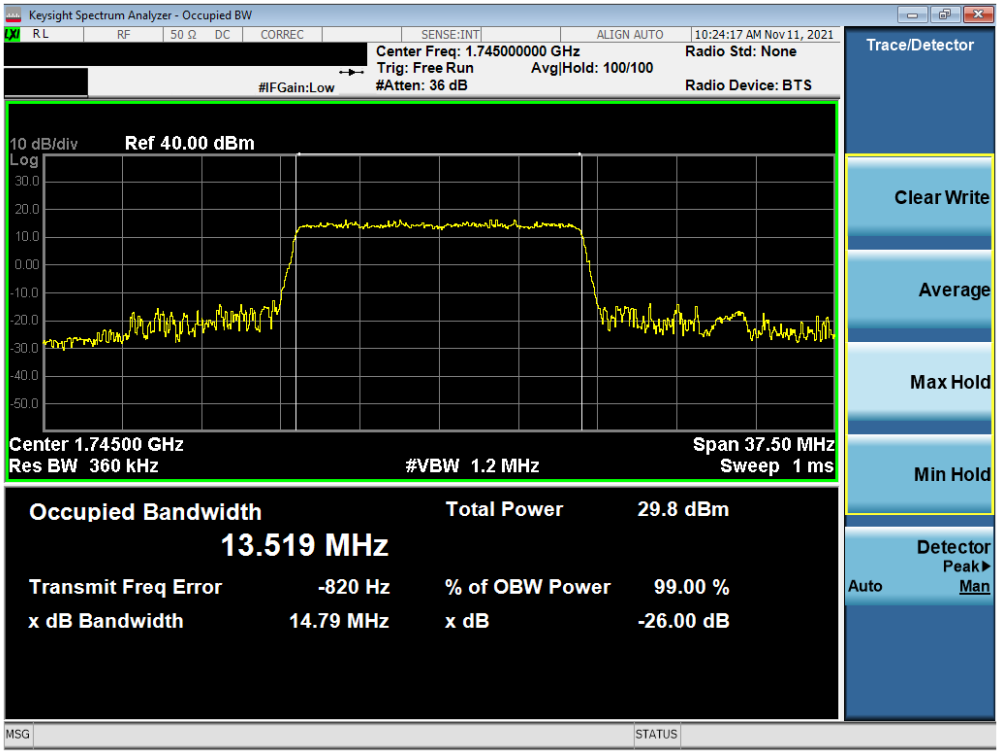
Plot 7-17. Occupied Bandwidth Plot (LTE Band 66/4 - 15MHz QPSK - Full RB)



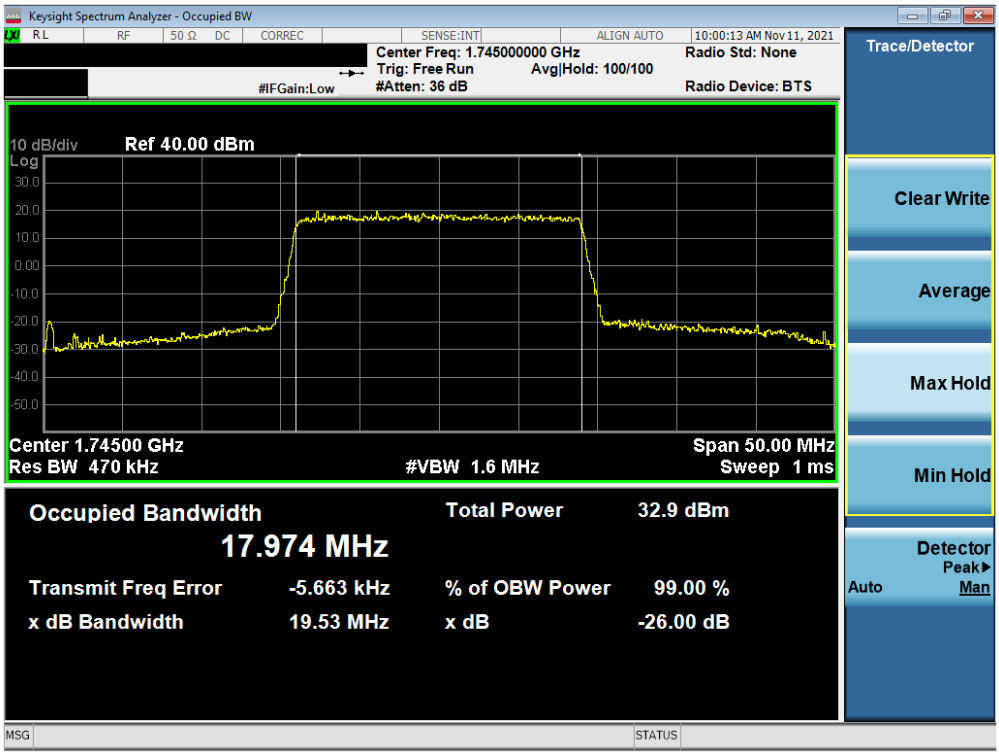
Plot 7-18. Occupied Bandwidth Plot (LTE Band 66/4 - 15MHz 16-QAM - Full RB)



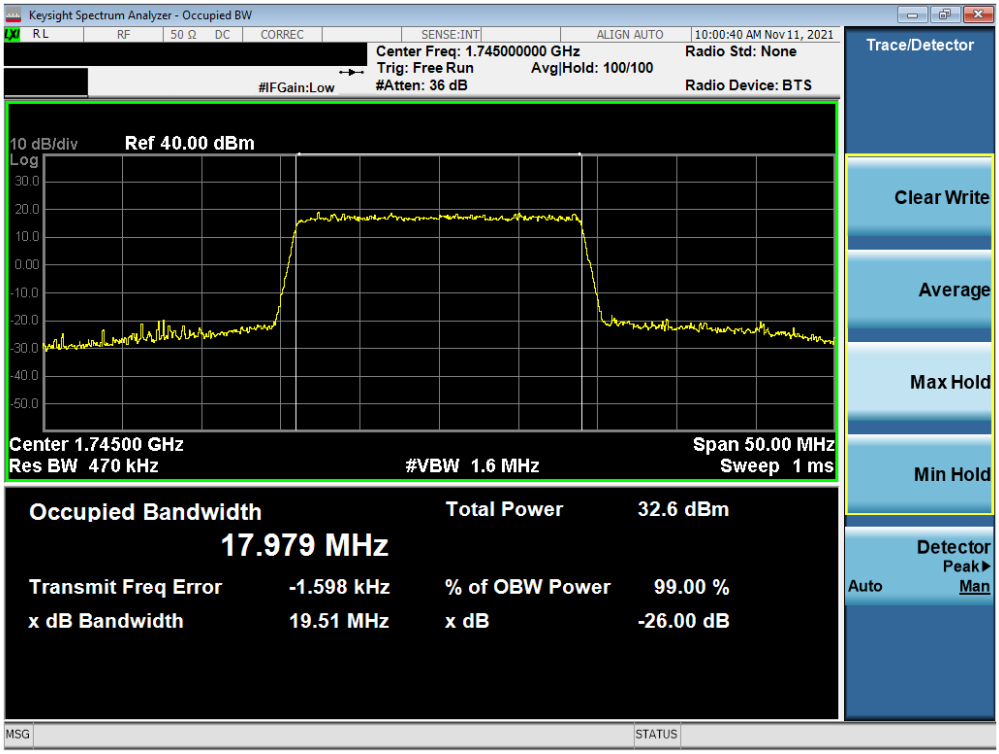
Plot 7-19. Occupied Bandwidth Plot (LTE Band 66/4 - 15MHz 64-QAM - Full RB)



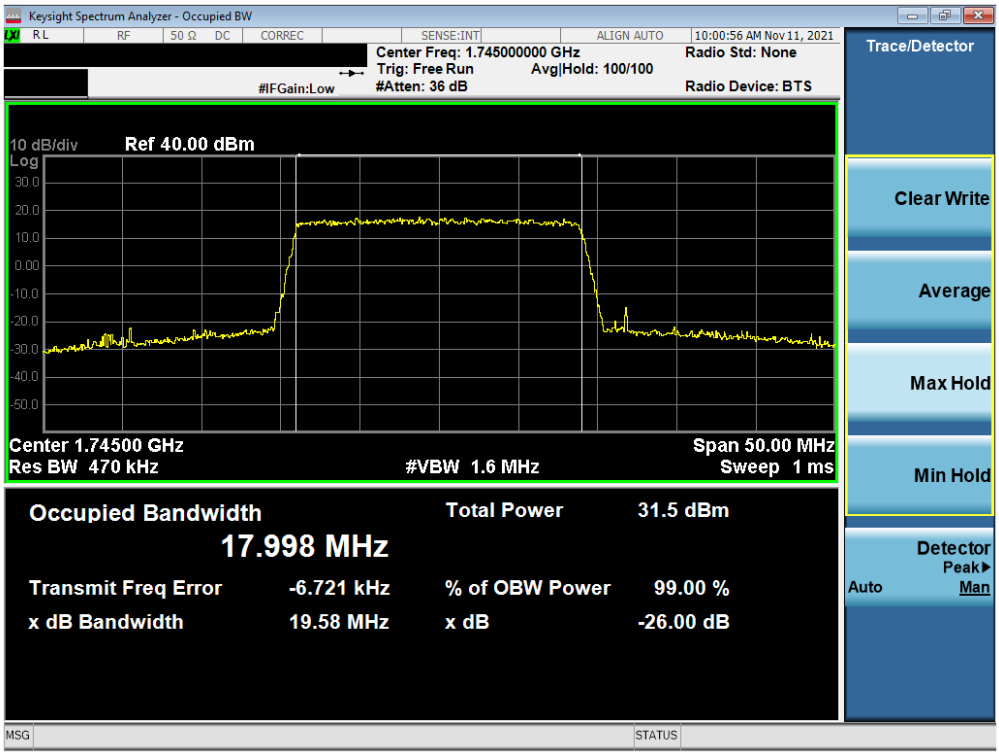
Plot 7-20. Occupied Bandwidth Plot (LTE Band 66/4 - 15MHz 256-QAM - Full RB)



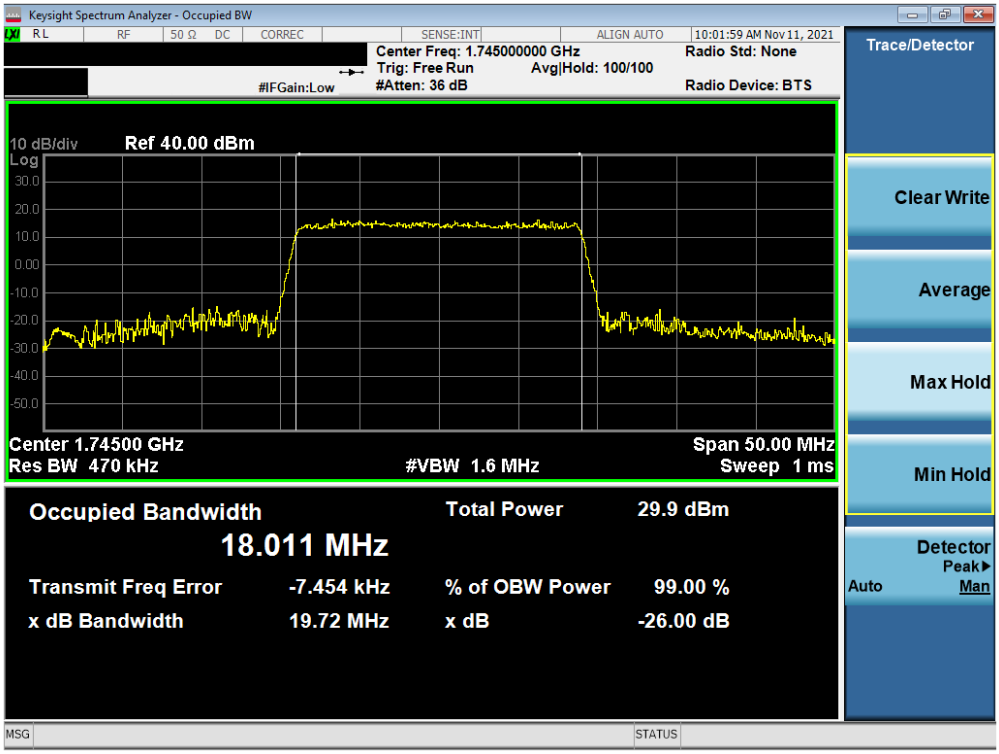
Plot 7-21. Occupied Bandwidth Plot (LTE Band 66/4 - 20MHz QPSK - Full RB)



Plot 7-22. Occupied Bandwidth Plot (LTE Band 66/4 - 20MHz 16-QAM - Full RB)



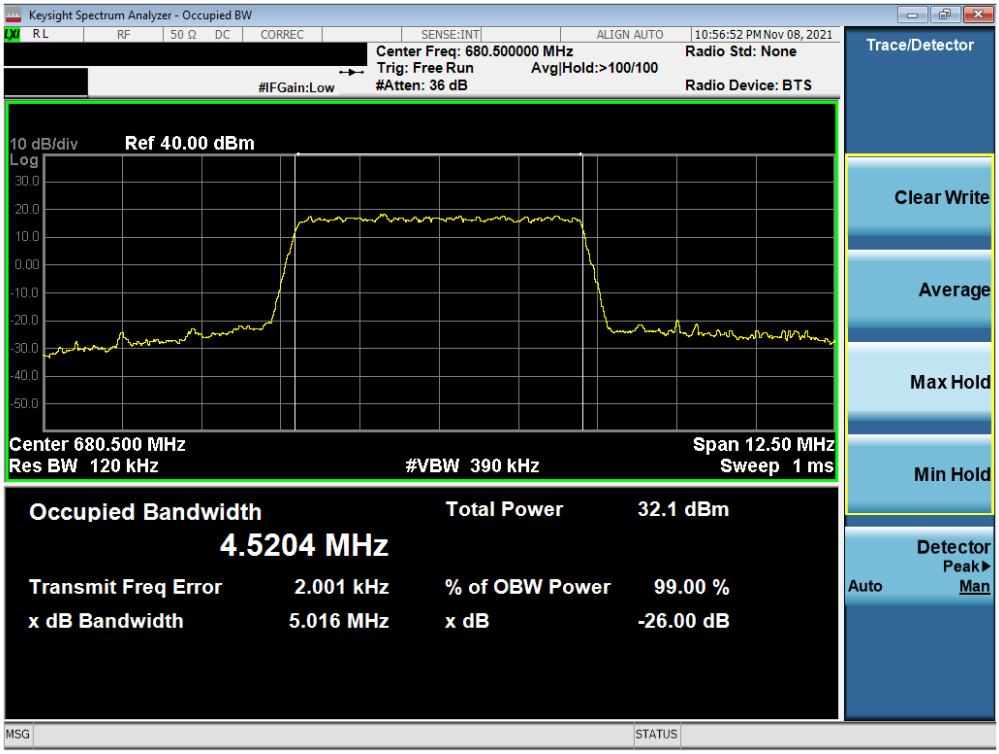
Plot 7-23. Occupied Bandwidth Plot (LTE Band 66/4 - 20MHz 64-QAM - Full RB)



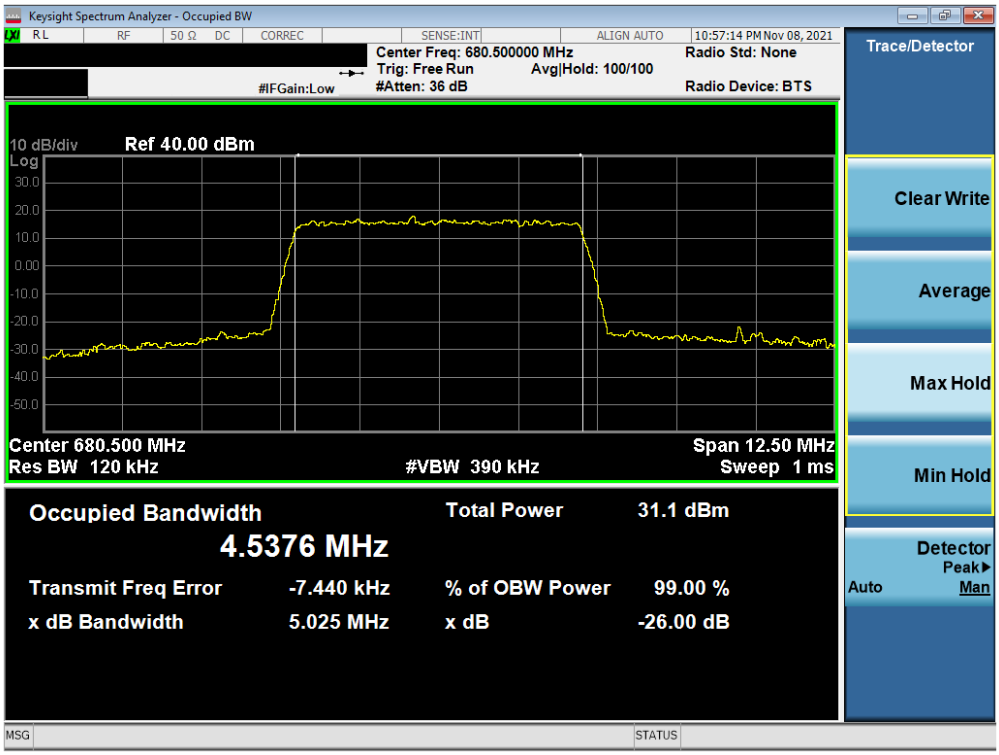
Plot 7-24. Occupied Bandwidth Plot (LTE Band 66/4 - 20MHz 256-QAM - Full RB)

LTE Band 71

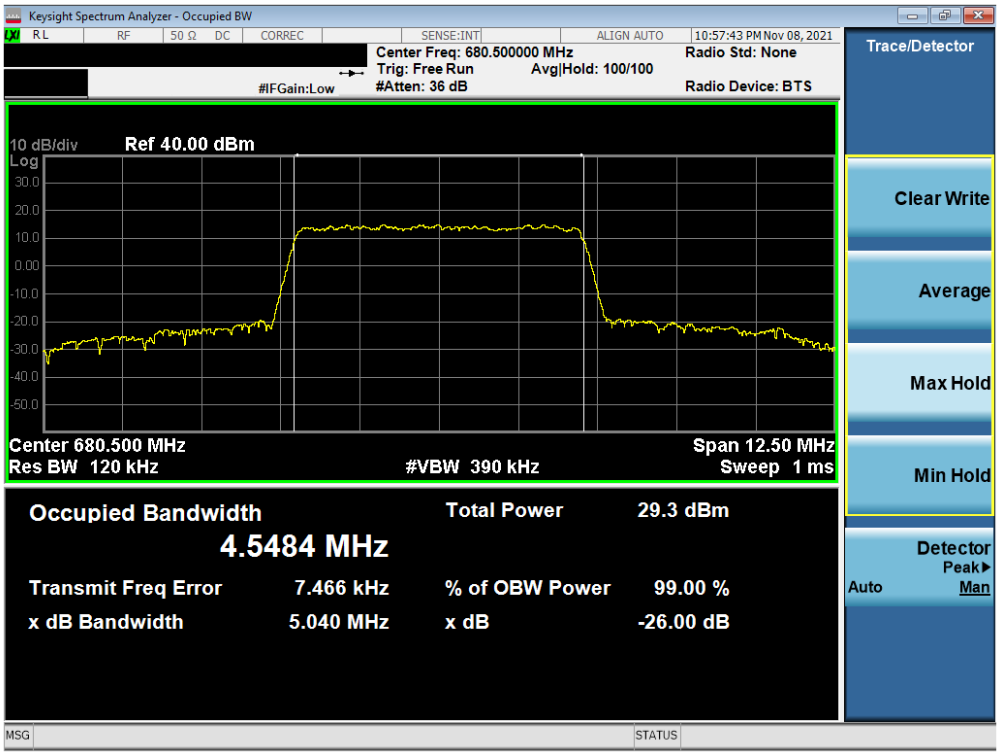
Plot 7-25. Occupied Bandwidth Plot (LTE Band 71 - 5MHz QPSK - Full RB)



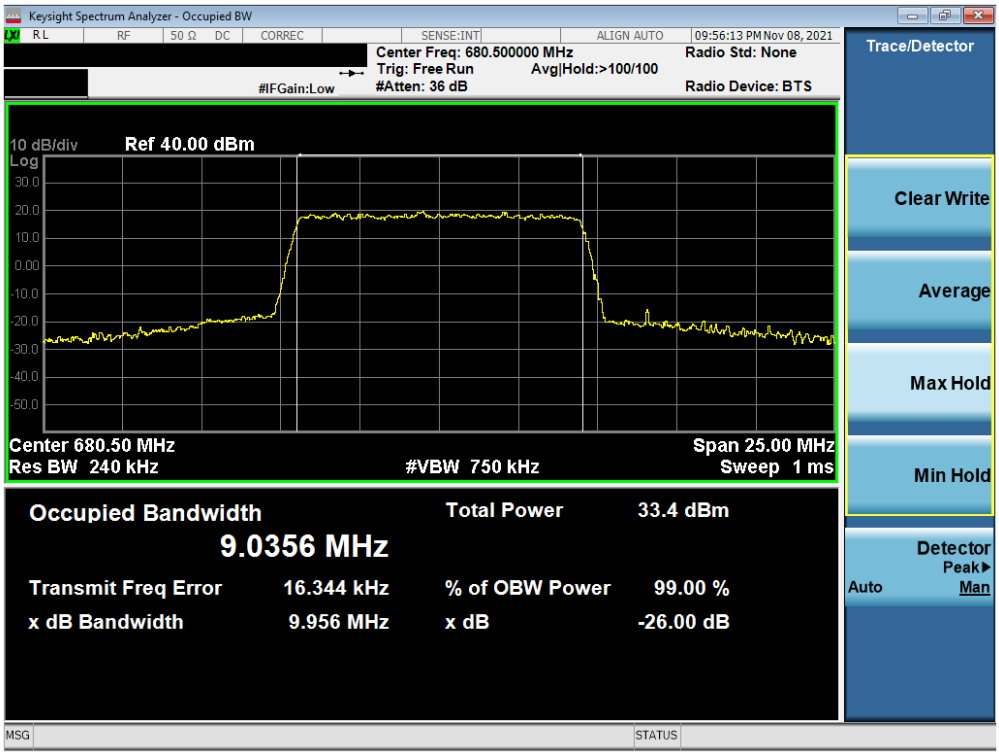
Plot 7-26. Occupied Bandwidth Plot (LTE Band 71 - 5MHz 16-QAM - Full RB)



