

## PCTEST

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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:

11/15/2021 - 12/03/2021 **Test Report Issue Date:** 12/17/2021 **Test Site/Location:** PCTEST Lab. Yongin-Si, Gyeonggi-do, South Korea **Test Report Serial No.:** 1M2110010116-28.A3L

# FCC ID:

## A3LSMS906E

### Samsung Electronics Co., Ltd.

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

Applicant Name:

Certification SM-S906E/DS SM-S906E 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.

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.

Prepared by

N

Reviewed by

FCC ID: A3LSMS906E		PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 1 of 60	
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Page 1 of 60	
© 2021 PCTEST	<u>.</u>			V2.0 3/15/2021	

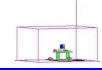


# TABLE OF CONTENTS

1.0	INTR	DDUCTION	.4
	1.1	Scope	.4
	1.2	PCTEST Test Location	.4
	1.3	Test Facility / Accreditations	.4
2.0	PRO	DUCT INFORMATION	.5
	2.1	Equipment Description	. 5
	2.2	Device Capabilities	. 5
	2.3	Test Configuration	. 5
	2.4	EMI Suppression Device(s)/Modifications	. 5
3.0	DESC	RIPTION OF TESTS	.6
	3.1	Evaluation Procedure	. 6
	3.2	Radiated Power and Radiated Spurious Emissions	. 6
4.0	MEAS	SUREMENT UNCERTAINTY	.7
5.0	TEST	EQUIPMENT CALIBRATION DATA	.8
6.0	SAMF	PLE CALCULATIONS	.9
7.0	TEST	RESULTS1	1
	7.1	Summary	11
	7.2	Occupied Bandwidth	12
	7.3	Spurious and Harmonic Emissions at Antenna Terminal	20
	7.4	Band Edge Emissions at Antenna Terminal	36
	7.5	Radiated Power (ERP)	14
	7.6	Radiated Spurious Emissions Measurements	<del>1</del> 7
	7.7	Frequency Stability / Temperature Variation	56
8.0	CON	CLUSION	60

FCC ID: A3LSMS906E		PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 2 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Fage 2 01 00
© 2021 PCTEST				V2.0 3/15/2021





# **PART 22 MEASUREMENT REPORT**



		Tx Frequency	ERP		EIRP		Emission	
Mode	Modulation	Range [MHz]	Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]	Designator	
GSM/GPRS	GMSK	824.2 - 848.8	0.483	26.84	0.793	28.99	241KGXW	
EDGE	8-PSK	824.2 - 848.8	0.147	21.66	0.240	23.81	238KG7W	
WCDMA	Spread Spectrum	826.4 - 846.6	0.084	19.25	0.138	21.40	4M15F9W	

			Tx Frequency	ERP		EIRP		Emission
Mode	Bandwidth	Modulation Range [MHz]		Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]	Designator
	15MHz (Band	QPSK	831.5 - 841.5	0.067	18.24	0.110	20.39	13M5G7D
	26 only)	16QAM	831.5 - 841.5	0.056	17.46	0.091	19.61	13M6W7D
	10 MHz	QPSK	829.0 - 844.0	0.071	18.49	0.116	20.64	9M06G7D
		16QAM	829.0 - 844.0	0.058	17.66	0.096	19.81	9M06W7D
LTE Band 26/5	5 MHz	QPSK	826.5 - 846.5	0.072	18.55	0.118	20.70	4M55G7D
LTE Barlu 20/5		16QAM	826.5 - 846.5	0.059	17.74	0.098	19.89	4M56W7D
	3 MHz	QPSK	825.5 - 847.5	0.073	18.62	0.119	20.77	2M73G7D
	1.4 MHz	16QAM	825.5 - 847.5	0.060	17.76	0.098	19.91	2M72W7D
		QPSK	824.7 - 848.3	0.072	18.55	0.118	20.70	1M11G7D
	1.4 10172	16QAM	824.7 - 848.3	0.057	17.59	0.094	19.74	1M10W7D

**EUT Overview** 

FCC ID: A3LSMS906E	PCTEST* Proud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 2 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Page 3 of 60
© 2021 PCTEST	•	•		V2.0 3/15/2021



## **1.0 INTRODUCTION**

## 1.1 Scope

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

## 1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST facility located at 13, Heungdeok 1-ro, Giheung-gu, Yongin-si, Gyeonggi-do, 16954, South Korea. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014.

## 1.3 Test Facility / Accreditations

Measurements were performed at PCTEST located in Yongin-si, Gyeonggi-do, 16954, South Korea.

- PCTEST is an ISO 17025-2017 accredited test facility under the National Voluntary Laboratory Accreditation Program (NVLAP) with Certificate number 600143-0 for Specific Absorption Rate (SAR), 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 (26168) test laboratory with the site description on file with ISED.

FCC ID: A3LSMS906E		PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dere 4 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Page 4 of 60
© 2021 PCTEST		•		V2.0 3/15/2021



# 2.0 PRODUCT INFORMATION

## 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMS906E**. 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.: 3715R, 3723R, 3892R

## 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), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII (5GHz), Bluetooth (1x, EDR, LE), NFC, Wireless Power Transfer, Ultra Wideband

## 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: 0 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.

FCC ID: A3LSMS906E		PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 5 of 60	
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Page 5 of 60	
© 2021 PCTEST	•	•		V2.0 3/15/2021	



# 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:

Pd [dBm] = Pg [dBm] - cable loss [dB] + antenna gain [dBd/dBi];

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

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:

 $E_{[dB\muV/m]}$  = Measured amplitude level $_{[dBm]}$  + 107 + Cable Loss $_{[dB]}$  + Antenna Factor $_{[dB/m]}$ And EIRP $_{[dBm]}$  =  $E_{[dB\muV/m]}$  + 20logD - 104.8; where D is the measurement distance in meters.

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 v01r01.

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

FCC ID: A3LSMS906E	PCTEST * 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 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Page 6 of 60
© 2021 PCTEST	-			V2.0 3/15/2021



## 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	1.20
Radiated Disturbance (<1GHz)	3.01
Radiated Disturbance (>1GHz)	5.56
Radiated Disturbance (>18GHz)	3.16

FCC ID: A3LSMS906E		PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 7 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Page 7 of 60
© 2021 PCTEST		·		V2.0 3/15/2021



# 5.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	E5515C	WIRELESS COMMUNICATION TEST SET	2/19/2021	Annual	2/18/2022	MY50262130
Agilent	N9030A	PXA Signal Analyzer	7/6/2021	Annual	7/5/2022	MY49432391
Anritsu	S820E	Cable and Antenna Analyzer	7/7/2021	Annual	7/6/2022	6201300731
Anritsu	MA24106A	USB Power Sensor	7/7/2021	Annual	7/6/2022	1244512
Anritsu	MA24106A	USB Power Sensor	2/19/2021	Annual	2/18/2022	1344557
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/29/2020	Biennial	10/28/2022	10160045
Com-Power	PAM-118A	Preamplifier	7/7/2021	Annual	7/6/2022	551042
Espec	SH-242	Environmental Chamber	9/15/2021	Annual	9/14/2022	93011064
ETS Lindgren	3110C	Biconical Antenna	7/9/2020	Biennial	7/8/2022	00211248
ETS Lindgren	3110C	Biconical Antenna	7/9/2020	Biennial	7/8/2022	00211250
Fairview Microwave	FM2CP1122-10	Coupler	7/7/2021	Annual	7/6/2022	1946
Keysight Technologies	N9030B	MXA Signal Analyzer	5/11/2021	Annual	5/10/2022	MY57142018
Mini Circuits	ZUDC10-83-S+	Coupler	9/15/2021	Annual	9/14/2022	2111
Mini-Circuits	BW-N10W5+	Attenuator	7/6/2021	Annual	7/5/2022	1607
Mini-Circuits	BW-N10W5+	Attenuator	7/6/2021	Annual	7/5/2022	1607
Rohde & Schwarz	TS-PR18	Preamplifier	7/8/2021	Annual	7/7/2022	102141
Rohde & Schwarz	SMBV100B	Signal Generator	11/4/2021	Annual	11/3/2022	101568
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	7/6/2021	Annual	7/5/2022	116851
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	2/19/2021	Annual	2/18/2022	131453
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	2/19/2021	Annual	2/18/2022	131454
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	2/19/2021	Annual	2/18/2022	150117
Rohde & Schwarz	ESW	EMI Test Receiver	7/6/2021	Annual	7/5/2022	101761
Rohde & Schwarz	FSW43	Signal & Spectrum Analyzer	9/15/2021	Annual	9/14/2022	101250
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2/19/2021	Annual	2/18/2022	102131
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	3/29/2021	Annual	3/28/2022	102151
Schwarzbeck	UHA9105	Dipole Antenna	7/9/2020	Biennial	7/8/2022	91052522
Sunol	DRH-118	Horn Antenna	7/14/2021	Biennial	7/13/2023	A102416-1
Sunol	DRH-118	Hom Antenna	1/12/2021	Biennial	1/11/2023	A060215

#### Table 5-1. Test Equipment

#### Notes:

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

FCC ID: A3LSMS906E		PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 8 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Fage 6 01 00
© 2021 PCTEST				V2.0 3/15/2021



# 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

FCC ID: A3LSMS906E	PCTEST* Proud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 9 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Fage 9 01 00
© 2021 PCTEST	•	·		V2.0 3/15/2021



## **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.

FCC ID: A3LSMS906E		PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 10 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Fage 10 01 00
© 2021 PCTEST				V2.0 3/15/2021



## 7.0 TEST RESULTS

## 7.1 Summary

Company Name:	Samsung Electronics Co., Ltd.
FCC ID:	A3LSMS906E
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
Mode(s):	GSM/GPRS/EDGE/WCDMA/LTE

Test Condition	Test Description	FCC Part Section(s)	RSS Section(s)	Test Limit	Test Result	Reference
Δ	Transmitter Conducted Output Power	2.1046	RSS-132(5.4)	N/A	PASS	See RF Exposure Report
UCTE	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
0	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.
- 4) 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.

