

PCTEST ENGINEERING LABORATORY, INC.

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MEASUREMENT REPORT

LTE

Applicant Name:

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

Date of Testing: 12/13/2018-1/1/2019 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M1811120202-03.A3L

FCC ID:

A3LSMG9750

APPLICANT:

Samsung Electronics Co., Ltd.

Application Type: Model: Additional Model(s): EUT Type: FCC Classification: FCC Rule Part(s): Test Procedure(s): Certification SM-G9750 SM-G9758 Portable Handset PCS Licensed Transmitter Held to Ear (PCE) 22, 24, & 27 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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MEASUREMENT REPORT FCC Part 22, 24, & 27



				RP	EIRP				
Mode	FCC Rule	Tx Frequency (MHz)	Max. Pow er	Max. Pow er	Max. Pow er	Max. Pow er	Emission	Modulation	
	Part		(W)	(dBm)	(W)	(dBm)	Designator		
LTE Band 12	27	699.7 - 715.3	0.044	16.46	0.073	18.61	1M09G7D	QPSK	
LTE Band 12	27	699.7 - 715.3	0.037	15.73	0.061	17.88	1M10W7D	16QAM	
LTE Band 12	27	699.7 - 715.3	0.030	14.75	0.049	16.90	1M10W7D	64QAM	
LTE Band 12	27	700.5 - 714.5	0.039	15.94	0.064	18.09	2M71G7D	QPSK	
LTE Band 12	27	700.5 - 714.5	0.033	15.14	0.054	17.29	2M71W7D	16QAM	
LTE Band 12	27	700.5 - 714.5	0.026	14.17	0.043	16.32	2M71W7D	64QAM	
LTE Band 12	27	701.5 - 713.5	0.045	16.55	0.074	18.70	4M52G7D	QPSK	
LTE Band 12	27	701.5 - 713.5	0.039	15.86	0.063	18.01	4M50W7D	16QAM	
LTE Band 12	27	701.5 - 713.5	0.031	14.88	0.050	17.03	4M51W7D	64QAM	
LTE Band 12	27	704 - 711	0.045	16.50	0.073	18.65	8M98G7D	QPSK	
LTE Band 12	27	704 - 711	0.036	15.59	0.059	17.74	8M97W7D	16QAM	
LTE Band 12	27	704 - 711	0.029	14.65	0.048	16.80	9M01W7D	64QAM	
LTE Band 13	27	779.5 - 784.5	0.046	16.65	0.076	18.80	4M52G7D	QPSK	
LTE Band 13	27	779.5 - 784.5	0.039	15.90	0.064	18.05	4M51W7D	16QAM	
LTE Band 13	27	779.5 - 784.5	0.031	14.91	0.051	17.06	4M49W7D	64QAM	
LTE Band 13	27	782	0.036	15.62	0.060	17.77	8M97G7D	QPSK	
LTE Band 13	27	782	0.030	14.77	0.049	16.92	8M96W7D	16QAM	
LTE Band 13	27	782	0.025	13.90	0.040	16.05	8M98W7D	64QAM	
LTE Band 26/5	22H	824.7 - 848.3	0.122	20.88	0.201	23.03	1M09G7D	QPSK	
LTE Band 26/5	22H	824.7 - 848.3	0.102	20.10	0.168	22.25	1M10W7D	16QAM	
LTE Band 26/5	22H	824.7 - 848.3	0.081	19.11	0.134	21.26	1M09W7D	64QAM	
LTE Band 26/5	22H	825.5 - 847.5	0.126	21.01	0.207	23.16	2M71G7D	QPSK	
LTE Band 26/5	22H	825.5 - 847.5	0.106	20.24	0.173	22.39	2M71W7D	16QAM	
LTE Band 26/5	22H	825.5 - 847.5	0.081	19.11	0.134	21.26	2M73W7D	64QAM	
LTE Band 26/5	22H	826.5 - 846.5	0.121	20.83	0.198	22.98	4M52G7D	QPSK	
LTE Band 26/5	22H	826.5 - 846.5	0.103	20.14	0.169	22.29	4M50W7D	16QAM	
LTE Band 26/5	22H	826.5 - 846.5	0.080	19.02	0.131	21.17	4M51W7D	64QAM	
LTE Band 26/5	22H	829 - 844	0.108	20.34	0.177	22.49	9M04G7D	QPSK	
LTE Band 26/5	22H	829 - 844	0.091	19.61	0.150	21.76	9M01W7D	16QAM	
LTE Band 26/5	22H	829 - 844	0.073	18.65	0.120	20.80	9M00W7D	64QAM	
LTE Band 26	22H	831.5 - 841.5	0.106	20.27	0.174	22.42	13M4G7D	QPSK	
LTE Band 26	22H	831.5 - 841.5	0.092	19.66	0.152	21.81	13M5W7D	16QAM	
LTE Band 26	22H	831.5 - 841.5	0.073	18.65	0.120	20.80	13M4W7D	64QAM	

EUT Overview (<1GHz)

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Mode	FCC Rule			RP	_ · ·	
Mode	Dort				Emission	
	Part	Tx Frequency (MHz)		Max. Pow er	Designator	Modulation
			(W)	(dBm)	0	
LTE Band 4	27	1710.7 - 1754.3	0.169	22.29	1M10G7D	QPSK
LTE Band 4	27	1710.7 - 1754.3	0.142	21.51	1M09W7D	16QAM
LTE Band 4	27	1710.7 - 1754.3	0.113	20.54	1M10W7D	64QAM
LTE Band 4	27	1711.5 - 1753.5	0.146	21.65	2M70G7D	QPSK
LTE Band 4	27	1711.5 - 1753.5	0.122	20.87	2M72W7D	16QAM
LTE Band 4	27	1711.5 - 1753.5	0.097	19.87	2M71W7D	64QAM
LTE Band 4	27	1712.5 - 1752.5	0.123	20.91	4M57G7D	QPSK
LTE Band 4	27	1712.5 - 1752.5	0.105	20.21	4M50W7D	16QAM
LTE Band 4	27	1712.5 - 1752.5	0.083	19.17	4M52W7D	64QAM
LTE Band 4	27	1715 - 1750	0.152	21.82	9M01G7D	QPSK
LTE Band 4	27	1715 - 1750	0.126	21.00	9M01W7D	16QAM
LTE Band 4	27	1715 - 1750	0.101	20.05	9M02W7D	64QAM
LTE Band 4	27	1717.5 - 1747.5	0.136	21.34	13M5G7D	QPSK
LTE Band 4	27	1717.5 - 1747.5	0.114	20.56	13M5W7D	16QAM
LTE Band 4	27	1717.5 - 1747.5	0.093	19.68	13M5W7D	64QAM
LTE Band 4	27	1720 - 1745	0.121	20.83	18M0G7D	QPSK
LTE Band 4	27	1720 - 1745	0.101	20.05	18M0W7D	16QAM
LTE Band 4	27	1720 - 1745	0.081	19.08	18M0W7D	64QAM
LTE Band 25/2	24E	1850.7 - 1914.3	0.188	22.73	1M10G7D	QPSK
LTE Band 25/2	24E	1850.7 - 1914.3	0.161	22.07	1M10W7D	16QAM
LTE Band 25/2	24E	1850.7 - 1914.3	0.128	21.06	1M10W7D	64QAM
LTE Band 25/2	24E	1851.5 - 1913.5	0.192	22.83	2M71G7D	QPSK
LTE Band 25/2	24E	1851.5 - 1913.5	0.163	22.13	2M73W7D	16QAM
LTE Band 25/2	24E	1851.5 - 1913.5	0.128	21.08	2M72W7D	64QAM
LTE Band 25/2	24E	1852.5 - 1912.5	0.191	22.82	4M52G7D	QPSK
LTE Band 25/2	24E	1852.5 - 1912.5	0.163	22.13	4M51W7D	16QAM
LTE Band 25/2	24E	1852.5 - 1912.5	0.128	21.07	4M52W7D	64QAM
LTE Band 25/2	24E	1855 - 1910	0.198	22.96	9M05G7D	QPSK
LTE Band 25/2	24E	1855 - 1910	0.166	22.21	9M00W7D	16QAM
LTE Band 25/2	24E	1855 - 1910	0.130	21.15	9M03W7D	64QAM
LTE Band 25/2	24E	1857.5 - 1907.5	0.205	23.11	13M5G7D	QPSK
LTE Band 25/2	24E	1857.5 - 1907.5	0.165	22.18	13M5W7D	16QAM
LTE Band 25/2	24E	1857.5 - 1907.5	0.131	21.18	13M5W7D	64QAM
LTE Band 25/2	24E	1860 - 1905	0.198	22.97	18M0G7D	QPSK
LTE Band 25/2	24E	1860 - 1905	0.166	22.20	18M0W7D	16QAM
LTE Band 25/2	24E	1860 - 1905	0.132	21.20	18M0W7D	64QAM
LTE Band 41	27	2498.5 - 2687.5	0.151	21.80	4M52G7D	QPSK
LTE Band 41	27	2498.5 - 2687.5	0.097	19.87	4M52W7D	16QAM
LTE Band 41	27	2498.5 - 2687.5	0.083	19.21	4M53W7D	64QAM
LTE Band 41	27	2501 - 2685	0.149	21.73	9M01G7D	QPSK
LTE Band 41	27	2501 - 2685	0.117	20.69	8M98W7D	16QAM
LTE Band 41	27	2501 - 2685	0.102	20.10	9M01W7D	64QAM
LTE Band 41	27	2503.5 - 2682.5	0.137	21.38	13M5G7D	QPSK
LTE Band 41	27	2503.5 - 2682.5	0.094	19.73	13M5W7D	16QAM
LTE Band 41	27	2503.5 - 2682.5	0.076	18.78	13M5W7D	64QAM
LTE Band 41	27	2506 - 2680	0.138	21.39	18M0G7D	QPSK
LTE Band 41	27	2506 - 2680	0.092	19.63	18M0W7D	16QAM
LTE Band 41	27	2506 - 2680	0.069	18.39	18M0W7D	64QAM

EUT Overview (>1GHz)

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1.0 INTRODUCTION

1.1 Scope

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

1.2 PCTEST Test Location

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

1.3 Test Facility / Accreditations

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

- PCTEST is an ISO 17025-2005 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 Portable Handset FCC ID: A3LSMG9750**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

Test Device Serial No.: 0589M, 0547M, 1339M, 0487M, 0775M, 0968M, 0300M, 0474M, 0338M, 0500M, 0388M, 0163M, 0368M

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII, Bluetooth (1x, EDR, LE), NFC, ANT+

LTE Band 26 (814.7 – 849 MHz) overlaps the entire frequency range of LTE Band 5 (824 – 849 MHz). Therefore, test data provided in this report covers Band 5 and the portion of Band 26 subject to Part 22.