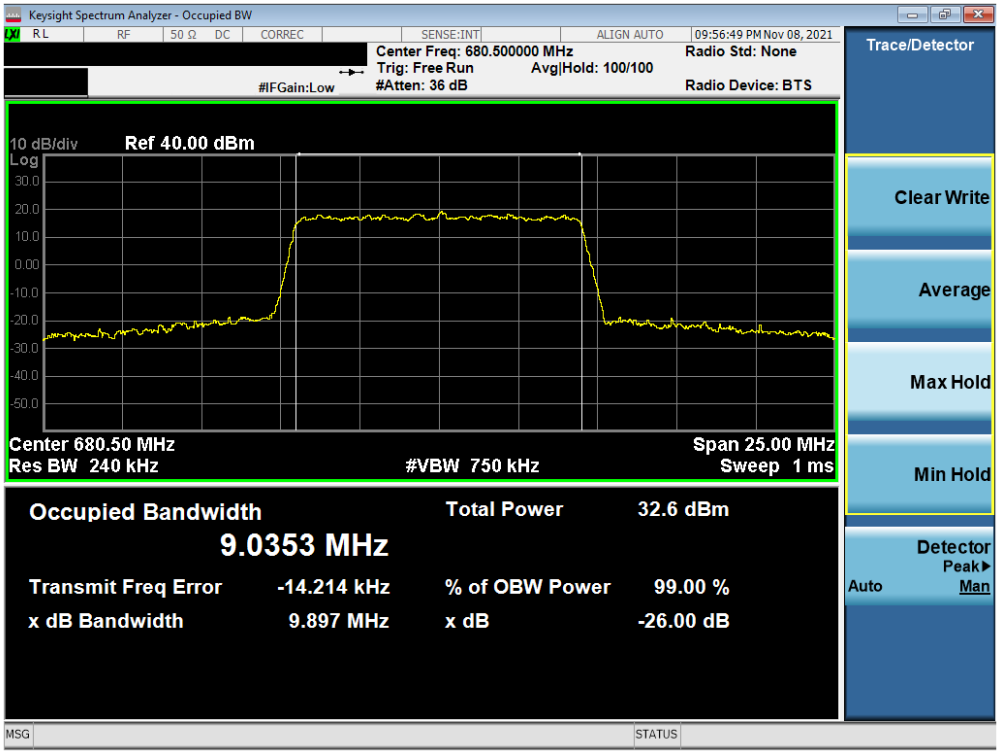
Plot 7-27. Occupied Bandwidth Plot (LTE Band 71 - 5MHz 64-QAM - Full RB)



Plot 7-28. Occupied Bandwidth Plot (LTE Band 71 - 5MHz 256-QAM - Full RB)

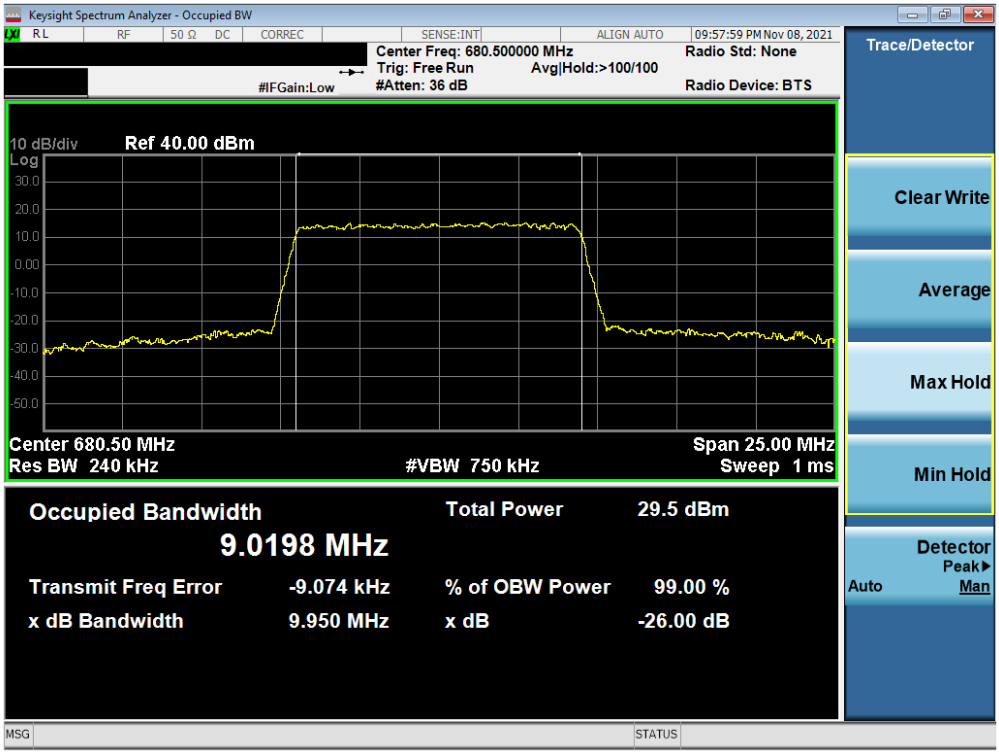


Plot 7-29. Occupied Bandwidth Plot (LTE Band 71 - 10MHz QPSK - Full RB)

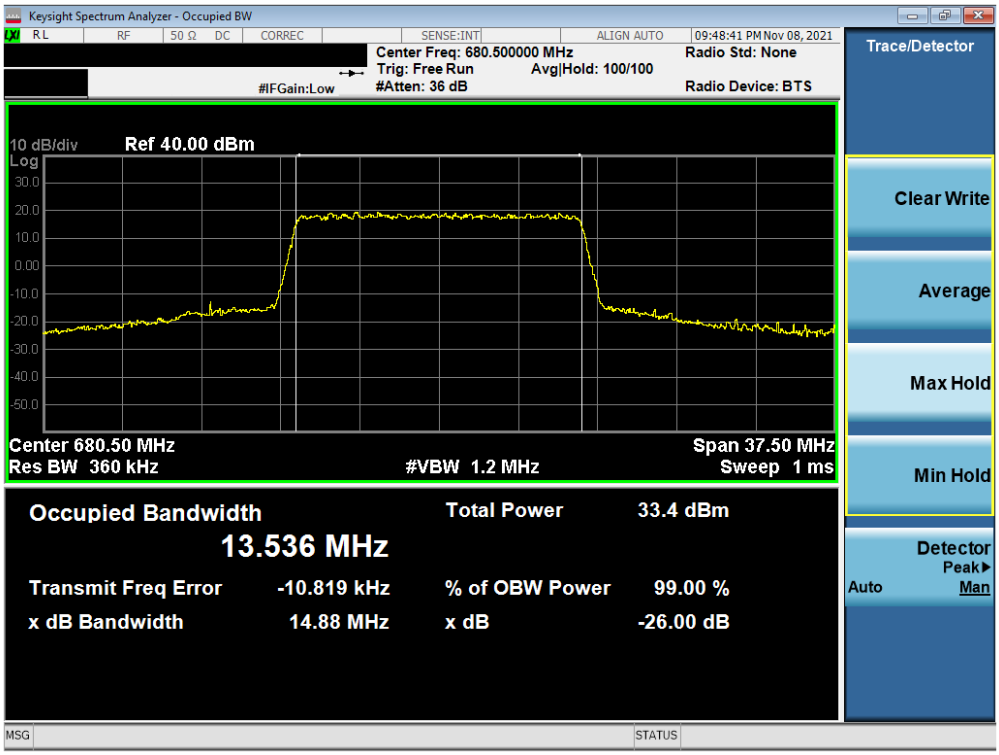


Plot 7-30. Occupied Bandwidth Plot (LTE Band 71 - 10MHz 16-QAM - Full RB)

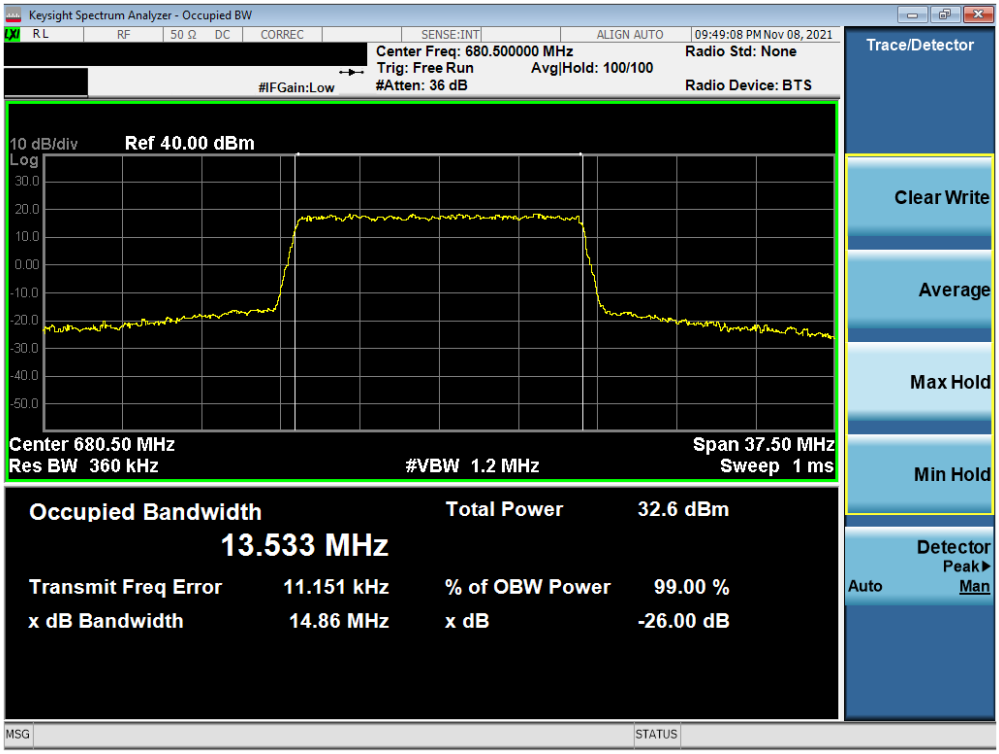
Plot 7-31. Occupied Bandwidth Plot (LTE Band 71 - 10MHz 64-QAM - Full RB)



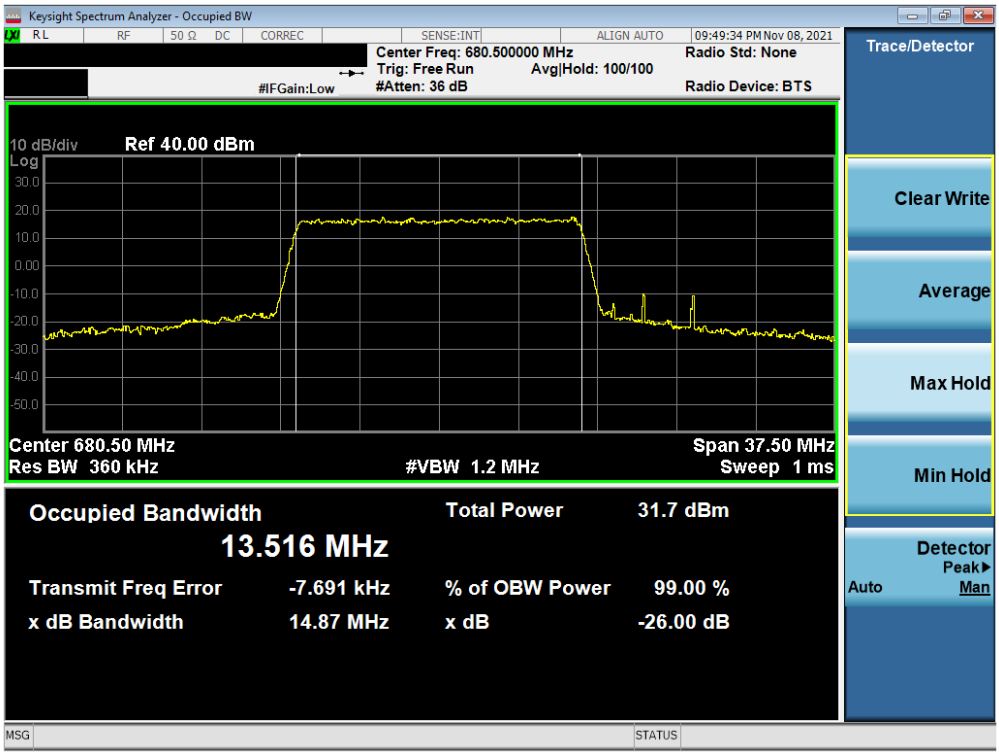
Plot 7-32. Occupied Bandwidth Plot (LTE Band 71 - 10MHz 256-QAM - Full RB)



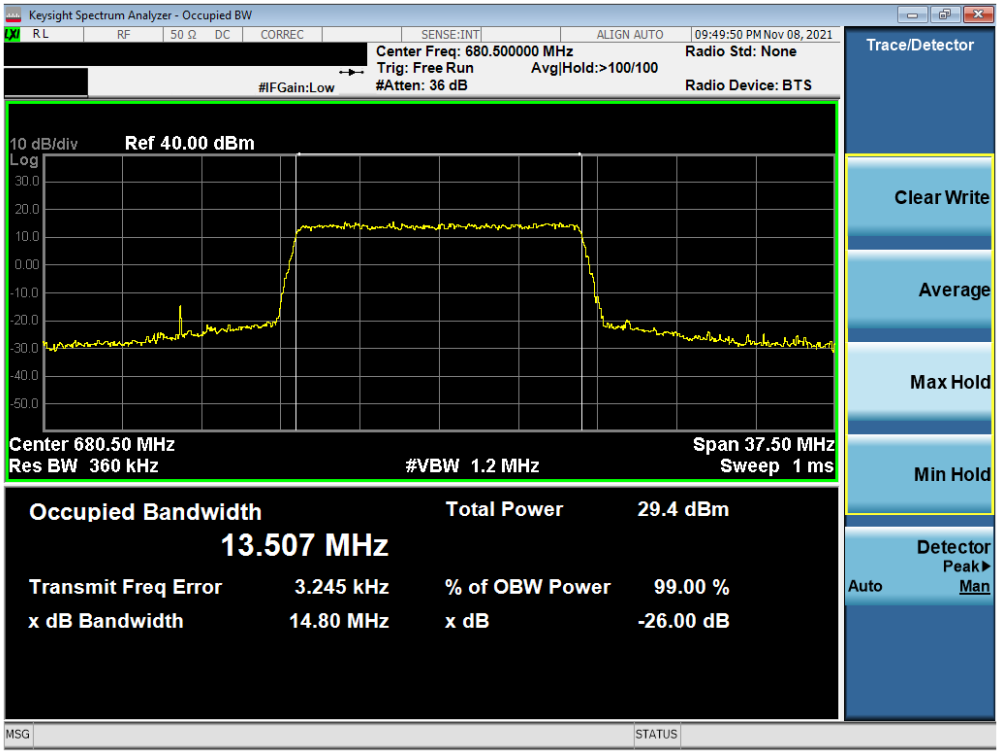
Plot 7-33. Occupied Bandwidth Plot (LTE Band 71 - 15MHz QPSK - Full RB)



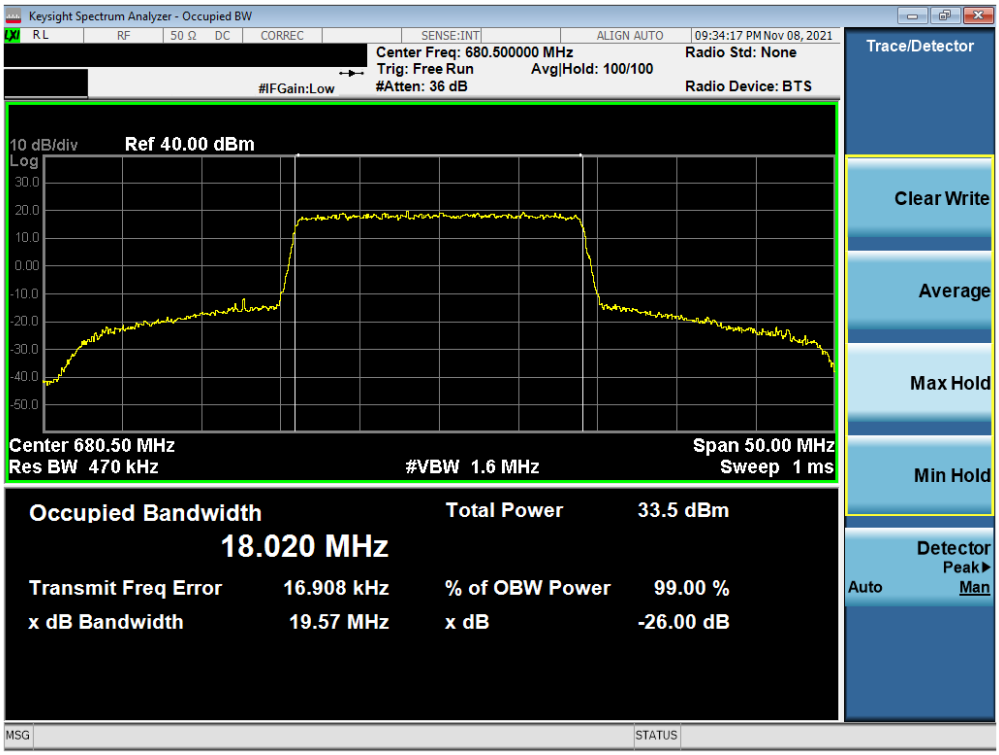
Plot 7-34. Occupied Bandwidth Plot (LTE Band 71 - 15MHz 16-QAM - Full RB)



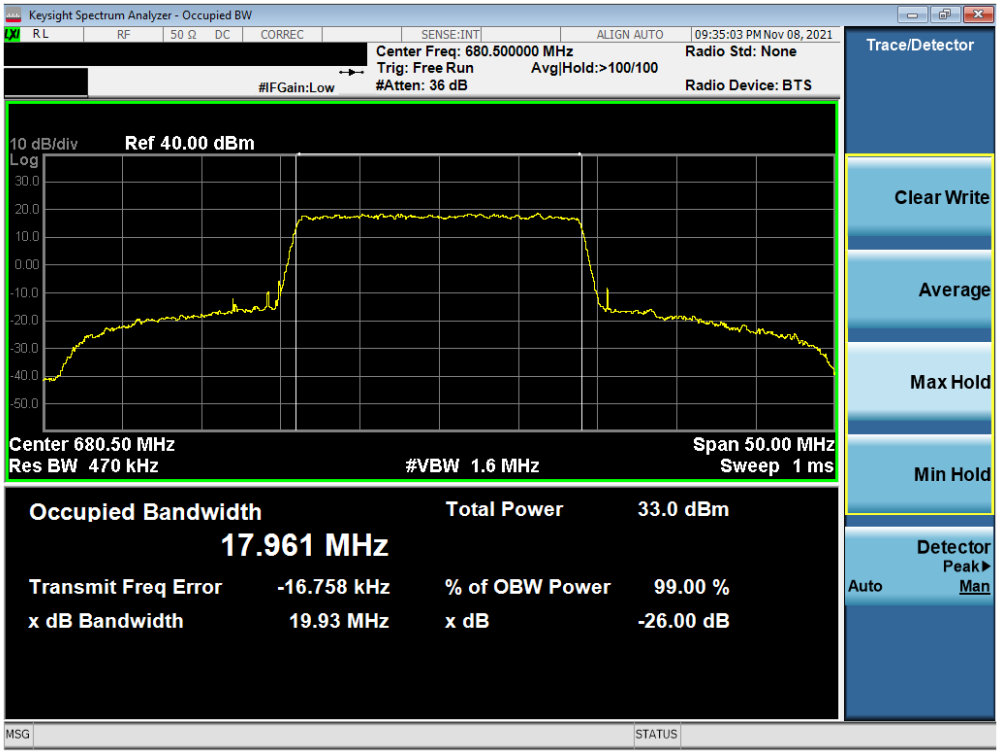
Plot 7-35. Occupied Bandwidth Plot (LTE Band 71 - 15MHz 64-QAM - Full RB)



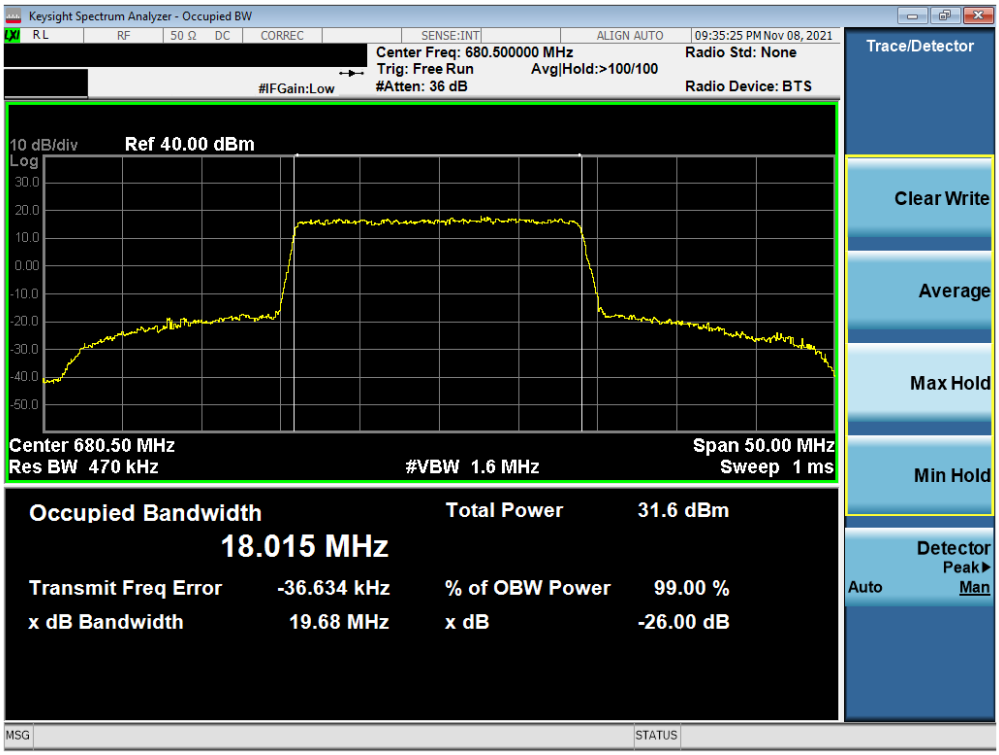
Plot 7-36. Occupied Bandwidth Plot (LTE Band 71 - 15MHz 256-QAM - Full RB)



