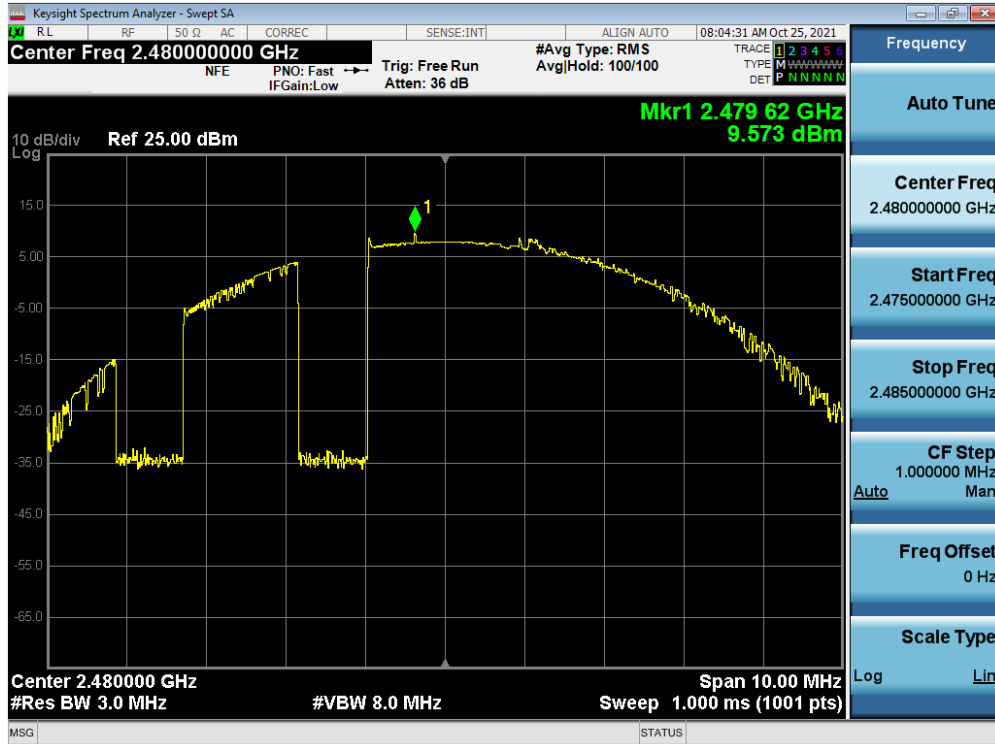
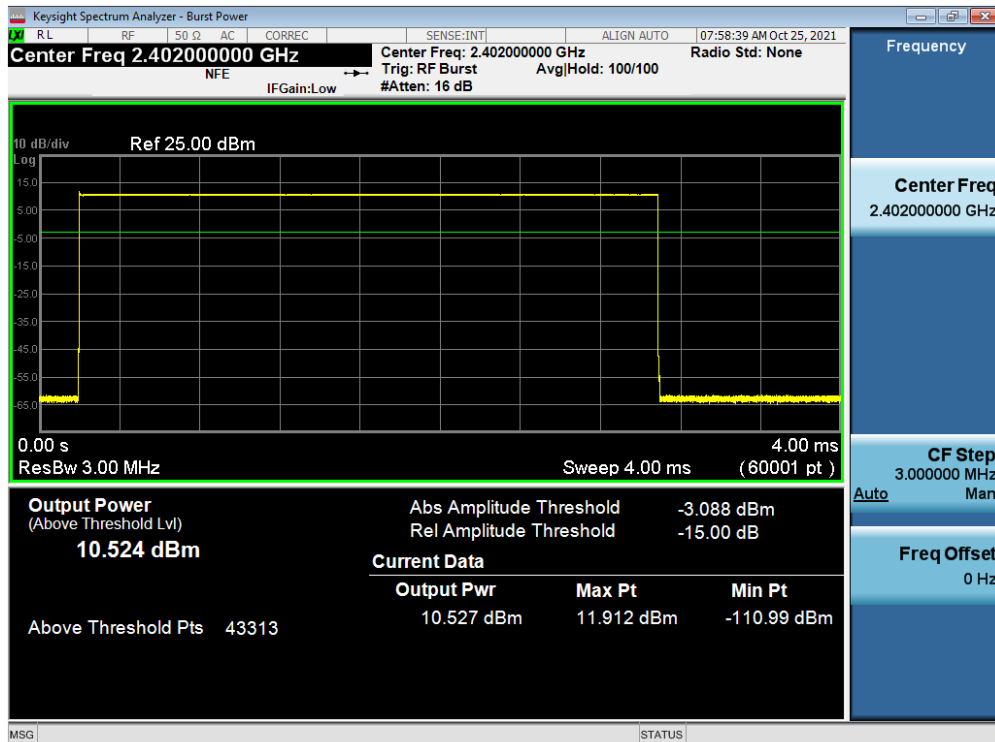


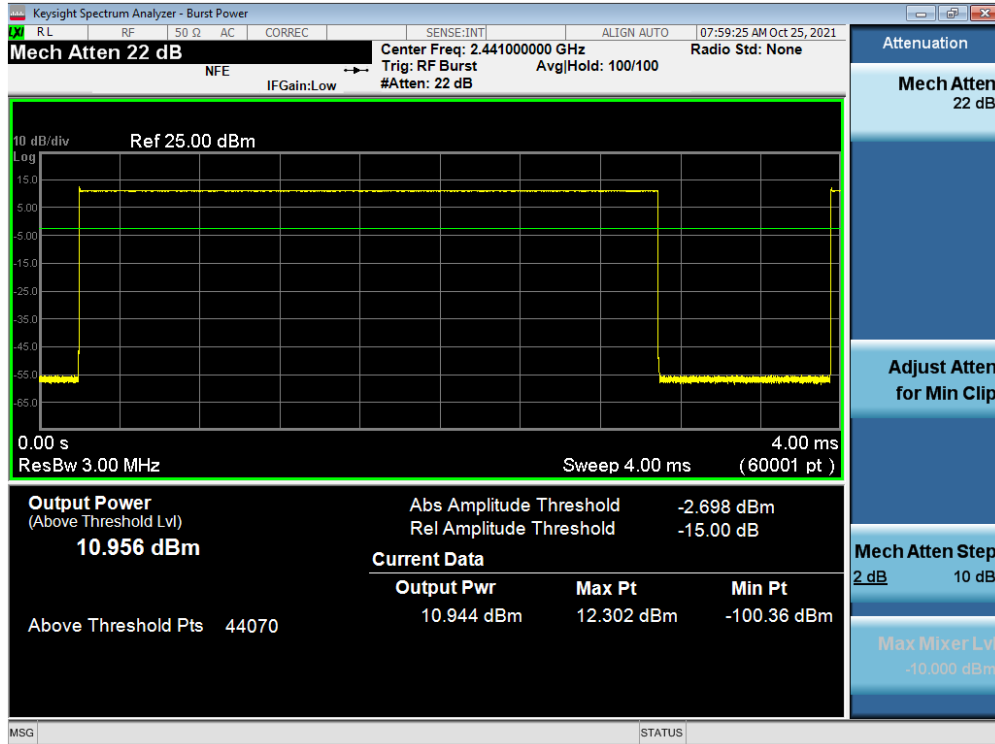


Plot 7-117. Dual Bluetooth Peak Conducted Power (3Mbps – Ch. 78) Antenna 2 iPA

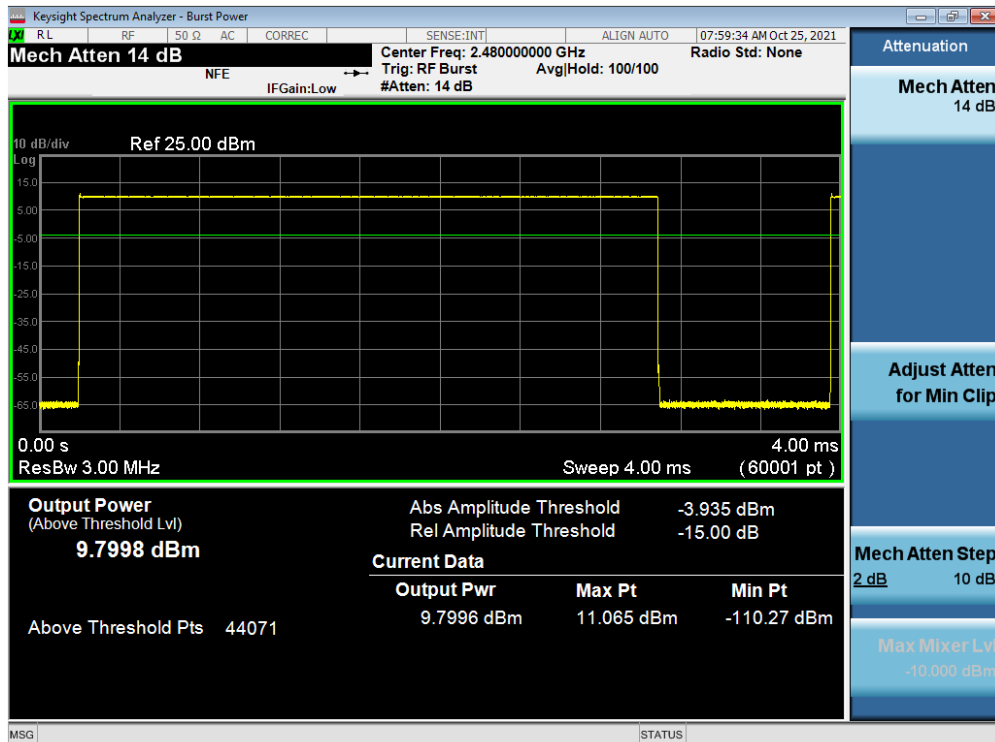


Plot 7-118. Dual Bluetooth Average Conducted Power (1Mbps – Ch. 0) Antenna 2 iPA

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 77 of 129                    |

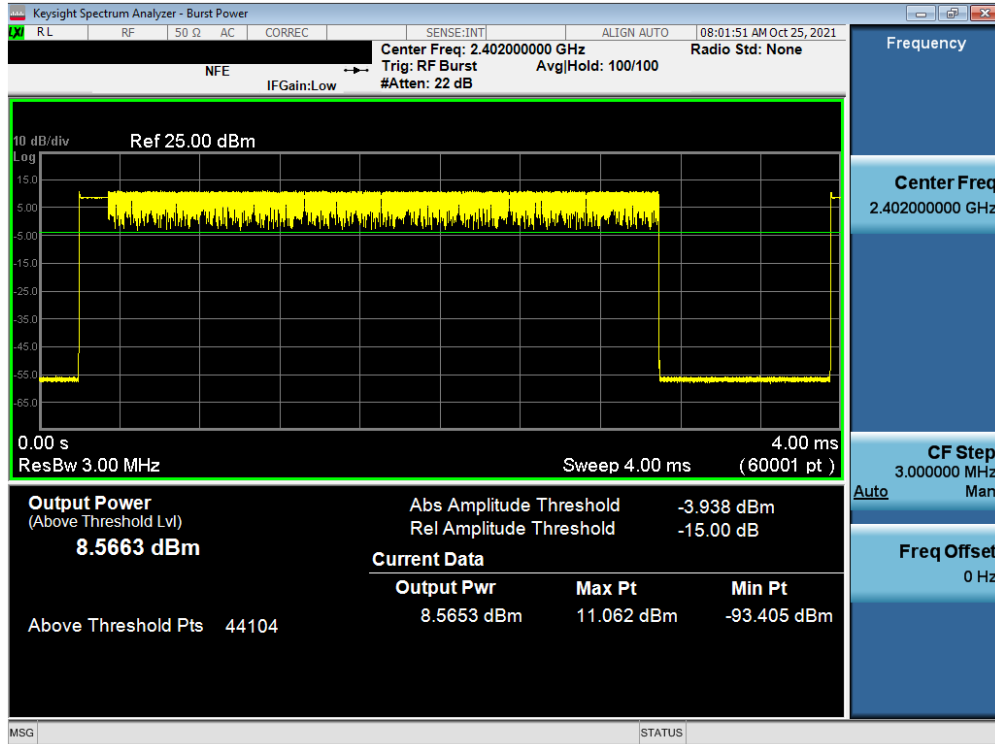


Plot 7-119. Dual Bluetooth Average Conducted Power (1Mbps – Ch. 39) Antenna 2 iPA

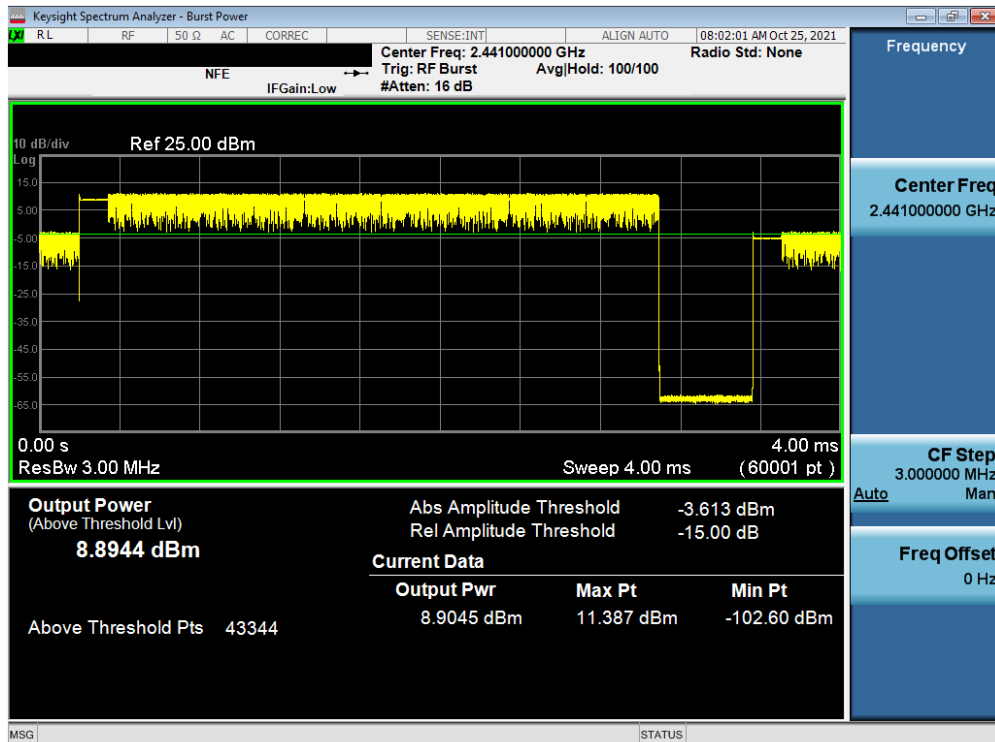


Plot 7-120. Dual Bluetooth Average Conducted Power (1Mbps – Ch. 78) Antenna 2 iPA

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 78 of 129                    |

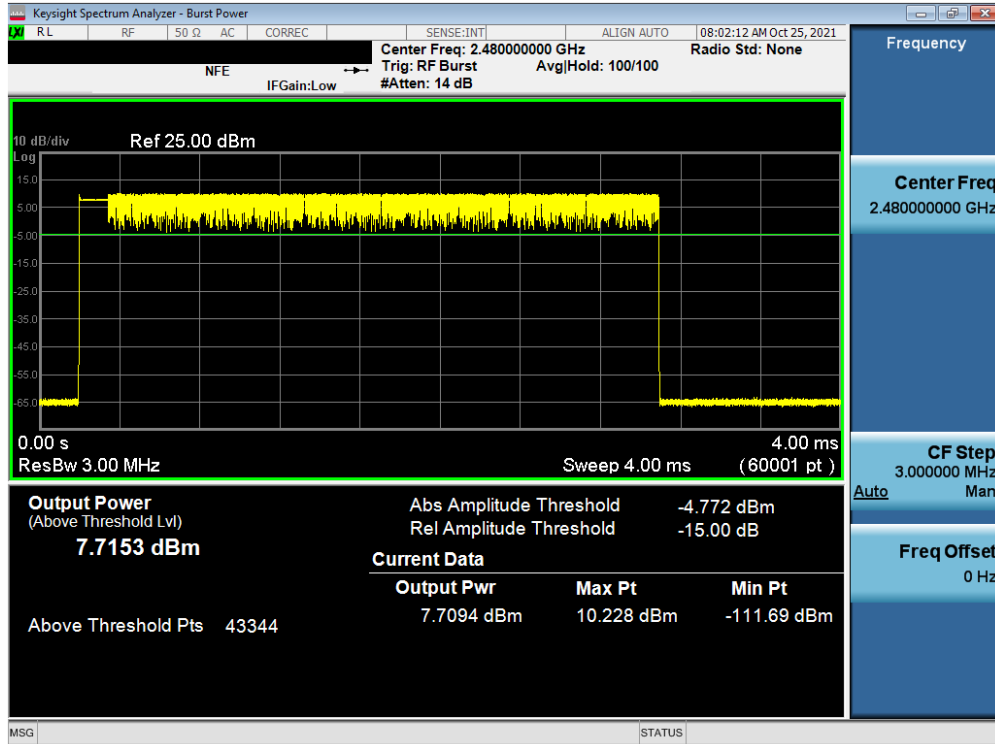


Plot 7-121. Dual Bluetooth Average Conducted Power (2Mbps – Ch. 0) Antenna 2 iPA

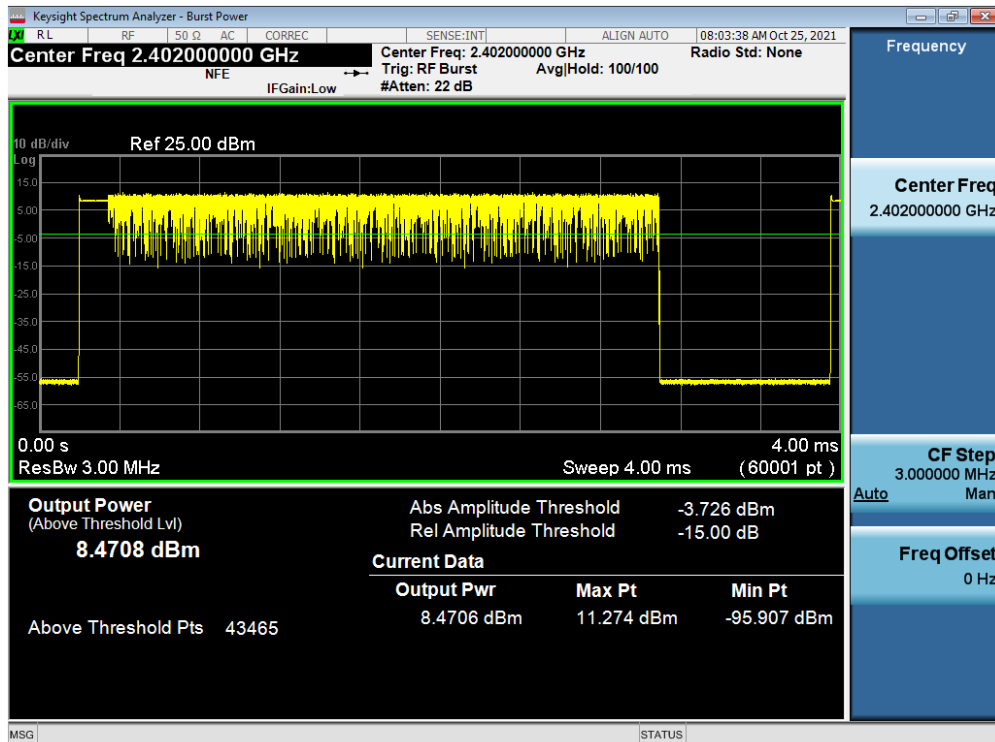


Plot 7-122. Dual Bluetooth Average Conducted Power (2Mbps – Ch. 39) Antenna 2 iPA

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 79 of 129                    |

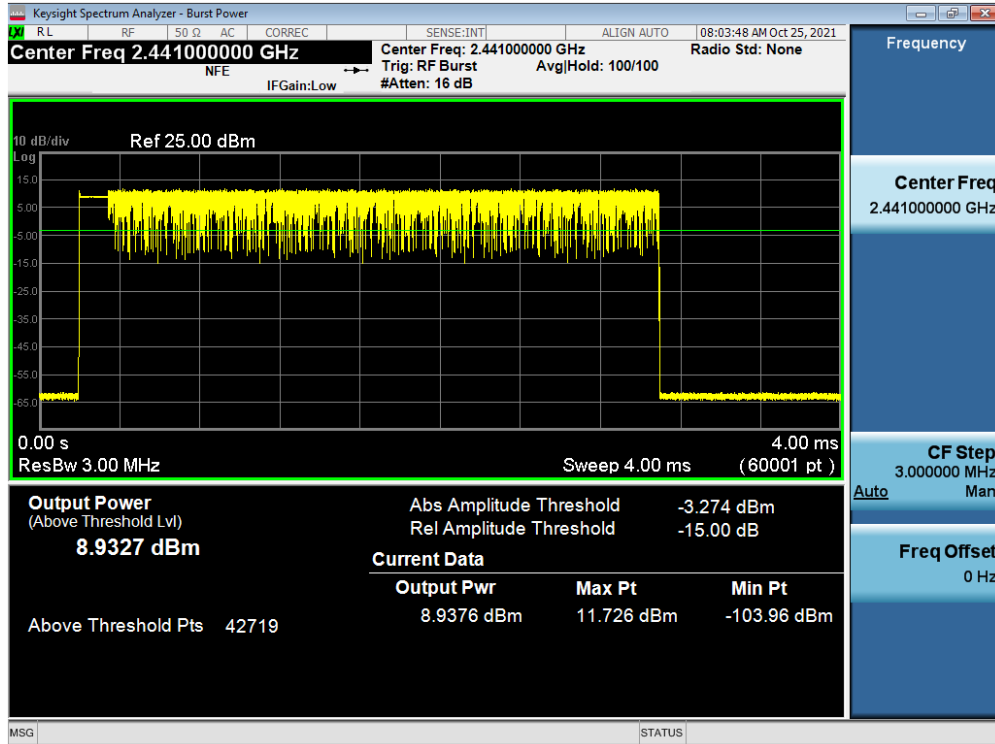


Plot 7-123. Dual Bluetooth Average Conducted Power (2Mbps – Ch. 78) Antenna 2 iPA

