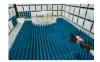


## **PCTEST**

13, Heungdeok 1-ro, Giheung-gu, Yongin-si, Gyeonggi-do, 16954 South Korea Tel. 031.660.7319 / Fax 031.660.7318 http://www.pctest.com



# PART 27 MEASUREMENT REPORT

#### **Applicant Name:**

Samsung Electronics Co., Ltd. 129, Samsung-ro, Yeongtong-gu, Suwon-si Gyeonggi-do, 16677, Korea Date of Testing: 01/03/2022 - 01/26/2022 Test Report Issue Date: 02/09/2022 Test Site/Location: PCTEST Lab. Yongin-Si, Gyeonggi-do, South Korea Test Report Serial No.: 1M2112270166-04.A3L

## FCC ID: APPLICANT:

## A3LSMA135U

Samsung Electronics Co., Ltd.

Application Type: Model: Additional Model(s): EUT Type: FCC Classification: FCC Rule Part: Test Procedure(s): Certification SM-A135U SM-A135U1, SM-A135U1/DS Portable Handset PCS Licensed Transmitter Held to Ear (PCE) 27 ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01

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

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

R

Prepared by

N

Reviewed by

FCC ID: A3LSMA135U	PCTEST* Poud to be part of @ element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 1 of 121
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset	ldset	
© 2022 PCTEST	·	·		V2.0 4/5/2021

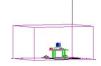


# TABLE OF CONTENTS

1.0	INTR	ODUCTION	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	CRIPTION 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	RESULTS	10
	7.1	Summary	10
	7.2	Occupied Bandwidth	12
	7.3	Spurious and Harmonic Emissions at Antenna Terminal	
	7.4	Band Edge Emissions at Antenna Terminal	53
	7.5	Peak-Average Ratio	
	7.6	Radiated Power (ERP/EIRP)	95
	7.7	Radiated Spurious Emissions Measurements	
	7.8	Frequency Stability / Temperature Variation	115
8.0	CON	CLUSION	121

FCC ID: A3LSMA135U		PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dere 2 of 121
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset	Page 2 of 121
© 2022 PCTEST		·	V2.0 4/5/2021





# MEASUREMENT REPORT FCC Part 27



				ERP		EIRP		
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]	Emission Designator
	20 MHz	QPSK	673.0 - 688.0	0.071	18.52	0.117	20.67	18M0G7D
		16QAM	673.0 - 688.0	0.052	17.19	0.086	19.34	18M1W7D
	15 MHz	QPSK	670.5 - 690.5	0.070	18.46	0.115	20.61	13M5G7D
LTE Band 71		16QAM	670.5 - 690.5	0.053	17.28	0.088	19.43	13M6W7D
	10 MHz	QPSK	668.0 - 693.0	0.070	18.47	0.115	20.62	9M02G7D
		16QAM	668.0 - 693.0	0.053	17.21	0.086	19.36	9M04W7D
	5 MHz	QPSK	665.5 - 695.5	0.064	18.07	0.105	20.22	4M54G7D
		16QAM	665.5 - 695.5	0.050	16.98	0.082	19.13	4M55W7D
	10 MHz	QPSK	704.0 - 711.0	0.067	18.24	0.109	20.39	9M01G7D
		16QAM	704.0 - 711.0	0.052	17.18	0.086	19.33	9M01W7D
	5 MHz	QPSK	701.5 - 713.5	0.064	18.03	0.104	20.18	4M55G7D
LTE Band 12		16QAM	701.5 - 713.5	0.048	16.83	0.079	18.98	4M55W7D
	3 MHz	QPSK	700.5 - 714.5	0.065	18.11	0.106	20.26	2M73G7D
		16QAM	700.5 - 714.5	0.048	16.84	0.079	18.99	2M72W7D
	1.4 MHz	QPSK	699.7 - 715.3	0.064	18.05	0.105	20.20	1M10G7D
		16QAM	699.7 - 715.3	0.048	16.79	0.078	18.94	1M10W7D
	10 MHz	QPSK	782.0	0.074	18.72	0.122	20.87	8M96G7D
LTE Band 13		16QAM	782.0	0.057	17.54	0.093	19.69	8M99W7D
	5 MHz	QPSK	779.5 - 784.5	0.074	18.71	0.122	20.86	4M54G7D
		16QAM	779.5 - 784.5	0.060	17.78	0.098	19.93	4M53W7D

## **Overview Table (<1GHz Bands)**

				EI	RP	
Mode Bandwidth		Modulation	Tx Frequency Range [MHz]	Max. Power [W]	Max. Power [dBm]	Emission Designator
WCDMA1700	N/A	Spread Spectrum	1712.4 - 1752.6	0.153	21.86	4M16F9W
	20 MH-	QPSK	1720.0 - 1770.0	0.186	22.68	18M0G7D
	20 MHz	16QAM	1720.0 - 1770.0	0.122	20.87	18M0W7D
	15 MHz	QPSK	1717.5 - 1772.5	0.203	23.07	13M5G7D
		16QAM	1717.5 - 1772.5	0.139	21.42	13M5W7D
	10 MHz	QPSK	1715.0 - 1775.0	0.203	23.08	8M99G7D
LTE Band 66/4		16QAM	1715.0 - 1775.0	0.133	21.23	9M01W7D
LIE Dallu 00/4	5 MHz	QPSK	1712.5 - 1777.5	0.205	23.12	4M53G7D
		16QAM	1712.5 - 1777.5	0.143	21.55	4M55W7D
	3 MHz	QPSK	1711.5 - 1778.5	0.205	23.12	2M72G7D
		16QAM	1711.5 - 1778.5	0.141	21.50	2M72W7D
	1.4 MHz	QPSK	1710.7 - 1779.3	0.199	22.98	1M09G7D
	1.4 10172	16QAM	1710.7 - 1779.3	0.134	21.28	1M11W7D

