

PCTEST ENGINEERING LABORATORY, INC.

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MEASUREMENT REPORT

FCC Part 22 & 90

Applicant Name:

Samsung Electronics Co., Ltd. 129, Samsung-ro, Yeongtong-gu, Suwon-si Gyeonggi-do, 16677, Korea Date of Testing: 12/14/2018 - 1/26/2019 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M1811230206-04.A3L

FCC ID:

A3LSMG9730

APPLICANT:

Samsung Electronics Co., Ltd.

Application Type: Model: Additional Model: EUT Type: FCC Classification: FCC Rule Part: Test Procedure(s): Certification SM-G9730 SM-G9738 Portable Handset PCS Licensed Transmitter Held to Ear (PCE) §2.1049, §22(H), §90(S) ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01, KDB 648474 D03 v01r04

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

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

Randy Ortanez President



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MEASUREMENT REPORT FCC Part 22(H) & 90

Mode	Tx Frequency (MHz)	Measurement	Max. Power (W)	Max. Power (dBm)	Emission Designator	Modulation
			0.294	24.68	1M08G7D	QPSK
	814.7 - 823.3		0.251	24.00	1M09W7D	16-QAM
			0.200	23.02	1M08W7D	64-QAM
			0.296	24.71	2M69G7D	QPSK
	815.5 - 822.5		0.249	23.97	2M70W7D	16-QAM
		Conducted	0.199	22.99	2M70W7D	64-QAM
	816.5 - 821.5		0.294	24.68	4M49G7D	QPSK
			0.249	23.96	4M49W7D	16-QAM
LTE Band 26			0.196	22.92	4M51W7D	64-QAM
	819		0.287	24.58	9M00G7D	QPSK
			0.247	23.93	8M98W7D	16-QAM
			0.195	22.90	8M99W7D	64-QAM
		1	0.305	24.85	13M5G7D	QPSK
	821.5		0.260	24.15	13M4W7D	16-QAM
			0.205	23.11	13M4W7D	64-QAM
			0.093	19.70	13M5G7D	QPSK
	821.5	ERP	0.087	19.38	13M4W7D	16-QAM
			0.069	18.36	13M4W7D	64-QAM

EUT Overview

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1.0 INTRODUCTION

1.1 Scope

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

1.2 PCTEST Test Location

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

1.3 Test Facility / Accreditations

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

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

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMG9730**. The test data contained in this report pertains only to the emissions due to the EUT's licensed transmitters that operate under the provisions of Part 22(H) and 90.691.

Test Device Serial No.: 1156M

2.2 Device Capabilities

This device contains the following capabilities:

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

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

2.3 Test Configuration

The EUT was tested per the guidance of ANSI/TIA-603-E-2016 and KDB 971168 D01 v03r01. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

This device supports wireless charging capability and, thus, is subject to the test requirements of KDB 648474 D03 v01r04. Additional radiated spurious emission measurements were performed with the EUT placed flush against the flat surface of authorized wireless charging pad (WCP) Model:EP-N5100 while operating under normal conditions in a simulated call or data transmission configuration. The WCP is designed with the flat charging surface angled 45 degrees relative to a horizontal surface on which the WCP rests. The worst case radiated emissions data is shown in this report.

2.4 EMI Suppression Device(s)/Modifications

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

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3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

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

3.2 Radiated Power and Radiated Spurious Emissions

<u>§2.1053, §90.635, §90.691</u>

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

The equipment under test was transmitting while connected to its integral antenna and is placed on a wooden turntable 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Radiated power levels are also investigated with the receive antenna horizontally and vertically polarized. The maximized power level is recorded using the spectrum analyzer "Channel Power" function with the integration band set to the emissions' occupied bandwidth, a RMS detector, RBW = 100kHz, VBW = 300kHz, and a 1 second sweep time over a minimum of 10 sweeps, per the guidelines of KDB 971168 D01 v03r01.

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

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

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

The calculated Pd levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of 43 + 10log10(Power [Watts]) specified in 90.691.

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

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

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4.0 MEASUREMENT UNCERTAINTY

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

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

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5.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	LTx2	Licensed Transmitter Cable Set	1/23/2018	Annual	1/23/2019	LTx2
Agilent	N9020A	MXA Signal Analyzer	1/24/2018	Annual	1/24/2019	US46470561
Agilent	N9030A	PXA Signal Analyzer (44GHz)	5/25/2018	Annual	5/25/2019	MY52350166
Anritsu	MT8821C	Radio Communication Analyzer	7/24/2018	Annual	7/24/2019	6201664756
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2017	Biennial	10/10/2019	121034
Com-Power	PAM-103	Pre-Amplifier (1-1000MHz)	9/17/2018	Annual	9/17/2019	441119
Emco	3115	Horn Antenna (1-18GHz)	3/28/2018	Biennial	3/28/2020	9704-5182
Espec	ESX-2CA	Environmental Chamber	3/28/2018	Annual	3/28/2019	17620
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/28/2018	Biennial	3/28/2020	128337
Huber + Suhner	Sucoflex 102A	40GHz Radiated Cable Set	1/23/2018	Annual	1/23/2019	251425001
Keysight Technologies	N9030A	3Hz-44GHz PXA Signal Analyzer	3/20/2018	Annual	3/20/2019	MY49430494
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	3/30/2018	Annual	3/30/2019	11401010036
Mini Circuits	TVA-11-422	RF Power Amp		N/A		QA1317001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11208010032
Rohde & Schwarz	CMW500	Radio Communication Tester	9/25/2018	Annual	9/25/2019	102060
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	5/21/2018	Annual	5/21/2019	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	8/9/2018	Annual	8/9/2019	100348
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	6/18/2018	Annual	6/18/2019	102134
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	6/25/2018	Annual	6/25/2019	102133
Rohde & Schwarz	TC-TA18	Cross Polarized Vivaldi Test Antenna	7/16/2018	Biennial	7/16/2020	101073
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	1/24/2018	Annual	1/24/2019	100040
Seekonk	NC-100	Torque Wrench	12/28/2017	Annual	11/8/2019	N/A
Sunol	DRH-118	Horn Antenna (1-18GHz)	8/11/2017	Biennial	8/11/2019	A050307
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	4/19/2018	Biennial	4/19/2020	A051107

