



PART 27 MEASUREMENT REPORT

Applicant Name:

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

Date of Testing:

04/12/2021 - 06/04/2021

Test Site/Location:

PCTEST Lab. Columbia, MD, USA

Test Report Serial No.:

1M2104070032-04.A3L

FCC ID:

A3LSMF711U

APPLICANT:

Samsung Electronics Co., Ltd.

Application Type:

Certification

Model:

SM-F711U

Additional Model(s):

SM-F711U1

EUT Type:

Portable Handset

FCC Classification:

PCS Licensed Transmitter Held to Ear (PCE)

FCC Rule Part:

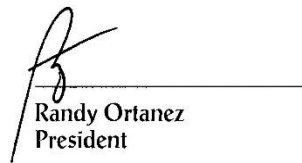
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Test Procedure(s):

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







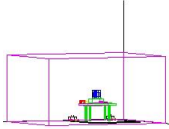
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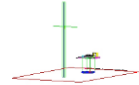
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FCC Part 27



Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	ERP		EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]	
LTE Band 71	20 MHz	QPSK	673.0 - 688.0	0.081	19.11	0.134	21.26	18M0G7D
		16QAM	673.0 - 688.0	0.069	18.41	0.114	20.56	17M9W7D
	15 MHz	QPSK	670.5 - 690.5	0.079	19.00	0.130	21.15	13M5G7D
		16QAM	670.5 - 690.5	0.069	18.41	0.114	20.56	13M5W7D
	10 MHz	QPSK	668.0 - 693.0	0.080	19.04	0.131	21.19	9M04G7D
		16QAM	668.0 - 693.0	0.069	18.41	0.114	20.56	8M98W7D
LTE Band 12	10 MHz	QPSK	665.5 - 695.5	0.078	18.94	0.128	21.09	4M51G7D
		16QAM	665.5 - 695.5	0.068	18.30	0.111	20.45	4M51W7D
	5 MHz	QPSK	704.0 - 711.0	0.081	19.08	0.133	21.23	9M01G7D
		16QAM	704.0 - 711.0	0.071	18.54	0.117	20.69	8M99W7D
	3 MHz	QPSK	701.5 - 713.5	0.084	19.24	0.138	21.39	4M51G7D
		16QAM	701.5 - 713.5	0.070	18.48	0.116	20.63	4M50W7D
LTE Band 13	10 MHz	QPSK	700.5 - 714.5	0.081	19.07	0.132	21.22	2M71G7D
		16QAM	700.5 - 714.5	0.071	18.53	0.117	20.68	2M72W7D
	5 MHz	QPSK	699.7 - 715.3	0.082	19.15	0.135	21.30	1M10G7D
		16QAM	699.7 - 715.3	0.069	18.40	0.113	20.55	1M10W7D
	1.4 MHz	QPSK	782.0	0.103	20.11	0.168	22.26	9M00G7D
		16QAM	782.0	0.084	19.26	0.138	21.41	8M94W7D
NR Band n71	10 MHz	QPSK	779.5 - 784.5	0.105	20.21	0.172	22.36	4M52G7D
		16QAM	779.5 - 784.5	0.082	19.16	0.135	21.31	4M50W7D
	5 MHz	QPSK	673.0 - 688.0	0.040	15.97	0.065	18.12	18M0G7D
		16QAM	673.0 - 688.0	0.039	15.87	0.063	18.02	19M0G7D
	15 MHz	QPSK	673.0 - 688.0	0.030	14.83	0.050	16.98	19M0W7D
		16QAM	673.0 - 688.0	0.030	14.83	0.050	16.98	19M0W7D
NR Band n12	15 MHz	QPSK	670.5 - 690.5	0.039	15.92	0.064	18.07	13M6G7D
		16QAM	670.5 - 690.5	0.039	15.96	0.065	18.11	14M2G7D
	10 MHz	QPSK	670.5 - 690.5	0.034	15.27	0.055	17.42	14M2W7D
		16QAM	670.5 - 690.5	0.034	15.27	0.055	17.42	14M2W7D
	5 MHz	QPSK	668.0 - 693.0	0.039	15.92	0.064	18.07	9M00G7D
		16QAM	668.0 - 693.0	0.039	15.87	0.063	18.02	9M36G7D
NR Band n12	15 MHz	QPSK	668.0 - 693.0	0.030	14.73	0.049	16.88	9M36W7D
		16QAM	668.0 - 693.0	0.030	14.73	0.049	16.88	9M36W7D
	10 MHz	QPSK	665.5 - 695.5	0.037	15.71	0.061	17.86	4M51G7D
		16QAM	665.5 - 695.5	0.037	15.71	0.061	17.86	4M51G7D
	5 MHz	QPSK	665.5 - 695.5	0.038	15.78	0.062	17.93	4M51G7D
		16QAM	665.5 - 695.5	0.038	15.78	0.062	17.93	4M51G7D
NR Band n12	15 MHz	QPSK	665.5 - 695.5	0.030	14.80	0.050	16.95	4M54W7D
		16QAM	665.5 - 695.5	0.030	14.80	0.050	16.95	4M54W7D
	10 MHz	QPSK	706.5 - 708.5	0.048	16.84	0.079	18.99	13M5G7D
		16QAM	706.5 - 708.5	0.048	16.84	0.079	18.99	13M5G7D
	5 MHz	QPSK	706.5 - 708.5	0.047	16.75	0.078	18.90	14M3G7D
		16QAM	706.5 - 708.5	0.047	16.75	0.078	18.90	14M3G7D
NR Band n12	15 MHz	QPSK	706.5 - 708.5	0.038	15.74	0.062	17.89	14M2W7D
		16QAM	706.5 - 708.5	0.038	15.74	0.062	17.89	14M2W7D
	10 MHz	QPSK	704.0 - 711.0	0.047	16.71	0.077	18.86	8M95G7D
		16QAM	704.0 - 711.0	0.047	16.71	0.077	18.86	8M95G7D
	5 MHz	QPSK	704.0 - 711.0	0.046	16.67	0.076	18.82	9M32G7D
		16QAM	704.0 - 711.0	0.046	16.67	0.076	18.82	9M32G7D
NR Band n12	15 MHz	QPSK	704.0 - 711.0	0.036	15.54	0.059	17.69	9M31W7D
		16QAM	704.0 - 711.0	0.036	15.54	0.059	17.69	9M31W7D
	10 MHz	QPSK	701.5 - 713.5	0.048	16.85	0.079	19.00	4M50G7D
		16QAM	701.5 - 713.5	0.048	16.85	0.079	19.00	4M50G7D
	5 MHz	QPSK	701.5 - 713.5	0.047	16.74	0.077	18.89	4M51G7D
		16QAM	701.5 - 713.5	0.047	16.74	0.077	18.89	4M51G7D
NR Band n12	15 MHz	QPSK	701.5 - 713.5	0.037	15.63	0.060	17.78	4M52W7D
		16QAM	701.5 - 713.5	0.037	15.63	0.060	17.78	4M52W7D
	10 MHz	QPSK	701.5 - 713.5	0.037	15.63	0.060	17.78	4M52W7D
		16QAM	701.5 - 713.5	0.037	15.63	0.060	17.78	4M52W7D
	5 MHz	QPSK	701.5 - 713.5	0.037	15.63	0.060	17.78	4M52W7D
		16QAM	701.5 - 713.5	0.037	15.63	0.060	17.78	4M52W7D



Overview Table (<1GHz Bands)

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Mode	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
			Max. Power [W]	Max. Power [dBm]	
LTE Band 66/4	QPSK	1720.0 - 1770.0	0.201	23.04	18M0G7D
	16QAM	1720.0 - 1770.0	0.175	22.42	18M0W7D
	QPSK	1717.5 - 1772.5	0.201	23.03	13M5G7D
	16QAM	1717.5 - 1772.5	0.178	22.50	13M5W7D
	QPSK	1715.0 - 1775.0	0.196	22.92	9M00G7D
	16QAM	1715.0 - 1775.0	0.168	22.25	9M02W7D
	QPSK	1712.5 - 1777.5	0.197	22.94	4M51G7D
	16QAM	1712.5 - 1777.5	0.163	22.12	4M54W7D
	QPSK	1711.5 - 1778.5	0.204	23.11	2M72G7D
	16QAM	1711.5 - 1778.5	0.165	22.17	2M71W7D
	QPSK	1710.7 - 1779.3	0.195	22.91	1M09G7D
	16QAM	1710.7 - 1779.3	0.159	22.01	1M10W7D
NR Band n66 ANT A	$\pi/2$ BPSK	1730.0 - 1760.0	0.263	24.21	38M6G7D
	QPSK	1730.0 - 1760.0	0.257	24.11	38M7G7D
	16QAM	1730.0 - 1760.0	0.215	23.33	38M6W7D
	$\pi/2$ BPSK	1725.0 - 1765.0	0.264	24.22	28M7G7D
	QPSK	1725.0 - 1765.0	0.257	24.10	28M8G7D
	16QAM	1725.0 - 1765.0	0.224	23.49	28M7W7D
	$\pi/2$ BPSK	1720.0 - 1770.0	0.263	24.19	17M9G7D
	QPSK	1720.0 - 1770.0	0.244	23.88	19M0G7D
	16QAM	1720.0 - 1770.0	0.208	23.18	19M0W7D
	$\pi/2$ BPSK	1717.5 - 1772.5	0.262	24.19	13M5G7D
	QPSK	1717.5 - 1772.5	0.246	23.91	14M2G7D
	16QAM	1717.5 - 1772.5	0.202	23.05	14M2W7D
	$\pi/2$ BPSK	1715.0 - 1775.0	0.263	24.19	8M97G7D
	QPSK	1715.0 - 1775.0	0.243	23.86	9M33G7D
	16QAM	1715.0 - 1775.0	0.195	22.90	9M35W7D
	$\pi/2$ BPSK	1712.5 - 1777.5	0.265	24.23	4M50G7D
	QPSK	1712.5 - 1777.5	0.249	23.96	4M50G7D
	16QAM	1712.5 - 1777.5	0.206	23.13	4M50W7D



Mode	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
			Max. Power [W]	Max. Power [dBm]	
WCDMA1700	Spread Spectrum	1712.4 - 1752.6	0.246	23.90	4M17F9W

Overview Table (>1GHz Bands)

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Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n66 ANT 1	40 MHz	$\pi/2$ BPSK	1730.0 - 1760.0	0.153	21.84	38M8G7D
		QPSK	1730.0 - 1760.0	0.152	21.82	38M6G7D
		16QAM	1730.0 - 1760.0	0.116	20.63	38M5W7D
	30 MHz	$\pi/2$ BPSK	1725.0 - 1765.0	0.157	21.95	28M8G7D
		QPSK	1725.0 - 1765.0	0.159	22.00	28M7G7D
		16QAM	1725.0 - 1765.0	0.114	20.55	28M7W7D
	20 MHz	$\pi/2$ BPSK	1720.0 - 1770.0	0.152	21.82	17M9G7D
		QPSK	1720.0 - 1770.0	0.159	22.02	19M0G7D
		16QAM	1720.0 - 1770.0	0.112	20.47	19M0W7D
	15 MHz	$\pi/2$ BPSK	1717.5 - 1772.5	0.154	21.89	13M4G7D
		QPSK	1717.5 - 1772.5	0.156	21.94	14M2G7D
		16QAM	1717.5 - 1772.5	0.114	20.57	14M2W7D
	10 MHz	$\pi/2$ BPSK	1715.0 - 1775.0	0.149	21.74	8M99G7D
		QPSK	1715.0 - 1775.0	0.159	22.00	9M32G7D
		16QAM	1715.0 - 1775.0	0.109	20.39	9M36W7D
	5 MHz	$\pi/2$ BPSK	1712.5 - 1777.5	0.156	21.92	4M50G7D
		QPSK	1712.5 - 1777.5	0.157	21.95	4M51G7D
		16QAM	1712.5 - 1777.5	0.116	20.65	4M50W7D

Overview Table (>1GHz Bands)

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1.0 INTRODUCTION

1.1 Scope

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



1.2 PCTEST Test Location

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

1.3 Test Facility / Accreditations

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

- PCTEST is an ISO 17025-2017 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.

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMF711U**. 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.: 0846M, 0859M, 0130M, 0129M, 0151M, 0880M, 0811M, 0193M

2.2 Device Capabilities

This device contains the following capabilities:

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

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.

This device supports two configurations: one is with screen open, and one is with screen closed. Both configurations are tested, and 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:

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

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 (dBi) or an isotropic source (dBd). 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 414788 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
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
Espec	ESX-2CA	Environmental Chamber	8/27/2020	Annual	8/27/2022	17620
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/12/2020	Biennial	3/12/2022	128337
Keysight Technologies	N9020A	MXA Signal Analyzer	8/14/2020	Annual	8/14/2021	US46470561
Keysight Technologies	N9038A	MXE EMI Receiver	8/11/2020	Annual	8/11/2021	MY51210133
Keysight Technologies	N9030A	PXA Signal Analyzer (44GHz)	8/17/2020	Annual	8/17/2021	MY52350166
Keysight Technologies	N9020A	MXA Signal Analyzer	9/22/2020	Annual	9/22/2021	MY54500644
Keysight Technologies	N9030B	PXA Signal Analyzer, Multi-touch	9/17/2020	Annual	9/17/2021	MY57141001
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	ESU40	EMI Test Receiver (40GHz)	9/9/2020	Annual	9/9/2021	100348
Rohde & Schwarz	FSW67	Signal / Spectrum Analyzer	8/10/2020	Annual	8/10/2021	103200
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
-	AP2	EMC Cable and Switch System	9/9/2020	Annual	9/9/2021	AP2
-	AP1	EMC Cable and Switch System	9/10/2020	Annual	9/10/2021	AP1
-	LTx2	Licensed Transmitter Cable Set	9/16/2020	Annual	9/16/2021	LTx2
-	LTx3	Licensed Transmitter Cable Set	8/28/2020	Annual	8/28/2021	LTx3
-	LTx4	Licensed Transmitter Cable Set	9/16/2020	Annual	9/16/2021	LTx4
-	LTx5	Licensed Transmitter Cable Set	9/16/2020	Annual	9/16/2021	LTx5

Table 5-1. Test Equipment

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

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: A3LSMF711U
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 Mode(s): WCDMA/LTE/NR



Test Condition	Test Description	FCC Part Section(s)	Test Limit	Test Result	Reference
CONDUCTED	Conducted Power	2.1046	N/A	PASS	Section 7.2, 7.7
	Occupied Bandwidth	2.1049	N/A	PASS	Section 7.3
	Conducted Band Edge / Spurious Emissions	2.1051, 27.53	> 43 + 10log10(P[Watts]) at Band Edge and for all out-of-band emissions	PASS	Sections 7.4, 7.5, 7.7
	Peak-Average Ratio	27.50(d)(5)	< 13 dB	PASS	Section 7.6
	Transmitter Conducted Output Power	2.1046	N/A	PASS	See RF Exposure Report
	Frequency Stability	2.1055, 27.54	Fundamental emissions stay within authorized frequency block	PASS	Section 7.10
RADIATED	Effective Radiated Power / Equivalent Isotropic Radiated Power (LTE Band 71)	27.50(c)(10)	< 3 Watts max. ERP < 5 Watts max. EIRP	PASS	Section 7.8
	Effective Radiated Power / Equivalent Isotropic Radiated Power (NR Band n71)			PASS	Section 7.8
	Effective Radiated Power / Equivalent Isotropic Radiated Power (LTE Band 12)			PASS	Section 7.8
	Effective Radiated Power / Equivalent Isotropic Radiated Power (NR Band n12)			PASS	Section 7.8
	Effective Radiated Power / Equivalent Isotropic Radiated Power (LTE Band 13)	27.50(b)(10)	< 3 Watts max. ERP < 5 Watts max. EIRP	PASS	Section 7.8
	Equivalent Isotropic Radiated Power (WCDMA)	27.50(d)(4)	< 1 Watts max. EIRP	PASS	Section 7.8
	Equivalent Isotropic Radiated Power (NR Band n66)			PASS	Section 7.8
	Equivalent Isotropic Radiated Power (LTE Band 4/66)			PASS	Section 7.8
	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 7.9
	Radiated Spurious Emissions	2.1053, 27.53	> 43 + 10 log10 (P[Watts]) for all out-of-band emissions	PASS	Section 7.7, 7.9

Table 7-1. Summary of Test Results

FCC ID: A3LSMF711U	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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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 EST Automation Version 1.1, 2G/3G Automation Version 4.2.
- 5) Due to MPR application across all bands, data for only the lowest order modulation is included in this section.

FCC ID: A3LSMF711U	 PART 27 MEASUREMENT REPORT 	Approved by: Technical Manager
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7.2 Conducted Power Output Data

§2.1046

Test Overview

The EUT is set up to transmit at maximum power for LTE. All power levels are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

A-MPR is implemented in this device per the A-MPR specification in 3GPP TS 36.101. The conducted powers are shown herein to cover the different A-MPR levels specified in the standard. Measurement equipment was set up with triggering/gating on the spectrum analyzer such that powers were measured only during the on-time of the signal.

Test Procedure Used

KDB 971168 D01 v03r01 – Section 6.0

Test Settings

1. Span = 2 x OBW to 3 x OBW
2. RBW = 1% to 5% of the OBW
3. Number of measurement points in sweep $\geq 2 \times \text{span} / \text{RBW}$
4. Sweep = auto-couple (less than transmission burst duration)
5. Detector = RMS (power)
6. Trigger was set to enable power measurements only on full power bursts
7. Trace was allowed to stabilize
8. Spectrum analyzer's "Channel Power" function was used to compute the power by integrating the spectrum across the OBW of the signal

Test Setup

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

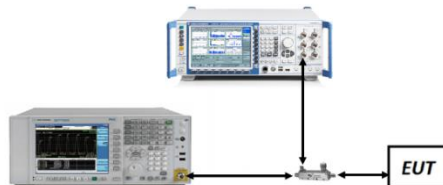




Figure 7-1. Test Instrument & Measurement Setup

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 14 of 254

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
40 MHz	$\pi/2$ BPSK	346000	1730.0	1 / 54	24.19
	QPSK	346000	1730.0	1 / 54	24.31
		349000	1745.0	1 / 108	23.97
		352000	1760.0	1 / 54	24.12
	16-QAM	346000	1730.0	1 / 54	22.91
	64-QAM	346000	1730.0	1 / 54	21.78
	256-QAM	346000	1730.0	1 / 54	19.73
30 MHz	$\pi/2$ BPSK	345000	1725.0	1 / 40	24.31
	QPSK	345000	1725.0	1 / 40	24.39
		349000	1745.0	1 / 40	24.06
		353000	1765.0	1 / 40	23.88
	16-QAM	345000	1725.0	1 / 40	23.06
	64-QAM	345000	1725.0	1 / 40	21.63
	256-QAM	345000	1725.0	1 / 40	19.91
20 MHz	$\pi/2$ BPSK	344000	1720.0	1 / 26	24.32
	QPSK	344000	1720.0	1 / 26	24.23
	16-QAM	344000	1720.0	1 / 26	23.20
	64-QAM	344000	1720.0	1 / 26	21.37
	256-QAM	344000	1720.0	1 / 26	19.81
15 MHz	$\pi/2$ BPSK	343500	1717.5	1 / 20	24.28
	QPSK	343500	1717.5	1 / 20	24.13
		349000	1745.0	1 / 20	23.90
		354500	1772.5	1 / 58	23.66
	16-QAM	343500	1717.5	1 / 20	23.15
	64-QAM	343500	1717.5	1 / 20	21.43
10 MHz	256-QAM	343500	1717.5	1 / 20	19.97
	$\pi/2$ BPSK	343000	1715.0	1 / 13	24.17
	QPSK	343000	1715.0	1 / 13	24.19
		349000	1745.0	1 / 26	23.96
		355000	1775.0	1 / 13	23.50
	16-QAM	343000	1715.0	1 / 13	23.16
5 MHz	64-QAM	343000	1715.0	1 / 13	21.58
	256-QAM	343000	1715.0	1 / 13	19.78
	$\pi/2$ BPSK	342500	1712.5	1 / 12	24.26
	QPSK	342500	1712.5	1 / 12	24.37
		349000	1745.0	1 / 18	23.97
		355500	1777.5	1 / 12	23.60
	16-QAM	342500	1712.5	1 / 12	23.08
	64-QAM	342500	1712.5	1 / 12	21.10
	256-QAM	342500	1712.5	1 / 12	19.86

Table 7-2. Conducted Power Output Data (n66 ANT I)

FCC ID: A3LSMF711U	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset	Page 15 of 254

7.3 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.

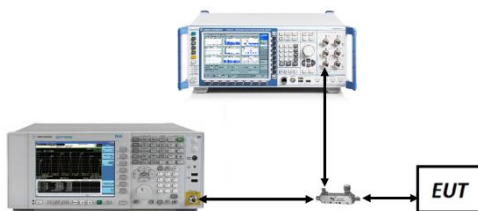


Figure 7-2. Test Instrument & Measurement Setup

Test Notes

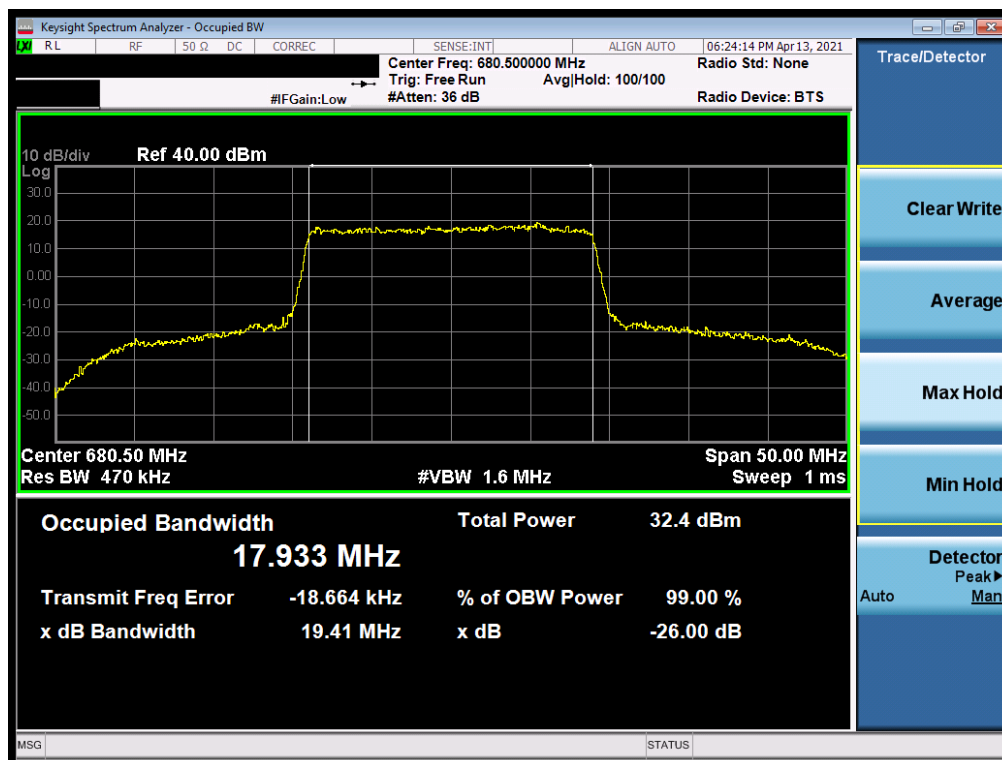
None.