**Overview Table (>1GHz Bands)** 

FCC ID: A3LSMA135U	PCTEST* Proud to be part of @ element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dega 2 of 101	
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset		Page 3 of 121	
© 2022 PCTEST				V2.0 4/5/2021	



## **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: A3LSMA135U		PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 4 of 121
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset	e Handset	
© 2022 PCTEST		•		V2.0 4/5/2021



# 2.0 PRODUCT INFORMATION

## 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMA135U**. 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 27.

Test Device Serial No.: 0336M, 0436M, 0444M, 0736M, 0764M, 0767M, 0874M, 4500M

## 2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n WLAN, 802.11a/n/ac UNII (5GHz), Bluetooth (1x, EDR, LE), NFC

## 2.3 Test Configuration

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

## 2.4 EMI Suppression Device(s)/Modifications

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

FCC ID: A3LSMA135U	PCTEST Proud to be part of @ element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 5 of 121
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset		
© 2022 PCTEST	•			V2.0 4/5/2021



# 3.0 DESCRIPTION OF TESTS

## 3.1 Evaluation Procedure

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

## 3.2 Radiated Power and Radiated Spurious Emissions

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

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

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

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

All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4-2014. Additionally, radiated emissions below 30MHz are also validated on an Open Area Test Site to assert correlation with the chamber measurements per the requirements of KDB 414788 D01 v01r01.

FCC ID: A3LSMA135U		PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dama 6 of 101	
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset		Page 6 of 121	
© 2022 PCTEST				V2.0 4/5/2021	



# 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: A3LSMA135U		PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 7 of 121
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset	e Handset	
© 2022 PCTEST	•			V2.0 4/5/2021



# 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	2021-02-19	Annual	2022-02-18	MY50262130
Agilent	N9030A	PXA Signal Analyzer	2021-07-06	Annual	2022-07-05	MY49432391
Anritsu	\$820E	Cable and Antenna Analyzer	2021-07-07	Annual	2022-07-06	6201300731
Anritsu	MA24106A	USB Power Sensor	2021-07-07	Annual	2022-07-06	1244512
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	2020-10-29	Biennial	2022-10-28	10160045
Com-Power	PAM-118A	Preamplifier	2021-07-07	Annual	2022-07-06	551042
Espec	SH-242	Environmental Chamber	2021-09-15	Annual	2022-09-14	93011064
Fairview Microwave	FM2CP1122-10	Coupler	2021-07-07	Annual	2022-07-06	1946
Keysight Technologies	N9030B	MXA Signal Analyzer	2021-05-11	Annual	2022-05-10	MY57142018
Mini Circuits	ZUDC10-83-S+	Coupler	2021-09-15	Annual	2022-09-14	2111
Mini-Circuits	BW-N10W5+	Attenuator	2021-07-06	Annual	2022-07-05	1607
Mini-Circuits	BW-N10W5+	Attenuator	2021-07-06	Annual	2022-07-05	1607
Rohde & Schwarz	SMBV100B	Signal Generator	2021-11-04	Annual	2022-11-03	101568
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	2021-07-06	Annual	2022-07-05	116851
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	2021-02-19	Annual	2022-02-18	131453
Rohde & Schwarz	ESW	EMI Test Receiver	2021-07-06	Annual	2022-07-05	101761
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2021-02-19	Annual	2022-02-18	102131
Schwarzbeck	VULB9162	Broadband TRILOG Antenna	2021-07-13	Biennial	2023-07-12	9162-217
Schwarzbeck	UHA9105	Dipole Antenna	2020-07-09	Biennial	2022-07-08	91052522
Sunol	DRH-118	Horn Antenna	2021-07-14	Biennial	2023-07-13	A102416-1
Sunol	DRH-118	Horn Antenna	2021-01-12	Biennial	2023-01-11	A060215

Table 5-1. Test Equipment

#### Notes:

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.

