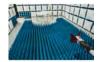


PCTEST

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



MEASUREMENT REPORT FCC PART 15.247 Bluetooth

Applicant Name:

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

Date of Testing: 10/05 - 11/20/2020 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M2009230152-13.A3L

FCC ID:

A3LSMG998U

Certification

APPLICANT:

Samsung Electronics Co., Ltd.

Application Type: Model: Additional Model(s): EUT Type: Max. RF Output Power: Frequency Range: Type of Modulation: FCC Classification: FCC Rule Part(s): Test Procedure(s):

SM-G998U SM-G998U1 Portable Handset 139.32 mW (21.44 dBm) Peak Conducted 2402 – 2480MHz GFSK, π /4-DQPSK, 8DPSK FCC Part 15 Spread Spectrum Transmitter (DSS) Part 15 Subpart C (15.247) ANSI C63.10-2013, KDB 558074 D01 v05r02, 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 ANSI C63.10-2013. 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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1.0 INTRODUCTION

1.1 Scope

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

1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST facility located at 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 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: A3LSMG998U**. The test data contained in this report pertains only to the emissions due to the EUT's Bluetooth transmitter.

- This Bluetooth module has been tested by a Bluetooth Qualification Lab, and we confirm the following:
 - A) The hopping sequence is pseudorandom
 - B) All channels are used equally on average
 - C) The receiver input bandwidth equals the transmit bandwidth
 - D) The receiver hops in sequence with the transmit signal
- 15.247(g): In accordance with the Bluetooth Industry Standard, the system is designed to comply with all of the regulations in Section 15.247 when the transmitter is presented with a continuous data (or information) system.
- 15.247(h): In accordance with the Bluetooth Industry Standard, the system does not coordinate its channels selection/ hopping sequence with other frequency hopping systems for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters.
- 15.247(h): The EUT employs Adaptive Frequency Hopping (AFH) which identifies sources of interference namely devices
 operating in 802.11 WLAN and excludes them from the list of available channels. The process of re-mapping reduces the
 number of test channels from 79 channels to a minimum number of 20 channels.

Test Device Serial No.: 0805M, 0779M, 0793M, 0814M, 0123M, 1575M, 1285M, 0061M, 0080M

2.2 Device Capabilities

This device contains the following capabilities:

800/850/1900 CDMA/EvDO Rev0/A, 1x Advanced (BC0, BC1, BC10), 850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 5G NR (n5, n71, n41, n66, n2, n12, n25, n30, n77, n260, n261), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII (5GHz and 6GHz), Bluetooth (1x, EDR, LE), NFC, Wireless Power Transfer, UWB

Frequency (MHz)		
2402		
:		
2441		
:		
2480		

Table 2-1. Frequency/ Channel Operations

Note: This device is capable of operating in hopping and non-hopping mode. The EUT can hop between 79 different channels in the 2400 – 2483.5MHz band.

This device is can transmit using Dual BT technology, transmitting 1-stream data using two antennas and receiving using two antennas.

2.3 Antenna Description

Following antenna was used for the testing.

Frequency	Antenna 1 Gain	Antenna 2 Gain
[GHz]	(dBi)	(dBi)
2.4	-6.0	-6.1

Table 2-2. Antenna Peak Gain

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Note: This device is capable of operating in hopping and non-hopping mode. The EUT can hop between 79 different channels in the 2400 – 2483.5MHz band.

2.4 Test Configuration

The EUT was tested per the guidance of ANSI C63.10-2013. ANSI C63.10-2013 was also used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing. See Sections 3.2 for AC line conducted emissions test setups, 3.3 for radiated emissions test setups, and 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, and 7.8 for antenna port conducted emissions test setups.

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) 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.

2.5 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 procedure described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) was used in the measurement of the EUT.

Deviation from measurement procedure.....None

3.2 AC Line Conducted Emissions

The line-conducted facility is located inside a 10'x16'x9' shielded enclosure. The shielded enclosure is manufactured by ETS Lindgren RF Enclosures. The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 65-5. A 1m x 1.5m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, $50\Omega/50\mu$ H Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. The external power line filter is an ETS Lindgren Model LPRX-4X30 (100dB Attenuation, 14kHz-18GHz) and the two EMI/RFI filters are ETS Lindgren Model LRW-2030-S1 (100dB Minimum Insertion Loss, 14kHz – 10GHz). These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply line(s) will be connected to the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference groundplane. Power cables for support equipment were routed down to the second LISN while ensuring that the cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The spectrum was scanned from 150kHz to 30MHz with a spectrum analyzer. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 10kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions is used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

Line conducted emissions test results are shown in Section 7.12. The EMI Receiver mode of the Agilent MXE was used to perform AC line conducted emissions testing.

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3.3 Radiated 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. An 80cm tall test table made of Styrodur is placed on top of the turn table. For measurements above 1GHz, an additional Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33 depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up was placed on top of the 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, mode of operation, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions.

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.

3.4 Environmental Conditions

The temperature is controlled within range of 15°C to 35°C. The relative humidity is controlled within range of 10% to 75%. The atmospheric pressure is monitored within the range 86-106kPa (860-1060mbar).

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4.0 ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

- The antennas of the EUT are permanently attached.
- There are no provisions for connection to an external antenna.

Conclusion:

The EUT complies with the requirement of §15.203.

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5.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013. 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
Conducted Disturbance	3.09
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

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6.0 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
-	BT1	Bluetooth Cable Set	9/16/2020	Annual	9/16/2021	BT1
Agilent	N4010A	Wireless Connectivity Test Set	N/A		GB46170464	
Anritsu	ML2495A	Power Meter	12/17/2019	Annual	12/17/2020	941001
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
Emco	3116	Horn Antenna (18 - 40GHz)	8/7/2018	Triennial	8/7/2021	9203-2178
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	2/14/2019	Biennial	2/14/2021	125518
ETS-Lindgren	3816/2NM	LISN	7/9/2020	Biennial	7/9/2022	114451
ETS-Lindgren	3115	Double Ridged Guide Horn 750MHz - 18GHz	3/12/2020	Biennial	3/12/2022	150693
Keysight Technologies	N9020A	MXA Signal Analyzer	8/14/2020	Annual	8/14/2021	US46470561
Keysight Technologies	N9038A	MXE EMI Receiver	8/11/2020	Annual	8/11/2021	MY51210133
Keysight Technologies	N9030A	PXA Signal Analyzer (44GHz)	8/17/2020	Annual	8/17/2021	MY52350166
Keysight Technologies	N9020A	MXA Signal Analyzer	9/22/2020	Annual	9/22/2021	MY54500644
Pasternack	NMLC-2	Line Conducted Emissions Cable (NM)	1/9/2020	Annual	1/9/2021	NMLC-2
Rohde & Schwarz	CMU200	Base Station Simulator		N/A	-	107826
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	7/15/2020	Annual	7/15/2021	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	9/9/2020	Annual	9/9/2021	100348
Rohde & Schwarz	FSW67	Signal / Spectrum Analyzer	8/10/2020	Annual	8/10/2021	103200
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2/10/2020	Annual	2/10/2021	102134
Solar Electronics	8012-50-R-24-BNC	Line Impedance Stabilization Network	10/1/2019	Biennial	10/1/2021	310233
Sunol	DRH-118	Horn Antenna (1-18GHz)	10/3/2019	Biennial	10/3/2021	A050307
Sunol Science	JB5	Bi-Log Antenna (30M - 5GHz)	7/27/2020	Biennial	7/27/2022	A051107

Table 6-1. Annual Test Equipment Calibration Schedule

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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7.0 TEST RESULTS

7.1 Summary

Company Name:	Samsung Electronics Co., Ltd.
FCC ID:	A3LSMG998U
Method/System:	Frequency Hopping Spread Spectrum (FHSS)
Number of Channels:	<u>79</u>

FCC Part Section(s)	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.247(a)(1)(iii)	RSS-247 [5.1(1)]	20dB Bandwidth	N/A		PASS	Section 7.2
15.247(b)(1)	RSS-247 [5.4(2)]	Peak Transmitter Output Power	< 1 Watt if <u>></u> 75 non- overlapping channels used		PASS	Section 7.3
15.247(a)(1)	RSS-247 [5.1(2)]	Channel Separation	> 2/3 of 20 dB BW for systems with Output Power < 125mW	CONDUCTED	PASS	Section 7.5
15.247(a)(1)(iii)	RSS-247 [5.1(4)]	Number of Channels	> 15 Channels		PASS	Section 7.7
15.247(a)(1)(iii)	RSS-247 [5.1(4)]	Time of Occupancy	< 0.4 sec in 31.6 sec period		PASS	Section 7.6
15.247(d)	RSS-247 [5.5]	Band Edge / Out-of-Band Emissions	Conducted > 20dBc		PASS	Section 7.4, Section 7.8
15.205 15.209	RSS-Gen [8.9]	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209 (RSS-247 limits)	RADIATED	PASS	Section 7.9, Section 7.10, Section 7.11
15.207	RSS-Gen [8.8]	AC Conducted Emissions 150kHz – 30MHz	< FCC 15.207 limits (RSS-Gen [8.8] limits)	LINE CONDUCTED	PASS	Section 7.12

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 shown in this section 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) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "BT Auto," Version 3.5.
- 5) For radiated band edge, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "Chamber Automation," Version 1.3.1.

