

PCTEST

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MEASUREMENT REPORT LTE / Sub-6GHz NR

Applicant Name:

Samsung Electronics Co., Ltd. 129, Samsung-ro, Yeongtong-gu, Suwon-si Gyeonggi-do, 16677, Korea Date of Testing: 8/22 - 9/12/2020 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M2007010102-02-R1.A3L

FCC ID:

A3LSMH303V

APPLICANT:

Samsung Electronics Co., Ltd.

Application Type: Model: EUT Type: FCC Classification: FCC Rule Part(s): Test Procedure(s): Certification SM-H303V Outdoor Customer Premises Equipment (CPE) PCS Licensed Transmitter(PCB) 22, 24 & 27 ANSI C63.26-2015, ANSI/TIA-603-E-2016, ANSI C63.4-2014, KDB 971168 D01 v03r01

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

This revised Test Report (S/N: 1M2007010102-02-R1.A3L) supersedes and replaces the previously issued test report (S/N: 1M2007010102-02.A3L) on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Randy Ortanez President



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MEASUREMENT REPORT FCC Part 22, 24 & 27

			Ef	RP		
Mode	FCC Rule Part	Tx Frequency (MHz)	Max. Pow er (W)	Max. Pow er (dBm)	Emission Designator	Modulation
LTE Band 13	27	779.5 - 784.5	0.262	24.18	4M52G7D	QPSK
LTE Band 13	27	779.5 - 784.5	0.222	23.47	4M50W7D	16QAM
LTE Band 13	27	779.5 - 784.5	0.175	22.42	4M51W7D	64QAM
LTE Band 13	27	782	0.271	24.32	8M98G7D	QPSK
LTE Band 13	27	782	0.224	23.49	8M97W7D	16QAM
LTE Band 13	27	782	0.190	22.79	8M98W7D	64QAM
LTE Band 5	22H	824.7 - 848.3	0.231	23.63	1M10G7D	QPSK
LTE Band 5	22H	824.7 - 848.3	0.201	23.04	1M09W7D	16QAM
LTE Band 5	22H	824.7 - 848.3	0.153	21.86	1M10W7D	64QAM
LTE Band 5	22H	825.5 - 847.5	0.235	23.72	2M71G7D	QPSK
LTE Band 5	22H	825.5 - 847.5	0.200	23.00	2M70W7D	16QAM
LTE Band 5	22H	825.5 - 847.5	0.157	21.95	2M71W7D	64QAM
LTE Band 5	22H	826.5 - 846.5	0.232	23.65	4M52G7D	QPSK
LTE Band 5	22H	826.5 - 846.5	0.206	23.13	4M51W7D	16QAM
LTE Band 5	22H	826.5 - 846.5	0.161	22.08	4M52W7D	64QAM
LTE Band 5	22H	829 - 844	0.237	23.75	9M01G7D	QPSK
LTE Band 5	22H	829 - 844	0.204	23.10	9M04W7D	16QAM
LTE Band 5	22H	829 - 844	0.157	21.97	9M00W7D	64QAM

EUT LTE Overview (<1 GHz)

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				EF	RP	Emission
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	Max. Power [W]	Max. Power [dBm]	Designator
		π/2 BPSK	834.0 - 839.0	0.232	23.66	17M9G7D
		QPSK	834.0 - 839.0	0.211	23.24	19M0G7D
	20 MHz	16QAM	834.0 - 839.0	0.201	23.02	19M0W7D
		64QAM	834.0 - 839.0	0.146	21.66	19M1W7D
		256QAM	834.0 - 839.0	0.088	19.45	18M9W7D
		π/2 BPSK	831.5 - 841.5	0.224	23.50	13M5G7D
		QPSK	831.5 - 841.5	0.206	23.15	14M2G7D
	15 MHz	16QAM	831.5 - 841.5	0.189	22.77	14M2W7D
		64QAM	831.5 - 841.5	0.127	21.04	14M2W7D
NR Band n5		256QAM	831.5 - 841.5	0.084	19.24	14M3W7D
NIN Dallu 115		π/2 BPSK	829.0 - 844.0	0.248	23.95	9M01G7D
		QPSK	829.0 - 844.0	0.238	23.76	9M36G7D
	10 MHz	16QAM	829.0 - 844.0	0.220	23.42	9M36W7D
		64QAM	829.0 - 844.0	0.157	21.96	9M34W7D
		256QAM	829.0 - 844.0	0.126	21.00	9M37W7D
		π/2 BPSK	826.5 - 846.5	0.224	23.49	4M52G7D
		QPSK	826.5 - 846.5	0.222	23.47	4M54G7D
	5 MHz	16QAM	826.5 - 846.5	0.221	23.44	4M57W7D
		64QAM	826.5 - 846.5	0.155	21.91	4M54W7D
		256QAM	826.5 - 846.5	0.096	19.83	4M53W7D

EUT Sub6 Overview (<1 GHz)

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			EI	RP		
Mode	FCC Rule	Tx Frequency (MHz)	Max. Power	Max. Power	Emission	Modulation
	Part	·····	(W)	(dBm)	Designator	
LTE Dand CC/4	07	4740 7 4770 0	0.010	20.42	41400070	ODCK
LTE Band 66/4	27 27	<u>1710.7 - 1779.3</u> 1710.7 - 1779.3	0.819	29.13	1M09G7D	QPSK 1COAM
LTE Band 66/4			0.664	28.22	1M07W7D	16QAM
LTE Band 66/4	27	1710.7 - 1779.3	0.609	27.85	1M07W7D	64QAM
LTE Band 66/4	27	1711.5 - 1778.5	0.834	29.21	2M70G7D	QPSK
LTE Band 66/4	27	1711.5 - 1778.5	0.728	28.62	2M70W7D	16QAM
LTE Band 66/4	27	1711.5 - 1778.5	0.619	27.91	2M71W7D	64QAM
LTE Band 66/4	27	1712.5 - 1777.5	0.802	29.04	4M45G7D	QPSK
LTE Band 66/4	27	1712.5 - 1777.5	0.703	28.47	4M52W7D	16QAM
LTE Band 66/4	27	1712.5 - 1777.5	0.678	28.31	4M44W7D	64QAM
LTE Band 66/4	27	1715 - 1775	0.776	28.90	9M02G7D	QPSK
LTE Band 66/4	27	1715 - 1775	0.678	28.31	9M00W7D	16QAM
LTE Band 66/4	27	1715 - 1775	0.651	28.14	9M00W7D	64QAM
LTE Band 66/4	27	1717.5 - 1772.5	0.838	29.23	13M5G7D	QPSK
LTE Band 66/4	27	1717.5 - 1772.5	0.718	28.56	13M6W7D	16QAM
LTE Band 66/4	27	1717.5 - 1772.5	0.727	28.61	13M5W7D	64QAM
LTE Band 66/4	27	1720 - 1770	0.847	29.28	18M1G7D	QPSK
LTE Band 66/4	27	1720 - 1770	0.743	28.71	18M1W7D	16QAM
LTE Band 66/4	27	1720 - 1770	0.690	28.39	18M0W7D	64QAM
LTE Band 2	24E	1850.7 - 1909.3	1.324	31.22	1M09G7D	QPSK
LTE Band 2	24E	1850.7 - 1909.3	1.204	30.81	1M10W7D	16QAM
LTE Band 2	24E	1850.7 - 1909.3	0.995	29.98	1M10W7D	64QAM
LTE Band 2	24E	1851.5 - 1908.5	1.313	31.18	2M71G7D	QPSK
LTE Band 2	24E	1851.5 - 1908.5	1.254	30.98	2M71W7D	16QAM
LTE Band 2	24E	1851.5 - 1908.5	0.947	29.76	2M71W7D	64QAM
LTE Band 2	24E	1852.5 - 1907.5	1.358	31.33	4M51G7D	QPSK
LTE Band 2	24E	1852.5 - 1907.5	1.186	30.74	4M51W7D	16QAM
LTE Band 2	24E	1852.5 - 1907.5	0.975	29.89	4M51W7D	64QAM
LTE Band 2	24E	1855 - 1905	1.433	31.56	8M99G7D	QPSK
LTE Band 2	24E	1855 - 1905	1.234	30.91	9M00W7D	16QAM
LTE Band 2	24E	1855 - 1905	0.945	29.75	8M99W7D	64QAM
LTE Band 2	24E	1857.5 - 1902.5	1.419	31.52	13M5G7D	QPSK
LTE Band 2	24E	1857.5 - 1902.5	1.245	30.95	13M5W7D	16QAM
LTE Band 2	24E	1857.5 - 1902.5	1.069	30.29	13M5W7D	64QAM
LTE Band 2	24E	1860 - 1900	1.444	31.60	17M9G7D	QPSK
LTE Band 2	24L 24E	1860 - 1900	1.290	31.11	17M9W7D	16QAM
LTE Band 2	24E	1860 - 1900	0.992	29.97	17M9W7D	64QAM
	ZHL					

EUT LTE Overview (Mid Bands)

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Overview Table (Above 1G bands)								
				EI	Emission			
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	Max. Power [W]	Max. Power [dBm]	Designator		
		π/2 BPSK	1720.0 - 1770.0	0.791	28.98	18M0G7D		
		QPSK	1720.0 - 1770.0	0.768	28.85	19M0G7D		
	20 MHz	16QAM	1720.0 - 1770.0	0.795	29.00	19M0W7D		
		64QAM	1720.0 - 1770.0	0.572	27.57	19M0W7D		
		256QAM	1720.0 - 1770.0	0.406	26.08	19M0W7D		
		π/2 BPSK	1717.5 - 1772.5	0.962	29.83	13M5G7D		
		QPSK	1717.5 - 1772.5	0.936	29.71	14M2G7D		
	15 MHz	16QAM	1717.5 - 1772.5	0.960	29.82	14M1W7D		
		64QAM	1717.5 - 1772.5	0.720	28.57	14M2W7D		
NR Band n66		256QAM	1717.5 - 1772.5	0.464	26.66	14M2W7D		
INIX Danu 1100		π/2 BPSK	1715.0 - 1775.0	0.925	29.66	9M04G7D		
		QPSK	1715.0 - 1775.0	0.880	29.44	9M31G7D		
	10 MHz	16QAM	1715.0 - 1775.0	0.882	29.45	9M31W7D		
		64QAM	1715.0 - 1775.0	0.640	28.06	9M35W7D		
		256QAM	1715.0 - 1775.0	0.439	26.42	9M35W7D		
		π/2 BPSK	1712.5 - 1777.5	0.997	29.99	4M50G7D		
		QPSK	1712.5 - 1777.5	0.992	29.97	4M51G7D		
	5 MHz	16QAM	1712.5 - 1777.5	0.970	29.87	4M50W7D		
		64QAM	1712.5 - 1777.5	0.699	28.45	4M50W7D		
		256QAM	1712.5 - 1777.5	0.459	26.62	4M50W7D		

