



MEASUREMENT REPORT

FCC PART 15.247 Bluetooth

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

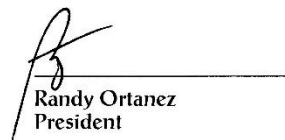
Date of Testing:
10/08/2021 – 10/20/2021
Test Report Issue Date:
02/11/2022
Test Site/Location:
PCTEST Lab. Morgan Hill, CA, USA
Test Report Serial No.:
1M2112100159-12.A3L

FCC ID: A3LSMS908JPN
APPLICANT: Samsung Electronics Co., Ltd.

Application Type: Certification
Model: SC-52C
Additional Model(s): SCG14
EUT Type: Portable Handset
Max. RF Output Power: 162.48mW (22.11dBm) Peak Conducted
Frequency Range: 2402 – 2480MHz
Modulation Type: GFSK, $\pi/4$ -DQPSK, 8DPSK
FCC Classification: FCC Part 15 Spread Spectrum Transmitter (DSS)
FCC Rule Part(s): Part 15 Subpart C (15.247)
ISED Specification: RSS-247 Issue 2
Test Procedure(s): ANSI C63.10-2013, KDB 558074 D01 v05r02,
KDB 648474 D03 v01r04, KDB 662911 D01 v02r01

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



FCC ID: A3LSMS908JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset	Page 1 of 131	

TABLE OF CONTENTS

1.0	INTRODUCTION	3
1.1	Scope	3
1.2	PCTEST Test Location	3
1.3	Test Facility / Accreditations	3
2.0	PRODUCT INFORMATION	4
2.1	Equipment Description	4
2.2	Device Capabilities	4
2.3	Antenna Description	5
2.4	Test Configuration	5
2.5	Software and Firmware	5
2.6	EMI Suppression Device(s)/Modifications	5
3.0	DESCRIPTION OF TESTS	6
3.1	Evaluation Procedure	6
3.2	AC Line Conducted Emissions	6
3.3	Radiated Emissions	7
3.4	Environmental Conditions	7
4.0	ANTENNA REQUIREMENTS	8
5.0	MEASUREMENT UNCERTAINTY	9
6.0	TEST EQUIPMENT CALIBRATION DATA	10
7.0	TEST RESULTS	11
7.1	Summary	11
7.2	20dB Bandwidth Measurement	12
7.3	Output Power Measurement	23
7.4	Conducted Authorized Band Edge	81
7.5	Carrier Frequency Separation	86
7.6	Time of Occupancy	89
7.7	Number of Hopping Channels	92
7.8	Conducted Spurious Emissions	95
7.9	Radiated Spurious Emissions Measurements – Above 1GHz	102
7.10	Radiated Restricted Band Edge Measurements	116
7.11	Radiated Spurious Emissions Measurements – Below 1GHz	119
7.12	AC Line Conducted Emissions Measurement	125
8.0	CONCLUSION	131

FCC ID: A3LSMS908JPN	 PCTEST <small>Proud to be part of </small>	MEASUREMENT REPORT (CERTIFICATION)	 Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset	Page 2 of 131

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 18855 Adams Court, Morgan Hill, CA 95037. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014 and KDB 414788 D01 v01r01.

1.3 Test Facility / Accreditations

Measurements were performed at PCTEST located in Morgan Hill, CA 95037, U.S.A.

- PCTEST is an ISO 17025-2017 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.02 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 (22831) test laboratory with the site description on file with ISED.

FCC ID: A3LSMS908JPN	 PCTEST <small>Proud to be part of </small>	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 3 of 131

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMS908JPN**. 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 manufacturer 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.: 0507M, 0579M, 0229M

2.2 Device Capabilities

This device contains the following capabilities:

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

Ch.	Frequency (MHz)
00	2402
:	:
39	2441
:	:
78	2480

Table 2-1. Bluetooth Frequency/ Channel Operations

Data Rate [Mbps]	Power Scheme	Antenna 1	Antenna 2	Dual
1.0	ePA	✓	✓	✗
	iPA	✓	✓	✓
2.0	ePA	✓	✓	✗
	iPA	✓	✓	✓
3.0	ePA	✓	✓	✗
	iPA	✓	✓	✓

Table 2-2. Supported Data Rate and Power Scheme

✓ = Supported

✗ = Not Supported

Notes: 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.

FCC ID: A3LSMS908JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset	Page 4 of 131	

2.3 Antenna Description

Following antenna gains provided by manufacturer were used for the test.

Frequency [MHz]	Antenna 1 Gain (dBi)	Antenna 2 Gain (dBi)	Directional Gain (dBi)
2402	-6.82	-6.12	-3.45
2441	-7.77	-5.84	-3.74
2480	-7.11	-5.76	-3.40

Table 2-2. Antenna Peak Gain

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 wireless charging pad (WCP): EP-N5100 while EUT 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 Software and Firmware

The test was conducted with firmware version S908USQU0AUJ9 installed on the EUT

2.6 EMI Suppression Device(s)/Modifications

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

FCC ID: A3LSMS908JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset	Page 5 of 131	

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 7m x 3.66m x 2.7m shielded enclosure. The shielded enclosure is manufactured by AP Americas. 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, 50Ω/50μH 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 EPCOS 2X60A Power Line Filter (100dB Attenuation, 14kHz-18GHz) and the two EPCOs 2X48A filters (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. Automated test software was used to perform the AC line conducted emissions testing. Automated measurement software utilized is Rohde & Schwarz EMC32, Version 10.50.40.

FCC ID: A3LSMS908JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset	Page 6 of 131	

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.

Per KDB 414788, radiated emission test sites other than open-field test sites (e.g., shielded anechoic chambers), may be employed for emission measurements below 30MHz if characterized so that the measurements correspond to those obtained at an open-field test site. To determine test site equivalency, a reference sample transmitting at 149kHz was measured on an open field test site (asphalt with no ground plane) and then measured in the 3m semi-anechoic chamber. A calibrated 60cm loop antenna was rotated about its vertical axis while the reference device was rotated through the X, Y and Z axis in order to capture the worst case level. A maximum deviation of 2.77dB at 149kHz was measured when comparing the 3 meter semi-anechoic chamber to the open field site.

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.

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).

FCC ID: A3LSMS908JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset	Page 7 of 131	

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.

FCC ID: A3LSMS908JPN	 Proud to be part of  element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset	Page 8 of 131	

5.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.23-2012. 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 (\pm dB)
Conducted Bench Top Measurements	1.65
Line Conducted Disturbance	2.75
Radiated Disturbance (<30MHz)	4.06
Radiated Disturbance (30MHz - 1GHz)	4.30
Radiated Disturbance (1 - 18GHz)	4.78
Radiated Disturbance (>18GHz)	4.79

FCC ID: A3LSMS908JPN	 PCTEST Proud to be part of  element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 9 of 131

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
Agilent Technologies	N4010A	Wireless Connectivity Test Set		N/A		GB46170464
Agilent Technologies	N9030A	3Hz-44GHz PXA Signal Analyzer	3/31/2021	Annual	3/31/2022	MY49430244
ATM	180-442-KF	20dB Nominal Gain Horn Antenna (18-40GHz)	12/9/2020	Annual	12/9/2021	T058701-01
ETS-Lindgren	3142E	BiConiLog Antenna (30MHz - 6GHz)	6/8/2021	Annual	6/8/2022	224569
ETS-Lindgren	3117	Double Ridged Guide Antenna (1-18 GHz)	5/3/2021	Annual	5/3/2022	205956
Rohde & Schwarz	TS-PR8	Pre-Amplifier (30MHz - 8GHz)	12/3/2020	Annual	12/3/2021	102327
Rohde & Schwarz	TS-PR18	Pre-Amplifier (1GHz - 18GHz)	12/3/2020	Annual	12/3/2021	101648
Rohde & Schwarz	TS-PR1840	Pre-Amplifier (18GHz - 40GHz)	4/29/2021	Annual	4/29/2022	100051
Rohde & Schwarz	FSV40	Signal Analyzer (10Hz-40GHz)	3/16/2021	Annual	3/16/2022	101619
Rohde & Schwarz	ESW26	EMI Test Receiver	6/11/2021	Annual	6/11/2022	101299
Rohde & Schwarz	ESW44	EMI Test Receiver	11/9/2020	Annual	11/9/2021	101570
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	4/3/2021	Annual	4/3/2022	166869
Rohde & Schwarz	HFH2-Z2	Loop Antenna	4/5/2021	Annual	4/5/2022	100519
Rohde & Schwarz	ENV216	Two-Line-V-Network (LISN)	12/7/2020	Annual	12/7/2021	101364

Table 6-1. Test Equipment List

Notes:

For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.

FCC ID: A3LSMS908JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset	Page 10 of 131	

7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.
 FCC ID: A3LSMS908JPN
 FCC Classification: Frequency Hopping Spread Spectrum (FHSS)
 Number of Channels: 79

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(a)]	20dB Bandwidth	N/A	CONDUCTED	N/A	Section 7.2
15.247(b)(1)	RSS-247 [5.4(b)]	Peak Transmitter Output Power	< 1 Watt if ≥ 75 non-overlapping channels used		PASS	Section 7.3
15.247(a)(1)	RSS-247 [5.1(b)]	Channel Separation	> 2/3 of 20 dB BW for systems with Output Power < 125mW		PASS	Section 7.5
15.247(a)(1)(iii)	RSS-247 [5.1(d)]	Time of Occupancy	< 0.4 sec in 31.6 sec period		PASS	Section 7.6
15.247(a)(1)(iii)	RSS-247 [5.1(d)]	Number of Channels	> 15 Channels		PASS	Section 7.7
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)		PASS	Section 7.9 Section 7.10 Section 7.11
15.207	RSS-Gen [8.8]	AC Line Conducted Emissions 150kHz – 30MHz	< FCC 15.207 limits (RSS-Gen [8.8] limits)	AC 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 and attenuators used as part of the system to connect the EUT to the analyzer 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 1.3.2.
- 6) Due to ePA Conducted Power measurement is the worst case, all additional testing was done in ePA mode.

FCC ID: A3LSMS908JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset	Page 11 of 131	

7.2 20dB Bandwidth Measurement

§2.1049; §15.247 (a.1); RSS-247 [5.1(a)]

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. $RBW = 1 - 5\% \text{ OBW}$
3. $VBW \geq 3 \times RBW$
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

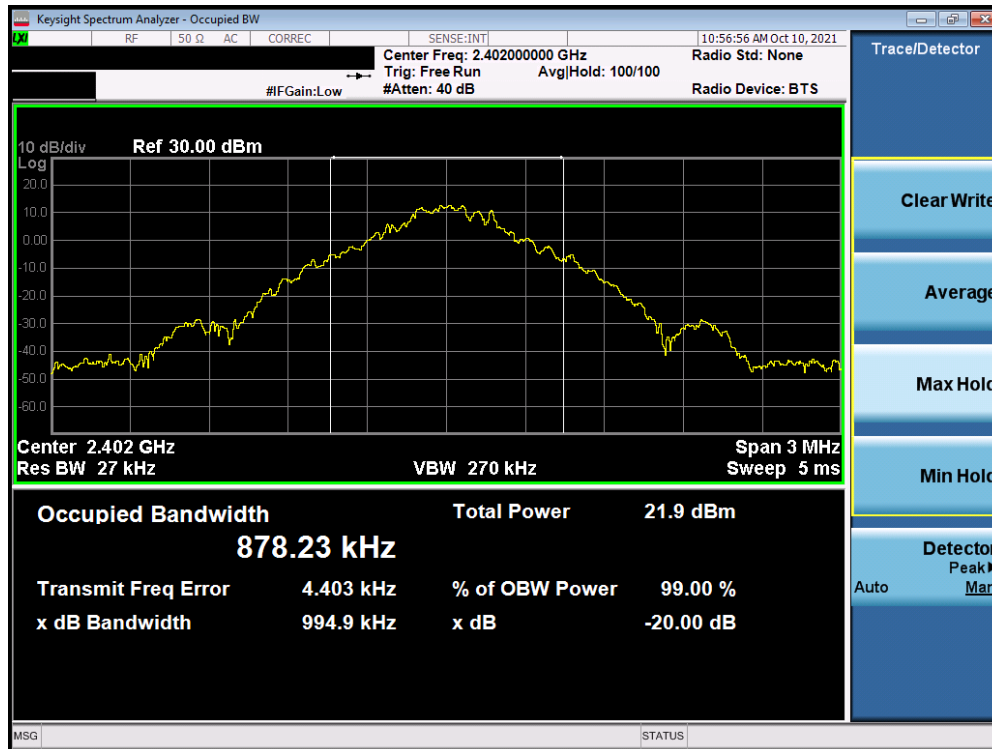
None

FCC ID: A3LSMS908JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 12 of 131

Antenna 1

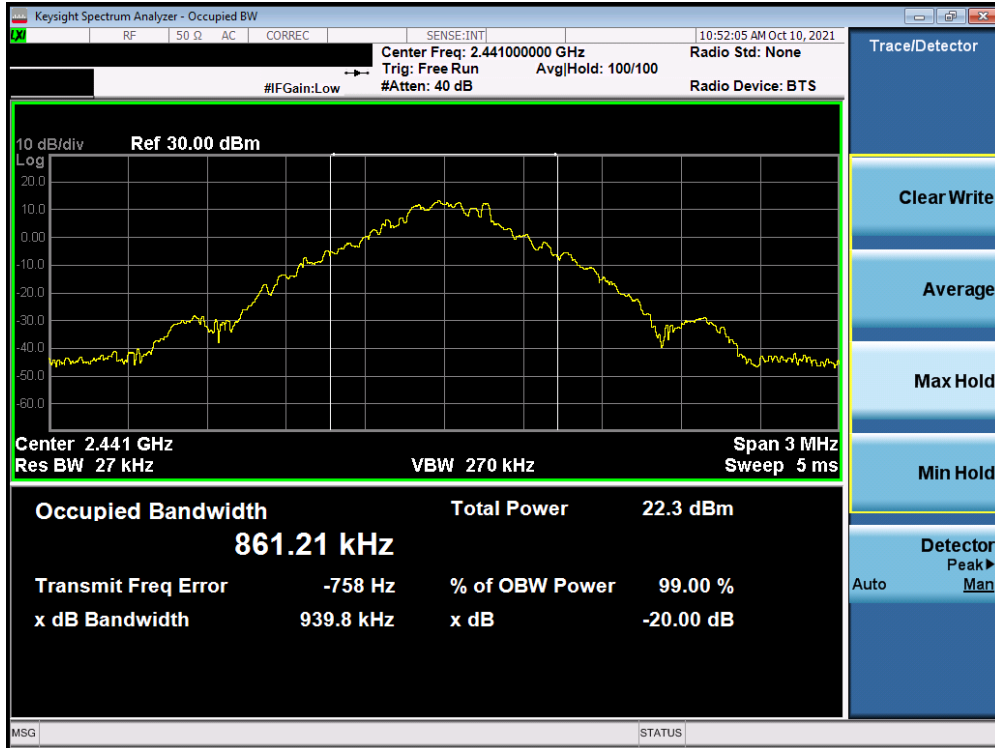
Frequency [MHz]	Data Rate [Mbps]	Modulation	Power Scheme	Channel No.	20dB Bandwidth Test Results [kHz]
2402	1.0	GFSK	ePA	0	994.90
2441	1.0	GFSK	ePA	39	939.80
2480	1.0	GFSK	ePA	78	936.80
2402	2.0	$\pi/4$ -DQPSK	ePA	0	1342.00
2441	2.0	$\pi/4$ -DQPSK	ePA	39	1321.00
2480	2.0	$\pi/4$ -DQPSK	ePA	78	1329.00
2402	3.0	8DPSK	ePA	0	1302.00
2441	3.0	8DPSK	ePA	39	1309.00
2480	3.0	8DPSK	ePA	78	1297.00

Table 7-2. Conducted 20dB Bandwidth Measurements Antenna 1

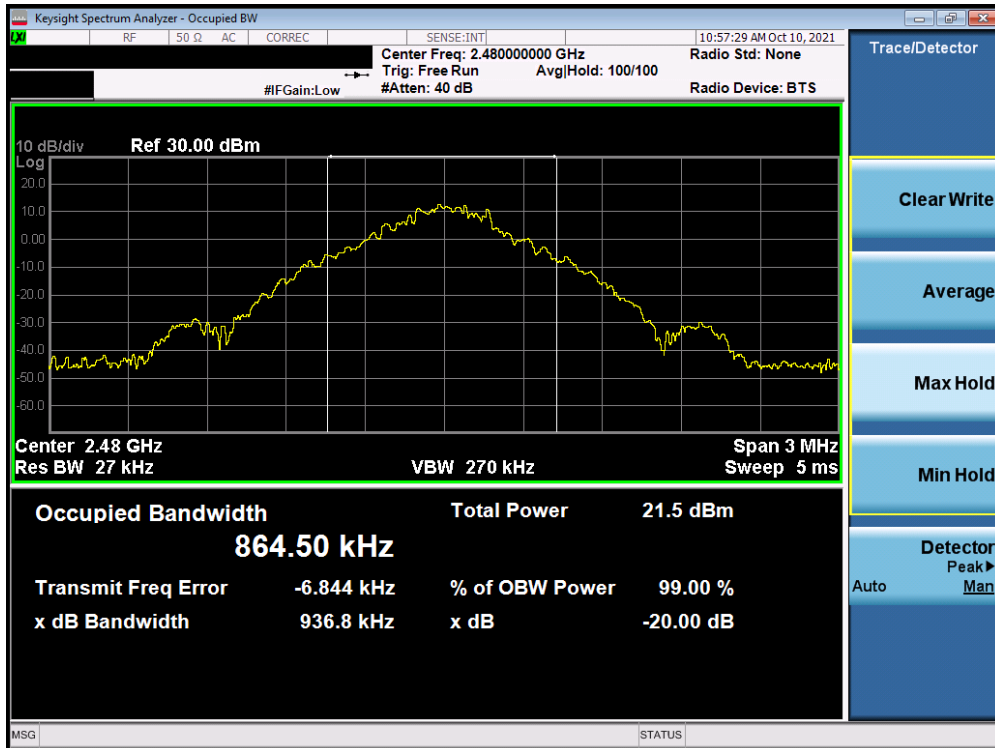


Plot 7-1. Conducted 20dB Plot (Bluetooth, 1Mbps– Ch. 0) Antenna 1

FCC ID: A3LSMS908JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 13 of 131

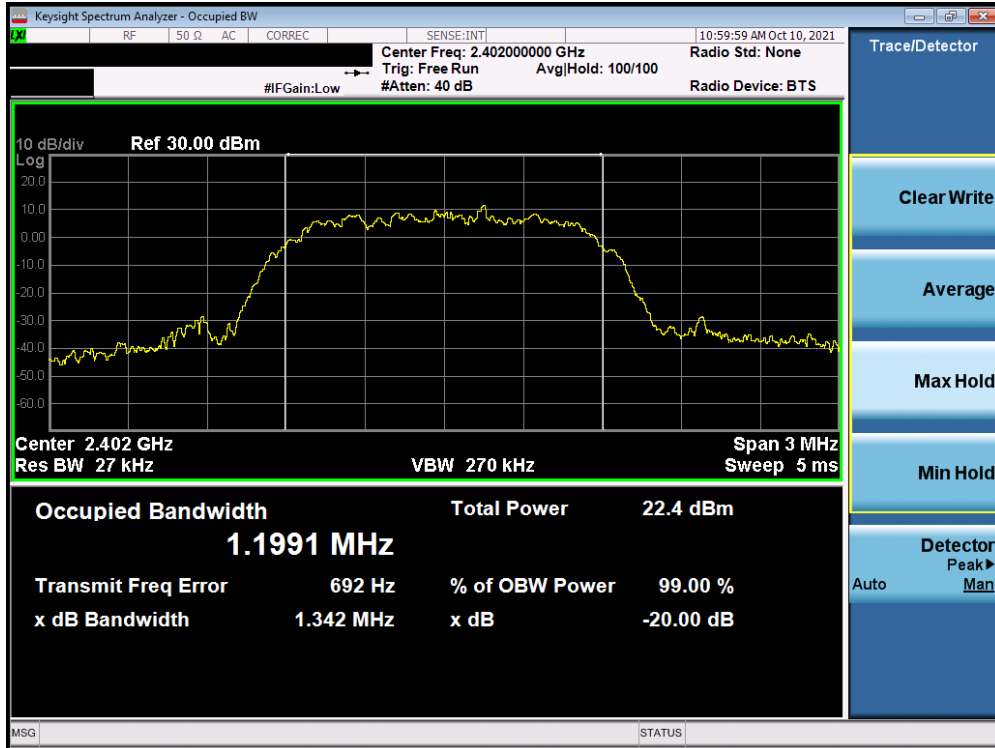


Plot 7-2. Conducted 20dB Plot (Bluetooth, 1Mbps– Ch. 39) Antenna 1

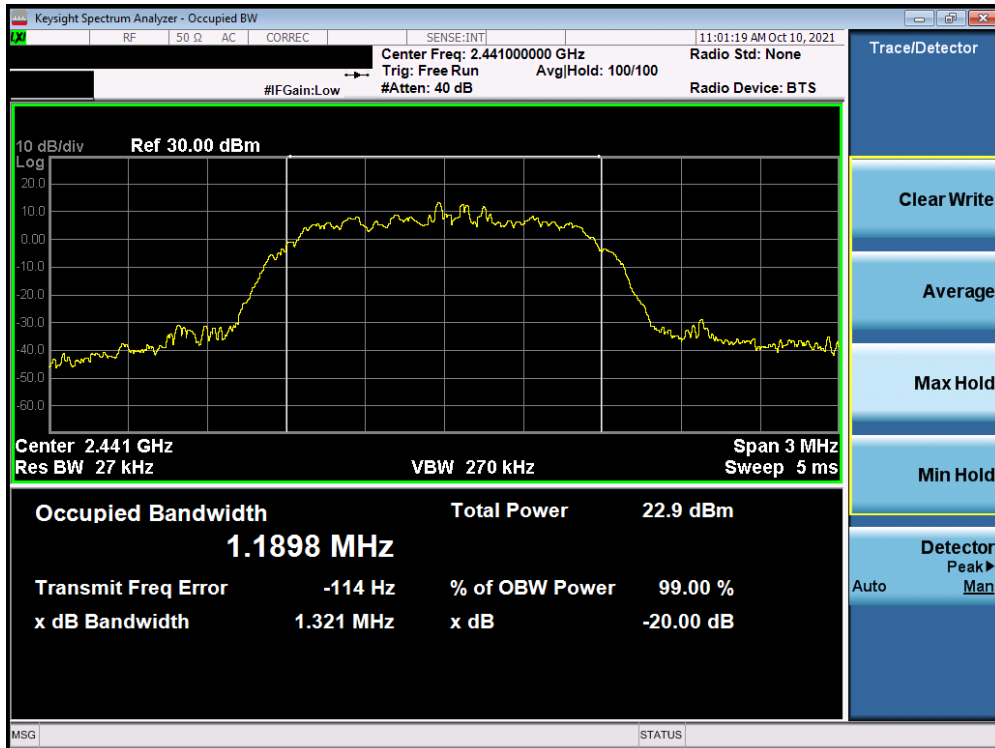


Plot 7-3. Conducted 20dB Plot (Bluetooth, 1Mbps– Ch. 78) Antenna 1

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 14 of 131

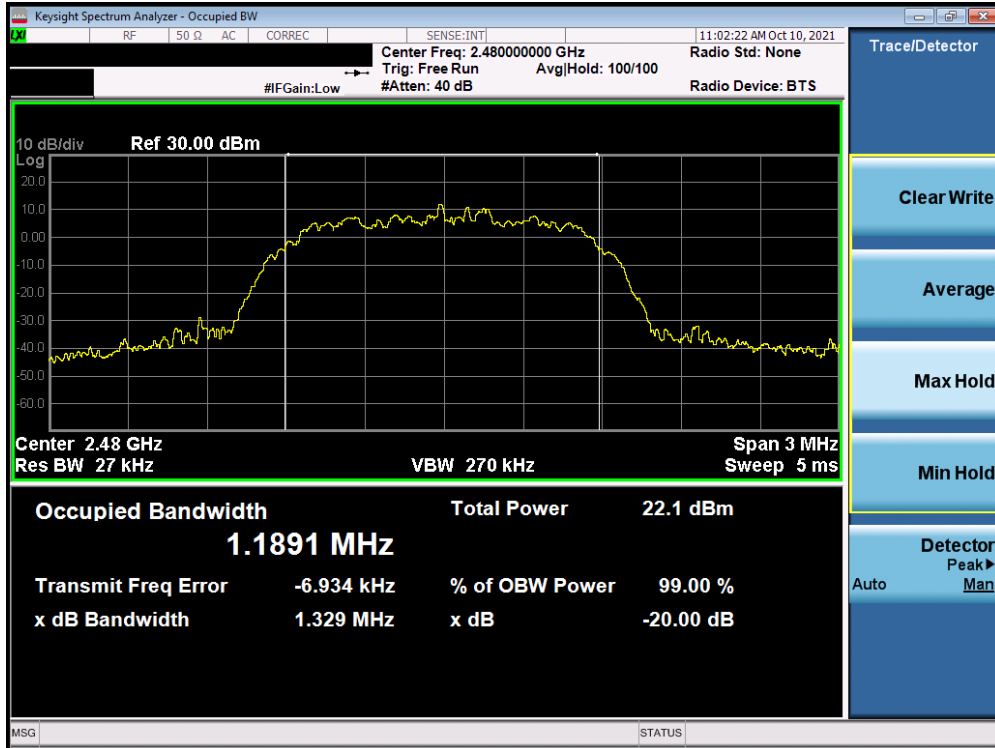


Plot 7-4. Conducted 20dB Plot (Bluetooth, 2Mbps- Ch. 0) Antenna 1

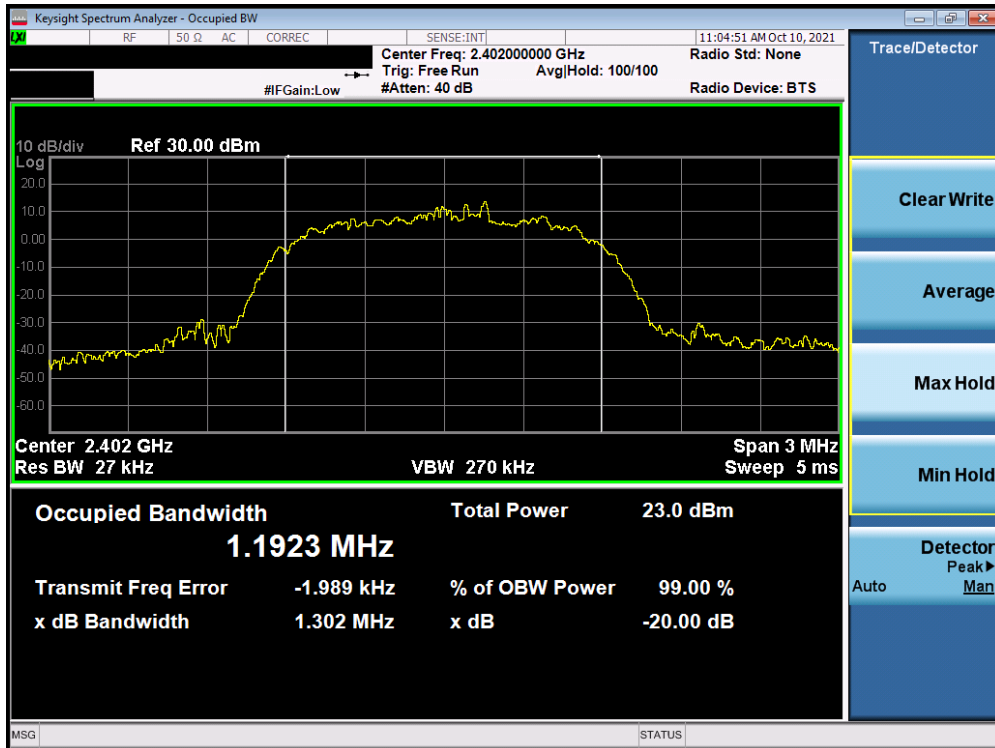


Plot 7-5. Conducted 20dB Plot (Bluetooth, 2Mbps - Ch. 39) Antenna 1

FCC ID: A3LSMS908JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 15 of 131

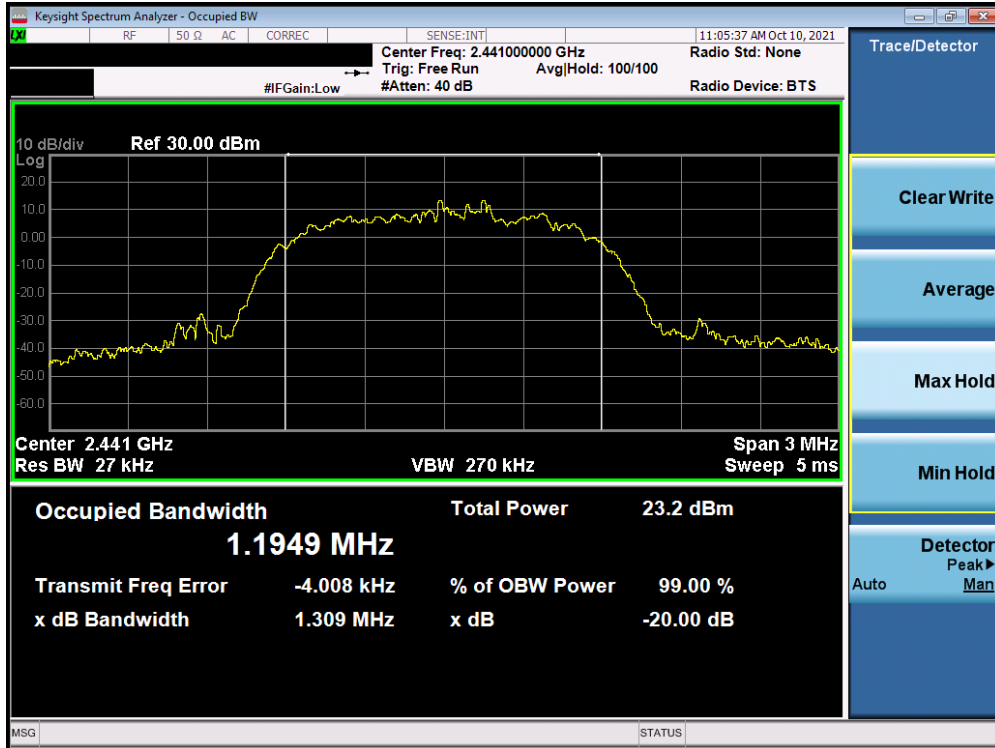


Plot 7-6. Conducted 20dB Plot (Bluetooth, 2Mbps – Ch. 78) Antenna 1

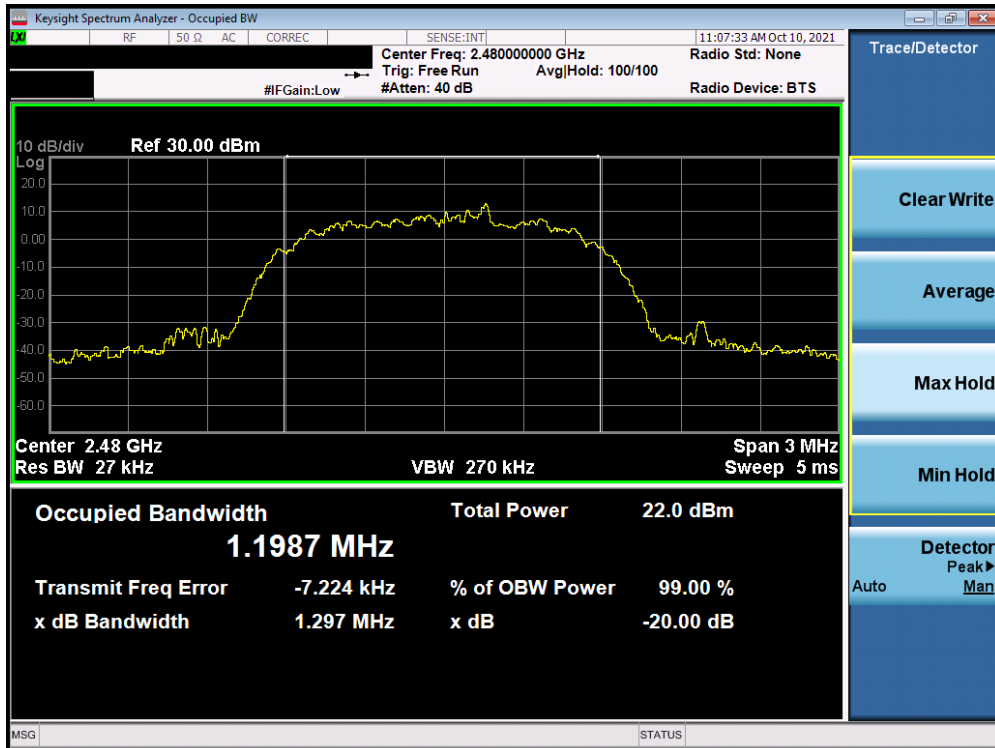


Plot 7-7. Conducted 20dB Plot (Bluetooth, 3Mbps– Ch. 0) Antenna 1

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 16 of 131



Plot 7-8. Conducted 20dB Plot (Bluetooth, 3Mbps – Ch. 39) Antenna 1



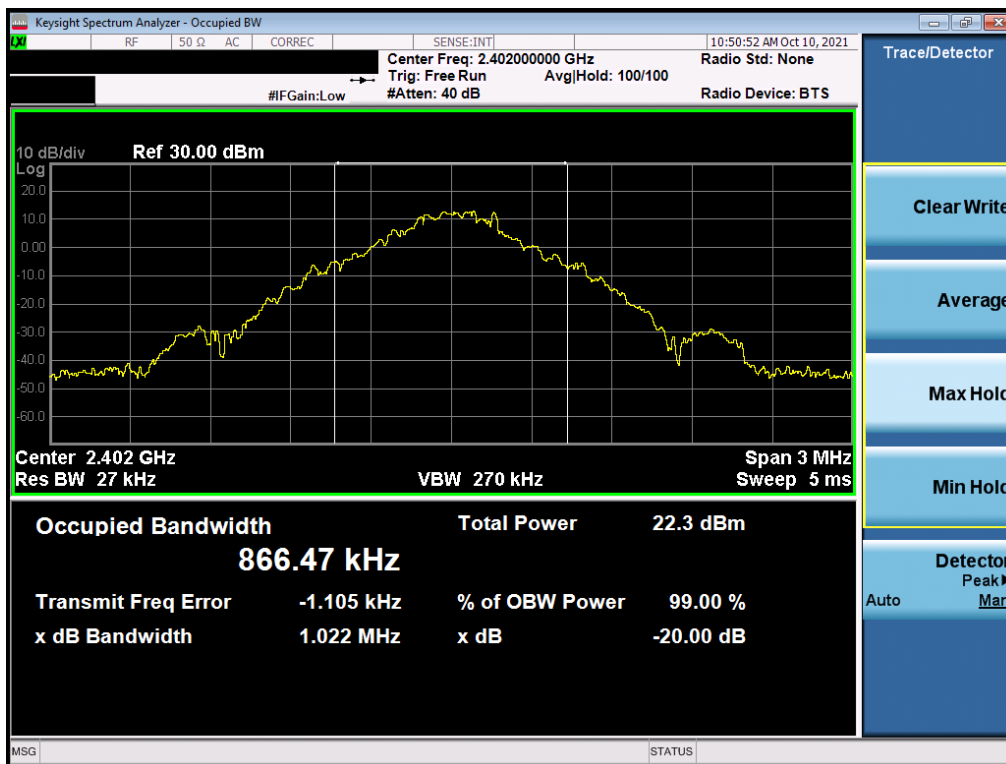
Plot 7-9. Conducted 20dB Plot (Bluetooth, 3Mbps – Ch. 78) Antenna 1