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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LTE Band 71



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

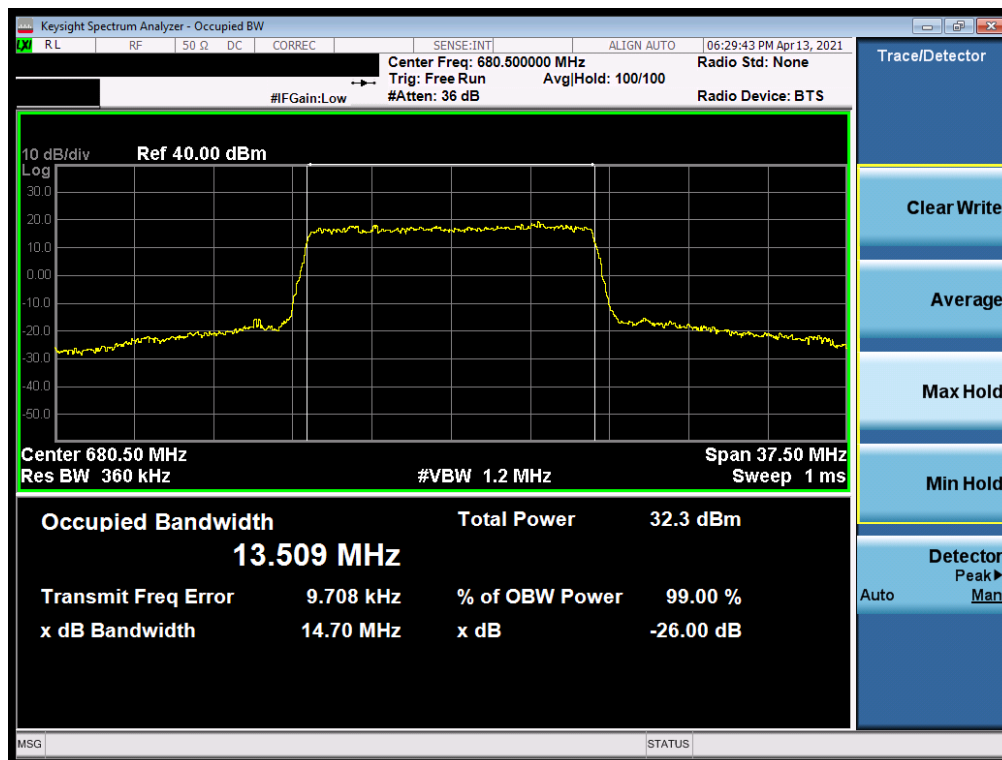


Plot 7-2. Occupied Bandwidth Plot (LTE Band 71 - 20MHz 16-QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 17 of 254

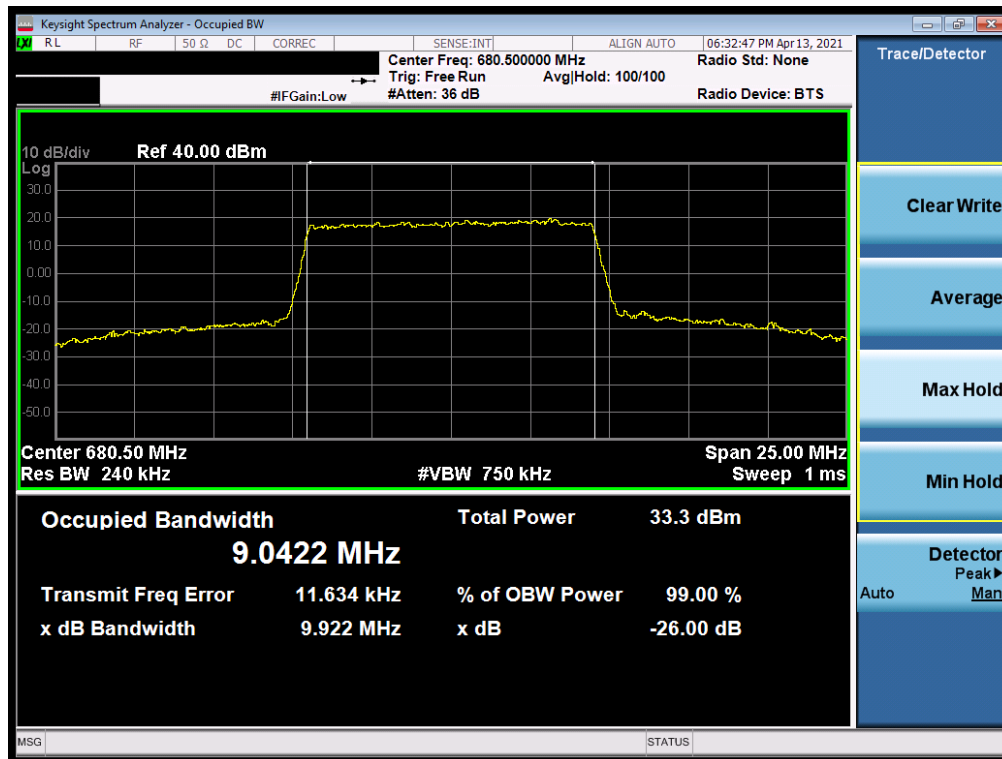


Plot 7-3. Occupied Bandwidth Plot (LTE Band 71 - 15MHz QPSK - Full RB)



Plot 7-4. Occupied Bandwidth Plot (LTE Band 71 - 15MHz 16-QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 18 of 254

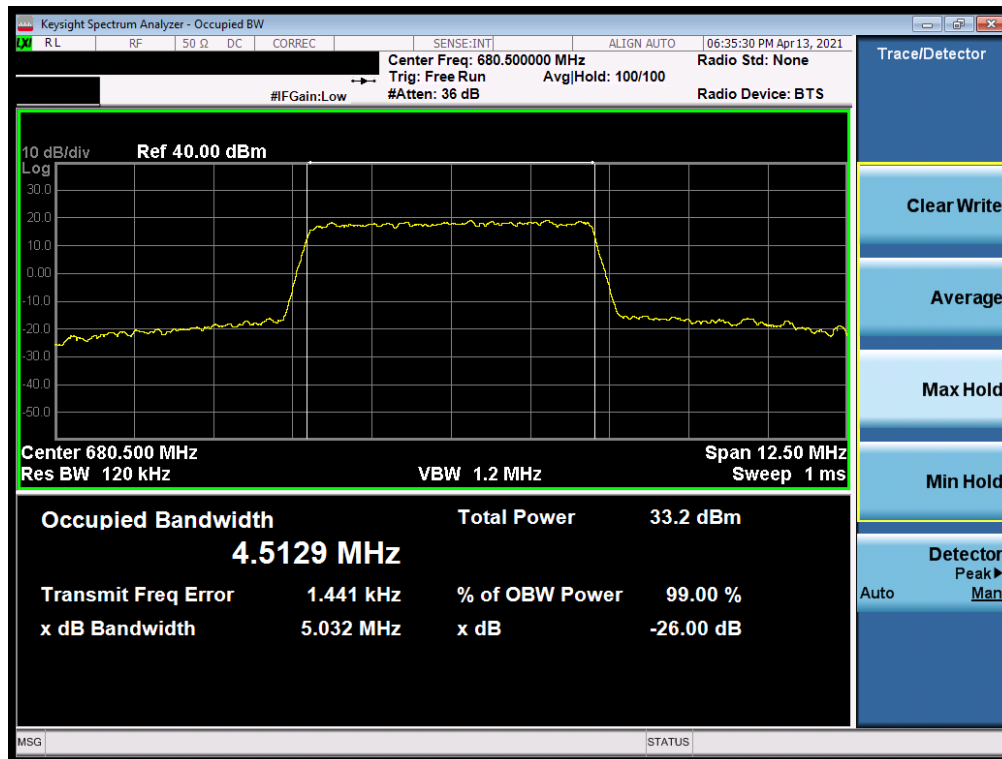


Plot 7-5. Occupied Bandwidth Plot (LTE Band 71 - 10MHz QPSK - Full RB)



Plot 7-6. Occupied Bandwidth Plot (LTE Band 71 - 10MHz 16-QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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Plot 7-7. Occupied Bandwidth Plot (LTE Band 71 - 5MHz QPSK - Full RB)



Plot 7-8. Occupied Bandwidth Plot (LTE Band 71 - 5MHz 16-QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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LTE Band 12



Plot 7-9. Occupied Bandwidth Plot (LTE Band 12 - 10MHz QPSK - Full RB)

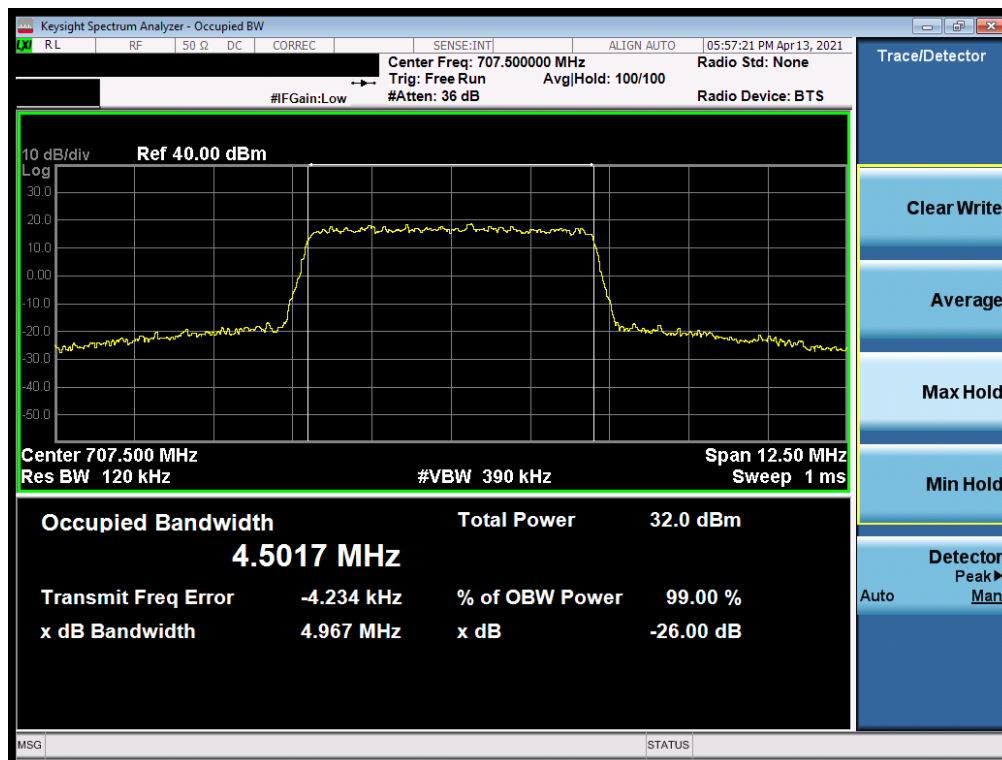


Plot 7-10. Occupied Bandwidth Plot (LTE Band 12 - 10MHz 16-QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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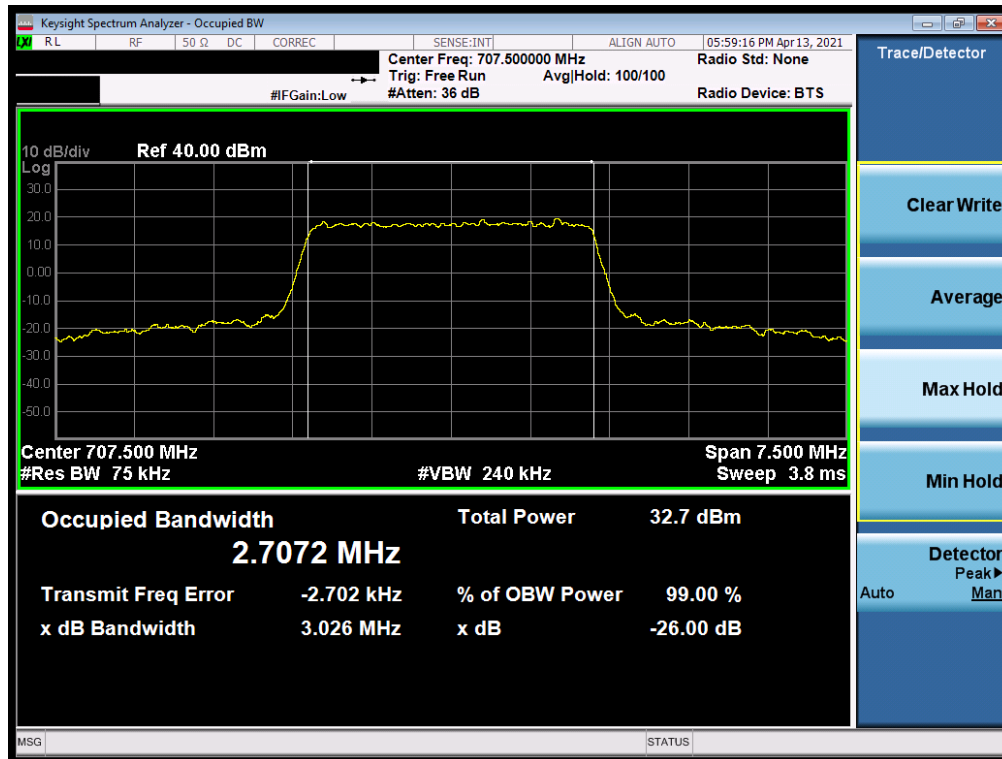


Plot 7-11. Occupied Bandwidth Plot (LTE Band 12 - 5MHz QPSK - Full RB)



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

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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Plot 7-13. Occupied Bandwidth Plot (LTE Band 12 - 3MHz QPSK - Full RB)



Plot 7-14. Occupied Bandwidth Plot (LTE Band 12 - 3MHz 16-QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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Plot 7-15. Occupied Bandwidth Plot (LTE Band 12 – 1.4MHz QPSK - Full RB)



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

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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LTE Band 13

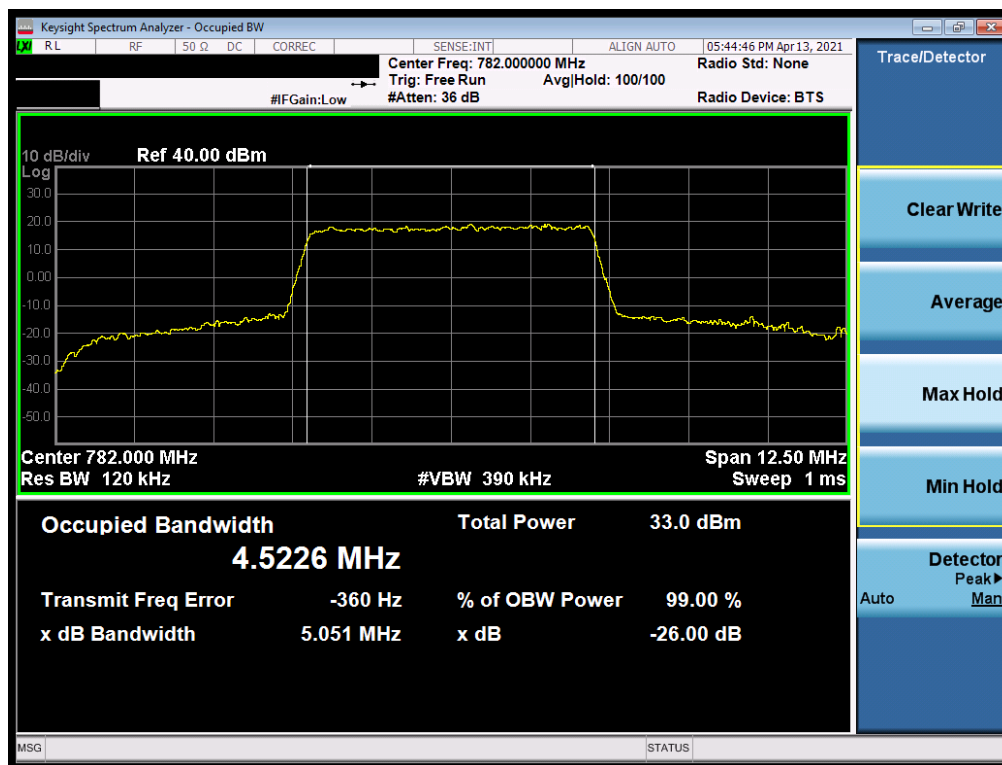


Plot 7-17. Occupied Bandwidth Plot (LTE Band 13 - 10MHz QPSK - Full RB)



Plot 7-18. Occupied Bandwidth Plot (LTE Band 13 - 10MHz 16-QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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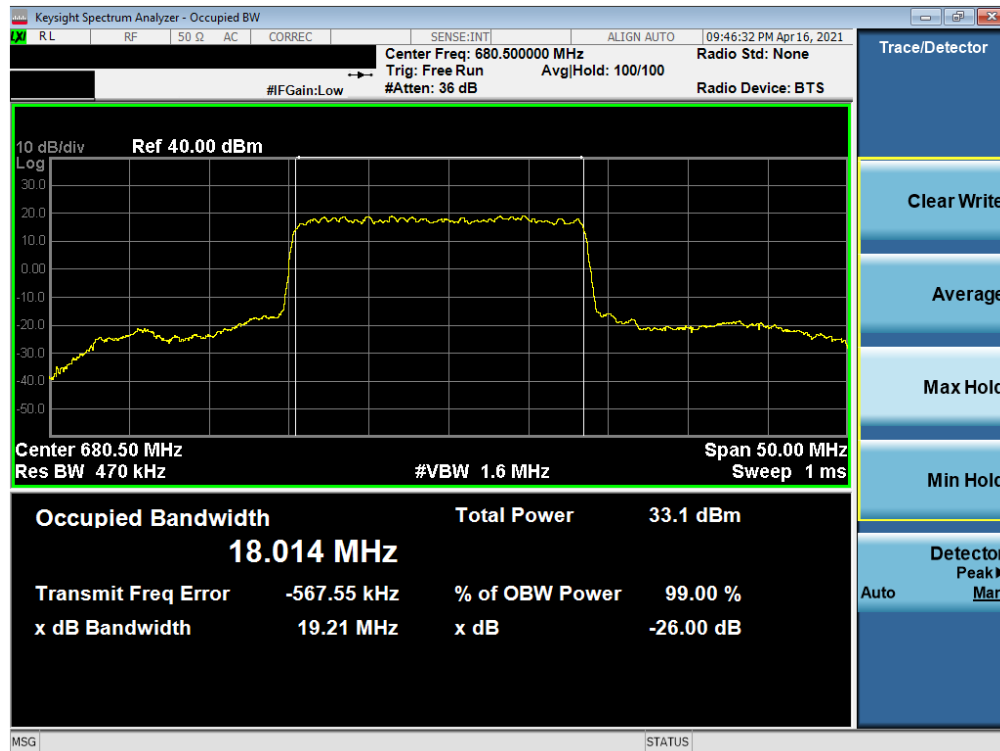
Plot 7-19. Occupied Bandwidth Plot (LTE Band 13 - 5MHz QPSK - Full RB)



Plot 7-20. Occupied Bandwidth Plot (LTE Band 13 - 5MHz 16-QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 26 of 254

NR Band n71

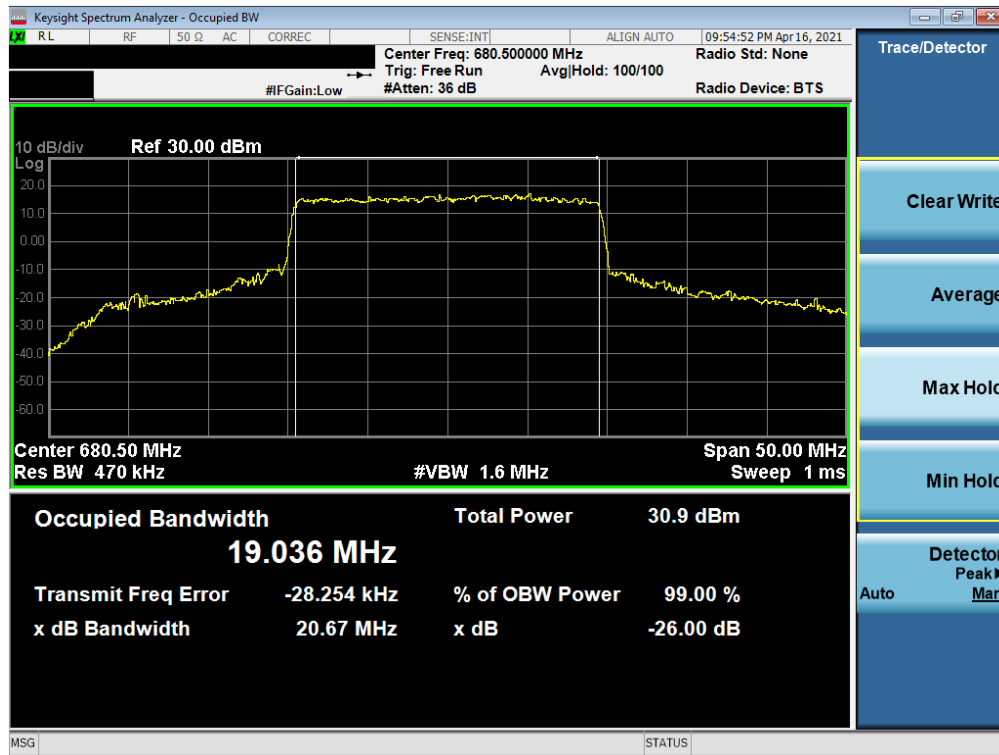


Plot 7-21. Occupied Bandwidth Plot (NR Band n71 - 20MHz DFT-s-OFDM BPSK - Full RB)

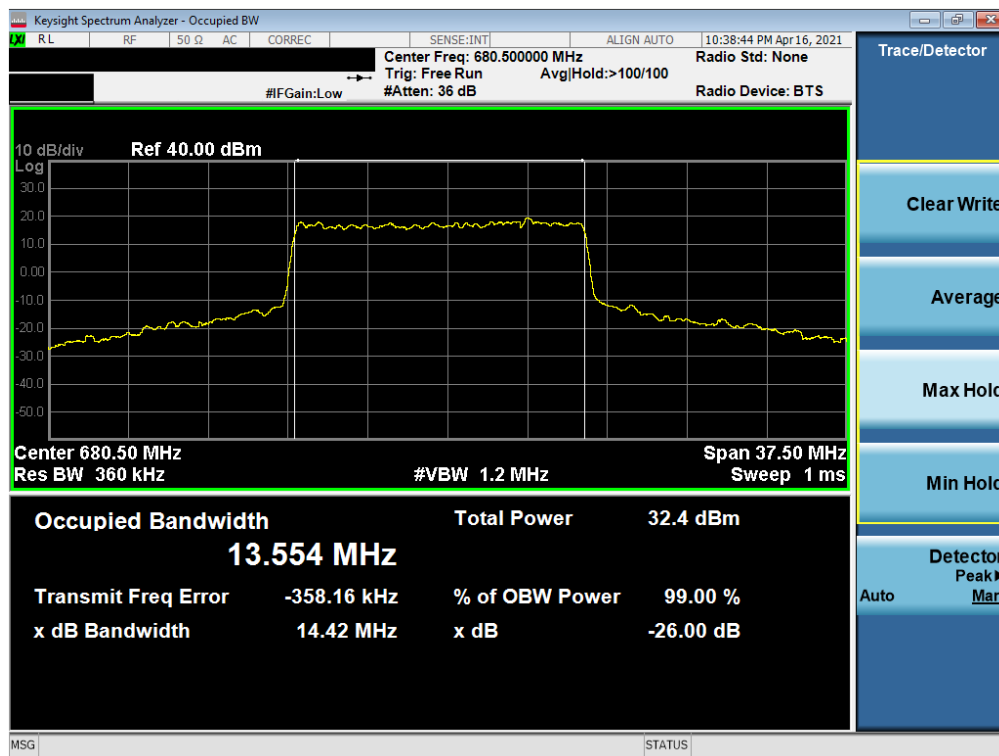


Plot 7-22. Occupied Bandwidth Plot (NR Band n71 - 20MHz CP-OFDM QPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 27 of 254

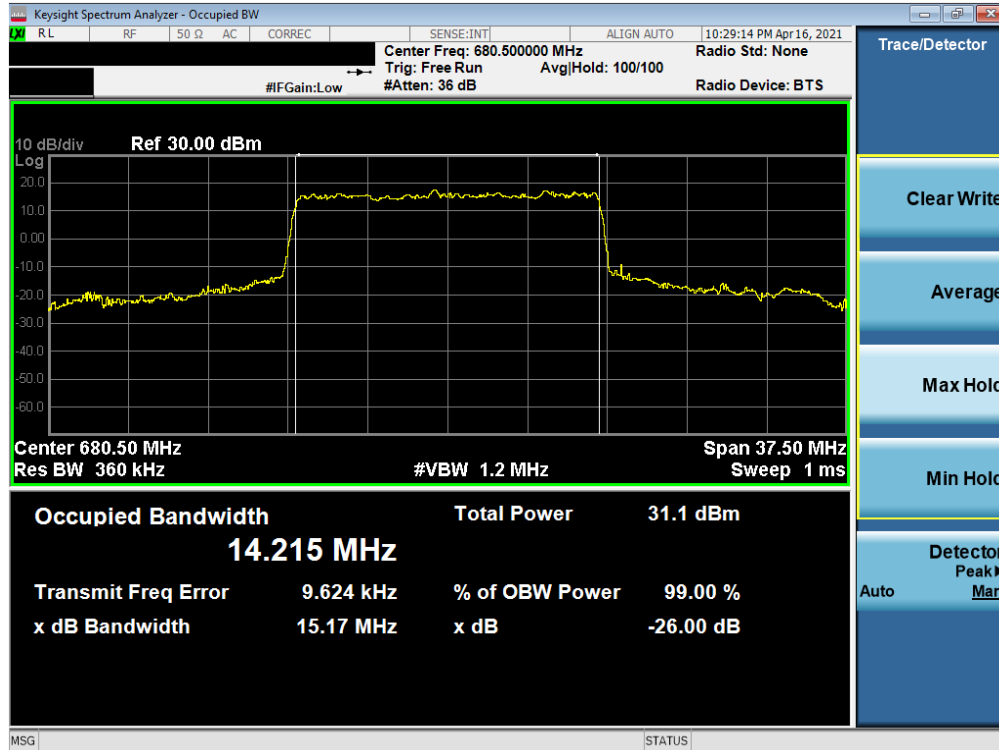


Plot 7-23. Occupied Bandwidth Plot (NR Band n71 - 20MHz CP-OFDM 16-QAM - Full RB)

