

PCTEST ENGINEERING LABORATORY, INC.

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MEASUREMENT REPORT GSM / GPRS / EDGE / WCDMA

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.: 1M1811230206-02.A3L

FCC ID:

A3LSMG9730

APPLICANT:

Samsung Electronics Co., Ltd.

Application Type: Model: Additional Model: EUT Type: FCC Classification: FCC Rule Part(s): Test Procedure(s): Certification SM-G9730 SM-G9738 Portable Handset PCS Licensed Transmitter Held to Ear (PCE) 22 & 24 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.





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MEASUREMENT REPORT GSM / GPRS / EDGE / WCDMA



			EF	RP	EI	RP	
Mode	FCC Rule Part	Tx Frequency (MHz)	Max. Power (W)	Max. Power (dBm)	Max. Power (W)	Max. Power (dBm)	Emission Designator
GPRS850	22H	824.2 - 848.8	0.577	27.61	0.946	29.76	240KGXW
EDGE850	22H	824.2 - 848.8	0.180	22.56	0.296	24.71	249KG7W
WCDMA850	22H	826.4 - 846.6	0.080	19.05	0.132	21.20	4M16F9W
GPRS1900	24E	1850.2 - 1909.8			0.869	29.39	242KGXW
EDGE1900	24E	1850.2 - 1909.8			0.171	22.34	242KG7W
WCDMA1900	24E	1852.4 - 1907.6			0.225	23.51	4M18F9W

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 and the Innovation, Science and Economic Development Canada.

1.2 PCTEST Test Location

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

1.3 Test Facility / Accreditations Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21046, U.S.A.

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

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMG9730**. The test data contained in this report pertains only to the emissions due to the EUT's 2G/3G licensed transmitters.

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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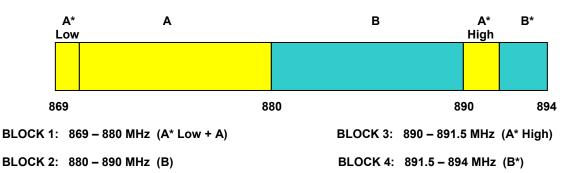
3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

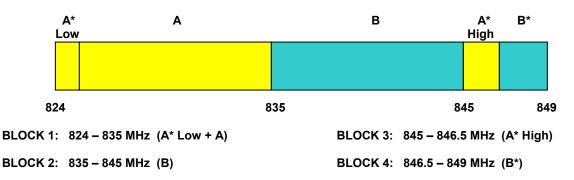
The measurement procedures described in the "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI/TIA-603-E-2016) and "Measurement Guidance for Certification of Licensed Digital Transmitters" (KDB 971168 D01 v03r01) were used in the measurement of the EUT.

Deviation from Measurement Procedure.....None

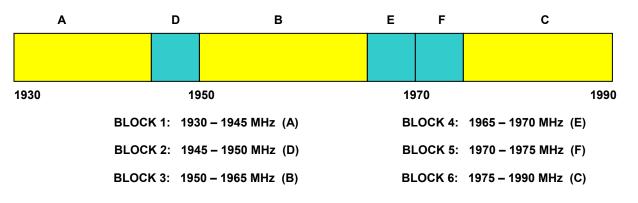
3.2 Cellular - Base Frequency Blocks



3.3 Cellular - Mobile Frequency Blocks



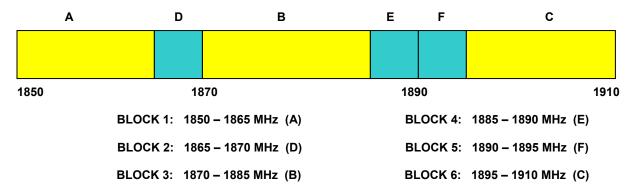
3.4 PCS - Base Frequency Blocks



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3.5 PCS - Mobile Frequency Blocks



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3.6 Radiated Measurements

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

The equipment under test was transmitting while connected to its integral antenna and is placed on a turntable 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer.

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].

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.

Radiated power and radiated spurious emission levels are investigated with the receive antenna horizontally and vertically polarized per ANSI/TIA-603-E-2016.

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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
-	LTx3	Licensed Transmitter Cable Set	8/23/2018	Annual	8/23/2019	LTx3
Agilent	E5515C	Wireless Communications Test Set	1/29/2016	Triennial	1/29/2019	GB46310798
Agilent	N9020A	MXA Signal Analyzer	1/24/2018	Annual	1/24/2019	US46470561
Agilent	E5515C	Wireless Communications Test Set	3/4/2016	Triennial	3/4/2019	GB45360985
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		9/17/2019	441119	
Espec	ESX-2CA	Environmental Chamber 3/28/2018 Annua		Annual	3/28/2019	17620
ETS Lindgren	3164-08	Quad Ridge Horn Antenna 3/28/2018 Biennial 3/		3/28/2020	128337	
Mini Circuits	TVA-11-422	RF Power Amp	N/A		N/A	QA1317001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		
Mini-Circuits	PWR-SEN-4RMS	USB Power Sensor	3/30/2018	3/30/2018 Annual 3/30/201		11210140001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11403100002
Rohde & Schwarz	CMU200	Base Station Simulator	5/18/2018	Annual	5/18/2019	109892
Rohde & Schwarz	CMW500	Radio Communication Tester	6/8/2018	Annual	6/8/2019	112347
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	1/24/2018	Annual	1/24/2019	100040
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
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	4/30/2018	Biennial	4/30/2020	9105-2404
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Tx	4/30/2018	Biennial	4/30/2020	9105-2403
Seekonk	NC-100	Torque Wrench (8" lb)	5/10/2018	Biennial	5/10/2020	N/A
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	4/19/2018	Biennial	4/19/2020	A051107
Sunol	DRH-118	Horn Antenna (1-18 GHz)	8/11/2017	Biennial	8/11/2019	A042511

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

GPRS Emission Designator

Emission Designator = 250KGXW

GPRS BW = 250 kHz G = Phase Modulation X = Cases not otherwise covered W = Combination (Audio/Data)

EDGE Emission Designator

Emission Designator = 250KG7W

EDGE BW = 250 kHz G = Phase Modulation 7 = Quantized/Digital Info W = Combination (Audio/Data)

WCDMA Emission Designator

Emission Designator = 4M16F9W

WCDMA BW = 4.16 MHz F = Frequency Modulation 9 = Composite Digital Info W = Combination (Audio/Data)

Spurious Radiated Emission

Example: Spurious emission at 3700.40 MHz

The receive 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 3700.40 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.50 dBm so this harmonic was 25.50 dBm -(-24.80) = 50.3 dBc.

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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):	<u>GSM / GPRS / EDGE / WCDMA</u>

FCC Part Section(s)	RSS Section(s)	Test Description Test Limit		Test Condition	Test Result	Reference
2.1049	RSS-Gen (4.6.1) RSS-133(2.3)	Occupied Bandwidth	N/A		PASS	Section 7.2
2.1051 22.917(a) 24.238(a) 27.53(h)	RSS-132(5.5) RSS-133(6.5)	Conducted Band Edge / Spurious Emissions	Spurious Emissions		PASS	Sections 7.3, 7.4
24.232(d) 27.50(d)(5)	RSS-132(5.4) RSS-133(6.4)	Peak-Average Ratio < 13 dB		CONDUCTED	PASS	Section 7.5
2.1046	RSS-132(5.4) RSS-133(4.1)	Transmitter Conducted Output Power	N/A		PASS	RF Exposure Report
2.1055 22.355 24.235 27.54	RSS-132(5.3) RSS-133(6.3)	Frequency Stability	< 2.5 ppm (Part 22) Emission must remain in band (Part 24)		PASS	Section 0
22.913(a)(5)	RSS-132(5.4)	Effective Radiated Power	< 7 Watts max. ERP		PASS	Section 7.6
24.232(c)	RSS-133(6.4)	Equivalent Isotropic		RADIATED	PASS	Section 7.6
2.1053 22.917(a) 24.238(a) 27.53(h)	RSS-132(5.5) RSS-133(6.5)	Radiated Spurious Emissions	> 43 + log₁₀ (P[Watts]) for all out-of-band emissions		PASS	Section 7.7

Table 7-1. Summary of Test Results

Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots 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 "2G/3G Automation," Version 3.9.

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7.2 Occupied Bandwidth

Test Overview

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

Test Procedure Used

KDB 971168 D01 v03r01 - Section 4.2

Test Settings

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

Test Setup

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



Figure 7-1. Test Instrument & Measurement Setup

Test Notes

None.

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Plot 7-1. Occupied Bandwidth Plot (Cellular GPRS Mode)



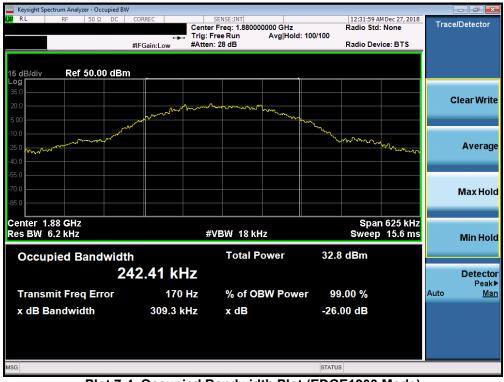
Plot 7-2. Occupied Bandwidth Plot (EDGE850 Mode)

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Plot 7-3. Occupied Bandwidth Plot (PCS GPRS Mode)



Plot 7-4. Occupied Bandwidth Plot (EDGE1900 Mode)

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Plot 7-5. Occupied Bandwidth Plot (Cellular WCDMA Mode)



Plot 7-6. Occupied Bandwidth Plot (PCS WCDMA Mode)

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7.3 Spurious and Harmonic Emissions at Antenna Terminal

Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at 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 for Cell and 20GHz for PCS (separated into at least two plots per channel)
- 2. Detector = RMS
- 3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
- 4. Sweep time = auto couple
- 5. The trace was allowed to stabilize
- 6. Please see test notes below for RBW and VBW settings

Test Setup

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



Figure 7-2. Test Instrument & Measurement Setup

Test Notes

Per 24.238(b), and RSS-133(6.5), compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 1MHz, and 100 kHz or greater for Part 22 and RSS-132 measurements below 1GHz. 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.