FCC ID: A3LSMS906E		PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 11 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Page 11 of 60
© 2021 PCTEST	•	· ·		V2.0 3/15/2021



## 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.

FCC ID: A3LSMS906E	Poud to be part of @element	PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 12 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Fage 12 01 00
© 2021 PCTEST	•			V2.0 3/15/2021



# LTE Band 26/5

	ut RF uping OC gn: Auto	Input Z 50 Gon CCon Freq Ref. In NFE: Off	RCal µW Path:	dB Trig. Free i Standard Gate: Off #IF Gain 1	Avgitto	Center Freq: 836.500000 MHz Avgihold: 100/100 Radio Std. None		Trace Type Clear / Write	Trace Control
Graph	-							Trace Average	Demon
cale/Div 10.0 dB		/	Rel Value	40.00 dBm				Max Hold Min Hold Restart Max Hold	
20.0 10.0 10.0 59.0					maha	mattheman			
enter 836.50 MH es BW 360.00 kH			#Video BW	1.2000 MHz		Spa Sweep 1.00 ms	in 37.5 MHz (1001 pts)		
Metrics Occupied	¥ Bandwidth 13.545	MHz		Total Poy	wer	31.4 dE	3m		
Transmit x dB Ban	Freq Error dwidth		162 kHz .16 MHz	% of OB/ x dB	W Power	99.00 -26.00			

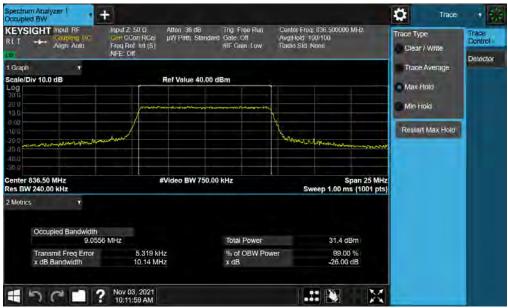
Plot 7-1. Occupied Bandwidth Plot (LTE Band 26 - 15MHz QPSK - Full RB)



Plot 7-2. Occupied Bandwidth Plot (LTE Band 26 - 15MHz 16-QAM - Full RB)

FCC ID: A3LSMS906E	PCTEST* Proud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 13 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Page 13 01 00
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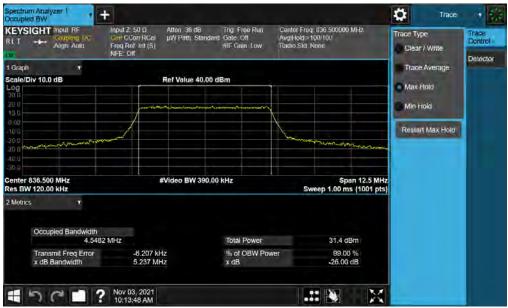
Plot 7-3. Occupied Bandwidth Plot (LTE Band 26/5 - 10MHz QPSK - Full RB)



Plot 7-4. Occupied Bandwidth Plot (LTE Band 26/5 - 10MHz 16-QAM - Full RB)

FCC ID: A3LSMS906E		PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 14 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Fage 14 01 00
© 2021 PCTEST				V2.0 3/15/2021





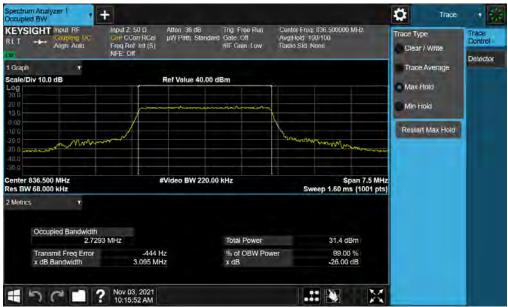
Plot 7-5. Occupied Bandwidth Plot (LTE Band 26/5 - 5MHz QPSK - Full RB)



Plot 7-6. Occupied Bandwidth Plot (LTE Band 26/5 - 5MHz 16-QAM - Full RB)

FCC ID: A3LSMS906E	PCTEST* Pread to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 15 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Fage 15 01 00
© 2021 PCTEST				V2.0 3/15/2021





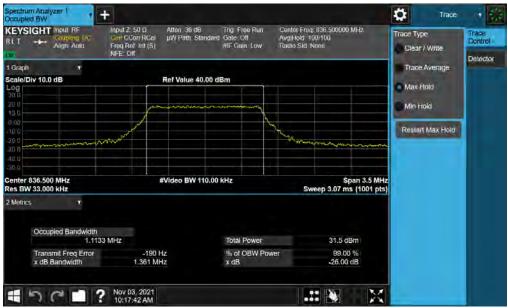
Plot 7-7. Occupied Bandwidth Plot (LTE Band 26/5 - 3MHz QPSK - Full RB)



Plot 7-8. Occupied Bandwidth Plot (LTE Band 26/5 - 3MHz 16-QAM - Full RB)

FCC ID: A3LSMS906E	PCTEST* Pread to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 16 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Fage 10 01 00
© 2021 PCTEST	•			V2.0 3/15/2021





Plot 7-9. Occupied Bandwidth Plot (LTE Band 26/5 - 1.4MHz QPSK - Full RB)



Plot 7-10. Occupied Bandwidth Plot (LTE Band 26/5 - 1.4MHz 16-QAM - Full RB)

FCC ID: A3LSMS906E		PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 17 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Fage 17 01 00
© 2021 PCTEST		•		V2.0 3/15/2021



## GPRS Cell



Plot 7-11. Occupied Bandwidth Plot (GPRS, Ch. 190)



Plot 7-12. Occupied Bandwidth Plot (EDGE, Ch. 190)

FCC ID: A3LSMS906E	PCTEST* Proud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 19 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset	Page 18 of 60	
© 2021 PCTEST				V2.0 3/15/2021



# WCDMA Cell

LT + Align: Auto	Input Z 50 Q Atten 36 d Gen CCorr RCal µW Path: 5 Freq Ref. Int (5) NFE: Off	Standard Gate Off Av	enter Freq: 836.600000 MHz vgHold: 100/100 adio Sid: None	Trace Type Trace Clear / Write Det
Graph v cale/Div 10.0 dB	Ref Value	40.00 dBm		Trace Average
				Max Hold
0.00 0.0 0.0 0.0 0 0 0 0 0 0 0			New York and the state of the s	Restart Max Hold
enter 836.600 MHz es BW 150.00 kHz	#Video BW	910.00 kHz	Span 15 MH Sweep 1.00 ms (1001 pt	
Metrics T Occupied Bandwidth 4.152	10 MHz	Total Power	33.2 dBm	
Transmit Freq Error x dB Bandwidth	9.740 kHz 4.765 MHz	% of OBW Power x dB	99.00 % -26.00 dB	

Plot 7-13. Occupied Bandwidth Plot (WCDMA, Ch. 4183)

FCC ID: A3LSMS906E		PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 19 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Page 19 01 60
© 2021 PCTEST		•		V2.0 3/15/2021



## 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 10<sup>th</sup> 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 = RMS
- 3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
- 4. Sweep time = auto couple
- 5. The trace was allowed to stabilize
- 6. Please see test notes below for RBW and VBW settings

#### Test Setup

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



Figure 7-2. Test Instrument & Measurement Setup

#### Test Notes

Per 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.