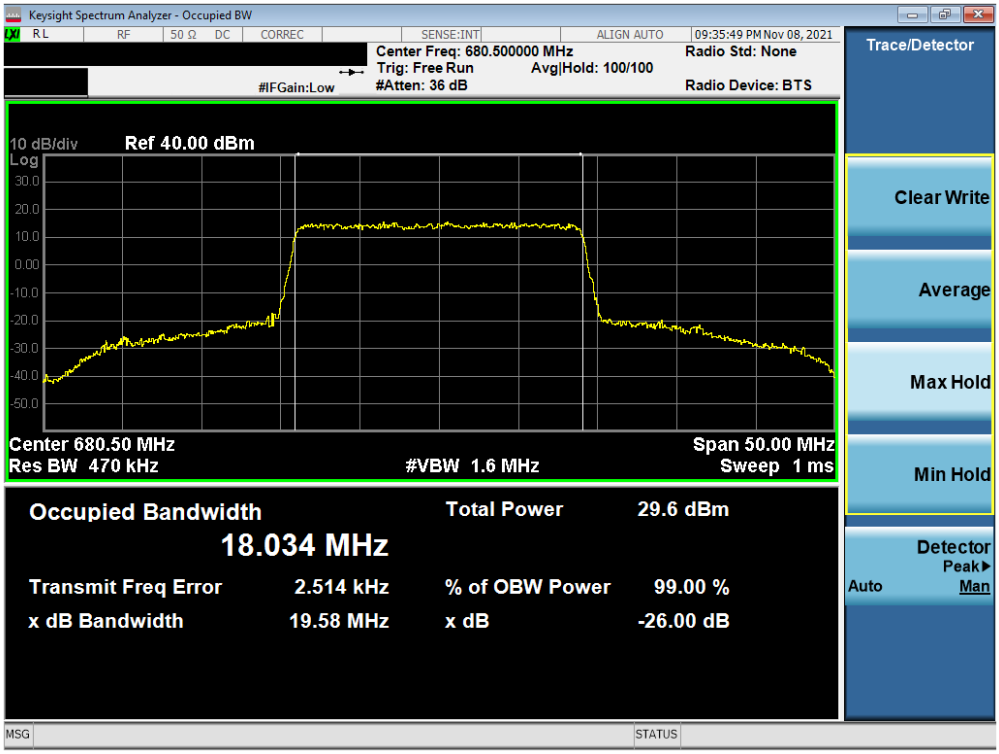
Plot 7-37. Occupied Bandwidth Plot (LTE Band 71 - 20MHz QPSK - Full RB)



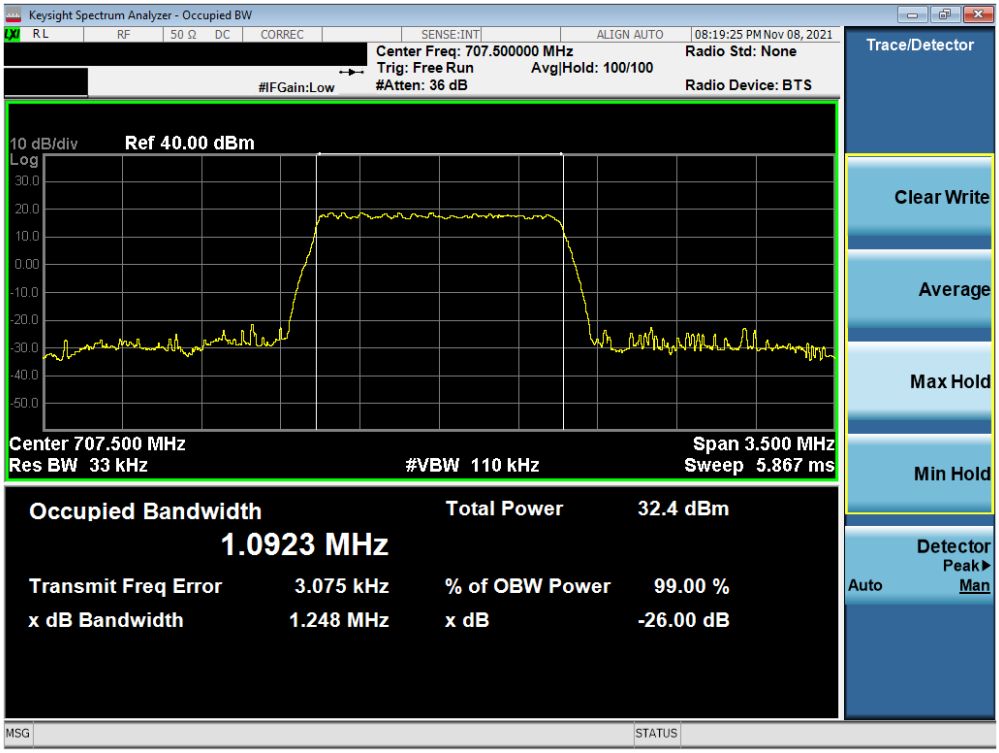
Plot 7-38. Occupied Bandwidth Plot (LTE Band 71 - 20MHz 16-QAM - Full RB)



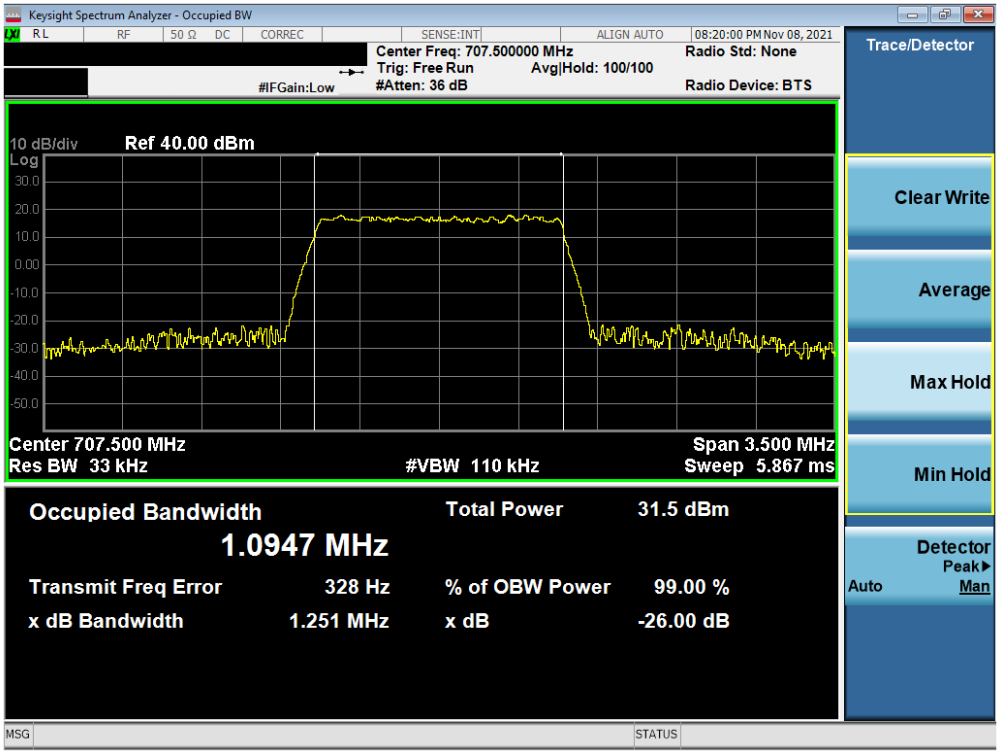
Plot 7-39. Occupied Bandwidth Plot (LTE Band 71 - 20MHz 64-QAM - Full RB)



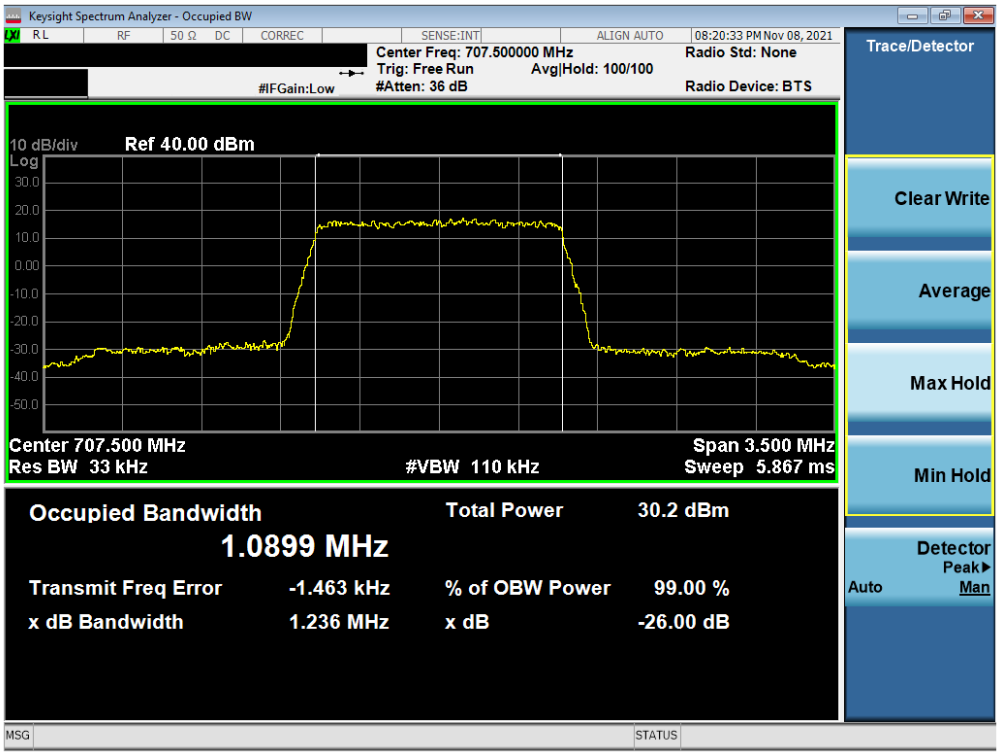
Plot 7-40. Occupied Bandwidth Plot (LTE Band 71 - 20MHz 256-QAM - Full RB)



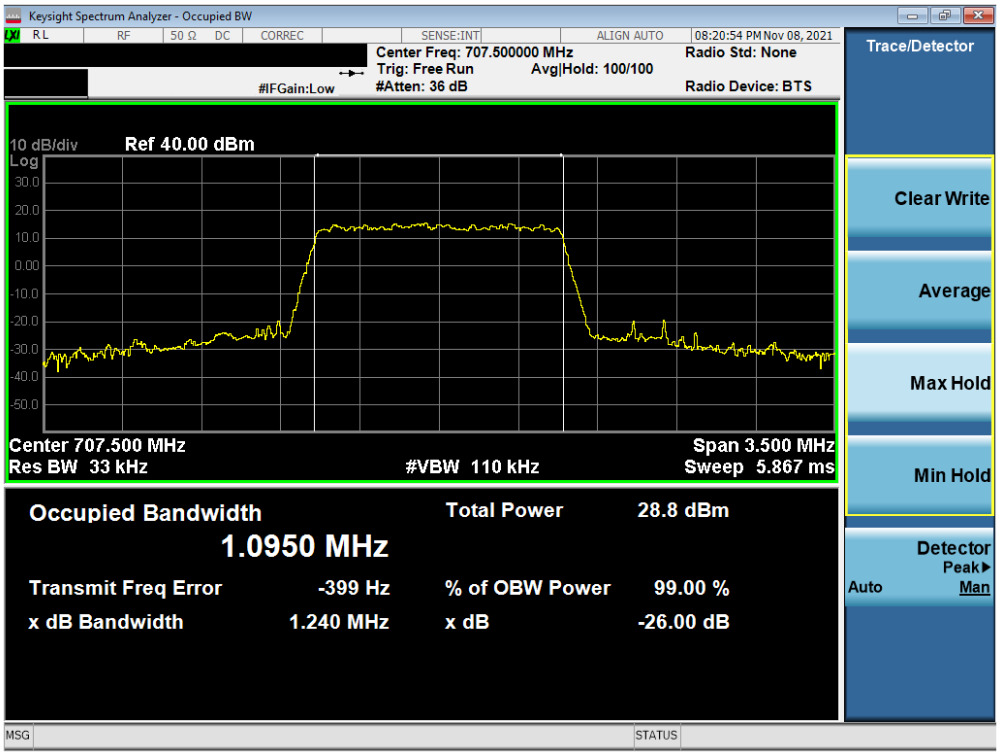
Plot 7-41. Occupied Bandwidth Plot (LTE Band 12 – 1.4MHz QPSK - Full RB)



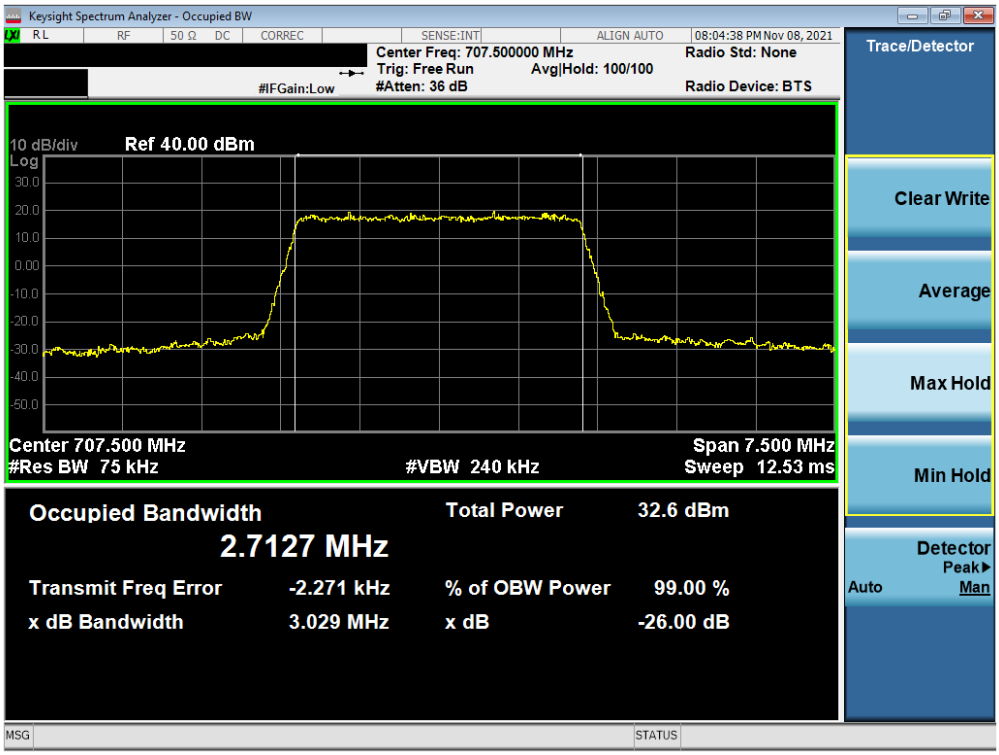
Plot 7-42. Occupied Bandwidth Plot (LTE Band 12 – 1.4MHz 16-QAM - Full RB)



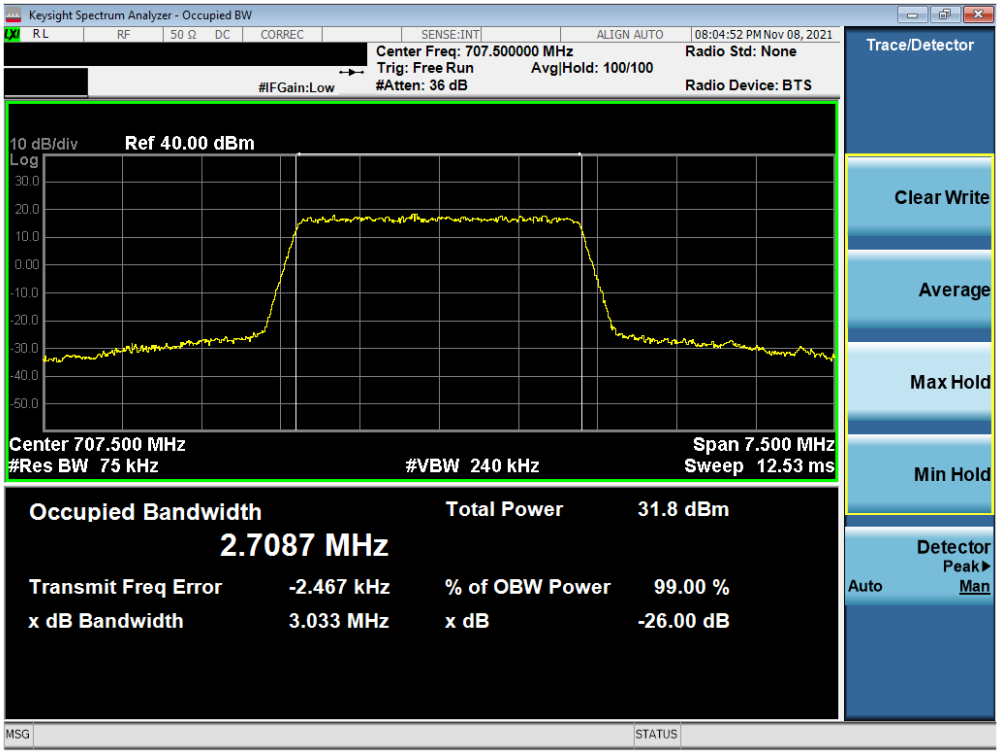
Plot 7-43. Occupied Bandwidth Plot (LTE Band 12 – 1.4MHz 64-QAM - Full RB)



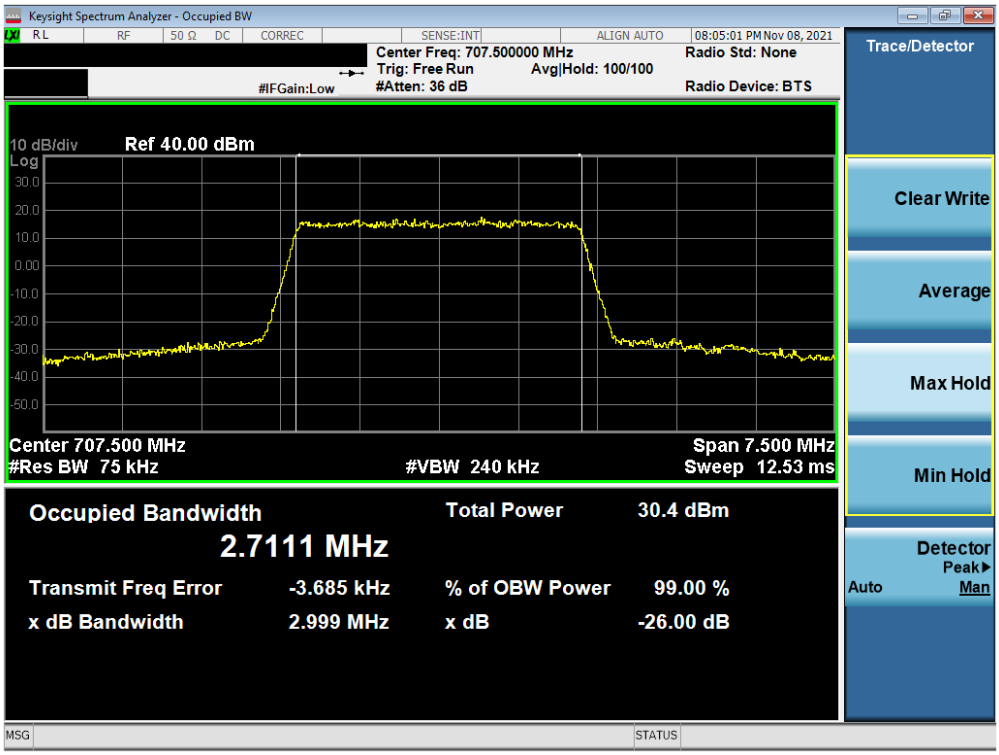
Plot 7-44. Occupied Bandwidth Plot (LTE Band 12 – 1.4MHz 256-QAM - Full RB)



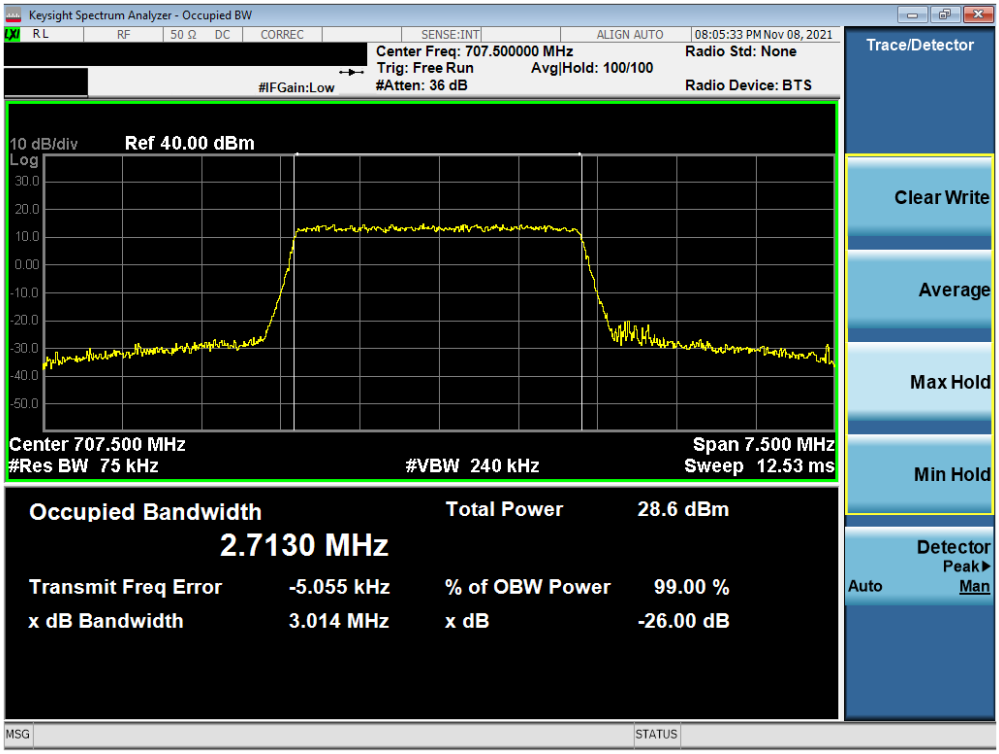
Plot 7-45. Occupied Bandwidth Plot (LTE Band 12 - 3MHz QPSK - Full RB)