FCC ID: A3LSMA135U		PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 9 of 101
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset		Page 8 of 121
© 2022 PCTEST	·	·		V2.0 4/5/2021



# 6.0 SAMPLE CALCULATIONS

## 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

## Spurious Radiated Emission – LTE Band

#### Example: Middle Channel LTE Mode 2<sup>nd</sup> Harmonic (1564 MHz)

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

FCC ID: A3LSMA135U		PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 0 of 101
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset		Page 9 of 121
© 2022 PCTEST				V2.0 4/5/2021



# 7.0 TEST RESULTS

# 7.1 Summary

Company Name:	Samsung Electronics Co., Ltd.
FCC ID:	A3LSMA135U
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
Mode(s):	WCDMA/LTE

Test Condition	Test Description	FCC Part Section(s)	Test Limit	Test Result	Reference
	Occupied Bandwidth	2.1049(h)	N/A	PASS	Section 7.2
	Conducted Band Edge / Spurious Emissions (LTE Band 13)	2.1051, 27.53(c), 27.53(f)	Undesirable emissions must meet the limits detailed in sections 27.53(c) and 27.53(f)	PASS	Sections 7.3, 7.4
CONDUCTED	Conducted Band Edge / Spurious Emissions (LTE Band 12, 71)	2.1051, 27.53(g)	≥ 43 + 10 log (P[Watts]) dB of attenuation below transmitter power	PASS	Sections 7.3, 7.4
CONDI	Conducted Band Edge / Spurious Emissions (WCDMA AWS; LTE Band 4, 66)	2.1051, 27.53(h)	≥ 43 + 10 log (P[Watts]) dB of attenuation below transmitter power	PASS	Sections 7.3, 7.4
	Peak-to-Average Ratio (WCDMA AWS; LTE Band 4, 66)	27.50(d)(5)	≤13 dB	PASS	Section 7.5
	Frequency Stability	2.1055, 27.54	Fundamental emissions stay within authorized frequency block	PASS	Section 7.8
	Effective Radiated Power (LTE Band 13)	27.50(b)(10)	≤ 3 Watts max. ERP	PASS	Section 7.6
	Effective Radiated Power (LTE Band 12, 71)	27.50(c)(10)	≤ 3 Watts max. ERP	PASS	Section 7.6
RADIATED	Equivalent Isotropic Radiated Power (WCDMA AWS; LTE Band 4, 66)	27.50(d)(10)	≤ 1 Watt max. EIRP	PASS	Section 7.6
RADI	Radiated Spurious Emissions (LTE Band 13)	2.1053, 27.53(c), 27.53(f)	Undesirable emissions must meet the limits detailed in sections 27.53(c) and 27.53(f)	PASS	Section 7.7
	Radiated Spurious Emissions (LTE Band 12, 71)	2.1053, 27.53(g)	≥ 43 + 10 log (P[Watts]) dB of attenuation below transmitter power	PASS	Section 7.7
	Radiated Spurious Emissions (WCDMA AWS; LTE Band 4, 66)	2.1053, 27.53(h)	≥ 43 + 10 log (P[Watts]) dB of attenuation below transmitter power	PASS	Section 7.7

## Table 7-1. Summary of Test Results

FCC ID: A3LSMA135U	PCTEST Proud to be part of @ element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dama 40 af 404	
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset		Page 10 of 121	
© 2022 PCTEST	•			V2.0 4/5/2021	



#### Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots shown in Section 7.0 were taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST EMC Software Tool v1.0.

FCC ID: A3LSMA135U	Proved to be part of the element	PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Degs 11 of 121
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset	Page 11 of 121
© 2022 PCTEST			V2.0 4/5/2021



## 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.

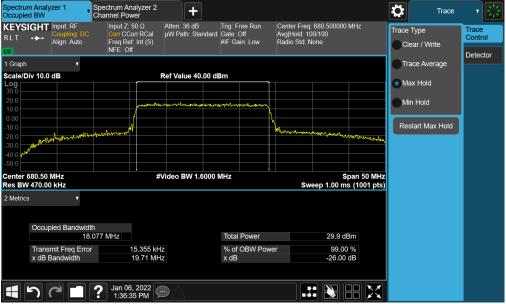
FCC ID: A3LSMA135U		PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 12 of 121
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset		Page 12 of 121
© 2022 PCTEST				V2.0 4/5/2021



# LTE Band 71



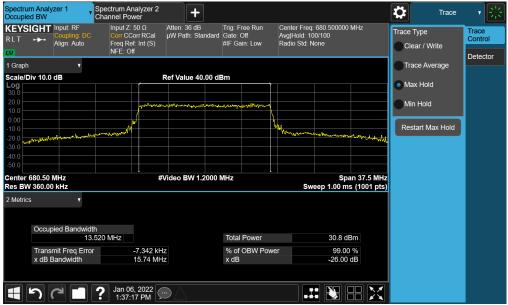
Plot 7-1. Occupied Bandwidth Plot (LTE Band 71 - 20MHz QPSK - Full RB)



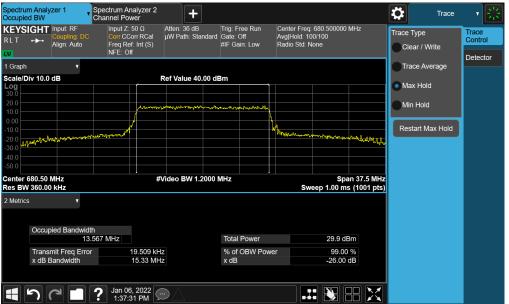
Plot 7-2. Occupied Bandwidth Plot (LTE Band 71 - 20MHz 16-QAM - Full RB)

FCC ID: A3LSMA135U		PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dego 12 of 121
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset	Page 13 of 121
© 2022 PCTEST			V2.0 4/5/2021





Plot 7-3. Occupied Bandwidth Plot (LTE Band 71 - 15MHz QPSK - Full RB)