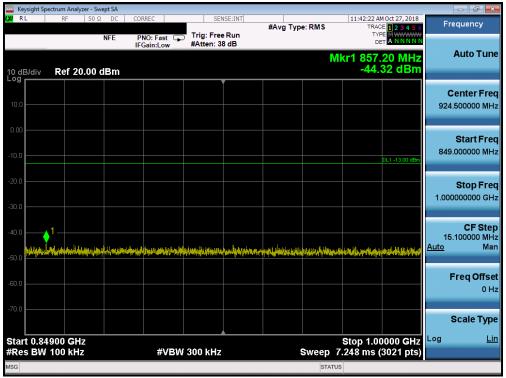
FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 17 of 75
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Cellular GPRS Mode

	ysight Sp																				×
X /RI	L	RF		50 Ω Ν	DC	PN		t 🖵		SEN I: Free ten: 3		#Ave	д Тур	e: RMS		TRA TY	M Oct 27, 20 CE 1 2 3 4 PE M WWW ET A N N N	5 6	Fr	equency	′
10 dE	3/div	Rei	f 20.	00 di	Bm	IFG	ann.LO	w							Mkr		.35 MI 60 dB			Auto T	un
Log 10.0																				Center F 6.500000	
0.00 -10.0																	DL1 -13.00 (IBm	30	Start F 0.000000	
-20.0 -30.0																		1	823	Stop F 3.000000	
-40.0	essine pal	al planter a	nd Phale	nikoler)]ti	djultiode	metral	-	riege lagt	(<mark>), ha ji sanda</mark>	a je gala je	(Application) (Application) and a dense respectively	(Ingel ^{a and} Angel (Internal)) And and a state of the statement	1), NJ 122-11 (* 14. 14. julij: 14. julij: 1		in production of the second second	ngaratipang ^a tipa			79 Auto	CF S 9.300000	
60.0																				Freq Of	fse 0⊦
-70.0																				Scale T	ур
	t 30.0 s BW						#\	/BW	300	kHz			s	weep	38.0	Stop 8 6 ms ('	23.0 MI 15861 p	12	Log		Li
MSG														STA	TUS						

Plot 7-7. Conducted Spurious Plot (Cellular GPRS Mode - Low Channel)



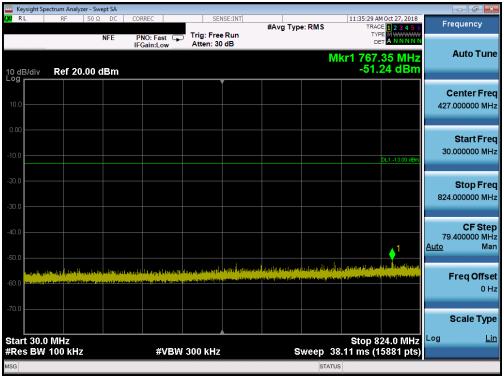
Plot 7-8. Conducted Spurious Plot (Cellular GPRS Mode - Low Channel)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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		trum Analyz											
L <mark>XI</mark> RL		RF	50 Ω Ν	DC	CORREC PNO: Fa	st 🖵	SEN Trig: Free #Atten: 38	#Avg Typ	e: RMS	TF	AM Oct 27, 2018 RACE 1 2 3 4 5 6 TYPE M WWWWW DET A N N N N N	Fi	requency
10 dB Log r	l/div	Ref 10	.00 d	Bm	IFGall1:L	ow	writen. or			Mkr1 9.7	23 5 GHz 3.94 dBm		Auto Tune
0.00													Center Fred 0000000 GH:
-10.0 - -20.0 -								 stere a start of y is a start of a start		المراجع المراجع	DL1 -13.00 dBm	1.00	Start Free
-30.0 -40.0												10.00	Stop Free 0000000 GH
-50.0												900 <u>Auto</u>	CF Ste 0.000000 MH Ma
-70.0													FreqOffse 0⊦
-80.0 -													Scale Typ
	: 1.000 ; BW 1	GHz .0 MHz	2		#	VBW	3.0 MHz	s	weep	Stop 1 15.60 ms	10.000 GHz (18001 pts)	Log	<u>Lir</u>
MSG									STA	TUS			

Plot 7-9. Conducted Spurious Plot (Cellular GPRS Mode - Low Channel)



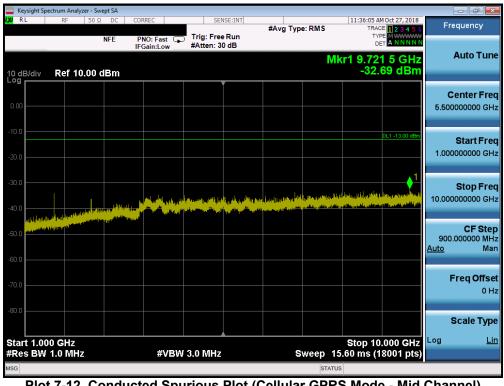
Plot 7-10. Conducted Spurious Plot (Cellular GPRS Mode - Mid Channel)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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🔤 Keysig	ht Spectrum	Analyzer - Sv	/ept SA										- # - ×
LXI RL	RI	50 <u>ព</u>	DC NFE	CORREC PNO: Fa		Trig: Free		#Avg Typ	e: RMS	TRA	M Oct 27, 2018 CE 1 2 3 4 5 6 (PE M WWWWW DET A N N N N N	Fre	quency
10 dB/c	liv Re	f 20.00	dBm	IFGain:L	ow	Atten: 30	dB		N	lkr1 876	.05 MHz .39 dBm	,	Auto Tune
10.0													enter Freq
-10.0											DL1 -13.00 dBm		Start Freq
-20.0													Stop Freq 000000 GHz
-40.0		•	1									15.1 <u>Auto</u>	CF Step 100000 MHz Man
-60.0	ini, iliyo ini di iliyo	a minu unitalla	laile, et al and a start of the s	itiya kaya	kovy platinistista i slav	ijiliya laidhin	wiliyanyaiyy	il bilantiqada istis	in a state of the state of the	kallış ileş debi deşiden	nipipilalipupupupipe	F	r eq Offsel 0 Hz
-70.0).84900	GHz								Stop 1.0	0000 GHz		cale Type <u>Lin</u>
#Res I	3W 100			#	VBW 3	00 kHz				7.248 ms	(3021 pts)		
MSG									STATI	JS			

Plot 7-11. Conducted Spurious Plot (Cellular GPRS Mode - Mid Channel)



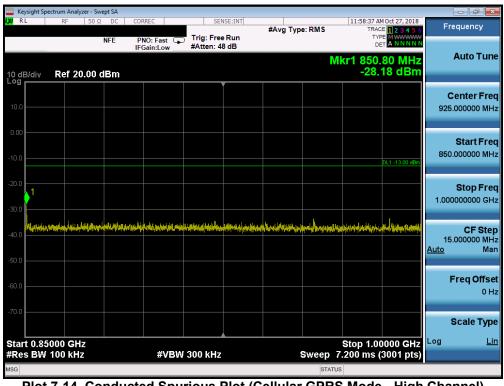
Plot 7-12. Conducted Spurious Plot (Cellular GPRS Mode - Mid Channel)

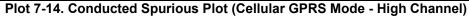
FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 75
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🔤 Keysight	Spectrum Analyz	er - Swept SA								
L <mark>XI</mark> RL	RF	50 Ω DC	CORREC		ISE:INT	#Avg Typ	e: RMS	TRA	M Oct 27, 2018 CE 1 2 3 4 5 6	Frequency
		NFE	PNO: Fast G	Trig: Free Atten: 30				T\ [PE MWWWWW ET A NNNNN	
			in outline of					Mkr1 663	.10 MHz	Auto Tune
10 dB/div	Ref 20	.00 dBm						-50	.29 dBm	
				``````						Center Fred
10.0										427.000000 MHz
0.00										Start Fred
-10.0										30.000000 MHz
-10.0									DL1 -13.00 dBm	
-20.0										Stop Fred
										824.000000 MHz
-30.0										
-40.0										CF Step
								1		79.400000 MHz <u>Auto</u> Mar
-50.0			alasha na goonalayaad	لم المراجعة الم	a a aine all an Usin	وريار وفاعرها بأرام	المقاربة مراءة	er betreft die bermastellenb	A Strategic and state	
-60.0			Contraction in the State of the Local State of the State			al GM committee and an	الأسينية (حمد تعادر)	A DECK DECK DECK DECK DECK DECK DECK DECK		Freq Offset
										0 Hz
-70.0										
										Scale Type
Start 30								Stop 8	324.0 MHz	Log <u>Lir</u>
	V 100 kHz	2	#VBV	/ 300 kHz		s		38.11 ms (	15881 pts)	
MSG							STA	TUS		

Plot 7-13. Conducted Spurious Plot (Cellular GPRS Mode - High Channel)