LTE Band 25 (1850 - 1915 MHz) overlaps the entire frequency range of LTE Band 2 (1850 - 1910 MHz). Therefore, test data provided in this report covers Band 2 as well as Band 25.

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

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 placed flush against the flat surface of authorized wireless charging pad (WCP) Model:EP-N5100 while operating under normal conditions in a simulated call or data transmission configuration. The WCP is designed with the flat charging surface angled 45 degrees relative to a horizontal surface on which the WCP rests. 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 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

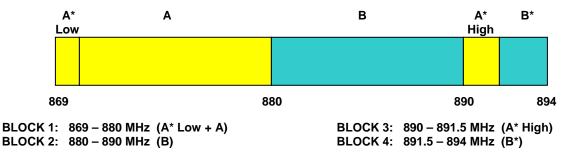
Two paired channels of 11 megahertz each are available for assignment in Block C in the 746-757 MHz and 776-787 MHz bands. In the event that no licenses for two channels in this Block C are assigned based on the results of the first auction in which such licenses were offered because the auction results 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.

3.3 Block A Frequency Range

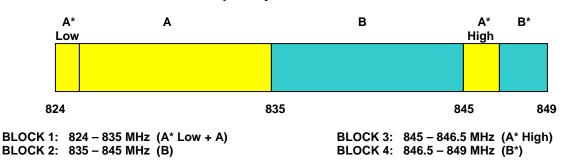
<u>698-746 MHz band</u>. The following frequencies are available for licensing pursuant to this part in the 698-746 MHz band: (1) Three paired channel blocks of 12 megahertz each are available for assignment as follows:

Block A: 698-704 MHz and 728-734 MHz; Block B: 704-710 MHz and 734-740 MHz; and Block C: 710-716 MHz and 740-746 MHz.

3.4 Cellular - Base Frequency Blocks



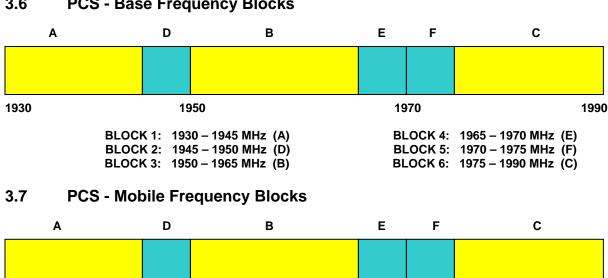
3.5 Cellular - Mobile Frequency Blocks



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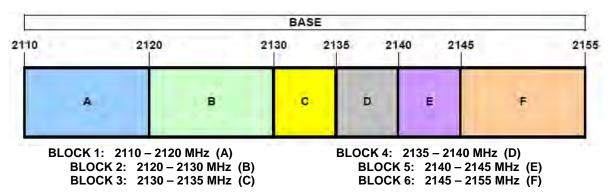
1850



	1870
BLOCK 2:	1850 – 1865 MHz (A) 1865 – 1870 MHz (D) 1870 – 1885 MHz (B)



AWS - Base Frequency Blocks 3.8



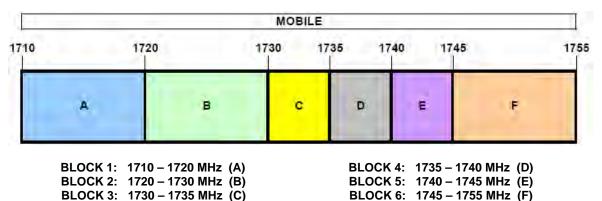
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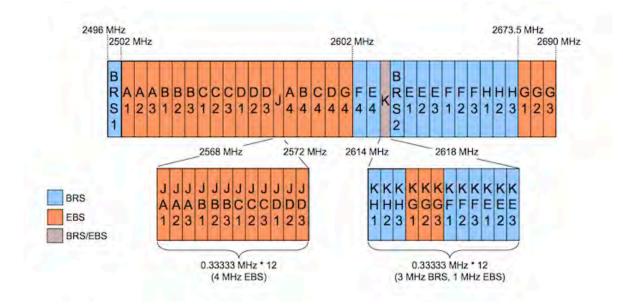
3.6 **PCS - Base Frequency Blocks**



3.9 AWS - Mobile Frequency Blocks



3.10 BRS/EBS Frequency Block



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3.11 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 + 10log₁₀(Power [Watts]). For 41, the calculated P_d levels are compared to the absolute spurious emission limit of -25dBm which is equivalent to the required minimum attenuation of 55 + 10log₁₀(Power [Watts]).

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

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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
-	LTx2	Licensed Transmitter Cable Set	1/23/2018	Annual	1/23/2019	LTx2
Agilent	N9020A	MXA Signal Analyzer	1/24/2018	Annual	1/24/2019	US46470561
Agilent	N9030A	PXA Signal Analyzer (44GHz)	5/25/2018	Annual	5/25/2019	MY52350166
Anritsu	MT8821C	Radio Communication Analyzer	7/24/2018	Annual	7/24/2019	6201664756
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2017	Biennial	10/10/2019	121034
Com-Power	PAM-103	Pre-Amplifier (1-1000MHz)	9/17/2018	Annual	9/17/2019	441119
Emco	3115	Horn Antenna (1-18GHz)	3/28/2018	Biennial	3/28/2020	9704-5182
Espec	ESX-2CA	Environmental Chamber	3/28/2018	Annual	3/28/2019	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	12/1/2016	Biennial	12/1/2018	125518
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/28/2018	Biennial	3/28/2020	128337
Huber + Suhner	Sucoflex 102A	40GHz Radiated Cable Set	1/23/2018	Annual	1/23/2019	251425001
Keysight Technologies	N9030A	3Hz-44GHz PXA Signal Analyzer	3/20/2018	Annual	3/20/2019	MY49430494
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	3/30/2018	Annual	3/30/2019	11401010036
Mini Circuits	TVA-11-422	RF Power Amp		N/A		
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		
Rohde & Schwarz	CMW500	Radio Communication Tester	9/25/2018	Annual	9/25/2019	102060
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	5/21/2018	Annual	5/21/2019	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	8/9/2018	Annual	8/9/2019	100348
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	6/18/2018	Annual	6/18/2019	102134
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	6/25/2018	Annual	6/25/2019	102133
Rohde & Schwarz	TC-TA18	Cross Polarized Vivaldi Test Antenna	7/16/2018	Biennial	7/16/2020	101073
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	1/24/2018	Annual	1/24/2019	100040
Seekonk	NC-100	Torque Wrench	12/28/2017	Annual	12/28/2018	N/A
Sunol	DRH-118	Horn Antenna (1-18GHz)	8/11/2017	Biennial	8/11/2019	A050307
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	4/19/2018	Biennial	4/19/2020	A051107

Table 5-1. Test Equipment

Notes:

- 1. For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.
- 2. Equipment with a calibration date of "N/A" shown in this list was not used to make direct calibrated measurements.

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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:	A3LSMG9750
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
Mode(s):	<u>LTE</u>

FCC Part Test Test **Test Description Test Limit** Reference Section(s) Condition Result 2.1049 N/A Occupied Bandwidth Section 7.2 2.1051 2.917(a) > 43 + 10log₁₀ (P[Watts]) at 24.238(a) Section 7.3, Out of Band Emissions Band Edge and for all out-of-27.53(c) 7.4 band emissions 27.53(g) 27.53(h) Undesirable emissions must Section 7.3, 27.53(m) Out of Band Emissions meet the limits detailed in 7.4 27.53(m) 24.232(d) Peak-Average Ratio < 13 dB Section 7.5 27.50(d)(5) CONDUCTED PASS See RF Transmitter Conducted 2.1046 N/A Exposure **Output Power** Report Undesirable emissions must **Uplink Carrier** 27.53(m) meet the limits detailed in Section 7.6 Aggregation 27.53(m) 2.1055 < 2.5 ppm (Part 22) and 22.355 fundamental emissions stay **Frequency Stability** Section 7.10 24.235 within authorized frequency 27.54 block (Part 24, 27)

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 (Band 26/5)	< 7 Watts max. ERP			Section 7.7
27.50(b)(10) 27.50(c)(10)	Effective Radiated Power (Band 12, 13)	< 3 Watts max. ERP		PASS	Section 7.7
24.232(c) 27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 25/2, 41)	< 2 Watts max. EIRP			Section 7.7
27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 4)	< 1 Watts max. EIRP			Section 7.7
2.1053 22.917(a) 24.238(a) 27.53(c) 27.53(g) 27.53(h)	Undesirable Emissions (Band 12, 26/5, 4, 25/2)	> 43 + 10log ₁₀ (P[Watts]) for all out-of-band emissions	RADIATED		Section 7.8
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 7.8
27.53(m)	Undesirable Emissions (Band 41)	Undesirable emissions must meet the limits detailed in 27.53(m)			Section 7.8
27.53(m)	Uplink Carrier Aggregation	Undesirable emissions must meet the limits detailed in 27.53(m)			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 4.8.
- 5) For operation <1GHz, the EIRP limits in the table above are referenced to the specifications written in the relevant Radio Standards Specifications for Innovation, Science, and Economic Development Canada.