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7.2 20dB Bandwidth Measurement

<u>§15.247 (a.1.iii); RSS-247 [5.1(1)]</u>

Test Overview and Limit

The bandwidth at 20dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the receive antenna while the EUT is operating in transmission mode at the appropriate frequencies.

Test Procedure Used

ANSI C63.10-2013 – Section 6.9.2

Test Settings

- 1. The signal analyzers' automatic bandwidth measurement capability of the spectrum analyzer was used to perform the 20dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 20. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
- 2. RBW = 1 5% OBW
- 3. VBW \geq 3 x RBW
- 4. Reference level set to keep signal from exceeding maximum input mixer level for linear operation.
- 5. Detector = Peak
- 6. Trace mode = max hold
- 7. Sweep = auto couple
- 8. The trace was allowed to stabilize

Test Setup

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



Figure 7-1. Test Instrument & Measurement Setup

Test Notes

None

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Frequency [MHz]	Data Rate [Mbps]	Channel No.	20dB Bandwidth Test Results [kHz]
2402	1.0	0	1021.00
2441	1.0	39	1020.00
2480	1.0	78	1020.00
2402	2.0	0	1329.00
2441	2.0	39	1327.00
2480	2.0	78	1330.00
2402	3.0	0	1306.00
2441	3.0	39	1296.00
2480	3.0	78	1293.00

Table 7-2. Conducted 20dB Bandwidth Measurements – ANT 1



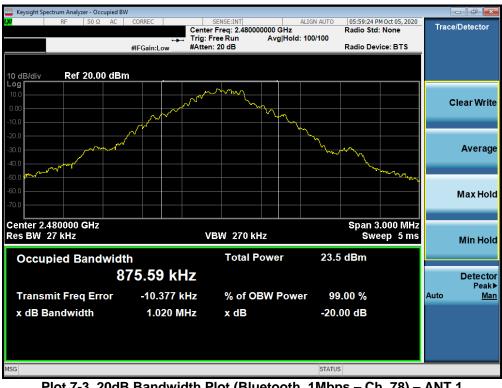
Plot 7-1. 20dB Bandwidth Plot (Bluetooth, 1Mbps - Ch. 0) - ANT 1

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Plot 7-2. 20dB Bandwidth Plot (Bluetooth, 1Mbps - Ch. 39) - ANT 1



Plot 7-3. 20dB Bandwidth Plot (Bluetooth, 1Mbps - Ch. 78) - ANT 1

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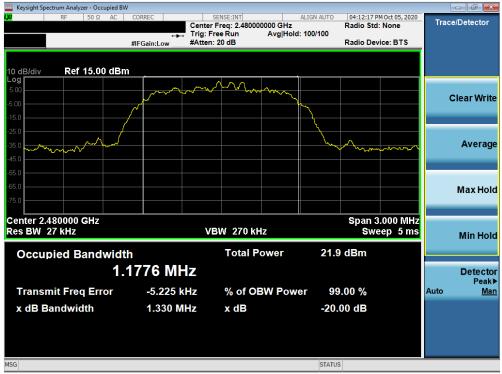
Plot 7-4. 20dB Bandwidth Plot (Bluetooth, 2Mbps - Ch. 0) - ANT 1



Plot 7-5. 20dB Bandwidth Plot (Bluetooth, 2Mbps – Ch. 39) – ANT 1

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Plot 7-6. 20dB Bandwidth Plot (Bluetooth, 2Mbps - Ch. 78) - ANT 1



Plot 7-7. 20dB Bandwidth Plot (Bluetooth, 3Mbps – Ch. 0) – ANT 1

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Plot 7-8. 20dB Bandwidth Plot (Bluetooth, 3Mbps - Ch. 39) - ANT 1



Plot 7-9. 20dB Bandwidth Plot (Bluetooth, 3Mbps - Ch. 78) - ANT 1

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Frequency [MHz]	Data Rate [Mbps]	Channel No.	20dB Bandwidth Test Results
2402	1.0	0	1020.00
2441	1.0	39	1020.00
2480	1.0	78	1022.00
2402	2.0	0	1326.00
2441	2.0	39	1328.00
2480	2.0	78	1325.00
2402	3.0	0	1295.00
2441	3.0	39	1296.00
2480	3.0	78	1298.00

Table 7-3. Conducted 20dB Bandwidth Measurements – ANT 2



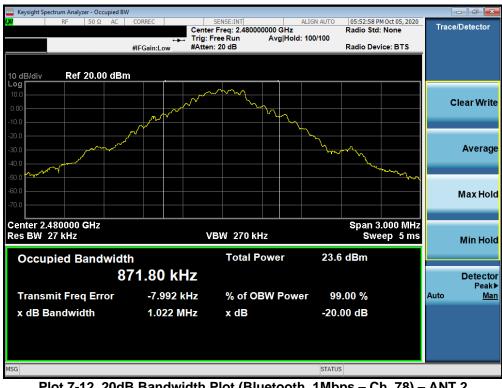
Plot 7-10. 20dB Bandwidth Plot (Bluetooth, 1Mbps - Ch. 0) - ANT 2

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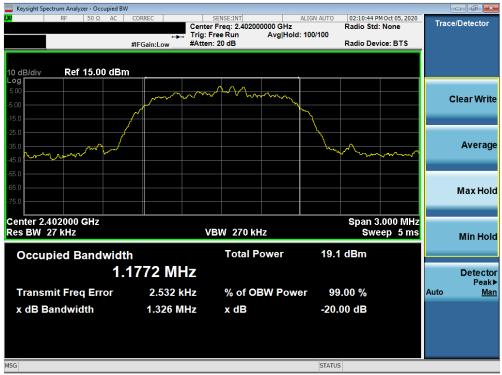
Plot 7-11. 20dB Bandwidth Plot (Bluetooth, 1Mbps - Ch. 39) - ANT 2



Plot 7-12. 20dB Bandwidth Plot (Bluetooth, 1Mbps - Ch. 78) - ANT 2

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Plot 7-13. 20dB Bandwidth Plot (Bluetooth, 2Mbps - Ch. 0) - ANT 2



Plot 7-14. 20dB Bandwidth Plot (Bluetooth, 2Mbps – Ch. 39) – ANT 2

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Plot 7-15. 20dB Bandwidth Plot (Bluetooth, 2Mbps - Ch. 78) - ANT 2



Plot 7-16. 20dB Bandwidth Plot (Bluetooth, 3Mbps – Ch. 0) – ANT 2

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Plot 7-17. 20dB Bandwidth Plot (Bluetooth, 3Mbps - Ch. 39) - ANT 2



Plot 7-18. 20dB Bandwidth Plot (Bluetooth, 3Mbps – Ch. 78) – ANT 2

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7.3 Output Power Measurement §15.247 (b.1); RSS-247 [5.4(2)]

Test Overview and Limits

Measurement is made while the EUT is operating in non-hopping transmission mode. The powers shown below were measured using a spectrum analyzer with a Bluetooth signaling test set (Agilent Model: N4010A) used only to maintain a Bluetooth link with the EUT. Average power measurements are performed using the analyzer's "burst power" function with RBW = 3MHz. The burst power function triggers on a single set burst set to maximum power and measures the maximum average power on the on-time.

The maximum permissible output power is 1 Watt.

