

PCTEST

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



PART 22 MEASUREMENT REPORT

Applicant Name:

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

Date of Testing:

1/16/2021 - 1/26/2021 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M2101110003-02.A3L

FCC ID:

Applicant Name:

A3LSMG998JPN

Samsung Electronics Co., Ltd.

Application Type: Model: EUT Type: FCC Classification: FCC Rule Part: Test Procedure(s): Certification SC-52B 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.

Randy Ortanez President



| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Dogo 1 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 1 of 65 |
| © 2021 PCTEST | • | · | | V1.2 11/2/2020 |

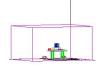


TABLE OF CONTENTS

| 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 | RIPTION OF TESTS | 6 |
| | 3.1 | Evaluation Procedure | 6 |
| | 3.2 | Cellular - Base Frequency Blocks | 6 |
| | 3.3 | Cellular - Mobile Frequency Blocks | 6 |
| | 3.4 | Radiated Power and Radiated Spurious Emissions | 7 |
| 4.0 | MEAS | | 8 |
| 5.0 | TEST | EQUIPMENT CALIBRATION DATA | 9 |
| 6.0 | SAMF | PLE CALCULATIONS | .10 |
| 7.0 | TEST | RESULTS | .12 |
| | 7.1 | Summary | . 12 |
| | 7.2 | Occupied Bandwidth | . 13 |
| | 7.3 | Spurious and Harmonic Emissions at Antenna Terminal | . 22 |
| | 7.4 | Band Edge Emissions at Antenna Terminal | . 38 |
| | 7.5 | Radiated Power (ERP) | . 46 |
| | 7.6 | Radiated Spurious Emissions Measurements | . 49 |
| | 7.7 | Frequency Stability / Temperature Variation | . 58 |
| 8.0 | CON | CLUSION | .65 |

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 2 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 2 01 65 |
| © 2021 PCTEST | | | | V1.2 11/2/2020 |





PART 22 MEASUREMENT REPORT



| Overview Table (Front Page Table) | | | | | | | | |
|-----------------------------------|-----------|-----------------|-----------------------------|-------------------|---------------------|-------------------|---------------------|------------------------|
| | | | T | EF | ۲P | El | RP | Fundamentaria |
| Mode | Bandwidth | Modulation | Tx Frequency Range [MHz] | Max. Power [W] | Max. Power [dBm] | Max. Power [W] | Max. Power [dBm] | Emission Designator |
| GSM/GPRS | - | GMSK | 824.2 - 848.8 | 0.365 | 25.62 | 0.598 | 27.77 | 243KGXW |
| EDGE | - | 8-PSK | 824.2 - 848.8 | 0.085 | 19.27 | 0.139 | 21.42 | 237KG7W |
| WCDMA | - | Spread Spectrum | 826.4 - 846.6 | 0.069 | 18.36 | 0.112 | 20.51 | 4M16F9W |
| | 10 MHz | QPSK | 829.0 - 844.0 | 0.067 | 18.26 | 0.110 | 20.41 | 9M02G7D |
| | | 16QAM | 829.0 - 844.0 | 0.058 | 17.64 | 0.095 | 19.79 | 8M97W7D |
| | | 64QAM | 829.0 - 844.0 | 0.047 | 16.71 | 0.077 | 18.86 | 9M00W7D |
| | | QPSK | 826.5 - 846.5 | 0.064 | 18.04 | 0.104 | 20.19 | 4M51G7D |
| | 5 MHz | 16QAM | 826.5 - 846.5 | 0.057 | 17.57 | 0.094 | 19.72 | 4M51W7D |
| LTE Band 5 | | 64QAM | 826.5 - 846.5 | 0.046 | 16.67 | 0.076 | 18.82 | 4M52W7D |
| LIE Banu S | | QPSK | 825.5 - 847.5 | 0.063 | 18.02 | 0.104 | 20.17 | 2M70G7D |
| | 3 MHz | 16QAM | 825.5 - 847.5 | 0.057 | 17.57 | 0.094 | 19.72 | 2M70W7D |
| | | 64QAM | 825.5 - 847.5 | 0.046 | 16.59 | 0.075 | 18.74 | 2M70W7D |
| | | QPSK | 824.7 - 848.3 | 0.063 | 17.97 | 0.103 | 20.12 | 1M09G7D |
| | 1.4 MHz | 16QAM | 824.7 - 848.3 | 0.057 | 17.58 | 0.094 | 19.73 | 1M10W7D |
| | | 64QAM | 824.7 - 848.3 | 0.046 | 16.60 | 0.000 | 18.75 | 1M09W7D |

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Dogo 2 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 3 of 65 |
| © 2021 PCTEST | | · | | V1.2 11/2/2020 |



1.0 INTRODUCTION

1.1 Scope

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

1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014.

1.3 Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21046, U.S.A.

- PCTEST is an ISO 17025-2017 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISED.

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Dege 4 of CE |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 4 of 65 |
| © 2021 PCTEST | • | • | | V1 2 11/2/2020 |



2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID:A3LSMG998JPN**. 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.: 0466M, 70564H, 70681H, 0482M

2.2 Device Capabilities

This device contains the following capabilities:

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

2.3 Test Configuration

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

This device supports wireless charging capability and, thus, is subject to the test requirements of KDB 648474 D03 v01r04. Additional radiated spurious emission measurements were performed with the EUT lying flat on an authorized wireless charging pad (WCP) Model: EP-5100 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: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Dogo 5 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 5 of 65 |
| © 2021 PCTEST | | | | V1 2 11/2/2020 |



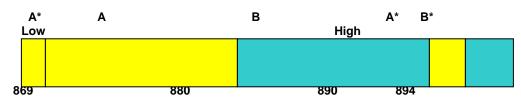
3.0 DESCRIPTION OF TESTS

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

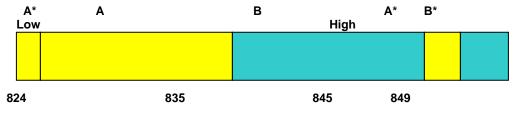
3.2 Cellular - Base Frequency Blocks



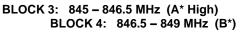
BLOCK 1: 869 - 880 MHz (A* Low + A) BLOCK 2: 880 - 890 MHz (B)

| BLOCK 3: | 890 – 891.5 MHz | (A* High) |
|----------|-----------------|-----------|
| BLOCK 4: | 891.5 – 894 MHz | (B*) |

3.3 Cellular - Mobile Frequency Blocks



BLOCK 1: 824 – 835 MHz (A* Low + A) BLOCK 2: 835 – 845 MHz (B)



| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Dogo 6 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 6 of 65 |
| © 2021 PCTEST | • | · | | V1.2 11/2/2020 |



3.4 Radiated Power and Radiated Spurious Emissions

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

The equipment under test was transmitting while connected to its integral antenna and is placed on a turntable 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer.

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

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

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 $P_{g \text{ [dBm]}}$ – 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:

 $E_{[dB\mu V/m]} =$ Measured amplitude level_[dBm] + 107 + Cable Loss_[dB] + Antenna Factor_[dB/m] And EIRP_[dBm] = E_[dB\mu V/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 474788 D01.

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: A3LSMG998JPN | PCTEST Proud to be part of the element | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-------------------------------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 7 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Fage 7 01 05 |
| © 2021 PCTEST | | | | \/1.2.11/2/2020 |



4.0 MEASUREMENT UNCERTAINTY

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

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

| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of the element | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-------------------------------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 8 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Fage 6 01 05 |
| © 2021 PCTEST | | | | V1 2 11/2/2020 |



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 |
|-----------------|------------|----------------------------------|------------|--------------|------------|---------------|
| - | LTx2 | Licensed Transmitter Cable Set | 4/9/2020 | Annual | 4/9/2021 | LTx2 |
| - | LTx4 | Licensed Transmitter Cable Set | 7/9/2020 | Annual | 7/9/2021 | LTx4 |
| - | LTx5 | LIcensed Transmitter Cable Set | 4/9/2020 | Annual | 4/6/2021 | LTx5 |
| Agilent | N9020A | MXA Signal Analyzer | 8/4/2020 | Annual | 8/4/2021 | US46470561 |
| Agilent | N9030A | PXA Signal Analyzer (44GHz) | 7/17/2020 | Annual | 7/17/2021 | MY52350166 |
| Agilent | E5515C | Wireless Communications Test Set | | N/A | | GB45360985 |
| Anritsu | MT8821C | Radio Communication Analyzer | | N/A | | 6200901190 |
| Com-Power | AL-130 | 9kHz - 30MHz Loop Antenna | 10/10/2019 | Biennial | 10/10/2021 | 121034 |
| Emco | 3115 | Horn Antenna (1-18GHz) | 6/18/2020 | Biennial | 6/18/2022 | 9704-5182 |
| ETS Lindgren | 3164-08 | Quad Ridge Horn Antenna | 3/12/2020 | Biennial | 3/12/2022 | 128337 |
| ETS Lindgren | 3164-08 | Quad Ridge Horn Antenna | 2/22/2019 | Biennial | 2/22/2021 | 128338 |
| Mini Circuits | TVA-11-422 | RF Power Amp | | N/A | | QA1317001 |
| Mini-Circuits | SSG-4000HP | Synthesized Signal Generator | | N/A | | 11403100002 |
| Rohde & Schwarz | CMW500 | Radio Communication Tester | | N/A | | 100976 |
| Rohde & Schwarz | CMW500 | Radio Communication Tester | | N/A | | 112347 |
| Rohde & Schwarz | ESU26 | EMI Test Receiver (26.5GHz) | 7/15/2020 | Annual | 7/15/2021 | 100342 |
| Rohde & Schwarz | SFUNIT-Rx | Shielded Filter Unit | 2/10/2020 | Annual | 2/10/2021 | 102134 |
| Rohde & Schwarz | SFUNIT-Rx | Shielded Filter Unit | 2/21/2020 | Annual | 2/21/2021 | 102133 |
| Sunol | DRH-118 | Horn Antenna (1-18 GHz) | 8/27/2019 | Biennial | 8/27/2021 | A042511 |

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: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 9 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | |
| © 2021 PCTEST | | | | V1 2 11/2/2020 |



6.0 SAMPLE CALCULATIONS

GSM Emission Designator

Emission Designator = 250KGXW

GSM BW = 250 kHzG = 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: A3LSMG998JPN | 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 10 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | dset | |
| © 2021 PCTEST | • | · | | V1 2 11/2/2020 |



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: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 11 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | et | |
| © 2021 PCTEST | - | · | | V1.2 11/2/2020 |



7.0 TEST RESULTS

7.1 Summary

| Company Name: | Samsung Electronics Co., Ltd. |
|---------------------|--------------------------------------------|
| FCC ID: | A3LSMG998JPN |
| FCC Classification: | PCS Licensed Transmitter Held to Ear (PCE) |
| Mode(s): | <u>GSM/GPRS/WCDMA</u> |

| Test Condition | Test Description | FCC Part Section(s) | RSS Section(s) | Test Limit | Test Result | Reference |
|-------------------|-------------------------------------------------------------------|---------------------|----------------|-----------------------------------------------------------------------------|-------------|------------------------------|
| | Occupied Bandwidth | 2.1049 | RSS-Gen(6.7) | N/A | PASS | Section 7.2 |
| | 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 |
| CONDUCTED | Transmitter Conducted Output Power | 2.1046 | RSS-132(5.4) | N/A | PASS | See RF Exposure Report |
| 0 | Frequency Stability | 2.1055, 22.355 | RSS-132(5/3) | Fundamental emissions stay within authorized frequency block | PASS | Section 7.8 |
| | 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 2G/3G Automation Version 4.5, LTE Automation Version 5.3.

| FCC ID: A3LSMG998JPN | Postest* | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 12 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | |
| © 2021 PCTEST | | | | V1 2 11/2/2020 |



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: A3LSMG998JPN | 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 65 | |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | table Handset | | |
| © 2021 PCTEST | • | • | | V1.2 11/2/2020 | |



LTE Band 5

| 🔤 Keysight Spect | | | upied BW | | | | | | | | | | |
|------------------|----------|----------|----------|-------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-----------------|-------------|-------------------------|----------------|------|-------------------|
| LXI RL | RF | 50 Ω | AC | CORRE | C | | SENSE:INT Freg: 836.50 | 0000 MHz | ALIGN AUTO | 10:44:39 P Radio Std | M Jan 15, 2021 | Trac | e/Detector |
| | | | | | ↔ | , Trig: F | ree Run | | ld: 100/100 | | | | |
| | | | | #IFGa | n:Low | #Atten: | 36 dB | | | Radio Dev | vice: BTS | | |
| | | | | | | | | | | | | | |
| 10 dB/div | Ref | 40.00 | dBm | | | | | | | | | | |
| Log 30.0 | | | | | | | | | | | | | |
| | | | | | | | | | | | | 0 | Clear Write |
| 20.0 | | | | | , marine the | an and a second s | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | war when we are | | | | | |
| 10.0 | | | | | | | | | 1 | | | | |
| 0.00 | | | | - / | | | | | <u>ل</u> | | | | |
| -10.0 | | | | - | | | | | 1, | | | | Average |
| -20.0 Annahra | Al March | Mr. Mark | dan m | ~ | | | | | mar and the | Woodhall | Marcal all | | |
| -30.0 | | | | | | | | | | 10.11 | A MARK OF DAMA | | |
| -40.0 | | | | | | | | | | | | | Max Hold |
| -50.0 | | | | | | | | | | | | | maxilora |
| | | | | | | | | | | | | | |
| Center 836 | | z | | | | -443 | 10W 76A | | | | 5.00 MHz | | |
| Res BW 24 | IU KHZ | | | | | #\ | /BW 750 | KHZ | | SW | eep 1 ms | | Min Hold |
| Occup | ied R | and | widt | h | | | Total | Power | 33. | 6 dBm | | | |
| Occup | | anten | | | | | | | | | | | |
| | | | 9.0 | J19 | 9 MI | ΗZ | | | | | | | Detector Peak► |
| Transm | it Fred | Erro | or | | 7.767 | kHz | % of C | BW Pov | ver 99 | 9.00 % | | Auto | Man |
| x dB Ba | ndwid | lth | | c | .835 N | 11- | x dB | | -26 | .00 dB | | | |
| | nuwiu | | | | .055 W | 1112 | X UD | | -20 | .00 UB | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| MSG | | | | | | | | | STATU | s | | | |