Table 5-1. Test Equipment

Notes:

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

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6.0 SAMPLE CALCULATIONS

Emission Designator

Emission Designator = 1M25F9W

CDMA BW = 1.25 MHz F = Frequency Modulation 9 = Composite Digital Info W = Combination (Audio/Data) (Measured at the 99.75% power bandwidth)

Spurious Radiated Emission – BC10

Example: Channel 476 CDMA BC10 Mode 3rd Harmonic (2453.70MHz)

The average spectrum analzyer 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 analzyer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 2453.70 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) = 50.3 dBc.

Emission Designator

QPSK Modulation

Emission Designator = 8M62G7D

LTE BW = 8.62 MHz

- G = Phase Modulation
- 7 = Quantized/Digital Info
- D = Data transmission, telemetry, telecommand

QAM Modulation

Emission Designator = 8M45W7D

LTE BW = 8.45 MHz W = Amplitude/Angle Modulated 7 = Quantized/Digital Info D = Data transmission, telemetry, telecommand

Spurious Radiated Emission – LTE Band

Example: Middle Channel LTE Mode 2nd Harmonic (1564 MHz)

The average spectrum analyzer reading at 3 meters with the EUT on the turntable was -81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of -81.0 dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 1564 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm – (-24.80).

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7.0 TEST RESULTS

7.1 Summary

Company Name:	Samsung Electronics Co., Ltd.
FCC ID:	A3LSMG9730
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
Mode(s):	LTE
Band:	Band 26

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1049	Occupied Bandwidth	N/A		PASS	Section 7.2
2.1051 90.691	Conducted Band Edge / Spurious Emissions	 > 43 + log₁₀ (P[Watts]) for all out-of- band emissions except > 50 + 10log₁₀ (P[Watts]) at Band Edge and for all out-of-band emissions within 37.5kHz of Block Edge (LTE B26) 	CONDUCTED	PASS	Sections 7.3, 7.4
2.1055 90.213	Frequency Stability	< 2.5 ppm		PASS	Section 7.8
2.1046 90.635	Conducted Power	< 100 Watts		PASS	Section 7.5
22.913(a.2)	Effective Radiated Power (Band 26)	< 7 Watts max. ERP		PASS	Section 7.6
2.1053 90.691	Radiated Spurious Emissions	 > 43 + log₁₀ (P[Watts]) for all out-of- band emissions except > 50 + 10log₁₀ (P[Watts]) at Band Edge and for all out-of-band emissions within 37.5kHz of Block Edge 	RADIATED	PASS	Section 7.7

Table 7-1. Summary of Test Results

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Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots shown in Section 7.0 were taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "2G/3G Automation," Version 3.11.

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7.2 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 D01 v03r01 - Section 4.2

Test Settings

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

1-5% of the 99% occupied bandwidth observed in Step 7

Test Setup

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

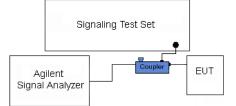


Figure 7-1. Test Instrument & Measurement Setup

Test Notes

None.

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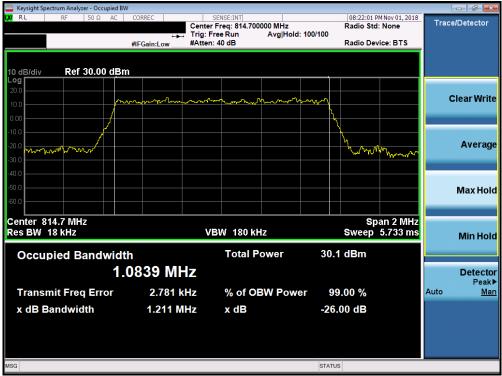
Plot 7-1. Occupied Bandwidth Plot (LTE Band 26, 1.4MHz QPSK – RB Size 6– Low Channel)



Plot 7-2. Occupied Bandwidth Plot (LTE Band 26, 1.4MHz 16-QAM - RB Size 6- Low Channel)

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Plot 7-3. Occupied Bandwidth Plot (LTE Band 26, 1.4MHz 64-QAM – RB Size 6– Low Channel)



Plot 7-4. Occupied Bandwidth Plot (LTE Band 26, 3MHz QPSK - RB Size 15- Low Channel)