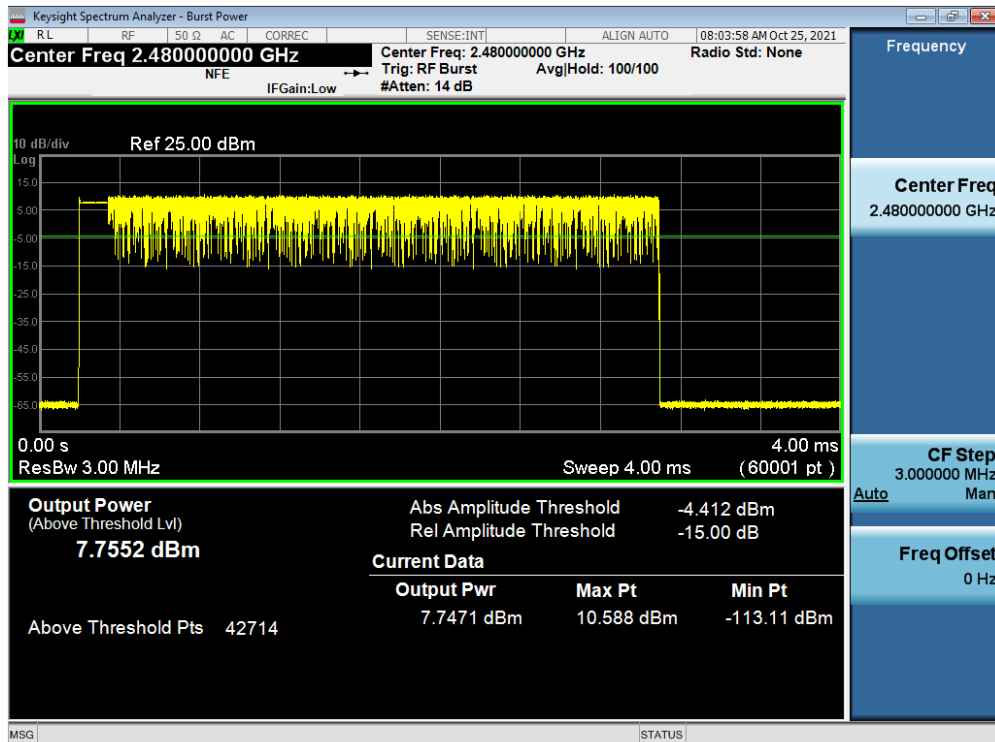


Plot 7-124. Dual Bluetooth Average Conducted Power (3Mbps – Ch. 0) Antenna 2 iPA

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 80 of 129                    |



Plot 7-125. Dual Bluetooth Average Conducted Power (3Mbps – Ch. 39) Antenna 2 iPA



Plot 7-126. Dual Bluetooth Average Conducted Power (3Mbps – Ch. 79) Antenna 2 iPA

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 81 of 129                    |

## 7.4 Band Edge Compliance

§15.247 (d); RSS-247 [5.5]

### Test Overview and Limits

EUT operates in hopping and non-hopping transmission mode. Measurement is taken at the highest point located outside of the emission bandwidth. **The maximum permissible out-of-band emission level is 20 dBc.**

### Test Procedure Used

ANSI C63.10-2013 – Section 6.10.4

### Test Settings

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW = 100kHz
4. VBW = 300kHz
5. Detector = Peak
6. Number of sweep points  $\geq 2 \times \text{Span/RBW}$
7. Trace mode = max hold
8. Sweep time = auto couple
9. The trace was allowed to stabilize

### Test Setup

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

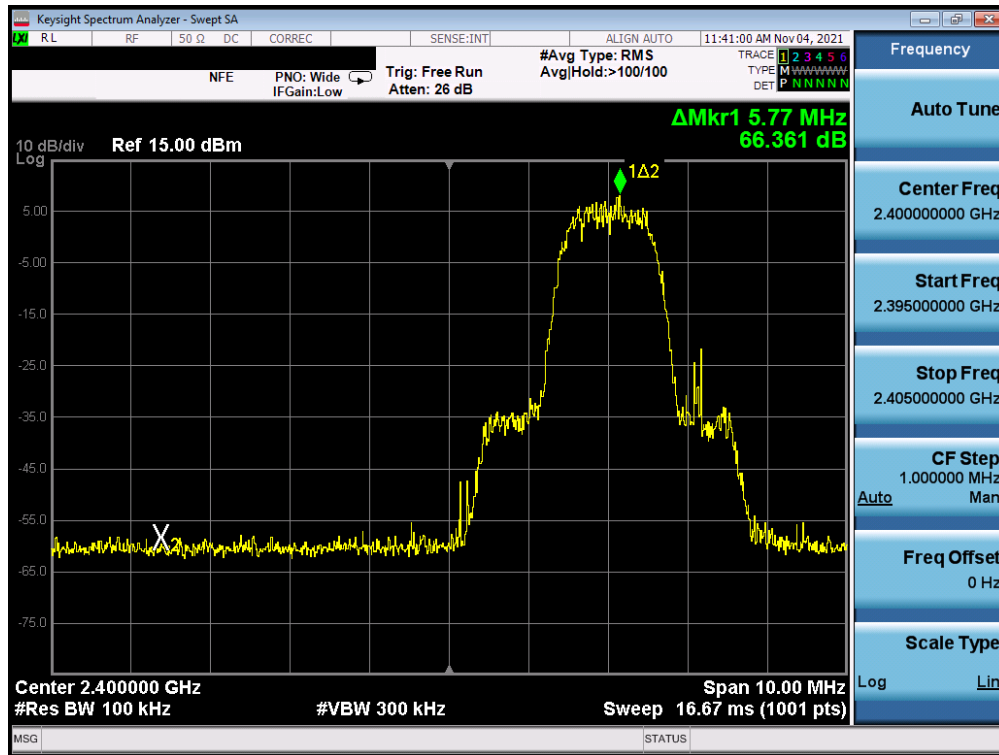


**Figure 7-3. Test Instrument & Measurement Setup**

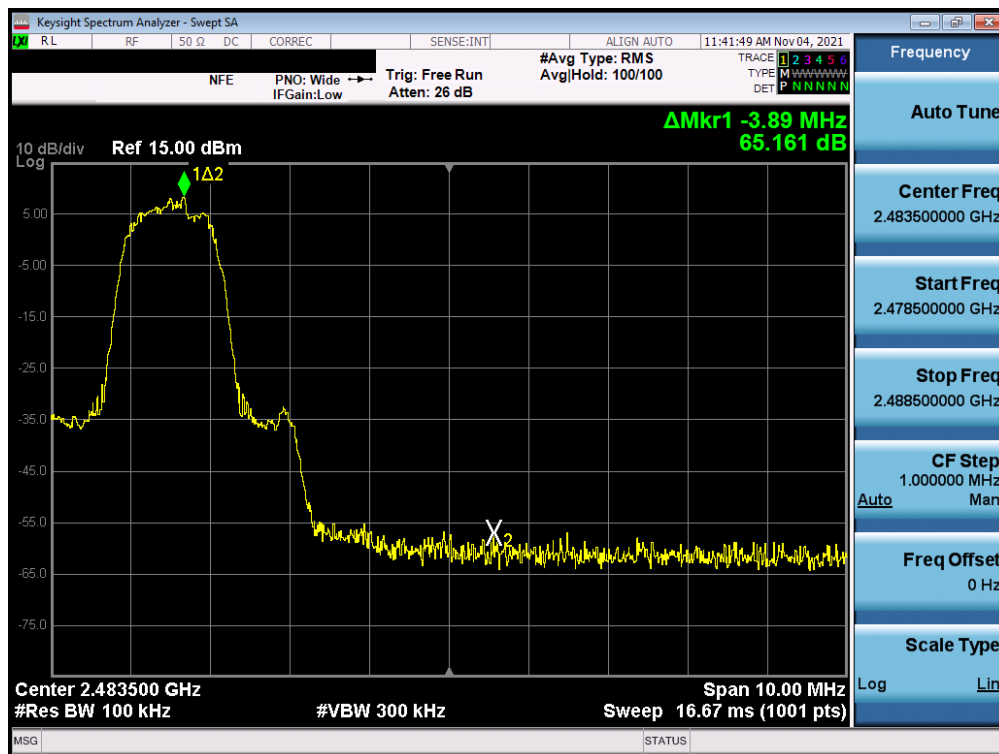
### Test Notes

Out of band conducted spurious emissions at the band edge were investigated for all data rates in hopping and non-hopping modes. The worst case emissions were found with the EUT transmitting at 3 Mbps. Band edge emissions were also investigated with the EUT transmitting in all data rates. Plots of the worst case emissions are shown below.

|                                         |                                                                                                                                                                                                |                                       |                                                                                       |                                   |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <br>Proud to be part of  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021                                                                                                                                                                | EUT Type:<br>Portable Handset         |                                                                                       | Page 82 of 129                    |

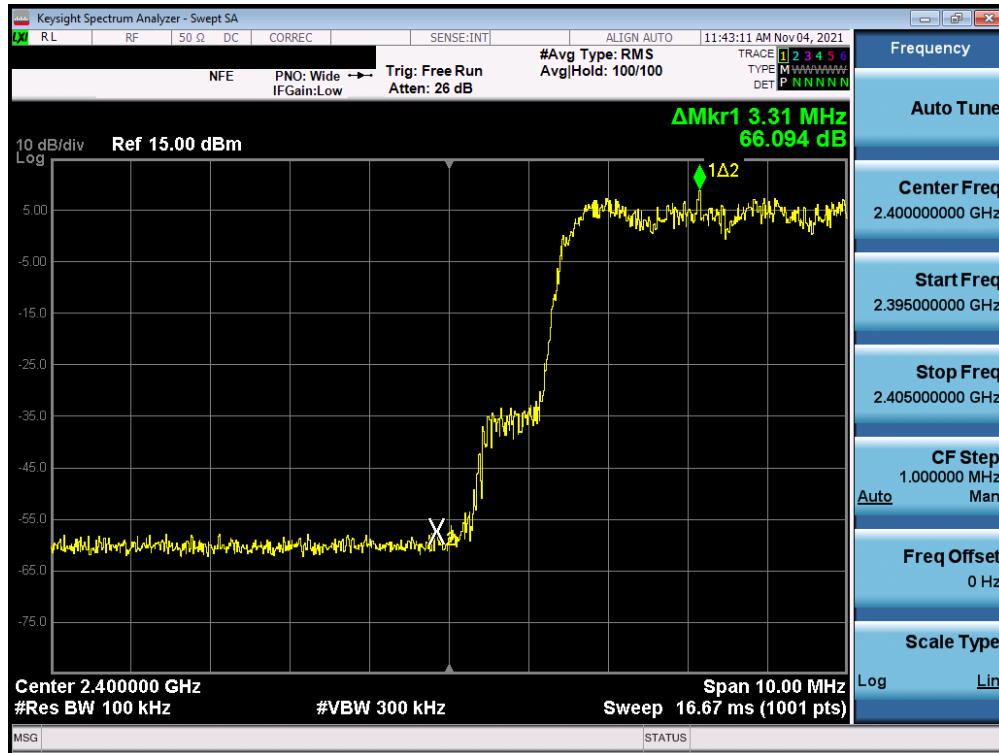


Plot 7-127. Band Edge Plot (Bluetooth with Hopping Disabled, 3Mbps– Ch. 0) Antenna 1

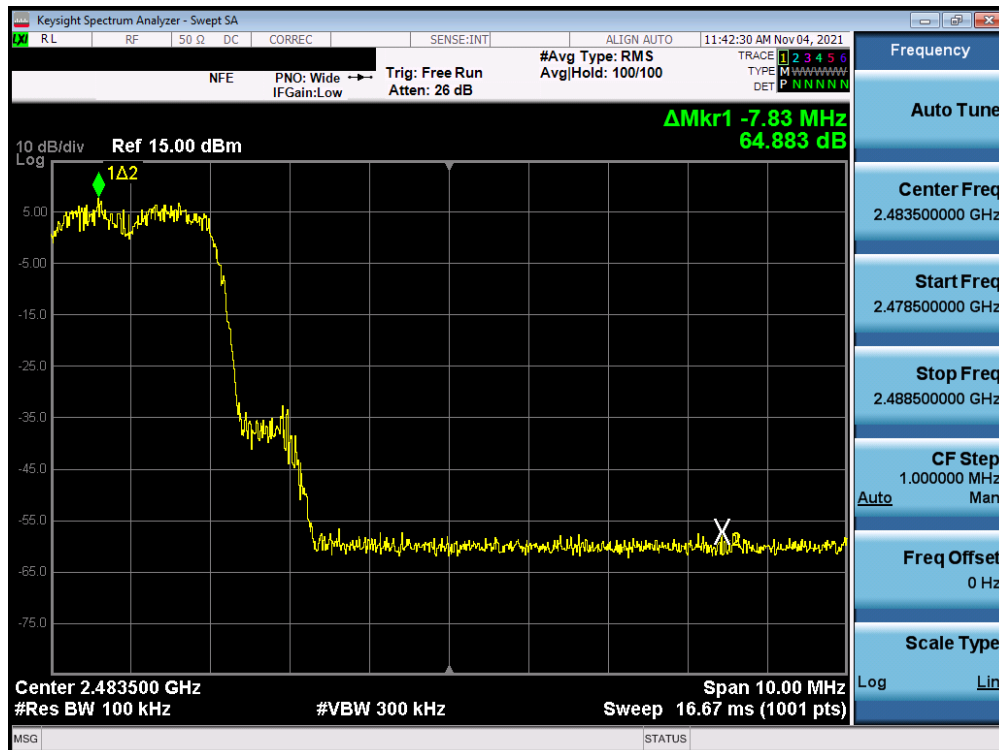


Plot 7-128. Band Edge Plot (Bluetooth with Hopping Disabled, 3Mbps– Ch. 78) Antenna 1

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 83 of 129                    |

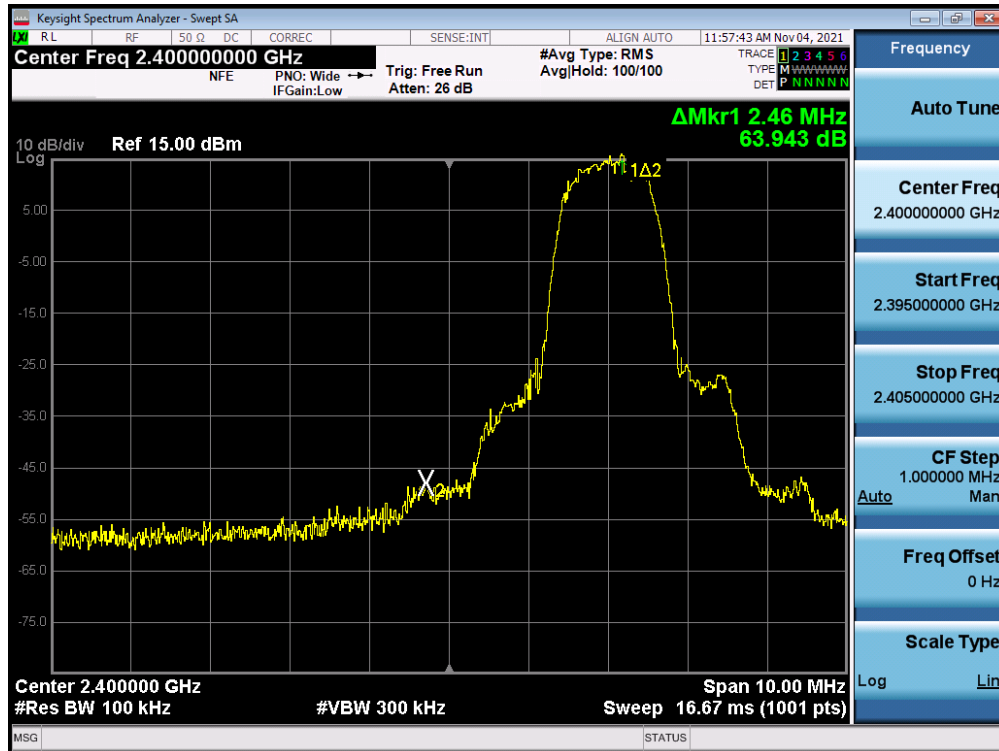


Plot 7-129. Band Edge Plot (Bluetooth with Hopping Enabled, 3Mbps- Ch. 0) Antenna 1

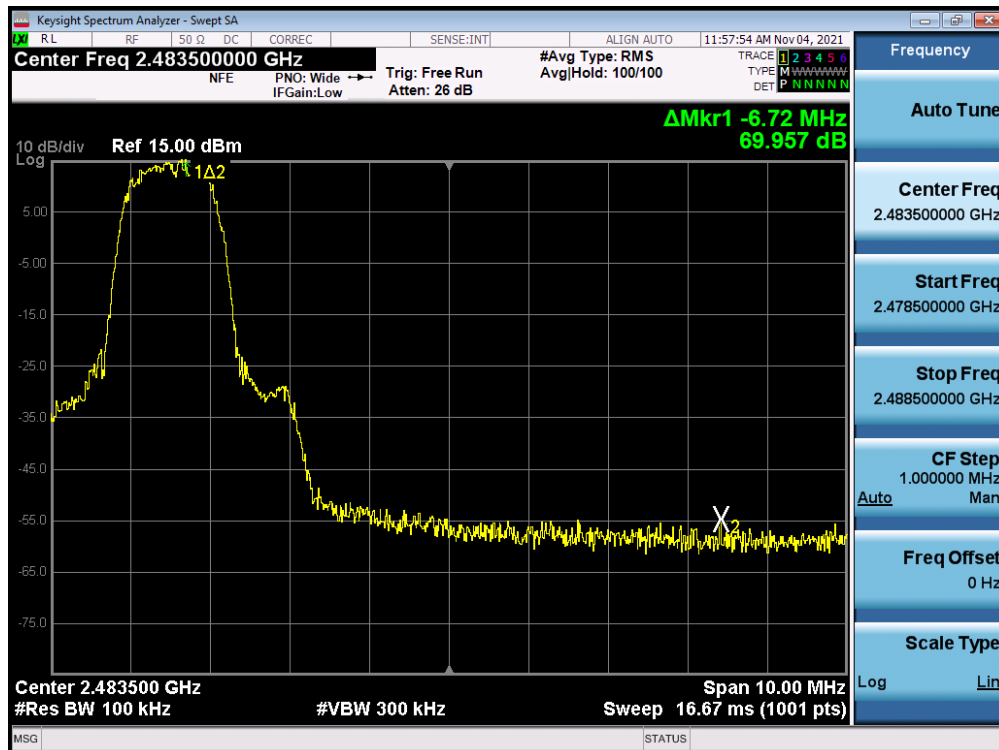


Plot 7-130. Band Edge Plot (Bluetooth with Hopping Enabled, 3Mbps- Ch. 78) Antenna 1

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 84 of 129                    |

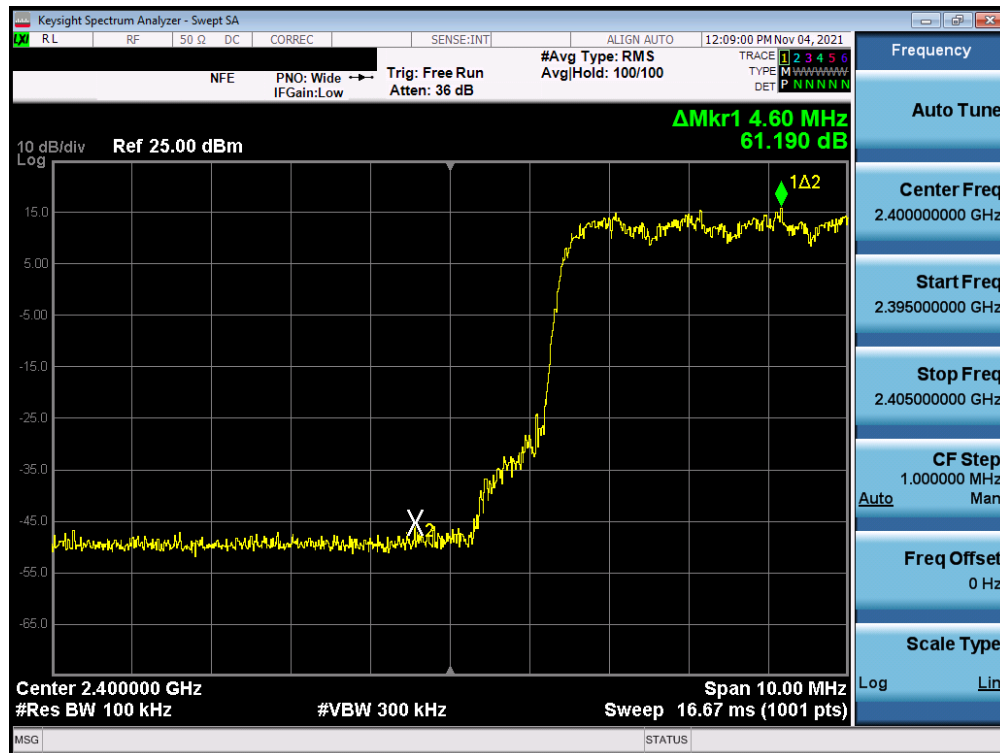


Plot 7-131. Band Edge Plot (Bluetooth with Hopping Disabled, 3Mbps- Ch. 0) Antenna 2



Plot 7-132. Band Edge Plot (Bluetooth with Hopping Disabled, 3Mbps- Ch. 78) Antenna 2

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 85 of 129                    |



Plot 7-133. Band Edge Plot (Bluetooth with Hopping Enabled, 3Mbps- Ch. 0) Antenna 2



Plot 7-134. Band Edge Plot (Bluetooth with Hopping Enabled, 3Mbps- Ch. 78) Antenna 2

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 86 of 129                    |

## 7.5 Carrier Frequency Separation

§15.247 (a.1); RSS-247 [5.1(2)]

### Test Overview and Limit

Measurement is made with EUT operating in hopping mode. ***The minimum permissible channel separation for this system is 2/3 the value of the 20dB BW.***

### Test Procedure Used

ANSI C63.10-2013 – Section 7.8.2

### Test Settings

1. Span = Wide enough to capture peaks of two adjacent channels
2. RBW = 30% of channel spacing. Adjust as necessary to best identify center of each individual channel
3. VBW  $\geq$  RBW
4. Sweep = Auto
5. Detector = Peak
6. Trace mode = max hold
7. The trace was allowed to stabilize.
8. Marker-delta function used to determine separation between peaks of the adjacent channels

### Test Setup

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



**Figure 7-4. Test Instrument & Measurement Setup**

### Test Notes

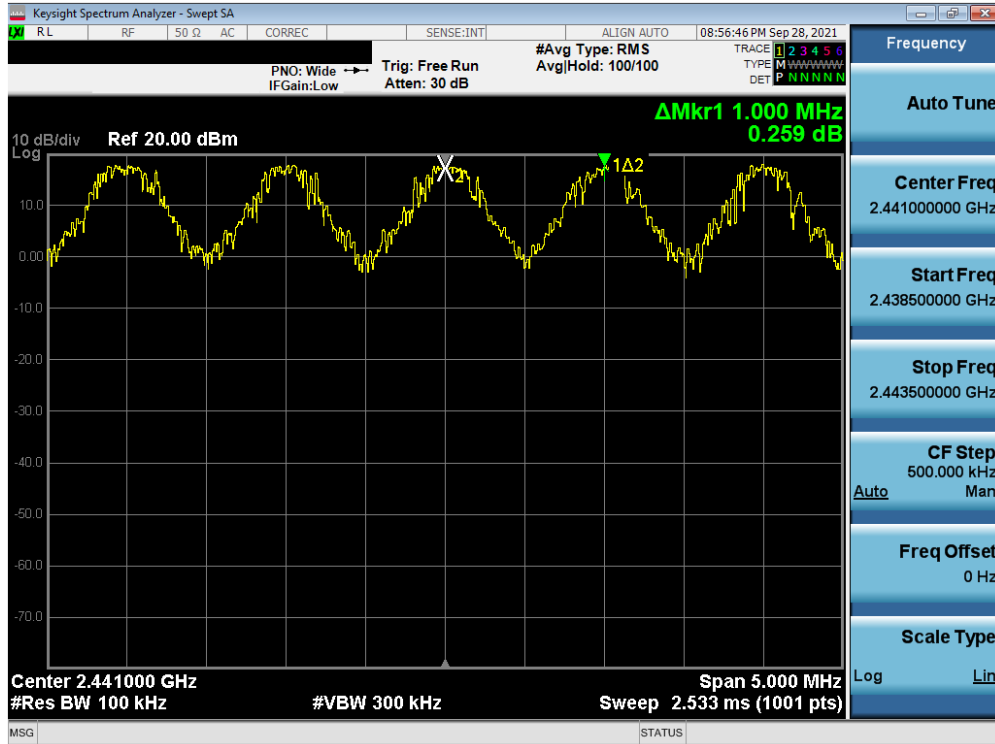
The EUT complies with the minimum channel separation requirement when it is operating in 1x/EDR mode using 79 channels and when operating in AFH mode using 20 channels.