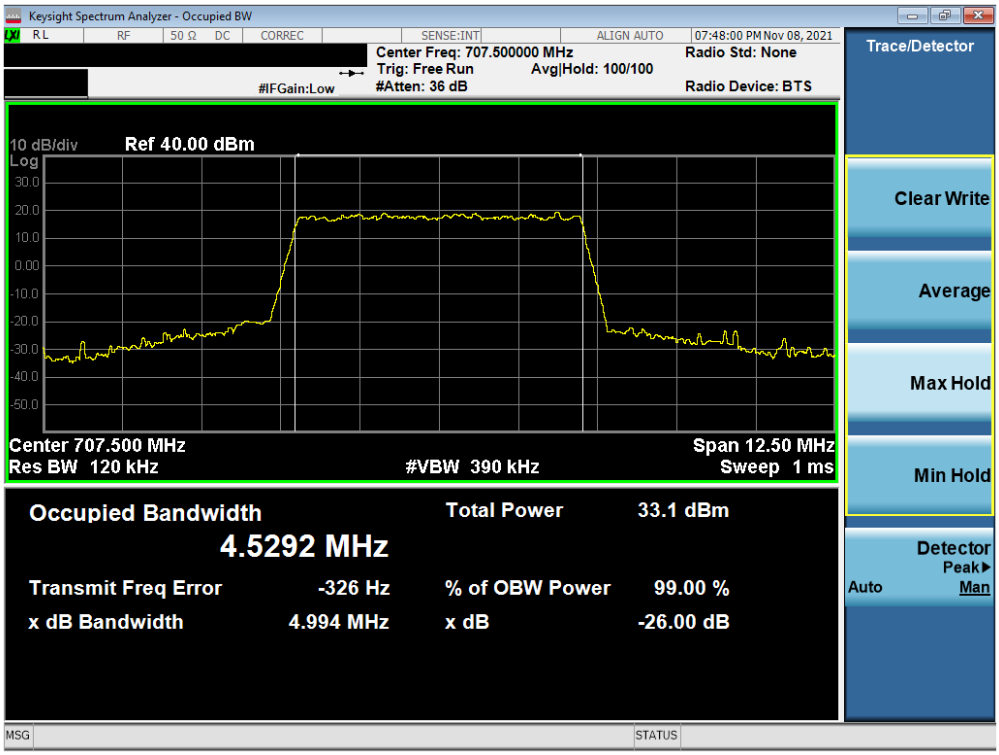
Plot 7-46. Occupied Bandwidth Plot (LTE Band 12 - 3MHz 16-QAM - Full RB)



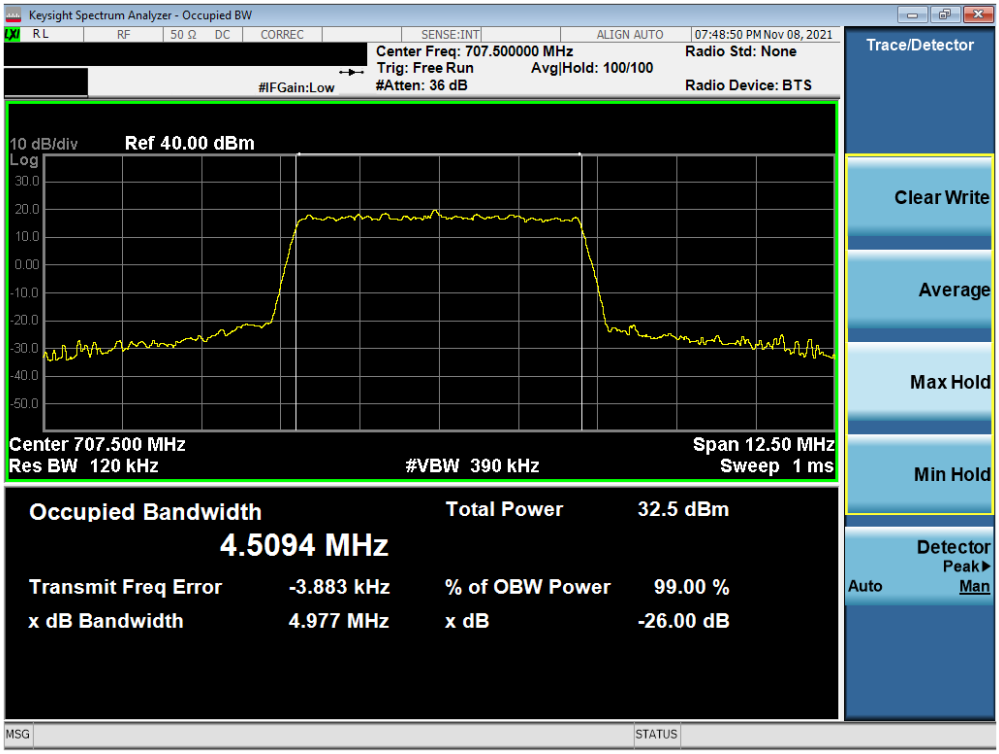
Plot 7-47. Occupied Bandwidth Plot (LTE Band 12 - 3MHz 64-QAM - Full RB)



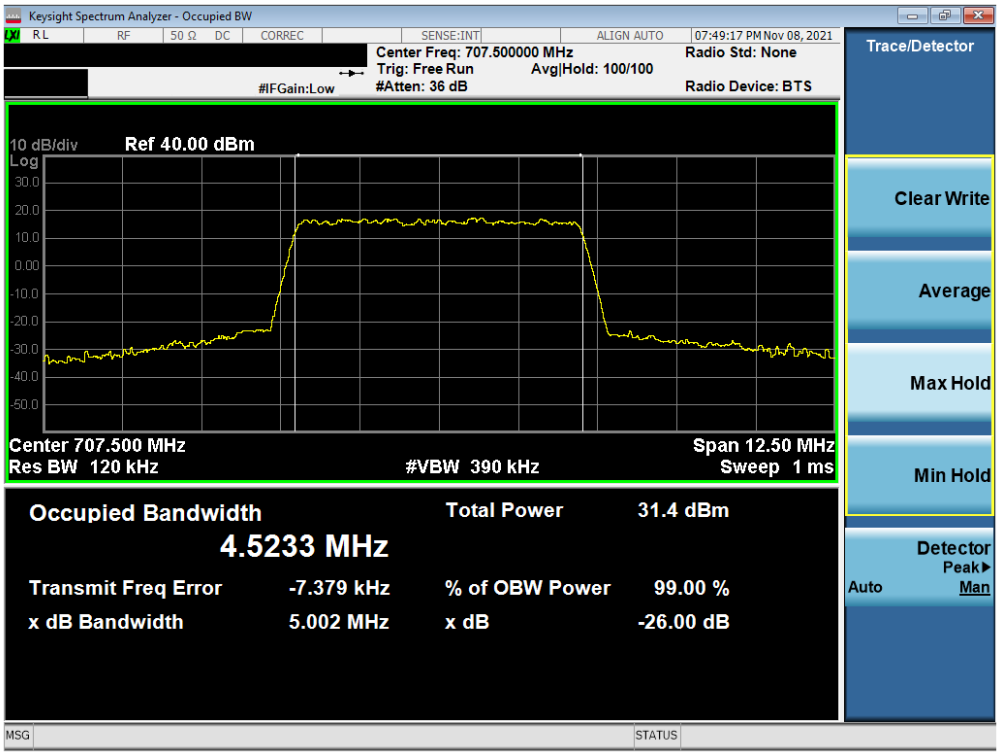
Plot 7-48. Occupied Bandwidth Plot (LTE Band 12 - 3MHz 256-QAM - Full RB)



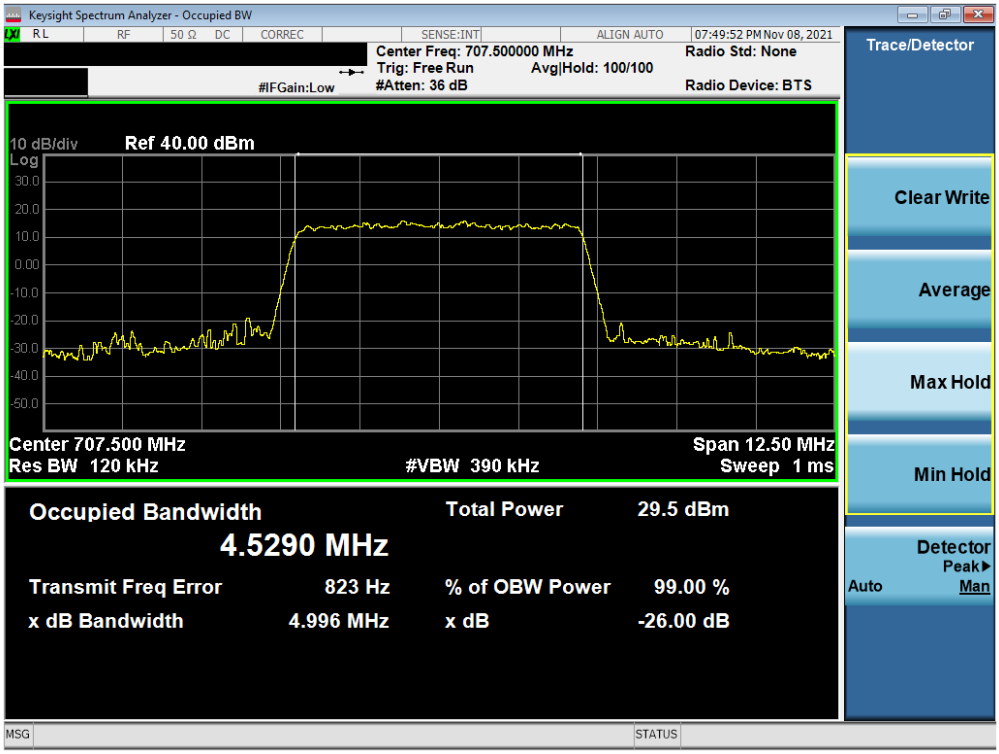
Plot 7-49. Occupied Bandwidth Plot (LTE Band 12/17 - 5MHz QPSK - Full RB)



Plot 7-50. Occupied Bandwidth Plot (LTE Band 12/17 - 5MHz 16-QAM - Full RB)

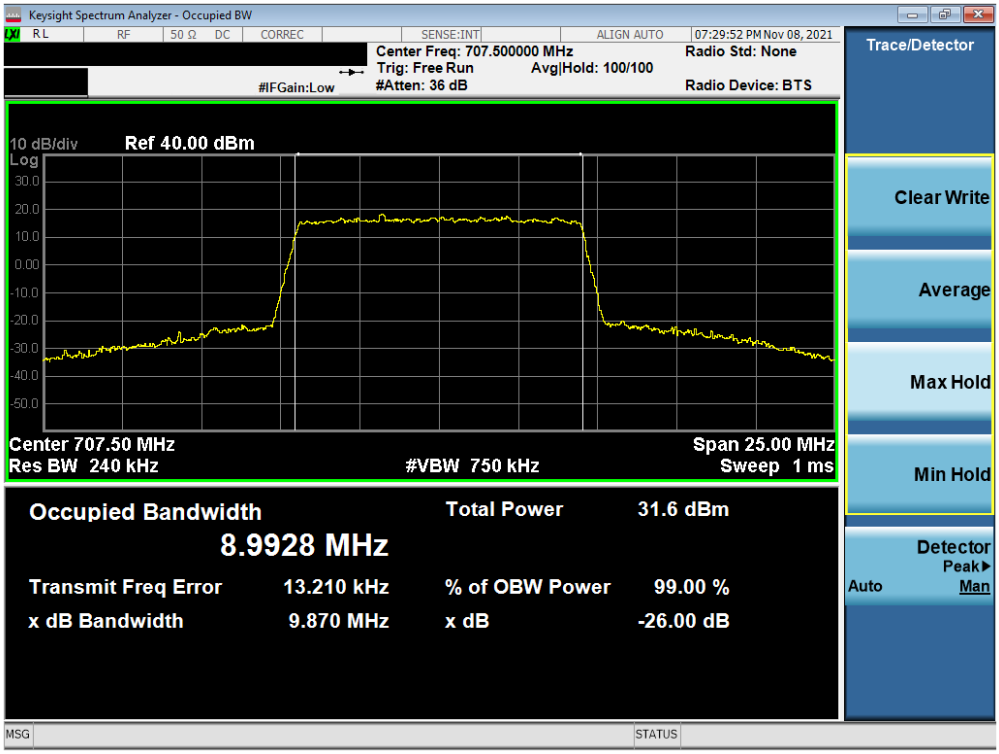


Plot 7-51. Occupied Bandwidth Plot (LTE Band 12/17 - 5MHz 64-QAM - Full RB)

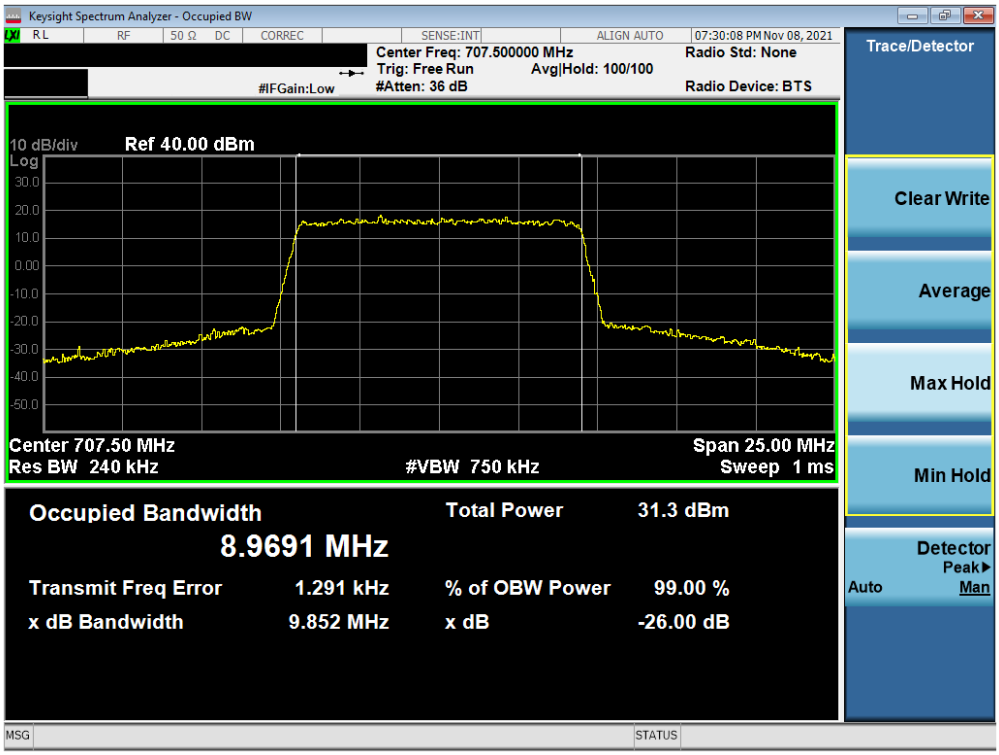


Plot 7-52. Occupied Bandwidth Plot (LTE Band 12/17 - 5MHz 256-QAM - Full RB)

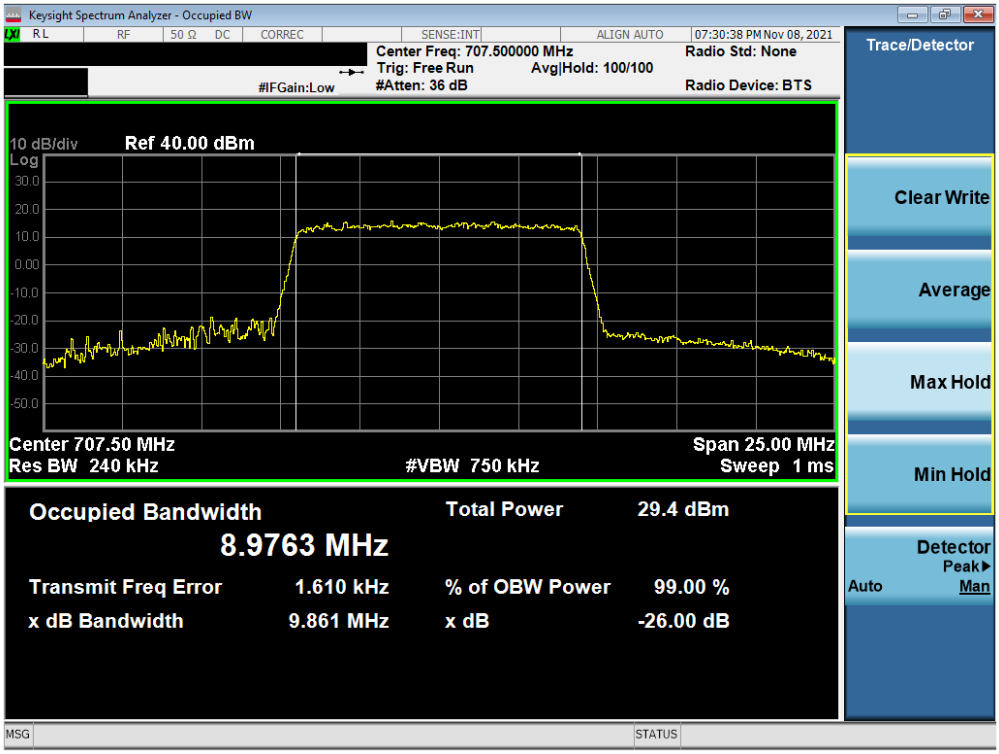
Plot 7-53. Occupied Bandwidth Plot (LTE Band 12/17 - 10MHz QPSK - Full RB)



Plot 7-54. Occupied Bandwidth Plot (LTE Band 12/17 - 10MHz 16-QAM - Full RB)



Plot 7-55. Occupied Bandwidth Plot (LTE Band 12/17 - 10MHz 64-QAM - Full RB)

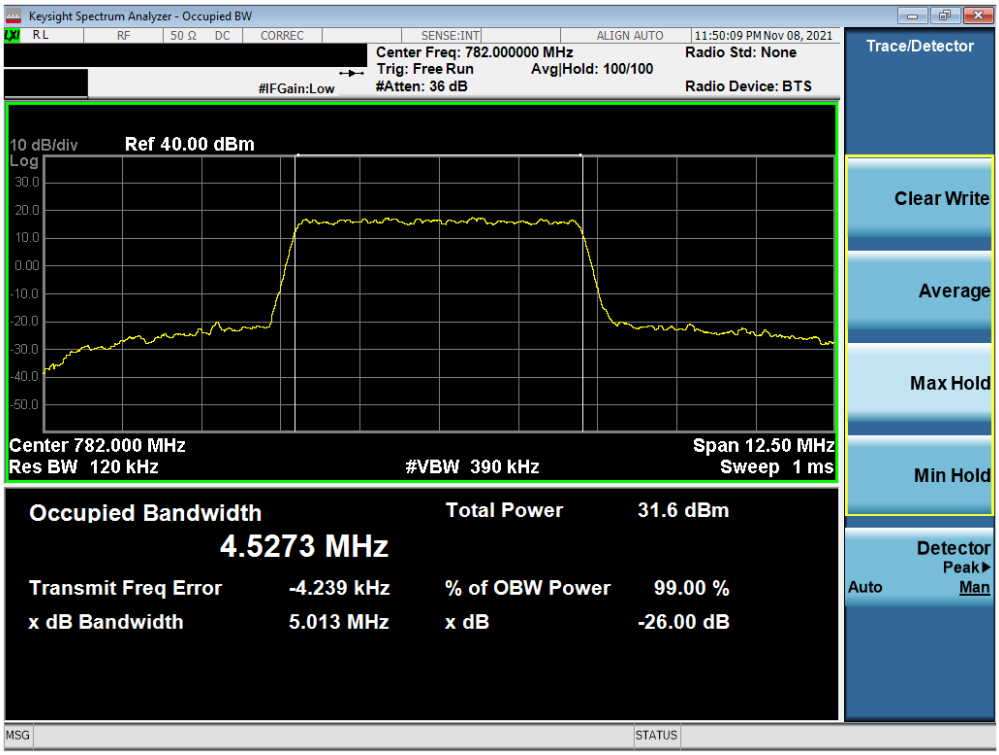


Plot 7-56. Occupied Bandwidth Plot (LTE Band 12/17 - 10MHz 256-QAM - Full RB)