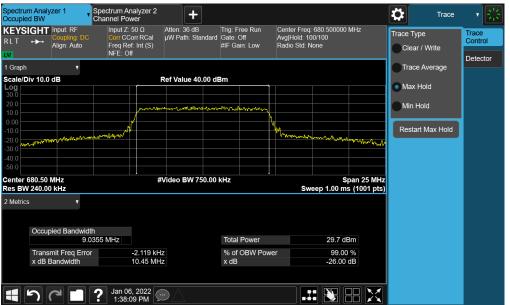
Plot 7-4. Occupied Bandwidth Plot (LTE Band 71 - 15MHz 16-QAM - Full RB)

FCC ID: A3LSMA135U		PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 14 of 101	
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset		Page 14 of 121	
© 2022 PCTEST	•			V2.0 4/5/2021	





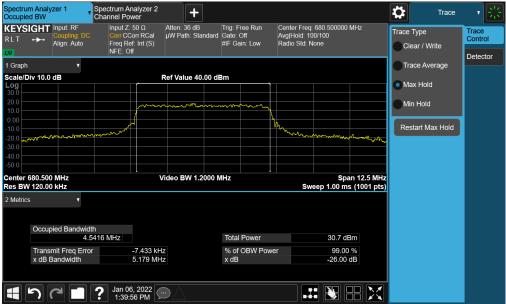
Plot 7-5. Occupied Bandwidth Plot (LTE Band 71 - 10MHz QPSK - Full RB)



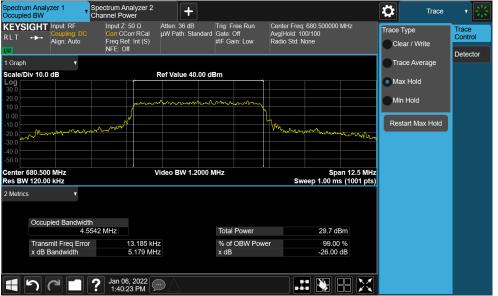
Plot 7-6. Occupied Bandwidth Plot (LTE Band 71 - 10MHz 16-QAM - Full RB)

FCC ID: A3LSMA135U		PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 15 of 101	
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset		Page 15 of 121	
© 2022 PCTEST	•	•		V2.0 4/5/2021	





Plot 7-7. Occupied Bandwidth Plot (LTE Band 71 - 5MHz QPSK - Full RB)



Plot 7-8. Occupied Bandwidth Plot (LTE Band 71 - 5MHz 16-QAM - Full RB)

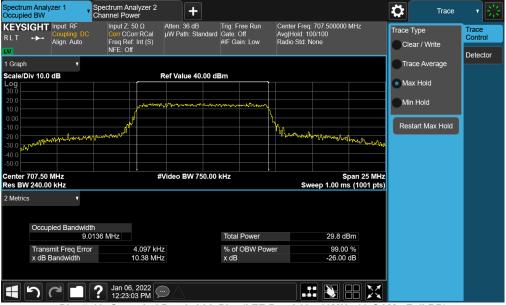
FCC ID: A3LSMA135U		PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 16 of 101	
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset		Page 16 of 121	
© 2022 PCTEST	•	•		V2.0 4/5/2021	



# LTE Band 12



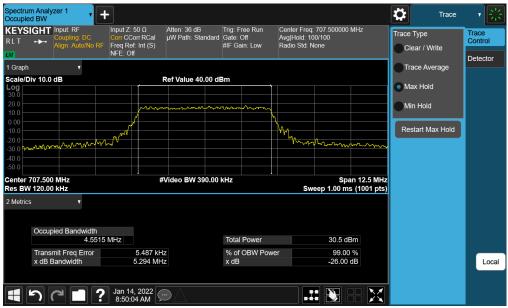
Plot 7-9. Occupied Bandwidth Plot (LTE Band 12 - 10MHz QPSK - Full RB)



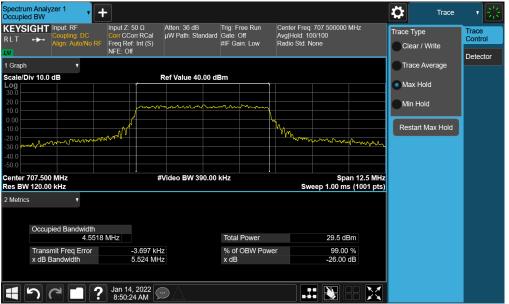
Plot 7-10. Occupied Bandwidth Plot (LTE Band 12 - 10MHz 16-QAM - Full RB)

FCC ID: A3LSMA135U	POTEST* Proud to be part of @ element	PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dego 17 of 101
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset	Page 17 of 121
© 2022 PCTEST	·		V2.0 4/5/2021





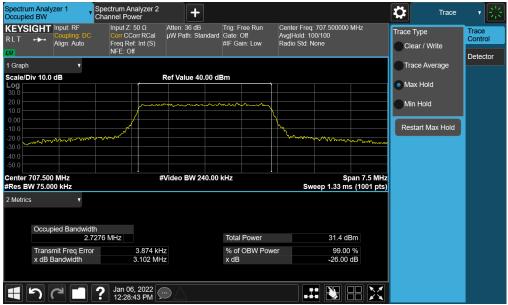
Plot 7-11. Occupied Bandwidth Plot (LTE Band 12 - 5MHz QPSK - Full RB)