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E Keysight Spectrum Analyzer - Occupied BW					
KL RF 50Ω AC		SENSE:INT ter Freq: 815.500000 MHz	08:18:38 Radio St	PM Nov 01, 2018 d: None	Trace/Detector
		:FreeRun Avg Ho en:40 dB	old:>100/100 Radio De	vice: BTS	
10 dB/div Ref 30.00 dBm Log	1				
20.0					
10.0	war have a second s	and the second s	m		Clear Write
0.00			\rightarrow		
-10.0					Averag
-20.0				survey and the second	Averag
-40.0					
-50.0					Max Hol
-60.0					maxinon
Center 815.5 MHz			SI	pan 5 MHz	
Res BW 47 kHz		VBW 470 kHz		2.133 ms	Min Hol
Occupied Bandwidt	h	Total Power	32.0 dBm		
	7011 MHz				Detecto
			~~ ~~ ~		Peak
Transmit Freq Error	6.321 kHz	% of OBW Po		F	Auto <u>Mar</u>
x dB Bandwidth	3.003 MHz	x dB	-26.00 dB		
ISG			STATUS		

Plot 7-5. Occupied Bandwidth Plot (LTE Band 26, 3MHz 16-QAM – RB Size 15– Low Channel)



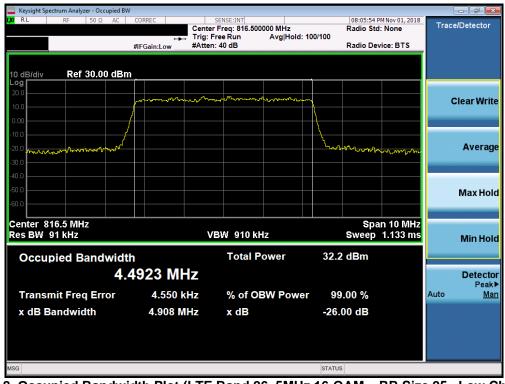
Plot 7-6. Occupied Bandwidth Plot (LTE Band 26, 3MHz 64-QAM - RB Size 15- Low Channel)

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Keysight Spectrum Analyzer - Occupied BW	1				
IXI RL RF 50Ω AC	Trig:	SENSE:INT r Freq: 816.500000 MHz Free Run Avg Hold: 1	Radio Sto	PM Nov 01, 2018 i: None	Trace/Detector
	#IFGain:Low #Atter	n: 40 dB	Radio De	vice: BTS	
10 dB/div Ref 30.00 dBm	1				
Log 20.0 10.0		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	1		Clear Write
0.00					
-20.0			hanne		Average
-40.0					
-60.0					Max Hold
Center 816.5 MHz Res BW 91 kHz	N N	/BW 910 kHz		an 10 MHz 1.133 ms	Min Hold
Occupied Bandwidt		Total Power	33.4 dBm		
4.4	4925 MHz				Detector Peak▶
Transmit Freq Error	5.521 kHz	% of OBW Power	99.00 %		Auto <u>Man</u>
x dB Bandwidth	5.004 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-7. Occupied Bandwidth Plot (LTE Band 26, 5MHz QPSK - RB Size 25- Low Channel)



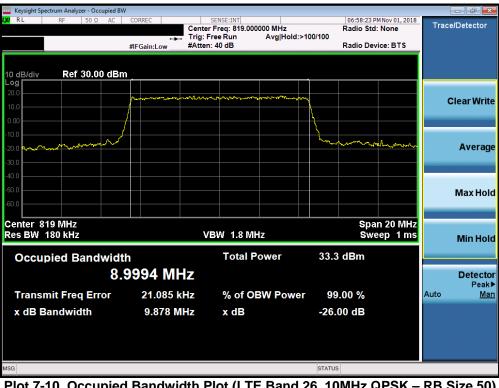
Plot 7-8. Occupied Bandwidth Plot (LTE Band 26, 5MHz 16-QAM - RB Size 25- Low Channel)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BV	V				- 6 -
UXIRL RF 50Ω AC	Center Trig: F	SENSE:INT r Freq: 816.500000 MHz Free Run Avg Hold: 10 n: 40 dB	08:06:10 PM No Radio Std: No 00/100 Radio Device	one	Trace/Detector
10 dB/div Ref 30.00 dBr	n				
20.0	mannen	man man	<u>∧</u>		Clear Write
-10.0	/				
-20.0			Mar Constants	~~~~~	Average
-50.0					Max Hold
Center 816.5 MHz Res BW 91 kHz	v	BW 910 kHz	Span 1 Sweep 1.1	10 MHz 133 ms	Min Hold
Occupied Bandwidt	^h 5070 MHz	Total Power	31.5 dBm		Detector
Transmit Freq Error	-652 Hz	% of OBW Power	99.00 %	A	Peak▶ uto <u>Man</u>
x dB Bandwidth	4.960 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-9. Occupied Bandwidth Plot (LTE Band 26, 5MHz 64-QAM - RB Size 25- Low Channel)