LTE Band 13

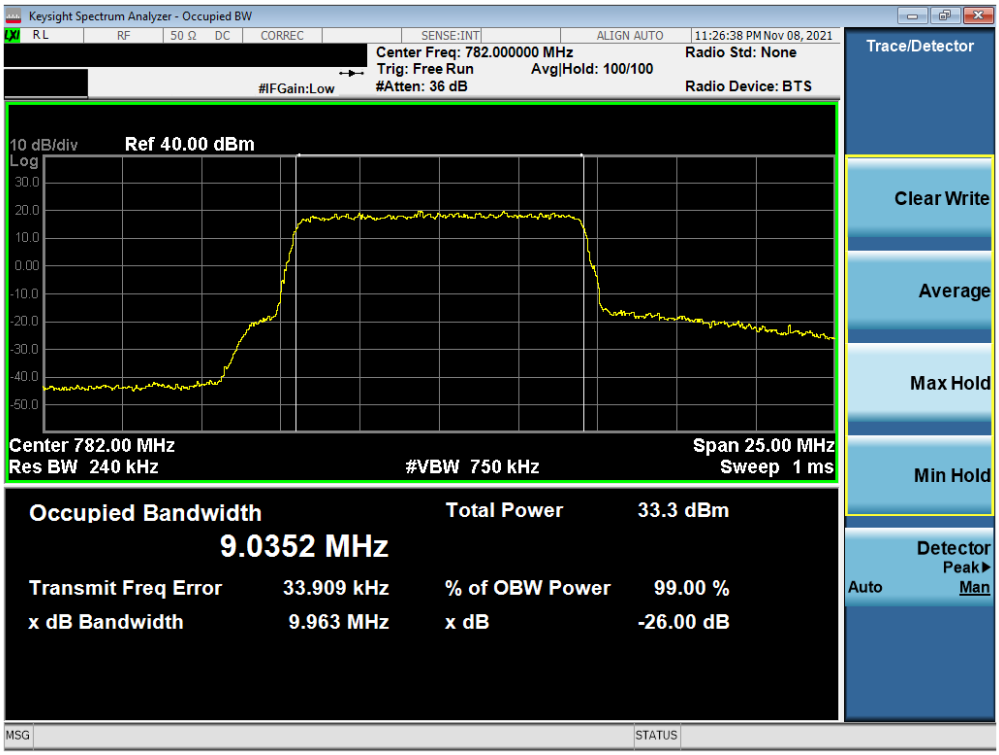
Plot 7-57. Occupied Bandwidth Plot (LTE Band 13 - 5MHz QPSK - Full RB)

Plot 7-58. Occupied Bandwidth Plot (LTE Band 13 - 5MHz 16-QAM - Full RB)

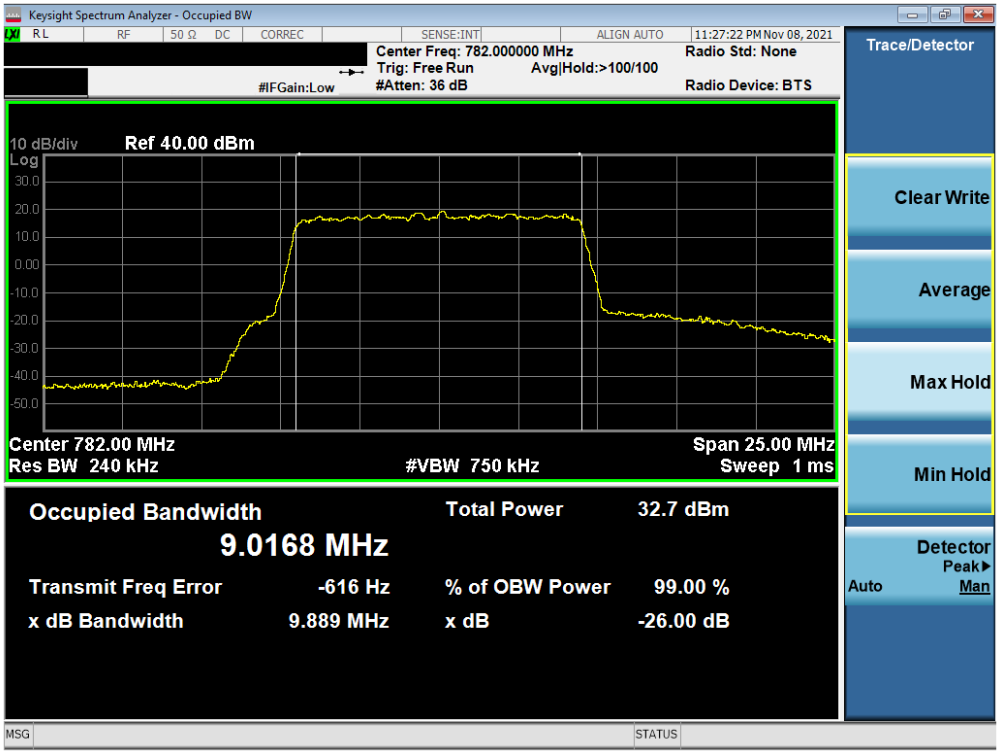


Plot 7-59. Occupied Bandwidth Plot (LTE Band 13 - 5MHz 64-QAM - Full RB)

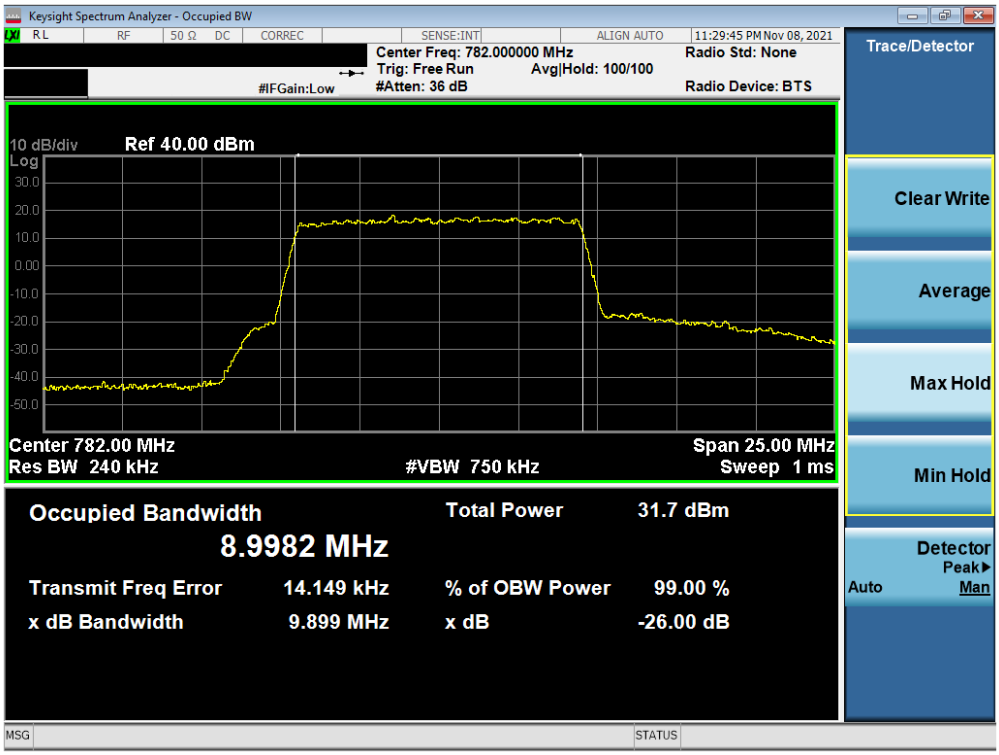
Plot 7-60. Occupied Bandwidth Plot (LTE Band 13 - 5MHz 256-QAM - Full RB)



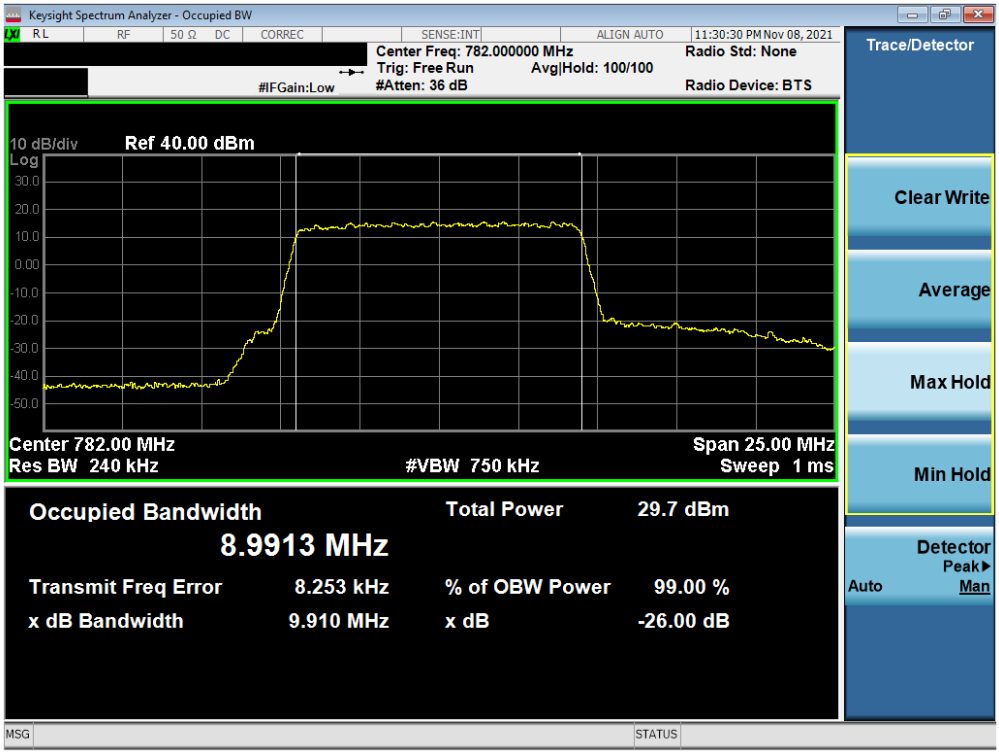
Plot 7-61. Occupied Bandwidth Plot (LTE Band 13 - 10MHz QPSK - Full RB)



Plot 7-62. Occupied Bandwidth Plot (LTE Band 13 - 10MHz 16-QAM - Full RB)

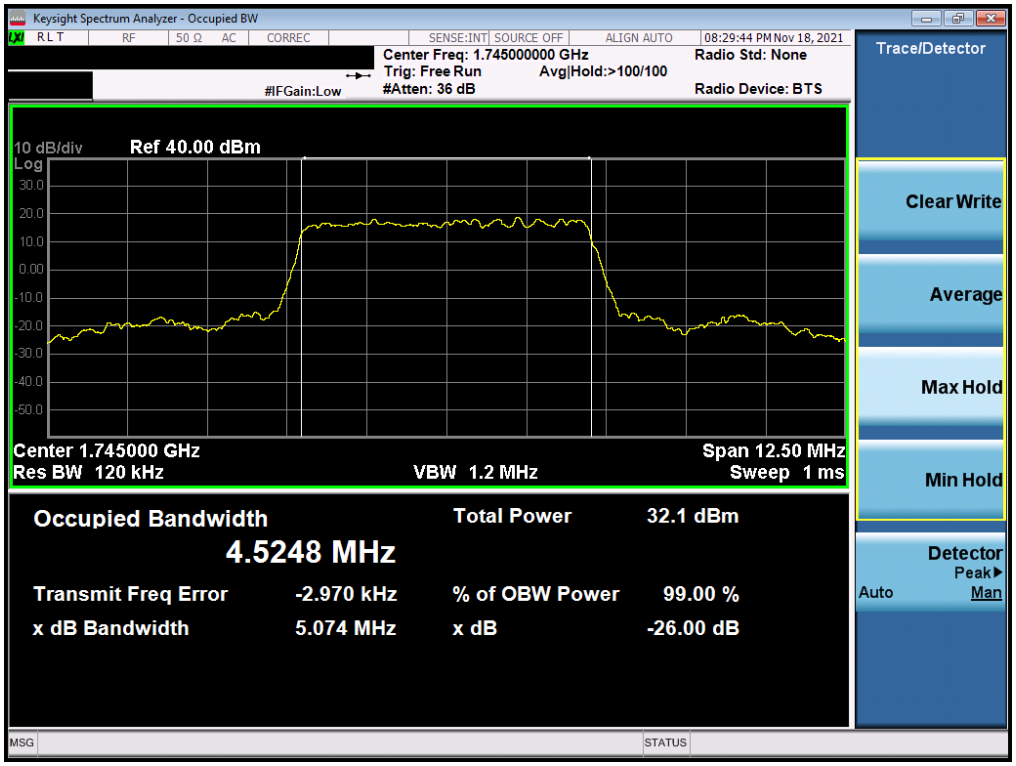


Plot 7-63. Occupied Bandwidth Plot (LTE Band 13 - 10MHz 64-QAM - Full RB)

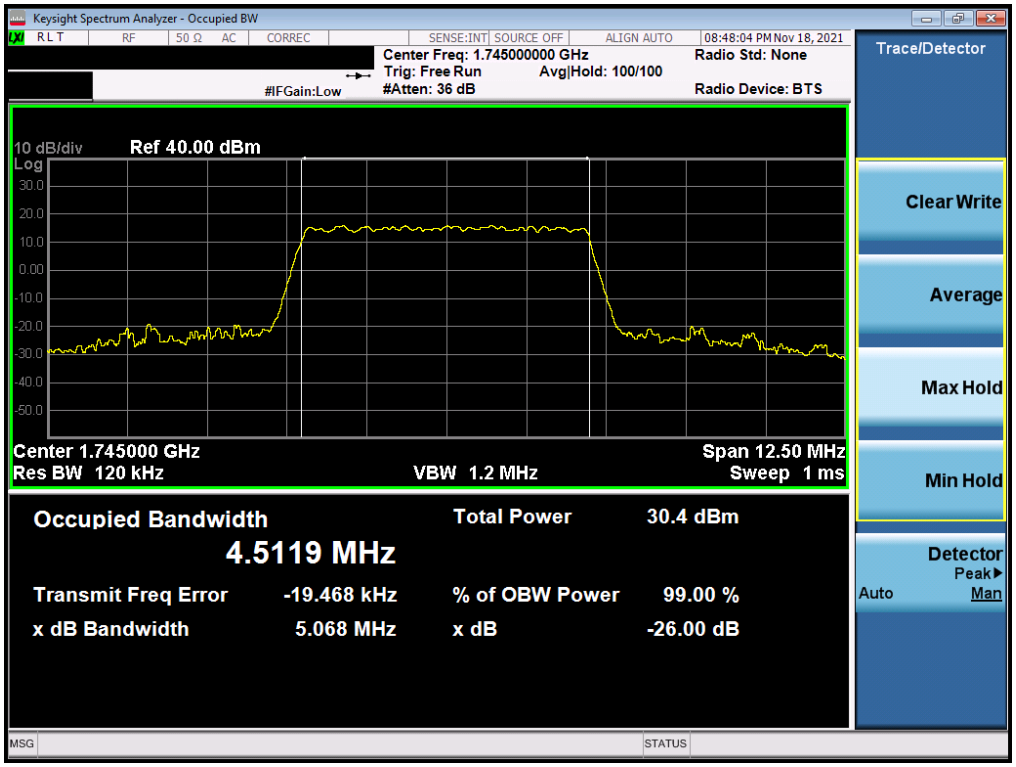


Plot 7-64. Occupied Bandwidth Plot (LTE Band 13 - 10MHz 256-QAM - Full RB)

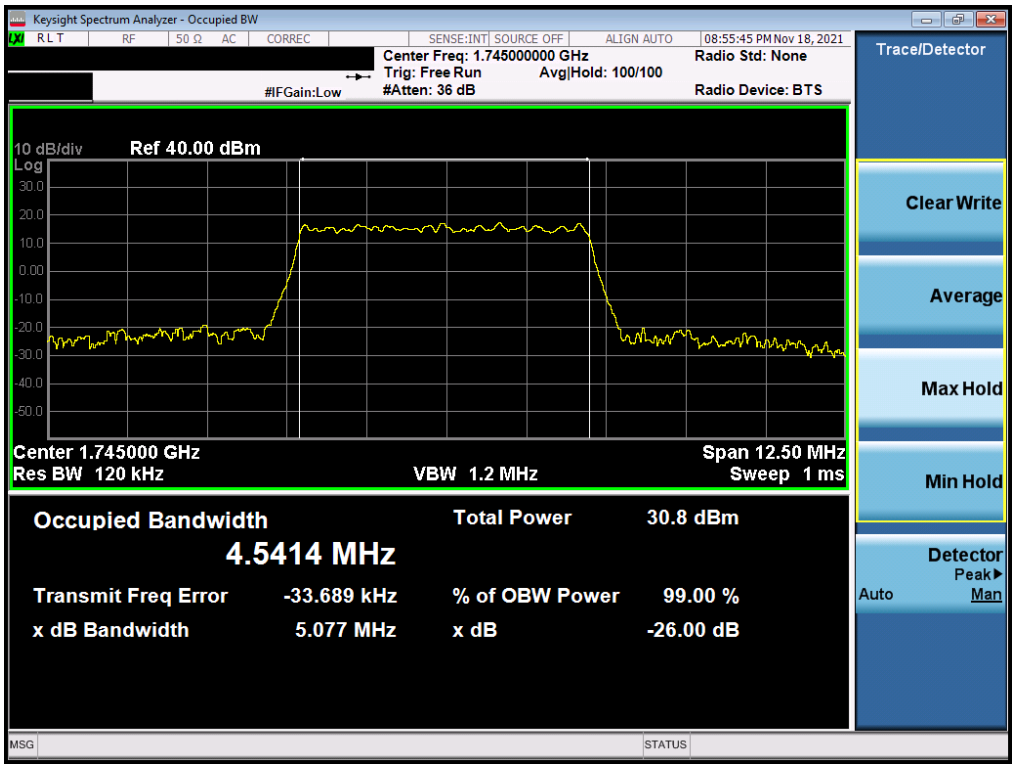
NR Band n66



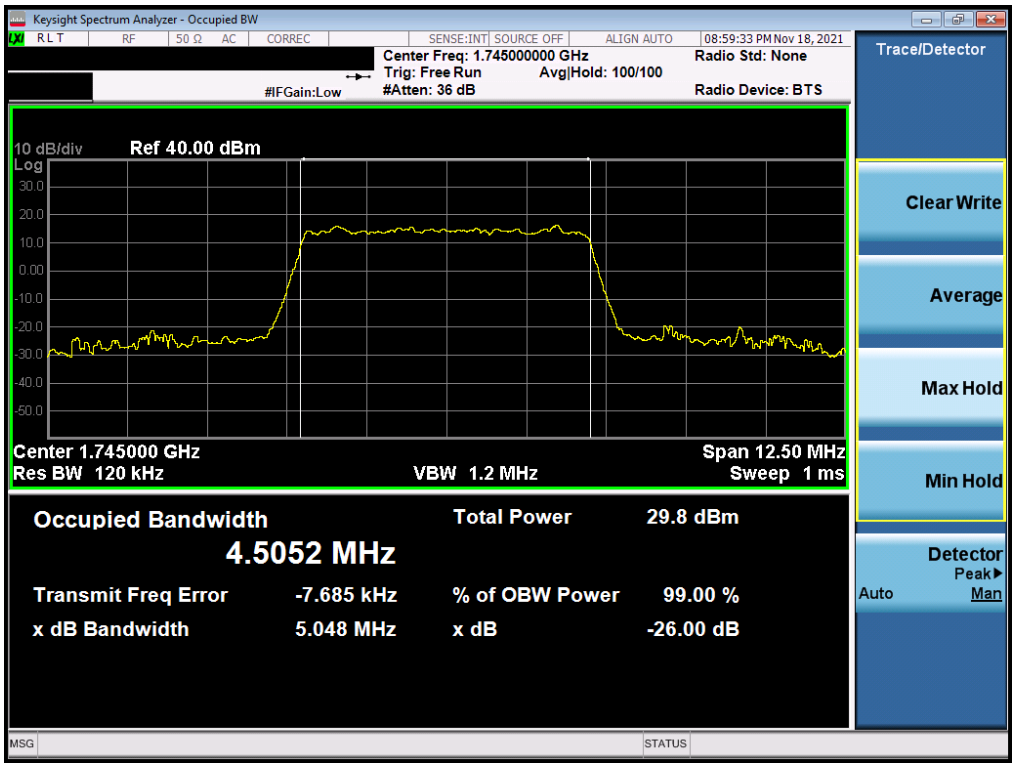
Plot 7-65. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz DFT-s-OFDM π/2 BPSK - Full RB)



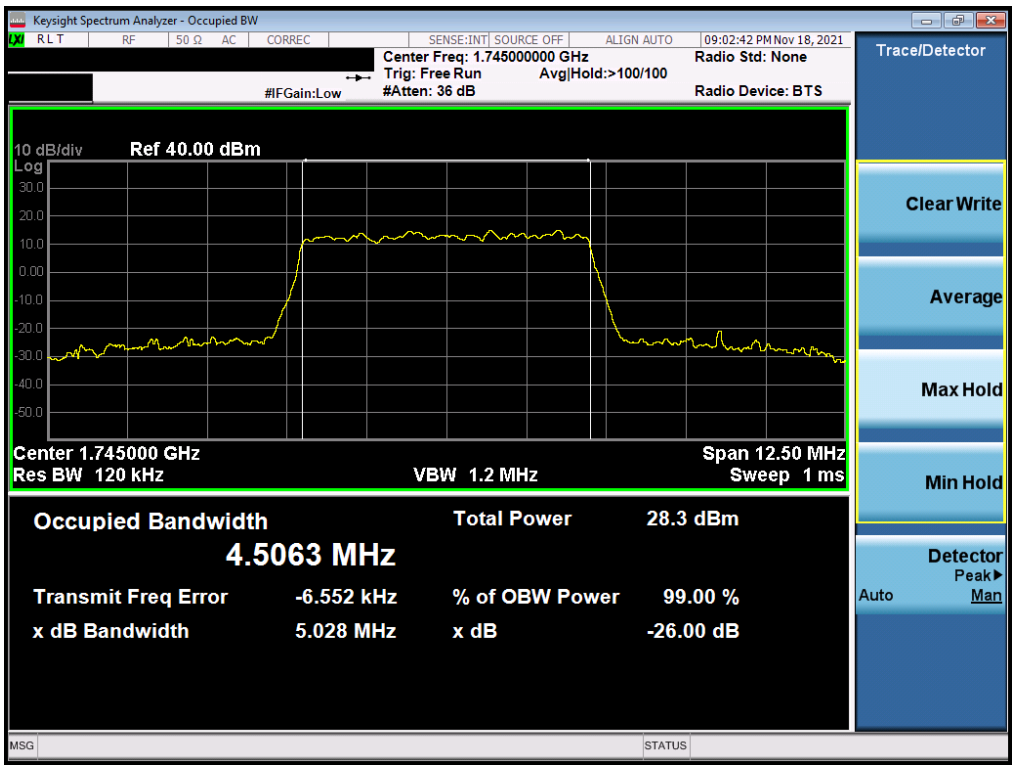
Plot 7-66. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz CP-OFDM QPSK - Full RB)



