

PCTEST

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# PART 27 C2PC TEST REPORT

#### **Applicant Name:**

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

#### Date of Testing: 2/02/2022 - 2/28/2022 Test Report Issue Date: 2/28/2022 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M2202030011-04.A3L

# FCC ID:

# A3LSMS908E

Applicant Name:

# Samsung Electronics Co., Ltd.

Application Type: Model: Additional Model(s): EUT Type: FCC Classification: FCC Rule Part: Test Procedure(s): Class II Permissive Change: Original Grant Date: Class II Permissive Change SM-S908E/DS SM-S908E Portable Handset PCS Licensed Transmitter Held to Ear (PCE) 27 ANSI C63.26-2015, KDB 648474 D03 v01r04 Please see FCC change document 01/07/2022

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

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

Randy Ortanez President



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# **PART 27 MEASUREMENT REPORT**

				EIRP		
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	Max. Power [W]	Max. Power [dBm]	Emission Designator
		π/2 BPSK	3500.0	0.205	23.13	96M7G7D
	100 MHz	QPSK	3500.0	0.206	23.15	97M9G7D
		16QAM	3500.0	0.189	22.77	97M7W7D
	00 MH-	T/2 BPSK	3495.0 - 3505.0	0.224	23.51 23.34	87M1G7D
	90 MHz	QPSK 16QAM	3495.0 - 3505.0 3495.0 - 3505.0	0.216	23.34	87M8G7D 87M9W7D
		π/2 BPSK	3490.0 - 3510.0	0.229	23.61	77M4G7D
	80 MHz	QPSK	3490.0 - 3510.0	0.214	23.31	77M8G7D
		16QAM	3490.0 - 3510.0	0.185	22.68	77M7W7D
		π/2 BPSK	3485.0 - 3515.0	0.235	23.72	64M6G7D
	70 MHz	QPSK	3485.0 - 3515.0	0.211	23.25	67M8G7D
		16QAM	3485.0 - 3515.0	0.186	22.70	67M6W7D
	60 MHz	π/2 BPSK QPSK	3480.0 - 3520.0 3480.0 - 3520.0	0.231 0.229	23.64 23.60	58M3G7D 58M2G7D
	00 10112	16QAM	3480.0 - 3520.0	0.213	23.29	58M1W7D
		π/2 BPSK	3475.0 - 3525.0	0.229	23.60	46M0G7D
NR Band n77 PC3	50 MHz	QPSK	3475.0 - 3525.0	0.223	23.48	47M7G7D
(3450 - 3550MHz)		16QAM	3475.0 - 3525.0	0.184	22.64	47M7W7D
		π/2 BPSK	3470.0 - 3530.0	0.247	23.92	35M9G7D
	40 MHz	QPSK	3470.0 - 3530.0	0.243	23.86	38M0G7D
		16QAM	3470.0 - 3530.0	0.212	23.25	38M0W7D
	30 MHz	T/2 BPSK	3465.0 - 3535.0 3465.0 - 3535.0	0.207	23.17	26M9G7D
	30 IVIEZ	QPSK 16QAM	3465.0 - 3535.0 3465.0 - 3535.0	0.238	23.76 23.01	28M1G7D 28M0W7D
		π/2 BPSK	3460.0 - 3540.0	0.258	24.12	18M0G7D
	20 MHz	QPSK	3460.0 - 3540.0	0.255	24.07	18M3G7D
		16QAM	3460.0 - 3540.0	0.228	23.58	18M3W7D
	15 MHz 10 MHz	π/2 BPSK	3457.5 - 3542.5	0.255	24.07	13M1G7D
		QPSK	3457.5 - 3542.5	0.252	24.02	13M7G7D
		16QAM	3457.5 - 3542.5	0.238	23.76	13M7W7D
		π/2 BPSK QPSK	3455.0 - 3545.0	0.232	23.66 24.11	8M73G7D 8M73G7D
		16QAM	3455.0 - 3545.0 3455.0 - 3545.0	0.258	24.11	8M73G7D 8M73W7D
		π/2 BPSK	3750.0 - 3930.0	0.175	22.42	97M1G7D
	100 MHz	QPSK	3750.0 - 3930.0	0.177	22.47	97M8G7D
		16QAM	3750.0 - 3930.0	0.145	21.62	97M6W7D
		π/2 BPSK	3745.0 - 3935.0	0.183	22.63	87M0G7D
	90 MHz	QPSK	3745.0 - 3935.0	0.181	22.57	88M1G7D
		16QAM	3745.0 - 3935.0	0.162	22.11	87M7W7D
	80 MHz	π/2 BPSK	3740.0 - 3940.0	0.186	22.69	77M4G7D
		QPSK 16QAM	3740.0 - 3940.0 3740.0 - 3940.0	0.179	22.53 22.48	77M7G7D 77M7W7D
		π/2 BPSK	3735.0 - 3945.0	0.182	22.48	64M6G7D
		QPSK	3735.0 - 3945.0	0.183	22.62	67M8G7D
		16QAM	3735.0 - 3945.0	0.176	22.46	67M7W7D
		π/2 BPSK	3730.0 - 3950.0	0.193	22.85	58M1G7D
	60 MHz	QPSK	3730.0 - 3950.0	0.192	22.82	58M2G7D
		16QAM	3730.0 - 3950.0	0.179	22.52	58M0W7D
NR Band n77 PC3	50 MHz	π/2 BPSK QPSK	3725.0 - 3955.0	0.198	22.96	45M9G7D
(3700 - 3980MHz)	50 MHZ	16QAM	3725.0 - 3955.0 3725.0 - 3955.0	0.159	22.86 22.02	47M7G7D 47M7W7D
		π/2 BPSK	3720.0 - 3960.0	0.201	23.02	36M0G7D
	40 MHz	QPSK	3720.0 - 3960.0	0.200	23.01	38M1G7D
		16QAM	3720.0 - 3960.0	0.195	22.90	38M1W7D
		π/2 BPSK	3715.0 - 3965.0	0.220	23.43	27M0G7D
	30 MHz	QPSK	3715.0 - 3965.0	0.194	22.88	28M1G7D
		16QAM	3715.0 - 3965.0	0.196	22.93	28M0W7D
	20 141 -	π/2 BPSK	3710.0 - 3970.0	0.233	23.67	18M1G7D
	20 MHz	QPSK 16QAM	3710.0 - 3970.0 3710.0 - 3970.0	0.203	23.06 22.82	18M4G7D 18M3W7D
		π/2 BPSK	3707.5 - 3972.5	0.192	22.62	13M1G7D
	15 MHz	QPSK	3707.5 - 3972.5	0.185	22.66	13M7G7D
		16QAM	3707.5 - 3972.5	0.181	22.57	13M7W7D
		π/2 BPSK	3705.0 - 3975.0	0.191	22.82	8M73G7D
	10 MHz	QPSK	3705.0 - 3975.0	0.200	23.02	8M71G7D
		16QAM	3705.0 - 3975.0	0.175	22.44	8M70W7D

**EUT** Overview

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# **1.0 INTRODUCTION**

# 1.1 Scope

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

# 1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST 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.

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# 2.0 PRODUCT INFORMATION

# 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID : A3LSMS908E**. The test data contained in this report pertains only to the emissions due to the EUT's licensed transmitters that operate under the provisions of Part 27.

Test Device Serial No.: 6044M, 0090V, 0105V, 6048M

## 2.2 Device Capabilities

This device contains the following capabilities:

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

The device has 1 Tx antenna for n77 data (Ant F) and 3 Rx antennas (Ant C, L, D). With SRS operations, all 4 antennas can transmit the SRS signal to check for the channel quality of n77. The antennas cannot simultaneously transmit. Only the single TX/RX antenna is used for Data transmission.

# 2.3 Test Configuration

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

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

## 2.4 EMI Suppression Device(s)/Modifications

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

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# 3.0 DESCRIPTION OF TESTS

# 3.1 Evaluation Procedure

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

Deviation from Measurement Procedure.....None

# 3.2 Radiated Power and Radiated Spurious Emissions

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

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

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

P<sub>d [dBm]</sub> = P<sub>g [dBm]</sub> - 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:

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

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

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

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# 4.0 MEASUREMENT UNCERTAINTY

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

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

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# 5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). 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
-	AP2	EMC Cable and Switch System	3/4/2021	Annual	3/4/2022	AP2
-	AP1	EMC Cable and Switch System	3/9/2021	Annual	3/9/2022	AP1
-	ETS	EMC Cable and Switch System	3/4/2021	Annual	3/4/2022	ETS
-	LTx3	LIcensed Transmitter Cable Set	2/26/2021	Annual	2/26/2022	LTx3
-	LTx4	Licensed Transmitter Cable Set	3/12/2021	Annual	3/12/2022	LTx4
Emco	3115	Horn Antenna (1-18GHz)	6/18/2020	Biennial	6/18/2022	9704-5182
Espec	ESX-2CA	Environmental Chamber	8/27/2020	Annual	8/27/2022	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/20/2021	Biennial	4/20/2023	00125518
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/12/2020	Biennial	3/12/2022	128337
ETS Lindgren	3816/2NM	LISN	7/9/2020	Biennial	7/9/2022	00114451
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11208010032
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11403100002
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	7/27/2020	Biennial	7/27/2022	A051107
Sunol	JB6	LB6 Antenna	11/13/2020	Biennial	11/13/2022	A082816
Keysight Technologies	N9038A	MXE EMI Receiver	1/21/2022	Annual	1/21/2023	MY51210133
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	8/3/2021	Annual	8/3/2022	100342

#### Table 5-1. Test Equipment

#### Notes:

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

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# 6.0 SAMPLE CALCULATIONS

# **QPSK Modulation**

#### Emission Designator = 8M62G7D

LTE BW = 8.62 MHz G = Phase Modulation 7 = Quantized/Digital Info D = Data transmission, telemetry, telecommand

# **QAM Modulation**

#### Emission Designator = 8M45W7D

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

# **Spurious Radiated Emission**

#### Example: Spurious emission at 3700.40 MHz

The receive spectrum analyzer reading at 3 meters with the EUT on the turntable was -81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of -81.0 dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 3700.40 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.50 dBm so this harmonic was 25.50 dBm -(-24.80) = 50.3 dBc.

