

MEASUREMENT REPORT

FCC Part 27

Applicant Name:

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

Date of Testing:

9/23 – 12/10/2020

Test Site/Location:

PCTEST Lab. Columbia, MD, USA

Test Report Serial No.:

1M2009230152-27.A3L

FCC ID:

A3LSMG998U

APPLICANT:

Samsung Electronics Co., Ltd.

Application Type:

Certification

Model:

SM-G998U

Additional Model(s):

SM-G998U1

EUT Type:

Portable Handset

FCC Classification:

PCS Licensed Transmitter Held to Ear (PCE)

FCC Rule Part:

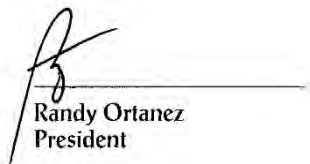
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Test Procedure(s):

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

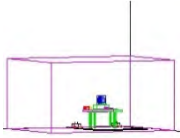


FCC ID: A3LSMG998U	 PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	 SAMSUNG	Approved by: Quality Manager
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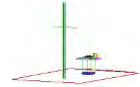
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Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		ERP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]	
LTE Band 71	20 MHz	QPSK	673.0 - 688.0	0.089	19.49	0.054	17.34	18M0G7D
		16QAM	673.0 - 688.0	0.076	18.79	0.046	16.64	18M0W7D
		64QAM	673.0 - 688.0	0.060	17.80	0.037	15.65	17M9W7D
		256QAM	673.0 - 688.0	0.033	15.22	0.020	13.07	18M0W7D
	15 MHz	QPSK	670.5 - 690.5	0.091	19.58	0.055	17.43	13M5G7D
		16QAM	670.5 - 690.5	0.076	18.79	0.046	16.64	13M5W7D
		64QAM	670.5 - 690.5	0.059	17.69	0.036	15.54	13M5W7D
		256QAM	670.5 - 690.5	0.032	14.99	0.019	12.84	13M5W7D
	10 MHz	QPSK	668.0 - 693.0	0.089	19.49	0.054	17.34	9M00G7D
		16QAM	668.0 - 693.0	0.075	18.74	0.046	16.59	8M99W7D
		64QAM	668.0 - 693.0	0.057	17.55	0.035	15.40	9M01W7D
		256QAM	668.0 - 693.0	0.031	14.97	0.019	12.82	8M99W7D
LTE Band 12	5 MHz	QPSK	665.5 - 695.5	0.091	19.59	0.055	17.44	4M52G7D
		16QAM	665.5 - 695.5	0.076	18.84	0.047	16.69	4M50W7D
		64QAM	665.5 - 695.5	0.062	17.91	0.038	15.76	4M52W7D
		256QAM	665.5 - 695.5	0.034	15.33	0.021	13.18	4M51W7D
	10 MHz	QPSK	704.0 - 711.0	0.116	20.63	0.070	18.48	9M01G7D
		16QAM	704.0 - 711.0	0.098	19.91	0.060	17.76	8M99W7D
		64QAM	704.0 - 711.0	0.077	18.84	0.047	16.69	9M00W7D
		256QAM	704.0 - 711.0	0.038	15.85	0.023	13.70	9M00W7D
	5 MHz	QPSK	701.5 - 713.5	0.117	20.67	0.071	18.52	4M51G7D
		16QAM	701.5 - 713.5	0.099	19.98	0.061	17.83	4M51W7D
		64QAM	701.5 - 713.5	0.080	19.06	0.049	16.91	4M52W7D
		256QAM	701.5 - 713.5	0.040	15.97	0.024	13.82	4M50W7D
	3 MHz	QPSK	700.5 - 714.5	0.118	20.71	0.072	18.56	2M70G7D
		16QAM	700.5 - 714.5	0.102	20.08	0.062	17.93	2M72W7D
		64QAM	700.5 - 714.5	0.088	19.47	0.054	17.32	2M71W7D
		256QAM	700.5 - 714.5	0.040	16.00	0.024	13.85	2M70W7D
	1.4 MHz	QPSK	699.7 - 715.3	0.122	20.87	0.074	18.72	1M10G7D
		16QAM	699.7 - 715.3	0.098	19.90	0.060	17.75	1M10W7D
		64QAM	699.7 - 715.3	0.085	19.30	0.052	17.15	1M10W7D
		256QAM	699.7 - 715.3	0.039	15.96	0.024	13.81	1M09W7D
LTE Band 13	10 MHz	QPSK	782.0	0.168	22.25	0.102	20.10	9M02G7D
		16QAM	782.0	0.137	21.35	0.083	19.20	8M96W7D
		64QAM	782.0	0.108	20.35	0.066	18.20	8M96W7D
		256QAM	782.0	0.052	17.15	0.032	15.00	8M96W7D
	5 MHz	QPSK	779.5 - 784.5	0.174	22.39	0.106	20.24	4M51G7D
		16QAM	779.5 - 784.5	0.139	21.42	0.085	19.27	4M52W7D
		64QAM	779.5 - 784.5	0.119	20.74	0.072	18.59	4M52W7D
		256QAM	779.5 - 784.5	0.054	17.35	0.033	15.20	4M51W7D
NR Band n12	15 MHz	11/2 BPSK	706.5 - 708.5	0.107	20.31	0.070	18.44	13M5G7D
		QPSK	706.5 - 708.5	0.119	20.75	0.072	18.60	14M2G7D
		16QAM	706.5 - 708.5	0.099	19.94	0.060	17.79	14M2W7D
		64QAM	706.5 - 708.5	0.069	18.37	0.042	16.22	14M2W7D
		256QAM	706.5 - 708.5	0.045	16.52	0.027	14.37	14M2W7D
		11/2 BPSK	704.0 - 711.0	0.127	20.71	0.077	18.56	8M94G7D
	10 MHz	QPSK	704.0 - 711.0	0.130	20.67	0.079	18.52	9M29G7D
		16QAM	704.0 - 711.0	0.109	19.77	0.066	17.62	9M32W7D
		64QAM	704.0 - 711.0	0.068	18.64	0.041	16.49	9M30W7D
		256QAM	704.0 - 711.0	0.045	16.49	0.027	14.34	9M35W7D
		11/2 BPSK	701.5 - 713.5	0.129	20.72	0.079	18.57	4M53G7D
		QPSK	701.5 - 713.5	0.127	20.65	0.077	18.50	4M53G7D
	5 MHz	16QAM	701.5 - 713.5	0.102	19.91	0.062	17.76	4M50W7D
		64QAM	701.5 - 713.5	0.068	18.42	0.041	16.27	4M51W7D
		256QAM	701.5 - 713.5	0.045	16.39	0.027	14.24	4M49W7D
NR Band n71	20 MHz	11/2 BPSK	673.0 - 688.0	0.127	21.03	0.077	18.88	18M0G7D
		QPSK	673.0 - 688.0	0.130	21.14	0.079	18.99	19M0G7D
		16QAM	673.0 - 688.0	0.109	20.36	0.066	18.21	19M0W7D
		64QAM	673.0 - 688.0	0.068	18.32	0.041	16.17	19M0W7D
		256QAM	673.0 - 688.0	0.045	16.51	0.027	14.36	19M0W7D
		11/2 BPSK	670.5 - 690.5	0.129	21.12	0.079	18.97	13M5G7D
	15 MHz	QPSK	670.5 - 690.5	0.127	21.03	0.077	18.88	14M1G7D
		16QAM	670.5 - 690.5	0.102	20.11	0.062	17.96	14M2W7D
		64QAM	670.5 - 690.5	0.068	18.30	0.041	16.15	14M2W7D
		256QAM	670.5 - 690.5	0.045	16.50	0.027	14.35	14M2W7D
		11/2 BPSK	668.0 - 693.0	0.108	20.32	0.066	18.17	8M99G7D
		QPSK	668.0 - 693.0	0.108	20.32	0.066	18.17	9M33G7D
	10 MHz	16QAM	668.0 - 693.0	0.105	20.22	0.064	18.07	9M34W7D
		64QAM	668.0 - 693.0	0.065	18.15	0.040	16.00	9M37W7D
		256QAM	668.0 - 693.0	0.039	15.94	0.024	13.79	9M32W7D
		11/2 BPSK	665.5 - 695.5	0.132	21.22	0.081	19.07	4M53G7D
		QPSK	665.5 - 695.5	0.120	20.78	0.073	18.63	4M52G7D
		16QAM	665.5 - 695.5	0.106	20.24	0.064	18.09	4M51W7D
	5 MHz	64QAM	665.5 - 695.5	0.060	17.76	0.036	15.61	4M53W7D
		256QAM	665.5 - 695.5	0.044	16.40	0.027	14.25	4M50W7D

Overview Table (<1GHz Bands)

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Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
WCDMA1700	N/A	Spread Spectrum	1712.4 - 1752.6	0.250	23.99	4M17F9W
LTE Band 66/4	20 MHz	QPSK	1720.0 - 1770.0	0.202	23.05	18M0G7D
		16QAM	1720.0 - 1770.0	0.172	22.36	18M0W7D
		64QAM	1720.0 - 1770.0	0.136	21.35	18M0W7D
		256QAM	1720.0 - 1770.0	0.062	17.93	18M0W7D
		QPSK	1717.5 - 1772.5	0.201	23.03	13M5G7D
	15 MHz	16QAM	1717.5 - 1772.5	0.165	22.17	13M5W7D
		64QAM	1717.5 - 1772.5	0.125	20.96	13M5W7D
		256QAM	1717.5 - 1772.5	0.062	17.93	13M5W7D
		QPSK	1715.0 - 1775.0	0.197	22.94	9M03G7D
	10 MHz	16QAM	1715.0 - 1775.0	0.160	22.03	8M98W7D
		64QAM	1715.0 - 1775.0	0.114	20.58	9M01W7D
		256QAM	1715.0 - 1775.0	0.063	17.97	8M99W7D
		QPSK	1712.5 - 1777.5	0.190	22.78	4M51G7D
	5 MHz	16QAM	1712.5 - 1777.5	0.183	22.62	4M50W7D
		64QAM	1712.5 - 1777.5	0.125	20.97	4M53W7D
		256QAM	1712.5 - 1777.5	0.063	18.00	4M50W7D
		QPSK	1711.5 - 1778.5	0.200	23.01	2M70G7D
	3 MHz	16QAM	1711.5 - 1778.5	0.165	22.18	2M72W7D
		64QAM	1711.5 - 1778.5	0.117	20.69	2M71W7D
		256QAM	1711.5 - 1778.5	0.063	18.03	2M70W7D
		QPSK	1710.7 - 1779.3	0.197	22.95	1M10G7D
	1.4 MHz	16QAM	1710.7 - 1779.3	0.160	22.04	1M10W7D
		64QAM	1710.7 - 1779.3	0.117	20.68	1M10W7D
		256QAM	1710.7 - 1779.3	0.063	17.98	1M09W7D
		QPSK	1710.7 - 1779.3	0.197	22.95	1M10G7D
NR Band n66 ANT A	40 MHz	11/2 BPSK	1730.0 - 1760.0	0.215	23.32	38M8G7D
		QPSK	1730.0 - 1760.0	0.207	23.16	38M8G7D
		16QAM	1730.0 - 1760.0	0.162	22.10	38M6W7D
		64QAM	1730.0 - 1760.0	0.098	19.93	38M6W7D
		256QAM	1730.0 - 1760.0	0.070	18.42	38M6W7D
	30 MHz	11/2 BPSK	1725.0 - 1765.0	0.204	23.10	28M6G7D
		QPSK	1725.0 - 1765.0	0.192	22.83	28M6G7D
		16QAM	1725.0 - 1765.0	0.157	21.96	28M6W7D
		64QAM	1725.0 - 1765.0	0.088	19.44	28M6W7D
		256QAM	1725.0 - 1765.0	0.068	18.35	28M6W7D
	20 MHz	11/2 BPSK	1720.0 - 1770.0	0.221	23.45	17M9G7D
		QPSK	1720.0 - 1770.0	0.223	23.49	19M0G7D
		16QAM	1720.0 - 1770.0	0.172	22.36	19M0W7D
		64QAM	1720.0 - 1770.0	0.118	20.72	19M0W7D
		256QAM	1720.0 - 1770.0	0.083	19.17	19M0W7D
	15 MHz	11/2 BPSK	1717.5 - 1772.5	0.217	23.36	13M5G7D
		QPSK	1717.5 - 1772.5	0.210	23.22	14M2G7D
		16QAM	1717.5 - 1772.5	0.171	22.33	14M2W7D
		64QAM	1717.5 - 1772.5	0.117	20.68	14M2W7D
		256QAM	1717.5 - 1772.5	0.083	19.17	14M2W7D
	10 MHz	11/2 BPSK	1715.0 - 1775.0	0.220	23.42	9M01G7D
		QPSK	1715.0 - 1775.0	0.222	23.46	9M36G7D
		16QAM	1715.0 - 1775.0	0.166	22.19	9M33W7D
		64QAM	1715.0 - 1775.0	0.112	20.50	9M35W7D
		256QAM	1715.0 - 1775.0	0.082	19.16	9M34W7D
	5 MHz	11/2 BPSK	1712.5 - 1777.5	0.214	23.30	4M52G7D
		QPSK	1712.5 - 1777.5	0.207	23.17	4M49G7D
		16QAM	1712.5 - 1777.5	0.164	22.15	4M50W7D
		64QAM	1712.5 - 1777.5	0.124	20.95	4M50W7D
		256QAM	1712.5 - 1777.5	0.085	19.28	4M49W7D
NR Band n66 ANT E	40 MHz	11/2 BPSK	1730.0 - 1760.0	0.045	16.58	38M9G7D
		QPSK	1730.0 - 1760.0	0.047	16.76	38M8G7D
		16QAM	1730.0 - 1760.0	0.037	15.72	38M9W7D
		64QAM	1730.0 - 1760.0	0.025	14.00	38M7W7D
		256QAM	1730.0 - 1760.0	0.016	12.08	38M9W7D
	30 MHz	11/2 BPSK	1725.0 - 1765.0	0.070	18.46	28M9G7D
		QPSK	1725.0 - 1765.0	0.051	17.06	28M8G7D
		16QAM	1725.0 - 1765.0	0.039	15.94	28M8W7D
		64QAM	1725.0 - 1765.0	0.031	14.86	28M8W7D
		256QAM	1725.0 - 1765.0	0.021	13.14	28M8W7D
	20 MHz	11/2 BPSK	1720.0 - 1770.0	0.072	18.59	18M0G7D
		QPSK	1720.0 - 1770.0	0.051	17.08	18M5G7D
		16QAM	1720.0 - 1770.0	0.040	16.05	18M6W7D
		64QAM	1720.0 - 1770.0	0.031	14.94	18M5W7D
		256QAM	1720.0 - 1770.0	0.021	13.24	18M5W7D
	15 MHz	11/2 BPSK	1717.5 - 1772.5	0.071	18.50	13M5G7D
		QPSK	1717.5 - 1772.5	0.047	16.72	14M2G7D
		16QAM	1717.5 - 1772.5	0.040	16.02	14M2W7D
		64QAM	1717.5 - 1772.5	0.031	14.90	14M2W7D
		256QAM	1717.5 - 1772.5	0.021	13.23	14M3W7D
	10 MHz	11/2 BPSK	1715.0 - 1775.0	0.072	18.56	8M98G7D
		QPSK	1715.0 - 1775.0	0.050	17.03	9M34G7D
		16QAM	1715.0 - 1775.0	0.039	15.88	9M38W7D
		64QAM	1715.0 - 1775.0	0.030	14.71	9M31W7D
		256QAM	1715.0 - 1775.0	0.021	13.22	9M35W7D
	5 MHz	11/2 BPSK	1712.5 - 1777.5	0.070	18.44	4M49G7D
		QPSK	1712.5 - 1777.5	0.051	17.06	4M49G7D
		16QAM	1712.5 - 1777.5	0.038	15.83	4M50W7D
		64QAM	1712.5 - 1777.5	0.033	15.17	4M51W7D
		256QAM	1712.5 - 1777.5	0.022	13.35	4M51W7D

Overview Table (>1GHz Bands)

FCC ID: A3LSMG998U	 PART 27 MEASUREMENT REPORT 	Approved by: Quality Manager
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1.0 INTRODUCTION

1.1 Scope

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

1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014.

1.3 Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21046, U.S.A.

- PCTEST is an ISO 17025-2017 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 ISSED Standards (RSS).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISSED.

FCC ID: A3LSMG998U		PART 27 MEASUREMENT REPORT		Approved by: Quality Manager
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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMG998U**. 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.: 0788M, 0722M, 0695M, 0706M, 0707M, 0752M, 0705M, 0144M

2.2 Device Capabilities

This device contains the following capabilities:

800/850/1900 CDMA/EvDO Rev0/A, 1x Advanced (BC0, BC1, BC10), 850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 5G NR (n5, n71, n41, n66, n2, n12, n25, n30, n77, n260, n261), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII (5GHz and 6GHz), Bluetooth (1x, EDR, LE), NFC, Wireless Power Transfer, UWB

This device uses a tuner circuit that dynamically updates the antenna impedance parameters to optimize antenna performance for certain bands and modes of operation. The tuner for this device was set to simulate a "free space" condition where the transmit antenna is matched to the medium into which it is transmitting and, thus, the power is at its maximum level.

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.

Sub 6GHz NR Band n71 (663 – 698 MHz) operates using 15kHz Subcarrier Spacing with both CP-OFDM and DFT-s OFDM waveforms. The band supports $\pi/2$ -BPSK, QPSK, 16QAM, 64QAM, and 256QAM modulation. The test data provided in this report represents the worst case configuration.

Sub 6GHz NR Band n66 (1710 – 1780 MHz) operates using 15kHz Subcarrier Spacing with both CP-OFDM and DFT-s OFDM waveforms. The band supports QPSK, 16QAM, 64QAM, and 256QAM modulation. The test data provided in this report represents the worst case configurations.

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.

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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/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 wooden turntable 80cm above the ground plane and 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:

$$P_d \text{ [dBm]} = P_g \text{ [dBm]} - \text{cable loss [dB]} + \text{antenna gain [dBd/dBi]}$$

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 $P_g \text{ [dBm]} - \text{cable loss [dB]}$.

For fundamental radiated power measurements, the guidance of KDB 971168 D01 v03r01 is used to record the EUT power level that is subsequently matched via the aforementioned substitution method given in ANSI/TIA-603-E-2016.

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.

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4.0 MEASUREMENT UNCERTAINTY

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

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

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5.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	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	N9020A	MXA Signal Analyzer	8/4/2020	Annual	8/4/2021	US46470561
Agilent	N9030A	PXA Signal Analyzer (44GHz)	7/17/2020	Annual	7/17/2021	MY52350166
Agilent	E5515C	Wireless Communications Test Set		N/A		GB45360985
Agilent	E5515C	Wireless Communications Test Set		N/A		GB46310798
Anritsu	MT8820C	Radio Communication Analyzer		N/A		6201300731
Anritsu	MT8821C	Radio Communication Analyzer		N/A		6201381794
Anritsu	MT8821C	Radio Communication Analyzer		N/A		6200901190
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2019	Biennial	10/10/2021	121034
Emco	3115	Horn Antenna (1-18GHz)	6/18/2020	Biennial	6/18/2022	9704-5182
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/12/2020	Biennial	3/12/2022	128337
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	2/22/2019	Biennial	2/22/2021	128338
Mini Circuits	TVA-11-422	RF Power Amp		N/A		QA1317001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11208010032
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11403100002
Rohde & Schwarz	CMU200	Base Station Simulator		N/A		836371/0079
Rohde & Schwarz	CMU200	Base Station Simulator		N/A		836536/0005
Rohde & Schwarz	CMW500	Radio Communication Tester		N/A		100976
Rohde & Schwarz	CMW500	Radio Communication Tester		N/A		112347
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	7/15/2020	Annual	7/15/2021	100342
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2/21/2020	Annual	2/21/2021	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
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	7/27/2020	Biennial	7/27/2022	A051107

Table 5-1. Summary of Test Results

Notes:

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

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6.0 SAMPLE CALCULATIONS

Emission Designator

QPSK Modulation

Emission Designator = 8M62G7D

LTE BW = 8.62 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

QAM Modulation

Emission Designator = 8M45W7D

LTE BW = 8.45 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

WCDMA Emission Designator

Emission Designator = 4M16F9W

WCDMA BW = 4.16 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

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 analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 1564 MHz. So 6.1 dB is added to the signal generator reading of –30.9 dBm yielding –24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm – (-24.80).

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7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.
 FCC ID: A3LSMG998U
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 Mode(s): WCDMA/LTE/NR

Test Condition	Test Description	FCC Part Section(s)	RSS Section(s)	Test Limit	Test Result	Reference
CONDUCTED	Occupied Bandwidth	2.1049	RSS-139(2.3)	N/A	PASS	Section 7.2
	Conducted Band Edge / Spurious Emissions	2.1051, 27.53	RSS-139(6.6)	> 43 + 10log10(P[Watts]) at Band Edge and for all out-of-band emissions	PASS	Sections 7.3, 7.4
	Transmitter Conducted Output Power	2.1046	RSS-139(4.1)	N/A	PASS	See RF Exposure Report
	Frequency Stability	2.1055, 27.54	RSS-139(6.4)	Fundamental emissions stay within authorized frequency block	PASS	Section 7.10
	Uplink Carrier Aggregation	27.53(h)	RSS-199(4.5)	> 43 + 10log10(P[Watts]) at Band Edge and for all out-of-band emissions	PASS	Section 7.6
RADIATED	Effective Radiated Power / Equivalent Isotropic Radiated Power (LTE Band 71)	27.50(b)(10)	RSS-130(4.4)	< 3 Watts max. ERP < 5 Watts max. EIRP	PASS	Section 7.7
	Effective Radiated Power / Equivalent Isotropic Radiated Power (NR Band n71)				PASS	Section 7.7
	Effective Radiated Power / Equivalent Isotropic Radiated Power (LTE Band 12)				PASS	Section 7.7
	Effective Radiated Power / Equivalent Isotropic Radiated Power (LTE Band 13)	27.50(c)(10)	RSS-130(4.4)	< 3 Watts max. ERP < 5 Watts max. EIRP	PASS	Section 7.7
	Equivalent Isotropic Radiated Power (WCDMA)	27.50(d)(4)	RSS-139(6.5)	< 1 Watts max. EIRP	PASS	Section 7.7
	Equivalent Isotropic Radiated Power (NR Band n66)				PASS	Section 7.7
	Equivalent Isotropic Radiated Power (LTE Band 4/66)				PASS	Section 7.7
	Radiated Spurious Emissions (LTE Band 13)	2.1053, 27.53(f)	RSS-139(6.6)	< -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 7.8
	Radiated Spurious Emissions	2.1053, 27.53	RSS-139(6.6)	> 43 + 10 log10 (P[Watts]) for all out-of-band emissions	PASS	Section 7.8
	Uplink Carrier Aggregation	27.53	RSS-199(4.5)	Undesirable emissions must meet the limits detailed in 27.53(m)	PASS	Section 7.9

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 shown in Section 7.0 were 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 2G/3G Automation Version 4.2.

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7.2 Occupied Bandwidth

Test Overview

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

Test Procedure Used

KDB 971168 D01 v03r01 – Section 4.2

Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW $\geq 3 \times$ RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

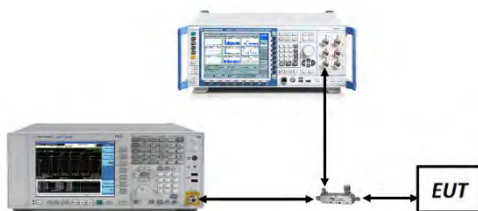


Figure 7-1. Test Instrument & Measurement Setup

Test Notes

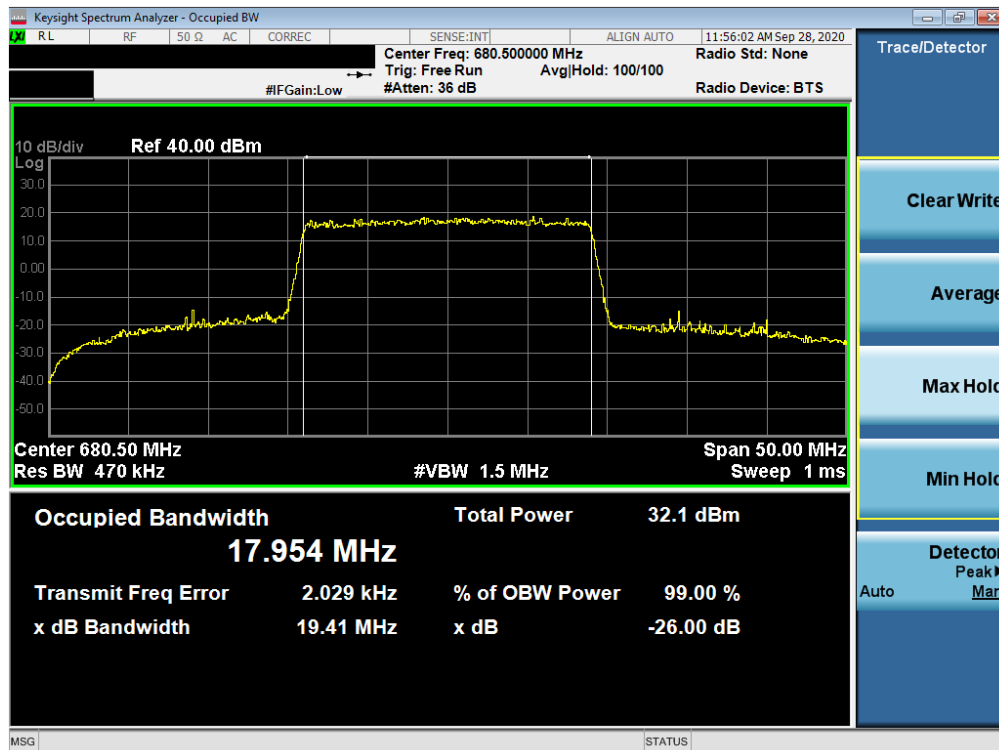
None.

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LTE Band 71



Plot 7-1. Occupied Bandwidth Plot (LTE Band 71 - 20MHz QPSK - Full RB Configuration)

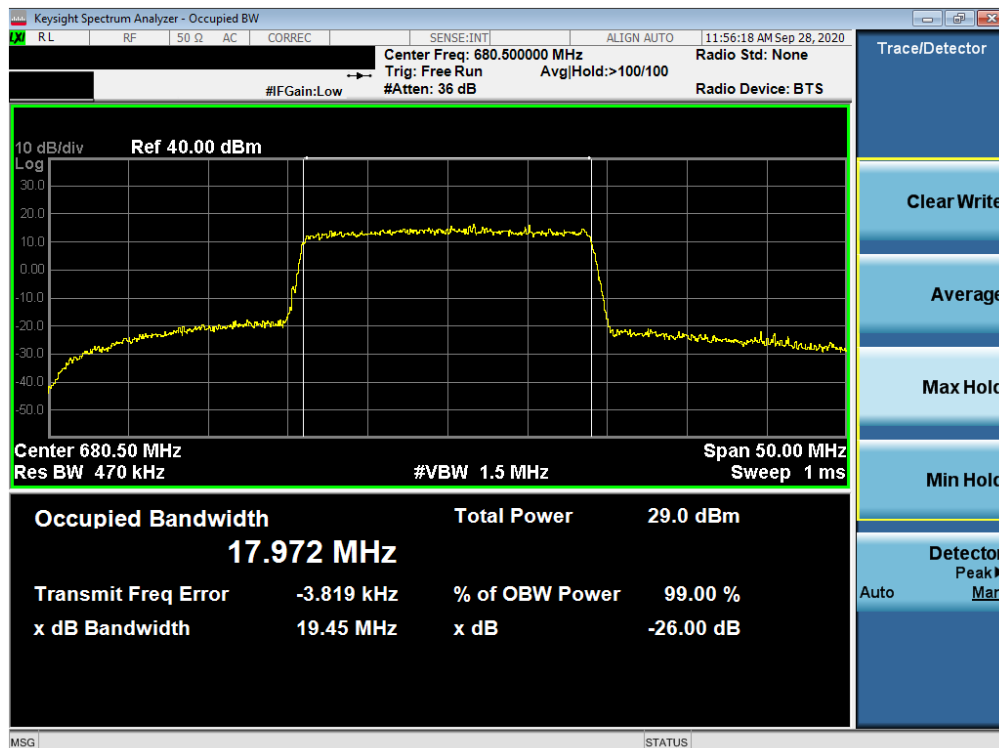


Plot 7-2. Occupied Bandwidth Plot (LTE Band 71 - 20MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
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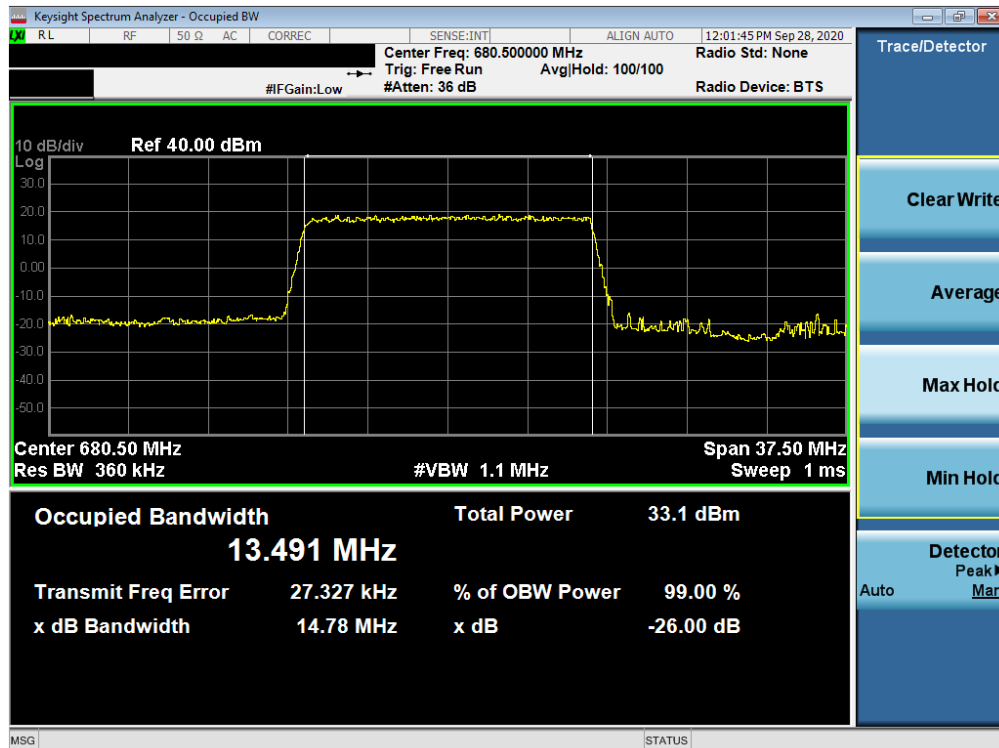


Plot 7-3. Occupied Bandwidth Plot (LTE Band 71 - 20MHz 64-QAM - Full RB Configuration)

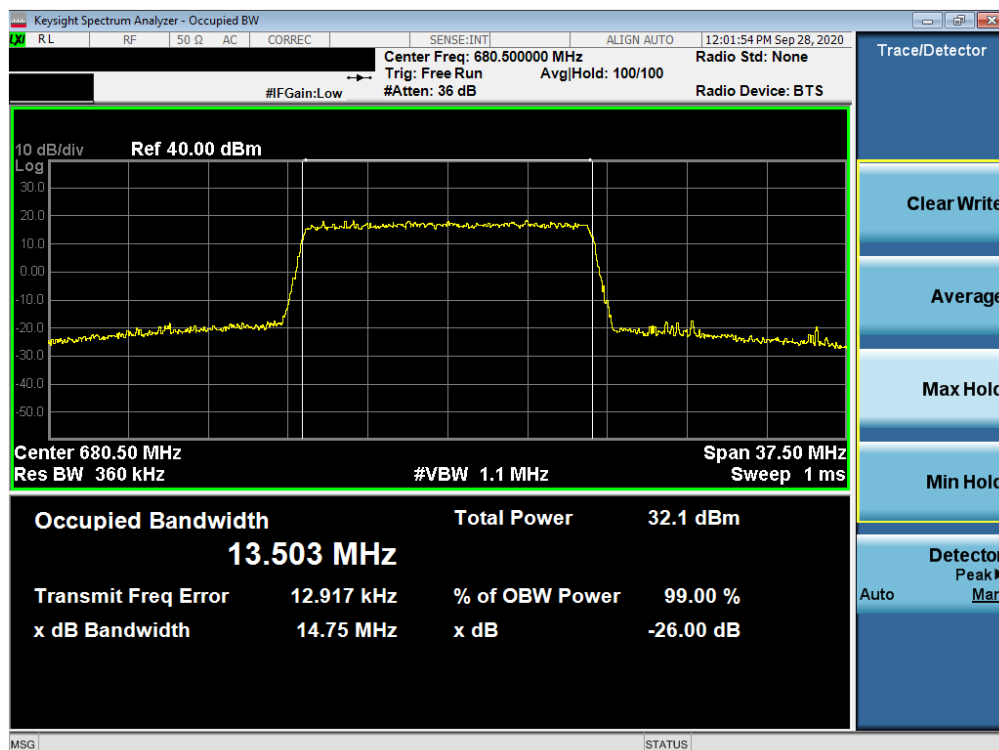


Plot 7-4. Occupied Bandwidth Plot (LTE Band 71 - 20MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
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Plot 7-5. Occupied Bandwidth Plot (LTE Band 71 - 15MHz QPSK - Full RB Configuration)