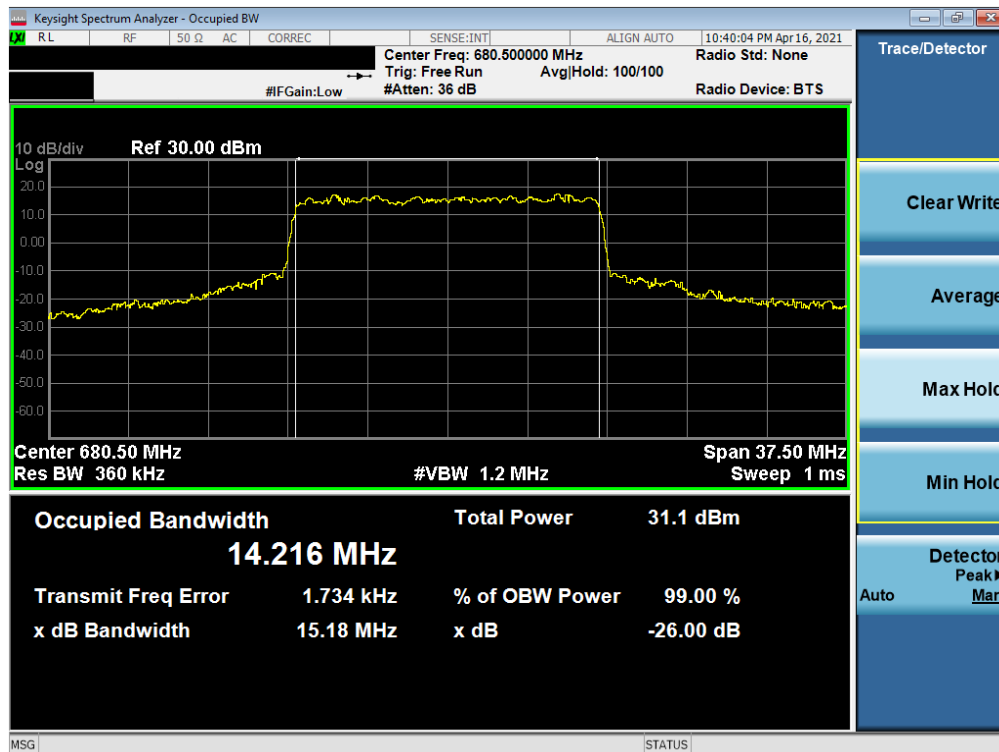


Plot 7-24. Occupied Bandwidth Plot (NR Band n71 - 15MHz DFT-s-OFDM BPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 28 of 254

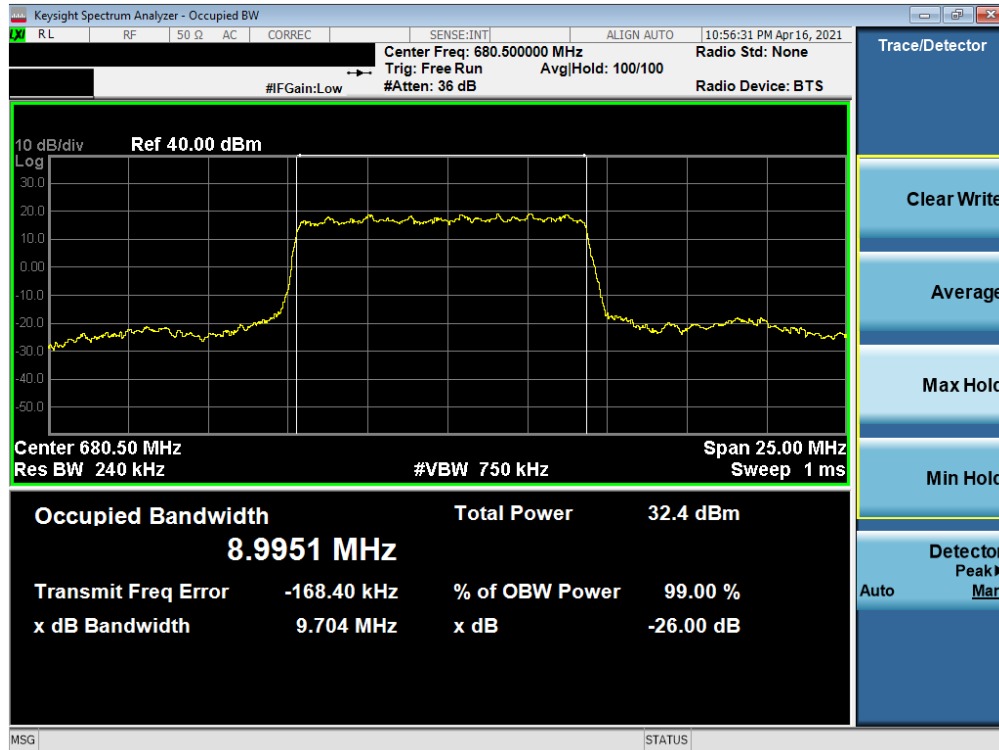


Plot 7-25. Occupied Bandwidth Plot (NR Band n71 - 15MHz QPSK - Full RB)

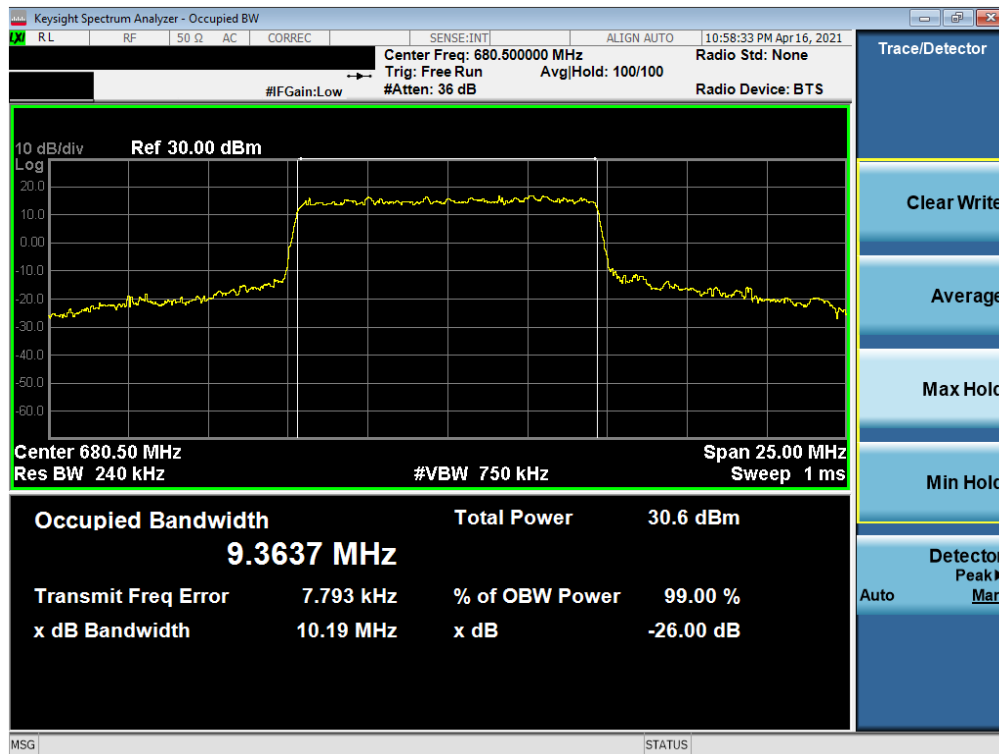


Plot 7-26. Occupied Bandwidth Plot (NR Band n71 - 15MHz CP-OFDM 16-QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 - 06/04/2021	EUT Type: Portable Handset		Page 29 of 254

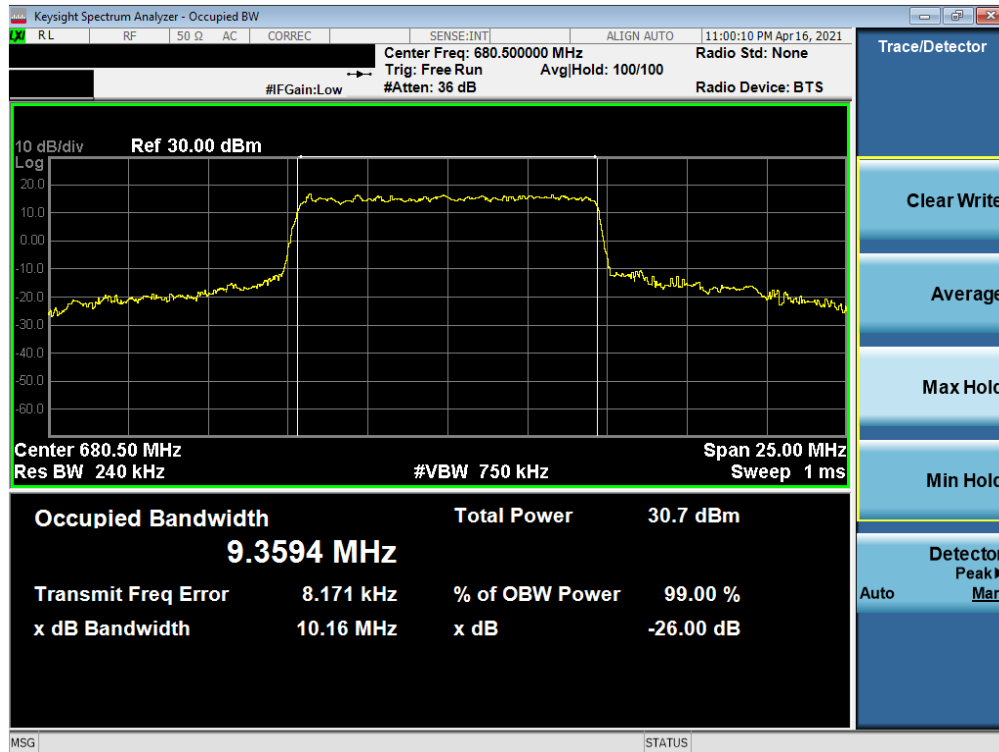


Plot 7-27. Occupied Bandwidth Plot (NR Band n71 - 10MHz DFT-s-OFDM BPSK - Full RB)



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

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 30 of 254

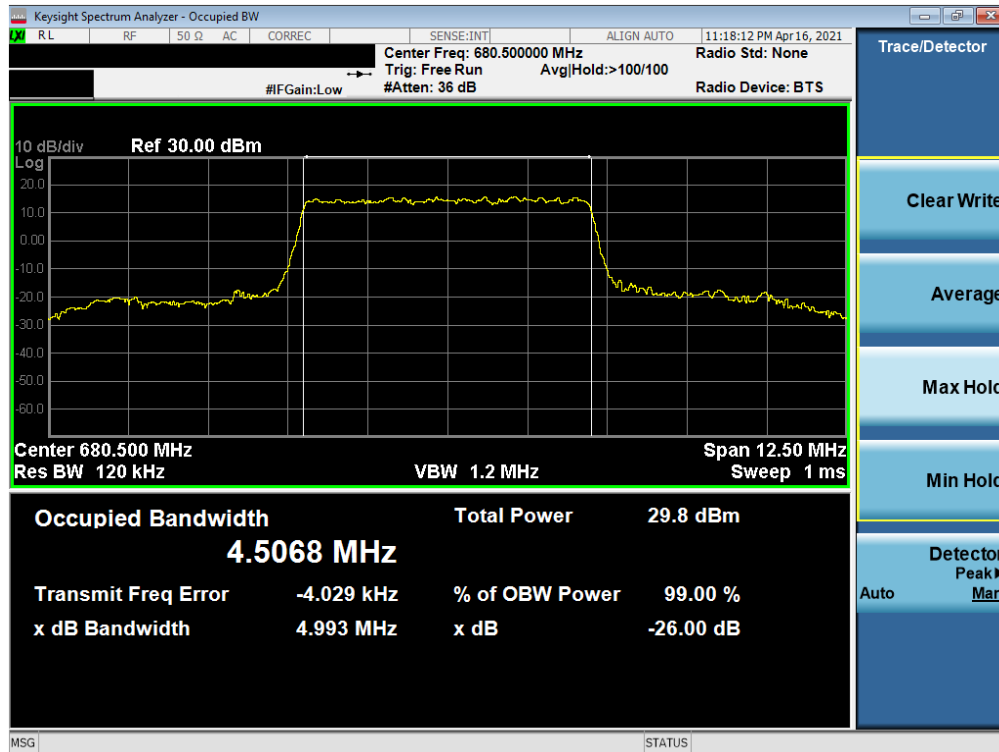


Plot 7-29. Occupied Bandwidth Plot (NR Band n71 - 10MHz CP-OFDM 16-QAM - Full RB)

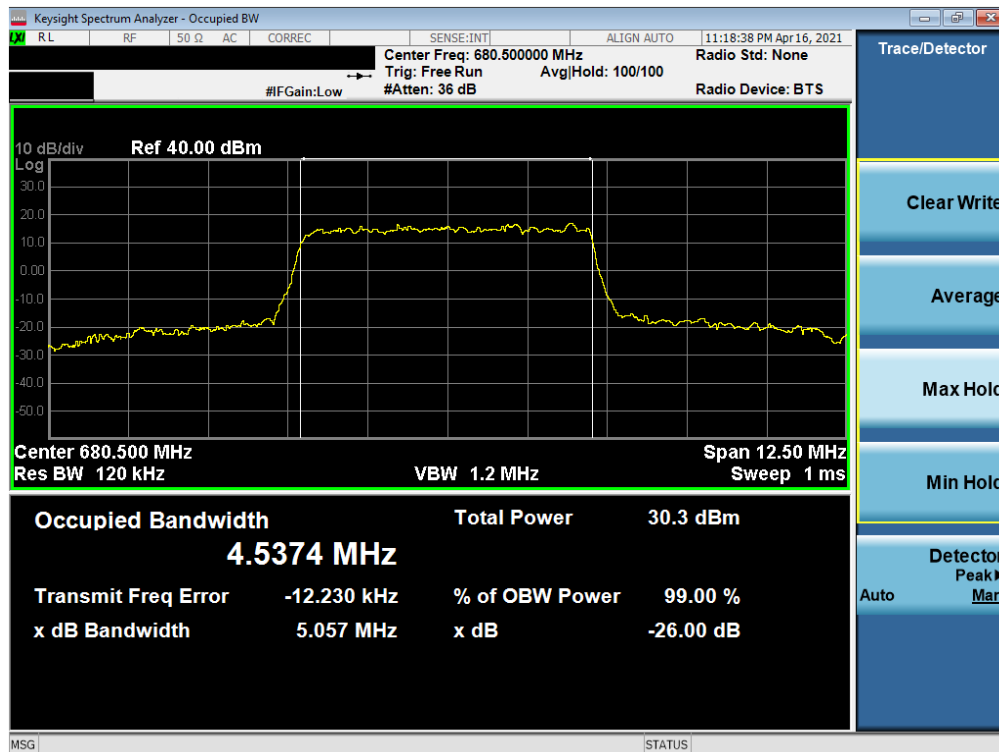


Plot 7-30. Occupied Bandwidth Plot (NR Band n71 - 5MHz DFT-s-OFDM BPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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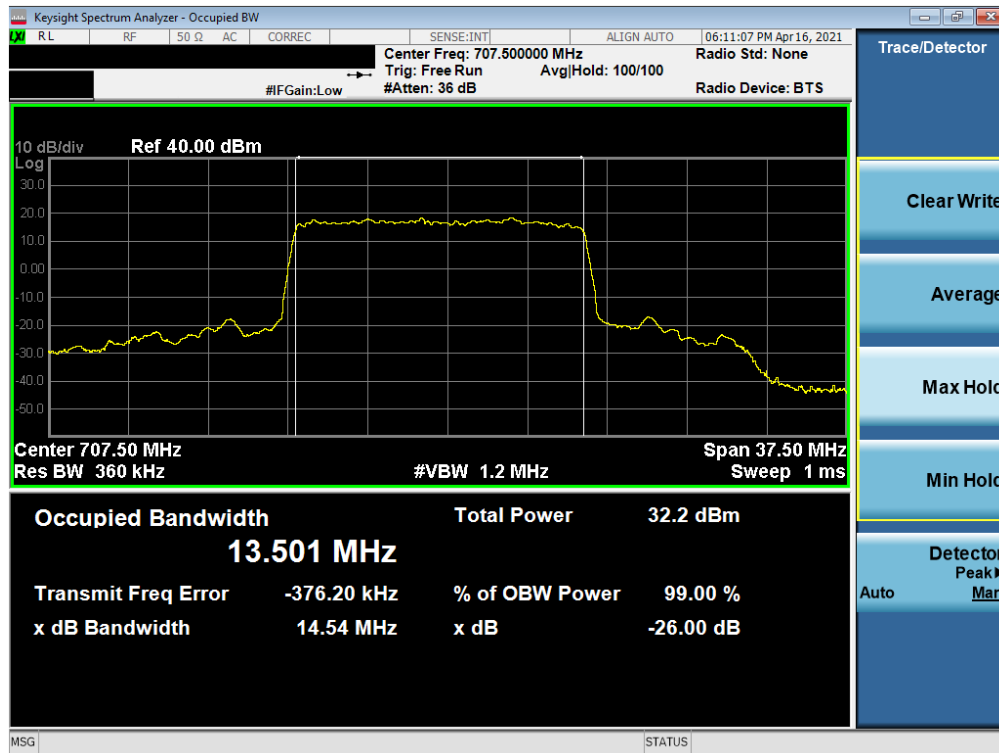
Plot 7-31. Occupied Bandwidth Plot (NR Band n71 - 5MHz CP-OFDM QPSK - Full RB)



Plot 7-32. Occupied Bandwidth Plot (NR Band n71 - 5MHz CP-OFDM 16-QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 - 06/04/2021	EUT Type: Portable Handset		Page 32 of 254

NR Band n12

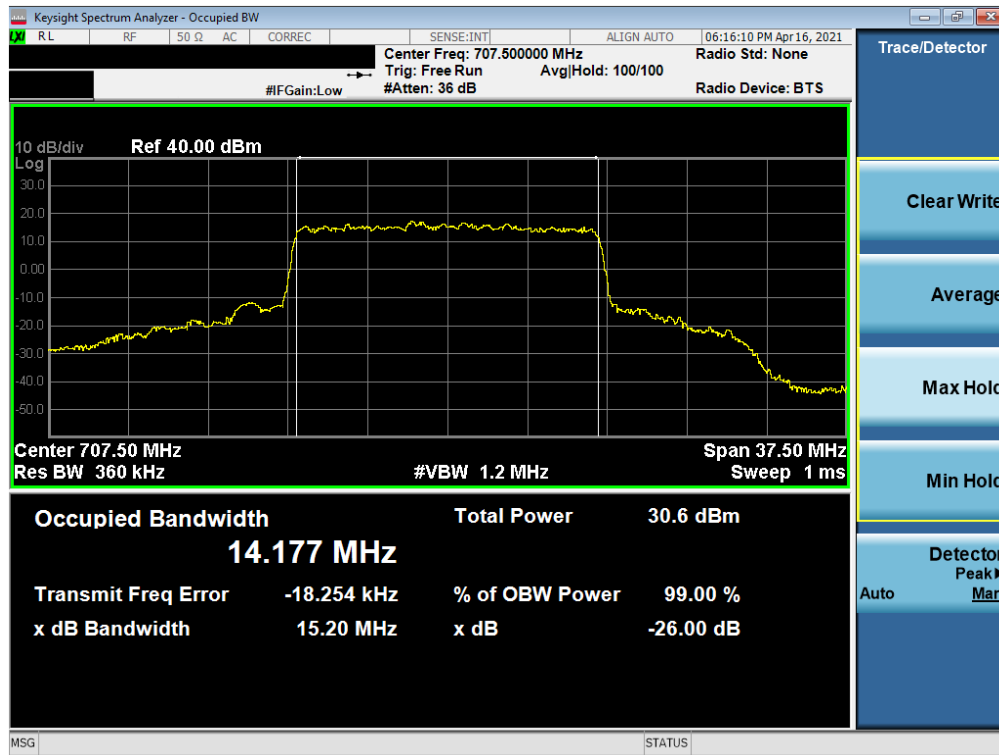


Plot 7-33. Occupied Bandwidth Plot (NR Band n12 - 15MHz DFT-s-OFDM BPSK - Full RB)

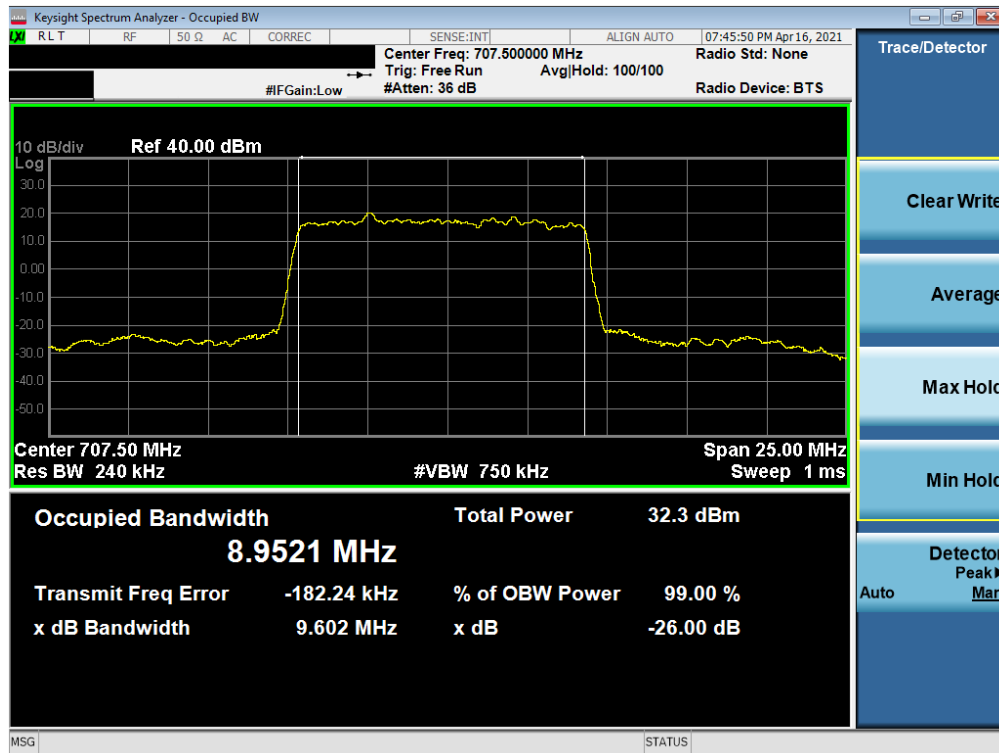


Plot 7-34. Occupied Bandwidth Plot (NR Band n12 - 15MHz CP-OFDM QPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 33 of 254

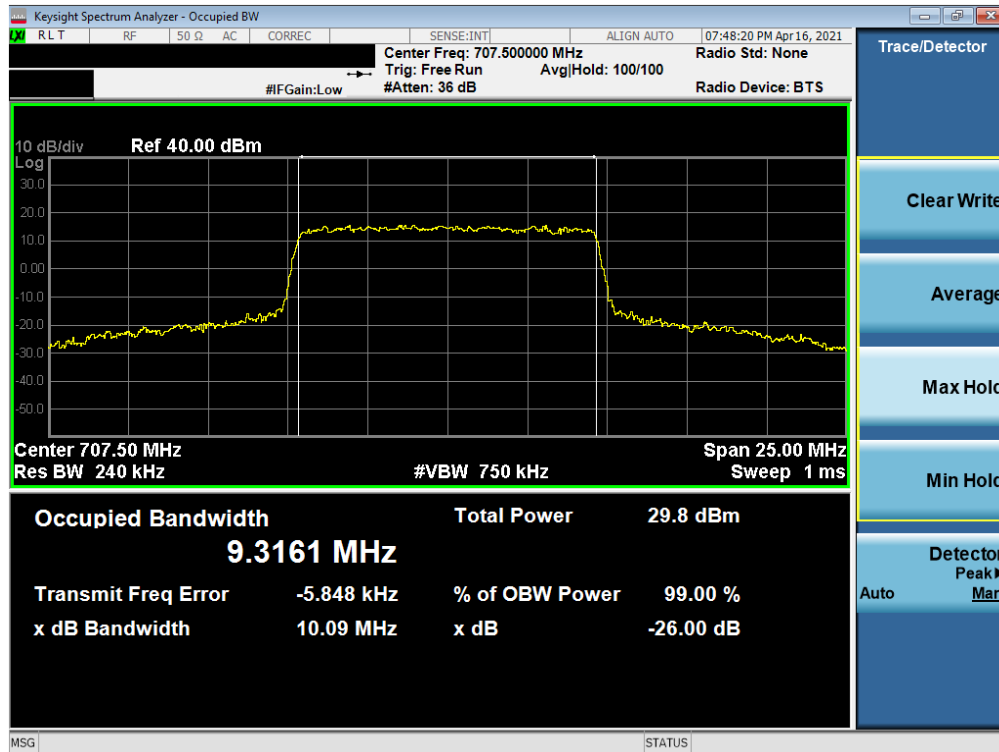


Plot 7-35. Occupied Bandwidth Plot (NR Band n12 - 15MHz CP-OFDM 16-QAM - Full RB)