EUT Sub6 Overview (NR Band n66)

			Ty Freemanny	EI	RP	Emission
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	Max. Power [W]	Max. Power [dBm]	Emission Designator
		π/2 BPSK	1860 - 1905	1.694	32.29	18M0G7D
		QPSK	1860 - 1905	1.497	31.75	19M0G7D
	20 MHz	16QAM	1860 - 1905	1.377	31.39	19M0W7D
		64QAM	1860 - 1905	0.946	29.76	19M0W7D
		256QAM	1860 - 1905	0.646	28.10	19M0W7D
		π/2 BPSK	1857.5 - 1907.5	1.608	32.06	13M5G7D
	15 MHz	QPSK	1857.5 - 1907.5	1.582	31.99	14M2G7D
		16QAM	1857.5 - 1907.5	1.446	31.60	14M1W7D
		64QAM	1857.5 - 1907.5	1.003	30.01	14M2W7D
NR Band n2		256QAM	1857.5 - 1907.5	0.675	28.29	14M2W7D
INK Dallu IIZ		π/2 BPSK	1855 - 1910	1.613	32.08	9M04G7D
		QPSK	1855 - 1910	1.547	31.90	9M31G7D
	10 MHz	16QAM	1855 - 1910	1.493	31.74	9M31W7D
		64QAM	1855 - 1910	1.028	30.12	9M35W7D
		256QAM	1855 - 1910	0.691	28.40	9M35W7D
		π/2 BPSK	1852.5 - 1912.5	1.682	32.26	4M58G7D
		QPSK	1852.5 - 1912.5	1.640	32.15	4M51G7D
	5 MHz	16QAM	1852.5 - 1912.5	1.400	31.46	4M50W7D
		64QAM	1852.5 - 1912.5	1.007	30.03	4M50W7D
		256QAM	1852.5 - 1912.5	0.676	28.30	4M50W7D

EUT Sub6 Overview (NR Band n2)

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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 17025-2005 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISED.

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Outdoor Customer Premises Equipment (CPE) FCC ID: A3LSMH303V**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

Test Device Serial No.: 13812, 14273

2.2 Device Capabilities

This device contains the following capabilities:

Multi-band LTE, 5G NR (n5, n66, n2, n261, n260), Bluetooth (LE)

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.

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.

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 Measurement Procedure

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

3.2 Block C Frequency Range

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

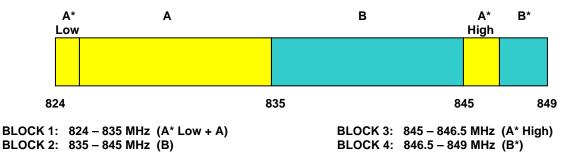
BLOCK 4: 891.5 - 894 MHz (B*)

3.3 Cellular - Base Frequency Blocks



BLOCK 1: 869 - 880 MHz (A* Low + A) BLOCK 2: 880 - 890 MHz (B)

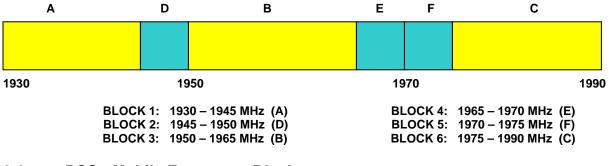
3.4 Cellular - Mobile Frequency Blocks



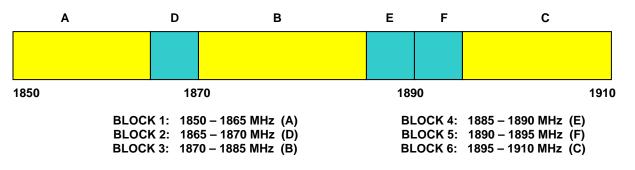
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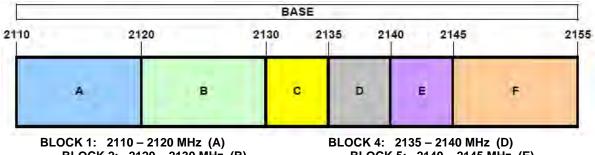
3.5 PCS - Base Frequency Blocks



3.6 PCS - Mobile Frequency Blocks

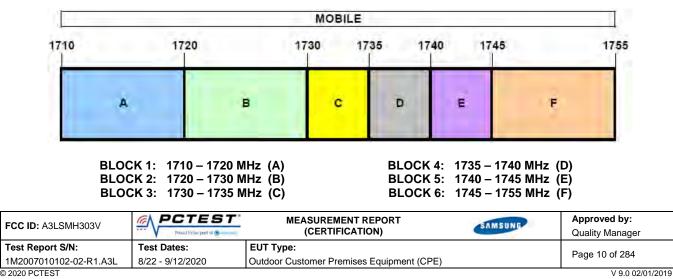


3.7 AWS - Base Frequency Blocks



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

3.8 AWS - Mobile Frequency Blocks





3.9 Radiated Power and Radiated Spurious Emissions

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

The equipment under test was transmitting while connected to its integral antenna and is placed on a turntable 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Radiated power levels are also investigated with the receive antenna horizontally and vertically polarized. The maximized power level is recorded using the spectrum analyzer "Channel Power" function with the integration band set to the emissions' occupied bandwidth, a RMS detector, RBW = 100kHz, VBW = 300kHz, and a 1 second sweep time over a minimum of 10 sweeps, per the guidelines of KDB 971168 D01 v03r01.

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

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

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

The calculated P_d levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of 43 + 10 log₁₀(Power [Watts]). For Band 48, the calculated P_d levels are compared to the absolute spurious emission limit of -40dBm which is equivalent to the required minimum attenuation of 70 + 10 log₁₀(Power [Watts]).

Per the guidance of ANSI C63.26-2015, field strength method may be performed for both Radiated power and Radiated Spurious Emissions. The filed strength is converted direct from radiated emission measurement.

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 (±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
-	LTx5	Licensed Transmitter Cable Set	4/9/2020	Annual	4/9/2021	LTx5
Agilent	N9030A	PXA Signal Analyzer (44GHz)	8/17/2020	Annual	8/17/2021	MY52350166
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	3117	1-18 GHz DRG Horn (Medium)	2/14/2019	Biennial	2/14/2021	125518
Mini Circuits	TVA-11-422	RF Power Amp		N/A		QA1317001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11208010032
Rohde & Schwarz	CMW500	Radio Communication Tester	8/26/2019	Annual	9/26/2020	100976
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	7/15/2020	Annual	7/15/2021	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	9/23/2019	Annual	9/23/2020	100348
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2/10/2020	Annual	2/10/2021	102134
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2/21/2020	Annual	2/21/2021	102133
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	11/1/2019	Annual	11/1/2020	100040
Sunol	DRH-118	Horn Antenna (1-18GHz)	10/3/2019	Biennial	10/3/2021	A050307
Sunol Science	JB5	Bi-Log Antenna (30M - 5GHz)	7/27/2020	Biennial	7/27/2022	A051107

Table 5-1. Test Equipment

Notes:

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:	A3LSMH303V
FCC Classification:	PCS Licensed Transmitter(PCB)
Mode(s):	LTE

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference			
2.1049	Occupied Bandwidth	N/A						Section 7.2
2.1051 22.917(a) 24.238(a) 27.53(c) 27.53(h)	Out of Band Emissions	> 43 + 10 log ₁₀ (P[Watts]) at Band Edge and for all out-of- band emissions			Section 7.3, 7.4			
24.232(d)	Peak-Average Ratio	< 13 dB		Section 7.5				
2.1046	Transmitter Conducted Output Power	N/A	CONDUCTED	PASS	Section 7.6			
22.917(a) 27.53(h)	Uplink Carrier Aggregation	>43 + 10log(P[Watts]) at Band Edge and for all out-of-band emissions		Section 7.9				
2.1055 22.355 24.235 27.54	Frequency Stability	< 2.5 ppm (Part 22) and fundamental emissions stay within authorized frequency block (Part 24, 27)			Section 7.11			

Table 7-1. Summary of Conducted Test Results

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

Table 7-2. Summary of Radiated Test Results

Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots (Sections 7.2, 7.3, 7.4,7.5) were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "LTE Automation," Version 5.3.
- 5) For 5G NR, both DFT-s and CP-OFDM transmission shcheme were investigated. The worst case test result is incluced.

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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 x RBW
- 4. Detector = Peak
- 5. Trace mode = max hold
- 6. Sweep = auto couple
- 7. The trace was allowed to stabilize
- 8. If necessary, steps 2 7 were repeated after changing the RBW such that it would be within
 - 1-5% of the 99% occupied bandwidth observed in Step 7

Test Setup

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



Figure 7-1. Test Instrument & Measurement Setup

Test Notes

None.