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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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Plot 7-1. Occupied Bandwidth Plot (Band 12 - 1.4MHz QPSK - Full RB Configuration)

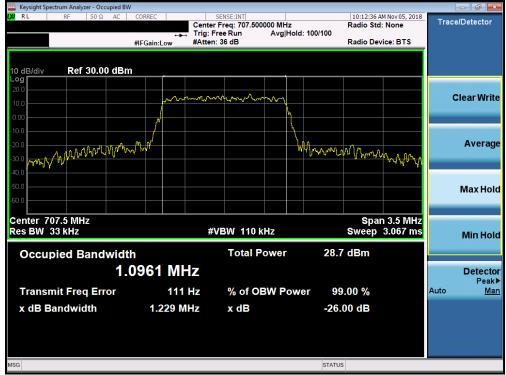


Plot 7-2. Occupied Bandwidth Plot (Band 12 - 1.4MHz 16-QAM - Full RB Configuration)

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Plot 7-3. Occupied Bandwidth Plot (Band 12 - 1.4MHz 64-QAM - Full RB Configuration)



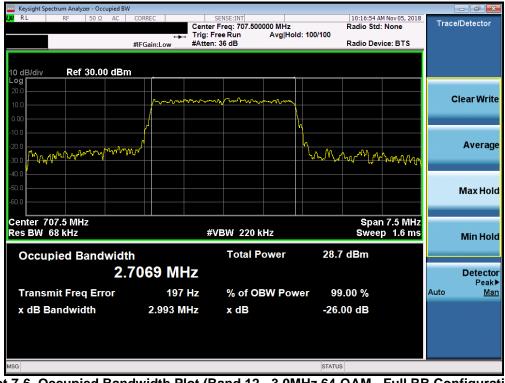
Plot 7-4. Occupied Bandwidth Plot (Band 12 - 3.0MHz QPSK - Full RB Configuration)

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Keysight Spectrum Analyzer - Occupied BW							- 6 💌
XIRL RF 50Ω AC CO		SENSE:INT Freq: 707.500000 MHz		10:16:39 A Radio Std	M Nov 05, 2018	Trac	e/Detector
	🛶 Trig: F	ree Run Avg Ho	old: 100/100				
#1	FGain:Low #Atten	: 36 dB		Radio Dev	ice: BTS		
10 dB/div Ref 30.00 dBm			1				
20.0							
10.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	m C. M.	n			(Clear Write
0.00	/		V				
-10.0	<u> </u>						
-20.0	r		4				Average
-20.0 -20.0 -30.0 pm - 20.0 -30.0 pm - 20.0 -30.0 pm - 20.0 - 20.			V V LMVm	www	MMMM		
-40.0							
-50.0							Max Hold
-60.0							Maxilolu
Center 707.5 MHz Res BW 68 kHz	-443	VBW 220 kHz			n 7.5 MHz p 1.6 ms		
	#			Swee	0 1.0 IIIS		Min Hold
Occupied Bandwidth		Total Power	29.7	/ dBm			
)73 MHz						Detector
2.1							Peak►
Transmit Freq Error	658 Hz	% of OBW Pov	wer 99	0.00 %		Auto	Man
x dB Bandwidth	3.014 MHz	x dB	-26.	00 dB			
MSG			STATUS	3			

Plot 7-5. Occupied Bandwidth Plot (Band 12 - 3.0MHz 16-QAM - Full RB Configuration)



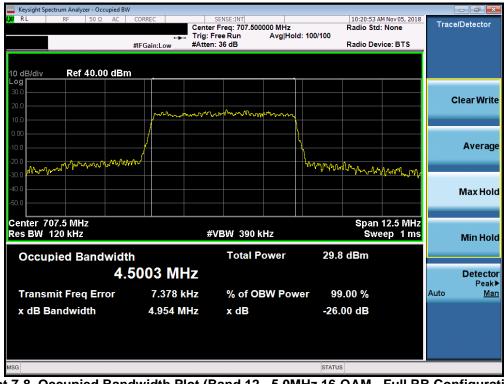
Plot 7-6. Occupied Bandwidth Plot (Band 12 - 3.0MHz 64-QAM - Full RB Configuration)

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🔤 Keysight Spectrum Analyzer - Occupied BV	V				
IX RL RF 50Ω AC	CORREC	SENSE:INT Center Freq: 707.5000 Trig: Free Run	00 MHz Avg Hold: 100/100	10:20:35 AM Nov 05, 20 Radio Std: None	Trace/Detector
	#IFGain:Low	#Atten: 36 dB	0.	Radio Device: BTS	
10 dB/div Ref 40.00 dBn	n				
30.0 20.0					Clear Write
10.0	and was some	month marine			
-10.0					Average
-20.0 for the source of the former and the			Juny and	munanan	J.
-50.0					Max Hold
Center 707.5 MHz Res BW 120 kHz		#VBW 390 ki	Hz	Span 12.5 MH Sweep 1 m	
Occupied Bandwidt	h	Total Po	ower 31.	1 dBm	
	5185 MH				Detector Peak▶
Transmit Freq Error	1.848 k	Hz % of OB	W Power 9	9.00 %	Auto <u>Man</u>
x dB Bandwidth	4.948 M	Hz x dB	-26	.00 dB	
MSG			STATU	JS	

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



Plot 7-8. Occupied Bandwidth Plot (Band 12 - 5.0MHz 16-QAM - Full RB Configuration)

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Keysight Spectrum Analyzer - Occupied BW						
LX RL RF 50Ω AC		SENSE:INT Freq: 707.500000 MHz		1:08 AM Nov 05, 2018 5 Std: None	Trace/I	Detector
	Trig: F		ld: 100/100	Device: BTS		
	#IFGain:Low #Atten	1. 36 dB	Raul	5 Device. B13		
10 dB/div Ref 40.00 dBm						
30.0						
20.0					CI	ear Write
10.0	month	munton man				
0.00			\			
-10.0			<u> </u>			Average
-20.0	~					
-20.0 -30.0 mm MM mm Mm Mm			Manan	Marcharcharch		
-40.0						Max Hold
-50.0						nuxtiona
Center 707.5 MHz Res BW 120 kHz	#	VBW 390 kHz		ban 12.5 MHz Sweep 1 ms		
	<i><i>w</i></i>	4044 330 KHZ		oweep rins		Min Hold
Occupied Bandwidth	1	Total Power	28.7 dBr	n		
4 5	6068 MHz					Detector
						Peak▶
Transmit Freq Error	-2.719 kHz	% of OBW Pov	ver 99.00 9	6	Auto	Man
x dB Bandwidth	4.924 MHz	x dB	-26.00 d	В		
MSG			STATUS			

Plot 7-9. Occupied Bandwidth Plot (Band 12 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-10. Occupied Bandwidth Plot (Band 12 - 10.0MHz QPSK - Full RB Configuration)

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🔤 Keysight Spectrum Analyzer - Occupied B	W					-	
IXI RL RF 50Ω AC		SENSE:INT Center Freq: 707.5000 Trig: Free Run	00 MHz Avg Hold: 100/100	10:25:45 AM Radio Std:	Nov 05, 2018 None	Trace/I	Detector
	#IFGain:Low	#Atten: 36 dB		Radio Devi	ce: BTS		
10 dB/div Ref 30.00 dBi	m						
20.0 10.0		ᡊᢛᡀᢩ᠕ᡙᡨᡔ᠆ᠹᡟᢦᢛᠰᢧ	wlmwhry			СІ	ear Write
-10.0			\				
-20.0 -30.0 Whole marked and a second se			Mart Mart	Muthuman	[፟] ዀኊቢሱጐ _{ሚፈ} ቢታኳ		Average
-40.0						I	Max Hold
Center 707.5 MHz Res BW 240 kHz		#VBW 750 kł	Hz		n 25 MHz ep 1 ms		Min Hold
Occupied Bandwid		Total Po	ower 29	.7 dBm			
8.	.9731 MHz	Ζ					Detector Peak▶
Transmit Freq Error	23.080 kH	z % of OB	W Power	99.00 %		Auto	<u>Man</u>
x dB Bandwidth	9.729 MH	z xdB	-2	6.00 dB			
MSG			STA	TUS			

Plot 7-11. Occupied Bandwidth Plot (Band 12 - 10.0MHz 16-QAM - Full RB Configuration)



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

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🔤 Keysight Spectrum Analy	zer - Occupied B	W						
LXIRL RF	50 Ω AC	CORREC	SENSE:INT Center Freg: 782.00	0000 MHz	10:31:35 A Radio Std	M Nov 05, 2018	Trace	/Detector
		→	Trig: Free Run	Avg Hold: 1	00/100			
		#IFGain:Low	#Atten: 36 dB		Radio Dev	ice: BTS		
10 dB/div Ref	30.00 dBi	m						
20.0								
10.0		mm	monterm	vmmm			С	lear Write
0.00		/		{				
-10.0								
	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	mm			B40 D D			Average
-20.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				enter allance the Vale of	Wwwwww		·····.g-
-40.0								
-50.0								
-50.0								Max Hold
-60,0								
Center 782 MHz						12.5 MHz		
Res BW 120 kHz	4		#VBW 390	kHz	Swe	ep 1 ms		Min Hold
Occupied B	andwid	th	Total F	ower	30.5 dBm			
Occupied B					50.5 UBIII			
	4.	5154 M	HZ					Detector Peak▶
Transmit Fre	a Error	8.003	kHz % of O	BW Power	99.00 %		Auto	Feak⊯ Man
		4.926						
x dB Bandwie	aun	4.9201			-26.00 dB			
MSG					STATUS			

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



Plot 7-14. Occupied Bandwidth Plot (Band 13 - 5.0MHz 16-QAM - Full RB Configuration)

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Keysight Spectrum Analyzer - Occupied BW	1				
<b>LX/</b> RL RF 50 Ω AC	CORREC	SENSE:INT Freq: 782.000000 MHz		32:01 AM Nov 05, 2018 io Std: None	Trace/Detector
		Free Run Avg H n:36 dB	old: 100/100 Rad	io Device: BTS	
	#IFGall.Low #/ tite	n. 66 aB		o Bernae. B To	
10 dB/div Ref 30.00 dBm	1				
Log 20.0					
10.0	mannon	hor ware and the second	<b>v</b>		Clear Write
0.00					
-10.0			N N		
					Average
-20.0 -30.0			WW My My	WWWWWWWWWWW	, in on a go
-40.0				· • • • • • • • • •	
-50.0					Max Hold
-60.0					wiax noid
Center 782 MHz Res BW 120 kHz	#	VBW 390 kHz	8	pan 12.5 MHz Sweep 1 ms	
Res DW TZO RHZ	"	V DVV 530 KHZ		oweep This	Min Hold
Occupied Bandwidt	h	Total Power	28.7 dB	m	
4.4	4901 MHz				Detector
				•	Peak►
Transmit Freq Error	1.873 kHz	% of OBW Po			Auto <u>Man</u>
x dB Bandwidth	4.972 MHz	x dB	-26.00 d	В	
MSG			STATUS		