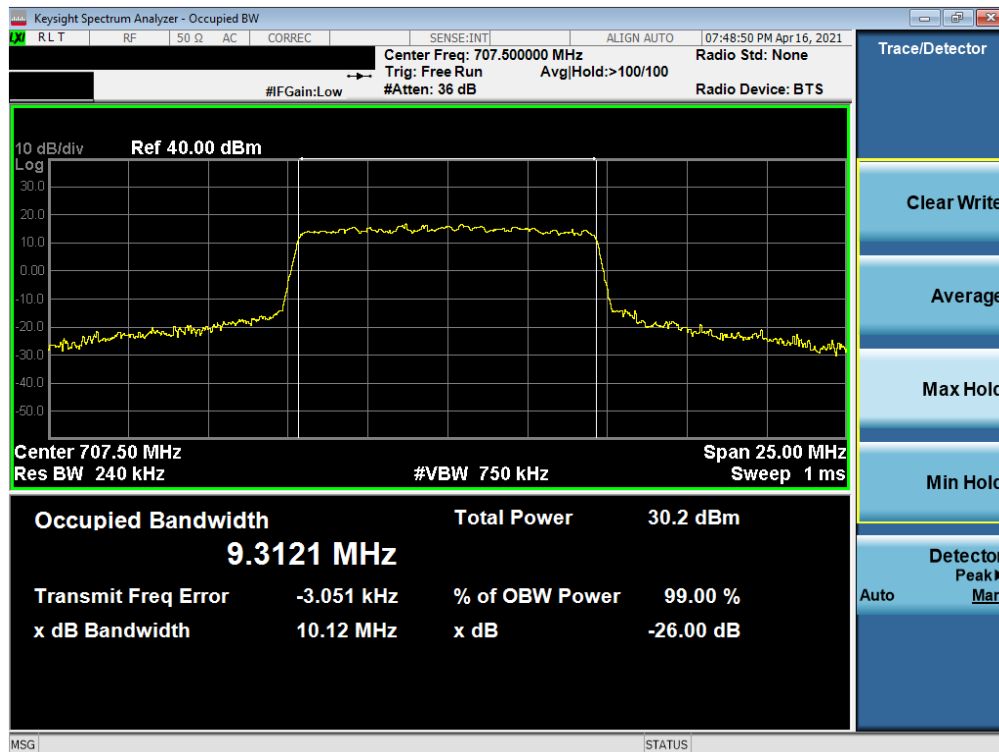


Plot 7-36. Occupied Bandwidth Plot (NR Band n12 - 10MHz DFT-s-OFDM BPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 34 of 254

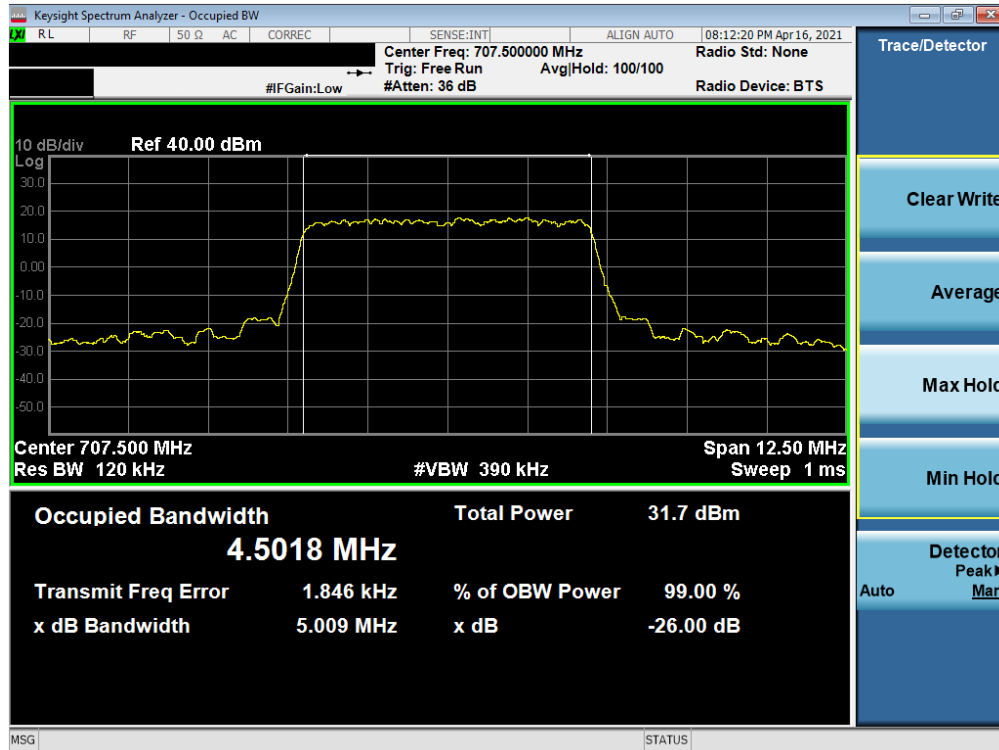


Plot 7-37. Occupied Bandwidth Plot (NR Band n12 - 10MHz CP-OFDM QPSK - Full RB)

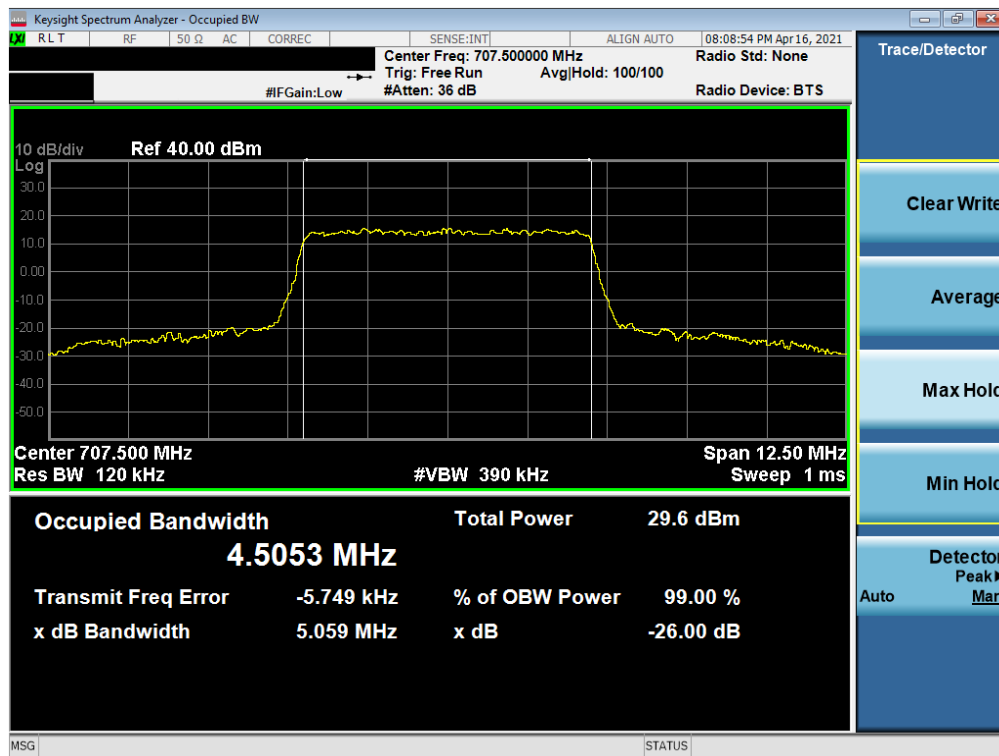


Plot 7-38. Occupied Bandwidth Plot (NR Band n12 - 10MHz CP-OFDM 16-QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 35 of 254

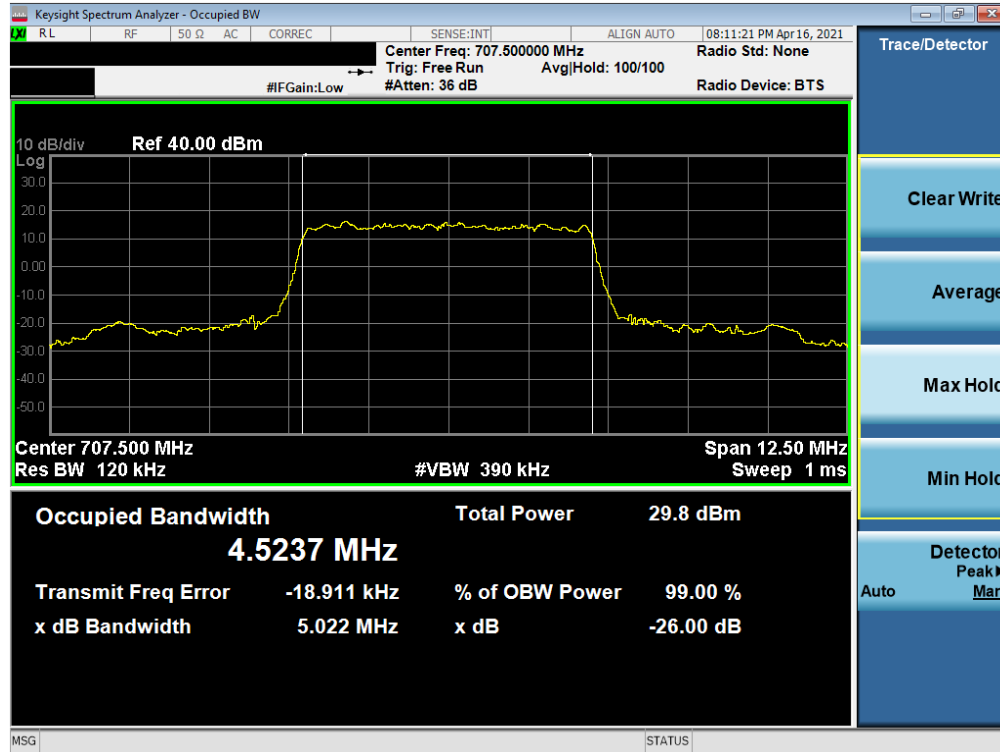


Plot 7-39. Occupied Bandwidth Plot (NR Band n12 - 5MHz DFT-s-OFDM BPSK - Full RB)



Plot 7-40. Occupied Bandwidth Plot (NR Band n12 - 5MHz CP-OFDM QPSK - Full RB)

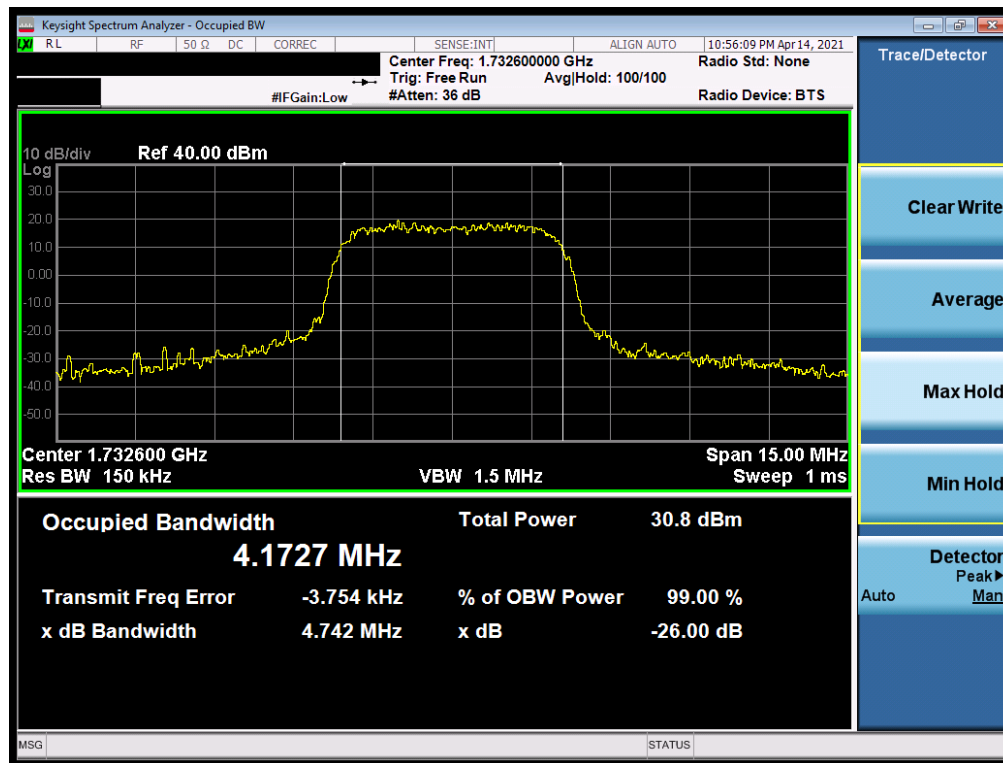
FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 - 06/04/2021	EUT Type: Portable Handset		Page 36 of 254



Plot 7-41. Occupied Bandwidth Plot (NR Band n12 - 5MHz CP-OFDM 16-QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 37 of 254

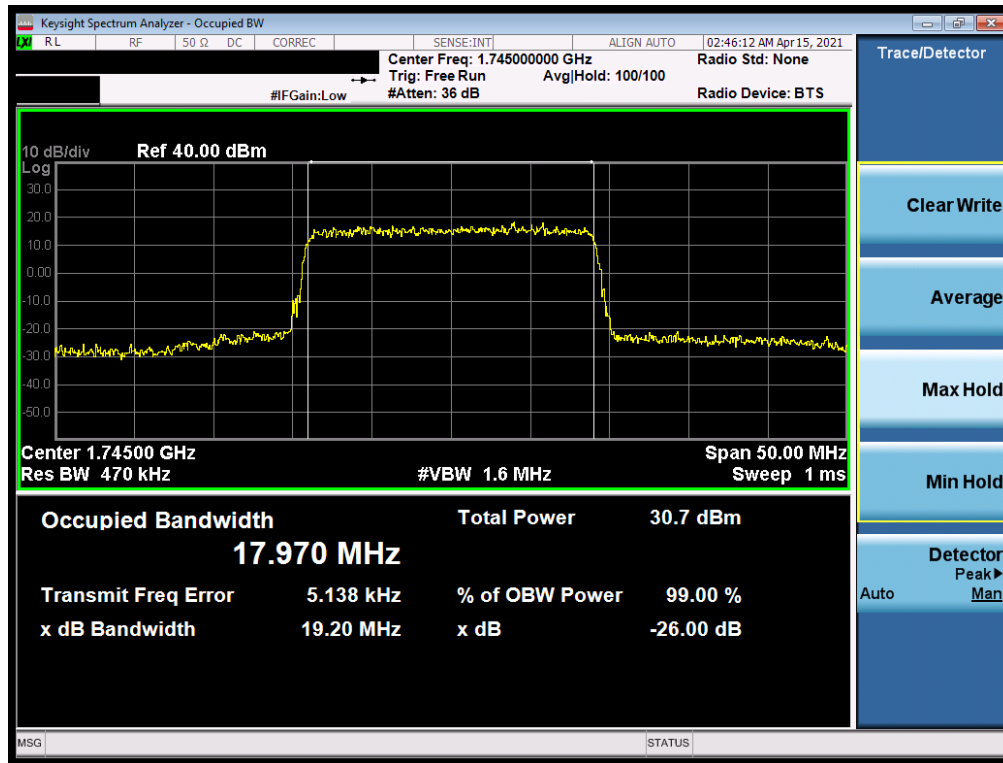
WCDMA AWS



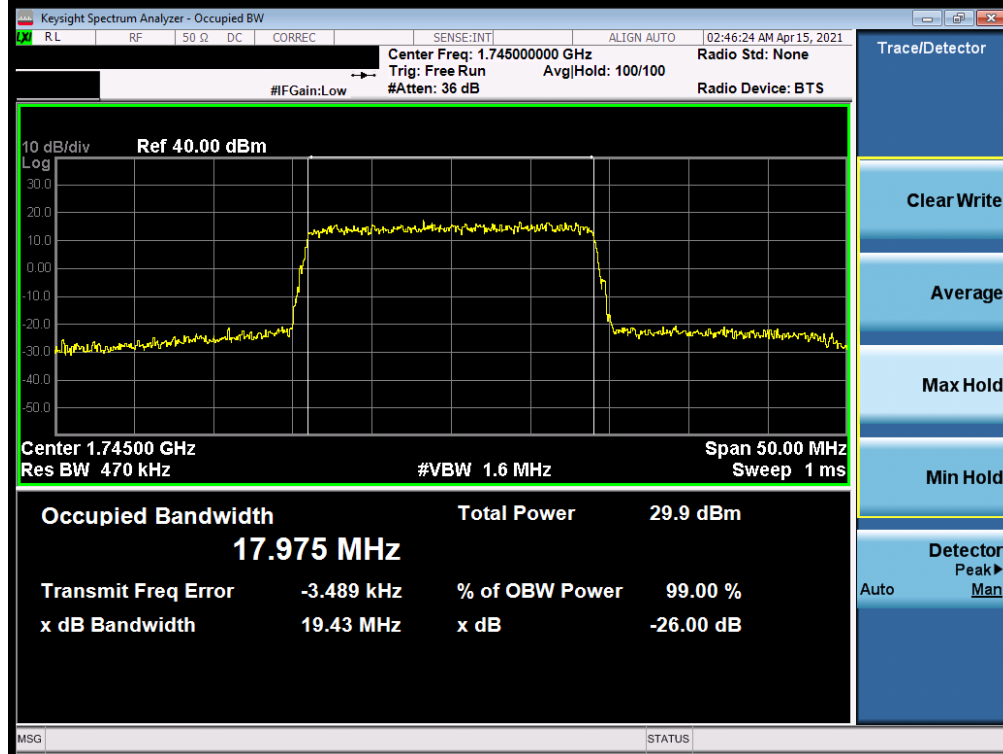
Plot 7-42. Occupied Bandwidth Plot (WCDMA, Ch. 1413)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 38 of 254

LTE Band 66/4

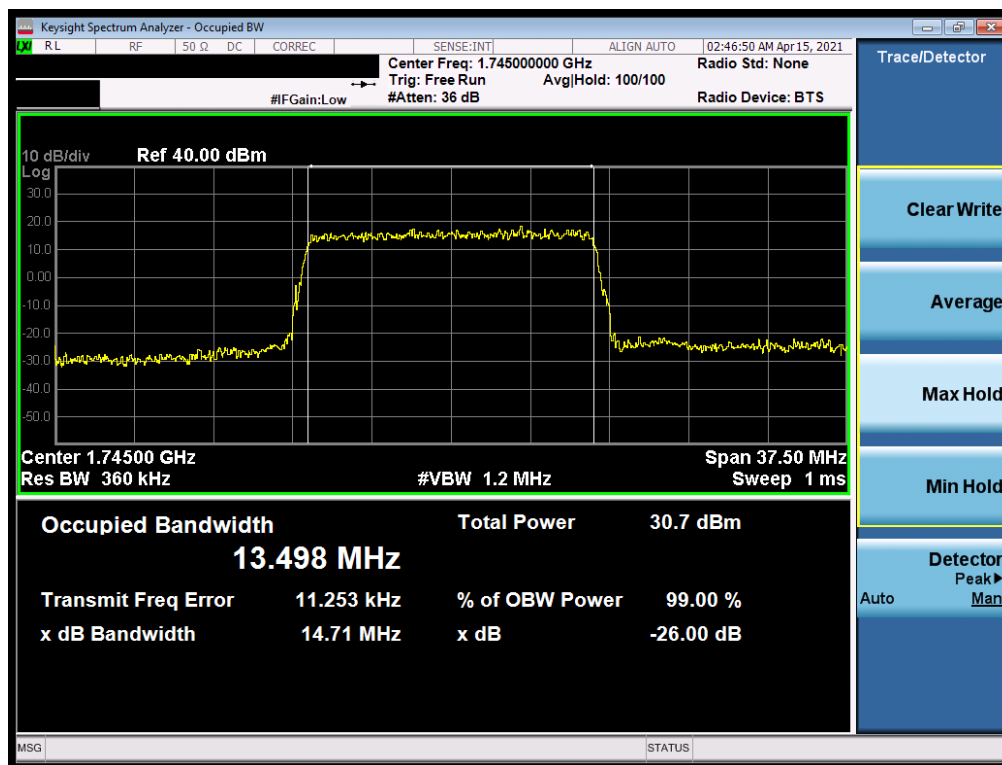


Plot 7-43. Occupied Bandwidth Plot (LTE Band 66/4 - 20MHz QPSK - Full RB)

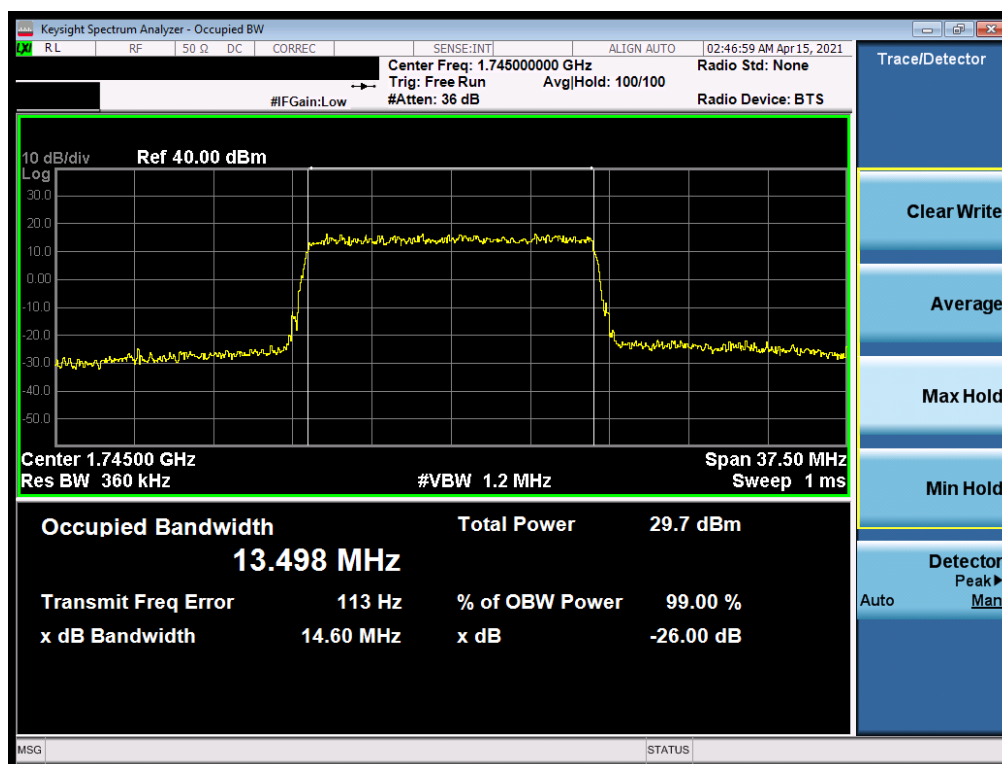


Plot 7-44. Occupied Bandwidth Plot (LTE Band 66/4 - 20MHz 16-QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 39 of 254

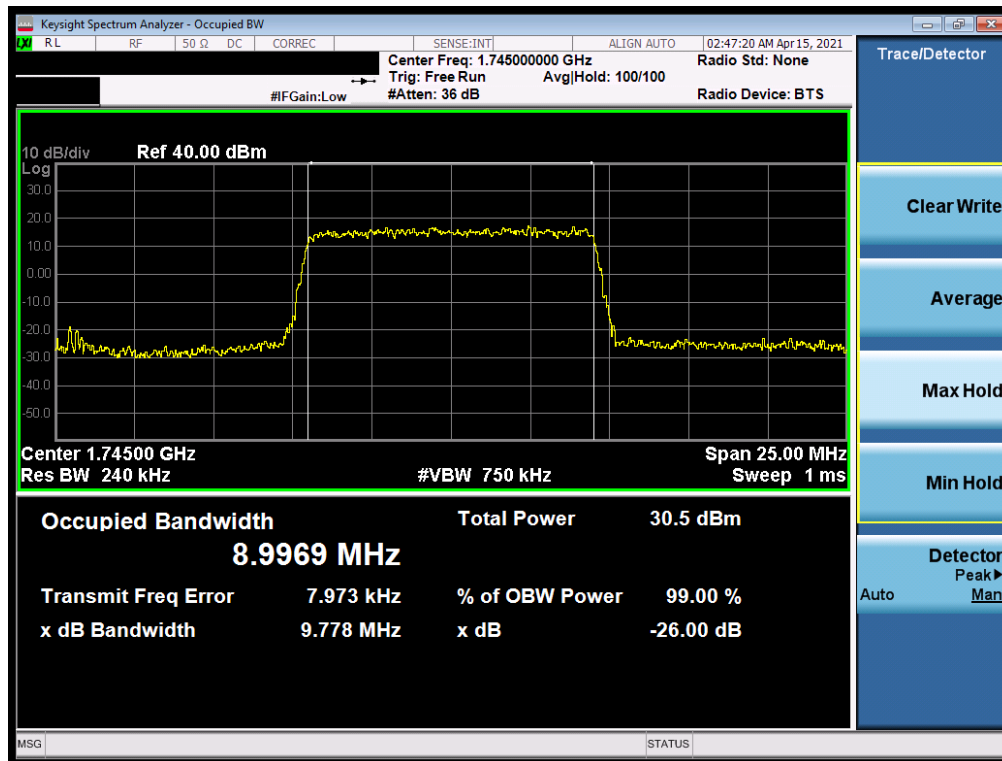


Plot 7-45. Occupied Bandwidth Plot (LTE Band 66/4 - 15MHz QPSK - Full RB)