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	ectrum Analyz									_	
X/RL	RF	50 Ω DC	CORREC	SEN	ISE:INT	#Avg Typ	e: RMS		M Oct 27, 2018	Fred	quency
		NFE	PNO: Fast G	Trig: Free #Atten: 3				TY D			
10 dB/div Log	Ref 10	.00 dBm					Μ	kr1 9.75 -28.	0 5 GHz 77 dBm	A	luto Tune
0.00											e <b>nter Freq</b> 100000 GHz
-10.0									DL1 -13.00 dBm		Start Freq
-30.0	and the set of the set	prover places dates in fighter		n provinsi ta kata puta na ta provinsi na patri na puta		a si pi en provi si si si si Ven en en provi si si si si si si	lagar yang salah ng kara Lalah na karakan ng karakan	in congration and a second			Stop Freq 100000 GHz
-50.0										900.0 <u>Auto</u>	CF Step 00000 MHz Mar
-70.0										Fr	r <b>eq Offse</b> l 0 Hz
-80.0											cale Type
Start 1.00 #Res BW			#VBW	3.0 MHz		s	weep 1	Stop 10 5.60 ms (1	.000 GHz 8001 pts)	Log	<u>Lin</u>
ISG							STATU				

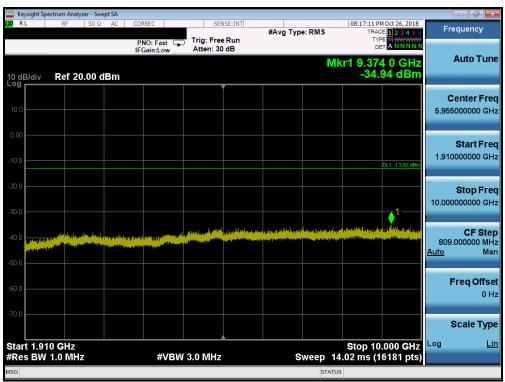
Plot 7-15. Conducted Spurious Plot (Cellular GPRS Mode - High Channel)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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@ 2010 DOTECT Engineering Labor	stem: Inc		V/0.0.44/40/2040



Keysight Spe	ectrum Analyzer - Swe RF 50 Ω		RREC		SE:INT			08:16:20.0	10ct 26, 2018	
KL	KF   50 52	Р	NO:Fast Gain:Low		Run	#Avg Typ	e: RMS	TRAC	E 1 2 3 4 5 6 E M W N N N N	Frequency
0 dB/div	Ref 20.00 d		SumEon				Mk	r1 1.74 -38.	5 0 GHz 38 dBm	Auto Tui
og 10.0										Center Fr 937.500000 M
10.0									DL1 -13.00 dBm	Start Fre 30.000000 M
20.0										<b>Stop Fr</b> 1.845000000 G
10.0 <b>(5,,/(19,1</b> ,,,)	hatibet få hanget stør såkel om							en sin in the state	n an	CF Sto 181.500000 M <u>Auto</u> M
0.0										Freq Offs 0
ro.o										Scale Ty
tart 0.03 Res BW	00 GHz 1.0 MHz		#VBW	/ 3.0 MHz			Sweep 2.	Stop 1.8 420 ms (	450 GHz 3631 pts)	Log <u>L</u>
ŝG							STATUS			

Plot 7-16. Conducted Spurious Plot (PCS GPRS Mode - Low Channel)



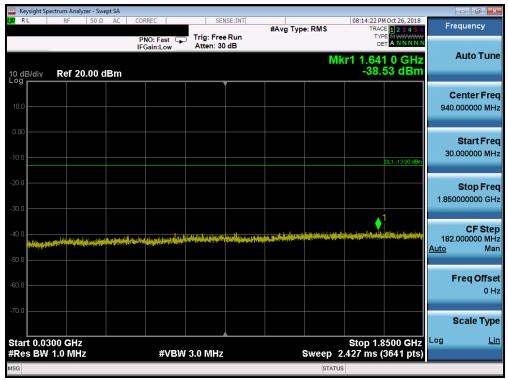
#### Plot 7-17. Conducted Spurious Plot (PCS GPRS Mode - Low Channel)

	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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	Test Dates:	EUT Type:       12/14/2018 - 1/26/2019



	Spectrum Analyzer	- Swept SA									×
XI RL	RF	i0Ω AC C	ORREC	SEN	ISE:INT	#Avg Typ	e: RMS	TRAC	MOct 26, 2018	Frequency	y
			PNO: Fast 🕞 FGain:Low	Trig: Free Atten: 20				TYF			
10 dB/div Log	Ref 10.0	0 dBm					Mkr	1 16.91 -38.	8 5 GHz 80 dBm	Auto T	'un
0.00										Center F 15.000000000	
-10.0									DL1 -13.00 dBm	Start F 10.000000000	
-30.0							1	A Hilly Mark Markey of La		Stop F 20.000000000	
50.0	یرو بر این اور این اور این	a phala in a fair an	un Illebreiter eine Seiter in anderen eine Seiter							CF S 1.000000000 <u>Auto</u>	Ste G⊢ Ma
70.0										Freq Of	ffs 0 H
80.0										Scale T	Гур
	).000 GHz W 1.0 MHz		#VBW	/ 3.0 MHz		s	weep 25	Stop 20 5.33 ms (2	.000 GHz 0001 pts)	Log	L
ISG							STATUS	3			

Plot 7-18. Conducted Spurious Plot (PCS GPRS Mode - Low Channel)



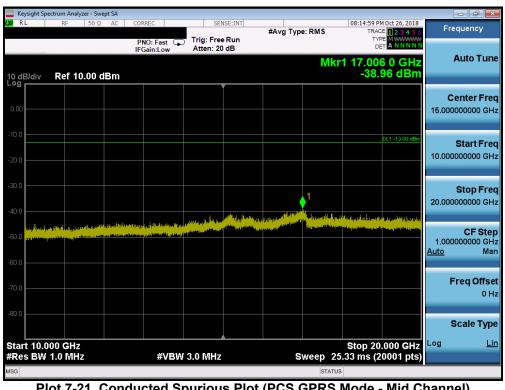
Plot 7-19. Conducted Spurious Plot (PCS GPRS Mode - Mid Channel)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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🔤 Keysight S	pectrum Analy	zer - Swept S	SA									×
XU RL	RF	50 Ω		NO: Fast	Trig: Fre		#Avg Typ	e: RMS	TRA	PM Oct 26, 2018 CE 1 2 3 4 5 6 (PE M WWWWW DET A N N N N N	Frequency	'
10 dB/div	Ref 20	).00 dB	IF	Gain:Low	Atten: 30	) dB		N	lkr1 9.42	4 0 GHz .64 dBm	Auto T	un
10.0											Center F 5.955000000	
10.0										DL1 -13.00 dBm	Start F 1.910000000	
20.0 30.0										1	Stop F 10.000000000	
40.0 <mark>(/m/////</mark> 50.0		a Norse (Marine Job Aline (Norse and State)		a contration of the		gyang pakan di kana daga ng pang pakan di kang pang ng pang pang pang pang pang pang pang pa	a yang penyertini ng di Panan-ta-terting pana		ng data (ng sint di Anna ani ya Ng sa guna ang sint di Anna ang sa		CF S 809.000000 I <u>Auto</u>	MI Mi
i0.0											Freq Off	fs 0
70.0	10 GHz								Stop 4		Scale T	ЪĿ
	10 GHZ V 1.0 MH:	z		#VBV	N 3.0 MHz		S	weep	- stop 1 14.02 ms (	0.000 GHz 16181 pts)	-	
SG								STAT	US			

Plot 7-20. Conducted Spurious Plot (PCS GPRS Mode - Mid Channel)



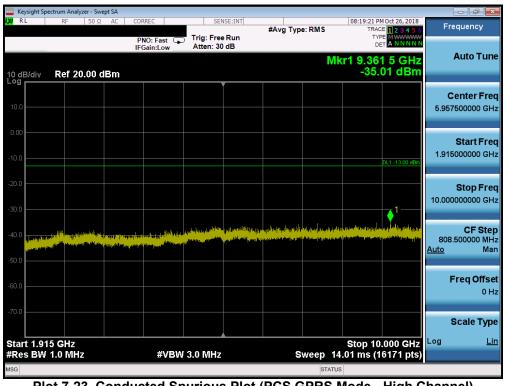
Plot 7-21. Conducted Spurious Plot (PCS GPRS Mode - Mid Channel)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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🔤 Keysight Spe	ectrum Analyz	zer - Swept	t SA									[	- • ×
LXU RL	RF	50 Ω	AC	CORREC	ast 🖵	Trig: Fre		#Avg Typ	e: RMS	TRA	PM Oct 26, 2018 CE 1 2 3 4 5 6 (PE M WWWWW DET A N N N N N	Fre	quency
10 dB/div Log	Ref 20	.00 dE	3m	IFGain:	Low	Atten: 3	0 dB		Μ		1 5 GHz 36 dBm		Auto Tune
10.0													enter Free 000000 MH
-10.0											DL1 -13.00 dBm		Start Fre 000000 MH
-20.0													<b>Stop Fre</b> 000000 GH
40.0	والمانية فأقروه	land the state	alin ju gate İri			den filmen og skører i	<del>keristanijasias dag</del>	an da an	in before the set of the	ija <mark>berediktettet</mark> fil	dyalang, kepertahangkan be	182. <u>Auto</u>	CF Ste 000000 MH Ma
60.0												F	req Offs 0 H
-70.0													Scale Typ
Start 0.03 #Res BW		4			#VBW	3.0 MHz	2		Sweep	Stop 1. 2.427 ms	8500 GHz (3641 pts)	Log	Li
MSG									STAT	JS			

Plot 7-22. Conducted Spurious Plot (PCS GPRS Mode - High Channel)