Plot 7-1. Occupied Bandwidth Plot (LTE Band 5 - 10MHz QPSK - Full RB Configuration)



Plot 7-2. Occupied Bandwidth Plot (LTE Band 5 - 10MHz 16-QAM - Full RB Configuration)

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 14 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Fage 14 01 05 |
| © 2021 PCTEST | • | • | | V1.2 11/2/2020 |

2021 PCTEST



| Keysight Spectrum Analyzer - Occupied E | | | | | ø |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------------------------------------|-------------------|
| LXI RL RF 50Ω AC | CORREC | SENSE:INT Center Freg: 836.500 | ALIGN AUTO | 10:45:01 PM Jan 15, 20: Radio Std: None | Trace/Detector |
| | ••• | Trig: Free Run | Avg Hold: 100/100 | | |
| | #IFGain:Low | #Atten: 36 dB | | Radio Device: BTS | _ |
| | | | | | |
| 10 dB/div Ref 40.00 dB | m | | | | |
| 30.0 | | | | | |
| 20.0 | | and the forther way to be a stand of the sta | | | Clear Write |
| 10.0 | moran | and a start a provide a start of the start o | Umaysen | | |
| 0.00 | | | \ | | |
| -10.0 | | | \ | | Average |
| -20.0 | - Charles - | | human - | 10 0 0 0 0 0 | |
| -20.0 merchanter and a start a | | | | M. Muldury | <i>n</i> , |
| -40.0 | | | | | Max Hold |
| -50.0 | | | | | ινίαχ ποιά |
| | | | | | |
| Center 836.50 MHz | | | 11_ | Span 25.00 MH | |
| Res BW 240 kHz | | #VBW 750 k | HZ | Sweep 1 m | S Min Hold |
| Occupied Bandwid | lth | Total P | ower 31. | 7 dBm | |
| | .0042 MH | - | | | Detector |
| 9 | .0042 1016 | 12 | | | Detector Peak► |
| Transmit Freq Error | -10.632 k | Hz % of OE | 3W Power 9 | 9.00 % | Auto <u>Man</u> |
| x dB Bandwidth | 9.849 M | Hz xdB | -26 | .00 dB | |
| | | | | | |
| | | | | | |
| | | | | | |
| MSG | | | STAT | IS | |
| | | | JIAN . | | |

Plot 7-3. Occupied Bandwidth Plot (LTE Band 5 - 10MHz 64-QAM - Full RB Configuration)



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

| FCC ID: A3LSMG998JPN | PCTEST Poud 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 65 | |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | | |
| © 2021 PCTEST | | • | | V1.2 11/2/2020 | |



| Keysight Spectrum Analyzer - O | ccupied BW | | | | | | | | | - 0 × |
|--------------------------------------|------------|---------------|----------------------------------------|----------------------|----------|------------|---------------------------|---------------------|-------|-----------------|
| 🗶 RL RF 50 S | AC CO | RREC | SENSE | :INT : 836.500000 | | ALIGN AUTO | 10:40:35 Pf Radio Std: | 4 Jan 15, 2021 | Trace | /Detector |
| | #IF | ⊶ Gain:Low | Trig: Free R #Atten: 36 c | un A | vg Hold: | 100/100 | Radio Sta: | | | |
| 10 dB/div Ref 40.0 | 00 dBm | | | | | | | | | |
| 30.0 20.0 | | | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | www. | | | | | c | lear Write |
| 0.00 | | | | | | | | | | |
| 10.0 20.0 20.0 Mr. M. M. M. M. | | | | | | hum | | | | Average |
| 30.0 30.0 40.0 50.0 | | | | | | | | ~~~~· | | Max Hold |
| Center 836.500 MHz Res BW 120 kHz | | | #VBW | / 390 kHz | | | | 2.50 MHz ep 1 ms | | Min Hole |
| Occupied Band | | | | otal Pow | /er | 32.4 | dBm | | | |
| | | 16 MH | | | | | | | | Detecto Peak |
| Transmit Freq Er | ror | 3.284 kl | -lz % | 6 of OBW | Powe | er 99 | .00 % | | Auto | Ma |
| x dB Bandwidth | | 5.006 MI | Hz x | dB | | -26. | 00 dB | | | |
| SG | | | | | | STATUS | | | | |

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



Plot 7-6. Occupied Bandwidth Plot (LTE Band 5 - 5MHz 64-QAM - Full RB Configuration)

| FCC ID: A3LSMG998JPN | PCTEST. Proud to be part of @wkerment | PART 22 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
|----------------------|------------------------------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 16 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 16 01 65 |
| © 2021 PCTEST | | | | V1.2 11/2/2020 |



| Keysight Spectrum Analyzer - Occupied B | | | | | |
|-----------------------------------------|-----------|-----------------------------------------------------------|-------------------|-------------------------------------------|-------------------|
| LXI RE 50 Ω AC | CORREC | SENSE:INT Center Freq: 836.500 | ALIGN AUTO | 10:32:20 PM Jan 15, 20 Radio Std: None | Trace/Detector |
| | | Trig: Free Run #Atten: 36 dB | Avg Hold: 100/100 | Radio Device: BTS | _ |
| 10 dB/div Ref 40.00 dB | n | | | | |
| 30.0 | | | | | Clear Write |
| 10.0 | | ∊⋰⋼∊⋰⋼∊ ⋬∊⋎⋫∊⋹ <mark>⋬</mark> ∊⋎⋫∊⋹ <mark>⋬</mark> | - man | | |
| -10.0 | | | | | Average |
| -20.0 | <i></i> | | `````` | ๚๚๛๛๛๛๚๚๛๚๛ | |
| -40.0 | | | | | Max Hold |
| Center 836.500 MHz | | | | Span 7.500 Mi | |
| Res BW 68 kHz | | #VBW 220 k | Hz | Sweep 3.8 n | ns Min Hold |
| Occupied Bandwid | th | Total P | ower 33 | .5 dBm | |
| 2. | .6985 MH | Z | | | Detector Peak▶ |
| Transmit Freq Error | -3.377 kH | z % of O | BW Power 9 | 9.00 % | Auto <u>Man</u> |
| x dB Bandwidth | 3.003 MH | lz x dB | -20 | 5.00 dB | |
| | | | | | |
| ISG | | | STAT | US | |

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



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

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 17 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Fage 17 01 05 |
| © 2021 PCTEST | | · | | V1.2 11/2/2020 |



| Keysight Spectrum Analyzer - | | | | | | | | 2 - X |
|----------------------------------|-------------------|-------------|--------------------------------------------------------|-------------------|----------------------------------------------------------------------------------------------------------------|----------------------|------------|--------------|
| RL RF 5 | OΩ AC | CORREC | SENSE:INT | ALIGN AU | TO 10:32:40 PI Radio Std: | MJan 15, 2021 | Trace/Dete | ctor |
| | | ₩IFGain:Low | Center Freq: 836.50 Trig: Free Run #Atten: 36 dB | Avg Hold: 100/100 | | | | |
| dB/div Ref 40 |).00 dBn | n | | | | | | |
| 9 g 0.0 0.0 | | | | | | | Clear | Wri |
| 0.0 | | mm | m | monten | | | | |
| 00 | | | | | | | Ave | era |
| .0 .0 | an and the second | ~.w/ | | | and and a second se | and the former | | |
| 1.0 | | | | | | | Max | Но |
| enter 836.500 MH es BW 68 kHz | Z | | #VBW 220 | kHz | | .500 MHz p 3.8 ms | Min | Нс |
| Occupied Bar | | | Total F | Power 3 | 1.3 dBm | | | |
| | 2. | 7004 MH | lz | | | | Det | ect Pea |
| Transmit Freq E | Error | 2.552 k | Hz % of O | BW Power | 99.00 % | | Auto | M |
| x dB Bandwidth | 1 | 2.994 M | Hz x dB | -1 | 26.00 dB | | | |
| | | | | ST | ATUS | | | _ |

Plot 7-9. Occupied Bandwidth Plot (LTE Band 5 - 3MHz 64-QAM - Full RB Configuration)



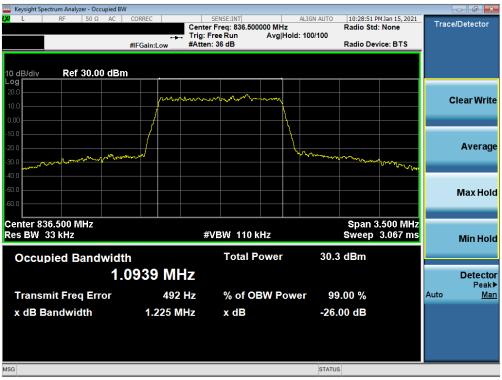
Plot 7-10. Occupied Bandwidth Plot (LTE Band 5 - 1.4MHz QPSK - Full RB Configuration)

| FCC ID: A3LSMG998JPN | Potest* | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 18 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Fage to 0105 |
| © 2021 PCTEST | · | · | | V1.2 11/2/2020 |



| Keysight Spectrum Analyzer - Occupied BV | | | | | Ø 🛃 |
|------------------------------------------|----------------------------------------|-----------------------------------------------|-------------------|---------------------------------------|----------------|
| L RF 50 Ω AC | CORREC | SENSE:INT | ALIGN AUTO | 10:28:30 PM Jan 15 Radio Std: None | |
| | Trig: | er Freq: 836.500000 Free Run / n: 36 dB | Avg Hold: 100/100 | Radio Std: None | , |
|) dB/div Ref 30.00 dBn | n | | | | |
| 0.0 | mm | m.h.m.m.m | m | | Clear Writ |
| 00 | | | | | |
|).0).0 | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | | | mannan na | Averag |
| | | | | | Max Hol |
| 0.0 | | | | | |
| enter 836.500 MHz es BW 33 kHz | | ≇VBW 110 kH | Z | Span 3.500 Sweep 3.06 | |
| Occupied Bandwidt | | Total Pov | wer 31. | 6 dBm | |
| 1. | 0969 MHz | | | | Detecto |
| Transmit Freq Error | 4.784 kHz | % of OBV | V Power 9 | 9.00 % | Auto <u>Ma</u> |
| x dB Bandwidth | 1.233 MHz | x dB | -26 | .00 dB | |
| 3 | | | STATU | IS | |

Plot 7-11. Occupied Bandwidth Plot (LTE Band 5 - 1.4MHz 16-QAM - Full RB Configuration)



Plot 7-12. Occupied Bandwidth Plot (LTE Band 5 - 1.4MHz 64-QAM - Full RB Configuration)

| FCC ID: A3LSMG998JPN | Poud to be part of the element | PART 22 MEASUREMENT REPORT | Approved by: Technical Manager |
|----------------------|--------------------------------|----------------------------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | Page 19 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | Fage 19 01 05 |
| © 2021 PCTEST | • | | V1.2 11/2/2020 |



GPRS Cell



Plot 7-13. Occupied Bandwidth Plot (GPRS, Ch. 190)



Plot 7-14. Occupied Bandwidth Plot (EDGE, Ch. 190)

| FCC ID: A3LSMG998JPN | 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 20 of CE | |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 20 of 65 | |
| © 2021 PCTEST | | • | | V1.2 11/2/2020 | |

© 2021 PCTEST



WCDMA Cell

| Keysight Spectrum Analyzer - Occup | pied BW | | | | |
|------------------------------------|-------------|----------------------------------------|----------------------|---------------------------------------------|-----------------|
| LXIRL RF 50Ω | DC CORREC | SENSE:INT Center Freg: 836.600000 M | ALIGN AUTO | 11:52:01 PM Jan 18, 2021 Radio Std: None | Trace/Detector |
| | - | | ⊓z Hold: 100/100 | Radio Sta: None | |
| | #IFGain:Low | #Atten: 28 dB | | Radio Device: BTS | |
| | | | | | |
| 10 dB/div Ref 40.00 | dBm | | | | |
| Log | | | | | |
| 30.0 | | | | | |
| 20.0 | | mmmm | | | Clear Write |
| 10.0 | | | | | |
| 0.00 | | | | | |
| | | | | | Average |
| -10.0 | | | 1 | | Average |
| -20.0 -30.0 Manna | urren M | | Mar Mar Mar Mar | | |
| -30.0 Marin menonination | ····· | | ~ 4% | | |
| -40.0 | | | | | Max Hold |
| -50.0 | | | | | muxmoru |
| | | | | | |
| Center 836.600 MHz | | | | Span 15.00 MHz | |
| Res BW 150 kHz | | #VBW 910 kHz | | Sweep 1 ms | Min Hold |
| | -: -141- | Total Powe | | dBm | |
| Occupied Bandw | | | 54.7 | ubm | |
| | 4.1613 M | Hz | | | Detector |
| | 0.055 | | | 00 M | Peak► |
| Transmit Freq Erro | or -2.655 | kHz % of OBW F | ower 99. | .00 % | Auto <u>Man</u> |
| x dB Bandwidth | 4.771 | MHz xdB | -26.0 | 0 dB | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| MSG | | | STATUS | | |

Plot 7-15. Occupied Bandwidth Plot (WCDMA, Ch. 4183)

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 21 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Fage 21 01 05 |
| © 2021 PCTEST | | | | V1 2 11/2/2020 |



7.3 Spurious and Harmonic Emissions at Antenna Terminal

Test Overview

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

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

Test Procedure Used

KDB 971168 D01 v03r01 - Section 6.0

Test Settings

- 1. Start frequency was set to 30MHz and stop frequency was set to 10GHz (separated into at least two plots per channel)
- 2. Detector = 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.