Test Procedure Used

ANSI C63.10-2013 – Section 7.8.5 ANSI C63.10-2013 – Section 11.9.2.3.2 method AVGPM-G

Test Settings

Peak Power Measurement

- 1. Span = approximately 5x 20dB bandwidth, centered on hopping channel
- 2. RBW > 20dB bandwidth of emission being measured
- 3. VBW ≥ RBW
- 4. Sweep = auto
- 5. Detector = peak
- 6. Trace mode = max hold
- 7. The trace was allowed to stabilize

Test Setup

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



Figure 7-2. Test Instrument & Measurement Setup

<u>Note</u>

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This unit was tested with all possible data rates and the highest peak power is reported with the unit transmitting at #REF!Mbps. Final results were obtained using calibrated couplers, attenuators and cables. The following formula was used:

	Data				onducted wer	-	nducted wer
Frequency [MHz]	Rate [Mbps]	Power Scheme	e No.	[dBm]	[mW]	[dBm]	[mW]
2402	1.0	ePA	0	16.74	47.174	16.21	41.774
2441	1.0	ePA	39	16.56	45.290	16.29	42.566
2480	1.0	ePA	78	15.99	39.719	15.72	37.325
2402	2.0	ePA	0	16.05	40.262	12.95	19.713
2441	2.0	ePA	39	16.27	42.355	13.40	21.879
2480	2.0	ePA	78	16.38	43.491	13.46	22.182
2402	3.0	ePA	0	16.98	49.877	13.67	23.292
2441	3.0	ePA	39	16.75	47.315	13.48	22.290
2480	3.0	ePA	78	16.88	48.708	13.53	22.563

Output Power (dBm) = Raw Analyzer Level (dBm) + Cable Loss (dB) + Loss in Directional Coupler/Insertion Loss (dB)

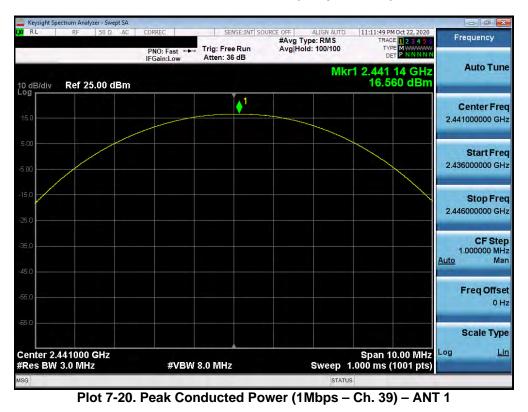
Table 7-4. Conducted Output Power Measurements – ANT 1

FCC ID: A3LSMG998U	POLICE POLICE	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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T RF 50 Ω AC	CORREC	SENSE:INT SC	URCE OFF ALIGN AUTO #Avg Type: RMS	11:11:37 PM Oct 22, 2020 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast +++	Trig: Free Run Atten: 36 dB	Avg Hold: 100/100		
0 dB/div Ref 25.00 dBm			Mki	1 2.402 13 GHz 16.737 dBm	Auto Tune
og		1			Center Free 2.402000000 GH
5.00					Start Free 2.397000000 GH
5.0					Stop Fre 2.407000000 GH
5.0					CF Ste 1.000000 MH <u>Auto</u> Ma
5.0					Freq Offse 0 H
5.0					Scale Typ
enter 2.402000 GHz Res BW 3.0 MHz	#VBW 8	.0 MHz	Sweep 1	Span 10.00 MHz .000 ms (1001 pts)	Log <u>Li</u>
G			STATU	-10-	

Plot 7-19. Peak Conducted Power (1Mbps - Ch. 0) - ANT 1



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RL RF 50Ω AC	CORREC	SENSE(INT SO	URCE OFF ALIGN AUTO #Avg Type: RMS	11:11:59 PM Oct 22, 2020 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast ↔→→ IFGain:Low	Trig: Free Run Atten: 36 dB	Avg Hold: 100/100		
dB/div Ref 25.00 dBm	I Guilleow		Mkr	1 2.480 09 GHz 15.990 dBm	Auto Tune
5.0		1			Center Fred 2,480000000 GH;
00					Start Fred 2.475000000 GH
5.0					Stop Fred 2.485000000 GH;
5.0					CF Stej 1.000000 MH <u>Auto</u> Ma
5.0					Freq Offse 0 H
5.0					Scale Type
enter 2.480000 GHz Res BW 3.0 MHz	#VBW 8	8.0 MHz	Sweep 1	Span 10.00 MHz .000 ms (1001 pts)	Log <u>Lir</u>
G			STATUS		

Plot 7-21. Peak Conducted Power (1Mbps - Ch. 78) - ANT 1



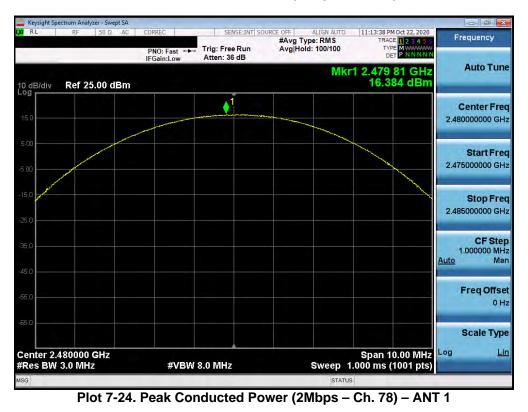
Plot 7-22. Peak Conducted Power (2Mbps - Ch. 0) - ANT 1

FCC ID: A3LSMG998U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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RL RF 50Ω AC	CORREC	SENSE:INT SO		11:13:29 PM Oct 22, 2020	Francisco
		rig: Free Run tten: 36 dB	#Avg Type: RMS Avg Hold: 100/100	TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P N N N N N	Frequency
D dB/div Ref 25.00 dBm	a dame da		Mkr	1 2.441 12 GHz 16.269 dBm	Auto Tune
og 15.0		1			Center Free 2.441000000 GH:
5.00					Start Free 2.436000000 GH:
25.0					Stop Free 2.446000000 GH
150					CF Ste 1.000000 MH <u>Auto</u> Ma
5.0					Freq Offse 0 H
35.0					Scale Typ
enter 2.441000 GHz Res BW 3.0 MHz	#VBW 8.0	MHz	Sweep 1	Span 10.00 MHz .000 ms (1001 pts)	Log <u>Lir</u>
Res BW 3.0 MHz	#VBW 8.0) MHz	Sweep 1		

Plot 7-23. Peak Conducted Power (2Mbps - Ch. 39) - ANT 1

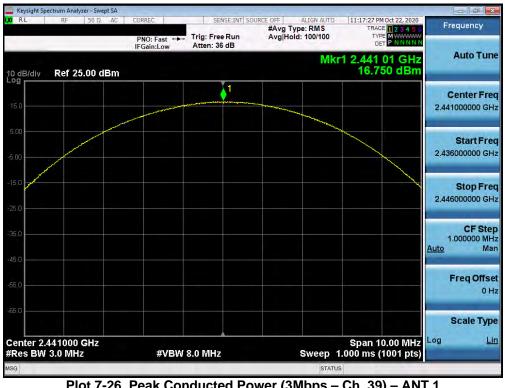


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RL RF 50 Ω AC	CORREC SENSE:	INT SOURCE OFF ALIGN AUTO	11:17:18 PM Oct 22, 2020	Farmers
	PNO: Fast +++ Trig: Free Ri IFGain:Low Atten: 36 dB		TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P N N N N N	Frequency
dB/div Ref 25.00 dBm	I GUILLOW		r1 2.402 07 GHz 16.979 dBm	Auto Tune
5.0				Center Free 2.402000000 GH:
.00				Start Free 2.397000000 GH
5.0				Stop Fre 2.407000000 GH
5.0				CF Ste 1.000000 MH <u>Auto</u> Ma
5.0				Freq Offse 0 H
50				Scale Type
enter 2.402000 GHz Res BW 3.0 MHz	#VBW 8.0 MHz	Sweep	Span 10.00 MHz 1.000 ms (1001 pts)	Log <u>Lir</u>
G		STAT	JS	

Plot 7-25. Peak Conducted Power (3Mbps - Ch. 0) - ANT 1



Plot 7-26. Peak Conducted Power (3Mbps - Ch. 39) - ANT 1

FCC ID: A3LSMG998U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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RL RF	50 Ω AC	CORREC	SENSE:INT SC	URCE OFF ALIGN AUT	0 11:17:36 PM	1 Oct 22, 2020	
		PNO: Fast ↔⊷→ IFGain:Low	Trig: Free Run Atten: 36 dB	#Avg Type: RMS Avg Hold: 100/100	TYP	E 1 2 3 4 5 6 E MWWWWW P N N N N N	Frequency
0 dB/div Ref 25	.00 dBm			M	kr1 2.480 16.87	06 GHz 76 dBm	Auto Tune
15.0			1				Center Fred 2.480000000 GH2
5.00							Start Free 2.475000000 GH
25.0							Stop Free 2.485000000 GH
5.0							CF Ste 1.000000 MH <u>Auto</u> Ma
5,0							Freq Offse 0 H
35.0							Scale Typ
enter 2.480000 (Res BW 3.0 MHz		#VBW	8.0 MHz	Sweep	Span 10 1.000 ms (*	0.00 101112	Log <u>Lir</u>
sg				STA			