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Band 13



Plot 7-1. Occupied Bandwidth Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-2. Occupied Bandwidth Plot (Band 13 - 5.0MHz 16-QAM - Full RB Configuration)

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Plot 7-3. Occupied Bandwidth Plot (Band 13 - 5.0MHz 64-QAM - Full RB Configuration)



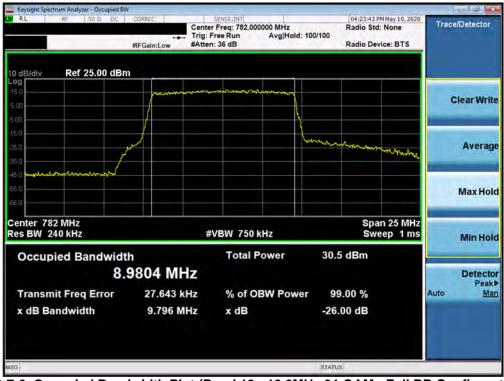
Plot 7-4. Occupied Bandwidth Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)

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Plot 7-5. Occupied Bandwidth Plot (Band 13 - 10.0MHz 16-QAM - Full RB Configuration)

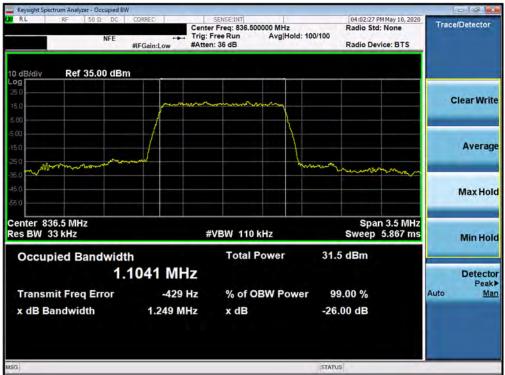


Plot 7-6. Occupied Bandwidth Plot (Band 13 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST"	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Band 5



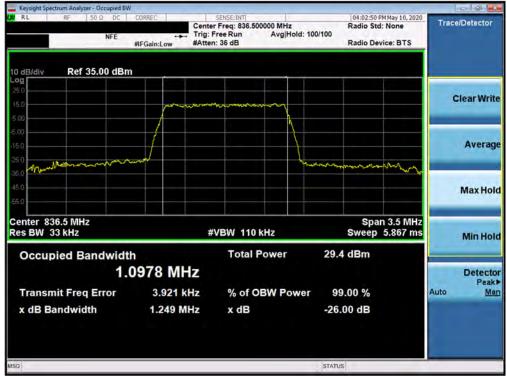
Plot 7-7. Occupied Bandwidth Plot (Band 5 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-8. Occupied Bandwidth Plot (Band 5 - 1.4MHz 16-QAM - Full RB Configuration)

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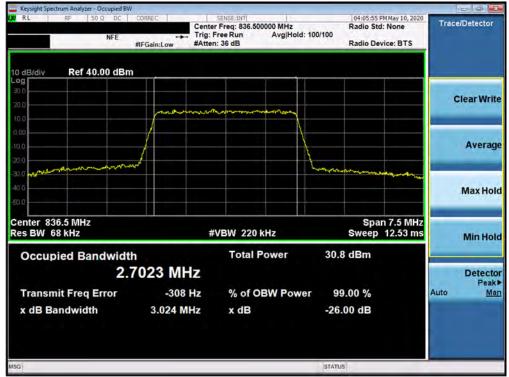
Plot 7-9. Occupied Bandwidth Plot (Band 5 - 1.4MHz 64-QAM - Full RB Configuration)



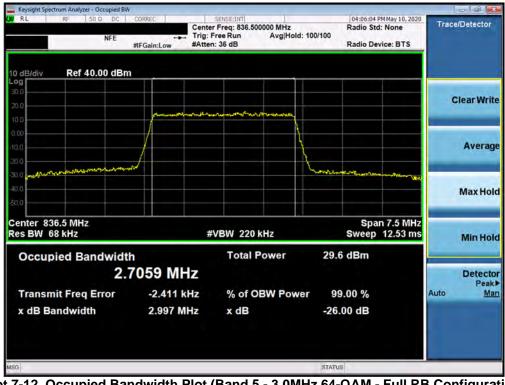
Plot 7-10. Occupied Bandwidth Plot (Band 5 - 3.0MHz QPSK - Full RB Configuration)

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Plot 7-11. Occupied Bandwidth Plot (Band 5 - 3.0MHz 16-QAM - Full RB Configuration)



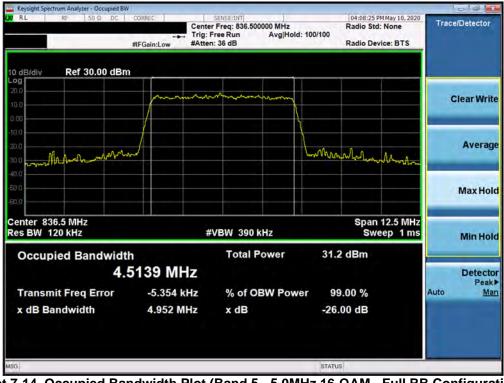
Plot 7-12. Occupied Bandwidth Plot (Band 5 - 3.0MHz 64-QAM - Full RB Configuration)

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Keysight Spectrum Analyzer - Occupied BW						o d X
	#IFGain:Low	SENSE:INT Center Freq: 836.50 Trig: Free Run #Atten: 36 dB	0000 MHz Avg Hold: 100/1	Radio Std:		Trace/Detector
10 dB/div Ref 30.00 dBm						
200 10.0	Jun	man	m			Clear Write
-10.0 -10.0 -20.0 -30.0 Marco	N			whitemark	Man	Average
-40.0 -60.0 -60.0						Max Hold
Center 836.5 MHz Res BW 120 kHz		#VBW 390	kHz		2.5 MHz ep 1 ms	Min Hold
Occupied Bandwidt	h 5152 MH	Total F Z	Power	32.0 dBm		Detector
Transmit Freq Error x dB Bandwidth	2.768 kl 5.014 Ml		BW Power	99.00 % -26.00 dB	A	Peak≱ Auto <u>Man</u>
MSG				STATUS		-

Plot 7-13. Occupied Bandwidth Plot (Band 5 - 5.0MHz QPSK - Full RB Configuration)



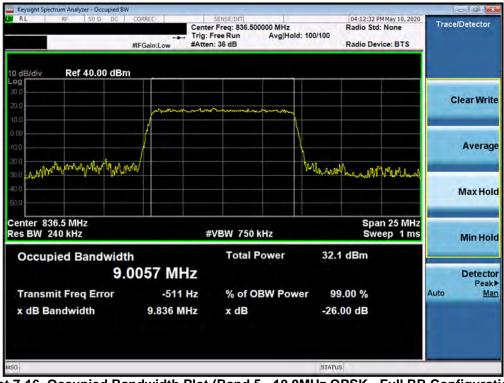
Plot 7-14. Occupied Bandwidth Plot (Band 5 - 5.0MHz 16-QAM - Full RB Configuration)

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20 RL RF 50 Ω DC	#IFGain:Low	SENSE:INT Center Freq: 836.500 Trig: Free Run #Atten: 36 dB	0000 MHz Avg Hold:>100/100	04:08:31 PM May 10, 202 Radio Std: None Radio Device: BTS	⁰ Trace/Detector
10 dB/div Ref 30.00 dBm					
10.0	from	mmmmm			Clear Write
10.0 20.0 30.0	~		Man	Multin man	Average
40.0 50.0 50.0					Max Hole
Center 836.5 MHz Res BW 120 kHz		#VBW 390 H	٢Hz	Span 12.5 MH Sweep 1 m	
Occupied Bandwidt	h 5238 MI	Total P HZ	ower 29.	8 dBm	Detecto
Transmit Freq Error x dB Bandwidth	-2.826 4.990 N			9.00 % .00 dB	Auto <u>Ma</u> i
sg			STATL	JS	

Plot 7-15. Occupied Bandwidth Plot (Band 5 - 5.0MHz 64-QAM - Full RB Configuration)



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

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XI RL RF 50Ω DC	#IFGain:Low	SENSE:INT Center Freq: 83 Trig: Free Run #Atten: 36 dB		1:>100/100	04:13:05 PM May 10 Radio Std: None Radio Device: BT	Trace/Dete	ctor
10 dB/div Ref 40.00 dBm							101-76
20.0 10.0	/~~~~					Clear	write
100 200 300	w.			Loung	WWM Jarmon M		erage
-30.0						0.040	Hold
Center 836.5 MHz Res BW 240 kHz		#VBW 7			Span 25 I Sweep 1	100.0	Hold
Occupied Bandwidth 9.0) 384 MH		al Power	31.7	dBm		tector
Transmit Freq Error x dB Bandwidth	2.271 k 9.962 M		f OBW Pow		.00 % 00 dB	Auto	Man
ISG				STATUS			

Plot 7-17. Occupied Bandwidth Plot (Band 5 - 10.0MHz 16-QAM - Full RB Configuration)



Plot 7-18. Occupied Bandwidth Plot (Band 5 - 10.0MHz 64-QAM - Full RB Configuration)

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Band 66/4



Plot 7-19. Occupied Bandwidth Plot (Band 66/4 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-20. Occupied Bandwidth Plot (Band 66/4 - 1.4MHz 16-QAM - Full RB Configuration)

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Plot 7-21. Occupied Bandwidth Plot (Band 66/4 - 1.4MHz 64-QAM - Full RB Configuration)



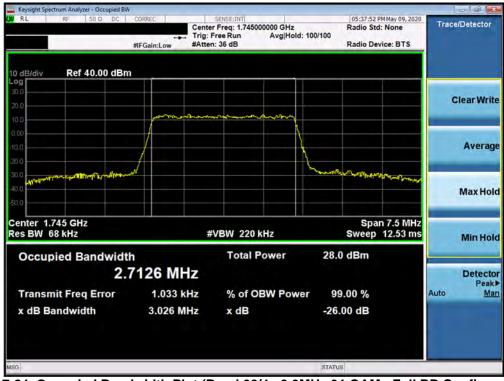
Plot 7-22. Occupied Bandwidth Plot (Band 66/4 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-23. Occupied Bandwidth Plot (Band 66/4 - 3.0MHz 16-QAM - Full RB Configuration)



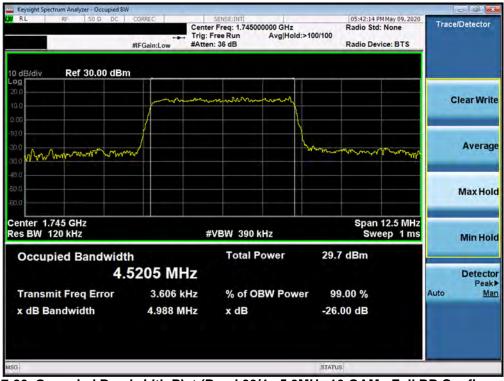
Plot 7-24. Occupied Bandwidth Plot (Band 66/4 - 3.0MHz 64-QAM - Full RB Configuration)

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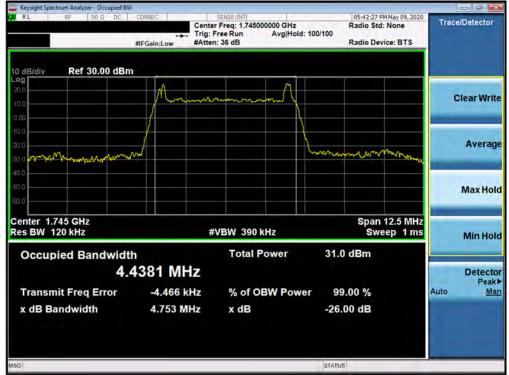
Plot 7-25. Occupied Bandwidth Plot (Band 66/4 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-26. Occupied Bandwidth Plot (Band 66/4 - 5.0MHz 16-QAM - Full RB Configuration)

