

PCTEST ENGINEERING LABORATORY, INC.

7185 Oakland Mills Road, Columbia, MD 21046 USA Tel. 410.290.6652 / Fax 410.290.6654 http://www.pctestlab.com



### MEASUREMENT REPORT FCC Part 22, 24, & 27 LTE

#### Applicant Name:

Samsung Electronics Co., Ltd. 129, Samsung-ro, Maetan dong, Yeongtong-gu, Suwon-si Gyeonggi-do 443-742, Korea

# FCC ID :

APPLICANT:

**Application Type:** 

FCC Rule Part(s):

EUT Type:

Model(s):

Test Procedure(s):

**Test Device Serial No.:** 

**FCC Classification:** 

### SAMSUNG ELECTRONICS CO., LTD.

EDD/EIDD

#### Certification PCS License

PCS Licensed Transmitter Held to Ear (PCE) §2; §22; §24; §27 ANSI/TIA-603-C-2004, KDB 971168 v02r02 Portable Handset SM-G920K, SM-G920S, SM-G920L *identical prototype* [S/N: FCC 5]

A3LSMG920KOR

				ERP/EIRP	
Mode	Tx Frequency (MHz)	Emission Designator	Modulation	Max. Pow er (W)	Max. Pow er (dBm)
LTE Band 17	706.5 - 713.5	4M52G7D	QPSK	0.024	13.80
LTE Band 17	706.5 - 713.5	4M52W7D	16QAM	0.019	12.82
LTE Band 17	709 - 711	8M96G7D	QPSK	0.027	14.24
LTE Band 17	709 - 711	8M97W7D	16QAM	0.021	13.32
LTE Band 5/26	824.7 - 848.3	1M13G7D	QPSK	0.046	16.61
LTE Band 5/26	824.7 - 848.3	1M12W7D	16QAM	0.038	15.76
LTE Band 5/26	825.5 - 847.5	2M75G7D	QPSK	0.045	16.53
LTE Band 5/26	825.5 - 847.5	2M74W7D	16QAM	0.033	15.20
LTE Band 5/26	826.5 - 846.5	4M53G7D	QPSK	0.045	16.51
LTE Band 5/26	826.5 - 846.5	4M52W7D	16QAM	0.036	15.52
LTE Band 5/26	829 - 844	9M01G7D	QPSK	0.041	16.10
LTE Band 5/26	829 - 844	9M01W7D	16QAM	0.030	14.80
LTE Band 26	831.5 - 841.5	13M4G7D	QPSK	0.042	16.25
LTE Band 26	831.5 - 841.5	13M5W7D	16QAM	0.032	15.04
LTE Band 2	1850.7 - 1909.3	1M14G7D	QPSK	0.225	23.52
LTE Band 2	1850.7 - 1909.3	1M13W7D	16QAM	0.181	22.58
LTE Band 2	1851.5 - 1908.5	2M74G7D	QPSK	0.198	22.97
LTE Band 2	1851.5 - 1908.5	2M74W7D	16QAM	0.151	21.79
LTE Band 2	1852.5 - 1907.5	4M53G7D	QPSK	0.212	23.27
LTE Band 2	1852.5 - 1907.5	4M51W7D	16QAM	0.169	22.28
LTE Band 2	1855 - 1905	8M99G7D	QPSK	0.143	21.56
LTE Band 2	1855 - 1905	9M00W7D	16QAM	0.117	20.67
LTE Band 2	1857.5 - 1902.5	13M5G7D	QPSK	0.192	22.84
LTE Band 2	1857.5 - 1902.5	13M5W7D	16QAM	0.145	21.60
LTE Band 2	1860 - 1900	18M0G7D	QPSK	0.134	21.28
LTE Band 2	1860 - 1900	18M0W7D	16QAM	0.105	20.21
LTE Band 41	2498.5 - 2687.5	4M52G7D	QPSK	0.048	16.85
LTE Band 41	2498.5 - 2687.5	4M51W7D	16QAM	0.037	15.66
LTE Band 41	2501 - 2685	9M00G7D	QPSK	0.045	16.53
LTE Band 41	2501 - 2685	9M02W7D	16QAM	0.037	15.63
LTE Band 41	2503.5 - 2682.5	13M5G7D	QPSK	0.041	16.15
LTE Band 41	2503.5 - 2682.5	13M5W7D	16QAM	0.033	15.25
LTE Band 41	2506 - 2680	18M0G7D	QPSK	0.036	15.59
LTE Band 41	2506 - 2680	18M0W7D	16QAM	0.030	14.73

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 Orlanez President					
FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager	
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Date of Testing: 1/8 - 1/22/2015 Test Site/Location: PCTEST Lab., Columbia, MD, USA Test Report Serial No.: 0Y1501080034.A3L

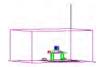


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## MEASUREMENT REPORT FCC Part 22, 24, & 27



### §2.1033 General Information

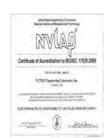
APPLICANT:	Samsung Electronics Co.,	Ltd.		
APPLICANT ADDRESS:	129, Samsung-ro, Maetan	dong,		
	Yeongtong-gu, Suwon-si, (	Gyeonggi-do 443-742	2, Korea	
TEST SITE:	PCTEST ENGINEERING L	ABORATORY, INC.		
TEST SITE ADDRESS:	7185 Oakland Mills Road,	Columbia, MD 21045	5 USA	
FCC RULE PART(S):	§2; §22; §24; §27			
BASE MODEL:	SM-G920K, SM-G920S, SM-G920L			
FCC ID:	A3LSMG920KOR			
FCC CLASSIFICATION:	PCS Licensed Transmitter	Held to Ear (PCE)		
FREQUENCY TOLERANCE:	±0.00025 % (2.5 ppm)			
Test Device Serial No.:	FCC 5	Production	Pre-Production	Engineering
DATE(S) OF TEST:	1/8 - 1/22/2015			
TEST REPORT S/N:	0Y1501080034.A3L			

#### **Test Facility / Accreditations**

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

- PCTEST facility is an FCC registered (PCTEST Reg. No. 159966) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (2451B-1).
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP Lab code: 100431-0) in EMC, FCC and Telecommunications.
- PCTEST Lab is accredited to ISO 17025-2005 by the American Association for Laboratory Accreditation (A2LA) in Specific Absorption Rate (SAR) testing, Hearing Aid Compatibility (HAC) testing, CTIA Test Plans, and wireless testing for FCC and Industry Canada Rules.
- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules and Industry Canada Standards (RSS).
- PCTEST facility is an IC registered (2451B-1) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS, CDMA, and EvDO wireless devices and for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.

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#### INTRODUCTION 1.0

#### 1.1 Scope

Measurement and determination of electromagnetic emissions (EME) 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 Industry Canada Certification and Engineering Bureau.

#### 1.2 Testing Facility

The map below shows the location of the PCTEST LABORATORY, its proximity to the FCC Laboratory, the Columbia vicinity, the Baltimore-Washington Internt'I (BWI) airport, the city of Baltimore and the Washington, DC area. (See Figure 1-1).

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The site coordinates are 39° 10'23" N latitude and 76° 49'50" W longitude. The facility is 0.4 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2003 on February 15, 2012.

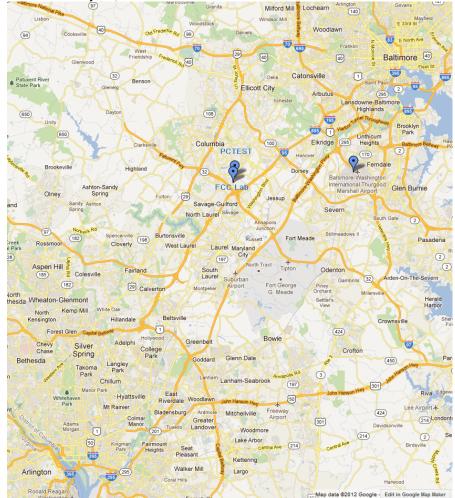


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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### 2.0 PRODUCT INFORMATION

#### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMG920KOR**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

### 2.2 Device Capabilities

This device contains the following capabilities:

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

<u>Note:</u> LTE Band 26 covers more than the entire range of LTE Band 5. Therefore, data/test results for only Band 26 have been provided in the report.

#### 2.3 Test Configuration

This device supports wireless charging capability and, thus, is subject to the test requirements of KDB 648474 D03 v01r02. Additional radiated spurious emission measurements were performed with the EUT lying flat on a certified wireless charging pad (WCP) while operating under normal conditions in a simulated call or data transmission configuration. The worst case radiated emissions data is shown in this report.

#### 2.4 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and no modifications were made during testing.

### 2.5 Labeling Requirements

#### Per 2.925

The FCC identifier shall be permanently affixed to the equipment and shall be readily visible to the purchaser at the time of purchase.

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### 3.0 DESCRIPTION OF TESTS

#### 3.1 Measurement Procedure

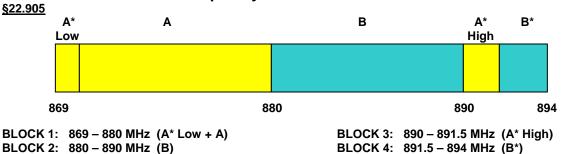
The measurement procedures described in the document titled "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI/TIA-603-C-2004) and "Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems" (KDB 971168) were used in the measurement of the **Samsung Portable Handset FCC ID: A3LSMG920KOR.** 

# 3.2 Block A Frequency Range §27.5(c)

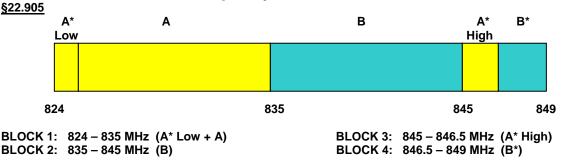
<u>698-746 MHz band</u>. The following frequencies are available for licensing pursuant to this part in the 698-746 MHz band: (1) Three paired channel blocks of 12 megahertz each are available for assignment as follows:

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.



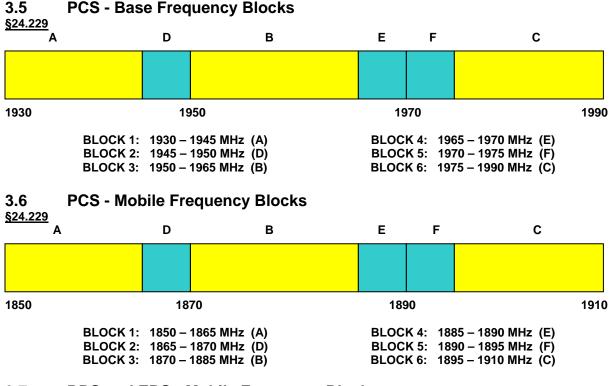


### 3.4 Cellular - Mobile Frequency Blocks



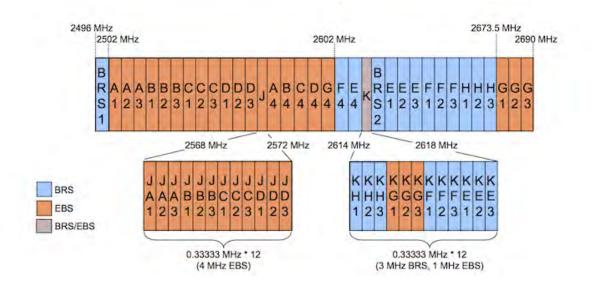
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#### <u>§27.5</u>



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#### **3.8** Radiated Power and Radiated Spurious Emissions §2.1053 §22.913(a.2) §22.917(a) §24.232(c) §24.238(a) §27.50(c.10) §27.53(g)

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 Clause 5, Figure 5.7 of ANSI C63.4-2009. For measurements above 1GHz 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 below 1GHz, the absorbers are removed. An ETS Lindgren Model 2188 raised turntable is used for radiated measurement. It 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. A 78cm high PVC support structure is placed on top of the turntable. A <sup>3</sup>/<sub>4</sub>" (~1.9cm) sheet of high density polyethylene is used as the table top and is placed on top of the PVC supports to bring the total height of the table to 80cm.

The equipment under test was transmitting while connected to its integral antenna and is placed on a wooden turntable 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Radiated power levels are also investigated with the receive antenna horizontally and vertically polarized. The maximized power level is recorded using the spectrum analyzer "Channel Power" function with the integration band set to the emissions' occupied bandwidth, a RMS detector, RBW = 100kHz, VBW = 300kHz, and a 1 second sweep time over a minimum of 10 sweeps, per the guidelines of KDB 971168.

Per the guidance of ANSI/TIA-603-C-2004, 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  $P_{g \text{ [dBm]}}$  – cable loss  $_{\text{[dB]}}$ .

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 + 10log<sub>10</sub>(Power <sub>[Watts]</sub>). For Band 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 + 10log<sub>10</sub>(Power <sub>[Watts]</sub>).

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# 4.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST).

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	3/25/2014	Annual	3/25/2015	N/A
-	LTx3	Licensed Transmitter Cable Set	10/15/2014	Annual	10/15/2015	N/A
Agilent	8447D	Broadband Amplifier	5/30/2014	Annual	5/30/2015	2443A01900
Agilent	E4448A	PSA (3Hz-50GHz) Spectrum Analyzer	4/16/2014	Annual	4/16/2015	US42510244
Agilent	N9020A	MXA Signal Analyzer	10/27/2014	Annual	10/27/2015	US46470561
Agilent	N9030A	PXA Signal Analyzer (44GHz)	3/17/2014	Annual	3/17/2015	MY52350166
Emco	6502	Active Loop Antenna (10k - 30 MHz)	6/24/2014	Biennial	6/24/2016	267
Espec	ESX-2CA	Environmental Chamber	4/16/2014	Annual	4/16/2015	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/8/2014	Biennial	4/8/2016	125518
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/12/2014	Biennial	3/12/2016	128337
K & L	13SH10-1000/U1000	N Type High Pass Filter	5/22/2014	Annual	5/22/2015	1
K & L	11SH10-3075/U18000	High Pass Filter	5/2/2014	Annual	5/2/2015	4
Mini-Circuits	SSG-4000HP	USB Synthesized Signal Generator		N/A		11208010032
Mini-Circuits	PWR-SENS-4RMS	USB Power Sensor	4/9/2014	Annual	4/9/2015	11401010036
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	10/4/2013	Biennial	10/4/2015	103962
Rohde & Schwarz	TS-PR18	1-18 GHz Pre-Amplifier	3/5/2014	Annual	3/5/2015	100071
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	3/27/2014	Annual	3/27/2015	100342
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	11/21/2013	Biennial	11/21/2015	9105-2404
Seekonk	NC-100	Torque Wrench (8" lb)	4/16/2014	Annual	4/16/2015	N/A
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	1/28/2014	Biennial	1/28/2016	A051107

Table 4-1. Test Equipment

#### Notes:

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

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### 5.0 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

#### 16QAM 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 2<sup>nd</sup> 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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# 6.0 TEST RESULTS

## 6.1 Summary

Company Name:	Samsung Electronics Co., Ltd.
FCC ID:	A3LSMG920KOR
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
Mode(s):	LTE

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Result	Reference
TRANSMITTER MC					
2.1049	Occupied Bandwidth	N/A		PASS	Section 6.2
2.1051 22.917(a) 24.238(a) 27.53(g)	Out of Band Emissions	<ul> <li>&gt; 43 + 10log<sub>10</sub> (P[Watts]) at Band Edge and for all out-of- band emissions.</li> <li>Or, similarly,</li> <li>&gt; -X dBW. where X= 43</li> </ul>		PASS	Section 6.3, 6.4
27.53(m)	Out of Band Emissions	<ul> <li>&gt; 43 + 10log<sub>10</sub> (P[Watts]) at channel edges</li> <li>Or, similarly,</li> <li>-X dBW. where X= 43; and</li> <li>&gt; 55 + 10log<sub>10</sub> (P[Watts]) at 5.5MHz away and beyond channel edges</li> <li>Or, similarly,</li> <li>-X dBW. where X= 55;</li> </ul>	CONDUCTED	PASS	Section 6.3, 6.4
24.232(d)	Peak-Average Ratio	< 13 dB		PASS	Section 6.5
2.1046	Transmitter Conducted Output Power	N/A		PASS	See RF Exposure Report
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)		PASS	Section 6.8
22.913(a.2)	Effective Radiated Power (Band 26)	< 7 Watts max. ERP		PASS	Section 6.6
24.232(c) 27.50(h.2)	Equivalent Isotropic Radiated Power (Band 2 41)	< 2 Watts max. EIRP		PASS	Section 6.6
2.1053 22.917(a) 24.238(a) 27.53(g)	Undesirable Emissions	<ul> <li>&gt; 43 + 10log<sub>10</sub> (P[Watts]) for all out-of-band emissions.</li> <li>Or, similarly,</li> <li>&gt; -X dBW. where X= 43</li> </ul>		PASS	Section 6.7
27.53(m)	Undesirable Emissions	<ul> <li>&gt; 43 + 10log<sub>10</sub> (P[Watts]) at channel edges</li> <li>Or, similarly,</li> <li>-X dBW. where X= 43; and,</li> <li>&gt; 55 + 10log<sub>10</sub> (P[Watts]) at 5.5MHz away and beyond channel edges</li> <li>Or, similarly,</li> <li>-X dBW. where X= 55;</li> </ul>	RADIATED	PASS	Section 6.7

Table 6-1. Summary of Test Results

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 11 of 111
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Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots (Sections 6.2, 6.3, 6.4, 6.5) 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 2.8.