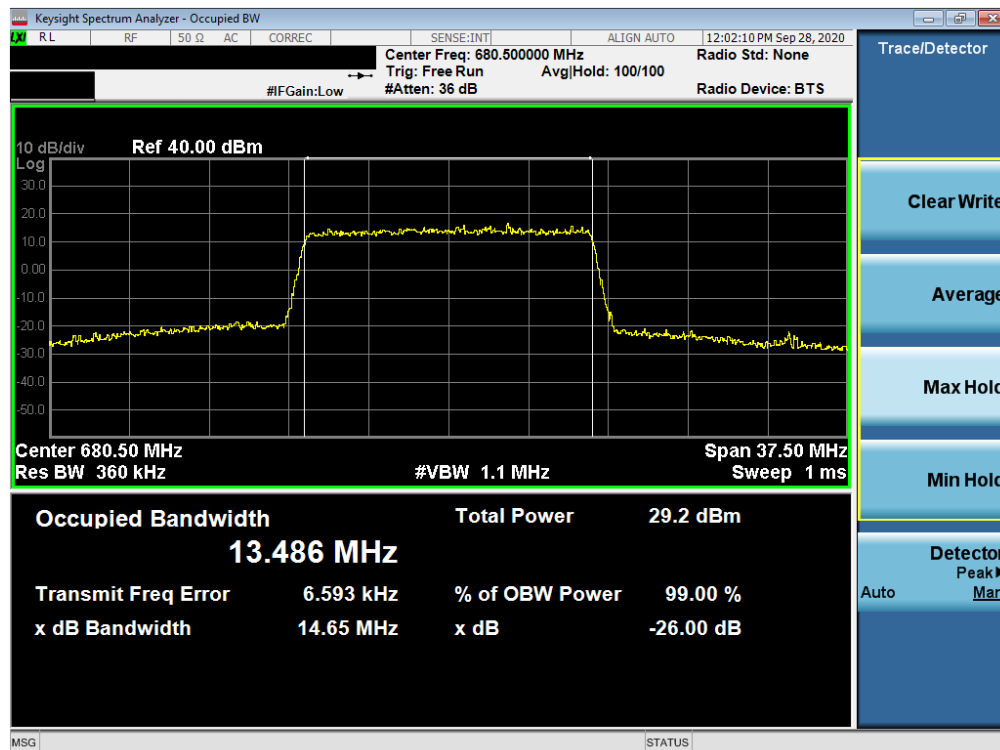


Plot 7-6. Occupied Bandwidth Plot (LTE Band 71 - 15MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
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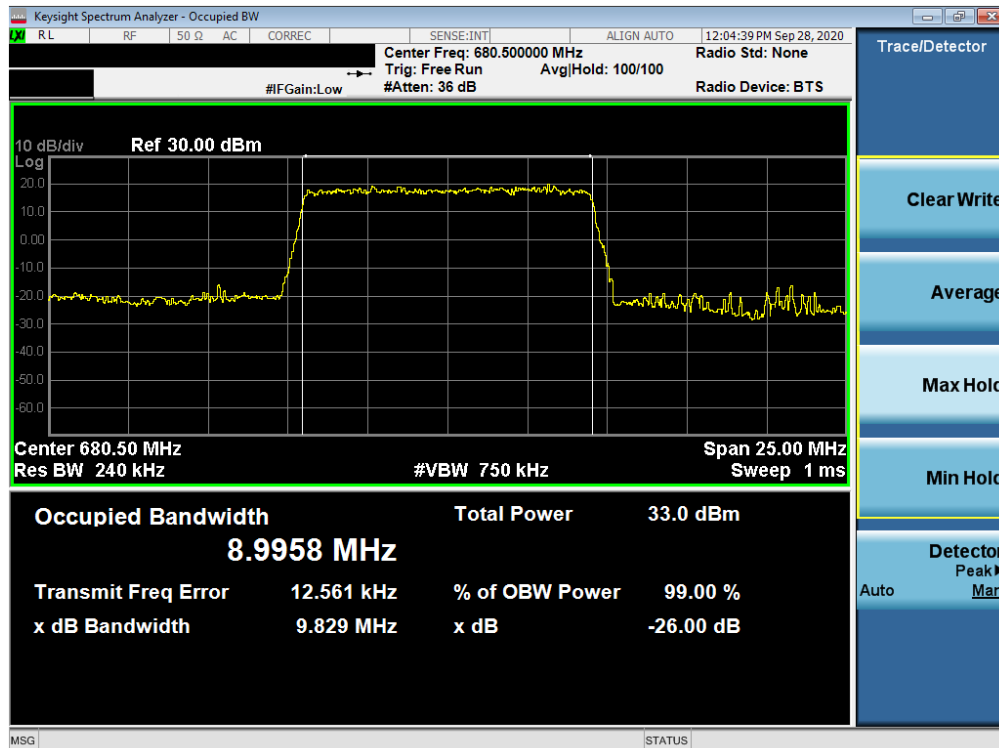


Plot 7-7. Occupied Bandwidth Plot (LTE Band 71 - 15MHz 64-QAM - Full RB Configuration)

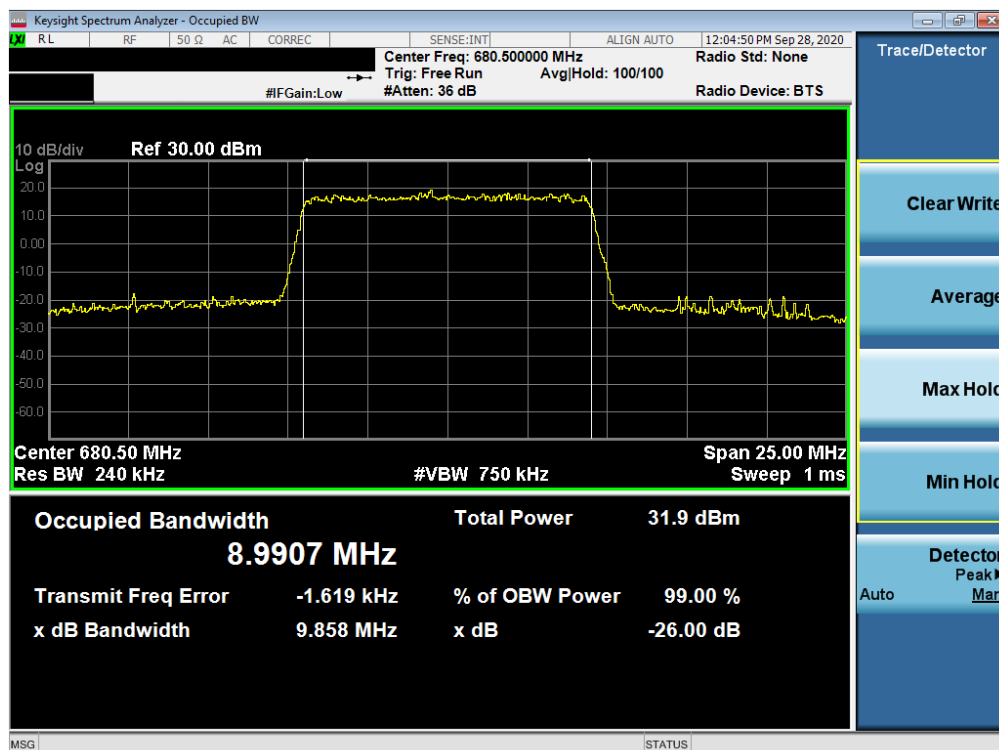


Plot 7-8. Occupied Bandwidth Plot (LTE Band 71 - 15MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
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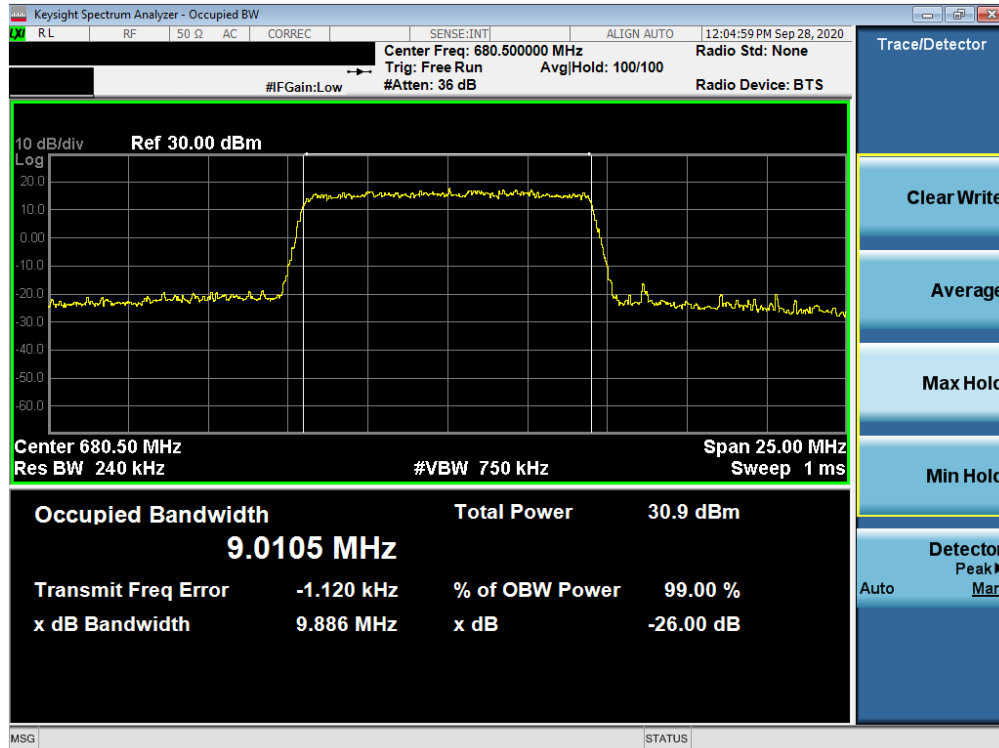


Plot 7-9. Occupied Bandwidth Plot (LTE Band 71 - 10MHz QPSK - Full RB Configuration)



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

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
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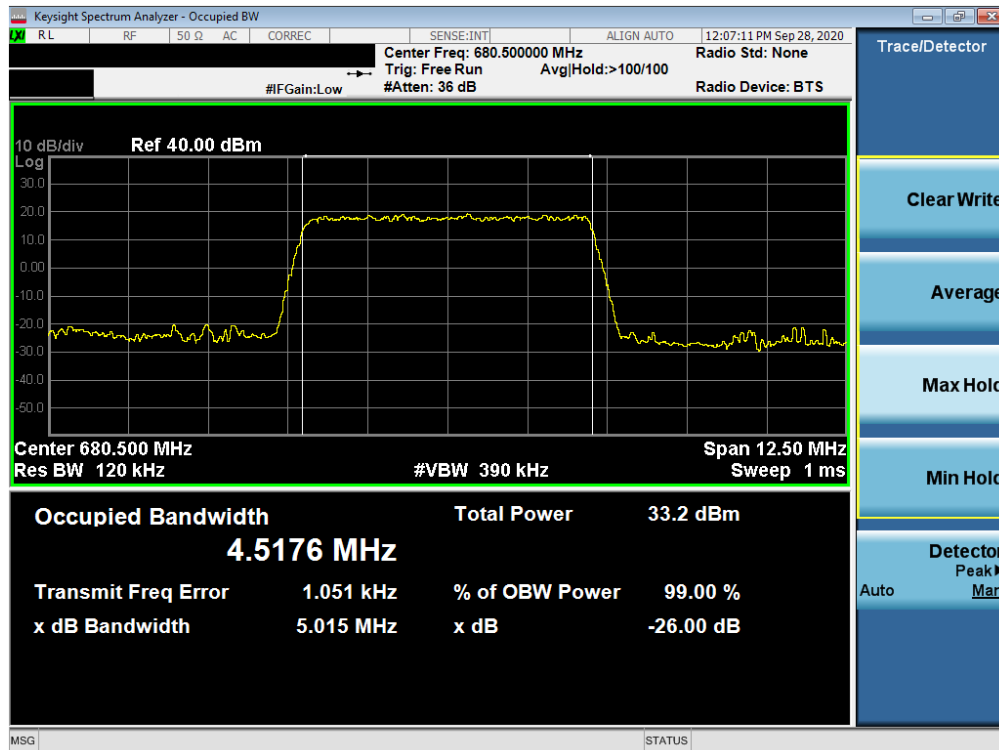


Plot 7-11. Occupied Bandwidth Plot (LTE Band 71 - 10MHz 64-QAM - Full RB Configuration)

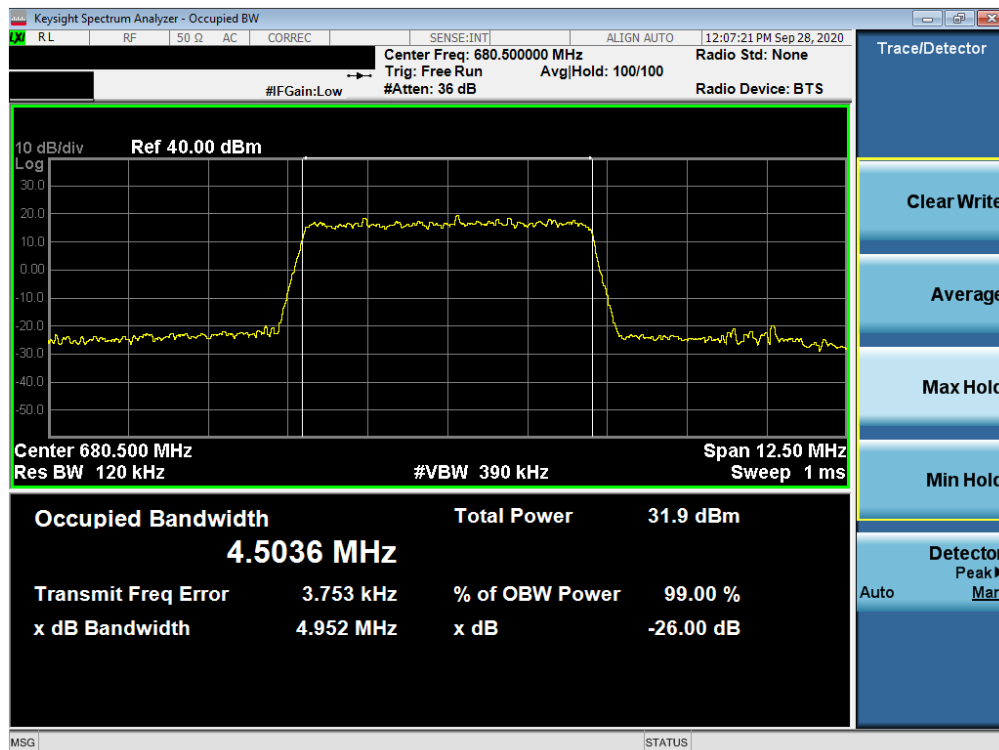


Plot 7-12. Occupied Bandwidth Plot (LTE Band 71 - 10MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
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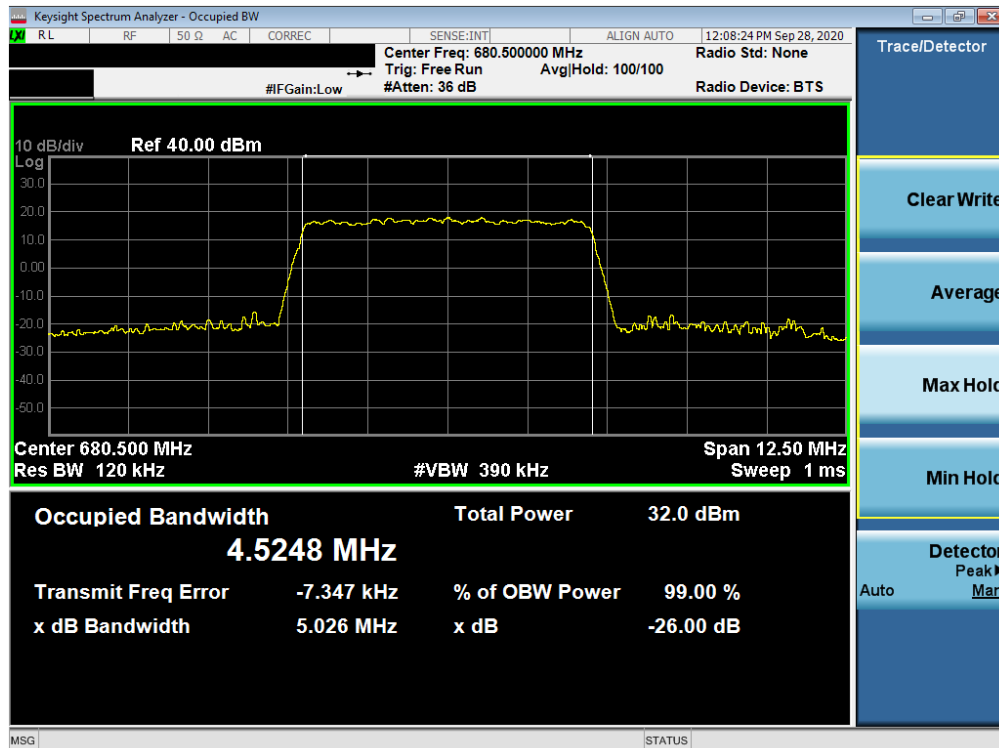


Plot 7-13. Occupied Bandwidth Plot (LTE Band 71 - 5MHz QPSK - Full RB Configuration)

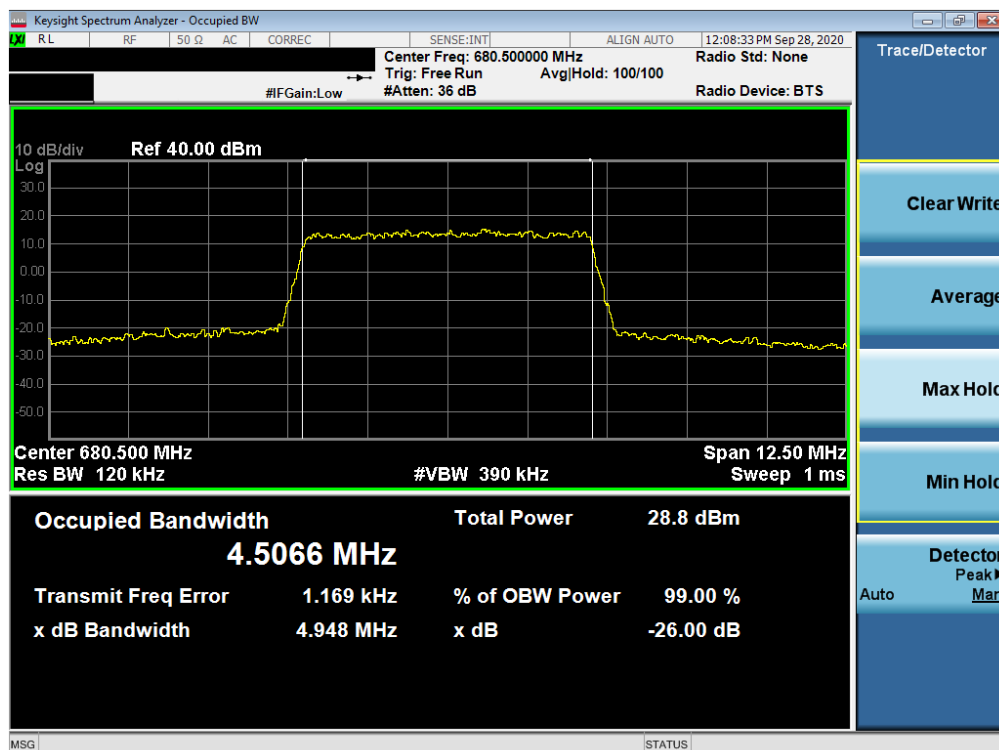


Plot 7-14. Occupied Bandwidth Plot (LTE Band 71 - 5MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
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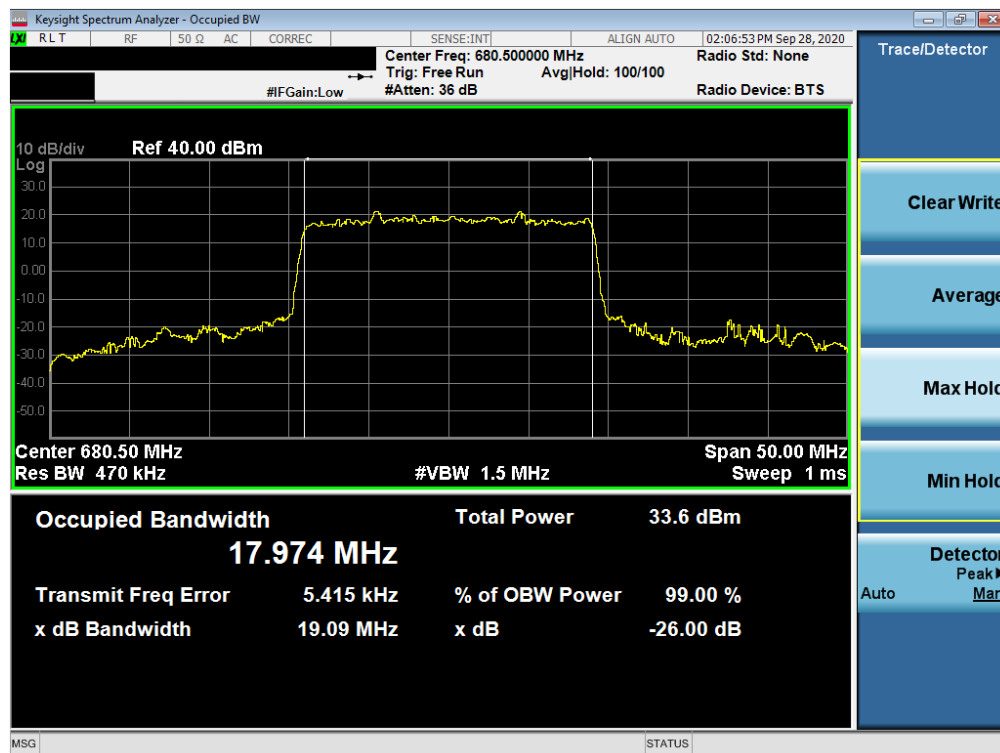
Plot 7-15. Occupied Bandwidth Plot (LTE Band 71 - 5MHz 64-QAM - Full RB Configuration)



Plot 7-16. Occupied Bandwidth Plot (LTE Band 71 - 5MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
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NR Band n71



Plot 7-17. Occupied Bandwidth Plot (NR Band n71 - 20MHz DFT-s-OFDM BPSK - Full RB)



Plot 7-18. Occupied Bandwidth Plot (NR Band n71 - 20MHz CP-OFDM QPSK - Full RB)

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Plot 7-19. Occupied Bandwidth Plot (NR Band n71 - 20MHz CP-OFDM 16-QAM - Full RB)

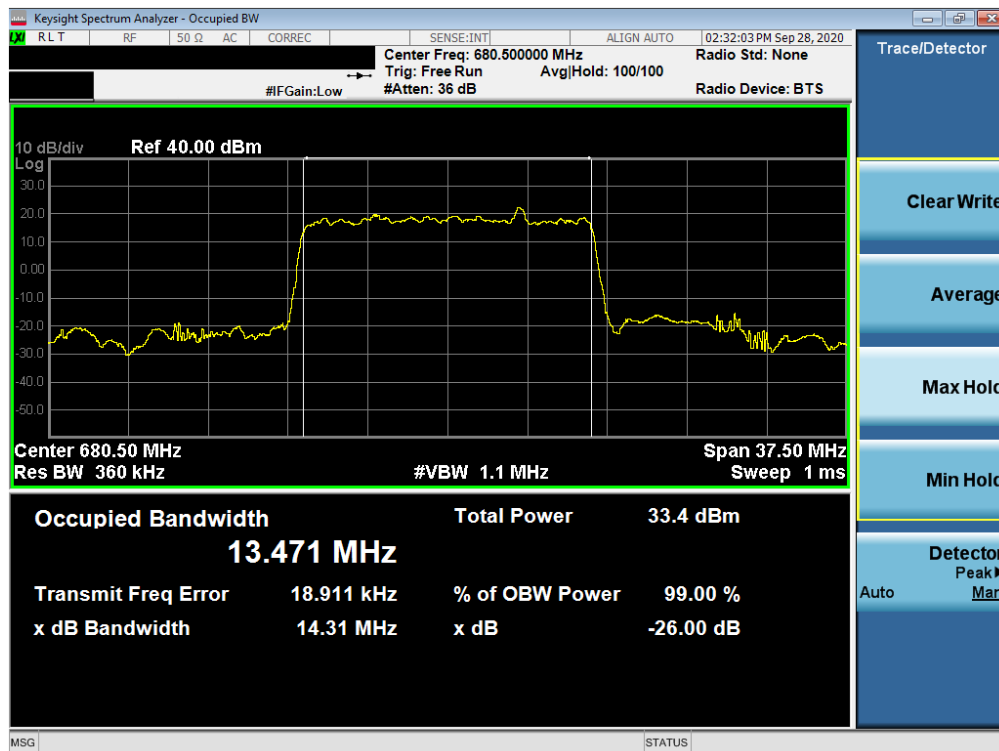


Plot 7-20. Occupied Bandwidth Plot (NR Band n71 - 20MHz CP-OFDM 64-QAM - Full RB)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
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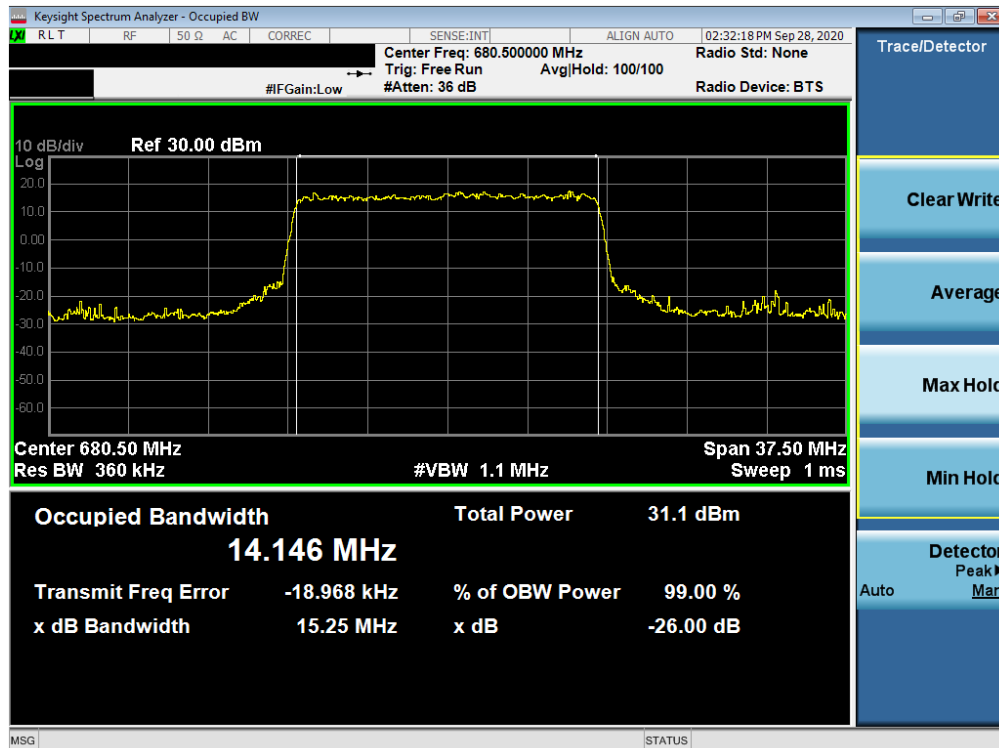


Plot 7-21. Occupied Bandwidth Plot (NR Band n71 - 20MHz CP-OFDM 256-QAM - Full RB)

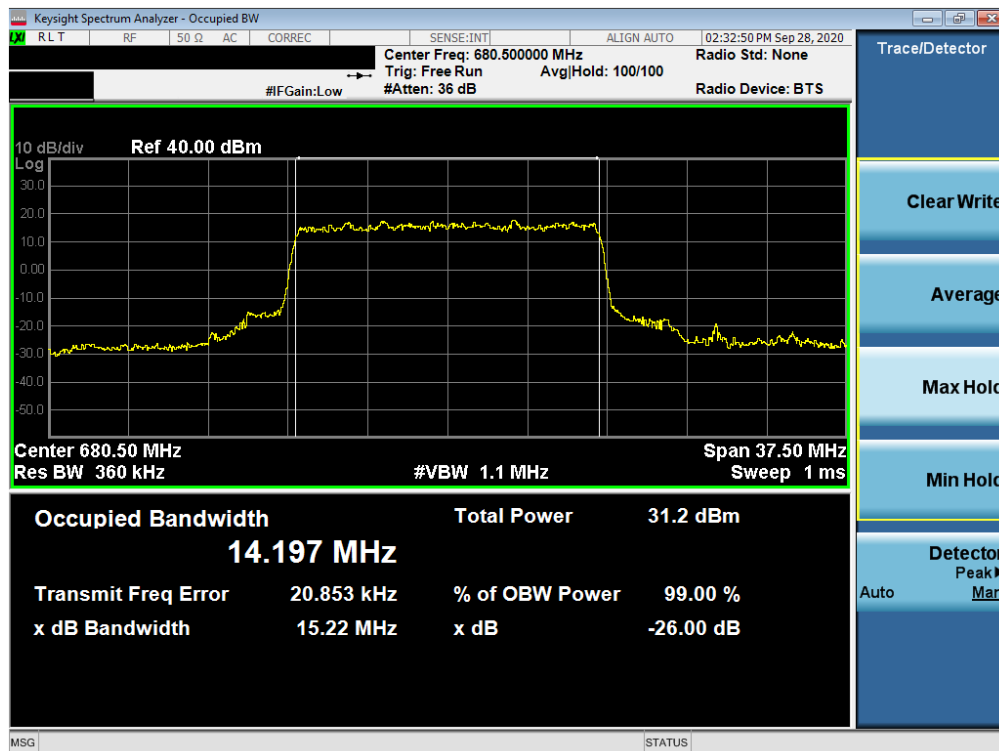


Plot 7-22. Occupied Bandwidth Plot (NR Band n71 - 15MHz DFT-s-OFDM BPSK - Full RB)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
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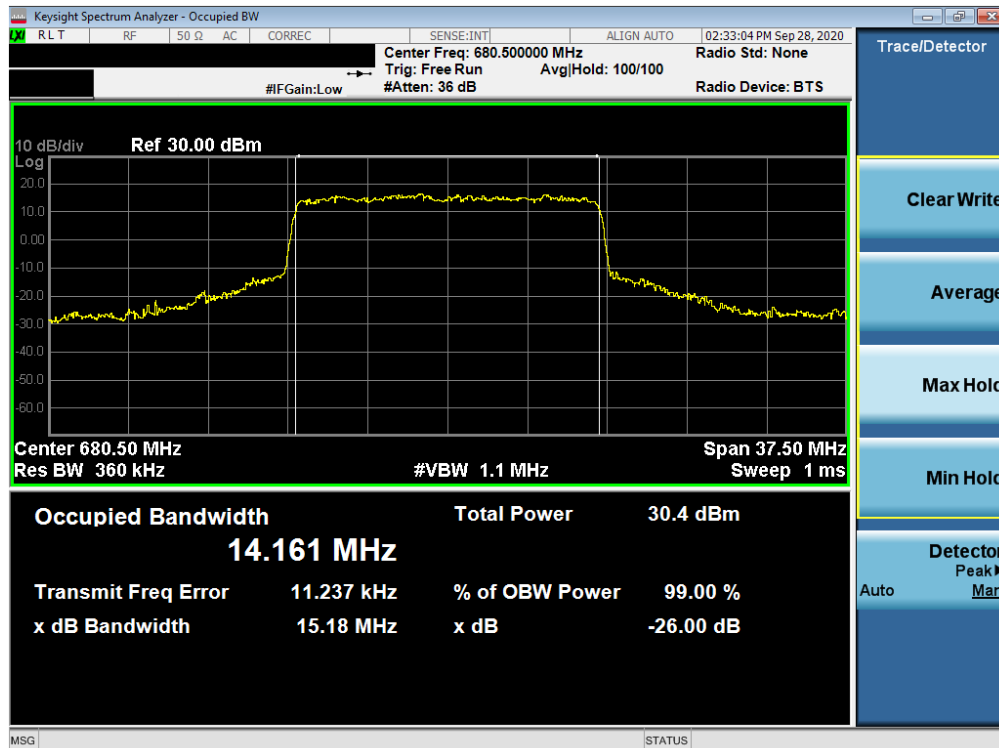


Plot 7-23. Occupied Bandwidth Plot (NR Band n71 - 15MHz CP-OFDM QPSK - Full RB)

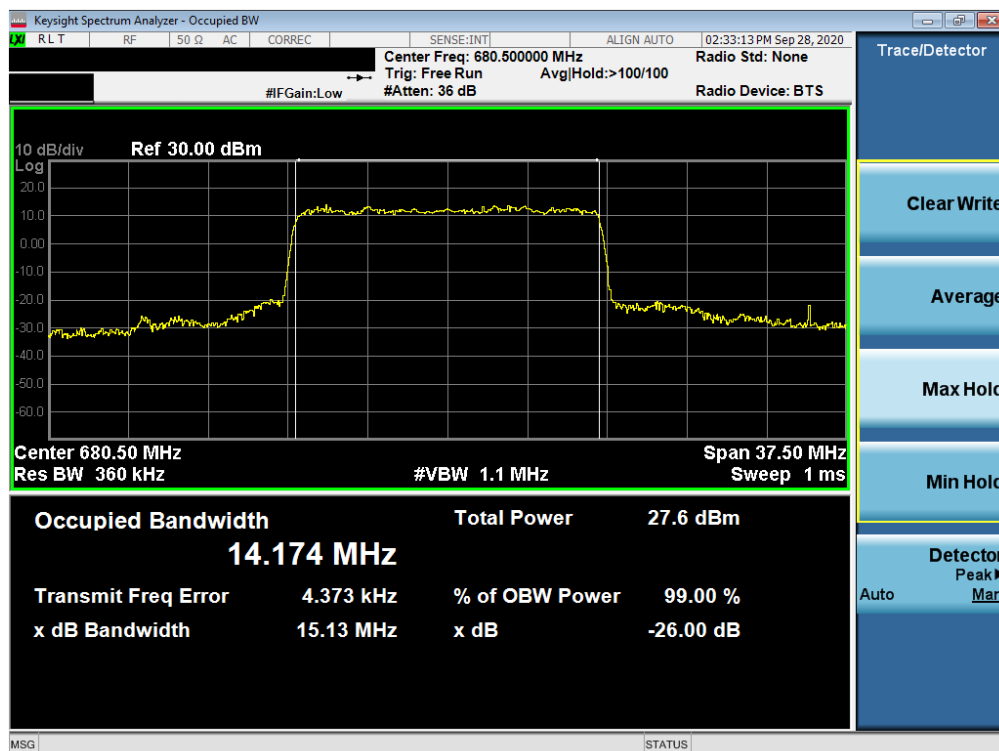


Plot 7-24. Occupied Bandwidth Plot (NR Band n71 - 15MHz CP-OFDM 16-QAM - Full RB)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
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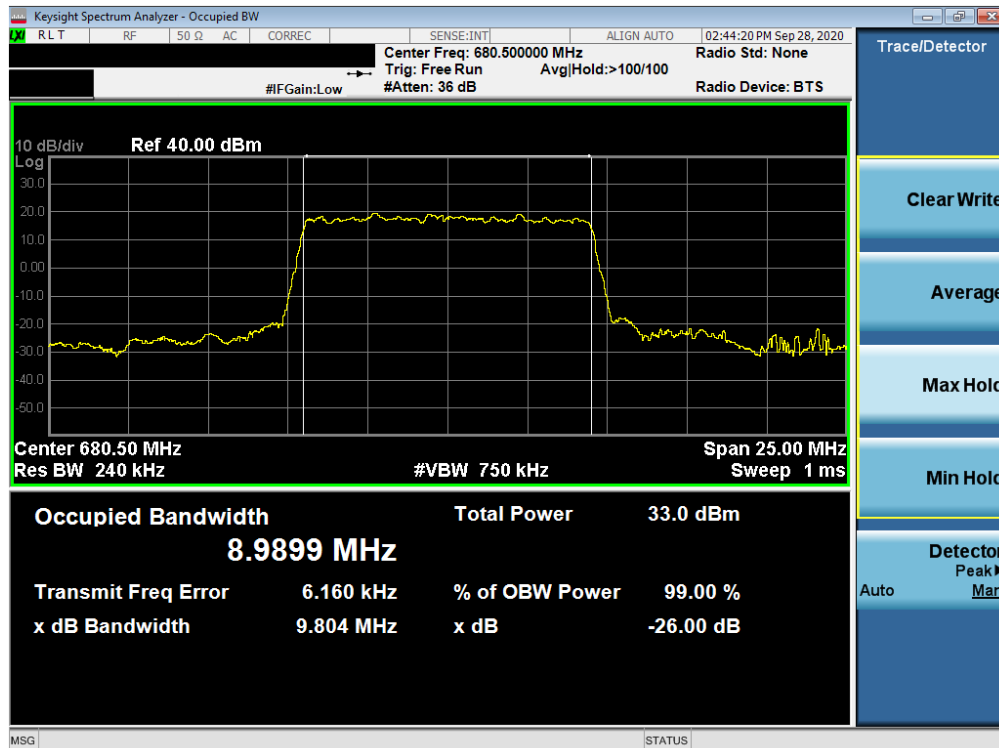


