

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: 2/1/2018 - 3/27/2018 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M1802070017-04-R1.A3L

FCC ID:

A3LSMJ337T

APPLICANT:

Samsung Electronics Co., Ltd.

Application Type: Model: Additional Model(s): EUT Type: FCC Classification: FCC Rule Part(s): Test Procedure(s): Certification SM-J337T SM-S357BL Portable Handset PCS Licensed Transmitter Held to Ear (PCE) 22, 24, & 27 ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03

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

This revised Test Report (S/N: 1M1802070017-04-R1.A3L) supersedes and replaces the previously issued test report (S/N: 1M1802070017-04.A3L) on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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

Randy Ortanez President



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			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	0.463	26.65	0.759	28.80	241KGXW
EDGE850	22H	824.2 - 848.8	0.119	20.74	0.195	22.89	246KG7W
WCDMA850	22H	826.4 - 846.6	0.057	17.59	0.094	19.74	4M15F9W
WCDMA1700	27	1712.4 - 1752.6			0.387	25.88	4M16F9W
GPRS1900	24E	1850.2 - 1909.8			1.129	30.53	244KGXW
EDGE1900	24E	1850.2 - 1909.8			0.450	26.53	251KG7W
WCDMA1900	24E	1852.4 - 1907.6			0.266	24.24	4M16F9W

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: A3LSMJ337T**. 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.: 22091, 22257, 22075

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n WLAN, Bluetooth (1x, EDR, LE)

2.3 Test Configuration

The EUT was tested per the guidance of ANSI/TIA-603-E-2016 and KDB 971168 D01 v03. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

2.4 EMI Suppression Device(s)/Modifications

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

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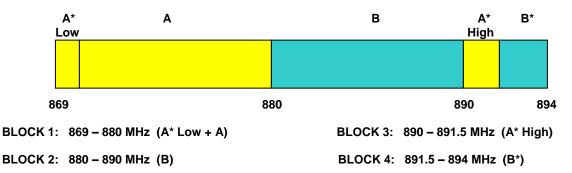
3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

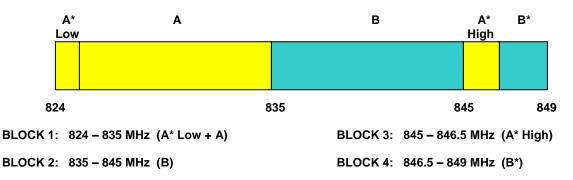
The measurement procedures described in the "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI/TIA-603-E-2016) and "Measurement Guidance for Certification of Licensed Digital Transmitters" (KDB 971168 D01 v03) were used in the measurement of the EUT.

Deviation from Measurement Procedure.....None

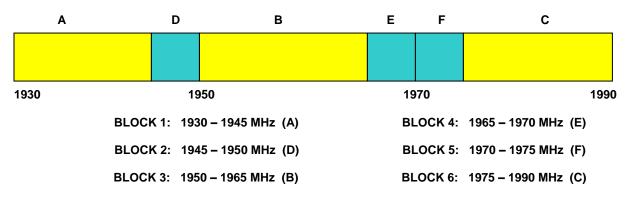
3.2 Cellular - Base Frequency Blocks



3.3 Cellular - Mobile Frequency Blocks



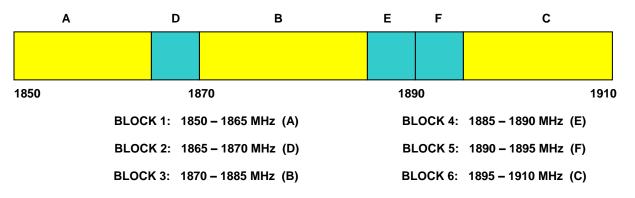
3.4 PCS - Base Frequency Blocks



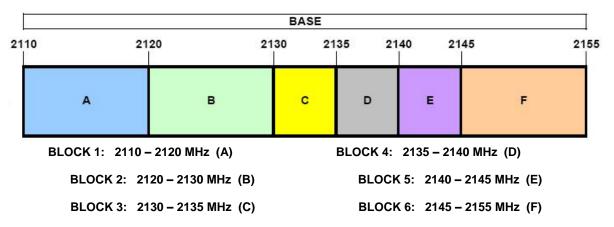
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3.5 PCS - Mobile Frequency Blocks



3.6 AWS - Base Frequency Blocks



3.7 AWS - Mobile Frequency Blocks

			MOBILE				
710	17	/20 1 	730 17	735 17	40 17	745 	1758
	A	в	с	D	E	F	
	BLOCK 1: 17	10 – 1720 MHz (A)		BLOCK	4: 1735 –	1740 MHz (D)	
	BLOCK 2: 17	20 – 1730 MHz (B)		BLOCK	5: 1740 –	1745 MHz (E)	
	BLOCK 3: 17	30 – 1735 MHz (C)		BLOCK	6: 1745 –	1755 MHz (F)	

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3.8 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].

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	8/10/2017	Annual	8/10/2018	LTx3
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	6/21/2017	Annual	6/21/2018	RE1
Agilent	N9030A	PXA Signal Analyzer (44GHz)	3/27/2017	Annual	3/27/2018	MY52350166
Agilent	N9038A	MXE EMI Receiver	4/26/2017	Annual	4/26/2018	MY51210133
Anritsu	MT8820C	Radio Communication Analyzer	5/23/2017	Annual	5/23/2018	6201240328
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2017	Biennial	10/10/2019	121034
Emco	3115	Horn Antenna (1-18GHz)	3/10/2016	Biennial	3/10/2018	9704-5182
EMCO	3160-09	Small Horn (18 - 26.5GHz)	8/23/2016	Biennial	8/23/2018	135427
Espec	ESX-2CA	Environmental Chamber	4/11/2017	Annual	4/11/2018	17620
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	4/26/2016	Biennial	4/26/2018	128337
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	12/1/2016	Biennial	12/1/2018	125518
Mini Circuits	TVA-11-422	RF Power Amp	N/A		QA1317001	
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	3/24/2017	3/24/2017 Annual 3/24/2018		11401010036
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11208010032
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/3/2017	Annual	7/3/2018	102135
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/3/2017	Annual	7/3/2018	102133
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	5/11/2017	Annual	5/11/2018	100040
Rohde & Schwarz	CMU200	Base Station Simulator	5/22/2017	Annual	5/22/2018	109892
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	7/31/2017	Annual	7/31/2018	100348
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	4/19/2017	Annual	4/19/2018	100342
Rohde & Schwarz	CMW500	Radio Communication Tester	5/4/2017	Annual	5/4/2018	112347
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/3/2017	Annual	7/3/2018	102134
Seekonk	NC-100	Torque Wrench 5/16", 8" lbs	3/2/2016	Biennial	3/2/2018	N/A
Sunol	DRH-118	Horn Antenna (1-18GHz)	8/11/2017	Biennial	8/11/2019	A050307
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	3/14/2016	Biennial	3/14/2018	A051107

Table 5-1. Test Equipment

Notes:

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

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6.0 SAMPLE CALCULATIONS

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:	A3LSMJ337T
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) RSS-139(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) RSS-139(6.6)	Conducted Band Edge / Spurious Emissions	> 43 + log ₁₀ (P[Watts]) at Band Edge and for all out-of-band emissions		PASS	Sections 7.3, 7.4
24.232(d)	RSS-132(5.4) RSS-133(6.4) RSS-139(6.5)	Peak-Average Ratio	< 13 dB	CONDUCTED	PASS	Section 7.5
2.1046	RSS-132(5.4) RSS-133(4.1) RSS-139(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) RSS-139(6.4)	Frequency Stability	Frequency Stability <a>< 2.5 ppm (Part 22) Emission must remain in band (Part 24, 27)		PASS	Section 7.8
22.913(a)(2)	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 Power	< 2 Watts max. EIRP		PASS	Section 7.6
27.50(d)(4)	RSS-139(6.5)	Equivalent Isotropic Radiated Power	< 1 Watts max. EIRP	RADIATED	PASS	Section 7.6
2.1053 22.917(a) 24.238(a) 27.53(h)	RSS-132(5.5) RSS-133(6.5) RSS-139(6.6)	Radiated Spurious Emissions	> 43 + log ₁₀ (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 v03 - 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.

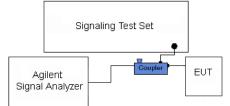


Figure 7-1. Test Instrument & Measurement Setup

Test Notes

None.

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

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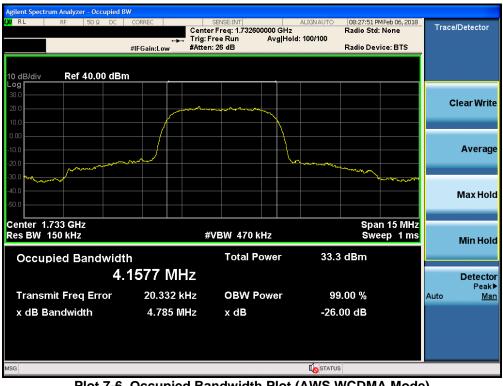
Plot 7-4. Occupied Bandwidth Plot (EDGE1900 Mode)

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

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Plot 7-7. 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 $43 + \log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.

Test Procedure Used

KDB 971168 D01 v03 - Section 6.0

Test Settings

- 1. Start frequency was set to 30MHz and stop frequency was set to 10GHz for Cell, 20GHz for AWS, 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.

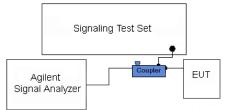


Figure 7-2. Test Instrument & Measurement Setup

Test Notes

Per 24.238(b), 27.53(h)(3), and RSS-133(6.5), RSS-139(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.

