

**Plot 7-42. Conducted Spurious Plot (WCDMA Ch. 9538)**

<b>FCC ID:</b> A3LSMA135U		<b>PART 24 MEASUREMENT REPORT</b>	<b>Approved by:</b> Technical Manager
<b>Test Report S/N:</b> 1M2112270166-03.A3L	<b>Test Dates:</b> 01/03/2022 - 01/26/2022	<b>EUT Type:</b> Portable Handset	Page 36 of 87

## 7.4 Band Edge Emissions at Antenna Terminal

### Test Overview

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

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

### Test Procedure Used

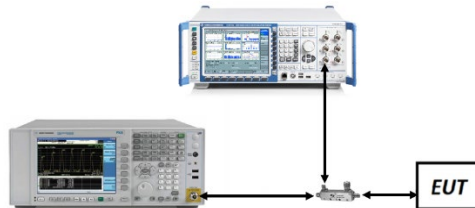
KDB 971168 D01 v03r01 – Section 6.0

### 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  $\geq$  1% of the emission bandwidth
4. VBW  $\geq$  3 x RBW
5. Detector = RMS
6. Number of sweep points  $\geq$  2 x Span/RBW
7. Trace mode = trace average for continuous emissions, max hold for pulse emissions
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.



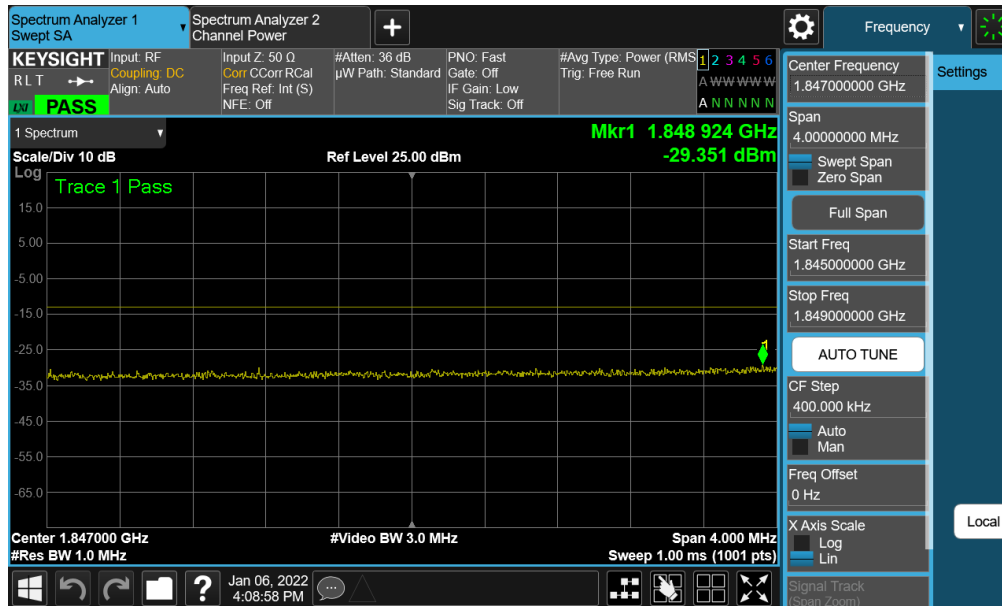
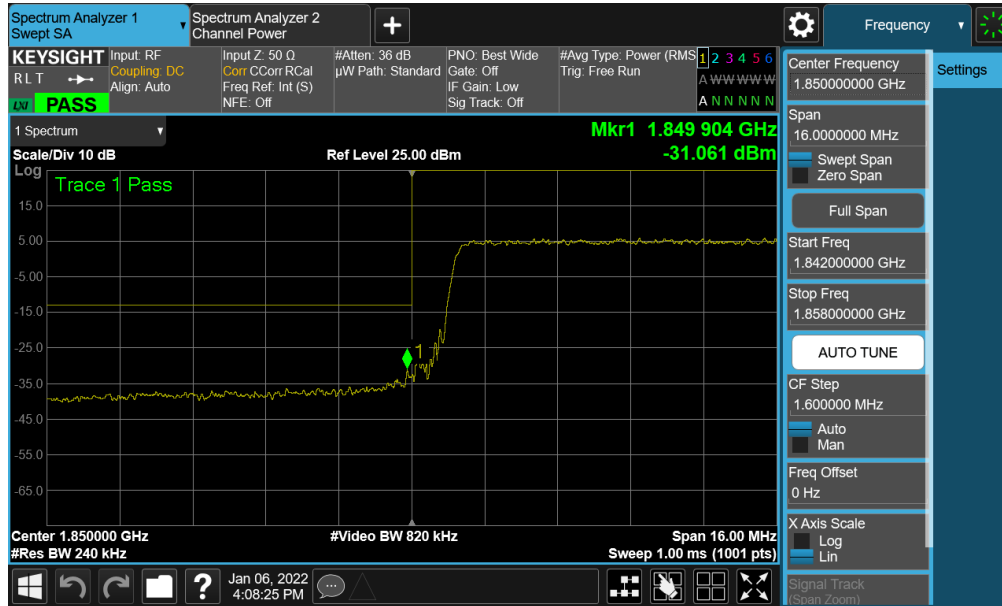
**Figure 7-3. Test Instrument & Measurement Setup**

### Test Notes

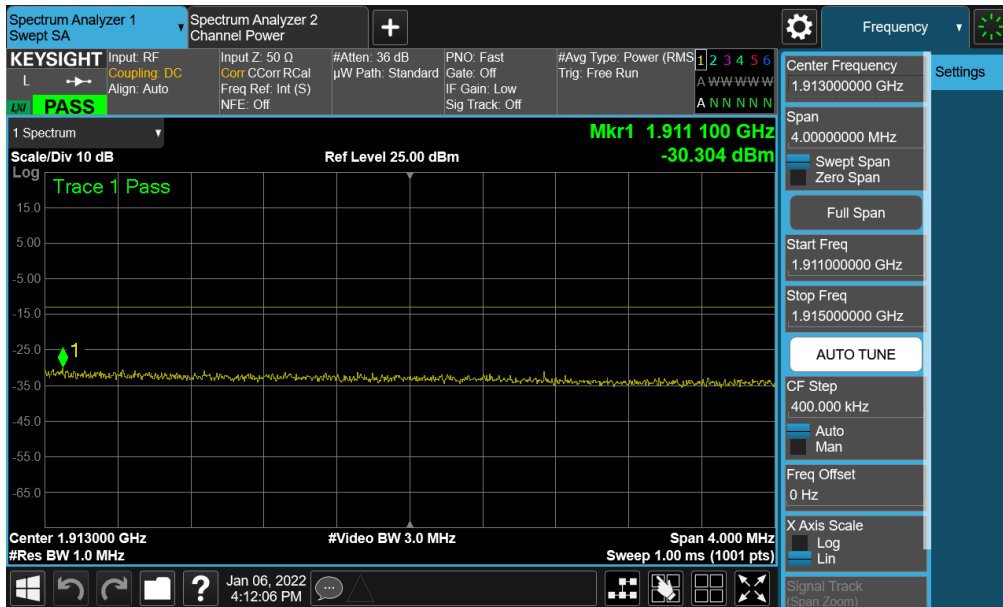
Per 24.238(b) and RSS-133(6.5), in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

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<b>Test Report S/N:</b> 1M2112270166-03.A3L	<b>Test Dates:</b> 01/03/2022 - 01/26/2022	<b>EUT Type:</b> Portable Handset	Page 37 of 87