FCC ID: A3LSMS908JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset	Page 17 of 131	

Antenna 2

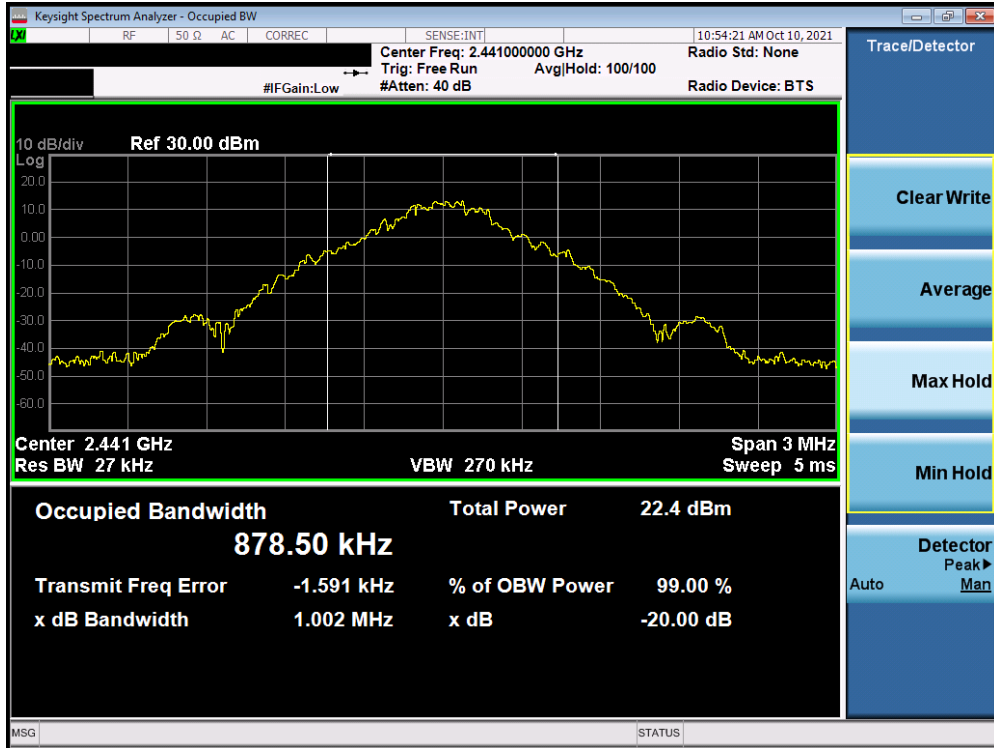
Frequency [MHz]	Data Rate [Mbps]	Modulation	Power Scheme	Channel No.	20dB Bandwidth Test Results [kHz]
2402	1.0	GFSK	ePA	0	1022.00
2441	1.0	GFSK	ePA	39	1002.00
2480	1.0	GFSK	ePA	78	993.60
2402	2.0	$\pi/4$ -DQPSK	ePA	0	1322.00
2441	2.0	$\pi/4$ -DQPSK	ePA	39	1323.00
2480	2.0	$\pi/4$ -DQPSK	ePA	78	1337.00
2402	3.0	8DPSK	ePA	0	1311.00
2441	3.0	8DPSK	ePA	39	1322.00
2480	3.0	8DPSK	ePA	78	1308.00

Table 7-3. Conducted 20dB Bandwidth Measurements Antenna 2

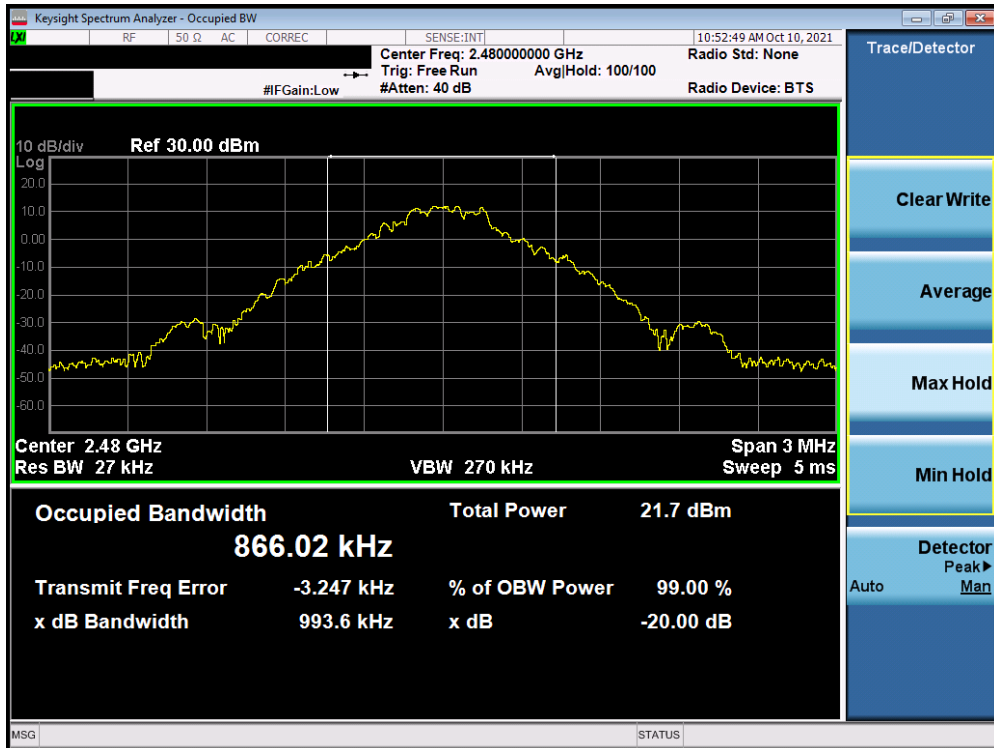


Plot 7-10. Conducted 20dB Plot (Bluetooth, 1Mbps- Ch. 0) Antenna 2

FCC ID: A3LSMS908JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 18 of 131

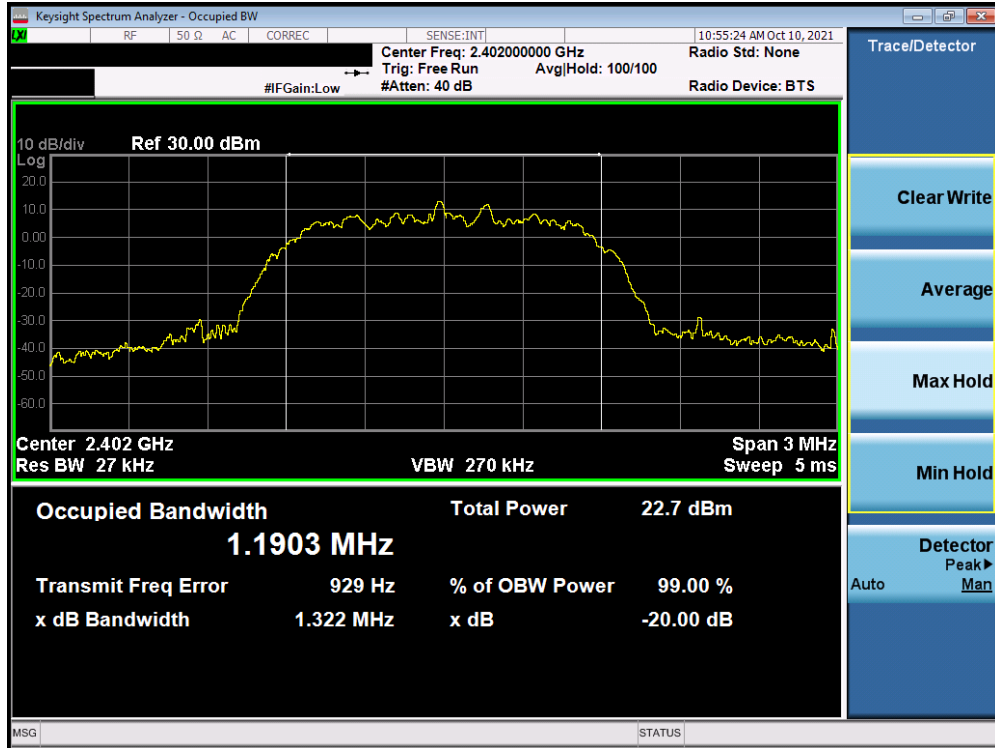


Plot 7-11. Conducted 20dB Plot (Bluetooth, 1Mbps- Ch. 39) Antenna 2

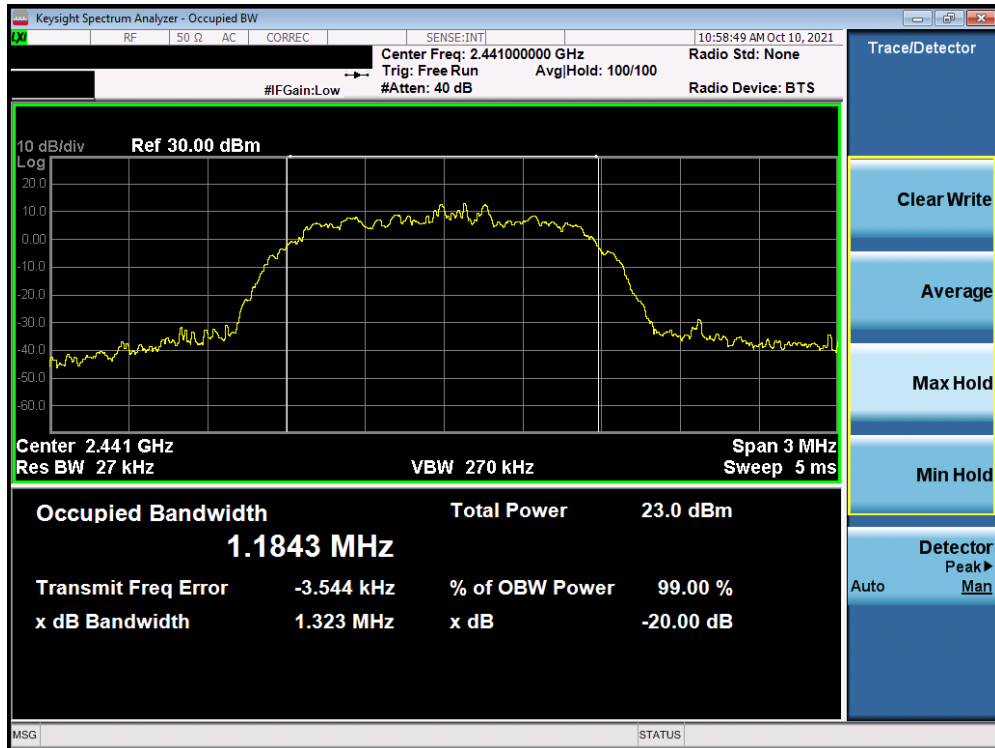


Plot 7-12. Conducted 20dB Plot (Bluetooth, 1Mbps- Ch. 78) Antenna 2

FCC ID: A3LSMS908JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset	Page 19 of 131	

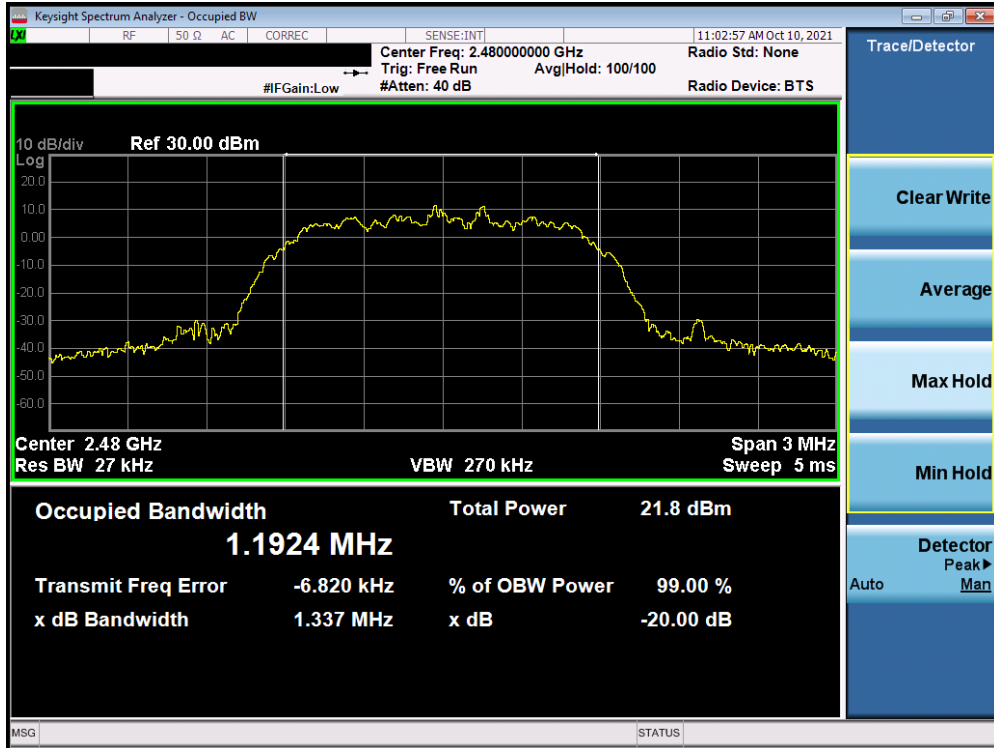


Plot 7-13. Conducted 20dB Plot (Bluetooth, 2Mbps- Ch. 0) Antenna 2

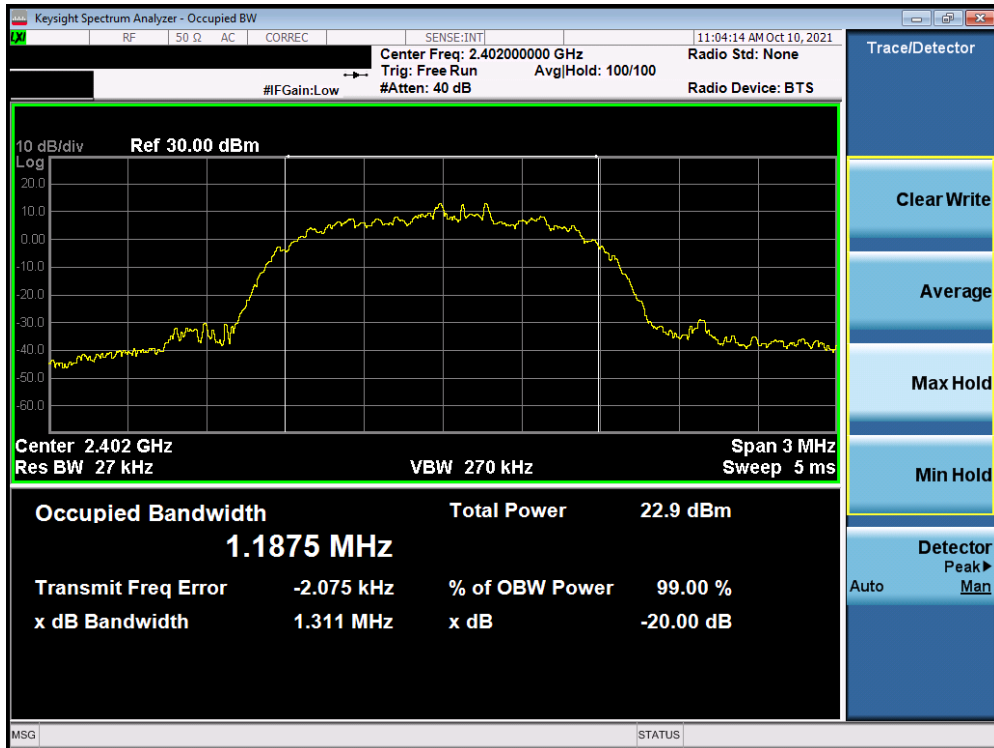


Plot 7-14. Conducted 20dB Plot (Bluetooth, 2Mbps - Ch. 39) Antenna 2

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 20 of 131

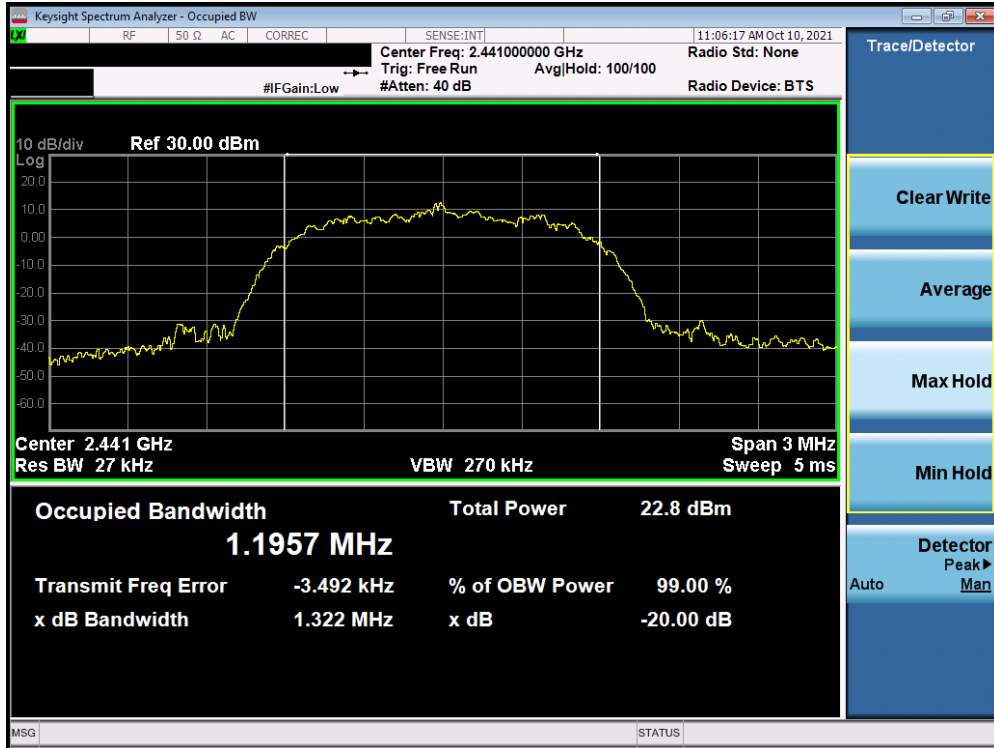


Plot 7-15. Conducted 20dB Plot (Bluetooth, 2Mbps – Ch. 78) Antenna 2

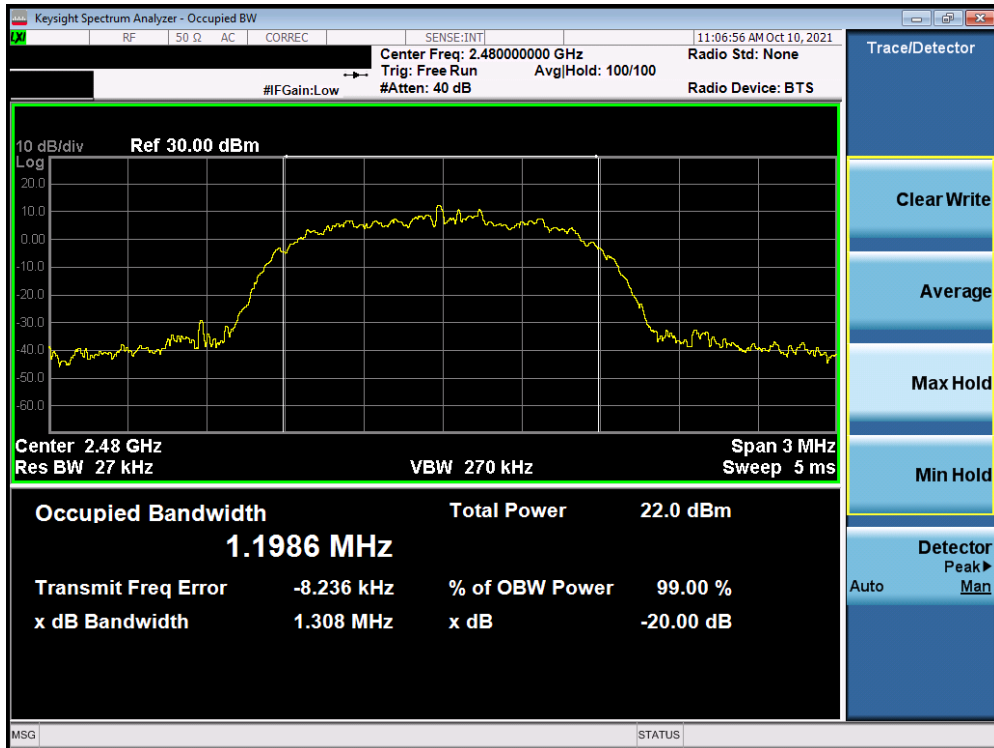


Plot 7-16. Conducted 20dB Plot (Bluetooth, 3Mbps– Ch. 0) Antenna 2

FCC ID: A3LSMS908JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset	Page 21 of 131	



Plot 7-17. Conducted 20dB Plot (Bluetooth, 3Mbps – Ch. 39) Antenna 2



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

FCC ID: A3LSMS908JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset	Page 22 of 131	

7.3 Output Power Measurement

§15.247 (b.1); RSS-247 [5.4(b)]

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 14.2 Measure-and-Sum Technique

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 for Peak and Average Power Measurement

Note

This unit was tested with all possible data rates and the highest peak power is reported with the unit transmitting at 3Mbps. Final results were obtained using calibrated couplers, attenuators and cables. The following formula was used:

$$\text{Output Power (dBm)} = \text{Raw Analyzer Level (dBm)} + \text{Cable Loss (dB)} + \text{Loss in Directional Coupler/Insertion Loss (dB)}$$

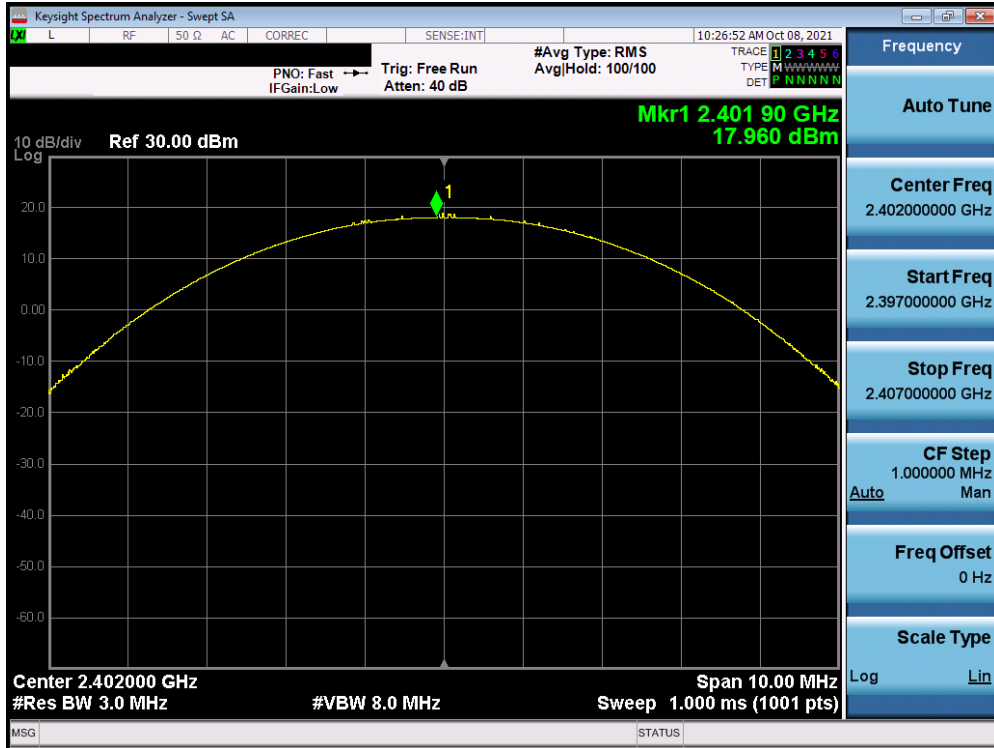
FCC ID: A3LSMS908JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 23 of 131

Antenna 1

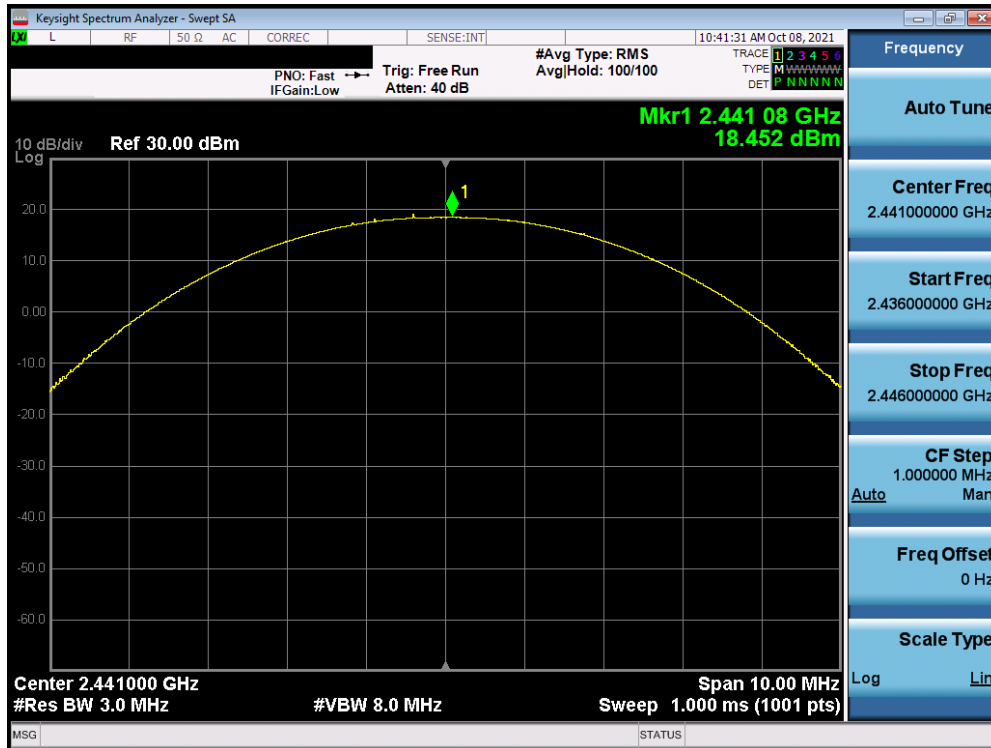
Frequency [MHz]	Data Rate [Mbps]	Modulation	Power Scheme	Channel No.	Peak Conducted Power		Avg Conducted Power	
					[dBm]	[mW]	[dBm]	[mW]
2402	1.0	GFSK	ePA	0	17.96	62.517	17.11	51.428
2441	1.0	GFSK	ePA	39	18.45	70.016	17.47	55.898
2480	1.0	GFSK	ePA	78	17.70	58.817	16.73	47.130
2402	1.0	GFSK	iPA	0	13.42	21.953	12.13	16.334
2441	1.0	GFSK	iPA	39	13.79	23.955	12.63	18.302
2480	1.0	GFSK	iPA	78	12.96	19.774	12.17	16.497
2402	2.0	$\pi/4$ -DQPSK	ePA	0	21.70	148.013	18.00	63.023
2441	2.0	$\pi/4$ -DQPSK	ePA	39	20.87	122.039	17.73	59.252
2480	2.0	$\pi/4$ -DQPSK	ePA	78	19.65	92.321	17.14	51.785
2402	2.0	$\pi/4$ -DQPSK	iPA	0	12.22	16.680	9.49	8.883
2441	2.0	$\pi/4$ -DQPSK	iPA	39	12.60	18.214	9.75	9.446
2480	2.0	$\pi/4$ -DQPSK	iPA	78	11.52	14.204	9.16	8.248
2402	3.0	8DPSK	ePA	0	22.11	162.480	17.81	60.353
2441	3.0	8DPSK	ePA	39	21.15	130.377	17.69	58.749
2480	3.0	8DPSK	ePA	78	20.34	108.218	17.15	51.904
2402	3.0	8DPSK	iPA	0	12.48	17.701	9.49	8.883
2441	3.0	8DPSK	iPA	39	12.87	19.369	9.86	9.676
2480	3.0	8DPSK	iPA	78	11.78	15.080	9.00	7.946

Table 7-4. Conducted Output Power Measurements Antenna 1

FCC ID: A3LSMS908JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset	Page 24 of 131	

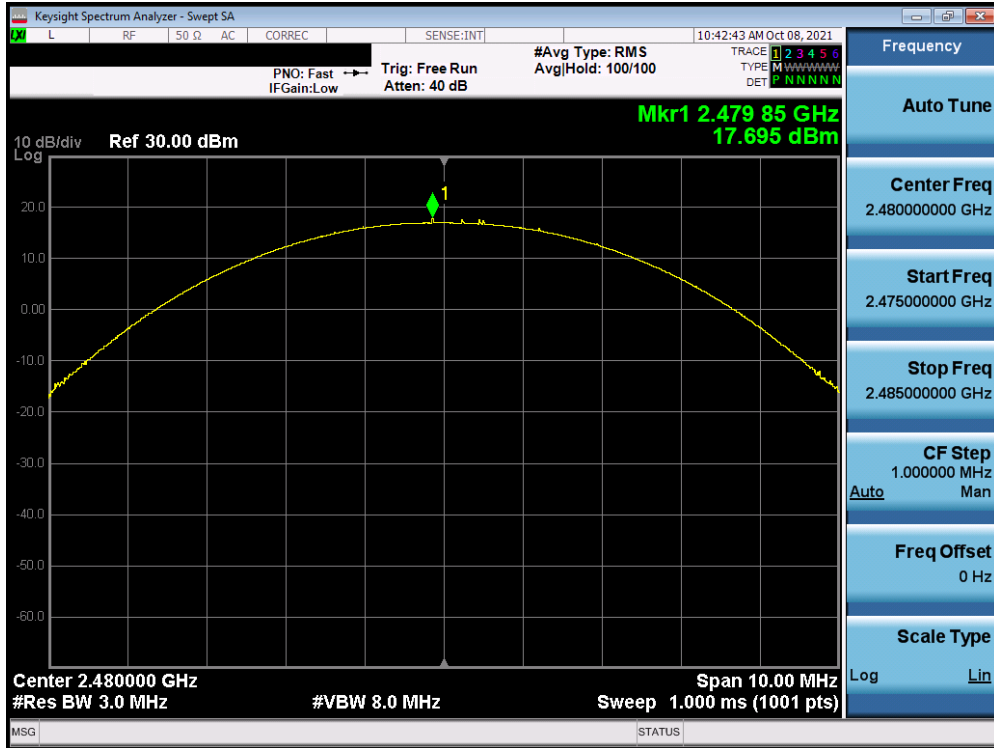


Plot 7-19. Peak Conducted Power (1Mbps – Ch. 0) Antenna 1 ePA

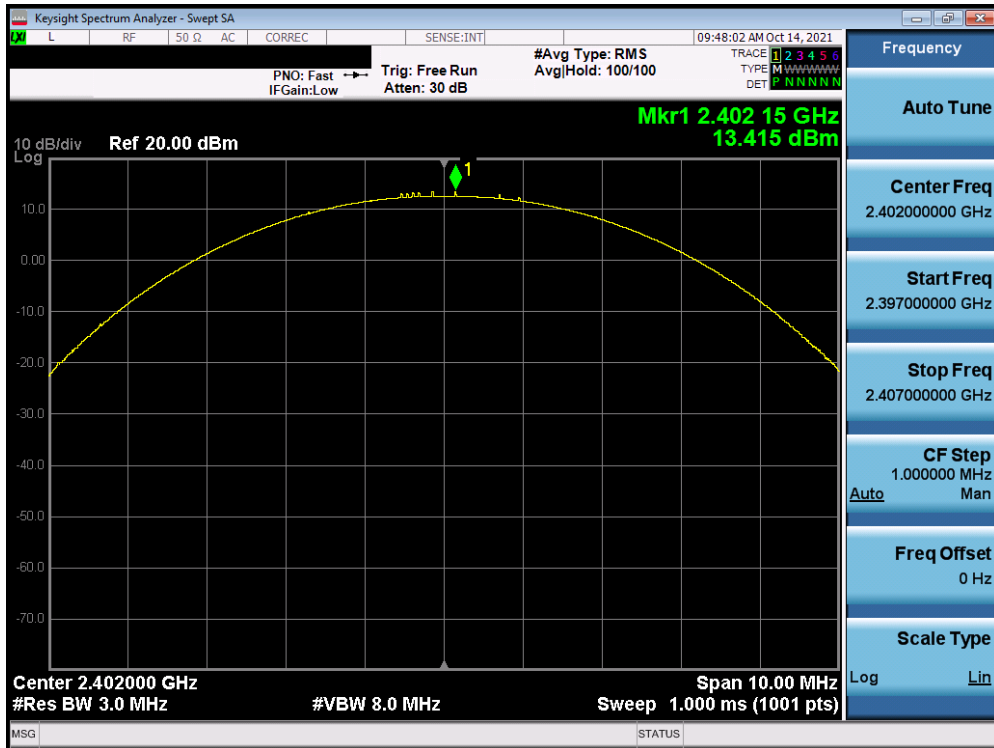


Plot 7-20. Peak Conducted Power (1Mbps – Ch. 39) Antenna 1 ePA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 25 of 131