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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# 6.2 Occupied Bandwidth §2.1049

#### Test Overview

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

#### Test Procedure Used

KDB 971168 v02r02 - 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.

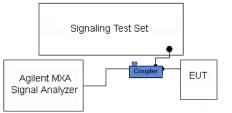


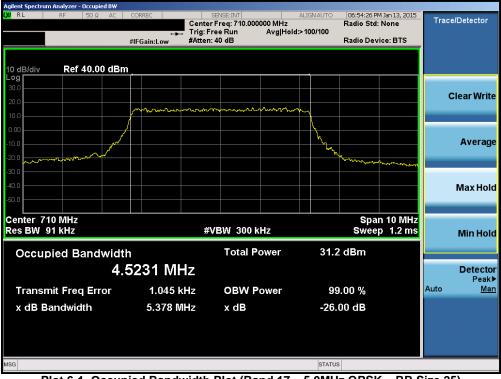
Figure 6-1. Test Instrument & Measurement Setup

#### Test Notes

None.

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager	
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Plot 6-1. Occupied Bandwidth Plot (Band 17 – 5.0MHz QPSK – RB Size 25)



Plot 6-2. Occupied Bandwidth Plot (Band 17 – 5.0MHz 16-QAM – RB Size 25)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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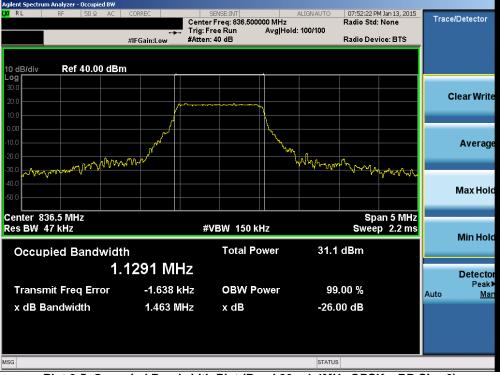
Plot 6-3. Occupied Bandwidth Plot (Band 17 – 10.0MHz QPSK – RB Size 50)



Plot 6-4. Occupied Bandwidth Plot (Band 17 – 10.0MHz 16-QAM – RB Size 50)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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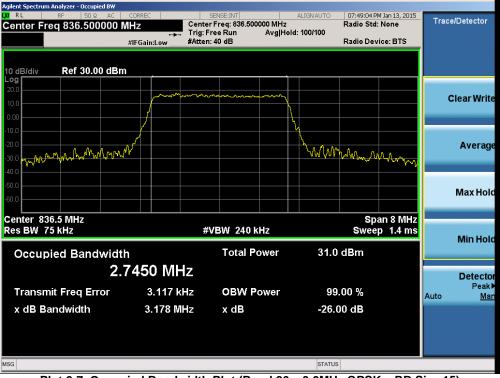
Plot 6-5. Occupied Bandwidth Plot (Band 26 – 1.4MHz QPSK – RB Size 6)



Plot 6-6. Occupied Bandwidth Plot (Band 26 – 1.4MHz 16-QAM – RB Size 6)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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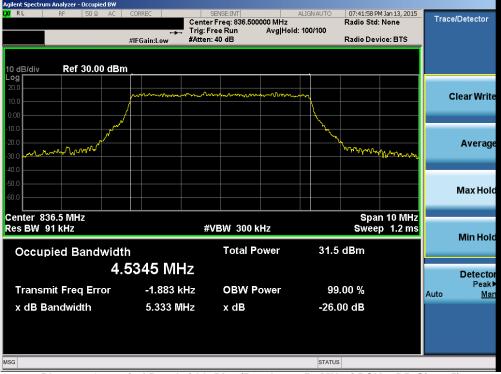
Plot 6-7. Occupied Bandwidth Plot (Band 26 – 3.0MHz QPSK – RB Size 15)



Plot 6-8. Occupied Bandwidth Plot (Band 26 – 3.0MHz 16-QAM – RB Size 15)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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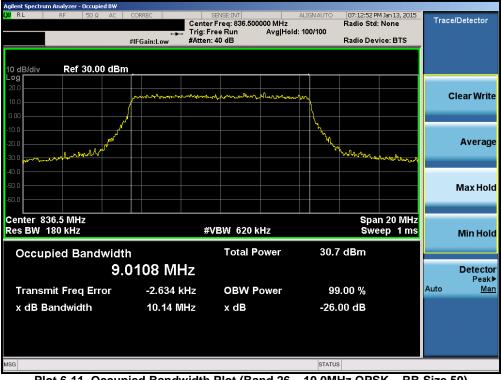
Plot 6-9. Occupied Bandwidth Plot (Band 26 – 5.0MHz QPSK – RB Size 25)



Plot 6-10. Occupied Bandwidth Plot (Band 26 – 5.0MHz 16-QAM – RB Size 25)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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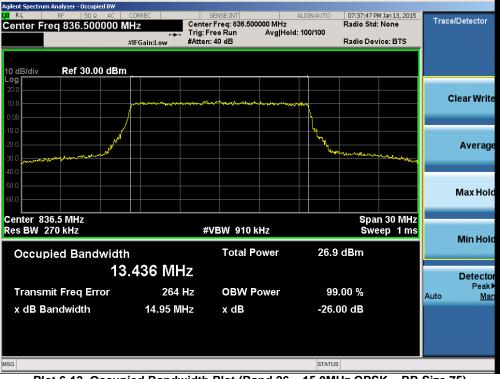
Plot 6-11. Occupied Bandwidth Plot (Band 26 – 10.0MHz QPSK – RB Size 50)



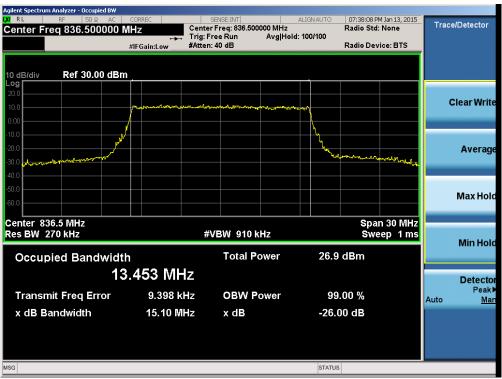
Plot 6-12. Occupied Bandwidth Plot (Band 26 - 10.0MHz 16-QAM - RB Size 50)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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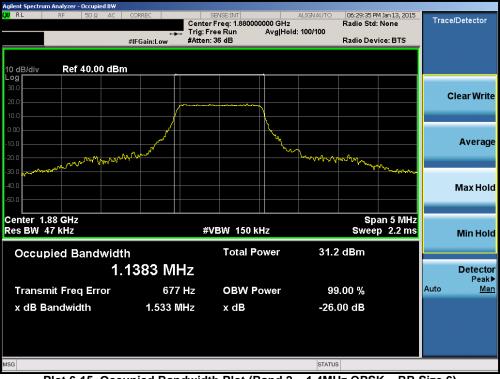
Plot 6-13. Occupied Bandwidth Plot (Band 26 – 15.0MHz QPSK – RB Size 75)



Plot 6-14. Occupied Bandwidth Plot (Band 26 – 15.0MHz 16-QAM – RB Size 75)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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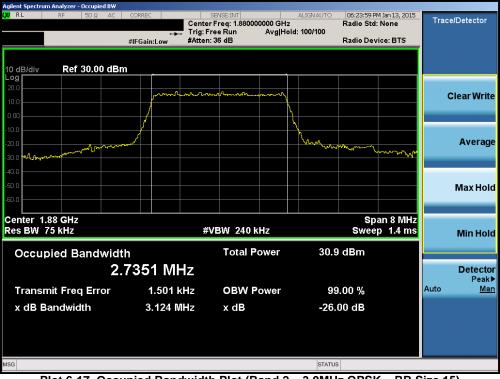
Plot 6-15. Occupied Bandwidth Plot (Band 2 – 1.4MHz QPSK – RB Size 6)



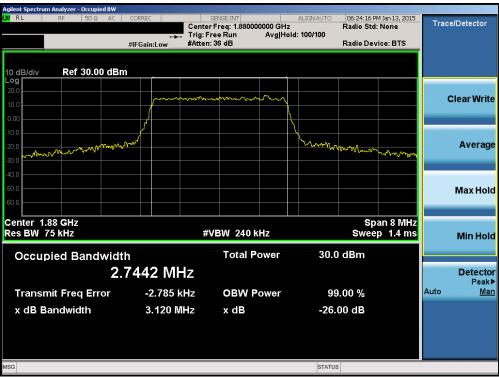
Plot 6-16. Occupied Bandwidth Plot (Band 2 – 1.4MHz 16-QAM – RB Size 6)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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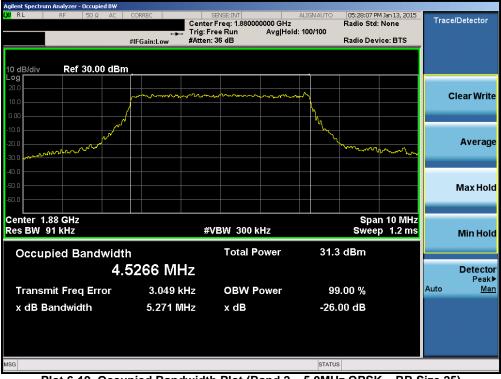
Plot 6-17. Occupied Bandwidth Plot (Band 2 – 3.0MHz QPSK – RB Size 15)



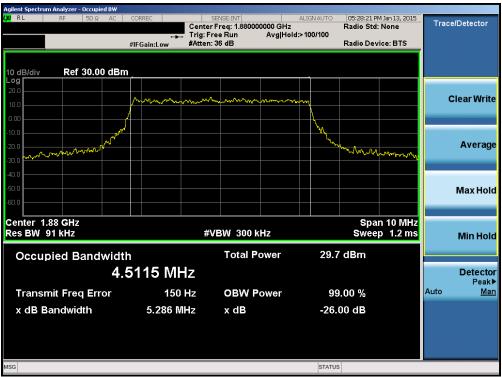
Plot 6-18. Occupied Bandwidth Plot (Band 2 – 3.0MHz 16-QAM – RB Size 15)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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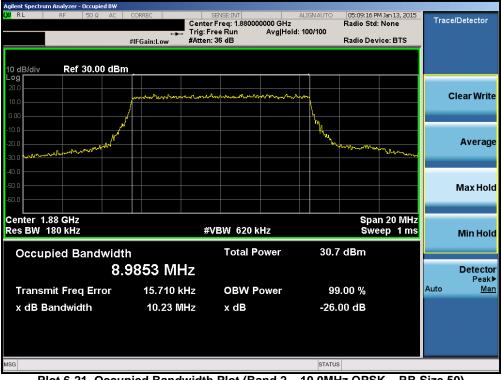
Plot 6-19. Occupied Bandwidth Plot (Band 2 – 5.0MHz QPSK – RB Size 25)



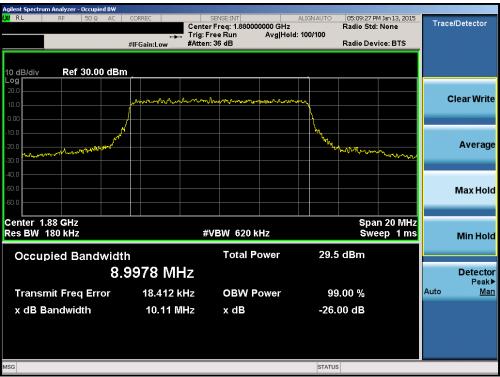
Plot 6-20. Occupied Bandwidth Plot (Band 2 – 5.0MHz 16-QAM – RB Size 25)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Plot 6-21. Occupied Bandwidth Plot (Band 2 – 10.0MHz QPSK – RB Size 50)



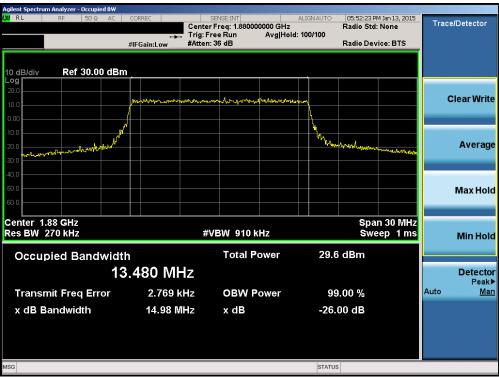
Plot 6-22. Occupied Bandwidth Plot (Band 2 – 10.0MHz 16-QAM – RB Size 50)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Plot 6-23. Occupied Bandwidth Plot (Band 2 – 15.0MHz QPSK – RB Size 75)



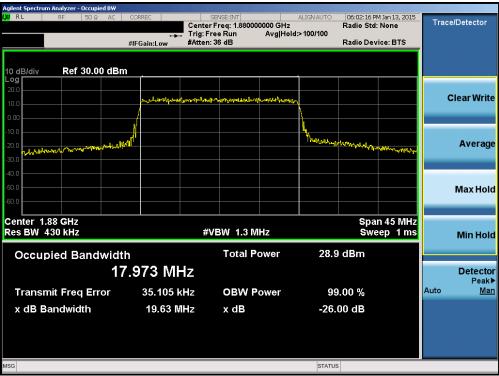
Plot 6-24. Occupied Bandwidth Plot (Band 2 – 15.0MHz 16-QAM – RB Size 75)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Plot 6-25. Occupied Bandwidth Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



Plot 6-26. Occupied Bandwidth Plot (Band 2 – 20.0MHz 16-QAM – RB Size 100)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Plot 6-27. Occupied Bandwidth Plot (Band 41 – 5.0MHz QPSK – RB Size 25)



Plot 6-28. Occupied Bandwidth Plot (Band 41 – 5.0MHz 16-QAM – RB Size 25)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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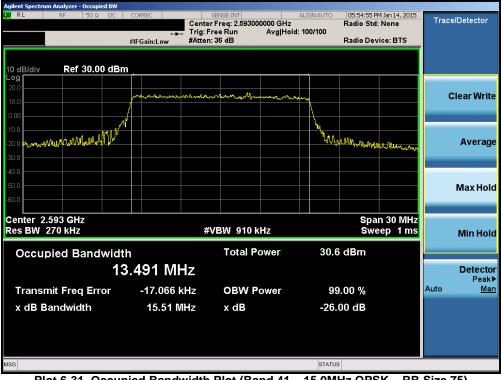
Plot 6-29. Occupied Bandwidth Plot (Band 41 – 10.0MHz QPSK – RB Size 50)



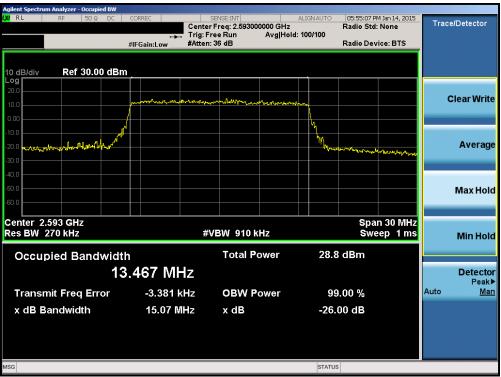
Plot 6-30. Occupied Bandwidth Plot (Band 41 – 10.0MHz 16-QAM – RB Size 50)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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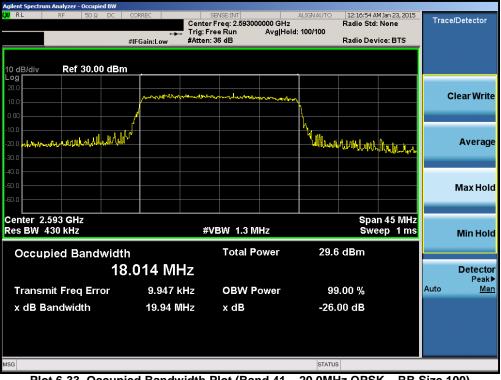
Plot 6-31. Occupied Bandwidth Plot (Band 41 – 15.0MHz QPSK – RB Size 75)



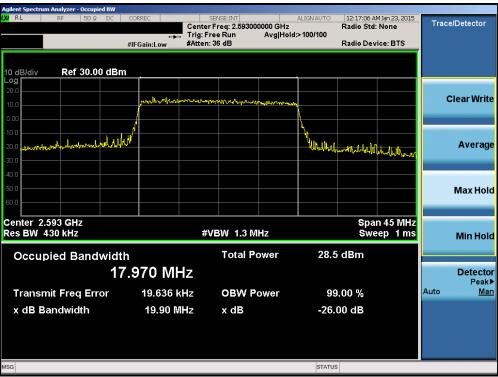
Plot 6-32. Occupied Bandwidth Plot (Band 41 – 15.0MHz 16-QAM – RB Size 75)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Plot 6-33. Occupied Bandwidth Plot (Band 41 – 20.0MHz QPSK – RB Size 100)



Plot 6-34. Occupied Bandwidth Plot (Band 41 - 20.0MHz 16-QAM - RB Size 100)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 20 of 111
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#### Spurious and Harmonic Emissions at Antenna Terminal 6.3 §2.1051 §22.917(a) §24.238(a) §27.53(g) §27.53(m)

#### 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 10<sup>th</sup> 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  $43 + \log_{10}(P_{IWattsl})$ , where P is the transmitter power in Watts. For Band 41, the minimum permissible attenuation level of any spurious emission is  $55 + \log_{10}(P_{[Watts]})$ .