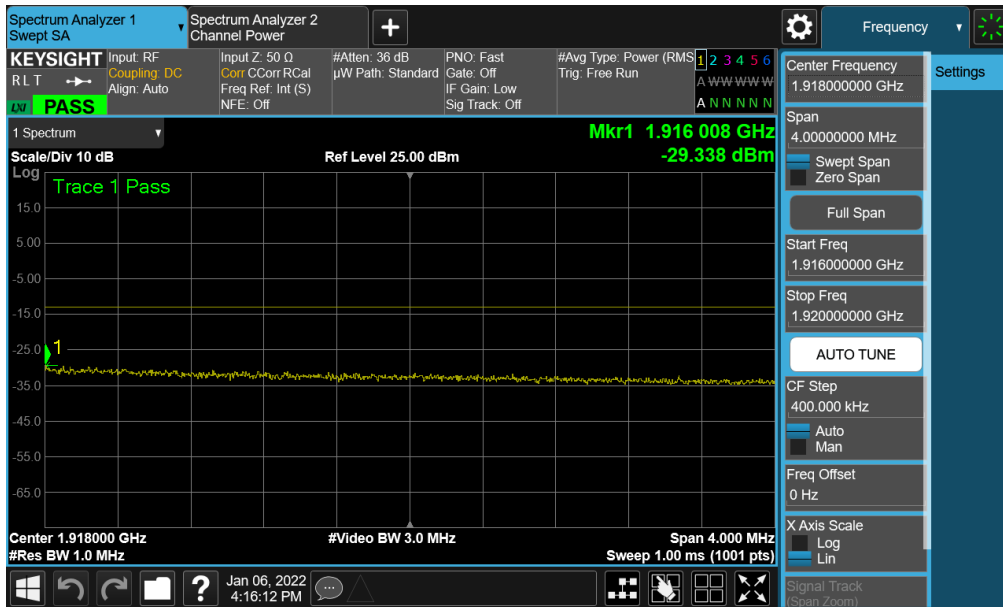
## LTE Band 25/2



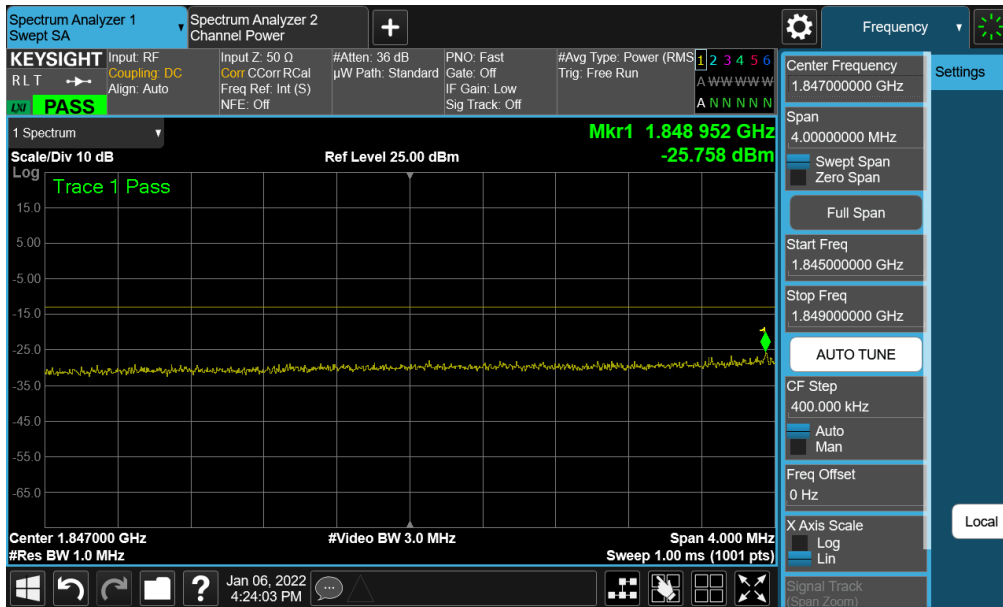
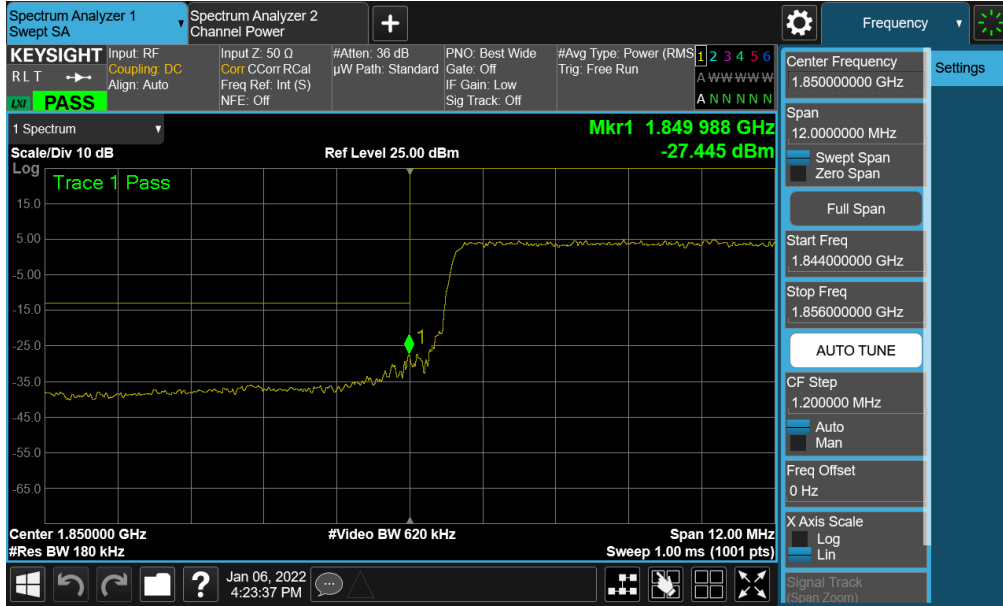
FCC ID: A3LSMA135U	<b>PCTEST</b> Proud to be part of element	<b>PART 24 MEASUREMENT REPORT</b>	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2112270166-03.A3L	Test Dates: 01/03/2022 - 01/26/2022	EUT Type: Portable Handset		Page 38 of 87



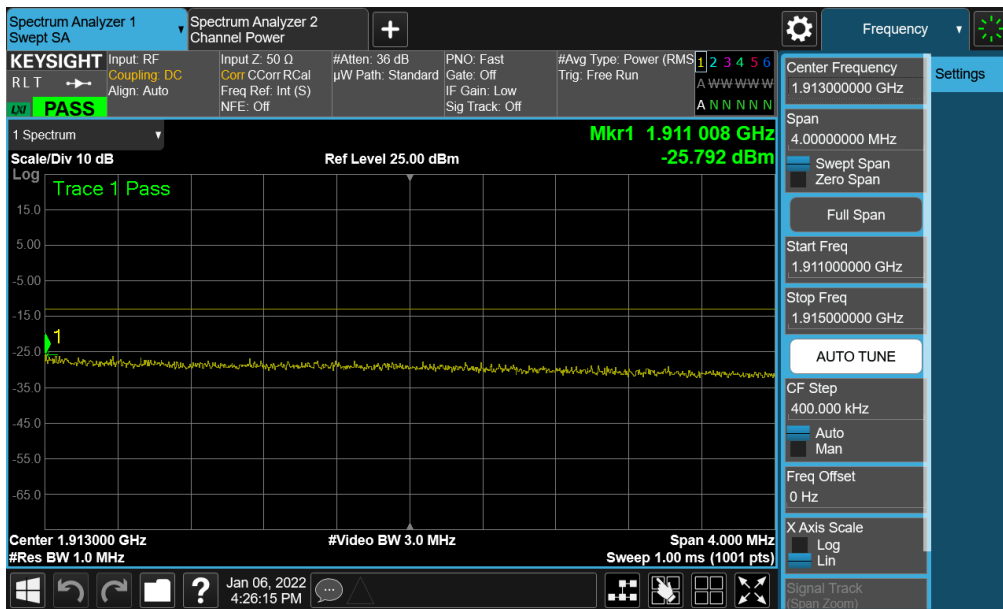
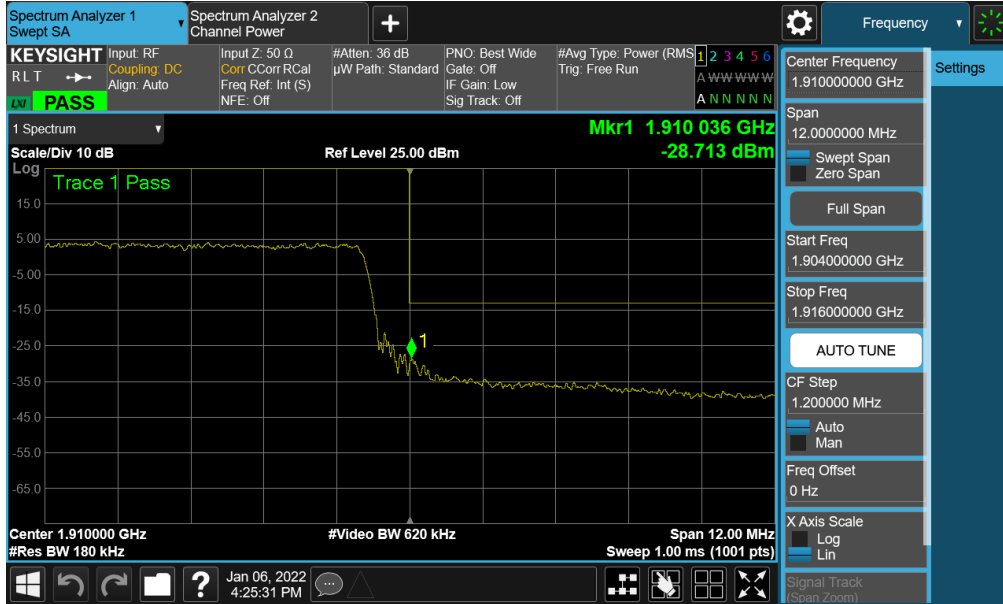
FCC ID: A3LSMA135U	<b>PCTEST</b> Proud to be part of element	<b>PART 24 MEASUREMENT REPORT</b>	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2112270166-03.A3L	Test Dates: 01/03/2022 - 01/26/2022	EUT Type: Portable Handset		Page 39 of 87



