

PCTEST

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



MEASUREMENT REPORT

FCC Part 90

Applicant Name:

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

Date of Testing: 3/23 - 5/7/2020 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M2003200047-10.A3L

FCC ID:

A3LSMA716U

APPLICANT:

Samsung Electronics Co., Ltd.

Application Type: Model: EUT Type: FCC Classification: FCC Rule Part: Test Procedure(s): Certification SM-A716U Portable Handset PCS Licensed Transmitter Held to Ear (PCE) §2.1049, §22(H), §90(S), §90(R) ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01

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

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

Randy Ortanez President



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MEASUREMENT REPORT FCC Part 22(H) & 90

Overview Table (Front Page Table)							
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	Measurement	Max. Power [W]	Max. Power [dBm]	Emission Designator
		QPSK	821.5	ERP	0.059	17.73	13M5G7D
	15 MHz	16QAM	821.5	ERP	0.051	16.77	13M5W7D
		64QAM	821.5	ERP	0.050	15.65	13M4W7D
		QPSK	821.5	Conducted	0.296	24.71	13M5G7D
	15 MHz	16QAM	821.5	Conducted	0.255	24.07	13M5W7D
		64QAM	821.5	Conducted	0.200	23.00	13M4W7D
		QPSK	819.0	Conducted	0.303	24.81	9M01G7D
	10 MHz	16QAM	819.0	Conducted	0.263	24.20	8M95W7D
		64QAM	819.0	Conducted	0.200	23.00	8M97W7D
LTE Band 26	5 MHz	QPSK	816.5 - 821.5	Conducted	0.304	24.83	4M49G7D
		16QAM	816.5 - 821.5	Conducted	0.275	24.40	4M49W7D
		64QAM	816.5 - 821.5	Conducted	0.202	23.06	4M49W7D
	3 MHz	QPSK	815.5 - 822.5	Conducted	0.296	24.71	2M69G7D
		16QAM	815.5 - 822.5	Conducted	0.267	24.27	2M69W7D
		64QAM	815.5 - 822.5	Conducted	0.207	23.15	2M68W7D
		QPSK	814.7 - 823.3	Conducted	0.310	24.91	1M08G7D
	1.4 MHz	16QAM	814.7 - 823.3	Conducted	0.253	24.03	1M09W7D
		64QAM	814.7 - 823.3	Conducted	0.211	23.25	1M08W7D
		QPSK	793.0	ERP	0.072	18.58	8M97G7D
	10 MHz	16QAM	793.0	ERP	0.063	18.01	8M92W7D
LTE Band 14		64QAM	793.0	ERP	0.050	17.02	8M95W7D
		QPSK	790.5 - 795.5	ERP	0.071	18.48	4M49G7D
	5 MHz	16QAM	790.5 - 795.5	ERP	0.057	17.53	4M50W7D
		64QAM	790.5 - 795.5	ERP	0.046	16.59	4M51W7D
CDMA BC10	N/A	CDMA	817.9 - 823.1	Conducted	0.295	24.70	1M28F9W

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 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 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: A3LSMA716U**. The test data contained in this report pertains only to the emissions due to the EUT's licensed transmitters that operate under the provisions of Part 90(R), 22(H) and 90(S).

Test Device Serial No.: 05500, 19097, 06656, 11985

2.2 Device Capabilities

This device contains the following capabilities:

800/850/1900 CDMA (BC0, BC1, BC10), 850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multiband LTE, 5G NR (n71, n5, n66, n2, n41), 802.11b/g/n WLAN, 802.11a/n/ac UNII, Bluetooth (1x, EDR, LE), NFC, ANT+

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.

2.4 EMI Suppression Device(s)/Modifications

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

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3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

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

3.2 Radiated Power and Radiated Spurious Emissions §2.1053, §90.635, §90(S), §90(R)

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

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

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

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

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

The calculated P_d levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of 43 + 10 log₁₀(Power [Watts]) specified in 90(S).

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

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

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4.0 MEASUREMENT UNCERTAINTY

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

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

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5.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	LTx1	Licensed Transmitter Cable Set	6/4/2019	Annual	6/4/2020	LTx1
-	LTx3	LIcensed Transmitter Cable Set	10/30/2019	Annual	10/30/2020	LTx3
Agilent	N9020A	MXA Signal Analyzer	4/20/2019	Annual	4/20/2020	US46470561
Agilent	N9038A	MXE EMI Receiver	7/17/2019	Annual	7/17/2020	MY51210133
Agilent	N9030A	PXA Signal Analyzer (44GHz)	6/12/2019	Annual	6/12/2020	MY52350166
Com-Power	PAM-103	Pre-Amplifier (1-1000MHz)	5/10/2019	Annual	5/10/2020	441112
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	2/22/2019	Biennial	2/22/2021	128338
Mini Circuits	TVA-11-422	RF Power Amp		N/A		QA1317001
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	4/19/2019	Annual	4/19/2020	11401010036
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A		11208010032	
Mini-Circuits	PWR-SEN-4RMS	USB Power Sensor	4/20/2019	Annual	4/20/2020	11210140001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11403100002
Rohde & Schwarz	CMW500	Radio Communication Tester		N/A		100976
Rohde & Schwarz	CMW500	Radio Communication Tester		N/A		112347
Rohde & Schwarz	CMW500	Radio Communication Tester		N/A		102060
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	9/23/2019	Annual	9/23/2020	100348
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/11/2019	Annual	7/11/2020	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
Sunol	DRH-118	Horn Antenna (1-18GHz)	10/3/2019	Biennial	10/3/2021	A050307
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	4/19/2018	Biennial	4/19/2020	A051107
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2019	Biennial	10/10/2021	121034

Table 5-1. Test Equipment

Notes:

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

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6.0 SAMPLE CALCULATIONS

Emission Designator

Emission Designator = 1M25F9W

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

Spurious Radiated Emission – BC10

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

The average spectrum analzyer reading at 3 meters with the EUT on the turntable was -81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of -81.0 dBm on the spectrum analzyer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 2453.70 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm -(-24.80) = 50.3 dBc.

Emission Designator

QPSK Modulation

Emission Designator = 8M62G7D

LTE BW = 8.62 MHz

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

QAM Modulation

Emission Designator = 8M45W7D

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

Spurious Radiated Emission – LTE Band

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

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

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7.0 TEST RESULTS

7.1 Summary

Company Name:	Samsung Electronics Co., Ltd.
FCC ID:	A3LSMA716U
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
Mode(s):	CDMA / EvDO / LTE
Band:	Band Class 10 / Band 26 / Band 14

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1049	Occupied Bandwidth	N/A		PASS	Section 7.2
2.1051 90(S).691(a) 90(R).543(a)	Conducted Band Edge / Spurious Emissions	On all frequencies between 769- 775 MHz and 799-805 MHz, attenuation by a factor not less than 65 + 10 log(P) dB in a 6.25 kHz band segment, for mobile and portable stations. On any frequency between 775- 788 MHz, above 805 MHz, and below 758 MHz, attenuation by at least 43 + 10 log(P) dB.(Band 14) > 43 + 10 log ₁₀ (P[Watts]) for all out-of-band emissions except > 50 + 10 log ₁₀ (P[Watts]) at Band Edge and for all out-of- band emissions within 37.5kHz of Block Edge (Band 26)	CONDUCTED	PASS	Sections 7.3, 7.4
2.1055 90.213	Frequency Stability	< 2.5 ppm		PASS	Section 7.8
2.1046 90.635	Conducted Power	< 100 Watts		PASS	Section 7.5
22.913(a.2)	Effective Radiated Power (Band 26)	< 7 Watts max. ERP		PASS	Section 7.6
90.542(a)(7)	Effective Radiated Power (Band 14)	< 3 Watts max. ERP	RADIATED	PASS	Section 7.6
2.1053 90(S).691(a) 90(R).543(e)	Radiated Spurious Emissions	 > 43 + 10 log₁₀ (P[Watts]) for all out-of-band emissions except > 50 + 10 log₁₀ (P[Watts]) at Band Edge and for all out-of- band emissions within 37.5kHz of Block Edge 		PASS	Section 7.7

Table 7-1. Summary of Test Results

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Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots shown in Section 7.0 were taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 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 are PCTEST "2G/3G Automation," Version 4.2. and PCTEST "LTE Automation," Version 5.3.

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7.2 Occupied Bandwidth §2.1049

Test Overview

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

Test Procedure Used

KDB 971168 D01 v03r01 - Section 4.2

Test Settings

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

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

Test Setup

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



Figure 7-1. Test Instrument & Measurement Setup

Test Notes

None.