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# 7.0 TEST RESULTS

# 7.1 Summary

Company Name:	Samsung Electronics Co., Ltd.
FCC ID:	A3LSMS908E
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)

NR

Mode(s):

Test Condition	Test Description	FCC Part Section(s)	Test Limit	Test Result	Reference
	Transmitter Conducted Output Power	2.1046(a), 2.1046(c)	N/A	PASS	Section 7.2
CONDUCTED	Occupied Bandwidth	2.1049(h)	N/A	PASS	Section 7.3
CONDI	nducted Band Edge / Spurious Emissions IR Band n77) ≤ 13 dBm / MHz		PASS	Sections 7.4, 7.5	
	Frequency Stability	2.1055, 27.54	Fundamental emissions stay within authorized frequency block.	PASS	Section 7.8
Ē	Effective Radiated Power / Equivalent Isotropic Radiated Power (NR Band n77)	27.53(j)(3), 27.53(k)(3)	≤ 1 Watt EIRP	PASS	Section 7.6
RADI	Radiated Spurious Emissions (NR Band n77)	2.1053, 27.53(l), 27.53(n)	≤ 13 dBm / MHz	PASS	Section 7.7

\* The only transmitter output conducted powers included in this report are those where the Pmax value, per the tune-up document, is higher than any of the DSI power levels. For the remaining conducted power measurements, see the **RF Exposure Report**.

#### Table 7-1. Summary of Test Results

#### Notes:

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

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# 7.2 Conducted Power Output Data §2.1046

#### Test Overview

The EUT is set up to transmit at maximum power. All power levels are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

#### Test Procedure Used

KDB 971168 D01 v03r01 - Section 6.0

#### **Test Settings**

- 1. Span =  $2 \times OBW$  to  $3 \times OBW$
- 2. RBW = 1% to 5% of the OBW
- 3. Number of measurement points in sweep  $\geq$  2 x span / RBW
- 4. Sweep = auto-couple (less than transmission burst duration)
- 5. Detector = RMS (power)
- 6. Trigger was set to enable power measurements only on full power bursts
- 7. Trace was allowed to stabilize
- 8. Spectrum analyzer's "Channel Power" function was used to compute the power by integrating the spectrum across the OBW of the signal

#### 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:

- 1. Conducted power measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. Channel bandwidth data is shown in the tables below based only on the channel bandwidths that were supported in this device.
- 2. All other conducted power measurements are contained in the RF exposure report for this filing.

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Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
	π/2 BPSK	633334	3500.01	1 / 68	23.03
100 MHz	QPSK	633334	3500.01	1 / 68	23.12
	16-QAM	633334	3500.01	1 / 68	22.82
		633000	3495.00	1 / 183	22.47
N	π/2 BPSK	633334	3500.01	1 / 183	23.13
90 MHz		633666	3504.99	1/61	23.42
8	QPSK	633000 633334	3495.00 3500.01	1 / 183 1 / 183	22.86
6,	GION	633666	3504.99	1 / 61	23.32 23.20
	16-QAM	633666	3504.99	1 / 61	23.03
		632668	3490.02	1 / 54	23.51
N	π/2 BPSK	633334	3500.01	1 / 54	23.24
£		634000	3510.00	1 / 54	23.00
80 MHz		632668	3490.02	1 / 54	23.25
80	QPSK	633334	3500.01	1 / 54	23.29
		634000	3510.00	1 / 54	23.19
	16-QAM	632668	3490.02	1 / 54	22.74
	10 00011	632334	3485.01	1 / 47	23.62
ы	π/2 BPSK	633334	3500.01	1 / 47	23.56
Η̈́		634332	3514.98	1/47	23.54
70 MHz	QPSK	632334 633334	3485.01 3500.01	1 / 47	23.23
	QF SK	634332	3514.98	1 / 47 1 / 47	23.19 23.16
	16-QAM	632334	3485.01	1/47	22.76
	10 00 111	632000	3480.00	1 / 81	23.55
	π/2 BPSK	633334	3500.01	1 / 81	23.51
우		634666	3519.99	1 / 81	23.45
60 MHz		632000	3480.00	1 / 81	23.57
60	QPSK	633334	3500.01	1 / 81	23.57
		634666	3519.99	1 / 81	23.51
	16-QAM	632000	3480.00	1 / 81	23.34
50 MHz		631668	3475.02	1 / 99	23.25
	π/2 BPSK	633334	3500.01	1 / 66	23.50
		635000	3525.00	1/66	23.36
	ODEK	631668	3475.02	1/99	23.46
	QPSK	633334 635000	3500.01 3525.00	1 / 66 1 / 66	23.41 23.35
	16-QAM	631668	3475.02	1 / 99	23.35
	10 00 111	631334	3470.01	1 / 53	23.83
	π/2 BPSK	633334	3500.01	1 / 79	23.54
우		635332	3529.98	1 / 53	23.54
40 MHz		631334	3470.01	1 / 53	23.84
40	QPSK	633334	3500.01	1 / 79	23.67
		635332	3529.98	1 / 53	23.20
	16-QAM	635332	3529.98	1 / 53	23.31
	10 5 5 5 1	631000	3465.00	1/39	23.07
N	π/2 BPSK	633334	3500.01	1/39	23.07
Η̈́		635666	3534.99	1/39	22.59
30 MH2	QPSK	631000 633334	3465.00 3500.01	1/39	23.74 23.63
т т	QF SK	635666	3534.99	1 / 39 1 / 39	23.63
	16-QAM	631000	3465.00	1/39	23.07
		630668	3460.02	1/33	24.02
	π/2 BPSK	633334	3500.01	1 / 25	23.47
₽		636000	3540.00	1 / 37	23.51
20 MHz		630668	3460.02	1 / 37	24.05
20	QPSK	633334	3500.01	1 / 25	23.76
		636000	3540.00	1 / 37	23.53
	16-QAM	630668	3460.02	1 / 37	23.63
	10	630500	3457.50	1 / 28	23.97
N	π/2 BPSK	633334	3500.01	1 / 28	23.85
Ξ.		636166 630500	3542.49 3457.50	1/28	23.30
5 1	QPSK		3457.50	1/28	23.99
÷	Gron	633334 636166	3542.49	1 / 28 1 / 28	23.91 23.38
	16-QAM	633334	3500.01	1 / 28	23.82
		630334	3455.01	1 / 12	23.56
	π/2 BPSK	633334	3500.01	1 / 12	23.47
£		636332	3544.98	1 / 12	23.36
10 MHz		630334	3455.01	1 / 12	24.09
9	QPSK	633334	3500.01	1 / 12	23.95
		636332	3544.98	1 / 12	23.79
	16-QAM	636332	3544.98	1 / 12	23.42

Table 7-1. Conducted Power Output Data (n77 (DoD Band) – ANT F)

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Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
	π/2 BPSK	633334	3500.01	1 / 204	18.94
100 MHz	QPSK	633334	3500.01	1 / 204	19.29
	16-QAM	633334	3500.01	1 / 204	18.07
Table 7-2	2. Conducted P	ower Outpu	t Data (n77 (Do	D Band) SRS2	– ANT C)

I (I (1 ιµ

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
	π/2 BPSK	633334	3500.01	1 / 68	21.34
100 MHz	QPSK	633334	3500.01	1 / 68	21.44
	16-QAM	633334	3500.01	1 / 68	21.03

Table 7-3. Conducted Power Output Data (n77 (DoD Band) SRS3 – ANT L)

	Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
		π/2 BPSK	633334	3500.01	1 / 68	18.67
	100 MHz	QPSK	633334	3500.01	1 / 68	18.82
		16-QAM	633334	3500.01	1 / 68	18.61

Table 7-4. Conducted Power Output Data (n77 (DoD Band) SRS4 – ANT D)