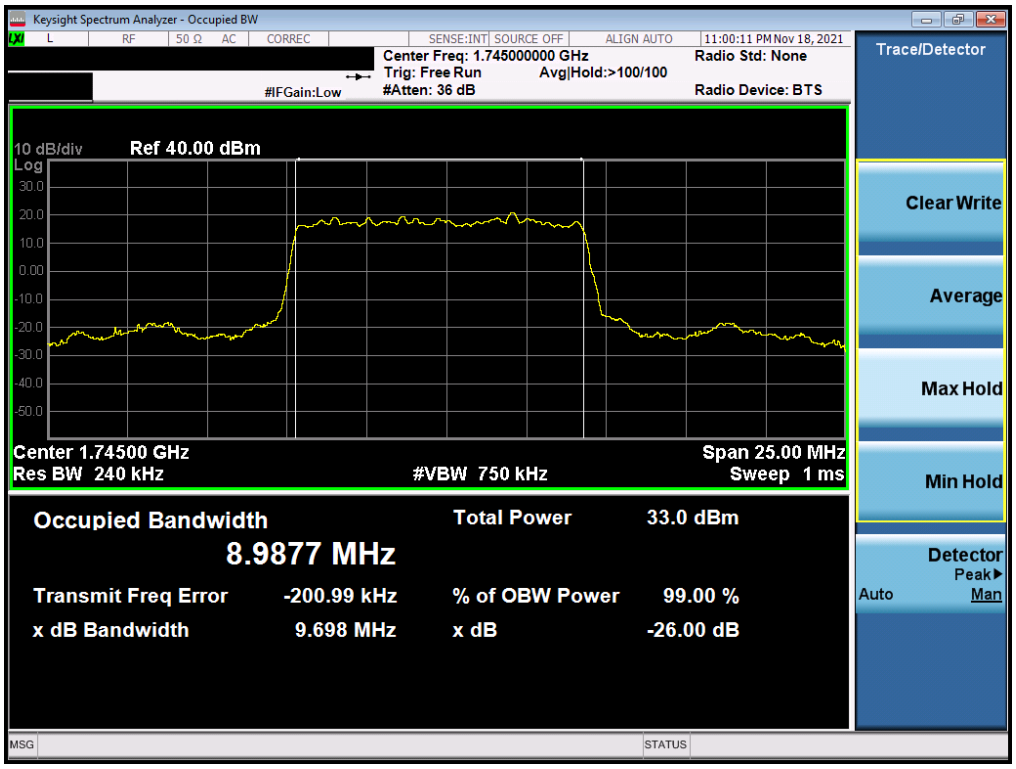
Plot 7-67. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz CP-OFDM 16QAM - Full RB)



Plot 7-68. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz CP-OFDM 64QAM - Full RB)

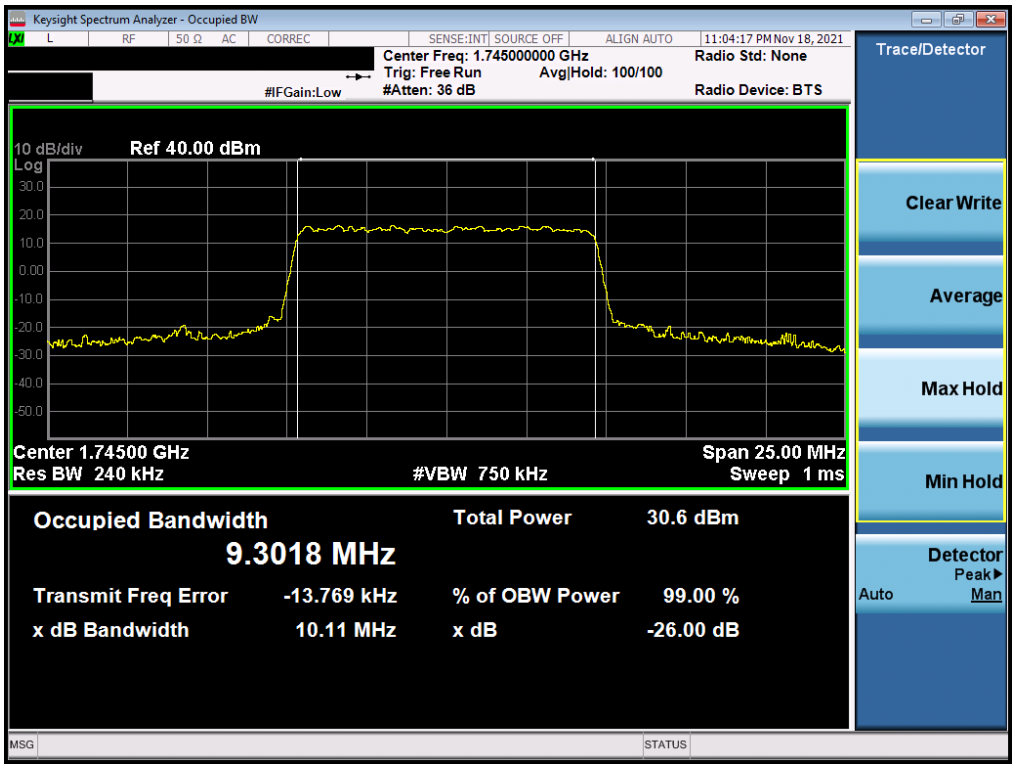


Plot 7-69. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz CP-OFDM 256QAM - Full RB)



Plot 7-70. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz DFT-s-OFDM π/2 BPSK - Full RB)

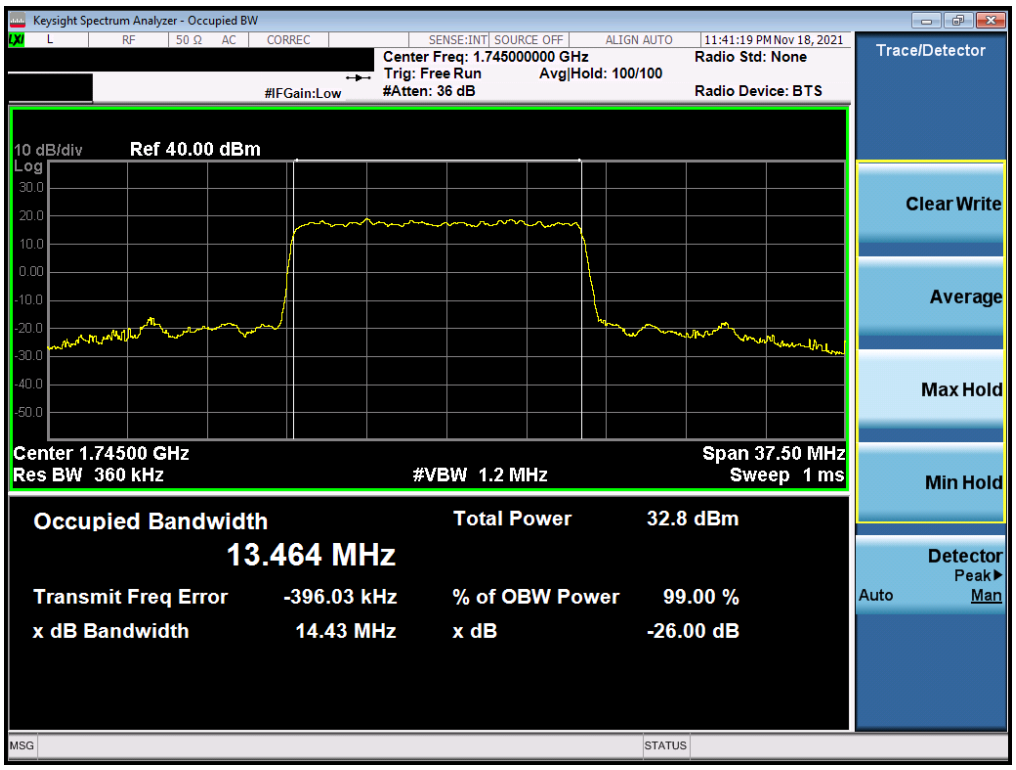
Plot 7-71. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz CP-OFDM QPSK - Full RB)



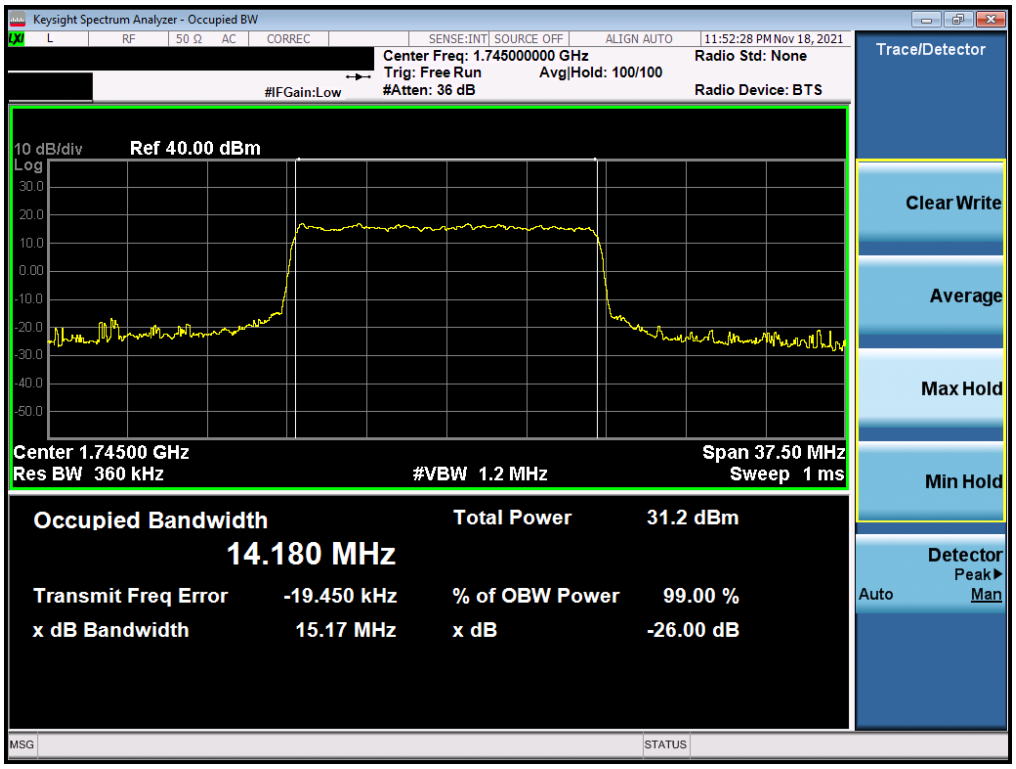
Plot 7-72. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz CP-OFDM 16QAM - Full RB)

Plot 7-73. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz CP-OFDM 64QAM - Full RB)

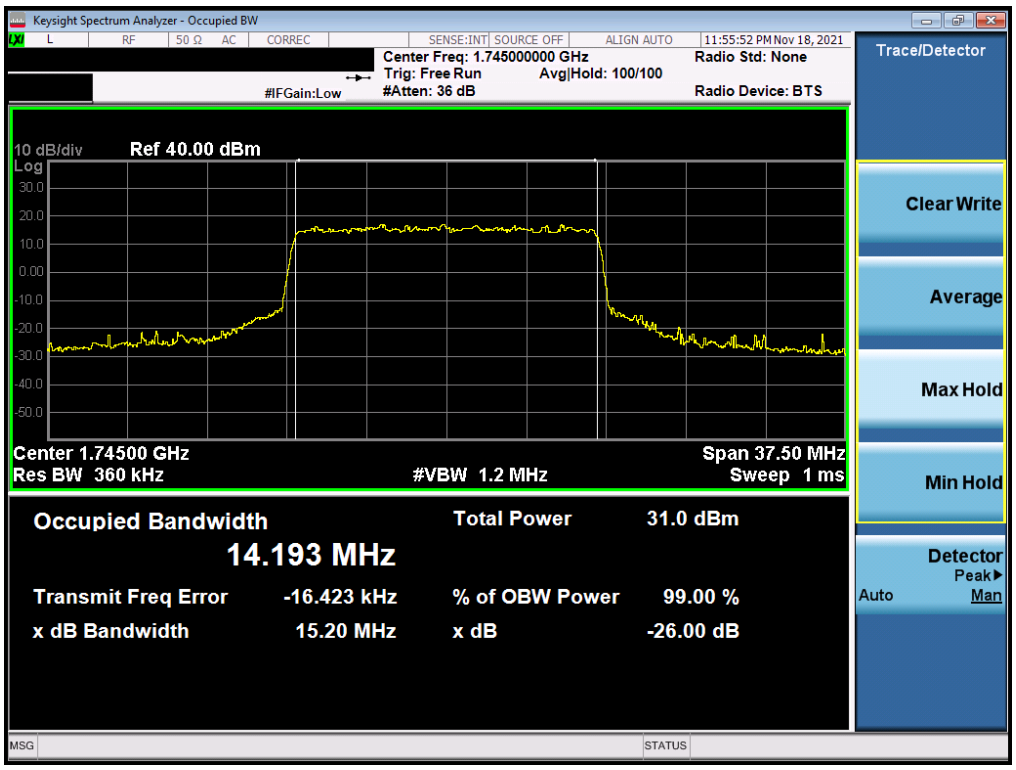
Plot 7-74. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz CP-OFDM 256QAM - Full RB)



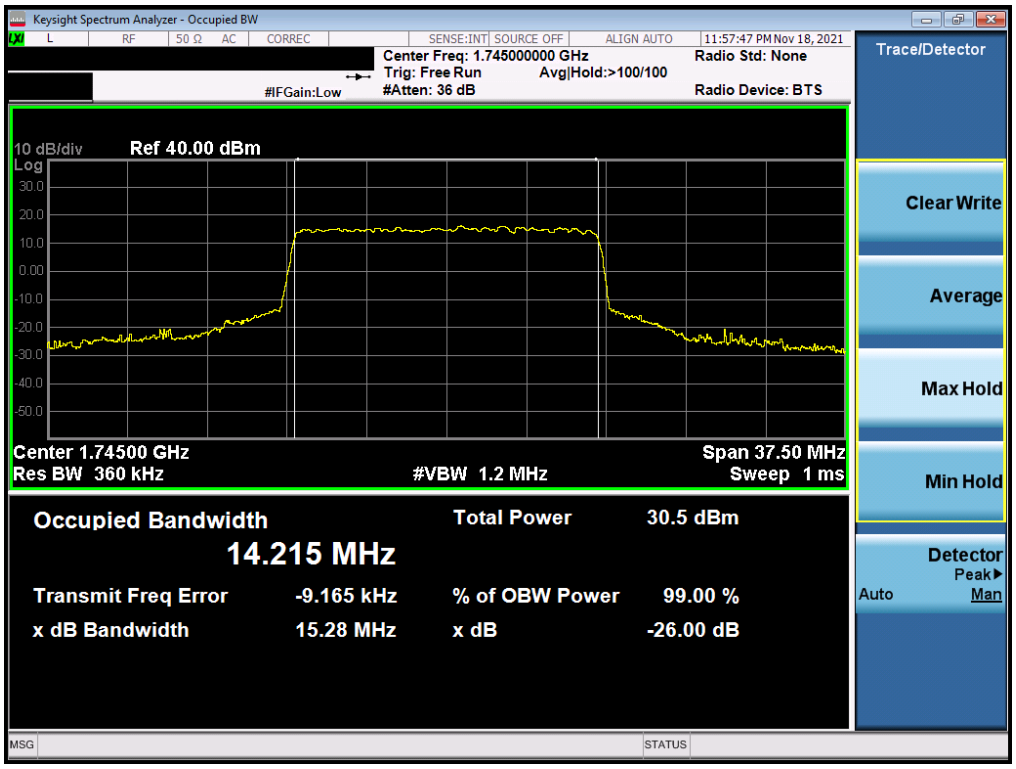
Plot 7-75. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz DFT-s-OFDM π/2 BPSK - Full RB)



Plot 7-76. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz CP-OFDM QPSK - Full RB)



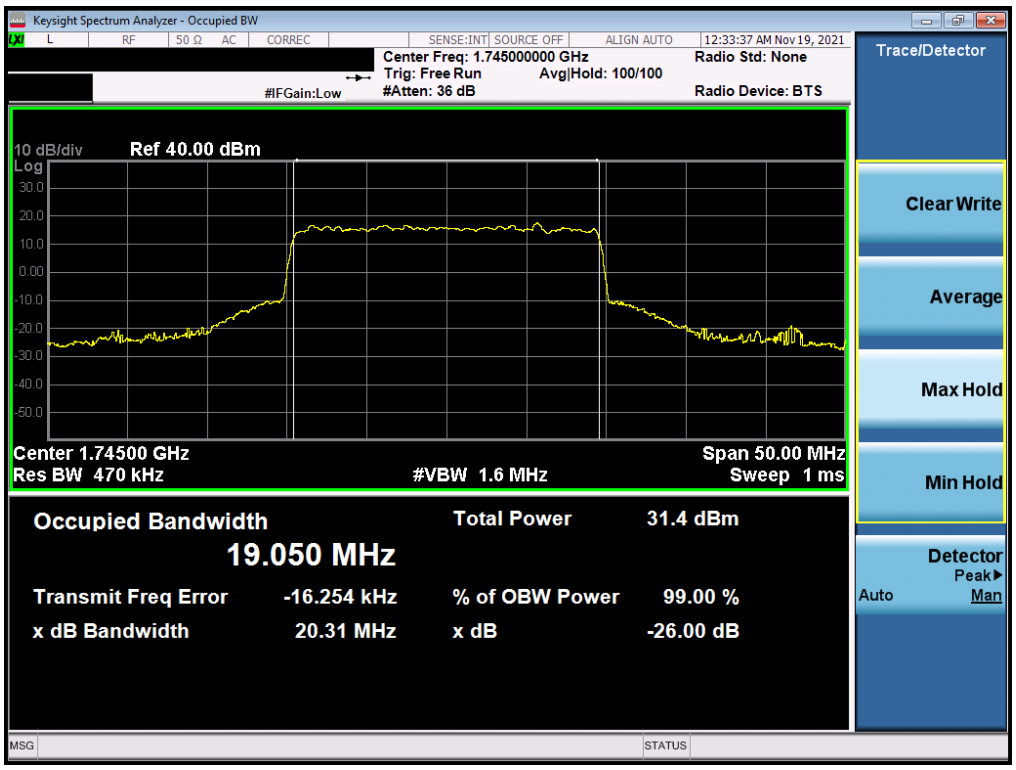
Plot 7-77. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz CP-OFDM 16QAM - Full RB)



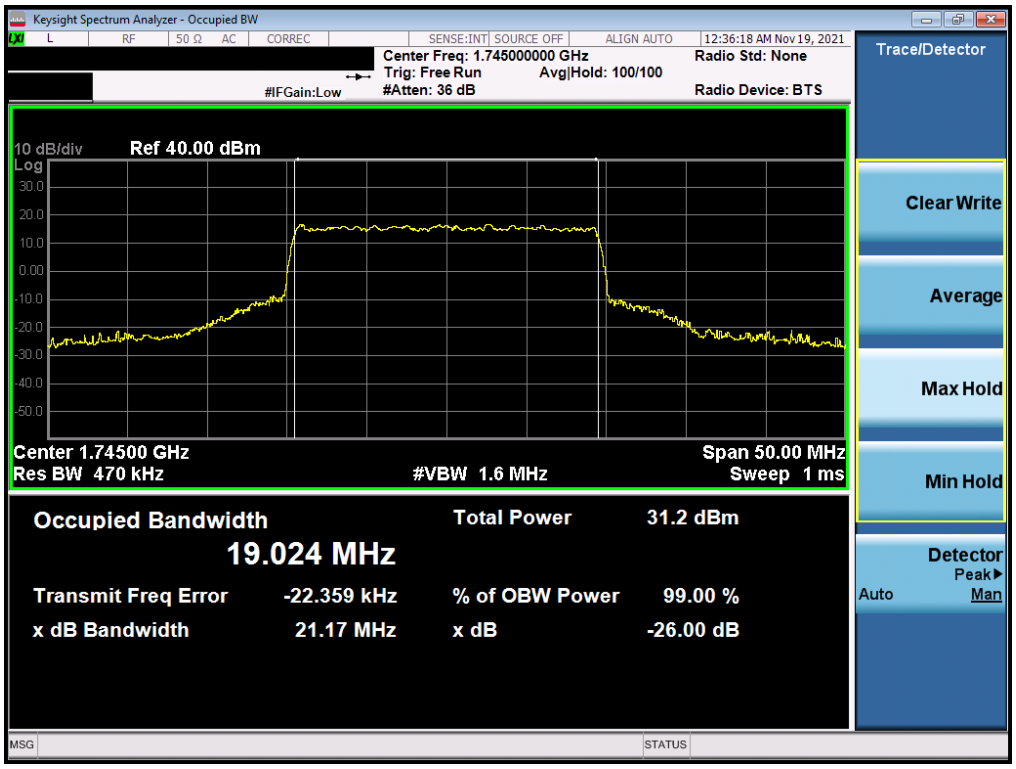
Plot 7-78. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz CP-OFDM 64QAM - Full RB)

Plot 7-79. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz CP-OFDM 256QAM - Full RB)