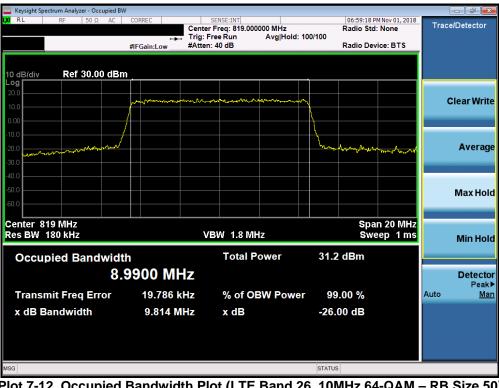
Plot 7-10. Occupied Bandwidth Plot (LTE Band 26, 10MHz QPSK – RB Size 50)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyze													
RL RF	50Ω A	IC	CORREC			ENSE:INT Freg: 819.000	000 MHz			06:58:59 P Radio Std	M Nov 01, 2018	Trac	e/Detector
				4	Trig: Fr	ee Run	Avg Hold:	100	0/100				
		;	#IFGain:l	_ow_	#Atten:	40 dB		_		Radio Dev	ICE: BIS		
	~ ~ ~ ~												
10 dB/div Ref Log	30.00 d	IBM											
20.0						ma na mala m							Clear Write
10.0		- /											Clear write
0.00		- }							-				
-10.0		-							-				
-20.0	mghan								Jan Mariana	manthe	-ward warded		Average
-30.0													
-40.0													
-50.0													Max Hold
-60.0													
Center 819 MHz										Spa	n 20 MHz		
Res BW 180 kHz					VE	W 1.8 MH	Iz			Swe	ep 1 ms		Min Hold
						Tatal D			22.5	dDee			
Occupied Ba					_	Total P	ower		32.5	dBm			
		8.9	813	MF	Z								Detecto
Transmit Freq	Error		5.	993 k	Hz	% of O	3W Powe	er	99	.00 %		Auto	Peakl Mar
x dB Bandwid				311 M		x dB				00 dB			
	un		9.0	D.I.I. IVI	ΠZ	хав			-20.	00 aB			
MSG									STATUS				
100								_	014103				

Plot 7-11. Occupied Bandwidth Plot (LTE Band 26, 10MHz 16-QAM - RB Size 50)



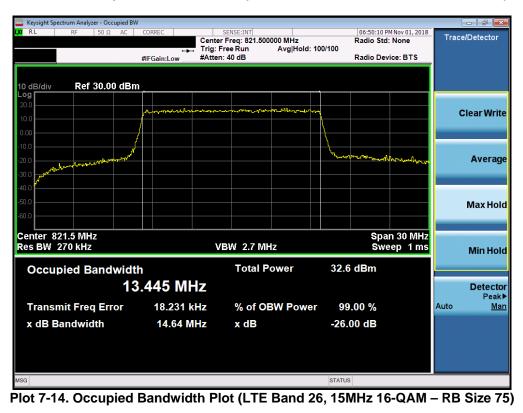
Plot 7-12. Occupied Bandwidth Plot (LTE Band 26, 10MHz 64-QAM – RB Size 50)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer											
CRL RF 5	50 Ω AC	CORREC		SENSE:INT r Freq: 821.50				06:48:47 P Radio Std	MNov 01, 2018 : None	Trac	e/Detector
		#IFGain:Low		Free Run I: 40 dB	Avg Hold:	>100	0/100	Radio Dev	ice: BTS		
		an Gameon									
0 dB/div Ref 3	0.00 dBm										
.og											
10.0		renam	- Marine M	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	and and a second s	~					Clear Writ
0.00		1				=					
0.0	/						۲				
0.0	month						www.	lther with the	mont moto		Averag
30.0											
10.0											
50.0											Max Ho
60.0											
enter 821.5 MHz									n 30 MHz		
es BW 270 kHz			V	BW 2.7 M	Hz			Swe	ep 1ms		Min Ho
Occupied Ba	ndwidth	n		Total F	Power		33.5	dBm			
	13	.471	MHz								Detect
											Pea
Transmit Freq			'0 kHz		BW Powe	er		.00 %		Auto	<u>M</u>
x dB Bandwidt	h	14.6	1 MHz	x dB			-26.	00 dB			
G							CTAT/C				
9							STATUS				

Plot 7-13. Occupied Bandwidth Plot (LTE Band 26, 15MHz QPSK – RB Size 75)



PCTEST Approved by: MEASUREMENT REPORT FCC ID: A3LSMG9730 SAMSUNG (CERTIFICATION) **Quality Manager** EUT Type: Test Report S/N: Test Dates: Page 19 of 40 1M1811230206-04.A3L 12/14/2018 - 1/26/2019 Portable Handset © 2019 PCTEST Engineering Laboratory, Inc. V 8.8 11/19/2018



E Keysight Spectrum Analyzer - Occup					
LX RE 50 Ω	AC CORREC	SENSE:INT Center Freq: 821.500000 MHz		3 PM Nov 01, 2018 td: None	Trace/Detector
		Trig: Free Run Avg Ho #Atten: 40 dB	ld: 100/100 Radio E	evice: BTS	
	#IFGam.Low	million. 40 ab	Rudio		
10 dB/div Ref 30.00	dBm				
Log					
20.0	an and the second second	and the	a sport		Clear Write
10.0					orear mine
0.00					
-10.0					
-20.0	pho ph		"have a series of the series o	Mar have and	Average
-30.0					
-40.0					
-50.0					Max Hold
-60.0					
Center 821.5 MHz			S	oan 30 MHz	
Res BW 270 kHz		VBW 2.7 MHz	S	weep 1ms	Min Hold
Occupied Bandw	vidth	Total Power	31.4 dBm		
Occupied Ballow					Detector
	13.438 MH				Detector Peak▶
Transmit Freq Erro	r 24.234 k	Hz % of OBW Pov	wer 99.00 %	/	Auto <u>Mar</u>
x dB Bandwidth	14.65 M	Hz xdB	-26.00 dB		
MSG			STATUS		
					DD 0: 7/