FCC ID: A3LSMS908E	Portest*	PART 27 MEASUREMENT REPORT CLASS II Permissive Change	Approved by: Technical Manager
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Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
_		650000	2750.00	1 / 136	22.22
00 MHz	π/2 BPSK	650000 656000	3750.00 3840.00	1 / 136	23.32 22.88
	in 2 bi oit	662000	3930.00	1 / 136	22.94
Σ		650000	3750.00	1/136	23.43
100	QPSK	656000	3840.00	1 / 136	23.06
		662000	3930.00	1 / 136	23.09
	16-QAM	650000	3750.00	1 / 136	22.28
		649668	3745.02	1 / 183	23.35
	π/2 BPSK	656000	3840.00	1 / 122	23.19
90 MHz		662332	3934.98	1 / 183	22.84
		649668	3745.02	1 / 183	23.52
	QPSK	656000	3840.00	1 / 122	23.26
		662332	3934.98	1 / 183	23.28
	16-QAM	656000	3840.00	1 / 122	22.46
		649334	3740.01	1 / 108	23.58
	π/2 BPSK	656000	3840.00	1 / 108	23.07
F		662666	3939.99	1 / 108	23.21
80 MHz		649334	3740.01	1 / 108	23.49
8	QPSK	656000	3840.00	1 / 108	23.00
		662666	3939.99	1 / 108	23.12
	16-QAM	649334	3740.01	1 / 108	23.14
		649000	3735.00	1 / 141	23.39
	π/2 BPSK	656000	3840.00	1 / 47	23.15
Ŧ		663000	3945.00	1 / 141	23.20
70 MHz		649000	3735.00	1 / 141	23.57
2	QPSK	656000	3840.00	1 / 47	23.15
		663000	3945.00	1 / 141	23.36
	16-QAM	649000	3735.00	1 / 141	23.12
		648668	3730.02	1 / 81	23.74
	π/2 BPSK	656000	3840.00	1 / 81	23.29
F		663332	3949.98	1 / 81	23.54
60 MHz		648668	3730.02	1 / 81	23.77
	QPSK	656000	3840.00	1 / 81	23.32
		663332	3949.98	1 / 81	23.65
	16-QAM	663332	3949.98	1 / 81	22.98
50 MHz		648334	3725.01	1 / 66	23.86
	π/2 BPSK	656000	3840.00	1 / 66	23.34
		663666	3954.99	1 / 66	23.08
	0001/	648334	3725.01	1 / 66	23.81
	QPSK	656000	3840.00	1 / 66	23.25
		663666	3954.99	1/66	23.06
	16-QAM	648334	3725.01	1/66	22.68
		648000	3720.00	1/79	23.92
N	π/2 BPSK	656000	3840.00	1/79	23.33
to MHz		664000	3960.00	1/79	23.30
o o	QPSK	648000	3720.00 3840.00	1 / 79 1 / 79	23.96
4	QPSK	656000 664000	3960.00	1/79	23.35
	16-QAM	648000	3720.00	1/79	23.38 23.56
	10-024101	647668	3715.02	1/39	23.30
	π/2 BPSK	656000	3840.00	1 / 19	24.32
N	II/2 DI SIX	664332	3964.98	1 / 39	23.36
H		647668	3715.02	1/39	23.83
30 MHz	QPSK	656000	3840.00	1/39	23.03
	GION	664332	3964.98	1/39	23.08
	16-QAM	647668	3715.02	1/39	23.59
		647334	3710.02	1/39	23.39
	π/2 BPSK	656000	3840.00	1/3/	23.80
N	III DI OK	664666	3969.99	1 / 25	23.80
20 MHz		647334	3710.01	1/25	24.30
8	QPSK	656000	3840.00	1/37	24.02
	~ 01	664666	3969.99	1 / 25	23.43
	16-QAM	647334	3710.01	1/25	23.05
		647167	3707.51	1/3/	23.48
	π/2 BPSK	656000	3840.00	1/28	23.30
Ņ	In 2 Dr OK	664499	3972.50	1 / 28	23.28
15 MHz		647167	3707.51	1/28	23.20
5	QPSK	656000	3840.00	1/28	1
<u> </u>	Q1'ON	664499			23.04
	16-QAM	664499 647167	3972.50	1/28	23.28
	TO-QAIVI		3707.51	1/28	23.23
		647000	3705.00	1/17	23.31
N	π/2 BPSK	656000	3840.00	1/17	23.37
Ξ		664332 647000	3975.00	1/17	22.84
ō	OPEK	647000	3705.00	1/17	23.97
-	QPSK	656000	3840.00	1/17	23.52
	16-QAM	664332 656000	3975.00 3840.00	1 / 17 1 / 17	23.55 22.79
	10-04101	000000	3040.00		22.19

 Table 7-5. Conducted Power Output Data (n77 (C Band) – ANT F)

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Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
		650000	3750.00	1 / 136	20.02
	π/2 BPSK	656000	3840.00	1 / 136	19.14
MHz		662000	3930.00	1 / 136	18.57
2		650000	3750.00	1 / 136	20.28
100	QPSK	656000	3840.00	1 / 136	19.42
		662000	3930.00	1 / 136	18.86
	16-QAM	662000	3930.00	1 / 136	18.29

Table 7-6. Conducted Power Output Data (n77 (C Band) SRS2 – ANT C)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
		650000	3750.00	1 / 204	22.60
	π/2 BPSK	656000	3840.00	1 / 68	21.84
MHz		662000	3930.00	1 / 136	21.87
		650000	3750.00	1 / 204	22.63
100	QPSK	656000	3840.00	1 / 68	21.89
		662000	3930.00	1 / 136	21.90
	16-QAM	650000	3750.00	1 / 204	22.42

Table 7-7. Conducted Power Output Data (n77 (C Band) SRS3 – ANT L)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
		650000	3750.00	1 / 136	19.44
	π/2 BPSK	656000	3840.00	1 / 68	18.69
MHz		662000	3930.00	1 / 68	17.57
		650000	3750.00	1 / 136	19.49
100	QPSK	656000	3840.00	1 / 68	18.77
		662000	3930.00	1 / 68	17.75
	16-QAM	662000	3930.00	1 / 68	17.41

Table 7-8. Conducted Power Output Data (n77 (C Band) SRS4 – ANT D)

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# 7.3 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 7-2. Test Instrument & Measurement Setup

## Test Notes

None.

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# NR Band n77 (PC3) – DoD-Band – SRS-1 – ANT F

Occupied		'L	+							<b>‡</b>	Trace	· · <del>影</del>
RL		ut: RF upling: DC gn: Auto	Input Z: 50 Ω Corr CCorr Freq Ref: Int (S)	Atten: 36 dB	Trig: Fr Gate: ( #IF Ga		Center Fr Avg Hold: Radio Std		00 GHz	Trace Type Clear /		Trace Control
1 Graph		•	NFE: Off							Trace	Average	Detector
Scale/Di Log 30.0	iv 10.0 dB			Ref Value 40.00	dBm		ÌI			<ul> <li>Max H</li> </ul>	old	
30.0 20.0 10.0					the and the second s	an and the second	v.			Min Ho	old	
0.00										Restart	Max Hold	
-20.0	- Angeler and a starter	meny approvement						and a second				
-40.0	5000 611											
	2.4000 GHz			#Video BW 8.00	UU MHZ		s		pan 250 MHz 1s (1001 pts)			
2 Metrics		•										
	Occupied	Bandwidth										
	Cocapica		36 MHz		Total	Power		31.2 c	lBm			
	Transmit I x dB Band	Freq Error dwidth	-434.67 k 102.4 M		% of x dB	OBW Pow	er	99.0 -26.00				
	って		Feb 22, 2022 11:59:23 AM	$\Box \Delta$								

Plot 7-9. Occupied Bandwidth Plot (NR Band n77 (DoD) - 100MHz π/2 BPSK - Full RB - ANT F)



Plot 7-10. Occupied Bandwidth Plot (NR Band n77 (DoD) - 100MHz QPSK - Full RB - ANT F)

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Spectrum /	Analyzer 1 BW	+							Trace	<ul> <li>▼</li> <li>★</li> </ul>
	Input: RF     Coupling: DC     Align: Auto	Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Off	Atten: 36 dB	Gate:	ree Run Off ain: Low	Center Freq Avg Hold: 10 Radio Std: N		0 GHz	Trace Type Clear / Write	Trace Control Detector
1 Graph									Trace Average	Delector
Scale/Div	10.0 dB	F	Ref Value 30.0	0 dBm		1			Max Hold	
Log 20.0 10.0 0.00			eijidarbriazere pro	Wiley and the second	n Marantera				Min Hold	
-10.0 -20.0 -30.0	لى الى مەدىر 1940م الىكى بىلى الىكى بىلى بىلى بىلى بىلى بىلى بىلى بىلى	and growthat				humanique	ngraksen anvieren datur	the stars what	Restart Max Hold	
-40.0 -50.0 -60.0										
Center 3.5 Res BW 2	5000 GHz .4000 MHz	#\	/ideo BW 8.00	00 MHz		Sw		an 250 MHz s (1001 pts)		
2 Metrics	v									
C	Occupied Bandwidth 97.69	95 MHz		Total	Power		29.2 di	3m		
	Fransmit Freq Error dB Bandwidth	95.156 kH; 103.4 MH;		% of x dB	OBW Powe	er	99.00 -26.00			
<b>H</b> r		Feb 22, 2022 12:00:46 PM								

Plot 7-11. Occupied Bandwidth Plot (NR Band n77 (DoD) - 100MHz 16-QAM - Full RB - ANT F)



Plot 7-12. Occupied Bandwidth Plot (NR Band n77 (DoD) - 90MHz π/2 BPSK - Full RB - ANT F)

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Spectru Occupie	m Analyzer 1 d BW	•	+									\$	Trace	- * 崇
RL		t: RF bling: DC a: Auto	Input Z: Corr CC Freq Re NFE: O	orr f: Int (S)	Atten: 36 dB	Gate:	Free Run Off ain: Low	Center Avg Ho Radio	old: 10		) GHz	Trace Type Clear /		Trace Control
1 Graph		•										Trace /	Average	Detector
	oiv 10.0 dB				Ref Value 30.0	00 dBm						Max H	ald	
20.0						person they desired							uu	
10.0				and a state of the	and a state of the second and a second s							Min Ho	old	
-10.0			/											
-20.0	Later growth the terry	where we are	montenadia					-	4m	1.0.4.5.4.5.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1	~+*******************	Restart	Max Hold	
-30.0														
-50.0														
	3.5000 GHz				Video BW 8.0					0	an 225 MHz			
	2.2000 GHZ	z		#	VIGEO BVV 8.0				Swe		an 225 MHZ 5 (1001 pts)			
2 Metric	s	v												
	Occupied E	3andwidth												
			15 MHz			Tota	l Power			29.9 dE	ßm			
	Transmit F			53.856 kH			f OBW Pow	er		99.00				
	x dB Band	width		93.06 MH	Z	x dE	5			-26.00 (	зВ			
	って			2, 2022 :56 PM										

Plot 7-13. Occupied Bandwidth Plot (NR Band n77 (DoD) - 90MHz QPSK - Full RB - ANT F)



Plot 7-14. Occupied Bandwidth Plot (NR Band n77 (DoD) - 90MHz 16-QAM - Full RB - ANT F)