Plot 7-23. Conducted Spurious Plot (PCS GPRS Mode - High Channel)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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	ectrum Analyze	er - Swept SA										×
KI RL	RF	50 Ω AC	PN	0: Fast 🗔	Trig: Free		#Avg Typ	e: RMS	TRAC	M Oct 26, 2018 E 1 2 3 4 5 6 E M M M N N N	Frequenc	У
10 dB/div	Ref 10.	.00 dBn		ain:Low	Atten: 20	dB		Mkr	1 16.97	3 0 GHz 62 dBm	Auto 1	Tun
0.00											Center 15.000000000	
20.0										DL1 -13.00 dBm	Start 10.000000000	
40.0						likely setting,		1 Julia kontrolast	Marile Management	Tapolisi Mari Japan V.	Stop 20.000000000	
50.0 <b></b>	بەلىرىي لەم 1940 روپ مەنىي مەنىيە تېخىمىسى	Ul contration of the second	lines più	a na ana ang kana ang Ng kana ang k		petitel Reparation of the second s		هم رط ^{ار} تا تعریس ایند. ا	i feliti ging sifekta sura shti		CF : 1.000000000 <u>Auto</u>	
'0.0 <b></b>											Freq O	offs 0 H
80.0	100 GHz								Stop 20	.000 GHz	Scale ⁻	<b>Ту</b> р <u>Ц</u>
Res BW	1.0 MHz			#VBW	/ 3.0 MHz		S		.33 ms (2	0001 pts)		
SG								STATUS	5			

Plot 7-24. Conducted Spurious Plot (PCS GPRS Mode - High Channel)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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# Cellular WCDMA Mode

Keysight Spectrum Analyzer						- 6 <b>-</b>
XIRL RF 5	NFE	PNO: Fast	SENSE:INT Trig: Free Run #Atten: 64 dB	#Avg Type: RMS	03:51:29 PM Oct 26, 2018 TRACE 2 3 4 5 6 TYPE A WWWWW DET A NNNN	Frequency
10 dB/div Ref 20.0		Gameon		N	lkr1 822.80 MHz -25.33 dBm	Auto Tun
10.0						<b>Center Fre</b> 426.500000 MH
10.0					DL1 -13.00 dBm	Start Fre 30.000000 M⊦
30.0	tin ( http://www.composition.com/					Stop Fre 823.000000 M⊦
40.0						CF Ste 79.300000 MH Auto Ma
60.0						Freq Offs 0 F
5tart 30.0 MHz					Stop 823.0 MHz 8.06 ms (15861 pts)	Scale Typ
#Res BW 100 kHz		#VBW	300 kHz	Sweep 3		

Plot 7-25. Conducted Spurious Plot (Cellular WCDMA Mode - Low Channel)

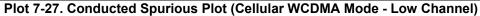


Plot 7-26. Conducted Spurious Plot (Cellular WCDMA Mode - Low Channel)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Keysight Spect	rum Analyzer - Swe	pt SA									
L <mark>XI</mark> RL	RF 50 Ω	DC CO	RREC	SEN	ISE:INT	#Avg Type	:RMS	TRAC	M Oct 26, 2018	Freque	ency
	1	NFE P IF	NO: Fast 😱 Gain:Low	Trig: Free #Atten: 3		• /		TYF DE			_
10 dB/div	Ref 10.00 d	Bm					M	kr1 9.99 -35.	1 0 GHz 32 dBm	Aut	o Tune
0.00										Cent 5.500000	<b>er Freq</b> 000 GHz
-10.0									DL1 -13.00 dBm	Sta	art Freq
-20.0										1.000000	
-30.0			~~~	~~~	$\sim$		~~~		1	<b>Sto</b> 10.000000	o <b>p Freq</b> 000 GHz
-50.0										<b>0</b> 900.000 <u>Auto</u>	CF Step 000 MHz Mar
-70.0										Free	<b>Offse</b> 0 Ha
-80.0										Sca	іе Туре
Start 1.000 #Res BW 1			#VBW	3.0 MHz		S	weep 1	Stop 10 5.60 ms (1	000 0112	Log	Lin
MSG							STATU	IS			





Plot 7-28. Conducted Spurious Plot (Cellular WCDMA Mode - Mid Channel)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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	ectrum Analyzer	- Swept SA									×
L <mark>XI</mark> RL	RF	50 Ω DC	CORREC	Trig: Free		#Avg Type	e: RMS	TRAC	E 1 2 3 4 5 6 A WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW	Frequency	
10 dB/div Log	Ref 20.0	00 dBm	IFGain:Low	#Atten: 46	dB		N	lkr1 849.	_	Auto T	une
10.0										Center F 924.500000	
-10.0									DL1 -13.00 dBm	Start F 849.000000	
-20.0										Stop F 1.000000000	
-40.0	macantration	لواليونياسي واليالي الم	ulgert off aftering the transfer of the	mangayan dalayan dalayan ya	*************	nd in stand of the standard	₩₽₩₽₩₽₩₽₩₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽	رو دوان کار اور در چر کار راد	mhuathairticheana	CF S 15.100000 <u>Auto</u>	
-60.0										Freq Of	fset 0 Hz
Start 0.84	900 GHz							Stop 1.00	000 0112	Scale T	ype Lin
#Res BW	TUU KHZ		#VBW	300 kHz			Sweep	7.248 ms ( s	3021 pts)		_

Plot 7-29. Conducted Spurious Plot (Cellular WCDMA Mode - Mid Channel)



Plot 7-30. Conducted Spurious Plot (Cellular WCDMA Mode - Mid Channel)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 75
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	pectrum Analyz										×
LXI RL	RF	50 Ω DC	CORREC	SEI	ISE:INT	#Avg Typ	e: RMS	TRAC	1 Oct 26, 2018	Frequenc	у
		NFE	PNO: Fast G	Trig: Free #Atten: 4		• ,,,		TYP	E A WWWWW T A N N N N N		
			II Gain.Low				M	kr1 820.	20 MHz	Auto 1	Гune
10 dB/div	Ref 20	.00 dBm						lkr1 820. -51.	56 dBm		
										Center	Eroa
10.0										427.000000	
0.00										Start	Eroa
40.0										30.000000	
-10.0									DL1 -13.00 dBm		
-20.0										Stop	Eroa
										824.000000	
-30.0											
-40.0											Step
-40.0										79.400000 <u>Auto</u>	) MHz Man
-50.0										Auto	Man
									a na phi na shi na shi	Freq O	ffset
-60.0											0 Hz
-70.0											
10.0										Scale 1	Туре
Start 30.								Stop 9	24.0 MHz	Log	Lin
	0 101HZ V 100 kHz		#VBV	V 300 kHz		s	weep 3	، stop 8 11 ms (1			
MSG							STATU	·			

Plot 7-31. Conducted Spurious Plot (Cellular WCDMA Mode - High Channel)



Plot 7-32. Conducted Spurious Plot (Cellular WCDMA Mode - High Channel)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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	ectrum Analyzer						
LXI RL	RF	50Ω DC	CORREC	SENSE:INT	#Avg Type: RMS	03:53:47 PM Oct 26, 2018 TRACE 1 2 3 4 5 6	Frequency
		NFE	PNO: Fast 🕞	Trig: Free Run #Atten: 32 dB	• /	TYPE A WWWWW DET A NNNNN	
10 dB/div Log	Ref 10.0	0 dBm			N	lkr1 9.771 5 GHz -39.26 dBm	Auto Tune
0.00							Center Freq 5.50000000 GHz
-10.0						DL1 -13.00 dBm	<b>Start Freq</b> 1.000000000 GHz
-30.0						1	<b>Stop Freq</b> 10.000000000 GHz
-50.0							CF Step 900.000000 MHz <u>Auto</u> Man
-70.0							<b>Freq Offset</b> 0 Hz
-80.0							Scale Type
Start 1.00 #Res BW			#VBW	3.0 MHz	Sweep	Stop 10.000 GHz 15.60 ms (18001 pts)	Log <u>Lin</u>
MSG					STAT	US	

Plot 7-33. Conducted Spurious Plot (Cellular WCDMA Mode - High Channel)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Keysight Spectrum Analyzer - S					
RL RF 50	Ω DC CORREC	Trig: Free Run #Atten: 50 dB	#Avg Type: RMS	03:57:06 PM Oct 26, 2018 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A NNNN	Frequency
0 dB/div Ref 20.00			M	kr1 1.845 0 GHz -29.15 dBm	Auto Tur
10.0					Center Fre 937.500000 M⊦
10.0				DL1 -13.00 dBm	Start Fre 30.000000 MH
20.0		ې د د د د د د د د د د د د د د د د د د د		normalization and hypergraphic second second	Stop Fre 1.845000000 GF
10.0 50.0					CF Ste 181.50000 MH <u>Auto</u> Ma
50.0					Freq Offs 0 F
70.0 Start 0.0300 GHz Res BW 1.0 MHz	-#1)	'BW 3.0 MHz	Sween	Stop 1.8450 GHz 2.420 ms (3631 pts)	Scale Typ Log <u>L</u>
SG	# V	BW J.0 WHZ	Sweep 2		

Plot 7-34. Conducted Spurious Plot (PCS WCDMA Mode - Low Channel)



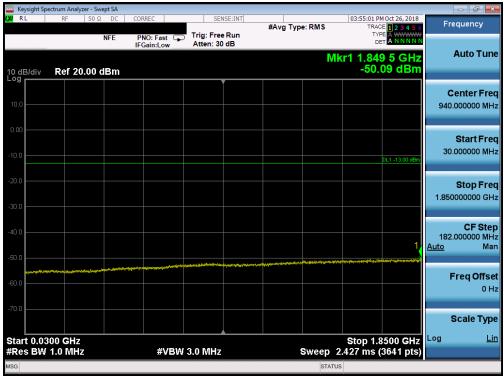
#### Plot 7-35. Conducted Spurious Plot (PCS WCDMA Mode - Low Channel)

