

**MEASUREMENT REPORT**  
**FCC PART 15.247 Bluetooth (Low Energy)**

**Applicant Name:**  
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Yeongtong-gu, Suwon-si  
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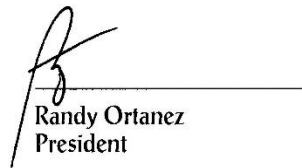
**Date of Testing:**  
9/22/2021 - 11/11/2021  
**Report Issue Date:**  
11/15/2021  
**Test Site/Location:**  
PCTEST Lab. Columbia, MD, USA  
**Test Report Serial No.:**  
1M2109090103-17.A3L

<b>FCC ID:</b>	<b>A3LSMS906U</b>
<b>APPLICANT:</b>	<b>Samsung Electronics Co., Ltd.</b>

<b>Application Type:</b>	Certification
<b>Model:</b>	SM-S906U
<b>Additional Models:</b>	SM-S906U1
<b>EUT Type:</b>	Portable Handset
<b>Max. RF Output Power:</b>	61.674mW (17.90dBm) Peak Conducted
<b>Frequency Range:</b>	2402 – 2480MHz
<b>FCC Classification:</b>	Digital Transmission System (DTS)
<b>FCC Rule Part(s):</b>	Part 15 Subpart C (15.247)
<b>Test Procedure(s):</b>	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 and KDB 558074 D01 v05r02. 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: A3LSMS906U**. The data found in this test report was taken with the EUT operating in Bluetooth low energy mode. While in low energy mode, the Bluetooth transmitter hops pseudo-randomly between 40 channels, three of which are “advertising channels”. When the transmitter is hopping only between the three advertising channels, the EUT does not fall under the category of a “hopper” as defined in 15.247(a)(iii) which states that a “frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.” As operation on only the advertising channels does not qualify the EUT as a hopper, the EUT is certified as a DTS device in this mode. The data found in this report is representative of the device when it transmits on its advertising channels. Typical Bluetooth operation is covered under the DSS report found with this application.

**Test Device Serial No.:** 1229M, 0292M, 0298M, 1224M, 0278M

### 2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, Multi-band 5G NR, 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII (5GHz and 6GHz), Bluetooth (1x, EDR, LE), NFC, Wireless Power Transfer, UWB

Ch.	Frequency (MHz)
0	2402
:	:
19	2440
:	:
39	2480

Table 2-1. Frequency / Channel Operations

Data Rate	Power Scheme	Antenna 0	Antenna 1	Dual
125kbps	ePA	x	x	x
	iPA	✓	✓	x
500kbps	ePA	x	x	x
	iPA	✓	✓	x
1Mbps	ePA	✓	✓	x
	iPA	✓	✓	✓
2Mbps	ePA	✓	✓	x
	iPA	✓	✓	✓

Table 2-2. Supported Data Rate and Power Scheme

✓= Supported  
x= Not Supported

**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.

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## 2.3 Antenna Description

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

Frequency [MHz]	Antenna 2 Gain (dBi)	Antenna 2 Gain (dBi)
2402	-6.1	-7.4
2441	-6.1	-7.3
2480	-6.4	-7.4

**Table 2-3. Highest Antenna 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 S906USQU0AUJ9 installed on the EUT.

## 2.6 EMI Suppression Device(s)/Modifications

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

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## 3.0 DESCRIPTION OF TESTS

### 3.1 Evaluation Procedure

The measurement procedures described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) and the guidance provided in KDB 558074 D01 v05r02 were 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, 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 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 that 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 7.10. 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 antenna(s) 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 ( $\pm$ dB)
Conducted Bench Top Measurements	1.13
Line 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
-	WL25-1	Conducted Cable Set (25GHz)	7/2/2020	Annual	8/18/2022	WL25-1
-	WL40-1	Conducted Cable Set (40GHz)	9/10/2021	Annual	9/10/2022	WL40-1
Agilent	N9038A	MXE EMI Receiver	7/17/2019	Annual	12/1/2021	MY51210133
Agilent	N9030A	PXA Signal Analyzer (44GHz)	7/17/2020	Annual	7/21/2022	MY49430494
Anritsu	ML2495A	Power Meter	12/17/2019	Annual	1/18/2022	941001
Anritsu	MA2411B	Pulse Power Sensor	8/14/2019	Annual	9/21/2022	1315051
Com-Power	AL-130R	9kHz - 30MHz Loop Antenna	10/10/2019	Biennial	12/10/2021	121085
Emco	3115	Horn Antenna (1-18GHz)	6/18/2020	Biennial	6/18/2022	9704-5182
Emco	3116C	Horn Antenna (18 - 40GHz)	5/11/2021	Biennial	5/11/2023	218893
ETS-Lindgren	3816/2NM	Line Impedance Stabilization Network	7/9/2020	Biennial	7/9/2022	114451
Keysight Technologies	N9030A	PXA Signal Analyzer (44GHz)	8/17/2020	Annual	12/17/2021	MY52350166
Pasternack	NMLC-2	Line Conducted Emissions Cable (NM)	9/10/2021	Annual	9/10/2022	NMLC-2
Rohde & Schwarz	TS-PR1840	18-40 GHz Pre-Amplifier	9/10/2021	Annual	9/10/2022	100059
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	8/3/2021	Annual	8/3/2022	100342
Rohde & Schwarz	ESW44	EMI Test Receiver 2Hz to 44GHz	1/21/2021	Annual	1/21/2022	101716
Rohde & Schwarz	FSW67	Signal / Spectrum Analyzer	8/25/2021	Annual	8/25/2022	103200
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	9/3/2021	Annual	9/3/2022	102138
Solar Electronics	8012-50-R-24-BNC	Line Impedance Stabilization Network	9/21/2021	Biennial	9/21/2023	310233
Rohde & Schwarz	TC-TA18	Cross Polarized Vivaldi Test Antenna	8/13/2020	Biennial	8/13/2022	101073
Schwarzbeck	VULB9162	Bilog Antenna	4/17/2020	Biennial	4/17/2022	00301

**Table 6-1. Annual Test Equipment Calibration Schedule**

**Note:**

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.

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## 7.0 TEST RESULTS

### 7.1 Summary

Company Name: Samsung Electronics Co., Ltd.  
 FCC ID: A3LSMS906U  
 FCC Classification: Digital Transmission System (DTS)  
 Number of Channels: 40

FCC Part Section(s)	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.247(a)(2)	RSS-247 [5.2]	6dB Bandwidth	> 500kHz	CONDUCTED	PASS	Section 7.2
15.247(b)(3)	RSS-247 [5.4(4)]	Transmitter Output Power	< 1 Watt		PASS	Sections 7.3
15.247(e)	RSS-247 [5.2]	Transmitter Power Spectral Density	< 8dBm / 3kHz Band		PASS	Section 7.4
15.247(d)	RSS-247 [5.5]	Band Edge / Out-of-Band Emissions	≥ 20dBc		PASS	Sections 7.5, 7.6
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-Gen [8.9])	RADIATED	PASS	Sections 7.7, 7.8, 7.9
15.207	RSS-Gen [8.8]	AC Conducted Emissions 150kHz – 30MHz	< FCC 15.207 limits (RSS-Gen[8.8])	LINE CONDUCTED	PASS	Section 7.10

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

#### Notes:

- All modes of operation were investigated. The test results shown in the following sections represent the worst case emissions.
- 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.
- 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 and attenuators.
- 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 “Bluetooth LE Automation,” Version 3.6.
- 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 6dB Bandwidth Measurement – Bluetooth (LE)

§15.247(a.2); RSS-247 [5.2]

### Test Overview and Limit

The bandwidth at 6dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the transmitter antenna terminal of the EUT while the EUT is operating at maximum power and at the appropriate frequencies. All modes of operation were investigated and the worst case configuration results are reported in this section.

***The minimum permissible 6dB bandwidth is 500 kHz.***

### Test Procedure Used

ANSI C63.10-2013 – Section 11.8.2 Option 2  
 KDB 558074 D01 v05r02 – Section 8.2

### Test Settings

1. The signal analyzers' automatic bandwidth measurement capability of the spectrum analyzer was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to  $X = 6$ . The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 100kHz
3. VBW  $\geq 3 \times$  RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize

### Test Setup

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



**Figure 7-1. Test Instrument & Measurement Setup**

### Test Notes

All supported data rates and power schemes have been tested on the unit and only the worst case configuration is reported.

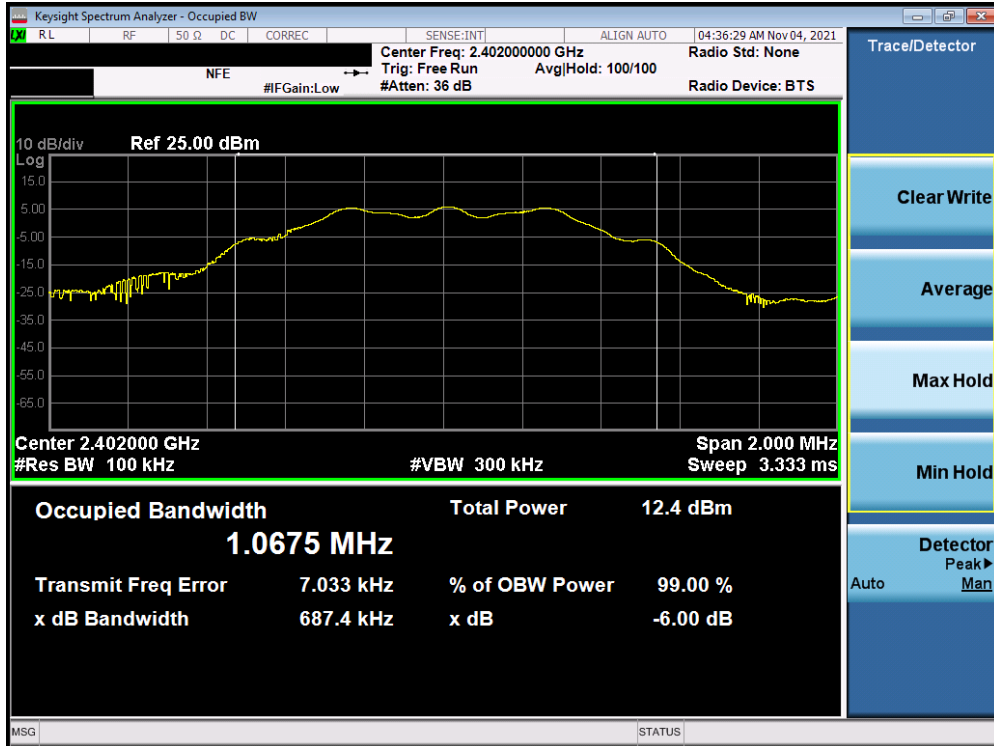
FCC ID: A3LSMS906U	 <b>PCTEST</b> Proud to be part of 	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
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**Antenna 1**

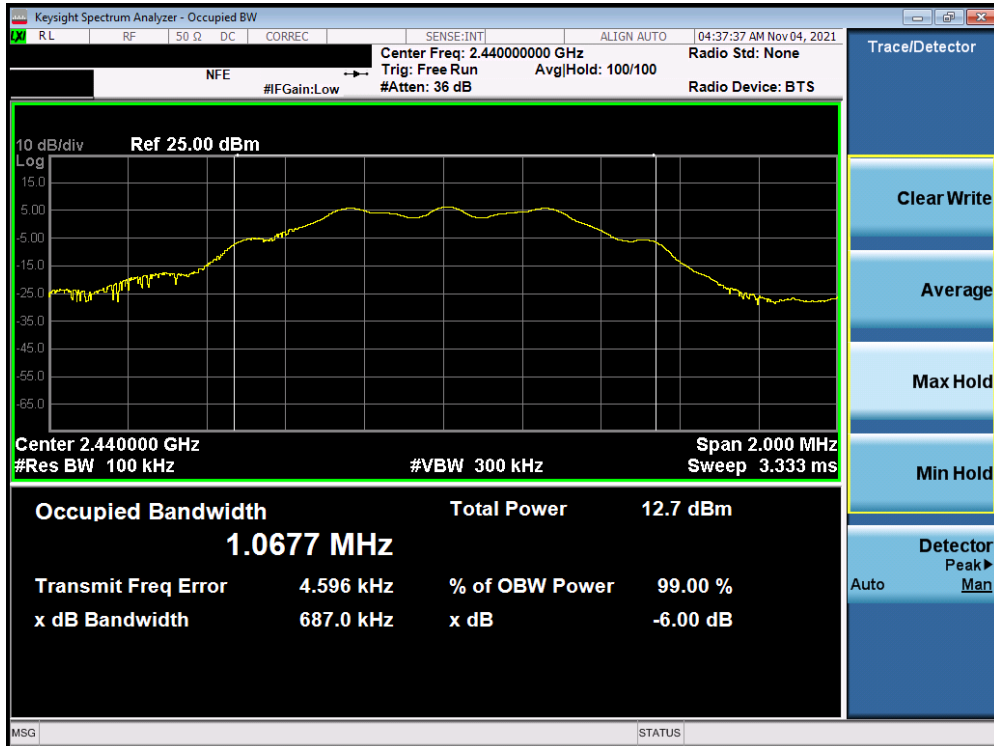
Frequency [MHz]	Data Rate	Power Scheme	Channel No.	Bluetooth Mode	Measured Bandwidth [kHz]	Minimum Bandwidth [kHz]	Pass / Fail
2402	125 kbps	iPA	0	LE	687.4	500	Pass
2440	125 kbps	iPA	19	LE	687.0	500	Pass
2480	125 kbps	iPA	39	LE	687.3	500	Pass
2402	500 kbps	iPA	0	LE	666.2	500	Pass
2440	500 kbps	iPA	19	LE	662.2	500	Pass
2480	500 kbps	iPA	39	LE	663.6	500	Pass
2402	1 Mbps	ePA	0	LE	717.3	500	Pass
2440	1 Mbps	ePA	19	LE	718.9	500	Pass
2480	1 Mbps	ePA	39	LE	721.5	500	Pass
2402	2 Mbps	ePA	0	LE	1229.0	500	Pass
2440	2 Mbps	ePA	19	LE	1236.0	500	Pass
2480	2 Mbps	ePA	39	LE	1239.0	500	Pass

**Table 7-2. Conducted Bandwidth Measurements Antenna 1**

FCC ID: A3LSMS906U	 <b>PCTEST</b> Proud to be part of 	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
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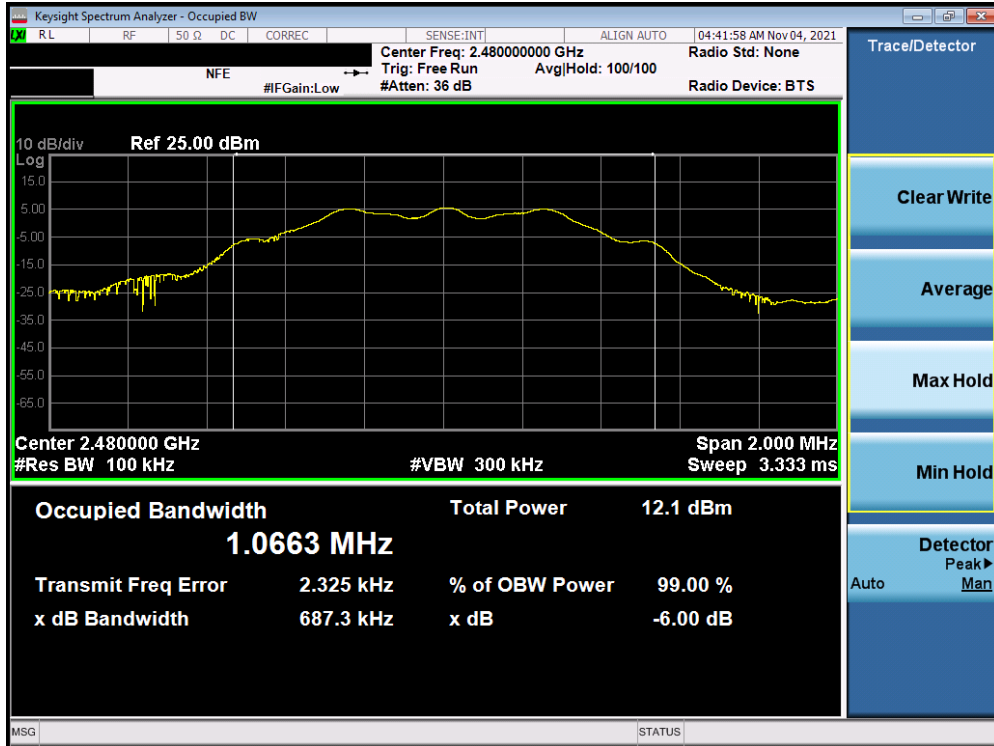


Plot 7-1. 6dB Bandwidth Plot (Bluetooth (LE), 125kbps iPA – Ch. 0) Antenna 1

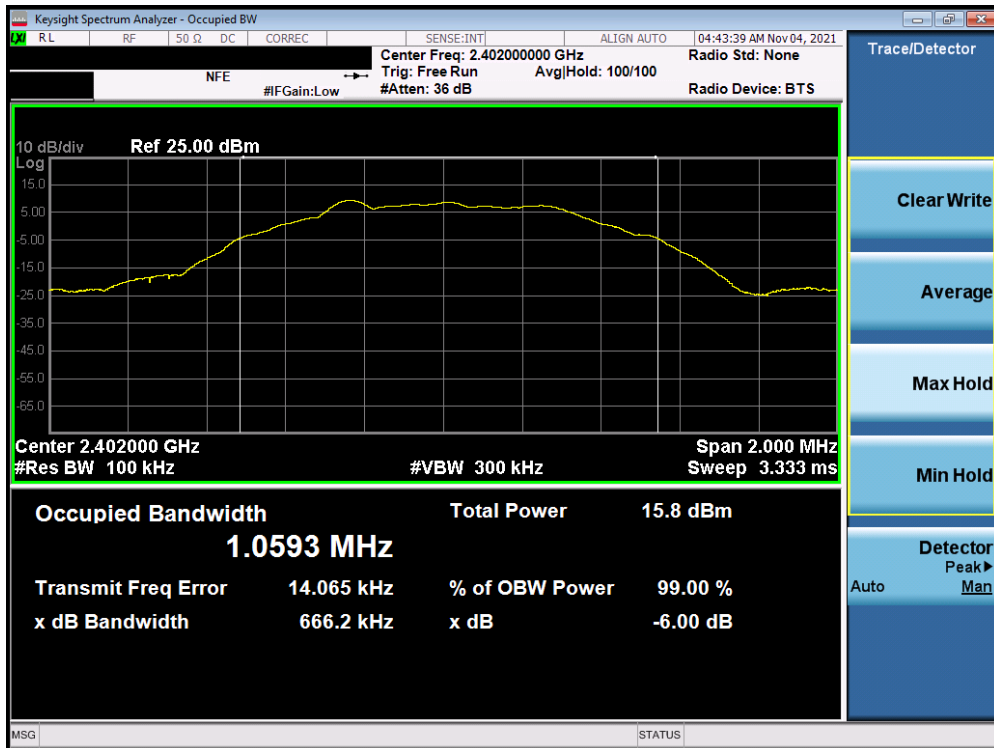


Plot 7-2. 6dB Bandwidth Plot (Bluetooth (LE), 125kbps iPA – Ch. 19) Antenna 1

FCC ID: A3LSMS906U		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 14 of 113

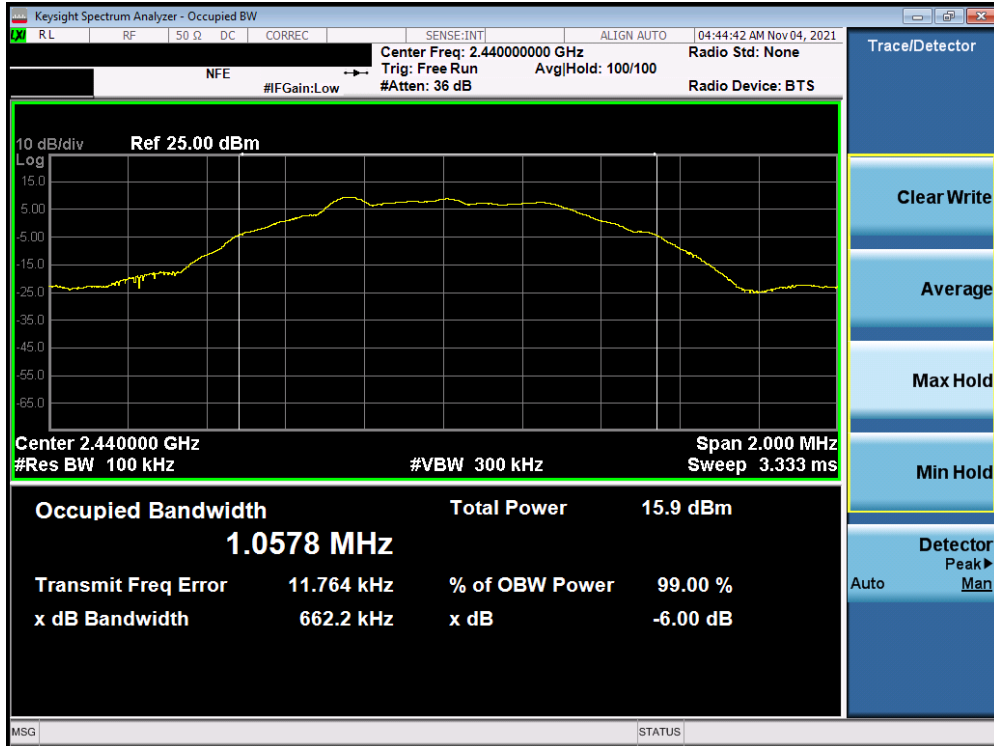


Plot 7-3. 6dB Bandwidth Plot (Bluetooth (LE), 125kbps iPA – Ch. 39) Antenna 1

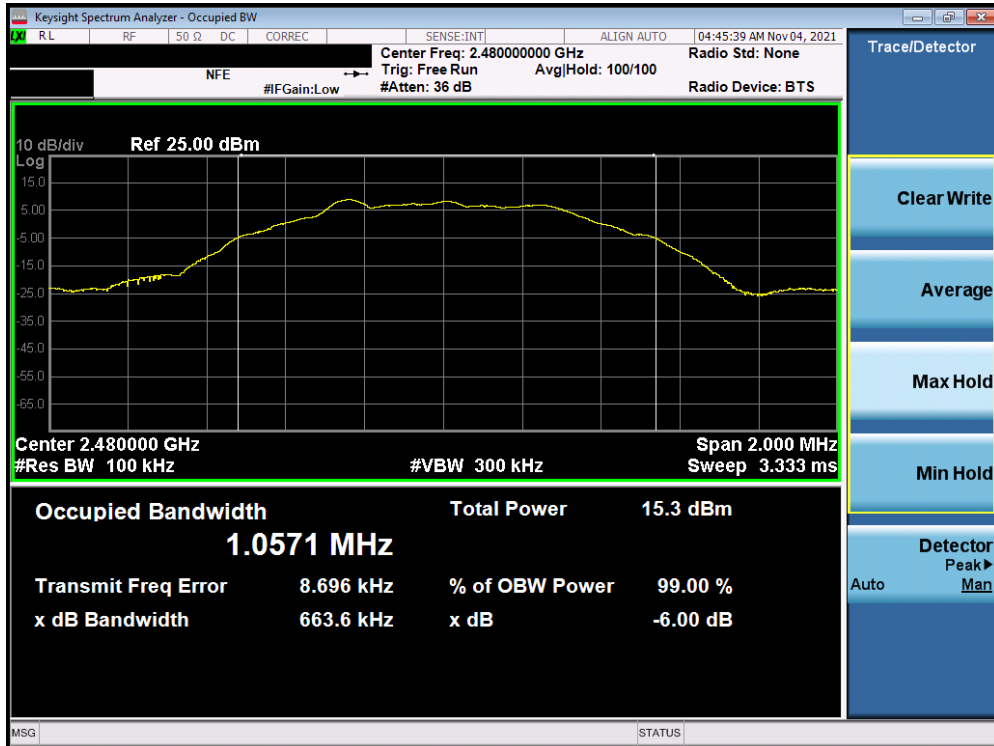


Plot 7-4. 6dB Bandwidth Plot (Bluetooth (LE), 500kbps iPA – Ch. 0) Antenna 1

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of  element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 15 of 113



Plot 7-5. 6dB Bandwidth Plot (Bluetooth (LE), 500kbps iPA – Ch. 19) Antenna 1



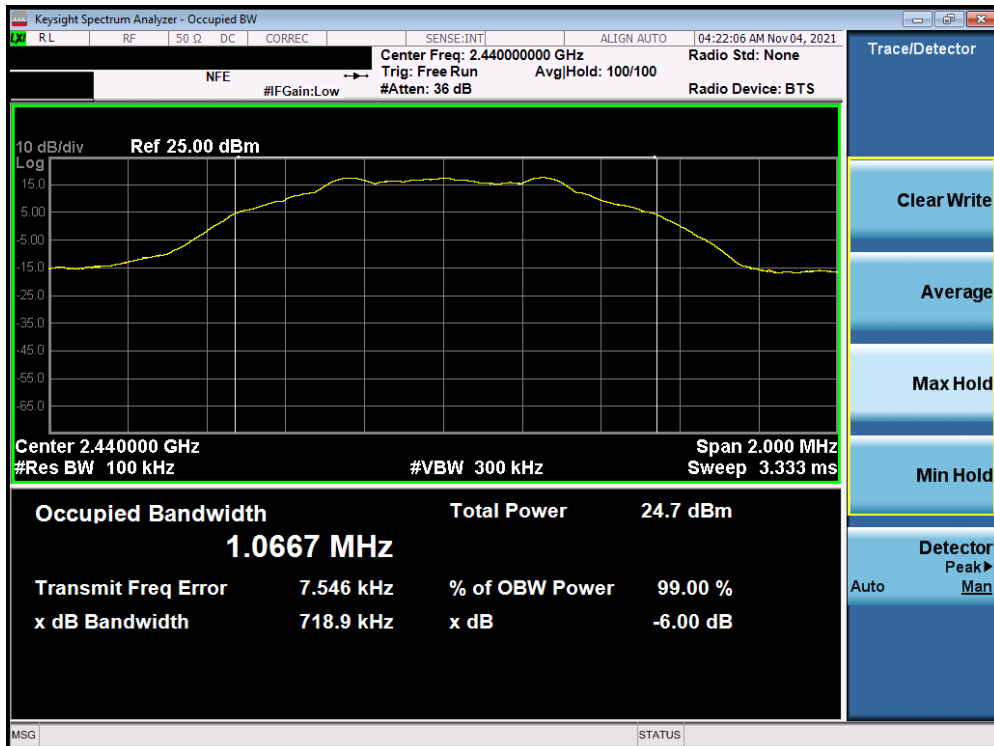
Plot 7-6. 6dB Bandwidth Plot (Bluetooth (LE), 500kbps iPA – Ch. 39) Antenna 1