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Plot 7-27. Occupied Bandwidth Plot (Band 66/4 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-28. Occupied Bandwidth Plot (Band 66/4 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST"	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 24 at 224
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Keysight Spectrum Analyzer - Occupied BV		1			- @ <mark>-</mark>
RL RF 50 Q DC	#IFGain:Low #A	SENSE:INT nter Freq: 1.745000000 g: Free Run Av tten: 36 dB	GHz yg Hold:>100/100	05:48:56 PM May 09, Radio Std: None Radio Device: BT:	Trace/Detector
10 dB/div Ref 30.00 dBn	n Manna	and a start and a start and a start a s	un		ClearWrite
-10.0 -20.0 -30.0	md		how	un and the second s	Average
-40.0 -50.0 -50.0					Max Hold
Center 1.745 GHz Res BW 240 kHz Occupied Bandwidt	h	#VBW 750 kHz Total Powe	er 30.	Span 25 M Sweep 1 7 dBm	
	9951 MHz 23.758 kHz 9.537 MHz	% of OBW	Power 9	9.00 % .00 dB	Detecto Peak Auto <u>Ma</u>
MSG			STATL	15	

Plot 7-29. Occupied Bandwidth Plot (Band 66/4 - 10.0MHz 16-QAM - Full RB Configuration)



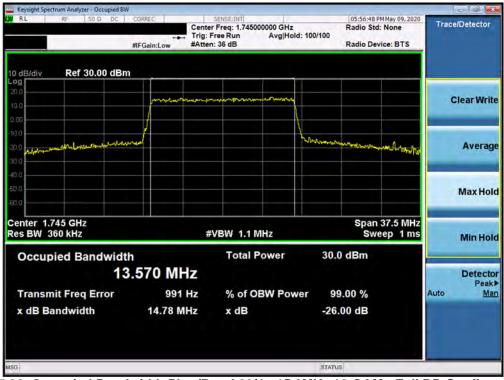
Plot 7-30. Occupied Bandwidth Plot (Band 66/4 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST'	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 20 at 204
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Keysight Spectrum Analyzer - Occupied BW				1000	and the second second	
RL RF 50 Ω DC	-+- T	SENSE:INT enter Freq: 1.74500 rig: Free Run Atten: 36 dB	00000 GHz Avg Hold: 100/	Radio Std		Trace/Detector
10 dB/div Ref 30.00 dBn						
Log 20.0 10.0	porman	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	montry			Clear Write
0.00 -10.0 -20.0 			<u> </u>	man an a	-	Average
-40.0 -50.0 -50.0						Max Hold
Center 1.745 GHz Res BW 360 kHz		#VBW 1.1 №		Swe	37.5 MHz ep 1 ms	Min Hold
Occupied Bandwidt	^h 8.530 MHz	Total P	ower	31.0 dBm		Detector Peak
Transmit Freq Error x dB Bandwidth	10.522 kHz 14.83 MHz		BW Power	99.00 % -26.00 dB		Auto <u>Man</u>
MSG				STATUS		

Plot 7-31. Occupied Bandwidth Plot (Band 66/4 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-32. Occupied Bandwidth Plot (Band 66/4 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST"	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 22 at 224
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Keysight Spectrum Analyzer - Occupied BW RL RF 50 Ω DC	CORREC	SENSE:INT		05-56-5	7 PM May 09, 2020	×
KL Nº 5032 0C	#IFGain:Low	Center Freq: 1.74	5000000 GHz Avg Hold:>1	Radio 5	bevice: BTS	Trace/Detector
10 dB/div Ref 30.00 dBm						
Log 20.0 10.0		n Martin Martin	winning			Clear Write
10.0 20.0 30.0				Manninghaman	nen liter new liter	Average
40.0 50.0 50.0						Max Hole
Center 1.745 GHz Res BW 360 kHz		#VBW 1.1	MHz		n 37.5 MHz weep 1 ms	Min Hole
Occupied Bandwidt	h .522 M⊦		Power	28.6 dBm		Detecto
Transmit Freq Error x dB Bandwidth	-6.856 k 14.84 M		OBW Power	99.00 % -26.00 dB		Auto <u>Mar</u>
ISG				STATUS		-

Plot 7-33. Occupied Bandwidth Plot (Band 66/4 - 15.0MHz 64-QAM - Full RB Configuration)



Plot 7-34. Occupied Bandwidth Plot (Band 66/4 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST"	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 04 at 004
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RL RF 50Ω DC	#IFGain:Low	SENSE:INT Center Freq: 1.7450 Trig: Free Run #Atten: 36 dB	00000 GHz Avg Hold: 100/	Radio Std		Trace/Detector
10 dB/div Ref 30.00 dBm						
10.0	Juraman	amenne and and a second s	man			Clear Write
0.00 10.0 20.0 	n			milanoula	What way	Average
40.0 50.0 60.0						Max Hold
Center 1.745 GHz Res BW 470 kHz		#VBW 1.5 N		Swe	n 50 MHz eep 1 ms	Min Hole
Occupied Bandwidth 18	095 MH	Total F	Power	30.4 dBm		Detecto
Transmit Freq Error x dB Bandwidth	-6.154 kl 19.84 Ml		BW Power	99.00 % -26.00 dB		Auto <u>Mar</u>
sg				STATUS		

Plot 7-35. Occupied Bandwidth Plot (Band 66/4 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-36. Occupied Bandwidth Plot (Band 66/4 - 20.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST"	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 25 of 204
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Band 2



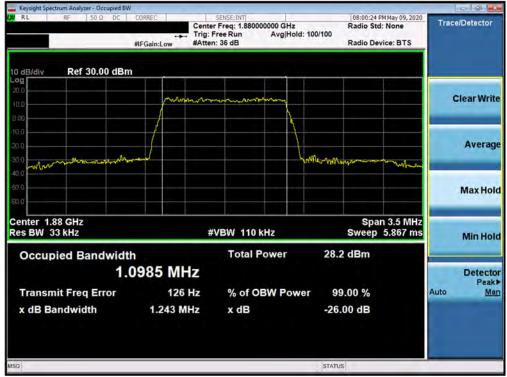
Plot 7-37. Occupied Bandwidth Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-38. Occupied Bandwidth Plot (Band 2 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST Prout lote part of B	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 26 of 294	
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Plot 7-39. Occupied Bandwidth Plot (Band 2 - 1.4MHz 64-QAM - Full RB Configuration)



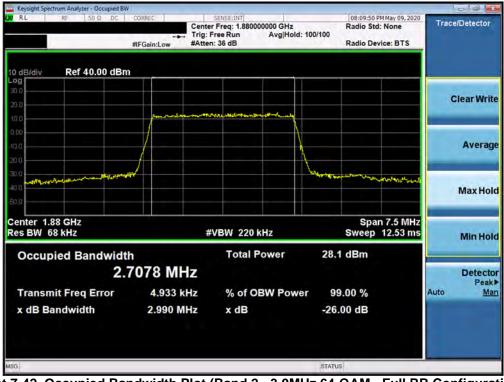
Plot 7-40. Occupied Bandwidth Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST"	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 27 of 204
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Plot 7-41. Occupied Bandwidth Plot (Band 2 - 3.0MHz 16-QAM - Full RB Configuration)



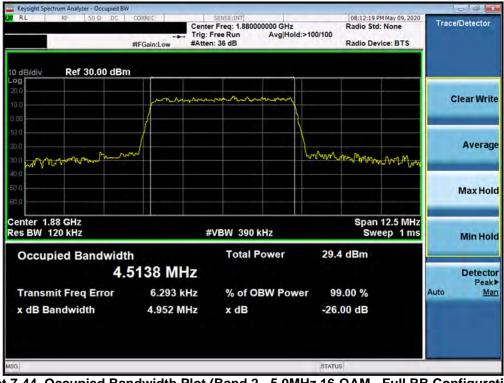
Plot 7-42. Occupied Bandwidth Plot (Band 2 - 3.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 20 of 204
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Keysight Spectrum Analyzer - Occupied BV					
U20 RL RF 50Ω DC	#IFGain:Low	SENSE:INT Center Freq: 1.880000000 Trig: Free Run Av #Atten: 36 dB	GHz /g Hold: 100/100	08:12:11 PM May 09, Radio Std: None Radio Device: BTS	Trace/Detector
10 dB/div Ref 30.00 dBn	n				
20.0 10.0 0.00		ware and the second	-		ClearWrite
-100 -100 -200 -300 pombry Ash	J		Luw	mmmmmu	Average
-40.0 -50 0 -60 0					Max Hold
Center 1.88 GHz Res BW 120 kHz		#VBW 390 kHz		Span 12.5 M Sweep 1	
Occupied Bandwidt 4.	հ 5099 MH	Total Pow IZ	er 30.	4 dBm	Detector Peak►
Transmit Freq Error x dB Bandwidth	656 4.985 M			9.00 % .00 dB	Auto <u>Man</u>
MSG			STATE	ıs	

Plot 7-43. Occupied Bandwidth Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)



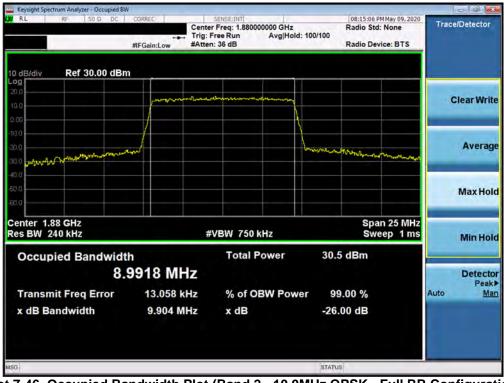
Plot 7-44. Occupied Bandwidth Plot (Band 2 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST'	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 20 of 204
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RL RF 50 Q DC	CORREC	SENSE:IN				M May 09, 2020	Trac	e/Detector
	#IFGain:Low	Talas Free Dave	880000000 GHz Avg Hold	: 100/100	Radio Std Radio Dev		The	
10 dB/div Ref 30.00 dBm					1			
20.0	June		m					Clear Write
0.00 00 0 00 0 00 0				Lowbog	mapan	Innan		Average
								Max Hol
enter 1.88 GHz es BW 120 kHz		#VBW 3	390 kHz			12.5 MHz eep 1 ms		Min Hol
Occupied Bandwidth	^h 5147 M⊦		tal Power	28.6	6 dBm			Detecto
Transmit Freq Error x dB Bandwidth	-1.516 k 4.999 M		of OBW Powe		9.00 % 00 dB		Auto	Peaki <u>Ma</u> i
SG				STATU	5			_