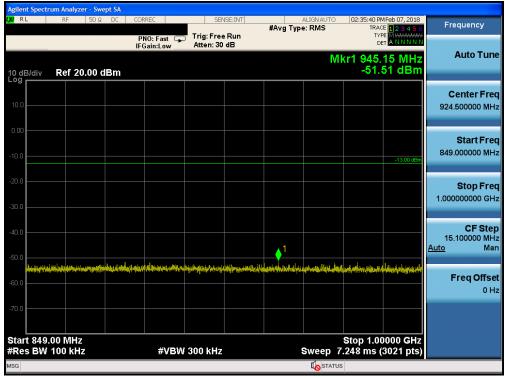
FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: Test Dates:		EUT Type:		Dage 19 of 95
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Cellular GPRS Mode

	Analyzer - Swept SA RF 50 Ω DC	CORREC	SENSE:INT	Â	IGN AUTO 02:	35:12 PM Feb 07, 2018	
116	0 30 3£ DC	PNO: Fast G		#Avg Type:		TRACE 123456 TYPE MWWWWW DET ANNNNN	Frequency
0 dB/div Re	ef 20.00 dBm				Mkr1	823.00 MHz -42.82 dBm	Auto Tur
10.0							Center Fre 426.500000 MH
0.00						-13.00 dBm	Start Fre 30.000000 MH
80.0							Stop Fre 823.000000 Mi
0.0						1	CF Ste 79.300000 MI <u>Auto</u> Mi
0.0 *********	ne at Talan till et sams af De Mary (d. Derschilt) er sok fan genaam werken te til het gene staar stearen te sams geneame	na di Algoni kalanan di Managi ang Pandanan Kalangan ang Pandari sa kang panganananan Kalangan ang Pandari sa kang panganananan	n januar en har in de plante en lifere General en jagente	an da ny têrmî ye. În persona de têrê de be Mîne ye. De de ser en yerende de têrê ye.	sharyyddis tafwydd Affrid yn Affrid Newd y consponso y consort	ng the part of the system of the system of the test of the system of the	Freq Offs 0 H
70.0 Start 30.0 MH Res BW 100		#VBM	(300 kHz	Sw	S1	op 823.0 MHz ns (15861 pts)	
5G							

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

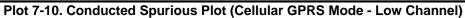


Plot 7-9. Conducted Spurious Plot (Cellular GPRS Mode - Low Channel)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 19 of 85
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Agilent Spectrum	Analyzer - Swept SA					
LXVIRL	RF 50Ω DC	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	02:36:21 PM Feb 07, 2018 TRACE 1 2 3 4 5 6	Frequency
		PNO: Fast 📮 IFGain:Low) Trig: Free Run #Atten: 34 dB	ang type. tune		
10 dB/div R	ef 10.00 dBm			Mł	r1 9.849 5 GHz -28.74 dBm	Auto Tune
0.00						Center Freq 5.50000000 GHz
-10.0					-13.00 dBm	Start Fred 1.000000000 GHz
-30.0		starting of the start start of the			a pitel negytelege set for all the set of program in the set of the set of th	Stop Fred 10.000000000 GH:
-50.0						CF Step 900.000000 MH: <u>Auto</u> Mar
-70.0						Freq Offse 0 H:
-80.0 Start 1.000 G	Hz				Stop 10.000 GHz	
#Res BW 1.0		#VBW	3.0 MHz		.60 ms (18001 pts)	
MSG					\$	



Agilent Spectrum Analyzer -	Swept SA 0 Ω DC CORF	FC	SEN	BE:INT		ALIGN AUTO	02-28-29 DM	IFeb 07, 2018	
	PN	0: Fast 🖵 ain:Low	Trig: Free Atten: 30	Run	#Avg Type		TRAC	123456 Mwwwww ANNNNN	Frequency
10 dB/div Ref 20.0		ain:Low	Atten: 50			MI	kr1 793.	_	Auto Tune
10.0									Center Freq 427.000000 MHz
-10.0								-13.00 dBm	Start Free 30.000000 MHz
-20.0									Stop Fred 824.000000 MH;
-40.0								<u>1</u>	CF Step 79.400000 MH: <u>Auto</u> Mar
and him process of the second state of the second state of the second state of the second state of the second s	na ini ini ina dia mangana ini ini ini ini ini ini ini ini ini	t i ferend se fil e type i g General i general general g	an Derst United Trans Alle and Der Der Der	ny hay harat yang di katala na ny gala katala katala katala		tonan Materi persatir Salapara ana ang dinip	n por a de la contra de la contra Novembra de la contra de la contra Novembra de la contra	konst for the form	Freq Offse 0 H:
-70.0 Start 30.0 MHz #Res BW 100 kHz		#VBW	300 kHz			weep 38	Stop 82	24.0 MHz 5881 pts)	
MSG						I STATUS			

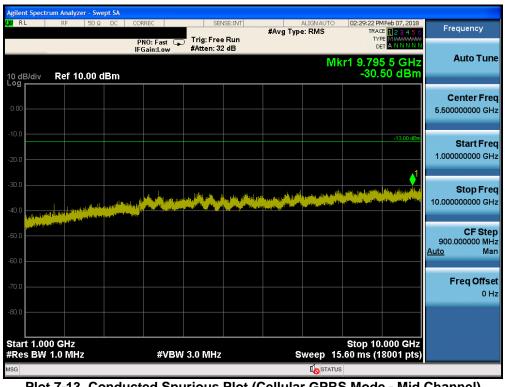
Plot 7-11. Conducted Spurious Plot (Cellular GPRS Mode - Mid Channel)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 95	
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MSG								STATUS	5		
	849.00 MH BW 100 ki			#VBV	V 300 kHz			Sweep 7	Stop 1.00 .248 ms (000 GHZ 3021 pts)	
	040.00 84	-							Oton 1-Of		
-70.0											
-60.0											0 H
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-50.0				1							<u>Auto</u> Ma
-40.0											CF Ste 15.100000 MH
-30.0											
10.0											Stop Fre 1.000000000 GH
-20.0											
-10.0										-13.00 dBm	849.000000 MH
0.00											Start Fre
10.0											924.500000 MH
10.0											Center Fre
10 dB/d	div Ref 2	20.00 d	Bm						-51.0	63 dBm	
			li	Gain:Low	Atten: 30	ab		M	kr1 891.		Auto Tun
				PNO: Fast 🔾	Trig: Free Atten: 30		#Avg Typ	e: RMS	TYP	E 1 2 3 4 5 6 E M WWWWW T A N N N N N	requeries
XI RL	RF	50 Ω	DC CC	DRREC	SEM	ISE:INT		ALIGN AUTO		1Feb 07, 2018	Frequency

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



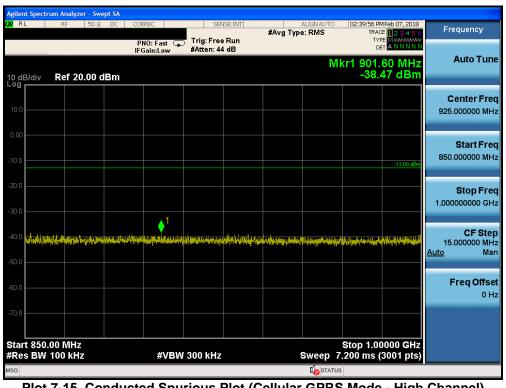
Plot 7-13. Conducted Spurious Plot (Cellular GPRS Mode - Mid Channel)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 21 of 95
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Agilent Spectrum Analyzer - S	wept SA				
lxu rl RF 50	PNO: Fast	SENSE:INT Trig: Free Run Atten: 30 dB	ALIGNAUTO #Avg Type: RMS	02:39:39 PM Feb 07, 2018 TRACE 1 2 3 4 5 6 TYPE MWWWWWW DET A N N N N N	Frequency
10 dB/div Ref 20.00	IFGain:Low	Atten. 30 GB	М	kr1 822.80 MHz -51.03 dBm	Auto Tune
10.0					Center Freq 427.000000 MHz
-10.0				-13.00 dBm	Start Free 30.000000 MH;
-20.0					Stop Fred 824.000000 MH:
-40.0				1	CF Stej 79.400000 MH <u>Auto</u> Ma
This prime a president in the second spin to the	Lag new Asternation and the polynamic lists 		la er personaliset principante (en en personaliset principante) A de la constante (de la constante en	t je frankranska postavni kar fotovska fotovska fotova je sa se sa se	Freq Offse 0 H
-70.0 Start 30.0 MHz #Res BW 100 kHz	#\/B\	V 300 kHz	Sween 30	Stop 824.0 MHz 3.11 ms (15881 pts)	
MSG		-000 KH2			

Plot 7-14. Conducted Spurious Plot (Cellular GPRS Mode - High Channel)



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

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 22 of 95	
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RL	RF 5	DΩ DC	CORREC		SENSE:INT		ALIGN AUTO	02:40:38 PM Feb 07,	2018
			PNO: Fa IFGain:L		j: Free Run en: 36 dB	#Avg Typ		TRACE 1 2 3 TYPE MWA DET A N N	456 Frequency
0 dB/div	Ref 10.0	0 dBm					Mł	r1 9.940 0 0 -26.78 d	Hz Auto Tun Bm
0.00									Center Fre 5.500000000 GH
20.0									00 dBm 1.000000000 GH
30.0 40.0 <mark>10 10 10 1</mark>	ana ka na ka	f Later of the second					ningen oger kingen filleren for som en s En som en som	a parte postal de la contra de la Contra de la contra d Contra de la contra d	Stop Fre 10.00000000 GH
io.o									CF Ste 900.000000 MH <u>Auto</u> Ma
'0.0									Freq Offs 0 F
80.0	0 GHz							Stop 10.000	GHZ
Res BW			#	VBW 3.01	MHz	\$	Sweep 15	.60 ms (18001	pts)