Plot 7-27. Peak Conducted Power (3Mbps - Ch. 78) - ANT 1



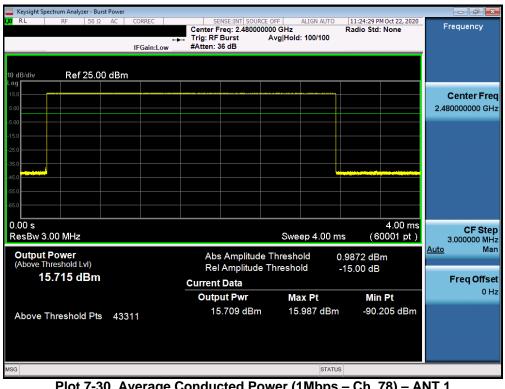
Plot 7-28. Average Conducted Power (1Mbps - Ch. 0) - ANT 1

FCC ID: A3LSMG998U	Proved to be part of @eremoted	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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	ectrum Analyze											- 6 -
XX/RL	RF	50 Ω		CORREC	ow	Center F			ALIGN AUTO	Radio Std	PM Oct 22, 2020 I: None	Frequency
10 dB/div Log	Ref 2	5.00	dBm	_								
5.00												Center Fre 2.441000000 GH
5.00 15.0 25.0												
-35.0												
-65.0												
0.00 s ResBw 3.	.00 MHz							Swe	ep 4.00 m	ns (6	4.00 ms 60001 pt)	CF Ste 3.000000 MH Auto Ma
	Power Treshold Lv 5.291 dE					Abs Amplitude Threshold 1.583 dBm Rel Amplitude Threshold -15.00 dB						
	.231 ui	2111				Current	t Data out Pwr	Ма	x Pt	Mi	n Pt	Freq Offse 0 H
Above T	hreshold	Pts	4331	2			6.295 dBm		.583 dBm		.998 dBm	
ISG									STATU	s		

Plot 7-29. Average Conducted Power (1Mbps - Ch. 39) - ANT 1



Plot 7-30. Average Conducted Power (1Mbps - Ch. 78) - ANT 1

FCC ID: A3LSMG998U	Prove to be part of the ended	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spec	trum Analyz RF	er - Burs 50 Ω	AC	CORREC			ENSE:INT SOUR		ALIGN AUTO	11:25:27 PM Oct 22, 2 Radio Std: None	020 Frequency
				IFGain:	Low	Talas DE		Avg Hold	i: 100/100	Radio Std: None	_
l0 dB/div	Ref	25.00) dBm				1				
5.00	a da a d	ut dal o	Hashilik	Manhulur		al tallah a laa	h <mark>alik sek lank</mark> ike				Center Fre 2.402000000 GH
5.00											
35.0											
55.0 65.0											
0.00 s ResBw 3.0	00 MHz							Swe	ep 4.00 r	4.00 ns (60001 p	CE STE
Output P (Above Thi	reshold Ly						s Amplitud I Amplitud			0.6321 dBm -15.00 dB	Auto Ma
12	12.948 dBm					Curren Outr	t Data out Pwr	Ma	ax Pt	Min Pt	Freq Offse 0 H
Above Th	hreshold	Pts	433	42		1:	2.918 dBm	n 15	.632 dBm	n -83.233 dB	m
SG									STATU	JS	

Plot 7-31. Average Conducted Power (2Mbps - Ch. 0) - ANT 1



Plot 7-32. Average Conducted Power (2Mbps - Ch. 39) - ANT 1

FCC ID: A3LSMG998U	Proved to be part of the energy	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spect	rum Analyz RF	er - Burs 50 Ω	AC AC	CORRE	-		SENSE:INT SOU		ALIGN AUTO	11:25:58	PM Oct 22, 2020		
	TV.	50 1		IFGair	++	Center	Freq: 2.48000 F Burst	00000 GHz	d: 100/100	Radio Std		Frequenc	У
l0 dB/div ₋og	Ref	25.00) dBm							1			
5.00	<mark>u j_e sy p</mark> i	w III.	l. ekelik	<mark>h an b</mark> h	. Malaka		<mark>ahali hangalah</mark>	Antole koloco (<mark>han baadke</mark>			Center 2.48000000	
5.00 15.0 25.0													
35.0													
-55.0													
0.00 s ResBw 3.0	0 MHz							Swe	eep 4.00 n	ns (6	4.00 ms 60001 pt)	CF 3.000000	MH
(Above Thr	Output Power (Above Threshold Lvi) 13.460 dBm				Re	Abs Amplitude Threshold 1.258 dBm Rel Amplitude Threshold -15.00 dB					Auto	Ma	
10.	10.400 dBill						Current Data Output Pwr		ax Pt	Mi	n Pt	Freq O	0 H
Above Th	reshold	d Pts	433	337			3.452 dBn		6.258 dBm		.701 dBm		
SG									STATU	IS			

Plot 7-33. Average Conducted Power (2Mbps - Ch. 78) - ANT 1



Plot 7-34. Average Conducted Power (3Mbps - Ch. 0) - ANT 1

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	um Analyzer - Bu									- F	×
LXI RL	RF 50 S						ALIGN AUTO	Radio Std	M Oct 22, 2020 : None	Frequency	y
			Gain:Low	#Atten: 4	36 dB						
10 dB/div Log	Ref 25.0	00 dBm									
15.0							tere and with a pro-			Center	Freq
5.00			dle dan para d	h an sharph	a da a da	Line of the part of the	da na katar			2.441000000	GHz
-5.00											
-15.0											
-25.0											
-35.0											
-45.0											
-55.0											
-05.0											
0.00 s ResBw 3.00) MHz					Swe	ep 4.00 n	ns (6	4.00 ms 0001 pt)	3.000000	
Output Po				Abs	Amplitud	le Thresh	old	1.694 dB	m	Auto	Man
(Above Thre				Rel Amplitude Threshold -15.00 dB							
13.4	13.481 dBm Current Data							Freq O	ffset 0 Hz		
					ut Pwr		ix Pt		n Pt		0 112
Above Th	Above Threshold Pts 42642				8.485 dBm	n 16	.694 dBm	ı -91.	147 dBm		
MSG							STATU	IS			
											_

Plot 7-35. Average Conducted Power (3Mbps - Ch. 39) - ANT 1



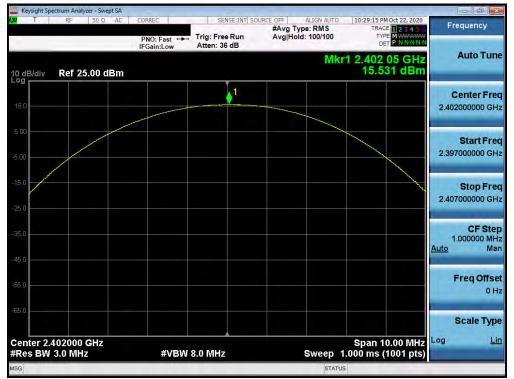
Plot 7-36. Average Conducted Power (3Mbps - Ch. 78) - ANT 1

FCC ID: A3LSMG998U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Frequency	Data Rate	Power	Channel No.		nducted wer	Avg Conducted Power	
[MHz]	[Mbps]	Scheme		[dBm]	[mW]	[dBm]	[mW]
2402	1.0	ePA	0	15.53	35.736	14.96	31.354
2441	1.0	ePA	39	17.15	51.820	16.76	47.467
2480	1.0	ePA	78	16.89	48.865	16.44	44.030
2402	2.0	ePA	0	13.14	20.611	10.03	10.074
2441	2.0	ePA	39	16.41	43.772	13.28	21.263
2480	2.0	ePA	78	16.70	46.730	12.29	16.930
2402	3.0	ePA	0	14.60	28.860	11.21	13.208
2441	3.0	ePA	39	16.89	48.809	13.53	22.517
2480	3.0	ePA	78	17.13	51.677	13.64	23.124

Table 7-5. Conducted Output Power Measurements – ANT 2



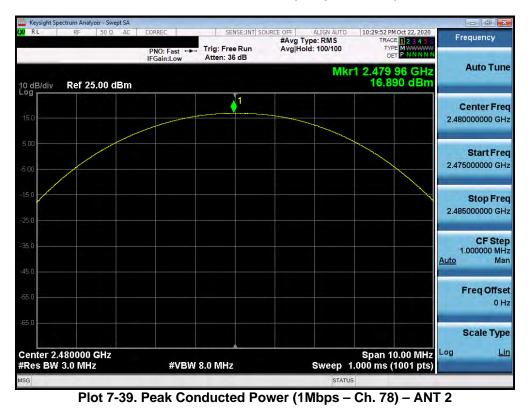
Plot 7-37. Peak Conducted Power (1Mbps - Ch. 0) - ANT 2