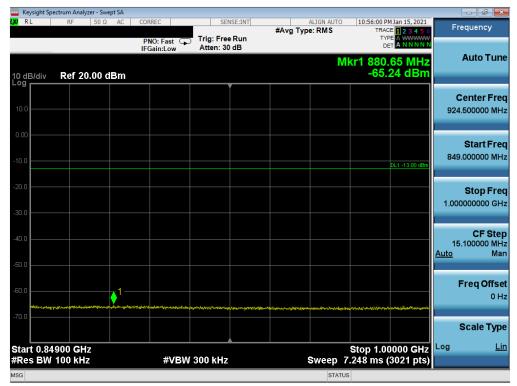
| FCC ID: A3LSMG998JPN | PCTEST* Proud to be part of @element | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-----------------------------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 22 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Fage 22 01 05 |
| © 2021 PCTEST | | | | V/1 2 11/2/2020 |



LTE Band 5

| | Spectrum Ana | | | | | | | | | | | |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------|-------------------------|---------|---------|------------|------------|----------------------------------------|------------|------------|
| RL | RF | <u>50 Ω</u> | AC | CORREC | | NSE:INT | #Avg Ty | ALIGN AUTO | TRAC | 4 Jan 15, 2021 E 1 2 3 4 5 6 | F | requency |
| | | | | PNO: Fast 🕞 | Trig: Free Atten: 30 | | | | TYF DE | | | |
| | | | | | | | | Μ | kr1 815. | 55 MHz 73 dBm | | Auto Tur |
| dB/div | Ref 2 | 20.00 d | Bm | | | | | | -49. | /s abm | | |
| | | | | | | | | | | | | Center Fr |
| 0.0 | | | | | | | | | | | 42 | 6.500000 N |
| | | | | | | | | | | | | |
| .00 | | | | | | | | | | | | Start F |
| | | | | | | | | | | | 3 | 0.000000 N |
| 3.0 | | | | | | | | | | DL1 -13.00 dBm | | 0.000000 |
| D.0 | | | | | | | | | | | | |
| | | | | | | | | | | | | Stop F |
| D.O | | | | | | | | | | | 82 | 3.000000 1 |
| | | | | | | | | | | | | |
| D.O | | | | | | | | | | | - | CF S |
| | | | | | | | | | | 1 | /: Auto | 9.300000 N |
| D.O | | | | | | | | | | ¥ | | |
| | | | | | | | | | | | | Freq Off |
| D.O | | | | | | | | | | | | |
| | and a sure band of an observe | | ferences | a second and the second se | | | | | | and the second second | | - |
| D.O History | Constanting of the local division of the loc | and a strength of the strength | an Land, Joseph and | الفائقة فأسألهم فاستخصر يشرح مركب ولاحمد والريال | | | | | | | | Seale T |
| | | | | | | | | | | | | Scale Ty |
| tart 30. | .0 MHz | | | | | | | | Stop 8 | 23.0 191112 | Log | |
| Res BV | V 100 ki | Hz | | #VBW | / 300 kHz | | | Sweep 3 | 8.06 ms (1 | 5861 pts) | | |
| G | | | | | | | | STATU | s | | | |

Plot 7-16. Conducted Spurious Plot (LTE Band 5 - 10MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



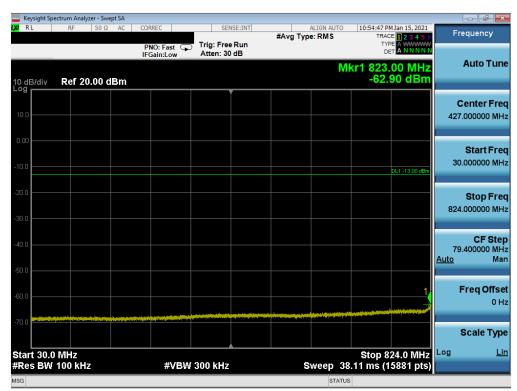
Plot 7-17. Conducted Spurious Plot (LTE Band 5 - 10MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 23 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Fage 23 01 05 |
| © 2021 PCTEST | | | | V1 2 11/2/2020 |





Plot 7-18. Conducted Spurious Plot (LTE Band 5 - 10MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



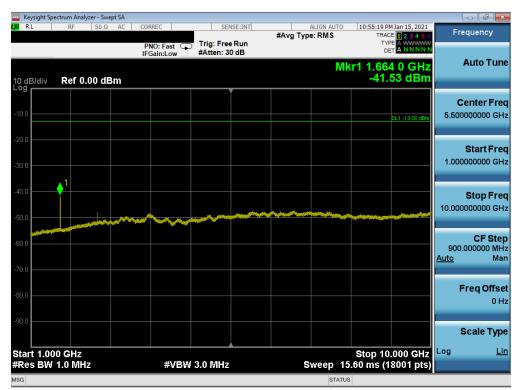
Plot 7-19. Conducted Spurious Plot (LTE Band 5 - 10MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 24 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Fage 24 01 05 |
| © 2021 PCTEST | • | · | | V1.2 11/2/2020 |



| | | nalyzer - Swe | | | | | | | | | | | | |
|----------------------|-----------------------------------------------------------------------------------------------------------------|-----------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------|---------|----------------------------------------------------------------------------------------------------------------|---------|--------------------|------------|--------------------------------------|--------------------|-------------------------------------|------------|--------------------|
| L <mark>XI</mark> RL | RF | 50 Ω | AC | CORREC | | | ISE:INT | #Av | | ALIGN AUTO E: RMS | | PM Jan 15, 2021 ACE 1 2 3 4 5 6 | Fr | equency |
| | | | | PNO: Fa | | Trig: Free Atten: 30 | | | | | | | | |
| | | | | in Game | | | | | | Μ | lkr1 850 | .65 MHz | | Auto Tune |
| 10 dB/div Log | Ref | 20.00 d | IBm | | | | | | | | -65 | .11 dBm | | |
| | | | | | | | | | | | | | | Center Freq |
| 10.0 | | | | | | | | | | | | | | .500000 MHz |
| | | | | | | | | | | | | | | |
| 0.00 | | | | | | | | | | | | | | Start Freq |
| -10.0 | | | | | | | | | | | | | 849 | .000000 MHz |
| 10.0 | | | | | | | | | | | | DL1 -13.00 dBm | | |
| -20.0 | | | | | | | | | | | | | | Stop Freq |
| | | | | | | | | | | | | | 1.00 | 0000000 GHz |
| -30.0 | | | | | | | | | | | | | | |
| -40.0 | | | | | | | | | | | | | | CF Step |
| | | | | | | | | | | | | | 15 Auto | .100000 MHz Man |
| -50.0 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | Freq Offset |
| -60.0 | | | | | | | | | | | | | | 0 Hz |
| -70.0 | And 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 19 | ineres in the second second | Welne Historingto of | april 2 and a second | homesta | an and the second s | | بازندا به مدر سوال | and period | مومال الراج اعيدي ع ^ر وبي | tien warde the set | المغيبة فالإخراجة المدعانات وريحاسه | | |
| | | | | | | | | | | | | | | Scale Type |
| Start 0.8 | 4900.0 | GHz | | | | | | | | | Stop 1.(| 0000 GHz | Log | Lin |
| #Res BW | | | | # | VBW 3 | 300 kHz | | | ş | Sweep | 7.248 ms | (3021 pts) | | |
| MSG | | | | | | | | | | STATU | IS | | | |

Plot 7-20. Conducted Spurious Plot (LTE Band 5 - 10MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



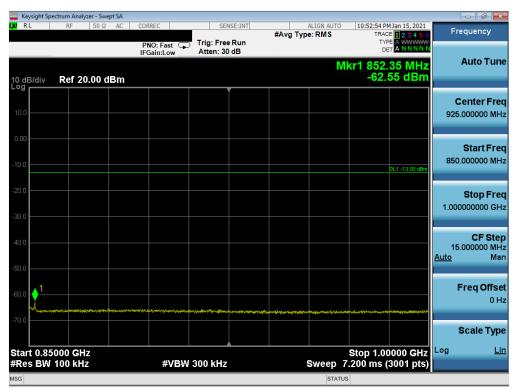
Plot 7-21. Conducted Spurious Plot (LTE Band 5 - 10MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 25 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 25 01 05 |
| © 2021 PCTEST | | • | | V1.2 11/2/2020 |



| PNO: Fast Frequency PNO: Fast Free Run Atten: 30 dB 10 dB/div Ref 20.00 dBm 10 dB/div Ref 20.00 dBm | | ctrum Analyzer - Swept S | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------------|----------------|-----------|---|-------------------|----------------|
| Atten: 30 dB Mkr1 821.75 MHz -64.02 dBm Center Freq 427.00000 MHz 200 000 000 000 000 000 000 00 | LXI RL | RF 50 Ω A | AC CORREC | SENSE:INT | | TRACE 1 2 3 4 5 6 | Frequency |
| Log Image: State Sta | 10 dB/diu | Bef 20.00 dB | IFGain:Low | | N | Ikr1 821.75 MHz | Auto Tune |
| 100 0.1 1 13.00 dem Start Freq 200 0.1 1 13.00 dem 0.1 1 13.00 dem 200 0.1 1 13.00 dem 0.1 1 13.00 dem 300 0.1 1 13.00 dem 0.1 1 13.00 dem 400 0.1 1 13.00 dem 0.1 1 13.00 dem 400 0.1 1 13.00 dem 0.1 1 13.00 dem 400 0.1 1 13.00 dem 0.1 1 13.00 dem 400 0.1 1 13.00 dem 0.1 1 13.00 dem 400 0.1 1 13.00 dem 0.1 1 13.00 dem 400 0.1 1 13.00 dem 0.1 1 13.00 dem 400 0.1 1 13.00 dem 0.1 1 13.00 dem 400 0.1 1 13.00 dem 0.1 1 13.00 dem 400 0.1 1 1 13.00 dem 0.1 1 1 13.00 dem 400 0.1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | Log | | | • | | | • |
| 300 400 400 400 400 400 400 400 | | | | | | DL1 -13.00 dBm | • |
| 4400 Image: Constraint of the second sec | | | | | | | |
| -500 -700 Start 30.0 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 38.11 ms (15881 pts) | | | | | | | 79.400000 MHz |
| Start 30.0 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 38.11 ms (15881 pts) | | | | | | <u>1</u> | • |
| | Start 30.0 | | <i>4</i> 1/544 | 200 kills | | Stop 024.0 Milli2 | Log <u>Lin</u> |
| | | TUU KHZ | #VBW | JUU KHZ | | | |

Plot 7-22. Conducted Spurious Plot (LTE Band 5 - 10MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-23. Conducted Spurious Plot (LTE Band 5 - 10MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Dogo 26 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 26 of 65 |
| © 2021 PCTEST | <u>.</u> | | | V1.2 11/2/2020 |



| 🔤 Keysight Spectrum Analyzer - Swept SA | | | | | | | | × |
|-----------------------------------------|---------------------------|--------------------------|-----------|----------------------|-------------------|----------------------------------------|------------------------------------|--------------------|
| LXX RL RF 50Ω AC | CORREC | | #Avg Type | ALIGN AUTO e: RMS | TRAC | 4 Jan 15, 2021 E 1 2 3 4 5 6 | Frequency | У |
| | PNO: Fast 😱 IFGain:Low | Trig: Free #Atten: 32 | | | TYF | | | |
| 10 dB/div Ref 0.00 dBm | | | | Mł | (r1 1.67) -42. | 9 0 GHz 18 dBm | Auto T | une |
| -10.0 | | Ĭ | | | | | Center | |
| | | | | | | DL1 -13.00 dBm | 5.500000000 | GHZ |
| -20.0 | | | | | | | Start F 1.000000000 | |
| -40.0 | | | | | | | Stop F | |
| -50.0 | \rightarrow | | | | | | 10.00000000 | GHz |
| -60.0 | | | | | | | CF \$ 900.000000 <u>Auto</u> | Step MHz Man |
| -80.0 | | | | | | | Freq Of | ffset 0 Hz |
| -90.0 | | | | | | | Scale T | Гуре |
| Start 1.000 GHz #Res BW 1.0 MHz | #\(B)M(| 3.0 MHz | | woon 16 | Stop 10 | .000 GHz 8001 pts) | Log | <u>Lin</u> |
| #Res DW 1.0 Minz | #9099 | 5.0191112 | | STATUS | | soor pis) | | |

Plot 7-24. Conducted Spurious Plot (LTE Band 5 - 10MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

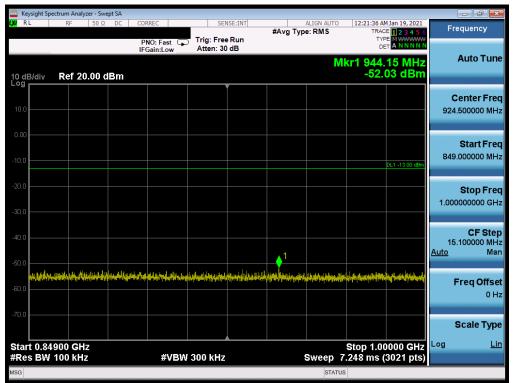
| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 27 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Fage 27 01 05 |
| © 2021 PCTEST | | | | V1 2 11/2/2020 |