Plot 7-15. Occupied Bandwidth Plot (Band 13 - 5.0MHz 64-QAM - Full RB Configuration)



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

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Plot 7-17. Occupied Bandwidth Plot (Band 13 - 10.0MHz 16-QAM - Full RB Configuration)



Plot 7-18. Occupied Bandwidth Plot (Band 13 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMG9750		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Occupied BW	000050	OF NOT THE	00.05.1	
<b>ά RL</b> RF 50 Ω AC	+++ Trig	SENSE:INT ter Freq: 836.500000 MHz  : Free Run Avg Hold: ten: 36 dB	08:36:16 AM N Radio Std: No 100/100 Radio Device	one Trace/Detector
0 dB/div Ref 30.00 dBm		mmmmmm		Clear Writ
0.0 0 0.0 0 0.0 0 0.0 0 0.0 0			Lammannap	Averaç
0.0				MaxHo
enter 836.5 MHz es BW 27 kHz		#VBW 30 kHz Total Power	Span Sweep 30.9 dBm	3 MHz 4.8 ms Min Ho
Occupied Bandwidt	)880 MHz	Total Power	30.9 UBIII	Detect Peal
Transmit Freq Error x dB Bandwidth	1.229 kHz 1.219 MHz	% of OBW Powe x dB	er 99.00 % -26.00 dB	Auto <u>Ma</u>
6G			STATUS	

Plot 7-19. Occupied Bandwidth Plot (Band 26/5 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-20. Occupied Bandwidth Plot (Band 26/5 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG9750		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 26 of 216
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🤤 Keysight Spectrum Analyzer - Occupied BV	V					r X
LXI RL RF 50Ω AC		SENSE:INT r Freg: 836.500000 MHz		9 AM Nov 05, 2018 td: None	Trace/Def	tector
	Trig: F	Trig: Free Run Avg Hold: 100/100				
	#IFGain:Low #Atten	:: 36 dB	Radio D	evice: BTS		
10 dB/div Ref 30.00 dBn	n					
20.0						
10.0	manny	montany			Clea	r Write
0.00						
-10.0						
-20.0 -30.0 NWW WWW WWW WWW	w.//		Whathat	an m 10	A	verage
-30.0 NWW 1 1 4-14-14-14-14-14				W - Wagen your		_
-40.0						
-50.0					Ma	x Hold
-60.0						
Center 836.5 MHz Res BW 27 kHz	#	VBW 30 kHz		span 3 MHz ep 4.8 ms		
Res DW ZI KHZ	<i>"</i>		300	ep 4.8 ms	Mi	in Hold
Occupied Bandwidt	h	Total Power	28.9 dBm			
	0929 MHz				D	etector
					D	Peak ►
Transmit Freq Error	2.710 kHz	% of OBW Pow	er 99.00 %		Auto	Man
x dB Bandwidth	1.228 MHz	x dB	-26.00 dB			
x dB Bandwidth	1.220 MITIZ	A UD	-20.00 ub			
			1			
MSG			STATUS			

Plot 7-21. Occupied Bandwidth Plot (Band 26/5 - 1.4MHz 64-QAM - Full RB Configuration)



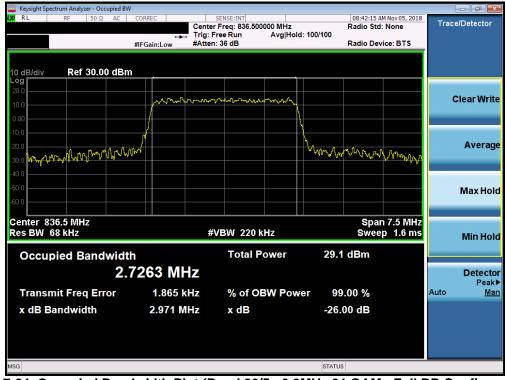
Plot 7-22. Occupied Bandwidth Plot (Band 26/5 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMG9750		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Occupied BV	V				- 6
UM2 RL   RF   50 Ω AC	Center Trig: F	SENSE:INT r Freq: 836.500000 MHz Free Run Avg Hol n: 36 dB	Radio d: 100/100	2:01 AM Nov 05, 2018 5 Std: None 5 Device: BTS	Trace/Detector
10 dB/div Ref 30.00 dBn	n				
20.0 10.0 0.00	mmmmm	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	h		Clear Writ
-10.0 -20.0 -30.0 mm Man Mar Mar			how we have a former of the second se	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Averag
-40.0					Max Hol
Center 836.5 MHz Res BW 68 kHz	#	VBW 220 kHz		Span 7.5 MHz weep 1.6 ms	Min Hol
	Occupied Bandwidth Total Power 30.3 dBm 2.7076 MHz				Detecto
Transmit Freq Error x dB Bandwidth	6.452 kHz 2.999 MHz	% of OBW Pow x dB	ver 99.00 % -26.00 dB		Реак Auto <u>Ma</u>
MSG			STATUS		

Plot 7-23. Occupied Bandwidth Plot (Band 26/5 - 3.0MHz 16-QAM - Full RB Configuration)



Plot 7-24. Occupied Bandwidth Plot (Band 26/5 - 3.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMG9750		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied B\	N				
LX/RL RF 50ΩAC		SENSE:INT Freq: 836.500000 MHz Free Run Avg Hol	08:45:13) Radio Sto d: 100/100	AM Nov 05, 2018 I: None	Trace/Detector
		n: 36 dB	Radio De	vice: BTS	
10 dB/div Ref 30.00 dBr	n				
20.0					
	mannon	mmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm			Clear Write
10.0					
0.00	N N		1		
-10.0					
-20.0	p-Am		marting	๛๛๛๛๛	Average
-30.0					
-40.0					
-50.0					Max Hold
-60.0					
Center 836.5 MHz			Enon	12.5 MHz	
Res BW 120 kHz	#	¢VBW 390 kHz		eep 1 ms	Bit Late
					Min Hold
Occupied Bandwidt	th	Total Power	31.3 dBm		
4	5231 MHz				Detector
					Peak►
Transmit Freq Error	10.572 kHz	% of OBW Pow	ver 99.00 %		Auto <u>Man</u>
x dB Bandwidth	5.009 MHz	x dB	-26.00 dB		
MSG			STATUS		
			014100		

Plot 7-25. Occupied Bandwidth Plot (Band 26/5 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-26. Occupied Bandwidth Plot (Band 26/5 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG9750	MEASUREMENT REPORT (CERTIFICATION)		SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 29 of 216
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Keysight Spectrum Analyzer - Occupied BW						
<mark>LX RL</mark> RF 50Ω AC C		SENSE:INT Freg: 836.500000 MHz		48 AM Nov 05, 2018 Std: None	Tracel	Detector
	Trig: F		d: 100/100	Device: BTS		
#	FGain:Low #Atten	: 36 dB	Radio	Device: B15		
10 dB/div Ref 30.00 dBm						
20.0					-	
10.0	mmmm	m-www.with			CI	ear Write
0.00						
-10.0	/		\			
-20.0	<u> </u>					Average
-20.0 -30.0			John Marin M	month have been and		
-40.0						
-50.0						Max Hold
-60.0						nux noid
Center 836.5 MHz Res BW 120 kHz	#1	VBW 390 kHz		an 12.5 MHz sweep 1 ms		
	#	VBVV 390 KH2		weep mis		Min Hold
Occupied Bandwidth		Total Power	28.9 dBm			
	106 MHz					Detector
4.5						Peak►
Transmit Freq Error	3.861 kHz	% of OBW Pow	ver 99.00 %		Auto	Man
x dB Bandwidth	4.944 MHz	x dB	-26.00 dB			
MSG			STATUS			

Plot 7-27. Occupied Bandwidth Plot (Band 26/5 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-28. Occupied Bandwidth Plot (Band 26/5 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMG9750		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied B ¹	W				
LXX RL RF 50Ω AC	Trig:	SENSE:INT er Freq: 836.500000 MHz Free Run Avg Hold:	Radio Std: 100/100		Trace/Detector
	#IFGain:Low #Atte	en: 36 dB	Radio Devi	ce: BTS	
10 dB/div Ref 40.00 dBr	n				
30.0					Clear Write
10.0	way way with more the	~mappy dure all more haven			
-10.0					Average
-20.0 -30.0 Manhaluthalana			Marin and the second	thathe program	
-40.0					Max Hold
Center 836.5 MHz Res BW 240 kHz		#VBW 750 kHz		n 25 MHz ep 1 ms	Min Hold
Occupied Bandwid	th	Total Power	30.3 dBm		
	0059 MHz				Detector Peak▶
Transmit Freq Error	-3.343 kHz	% of OBW Powe	r 99.00 %		Auto <u>Man</u>
x dB Bandwidth	9.802 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-29. Occupied Bandwidth Plot (Band 26/5 - 10.0MHz 16-QAM - Full RB Configuration)



Plot 7-30. Occupied Bandwidth Plot (Band 26/5 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMG9750		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-31. Occupied Bandwidth Plot (Band 26 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-32. Occupied Bandwidth Plot (Band 26 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG9750		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-33. Occupied Bandwidth Plot (Band 26 - 15.0MHz 64-QAM - Full RB Configuration)

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#### Band 4



Plot 7-34. Occupied Bandwidth Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-35. Occupied Bandwidth Plot (Band 4 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG9750		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-36. Occupied Bandwidth Plot (Band 4 - 1.4MHz 64-QAM - Full RB Configuration)



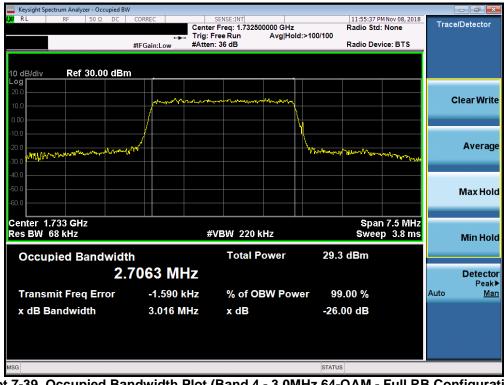
Plot 7-37. Occupied Bandwidth Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMG9750		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 25 of 216
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Keysight Spectrum Analyzer - Occupied B\	V						
UX RL RF 50Ω DC	Center	SENSE:INT r Freq: 1.732500000 GHz Free Run Avg Ho n: 36 dB	z bld: 100/100	11:53:47 PM Radio Std: Radio Devi		Trace	Detector
10 dB/div Ref 30.00 dBr	n		<b>.</b>				
20.0		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	, , ,			c	lear Write
0.00 -10.0 -20.0 -30.0	w		M. Marcon	an angelo angelo ang	aler from the		Average
-40.0 -50.0 -60.0							Max Hold
Center 1.733 GHz Res BW 68 kHz	#	VBW 220 kHz			7.5 MHz 3.8 ms		Min Hold
Occupied Bandwidf 2.	th 7204 MHz	Total Power	30.5	dBm			Detector Peak▶
Transmit Freq Error x dB Bandwidth	3.042 kHz 3.052 MHz	% of OBW Po x dB		.00 % 00 dB		Auto	Man
MSG			STATUS	6			