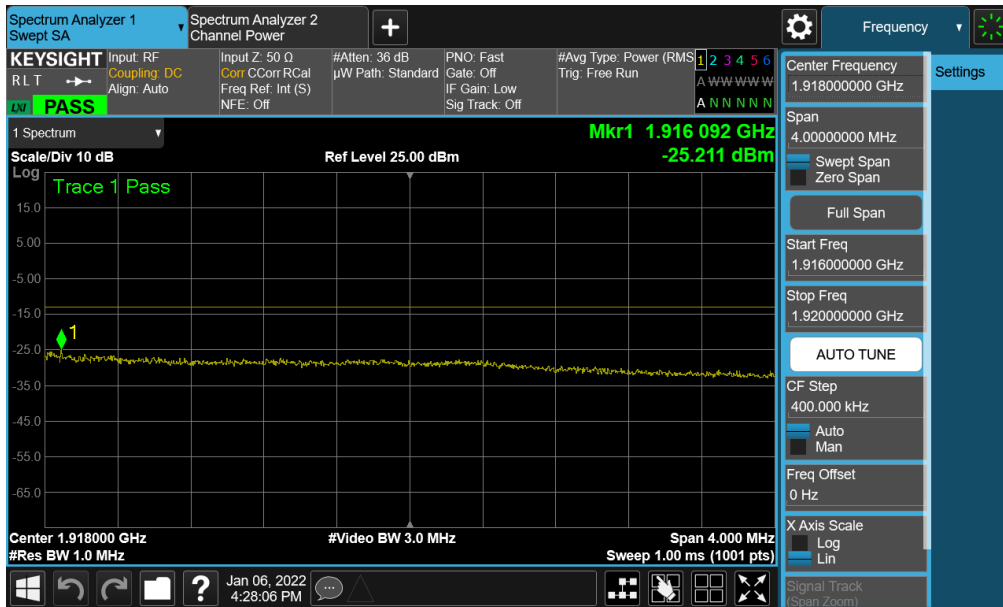
FCC ID: A3LSMA135U	<b>PCTEST</b> Proud to be part of element	<b>PART 24 MEASUREMENT REPORT</b>	<b>SAMSUNG</b>	Approved by: Technical Manager
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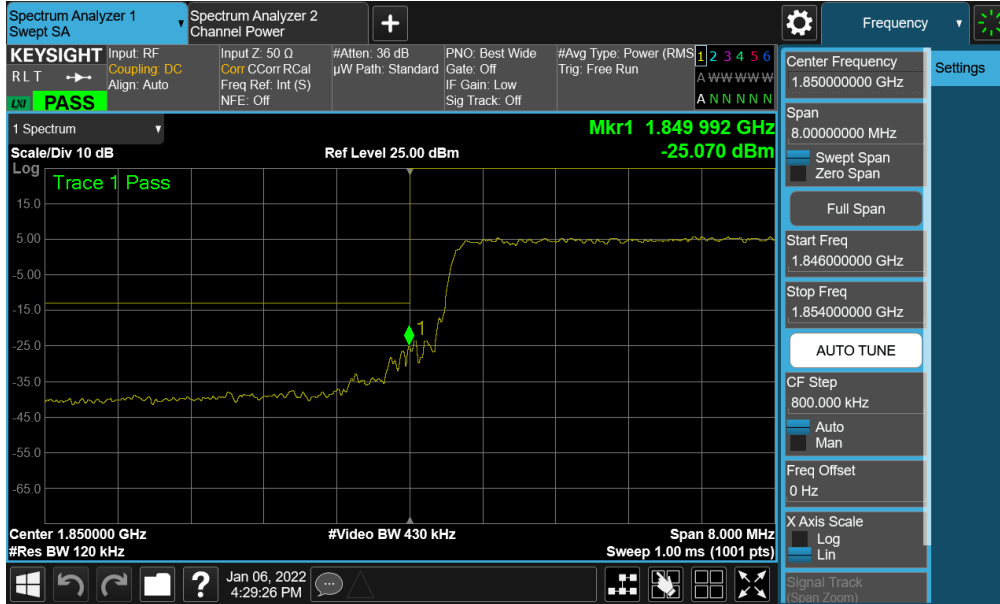


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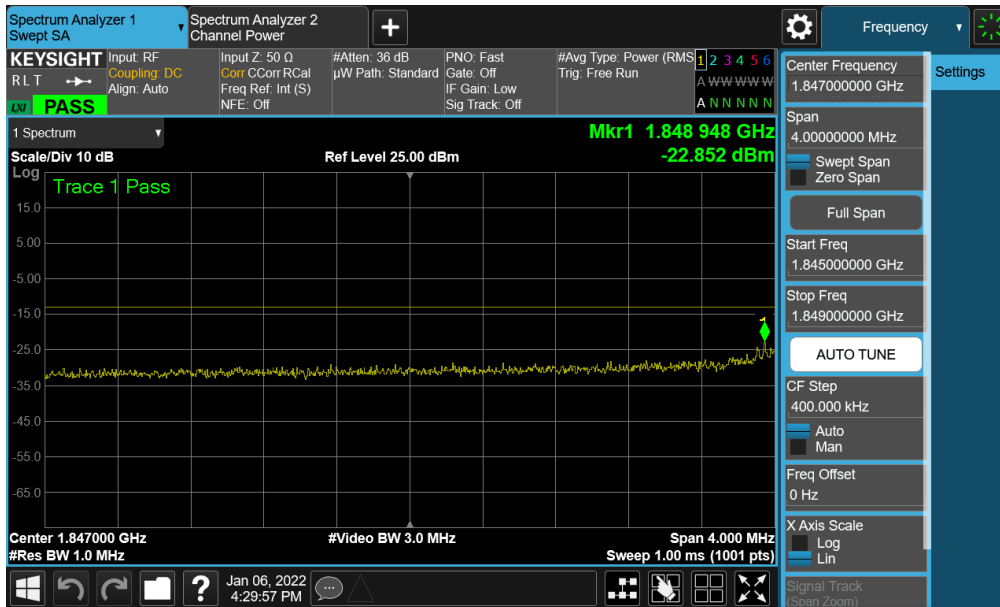


