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PART 22 MEASUREMENT REPORT

Applicant Name:

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

Date of Testing:

9/10/2021 - 11/23/2021 **Test Report Issue Date:** 12/2/2021 **Test Site/Location:** PCTEST Lab. Columbia, MD, USA **Test Report Serial No.:** 1M2109090103-02-R2.A3L

FCC ID:

A3LSMS906U

Applicant Name:

Samsung Electronics Co., Ltd.

Application Type: Model: Additional Model(s): EUT Type: FCC Classification: FCC Rule Part: Test Procedure(s):

Certification SM-S906U SM-S906U1 Portable Handset PCS Licensed Transmitter Held to Ear (PCE) 22 ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01, KDB 648474 D03 v01r04

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

Note: This revised Test Report (S/N: 1M2109090103-02-R2.A3L) supersedes and replaces the previously issued test report 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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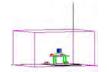


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on Tx Frequence Range [MHz	- I M	lax. Power	Max. Power	Max. Power	Max Power	Emission
	-	[W]	[dBm]	[W]	[dBm]	Designator
824.2 - 848.	8	0.413	26.16	0.678	28.31	246KGXW
824.2 - 848.	8	0.116	20.66	0.191	22.81	244KG7W
ctrum 826.4 - 846.	6	0.097	19.88	0.160	22.03	4M18F9W
	824.2 - 848.	824.2 - 848.8	824.2 - 848.8 0.116 ctrum 826.4 - 846.6 0.097	824.2 - 848.8 0.116 20.66 ctrum 826.4 - 846.6 0.097 19.88	824.2 - 848.8 0.116 20.66 0.191 ctrum 826.4 - 846.6 0.097 19.88 0.160	824.2 - 848.8 0.116 20.66 0.191 22.81 ctrum 826.4 - 846.6 0.097 19.88 0.160 22.03

EUT Overview

		Modulation Tx Frequency Range [MHz]	EF	RP	EIRP		Emission	
Mode	Bandwidth			Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]	Designator
	15MHz (Band	QPSK	831.5 - 841.5	0.074	18.71	0.122	20.86	13M6G7D
	26 only)	16QAM	831.5 - 841.5	0.059	17.72	0.097	19.87	13M6W7D
	10 MHz	QPSK	829.0 - 844.0	0.077	18.85	0.126	21.00	9M02G7D
		16QAM	829.0 - 844.0	0.065	18.13	0.107	20.28	9M02W7D
LTE Band 26/5	5 MHz	QPSK	826.5 - 846.5	0.078	18.92	0.128	21.07	4M52G7D
LIE Band 20/5		16QAM	826.5 - 846.5	0.066	18.18	0.108	20.33	4M54W7D
	2 M⊔-	QPSK	825.5 - 847.5	0.079	18.95	0.129	21.10	2M71G7D
	3 MHz	16QAM	825.5 - 847.5	0.062	17.92	0.102	20.07	2M72W7D
	1.4 MHz	QPSK	824.7 - 848.3	0.078	18.90	0.127	21.05	1M10G7D
		16QAM	824.7 - 848.3	0.064	18.09	0.106	20.24	1M11W7D
	20 MHz	π/2 BPSK	834.0 - 839.0	0.102	20.09	0.168	22.24	18M0G7D
		QPSK	834.0 - 839.0	0.100	19.99	0.164	22.14	19M0G7D
		16QAM	834.0 - 839.0	0.084	19.23	0.138	21.38	19M1W7D
		π/2 BPSK	831.5 - 841.5	0.098	19.92	0.161	22.07	13M5G7D
	15 MHz	QPSK	831.5 - 841.5	0.098	19.91	0.161	22.06	14M2G7D
NR Band n5		16QAM	831.5 - 841.5	0.082	19.13	0.134	21.28	14M2W7D
INK Banu no		π/2 BPSK	829.0 - 844.0	0.097	19.88	0.160	22.03	9M02G7D
	10 MHz	QPSK	829.0 - 844.0	0.096	19.80	0.157	21.95	9M37G7D
		16QAM	829.0 - 844.0	0.083	19.22	0.137	21.37	9M35W7D
		π/2 BPSK	826.5 - 846.5	0.096	19.84	0.158	21.99	4M53G7D
	5 MHz	QPSK	826.5 - 846.5	0.099	19.95	0.162	22.10	4M55G7D
		16QAM	826.5 - 846.5	0.086	19.34	0.141	21.49	4M54W7D

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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 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 17025-2017 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: A3LSMS906U**. The test data contained in this report pertains only to the emissions due to the EUT's licensed transmitters that operate under the provisions of Part 22.

Test Device Serial No.: 0100M, 0061M, 0097M, 0045M, 0044M, 0080M, 1218M, 0359M, 0364M, 0379M, 0361M

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 5G NR (FR1 and FR2), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII (5,6GHz), Bluetooth (1x, EDR, LE), NFC, UWB, Wireless Power Transfer

2.3 Test Configuration

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

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

2.4 EMI Suppression Device(s)/Modifications

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

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3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

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

Deviation from Measurement Procedure.....None

3.2 Radiated Power and Radiated Spurious Emissions

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.

For radiated power measurements, substitution method is used per the guidance of ANSI/TIA-603-E-2016. A halfwave dipole is 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]</sub> + 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].

For radiated spurious emissions measurements and calculations, conversion method is used per the formulas in KDB 971168 Section 5.8.4. Field Strength (EIRP) is calculated using the following formulas:

$$\begin{split} E_{[dB\mu V/m]} &= Measured \ amplitude \ level_{[dBm]} + 107 + Cable \ Loss_{[dB]} + Antenna \ Factor_{[dB/m]} \\ And \\ EIRP_{[dBm]} &= E_{[dB\mu V/m]} + 20 logD - 104.8; \ where \ D \ is the measurement \ distance \ in \ meters. \end{split}$$

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 414788 D01.

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

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4.0 MEASUREMENT UNCERTAINTY

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

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

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5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurement 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		
-	AP2	EMC Cable and Switch System	3/4/2021	Annual	3/4/2022	AP2
-	AP1	EMC Cable and Switch System	3/9/2021	Annual	3/9/2022	AP1
-	ETS	EMC Cable and Switch System	3/4/2021	Annual	3/4/2022	ETS
-	LTx1	Licensed Transmitter Cable Set	3/12/2021	Annual	3/12/2022	LTx1
-	LTx2	Licensed Transmitter Cable Set	3/12/2021	Annual	3/12/2022	LTx2
Agilent	N9030A	50GHz PXA Signal Analyzer	1/20/2021	Annual	1/20/2022	US51350301
Anritsu	MT8821C	Radio Communication Analyzer		N/A		6201381794
Emco	3115	Horn Antenna (1-18GHz)	6/18/2020	Biennial	6/18/2022	9704-5182
Espec	ESX-2CA	Environmental Chamber	8/27/2020	Annual	8/27/2022	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/20/2021	Biennial	4/20/2023	00125518
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/12/2020	Biennial	3/12/2022	128337
Keysight Technologies	N9020A	MXA Signal Analyzer	12/22/2020	Annual	12/22/2021	MY54500644
Keysight Technologies	N9030A	PXA Signal Analyzer (44GHz)	7/21/2021	Annual	7/21/2022	MY49430494
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11208010032
Rohde & Schwarz	CMW500	Radio Communication Tester		N/A		100976
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	8/3/2021	Annual	8/3/2022	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	4/30/2021	Annual	4/30/2022	100348
Rohde & Schwarz	ESW44	EMI Test Receiver 2Hz to 44 GHz	1/21/2021	Annual	1/21/2022	101716
Rohde & Schwarz	FSW26	2Hz-26.5GHz Signal and Spectrum Analyzer	2/10/2021	Annual	2/10/2022	103187
Sunol	JB6	LB6 Antenna	11/13/2020	Biennial	11/13/2022	A082816

Table 5-1. Test Equipment

Notes:

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

GSM Emission Designator

Emission Designator = 250KGXW

GSM 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)

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

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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:	A3LSMS906U
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
Mode(s):	NR/GSM/GPRS/EDGE/WCDMA/LTE

Test Condition	Test Description	FCC Part Section(s)	RSS Section(s)	Test Limit	Test Result	Reference
0	Transmitter Conducted Output Power	2.1046	RSS-132(5.4)	N/A	PASS	See RF Exposure Report
JC TE	Occupied Bandwidth	2.1049	RSS-Gen(6.7)	N/A	PASS	Section 7.2
CONDUCTED	Conducted Band Edge / Spurious Emissions	2.1051, 22.917(a)	RSS-132(5.5)	> 43 + 10log10(P[Watts]) at Band Edge and for all out-of- band emissions	PASS	Sections 7.3, 7.4
O	Frequency Stability	2.1055, 22.355	RSS-132(5.3)	Fundamental emissions stay within authorized frequency block	PASS	Section 7.8
RADIATED	Effective Radiated Power / Equivalent Isotropic Radiated Power	22.913(a)(5)	RSS-132(5.4)	< 7 Watts max. ERP	PASS	Section 7.6
RADI	Radiated Spurious Emissions	2.1053, 22.917(a)	RSS-132(5.5)	> 43 + 10 log10 (P[Watts]) for all out-of-band emissions	PASS	Section 7.7

Table 7-1. Summary of Test Results

Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
- All conducted emissions measurements are performed with automated test software to capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST EMC Software Tool v1.0.

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7.2 Occupied Bandwidth

Test Overview

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

Test Procedure Used

KDB 971168 D01 v03r01 - Section 4.2

Test Settings

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

Test Setup

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



Figure 7-1. Test Instrument & Measurement Setup

Test Notes

None.

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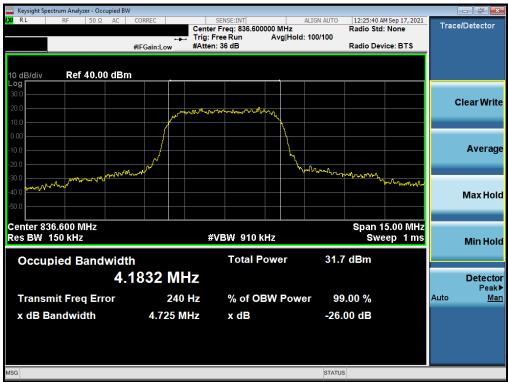


Plot 7-2. Occupied Bandwidth Plot (EDGE, Ch. 190)

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Plot 7-3. Occupied Bandwidth Plot (WCDMA, Ch. 4183)

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www.www.www.www.www.www.www.www.www.ww					
LX/ RL RF 50Ω AC	CORREC	SENSE:INT	ALIGN AUTO	06:50:12 PM Sep 19, 2021 Radio Std: None	Trace/Detector
	tine T	rig: Free Run Avg Hol	d: 100/100		
	#IFGain:Low #	Atten: 36 dB	F	Radio Device: BTS	
10 dB/div Ref 40.00 dBn	n				
Log 30.0					
20.0					Clear Wri
10.0	man her her	war war and the second of the			
0.00					
	/		1 I		Avera
-10.0 -20.0	- Martine		July marker	to be a state of the state of t	Arciu
				and the state of t	
-30.0					
-40.0					Max Ho
-50.0					
Center 836.50 MHz				Span 37.50 MHz	
Res BW 360 kHz		#VBW 1.2 MHz		Sweep 1 ms	Min Ho
		Tatal Damas	22.0.	ID	
Occupied Bandwidt		Total Power	33.0 c	IBM	
13	3.600 MHz	2			Detect
Transmit Frog Error	-5.590 kHz	z % of OBW Pow	ver 99.0	0.0/	Peal Auto M
Transmit Freq Error					
x dB Bandwidth	15.20 MHz	z xdB	-26.00) dB	
MSG			STATUS		

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



Plot 7-5. Occupied Bandwidth Plot (LTE Band 26 - 15MHz 16-QAM - Full RB)

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Plot 7-6. Occupied Bandwidth Plot (LTE Band 26/5 - 10MHz QPSK - Full RB)



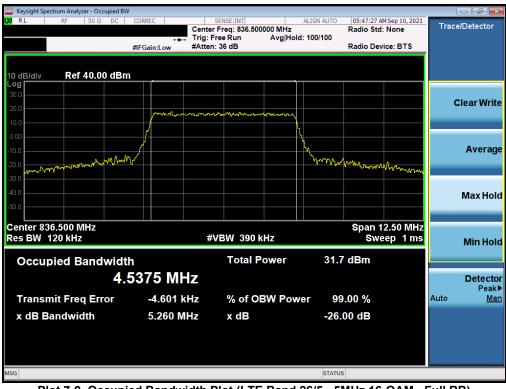
Plot 7-7. Occupied Bandwidth Plot (LTE Band 26/5 - 10MHz 16-QAM - Full RB)

FCC ID: A3LSMS906U	PctEST* Proud to be part of @element	PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
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Plot 7-8. Occupied Bandwidth Plot (LTE Band 26/5 - 5MHz QPSK - Full RB)



Plot 7-9. Occupied Bandwidth Plot (LTE Band 26/5 - 5MHz 16-QAM - Full RB)

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Plot 7-10. Occupied Bandwidth Plot (LTE Band 26/5 - 3MHz QPSK - Full RB)



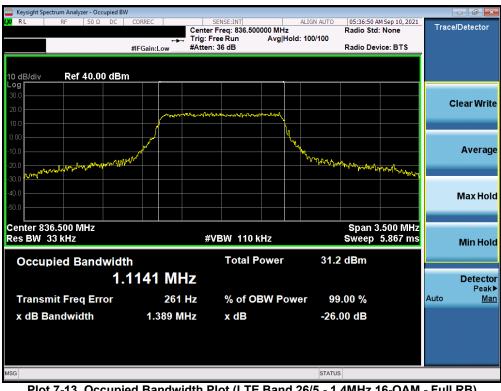
Plot 7-11. Occupied Bandwidth Plot (LTE Band 26/5 - 3MHz 16-QAM - Full RB)

FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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Plot 7-12. Occupied Bandwidth Plot (LTE Band 26/5 - 1.4MHz QPSK - Full RB)



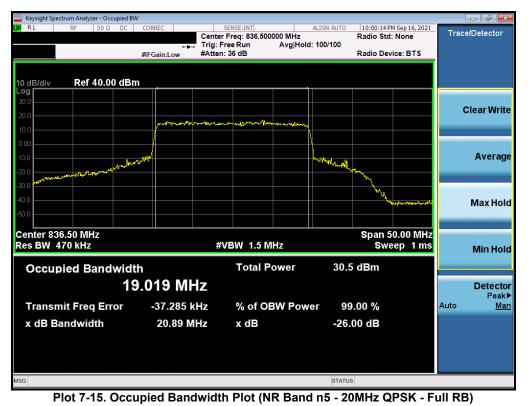
Plot 7-13. Occupied Bandwidth Plot (LTE Band 26/5 - 1.4MHz 16-QAM - Full RB)

FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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Keysight Spectrum Analyzer - Occupied BW				
RL RF 50Ω DC	CORREC	SENSE:INT ALI Center Freq: 836.500000 MHz Trig: Free Run Avg Hold: 10 #Atten: 36 dB	IGN AUTO 09:59:44 PM Sep 16, 2021 Radio Std: None 00/100 Radio Device: BTS	Trace/Detector
0 dB/div Ref 40.00 dBn .og	•			
20.0	and the second s	March Consister Andred Mar Department		Clear Writ
0.00 10.0 20.0	للمر		willing the state	Averag
				Max Ho
enter 836.50 MHz les BW 470 kHz		#VBW 1.5 MHz Total Power	Span 50.00 MHz Sweep 1 ms 31.9 dBm	
	.028 MH	Z		Detect Peal
Transmit Freq Error x dB Bandwidth	-612.63 ki 19.21 Mi		99.00 % -26.00 dB	Auto <u>M</u> i
G			STATUS	

Plot 7-14. Occupied Bandwidth Plot (NR Band n5 - 20MHz π/2 BPSK - Full RB)



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Plot 7-16. Occupied Bandwidth Plot (NR Band n5 - 20MHz 16-QAM - Full RB)



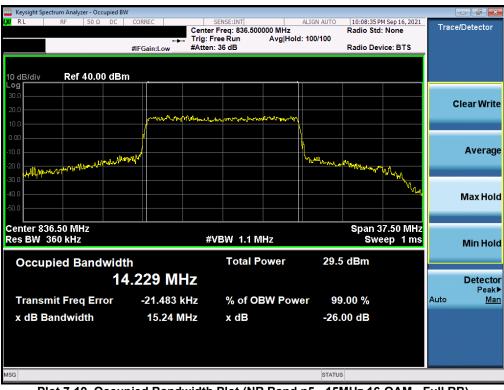
Plot 7-17. Occupied Bandwidth Plot (NR Band n5 - 15MHz π/2 BPSK - Full RB)

FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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Plot 7-18. Occupied Bandwidth Plot (NR Band n5 - 15MHz QPSK - Full RB)



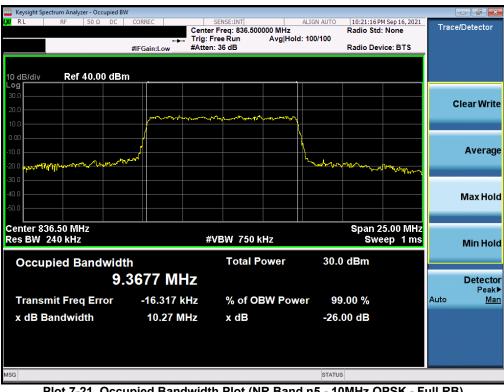
Plot 7-19. Occupied Bandwidth Plot (NR Band n5 - 15MHz 16-QAM - Full RB)

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Keysight Spectrum Analyzer - Occupied BV	V				
RL RF 50Ω DC	CORREC	SENSE:INT Center Freq: 836.5000 Trig: Free Run #Atten: 36 dB	ALIGN AUTO 000 MHz Avg Hold: 100/100	10:20:30 PM Sep 16, 2021 Radio Std: None Radio Device: BTS	Trace/Detector
0 dB/div Ref 40.00 dBr	n				
	John Marine	manulanarymanara	without the second s		Clear Writ
0.0 0.0 0.0 0.0	A			umglaghauranglahaurang	Averag
0.0					Max Ho
enter 836.50 MHz es BW 240 kHz		#VBW 750 ki		Span 25.00 MHz Sweep 1 ms	Min Ho
Occupied Bandwidt 9.	th 0230 MH	Total Po Z	ower 31.4	dBm	Detect
Transmit Freq Error	-188.00 k	Hz % of OB	W Power 99	.00 %	Peal Auto <u>M</u> a
x dB Bandwidth	9.699 M	Hz xdB	-26.	00 dB	
G			STATUS	3	

Plot 7-20. Occupied Bandwidth Plot (NR Band n5 - 10MHz π/2 BPSK - Full RB)



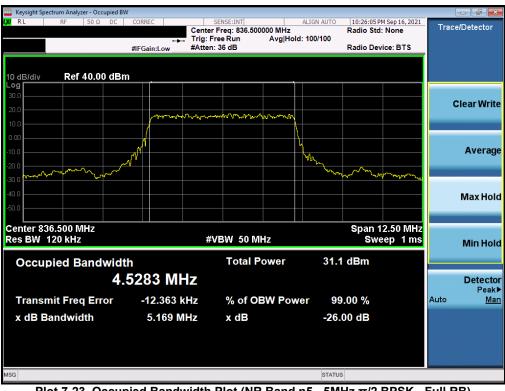
Plot 7-21. Occupied Bandwidth Plot (NR Band n5 - 10MHz QPSK - Full RB)

FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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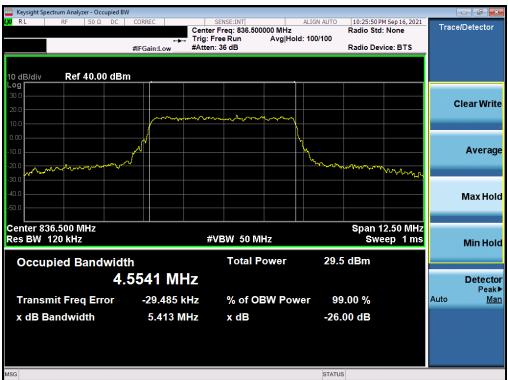
Plot 7-22. Occupied Bandwidth Plot (NR Band n5 - 10MHz 16-QAM - Full RB)



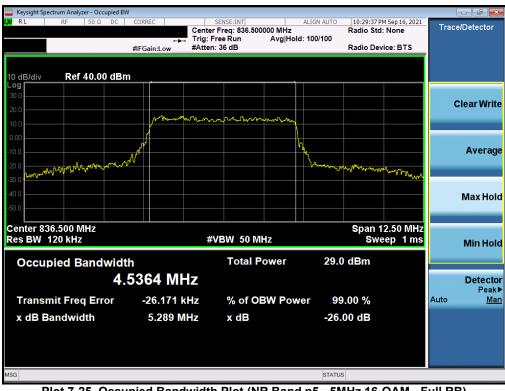
Plot 7-23. Occupied Bandwidth Plot (NR Band n5 - 5MHz π/2 BPSK - Full RB)

FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
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Plot 7-24. Occupied Bandwidth Plot (NR Band n5 - 5MHz QPSK - Full RB)



Plot 7-25. Occupied Bandwidth Plot (NR Band n5 - 5MHz 16-QAM - Full RB)

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7.3 Spurious and Harmonic Emissions at Antenna Terminal

Test Overview

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

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

Test Procedure Used

KDB 971168 D01 v03r01 - Section 6.0

Test Settings

- 1. Start frequency was set to 30MHz and stop frequency was set to 10GHz (separated into at least two plots per channel)
- 2. Detector = $\acute{R}MS$
- 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

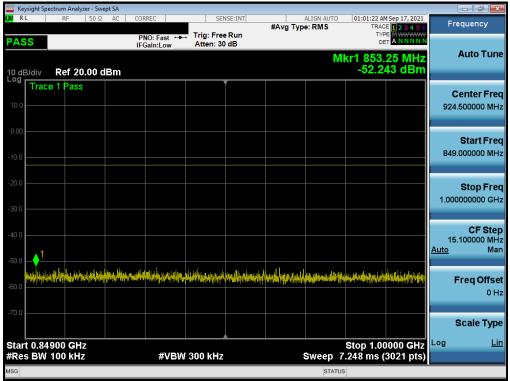
- Per Part 22 and RSS-132, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth 100 kHz or greater for measurements below 1GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth 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.
- 2. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) 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.

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🔤 Keysig	ght Spectru	m Analyzer -	Swept SA										
<mark>lxi</mark> rl		RF 5	Ω AC	COR	REC	SEN	NSE:INT	#Avg Typ	ALIGN AUT		M Sep 17, 2021	F	requency
PASS					IO: Fast ↔ ain:Low	. Trig: Free Atten: 30		****9**		TYI Di			
10 dB/c	div R	ef 20.0	0 dBm							Mkr1 822. -29.9	50 MHz 47 dBm		Auto Tune
Log 7	Trace 1	Pass				`							Center Freq 5.500000 MHz
-10.0												30	Start Freq 0.000000 MHz
-20.0											1	823	Stop Freq 3.000000 MHz
-40.0 -												79 <u>Auto</u>	CF Step 9.300000 MHz Man
-60.0	n ge japen, ^{De} ge	e topby for allow	aliti (anto) Alice (anto)	ana palatata) Anta ang ang ang ang ang ang ang ang ang an	n diga pangkan di <mark>k</mark> angan Ang ang ang kang di kang di di bahar di	lju ng pa terrejaliter Liu ag estekter seter st	u <mark>leasta paparila.</mark> Tanta kan	(Annel) (Anternet Second	aangalalan aasartaanip	ang ang pang (Sing ang pang ang pang ang pang pang pang	a luuneetti yye luu heyde Yyestään on ye seeristä		Freq Offset 0 Hz
Start :	30.0 M	Hz								Stop.8	23.0 MHz		Scale Type <u>Lin</u>
	BW 10				#VBW	300 kHz		9	weep	38.06 ms (1	5861 pts)		
MSG									STA	ATUS			

Plot 7-26. Conducted Spurious Plot (GPRS Ch. 128)



Plot 7-27. Conducted Spurious Plot (GPRS Ch. 128)

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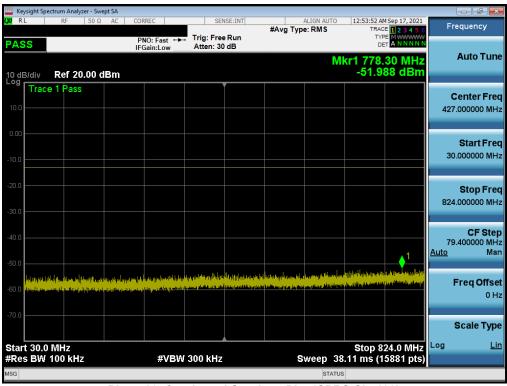
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Keys	ight Spectr	um Analy												
XI RL		RF	50 Ω	AC	CORREC		SEI	SE:INT	#Avg Ty	ALIGN AUTO		AM Sep 17, 2021	Fr	equency
PAS	S				PNO: IFGain	Fast ⊶⊶	Trig: Free #Atten: 3		#/ 19 I I	Se. 14115	T			
					II Oalli	LOW				M	kr1 6.43	84 5 GHz		Auto Tune
10 dBi Log 🗖	div	Ref 0.	00 dB	m							-30.2	280 dBm		
	Trace	1 Pass											c	Center Fred
-10.0														0000000 GHz
-20.0									. 1					Start Freq
-30.0 -									•				1.00	0000000 GHz
	Indpulped.	والمحمد ال	(ereally)e	al a fill the	nati ⁿⁱⁿ lar Mita	di landra dhe	بالدون بينال وارين. مامانيا بيناكرون وارين	a band ng jara tagan Na katang sa katang sa	line, Reproportion of the second s		all and an interaction of the second seco	الألار ويعلون واليوني. أستخلو المحالين التي		
-40.0	an sa		a sa alianga a		and the	السيعتقان علكت	1101-1 (AF)							Stop Free
-50.0 -													10.00	0000000 GHz
30.0														
-60.0													900	CF Step .000000 MHz
													Auto	Man
-70.0														
-80.0													- I	Freq Offset
														0 Hz
-90.0														
														Scale Type
	1.000										Stop 1	0.000 GHz	Log	Lin
_	BW 1.	0 MHz	z			#VBW	3.0 MHz		\$			18001 pts)		
ISG										STATI	JS			

Plot 7-28. Conducted Spurious Plot (GPRS Ch. 128)



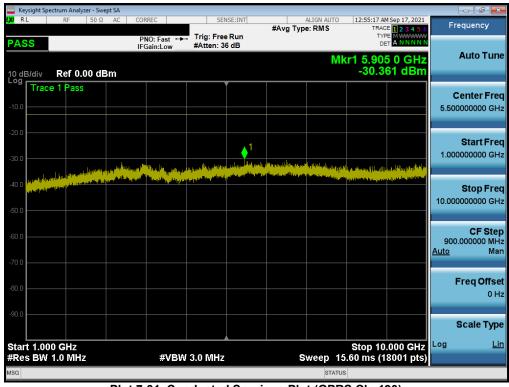
Plot 7-29. Conducted Spurious Plot (GPRS Ch. 190)

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PASS PNO: Fast +++ Trig: Free Run Atten: 30 dB Trig: Free Run Atten: 30 dB Mkr1 876.95 MHz -52.081 dBm Auto Tune 100 dB/div Ref 20.00 dBm -52.081 dBm -52.081 dBm Center Freq 924.50000 MHz Start Freq 849.00000 MHz 000 100 <th></th> <th>oectrum Analyzer - Swe</th> <th>pt SA</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>		oectrum Analyzer - Swe	pt SA									
PASS PHO: Fast IF GaintLow Trig: Free Run Atten: 30 dB Trig: Free Run Start 1 2 3 dB Auto Tune 0 dB/div Ref 20.00 dBm -52.081 dBm -52.081 dBm Center Freq 924.500000 MHz 0 0 Image: Start Freq 849.000000 MHz Start Freq 849.000000 MHz Start Freq 849.000000 GHz 0 0 Image: Start Freq 924.500000 MHz Image: Start Freq 849.000000 GHz Start Freq 849.000000 GHz 0 0 Image: Start Freq 924.500000 MHz Image: Start Freq 924.500000 MHz Start Freq 924.500000 MHz 0 0 Image: Start Freq 924.500000 MHz Image: Start Freq 924.500000 MHz Start Freq 924.500000 MHz 0 0 Image: Start Freq 924.500000 MHz Image: Start Freq 924.500000 MHz Start Freq 924.500000 MHz 0 0 Image: Start Freq 924.500000 MHz Image: Start Freq 924.500000 MHz Image: Start Freq 924.500000 MHz 0 0 Image: Start Freq 924.500000 MHz Image: Start Freq 924.50000 MHz Image: Start Freq 924.500000 MHz 0 0 Image: Start Freq 924.50000 MHz Image: Start Freq 924.500000 MHz Image: Start Freq 924.500000 MHz 0 0 Image: Start Freq 924.500000 MHz Image: Start Freq 924.500000 MHz Image: Start Freq 924.500000 MHz 0 0 Image: Start Freq 924.500000 MHz <	LXI RL	RF 50 Ω	AC COF	RREC	SEN	ISE:INT					Frequ	iency
INNET OTO: SP3 MIRE 000 Trace 1 Pass -52.081 dBm 000 Trace 1 Pass Center Freq 000 Start Freq	PASS						#/18/JP		TYF DE			
Trace 1 Pass Center Freq 100 Start Freq 100 Stop Freq 100000000 GHz Stop Freq 10000000 GHz Stop Freq 10000000 GHz Stop Freq 1000000 GHz Stop Freq 10000000 GHz Stop Freq 10000000 GHz Stop Freq 10000	10 dB/div	Ref 20.00 d	Bm					MI	(r1 876. -52.0	95 MHz 81 dBm	AL	ito Tune
1000 Image: start Freq 2000 Image: start Start Freq 2000 Image: start Start Freq 2000 Image: start St	10.0	ce 1 Pass										
.300 .300												
4400 500 500 500 500 500 500 500	-20.0											
.700	-40.0		1								15.10	0000 MHz
Start 0.84900 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 7.248 ms (3021 pts)			in the state	din ng kaling pangla	ndalaşı kedişekişi		a, mart dags so rap	niyan iladada	hifudikturkets	ég bekandet met gebenete	Fre	•
Bit 100 kHz #VBW 300 kHz Sweep 7.248 ms (3021 pts)	-70.0										Sc	ale Type
2017.472				#VBW	300 kHz			Sweep 7	Stop 1.00 .248 ms (0000 GHz 3021 pts)	Log	<u>Lin</u>
STATUS	MSG							STATUS				

Plot 7-30. Conducted Spurious Plot (GPRS Ch. 190)



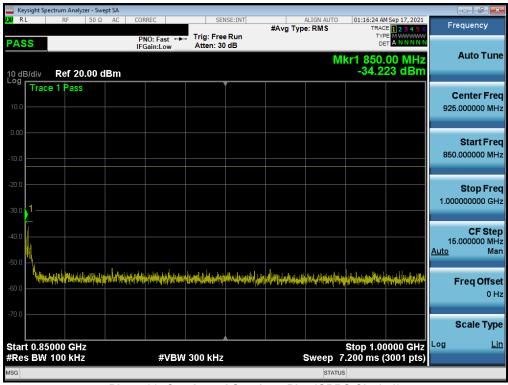
Plot 7-31. Conducted Spurious Plot (GPRS Ch. 190)

FCC ID: A3LSMS906U	PCTEST* Proud to be part of @element	PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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PASS PPO: Fast Provide the second and the public term of the second and term of the second an		ctrum Analyzer - Sv	vept SA									
PRO: East Trig: Free Run Atten: 30 dB Mkr1 750.55 MHz -51.730 dBm Auto Tune 0 dB/div Ref 20.00 dBm -51.730 dBm Center Free 427.00000 MHz 00 00 00 00 00 00 00 00 00 00 00 00 00	LXI RL	RF 50 9	AC C	ORREC	SEN	ISE:INT					Fre	quency
Odd/div Ref 20.00 dBm -51.730 dBm Odd -51.730 dB	PASS								TYF DE			
Trace 1 Pass Center Free 100 Center Free 100 Start Free 101 Start Free 102 Start Free 103 Start Free 104 Start Free 105 Start Free 106 Start Free 107 Start Free 108 S	10 dB/div	Ref 20.00	dBm					M	kr1 750. -51.7	55 MHz 30 dBm		Auto Tune
100 Start Free 200 Start Free 200 Start Free 300 Start Free </td <td>10.0</td> <td>e 1 Pass</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>•</td>	10.0	e 1 Pass										•
Stop Prec Start 30.0 MHz Stop Stop Start 30.0 MHz Stop Stop Start 30.0 MHz Stop Start 30.0 MHz	-10.0											Start Freq 000000 MHz
40.0 1 1 79.400000 MHz 50.0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 <t< td=""><td>-20.0</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Stop Freq 000000 MHz</td></t<>	-20.0											Stop Freq 000000 MHz
6000 methods and a second seco	-40.0									↓ 1		CF Step 400000 MHz Man
Scale Type	-60.0 <mark>data pite</mark>	h <mark>long di Italia (</mark> Herbergional) 1934 - Constant Joseph (Herbergional) 1934 - Constant Joseph (Herbergional)	ka jing kabutan jigi ma Mang kasa sa kasa sa s	t <mark>t (,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</mark>	a fogstalet han patere som and paper and and	j od teresliki bara Rođen stanov tereslik	a alattır. Jatis Skinan,	Wigite Alleni Sectory and stand	en gynaed yr len ffeni mysieta witer tel fan	Alifetti filman Olipetti indittelene	F	req Offset 0 Hz
	-70.0										S	cale Type
				#VBW	300 kHz		s	weep 38	Stop 8 11 ms (1	24.0 MHz 5881 pts)		<u>Lin</u>
SG STATUS	MSG							STATUS				