#### **Test Procedure Used**

KDB 971168 v02r02 - 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 = max hold
- 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.

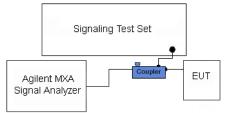


Figure 6-2. Test Instrument & Measurement Setup

#### Test Notes

Typically, unwanted emissions are required by the licensed rule parts to be attenuated below the transmitter power by a factor of at least X + 10log(P) dB, where P represents the transmitter power expressed in watts and X is a specified scalar value (e.g., 43). This specification can be interpreted in one of two equivalent ways. First, the required attenuation can be construed to be relative to the mean carrier power, with the resultant of the equation X + 10log(P) being expressed in dBc (dB relative to the maximum carrier power). Alternatively, the specification can be interpreted as an absolute limit when the specified attenuation is actually subtracted from the maximum permissible transmitter power [i.e.,  $10\log(P) - {X + P}$ 10log(P)}], resulting in an absolute level of -X dBW [or (-X + 30) dBm].

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dogo 21 of 111		
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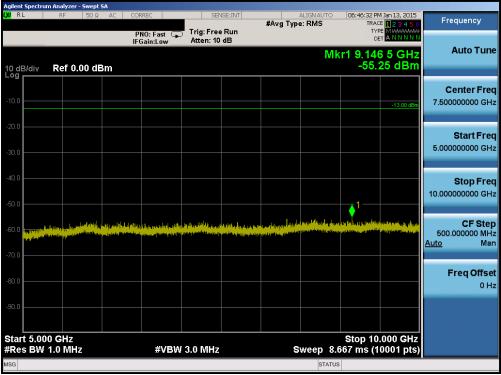
Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz. However, in the 1 MHz bands immediately outside and adjacent to the 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.

RL	RF	50 Ω	AC C	ORREC	SEM	ISE:INT	#Avg Typ	ALIGN AUTO	TRAC	M Jan 13, 2015 E <mark>1 2 3 4 5 6</mark>	Frequency
				PNO: Fast 🕞 FGain:Low	Trig: Free Atten: 40				TYF De		
0 dB/div	Ref 3	0.00 dl	Зm					Mkr1	3.151 1 -25.	60 GHz 13 dBm	Auto Tur
20.0											Center Fre 2.515000000 GF
0.0											Start Fre 30.000000 MH
0.0							1			-13.00 dBm	<b>Stop Fre</b> 5.000000000 GH
		n y feynal hefnaf. Yn feynal fernau	n an	e la systèlatique de la serie de la se	<mark>ni yang kanan s</mark> ayan <sup>kal</sup> un k Natura kanan sang kalun <sup>ka</sup> ng ka						CF Ste 497.000000 Mi <u>Auto</u> Ma
D.0											<b>Freq Offs</b> 0 I
0.0 tart 30	MHz								Stop 5	.000 GHz	
Res BV	/ 1.0 MH	z		#VBV	V 3.0 MHz		S	weep 8.0	667 ms (1	0001 pts)	

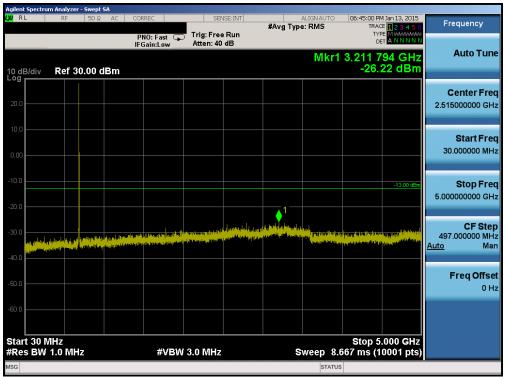
Plot 6-35. Conducted Spurious Plot (Band 17 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager		
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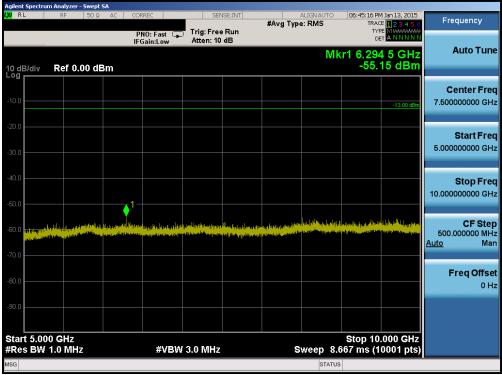
Plot 6-36. Conducted Spurious Plot (Band 17 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)



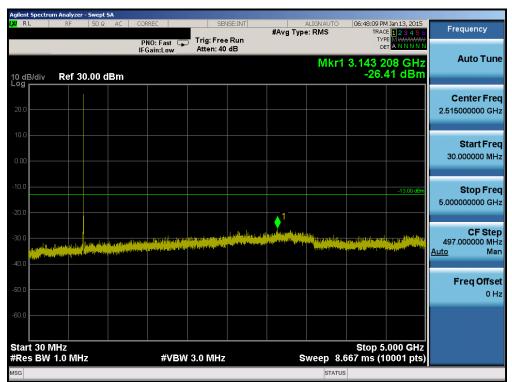
Plot 6-37. Conducted Spurious Plot (Band 17 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager	
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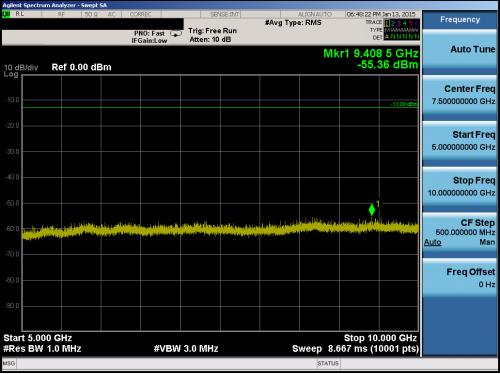
Plot 6-38. Conducted Spurious Plot (Band 17 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



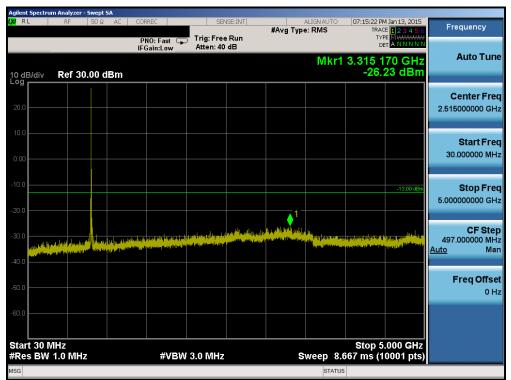
Plot 6-39. Conducted Spurious Plot (Band 17 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager		
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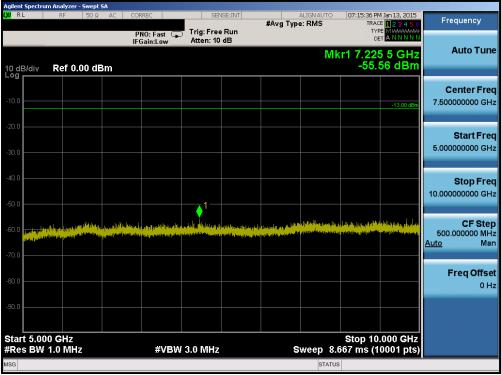
Plot 6-40. Conducted Spurious Plot (Band 17 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



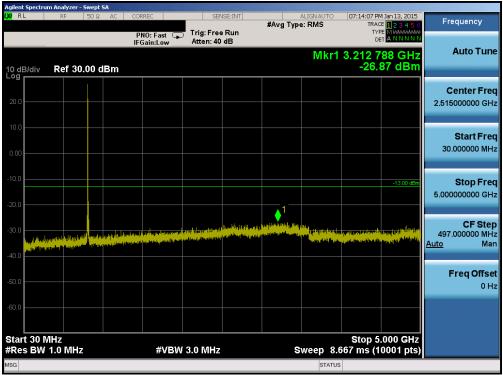
Plot 6-41. Conducted Spurious Plot (Band 26 – 10.0MHz QPSK – RB Size 1, RB Offset 0– Low Channel)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager		
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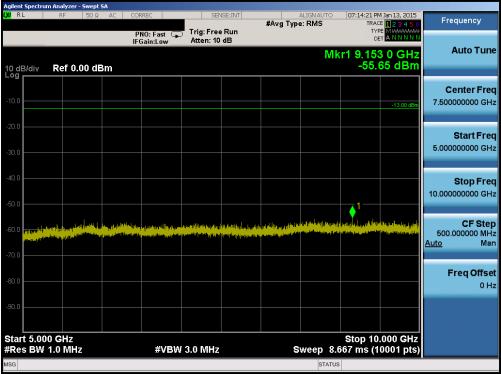
Plot 6-42. Conducted Spurious Plot (Band 26 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)



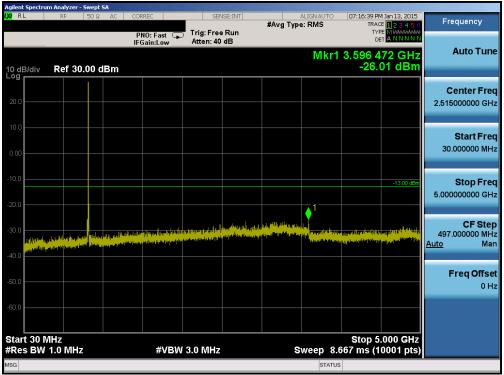
Plot 6-43. Conducted Spurious Plot (Band 26 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager	
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Plot 6-44. Conducted Spurious Plot (Band 26 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



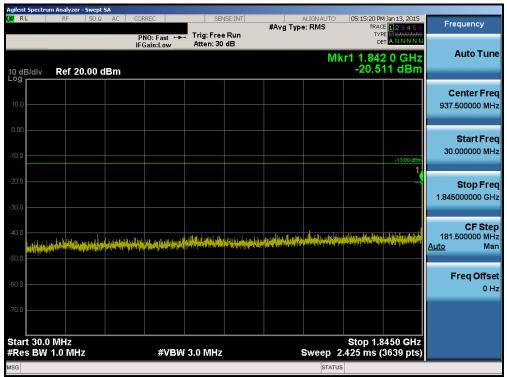
Plot 6-45. Conducted Spurious Plot (Band 26 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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		n Analyzer											
l <mark>XI</mark> RI	L	RF	50 Ω	AC	CORREC		SEN	SE:INT	#Avg Typ	ALIGNAUTO		4 Jan 13, 2015 E <mark>1 2 3 4 5</mark> 6	Frequency
					PNO: Fast IFGain:Lov		rig: Free atten: 10		HOTY IV	e. Amo	TYI		
10 dE Log	3/div	Ref 0	.00 dE	§m						Mł	(r1 9.73) -55.	6 5 GHz 33 dBm	Auto Tune
-10.0												-13.00 dBm	Center Freq 7.50000000 GHz
-20.0 -30.0													<b>Start Freq</b> 5.000000000 GHz
-40.0 -50.0												1_	<b>Stop Freq</b> 10.000000000 GHz
-60.0 -70.0	ing in start start	<u>tan kan</u> kad	ga ta paga	la departa de podela de	silay aska ayala Para ya ganara	i ka mili asi pati		Onland an forger		a konzent konstanten an n procesi filmenten processe	t Martin Ing <mark>a para 1974.</mark> Panalaria pana pana kata pana		CF Step 500.000000 MHz <u>Auto</u> Man
-80.0													<b>Freq Offset</b> 0 Hz
-90.0 Star	t 5 00	0 GHz									Stop 10	.000 GHz	
		1.0 MH	z		#V	BW 3.0	) MHz		S	weep 8.	667 ms (1	0001 pts)	
MSG										STATUS	3		

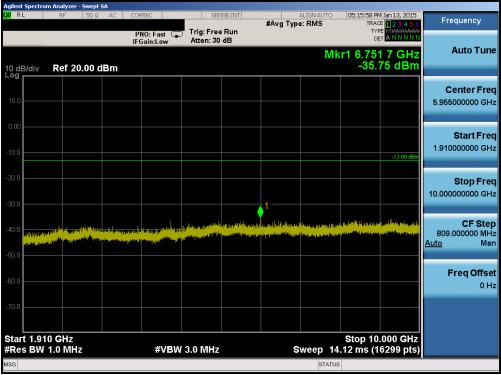
Plot 6-46. Conducted Spurious Plot (Band 26 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



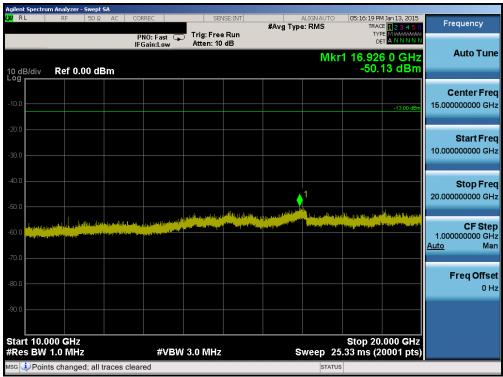
Plot 6-47. Conducted Spurious Plot (Band 2 – 10.0MHz QPSK – RB Size 1, RB Offset 0– Low Channel)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Plot 6-48. Conducted Spurious Plot (Band 2 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)



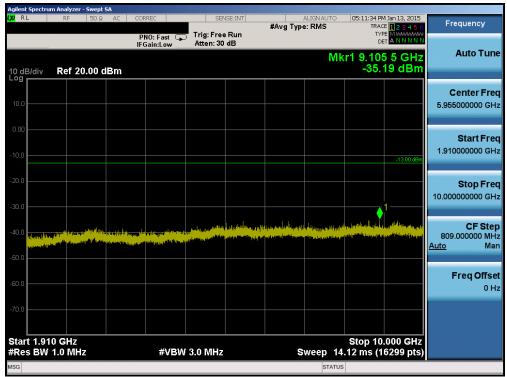
Plot 6-49. Conducted Spurious Plot (Band 2 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Agilent Spectrum Anal		CORREC	CENCE THE			05-10-15 DM 1	10, 0015	
LXU RL RF	50Ω AC	CORREC	SENSE:INT	#Avg Ty	ALIGN AUTO pe: RMS	05:10:15 PM Jan TRACE		Frequency
		PNO: Fast 🖵 IFGain:Low	Atten: 30 dB			DET A I	NNNN	• • •
10 dB/div Re	f 20.00 dBm				Mk	r1 1.479 5 -38.55	GHz dBm	Auto Tune
10.0								Center Fred 939,500000 MHz
0.00								939.500000 MH2
								Start Free 30.000000 MH;
-10.0							13.00 dBm	
-20.0								Stop Fred 1.849000000 GH:
-30.0						1		05.04
-40.0	teleting (11) the late		et de la kalden strant finske de la					<b>CF Step</b> 181.900000 MHz Auto Mar
-50.0								
-60.0								Freq Offset 0 Hz
-70.0								
Start 30.0 MH #Res BW 1.0 I		#VBW	3.0 MHz		Sweep 2	Stop 1.849 .425 ms (363	0 GHz 19 pts)	
MSG					STATUS			

Plot 6-50. Conducted Spurious Plot (Band 2 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



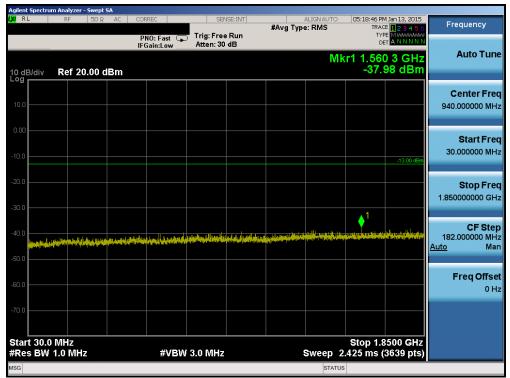
Plot 6-51. Conducted Spurious Plot (Band 2 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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KIRL RF 50	PNO: Fast 🔾	Trig: Free Run	ALIGN AUTO #Avg Type: RMS	05:11:56 PM Jan 13, 2015 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET A N N N N N	Frequency
10 dB/div Ref 0.00 c	IFGain:Low	Atten: 10 dB	Mkr	1 16.955 5 GHz -50.19 dBm	Auto Tune
- <b>og</b> -10.0				-13.00 dBm	Center Free 15.000000000 GH:
30.0					Start Free 10.000000000 GH:
-40.0			1		Stop Free 20.000000000 GH:
-60.0 Might Apple a base to a first defined of the second se	a di kawa ji kisi taona yina di ayaa ta ku a shina di dadi Miri ayaa shina ayaa da ka yayaa ya ayaa ya shina ta ayaa di	a an a the generative grant the first law and t		ing pagtang talang pang bir Antonio ang tang pang bir Antonio ang pang bir Antonio ang pang bir Antonio ang pan Antonio ang pang pang bir Antonio ang pang bir Antonio ang pang bir Antonio ang pang bir Antonio ang pang bir A Antonio ang pang bir Antonio	CF Step 1.000000000 GH <u>Auto</u> Mar
80.0					Freq Offse 0 H
90.0				Stop 20.000 GHz	
#Res BW 1.0 MHz		/ 3.0 MHz	Sweep 25	.33 ms (20001 pts)	