FCC ID: A3LSMA135U	<b>PCTEST</b> Proud to be part of element	<b>PART 24 MEASUREMENT REPORT</b>	<b>SAMSUNG</b>	Approved by: Technical Manager
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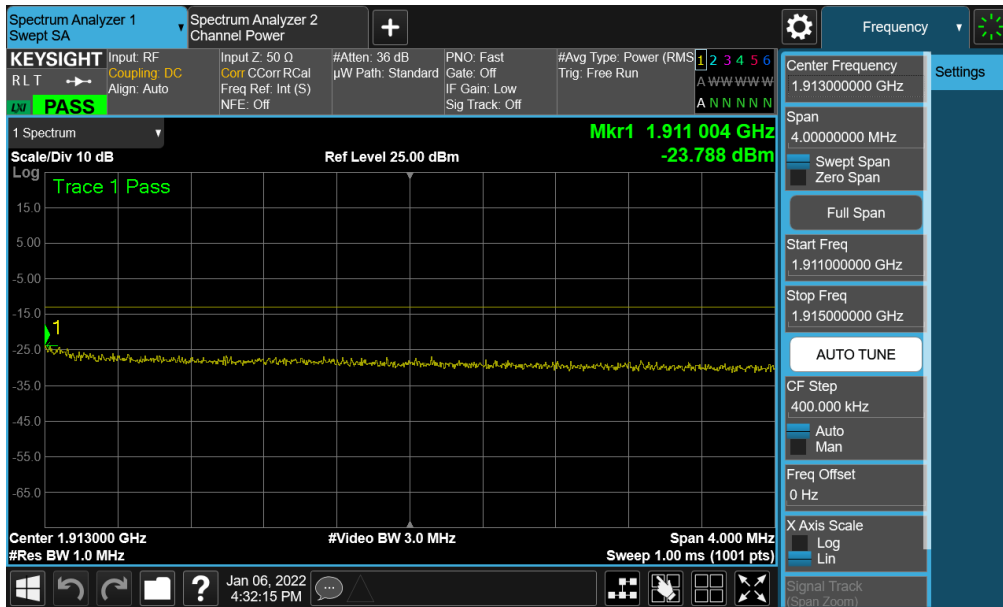


Plot 7-55. Lower Band Edge Plot (LTE Band 25/2 - 10MHz QPSK – Full RB)

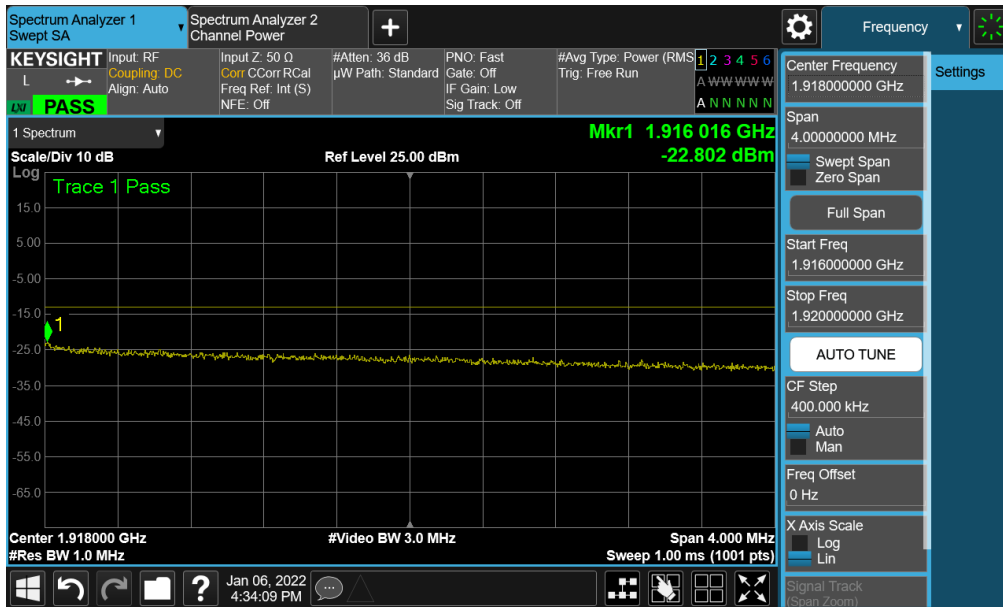


Plot 7-56. Extended Lower Band Edge Plot (LTE Band 25/2 - 10MHz QPSK – Full RB)

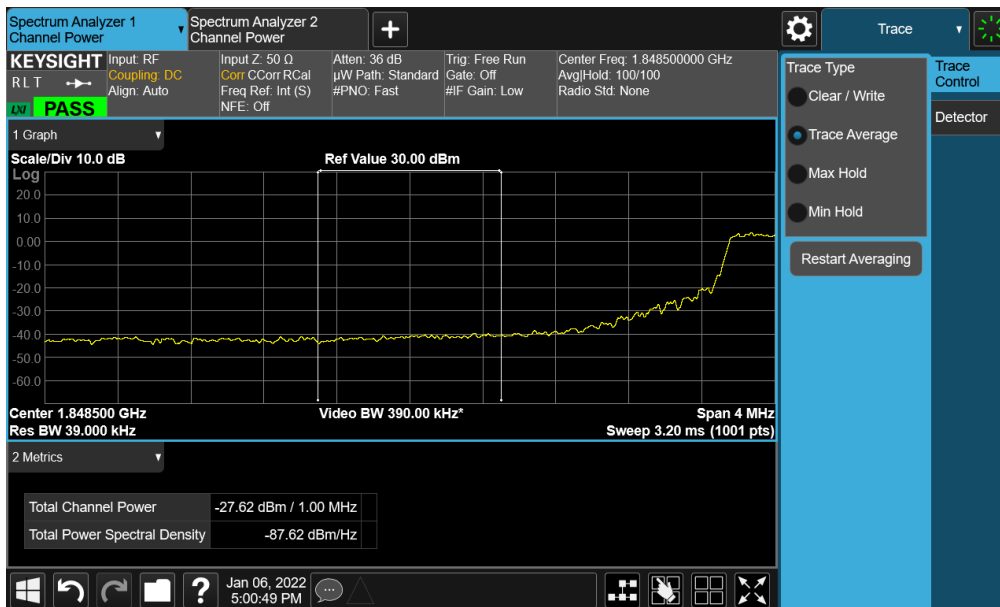
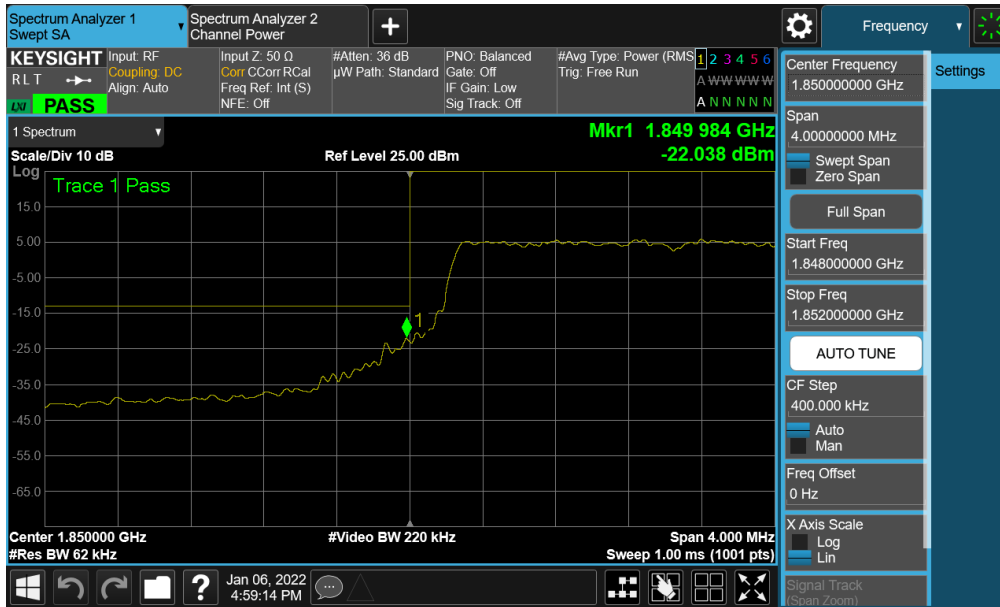
FCC ID: A3LSMA135U	<b>PCTEST</b> Proud to be part of element	<b>PART 24 MEASUREMENT REPORT</b>	<b>SAMSUNG</b>	Approved by: Technical Manager
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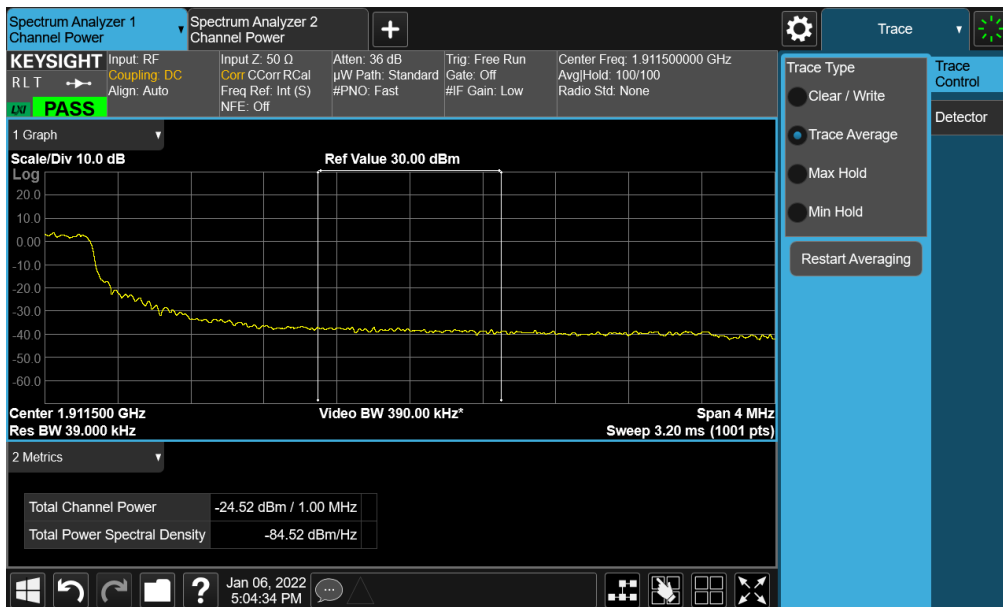
FCC ID: A3LSMA135U	<b>PCTEST</b> Proud to be part of element	<b>PART 24 MEASUREMENT REPORT</b>	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2112270166-03.A3L	Test Dates: 01/03/2022 - 01/26/2022	EUT Type: Portable Handset		Page 46 of 87