FCC ID: A3LSMS906E		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Page 20 of 60
© 2021 PCTEST	•	•		V2.0 3/15/2021



# LTE Band 26/5

L T Align: Auto	Input Z: 50 Ω Atten: 30 dB Gon CCorr RCal μW Path: Standa Freq Ref. Int (S) NFE: Off	PNO: Fast intl. Gate: Off IF Gain, Low Sig Track: Off	#Avg Type: Power (RMS 2 2 3 4 5 Trig. Free Run A www.ww A N N N N	426,500000 MHz
Spectrum v cale/Div 10 dB	Ref Level 20.00	dBm	Mkr1 822.85 MH -59.884 dBr	Z 793.000000 MHz
Trace 1 Pass				Full Span
0.00				Start Freq 30.000000 MHz
0.0				Stop Freq 823.000000 MHz
				AUTO TUNE
				CF Step 79.300000 MHz
50.0 50.0				Auto Man
0.0				Freq Offset 0 Hz
tart 30.0 MHz Res BW 100 kHz	#Video BW 300	kHz	Stop 823.0 Mł Sweep 38.1 ms (15861 pt	

Plot 7-14. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Low Channel)

EYSIGHT Input RF Coopling DC Align: Auto	Input Z 50 0 Gon CCorr RCal Freq Ref. Int (S) NFE: Off	Atten: 30 dB µW Path: Standard	PNO: Fast Gate: Off IF Gain Low Sig Track: Off	#Avg Type: Power (F Trig. Free Run	A NN NN N	Center Frequency 924.500000 MHz	Settings
Spectrum r cale/Div 10 dB		Ref Level 20.00 dl	Bm		879.15 MHz 61.049 dBm	Span 151.000000 MHz Swept Span Zero Span	
00					_	Full Span	
						Start Freq 849.000000 MHz	1
0.0						Stop Freq 1.000000000 GHz	
						AUTO TUNE	
						CF Step 15.100000 MHz	
0.0						Auto Man	
0.0	n in anti-anti-anti-anti-anti-atte	n fan it ser in de ser fan de ser fan de ser it ser de			seestin timerine in svining type	Freq Offset 0 Hz	
art 0.84900 GHz Res BW 100 kHz		#Video BW 300 k	Hz		op 1.00000 GHz 5 ms (3021 pts)	X Axis Scale Log Lin	

Plot 7-15. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Low Channel)

FCC ID: A3LSMS906E		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 21 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Page 21 of 60
© 2021 PCTEST	•			V2.0 3/15/2021



EYSIGHT Input RF T +++ Coupling DC Align: Auto	input Z 50 Ω Corr CCorr RCal Freq Ref Int (S) NFE: Off	µW Path Standard Gate	D Fast e Off Sain Low Track Off	#Avg Type: Power Trig: Free Run	(RMS 1 2 3 4 5 6 A WWWWW A N N N N N	Center Frequency 5,50000000 GHz	Setting
Spectrum v ale/Div 10 dB		Ref Level 0.00 dBm			9.973 5 GHz 41.556 dBm	Span 9.00000000 GHz Swept Span Zero Span	
Trace 1 Pass						Full Span	
						Start Freq 1.00000000 GHz	
					1	Stop Freq 10.000000000 GHz	
0.0						AUTO TUNE	
						CF Step 900.000000 MHz	
0.0						Auto Man	
						Freq Offset 0 Hz	
art 1.000 GHz es BW 1.0 MHz		#Video BW 3.0 MHz			Stop 10.000 GHz 5 ms (18001 pts)	X Axis Scale Log Lin	Lo

Plot 7-16. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Low Channel)

EYSIGHT Input RF L T +++ Coupling DC Align: Auto	Input Z. 50 Ω Corr CCorr RCal Freq Ref Int (S) NFE: Off	Atten 30 dB PNO Fast µW Path Standard Gate Off IF Gain Low Sig Track Off	#Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run A WW WW W A N N N N N	Center Frequency 427.000000 MHz Span
Spectrum v cale/Div 10 dB		Ref Level 20.00 dBm	Mkr1 823.80 MHz -59.118 dBm	794.000000 MHz
Trace 1 Pass				Full Span
				Start Freq 30.000000 MHz
0.0				Stop Freq 824.000000 MHz
				AUTO TUNE
				CF Step 79.400000 MHz
0.0			1	Auto Man
0.0	a na ana ana ana ana ana ana ana ana an			Freq Offset 0 Hz
art 30.0 MHz les BW 100 kHz		#Video BW 300 kHz	Stop 824.0 MHz Sweep 38.1 ms (15881 pts)	X Axis Scale

Plot 7-17. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Mid Channel)

FCC ID: A3LSMS906E		PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 22 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Fage 22 01 00
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EYSIGHT Input RF Coupling DC Align Auto	Input Z: 50 0 Atten: 30 dB Gen CCorr RCal µW Path: Stand Freq Ref. Int (S) NFE: Off	PNO:Fast danti Gate:Off IF Cain Low Sig Track:Off	#Avg Type: Power (RMS 1 2 3 4 5 Trig. Free Run A WW WW A N N N N	924.500000 MHz
Spectrum v cale/Div 10 dB	Ref Level 20.0	0 dBm	Mkr1 970.20 MH -60.895 dB	Z 151.000000 MHz
Trace 1 Pass				Full Span
				Start Freq 849,000000 MHz
0.0				Stop Freq 1.000000000 GHz
				AUTO TUNE
				CF Step 15.100000 MHz
0.0			•1	Auto Man
0.0				Freq Offset 0 Hz
art 0.84900 GHz Res BW 100 kHz	#Video BW 30	10 kHz	Stop 1,00000 GI Sweep 7.25 ms (3021 pt	

Plot 7-18. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Mid Channel)



Plot 7-19. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Mid Channel)

FCC ID: A3LSMS906E	Poud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 23 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Fage 25 01 00
© 2021 PCTEST	•	·		V2.0 3/15/2021



EYSIGHT Input RF Coupling DC Align Auto	Input Z 50 Ω Gon CCorr RCal Freq Ref. Int (S) NFE: Off	Atten: 30 dB µW Path: Standard	PNO: Fast Gate: Off IF Gain Low Sig Track: Off	#Avg Type: Power Trig: Free Run	(RMS 1 2 3 4 5 6 A WWWWW A NN NN N	Center Frequency 427.000000 MHz Span	Setting
Spectrum + cale/Div 10 dB	,	Ref Level 20.00 dE	Bm		805.40 MHz 60.389 dBm	794.000000 MHz Swept Span Zero Span	
na Hace i Pass						Full Span	
00						Start Freq 30.000000 MHz	
0.0						Stop Freq 824.000000 MHz	
						AUTO TUNE	
						CF Step 79.400000 MHz	
					4	Auto Man	
0.0						Freq Offset 0 Hz	
art 30.0 MHz tes BW 100 kHz		#Video BW 300 ki	Hz	Sweep 38	Stop 824.0 MHz .1 ms (15881 pts)	X Axis Scale Log	

Plot 7-20. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - High Channel)

KEYSIGHT     Input RF       RL T     →     Coupling: DC       Align: Auto     Align: Auto	Input Ζ: 50 Ω Corr CCorr RCal Freq Ref: Int (S) NFE: Off	Atten 30 dB PNO Fast µW Path Standard Gate Off IF Gain Low Sig Track Off	#Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run A WW WW W A N N N N N	Center Frequency 925.000000 MHz Span	ettings
spectrum v cale/Div 10 dB		Ref Level 20.00 dBm	Mkr1 850.25 MHz -60.473 dBm	150.000000 MHz	
10.0				Full Span	
				Start Freq 850.000000 MHz	
20.0				Stop Freq 1.000000000 GHz	
				AUTO TUNE	
				CF Step 15.000000 MHz	
50.0 50.0				Auto Man	
70.0	da ad en viller o lande aver fordet af der over			Freq Offset 0 Hz	<u>م</u>
tart 0.85000 GHz Res BW 100 kHz		#Video BW 300 kHz	Stop 1.00000 GHz Sweep 7.20 ms (3001 pts)		LO

Plot 7-21. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - High Channel)

FCC ID: A3LSMS906E	Proud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 24 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Fage 24 01 00
© 2021 PCTEST	•			V2.0 3/15/2021



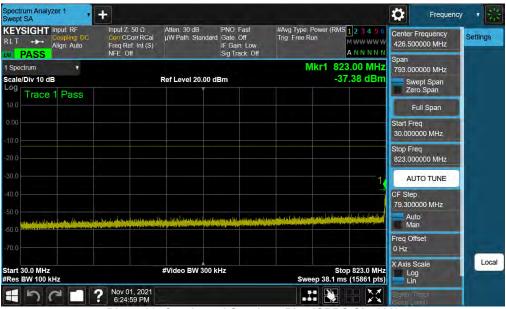
CEYSIGHT Inout RF Coupling, DC Align: Auto	Input Z 50 0 #Atten 30 dB Gon CCorr RCal µW Path: Star Freq Ref. Int (5) NFE: Off	PNO: Fast dard Gate: Off IF Gain Low Sig Track Off	#Avg Type: Power (RMS 2 2 4 Trig. Free Run A WW W	5.50000000 GHz
Spectrum v cale/Div 10 dB	Ref Level 0.0	0 dBm	Mkr1 9.986 0 G -41,193 dl	
Trace 1 Pass				Full Span
				Start Freq 1.00000000 GHz
40.0	00.000			Stop Freq 10.00000000 GHz
50.0			القر الأكر وحدة ا	AUTO TUNE
				CF Step 900.000000 MHz
(0.0 30.0				Auto Man
90.0				Freq Offset 0 Hz
tart 1.000 GHz Res BW 1.0 MHz	#Video BW 3	.0 MHz	Stop 10.000 Sweep ~16.5 ms (18001	

Plot 7-22. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - High Channel)

FCC ID: A3LSMS906E	PCTEST Proud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 25 of 60
1M2110010116-28.A3L				Page 25 01 60
© 2021 PCTEST	•	·		V2.0 3/15/2021



## **GSM/GPRS** Cell



Plot 7-23. Conducted Spurious Plot (GPRS Ch. 128)