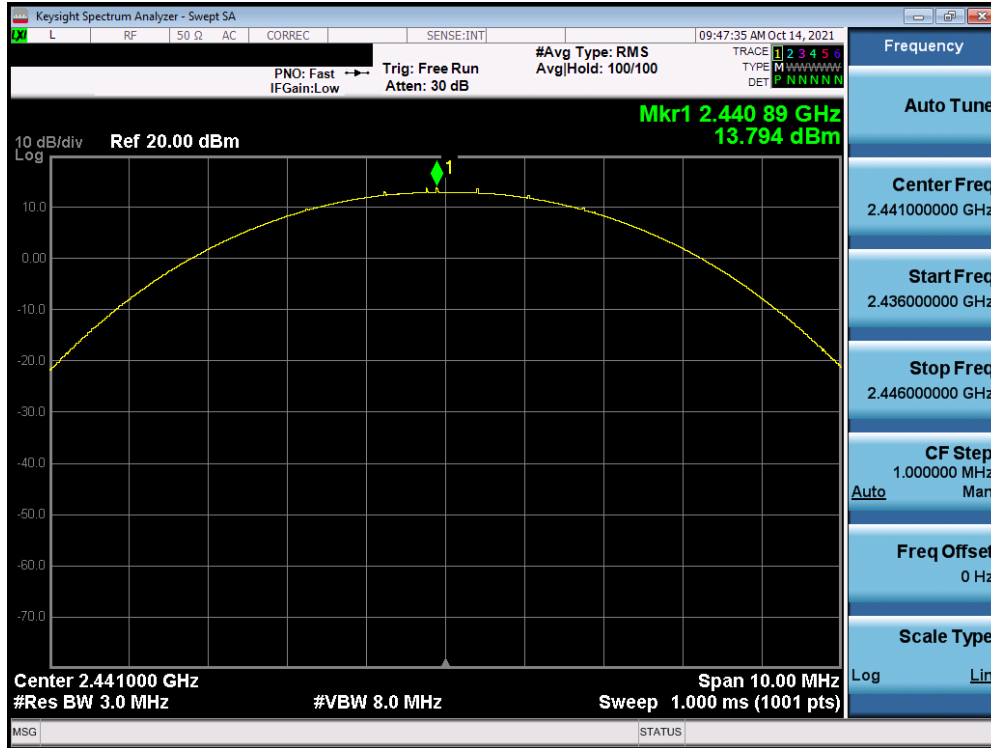


Plot 7-21. Peak Conducted Power (1Mbps – Ch. 78) Antenna 1 ePA

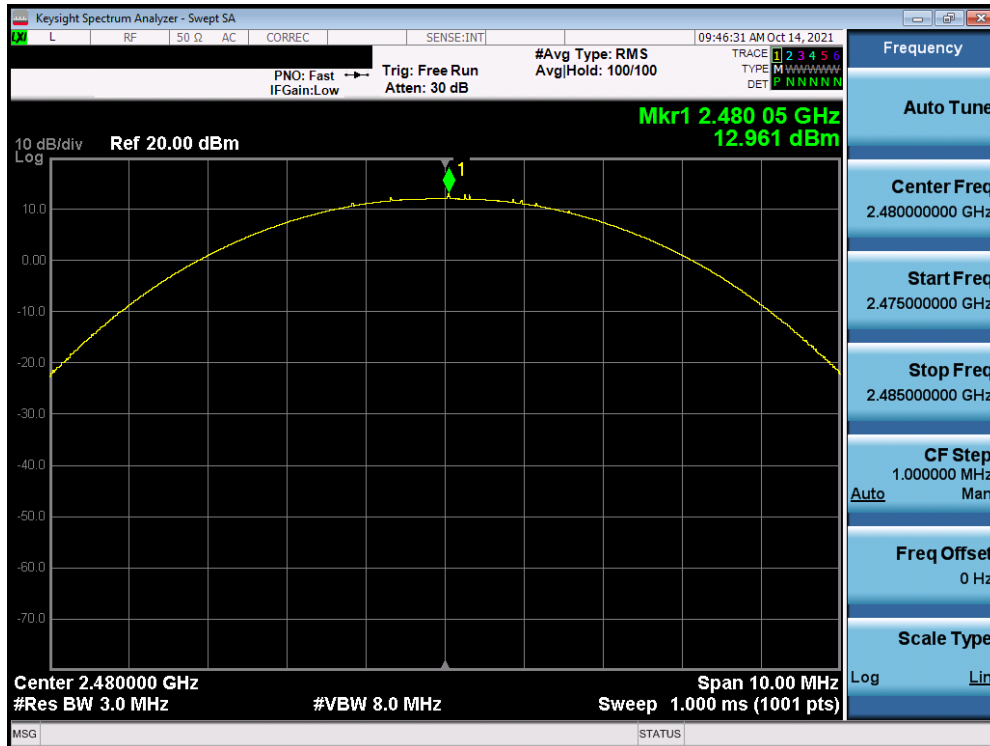


Plot 7-22. Peak Conducted Power (1Mbps – Ch. 0) Antenna 1 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 26 of 131

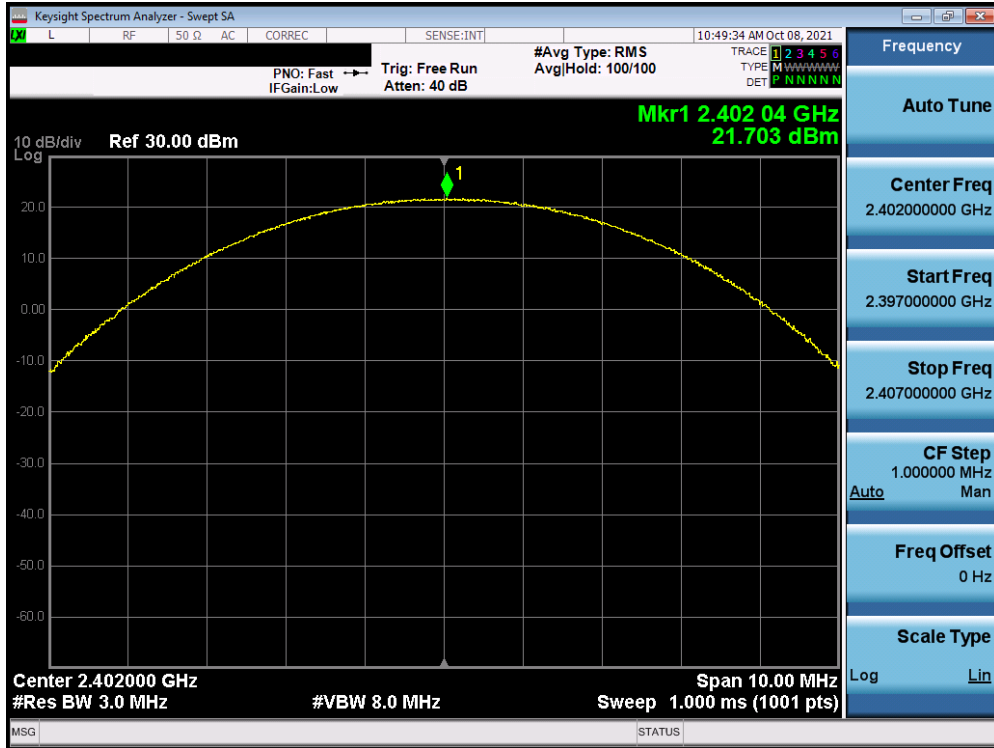


Plot 7-23. Peak Conducted Power (1Mbps – Ch. 39) Antenna 1 iPA

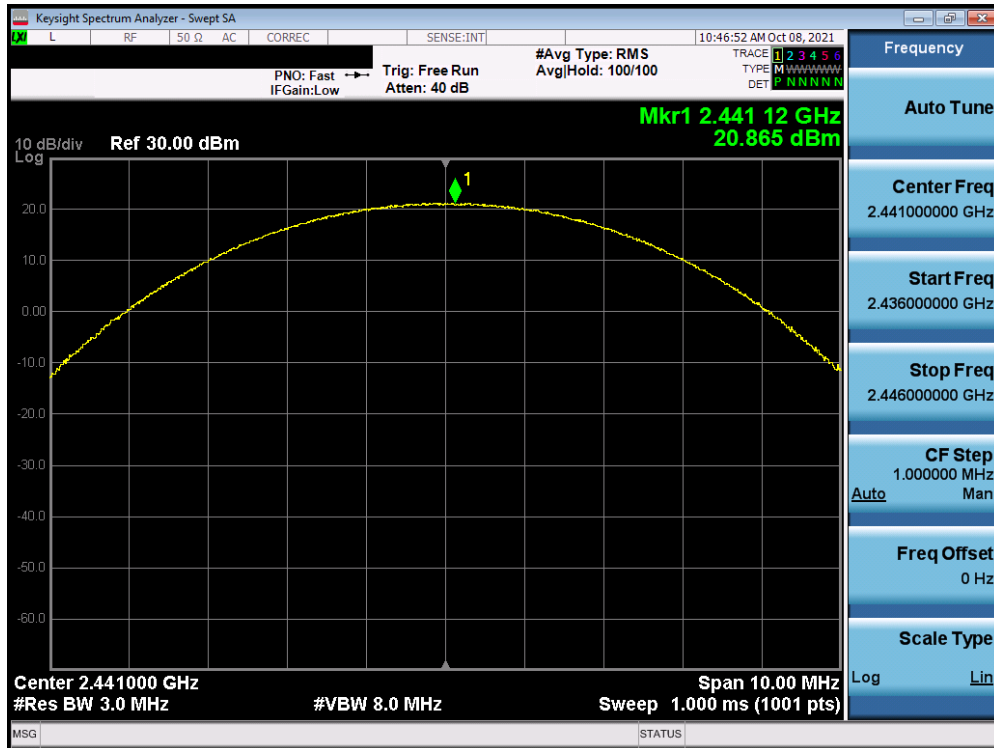


Plot 7-24. Peak Conducted Power (1Mbps – Ch. 78) Antenna 1 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 27 of 131

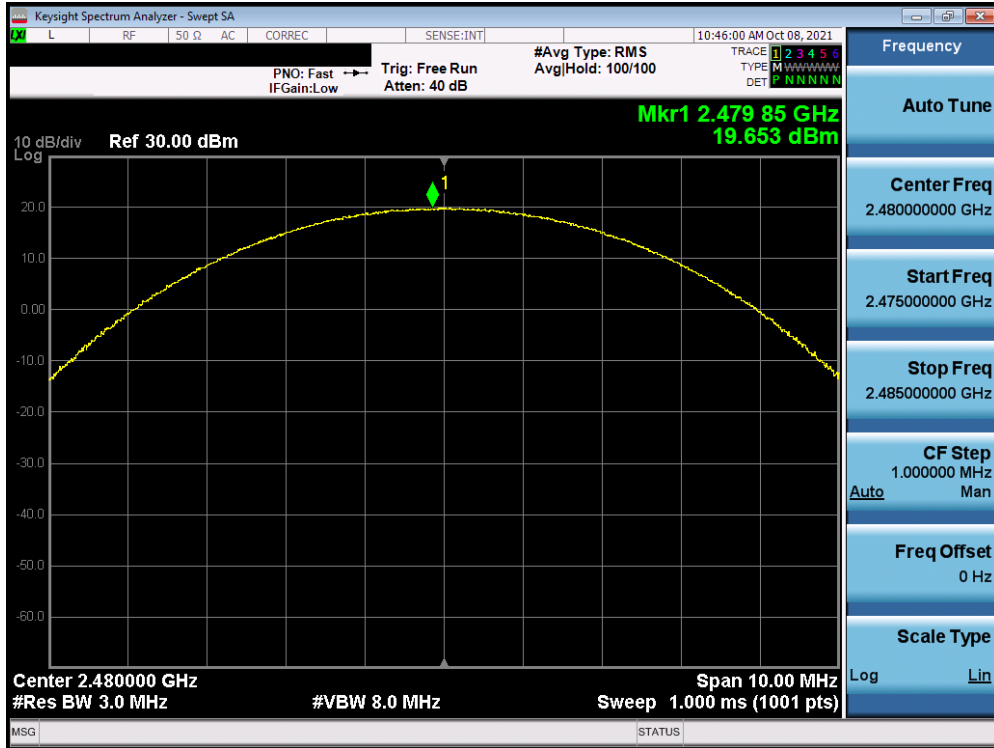


Plot 7-25. Peak Conducted Power (2Mbps – Ch. 0) Antenna 1 ePA

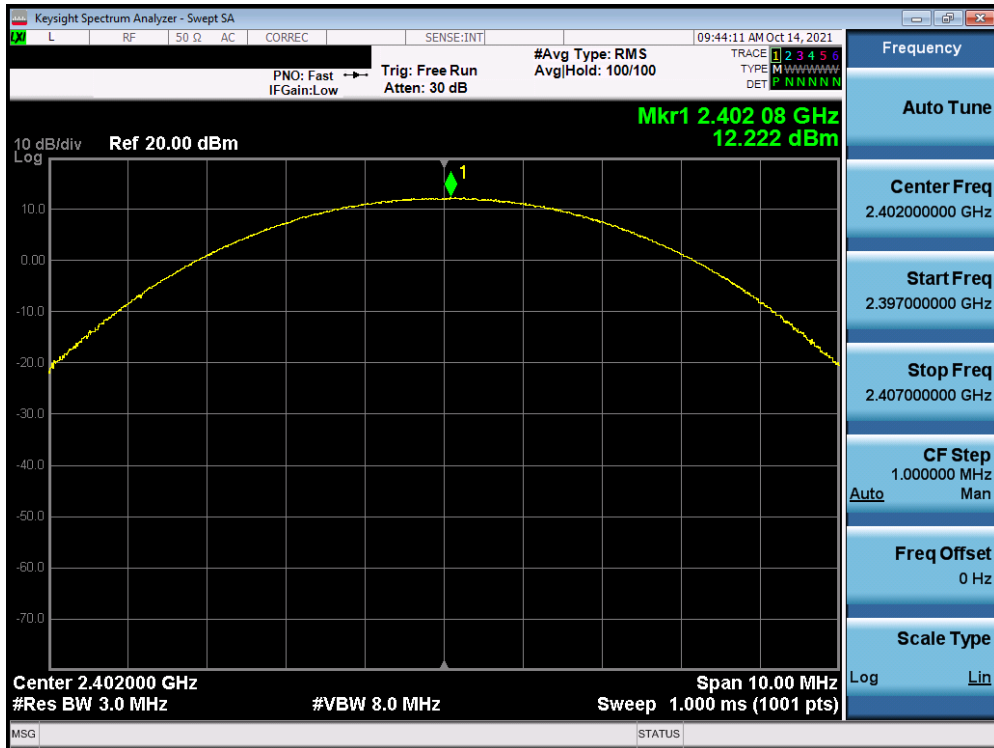


Plot 7-26. Peak Conducted Power (2Mbps – Ch. 39) Antenna 1 ePA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 28 of 131

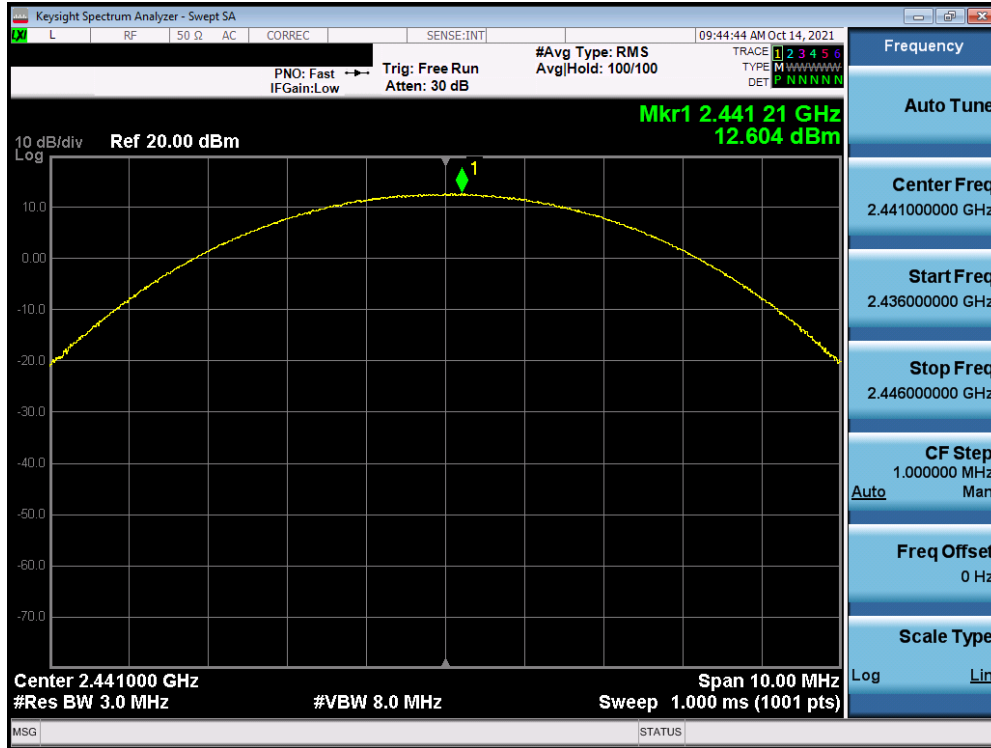


Plot 7-27. Peak Conducted Power (2Mbps – Ch. 78) Antenna 1ePA

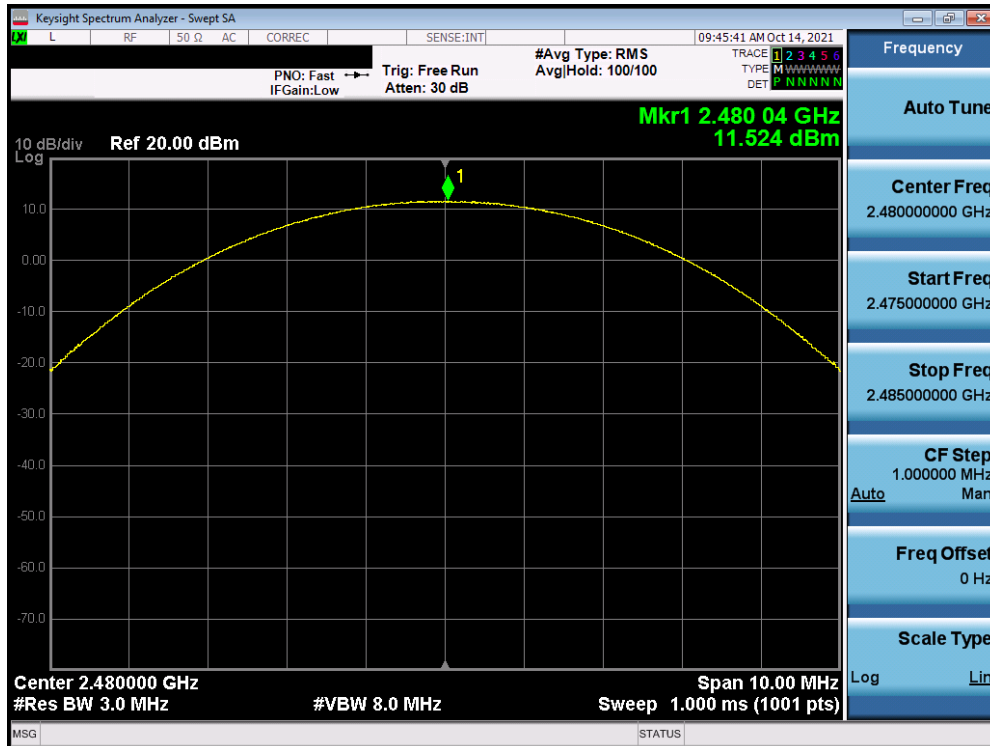


Plot 7-28. Peak Conducted Power (2Mbps – Ch. 0) Antenna 1 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 29 of 131

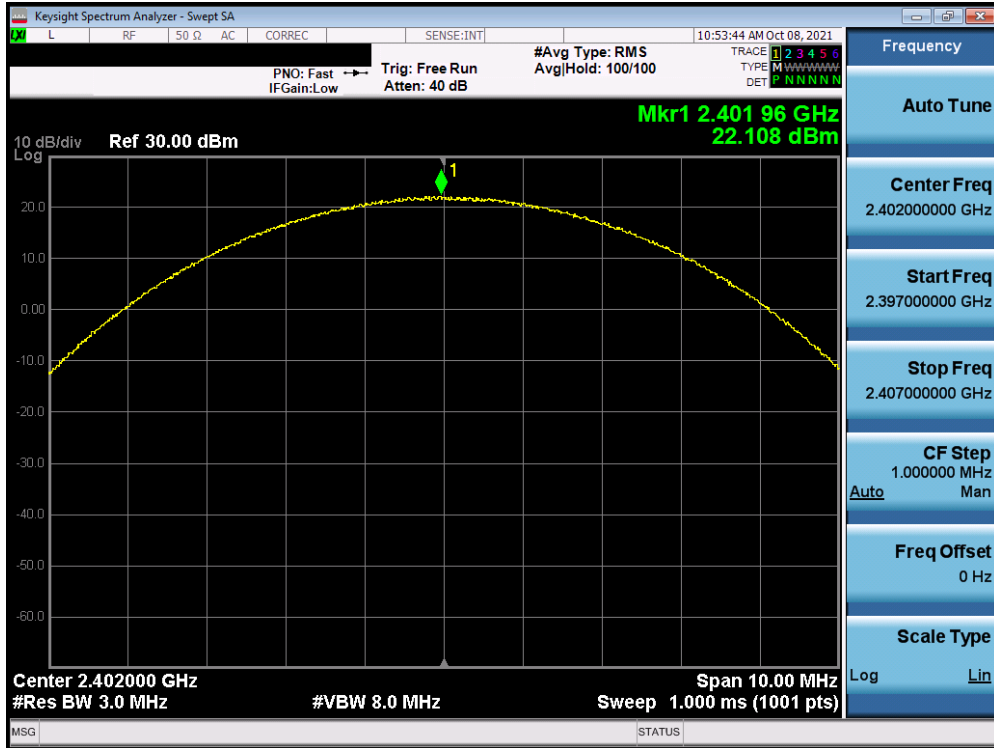


Plot 7-29. Peak Conducted Power (2Mbps – Ch. 39) Antenna 1 iPA

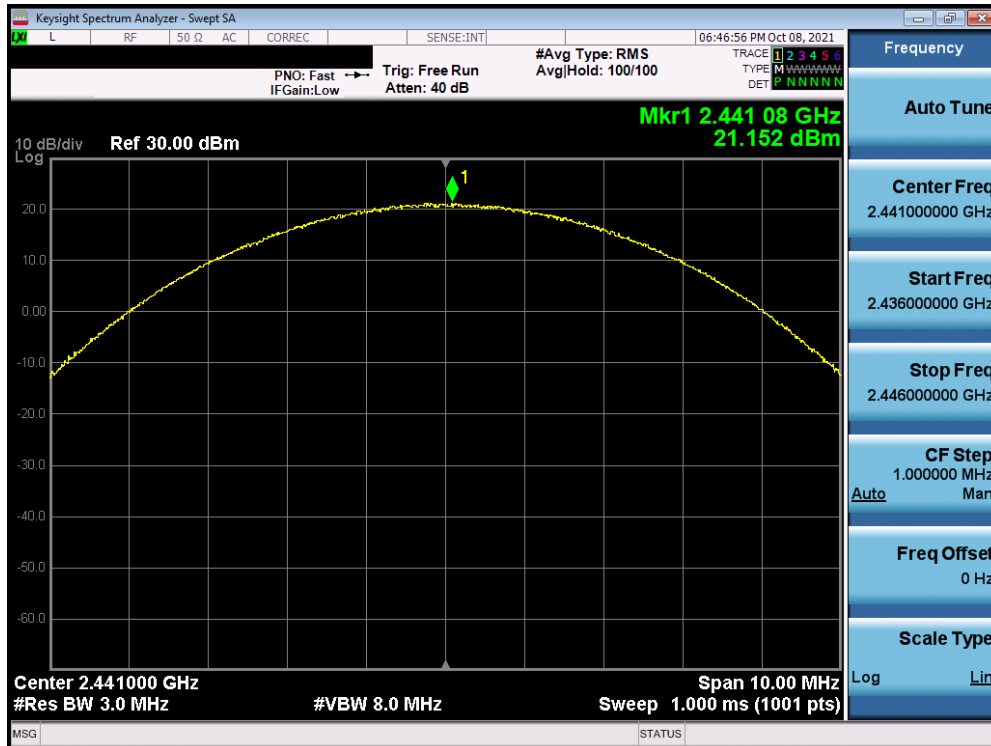


Plot 7-30. Peak Conducted Power (2Mbps – Ch. 78) Antenna 1 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 30 of 131

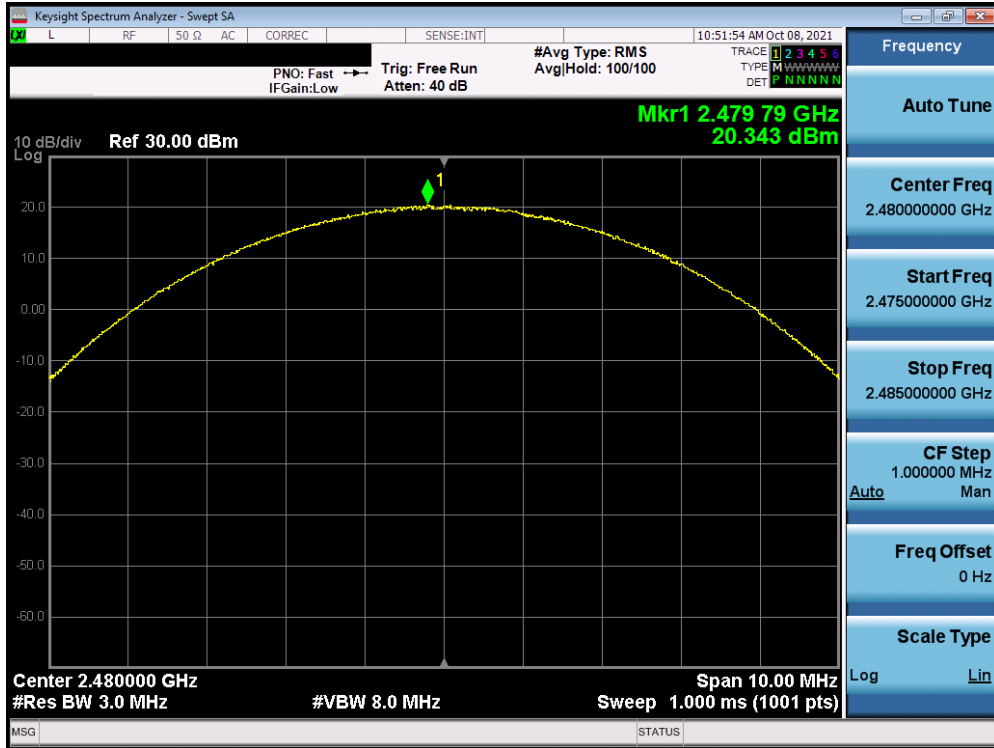


Plot 7-31. Peak Conducted Power (3Mbps – Ch. 0) Antenna 1 ePA

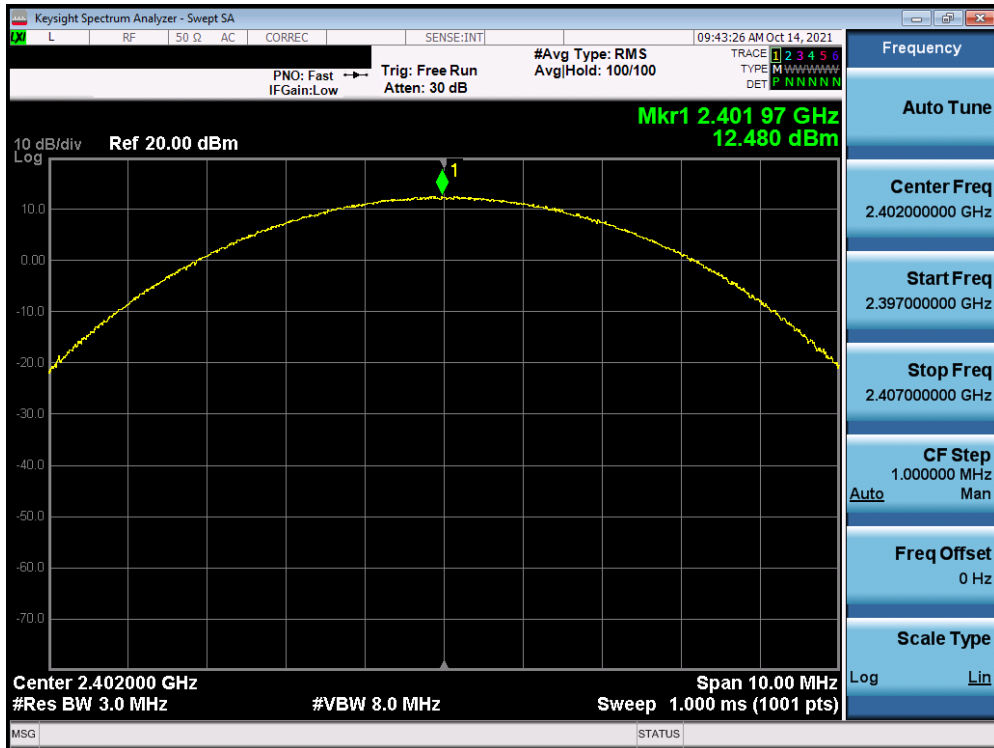


Plot 7-32. Peak Conducted Power 32Mbps – Ch. 39) Antenna 1 ePA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 31 of 131

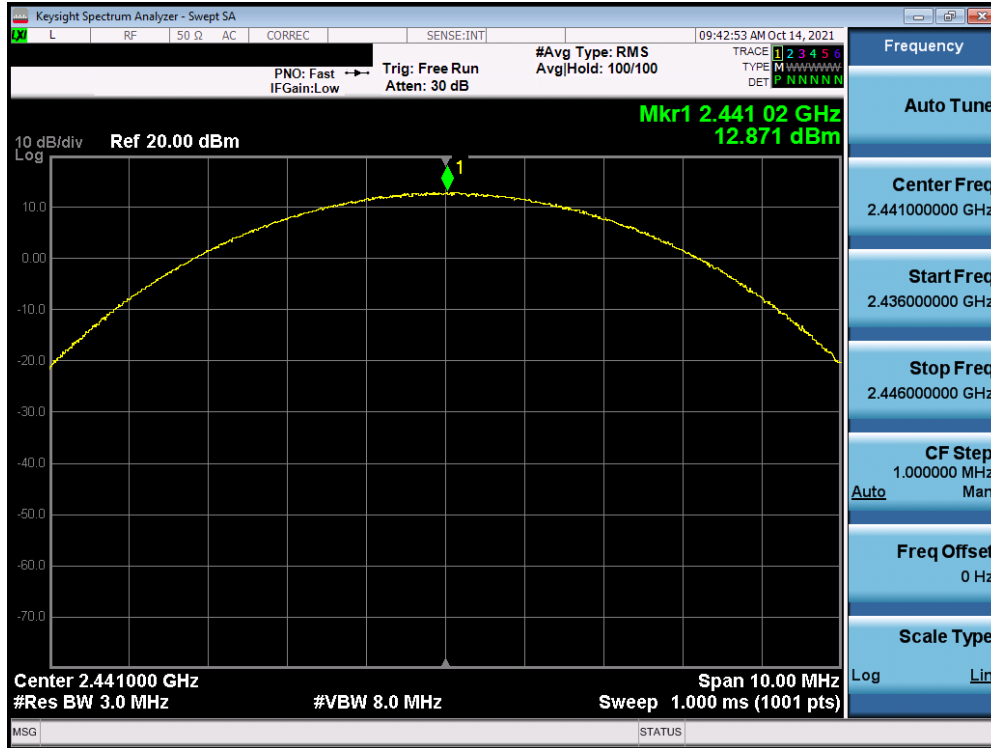


Plot 7-33. Peak Conducted Power (3Mbps – Ch. 78) Antenna 1 ePA

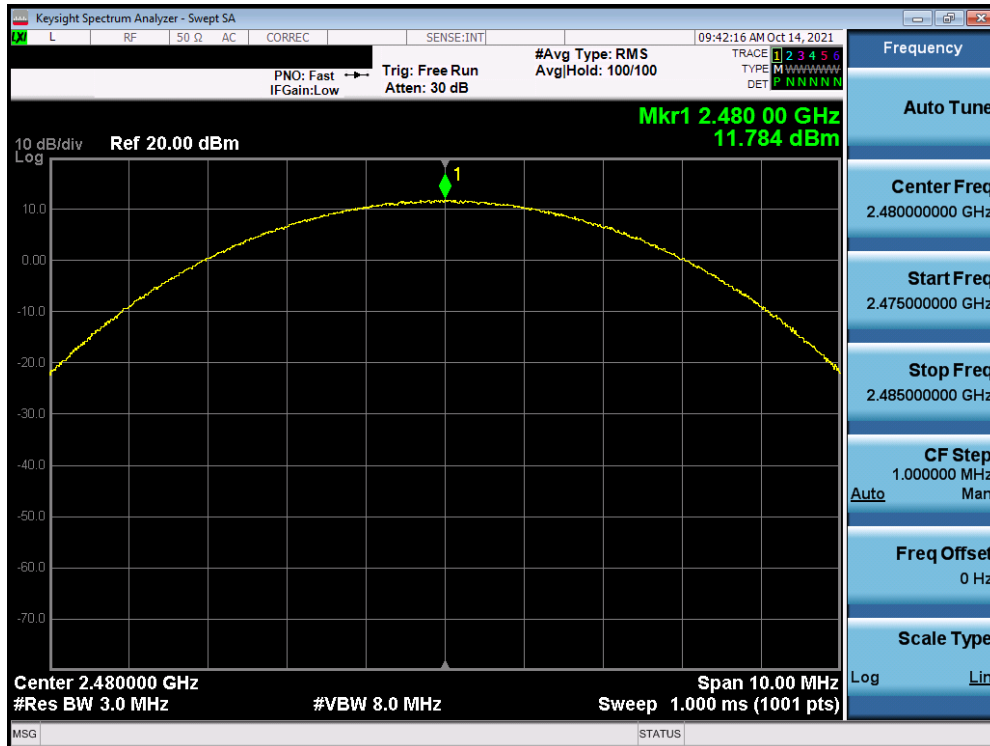


Plot 7-34. Peak Conducted Power (3Mbps – Ch. 0) Antenna 1 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 32 of 131