FCC ID: A3LSMA135U	<b>PCTEST</b> Proud to be part of element	<b>PART 24 MEASUREMENT REPORT</b>	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2112270166-03.A3L	Test Dates: 01/03/2022 - 01/26/2022	EUT Type: Portable Handset		Page 47 of 87

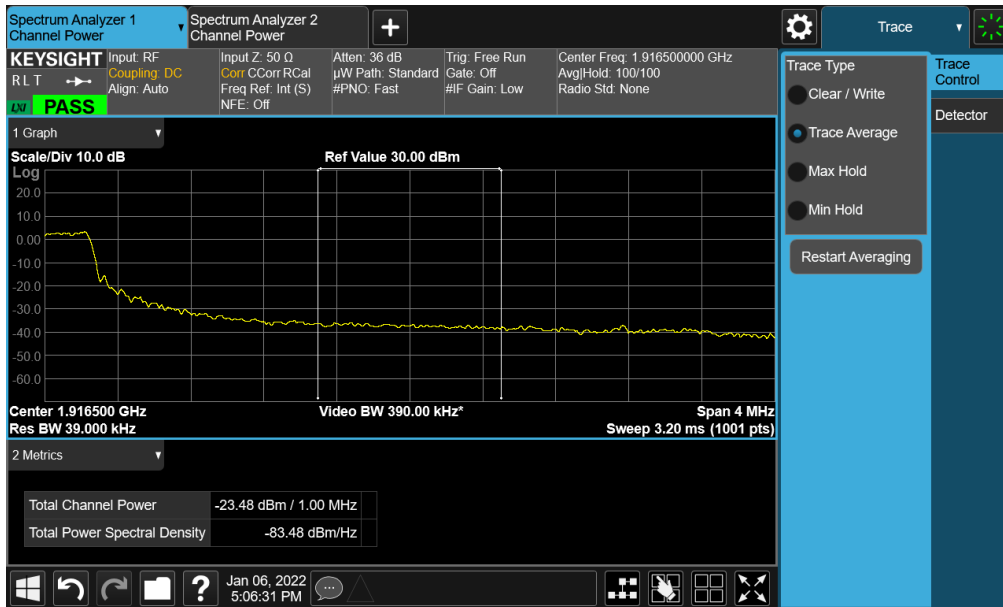


**Plot 7-63. Upper Band Edge Plot (LTE Band 2 - 5MHz QPSK – Full RB)**

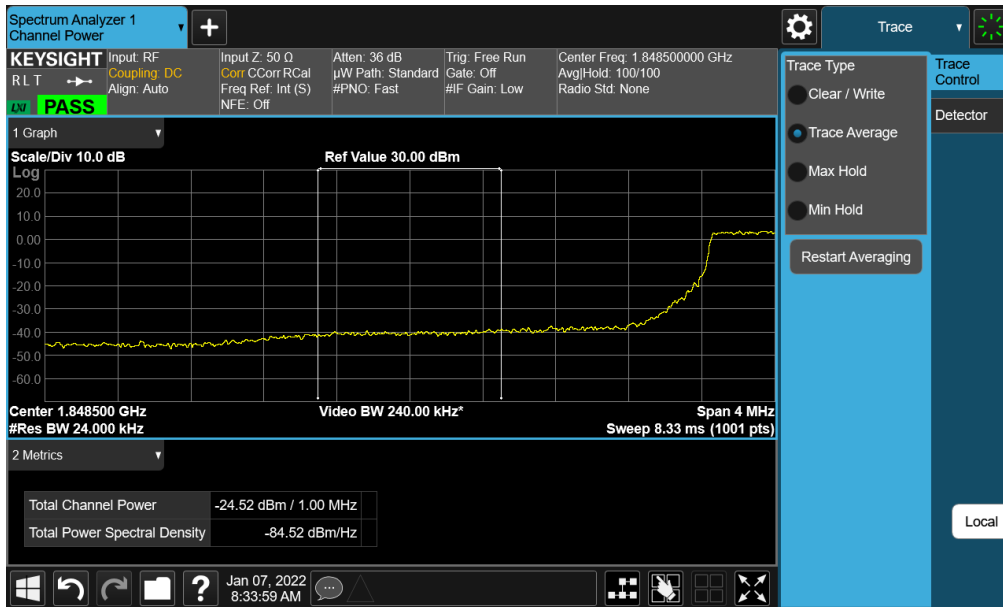
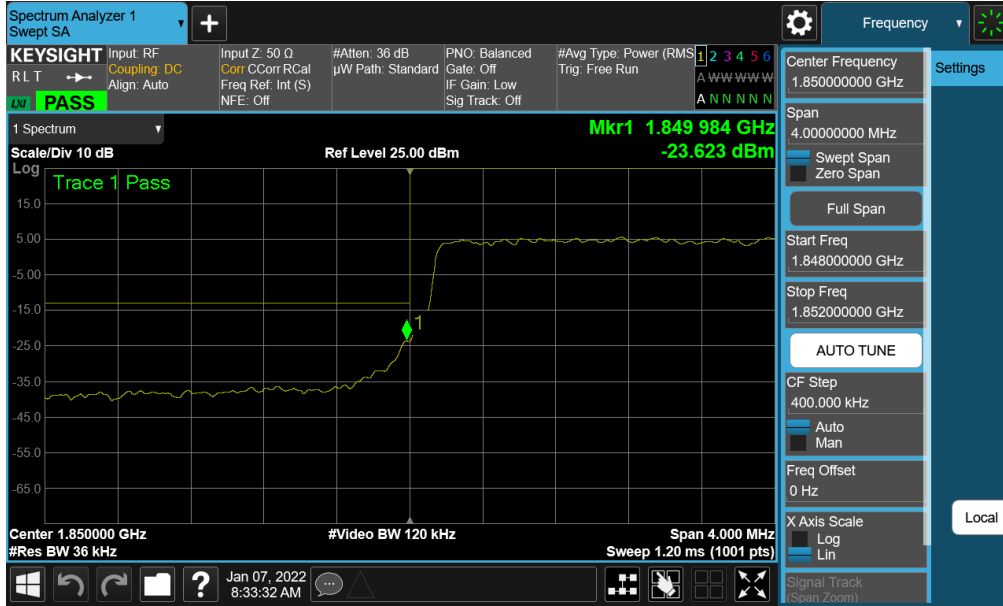