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CDMA BC10



Plot 7-1. Occupied Bandwidth Plot (CDMA/EvDO, Low Channel)



Plot 7-2. Occupied Bandwidth Plot (CDMA/EvDO, High Channel)

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LTE Band 26



Plot 7-3. Occupied Bandwidth Plot (LTE Band 26 - 15MHz QPSK - Full RB Configuration)



Plot 7-4. Occupied Bandwidth Plot (LTE Band 26 - 15MHz 16-QAM - Full RB Configuration)

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🔤 Keysight Spectrum Analyzer - Occup	pied BW				
LX RL RF 50 Ω	AC CORREC			M Mar 27, 2020	Trace/Detector
		er Freq: 821.500000 MHz Free Run Avg Hold:	Radio Std 100/100	: None	
		en: 40 dB	Radio Dev	vice: BTS	
,					
10 JD/JU Dof 10 00	dBm				
10 dB/div Ref 40.00					
30.0					
20.0					Clear Write
10.0	Mr. March and walk	- the monor fill was here and have been and the	-wq		
0.00	/				
-10.0	} 				Average
-20.0			\sim		
-20.0 -30.0	10-14 ⁻¹		C. A. LONG . M C. A. M. P.	Withinsould are	
-40.0					
					Max Hold
-50.0					
Center 821.50 MHz			Snan 3	0.00 MHz	
Res BW 270 kHz		VBW 2.7 MHz		ep 1 ms	Min Llald
					Min Hold
Occupied Bandw	vidth	Total Power	29.9 dBm		
	13.419 MHz				Detector Peak▶
Transmit Freq Erro	or 21.470 kHz	% of OBW Powe	r 99.00 %		Auto <u>Man</u>
x dB Bandwidth	14.47 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-5. Occupied Bandwidth Plot (LTE Band 26 - 15MHz 64-QAM - Full RB Configuration)



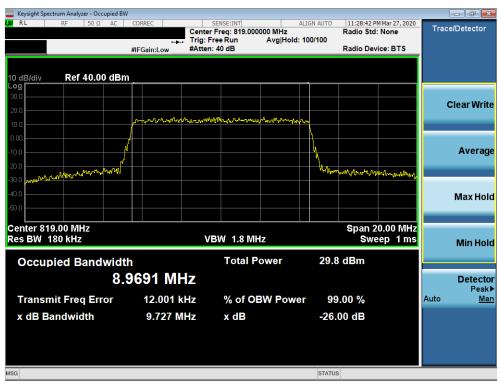
Plot 7-6. Occupied Bandwidth Plot (LTE Band 26 - 10MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA716U	PCTEST Proud to be part of @ element		SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied B	3W				- # X
KL RF 50Ω AC	CORREC	SENSE:INT AL	IGN AUTO 11:28:35 Radio Sto	PM Mar 27, 2020	Trace/Detector
		FreeRun Avg Hold: 1		: None	
	#IFGain:Low #Atter	n: 40 dB	Radio De	vice: BTS	
10 dB/div Ref 40.00 dB	m				
Log					
30.0					Clear Write
20.0					Clear write
10.0	marthantown	www.warenauter	n		
0.00			Λ		
-10.0	<u>۱</u>				Average
	/		han a mha a a		g .
-20.0 -30.0			www.Whilewayara	al alight floor and	
-40.0					Max Hold
-50.0					
Center 819.00 MHz				20.00 MHz	
Res BW 180 kHz	V	/BW 1.8 MHz		eep 1 ms	
				oop Tillo	Min Hold
Occupied Bandwid	th	Total Power	30.8 dBm		
	.9509 MHz				Detector
0	.9509 WINZ				Detector Peak▶
Transmit Freq Error	-4.638 kHz	% of OBW Power	99.00 %		Auto <u>Man</u>
x dB Bandwidth	9.663 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-7. Occupied Bandwidth Plot (LTE Band 26 - 10MHz 16-QAM - Full RB Configuration)



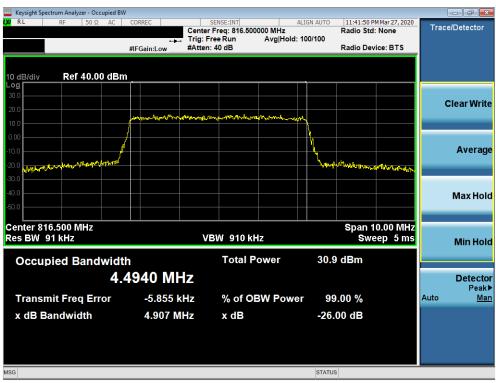
Plot 7-8. Occupied Bandwidth Plot (LTE Band 26 - 10MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMA716U	Proud to be part of element		SAMSUNG	Approved by: Quality Manager
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Plot 7-9. Occupied Bandwidth Plot (LTE Band 26 - 5MHz QPSK - Full RB Configuration)



Plot 7-10. Occupied Bandwidth Plot (LTE Band 26 - 5MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMA716U	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Occupied BW	/					3
KI RF 50Ω AC				PM Mar 27, 2020	Trace/Detector	
		Freq: 816.500000 MHz Free Run Avg Hold: 1	Radio St 100/100	d: None	11400120100101	
		: 40 dB		evice: BTS		
to album Dof 40.00 dBm	-					
10 dB/div Ref 40.00 dBn						
30.0						
20.0					Clear Write	e
10.0	Montherphysipherson	the she was he was weller and	h.			
	/					
0.00			1		<u>.</u>	
-10.0					Averag	e
-20.0 ppptington the stand of a stand			Wornweithershim	who have		
-30.0						-
-40.0					Maylia	
-50.0					Max Hol	a
-30.0						
Center 816.500 MHz			Span	10.00 MHz		
Res BW 91 kHz	V	BW 910 kHz		reep 5 ms	Min Hol	d
					WIIITION	~
Occupied Bandwidt	h	Total Power	30.4 dBm			
1	4931 MHz				Detecto	
4.					Peak	
Transmit Freq Error	-1.636 kHz	% of OBW Power	r 99.00 %		Auto <u>Ma</u>	
x dB Bandwidth	4.909 MHz	x dB	-26.00 dB			
			Loloo al			
MSG			STATUS			

Plot 7-11. Occupied Bandwidth Plot (LTE Band 26 - 5MHz 64-QAM - Full RB Configuration)



Plot 7-12. Occupied Bandwidth Plot (LTE Band 26 - 3MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA716U	POUL to be part of element		SAMSUNG	Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Occupied B						
🗶 RL RF 50Ω AC	CORREC	SENSE:INT nter Freg: 815.500	ALIGN		:33 PM Mar 27, 2020 Std: None	Trace/Detector
	🛶 Tri	ig: Free Run tten: 40 dB	Avg Hold: 100/	100	Device: BTS	
10 dB/div Ref 40.00 dB	m			_		
20.0			0 - n			Clear Write
10.0	ᡰ᠕᠃᠆ᢕᡊ᠆ᡔᢇ᠉ᡊᠬᠬ᠆ᡅᢇᡧ᠕ᠴ	h.h				
-10.0 ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~				The Market	vir march	Average
-30.0						Maxilala
-50.0						Max Hold
Center 815.500 MHz Res BW 47 kHz		VBW 470 kH	łz		n 5.000 MHz ep 2.533 ms	Min Hold
Occupied Bandwid	th	Total P	ower	30.7 dBm		
2.	.6908 MHz					Detector Peak▶
Transmit Freq Error	1.520 kHz	% of O	BW Power	99.00 %		Auto <u>Man</u>
x dB Bandwidth	2.984 MHz	x dB		-26.00 dE	3	
ISG				STATUS		

Plot 7-13. Occupied Bandwidth Plot (LTE Band 26 - 3MHz 16-QAM - Full RB Configuration)



Plot 7-14. Occupied Bandwidth Plot (LTE Band 26 - 3MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMA716U	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Occupied B						- d - X
XIRL RF 50Ω AC	CORREC	SENSE:INT enter Freg: 814.7000	ALIGN AUTO	2 11:54:41 PM M Radio Std: N		Trace/Detector
	Ti taga	rig: Free Run Atten: 40 dB	Avg Hold: 100/100	Radio Device		
10 dB/div Ref 30.00 dB	m					
20.0	mmmmmm	mmmmm	mangener			Clear Write
0.00				ч. — — — — — — — — — — — — — — — — — — —		
-10.0				hunn	mmmy	Average
-30.0						
-50.0						Max Hold
Center 814.700 MHz Res BW 18 kHz		VBW 180 kH	z	Span 2.0 Sweep 5.		Min Hold
Occupied Bandwid	th	Total Po	ower 31	.7 dBm		
1.	.0841 MHz					Detector Peak▶
Transmit Freq Error	-898 Hz	% of OB	W Power	99.00 %	Au	ito <u>Mar</u>
x dB Bandwidth	1.223 MHz	x dB	-21	6.00 dB		
ISG			STA	rus		

Plot 7-15. Occupied Bandwidth Plot (LTE Band 26 - 1.4MHz QPSK - Full RB Configuration)