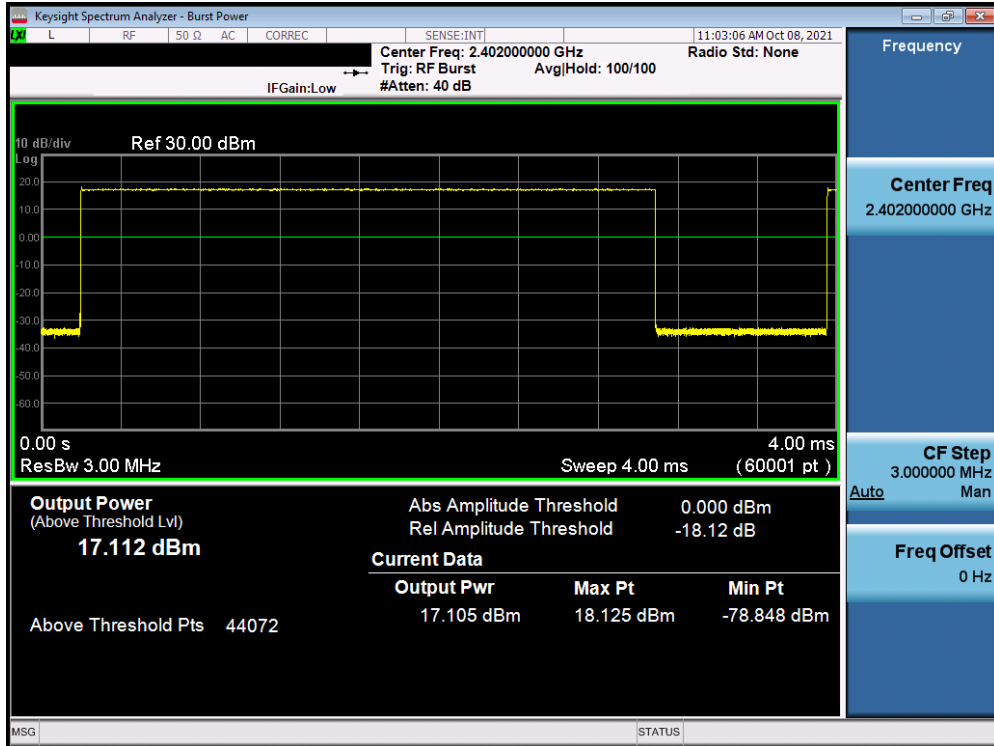


Plot 7-35. Peak Conducted Power (3Mbps – Ch. 39) Antenna 1 iPA

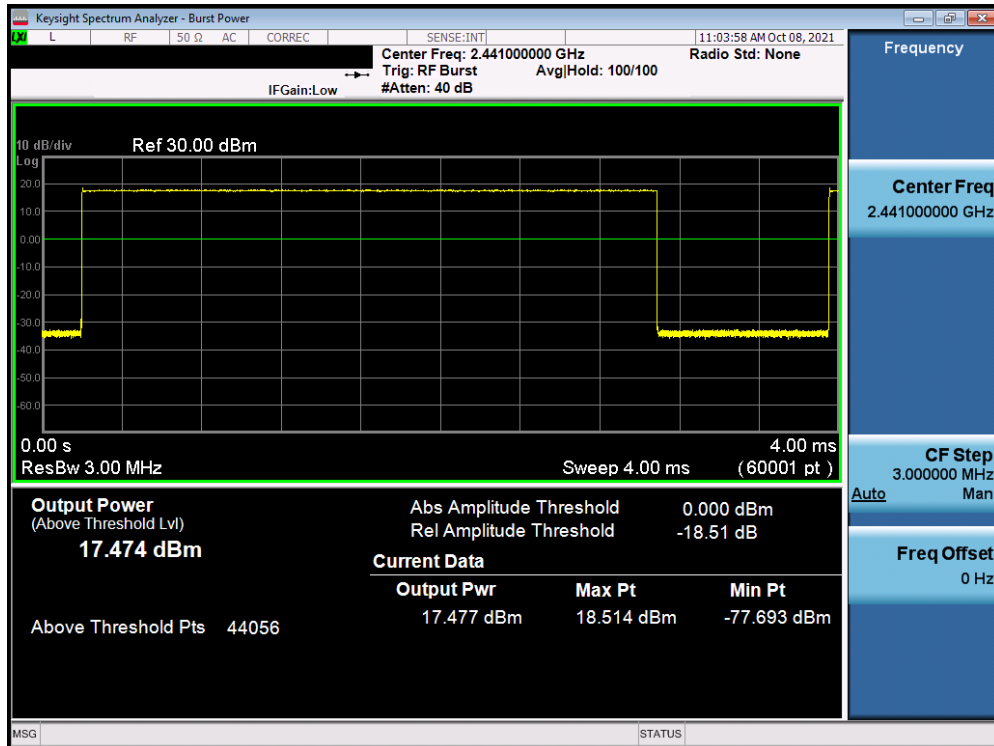


Plot 7-36. Peak Conducted Power (3Mbps – Ch. 78) Antenna 1 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 33 of 131

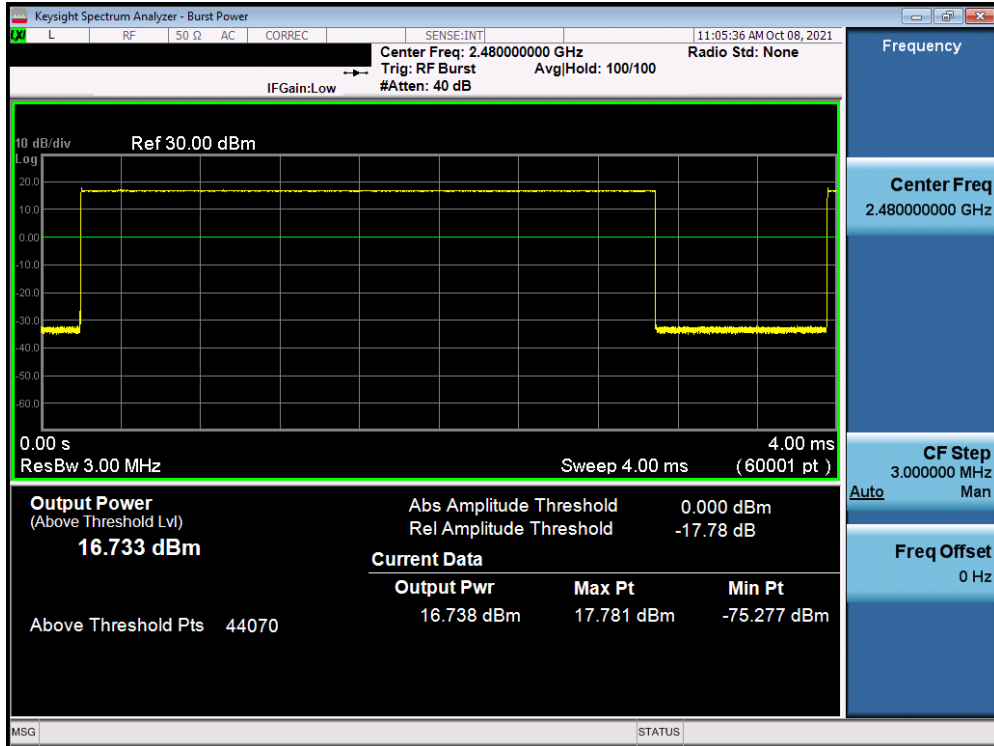


Plot 7-37. Average Conducted Power (1Mbps – Ch. 0) Antenna 1 ePA

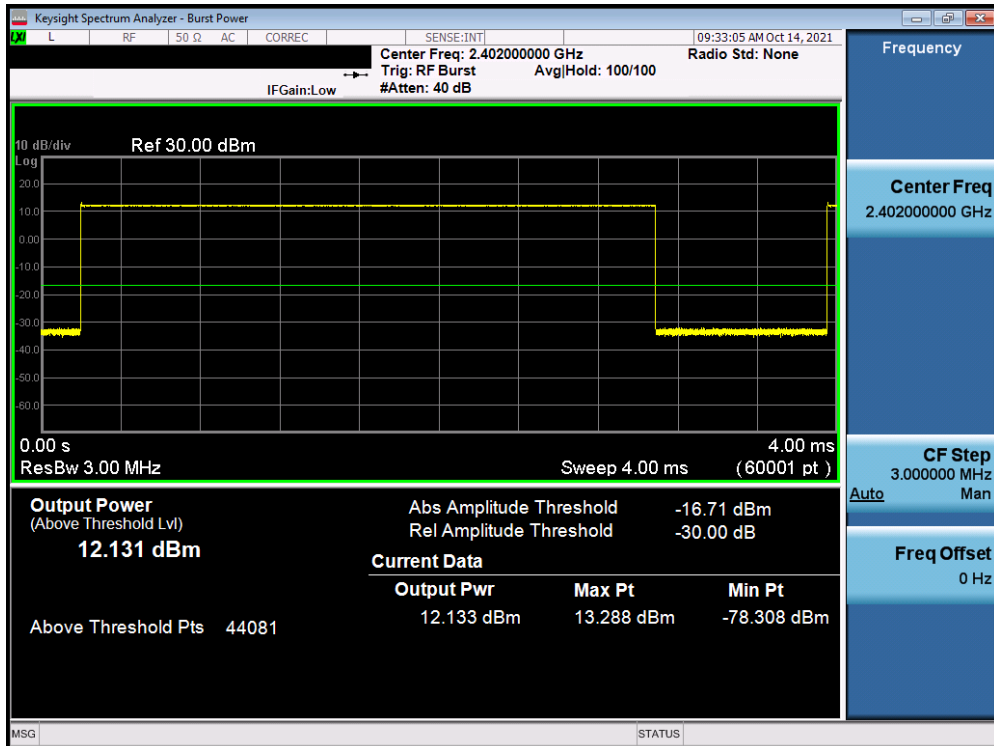


Plot 7-38. Average Conducted Power (1Mbps – Ch. 39) Antenna 1 ePA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 34 of 131

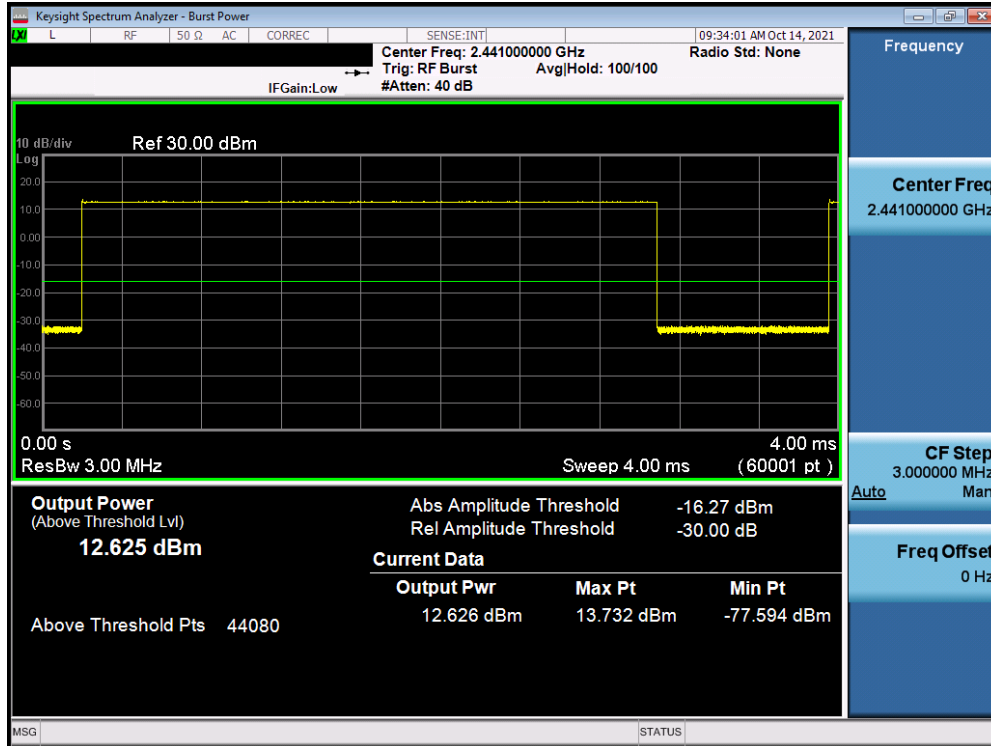


Plot 7-39. Average Conducted Power (1Mbps – Ch. 78) Antenna 1 ePA

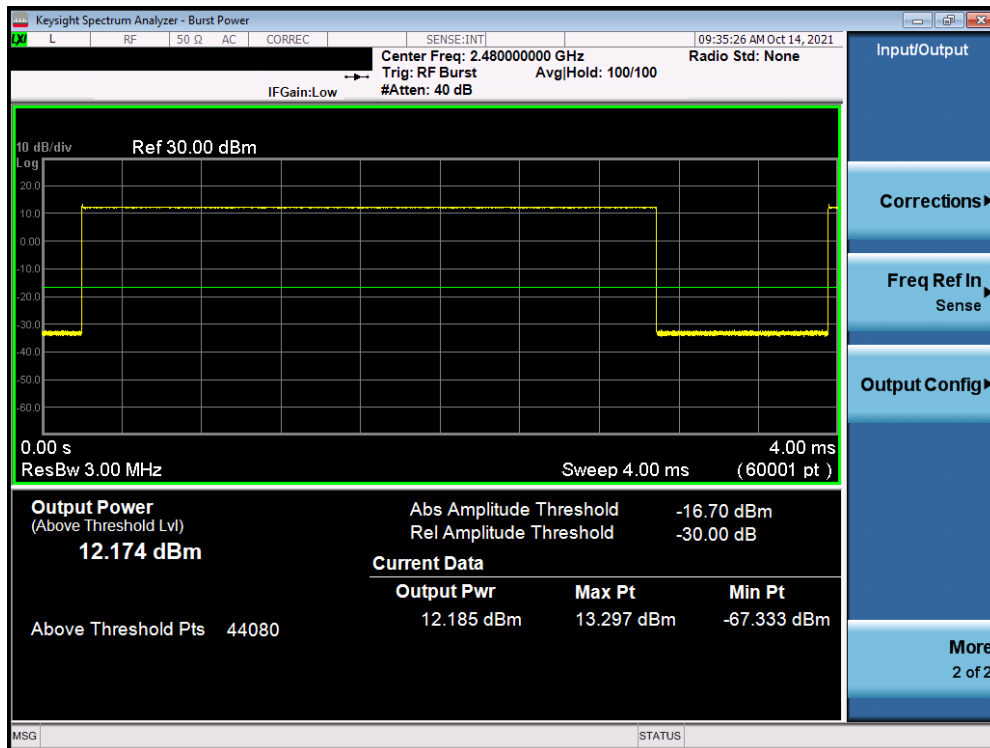


Plot 7-40. Average Conducted Power (1Mbps – Ch. 0) Antenna 1 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 35 of 131

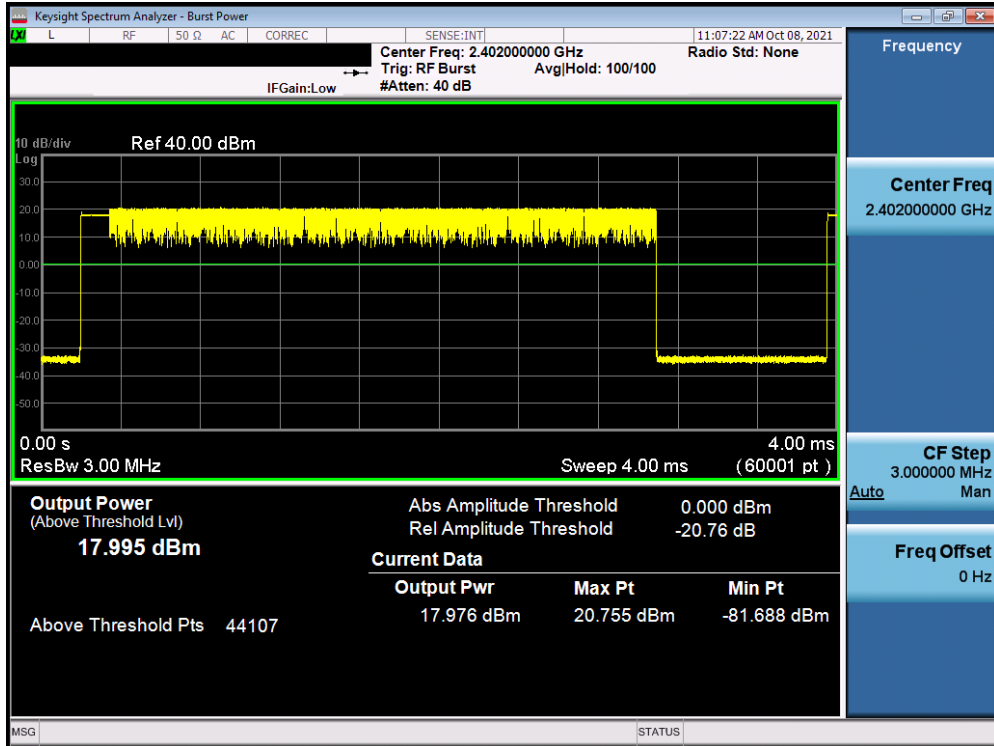


Plot 7-41. Average Conducted Power (1Mbps – Ch. 39) Antenna 1 iPA

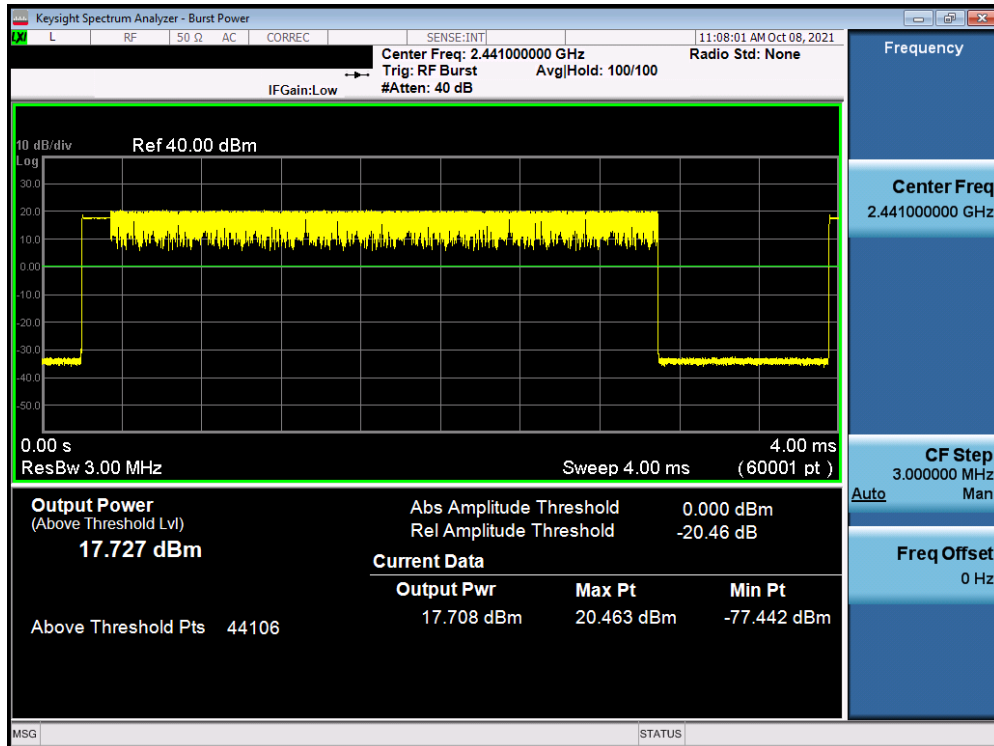


Plot 7-42. Average Conducted Power (1Mbps – Ch. 78) Antenna 1 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 36 of 131

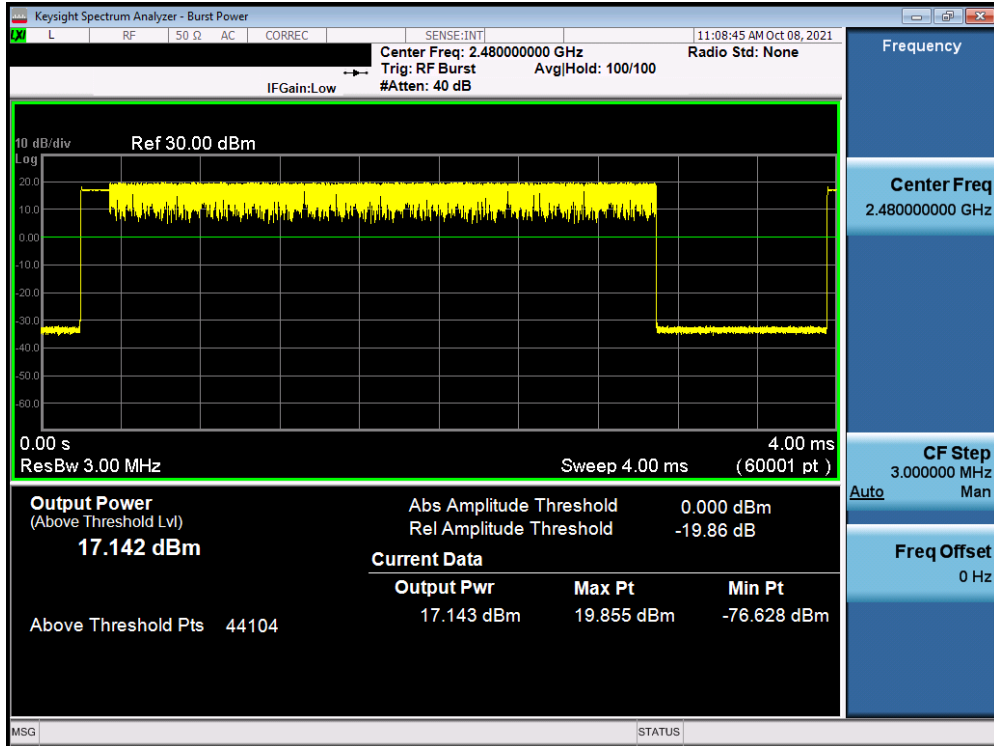


Plot 7-43. Average Conducted Power (2Mbps – Ch. 0) Antenna 1 ePA

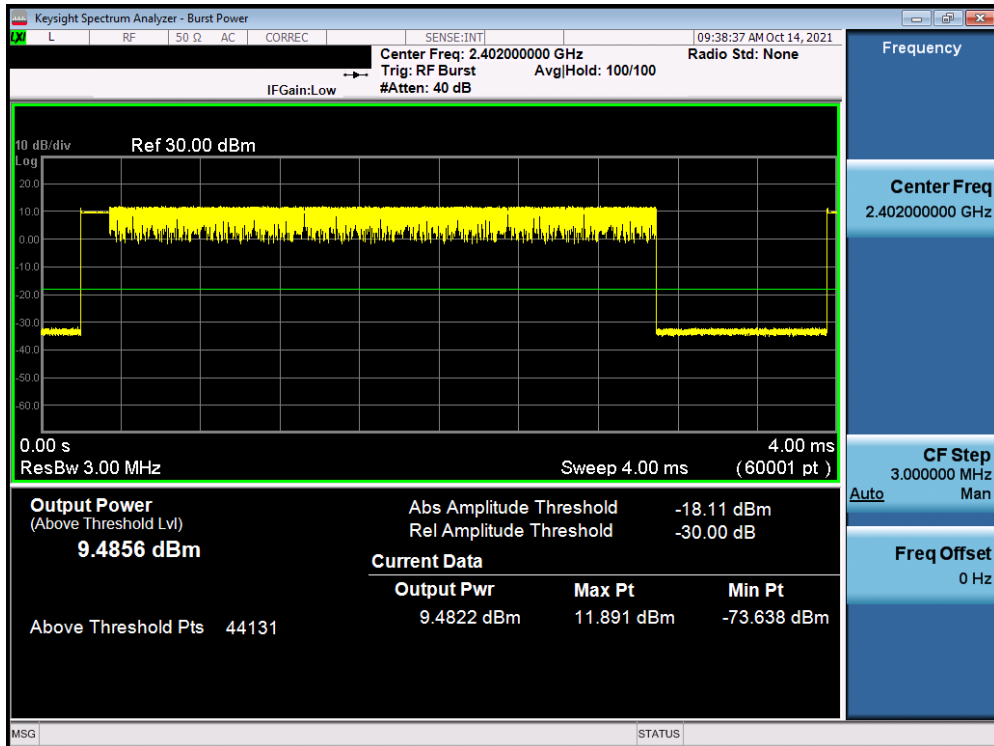


Plot 7-44. Average Conducted Power (2Mbps – Ch. 39) Antenna 1 ePA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 37 of 131

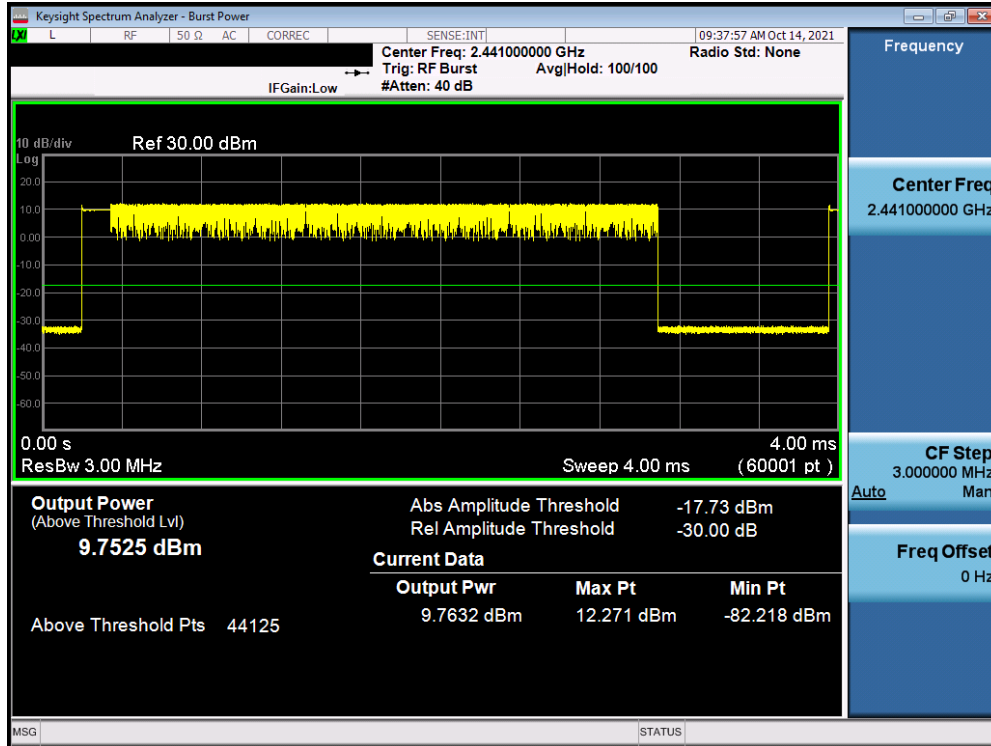


Plot 7-45. Average Conducted Power (2Mbps – Ch. 78) Antenna 1 ePA

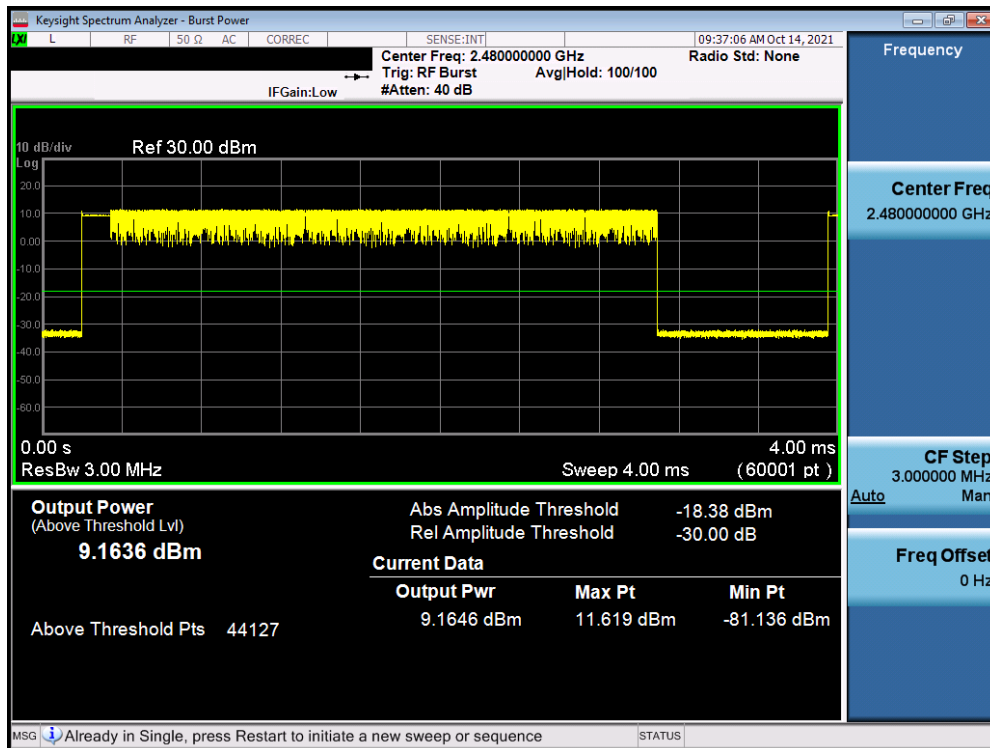


Plot 7-46. Average Conducted Power (2Mbps – Ch. 0) Antenna 1 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 38 of 131

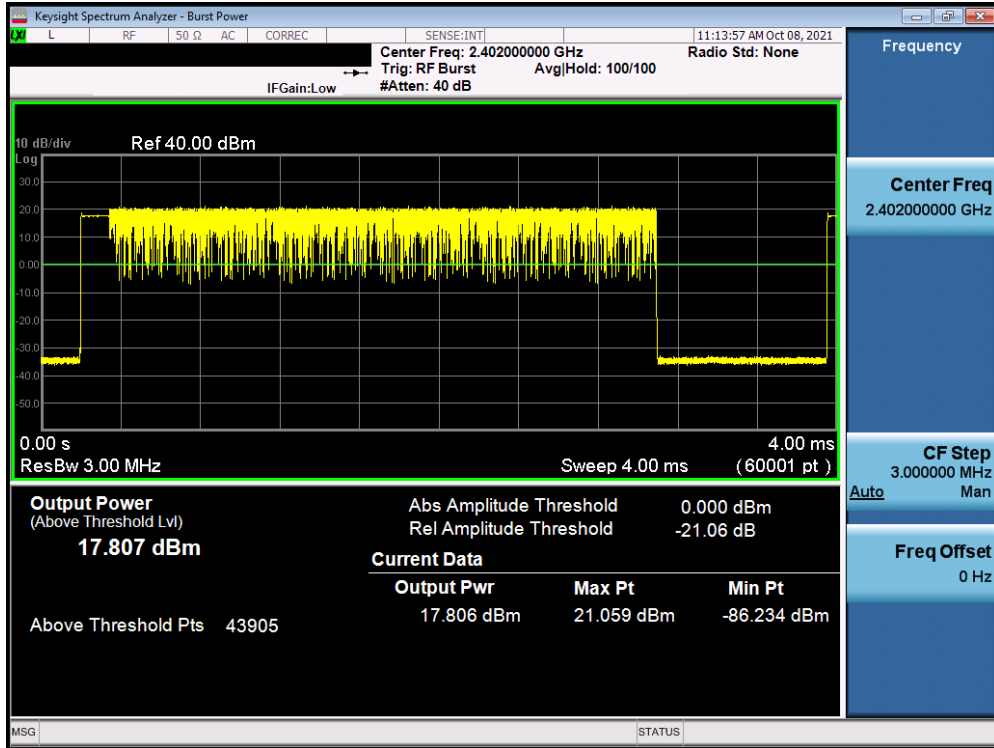


Plot 7-47. Average Conducted Power (2Mbps – Ch. 39) Antenna 1 iPA

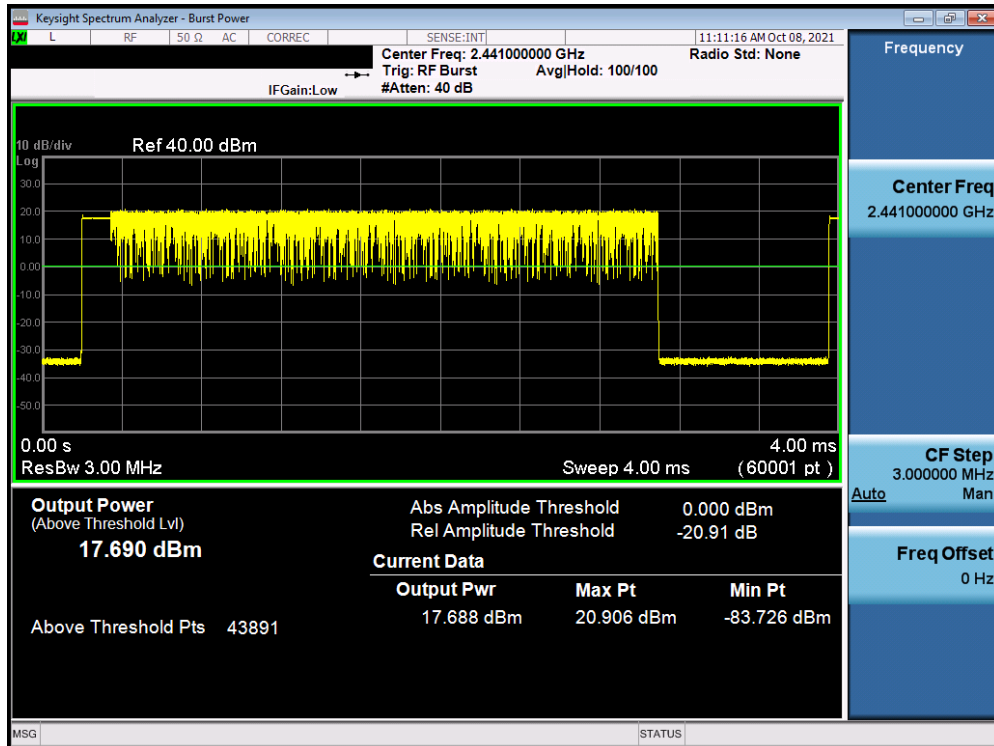


Plot 7-48. Average Conducted Power (2Mbps – Ch. 78) Antenna 1 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 39 of 131