Plot 7-32. Conducted Spurious Plot (GPRS Ch. 251)



Plot 7-33. Conducted Spurious Plot (GPRS Ch. 251)

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	ectrum Analy												
XI RL	RF	50 Ω	AC	CORREC	ast ↔	Trig: Fre		#Avg Typ	ALIGN AUTO	TRA	AM Sep 17, 2021 CE 1 2 3 4 5 6 (PE M WWWWW DET A N N N N N	Frequ	ency
PASS	Ref 0.	00 dB	m	IFGain	Low	#Atten: 3	6 dB		M	kr1 5.95	1 0 GHz 87 dBm	Au	ito Tun
10.0 Trac	e 1 Pass											Cen 5.50000	ter Fre 0000 GH
30.0		L Itilia da	a lastin bala	And In Les	ality Laborator	<u>i na sua la mandra d</u>	1 adding Physics	(Marahanderster)		d postation of the	, dage of the state of the stat	St 1.00000	artFre 0000 G⊢
40.0 (1997) 50.0		(<u>نظميني) او .</u>	a da			an in the second se					alia and a pair it pair in a single state of the second state of t	St 10.00000	: op Fre 0000 G⊦
70.0													CF Ste D000 MH Ma
80.0												Fre	q Offs 0 ⊦
Start 1.00					4) (B)()	0.0.8411-				Stop 1	0.000 GHz	Log	ale Typ
Res BW	T.U MIH	2			#VBW	3.0 MHz			Sweep 1		18001 pts)		

Plot 7-34. Conducted Spurious Plot (GPRS Ch. 251)

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	ectrum Analyze									ð 🔀
LXI RL	RF	50 Ω AC	CORREC	SENSE:I	AVG TV	ALIGN AUTO	TRACI	Sep 17, 2021	Frequer	ncy
PASS			PNO: Fast +++ IFGain:Low	Trig: Free Ru Atten: 30 dB	in e si		TYP DE			-
10 dB/div Log	Ref 20.	00 dBm				M	kr1 822. -37.62	90 MHz 23 dBm	Auto	Tune
	e 1 Pass			Ĭ					Cente	r Freq
10.0									426.5000	00 MHz
0.00									Star	tFreq
-10.0									30.0000	00 MHz
-20.0									Sto	p Freq
-30.0									823.0000	00 MHz
-40.0										F Step
									79.3000 <u>Auto</u>	00 MHz Man
-50.0									Freq	Offset
-60.0					and the set of the set				incq	0 Hz
-70.0									Scale	е Туре
Start 30.0	MHz						Stop 82	23.0 MHz	Log	Lin
#Res BW			#VBW	300 kHz		weep 38	.06 ms (1	5861 pts)		
MSG						STATUS				

Plot 7-35. Conducted Spurious Plot (WCDMA Ch. 4132)



Plot 7-36. Conducted Spurious Plot (WCDMA Ch. 4132)

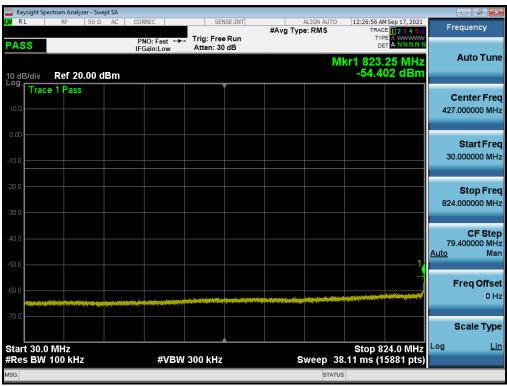
FCC ID: A3LSMS906U	PCTEST. Proud to be part of @elettosent	PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 22 of 07
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L <mark>XI</mark> RL		RF	50 Ω	AC	CORREC		SEI	NSE:INT	#Avg Typ	ALIGN AUTO		AM Sep 17, 2021	Fr	equency
PASS						ast 🛏	Trig: Free		#rig iyp	e. 11113	T			
PA33					IFGain:	Low	#Atten: 3	2 dB						Auto Tune
	_									M	(r1 6.00	6 0 GHz 31 dBm		Auto Tune
10 dB/d Log		ef 0.0	0 dB	m							-42.1	эгавш		
T	Frace 1	Pass						Ĩ					C	Center Freq
-10.0														0000000 GHz
			\rightarrow											
-20.0														
														Start Freq
-30.0													1.00	0000000 GHz
								. 4						
-40.0								├── ♦ <u>'</u>						Stop Freq
		- ALMAN A		-	~~~~	\sim	and the second sec	and the second s		State of the second			10.00	0000000 GHz
-50.0														
														CF Step
-60.0													900	.000000 MHz
													<u>Auto</u>	Man
-70.0														
														Freq Offset
-80.0														0 Hz
-90.0														
-50.0														Scale Type
Start 1											Stop 1	0.000 GHz	Log	<u>Lin</u>
#Res E	BW 1.0) MHz				#VBW	3.0 MHz		S	weep 15	.60 ms (18001 pts)		
MSG										STATUS	3			

Plot 7-37. Conducted Spurious Plot (WCDMA Ch. 4132)



Plot 7-38. Conducted Spurious Plot (WCDMA Ch. 4183)

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	ctrum Analyzer - S									
L <mark>XI</mark> RL	RF 50	ΩAC	CORREC	SEN	ISE:INT	#Avg Typ	ALIGN AUTO e: RMS	TRAC	I Sep 17, 2021	Frequency
PASS			PNO: Fast ++- IFGain:Low	. Trig: Free Atten: 30		•		TYF DE		
10 dB/div	Ref 20.00	dBm					Μ	kr1 849. -56.5	80 MHz 53 dBm	Auto Tune
Log	e 1 Pass									Center Freq
10.0										924.500000 MHz
0.00										
										Start Freq 849.000000 MHz
-10.0										
-20.0										Stop Freq
-30.0										1.000000000 GHz
										CF Step
-40.0										15.100000 MHz Auto Man
-50.0										
-60.0										Freq Offset
manut	aja,250 [°] a ⁿ ongongonana	heyesen myslorb	rantyrana riphysicipateria yd	her fairle fflige war og	hahanfanihissandahan	n ser yen ye han a	alandarian ana ana ana ana ana ana ana ana ana	er and the state of the second se	ant and an	0 Hz
-70.0										Scale Type
Start 0.84	900 GHz							Stop 1.00	0000 GHz	Log <u>Lin</u>
#Res BW			#VBW	300 kHz			Sweep 7	7.248 ms (3021 pts)	
MSG							STATU	s		

Plot 7-39. Conducted Spurious Plot (WCDMA Ch. 4183)



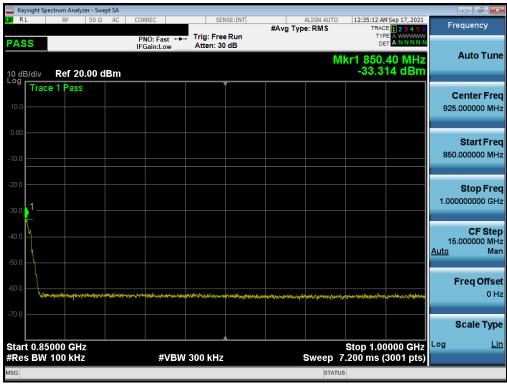
Plot 7-40. Conducted Spurious Plot (WCDMA Ch. 4183)

FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
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	ectrum Analyzer - S						
LXI RL	RF 50	Ω AC	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	12:35:00 AM Sep 17, 2021 TRACE 1 2 3 4 5 6	Frequency
PASS			PNO: Fast ↔ IFGain:Low	Trig: Free Run Atten: 30 dB			
10 dB/div Log	Ref 20.00	dBm			M	kr1 816.35 MHz -61.076 dBm	Auto Tune
10.0 Trac	e 1 Pass						Center Freq 427.000000 MHz
-10.0							Start Freq 30.000000 MHz
-20.0							Stop Freq 824.000000 MHz
-40.0							CF Step 79.400000 MHz <u>Auto</u> Man
-60.0					Alexand Specific sectors as a many of a large sector of the sector sector sector sector sectors and the sector		Freq Offset 0 Hz
-70.0							Scale Type
Start 30.0 #Res BW			#VBW	300 kHz	Sweep 3	Stop 824.0 MHz 8.11 ms (15881 pts)	Log <u>Lin</u>
MSG					STATU	s	

Plot 7-41. Conducted Spurious Plot (WCDMA Ch. 4233)



Plot 7-42. Conducted Spurious Plot (WCDMA Ch. 4233)

FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
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	ectrum Analyz	zer - Swep	t SA										
LX/RL	RF	50 Ω	AC	CORREC		SEN	SE:INT	#Avg Typ	ALIGN AUTO e: RMS		AM Sep 17, 2021	Fr	equency
PASS				PNO: Fa	ast ↔ .ow	Trig: Free #Atten: 3							
10 dB/div	Ref 0.0	00 dBi	m						Μ	kr1 6.8 -42.	98 5 GHz 689 dBm		Auto Tune
Log Trac	e 1 Pass												Center Freq 0000000 GHz
-20.0												1.00	Start Fred
-40.0			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~	~~	-					10.00	Stop Freq 0000000 GHz
-60.0												900 <u>Auto</u>	CF Step 0.000000 MH Mar
-80.0													Freq Offse 0 Hi
-90.0													Scale Type
Start 1.00 #Res BW		2		\$	#VBW	3.0 MHz		s	weep 1	Stop ' 5.60 ms	10.000 GHz (18001 pts)	Log	Lin
MSG									STAT	US			

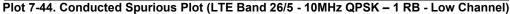
Plot 7-43. Conducted Spurious Plot (WCDMA Ch. 4233)

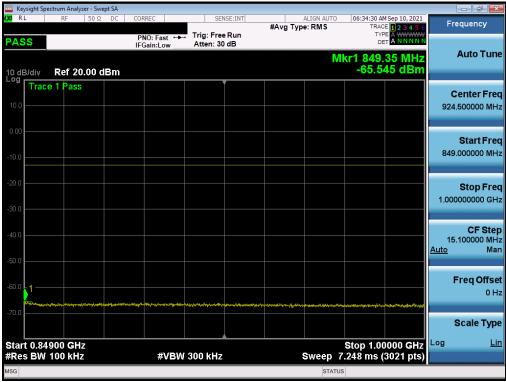
FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
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LTE Band 26/5

Keysight Spectrum Analyzer - Swept SA	000050	ashas h		00.01.10.010.00.00.00.00.00	
RL RF 50Ω DC	CORREC	SENSE:INT Trig: Free Run Atten: 30 dB	ALIGN AUTO #Avg Type: RMS	06:34:19 AM Sep 10, 2021 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A NNNNN	Frequency
dB/div Ref 20.00 dBm	IFGain:Low	Atten: 30 dB	М	kr1 822.90 MHz -61.145 dBm	Auto Tu
Trace 1 Pass					Center Fr 426.500000 M
0.0					Start Fr 30.000000 M
0.0					Stop Fi 823.000000 M
0.0					CF Si 79.300000 M <u>Auto</u> M
0.0				1	Freq Off 0
	n general de la constant de la const Constant de la constant		in the second		Scale Ty
tart 30.0 MHz Res BW 100 kHz	#VBW	300 kHz	Sweep 38	Stop 823.0 MHz 3.06 ms (15861 pts)	





Plot 7-45. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Low Channel)

FCC ID: A3LSMS906U	PCTEST Preud to be post of @eletterent	PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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	ectrum Analyzer - S									
L <mark>XI</mark> RL	RF 50	Ω AC	CORREC		SENSE:INT	#Avg Typ	ALIGN AUTO		M Sep 19, 2021	Frequency
PASS			PNO: Fast IFGain:Low		Free Run n: 36 dB			TYI Di		
10 dB/div Log	Ref 0.00 (dBm					MI	kr1 5.96 -38.6	6 5 GHz 44 dBm	Auto Tune
Trace	e 1 Pass									Center Free
-10.0										5.500000000 GH
-20.0										Start Fred
-30.0										1.000000000 GH;
-40.0			$ \rightarrow $			-				Stop Fred
-50.0										10.000000000 GH
-60.0										CF Step
-60.0										900.000000 MHz <u>Auto</u> Mar
-70.0										
-80.0										Freq Offse 0 Ha
-90.0										
										Scale Type
Start 1.00 #Res BW			#V	BW 3.0 MI	Hz	S	weep 1	Stop 10 5.60 ms (1	.000 GHz 8001 pts)	
MSG							STATU	s		

Plot 7-46. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Low Channel)



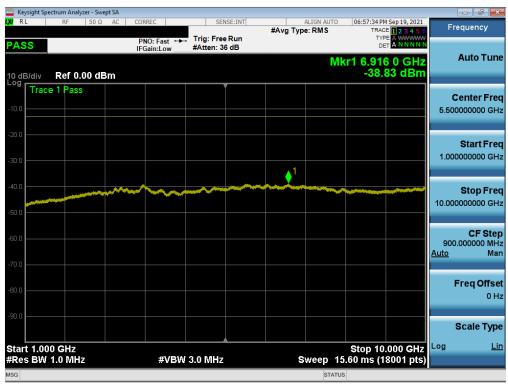
Plot 7-47. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Mid Channel)

FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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Keysight Spe			t SA										
<mark>(</mark> RL	RF	50 Ω	DC	CORREC		SE	NSE:INT	#Ava Tv	ALIGN AUTO		M Sep 10, 2021	Frequ	Jency
PASS				PNO: Fa	ast ↔ .ow	Trig: Fre Atten: 3				TYI			
0 dB/div	Ref 20	.00 dE	Зm						М	kr1 849 -65.	.35 MHz 74 dBm	Au	uto Tun
	e 1 Pass						Ĭ						nter Fre
10.0												924.50	0000 MH
3.00												s	tart Fre
10.0												849.00	0000 MH
20.0												s	top Fre
:0.0												1.00000	0000 GH
0.0													CF Ste
i0.0												15.10 <u>Auto</u>	0000 MI Ma
												Fre	eq Offs
io.o - 1	stallaha Milekanderina		Hall Marsha	and an entering	horacionation	Annalistic Andrea Andrea		and and a sole sole sole of	1 m		en werdelan oor Alia aa		. 01
0.0												Sc	ale Typ
tart 0.84										Stop 1.0	0000 GHz	Log	L
Res BW	100 kHz			4	¢VB₩	300 kHz			Sweep 7	.248 ms ((3021 pts)		
G									STATUS	5			

Plot 7-48. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Mid Channel)



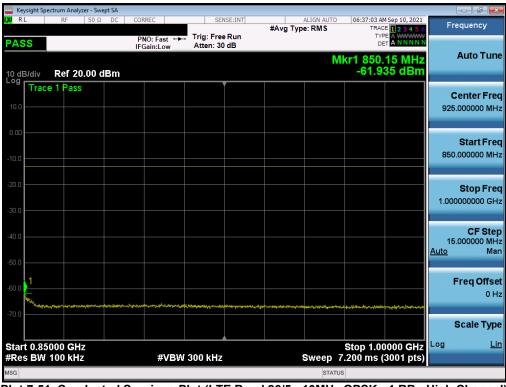
Plot 7-49. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Mid Channel)

FCC ID: A3LSMS906U	PCTEST. Proud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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	ectrum Analy											- F	×
KI RL	RF	50 Ω	DC	CORREC			SENSE:INT	#Avg Typ	ALIGN AUTO	TR4	AM Sep 10, 2021 ACE 1 2 3 4 5 6	Frequency	
PASS				PNO: IFGain	Fast ↔ :Low	Trig: F Atten:	ree Run 30 dB						
10 dB/div	Ref 20).00 dE	3m						Μ	kr1 819 -64.6	.30 MHz 665 dBm	Auto Tu	un
-og Trac	e 1 Pass											Center F	re
10.0												427.000000 N	мн
0.00													
												Start Fi 30.000000 N	
-10.0												30.000000	****
-20.0												Stop Fi	re
30.0												824.000000 N	мн
												CF St	to
40.0												79.400000 N	
-50.0												Auto M	via
-60.0											1.	Freq Off	fse
-00.0										والمتحقق وتحرير ومرور متركب والم		0	0 H
-70.0					Should be an in the							Scale Ty	vn
													Li
Start 30.0 #Res BW		2			#VBW	300 kH	z	9	weep 38	Stop 3 3.11 ms (824.0 MHz 15881 pts)	Log	
ISG									STATUS				_