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 87 of 129                    |

| Frequency [MHz] | Data Rate [Mbps] | Mod.           | Power Scheme | Channel No. | Min. Channel Separation [MHz] |
|-----------------|------------------|----------------|--------------|-------------|-------------------------------|
| 2402            | 1.0              | GFSK           | ePA          | 0           | 0.638                         |
| 2441            | 1.0              | GFSK           | ePA          | 39          | 0.626                         |
| 2480            | 1.0              | GFSK           | ePA          | 78          | 0.638                         |
| 2402            | 1.0              | GFSK           | iPA          | 0           | 0.627                         |
| 2441            | 1.0              | GFSK           | iPA          | 39          | 0.640                         |
| 2480            | 1.0              | GFSK           | iPA          | 78          | 0.673                         |
| 2402            | 2.0              | $\pi/4$ -DQPSK | ePA          | 0           | 0.885                         |
| 2441            | 2.0              | $\pi/4$ -DQPSK | ePA          | 39          | 0.890                         |
| 2480            | 2.0              | $\pi/4$ -DQPSK | ePA          | 78          | 0.874                         |
| 2402            | 2.0              | $\pi/4$ -DQPSK | iPA          | 0           | 0.881                         |
| 2441            | 2.0              | $\pi/4$ -DQPSK | iPA          | 39          | 0.880                         |
| 2480            | 2.0              | $\pi/4$ -DQPSK | iPA          | 78          | 0.903                         |
| 2402            | 3.0              | 8DPSK          | ePA          | 0           | 0.871                         |
| 2441            | 3.0              | 8DPSK          | ePA          | 39          | 0.869                         |
| 2480            | 3.0              | 8DPSK          | ePA          | 78          | 0.858                         |
| 2402            | 3.0              | 8DPSK          | iPA          | 0           | 0.867                         |
| 2441            | 3.0              | 8DPSK          | iPA          | 39          | 0.879                         |
| 2480            | 3.0              | 8DPSK          | iPA          | 78          | 0.877                         |

**Table 7-8. Minimum Channel Separation – Antenna 1**

|                                         |                                                                                                                                                                                                              |                                       |                                                                                       |                                   |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------|
| FCC ID: A3LSMS906U                      |  <b>PCTEST</b><br>Proud to be part of  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021                                                                                                                                                                              | EUT Type:<br>Portable Handset         |                                                                                       | Page 88 of 129                    |



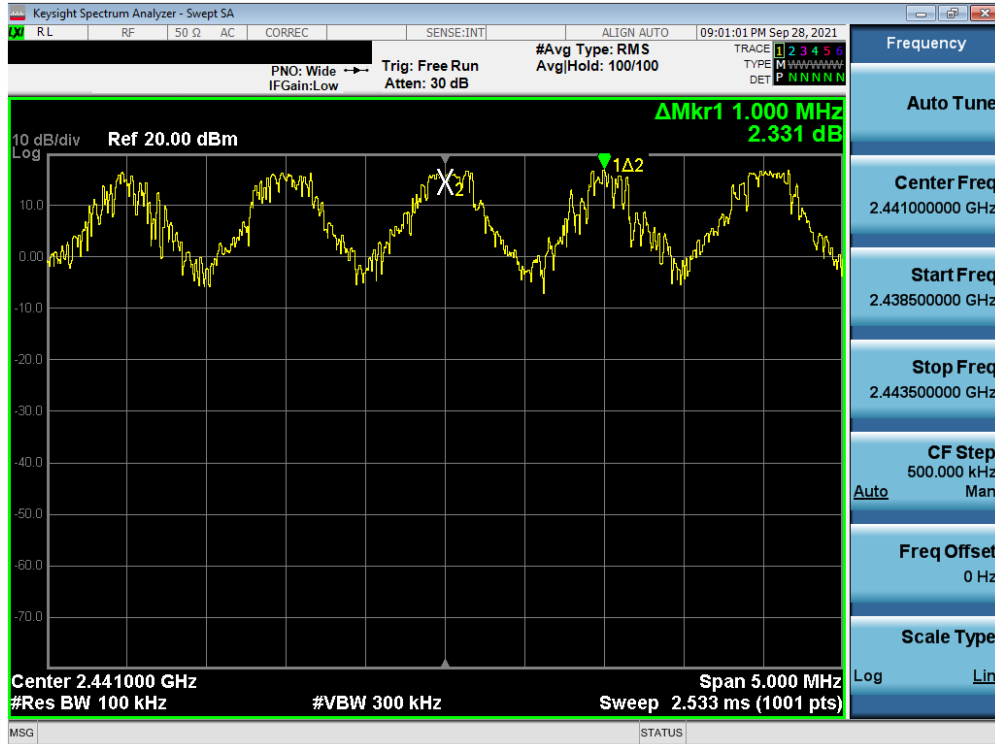
Plot 7-135. Channel Spacing Plot (Bluetooth)

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 89 of 129                    |

| Frequency [MHz] | Data Rate [Mbps] | Mod.           | Power Scheme | Channel No. | Min. Channel Separation [MHz] |
|-----------------|------------------|----------------|--------------|-------------|-------------------------------|
| 2402            | 1.0              | GFSK           | ePA          | 0           | 0.675                         |
| 2441            | 1.0              | GFSK           | ePA          | 39          | 0.682                         |
| 2480            | 1.0              | GFSK           | ePA          | 78          | 0.681                         |
| 2402            | 1.0              | GFSK           | iPA          | 0           | 0.679                         |
| 2441            | 1.0              | GFSK           | iPA          | 39          | 0.667                         |
| 2480            | 1.0              | GFSK           | iPA          | 78          | 0.673                         |
| 2402            | 2.0              | $\pi/4$ -DQPSK | ePA          | 0           | 0.891                         |
| 2441            | 2.0              | $\pi/4$ -DQPSK | ePA          | 39          | 0.883                         |
| 2480            | 2.0              | $\pi/4$ -DQPSK | ePA          | 78          | 0.886                         |
| 2402            | 2.0              | $\pi/4$ -DQPSK | iPA          | 0           | 0.886                         |
| 2441            | 2.0              | $\pi/4$ -DQPSK | iPA          | 39          | 0.888                         |
| 2480            | 2.0              | $\pi/4$ -DQPSK | iPA          | 78          | 0.882                         |
| 2402            | 3.0              | 8DPSK          | ePA          | 0           | 0.863                         |
| 2441            | 3.0              | 8DPSK          | ePA          | 39          | 0.900                         |
| 2480            | 3.0              | 8DPSK          | ePA          | 78          | 0.864                         |
| 2402            | 3.0              | 8DPSK          | iPA          | 0           | 0.864                         |
| 2441            | 3.0              | 8DPSK          | iPA          | 39          | 0.864                         |
| 2480            | 3.0              | 8DPSK          | iPA          | 78          | 0.865                         |

**Table 7-9. Minimum Channel Separation – Antenna 2**

|                                         |                                                                                                                                                                                                              |                                       |                                                                                       |                                   |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------|
| FCC ID: A3LSMS906U                      |  <b>PCTEST</b><br>Proud to be part of  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021                                                                                                                                                                              | EUT Type:<br>Portable Handset         |                                                                                       | Page 90 of 129                    |



Plot 7-136. Channel Spacing Plot (Bluetooth) – Antenna 2

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 91 of 129                    |

## 7.6 Time of Occupancy

§15.247 (a.1.iii); RSS-247 [5.1(4)]

### Test Overview and Limit

Measurement is made while EUT is operating in hopping mode with the spectrum analyzer set to zero span. **The maximum permissible time of occupancy is 400 ms within a period of 400ms multiplied by the number of hopping channels employed.**

### Test Procedure Used

ANSI C63.10-2013 – Section 7.8.4

### Test Settings

1. Span = zero span, centered on a hopping channel
2. RBW  $\leq$  channel spacing and  $\gg 1/T$ , where T is expected dwell time per channel
3. Sweep = as necessary to capture entire dwell time. Second plot may be required to demonstrate two successive hops on a channel
4. Trigger is set with appropriate trigger delay to place pulse near the center of the plot
5. Detector = peak
6. Trace mode = max hold
7. Marker-delta function used to determine transmit time per hop

### Test Setup

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

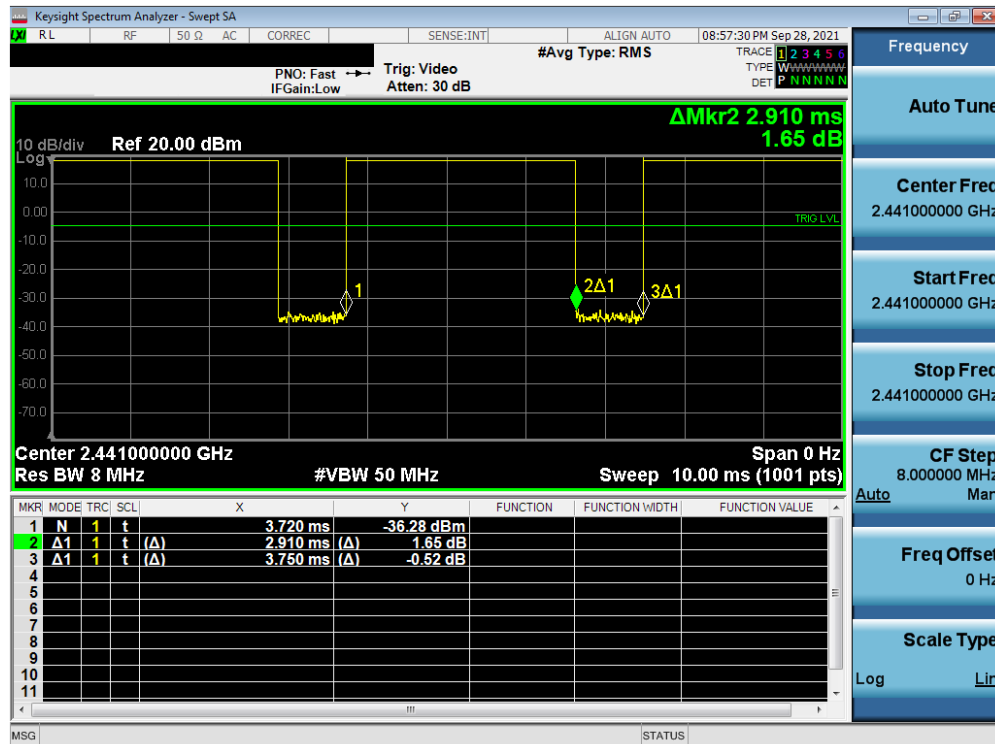


Figure 7-5. Test Instrument & Measurement Setup

### Test Notes

None

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 92 of 129                    |



**Plot 7-137. Time of Occupancy Plot (Bluetooth) -Antenna 1**

### Bluetooth time of Occupancy Calculation

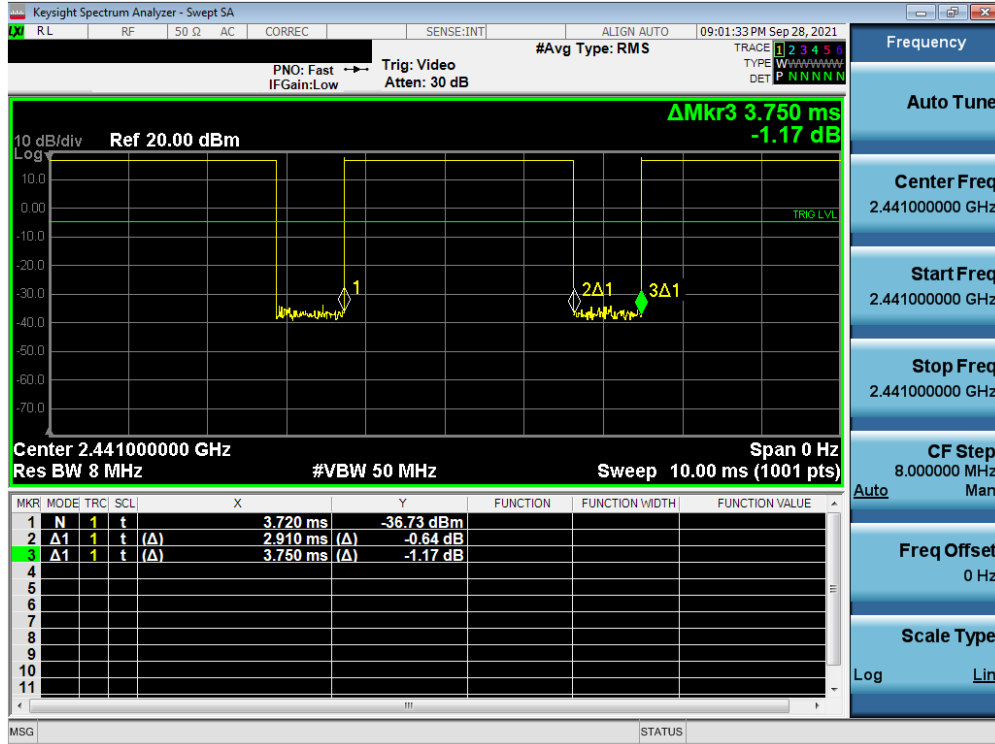
Typically, Bluetooth 1x/EDR mode has a channel hopping rate of 1600 hops/s. Since 1x/BDR modes use 5 transmit and 1 receive slot, for a total of 6 slots, the Bluetooth transmitter is actually hopping at a rate of  $1600 / 6 = 266.67$  hops/s/slot

- $400\text{ms} \times 79$  hopping channels = 31.6 sec (Time of Occupancy Limit)
- Worst case BT has 266.67 hops/second (for 1x/EDR modes with DH5 operation)
- $266.67 \text{ hops/second} / 79 \text{ channels} = 3.38 \text{ hops/second}$  (# of hops/second on one channel)
- $3.38 \text{ hops/second/channel} \times 31.6 \text{ seconds} = 106.67 \text{ hops}$  (# hops over a 31.6 second period)
- $106.67 \text{ hops} \times 2.910 \text{ ms/channel} = 310.41 \text{ ms}$  (worst case dwell time for one channel in 1x/EDR modes)

With AFH, the number of channels is reduced to a minimum of 20 channels and the channel hopping rate is reduced by 50% to 800 hops/s. AFH mode also uses 6 total slots so the Bluetooth transmitter hops at a rate of  $800 / 6 = 133.3$  hops/s/slot

- $400\text{ms} \times 20$  hopping channels = 8 sec (Time of Occupancy Limit)
- Worst case BT has 133.3 hops/second/slot (for AFH mode with DH5 operation)
- $133.3 \text{ hops/s} / 20 \text{ channels} = 6.67 \text{ hops/second}$  (# of hops/second on one channel)
- $6.67 \text{ hops/s} / \text{channel} \times 8 \text{ seconds} = 53.34 \text{ hops}$  (# hops over a 8 second period)
- $53.34 \text{ hops} \times 2.910 \text{ ms/channel} = 155.22 \text{ ms}$  (worst case dwell time for one channel in AFH mode)

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 93 of 129                    |



**Plot 7-138. Time of Occupancy Plot (Bluetooth) -Antenna 2**

### Bluetooth time of Occupancy Calculation

Typically, Bluetooth 1x/EDR mode has a channel hopping rate of 1600 hops/s. Since 1x/BDR modes use 5 transmit and 1 receive slot, for a total of 6 slots, the Bluetooth transmitter is actually hopping at a rate of  $1600 / 6 = 266.67$  hops/s/slot

- $400\text{ms} \times 79$  hopping channels = 31.6 sec (Time of Occupancy Limit)
- Worst case BT has 266.67 hops/second (for 1x/EDR modes with DH5 operation)
- $266.67 \text{ hops/second} / 79 \text{ channels} = 3.38 \text{ hops/second}$  (# of hops/second on one channel)
- $3.38 \text{ hops/second/channel} \times 31.6 \text{ seconds} = 106.67 \text{ hops}$  (# hops over a 31.6 second period)
- $106.67 \text{ hops} \times 2.910 \text{ ms/channel} = 310.41 \text{ ms}$  (worst case dwell time for one channel in 1x/EDR modes)

With AFH, the number of channels is reduced to a minimum of 20 channels and the channel hopping rate is reduced by 50% to 800 hops/s. AFH mode also uses 6 total slots so the Bluetooth transmitter hops at a rate of  $800 / 6 = 133.3$  hops/s/slot

- $400\text{ms} \times 20$  hopping channels = 8 sec (Time of Occupancy Limit)
- Worst case BT has 133.3 hops/second/slot (for AFH mode with DH5 operation)
- $133.3 \text{ hops/s} / 20 \text{ channels} = 6.67 \text{ hops/second}$  (# of hops/second on one channel)
- $6.67 \text{ hops/s} / \text{channel} \times 8 \text{ seconds} = 53.34 \text{ hops}$  (# hops over a 8 second period)
- $53.34 \text{ hops} \times 2.910 \text{ ms/channel} = 155.22 \text{ ms}$  (worst case dwell time for one channel in AFH mode)

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 94 of 129                    |

## 7.7 Number of Hopping Channels

§15.247 (a.1.iii); RSS-247 [5.1(4)]

### Test Overview and Limit

Measurement is made while EUT is operating in hopping mode. ***This frequency hopping system must employ a minimum of 15 hopping channels.***

### Test Procedure Used

ANSI C63.10-2013 – Section 7.8.3

### Test Settings

1. Span = frequency of band of operation (divided into two plots)
2. RBW < 30% of channel spacing or 20dB bandwidth, whichever is smaller.
3. VBW ≥ RBW
4. Sweep = auto
5. Detector = peak
6. Trace mode = max hold
7. Trace was allowed to stabilize

### Test Setup

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

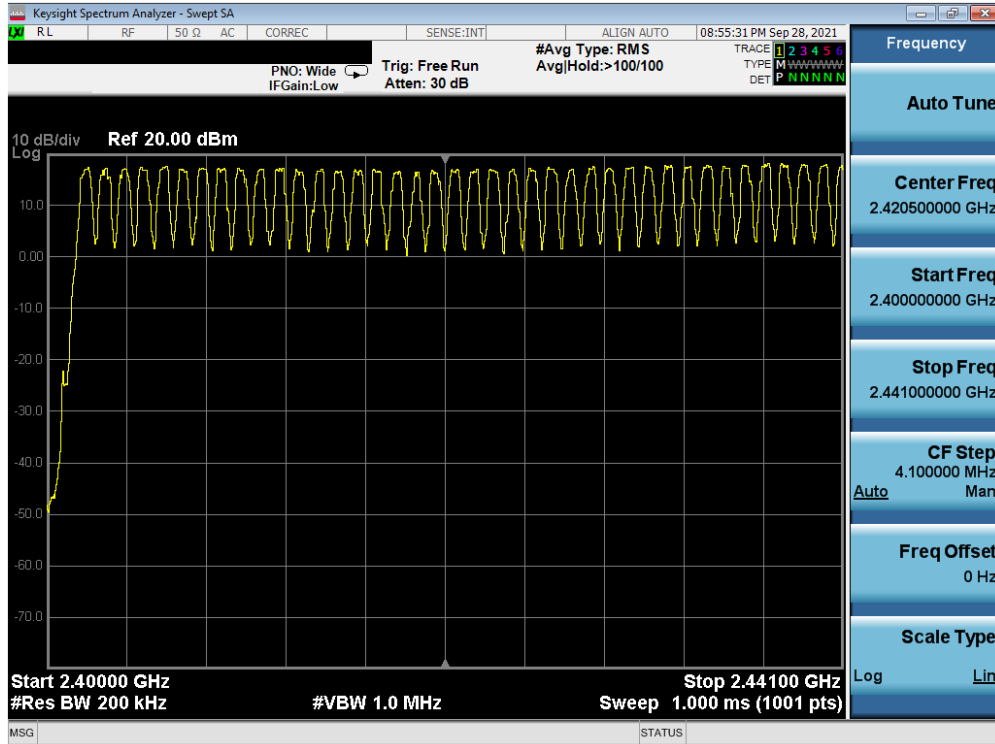


**Figure 7-6. Test Instrument & Measurement Setup**

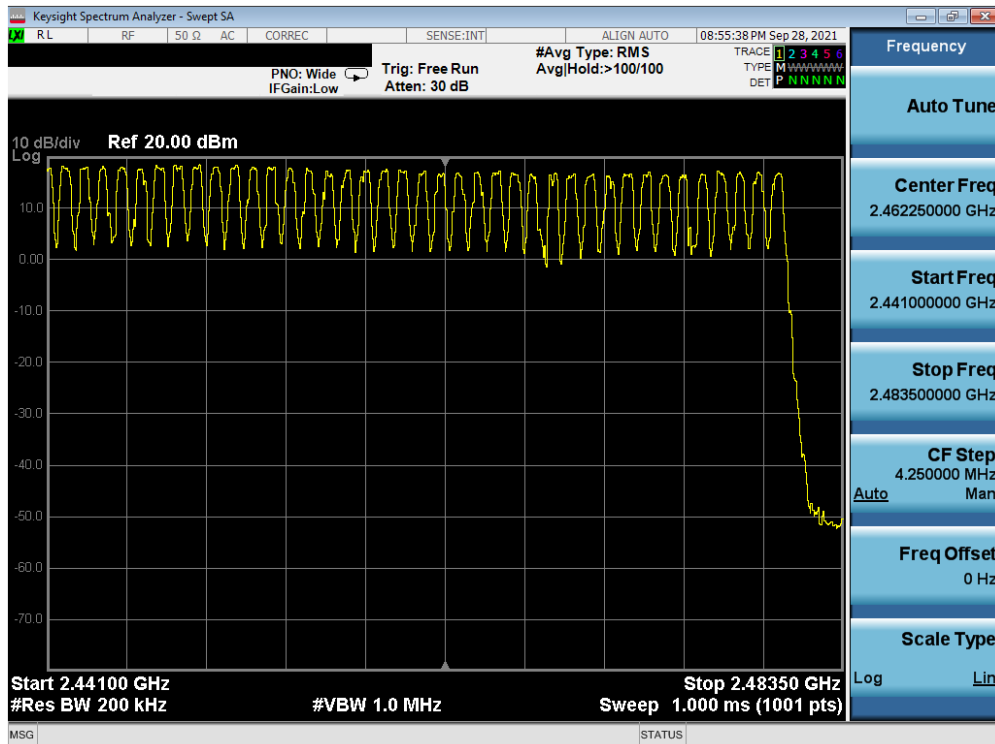
### Test Notes

The frequency spectrum was broken up into two sub-ranges to clearly show all of the hopping frequencies. In AFH mode, this device operates using 20 channels so the requirement for minimum number of hopping channels is satisfied.