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

FCC ID: A3LSMA716U	Proud to be part of @ element		SAMSUNG	Approved by: Quality Manager	
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Center Fred, 514,70000 Min2 Radio Std. None → Trij: Free Run Avg Hold: 100/100 Radio Device: BTS #IFGain:Low #Atten: 40 dB Radio Device: BTS	ce/Detector
Trig: Free Run Avg Hold: 100/100 #IFGain:Low #Atten: 40 dB Radio Device: BTS 10 dB/div Ref 30.00 dBm	
10 dB/div Ref 30.00 dBm	
100 Anthen an and a second a se	Clear Write
20.0 monor market and hard market and her and	Average
-40.0	
-50.0	Max Hold
-60.0	Maxinola
Center 814.700 MHz Span 2.000 MHz	
Res BW 18 kHz Sweep 5.733 ms	Min Hold
Occupied Bandwidth Total Power 29.8 dBm	
1.0815 MHz	Detector
Transmit Freq Error 387 Hz % of OBW Power 99.00 % Auto	Peak▶ Man
	Interi
x dB Bandwidth 1.212 MHz x dB -26.00 dB	
MSG STATUS	

Plot 7-17. Occupied Bandwidth Plot (LTE Band 26 - 1.4MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMA716U	PCTEST°	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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LTE Band 14



Plot 7-18. Occupied Bandwidth Plot (LTE Band 14 - 10MHz QPSK - Full RB Configuration)

🔤 Keysight Spectrum Analyzer - Occupied								
LXI RL RF 50Ω AC	C CORREC	SENSE:INT Center Freg: 793.000		ALIGN AUTO	11:17:05 Pf Radio Std:	4 Apr 08, 2020	Trace/D	etector
NFE		Trig: Free Run	Avg Hold:	100/100				
,	#IFGain:Low	#Atten: 36 dB			Radio Dev	ice: BTS		
10 dB/div Ref 30.00 dl	Bm							
20.0								
	maryton	ᢣᡅ᠋ᠬᠯᢣ᠆ᢛᡃᡁ᠆ᡩ᠕᠈ᢛ᠇᠃ᢞ᠕ᡁᡘ	Mamo				Cle	ar Write
10.0								
0.00			1					
-10.0								_
-20.0	معدال مع			Mary Charles	mullinky		1	Average
-30.0 IL of VIVIII and I				10 A. Y - 16		Whentyntory		
-40.0 Mm ^{m-r**}								
-50.0							N	ax Hold
-60.0								
Center 793.00 MHz Res BW 240 kHz		#VBW 7501	/LI-1			5.00 MHz ep 1 ms		
Res DW 240 KHZ		#VBW 7301	NΠZ		Swe	ep mis	Ν	/lin Hold
Occupied Bandwi	dth	Total P	ower	29.9	dBm			
	8.9216 MH							Detector
		Z					L	Jetector Peak▶
Transmit Freq Error	8.007 kł	Hz % of O	BW Powe	r 99	.00 %		Auto	Man
x dB Bandwidth	9.749 MI	Hz xdB		-26	00 dB			
	5.7 45 111			-20.	JO UB			
								_
MSG				STATUS				

Plot 7-19. Occupied Bandwidth Plot (LTE Band 14 - 10MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMA716U	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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🔤 Keysight Spectrum Analyzer - Oo	ccupied BW									
LXI RL RF 50 Ω	2 AC COR	REC		SE:INT eq: 793.000		ALIGN AUTO	11:17:12 P	M Apr 08, 2020	Trace	e/Detector
	NFE		Trig: Free	Run		d: 100/100	Radio Stu.	None		
		ain:Low	#Atten: 36	dB			Radio Dev	ice: BTS		
10 dB/div Ref 30.0	00 dBm									
Log										_
20.0		no in the or	what a have	m man h	A. A. A.					lear Write
10.0		-			A MARCEL AND					
0.00		(\ \				
-10.0		J				-				
-20.0						<u>4</u>				Average
-30.0	mound					Warney	149 Normania	1 m m m m m		
-20.0 -30.0 -40.0 MMM/W/W/W/W/M/								a Iman funder		
-50.0										
-60.0										Max Hold
-bU.U									_	
Center 793.00 MHz		_			I		Span 2	5.00 MHz		
Res BW 240 kHz			#VB	W 750 k	Hz			ep 1 ms		Min Hold
				_						minner
Occupied Band	dwidth			Total P	ower	29.2	dBm			
	8.95	34 MH	z							Detector
										Peak▶
Transmit Freq Er	ror	1.336 k	Hz	% of O	BW Pow	ver 99	.00 %		Auto	<u>Man</u>
x dB Bandwidth		9.720 M	Hz	x dB		-26.	00 dB			
MSG						STATUS				

Plot 7-20. Occupied Bandwidth Plot (LTE Band 14 - 10MHz 64-QAM - Full RB Configuration)



Plot 7-21. Occupied Bandwidth Plot (LTE Band 14 - 5MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA716U	PCTEST Proud to be part of @ elem		SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BV					
LX/ RL RF 50Ω AC	CORREC	SENSE:INT Center Freg: 793.00000	ALIGN AUTO	11:22:30 PM Apr 08, 2020 Radio Std: None	Trace/Detector
		Trig: Free Run	Avg Hold: 100/100		
	#IFGain:Low	#Atten: 36 dB		Radio Device: BTS	
10 dB/div Ref 40.00 dBr	n				
Log 30.0					
					Clear Write
20.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	non la		
10.0					
0.00	<u></u>				<u>_</u>
-10.0					Average
-20.0	w.W ^A		Www	www.www.	
-20.0 -30.0				a ward a ward and	
-40.0					Max Hold
-50.0					
Center 793.000 MHz Res BW 120 kHz		#VBW 390 kH	-	Span 12.50 MHz Sweep 1 ms	
Res BW 120 KHZ		#VDVV J90 KH	Z	Sweep This	Min Hold
Occupied Bandwidt	th	Total Po	wer 30.0	0 dBm	
	5031 MH	-			Detector
4.		Z			Detector Peak▶
Transmit Freq Error	3.372 ki	Hz % of OB	N Power 99	9.00 %	Auto <u>Man</u>
x dB Bandwidth	4.933 MI	Hz xdB	-26	00 dB	
	4.555 Mil		-20.		
MSG			STATU	s	

Plot 7-22. Occupied Bandwidth Plot (LTE Band 14 - 5MHz 16-QAM - Full RB Configuration)



Plot 7-23. Occupied Bandwidth Plot (LTE Band 14 - 5MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMA716U	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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7.3 Spurious and Harmonic Emissions at Antenna Terminal §2.1051 §90(S).691(a) §90(R).543(e)

Test Overview

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

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

Test Procedure Used

KDB 971168 D01 v03r01 - Section 6.0

Test Settings

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

Test Setup

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



Figure 7-2. Test Instrument & Measurement Setup

Test Notes

Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for Part 22. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

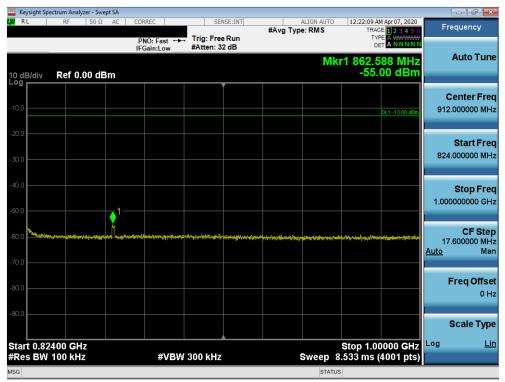
FCC ID: A3LSMA716U	Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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CDMA BC10

Keysight Spectrum			000050		0.00			10.00.00.00		_	- 7 🔀
KL F	KF 50 Ω	AC (CORREC		NSE:INT	#Avg Typ	ALIGN AUTO e: RMS		M Apr 07, 2020	Fred	quency
			PNO: Fast ↔ IFGain:Low	Trig: Free Atten: 40							
			II Galli.Low				Mkr1	387 03	3 6 MHz	A	uto Tun
0 dB/div Re	ef 30.00 d	Bm						-51.	46 dBm		
.ºg					Ĭ						
20.0											nter Fre
20.0										422.0	00000 MH
10.0											
										5	Start Fre
0.00										30.0	00000 MH
10.0									DL1 -13.00 dBm	9	Stop Fre
											00000 MH
20.0											
											CF Ste
30.0										78.4	00000 MH
										<u>Auto</u>	Ma
40.0											
50.0				▲1						Fr	eq Offse
50.0											0 H
60.0											
										S	cale Typ
Start 30.0 MH			41) (D) A	1 200 KH-				Stop 8	14.0 MHz	Log	<u>L</u>
Res BW 100	KHZ		#vBv	/ 300 kHz		5			0001 pts)		
SG							STATU	5			





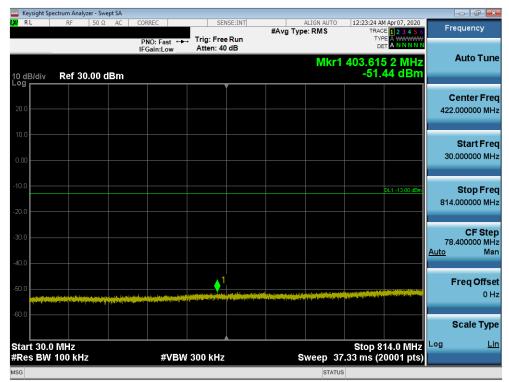
Plot 7-25. Conducted Spurious Plot (CDMA/EvDO, Low Channel)