GSM/GPRS Cell

| Keysight Spectrum Analyzer - Switch | | | | | |
|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| LX/ RL RF 50 Ω | DC CORREC | SENSE:INT | ALIGN AUTO #Avg Type: RMS | 12:21:27 AM Jan 19, 2021 TRACE 1 2 3 4 5 6 TYPE M | Frequency |
| 10 dB/div Ref 20.00 d | IFGain:Low _ | Atten: 30 dB | М | ьета NNNNN kr1 822.75 MHz -29.449 dBm | Auto Tune |
| 10.0 | | | | | Center Freq 426.500000 MHz |
| -10.0 | | | | DL1 -13.00 dBm | Start Freq 30.000000 MHz |
| -20.0 | | | | 1, | Stop Freq 823.000000 MHz |
| -40.0 | | | | | CF Step 79.300000 MHz <u>Auto</u> Man |
| ing stars they entremine including to the stars to a second second second second second second second second se | han hij Nep 19 provinsi hadala provinsi kana ji farih da Grand Markan ji kata provinsi na pitanta na pana kata ba | per den på på passe og kannel en på sen skapa for som skal det som | na di Balikan kana pangan pangan kana balan kana kana kana kana kana kana kana | a in a bar and an an a bar and a second and a second a s | Freq Offset 0 Hz |
| -70.0 | | | | | Scale Type |
| Start 30.0 MHz #Res BW 100 kHz | #VB | W 300 kHz | Sweep 38 | Stop 823.0 MHz 8.06 ms (15861 pts) | Log <u>Lin</u> |
| MSG | | | STATUS | 3 | |

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



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

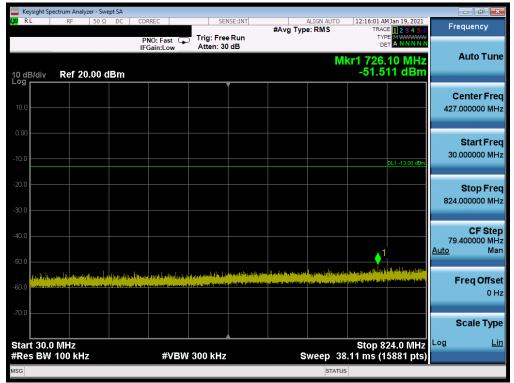
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of @ element | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-----------------------------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Dage 29 of CE |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 28 of 65 |
| © 2021 PCTEST | | | | V1.2 11/2/2020 |

© 2021 PCTEST



| | | Analyzer - Swe | | | | | | | | | ð X |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---|----------|-----------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------|-------------------------------|-------------------------|
| XI RI | - F | F 50 Ω | F | NO: Fast | | #Avg Typ | ALIGN AUTO e: RMS | | | Frequer | псу |
| 10 dE | 3/div Re | ef 20.00 c | | Gain:Low | Atten: 30 | | MI | (r1 9.674 5 -31.59 | GHz | Auto | Tun |
| 10.0 | | | | | | | | | | Cente 5.5000000 | |
| 0.00 - | | | | | | | | DL1 | -13.00 dBm | Stai 1.0000000 | r t Fre 00 GH |
| -20.0 -30.0 | | | | | | | | | 1 | Sto 10.0000000 | p Fre 00 GH |
| -40.0 | and a state of the | | | | | | elas (1996) (n. 1997), a definis 19 metriko en 1996 en 1996 en 1996 19 metriko en 1996 en 1996 en 1996 en 1996 1996 en 1996 | | | CI 900.0000 <u>Auto</u> | F Ste 00 MH Ma |
| -60.0 + | | | | | | | | | | Freq | Offse 0⊦ |
| -70.0 | | | | | | | | | | Scale | |
| | t 1.000 G s BW 1.0 | | | #VBW | / 3.0 MHz | s | weep 15 | Stop 10.00 6.60 ms (180 | 0 0 12 | Log | Li |
| ISG | | | | | | | STATUS | 3 | | | |

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



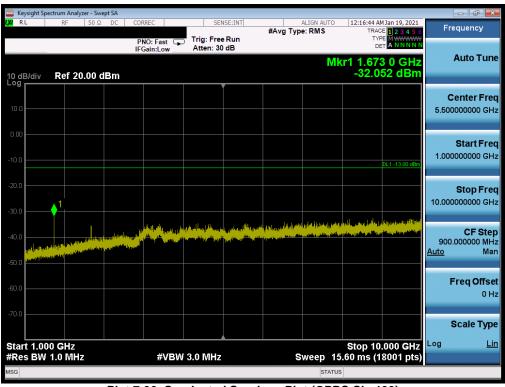
Plot 7-28. Conducted Spurious Plot (GPRS Ch. 190)

| FCC ID: A3LSMG998JPN | 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 29 of 6 | | |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Faye 29 01 00 | |
| © 2021 PCTEST | | | | V1 2 11/2/2020 | |



| 🔤 Keysight Sp | ectrum Analyzer - | Swept SA | | | | | | | | | a X |
|-----------------------|-------------------|---------------------------------------|-------------------------|-------------------------|-------------------------|---------------------------|-----------------|-------------------------|---------------------------------------|------------------------|---------------------------------|
| L <mark>XI</mark> RL | RF 50 | DΩ DC | CORREC | SEN | ISE:INT | #Avg Typ | ALIGN AUTO | | MJan 19, 2021 E 1 2 3 4 5 6 | Freque | ncv |
| | | | PNO: Fast IFGain:Low | Trig: Free Atten: 30 | | #Avg Typ | | TYP | | | o Tune |
| 10 dB/div Log | Ref 20.0 | 0 dBm | | | | | | -52.1 | 38 dBm | | |
| 10.0 | | | | | | | | | | Cent 924.5000 | er Freq 000 MHz |
| -10.0 | | | | | | | | | DL1 -13.00 dBm | Sta 849.0000 | irt Freq 000 MHz |
| -20.0 | | | | | | | | | | Sto 1.000000 | o p Freq 000 GHz |
| -40.0 | | | | | | | | | | | F Step 000 MHz Man |
| and the state | water in the set | n fi gå <mark>d</mark> åler hvir dete | hinglet Mennehenslande | halanti pikingi | k, jiliyosik, kiling, p | ilyilatada kalifa di gily | inderfor indele | inedyntellingåsiski, | ileitisetti oltaatii | Frec | Offset 0 Hz |
| -70.0 | | | | | | | | | | Sca | le Type |
| Start 0.84 #Res BW | | | #VBW | / 300 kHz | | | Sweep 7 | Stop 1.00 7.248 ms (| 0000 GHz 3021 pts) | Log | <u>Lin</u> |
| MSG | | | | | | | STATU | s | | | |

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



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

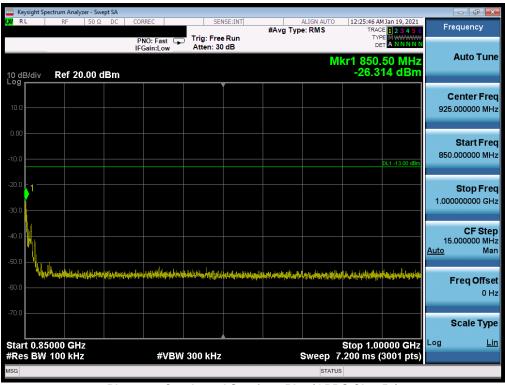
| FCC ID: A3LSMG998JPN | PCTEST* | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 30 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 30 01 65 |
| © 2021 PCTEST | | • | | V1.2 11/2/2020 |

All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTEST.COM.



| | trum Analyzer - Sv | vept SA | | | | | | | | | - • • • |
|-------------------------|-----------------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------------------------|------------------------------------------|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------------------------|
| LXI RL | RF 50 S | | NO: Fast | | | #Avg Typ | ALIGN AUTO e: RMS | TRAC | MJan 19, 2021 E 1 2 3 4 5 6 E M WWWWW | Fre | quency |
| 10 dB/div | Ref 20.00 | IF | Gain:Low | Atten: 30 | | | M | kr1 811. | 85 MHz 87 dBm | | Auto Tune |
| 10.0 | | | | | | | | | | | enter Freq 000000 MHz |
| -10.0 | | | | | | | | | DL1 -13.00 dBm | | Start Freq 000000 MHz |
| -20.0 | | | | | | | | | | | Stop Freq 000000 MHz |
| -40.0 | | | | | | | | | 4 | 79. <u>Auto</u> | CF Step 400000 MHz Man |
| -60.0 | tiyalan falaniyadandi Managalan yalaman katawa a | lay a beller, på filler och fill <u>a verta på antika</u> l omstadde | n og standel for frænder for som | n han han an dir ber an | nagi ((pres) and an ing | e lette (Andreik preise operations and preise | degeligen gebeuren engeligen gebeuren | Uniper Skillinger og det skiller næret skiller og det skiller | an an Angela Kagari (194 Ainte an an an Angela Angela Ainte an an an Angela Angela Angela Angela Angela Angela Angela Angela Angela Angel | F | r eq Offset 0 Hz |
| | | | | | | | | | | | cale Type |
| Start 30.0 #Res BW 1 | | | #VBW | 300 kHz | | s | weep 38 | 8 Stop 11 ms (1 | 24.0 MHz 5881 pts) | Log | Lin |
| MSG | | | | | | | STATUS | | | | |

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



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

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager | |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|--|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 31 of 65 | |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | | |
| © 2021 PCTEST | • | • | | V1.2 11/2/2020 | |



| Image: New State S | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| PNO: Fast Trig: Free Run Atten: 30 dB Trig: Free Run Atten: 30 dB 10 dB/div Ref 20.00 dBm -31.593 dB -10 d -10 d -10 d -10 d -10 d -10 d -10 d -10 d -10 d -20 d -10 d -10 d -10 d -10 d -30 d -10 d -10 d -10 d -10 d -10 d -10 d -10 d -10 d -10 d -10 d -10 d -10 d -10 d -10 d -10 d -10 d -10 d -10 d -10 d -10 d -10 d -10 d | |
| Log 10.0 .000 .10.0 .10.0 .20.0 .30.0 .30.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 | XX Auto Tune |
| 100 | n |
| -10.0 | Center Fred 5.500000000 GHz |
| -30.0 | Start Fred 1.000000000 GH: |
| | Stop Fred 10.000000000 GH: |
| | CF Step 900.000000 MH <u>Auto</u> Mar |
| -60.0 | Freq Offse 0 H |
| -70.0 | Scale Type |
| Start 1.000 GHz Stop 10.000 G #Res BW 1.0 MHz #VBW 3.0 MHz Sweep 15.60 ms (18001 p | Z Log <u>Lir</u> |
| #KCS DW 1.0 WH2 #VDW J.0 WH2 SWEEP 13.00 HIS (18001 P MSG STATUS | 9/ |

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

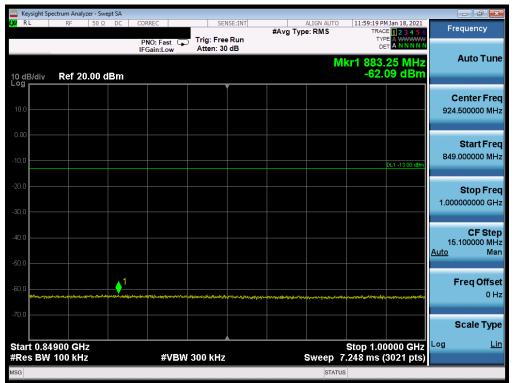
| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager | |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|--|
| Test Report S/N: | Test Dates: | EUT Type: | | Dogo 22 of 65 | |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 32 of 65 | |
| © 2021 PCTEST | | | | V1 2 11/2/2020 | |



WCDMA Cell

| | ectrum Analyzer - Swept | | | | | |
|-----------------------|-----------------------------------------------------------------------------------------------------------------|------------|--------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------|--------------------------------------------|
| XI RL | RF 50 Ω | PNO: Fast | Trig: Free Run Atten: 30 dB | #Avg Type: RMS | 11:59:08 PM Jan 18, 2021 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N N | Frequency |
| 10 dB/div | Ref 20.00 dB | IFGain:Low | Atten: 30 dB | М | kr1 822.55 MHz -37.05 dBm | Auto Tune |
| 10.0 | | | | | | Center Fred 426.500000 MHz |
| -10.0 | | | | | DL1 -13.00 dBm | Start Free 30.000000 MH; |
| -20.0 | | | | | 1 | Stop Fred 823.000000 MH: |
| -40.0 | | | | | | CF Step 79.300000 MH <u>Auto</u> Mar |
| -60.0 | re en en ja de anterior de la tradeción de la composition de la composition de la composition de la composition | | | terefor er men og sjoner i hende med af er er og støtet i der med atter | | Freq Offse 0 H: |
| -70.0 | | | | | | Scale Type |
| Start 30.0 #Res BW | | #VBV | V 300 kHz | Sweep 38 | Stop 823.0 MHz 3.06 ms (15861 pts) | Log <u>Lir</u> |
| MSG | | | | STATU | s | |