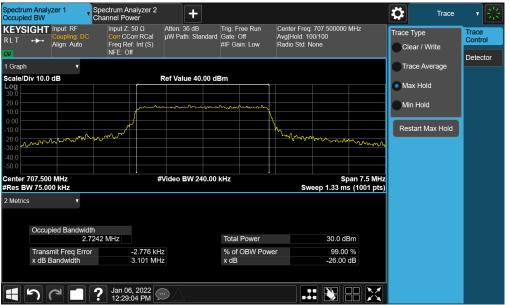
Plot 7-12. Occupied Bandwidth Plot (LTE Band 12 - 5MHz 16-QAM - Full RB)

FCC ID: A3LSMA135U		PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 19 of 101
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset		Page 18 of 121
© 2022 PCTEST	•			V2.0 4/5/2021





Plot 7-13. Occupied Bandwidth Plot (LTE Band 12 - 3MHz QPSK - Full RB)



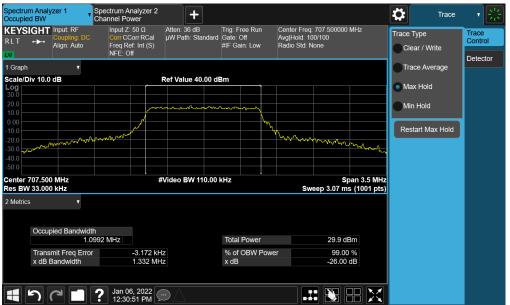
Plot 7-14. Occupied Bandwidth Plot (LTE Band 12 - 3MHz 16-QAM - Full RB)

FCC ID: A3LSMA135U		PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Demo 10 of 101
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset		Page 19 of 121
© 2022 PCTEST	•			V2.0 4/5/2021





Plot 7-15. Occupied Bandwidth Plot (LTE Band 12 - 1.4MHz QPSK - Full RB)



Plot 7-16. Occupied Bandwidth Plot (LTE Band 12 – 1.4MHz 16-QAM - Full RB)

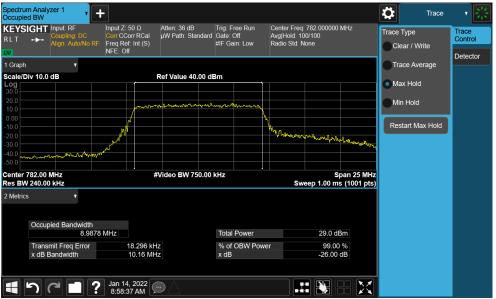
FCC ID: A3LSMA135U		PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 20 of 121
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset		Page 20 of 121
© 2022 PCTEST	•			V2.0 4/5/2021



# LTE Band 13



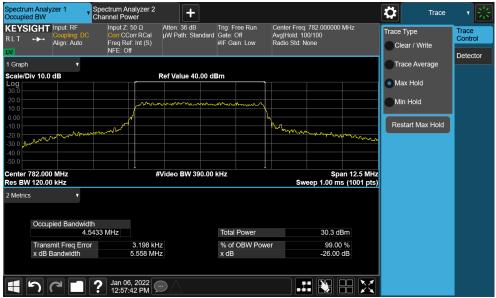
Plot 7-17. Occupied Bandwidth Plot (LTE Band 13 - 10MHz QPSK - Full RB)



Plot 7-18. Occupied Bandwidth Plot (LTE Band 13 - 10MHz 16-QAM - Full RB)

FCC ID: A3LSMA135U	Poctest*	PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 01 of 101
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset	Page 21 of 121
© 2022 PCTEST		·	V2.0 4/5/2021





Plot 7-19. Occupied Bandwidth Plot (LTE Band 13 - 5MHz QPSK - Full RB)



Plot 7-20. Occupied Bandwidth Plot (LTE Band 13 - 5MHz 16-QAM - Full RB)

FCC ID: A3LSMA135U		PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 22 of 121
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset		Page 22 of 121
© 2022 PCTEST	•			V2.0 4/5/2021



# WCDMA AWS

Spectrum Analyzer 1 Occupied BW KEYSIGHT Input: RF Couping: DC Align: Auto	H Input Ζ: 50 Ω Corr CCorr RCal Freq Ref: Int (S) NFE: Off	µW Path: Standard	Trig: Free Run Gate: Off #IF Gain: Low	Center Freq; 1.732600000 GHz Avg Hold: 100/100 Radio Std: None	Trace Type Clear / Write	Trace Control
1 Graph v Scale/Div 10.0 dB		Ref Value 40.00 dE	3m		Trace Average	Deteolor
20.0 10.0			mont		Min Hold	
0.00 10.0 20.0 30.0 Whay w/manufacture / // and				hannen	Restart Max Hold	
-40.0 -50.0 Center 1.732600 GHz		/ideo BW 1.5000 N	1Hz	Span 15 M		
Res BW 150.00 kHz 2 Metrics				Sweep 1.00 ms (1001 )	ots)	
Occupied Bandwidth 4.16	649 MHz		Total Power	31.2 dBm		
Transmit Freq Error x dB Bandwidth	6.290 kH 4.792 MH		% of OBW Powe x dB	er 99.00 % -26.00 dB		Local
	<b>?</b> Jan 07, 2022 3:15:31 PM					