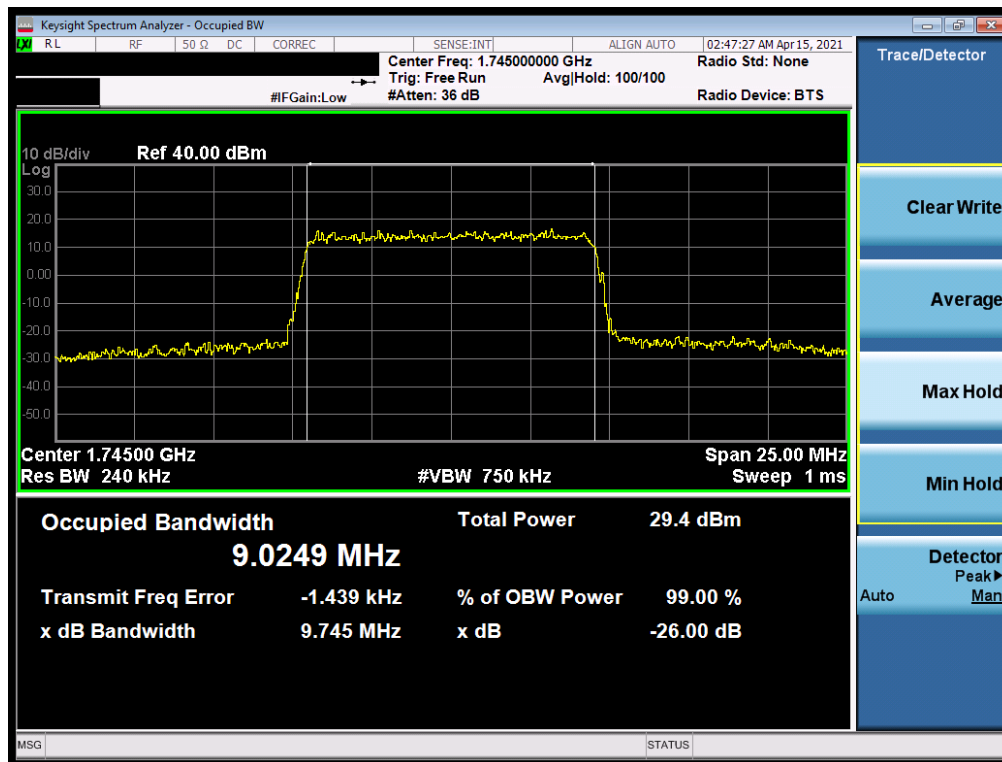


Plot 7-46. Occupied Bandwidth Plot (LTE Band 66/4 - 15MHz 16-QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 40 of 254

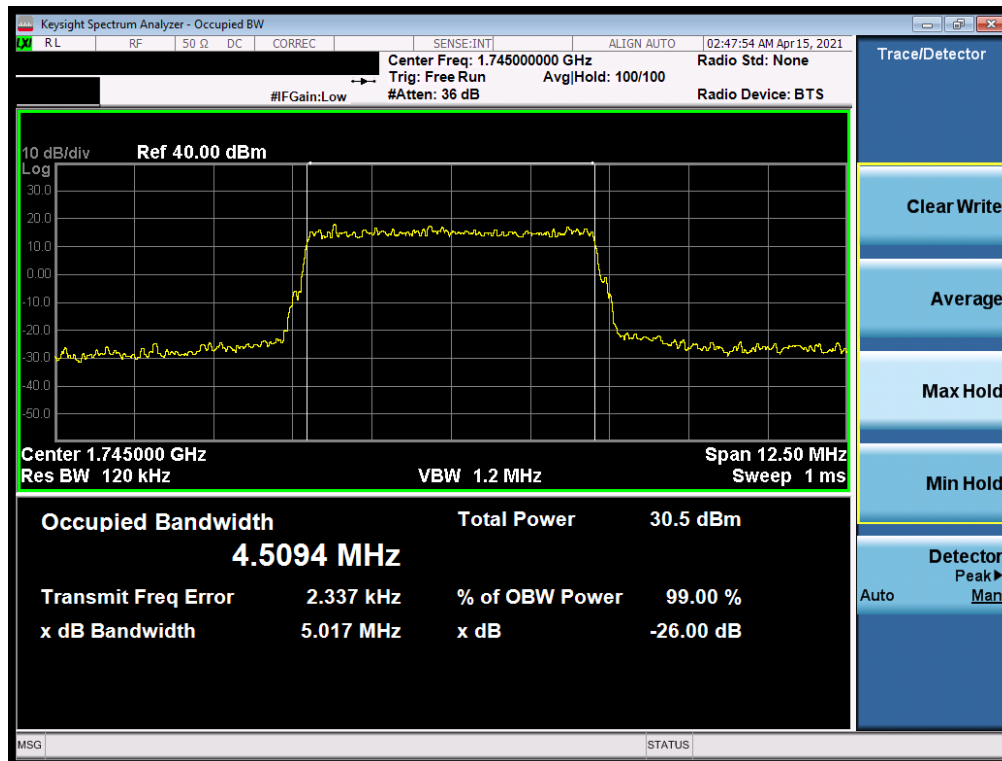


Plot 7-47. Occupied Bandwidth Plot (LTE Band 66/4 - 10MHz QPSK - Full RB)

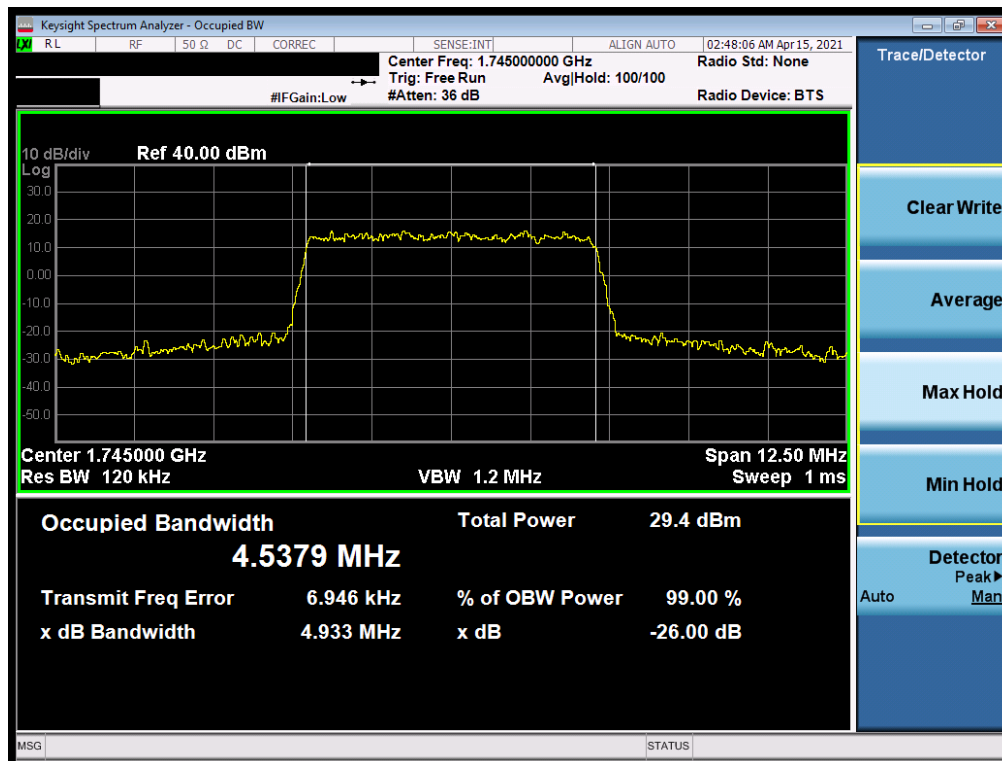


Plot 7-48. Occupied Bandwidth Plot (LTE Band 66/4 - 10MHz 16-QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 41 of 254

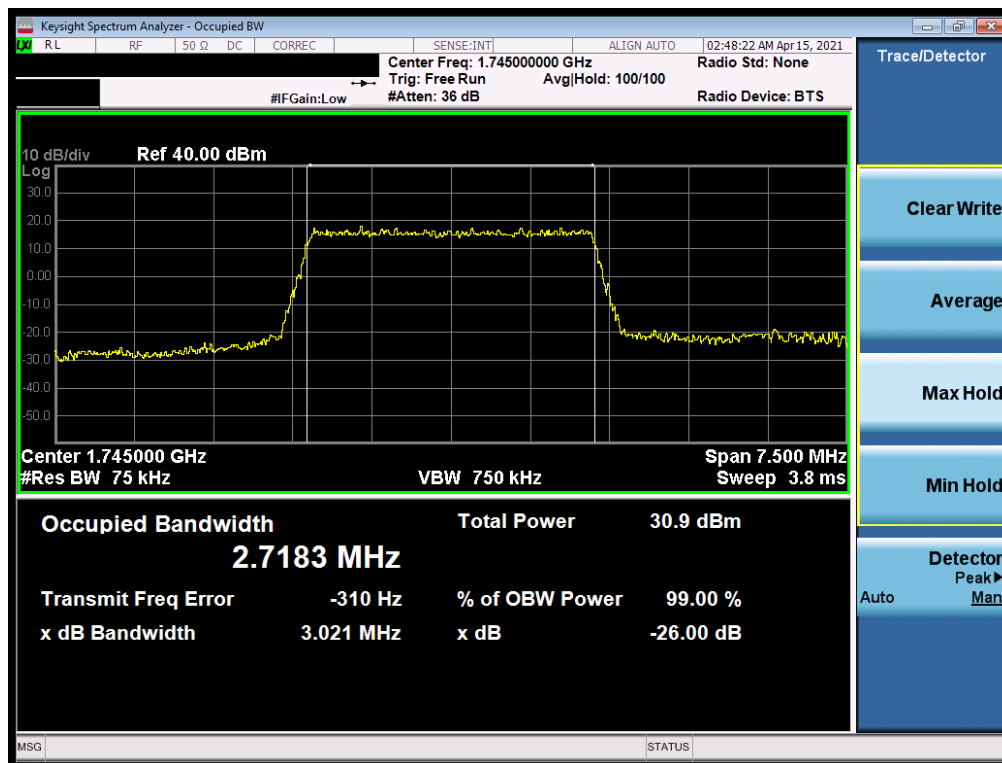


Plot 7-49. Occupied Bandwidth Plot (LTE Band 66/4 - 5MHz QPSK - Full RB)

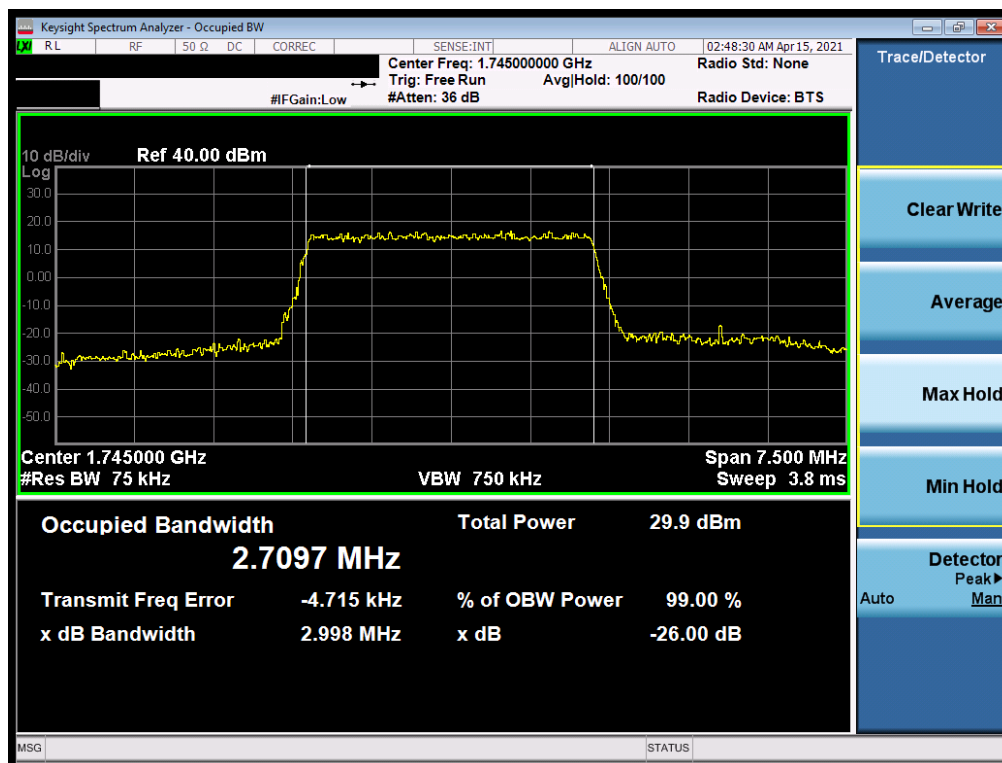


Plot 7-50. Occupied Bandwidth Plot (LTE Band 66/4 - 5MHz 16-QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 42 of 254

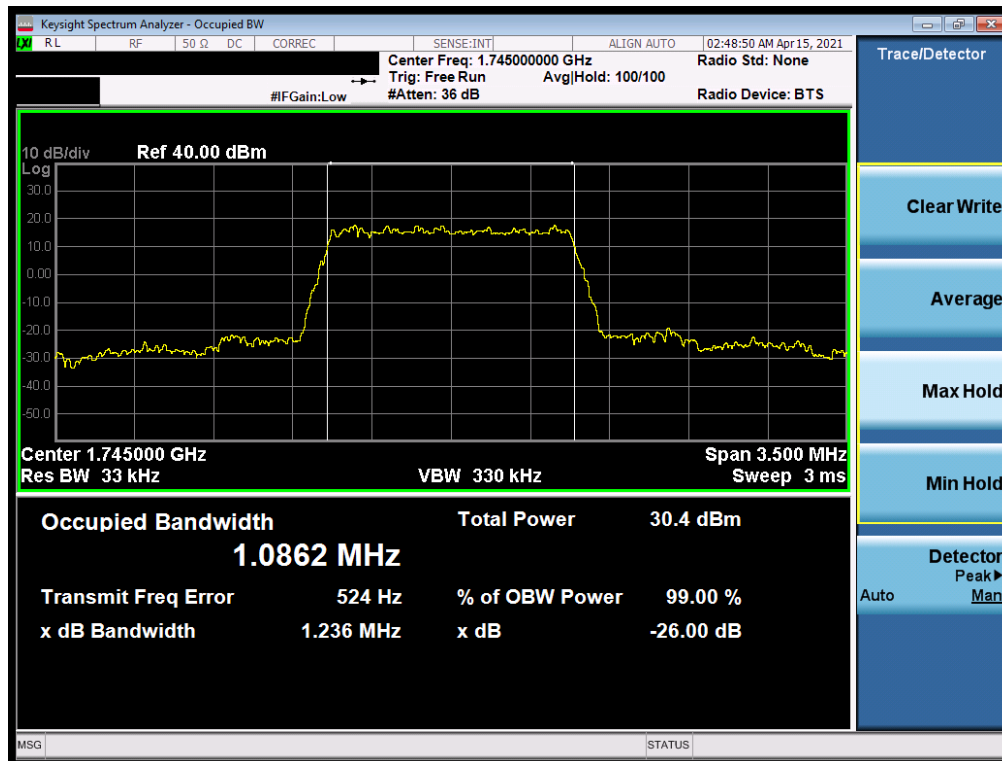


Plot 7-51. Occupied Bandwidth Plot (LTE Band 66/4 - 3MHz QPSK - Full RB)

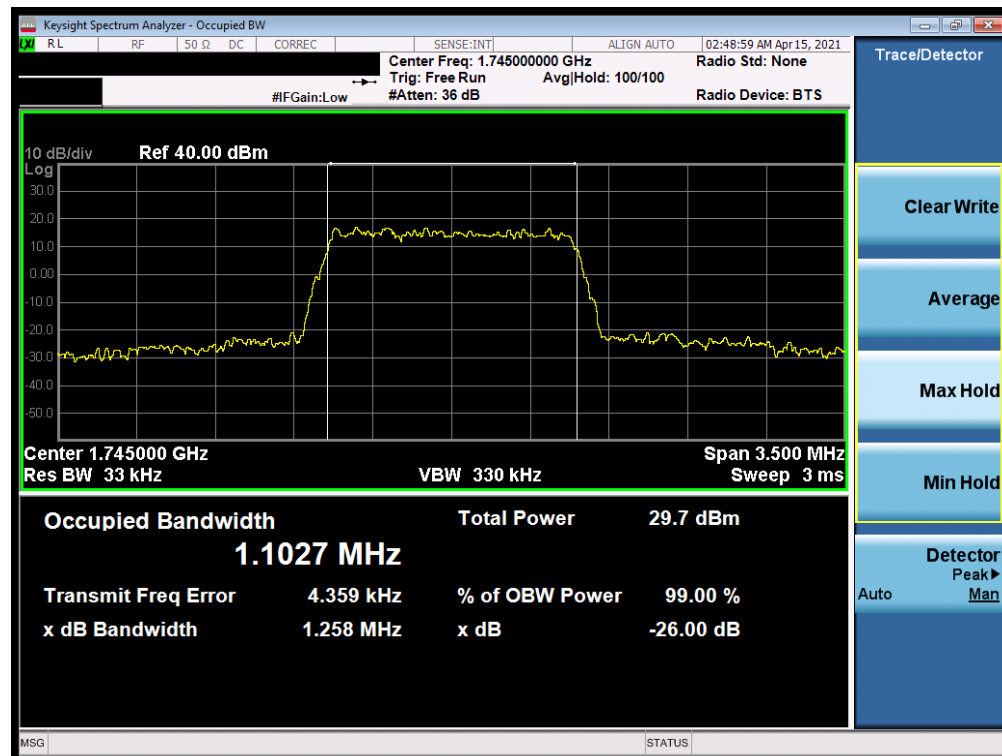


Plot 7-52. Occupied Bandwidth Plot (LTE Band 66/4 - 3MHz 16-QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 43 of 254



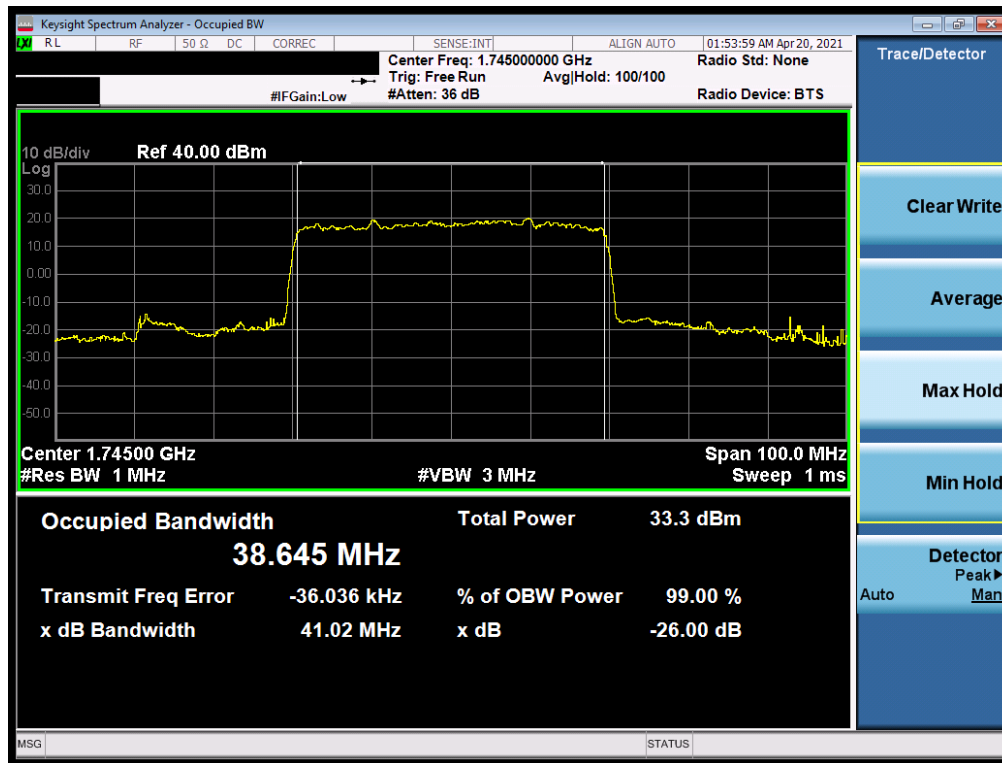
Plot 7-53. Occupied Bandwidth Plot (LTE Band 66/4 - 1.4MHz QPSK - Full RB)



Plot 7-54. Occupied Bandwidth Plot (LTE Band 66/4 - 1.4MHz 16-QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 44 of 254

NR Band n66 – Ant A

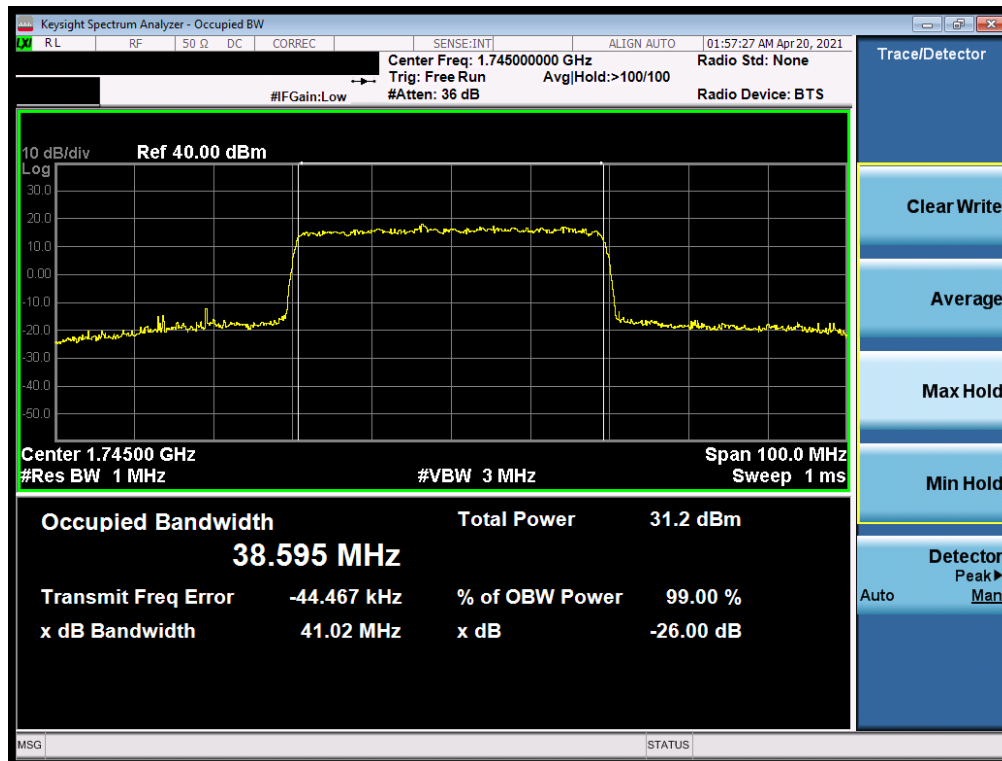


Plot 7-55. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz DFT-s-OFDM BPSK - Full RB)

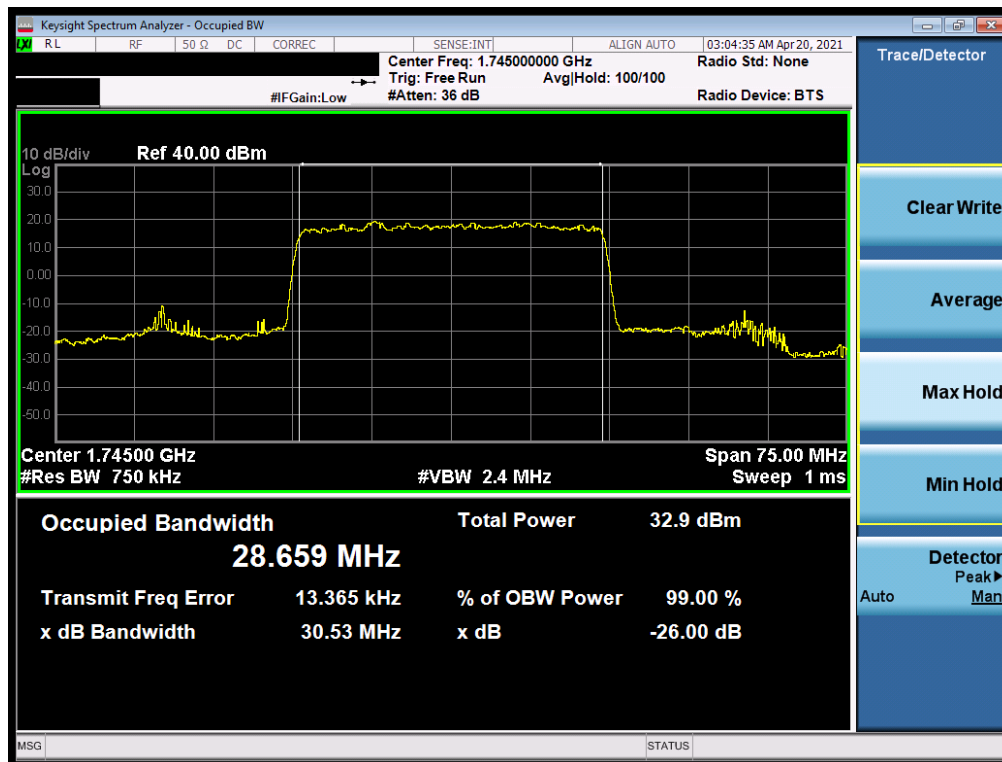


Plot 7-56. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM QPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 45 of 254