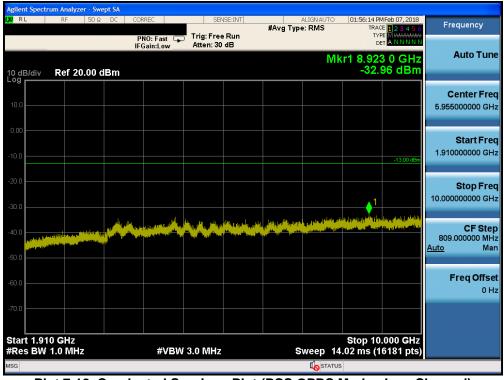
Plot 7-16. Conducted Spurious Plot (Cellular GPRS Mode - High Channel)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 22 of 95
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Agilent Spe	ectrum Analyzer - Sw RF 50 Ω		RREC	GEN	JSE:INT		ALIGN AUTO	01:55:43 PMFeb 07, 2018	
11.6	11 00 %	P	NO: Fast 🕞 Gain:Low		Run	#Avg Typ		TRACE 12345 TYPE MWWWW DET A N N N N	Frequency
0 dB/div	Ref 20.00 (Jain.Low	TREET. O			Mk	r1 1.686 5 GHz -41.03 dBm	
10.0									Center Fre 937.500000 MH
10.0								-13.00 dBr	Start Fre 30.000000 MH
20.0									Stop Fr 1.845000000 Gi
10.0 50.0	strada (j. n. j. n. j Na strategy s		n sjistelje kan de s	in for the form of the second	idini parah di	a an	a da para pangan kang kang kang kang kang kang kang	1 <u>Ale and de la constant de la constan</u> t Ale ana de la constant	CF Ste 181.500000 Mł <u>Auto</u> Mł
:0.0									Freq Offs 0
).0 MHz							Stop 1.8450 GHz	
Res B	W 1.0 MHz		#VBN	/ 3.0 MHz			Sweep 2.	420 ms (3631 pts	

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



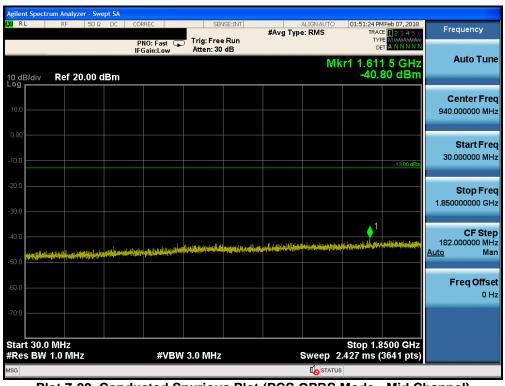
Plot 7-18. Conducted Spurious Plot (PCS GPRS Mode - Low Channel)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 24 of 95	
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	um Analyzer - S									
L <mark>XI</mark> RL	RF 50	Ω DC CO	RREC	SENS	E:INT	#Avg Typ	ALIGN AUTO	01:56:55 PM	Feb 07, 2018	Frequency
		P	NO: Fast 📮 Gain:Low	Trig: Free Atten: 20		#Avg iyp	e: RIVIS	TYPE	123456 Mwwww ANNNNN	
10 dB/div	Ref 10.00	dBm					Mkr	1 19.520 -37.9	5 GHz 5 dBm	Auto Tune
0.00										Center Fred 15.000000000 GH
-10.0									-13.00 dBm	Start Fre 10.000000000 GH
-30.0	diana di 1900 genti dan		uhu	d. many source state		l He alcounte d	ranati de tid khailide	and provide the state of the later of the	1 styles till as ar	Stop Fre 20.000000000 GH
50.0	na na sina na sina sina sina sina sina s	en de Mayer (indicated de Mary de grandet de Mary e				ng (peri lag pelenger est) Lag pelang			ak (1004 juli (100 august)) is	CF Ste 1.000000000 GH <u>Auto</u> Ma
70.0										Freq Offso 0 ⊦
-80.0 Start 10.0 #Res BW			#VBW	/ 3.0 MHz			weep 17	Stop 20. .33 ms (20	000 GHz	
ISG							STATUS			

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



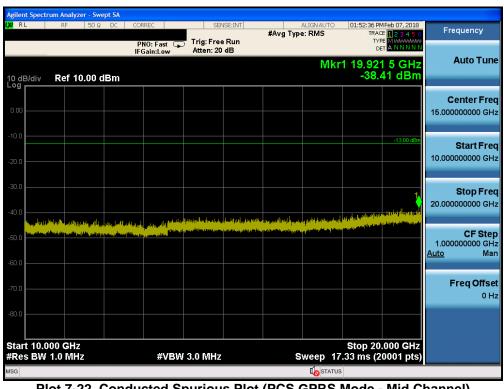
Plot 7-20. Conducted Spurious Plot (PCS GPRS Mode - Mid Channel)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 25 of 95	
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RL	r <mark>um Analyzer - S</mark> w RF 50 ຊ		RREC	CEN	JSE:INT		ALIGN AUTO	01/52/02 04	Feb 07, 2018	
KL .	KF 50 %	Р	NO: Fast 🕞 Gain:Low		Run	#Avg Typ		TRAC	1 2 3 4 5 6 E MWWWWW T A N N N N N	Frequency
0 dB/div	Ref 20.00	dBm					Mk	r1 9.553 -32.9	3 0 GHz 33 dBm	Auto Tun
10.0										Center Fre 5.955000000 GF
10.0									-13.00 dBm	Start Fre 1.91000000 GF
80.0									1	Stop Fre 10.000000000 GH
										CF Ste 809.000000 Mi <u>Auto</u> Mi
0.0										Freq Offs 0 I
70.0	0 GHz							Stop 10.	000 GHz	
Res BW	1.0 MHz		#VBW	3.0 MHz		s	weep 14	.02 ms (1	6181 pts)	

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



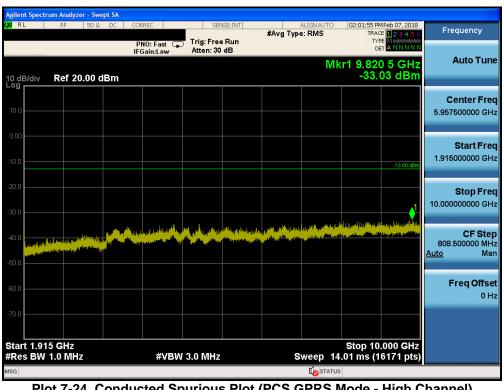
Plot 7-22. Conducted Spurious Plot (PCS GPRS Mode - Mid Channel)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 26 of 95	
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Agilent Spectrum										
XV RL	RF 50Ω [Fast 😱	Trig: Free Atten: 30		#Avg Type	ALIGN AUTO e: RMS	TYPE	Feb 07, 2018 1 2 3 4 5 6 MWWWWWWW A N N N N N	Frequency
10 dB/div R	ef 20.00 dB		1:LUW_	Atten: 00			Mk	r1 1.685 -40.9	0 GHz 4 dBm	Auto Tuno
10.0										Center Fre 940.000000 MH
10.0									-13.00 dBm	Start Fre 30.000000 M⊦
20.0										Stop Fre 1.850000000 G⊦
40.0	lles dame ble bie fer for for f	u deserver stat i det s	ing a state of the state of the	interest and the interest of the	lat hay first a state to a state of the stat	. La proposition de la constance de la	altera försklada att den som	La Mana Lata Mana Maria Mana Panga Panga Mana Mana Panga Panga Panga Mana	1 Innan-Idday	CF Ste 182.000000 M⊦ <u>Auto</u> Ma
60.0										Freq Offs 0 F
70.0 Start 30.0 MI ≉Res BW 1.0			#VBW	3.0 MHz			Sweep_2	Stop 1.84 .427 ms (3	500 GHz	
SG							STATUS			

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



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

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 27 of 95
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	ctrum Analyzer	- Swept SA								
L <mark>XI</mark> RL	RF	50Ω DC	CORREC	SENS	E:INT		ALIGN AUTO	02:02:26 PM Feb		Frequency
			PNO: Fast 🕞 IFGain:Low	Trig: Free Atten: 20 d		#Avg Typ	e: RMS	TRACE 1 TYPE MU DET A	23456 NNNNN	
10 dB/div	Ref 10.0	00 dBm					Mkr	1 19.955 5 -38.42	GHz dBm	Auto Tune
0.00										Center Fred 15.000000000 GH;
-10.0									13.00 dBm	Start Fred 10.000000000 GH
-30.0	and fills and the colded in			ي من بير بير بين أن يتألم بيرار	Notes of States	n Instanlar adını sıla	التعمل المتعالي		1 In this paper	Stop Free 20.000000000 GH
-50.0			and the second second		an i kara si kana si ka	an na her stillen van het sen.				CF Step 1.000000000 GH <u>Auto</u> Ma
70.0										Freq Offse 0 H
-80.0										
	.000 GHz V 1.0 MHz		#VBV	¥ 3.0 MHz		s	weep 17	Stop 20.00 .33 ms (2000	0 GHz 11 pts)	
MSG										

Plot 7-25. Conducted Spurious Plot (PCS GPRS Mode - High Channel)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dege 20 of 95	
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© 2018 PCTEST Engineering Labo	ratory Inc			\/ 7 / 1/16/2018	



Cellular WCDMA Mode

gilent Spectrum Analyzer - Swept SA GRL RF 50 Ω DC	CORREC	SENSE:INT	ALIGN AUTO	01:29:40 PM Feb 07, 2018	-
	PNO: Fast 😱 IFGain:Low	Trig: Free Run #Atten: 54 dB	#Avg Type: RMS	TRACE 123456 TYPE A WWWWW DET A N N N N N	Frequency
0 dB/div Ref 20.00 dBm			М	kr1 822.95 MHz -35.81 dBm	Auto Tun
10.0					Center Fre 426.500000 M⊦
10.0				-13.00 dBm	Start Fre 30.000000 MH
80.0				1	Stop Fre 823.000000 MH
10.0					CF Ste 79.300000 MH <u>Auto</u> Ma
50.0					Freq Offs 0 F
70.0 ttart 30.0 MHz Res BW 100 kHz	#VBW 3		Swoon 39	Stop 823.0 MHz 3.06 ms (15861 pts)	
SG		00-MH2	Sweep Ja		