Plot 7-21. Occupied Bandwidth Plot (WCDMA, Ch. 1413)

FCC ID: A3LSMA135U	PCTEST Proud to be port of @ element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 22 of 121
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset		Page 23 of 121
© 2022 PCTEST	V2.0 4/5/2021			



# LTE Band 66/4



Plot 7-22. Occupied Bandwidth Plot (LTE Band 66/4 - 20MHz QPSK - Full RB)

RLT + Coupling: DC C Align: Auto Fi	nput Z: 50 Ω Atten: 36 dB iorr CCorr RCal μW Path: Standa req Ref: Int (S) IFE: Off	ard Gate: Off Avg	nter Freq: 1.745000000 GHz g Hold: 100/100 dio Std: None	Trace Type Clear / Write	Trace Control
1 Graph v Scale/Div 10.0 dB Log	Ref Value 40.00	dBm		<ul> <li>Trace Average</li> <li>Max Hold</li> </ul>	Detector
30.0 20.0 10.0	Add Straft Charles and a strain of the strai	www.www.www.		Min Hold	
0.00 -10.0 -20.0 wallowyhad waynad www.han -30.0	wayn A		Land Contraction and Contraction of the State of the Stat	Restart Max Hold	
-40.0 -50.0 Center 1.74500 GHz Res BW 470.00 kHz	#Video BW 1.600	00 MHz	Span 50 MHz		
2 Metrics v			Sweep 1.00 ms (1001 pts)		
Occupied Bandwidth 17.986 MH	Hz	Total Power	30.4 dBm		
Transmit Freq Error x dB Bandwidth	-57.251 kHz 19.84 MHz	% of OBW Power x dB	99.00 % -26.00 dB		
t C I ? `	Jan 06, 2022 9:30:25 AM				

Plot 7-23. Occupied Bandwidth Plot (LTE Band 66/4 - 20MHz 16-QAM - Full RB)

FCC ID: A3LSMA135U	PCTEST* Proud to be part of @ element	PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 24 of 121
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset	Page 24 of 121
© 2022 PCTEST	-		V2.0 4/5/2021





Plot 7-24. Occupied Bandwidth Plot (LTE Band 66/4 - 15MHz QPSK - Full RB)



Plot 7-25. Occupied Bandwidth Plot (LTE Band 66/4 - 15MHz 16-QAM - Full RB)

FCC ID: A3LSMA135U		PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 25 of 121
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset	Page 25 of 121
© 2022 PCTEST	•		V2.0 4/5/2021





Plot 7-26. Occupied Bandwidth Plot (LTE Band 66/4 - 10MHz QPSK - Full RB)



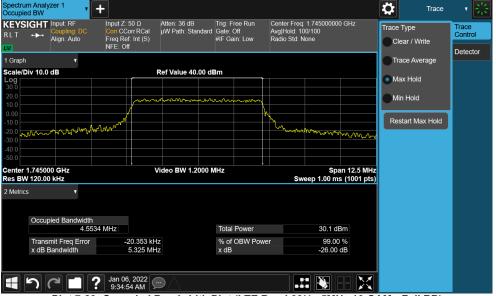
Plot 7-27. Occupied Bandwidth Plot (LTE Band 66/4 - 10MHz 16-QAM - Full RB)

FCC ID: A3LSMA135U	Poctest Provid to be part of @ element	PART 27 MEASUREMENT REPORT	SUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 26 of 121
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset		Page 26 of 121
© 2022 PCTEST	•			V2.0 4/5/2021





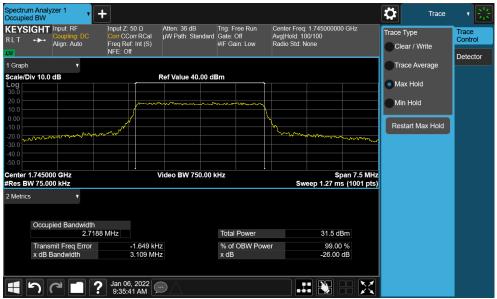
Plot 7-28. Occupied Bandwidth Plot (LTE Band 66/4 - 5MHz QPSK - Full RB)



Plot 7-29. Occupied Bandwidth Plot (LTE Band 66/4 - 5MHz 16-QAM - Full RB)

FCC ID: A3LSMA135U		PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 07 of 101
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset		Page 27 of 121
© 2022 PCTEST	•			V2.0 4/5/2021





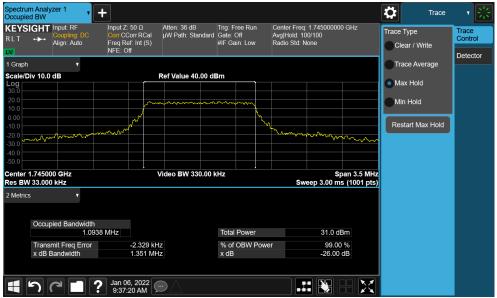
Plot 7-30. Occupied Bandwidth Plot (LTE Band 66/4 - 3MHz QPSK - Full RB)