FCC ID: A3LSMG998U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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RL RF 50Ω AC	CORREC SENSE:INT :	SOURCE OFF ALIGN AUTO	10:29:41 PM Oct 22, 2020	Francisco
	PNO: Fast +++ Trig: Free Run IFGain:Low Atten: 36 dB	#Avg Type: RMS Avg Hold: 100/100	TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P N N N N N	Frequency
dB/div Ref 25.00 dBm		Mki	1 2.441 07 GHz 17.145 dBm	Auto Tune
5.0	1			Center Free 2.441000000 GH
				Start Fre 2.436000000 GH
5.0				Stop Fre 2.446000000 GH
5.0				CF Ste 1.000000 MH Auto Ma
5.0				Freq Offso 0 H
50				Scale Typ
enter 2.441000 GHz Res BW 3.0 MHz	#VBW 8.0 MHz	Sweep 1	Span 10.00 MHz .000 ms (1001 pts)	Log <u>Li</u>

Plot 7-38. Peak Conducted Power (1Mbps - Ch. 39) - ANT 2



PCTEST Approved by: MEASUREMENT REPORT (a SAMSUNG FCC ID: A3LSMG998U (CERTIFICATION) Quality Manager Protect to be port of Test Report S/N: EUT Type: Test Dates: Page 35 of 108 1M2009230152-13.A3L 10/05 - 11/20/2020 Portable Handset V 9.0 02/01/2019

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Plot 7-40. Peak Conducted Power (2Mbps - Ch. 0) - ANT 2



Plot 7-41. Peak Conducted Power (2Mbps - Ch. 39) - ANT 2

FCC ID: A3LSMG998U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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RL RF 50 Ω AC	CORREC	SENSE:INT SO		10:31:15 PM Oct 22, 2020	Frequency
		Trig: Free Run Atten: 36 dB	#Avg Type: RMS Avg Hold: 100/100	TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P N N N N N	Frequency
dB/div Ref 25.00 dBm			Mki	1 2.480 18 GHz 16.696 dBm	Auto Tune
g .0		1			Center Free 2.480000000 GH:
					Start Fre 2.475000000 GH
•					Stop Fre 2.485000000 GH
0					CF Ste 1.000000 M⊦ <u>Auto</u> Ma
.0					Freq Offse 0 H
0					Scale Typ
enter 2.480000 GHz tes BW 3.0 MHz	#VBW 8	.0 MHz	Sweep	Span 10.00 MHz 1.000 ms (1001 pts)	Log <u>Lir</u>

Plot 7-42. Peak Conducted Power (2Mbps - Ch. 78) - ANT 2



Plot 7-43. Peak Conducted Power (3Mbps - Ch. 0) - ANT 2

FCC ID: A3LSMG998U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 37 of 109
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CORREC	SENSE:INT SO		10:31:36 PM Oct 22, 2020	
		#Avg Type: RMS Avg Hold: 100/100	TRACE 1 2 3 4 5 TYPE MWWWWM DET P NNNN	N .
		Mki	1 2.441 20 GH 16.885 dBn	z Auto Tune
	↓ 1			Center Free 2.441000000 GH;
				Start Free 2.436000000 GH:
				Stop Fre 2.446000000 GH
				CF Ste 1.000000 MH <u>Auto</u> Ma
				Freq Offse 0 H
				Scale Type
#VBW 8.0	MHz	Sweep	Span 10.00 MH: .000 ms (1001 pts	z Log <u>Lir</u>
	PNO: Fast \rightarrow Trig	PNO: Fast +++ Trig: Free Run	PNO: Fast \rightarrow Trig: Free Run IFGain:Low Atten: 36 dB MIKT	PNO: Fast Trig: Free Run Atten: 36 dB #Avg Type: RMS Avg/Hold: 100/100 Trace D34 5 Trig: Free Run Atten: 36 dB Mkr1 2.441 20 GH: 16.885 dBn 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

Plot 7-44. Peak Conducted Power (3Mbps - Ch. 39) - ANT 2



Plot 7-45. Peak Conducted Power (3Mbps - Ch. 78) - ANT 2

FCC ID: A3LSMG998U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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RL	RF	50 Ω	AC	CORREC			ENSE:INT SOURC		ALIGN AUTO		M Oct 22, 2020	-
				IFGain:	_ow			000 GHz Avg Hold	: 100/100	Radio Std	: None	Frequency
dB/div g	Ref	25.00) dBm									
												Center Fr 2.402000000 G
.0												
.0												
.0												
.00 s esBw 3.0									ep 4.00 m	ıs (6	4.00 ms i0001 pt)	CF Ste 3.000000 MI Auto M
Output F (Above Th							Amplitude Amplitude).2391 dE -15.00 dE		
14	.905 0					Current			x Pt		ı Pt	Freq Offs 0
Above T	hreshol	d Pts	433	12			u t Pwr I.962 dBm		239 dBm		712 dBm	

Plot 7-46. Average Conducted Power (1Mbps - Ch. 0) - ANT 2



Plot 7-47. Average Conducted Power (1Mbps - Ch. 39) - ANT 2

FCC ID: A3LSMG998U	Provid to be part of the enterna	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spe	ctrum Analyze RF	er - Bun 50 Ω		CORREC	 6	ENSE:INT SOUR		ALIGN AUTO	10/26/21 0	PM Oct 22, 2020	
	NF.	20.25	AC	IFGain	 Center I	Freq: 2.48000 Burst			Radio Std		Frequency
10 dB/div Log	Ref2	25.00) dBm								
5.00											Center Fre 2.480000000 GH
-5.00 -15.0 -25.0											
-35.0											
-55.0											
0.00 s ResBw 3.	00 MHz						Swe	ep 4.00 n	ns (6	4.00 ms 60001 pt)	CF Ste 3.000000 MH Auto Ma
Output I (Above Th						s Amplitud I Amplitude			1.743 dE -15.00 dE		
10	.457 u	ыш			Curren	t Data out Pwr	Ma	ax Pt	Mi	n Pt	Freq Offs 0 H
Above T	hreshold	l Pts	433	11		6.438 dBm		.743 dBm		297 dBm	
ISG								STATU	IS		

Plot 7-48. Average Conducted Power (1Mbps - Ch. 78) - ANT 2



Plot 7-49. Average Conducted Power (2Mbps - Ch. 0) - ANT 2

FCC ID: A3LSMG998U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spe	ectrum Analyz RF	er - Bur 50 Ω	AC AC	CORREC	+	Center		0000 GHz	ALIGN AUTO	10:39:12 Radio Sto	PM Oct 22, 2020 1: None	Frequency	
10 dB/div Log	Ref	25.00) dBm										
5.00	Lines in	<mark>a ala</mark> a	Tahlu	<mark>ktAnijnikh</mark>	<mark>a madalana</mark>	<mark>ishiri kana</mark>	<mark>shi li si najilin</mark>	Milenten (<mark>hin L_{an}th i</mark>			Center I 2.441000000	
-15.0													
-35.0													
-65.0													ſ
0.00 s ResBw 3.									ep 4.00 n	ns (6	4.00 ms 60001 pt)	CF \$ 3.000000 Auto	
Output I (Above Th 13						Re	el Amplitud			1.128 dE -15.00 dE		Freq Of	
							put Pwr		ax Pt		n Pt		0 H
Above T	hreshold	d Pts	433	40		1	3.293 dBm	n 16	.128 dBm	ı -79	.037 dBm		
SG									STATU	IS			

Plot 7-50. Average Conducted Power (2Mbps - Ch. 39) - ANT 2



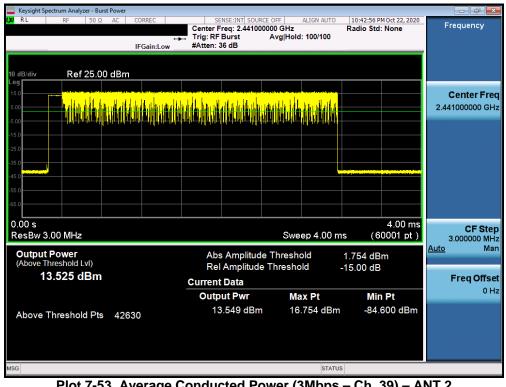
Plot 7-51. Average Conducted Power (2Mbps - Ch. 78) - ANT 2

FCC ID: A3LSMG998U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Burst Power K RL RF 50 Ω AC CORREC	SENSE:INT SOURCE OFF ALIGN AUTO	10:40:15 PM Oct 22, 2020
IFGain:Low	Center Freq: 2.40200000 GHz	Radio Std: None Frequency
10 dB/div Ref 25.00 dBm		
	al technical attack the place and the boll and a start	Center Freq 2.402000000 GHz
-15.0	ul Fuddoni (Fudd Haffingd Chill Fudding) (
-55.0		
.65.0		4.00 ms
ResBw 3.00 MHz Output Power	Sweep 4.00 Abs Amplitude Threshold	CE STen
(Above Threshold Lvl) 11.208 dBm	Rel Amplitude Threshold Current Data	-15.00 dB Freq Offset
Above Threshold Pts 42629	Output Pwr Max Pt 11.222 dBm 14.382 dBr	Min Pt
MSG	STAT	us