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

RL	RF	<mark>r - Swep</mark> 50 Ω		CORREC		SE	NSE:INT		ALIGN AUTO	01:29:55 P	MFeb 07, 2018	
				PNO: F	ast 🖵 .ow	Trig: Fre #Atten: 3		#Avg Ty	pe: RMS	TY	E 1 2 3 4 5 6 E A WWWWW A N N N N N	Frequency
0 dB/div og r	Ref 20	.00 dE	3m						Mkr	1 1.992 -41.	50 GHz 85 dBm	Auto Tun
10.0												Center Fre 1.424500000 GF
0.0											-13.00 dBm	Start Fre 849.000000 MF
80.0												Stop Fre 2.000000000 GH
10.0 	N-nçîriy yeçi inceder.	- Marian (alignation)	tingan digang si	aire astron	wertertrafte	adal fili y anna ghad aine a'	ii yaqaa yaqaa ii aha	den and any trace () of the set	10) 101 101 101 101 101 101 101 101 101	iş işaşı in seriesi in d	1. A a contra laineathair an	CF Ste 115.100000 MH <u>Auto</u> Ma
i0.0												Freq Offs 0 F
70.0												
tart 849. Res BW				\$	≠vbw	3.0 MHz			Sweep 1.	Stop 2.0 535 ms (2	0000 GHz 3021 pts)	
G									I STATUS			

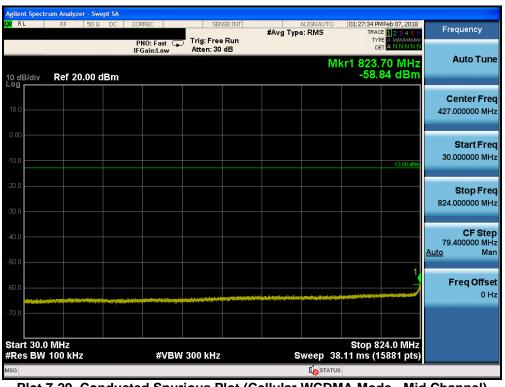
Plot 7-27. Conducted Spurious Plot (Cellular WCDMA Mode - Low Channel)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 95
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Plot 7-28. Conducted Spurious Plot (Cellular WCDMA Mode - Low Channel)

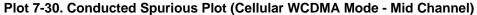


Plot 7-29. Conducted Spurious Plot (Cellular WCDMA Mode - Mid Channel)

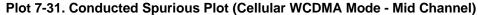
FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 20 of 85
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gilent Spectrum Analyzer - Sv RL RF 50 S		RREC	SENSE:INT	ALIGN AUTO	01:27:43 PM Feb 07, 2018	
NE NI 303	F	PNO: Fast 🖵 Gain:Low	Trig: Free Run Atten: 30 dB	#Avg Type: RMS	TRACE 1 2 3 4 5 6 TYPE A WWWWW DET A N N N N N	Frequency
0 dB/div Ref 20.00	dBm			MI	kr1 849.00 MHz -49.08 dBm	Auto Tun
10.0						Center Fre 1.424500000 G⊦
10.0					-13.00 dBm	Start Fre 849.000000 M⊦
20.0						Stop Fre 2.000000000 G⊦
0.0				and a start and a start and a start with the start and		CF Ste 115.100000 Mł <u>Auto</u> Ma
0.0		it hafatik metetikke	annadalar (h.)			Freq Offs 0 F
70.0 tart 849.0 MHz Res BW 1.0 MHz		#\/B\M	3.0 MHz	Sween 1	Stop 2.0000 GHz 535 ms (23021 pts)	
		# V D VV	5.0 WITZ	Sweep 1.		







FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 21 of 85
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	rum Analyzer - !									
XIRL	RF 50)Ω DC	CORREC		SENSE:INT	ALI #Avg Type: I	IGN AUTO	01:31:04 PMF TRACE		Frequency
			PNO: Fast IFGain:Lov		Free Run n:30 dB				123456 A WWWWWW A N N N N N N	
10 dB/div	Ref 20.00) dBm					Mk	r1 823.8 -61.5	5 MHz 5 dBm	Auto Tun
- ^{og}										Center Free
10.0										427.000000 MH
0.00										Start Free
-10.0									-13.00 dBm	30.000000 MH
-20.0										
										Stop Fre 824.000000 MH
30.0										
40.0										CF Ste 79.400000 MH <u>Auto</u> Ma
50.0										
-60.0									1	Freq Offse 0 H
70.0										
Start 30.0 ≉Res BW	MHz 100 kHz		#V	'BW 300 k	Hz	Sw	eep 38.	24 Stop 82 11 ms (15	4.0 MHz 881 pts)	
ISG										

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



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

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dama 20 at 05
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Agilent Spect	rum Analyzer	- Swept SA									
L <mark>XI</mark> RL	RF	50 Ω DC	CORREC		SEN	ISE:INT		ALIGN AUTO		MFeb 07, 2018	Frequency
			PNO: F IFGain:I	ast 🖵	Trig: Free #Atten: 24		#Avg Typ	e: RMS	TRAC TY D	CE 1 2 3 4 5 6 PE A WWWWW ET A NNNNN	
10 dB/div Log	Ref 0.0	0 dBm						MI	(r1 9.84 -47.	4 5 GHz 52 dBm	Auto Tune
											Center Fred
-10.0										-13.00 dBm	6.00000000 GHz
-20.0											Start Freq 2.000000000 GHz
-40.0			~								Stop Freq 10.000000000 GHz
-60.0											CF Step 800.000000 MH: <u>Auto</u> Mar
-80.0											Freq Offse 0 Hz
-90.0											
Start 2.00 #Res BW				#VBW :	3.0 MHz			weep 13	Stop 10 3.87 ms (1	.000 GHz 6001 pts)	
MSG									3		

Plot 7-34. Conducted Spurious Plot (Cellular WCDMA Mode - High Channel)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 22 of 85
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AWS WCDMA Mode

R L	rum Analyzer - Swept SA RF 50 Ω DC	CORREC	SENSE:INT	ALIGN AUTO	08:42:31 PMFeb 06, 2018	
		PNO: Fast 🖵 IFGain:Low	Trig: Free Run Atten: 30 dB	#Avg Type: RMS	TRACE 123456 TYPE A WWWWW DET A N N N N N	Frequency
) dB/div	Ref 20.00 dBm			Mk	r1 1.705 0 GHz -38.91 dBm	Auto Tur
0.0						Center Fre 867.500000 MH
0.0					-13.00 dBm	Start Fre 30.000000 MH
0.0						Stop Fre 1.705000000 GH
D.O					Management of the state of the	CF Ste 167.500000 Mi <u>Auto</u> Mi
0.0	4/++.i=10-10,	() 45 45 4 45 4 46 4 46 4 46 4 4 4 4 4 4 4				Freq Offs 01
tart 30.0) MHz 1.0 MHz	#VBW	3.0 MHz	Sween 2	Stop 1.7050 GHz .233 ms (3351 pts)	
G						

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



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

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 34 of 85
1M1802070017-04-R1.A3L	2/1/2018 - 3/27/2018	Portable Handset	raye 34 01 00
© 2010 DOTECT Engineering Labo	roton loo		V 7 4 4/4C/0040



Agilent Spectrum An			SENSE:INT	ALIGN AUTO	08:43:38 PM Feb 06, 2018	
	30 % 00	PNO: Fast		#Avg Type: RMS	TRACE 1 2 3 4 5 6 TYPE A WAYAWAY DET A N N N N N	Frequency
IO dB/div Re	f 10.00 dBm			Mkr	1 19.553 5 GHz -47.35 dBm	Auto Tun
0.00						Center Fre 15.000000000 GH
20.0					-13.00 dBm	Start Fre 10.00000000 G⊦
40.0					1	Stop Fre 20.000000000 GH
0.0	~~~~		a dan baran kana dan gara kang pana kang Pang taun data dan pang dan mang pana kang pang pang pang pang pang pang pang p			CF Ste 1.000000000 GH <u>Auto</u> Ma
0.0						Freq Offs 0 I
80.0 Start 10.000 G					Stop 20.000 GHz	
Res BW 1.0 I	VIHZ	#VBV	/ 3.0 MHz	Sweep 17	.33 ms (20001 pts)	

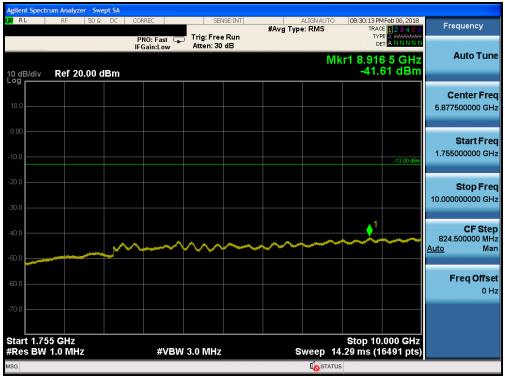
Plot 7-37. Conducted Spurious Plot (AWS WCDMA Mode - Low Channel)

RL	RF 50	Ω DC	CORREC	SE	NSE:INT		ALIGN AUTO	08:28:28 PI	MFeb 06, 2018	-
			PNO: Fa IFGain:L	Trig: Fre Atten: 30		#Avg T	ype: RMS	TRAC TY D	CE 123456 PE A WWWWW ET A N N N N N	Frequency
dB/div	Ref 20.00	dBm					М	kr1 1.69 -49.	7 5 GHz 82 dBm	Auto Tur
										Center Fre
).0										870.000000 MI
										Start Fre
									-13.00 dBm	30.000000 M
.0										Stop Fr
										1.710000000 G
.0										CF Ste 168.000000 MI
.0									1	Auto M
.0	97997-97-97-97-97			 an an a		ar standard Are				Freq Offs
										01
art 30.0	MHz 1.0 MHz			3.0 MHz			Cwoon (Stop 1.7 2.240 ms (7100 GHz	
S DW			#	5.0 WIH2			Sweep .		3301 hts)	