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Occupie			+								₽	Trace	- <b>*</b> <del>  </del> *
RL RL		nput: RF Coupling: DC Nign: Auto		Corr ef: Int (S)	Atten: 36 dB	Gate:	Free Run Off ain: Low	Center Fre Avg Hold: Radio Std:		0 GHz	Trace T	Гуре ar / Write	Trace Control
ري 1 Graph		•	NFE: O	νff							Tra	ce Average	Detector
Log 30.0 20.0	0iv 10.0 d	B			Ref Value 40.		The section of the method					x Hold	
10.0 0.00 -10.0 -20.0										well-re-re-ro-ro-ro-	Rest	tart Max Hold	
-20.0 -30.0 -40.0 -50.0	الموال معين	elsen million											
	3.5000 G / 1.8000 I			#\	/ideo BW 6.0	000 MHz		Si	Sp weep 1.00 m	oan 200 MHz s (1001 pts)			
2 Metrics	s	T											
	Occupie	ed Bandwidti 77.	h 356 MHz			Tota	l Power		31.3 d	Bm			
		it Freq Error andwidth		182.74 kHz 81.62 MHz		% of x dB	f OBW Pow	er	99.00 -26.00				
	5			2, 2022 :27 PM									

Plot 7-15. Occupied Bandwidth Plot (NR Band n77 (DoD) - 80MHz π/2 BPSK - Full RB - ANT F)



Plot 7-16. Occupied Bandwidth Plot (NR Band n77 (DoD) - 80MHz QPSK - Full RB - ANT F)

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Spectrum Occupied	n Analyzer 1 d BW	- <b>-</b>	+								₽	Trace	- * 崇
KEYSI RL	GHT Input:	ling: DC	Input Z: Corr CC Freq Re NFE: Of	orr f: Int (S)	Atten: 36 dB	Gate:	Free Run Off ain: Low	Center Freq Avg Hold: 1 Radio Std: 1		0 GHz	Trace Type Clear / Wri	te	Trace Control Detector
1 Graph		•									Trace Ave	age	Delecio
	iv 10.0 dB			F	Ref Value 30.	00 dBm					Max Hold		
20.0											Wiak Hold		
10.0				and and an order of the second se							Min Hold		
-10.0								<u>\</u>					
-20.0	A	a dhear ar cata	Mart Martille					mondand	h-verten altera	North Charge	Restart Ma:	(Hold	
-30.0													
-50.0													
-60.0									_				
	3.5000 GHz 1.8000 MHz			#\	/ideo BW 6.0	000 MHz		Sw		an 200 MHz s (1001 pts)			
2 Metrics	;	v											
	Occupied B	ondwidth											
	Occupica D		7 MHz			Tota	l Power		29.5 di	Зm			
	Transmit Fr			54.361 kHz		% o	f OBW Powe	er	99.00				
	x dB Bandw	vidth		82.05 MHz	Z	x dE	3		-26.00	dB			
	って		Feb 22 12:04:	2, 2022 25 PM									

Plot 7-17. Occupied Bandwidth Plot (NR Band n77 (DoD) - 80MHz 16-QAM - Full RB - ANT F)



Plot 7-18. Occupied Bandwidth Plot (NR Band n77 (DoD) - 70MHz π/2 BPSK - Full RB - ANT F)

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Spectru Occupie	um Analy ed BW	zer 1	+							🛟 Тга	ce v 洪
RL	SIGHT ↔	Input: RF Coupling: DC Align: Auto	Input Z: 50 0 Corr CCorr Freq Ref: In NFE: Off		Gate:	Free Run Off ain: Low	Center Fre Avg Hold: Radio Std		) GHz	Trace Type Clear / Write	Trace Control
1 Graph	n	•	,							Trace Average	Detector
	Div 10.0	dB		Ref Value 30	0.00 dBm					Max Hold	
20.0					- a	1				Wiax Hold	
10.0										Min Hold	
-10.0			كليبهمهم				hum			Destant Marcula	
-20.0 -30.0	ingladge tandalahigan	H.L. market and a starting	-Around Color					"WARD AND IN THE REAL PROPERTY OF	- Albert March 19	Restart Max Ho	
-40.0											
-50.0 -60.0											
	3.50000		ļ	#Video BW 5.	.0000 MHz				an 175 MHz		
2 Metric	N 1.6000						s	weep 1.00 ms	s (1001 pts)		
2 Metric	es	•									
	-										
	Occup	oied Bandwidth 67.8	33 MHz		Tota	Power		30.1 dE	3m		
	Transr	mit Freq Error	77.9	005 kHz	% of	OBW Pow	er	99.00	%		
	x dB B	Bandwidth	71.	71 MHz	x dB			-26.00	dB		
$\blacksquare$	ち (		Feb 22, 20 12:05:29								

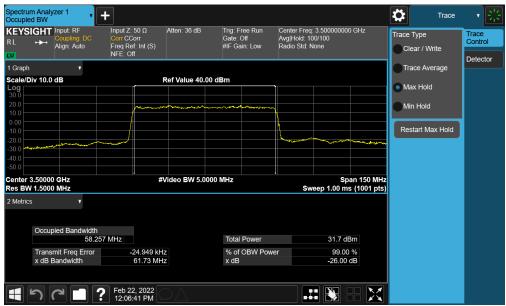
Plot 7-19. Occupied Bandwidth Plot (NR Band n77 (DoD) - 70MHz QPSK - Full RB - ANT F)



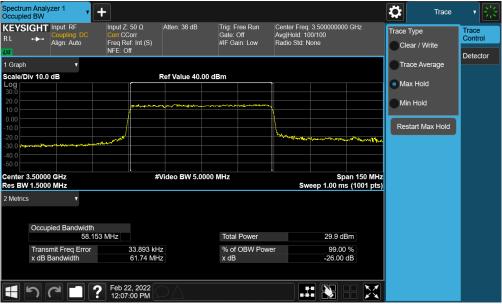
Plot 7-20. Occupied Bandwidth Plot (NR Band n77 (DoD) - 70MHz 16-QAM - Full RB - ANT F)

FCC ID: A3LSMS908E		PART 27 MEASUREMENT REPORT CLASS II Permissive Change	SAMSUNG	Approved by: Technical Manager
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Plot 7-21. Occupied Bandwidth Plot (NR Band n77 (DoD) - 60MHz π/2 BPSK - Full RB - ANT F)



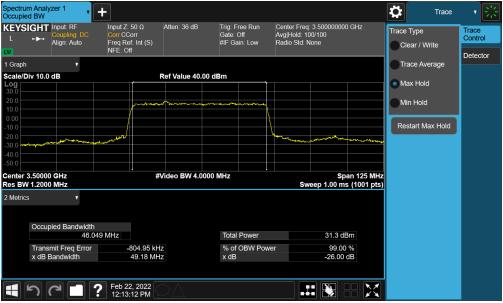
Plot 7-22. Occupied Bandwidth Plot (NR Band n77 (DoD) - 60MHz QPSK - Full RB - ANT F)

FCC ID: A3LSMS908E		PART 27 MEASUREMENT REPORT CLASS II Permissive Change	SAMSUNG	Approved by: Technical Manager
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Occupie		+ Input Ζ: 50 Ω	Atten: 36 dB	Triq: Free R	un Conto	- Freq: 3.50	იიიიიიი	CH-	Тгасе	· <del>*</del>
RL RL	IGHT Input: RF ← Coupling: DC Align: Auto	Freq Ref: Int (S)	Allen. 50 ub	Gate: Off #IF Gain: Lo	Avg He	old:>100/10 Std: None	00	Gnz	Trace Type Clear / Write	Trace Control
1 Graph									Trace Average	Detector
Scale/D Log 20.0	9iv 10.0 dB		Ref Value 30.00						Max Hold	
10.0 0.00		A A A A A A A A A A A A A A A A A A A	4470	for the contraction of the second					Min Hold	
-10.0		untermentel			Mur	-	waren (Natar Ada	เป็นไปประเทศ	Restart Max Hold	
-40.0										
	3.50000 GHz		Video BW 5.00	00 MHz				n 150 MHz		
Res BW 2 Metrics	/ 1.5000 MHz					Sweep	1.00 ms	(1001 pts)		
	Occupied Bandwidth 58.10	02 MHz		Total Pow	er		29.5 dB	m		
	Transmit Freq Error x dB Bandwidth	-55.975 kH 61.56 MH		% of OBW x dB	Power		99.00 -26.00 c			
$\blacksquare$		Feb 22, 2022 12:07:12 PM								

Plot 7-23. Occupied Bandwidth Plot (NR Band n77 (DoD) - 60MHz 16-QAM - Full RB - ANT F)



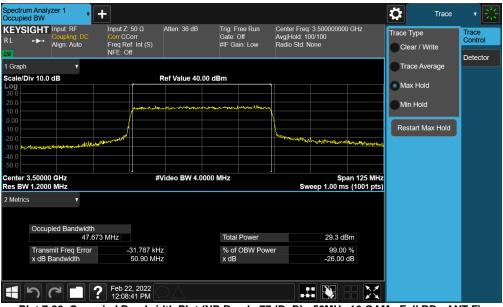
Plot 7-24. Occupied Bandwidth Plot (NR Band n77 (DoD) - 50MHz π/2 BPSK - Full RB - ANT F)

FCC ID: A3LSMS908E		PART 27 MEASUREMENT REPORT CLASS II Permissive Change	SAMSUNG	Approved by: Technical Manager
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EYSIGHT Input: RF Coupling: DC Align: Auto	Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Off	Atten: 36 dB	Trig: Free Run Gate: Off #IF Gain: Low	Center Frec Avg Hold: 1 Radio Std: I		GHz	Trace Type Clear / Write	Trace Control Detecto
Graph v							Trace Average	
cale/Div 10.0 dB		Ref Value 30.00	dBm	1			Max Hold	
0.0 0.0 00		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	alan and the second second				Min Hold	
0.0 0.0 0.0	market and a second			have wellen	Num Marman	enterporte-Ales-Ales-Ales-Ales-Ales-Ales-Ales-Ale	Restart Max Hold	
0.0 0.0 0.0								
enter 3.50000 GHz		Video BW 4.000	0 MHz			n 125 MHz		
s BW 1.2000 MHz Metrics				50	veep 1.00 ms	(1001 pts)		
Occupied Bandwidth	76 MHz		Total Power		30.1 dBr	n		
	16.719 kH	iz	% of OBW Pov	ver	99.00 %			
Transmit Freg Error	50.56 MH		x dB		-26.00 dl			