Plot 6-52. Conducted Spurious Plot (Band 2 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



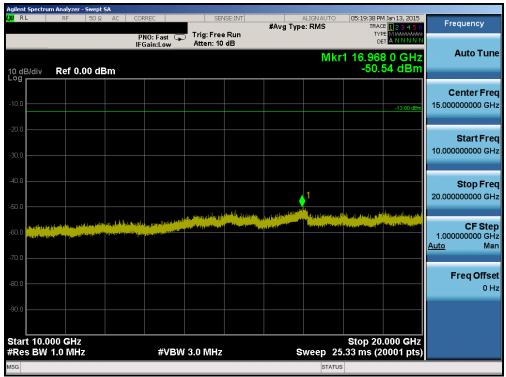
Plot 6-53. Conducted Spurious Plot (Band 2 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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		n Analyzer - S										
l <mark>XI</mark> RL		RF	50 Ω	AC CO	RREC	SEI	NSE:INT	#Avg Typ	ALIGN AUTO		A Jan 13, 2015	Frequency
				P	NO: Fast 🖵 Gain:Low	Trig: Fre Atten: 30		190 B 196	e. Rino	TYF		
10 dB Log r	/div	Ref 20.	00 dE	3m					Mk	r1 1.910 -18.4	0 0 GHz 57 dBm	Auto Tune
10.0 -												Center Freq 5.955000000 GHz
-10.0	1										-13.00 dBm	<b>Start Freq</b> 1.910000000 GHz
-20.0 - -30.0 -	<u>-</u>											<b>Stop Freq</b> 10.000000000 GHz
	Pe <mark>l Massach</mark>			an a line ray and a solution of the	densionen entitetetete 1 maarten			an tour for the form	n a teorem and a second se Second second	agente and the Consects projection and the Consects	a <sub>ma</sub> nang latang kapanang lata Ng pang datahan (na matang kapanang kapanang kapanang kapanang kapanang kapanang kapanang kapanang kapanang kap Ng pang kapanang kapa	CF Step 809.000000 MHz <u>Auto</u> Man
-50.0 - -60.0 -												Freq Offset 0 Hz
-70.0												
		0 GHz 1.0 MHz			#VBW	3.0 MHz		s	weep 14	Stop 10 12 ms (1.	.000 GHz 6299 pts)	
MSG									STATUS			
	_		_									

Plot 6-54. Conducted Spurious Plot (Band 2 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



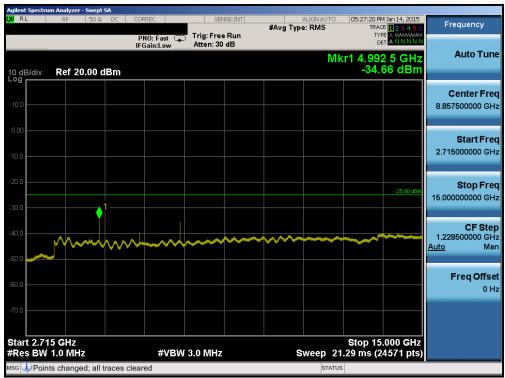
Plot 6-55. Conducted Spurious Plot (Band 2 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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R L	m Analyzer - Swept SA RF 50 Ω DC	CORREC	SENSE:INT	ALIGNAUTO	05:26:33 PM Jan 14, 2015	
NL.	KF JUW DC	PNO: Fast 😱	Trig: Free Run	#Avg Type: RMS	TRACE 123456 TYPE A WWWWW DET A N N N N N	Frequency
0 dB/div	Ref 20.00 dBm	IFGain:Low	Atten: 30 dB	MI	(r1 2.475 0 GHz -47.44 dBm	Auto Tune
10.0						Center Fre 1.252500000 GH
10.0						Start Fre 30.000000 M⊦
30.0					-25.00 dBm	Stop Fre 2.475000000 G⊦
io.o					1	CF Ste 244.500000 MH <u>Auto</u> Ma
60.0	Stanger and Stanger Marine provider and the stand	na para na ang kang kang kang kang kang kang k	ana ana ang ang ang ang ang ang ang ang	alan dina mangkangkan kanangkan kanangkangkan kanangkan kanangkan kanangkan kanangkan kanangkan kanangkan kana Pendemonikan		Freq Offs 0 H
70.0	ЛНг				Stop 2.475 GHz	
	1.0 MHz	#VBW	3.0 MHz	-	3.260 ms (4891 pts)	
SG				STATU	S	

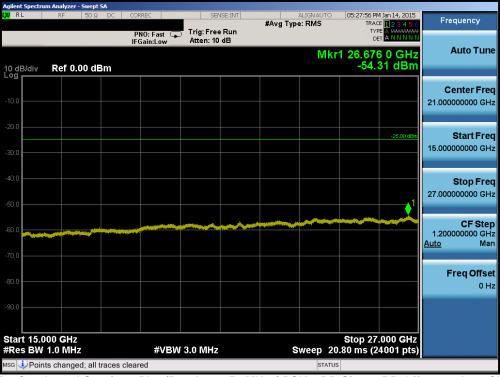
Plot 6-56. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)



Plot 6-57. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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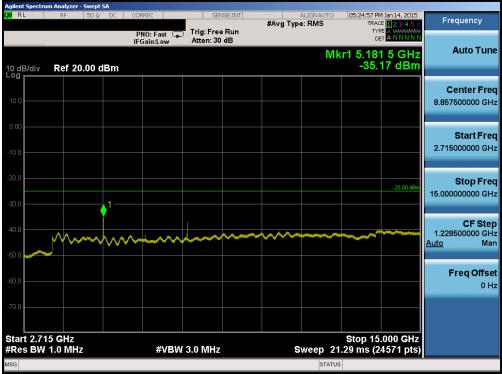
Plot 6-58. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)



Plot 6-59. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager	
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Plot 6-60. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



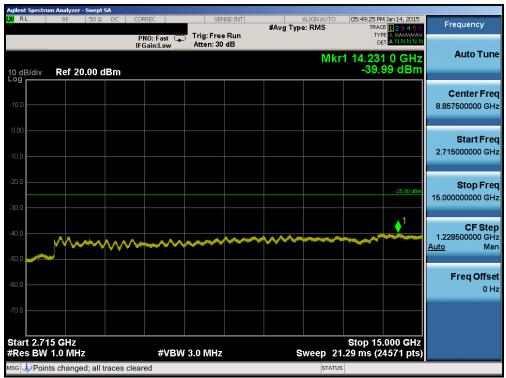
Plot 6-61. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Agilent Spectru	m Analyzer - Swept SA							
L <mark>XI</mark> RL	RF 50Ω DC	CORREC	SENSE:INT	#Avg Type:	IGN AUTO	05:49:01 PM TRACE	123456	Frequency
		PNO: Fast 🖵 IFGain:Low	Trig: Free Run Atten: 30 dB			TYPE DET	A NNNNN	
		in Gamillon			Mki	1 2.473	5 GHz	Auto Tune
10 dB/div Log	Ref 20.00 dBm	n				1 2.473 -48.2	1 dBm	
								Center Freq
10.0								1.252500000 GHz
0.00								Start Freq
-10.0								30.000000 MHz
-10.0								
-20.0								Stop Freq
							-25.00 dBm	2.475000000 GHz
-30.0								
								CF Step
-40.0							1	244.500000 MHz <u>Auto</u> Man
-50.0							and the second second	Auto
		and the second						Freq Offset
-60.0								0 Hz
-70.0								
Start 30 M #Res BW		#VRM	3.0 MHz	9	woon 3	4.Stop 2 260 ms (4	175 GHz	
MSG	1.0 10112	#0000	5.0 WH12	3	STATUS	200 1115 (4	os i pis)	
					0.1.1.50			

Plot 6-62. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 6-63. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Plot 6-64. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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#### 6.4 Band Edge Emissions at Antenna Terminal §2.1051 §22.917(a) §24.238(a) §27.53(g) §27.53(m)

# **Test Overview**

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.

Typically, unwanted emissions are required by the licensed rule parts to be attenuated below the transmitter power by a factor of at least X + 10log(P) dB, where P represents the transmitter power expressed in watts and X is a specified scalar value (e.g., 43). This specification can be interpreted in one of two equivalent ways. First, the required attenuation can be construed to be relative to the mean carrier power, with the resultant of the equation X + 10log(P) being expressed in dBc (dB relative to the maximum carrier power). Alternatively, the specification can be interpreted as an absolute limit when the specified attenuation is actually subtracted from the maximum permissible transmitter power [i.e.,  $10\log(P) - {X + P}$ 10log(P)}], resulting in an absolute level of -X dBW [or (-X + 30) dBm].

Threfore, The minimum permissible attenuation level of any spurious emission is 43 +  $log_{10}(P_{IWatts1})$ , where P is the transmitter power in Watts.

The minimum permissible attenuation level for Band 41 is > 43 + 10log<sub>10</sub> (P[Watts]) at channel edges and > 55 + 10log<sub>10</sub> (P[Watts]) at 5.5 MHz away and beyond channel edges.

## **Test Procedure Used**

KDB 971168 v02r02 - Section 6.0

## Test Settings

- 1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
- 2. Span was set large enough so as to capture all out of band emissions near the band edge
- 3. RBW > 1% of the emission bandwidth
- 4. VBW > 3 x RBW
- 5. Detector = RMS
- 6. Number of sweep points  $\geq 2 \times \text{Span/RBW}$
- 7. Trace mode = max hold
- 8. Sweep time = auto couple
- 9. The trace was allowed to stabilize

#### Test Setup

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

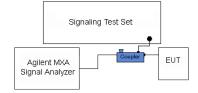


Figure 6-3. Test Instrument & Measurement Setup

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager	
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Per 22.917(b) 24.238(a) 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 to demonstrate compliance with the out-of-band emissions limit. 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.

Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.



Plot 6-65. Lower Band Edge Plot (Band 17 - 5.0MHz QPSK - RB Size 25)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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	m Analyzer - Swept							
L <mark>XI</mark> RL	RF 50 Ω	AC	CORREC	SENSE		ALIGN AUTO	06:56:04 PM Jan 13, 2015 TRACE 1 2 3 4 5	
			PNO: Wide ↔ IFGain:Low	Trig: Free R Atten: 40 dB	un	nvg Type. Rivio	TYPE MWWWW DET A N N N N	Ý N
10 dB/div Log	Ref 30.00	dBm				Mk	r1 697.764 MH: -43.49 dBn	z Auto Tune
20.0								Center Freq 695.900000 MHz
0.00								Start Freq 693.900000 MHz
-10.0							-13.00 dB	Stop Freq 697.900000 MHz
-30.0								CF Step 400.000 kHz <u>Auto</u> Man
-40.0	u	- inter and a rate	5494			and a second sec		Freq Offset 0 Hz
-60.0								
Center 69 #Res BW	5.900 MHz 100 kHz		#VBW	/ 300 kHz		#Sweep	Span 4.000 MH: 3.000 s (1001 pts	z )
MSG						STATU		

Plot 6-66. Lower Extended Band Edge Plot (Band 17 – 5.0MHz QPSK – RB Size 25)



Plot 6-67. Upper Band Edge Plot (Band 17 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager	
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	m Analyzer - Swept S										
(XI RL	RF 50 Ω	AC COP	REC	SEN	ISE:INT	#A	ALIGN AUTO Type: RMS		4 Jan 13, 2015 E <mark>1 2 3 4 5 6</mark>	F	requency
			IO: Wide 🔸 Gain:Low	Trig: Free Atten: 40		#49		TYF De			
10 dB/div Log	Ref 30.00 dl	Bm					Mkı	1 716.1 -23.4	12 MHz 49 dBm		Auto Tune
20.0											Center Freq 3.100000 MHz
0.00										710	Start Freq 5.100000 MHz
-10.0									-13.00 dBm	720	Stop Freq 0.100000 MHz
-30.0		an the state of th	Makes and a second s	and the many section of						<u>Auto</u>	<b>CF Step</b> 400.000 kHz Man
-50.0								and the second			Freq Offset 0 Hz
-60.0	8.100 MHz							Snon 4	000 MHz		
#Res BW			#VBW	300 kHz			#Sweep	span 4 3.000 s (	.000 MHz 1001 pts)		
MSG							STATUS				

Plot 6-68. Upper Extended Band Edge Plot (Band 17 – 5.0MHz QPSK – RB Size 25)



Plot 6-69. Lower Band Edge Plot (Band 17 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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	m Analyzer - Swept Si							-		
L <mark>XI</mark> RL	RF 50 Ω	AC (	CORREC	SEN	JSE:INT	#Avg Typ	ALIGNAUTO		I Jan 13, 2015	Frequency
			PNO: Wide IFGain:Low	Trig: Free Atten: 40				TYP DE	E MWWWWW T A N N N N N	
10 dB/div Log	Ref 30.00 dl	Bm					Mk	1 716.0 -27.6	00 MHz 37 dBm	Auto Tune
20.0										Center Freq 716.000000 MHz
0.00	n game of the real day and a second	i, a kaffatiran yan kafa								Start Freq 712.000000 MHz
-10.0					4				-13.00 dBm	Stop Freq 720.000000 MHz
-30.0					Contraction of the second seco	herente			angunate the contractions	CF Step 800.000 kHz <u>Auto</u> Man
-50.0										<b>Freq Offset</b> 0 Hz
-60.0	6.000 MHz							Snan 8	000 MHz	
#Res BW			#VE	3W 300 kHz			#Sweep	Span 8. 1.000 s (	1001 pts)	
MSG							STATUS			

Plot 6-70. Upper Band Edge Plot (Band 17 – 10.0MHz QPSK – RB Size 50)



Plot 6-71. Lower Band Edge Plot (Band 26 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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	m Analyzer - Swept SA									
L <mark>XI</mark> RL	RF 50 Ω	AC CORREC			SE:INT	#Avg Type	ALIGN AUTO	TRAC	M Jan 29, 2015 CE <mark>1 2 3 4 5 6</mark>	Frequency
		PNO: N IFGain		Trig: Free Atten: 36				TYI Di		
10 dB/div Log	Ref 25.00 dE	3m					Mkı	1 822.9 -38.	72 MHz 49 dBm	Auto Tune
15.0										Center Freq 821.000000 MHz
-5.00										Start Freq 819.000000 MHz
-15.0									-13.00 dBm	Stop Freq 823.000000 MHz
-35.0								العوروفي والمستعم		CF Step 400.000 kHz <u>Auto</u> Man
-45.0		and the second sec		~	and the second					Freq Offset 0 Hz
-65.0										
Center 82 #Res BW	1.000 MHz 100 kHz		#VBW 3	00 kHz			#Sweep	Span 4 3.000 s (	.000 MHz (1001 pts)	
MSG							STATUS			

Plot 6-72. Lower Extended Band Edge Plot (Band 26 – 1.4MHz QPSK – RB Size 6)



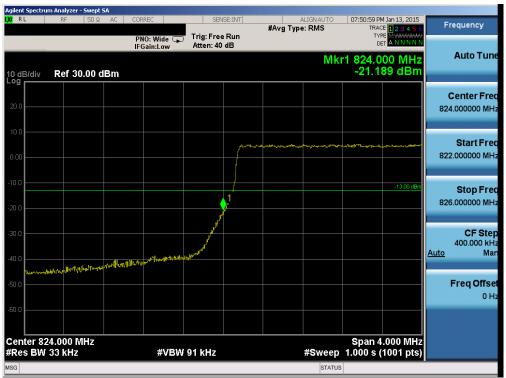
Plot 6-73. Upper Band Edge Plot (Band 26 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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			zer - Swept											
l <mark>XI</mark> RI	L	RF	50 Ω	AC	CORRE	C	SE	INSE:INT	#Avg Typ	ALIGNAUTO		M Jan 29, 2015 CE <mark>1 2 3 4 5 6</mark>	F	Frequency
						Wide ↔ in:Low	Trig: Fre		HULA LAN		TY D			
10 dE Log i	B/div	Ref	25.00	lBm						Mk	r1 850.0 -37.	16 MHz 16 dBm		Auto Tune
15.0														Center Freq 52.000000 MHz
5.00 -5.00												-13.00 dBm	85	Start Freq 50.000000 MHz
-15.0 -25.0												-13.00 dbm	88	Stop Freq 54.000000 MHz
-35.0	4 marsh	way	kipeyohisenenene	m	~								Auto	<b>CF Step</b> 400.000 kHz Man
-55.0							and the second	hilling grade and a free		an a	a faata ahaan kaa ahaa maa	a hange a description of the second		Freq Offset 0 Hz
-65.0														
	ter 85 s BW					#VBW	/ 300 kH:	2		#Sweep	Span 4 3.000 s (	.000 MHz (1001 pts)		
MSG										STATUS	3			

Plot 6-74. Upper Extended Band Edge Plot (Band 26 – 1.4MHz QPSK – RB Size 6)