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 16 of 113





Plot 7-7. 6dB Bandwidth Plot (Bluetooth (LE), 1Mbps ePA – Ch. 0) Antenna 1

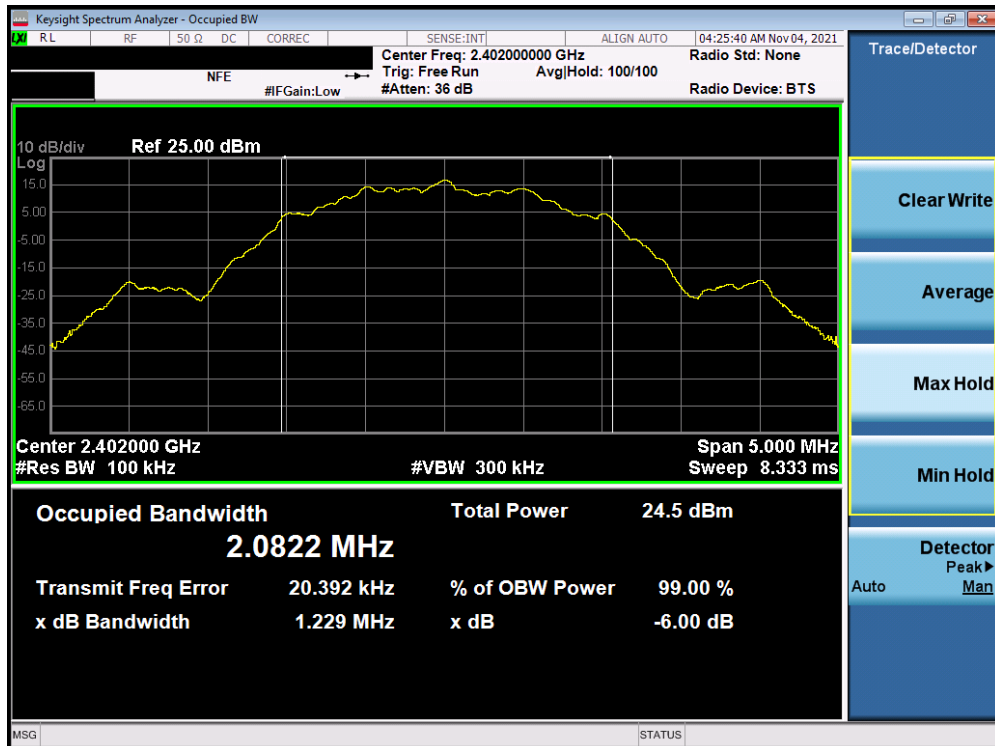


Plot 7-8. 6dB Bandwidth Plot (Bluetooth (LE), 1Mbps ePA – Ch. 19) Antenna 1

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 17 of 113



Plot 7-9. 6dB Bandwidth Plot (Bluetooth (LE), 1Mbps ePA – Ch. 39) Antenna 1



Plot 7-10. 6dB Bandwidth Plot (Bluetooth (LE), 2Mbps ePA – Ch. 0) Antenna 1

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 18 of 113



Plot 7-11. 6dB Bandwidth Plot (Bluetooth (LE), 2Mbps ePA – Ch. 19) Antenna 1



Plot 7-12. 6dB Bandwidth Plot (Bluetooth (LE), 2Mbps ePA – Ch. 39) Antenna 1

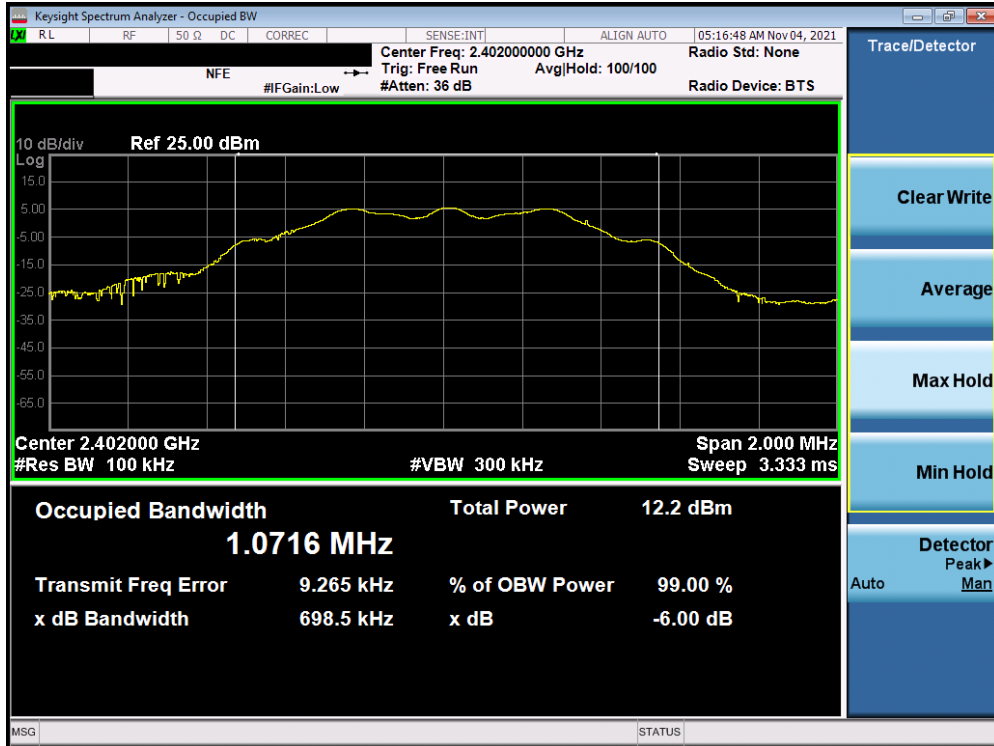
FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 19 of 113

## Antenna 2

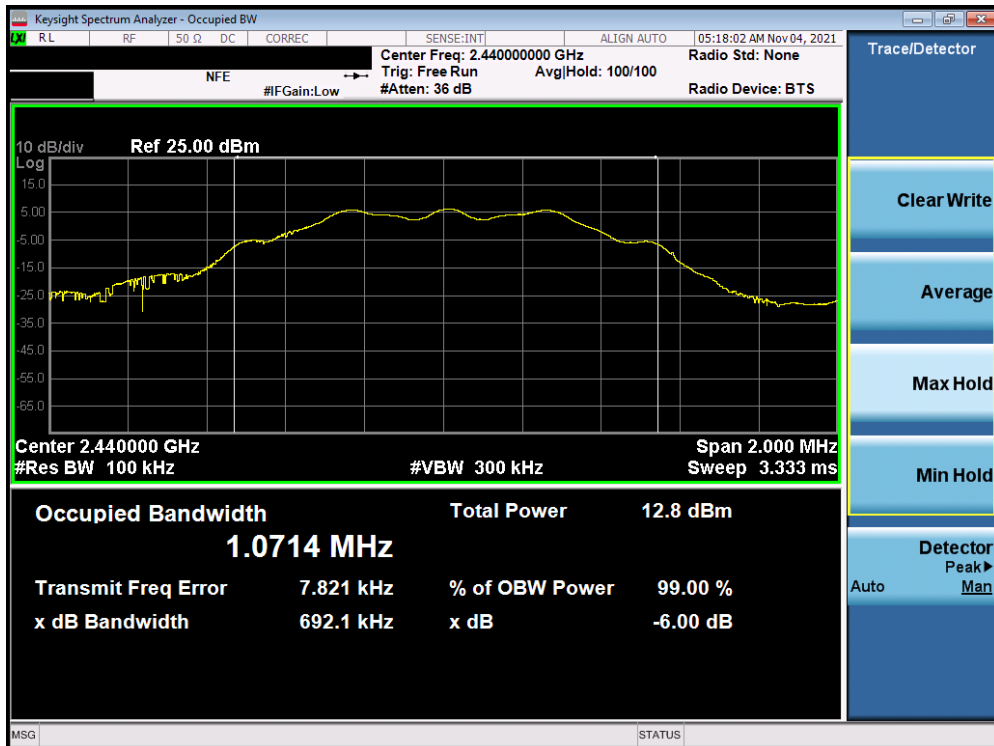
Frequency [MHz]	Data Rate	Power Scheme	Channel No.	Bluetooth Mode	Measured Bandwidth [kHz]	Minimum Bandwidth [kHz]	Pass / Fail
2402	125 kbps	iPA	0	LE	698.5	500	Pass
2440	125 kbps	iPA	19	LE	692.1	500	Pass
2480	125 kbps	iPA	39	LE	689.9	500	Pass
2402	500 kbps	iPA	0	LE	665.7	500	Pass
2440	500 kbps	iPA	19	LE	665.1	500	Pass
2480	500 kbps	iPA	39	LE	662.3	500	Pass
2402	1 Mbps	ePA	0	LE	718.9	500	Pass
2440	1 Mbps	ePA	19	LE	724.2	500	Pass
2480	1 Mbps	ePA	39	LE	722.6	500	Pass
2402	2 Mbps	ePA	0	LE	1230.0	500	Pass
2440	2 Mbps	ePA	19	LE	1237.0	500	Pass
2480	2 Mbps	ePA	39	LE	1238.0	500	Pass

**Table 7-3. Conducted Bandwidth Measurements Antenna 2**

FCC ID: A3LSMS906U	 <b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 20 of 113



Plot 7-13. 6dB Bandwidth Plot (Bluetooth (LE), 125kbps iPA – Ch. 0) Antenna 2

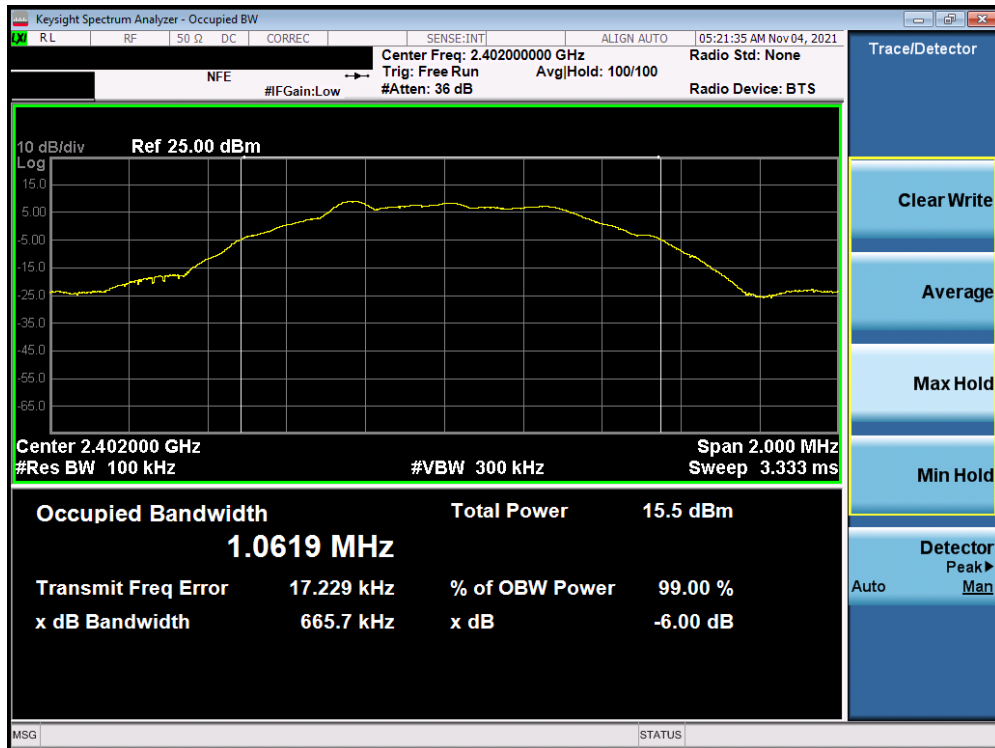


Plot 7-14. 6dB Bandwidth Plot (Bluetooth (LE), 125kbps iPA – Ch. 19) Antenna 2

FCC ID: A3LSMS906U	Proud to be part of  element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 21 of 113



Plot 7-15. 6dB Bandwidth Plot (Bluetooth (LE), 125kbps iPA – Ch. 39) Antenna 2

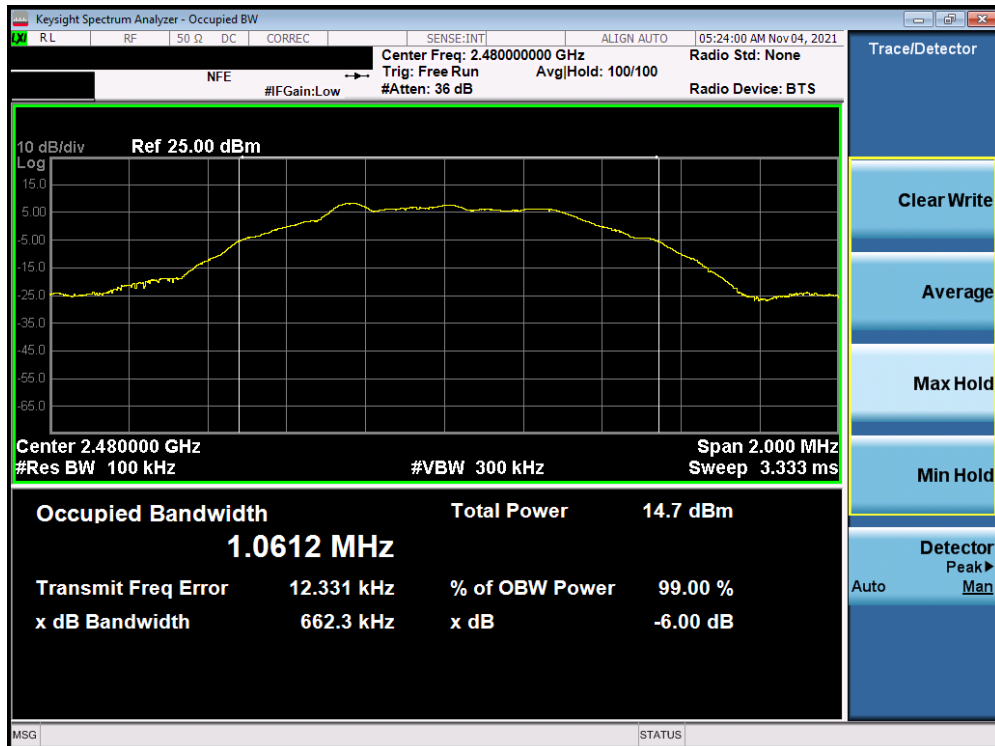


Plot 7-16. 6dB Bandwidth Plot (Bluetooth (LE), 500kbps iPA – Ch. 0) Antenna 2

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 22 of 113

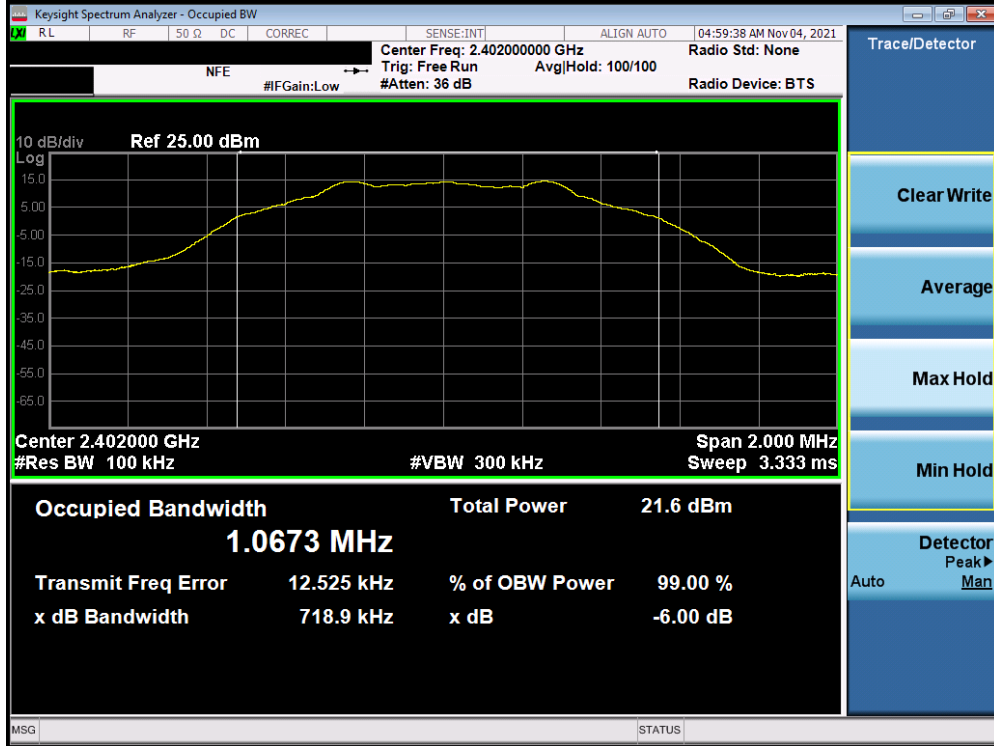


Plot 7-17. 6dB Bandwidth Plot (Bluetooth (LE), 500kbps iPA – Ch. 19) Antenna 2

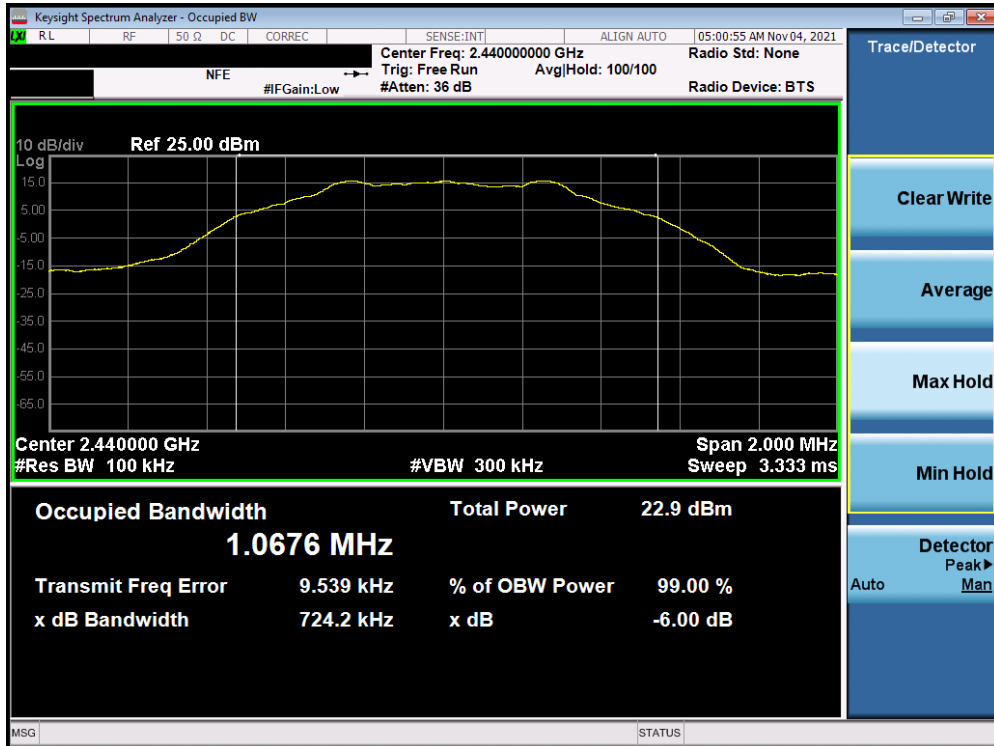


Plot 7-18. 6dB Bandwidth Plot (Bluetooth (LE), 500kbps iPA – Ch. 39) Antenna 2

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of  element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 23 of 113



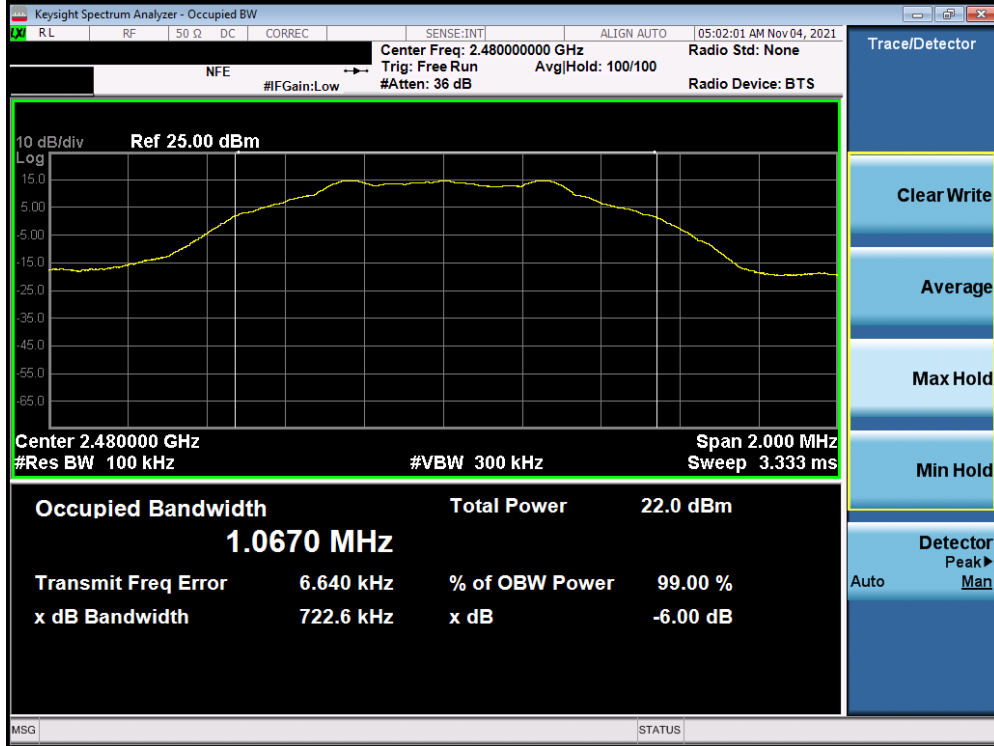
Plot 7-19. 6dB Bandwidth Plot (Bluetooth (LE), 1Mbps ePA – Ch. 0) Antenna 2



Plot 7-20. 6dB Bandwidth Plot (Bluetooth (LE), 1Mbps ePA – Ch. 19) Antenna 2

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 24 of 113





Plot 7-21. 6dB Bandwidth Plot (Bluetooth (LE), 1Mbps ePA – Ch. 39) Antenna 2



Plot 7-22. 6dB Bandwidth Plot (Bluetooth (LE), 2Mbps ePA – Ch. 0) Antenna 2

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of  element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 25 of 113



Plot 7-23. 6dB Bandwidth Plot (Bluetooth (LE), 2Mbps ePA – Ch. 19) Antenna 2



Plot 7-24. 6dB Bandwidth Plot (Bluetooth (LE), 2Mbps ePA – Ch. 39) Antenna 2

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of  element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 26 of 113

### 7.3 Output Power Measurement – Bluetooth (LE) §15.247(b.3); RSS-247 [5.4(4)]

#### Test Overview and Limits

The transmitter antenna terminal of the EUT is connected to the input of a spectrum analyzer. Measurements are made while the EUT is operating at maximum power and at the appropriate frequencies.

**The maximum peak conducted output power of digital modulation systems operating in the 2400-2483.5 MHz band is 1 Watt.**

**The conducted output power limit on paragraph above is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.**

#### Test Procedure Used

ANSI C63.10-2013 – Section 11.9.1.1

KDB 558074 D01 v05r02 – Section 8.3.1.1

ANSI C63.10-2013 – Section 14.2 Measure-and-Sum Technique

KDB 662911 D01 v02r01 – Section E)1) Measure-and-Sum Technique

#### Test Settings

1. RBW = 3MHz
2. VBW = 50MHz
3. Span  $\geq 3 \times$  RBW
4. Sweep = auto couple
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

#### Test Notes

None

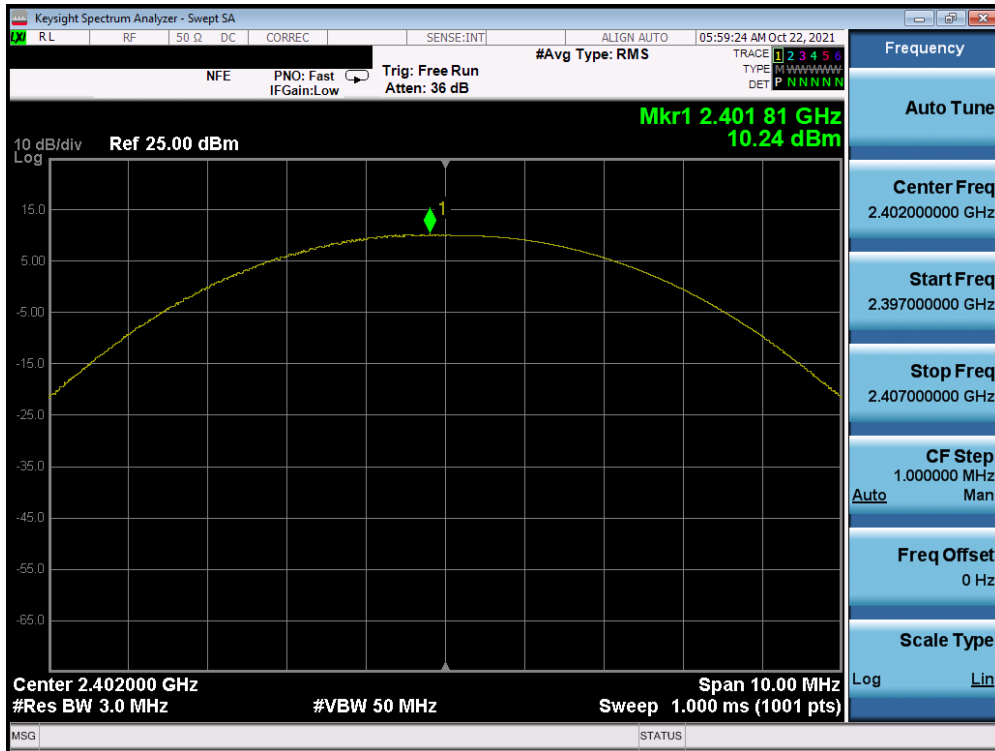
FCC ID: A3LSMS906U		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 27 of 113

## Antenna 1

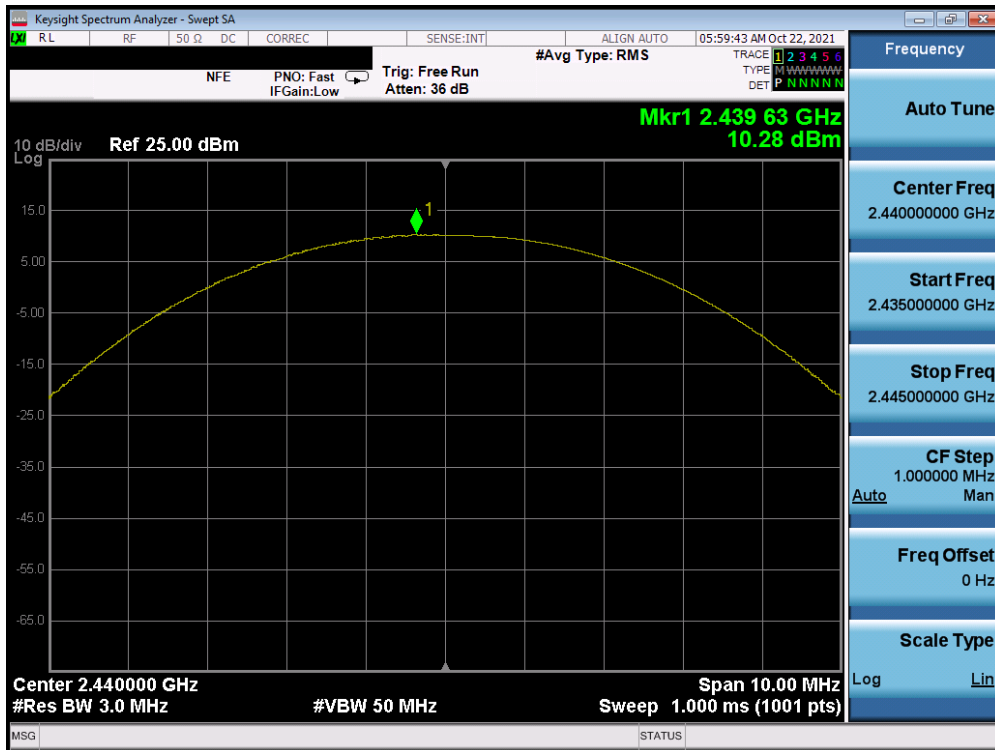
Frequency [MHz]	Data Rate	Power Scheme	Channel No.	Bluetooth Mode	Peak Conducted Power	
					[dBm]	[mW]
2402	125 kbps	iPA	0	LE	10.24	10.575
2440	125 kbps	iPA	19	LE	10.28	10.661
2480	125 kbps	iPA	39	LE	9.61	9.143
2402	500 kbps	iPA	0	LE	10.39	10.937
2440	500 kbps	iPA	19	LE	10.39	10.945
2480	500 kbps	iPA	39	LE	9.55	9.020
2402	1 Mbps	ePA	0	LE	16.09	40.644
2440	1 Mbps	ePA	19	LE	17.52	56.546
2480	1 Mbps	ePA	39	LE	16.37	43.351
2402	1 Mbps	iPA	0	LE	10.39	10.937
2440	1 Mbps	iPA	19	LE	10.36	10.874
2480	1 Mbps	iPA	39	LE	9.64	9.200
2402	2 Mbps	ePA	0	LE	17.28	53.469
2440	2 Mbps	ePA	19	LE	17.90	61.674
2480	2 Mbps	ePA	39	LE	17.22	52.674
2402	2 Mbps	iPA	0	LE	10.48	11.179
2440	2 Mbps	iPA	19	LE	10.47	11.153
2480	2 Mbps	iPA	39	LE	9.76	9.467

**Table 7-4. Conducted Output Power Measurements (Bluetooth (LE)) Antenna 1**

FCC ID: A3LSMS906U	 PCTEST® Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 28 of 113