	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Dates:	EUT Type:	Page 33 of 75	
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	Test Dates:	EUT Type:     EUT Type:       12/14/2018 - 1/26/2019     Portable Handset	



🔤 Keysight Spectru									
LXU RL	RF 50 S	NFE	PNO: Fast	Trig: Free Run #Atten: 22 dB	#Avg Typ	e: RMS	03:58:05 PM Oct 2 TRACE 1 2 TYPE A W DET A	3456	Frequency
10 dB/div	Ref 10.00	dBm	IFGain:Low	#Atten: 22 db		Mkr	1 19.539 5 -44.06	GHz	Auto Tune
0.00									Center Fred 15.000000000 GH:
-10.0							DL1 -1	3.00 dBm	Start Free 10.000000000 GH:
-30.0								<b>↓</b> 1_	Stop Free 20.000000000 GH
-50.0									<b>CF Stej</b> 1.000000000 GH <u>Auto</u> Ma
-70.0									<b>Freq Offse</b> 0 H
-80.0									Scale Typ
Start 10.000 #Res BW 1.			#VBW	/ 3.0 MHz	s	weep 17	Stop 20.000 7.33 ms (2000	GHz 1 pts)	Log <u>Lir</u>
MSG						STATUS	S		

Plot 7-36. Conducted Spurious Plot (PCS WCDMA Mode - Low Channel)



Plot 7-37. Conducted Spurious Plot (PCS WCDMA Mode - Mid Channel)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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		zer - Swept SA								
L <mark>XI</mark> RL	RF	50 Ω DC	CORREC	SEI	NSE:INT	#Avg Typ	e: RMS		MOct 26, 2018	Frequency
		NFE	PNO: Fast G	Trig: Free Atten: 30				TYF DE		
10 dB/div Log	Ref 20	.00 dBm					M	lkr1 9.75 -41.	7 5 GHz 41 dBm	Auto Tur
10.0										Center Fre 5.955000000 G⊦
-10.0									DL1 -13.00 dBm	Start Fre 1.910000000 G⊦
-20.0										Stop Fre 10.000000000 GH
-40.0		~~	~~~~		~~~~					CF Ste 809.000000 M⊦ <u>Auto</u> Ma
-60.0										Freq Offs 0 ⊦
										Scale Typ
Start 1.91 #Res BW			#VBV	V 3.0 MHz		s	weep 1	Stop 10 4.02 ms (1	.000 0112	Log <u>L</u>
MSG							STAT			

Plot 7-38. Conducted Spurious Plot (PCS WCDMA Mode - Mid Channel)



Plot 7-39. Conducted Spurious Plot (PCS WCDMA Mode - Mid Channel)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager		
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	ectrum Analyzer	- Swept SA									
XV RL	RF	50 Ω DC	CORREC PNO: Fast	Trig: Fre		#Avg Type	e: RMS	TRA	M Oct 26, 2018 CE 1 2 3 4 5 6 PE A WWWWW ET A N N N N N	Fre	quency
10 dB/div Log	Ref 20.0	00 dBm	IFGain:Low	Atten: 30	) dB		М		4 5 GHz 33 dBm		Auto Tune
10.0											enter Fred 000000 MH
-10.0									DL1 -13.00 dBm		Start Free 000000 MH
-20.0											Stop Fre D00000 GH
40.0						h grand grand and an and an and	the marked line big day and should be	and at some plan to opping the	1	182.0 <u>Auto</u>	CF Ste 000000 M⊦ Ma
50.0	ny hiji ningi mi _{ng} ng higo di metrografik		anna a fa an ann an a	nterne and for the second s	in the second					F	req Offs 0 H
-70.0 Start 0.03								Stop 1.		Log	cale Typ <u>Li</u>
¢Res B₩	1.0 MHz		#VE	SW 3.0 MHz				2.427 ms	(3641 pts)		
SG							STATU	15			

Plot 7-40. Conducted Spurious Plot (PCS WCDMA Mode - High Channel)



Plot 7-41. Conducted Spurious Plot (PCS WCDMA Mode - High Channel)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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	ctrum Analyzer										
LXU RL	RF 5	50 Ω DC   NFE	CORREC PNO: Fast	Trig: Free		#Avg Type:   Avg Hold:>1		TRACE	Oct 26, 2018 <b>1 2 3 4 5 6</b> <b>A WWWWW</b> <b>A N N N N N</b>	Free	quency
10 dB/div Log	Ref 10.0	0 dBm	IFGain:Low	#Atten: 36	dB		Mk	r1 9.736		Ļ	Auto Tune
0.00											enter Fred
-10.0									DL1 -13.00 dBm		Start Fred 000000 GH:
-30.0											<b>Stop Fred</b> 000000 GH:
60.0										1.0000 <u>Auto</u>	CF Stej 000000 GH Mar
70.0										Fi	r <b>eq Offse</b> 0 H
-80.0 <u>1</u> Start 10.0	00 GHz							Stop 20	000 GHz	S Log	cale Type Lir
#Res BW	1.0 MHz			W 3.0 MHz*				33 ms (20	0001 pts)		
sg 😻 File r	iame error; l	D:\Users\li	nstrument\Doc	cuments\SA\sc	reen\scre	een does	STATUS				

Plot 7-42. Conducted Spurious Plot (PCS WCDMA Mode - High Channel)

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

### **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 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 $43 + \log_{10}(P_{[Watts]})$ , where P is the transmitter power in Watts.

### **Test Procedure Used**

KDB 971168 D01 v03r01 - 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  $\geq$  3 x RBW
- 5. Detector = RMS
- 6. Number of sweep points  $\geq 2 \times \text{Span/RBW}$
- 7. Trace mode = trace average for continuous emissions, max hold for pulse emissions
- 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 7-3. Test Instrument & Measurement Setup

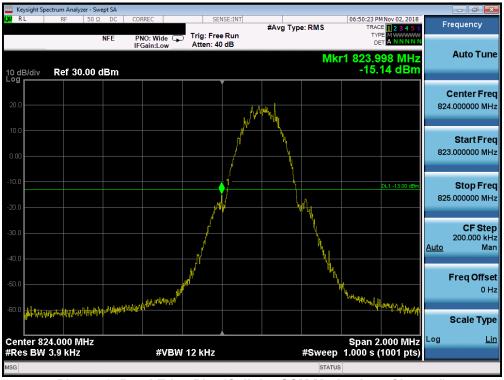
### Test Notes

Per 22.917(b), 24.238(b), and RSS-132(5.5), RSS-133(6.5), 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.

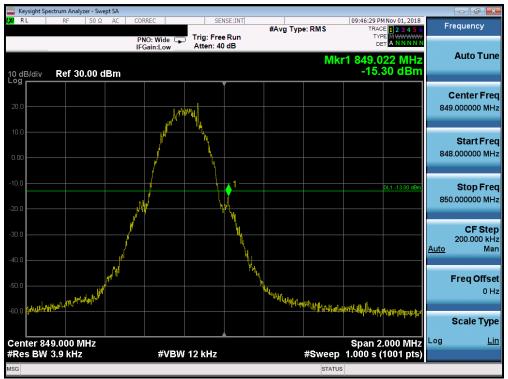
FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dega 20 of 75	
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## **Cellular GPRS Mode**



Plot 7-43. Band Edge Plot (Cellular GSM Mode - Low Channel)

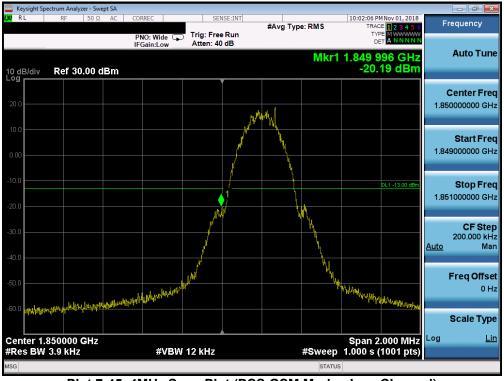


### Plot 7-44. Band Edge Plot (Cellular GSM Mode - High Channel)

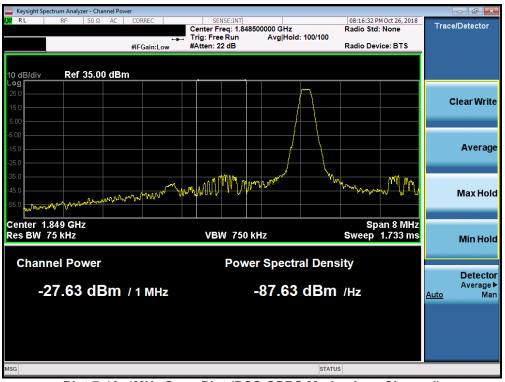
FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 20 of 75
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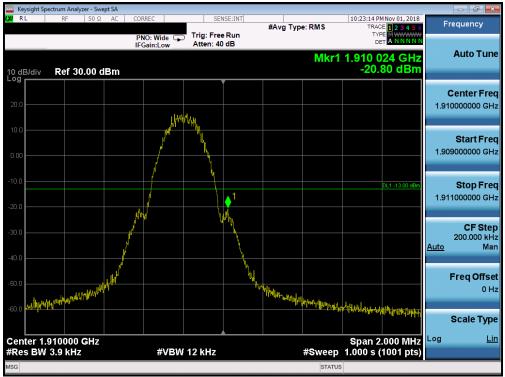
Plot 7-45. 4MHz Span Plot (PCS GSM Mode - Low Channel)