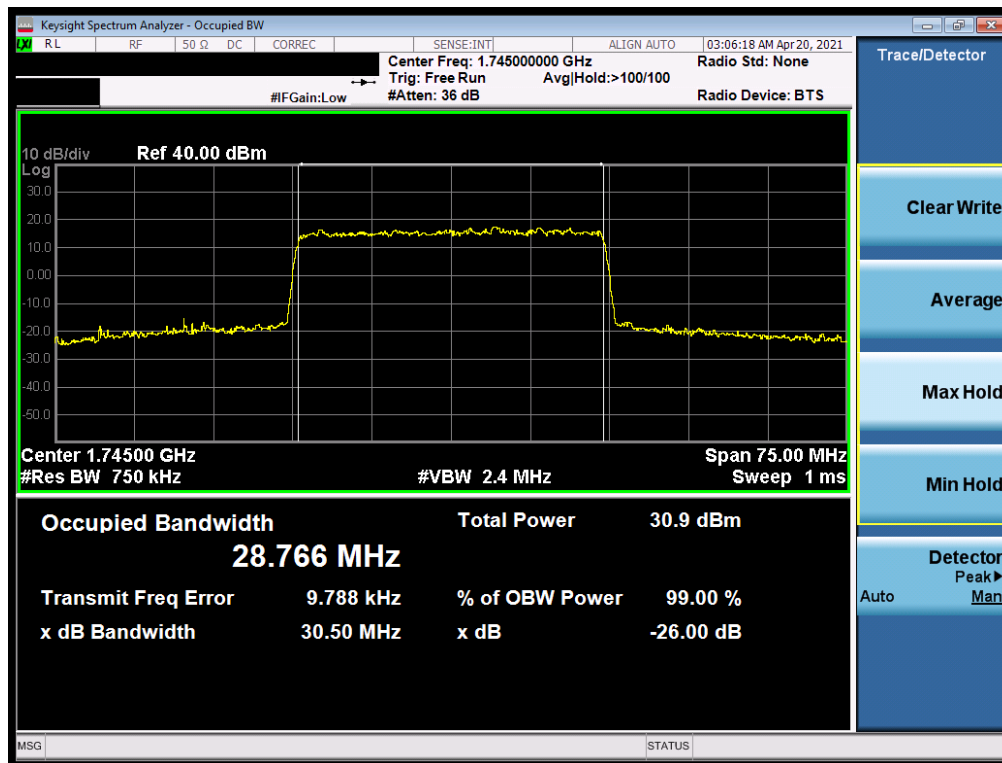


Plot 7-57. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM 16QAM - Full RB)

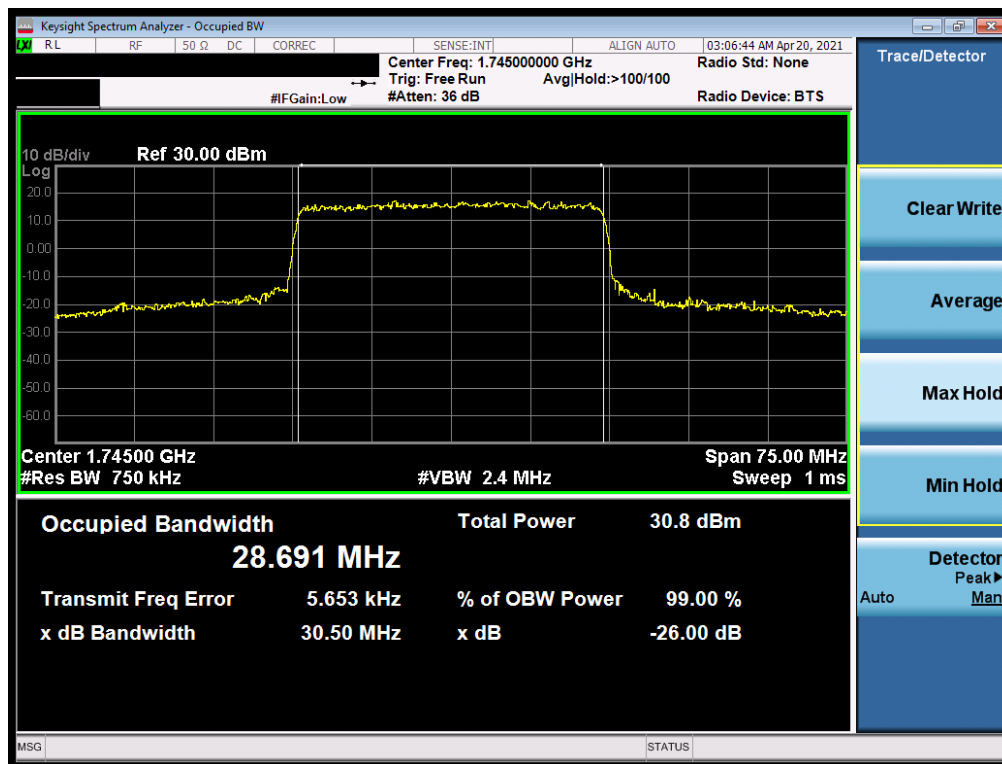


Plot 7-58. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz DFT-s-OFDM BPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 46 of 254



Plot 7-59. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM QPSK - Full RB)

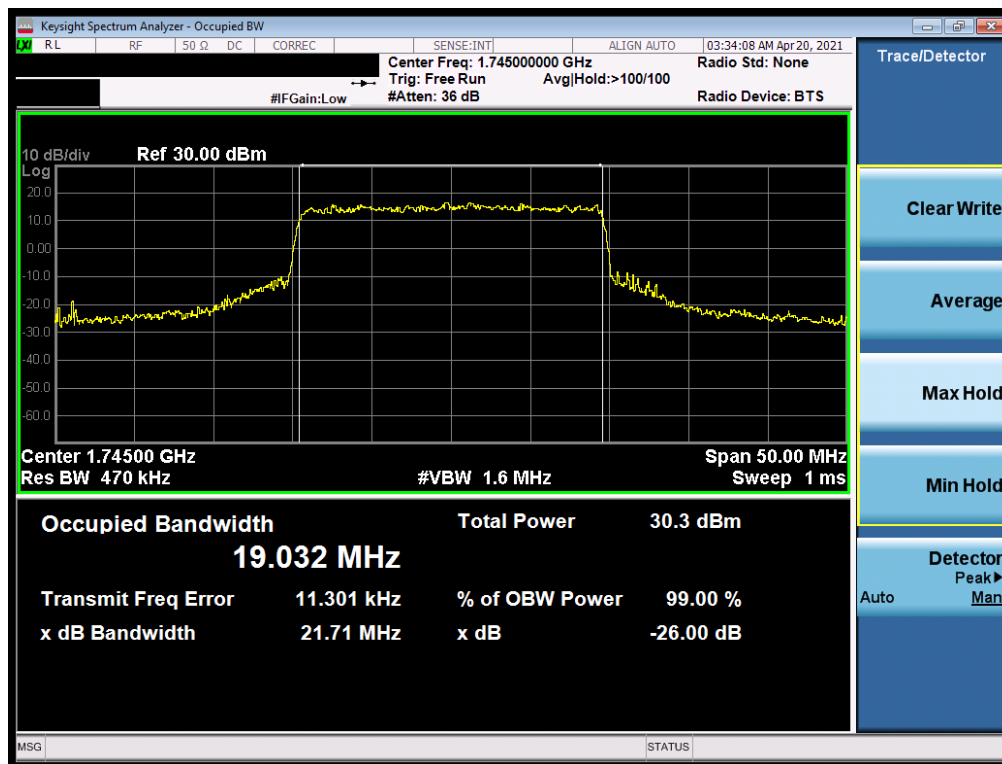


Plot 7-60. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM 16QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 47 of 254

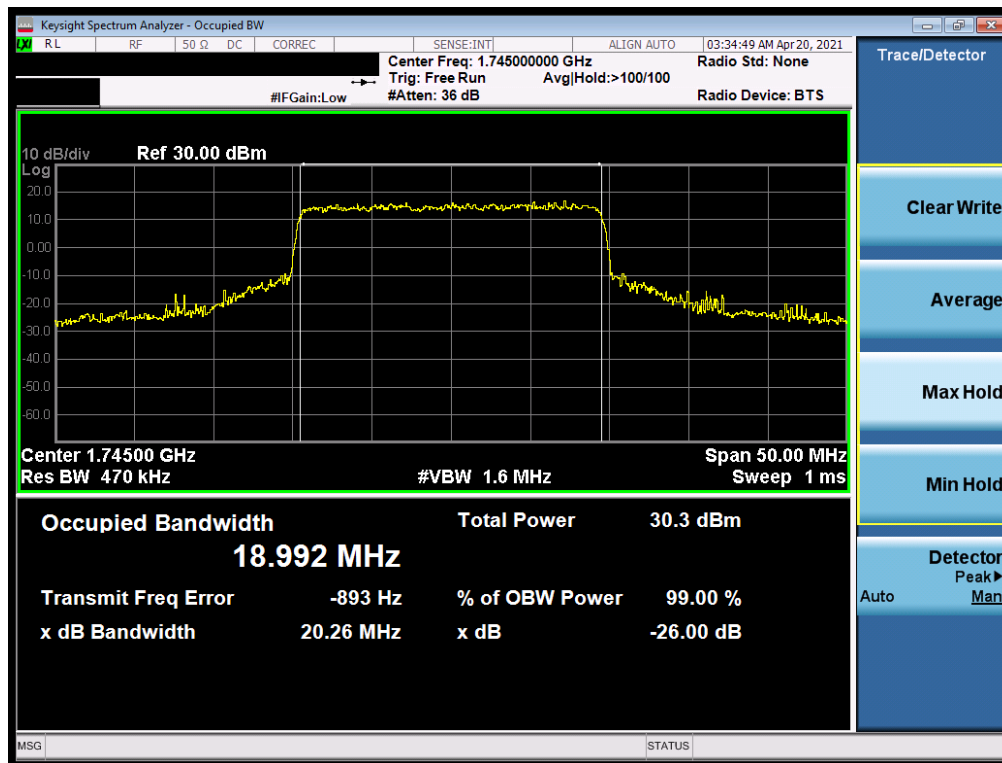


Plot 7-61. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz DFT-s-OFDM BPSK - Full RB)

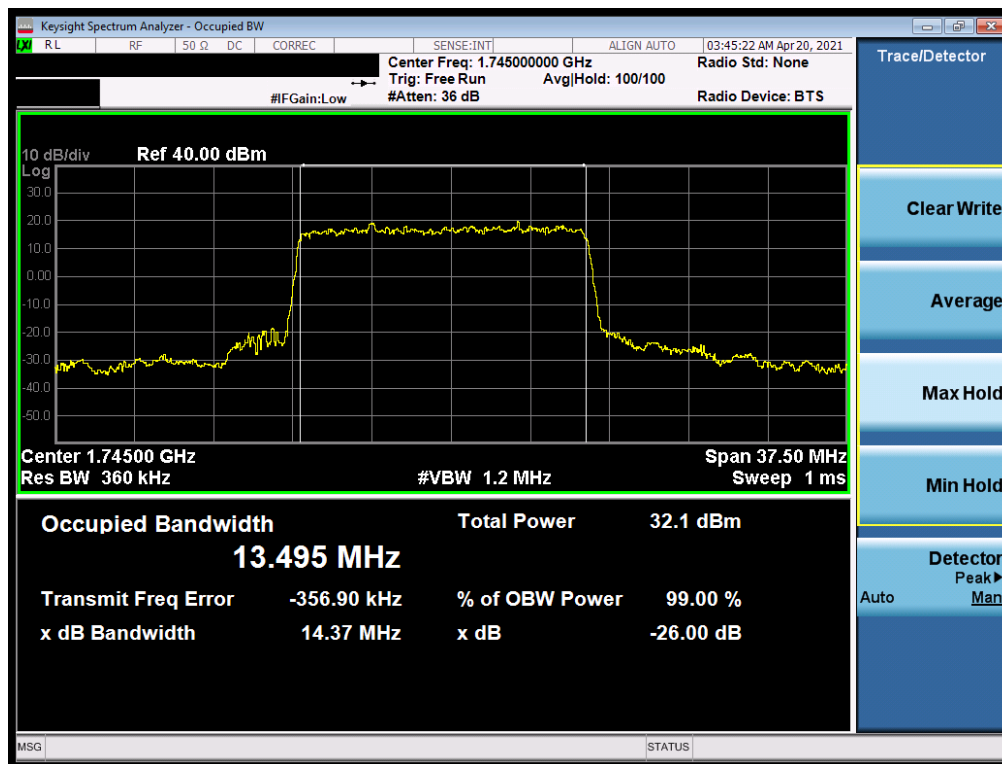


Plot 7-62. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM QPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 48 of 254

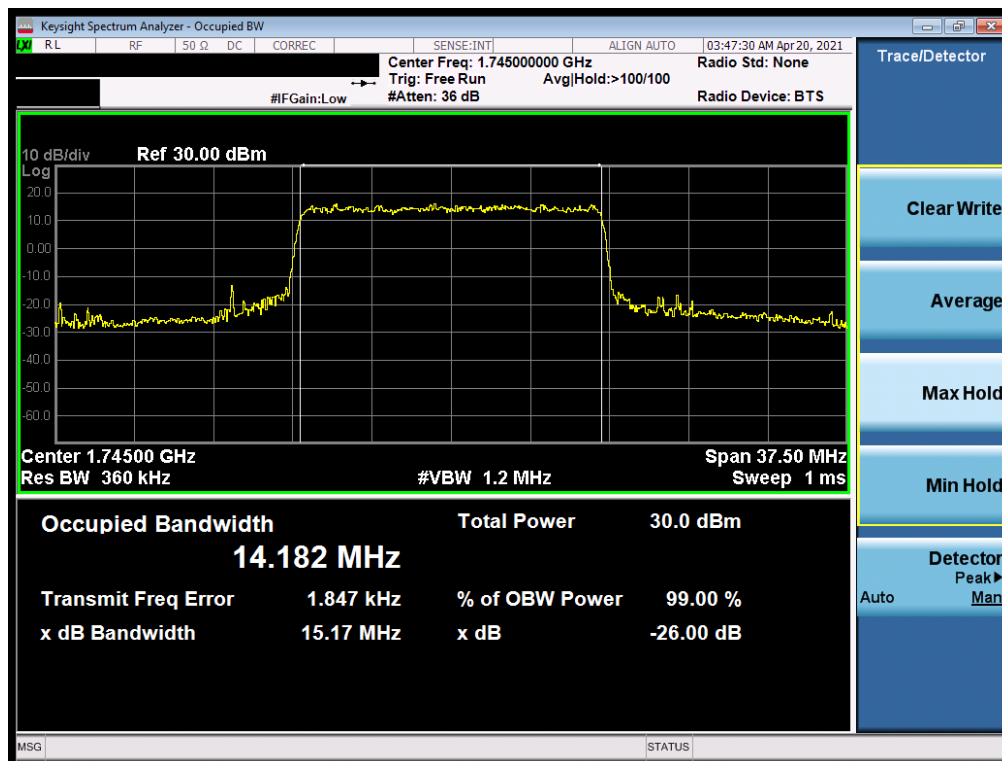


Plot 7-63. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM 16QAM - Full RB)

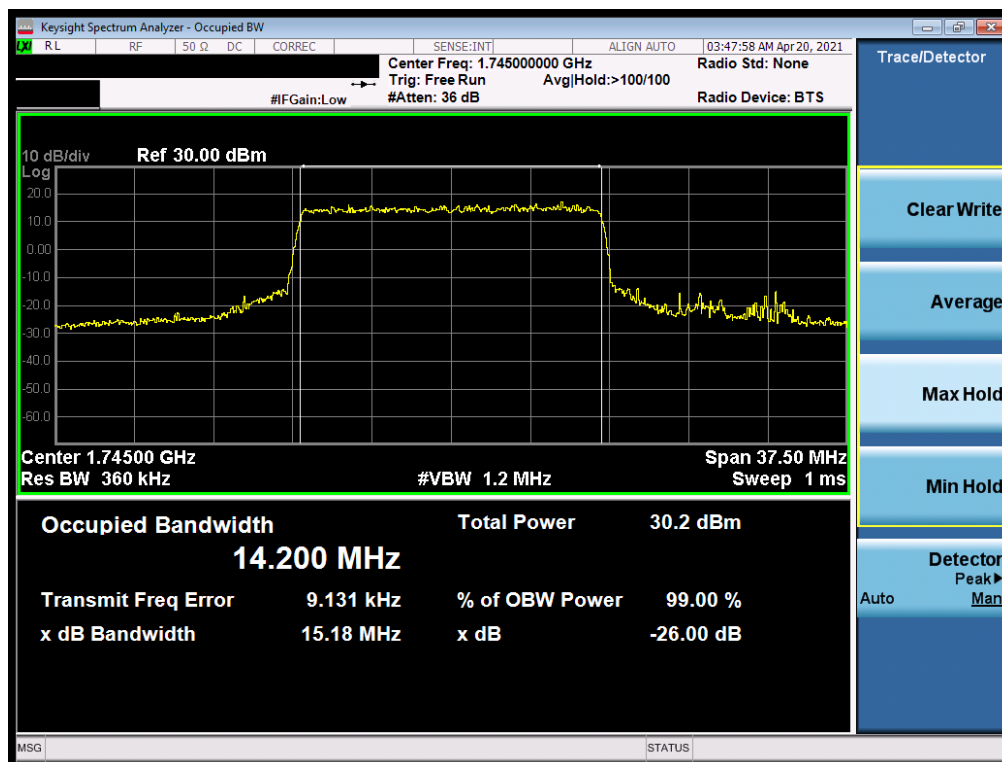


Plot 7-64. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz DFT-s-OFDM BPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 49 of 254

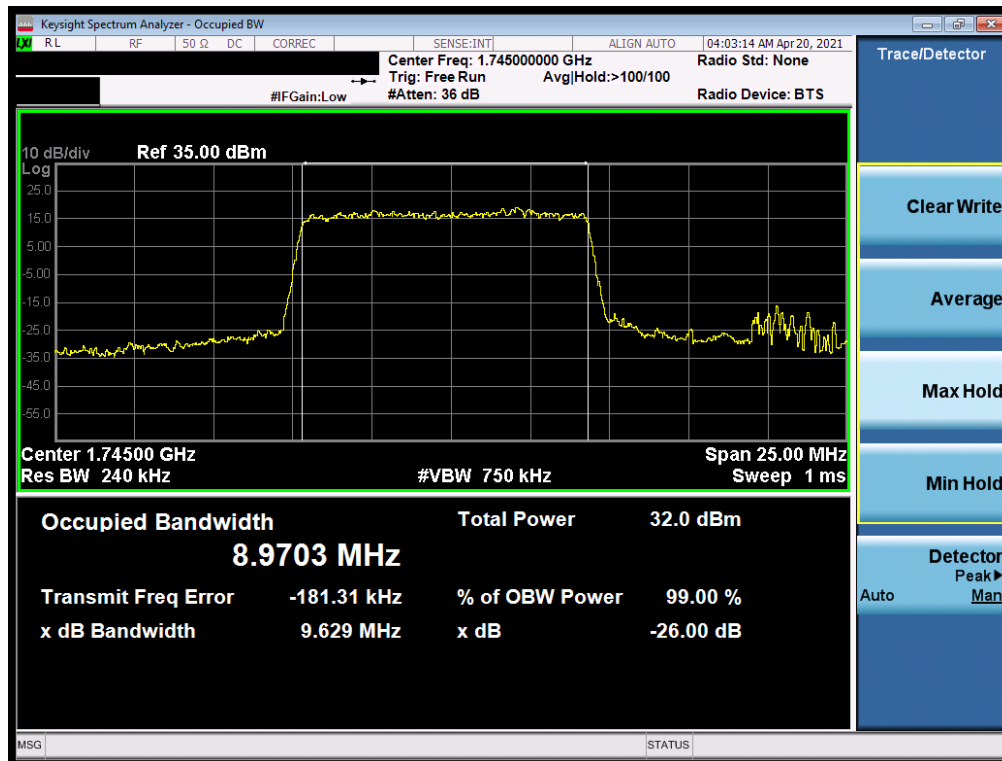


Plot 7-65. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz CP-OFDM QPSK - Full RB)

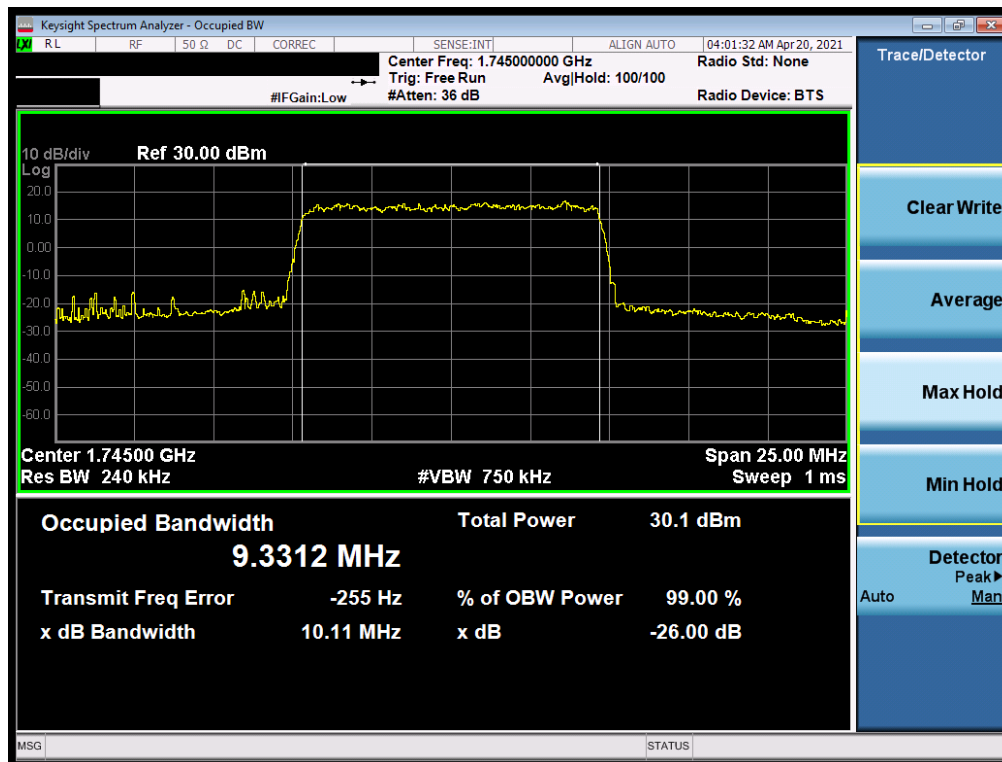


Plot 7-66. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz CP-OFDM 16QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 - 06/04/2021	EUT Type: Portable Handset		Page 50 of 254

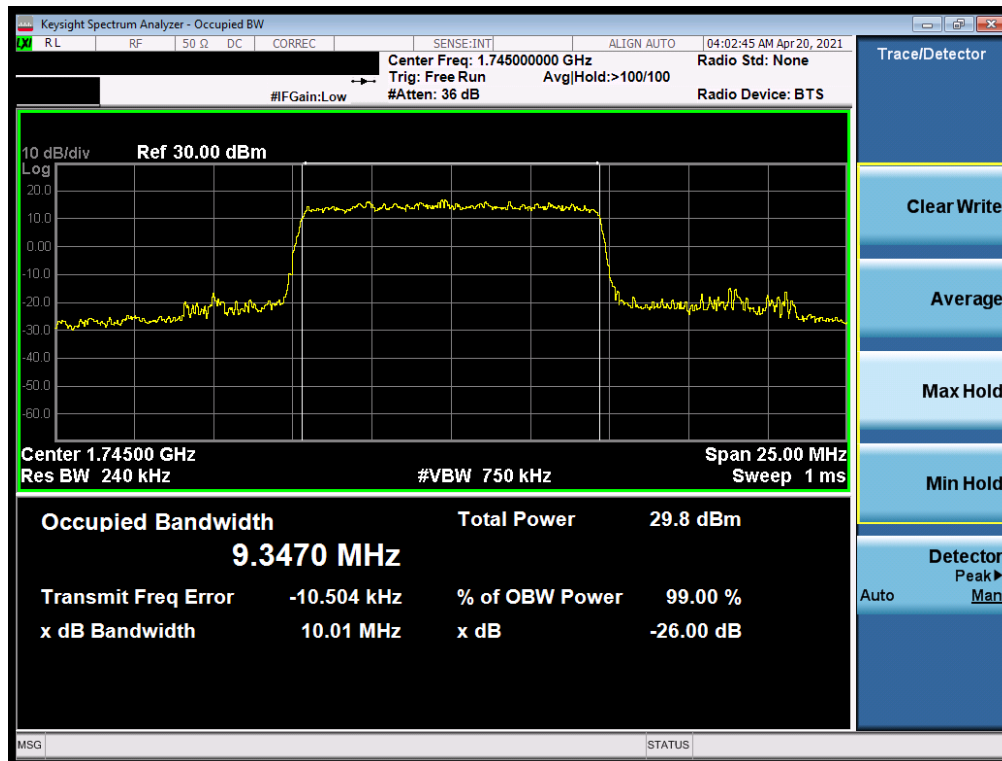


Plot 7-67. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz DFT-s-OFDM BPSK - Full RB)