Plot 7-50. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - High Channel)



Plot 7-51. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - High Channel)

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	ectrum Analyzer -									
LXIRL	RF 51	Ω AC	CORREC	SEN	ISE:INT	#Avg Typ	ALIGN AUTO		Sep 19, 2021	Frequency
PASS			PNO: Fast ↔ IFGain:Low	, Trig: Free #Atten: 3				TYP DE		Auto Tun
10 dB/div Log	Ref 0.00	dBm					Mk	(r1 6.452 -38.6	2 5 GHz 07 dBm	Auto Tun
Trac	e 1 Pass									Center Fre
-10.0										5.500000000 GH
-20.0										
-20.0										Start Fre
-30.0										1.000000000 GH
						♦ ¹				
-40.0		se m	\sim		and the second designed to the second designe					Stop Fre
-50.0										10.00000000 GH
										CF Ste
-60.0										900.00000 MH
-70.0										<u>Auto</u> Ma
										Freq Offs
-80.0										0+
-90.0										
										Scale Typ
Start 1.00	00 GHz							Stop 10	.000 GHz	Log <u>Li</u>
#Res BW			#VBW	/ 3.0 MHz		S	weep 15	.60 ms (1	8001 pts)	
MSG							STATUS			

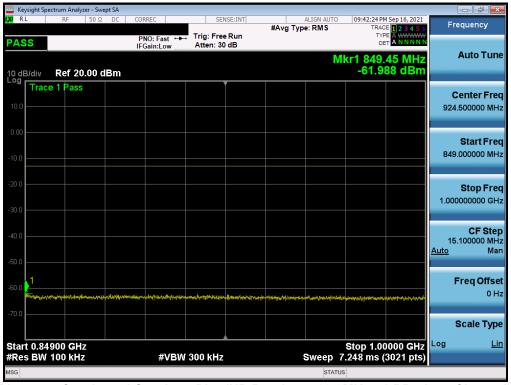
Plot 7-52. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - High Channel)

FCC ID: A3LSMS906U	PCTEST. Proud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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	ectrum Analyze	r - Swept SA						
LXU RL	RF	50 Ω DC	CORREC PNO: Fast ↔	SENSE:INT	#Avg Type	ALIGN AUTO E: RMS	09:42:14 PM Sep 16, 2021 TRACE 1 2 3 4 5 TYPE A WWWW	f
PASS 10 dB/div	Ref 20.0	00 dBm	IFGain:Low	Atten: 30 dB		Μ	ьет <mark>А N N N N</mark> kr1 823.45 MHz -59.769 dBm	Auto Tune
10.0 Trac	e 1 Pass							Center Fred 427.000000 MH:
-10.0								Start Free 30.000000 MH
-20.0								Stop Free 824.000000 MH
-40.0								CF Stej 79.400000 MH <u>Auto</u> Ma
-60.0						a di seconda per per per di secola de		Freq Offse 0 H
-70.0								Scale Type
Start 30.0 #Res BW			#VB\	V 300 kHz	SI	weep 38	Stop 824.0 MHz .11 ms (15881 pts	Log <u>Lir</u>
MSG						STATUS	3	

Plot 7-53. Conducted Spurious Plot (NR Band n5 - 20.0MHz - 1 RB - Low Channel)



Plot 7-54. Conducted Spurious Plot (NR Band n5 - 20.0MHz - 1 RB - Low Channel)

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Keysight Spe			ot SA										
LXI RL	RF	50 Ω	DC	CORREC		SEI	SE:INT	#Avg Ty	ALIGN AUTO		M Sep 16, 2021	Fr	equency
PASS				PNO: F	ast ↔ .ow	Trig: Free #Atten: 3				TYP			
10 dB/div Log	Ref 0.0)0 dB	m						M	(r1 8.91) -37.7	0 5 GHz 72 dBm		Auto Tune
-10.0	e 1 Pass												Center Freq 0000000 GHz
-20.0										1		1.000	Start Freq
-40.0				~~	`~~~	~~~	~~~					10.000	Stop Freq
-60.0												900 <u>Auto</u>	CF Step .000000 MHz Mar
-80.0												•	Freq Offset 0 Hz
-90.0													Scale Type
Start 1.00 #Res BW		:		3	≠vbw	3.0 MHz			Sweep 15	Stop 10 .60 ms (1	.000 GHz 8001 pts)	Log	<u>Lin</u>
MSG									STATUS	3			

Plot 7-55. Conducted Spurious Plot (NR Band n5 - 20.0MHz - 1 RB - Low Channel)

Keysight Spectrum Analyzer - Swept SA RL RF 50 Ω DC	CORREC	SENSE:INT	ALIGN AUTO	09:58:25 PM Sep 16, 2021	- .
ASS	PNO: Fast ↔ IFGain:Low	Trig: Free Run Atten: 30 dB	#Avg Type: RMS	TRACE 1 2 3 4 5 6 TYPE A WWWW DET A NNNNN	Frequency
dB/div Ref 20.00 dBm			Μ	kr1 823.20 MHz -60.064 dBm	Auto Tur
Drace 1 Pass					Center Fre 427.000000 MH
.0					Start Fre 30.000000 Mi
					Stop Fre 824.000000 Mł
					CF Ste 79.400000 MI <u>Auto</u> M
0.0	y na sang sa sang sa	a state of the sta	ne en substativen av med han bet ef den må av som av det beskande. Ne en substativen av som av det som av gener som av som	Anna and the state of the state	Freq Offs 0 I
0.0					Scale Ty
art 30.0 MHz Res BW 100 kHz	#VBW	/ 300 kHz	Sweep 3	Stop 824.0 MHz 3.11 ms (15881 pts)	Log <u>L</u>

Plot 7-56. Conducted Spurious Plot (NR Band n5 - 20.0MHz - 1 RB - Mid Channel)

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										/sight Spectrum	
Frequency	:58:34 PM Sep 16, 2021 TRACE 1 2 3 4 5 6		#Avg Ty	NSE:INT	SEI	C	CORR	DC	F 50 Ω	LR	XI RI
					Trig: Free Atten: 30	:Fast ↔ n:Low				S	PAS
Auto Tune	850.05 MHz -61.39 dBm	Mkr1						dBm	ef 20.00 c	3/div Re	10 dE
Center Fred				Ĭ					Pass	Trace 1	Log
924.500000 MHz											10.0
											0.00
Start Fred 849.000000 MHz											
849.00000 1017											-10.0
Stop Fred											-20.0
1.000000000 GH											-30.0
CF Step											
15.100000 MH											-40.0
<u>Auto</u> Mar											-50.0
Freq Offse										1	-60.0
0 H:	ermekturgerupterparanti)	and the second second		ant the spectrum of the second se	and the second	fan an the state	iyabelitiyaya	(alata) and	an a	A Property of the party of the	-00.0
Scale Type											-70.0
Log <u>Lir</u>	p 1.00000 GHz 3 ms (3021 pts)	Sto Sweep 7 <u>.24</u>			300 kHz	#VBW				t 0.84900 s BW 100	
		STATUS									//SG





Plot 7-58. Conducted Spurious Plot (NR Band n5 - 20.0MHz - 1 RB - Mid Channel)

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	ectrum Analyz		ot SA										
X/RL	RF	50 Ω	DC	CORREC		S	ENSE:INT	#Avg Ty	ALIGN AUTO		M Sep 16, 2021	Fr	equency
PASS				PNO: F	ast ⊶⊷ .ow	Trig: Fr Atten:				TYP			
10 dB/div	Ref 20	.00 dE	Bm						М	kr1 823. -61.2	75 MHz 82 dBm		Auto Tune
	e 1 Pass											c	enter Free
10.0												427	.000000 MH
0.00													Start Free
-10.0												30	.000000 MH
20.0													Stop Fre
30.0												824	.000000 MH
40.0													CF Ste
												79 <u>Auto</u>	.400000 MH Ma
50.0											1		Freq Offse
-60.0			a Baska se bi					einin de state metire					0 H
70.0													Scale Typ
Start 30.0	MHz									Stop 8	24.0 MHz	Log	Lir
#Res BW				1	#VBW	300 kH	z		Sweep 38	3.11 ms (1	5881 pts)		
MSG									STATUS	5			

Plot 7-59. Conducted Spurious Plot (NR Band n5 - 20.0MHz - 1 RB - High Channel)

Keysight Spectrum Analyzer - Swept S/					
C RL RF 50 Ω D	PNO: Fast 🔸	SENSE:INT	#Avg Type: RMS	09:54:57 PM Sep 16, 2021 TRACE 1 2 3 4 5 6 TYPE A WWWWW DET A N N N N N	Frequency
0 dB/div Ref 20.00 dBr	IFGain:Low	#Atten: 36 dB	Μ	kr1 852.50 MHz -55.802 dBm	Auto Tun
10.0 Trace 1 Pass					Center Fre 924.500000 MH
10.0					Start Fre 849.000000 M⊦
20.0					Stop Fre 1.000000000 GF
40.0					CF Ste 15.100000 MH <u>Auto</u> Ma
50.0	4,214994498444994449449989494494494494494494	₽ [₽] ₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽	สะาระกับรัฐสุดาราสตรีไว้มีผูสัตรูกรัฐที่วี่มีรู้สัตรูสารูสุรัง _{ยุ} สระ _ก อง	Newsenson (nders Spingersperspersperspers	Freq Offs 0 H
70.0					Scale Typ
start 0.84900 GHz Res BW 100 kHz	#VBW	300 kHz	Sweep 7	Stop 1.00000 GHz 7.248 ms (3021 pts)	Log <u>L</u>
SG			STATU	S	

Plot 7-60. Conducted Spurious Plot (NR Band n5 - 20.0MHz - 1 RB - High Channel)

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	ectrum Analyz	er - Swep	ot SA										
LXU RL	RF	50 Ω	DC	CORREC		SEI	NSE:INT	#Avg Typ	ALIGN AUTO	TR	PM Sep 16, 2021	Fr	equency
PASS				PNO: Fa	ast ↔ .ow	#Atten: 3							A
10 dB/div Log	Ref 0.0)0 dB	m						M	kr1 4.94 -37.	46 5 GHz 792 dBm		Auto Tune
-10.0	e 1 Pass												Center Freq 0000000 GHz
-20.0												0.00	
-30.0												1.00	Start Freq 0000000 GHz
-40.0						, 📌 🚬							
-50.0			and the second			~~~						10.00	Stop Freq 0000000 GHz
-60.0												900 <u>Auto</u>	CF Step 0.000000 MHz Mar
-70.0													Freq Offse
-90.0													0 Hz
													Scale Type
Start 1.00 #Res BW				#	#VBW	3.0 MHz		S	weep 1	Stop 1 5.60 ms (0.000 GHz 18001 pts)	Log	<u>Lin</u>
MSG									STAT	JS			

Plot 7-61. Conducted Spurious Plot (NR Band n5 - 20.0MHz - 1 RB - High Channel)

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

Test Procedure Used

KDB 971168 D01 v03r01 - Section 6.0

Test Settings

- 1. Start 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

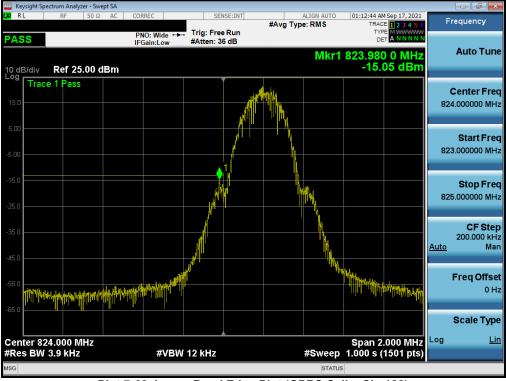
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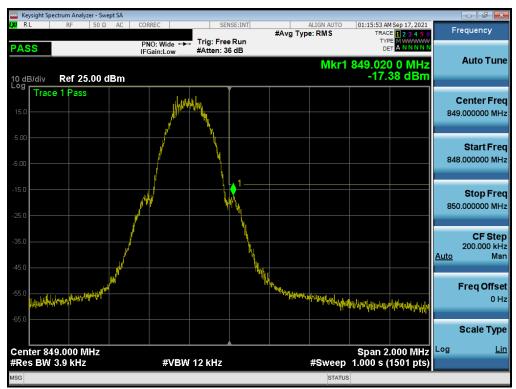
- 1. Per 22.917(b) and RSS-132(5.5), in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions 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.
- 2. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) 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.

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Plot 7-62. Lower Band Edge Plot (GPRS Cell – Ch. 128)



Plot 7-63. Upper Band Edge Plot (GPRS Cell – Ch. 251)

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Plot 7-64. Lower Band Edge Plot (WCDMA Cell – Ch. 4132)



Plot 7-65. Upper Band Edge Plot (WCDMA Cell - Ch. 4233)

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	ectrum Analyz											•
RL	RF	50 Ω AC	CORR	EC	SEI	ISE:INT		ALIGN AUTO	10:05:59 PM S		Frequ	iencv
ASS):Wide ↔ iin:Low	. Trig: Free #Atten: 3		#Avg I	ype: RMS	TYPE	1 2 3 4 5 6 A WWWWW A NNNNN		
dB/div	Ref 25	.00 dBm	ì					Mk	r1 823.36 -24.6	4 MHz 0 dBm	Au	ito Tui
Trac	e 1 Pass										Con	ter Fr
5.0											824.00	
5.0											824.00	0000 10
.00									<u>.</u>			
						ſ					St	artFr
											818.00	0000 N
5.0												
5.0					<u>م</u> 1							top Fr
5.0						N					830.00	0000 M
		m	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	manne	m m	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~						
5.0												CF St
												0000 N
5.0											<u>Auto</u>	N
,												
5.0											Fre	q Offs
												0
5.0												
											Sca	ale Ty
												-
enter 82	24.000 M	Hz							Span 12	.00 MHz	Log	
Res BW	150 kHz			#VBW	470 kHz			Sweep 1	.000 ms (1	001 pts)		
3								STATUS	5			

Plot 7-66. Lower Band Edge Plot (LTE Band 26 - 15MHz QPSK - Full RB)



Plot 7-67. Upper Band Edge Plot (LTE Band 26 - 15MHz QPSK - Full RB)

FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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	ectrum Analyzer -	Swept SA								
XI RL	RF 50	Ω AC	CORREC	SENSE:		#Avg Type: RMS	S TR/	PM Sep 17, 2021 ACE 1 2 3 4 5 6 YPE A WWWWW DET A NNNN	Freq	uency
PASS	Ref 25.0) dBm	IFGain:Low	#Atten: 36 dl	3		Mkr1 823.		A	uto Tune
15.0	e 1 Pass									nter Fred 00000 MH:
5.00						en gyggyngen francoen far twee ei alle gen y der fry de far y	**************************************			Start Free
-15.0				1						Stop Free
45.0	ngunapag kuntapanta	*****							8 <u>Auto</u>	CF Ste 00.000 kH Ma
55.0									Fr	eq Offse 0 H
Center 82	4.000 MHz		#\/B\A	300 kHz		Swee	Span p 13.33 ms	0.000 191112	So Log	ale Typ
ISG			#VDV	500 KH2			TATUS	(Toor pis)		

Plot 7-68. Lower Band Edge Plot (LTE Band 26/5 - 10MHz QPSK - Full RB)



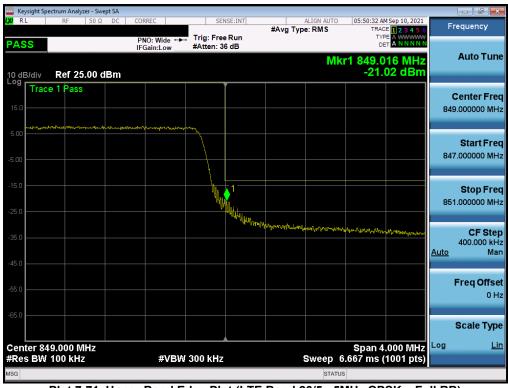
Plot 7-69. Upper Band Edge Plot (LTE Band 26/5 - 10MHz QPSK – Full RB)

FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
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Keysight Spect		- Swept SA								
XI RL	RF 5	0Ω DC	CORREC	SENSE:IN	#Avg Type	ALIGN AUTO E: RMS	TRACE	Sep 10, 2021	F	requency
PASS			PNO: Wide	Trig: Free Rur #Atten: 36 dB	1		TYPI DE			
10 dB/div Log	Ref 25.0	0 dBm				Mkr	1 823.9 -20.3	96 MHz 30 dBm		Auto Tune
15.0 Trace	1 Pass									Center Freq 4.000000 MHz
-5.00						<u>, 1997, 1997, 1997, 1997, 1997</u> , 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997	MUColompo ⁻¹ klyws		822	Start Freq 2.000000 MHz
-15.0									826	Stop Fred 5.000000 MHz
-35.0	nangentenisch	แระทับ <mark>ใ</mark> นสัง _ช างสุณฑ	n han an a	jt/cet/-27-1					<u>Auto</u>	CF Step 400.000 kHz Mar
-55.0										Freq Offse 0 Ha
-65.0										Scale Type
Center 824 #Res BW 1		z	#VBW	300 kHz		Sweep 6.0	Span 4. 667 ms (′	000 10112	Log	Lin
MSG						STATUS				

Plot 7-70. Lower Band Edge Plot (LTE Band 26/5 - 5MHz QPSK - Full RB)



Plot 7-71. Upper Band Edge Plot (LTE Band 26/5 - 5MHz QPSK - Full RB)

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🚾 Keysight Spectrum												
LXIRL R	F 50 Ω	DC	CORREC		SEN	ISE:INT	#Avg Typ	ALIGN AUTO		M Sep 10, 2021	F	requency
PASS			PNO: Wie IFGain:Lo		Trig: Free #Atten: 36				TYI Di			
10 dB/div Re	f 25.00 di	Вm						Mk	r1 823.9 -16.	92 MHz 93 dBm		Auto Tune
15.0 Trace 1 F	Pass						ng manyar Manna Ma	Jugantar Jungar angle	and the second	-		Center Freq 4.000000 MHz
-5.00											82	Start Freq 2.000000 MHz
-15.0			athu		and the full	1					82	Stop Freq 6.000000 MHz
-25.0 -35.0	eruhprasier ^{afti} n'ny ⁿⁱ n	᠕ᡃᡰ᠆ᡁᠰᢧ᠕ᡃᢪᡁ	Weine K. Henriel W	aken alle i							<u>Auto</u>	CF Step 400.000 kHz Mar
-55.0												Freq Offse 0 Hi
-65.0												Scale Type
Center 824.00 #Res BW 100			#	VBW	300 kHz			Sweep 6	Span 4 .667 ms (.000 MHz (1001 pts)	Log	Lin
MSG								STATUS	6			

Plot 7-72. Lower Band Edge Plot (LTE Band 26/5 - 3MHz QPSK - Full RB)



Plot 7-73. Upper Band Edge Plot (LTE Band 26/5 - 3MHz QPSK - Full RB)

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Plot 7-74. Lower Band Edge Plot (LTE Band 26/5 – 1.4MHz QPSK – Full RB)



Plot 7-75. Upper Band Edge Plot (LTE Band 26/5 – 1.4MHz QPSK – Full RB)

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Plot 7-76. Lower Band Edge Plot (NR Band n5 - 20.0MHz - Full RB)

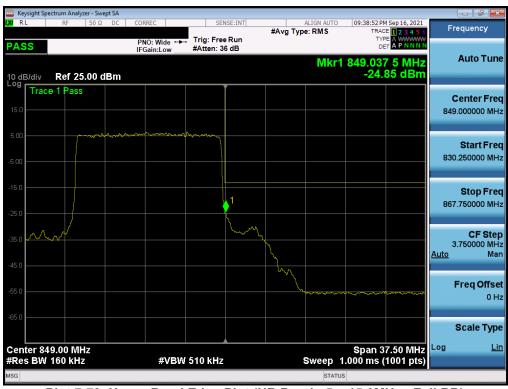


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🔤 Keysight Spectrum Analyzer - Swept SA			
K RL RF 50Ω DC	CORREC SENSE:IN	T ALIGN AUTO 09:37:11 PM Sep 16, 2021 #Avg Type: RMS TRACE 12 3 4 5	
PASS	PNO: Wide +++ IFGain:Low #Atten: 36 dB		V N
10 dB/div Ref 25.00 dBm		Mkr1 823.962 5 MH: -24.97 dBn	Auto Tune
15.0 Trace 1 Pass			Center Freq 824.000000 MHz
-5.00			Start Freq 805.250000 MHz
-15.0	1		Stop Freq 842.750000 MHz
-35.0	- Martin		CF Step 3.750000 MHz <u>Auto</u> Mar
-55.0			Freq Offse 0 H:
-65.0			Scale Type
Center 824.00 MHz #Res BW 160 kHz	#VBW 510 kHz	Span 37.50 MH Sweep 1.000 ms (1001 pts	Log <u>Lin</u>
MSG		STATUS	

Plot 7-78. Lower Band Edge Plot (NR Band n5 – 15.0MHz - Full RB)



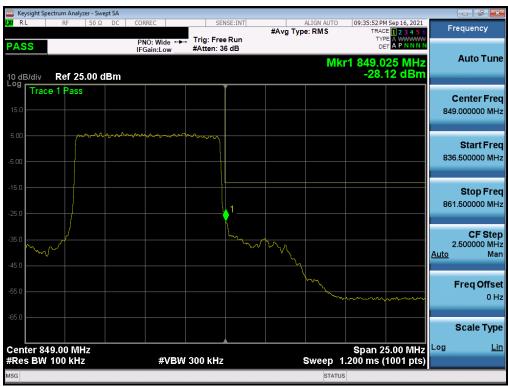
Plot 7-79. Upper Band Edge Plot (NR Band n5 – 15.0MHz - Full RB)