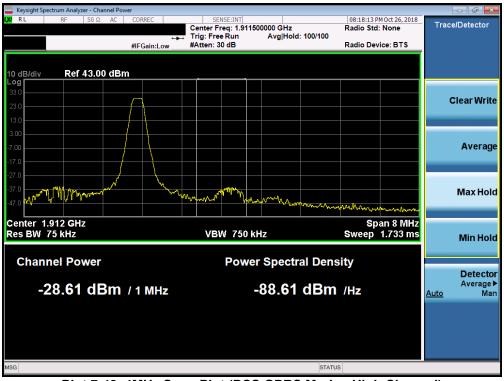
### Plot 7-46. 4MHz Span Plot (PCS GPRS Mode - Low Channel)

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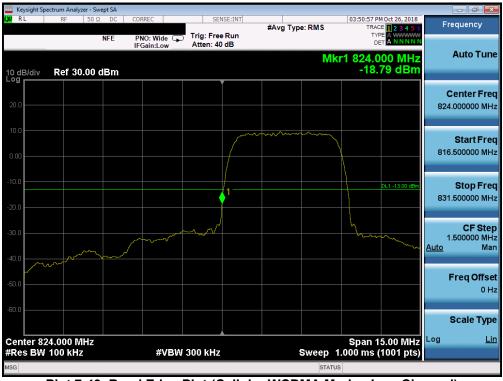


### Plot 7-48. 4MHz Span Plot (PCS GPRS Mode - High Channel)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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# **Cellular WCDMA Mode**



Plot 7-49. Band Edge Plot (Cellular WCDMA Mode - Low Channel)



### Plot 7-50. Band Edge Plot (Cellular WCDMA Mode - High Channel)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-51. Band Edge Plot (PCS WCDMA Mode - Low Channel)



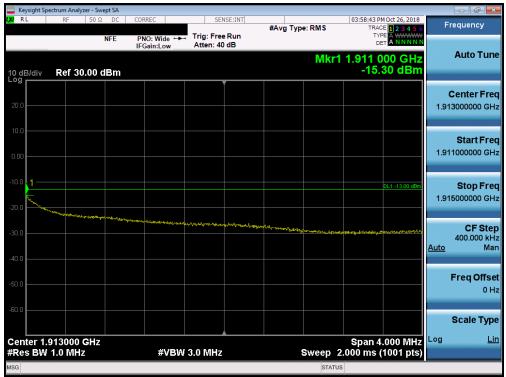
### Plot 7-52. 4MHz Span Plot (PCS WCDMA Mode - Low Channel)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)		proved by: ality Manager
Test Report S/N:	Test Dates:	EUT Type:	Der	no. 42 of 75
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	ectrum Analyzer - Swept SA					
LXI RL	RF 50 Ω DC	CORREC	SENSE:INT	#Avg Type: RMS	03:58:29 PM Oct 26, 2018 TRACE 1 2 3 4 5 6	Frequency
	NFE	PNO: Wide 🖵 IFGain:Low	Trig: Free Run Atten: 40 dB		DET A NNNNN	
10 dB/div Log	Ref 30.00 dBm			Mkr	1.910 000 GHz -19.18 dBm	Auto Tune
20.0						Center Freq 1.91000000 GHz
0.00		n.m.m.m.m.m.m.m.m.m.m.m.m.m.m.m.m.m.m.m	~			Start Freq 1.902500000 GHz
-10.0			1		DL1 -13.00 dBm	<b>Stop Fred</b> 1.917500000 GHz
-30.0			h	Munum .	~~~~~	CF Step 1.500000 MHz <u>Auto</u> Mar
-50.0						Freq Offse 0 H:
-60.0						Scale Type
Center 1. #Res BW	910000 GHz 100 kHz	#VBW		Sweep	Span 15.00 MHz 1.000 ms (1001 pts)	Log <u>Lin</u>
MSG				STATU		

Plot 7-53. Band Edge Plot (PCS WCDMA Mode - High Channel)



### Plot 7-54. 4MHz Span Plot (PCS WCDMA Mode - High Channel)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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### 7.5 Peak-Average Ratio

### **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 D01 v03r01 - 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.



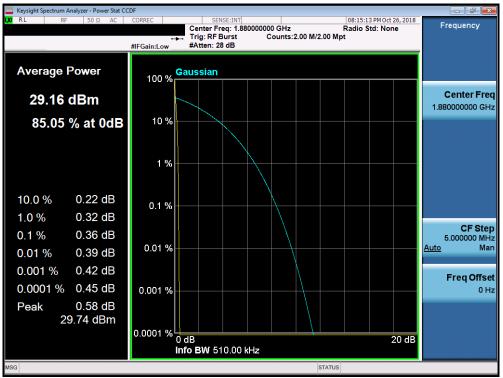
Figure 7-4. Test Instrument & Measurement Setup

### **Test Notes**

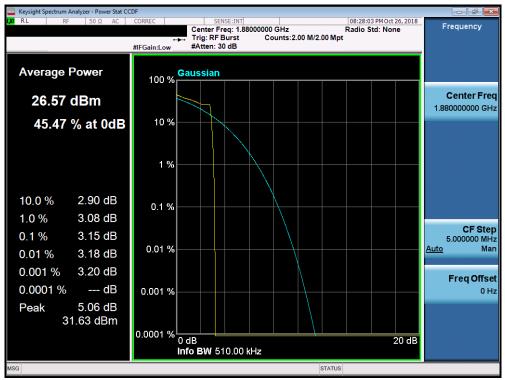
None

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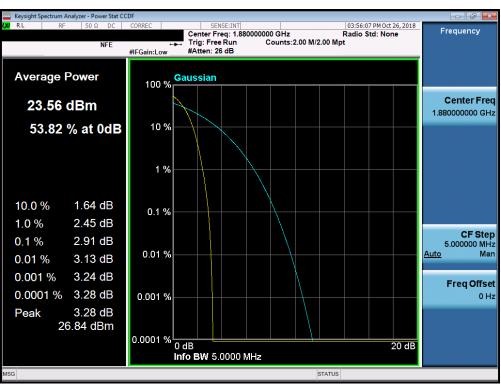




### Plot 7-56. Peak-Average Ratio Plot (PCS EDGE Mode)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-57. Peak-Average Ratio Plot (PCS WCDMA Mode)

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Test Report S/N:	Test Dates:	EUT Type:		Dage 47 of 75	
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### 7.6 Radiated Power (ERP/EIRP)

### Test Overview

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) 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. Measurements on signals operating above 1GHz are performed using vertically and horizontally and horizontally polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating 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. 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.

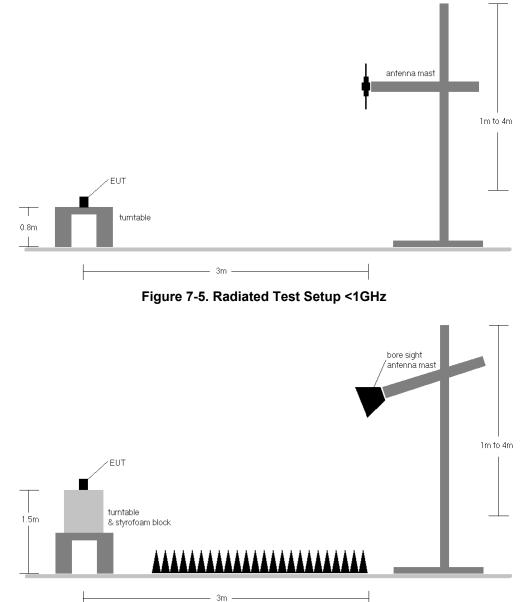


Figure 7-6. Radiated Test Setup >1GHz

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- 1) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest power is reported in GPRS mode while transmitting with one slot active.
- 2) This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, and HSUPA capabilities. For WCDMA and HSUPA transmission, all configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2kbps with HSDPA inactive and TPC bits all set to "1."
- 3) This unit was tested with its standard battery.
- 4) 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.

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Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
824.20	GPRS850	Н	222	331	23.01	6.75	27.61	38.45	-10.84	29.76	40.61	-10.85
836.60	GPRS850	Н	211	323	22.83	6.78	27.46	38.45	-11.00	29.61	40.61	-11.00
848.80	GPRS850	Н	217	327	22.78	6.80	27.43	38.45	-11.02	29.58	40.61	-11.03
824.20	GPRS850	V	237	54	22.60	6.75	27.20	38.45	-11.25	29.35	40.61	-11.26
824.20	EDGE850	Н	222	331	17.96	6.75	22.56	38.45	-15.89	24.71	40.61	-15.90
824.20	GPRS850 (WCP)	Н	133	89	19.47	6.75	24.07	38.45	-14.38	26.22	40.61	-14.39

Table 7-2. ERP/EIRP (Cellular GPRS)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
826.40	WCDMA850	Н	116	172	14.15	6.76	18.76	38.45	-19.70	20.91	40.61	-19.70
836.60	WCDMA850	Н	116	172	14.37	6.78	19.00	38.45	-19.46	21.15	40.61	-19.46
846.60	WCDMA850	н	335	172	14.40	6.80	19.05	38.45	-19.40	21.20	40.61	-19.41
846.60	WCDMA850	V	239	253	14.01	6.80	18.66	38.45	-19.79	20.81	40.61	-19.80
846.60	WCDMA850 (WCP)	Н	136	126	10.25	6.80	14.90	38.45	-23.55	17.05	40.61	-23.56

Table 7-3. ERP/EIRP (Cellular WCDMA)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1850.20	GPRS1900	V	133	198	20.46	8.37	28.83	33.01	-4.18
1880.00	GPRS1900	V	124	132	20.22	8.41	28.63	33.01	-4.38
1909.80	GPRS1900	V	141	188	20.93	8.46	29.39	33.01	-3.62
1909.80	GPRS1900	Н	100	182	20.32	8.46	28.78	33.01	-4.23
1909.80	EDGE1900	V	141	188	13.88	8.46	22.34	33.01	-10.67
1909.80	GPRS1900 (WCP)	V	351	43	17.11	8.46	25.57	33.01	-7.44