EYSIGHT Input RF Coupling DC Align Auto	Input Z: 50 Ω Atten: 30 dB Gen CCorr RCal μW Path: Stand Freq Ref. Int (5) NFE: Off	PNO: Fast ard: Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Power (RMS 1 2 3 4 5 Trig. Free Run A N N N N	324.00000 MHz
Spectrum v cale/Div 10 dB	Ref Level 20.00	) dBm	Mkr1 895.20 MH -51.16 dBn	4 151.000000 MHz
Trace 1 Pass				Full Span
0.00				Start Freq 849.000000 MHz
20.0				Stop Freq 1.000000000 GHz
				AUTO TUNE
	1			CF Step 15.100000 MHz
50 0 Prinfamonanan Jaimenhillandar Angad 50 0	hina ang mangang mangan	muniting resident allowed by	<del>ฉ</del>	Auto Man
				Freq Offset 0 Hz
tart 0.84900 GHz Res BW 100 kHz	#Video BW 30	0 kHz	Stop 1,00000 GH Sweep 7.25 ms (3021 pt	

Plot 7-24. Conducted Spurious Plot (GPRS Ch. 128)

FCC ID: A3LSMS906E	PCTEST* Pread to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 26 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021			Fage 20 01 00
© 2021 PCTEST	•	·		V2.0 3/15/2021



LT +- Align: Auto	Input Z 50 0 #Atten 3 Gen CCorr RCal µW Path Freq Ref Int (S) NFE: Off	0 dB PNO: Fast Standard Gate: Off IF Gain Low Sig Track: Off		2 3 4 5 6 WWWWW NNNNN	Center Frequency 5.500000000 GHz Span	Settings
Spectrum v cale/Div 10 dB	Ref Leve	1 0.00 dBm	Mkr1 9.86 -33.	5 5 GHz 50 dBm	9.00000000 GHz Swept Span Zero Span	
					Full Span	
				1	Start Freq 1.000000000 GHz	
	ma the second	-			Stop Freq 10.000000000 GH2	
0.0					AUTO TUNE	
					CF Step 900,000000 MHz	
10.0					Auto Man	
					Freq Offset 0 Hz	
tart 1.000 GHz Res BW 1.0 MHz	#Video E	BW 3.0 MHz	Stop 1 Sweep ~16.5 ms	10.000 GHz	X Axis Scale Log Lin	

Plot 7-25. Conducted Spurious Plot (GPRS Ch. 128)

Coupling DC Con C	Z 50 Ω Atten 30 dB PNO. CorrRCal μW Path: Standard Gate: Ref: Int (S) IF Ga Off Sig Ti	#Avg Type: Power (RMS 1 2 1 4 5 6 Trig. Free Run M WW WW W A N N N N N	427.000000 WI 12
Spectrum v cale/Div 10 dB	Ref Level 20.00 dBm	Mkr1 745.50 MHz -50.76 dBm	
Trace 1 Pass			Full Span
			Start Freq 30.000000 MHz
20.0			Stop Freq 824.000000 MHz
			AUTO TUNE
10.0		1	CF Step 79.400000 MHz
50.0 50.0	ومدوالي فالماد وموفر المتنابي وأوجر فالمدود والم		Auto Man
			Freq Offset 0 Hz
tart 30.0 MHz Res BW 100 kHz	#Video BW 300 kHz	Stop 824.0 MHz Sweep 38.1 ms (15881 pts	

Plot 7-26. Conducted Spurious Plot (GPRS Ch. 190)

FCC ID: A3LSMS906E	Proud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 27 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Fage 27 01 00
© 2021 PCTEST	•	·		V2.0 3/15/2021



T +++ Coupling DC Align: Auto	input Z 50 Ω Con CCorr RCal Freq Ref Int (S) NFE Off	Atten: 30 dB µW Path: Standard	PNO: Fast Gate Off IF Gain Low Sig Track: Off	#Avg Type: Power (RMS 1 2 3 4 Trig: Free Run A N N N	924.500000 MHz	Settings
Spectrum • ale/Div 10 dB		Ref Level 20.00 dE	Bm	Mkr1 888.35 M -50.86 dE	HZ 151.000000 MHz	
Trace 1 Pass					Full Span	
					Start Freq 849.000000 MHz	
.0					Stop Freq 1.00000000 GHz	
					AUTO TUNE	
	<u></u>				CF Step 15.100000 MHz	
0.0 10.00000000000000000000000000000000	neradapan filin afilin an an an Isan kasala	erinal exercises the experience	annal an rain an an air an	yerseninsenistereneyterelansekkongtaltelaktiversenista	Auto Man	
					Freq Offset 0 Hz	L,=
rt 0.84900 GHz es BW 100 kHz		#Video BW 300 kl	Hz	Stop 1.00000 ( Sweep 7.25 ms (3021		Loc

Plot 7-27. Conducted Spurious Plot (GPRS Ch. 190)



Plot 7-28. Conducted Spurious Plot (GPRS Ch. 190)

FCC ID: A3LSMS906E	Poud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 28 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Fage 20 01 00
© 2021 PCTEST	•			V2.0 3/15/2021



EYSIGHT Input RF Coupling DC Align: Auto	Input Z 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE: Off	Atten: 30 dB µW Path: Standard	PNO Fast Gate Off IF Gain Low Sig Track Off		1 2 3 4 5 6 M WW WW W A N N N N N	Center Frequency 427.000000 MHz Span	Settings
Spectrum v cale/Div 10 dB		Ref Level 20.00 dl	3m		.00 MHz .09 dBm	794.000000 MHz Swept Span Zero Span	
<sup>0.0</sup> Trace 1 Pass						Full Span	
						Start Freq 30.000000 MHz	
0.0						Stop Freq 824.000000 MHz	
						AUTO TUNE	
					1	CF Step 79.400000 MHz	
0.0			Sinning for a contribution		Contraction of the state	Auto Man	
						Freq Offset 0 Hz	
art 30.0 MHz es BW 100 kHz		#Video BW 300 k	Hz	Stop Sweep 38.1 ms	o 824.0 MHz (15881 pts)	X Axis Scale Log Lin	Loc
50	? Nov 01, 2021 6:26:45 PM					Engrical Track (Sour Zoom)	

Plot 7-29. Conducted Spurious Plot (GPRS Ch. 251)

	Corr RCal µW Path: Standard Gate: Off af Int (S) IF Gain Low	#Avg Type: Power (RMS 1 2 3 4 5 6 Trig. Free Run M WW WW W A N N N N N	320/00000 WINE
Spectrum v cale/Div 10 dB	Ref Level 20.00 dBm	Mkr1 850.50 MHz -32.28 dBm	Span 150,000000 MHz Swept Span Zero Span
Trace 1 Pass			Full Span
			Start Freq 850,000000 MHz
20 0			Stop Freq 1.000000000 GHz
			AUTO TUNE
40.0			CF Step 15.000000 MHz
50.0 Menergetering	ىلىدىلىنەلىقەيدىن يەرسىلىرىنىدە بىرىنى تىلىنىغانىيە بەلىمىيە يەر يەر يەر يەر يەر يەر يەر يەر يەر ي	وجوا الإصفاد والماجة والمتدرية المتعادية المعادي معلمه	Auto: Man
			Freq Offset 0 Hz
tart 0,85000 GHz Res BW 100 kHz	#Video BW 300 kHz	Stop 1,00000 GHz Sweep 7.20 ms (3001 pts)	

Plot 7-30. Conducted Spurious Plot (GPRS Ch. 251)

FCC ID: A3LSMS906E	Poud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 29 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Fage 29 01 00
© 2021 PCTEST	•			V2.0 3/15/2021





Plot 7-31. Conducted Spurious Plot (GPRS Ch. 251)

FCC ID: A3LSMS906E	Postest*	PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Page 30 of 60
© 2021 PCTEST	•	·		V2.0 3/15/2021



# WCDMA Cell

EYSIGHT Input RF L T +++ Coupling DC Align: Auto	Input Ζ. 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE: Off	Atten: 30 dB µW Path: Standard	PNO Fast Gate Off IF Gain Low Sig Track Off	#Avg Type: Po Trig: Free Run	wer(RMS123456 A WW WW W A N N N N N	Center Frequency 426.500000 MHz Span	Settings
Spectrum  cale/Div 10 dB		Ref Level 20.00 d	Bm	Mk	r1 822.85 MHz -36.084 dBm	793.000000 MHz Swept Span Zero Span	
0.0 Trace 1 Pass						Full Span	1
						Start Freq 30.000000 MHz	
20.0						Stop Freq 823.000000 MHz	1
						AUTO TUNE	
						CF Step 79.300000 MHz Auto	
50.0 	ang tapat part and an	i daniya mushuda mushini mushini mushini				Man Freq Offset 0 Hz	
tart 30.0 MHz Res BW 100 kHz		#Video BW 300 k	Hz	Sweer	Stop 823.0 MHz 38.1 ms (15861 pts)	X Axis Scale Log Lin	Lo

Plot 7-32. Conducted Spurious Plot (WCDMA Ch. 4132)