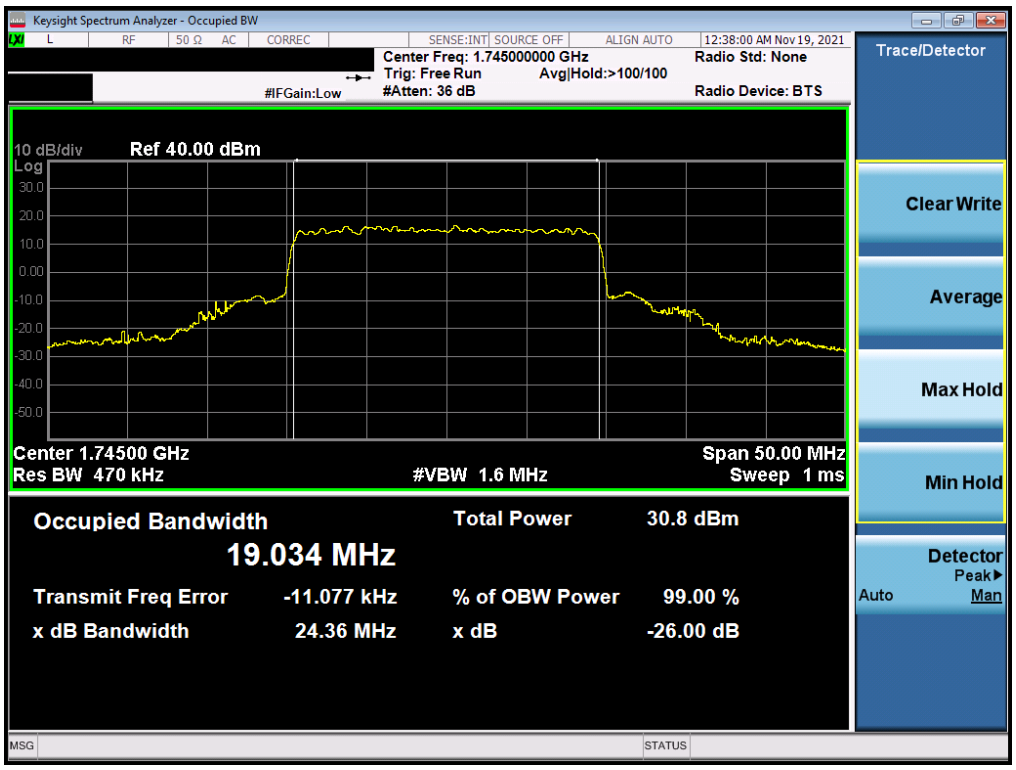
Plot 7-80. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz DFT-s-OFDM π/2 BPSK - Full RB)



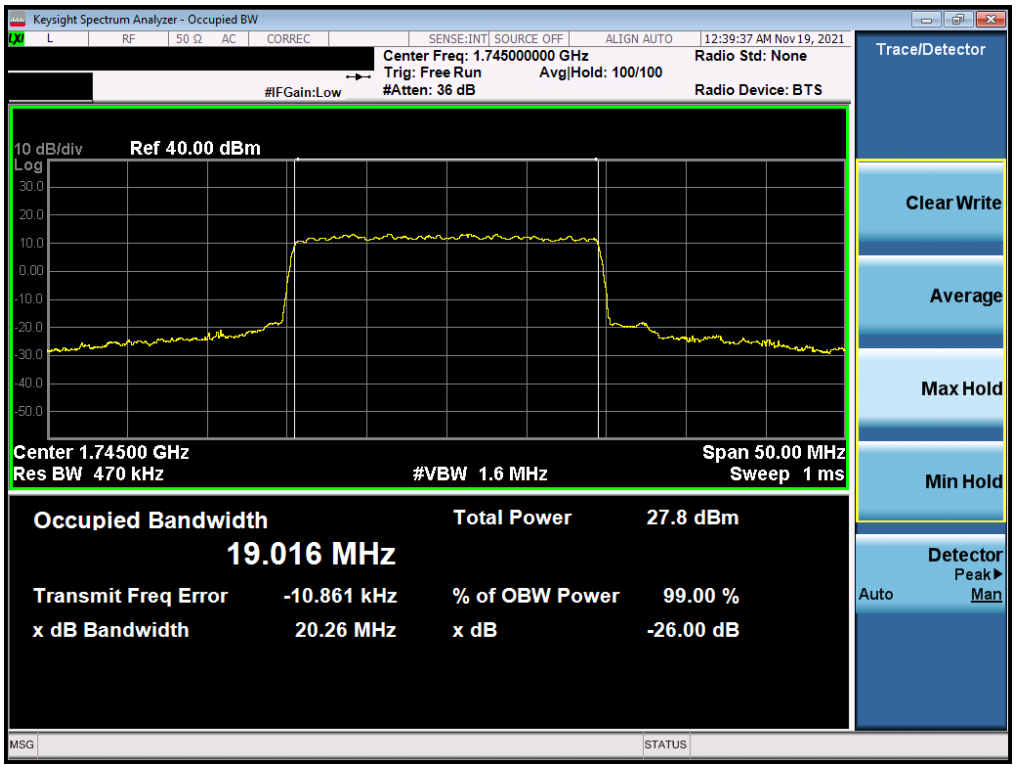
Plot 7-81. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM QPSK - Full RB)



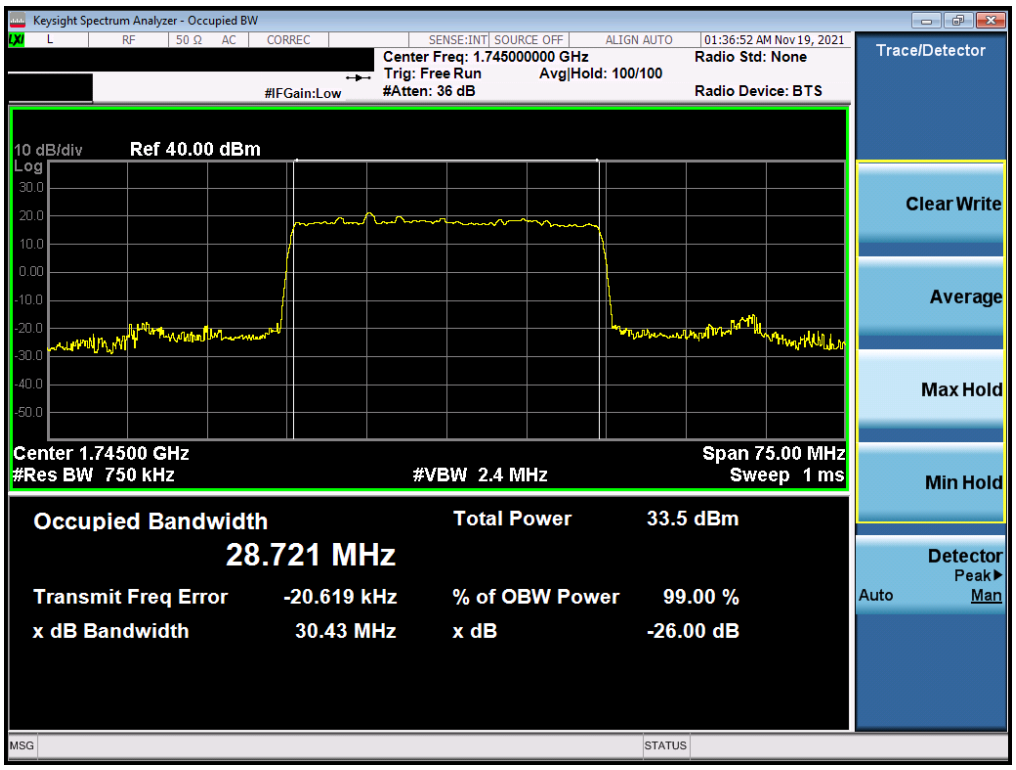
Plot 7-82. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM 16QAM - Full RB)



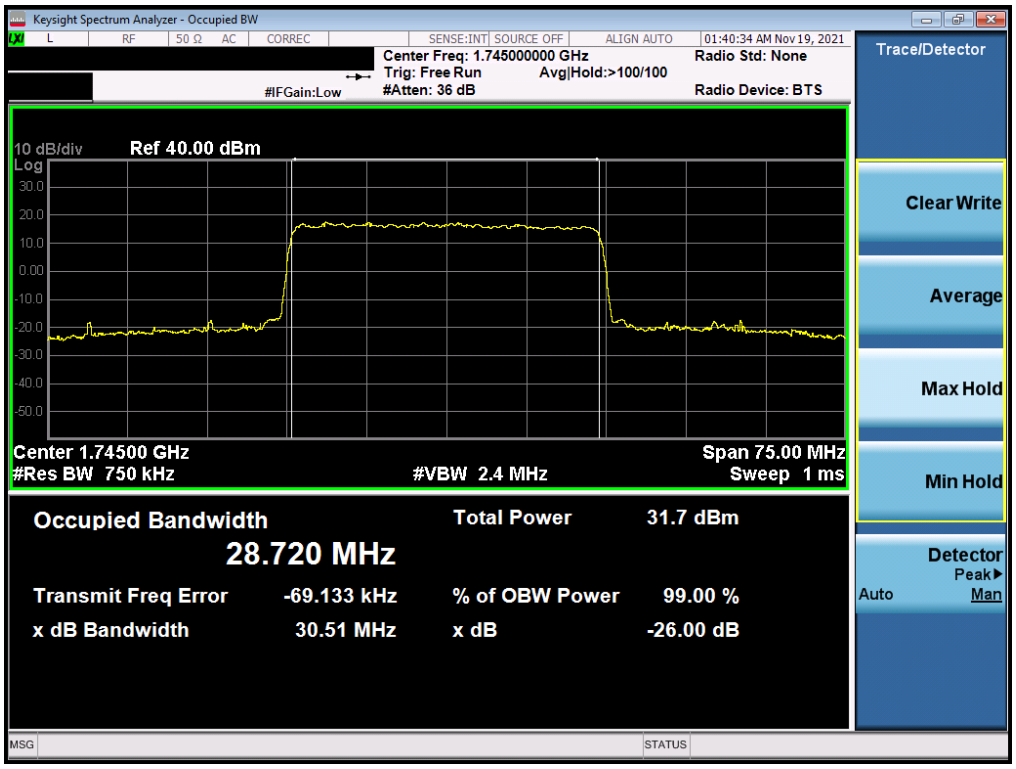
Plot 7-83. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM 64QAM - Full RB)



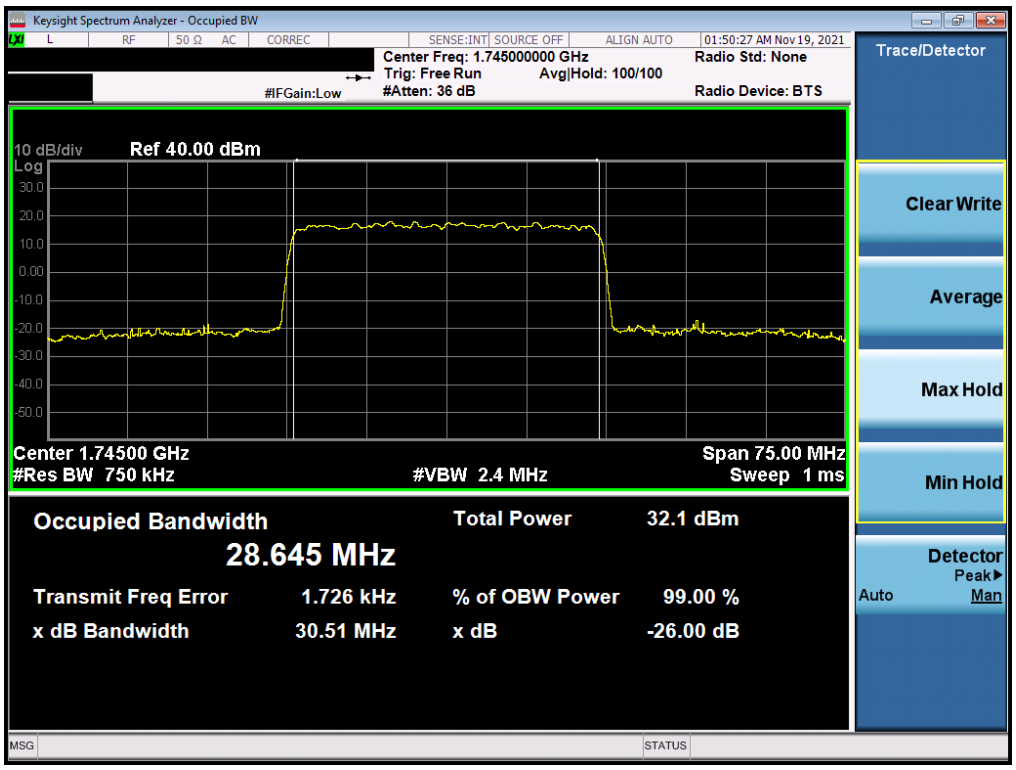
Plot 7-84. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM 256QAM - Full RB)



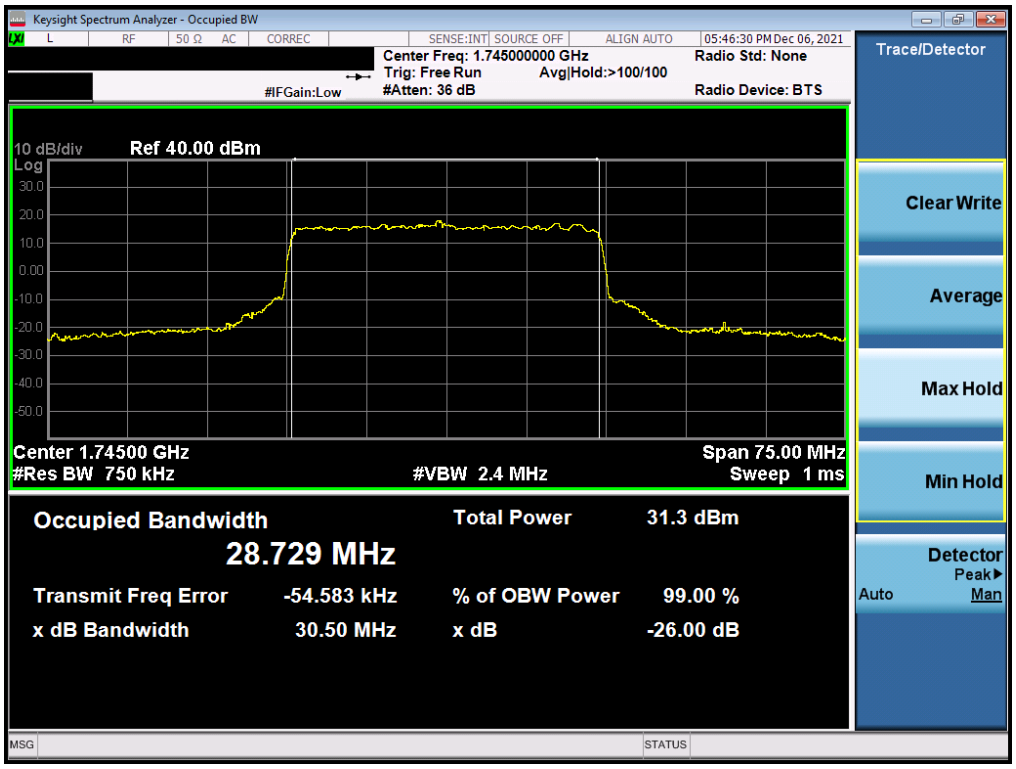
Plot 7-85. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz DFT-s-OFDM π/2 BPSK - Full RB)



Plot 7-86. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM QPSK - Full RB)

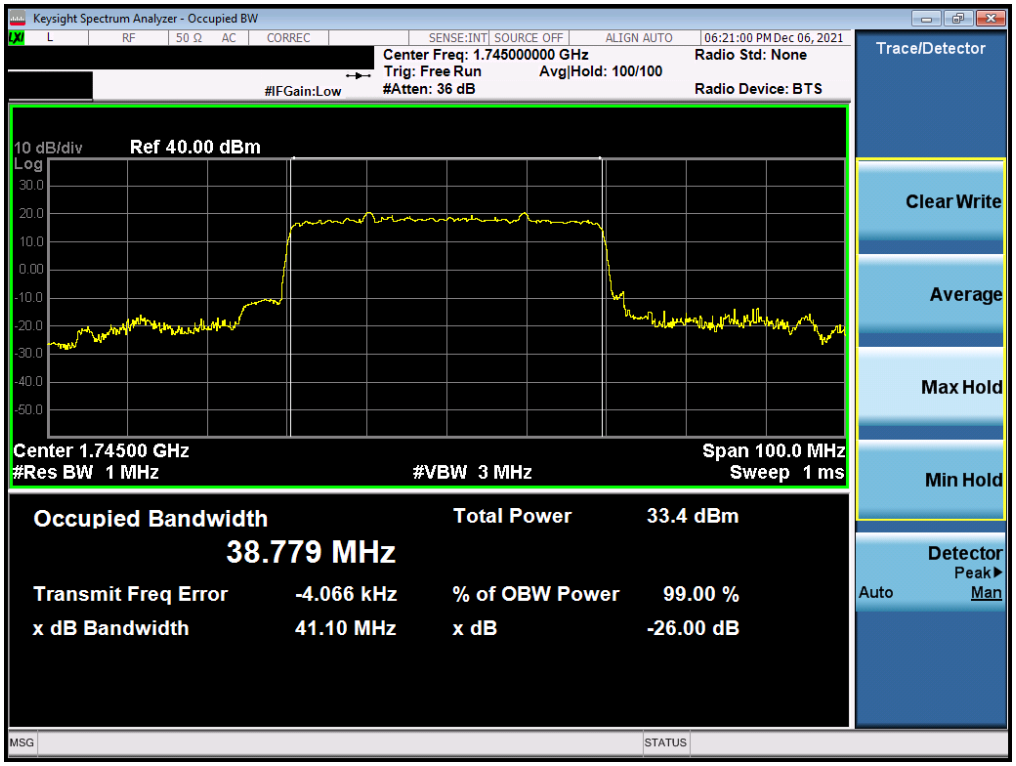


Plot 7-87. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM 16QAM - Full RB)

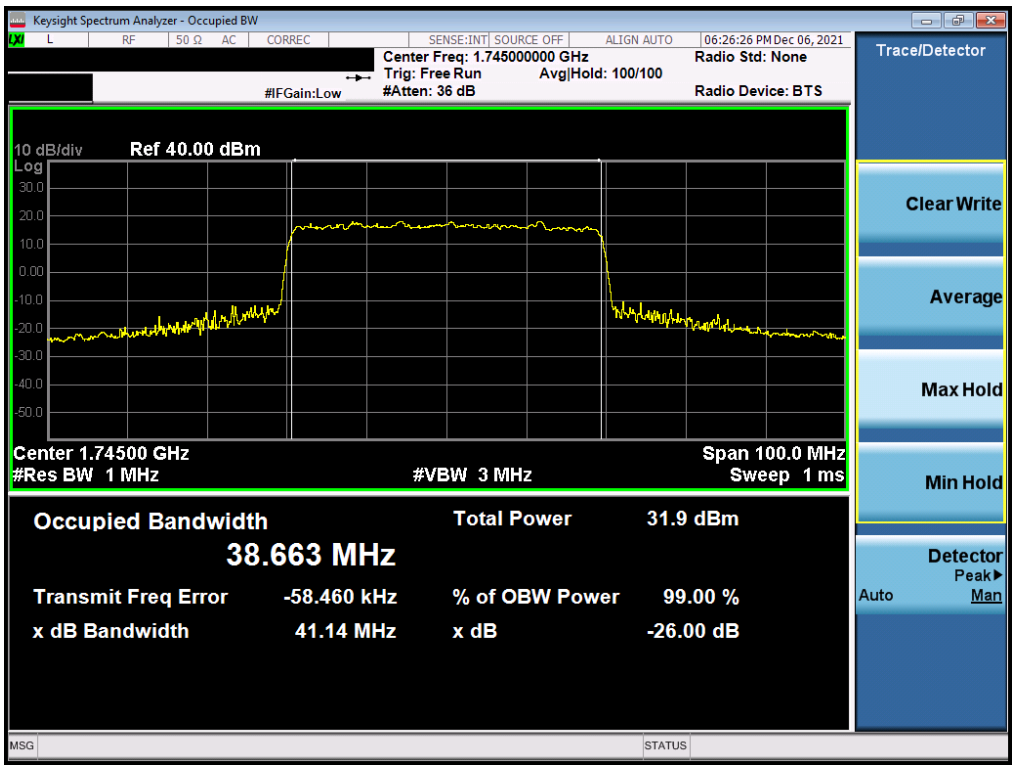


Plot 7-88. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM 64QAM - Full RB)

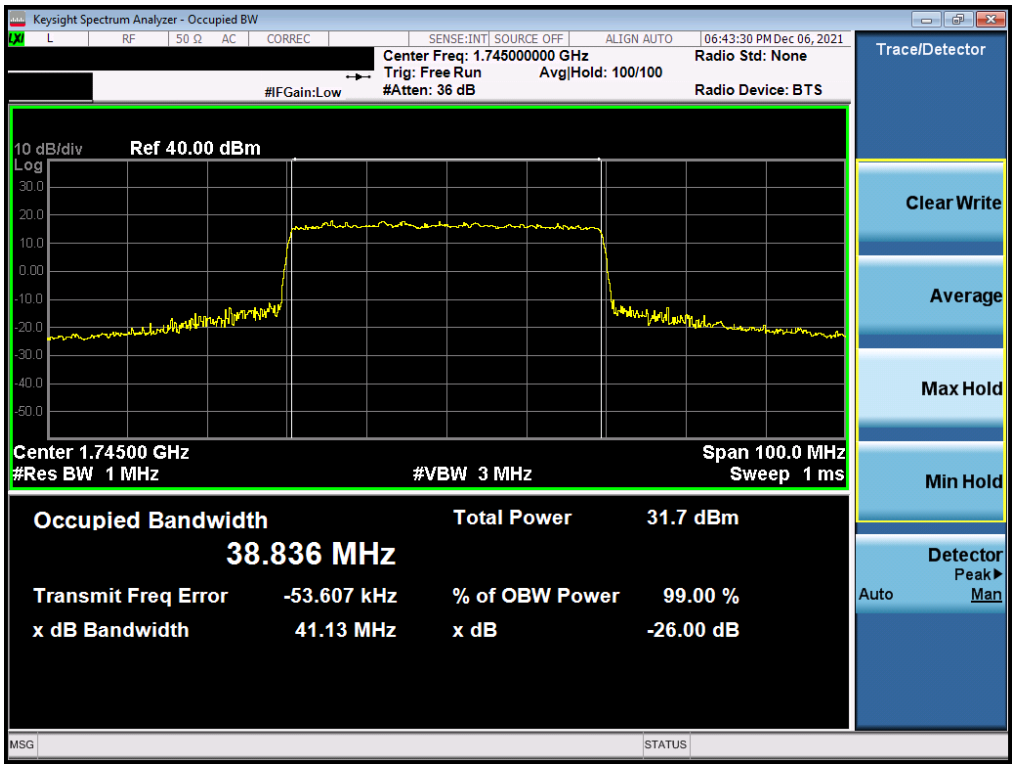
Plot 7-89. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM 256QAM - Full RB)