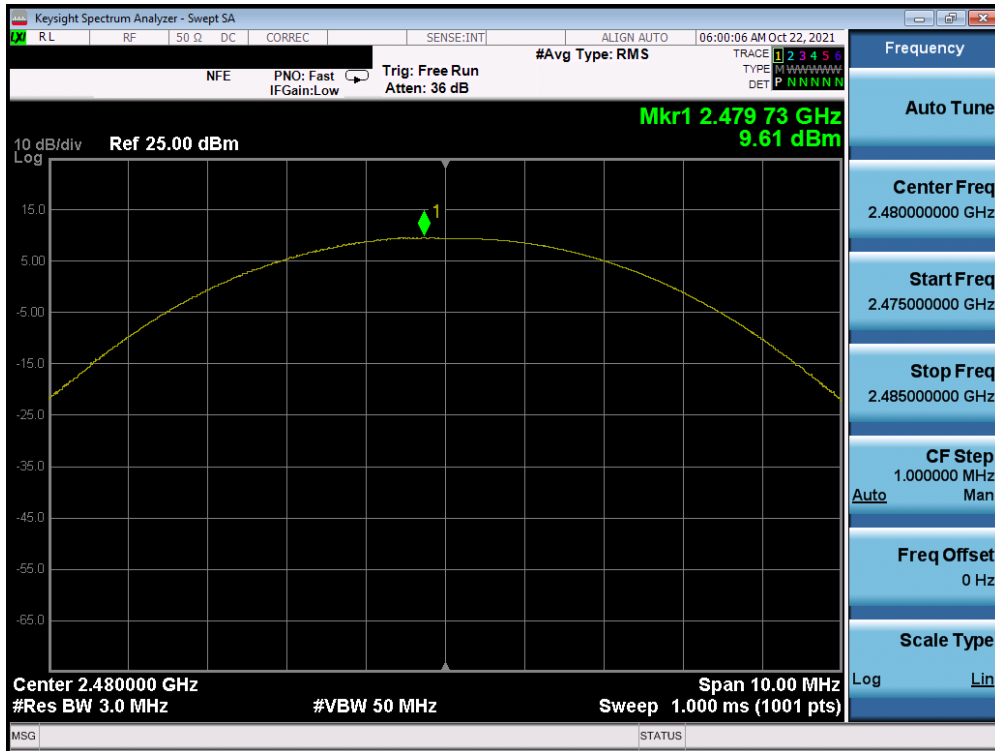


Plot 7-25. Peak Power Plot (Bluetooth (LE), 125kbps iPA – Ch. 0) Antenna 1

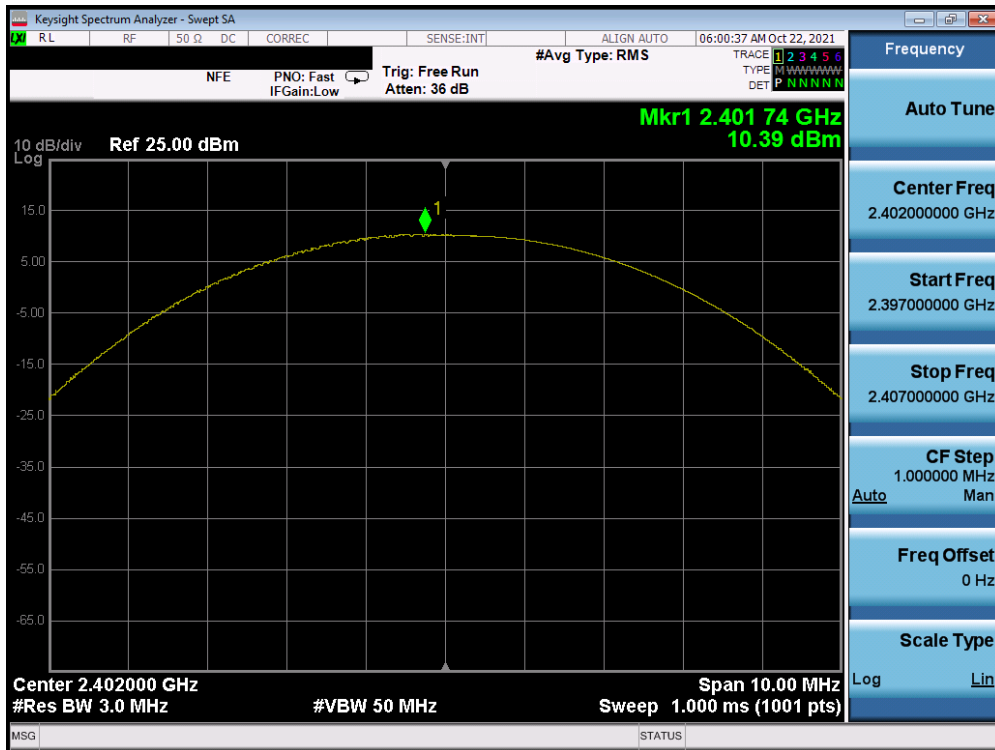


Plot 7-26. Peak Power Plot (Bluetooth (LE), 125kbps iPA– Ch. 19) Antenna 1

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of  element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 29 of 113

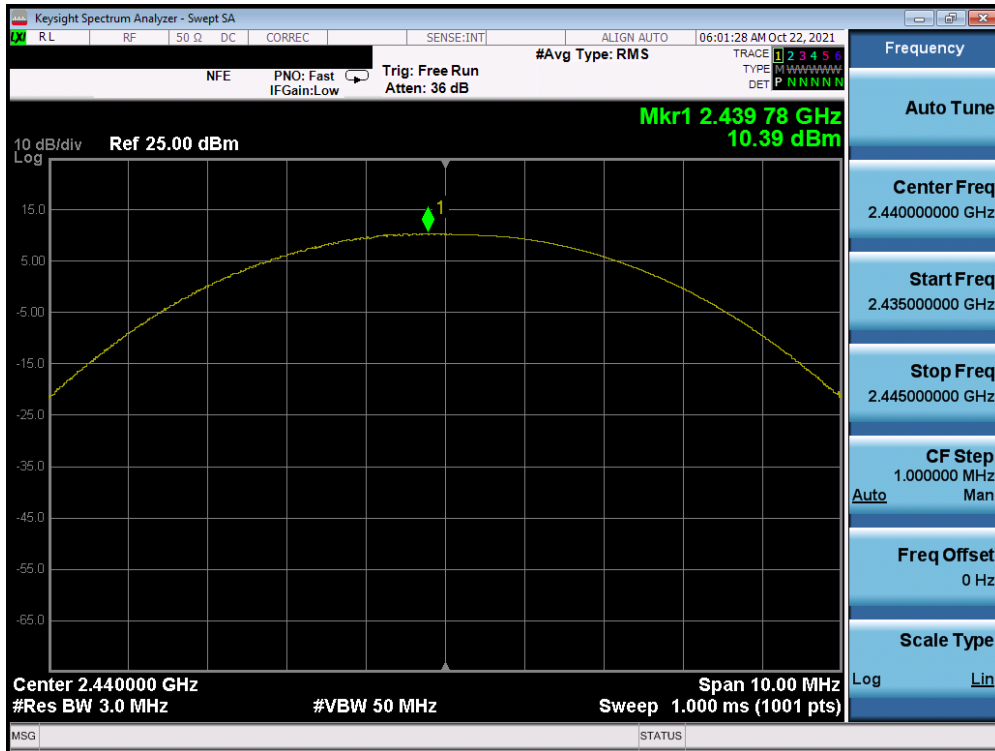


Plot 7-27. Peak Power Plot (Bluetooth (LE), 125kbps iPA – Ch. 39) Antenna 1

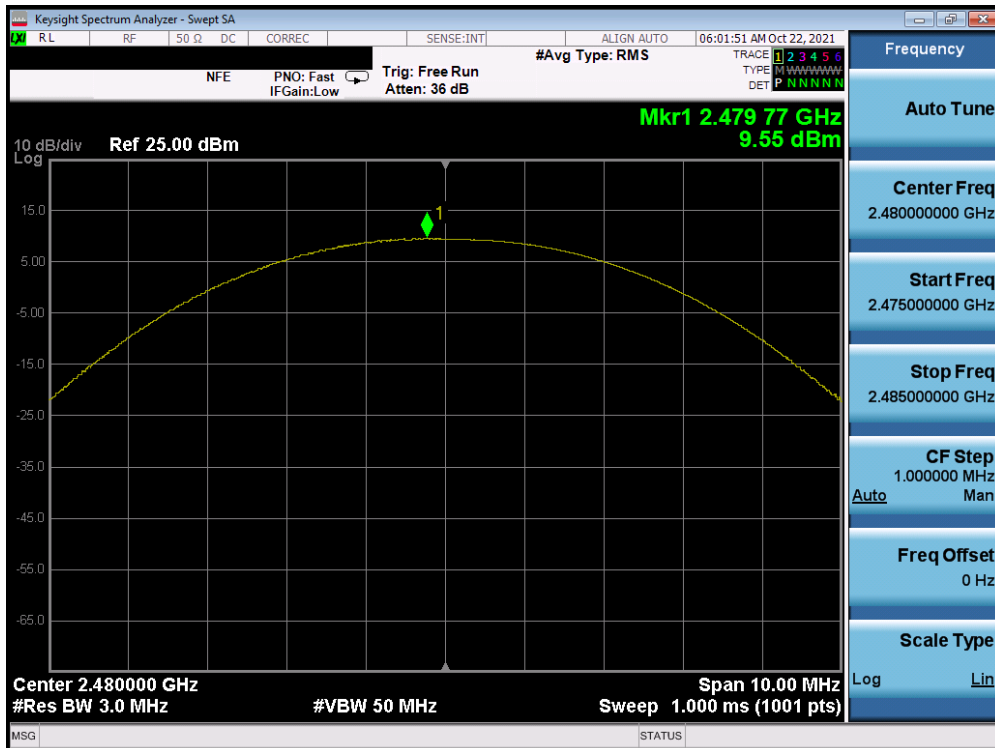


Plot 7-28. Peak Power Plot (Bluetooth (LE), 500kbps iPA – Ch. 0) Antenna 1

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of  element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 30 of 113

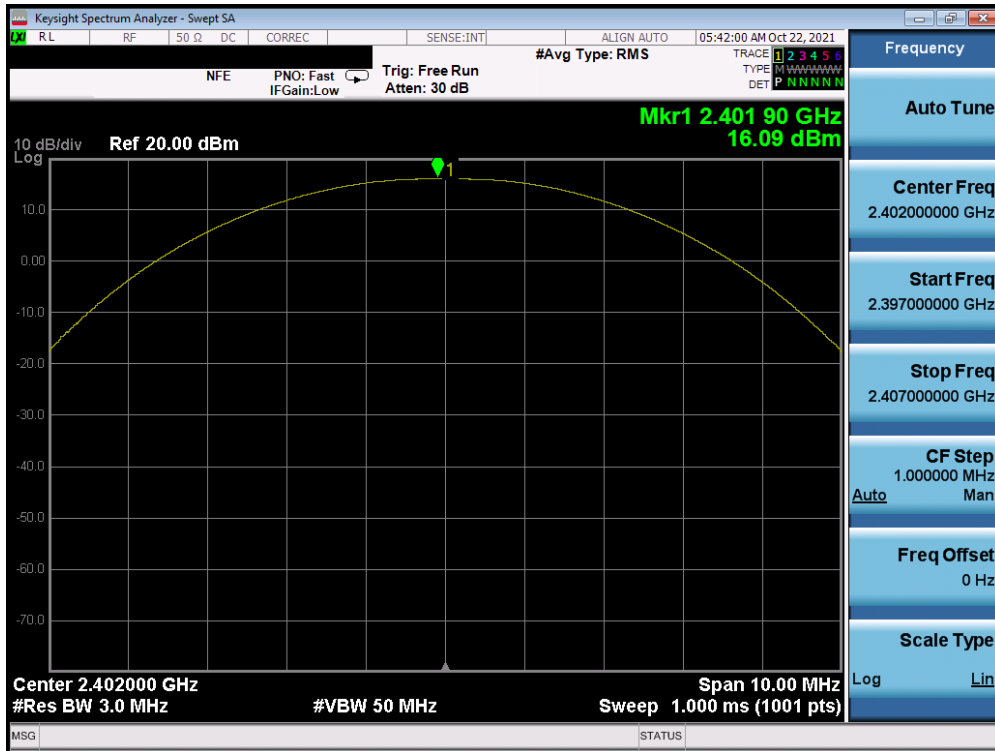


Plot 7-29. Peak Power Plot (Bluetooth (LE), 500kbps iPA – Ch. 19 Antenna 1

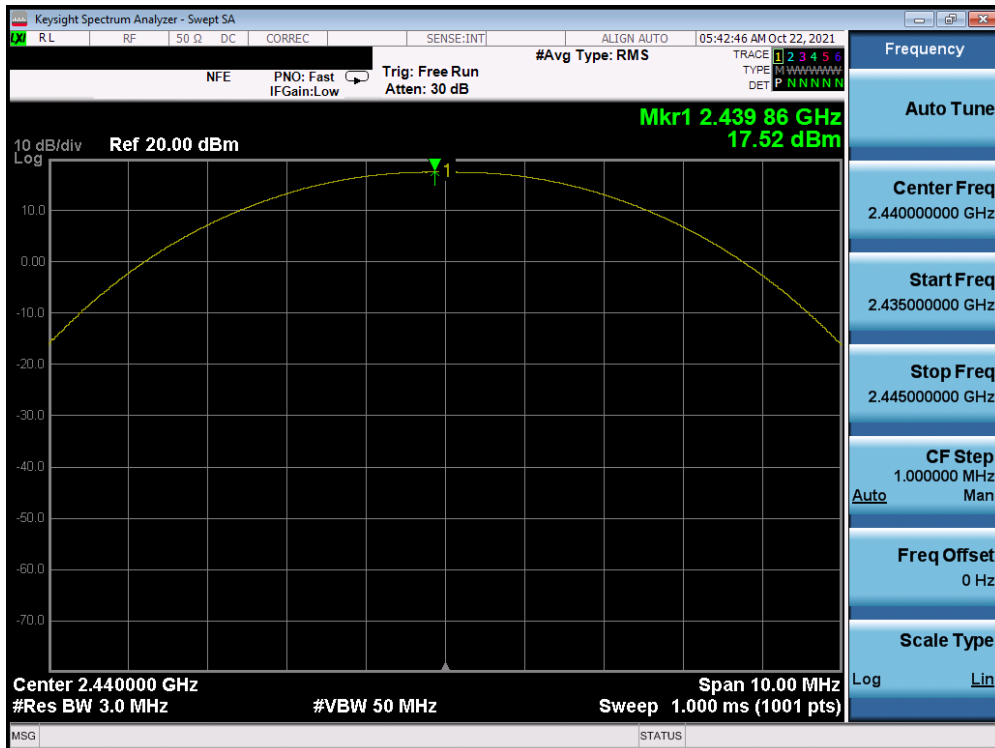


Plot 7-30. Peak Power Plot (Bluetooth (LE), 500kbps iPA – Ch. 39) Antenna 1

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of  element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 31 of 113



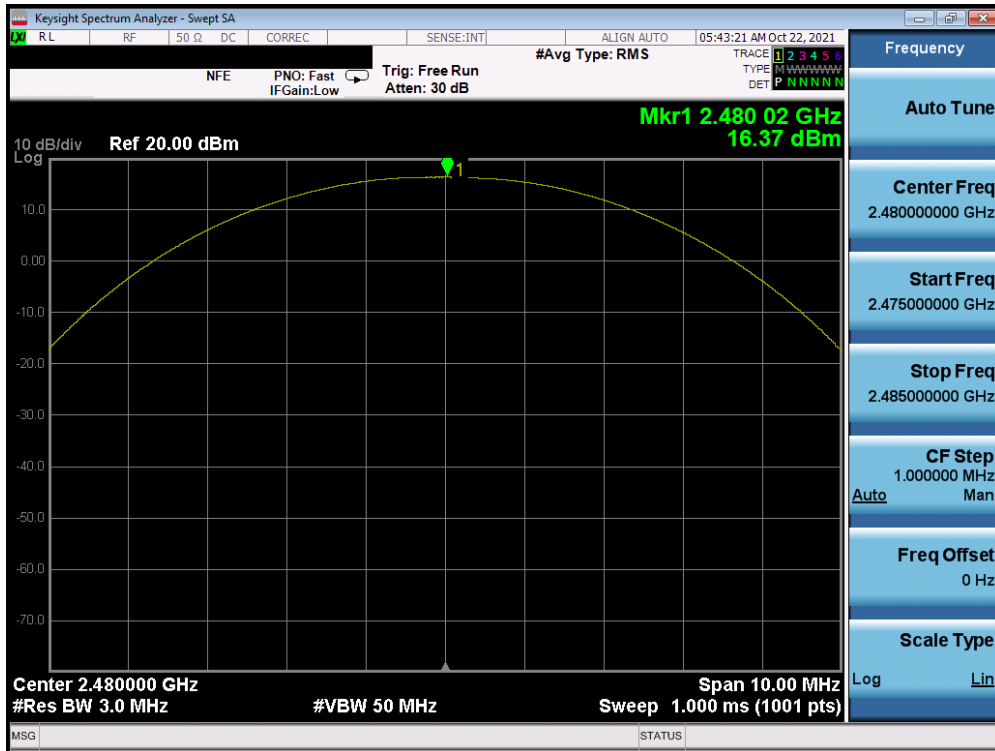
Plot 7-31. Peak Power Plot (Bluetooth (LE), 1Mbps ePA – Ch. 0) Antenna 1



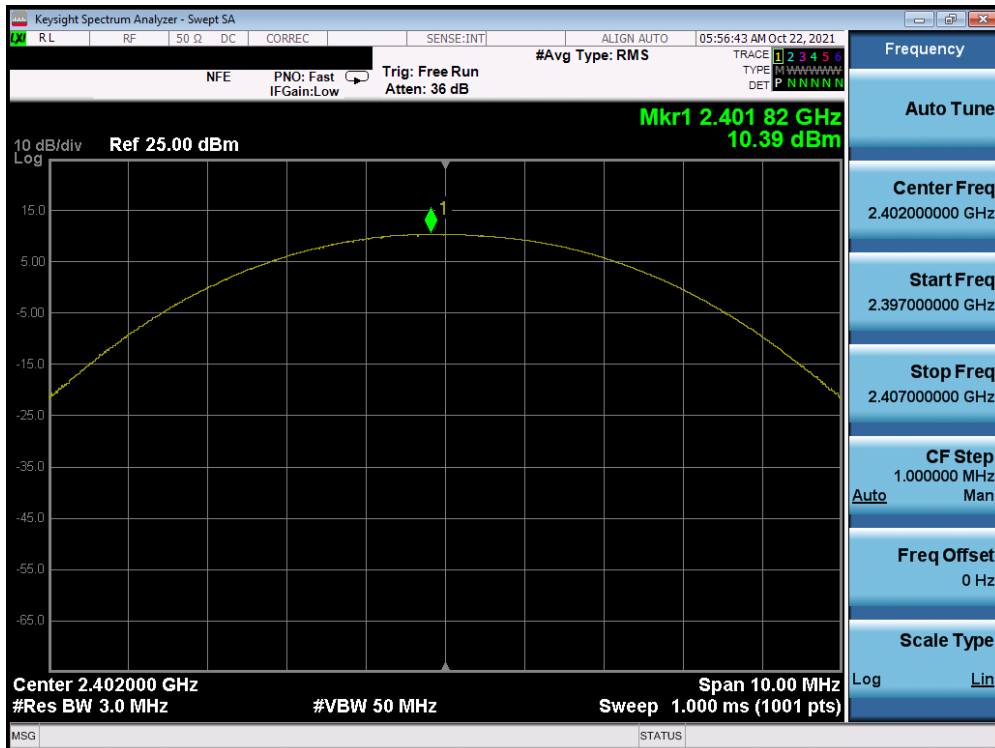
Plot 7-32. Peak Power Plot (Bluetooth (LE), 1Mbps ePA – Ch. 19) Antenna 1

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 32 of 113



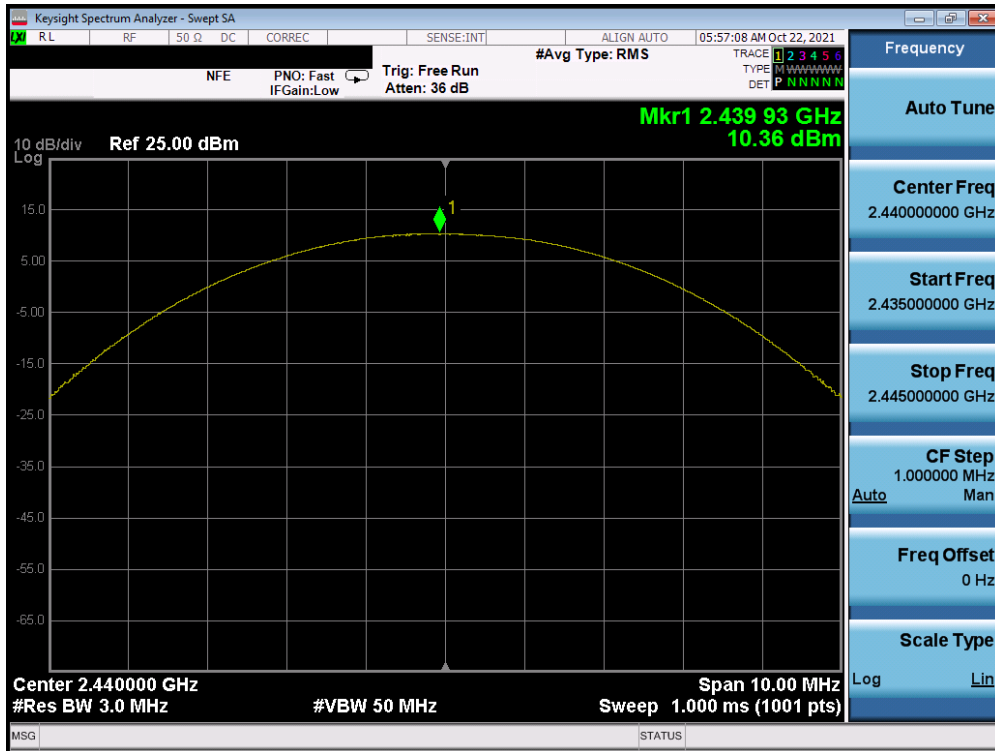


Plot 7-33. Peak Power Plot (Bluetooth (LE), 1Mbps ePAs – Ch. 39) Antenna 1

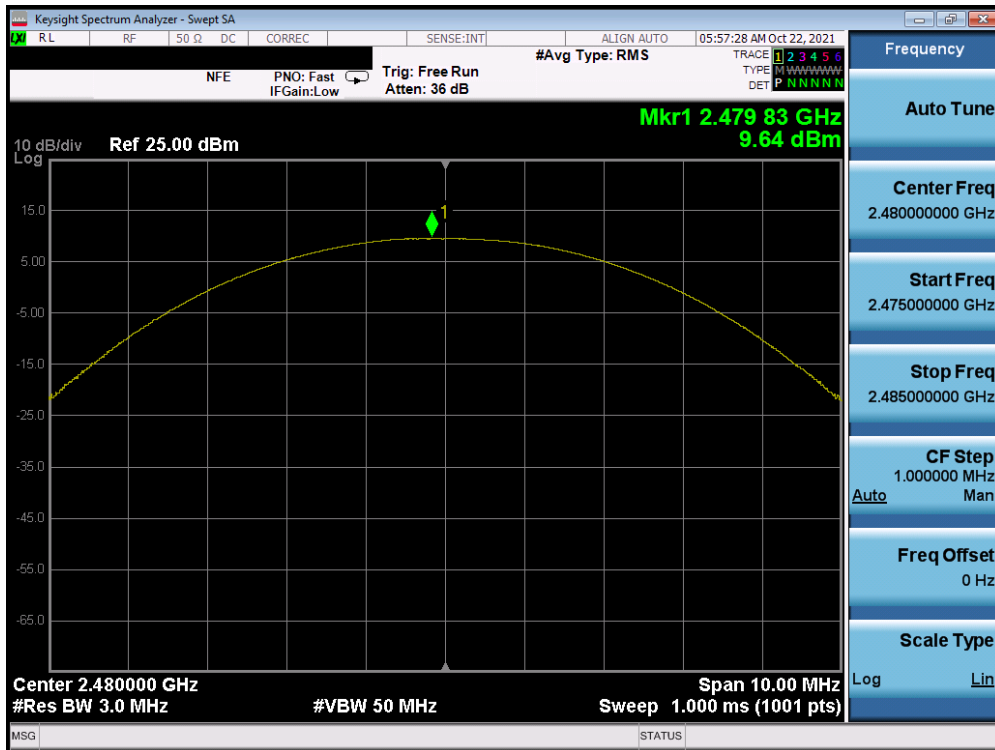


Plot 7-34. Peak Power Plot (Bluetooth (LE), 1Mbps iPA – Ch. 0) Antenna 1

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of  element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 33 of 113