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 95 of 129                    |

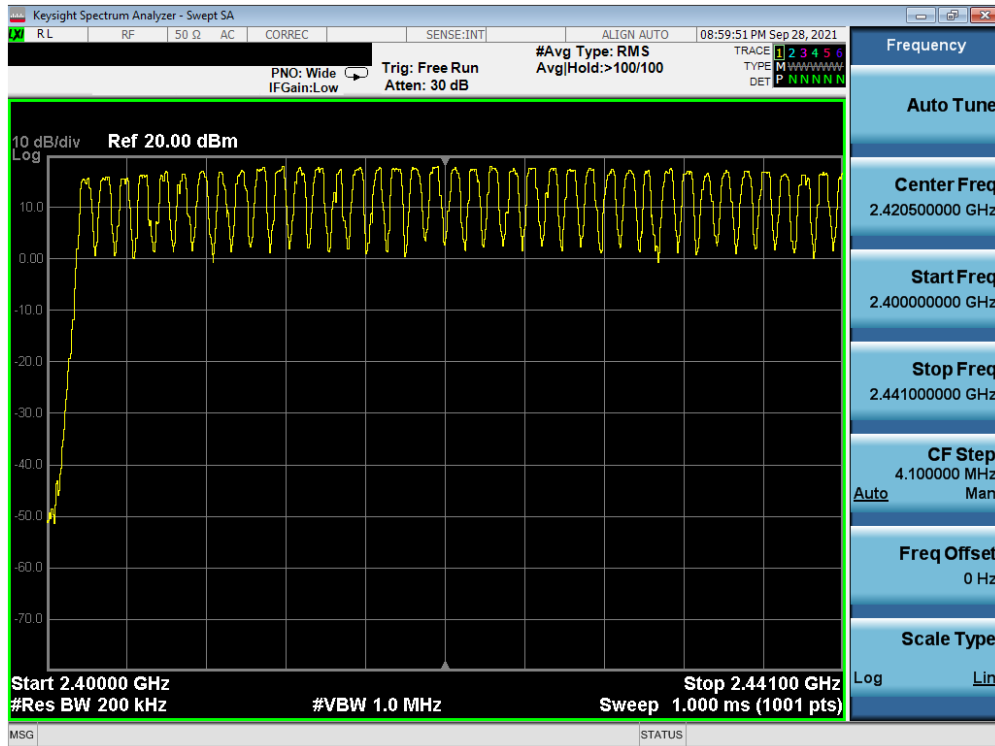


Plot 7-139. Low End Spectrum Channel Hopping Plot (Bluetooth) Antenna 1

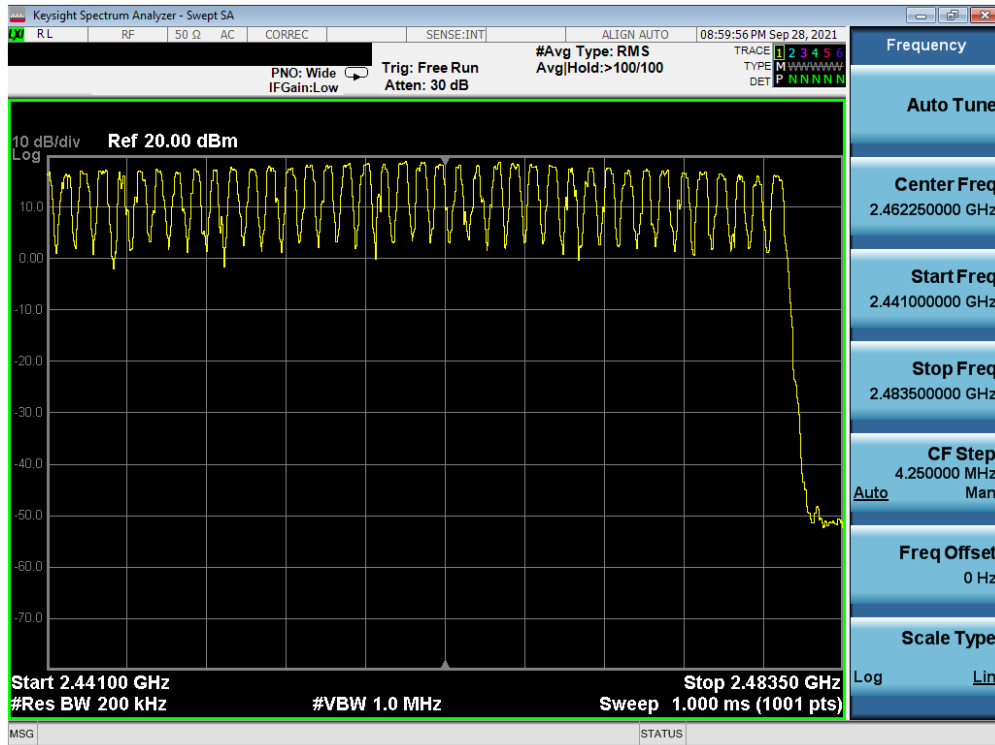


Plot 7-140. High End Spectrum Channel Hopping Plot (Bluetooth) Antenna 1

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 96 of 129                    |



Plot 7-141. Low End Spectrum Channel Hopping Plot (Bluetooth) Antenna 2



Plot 7-142. High End Spectrum Channel Hopping Plot (Bluetooth) Antenna 2

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 97 of 129                    |

## 7.8 Conducted Spurious Emissions

§15.247 (d); RSS-247 [5.5]

### Test Overview and Limit

Conducted out-of-band spurious emissions were investigated from 30MHz up to 25GHz to include the 10<sup>th</sup> harmonic of the fundamental transmit frequency. **The maximum permissible out-of-band emission level is 20 dBc.**

### Test Procedure Used

ANSI C63.10-2013 – Section 7.8.8

### Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to 25GHz (separated into two plots per channel)
2. RBW = 1MHz\* (See note below)
3. VBW = 3MHz
4. Detector = Peak
5. Trace mode = max hold
6. Sweep time = 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.

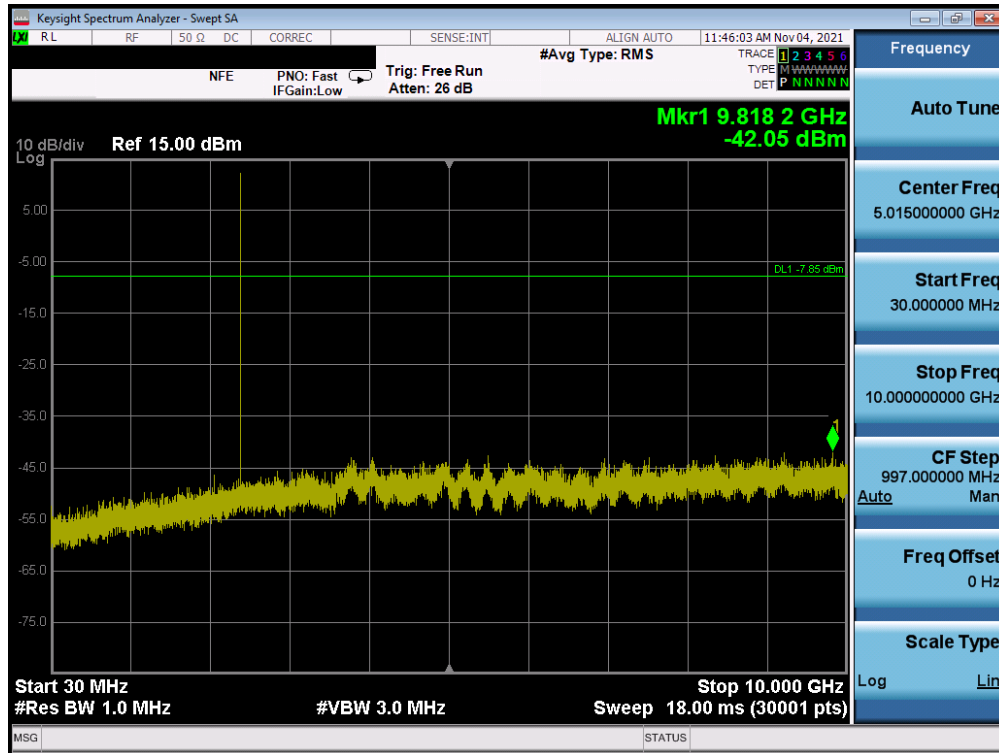


**Figure 7-7. Test Instrument & Measurement Setup**

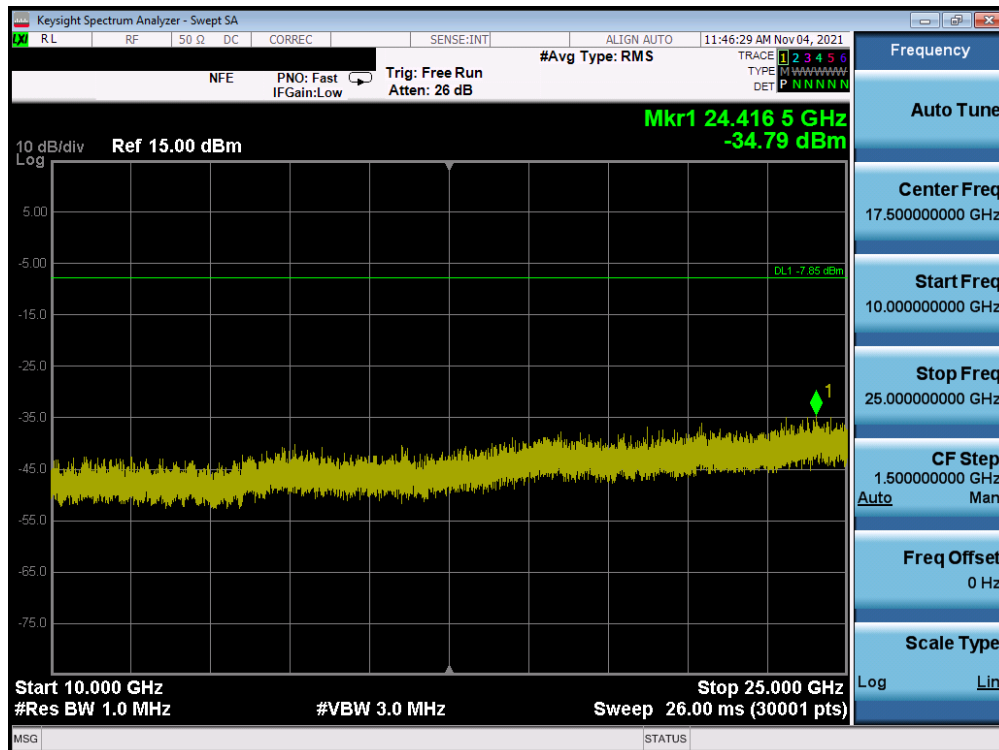
### Test Notes

Out-of-band conducted spurious emissions were investigated for all data rates and the worst case emissions were found with the EUT transmitting at 3Mbps. The display line shown in the following plots is the limit at 20dB below the fundamental emission level measured in a 100kHz bandwidth. However, the traces in the following plots are measured with a 1MHz RBW to reduce test time, so the display line may not necessarily appear to be 20dB below the level of the fundamental in a 1MHz bandwidth.

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 98 of 129                    |

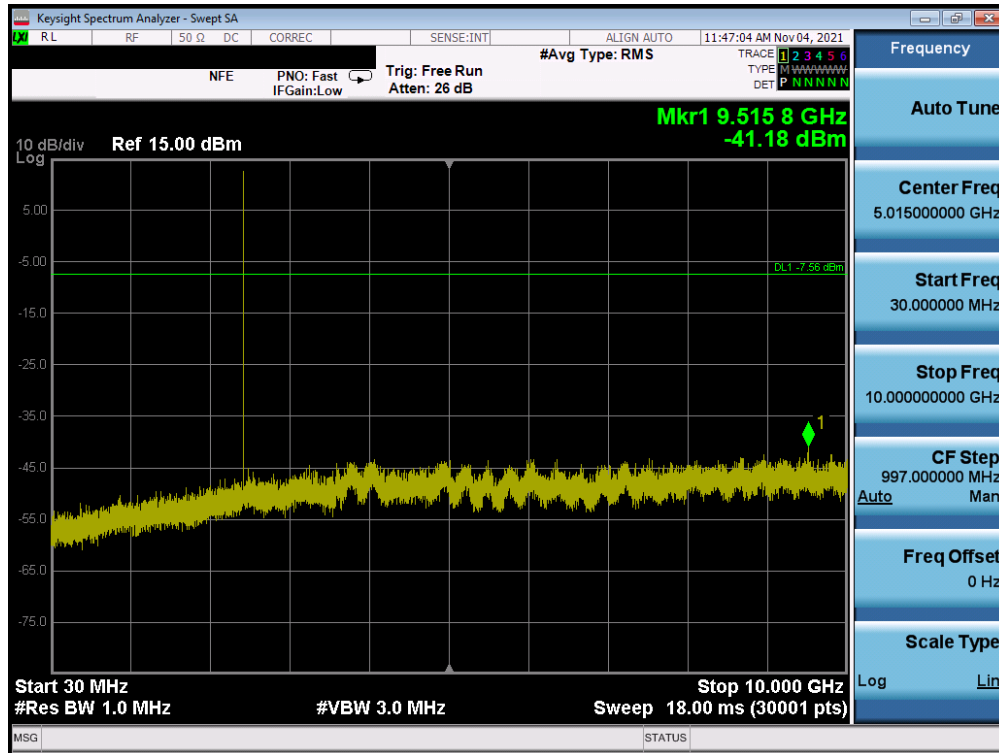


Plot 7-143. Conducted Spurious Plot (Bluetooth, 1Mbps– Ch. 0) Antenna 1

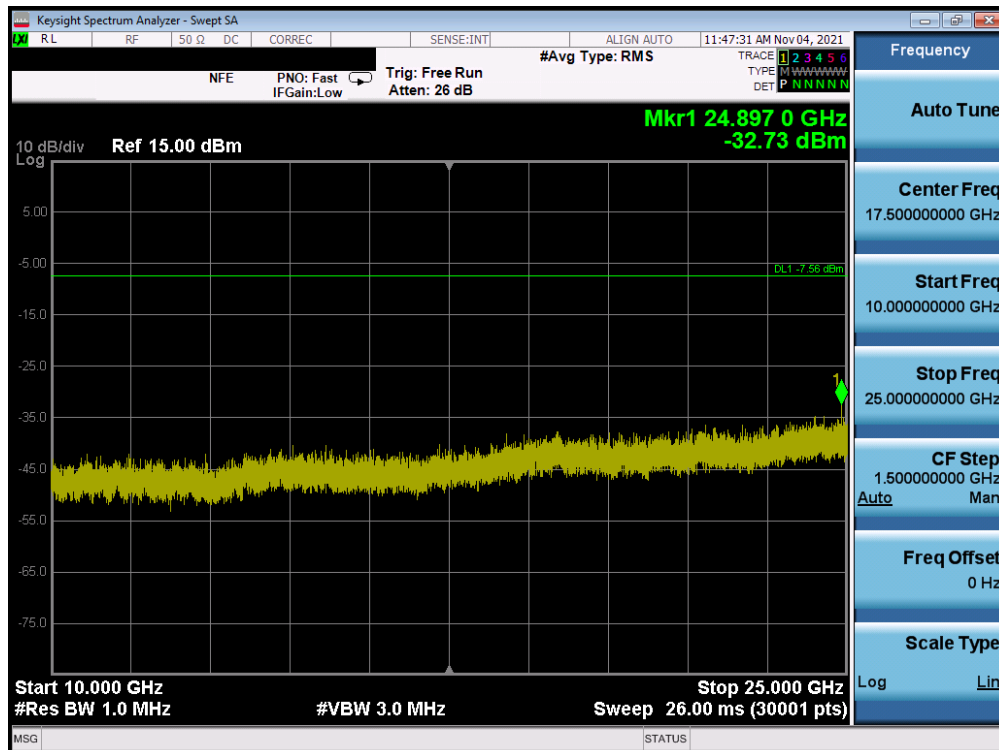


Plot 7-144. Conducted Spurious Plot (Bluetooth, 1Mbps– Ch. 0) Antenna 1

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 99 of 129                    |

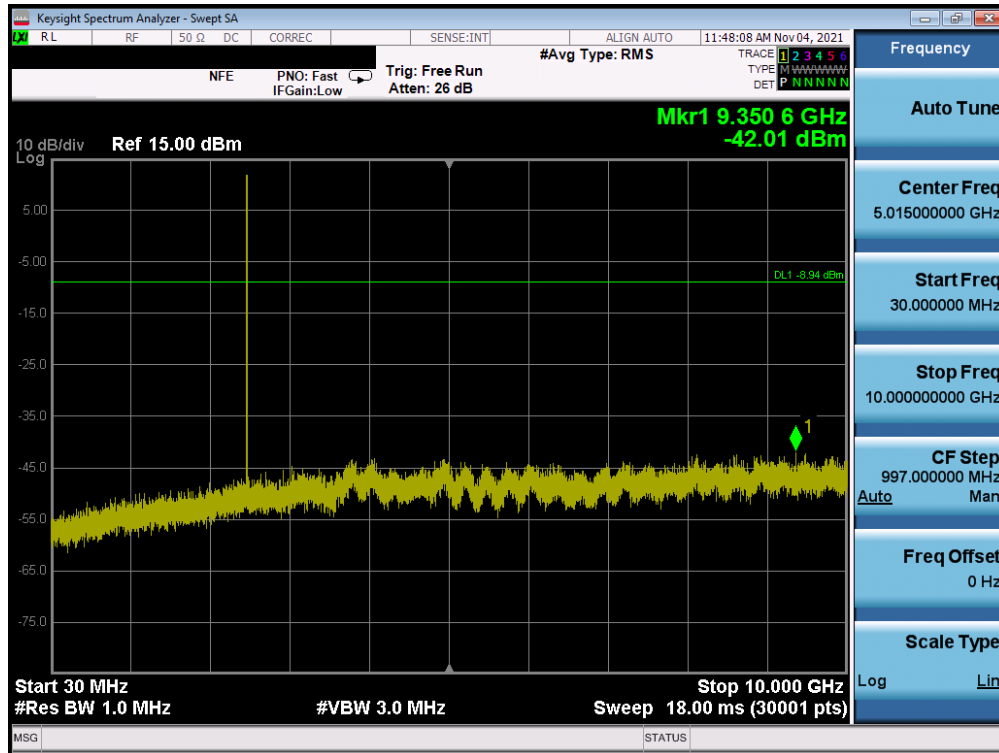


Plot 7-145. Conducted Spurious Plot (Bluetooth, 1Mbps- Ch. 39) Antenna 1

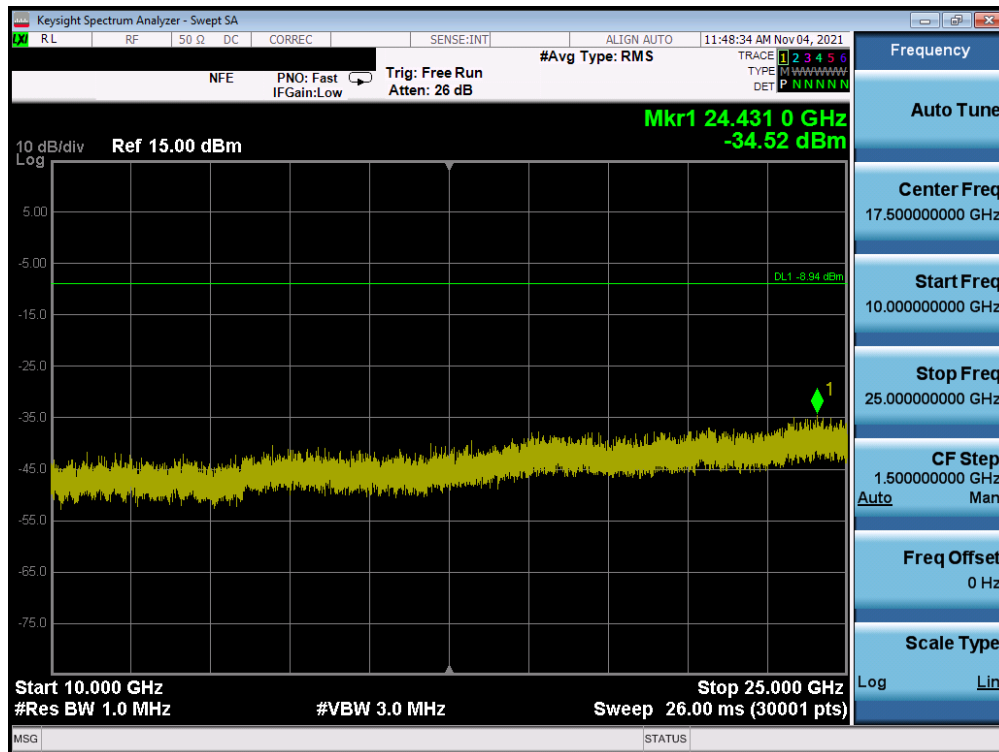


Plot 7-146. Conducted Spurious Plot (Bluetooth, 1MbpsCh. 39) Antenna 1

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 100 of 129                   |