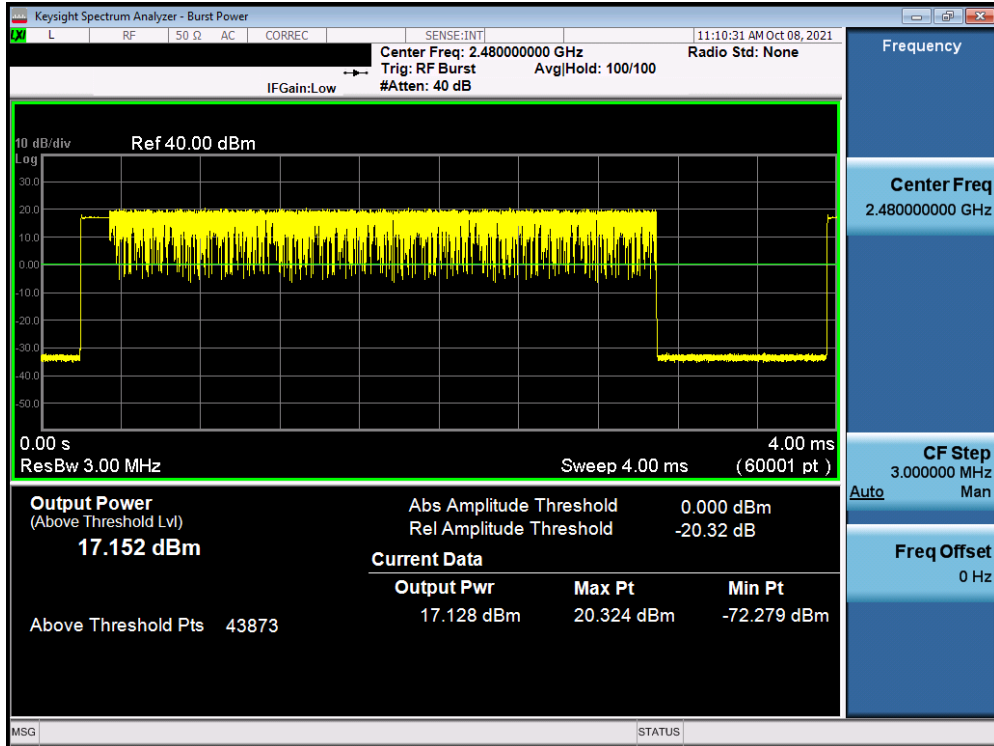


Plot 7-49. Average Conducted Power (3Mbps – Ch. 0) Antenna 1 ePA

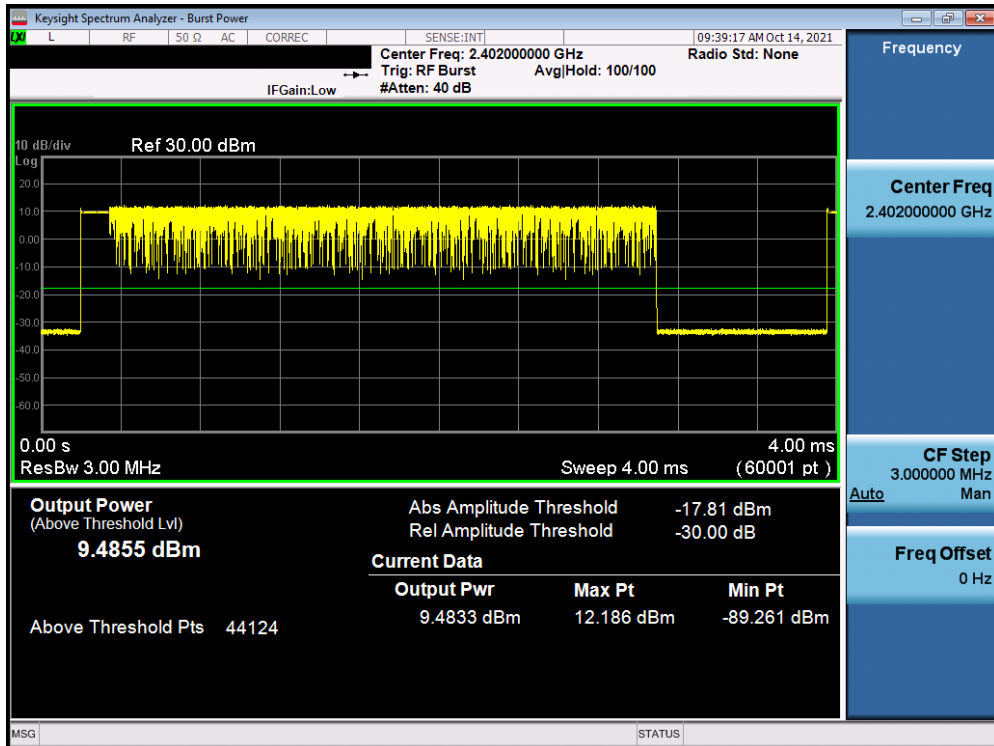


Plot 7-50. Average Conducted Power 32Mbps – Ch. 39) Antenna 1 ePA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 40 of 131

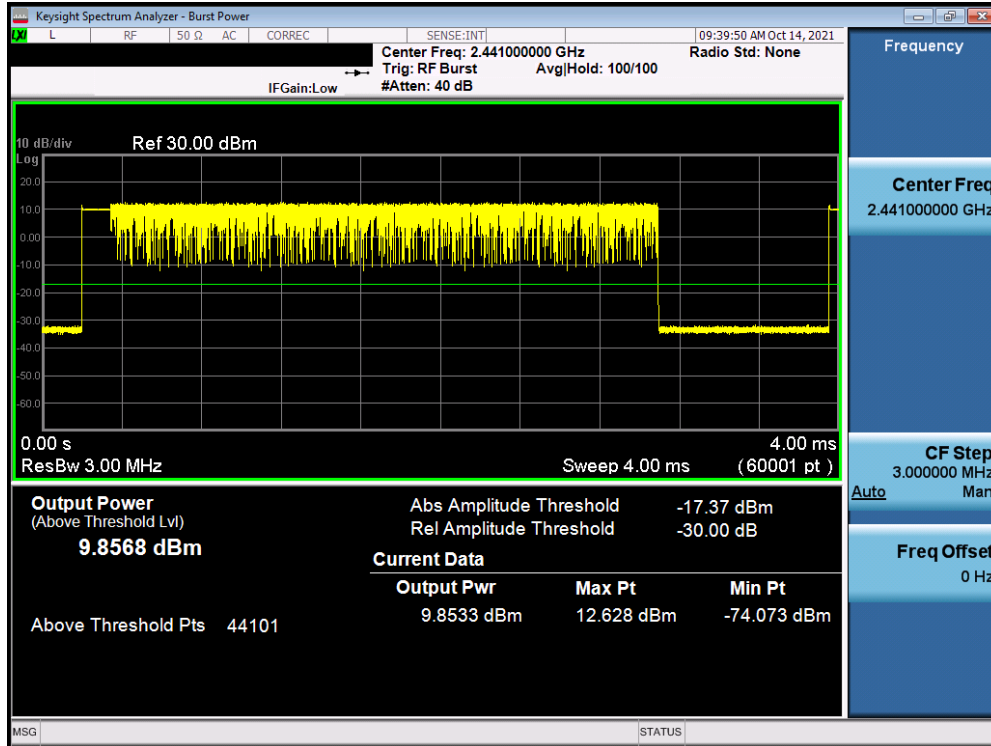


Plot 7-51. Average Conducted Power (3Mbps – Ch. 78) Antenna 1 ePA

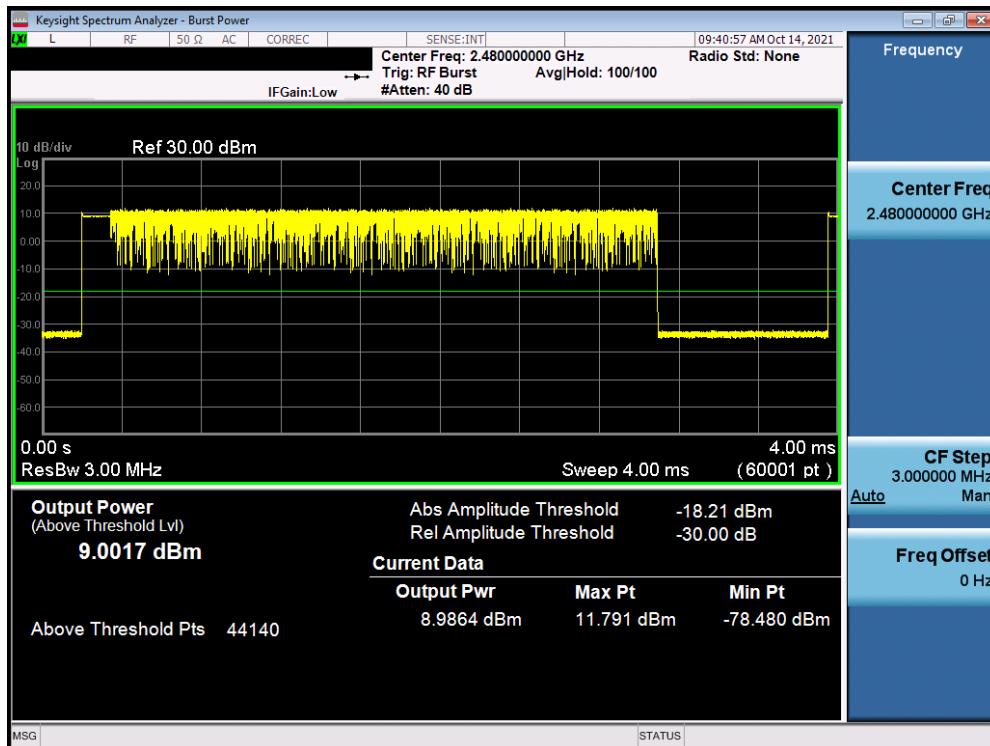


Plot 7-52. Average Conducted Power (3Mbps – Ch. 0) Antenna 1 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 41 of 131



Plot 7-53. Average Conducted Power (3Mbps – Ch. 39) Antenna 1 iPA



Plot 7-54. Average Conducted Power (3Mbps – Ch. 78) Antenna 1 iPA

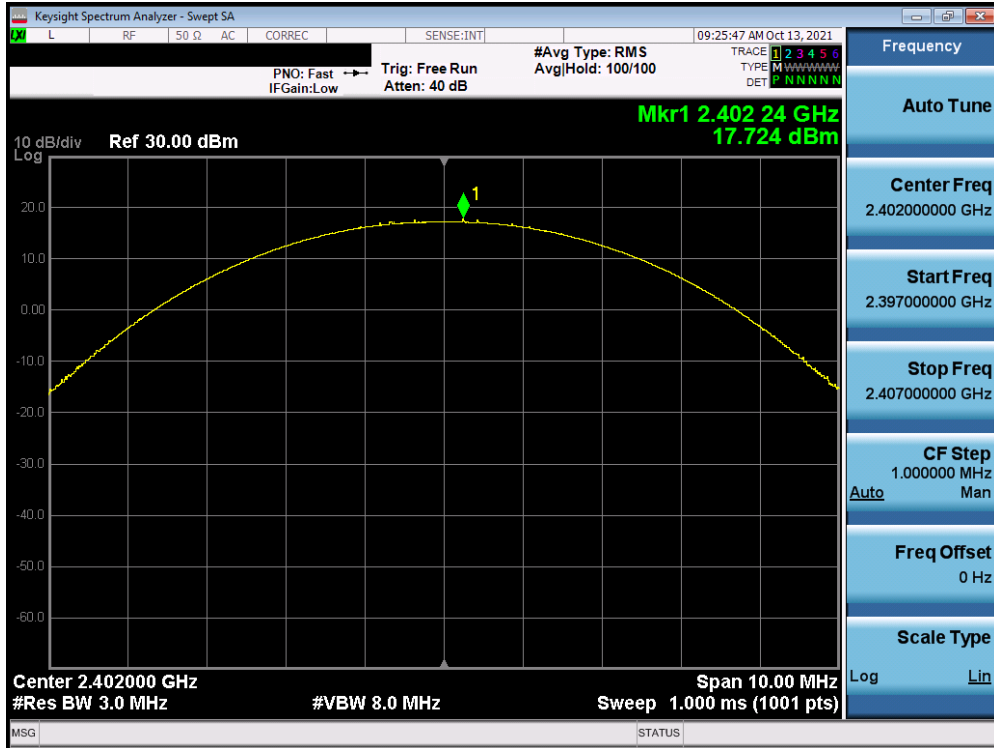
FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 42 of 131

Antenna 2

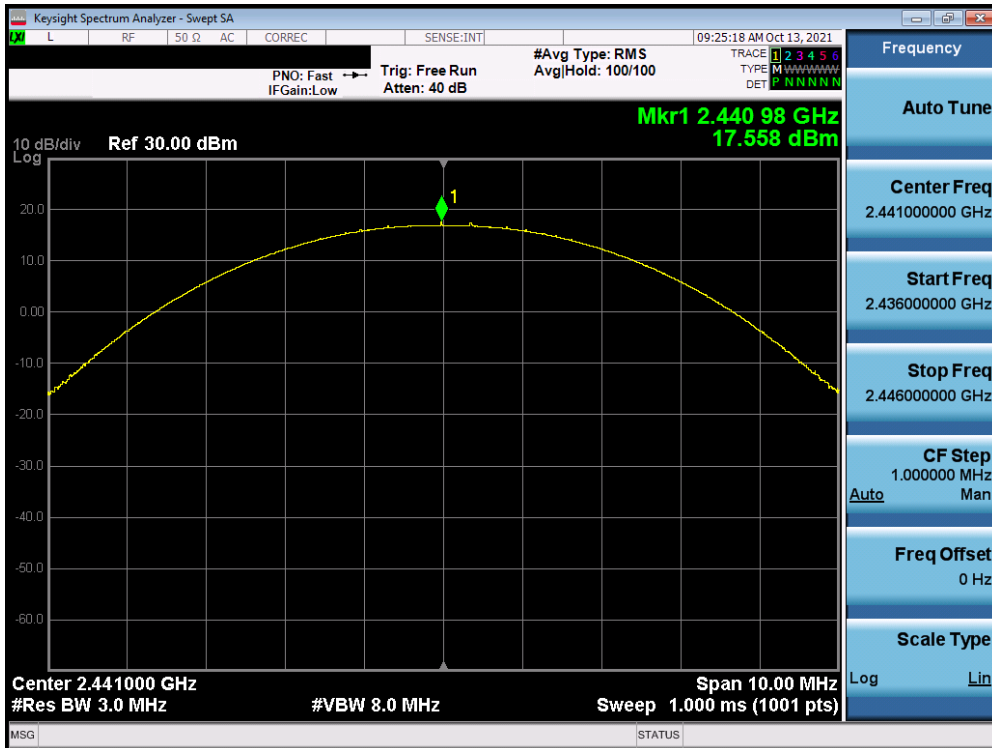
Frequency [MHz]	Data Rate [Mbps]	Modulation	Power Scheme	Channel No.	Peak Conducted Power		Avg Conducted Power	
					[dBm]	[mW]	[dBm]	[mW]
2402	1.0	GFSK	ePA	0	17.72	59.211	16.57	45.373
2441	1.0	GFSK	ePA	39	17.56	56.990	16.73	47.044
2480	1.0	GFSK	ePA	78	17.31	53.877	16.57	45.384
2402	1.0	GFSK	iPA	0	12.35	17.171	10.67	11.660
2441	1.0	GFSK	iPA	39	12.89	19.463	10.97	12.491
2480	1.0	GFSK	iPA	78	12.32	17.053	10.81	12.036
2402	2.0	$\pi/4$ -DQPSK	ePA	0	19.44	87.943	16.71	46.925
2441	2.0	$\pi/4$ -DQPSK	ePA	39	19.17	82.642	16.51	44.802
2480	2.0	$\pi/4$ -DQPSK	ePA	78	18.81	75.998	16.27	42.364
2402	2.0	$\pi/4$ -DQPSK	iPA	0	10.97	12.514	8.33	6.800
2441	2.0	$\pi/4$ -DQPSK	iPA	39	11.75	14.966	8.77	7.535
2480	2.0	$\pi/4$ -DQPSK	iPA	78	10.80	12.034	8.31	6.775
2402	3.0	8DPSK	ePA	0	19.83	96.139	16.74	47.152
2441	3.0	8DPSK	ePA	39	19.77	94.842	16.53	45.009
2480	3.0	8DPSK	ePA	78	19.31	85.251	16.64	46.132
2402	3.0	8DPSK	iPA	0	11.23	13.265	8.39	6.896
2441	3.0	8DPSK	iPA	39	11.97	15.751	8.84	7.649
2480	3.0	8DPSK	iPA	78	11.14	13.008	8.32	6.788

Table 7-5. Conducted Output Power Measurements Antenna 2

FCC ID: A3LSMS908JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset	Page 43 of 131	

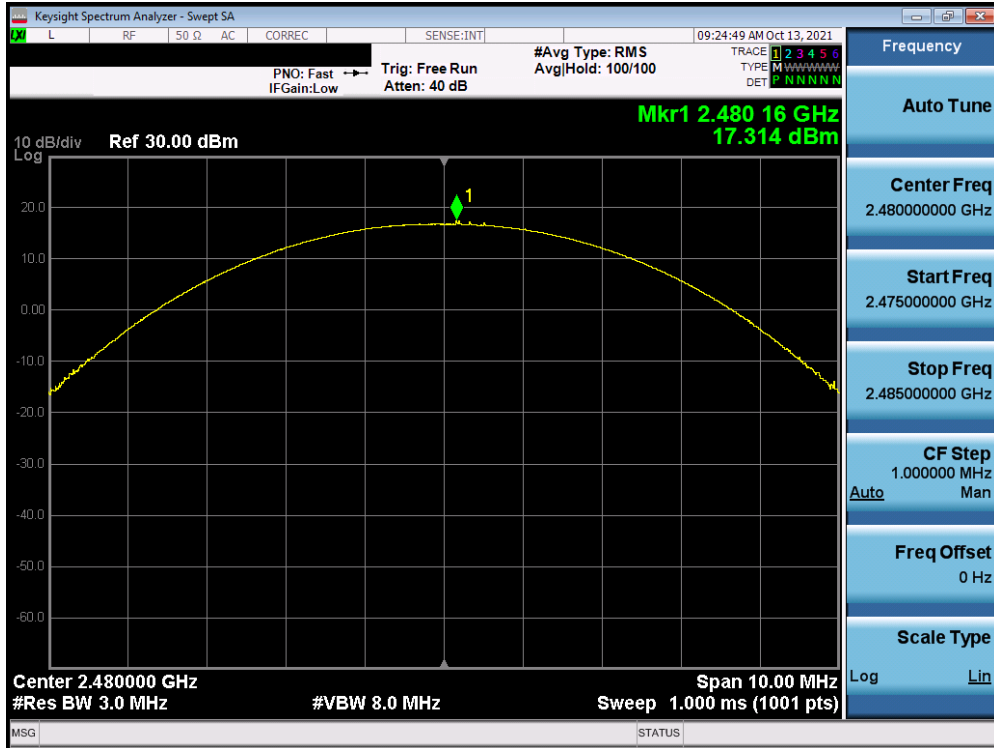


Plot 7-55. Peak Conducted Power (1Mbps – Ch. 0) Antenna 2 ePA

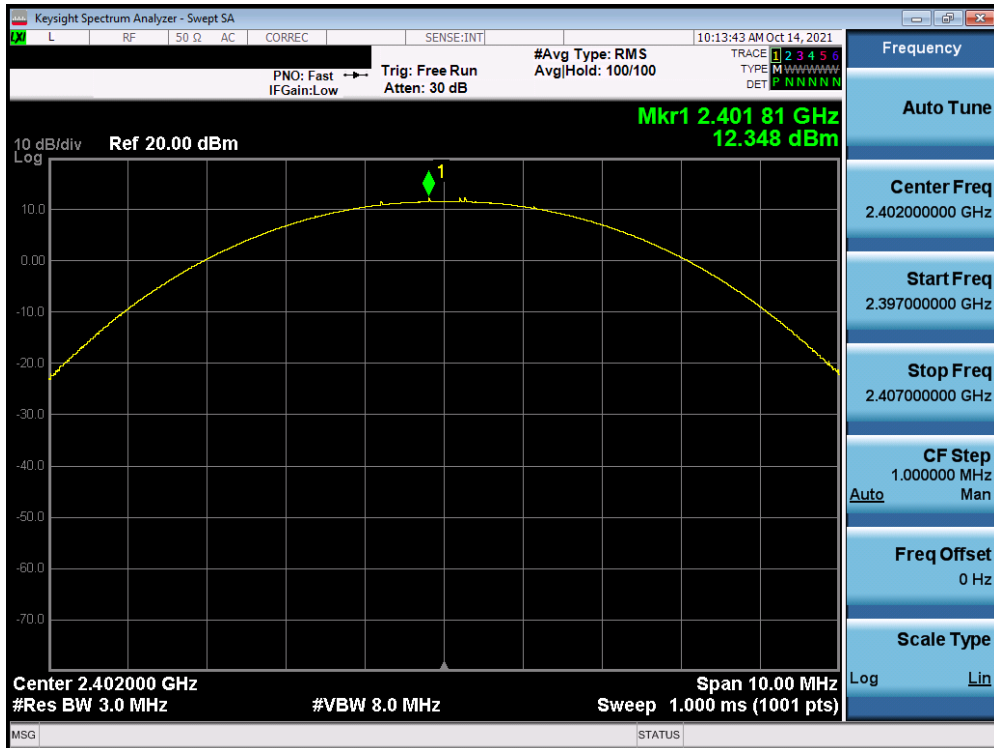


Plot 7-56. Peak Conducted Power (1Mbps – Ch. 39) Antenna 2 ePA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 44 of 131

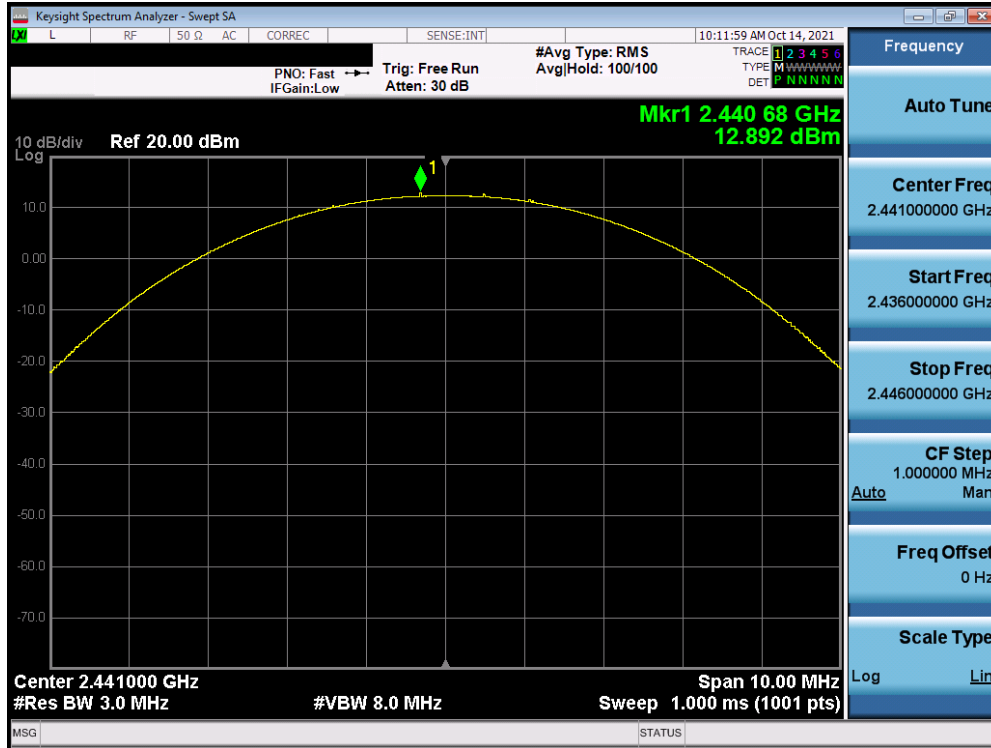


Plot 7-57. Peak Conducted Power (1Mbps – Ch. 78) Antenna 2 ePA

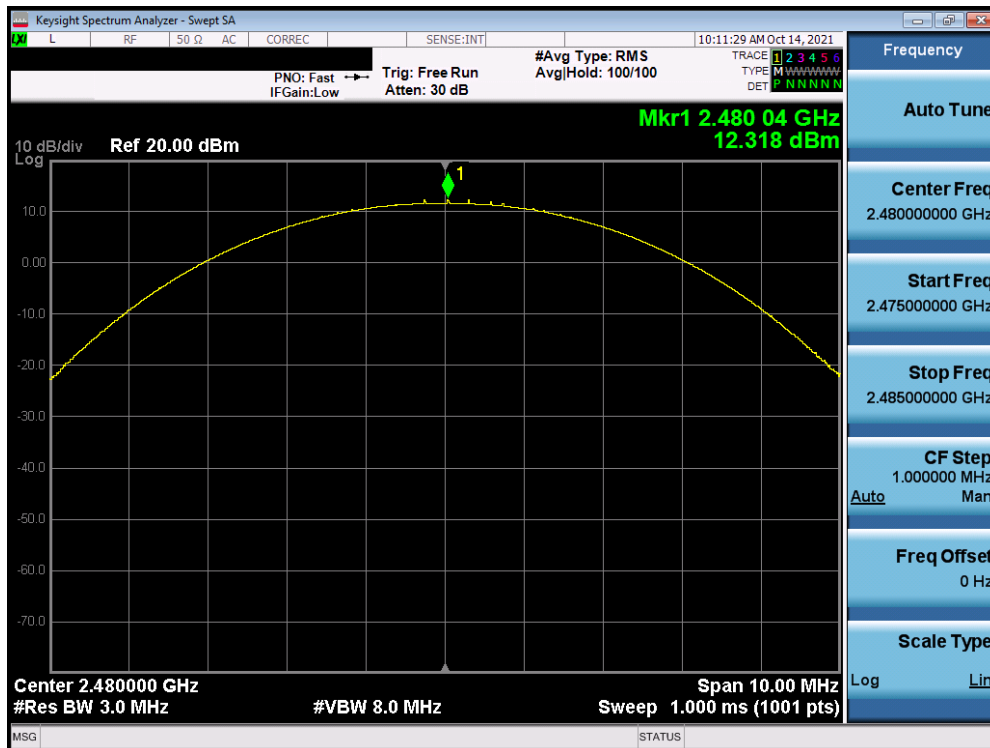


Plot 7-58. Peak Conducted Power (1Mbps – Ch. 0) Antenna 2 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 45 of 131



Plot 7-59. Peak Conducted Power (1Mbps – Ch. 39) Antenna 2 iPA

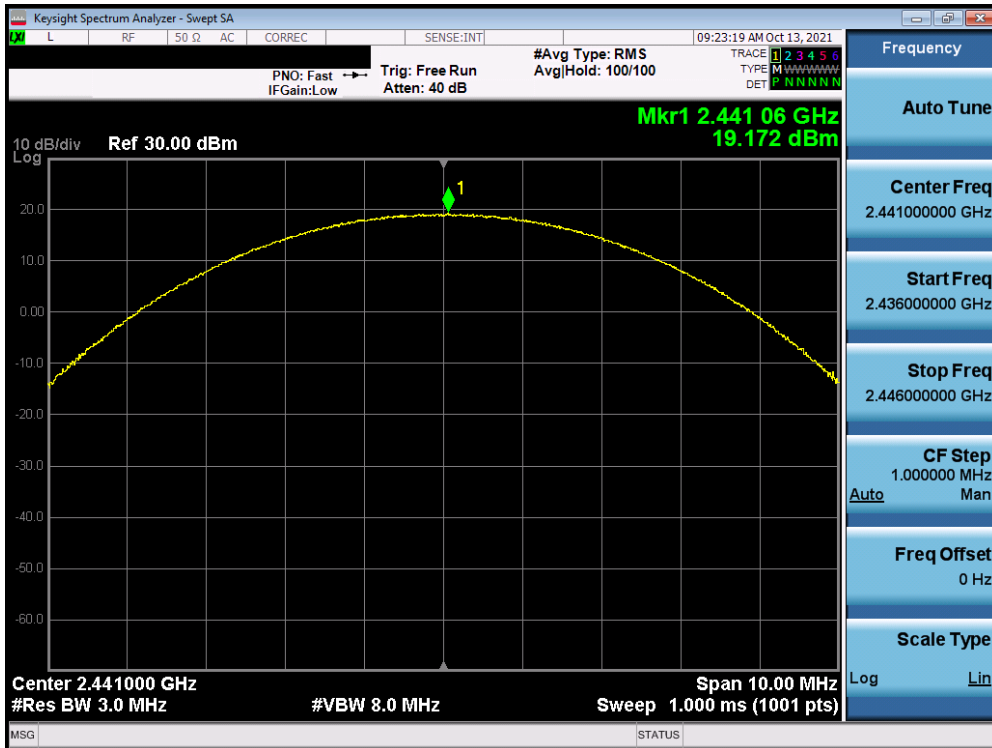


Plot 7-60. Peak Conducted Power (1Mbps – Ch. 78) Antenna 2 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 46 of 131



Plot 7-61. Peak Conducted Power (2Mbps – Ch. 0) Antenna 2 ePA

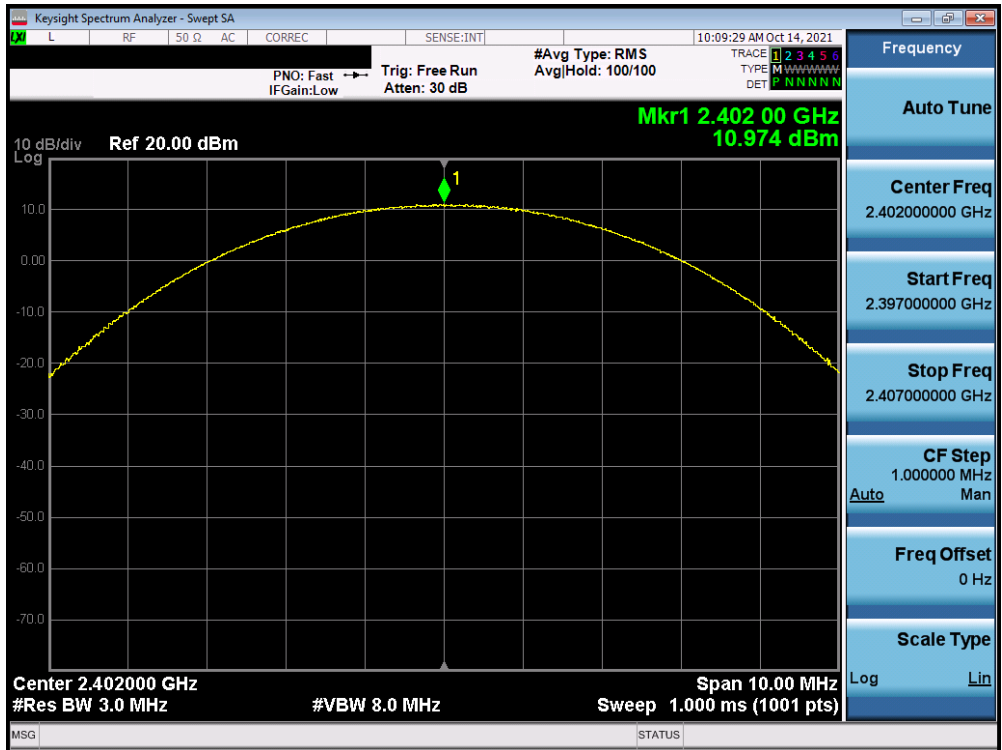


Plot 7-62. Peak Conducted Power (2Mbps – Ch. 39) Antenna 2 ePA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 47 of 131