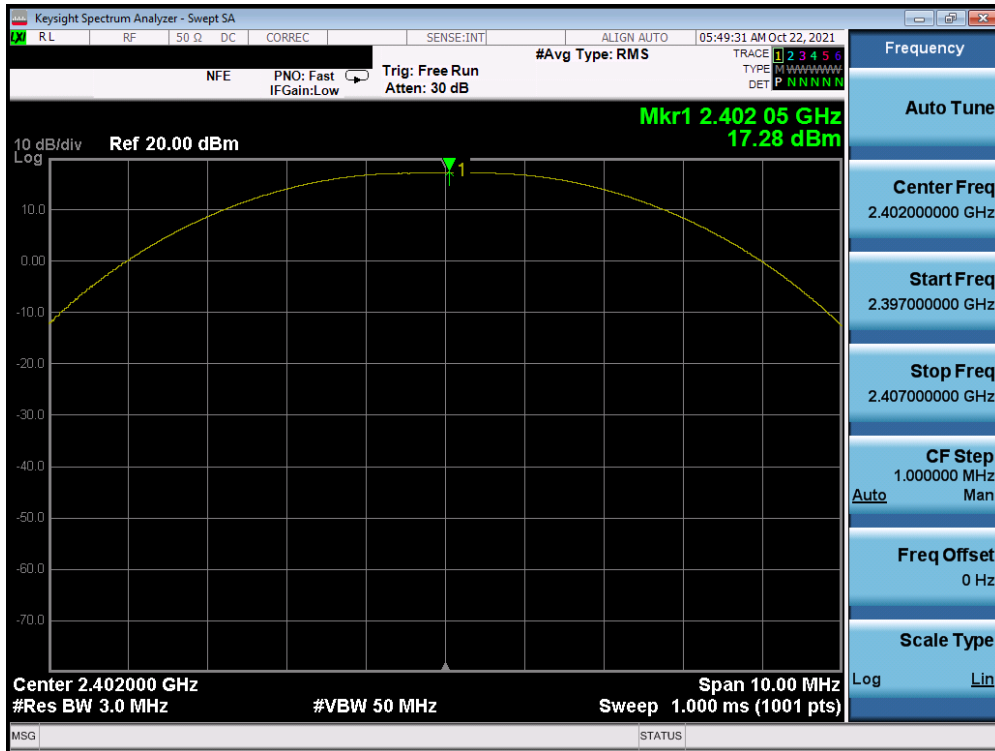


Plot 7-35. Peak Power Plot (Bluetooth (LE), 1Mbps iPA – Ch. 19) Antenna 1

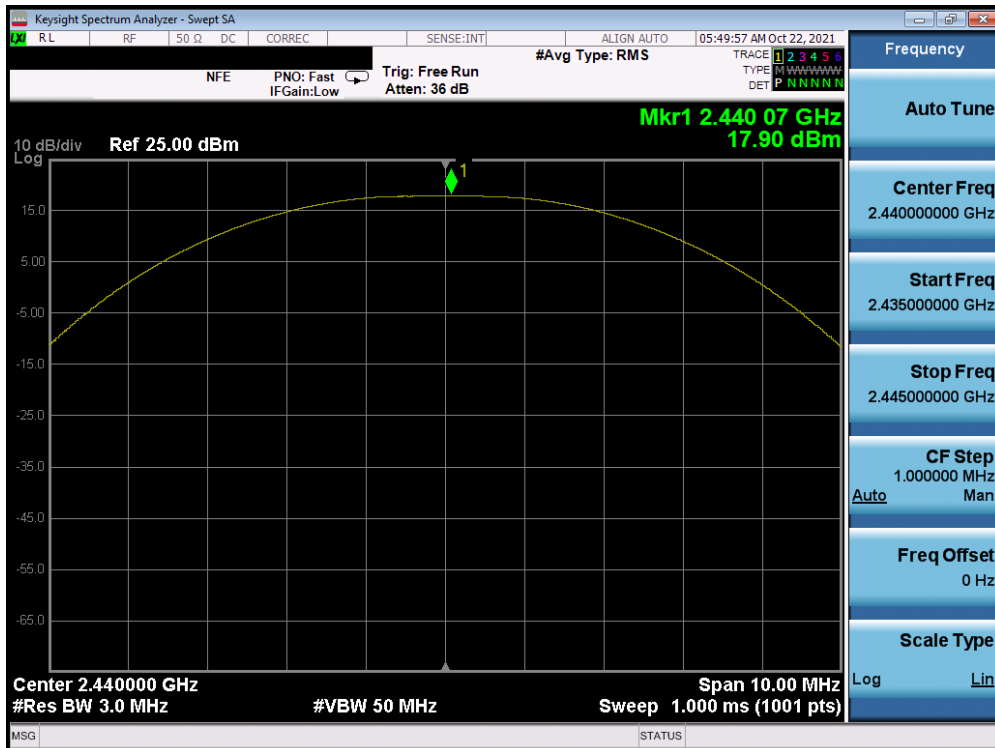


Plot 7-36. Peak Power Plot (Bluetooth (LE), 1Mbps iPA – Ch. 39) Antenna 1

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 34 of 113

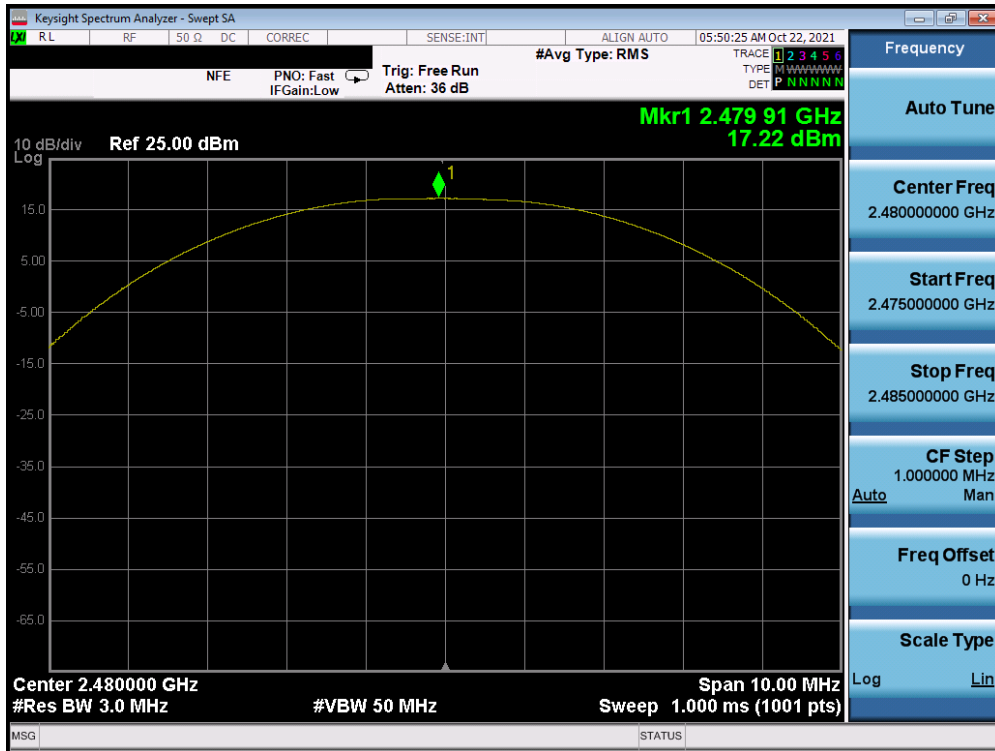


Plot 7-37. Peak Power Plot (Bluetooth (LE), 2Mbps ePA – Ch. 0) Antenna 1

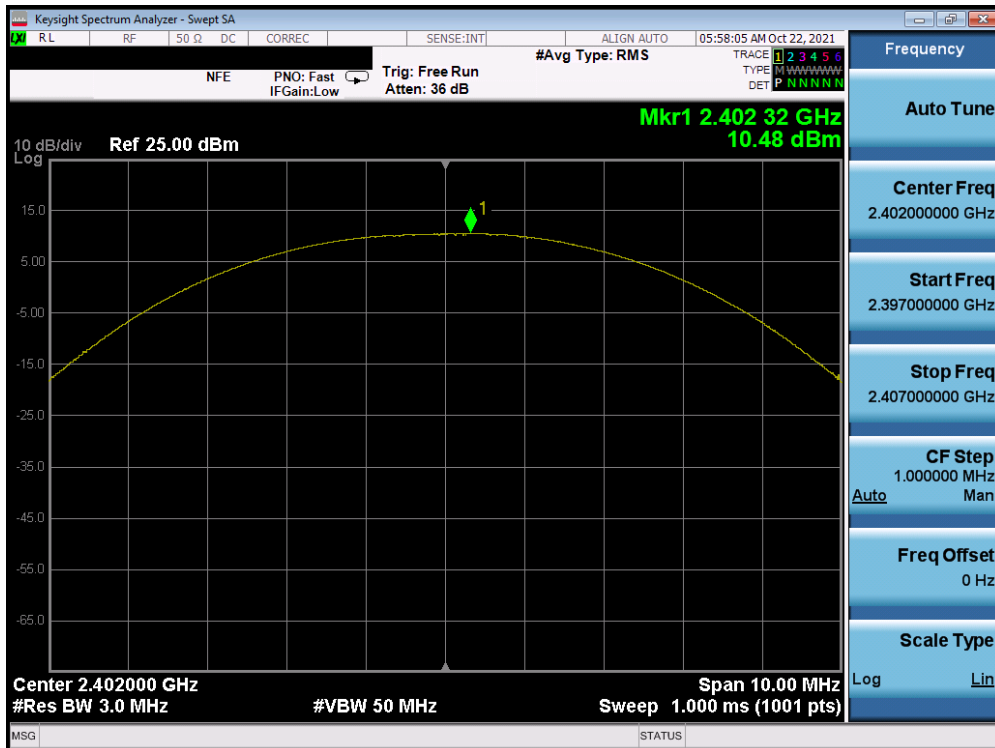


Plot 7-38. Peak Power Plot (Bluetooth (LE), 2Mbps ePA – Ch. 19) Antenna 1

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 35 of 113

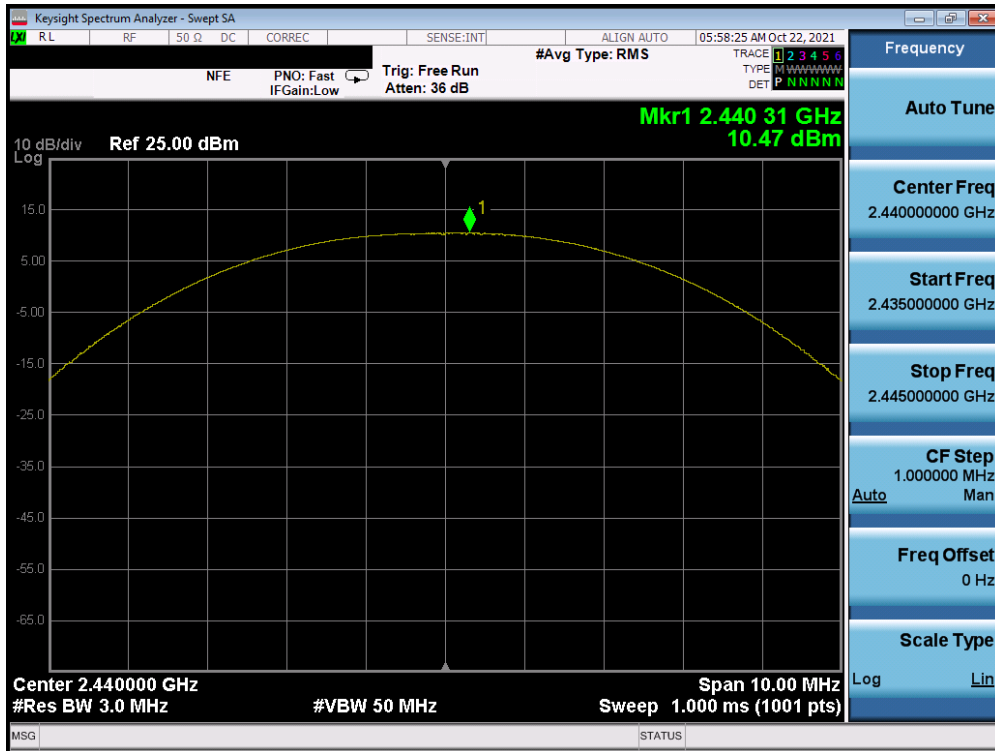


Plot 7-39. Peak Power Plot (Bluetooth (LE), 2Mbps ePA – Ch. 39) Antenna 1

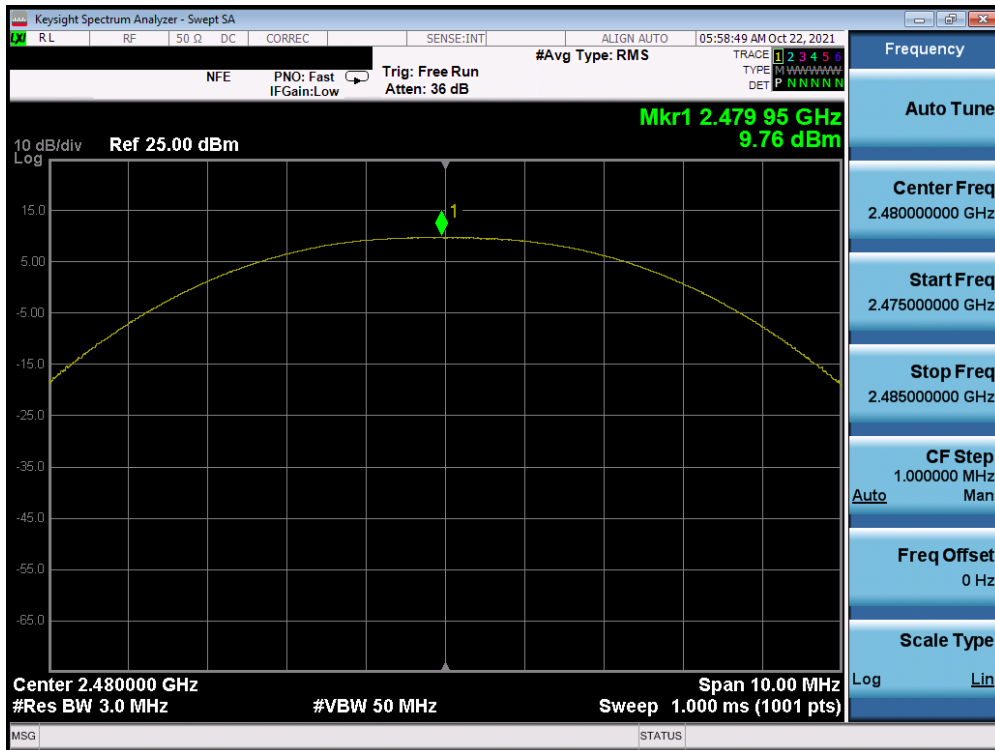


Plot 7-40. Peak Power Plot (Bluetooth (LE), 2Mbps iPA – Ch. 0) Antenna 1

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of  element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 36 of 113



**Plot 7-41. Peak Power Plot (Bluetooth (LE), 2Mbps iPA – Ch. 19) Antenna 1**



**Plot 7-42. Peak Power Plot (Bluetooth (LE), 2Mbps iPA – Ch. 39) Antenna 1**

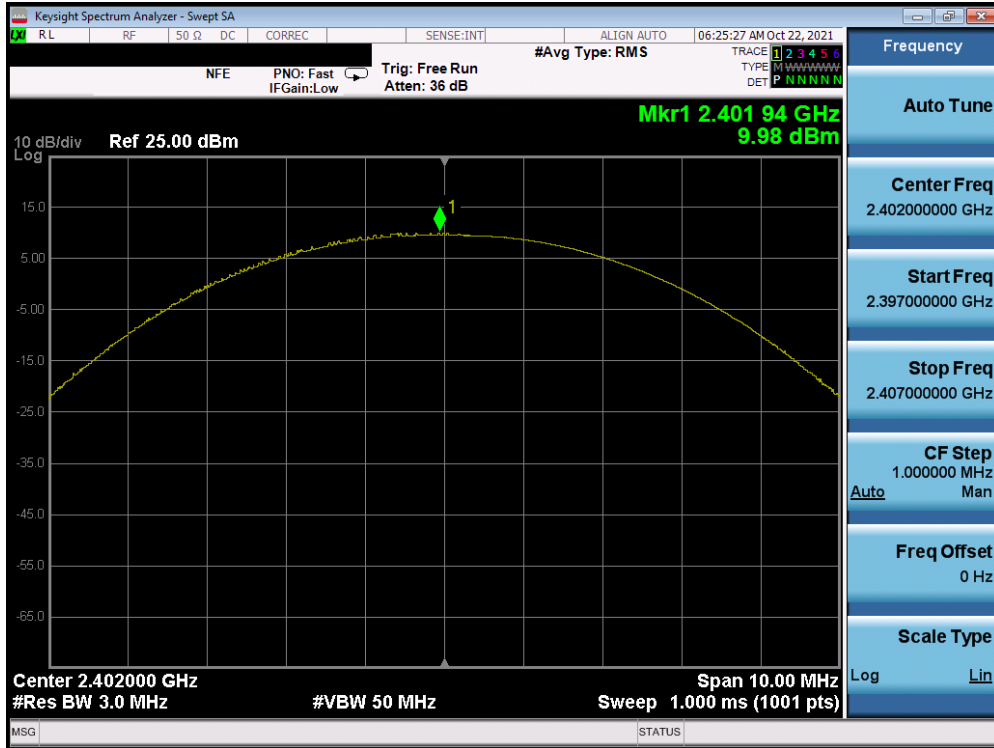
FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of  element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 37 of 113

## Antenna 2

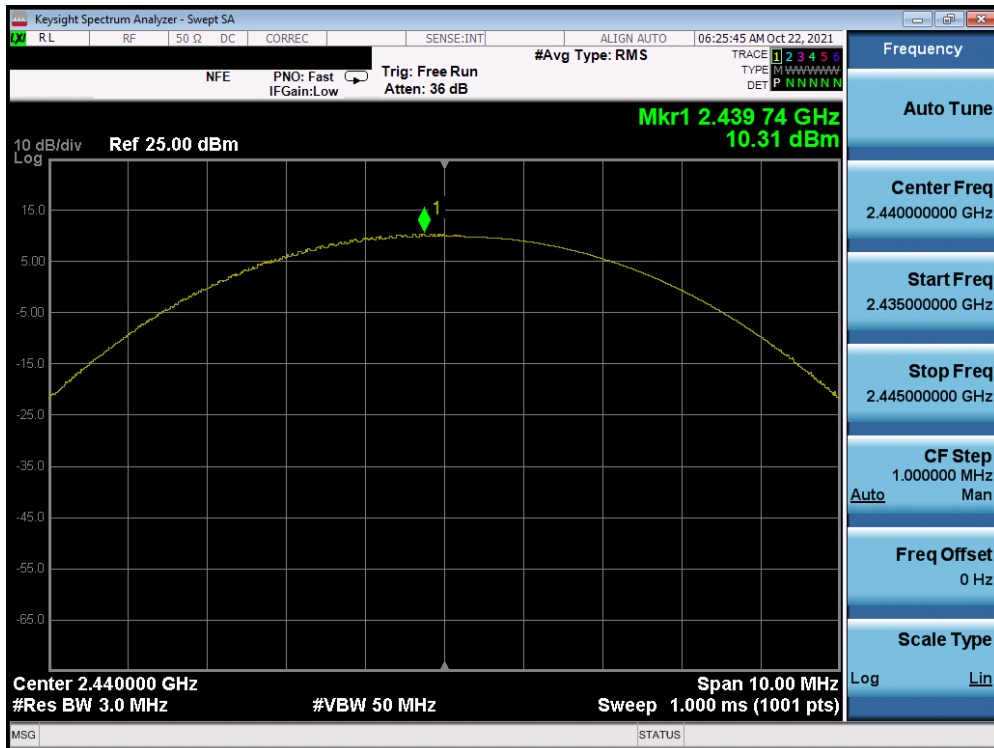
Frequency [MHz]	Data Rate [Mbps]	Power Scheme	Channel No.	Bluetooth Mode	Peak Conducted Power	
					[dBm]	[mW]
2402	125 kbps	iPA	0	LE	9.98	9.954
2440	125 kbps	iPA	19	LE	10.31	10.740
2480	125 kbps	iPA	39	LE	9.18	8.279
2402	500 kbps	iPA	0	LE	10.00	10.000
2440	500 kbps	iPA	19	LE	10.35	10.839
2480	500 kbps	iPA	39	LE	8.90	7.762
2402	1 Mbps	ePA	0	LE	15.25	33.497
2440	1 Mbps	ePA	19	LE	16.10	40.738
2480	1 Mbps	ePA	39	LE	15.33	34.119
2402	1 Mbps	iPA	0	LE	10.20	10.471
2440	1 Mbps	iPA	19	LE	10.48	11.169
2480	1 Mbps	iPA	39	LE	9.14	8.204
2402	2 Mbps	ePA	0	LE	15.94	39.264
2440	2 Mbps	ePA	19	LE	16.64	46.132
2480	2 Mbps	ePA	39	LE	16.20	41.687
2402	2 Mbps	iPA	0	LE	10.15	10.351
2440	2 Mbps	iPA	19	LE	10.53	11.298
2480	2 Mbps	iPA	39	LE	8.96	7.870

**Table 7-5. Conducted Output Power Measurements (Bluetooth (LE)) Antenna 2**

FCC ID: A3LSMS906U	 PCTEST <sup>®</sup> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 38 of 113

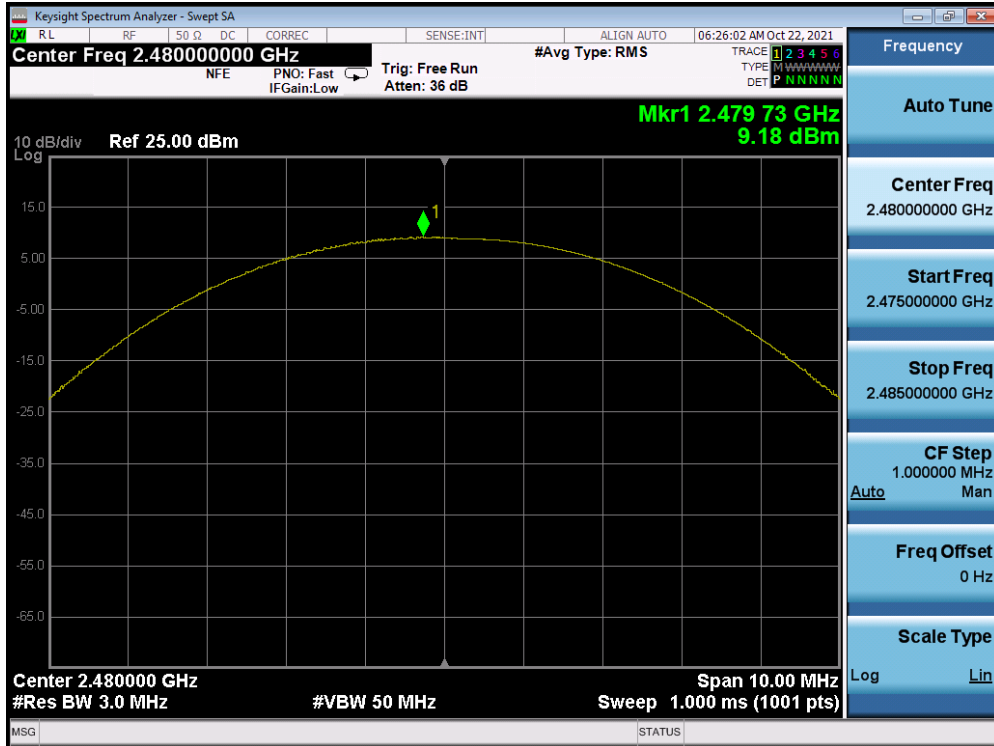


Plot 7-43. Peak Power Plot (Bluetooth (LE), 125kbps iPA – Ch. 0) Antenna 2

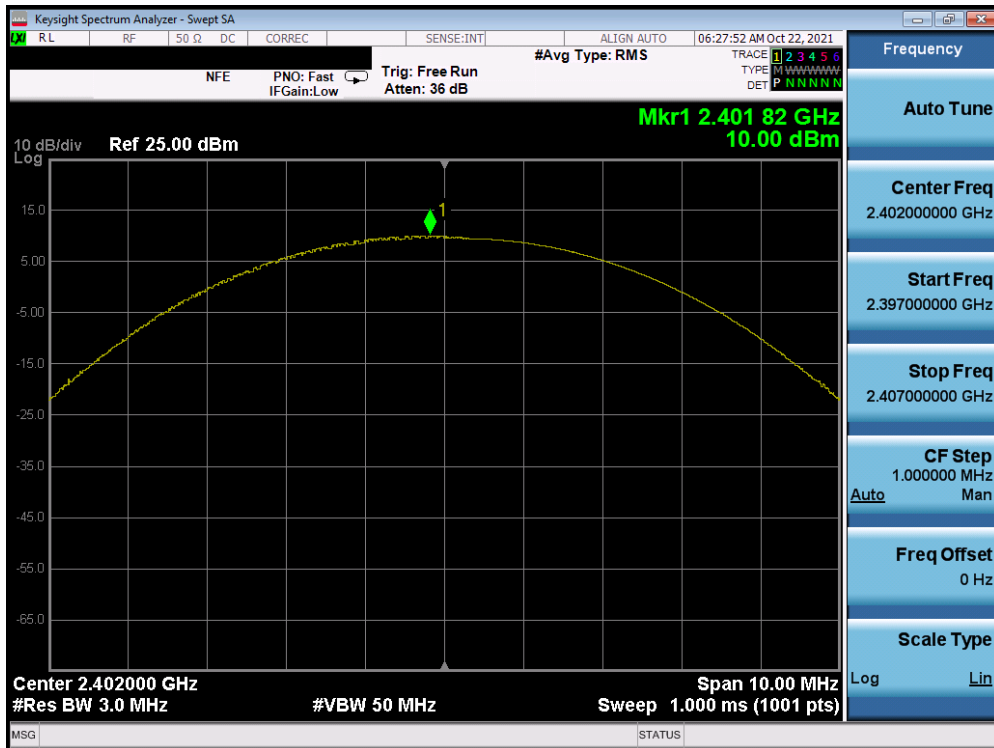


Plot 7-44. Peak Power Plot (Bluetooth (LE), 125kbps iPA– Ch. 19) Antenna 2

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 39 of 113



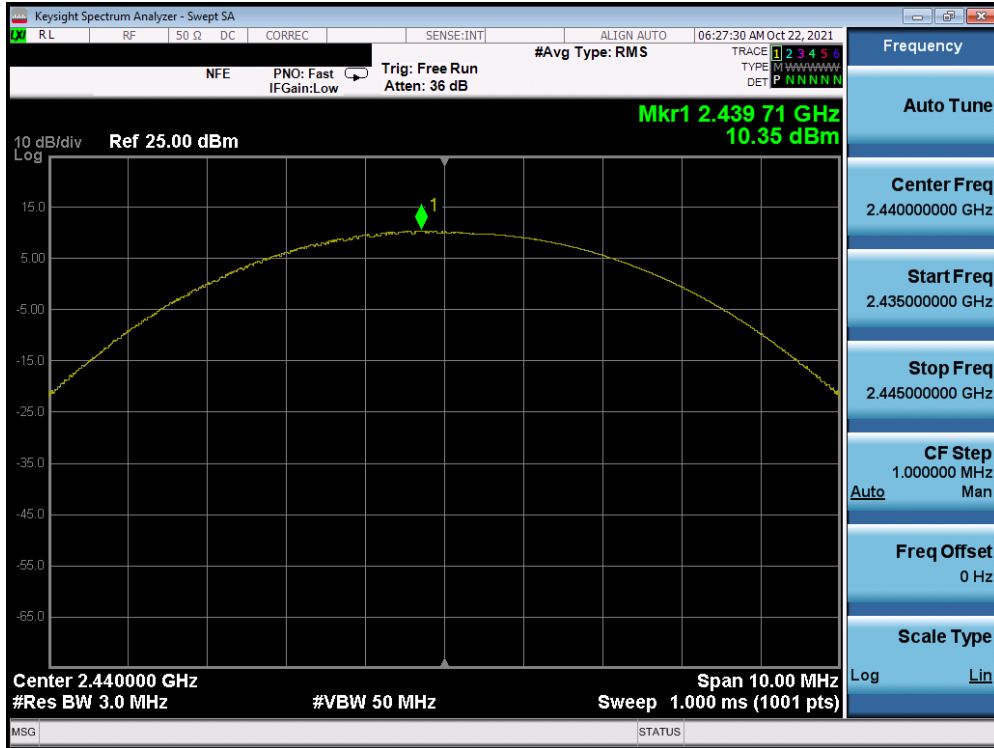
Plot 7-45. Peak Power Plot (Bluetooth (LE), 125kbps iPA – Ch. 39) Antenna 2



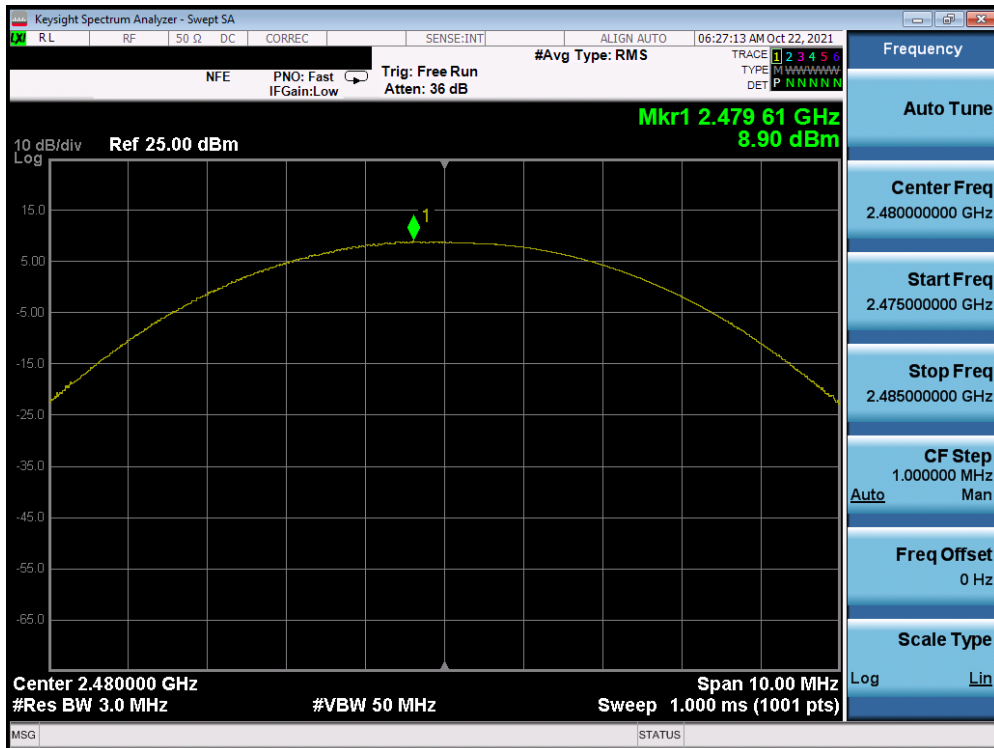
Plot 7-46. Peak Power Plot (Bluetooth (LE), 500kbps iPA – Ch. 0) Antenna 2