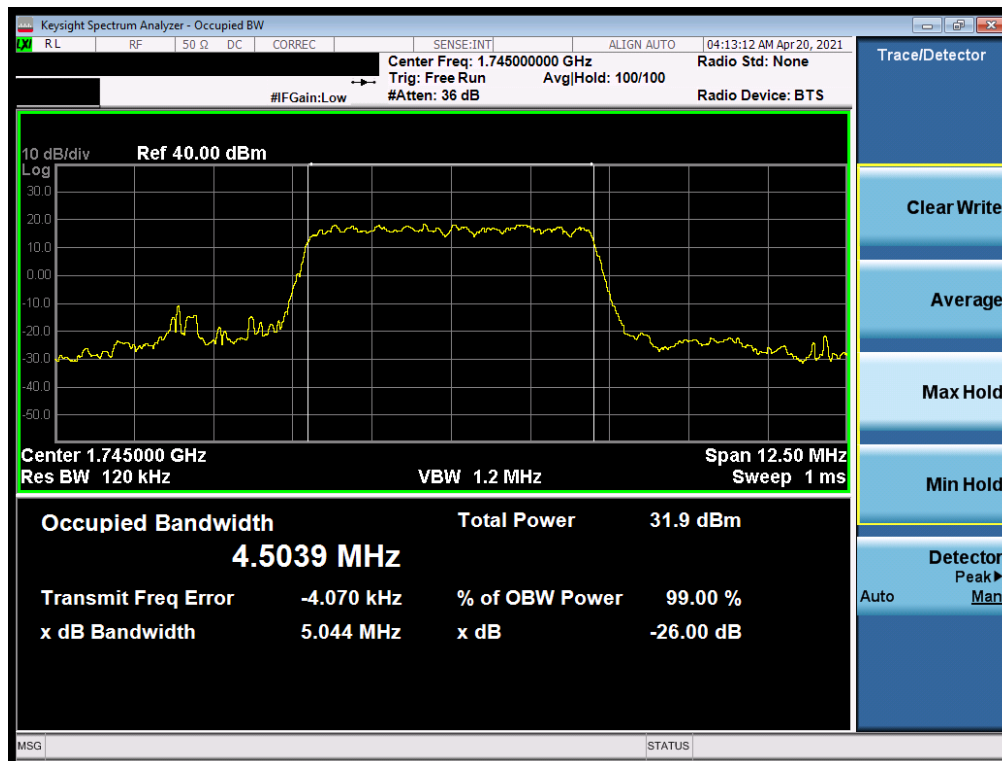


Plot 7-68. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz CP-OFDM QPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 51 of 254

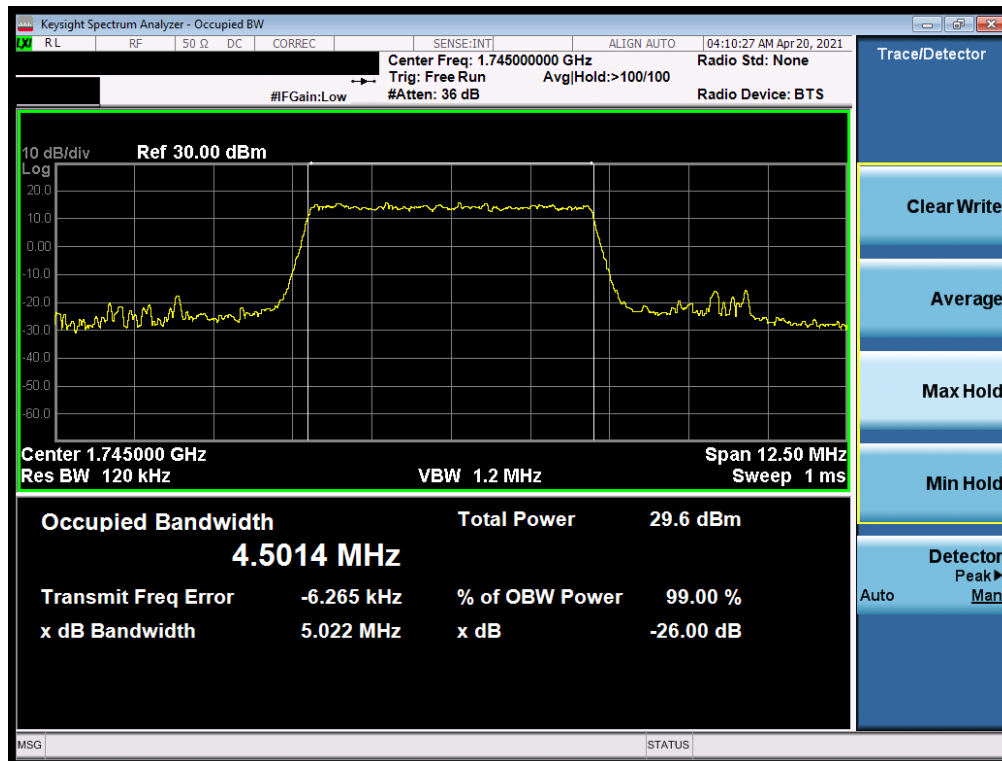


Plot 7-69. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz CP-OFDM 16QAM - Full RB)

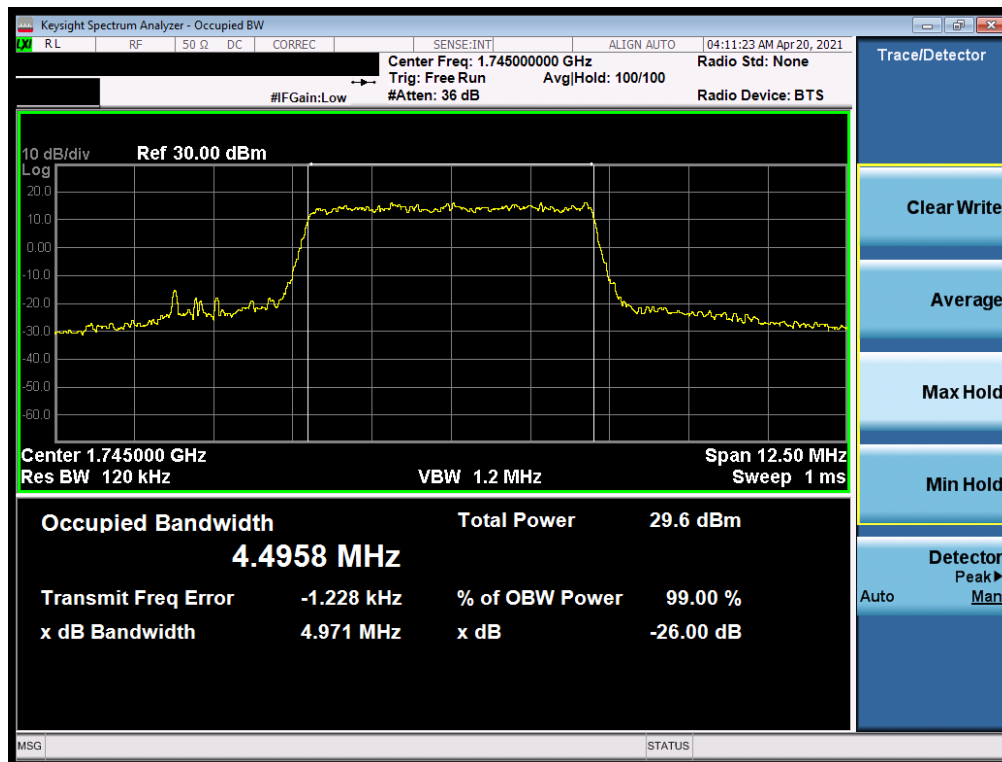


Plot 7-70. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz DFT-s-OFDM BPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 52 of 254



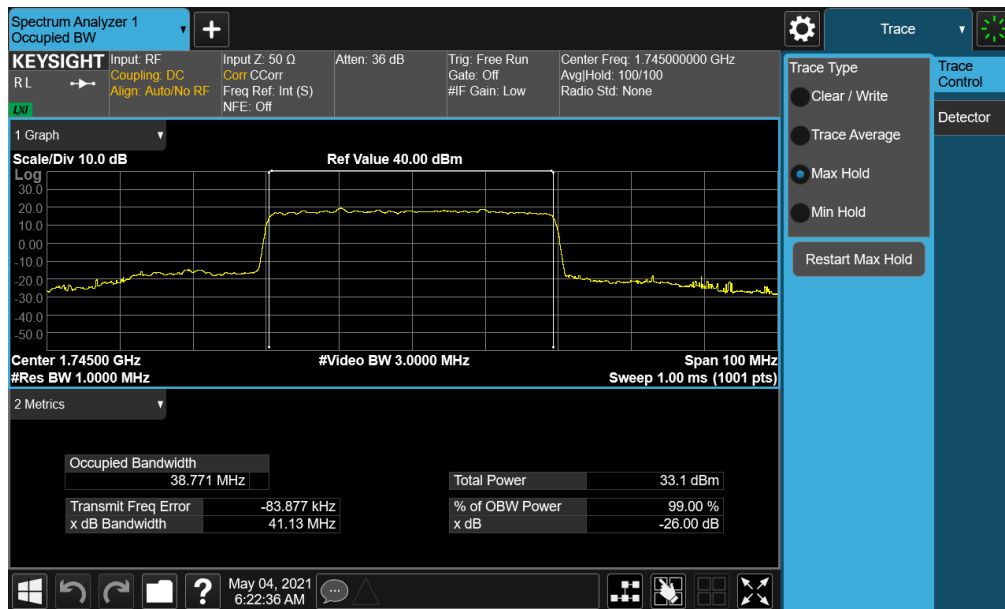
Plot 7-71. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz CP-OFDM QPSK - Full RB)



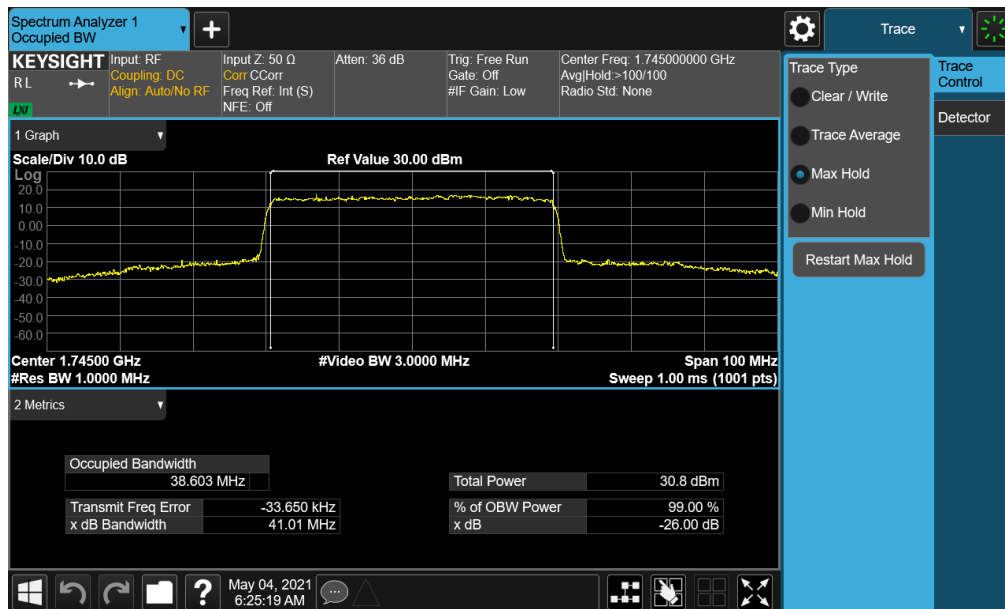
Plot 7-72. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz CP-OFDM 16QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 53 of 254

NR Band n66 – Ant I

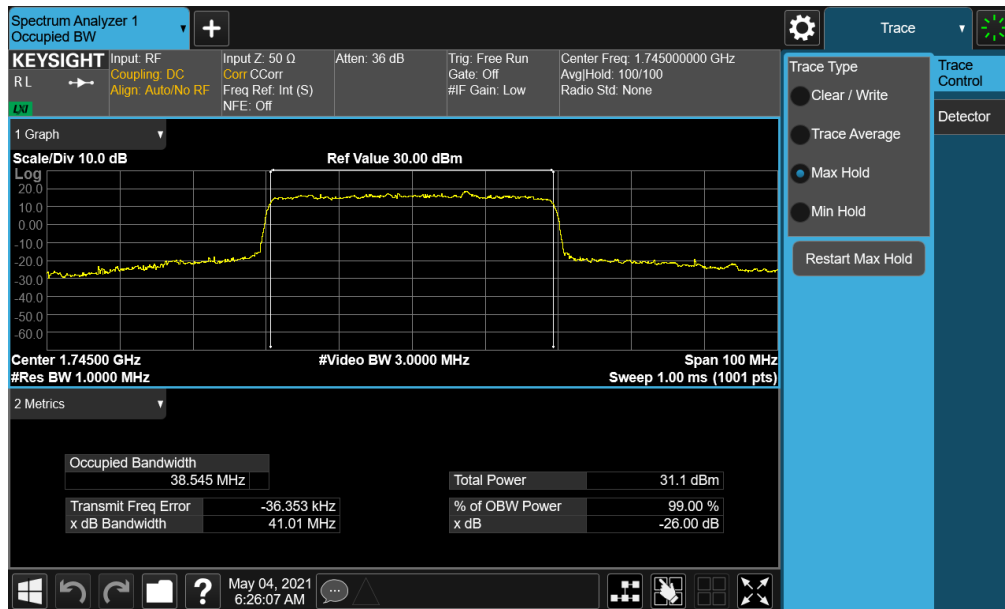


Plot 7-73. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz DFT-s-OFDM BPSK - Full RB)

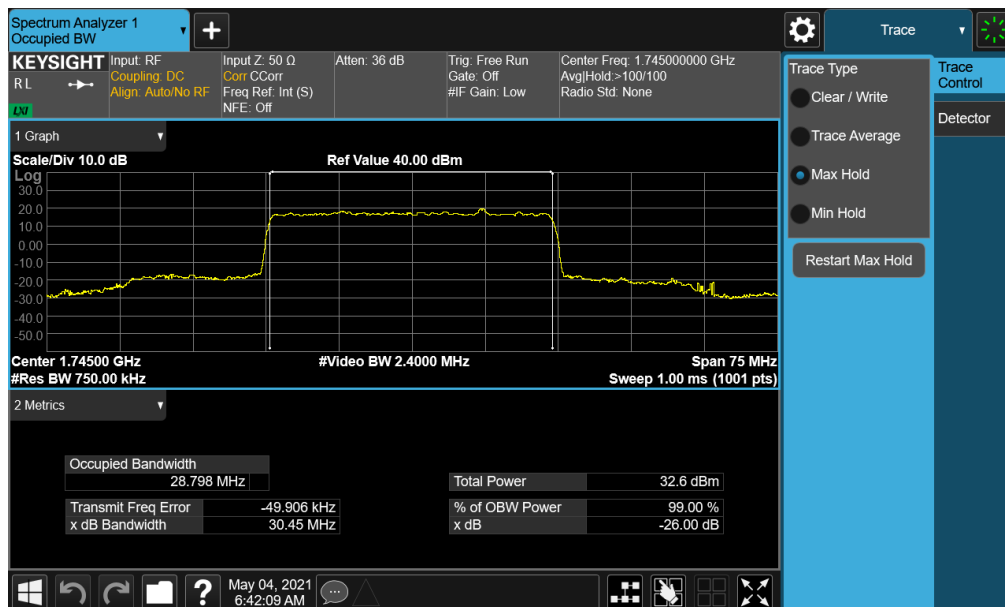


Plot 7-74. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM QPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 54 of 254

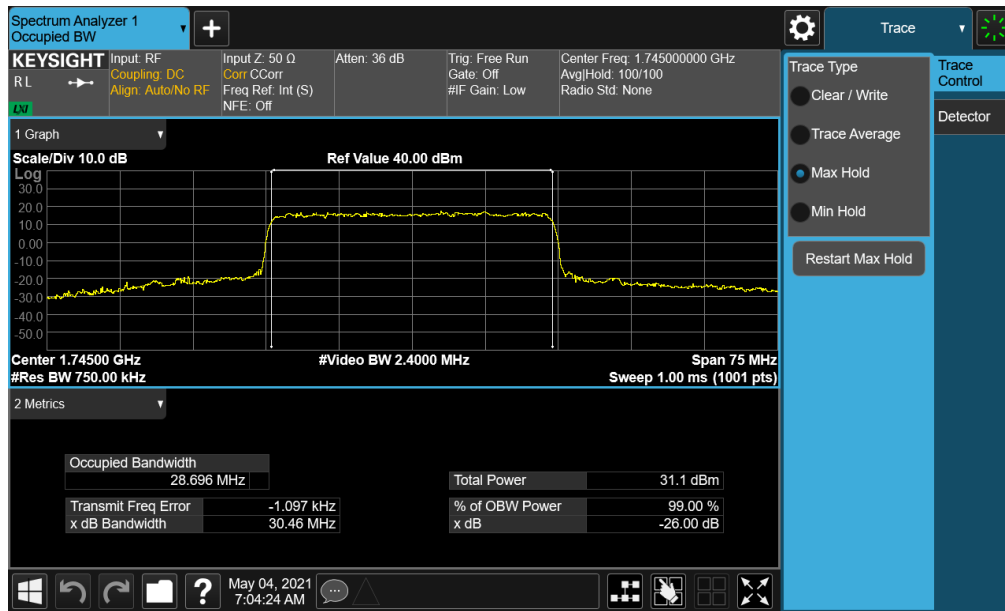


Plot 7-75. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM 16QAM - Full RB)



Plot 7-76. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz DFT-s-OFDM BPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 55 of 254



Plot 7-77. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM QPSK - Full RB)

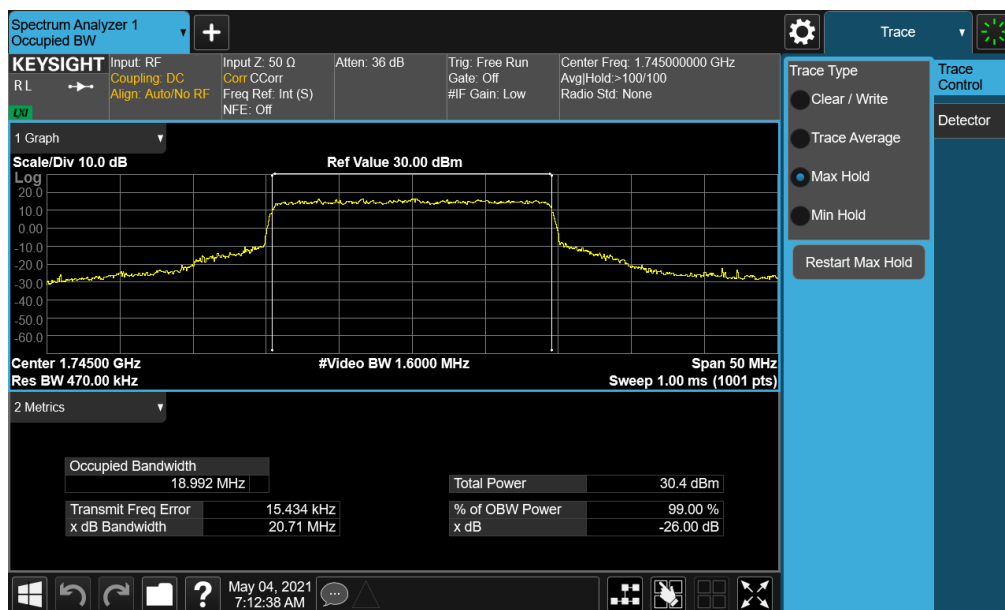


Plot 7-78. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM 16QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 56 of 254



Plot 7-79. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz DFT-s-OFDM BPSK - Full RB)

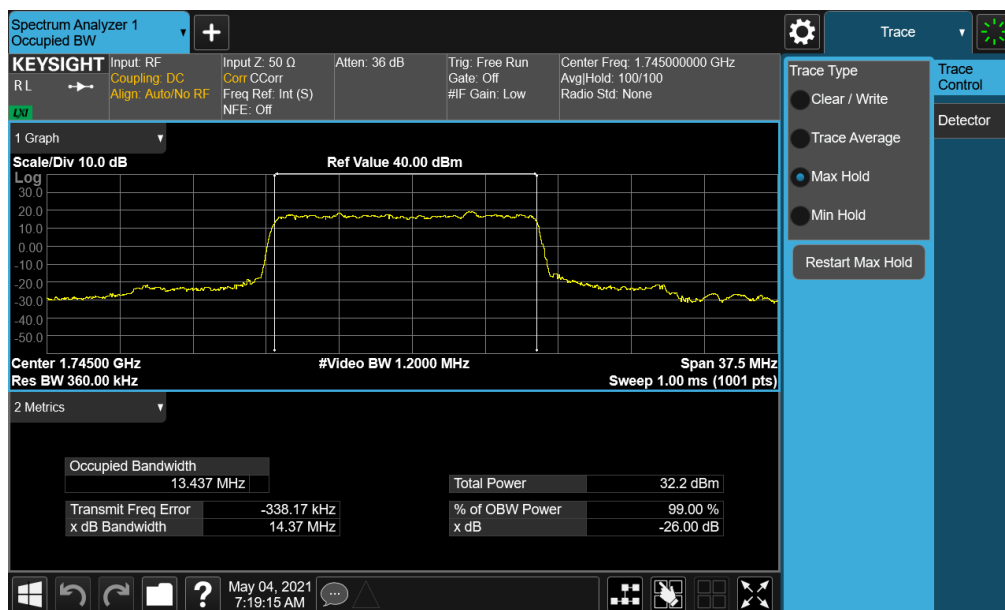


Plot 7-80. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM QPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-04.A3L	Test Dates: 04/12/2021 – 06/04/2021	EUT Type: Portable Handset		Page 57 of 254



Plot 7-81. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM 16QAM - Full RB)

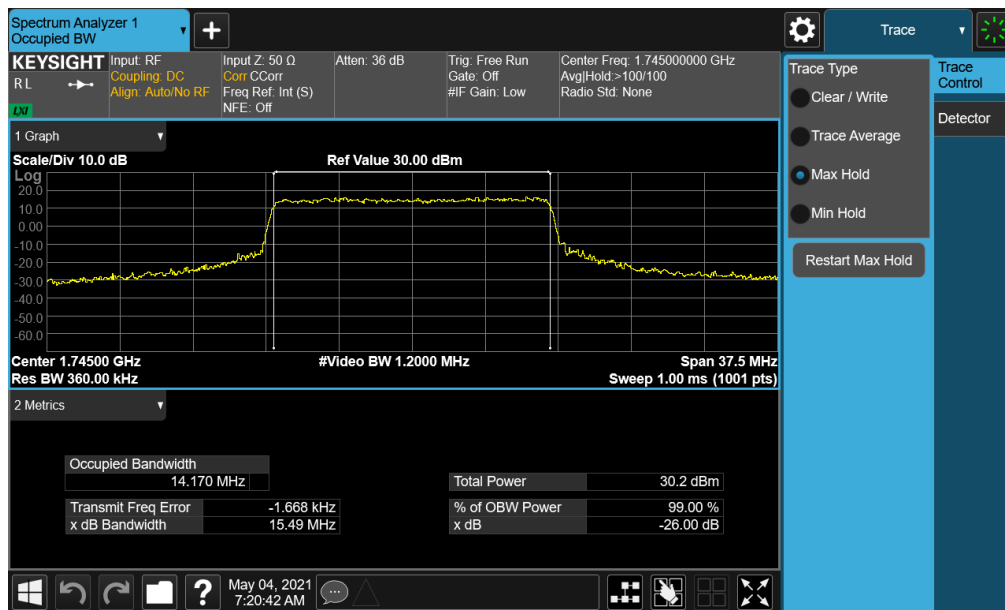


Plot 7-82. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz DFT-s-OFDM BPSK - Full RB)