Plot 7-25. Occupied Bandwidth Plot (NR Band n71 - 15MHz CP-OFDM 64-QAM - Full RB)

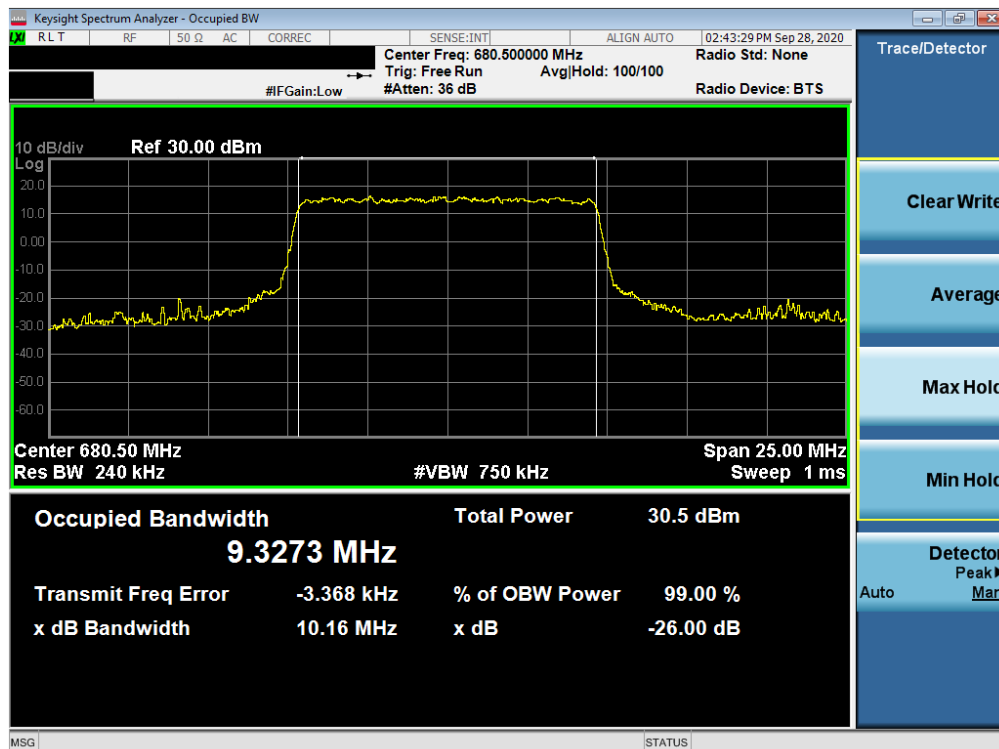


Plot 7-26. Occupied Bandwidth Plot (NR Band n71 - 15MHz CP-OFDM 256-QAM - Full RB)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27.A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 25 of 297

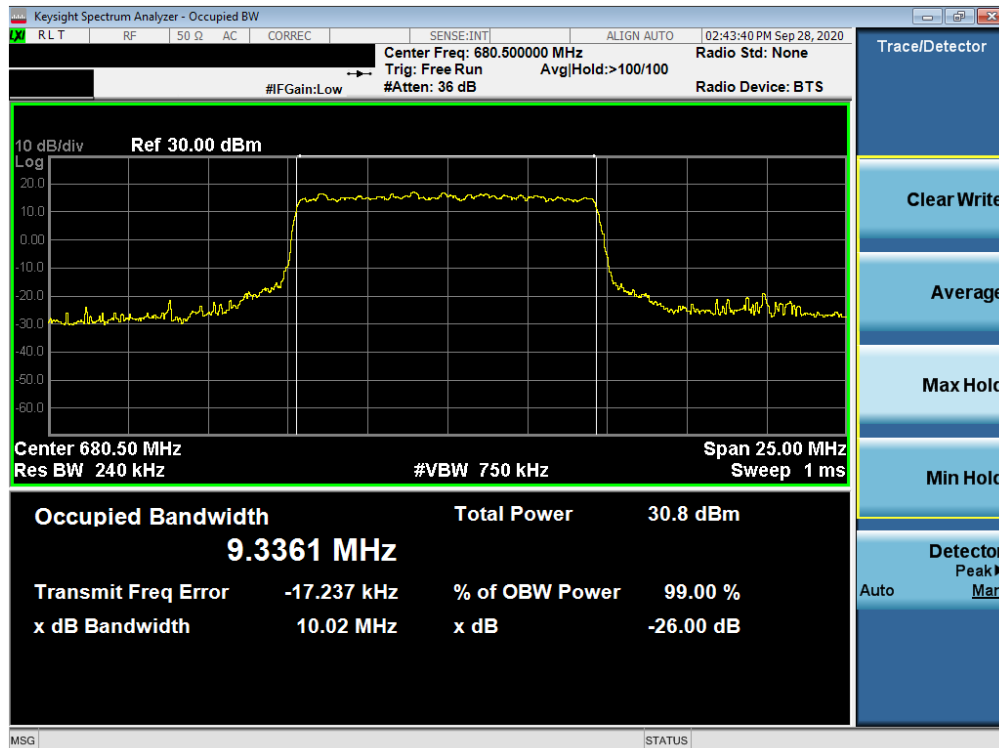


Plot 7-27. Occupied Bandwidth Plot (NR Band n71 - 10MHz DFT-s-OFDM BPSK - Full RB)

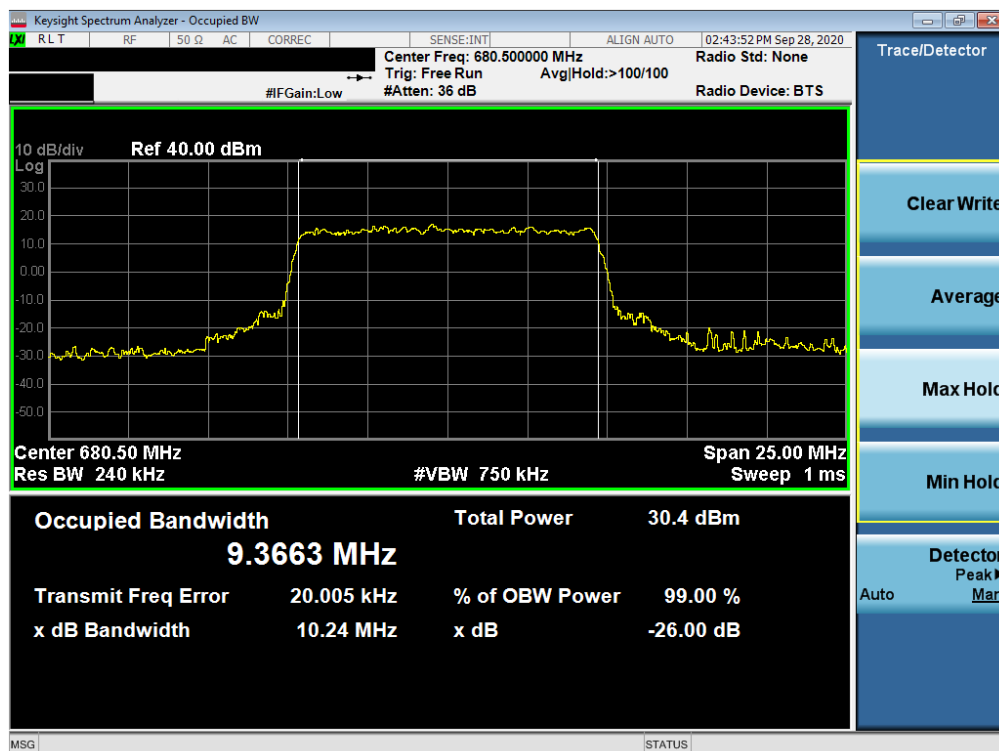


Plot 7-28. Occupied Bandwidth Plot (NR Band n71 - 10MHz CP-OFDM QPSK - Full RB)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27.A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 26 of 297



Plot 7-29. Occupied Bandwidth Plot (NR Band n71 - 10MHz CP-OFDM 16-QAM - Full RB)

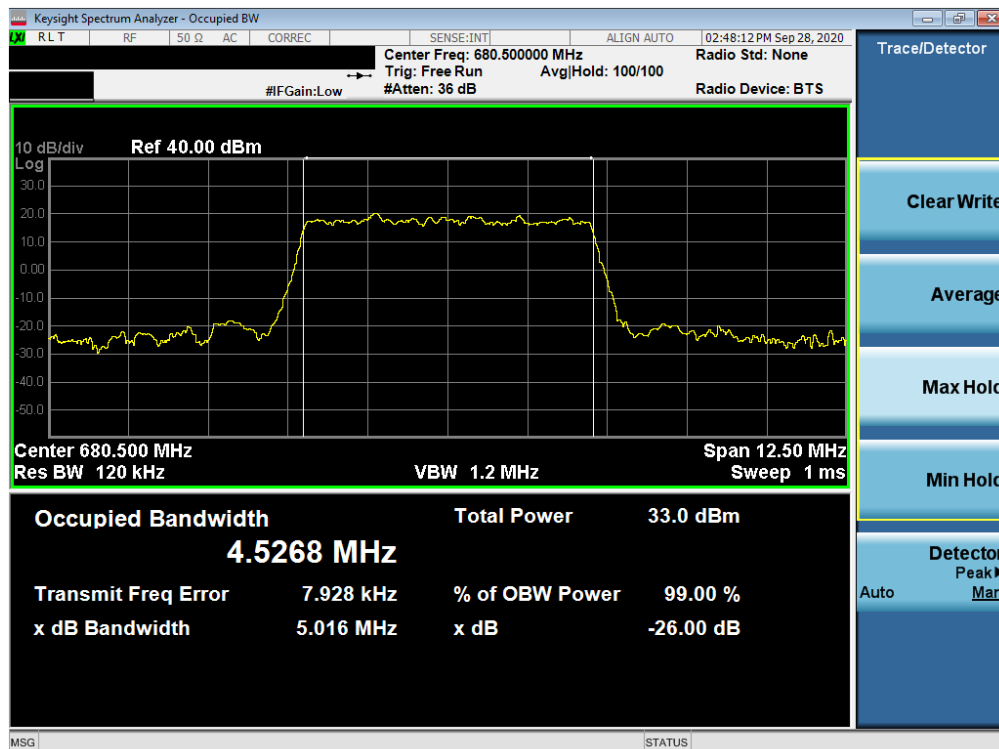


Plot 7-30. Occupied Bandwidth Plot (NR Band n71 - 10MHz CP-OFDM 64-QAM - Full RB)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27.A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 27 of 297

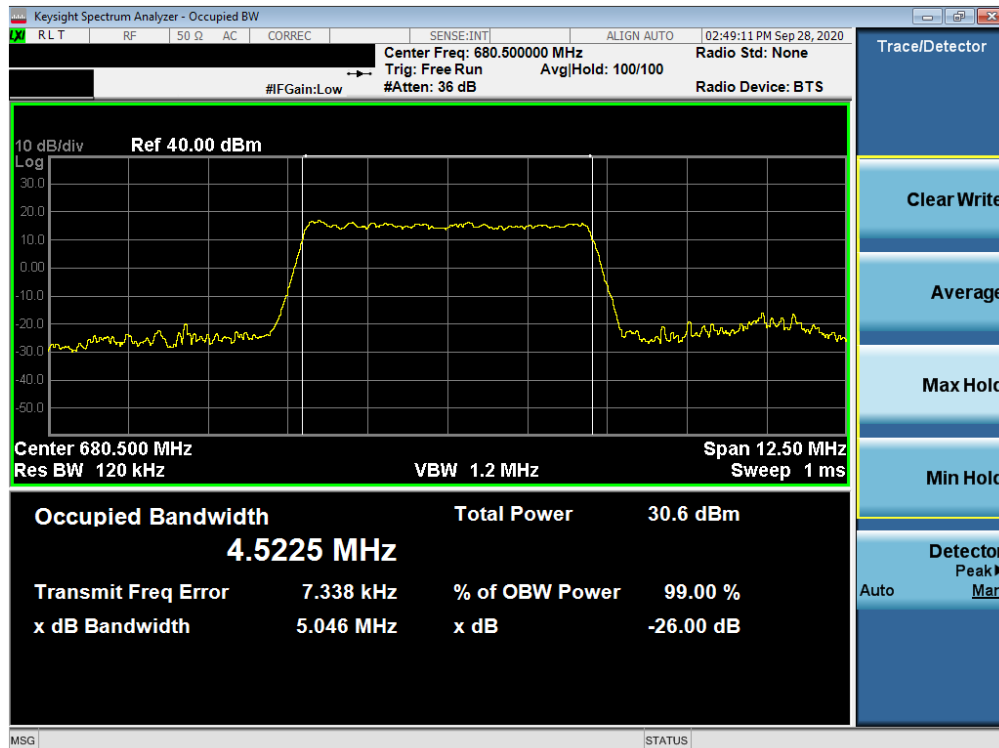


Plot 7-31. Occupied Bandwidth Plot (NR Band n71 - 10MHz CP-OFDM 256-QAM - Full RB)

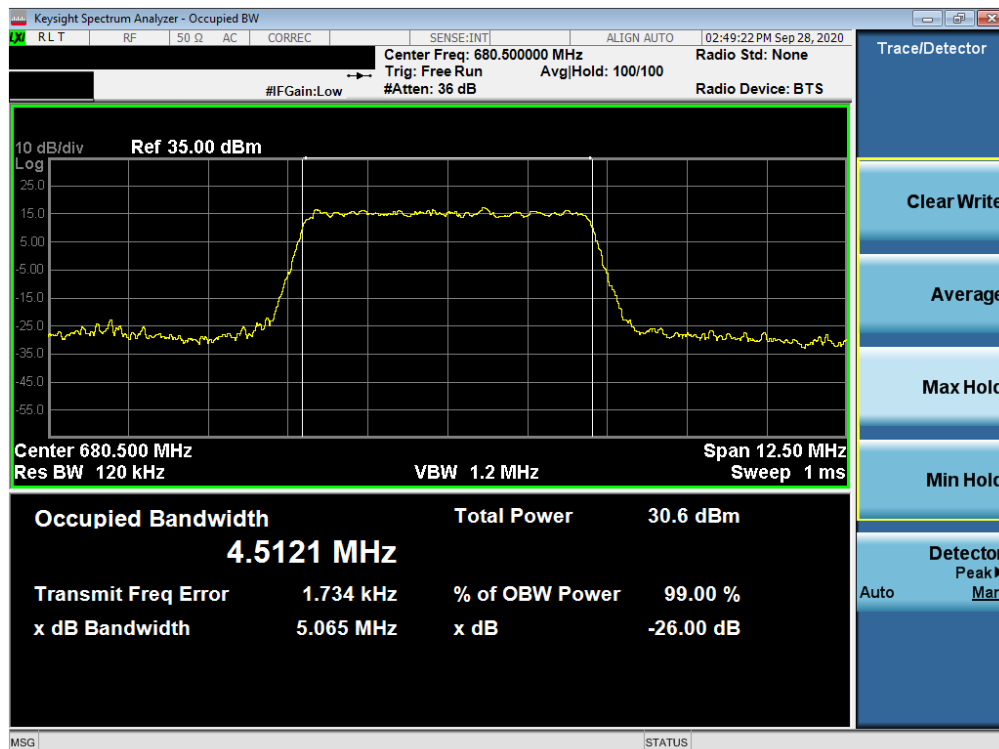


Plot 7-32. Occupied Bandwidth Plot (NR Band n71 - 5.0MHz DFT-s-OFDM BPSK - Full RB)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27.A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 28 of 297

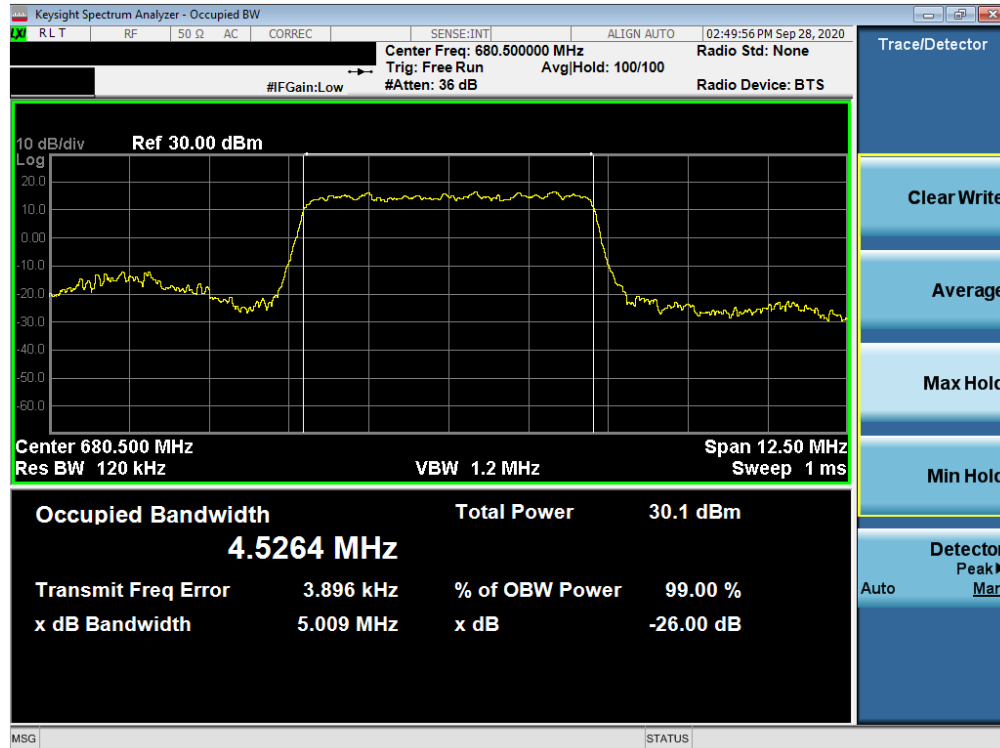


Plot 7-33. Occupied Bandwidth Plot (NR Band n71 - 5.0MHz CP-OFDM QPSK - Full RB)

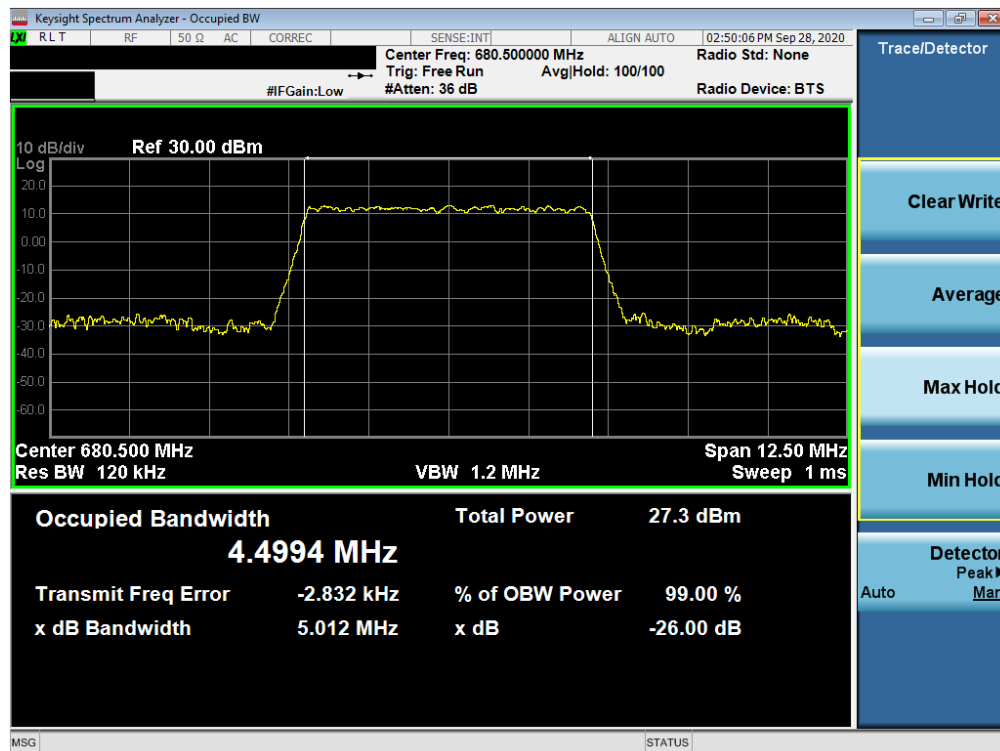


Plot 7-34. Occupied Bandwidth Plot (NR Band n71 - 5MHz CP-OFDM 16-QAM - Full RB)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27.A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 29 of 297



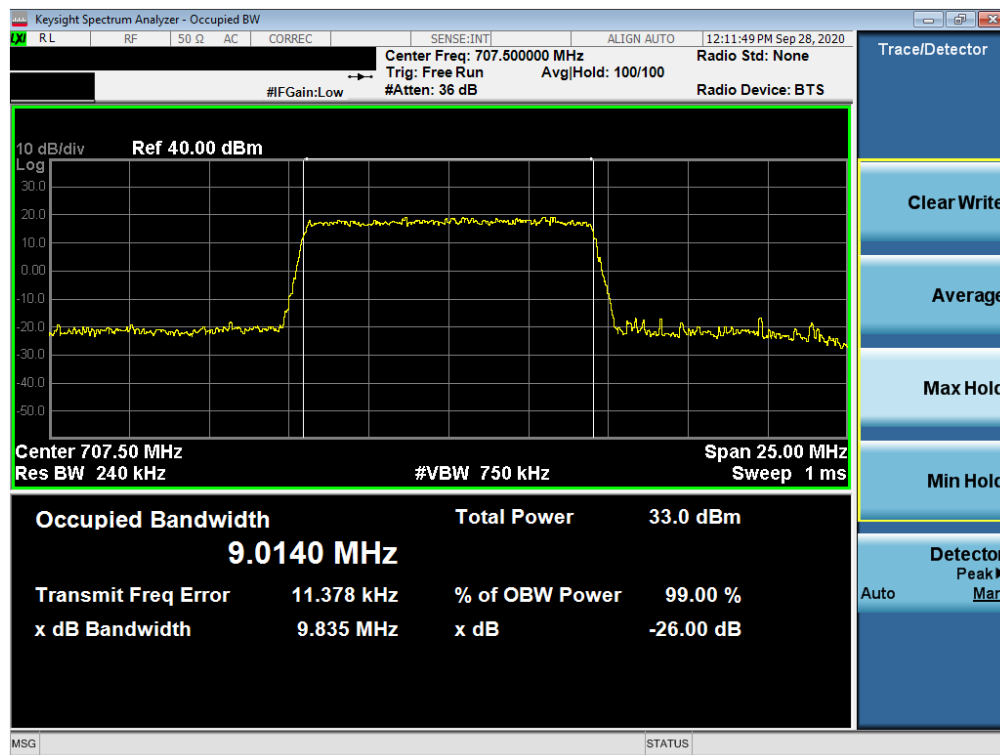
Plot 7-35. Occupied Bandwidth Plot (NR Band n71 - 5MHz CP-OFDM 64-QAM - Full RB)



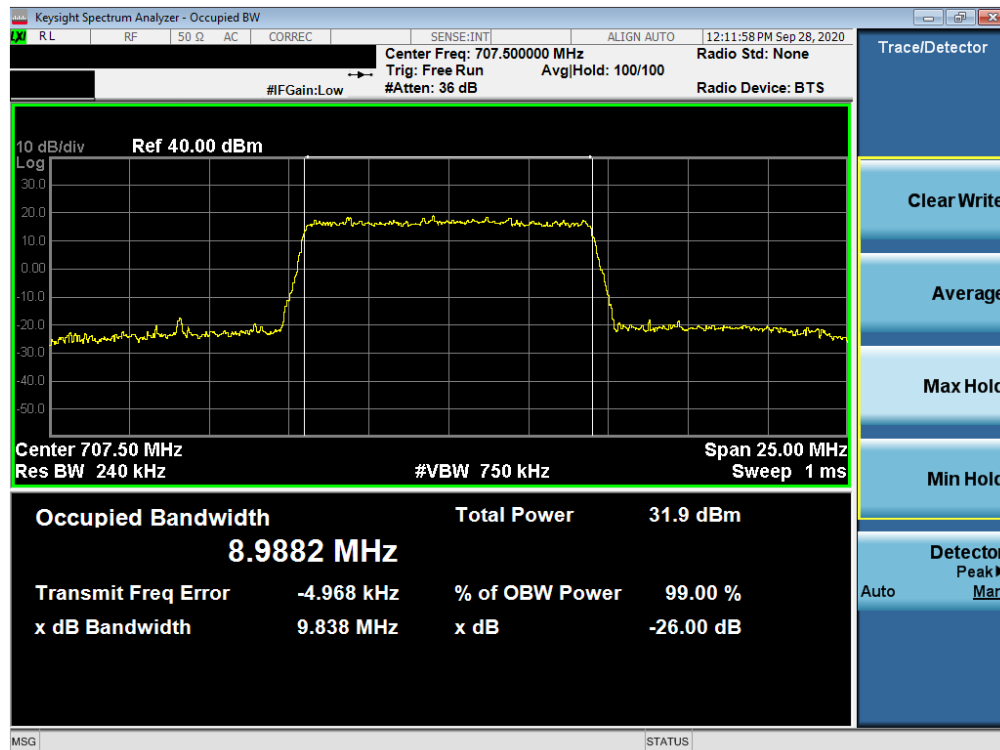
Plot 7-36. Occupied Bandwidth Plot (NR Band n71 - 5MHz CP-OFDM 256-QAM - Full RB)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27.A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 30 of 297

LTE Band 12

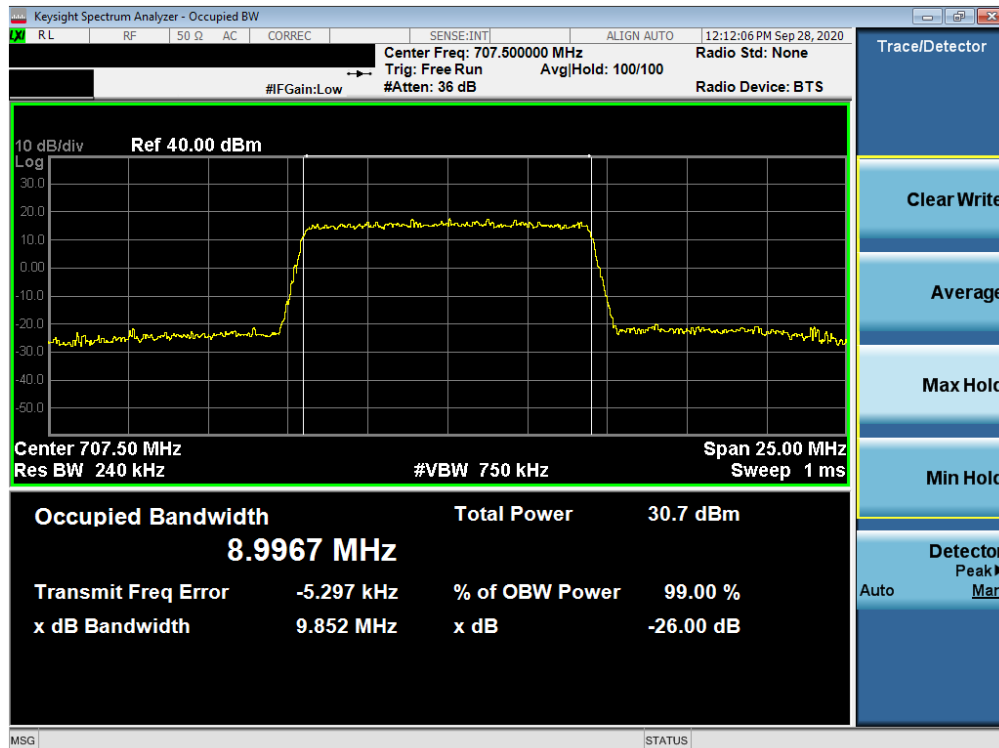


Plot 7-37. Occupied Bandwidth Plot (LTE Band 12 - 10MHz QPSK - Full RB Configuration)

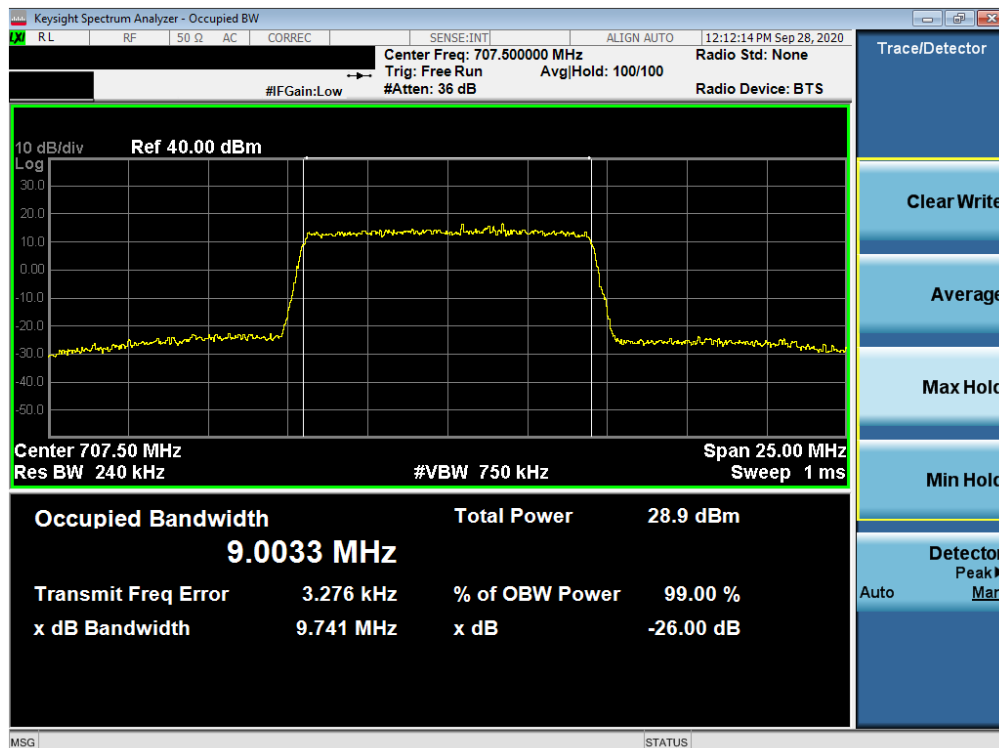


Plot 7-38. Occupied Bandwidth Plot (LTE Band 12 - 10MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27-A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 31 of 297

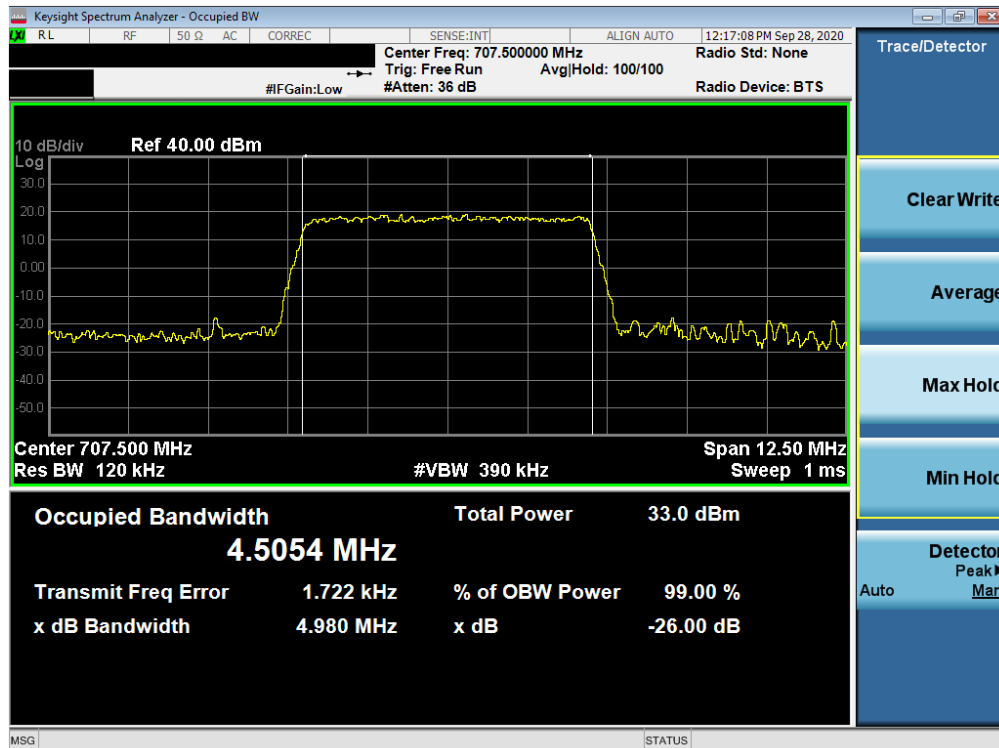


Plot 7-39. Occupied Bandwidth Plot (LTE Band 12 - 10MHz 64-QAM - Full RB Configuration)