Plot 7-52. Average Conducted Power (3Mbps - Ch. 0) - ANT 2



Plot 7-53. Average Conducted Power (3Mbps - Ch. 39) - ANT 2

FCC ID: A3LSMG998U	Provid to be part of the enterna	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum A				1							
LXI RL RF	50 Ω	AC	CORREC	Center F	INSE:INT SOU		ALIGN AUTO	10:43:12 Radio Sto	PM Oct 22, 2020 d: None	Freque	ncy
			IFGain:Low	Trig: RF #Atten: 3	Burst 36 dB	Avg Hold	I: 100/100				
			FGain:Low	#Atten.	30 UD						
10 dB/div R	ef 25.0	0 dBm									
Log	er 23.0	0 abm									
15.0		a state		n i li i i							er Freq
5.00		<u>itteitei</u> i					HALLMAR			2.4800000	000 GHz
-5.00	i larar Ni	1 4 2 1 1 4 1 21	<u>ab thirth ib</u>	i larar bili dali.		1 10.1 1 0.140.000					
-15.0											
-25.0											
-35.0											
-45.0											
-55.0											
-65.0											
0.00 s						_			4.00 ms	С	F Step
ResBw 3.00 M	Hz					Swe	ep 4.00 n	ns (t	60001 pt)		00 MHz
Output Powe	.					de Thresh		1.977 dE	3m	Auto	Man
(Above Thresho 13.641				Rel	Amplitud	e Thresho	old	-15.00 dE	3	_	
15.04	ubili			Current	t Data					Freq	Offset 0 Hz
							ax Pt		n Pt		0 112
Above Thresh	Above Threshold Pts 42566						dBm 16.977 dBm -89.025 dBm				
MSG							STATU	JS			

Plot 7-54. Average Conducted Power (3Mbps - Ch. 78) - ANT 2

FCC ID: A3LSMG998U	PCTEST Proud to be part of @ merced	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Dual BT

Frequency	Data	Power	Channel	Peak Co Power	nducted _ANT1		eak Conducted Peak Cor Power_ANT2 Power_		
[MHz]	Rate [Mbps]	Scheme	No.	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]
2402	1.0	iPA	0	12.26	16.831	11.59	14.431	14.95	31.261
2441	1.0	iPA	39	12.18	16.501	11.93	15.585	15.06	32.063
2480	1.0	iPA	78	12.27	16.854	11.44	13.916	14.88	30.761
2402	2.0	ePA	0	17.00	50.130	13.70	23.453	18.67	73.621
2441	2.0	ePA	39	19.08	80.872	15.89	38.797	20.78	119.674
2480	2.0	ePA	78	17.25	53.088	15.68	37.008	19.55	90.157
2402	3.0	ePA	0	18.22	66.344	14.19	26.248	19.67	92.683
2441	3.0	ePA	39	19.80	95.499	16.42	43.813	21.44	139.316
2480	3.0	ePA	78	17.97	62.676	16.29	42.550	20.22	105.196

Table 7-6. Dual BT Conducted Powers - Peak Measurements

Frequency	Data	Power	Channel	Avg Cor Power	nducted _ANT1	_	nducted _ANT2	Avg Cor Power	nducted _DUAL
[MHz]	Rate [Mbps]	Scheme	No.	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]
2402	1.0	iPA	0	11.85	15.318	11.57	14.362	14.72	29.648
2441	1.0	iPA	39	12.03	15.970	11.50	14.132	14.79	30.130
2480	1.0	iPA	78	11.81	15.157	11.06	12.753	14.46	27.925
2402	2.0	ePA	0	14.79	30.151	11.73	14.894	16.54	45.082
2441	2.0	ePA	39	15.87	38.619	12.15	16.395	17.40	54.954
2480	2.0	ePA	78	13.28	21.262	11.96	15.707	15.68	36.983
2402	3.0	ePA	0	14.96	31.326	11.79	15.115	16.67	46.452
2441	3.0	ePA	39	15.81	38.142	12.26	16.811	17.40	54.954
2480	3.0	ePA	78	13.94	24.757	11.88	15.424	16.04	40.179

Table 7-7. Dual BT Conducted Powers - Average Measurements

FCC ID: A3LSMG998U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Dual BT ANTENNA 1



Plot 7-55. Peak Conducted Power (1Mbps - Ch. 0) - ANT 1



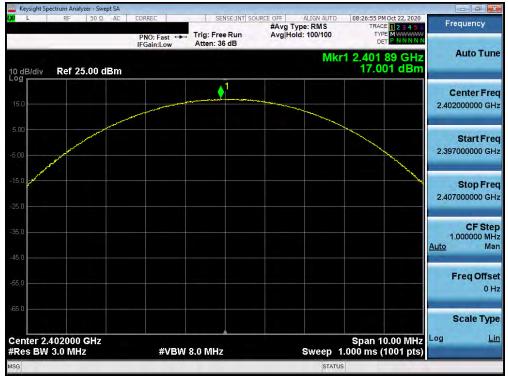
FCC ID: A3LSMG998U	POLICE Proved to De part of Beneration	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 45 of 109
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Plot 7-57. Peak Conducted Power (1Mbps - Ch. 78) - ANT 1



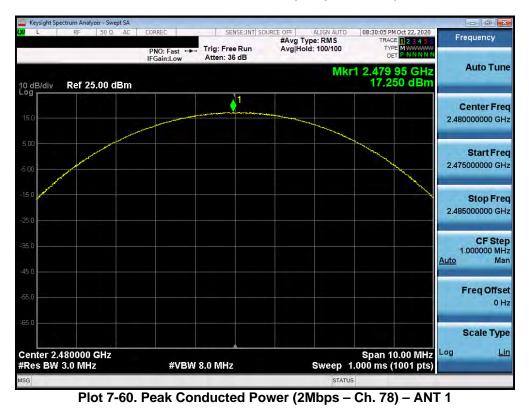
Plot 7-58. Peak Conducted Power (2Mbps - Ch. 0) - ANT 1

FCC ID: A3LSMG998U	PCTEST Proud to be part of @ energy	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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PNO: Fast +++ Trig: Free Run IFGain:Low Atten: 36 dB	#Avg Type: RMS Avg Hold: 100/100	TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P N N N N N	Frequency
	Mkr	1 2.441 03 GHz 19.078 dBm	Auto Tune
1			Center Fred 2.441000000 GH
			Start Free 2.436000000 GH
			Stop Fre 2.446000000 GH
			CF Ste 1.000000 MH <u>Auto</u> Ma
			Freq Offse 0 H
			Scale Typ
#VBW 8.0 MHz	Sweep 1	Span 10.00 MHz .000 ms (1001 pts)	Log <u>Lir</u>
	Atten: 36 dB	PNO: Fast Trig: Free Run Atten: 36 dB	PRO: Fast + Trig: Free Run Atten: 36 dB Mkr1 2.441 03 GHz 19.078 dBm

Plot 7-59. Peak Conducted Power (2Mbps - Ch. 39) - ANT 1



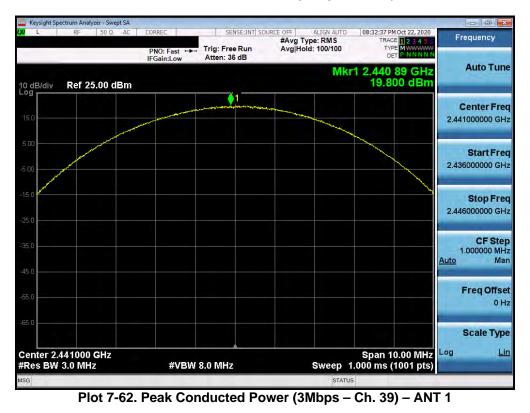
PCTEST Approved by: MEASUREMENT REPORT (a SAMSUNG FCC ID: A3LSMG998U (CERTIFICATION) Quality Manager Protect to be port of Test Report S/N: EUT Type: Test Dates: Page 47 of 108 1M2009230152-13.A3L 10/05 - 11/20/2020 Portable Handset V 9.0 02/01/2019

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PNO: Fast +++ Trig: Free Run IFGain:Low Atten: 36 dB	#Avg Type: RMS Avg Hold: 100/100	TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P. N.N.N.N.N	Frequency
	Mkr	1 2.402 09 GHz 18.218 dBm	Auto Tune
	and the second sec		Center Free 2.402000000 GH
			Start Fre 2.397000000 GH
			Stop Fre 2.407000000 GH
			CF Ste 1.000000 MH Auto Ma
			Freq Offso 0 H
			Scale Typ
#VBW 8.0 MHz	Sweep 1		Log <u>Li</u>
	Atten: 36 dB	#VBW 8.0 MHz Sweep 1	IFGainLow Atten: 36 dB MKr1 2.402 09 GHz 18.218 dBm