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	um Analyzer - Sw	ept SA									
LXU RL	RF 50 Ω	DC	CORREC	SEN	ISE:INT	#Avg Typ	ALIGN AUTO		M Sep 16, 2021	Fr	equency
PASS			PNO: Wide ↔ IFGain:Low	Trig: Free #Atten: 36				TY D			
10 dB/div	Ref 25.00 (dBm					Mk	r1 823.9 -25.	975 MHz 79 dBm		Auto Tune
Log Trace	1 Pass									c	enter Freq
15.0										824	.000000 MHz
5.00						wanne	·····	m			
-5.00										811	Start Free .500000 MH;
-5.00											
-15.0											Stop Free
-25.0					<u></u>					836	.500000 MH:
-35.0			m	~ ~)	my a		CF Step
		~~~~	~	hand a					6.00 4	2 <u>Auto</u>	.500000 MH: Mar
-45.0	m M	<u> </u>									
-55.0											Freq Offset
-65.0											
											Scale Type
Center 824.								Span 2		Log	Lir
#Res BW 10	JU KHZ		#VBW	300 kHz					(1001 pts)		
ISG							STATUS				

Plot 7-80. Lower Band Edge Plot (NR Band n5 – 10.0MHz - Full RB)



Plot 7-81. Upper Band Edge Plot (NR Band n5 – 10.0MHz - Full RB)

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🚾 Keysight Spectrum Analyzer - Swept SA 👘					
XVIRL RF 50Ω DC	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	09:32:55 PM Sep 16, 2021 TRACE 1 2 3 4 5 6	Frequency
PASS		rig: Free Run Atten: 36 dB		DET A P N N N N	
10 dB/div Ref 25.00 dBm			Mkr1	823.987 5 MHz -20.81 dBm	Auto Tune
Trace 1 Pass		Ĭ			Center Freq
15.0					824.000000 MHz
5.00				~~~~	
					Start Fred 817.750000 MHz
-5.00					817.750000 MHz
-15.0		/			Stop Free
		2		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	830.250000 MH:
-35.0	~~~~			hor	CF Step
					1.250000 MH Auto Mar
-45.0					
-55.0					Freq Offse
					0 Ha
-65.0					Scale Type
Center 824.000 MHz #Res BW 100 kHz	#VBW 30	0 kHz	Sweep 7	Span 12.50 MHz 1.000 ms (1001 pts)	
MSG			STATU		

Plot 7-82. Lower Band Edge Plot (NR Band n5 – 5.0MHz - Full RB)



Plot 7-83. Upper Band Edge Plot (NR Band n5 – 5.0MHz - Full RB)

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#### 7.5 Uplink Carrier Aggregation §27.53(m)

#### Test Overview

The EUT is set up to transmit two contiguous LTE channels. The power level of both carriers 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 its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

#### **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 at least 10 * the fundamental frequency (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 7-4. Test Instrument & Measurement Setup

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- 1. Conducted power and spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. Channel bandwidth data is shown in the tables below based only on the channel bandwidths that were supported in this device. The worst case (highest) powers were found while operating with QPSK modulation with both carriers set to transmit using 1RB.
- 2. Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.
- 3. Conducted power measurements are also evaluated for simultaneous transmission of two NR FR1 carriers operating in different bands (interband NR FR1 ULCA). The powers were investigated while both bands are operating at their widest supported channel bandwidth.

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# **Uplink CA Configuration 5B**

Power	Band	Bandwidth	PCC					scc				ULCA Tx.			
State Band (PCC + SC	(PCC + SCC)	Modulation	UL Channel	UL Frequency	UL # RB	UL RB Offset	Modulation	UL Channel	UL Frequency	UL # RB	UL RB Offset	Power [dBm]			
		20450	829.0	1	49		20549	838.9	1	0	24.74				
			QPSK	20475	831.5	1	49	QPSK	20574	841.4	1	0	24.67		
				20600	844.0	1	0		20501	834.1	1	49	24.82		
Max	LTE B5	10MHz + 10MHz	QPSK	20600	844	50	0	QPSK	20501	834.1	50	0	23.07		
			16-QAM	20600	844	50	0	16-QAM	20501	834.1	50	0	22.06		
					64-QAM	20600	844	50	0	64-QAM	20501	834.1	50	0	21.96
		256-QAM	20600	844	50	0	256-QAM	20501	834.1	50	0	20.03			

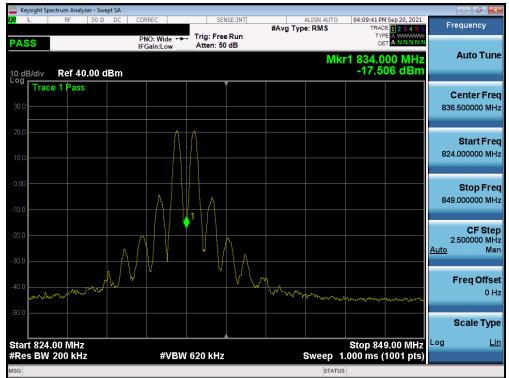
Table 7-2. Conducted Powers (5B)

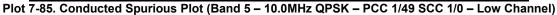
🔤 Keysight Spe		zer - Swep	it SA										
XI RL	RF	50 Ω	AC	CORREC		SEN	ISE:INT	#Avg Typ	ALIGN AUTO		AM Sep 17, 2021	F	requency
PASS				PNO: Fa	ast ⊶⊶	Trig: Free Atten: 30		• ,,		T) [	PET A WAWWAW		
				II Gam.E						<u> Mkr1 823</u>	.00 MHz		Auto Tune
10 dB/div	Ref 20	.00 di	Зm							-59.8	373 dBm		
Log Trace	e 1 Pass												Center Freq
10.0													6.500000 MHz
0.00													Start Freq
-10.0												3	0.000000 MHz
-10.0													
-20.0													Stop Freq
												82	3.000000 MHz
-30.0													
-40.0													CF Step
40.0												79 Auto	9.300000 MHz Man
-50.0													
											1		Freq Offset
-60.0											Ť		0 Hz
-70.0	and the second second			and the second			finite and states of states				and a second		
													Scale Type
Start 30.0	MHz									Ston	823.0 MHz	Log	Lin
#Res BW		z		#	¢VBW	300 kHz		s	weep	38.06 ms (	15861 pts)		
MSG									STA	TUS			

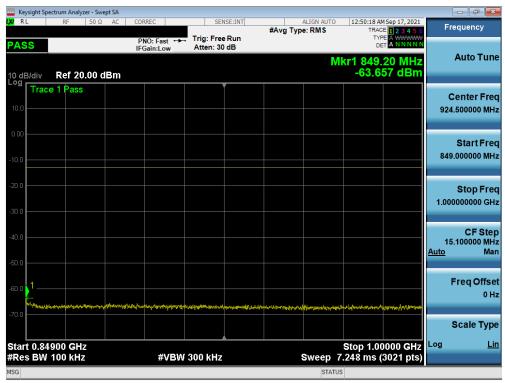
Plot 7-84. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/49 SCC 1/0 – Low Channel)

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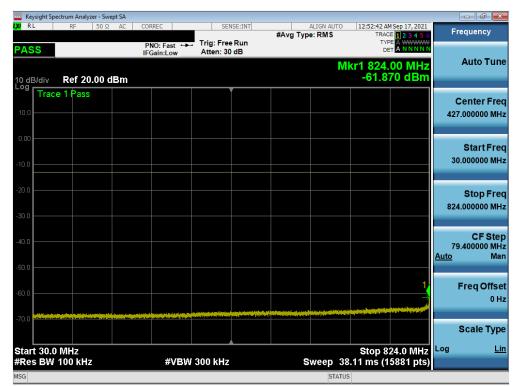
Plot 7-86. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/49 SCC 1/0 – Low Channel)

FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager		
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	rum Analyzer - S										
X/RL	RF 50	Ω AC	CORREC		ISE:INT	#Avg Typ	ALIGN AUT e: RMS	TRA	M Sep 17, 2021	Fr	equency
PASS			PNO: Fast ++ IFGain:Low	Atten: 36				TY D	PE A WWWWW ET A N N N N N		
								Mkr1 9.97 -41.8	4 0 GHz		Auto Tune
Log	Ref 25.00	dBm						-41.8	80 aBm		
Trace	1 Pass									c	enter Freq
15.0										5.50	0000000 GHz
5.00											
5.00											Start Freq
-5.00										1.00	0000000 GHz
-15.0											Stop Freq
-25.0										10.00	0000000 GHz
											CF Step
-35.0									1		.000000 MHz
-45.0								and the second state of th		<u>Auto</u>	Man
	and the second sec										
-55.0											Freq Offset 0 Hz
											0112
-65.0											Scale Type
										Log	Lin
Start 1.000 #Res BW 1			#VBW	/ 3.0 MHz		s	weep	Stop 10 15.60 ms (1	.000 GHz 8001 pts)	LUg	
ISG								ATUS	oo ah paoy		

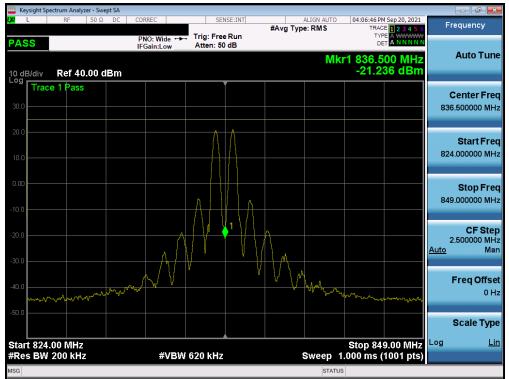
Plot 7-87. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - PCC 1/49 SCC 1/0 - Low Channel)



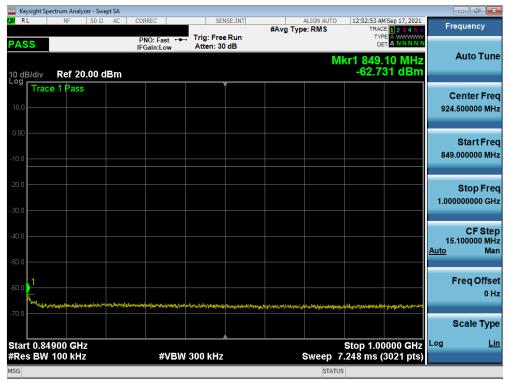
Plot 7-88. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/49 SCC 1/0 – Mid Channel)

FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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Plot 7-89. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - PCC 1/49 SCC 1/0 - Mid Channel)



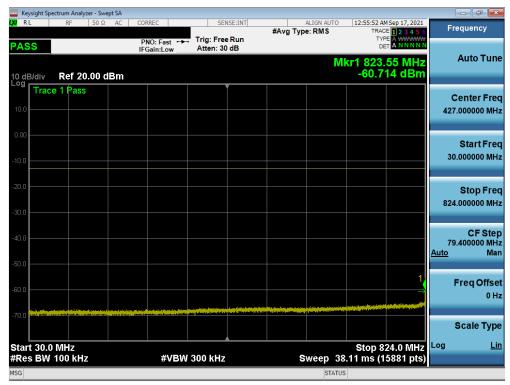
Plot 7-90. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/49 SCC 1/0 – Mid Channel)

FCC ID: A3LSMS906U	Proud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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	ectrum Analyz	er - Swep	ot SA										×
XI RL	RF	50 Ω	AC	CORREC			VSE:INT	#Avg Typ	ALIGN AUT		46 AM Sep 17, 2021 TRACE 1 2 3 4 5 6	Frequency	у
PASS				PNO: F IFGain:	ast ↔ Low	Trig: Free Atten: 36							
10 dB/div	Ref 25	.00 dl	Bm							41 Mkr1 41-	970 5 GHz .922 dBm	Auto T	une
Log Trace	e 1 Pass					,						Center	Freq
15.0												5.50000000	GHz
5.00												Start	Frec
5.00												1.000000000	) GHz
15.0												Stop I	Fred
-25.0												10.000000000	
												CFS	Ster
35.0											ł	900.000000 <u>Auto</u>	MH: Mar
-45.0	a la carrente	-	******	-		يعتقليه فتتجنبه				chan a chan			
-55.0												Freq Of	ffset 0 Hz
.65.0													
												Scale 1	
Start 1.00 #Res BW					#\/R\M	3.0 MHz		_	ween	Stop	10.000 GHz (18001 pts)	Log	Lin
ANG SI DAV	The Initia					0.0 10112				ATUS	(Hotor pts)		

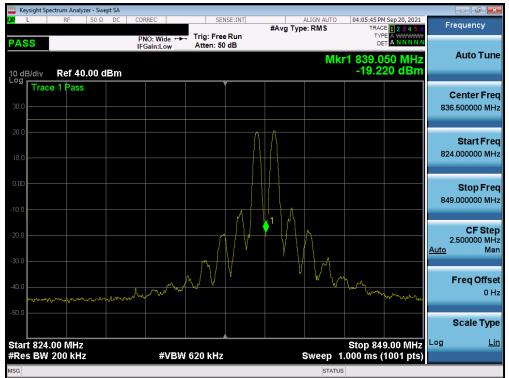
Plot 7-91. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/49 SCC 1/0 – Mid Channel)



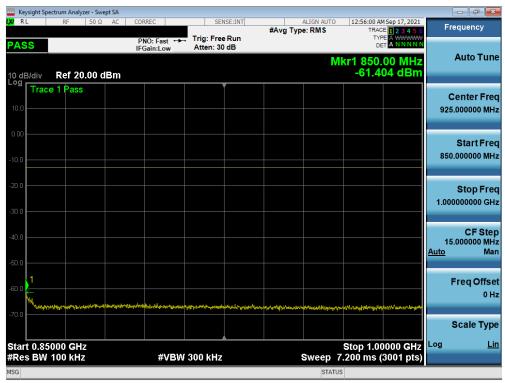
Plot 7-92. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/0 SCC 1/49 – High Channel)

FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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Plot 7-94. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/0 SCC 1/49 – High Channel)

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🔤 Keysight Spectru		vept SA									
X/RL	RF 50 Ω	2 AC	CORREC		ISE:INT	#Avg Typ	ALIGN AUT e: RMS	TRA	M Sep 17, 2021	Fr	equency
PASS			PNO: Fast ↔ IFGain:Low	Trig: Free Atten: 36				TY D	PE A WWWWW ET A NNNNN		
							N	/kr1 9.97	2 0 GHz		Auto Tune
10 dB/div R	lef 25.00	dBm						-41.6	59 dBm		
Trace 1	Pass									c	enter Freq
15.0											0000000 GHz
5.00											
5.00											Start Freq
-5.00										1.00	0000000 GHz
-15.0											Stop Freq
-25.0										10.00	0000000 GHz
											05.044
-35.0									1	900	CF Step .000000 MHz
-45.0								-		<u>Auto</u>	Man
-45.0											
-55.0											Freq Offset 0 Hz
											0112
-65.0											Scale Type
										Log	
Start 1.000 ( #Res BW 1.(			#VB	V 3.0 MHz		s	weep	Stop 10 15.60 ms (1	.000 GHz 8001 pts)	Log	Lin
MSG								TUS	pto/		

Plot 7-95. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/0 SCC 1/49 – High Channel)



Plot 7-96. Lower Band Edge Plot (Band 5 QPSK – PCC:10 MHz SCC:10 MHz – Full RB)

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	Spectrum Analy	zer - Swep	t SA										- 6 <b>-</b>
RL	RF	50 Ω	AC	CORREC		SET		#Avg Typ	ALIGN AUTO	TRAC	M Sep 17, 2021	Fr	equency
O dB/div	Ref 25	.00 dE		PNO: Fa IFGain:L		#Atten: 3			N	lkr1 849	.00 MHz 84 dBm		Auto Tun
og Tra	ce 1 Pass												enter Fre .000000 MH
5.00		nnuhn	~~~w~~~~		and and a	Lo lo along						824	Start Fre .000000 M⊦
25.0							1					874	Stop Fre .000000 MH
5.0	Mund						M. M. M.					5 <u>Auto</u>	CF Ste .000000 MI Ma
5.0								- vr	mm	Mmm	annorma		Freq Offs 0 H
i5.0										0			Scale Typ L
	349.00 MH V 200 kHz			#	VBW	680 kHz			Sweep	span s 1.000 ms (	0.00 MHz (1001 pts)	209	<u> </u>
G									STATU				

Plot 7-97. Upper Band Edge Plot (Band 5 QPSK – PCC:10 MHz SCC:10 MHz – Full RB)

FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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# Uplink CA Configuration n5 – n77

PCC Band	PCC Bandwidth [MHz]	PCC (UL) channel	PCC (UL) channel	PCC (UL) frequency	Mod.	PCC UL RB#/Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) channel	SCC (UL) channel	SCC (UL) frequency	Mod.	SCC UL RB#/Offset	PCC Conducted Power [dBm]	SCC Conducted Power [dBm]	Inter-Band ULCA Total Tx. Power (dBm)
					π/2 BPSK	1/53						π/2 BPSK	1/137	19.82	21.18	23.56
					QPSK	100/0						QPSK	270/0	19.68	20.80	23.29
		Low	166800	834.0	QPSK	1/26			Low	633333	3500.0	QPSK	1/68	19.91	20.91	23.45
		LOW	100000	034.0	QPSK	1/53			LOW	033333	3300.0	QPSK	1/137	19.88	21.01	23.49
					QPSK	1/79						QPSK	1/205	19.91	21.20	23.61
					16Q	1/53						16Q	1/137	19.77	21.09	23.49
				π/2 BPSK	1/79						π/2 BPSK	1/205	19.81	21.42	23.70	
					QPSK	100/0						QPSK	270 / 0	19.75	20.71	23.27
n5	20	Mid	167300	836.5	QPSK	1/26	n77	100	Mid	633333	3500.0	QPSK	1/68	19.89	20.90	23.43
	20		10/000	000.0	QPSK	1/53		100		000000		QPSK	1/137	19.75	21.11	23.49
					QPSK	1/79						QPSK	1/205	19.73	21.17	23.52
					16Q	1/79						16Q	1/205	19.69	21.29	23.57
					π/2 BPSK	1/79						π/2 BPSK	1/205	19.74	21.27	23.58
					QPSK	100/0						QPSK	270/0	19.68	20.79	23.28
	High 16780	167800	839.0	QPSK	1/26			High	633333	3500.0	QPSK	1/68	19.55	20.88	23.28	
				QPSK	1/53					222010	QPSK	1/137	19.71	21.09	23.46	
			i E	QPSK	1/79						QPSK	1/205	19.70	21.22	23.54	
					16Q	1/79						16Q	1/205	19.64	21.16	23.48

Table 7-3. Conducted Powers (5B)

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## 7.6 Radiated Power (ERP)

#### 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. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

#### Test Procedures Used

KDB 971168 D01 v03r01 - Section 5.2.1

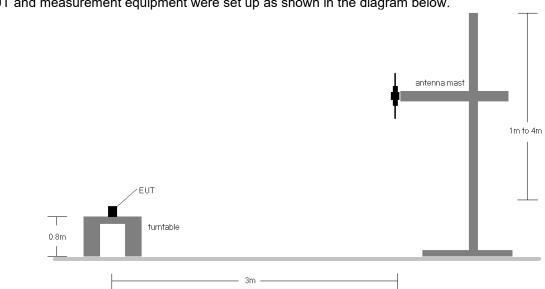
ANSI/TIA-603-E-2016 - Section 2.2.17

#### Test Settings

- 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  $\ge$  3 x RBW
- 4. Span = 1.5 times the OBW
- 5. No. of sweep points  $\geq$  2 x span / RBW
- 6. Detector = RMS
- 7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto". Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration
- 8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power
- 9. Trace mode = trace averaging (RMS) over 100 sweeps
- 10. The trace was allowed to stabilize

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

Figure 7-5. Radiated Test Setup <1GHz

#### **Test Notes**

- 1) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest powers is reported in GPRS mode while transmitting with one slot active.