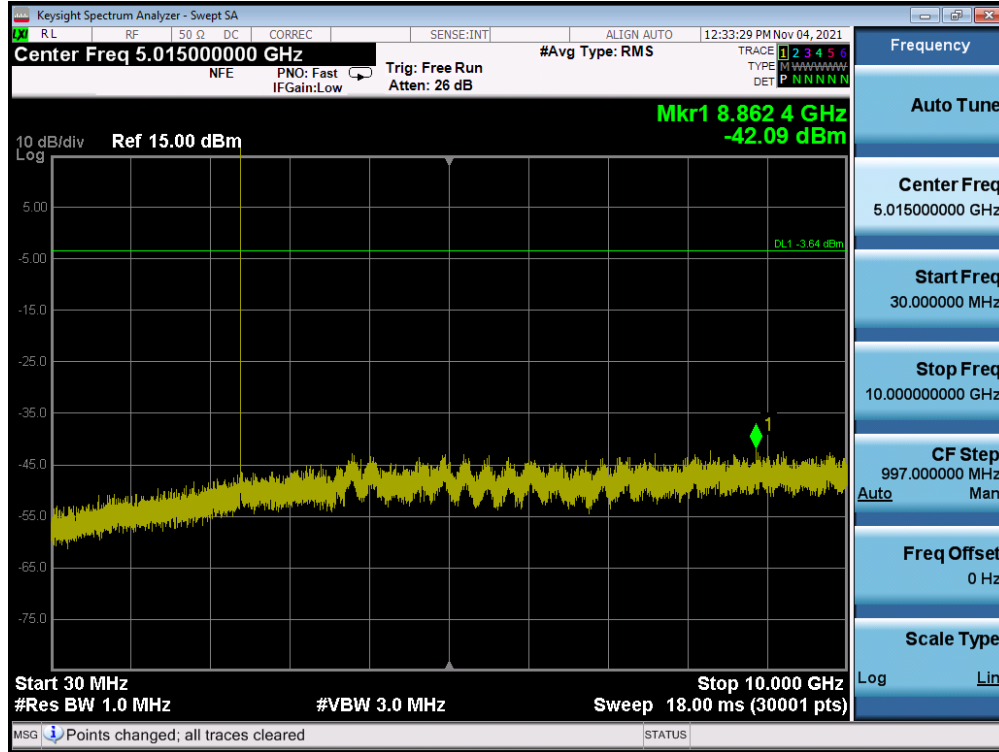


Plot 7-147. Conducted Spurious Plot (Bluetooth, 1Mbps– Ch. 78) Antenna 1

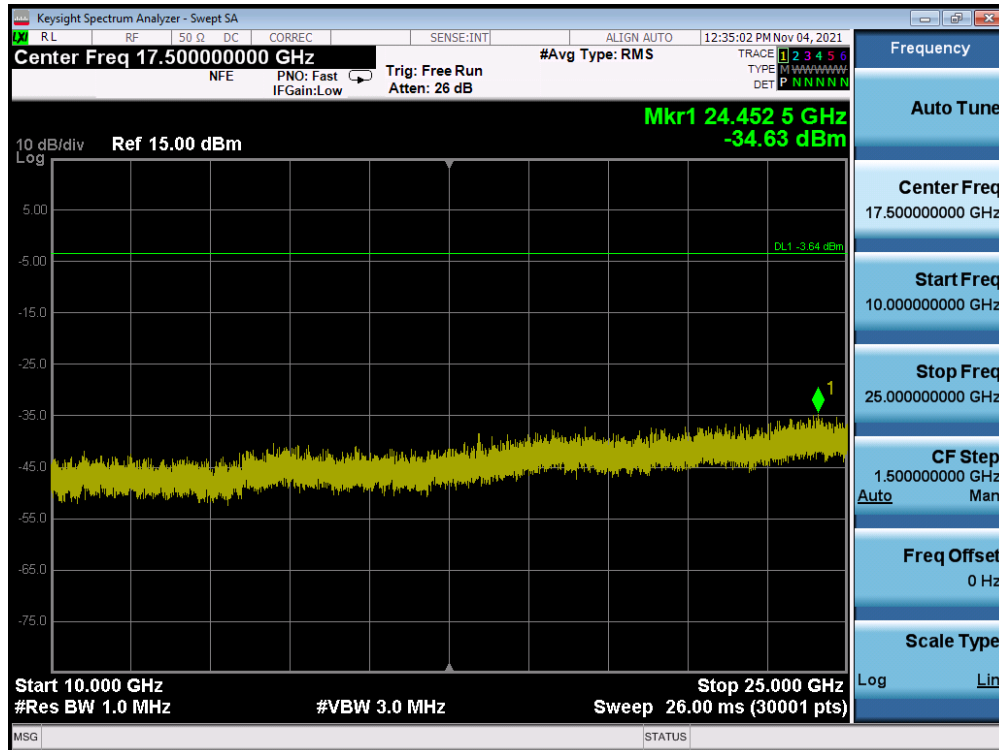


Plot 7-148. Conducted Spurious Plot (Bluetooth, 1Mbps– Ch. 78) Antenna 1

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 101 of 129                   |

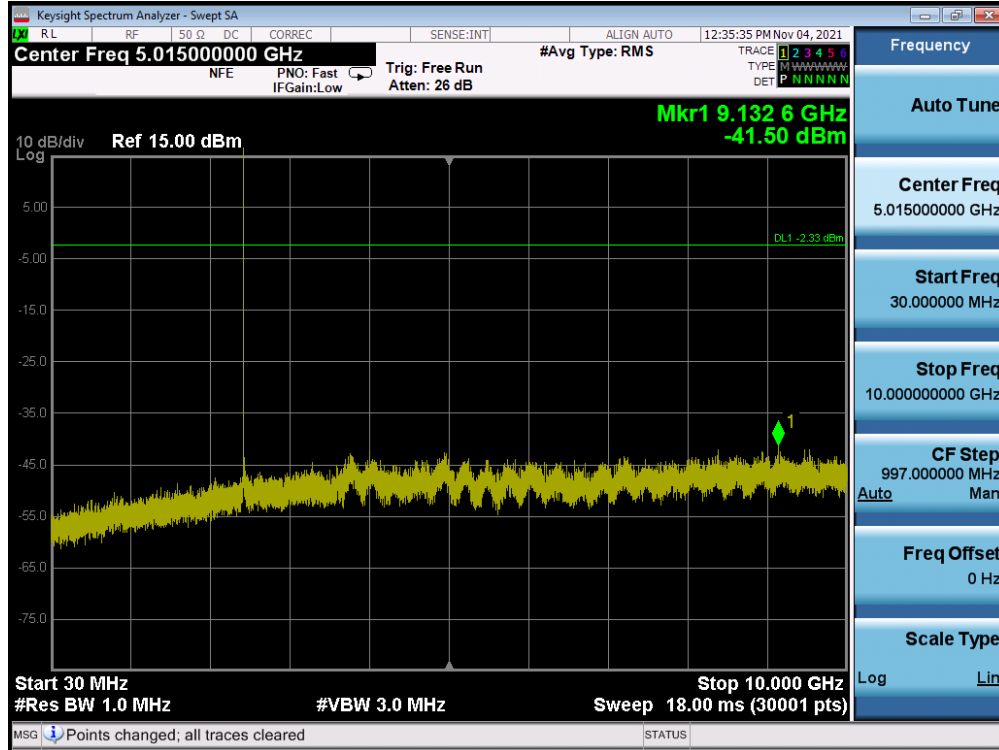


Plot 7-149. Conducted Spurious Plot (Bluetooth, 1Mbps– Ch. 0) Antenna 2

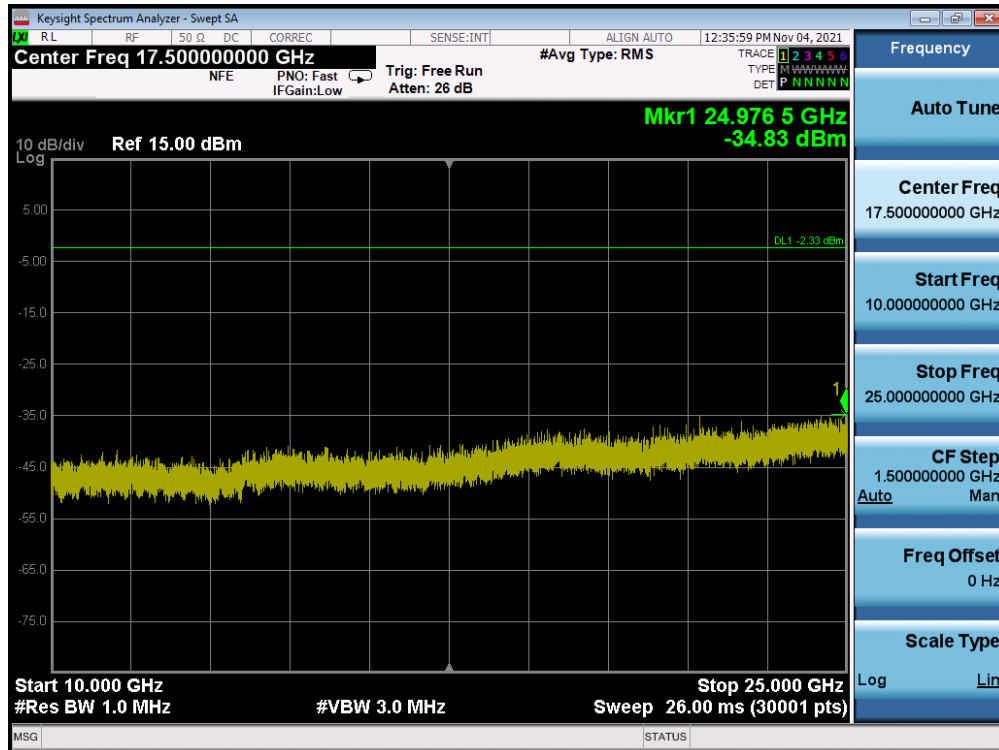


Plot 7-150. Conducted Spurious Plot (Bluetooth, 1Mbps– Ch. 0) Antenna 2

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 102 of 129                   |

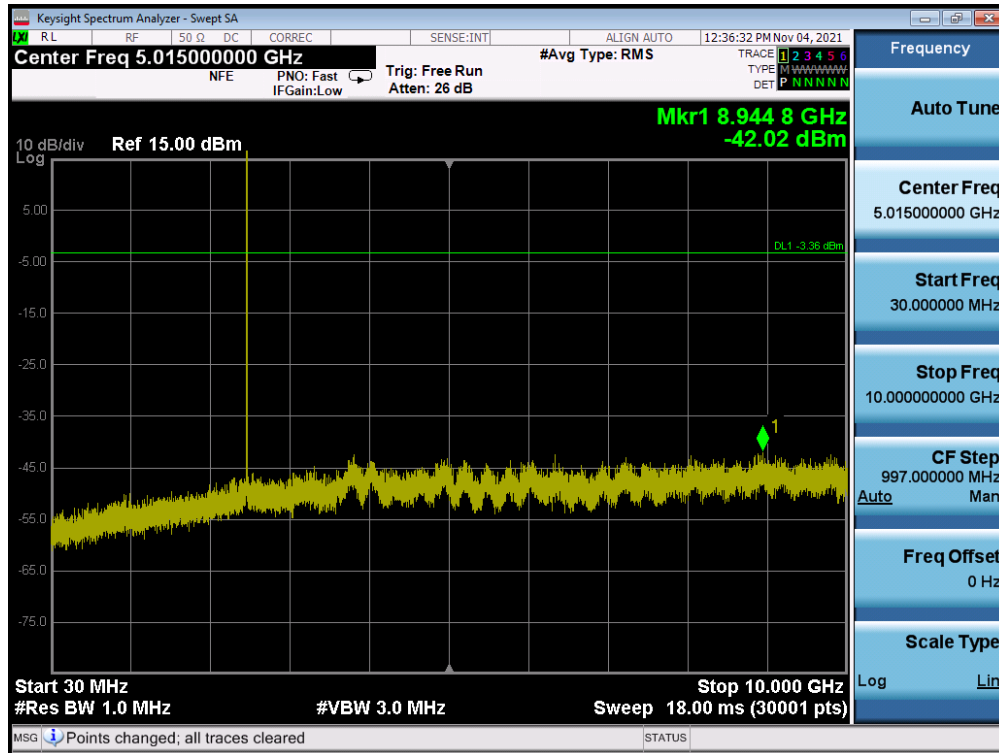


Plot 7-151. Conducted Spurious Plot (Bluetooth, 1Mbps– Ch. 39) Antenna 2

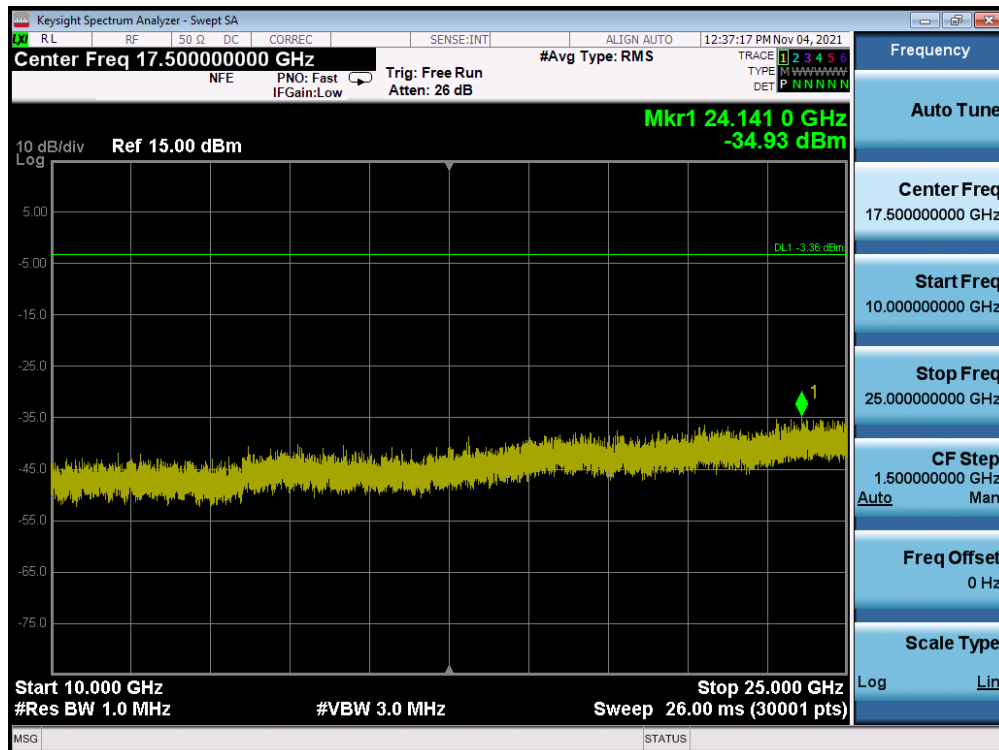


Plot 7-152. Conducted Spurious Plot (Bluetooth, 1MbpsCh. 39) Antenna 2

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 103 of 129                   |



Plot 7-153. Conducted Spurious Plot (Bluetooth, 1Mbps– Ch. 78) Antenna 2



Plot 7-154. Conducted Spurious Plot (Bluetooth, 1Mbps– Ch. 78) Antenna 2

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 104 of 129                   |

## 7.9 Radiated Spurious Emission Measurements – Above 1GHz

§15.205 §15.209 §15.247 (d); RSS-Gen [8.9]

### Test Overview and Limit

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at maximum power and at the appropriate frequencies. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

***All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR and Table 6 of RSS-Gen (8.10) must not exceed the limits shown in Table 7-10 per Section 15.209 and RSS-Gen (8.9).***

| Frequency       | Field Strength<br>[ $\mu\text{V/m}$ ] | Measured Distance<br>[Meters] |
|-----------------|---------------------------------------|-------------------------------|
| Above 960.0 MHz | 500                                   | 3                             |

**Table 7-10. Radiated Limits**

### Test Procedure Used

ANSI C63.10-2013 – Section 6.6.4.3

### Test Settings

#### Average Field Strength Measurements per Section 4.1.4.2.3 of ANSI C63.10-2013

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 1kHz  $\geq 1/\tau$  Hz, where  $\tau$  = pulse width in seconds
4. Averaging type was set to RMS to ensure that video filtering was applied in the power domain
5. Detector = peak
6. Sweep time = auto
7. Trace mode = max hold
8. Trace was allowed to stabilize

#### Peak Field Strength Measurements per Section 4.1.4.2.2 of ANSI C63.10-2013

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW is set depending on measurement frequency, as specified in Table 7-11 below
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

|                                         |                                                                                     |                                       |                                                                                       |                                   |
|-----------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------|
| FCC ID: A3LSMS906U                      |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021                                                     | EUT Type:<br>Portable Handset         |                                                                                       | Page 105 of 129                   |

| Frequency    | RBW          |
|--------------|--------------|
| 9 – 150kHz   | 200 – 300Hz  |
| 0.15 – 30MHz | 9 – 10kHz    |
| 30 – 1000MHz | 100 – 120kHz |
| > 1000MHz    | 1MHz         |

**Table 7-11. RBW as a Function of Frequency**

### Test Setup

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

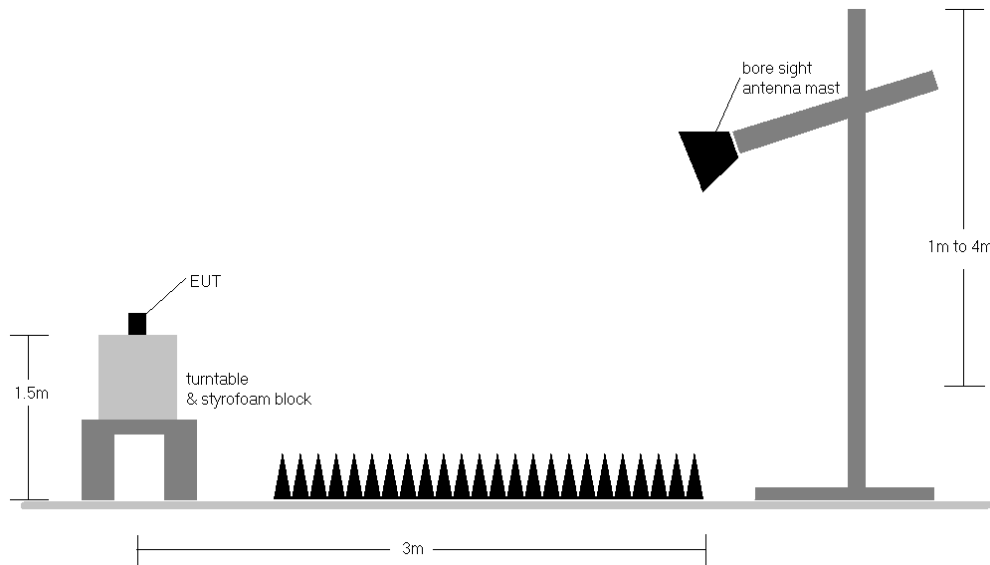


**Figure 7-8. Radiated Test Setup >1GHz**

### Test Notes

1. All emissions lying in restricted bands specified in §15.205 and Section 8.10 of RSS-Gen are below the limit shown in Table 7-10.
2. No significant radiated emissions were found in the 2310 - 2390MHz restricted band.
3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
4. This unit was tested with its standard battery.
5. The spectrum is measured from 9kHz to the 10<sup>th</sup> harmonic and the worst-case emissions are reported.
6. The duty cycle correction factor was not applied to noise floor measurements.
7. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. Any emissions found to be within 20dB of the limit are fully investigated and the results are shown in this section.
8. The "-" shown in the following RSE tables are used to denote a noise floor measurement.