FCC ID: A3LSMA716U	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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	Spectrum Anal											_	
RL	RF	50 Ω	AC	CORREC		SEM	ISE:INT	#Avg Typ	ALIGN AUTO		AM Apr 07, 2020 CE 1 2 3 4 5 6	Fr	equency
	_			PNO: F IFGain:	ast ⊶⊶ Low	Trig: Free #Atten: 3		#Avg typ	e. RIVIS	T) [
dB/div	Ref 0.	00 dB	m						Mk	r1 6.449 -40	05 GHz .39 dBm		Auto Tur
											DL1 -13.00 dBm		Center Fro
).0).0												1.00	Start Fr 0000000 G
	a a wa da ka			*								10.00	Stop Fr 0000000 G
).0 <u> </u>												900 <u>Auto</u>	CF St 0000000 M N
).0													Freq Offs 0
).0													Scale Ty
	00 GHz V 1.0 MH	7			#V8\//	3.0 MHz		s	ween 1	Stop 1	0.000 GHz 20001 pts)	Log	<u>!</u>
CC3 D1		2			<i></i>	0.0 101112			weep i	0.00 III3 (.	Loool pts)		

Plot 7-26. Conducted Spurious Plot (CDMA/EvDO, Low Channel)



Plot 7-27. Conducted Spurious Plot (CDMA/EvDO, High Channel)

FCC ID: A3LSMA716U	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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	pectrum A	nalyzer - Swe										_ # <mark>×</mark>
X/RL	RF	50 Ω	AC	CORREC		SEN	ISE:INT	#Avg Typ	ALIGN AUTO e: RMS		M Apr 07, 2020	Frequency
				PNO: Fa	ast ⊶⊶ .ow	Trig: Free #Atten: 3		• //		TYP		
10 dB/div Log	Ref	0.00 dE	sm						Mł	(r1 824.0 -23.	00 MHz 46 dBm	Auto Tune
-10.0												Center Freq
-10.0											DL1 -13.00 dBm	912.000000 MHz
-20.0 1												Start Freq 824.000000 MHz
-40.0												Stop Freq 1.000000000 GHz
-50.0	بېروندونون	hipworkepwerke	en and an and a second of	eljije konstantije en specification of the second second second second second second second second second secon	adda cyriaddigol	nd fasterig (bloch liv) nd	<mark>ydagraffan stylen y</mark> f vynd	işiştiği İştiştiya daşırtı	tang (penghalang)	d of the local parts	e affizier fan de fiere fan fe	CF Step 17.600000 MHz <u>Auto</u> Man
-70.0												Freq Offset
-90.0												Scale Type
Start 0.8	2400 C	GH7								Stop 1.0	0000 GHz	Log <u>Lin</u>
#Res BW				#	≠VBW	300 kHz			Sweep	8.533 ms (4001 pts)	
MSG									STATU	IS		

Plot 7-28. Conducted Spurious Plot (CDMA/EvDO, High Channel)





FCC ID: A3LSMA716U	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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LTE Band 26

	ectrum Analyzer - Sv									
K RL	RF 50 \$	2 AC	CORREC PNO: Fast ↔	Trig: Free		#Avg	ALIGN AUTO	TRACI TYP	Mar 27, 2020 E 1 2 3 4 5 6 E A WWWWW	Frequency
I0 dB/div	Ref 30.00	dBm	IFGain:Low	Atten: 40	dB		Mkr1	402.086	6 4 MHz 14 dBm	Auto Tu
20.0										Center Fr 422.000000 M
0.00										Start Fr 30.000000 M
20.0									DL1 -13.00 dBm	Stop Fr 814.000000 M
30.0										CF St 78.400000 M <u>Auto</u> M
40.0 50.0										Freq Offs 0
60.0										Scale Ty
Start 30.0 ∮Res BW			#VBW	300 kHz			Sweep 3	2 Stop 8 7.33 ms (2	14.0 MHz 0001 pts)	Log _
SG							STATU			

Plot 7-30. Conducted Spurious Plot (LTE Band 26 - 15MHz QPSK - RB Size 1, RB Offset 0)



Plot 7-31. Conducted Spurious Plot (LTE Band 26 - 15MHz QPSK - RB Size 1, RB Offset 0)

FCC ID: A3LSMA716U	Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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🔤 Keysight Spe													- # X
LXI RL	RF	50 Ω	AC	CORREC		SEI	ISE:INT	#Avg Ty	ALIGN AUTO pe: RMS		M Mar 27, 2020 CE 1 2 3 4 5 6	Fre	equency
				PNO: Fa IFGain:L		Trig: Free #Atten: 3			Mk	T) [Auto Tune
10 dB/div Log	Ref	10.00 (dBm							-38	.62 dBm		
209												С	enter Freq
0.00												5.500	000000 GHz
-10.0											DL1 -13.00 dBm		Start Freq
-20.0												1.000	0000000 GHz
													_
-30.0								1				10 000	Stop Freq
-40.0					-								
-50.0		description of the local data			4 . 114							900.	CF Step
-60.0												<u>Auto</u>	Man
												F	req Offset
-70.0													0 Hz
-80.0												9	Scale Type
Stort 1 00										Stop 4		Log	Lin
Start 1.00 #Res BW				#	VBW	3.0 MHz		5	Sweep 1	6.00 ms (0.000 GHz 20001 pts)		
MSG									STAT	US			

Plot 7-32. Conducted Spurious Plot (LTE Band 26 - 15MHz QPSK - RB Size 1, RB Offset 0)

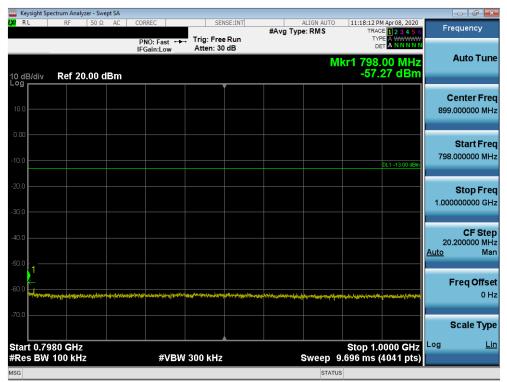
FCC ID: A3LSMA716U	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	AMSUNG	Approved by: Quality Manager	
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LTE Band 14

	pectrum Analyz									
LX/IRL	RF	50 Ω AC	CORREC	SEI	ISE:INT	#Avg Typ	ALIGN AUTO e: RMS	11:18:06 PM TRACE	Apr 08, 2020	Frequency
	-		PNO: Fast IFGain:Low	Atten: 30		• //		TYPE DET	A WWWWW A N N N N N	Auto Tune
10 dB/div Log	Ref 20.	.00 dBm					M	kr1 788.0 -31.8	00 MHz 7 dBm	Auto Tune
										Center Freq
10.0										409.000000 MHz
0.00										Start Freq
-10.0)L1 -13.00 dBm	30.000000 MHz
-20.0										
-20.0									1,	Stop Freq 788.000000 MHz
-30.0										
-40.0										CF Step 75.800000 MHz
-50.0										<u>Auto</u> Man
-60.0										Freq Offset
-60.0										0 Hz
-70.0										Scale Type
Start 30.	0 MHz							Ston 78	8.0 MHz	
#Res BW			#VE	3W 300 kHz		s	weep 36	6.38 ms (15	i161 pts)	
MSG							STATU	S		

Plot 7-33. Conducted Spurious Plot (LTE Band 14, 10 MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 7-34. Conducted Spurious Plot (LTE Band 14, 10 MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: A3LSMA716U	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
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🔤 Keysight Spectrum Analyzer - S					
lXi r. RF 50	Ω AC CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	11:18:23 PM Apr 08, 2020 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast ↔ IFGain:Low	Trig: Free Run #Atten: 32 dB		TYPE A WWWWW DET A NNNNN	
10 dB/div Ref 0.00 d	dBm		Mk	r1 6.914 0 GHz -40.45 dBm	Auto Tune
-10.0				DL1 -13.00 dBm	Center Freq 5.50000000 GHz
-20.0			. 1		Start Freq 1.000000000 GHz
-40.0					Stop Freq 10.000000000 GHz
-60.0					CF Step 900.000000 MHz <u>Auto</u> Man
-80.0					Freq Offset 0 Hz
-90.0					Scale Type
Start 1.000 GHz #Res BW 1.0 MHz	#\/B\//	3.0 MHz	Sween 15	Stop 10.000 GHz .60 ms (18001 pts)	Log <u>Lin</u>
MSG	#4BV8	5.0 WHZ	STATUS	oo ma (1000 1 pts)	

Plot 7-35. Conducted Spurious Plot (LTE Band 14, 10 MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: A3LSMA716U	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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7.4 Band Edge Emissions at Antenna Terminal §2.1051 §90(S).691(a) §90(R).543(e)

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.