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 40 of 113



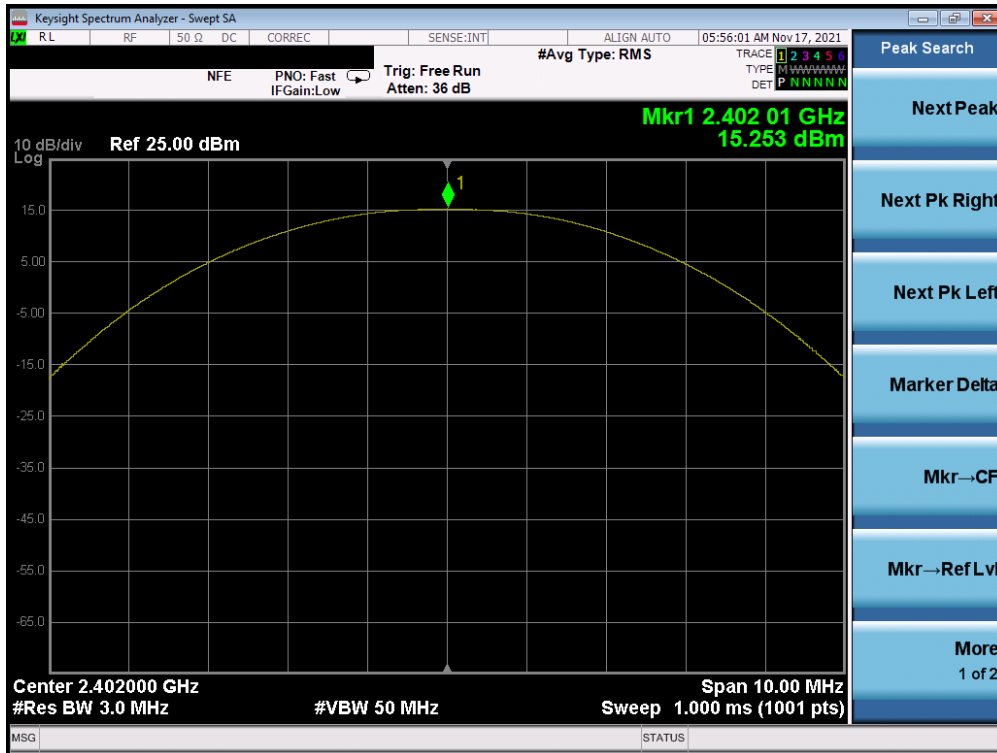


Plot 7-47. Peak Power Plot (Bluetooth (LE), 500kbps iPA – Ch. 19 Antenna 2

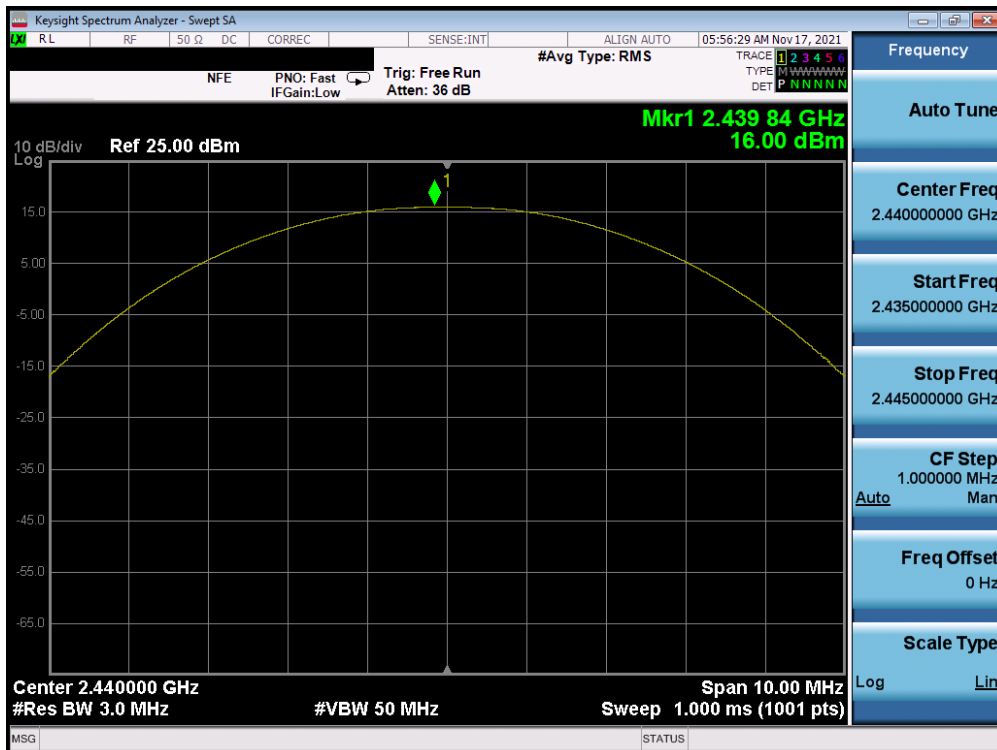


Plot 7-48. Peak Power Plot (Bluetooth (LE), 500kbps iPA – Ch. 39) Antenna 2

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 41 of 113

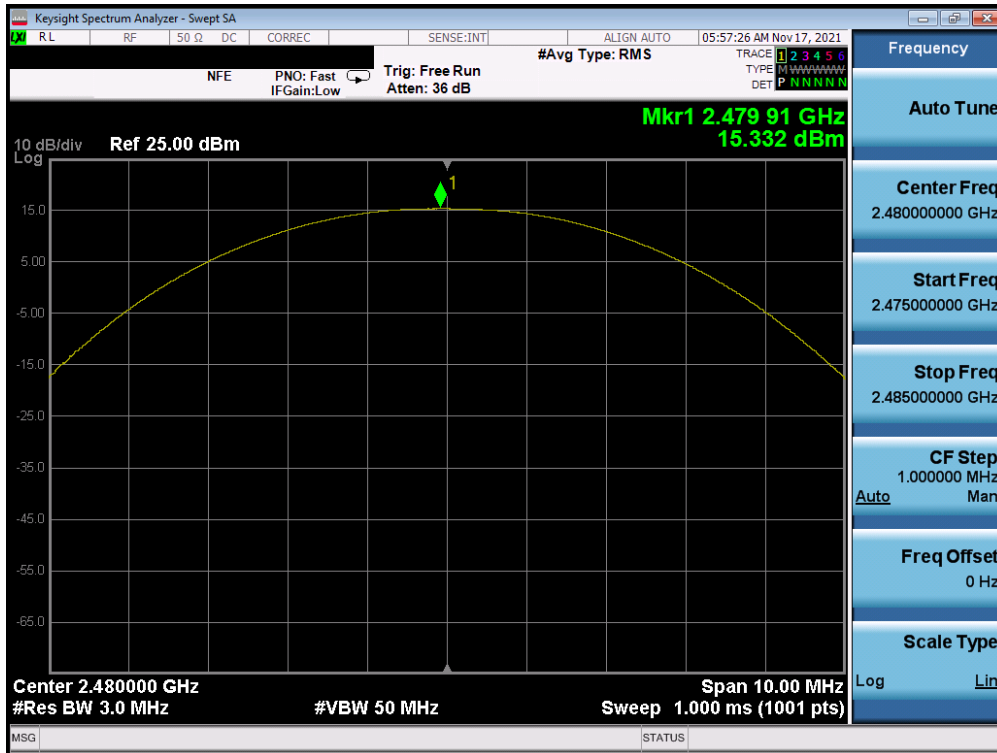


Plot 7-49. Peak Power Plot (Bluetooth (LE), 1Mbps ePA – Ch. 0) Antenna 2

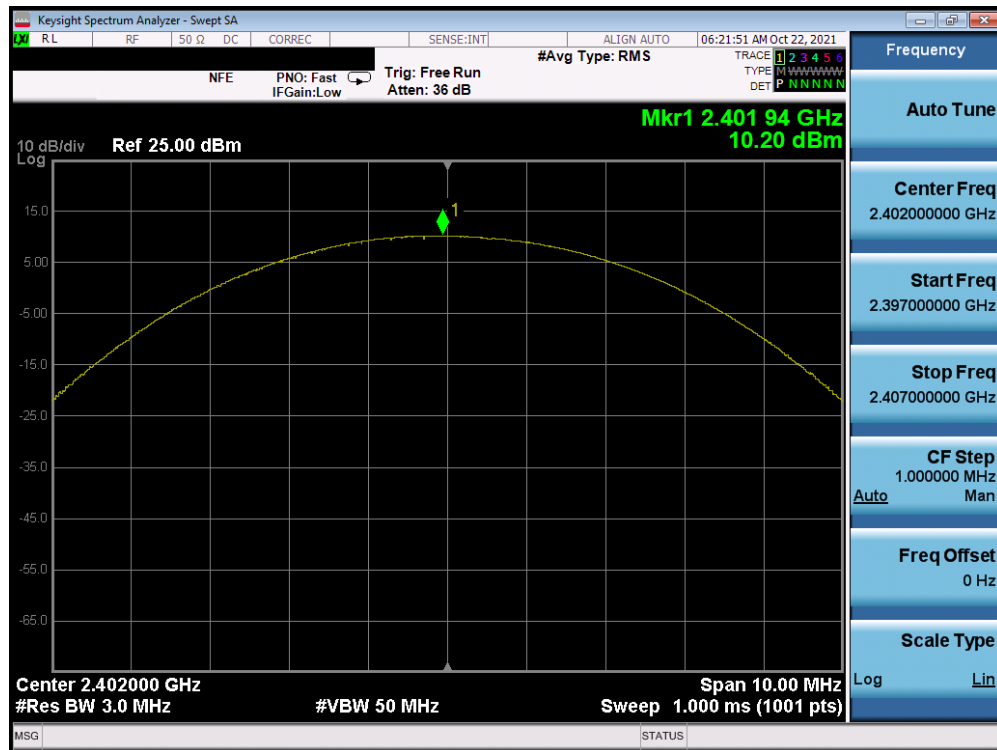


Plot 7-50. Peak Power Plot (Bluetooth (LE), 1Mbps ePA – Ch. 19) Antenna 2

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 42 of 113

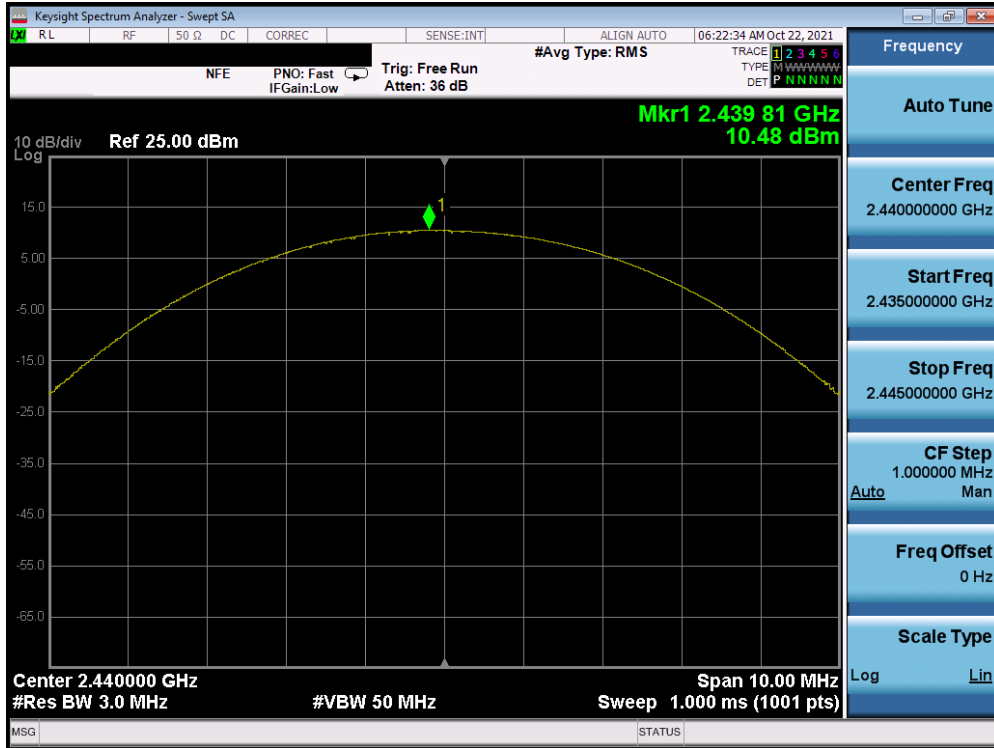


**Plot 7-51. Peak Power Plot (Bluetooth (LE), 1Mbps ePAs – Ch. 39) Antenna 2**

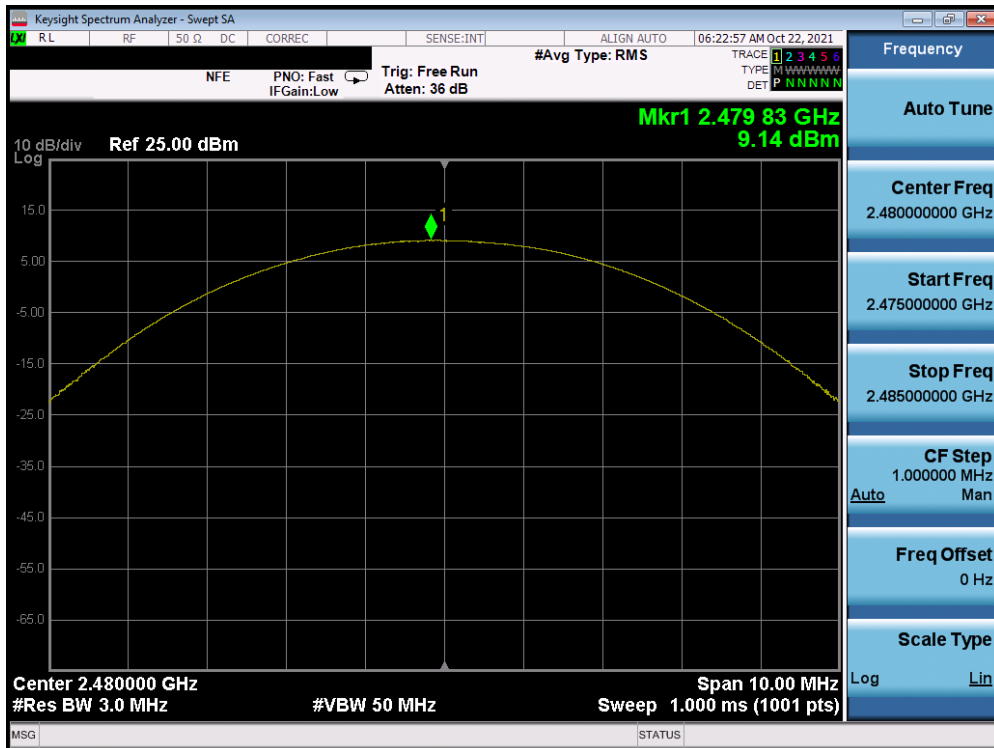


**Plot 7-52. Peak Power Plot (Bluetooth (LE), 1Mbps iPA – Ch. 0) Antenna 2**

FCC ID: A3LSMS906U	Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 43 of 113

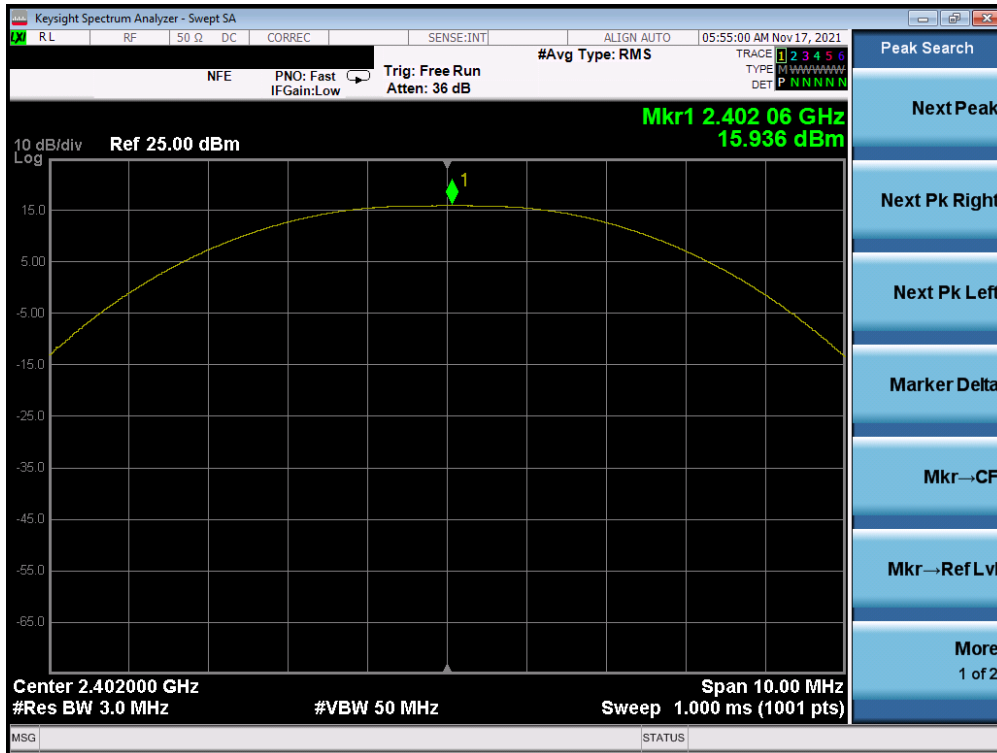


Plot 7-53. Peak Power Plot (Bluetooth (LE), 1Mbps iPA – Ch. 19) Antenna 2

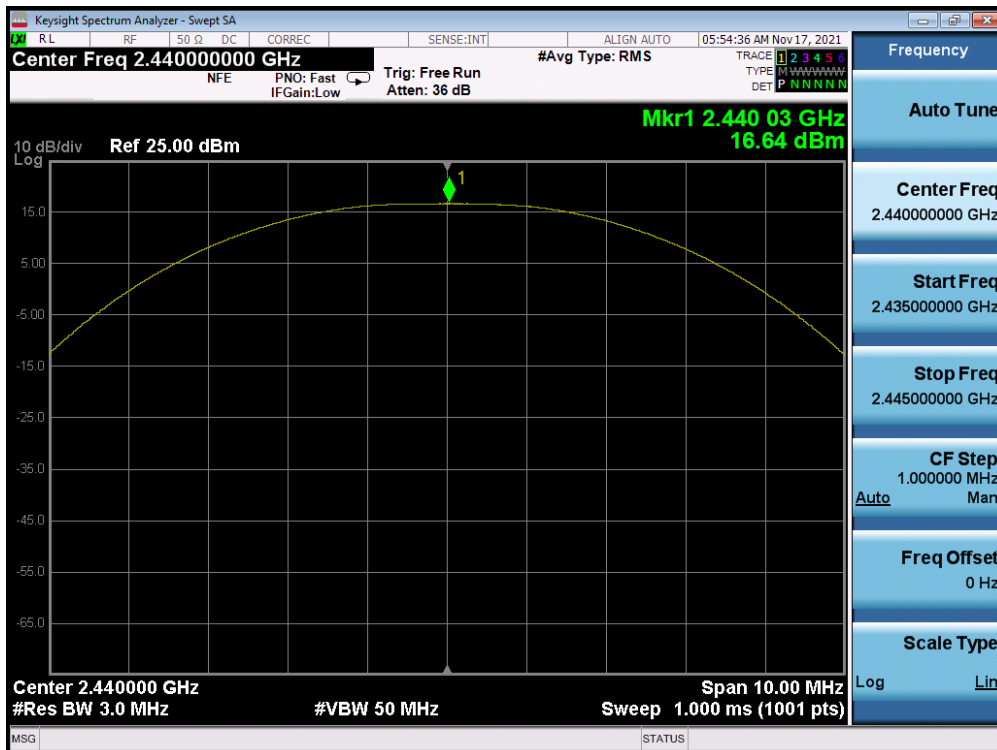


Plot 7-54. Peak Power Plot (Bluetooth (LE), 1Mbps iPAs – Ch. 39) Antenna 2

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 44 of 113

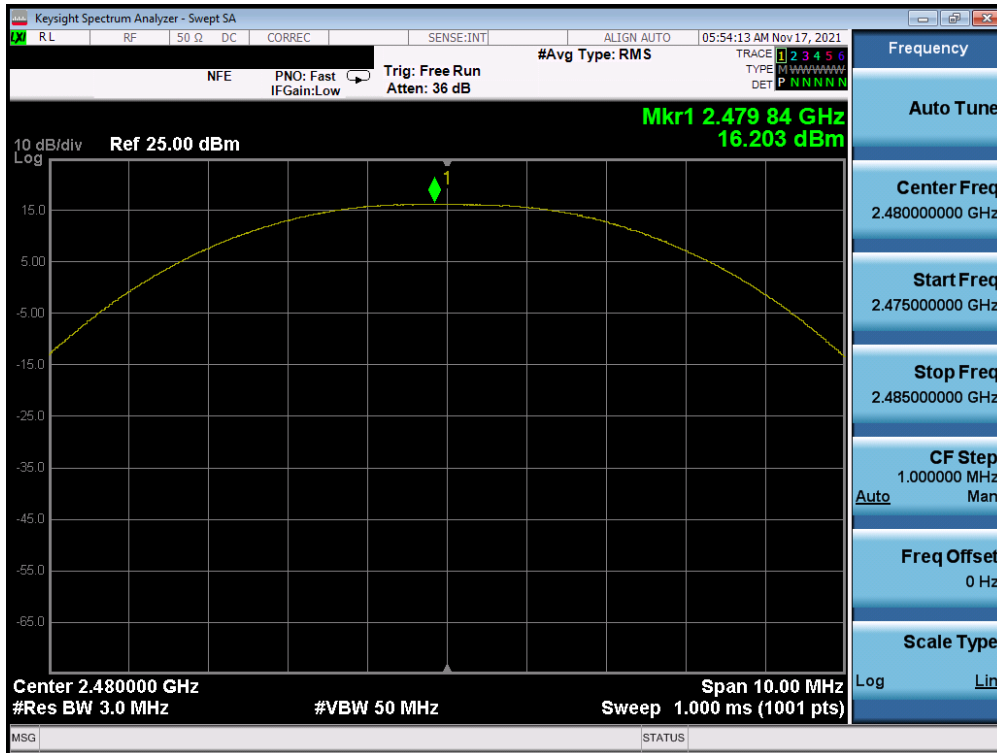


Plot 7-55. Peak Power Plot (Bluetooth (LE), 2Mbps ePA – Ch. 0) Antenna 2

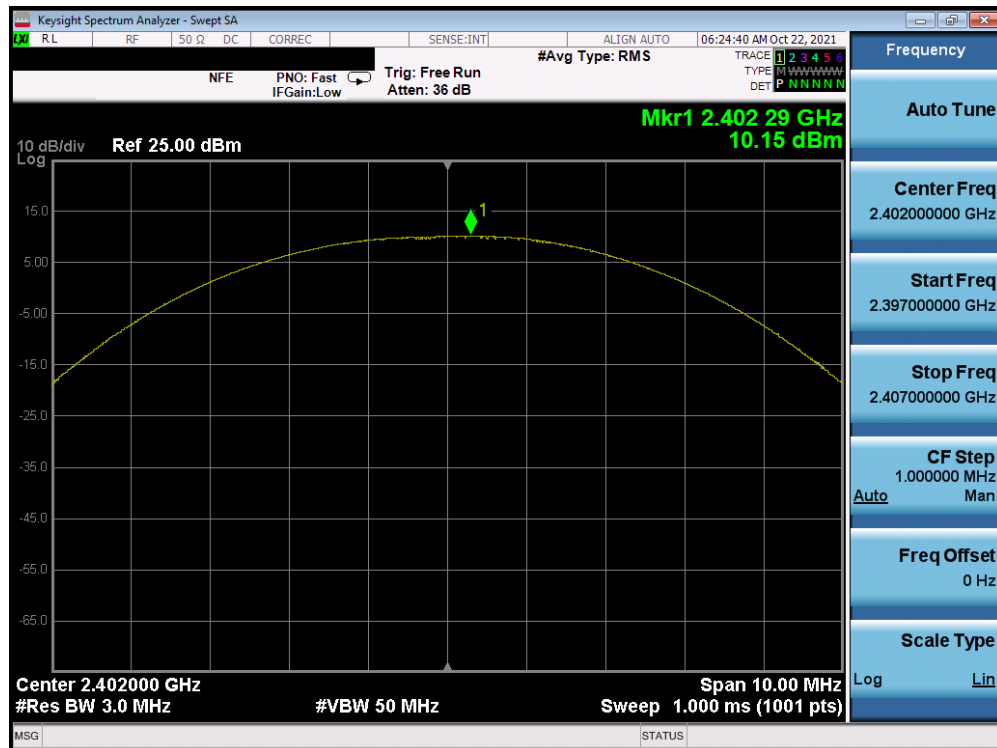


Plot 7-56. Peak Power Plot (Bluetooth (LE), 2Mbps ePA – Ch. 19) Antenna

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 45 of 113

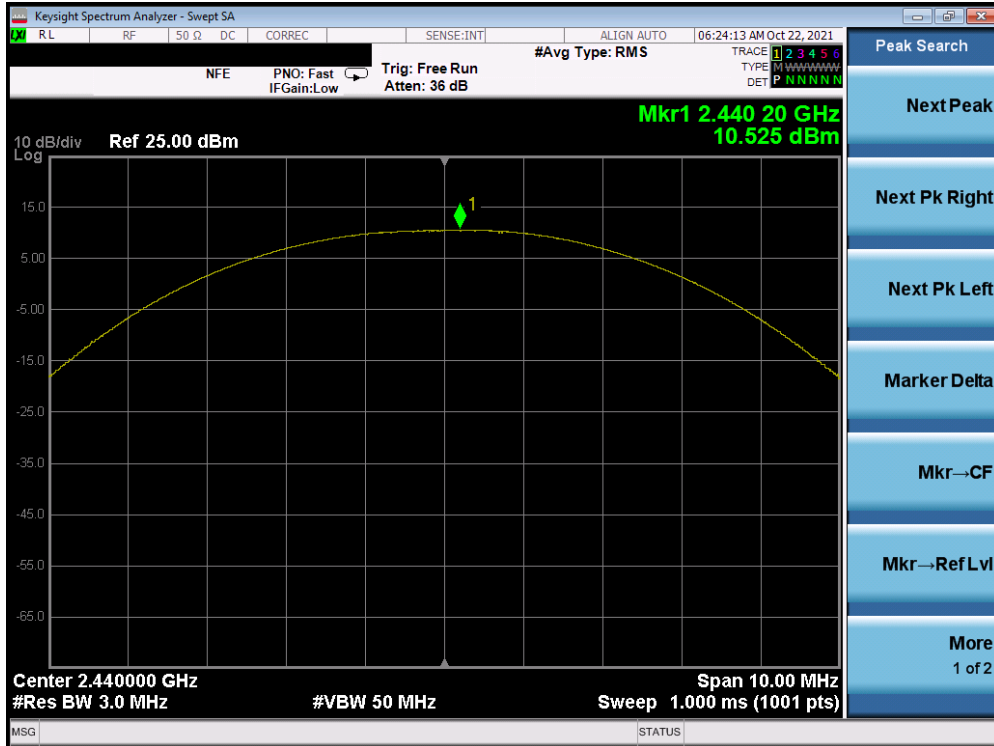


Plot 7-57. Peak Power Plot (Bluetooth (LE), 2Mbps ePA – Ch. 39) Antenna 2

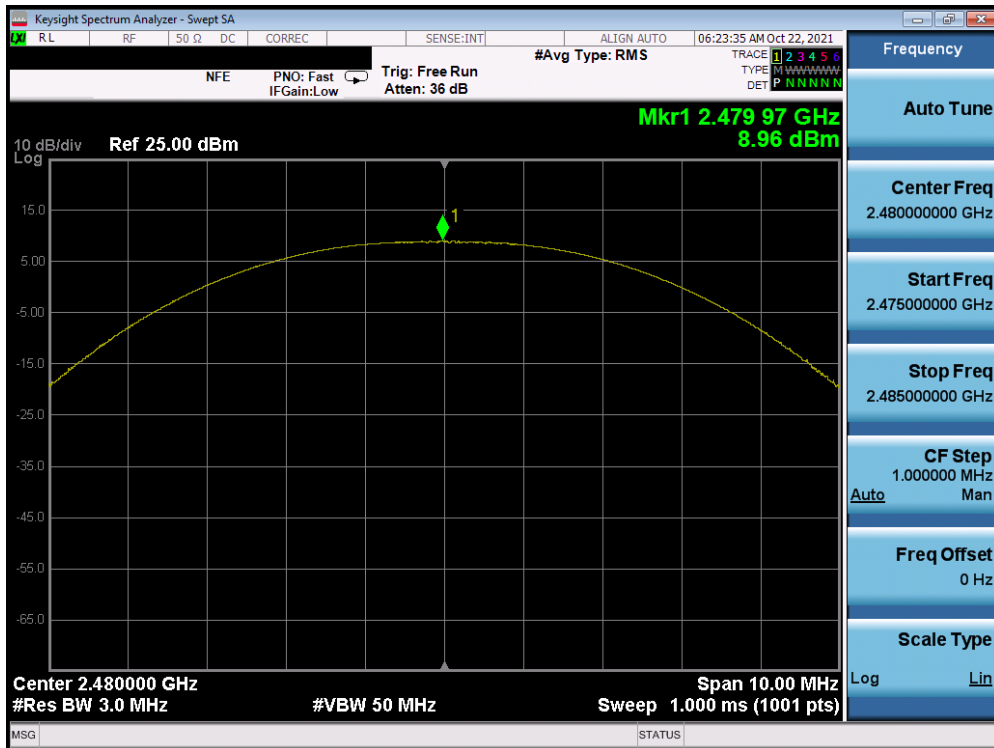


Plot 7-58. Peak Power Plot (Bluetooth (LE), 2Mbps iPA – Ch. 0) Antenna 2

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 46 of 113



Plot 7-59. Peak Power Plot (Bluetooth (LE), 2Mbps iPA – Ch. 19) Antenna 2



Plot 7-60. Peak Power Plot (Bluetooth (LE), 2Mbps iPA – Ch. 39) Antenna 2

FCC ID: A3LSMS906U	Proud to be part of  element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 47 of 113