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 106 of 129                   |

### Sample Calculation

- Field Strength Level  $[\text{dB}\mu\text{V/m}] = \text{Analyzer Level} [\text{dBm}] + 107 + \text{AFCL} [\text{dB/m}] + \text{Duty Cycle Correction} [\text{dB}]$
- $\text{AFCL} [\text{dB/m}] = \text{Antenna Factor} [\text{dB/m}] + \text{Cable Loss} [\text{dB}]$
- $\text{Margin} [\text{dB}] = \text{Field Strength Level} [\text{dB}\mu\text{V/m}] - \text{Limit} [\text{dB}\mu\text{V/m}]$

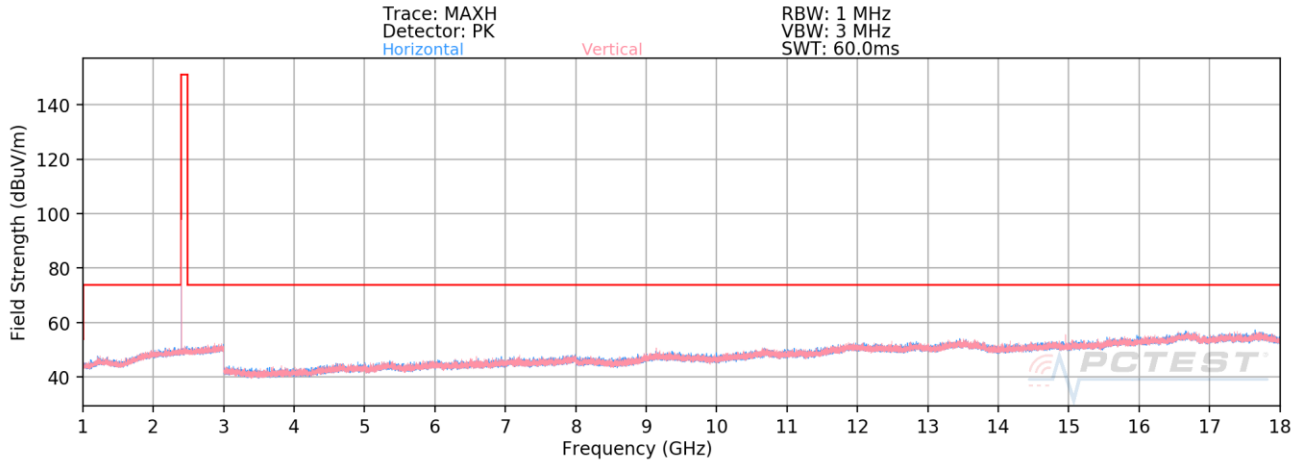
### Duty Cycle Correction Factor Calculation

- Channel hop rate = 800 hops/second (AFH Mode)
- Adjusted channel hop rate for DH5 mode = 133.33 hops/second
- Time per channel hop =  $1 / 133.33 \text{ hops/second} = 7.50 \text{ ms}$
- Time to cycle through all channels =  $7.50 \times 20 \text{ channels} = 150 \text{ ms}$
- Number of times transmitter hits on one channel =  $100 \text{ ms} / 150 \text{ ms} = 1 \text{ time(s)}$
- Worst case dwell time = 7.5 ms
- Duty cycle correction factor =  $20\log_{10}(7.5\text{ms}/100\text{ms}) = -22.5 \text{ dB}$

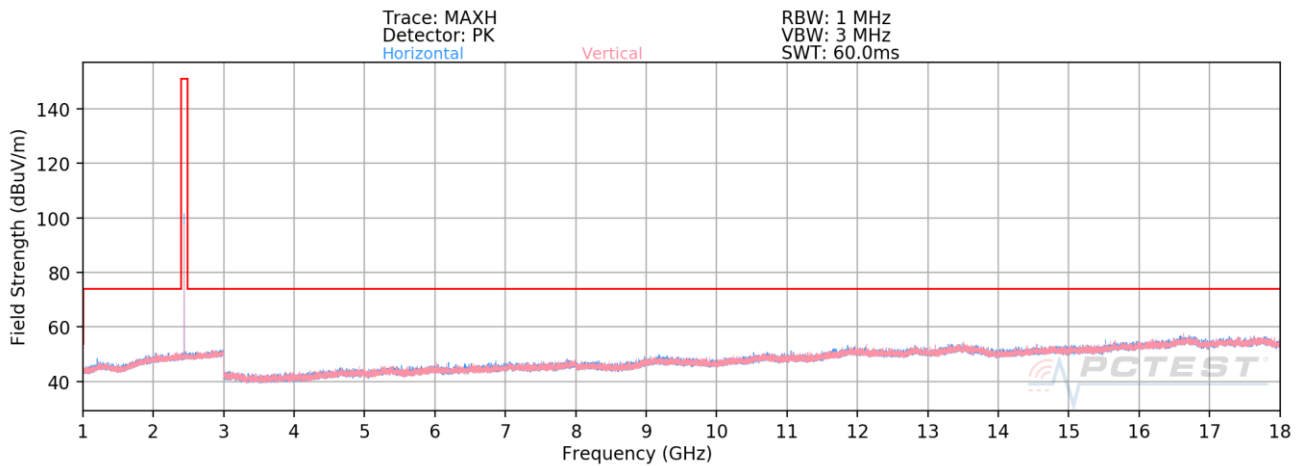
|                                         |                                                                                                                                                                                                              |                                       |                                                                                       |                                   |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------|
| FCC ID: A3LSMS906U                      |  <b>PCTEST</b><br>Proud to be part of  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021                                                                                                                                                                              | EUT Type:<br>Portable Handset         |                                                                                       | Page 107 of 129                   |

## Radiated Spurious Emission Measurements

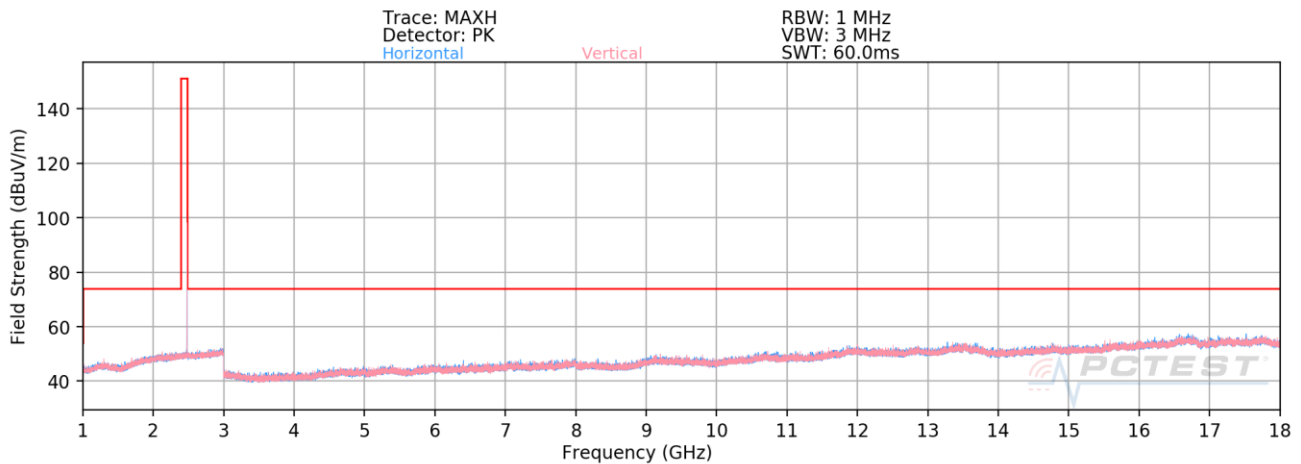
§15.205 §15.209 §15.247 (d); RSS-Gen [8.9]



Plot 7-155. Radiated Spurious Plot above 1GHz (BT- Ch. 0) – Antenna 1



Plot 7-156. Radiated Spurious Plot above 1GHz (BT- Ch. 39) – Antenna 1

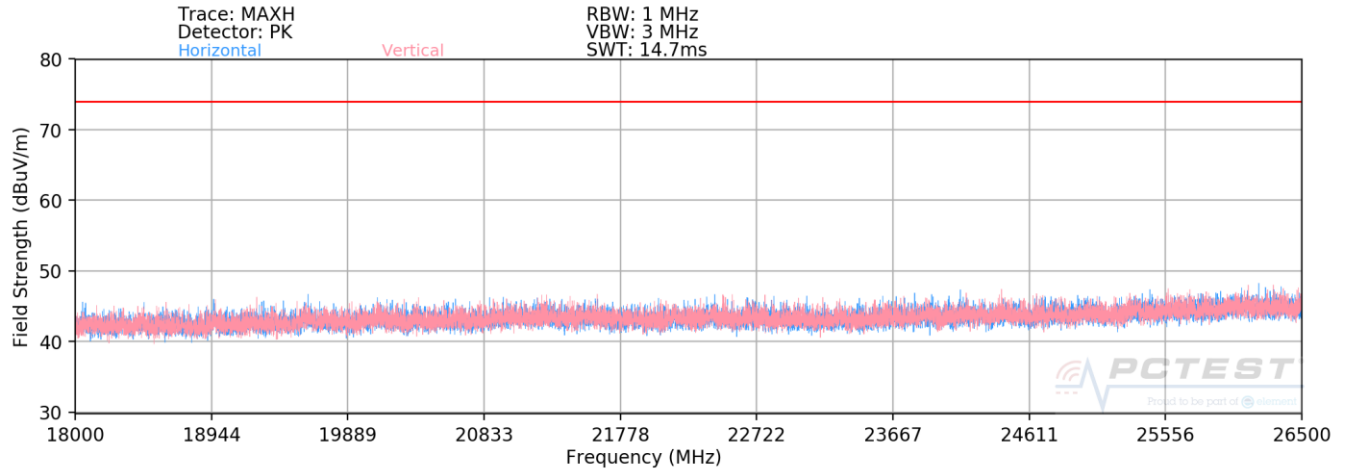


Plot 7-157. Radiated Spurious Plot above 1GHz (BT- Ch. 78) – Antenna 1

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 108 of 129                   |

## Radiated Spurious Emissions Measurements (Above 18GHz)

§15.209; RSS-Gen [8.9]



Plot 7-158. Radiated Spurious Plot above 18GHz Antenna 1

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 109 of 129                   |

## Radiated Spurious Emission Measurements

§15.205 §15.209 §15.247 (d); RSS-Gen [8.9]

Worst Case Mode: Bluetooth  
Worst Case Data Rate: 1 Mbps  
Measurement Distance: 3 Meters  
Operating Frequency: 2402MHz  
Channel: 0

| Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Duty Cycle Correction [dB] | Field Strength [dBμV/m] | Limit [dBμV/m] | Margin [dB] |
|-----------------|----------|-----------------|---------------------|----------------------------|----------------------|-------------|----------------------------|-------------------------|----------------|-------------|
| 4804.00         | Avg      | H               | 366                 | 32                         | -80.14               | 9.82        | -22.50                     | 14.18                   | 53.98          | -39.80      |
| 4804.00         | Peak     | H               | 366                 | 31                         | -69.45               | 9.82        | 0.00                       | 47.37                   | 73.98          | -26.61      |
| 12010.00        | Avg      | H               | -                   | -                          | -79.99               | 22.99       | 0.00                       | 50.00                   | 53.98          | -3.98       |
| 12010.00        | Peak     | H               | -                   | -                          | -69.36               | 22.99       | 0.00                       | 60.63                   | 73.98          | -13.35      |

Table 7-12. Radiated Measurements – Antenna 1

Worst Case Mode: Bluetooth  
Worst Case Data Rate: 1 Mbps  
Measurement Distance: 3 Meters  
Operating Frequency: 2441MHz  
Channel: 39

| Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Duty Cycle Correction [dB] | Field Strength [dBμV/m] | Limit [dBμV/m] | Margin [dB] |
|-----------------|----------|-----------------|---------------------|----------------------------|----------------------|-------------|----------------------------|-------------------------|----------------|-------------|
| 4882.00         | Avg      | H               | 377                 | 25                         | -77.58               | 9.18        | -22.50                     | 16.10                   | 53.98          | -37.88      |
| 4882.00         | Peak     | H               | 377                 | 25                         | -66.54               | 9.18        | 0.00                       | 49.64                   | 73.98          | -24.34      |
| 7323.00         | Avg      | H               | -                   | -                          | -76.14               | 15.31       | 0.00                       | 46.17                   | 53.98          | -7.81       |
| 7323.00         | Peak     | H               | -                   | -                          | -67.80               | 15.31       | 0.00                       | 54.51                   | 73.98          | -19.47      |
| 12205.00        | Avg      | H               | -                   | -                          | -79.01               | 22.70       | 0.00                       | 50.69                   | 53.98          | -3.29       |
| 12205.00        | Peak     | H               | -                   | -                          | -72.16               | 22.70       | 0.00                       | 57.54                   | 73.98          | -16.44      |

Table 7-13. Radiated Measurements – Antenna 1

|                                         |                                                                                                                                                                                                              |                                       |                                                                                       |                                   |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------|
| FCC ID: A3LSMS906U                      |  <b>PCTEST</b><br>Proud to be part of  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021                                                                                                                                                                              | EUT Type:<br>Portable Handset         |                                                                                       | Page 110 of 129                   |

## Radiated Spurious Emission Measurements

§15.205 §15.209 §15.247 (d); RSS-Gen [8.9]

|                       |           |
|-----------------------|-----------|
| Worst Case Mode:      | Bluetooth |
| Worst Case Data Rate: | 1 Mbps    |
| Measurement Distance: | 3 Meters  |
| Operating Frequency:  | 2480MHz   |
| Channel:              | 78        |

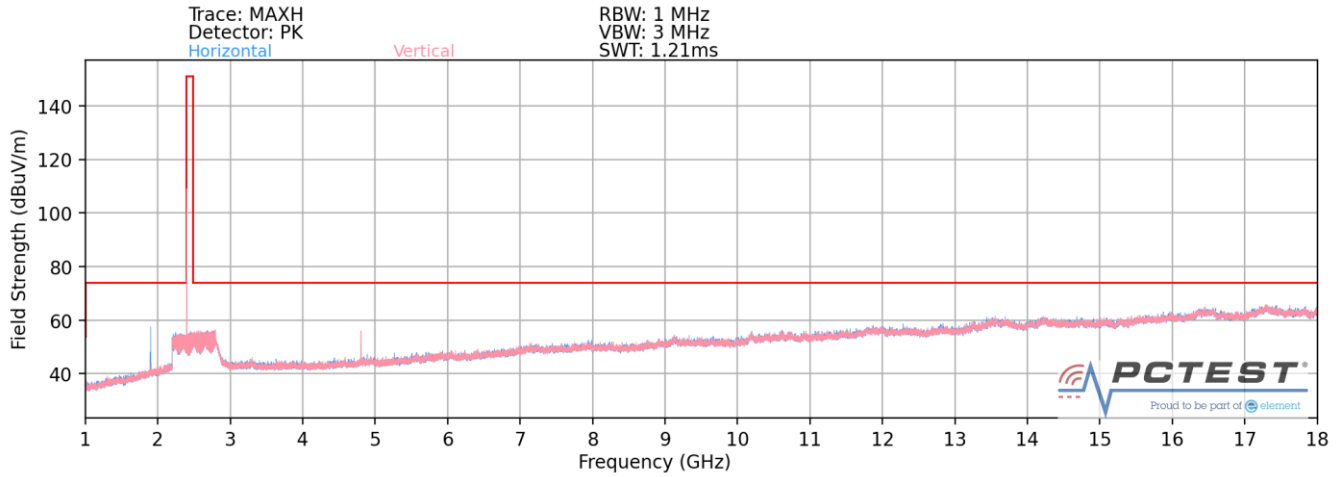
| Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Duty Cycle Correction [dB] | Field Strength [dBμV/m] | Limit [dBμV/m] | Margin [dB] |
|-----------------|----------|-----------------|---------------------|----------------------------|----------------------|-------------|----------------------------|-------------------------|----------------|-------------|
| 4960.00         | Avg      | H               | 376                 | 180                        | -74.82               | 9.92        | -22.50                     | 19.60                   | 53.98          | -34.38      |
| 4960.00         | Peak     | H               | 376                 | 180                        | -66.46               | 9.92        | 0.00                       | 50.46                   | 73.98          | -23.52      |
| 7440.00         | Avg      | H               | -                   | -                          | -77.01               | 15.55       | 0.00                       | 45.54                   | 53.98          | -8.44       |
| 7440.00         | Peak     | H               | -                   | -                          | -68.21               | 15.55       | 0.00                       | 54.34                   | 73.98          | -19.64      |
| 12400.00        | Avg      | H               | -                   | -                          | -79.90               | 23.00       | 0.00                       | 50.10                   | 53.98          | -3.88       |
| 12400.00        | Peak     | H               | -                   | -                          | -69.00               | 23.00       | 0.00                       | 61.00                   | 73.98          | -12.98      |

Table 7-14. Radiated Measurements – Antenna 1

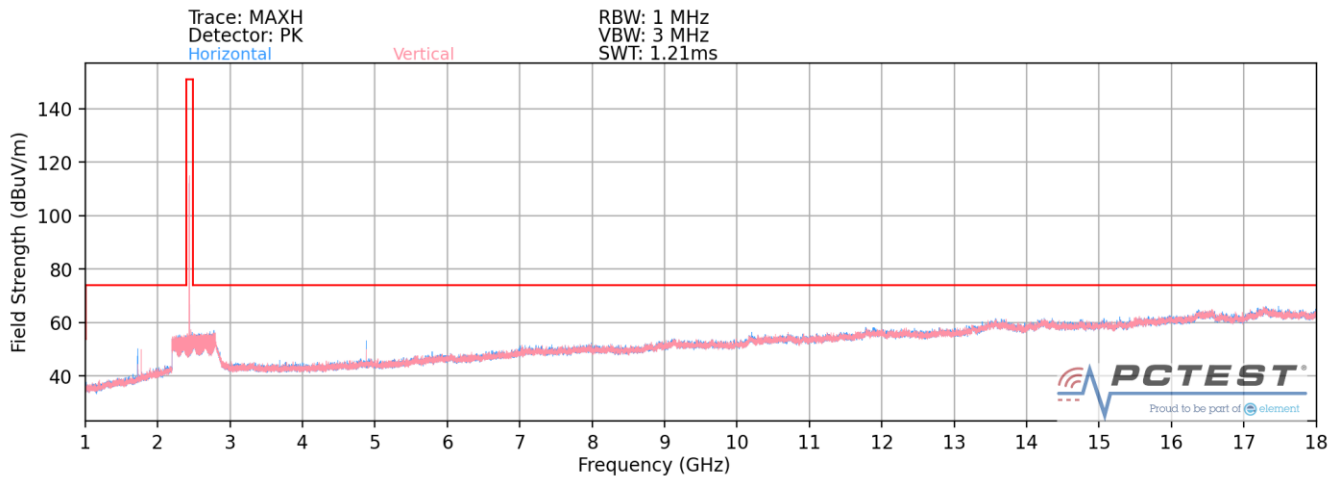
|                                         |                                                                                                                                                                                                              |                                       |                                                                                       |                                   |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------|
| FCC ID: A3LSMS906U                      |  <b>PCTEST</b><br>Proud to be part of  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021                                                                                                                                                                              | EUT Type:<br>Portable Handset         |                                                                                       | Page 111 of 129                   |

## Radiated Spurious Emission Measurements

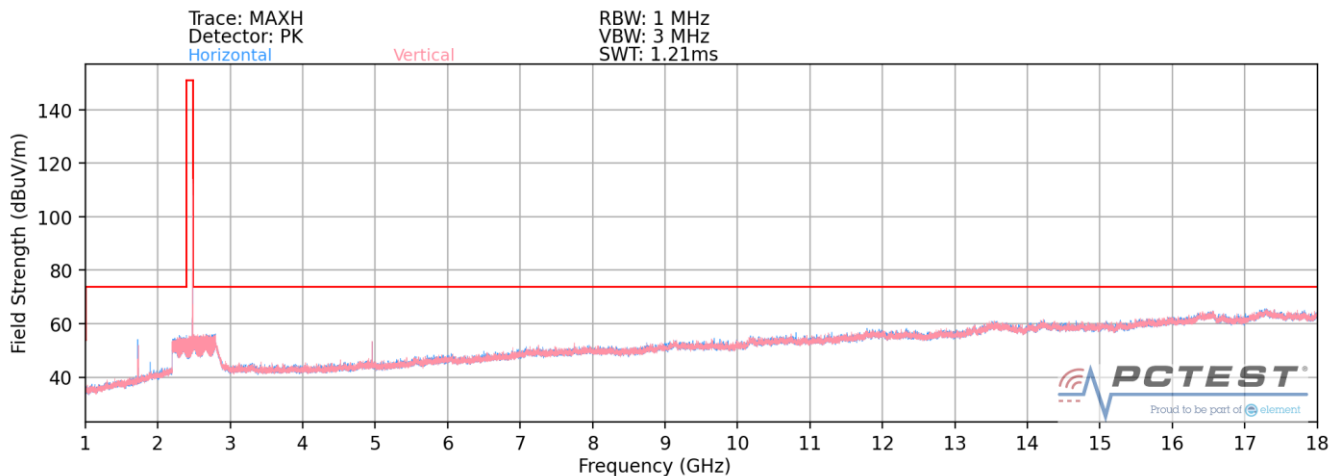
§15.205 §15.209 §15.247 (d); RSS-Gen [8.9]



**Plot 7-159. Radiated Spurious Plot above 1GHz (BT– Ch. 0) – Antenna 2**



**Plot 7-160. Radiated Spurious Plot above 1GHz (BT– Ch. 39) – Antenna 2**

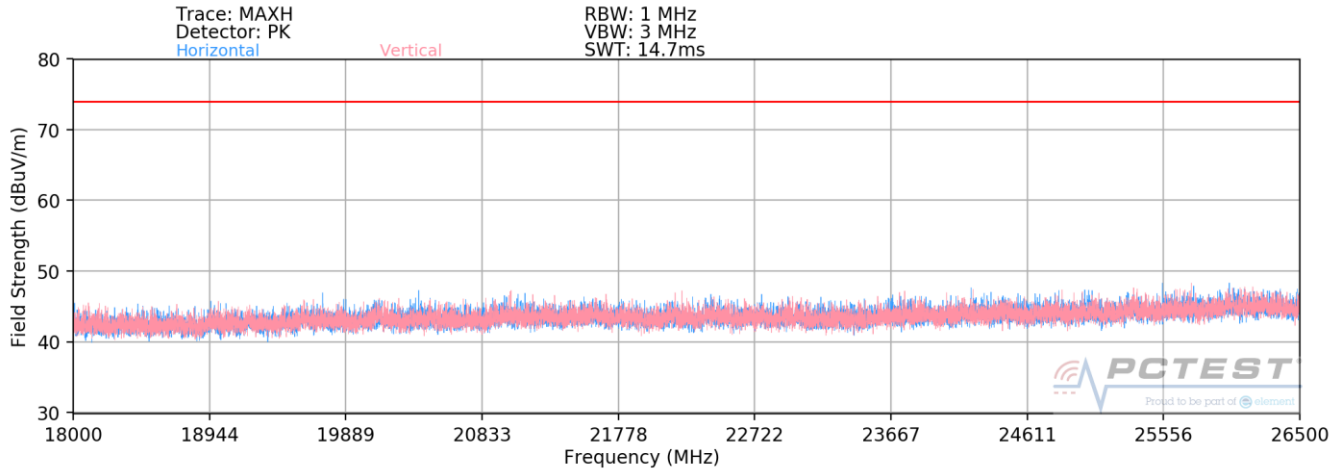


**Plot 7-161. Radiated Spurious Plot above 1GHz (BT– Ch. 78) – Antenna 2**

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 112 of 129                   |

## Radiated Spurious Emissions Measurements (Above 18GHz)

§15.209; RSS-Gen [8.9]



Plot 7-162. Radiated Spurious Plot above 18GHz Antenna 2

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 113 of 129                   |

## Radiated Spurious Emission Measurements

§15.205 §15.209 §15.247 (d); RSS-Gen [8.9]

Worst Case Mode: Bluetooth  
Worst Case Data Rate: 1 Mbps  
Measurement Distance: 3 Meters  
Operating Frequency: 2402MHz  
Channel: 0

| Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Duty Cycle Correction [dB] | Field Strength [dBμV/m] | Limit [dBμV/m] | Margin [dB] |
|-----------------|----------|-----------------|---------------------|----------------------------|----------------------|-------------|----------------------------|-------------------------|----------------|-------------|
| 4804.00         | Avg      | H               | 162                 | 71                         | -76.99               | 9.82        | -22.50                     | 17.33                   | 53.98          | -36.65      |
| 4804.00         | Peak     | H               | 162                 | 71                         | -67.21               | 9.82        | 0.00                       | 49.61                   | 73.98          | -24.37      |
| 12010.00        | Avg      | H               | -                   | -                          | -79.21               | 22.99       | 0.00                       | 50.78                   | 53.98          | -3.20       |
| 12010.00        | Peak     | H               | -                   | -                          | -70.14               | 22.99       | 0.00                       | 59.85                   | 73.98          | -14.13      |