For LTE B26 operation under Part 90.691, the minimum permissible attenuation level of any spurious emission removed from the EA licensee's frequency block by greater than 37.5 kHz is $43 + 10\log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts. The minimum permissible attenuation level of any spurious emission removed from the EA licensee's frequency block by up to and including 37.5 kHz is 50 + $10\log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.

Test Procedure Used

KDB 971168 D01 v03r01 - Section 6.0

Test Settings

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

Test Setup

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



Figure 7-3. Test Instrument & Measurement Setup

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Test Notes

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

Per 22.917(b) in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

For LTE Band 14 operation under Part 90.543, the power of any emission must be reduced below the mean output power (P) by at least 43 + 10log (P) dB measured in a 100 kHz bandwidth for frequencies less than 1 GHz, and in a 1 MHz bandwidth for frequencies greater than 1 GHz.

Additionally, for LTE Band 14 operation, on all frequencies between 769-775 MHz and 799-805 MHz, the power of any emission shall be attenuated by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations.

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CDMA BC10



Plot 7-36. Channel Edge Plot (CDMA BC10 - Ch. 476)



Plot 7-37. Channel Edge Plot (CDMA BC10 - Ch. 684)

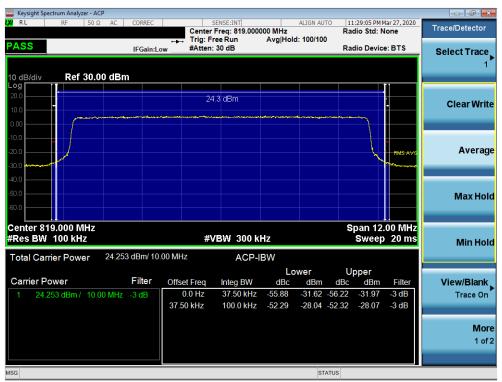
FCC ID: A3LSMA716U	Proud to be part of @ elem		SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga 25 of 60	
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LTE Band 26

Keysight Spectrum Analyzer - ACP						
XI RL RF 50 Ω AC CORREC		NSE:INT reg: 821.500000	ALIGN AU		3 PM Mar 27, 2020	Trace/Detector
PASS IFGain:Lo	Trig: Free	eRun A	vg Hold: 100/100	0	Device: BTS	Select Trace
10 dB/div Ref 20.00 dBm						
	24.2	dBm				Clear Write
-10.0						
-20.0					RMS AVG	Average
-40.0						
-60.0						Max Hold
-70.0						Maxilola
Center 821.50 MHz #Res BW 100 kHz	#VE	3W 300 kHz			120.00 MHz reep 20 ms	Min Hold
Total Carrier Power 24.199 dBm/ 15.	00 MHz	ACP-IBV	V			
			Lower	Uppe		
Carrier Power Filter	Offset Freq 0.0 Hz	Integ BW	dBc dBm 57.93 -33.73		Bm Filter	View/Blank
1 24.199 dBm / 15.00 MHz -3 dB	0.0 Hz 37.50 kHz		57.93 -33.73 53.86 -29.66		2.80 -3 dB 9.03 -3 dB	Trace On
						More
						1 of 2
MSG			ST	ATUS		





Plot 7-39. Channel Edge Plot (LTE Band 26 - 10MHz QPSK - Mid Channel)

FCC ID: A3LSMA716U	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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🔤 Keysight Spectr													-	
LXI RL	RF	50 Ω	AC	CORREC			NSE:INT reg: 816.5000		ALIGN AUTO	11:42: Radio		Mar 27, 2020	Trace/E	Detector
DA 00					+	Trig: Fre	e Run	Avg Hold	I: 100/100					
PASS				IFGain:L	ow	#Atten: 3	0 dB			Radio	Devic	e: BTS	Selec	t Trace
														1
10 dB/div	Ref 3	0.00	dBm											
Log 20.0	i 11										-111			
						24.3	8 dBm				·		Cle	ear Write
10.0	1													
0.00										+				
-10.0										1				
-20.0												RMS AVG		Average
-30.0														
-40.0														
-50.0														/lax Hold
-60.0														nux noiu
Center 816												500 MHz		
#Res BW 1	00 kHz					#VE	300 k	HZ		Sv	veep) 20 ms		Min Hold
Total Carrie	r Powei	r 2	4.271	dBm/ 5.(00 MH:	z	ACP-I	BW						
								Lo	wer	Uppe	er			
Carrier Pov	ver			Filter	Offs	set Freq	Integ BW	dBc	dBm		dBm	Filter	Viev	v/Blank
1 24.27	1 dBm / 🕴	5.000 I	MHz -	3 dB		0.0 Hz	37.50 kHz	-50.53	-26.26 -5	51.37 -2	7.10	-3 dB	1	race On
					37.	50 kHz	100.0 kHz	-47.47	-23.20 -4	8.29 -2	4.01	-3 dB		
														More
														1 of 2
MSG									STAT	US				_





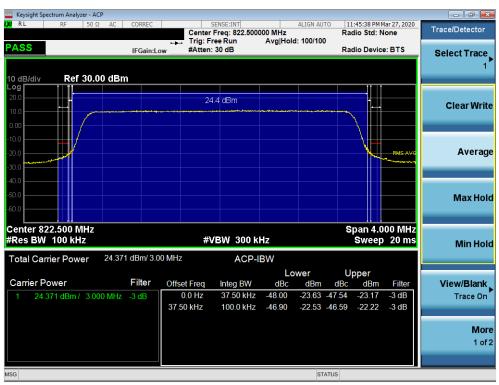
Plot 7-41. Channel Edge Plot (LTE Band 26 - 5MHz QPSK - High Channel)

FCC ID: A3LSMA716U	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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🔤 Keysight Spectr		ACP									
LXVI RL	RF 50	Ω AC	CORREC			NSE:INT eq: 815.5000	00 MH-	ALIGN AUTO	11:50:15 PM Radio Std:	Mar 27, 2020	Trace/Detector
D 4 0 0					Trig: Free	e Run	Avg Hold	I: 100/100			
PASS			IFGain:L	.ow	#Atten: 2	8 dB			Radio Devi	ce: BTS	Select Trace
											1
10 dB/div	Ref 30	.00 dB	m								
20.0	i II.										
	. j				24.4	dBm			1		Clear Write
10.0								· · · · · · · · · · · · · · · · · · ·	manna 1		
0.00											
-10.0											
-20.0										RMS AVG	Average
-30.0											
-40.0											
-50.0											Manufactor
-60.0											Max Hold
-80.0											
Center 815.		z								000 MHz	
#Res BW 1	00 kHz				#VE	300 k	Hz		Swee	p 20 m s	Min Hold
Total Carrie	r Power	24.3	77 dBm/ 3.	00 MHz		ACP-I	BW				
							Lo	wer	Upper		
Carrier Pow	ver		Filter	Offse	et Freq	Integ BW	dBc		dBc dBm	Filter	View/Blank
1 24.377	7 dBm / 3.	000 MHz	-3 dB	(0.0 Hz	37.50 kHz	-45.93	-21.55 -46	6.13 -21.75	-3 dB	Trace On
				37.5	0 kHz	100.0 kHz	-43.64	-19.26 -44	4.18 -19.80	-3 dB	
											More
											1 of 2
MSG								STATU	s		

Plot 7-42. Channel Edge Plot (LTE Band 26 - 3MHz QPSK - Low Channel)



Plot 7-43. Channel Edge Plot (LTE Band 26 - 3MHz QPSK - High Channel)

FCC ID: A3LSMA716U	Proud to be part of @ elem		SAMSUNG	Approved by: Quality Manager	
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LXI RE 50 Ω AC CORREC	SENSE:INT Center Freg: 814.700	ALIGN AUTO	11:55:35 PM Mar 27, 2020 Radio Std: None	Trace/Detector
PASS IFGain:Lo	🛶 Trig: Free Run	Avg Hold: 100/100	Radio Device: BTS	Select Trace
10 dB/div Ref 40.00 dBm			+ + - 1	
	24.2 dBm			Clear Write
-10.0			RMS AVG	Average
				Max Hold
Center 814.700 MHz #Res BW 100 kHz Total Carrier Power 24.242 dBm/1.4	#VBW 300 F		Span 2.100 MHz Sweep 20 ms	Min Hold
		Lower	Upper	
Carrier Power Filter	Offset Freq Integ BW		Bc dBm Filter	View/Blank
1 24.242 dBm / 1.400 MHz -3 dB	0.0 Hz 37.50 kHz 37.50 kHz 100.0 kHz			Trace On
				More 1 of 2
MSG		STATUS		





Plot 7-45. Channel Edge Plot (LTE Band 26 - 1.4MHz QPSK - High Channel)