- This device employs UMTS technology with WCDMA (AMR/RMC) and HSDPA capabilities. The EUT was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA Inactive at 12.2 kbps RMC and TPC bits all set to "1".
- 3) 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.
- 4) This unit was tested with its standard battery.
- 5) For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) 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.

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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 [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
824.2	GPRS850	V	135	299	21.75	6.13	25.73	0.374	38.45	-12.72	27.88	0.614	40.61	-12.73
836.6	GPRS850	V	141	277	22.13	6.18	26.16	0.413	38.45	-12.29	28.31	0.678	40.61	-12.30
848.8	GPRS850	V	143	257	21.69	6.41	25.95	0.393	38.45	-12.51	28.10	0.645	40.61	-12.51
836.6	GPRS850	Н	201	284	20.22	6.74	24.81	0.303	38.45	-13.64	26.96	0.497	40.61	-13.65
836.6	EDGE850	V	141	277	16.63	6.18	20.66	0.116	38.45	-17.79	22.81	0.191	40.61	-17.80
836.6	GPRS850 (WCP)	V	143	237	15.99	6.18	20.02	0.100	38.45	-18.43	22.17	0.165	40.61	-18.44

#### Table 7-4. ERP Data (GPRS Cell)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
826.4	WCDMA850	V	137	284	15.45	6.07	19.37	0.087	38.45	-19.08	21.52	0.142	40.61	-19.08
836.6	WCDMA850	٧	148	288	15.23	6.18	19.26	0.084	38.45	-19.19	21.41	0.138	40.61	-19.20
846.6	WCDMA850	V	151	284	15.65	6.38	19.88	0.097	38.45	-18.57	22.03	0.160	40.61	-18.57
846.6	WCDMA850	Н	209	293	13.43	6.78	18.06	0.064	38.45	-20.39	20.21	0.105	40.61	-20.39
846.6	WCDMA850 (WCP)	V	137	303	12.86	6.38	17.09	0.051	38.45	-21.36	19.24	0.084	40.61	-21.36

#### Table 7-5. ERP Data (WCDMA Cell)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	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]
15MHz	QPSK	831.5	v	144	235	6.13	1/74	14.56	18.54	0.071	38.45	-19.91	20.69	0.117	40.61
(Band 26	QPSK	836.5	V	142	246	6.18	1/74	14.57	18.60	0.072	38.45	-19.85	20.75	0.119	40.61
	QPSK	841.5	V	136	240	6.33	1/0	14.53	18.71	0.074	38.45	-19.74	20.86	0.122	40.61
only)	16-QAM	841.5	V	136	240	6.33	1/0	13.54	17.72	0.059	38.45	-20.73	19.87	0.097	40.61
	QPSK	829.0	V	144	235	6.10	1/49	14.66	18.61	0.073	38.45	-19.84	20.76	0.119	40.61
10 MHz	QPSK	836.5	V	142	246	6.18	1/0	14.70	18.73	0.075	38.45	-19.72	20.88	0.122	40.61
10 MHZ	QPSK	844.0	V	136	240	6.36	1/25	14.64	18.85	0.077	38,45	-19.61	21.00	0.126	40,61
	16-QAM	829.0	V	144	235	6.10	1/49	14.18	18.13	0.065	38.45	-20 32	20.28	0.107	40.61
	QPSK	826.5	V	144	235	6.07	1/12	14.85	18.77	0.075	38.45	-19.68	20.92	0.124	40.61
5 MHz	QPSK	836.5	V	142	246	6.18	1/12	14.90	18.92	0.078	38.45	-19.53	21.07	0.128	40.61
5 MILZ	QPSK	846.5	V	136	240	6.38	1/0	14.56	18.79	0.076	38.45	-19.66	20.94	0.124	40.61
	16-QAM	826.5	V	144	235	6.07	1/12	14.25	18.18	0.066	38.45	-20.27	20.33	0.108	40.61
	QPSK	825.5	V	144	235	6.06	1/0	14.81	18.73	0.075	38.45	-19.72	20.88	0.122	40.61
3 MHz	QPSK	836.5	V	142	246	6.18	1/14	14.73	18.76	0.075	38.45	-19.69	20.91	0.123	40.61
3 MITZ	QPSK	847.5	V	136	240	6.39	1/14	14.71	18.95	0.079	38.45	-19.50	21.10	0.129	40.61
	16-QAM	825.5	V	144	235	6.06	1/0	14.00	17.92	0.062	38.45	-20.53	20.07	0.102	40.61
	QPSK	824.7	V	144	235	6.09	1/5	14.71	18.65	0.073	38.45	-19.80	20.80	0.120	40.61
1.4 MHz	QPSK	836.5	V	142	246	6.18	1/3	14.80	18.83	0.076	38.45	-19.62	20.98	0.125	40.61
1.4 MHZ	QPSK	848.3	V	136	240	6.40	1/0	14.65	18.90	0.078	38.45	-19.55	21.05	0.127	40.61
	16-QAM	824.7	V	144	235	6.09	1/5	14.16	18.09	0.064	38.45	-20.36	20.24	0.106	40.61
15MHz	QPSK (Opposite Pol.)	841.5	н	202	151	6.18	1/3	11.89	15.92	0.039	38.45	-22.53	18.07	0.064	40.61
TEMHZ	QPSK (WCP)	841.5	V	136	259	6.18	1/0	10.56	14.59	0.029	38.45	-23.86	16.74	0.047	40.61

Table 7-6. ERP Data (LTE Band 26/5)

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Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	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]
-	TT/2 BPSK	834.0	V	139	234	6.15	1/79	15.71	19.71	0.094	38.45	-18.74	21.86	0.154	40.61
	TT/2 BPSK	836.5	V	151	230	6.18	1/53	15.72	19.75	0.094	38.45	-18.70	21.90	0.155	40.61
	TT/2 BPSK	839.0	V	147	257	6.30	1/53	15.94	20.09	0.102	38.45	-18.36	22.24	0.168	40.61
20 MHz	QPSK	834.0	V	139	234	6,15	1/79	15.60	19,60	0.091	38.45	-18.85	21.75	0.150	40,61
	QPSK	836.5	V	151	230	6.18	1/53	15.67	19.70	0.093	38.45	-18.75	21.85	0.153	40.61
	QPSK	839.0	V	147	257	6.30	1/53	15.84	19.99	0.100	38.45	-18.46	22.14	0.164	40.61
	16-QAM	839.0	V	147	257	6.30	1/53	15.08	19.23	0.084	38.45	-19.22	21.38	0 138	40.61
	TT/2 BPSK	831.5	V	139	234	6.13	1/20	15.91	19.88	0.097	38.45	-18.57	22.03	0.160	40.61
	TT/2 BPSK	836.5	V	151	230	6.18	1/20	15.75	19.78	0.095	38.45	-18.67	21.93	0.156	40.61
	TT/2 BPSK	841.5	V	147	257	6.33	1/58	15.74	19.92	0.098	38.45	-18.53	22.07	0.161	40.61
15 MHz	QPSK	831.5	V	139	234	6.13	1/20	15.58	19.56	0.090	38.45	-18.89	21.71	0.148	40.61
	QPSK	836.5	V	151	230	6.18	1/20	15.82	19.84	0.096	38.45	-18.61	21.99	0.158	40.61
	QPSK	841.5	V	147	257	6.33	1/58	15.73	19.91	0.098	38.45	-18.54	22.06	0.161	40.61
	16-QAM	836.5	V	151	230	6.18	1/20	15.11	19.13	0.082	38.45	-19.32	21.28	0.134	40.61
	TT/2 BPSK	829.0	V	139	234	6.10	1/13	15.68	19.63	0.092	38.45	-18.82	21.78	0.151	40.61
	TT/2 BPSK	836.5	V	151	230	6,18	1/26	15.61	19.64	0.092	38.45	-18.81	21.79	0.151	40.61
	TT/2 BPSK	844.0	V	147	257	6.36	1/13	15.68	19.88	0.097	38.45	-18.57	22.03	0.160	40.61
10 MHz	QPSK	829.0	V	139	234	6.10	1/13	15.53	19.48	0.089	38.45	-18.97	21.63	0.146	40.61
	QPSK	836.5	V	151	230	6.18	1/26	15.54	19.56	0.090	38.45	-18.89	21.71	0 148	40.61
	QPSK	844.0	V	147	257	6.36	1/13	15.60	19.80	0.096	38.45	-18.65	21.95	0.157	40.61
	16-QAM	844.0	V	147	257	6.36	1 / 13	15.01	19.22	0.083	38.45	-19.24	21.37	0.137	40.61
	TT/2 BPSK	829.0	V	139	234	6.07	1/12	15.63	19.55	0.090	38.45	-18.90	21.70	0.148	40.61
	TT/2 BPSK	836.5	V	151	230	6.18	1/18	15.69	19.72	0.094	38.45	-18.73	21.87	0.154	40.61
	TT/2 BPSK	844.0	V	147	257	6.38	1/6	15.61	19.84	0.096	38.45	-18.61	21.99	0.158	40.61
5 MHz	QPSK	829.0	V	139	234	6.07	1/12	15.55	19.47	0.088	38.45	-18.98	21.62	0.145	40.61
	QPSK	836.5	V	151	230	6.18	1/18	15.53	19.56	0.090	38.45	-18.89	21.71	0.148	40.61
	QPSK	844.0	V	147	257	6.38	1/6	15.71	19.95	0.099	38.45	-18.50	22.10	0.162	40.61
	16-QAM	836.5	V	151	230	6.18	1/18	15.31	19.34	0.086	38.45	-19.11	21.49	0.141	40.61
	QPSK (CP-OFDM)	839.0	V	145	239	6.30	1/53	14.10	18.25	0.067	38.45	-20.20	20.40	0.110	40.61
20 MHz	BPSK (Opposite Pol.)	839.0	н	138	286	6.80	1/26	13.86	18.51	0.071	38.45	-19.94	20.66	0.117	40.61
	BPSK (WCP)	839.0	V	131	333	6.30	1/79	13.37	17.52	0.057	38.45	-20.93	19.67	0.093	40.61

Table 7-7. ERP Data (NR Band n5)

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## 7.7 Radiated Spurious Emissions Measurements

### **Test Overview**

Radiated spurious emissions measurements are performed using the field strength conversion method described in KDB 971168 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 RMS measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

#### **Test Procedures Used**

KDB 971168 D01 v03r01 - Section 5.8

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

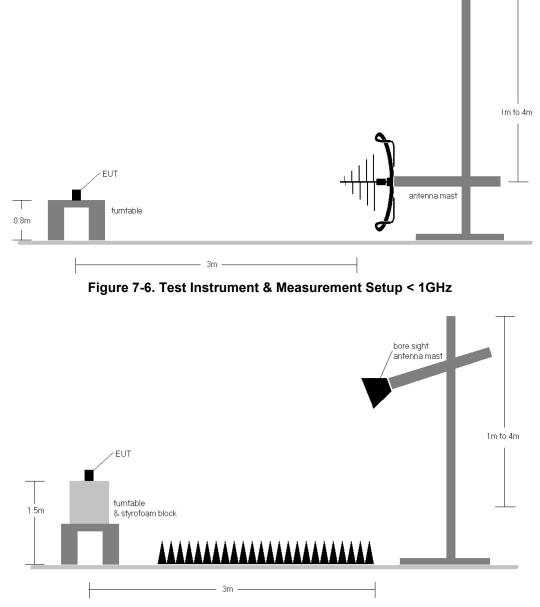


Figure 7-7. Test Instrument & Measurement Setup >1 GHz

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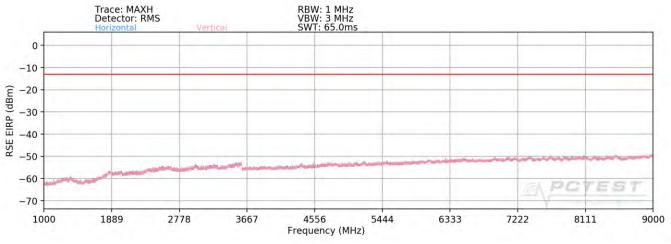


- Field strengths are calculated using the Measurement quantity conversions in KDB 971168 Section 5.8.4.
  a) E(dBµV/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m)
  b) EIRP (dBm) = E(dBµV/m) + 20logD 104.8; where D is the measurement distance in meters.
- 2) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest powers is reported in GPRS mode while transmitting with one slot active.
- 3) This device employs UMTS technology with WCDMA (AMR/RMC) and HSDPA capabilities. The EUT was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA Inactive at 12.2 kbps RMC and TPC bits all set to "1".
- 4) 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.
- 5) This unit was tested with its standard battery.
- 6) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 7) 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.
- 8) The "-" shown in the following RSE tables are used to denote a noise floor measurement.
- 9) ULCA spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. Channel bandwidth data is shown in the tables below based only on the channel bandwidths that were supported in this device.
- 10) For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) 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.
- 11) Spurious emissions shown in this section are measured while operating in EN-DC mode with Sub 6GHz NR carrier as well as an LTE carrier (anchor). Spurious emissions from the NR carrier device, is subject to the rules under which the NR carrier operates. Spurious emission caused by the LTE carrier must meet the requirements of the rules under which the LTE carrier operates.
- 12) Spurious emissions measurements are included in this section to address compliance of the NR FR1 ULCA capability. The EUT was set to transmit at the widest bandwidth and on the middle channel of each band.

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# GSM/GPRS Cell



### Plot 7-98. Radiated Spurious Plot (GPRS Cell)

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]
1648.40	V	-	-	-70.60	-2.27	34.13	-61.13	-13.00	-48.13
2472.60	V	206.00	222.00	-67.63	1.97	41.34	-53.91	-13.00	-40.91
3296.80	V	-	-	-72.59	3.13	37.54	-57.72	-13.00	-44.72
4121.00	V	-	-	-75.98	4.32	35.34	-59.92	-13.00	-46.92
4945.20	V	-	-	-77.02	5.42	35.40	-59.85	-13.00	-46.85
5769.40	V	-	-	-78.13	7.01	35.88	-59.37	-13.00	-46.37

Table 7-8. Radiated Spurious Data (GPRS Cell – Low Channel)

Mode:	GPRS 1 Tx Slot
Channel:	190
Frequency (MHz):	836.6

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]
1673.20	V	-	-	-71.86	-2.16	32.98	-62.28	-13.00	-49.28
2509.80	V	-	-	-71.53	2.23	37.70	-57.56	-13.00	-44.56
3346.40	V	-	-	-71.95	3.26	38.31	-56.95	-13.00	-43.95
4183.00	V	-	-	-76.11	4.45	35.34	-59.92	-13.00	-46.92
5019.60	V	-	-	-77.34	5.89	35.55	-59.71	-13.00	-46.71

Table 7-9. Radiated Spurious Data (GPRS Cell – Mid Channel)

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Mode:	GPRS 1 Tx Slot
Channel:	251
Frequency (MHz):	848.8

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]
1697.60	V	275.00	20.00	-70.32	-1.51	35.17	-60.09	-13.00	-47.09
2546.40	V	170.00	272.00	-68.24	2.63	41.39	-53.87	-13.00	-40.87
3395.20	V	-	-	-72.47	2.97	37.50	-57.75	-13.00	-44.75
4244.00	V	-	-	-75.77	4.19	35.42	-59.83	-13.00	-46.83
5092.80	V	-	-	-77.29	6.01	35.72	-59.53	-13.00	-46.53
5941.60	V	-	-	-77.63	7.39	36.76	-58.49	-13.00	-45.49

### Table 7-10. Radiated Spurious Data (GPRS Cell – High Channel)

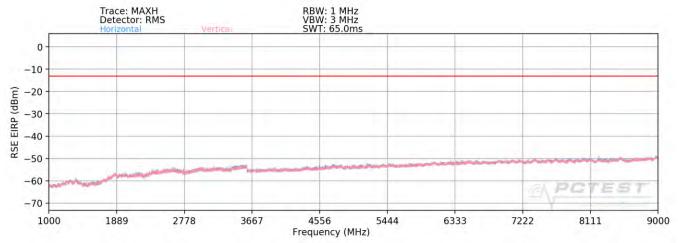
Case:	w/ Wireless Charging Pad
Mode:	GPRS 1 Tx Slot
Channel:	251
Frequency (MHz):	848.8

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]
1697.60	V	240.00	84.00	-70.96	-1.51	34.53	-60.73	-13.00	-47.73
2546.40	V	235.00	87.00	-71.81	2.63	37.82	-57.44	-13.00	-44.44
3395.20	V	-	-	-72.93	2.97	37.04	-58.21	-13.00	-45.21
4244.00	V	-	-	-76.01	4.19	35.18	-60.07	-13.00	-47.07
5092.80	V	-	-	-77.15	6.01	35.86	-59.39	-13.00	-46.39
5941.60	V	-	-	-77.83	7.39	36.56	-58.69	-13.00	-45.69

Table 7-11. Radiated Spurious Data with WCP (GPRS Cell)

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Plot 7-99. Radiated Spurious Plot (WCDMA Cell)

Mode:	WCDMA RMC
Channel:	4132
Frequency (MHz):	826.4

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]
1652.80	V	-	-	-76.76	-2.27	27.97	-67.29	-13.00	-54.29
2479.20	V	-	-	-77.26	1.95	31.69	-63.57	-13.00	-50.57
3305.60	V	-	-	-78.00	3.09	32.09	-63.17	-13.00	-50.17
4132.00	V	-	-	-77.81	4.27	33.46	-61.80	-13.00	-48.80
4958.40	V	-	-	-78.90	5.35	33.45	-61.80	-13.00	-48.80

Table 7-12. Radiated Spurious Data (WCDMA Cell – Low Channel)

Mode:	WCDMA RMC
Channel:	4183
Frequency (MHz):	836.6

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]
1673.20	V	-	-	-77.17	-2.16	27.67	-67.59	-13.00	-54.59
2509.80	V	-	-	-77.34	2.23	31.89	-63.37	-13.00	-50.37
3346.40	V	-	-	-77.71	3.26	32.55	-62.71	-13.00	-49.71
4183.00	V	-	-	-78.33	4.45	33.12	-62.14	-13.00	-49.14
5019.60	V	-	-	-79.15	5.89	33.74	-61.52	-13.00	-48.52

Table 7-13. Radiated Spurious Data (WCDMA Cell – Mid Channel)

FCC ID: A3LSMS906U	PCTEST Proud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
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Mode:	WCDMA RMC			
Channel:	4233			
Frequency (MHz):	846.6			

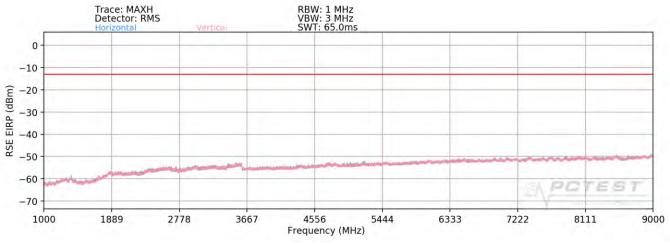
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1693.20	V	-	-	-77.15	-1.65	28.20	-67.06	-13.00	-54.06
2539.80	V	-	-	-77.86	2.57	31.71	-63.55	-13.00	-50.55
3386.40	V	-	-	-77.94	2.99	32.05	-63.21	-13.00	-50.21