Plot 7-38. Occupied Bandwidth Plot (Band 4 - 3.0MHz 16-QAM - Full RB Configuration)



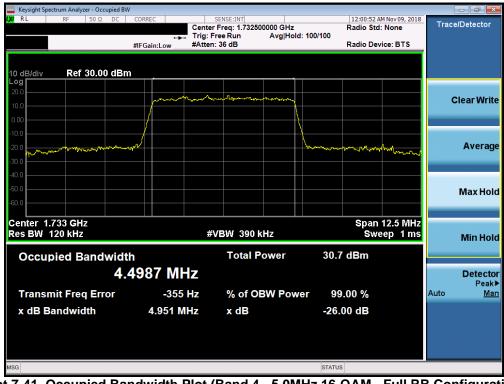
Plot 7-39. Occupied Bandwidth Plot (Band 4 - 3.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMG9750		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Occupied B	W				- • • <b>*</b>
LXU RL RF 50Ω DC		sense:INT Iter Freq: 1.732500000 GHz I: Free Run Avg Ho		AM Nov 09, 2018 d: None	Trace/Detector
		ten: 36 dB		vice: BTS	
10 dB/div Ref 30.00 dB	m				
Log 20.0 10.0	M	·			Clear Write
-10.0					
-20.0			- Lamman and and and and and and and and and a	A. Marria	Average
-40.0					Max Hold
-60.0 Center 1.733 GHz			Span	12.5 MHz	
Res BW 120 kHz		#VBW 390 kHz	Sw	eep 1 ms	Min Hold
Occupied Bandwid	th	Total Power	32.9 dBm		
	5652 MHz				Detector Peak▶
Transmit Freq Error	-38.313 kHz	% of OBW Pov	ver 99.00 %		Auto <u>Man</u>
x dB Bandwidth	4.855 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-40. Occupied Bandwidth Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)



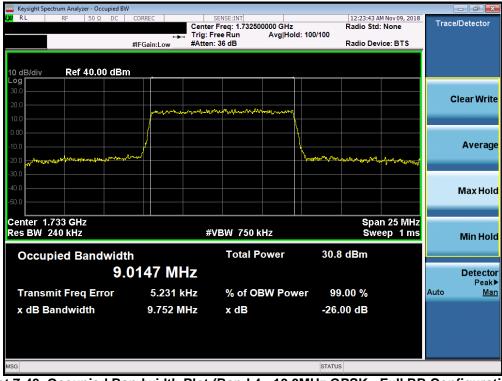
Plot 7-41. Occupied Bandwidth Plot (Band 4 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG9750		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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🤤 Keysight Spectrum Analyzer - Occupied BW					- P	×
LXU RL RF 50Ω DC	Center	SENSE:INT Freq: 1.732500000 GHz free Run Avg Hol	12:01:34 Radio St d: 100/100	AM Nov 09, 2018 d: None	Trace/Detect	or
	#IFGain:Low #Atten	: 36 dB	Radio De	evice: BTS		
10 dB/div Ref 30.00 dBm						
Log 20.0 10.0		Mumm			Clear W	lrite
-10.0 -20.0 -30.0 m/www.www.www.www.	~~			www.	Aver	age
-40.0 -50.0 -60.0					Max H	lold
Center 1.733 GHz Res BW 120 kHz	#	VBW 390 kHz		n 12.5 MHz veep 1 ms	Min H	lold
Occupied Bandwidt	n	Total Power	29.7 dBm			
	5205 MHz				Dete	ctor eak▶
Transmit Freq Error	-9.436 kHz	% of OBW Pow	ver 99.00 %		Auto	<u>Man</u>
x dB Bandwidth	4.975 MHz	x dB	-26.00 dB			
MSG			STATUS			

Plot 7-42. Occupied Bandwidth Plot (Band 4 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-43. Occupied Bandwidth Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMG9750		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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🤤 Keysight Spectrum Analyzer - Occupied BW	1				
LX/RL RF 50Ω DC		SENSE:INT Freq: 1.732500000 GHz Free Run Avg Hold	12:23:28 Radio St :>100/100	AM Nov 09, 2018 d: None	Trace/Detector
		n: 36 dB		evice: BTS	
10 dB/div Ref 40.00 dBm	1				
Log 30.0					
20.0					Clear Write
10.0	and an and the second second	~home-on-on-on-on-on-on-on-on-on-on-on-on-on-			
0.00	/				
-10.0			Y		Average
-20.0 - And They Property to the second second	ms		Maryanappungton	mallelm t. ml	J
-30.0				and a martine freedow	
-40.0					Max Hold
-50.0					Maxilola
Center 1.733 GHz				on Of Mills	
Res BW 240 kHz	#	¢VBW 750 kHz		an 25 MHz /eep  1 ms	Min Hold
Occupied Bandwidt	h	Total Power	30.3 dBm		
9.0	0087 MHz				Detector
Transmit Freq Error	-2.517 kHz	% of OBW Pow	er 99.00 %		Peak▶ Auto <u>Man</u>
x dB Bandwidth	9.877 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-44. Occupied Bandwidth Plot (Band 4 - 10.0MHz 16-QAM - Full RB Configuration)



Plot 7-45. Occupied Bandwidth Plot (Band 4 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMG9750		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 216	
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🔤 Keysight Spectrum Analyzer - Occupied BV	V				
(X) RL RF 50Ω DC	Tri	SENSE:INT enter Freq: 1.732500000 GH ig: Free Run Avg H tten: 36 dB			Trace/Detector
10 dB/div <b>Ref 40.00 dBn</b>	n		<b>.</b>		
30.0	مرد				Clear Write
0.00					
-10.0 -20.0 - mollowshammen line in	-Filor		how have a work have	have the second	Average
-30.0					Max Hold
-50.0 Center 1.733 GHz				37.5 MHz	
Res BW 360 kHz Occupied Bandwidt	h	#VBW 1.1 MHz Total Power	32.0 dBm	eep 1 ms	Min Hold
13	8.540 MHz				Detector Peak▶
Transmit Freq Error	19.460 kHz				Auto <u>Man</u>
x dB Bandwidth	14.79 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-46. Occupied Bandwidth Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)



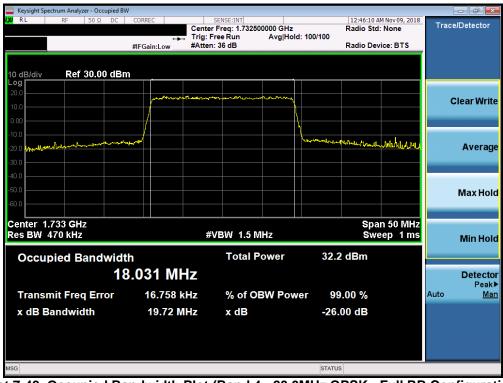
Plot 7-47. Occupied Bandwidth Plot (Band 4 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG9750		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Occupied B\	N				
<mark>(X)</mark> RL   RF   50 Ω DC		sense:INT Iter Freq: 1.732500000 GHz I: Free Run Avg Ho		:17 AM Nov 09, 2018 Std: None	Trace/Detector
		ten: 36 dB		Device: BTS	
10 dB/div Ref 30.00 dBr	n				
20.0					
10.0	priorman	how all have a second	<u>V</u>		Clear Write
0.00					
-10.0			1		
20.0			harmon due		Average
-30.0				Land and California March	
-40.0					
-50.0					
-60.0					Max Hold
-00.0					
Center 1.733 GHz				an 37.5 MHz	
Res BW 360 kHz		#VBW 1.1 MHz		Sweep 1 ms	Min Hold
Occupied Bandwidt	th	Total Power	30.0 dBm		
	3.510 MHz				Detector
					Peak►
Transmit Freq Error	10.106 kHz	% of OBW Pov	wer 99.00 %		Auto <u>Man</u>
x dB Bandwidth	14.88 MHz	x dB	-26.00 dE	3	
MSG			STATUS		

Plot 7-48. Occupied Bandwidth Plot (Band 4 - 15.0MHz 64-QAM - Full RB Configuration)



Plot 7-49. Occupied Bandwidth Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMG9750		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied B	W					_	- • •
LXX RL RF 50Ω DC		SENSE:INT Center Freq: 1.732500000 Trig: Free Run A #Atten: 36 dB	) GHz vg Hold:>100/100	12:46:24 AM Radio Std: I Radio Devid		Tracel	Detector
10 dB/div Ref 30.00 dBr	m						
20.0	mmonth		many			СІ	ear Write
0.00 -10.0 -20.0 -30.0				mmon modallit	in the most increase		Average
-40.0 -50.0 -60.0							Max Hold
Center 1.733 GHz Res BW 470 kHz		#VBW 1.5 MHz		Swee	50 MHz ep 1 ms		Min Hold
Occupied Bandwid	th 7.976 MH	Total Pow Z	er 30.7	′ dBm			Detector Peak▶
Transmit Freq Error x dB Bandwidth	-8.461 kH 19.44 MH			.00 % 00 dB		Auto	Man
MSG			STATUS	5			

Plot 7-50. Occupied Bandwidth Plot (Band 4 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-51. Occupied Bandwidth Plot (Band 4 - 20.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMG9750		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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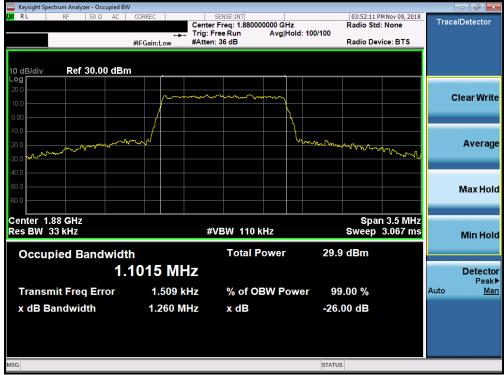
Plot 7-52. Occupied Bandwidth Plot (Band 2/25 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-53. Occupied Bandwidth Plot (Band 2/25 - 1.4MHz 16-QAM - Full RB Configuration)