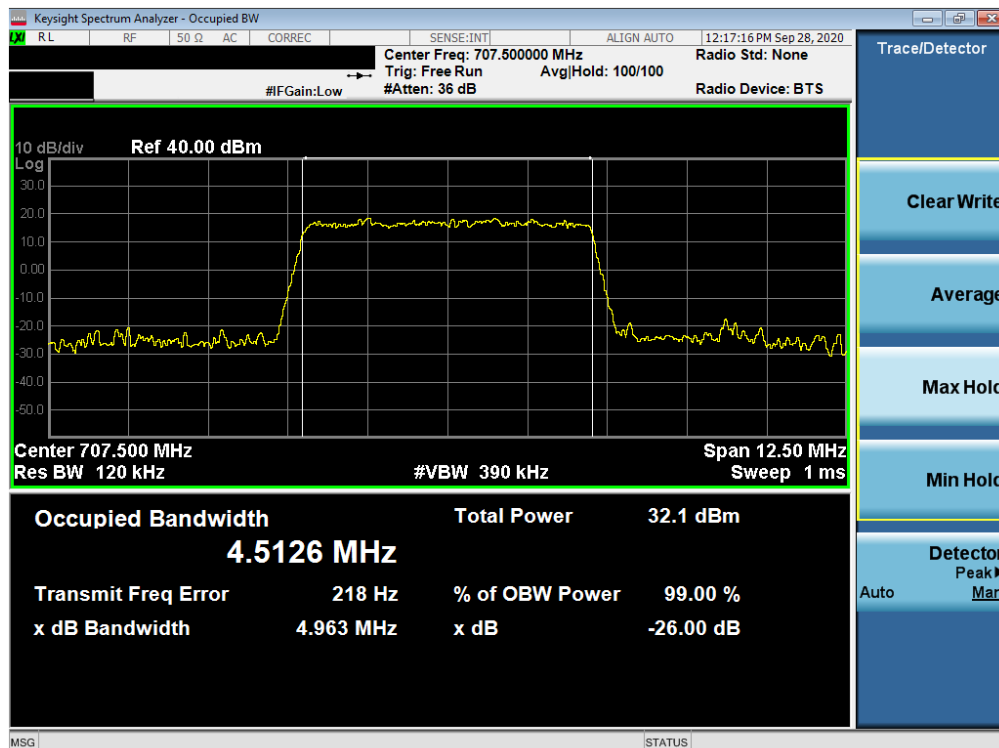


Plot 7-40. Occupied Bandwidth Plot (LTE Band 12 - 10MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27-A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 32 of 297

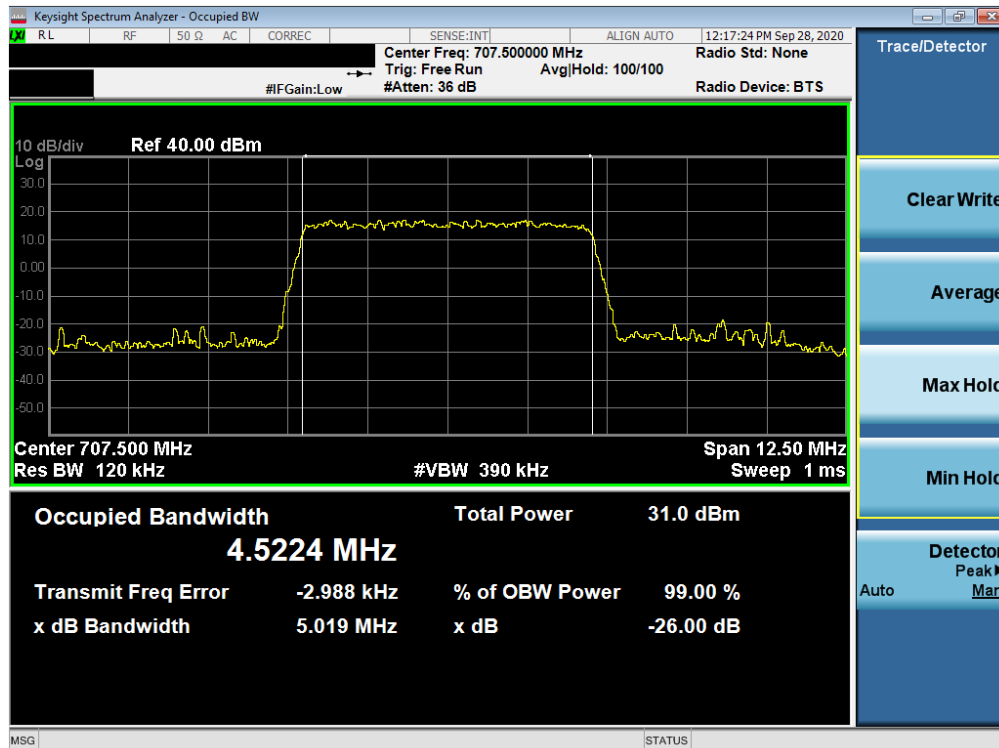


Plot 7-41. Occupied Bandwidth Plot (LTE Band 12 - 5MHz QPSK - Full RB Configuration)

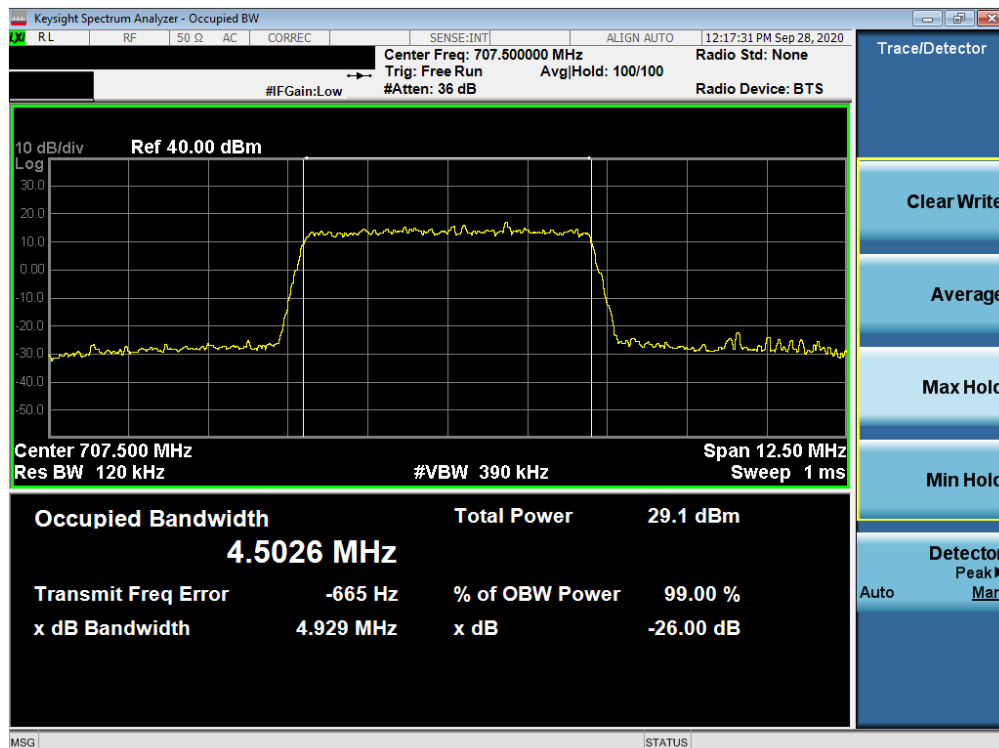


Plot 7-42. Occupied Bandwidth Plot (LTE Band 12 - 5MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27-A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 33 of 297

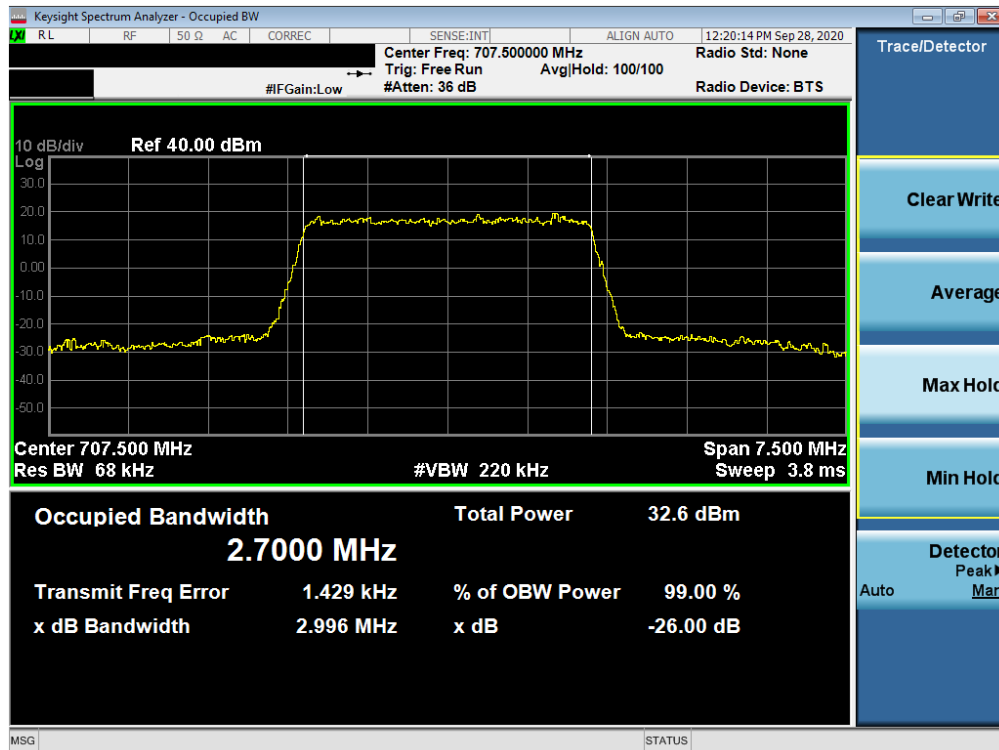


Plot 7-43. Occupied Bandwidth Plot (LTE Band 12 - 5MHz 64-QAM - Full RB Configuration)

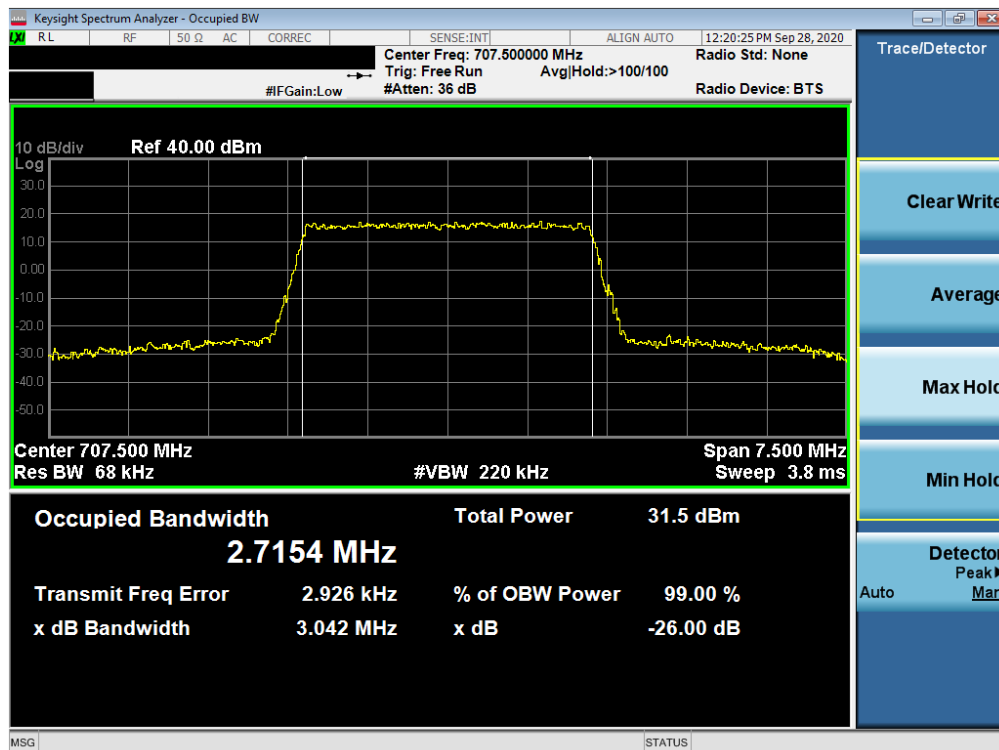


Plot 7-44. Occupied Bandwidth Plot (LTE Band 12 - 5MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27-A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 34 of 297

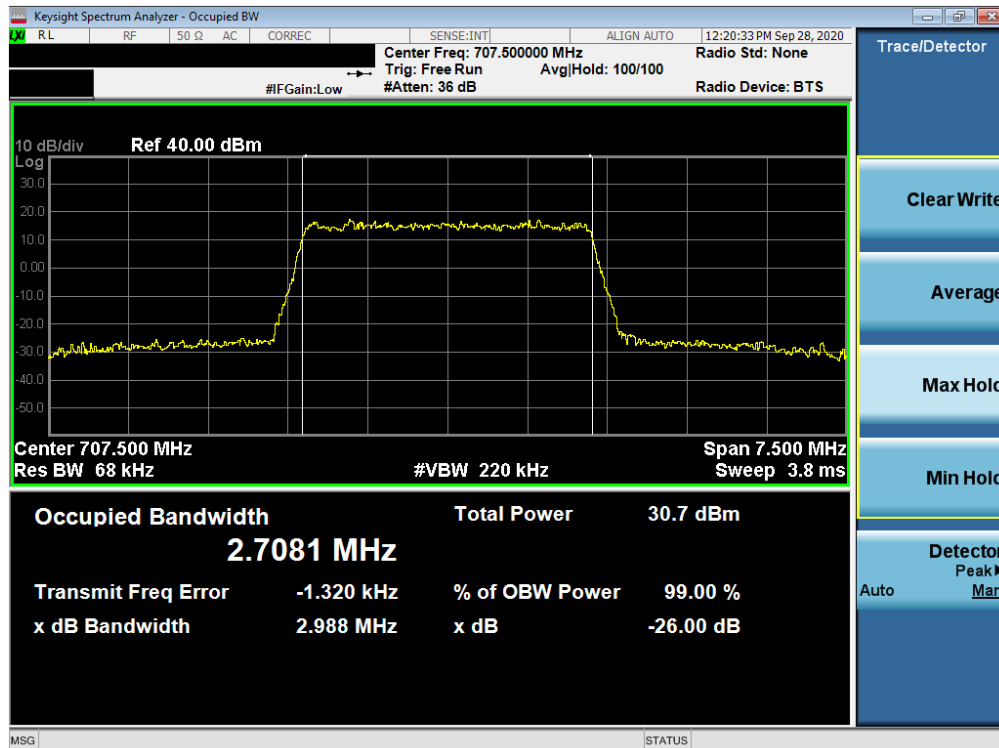


Plot 7-45. Occupied Bandwidth Plot (LTE Band 12 - 3MHz QPSK - Full RB Configuration)

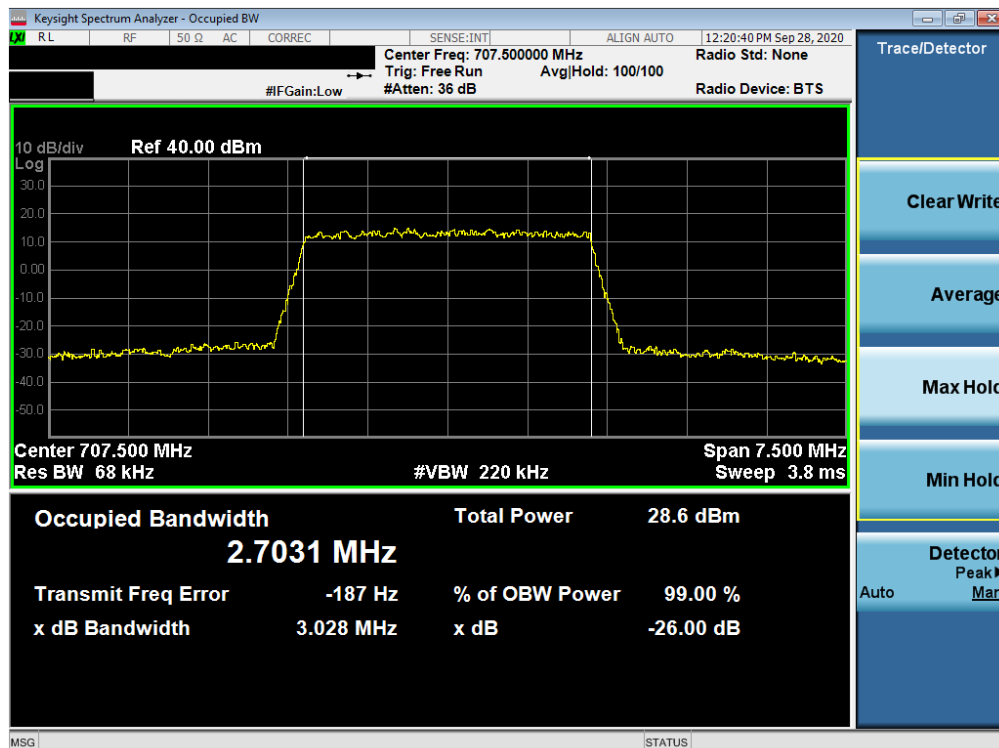


Plot 7-46. Occupied Bandwidth Plot (LTE Band 12 - 3MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27-A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 35 of 297

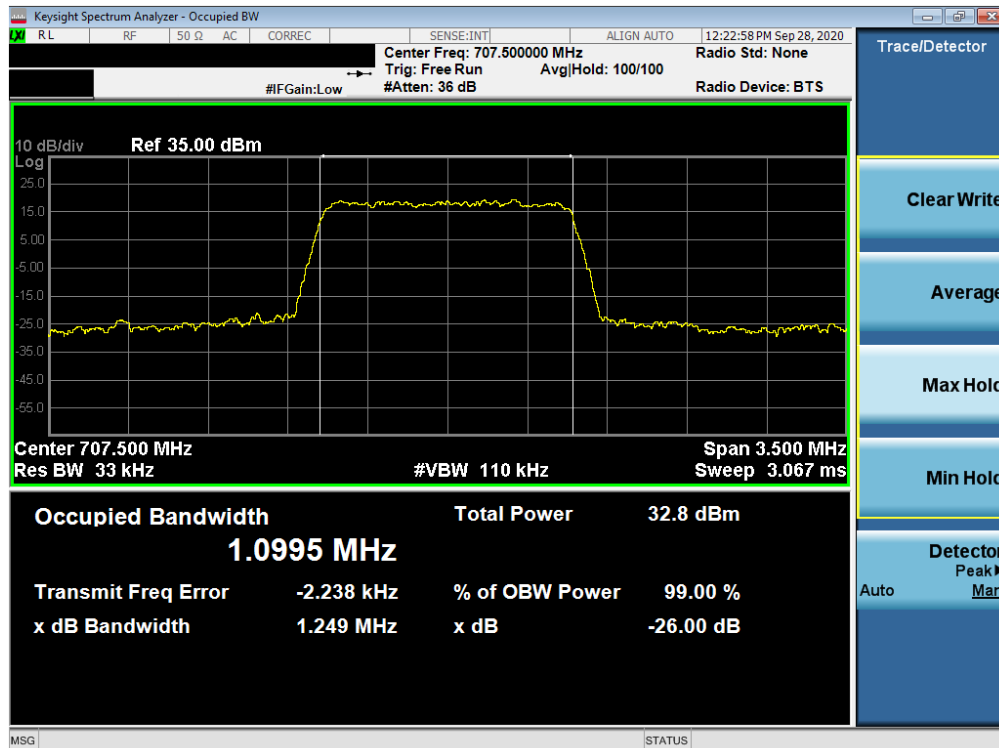


Plot 7-47. Occupied Bandwidth Plot (LTE Band 12 - 3MHz 64-QAM - Full RB Configuration)

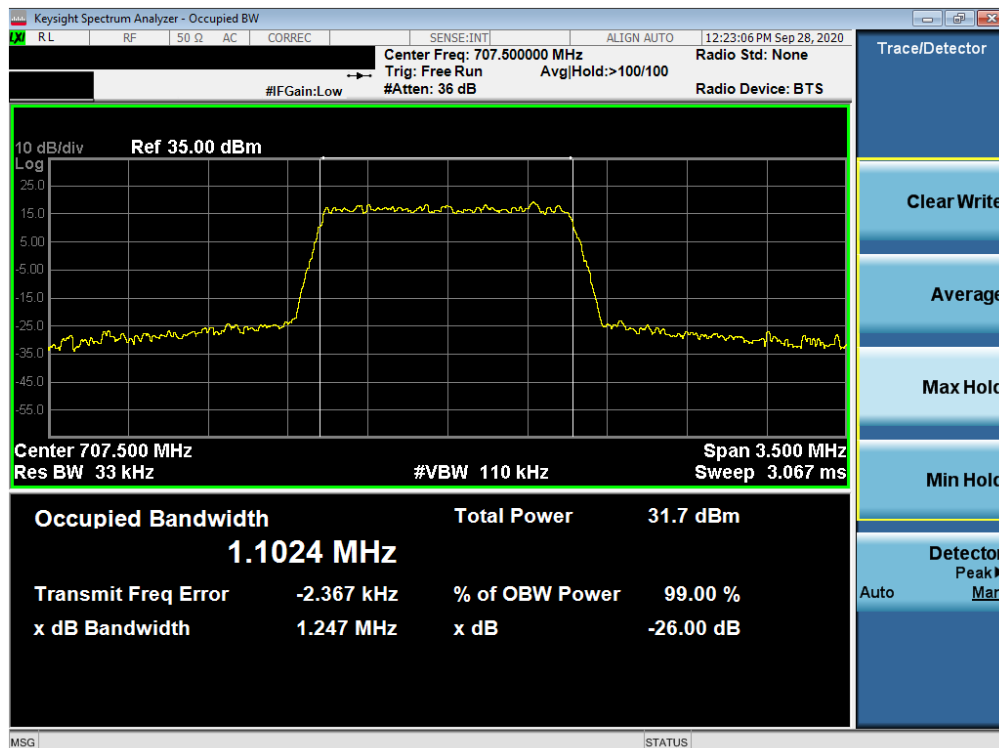


Plot 7-48. Occupied Bandwidth Plot (LTE Band 12 - 3MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27-A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 36 of 297

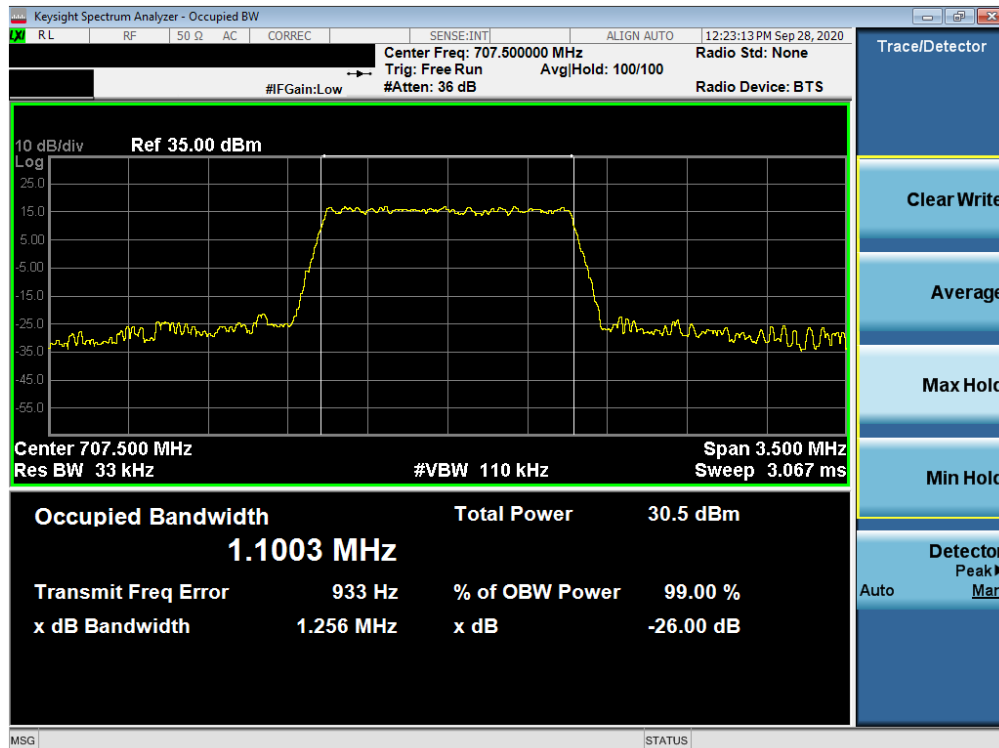


Plot 7-49. Occupied Bandwidth Plot (LTE Band 12 – 1.4MHz QPSK - Full RB Configuration)

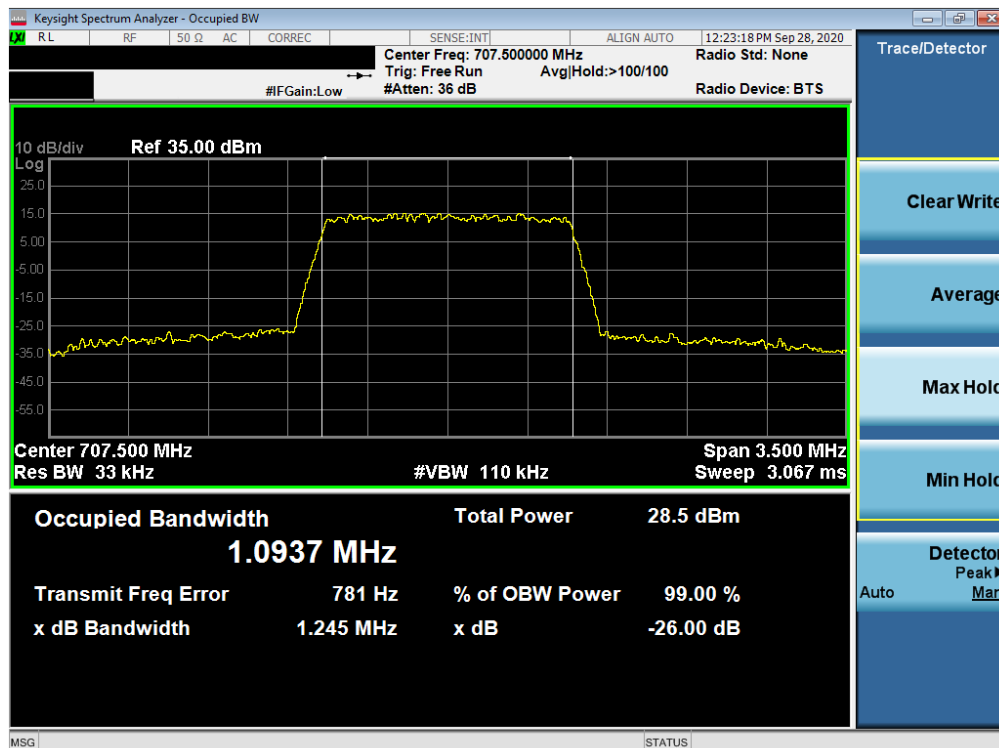


Plot 7-50. Occupied Bandwidth Plot (LTE Band 12 – 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27.A3L	Test Dates: 9/23 – 12/10/2020	EUT Type: Portable Handset		Page 37 of 297



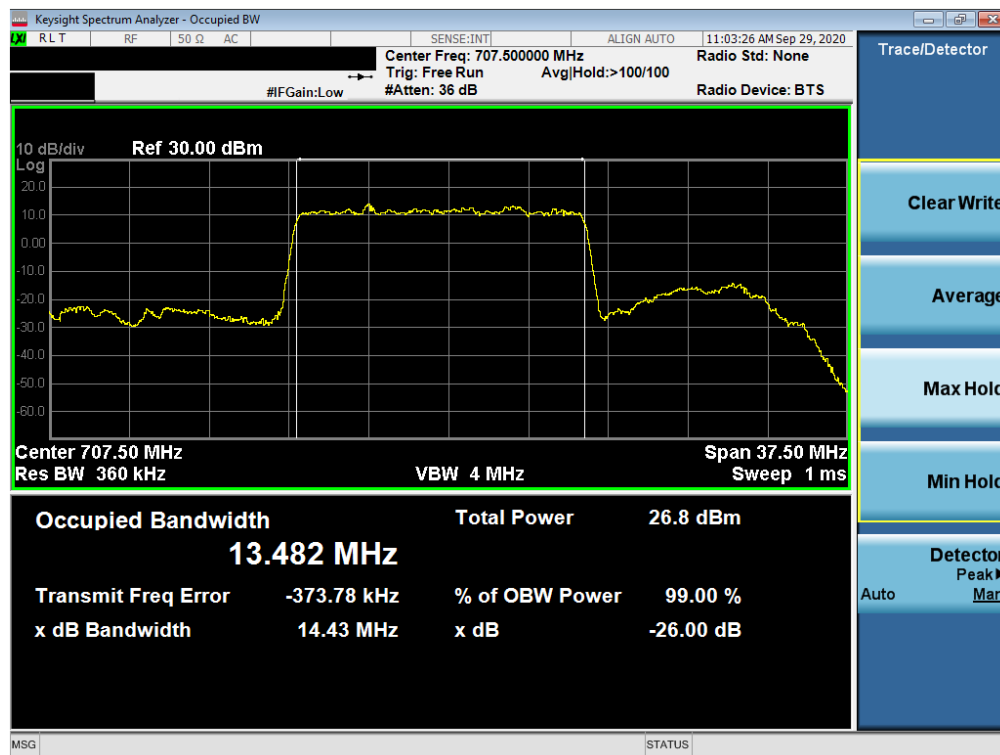
Plot 7-51. Occupied Bandwidth Plot (LTE Band 12 – 1.4MHz 64-QAM - Full RB Configuration)



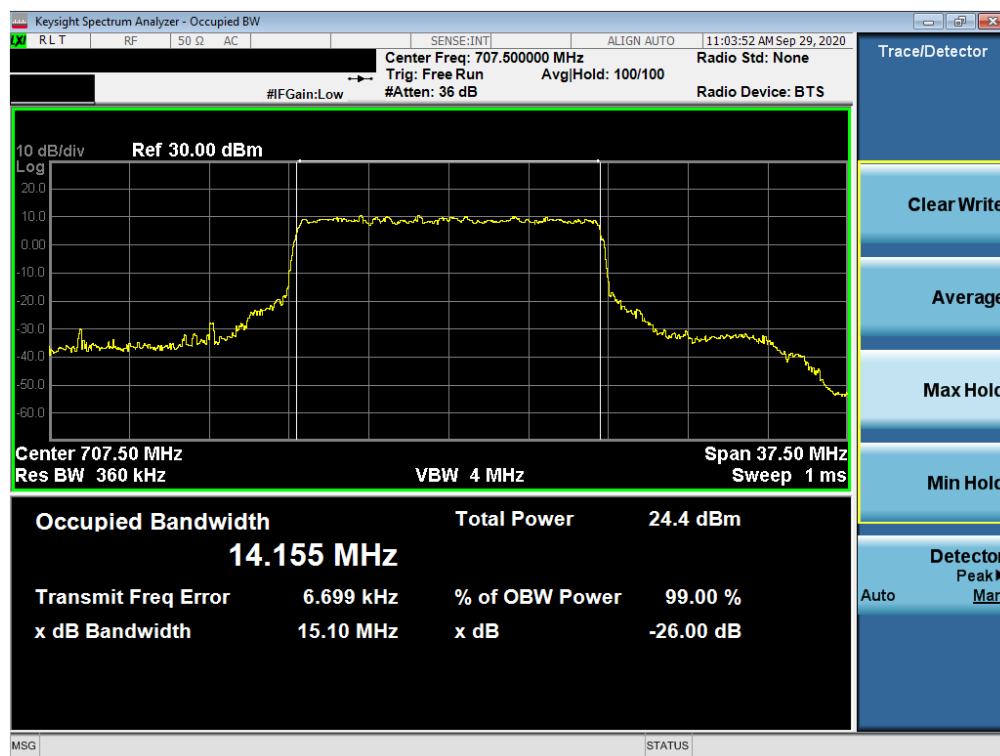
Plot 7-52. Occupied Bandwidth Plot (LTE Band 12 – 1.4MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27.A3L	Test Dates: 9/23 – 12/10/2020	EUT Type: Portable Handset		Page 38 of 297

NR Band n12

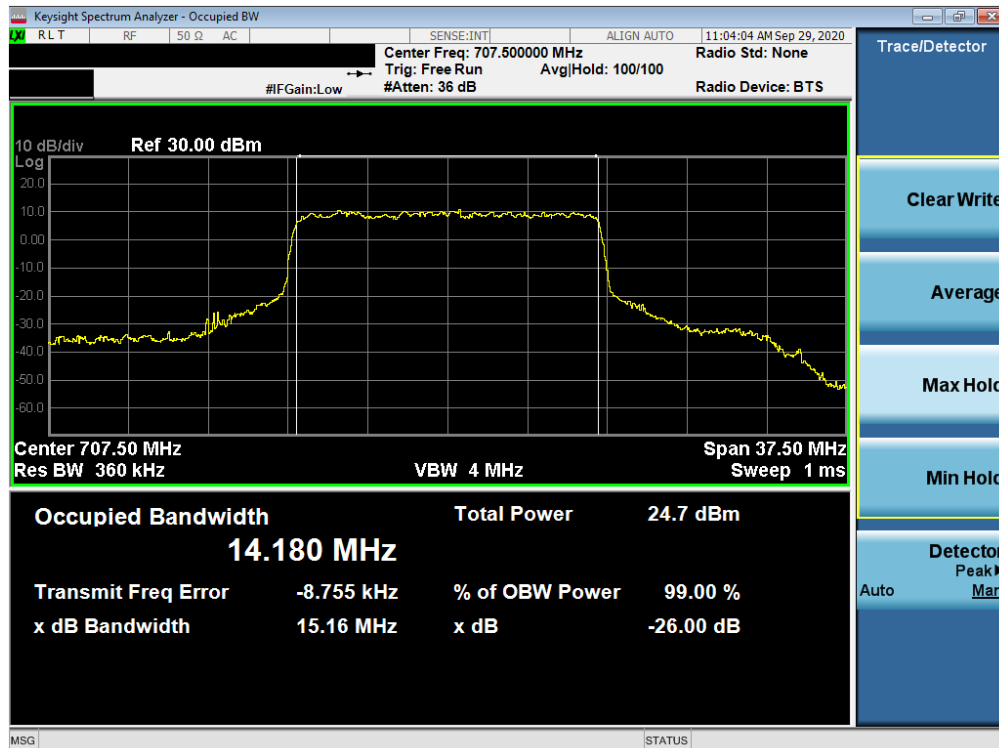


Plot 7-53. Occupied Bandwidth Plot (NR Band n12 - 15MHz DFT-s-OFDM BPSK - Full RB)