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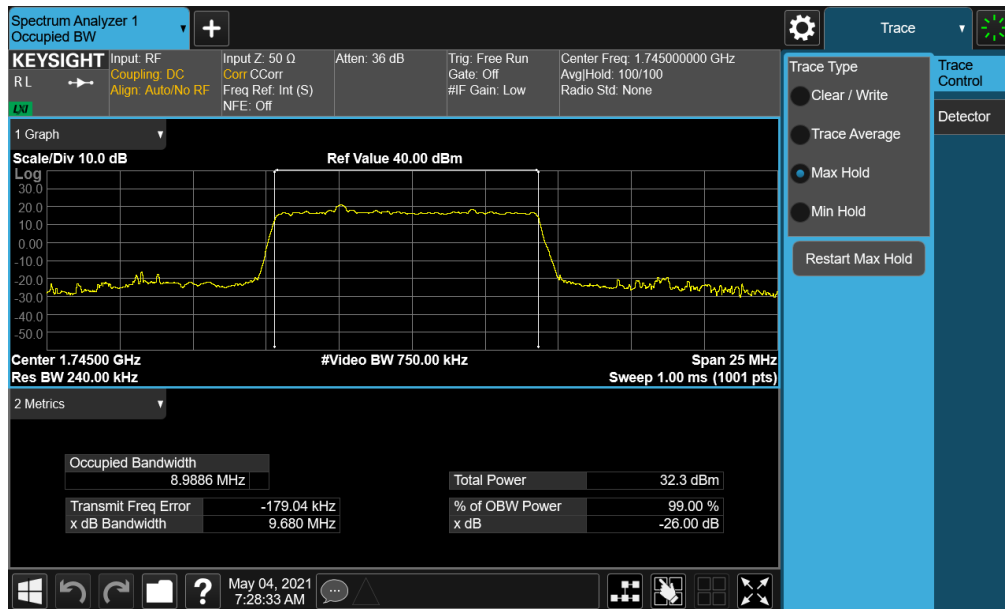


Plot 7-83. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz CP-OFDM QPSK - Full RB)

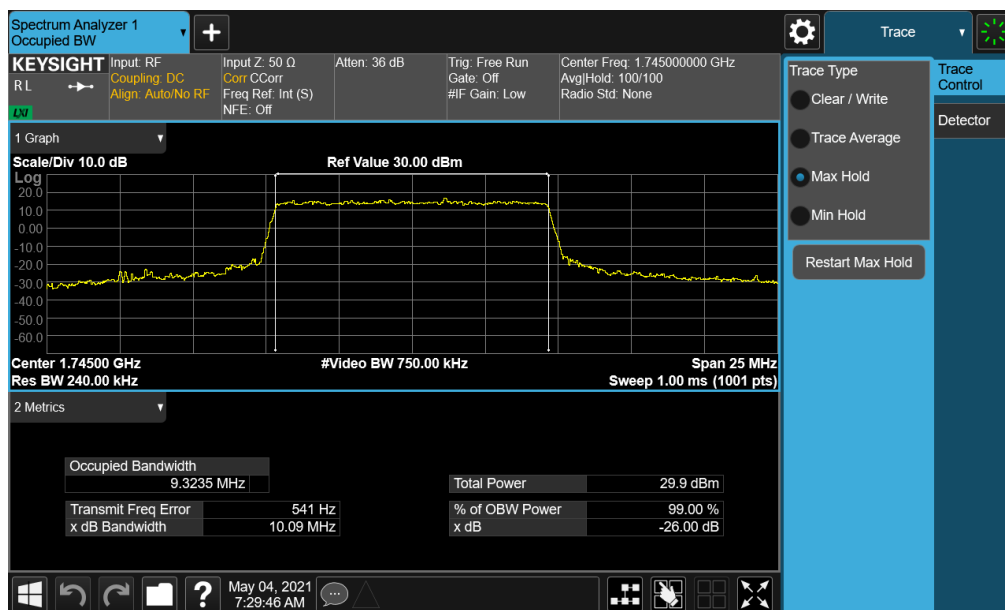


Plot 7-84. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz CP-OFDM 16QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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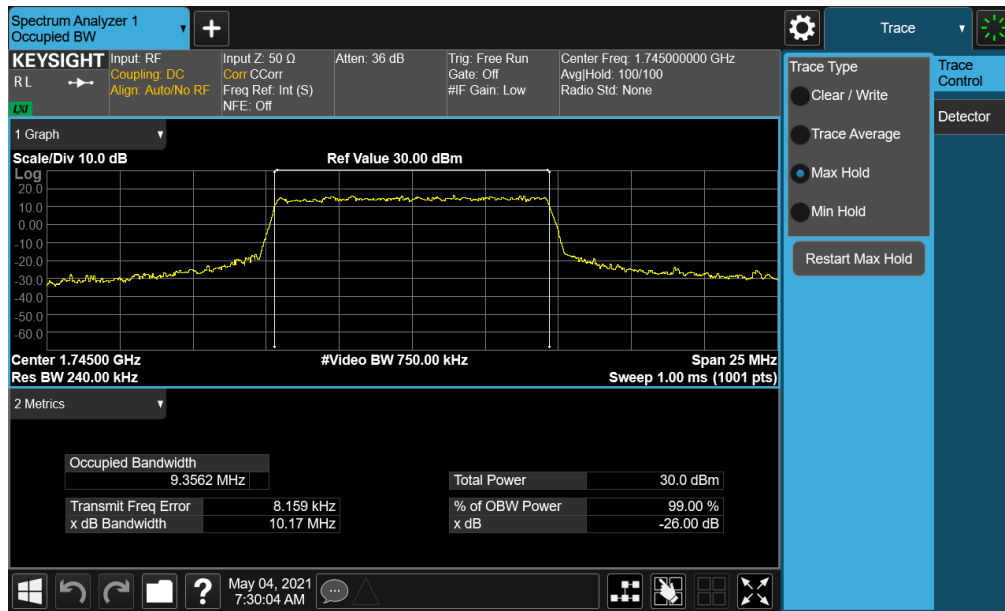


Plot 7-85. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz DFT-s-OFDM BPSK - Full RB)

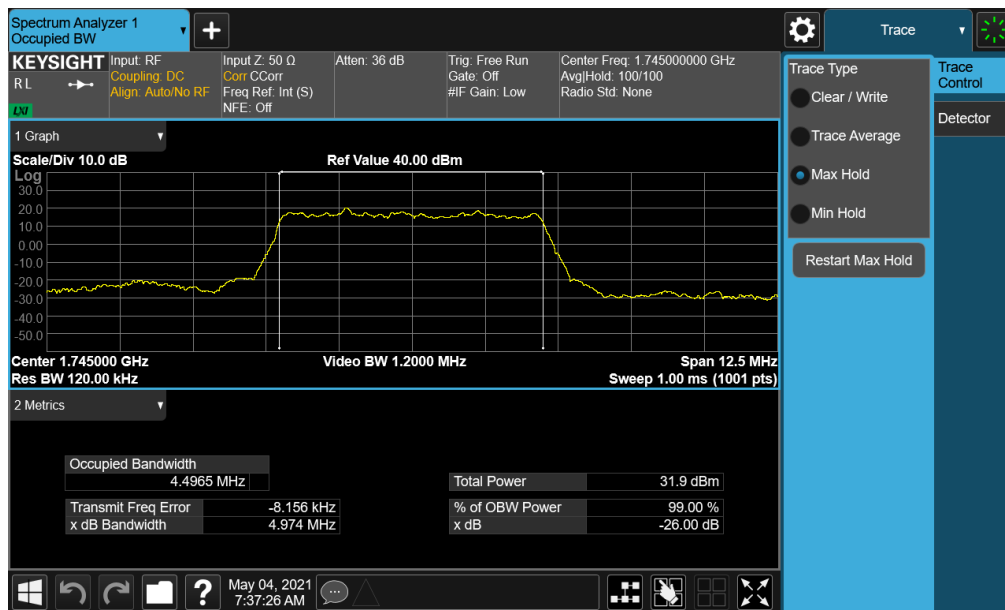


Plot 7-86. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz CP-OFDM QPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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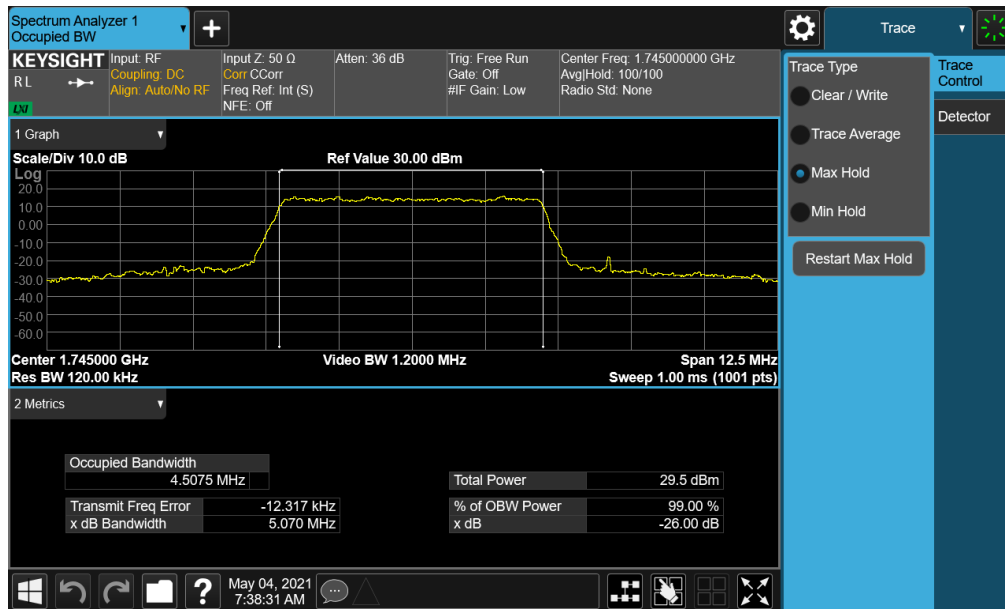


Plot 7-87. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz CP-OFDM 16QAM - Full RB)

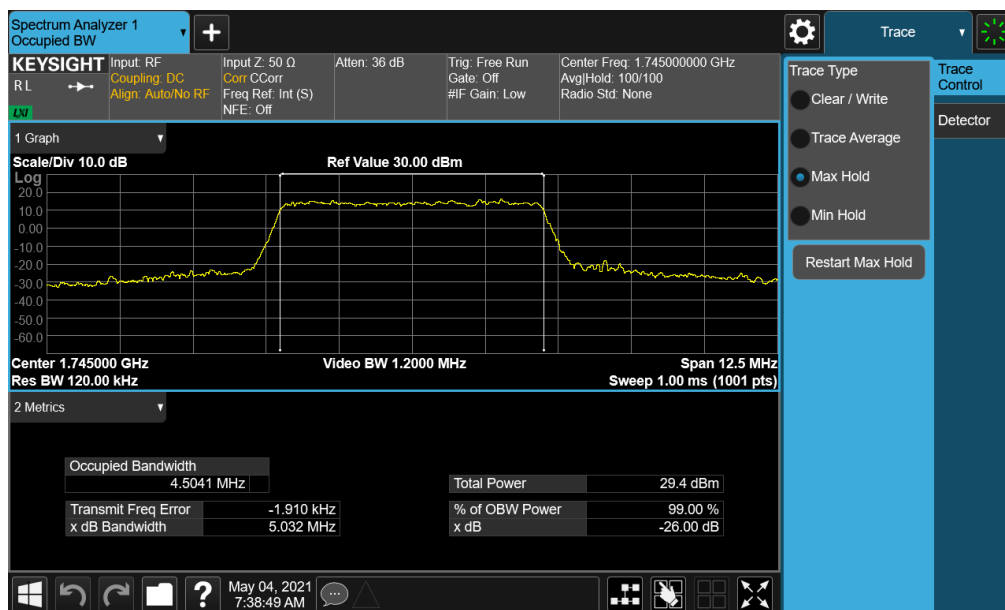


Plot 7-88. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz DFT-s-OFDM BPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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Plot 7-89. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz CP-OFDM QPSK - Full RB)



Plot 7-90. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz CP-OFDM 16QAM - Full RB)

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7.4 Spurious and Harmonic Emissions at Antenna Terminal

Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

The minimum permissible attenuation level of any spurious emission is $43 + 10 \log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.

Test Procedure Used

KDB 971168 D01 v03r01 – Section 6.0

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to 18GHz (separated into at least two plots per channel)
2. RBW \geq 100kHz
3. VBW \geq 3 x RBW
4. Detector = RMS
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

Test Setup

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

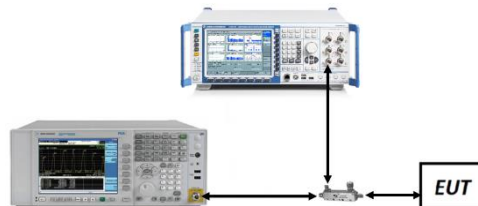




Figure 7-3. Test Instrument & Measurement Setup

Test Notes

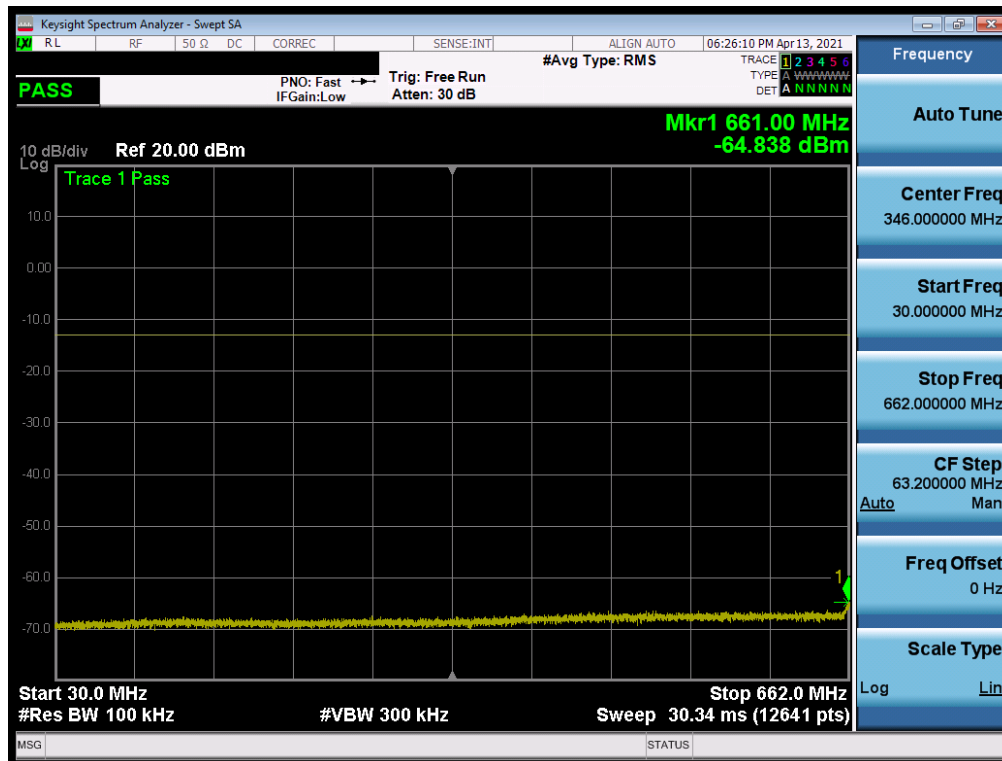
1. Per Part 27 and RSS-139, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth 100 kHz or greater for measurements below 1GHz and 1MHz or greater for measurements above 1GHz. However, in the bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

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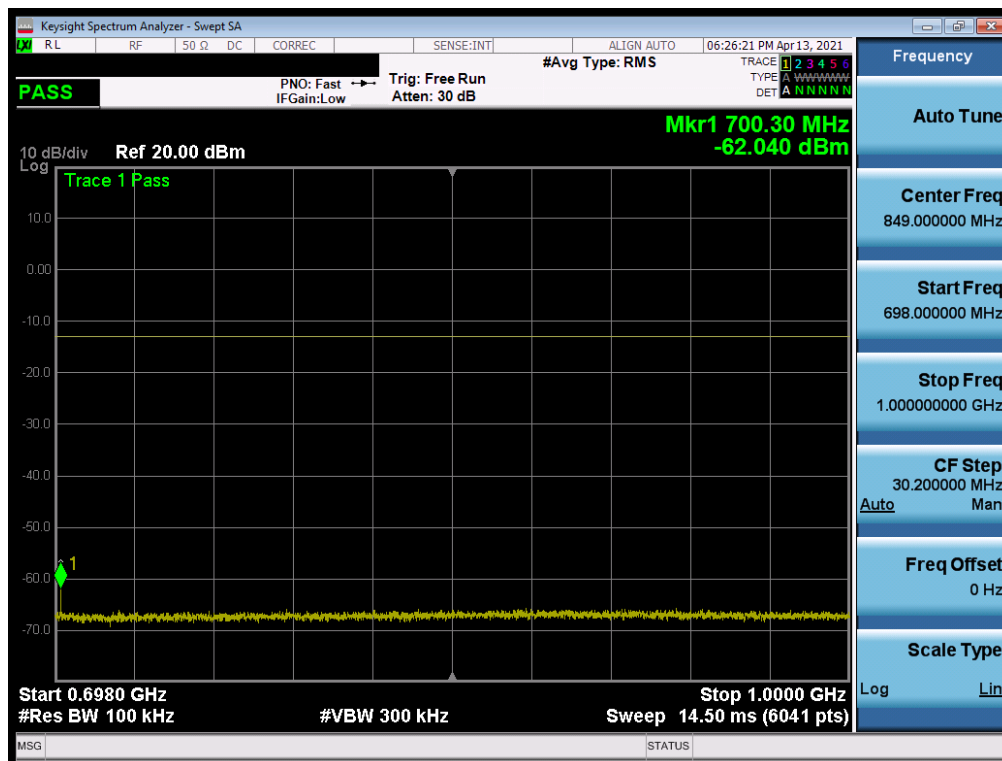
2. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

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LTE Band 71

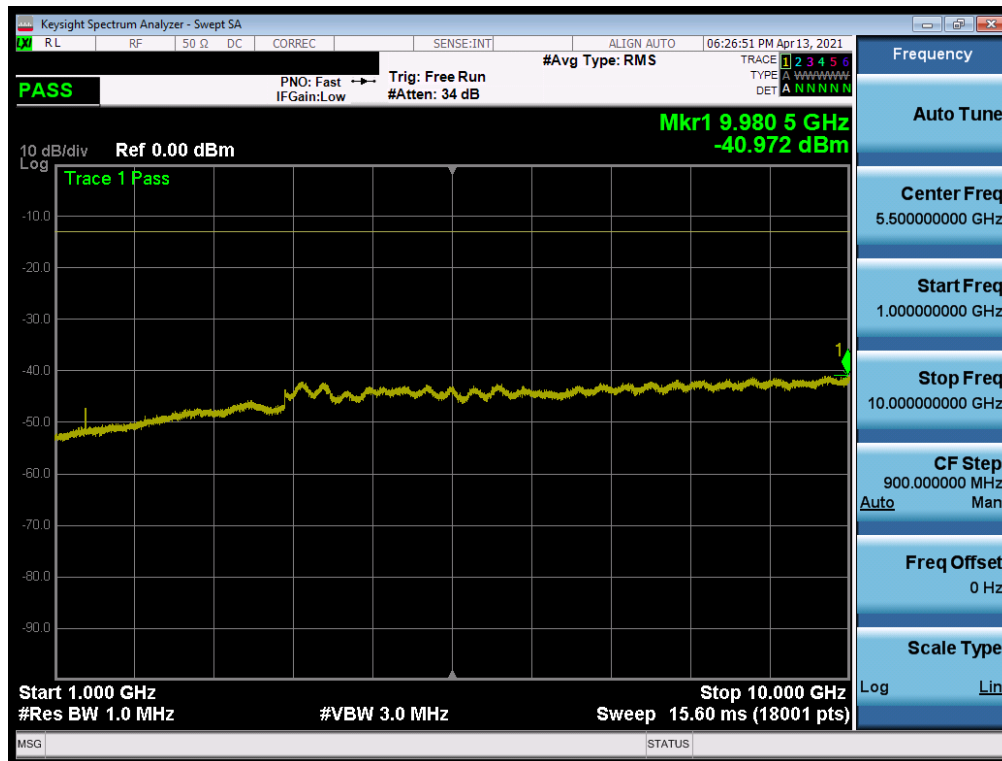


Plot 7-91. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

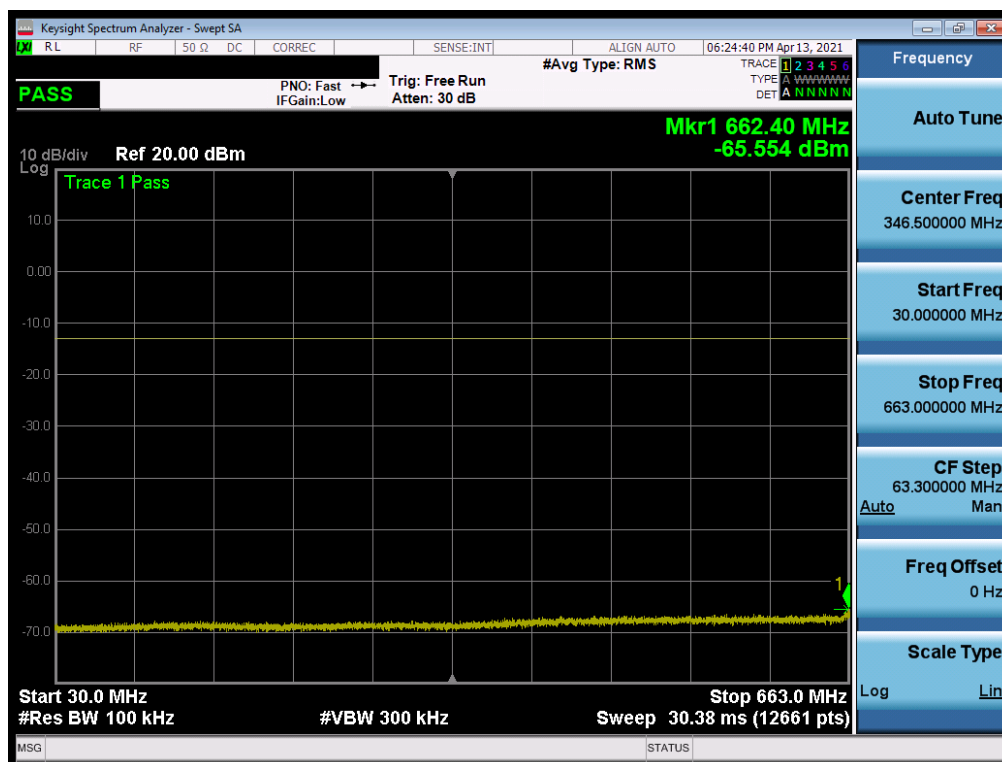


Plot 7-92. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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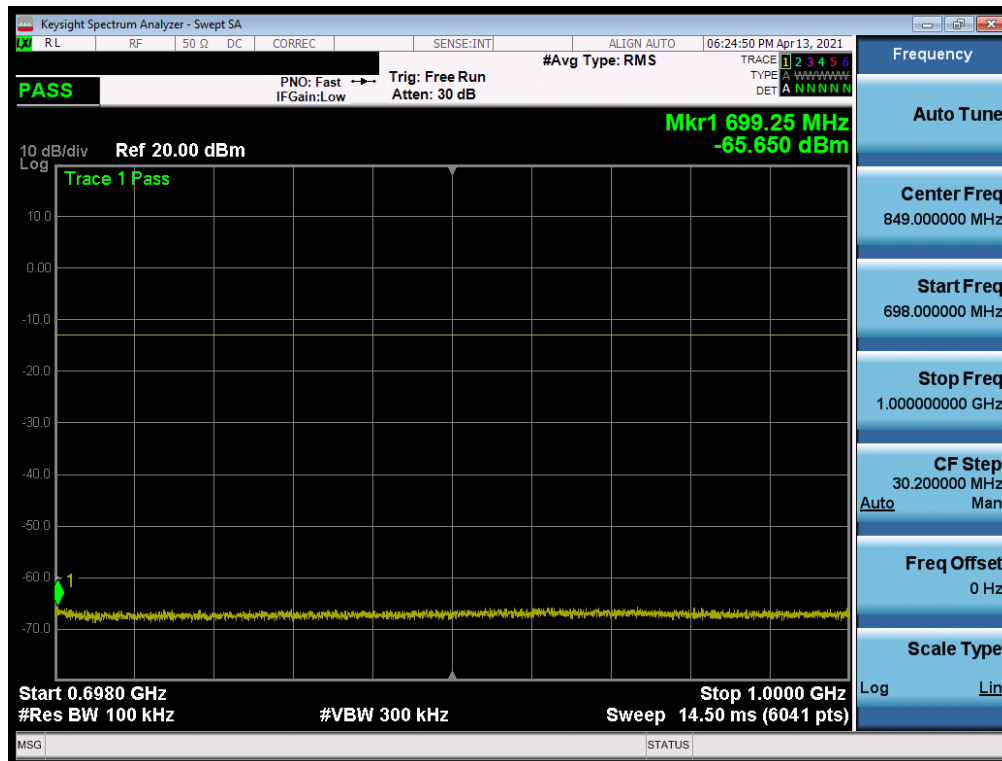


Plot 7-93. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-94. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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Plot 7-95. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-96. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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