ELT +++ Auto	Input Z: 50 Ω Con CCorr RCal Freq Ref Int (S) NFE: Off	Atten. 30 dB PNO: Fast µW Path: Standard Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run A WW WW A N N N N N	Center Frequency 924.500000 MHz
Spectrum v cale/Div 10 dB		Ref Level 20.00 dBm	Mkr1 870.30 MHz -61.059 dBm	101.000000 10112
Trace 1 Pass				Full Span
				Start Freq 849.000000 MHz
				Stop Freq 1.00000000 GHz
				AUTO TUNE
				CF Step 15.100000 MHz
50.0				Auto Man
0.0				Freq Offset 0 Hz
art 0.84900 GHz Res BW 100 kHz		#Video BW 300 kHz	Stop 1.00000 GHz Sweep 7.25 ms (3021 pts)	
1961	Nov 01, 2021 5:38:11 PM		💓 – 🔀	Eliginal Track (Scan John)

Plot 7-33. Conducted Spurious Plot (WCDMA Ch. 4132)

FCC ID: A3LSMS906E		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 21 of 60	
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Page 31 of 60	
© 2021 PCTEST	•			V2.0 3/15/2021	



RLT     Input RF       Coupling DC       Align: Auto	Input Z: 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE: Off	#Atten: 30 dB µW Path: Standard	PNO Fast Gate Off IF Gain Low Sig Track Off	#Avg Type: Pow Trig: Free Run	er (RMS <mark>1</mark> 23456 A WWWWW A N N N N N	Center Frequency 5.500000000 GHz	Settings
Spectrum v cale/Div 10 dB		Ref Level 0.00 dE	łm	Mkr	1 9.982 0 GHz -41.330 dBm	0.000000000112	
0.0						Full Span	
						Start Freq 1.000000000 GHz	
			~ ~ ~		1/	Stop Freq 10.000000000 GHz	1
0.0						AUTO TUNE	
0.0						CF Step 900.000000 MHz	
						Auto Man	
0.0						Freq Offset 0 Hz	
art 1.000 GHz Res BW 1.0 MHz		#Video BW 3.0 M	Hz	Sweep ~	Stop 10.000 GHz 16.5 ms (18001 pts)		Loc
1501	Nov 01, 2021 5:38:51 PM	<u> </u>				Eugral Trach (Sear 2000)	

Plot 7-34. Conducted Spurious Plot (WCDMA Ch. 4132)

EYSIGHT Input RF L T +++ Coupling DC Align: Auto	Input Z 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE. Off	µW Path Standard C	'NO Fast Sate Off F Gain: Low Sig Track: Off	#Avg Type: Po Trig: Free Run	ower (RMS1234 A WWW A N N N	427.000000 MHz	Settings
Spectrum  cale/Div 10 dB		Ref Level 20.00 dBr	n	Mk	kr1 823.70 M -56.198 dE	101.000000 1011 12	
0.0						Full Span	
						Start Freq 30.000000 MHz	
0.0						Stop Freq 824.000000 MHz	
						AUTO TUNE	
						CF Step 79.400000 MHz	í L
50_0 50_0						Auto Man	
		gentilse of the section is an indigeneration in the				Freq Offset 0 Hz	
art 30.0 MHz Res BW 100 kHz		#Video BW 300 kHz	z	Sween	Stop 824.0 M p 38.1 ms (15881		Lo

Plot 7-35. Conducted Spurious Plot (WCDMA Ch. 4183)

FCC ID: A3LSMS906E	PCTEST* Proud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 22 of 60	
1M2110010116-28.A3L	11/15/2021 - 12/03/2021			Page 32 of 60	
© 2021 PCTEST	·			V2.0 3/15/2021	



Spectrum v	IFE- Off	IF Gam Low Sig Track: Off	Trig. Free Run	AS 1 2 3 4 5 6 A WWWWW A N N N N N	Center Frequency 924.500000 MHz Span	Setting
ale/Div 10 dB	Ref Level 20.00 d	1Bm		49.90 MHz 7.879 dBm	151.000000 MHz Swept Span Zero Span	
Trace 1 Pass					Full Span	
					Start Freq 849.000000 MHz	
30					Stop Freq 1.000000000 GHz	1
					AUTO TUNE	
					CF Step 15.100000 MHz	
2.0					Auto Man	
0.0			an a		Freq Offset 0 Hz	
art 0.84900 GHz es BW 100 kHz	#Video BW 300 P	kHz		p 1.00000 GHz ms (3021 pts)	X Axis Scale Log	

Plot 7-36. Conducted Spurious Plot (WCDMA Ch. 4183)



Plot 7-37. Conducted Spurious Plot (WCDMA Ch. 4183)

FCC ID: A3LSMS906E		PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 33 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Fage 33 01 00
© 2021 PCTEST	•			V2.0 3/15/2021



EYSIGHT Input RF LT +- Align: Auto	Input Z: 50 0 Atten: 30 dB Gen CCorr RCal µW Path: Star Freq Ref. Int (S) NFE: Off	PNO Fast ndard Gate Off IF Gain Low Sig Track Off	#Avg Type: Power (RMS 1 2 1 4 5 0 Trig. Free Run A N N N N 1	427.000000 MHz	etting
Spectrum v cale/Div 10 dB	Ref Level 20.	00 dBm	Mkr1 823.60 MH -60.949 dBn	794.000000 MHz	
Trace 1 Pass				Full Span	
				Start Freq 30.000000 MHz	
00				Stop Freq 824.000000 MHz	
				AUTO TUNE	
				CF Step 79.400000 MHz	
			1	Auto Man	
0.0				Freq Offset 0 Hz	
art 30.0 MHz Res BW 100 kHz	#Video BW 3	00 kHz	Stop 824.0 MH Sweep 38.1 ms (15881 pts		

Plot 7-38. Conducted Spurious Plot (WCDMA Ch. 4233)

EYSIGHT Input: RF Coupling: DC Align: Auto	Input Z: 50 Ω Corr CCorr RCal Freq Ref: Int (S) NFE: Off	Atten: 30 dB µW Path: Standard	PNO Fast Gate Off IF Gain: Low Sig Track: Off	#Avg Type: Pov Trig: Free Run	ver (RMS <mark>123456</mark> A <del>WW WW W</del> A N N N N N	Center Frequency 925.000000 MHz Span	Settings
Spectrum v cale/Div 10 dB		Ref Level 20.00 dl	Bm	Mk	1 850.15 MHz -32.527 dBm	150.000000 MHz	
0.0 Trace 1 Pass						Full Span	
00						Start Freq 850.000000 MHz	
						Stop Freq 1.000000000 GHz	1
0.0 1						AUTO TUNE	
0.0						CF Step 15.000000 MHz	
0.0						Auto Man	
0.0	an she ya a a a a a a a a a a a a a a a a a a	1912 1919 1921 1921 1921 1921 1921 1921	Maaniaangorinatoonaaninata	an a	₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩	Freq Offset 0 Hz	
art 0.85000 GHz tes BW 100 kHz		#Video BW 300 k	Hz	Swee	Stop 1.00000 GHz p 7.20 ms (3001 pts)		Lo

Plot 7-39. Conducted Spurious Plot (WCDMA Ch. 4233)

FCC ID: A3LSMS906E		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 34 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Fage 34 01 00
© 2021 PCTEST	•	•		V2.0 3/15/2021



EYSIGHT Input RF LT + Align: Auto	Input Z: 50 0 #Atten: 30 dB Gen CCorr RCal µW Path: Stan Freq Ref. Int (S) NFE: Off	PNO: Fast dard: Gate: Off IF Gain: Low Sig Track: Off	#Awg Type: Power (RMS 1 2 3 4 Trig. Free Run A www. A N N N N	5.50000000 GHz
Spectrum v cale/Div 10 dB	Ref Level 0.0	0 dBm	Mkr1 9.992 5 G -40.797 dE	12 9.00000000 GHz
Trace 1 Pass				Full Span
				Start Freq 1.00000000 GHz
0.0				Stop Freq 10.00000000 GHz
0.0			للغانية ويغده	AUTO TUNE
				CF Step 900.000000 MHz
0.0				Auto: Man
				Freq Offset 0 Hz
art 1.000 GHz Res BW 1.0 MHz	#Video BW 3	0 MHz	Stop 10.000 C Sweep ~16.5 ms (18001 p	

Plot 7-40. Conducted Spurious Plot (WCDMA Ch. 4233)

FCC ID: A3LSMS906E	Poud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 25 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Page 35 of 60
© 2021 PCTEST		•		V2.0 3/15/2021



## 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<sub>10</sub>(P<sub>[Watts]</sub>), 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

#### Test Notes

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.