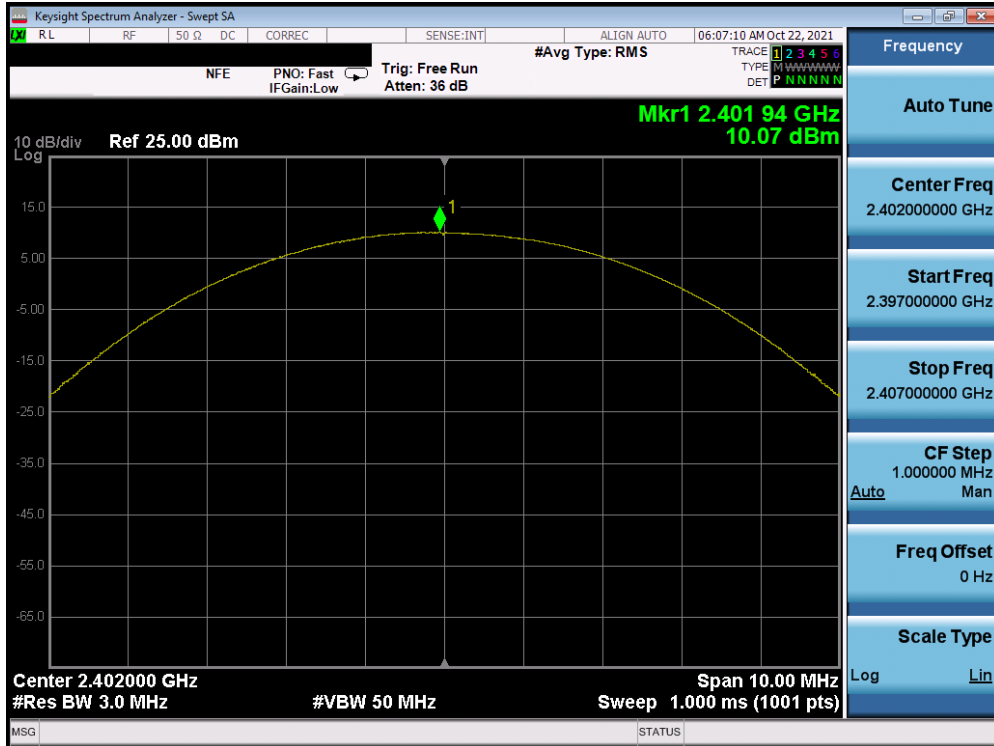
## Dual Antenna

Frequency [MHz]	Data Rate [Mbps]	Power Scheme	Channel No.	Bluetooth Mode	Peak Conducted Power					
					Antenna 0		Antenna 1		Dual	
					[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]
2402	1 Mbps	iPA	0	LE	10.07	10.162	9.68	9.279	12.49	17.742
2440	1 Mbps	iPA	19	LE	10.24	10.571	10.12	10.292	13.22	20.989
2480	1 Mbps	iPA	39	LE	9.38	8.662	8.86	7.651	11.29	13.459
2402	2 Mbps	iPA	0	LE	10.24	10.561	9.91	9.802	12.87	19.364
2440	2 Mbps	iPA	19	LE	10.22	10.517	10.29	10.686	13.50	22.387
2480	2 Mbps	iPA	39	LE	9.37	8.646	8.87	7.700	11.33	13.583

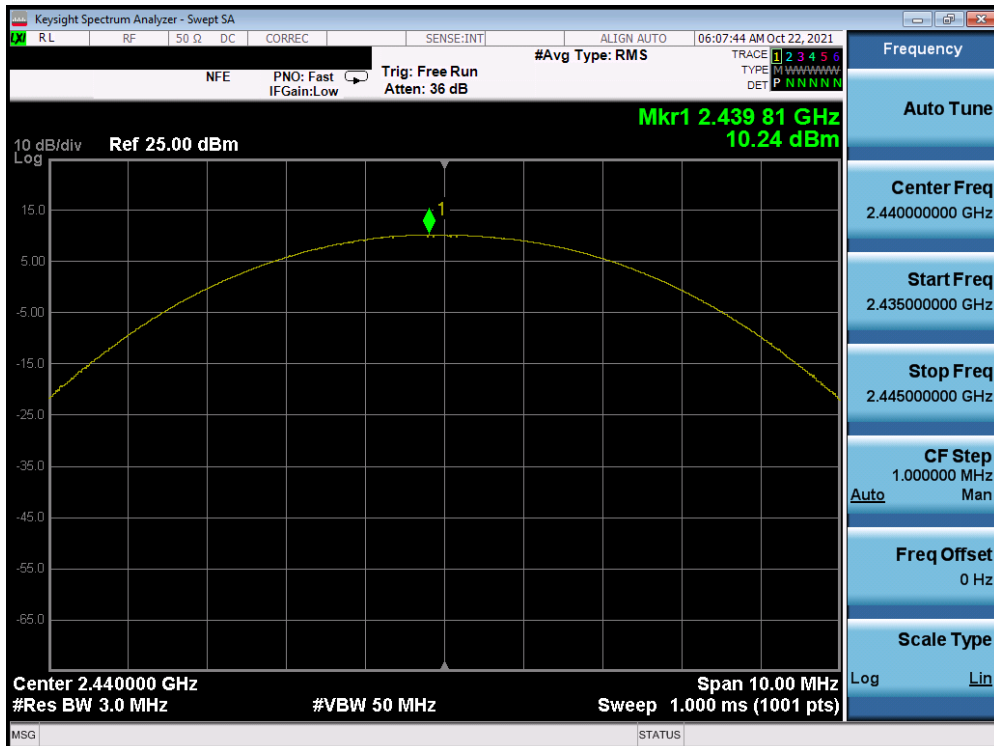
**Table 7-6. Conducted Output Power Measurements (Bluetooth LE) Dual Antenna**

FCC ID: A3LSMS906U	 PCTEST <sup>®</sup> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 48 of 113



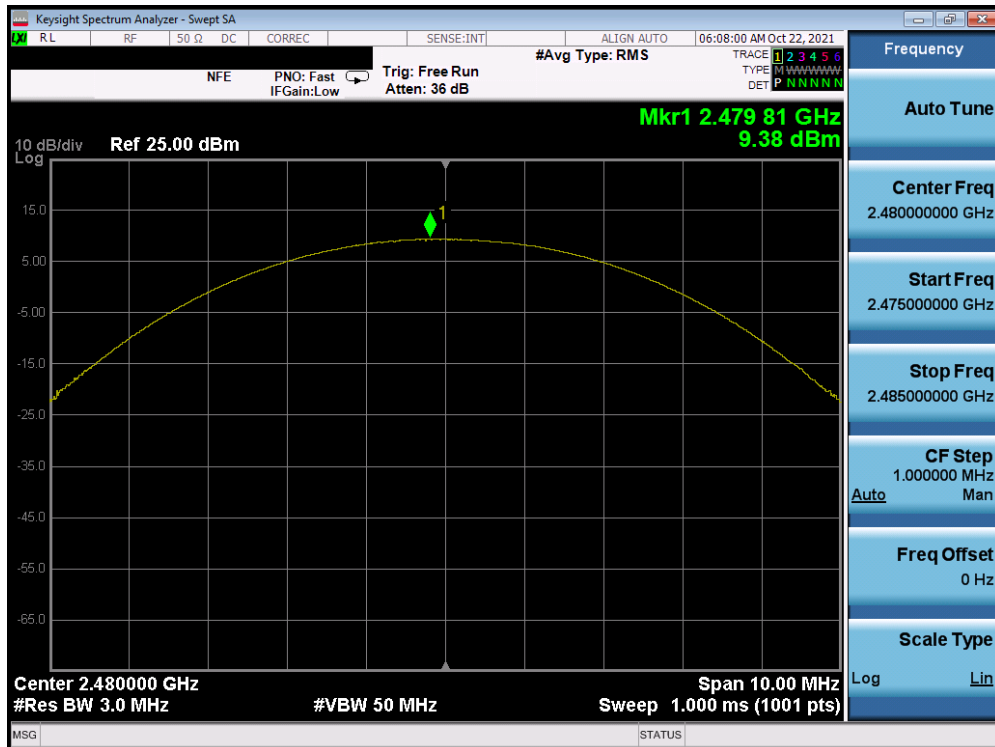


Plot 7-61. Peak Power Plot (Dual Bluetooth (LE), 1Mbps, iPA – Ch. 0) Antenna 1

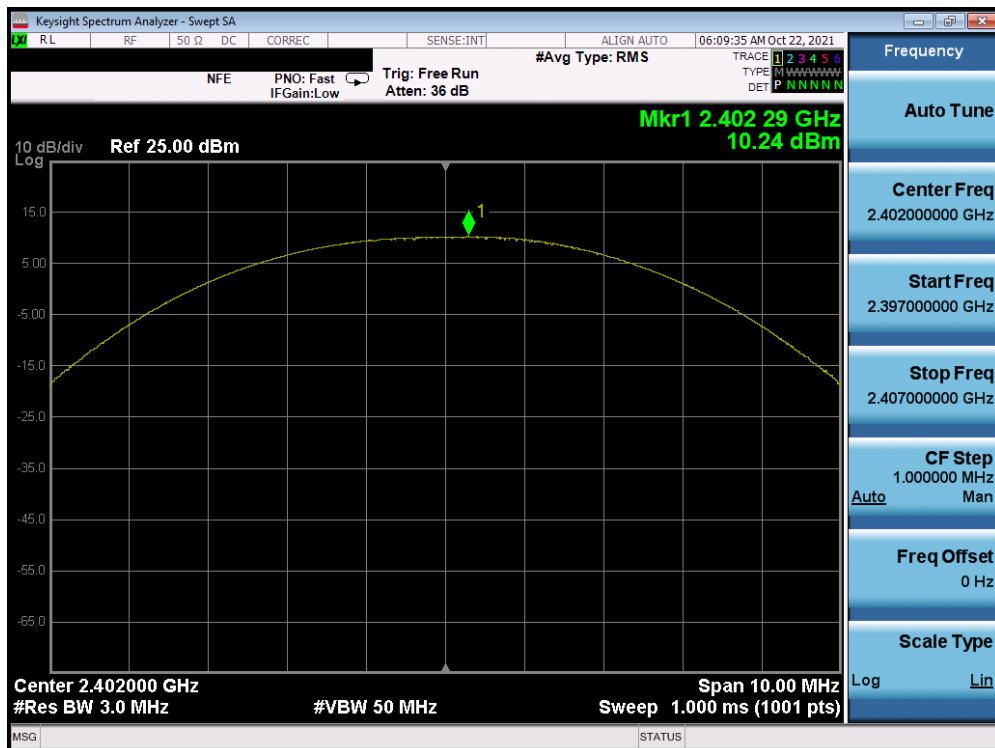


Plot 7-62. Peak Power Plot (Dual Bluetooth (LE), 1Mbps, iPA – Ch. 19) Antenna 1

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 49 of 113

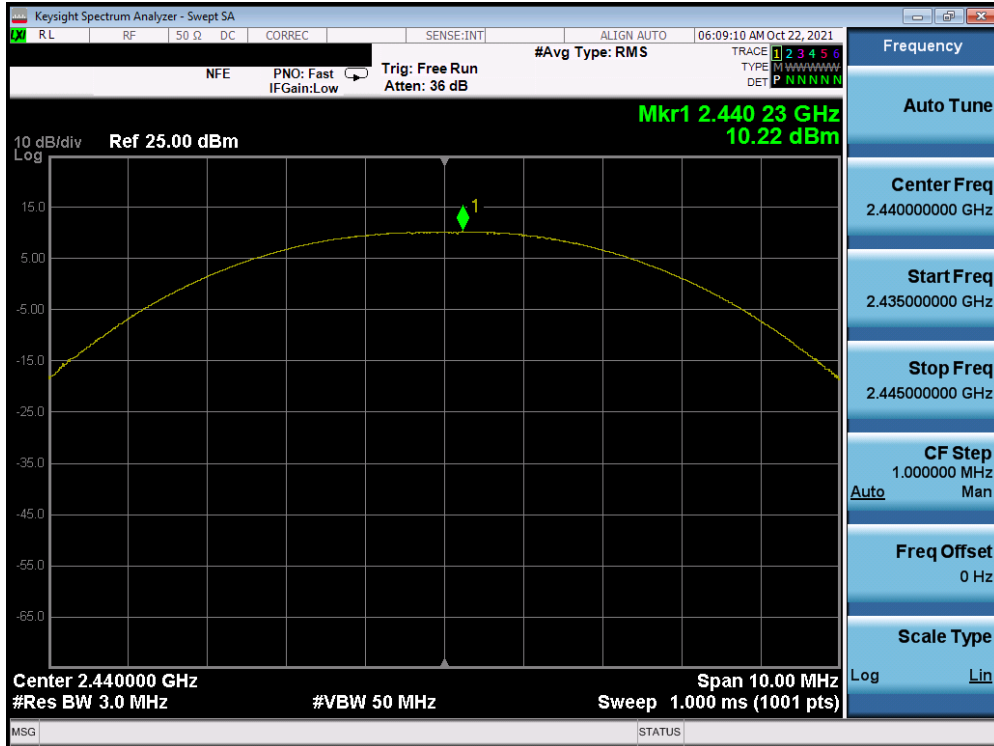


Plot 7-63. Peak Power Plot (Dual Bluetooth (LE), 1Mbps, iPA – Ch. 39) Antenna 1

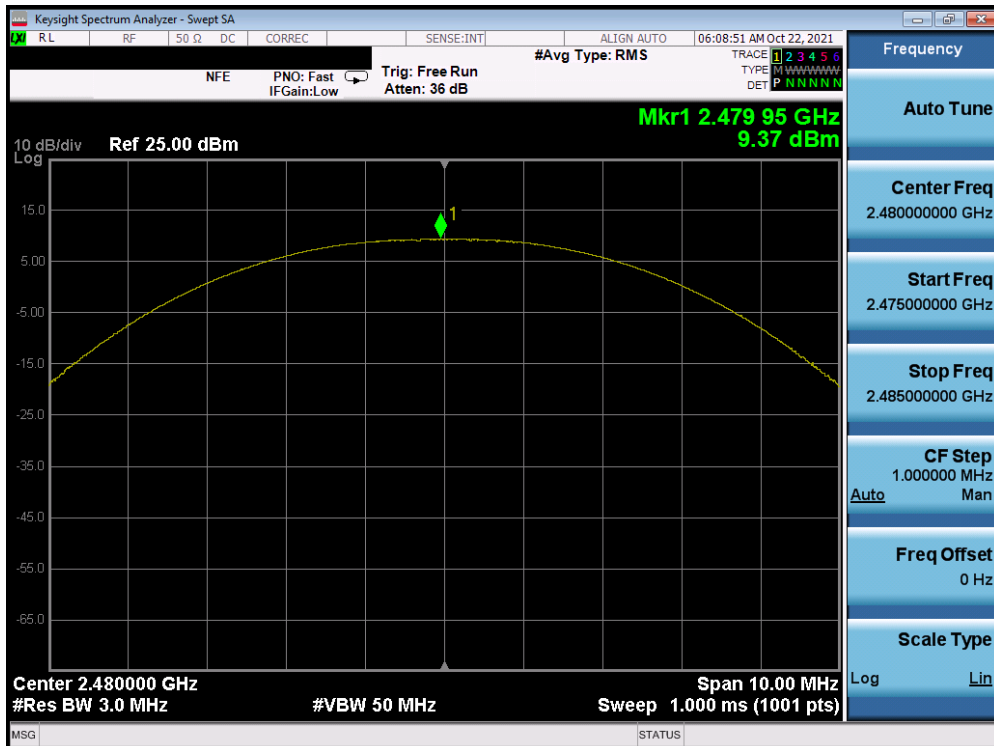


Plot 7-64. Peak Power Plot (Dual Bluetooth (LE), 2Mbps, iPA – Ch. 0) Antenna 1

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of  element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 50 of 113

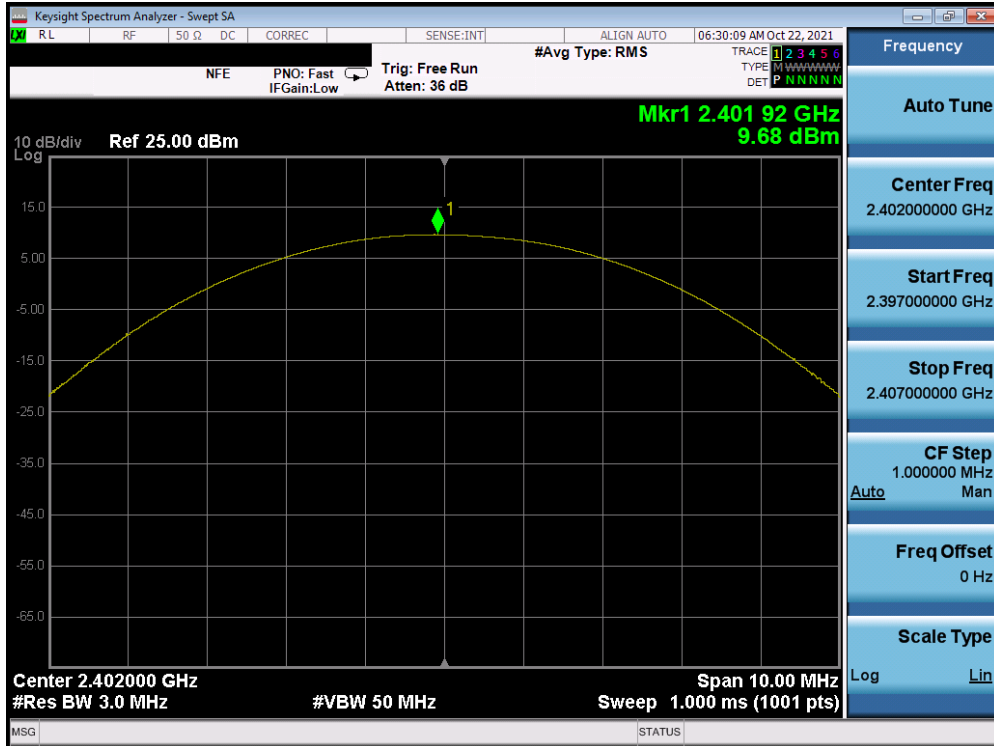


Plot 7-65. Peak Power Plot (Dual Bluetooth (LE), 2Mbps, iPA – Ch. 19) Antenna 1

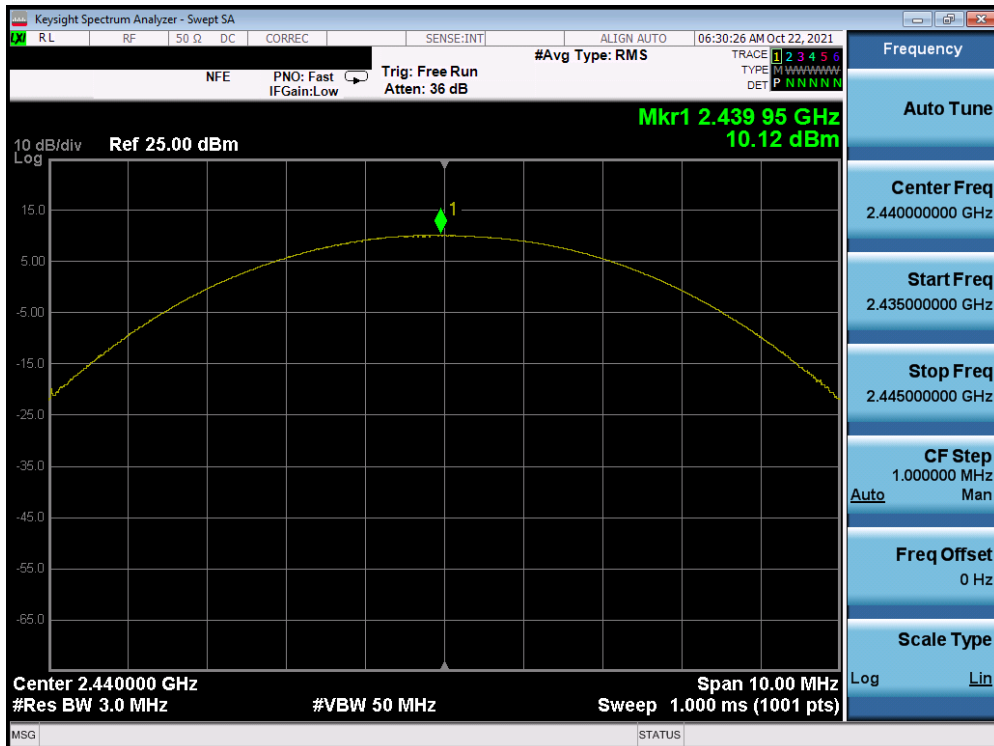


Plot 7-66. Peak Power Plot (Dual Bluetooth (LE), 2Mbps, iPA – Ch. 39) Antenna 1

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of  element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 51 of 113

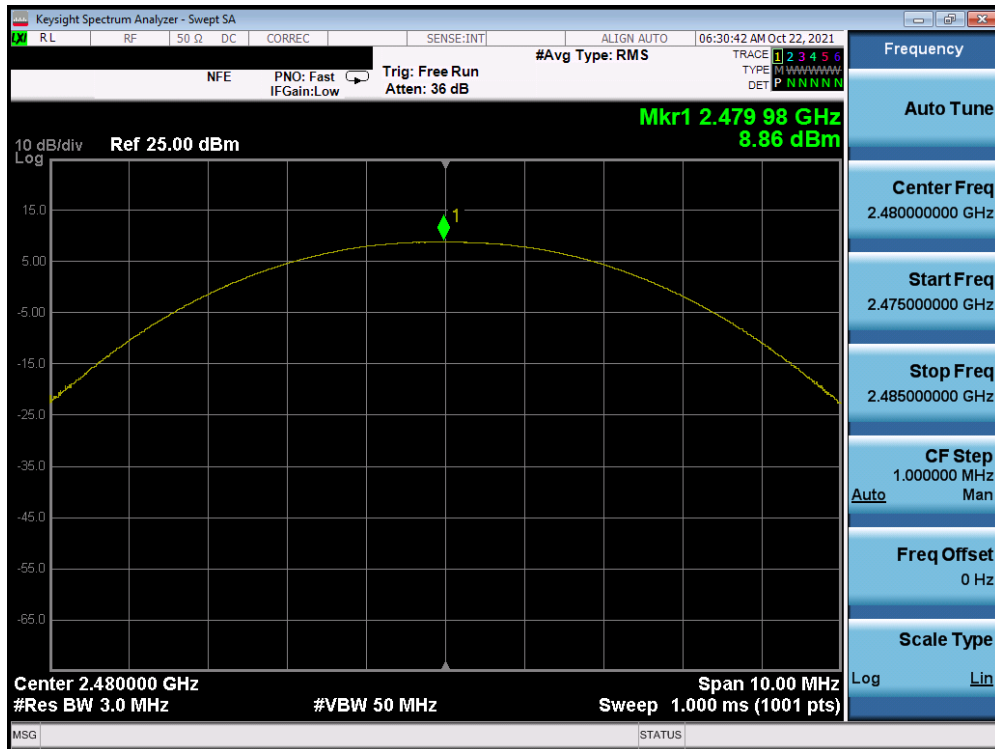


Plot 7-67. Peak Power Plot (Dual Bluetooth (LE), 1Mbps, iPA – Ch. 0) Antenna 2

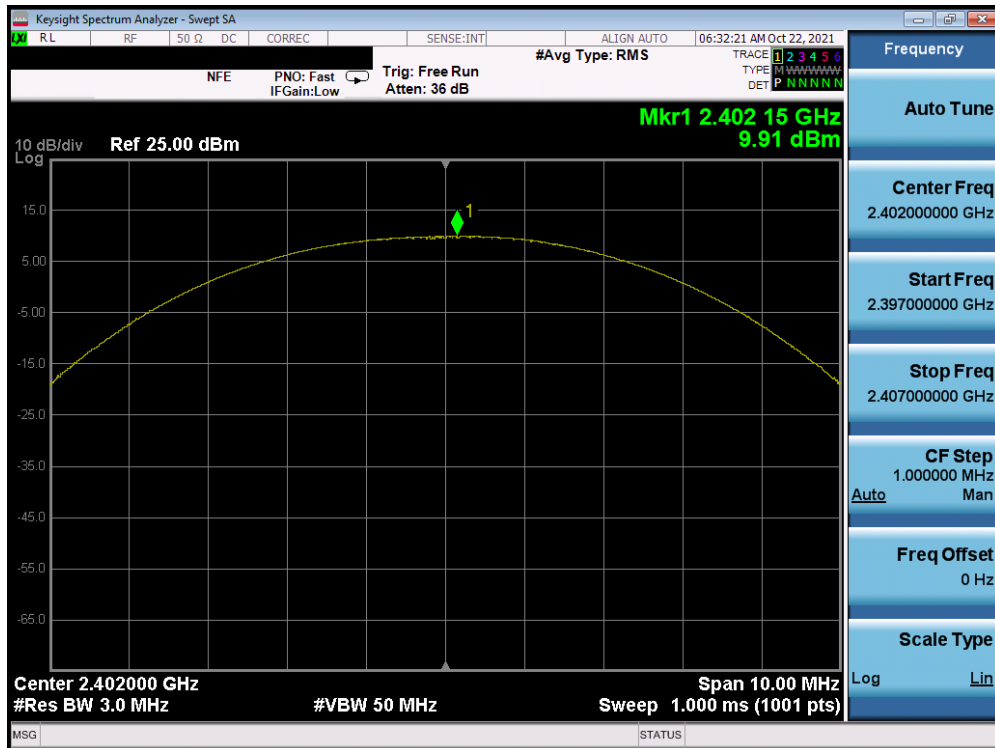


Plot 7-68. Peak Power Plot (Dual Bluetooth (LE), 1Mbps, iPA – Ch. 19) Antenna 2

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 52 of 113

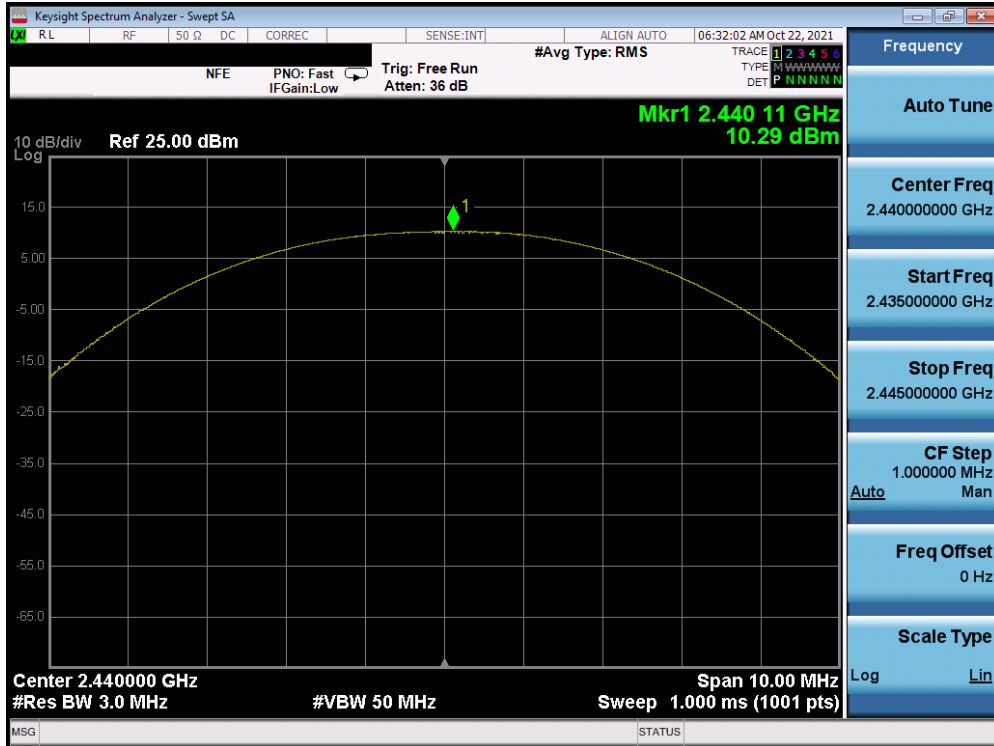


Plot 7-69. Peak Power Plot (Dual Bluetooth (LE), 1Mbps, iPA – Ch. 39) Antenna 2

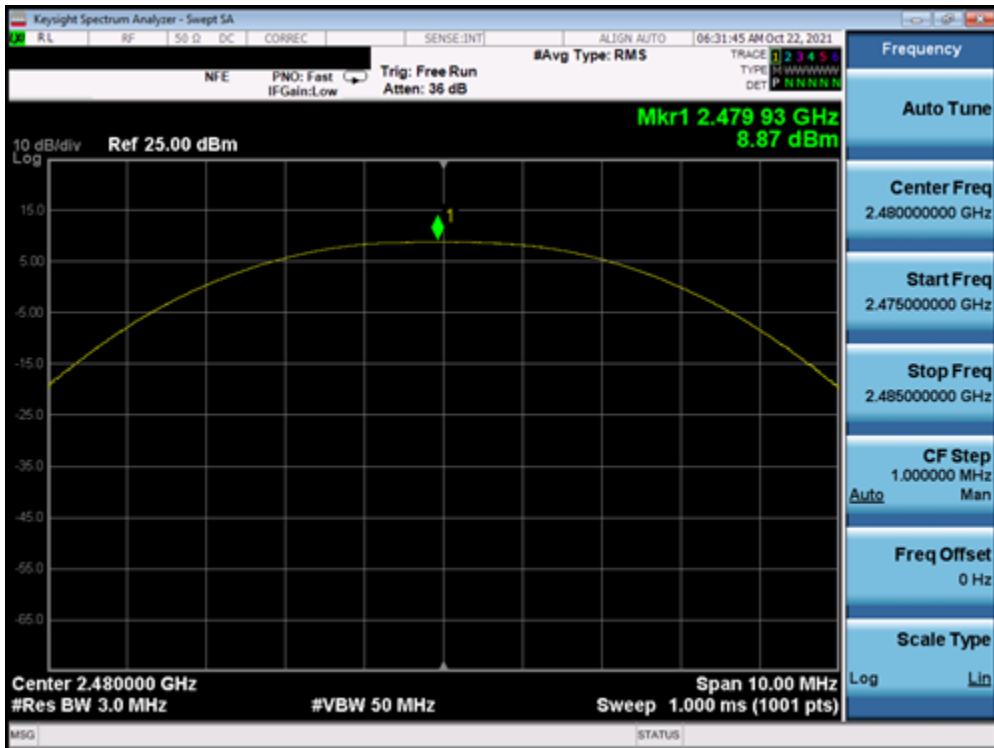


Plot 7-70. Peak Power Plot (Dual Bluetooth (LE), 2Mbps, iPA – Ch. 0) Antenna 2

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 53 of 113



Plot 7-71. Peak Power Plot (Dual Bluetooth (LE), 2Mbps, iPA – Ch. 19) Antenna 2



Plot 7-72. Peak Power Plot (Dual Bluetooth (LE), 2Mbps, iPA – Ch. 39) Antenna 2

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 54 of 113

## 7.4 Power Spectral Density – Bluetooth (LE)

§15.247(e); RSS-247 [5.2]

### Test Overview and Limit

The peak power density is measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power and at the appropriate frequencies.