Plot 6-75. Lower Band Edge Plot (Band 26 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager		
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	m Analyzer - Swept SA					
LX/RL	RF 50Ω AC	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	07:51:10 PM Jan 13, 2015 TRACE 1 2 3 4 5 6 TYPE MWWWW	Frequency
		PNO: Wide ↔↔ IFGain:Low	Trig: Free Run Atten: 40 dB		DET A N N N N	
		II Galil.20w		Mk	r1 822.936 MHz	Auto Tune
10 dB/div	Ref 30.00 dBm				-37.92 dBm	
20.0						Center Freq
20.0						821.000000 MHz
10.0						
						Start Freq
0.00						819.000000 MHz
-10.0					-13.00 dBm	Stop Fred
-20.0						823.000000 MHz
-20.0						
-30.0						CF Step
						400.000 kHz
-40.0				And and a fighting of the second of the seco	10 parte de de la de	<u>Auto</u> Man
and the second se	and a start of the	and a second and the second				
-50.0						Freq Offset
						0 Hz
-60.0						
	1.000 MHz	40 (D) M	200 141-	<b>"</b> C	Span 4.000 MHz	
#Res BW	100 KH2	#VBW	300 kHz		3.000 s (1001 pts)	
MSG				STATU	3	

Plot 6-76. Lower Extended Band Edge Plot (Band 26 – 3.0MHz QPSK – RB Size 15)



Plot 6-77. Upper Band Edge Plot (Band 26 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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	ım Analyzer - Swept SA					
LX/RL	RF 50 Q AC	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	07:51:55 PM Jan 13, 2015 TRACE 1 2 3 4 5 6 TYPE MWWWW	Frequency
		PNO: Wide ↔↔ IFGain:Low	Trig: Free Run Atten: 40 dB		DET A N N N N N	
10 dB/div	Ref 30.00 dBm	,		Mk	r1 850.532 MHz -32.86 dBm	Auto Tune
		·				
20.0						Center Freq
20.0						852.000000 MHz
10.0						
						Start Freq
0.00						850.000000 MHz
10.0						
-10.0					-13.00 dBm	Stop Freq
-20.0						854.000000 MHz
-30.0						CF Step
		manan				400.000 kHz <u>Auto</u> Man
-40.0			Lange and and a factor and a state of the second state of the seco			
-50.0				and the second s	and a second	Freq Offset
						0 Hz
-60.0						
	52.000 MHz				Span 4.000 MHz 3.000 s (1001 pts)	
#Res BW	100 kHz	#VBW	300 kHz			
MSG				STATUS	·	

Plot 6-78. Upper Extended Band Edge Plot (Band 26 – Band 5 – 3.0MHz QPSK – RB Size 15)



Plot 6-79. Lower Band Edge Plot (Band 26 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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	m Analyzer - Swept SA					
L <mark>X/</mark> RL	RF 50 Ω AC	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	07:44:16 PM Jan 13, 2015 TRACE 1 2 3 4 5 6 TYPE MWWWW	Frequency
		PNO: Wide ↔ IFGain:Low	Trig: Free Run Atten: 40 dB		DET A N N N N	
		II Gam.cow		Mk	r1 822.848 MHz	Auto Tune
10 dB/div	Ref 30.00 dBm	1			-38.80 dBm	
20.0						Center Freq
20.0						821.000000 MHz
10.0						
						Start Freq
0.00						819.000000 MHz
-10.0					-13.00 dBm	Stop Freq
-20.0						823.000000 MHz
-20.0						
-30.0						CF Step
					1	400.000 kHz
-40.0			and the state of the second	and a second of the second	and the second of the second second second	<u>Auto</u> Man
-50.0						Freq Offset
-60.0						0 Hz
-00.0						
Center 82 #Res BW	1.000 MHz 100 kHz	#\/B\//	300 kHz	#Sween	Span 4.000 MHz 3.000 s (1001 pts)	
MSG	TOO KI12	#VDVV	500 MIZ	#Sweep		
				STATUS		

Plot 6-80. Lower Extended Band Edge Plot (Band 26 – 5.0MHz QPSK – RB Size 25)



Plot 6-81. Upper Band Edge Plot (Band 26 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dogo 57 of 111		
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Agilent Spectrur <mark>X/</mark> RL	m Analyzer - Swept SA RF 50 Q AC	CORREC	SENSE:INT	ALIGNAU	TO 07:45:00 PM Jan 13, 201	5
		PNO: Wide 🗝		#Avg Type: RMS	TRACE 12345 TYPE MWAAAAA	6 Frequency
		IFGain:Low	Atten: 40 dB		DET A N N N N	
10 dB/div Log	Ref 30.00 dBm				Mkr1 850.000 MH -36.87 dBr	<b>Z</b>
3						Center Freq
20.0						852.000000 MHz
10.0						
						Start Freq 850.000000 MHz
0.00						850.000000 MHz
-10.0					-13.00 dB	Stop Fred
-20.0						854.000000 MH2
20.0						
-30.0 <mark>1</mark>						CF Step 400.000 kHz
-40.0						<u>Auto</u> Mar
		and the second sec		reason to a second and a second a		
-50.0					and a second	Freq Offset
-60.0						
	2.000 MHz	#\/D\M	200 647	# <b>0</b>	Span 4.000 MH eep 3.000 s (1001 pt	z
#Res BW	TUU KHZ	#VBW	300 kHz			ข

Plot 6-82. Upper Extended Band Edge Plot (Band 26 – 5.0MHz QPSK – RB Size 25)



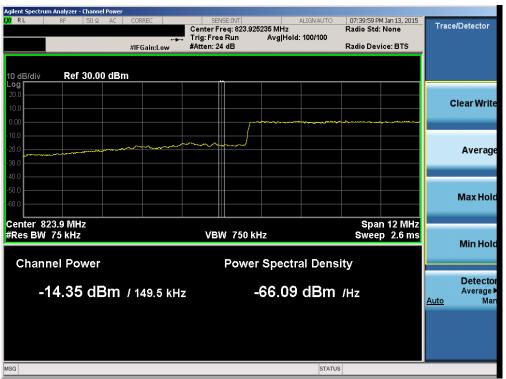
Plot 6-83. Lower Band Edge Plot (Band 26 - 10.0MHz QPSK - RB Size 50)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Plot 6-84. Upper Band Edge Plot (Band 26 – 10.0MHz QPSK – RB Size 50)



Plot 6-85. Lower Band Edge Plot (Band 26 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Agilent Spectru LXI RL	m Analyzer - Swept SA RF 50 Ω AC	CORREC	SENSE:INT	ALIGN AUTO	07:40:13 PM Jan 13, 2015	
	KF JUW AC			#Avg Type: RMS	TRACE 1 2 3 4 5 6 TYPE MWARMAN	Frequency
		PNO: Wide +++ IFGain:Low	Trig: Free Run Atten: 40 dB		DET A N N N N N	
				Mk	r1 822.868 MHz -14.85 dBm	Auto Tune
10 dB/div Log	Ref 30.00 dBm				-14.85 GBM	
						Center Freq
20.0						821.000000 MHz
10.0						
10.0						Start Freq
0.00						819.000000 MHz
-10.0					-13.0	Stop Freq
-20.0	and the first statement of the statement	and the design of the second state of the seco				823.000000 MHz
-30.0						CF Step 400.000 kHz
-40.0						Auto Man
40.0						
-50.0						Freq Offset
						0 Hz
-60.0						
Center 82 #Res BW	1.000 MHz 100 kHz	#VBW	300 kHz	#Sween	Span 4.000 MHz 3.000 s (1001 pts)	
MSG		<i>"</i> • BN		STATUS		

Plot 6-86. Lower Extended Band Edge Plot (Band 26 – 15.0MHz QPSK – RB Size 75)



Plot 6-87. Upper Band Edge Plot (Band 26 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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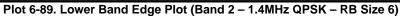
kgilent Spectrun <mark>X/</mark> RL	n Analyzer - Swept SA RF 50 Ω AC	CORREC	SENSE:INT	ALIGNAUTO #Avg Type: RMS	07:40:48 PM Jan 13, 2015 TRACE 12 3 4 5 6 TYPE MWWWWW	Frequency
10 dB/div	Ref 30.00 dBm	PNO: Wide ↔ IFGain:Low	Atten: 40 dB	Mk	r1 850.092 MHz -18.15 dBm	Auto Tune
20.0						Center Fred 852.000000 MH:
0.00						Start Free 850.000000 MH
-10.0	Marine State of State				-13.00 dBm	Stop Free 854.000000 MH
30.0						<b>CF Stej</b> 400.000 kH <u>Auto</u> Ma
50.0						Freq Offse 0 H
	2.000 MHz 100 kHz	#VBW	300 kHz	#Sweep	Span 4.000 MHz 3.000 s (1001 pts)	
sg status						

Plot 6-88. Upper Extended Band Edge Plot (Band 26 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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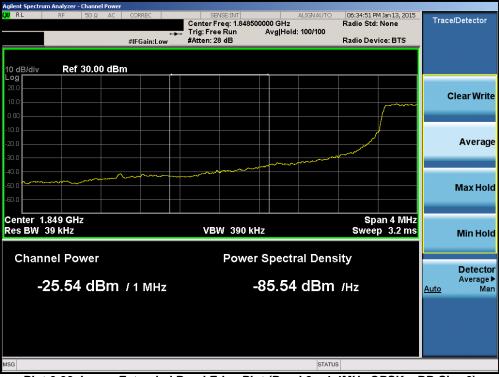






FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Plot 6-90. Lower Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)



Plot 6-91. Upper Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Plot 6-92. Upper Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)



Plot 6-93. Lower Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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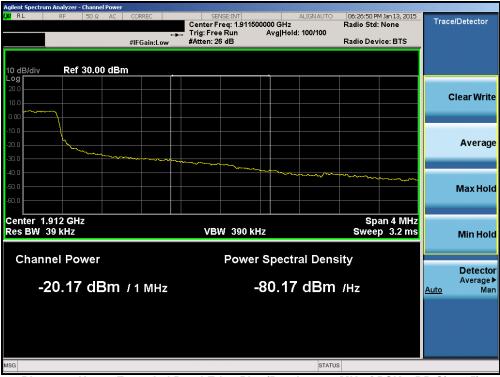
Plot 6-94. Lower Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)



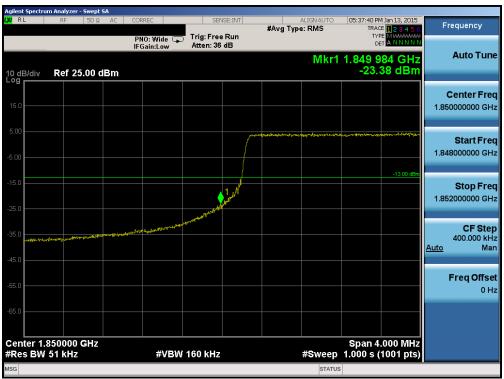
Plot 6-95. Upper Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Plot 6-96. Upper Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)



Plot 6-97. Lower Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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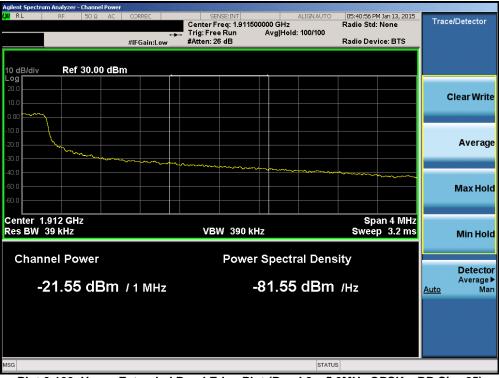
Plot 6-98. Lower Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)



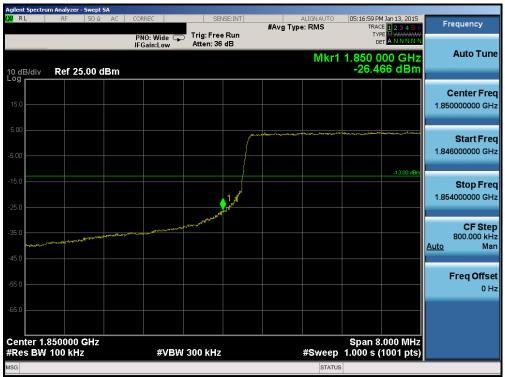
Plot 6-99. Upper Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Plot 6-100. Upper Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)



Plot 6-101. Lower Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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		m Analyzer ·												
l <mark>XI</mark> RI	L	RF	50 Ω	AC	CORREC			SENSE:INT	#404	ALIGNAUTO Type: RMS		M Jan 13, 2015 CE 1 2 3 4 5 6	F	requency
					PNO: IFGain	Fast 🔸		ree Run : 36 dB	#AY2		TY D			
10 dE Log I	3/div	Ref 25	5.00 dE	3m						Mkr1	1.849 ( -22.	00 GHz 11 dBm		Auto Tune
15.0														<b>Center Freq</b> 47000000 GHz
5.00 -5.00												-13.00 dBm	1.84	Start Freq 45000000 GHz
-15.0 -25.0										androse a strange and a strange at the		1	1.84	Stop Freq 49000000 GHz
-35.0 -45.0													Auto	<b>CF Step</b> 400.000 kHz Man
-55.0														Freq Offset 0 Hz
-65.0 Cent	ter 1.8	347000	GHz								Span 4	.000 MHz		
#Res		1.0 MH				#VBW	3.0 M	Hz			3.000 s (	(1001 pts)		
MSG										STATUS	3			

Plot 6-102. Lower Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)



Plot 6-103. Upper Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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			- Swept SA											
l <b>xi</b> ri	L	RF	50Ω A	IC CO	RREC		SE	NSE:INT	#Δ.,	ALIGNAUTO g Type: RMS		PM Jan 13, 2015	Fr	equency
					'NO: Fas Gain:Lo		Trig: Fre Atten: 3			•		TYPE MWWWWWW DET A N N N N N		
10 dE Log i	3/div	Ref 2	5.00 dBr	n						Mkr	1 1.911 -1§	000 GHz 9.92 dBm		Auto Tune
15.0														<b>Center Freq</b> 3000000 GHz
5.00 -5.00												-13.00 dBm	1.91	Start Freq 1000000 GHz
-15.0	1		······································						***			-13.00 (00)	1.91	Stop Freq 5000000 GHz
-35.0 -45.0													<u>Auto</u>	CF Step 400.000 kHz Man
-55.0														Freq Offset 0 Hz
-65.0		40000												
		13000 1.0 MH			#\	/BW :	3.0 MHz			#Swee	span 3.000 s	4.000 MHz 5 (1001 pts)		
MSG										STAT	JS			

Plot 6-104. Upper Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)



Plot 6-105. Lower Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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		n Analyzer													
l <mark>XI</mark> RL	-	RF	50 Ω	AC	CORREC			SENSE:INT	#407	AL g Type:			M Jan 13, 2015 CE <mark>1 2 3 4 5 6</mark>	F	requency
					PNO: Fa IFGain:L		Trig: F Atten:	ree Run 36 dB		g Type.	Nillo	T١	TYPE MWWWWWW DET A N N N N N		
10 dE Log	3/div	Ref 2	5.00 dB	Sm							Mkr1	1.849 -23	000 GHz .02 dBm		Auto Tune
15.0															<b>Center Freq</b> 47000000 GHz
5.00 -5.00														1.84	Start Freq 45000000 GHz
-15.0												and a star and a star and a star and a star	-13.00 dBm	1.84	<b>Stop Freq</b> 49000000 GHz
-35.0														<u>Auto</u>	<b>CF Step</b> 400.000 kHz Man
-45.0 -55.0															Freq Offset 0 Hz
-65.0															
		47000 1.0 MH			#	¢VBW	3.0 MI	łz		#	≠Sweep	Span 4 3.000 s	4.000 MHz (1001 pts)		
MSG											STATUS				

Plot 6-106. Lower Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)



Plot 6-107. Upper Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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	m Analyzer - Swept SA					
LXIRL	RF 50Ω AC	CORREC	SENSE:I	ALIGNAUTO	05:55:00 PM Jan 13, 2015 TRACE 1 2 3 4 5 6	Frequency
		PNO: Fast ↔ IFGain:Low	Trig: Free Ru Atten: 36 dB	•		
10 dB/div Log	Ref 25.00 dBm			Mkr1	1.911 008 GHz -20.38 dBm	Auto Tune
15.0						Center Freq 1.913000000 GHz
-5.00						Start Freq 1.911000000 GHz
-15.0 -1				**************************************	-13.00 dBm	<b>Stop Freq</b> 1.915000000 GHz
-35.0						<b>CF Step</b> 400.000 kHz <u>Auto</u> Man
-55.0						<b>Freq Offset</b> 0 Hz
-65.0	913000 GHz				Spop 4 000 MHz	
#Res BW		#VBW	3.0 MHz	#Sweep	Span 4.000 MHz 3.000 s (1001 pts)	
MSG				STATUS	3	

Plot 6-108. Upper Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)