FCC ID: A3LSMS906E	PCTEST * Proud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 36 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Fage 30 01 00
© 2021 PCTEST	•			V2.0 3/15/2021



## LTE Band 26/5



Plot 7-41. Lower Band Edge Plot (LTE Band 26 - 15MHz QPSK – Full RB)



Plot 7-42. Upper Band Edge Plot (LTE Band 26 - 15MHz QPSK – Full RB)

FCC ID: A3LSMS906E		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dego 27 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Page 37 of 60
© 2021 PCTEST	•			V2.0 3/15/2021



(EYSIGHT     Input RF       RLT     Imput RF       Coupling     DC       Align     Auto       PASS	Input Z: 50 Ω Corr CCorr RCal Freq Ref. Int (S) NFE: Off	µW Path: Standard Ga	O Best Wide te Off Gain Low Track Off	#Avg Type: Powe Trig Free Run	er (RMS <mark>123456</mark> A WW WW W A N N N N N	Center Frequency 824.000000 MHz Span	Settings
Spectrum		Ref Level 25.00 dBm		Mkr1	823.992 MHz -31.220 dBm	8.00000000 MHz Swept Span Zero Span	
5.0 Trace 1 Pass						Full Span	
			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			Start Freq 820.000000 MHz	
5.0						Stop Freq 828.000000 MHz	
25.0		1 <i>∠</i>				AUTO TUNE	
35.0		mont				CF Step 800.000 kHz	
55.0						Auto Man	
						Freq Offset 0 Hz	
enter 824.000 MHz Res BW 100 kHz		#Video BW 300 kHz		Sweep	Span 8.000 MHz 1.00 ms (1001 pts)	X Axis Scale Log Lin	Lo
500	Nov 01, 2021 9:37:51 AM					Squal Track	

Plot 7-43. Lower Band Edge Plot (LTE Band 26/5 - 10MHz QPSK – Full RB)



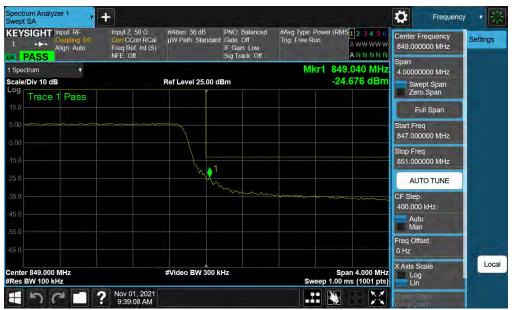
Plot 7-44. Upper Band Edge Plot (LTE Band 26/5 - 10MHz QPSK - Full RB)

FCC ID: A3LSMS906E		PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 38 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset	Page 38 of 6	
© 2021 PCTEST				V2.0 3/15/2021



ELT +++ Auto	Input Z: 50 Ω Corr CCorr RCal Freq Ref: Int (S) NFE: Off	#Atten: 36 dB µW Path: Standard	PNO Balanced Gate Off IF Gain Low Sig Track Off	#Avg Type: Powe Trig: Free Run	er (RMS <mark>123456</mark> A <del>WW WW W</del> A N N N N N	Center Frequency 824.000000 MHz	Settin
Spectrum v cale/Div 10 dB	HE ON	Ref Level 25.00 d		Mkr1	823.992 MHz -22.013 dBm	Span 4.00000000 MHz Swept Span	
Trace 1 Pass						Zero Span Full Span	
				man and a second second		Start Freq 822.000000 MHz	
5.0		<b>1</b>				Stop Freq 826.000000 MHz	
5.0						AUTO TUNE	
15.0						CF Step 400.000 kHz	
55.0						Auto Man	
						Freq Offset 0 Hz	
enter 824.000 MHz Res BW 100 kHz		#Video BW 300 k	Hz	Sweep	Span 4.000 MHz 1.00 ms (1001 pts)	X Axis Scale Log Lin	
1901	Nov 01, 2021 9:38:44 AM					Eliqual Troch	

Plot 7-45. Lower Band Edge Plot (LTE Band 26/5 - 5MHz QPSK - Full RB)



Plot 7-46. Upper Band Edge Plot (LTE Band 26/5 - 5MHz QPSK – Full RB)

FCC ID: A3LSMS906E		PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 39 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Page 39 of 60
© 2021 PCTEST				V2.0 3/15/2021



EYSIGHT Input RF L T + Align: Auto	Input Z 50 Ω Corr CCorr RCal Freq Ref Int (S) NFE: Off	#Atten: 36 dB µW Path: Standard	PNO Balanced Gate Off IF Gain Low Sig Track Off	#Avg Type: Powe Trig: Free Run	er (RMS <mark>1</mark> 23456) A <del>WWWW</del> W A N N N N N	Center Frequency 824.000000 MHz Span	Settings
Spectrum v cale/Div 10 dB		Ref Level 25.00 dl	Bm	Mkr1	823.996 MHz -18.113 dBm	4.00000000 MHz Swept Span Zero Span	
Trace 1 Pass						Full Span	
		1				Start Freq 822.000000 MHz	
5.0		1-				Stop Freq 826.000000 MHz	
						AUTO TUNE	
.0		~~~~~				CF Step 400.000 kHz	
5.0						Auto Man	
						Freq Offset 0 Hz	
nter 824.000 MHz es BW 100 kHz		#Video BW 300 k	Hz	Sweep	Span 4.000 MHz 1.00 ms (1001 pts)	X Axis Scale Log Lin	Lo
50	Nov 01, 2021 9:39:29 AM					Eliginal Track (Scan John)	

Plot 7-47. Lower Band Edge Plot (LTE Band 26/5 - 3MHz QPSK – Full RB)



Plot 7-48. Upper Band Edge Plot (LTE Band 26/5 - 3MHz QPSK – Full RB)

FCC ID: A3LSMS906E		PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 40 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Fage 40 01 00
© 2021 PCTEST				V2.0 3/15/2021





Plot 7-49. Lower Band Edge Plot (LTE Band 26/5 – 1.4MHz QPSK – Full RB)



Plot 7-50. Upper Band Edge Plot (LTE Band 26/5 – 1.4MHz QPSK – Full RB)

FCC ID: A3LSMS906E	Proud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 41 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset	Page 41 of 6	
© 2021 PCTEST	•			V2.0 3/15/2021



## **GSM/GPRS** Cell



Plot 7-51. Lower Band Edge Plot (GPRS Cell – Ch. 128)



Plot 7-52. Upper Band Edge Plot (GPRS Cell – Ch. 251)

FCC ID: A3LSMS906E		PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dago 42 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Page 42 of 60
© 2021 PCTEST	-			V2.0 3/15/2021



## WCDMA Cell



Plot 7-53. Lower Band Edge Plot (WCDMA Cell – Ch. 4132)



Plot 7-54. Upper Band Edge Plot (WCDMA Cell – Ch. 4233)

FCC ID: A3LSMS906E	Found to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 43 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Fage 45 01 00
© 2021 PCTEST	•	·		V2.0 3/15/2021



## 7.5 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

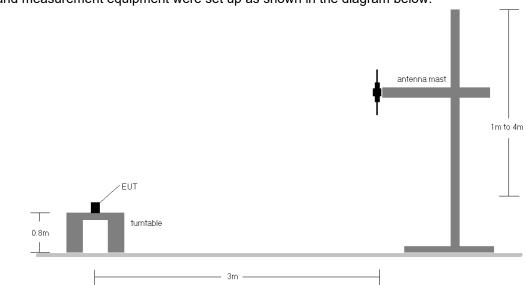
### Test Settings

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

FCC ID: A3LSMS906E	PCTEST Proud to be part of @element	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 44 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Page 44 01 00
© 2021 PCTEST		•		V2.0 3/15/2021



#### Test Setup



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

Figure 7-4. Radiated Test Setup <1GHz

### Test Notes

- 1) 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.
- 2) 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.

FCC ID: A3LSMS906E	PCTEST* Prod to be port of @ element	PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dago 45 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Page 45 of 60
© 2021 PCTEST	·	•		V2.0 3/15/2021



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]
15MHz	QPSK	831.5	V	134	224	1.29	1 / 37	19.06	18.20	0.066	38.45	-20.25
(Band 26	QPSK	836.5	V	131	235	1.31	1/0	18.94	18.10	0.065	38.45	-20.35
•	QPSK	841.5	V	136	232	1.33	1/0	19.06	18.24	0.067	38.45	-20.21
only)	16-QAM	831.5	V	134	224	1.29	1 / 37	18.32	17.46	0.056	38.45	-20.99
	QPSK	829.0	V	134	224	1.27	1/0	19.37	18.49	0.071	38.45	-19.96
10 MHz	QPSK	836.5	V	131	235	1.31	1/0	19.17	18.33	0.068	38.45	-20.12
	QPSK	844.0	V	136	232	1.35	1 / 25	19.10	18.30	0.068	38.45	-20.15
	16-QAM	829.0	V	134	224	1.27	1/0	18.54	17.66	0.058	38.45	-20.79
	QPSK	826.5	V	134	224	1.26	1 / 12	19.44	18.55	0.072	38.45	-19.90
5 MHz	QPSK	836.5	V	131	235	1.31	1/0	19.25	18.41	0.069	38.45	-20.04
0 11112	QPSK	846.5	V	136	232	1.36	1/0	18.99	18.20	0.066	38.45	-20.25
	16-QAM	826.5	V	134	224	1.26	1 / 12	18.63	17.74	0.059	38.45	-20.71
	QPSK	825.5	V	134	224	1.26	1/7	19.51	18.62	0.073	38.45	-19.83
3 MHz	QPSK	836.5	V	131	235	1.31	1/7	19.19	18.35	0.068	38.45	-20.10
5 10112	QPSK	847.5	V	136	232	1.36	1/7	19.07	18.28	0.067	38.45	-20.17
	16-QAM	836.5	V	131	235	1.31	1/0	18.60	17.76	0.060	38.45	-20.69
	QPSK	824.7	V	134	224	1.25	1/3	19.45	18.55	0.072	38.45	-19.90
1.4 MHz	QPSK	836.5	V	131	235	1.31	1/3	19.24	18.40	0.069	38.45	-20.05
1.4 10112	QPSK	848.3	V	136	232	1.37	1/5	18.99	18.21	0.066	38.45	-20.24
	16-QAM	824.7	V	134	224	1.25	1/3	18.49	17.59	0.057	38.45	-20.86
3 MHz	QPSK (Opposite Pol.)	825.5	Н	200	274	1.26	1/3	17.50	16.61	0.046	38.45	-21.84
	QPSK (WCP)	825.5	V	128	291	1.26	1/3	15.41	14.52	0.028	38.45	-23.93