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

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 25 of 95	
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Plot 7-39. Conducted Spurious Plot (AWS WCDMA Mode - Mid Channel)

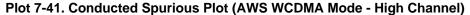


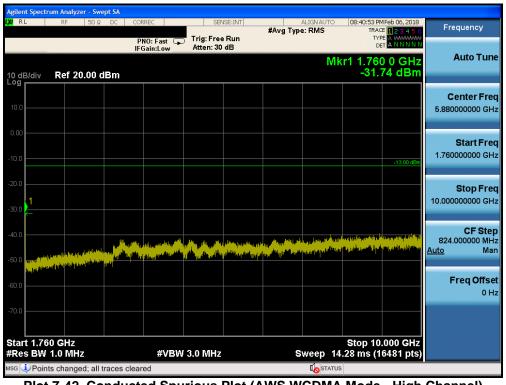
Plot 7-40. Conducted Spurious Plot (AWS WCDMA Mode - Mid Channel)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 26 of 95
1M1802070017-04-R1.A3L	2/1/2018 - 3/27/2018	table Handset		Page 36 of 85
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gilent Spectrum Analyzer - Swept S/ RL RF 50 Ω DC		SENSE:INT	ALIGN AUTO	08:40:48 PM Feb 06, 2018	
	PNO: Fast 😱	Trig: Free Run Atten: 30 dB	#Avg Type: RMS	TRACE 123456 TYPE A WWWW DET A N N N N N	Frequency
0 dB/div Ref 20.00 dBm			Mk	r1 1.675 5 GHz -49.87 dBm	Auto Tun
og 10.0					Center Fre 870.000000 M⊦
0.00				-13.00 dBm	Start Fre 30.000000 MF
30.0					Stop Fre 1.710000000 GF
				1	CF Ste 168.000000 MH <u>Auto</u> Ma
0.0	مد منه او به منه او به او ه او او ا	24febrarran - Marine San			Freq Offs 0 H
70.0 Itart 30.0 MHz Res BW 1.0 MHz	#VBM	3 0 MHz	Sween 2	Stop 1.7100 GHz	
Res BW 1.0 MHz	#VBW :	3.0 MHz	Sweep 2	.240 ms (3361 pts)	





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

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 27 of 95	
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RL	RF	50 Ω	DC CC	DRREC		SEI	VSE:INT		ALIGN AUTO	08:41:24 P	MFeb 06, 2018	
				PNO: Fast Gain:Lov		rig: Free		#Avg Typ	e: RMS	TRA TY D	CE 123456 PE A WWWW ET A N N N N N	Frequency
0 dB/div	Ref 10	.00 dB	m						Mkr	1 19.50 -47.	9 0 GHz 35 dBm	Auto Tun
0.00												Center Fre 15.000000000 GH
20.0											-13.00 dBm	Start Fre 10.000000000 GH
40.0											1	Stop Fre 20.000000000 G⊦
50.0		~										CF Ste 1.000000000 GH <u>Auto</u> Ma
0.0												Freq Offs 0 H
30.0												
tart 10.0 Res BW				#V	BW 3.	0 MHz		s	weep 17	Stop 20 2.33 ms (2	.000 GHz 20001 pts)	

Plot 7-43. Conducted Spurious Plot (AWS WCDMA Mode - High Channel)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 29 of 95	
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RL RF 50Ω DC	CORREC	SENSE:INT	ALIGN AUTO	01:20:47 PMFeb 07, 2018	Frequency
	PNO: Fast 🕞 IFGain:Low) Trig: Free Run Atten: 30 dB	#Avg Type: RMS	TRACE 123456 TYPE A WWWW DET A N N N N N	
dB/div Ref 20.00 dBm			MI	r1 1.844 0 GHz -42.70 dBm	Auto Tur
					Center Fre
0.0					937.500000 M
00					Start Fre
0.0				-13.00 dBm	30.000000 M
0.0					Stop Fr
0.0					1.845000000 G
).0				1	CF Ste
					181.500000 M <u>Auto</u> M
0.0	The state of the s			an a	Ere a Offe
J.O					Freq Offs 0
D.0					
tart 30.0 MHz				Stop 1.8450 GHz	
Res BW 1.0 MHz	#VBW	3.0 MHz	Sweep 2	.420 ms (3631 pts)	

Plot 7-44. Conducted Spurious Plot (PCS WCDMA Mode - Low Channel)



Plot 7-45. Conducted Spurious Plot (PCS WCDMA Mode - Low Channel)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 20 of 95	
1M1802070017-04-R1.A3L	2/1/2018 - 3/27/2018	Portable Handset	Page 39 of 85	
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	ım Analyzer - Sw	ept SA								
L <mark>XI</mark> RL	RF 50 Ω	DC CO	RREC	SEN	ISE:INT	#Avg Typ	ALIGN AUTO	01:21:53 PMF		Frequency
		P	NO: Fast 🕞 Gain:Low	Trig: Free Atten: 20		#Avg iyp	e: RIVIS	TYPE	123456 A Www.MM A N N N N N	
10 dB/div	Ref 10.00 (dBm					Mkr	1 19.482	5 GHz 6 dBm	Auto Tune
0.00										Center Freq 15.00000000 GHz
-10.0									-13.00 dBm	Start Freq
-20.0										10.00000000 GHz
-30.0									1	Stop Free 20.000000000 GH:
-50.0									<u></u>	CF Step 1.000000000 GH: <u>Auto</u> Mar
.60.0										Freq Offse
-70.0										0 H
Start 10.00 #Res BW 1			#\/B\	/ 3.0 MHz			woon 47	Stop 20.0 .33 ms (20	00 GHz	
ARES DW	RO WINZ		#VDV	7 3.0 WIHZ			status		oorpis)	

Plot 7-46. Conducted Spurious Plot (PCS WCDMA Mode - Low Channel)



Plot 7-47. Conducted Spurious Plot (PCS WCDMA Mode - Mid Channel)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-48. Conducted Spurious Plot (PCS WCDMA Mode - Mid Channel)

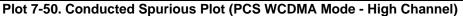


Plot 7-49. Conducted Spurious Plot (PCS WCDMA Mode - Mid Channel)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dama 44 of 05	
1M1802070017-04-R1.A3L	2/1/2018 - 3/27/2018	Portable Handset	Page 41 of 85	
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RL	um Analyzer - Swept RF 50 Ω		C	SEN	ISE:INT		ALIGN AUTO	01:22:39 PM	Feb 07, 2018	
	10 30 31	PNC	:Fast 😱		Run	#Avg Typ			123456 A WWWWW A NNNNN	Frequency
0 dB/div	Ref 20.00 dE	ßm					Mk	r1 1.833 -50.0	5 GHz)8 dBm	Auto Tun
10.0										Center Fre 940.000000 M⊦
10.0									-13.00 dBm	Start Fre 30.000000 M⊦
20.0 30.0 										Stop Fre 1.85000000 GF
io.o							A <i>at an interference and the second second</i>		1	CF Ste 182.000000 Mł <u>Auto</u> Ma
i0.0	1987)	an for the second s	an a	**************************************	Millio ang tury falogorory	gen film an de film and de set de set				Freq Offs 0 F
70.0 Start 30.0			#\/R\M	3.0 MHz			Sweep 2	Stop 1.8	500 GHz	
G	110 10112			0.0 141112					, proj	





Plot 7-51. Conducted Spurious Plot (PCS WCDMA Mode - High Channel)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 40 of 95	
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RL	RF 5	iOΩ DC	CORREC		SEI	VSE:INT		ALIGN AUTO	01:23:33 F	MFeb 07, 2018	
			PNO: Fa IFGain:L		Trig: Free Atten: 20	Run	#Avg Typ		TRA TY	CE 123456 PE A WWWWW ET A NNNNN	Frequency
0 dB/div	Ref 10.0	0 dBm						Mkr	1 19.52 -46.	8 5 GHz 88 dBm	Auto Tun
0.00											Center Fre 15.000000000 GH
20.0										-13.00 dBm	Start Fre 10.000000000 G⊦
10.0 										1	Stop Fre 20.000000000 G⊦
0.0			~~~~								CF Ste 1.000000000 GH <u>Auto</u> Ma
0.0											Freq Offs 0 H
80.0	00 GH7								Stop 20	.000 GHz	
Res BW			#	VBW 3	.0 MHz		s	weep 17	.33 ms (2	20001 pts)	

Plot 7-52. Conducted Spurious Plot (PCS WCDMA Mode - High Channel)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	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 v03 - 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 \geq 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.

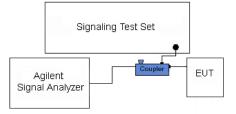


Figure 7-3. Test Instrument & Measurement Setup

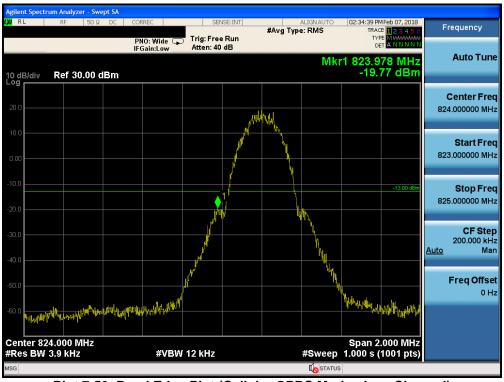
Test Notes

Per 22.917(b), 24.238(b), 27.53(h)(3), and RSS-132(5.5), RSS-133(6.5), RSS-139(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.