Plot 7-45. Occupied Bandwidth Plot (Band 2 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-46. Occupied Bandwidth Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dama 40 af 004	
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Plot 7-47. Occupied Bandwidth Plot (Band 2 - 10.0MHz 16-QAM - Full RB Configuration)



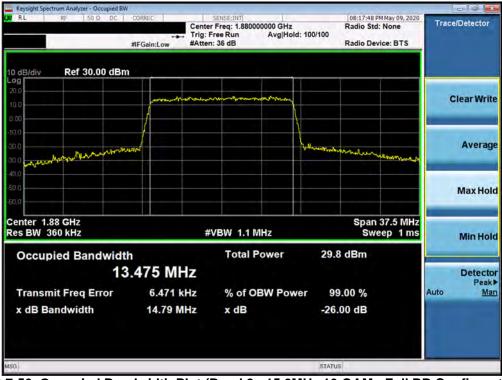
Plot 7-48. Occupied Bandwidth Plot (Band 2 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST'	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 44 af 004
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Keysight Spectrum Analyzer - Occupied BW								_	- @ X
RL RF 50Ω DC	#IFGain:Low	Center Fre Trig: Free #Atten: 36	Run	0000 GHz Avg Hold:>	100/100	Radio De		Trac	e/Detector
10 dB/div Ref 30.00 dBm	<u> </u>			-					
20.0	forment	an see man		mmy					Clear Write
10,0									Average
20.0 30.0 When We de alter and an anna an a						man Martin	homen	-	Average
-50 0									Max Hold
Center 1.88 GHz Res BW 360 kHz		#VB	W 1.1 M	Hz			37.5 MHz eep 1 ms		Min Hold
Occupied Bandwidt	^h 8.469 MH		Total P	ower	30.6	dBm			Detector
Transmit Freq Error x dB Bandwidth	11.843 H 14.75 M		% of OE x dB	3W Power		.00 % 00 dB		Auto	Peak∙ <u>Mar</u>
#sg					STATUS				

Plot 7-49. Occupied Bandwidth Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



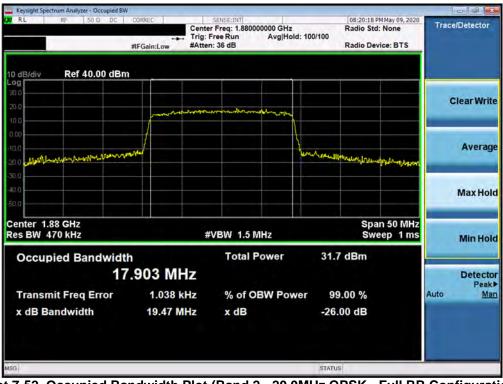
Plot 7-50. Occupied Bandwidth Plot (Band 2 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 40 at 004
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Plot 7-51. Occupied Bandwidth Plot (Band 2 - 15.0MHz 64-QAM - Full RB Configuration)



Plot 7-52. Occupied Bandwidth Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dama 40 af 004	
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Plot 7-53. Occupied Bandwidth Plot (Band 2 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-54. Occupied Bandwidth Plot (Band 2 - 20.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST'	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 44 af 004
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NR Band n5



Plot 7-55. Occupied Bandwidth Plot (NR Band n5 - 20MHz DFT-s-OFDM π/2 BPSK - Full RB Configuration)



Plot 7-56. Occupied Bandwidth Plot (NR Band n5 - 20MHz CP-OFDM QPSK - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST Proat 15 be part of B	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 45 of 204	
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Keysight Spectrum Analyzer - Occupied BV	V				
LX/RL RF 50Ω DC	CORREC	SENSE:INT er Freg: 836.500000 MHz		2:33:09 PM May 03, 2020 dio Std: None	Trace/Detector
	Trig:	Free Run Avg Hol	d:>100/100		
	#IFGain:Low #Atte	n: 36 dB	Rad	dio Device: BTS	
10 dB/div Ref 30.00 dBn	n				
20.0					
10.0	man				Clear Write
0.00					
-10.0			h		
and the second way	-multu ^{n v}		and the second s		Average
-20.0				× .	Average
-30.0				NA N	
-40.0				Wayde Marineone	
-50.0					Max Hold
-60.0					
Center 836.5 MHz				Span 50 MHz	
Res BW 470 kHz	#	≇VBW 1.5 MHz		Sweep 1 ms	Min Hold
Occupied Bandwidt	h	Total Power	29.5 dE	3m	
19	9.017 MHz				Detector
					Peak▶
Transmit Freq Error	-37.850 kHz	% of OBW Pow	ver 99.00	%	Auto <u>Man</u>
x dB Bandwidth	22.52 MHz	x dB	-26.00	dB	
MSG			STATUS		

Plot 7-57. Occupied Bandwidth Plot (NR Band n5 – 20MHz CP-OFDM 16-QAM – Full RB Configuration)



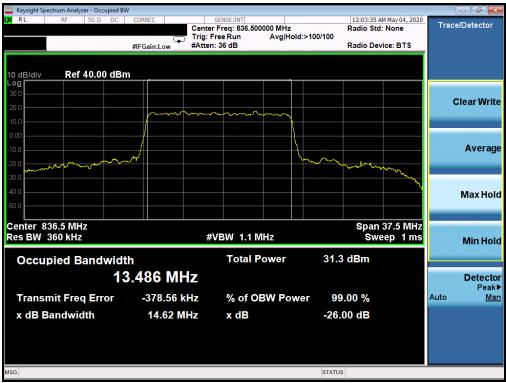
Plot 7-58. Occupied Bandwidth Plot (NR Band n5 - 20MHz CP-OFDM 64-QAM - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST'	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 46 of 204
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Plot 7-59. Occupied Bandwidth Plot (NR Band n5 - 20MHz CP-OFDM 256-QAM - Full RB Configuration)



Plot 7-60. Occupied Bandwidth Plot (NR Band n5 - 15MHz DFT-s-OFDM π/2 BPSK - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:		Page 47 of 284			
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Keysight Spectrum Analyzer - Occupied B ¹	N				- 6 -
KI RF 50Ω DC		SENSE:INT r Freq: 836.500000 MHz		2:00 AM May 04, 2020 5 Std: None	Trace/Detector
			d:>100/100	5 Std. None	
,	#IFGain:Low #Atten	1: 36 dB	Radio	Device: BTS	
10 dB/div Ref 30.00 dBr	n				
Log					
20.0	a ana m	Mm-0- 000- 10			Clear Write
10.0					Cicui Winc
0.00					
-10.0			how have have have have have have have have		
-20.0			. and the second	~~~	Average
-30.0				- The second second	
-40.0				V	
-50.0					Max Hold
-60.0					
Center 836.5 MHz			<u> </u>	oan 37.5 MHz	
Res BW 360 kHz	#	VBW 1.1 MHz		Sweep 1 ms	Min Hold
					WIN HOID
Occupied Bandwid	th	Total Power	29.2 dBr	n	
	4.204 MHz				Detector
	1.204 WINZ				Detector Peak►
Transmit Freq Error	-41.781 kHz	% of OBW Pov	ver 99.00 %	6	Auto <u>Man</u>
x dB Bandwidth	17.58 MHz	x dB	-26.00 dl	в	
MSG			STATUS		

Plot 7-61. Occupied Bandwidth Plot (NR Band n5 - 15MHz CP-OFDM QPSK - Full RB Configuration)



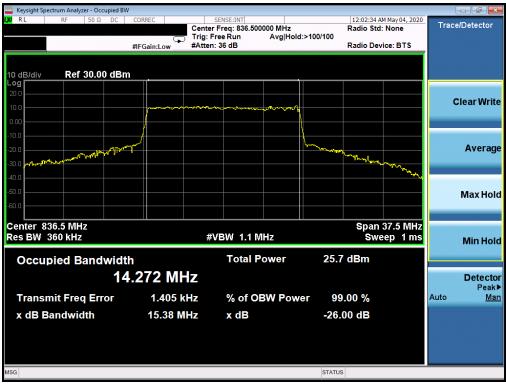
Plot 7-62. Occupied Bandwidth Plot (NR Band n5 – 15MHz CP-OFDM 16-QAM – Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST Prod 15 to part of B	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:		Page 48 of 284			
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Keysight Spectrum Analyzer - Occupied	BW				
LXX RL RF 50Ω DC	Center Trig: F	SENSE:INT r Freq: 836.500000 MHz Free Run Avg Hol 1: 36 dB	Radio St d:>100/100	AM May 04, 2020 td: None	Trace/Detector
10 dB/div Ref 30.00 dE	in ounces		Radio D	evice. B13	
20.0 10.0		ware house and house			Clear Write
-10.0 -20.0 -30.0			hormon		Average
-40.0 -60.0 -60.0					Max Hold
Center 836.5 MHz Res BW 360 kHz Occupied Bandwic		VBW 1.1 MHz		n 37.5 MHz veep 1 ms	Min Hold
1	4.229 MHz				Detector Peak▶
Transmit Freq Error x dB Bandwidth	-47.750 kHz 17.15 MHz	% of OBW Pow x dB	ver 99.00 % -26.00 dB		Auto <u>Man</u>
MSG			STATUS		

Plot 7-63. Occupied Bandwidth Plot (NR Band n5 - 15MHz CP-OFDM 64-QAM - Full RB Configuration)



Plot 7-64. Occupied Bandwidth Plot (NR Band n5 - 15MHz CP-OFDM 256-QAM - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST Prod 15 to part of B	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager			
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🔤 Keysight Spectrum Analyzer - Occupi	ed BW						d X
LXI RL RF 50Ω [SENSE:INT Freg: 836.500000 MHz		01:22:53 AM	1 May 04, 2020	Trace/Det	<u>ecto</u> r
	Trig:	Free Run Avg Hol	d:>100/100				
	#IFGain:Low #Atte	n: 36 dB		Radio Devi	ce: BTS		
10 dB/div Ref 40.00 d	1Bm						
Log							
30.0						Clear	r Write
20.0	·····	mm					
10.0							
0.00							
-10.0						A	/erage
-20.0	~~~		home	man	~ <i>m</i>		
-30.0					the strong		
-40.0							11-1-1
-50.0						ма	x Hold
-30.0							
Center 836.5 MHz				Spar	ו 25 MHz		
Res BW 240 kHz	#	≇VBW 750 kHz		Swe	ep 1 ms	Mi	n Hold
		T-t-l D-mar	24.4	-10			
Occupied Bandw		Total Power	31.1	dBm			
	9.0108 MHz					De	etector
			00	00.0/		A	Peak►
Transmit Freq Error	-183.99 kHz	% of OBW Pow	ver 99.	.00 %		Auto	Man
x dB Bandwidth	9.835 MHz	x dB	-26.0	00 dB			
MSG			STATUS				