Plot 6-109. Lower Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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			er - Swept												
l <b>XI</b> RI	L	RF	50 Ω	AC	CORREC			SENSE:INT	#4	Avg Typ	ALIGNAUTO		M Jan 13, 2015 CE <mark>1 2 3 4 5 6</mark>	F	requency
					PNO: IFGaiı	Fast ↔ n:Low		Free Run n: 36 dB		ing iyp		T\ [			
10 dE Log i	3/div	Ref	25.00 (	dBm							Mkr1	1.848 -23	996 GHz 37 dBm		Auto Tune
15.0															<b>Center Freq</b> 7000000 GHz
5.00 -5.00														1.84	Start Freq 5000000 GHz
-15.0 -25.0						den generative de la constitue							-13.00 dBm	1.84	Stop Freq 9000000 GHz
-35.0 -45.0														<u>Auto</u>	<b>CF Step</b> 400.000 kHz Man
-45.0															Freq Offset 0 Hz
-65.0															
	ter 1.3 s BW		0 GHz Hz			#VBV	/ 3.0 N	٩Hz			#Sweep	Span 2 3.000 s	l.000 MHz (1001 pts)		
MSG											STATUS	6			

Plot 6-110. Lower Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



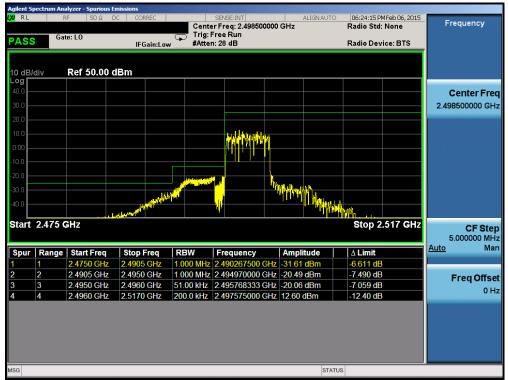
Plot 6-111. Upper Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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		n Analyzer													
<b>lxi</b> ri	L	RF	50 Ω	AC	CORREC			SENSE:INT	#0	µ µg Tγpe	LIGNAUTO		M Jan 13, 2015	F	requency
					PNO: Fa	ast ⊶⊷ .ow		Free Run : 36 dB		ig iype	. 1400	T			
10 dE Log	B/div	Ref 2	5.00 dB	m							Mkr1	1.911 -20	060 GHz .73 dBm		Auto Tune
15.0															<b>Center Freq</b> 13000000 GHz
5.00 -5.00														1.9 <sup>,</sup>	Start Freq 11000000 GHz
-15.0 -25.0	<b>∮</b> <sup>1</sup>	- 13-by - 10				·				inter and a state of the	**************************************	anget All veloper or property	-13.00 dBm	1.9*	<b>Stop Freq</b> 15000000 GHz
-35.0 -45.0														<u>Auto</u>	<b>CF Step</b> 400.000 kHz Man
-55.0															Freq Offset 0 Hz
-65.0															
Cen #Re:	ter 1.9 s BW	13000 1.0 MH	GHz z		#	¢VB₩	3.0 M	Hz			#Sweep	Span 4 3.000 s	4.000 MHz (1001 pts)		
MSG											STATUS				

Plot 6-112. Upper Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



Plot 6-113. Lower ACP Plot (Band 41 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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vgilent Spo <mark>X/</mark> R L		l <b>lyzer - Spuri</b> k F 50 Ω		CORRE	c		SENSE:			011-	ALIGN AUTO			1 Jan 14, 2015		requency
PASS	Gat	e: LO		IFGai	( n:Low_	Trig:	er Freq: Free Ru n: 28 dB		0000	GHZ			o Std: o Devi	None ce: BTS		
10 dB/d ∟og <b>Г</b>	div	Ref 50.0	00 dBr	n												
40.0 30.0																Center Free 87500000 GH
20.0						and the second										
-10.0						]										
-30.0		and the second second	الإنجاب الإنجاب	WHILE WAR			W			No.						
Start :	2.665 C	SHz										Ste	op 2.	715 GHz		CF Ster 6.250000 MH
Spur	Range	Start Fre	q S	top Fre	eq 📗	RBW	Freq	uency		Ampl	itude	ΔLi	mit		Auto	Ma
1	1	2.6650 GI	Hz 2.	6900 G		.000 MHz						-11.6	6 <mark>2 d</mark> B			
2	2	2.6900 GI	Hz 2.	6910 G	Hz 9	)1.00 kHz	2.690	078333	GHz	-20.74	dBm	-10.7	74 dB			Freq Offse
3	3	2.6910 GI	Hz 2.	6950 G	Hz 1	.000 MHz	2.692	180000	GHz	-20.09	dBm	-10.0	09 dB			0 H;
	4	2.6950 GI	Hz 2.	6960 G	Hz 1	.000 MHz	2.695	016667	GHz	-29.56	dBm	-16.5	56 dB			U Ha
5	5	2.6960 GI	Hz 2.	7150 G	Hz 1	.000 MHz	2.696	031667	GHz	-32.24	dBm	-7.24	43 dB			
4	4	2.6950 GI	Hz 2.	6960 G	Hz 1	.000 MHz	2.695	016667	GHz	-29.56	dBm	-16.5	56 dB			
SG											STATU	IS				

Plot 6-114. Upper ACP Plot (Band 41 – 5.0MHz QPSK – RB Size 25)



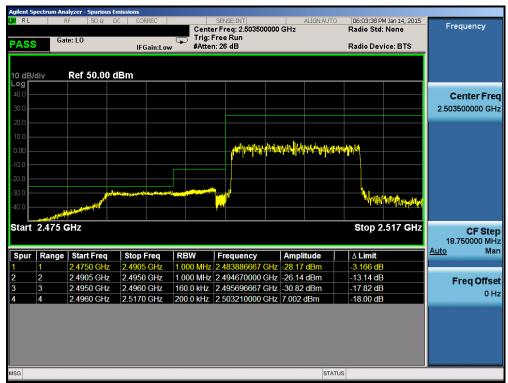
Plot 6-115. Lower ACP Plot (Band 41 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Agilent Sj <mark>I XI</mark> R L		l <b>yzer - Spurious</b> F 50 Ω	Emissions DC CORREC		SENSE:INT		ALIGN AUTO	05:14:10 PM	1 Jan 14, 2015	-
PASS	Gat	e: LO	IFGain:L	Trig	ter Freq: 2.68499 : Free Run en: 26 dB	95000 GHz		Radio Std: Radio Devi		Frequency
10 dB/	'div	Ref 50.00	dBm							
Log 40.0										Center Freq 2.684995000 GHz
20.0				·····						
-10.0 — -20.0 —			~~~~							
-40.0 🕫	ALL STORE STORE STORE						and the second second	*****		
Start	2.665 0	SHz						Stop 2.	715 GHz	CF Step 1.500000 MHz
Spur		Start Freq	Stop Freq	RBW	Frequency	Ampl		∆ Limit		<u>Auto</u> Man
1	1	2.6650 GHz	2.6900 GHz		z 2.681500000			-13.54 dB		
2	2	2.6900 GHz	2.6910 GHz		2.690011667	GHz -25.74	dBm	-15.74 dB		Freq Offset
3	3	2.6910 GHz	2.6950 GHz	1.000 MH	z 2.691060000	GHz -21.81	dBm	-11.81 dB		0 Hz
4	4	2.6950 GHz	2.7006 GHz		z 2.695046717	GHz -23.96	dBm	-10.96 dB		0 H2
5	5	2.7006 GHz	2.7150 GHz	1.000 MH	z 2.700701960	GHz -37.10	dBm	-12.10 dB		
MSG							STATU	5		
_					ot (Band A					

Plot 6-116. Upper ACP Plot (Band 41 – 10.0MHz QPSK – RB Size 50)



Plot 6-117. Lower ACP Plot (Band 41 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Agilent Sj	pectrum Ana	<mark>lyzer - Spuriou</mark> F 50 Ω		RREC		SENSE:INT			ALIGN AUTO	06:07:59	PM Jan 14, 2015		
PASS	C.+	e: LO			Trig:	er Freq: 2.682 Free Run n: 26 dB	500000			Radio St	d: None	Freq	uency
PASS	<u> </u>		IFO	Gain:Lov	w #Atte	n: 26 dB				Radio De	vice: BTS		
10 dB/	div	Ref 50.00	) dBm										
Log 40.0													
													nter Freq
30.0												2.68250	00000 GHz
20.0 —													
10.0				Lorderto	-								
0.00			ſ		and the second	where a second s							
		ļ											
-10.0													
-20.0	and the second	and the second of the second o											
-30.0						<mark>//</mark>		<b>Angelet</b>					
-40.0									The second	and the second se			
1010											N		
Start	2.665 G	Hz								Stop	2.715 GHz		CF Step
												2.25	0000 MHz
Spur	Danas	Start Freq	Stop		RBW	Frequency		Ampli	ituda	∆ Limit		Auto	Man
1 Spur		2.6650 GHz				2.67904166				-14.50 d	<b>R</b>		
2		2.6900 GHz				2.69030333				-14.30 d		_	
3		2.6910 GHz				2.69222000				-13.05 d		Fre	eq Offset
4	-	2.6950 GHz				2.69505255				-12.15 d			0 Hz
5		2.7055 GHz				2.70571561				-12.89 d			
								_	07.7	10			
MSG									STATU	JS			

Plot 6-118. Upper ACP Plot (Band 41 – 15.0MHz QPSK – RB Size 75)



Plot 6-119. Lower ACP Plot (Band 41 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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<b>Agilent Sp LXI</b> RL	R	1		ORREC	т.		NSE:INT req: 2.68000 e Run	00000		ALIGN AUTO		7 PM Jan 14, 2015 itd: None	Fre	equency
PASS	Gat	e: L0	IF	Gain:Lo	_ <b>→</b>	Atten: 2					Radio D	evice: BTS		
10 dB/c	div	Ref 50.0												
40.0														<b>enter Freq</b> 000000 GHz
20.0		for the second	ikatiyata tiriyasiyasi	mendal <sub>issi</sub>	114 minuteration	A Constant								
-10.0	nneurunt ann fhai								abterna a	. Nyek-super				
-40.0							<mark>lea</mark>				- New York	North Contraction		
Start	2.665 0	Hz									Stop	2.715 GHz		CF Step 000000 MHz
Spur	Range	Start Freq	Stop	Freq	RBW	F	requency		Ampli	tude	∆ Limi	t	<u>Auto</u>	Man
1		2.6650 GH		0 GHz			6 <b>72458333</b>				-14.17			
2		2.6900 GH		0 GHz			690603333				-18.58		F	req Offset
3		2.6910 GH		0 GHz			692773333				-14.90			0 Hz
4		2.6950 GH		5 GHz			697715083				-13.27			0112
5	5	2.7055 GH	z 2.715	0 GHz	1.000 N	/Hz 2.1	706111033	GHz	-29.23	dBm	-4.228	dB		

Plot 6-120. Upper ACP Plot (Band 41 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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# 6.5 Peak-Average Ratio §24.232(d)

## Test Overview

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

## Test Procedure Used

KDB 971168 v02r02 - Section 5.7.1

## Test Settings

- 1. The signal analyzer's CCDF measurement profile is enabled
- 2. Frequency = carrier center frequency
- 3. Measurement BW > Emission bandwidth of signal
- 4. The signal analyzer was set to collect one million samples to generate the CCDF curve
- 5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power

## Test Setup

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

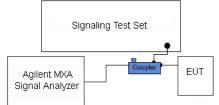


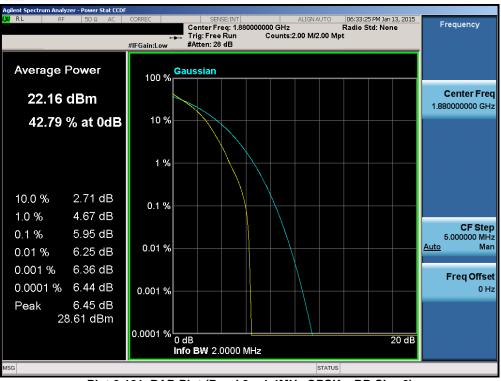
Figure 6-4. Test Instrument & Measurement Setup

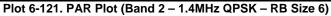
## Test Notes

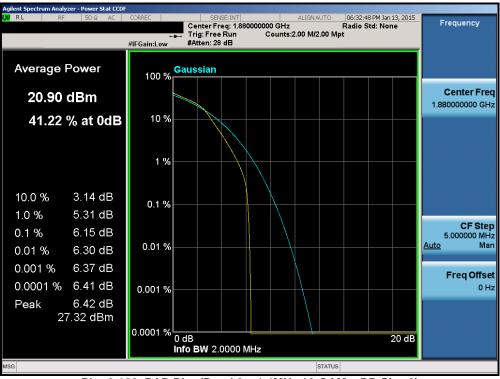
None.

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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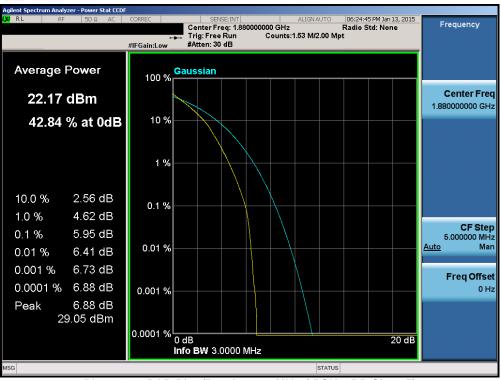


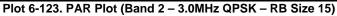


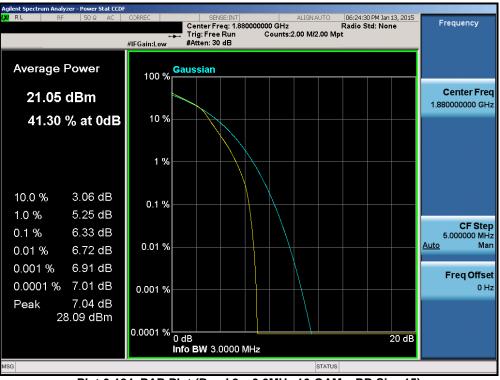
Plot 6-122. PAR Plot (Band 2 – 1.4MHz 16-QAM – RB Size 6)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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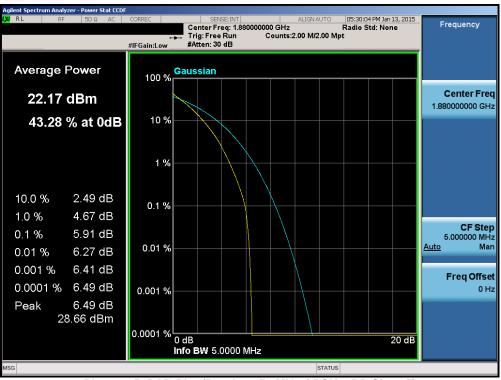


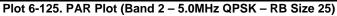


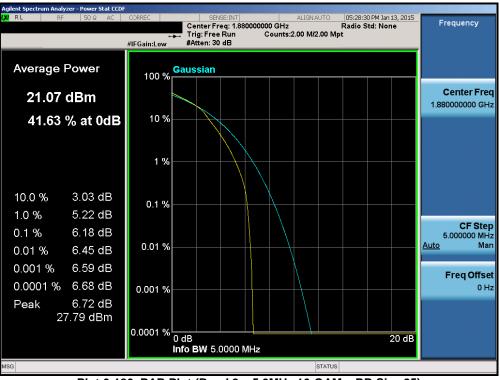
Plot 6-124. PAR Plot (Band 2 - 3.0MHz 16-QAM - RB Size 15)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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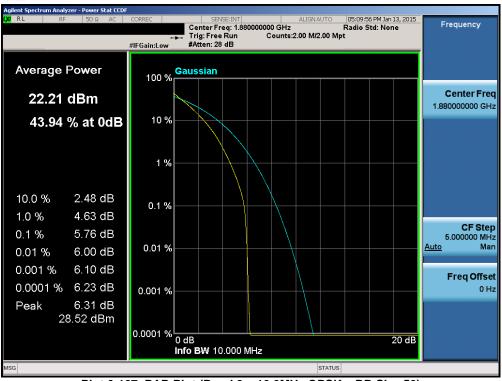


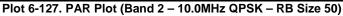


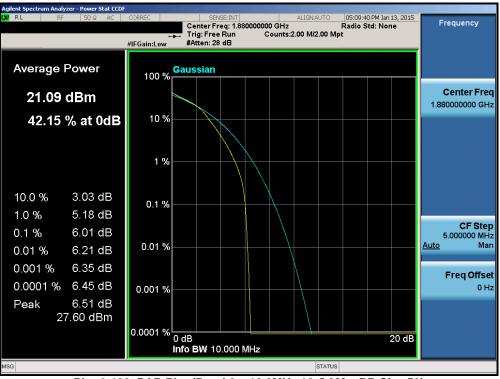
Plot 6-126. PAR Plot (Band 2 - 5.0MHz 16-QAM - RB Size 25)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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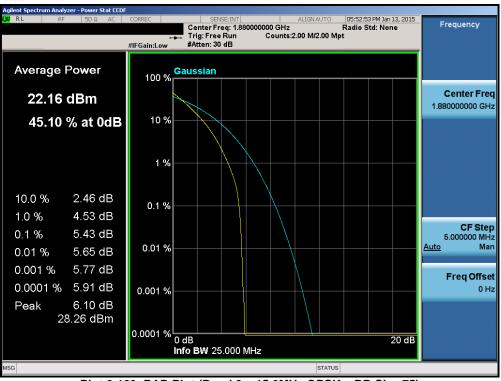