**Plot 7-64. Extended Upper Band Edge Plot (LTE Band 2 - 5MHz QPSK – Full RB)**

FCC ID: A3LSMA135U	<b>PCTEST</b> Proud to be part of element	<b>PART 24 MEASUREMENT REPORT</b>	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2112270166-03.A3L	Test Dates: 01/03/2022 - 01/26/2022	EUT Type: Portable Handset		Page 48 of 87



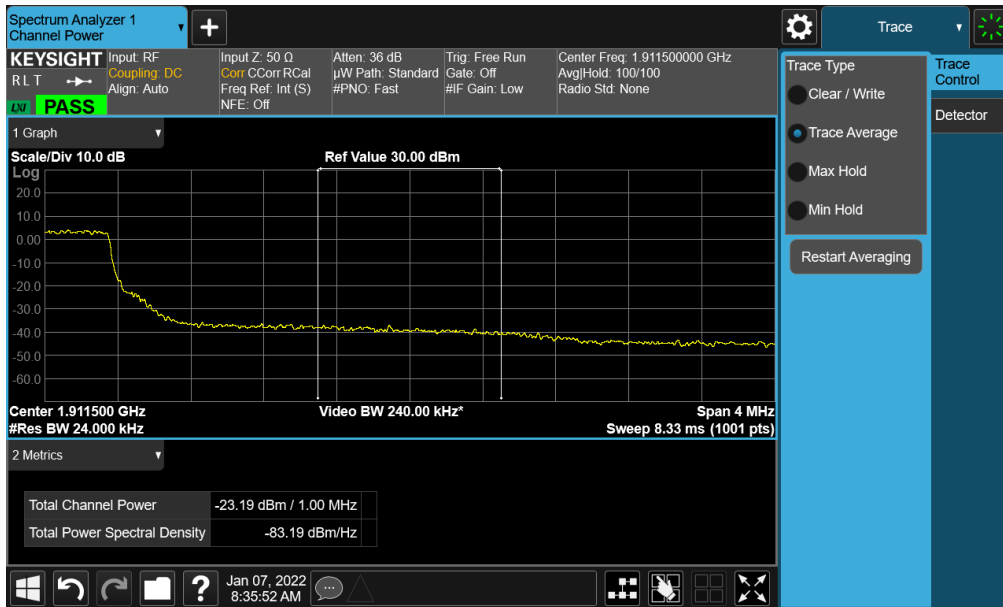
FCC ID: A3LSMA135U	<b>PCTEST</b> Proud to be part of element	<b>PART 24 MEASUREMENT REPORT</b>	<b>SAMSUNG</b>	Approved by: Technical Manager
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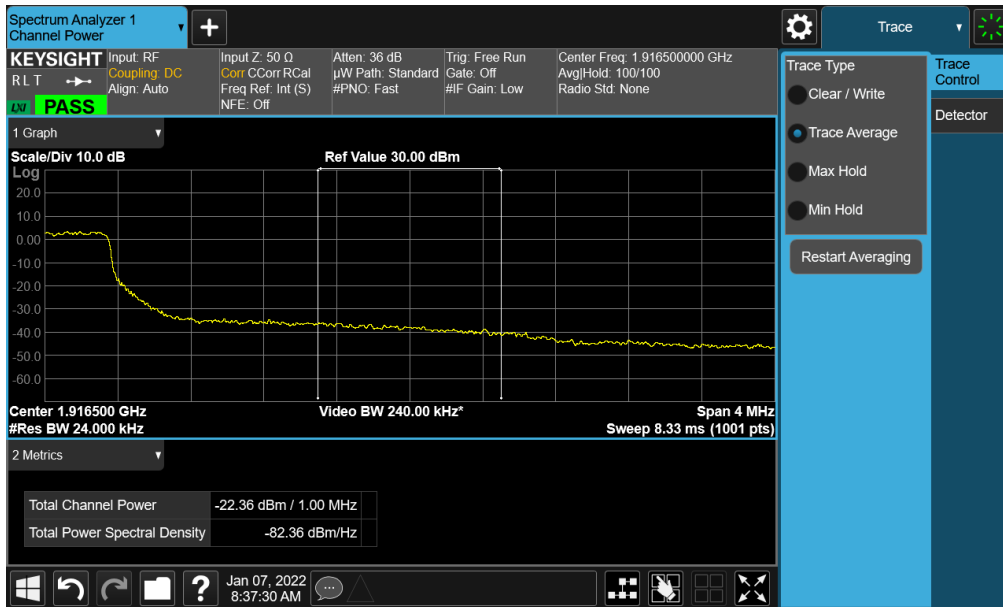
**Plot 7-69. Upper Band Edge Plot (LTE Band 2 - 3MHz QPSK – Full RB)**



**Plot 7-70. Extended Upper Band Edge Plot (LTE Band 2 - 3MHz QPSK – Full RB)**

FCC ID: A3LSMA135U	<b>PCTEST</b> Proud to be part of element	<b>PART 24 MEASUREMENT REPORT</b>	<b>SAMSUNG</b>	Approved by: Technical Manager
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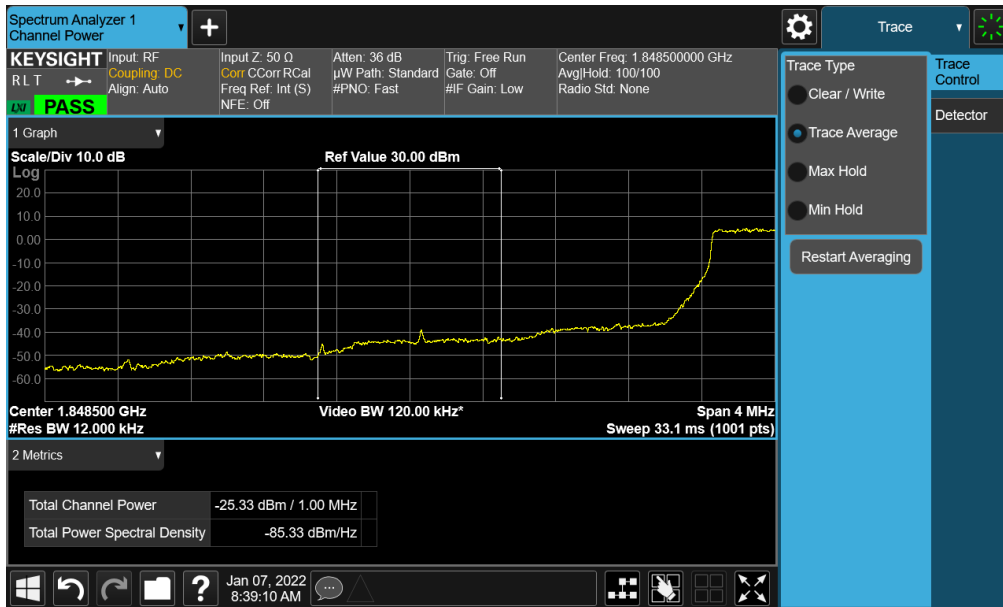