Plot 7-65. Occupied Bandwidth Plot (NR Band n5 - 10MHz DFT-s-OFDM π/2 BPSK - Full RB Configuration)



Plot 7-66. Occupied Bandwidth Plot (NR Band n5 - 10MHz CP-OFDM QPSK - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupi	ed BW						7 X
<mark>l XI</mark> R L RF 50 Ω D	OC CORREC	SENSE:INT Center Freg: 836.500	000 MHz	01:21:25 A Radio Std	M May 04, 2020	Trace/Dete	ctor
	- 	Trig: Free Run	Avg Hold: 100/100				
	#IFGain:Low	#Atten: 36 dB		Radio Dev	vice: BTS		
10 dB/div Ref 30.00 c	lBm						
20.0							
		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	m			Clear	Write
10.0							
0.00	1						
-10.0	~~~		Lin	Ψh			
-20.0				Thursday,	- Channa	AV	erage
-30.0							
-40.0							
-50.0						Мах	Hold
-60.0							
Center 836.5 MHz Res BW 240 kHz		#VBW 750 k			n 25 MHz		
Res DW 240 KHZ		#VDVV / 30 K	.nz	SWG	eep 1 ms	Min	Hold
Occupied Bandw	idth	Total P	ower 29	9.3 dBm			
		-				-	
	9.3597 MH	Z					tector Peak▶
Transmit Freq Error	-20.830 k	Hz % of O	BW Power	99.00 %		Auto	Man
x dB Bandwidth	10.43 M	Hz xdB	-2	6.00 dB			
			074	TUS			
MSG			STA	lius			

Plot 7-67. Occupied Bandwidth Plot (NR Band n5 – 10MHz CP-OFDM 16-QAM – Full RB Configuration)



Plot 7-68. Occupied Bandwidth Plot (NR Band n5 - 10MHz CP-OFDM 64-QAM - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	SUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega E1 of 201
1M2007010102-02-R1.A3L	8/22 - 9/12/2020	Dutdoor Customer Premises Equipment (CPE)		Page 51 of 284
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Keysight Spectrum Analyzer - Occupied B	W					
LXX RL RF 50Ω DC	Tri	SENSE:INT Inter Freq: 836.5000 ig: Free Run tten: 36 dB	000 MHz Avg Hold: 100/100	01:21:46 A Radio Std: Radio Dev		Trace/Detector
10 dB/div Ref 30.00 dBi	m					
20.0						Clear Write
-10.0 -20.0 -30.0				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		Average
-40.0						Max Hold
Center 836.5 MHz Res BW 240 kHz		#VBW 750 ki	Hz		n 25 MHz ep 1 ms	Min Hold
Occupied Bandwid	th .3674 MHz	Total Po	ower 25	.6 dBm		Datastar
9. Transmit Freq Error	-14.682 kHz	% of OB	W Power	99.00 %		Detector Peak▶ Auto <u>Man</u>
x dB Bandwidth	10.37 MHz	x dB	-2	6.00 dB		
MSG			STA	TUS		

Plot 7-69. Occupied Bandwidth Plot (NR Band n5 - 10MHz CP-OFDM 256-QAM - Full RB Configuration)



Plot 7-70. Occupied Bandwidth Plot (NR Band n5 - 5MHz DFT-s-OFDM π/2 BPSK - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST Proat 15 be part of B	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 50 af 004
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Keysight Spectrum Analyzer - Occupied BV	v				
<mark>(X)</mark> RL RF 50Ω DC	CORREC	SENSE:INT er Freq: 836.500000 MHz		15 AM May 04, 2020 Std: None	Trace/Detector
	Trig:	Free Run Avg Ho	ld:>100/100		
	#IFGain:Low #Atte	en: 36 dB	Radio	Device: BTS	
10 dB/div Ref 30.00 dBn	n				
20.0					
10.0		momment			Clear Write
0.00					
-10.0					
-20.0			harmon		Average
-30.0				- Contraction of the second se	Averuge
-40.0					
-50.0					Max Hold
-60.0					
Center 836.5 MHz			Spa	an 12.5 MHz	
Res BW 120 kHz	ŧ	#VBW 50 MHz		weep 1 ms	Min Hold
		T. ( .   D	00.5.10		
Occupied Bandwidt		Total Power	28.5 dBm		
4.	5431 MHz				Detector
Transmit Freq Error	-988 Hz	% of OBW Pov	ver 99.00 %		Peak▶ Auto Man
x dB Bandwidth	5.318 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-71. Occupied Bandwidth Plot (NR Band n5 - 5MHz CP-OFDM QPSK - Full RB Configuration)



Plot 7-72. Occupied Bandwidth Plot (NR Band n5 – 5MHz CP-OFDM 16-QAM – Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST Prod 15 to part of B	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 52 of 294
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Keysight Spectrum Analyzer - Occupied B ¹	W						- 0 ×
L <mark>X/</mark> RL RF 50Ω DC	CORREC	SENSE:INT nter Freq: 836.500	000 MHz		I3 AM May 04, 2020	Trace	/Detector
	ter Tr	ig: Free Run	Avg Hold:	100/100			
	#IFGain:Low #A	tten: 36 dB		Radio I	Device: BTS		
10 dB/div Ref 30.00 dBr	n						
20.0							
10.0	m	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			С	lear Write
0.00							
-10.0				manna			
-20.0					~~~~~~		Average
-30.0							
-40.0							
-50.0							Max Hold
-60.0							
Center 836.5 MHz Res BW 120 kHz		#VBW 50 M	u-,		m 12.5 MHz weep 1 ms		
Res BW 120 KH2		#VBVV JUIVI	12		weep rms		Min Hold
Occupied Bandwid	th	Total P	ower	29.2 dBm			
	 5376 MHz						Detector
4.							Detector Peak▶
Transmit Freq Error	-13.329 kHz	% of O	3W Powe	r 99.00 %		Auto	Man
x dB Bandwidth	5.361 MHz	x dB		-26.00 dB			
MSG				STATUS			
				United			

Plot 7-73. Occupied Bandwidth Plot (NR Band n5 - 5MHz CP-OFDM 64-QAM - Full RB Configuration)

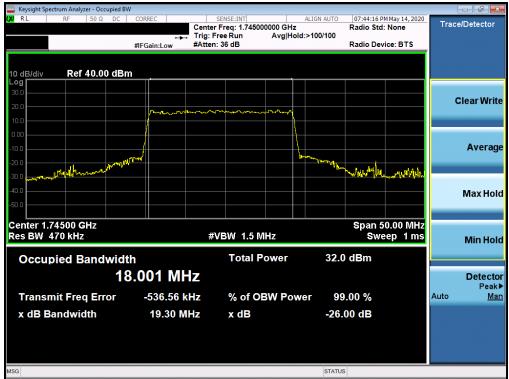


Plot 7-74. Occupied Bandwidth Plot (NR Band n5 - 5MHz CP-OFDM 256-QAM - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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## NR Band n66



Plot 7-75. Occupied Bandwidth Plot (NR Band n66 - 20MHz DFT-s-OFDM π/2 BPSK - Full RB Configuration)



Plot 7-76. Occupied Bandwidth Plot (NR Band n66 - 20MHz CP-OFDM QPSK - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dege EE of 204	
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Plot 7-77. Occupied Bandwidth Plot (NR Band n66 - 20MHz CP-OFDM 16-QAM - Full RB Configuration)



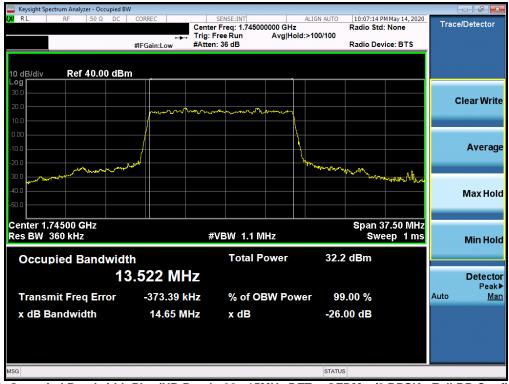
Plot 7-78. Occupied Bandwidth Plot (NR Band n66 - 20MHz CP-OFDM 64-QAM - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST"	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dege EC of 204
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🔤 Keysight Spectrum Analyzer - Occ									
L <mark>XI</mark> RL RF 50Ω	DC CORREC	SENSE Center Free	E:INT <b>q: 1.74500000</b>		IGN AUTO	07:45:38 PM Radio Std:	May 14, 2020	_ Trac	e/Detector
		Trig: Free F	Run A	vg Hold: 10	00/100				
	#IFGain:Lov	, #Atten: 36 d	dB			Radio Devi	ce: BTS		
10 dB/div Ref 30.00	0 dBm								
20.0									
10.0	<b>A</b> A	and the second	h						Clear Write
0.00									
-10.0									
									Average
-20.0	- MARINA				mon				Average
-30.0 -40.0 with Mila Maran Mary	A PAL WHALE				البرج والارال	lowinner			
-50.0									Max Hold
-60.0									
Center 1.74500 GHz						Span 5	0.00 MHz		
Res BW 470 kHz		#VBV	V 1.5 MHz				ep 1 ms		Min Hold
									Millinoid
Occupied Band	width		Fotal Pow	er	26.8	dBm			
	18.952	MHz							Detector
Tronomit From Fre				Baura		00.0/		Auto	Peak▶ Man
Transmit Freq Err			% of OBW	Power		.00 %		Auto	IVIAII
x dB Bandwidth	20.3	3 MHz x	( dB		-26.0	00 dB			
MSG					STATUS				

Plot 7-79. Occupied Bandwidth Plot (NR Band n66 - 20MHz CP-OFDM 256-QAM - Full RB Configuration)