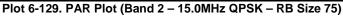


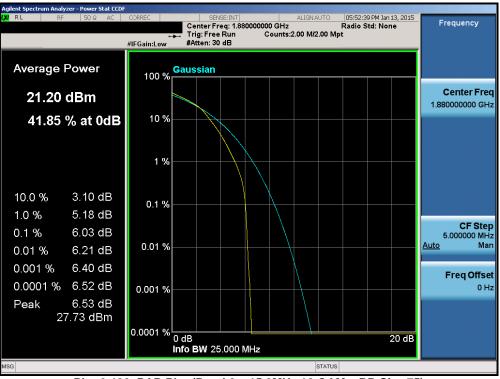
Plot 6-128. PAR Plot (Band 2 - 10.0MHz 16-QAM - RB Size 50)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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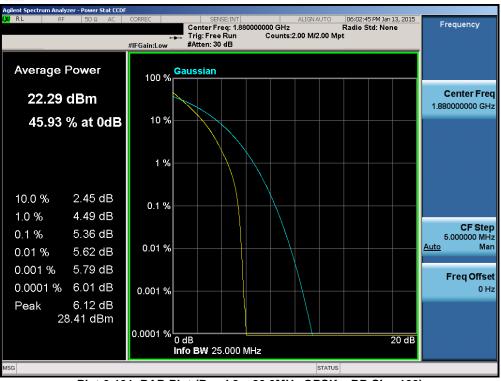


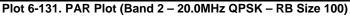


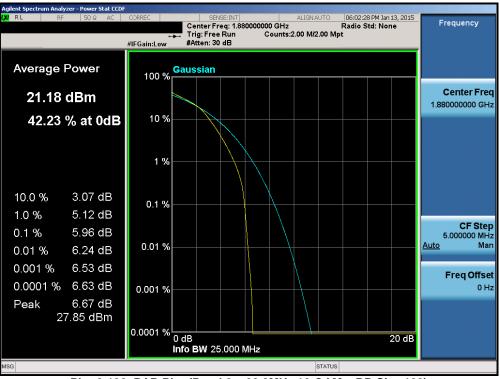
Plot 6-130. PAR Plot (Band 2 – 15.0MHz 16-QAM – RB Size 75)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Plot 6-132. PAR Plot (Band 2 - 20.0MHz 16-QAM - RB Size 100)

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## 6.6 Radiated Power (ERP/EIRP) §22.913(a.2) §24.232(c.2) §27.50(h.2) §27.50(c.10)

## **Test Overview**

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-C-2004 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

#### Test Procedures Used

KDB 971168 v02r02 - Section 5.2.1

ANSI/TIA-603-C-2004 - Section 2.2.17

#### Test Settings

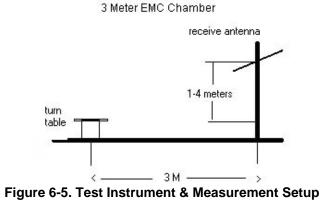
- Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
- 2. RBW = 1 5% of the expected OBW, not to exceed 1MHz
- 3. VBW  $\geq$  3 x RBW
- 4. Span = 1.5 times the OBW
- 5. No. of sweep points  $\geq$  2 x span / RBW
- 6. Detector = RMS
- 7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto". Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration
- 8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power
- 9. Trace mode = trace averaging (RMS) over 100 sweeps
- 10. The trace was allowed to stabilize

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## Test Setup

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



#### Test Notes

The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	Ant. Pol. [H/V]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
706.50	5	QPSK	Standard	1 / 0	12.56	1.05	V	13.61	34.77	-21.16
710.00	5	QPSK	Standard	1 / 0	12.68	1.12	V	13.80	34.771	-20.97
713.50	5	QPSK	Standard	1 / 0	12.51	1.19	V	13.70	34.771	-21.07
706.50	5	16-QAM	Standard	1 / 0	11.60	1.05	V	12.65	34.771	-22.12
710.00	5	16-QAM	Standard	1 / 0	11.70	1.12	V	12.82	34.771	-21.95
713.50	5	16-QAM	Standard	1 / 0	11.49	1.19	V	12.68	34.771	-22.09
709.00	10	QPSK	Standard	1 / 0	13.07	1.10	V	14.17	34.77	-20.60
710.00	10	QPSK	Standard	1 / 0	13.12	1.12	V	14.24	34.771	-20.53
711.00	10	QPSK	Standard	1 / 0	13.00	1.14	V	14.14	34.771	-20.63
709.00	10	16-QAM	Standard	1 / 0	12.18	1.10	V	13.28	34.771	-21.49
710.00	10	16-QAM	Standard	1 / 0	12.20	1.12	V	13.32	34.771	-21.45
711.00	10	16-QAM	Standard	1 / 0	11.09	1.14	V	12.23	34.771	-22.54

Table 6-2. ERP Data (Band 17)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	Ant. Pol. [H/V]	ERP [dBm]	EIRP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	Standard	3 / 2	13.63	2.98	V	16.61	38.451	-21.84
836.50	1.4	QPSK	Standard	3 / 2	12.78	3.04	V	15.82	38.451	-22.63
848.30	1.4	QPSK	Standard	3 / 2	11.46	3.10	V	14.56	38.451	-23.89
824.70	1.4	16-QAM	Standard	3 / 2	12.78	2.98	V	15.76	38.451	-22.69
836.50	1.4	16-QAM	Standard	3 / 2	11.88	3.04	V	14.92	38.451	-23.53
848.30	1.4	16-QAM	Standard	3 / 2	10.56	3.10	V	13.66	38.451	-24.79
825.50	3	QPSK	Standard	1 / 0	13.55	2.98	V	16.53	38.451	-21.92
836.50	3	QPSK	Standard	1 / 0	12.79	3.04	V	15.83	38.451	-22.62
847.50	3	QPSK	Standard	1 / 0	11.43	3.10	V	14.53	38.451	-23.92
825.50	3	16-QAM	Standard	1 / 0	12.22	2.98	V	15.20	38.451	-23.25
836.50	3	16-QAM	Standard	1 / 0	11.90	3.04	V	14.94	38.451	-23.51
847.50	3	16-QAM	Standard	1 / 0	10.38	3.10	V	13.48	38.451	-24.97
826.50	5	QPSK	Standard	1 / 0	13.52	2.99	V	16.51	38.451	-21.94
836.50	5	QPSK	Standard	1 / 0	12.79	3.04	V	15.83	38.451	-22.62
846.50	5	QPSK	Standard	1 / 0	11.74	3.09	V	14.83	38.451	-23.62
826.50	5	16-QAM	Standard	1 / 0	12.53	2.99	V	15.52	38.451	-22.93
836.50	5	16-QAM	Standard	1 / 0	11.75	3.04	V	14.79	38.451	-23.66
846.50	5	16-QAM	Standard	1 / 0	10.74	3.09	V	13.83	38.451	-24.62
829.00	10	QPSK	Standard	1 / 0	13.10	3.00	V	16.10	38.451	-22.35
836.50	10	QPSK	Standard	1 / 0	12.73	3.04	V	15.77	38.451	-22.68
844.00	10	QPSK	Standard	1 / 0	11.71	3.08	V	14.79	38.451	-23.66
829.00	10	16-QAM	Standard	1 / 0	11.80	3.00	V	14.80	38.451	-23.65
836.50	10	16-QAM	Standard	1 / 0	11.71	3.04	V	14.75	38.451	-23.70
844.00	10	16-QAM	Standard	1 / 0	10.58	3.08	V	13.66	38.451	-24.79
831.50	15	QPSK	Standard	1 / 0	13.24	3.01	V	16.25	38.451	-22.20
836.50	15	QPSK	Standard	1 / 0	12.80	3.04	V	15.84	38.451	-22.61
841.50	15	QPSK	Standard	1 / 0	12.67	3.07	V	15.74	38.451	-22.71
831.50	15	16-QAM	Standard	1 / 0	12.03	3.01	V	15.04	38.451	-23.41
836.50	15	16-QAM	Standard	1 / 0	11.74	3.04	V	14.78	38.451	-23.67
841.50	15	16-QAM	Standard	1 / 0	11.67	3.07	V	14.74	38.451	-23.71

# Table 6-3. ERP Data (Band 26)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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[MHz]	Channel Bandwidth [MHz]	Mod.	Battery	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	Ant. Pol. [H/V]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	Standard	3/2	15.18	8.34	V	23.52	33.010	-9.49
1880.00	1.4	QPSK	Standard	3/2	14.49	8.46	V	22.95	33.010	-10.06
1909.30	1.4	QPSK	Standard	3/2	13.46	8.64	V	22.10	33.010	-10.91
1850.70	1.4	16-QAM	Standard	3/2	14.24	8.34	V	22.58	33.010	-10.43
1880.00	1.4	16-QAM	Standard	3/2	13.55	8.46	V	22.01	33.010	-11.00
1909.30	1.4	16-QAM	Standard	3/2	12.43	8.64	V	21.07	33.010	-11.94
1851.50	3	QPSK	Standard	1 / 14	14.62	8.35	V	22.97	33.010	-10.04
1880.00	3	QPSK	Standard	1 / 14	14.15	8.46	V	22.61	33.010	-10.40
1908.50	3	QPSK	Standard	1 / 14	13.17	8.63	V	21.80	33.010	-11.21
1851.50	3	16-QAM	Standard	1 / 14	13.43	8.35	V	21.78	33.010	-11.23
1880.00	3	16-QAM	Standard	1 / 14	13.33	8.46	V	21.79	33.010	-11.22
1908.50	3	16-QAM	Standard	1 / 14	12.13	8.63	V	20.76	33.010	-12.25
1852.50	5	QPSK	Standard	1 / 0	14.92	8.35	V	23.27	33.010	-9.74
1880.00	5	QPSK	Standard	1 / 24	14.18	8.46	V	22.64	33.010	-10.37
1907.50	5	QPSK	Standard	1 / 24	13.09	8.62	V	21.71	33.010	-11.30
1852.50	5	16-QAM	Standard	1 / 0	13.93	8.35	V	22.28	33.010	-10.73
1880.00	5	16-QAM	Standard	1 / 24	13.39	8.46	V	21.85	33.010	-11.16
1907.50	5	16-QAM	Standard	1 / 24	12.09	8.62	V	20.71	33.010	-12.30
1855.00	10	QPSK	Standard	1 / 49	12.99	8.36	V	21.35	33.010	-11.66
1880.00	10	QPSK	Standard	1 / 49	12.83	8.46	V	21.29	33.010	-11.72
1905.00	10	QPSK	Standard	1 / 0	12.97	8.59	V	21.56	33.010	-11.45
1855.00	10	16-QAM	Standard	1 / 49	11.86	8.36	V	20.22	33.010	-12.79
1880.00	10	16-QAM	Standard	1 / 49	11.82	8.46	V	20.28	33.010	-12.73
1905.00	10	16-QAM	Standard	1 / 0	12.08	8.59	V	20.67	33.010	-12.34
1857.50	15	QPSK	Standard	1 / 0	14.47	8.37	V	22.84	33.010	-10.17
1880.00	15	QPSK	Standard	1 / 74	11.62	8.46	V	20.08	33.010	-12.93
1902.50	15	QPSK	Standard	1 / 74	12.69	8.56	V	21.25	33.010	-11.76
1857.50	15	16-QAM	Standard	1 / 0	13.23	8.37	V	21.60	33.010	-11.41
1880.00	15	16-QAM	Standard	1 / 74	10.75	8.46	V	19.21	33.010	-13.80
1902.50	15	16-QAM	Standard	1 / 74	11.67	8.56	V	20.23	33.010	-12.78
1860.00	20	QPSK	Standard	1 / 99	12.28	8.38	V	20.66	33.010	-12.35
1880.00	20	QPSK	Standard	1 / 99	12.48	8.46	V	20.94	33.010	-12.07
1900.00	20	QPSK	Standard	1 / 99	12.75	8.53	V	21.28	33.010	-11.73
1860.00	20	16-QAM	Standard	1 / 99	11.37	8.38	V	19.75	33.010	-13.26
1880.00	20	16-QAM	Standard	1 / 99	11.41	8.46	V	19.87	33.010	-13.14
1900.00	20	16-QAM	Standard	1 / 99	11.68	8.53	V	20.21	33.010	-12.80

# Table 6-4. EIRP Data (Band 2)

Test Report S/N:         Test Dates:         EUT Type:           0Y1501080034.A3L         1/8 - 1/22/2015         Portable Handset	FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
0Y1501080034.A3L 1/8 - 1/22/2015 Portable Handset Page 90 01 111	Test Report S/N:	Test Dates:	EUT Type:		Daga 00 of 111
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	Ant. Pol. [H/V]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
2498.50	5	QPSK	Standard	1 / 0	6.23	7.09	V	13.32	33.010	-19.69
2593.00	5	QPSK	Standard	12 / 6	3.15	7.55	V	10.70	33.010	-22.31
2687.50	5	QPSK	Standard	12 / 6	9.03	7.82	V	16.85	33.010	-16.16
2498.50	5	16-QAM	Standard	1 / 0	4.22	7.09	V	11.31	33.010	-21.70
2593.00	5	16-QAM	Standard	1 / 0	2.64	7.55	V	10.19	33.010	-22.82
2687.50	5	16-QAM	Standard	12 / 6	7.84	7.82	V	15.66	33.010	-17.35
2501.00	10	QPSK	Standard	25 / 12	6.55	7.08	V	13.63	33.010	-19.38
2593.00	10	QPSK	Standard	25 / 12	5.84	7.55	V	13.39	33.010	-19.62
2685.00	10	QPSK	Standard	25 / 12	8.72	7.81	V	16.53	33.010	-16.48
2501.00	10	16-QAM	Standard	25 / 12	5.84	7.08	V	12.92	33.010	-20.09
2593.00	10	16-QAM	Standard	25 / 12	4.34	7.55	V	11.89	33.010	-21.12
2685.00	10	16-QAM	Standard	25 / 12	7.82	7.81	V	15.63	33.010	-17.38
2503.50	15	QPSK	Standard	1 / 0	7.84	7.10	V	14.94	33.010	-18.07
2593.00	15	QPSK	Standard	1 / 0	4.63	7.55	V	12.18	33.010	-20.83
2682.50	15	QPSK	Standard	1 / 0	8.34	7.81	V	16.15	33.010	-16.86
2503.50	15	16-QAM	Standard	1 / 0	6.83	7.10	V	13.93	33.010	-19.08
2593.00	15	16-QAM	Standard	1 / 0	3.35	7.55	V	10.90	33.010	-22.11
2682.50	15	16-QAM	Standard	1 / 0	7.44	7.81	V	15.25	33.010	-17.76
2506.00	20	QPSK	Standard	1 / 99	6.95	7.11	V	14.06	33.010	-18.95
2593.00	20	QPSK	Standard	50 / 25	3.83	7.55	V	11.38	33.010	-21.63
2680.00	20	QPSK	Standard	50 / 25	7.79	7.80	V	15.59	33.010	-17.42
2506.00	20	16-QAM	Standard	1 / 99	5.83	7.11	V	12.94	33.010	-20.07
2593.00	20	16-QAM	Standard	50 / 25	2.86	7.55	V	10.41	33.010	-22.60
2680.00	20	16-QAM	Standard	50 / 25	6.93	7.80	V	14.73	33.010	-18.28

#### Table 6-5. EIRP Data (Band 41)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager		
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## 6.7 Radiated Spurious Emissions Measurements §2.1053 §22.917(a) §24.238(a) §27.53(g) §27.53(m)

#### **Test Overview**

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-C-2004 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

#### **Test Procedures Used**

KDB 971168 v02r02 - Section 5.8

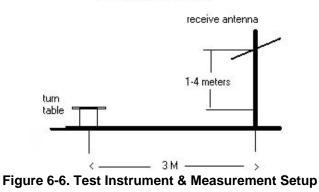
ANSI/TIA-603-C-2004 - Section 2.2.12

#### **Test Settings**

- 1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
- 2. VBW  $\geq$  3 x RBW
- 3. Span = 1.5 times the OBW
- 4. No. of sweep points  $\geq$  2 x span / RBW
- 5. Detector = Peak
- 6. Trace mode = max hold
- 7. The trace was allowed to stabilize

## Test Setup

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



3 Meter EMC Chamber

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#### Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing up on its side, and the "U" positioning, is defined with the EUT standing upright. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 3) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.