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



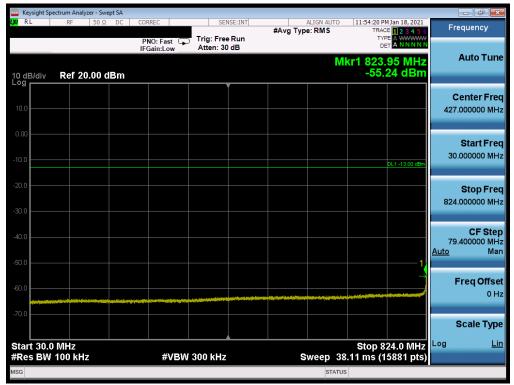
Plot 7-35. Conducted Spurious Plot (WCDMA Ch. 4132)

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | Page 33 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | Fage 33 01 05 |
| © 2021 PCTEST | | | V1.2 11/2/2020 |



| Keysight Spectrum Analyzer - Swept | | | | | e e 💌 |
|------------------------------------|------------|--------------|------------------------------|------------------------------------------------------------------------------|-------------------------------------------|
| Χ RL RF 50 Ω | | SENSE:INT | ALIGN AUTO #Avg Type: RMS | 12:00:02 AM Jan 19, 2021 TRACE 1 2 3 4 5 6 TYPE A WWWWW DET A NNNNN | Frequency |
| 10 dB/div Ref 20.00 dB | I Guilleow | Atten: 32 dB | MI | kr1 9.994 5 GHz -38.41 dBm | Auto Tun |
| 10.0 | | | | | Center Fre 5.500000000 G⊦ |
| 10.0 | | | | DL1 -13.00 dBm | Start Fre 1.000000000 G⊦ |
| 30.0 | | | | | Stop Fre 10.00000000 GF |
| 40.0 | | ~~~~ | | | CF Ste 900.000000 MH <u>Auto</u> Ma |
| 60.0 | | | | | Freq Offs 0 H |
| 70.0 | | | | | Scale Typ |
| Start 1.000 GHz #Res BW 1.0 MHz | #VBW 3. | .0 MHz | Sweep 1 | Stop 10.000 GHz 5.60 ms (18001 pts) | Log <u>L</u> |
| ISG | | | STATU | s | |

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



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

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|--------------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | Page 34 of 6 | |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Fage 34 01 05 |
| © 2021 PCTEST | | | | V1 2 11/2/2020 |



| | ectrum Analyzer - S | wept SA | | | | | | | | | di X |
|----------------------|------------------------------------------------------|--------------|----------------------------------------------------|---------------------------|----------------------------------------------------------------------------------------------------------------|----------|----------------------------------------|-------------------------------|-------------------------------------------------|-----------------|-----------------------------|
| L <mark>XI</mark> RL | RF 50 | ΩDC | CORREC | | E:INT | #Avg Typ | ALIGN AUTO | TRAC | I Jan 18, 2021 | Freque | ency |
| 10 dB/div Log | Ref 20.00 | dBm | PNO: Fast IFGain:Low | Atten: 30 | | | М | kr1 849. | 00 MHz 93 dBm | Aut | to Tune |
| 10.0 | | | | | | | | | | Cent 924.500 | e r Freq 000 MHz |
| -10.0 | | | | | | | | | DL1 -13.00 dBm | Sta 849.000 | a rt Freq 000 MHz |
| -20.0 | | | | | | | | | | Sto 1.000000 | o p Freq 000 GHz |
| -40.0 | | | | | | | | | | | CF Step 000 MHz Mar |
| -60.0 | an di sama na sa | % .}} | 6-1-130-90 - 1-15-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1- | gryvesta, ctrastriategatu | للموجود العنوان والمراجع والمعالية والمراجع والمحافظ والمراجع والمحافظ والمراجع والمحافظ والمحافظ والمحافظ وال | | ······································ | alan tanakan di kardi ya tang | hansansan ang mang mang mang mang mang mang man | Free | Offse 0 Hz |
| -70.0 Start 0.84 | 900 GHz | | | | | | | Stop 1.00 | 000 GHz | | le Type <u>Lin</u> |
| #Res BW | | | #VBW | 300 kHz | | | | .248 ms (| | | |
| MSG | | | | | | | STATUS | 5 | | | |

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



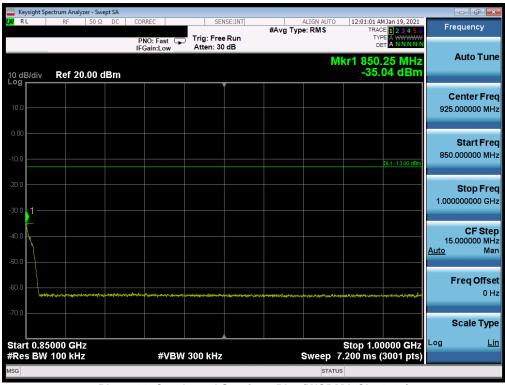
Plot 7-39. Conducted Spurious Plot (WCDMA Ch. 4183)

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Dogo 25 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 35 of 65 |
| © 2021 PCTEST | - | · | | V1.2 11/2/2020 |



| | ectrum Analyzer - | Swept SA | | | | | | |
|-----------------------|-------------------|----------|-------------------------------------------|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------------|----------------------------------------------------|
| LXI RL | RF 5 | DΩ DC | CORREC | SENSE:INT | ALIG #Avg Type: R | | AM Jan 19, 2021 | Frequency |
| | | | PNO: Fast C IFGain:Low | Trig: Free Run Atten: 30 dB | #Avg Type. R | | | Auto Tune |
| 10 dB/div Log | Ref 20.0 | 0 dBm | | | | -6 | 1.36 dBm | |
| 10.0 | | | | | | | | Center Freq 427.000000 MHz |
| -10.0 | | | | | | | DL1 -13.00 dBm | Start Freq 30.000000 MHz |
| -20.0 | | | | | | | | Stop Freq 824.000000 MHz |
| -40.0 | | | | | | | | CF Step 79.400000 MHz <u>Auto</u> Man |
| -60.0 | | | n jaaran da salahiya kading salahiya sala | | hall particular solution of the later of t | | | Freq Offset 0 Hz |
| -70.0 | | | | | | | | Scale Type |
| Start 30.0 #Res BW | | | #VB | N 300 kHz | Swe | Stop ep 38.11 ms | | Log <u>Lin</u> |
| MSG | | | | | | STATUS | | |

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



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

| FCC ID: A3LSMG998JPN | Pout 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 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Fage 30 01 05 |
| © 2021 PCTEST | | | | V1 2 11/2/2020 |

All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTEST.COM.



| 🔤 Keysight Spe | ectrum Analyzer - | Swept SA | | | | | | | | _ | |
|-----------------------|-------------------|----------|---------------------------|-------------------------|--------|----------|----------------------|------------|----------------------------------------------|----------------------|-------------------------------|
| LXU RL | RF 50 | DΩ DC | CORREC | | SE:INT | #Avg Typ | ALIGN AUTO e: RMS | TRAC | 4 Jan 19, 2021 E <mark>1 2 3 4 5 6</mark> | Frec | luency |
| 10 dB/div Log | Ref 20.00 | 0 dBm | PNO: Fast 🖵 IFGain:Low | Trig: Free Atten: 30 | | | M | kr1 9.76 | 7 5 GHz 60 dBm | A | uto Tune |
| 10.0 | | | | | | | | | | | nter Freq 00000 GHz |
| -10.0 | | | | | | | | | DL1 -13.00 dBm | | Start Freq 00000 GHz |
| -20.0 | | | | | | | | | | | Stop Freq 00000 GHz |
| -40.0 | | | | - | ~~~ | | | | ↓ 1 | 900.0 <u>Auto</u> | CF Step 00000 MHz Mar |
| -60.0 | | | | | | | | | | Fr | e q Offse 0 H: |
| -70.0 | | | | | | | | | | So | c ale Type Lir |
| Start 1.00 #Res BW | | | #VBW | 3.0 MHz | | s | weep 1: | 5.60 ms (1 | .000 GHz 8001 pts) | | |
| MSG | | | | | | | STATU | s | | | |

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

| FCC ID: A3LSMG998JPN | Poud to be part of @ element | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager | |
|----------------------|------------------------------|----------------------------|---------|-----------------------------------|--|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 37 of 65 | |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 37 01 05 | |
| © 2021 PCTEST | | | | V1 2 11/2/2020 | |



7.4 Band Edge Emissions at Antenna Terminal

Test Overview

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

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

Test Procedure Used

KDB 971168 D01 v03r01 - Section 6.0

Test Settings

- 1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
- 2. Span was set large enough so as to capture all out of band emissions near the band edge
- 3. RBW \geq 1% of the emission bandwidth
- 4. VBW \geq 3 x RBW
- 5. Detector = RMS
- 6. Number of sweep points $\geq 2 \times \text{Span/RBW}$
- 7. Trace mode = trace average for continuous emissions, max hold for pulse emissions
- 8. Sweep time = auto couple
- 9. The trace was allowed to stabilize

Test Setup

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



Figure 7-3. Test Instrument & Measurement Setup

| FCC ID: A3LSMG998JPN | Post 5 be part of @ element | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager | |
|----------------------|-----------------------------|----------------------------|---------|-----------------------------------|--|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 38 of 65 | |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Fage 30 01 05 | |
| © 2021 PCTEST | | | | V1 2 11/2/2020 | |



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: A3LSMG998JPN | PCTEST Froud to be part of @ element | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager | |
|----------------------|-----------------------------------------|----------------------------|---------|-----------------------------------|--|
| Test Report S/N: | Test Dates: | EUT Type: | | Dage 20 of 65 | |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 39 of 65 | |
| © 2021 PCTEST | | | | V1.2 11/2/2020 | |



LTE Band 5

| 🔤 Keysight Spectrun | | | | | | | | | | | |
|---------------------|---------------|--------|--------------------------|------------------------------|-----------------------------------------------------------------------------------------------------------------|----------------|----------------------------------------------------------------------------------------------------------------|-----------------------|---------------------------------|------|----------------------------|
| LXI L F | RF 50 Ω | AC COI | RREC | SEI | NSE:INT | #Avg Typ | ALIGN AUTO | | 4 Jan 15, 2021 E 1 2 3 4 5 6 | F | requency |
| | | | NO: Wide ↔ Gain:Low | Trig: Free Atten: 36 | | " ə .)P | | TYF DE | | | |
| 10 dB/div Ro | ef 25.00 di | Bm | | | | | Mk | r1 824.0 -29.9 | 00 MHz 47 dBm | | Auto Tune |
| 209 | | | | | | | | | | (| Center Freq |
| 15.0 | | | | | | | | | | 824 | 4.000000 MHz |
| 5.00 | | | | | m | | and a second | and the second second | | | |
| -5.00 | | | | | | | | | | 820 | Start Freq 0.000000 MHz |
| -5.00 | | | | | | | | | DL1 -13.00 dBm | | |
| -15.0 | | | | | | | | | | | Stop Freq |
| -25.0 | | | | | 1 | | | | | 828 | 3.000000 MHz |
| | | | erandreferrand type have | and an and the second second | a de la calendaria de la c | | | | | | CF Step |
| -35.0 | Wynery Nowe A | | | | | | | | | Auto | 800.000 kHz Man |
| -45.0 | | | | | | | | | | Auto | Widi |
| -55.0 | | | | | | | | | | | Freq Offset |
| | | | | | | | | | | | 0 Hz |
| -65.0 | | | | | | | | | | | Scale Type |
| Center 824.0 | 00 MHz | | | | | | | Snan 9 | .000 MHz | Log | Lin |
| #Res BW 100 | | | #VBW | / 300 kHz | | | Sweep 4 | .000 ms (| 1000 MHZ 1001 pts) | | |
| MSG | | | | | | | STATUS | 5 | | | |

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



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

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | Page 40 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | Fage 40 01 05 |
| © 2021 PCTEST | • | · | V1.2 11/2/2020 |

© 2021 PCTEST



| | ctrum Analyze | | | | | | | | | | | | |
|---------------------|---------------|----------------|---------------|--------------------|---------------|-------------------------|----------------------------------------|----------------------------------------|------------|----------------------------------------|------------------|-------------|------------------|
| <mark>XI</mark> L | RF | 50 Ω | AC | CORREC | | SEI | ISE:INT | #Avg Typ | ALIGN AUTO | | MJan 15, 2021 | F | requency |
| | | | | PNO: W IFGain:l | lide ↔ ∟ow | Trig: Free Atten: 36 | | • // | | TYF DE | | | Auto Tune |
| 10 dB/div Log | Ref 25. | 00 di | Зm | | | | | | Mk | r1 824.0 -24.9 | 00 MHz 04 dBm | | Auto Tune |
| | | | | | | , | | | | | | | Center Fred |
| 15.0 | | | | | | | ~ | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | - margare | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | mm | 82 | 4.000000 MH: |
| 5.00 | | | | | | | | | | | | | Start Free |
| -5.00 | | | | | | | | | | | | 82: | 2.000000 MH: |
| 15.0 | | | | | | | | | | | DL1 -13.00 dBm | | Stop Free |
| -25.0 | | | | | | | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | | | | | 82 | 6.000000 MH |
| -35.0 <u>~~~~</u> ~ | mana | ر مەرىكىمىر | والمحاصر عوره | m | mada | mark | | | | | | | CF Ste |
| 45.0 | | | | | | | | | | | | <u>Auto</u> | 400.000 kH Ma |
| 45.0 | | | | | | | | | | | | | Freq Offse |
| -55.0 | | | | | | | | | | | | | 0 H |
| -65.0 | | | | | | | | | | | | | Scale Type |
| Center 82 | 4.000 MI | Hz | | | | | | | | Span 4 | .000 MHz | Log | Lir |
| #Res BW | | | | | #VBW | 300 kHz | | | Sweep 2 | .000 ms (| 1001 pts) | | |
| ISG | | | | | | | | | STATUS | 5 | | | |