FCC ID: A3LSMA135U	<b>PCTEST</b> Proud to be part of element	<b>PART 24 MEASUREMENT REPORT</b>	<b>SAMSUNG</b>	Approved by: Technical Manager
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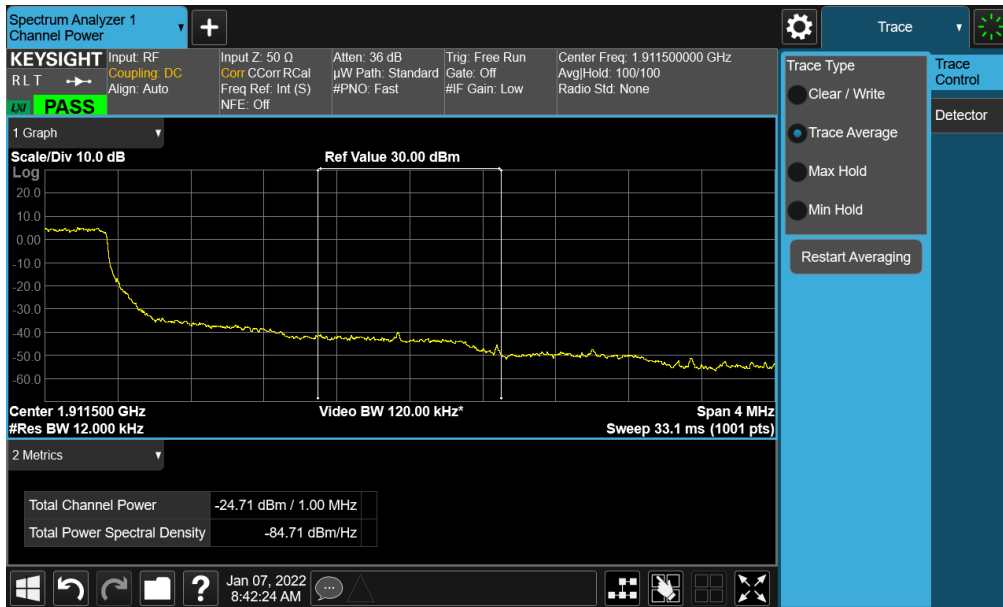


**Plot 7-73. Lower Band Edge Plot (LTE Band 25/2 – 1.4MHz QPSK – Full RB)**



**Plot 7-74. Extended Lower Band Edge Plot (LTE Band 25/2 – 1.4MHz QPSK – Full RB)**

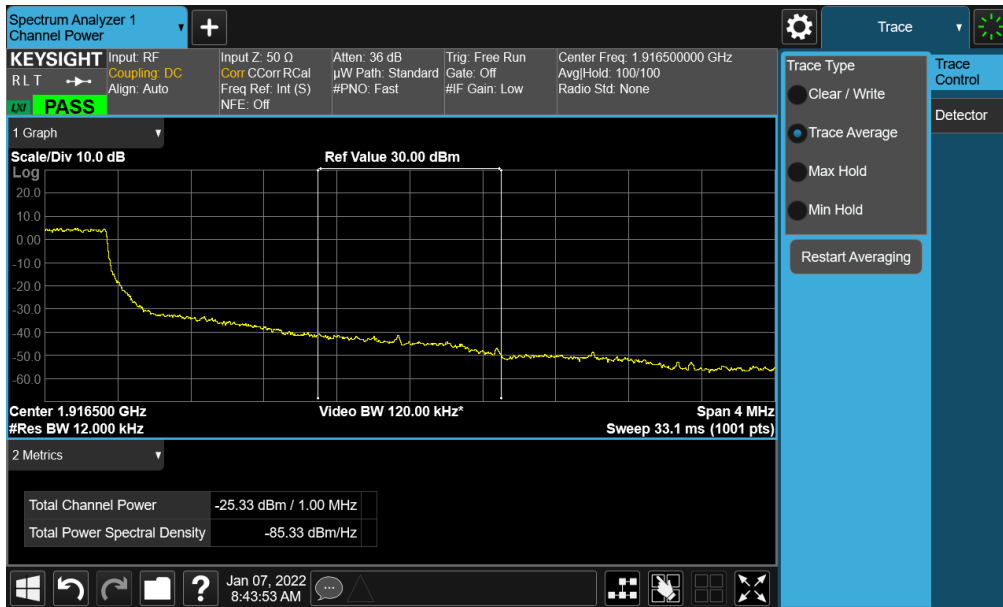
FCC ID: A3LSMA135U	<b>PCTEST</b> Proud to be part of element	<b>PART 24 MEASUREMENT REPORT</b>	<b>SAMSUNG</b>	Approved by: Technical Manager
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FCC ID: A3LSMA135U	<b>PCTEST</b> Proud to be part of element	<b>PART 24 MEASUREMENT REPORT</b>	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2112270166-03.A3L	Test Dates: 01/03/2022 - 01/26/2022	EUT Type: Portable Handset		Page 54 of 87



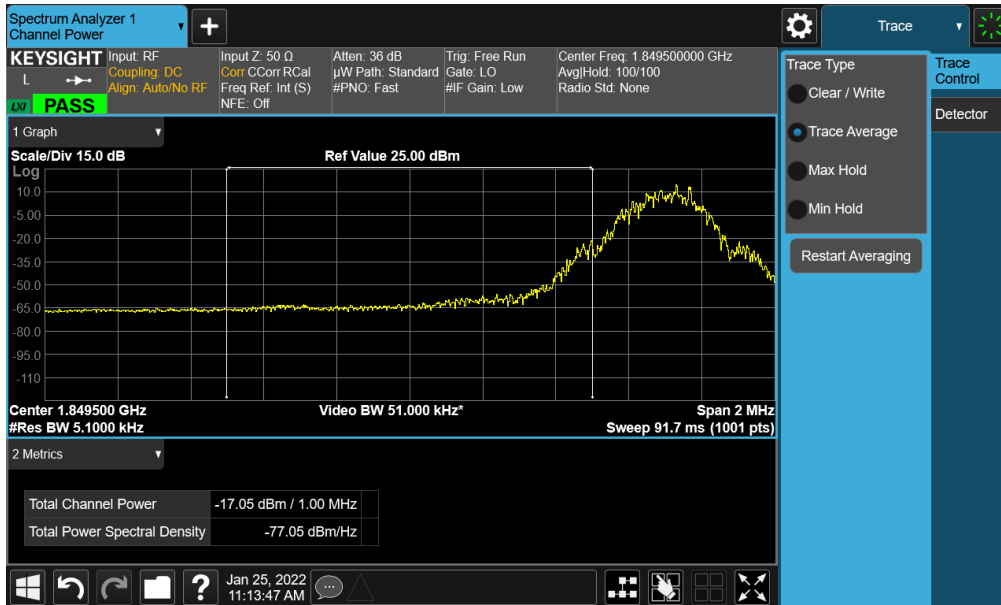
Plot 7-77. Upper Band Edge Plot (LTE Band 25 – 1.4MHz QPSK – Full RB)



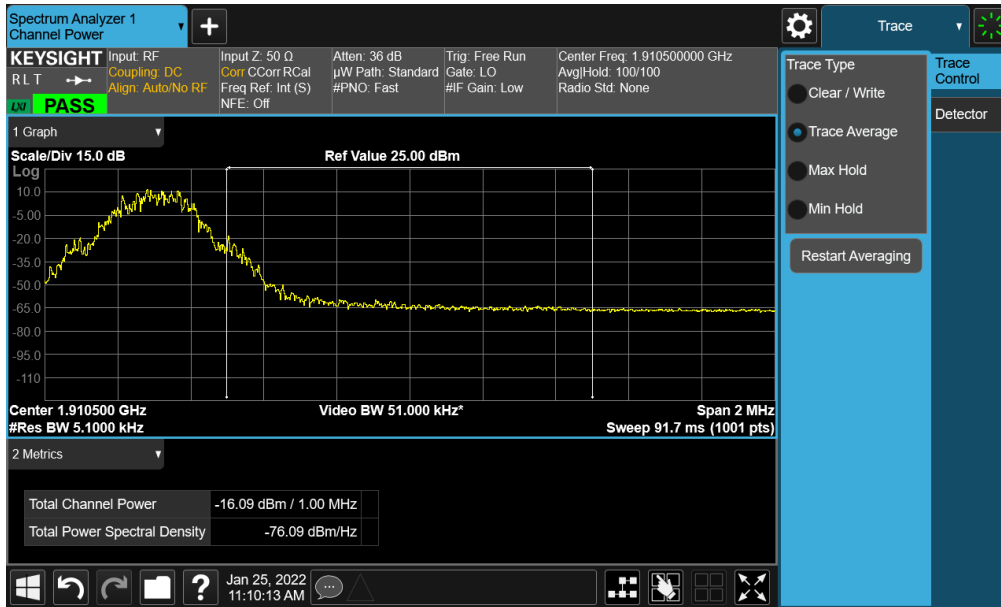
Plot 7-78. Extended Upper Band Edge Plot (LTE Band 25 – 1.4MHz QPSK – Full RB)