Plot 7-80. Occupied Bandwidth Plot (NR Band n66 - 15MHz DFT-s-OFDM π/2 BPSK - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST"	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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🔤 Keysight Spectrum Analyzer - Occup	ied BW						
<mark>(X)</mark> RL RF 50Ω	DC CORREC	SENSE:INT Center Freq: 1.7450	ALIGN AUT	0 10:10:45 P Radio Std	M May 14, 2020	Trac	e/Detector
	·••	Trig: Free Run	Avg Hold: 100/100		. None		
	#IFGain:Low	#Atten: 36 dB		Radio Dev	/ice: BTS		
10 dB/div Ref 30.00	dBm						
Log							
20.0	aman	man man plan	an m			(	Clear Write
10.0							neur mine
0.00	/						
-10.0							
-20.0	ANNINTY .		ht have				Average
-30.0				the My Rowald have	- And - and		
-40.0					5 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -		
-50.0							Max Hold
-60.0							
Center 1.74500 GHz				Snan 3	7.50 MHz		
Res BW 360 kHz		#VBW 1.1 N	/Hz		eep 1 ms		Min Hold
							Min Hold
Occupied Bandw	vidth	Total F	Power 30	).0 dBm			
	14.237 MH	7					Detector
	17.237 WIII						Peak►
Transmit Freq Erro	r 4.775 kl	Hz % of O	BW Power	99.00 %		Auto	Man
x dB Bandwidth	15.78 MI	Hz xdB	-0	6.00 dB			
	15.70 1		-2	0.00 00			
MSG			STA	TUS			

Plot 7-81. Occupied Bandwidth Plot (NR Band n66 - 15MHz CP-OFDM QPSK - Full RB Configuration)



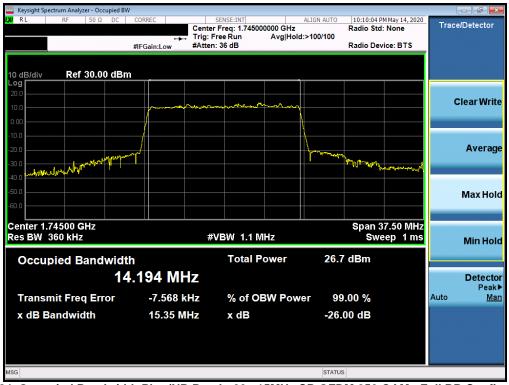
Plot 7-82. Occupied Bandwidth Plot (NR Band n66 - 15MHz CP-OFDM 16-QAM - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST"	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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🔤 Keysight Spectrum Analyzer - Occup	oied BW							
<mark>(X)</mark> RL RF 50 Ω	DC CORREC	SENSE:INT Center Freg: 1.7450000	ALIGN AUTO	10:10:18 PM M Radio Std: N		Trace/D	etector	
			Avg Hold:>100/100					
	#IFGain:Low #Atten: 36 dB Radio Device: BTS							
10 dB/div Ref 30.00	dBm							
20.0								
		Mar Mar and the Construction of the Constructi	mm			Cle	ar Write	
10.0								
0.00	ľ –							
-10.0								
-20.0				and makers			Average	
-30.0 pharman pharman				hould	May warman			
-40.0								
-50.0						N	ax Hold	
-60.0							axiioia	
Center 1.74500 GHz				Span 37.				
Res BW 360 kHz		#VBW 1.1 MH	Z	Swee	p 1 ms	Ν	/lin Hold	
Occupied Bandw	vidth	Total Po	wer 29.5	dBm				
	14.181 MH	Ζ				I	Detector Peak▶	
Transmit Freq Erro	r -5.261 kH	z % of OB	N Power 99	.00 %		Auto	Man	
x dB Bandwidth	15.41 MH	z xdB	-26	00 dB				
			201					
MSG			STATUS	8				

Plot 7-83. Occupied Bandwidth Plot (NR Band n66 - 15MHz CP-OFDM 64-QAM - Full RB Configuration)



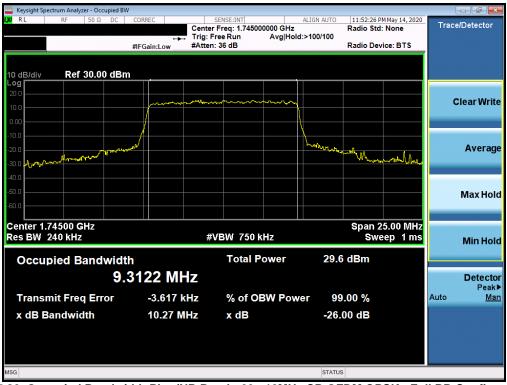
Plot 7-84. Occupied Bandwidth Plot (NR Band n66 - 15MHz CP-OFDM 256-QAM - Full RB Configuration)

FCC ID: A3LSMH303V		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 50 at 004
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Keysight Spectrum Analyzer - Occupied	3W				
KL RF 50Ω DC	CORREC	SENSE:INT AL	IGN AUTO 11:50:28 Pf Radio Std:	May 14, 2020	Trace/Detector
		Free Run Avg Hold: 1		None	
	#IFGain:Low #Atte	n: 36 dB	Radio Dev	ice: BTS	
10 dB/div Ref 40.00 dB	m				
Log					
30.0					Clear Write
20.0					Clear write
10.0					
0.00					
-10.0					Average
					Average
-20.0	$\sim$		man and a second	200.04.0	
-30.0 - 2				month	
-40.0					Max Hold
-50.0					
Center 1.74500 GHz				5.00 MHz	
Res BW 240 kHz	#	VBW 750 kHz	Swe	ep 1 ms	Min Hold
Occurried Denducid		Total Power	32.4 dBm		
Occupied Bandwid		Total Fower	52.4 UBIII		
9	.0365 MHz				Detector
					Peak►
Transmit Freq Error	-192.56 kHz	% of OBW Power	99.00 %		Auto <u>Man</u>
x dB Bandwidth	10.03 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-85. Occupied Bandwidth Plot (NR Band n66 - 10MHz DFT-s-OFDM π/2 BPSK - Full RB Configuration)



Plot 7-86. Occupied Bandwidth Plot (NR Band n66 - 10MHz CP-OFDM QPSK - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST"	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied	BW				
LXI RL RF 50Ω DC		SENSE:INT nter Freg: 1.745000		11:52:12 PM May 14, 2 Radio Std: None	Trace/Detector
	🛶 Tri	g: Free Run	Avg Hold: 100/100		
,	#IFGain:Low #A	tten: 36 dB		Radio Device: BTS	5
10 dB/div Ref 30.00 dB	3m				
20.0					
	munn	monor	m		Clear Write
10.0	/		ì		
0.00					
-10.0	a hold		hul your		
-20.0 -30.0			- Martine Jon	munnul	Average
-30.0 -30.0				~ many	As-opt
-40.0					
-50.0					Max Hold
-60.0					maxriora
Center 1.74500 GHz				Span 25.00 M	
Res BW 240 kHz		#VBW 750 kH	12	Sweep 1	ms Min Hold
Occupied Bandwig	dth	Total Po	wer 29.6	dBm	
9	).3144 MHz				Detector Peak►
Transmit Freq Error	-14.146 kHz	% of OB	W Power 99	.00 %	Auto <u>Man</u>
x dB Bandwidth	10.18 MHz	x dB	26	00 dB	
		Xub	-20.0	00 08	
MSG			STATUS	5	

Plot 7-87. Occupied Bandwidth Plot (NR Band n66 - 10MHz CP-OFDM 16-QAM - Full RB Configuration)



Plot 7-88. Occupied Bandwidth Plot (NR Band n66 - 10MHz CP-OFDM 64-QAM - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST'	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BW							
K RL RF 50Ω DC	CORREC	SENSE:INT Center Freg: 1.74500	ALIGN AUTO	11:51:42 PM Radio Std:	May 14, 2020	Trac	e/Detector
		Trig: Free Run	Avg Hold:>100/100	Raulo Stu. I	None		
		#Atten: 36 dB	<b>-</b> .	Radio Devid	e: BTS		
10 dB/div Ref 30.00 dBm							
Log							
20.0						(	Clear Write
10.0	- maria						
0.00							
-10.0							
-20.0							Average
-30.0			- margar	hand	And the sector		
-40.0 Maral have a strain have have been a strain h							
-50.0							Max Hold
-60.0							Max Hold
-80.0							
Center 1.74500 GHz					.00 MHz		
Res BW 240 kHz		#VBW 750 k	Hz	Swee	ep 1ms		Min Hold
Occurried Developidat		Total P	ower 26 P	5 dBm			
Occupied Bandwidth			ower 20.3	равш			
9.3	3483 MHz	Ζ					Detector
Tronomit From Freeze	40 507 kl	- % of OF		.00 %		Auto	Peak▶ Man
Transmit Freq Error	-12.537 kH					Auto	Man
x dB Bandwidth	10.38 MH	z xdB	-26.	00 dB			
MSG			STATUS	5			

Plot 7-89. Occupied Bandwidth Plot (NR Band n66 - 10MHz CP-OFDM 256-QAM - Full RB Configuration)



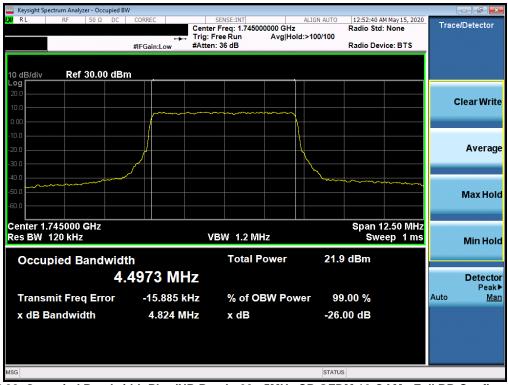
Plot 7-90. Occupied Bandwidth Plot (NR Band n66 - 5MHz DFT-s-OFDM π/2 BPSK - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST'	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama (0) af 004
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Keysight Spectrum Analyzer - Occupied E	3W						×
💢 RL RF 50Ω DC	CORREC	SENSE:INT	ALIGN AUTO	12:53:37 AM M Radio Std: N		Trace/Detec	tor
	T		g Hold: 100/100	Radio Stu. N	one		
		Atten: 36 dB		Radio Device	e: BTS		
10 dB/div Ref 30.00 dB	m						
Log							
20.0						ClearV	Nrito
10.0			~			Cicai	vinc
0.00	/		<u>\</u>				
-10.0							
-20.0						Ave	rage
-30.0			\				Ŭ
-40.0							
			•لىرىمر	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			
-50.0						Max	Hold
-60.0							
Center 1.745000 GHz				Span 12.	50 MHz		
Res BW 120 kHz		VBW 1.2 MHz			p 1 ms	<b></b>	
						Min	Hold
Occupied Bandwid	th	Total Powe	er 24.1	dBm			
1	.5077 MHz	,				Dete	octor
							eak▶
Transmit Freq Error	-19.254 kHz	% of OBW	Power 99	.00 %		Auto	Man
x dB Bandwidth	4.820 MHz	x dB	-26	00 dB			
	4.020 11112		20.				
MSG			STATUS	5			