Plot 7-15. Occupied Bandwidth Plot (LTE Band 26, 15MHz 64-QAM – RB Size 75)

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7.3 Spurious and Harmonic Emissions at Antenna Terminal §2.1051 §90.691

Test Overview

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

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

Test Procedure Used

KDB 971168 D01 v03r01 - Section 6.0

Test Settings

- 1. Start frequency was set to 30MHz and stop frequency was set to 10GHz (separated into at least two plots per channel)
- 2. RBW ≥ 100kHz
- 3. VBW \geq 3 x RBW
- 4. Detector = RMS
- 5. Trace mode = trace averaging (RMS)
- 6. Sweep time = auto couple
- 7. The trace was allowed to stabilize

Test Setup

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

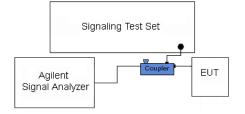


Figure 7-2. Test Instrument & Measurement Setup

Test Notes

Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for Part 22. 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.

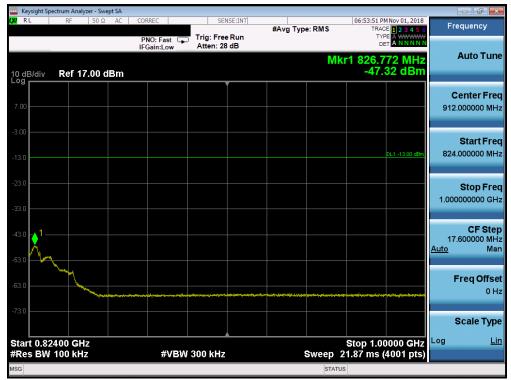
FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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LTE BAND 26

Keysight Spec												
KU RL	RF	50 Ω	AC	CORREC PNO: Fast		rig: Fre		#Avg Typ	e: RMS	TRA	PM Nov 01, 2018 CE 1 2 3 4 5 6 (PE A WWWWW DET A NNNNN	Frequency
I0 dB/div	Ref 3	0.00 d	Bm	IFGain:Low	,	Atten: 40	Jab		Mkr1	814.00	0 0 MHz .76 dBm	Auto Tui
20.0												Center Fr 422.000000 M
0.00												Start Fr 30.000000 M
20.0											DL1 -13.00 dBm	Stop Fr 814.000000 M
40.0											1, 	CF Ste 78.400000 M <u>Auto</u> M
50.0												Freq Offs 0
60.0												Scale Ty
Start 30.0 #Res BW 1		Z		#VE	3W 30)0 kHz		s	weep 9	7.33 ms (:	314.0 MHz 20001 pts)	Log <u>L</u>

Plot 7-16. Conducted Spurious Plot (LTE Band 26, 15MHz QPSK - RB Size 1, RB Offset 0)



Plot 7-17. Conducted Spurious Plot (LTE Band 26, 15MHz QPSK - RB Size 1, RB Offset 0)

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	ectrum Analy		pt SA										- 5 -
XI RL	RF	50 Ω	AC	CORREC			NSE:INT	#Avg Typ	e: RMS	TRAC	MNov 01, 2018 DE 1 2 3 4 5 6	Fre	quency
				PNO: I IFGain:	Fast ⊶⊷ Low	Trig: Free Atten: 32				TY D			
10 dB/div Log	Ref 21	l.00 d	Bm						Mk	r1 1.630 -43.5	00 GHz 55 dBm		Auto Tune
11.0													enter Fred 000000 GH:
-9.00											DL1 -13.00 dBm		Start Free 000000 GH:
.19.0												10.000	Stop Fre 000000 GH
39.0	1											900. <u>Auto</u>	CF Stej 000000 MH Ma
-49.0								A CONTRACTOR OF		gere y ele sometal de la ciata a		F	req Offse
69.0												5	Scale Typ
Start 1.00 #Res BW		z			#VBW	3.0 MHz		s	weep <u>1</u>	Stop 10 6.00 ms (2	.000 GHz 20001 pts)	Log	<u>Lir</u>
//SG									STATU	S			

Plot 7-18. Conducted Spurious Plot (LTE Band 26, 15MHz QPSK – RB Size 1, RB Offset 0)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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7.4 Band Edge Emissions at Antenna Terminal §2.1051 §90.691

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 maximum power, and at the appropriate frequencies. All modes of operation and data rates were investigated to determine the worst case configuration.

For LTE Band 26 operation under Part 90.691, the minimum permissible attenuation level of any spurious emission removed from the EA licensee's frequency block by greater than 37.5 kHz is $43 + 10\log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts. The minimum permissible attenuation level of any spurious emission removed from the EA licensee's frequency block by up to and including 37.5 kHz is $50 + 10\log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.