Plot 7-25. Occupied Bandwidth Plot (NR Band n77 (DoD) - 50MHz QPSK - Full RB - ANT F)



Plot 7-26. Occupied Bandwidth Plot (NR Band n77 (DoD) - 50MHz 16-QAM - Full RB - ANT F)

FCC ID: A3LSMS908E	PCTEST. Proud to be part of @ element	PART 27 MEASUREMENT REPORT CLASS II Permissive Change	SAMSUNG	Approved by: Technical Manager
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Plot 7-27. Occupied Bandwidth Plot (NR Band n77 (DoD) - 40MHz π/2 BPSK - Full RB - ANT F)



Plot 7-28. Occupied Bandwidth Plot (NR Band n77 (DoD) - 40MHz QPSK - Full RB - ANT F)

FCC ID: A3LSMS908E		PART 27 MEASUREMENT REPORT CLASS II Permissive Change	SAMSUNG	Approved by: Technical Manager
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Spectrum Occupied	n Analyzer 1 d BW	t					<b>Č</b> Trace	- * 崇
	GHT Input: RF ← Coupling: DC Align: Auto	Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Off	Atten: 36 dB	Trig: Free Run Gate: Off #IF Gain: Low	Center Freq Avg Hold: 1 Radio Std: 1		Trace Type Clear / Write	Trace Control
1 Graph	•						Trace Average	Detector
	v 10.0 dB		Ref Value 30.00	0 dBm			Max Hold	
Log 20.0 10.0 0.00			-	hallen an			Min Hold	
	Augenterson and an ar	ndroorWinder			And the second s	And and a start and a start to a	Restart Max Hold	
-40.0 -50.0 -60.0								
	.50000 GHz 910.00 kHz	#	Video BW 3.00	00 MHz	Sw	Span 100 MH veep 1.00 ms (1001 pts		
2 Metrics	•							
	Occupied Bandwidth 37.97	6 MHz		Total Power		29.6 dBm		
	Transmit Freq Error x dB Bandwidth	-23.311 kH 40.75 MH		% of OBW Pow x dB	ver	99.00 % -26.00 dB		
	って - ?	Feb 22, 2022 12:14:24 PM						

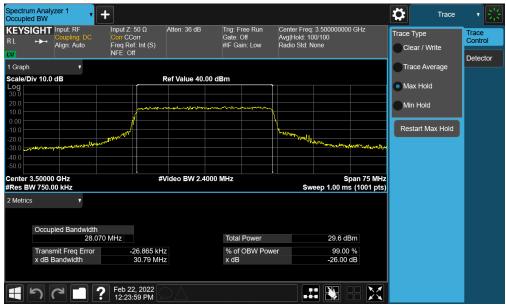
Plot 7-29. Occupied Bandwidth Plot (NR Band n77 (DoD) - 40MHz 16-QAM - Full RB - ANT F)



Plot 7-30. Occupied Bandwidth Plot (NR Band n77 (DoD) - 30MHz π/2 BPSK - Full RB - ANT F)

FCC ID: A3LSMS908E		PART 27 MEASUREMENT REPORT CLASS II Permissive Change	Approved by: Technical Manager
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Plot 7-31. Occupied Bandwidth Plot (NR Band n77 (DoD) - 30MHz QPSK - Full RB - ANT F)



Plot 7-32. Occupied Bandwidth Plot (NR Band n77 (DoD) - 30MHz 16-QAM - Full RB - ANT F)

FCC ID: A3LSMS908E		PART 27 MEASUREMENT REPORT CLASS II Permissive Change	SAMSUNG	Approved by: Technical Manager
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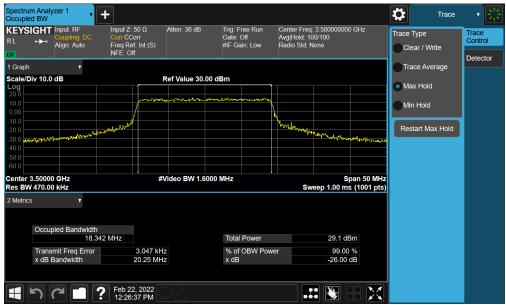
Plot 7-33. Occupied Bandwidth Plot (NR Band n77 (DoD) - 20MHz π/2 BPSK - Full RB - ANT F)



Plot 7-34. Occupied Bandwidth Plot (NR Band n77 (DoD) - 20MHz QPSK - Full RB - ANT F)

FCC ID: A3LSMS908E	PCTEST Proud to be part of @ element	PART 27 MEASUREMENT REPORT CLASS II Permissive Change	Approved by: Technical Manager
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Plot 7-35. Occupied Bandwidth Plot (NR Band n77 (DoD) - 20MHz 16-QAM - Full RB - ANT F)



Plot 7-36. Occupied Bandwidth Plot (NR Band n77 (DoD) - 15MHz π/2 BPSK - Full RB - ANT F)

FCC ID: A3LSMS908E		PART 27 MEASUREMENT REPORT CLASS II Permissive Change	Approved by: Technical Manager
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Spectrui Occupie	m Analyzer 1 d BW	+						Trace	- 米
RL	IGHT Input: RF Coupling: DC Align: Auto	Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Off	Atten: 36 dB	Trig: Free Run Gate: Off #IF Gain: Low	Center Fre Avg Hold: Radio Std		GHz	Trace Type Clear / Write	Trace Control
1 Graph	•							Trace Average	Deteolor
	iv 10.0 dB		Ref Value 30.00	dBm				Max Hold	
20.0			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					
10.0		=			<u>ر</u>			Min Hold	
-10.0		/			<u></u>				
-20.0	made and a second a	- Arana			- Marthan	mm		Restart Max Hold	
-40.0									
-50.0									
	3.50000 GHz	#	Video BW 1.200	0 MHz		Spa	1 37.5 MHz		
Res BW	360.00 kHz				S	weep 1.00 ms			
2 Metrics	s <b>v</b>								
	Occupied Bandwidth						_		
	13.69			Total Power	_	29.5 dB			
	Transmit Freq Error x dB Bandwidth	-19.189 kH 15.45 MH		% of OBW Pow x dB	er	99.00 -26.00 d			
		Feb 22, 2022	$\sim$ $\wedge$						
	<u> </u>	12:27:26 PM							

Plot 7-37. Occupied Bandwidth Plot (NR Band n77 (DoD) - 15MHz QPSK - Full RB - ANT F)



Plot 7-38. Occupied Bandwidth Plot (NR Band n77 (DoD) - 15MHz 16-QAM - Full RB - ANT F)

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Plot 7-39. Occupied Bandwidth Plot (NR Band n77 (DoD) - 10MHz π/2 BPSK - Full RB - ANT F)



Plot 7-40. Occupied Bandwidth Plot (NR Band n77 (DoD) - 10MHz QPSK - Full RB - ANT F)

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Spectrum Analyzer 1 Occupied BW	• +						Trace	_ 7 🔡
	ling: DC C Auto Fi	put Ζ: 50 Ω orr CCorr req Ref: Int (S) FE: Off	Atten: 36 dB	Trig: Free Run Gate: Off #IF Gain: Low	Center Freq Avg Hold: 1 Radio Std: 1		Trace Type Clear / Write	Trace Control
1 Graph	T						Trace Average	Detector
Scale/Div 10.0 dB 20.0 10.0			Ref Value 30.00	dBm			Max Hold	
0.00 -10.0 -20.0	man	Mar			hand the second	In Mailerran apriles	Restart Max Hold	
-30.0								
Center 3.50000 GHz Res BW 240.00 kHz		#	Video BW 750.0	IO kHz	Sw	Span 25 N veep 1.00 ms (1001 p		
2 Metrics	T							
Occupied B	andwidth 8.7314 Mł	Ηz		Total Power		29.0 dBm		
Transmit Fro x dB Bandw		-1.754 kH 10.11 MH		% of OBW Pow x dB	ver	99.00 % -26.00 dB		
		Feb 22, 2022	~ ^					
		12:29:19 PM						

Plot 7-41. Occupied Bandwidth Plot (NR Band n77 (DoD) - 10MHz 16-QAM - Full RB - ANT F)

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# NR Band n77 (PC3) – C-Band – SRS-1 – ANT F

Spectrur Occupie		zer 1	• +	•							₽	Trace	· · 米
RL	GHT ·▶·	Input: RF Coupling: Align: Aute		Input Z: 50 Ω Corr CCorr Freq Ref: Int		Gate	Free Run Off ain: Low	Center Fre Avg Hold: Radio Std:		) GHz	Trace Type Clear /		Trace Control
1 Graph				NFE: Off							Trace A	verage	Detector
Scale/D	iv 10.0	dB			Ref Value	e 40.00 dBm							
Log 30.0											Max Ho	DIQ	
20.0							~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				Min Ho	ld	
0.00											Restart I	Max Hold	
-20.0	- all and a second		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					·~~~					
-30.0 -40.0													
-50.0				ļ									
Center 3 Res BW					#Video BW	V 8.0000 MHz		s	Sp weep 1.00 ms	an 250 MHz s (1001 pts)			
2 Metrics													
	Occup	ied Band	width 97.135	MH7		Tota	l Power		31.7 dE	Rm			
	Transi	nit Freg E			l0 kHz		f OBW Pow	er	99.00				
	x dB E	Bandwidth	l i	102.	5 MHz	x dE	3		-26.00	dB			
	ງ (	2	]?	Feb 22, 20 12:30:56 P	22 M								