Table 7-2. ERP Data (LTE Band 26/5)

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]
824.20	GPRS850	V	133	249	27.22	1.25	26.32	0.429	38.45	-12.13
836.60	GPRS850	V	129	233	27.68	1.31	26.84	0.483	38.45	-11.61
848.80	GPRS850	V	126	230	27.03	1.37	26.25	0.422	38.45	-12.20
836.60	GPRS850	Н	373	280	26.24	1.31	25.40	0.347	38.45	-13.05
836.60	EDGE850	V	129	233	22.50	1.31	21.66	0.147	38.45	-16.79
836.60	GPRS850 (WCP)	V	127	289	22.72	1.31	21.88	0.154	38.45	-16.57

## Table 7-3. 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]
826.40	WCDMA850	V	139	235	20.14	1.26	19.25	0.084	38.45	-19.20
836.60	WCDMA850	V	129	230	19.90	1.31	19.06	0.081	38.45	-19.39
846.60	WCDMA850	V	138	236	19.74	1.36	18.95	0.078	38.45	-19.50
826.40	WCDMA850	Н	201	266	17.69	1.26	16.80	0.048	38.45	-21.65
826.40	WCDMA850 (WCP)	V	151	267	15.91	1.26	15.02	0.032	38.45	-23.43

Table 7-4. ERP Data (WCDMA Cell)

FCC ID: A3LSMS906E	PCTEST* Proved to be poart of @ element	PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager		
Test Report S/N:	Test Dates:	EUT Type:		Page 46 of 60		
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset	e Handset			
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## 7.6 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  $\geq$  2 x span / RBW
- 5. Detector = RMS
- 6. Trace mode = Average (Max Hold for pulsed emissions)
- 7. The trace was allowed to stabilize

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Test Report S/N:	Test Dates:	EUT Type:		Page 47 of 60	
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset			
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### <u>Test Setup</u>

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

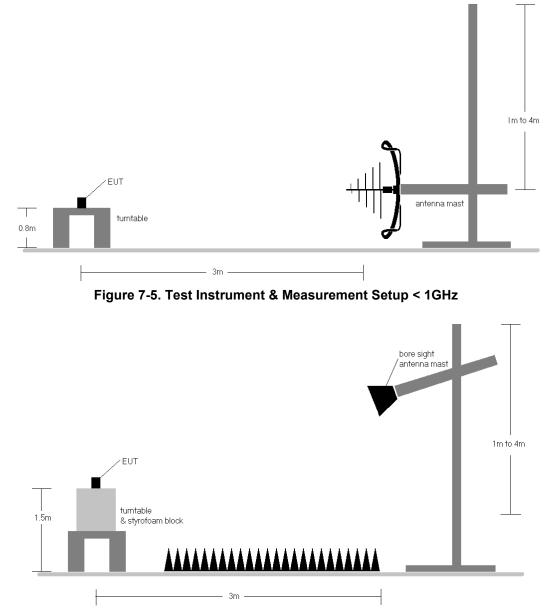


Figure 7-6. Test Instrument & Measurement Setup >1 GHz

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Test Report S/N:	Test Dates:	EUT Type:		Dogo 48 of 60	
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	1 - 12/03/2021 Portable Handset		Page 48 of 60	
© 2021 PCTEST				V2.0 3/15/2021	



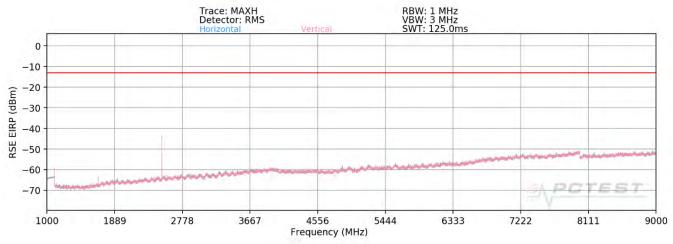
#### Test Notes

- 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.

FCC ID: A3LSMS906E	PCTEST * Proud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager		
Test Report S/N:	Test Dates:	EUT Type:		Page 49 of 60		
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset	indset			
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## LTE Band 26/5



### Plot 7-55. Radiated Spurious Plot (LTE Band 26/5)

Bandwidth (MHz):	3
Frequency (MHz):	825.5
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]
1651.00	н	124	26	-73.72	-7.51	25.77	-69.49	-13.00	-56.49
2476.50	н	133	37	-50.36	-4.19	52.45	-42.80	-13.00	-29.80
3302.00	н	-	-	-77.71	-0.89	28.40	-66.86	-13.00	-53.86
4127.50	Н	-	-	-77.54	0.85	30.31	-64.94	-13.00	-51.94
4953.00	Н	-	-	-77.69	1.70	31.01	-64.24	-13.00	-51.24
5778.50	Н	-	-	-78.55	3.97	32.42	-62.84	-13.00	-49.84

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

Bandwidth (MHz):	3
Frequency (MHz):	836.5
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]
1673.00	н	-	-	-75.76	-7.32	23.92	-71.34	-13.00	-58.34
2509.50	н	114	42	-50.77	-3.98	52.25	-43.01	-13.00	-30.01
3346.00	н	-	-	-76.22	-0.69	30.09	-65.17	-13.00	-52.17
4182.50	Н	-	-	-76.71	0.53	30.82	-64.44	-13.00	-51.44
5019.00	Н	-	-	-77.59	1.37	30.78	-64.48	-13.00	-51.48
5855.50	Н	-	-	-78.60	4.81	33.21	-62.05	-13.00	-49.05

Table 7-6. Radiated Spurious Data (LTE Band 26/5 – Mid Channel)

FCC ID: A3LSMS906E	PCTEST* Preud to be pcst of @ element	PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 50 of 60	
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Page 50 of 60	
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Bandwidth (MHz):	3
Frequency (MHz):	847.5
RB / Offset:	1/0

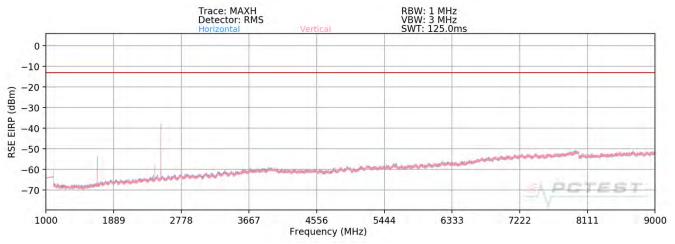
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1695.00	Н	162	11	-72.94	-7.06	27.00	-68.26	-13.00	-55.26
2542.50	Н	143	41	-49.54	-4.06	53.40	-41.86	-13.00	-28.86
3390.00	Н	-	-	-77.19	-0.89	28.92	-66.34	-13.00	-53.34
4237.50	Н	-	-	-77.24	0.42	30.18	-65.07	-13.00	-52.07
5085.00	Н	-	-	-78.16	1.99	30.83	-64.43	-13.00	-51.43
5932.50	Н	-	-	-78.82	4.83	33.01	-62.25	-13.00	-49.25

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

FCC ID: A3LSMS906E	Poud to be part of @ element	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 51 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Page 51 01 60
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## **GSM/GPRS** Cell



Plot 7-56. Radiated Spurious Plot (GPRS Cell)

Mode:	GPRS 1 Tx Slot
Channel:	128
Frequency (MHz):	824.2

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]
1648.40	Н	147	74	-60.46	-7.51	39.03	-56.23	-13.00	-43.23
2472.60	н	120	44	-42.63	-4.19	60.18	-35.07	-13.00	-22.07
3296.80	н	-	-	-68.33	-0.88	37.79	-57.47	-13.00	-44.47
4121.00	н	113	58	-66.35	0.79	41.44	-53.82	-13.00	-40.82
4945.20	Н	-	-	-67.04	1.60	41.56	-53.70	-13.00	-40.70
5769.40	н	-	-	-68.98	4.00	42.02	-53.24	-13.00	-40.24
6593.60	н	-	-	-69.73	6.32	43.59	-51.66	-13.00	-38.66