4233.00	V	-	-	-77.78	4.07	33.29	-61.97	-13.00	-48.97
5079.60	V	-	-	-78.98	5.93	33.95	-61.31	-13.00	-48.31

Table 7-14. Radiated Spurious Data (WCDMA Cell – High Channel)

FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
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# LTE Band 26



### Plot 7-100. Radiated Spurious Plot (LTE Band 26)

15	Bandwidth (MHz):
831.5	Frequency (MHz):
1/37	RB / Offset:
1 / 37	RB / Offset:

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]
1663.00	Н	-	-	-76.46	-2.30	28.24	-67.02	-13.00	-54.02
2494.50	Н	-	-	-76.67	2.01	32.34	-62.92	-13.00	-49.92
3326.00	Н	-	-	-77.24	3.15	32.91	-62.34	-13.00	-49.34
4157.50	Н	-	-	-77.58	4.26	33.68	-61.57	-13.00	-48.57

### Table 7-15. Radiated Spurious Data (LTE Band 26 – Low Channel)

Bandwidth (MHz):	15
Frequency (MHz):	836.5
RB / Offset:	1/37

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]
1673.00	Н	-	-	-76.62	-2.16	28.22	-67.04	-13.00	-54.04
2509.50	Н	-	-	-76.76	2.23	32.47	-62.79	-13.00	-49.79
3346.00	Н	-	-	-77.28	3.26	32.98	-62.28	-13.00	-49.28
4182.50	Н	-	-	-77.98	4.46	33.48	-61.78	-13.00	-48.78

Table 7-16. Radiated Spurious Data (LTE Band 26 – Mid Channel)

FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 92 of 07	
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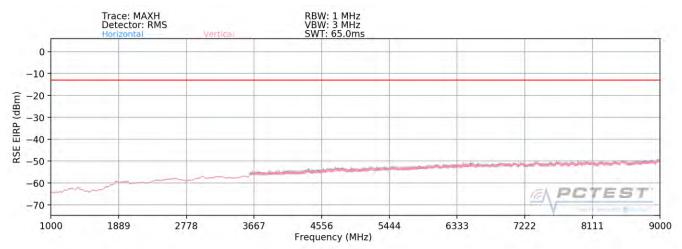
Bandwidth (MHz):	15
Frequency (MHz):	841.5
RB / Offset:	1 / 37

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]
1683.00	Н	-	-	-76.79	-1.92	28.29	-66.96	-13.00	-53.96
2524.50	Н	-	-	-76.90	2.51	32.61	-62.65	-13.00	-49.65
3366.00	Н	-	-	-77.15	3.16	33.01	-62.25	-13.00	-49.25
4207.50	Н	-	-	-77.47	4.17	33.70	-61.56	-13.00	-48.56

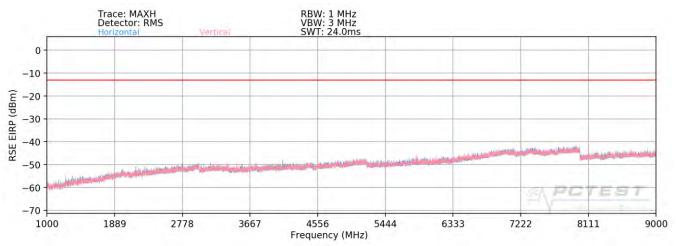
Table 7-17. Radiated Spurious Data (LTE Band 26 – High Channel)

FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 92 of 07
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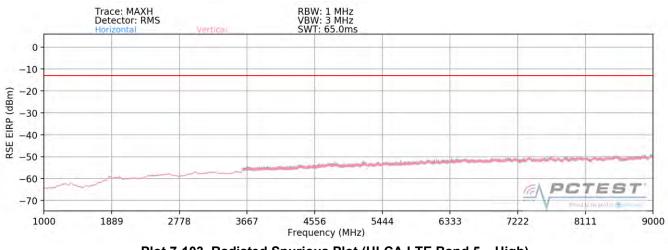












### Plot 7-103. Radiated Spurious Plot (ULCA LTE Band 5 - High)

FCC ID: A3LSMS906U	Protest @element	PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	EUT Type:		
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10
829.0
1 / 49
10
838.9
1 / 0

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]
1658.00	V	-	-	-76.87	1.45	31.58	-63.68	-13.00	-50.68
2487.00	V	-	-	-77.85	5.40	34.55	-60.70	-13.00	-47.70
3316.00	V	-	-	-78.48	6.74	35.26	-60.00	-13.00	-47.00
4145.00	V	-	-	-78.77	8.01	36.24	-59.02	-13.00	-46.02

### Table 7-18. Radiated Spurious Data (ULCA LTE Band 5 – Low Channel)

PCC Bandwidth (MHz):	10
PCC Frequency (MHz):	831.5
PCC RB / Offset:	1 / 49
SCC Bandwidth (MHz):	10
SCC Frequency (MHz):	841.4
SCC RB / Offset:	1/0

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]
1663.00	V	-	-	-76.34	1.53	32.19	-63.07	-13.00	-50.07
2494.50	V	-	-	-77.84	5.44	34.60	-60.66	-13.00	-47.66
3326.00	V	-	-	-78.32	6.81	35.49	-59.77	-13.00	-46.77
4157.50	V	-	-	-78.86	7.83	35.97	-59.29	-13.00	-46.29

Table 7-19. Radiated Spurious Data (ULCA LTE Band 5 – Mid Channel)

PCC Bandwidth (MHz):	10
PCC Frequency (MHz):	844.0
PCC RB / Offset:	1/0
SCC Bandwidth (MHz):	10
SCC Frequency (MHz):	834.1
SCC RB / Offset:	1 / 49

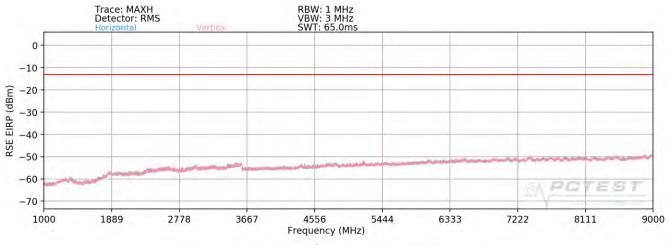
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1688.00	V	-	-	-77.16	1.72	31.56	-63.70	-13.00	-50.70
2532.00	V	-	-	-77.78	5.21	34.43	-60.83	-13.00	-47.83
3376.00	V	-	-	-78.44	7.30	35.86	-59.40	-13.00	-46.40
4220.00	V	-	-	-78.41	7.29	35.88	-59.38	-13.00	-46.38

### Table 7-20. Radiated Spurious Data (ULCA LTE Band 5 – High Channel)

FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 85 of 97
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# NR Band n5



Plot 7-104. Radiated Spurious Plot (NR Band n5)

Bandwidth (MHz):	20			
Frequency (MHz):	834			
RB / Offset:	1 / 53			
Mode:	Stand Alone			

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]
1668.00	Н	-	-	-76.58	-2.27	28.15	-67.10	-13.00	-54.10
2502.00	Н	-	-	-76.76	2.15	32.39	-62.87	-13.00	-49.87
3336.00	Н	-	-	-77.31	3.27	32.96	-62.30	-13.00	-49.30
4170.00	Н	-	-	-77.87	4.36	33.49	-61.77	-13.00	-48.77

Table 7-21. Radiated Spurious Data (NR Band n5 – Low Channel)

Bandwidth (MHz):	20
Frequency (MHz):	836.5
RB / Offset:	1 / 53
Mode:	Stand Alone

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]
1673.00	Н	-	-	-76.59	-2.16	28.25	-67.01	-13.00	-54.01
2509.50	Н	-	-	-76.81	2.23	32.42	-62.84	-13.00	-49.84
3346.00	Н	-	-	-77.27	3.26	32.99	-62.27	-13.00	-49.27
4182.50	Н	-	-	-77.88	4.46	33.58	-61.68	-13.00	-48.68

Table 7-22. Radiated Spurious Data (NR Band n5 – Mid Channel)

FCC ID: A3LSMS906U	POLIEST. Proud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage %6 of 07	
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Bandwidth (MHz):	20
Frequency (MHz):	839
RB / Offset:	1 / 53
Mode:	Stand Alone

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]
1678.00	Н	-	-	-76.63	-2.04	28.33	-66.93	-13.00	-53.93
2517.00	Н	-	-	-76.87	2.41	32.54	-62.72	-13.00	-49.72
3356.00	Н	-	-	-77.44	3.22	32.78	-62.48	-13.00	-49.48
4195.00	Н	-	-	-77.70	4.31	33.61	-61.64	-13.00	-48.64

# Table 7-23. Radiated Spurious Data (NR Band n5 – High Channel)

w/ Wireless Charging Pad
20
836.5
1 / 53
Stand Alone
0

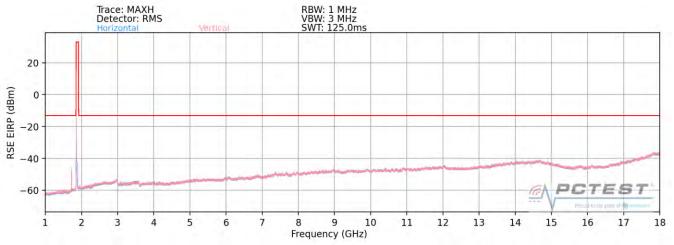
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.00	Н	-	-	-76.57	-2.16	28.27	-66.99	-13.00	-53.99
2509.50	Н	-	-	-76.78	2.23	32.45	-62.81	-13.00	-49.81
3346.00	Н	-	-	-77.32	3.26	32.94	-62.32	-13.00	-49.32
4182.50	Н	-	-	-77.86	4.46	33.60	-61.66	-13.00	-48.66

Table 7-24. Radiated Spurious Data with WCP (NR Band n5)

FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 87 of 97
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## NR Band n5 – B2





Bandwidth (MHz):	20 / 20
Frequency (MHz):	834 / 1880
RB / Offset:	1 / 53 & 1 / 50
Mode:	EN-DC
Anchor Band:	2

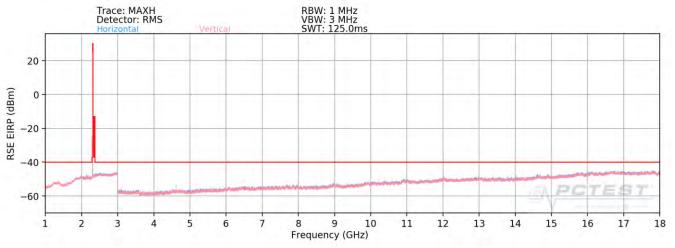
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
2502.1	Н	-	-	-66.45	-1.77	38.78	-56.48	-13.00	-43.48
3356.8	Н	-	-	-68.55	1.61	40.06	-55.20	-13.00	-42.20
5580.3	Н	-	-	-71.81	6.52	41.71	-53.54	-13.00	-40.54
7440.4	Н	-	-	-71.66	9.63	44.97	-50.29	-13.00	-37.29

Table 7-25. Radiated Spurious Data (NR Band n5 – B2)

FCC ID: A3LSMS906U	PCTEST* Proud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type: Portable Handset		Page 88 of 97
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## NR Band n5 – B30





20 / 10
836.5 / 2310
1 / 53 & 1 / 25
EN-DC
30

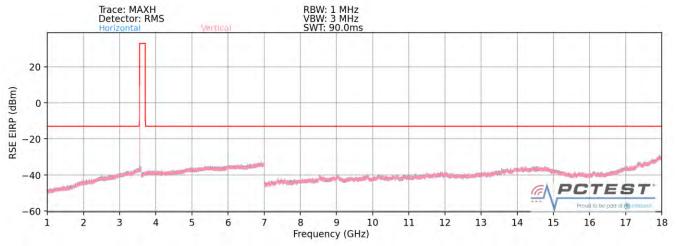
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1662.9	Н	-	-	-77.55	6.02	35.47	-59.79	-13.00	-46.79
2502.1	Н	-	-	-77.84	10.75	39.91	-55.35	-13.00	-42.35
3356.8	Н	-	-	-79.42	11.37	38.95	-56.31	-13.00	-43.31
4620.4	Н	-	-	-78.61	5.65	34.04	-61.22	-13.00	-48.22
6903.6	Н	-	-	-79.32	8.81	36.49	-58.77	-13.00	-45.77
9204.8	Н	-	-	-79.81	9.46	36.65	-58.61	-13.00	-45.61

Table 7-26. Radiated Spurious Data (NR Band n5 – B30)

FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 90 of 07
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## NR Band n5 – B48





Bandwidth (MHz):	20 / 20
Frequency (MHz):	836.5 / 3560
RB / Offset:	1 / 53 & 1 / 50
Mode:	EN-DC
Anchor Band:	48

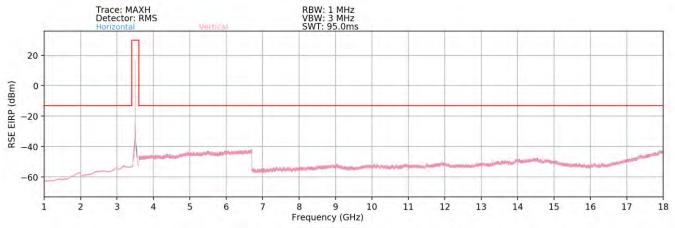
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1887.0	Н	-	-	-66.47	8.98	49.51	-45.75	-13.00	-32.75
3336.8	Н	-	-	-65.81	11.44	52.63	-42.63	-13.00	-29.63
4610.5	Н	-	-	-65.14	13.76	55.62	-39.64	-13.00	-26.64
7334.0	Н	-	-	-66.18	8.66	49.48	-45.78	-13.00	-32.78
11730.5	Н	-	-	-67.51	13.66	53.15	-42.11	-13.00	-29.11
14454.0	Н	-	-	-67.78	15.50	54.72	-40.54	-13.00	-27.54

Table 7-27. Radiated Spurious Data (NR Band n5 – B48)

FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dago 00 of 07
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## NR FR1 ULCA: NR n5 – n77





PCC Bandwidth (MHz):	20
PCC Frequency (MHz):	834.0
PCC RB / Offset:	1 / 53
SCC Bandwidth (MHz):	100
SCC Frequency (MHz):	3500.0
SCC RB / Offset:	1 / 135
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

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]
1832.01	V	-	-	-69.35	-3.37	34.28	-60.98	-13.00	-47.98
2666.00	V	-	-	-67.21	-0.86	38.93	-56.33	-13.00	-43.33
4334.00	V	-	-	-67.43	3.58	43.15	-52.11	-13.00	-39.11
5332.00	V	-	-	-71.09	5.78	41.69	-53.56	-13.00	-40.56
6836.00	V	-	-	-70.89	7.98	44.09	-51.16	-13.00	-38.16

Table 7-28. Radiated Spurious Data (NR Band n5 – n77)

FCC ID: A3LSMS906U	PCTEST. Proud to be part of @eletesent	PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dago 01 of 07	
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## 7.8 Frequency Stability / Temperature Variation

#### 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 and RSS-132, the frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5$  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

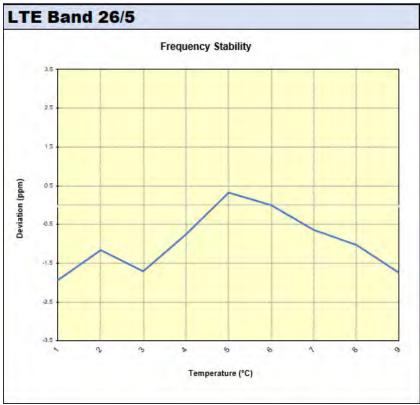
None

FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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LTE Band 26/5								
	Operating F	requency (Hz):	836,50	00,000	]			
	Ref.	Voltage (VDC):	4.	43				
		Deviation Limit:	± 0.00025%	or 2.5 ppm				
					-			
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)			
		- 30	836,501,335	-1,616	-0.0001932			
		- 20	836,501,973	-978	-0.0001169			
		- 10	836,501,524	-1,427	-0.0001706			
		0	836,502,309	-642	-0.0000767			
100 %	4.43	+ 10	836,503,228	277	0.0000331			
		+ 20 (Ref)	836,502,951	0	0.0000000			
		+ 30	836,502,413	-538	-0.0000643			
			836,502,094	-857	-0.0001025			
		+ 50	836,501,493	-1,458	-0.0001743			
Battery Endpoint	3.36	+ 20	836,502,551	-400	-0.0000478			

Table 7-29. LTE Band 26/5 Frequency Stability Data



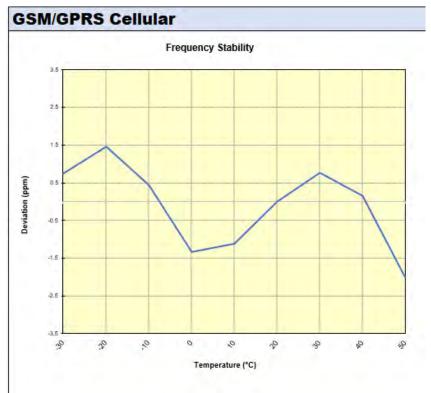
Plot 7-109. LTE Band 26/5 Frequency Stability Chart

FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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GSM/GPR	S Cellul	ar			
	Operating F	requency (Hz):	836,600,000	)	1
	Ref.	Voltage (VDC):	4.43		
		Deviation Limit:	± 0.00025% or 2.	5 ppm	
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
		- 30	836,604,380	631	0.0000754
		- 20	836,604,974	1,225	0.0001464
		- 10	836,604,113	364	0.0000435
		0	836,602,633	-1,116	-0.0001334
100 %	4.43	+ 10	836,602,811	-938	-0.0001122
		+ 20 (Ref)	836,603,749	0	0.0000000
		+ 30	836,604,389	639	0.0000764
		+ 40	836,603,875	126	0.0000151
		+ 50	836,602,074	-1,675	-0.0002002
Battery Endpoint	3.36	+ 20	836,603,582	-167	-0.0000199

Table 7-30. GSM/GPRS Cell Frequency Stability Data



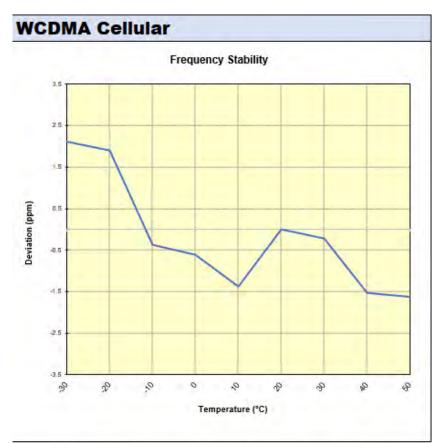
Plot 7-110. GSM/GPRS Cell Frequency Stability Chart

FCC ID: A3LSMS906U	PCTEST. Proud to be part of @element	PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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WCDMA (	Cellular				
	Operating F	requency (Hz):	836,60	00,000	]
	Ref.	Voltage (VDC):	4.	43	
		Deviation Limit:	± 0.00025%	or 2.5 ppm	
					•
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
		- 30	836,604,307	1,776	0.0002123
		- 20	836,604,126	1,596	0.0001907
		- 10	836,602,214	-317	-0.0000379
		0	836,602,023	-508	-0.0000607
100 %	4.43	+ 10	836,601,383	-1,148	-0.0001372
		+ 20 (Ref)	836,602,531	0	0.0000000
		+ 30	836,602,352	-179	-0.0000214
		+ 40	836,601,245	-1,286	-0.0001537
		+ 50	836,601,175	-1,356	-0.0001620
Battery Endpoint	3.36	+ 20	836,602,212	-319	-0.0000381

Table 7-31. WCDMA Cell Frequency Stability Data



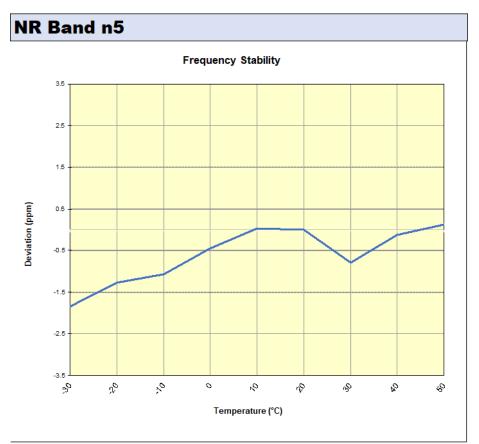
Plot 7-111. WCDMA Cell Frequency Stability Chart

FCC ID: A3LSMS906U	POLIEST. Proud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 95 of 97
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NR Band n5									
	Operating F	requency (Hz):	836,500,000						
	Ref. Voltage (VDC):		4.43						
	Deviation Limit:		± 0.00025% or 2.5 ppm		1				
					•				
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)				
		- 30	836,500,445	-1,541	-0.0001842				
		- 20	836,500,918	-1,068	-0.0001277				
		- 10	836,501,094	-892	-0.0001066				
		0	836,501,612	-374	-0.0000447				
100 %	4.43	+ 10	836,502,018	32	0.000038				
		+ 20 (Ref)	836,501,986	0	0.0000000				
		+ 30	836,501,331	-655	-0.0000783				
		+ 40	836,501,884	-102	-0.0000122				
		+ 50	836,502,086	100	0.0000120				
Battery Endpoint	3.36	+ 20	836,501,827	-159	-0.0000190				

Table 7-32. NR Band n5 Frequency Stability Data



Plot 7-112. NR Band n5 Frequency Stability Chart

FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical 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: A3LSMS906U** complies with all the requirements of Part 22 of the FCC rules.

FCC ID: A3LSMS906U		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Page 97 of 97	
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