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Plot 7-54. Occupied Bandwidth Plot (Band 2/25 - 1.4MHz 64-QAM - Full RB Configuration)



Plot 7-55. Occupied Bandwidth Plot (Band 2/25 - 3.0MHz QPSK - Full RB Configuration)

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Keysight Spectrum Analyzer - Occupied E	W				
LX/RL RF 50Ω AC	CORREC	SENSE:INT Center Freg: 1.88000	0000 GHz	03:58:06 PM Nov 09 Radio Std: None	,2018 Trace/Detector
	↔ #IFGain:Low	Trig: Free Run #Atten: 36 dB	Avg Hold:>100/100	Radio Device: BT	s
	#IFGalli.LOW	mattern. oo ab		Rudio Berlice. B I	
10 dB/div Ref 30.00 dB	m				
Log					
10.0	m	·····	www		Clear Write
0.00			h,		
-10.0	/		h		
			han		Average
-20.0 -30.0				- A marker and a	~~~^
-40.0					
-50.0					Max Hold
-60.0					wax noiu
Center 1.88 GHz Res BW 68 kHz		#VBW 220 k	<b>U</b> 7	Span 7.5 I Sweep 1.6	
Res DW Vo Kilz		#4044 220 K	112	Sweep 1.0	Min Hold
Occupied Bandwid	th	Total P	ower 31.0	) dBm	
2	.7273 M⊦	7			Detector
					Peak►
Transmit Freq Error	2.802 k	Hz % of O	BW Power 99	9.00 %	Auto <u>Man</u>
x dB Bandwidth	3.054 M	Hz x dB	-26.	00 dB	
MSG			STATU	S	

Plot 7-56. Occupied Bandwidth Plot (Band 2/25 - 3.0MHz 16-QAM - Full RB Configuration)



Plot 7-57. Occupied Bandwidth Plot (Band 2/25 - 3.0MHz 64-QAM - Full RB Configuration)

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🔤 Keysight Spectrum Analyzer - Occupied BW	1					×
IXIRL RF 50Ω AC	🛶 Trig			PM Nov 09, 2018 d: None	Trace/Detecto	or
	#IFGain:Low #At	ten: 36 dB	Radio De	evice: BTS		
10 dB/div Ref 30.00 dBn	1					
20.0						
10.0					Clear Wi	rite
0.00	/		Δ			
-10.0						
-20.0	-mod		Law Mannella	werman un	Avera	age
-30.0						5
-40.0						
-50.0						- 1 -1
-60.0					Max H	oia
Center 1.88 GHz				12.5 MHz		
Res BW 120 kHz		#VBW 390 kHz	SW	veep 1 ms	Min H	old
Occupied Bandwidt	h	Total Power	32.5 dBm			
4.	5200 MHz				Detec	tor
			00.00.00			ak▶
Transmit Freq Error	3.153 kHz	% of OBW Po	wer 99.00 %		Auto <u>N</u>	Man
x dB Bandwidth	5.031 MHz	x dB	-26.00 dB			
MSG			STATUS			

Plot 7-58. Occupied Bandwidth Plot (Band 2/25 - 5.0MHz QPSK - Full RB Configuration)



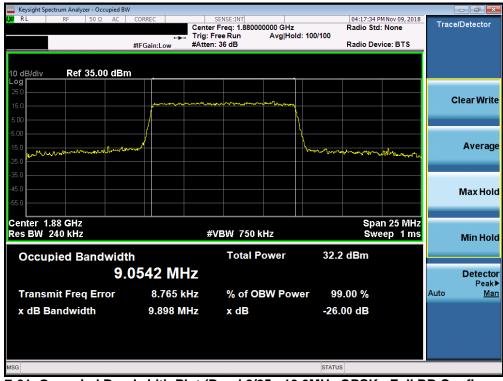
Plot 7-59. Occupied Bandwidth Plot (Band 2/25 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG9750		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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🔤 Keysight Spectrum Analyzer - Occupied BV	/				
IX RL RF 50Ω AC		SENSE:INT Center Freq: 1.880000 Trig: Free Run	000 GHz Avg Hold: 100/100	04:09:16 PM Nov 09, Radio Std: None	2018 Trace/Detector
	#IFGain:Low	#Atten: 36 dB	<b>.</b>	Radio Device: BTS	s
10 dB/div Ref 40.00 dBn	1				
30.0					Clear Write
10.0	mmm	᠕᠂ᢌᡣᠬᡊ᠆ᠬ᠆ᠬ᠕᠆᠆᠆᠆᠆᠆	mm		
0.00 -10.0 -20.0				Mr. L. M. L. M.	Average
-30.0				- 10	Max Hold
Center 1.88 GHz Res BW 120 kHz		#VBW 390 kH	 Iz	Span 12.5 M Sweep 1	
Occupied Bandwidt		Total Po	ower 30.0	) dBm	
4.	5197 MH	Z			Detector Peak►
Transmit Freq Error	342 H	z % of OB	W Power 99	0.00 %	Auto <u>Man</u>
x dB Bandwidth	4.998 MH	lz x dB	-26.	00 dB	
MSG			STATUS	3	

Plot 7-60. Occupied Bandwidth Plot (Band 2/25 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-61. Occupied Bandwidth Plot (Band 2/25 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMG9750		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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🔤 Keysight Spectrum Analyzer - Occupied BV	1				- 6
<b>ιχ RL</b> RF 50 Ω AC	Trig: I	SENSE:INT r Freq: 1.880000000 GHz Free Run Avg Hold: n: 36 dB	Radio Std		Trace/Detector
10 dB/div Ref 35.00 dBn					
15.0		har and a start			Clear Write
5.00 -5.00 -15.0 -25.0	-		honor Aller and and a		Average
-25.0				and an and the second	Max Hold
Center 1.88 GHz Res BW 240 kHz		VBW 750 kHz		n 25 MHz eep 1 ms	
Occupied Bandwidt	h	Total Power	30.8 dBm		Min Hold
8. Transmit Freq Error	9985 MHz -5.186 kHz	% of OBW Powe	er 99.00 %		Detector Peak Auto <u>Mar</u>
x dB Bandwidth	9.794 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-62. Occupied Bandwidth Plot (Band 2/25 - 10.0MHz 16-QAM - Full RB Configuration)



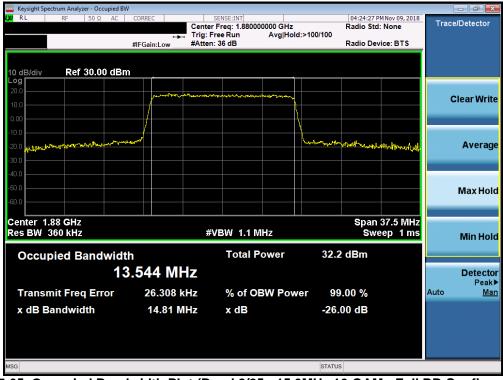
Plot 7-63. Occupied Bandwidth Plot (Band 2/25 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMG9750		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Occupied BW						
()20 RL RF 50Ω AC	• <b>•</b> •	SENSE:INT Center Freq: 1.8800000 Trig: Free Run #Atten: 36 dB	00 GHz Avg Hold: 100/100	04:24:11 PMN Radio Std: N Radio Device	one	Trace/Detector
10 dB/div Ref 30.00 dBm						
20.0						Clear Write
-10.0 -20.0				www.auto.auto.auto.auto.auto.auto.auto.auto	produced as	Average
-40.0 -50.0 -60.0						Max Hold
Center 1.88 GHz Res BW 360 kHz		#VBW 1.1 MH;			7.5 MHz p 1 ms	Min Hold
Occupied Bandwidt	h . <b>535 MH</b>	Total Pov Z	ver 32.8	dBm		Detector Peak▶
Transmit Freq Error x dB Bandwidth	33.245 kH 14.83 MH			.00 % 00 dB		Auto <u>Man</u>
MSG			STATUS	6		

Plot 7-64. Occupied Bandwidth Plot (Band 2/25 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-65. Occupied Bandwidth Plot (Band 2/25 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG9750		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Occupied BW	1				
<b>(X)</b> RL RF 50 Ω AC	Trig: F	SENSE:INT r Freq: 1.880000000 GHz Free Run Avg Hol n: 36 dB	04:25:43 F Radio Sto d:>100/100 Radio De		Trace/Detector
10 dB/div Ref 30.00 dBm	1 <u>.</u>				
20.0	por an				Clear Write
0.00 -10.0 -20.0 -30.0	And the second s		man	- Barrely and a factor of	Average
-40.0 -50.0 -60.0					Max Hold
Center 1.88 GHz Res BW 360 kHz	#	VBW 1.1 MHz		37.5 MHz eep 1 ms	Min Hold
Occupied Bandwidt 13	^h 8.496 MHz	Total Power	30.2 dBm		Detector
Transmit Freq Error x dB Bandwidth	15.668 kHz 14.74 MHz	% of OBW Pow x dB	ver 99.00 % -26.00 dB		Peak▶ Auto <u>Man</u>
MSG			STATUS		

Plot 7-66. Occupied Bandwidth Plot (Band 2/25 - 15.0MHz 64-QAM - Full RB Configuration)



Plot 7-67. Occupied Bandwidth Plot (Band 2/25 - 20.0MHz QPSK - Full RB Configuration)