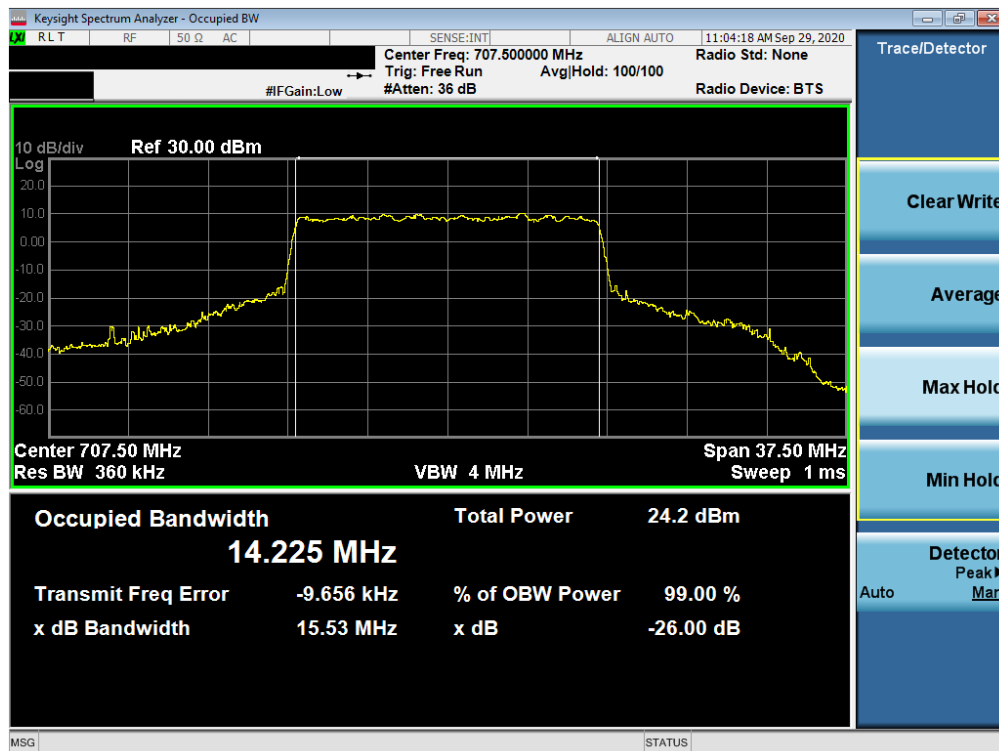


Plot 7-54. Occupied Bandwidth Plot (NR Band n12 - 15MHz CP-OFDM QPSK - Full RB)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27-A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 39 of 297

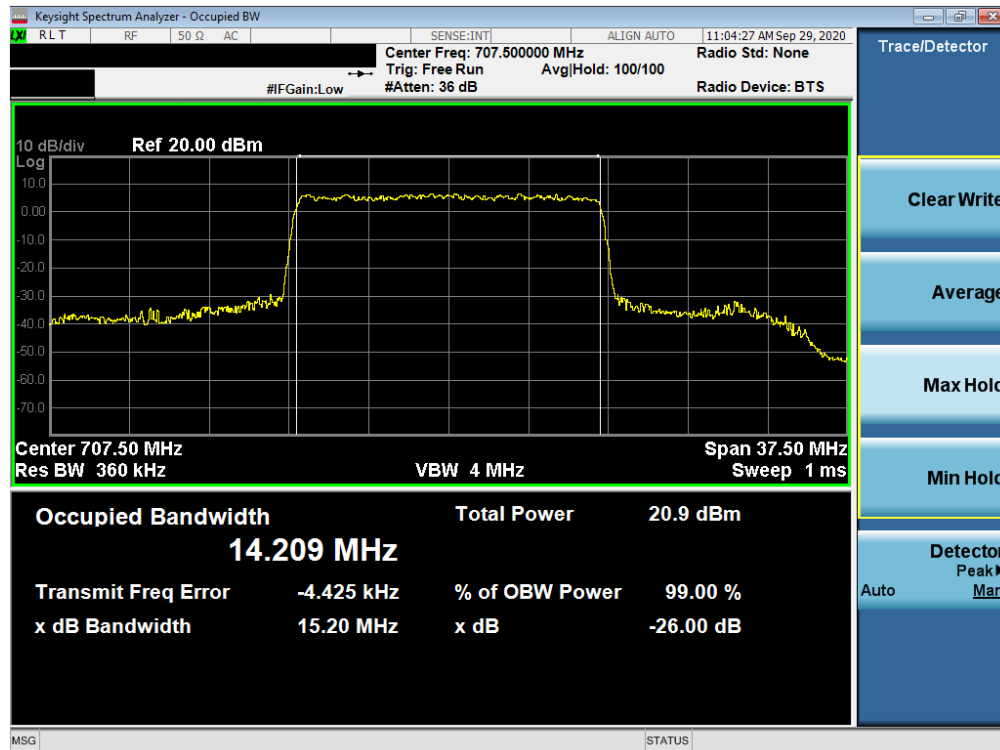


Plot 7-55. Occupied Bandwidth Plot (NR Band n12 - 15MHz CP-OFDM 16-QAM - Full RB)

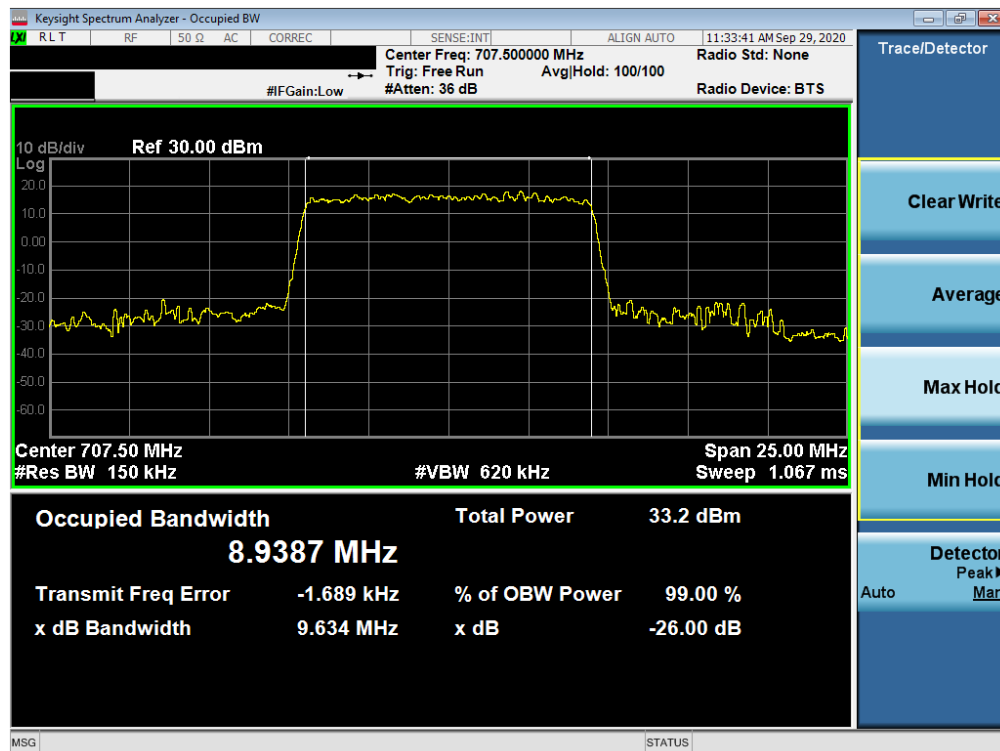


Plot 7-56. Occupied Bandwidth Plot (NR Band n12 - 15MHz CP-OFDM 64-QAM - Full RB)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27.A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 40 of 297

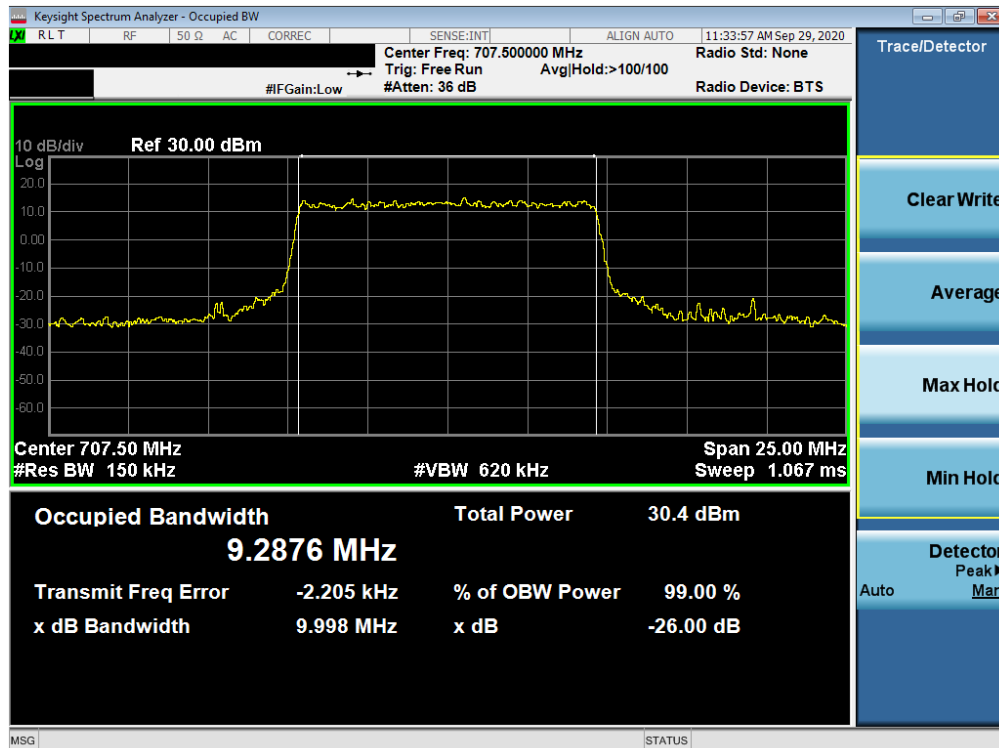


Plot 7-57. Occupied Bandwidth Plot (NR Band n12 - 15MHz CP-OFDM 256-QAM - Full RB)

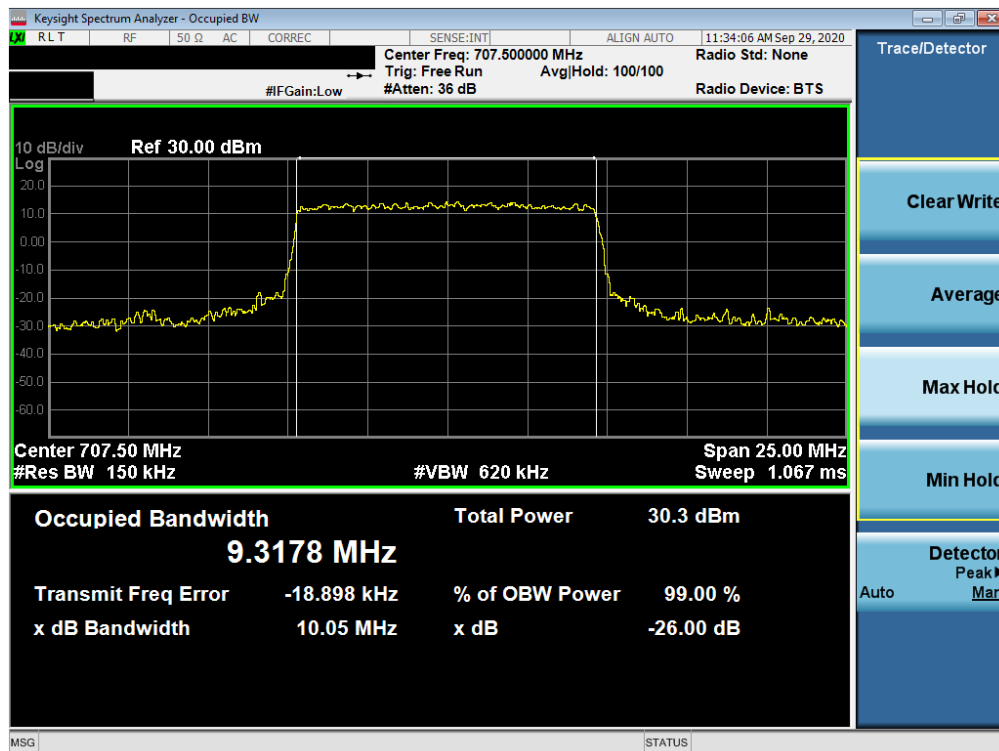


Plot 7-58. Occupied Bandwidth Plot (NR Band n12 - 10MHz DFT-s-OFDM BPSK - Full RB)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27.A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 41 of 297

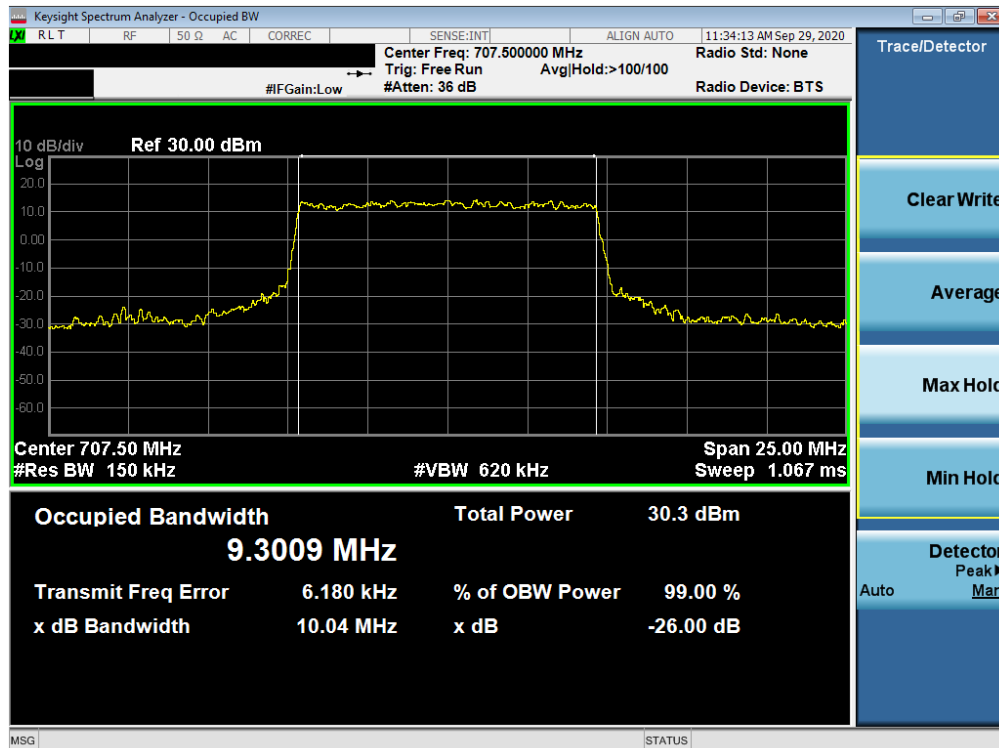


Plot 7-59. Occupied Bandwidth Plot (NR Band n12 - 10MHz CP-OFDM QPSK - Full RB)

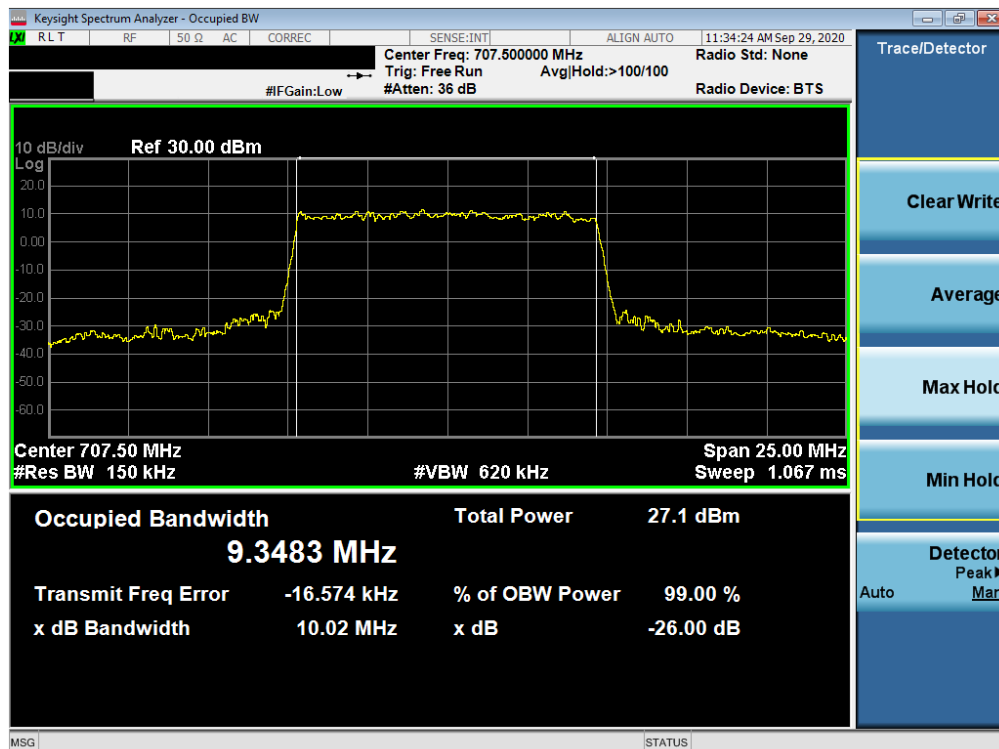


Plot 7-60. Occupied Bandwidth Plot (NR Band n12 - 10MHz CP-OFDM 16-QAM - Full RB)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27.A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 42 of 297

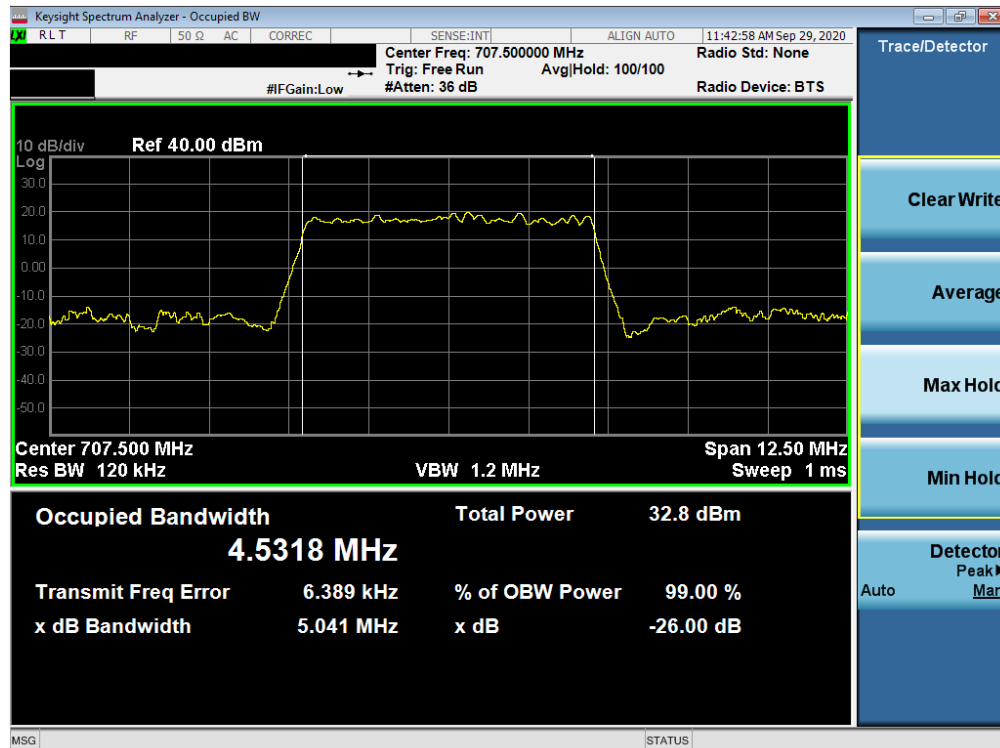


Plot 7-61. Occupied Bandwidth Plot (NR Band n12 - 10MHz CP-OFDM 64-QAM - Full RB)

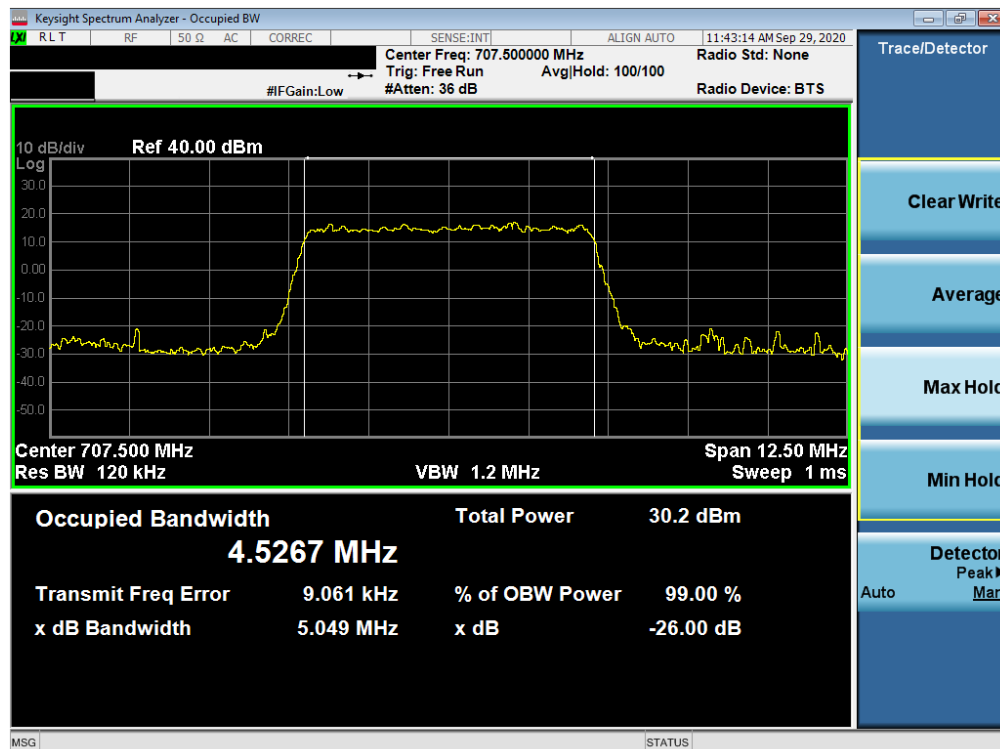


Plot 7-62. Occupied Bandwidth Plot (NR Band n12 - 10MHz CP-OFDM 256-QAM - Full RB)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27.A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 43 of 297

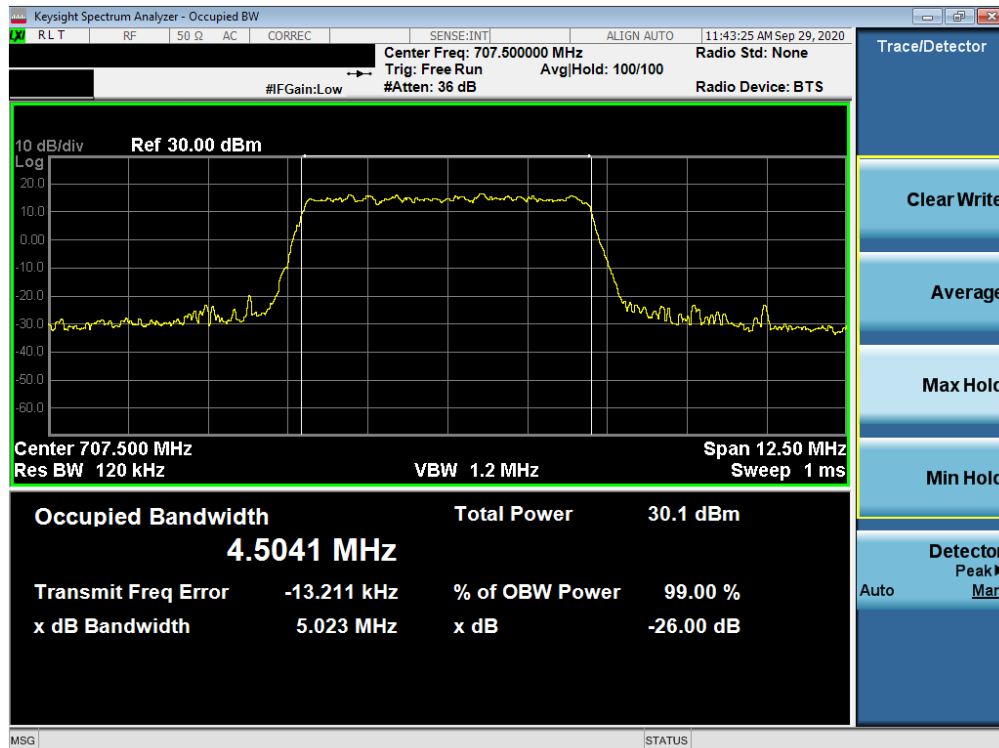


Plot 7-63. Occupied Bandwidth Plot (NR Band n12 - 5MHz DFT-s-OFDM BPSK - Full RB)

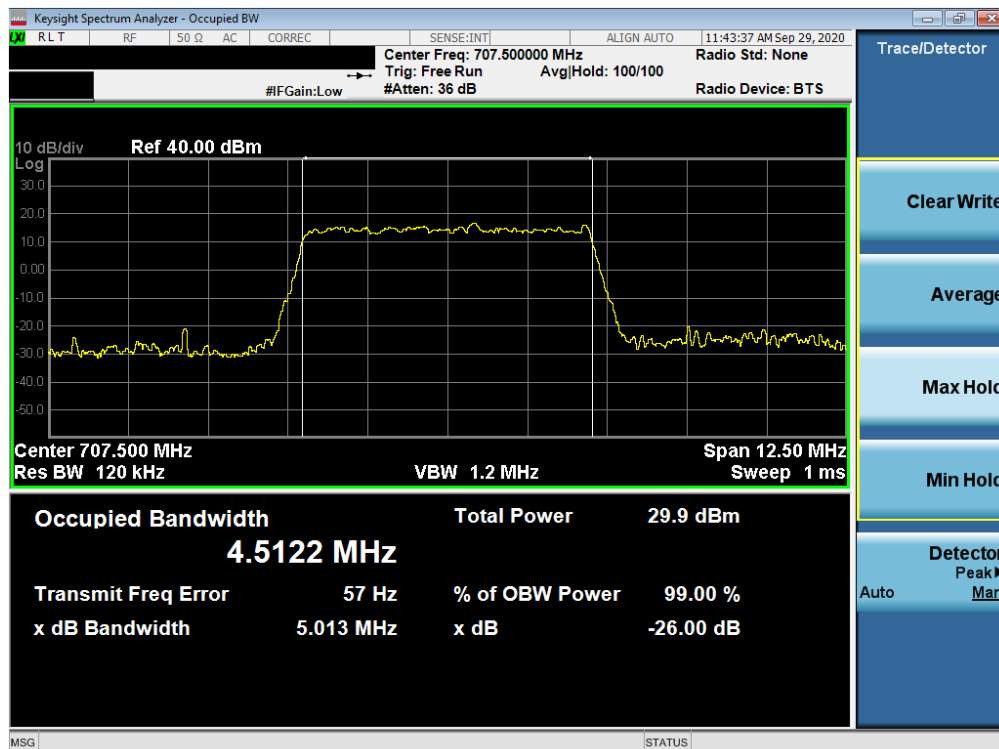


Plot 7-64. Occupied Bandwidth Plot (NR Band n12 - 5MHz CP-OFDM QPSK - Full RB)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27.A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 44 of 297

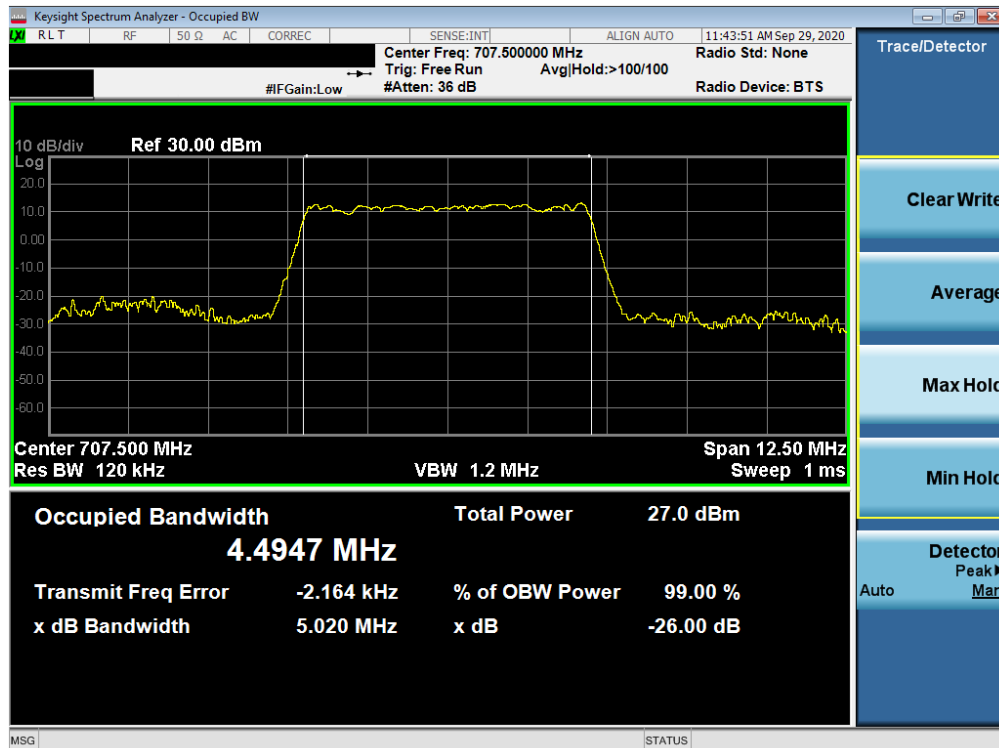


Plot 7-65. Occupied Bandwidth Plot (NR Band n12 - 5MHz CP-OFDM 16-QAM - Full RB)



Plot 7-66. Occupied Bandwidth Plot (NR Band n12 - 5MHz CP-OFDM 64-QAM - Full RB)

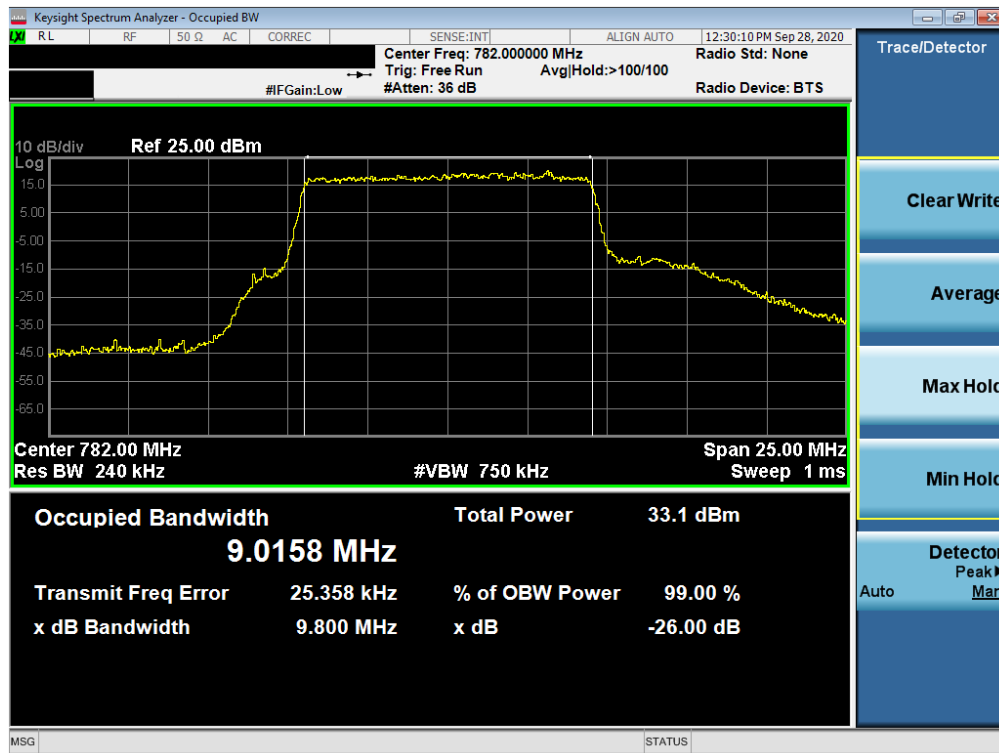
FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27.A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 45 of 297



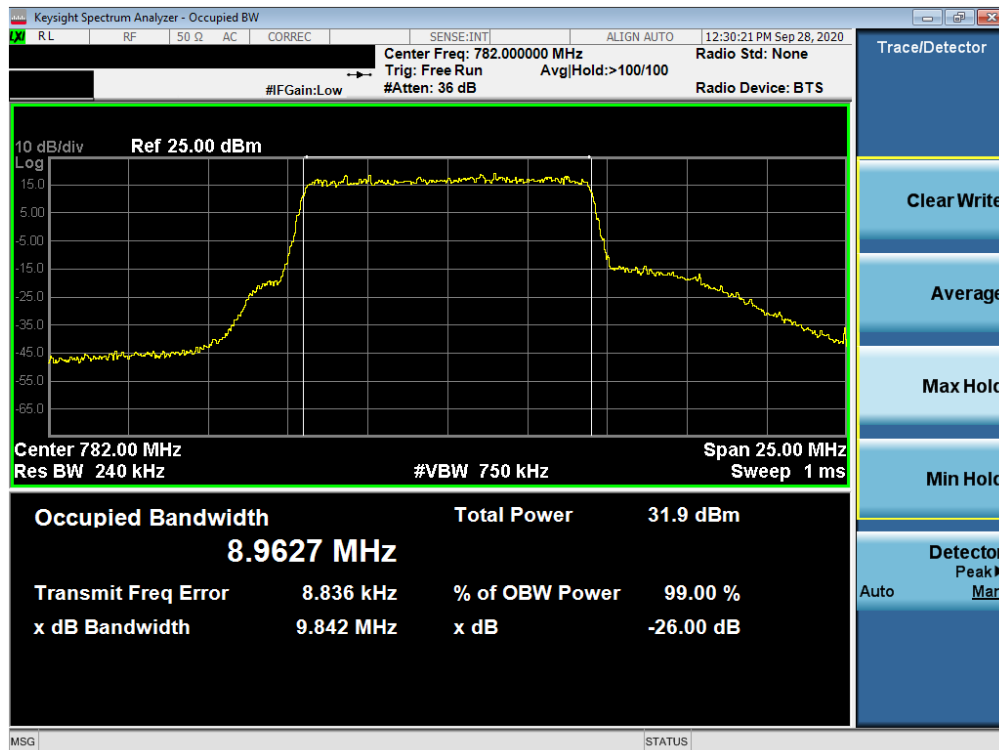
Plot 7-67. Occupied Bandwidth Plot (NR Band n12 - 5MHz CP-OFDM 256-QAM - Full RB)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27-A3L	Test Dates: 9/23 – 12/10/2020	EUT Type: Portable Handset		Page 46 of 297