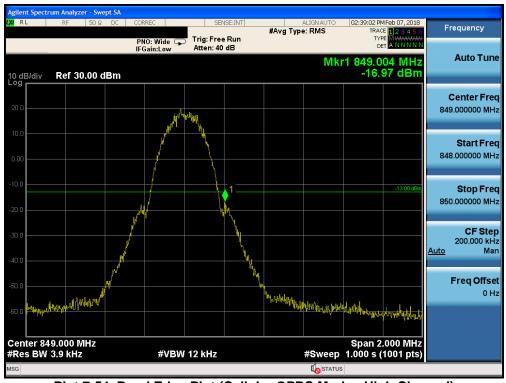
FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 44 of 95
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Cellular GPRS Mode



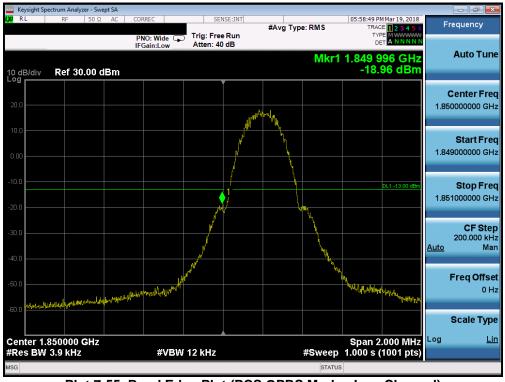
Plot 7-53. Band Edge Plot (Cellular GPRS Mode - Low Channel)



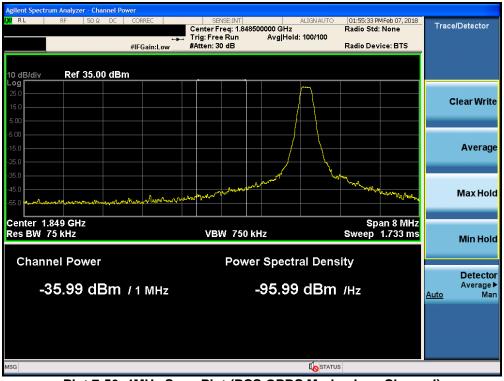
Plot 7-54. Band Edge Plot (Cellular GPRS Mode - High Channel)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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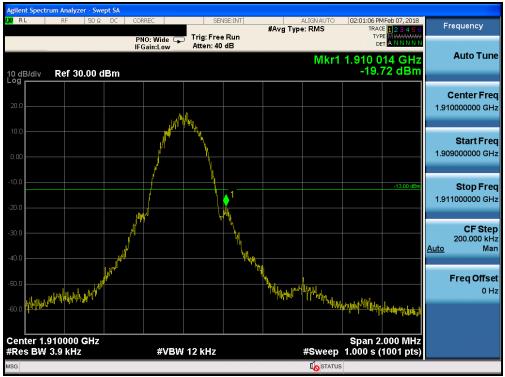




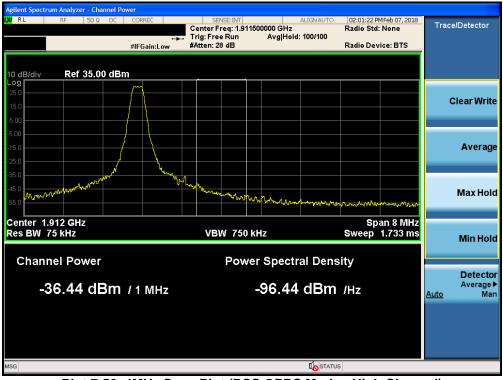
Plot 7-56. 4MHz Span Plot (PCS GPRS Mode - Low Channel)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Page 46 of 85	
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Plot 7-58. 4MHz Span Plot (PCS GPRS Mode - High Channel)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 47 of 95
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Cellular WCDMA Mode



Plot 7-59. Band Edge Plot (Cellular WCDMA Mode - Low Channel)



Plot 7-60. Band Edge Plot (Cellular WCDMA Mode - High Channel)

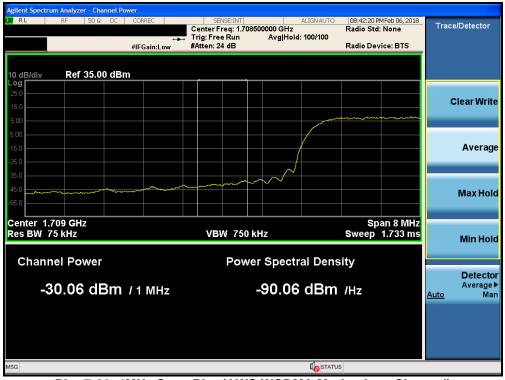
FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 49 of 95	
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AWS WCDMA Mode







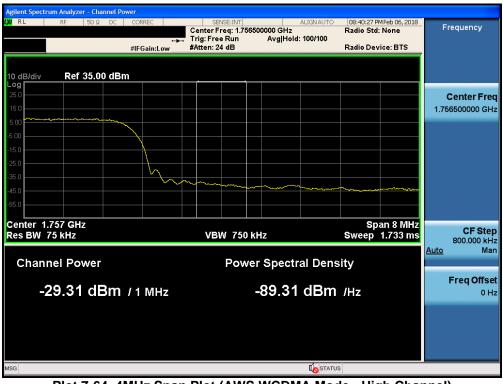
Plot 7-62. 4MHz Span Plot (AWS WCDMA Mode - Low Channel)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 40 of 95
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RL RF 50Ω DC	CORREC	SENSE:INT		ALIGN AUTO	08:40:21 PM Feb 06, 201	
	PNO: Wide 😱 IFGain:Low	Trig: Free Run Atten: 40 dB	#Avg Typ	e: RMS	TRACE 1 2 3 4 5 TYPE A WWWW DET A N N N N	W N
dB/div Ref 30.00 dBm				Mkr1	1.755 000 GH -16.71 dBn	z Auto Tur n
0.0						Center Fre 1.755000000 GH
00	·	~~~				Start Fre 1.747500000 G⊦
1.0 / 1.0		1			-13.00 dB	a Stop Fre 1.762500000 GH
		h				CF Ste 1.500000 Mł <u>Auto</u> Ma
0.0				~~~~~		Freq Offs 0 F
enter 1.755000 GHz Res BW 100 kHz	#\/BW	300 kHz		Sweep 1	Span 15.00 MH .000 ms (1001 pts	Z

Plot 7-63. Band Edge Plot (AWS WCDMA Mode - High Channel)



Plot 7-64. 4MHz Span Plot (AWS WCDMA Mode - High Channel)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 50 of 95
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Plot 7-65. Band Edge Plot (PCS WCDMA Mode - Low Channel)



Plot 7-66. 4MHz Span Plot (PCS WCDMA Mode - Low Channel)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dago 51 of 95	
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Plot 7-67. Band Edge Plot (PCS WCDMA Mode - High Channel)



Plot 7-68. 4MHz Span Plot (PCS WCDMA Mode - High Channel)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 52 of 95
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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 v03 - 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.

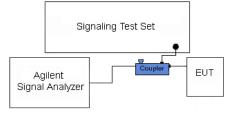


Figure 7-4. Test Instrument & Measurement Setup

Test Notes

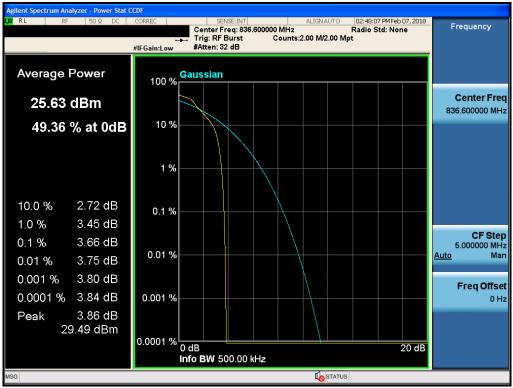
None

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 52 of 95
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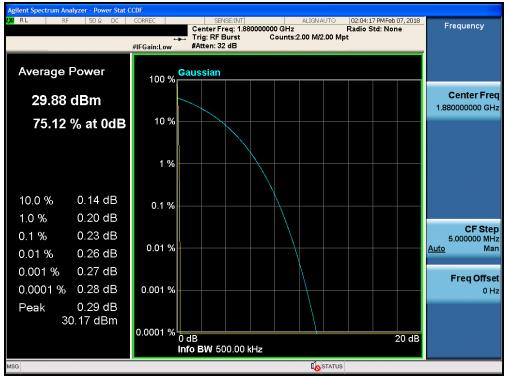




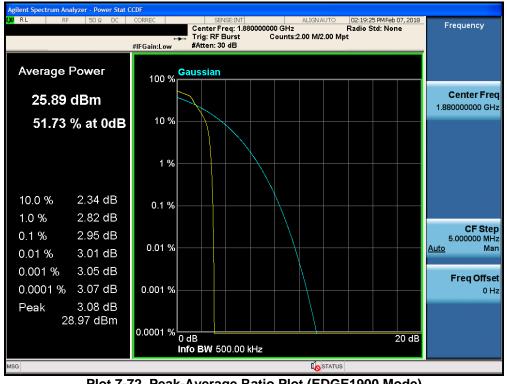
Plot 7-70. Peak-Average Ratio Plot (EDGE850 Mode)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo E4 of 95
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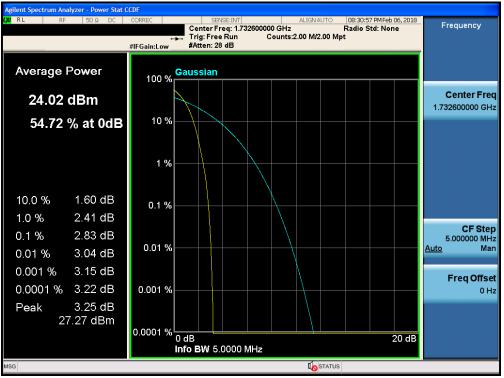