Plot 7-42. Occupied Bandwidth Plot (NR Band n77 - 100MHz π/2 BPSK - Full RB - ANT F)



Plot 7-43. Occupied Bandwidth Plot (NR Band n77 - 100MHz QPSK - Full RB - ANT F)

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Spectrum Anal Occupied BW	yzer 1	+						Trace	<u>ب</u> ا
KEYSIGHT RL +++	Input: RF Coupling: DC Align: Auto	Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Off	Atten: 36 dB	Trig: Free Run Gate: Off #IF Gain: Low	Center Fre Avg Hold: ' Radio Std:		GHz	Trace Type Clear / Write	Trace Control
1 Graph								Trace Average	Delector
Scale/Div 10.	0 dB		Ref Value 30.00	dBm	- <b>h</b>			Max Hold	
20.0 10.0 0.00		and the second s	and a start and a start and a start and a start	estrated in the second	•			Min Hold	
-10.0 -20.0 -30.0	mayle all an and a start of the second se	muladurad			hander		an and the state of the	Restart Max Hold	
-40.0 -50.0 -60.0									
Center 3.8400 Res BW 2.400		l 	fVideo BW 8.000	00 MHz	Si	Spa weep 1.00 ms	an 250 MHz (1001 pts)		
2 Metrics	۲								
Occu	pied Bandwidth 97.64	4 MHz		Total Power		29.2 dB	m		
	smit Freq Error Bandwidth	-57.507 kł 103.6 Mł		% of OBW Pov x dB	ver	99.00 -26.00 c			
<b>۲</b>		Feb 22, 2022 12:31:31 PM							

Plot 7-44. Occupied Bandwidth Plot (NR Band n77 - 100MHz 16-QAM - Full RB - ANT F)

Spectrum Analy Occupied BW KEYSIGHT RL	ľ.	Hoput Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Off	Atten: 36 dB	Trig: Free Gate: Off #IF Gain:		Center Freq: Avg Hold: 10 Radio Std: N		) GHz	Trace Type Clear / W	Trace	Trace Control
LVI 1 Graph Scale/Div 10.0	<b>▼</b> dB		Ref Value 40.00	dBm					Trace Ave		Detector
Log 30.0 20.0 10.0			, margan mar	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				<ul> <li>Max Hold</li> <li>Min Hold</li> </ul>		
0.00 -10.0 -20.0 -30.0	m mar and the second					h			Restart Ma	ax Hold	
-40.0 -50.0 Center 3.8400	GHz		Video BW 8.000	0 MHz			Sp	an 225 MHz			
Res BW 2.2000 2 Metrics	) MHz T					Sw	eep 1.00 m	s (1001 pts)			
Occup	bied Bandwidth 87.022	2 MHz		Total Po	wer		31.4 dE	Зm			
	mit Freq Error 3andwidth	-312.02 kH 92.27 MH		% of OB x dB	W Powe	r	99.00 -26.00				
<b>1</b> 5		Feb 22, 2022 12:32:52 PM									

Plot 7-45. Occupied Bandwidth Plot (NR Band n77 - 90MHz π/2 BPSK - Full RB - ANT F)

FCC ID: A3LSMS908E		PART 27 MEASUREMENT REPORT CLASS II Permissive Change	SAMSUNG	Approved by: Technical Manager	
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Spectrum Analyzer 1 Occupied BW KEYSIGHT Input: RF RL + Coupling: DC Align: Auto	Corr CCorr Freq Ref: Int (S)		Frig: Free Run Gate: Off #F Gain: Low	Center Freq: 3.8400 Avg Hold:>100/100 Radio Std: None		Trace Type Clear / Write	Trace Control
CV           1 Graph           Scale/Div 10.0 dB           Log           20.0           0.00           10.0           0.00           -00           -00           -00           -00           -00           -00           -00           -00	NFE: Off	f Value 30.00 dBr				Trace Average Max Hold Min Hold Restart Max Hold	Detector
-30.0 -50.0 -60.0 Center 3.8400 GHz Res BW 2.2000 MHz 2 Metrics Y	#Vid	leo BW 8.0000 M	Hz	Sweep 1.	Span 225 MHz 00 ms (1001 pts)		
Occupied Bandwidth 88.07 Transmit Freq Error x dB Bandwidth	1 MHz -207.53 kHz 93.17 MHz		Total Power % of OBW Powe x dB	۲	9.6 dBm 99.00 % 26.00 dB		

Plot 7-46. Occupied Bandwidth Plot (NR Band n77 - 90MHz QPSK - Full RB - ANT F)

Spectrum Analyzer 1 Decupied BW KEYSIGHT R L Align: Auto	Hoput Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Off		Trig: Free Run Gate: Off #IF Gain: Low	Center Freq: 3.8400000 Avg Hold:>100/100 Radio Std: None	00 GHz	Trace Type Clear / Write	Trace Control
1 Graph v Scale/Div 10.0 dB	R	ef Value 30.00 dE	3m			Trace Average	Delector
Log 20.0 10.0 0.00	and here here a	เมาร์การไปมากกรุงไปรูปสู่ไประเทศ	epharanet an addition			Max Hold	
10.0 20.0 30.0 40.0 50.0	and a start of the			Warner and a second and	**************************************	Restart Max Hold	
Center 3.8400 GHz Res BW 2.2000 MHz	⊥⊥ #Vi	deo BW 8.0000 I	MHz	s Sweep 1.00 n	pan 225 MHz ns (1001 pts)		
	681 MHz		Total Power	29.0 c			
Transmit Freq Error x dB Bandwidth	r -111.70 kHz 93.03 MHz		% of OBW Powe x dB	er 99.0 -26.00			
- n c	<b>?</b> Feb 22, 2022 12:32:03 PM						

Plot 7-47. Occupied Bandwidth Plot (NR Band n77 - 90MHz 16-QAM - Full RB - ANT F)

FCC ID: A3LSMS908E		PART 27 MEASUREMENT REPORT CLASS II Permissive Change	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 26 of 114
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EYSIGHT Input: RF L +++ Coupling: DC Align: Auto	Input Ζ: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Off	Atten: 36 dB	Trig: Free Run Gate: Off #IF Gain: Low	Center Freq Avg Hold: 10 Radio Std: N		Trace Type Clear / Write	Trace Control
Graph v						Trace Average	
cale/Div 10.0 dB og 0.0	ſ	Ref Value 40.00	dBm	1		Max Hold	
0.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		\		Min Hold	
0.0				Lange	and a start of the	Restart Max Hold	
0.0							
0.0 enter 3.8400 GHz		Video BW 6.000	0 MHz		Span 200 M	Hz	
es BW 1.8000 MHz				Sw	eep 1.00 ms (1001 p		
Metrics <b>v</b>							
Occupied Bandwidth 77.43	39 MHz		Total Power		31.6 dBm		
Transmit Freq Error x dB Bandwidth	-379.99 kH 81.89 MH		% of OBW Pow x dB	er	99.00 % -26.00 dB		

Plot 7-48. Occupied Bandwidth Plot (NR Band n77 - 80MHz π/2 BPSK - Full RB - ANT F)

Spectrum Analyz Occupied BW		┣						<b>Ç</b> T	ace 🔻 🔛
	Input: RF Coupling: DC Align: Auto	Input Ζ: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Off	Atten: 36 dB	Trig: Free Run Gate: Off #IF Gain: Low	Center Freq: Avg Hold: 10 Radio Std: N		0 GHz	Trace Type Clear / Write	Trace Control Detector
1 Graph	•							Trace Averag	
Scale/Div 10.0 c	dB		Ref Value 30.00 o	dBm	•			Max Hold	
20.0 10.0 0.00			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	and a factor of the state of th				Min Hold	
-30.0	mummentur	warne ward			lonven		and wanter of the second	Restart Max H	old
-40.0 -50.0 -60.0									
Center 3.8400 C Res BW 1.8000		#	Video BW 6.0000	MHz	Sw		an 200 MHz s (1001 pts)		
2 Metrics	v					·			
Occupi	ied Bandwidth 77.721	I MHz		Total Power		29.6 di	3m		
	nit Freq Error andwidth	-44.295 kH 82.19 MH		% of OBW Pow x dB	er	99.00 -26.00			
<b>1</b> 50	2 2	Feb 22, 2022 12:33:53 PM							

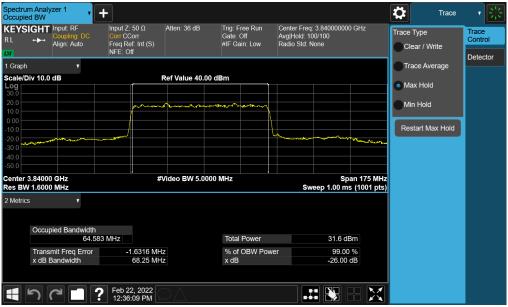
Plot 7-49. Occupied Bandwidth Plot (NR Band n77 - 80MHz QPSK - Full RB - ANT F)

FCC ID: A3LSMS908E	PCTEST* Proud to be part of @ element	PART 27 MEASUREMENT REPORT CLASS II Permissive Change	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 27 of 144
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<b>YSIGHT</b> Input: RF Coupling: DC Align: Auto	Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Off	Atten: 36 dB	Gate:	Free Run Off ain: Low	Center Freq Avg Hold:>1 Radio Std: N		0 GHz	Trace Type Clear / Write	Trace Control Detecto
Graph V								Trace Average	
ale/Div 10.0 dB		Ref Value 3	0.00 dBm					Max Hold	
0.0		an the second second	alante of a start	andre for the lither				Min Hold	
0.0 0.0 0.0 0.0						and here a factor of the	and and a stand and and and and and a stand and a s	Restart Max Hold	
0.0									
nter 3.8400 GHz s BW 1.8000 MHz		#Video BW 6	.0000 MHZ		Sw		oan 200 MHz Is (1001 pts)		
Netrics V									
Occupied Bandwidth 77.66	67 MHz		Tota	Power		29.3 d	Bm		
Transmit Freq Error x dB Bandwidth	-75.521 k 82.31 M		% of x dB	OBW Powe	er	99.00 -26.00			