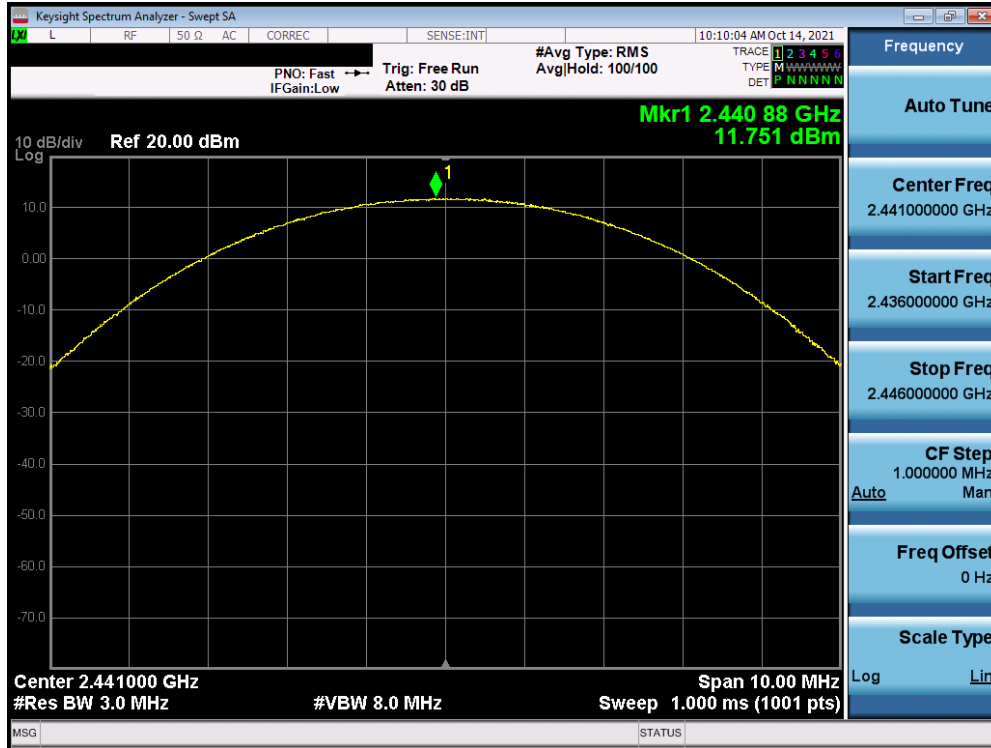


Plot 7-63. Peak Conducted Power (2Mbps – Ch. 78) Antenna 2 ePA

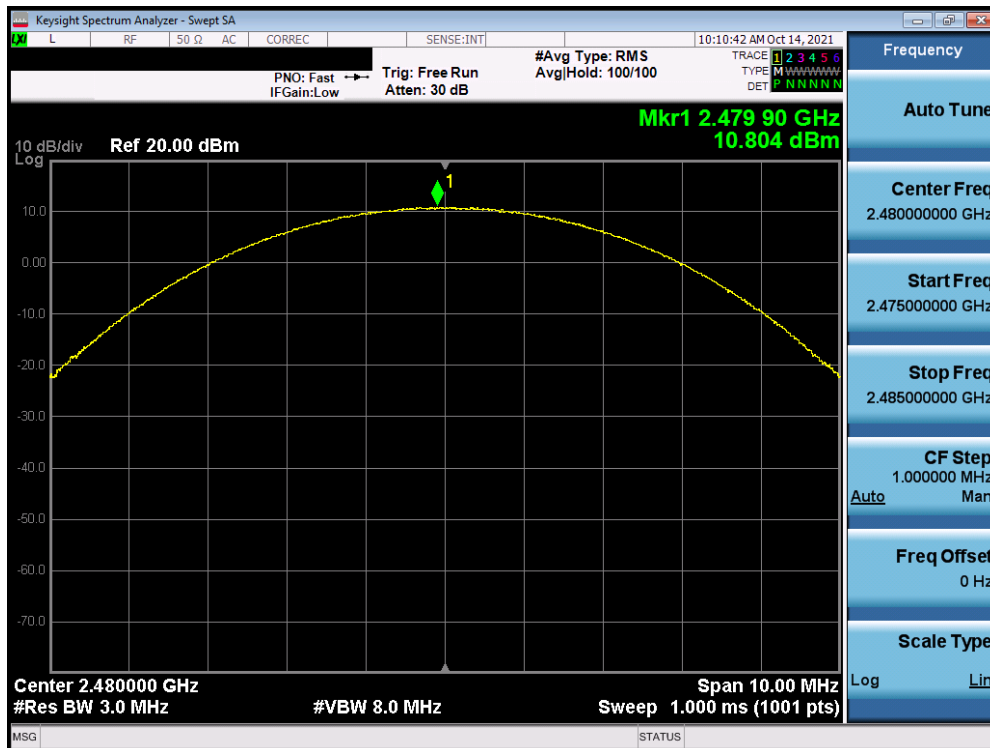


Plot 7-64. Peak Conducted Power (2Mbps – Ch. 0) Antenna 2 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 48 of 131

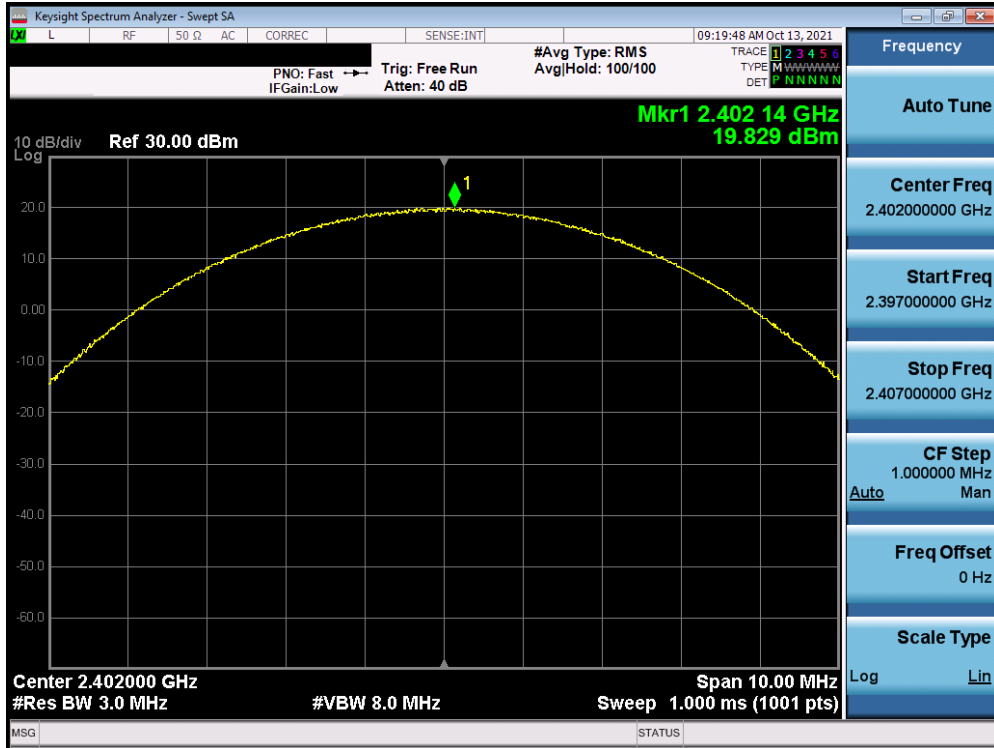


Plot 7-65. Peak Conducted Power (2Mbps – Ch. 39) Antenna 2 iPA

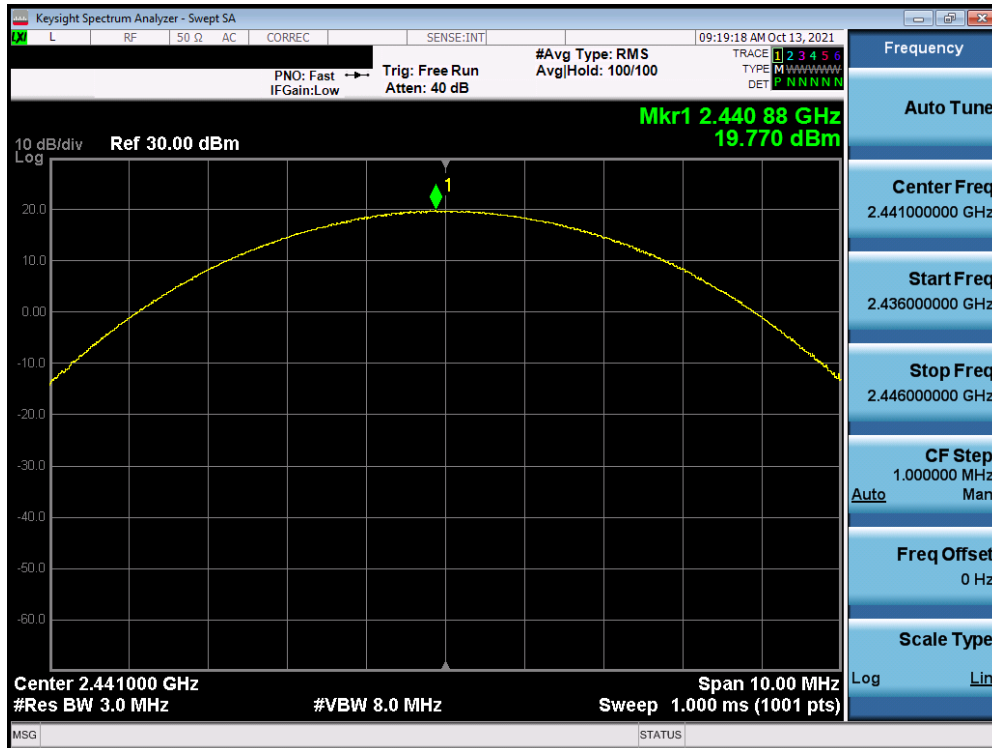


Plot 7-66. Peak Conducted Power (2Mbps – Ch. 78) Antenna 2 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 49 of 131

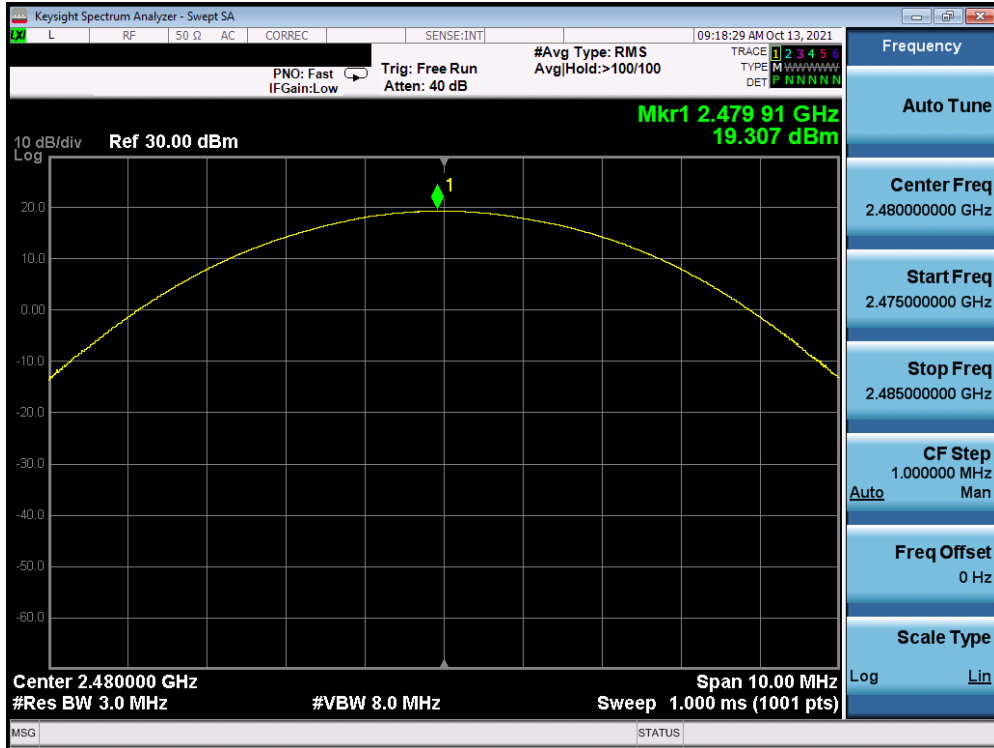


Plot 7-67. Peak Conducted Power (3Mbps – Ch. 0) Antenna 2 ePA

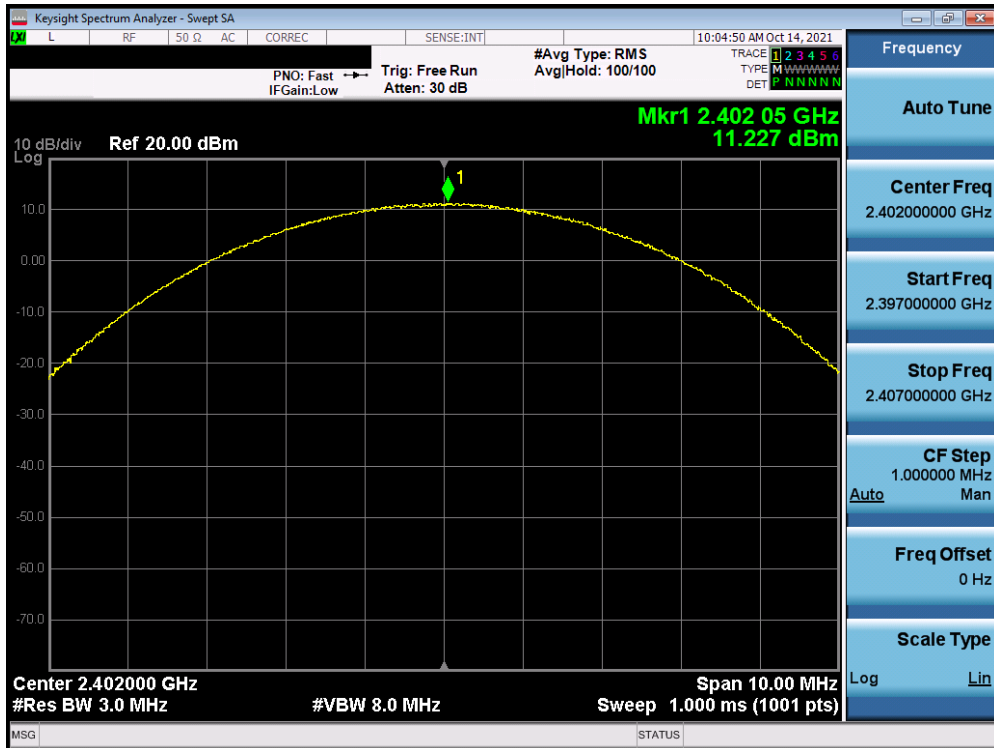


Plot 7-68. Peak Conducted Power 32Mbps – Ch. 39) Antenna 2 ePA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 50 of 131

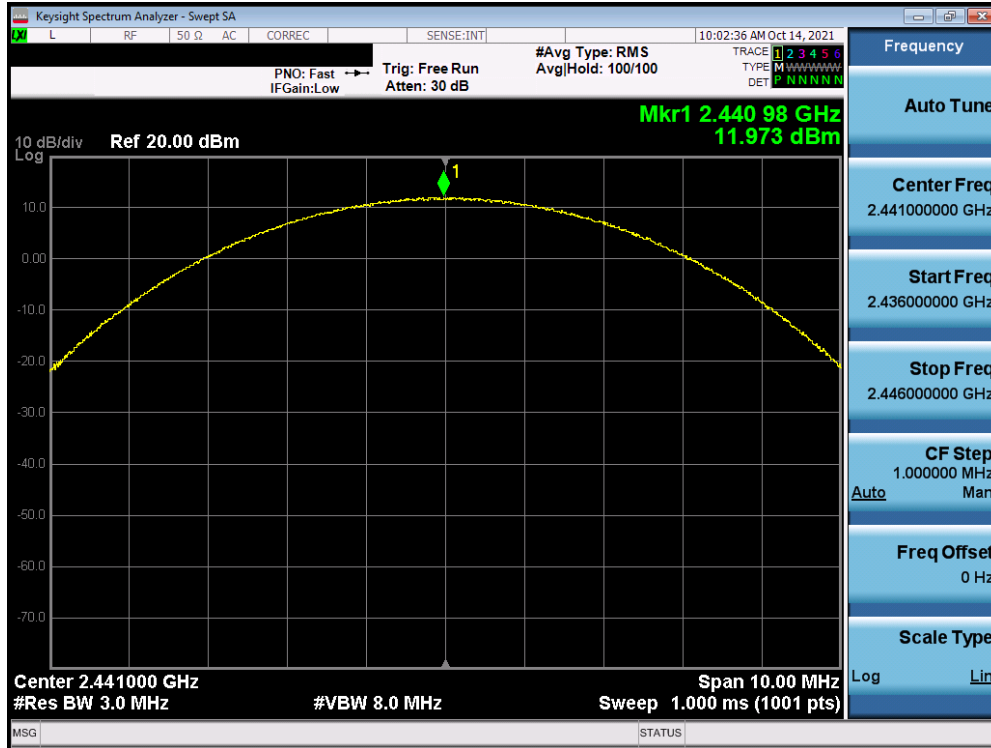


Plot 7-69. Peak Conducted Power (3Mbps – Ch. 78) Antenna 2 ePA

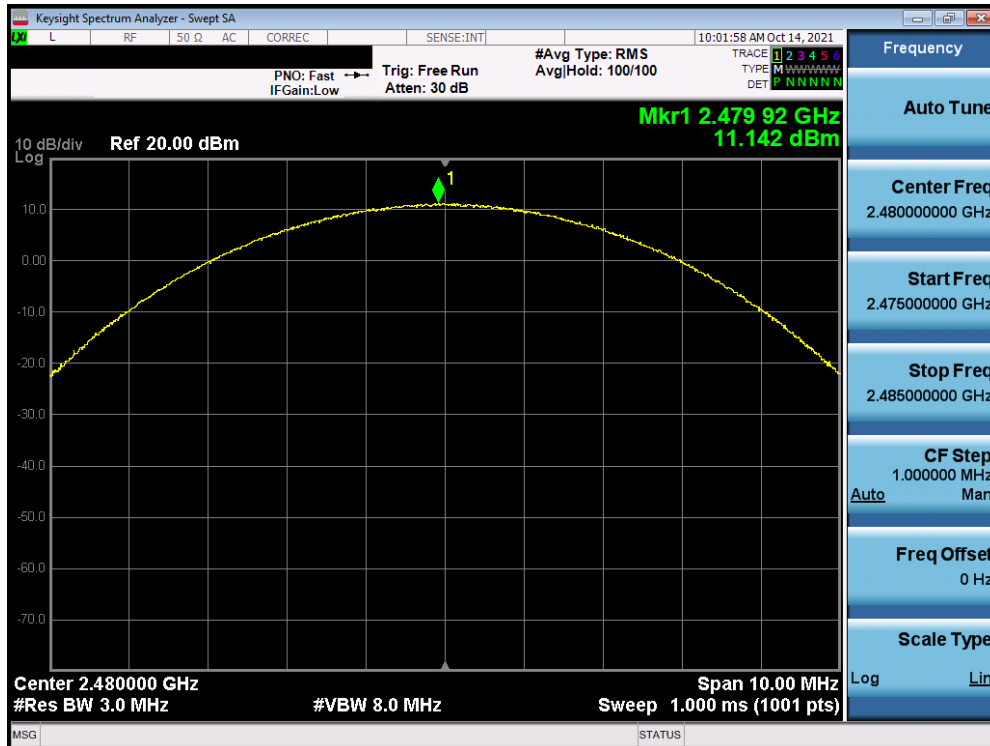


Plot 7-70. Peak Conducted Power (3Mbps – Ch. 0) Antenna 2 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 51 of 131

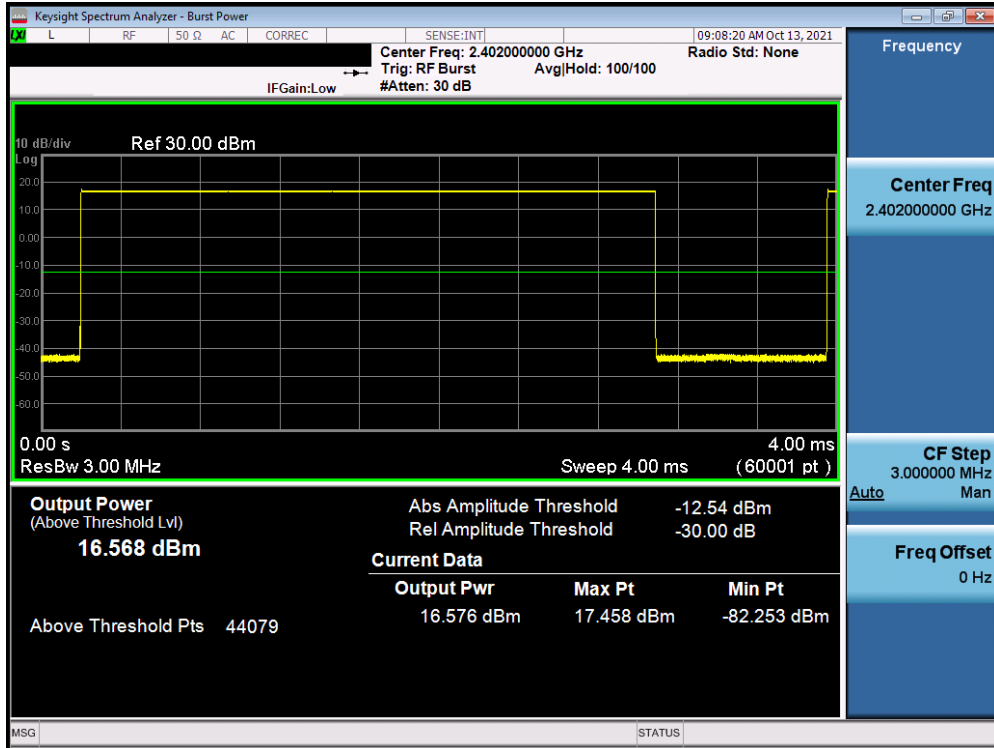


Plot 7-71. Peak Conducted Power (3Mbps – Ch. 39) Antenna 2 iPA

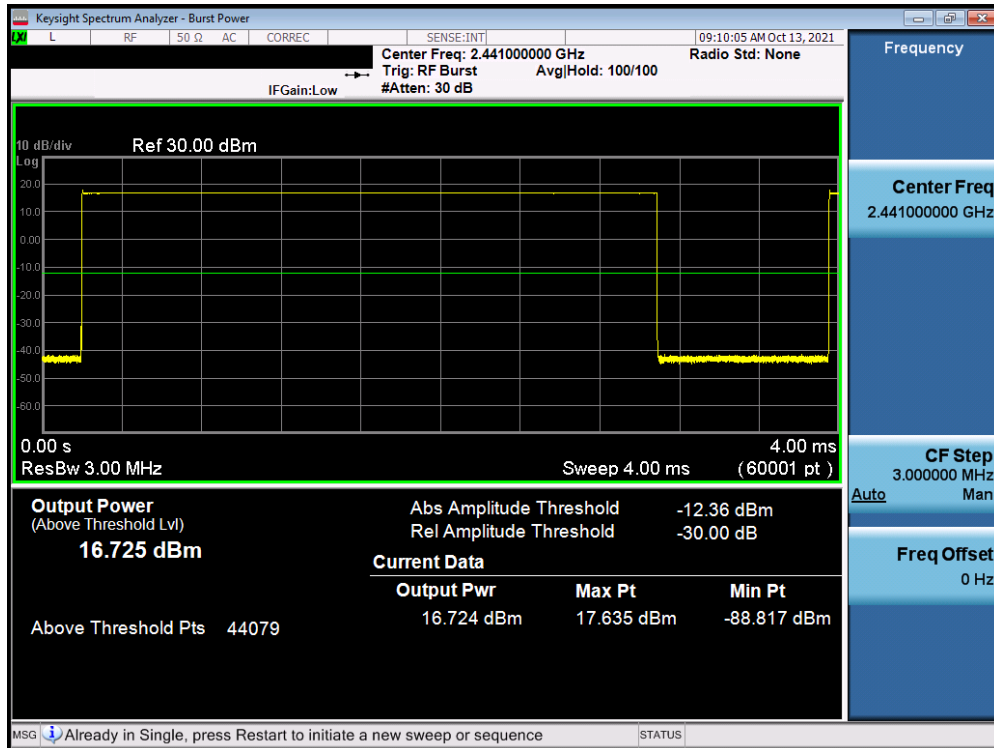


Plot 7-72. Peak Conducted Power (3Mbps – Ch. 78) Antenna 2 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 52 of 131

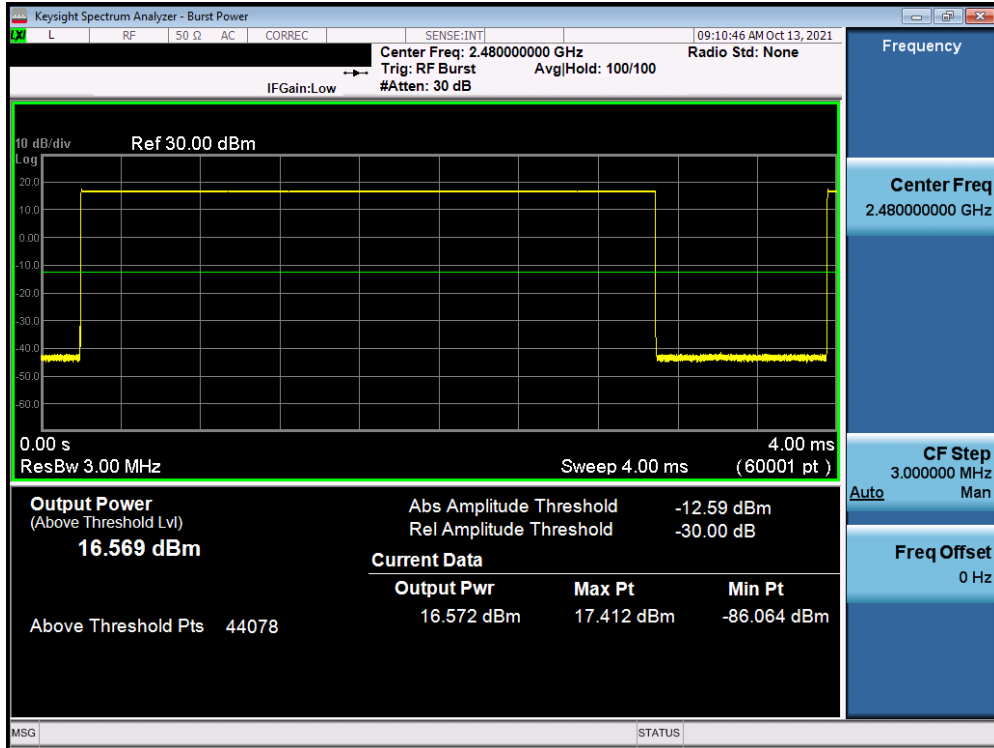


Plot 7-73. Average Conducted Power (1Mbps – Ch. 0) Antenna 2 ePA

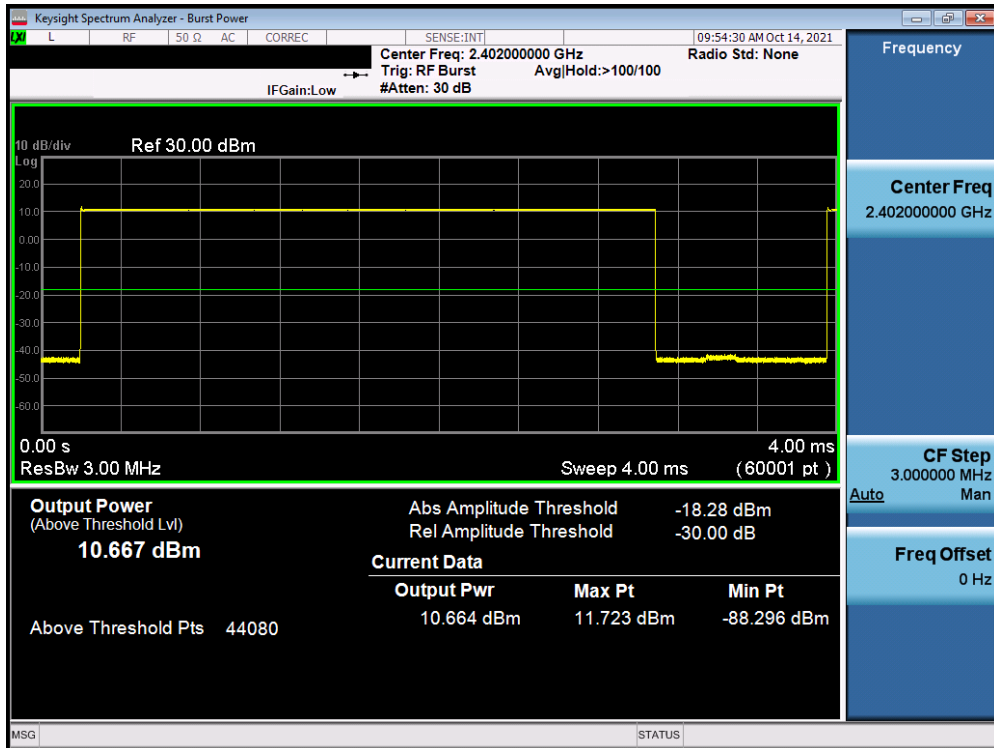


Plot 7-74. Average Conducted Power (1Mbps – Ch. 39) Antenna 2 ePA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 53 of 131

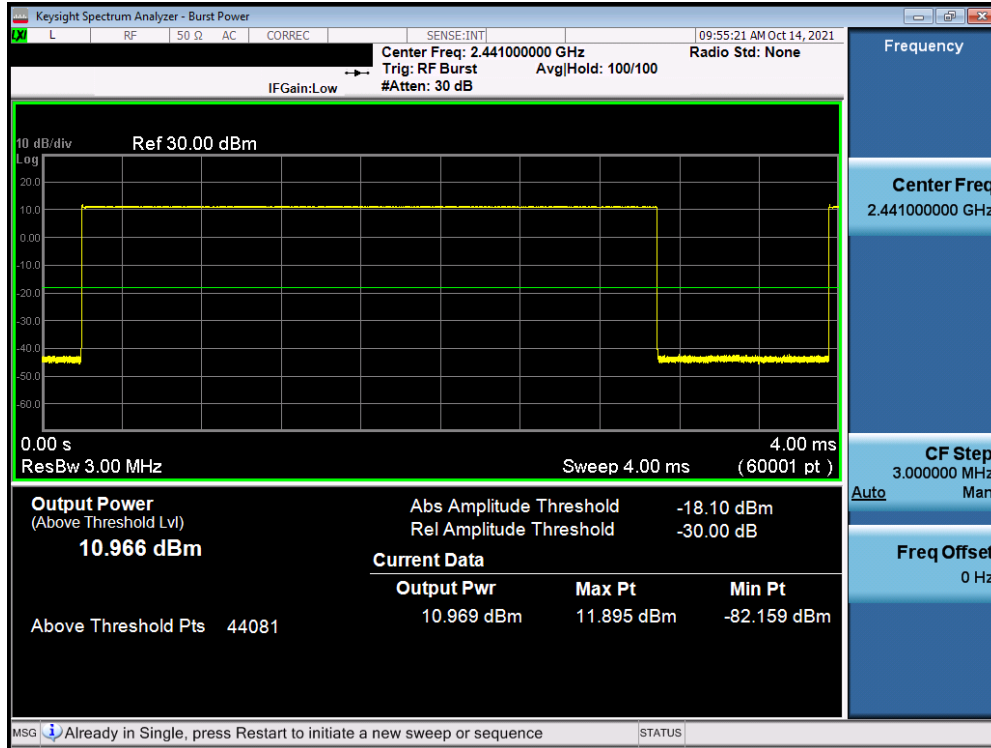


Plot 7-75. Average Conducted Power (1Mbps – Ch. 78) Antenna 2 ePA

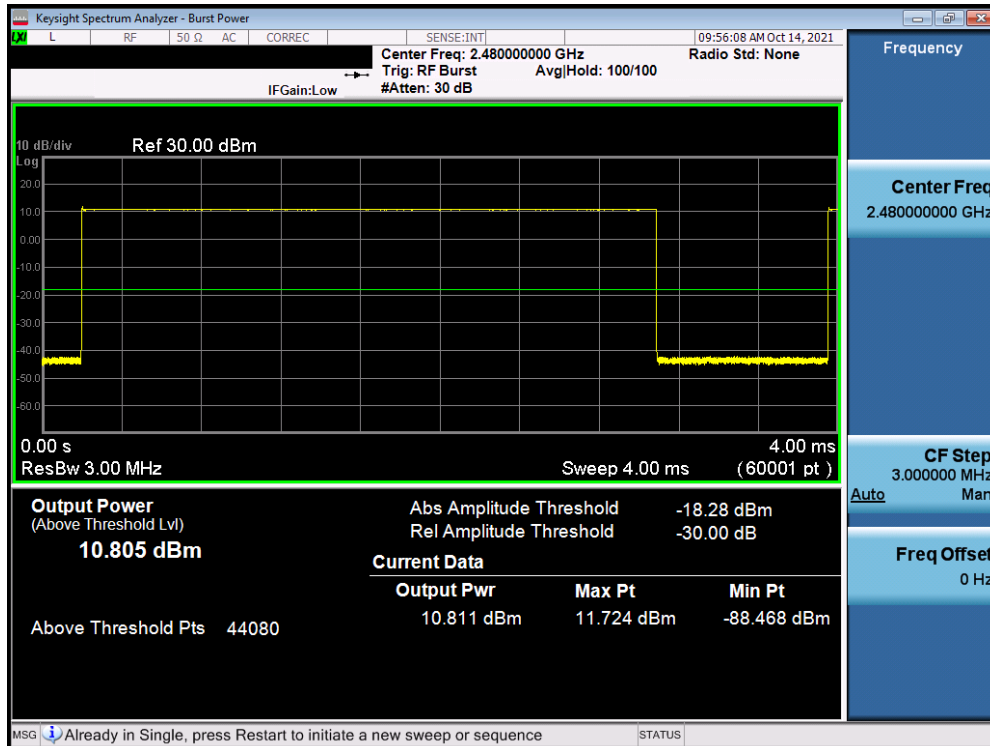


Plot 7-76. Average Conducted Power (1Mbps – Ch. 0) Antenna 2 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 54 of 131