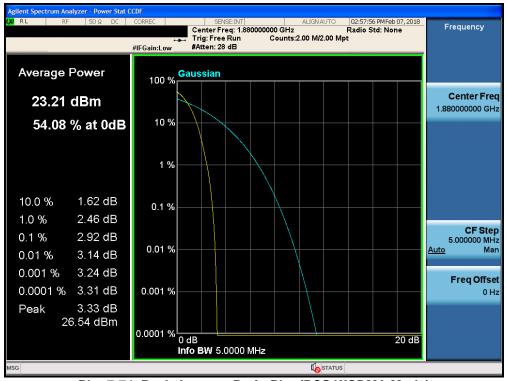
Plot 7-72. Peak-Average Ratio Plot (EDGE1900 Mode)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dege EE of 95	
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Plot 7-74. Peak-Average Ratio Plot (PCS WCDMA Mode)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 56 of 95
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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 v03 - 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

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	UNG	Approved by: Quality Manager
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Test Setup

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

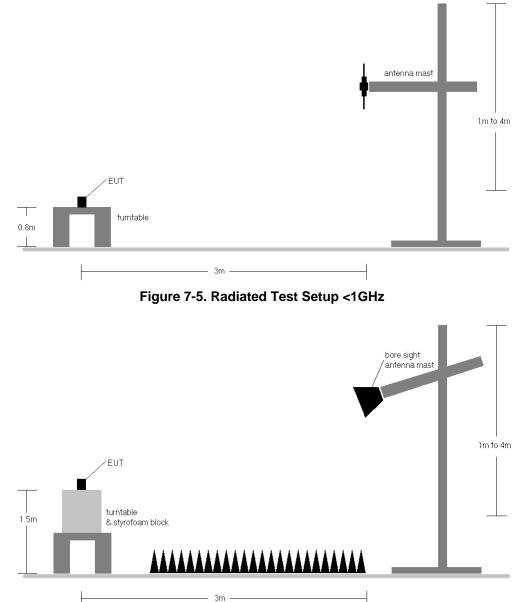


Figure 7-6. Radiated Test Setup >1GHz

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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.

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 50 of 95	
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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	V	150	6	26.85	1.50	26.20	38.45	-12.25	28.35	40.61	-12.26
836.60	GPRS850	V	150	3	27.02	1.50	26.37	38.45	-12.08	28.52	40.61	-12.09
848.80	GPRS850	V	150	4	27.30	1.50	26.65	38.45	-11.80	28.80	40.61	-11.80
848.80	GPRS850	н	150	164	26.86	1.50	26.21	38.45	-12.24	28.36	40.61	-12.25
848.80	EDGE850	V	150	4	21.39	1.50	20.74	38.45	-17.71	22.89	40.61	-17.72

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

Frequency [MHz]	wode	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	V	150	3	18.24	1.50	17.59	38.45	-20.86	19.74	40.61	-20.87
836.60	WCDMA850	V	150	351	18.21	1.50	17.56	38.45	-20.89	19.71	40.61	-20.90
846.60	WCDMA850	V	150	354	18.07	1.50	17.42	38.45	-21.03	19.57	40.61	-21.04
826.40	WCDMA850	н	150	0	18.15	1.50	17.50	38.45	-20.95	19.65	40.61	-20.96

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]
1712.40	WCDMA1700	V	150	17	20.25	5.63	25.88	30.00	-4.12
1732.60	WCDMA1700	V	150	16	19.63	5.41	25.04	30.00	-4.96
1752.60	WCDMA1700	V	150	12	19.53	5.19	24.72	30.00	-5.28
1712.40	WCDMA1700	н	150	103	17.69	5.63	23.32	30.00	-6.68

Table 7-4. EIRP (AWS WCDMA)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 60 of 95	
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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]
1850.20	GPRS1900	Н	150	266	24.95	4.79	29.74	33.01	-3.27
1880.00	GPRS1900	Н	150	251	25.25	4.84	30.09	33.01	-2.92
1909.80	GPRS1900	Н	150	259	25.67	4.86	30.53	33.01	-2.48
1909.80	GPRS1900	V	150	350	23.65	4.68	28.33	33.01	-4.68
1909.80	EDGE1900	н	150	259	21.85	4.68	26.53	33.01	-6.48

Table 7-5. EIRP (PCS GPRS)

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	150	78	19.43	4.81	24.24	33.01	-8.77
1880.00	WCDMA1900	н	150	74	18.37	4.74	23.11	33.01	-9.90
1907.60	WCDMA1900	н	150	145	17.39	4.68	22.07	33.01	-10.94
1852.40	WCDMA1900	V	150	13	18.18	4.81	22.99	33.01	-10.02

Table 7-6. EIRP (PCS WCDMA)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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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 v03 - 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 > 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.

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Cellular GPRS Mode

OPERATING FREQUENCY:	82	24.20	MHz
CHANNEL:		_	
MODULATION SIGNAL:	GPRS (GMSK)	_	
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1648.40	V	181	285	-60.79	5.92	-54.87	-41.9
2472.60	V	148	134	-62.97	5.70	-57.27	-44.3
3296.80	V	-	-	-66.06	7.61	-58.45	-45.5

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

OPERATING FREQUENCY:	830	MHz	
CHANNEL:	190		
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]
1673.20	V	343	58	-60.16	5.84	-54.31	-41.3
2509.80	V	110	43	-58.28	5.66	-52.62	-39.6
3346.40	V	-	-	-65.55	7.89	-57.66	-44.7

Table 7-8. Radiated Spurious Data (Cellular GPRS Mode – Ch. 190)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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OPERATING FREQUENCY:	848	3.80	MHz
CHANNEL:	2		
MODULATION SIGNAL:	GPRS (GMSK)	_	_
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1697.60	V	-	-	-68.70	5.77	-62.93	-49.9

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

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Cellular WCDMA Mode

OPERATING FREQUENCY:	8	26.40	MHz
CHANNEL:			
MODULATION SIGNAL:	WCDMA		
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1652.80	V	140	231	-72.27	5.90	-66.37	-53.4
2479.20	V	-	-	-70.69	5.67	-65.02	-52.0

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

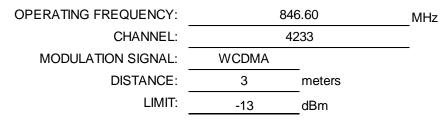
OPERATING FREQUENCY:	836	6.60 MHz
CHANNEL:	41	83
MODULATION SIGNAL:	WCDMA	
DISTANCE:	3	meters
LIMIT:	-13	dBm

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	343	241	-73.90	5.84	-68.05	-55.1
2509.80	V	-	-	-70.21	5.66	-64.55	-51.5

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

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	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]
1693.20	V	113	237	-71.40	5.78	-65.61	-52.6
2539.80	V	-	-	-70.30	5.88	-64.41	-51.4

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

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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OPERATING FREQUENCY:	1712.40		MHz
CHANNEL:			
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]
3424.80	V	124	308	-69.63	8.22	-61.40	-48.4
5137.20	V	341	181	-72.57	10.31	-62.26	-49.3
6849.60	V	166	391	-69.64	11.41	-58.23	-45.2
8562.00	V	-	-	-74.03	13.16	-60.87	-47.9

Table 7-13. Radiated Spurious Data (AWS WCDMA Mode – Ch. 1312)

OPERATING FREQUENCY:	173	32.60	MHz
CHANNEL:	1413		
MODULATION SIGNAL:	WCDMA		
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3465.20	V	161	39	-71.92	8.30	-63.61	-50.6
5197.80	V	-	-	-73.58	10.25	-63.33	-50.3

Table 7-14. Radiated Spurious Data (AWS WCDMA Mode - Ch. 1413)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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175	52.60 MHz	
1:	513	
WCDMA		
3	meters	
-13	dBm	
	UCDMA 3	1513 WCDMA 3 meters

Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3505.20	V	133	318	-68.21	8.38	-59.83	-46.8
5257.80	V	-	-	-72.13	10.32	-61.82	-48.8

Table 7-15. Radiated Spurious Data (AWS WCDMA Mode – Ch. 1513)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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OPERATING FREQUENCY:	185	50.20	MHz	
CHANNEL:	5	512		
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	114	318	-68.56	8.52	-60.05	-47.0
5550.60	V	389	0	-53.71	10.56	-43.15	-30.1
7400.80	V	-	-	-69.97	12.02	-57.95	-44.9

Table 7-16. Radiated Spurious Data (PCS GPRS Mode - Ch. 512)

OPERATING FREQUENCY:	188	0.00	MHz
CHANNEL:	6		
MODULATION SIGNAL:	GPRS (GMSK)	_	-
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3760.00	V	-	-	-68.92	8.57	-60.36	-47.4

 Table 7-17. Radiated Spurious Data (PCS GPRS Mode – Ch. 661)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:		Dage 70 of 95			
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OPERATING FREQUENCY:	190	9.80	MHz
CHANNEL:	8	510	
MODULATION SIGNAL:	GPRS (GMSK)		
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3819.60	V	-	-	-69.84	8.58	-61.27	-48.3

Table 7-18. Radiated Spurious Data (PCS GPRS Mode – Ch. 810)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 71 of 95
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OPERATING FREQUENCY:	1	852.40	MHz		
CHANNEL:		9262			
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]
3704.80	V	192	325	-53.75	8.52	-45.23	-32.2
5557.20	V	112	191	-70.15	10.57	-59.58	-46.6
7409.60	V	-	-	-72.47	12.03	-60.44	-47.4

Table 7-19. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9262)

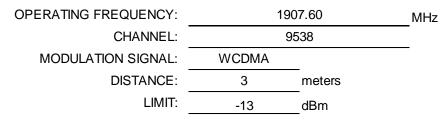
MHz	0.00	188	OPERATING FREQUENCY:
_	00	94	CHANNEL:
—		WCDMA	MODULATION SIGNAL:
	meters	3	DISTANCE:
	dBm	-13	LIMIT:

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]
3760.00	V	169	332	-59.97	8.57	-51.41	-38.4
5640.00	V	111	207	-71.41	10.68	-60.73	-47.7
7520.00	V	-	-	-71.79	12.17	-59.62	-46.6

Table 7-20. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9400)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	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]
3815.20	V	201	22	-62.30	8.58	-53.72	-40.7
5722.80	V	110	195	-70.60	10.74	-59.85	-46.9
7630.40	V	-	-	-71.41	12.26	-59.16	-46.2

Table 7-21. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9538)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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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 $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency. For Part 24, Part 27, and RSS-139, 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:	4.35	VDC
DEVIATION LIMIT :	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.35	+ 20 (Ref)	836,599,869	-131	-0.0000156
100 %		- 30	836,599,998	-2	-0.0000002
100 %		- 20	836,599,814	-186	-0.0000222
100 %		- 10	836,599,965	-35	-0.0000042
100 %		0	836,599,955	-45	-0.0000053
100 %		+ 10	836,599,841	-159	-0.0000190
100 %		+ 20	836,599,982	-18	-0.0000021
100 %		+ 30	836,599,971	-29	-0.0000035
100 %		+ 40	836,599,889	-111	-0.0000133
100 %		+ 50	836,599,809	-191	-0.0000229
BATT. ENDPOINT	3.40	+ 20	836,599,808	-192	-0.0000230

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

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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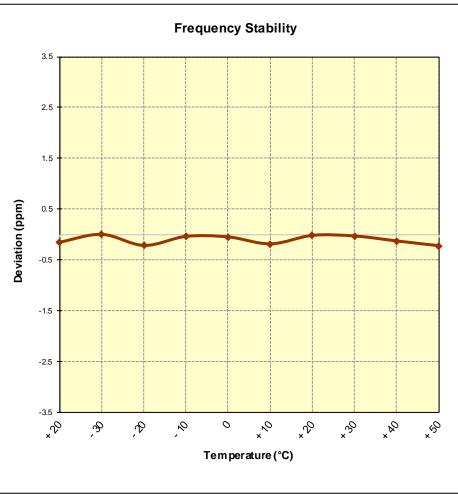


Figure 7-8. Frequency Stability Graph (Cellular GPRS Mode – Ch. 190)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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OPERATING FREQUENCY:	836,600,000	Hz
CHANNEL:	4183	_
REFERENCE VOLTAGE:	4.35	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	_

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.35	+ 20 (Ref)	836,599,829	-171	-0.0000204
100 %		- 30	836,599,855	-145	-0.0000173
100 %		- 20	836,599,881	-119	-0.0000143
100 %		- 10	836,599,966	-34	-0.0000041
100 %		0	836,599,923	-77	-0.0000092
100 %		+ 10	836,599,807	-193	-0.0000231
100 %		+ 20	836,599,908	-92	-0.0000110
100 %		+ 30	836,599,871	-129	-0.0000154
100 %		+ 40	836,599,867	-133	-0.0000158
100 %		+ 50	836,599,805	-195	-0.0000233
BATT. ENDPOINT	3.40	+ 20	836,599,961	-39	-0.0000047

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

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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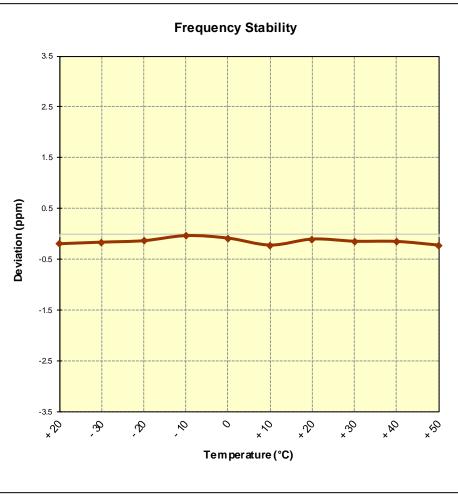


Figure 7-9. Frequency Stability Graph (Cellular WCDMA Mode – Ch. 4183)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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OPERATING FREQUENCY:	1,732,600,000	Hz
CHANNEL:	1413	
REFERENCE VOLTAGE:	4.35	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.35	+ 20 (Ref)	1,732,599,878	-122	-0.0000071
100 %		- 30	1,732,599,977	-23	-0.0000014
100 %		- 20	1,732,599,994	-6	-0.0000004
100 %		- 10	1,732,599,951	-49	-0.0000028
100 %		0	1,732,599,906	-94	-0.0000054
100 %		+ 10	1,732,599,947	-53	-0.0000031
100 %		+ 20	1,732,599,891	-109	-0.0000063
100 %		+ 30	1,732,599,982	-18	-0.0000010
100 %		+ 40	1,732,599,871	-129	-0.0000074
100 %		+ 50	1,732,599,936	-64	-0.0000037
BATT. ENDPOINT	3.40	+ 20	1,732,599,927	-73	-0.0000042

Table 7-24. Frequency Stability Data (AWS WCDMA Mode – Ch. 1413)

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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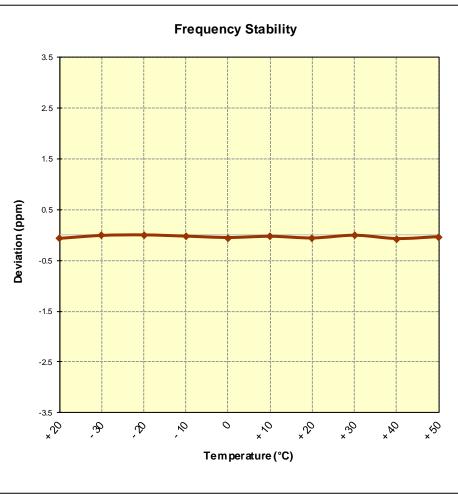


Figure 7-10. Frequency Stability Graph (AWS WCDMA Mode – Ch. 1413)

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OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	661	_
REFERENCE VOLTAGE:	4.35	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	_

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.35	+ 20 (Ref)	1,879,999,874	-126	-0.0000067
100 %		- 30	1,879,999,909	-91	-0.0000049
100 %		- 20	1,879,999,949	-51	-0.0000027
100 %		- 10	1,879,999,864	-136	-0.0000072
100 %		0	1,879,999,860	-140	-0.0000074
100 %		+ 10	1,879,999,998	-2	-0.0000001
100 %		+ 20	1,879,999,903	-97	-0.0000051
100 %		+ 30	1,879,999,865	-135	-0.0000072
100 %		+ 40	1,879,999,935	-65	-0.0000034
100 %		+ 50	1,879,999,897	-103	-0.0000055
BATT. ENDPOINT	3.40	+ 20	1,879,999,958	-42	-0.0000022

Table 7-25. Frequency Stability Data (PCS GPRS Mode – Ch. 661)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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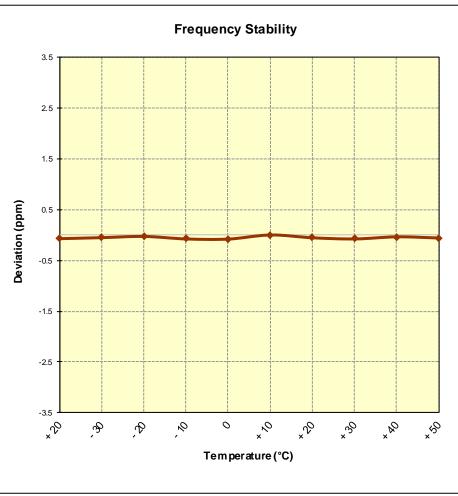


Figure 7-11. Frequency Stability Graph (PCS GPRS Mode – Ch. 661)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	9400	_
REFERENCE VOLTAGE:	4.35	VDC
DEVIATION LIMIT :	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.35	+ 20 (Ref)	1,879,999,863	-137	-0.0000073
100 %		- 30	1,879,999,959	-41	-0.0000022
100 %		- 20	1,879,999,916	-84	-0.0000045
100 %		- 10	1,879,999,958	-42	-0.0000022
100 %		0	1,879,999,951	-49	-0.0000026
100 %		+ 10	1,879,999,956	-44	-0.0000024
100 %		+ 20	1,879,999,887	-113	-0.0000060
100 %		+ 30	1,879,999,941	-59	-0.0000032
100 %		+ 40	1,879,999,842	-158	-0.0000084
100 %		+ 50	1,879,999,876	-124	-0.0000066
BATT. ENDPOINT	3.40	+ 20	1,879,999,938	-62	-0.0000033

Table 7-26. Frequency Stability Data (PCS WCDMA Mode – Ch. 9400)

FCC ID: A3LSMJ337T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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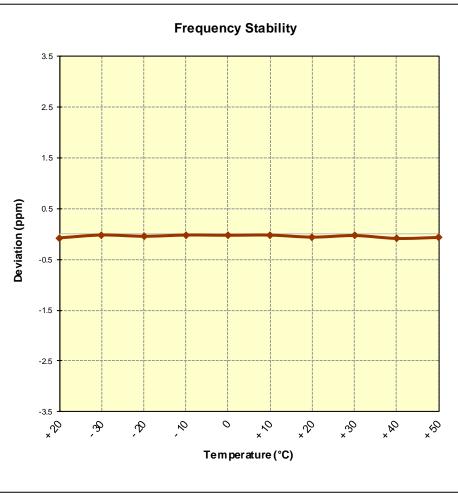


Figure 7-12. Frequency Stability Graph (PCS WCDMA Mode – Ch. 9400)

FCC ID: A3LSMJ337T		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: A3LSMJ337T** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules.

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Test Report S/N:	Test Dates:	EUT Type:		Dage 85 of 85
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