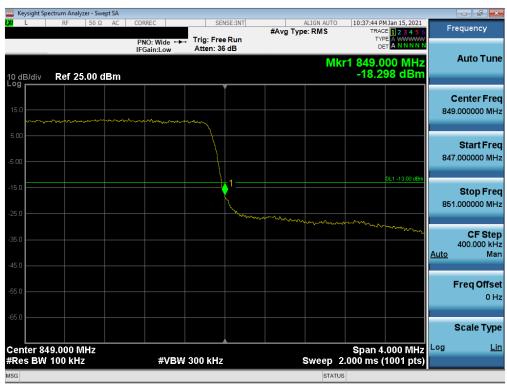
Plot 7-46. Upper Band Edge Plot (LTE Band 5 - 5MHz QPSK – Full RB Configuration)

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager | |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|--|
| Test Report S/N: | Test Dates: | EUT Type: | | Dage 41 of 65 | |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 41 of 65 | |
| © 2021 PCTEST | | | | V1 2 11/2/2020 | |



| 🔤 Keysight Spe | ectrum Analyzer - Swept SA | | | | | | | | |
|------------------|----------------------------|---------------------------|-------------------------------|----|------------|-------------------------|------------------------|-------------------|-------------------------------------|
| LXI L | RF 50 Ω AC | CORREC | SENSE:1 | #A | ALIGN AUTO | TRACE | 123456 | Freq | uency |
| | | PNO: Wide ↔ IFGain:Low | Trig: Free Ru Atten: 36 dB | n | | DET | A WWWWW A N N N N N | | |
| 10 dB/div Log | Ref 25.00 dBm | 1 | | | M | kr1 824.00 -18.09 | 00 MHz 5 dBm | A | uto Tune |
| 15.0 | | | | | man | mar radio and a fait | , markenne | | n ter Freq 10000 MHz |
| -5.00 | | | / | / | | | | | tart Freq 10000 MHz |
| -15.0 | | | 1 | | | | L1 -13.00 dBm | | t op Freq 10000 MHz |
| -35.0 | | | ~~~~~ | | | | | 40 <u>Auto</u> | CF Step 00.000 kHz Man |
| -55.0 | | | | | | | | Fre | e q Offset 0 Hz |
| -65.0 | | | | | | | | | ale Type Lin |
| #Res BW | 4.000 MHz 100 kHz | #VBW | 300 kHz | | Sweep | Span 4.0 2.000 ms (1 | 000 MHz 001 pts) | - vg | <u></u> |
| MSG | | | | | STAT | | | | |

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



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

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager | |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|--|
| Test Report S/N: | Test Dates: | EUT Type: | | Dage 42 of 65 | |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 42 of 65 | |
| © 2021 PCTEST | • | · | | V1.2 11/2/2020 | |



| 🚾 Keysight Spectrum Analyzer - Swept SA | | | | | |
|-----------------------------------------|-----------------------------|--------------------------------|--------------------------------------|-----------------------------------------------|------------------------------------|
| L RF 50Ω AC | CORREC | SENSE:INT | ALIGN AUTO #Avg Type: RMS | 10:30:45 PM Jan 15, 2021 TRACE 1 2 3 4 5 6 | Frequency |
| | PNO: Wide +++ IFGain:Low | Trig: Free Run Atten: 36 dB | | DET A WWWWW | |
| | II Guill.cow | _ | Mk | r1 824.000 MHz | Auto Tune |
| 10 dB/div Ref 25.00 dBm | | | | -24.281 dBm | |
| Log | | | | | Center Freq |
| 15.0 | | | Paralanter the the mather water of a | <u></u> | 824.000000 MHz |
| 5.00 | | \int | | | |
| 5.00 | | | | | Start Freq |
| -5.00 | | / | | | 822.000000 MHz |
| | | | | DL1 -13.00 dBm | |
| -15.0 | | 1 | | | Stop Freq 826.000000 MHz |
| -25.0 | | | | howana | |
| | mon | manned | | | CF Step |
| -35.0 | | | | | 400.000 kHz Auto Man |
| -45.0 | | | | | |
| -55.0 | | | | | Freq Offset |
| -33.0 | | | | | 0 Hz |
| -65.0 | | | | | |
| | | | | | Scale Type |
| Center 824.000 MHz | | | | Span 4.000 MHz | Log <u>Lin</u> |
| #Res BW 100 kHz | #VBW | 300 kHz | Sweep 2 | 2.000 ms (1001 pts) | |
| MSG | | | STATU | S | |



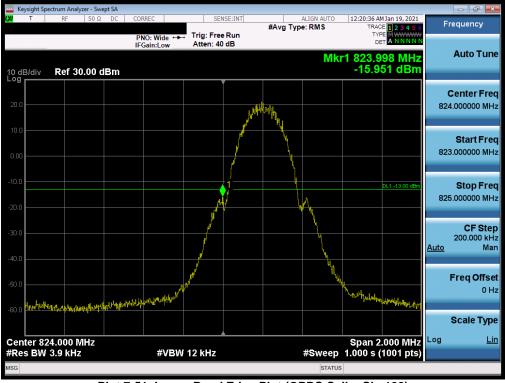


Plot 7-50. Upper Band Edge Plot (LTE Band 5 – 1.4MHz QPSK – Full RB Configuration)

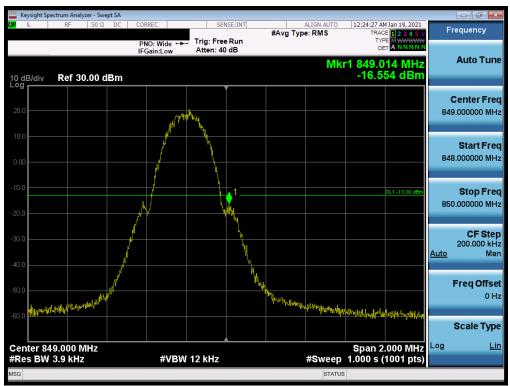
| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager | |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|--|
| Test Report S/N: | Test Dates: | EUT Type: | | Dogo 42 of 65 | |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 43 of 65 | |
| © 2021 PCTEST | • | · | | V1.2 11/2/2020 | |



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: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager | |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|--|
| Test Report S/N: | Test Dates: | EUT Type: | | Dage 44 of CE | |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 44 of 65 | |
| © 2021 PCTEST | • | | | V1.2 11/2/2020 | |

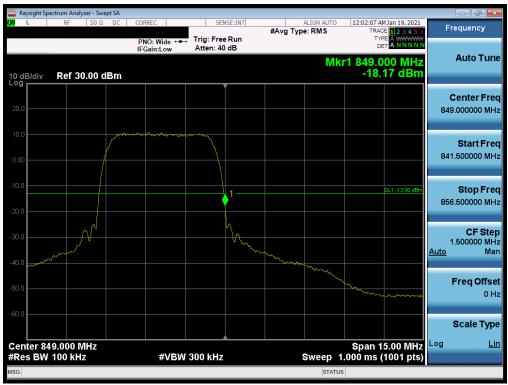
© 2021 PCTEST



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: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager | |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|--|
| Test Report S/N: | Test Dates: | EUT Type: | | Dage 45 of 65 | |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 45 of 65 | |
| © 2021 PCTEST | • | | | V1.2 11/2/2020 | |

© 2021 PCTEST



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

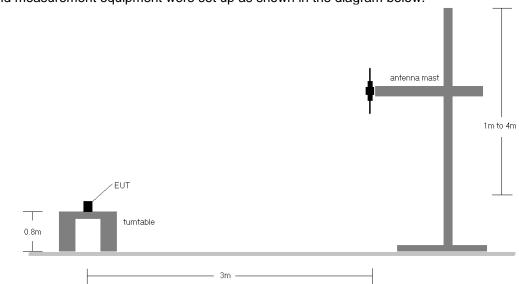
Test Settings

- 1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
- 2. RBW = 1 5% of the expected OBW, not to exceed 1MHz
- 3. VBW \ge 3 x RBW
- 4. Span = 1.5 times the OBW
- 5. No. of sweep points $\geq 2 \times \text{span} / \text{RBW}$
- 6. Detector = RMS
- 7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto". 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: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager | |
|------------------------------|-----------------------|----------------------------|---------|-----------------------------------|--|
| Test Report S/N: | Test Dates: | EUT Type: | | Dogo 46 of 65 | |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 46 of 65 | |
| © 2021 PCTEST V1.2 11/2/2020 | | | | | |



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.
- 5) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager | |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|--|
| Test Report S/N: | Test Dates: | EUT Type: | | Dogo 47 of 65 | |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 47 of 65 | |
| © 2021 PCTEST | · | • | | V1.2 11/2/2020 | |



| Bandwidth | Mod. | Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Ant. Gain [dBi] | RB Size/Offset | Substitute Level [dBm] | ERP [dBm] | ERP [Watts] | ERP Limit [dBm] | Margin [dB] | EIRP [dBm] | EIRP [Watts] | EIRP Limit [dBm] | Margin [dB] |
|-----------|---------------|--------------------|--------------------|---------------------------|----------------------------------|--------------------|-------------------|------------------------------|-----------|----------------|--------------------|----------------|---------------|-----------------|---------------------|----------------|
| | | 829.0 | Н | 226 | 287 | 6.80 | 1 / 25 | 13.09 | 17.74 | 0.059 | 38.45 | -20.71 | 19.89 | 0.098 | 40.61 | -20.72 |
| | QPSK | 836.5 | Н | 114 | 283 | 6.68 | 1 / 49 | 13.70 | 18.23 | 0.067 | 38.45 | -20.22 | 20.38 | 0.109 | 40.61 | -20.23 |
| 10 MHz | | 844.0 | н | 115 | 287 | 6.66 | 1/0 | 13.75 | 18.26 | 0.067 | 38.45 | -20.19 | 20.41 | 0.110 | 40.61 | -20.20 |
| | 16-QAM | 844.0 | н | 115 | 287 | 6.66 | 1 / 25 | 13.13 | 17.64 | 0.058 | 38.45 | -20.81 | 19.79 | 0.095 | 40.61 | -20.82 |
| | 64-QAM | 844.0 | н | 115 | 287 | 6.66 | 1 / 25 | 12.20 | 16.71 | 0.047 | 38.45 | -21.74 | 18.86 | 0.077 | 40.61 | -21.75 |
| | | 826.5 | Н | 226 | 287 | 6.80 | 1 / 12 | 12.98 | 17.63 | 0.058 | 38.45 | -20.82 | 19.78 | 0.095 | 40.61 | -20.83 |
| | QPSK | 836.5 | н | 114 | 283 | 6.68 | 1 / 12 | 13.51 | 18.04 | 0.064 | 38.45 | -20.41 | 20.19 | 0.104 | 40.61 | -20.42 |
| 5 MHz | | 846.5 | н | 115 | 287 | 6.66 | 1 / 12 | 13.48 | 17.99 | 0.063 | 38.45 | -20.46 | 20.14 | 0.103 | 40.61 | -20.47 |
| | 16-QAM | 836.5 | н | 114 | 283 | 6.68 | 1 / 12 | 13.04 | 17.57 | 0.057 | 38.45 | -20.88 | 19.72 | 0.094 | 40.61 | -20.89 |
| | 64-QAM | 846.5 | Н | 115 | 287 | 6.66 | 1 / 12 | 12.16 | 16.67 | 0.046 | 38.45 | -21.78 | 18.82 | 0.076 | 40.61 | -21.79 |
| | | 825.5 | н | 226 | 287 | 6.80 | 1/0 | 12.99 | 17.64 | 0.058 | 38.45 | -20.81 | 19.79 | 0.095 | 40.61 | -20.82 |
| | QPSK | 836.5 | н | 114 | 283 | 6.68 | 1/0 | 13.49 | 18.02 | 0.063 | 38.45 | -20.43 | 20.17 | 0.104 | 40.61 | -20.44 |
| 3 MHz | | 847.5 | н | 115 | 287 | 6.66 | 1/0 | 13.38 | 17.89 | 0.061 | 38.45 | -20.56 | 20.04 | 0.101 | 40.61 | -20.57 |
| | 16-QAM | 836.5 | н | 114 | 283 | 6.68 | 1/0 | 13.04 | 17.57 | 0.057 | 38.45 | -20.88 | 19.72 | 0.094 | 40.61 | -20.89 |
| | 64-QAM | 847.5 | Н | 115 | 287 | 6.66 | 1/0 | 12.08 | 16.59 | 0.046 | 38.45 | -21.86 | 18.74 | 0.075 | 40.61 | -21.87 |
| | | 824.7 | н | 226 | 287 | 6.80 | 1/2 | 13.00 | 17.65 | 0.058 | 38.45 | -20.80 | 19.80 | 0.096 | 40.61 | -20.81 |
| | QPSK | 836.5 | н | 114 | 283 | 6.68 | 1/2 | 13.44 | 17.97 | 0.063 | 38.45 | -20.48 | 20.12 | 0.103 | 40.61 | -20.49 |
| 1.4 MHz | | 848.3 | н | 115 | 287 | 6.66 | 1/2 | 13.40 | 17.91 | 0.062 | 38.45 | -20.54 | 20.06 | 0.101 | 40.61 | -20.55 |
| | 16-QAM | 836.5 | н | 114 | 283 | 6.68 | 1/2 | 13.05 | 17.58 | 0.057 | 38.45 | -20.87 | 19.73 | 0.094 | 40.61 | -20.88 |
| | 64-QAM | 848.3 | Н | 115 | 287 | 6.66 | 1/2 | 12.09 | 16.60 | 0.046 | 38.45 | -21.85 | 18.75 | 0.075 | 40.61 | -21.86 |
| 10 MHz | Opposite Pol. | 844.0 | V | 135 | 269 | 6.46 | 1/0 | 11.69 | 18.15 | 0.065 | 38.45 | -20.30 | 20.30 | 0.107 | 40.61 | -20.31 |
| 10 10112 | WCP | 844.0 | н | 178 | 258 | 6.66 | 1/0 | 5.95 | 12.61 | 0.018 | 38.45 | -25.84 | 14.76 | 0.030 | 40.61 | -25.85 |