Plot 7-50. Occupied Bandwidth Plot (NR Band n77 - 80MHz 16-QAM - Full RB - ANT F)



Plot 7-51. Occupied Bandwidth Plot (NR Band n77 - 70MHz π/2 BPSK - Full RB - ANT F)

FCC ID: A3LSMS908E	Proud to be pert of @ element	PART 27 MEASUREMENT REPORT CLASS II Permissive Change	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M2202030011-04.A3L	2/02/2022 - 2/28/2022	2/02/2022 - 2/28/2022 Portable Handset		Page 38 of 144
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Occupied	n Analyzer 1 d BW GHT Input: RF	<b>Η</b> Input Z: 50 Ω	Atten: 36 dB	Trig: Free Run	Center Fre	q: 3.84000000 GH;	7	Trace	· / <del>影</del>
	Coupling: DC Align: Auto	Corr CCorr Freq Ref: Int (S) NFE: Off	Auton: 50 dB	Gate: Off #IF Gain: Low	Avg Hold: 1 Radio Std:	00/100	L	Trace Type Clear / Write	Trace Control
1 Graph	· · ·							Trace Average	Detector
Scale/Di Log 20.0	iv 10.0 dB		Ref Value 30.00	) dBm				O Max Hold	
10.0			••••••••••••••••••••••••••••••••••••••		<u> </u>			Min Hold	
-10.0	Add and a second and	mar parts			hardwoodron	And a state of the	-fr/+fr	Restart Max Hold	
-30.0 -40.0 -50.0									
-60.0	04000 011-						75 841-		
	.84000 GHz 1.6000 MHz	#	Video BW 5.000	DU MHZ	SI	Span 1 weep 1.00 ms (10	75 MHz 001 pts)		
2 Metrics	T								
	Occupied Bandwidth 67.761	1 MHz		Total Power		29.6 dBm			
	Transmit Freq Error x dB Bandwidth	-61.675 kH 73.66 MH		% of OBW Pow x dB	ver	99.00 % -26.00 dB			
	って 🗖 ?	Feb 22, 2022 12:35:21 PM					X		

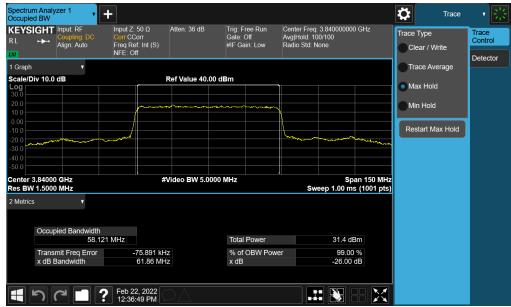
Plot 7-52. Occupied Bandwidth Plot (NR Band n77 - 70MHz QPSK - Full RB - ANT F)

Spectrum Anal Docupied BW KEYSIGHT R L +++	ľ ľ	H Input Z: 5 Corr CCo Freq Ref: NFE: Off	rr	Atten: 36 dB	Trig: Free Ru Gate: Off #IF Gain: Low	Avg F	er Freq: told: 100 Std: No		0 GHz	Trace Type	Trace Write	Trace Control
1 Graph										Trace A	verage	Detector
Scale/Div 10.0	) dB			Ref Value 30.00	dBm							
20.0										Max Ho	d	
10.0 0.00		(	anun kunduttan	h-p-r-dar-Pahambann	Verthalten of the second	~~~				Min Hol	đ	
20.0	e-longitude-stranger and the	and all all and				man	<b>Berlessen</b> gene	and the splant	man and Mar	Restart N	/lax Hold	
30.0 40.0												
-50.0												
Center 3.8400			#\	/ideo BW 5.000	0 MHz				an 175 MHz			
Res BW 1.600	0 MHz						Swe	ep 1.00 m	s (1001 pts)			
2 Metrics	▼ pied Bandwidth											
0000		10 MHz			Total Power			29.2 d	Bm			
	smit Freq Error		5.500 kHz		% of OBW	Power		99.00				
x dB	Bandwidth	7	'1.85 MHz		x dB			-26.00	dB			
<b>1</b> 5		Feb 22, 12:34:5										

Plot 7-53. Occupied Bandwidth Plot (NR Band n77 - 70MHz 16-QAM - Full RB - ANT F)

FCC ID: A3LSMS908E		PART 27 MEASUREMENT REPORT CLASS II Permissive Change	SAMSUNG	Approved by: Technical Manager
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Plot 7-54. Occupied Bandwidth Plot (NR Band n77 - 60MHz π/2 BPSK - Full RB - ANT F)

Spectrum Anal Docupied BW KEYSIGHT R L +++		HINDUT Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Off	Atten: 36 dB	Trig: Free Run Gate: Off #IF Gain: Low	Avg Ho	Freq: 3.8400000 old: 100/100 Std: None	00 GHz	Trace Type Clear / Writ	te	Trace Control
l Graph Scale/Div 10.0	v dB		Ref Value 30.00	dBm				Trace Aver		Delecioi
_og								Max Hold		
10.0			nely and filmen and a	an a				Min Hold		
10.0 20.0 30.0	and group and have been a	www.			hyper	Manager of the state of the sta	w-alanty-have	Restart Max	Hold	
40.0 50.0										
enter 3.8400 es BW 1.500			#Video BW 5.000	0 MHz		S Sweep 1.00 n	pan 150 MHz ns (1001 pts)			
Metrics	V									
Occu	pied Bandwidth 58.16	5 MHz		Total Power		29.3 (	dBm			
	smit Freq Error Bandwidth	2.620 k 61.79 M		% of OBW F x dB	ower	99.0 -26.00				
<b>1</b> 5		Feb 22, 2022 12:37:39 PM								

Plot 7-55. Occupied Bandwidth Plot (NR Band n77 - 60MHz QPSK - Full RB - ANT F)

FCC ID: A3LSMS908E		PART 27 MEASUREMENT REPORT CLASS II Permissive Change	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 40 of 144
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Spectrur Occupie	m Analyzer 1 d BW	+						Trace	- <b>*</b> 😤
KEYS RL	IGHT Input: RF ← Coupling: DC Align: Auto	Input Ζ: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Off	Atten: 36 dB	Trig: Free Run Gate: Off #IF Gain: Low	Center Free Avg Hold: 1 Radio Std:		θHz	Trace Type Clear / Write	Trace Control
1 Graph	•							Trace Average	
	iv 10.0 dB		Ref Value 30.00	) dBm				Max Hold	
Log 20.0 10.0 0.00		and the second s	La rennan ser na fer	and an				Min Hold	
-10.0 -20.0 -30.0	house and a second a	handhand				- Antonia and a factor of the second	Angenes and a second	Restart Max Hold	
-40.0 -50.0 -60.0									
	3.84000 GHz / 1.5000 MHz	#	Video BW 5.000	00 MHz	Sv	Spar veep 1.00 ms	150 MHz (1001 pts)		
2 Metrics	; v								
	Occupied Bandwidth 58.02	1 MHz		Total Power		29.4 dBn	1		
	Transmit Freq Error x dB Bandwidth	-109.06 kH 61.63 MH		% of OBW Pow x dB	ver	99.00 % -26.00 dE			
	502	Feb 22, 2022 12:37:55 PM							

Plot 7-56. Occupied Bandwidth Plot (NR Band n77 - 60MHz 16-QAM - Full RB - ANT F)



Plot 7-57. Occupied Bandwidth Plot (NR Band n77 - 50MHz π/2 BPSK - Full RB - ANT F)

FCC ID: A3LSMS908E	Provide to be preef of the elements	PART 27 MEASUREMENT REPORT CLASS II Permissive Change	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 41 of 144
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EYSIGHT Input: RF Coupling: DC Align: Auto	Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Off	Atten: 36 dB	Trig: Free Run Gate: Off #IF Gain: Low	Center Freq Avg Hold: 10 Radio Std: N		Trace Type Clear / Write	Trace Control Detector
Graph v						Trace Average	
ale/Div 10.0 dB		Ref Value 30.00	) dBm			Max Hold	
0.0	January Market and Market			1		Min Hold	
).0 ).0 0.0				man		Restart Max Hold	
0.0							
nter 3.84000 GHz s BW 1.2000 MHz		fVideo BW 4.000	00 MHz	Sw	Span 125 veep 1.00 ms (1001		
Netrics v					<u>`</u>		
Occupied Bandwidth	95 MHz		Total Power		00 5 40		
Transmit Freq Error	-9.061 kł	17	% of OBW Pov	vor	29.5 dBm 99.00 %		
x dB Bandwidth	50.91 MH		x dB	Wei	-26.00 dB		

Plot 7-58. Occupied Bandwidth Plot (NR Band n77 - 50MHz QPSK - Full RB - ANT F)

	+	14 00 ID	7. 6. 0				Trace	, 崇
RL Align: Auto	Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Off	Atten: 36 dB	Trig: Free Run Gate: Off #IF Gain: Low	Center Freq Avg Hold:>1 Radio Std: N		GHZ	Trace Type Clear / Write	Trace Control
1 Graph							Trace Average	Detector
Scale/Div 10.0 dB Log		Ref Value 30.00	dBm	•			Max Hold	
20.0 10.0 0.00	Josef Victor Brief	Hydgaar Testawaran ar	angert and an antiperson for	1			Min Hold	
-10.0 -20.0 -30.0				Renderver	an the second of the	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Restart Max Hold	
-40.0 -50.0 -60.0								
Center 3.84000 GHz Res BW 1.2000 MHz	#	Video BW 4.000	00 MHz	Sw	Spa veep 1.00 ms	an 125 MHz (1001 pts)		
2 Metrics v						()		
Occupied Bandwidth	52 MHz		Total Power		29.0 dB	m		
Transmit Freq Error	-31.715 kH	7	% of OBW Pow	ver	29.0 dB 99.00			
x dB Bandwidth	50.89 MH		x dB		-26.00 d			
<b>1</b> 571	Feb 22, 2022 12:38:36 PM							