Plot 7-91. Occupied Bandwidth Plot (NR Band n66 - 5MHz CP-OFDM QPSK - Full RB Configuration)



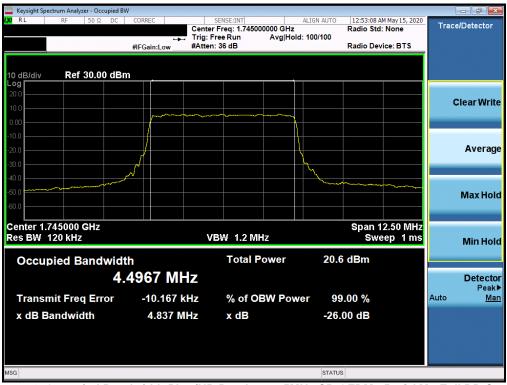
Plot 7-92. Occupied Bandwidth Plot (NR Band n66 - 5MHz CP-OFDM 16-QAM - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST'	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied	BW					-	
LXI RL RF 50Ω DC	CORREC	SENSE:INT ter Freg: 1.745000000 G	ALIGN AUTO	12:52:49 AM	May 15, 2020	Trace	/Detector
			Hold: 100/100	Radio Stu.	None		
	#IFGain:Low #Att	en: 36 dB		Radio Devi	ce: BTS		
10 dB/div Ref 30.00 dB	m						
Log							
20.0						c	lear Write
10.0			~				
0.00							
-10.0							
-20.0							Average
-30.0			<u> </u>				-
-40.0							
	~				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
-50.0							Max Hold
-60.0							
Center 1.745000 GHz				Snan 1	2.50 MHz		
Res BW 120 kHz		VBW 1.2 MHz			ep 1 ms		
					op This		Min Hold
Occupied Bandwid	lth	Total Power	21.7	/ dBm			
	.4953 MHz						Detector
4	.4355 WINZ						Detector Peak▶
Transmit Freq Error	-16.668 kHz	% of OBW P	ower 99	9.00 %		Auto	Man
x dB Bandwidth	4.844 MHz	x dB	-26.	00 dB			
MSG			STATU	S			

Plot 7-93. Occupied Bandwidth Plot (NR Band n66 - 5MHz CP-OFDM 64-QAM - Full RB Configuration)

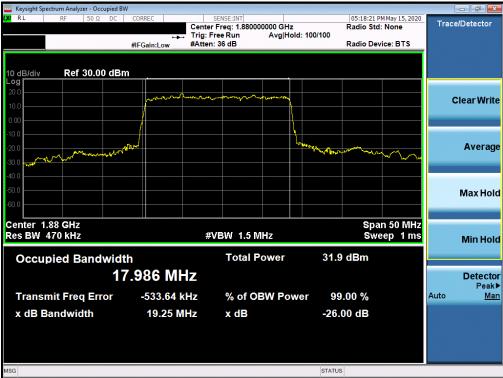


Plot 7-94. Occupied Bandwidth Plot (NR Band n66 - 5MHz CP-OFDM 256-QAM - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST"	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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## NR Band n2



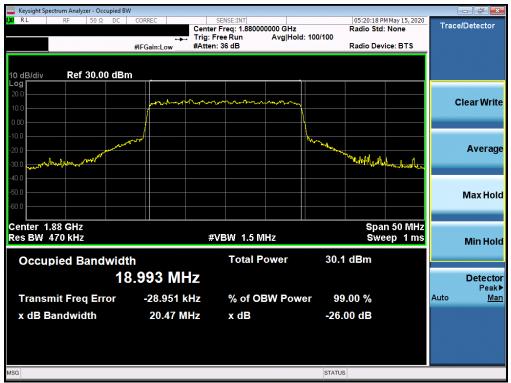
Plot 7-95. Occupied Bandwidth Plot (NR Band n2 - 20MHz DFT-s-OFDM π/2 BPSK - Full RB Configuration)



Plot 7-96. Occupied Bandwidth Plot (NR Band n2 - 20MHz CP-OFDM QPSK - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST'	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Plot 7-97. Occupied Bandwidth Plot (NR Band n2 - 20MHz CP-OFDM 16-QAM - Full RB Configuration)



Plot 7-98. Occupied Bandwidth Plot (NR Band n2 - 20MHz CP-OFDM 64-QAM - Full RB Configuration)

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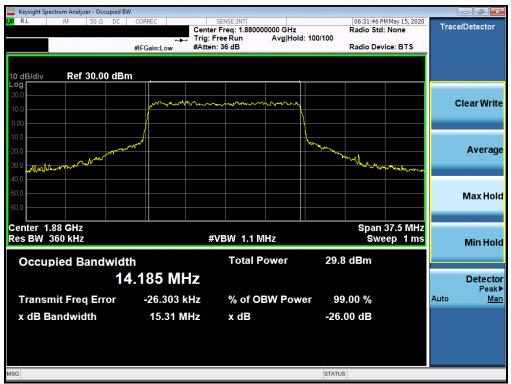
Plot 7-99. Occupied Bandwidth Plot (NR Band n2 - 20MHz CP-OFDM 256-QAM - Full RB Configuration)



Plot 7-100. Occupied Bandwidth Plot (NR Band n2 - 15MHz DFT-s-OFDM π/2 BPSK - Full RB Configuration)

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Plot 7-101. Occupied Bandwidth Plot (NR Band n2 - 15MHz CP-OFDM QPSK - Full RB Configuration)



Plot 7-102. Occupied Bandwidth Plot (NR Band n2 - 15MHz CP-OFDM 16-QAM - Full RB Configuration)

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🔤 Keysight Spectrum Analyzer - Occu	upied BW					
LXI RL RF 50 Ω	DC CORREC #IFGain:Low	SENSE:INT Center Freq: 1.8800 Trig: Free Run #Atten: 36 dB	000000 GHz Avg Hold: 100/100	06:31:32 Pl Radio Std: Radio Dev		Trace/Detector
10 dB/div Ref 30.00	dBm					
20.0	jerna nu	nghaqarithadanaa Mingita aayaa qaaraa w				Clear Write
0.00 -10.0 -20.0 -30.0	-nloa April			whatthe way have	and the start of the	Average
-40.0						Max Hold
Center 1.88 GHz Res BW 360 kHz		#VBW 1.11		Swe	37.5 MHz sep 1 ms	Min Hold
Occupied Bandy	width 14.199 N		Power 29.	.2 dBm		Detector Peak▶
Transmit Freq Erro x dB Bandwidth	or -31.409 15.36			9.00 % 5.00 dB		Auto <u>Man</u>
MSG			STAT	US		

Plot 7-103. Occupied Bandwidth Plot (NR Band n2 - 15MHz CP-OFDM 64-QAM - Full RB Configuration)



Plot 7-104. Occupied Bandwidth Plot (NR Band n2 - 15MHz CP-OFDM 256-QAM - Full RB Configuration)

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Plot 7-105. Occupied Bandwidth Plot (NR Band n2 - 10MHz DFT-s-OFDM π/2 BPSK - Full RB Configuration)



Plot 7-106. Occupied Bandwidth Plot (NR Band n2 - 10MHz CP-OFDM QPSK - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied I	BW					
LXXIRL RF 50Ω DC	+++ Trig:	SENSE:INT er Freq: 1.880000000 GHz Free Run Avg Hol n: 36 dB	d: 100/100	adio Std: N adio Device	one	Trace/Detector
10 dB/div Ref 30.00 dB	m					
20.0		and the second s				Clear Write
-10.0 -20.0 -30.0	np-mont		han allow and and	Mulum	Alan almandante	Average
-40.0 -60.0 -60.0						Max Hold
Center 1.88 GHz Res BW 240 kHz	#	VBW 750 kHz		Swee	25 MHz p 1 ms	Min Hold
Occupied Bandwid 9	.3372 MHz	Total Power	29.2 d	Bm		Detector Peak▶
Transmit Freq Error x dB Bandwidth	991 Hz 10.33 MHz	% of OBW Pow x dB	ver 99.00 -26.00			Auto <u>Man</u>
MSG			STATUS			

Plot 7-107. Occupied Bandwidth Plot (NR Band n2 - 10MHz CP-OFDM 16-QAM - Full RB Configuration)



Plot 7-108. Occupied Bandwidth Plot (NR Band n2 - 10MHz CP-OFDM 64-QAM - Full RB Configuration)

FCC ID: A3LSMH303V	PCTEST"	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupie						
<mark>Ι XI</mark> R L RF 50 Ω D	C	SENSE:INT		08:39:29 Pt Radio Std:	May 15, 2020 None	Trace/Detector
		rig: Free Run Avg Atten: 36 dB	Hold: 100/100	Radio Dev	ice: BTS	
10 dB/div Ref 30.00 d	Bm					
20.0						
10.0	mon	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~			Clear Write
0.00						
-10.0						
-20.0						Average
-30.0	Ashan		home	how we and the second		
-40.0	ومطالعك				and and with	
-50.0						Max Hold
-60.0						Max Holu
Center 1.88 GHz					n 25 MHz	
Res BW 240 kHz		#VBW 750 kHz		Swe	ep 1 ms	Min Hold
Occupied Bandwi	idth	Total Power	r 26.1	dBm		
	9.2989 MHz					Detector
	9.2909 WINZ					Detector Peak▶
Transmit Freq Error	-10.318 kHz	z % of OBW F	ower 99	.00 %		Auto <u>Man</u>
x dB Bandwidth	10.21 MHz	z x dB	-26.	00 dB		
MSG			STATUS	3		
MSG			STATUS	3		

Plot 7-109. Occupied Bandwidth Plot (NR Band n2 - 10MHz CP-OFDM 256-QAM - Full RB Configuration)



Plot 7-110. Occupied Bandwidth Plot (NR Band n2 - 5MHz π/2 DFT-s-OFDM BPSK - Full RB Configuration)

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