Table 7-2. ERP Data (LTE Band 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 | GSM850 | Н | 196 | 276 | 20.83 | 6.75 | 25.43 | 0.349 | 38.45 | -13.02 |
| 836.60 | GSM850 | Н | 100 | 287 | 21.09 | 6.68 | 25.62 | 0.365 | 38.45 | -12.83 |
| 848.80 | GSM850 | Н | 389 | 293 | 20.27 | 6.71 | 24.83 | 0.304 | 38.45 | -13.63 |
| 836.60 | GSM850 | V | 169 | 258 | 19.50 | 6.38 | 23.73 | 0.236 | 38.45 | -14.72 |
| 836.60 | EDGE850 | Н | 100 | 287 | 14.74 | 6.68 | 19.27 | 0.085 | 38.45 | -19.18 |
| 836.60 | GSM850 (WCP) | Н | 311 | 259 | 16.93 | 6.68 | 21.46 | 0.140 | 38.45 | -16.99 |

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 | Н | 221 | 295 | 13.16 | 6.77 | 17.78 | 0.060 | 38.45 | -20.67 |
| 836.60 | WCDMA850 | Н | 199 | 295 | 13.83 | 6.68 | 18.36 | 0.069 | 38.45 | -20.09 |
| 846.60 | WCDMA850 | Н | 210 | 290 | 13.71 | 6.68 | 18.24 | 0.067 | 38.45 | -20.21 |
| 836.60 | WCDMA850 | V | 150 | 251 | 12.54 | 6.38 | 16.77 | 0.048 | 38.45 | -21.68 |
| 836.60 | WCDMA850 (WCP) | Н | 183 | 300 | 10.13 | 6.68 | 14.66 | 0.029 | 38.45 | -23.79 |

Table 7-4. ERP Data (WCDMA Cell)

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager | |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|--|
| Test Report S/N: | Test Dates: | EUT Type: | | Dage 49 of 65 | |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 48 of 65 | |
| © 2021 PCTEST | | | | V1.2 11/2/2020 | |



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 peak measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v03r01 - Section 5.8

Test Settings

- 1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
- 2. VBW \geq 3 x RBW
- 3. Span = 1.5 times the OBW
- 4. No. of sweep points > 2 x span / RBW
- 5. Detector = RMS
- 6. Trace mode = Average (Max Hold for pulsed emissions)
- 7. The trace was allowed to stabilize

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager | |
|------------------------------|-----------------------|----------------------------|---------|-----------------------------------|--|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 49 of 65 | |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 49 01 65 | |
| © 2021 PCTEST V1 2 11/2/2020 | | | | | |



Test Setup

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

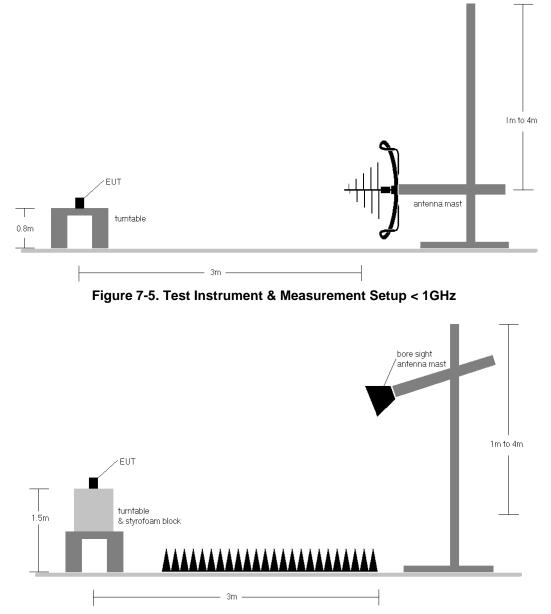


Figure 7-6. Test Instrument & Measurement Setup >1 GHz

| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of @ element | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-----------------------------------------|----------------------------|---------------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Dago E0 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | Page 50 of 65 | |
| © 2021 PCTEST | | | | V1.2 11/2/2020 |



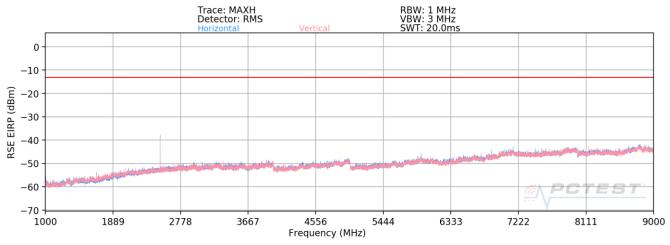
Test Notes

- Field strengths are calculated using the Measurement quantity conversions in KDB 971168 Section 5.8.4.
 b) E(dBµV/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m)
 d) 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 EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.
- 7) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 8) 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.
- 9) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager | |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|--|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 51 of 65 | |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 51 01 05 | |
| © 2021 PCTEST | | | | \/1.2.11/2/2020 | |



LTE Band 5



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

| Bandwidth (MHz): | 10 |
|------------------|--------|
| Frequency (MHz): | 829.0 |
| RB / Offset: | 1 / 25 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBµV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|-----------------|--------------------|---------------------------|----------------------------------|----------------------------|----------------|-------------------------------|------------------------------------------|----------------|----------------|
| 1658.0 | Н | 151 | 196 | -72.80 | 0.77 | 34.97 | -60.29 | -13.00 | -47.29 |
| 2487.0 | Н | 101 | 254 | -60.71 | 5.14 | 51.43 | -43.83 | -13.00 | -30.83 |
| 3316.0 | Н | - | - | -80.18 | 6.76 | 33.58 | -61.68 | -13.00 | -48.68 |
| 4145.0 | Н | - | - | -80.94 | 8.53 | 34.59 | -60.66 | -13.00 | -47.66 |
| 4974.0 | Н | - | - | -81.44 | 10.56 | 36.12 | -59.14 | -13.00 | -46.14 |

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

| Bandwidth (MHz): | 10 |
|------------------|--------|
| Frequency (MHz): | 836.5 |
| RB / Offset: | 1 / 25 |

| 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] |
|--------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Н | 144 | 174 | -75.40 | 1.02 | 32.62 | -62.64 | -13.00 | -49.64 |
| Н | 117 | 254 | -64.59 | 5.17 | 47.58 | -47.67 | -13.00 | -34.67 |
| Н | - | - | -81.22 | 6.75 | 32.53 | -62.73 | -13.00 | -49.73 |
| Н | - | - | -82.19 | 8.62 | 33.43 | -61.83 | -13.00 | -48.83 |
| Н | - | - | -83.19 | 10.78 | 34.59 | -60.67 | -13.00 | -47.67 |
| | (H/V) H H H H H | Ant. Pol. Height [cm] H 144 H 117 H - H - H - H - H - H - | Ant. Pol. [H/V] Height [cm] Azimuth [degree] H 144 174 H 117 254 H - - H - - H - - H - - H - - H - - | Ant. Pol. [H/V] Height [cm] Azimuth [degree] Level [dBm] H 144 174 -75.40 H 117 254 -64.59 H - - -81.22 H - - -82.19 H - - -83.19 | Ant. Pol. [H/V] Height [cm] Azimuth [degree] Level [dBm] AFCL [dB/m] H 144 174 -75.40 1.02 H 117 254 -64.59 5.17 H - - -81.22 6.75 H - - -82.19 8.62 H - - -83.19 10.78 | Ant. Pol. [H/V] Height [cm] Azimuth [degree] Level [dBm] AFCL [dB/m] Strength [dBµ//m] H 144 174 -75.40 1.02 32.62 H 117 254 -64.59 5.17 47.58 H - - -81.22 6.75 32.53 H - - -82.19 8.62 33.43 H - - -83.19 10.78 34.59 | Ant. Pol. [H/V] Height [cm] Azimuth [degree] Level [dBm] AFCL [dB/m] Strength [dB/m] Emission Level [dB/m] H 144 174 -75.40 1.02 32.62 -62.64 H 117 254 -64.59 5.17 47.58 -47.67 H - - -81.22 6.75 32.53 -62.73 H - - -82.19 8.62 33.43 -61.83 H - - -83.19 10.78 34.59 -60.67 | Ant. Pol. [H/V] Height [cm] Azimuth [degree] Level [dBm] AFCL [dB/m] Strength [dB/V/m] Emission Level [dBm] Limit [dBm] H 144 174 -75.40 1.02 32.62 -62.64 -13.00 H 117 254 -64.59 5.17 47.58 -47.67 -13.00 H - - -81.22 6.75 32.53 -62.73 -13.00 H - - -82.19 8.62 33.43 -61.83 -13.00 H - - -83.19 10.78 34.59 -60.67 -13.00 |

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

| FCC ID: A3LSMG998JPN | Post to be part of & element | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|----------------------------------------------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Dage 52 of 65 |
| 1M2101110003-02.A3L | 2101110003-02.A3L 1/16/2021 - 1/26/2021 Portable Handset | | | Page 52 of 65 |
| © 2021 PCTEST | | · | | V1.2 11/2/2020 |



| Bandwidth (MHz): | 10 |
|------------------|--------|
| Frequency (MHz): | 844.0 |
| RB / Offset: | 1 / 25 |

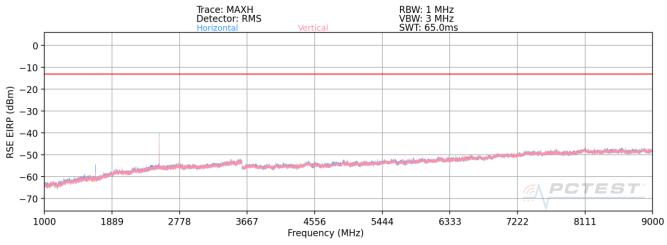
| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBµV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|-----------------|--------------------|---------------------------|----------------------------------|----------------------------|----------------|-------------------------------|------------------------------------------|----------------|----------------|
| 1688.00 | Н | 139 | 177 | -72.55 | 1.24 | 35.69 | -59.56 | -13.00 | -46.56 |
| 2532.00 | Н | 121 | 262 | -59.11 | 5.61 | 53.50 | -41.76 | -13.00 | -28.76 |
| 3376.00 | Н | - | - | -80.53 | 7.09 | 33.56 | -61.70 | -13.00 | -48.70 |
| 4220.00 | Н | - | - | -81.07 | 8.36 | 34.29 | -60.96 | -13.00 | -47.96 |
| 5064.00 | Н | - | - | -81.41 | 9.77 | 35.36 | -59.90 | -13.00 | -46.90 |

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

| FCC ID: A3LSMG998JPN | Poud to be part of @ element | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager | |
|----------------------|------------------------------------------|----------------------------|---------|-----------------------------------|--|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 53 of 65 | |
| 1M2101110003-02.A3L | L 1/16/2021 - 1/26/2021 Portable Handset | | | raye 55 01 65 | |
| © 2021 PCTEST | | | | V1 2 11/2/2020 | |



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] |
|-----------------|--------------------|---------------------------|----------------------------------|----------------------------|----------------|-------------------------------|------------------------------------------|----------------|----------------|
| 1648.4 | Н | 213 | 2 | -60.93 | -5.62 | 40.45 | -54.81 | -13.00 | -41.81 |
| 2472.6 | Н | 124 | 216 | -43.40 | -2.33 | 61.27 | -33.98 | -13.00 | -20.98 |
| 3296.8 | Н | - | - | -71.86 | 0.72 | 35.86 | -59.40 | -13.00 | -46.40 |
| 4121.0 | Н | - | - | -76.41 | 2.17 | 32.76 | -62.50 | -13.00 | -49.50 |
| 4945.2 | Н | - | - | -77.16 | 3.41 | 33.25 | -62.01 | -13.00 | -49.01 |

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] |
|-----------------|--------------------|---------------------------|----------------------------------|----------------------------|----------------|-------------------------------|------------------------------------------|----------------|----------------|
| 1673.2 | Н | 138 | 356 | -60.42 | -5.27 | 41.31 | -53.95 | -13.00 | -40.95 |
| 2509.8 | Н | 127 | 209 | -47.21 | -2.26 | 57.53 | -37.73 | -13.00 | -24.73 |
| 3346.4 | Н | - | - | -71.66 | 0.40 | 35.74 | -59.51 | -13.00 | -46.51 |
| 4183.0 | Н | - | - | -76.81 | 2.10 | 32.29 | -62.97 | -13.00 | -49.97 |
| 5019.6 | Н | - | - | -76.93 | 4.01 | 34.08 | -61.17 | -13.00 | -48.17 |

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

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 54 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | 1/16/2021 - 1/26/2021 Portable Handset | | Fage 54 01 05 |
| © 2021 PCTEST | | | | V1 2 11/2/2020 |



| 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] |
|-----------------|--------------------|---------------------------|----------------------------------|----------------------------|----------------|-------------------------------|------------------------------------------|----------------|----------------|
| 1697.6 | Н | 157 | 350 | -61.68 | -4.61 | 40.71 | -54.55 | -13.00 | -41.55 |
| 2546.4 | Н | 155 | 304 | -38.86 | -1.77 | 66.37 | -28.88 | -13.00 | -15.88 |
| 3395.2 | Н | - | - | -71.21 | 0.51 | 36.30 | -58.95 | -13.00 | -45.95 |
| 4244.0 | Н | - | - | -78.38 | 1.95 | 30.57 | -64.68 | -13.00 | -51.68 |
| 5092.8 | Н | - | - | -79.16 | 4.42 | 32.26 | -62.99 | -13.00 | -49.99 |