Plot 7-61. Peak Conducted Power (3Mbps - Ch. 0) - ANT 1



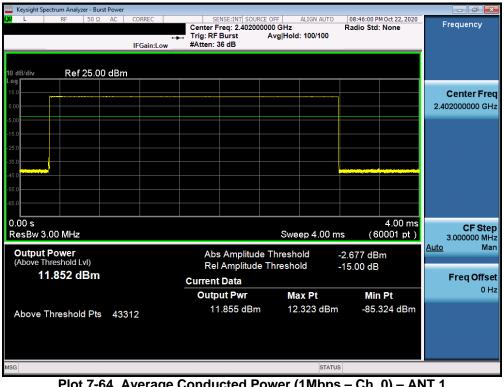
PCTEST Approved by: MEASUREMENT REPORT (a SAMSUNG FCC ID: A3LSMG998U (CERTIFICATION) Protect to be part of 🛞 Quality Manager Test Report S/N: EUT Type: Test Dates: Page 48 of 108 1M2009230152-13.A3L 10/05 - 11/20/2020 Portable Handset V 9.0 02/01/2019

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L RF 50 Ω AC	CORREC	SENSE:INT SO	URCE OFF ALIGN AL	JTO 08:34:54 PI	MOct 22, 2020	
		Trig: Free Run Atten: 36 dB	#Avg Type: RMS Avg Hold: 100/10	O TYP	E 1 2 3 4 5 6 E MWWWW F P NNNNN	Frequency
dB/div Ref 25.00 dBm	in Guinteow		N	Akr1 2.479 17.9	94 GHz 71 dBm	Auto Tune
5.0		1	and the second second			Center Fred 2.480000000 GH2
.00						Start Free 2.475000000 GH:
5.0						Stop Free 2.485000000 GH
5.0						CF Ste 1.000000 MH <u>Auto</u> Ma
5.0						Freq Offse 0 H
5.0						Scale Typ
enter 2.480000 GHz Res BW 3.0 MHz	#VBW 8	.0 MHz	Swee	Span 1 p 1.000 ms (0.00 MHz 1001 pts)	Log <u>Lir</u>
G				TATUS		

Plot 7-63. Peak Conducted Power (3Mbps - Ch. 78) - ANT 1



Plot 7-64. Average Conducted Power (1Mbps - Ch. 0) - ANT 1

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Keysight Spec	trum Analyzer			CORREC	1		NSE:INT SOUR		ALIGN AUTO	08:50:51	PM Oct 22, 2020	- ē	x
	N	20.35		IFGain:L	ow	Center F	req: 2.44100 Burst	0000 GHz	:>100/100	Radio Std		Frequency	
10 dB/div Log	Ref 2	5.00	dBm						1				
5.00								· · · · · ·				Center F 2.441000000 0	
5.00 15.0 25.0													
45.0													
-55.0													
0.00 s ResBw 3.0	00 MHz							Swe	ep 4.00 m	ns (6	4.00 ms 0001 pt)	CF St 3.000000 M	мΗ
Output P (Above Thr 12	reshold Lv					Abs Amplitude Threshold -2.365 dBm Rel Amplitude Threshold -15.00 dB				Auto Freg Off	Ma		
	12.033 dBm				Current	Data Dut Pwr	Ма	x Pt	Mi	n Pt		DH	
Above Th	nreshold	Pts	4331	2			2.039 dBm		.635 dBm		279 dBm		
SG									STATU	s			

Plot 7-65. Average Conducted Power (1Mbps - Ch. 39) - ANT 1



Plot 7-66. Average Conducted Power (1Mbps - Ch. 78) - ANT 1

FCC ID: A3LSMG998U	Proved to be part of @ enterned	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectr												
	RF	50 Ω	AC	IFGain	↔	Center		0000 GHz	ALIGN AUTO	Radio Std	M Oct 22, 2020 : None	Frequency
10 dB/div Log	Ref 2	5.00) dBm									
5.00		<mark>llun</mark> v	الم افروا ملي. 19	A. Salas I A. grie	<mark>a lua liseita l</mark> e	an salle d'égy a t	an di sa si si la s ^{at} a d	<mark></mark>	n (^{bi} stydd Roedd ffellau			Center Fre 2.402000000 GF
-5.00												
35.0												
55.0 65.0												
0.00 s ResBw 3.00	0 MHz							Swe	ep 4.00 m	ıs (6	4.00 ms 0001 pt)	CF Ste 3.000000 Mi
Output Po (Above Three	ower eshold Lv 793 dE						s Amplitude I Amplitude			2.518 dB -15.00 dB		<u>Auto</u> Ma
14.	(95 GE	SIII				Curren Outr	t Data out Pwr	Ma	ax Pt	Mir	ı Pt	Freq Offs 0 F
Above Th	reshold	Pts	433	43		-	4.795 dBm		.518 dBm		296 dBm	
ISG									STATU	5		

Plot 7-67. Average Conducted Power (2Mbps - Ch. 0) - ANT 1



Plot 7-68. Average Conducted Power (2Mbps - Ch. 39) - ANT 1

FCC ID: A3LSMG998U	Proved to be part of @erener	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectru				CORREC			ENSE:INT SOURC		ALIGN AUTO	09:12:04 F	M Oct 22, 2020	Frequency	×
				IFGain:I	.ow	Teles DE		Avg Hold	: 100/100	Radio Std	: None		
10 dB/div Log	Ref 25	.00 (dBm										
5.00	La _{pe} te te te fil	all is an		in fan fin a	n bergen be	<mark>an half haif dagan ha</mark>		<mark>ho, apata wakatika</mark>	<mark>d Hengan Russel (1968) in s</mark>			Center Fi 2.480000000 G	
-5.00													
-25.0													
-45.0													
-65.0													
0.00 s ResBw 3.00	MHz							Swe	ep 4.00 m	ıs (6	4.00 ms 60001 pt)	CF St 3.000000 M	ин
Output Po (Above Three	shold Lvl)						s Amplitude I Amplitude			1.659 dB -15.00 dB			Mai
13.8	62 dBr	n				Current						Freq Offs 0	' se) н
Above Thr	eshold P	ts	4334	2			o ut Pwr 3.876 dBm		i x Pt .659 dBm		1 Pt 960 dBm		
ISG									STATU	S			

Plot 7-69. Average Conducted Power (2Mbps - Ch. 78) - ANT 1



Plot 7-70. Average Conducted Power (3Mbps - Ch. 0) - ANT 1

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Keysight Spectr				0000050								
	RF	50 Ω	AC	CORREC IFGain	÷	Center			ALIGN AUTO	Radio Std	M Oct 22, 2020 : None	Frequency
0 dB/div og	Ref 2	25.00) dBm						1			
5.00		les de la	n nin heider In nin heider		<mark>. population</mark>	n an an an Anna an Ann	it of the state of t	<mark>ç tır başını danı</mark>	alara ya shi ka shi ya			Center Fr 2.441000000 G
5.0												
5.0												
5.0												
1.00 s ResBw 3.00									ep 4.00 m	ıs (6	4.00 ms 0001 pt)	CF St 3.000000 M Auto M
Output Po (Above Three 15.8						Abs Amplitude Threshold 4.101 dBm Rel Amplitude Threshold -15.00 dB				Auto Man Freq Offset		
Above Th	reshold	Pts	426	317		Out	5.786 dBm		i x Pt .101 dBm		1 Pt 129 dBm	0
G									STATUS	5		

Plot 7-71. Average Conducted Power (3Mbps - Ch. 39) - ANT 1

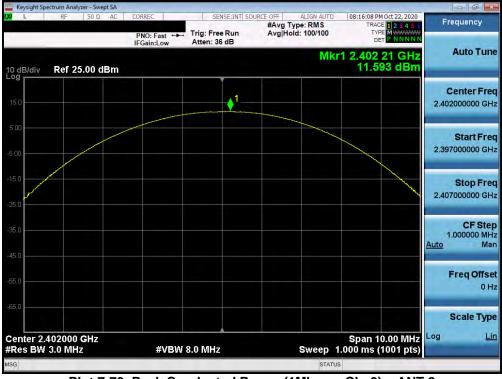


Plot 7-72. Average Conducted Power (3Mbps - Ch. 78) - ANT 1

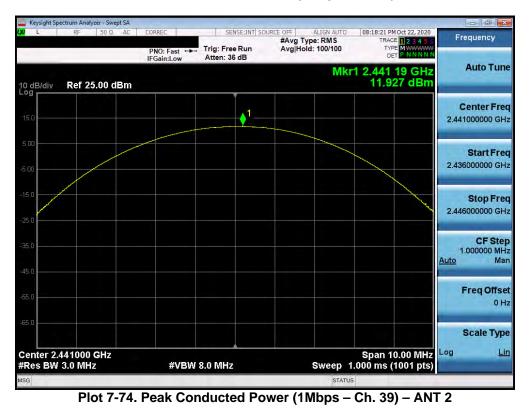
FCC ID: A3LSMG998U	POLY to be part of @ enterned	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Dual BT ANTENNA 2