FCC ID: A3LSMA716U	Proud to be part of @ elem		SAMSUNG	Approved by: Quality Manager
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LTE Band 14

	pectrum Analy													
RL	RF	50 Ω	AC	CORREC			ISE:INT	#Avg		ILIGN AUTO	TR	PM Apr 08, 2020	F	requency
				PNO: Wie IFGain:Le		Trig: Free Atten: 36								
0 dB/div	Ref 2	5.00 di	Bm							M	kr1 788. -25.	.000 MHz 149 dBm		Auto Tur
														Center Fre
15.0													78	B.000000 M
5.00							,_ ~	www	w	mm	mmm	maria		
													78	Start Fr 6.000000 M
5.00												DL1 -13.00 dBm		
5.0														Stop Fr
5.0							1						79	D.000000 M
					m	normal								05.04
5.0	man	-parate V	19-1- -	~~~~~										CF St 400.000 k
5.0													<u>Auto</u>	N
0.0														Freq Offs
5.0														0
5.0														
0.0														Scale Ty
enter Z	88.000 N	ЛНz									Span	4.000 MHz	Log	ļ
	100 kH			#	VBW	300 kHz			5	Sweep	2.000 ms	(1001 pts)		
G										STAT				

Plot 7-46. Lower Band Edge Plot (LTE Band 14, 5MHz QPSK)



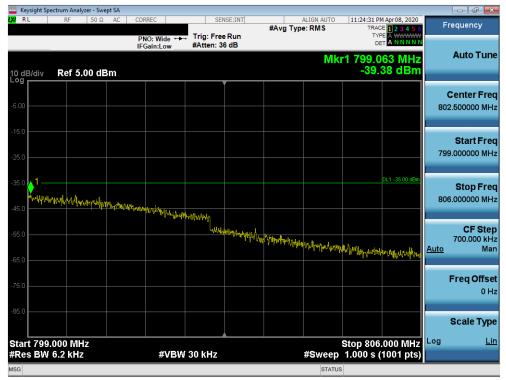
Plot 7-47. Lower Emission Mask Plot (LTE Band 14, 5MHz QPSK)

FCC ID: A3LSMA716U	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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	ectrum Analyz														_	
RL	RF	50 Ω	AC	CORREC			SENS	SE:INT	#		ALIGN AUTO) 11		4 Apr 08, 2020	E	requency
				PNO: N IFGain	Vide ↔ :Low	Trig: Atten			#AV	д тур	e: RMS		TYP	E 1 2 3 4 5 6 E A WWWWW T A NNNN		
) dB/div	Ref 25	.00 dl	Bm								Μ	kr1 7 -	98.0 22.6	00 MHz 52 dBm		Auto Tui
5.0																Center Fre 8.000000 MI
		nun	᠕᠕᠕᠉᠕	nym	AND	wy										
.00															79	Start Fr 6.000000 M
5.0														DL1 -13.00 dBm		Oton Er
5.0							5	1							80	Stop Fr 0.000000 М
5.0								ومرتمراني ور	-vn-vn	r www.w	᠆ᡣ᠆᠁ᠰ	mm	hutherto	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		CF St
5.0															<u>Auto</u>	400.000 H N
5.0																Freq Off
5.0																0
0.0																Scale Ty
	98.000 M 100 kHz				#VBV	V 300 k	Hz				Sweep	S 2.000	pan 4) ms_(.000 MHz 1001 pts)	Log	ļ
G											STAT		· · ·			





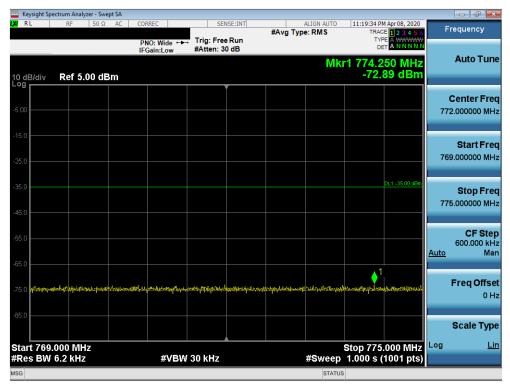
Plot 7-49. Upper Emission Mask Plot (LTE Band 14, 5MHz QPSK)

FCC ID: A3LSMA716U	POUL to be part of the elem		SAMSUNG	Approved by: Quality Manager
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RL	ectrum Anal RF	50 Ω		CORREC		CEN	ISE:INT		ALIGN AUTO	11-10-06 0	4 Apr 08, 2020		
KL.		1 20 32	AC		ide ↔→ .ow	Trig: Free Atten: 36	Run	#Avg Typ		TRAC	E 1 2 3 4 5 6 E A WWWWW T A NNNN	Fi	requency
dB/div	Ref 2	5.00 d	Bm						Mk	1 788.0 -28.8	00 MHz 81 dBm		Auto Tun
5.0													Center Fre 3.000000 M⊦
00								hypholomete	Mray-Alastan	^A lloft-Court Spaces	مىلىمى مەللىمىيى مەللىمى	784	Start Fre
5.0							1,4				DL1 -13.00 dBm	792	Stop Fr 2.000000 Mi
	Say waranga	nation	wa _{nto} log-4	and a second	and the second	and the second	run -					<u>Auto</u>	CF Ste 800.000 ki M
5.0													Freq Offs 0
5.0													Scale Typ
	88.000 I 100 kH				≠VBW_	300 kHz			Sweep 4	Span 8 .000 ms (Log	L
_									STATUS				_

Plot 7-50. Lower Band Edge Plot (LTE Band 14, 10MHz QPSK)



Plot 7-51. Lower Emission Mask Plot (LTE Band 14, 10MHz QPSK)

FCC ID: A3LSMA716U	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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RL	RF	alyzer - Sw	AC	CORREC		SE	VSE:INT		ALIGN AUTO	11:19:46 P	M Apr 08, 2020		
	13	00 12	110		ide ↔→ ₋ow	Trig: Fre Atten: 36	e Run	#Avg Typ		TRA	CE 1 2 3 4 5 6 PE A WWWW ET A NNNN	F	requency
dB/div	Ref	25.00 c	iBm						Mk	r1 798.0 -29.	00 MHz 88 dBm		Auto Tur
5.0													Center Fr 8.000000 M
00 	_Ŋ ŊŶ _{ŶĬ} Ŷĸ _Ŕ ŊŊĬĸĸŀĬĸ	en fantsforte	an Allina Su	myslavy	* 1# ****{/rufy#	AUT						794	Start Fr 4.000000 M
.0						h _l	1—				DL1 -13.00 dBm	80)	Stop Fr 2.000000 M
.0						,	Www. Hollyncewyla	munu		aller for the state of the state	almana Waraya	<u>Auto</u>	CF St 800.000 F N
.0													Freq Off 0
i.0													Scale Ty
	798.000 N 100 k				≠vbw∶	300 kHz			Sweep 4	Span 8 .000 ms	.000 MHz (1001 pts)	Log	ļ

Plot 7-52. Upper Band Edge Plot (LTE Band 14, 10MHz QPSK)

Keysight Sp	pectrum Analyzer - Sv	vept SA									- F X
RL	RF 50 S	2 AC	CORREC	SEI	SE:INT		ALIGN AUTO		4 Apr 08, 2020	Er	requency
			PNO: Wide ↔	Trig: Free	Run	#Avg Typ	e:RMS	TYP	E 1 2 3 4 5 6 E A WWWW		equency
	_		IFGain:Low	#Atten: 3				DE			
							Mk	r1 800.1	34 MHz		Auto Tun
0 dB/div	Ref 5.00 d	Bm						-44.	08 dBm		
^{og} r				,							
										(Center Fre
5.00										802	2.500000 MH
15.0											
											Start Fre
25.0										799	9.000000 MH
35.0									DL1 -35.00 dBm		04
	1										Stop Fre
45.0	Y									806	5.000000 MH
Mara da	www.huppy.whitman	manually	patholic and particulations of the	hallen and a state	Marmelan	Man Italian a I					
55.0						ALAN ALAN ALAN	MANNE THE AL	WHUNK AND STA	hympedlynn		CF Ste
55.0											700.000 kH
65.0										<u>Auto</u>	Ma
03.0											
75.0											Freq Offse
75.0											0 H
85.0											Scale Typ
											Scale Typ
start 799	0.000 MHz							Stop 806	.000 MHz	Log	Li
	/ 6.2 kHz		#VBW	30 kHz			#Sweep	1.000 s (1001 pts)		
SG							STATU				_
							onario				

Plot 7-53. Upper Emission Mask Plot (LTE Band 14, 10MHz QPSK)

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7.5 Conducted Power Output Data

§2.1046 §90.635

Frequency [MHz]	Channel	Battery Type	Conducted Power [dBm]	Conducted Power [Watts]	Conducted Power Limit [dBm]	Margin [dB]
817.90	476	Standard	24.70	0.295	50.00	-25.30
823.10	684	Standard	24.67	0.293	50.00	-25.33