***The maximum permissible power spectral density is 8 dBm in any 3 kHz band.***

### Test Procedure Used

ANSI C63.10-2013 – Section 11.10.2 Method PKPSD

KDB 558074 D01 v05r02 – Section 8.4 DTS Maximum Power Spectral Density level in the fundamental emission

### Test Settings

1. Analyzer was set to the center frequency of the DTS channel under investigation
2. Span = 1.5 times the DTS channel bandwidth
3. RBW = 3kHz
4. VBW = 1MHz
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Trace was allowed to stabilize

### Test Setup

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



**Figure 7-3. Test Instrument & Measurement Setup**

### Test Notes

None

FCC ID: A3LSMS906U	 Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 55 of 113

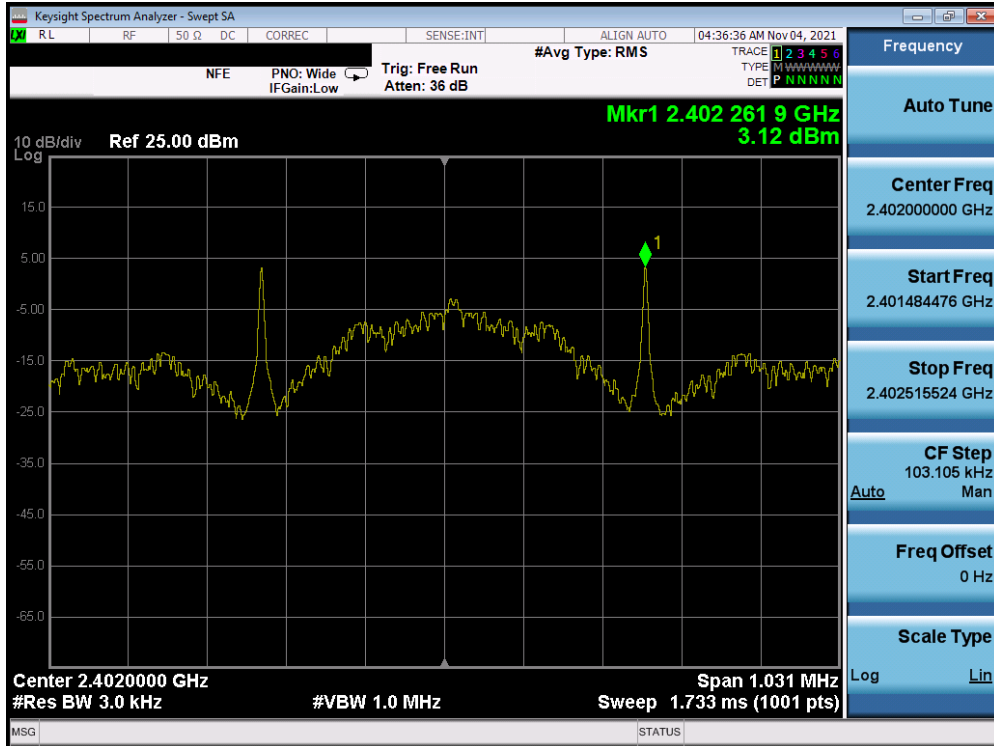
### Antenna 1

Frequency [MHz]	Data Rate	Power Scheme	Channel No.	Bluetooth Mode	Measured Power Spectral Density [dBm]	Maximum Permissible Power Density [dBm / 3kHz]	Margin [dB]
2402	125 kbps	iPA	0	LE	3.12	8.0	-4.88
2440	125 kbps	iPA	19	LE	3.39	8.0	-4.61
2480	125 kbps	iPA	39	LE	2.74	8.0	-5.26
2402	500 kbps	iPA	0	LE	3.06	8.0	-4.94
2440	500 kbps	iPA	19	LE	3.13	8.0	-4.87
2480	500 kbps	iPA	39	LE	2.55	8.0	-5.45
2402	1 Mbps	ePA	0	LE	1.52	8.0	-6.48
2440	1 Mbps	ePA	19	LE	2.66	8.0	-5.34
2480	1 Mbps	ePA	39	LE	1.48	8.0	-6.52
2402	2 Mbps	ePA	0	LE	-0.08	8.0	-8.08
2440	2 Mbps	ePA	19	LE	1.26	8.0	-6.74
2480	2 Mbps	ePA	39	LE	0.22	8.0	-7.78

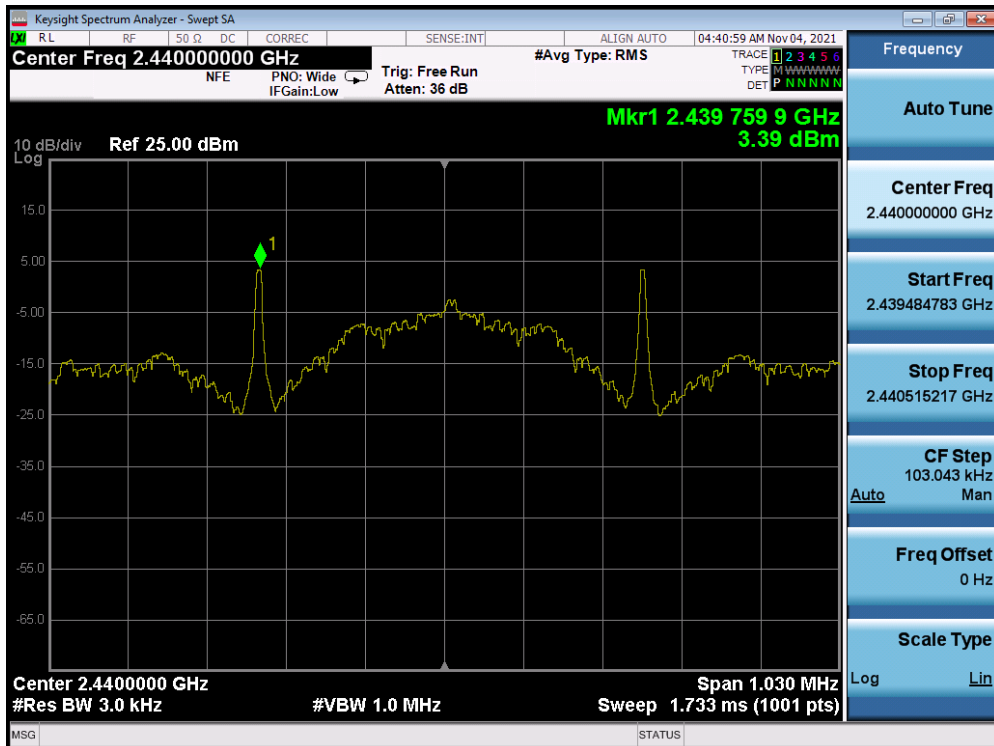
**Table 7-7. Conducted Power Density Measurements Antenna 1**

FCC ID: A3LSMS906U	 <b>PCTEST</b> Proud to be part of 	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset	Page 56 of 113	



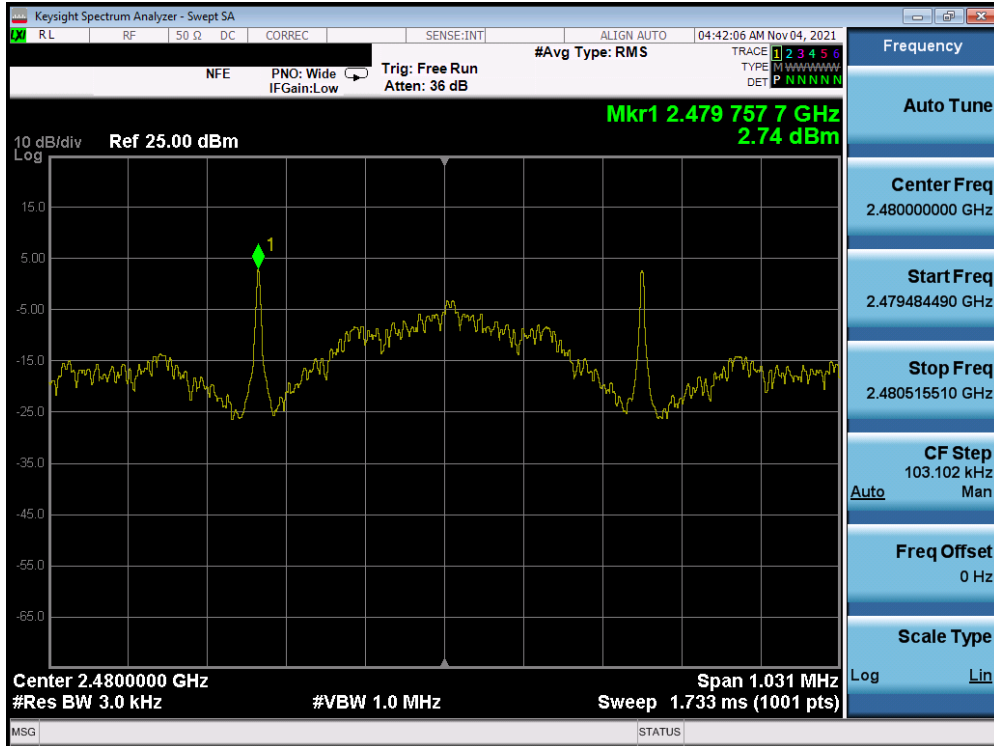


Plot 7-73. Power Spectral Density Plot (Bluetooth (LE), 125kbps, iPA – Ch. 0) Antenna 1

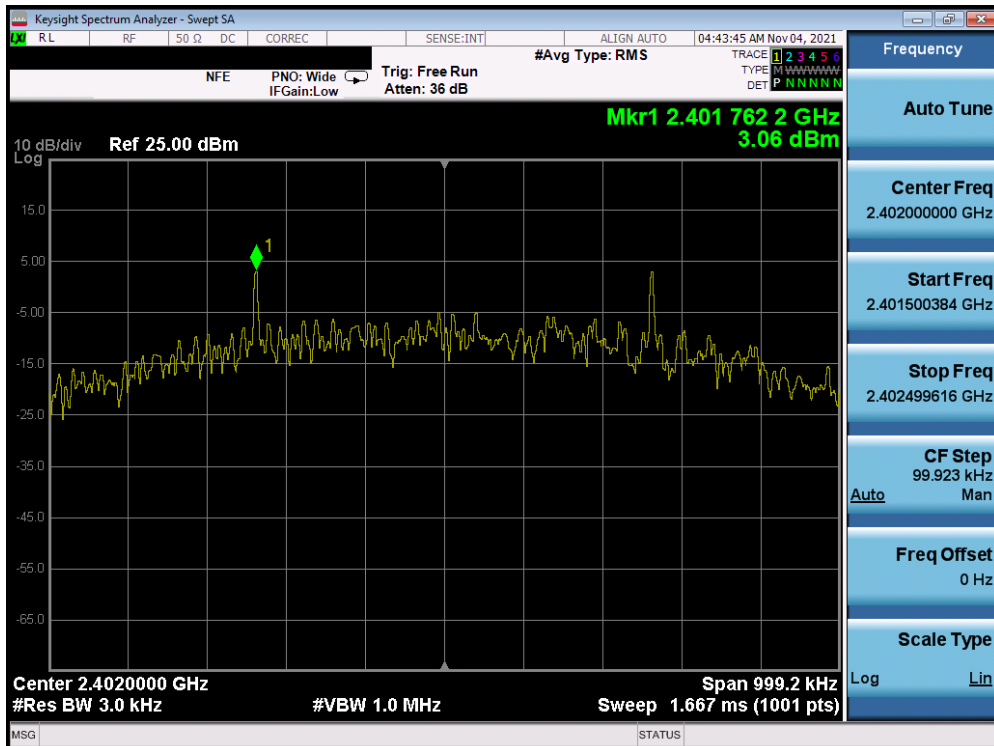


Plot 7-74. Power Spectral Density Plot (Bluetooth (LE), 125kbps, iPA – Ch. 19) Antenna 1

FCC ID: A3LSMS906U	Proud to be part of  element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 57 of 113

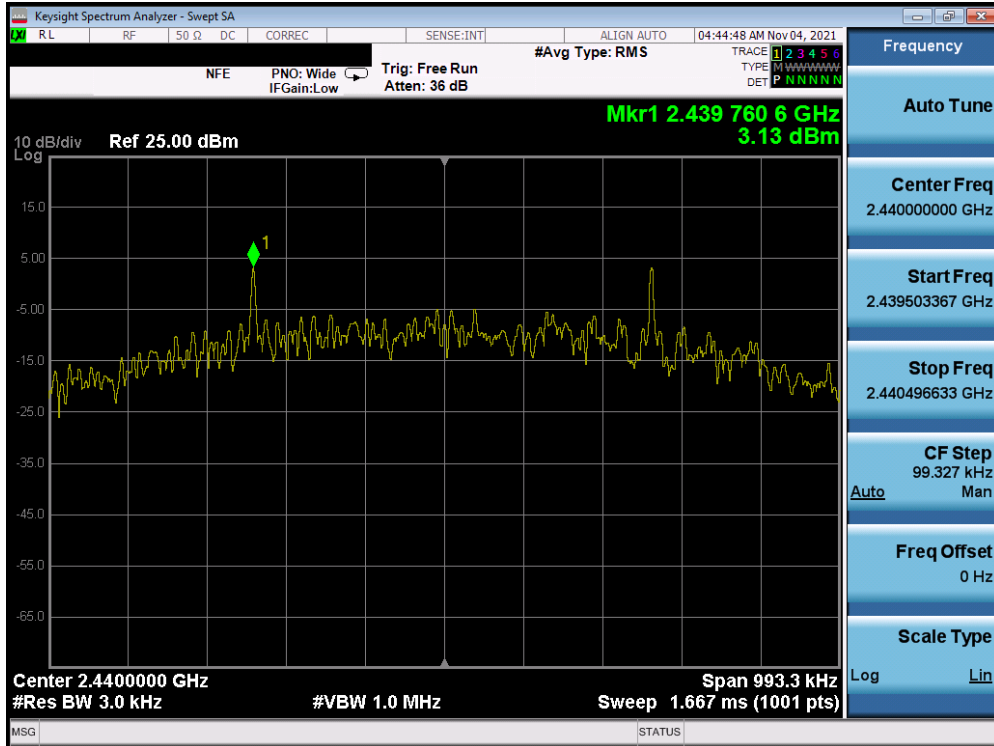


Plot 7-75. Power Spectral Density Plot (Bluetooth (LE), 125kbps, iPA – Ch. 39) Antenna 1

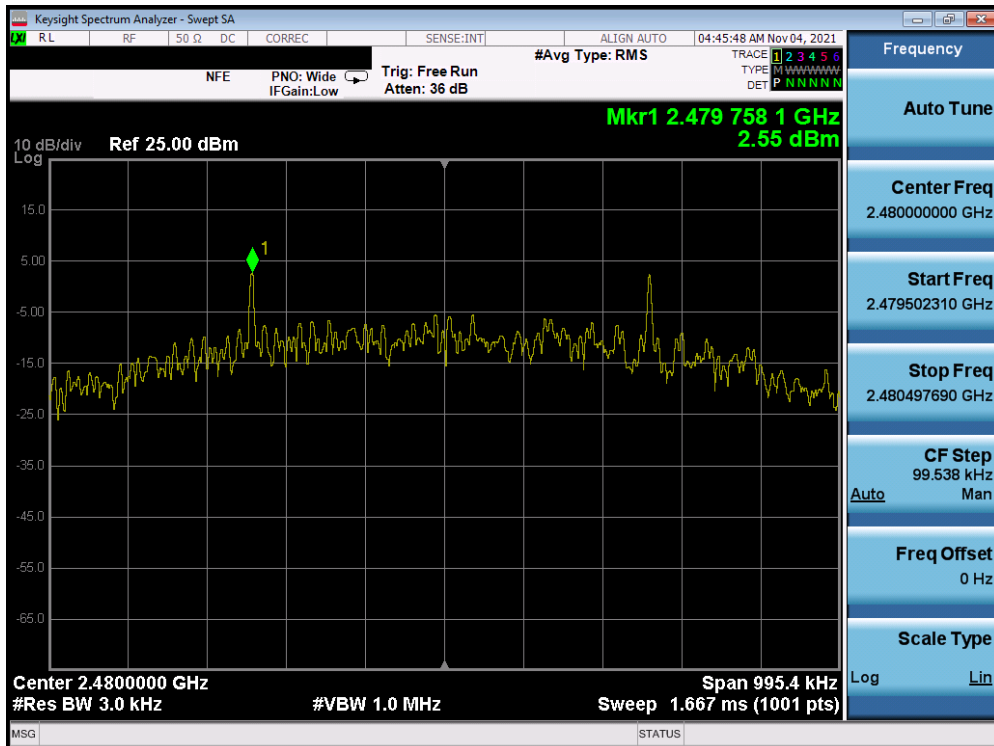


Plot 7-76. Power Spectral Density Plot (Bluetooth (LE), 500kbps, iPA – Ch. 0) Antenna 1

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 58 of 113

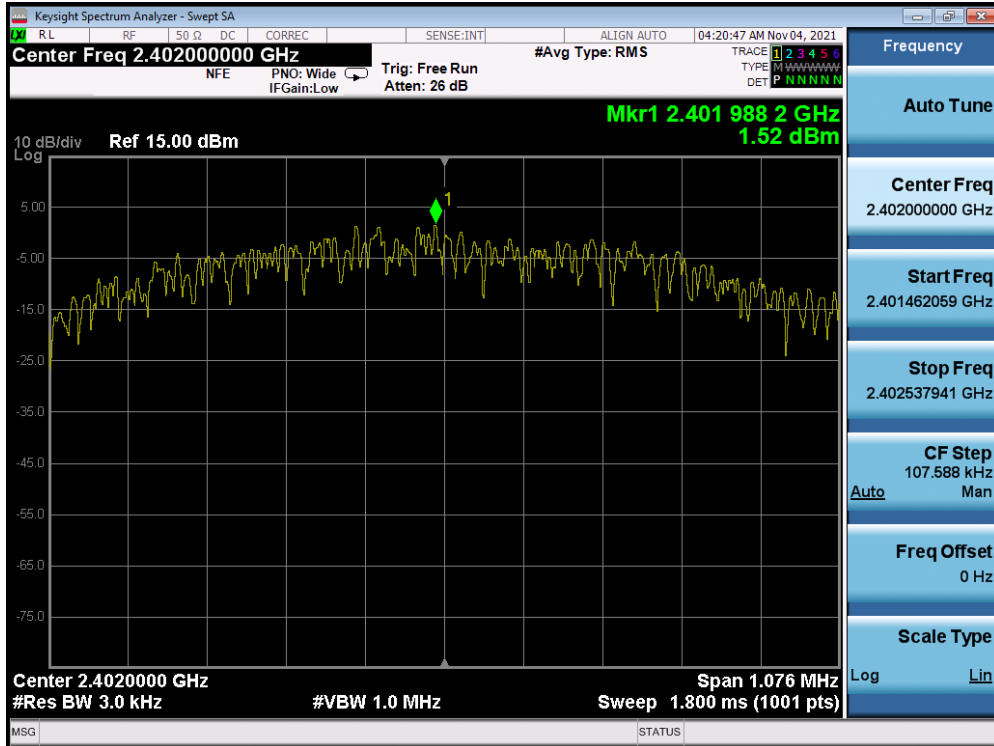


Plot 7-77. Power Spectral Density Plot (Bluetooth (LE), 500kbps, iPA – Ch. 19) Antenna 1

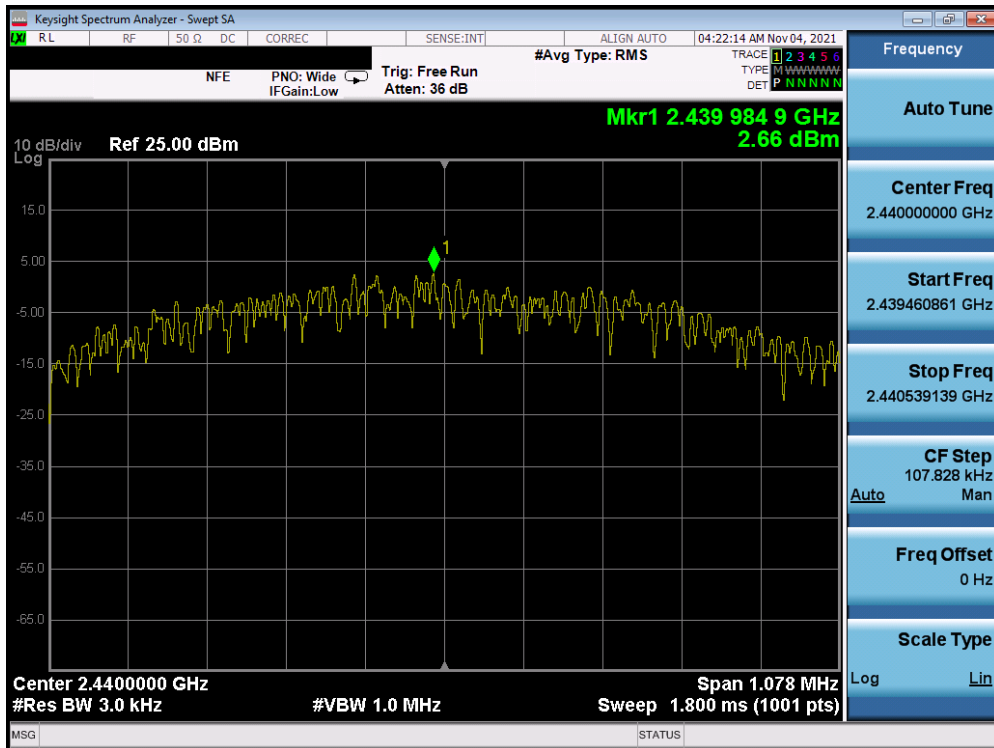


Plot 7-78. Power Spectral Density Plot (Bluetooth (LE), 500kbps, iPA – Ch. 39) Antenna 1

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 59 of 113

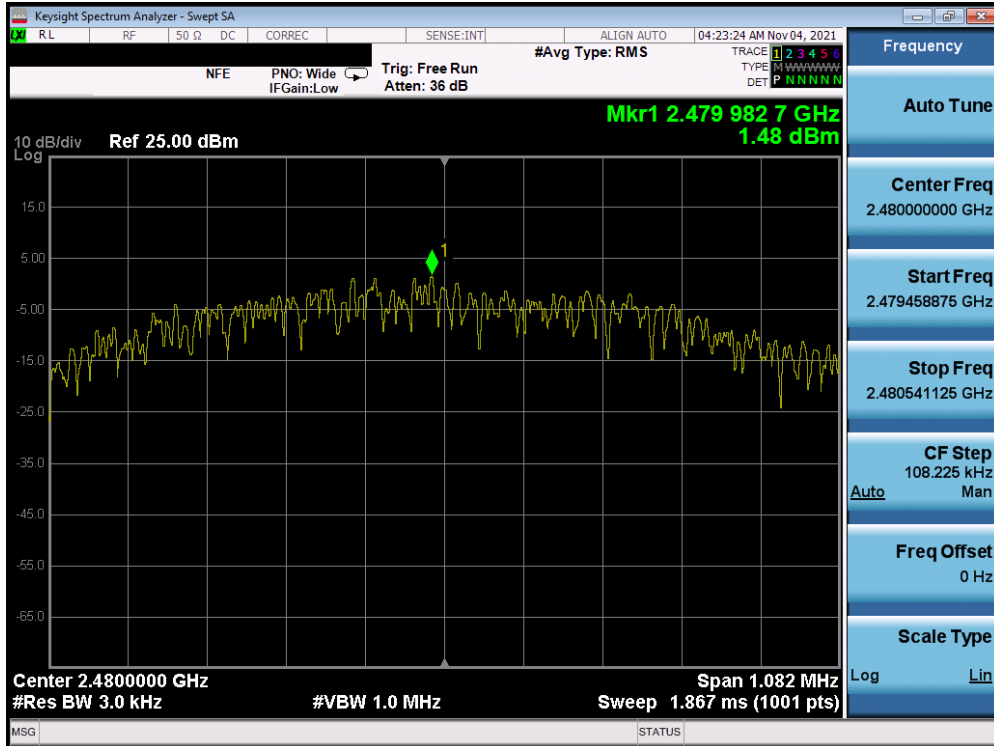


Plot 7-79. Power Spectral Density Plot (Bluetooth (LE), 1Mbps, ePA – Ch. 0) Antenna 1