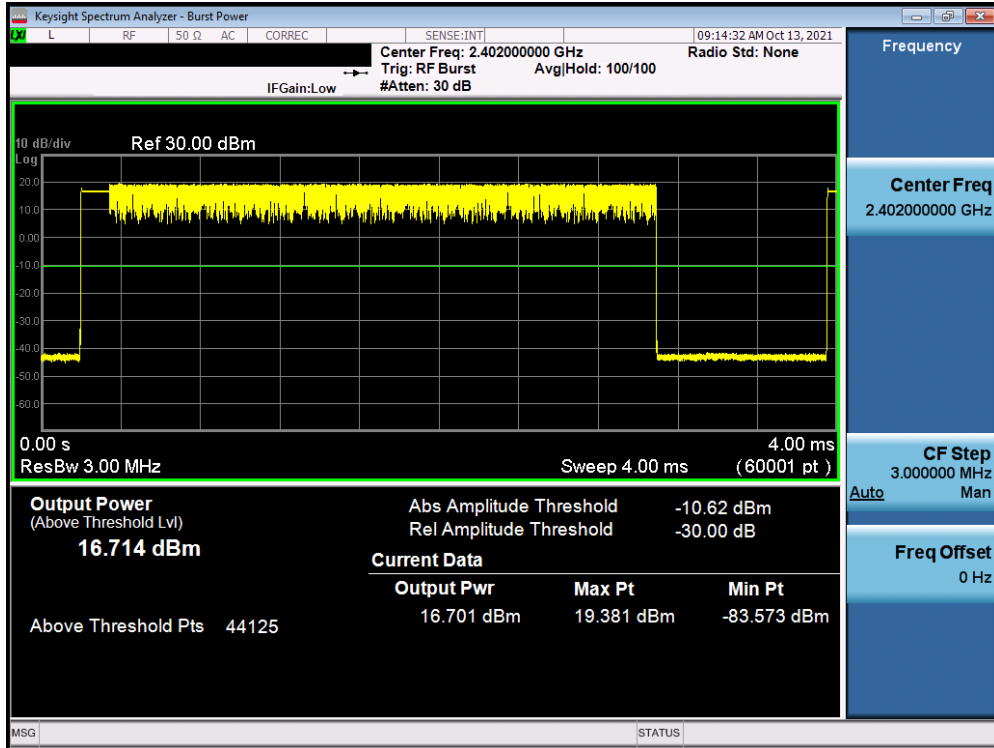


Plot 7-77. Average Conducted Power (1Mbps – Ch. 39) Antenna 2 iPA

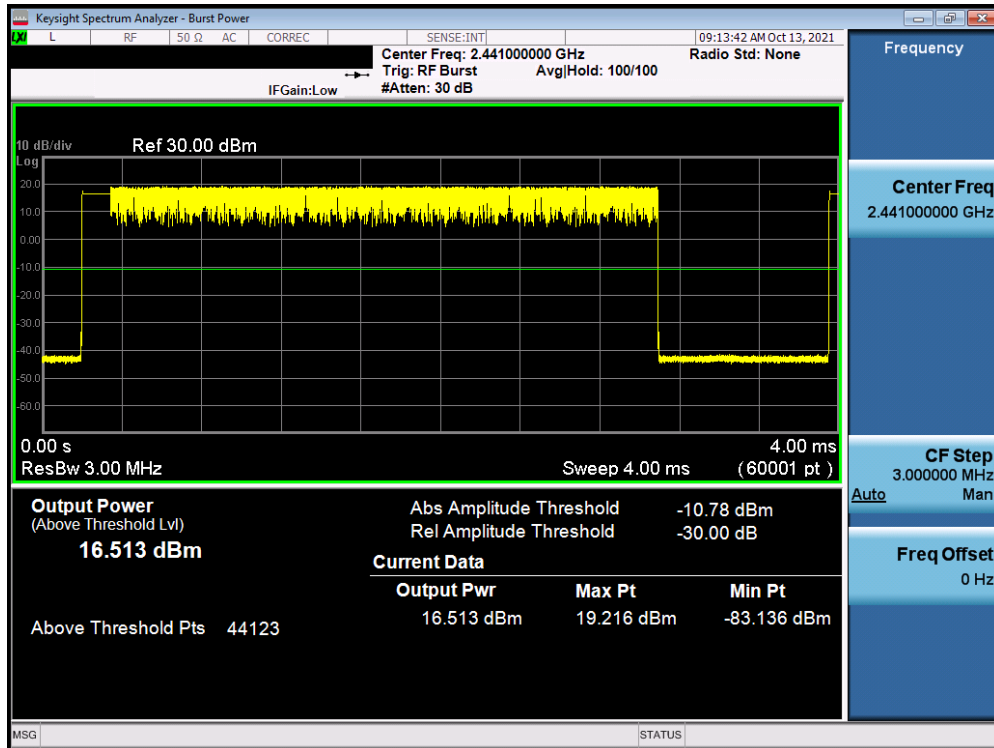


Plot 7-78. Average Conducted Power (1Mbps – Ch. 78) Antenna 2 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 55 of 131

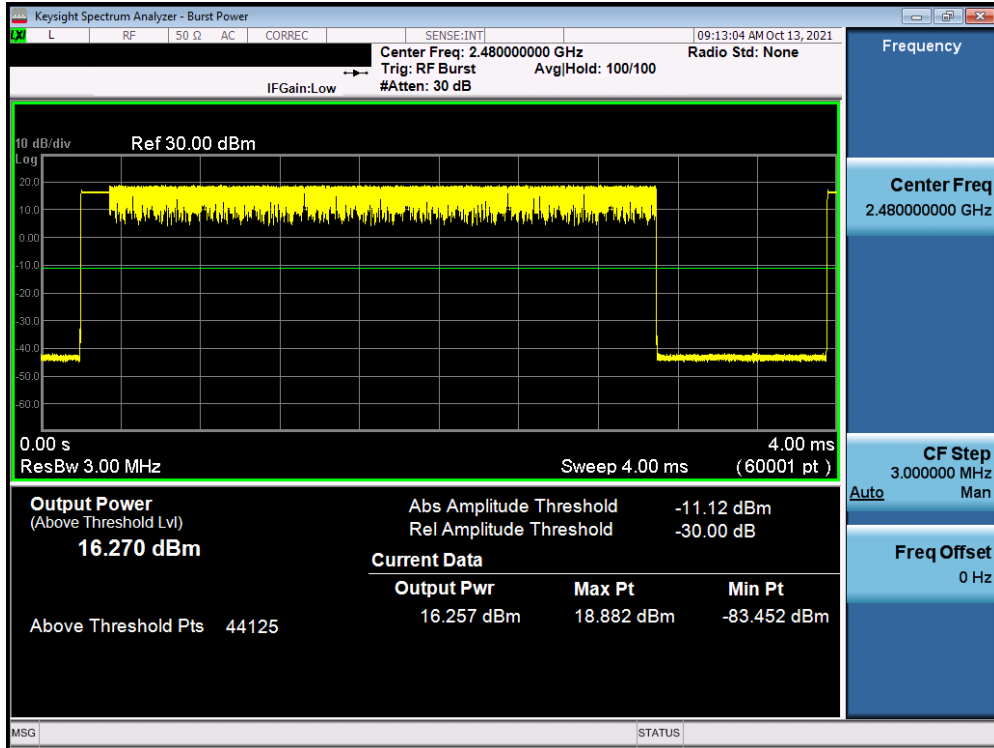


Plot 7-79. Average Conducted Power (2Mbps – Ch. 0) Antenna 2 ePA

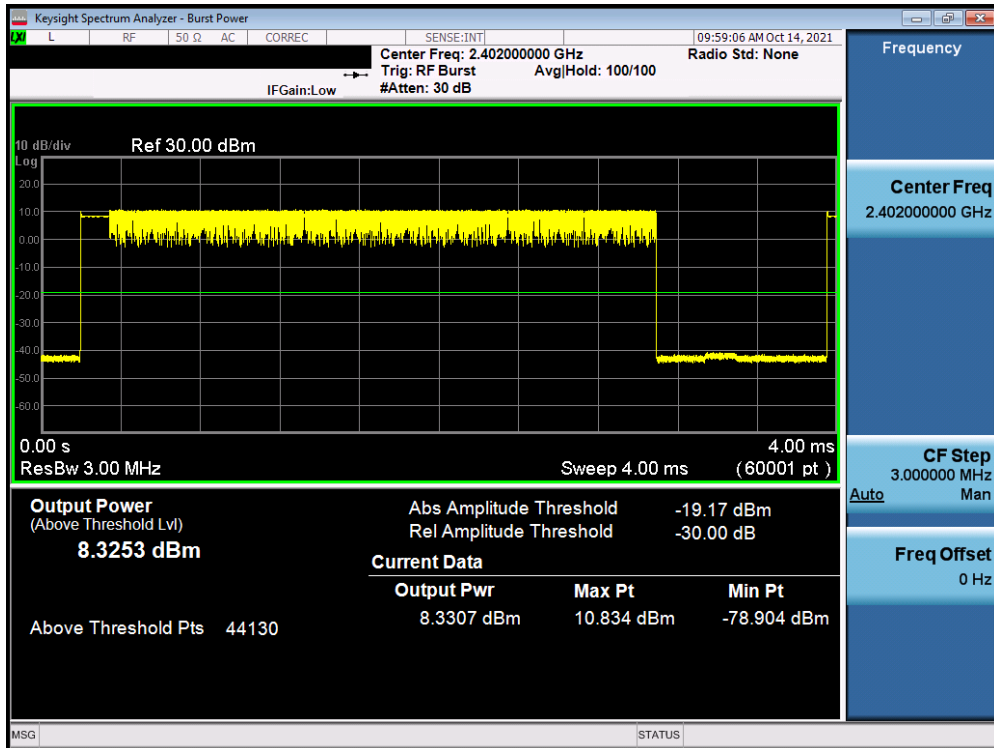


Plot 7-80. Average Conducted Power (2Mbps – Ch. 39) Antenna 2 ePA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 56 of 131

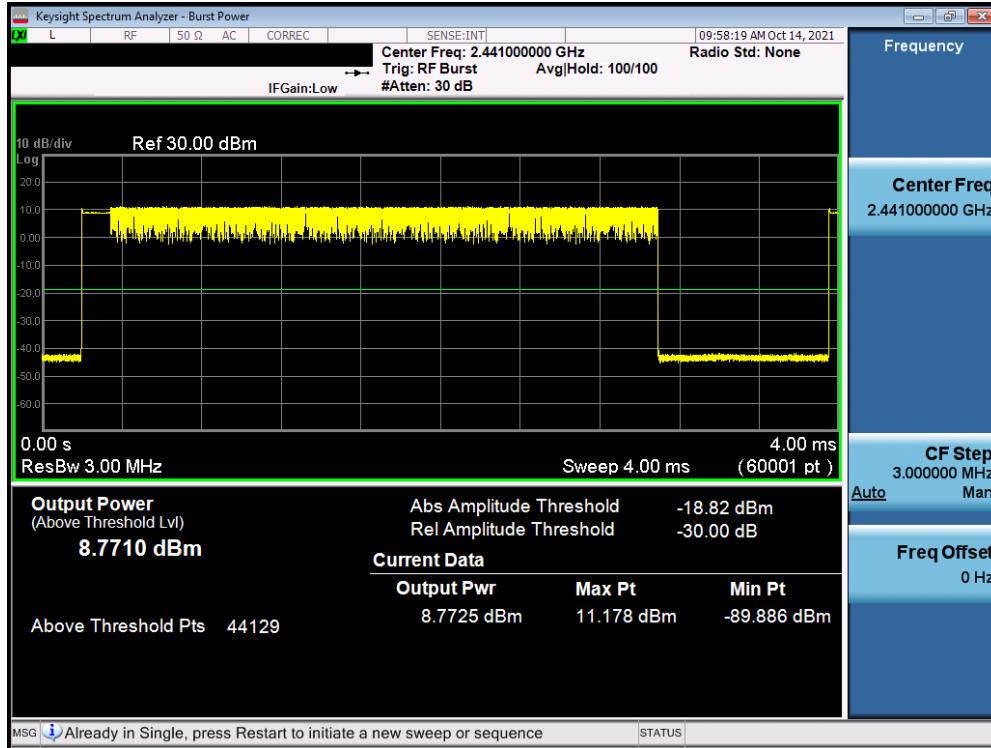


Plot 7-81. Average Conducted Power (2Mbps – Ch. 78) Antenna 2 ePA

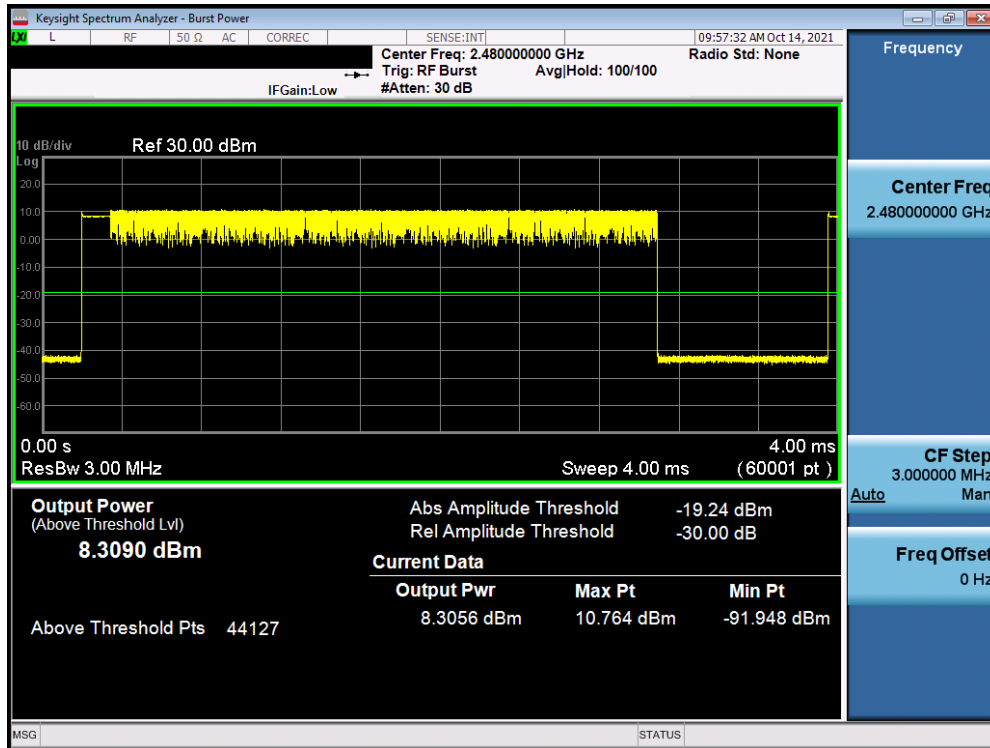


Plot 7-82. Average Conducted Power (2Mbps – Ch. 0) Antenna 2 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 57 of 131

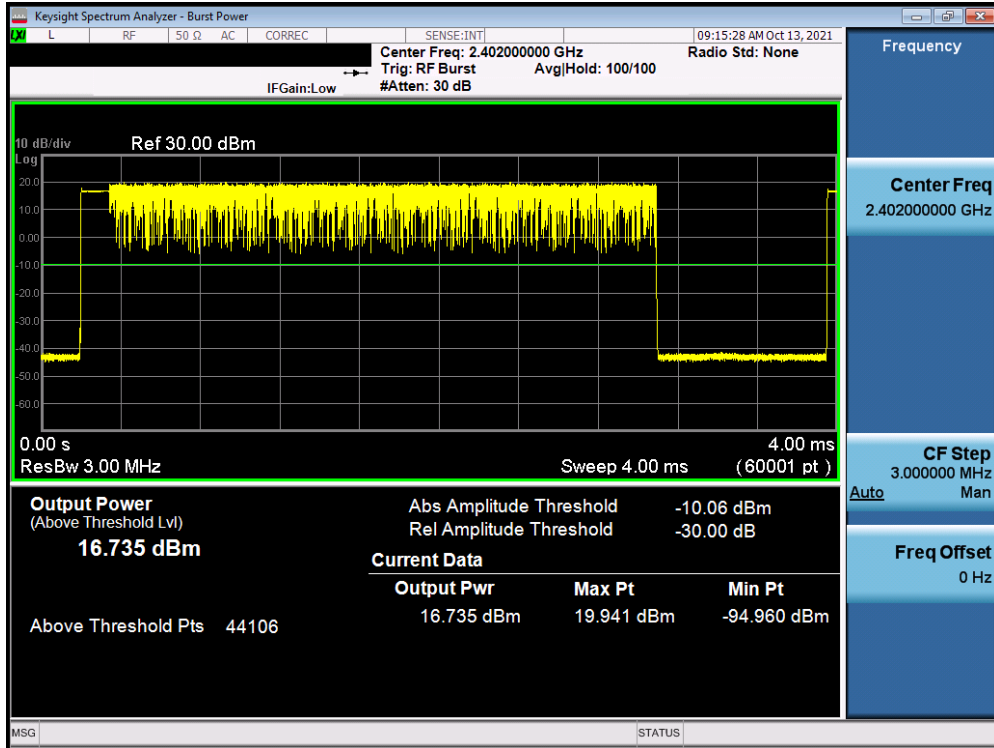


Plot 7-83. Average Conducted Power (2Mbps – Ch. 39) Antenna 2 iPA

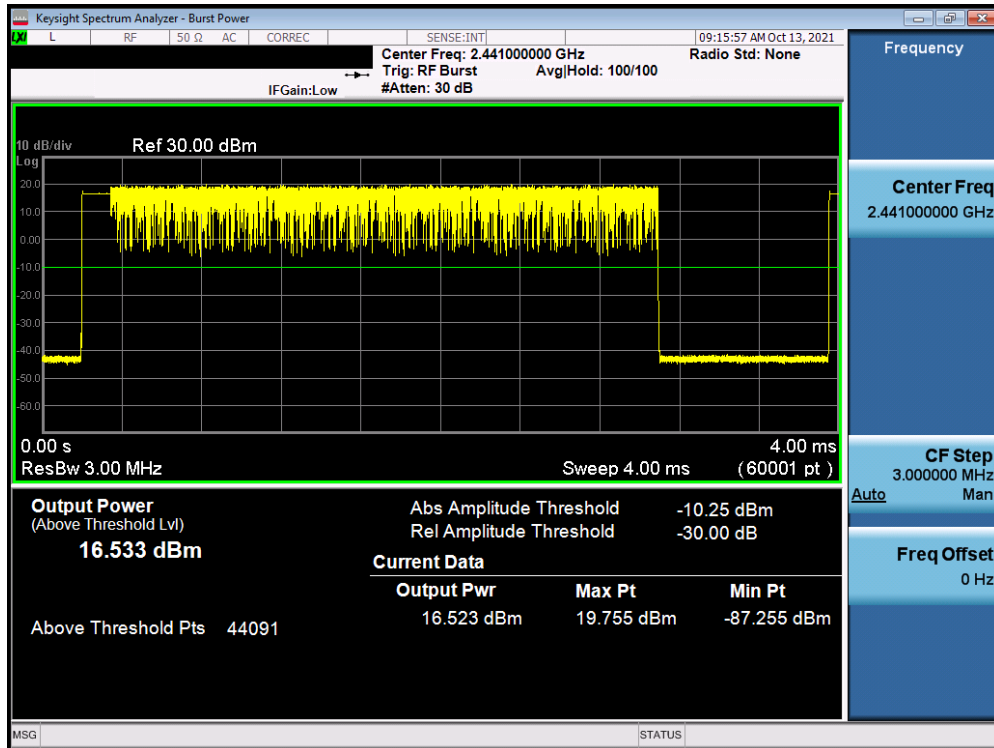


Plot 7-84. Average Conducted Power (2Mbps – Ch. 78) Antenna 2 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 58 of 131

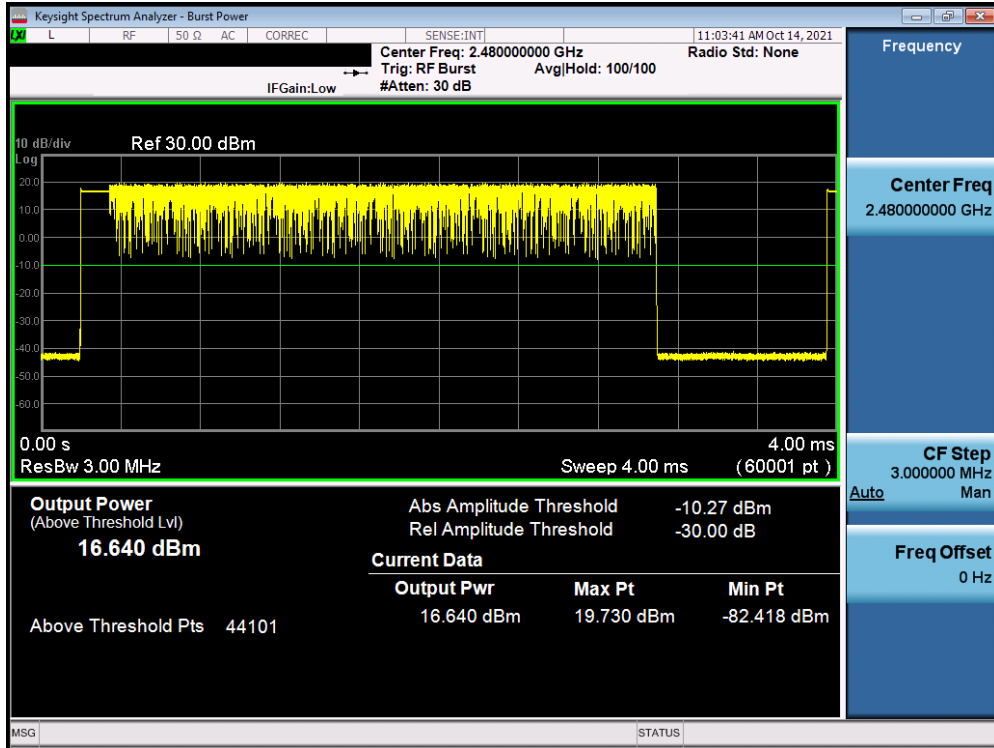


Plot 7-85. Average Conducted Power (3Mbps – Ch. 0) Antenna 2ePA

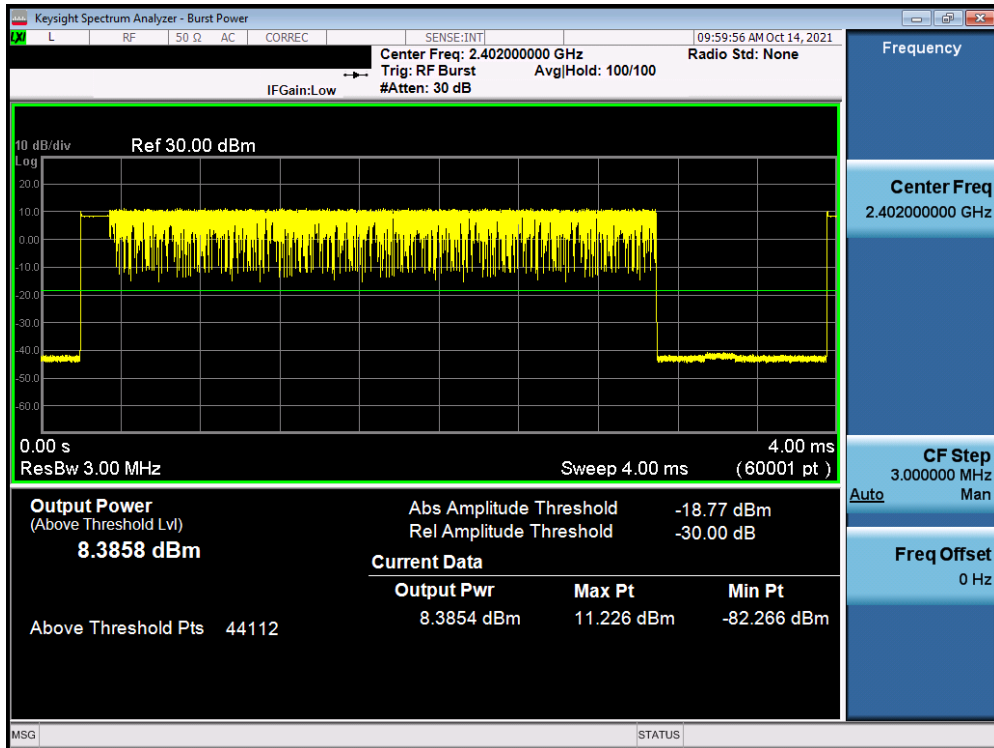


Plot 7-86. Average Conducted Power 32Mbps – Ch. 39) Antenna 2 ePA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 59 of 131

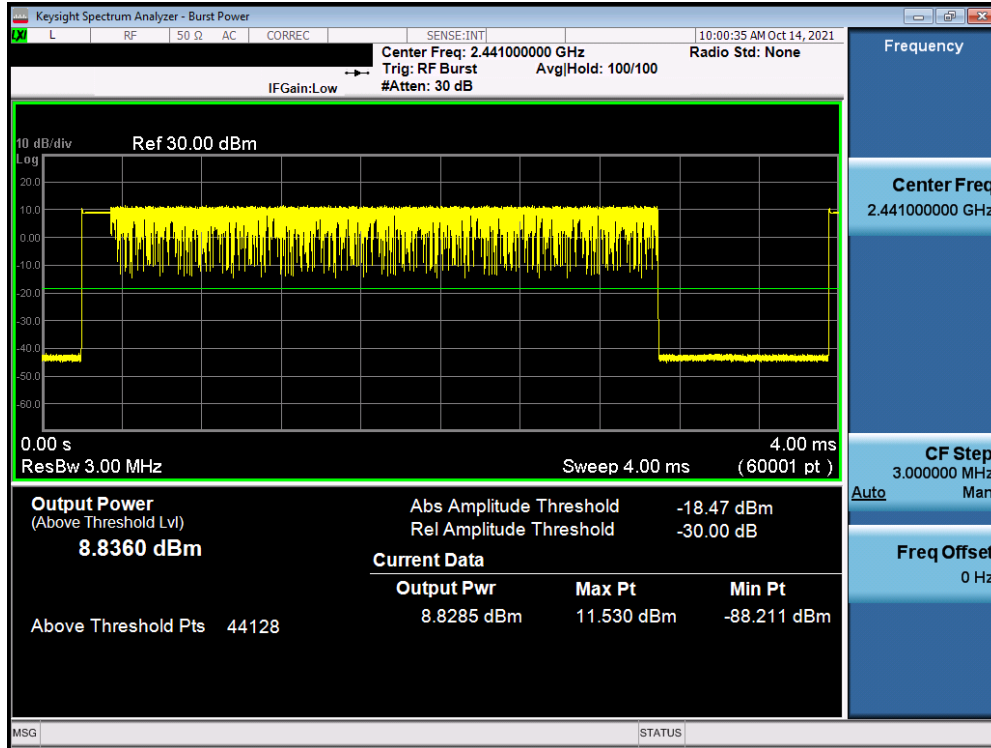


Plot 7-87. Average Conducted Power (3Mbps – Ch. 78) Antenna 2 ePA

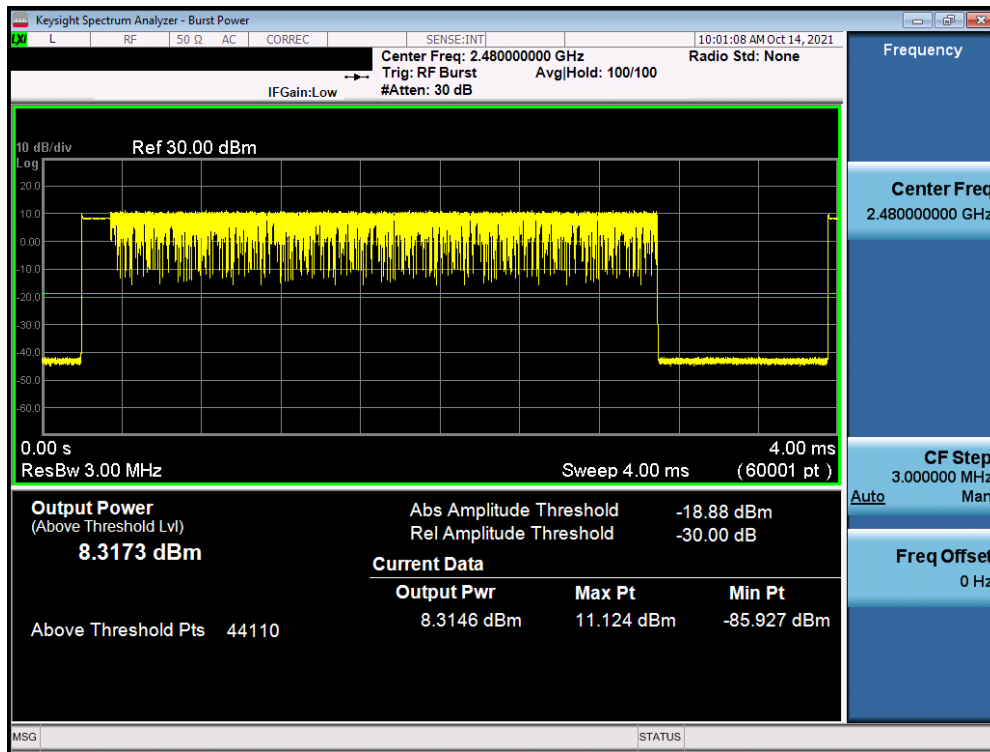


Plot 7-88. Average Conducted Power (3Mbps – Ch. 0) Antenna 2 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 60 of 131



Plot 7-89. Average Conducted Power (3Mbps – Ch. 39) Antenna 2 iPA



Plot 7-90. Average Conducted Power (3Mbps – Ch. 78) Antenna 2 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 61 of 131

Dual Antenna

Frequency [MHz]	Data Rate [Mbps]	Modulation	Power Scheme	Channel No.	Peak Conducted Power ANT 1		Peak Conducted Power ANT 2		Peak Conducted Power Dual	
					[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]
2402	1.0	GFSK	iPA	0	13.07	20.272	10.65	11.614	15.04	31.915
2441	1.0	GFSK	iPA	39	13.28	21.267	11.47	14.028	15.48	35.318
2480	1.0	GFSK	iPA	78	12.32	17.065	10.48	11.179	14.51	28.249
2402	2.0	$\pi/4$ -DQPSK	iPA	0	12.46	17.620	9.80	9.552	14.34	27.164
2441	2.0	$\pi/4$ -DQPSK	iPA	39	12.87	19.382	10.61	11.497	14.90	30.903
2480	2.0	$\pi/4$ -DQPSK	iPA	78	11.75	14.966	9.56	9.026	13.80	23.988
2402	3.0	8DPSK	iPA	0	12.79	19.002	9.98	9.963	14.62	28.973
2441	3.0	8DPSK	iPA	39	13.09	20.347	10.87	12.226	15.13	32.584
2480	3.0	8DPSK	iPA	78	12.13	16.315	9.94	9.870	14.18	26.182

Table 7-6. Dual Bluetooth Conducted Output Power – Peak Measurements

Frequency [MHz]	Data Rate [Mbps]	Modulation	Power Scheme	Channel No.	Avg Conducted Power ANT 1		Avg Conducted Power ANT 2		Avg Conducted Power Dual	
					[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]
2402	1.0	GFSK	iPA	0	12.33	17.096	9.96	9.920	14.32	27.040
2441	1.0	GFSK	iPA	39	12.44	17.535	10.08	10.186	14.43	27.733
2480	1.0	GFSK	iPA	78	12.10	16.214	9.65	9.224	14.05	25.410
2402	2.0	$\pi/4$ -DQPSK	iPA	0	10.24	10.575	8.09	6.435	12.31	17.022
2441	2.0	$\pi/4$ -DQPSK	iPA	39	10.63	11.553	9.00	7.935	12.90	19.498
2480	2.0	$\pi/4$ -DQPSK	iPA	78	10.26	10.624	8.05	6.378	12.31	17.022
2402	3.0	8DPSK	iPA	0	10.55	11.340	7.58	5.724	12.32	17.061
2441	3.0	8DPSK	iPA	39	10.75	11.890	8.50	7.084	12.78	18.967
2480	3.0	8DPSK	iPA	78	10.18	10.411	7.52	5.649	12.06	16.069

Table 7-7. Dual Bluetooth Conducted Output Power – Average Measurements

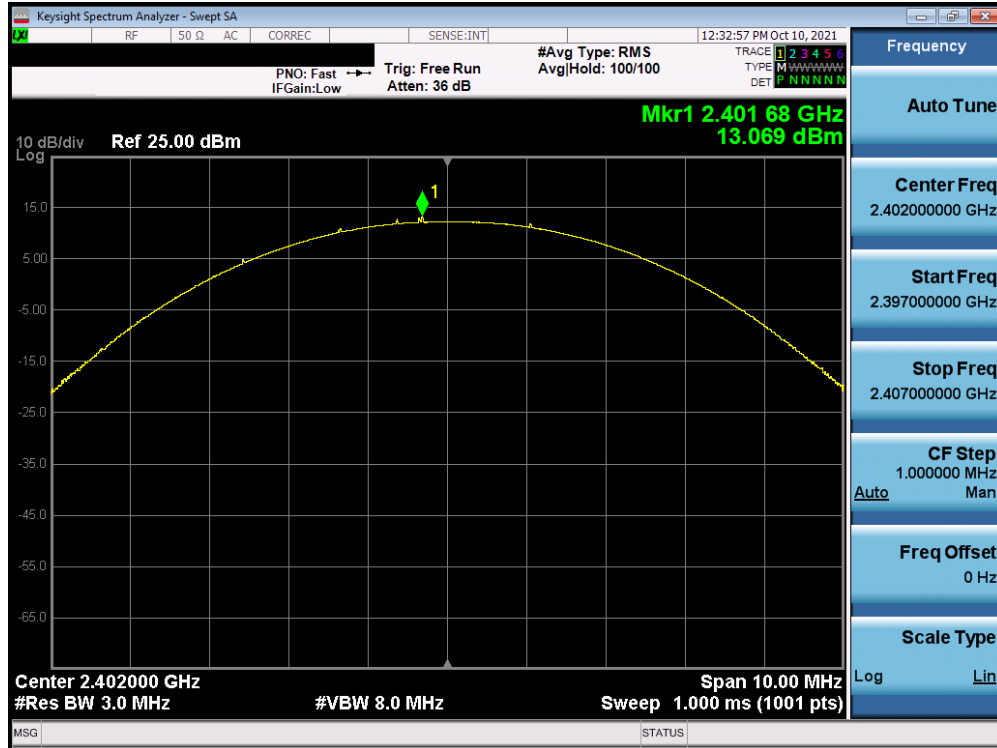
Note:

This device can operate simultaneously on two antennas. The directional gains are shown in Table 2-2 in Section 2.3 of this report. The directional gain from the operation of two antennas is shown to operate at less than 6dBi per the calculation below:

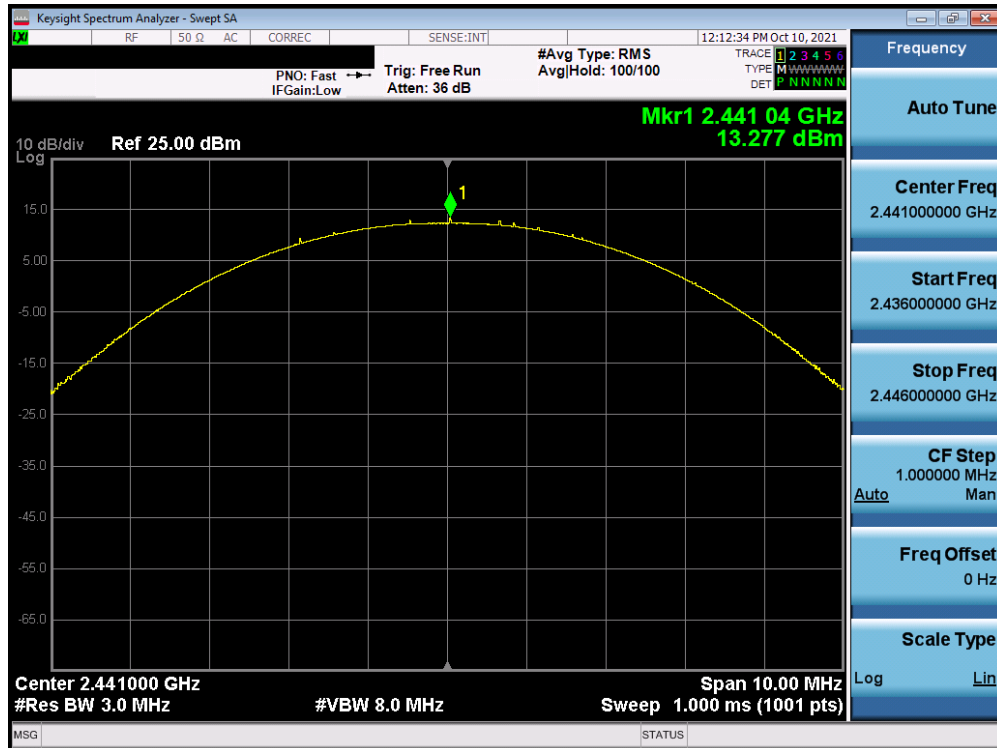
$$\begin{aligned}
 \text{Directional gain} &= 10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N_{ANT}] \text{ dBi} \\
 &= 10 \log[(10^{-6.82/20} + 10^{-6.12/20})^2 / 2] \text{ dBi} \\
 &= -3.45\text{dBi}
 \end{aligned}$$

where G_N is the gain of the nth antenna and N_{ANT} is the total number of antennas used.