Table 7-4. EIRP (PCS GPRS)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager		
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Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1852.40	WCDMA1900	Н	146	89	14.43	8.37	22.80	33.01	-10.21
1880.00	WCDMA1900	Н	146	89	15.10	8.41	23.51	33.01	-9.50
1907.60	WCDMA1900	Н	143	89	14.74	8.46	23.20	33.01	-9.81
1880.00	WCDMA1900	V	143	33	13.74	8.41	22.15	33.01	-10.86
1880.00	WCDMA1900 (WCP)	Н	301	55	12.27	8.41	20.68	33.01	-12.33

Table 7-5. EIRP (PCS WCDMA)

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### 7.7 Radiated Spurious Emissions Measurements

### **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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EUT turntable 8. styrofoam block

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

Figure 7-7. Test Instrument & Measurement Setup

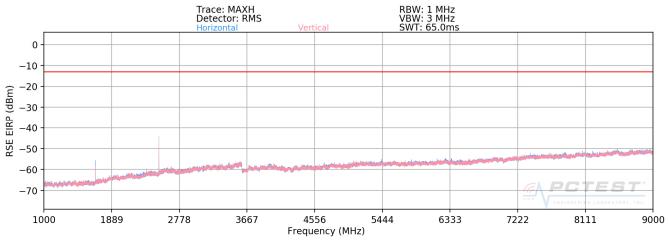
### Test Notes

- 1) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest power is reported in GPRS mode while transmitting with one slot active.
- 2) This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, and HSUPA capabilities. For WCDMA and HSUPA transmission, all configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2kbps with HSDPA inactive and TPC bits all set to "1."
- 3) This unit was tested with its standard battery.
- 4) 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.
- 5) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 6) 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.
- 7) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

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### **Cellular GPRS Mode**



Plot 7-58. Radiated Spurious Plot 1-18GHz (Cellular GPRS Mode)

824.20

MHz

OPERATING FREQUENCY:	

MODULATION SIGNAL:

ON SIGNAL:	GPRS (GMSK)	_
DISTANCE:	3	meters
LIMIT:	-13	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]
1648.40	V	-	-	-63.51	3.61	-59.90	-46.9
2472.60	V	242	263	-48.59	4.21	-44.38	-31.4
3296.80	V	-	-	-60.83	5.77	-55.06	-42.1
4121.00	V	-	-	-62.08	7.59	-54.49	-41.5

Table 7-6. Radiated Spurious Data (Cellular GPRS Mode – Ch. 128)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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836	6.60	MHz
GPRS (GMSK)		_
3	meters	
-13	dBm	
	GPRS (GMSK) 3	3 meters

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]
1673.20	V	195	213	-59.50	3.62	-55.88	-42.9
2509.80	V	299	92	-46.30	4.34	-41.96	-29.0
3346.40	V	-	-	-60.91	5.92	-54.99	-42.0
4183.00	V	-	-	-62.28	7.70	-54.58	-41.6

Table 7-7. Radiated Spurious Data (Cellular GPRS Mode – Ch. 190)

848.80

meters

MHz

OPERATING FREQUENCY:

MODULATION SIGNAL: GPRS (GMSK)

DISTANCE:

LIMIT: -13 dBm

3

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]
1697.60	V	-	-	-63.16	3.63	-59.53	-46.5
2546.40	V	174	119	-44.84	4.56	-40.28	-27.3
3395.20	V	-	-	-60.85	6.14	-54.72	-41.7
4244.00	V	-	-	-62.32	7.80	-54.53	-41.5

Table 7-8. Radiated Spurious Data (Cellular GPRS Mode – Ch. 251)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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OPERATING FREQUENCY:	848	8.80	MHz
MODULATION SIGNAL:	GPRS (GMSK)		
DISTANCE:	3	meters	
LIMIT:	-13	_dBm	

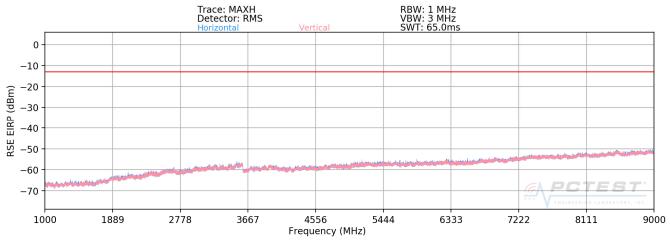
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1697.60	V	-	-	-63.45	3.63	-59.82	-46.8
2546.40	V	155	132	-54.36	4.56	-49.81	-36.8
3395.20	V	-	-	-61.42	6.14	-55.29	-42.3
4244.00	V	-	-	-62.28	7.80	-54.49	-41.5

Table 7-9. Radiated Spurious Data with WCP (Cellular GPRS Mode – Ch. 251)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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### **Cellular WCDMA Mode**



Plot 7-59. Radiated Spurious Plot 1-18GHz (Cellular WCDMA Mode)

OPERATING FREQUENCY:	82	6.40	MHz
MODULATION SIGNAL:	WCDMA	_	
DISTANCE:	3	meters	
LIMIT:	-13	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]
1652.80	V	-	-	-64.25	3.61	-60.64	-47.6
2479.20	V	-	-	-61.73	4.21	-57.52	-44.5

Table 7-10. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4132)

OPERATING FREQUENCY:836.60MHzMODULATION SIGNAL:WCDMADISTANCE:3LIMIT:-13dBm

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]
1673.20	V	-	-	-64.60	3.62	-60.98	-48.0
2509.80	V	-	-	-61.12	4.34	-56.78	-43.8

Table 7-11. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4183)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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OPERATING FREQUENCY:	84	6.60	MHz
MODULATION SIGNAL:	WCDMA		
DISTANCE:	3	meters	
LIMIT:	-13	_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]
1693.20	V	-	-	-64.61	3.63	-60.98	-48.0
2539.80	V	-	-	-62.26	4.56	-57.70	-44.7

Table 7-12. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4233)

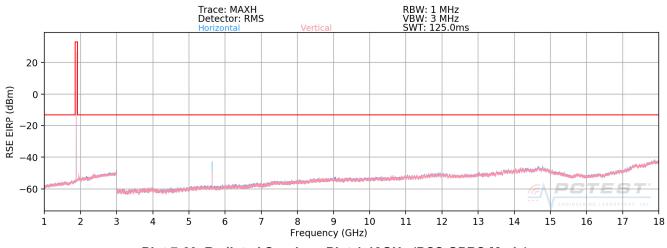
OPERATING FREQUENCY:	83	6.60	MHz
CHANNEL:	4		
MODULATION SIGNAL:	WCDMA	_	
DISTANCE:	3	meters	
LIMIT:	-13	_dBm	

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]
1673.20	V	-	-	-64.60	3.62	-60.98	-48.0
2509.80	V	-	-	-61.12	4.34	-56.78	-43.8

Table 7-13. Radiated Spurious Data with WCP (Cellular WCDMA Mode – Ch. 4183)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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OPERATING FREQUENCY:	185	50.20	MHz
MODULATION SIGNAL:	GPRS (GMSK)	_	
DISTANCE:	3	meters	
LIMIT:	-13	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]
3700.40	V	-	-	-60.26	6.56	-53.70	-40.7
5550.60	V	198	181	-34.08	8.72	-25.36	-12.4
7400.80	V	-	-	-55.67	8.41	-47.26	-34.3
9251.00	V	-	-	-55.20	9.47	-45.73	-32.7

Table 7-14. Radiated Spurious Data (PCS GPRS Mode – Ch. 512)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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188	0.00	MHz
GPRS (GMSK)	_	_
3	meters	
-13	dBm	
	GPRS (GMSK) 3	3 meters

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]
3760.00	V	-	-	-60.17	6.67	-53.50	-40.5
5640.00	V	177	201	-43.58	8.81	-34.76	-21.8
7520.00	V	-	-	-56.06	8.48	-47.58	-34.6
9400.00	V	-	-	-55.10	9.32	-45.78	-32.8

Table 7-15. Radiated Spurious Data (PCS GPRS Mode - Ch. 661)

**OPERATING FREQUENCY:** 

MODULATION SIG

REQUENCY:	190	9.80
ON SIGNAL:	GPRS (GMSK)	
DISTANCE:	3	meters
LIMIT:	-13	dBm

MHz

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]
3819.60	V	-	-	-60.13	7.00	-53.14	-40.1
5729.40	V	385	273	-43.01	8.77	-34.24	-21.2
7639.20	V	-	-	-55.86	8.54	-47.32	-34.3
9549.00	V	-	-	-54.74	9.43	-45.31	-32.3

Table 7-16. Radiated Spurious Data (PCS GPRS Mode – Ch. 810)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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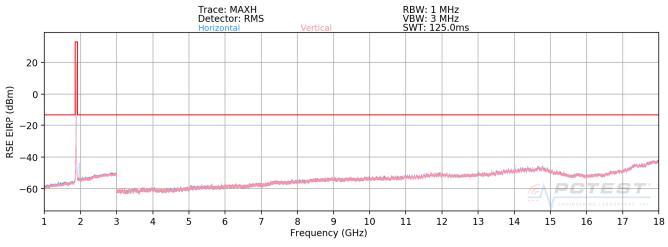
OPERATING FREQUENCY:	185	50.20	MHz
CHANNEL:	5		
MODULATION SIGNAL:	GPRS (GMSK)	_	
DISTANCE:	3	meters	
LIMIT:	-13	_dBm	

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]
3700.40	V	-	-	-60.75	6.56	-54.19	-41.2
5550.60	V	198	181	-40.94	8.72	-32.22	-19.2
7400.80	V	-	-	-56.67	8.41	-48.26	-35.3
9251.00	V	-	-	-56.20	9.47	-46.73	-33.7

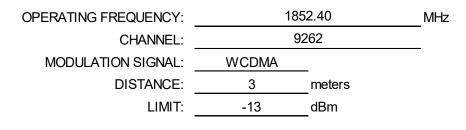
Table 7-17. Radiated Spurious Data with WCP (PCS GPRS Mode – Ch. 512)

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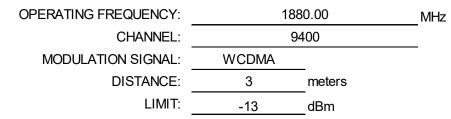


Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3704.80	Н	-	-	-73.20	9.57	-63.64	-50.6
5557.20	Н	-	-	-73.36	10.95	-62.41	-49.4

Table 7-18. Radiated Spurious Data (PCS WCDMA Mode – Low Ch.)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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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]
3760.00	Н	-	-	-73.23	9.37	-63.86	-50.9
5640.00	Н	115	64	-70.66	11.17	-59.49	-46.5
7520.00	Н	-	-	-71.27	11.11	-60.16	-47.2
9400.00	Н	-	-	-69.96	11.57	-58.39	-45.4

Table 7-19. Radiated Spurious Data (PCS WCDMA Mode – Mid Ch.)