OPERATING FREQUENCY:	709.0	00	MHz
CHANNEL:	2378	30	_
MEASURED OUTPUT POWER:	14.17	dBm =	0.026 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	10.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	27.17	dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1418.00	-56.73	5.75	-50.98	Н	65.1
2127.00	-59.29	6.76	-52.53	Н	66.7
2836.00	-62.61	7.79	-54.82	Н	69.0
3545.00	-63.05	7.59	-55.46	Н	69.6

Table 6-6. Radiated Spurious Data (Band 17 – Low Channel)

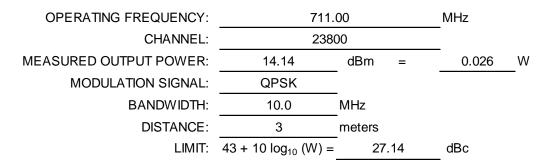
FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Daga 02 of 111		
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OPERATING FREQUENCY:	710.	00	MHz
CHANNEL:	237	90	
MEASURED OUTPUT POWER:	14.24	dBm =	0.027 W
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	10.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	27.24	dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1420.00	-55.49	5.76	-49.73	Н	64.0
2130.00	-60.24	6.77	-53.46	Н	67.7
2840.00	-62.53	7.78	-54.74	Н	69.0
3550.00	-62.89	7.59	-55.30	Н	69.5

Table 6-7. Radiated Spurious Data (Band 17 – Mid Channel)



Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1422.00	-55.85	5.77	-50.08	Н	64.2
2133.00	-58.88	6.79	-52.09	Н	66.2
2844.00	-62.65	7.78	-54.87	Н	69.0
3555.00	-63.11	7.59	-55.52	Н	69.7

Table 6-8. Radiated Spurious Data (Band 17 – High Channel)

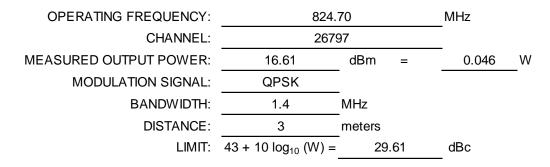
FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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OPERATING FREQUENCY:	710.	00	MHz
CHANNEL:	2379	90	_
MEASURED OUTPUT POWER:	14.24	dBm =	0.027 W
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	10.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	27.24	dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1420.00	-52.01	5.76	-46.25	Н	60.5
2130.00	-56.49	6.77	-49.71	Н	64.0
2840.00	-60.77	7.78	-52.98	Н	67.2
3550.00	-63.66	7.59	-56.07	Н	70.3
4260.00	-63.83	8.46	-55.37	Н	69.6

Table 6-9. Radiated Spurious Data with WCP (Band 17 – Mid Channel)



Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1649.40	-63.71	6.56	-57.15	Н	73.8
2474.10	-50.58	7.30	-43.29	Н	59.9
3298.80	-58.87	7.37	-51.50	Н	68.1
4123.50	-61.83	8.02	-53.80	Н	70.4

Table 6-10. Radiated Spurious Data (Band 26 – Low Channel)

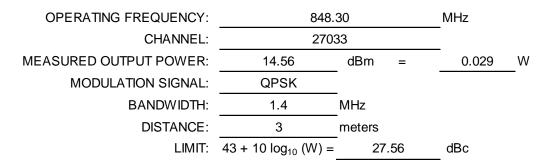
FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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OPERATING FREQUENCY:	836.	50	MHz
CHANNEL:	2691	15	_
MEASURED OUTPUT POWER:	15.82	dBm =	0.038 W
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	1.4	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	28.82	dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1673.00	-61.91	6.55	-55.36	Н	71.2
2509.50	-54.34	7.34	-46.99	Н	62.8
3346.00	-58.52	7.44	-51.08	Н	66.9
4182.50	-62.83	8.20	-54.63	Н	70.4

Table 6-11. Radiated Spurious Data (Band 26 – Mid Channel)



Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1696.60	-58.50	6.55	-51.95	Н	66.5
2544.90	-53.63	7.36	-46.27	Н	60.8
3393.20	-59.93	7.51	-52.42	Н	67.0
4241.50	-62.24	8.39	-53.84	Н	68.4

Table 6-12. Radiated Spurious Data (Band 26 – High Channel)

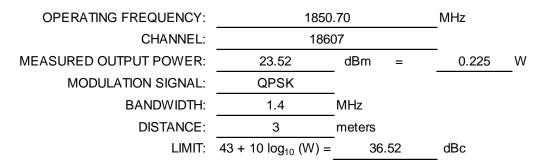
FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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OPERATING FREQUENCY:	824.	70	MHz
CHANNEL:	2679	97	_
MEASURED OUTPUT POWER:	16.61	dBm =	0.046 W
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	1.4	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	29.61	dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1649.40	-56.55	6.56	-49.99	Н	66.6
2474.10	-50.56	7.30	-43.27	Н	59.9
3298.80	-64.37	7.37	-57.00	Н	73.6

Table 6-13. Radiated Spurious Data with WCP (Band 26 – Low Channel)

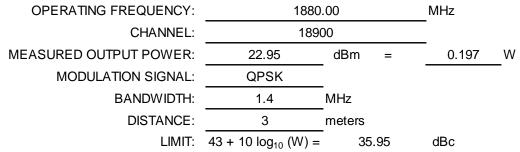


Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
3701.40	-47.67	9.44	-38.24	Н	61.8
5552.10	-52.27	10.79	-41.48	Н	65.0
7402.80	-55.26	10.69	-44.56	Н	68.1
9253.50	-56.21	11.58	-44.63	Н	68.2

Table 6-14. Radiated Spurious Data (Band 2 – Low Channel)

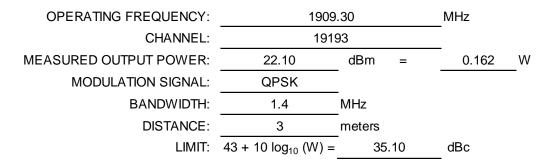
FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
3760.00	-48.50	9.28	-39.22	Н	62.2
5640.00	-54.54	11.03	-43.50	Н	66.4
7520.00	-55.84	10.97	-44.87	Н	67.8
9400.00	-56.96	11.53	-45.42	Н	68.4

Table 6-15. Radiated Spurious Data (Band 2 – Mid Channel)



Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
3818.60	-41.17	9.19	-31.98	Н	54.1
5727.90	-57.73	11.28	-46.45	Н	68.6
7637.20	-56.61	11.17	-45.44	Н	67.5
9546.50	-57.94	11.82	-46.11	Н	68.2

Table 6-16. Radiated Spurious Data (Band 2 – High Channel)

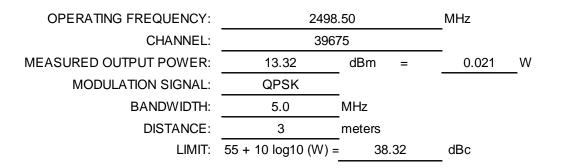
FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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OPERATING FREQUENCY:	1850.70		MHz	
CHANNEL:	1860	18607		
MEASURED OUTPUT POWER:	23.52	dBm =	0.225 W	
MODULATION SIGNAL:	QPSK	_		
BANDWIDTH:	1.4	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 log <sub>10</sub> (W) =	36.52	dBc	

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
3701.40	-52.64	9.44	-43.21	Н	66.7
5552.10	-54.37	10.79	-43.58	Н	67.1
7402.80	-48.37	10.69	-37.67	Н	61.2
9253.50	-54.39	11.58	-42.81	Н	66.3
11104.20	-51.48	12.79	-38.69	Н	62.2
12954.90	-55.45	13.18	-42.26	Н	65.8

Table 6-17. Radiated Spurious Data with WCP (Band 2 – Low Channel)



Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
4997.00	-48.33	10.93	-37.40	Н	50.7
7495.50	-52.68	10.92	-41.76	Н	55.1
9994.00	-56.62	12.02	-44.59	Н	57.9

Table 6-18. Radiated Spurious Data (Band 41 – Low Channel)

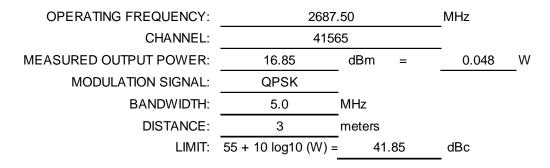
FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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OPERATING FREQUENCY:	2593.00		MHz	
CHANNEL:	406	40620		
MEASURED OUTPUT POWER:	10.70	dBm =	0.012 W	
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	55 + 10 log10 (W)	= 35.70	dBc	

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
5186.00	-50.21	10.60	-39.61	Н	50.3
7779.00	-44.55	11.22	-33.33	Н	44.0
10372.00	-55.83	12.36	-43.47	Н	54.2
12965.00	-55.56	13.16	-42.39	Н	53.1
15558.00	-60.75	16.15	-44.60	Н	55.3

Table 6-19. Radiated Spurious Data (Band 41 – Mid Channel)



	Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
	5375.00	-38.71	10.58	-28.12	Н	45.0
ĺ	8062.50	-40.34	11.10	-29.24	Н	46.1
ĺ	10750.00	-46.56	12.60	-33.96	Н	50.8

Table 6-20. Radiated Spurious Data (Band 41 – High Channel)

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OPERATING FREQUENCY:	2687.50		MHz
CHANNEL:	415	65	
MEASURED OUTPUT POWER:	16.85	dBm =	0.048 W
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	5.0	MHz	
DISTANCE:	3	meters	
LIMIT:	55 + 10 log10 (W) =	= 41.85	dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
5375.00	-38.81	10.58	-28.22	Н	45.1
8062.50	-40.86	11.10	-29.76	Н	46.6
10750.00	-46.89	12.60	-34.29	Н	51.1

Table 6-21. Radiated Spurious Data with WCP (Band 41 – High Channel)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager	
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## 6.8 Frequency Stability / Temperature Variation §2.1055 §22.355 §24.235 §27.54

#### **Test Overview and Limit**

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-C-2004. The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

For Part 22, the frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5$  ppm) of the center frequency. For Part 24 and Part 27, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

#### Test Procedure Used

ANSI/TIA-603-C-2004

#### Test Settings

- 1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
- 2. The equipment is turned on in a "standby" condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
- 3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

#### Test Setup

The EUT was connected via an RF cable to a spectrum analyzer with the EUT placed inside an environmental chamber.

#### **Test Notes**

None

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# Band 17 Frequency Stability Measurements §2.1055 §27.54

OPERATING FREQUENCY:	710,000,000	Hz
CHANNEL:	23090	
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	709,999,980	-20	-0.0000028
100 %		- 30	709,999,981	-19	-0.0000027
100 %		- 20	709,999,998	-2	-0.0000003
100 %		- 10	709,999,981	-19	-0.0000027
100 %		0	709,999,987	-13	-0.0000018
100 %		+ 10	709,999,995	-5	-0.0000007
100 %		+ 20	709,999,991	-9	-0.0000012
100 %		+ 30	709,999,999	-1	-0.0000001
100 %		+ 40	709,999,980	-20	-0.0000028
100 %		+ 50	709,999,993	-7	-0.0000009
BATT. ENDPOINT	3.40	+ 20	709,999,999	-1	-0.0000001

 Table 6-22. Frequency Stability Data (Band 17)

## Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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# Band 17 Frequency Stability Measurements §2.1055 §27.54

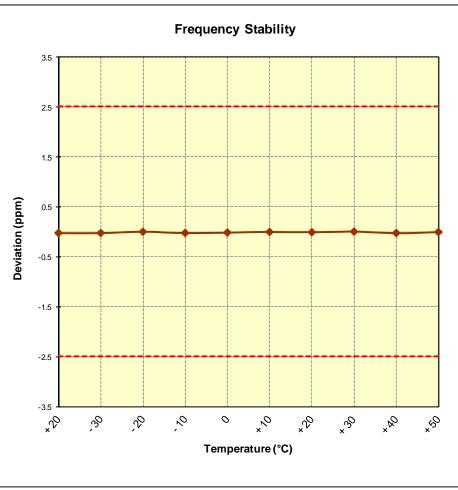


Figure 6-7. Frequency Stability Graph (Band 17)

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# Band 26 Frequency Stability Measurements §2.1055 §22.355

OPERATING FREQUENCY:	831,500,000	Hz
CHANNEL:	26865	_
REFERENCE VOLTAGE:	3.85	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	_

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	831,499,998	-2	-0.0000002
100 %		- 30	831,499,988	-12	-0.0000015
100 %		- 20	831,499,987	-13	-0.0000016
100 %		- 10	831,499,997	-3	-0.0000003
100 %		0	831,499,985	-15	-0.0000018
100 %		+ 10	831,499,990	-10	-0.0000012
100 %		+ 20	831,499,991	-9	-0.0000011
100 %		+ 30	831,499,991	-9	-0.0000011
100 %		+ 40	831,499,992	-8	-0.0000010
100 %		+ 50	831,499,995	-5	-0.0000006
BATT. ENDPOINT	3.40	+ 20	831,499,982	-18	-0.0000021

Table 6-23. Frequency Stability Data (Band 26)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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# **Band 26 Frequency Stability Measurements** §2.1055 §22.355

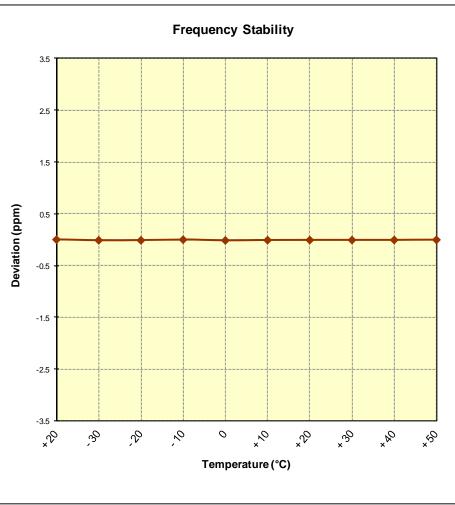


Figure 6-8. Frequency Stability Graph (Band 26)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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# Band 2 Frequency Stability Measurements §2.1055 §24.235

OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	18900	
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,879,999,992	-8	-0.0000004
100 %		- 30	1,879,999,983	-17	-0.0000009
100 %		- 20	1,879,999,985	-15	-0.000008
100 %		- 10	1,879,999,982	-18	-0.0000010
100 %		0	1,879,999,986	-14	-0.0000007
100 %		+ 10	1,879,999,999	-1	0.0000000
100 %		+ 20	1,879,999,984	-16	-0.000008
100 %		+ 30	1,879,999,996	-4	-0.0000002
100 %		+ 40	1,879,999,998	-2	-0.0000001
100 %		+ 50	1,879,999,989	-11	-0.0000006
85 %	3.27	+ 20	1,879,999,987	-13	-0.0000007
BATT. ENDPOINT	3.40	+ 20	1,879,999,984	-16	-0.000008

 Table 6-24. Frequency Stability Data (Band 2)

## Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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# **Band 2 Frequency Stability Measurements** §2.1055 §24.235

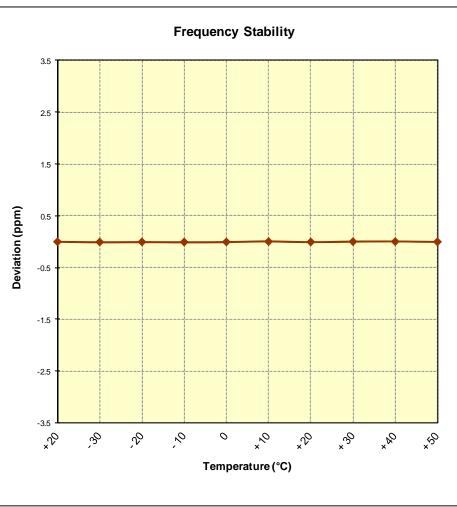


Figure 6-9. Frequency Stability Graph (Band 2)

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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# Band 41 Frequency Stability Measurements §2.1055 §27.54

OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	18900	_
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,879,999,992	-8	-0.0000004
100 %		- 30	1,879,999,983	-17	-0.0000009
100 %		- 20	1,879,999,985	-15	-0.0000008
100 %		- 10	1,879,999,982	-18	-0.0000010
100 %		0	1,879,999,986	-14	-0.0000007
100 %		+ 10	1,879,999,999	-1	0.0000000
100 %		+ 20	1,879,999,984	-16	-0.0000008
100 %		+ 30	1,879,999,996	-4	-0.0000002
100 %		+ 40	1,879,999,998	-2	-0.0000001
100 %		+ 50	1,879,999,989	-11	-0.0000006
BATT. ENDPOINT	3.40	+ 20	1,879,999,984	-16	-0.000008

Table 6-25. Frequency Stability Data (Band 41)

## Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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# **Band 41 Frequency Stability Measurements** §2.1055 §27.54

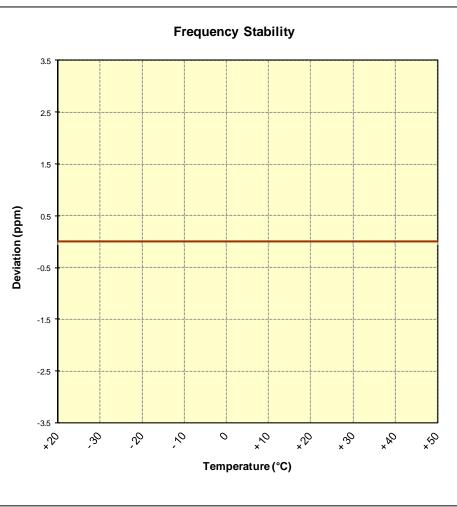


Figure 6-10. Frequency Stability Graph (Band 41)

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# 7.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMG920KOR** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

FCC ID: A3LSMG920KOR		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 111 of 111
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