Table 7-15. Radiated Measurements – Antenna 2

Worst Case Mode: Bluetooth  
Worst Case Data Rate: 1 Mbps  
Measurement Distance: 3 Meters  
Operating Frequency: 2441MHz  
Channel: 39

| Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Duty Cycle Correction [dB] | Field Strength [dBμV/m] | Limit [dBμV/m] | Margin [dB] |
|-----------------|----------|-----------------|---------------------|----------------------------|----------------------|-------------|----------------------------|-------------------------|----------------|-------------|
| 4882.00         | Avg      | H               | 154                 | 72                         | -77.21               | 9.18        | -22.50                     | 16.47                   | 53.98          | -37.51      |
| 4882.00         | Peak     | H               | 154                 | 72                         | -66.01               | 9.18        | 0.00                       | 50.17                   | 73.98          | -23.81      |
| 7323.00         | Avg      | H               | -                   | -                          | -78.92               | 15.31       | 0.00                       | 43.39                   | 53.98          | -10.59      |
| 7323.00         | Peak     | H               | -                   | -                          | -69.25               | 15.31       | 0.00                       | 53.06                   | 73.98          | -20.92      |
| 12205.00        | Avg      | H               | -                   | -                          | -82.01               | 22.70       | 0.00                       | 47.69                   | 53.98          | -6.29       |
| 12205.00        | Peak     | H               | -                   | -                          | -72.59               | 22.70       | 0.00                       | 57.11                   | 73.98          | -16.87      |

Table 7-16. Radiated Measurements – Antenna 2

|                                         |                                                                                                                                                                                                              |                                       |                                                                                       |                                   |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------|
| FCC ID: A3LSMS906U                      |  <b>PCTEST</b><br>Proud to be part of  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021                                                                                                                                                                              | EUT Type:<br>Portable Handset         |                                                                                       | Page 114 of 129                   |

## Radiated Spurious Emission Measurements

§15.205 §15.209 §15.247 (d); RSS-Gen [8.9]

|                       |           |
|-----------------------|-----------|
| Worst Case Mode:      | Bluetooth |
| Worst Case Data Rate: | 1 Mbps    |
| Measurement Distance: | 3 Meters  |
| Operating Frequency:  | 2480MHz   |
| Channel:              | 78        |

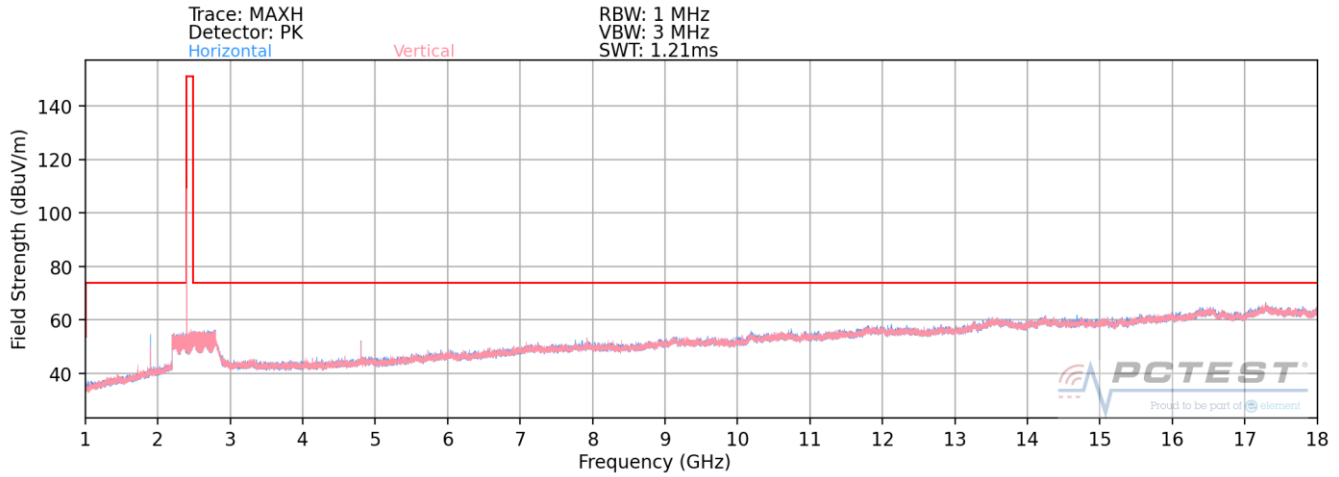
| Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Duty Cycle Correction [dB] | Field Strength [dBμV/m] | Limit [dBμV/m] | Margin [dB] |
|-----------------|----------|-----------------|---------------------|----------------------------|----------------------|-------------|----------------------------|-------------------------|----------------|-------------|
| 4960.00         | Avg      | H               | 160                 | 69                         | -76.88               | 9.92        | -22.50                     | 17.54                   | 53.98          | -36.44      |
| 4960.00         | Peak     | H               | 160                 | 69                         | -65.30               | 9.92        | 0.00                       | 51.62                   | 73.98          | -22.36      |
| 7440.00         | Avg      | H               | -                   | -                          | -80.00               | 15.55       | 0.00                       | 42.55                   | 53.98          | -11.43      |
| 7440.00         | Peak     | H               | -                   | -                          | -71.42               | 15.55       | 0.00                       | 51.13                   | 73.98          | -22.85      |
| 12400.00        | Avg      | H               | -                   | -                          | -81.44               | 23.00       | 0.00                       | 48.56                   | 53.98          | -5.42       |
| 12400.00        | Peak     | H               | -                   | -                          | -73.53               | 23.00       | 0.00                       | 56.47                   | 73.98          | -17.51      |

Table 7-17. Radiated Measurements – Antenna 2

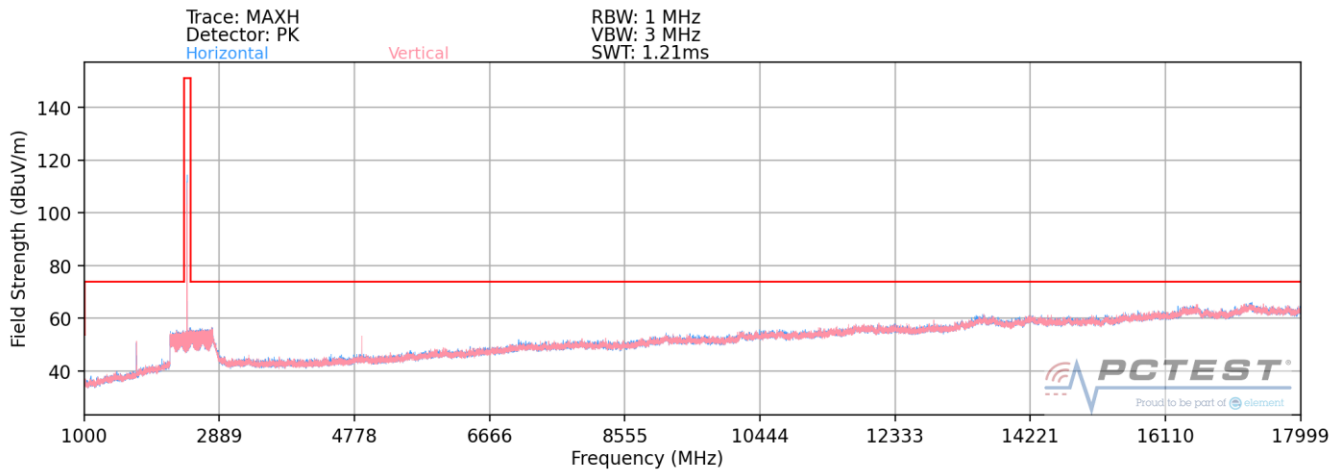
|                                         |                                                                                     |                                       |                                                                                       |                                   |
|-----------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------|
| FCC ID: A3LSMS906U                      |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021                                                     | EUT Type:<br>Portable Handset         |                                                                                       | Page 115 of 129                   |

## Radiated Spurious Emission Measurements

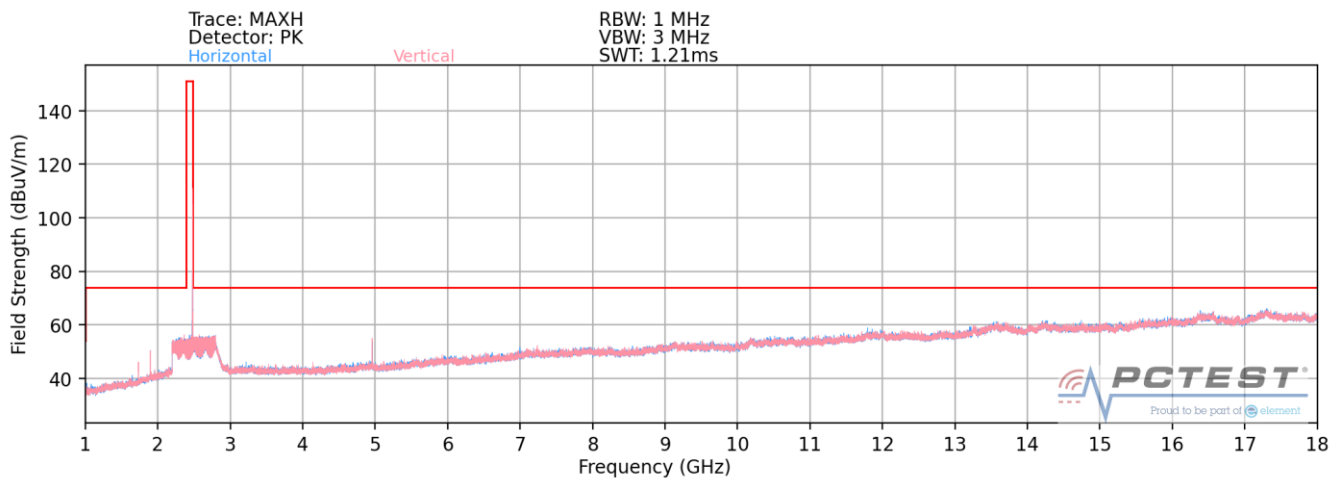
§15.205 §15.209 §15.247 (d); RSS-Gen [8.9]



Plot 7-163. Radiated Spurious Plot above 1GHz (BT- Ch. 0) – Dual



Plot 7-164. Radiated Spurious Plot above 1GHz (BT- Ch. 39) – Dual

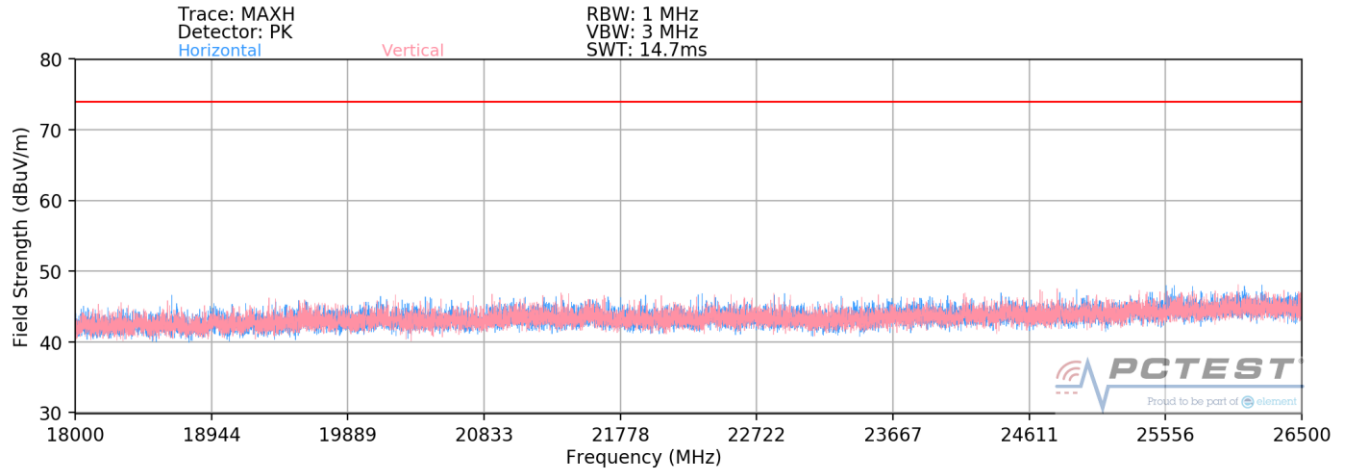


Plot 7-165. Radiated Spurious Plot above 1GHz (BT- Ch. 78) – Dual

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 116 of 129                   |

## Radiated Spurious Emissions Measurements (Above 18GHz)

§15.209; RSS-Gen [8.9]



Plot 7-166. Radiated Spurious Plot above 18GHz Dual

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 117 of 129                   |

## Radiated Spurious Emission Measurements

§15.205 §15.209 §15.247 (d); RSS-Gen [8.9]

Worst Case Mode: Bluetooth  
Worst Case Data Rate: 1 Mbps  
Measurement Distance: 3 Meters  
Operating Frequency: 2402MHz  
Channel: 0

| Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBμV/m] | Limit [dBμV/m] | Margin [dB] |
|-----------------|----------|-----------------|---------------------|----------------------------|----------------------|-------------|-------------------------|----------------|-------------|
| 4804.00         | Avg      | H               | -                   | -                          | -79.52               | 9.82        | 37.30                   | 53.98          | -16.68      |
| 4804.00         | Peak     | H               | -                   | -                          | -68.32               | 9.82        | 48.50                   | 73.98          | -25.48      |
| 12010.00        | Avg      | H               | -                   | -                          | -81.11               | 22.99       | 48.88                   | 53.98          | -5.10       |
| 12010.00        | Peak     | H               | -                   | -                          | -70.59               | 22.99       | 59.40                   | 73.98          | -14.58      |

Table 7-18. Radiated Measurements – Dual

Worst Case Mode: Bluetooth  
Worst Case Data Rate: 1 Mbps  
Measurement Distance: 3 Meters  
Operating Frequency: 2441MHz  
Channel: 39

| Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Duty Cycle Correction [dB] | Field Strength [dBμV/m] | Limit [dBμV/m] | Margin [dB] |
|-----------------|----------|-----------------|---------------------|----------------------------|----------------------|-------------|----------------------------|-------------------------|----------------|-------------|
| 4882.00         | Avg      | H               | 131                 | 26                         | -78.44               | 9.18        | -22.50                     | 15.24                   | 53.98          | -38.74      |
| 4882.00         | Peak     | H               | 131                 | 26                         | -67.34               | 9.18        | 0.00                       | 48.84                   | 73.98          | -25.14      |
| 7323.00         | Avg      | H               | -                   | -                          | -77.74               | 15.31       | 0.00                       | 44.57                   | 53.98          | -9.41       |
| 7323.00         | Peak     | H               | -                   | -                          | -68.64               | 15.31       | 0.00                       | 53.67                   | 73.98          | -20.31      |
| 12205.00        | Avg      | H               | -                   | -                          | -78.82               | 22.70       | 0.00                       | 50.88                   | 53.98          | -3.10       |
| 12205.00        | Peak     | H               | -                   | -                          | -71.04               | 22.70       | 0.00                       | 58.66                   | 73.98          | -15.32      |

Table 7-19. Radiated Measurements – Dual

|                                         |                                                                                                                                                                                                              |                                       |                                                                                       |                                   |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------|
| FCC ID: A3LSMS906U                      |  <b>PCTEST</b><br>Proud to be part of  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021                                                                                                                                                                              | EUT Type:<br>Portable Handset         |                                                                                       | Page 118 of 129                   |

## Radiated Spurious Emission Measurements

§15.205 §15.209 §15.247 (d); RSS-Gen [8.9]

|                       |           |
|-----------------------|-----------|
| Worst Case Mode:      | Bluetooth |
| Worst Case Data Rate: | 1 Mbps    |
| Measurement Distance: | 3 Meters  |
| Operating Frequency:  | 2480MHz   |
| Channel:              | 78        |

| Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Duty Cycle Correction [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|-----------------|----------|-----------------|---------------------|----------------------------|----------------------|-------------|----------------------------|-------------------------|----------------|-------------|
| 4960.00         | Avg      | H               | 112                 | 9                          | -75.90               | 9.92        | -22.50                     | 18.52                   | 53.98          | -35.46      |
| 4960.00         | Peak     | H               | 112                 | 9                          | -66.83               | 9.92        | 0.00                       | 50.09                   | 73.98          | -23.89      |
| 7440.00         | Avg      | H               | -                   | -                          | -76.80               | 15.55       | 0.00                       | 45.75                   | 53.98          | -8.23       |
| 7440.00         | Peak     | H               | -                   | -                          | -67.81               | 15.55       | 0.00                       | 54.74                   | 73.98          | -19.24      |
| 12400.00        | Avg      | H               | -                   | -                          | -79.24               | 23.00       | 0.00                       | 50.76                   | 53.98          | -3.22       |
| 12400.00        | Peak     | H               | -                   | -                          | -70.83               | 23.00       | 0.00                       | 59.17                   | 73.98          | -14.81      |

Table 7-20. Radiated Measurements – Dual

|                       |           |
|-----------------------|-----------|
| Worst Case Mode:      | Bluetooth |
| Worst Case Data Rate: | 1 Mbps    |
| Measurement Distance: | 3 Meters  |
| Operating Frequency:  | 2480MHz   |
| Channel:              | 78        |

| Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Duty Cycle Correction [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|-----------------|----------|-----------------|---------------------|----------------------------|----------------------|-------------|----------------------------|-------------------------|----------------|-------------|
| 4960.00         | Avg      | H               | -                   | -                          | -76.24               | 9.92        | -22.50                     | 18.18                   | 53.98          | -35.80      |
| 4960.00         | Peak     | H               | -                   | -                          | -65.99               | 9.92        | 0.00                       | 50.93                   | 73.98          | -23.05      |
| 7440.00         | Avg      | H               | -                   | -                          | -77.01               | 15.55       | 0.00                       | 45.54                   | 53.98          | -8.44       |
| 7440.00         | Peak     | H               | -                   | -                          | -68.21               | 15.55       | 0.00                       | 54.34                   | 73.98          | -19.64      |
| 12400.00        | Avg      | H               | -                   | -                          | -80.04               | 23.00       | 0.00                       | 49.96                   | 53.98          | -4.02       |
| 12400.00        | Peak     | H               | -                   | -                          | -71.11               | 23.00       | 0.00                       | 58.89                   | 73.98          | -15.09      |

Table 7-21. Radiated Measurements – Dual WCP

|                                         |                                                                                                                                                                                                              |                                       |                                                                                       |                                   |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------|
| FCC ID: A3LSMS906U                      |  <b>PCTEST</b><br>Proud to be part of  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021                                                                                                                                                                              | EUT Type:<br>Portable Handset         |                                                                                       | Page 119 of 129                   |

## 7.10 Radiated Restricted Band Edge Measurements

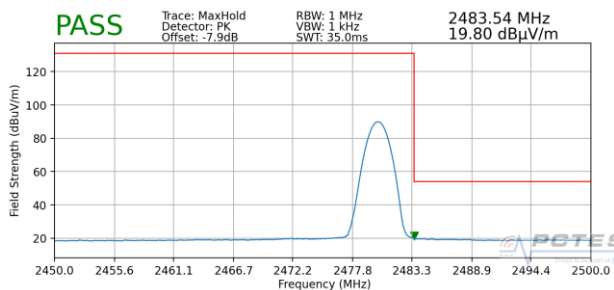
§15.205 §15.209 §15.247 (d); RSS-Gen [8.9]

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting. Two different amplitude offsets were used depending on whether peak or average measurements were measured. The average measurements use a duty cycle correction factor (DCCF).