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

| Sample #: | 0466M |
|------------------|----------------|
| Mode: | GPRS 1 Tx Slot |
| Channel: | 251 |
| Frequency (MHz): | 848.8 |
| | |

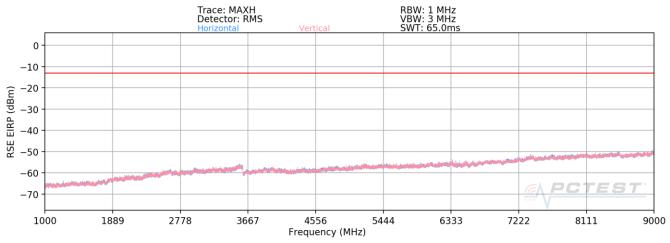
| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBµV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|-----------------|--------------------|---------------------------|----------------------------------|----------------------------|----------------|-------------------------------|------------------------------------------|----------------|----------------|
| 1697.6 | Н | - | - | -70.56 | -4.61 | 31.83 | -63.43 | -13.00 | -50.43 |
| 2546.4 | Н | - | - | -71.13 | -1.77 | 34.10 | -61.15 | -13.00 | -48.15 |
| 3395.2 | Н | - | - | -71.87 | 0.51 | 35.64 | -59.61 | -13.00 | -46.61 |

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

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Dogo EE of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | Page 55 of 65 | |
| © 2021 PCTEST | | • | | V1.2 11/2/2020 |



WCDMA Cell



Plot 7-57. Radiated Spurious Plot (WCDMA Cell)

| WCDMA RMC |
|-----------|
| 4132 |
| 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] |
|-----------------|--------------------|---------------------------|----------------------------------|----------------------------|----------------|-------------------------------|------------------------------------------|----------------|----------------|
| 1652.8 | V | 199 | 85 | -71.12 | -5.60 | 30.28 | -64.98 | -13.00 | -51.98 |
| 2479.2 | V | - | - | -73.73 | -2.39 | 30.88 | -64.38 | -13.00 | -51.38 |
| 3305.6 | V | - | - | -74.08 | 0.70 | 33.62 | -61.64 | -13.00 | -48.64 |
| 4132.0 | V | - | - | -76.84 | 2.03 | 32.19 | -63.07 | -13.00 | -50.07 |

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

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

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBµV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|-----------------|--------------------|---------------------------|----------------------------------|----------------------------|----------------|-------------------------------|------------------------------------------|----------------|----------------|
| 1673.2 | V | 218 | 54 | -72.64 | -5.27 | 29.09 | -66.17 | -13.00 | -53.17 |
| 2509.8 | V | - | - | -74.46 | -2.26 | 30.28 | -64.98 | -13.00 | -51.98 |
| 3346.4 | V | - | - | -74.32 | 0.40 | 33.08 | -62.17 | -13.00 | -49.17 |
| 4183.0 | V | - | - | -77.37 | 2.10 | 31.73 | -63.53 | -13.00 | -50.53 |

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

| FCC ID: A3LSMG998JPN | Post to be part of & element | PART 22 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager | |
|----------------------|------------------------------|----------------------------|---------|-----------------------------------|--|
| Test Report S/N: | Test Dates: | EUT Type: | | Dage F6 of 65 | |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 56 of 65 | |
| © 2021 PCTEST | | • | | V1.2 11/2/2020 | |



| 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] |
|-----------------|--------------------|---------------------------|----------------------------------|----------------------------|----------------|-------------------------------|------------------------------------------|----------------|----------------|
| 1693.2 | V | 228 | 117 | -73.42 | -4.72 | 28.86 | -66.40 | -13.00 | -53.40 |
| 2539.8 | V | - | - | -74.11 | -1.84 | 31.05 | -64.21 | -13.00 | -51.21 |
| 3386.4 | V | - | - | -73.36 | 0.38 | 34.02 | -61.24 | -13.00 | -48.24 |
| 4233.0 | V | - | - | -77.23 | 1.83 | 31.60 | -63.66 | -13.00 | -50.66 |

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

| FCC ID: A3LSMG998JPN | Potest Proud to be part of eveneent | PART 22 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
|----------------------|----------------------------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Dogo 57 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 57 of 65 |
| © 2021 PCTEST | | | | |



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 $\pm 0.00025\%$ (± 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: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 58 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Fage 56 01 05 |
| © 2021 PCTEST | | | | |



г

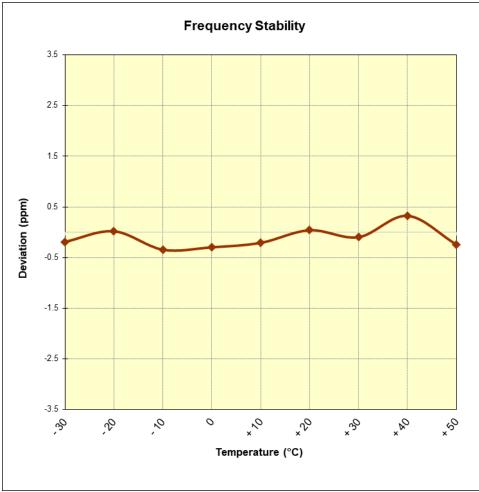
LTE Band 5

| OPERATING FREQUENCY: CHANNEL: REFERENCE VOLTAGE: DEVIATION LIMIT: | | 836,500,000 20525 4.18 ± 0.00025 % or 2.5 ppm | | _Hz _ _ VDC _ | |
|----------------------------------------------------------------------------|----------------|--------------------------------------------------------|-------------------|------------------------|------------------|
| VOLTAGE (%) | POWER (VDC) | ТЕМР (°С) | FREQUENCY (Hz) | Freq. Dev. (Hz) | Deviation (%) |
| 100 % | | + 20 (Ref) | 836,500,006 | 6 | 0.0000000 |
| 100 % | | - 30 | 836,499,848 | -158 | -0.0000189 |
| 100 % | | - 20 | 836,500,024 | 18 | 0.0000022 |
| 100 % | | - 10 | 836,499,720 | -286 | -0.0000342 |
| 100 % | | 0 | 836,499,759 | -247 | -0.0000295 |
| 100 % | 4.18 | + 10 | 836,499,832 | -174 | -0.0000208 |
| 100 % | 4.10 | + 20 | 836,500,041 | 35 | 0.0000042 |
| 100 % | | + 30 | 836,499,926 | -80 | -0.000096 |
| 100 % | | + 40 | 836,500,279 | 273 | 0.0000326 |
| 100 % | | + 50 | 836,499,805 | -201 | -0.0000240 |
| 85 % | | + 20 | 836,499,931 | -75 | -0.0000090 |
| BATT. ENDPOINT | 2.98 | + 20 | 836,499,981 | -25 | -0.0000030 |

Table 7-15. LTE Band 5 Frequency Stability Data

| FCC ID: A3LSMG998JPN | POTEST Proud to be part of @ element | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-----------------------------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Page 59 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Fage 59 01 05 |
| © 2021 PCTEST | • | | | V1.2 11/2/2020 |





Plot 7-58. LTE Band 5 Frequency Stability Chart

| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of @ element | PART 22 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
|----------------------|-----------------------------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Dogo 60 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 60 of 65 |
| © 2021 PCTEST | | • | | V1.2 11/2/2020 |



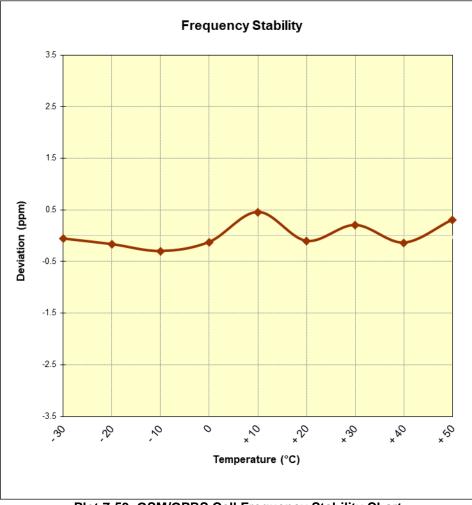
GSM/GPRS Cell

| OPERATING FREQUENCY: | | 836,600,000 | | Hz | |
|----------------------|----------------|--------------|-------------------|--------------------|------------------|
| С | HANNEL: | 190 | | - | |
| REFERENCE VOLTAGE: | | | 4.18 | VDC | |
| DEVIATIO | ON LIMIT: | ± 0.00025 | % or 2.5 ppm | - | |
| | | | | - | |
| VOLTAGE (%) | POWER (VDC) | TEMP (°C) | FREQUENCY (Hz) | Freq. Dev. (Hz) | Deviation (%) |
| 100 % | | + 20 (Ref) | 836,599,990 | -10 | 0.0000000 |
| 100 % | 4.18 | - 30 | 836,599,940 | -50 | -0.0000060 |
| 100 % | | - 20 | 836,599,850 | -140 | -0.0000167 |
| 100 % | | - 10 | 836,599,738 | -252 | -0.0000301 |
| 100 % | | 0 | 836,599,886 | -104 | -0.0000124 |
| 100 % | | + 10 | 836,600,373 | 383 | 0.0000458 |
| 100 % | | + 20 | 836,599,903 | -87 | -0.0000104 |
| 100 % | | + 30 | 836,600,161 | 171 | 0.0000204 |
| 100 % | | + 40 | 836,599,876 | -114 | -0.0000136 |
| 100 % | | + 50 | 836,600,248 | 258 | 0.0000308 |
| 85 % | | + 20 | 836,600,175 | 185 | 0.0000221 |
| BATT. ENDPOINT | 2.98 | + 20 | 836,600,074 | 84 | 0.0000100 |

Table 7-16. GSM/GPRS Cell Frequency Stability Data

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Dogo 61 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 61 of 65 |
| © 2021 PCTEST | • | · | | V1.2 11/2/2020 |





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

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Dage 62 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 62 of 65 |
| © 2021 PCTEST | | · | | V1.2 11/2/2020 |



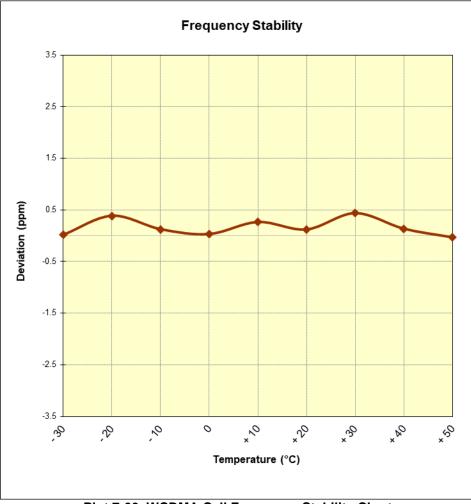
WCDMA Cell

| OPERATING FREQUENCY: | | 836,600,000 | | Hz | |
|----------------------|----------------|--------------|-------------------|--------------------|------------------|
| С | HANNEL: | 4183 | | - | |
| REFERENCE VOLTAGE: | | 4.18 | | VDC | |
| DEVIATIO | ON LIMIT: | ± 0.00025 | % or 2.5 ppm | _ | |
| | | | | | |
| VOLTAGE (%) | POWER (VDC) | TEMP (°C) | FREQUENCY (Hz) | Freq. Dev. (Hz) | Deviation (%) |
| 100 % | | + 20 (Ref) | 836,600,215 | 215 | 0.0000000 |
| 100 % | | - 30 | 836,600,229 | 14 | 0.0000017 |
| 100 % | | - 20 | 836,600,537 | 322 | 0.0000385 |
| 100 % | | - 10 | 836,600,319 | 104 | 0.0000124 |
| 100 % | | 0 | 836,600,241 | 26 | 0.0000031 |
| 100 % | 4.18 | + 10 | 836,600,436 | 221 | 0.0000264 |
| 100 % | 4.10 | + 20 | 836,600,315 | 100 | 0.0000120 |
| 100 % | | + 30 | 836,600,579 | 364 | 0.0000435 |
| 100 % | | + 40 | 836,600,327 | 112 | 0.0000134 |
| 100 % | | + 50 | 836,600,188 | -27 | -0.0000032 |
| 85 % | | + 20 | 836,600,200 | -15 | -0.0000018 |
| BATT. ENDPOINT | 2.98 | + 20 | 836,600,301 | 86 | 0.0000103 |

Table 7-17. WCDMA Cell Frequency Stability Data

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Dogo 62 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 63 of 65 |
| © 2021 PCTEST | • | · | | V1.2 11/2/2020 |





Plot 7-60. WCDMA Cell Frequency Stability Chart

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Dage 64 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 64 of 65 |
| © 2021 PCTEST | • | · | | V1.2 11/2/2020 |



8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the Samsung **Portable Handset FCC ID: A3LSMG998JPN** complies with all the requirements of Part 22 of the FCC rules.

| FCC ID: A3LSMG998JPN | | PART 22 MEASUREMENT REPORT | SAMSUNE | Approved by: Technical Manager |
|----------------------|-----------------------|----------------------------|---------|-----------------------------------|
| Test Report S/N: | Test Dates: | EUT Type: | | Dogo 65 of 65 |
| 1M2101110003-02.A3L | 1/16/2021 - 1/26/2021 | Portable Handset | | Page 65 of 65 |
| © 2021 PCTEST | • | · | | V1.2 11/2/2020 |