Plot 7-59. Occupied Bandwidth Plot (NR Band n77 - 50MHz 16-QAM - Full RB - ANT F)

FCC ID: A3LSMS908E		PART 27 MEASUREMENT REPORT CLASS II Permissive Change	SAMSUNG	Approved by: Technical Manager
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Plot 7-60. Occupied Bandwidth Plot (NR Band n77 - 40MHz π/2 BPSK - Full RB - ANT F)

		Linput Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Off	Atten: 36 dB	Trig: Free Run Gate: Off #IF Gain: Low	Center Freq: 3. Avg Hold: 100/ Radio Std: Non		Trace Type Clear / Write	Trace Control
1 Graph							Trace Average	Detector
Scale/Div 10.0 d	в		Ref Value 30.00	dBm			Max Hold	
20.0								
10.0			~~ <u>***</u> ********************************	man and a second se	ъ		Min Hold	
-20.0	and the second sec	wand			how mentore	- Manual Manufactures days	Restart Max Hold	
-40.0								
-50.0								
-60.0			#Video BW 3.000			0		
Center 3.84000 Res BW 910.00 I			#video Bw 3.000	JU MHZ	Swee	Span 100 MH p 1.00 ms (1001 pt		
2 Metrics	Ŧ							
Occupie	ed Bandwidth							
	38.097	7 MHz		Total Power		29.4 dBm		
	it Freq Error	3.992		% of OBW Pov	ver	99.00 %		
x dB Ba	Indwidth	40.65	nHZ	x dB		-26.00 dB		
		Feb 22, 2022						

Plot 7-61. Occupied Bandwidth Plot (NR Band n77 - 40MHz QPSK - Full RB - ANT F)

FCC ID: A3LSMS908E		PART 27 MEASUREMENT REPORT CLASS II Permissive Change	SAMSUNG	Approved by: Technical Manager	
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Spectrur Occupie	m Analyz :d BW	er 1 ,	+								\$	Trace	· * 絵
RL		nput: RF Coupling: DC Align: Auto	Input Z: Corr CC Freq Re NFE: Of	orr f: Int (S)	Atten: 36 dB	Gate:	Free Run Off ain: Low	Center Fr Avg Hold Radio Sto		00 GHz	Trace Type Clear /		Trace Control
1 Graph		•									Trace A	verage	
	)iv 10.0 c	iB			Ref Value 30.	00 dBm		•			Max Ho	Ja	
20.0													
10.0				pro production and	an Men May Prise	hangha san da san d	-ballingaran araya	1			Min Hol	ld	
0.00			(					1					
-20.0			monorport					Winano	and the and the stand		Restart I	Max Hold	
-30.0	er og en star han star fan star	even and the owned	Conditions of the						an or and the second for the second for the second s	and the second s			
-50.0													
-60.0													
	3.84000 / 910.00			#	Video BW 3.0	000 MHz			Si Sweep 1.00 m	pan 100 MHz s (1001 pts)			
2 Metrics		<b>v</b>								ie (iee: pie,			
	<b>•</b>												
	Occupi	ed Bandwidth 38.0	87 MHz			Tota	l Power		29.1 d	IBm			
	Transm	nit Freq Error		126.02 kH	z	% of	OBW Pov	ver	99.0	0 %			
		andwidth		40.89 MH		x dB			-26.00				
			Feb 22	. 2022									
	-) (		12:40:	36 PM									

Plot 7-62. Occupied Bandwidth Plot (NR Band n77 - 40MHz 16-QAM - Full RB - ANT F)



Plot 7-63. Occupied Bandwidth Plot (NR Band n77 - 30MHz π/2 BPSK - Full RB - ANT F)

FCC ID: A3LSMS908E		PART 27 MEASUREMENT REPORT CLASS II Permissive Change	SAMSUNG	Approved by: Technical Manager
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Plot 7-64. Occupied Bandwidth Plot (NR Band n77 - 30MHz QPSK - Full RB - ANT F)

Spectrum Analyzer 1 Occupied BW KEYSIGHT Input: R RL + Couplin Align: A	ng: DC Corr CCor	r	Trig: Free Run Gate: Off #IF Gain: Low	Center Freq: 3.84000 Avg Hold: 100/100 Radio Std: None	00000 GHz	Trace Type Clear / Write	Trace Control
1 Graph	•					Trace Average	Detector
Scale/Div 10.0 dB		Ref Value 30.0	0 dBm			Max Hold	
20.0 10.0 0.00		and and a start and a	laur an			Min Hold	
-10.0 -20.0 -30.0	and the second s			monthemania	-	Restart Max Hold	
-50.0							
Center 3.84000 GHz #Res BW 750.00 kHz		#Video BW 2.40	00 MHz	Sweep 1.0	Span 75 MHz 0 ms (1001 pts)		
2 Metrics Occupied Ba							
	28.042 MHz		Total Power		.1 dBm		
Transmit Fre x dB Bandwid		l.259 kHz 0.22 MHz	% of OBW Pow x dB		9.00 % 5.00 dB		
1 n n	Feb 22, 12:41:0	2022 7 PM					

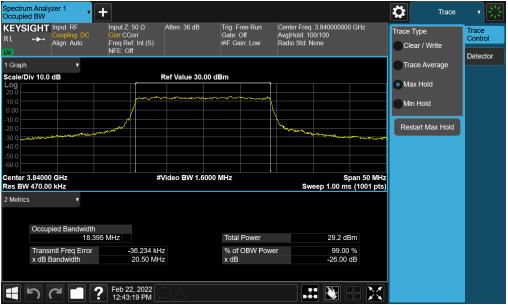
Plot 7-65. Occupied Bandwidth Plot (NR Band n77 - 30MHz 16-QAM - Full RB - ANT F)

FCC ID: A3LSMS908E		PART 27 MEASUREMENT REPORT CLASS II Permissive Change	SAMSUNG	Approved by: Technical Manager
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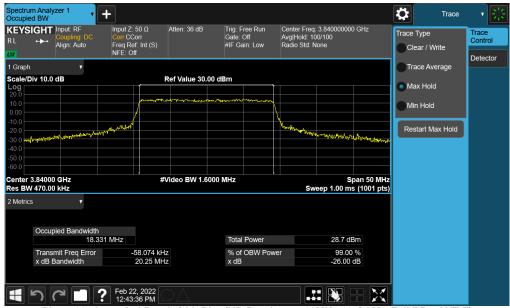
Plot 7-66. Occupied Bandwidth Plot (NR Band n77 - 20MHz π/2 BPSK - Full RB - ANT F)



Plot 7-67. Occupied Bandwidth Plot (NR Band n77 - 20MHz QPSK - Full RB - ANT F)

FCC ID: A3LSMS908E		PART 27 MEASUREMENT REPORT CLASS II Permissive Change	SAMSUNG	Approved by: Technical Manager
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Plot 7-68. Occupied Bandwidth Plot (NR Band n77 - 20MHz 16-QAM - Full RB - ANT F)



Plot 7-69. Occupied Bandwidth Plot (NR Band n77 - 15MHz π/2 BPSK - Full RB - ANT F)

FCC ID: A3LSMS908E		PART 27 MEASUREMENT REPORT CLASS II Permissive Change	SAMSUNG	Approved by: Technical Manager
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Plot 7-70. Occupied Bandwidth Plot (NR Band n77 - 15MHz QPSK - Full RB - ANT F)



Plot 7-71. Occupied Bandwidth Plot (NR Band n77 - 15MHz 16-QAM - Full RB - ANT F)

FCC ID: A3LSMS908E	PCTEST* Preud to be pert of @ element	PART 27 MEASUREMENT REPORT CLASS II Permissive Change	SAMSUNG	Approved by: Technical Manager
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Plot 7-72. Occupied Bandwidth Plot (NR Band n77 - 10MHz π/2 BPSK - Full RB - ANT F)



Plot 7-73. Occupied Bandwidth Plot (NR Band n77 - 10MHz QPSK - Full RB - ANT F)

FCC ID: A3LSMS908E		PART 27 MEASUREMENT REPORT CLASS II Permissive Change	SAMSUNG	Approved by: Technical Manager
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EYSIGHT Input: RF L + Align: Auto	Input Ζ: 50 Ω A Corr CCorr Freq Ref: Int (S) NFE: Off	Gate	e:Off Av	enter Freq: 3.84000000 /g Hold:>100/100 adio Std: None	GHz	Trace Type Clear / Write	Trace Control
Graph v						Trace Average	
cale/Div 10.0 dB	Re	f Value 30.00 dBm				<ul> <li>Max Hold</li> </ul>	
0.0		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				Min Hold	
0.0 0.0 0.0				hourse and the second	www.	Restart Max Hold	
10.0 50.0 50.0							
enter 3.84000 GHz	#Vi	deo BW 750.00 kHz			an 25 MHz		
es BW 240.00 kHz				Sweep 1.00 ms	(1001 pts)		
Metrics	7 MHz			00.0 45			
	2.579 kHz		tal Power of OBW Power	28.2 dBr			
Transmit Freq Error x dB Bandwidth	2.579 KHZ 10.28 MHz	% d		99.00 9 -26.00 d			

Plot 7-74. Occupied Bandwidth Plot (NR Band n77 - 10MHz 16-QAM - Full RB - ANT F)

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# 7.4 Spurious and Harmonic Emissions at Antenna Terminal

#### **Test Overview**

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

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

#### **Test Procedure Used**

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## 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 7-3. Test Instrument & Measurement Setup

#### Test Notes

- Per Part 27 and RSS-199, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth 100 kHz or greater for measurements below 1GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.
- 2. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

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