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Keysight Spectrum Analyzer - Occupied BW						_	
<mark>ιχα</mark> RL RF 50Ω AC CC		SENSE:INT Center Freq: 1.88000 Frig: Free Run	0000 GHz AvgiHold: 100	Radio Std:	Nov 09, 2018 None	Tracel	Detector
#1		Atten: 36 dB		Radio Devi	ce: BTS		
10 dB/div Ref 40.00 dBm							
30.0							
20.0						C	ear Write
10.0	Muningerman	here and the states of the second	Merson				
0.00			{				
-10.0	/		\				Average
1. a started	P ⁴		here	Mul Marine Barrow			
-20.0 -30.0				and a standard filter the	manuntran		
-40.0							
							Max Hold
-50.0							
Center 1.88 GHz				Spar	ז 50 MHz		
Res BW 470 kHz		#VBW 1.5 M	Hz	Swe	ep 1 ms		Min Hold
Occupied Bandwidth		Total P	ower	31.0 dBm			
	981 MHz	4					Detector Peak▶
Transmit Freq Error	-10.153 kH	z % of OE	<b>3W Power</b>	99.00 %		Auto	Man
x dB Bandwidth	19.43 MH	z x dB		-26.00 dB			
MSG				STATUS			

Plot 7-68. Occupied Bandwidth Plot (Band 2/25 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-69. Occupied Bandwidth Plot (Band 2/25 - 20.0MHz 64-QAM - Full RB Configuration)

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	ectrum Analyze	r - Occup	ied BW											
LXI RL	RF	50 Ω	AC CC	ORREC			ENSE:INT	000000 GHz			01:25:30 F	MNov 22, 2018	Trac	e/Detector
					+	. Trig: Fre	e Run	Avg Ho	ld: 10	00/100				
			#1	Gain:	:Low	#Atten:	36 dB				Radio Dev	vice: BTS		
10 dB/div Log	Ref 2	25.00	dBm	,-										
15.0				,	$\sim$		m	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~						
5.00									\					Clear Write
-5.00				1					<u>\</u>					
-15.0			M	ſ					K					
	www.	www	~~/~							and marked	margananana	min		Average
-35.0														
-45.0														
-55.0														
-65.0														Max Hold
-05.0														
	.593 GHz											12.5 MHz		
Res BW	120 kHz					#V	BW 390	kHz			Sw	eep 1 ms		Min Hold
000	pied Ba	n du	idth				Total	Power		31.8	dBm			
Occu							Total			01.0	abiii			
			4.51	68	3 MI	1Z								Detector Peak▶
Trans	mit Freq	Erro	r	5	.290 k	Hz	% of C	BW Pov	ver	99	.00 %		Auto	Man
	Bandwidi			5	002 M	<b>U</b> 7	x dB			-26 (	)0 dB			
	sanuwiu	un		J.	002 W	INZ	Xub			-20.0	JU UB			
MSG										STATUS				

Plot 7-70. Occupied Bandwidth Plot (Band 41 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-71. Occupied Bandwidth Plot (Band 41 - 5.0MHz 16-QAM - Full RB Configuration)

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Plot 7-72. Occupied Bandwidth Plot (Band 41 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-73. Occupied Bandwidth Plot (Band 41 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMG9750		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager			
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Keysight Spectrum Analyzer - Occupied B	W				
LX RL RF 50Ω AC		SENSE:INT r Freq: 2.593000000 GHz Free Run Avg Hold	01:48:24 P Radio Std d: 100/100	MNov 22, 2018 : None	Trace/Detector
	#IFGain:Low #Atter	n: 36 dB	Radio Dev	/ice: BTS	
10 dB/div Ref 25.00 dBi	m				
15.0 5.00					Clear Write
-15.0 -25.0 <del>კესეთა^ტილიზებიკი იკიდი</del> -35.0			Hall Brown Annual march	M.A.Autonymough	Average
-45.0 -55.0 -65.0					Max Hold
Center 2.593 GHz Res BW 240 kHz	#	VBW 750 kHz	Swe	n 25 MHz eep 1 ms	Min Hold
Occupied Bandwid	th	Total Power	30.8 dBm		
8.	.9840 MHz				Detector Peak▶
Transmit Freq Error	10.845 kHz	% of OBW Pow	er 99.00 %		Auto <u>Man</u>
x dB Bandwidth	10.00 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-74. Occupied Bandwidth Plot (Band 41 - 10.0MHz 16-QAM - Full RB Configuration)



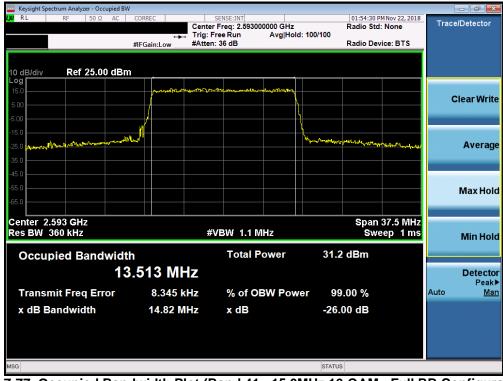
Plot 7-75. Occupied Bandwidth Plot (Band 41 - 10.0MHz 64-QAM - Full RB Configuration)

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Keysight Spectrum Analyzer - Occupied B						r X
<b>(X)</b> RL RF 50 Ω AC		SENSE:INT r Freq: 2.593000000 GHz	Radio Std	MNov 22, 2018 None	Trace/Det	ector
		Free Run Avg Hold n: 36 dB	Radio Dev	vice: BTS		
10 dB/div Ref 40.00 dB	n					
Log 30.0						
20.0					Clea	r Write
10.0		- man man man				
0.00	/					
-10.0		\			A	verage
-20.0	<b>^^</b> ₽		W Walate Marian Draft Anoral	Moorthyman		
-30.0						
-40.0					Ма	x Hold
-50.0						
Center 2.593 GHz			Span	37.5 MHz		
Res BW 360 kHz	#	VBW 1.1 MHz		eep 1 ms	Mi	n Hold
Occupied Bandwid	th	Total Power	32.2 dBm			
			02.2 dBm		_	
1.	3.523 MHz				De	etector Peak►
Transmit Freq Error	26.723 kHz	% of OBW Powe	er 99.00 %		Auto	Man
x dB Bandwidth	14.75 MHz	x dB	-26.00 dB			
MSG			STATUS			

Plot 7-76. Occupied Bandwidth Plot (Band 41 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-77. Occupied Bandwidth Plot (Band 41 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMG9750		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied B\	N				- ē 🔀
KX RL RF 50Ω AC		SENSE:INT er Freq: 2.593000000 GHz Free Run Avg Ho		PM Nov 22, 2018 d: None	Trace/Detector
	#IFGain:Low #Atte	n: 36 dB	Radio De	vice: BTS	
10 dB/div Ref 25.00 dBr	n				
Log 15.0		wath man man when you we have			
5.00					Clear Write
-5.00			l l		
-15.0					
-25.0 Mr. my rhy hope - Mar Mar Mar - Mar	normal		hoper hours way and	Autor .	Average
-35.0				·····	g.
-45.0					
-55.0					
-65.0					Max Hold
-89.0					
Center 2.593 GHz				37.5 MHz	
Res BW 360 kHz	#	#VBW 1.1 MHz	Sw	eep 1 ms	Min Hold
Occupied Bandwidt	th	Total Power	30.0 dBm		
		rotarr offor			
1	3.493 MHz				Detector Peak▶
Transmit Freq Error	34.098 kHz	% of OBW Pow	ver 99.00 %		Auto <u>Man</u>
x dB Bandwidth	14.65 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-78. Occupied Bandwidth Plot (Band 41 - 15.0MHz 64-QAM - Full RB Configuration)



Plot 7-79. Occupied Bandwidth Plot (Band 41 - 20.0MHz QPSK - Full RB Configuration)

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Keysight Spectrum Analyzer - Occupied BV	N				
<b>X RL</b> RF 50 Ω AC		SENSE:INT ter Freq: 2.593000000 GH: : Free Run AvgHe		51 PM Nov 22, 2018 Std: None	Trace/Detector
	#IFGain:Low #Att	en: 36 dB	Radio	Device: BTS	
10 dB/div Ref 25.00 dBr	n				
Log 15.0		uf Cubapathank-hallpath-th-mai			Clear Write
-5.00	hereward		Depromote and a		
-25.0 through a short the second seco			With months was and	······································	Average
-45.0					Max Hold
Center 2.593 GHz				pan 50 MHz	
Res BW 470 kHz Occupied Bandwidt		#VBW 1.5 MHz Total Power	31.0 dBm	Sweep 1 ms	Min Hold
	7.951 MHz				Detector Peak▶
Transmit Freq Error	14.893 kHz	% of OBW Po	wer 99.00 %		Auto <u>Man</u>
x dB Bandwidth	19.45 MHz	x dB	-26.00 dE	;	
MSG			STATUS		

Plot 7-80. Occupied Bandwidth Plot (Band 41 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-81. Occupied Bandwidth Plot (Band 41 - 20.0MHz 64-QAM - Full RB Configuration)

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# 7.3 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 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.

# The minimum permissible attenuation level of any spurious emission is 43 +10log₁₀(P_[Watts]), where P is the transmitter power in Watts.

For Band 41, the minimum permissible attenuation level of any spurious emission is 55 + log₁₀(P_[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 at least 10 * the fundamental frequency (separated into at least two plots per channel)
- 2. Detector = RMS
- 3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
- 4. Sweep time = auto couple
- 5. The trace was allowed to stabilize
- 6. Please see test notes below for RBW and VBW settings

#### 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**

Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz. However, in the 1 MHz 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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RL RL	RF 50 Ω AC	CORREC	SENSE:INT		11:58:34 AM Nov 14, 2018	
		PNO: Fast 🕞		#Avg Type: RMS	TRACE <b>1 2 3 4 5 6</b> TYPE A WWWW DET <b>A NNNN</b>	Frequency
10 dB/div	Ref 20.00 dBm			Ν	/kr1 695.40 MHz -42.23 dBm	Auto Tur
10.0						Center Fre 363.950000 MH
-10.0					DL1 -13.00 dBm	Start Fre 30.000000 MH
-20.0						Stop Fre 697.900000 MH
-40.0					1	CF Ste 66.790000 Mi <u>Auto</u> Ma
-60.0		len Malatil all directors to be growers and an anti-base for the of the base and to be a second and a second		s las etc. Souther card Merican development development development development development development develop	san faran ya sa ka sa sa ka sa sa ka sa	Freq Offs 0 H
-70.0						Scale Typ
Start 30.0 Res BW	0 MHz / 100 kHz	#VBW	300 kHz	Sweep 8	Stop 697.9 MHz 2.82 ms (13359 pts)	Log <u>L</u>
ISG				STAT		