Table 7-2. CDMA BC10 Conducted Power Output Data

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]	Conducted Power [Watts]	Conducted Power Limit [dBm]	Margin [dB]
	QPSK	26765	821.5	1/74	24.71	0.296	50.00	-25.29
15 MHz	16-QAM	26765	821.5	1/74	24.07	0.255	50.00	-25.93
	64-QAM	26765	821.5	1/74	23.00	0.200	50.00	-27.00
	QPSK	26740	819.0	1/25	24.81	0.303	50.00	-25.19
10 MHz	16-QAM	26740	819.0	1/0	24.20	0.263	50.00	-25.80
	64-QAM	26740	819.0	1/49	23.00	0.200	50.00	-27.00
	QPSK	26715	816.5	1/24	24.83	0.304	50.00	-25.17
	QION	26765	821.5	1/24	24.67	0.293	50.00	-25.33
5 MHz	16-QAM	26715	816.5	1/12	24.40	0.275	50.00	-25.60
5 1011 12		26765	821.5	1/0	24.01	0.252	50.00	-25.99
	64-QAM	26715	816.5	1/12	23.06	0.202	50.00	-26.94
	04 GAM	26765	821.5	1/24	22.83	0.192	50.00	-27.17
	QPSK	26705	815.5	1/14	24.71	0.296	50.00	-25.29
	QION	26775	822.5	1/14	24.66	0.292	50.00	-25.34
3 MHz	16-QAM	26705	815.5	1/7	24.27	0.267	50.00	-25.73
5 1011 12	10-02-101	26775	822.5	1/0	23.79	0.239	50.00	-26.21
	64-QAM	26705	815.5	1/14	22.77	0.189	50.00	-27.23
	04 GAM	26775	822.5	1/14	23.15	0.207	50.00	-26.85
	QPSK	26697	814.7	1/2	24.91	0.310	50.00	-25.09
	QION	26783	823.3	1/0	24.86	0.306	50.00	-25.14
1.4 MHz	16-QAM	26697	814.7	3/2	24.03	0.253	50.00	-25.97
1.4 101112	10 32411	26783	823.3	1/2	24.00	0.251	50.00	-26.00
	64-QAM	26697	814.7	3/2	23.25	0.211	50.00	-26.75
		26783	823.3	1/2	23.20	0.209	50.00	-26.80

Table 7-3. LTE Band 26 Conducted Power Output Data

NOTES:

- 1. For CDMA mode, this device was tested under all R.C.s and S.O.s and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 2. For LTE mode, the device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with 1 RB.
- 3. This unit was tested with its standard battery.

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7.6 Radiated Power (ERP) §22.913(a.2) §90.542(a)(7)

Test Overview

Effective Radiated Power (ERP) measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v03r01 - Section 5.2.1

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

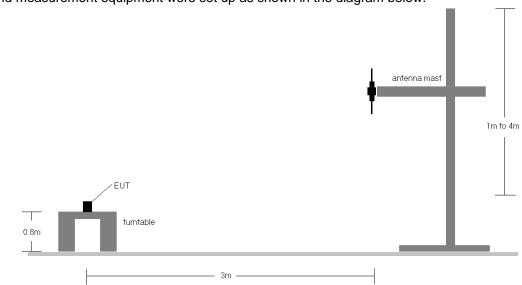
Test Settings

- 1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
- 2. RBW = 1 5% of the expected OBW, not to exceed 1MHz
- 3. VBW ≥ 3 x RBW
- 4. Span = 1.5 times the OBW
- 5. No. of sweep points $\geq 2 \times \text{span} / \text{RBW}$
- 6. Detector = RMS
- 7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
- 8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
- 9. Trace mode = trace averaging (RMS) over 100 sweeps
- 10. The trace was allowed to stabilize

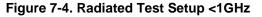
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Test Setup



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



Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	EUT Pol.	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
	QPSK	821.5	V	Z	138	241	6.32	1/0	13.56	17.73	0.059	38.45	-20.72
15 MHz	16-QAM	821.5	V	Z	138	241	6.32	1/0	12.60	16.77	0.048	38.45	-21.68
	64-QAM	821.5	V	Z	138	241	6.32	1/0	11.48	15.65	0.037	38.45	-22.80

Table 7-4.	ERP	Data	(Band	26)
------------	-----	------	-------	-----

Bandwidth	Modulation	Frequency [MHz]	Ant. Pol. [H/V]	EUT Pol.	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
	QPSK	793.0	V	Z	162	252	5.91	1/0	14.82	18.58	0.072	38.45	-19.87	20.73	0.118	40.61	-19.87
10 MHz	16-QAM	793.0	V	Z	162	252	5.91	1/0	14.25	18.01	0.063	38.45	-20.44	20.16	0.104	40.61	-20.44
	64-QAM	793.0	V	Z	162	252	5.91	1/0	13.26	17.02	0.050	38.45	-21.43	19.17	0.083	40.61	-21.43
		790.5	V	Z	151	262	5.89	1/0	14.51	18.25	0.067	38.45	-20.20	20.40	0.110	40.61	-20.21
	QPSK	793.0	V	Z	166	266	5.91	1/0	14.57	18.33	0.068	38.45	-20.12	20.48	0.112	40.61	-20.12
5 MHz		795.5	V	Z	166	250	5.94	1 / 12	14.69	18.48	0.071	38.45	-19.97	20.63	0.116	40.61	-19.97
	16-QAM	795.5	V	Z	166	250	5.94	1 / 12	13.74	17.53	0.057	38.45	-20.92	19.68	0.093	40.61	-20.92
	64-QAM	795.5	V	Z	166	250	5.94	1 / 12	12.80	16.59	0.046	38.45	-21.86	18.74	0.075	40.61	-21.86
	QPSK	793.00	н	Х	100	288	6.11	1/0	14.54	18.50	0.071	38.45	-19.95	20.65	0.116	40.61	-19.96

Table 7-5. ERP Data (Band 14)

FCC ID: A3LSMA716U	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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7.7 Radiated Spurious Emissions Measurements §2.1053 §90(S).691(a) §90(R).543(e)

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 > 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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Test Setup

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

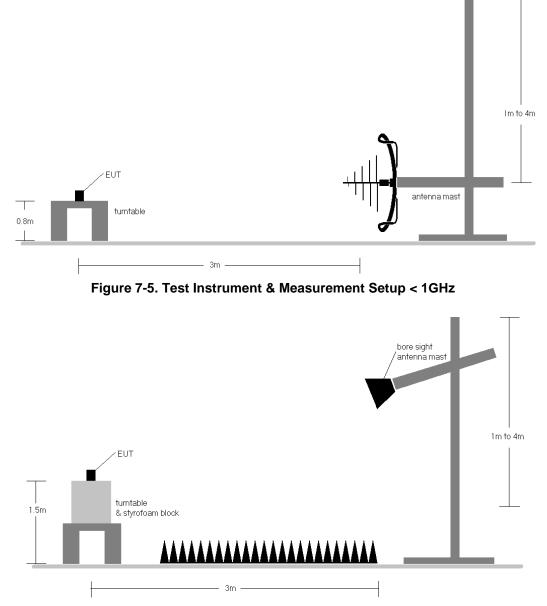


Figure 7-6. Test Instrument & Measurement Setup >1 GHz

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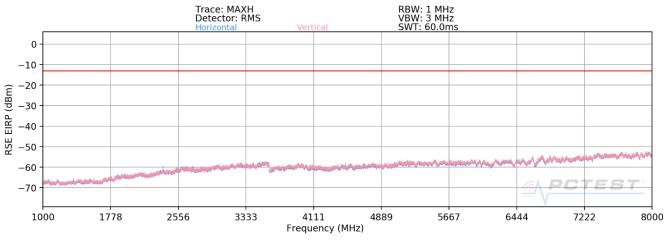
Test Notes

- 1. For CDMA mode, this device was tested under all R.C.s and S.O.s and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 2. For LTE mode, the device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with 1 RB.
- 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 "-" shown in the following RSE tables are used to denote a noise floor measurement.
- 6. Per 90(R)(f), emissions in the 1559 1610MHz band are subject to a limit of -40dBm/MHz for wideband signals. These emission measurements are shown in this section below.

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CDMA BC10



Plot 7-54. Radiated Spurious Plot (CDMA BC10)

Frequency (MHz):	817.9			
Modulation:	CDMA BC10			

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1635.8	Н	165	257	-76.98	0.86	30.88	-64.37	-13.00	-51.37
1725.9	Н	153	329	-62.40	1.55	46.15	-49.11	-13.00	-36.11
2453.7	Н	393	4	-74.44	5.26	37.82	-57.44	-13.00	-44.44
3271.6	Н	114	144	-78.42	6.25	34.83	-60.43	-13.00	-47.43
4089.5	Н	-	-	-80.31	6.75	33.44	-61.81	-13.00	-48.81
4907.4	Н	-	-	-80.38	7.77	34.39	-60.86	-13.00	-47.86

Table 7-4. CDMA BC10 Radiated Spurious Data (Low Channel)