LTE Band 13

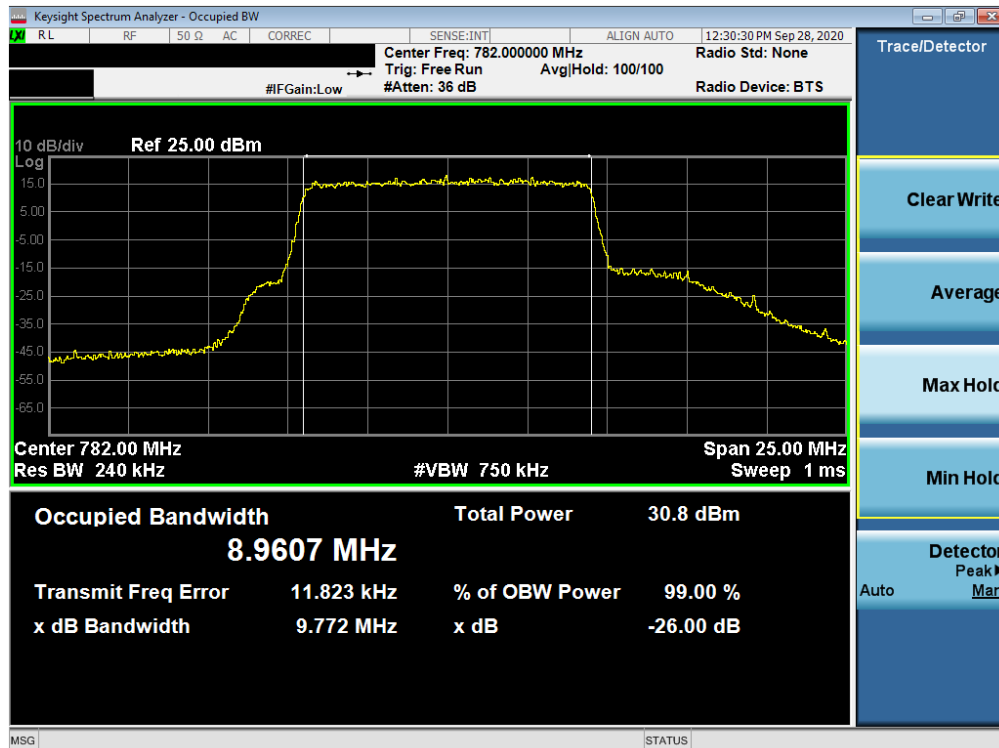


Plot 7-68. Occupied Bandwidth Plot (LTE Band 13 - 10MHz QPSK - Full RB Configuration)

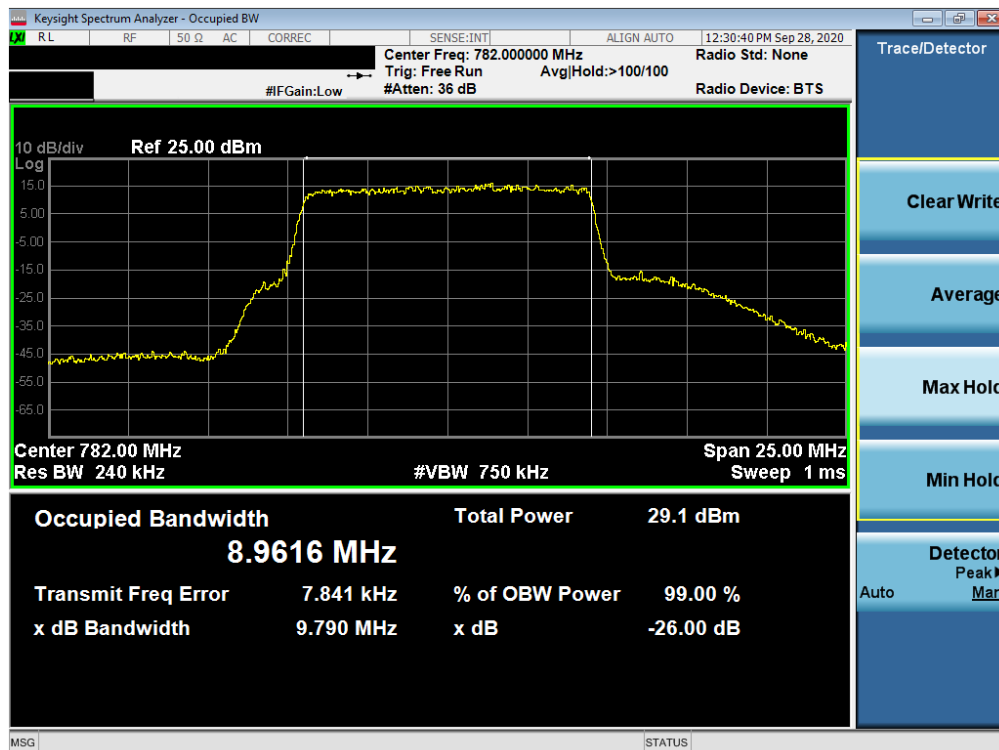


Plot 7-69. Occupied Bandwidth Plot (LTE Band 13 - 10MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27-A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 47 of 297

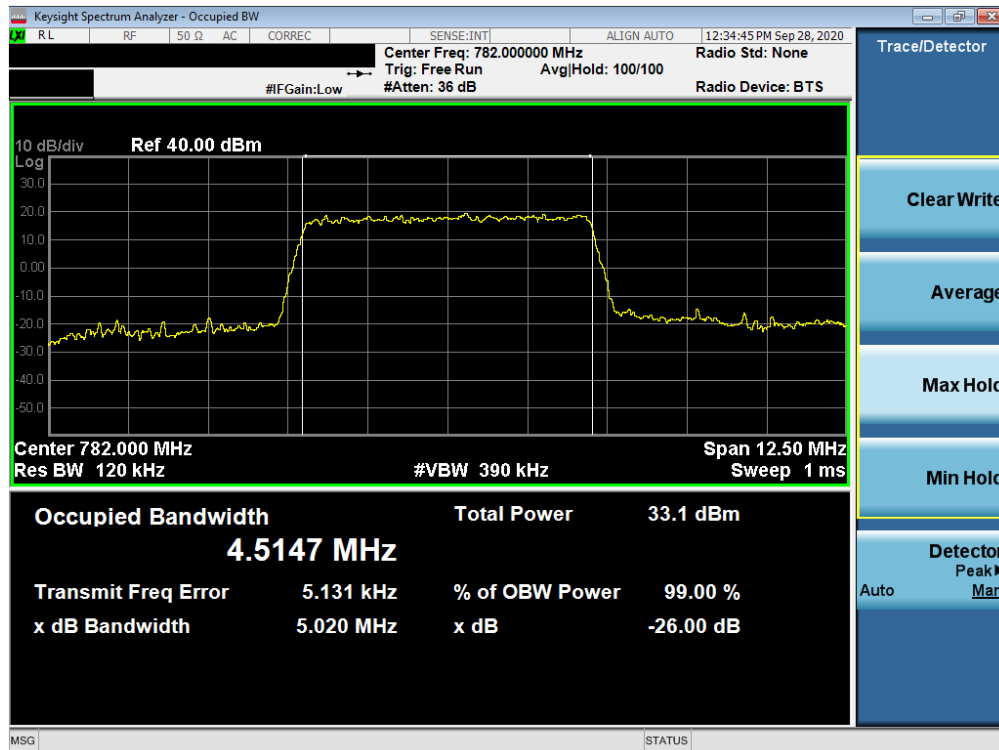


Plot 7-70. Occupied Bandwidth Plot (LTE Band 13 - 10MHz 64-QAM - Full RB Configuration)

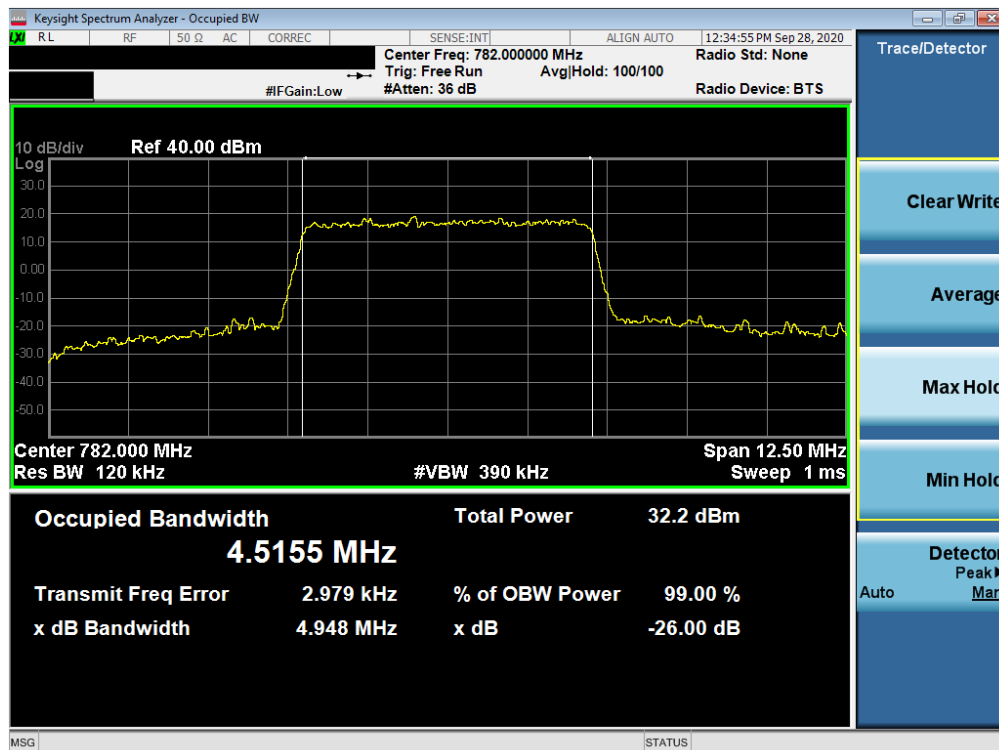


Plot 7-71. Occupied Bandwidth Plot (LTE Band 13 - 10MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27-A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 48 of 297

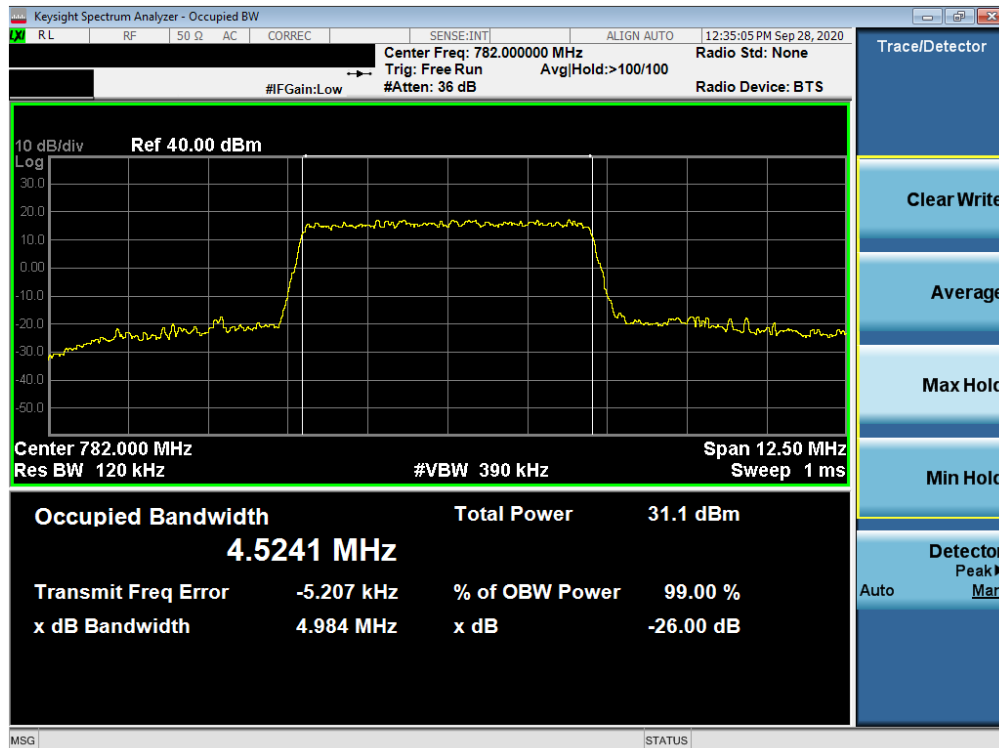


Plot 7-72. Occupied Bandwidth Plot (LTE Band 13 - 5MHz QPSK - Full RB Configuration)

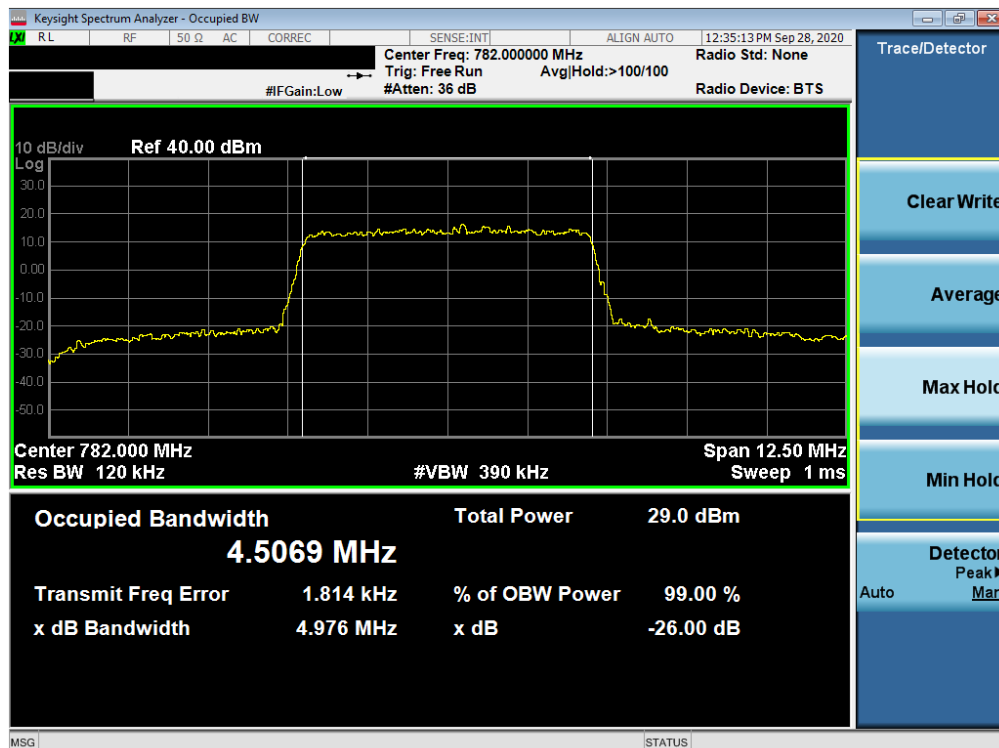


Plot 7-73. Occupied Bandwidth Plot (LTE Band 13 - 5MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
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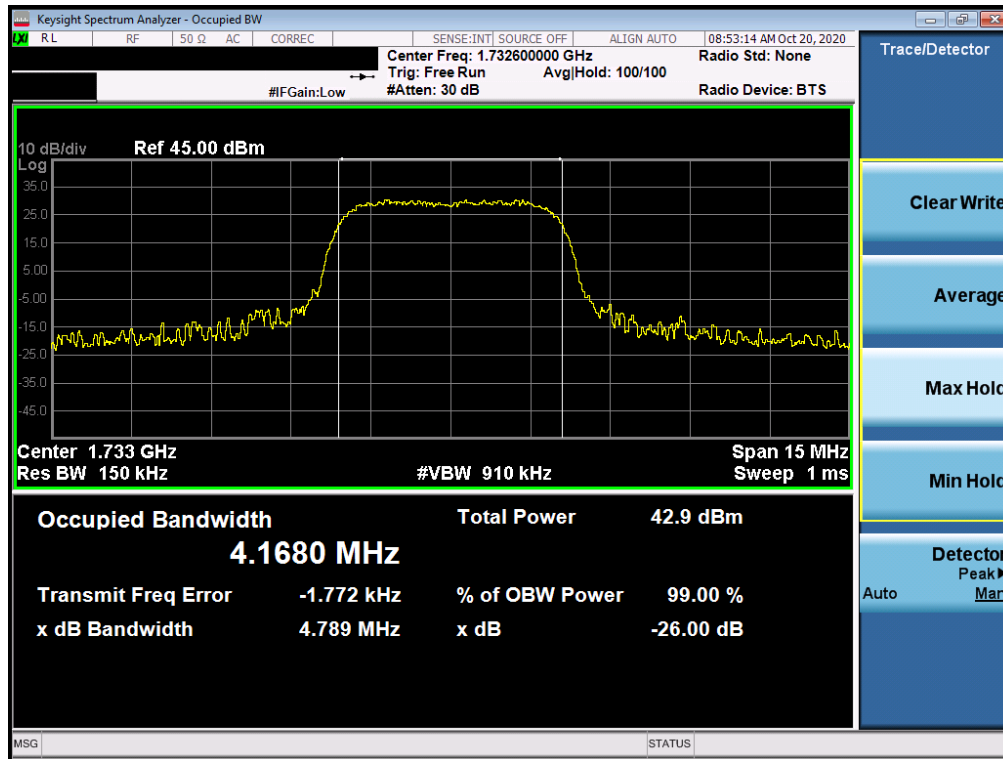
Plot 7-74. Occupied Bandwidth Plot (LTE Band 13 - 5MHz 64-QAM - Full RB Configuration)



Plot 7-75. Occupied Bandwidth Plot (LTE Band 13 - 5MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27-A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 50 of 297

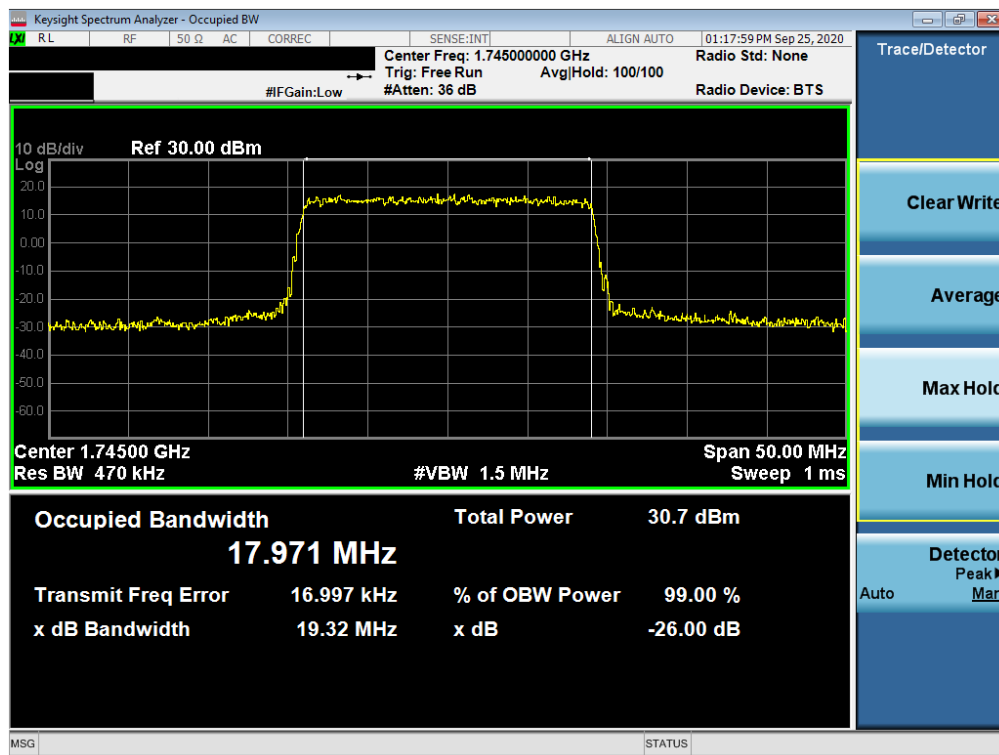
WCDMA AWS



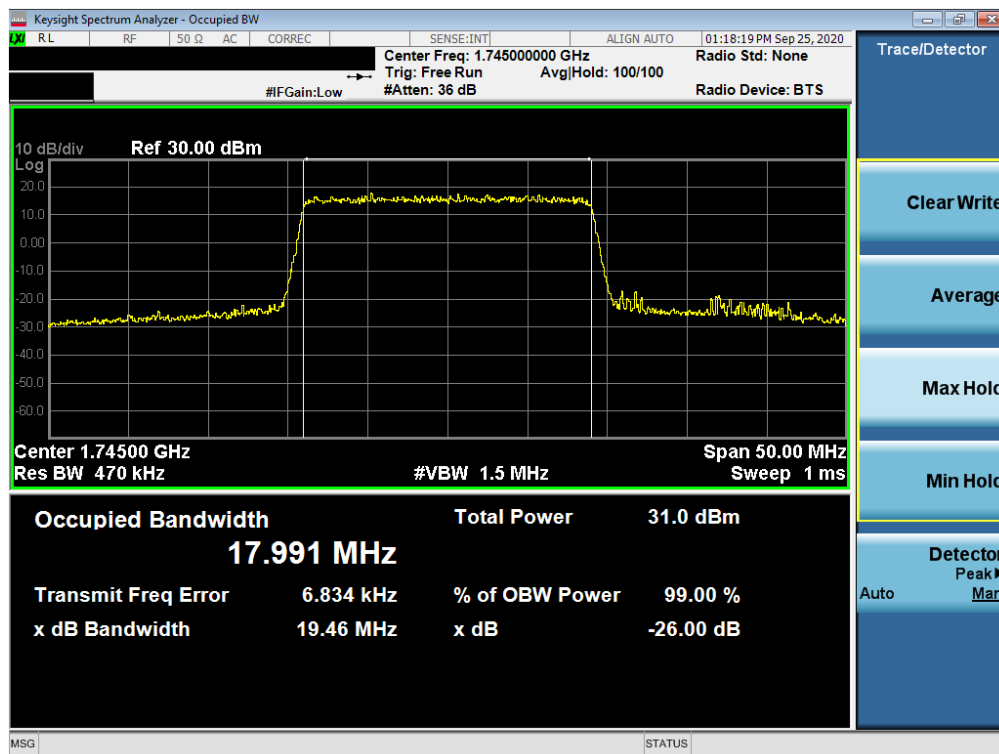
Plot 7-76. Occupied Bandwidth Plot (WCDMA, Ch. 1413)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27.A3L	Test Dates: 9/23 – 12/10/2020	EUT Type: Portable Handset		Page 51 of 297

LTE Band 66/4

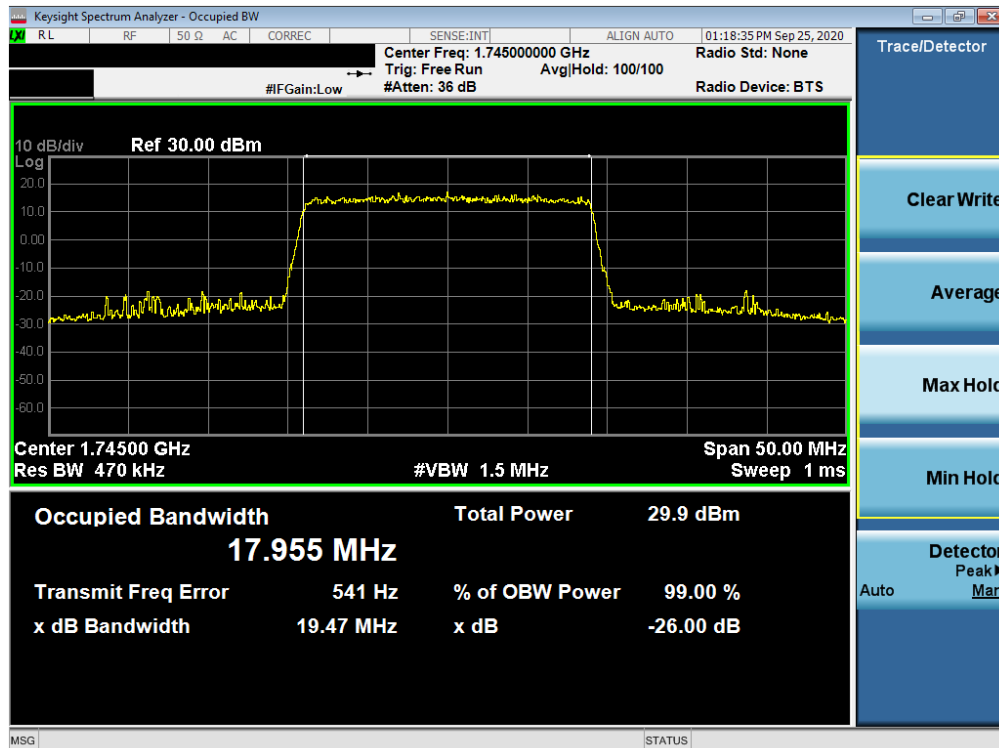


Plot 7-77. Occupied Bandwidth Plot (LTE Band 66/4 - 20MHz QPSK - Full RB Configuration)

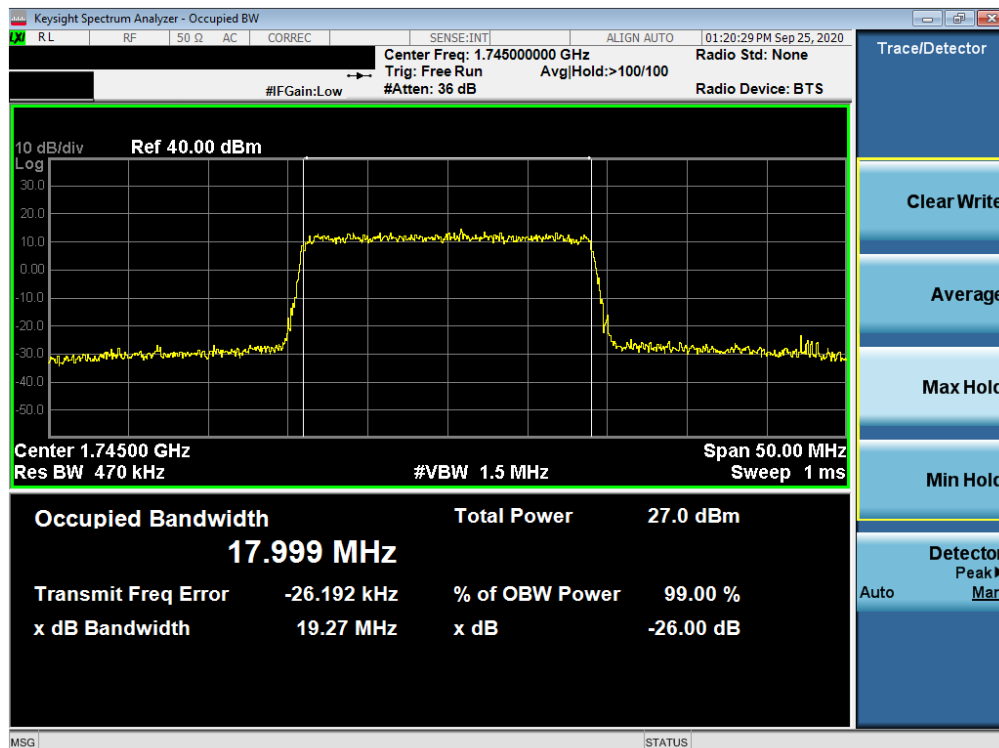


Plot 7-78. Occupied Bandwidth Plot (LTE Band 66/4 - 20MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27-A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 52 of 297

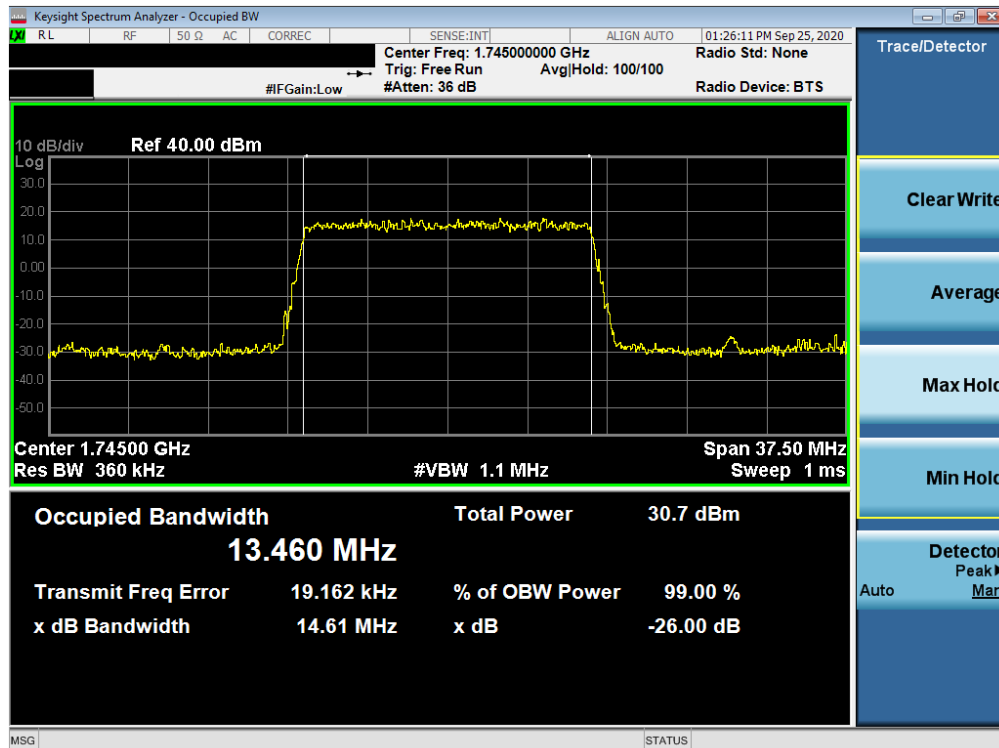


Plot 7-79. Occupied Bandwidth Plot (LTE Band 66/4 - 20MHz 64-QAM - Full RB Configuration)

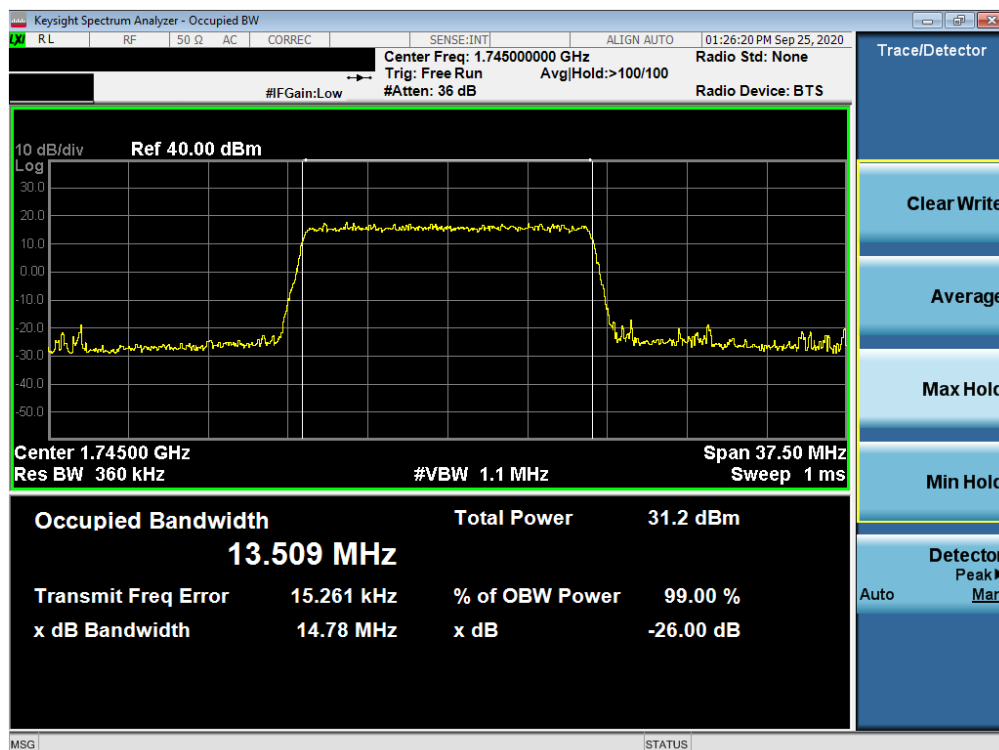


Plot 7-80. Occupied Bandwidth Plot (LTE Band 66/4 - 20MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27-A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 53 of 297