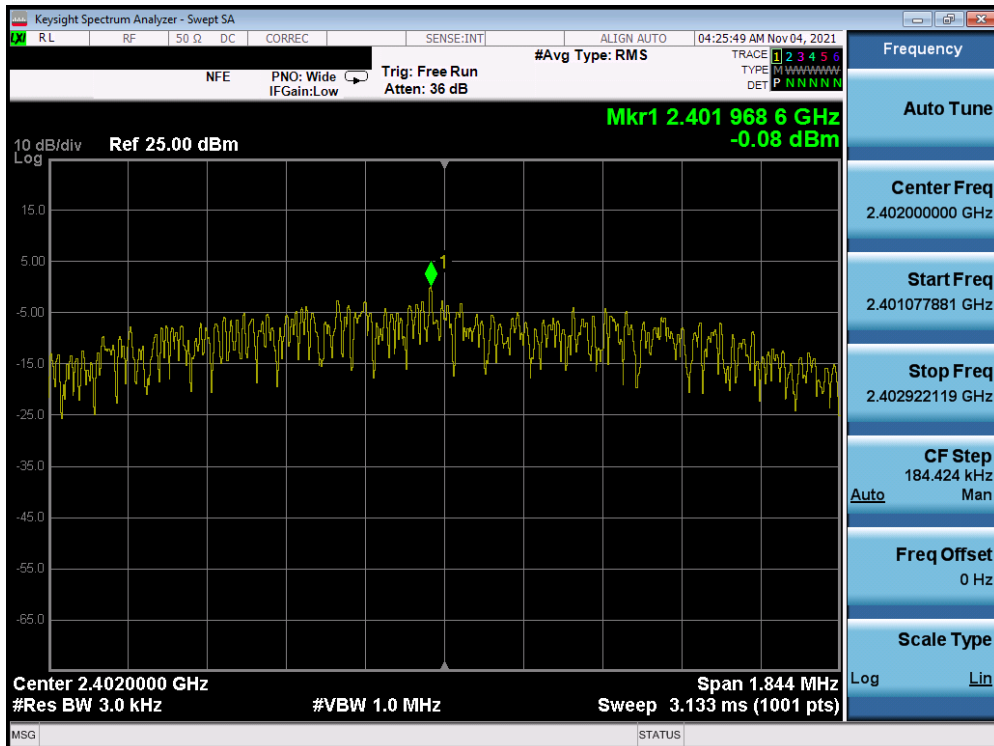


Plot 7-80. Power Spectral Density Plot (Bluetooth (LE), 1Mbps, ePA – Ch. 19) Antenna 1

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 60 of 113

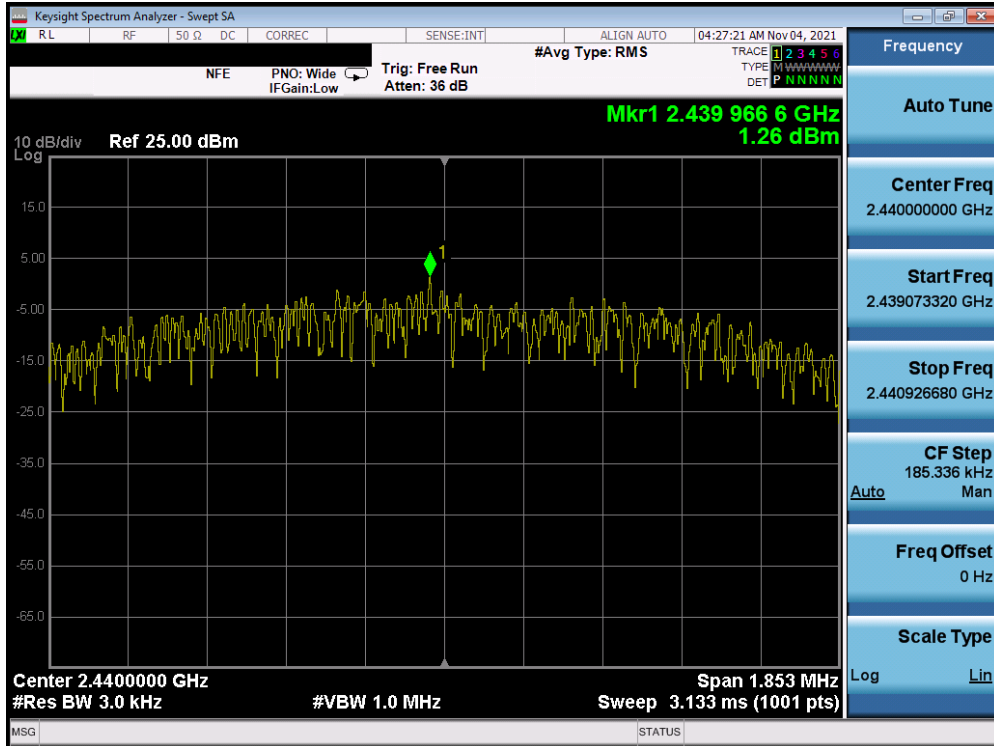


Plot 7-81. Power Spectral Density Plot (Bluetooth (LE), 1Mbps, ePA – Ch. 39) Antenna 1

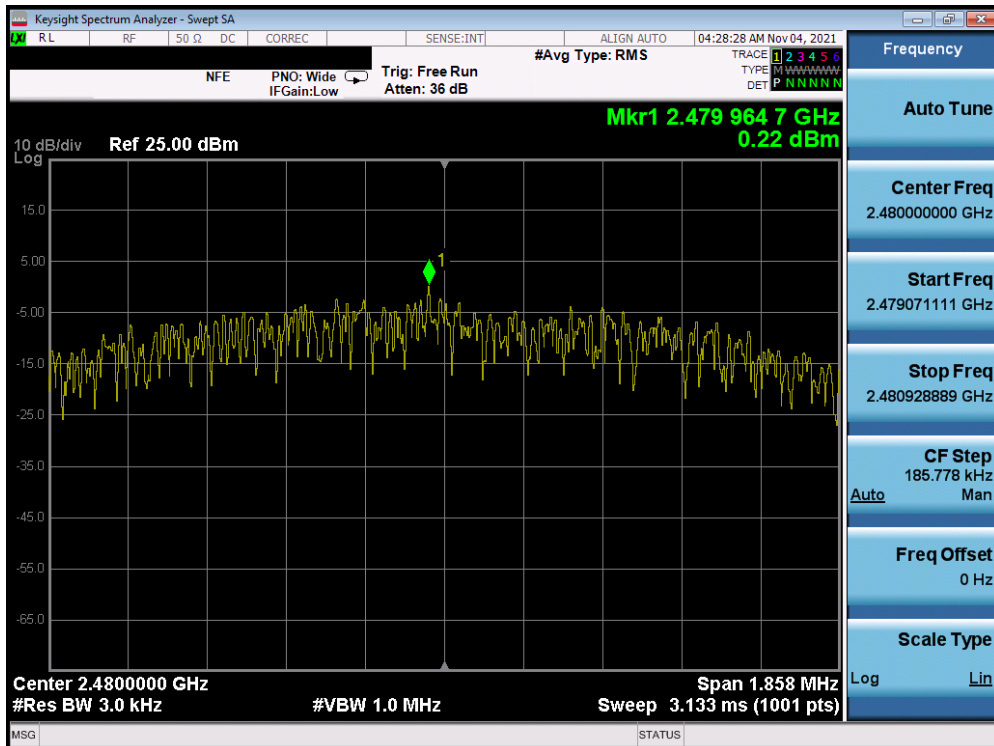


Plot 7-82. Power Spectral Density Plot (Bluetooth (LE), 2Mbps, ePA – Ch. 0) Antenna 1

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 61 of 113



Plot 7-83. Power Spectral Density Plot (Bluetooth (LE), 2Mbps, ePA – Ch. 19) Antenna 1



Plot 7-84. Power Spectral Density Plot (Bluetooth (LE), 2Mbps, ePA – Ch. 39) Antenna 1

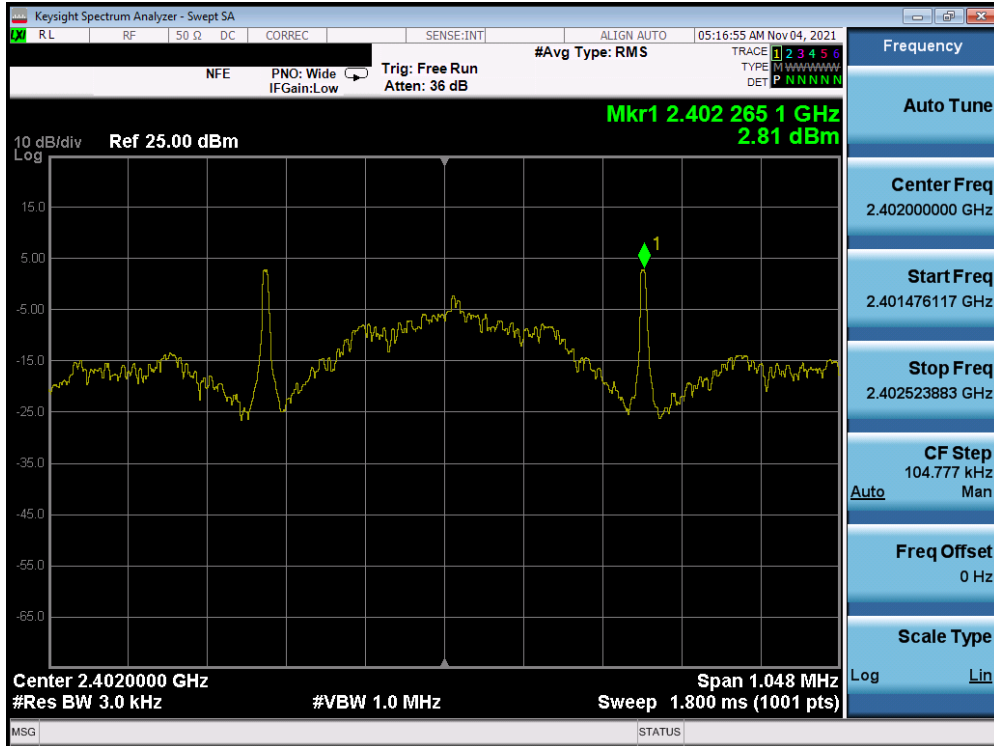
FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of  element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 62 of 113

## Antenna 2

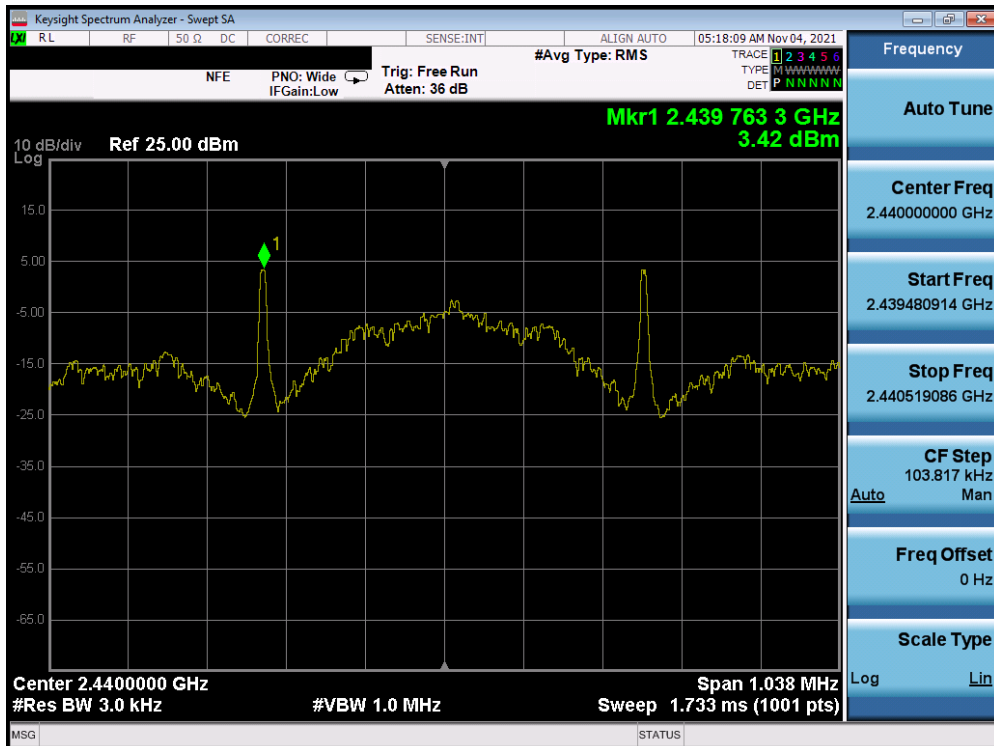
Frequency [MHz]	Data Rate [Mbps]	Power Scheme	Channel No.	Bluetooth Mode	Measured Power Spectral Density [dBm]	Maximum Permissible Power Density [dBm / 3kHz]	Margin [dB]
2402	125 kbps	iPa	0	LE	2.81	8.0	-5.19
2440	125 kbps	iPa	19	LE	3.42	8.0	-4.58
2480	125 kbps	iPa	39	LE	2.14	8.0	-5.86
2402	500 kbps	iPa	0	LE	2.79	8.0	-5.21
2440	500 kbps	iPa	19	LE	3.26	8.0	-4.74
2480	500 kbps	iPa	39	LE	2.08	8.0	-5.92
2402	1 Mbps	ePA	0	LE	-0.43	8.0	-8.43
2440	1 Mbps	ePA	19	LE	0.86	8.0	-7.14
2480	1 Mbps	ePA	39	LE	-0.10	8.0	-8.10
2402	2 Mbps	ePA	0	LE	-1.45	8.0	-9.45
2440	2 Mbps	ePA	19	LE	-0.83	8.0	-8.83
2480	2 Mbps	ePA	39	LE	-1.70	8.0	-9.70

**Table 7-8. Conducted Power Density Measurements Antenna 2**

FCC ID: A3LSMS906U	 <b>PCTEST</b> Proud to be part of 	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 63 of 113



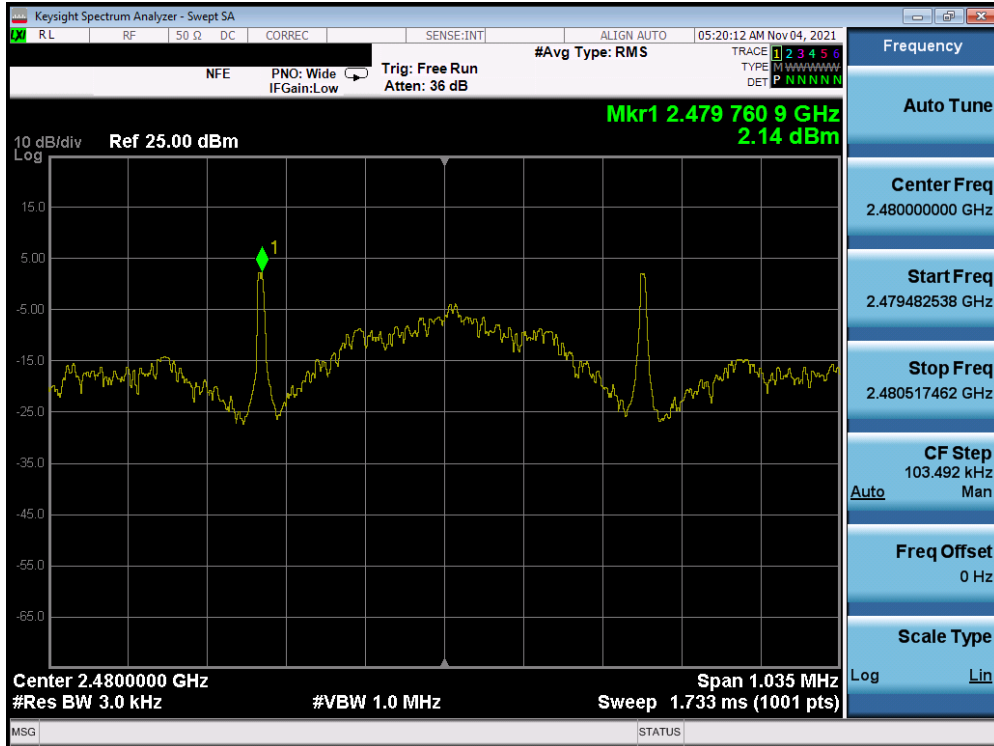
Plot 7-85. Power Spectral Density Plot (Bluetooth (LE), 125kbps, iPA – Ch. 0) Antenna 2



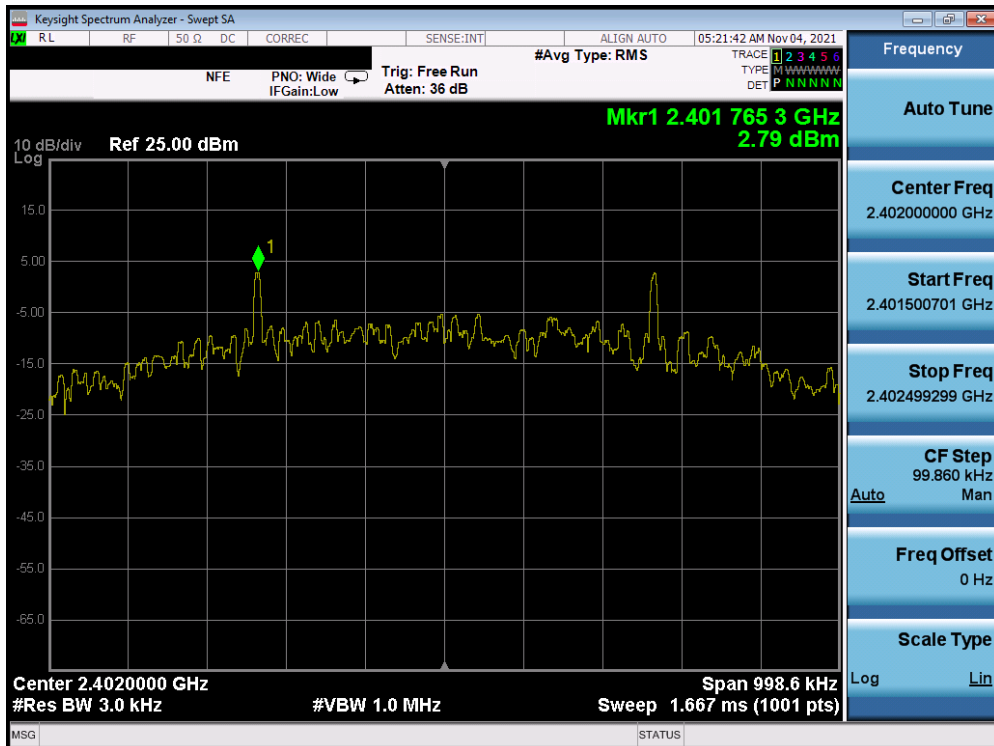
Plot 7-86. Power Spectral Density Plot (Bluetooth (LE), 125kbps, iPA – Ch. 19) Antenna 2

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 64 of 113



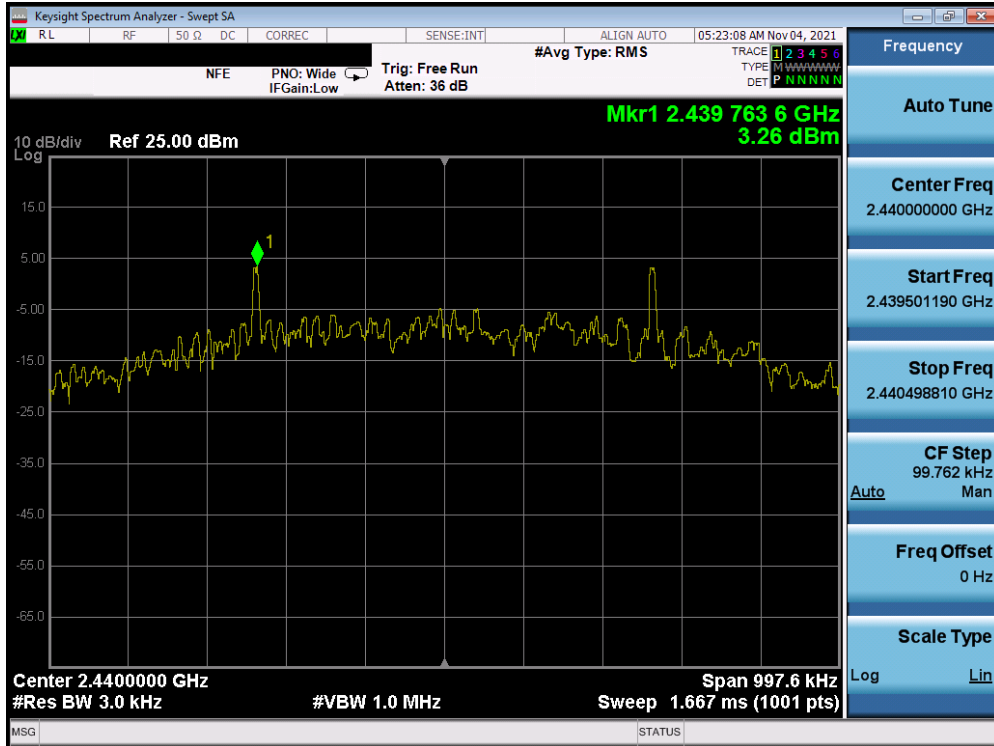


Plot 7-87. Power Spectral Density Plot (Bluetooth (LE), 125kbps, iPA – Ch. 39) Antenna 2

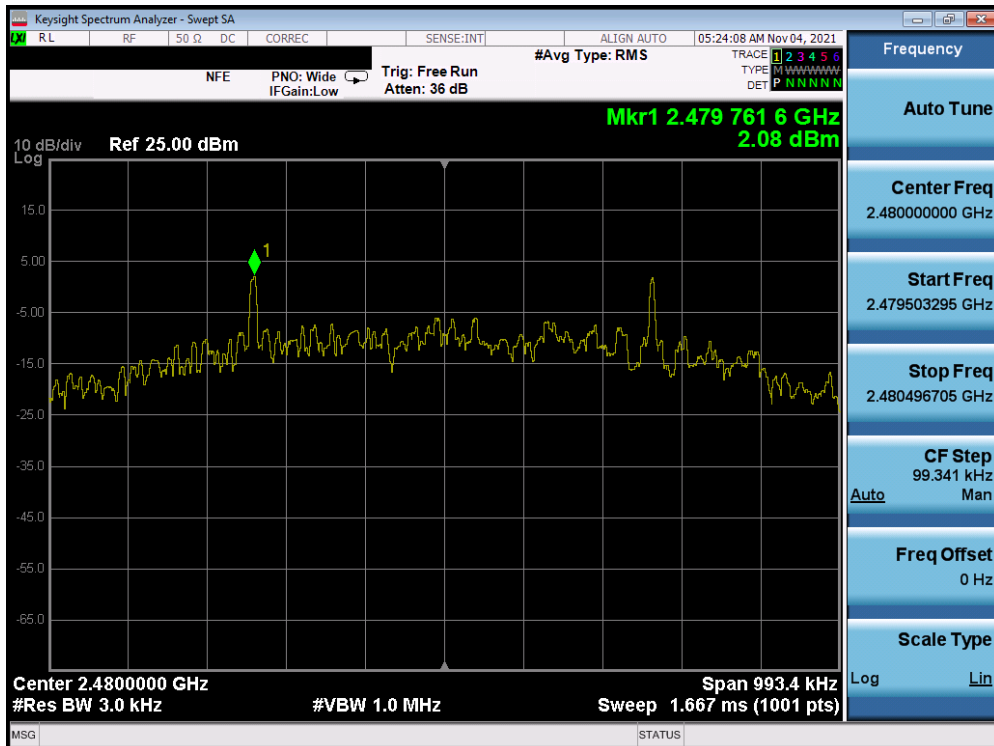


Plot 7-88. Power Spectral Density Plot (Bluetooth (LE), 500kbps, iPA – Ch. 0) Antenna 2

FCC ID: A3LSMS906U		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 65 of 113

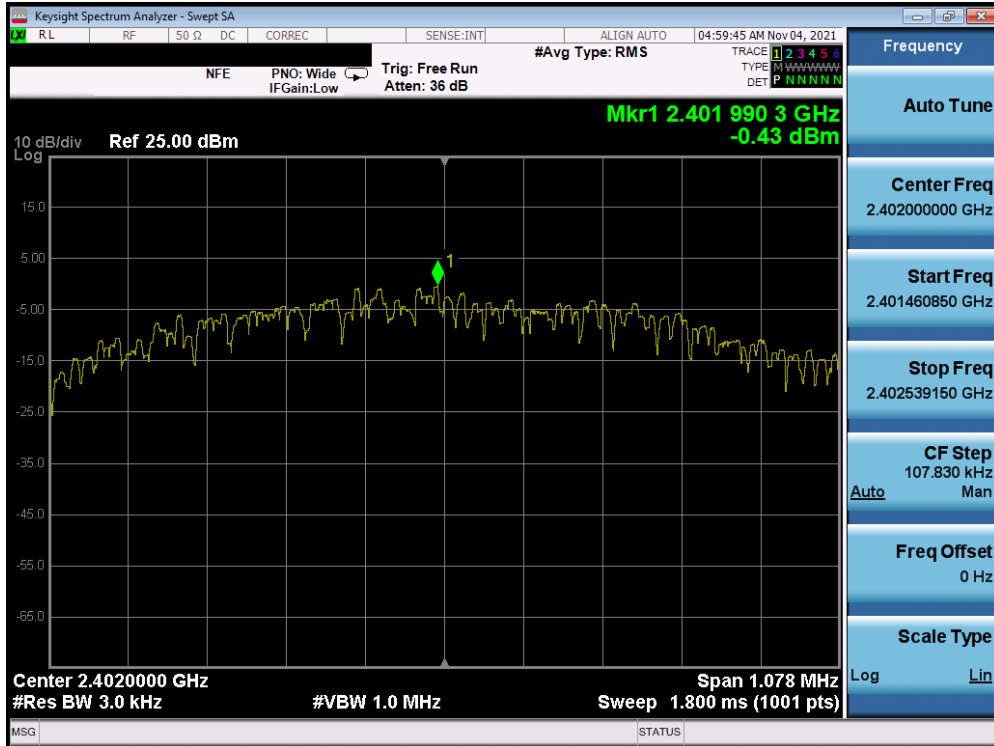


Plot 7-89. Power Spectral Density Plot (Bluetooth (LE), 500kbps, iPA – Ch. 19) Antenna 2

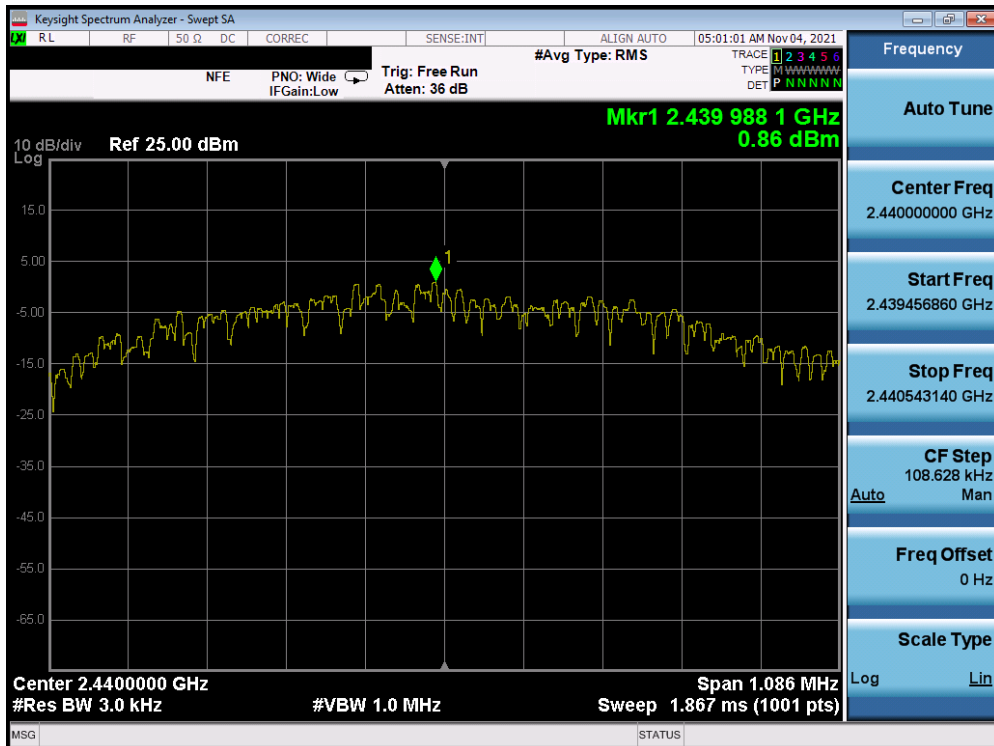


Plot 7-90. Power Spectral Density Plot (Bluetooth (LE), 500kbps, iPA – Ch. 39) Antenna 2

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 66 of 113



Plot 7-91. Power Spectral Density Plot (Bluetooth (LE), 1Mbps, ePA – Ch. 0) Antenna 2



Plot 7-92. Power Spectral Density Plot (Bluetooth (LE), 1Mbps, ePA – Ch. 19) Antenna 2

FCC ID: A3LSMS906U	<b>PCTEST</b> Proud to be part of  element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1M2109090103-17.A3L	Test Dates: 9/22/2021 - 11/11/2021	EUT Type: Portable Handset		Page 67 of 113