MHz	.60	190	OPERATING FREQUENCY:
	8	95	CHANNEL:
_		WCDMA	MODULATION SIGNAL:
	neters	3	DISTANCE:
	dBm	-13	LIMIT:

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]
3815.20	Н	-	-	-72.88	9.30	-63.58	-50.6
5722.80	Н	113	67	-70.69	11.37	-59.32	-46.3
7630.40	Н	-	-	-70.43	11.31	-59.12	-46.1
9538.00	Н	-	-	-68.89	11.76	-57.13	-44.1

Table 7-20. Radiated Spurious Data (PCS WCDMA Mode – High Ch.)

FCC ID: A3LSMG9730		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager		
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OPERATING FREQUENCY:	19	MHz	
CHANNEL:	g		
MODULATION SIGNAL:	WCDMA		
DISTANCE:	3	meters	
LIMIT:	-13	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]
3815.20	V	-	-	-72.51	9.30	-63.21	-50.2
5722.80	V	370	126	-66.79	11.37	-55.42	-42.4
7630.40	V	-	-	-70.36	11.31	-59.05	-46.0
9538.00	V	-	-	-68.55	11.76	-56.79	-43.8

Table 7-21. Radiated Spurious Data with WCP (PCS WCDMA Mode - High Ch.)

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### **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.

For Part 22, RSS-132, and RSS-133, the frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5$  ppm) of the center frequency. For Part 24, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

#### 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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OPERATING FREQUENCY:	836,600,000	Hz
CHANNEL:	190	
REFERENCE VOLTAGE:	4.31	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.31	- 30	836,599,827	-173	-0.0000207
100 %		- 20	836,599,897	-103	-0.0000123
100 %		- 10	836,599,903	-97	-0.0000116
100 %		0	836,600,042	42	0.0000050
100 %		+ 10	836,599,967	-33	-0.0000039
100 %		+ 20	836,599,931	-69	-0.000082
100 %		+ 30	836,600,144	144	0.0000172
100 %		+ 40	836,600,014	14	0.0000017
100 %		+ 50	836,599,947	-53	-0.0000063
BATT. ENDPOINT	3.48	+ 20	836,600,184	184	0.0000220

Table 7-22. Frequency Stability Data (Cellular GPRS Mode – Ch. 190)

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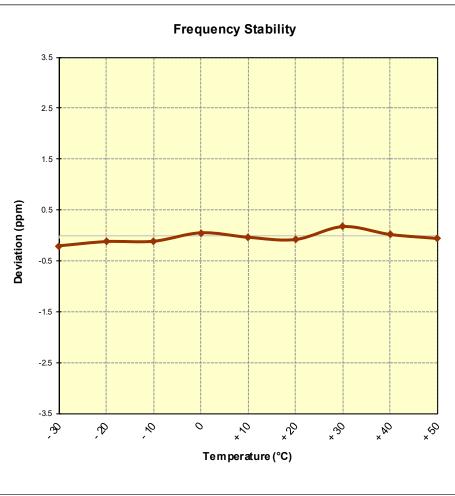


Figure 7-8. Frequency Stability Graph (Cellular GPRS Mode – Ch. 190)

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OPERATING FREQUENCY:	836,600,000	Hz
CHANNEL:	4183	_
REFERENCE VOLTAGE:	4.31	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	_

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.31	- 30	836,600,019	19	0.0000023
100 %		- 20	836,599,952	-48	-0.0000057
100 %		- 10	836,599,748	-252	-0.0000301
100 %		0	836,600,019	19	0.0000023
100 %		+ 10	836,600,116	116	0.0000139
100 %		+ 20	836,600,162	162	0.0000194
100 %		+ 30	836,600,122	122	0.0000146
100 %		+ 40	836,599,582	-418	-0.0000500
100 %		+ 50	836,600,022	22	0.0000026
BATT. ENDPOINT	3.48	+ 20	836,600,097	97	0.0000116

 Table 7-23. Frequency Stability Data (Cellular WCDMA Mode – Ch. 4183)

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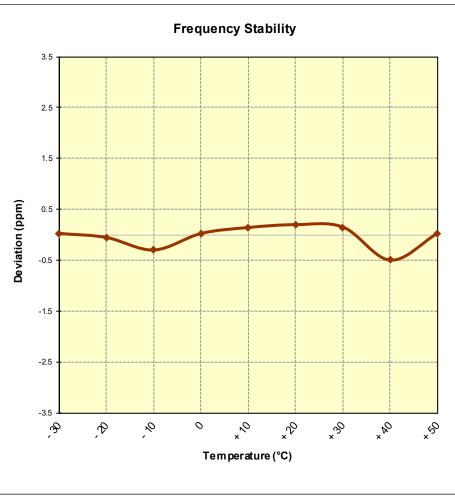


Figure 7-9. Frequency Stability Graph (Cellular WCDMA Mode – Ch. 4183)

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OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	661	_
REFERENCE VOLTAGE:	4.31	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.31	- 30	1,880,000,444	444	0.0000236
100 %		- 20	1,880,000,196	196	0.0000104
100 %		- 10	1,879,999,959	-41	-0.0000022
100 %		0	1,880,000,039	39	0.0000021
100 %		+ 10	1,879,999,856	-144	-0.0000077
100 %		+ 20	1,879,999,980	-20	-0.0000011
100 %		+ 30	1,880,000,026	26	0.0000014
100 %		+ 40	1,879,999,820	-180	-0.0000096
100 %		+ 50	1,879,999,592	-408	-0.0000217
BATT. ENDPOINT	3.48	+ 20	1,879,999,926	-74	-0.000039

Table 7-24. Frequency Stability Data (PCS GPRS Mode – Ch. 661)

### 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 in-band 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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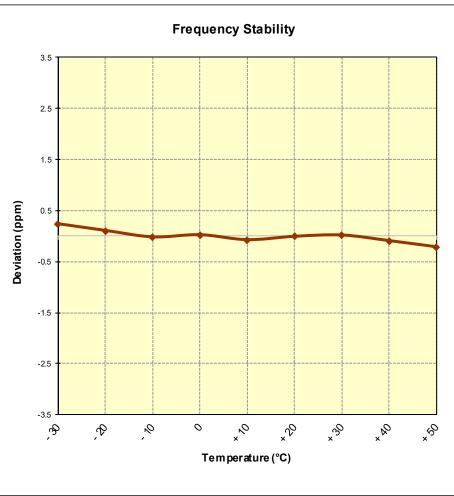


Figure 7-10. Frequency Stability Graph (PCS GPRS Mode – Ch. 661)

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OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	9400	_
REFERENCE VOLTAGE:	4.31	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.31	- 30	1,880,000,242	242	0.0000129
100 %		- 20	1,880,000,004	4	0.0000002
100 %		- 10	1,880,000,164	164	0.000087
100 %		0	1,879,999,863	-137	-0.0000073
100 %		+ 10	1,879,999,871	-129	-0.0000069
100 %		+ 20	1,880,000,427	427	0.0000227
100 %		+ 30	1,880,000,145	145	0.0000077
100 %		+ 40	1,879,999,868	-132	-0.0000070
100 %		+ 50	1,880,000,082	82	0.0000044
BATT. ENDPOINT	3.48	+ 20	1,879,999,952	-48	-0.0000026

Table 7-25. Frequency Stability Data (PCS WCDMA Mode – Ch. 9400)

### 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 in-band 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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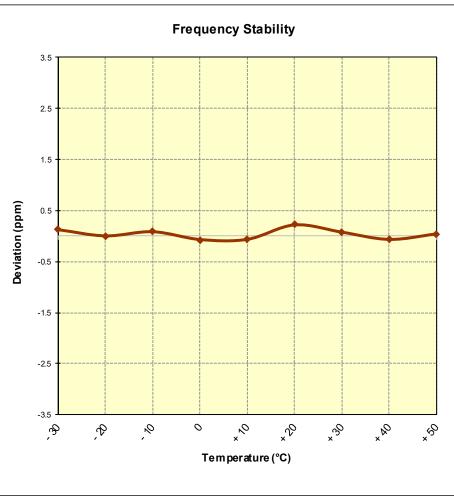


Figure 7-11. Frequency Stability Graph (PCS WCDMA Mode – Ch. 9400)

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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 Part 22 & 24 of the FCC Rules.

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