Test Procedure Used

KDB 971168 D01 v03r01 - Section 6.0

Test Settings

- 1. Span was set large enough so as to capture all out of band emissions near the band edge
- 2. RBW = 100 kHz
- 3. VBW = 300 kHz
- 4. Detector = RMS
- 5. Trace mode = trace average
- 6. Sweep time = auto couple
- 7. The trace was allowed to stabilize

Test Setup

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

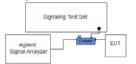


Figure 7-3. Test Instrument & Measurement Setup

Test Notes

For channel edge emission, the signal analyzer's "ACP" measurement capability is used.

Per 22.917(b) 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.

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LTE BAND 26

Keysight Spectrum Analyzer - ACP RL RF 50 Ω AC CORREC	Center Freq: 8	14.700000 MHz	Ra	3:22:19 PM Nov 01, 20 dio Std: None	18 Trace/Detector
PASS IFGain:				dio Device: BTS	Select Trace
10 dB/div Ref 40.00 dBm	23.9 dBm				Clear Writ
					Averag
20.0				RMS /	Max Hol
Center 814.7 MHz #Res BW 100 kHz Total Carrier Power 23.897 dBm/1.	#VBW 3	300 kHz		Span 2.1 Mi Sweep 20 n	
	, ,		wer U	pper	
Carrier Power Filter 1 23.897 dBm / 1.400 MHz OFF			dBm dBc -26.26 -50.77 -23.00 -47.73	dBm Filte -26.87 OFF	Trace On
					Mo 1 o
SG			STATUS		

Plot 7-19. Channel Edge Plot (LTE Band 26, 1.4MHz QPSK – RB Size 6– Low Channel)



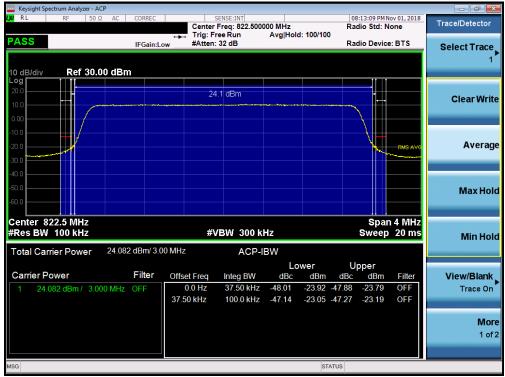
Plot 7-20. Channel Edge Plot (LTE Band 26, 1.4MHz QPSK - RB Size 6 - High Channel)

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Keysight Spectrum Analyzer - ACP RL RF 50 Ω AC CORRE ASS IFGai	Center	SENSE:INT Freq: 815.5000 ree Run : 32 dB	000 MHz Avg Hold: 100/	Ra(8:28:29 PMI dio Std: I dio Devic		Frequency
0 dB/div Ref 40.00 dBm							
	24	4.0 dBm					Center Fr 815.500000 M
						RMS AVG	
40.0							
Center 815.5 MHz Res BW 100 kHz		/BW 300 k	Hz			n4MHz 20ms	CF St 400.000 k Auto M
Total Carrier Power 24.046 dBm/	3.00 MHz	ACP-I					<u>Auto</u> N
Carrier Power Filte	Offset Freq	Integ BW	Lower dBc dB		pper dBm	Filter	Freq Offs
1 24.046 dBm / 3.000 MHz OFF	0.0 Hz	37.50 kHz		5 -47.48	-23.44	OFF	
1 24.040 dBinn 3.000 Winz OFF	37.50 kHz	100.0 kHz		9 -46.73		OFF	U

Plot 7-21. Channel Edge Plot (LTE Band 26, 3MHz QPSK - RB Size 15- Low Channel)



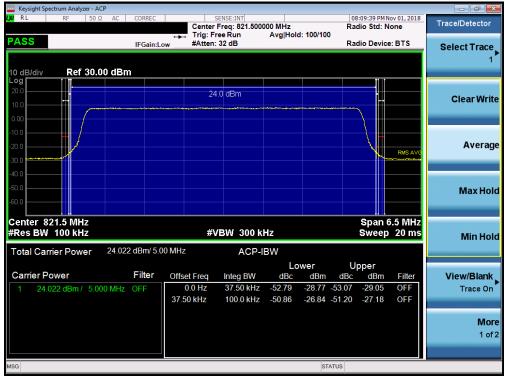
Plot 7-22. Channel Edge Plot (LTE Band 26, 3MHz QPSK - RB Size 15 - High Channel)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - ACP RL RF 50 Ω AC CORRI			00 MHz Avg Hold: 100/10	Radio S 0	9 PM Nov 01, 2018 itd: None Device: BTS	Trace/Detector
0 dB/div Ref 30.00 dBm					11 11	1
	24.	1 dBm	****=*, (a.e. p			Clear Write
						A
					RMS AVG	Averag
						Max Hol
tenter 816.5 MHz Res BW 100 kHz	#\/	BW 300 KH			an 6.5 MHz eep 20 ms	
Total Carrier Power 24.072 dBm		ACP-IE			eep zoms	Min Hol
			Lower	Uppe	r	
Carrier Power Filte	oneerined	Integ BW	dBc dBm	dBc d	Bm Filter	View/Blank
1 24.072 dBm / 5.000 MHz OFF	0.0 Hz	37.50 kHz			.90 OFF	Trace On
	37.50 kHz	100.0 kHz	-50.80 -26.72	-50.69 -26	.62 OFF	
						Мо
						1 of

Plot 7-23. Channel Edge Plot (LTE Band 26, 5MHz QPSK - RB Size 25- Low Channel)