Plot 7-82. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



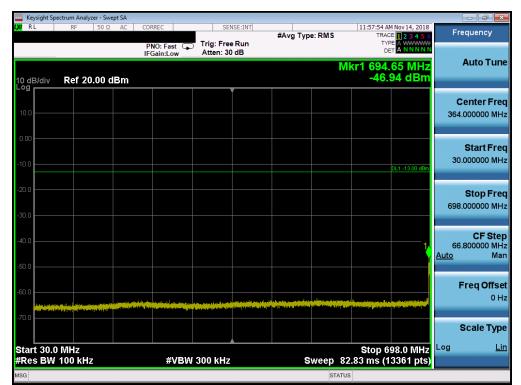
Plot 7-83. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

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	pectrum Analyz		t SA										
🗶 RL	RF	50 Ω	AC	CORREC		SE	NSE:INT	#Avg Typ	e: RMS		M Nov 14, 2018 CE 1 2 3 4 5 6	Frequ	lency
				PNO: F	ast 🖵	Trig: Fre				TY			
				IFGain:	Low	Atten: 3	0 88					Au	ito Tune
	-								IVI	KF1 9.12	1 5 GHz 28 dBm		
10 dB/div Log <b>r</b>	Ref 20	.00 dE	3m				<b>_</b>			-47.	20 0.011		
												Cer	nter Fred
10.0													0000 GH;
0.00												_	
													tart Fred
-10.0											DL1 -13.00 dBm	1.00000	0000 GHz
-20.0												S	top Fred
												10.00000	0000 GHz
-30.0													
													CF Step
-40.0											1	900.00	0000 мні
-50.0							ر الملت	and a family state	ويربد والملفطين	يراد وماطلودة ورور والم		Auto	Man
-50.0			and the second					and the set provide a set of the set	Print and the second	in the second second second	Constant Control of the American Street		
-60.0												Fre	q Offse
-00.0													0 Hz
-70.0													
												Sc	ale Type
Start 1.0						0.0.0411				Stop 10	0.000 GHz	Log	Lir
	/ 1.0 MHz				#VBW	3.0 MHz		S		-	18001 pts)		
MSG									STATI	JS			

Plot 7-84. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



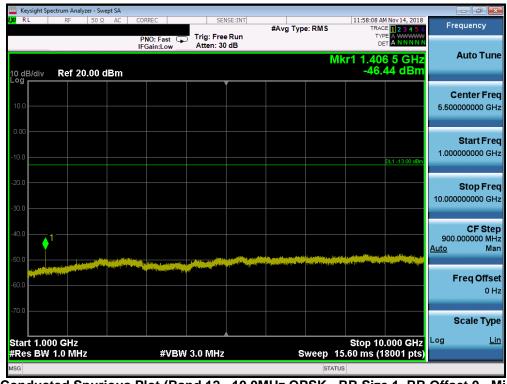
Plot 7-85. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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🔤 Keysight Spectrum Analyzer - Sv					
<b>LX RL RF 50 Ω</b>	2 AC CORREC	SENSE:INT	#Avg Type: RMS	11:58:00 AM Nov 14, 2018 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast IFGain:Low	Trig: Free Run Atten: 30 dB	M	TYPE A WWWWW DET A NNNNN kr1 720.35 MHz	Auto Tune
10 dB/div Ref 20.00	dBm			-62.40 dBm	
10.0					Center Freq 858.000000 MHz
0.00					
0.00					Start Freq
-10.0				DL1 -13.00 dBm	716.000000 MHz
-20.0					Stop Fred
-30.0					1.000000000 GH:
-40.0					CF Step 28.400000 MH;
-50.0					Auto Mar
-30.0					Freq Offse
-60.0	and a state in the second s	alan - la plant est est a alangita d'a disentificien det		in ( in the last of the second start, the second in second	0 Hz
-70.0					O a da Tarra
					Scale Type
Start 0.7160 GHz #Res BW 100 kHz	#VI	300 kHz	Sweep 3	Stop 1.0000 GHz 5.22 ms (5681 pts)	Log <u>Lin</u>
мsg 🔱 Points changed; all			STATU		

Plot 7-86. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



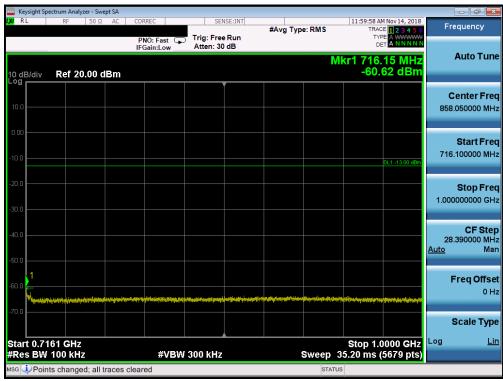
Plot 7-87. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: A3LSMG9750		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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	ectrum Analyzer -									_	
LXI RL	RF 5	OΩ AC	CORREC		NSE:INT	#Avg Typ	e: RMS	TRAC	M Nov 14, 2018	Fred	luency
			PNO: Fast G	Trig: Free Atten: 30				TYF			
10 dB/div Log	Ref 20.0	0 dBm					Μ	lkr1 697. -46.	95 MHz 84 dBm	A	uto Tune
10.0											nter Freq 00000 MHz
-10.0									DL1 -13.00 dBm		Start Freq 00000 MHz
-20.0											<b>Stop Freq</b> 00000 MHz
-40.0									1	66.8 <u>Auto</u>	CF Step 00000 MHz Man
-60.0					a fa desta de la composición de la comp		and the second	line Algebourg and provide the second states	la polymetrik na stala stáli V se seconda na stala stáli	Fr	r <b>eq Offset</b> 0 Hz
-70.0											cale Type
Start 30.0 #Res BW			#VBI	N 300 kHz		s	weep 8	8 Stop 2.83 ms (1	98.0 MHz 3361 pts)	Log	Lin
MSG							STATU				

Plot 7-88. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-89. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

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	ctrum Analyzer										
X/RL	RF 5	50Ω AC	COR	REC		SE:INT	#Avg Typ	e: RMS	TRAC	MNov 14, 2018 E <b>1 2 3 4 5 6</b>	Frequency
			PN IFG	O: Fast 🕞 ain:Low	Trig: Free Atten: 30						
10 dB/div Log	Ref 20.0	0 dBm						MI	kr1 1.41; -45.	3 5 GHz 71 dBm	Auto Tune
209											Center Free
10.0											5.50000000 GH:
0.00											Start Fred
-10.0										DL1 -13.00 dBm	1.000000000 GH
-20.0										DET FISSO ADIT	
-20.0											Stop Free 10.00000000 GH
-30.0											
-40.0											CF Step 900.000000 MH
-50.0		and the same of the	and the second				line	equation to product the		a per l'anne anne la	<u>Auto</u> Mar
		and the second secon		an Maray Japan San San San San San San San San San S	addition of the state		Let - multiple states held				Freq Offse
-60.0											0 H:
-70.0											Scale Type
									Oton 40		Log <u>Lir</u>
Start 1.00 #Res BW				#VBW	/ 3.0 MHz		s	weep 1:		.000 GHz 8001 pts)	
MSG								STATU	s		

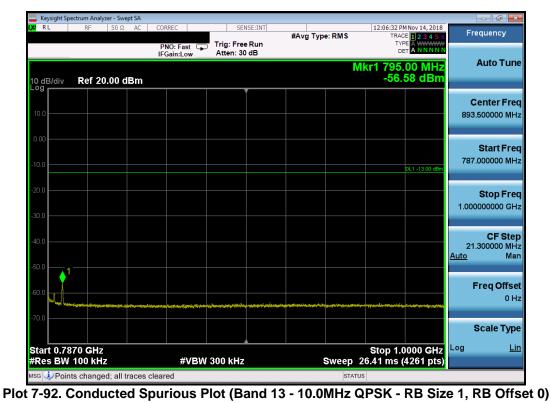
Plot 7-90. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

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	ectrum Analy.														
RL	RF	50 Ω	AC	CORRECT PNO:	Fast G		Free		#Avg Ty	pe: RMS		TRAC	MNov 14, 2018 E 1 2 3 4 5 6 E A WWWW A N N N N N	F	requency
0 dB/div	Ref 20	.00 dl	Bm	IFGair	i:Low	Atte	en: 30	dB			Mk	r1 777.	00 MHz 13 dBm		Auto Tur
10.0															Center Fre 3.500000 MH
10.0													DL1 -13.00 dBm	3	Start Fr 0.000000 M
0.0													1	77	<b>Stop Fr</b> 7.000000 M
0.0														7. <u>Auto</u>	CF St 4.700000 M N
					ant logi company				(n) hay data databilit bay wanta a			n al distance and the second secon	te linte og onlige til get til består 1 societ for støre støre at te støre f		Freq Offs 0
														Log	Scale Ty
tart 30.0 Res BW		z			#VB\	V 300 I	kHz			Sweep	92.0	- stop / 63 ms (1	77.0 MHz 4941 pts)	209	<u> </u>
G										_	TATUS				

Plot 7-91. Conducted Spurious Plot (Band 13 - 10.0MHz QPSK - RB Size 1, RB Offset 0)



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	pectrum Anal	yzer - Swej	ot SA										d X
RL	RF	50 Ω	AC	CORREC	ast 🖵	Trig: Fre		#Avg Typ	e: RMS	TRAC	MNov 14, 2018 E 1 2 3 4 5 6 PE A MNNNN	Freque	ncy
0 dB/div	Ref 2	0.00 d	Bm	IFGain:	ow	Atten: 30	Jab		Mł	r1 1.55	5 5 GHz 76 dBm	Aut	o Tun
10.0												Cento 5.5000000	
10.0											DL1 -13.00 dBm	Sta 1.0000000	n <b>rtFre</b> 000 G⊦
20.0 30.0												<b>Sto</b> 10.0000000	op Fre
i0.0	↓ 1				en er fakkisken s				a Silana ( Managang Kappa)		en of a Million on the set of	<b>C</b> 900.0000 <u>Auto</u>	F Ste DOO MH Ma
50.0 					le contra la contra de la cont	all de la constitue						Freq	Offs 0 ⊦
5tart 1.0	00 GHz									Stop 10			le Typ
Res BW	/ 1.0 MH	Z			#VBW	3.0 MHz		S	status		8001 pts)		

Plot 7-93. Conducted Spurious Plot (Band 13 - 10.0MHz QPSK - RB Size 1, RB Offset 0)

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