Frequency (MHz):	823.1		
Modulation:	CDMA BC10		

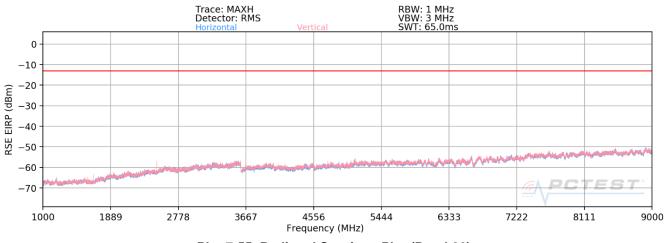
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1646.2	Н	195	155	-75.47	0.49	32.02	-63.24	-13.00	-50.24
1736.3	Н	123	338	-63.56	1.52	44.96	-50.30	-13.00	-37.30
2469.3	Н	100	167	-75.37	5.10	36.73	-58.53	-13.00	-45.53
3292.4	Н	115	145	-78.14	6.00	34.86	-60.40	-13.00	-47.40
4115.5	Н	-	-	-80.28	7.34	34.06	-61.20	-13.00	-48.20
4938.6	Н	-	-	-80.14	8.59	35.45	-59.80	-13.00	-46.80

Table 7-5. CDMA BC10 Radiated Spurious Data (High Channel)

FCC ID: A3LSMA716U	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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LTE Band 26



Plot 7-55. Radiated Spurious Plot (Band 26)

Bandwidth (MHz):	10
Frequency (MHz):	819.0
Modulation Signal:	QPSK
RB Config (Size / Offset):	1 / 25

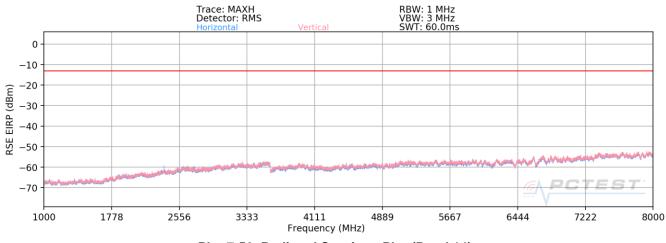
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1638.0	V	112	244	-71.89	-6.47	28.64	-66.62	-13.00	-53.62
2457.0	V	128	37	-67.85	-2.30	36.85	-58.41	-13.00	-45.41
3276.0	V	135	316	-73.29	1.32	35.03	-60.23	-13.00	-47.23
4095.0	V	400	8	-76.91	2.54	32.63	-62.63	-13.00	-49.63
4914.0	V	-	-	-78.22	3.45	32.23	-63.03	-13.00	-50.03
5733.0	V	-	-	-78.11	4.93	33.82	-61.44	-13.00	-48.44

Table 7-6. Radiated Spurious Data (LTE Band 26 – Mid Channel)

FCC ID: A3LSMA716U	PCTEST° Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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LTE Band 14



Plot 7-56. Radiated Spurious Plot (Band 14)

Bandwidth (MHz):	10
Frequency (MHz):	793.0
Modulation Signal:	QPSK
RB Config (Size / Offset):	1 / 25

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1586.0	Н	-	-	-76.21	-6.38	24.41	-70.85	-40.00	-30.85
2379.0	Н	122	146	-67.86	-2.30	36.84	-58.41	-13.00	-45.41
3172.0	Н	-	-	-76.53	0.84	31.31	-63.95	-13.00	-50.95
3965.0	Н	-	-	-77.83	3.48	32.65	-62.61	-13.00	-49.61

Table 7-7. Radiated Spurious Data (LTE Band 14 – Mid Channel)

FCC ID: A3LSMA716U	PCTEST° Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	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.

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

Test Procedure Used

ANSI/TIA-603-E-2016

Test Settings

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

Test Setup

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

Test Notes

None

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OPERATING FREQUENCY:	817,900,000	Hz
CHANNEL:	476	<u>.</u>
REFERENCE VOLTAGE:	4.26	VDC

VOLTAGE (%)	POWER (VDC)	ТЕМР ([°] С)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.26	- 30	817,899,982	-18	-0.0000022
100 %		- 20	817,899,829	-171	-0.0000209
100 %		- 10	817,899,858	-142	-0.0000174
100 %		0	817,900,282	282	0.0000345
100 %		+ 10	817,899,924	-76	-0.0000093
100 %		+ 20	817,899,896	-104	-0.0000127
100 %		+ 30	817,899,860	-140	-0.0000171
100 %		+ 40	817,900,287	287	0.0000351
100 %		+ 50	817,900,114	114	0.0000139
BATT. ENDPOINT	3.63	+ 20	817,899,708	-292	-0.0000357

Table 7-8. CDMA BC10 Frequency Stability Data

FCC ID: A3LSMA716U	PCTEST [®] Proud to be part of [®] element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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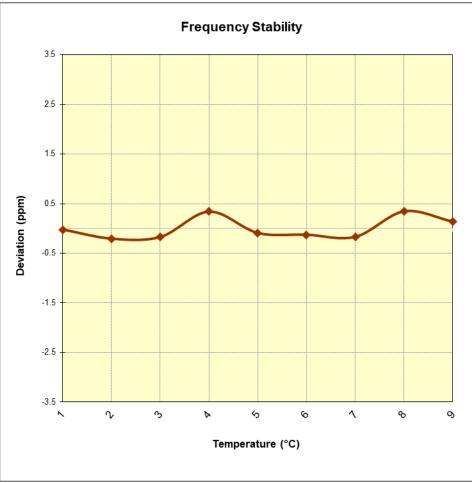


Figure 7-7. CDMA BC10 Frequency Stability Chart

FCC ID: A3LSMA716U	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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OPERATING FREQUENCY:	819,000,000	Hz
CHANNEL:	26740	_
REFERENCE VOLTAGE:	4.26	VDC

VOLTAGE (%)	POWER (VDC)	ТЕМР ([°] С)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.26	- 30	819,000,305	305	0.0000372
100 %		- 20	819,000,055	55	0.0000067
100 %		- 10	818,999,932	-68	-0.0000083
100 %		0	819,000,084	84	0.0000103
100 %		+ 10	818,999,841	-159	-0.0000194
100 %		+ 20	819,000,039	39	0.0000048
100 %		+ 30	819,000,087	87	0.0000106
100 %		+ 40	819,000,321	321	0.0000392
100 %		+ 50	818,999,977	-23	-0.0000028
BATT. ENDPOINT	3.63	+ 20	819,000,225	225	0.0000275

Table 7-9. LTE Band 26 Frequency Stability Data

FCC ID: A3LSMA716U	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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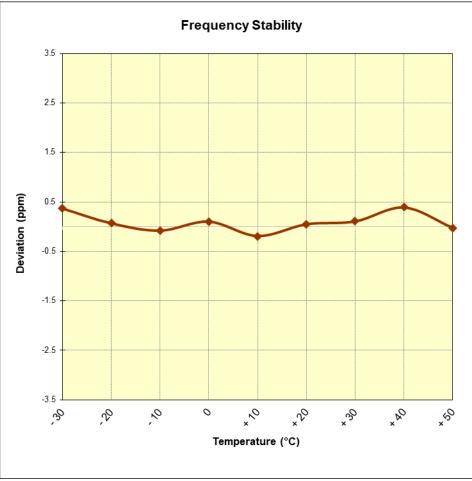


Table 7-10. LTE Band 26 Frequency Stability Chart

FCC ID: A3LSMA716U	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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OPERATING FREQUENCY:	793,000,000	Hz
CHANNEL:	23330	_
REFERENCE VOLTAGE:	4.26	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.26	- 30	793,000,082	82	0.0000103
100 %		- 20	792,999,901	-99	-0.0000125
100 %		- 10	792,999,988	-12	-0.0000015
100 %		0	792,999,816	-184	-0.0000232
100 %		+ 10	792,999,843	-157	-0.0000198
100 %		+ 20	793,000,127	127	0.0000160
100 %		+ 30	793,000,171	171	0.0000216
100 %		+ 40	792,999,750	-250	-0.0000315
100 %		+ 50	792,999,937	-63	-0.0000079
BATT. ENDPOINT	3.63	+ 20	793,000,086	86	0.0000108

Table 7-11. LTE Band 14 Frequency Stability Data

FCC ID: A3LSMA716U	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 58 of 60
1M2003200047-10.A3L	3/23 - 5/7/2020	Portable Handset	
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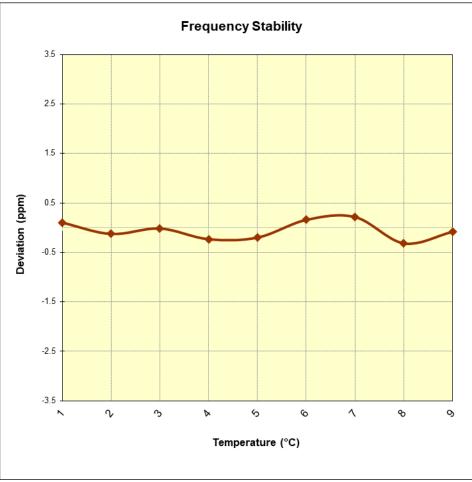


Table 7-12. LTE Band 14 Frequency Stability Chart

FCC ID: A3LSMA716U	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 50 of 60
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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: A3LSMA716U** complies with all the requirements of Parts 22(H) and 90 of the FCC rules.

FCC ID: A3LSMA716U	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 60 of 60
1M2003200047-10.A3L	3/23 - 5/7/2020	Portable Handset	
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