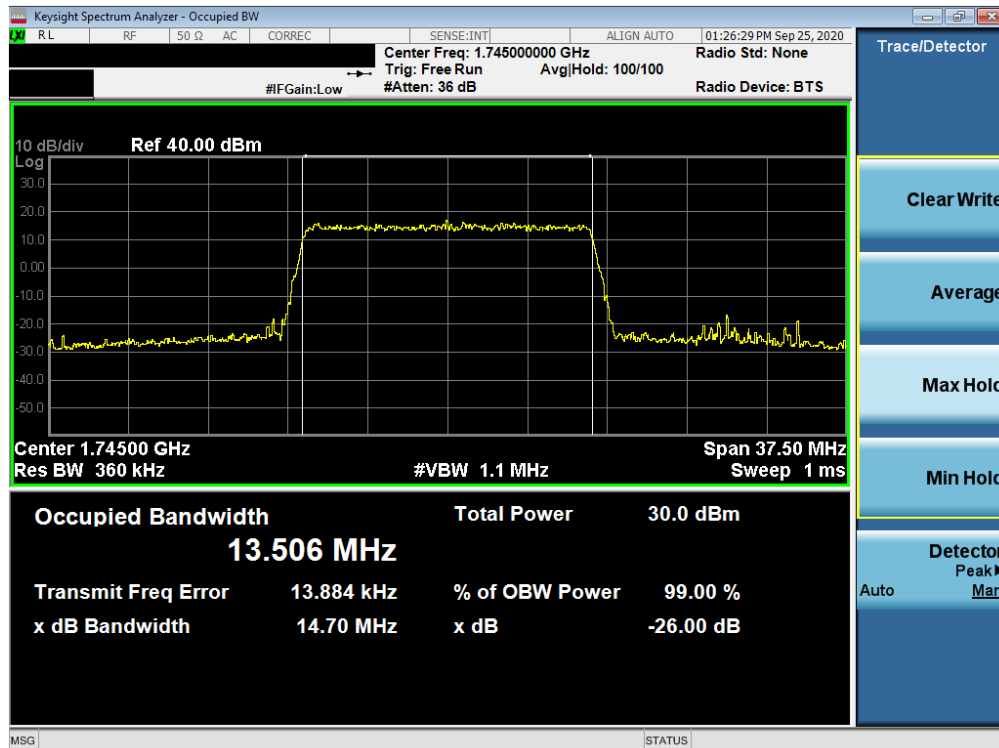


Plot 7-81. Occupied Bandwidth Plot (LTE Band 66/4 - 15MHz QPSK - Full RB Configuration)

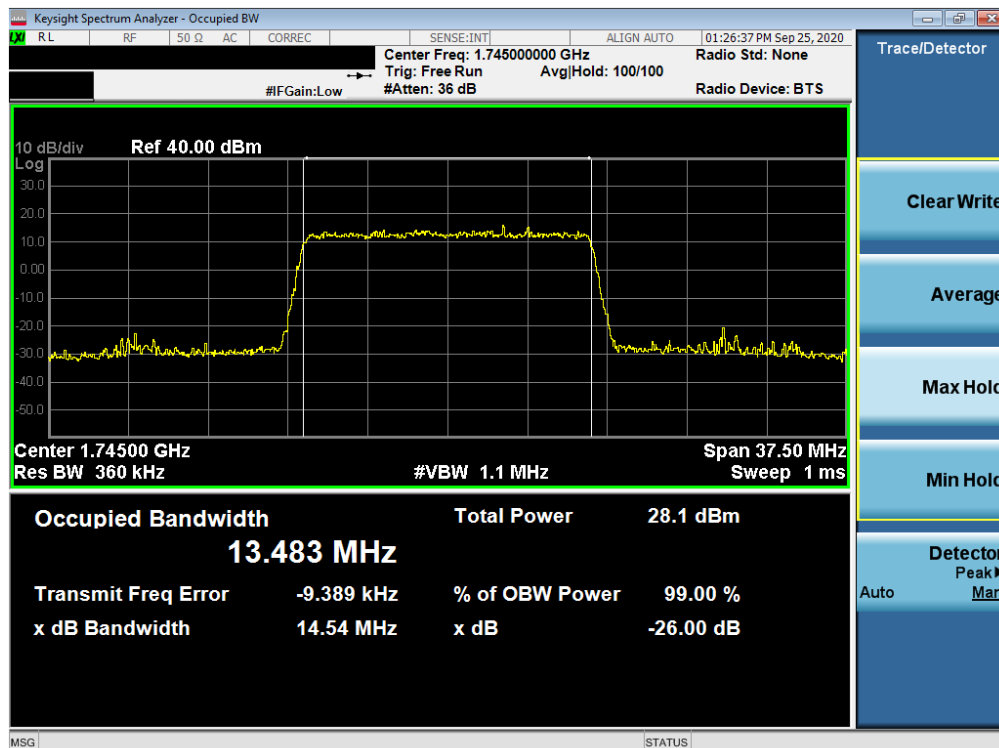


Plot 7-82. Occupied Bandwidth Plot (LTE Band 66/4 - 15MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27-A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 54 of 297

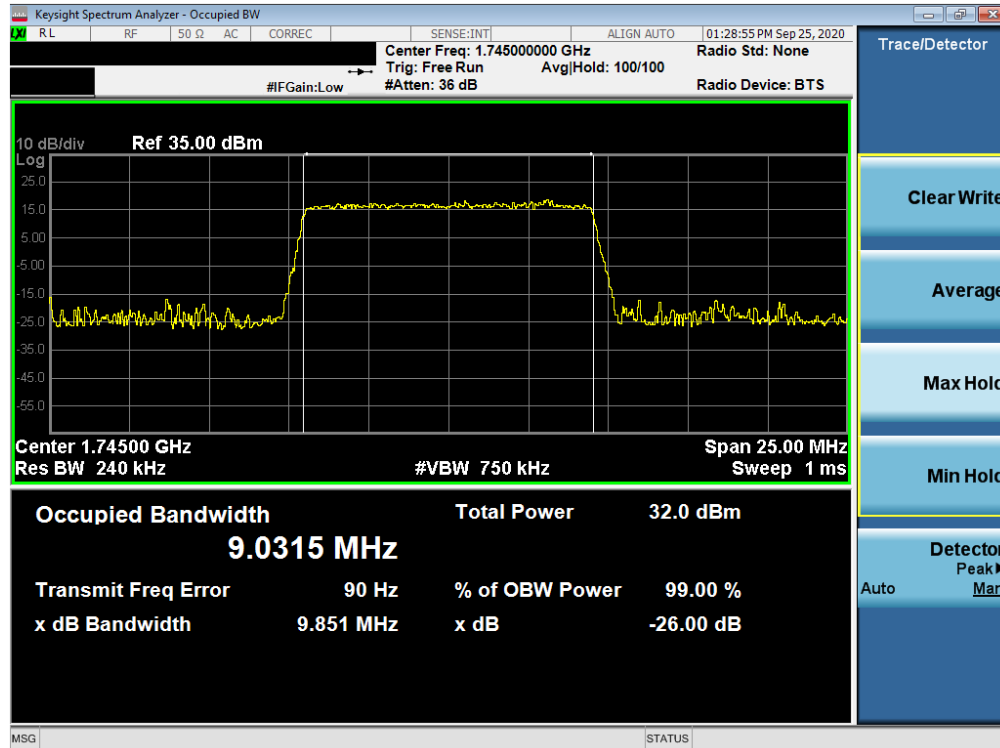


Plot 7-83. Occupied Bandwidth Plot (LTE Band 66/4 - 15MHz 64-QAM - Full RB Configuration)

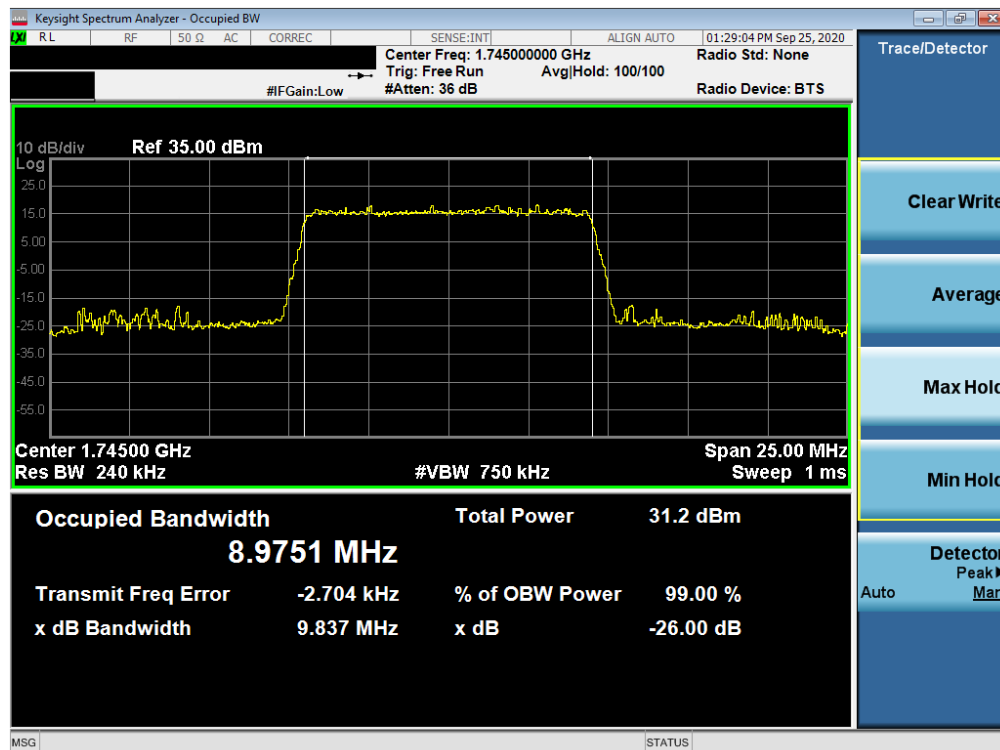


Plot 7-84. Occupied Bandwidth Plot (LTE Band 66/4 - 15MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27-A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 55 of 297

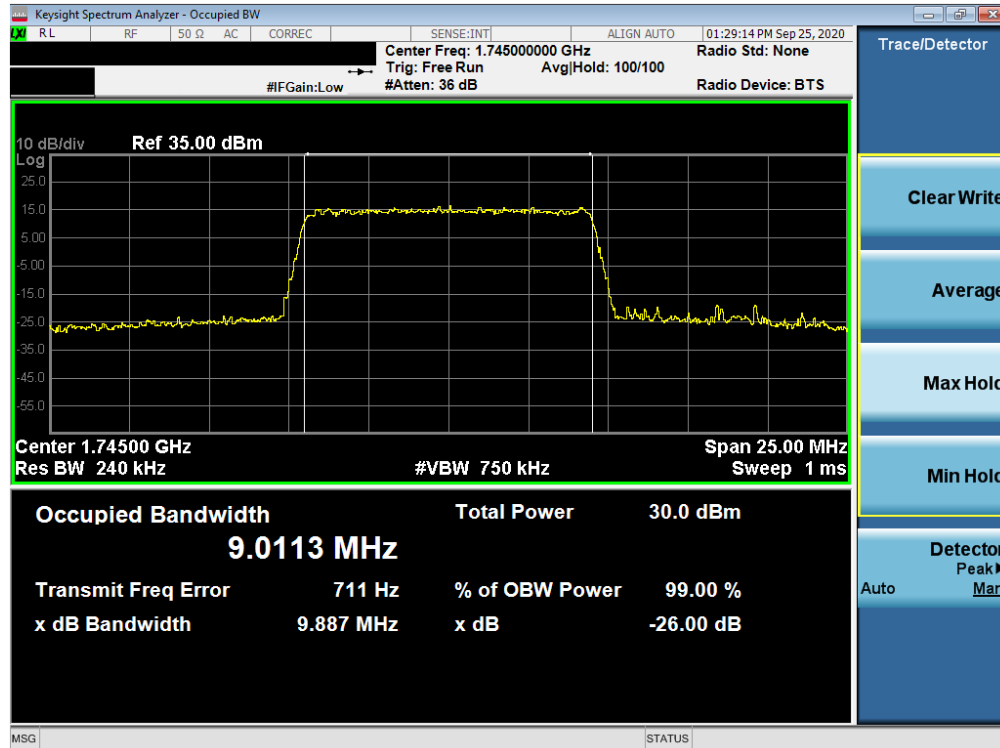


Plot 7-85. Occupied Bandwidth Plot (LTE Band 66/4 - 10MHz QPSK - Full RB Configuration)

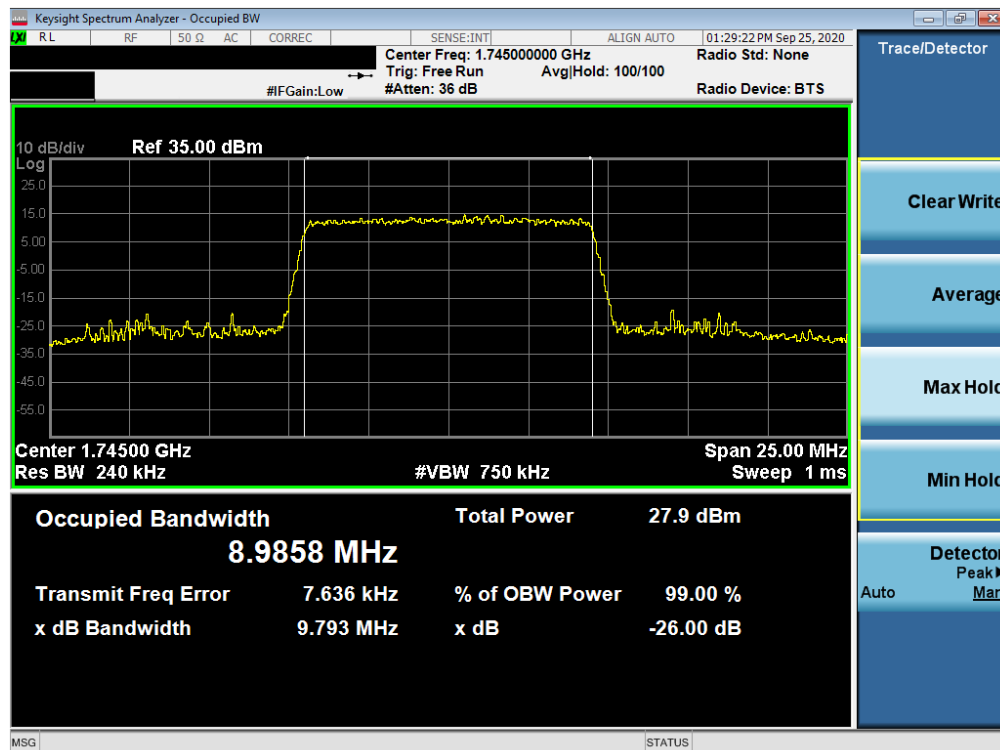


Plot 7-86. Occupied Bandwidth Plot (LTE Band 66/4 - 10MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27.A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 56 of 297

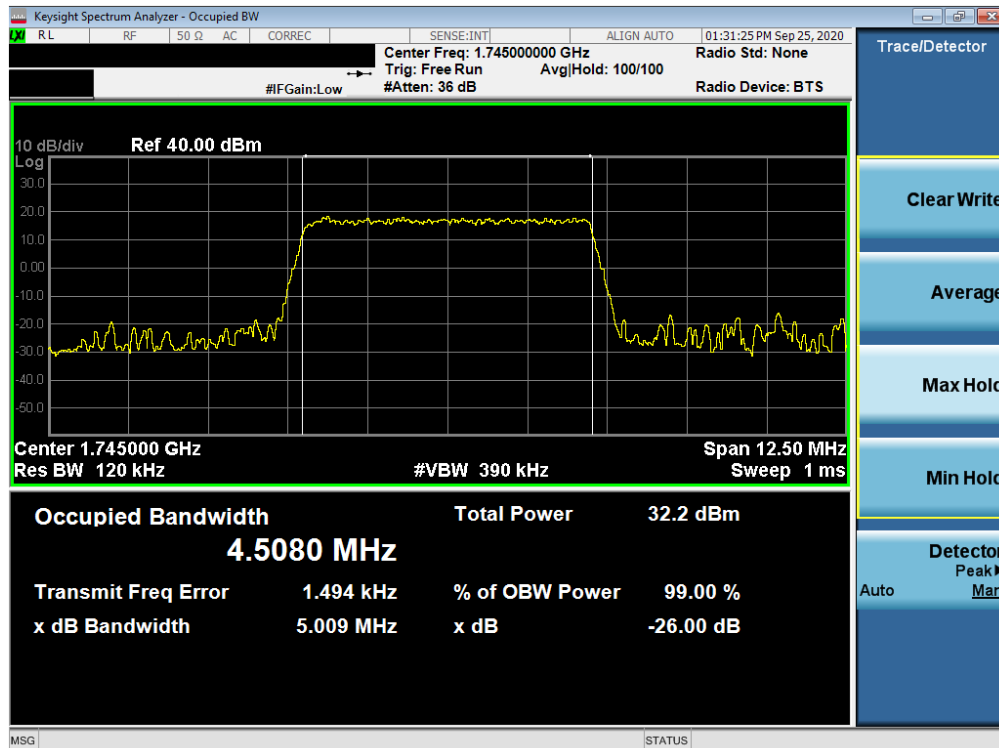


Plot 7-87. Occupied Bandwidth Plot (LTE Band 66/4 - 10MHz 64-QAM - Full RB Configuration)

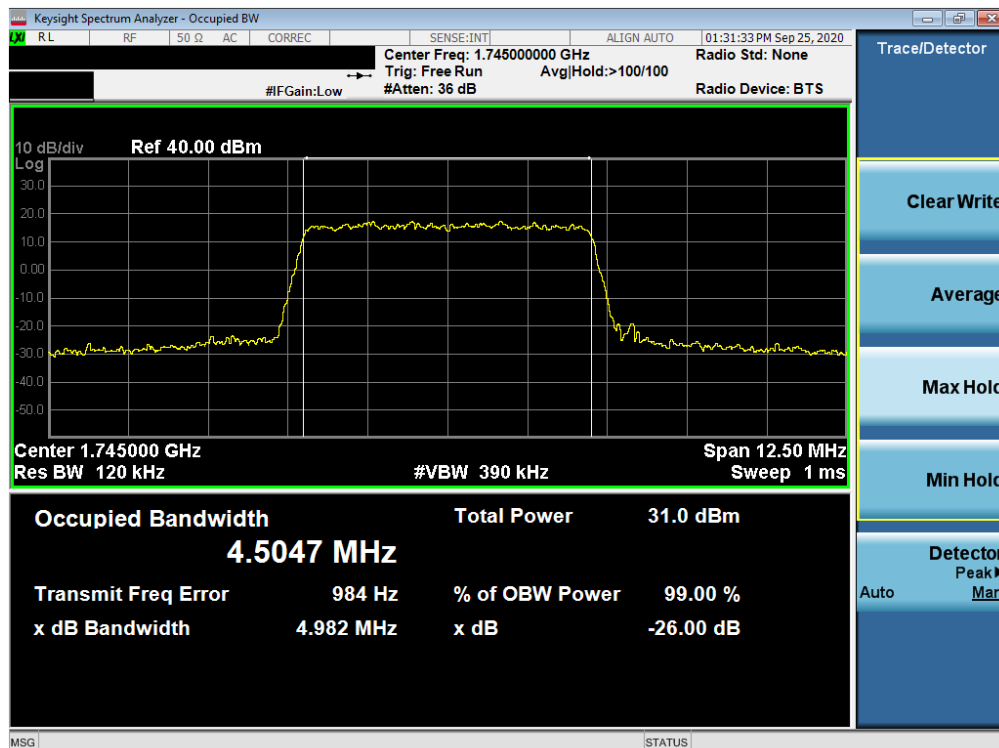


Plot 7-88. Occupied Bandwidth Plot (LTE Band 66/4 - 10MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27.A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 57 of 297

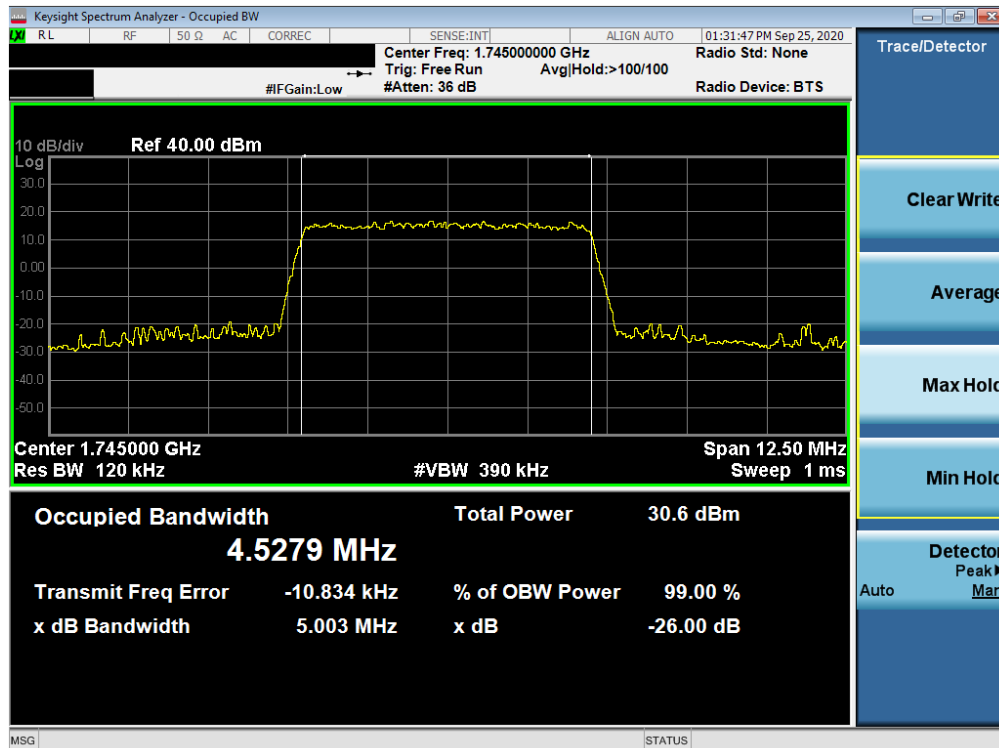


Plot 7-89. Occupied Bandwidth Plot (LTE Band 66/4 - 5MHz QPSK - Full RB Configuration)

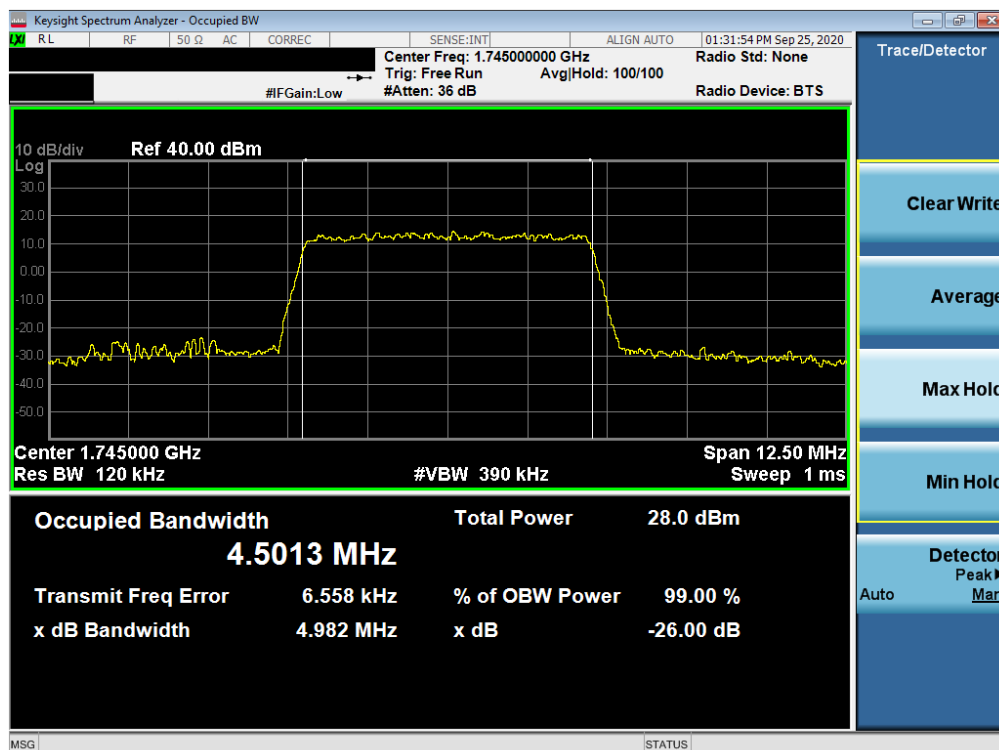


Plot 7-90. Occupied Bandwidth Plot (LTE Band 66/4 - 5MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27-A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 58 of 297

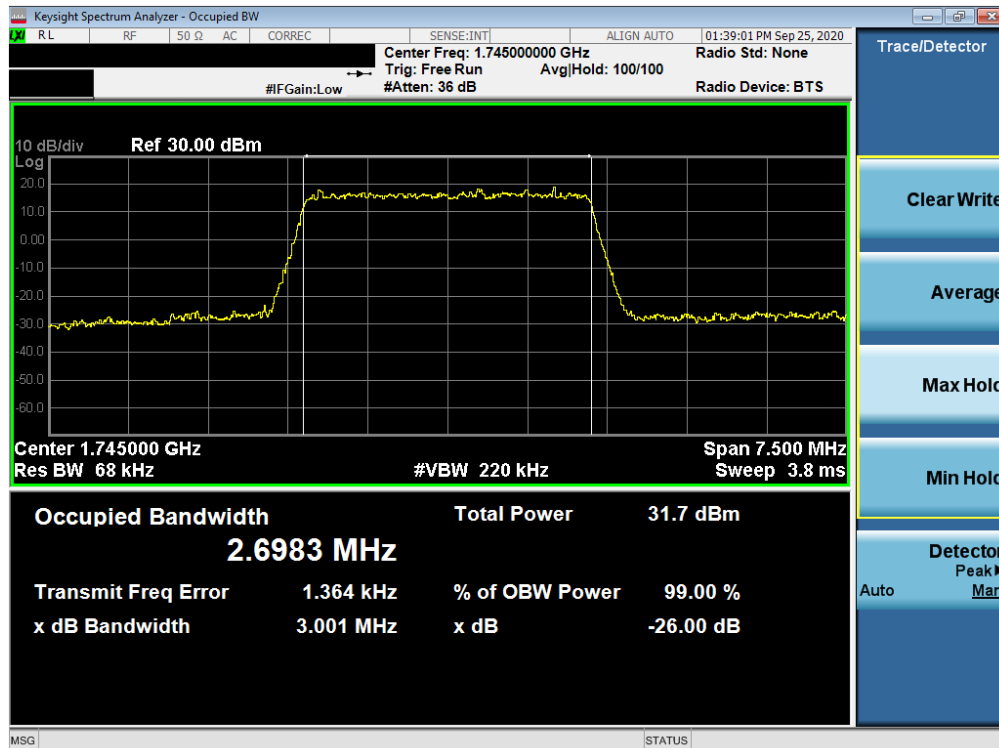


Plot 7-91. Occupied Bandwidth Plot (LTE Band 66/4 - 5MHz 64-QAM - Full RB Configuration)

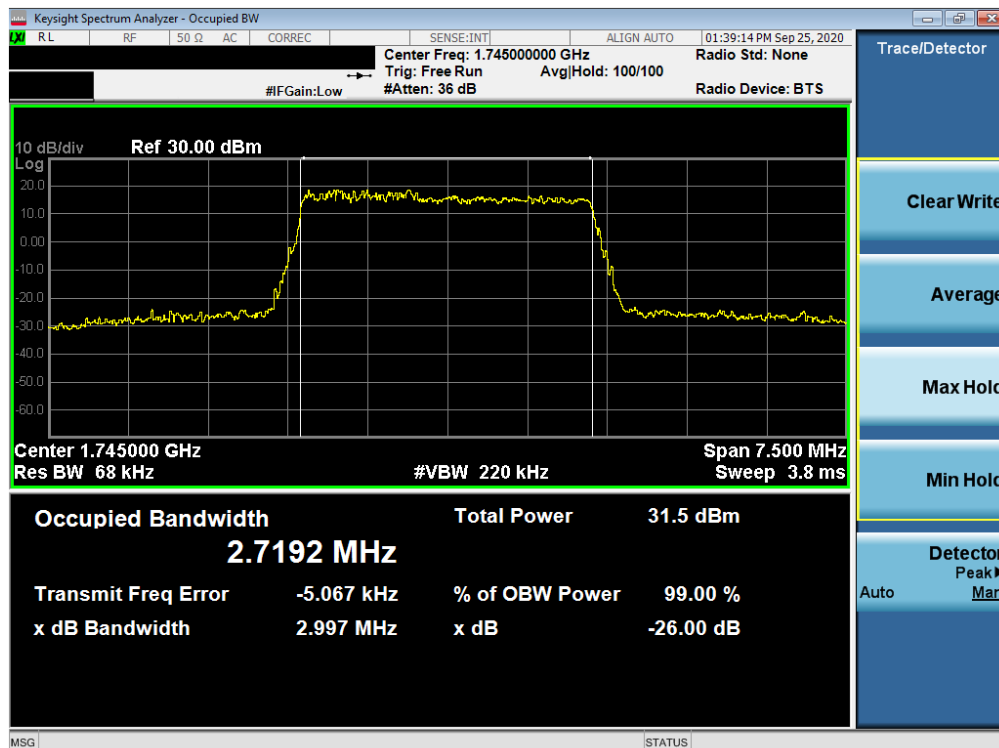


Plot 7-92. Occupied Bandwidth Plot (LTE Band 66/4 - 5MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27-A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 59 of 297

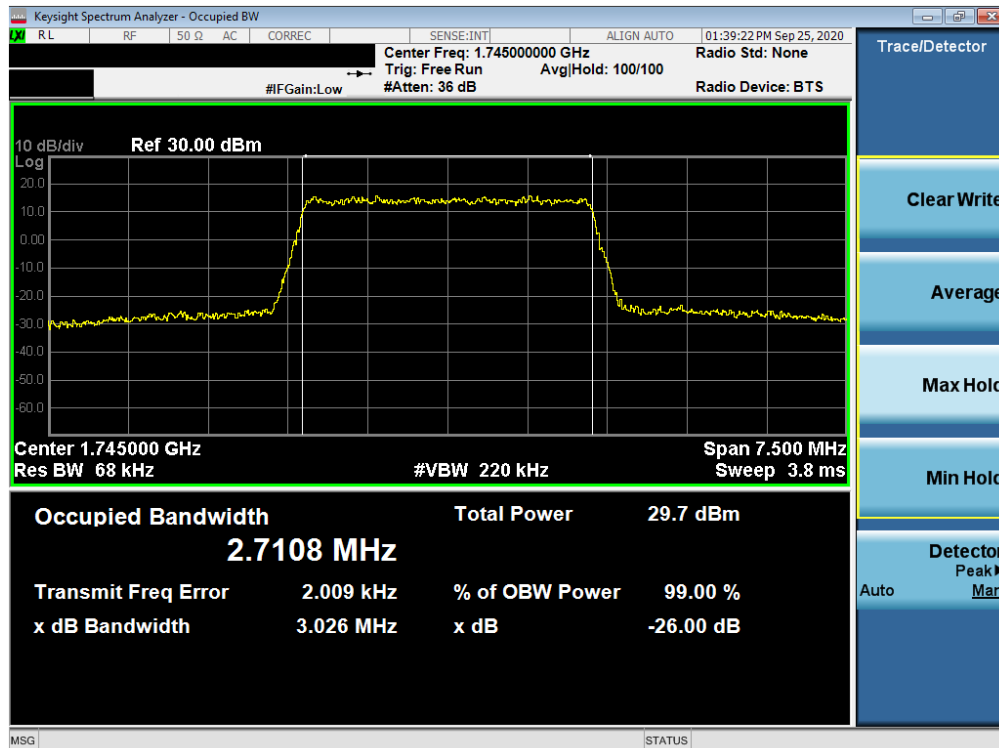


Plot 7-93. Occupied Bandwidth Plot (LTE Band 66/4 - 3MHz QPSK - Full RB Configuration)

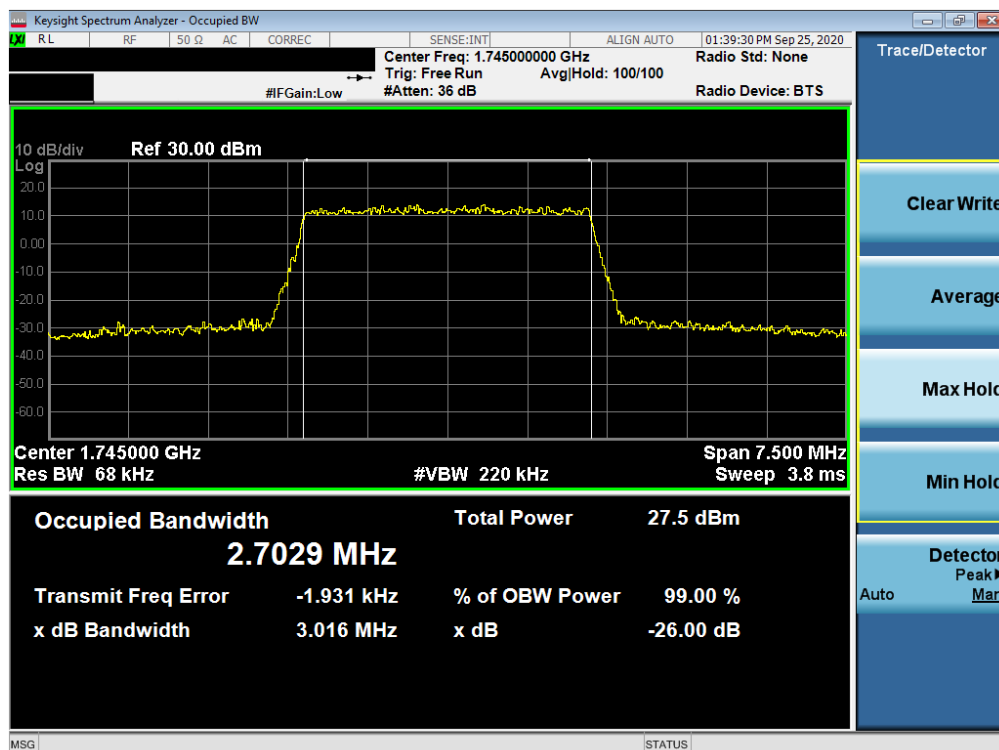


Plot 7-94. Occupied Bandwidth Plot (LTE Band 66/4 - 3MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27.A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 60 of 297