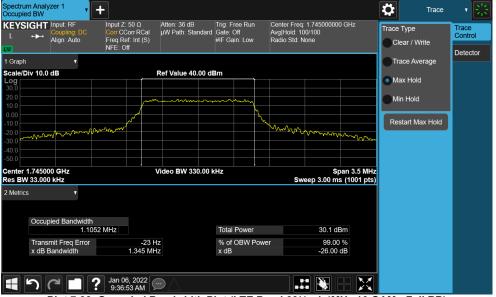
Plot 7-31. Occupied Bandwidth Plot (LTE Band 66/4 - 3MHz 16-QAM - Full RB)

FCC ID: A3LSMA135U	PCTEST Poud to be part of @ element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 29 of 121
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset		Page 28 of 121
© 2022 PCTEST	•			V2.0 4/5/2021





Plot 7-32. Occupied Bandwidth Plot (LTE Band 66/4 - 1.4MHz QPSK - Full RB)



Plot 7-33. Occupied Bandwidth Plot (LTE Band 66/4 - 1.4MHz 16-QAM - Full RB)

FCC ID: A3LSMA135U		PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 29 of 121
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset		Page 29 01 121
© 2022 PCTEST	•	·		V2.0 4/5/2021



## 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 18GHz (separated into at least two plots per channel)
- 2. RBW ≥ 100kHz
- 3. VBW  $\geq$  3 x RBW
- 4. Detector = RMS
- 5. Trace mode = max hold
- 6. Sweep time = auto couple
- 7. The trace was allowed to stabilize

#### Test Setup

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



Figure 7-2. Test Instrument & Measurement Setup

#### Test Notes

Per Part 27 and RSS-139, 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: A3LSMA135U		PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 20 of 101
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset		Page 30 of 121
© 2022 PCTEST	•			V2.0 4/5/2021



# LTE Band 71

Spectrum Analyzer 1 Swept SA	Spectrum Analyzer 2 Channel Power	+			Frequency	•
KEYSIGHT Input: RF RLT ↔ 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: Power (RMS 1 2 3 4 5 6 Trig: Free Run A WW WW W A N N N N N	Center Frequency 346.000000 MHz	Settings
Spectrum v cale/Div 10 dB		Ref Level 20.00 di	-	Mkr1 660.40 MHz -47.619 dBm	002.000000 10112	
Trace 1 Pass					Full Span	
0.00					Start Freq 30.000000 MHz Stop Freq	
20.0					662.000000 MHz	
				1	AUTO TUNE CF Step 63.200000 MHz	
60.0		NATE OF THE DAY OF THE DAY.	laug send burges and a state substation for		Auto Man	
70.0					Freq Offset 0 Hz X Axis Scale	
start 30.0 MHz Res BW 100 kHz		#Video BW 300 ki	Hz	Stop 662.0 MHz Sweep 30.3 ms (12641 pts)	Log Lin	
	<b>?</b> Jan 06, 2022 1:42:59 PM				Signal Track (Span Zoom)	

Plot 7-34. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Low Channel)

Spectrum Analyzer 1	Spectrum Analyzer 2 Channel Power	+			Frequency	/ * 亲
KEYSIGHT     Input: RF       RLT     Input: RF       Align: Auto			Fast #Avg Type Off Trig: Free in: Low ack: Off	E Power (RMS <mark>1</mark> 23456 Run A <del>WWWW</del> A N N N N N	Center Frequency 849.000000 MHz	Settings
1 Spectrum v Scale/Div 10 dB	R	tef Level 20.00 dBm		Mkr1 699.50 MHz -17.253 dBm	302.000000 1011 12	
10.0 0.00					Full Span	
-10.0					Start Freq 698.000000 MHz Stop Freq	
-20.0					1.000000000 GHz	
-40.0					CF Step 30.200000 MHz	
-60.0	***************************************	yariya afanyada ayada yaka yaka yaka yaka yaka kutoka di taka yaka yaka yaka yaka yaka yaka yaka	allend - annal for de l'Allen al anno ter son anna airs		Man Freq Offset 0 Hz	
Start 0.6980 GHz #Res BW 100 kHz	#	₽Video BW 300 kHz	s	Stop 1.0000 GHz weep 14.5 ms (6041 pts)	X Axis Scale	Local
<b>4</b> 7 7 <b>1</b>	<b>?</b> Jan 06, 2022 1:44:06 PM				Signal Track (Span Zoom)	

Plot 7-35. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Low Channel)

FCC ID: A3LSMA135U	PCTEST Proud to be part of & element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Demo 21 of 121
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset		Page 31 of 121
© 2022 PCTEST	•			V2.0 4/5/2021





Plot 7-36. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Low Channel)

Spectrum Analyzer 1 Swept SA	Spectrum Analyzer 2 Channel Power	+			Frequency	/ • 🕄
L       +++       Input: RF         Coupling: D       Align: Auto         V       PASS	Input Z: 50 Ω C Corr CCorr RCal Freq Ref: Int (S) NFE: Off		: Fast #Avg Type: : Off Trig: Free F ain: Low rack: Off	Power (RMS <mark>1</mark> 23456 Run A <del>WWWW</del> ANNNN	Center Frequency 346.500000 MHz Span	Settings
Spectrum v			Ν	Akr1 662.80 MHz	633.000000 MHz	
cale/Div 10 dB		Ref Level 20.00 dBm		-39.805 dBm	Swept Span	
Trace 1 Pass					Zero Span	
					Full Span	
0.00					Start Freq 30.000000 MHz	
					Stop Freq 663.000000 MHz	
				1	AUTO TUNE	
				<del>_</del>	CF Step 63.300000 MHz	
60.0				y	Auto Man	
r0.0					Freq Offset 0 Hz	
tart 30.0 MHz Res BW 100 kHz		#Video BW 300 kHz	Swe	Stop 663.0 MHz eep 30.4 ms (12661 pts)		
	<b>?</b> Jan 06, 2022 1:45:59 PM	ÐA			Signal Track (Span Zoom)	