FCC ID: A3LSMS908JPN		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset	Page 62 of 131	

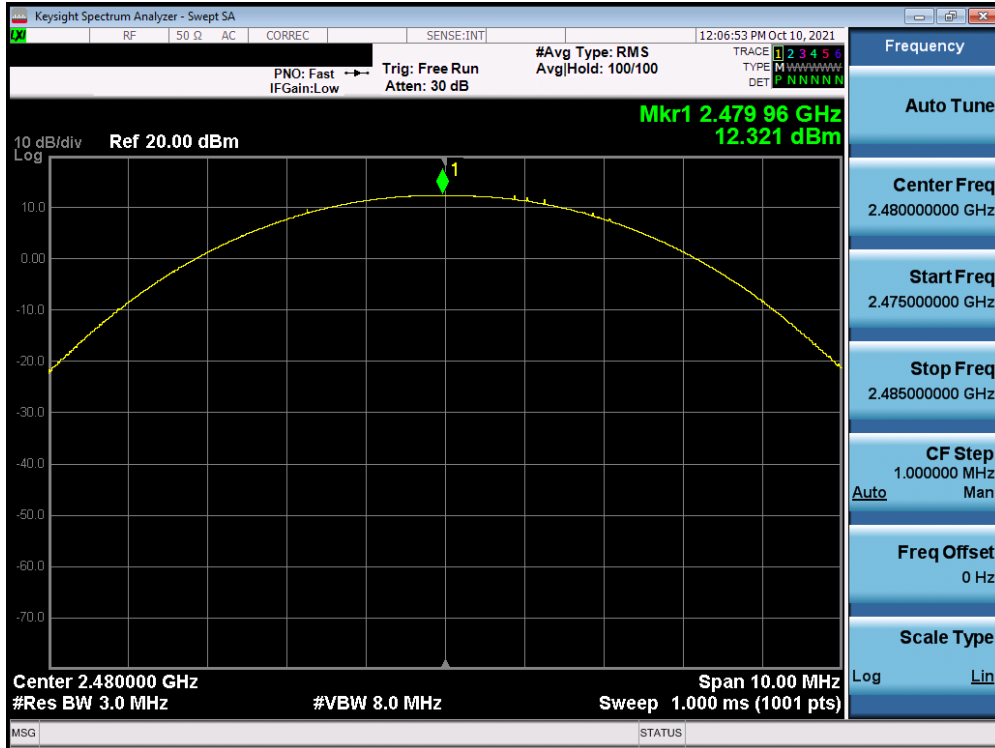


Plot 7-91. Dual Bluetooth Peak Conducted Power (1Mbps – Ch. 0) Antenna 1 iPA

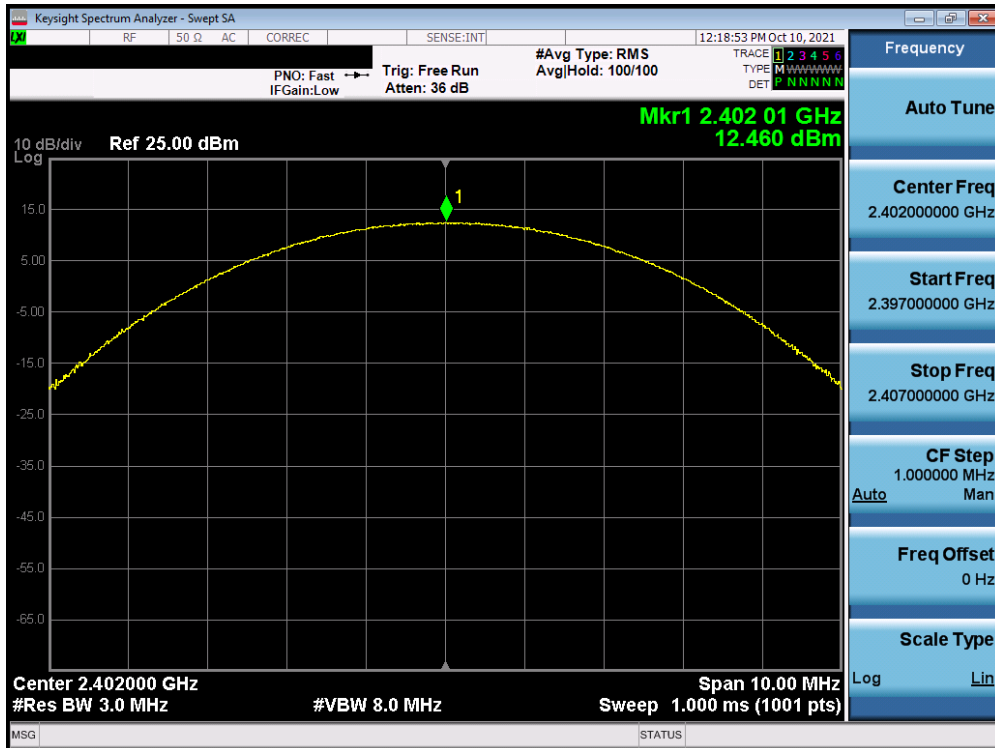


Plot 7-92. Dual Bluetooth Peak Conducted Power (1Mbps – Ch. 39) Antenna 1 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 63 of 131

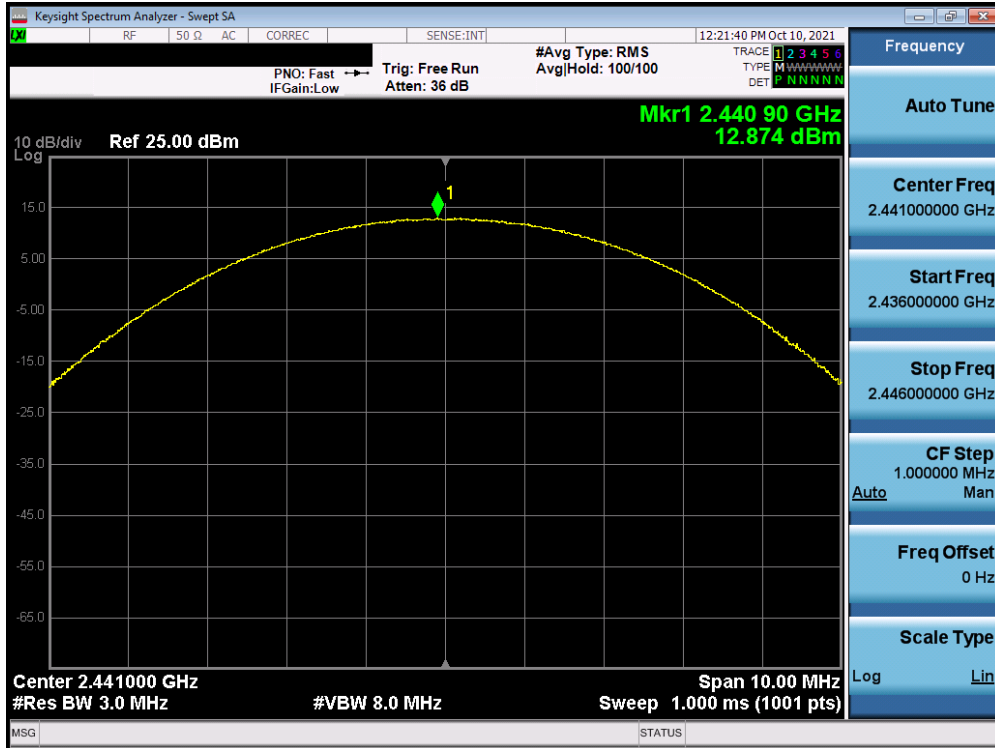


Plot 7-93. Dual Bluetooth Peak Conducted Power (1Mbps – Ch. 78) Antenna 1 iPA

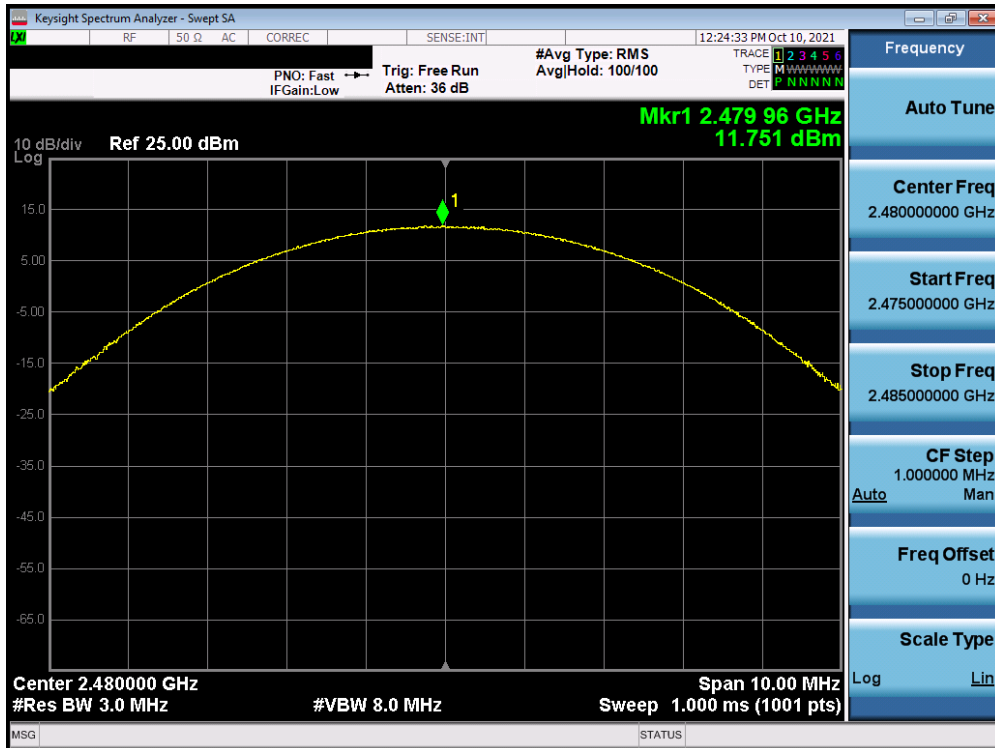


Plot 7-94. Dual Bluetooth Peak Conducted Power (2Mbps – Ch. 0) Antenna 1 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 64 of 131

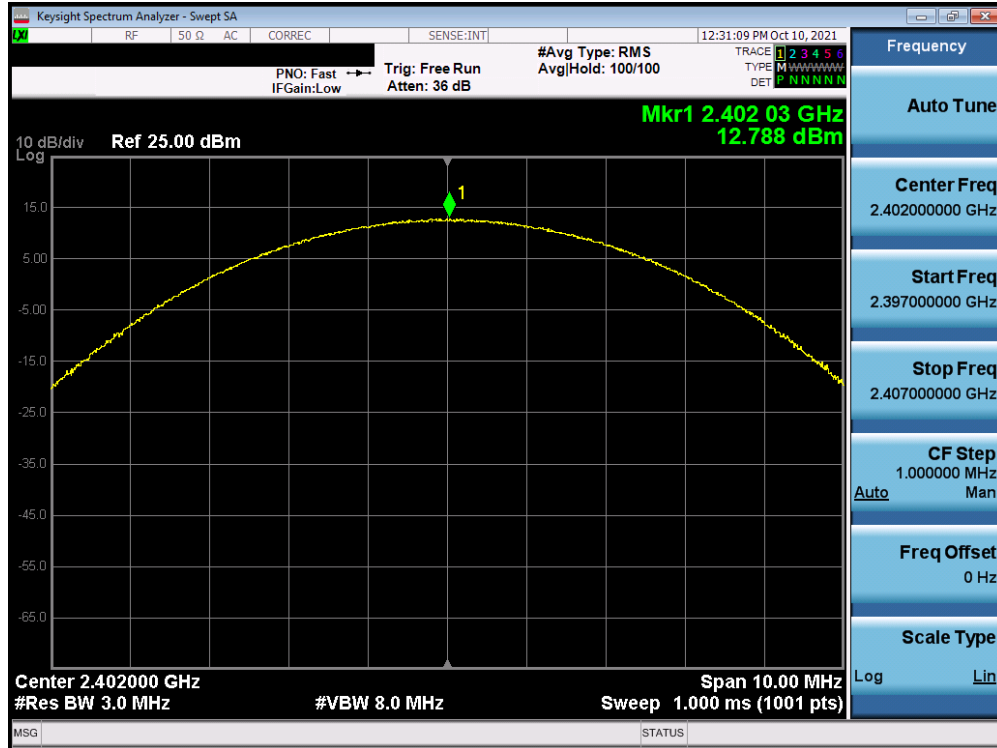


Plot 7-95. Dual Bluetooth Peak Conducted Power (2Mbps – Ch. 39) Antenna 1 iPA

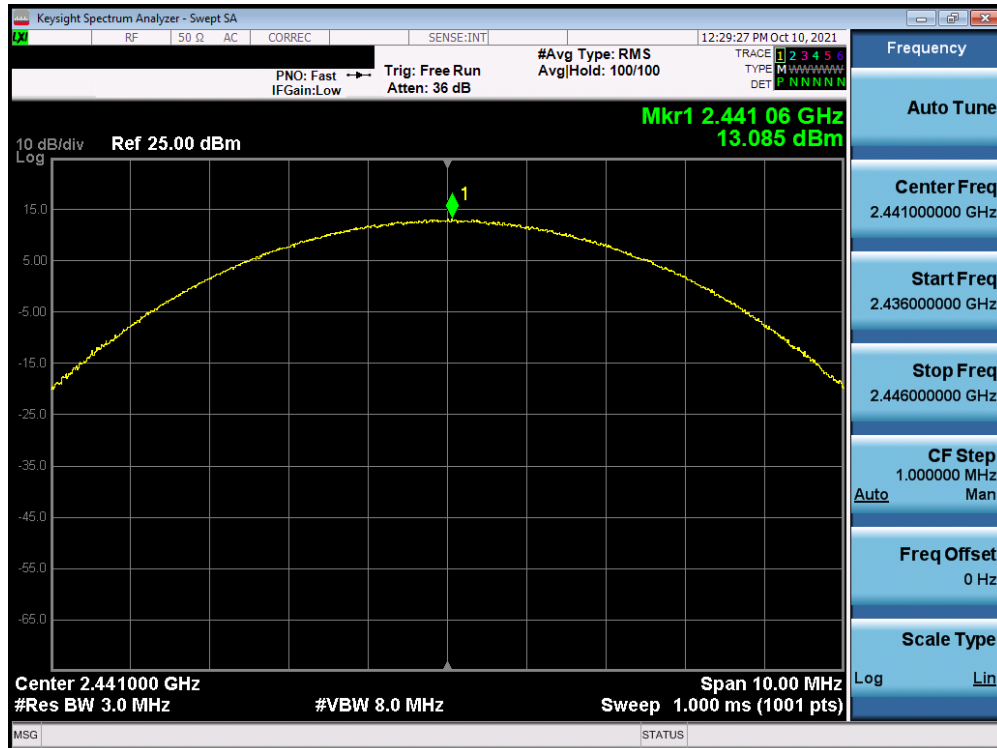


Plot 7-96. Dual Bluetooth Peak Conducted Power (2Mbps – Ch. 78) Antenna 1 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 65 of 131

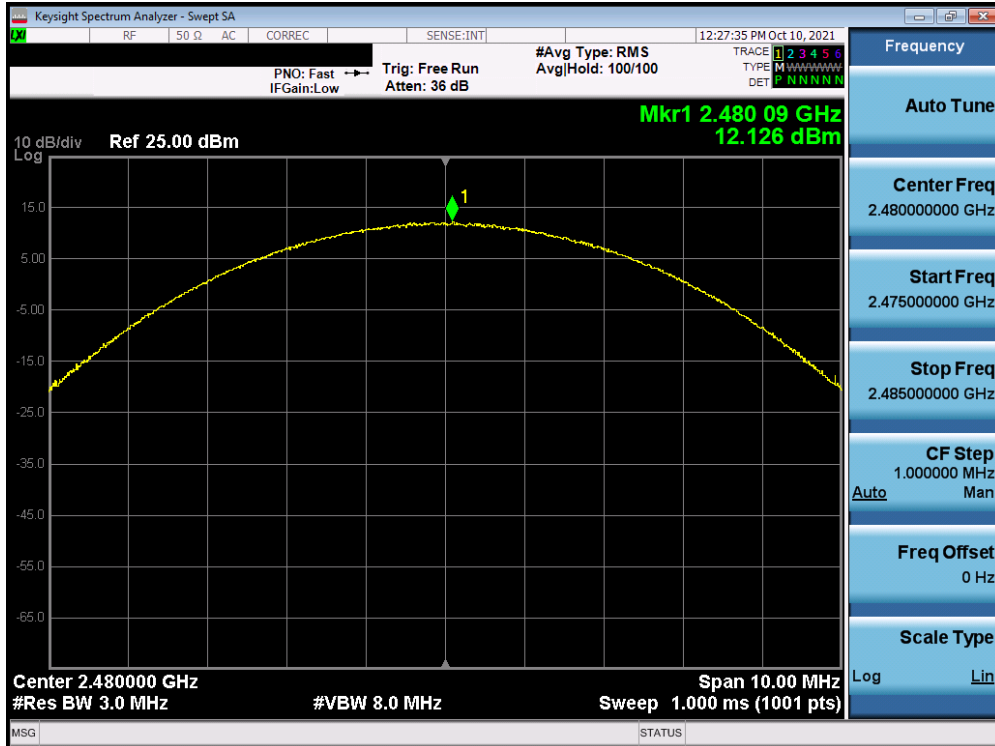


Plot 7-97. Dual Bluetooth Peak Conducted Power (3Mbps – Ch. 0) Antenna 1 iPA

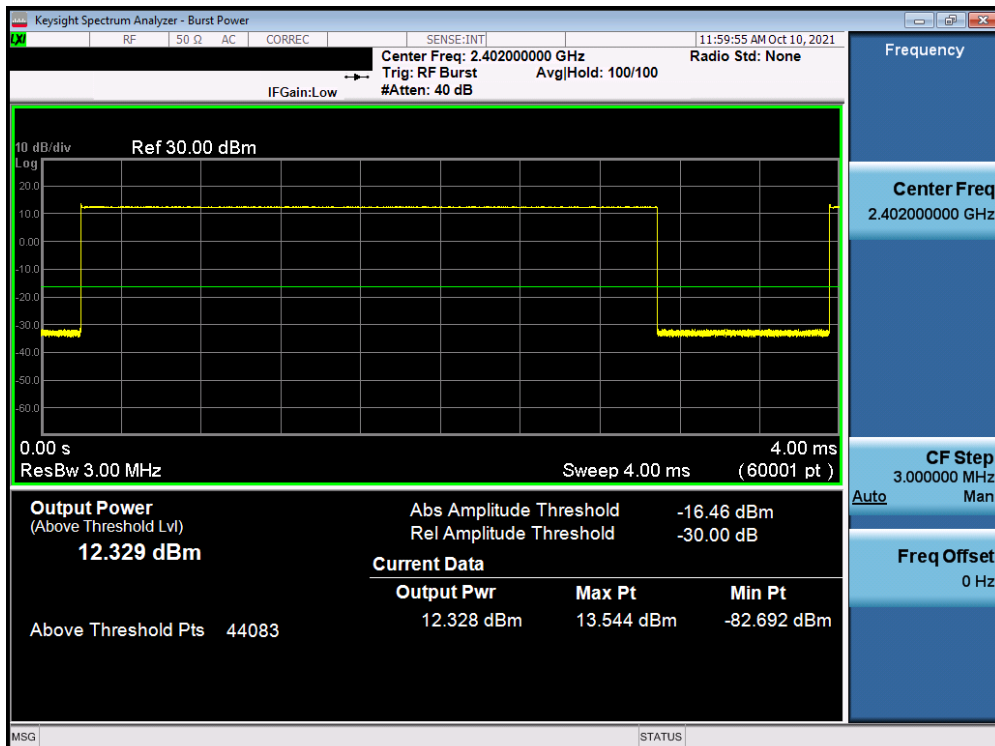


Plot 7-98. Dual Bluetooth Peak Conducted Power (3Mbps – Ch. 39) Antenna 1 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 66 of 131

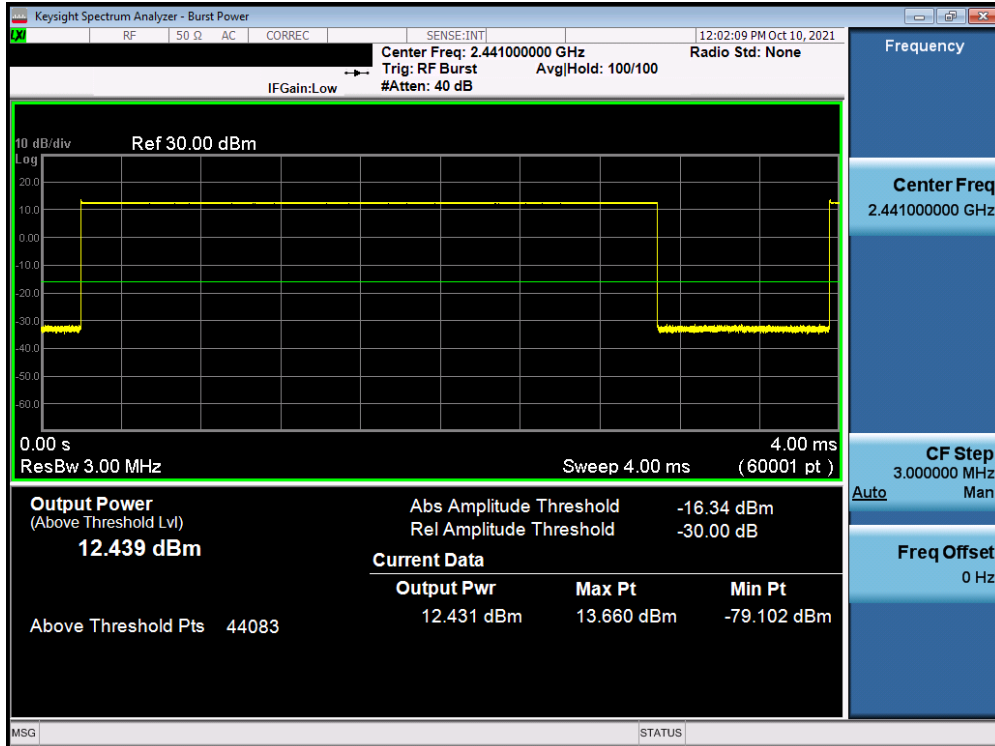


Plot 7-99. Dual Bluetooth Peak Conducted Power (3Mbps – Ch. 78) Antenna 1 iPA

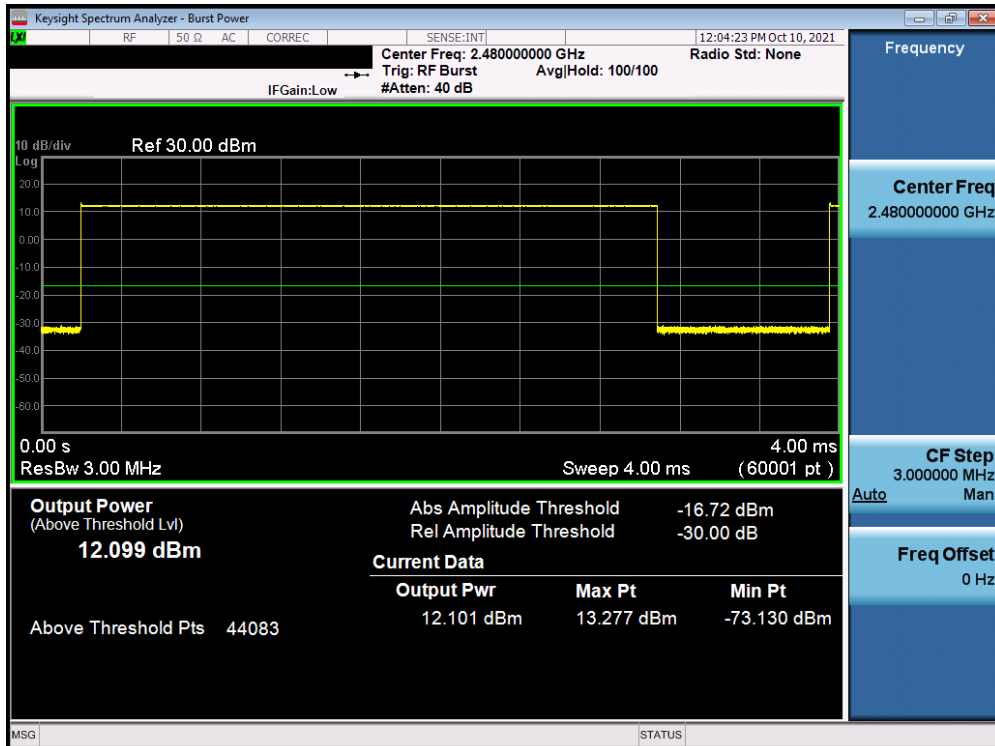


Plot 7-100. Dual Bluetooth Average Conducted Power (1Mbps – Ch. 0) Antenna 1 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 67 of 131

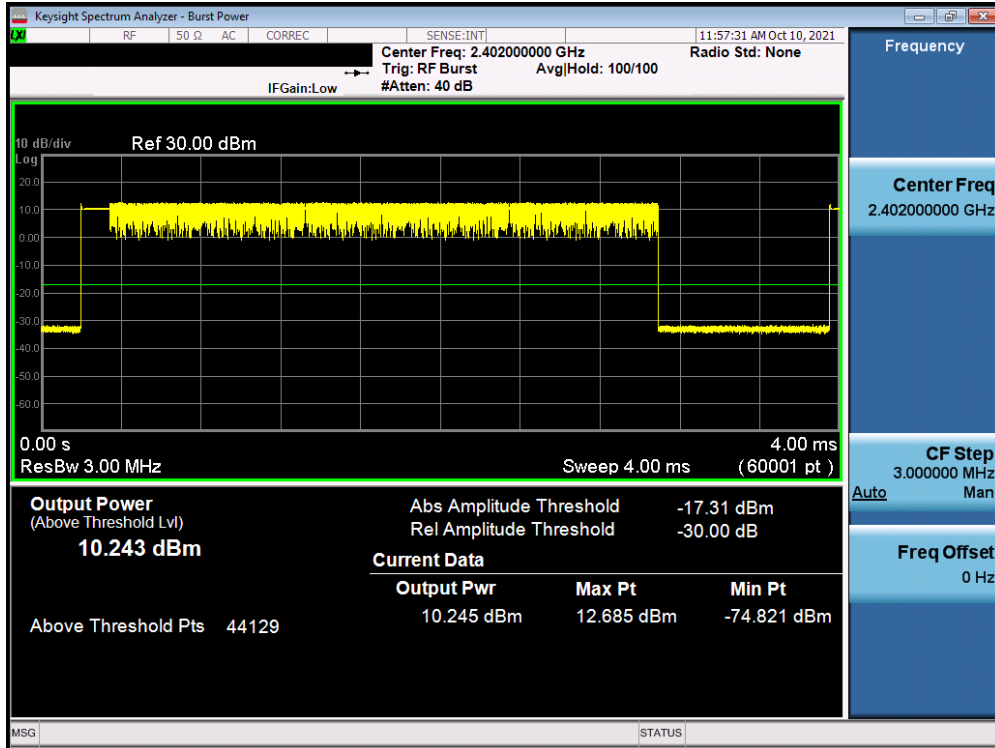


Plot 7-101. Dual Bluetooth Average Conducted Power (1Mbps – Ch. 39) Antenna 1 iPA

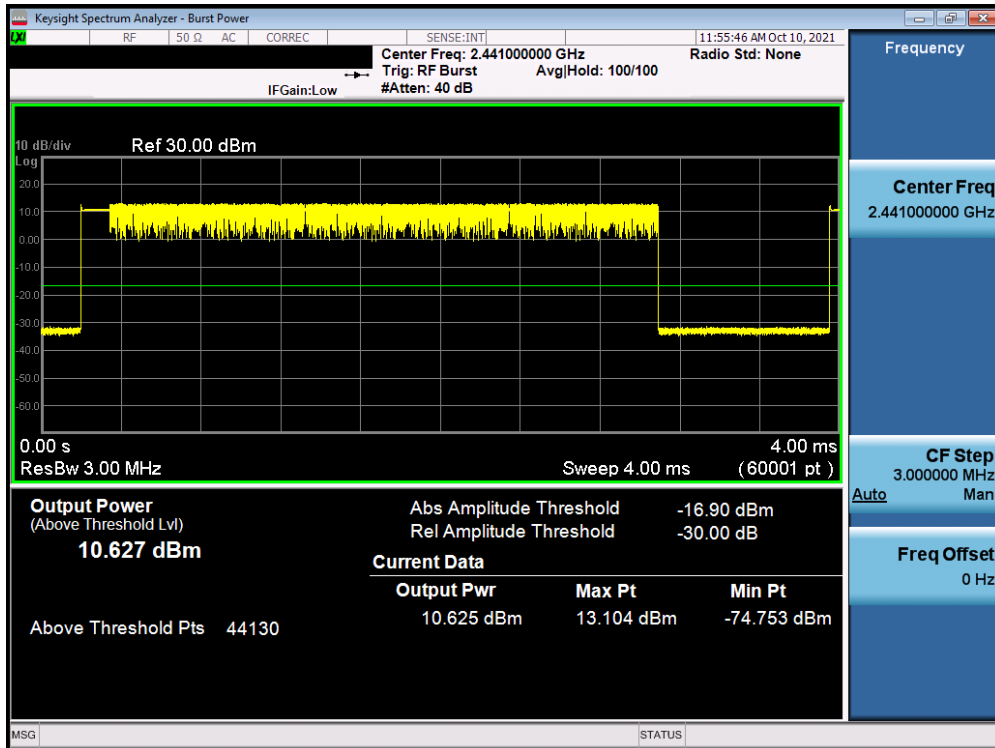


Plot 7-102. Dual Bluetooth Average Conducted Power (1Mbps – Ch. 78) Antenna 1 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 68 of 131



Plot 7-103. Dual Bluetooth Average Conducted Power (2Mbps – Ch. 0) Antenna 1 iPA



Plot 7-104. Dual Bluetooth Average Conducted Power (2Mbps – Ch. 39) Antenna 1 iPA

FCC ID: A3LSMS908JPN	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2112100159-12.A3L	Test Dates: 10/8/2021-10/20/2021	EUT Type: Portable Handset		Page 69 of 131