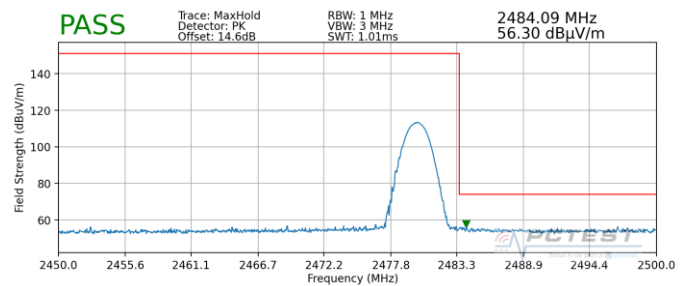
The amplitude offset shown in the following plots for average measurements was calculated using the formula:

$$\text{Offset (dB)} = (\text{Antenna Factor} + \text{Cable Loss} + \text{Attenuator}) - \text{Preamplifier Gain} + \text{DCCF}$$

|                       |           |
|-----------------------|-----------|
| Worst Case Mode:      | Bluetooth |
| Worst Case Data Rate: | 3 Mbps    |
| Measurement Distance: | 3 Meters  |
| Operating Frequency:  | 2480MHz   |
| Channel:              | 78        |

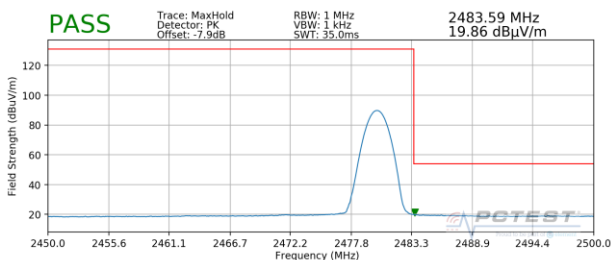


**Plot 7-167. Radiated Restricted Upper Band Edge Measurement (Average) – Antenna 1**

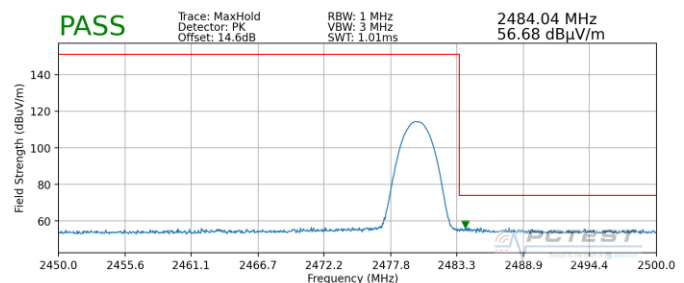


**Plot 7-168. Radiated Restricted Upper Band Edge Measurement (Peak) – Antenna 1**

|                       |           |
|-----------------------|-----------|
| Worst Case Mode:      | Bluetooth |
| Worst Case Data Rate: | 2 Mbps    |
| Measurement Distance: | 3 Meters  |
| Operating Frequency:  | 2480MHz   |
| Channel:              | 78        |



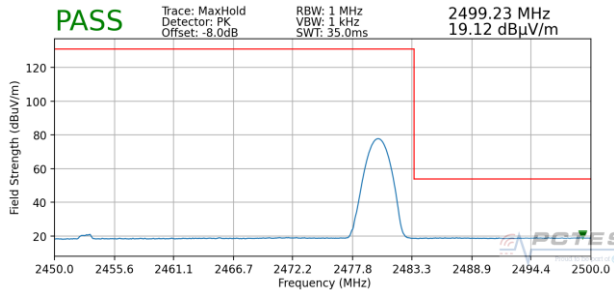
**Plot 7-169. Radiated Restricted Upper Band Edge Measurement (Average) – Antenna 2**



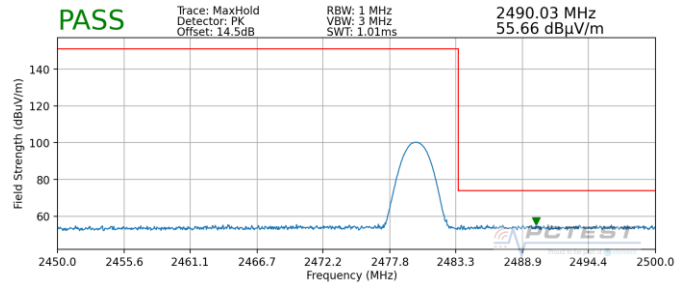
**Plot 7-170. Radiated Restricted Upper Band Edge Measurement (Peak) – Antenna 2**

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021              | EUT Type:<br>Portable Handset         |                | Page 120 of 129                   |

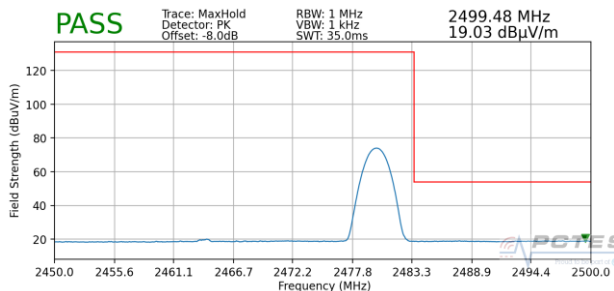
|                       |           |
|-----------------------|-----------|
| Worst Case Mode:      | Bluetooth |
| Worst Case Data Rate: | 1 Mbps    |
| Measurement Distance: | 3 Meters  |
| Operating Frequency:  | 2480MHz   |
| Channel:              | 78        |



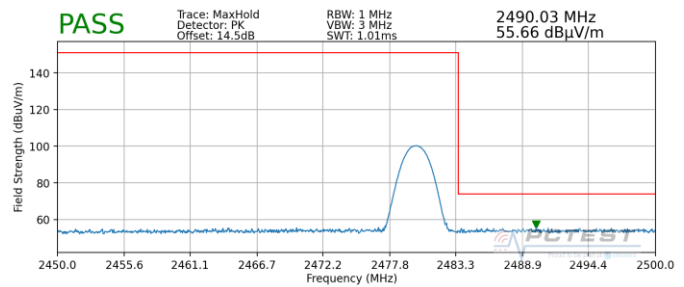
**Plot 7-171. Radiated Restricted Upper Band Edge Measurement (Average) – Dual**



**Plot 7-172. Radiated Restricted Upper Band Edge Measurement (Peak) – Dual**



**Plot 7-173. Radiated Restricted Upper Band Edge Measurement with WCP (Average) – Dual**



**Plot 7-174. Radiated Restricted Upper Band Edge Measurement with WCP (Peak) – Dual**

|                                         |                                                                                     |                                       |                                                                                       |                                   |
|-----------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------|
| FCC ID: A3LSMS906U                      |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021                                                     | EUT Type:<br>Portable Handset         |                                                                                       | Page 121 of 129                   |

## 7.11 Radiated Spurious Emissions Measurements – Below 1GHz

§15.209; RSS-Gen [8.9]

### Test Overview and Limit

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for radiated spurious emissions. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

***All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR and Table 6 of RSS-Gen (8.10) must not exceed the limits shown in Table 7-22 per Section 15.209 and RSS-Gen (8.9).***

| Frequency         | Field Strength<br>[ $\mu$ V/m] | Measured Distance<br>[Meters] |
|-------------------|--------------------------------|-------------------------------|
| 0.009 – 0.490 MHz | 2400/F (kHz)                   | 300                           |
| 0.490 – 1.705 MHz | 24000/F (kHz)                  | 30                            |
| 1.705 – 30.00 MHz | 30                             | 30                            |
| 30.00 – 88.00 MHz | 100                            | 3                             |
| 88.00 – 216.0 MHz | 150                            | 3                             |
| 216.0 – 960.0 MHz | 200                            | 3                             |
| Above 960.0 MHz   | 500                            | 3                             |

**Table 7-22. Radiated Limits**

### Test Procedures Used

ANSI C63.10-2013

### Test Settings

#### Quasi-Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 120kHz (for emissions from 30MHz – 1GHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

|                                         |                                                                                                                                                                                                              |                                       |                                                                                       |                                   |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------|
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| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021                                                                                                                                                                              | EUT Type:<br>Portable Handset         |                                                                                       | Page 122 of 129                   |

## Test Setup

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

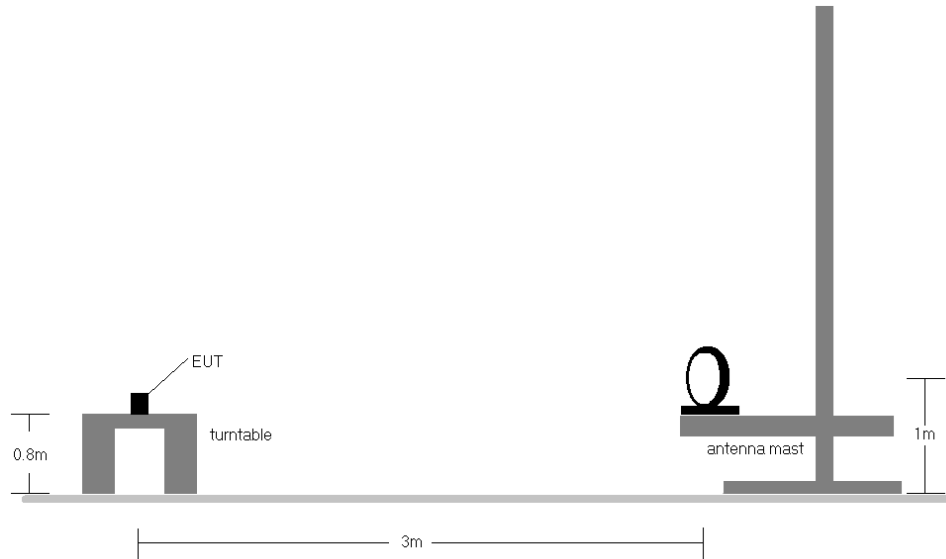


**Figure 7-9. Radiated Test Setup < 30Mhz**

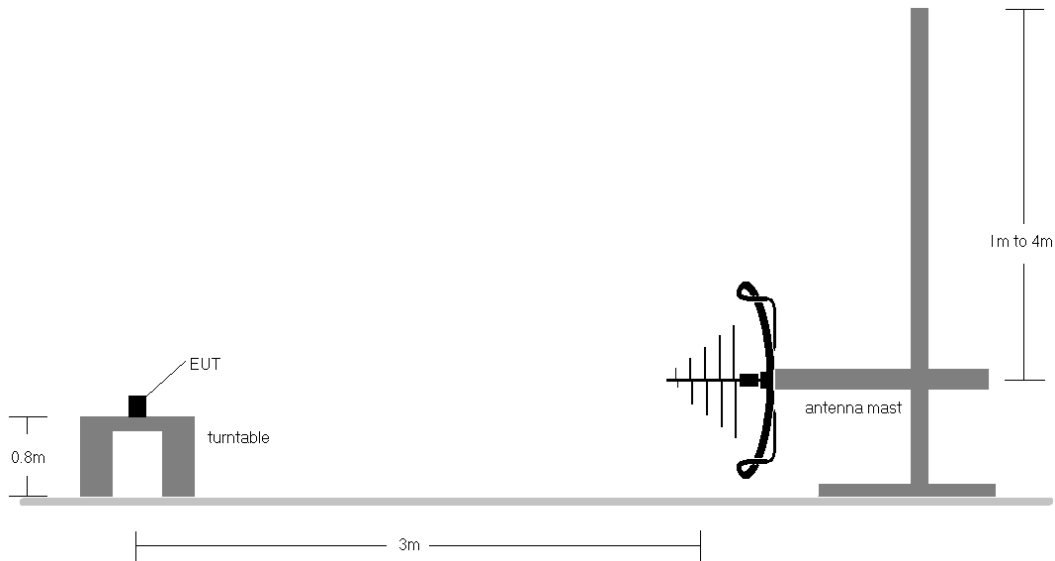


**Figure 7-10. Radiated Test Setup < 1GHz**

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
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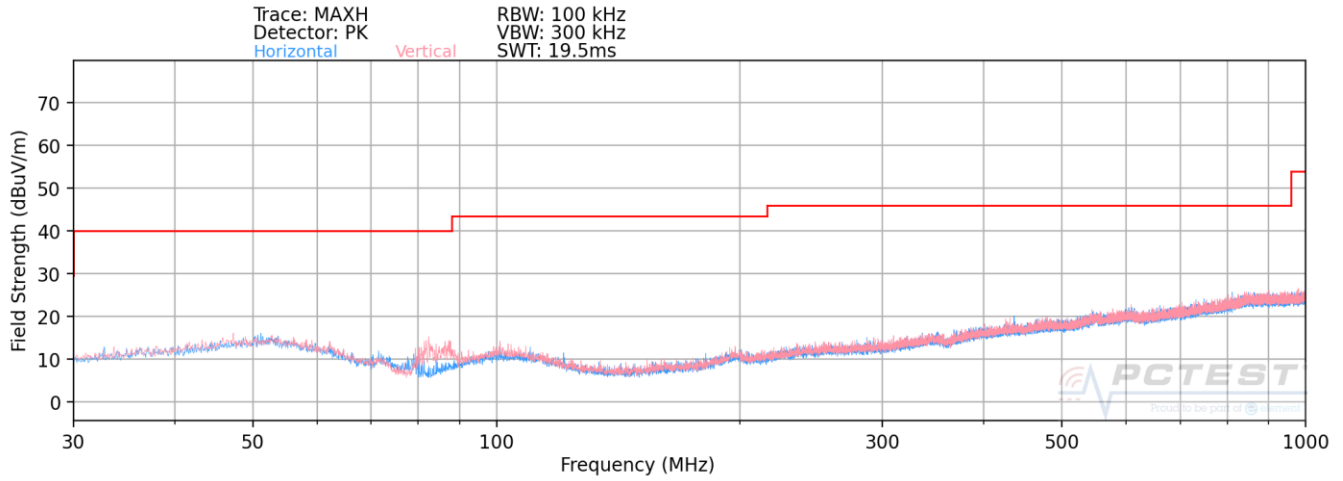
## Test Notes

1. All emissions lying in restricted bands specified in §15.205 and RSS-Gen (8.10) are below the limit shown in Table 7-22.
2. The broadband receive antenna is manipulated through vertical and horizontal polarizations during the tests. The EUT is manipulated through three orthogonal planes.
3. This unit was tested with its standard battery.
4. The spectrum is investigated using a peak detector and final measurements are recorded using CISPR quasi peak detector. The worst-case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
5. Emissions were measured at a 3 meter test distance.
6. Emissions are investigated while operating on the center channel of the mode, band, and modulation that produced the worst case results during the transmitter spurious emissions testing.
7. No spurious emissions were detected within 20dB of the limit below 30MHz.
8. The results recorded using the broadband antenna is known to correlate with the results obtained by using a tuned dipole with an acceptable degree of accuracy. The VSWR for the measurement antenna was found to be less than 2:1.
9. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. There were no emissions detected in the 30MHz – 1GHz frequency range, as shown in the subsequent plots.

|                                         |                                                                                                                                                                                                              |                                       |                                                                                       |                                   |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------|
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| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021                                                                                                                                                                              | EUT Type:<br>Portable Handset         |                                                                                       | Page 124 of 129                   |

## Radiated Spurious Emissions Measurements (Below 1GHz)

§15.209; RSS-Gen [8.9]



Plot 7-175. Radiated Spurious Plot below 1GHz

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
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## 7.12 Line Conducted Measurement Data

§15.207; RSS-Gen [8.8]

### Test Overview and Limit

All AC line conducted spurious emissions are measured with a receiver connected to a grounded LISN while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for conducted spurious emissions. Only the conducted emissions of the configuration that produced the worst case emissions are reported in this section.

***All conducted emissions must not exceed the limits shown in the table below, per Section 15.207 and RSS-Gen (8.8).***

| Frequency of emission (MHz) | Conducted Limit (dBμV) |           |
|-----------------------------|------------------------|-----------|
|                             | Quasi-peak             | Average   |
| 0.15 – 0.5                  | 66 to 56*              | 56 to 46* |
| 0.5 – 5                     | 56                     | 46        |
| 5 – 30                      | 60                     | 50        |

**Table 7-23. Conducted Limits**

\*Decreases with the logarithm of the frequency.

### Test Procedures Used

ANSI C63.10-2013, Section 6.2

### Test Settings

#### Quasi-Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the spurious emission of interest
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

#### Average Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the spurious emission of interest
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = RMS
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

|                                         |                                                                                                                                                                                                              |                                       |                                                                                       |                                   |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------|
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| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021                                                                                                                                                                              | EUT Type:<br>Portable Handset         |                                                                                       | Page 126 of 129                   |

## Test Setup

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

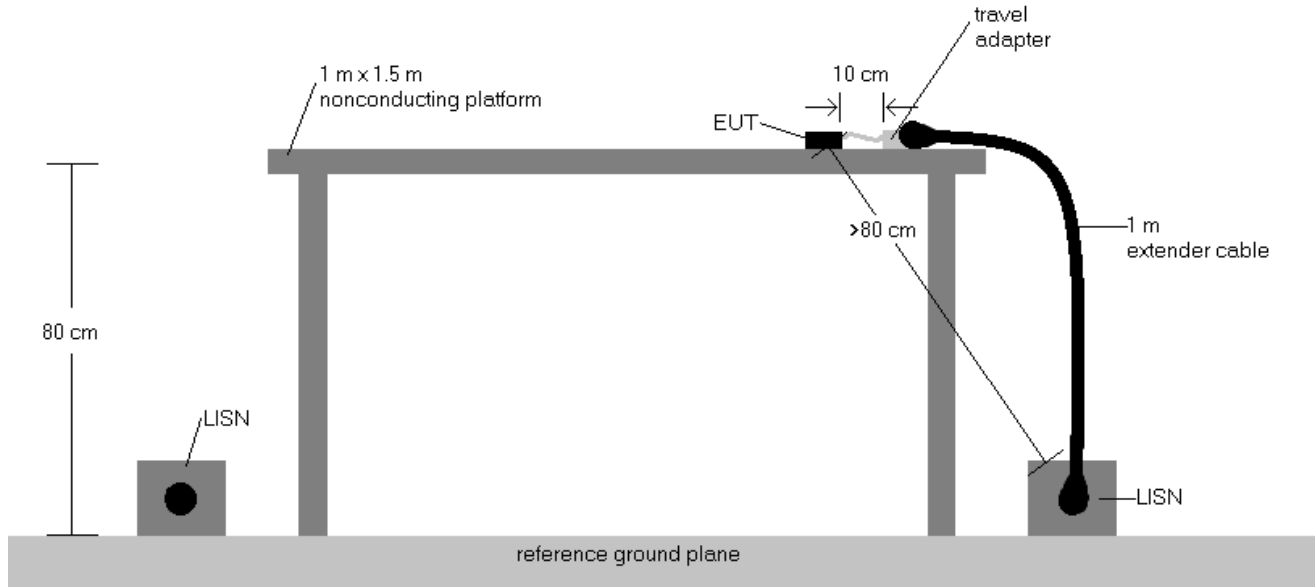
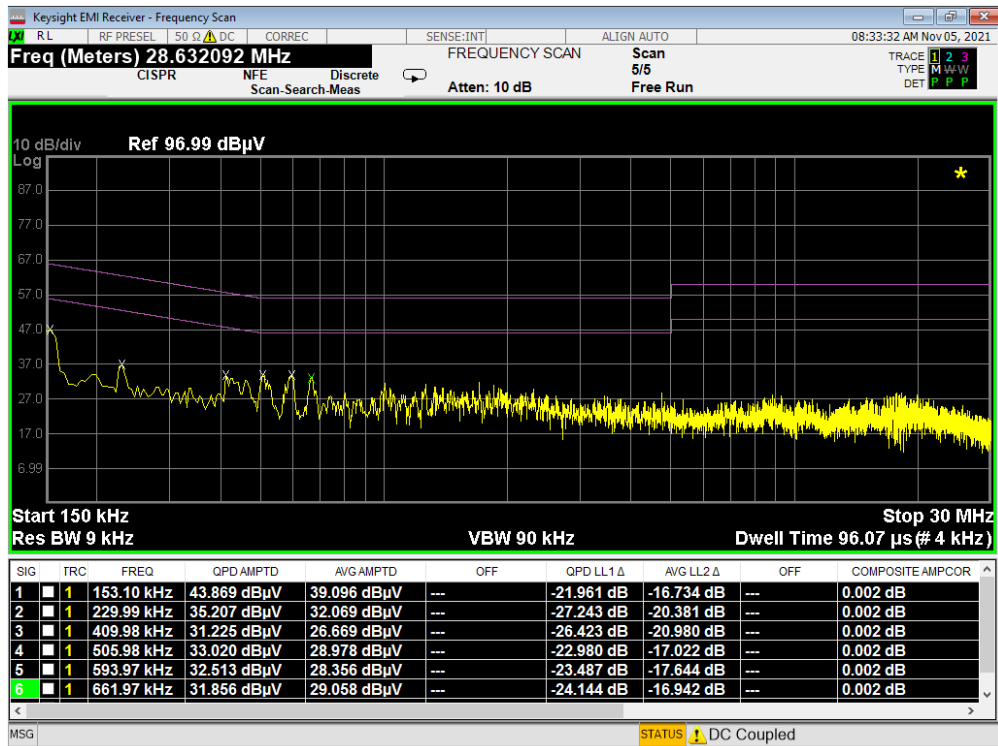


**Figure 7-11. Test Instrument & Measurement Setup**

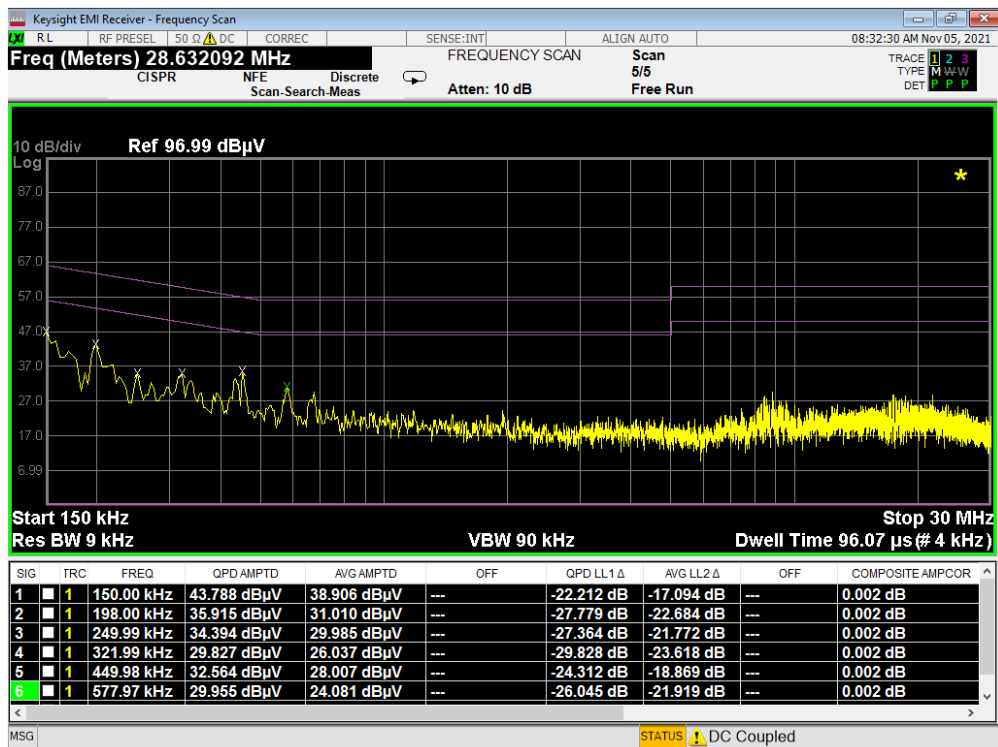
## Test Notes

1. All modes of operation were investigated and the worst-case emissions are reported using mid channel. The emissions found were not affected by the choice of channel used during testing.
2. The limit for an intentional radiator from 150kHz to 30MHz are specified in 15.207 and RSS-Gen (8.8).
3.  $\text{Corr. (dB)} = \text{Cable loss (dB)} + \text{LISN insertion factor (dB)}$
4.  $\text{QP/AV Level (dB}\mu\text{V)} = \text{QP/AV Analyzer/Receiver Level (dB}\mu\text{V)} + \text{Corr. (dB)}$
5.  $\text{Margin (dB)} = \text{QP/AV Limit (dB}\mu\text{V)} - \text{QP/AV Level (dB}\mu\text{V)}$
6. Traces shown in plot are made using a peak detector.
7. Deviations to the Specifications: None.

|                                         |                                              |                                       |                |                                   |
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Plot 7-176. Line-Conducted Test Plot (L1)



Plot 7-177. Line-Conducted Test Plot (N)

|                                         |                                              |                                       |                |                                   |
|-----------------------------------------|----------------------------------------------|---------------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMS906U                      | <b>PCTEST</b><br>Proud to be part of element | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>SAMSUNG</b> | Approved by:<br>Technical Manager |
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## 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMS906U** is in compliance with Part 15 Subpart C (15.247) of the FCC Rules.

|                                         |                                                                                     |                                       |                                                                                       |                                   |
|-----------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------|
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| Test Report S/N:<br>1M2109090103-16.A3L | Test Dates:<br>9/9 - 11/11/2021                                                     | EUT Type:<br>Portable Handset         |                                                                                       | Page 129 of 129                   |