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	н	173	59	-58.88	-7.32	40.80	-54.46	-13.00	-41.46
2509.80	н	150	42	-40.99	-3.98	62.03	-33.23	-13.00	-20.23
3346.40	н	124	19	-68.02	-0.69	38.29	-56.97	-13.00	-43.97
4183.00	н	115	48	-67.52	0.52	40.00	-55.25	-13.00	-42.25
5019.60	н	-	-	-68.56	1.38	39.82	-55.44	-13.00	-42.44
5856.20	н	-	-	-68.98	4.81	42.83	-52.43	-13.00	-39.43
6692.80	Н	-	-	-69.03	6.92	44.89	-50.37	-13.00	-37.37

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

FCC ID: A3LSMS906E		PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 52 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Fage 52 01 00
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Mode:	GPRS 1 Tx Slot
Channel:	251
Frequency (MHz):	848.8

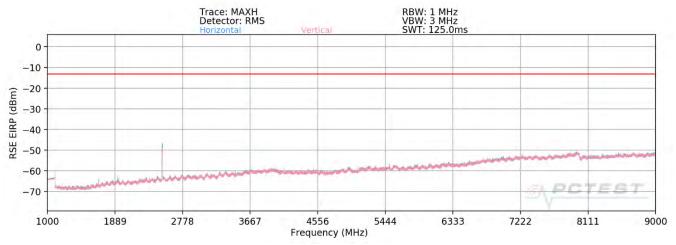
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1697.60	Н	162	62	-63.00	-7.03	36.97	-58.29	-13.00	-45.29
2546.40	Н	134	37	-38.75	-4.11	64.14	-31.12	-13.00	-18.12
3395.20	Н	163	20	-68.07	-0.98	37.95	-57.31	-13.00	-44.31
4244.00	Н	133	46	-67.24	0.41	40.17	-55.09	-13.00	-42.09
5092.80	Н	-	-	-68.75	2.30	40.55	-54.71	-13.00	-41.71
5941.60	Н	-	-	-68.78	4.69	42.91	-52.35	-13.00	-39.35
6790.40	Н	-	-	-69.60	7.52	44.92	-50.34	-13.00	-37.34

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

FCC ID: A3LSMS906E	Proved to be point of @ element	PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dego 52 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Page 53 of 60
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# WCDMA Cell



Plot 7-57. 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	н	137	22	-72.80	-7.50	26.70	-68.55	-13.00	-55.55
2479.20	н	117	39	-58.80	-4.17	44.03	-51.23	-13.00	-38.23
3305.60	н	-	-	-77.07	-0.87	29.06	-66.20	-13.00	-53.20
4132.00	н	-	-	-76.71	0.97	31.26	-64.00	-13.00	-51.00
4958.40	Н	-	-	-76.06	1.73	32.67	-62.58	-13.00	-49.58
5784.80	Н	-	-	-77.59	3.90	33.31	-61.95	-13.00	-48.95

Table 7-11. 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	Н	160	12	-72.94	-7.32	26.74	-68.52	-13.00	-55.52
2509.80	н	135	41	-57.02	-3.98	46.00	-49.26	-13.00	-36.26
3346.40	Н	-	-	-75.84	-0.69	30.47	-64.79	-13.00	-51.79
4183.00	н	-	-	-76.16	0.52	31.36	-63.89	-13.00	-50.89
5019.60	н	-	-	-76.33	1.38	32.05	-63.21	-13.00	-50.21
5856.20	н	-	-	-77.62	4.81	34.19	-61.07	-13.00	-48.07

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

FCC ID: A3LSMS906E	Poud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 54 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		
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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	Н	144	9	-73.16	-7.08	26.76	-68.50	-13.00	-55.50
2539.80	Н	143	39	-56.60	-4.02	46.38	-48.88	-13.00	-35.88
3386.40	Н	-	-	-76.80	-0.81	29.39	-65.87	-13.00	-52.87
4233.00	Н	-	-	-76.48	0.43	30.95	-64.30	-13.00	-51.30
5079.60	Н	-	-	-76.77	1.78	32.01	-63.25	-13.00	-50.25
5926.20	Н	-	-	-77.49	4.92	34.43	-60.83	-13.00	-47.83

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

FCC ID: A3LSMS906E	Poud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga 55 of 60	
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	rtable Handset		Page 55 of 60	
© 2021 PCTEST	•	•		V2.0 3/15/2021	



## 7.7 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

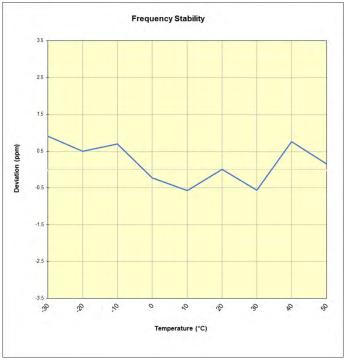
FCC ID: A3LSMS906E		PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 56 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Fage 50 01 00
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## LTE Band 26/5

LTE Band 26/5								
	Operating F	requency (Hz):	836,50	00,000				
	Ref.	Voltage (VDC):	4.	39				
		Deviation Limit:	± 0.00025%	or 2.5 ppm				
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)			
		- 30	836,499,353	760	0.0000909			
		- 20	836,499,009	416	0.0000497			
		- 10	836,499,170	577	0.0000690			
		0	836,498,404	-189	-0.0000226			
100 %	4.39	+ 10	836,498,112	-481	-0.0000575			
		+ 20 (Ref)	836,498,593	0	0.0000000			
		+ 30	836,498,127	-466	-0.0000557			
		+ 40	836,499,230	637	0.0000762			
		+ 50	836,498,715	122	0.0000145			
Battery Endpoint	3.80	+ 20	836,498,751	158	0.0000189			

Table 7-14. LTE Band 26/5 Frequency Stability Data



Plot 7-58. LTE Band 26/5 Frequency Stability Chart

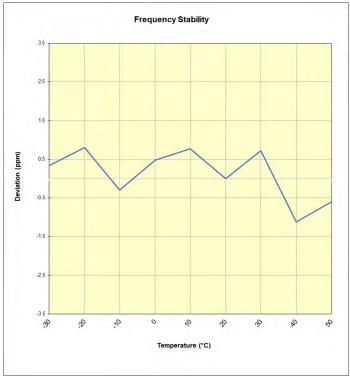
FCC ID: A3LSMS906E	Poud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 57 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		
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## **GSM/GPRS** Cell

GSM/GPRS Cellular									
	Operating F	requency (Hz):	836,60	00,000					
	Ref.	Voltage (VDC):	4.	39					
		Deviation Limit:	± 0.00025%	or 2.5 ppm					
					-				
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)				
		- 30	836,600,108	276	0.0000330				
		- 20	836,600,507	675	0.0000807				
		- 10	836,599,585	-247	-0.0000295				
		0	836,600,232	400	0.0000478				
100 %	4.39	+ 10	836,600,474	642	0.0000767				
		+ 20 (Ref)	836,599,832	0	0.0000000				
		+ 30	836,600,437	605	0.0000723				
		+ 40	836,598,894	-938	-0.0001121				
		+ 50	836,599,332	-500	-0.0000598				
Battery Endpoint	3.80	+ 20	836,599,815	-17	-0.0000020				

## Table 7-15. GSM/GPRS Cell Frequency Stability Data



### Plot 7-59. GSM/GPRS Cell Frequency Stability Chart

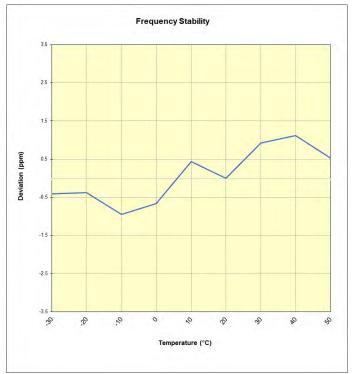
FCC ID: A3LSMS906E	PCTEST* Proud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 58 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset	able Handset	
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# WCDMA Cell

WCDMA Cellular									
	Operating F	Frequency (Hz):	836,600,000						
	Ref. Voltage (VDC):		4.39						
	Deviation Limit:		± 0.00025% or 2.5 ppm						
					-				
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)				
		- 30	836,600,314	-342	-0.0000409				
		- 20	836,600,340	-316	-0.0000378				
		- 10	836,599,865	-791	-0.0000945				
		0	836,600,104	-552	-0.0000660				
100 %	4.39	+ 10	836,601,024	368	0.0000440				
		+ 20 (Ref)	836,600,656	0	0.0000000				
		+ 30	836,601,426	770	0.0000920				
		+ 40	836,601,595	939	0.0001122				
		+ 50	836,601,099	443	0.0000530				
Battery Endpoint	3.80	+ 20	836,600,137	-519	-0.0000620				

Table 7-16. WCDMA Cell Frequency Stability Data



### Plot 7-60. WCDMA Cell Frequency Stability Chart

FCC ID: A3LSMS906E	PCTEST Proud to be part of @ element	PART 22 MEASUREMENT REPORT	SAMSUND	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 50 of 60	
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Page 59 of 60	
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## 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the Samsung **Portable Handset FCC ID: A3LSMS906E** complies with all the requirements of Part 22 of the FCC rules.

FCC ID: A3LSMS906E		PART 22 MEASUREMENT REPORT	SAMSUNE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 60 of 60
1M2110010116-28.A3L	11/15/2021 - 12/03/2021	Portable Handset		Fage 00 01 00
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