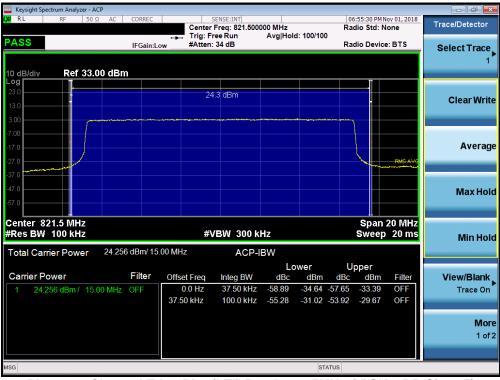
Plot 7-24. Channel Edge Plot (LTE Band 26, 5MHz QPSK - RB Size 25 - High Channel)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Keysight Spectrum Analyzer - ACP RL RF 50 Ω AC CORREC PASS IFGain:	Center F		000 MHz Avg Hold	: 100/100	08:04:09 PM No adio Std: No adio Device	one	Trace/Detector
10 dB/div Ref 30.00 dBm							1
Log 200 10.0 0.00	24.	0 dBm				•	Clear Write
-20.0						RMS AVG	Average
-40.0 -60.0 -60.0							Max Hold
Center 819 MHz #Res BW 100 kHz		BW 300 k			Span ′ Sweep	, 12 MHz 20 ms	Min Hold
Total Carrier Power 24.038 dBm/ 10).00 MHz	ACP-I					
Carrier Power Filter	Offset Freq	Integ BW	dBc	wer L dBm dBc	Jpper dBm	Filter	View/Blank
1 24.038 dBm / 10.00 MHz OFF	0.0 Hz 37.50 kHz	37.50 kHz 100.0 kHz	-54.96	-30.92 -55.38 -27.30 -51.64	-31.34	OFF OFF	Trace On
							Moro 1 of:
NSG				STATUS			

Plot 7-25. Channel Edge Plot (LTE Band 26, 10MHz QPSK – RB Size 50)



Plot 7-26. Channel Edge Plot (LTE Band 26, 15MHz QPSK – RB Size 75)

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7.5 Conducted Power Output Data §2.1046 §90.635

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Cond. PWR [dBm]	Cond. PWR [Watts]	Cond. PWR Limit [dBm]	Margin [dB]
814.70	1.4	QPSK	24.68	0.294	50.00	-25.32
823.30	1.4	QPSK	24.63	0.290	50.00	-25.37
814.70	1.4	16-QAM	23.97	0.249	50.00	-26.03
823.30	1.4	16-QAM	24.00	0.251	50.00	-26.00
814.70	1.4	64-QAM	23.02	0.200	50.00	-26.98
823.30	1.4	64-QAM	22.89	0.195	50.00	-27.11
815.50	3	QPSK	24.60	0.288	50.00	-25.40
822.50	3	QPSK	24.71	0.296	50.00	-25.29
815.50	3	16-QAM	23.90	0.245	50.00	-26.10
822.50	3	16-QAM	23.97	0.249	50.00	-26.03
815.50	3	64-QAM	22.99	0.199	50.00	-27.01
822.50	3	64-QAM	22.94	0.197	50.00	-27.06
816.50	5	QPSK	24.62	0.290	50.00	-25.38
821.50	5	QPSK	24.68	0.294	50.00	-25.32
816.50	5	16-QAM	23.96	0.249	50.00	-26.04
821.50	5	16-QAM	23.90	0.245	50.00	-26.10
816.50	5	64-QAM	22.89	0.195	50.00	-27.11
821.50	5	64-QAM	22.92	0.196	50.00	-27.08
819.00	10	QPSK	24.58	0.287	50.00	-25.42
819.00	10	16-QAM	23.93	0.247	50.00	-26.07
819.00	10	64-QAM	22.9	0.195	50.00	-27.10
821.50	15	QPSK	24.85	0.305	50.00	-25.15
821.50	15	16-QAM	24.15	0.260	50.00	-25.85
821.50	15	64-QAM	23.11	0.205	50.00	-26.89
	Table 7-2	. LTE Band	26 Conduct	ed Power Out	put Data	

NOTES:

- 1. For LTE mode, the device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with 1 RB.
- 2. This unit was tested with its standard battery.

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7.6 Radiated Power (ERP) §22.913(a.2)

Test Overview

Effective Radiated Power (ERP) measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole 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 D01 v03r01 - Section 5.2.1

ANSI/TIA-603-E-2016 - Section 2.2.17

Test Settings

- 1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
- 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 $\geq 2 \times \text{span} / \text{RBW}$
- 6. Detector = RMS
- 7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
- 8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
- 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.

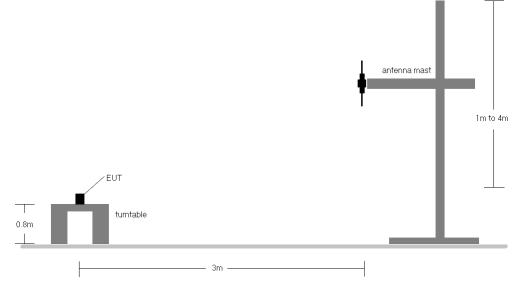


Figure 7-4. Radiated Test Setup <1GHz

Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. 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) This unit was tested with its standard battery.