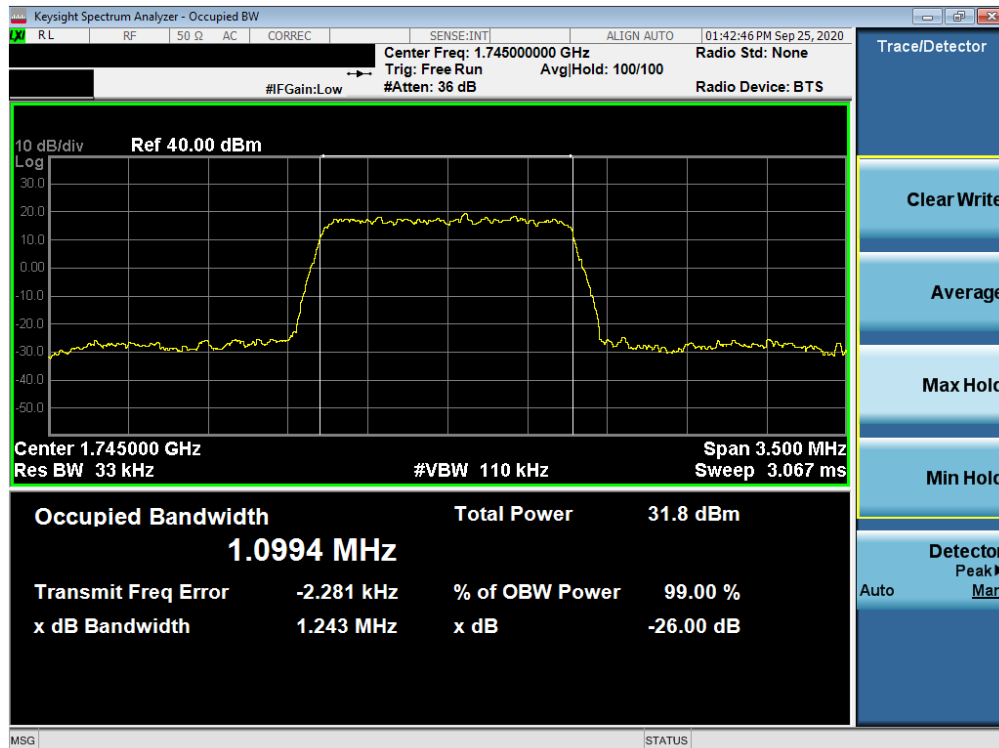


Plot 7-95. Occupied Bandwidth Plot (LTE Band 66/4 - 3MHz 64-QAM - Full RB Configuration)

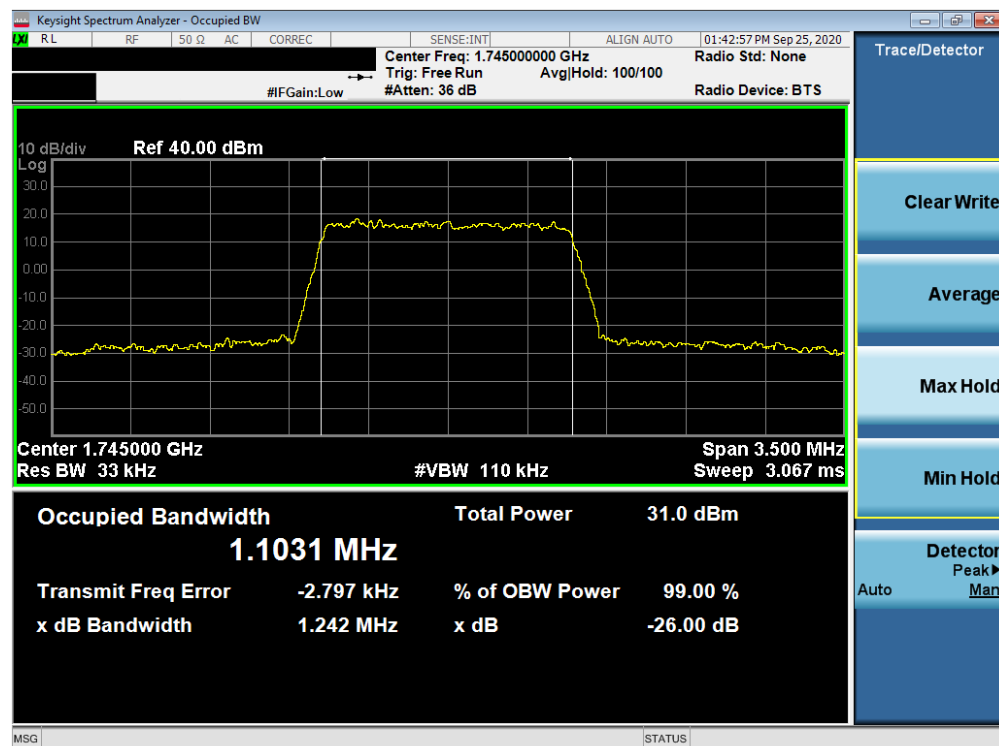


Plot 7-96. Occupied Bandwidth Plot (LTE Band 66/4 - 3MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27.A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 61 of 297

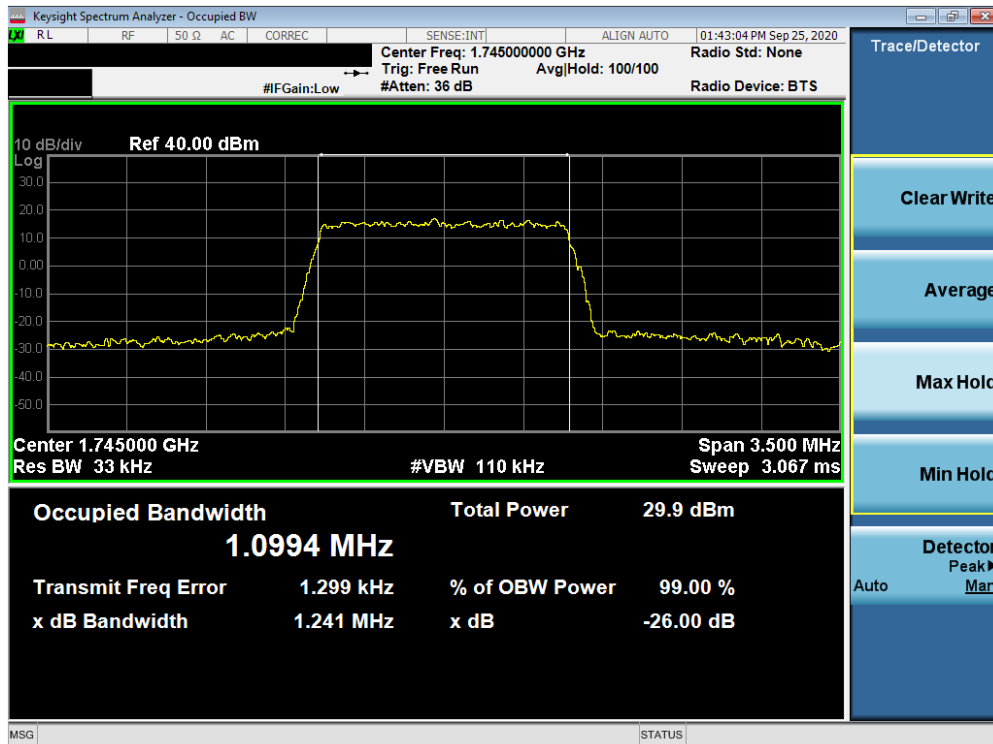


Plot 7-97. Occupied Bandwidth Plot (LTE Band 66/4 - 1.4MHz QPSK - Full RB Configuration)

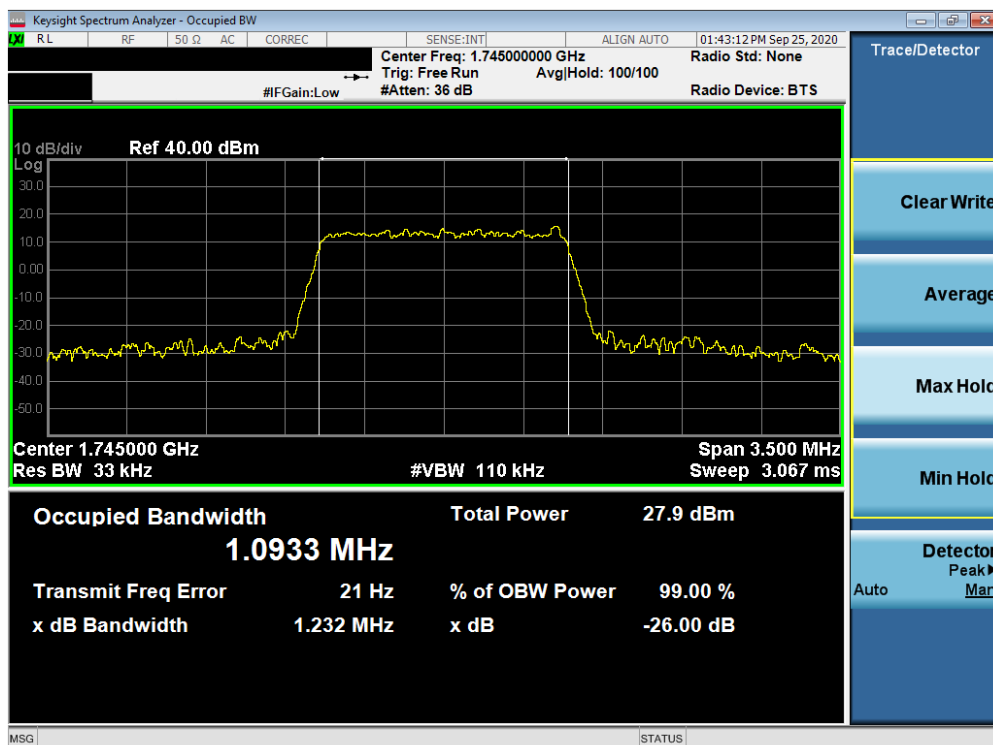


Plot 7-98. Occupied Bandwidth Plot (LTE Band 66/4 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
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Plot 7-99. Occupied Bandwidth Plot (LTE Band 66/4 - 1.4MHz 64-QAM - Full RB Configuration)



Plot 7-100. Occupied Bandwidth Plot (LTE Band 66/4 - 1.4MHz 256-QAM - Full RB Configuration)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27-A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 63 of 297

NR Band n66 Antenna A



Plot 7-101. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz DFT-s-OFDM BPSK - Full RB)



Plot 7-102. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM QPSK - Full RB)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27-A3L	Test Dates: 9/23 – 12/10/2020	EUT Type: Portable Handset		Page 64 of 297



Plot 7-103. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM 16QAM - Full RB)

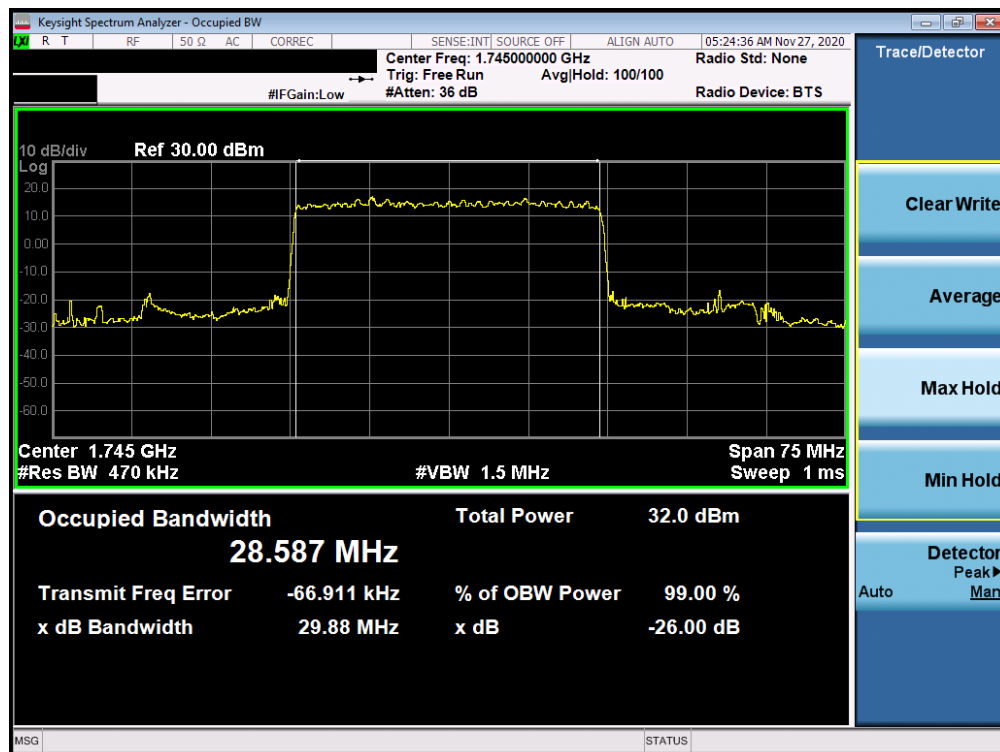


Plot 7-104. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM 64QAM - Full RB)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27-A3L	Test Dates: 9/23 – 12/10/2020	EUT Type: Portable Handset		Page 65 of 297

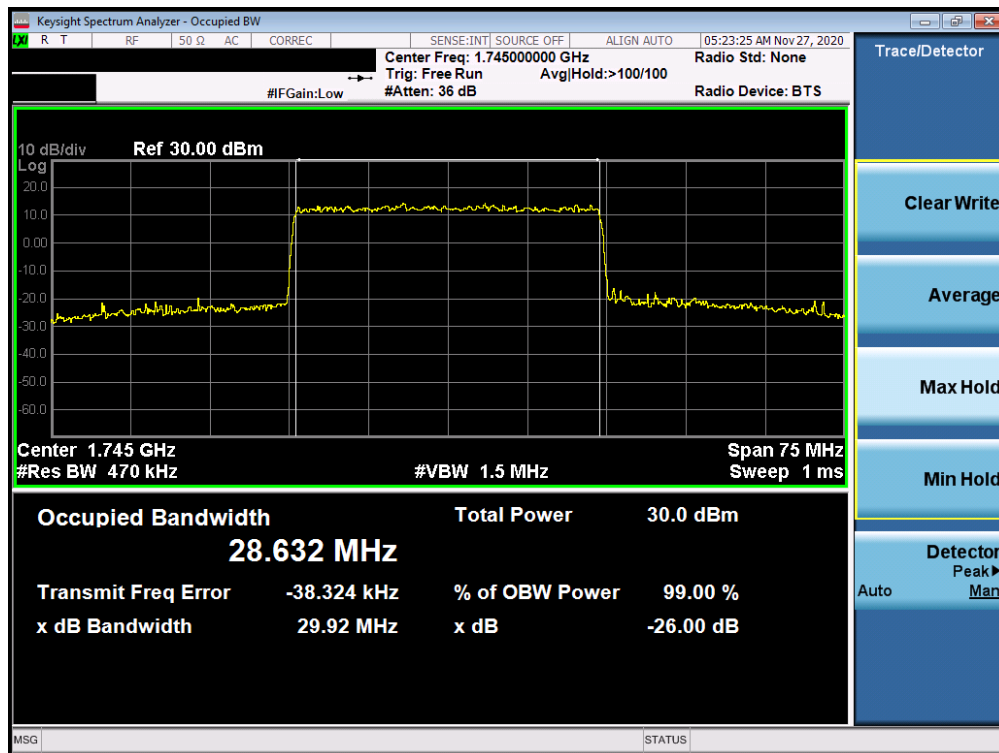


Plot 7-105. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM 256QAM - Full RB)

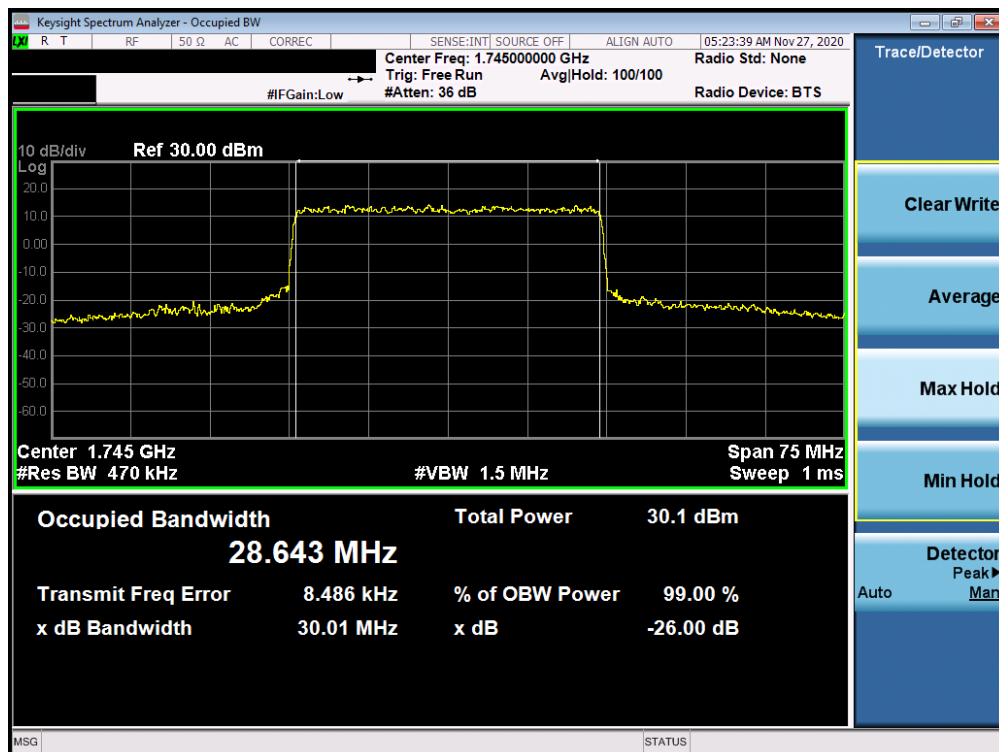


Plot 7-106. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz DFT-s-OFDM BPSK - Full RB)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27.A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 66 of 297

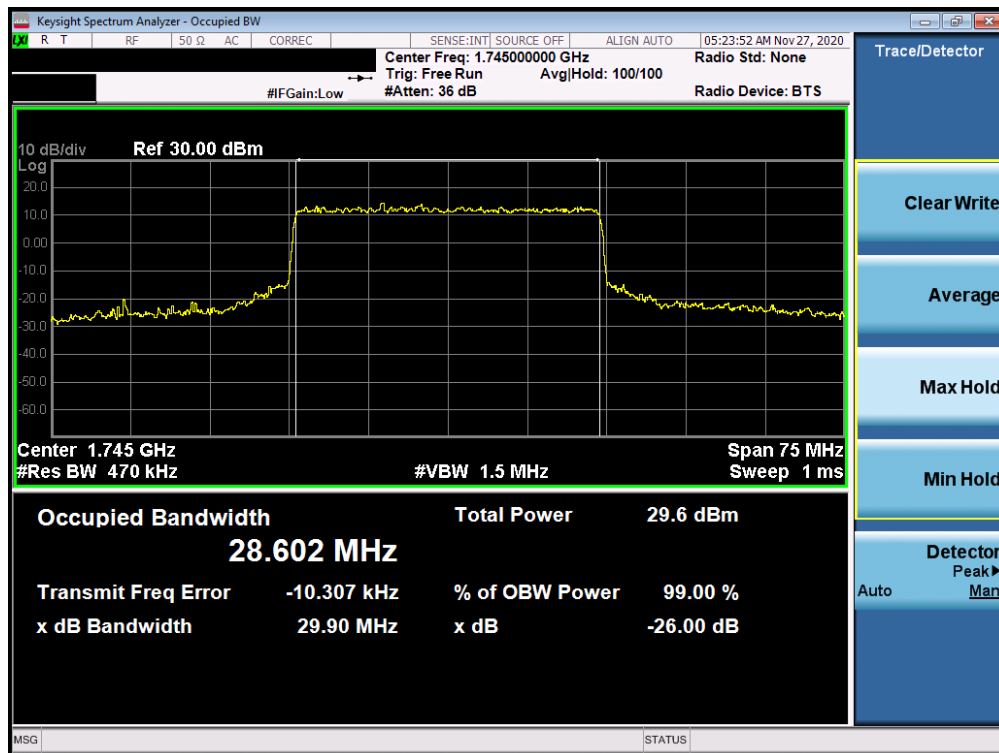


Plot 7-107. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM QPSK - Full RB)

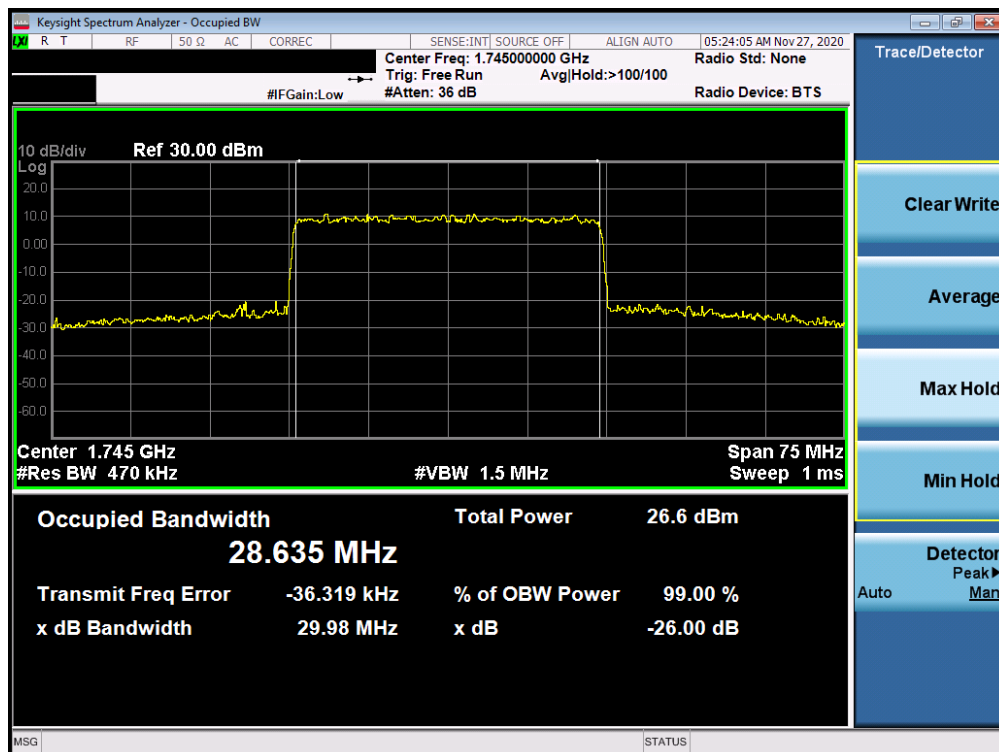


Plot 7-108. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM 16QAM - Full RB)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27-A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 67 of 297

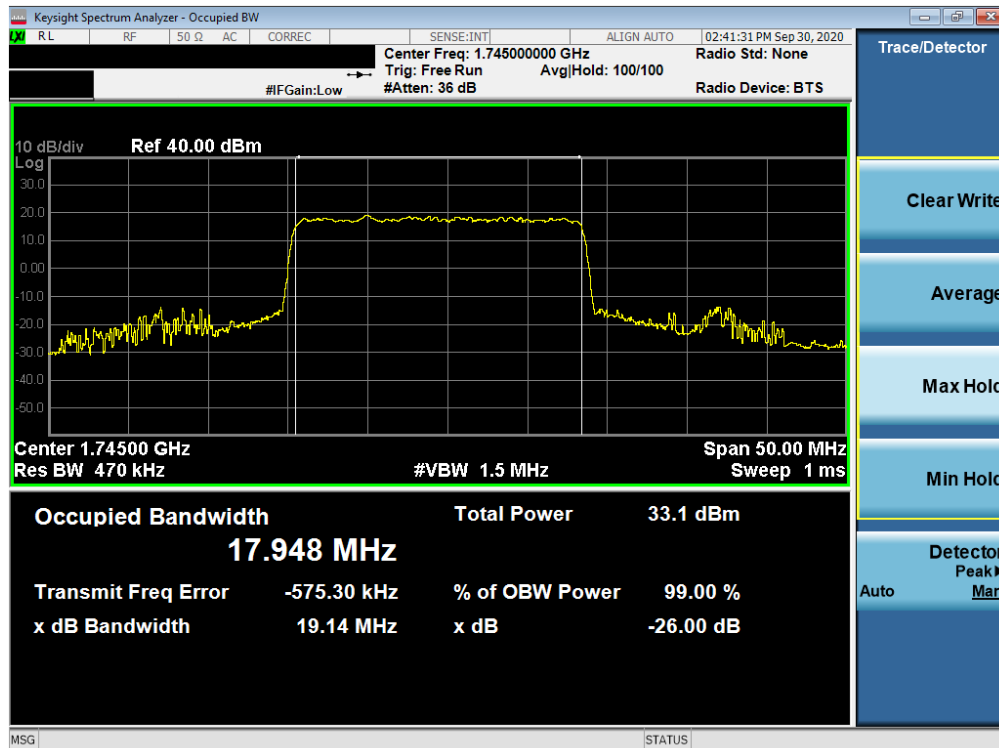


Plot 7-109. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM 64QAM - Full RB)

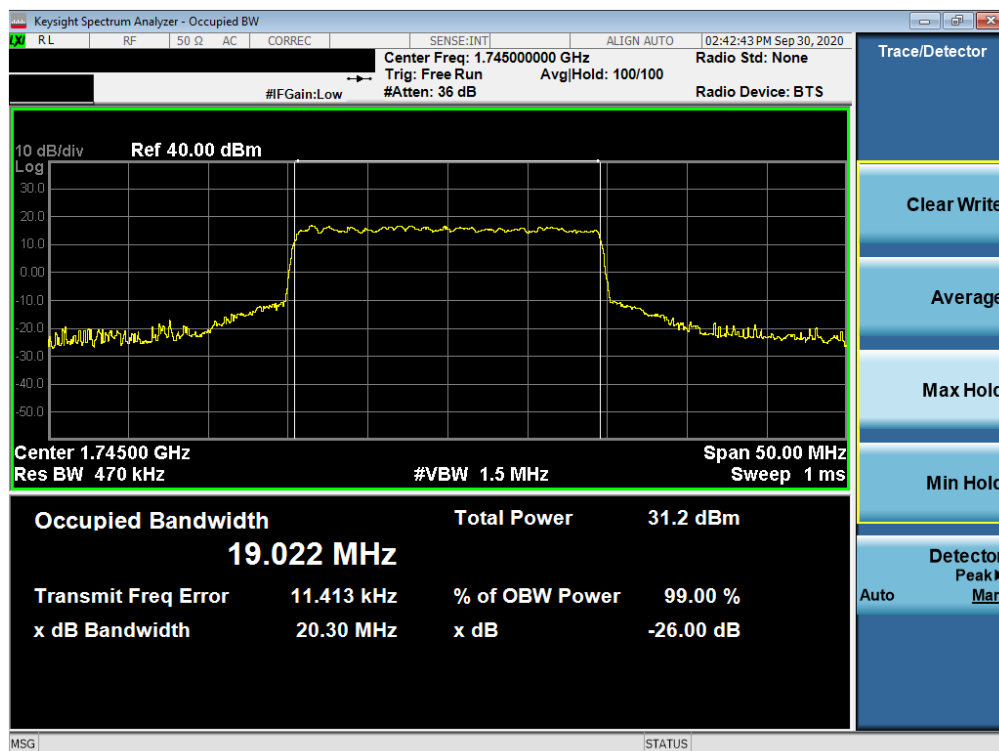


Plot 7-110. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM 256QAM - Full RB)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
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Plot 7-111. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz DFT-s-OFDM BPSK - Full RB)

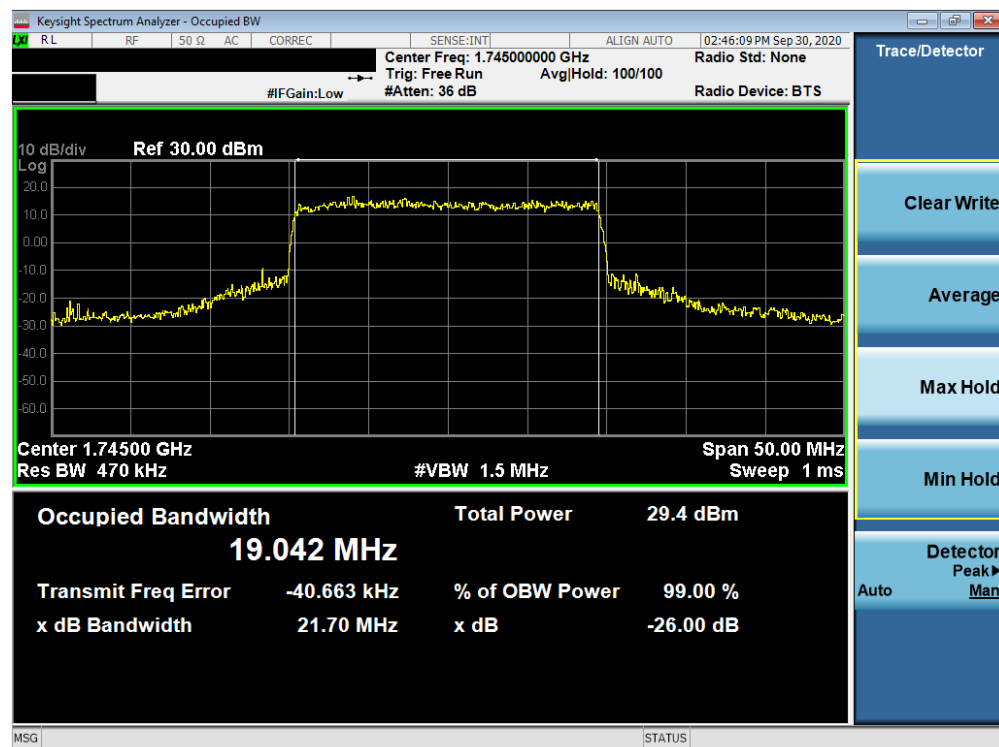


Plot 7-112. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM QPSK - Full RB)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27.A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 69 of 297

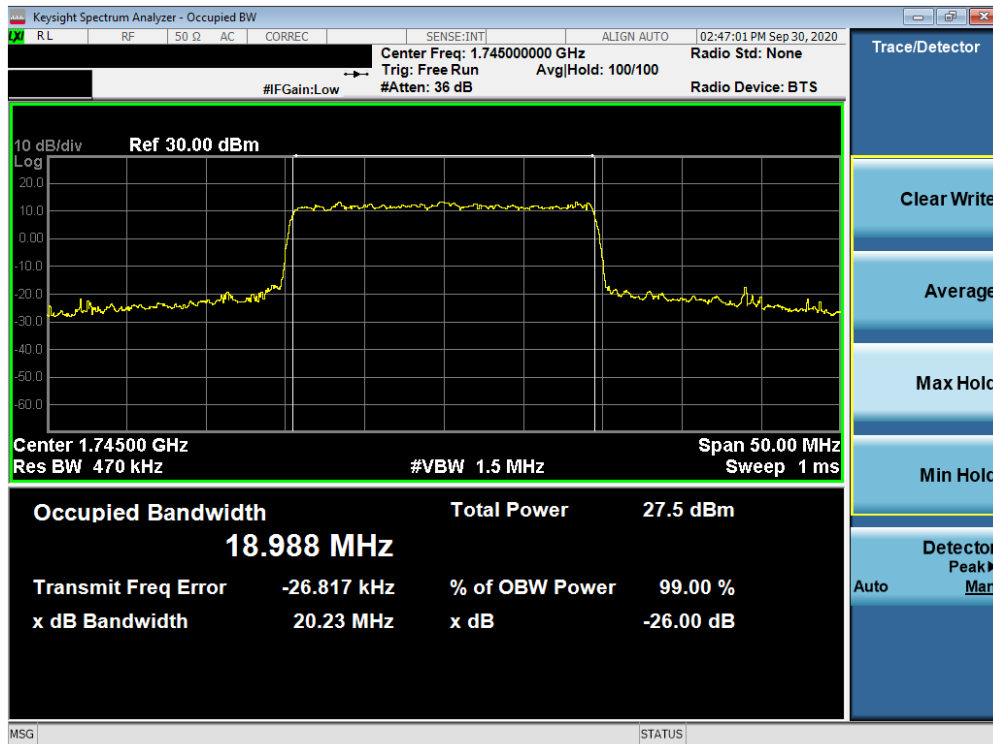


Plot 7-113. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM 16QAM - Full RB)

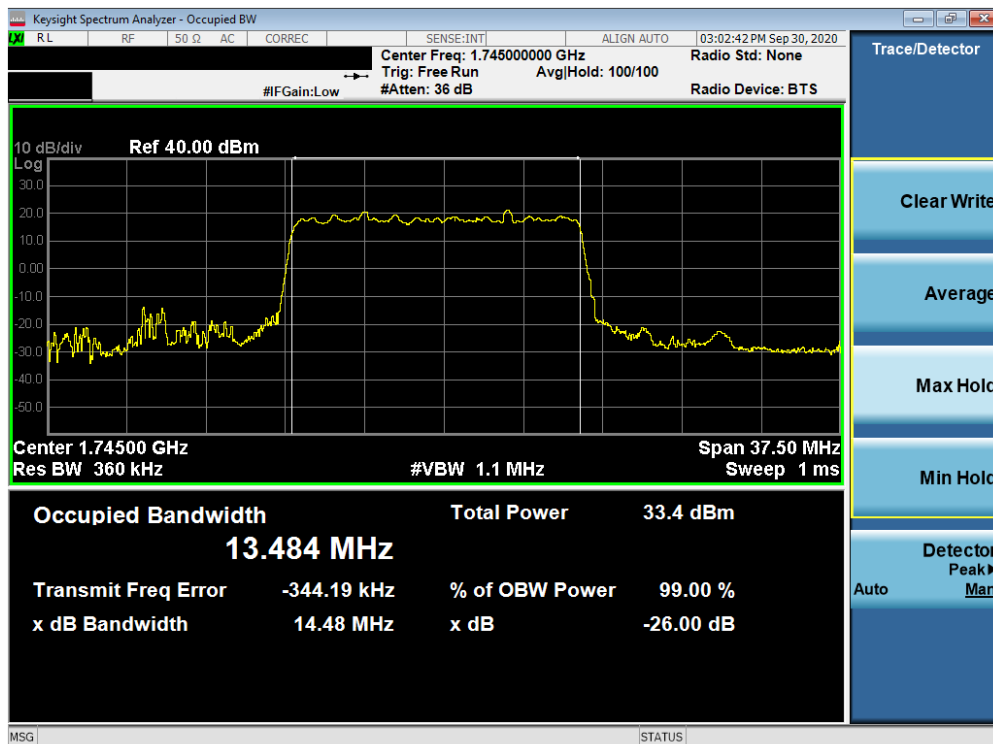


Plot 7-114. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM 64QAM - Full RB)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
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Plot 7-115. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM 256QAM - Full RB)



Plot 7-116. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz DFT-s-OFDM BPSK - Full RB)

FCC ID: A3LSMG998U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M2009230152-27.A3L	Test Dates: 9/23 - 12/10/2020	EUT Type: Portable Handset		Page 71 of 297