Plot 7-73. Peak Conducted Power (1Mbps - Ch. 0) - ANT 2



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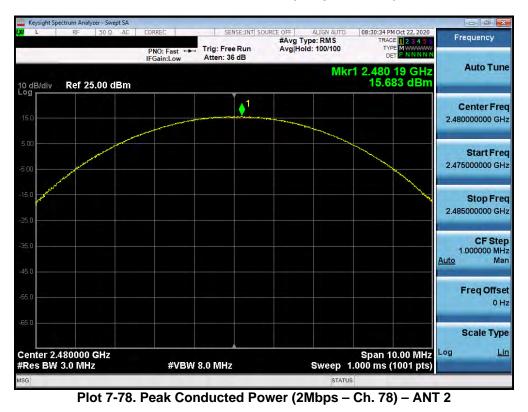
Plot 7-76. Peak Conducted Power (2Mbps - Ch. 0) - ANT 2

FCC ID: A3LSMG998U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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CORREC	SENSE:INT SO		08:29:18 PM Oct 22, 2020	Frequency
		#Avg Type: RMS Avg Hold: 100/100	TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P N N N N	Frequency
		Mki	1 2.441 10 GHz 15.888 dBm	Auto Tune
	1			Center Free 2.441000000 GH
				Start Free 2.436000000 GH
				Stop Free 2.446000000 GH
				CF Ste 1.000000 MH <u>Auto</u> Ma
				Freq Offse 0 H
				Scale Type
#VBW 8.	0 MHz	Sweep 1	Span 10.00 MHz .000 ms (1001 pts)	Log <u>Lir</u>
	PNO: Fast \rightarrow T	PNO: Fast +++ Trig: Free Run IFGain:Low Atten: 36 dB	PNO: Fast ++ Trig: Free Run IFGain:Low Trig: Free Run Atten: 36 dB #Avg Type: RMS Avg Hold: 100/100 Mkr	PNO: Fast + Trig: Free Run IF Gain: Low Atten: 36 dB *Avg Hold: 100/100 Trace 12:24:56 Mikr1 2:441 10 GHz 15.888 dBm

Plot 7-77. Peak Conducted Power (2Mbps - Ch. 39) - ANT 2



PCTEST Approved by: MEASUREMENT REPORT (a SAMSUNG FCC ID: A3LSMG998U (CERTIFICATION) Quality Manager ad to be part of 📾 Test Report S/N: EUT Type: Test Dates: Page 56 of 108 1M2009230152-13.A3L 10/05 - 11/20/2020 Portable Handset V 9.0 02/01/2019

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Plot 7-79. Peak Conducted Power (3Mbps - Ch. 0) - ANT 2



Plot 7-80. Peak Conducted Power (3Mbps - Ch. 39) - ANT 2

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L RF 50 Ω AC	CORREC SENSE:INT :		08:35:24 PM Oct 22, 2020	A Support of the
	PNO: Fast +++ Trig: Free Run IFGain:Low Atten: 36 dB	#Avg Type: RMS Avg Hold: 100/100	TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P N N N N N	Frequency
dB/div Ref 25.00 dBm		Mki	1 2.479 88 GHz 16.289 dBm	Auto Tune
5.0	1	and a star and a star		Center Fred 2.480000000 GH
				Start Fre 2.475000000 GH
5.0				Stop Fre 2.485000000 GH
5.0				CF Ste 1.000000 MH Auto Ma
5.0				Freq Offse 0 H
50				Scale Typ
enter 2.480000 GHz Res BW 3.0 MHz	#VBW 8.0 MHz	Sweep 1	Span 10.00 MHz .000 ms (1001 pts)	Log <u>Li</u> i
G		STATU		

Plot 7-81. Peak Conducted Power (3Mbps - Ch. 78) - ANT 2



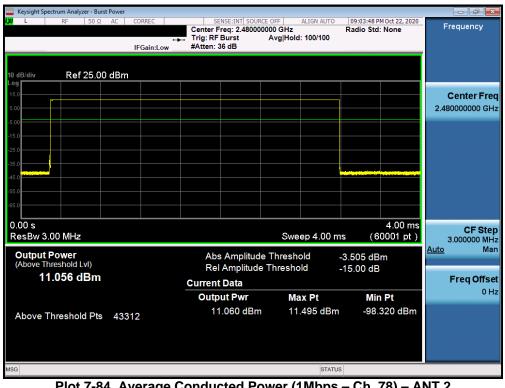
Plot 7-82. Average Conducted Power (1Mbps – Ch. 0) – ANT 2

FCC ID: A3LSMG998U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spe	RF 5	- Burst Power 0 Ω AC	CORREC	_ow				ALIGN AUTO	09:02:09 F Radio Std	PM Oct 22, 2020 I: None	Frequency
10 dB/div Log	Ref 2	5.00 dBn	n								
15.0 5.00									1		Center Fre 2.441000000 GH
-5.00											
-35.0										4	
-55.0											
0.00 s ResBw 3.	00 MHz						Swe	ep 4.00 n	ns (6	4.00 ms 50001 pt)	CF Ste 3.000000 M⊦
	Power ireshold Lvl) .502 dB					a Amplitud Amplitude			-3.011 dE -15.00 dE		<u>Auto</u> Ma
	.502 uD				Current		Ma	x Pt	Mi	n Pt	Freq Offs 0 H
Above T	hreshold I	Pts 43	312			u t Pwr I.499 dBm		989 dBm		n Pt .132 dBm	
MSG								STATU	IS		

Plot 7-83. Average Conducted Power (1Mbps - Ch. 39) - ANT 2



Plot 7-84. Average Conducted Power (1Mbps - Ch. 78) - ANT 2

FCC ID: A3LSMG998U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectru												
XI L	RF 5	Ω 0	AC	CORREC IFGain		Center F			ALIGN AUTO	09:08:28 PM Radio Std:	Oct 22, 2020 None	Frequency
10 dB/div Log	Ref 25	5.00) dBm									
5.00	In the second	i <mark>aste</mark> t	niin fai	<mark>, hran a</mark> l	<mark>i Antika kalik</mark>	<mark>hidan paharana</mark>	<mark>dala so algula</mark> .	n Hulvanhukekan	piliti arile ta la la a			Center Fre 2.402000000 GH
5.00 15.0 25.0												
45.0												
55.0 65.0												
0.00 s ResBw 3.00								Swe	ep 4.00 m		4.00 ms 001 pt)	CF Ste 3.000000 MH Auto Ma
Output Po (Above Thres 11.7	wer shold Lvl) 30 dB					Rel	Amplitud			0.5279 dBn -15.00 dB	n	Freq Offs
							ut Pwr 1.716 dBm		a x Pt .472 dBm	Min		01
Above Thre	eshold I	Pts	433	42		11	r.716 dBm	114	.472 dBm	-999.	00 dBm	
SG									STATU	S		

Plot 7-85. Average Conducted Power (2Mbps - Ch. 0) - ANT 2



Plot 7-86. Average Conducted Power (2Mbps - Ch. 39) - ANT 2

FCC ID: A3LSMG998U		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spect	RF	50 Ω	AC	CORRE	C	Center	ENSE:INT SOUR	0000 GHz	ALIGN AUTO	09:12:58 PM Oct 22, 2 Radio Std: None	020 Frequency
				IFGai	⊶ n:Low	Trig: RF #Atten:		Avg Hold	: 100/100		_
10 dB/div	Ref 2	25.00) dBm								
- og 15.0 5.00		Winth	nii da	a di tana a	l Mariikuf		alalas suidestature		nili je da ta da s		Center Fre 2.480000000 GH
5.00											
25.0											
45.0											
55.0 65.0											
0.00 s ResBw 3.0	0 MHz							Swe	ep 4.00 m	4.00 r ns (60001 p	t) 3.000000 MH
Output P (Above Thre	ower eshold Lv	/I)					s Amplitude I Amplitude			0.1997 dBm -15.00 dB	<u>Auto</u> Ma
11.	961 di	Зm				Curren					Freq Offse
							out Pwr		x Pt	Min Pt	
Above Th	reshold	Pts	433	335		1	1.953 dBm	14	.800 dBm	-91.327 dB	m

Plot 7-87. Average Conducted Power (2Mbps - Ch. 78) - ANT 2



Plot 7-88. Average Conducted Power (3Mbps - Ch. 0) - ANT 2

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