Plot 7-37. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Mid Channel)

FCC ID: A3LSMA135U	PCTEST* Proud to be perfect of @element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 22 of 121
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset		Page 32 of 121
© 2022 PCTEST	•			V2.0 4/5/2021



Spectrum Analyzer 1 Swept SA	Spectrum Analyzer 2 Channel Power	+		Frequency 🔻 🔆
KEYSIGHT       Input: RF         L       →→         Align: Auto         DXT       PASS	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 A N N N N N	Center Frequency 849.000000 MHz Span
1 Spectrum v Scale/Div 10 dB		Ref Level 20.00 dBm	Mkr1 707.05 MHz -20.262 dBm	302.000000 MHz Swept Span Zero Span
10.0				Full Span
-10.0				Start Freq 698.000000 MHz
-20.0				Stop Freq 1.00000000 GHz
-40.0				AUTO TUNE CF Step 30.200000 MHz
-50.0	ngefuurtuigengen inner, na illitationisten Masser, fa			Auto Man
-70.0				Freq Offset 0 Hz
Start 0.6980 GHz #Res BW 100 kHz		#Video BW 300 kHz	Stop 1.0000 GHz Sweep 14.5 ms (6041 pts)	X Axis Scale Log Lin
	• 1.+0.201 NI			Signal Track (Span Zoom)

Plot 7-38. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Mid Channel)

Spectrum Analyzer 1 Swept SA	Spectrum Analyzer 2 Channel Power	+		Frequency v
KEYSIGHT     Input: RF       R L T     Coupling: DC       Align: Auto	Input Ζ: 50 Ω Corr CCorr RCal Freq Ref: Int (S) NFE: Off	#Atten: 26 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 5.500000000 GHz Span
l Spectrum 🔹			Mkr1 9.991 5 GHz	9.00000000 GHz
Scale/Div 10 dB		Ref Level 0.00 dBm	-44.733 dBm	Swept Span Zero Span
				Full Span
				Start Freq 1.000000000 GHz
40.0			1	Stop Freq 10.00000000 GHz
50.0	~~			AUTO TUNE
50.0				CF Step 900.000000 MHz
30.0				Auto Man
				Freq Offset 0 Hz
tart 1.000 GHz Res BW 1.0 MHz		#Video BW 3.0 MHz	Stop 10.000 GHz Sweep ~16.5 ms (18001 pts)	X Axis Scale
	Jan 06, 2022 1:46:55 PM			Signal Track (Span Zoom)

Plot 7-39. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Mid Channel)

FCC ID: A3LSMA135U		PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Demo 22 of 121
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset		Page 33 of 121
© 2022 PCTEST				V2.0 4/5/2021



Spectrum Analyzer 1 Swept SA	Spectrum Analyzer 2 Channel Power	+		Frequency 🔻 🤮
KEYSIGHT L + 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: C		340.300000 10112
1 Spectrum v Scale/Div 10 dB		Ref Level 20.00 dBm	Mkr1 661.70 MHz -44.165 dBm	000.000000 Milliz
10.0 0.00				Full Span
-10.0				Start Freq 30.000000 MHz Stop Freq
-20.0				663.000000 MHz
-40.0			1	CF Step 63.300000 MHz
-60.0	A contract of the section of the sec	ter and an and the second s		Auto Man Freq Offset
-70.0 Start 30.0 MHz		#Video BW 300 kHz	Stop 663.0 MHz	
	1:47:48 PM		Sweep 30.4 ms (12661 pts)	Lin Signal Track (Span Zoom)

Plot 7-40. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - High Channel)

Spectrum Analyzer 1 Swept SA	Spectrum Analyzer 2 Channel Power	+		Frequency	/ 「米
Imput: RF       Coupling: DC       AL T       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: Of		849.500000 MHz	Settings
Spectrum v			Mkr1 705.65 MHz	001.000000 10112	
cale/Div 10 dB		Ref Level 20.00 dBm	-38.831 dBm	Swept Span Zero Span	
Trace 1 Pass				Full Span	
.00				Start Freq	
0.0				699.000000 MHz	
20.0				Stop Freq 1.000000000 GHz	
0.0				AUTO TUNE	
0.0				CF Step 30.100000 MHz	
50.0				Auto Man	
70.0				Freq Offset 0 Hz	
tart 0.6990 GHz Res BW 100 kHz		#Video BW 300 kHz	Stop 1.0000 GHz Sweep 14.4 ms (6021 pts		Local
<b>1</b> 7 7 7	Signal Track (Span Zoom)				

Plot 7-41. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - High Channel)

FCC ID: A3LSMA135U		PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M2112270166-04.A3L	01/03/2022 - 01/26/2022	Portable Handset		Page 34 of 121
© 2022 PCTEST	•			V2.0 4/5/2021