Plot 7-90. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz DFT-s-OFDM π/2 BPSK - Full RB)

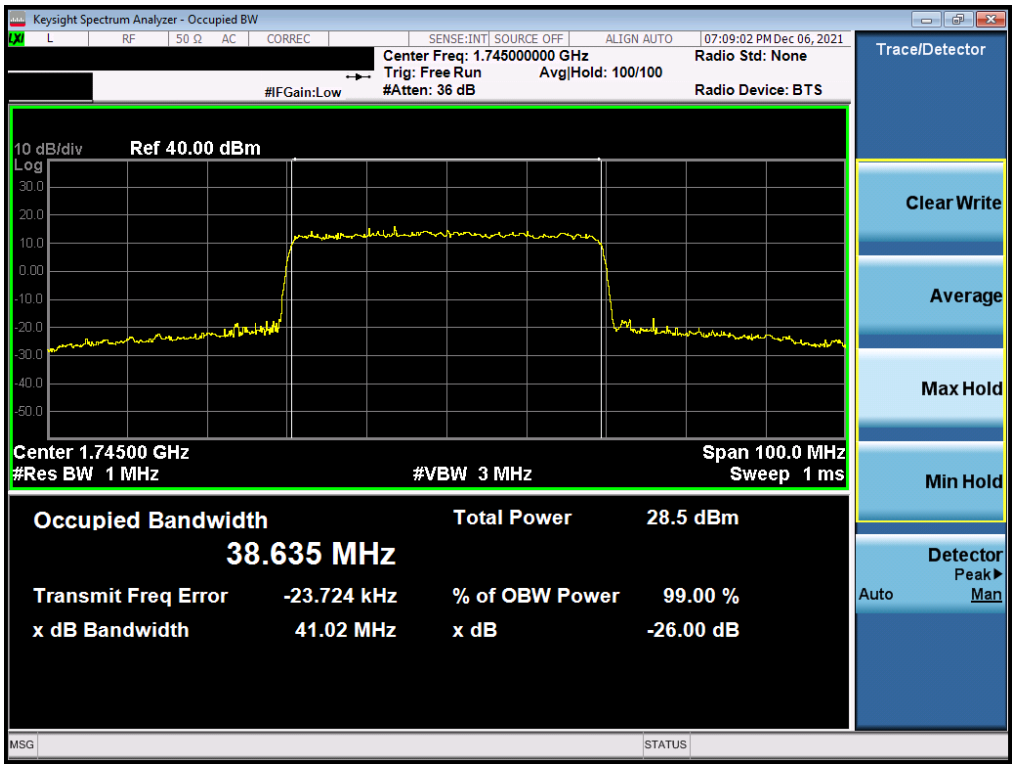


Plot 7-91. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM QPSK - Full RB)



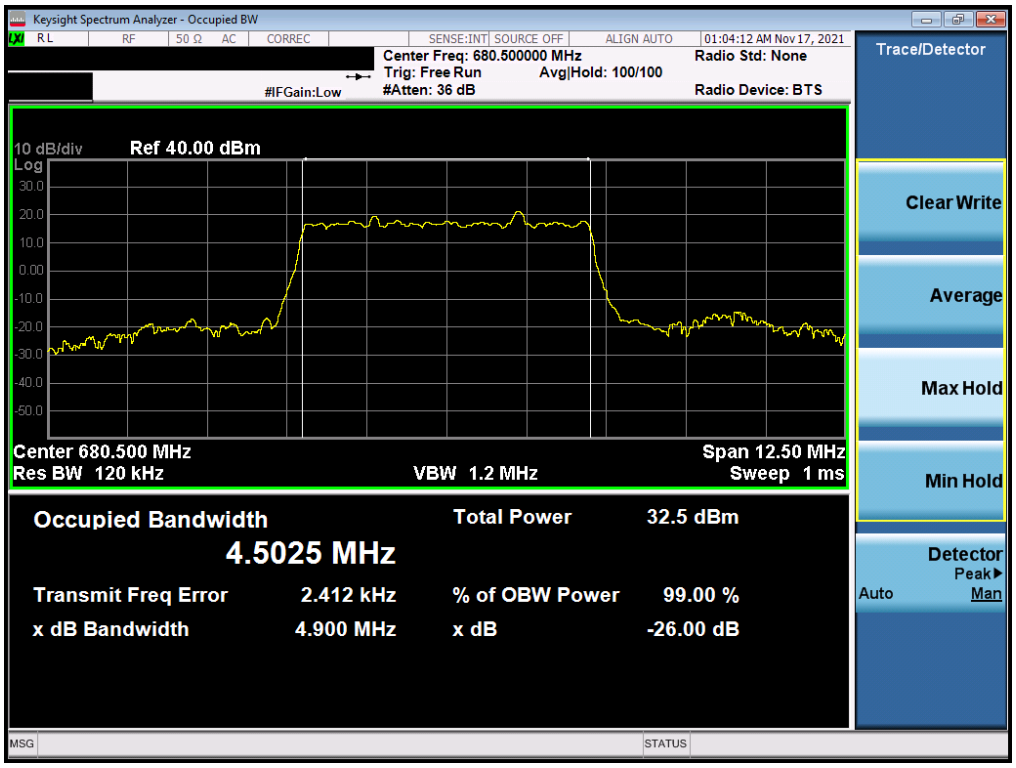
Plot 7-92. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM 16QAM - Full RB)

Plot 7-93. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM 64QAM - Full RB)

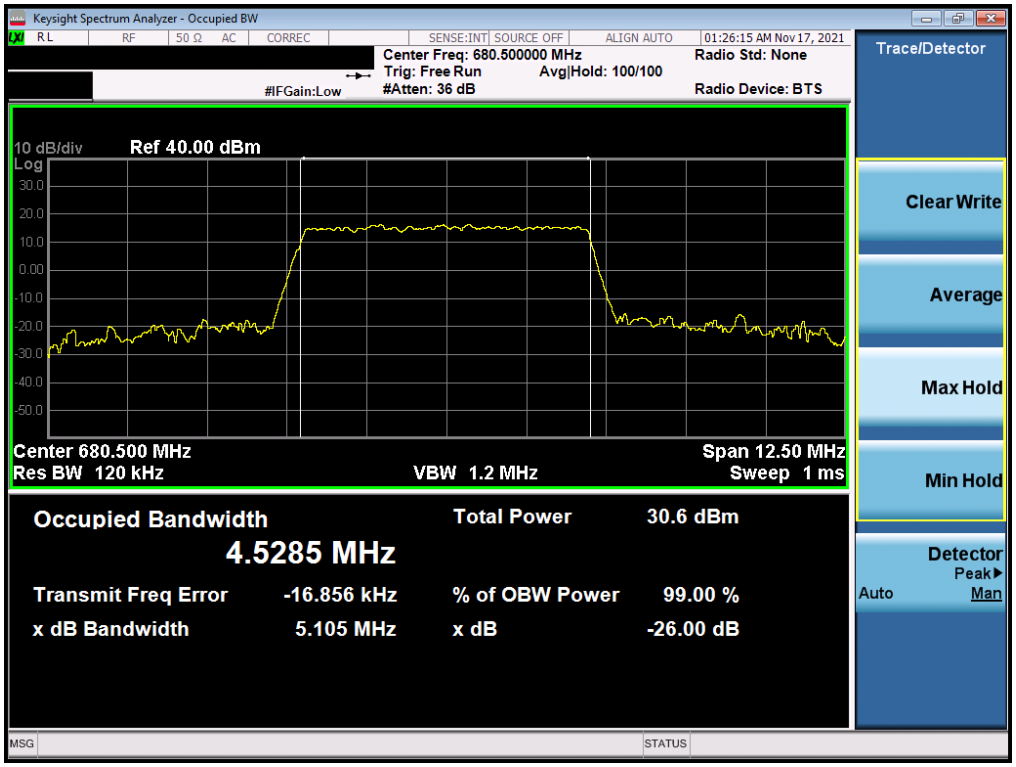


Plot 7-94. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM 256QAM - Full RB)

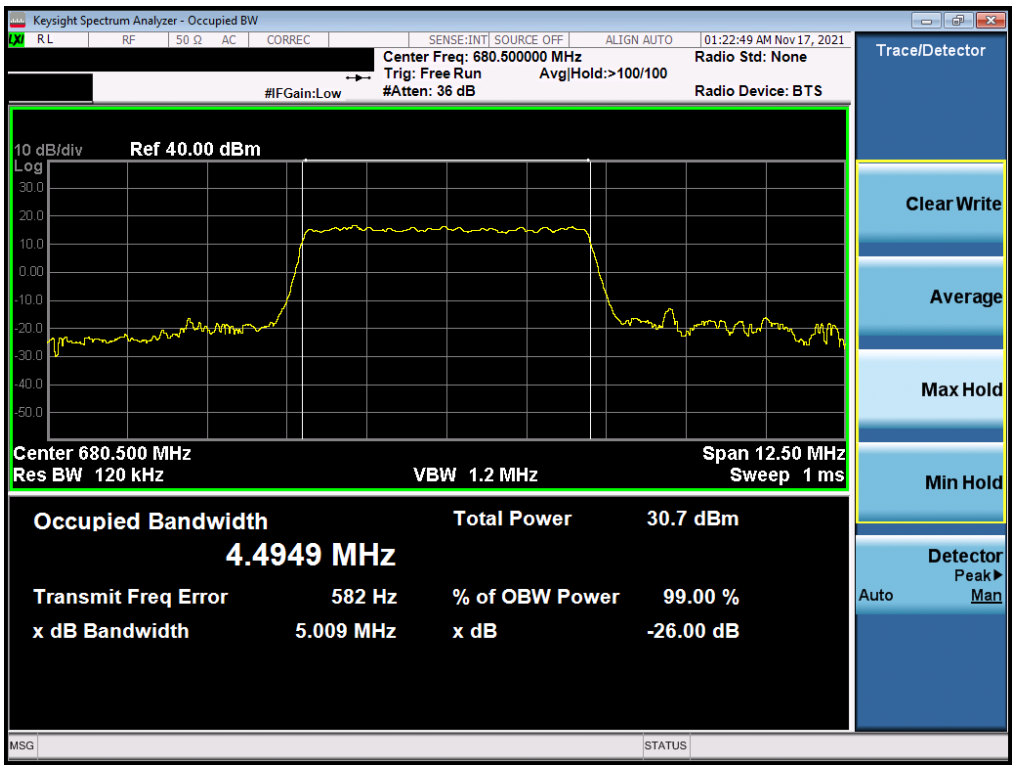
NR Band n71



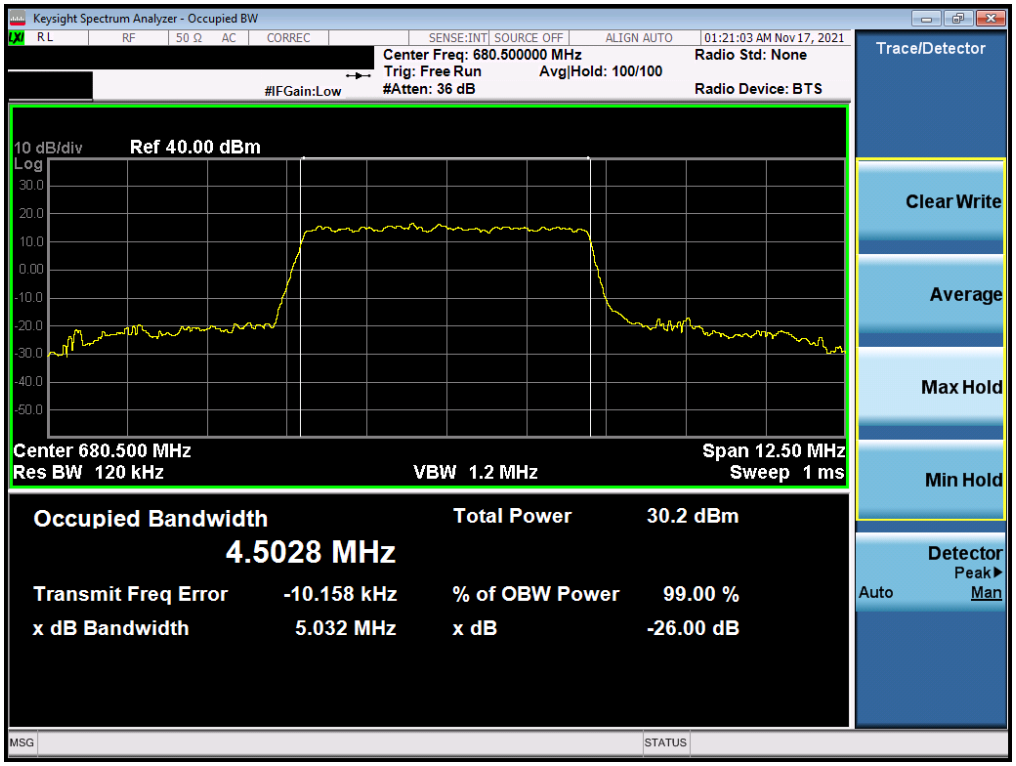
Plot 7-95. Occupied Bandwidth Plot (NR Band n71 - 5MHz DFT-s-OFDM π/2 BPSK - Full RB)



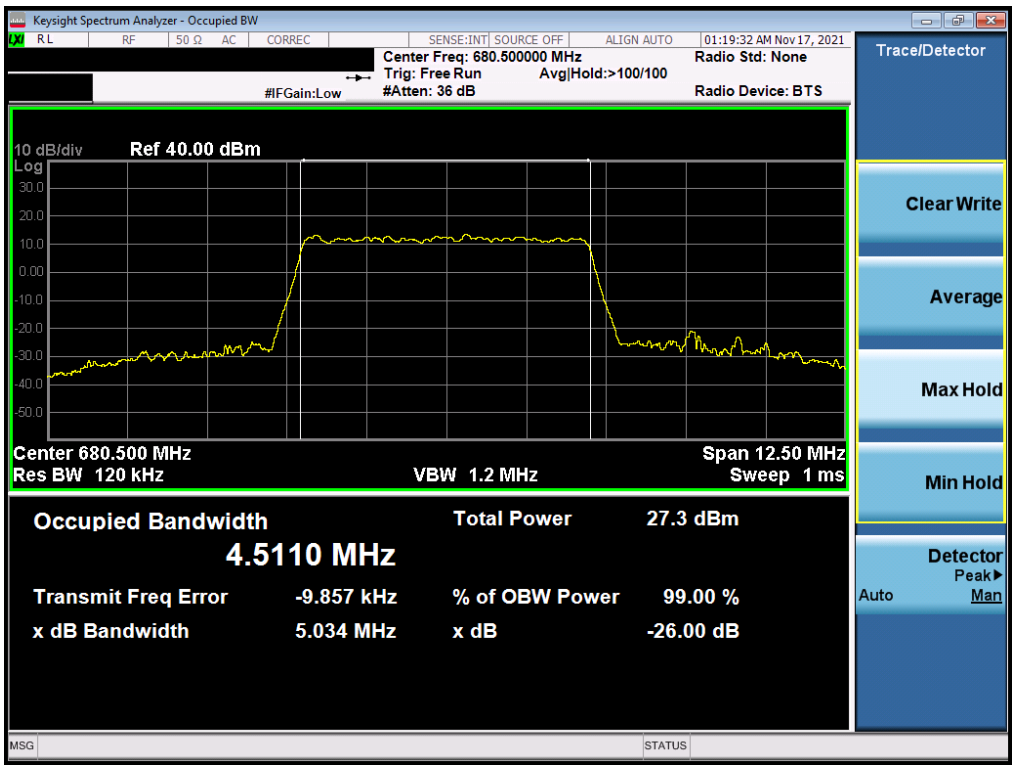
Plot 7-96. Occupied Bandwidth Plot (NR Band n71 - 5MHz CP-OFDM QPSK - Full RB)



Plot 7-97. Occupied Bandwidth Plot (NR Band n71 - 5MHz CP-OFDM 16-QAM - Full RB)

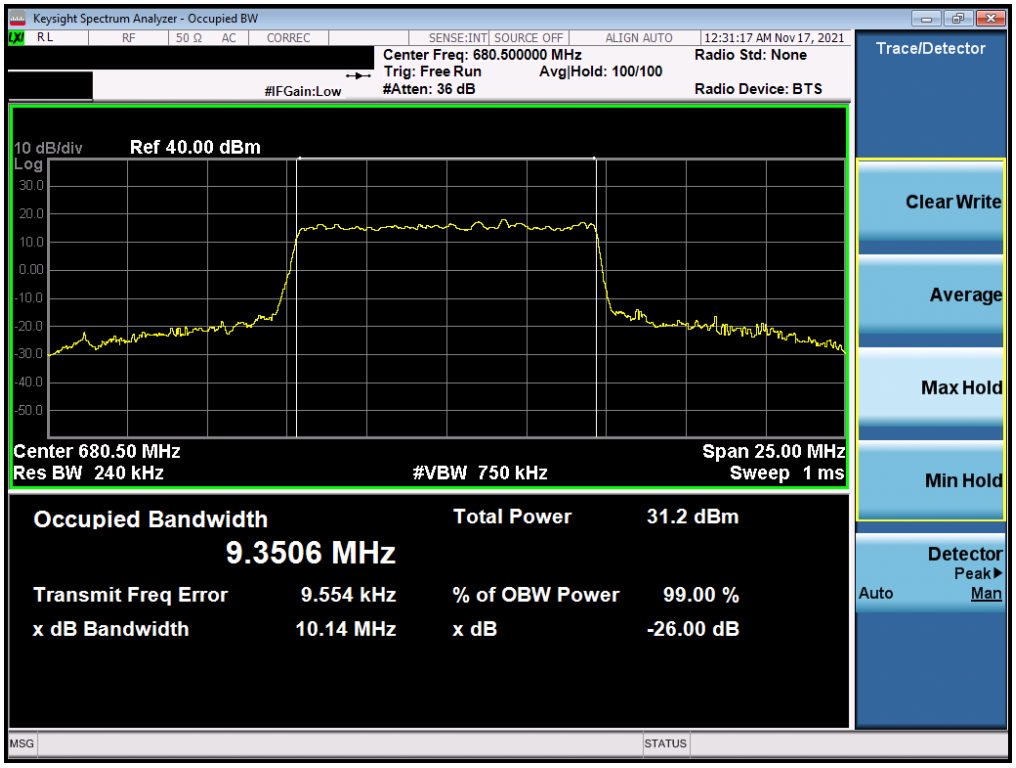


Plot 7-98. Occupied Bandwidth Plot (NR Band n71 - 5MHz CP-OFDM 64-QAM - Full RB)



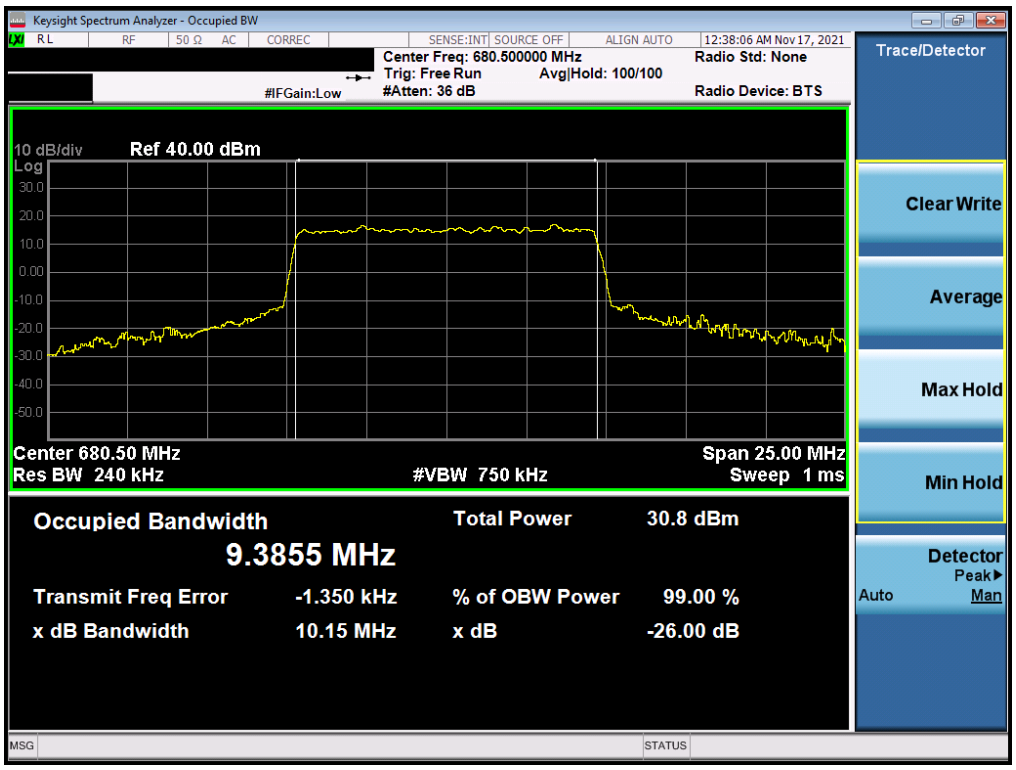
Plot 7-99. Occupied Bandwidth Plot (NR Band n71 - 5MHz CP-OFDM 256-QAM - Full RB)

Plot 7-100. Occupied Bandwidth Plot (NR Band n71 - 10MHz DFT-s-OFDM π/2 BPSK - Full RB)



Plot 7-101. Occupied Bandwidth Plot (NR Band n71 - 10MHz CP-OFDM QPSK - Full RB)

Plot 7-102. Occupied Bandwidth Plot (NR Band n71 - 10MHz CP-OFDM 16-QAM - Full RB)



Plot 7-103. Occupied Bandwidth Plot (NR Band n71 - 10MHz CP-OFDM 64-QAM - Full RB)

Plot 7-104. Occupied Bandwidth Plot (NR Band n71 - 10MHz CP-OFDM 256-QAM - Full RB)