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
821.50	15	QPSK	Н	178	342	36 / 18	20.36	1.49	19.70	0.093	38.45	-18.75
821.50	15	16-QAM	н	178	342	1 / 74	20.04	1.49	19.38	0.087	38.45	-19.07
821.50	15	64-QAM	Н	178	342	1 / 74	19.02	1.49	18.36	0.068	38.45	-20.09
821.50	15 (WCP)	QPSK	Н	178	342	1 / 74	19.94	1.49	19.28	0.085	38.45	-19.17

Table 7-3. ERP Data (Band 26)

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7.7 Radiated Spurious Emissions Measurements §2.1053 §90.691

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using horizontally and vertically 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 maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v03r01 - Section 5.8

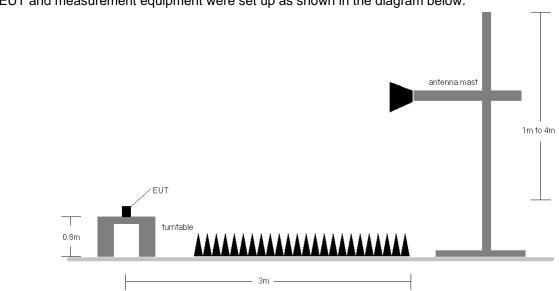
ANSI/TIA-603-E-2016 - Section 2.2.12

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 = RMS
- 6. Trace mode = Average (Max Hold for pulsed emissions)
- 7. The trace was allowed to stabilize

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

Figure 7-5. Test Instrument & Measurement Setup

Test Notes

- 1. For LTE mode, the device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with 1 RB.
- 2. The unit was tested with a standard battery.
- 3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst-case setup is reported in the tables below.
- 4. The "-" shown in the following RSE tables are used to denote a noise floor measurement.

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LTE BAND 26

OPERATING FREQUENCY:		815.50	MHz
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	3.0	MHz	
DISTANCE:	3	meters	
LIMIT:	-13.00	dBm	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1631.00	Н	-	-	-78.97	8.83	-70.14	-57.1
2446.50	Н	-	-	-76.87	9.53	-67.33	-54.3

Table 7-4. Radiated Spurious Data (LTE Band 26 – Low Channel)

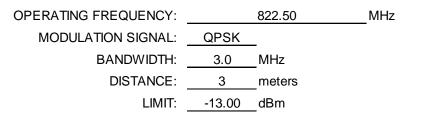
OPERATING FREQUENCY:		822.50	MHz
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	3.0	MHz	
DISTANCE:	3	meters	
LIMIT:	-13.00	_dBm	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1645.00	Н	151	301	-74.80	8.93	-65.87	-52.9
2467.50	Н	-	-	-76.88	9.63	-67.25	-54.2
3290.00	Н	-	-	-73.29	9.57	-63.71	-50.7

Table 7-5. Radiated Spurious Data (LTE Band 26 – High Channel)

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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1645.00	Н	201	26	-75.76	8.93	-66.83	-53.8
2467.50	Н	-	-	-76.92	9.63	-67.29	-54.3
3290.00	Н	-	-	-73.36	9.57	-63.78	-50.8

Table 7-6. Radiated Spurious Data with WCP (LTE Band 26 – High Channel)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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7.8 Frequency Stability / Temperature Variation §2.1055 §90.213

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-E-2016. 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.

The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency.

Test Procedure Used

ANSI/TIA-603-E-2016

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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Frequency Stability / Temperature Variation §2.1055, §90.213

OPERATING FREQUENCY:	819,000,000	Hz
CHANNEL:	26740	_
REFERENCE VOLTAGE:	4.34	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	_

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %		- 30	819,000,023	23	0.0000028
100 %		- 20	819,000,079	79	0.0000096
100 %		- 10	819,000,086	86	0.0000105
100 %		0	819,000,108	108	0.0000132
100 %		+ 10	819,000,278	278	0.0000339
100 %		+ 20	818,999,896	-104	-0.0000127
100 %		+ 30	819,000,055	55	0.0000067
100 %		+ 40	819,000,096	96	0.0000117
100 %		+ 50	818,999,701	-299	-0.0000365
BATT. ENDPOINT	3.49	+ 20	819,000,004	4	0.0000005

Table 7-7. LTE Band 26 Frequency Stability Data

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Frequency Stability / Temperature Variation §2.1055, §90.213

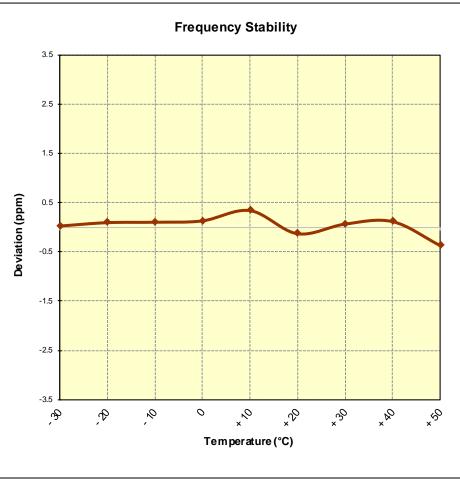


Table 7-8. LTE Band 26 Frequency Stability Data

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMG9730** complies with all the requirements of Parts 22(H) and 90 of the FCC rules.

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