FCC ID: A3LSMA135U	<b>PCTEST</b> Proud to be part of element	<b>PART 24 MEASUREMENT REPORT</b>	<b>SAMSUNG</b>	Approved by: Technical Manager
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# GSM/GPRS PCS



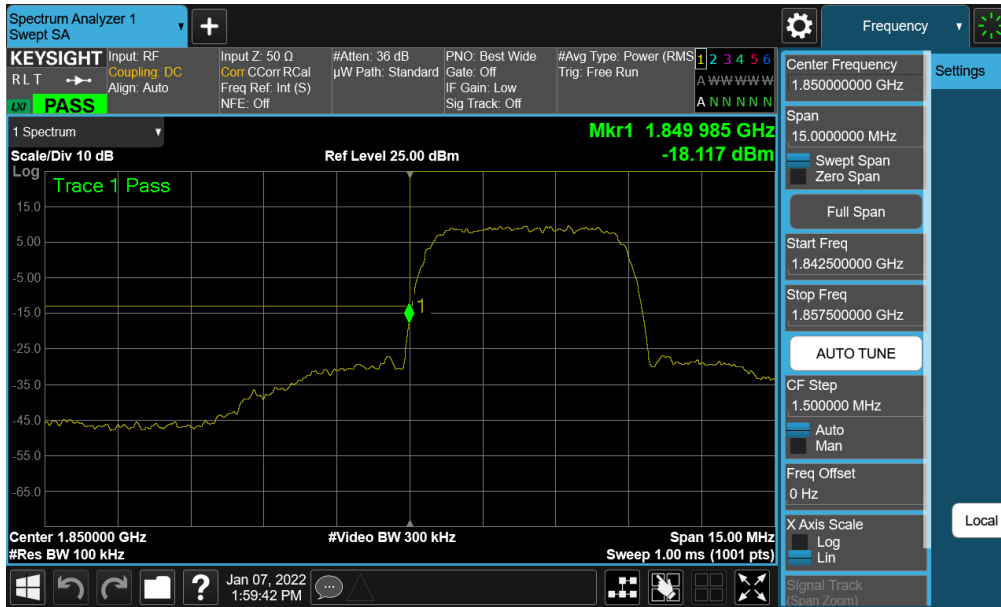
**Plot 7-79. Lower Band Edge Plot (GPRS PCS – Ch. 512)**



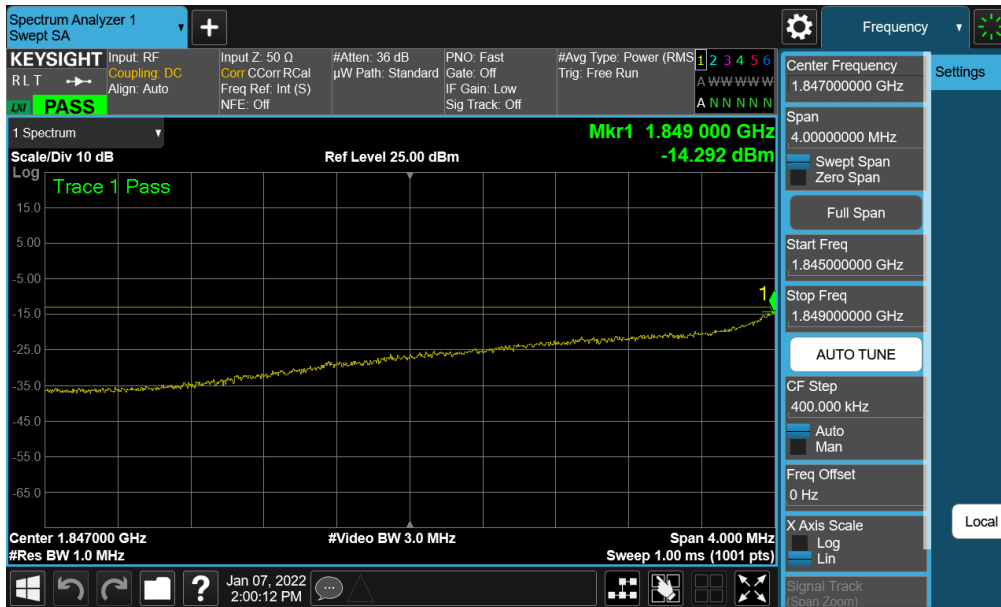
**Plot 7-80. Upper Band Edge Plot (GPRS PCS – Ch. 810)**

FCC ID: A3LSMA135U	<b>PCTEST</b> Proud to be part of element	<b>PART 24 MEASUREMENT REPORT</b>	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2112270166-03.A3L	Test Dates: 01/03/2022 - 01/26/2022	EUT Type: Portable Handset		Page 56 of 87

**WCDMA PCS**

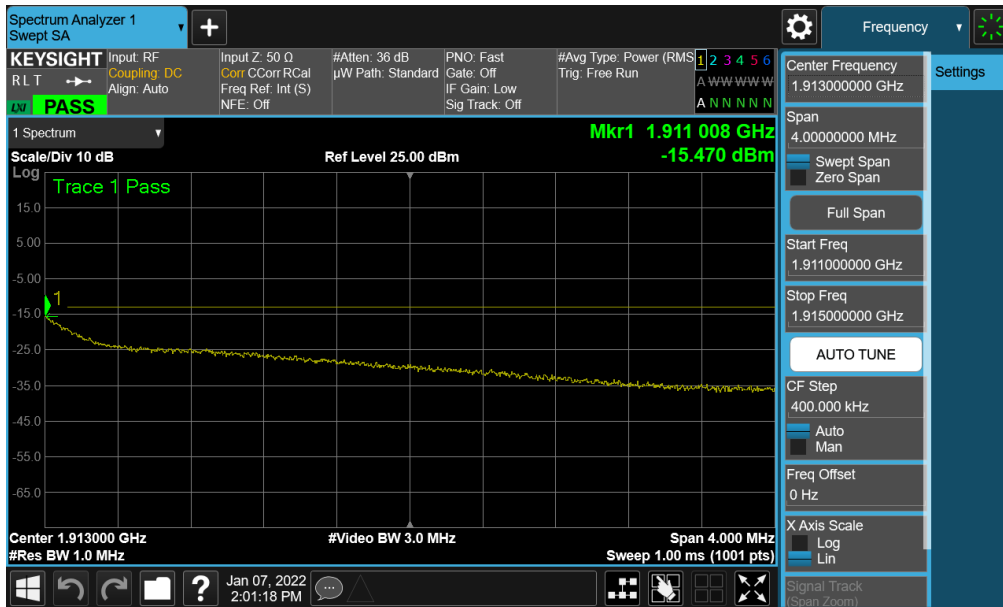


**Plot 7-81. Lower Band Edge Plot (WCDMA PCS – Ch. 9262)**



**Plot 7-82. Extended Lower Band Edge Plot (WCDMA PCS – Ch. 9262)**

FCC ID: A3LSMA135U	<b>PCTEST</b> Proud to be part of element	<b>PART 24 MEASUREMENT REPORT</b>	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2112270166-03.A3L	Test Dates: 01/03/2022 - 01/26/2022	EUT Type: Portable Handset		Page 57 of 87



FCC ID: A3LSMA135U	<b>PCTEST</b> Proud to be part of element	<b>PART 24 MEASUREMENT REPORT</b>	<b>SAMSUNG</b>	Approved by: Technical Manager
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## 7.5 Peak-Average Ratio

### Test Overview

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

### Test Procedure Used

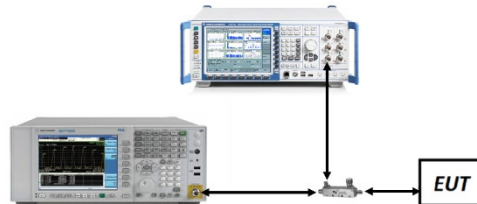
KDB 971168 D01 v03r01 – Section 5.7.1

### Test Settings

1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW  $\geq$  OBW or specified reference bandwidth
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power

### Test Setup

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



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

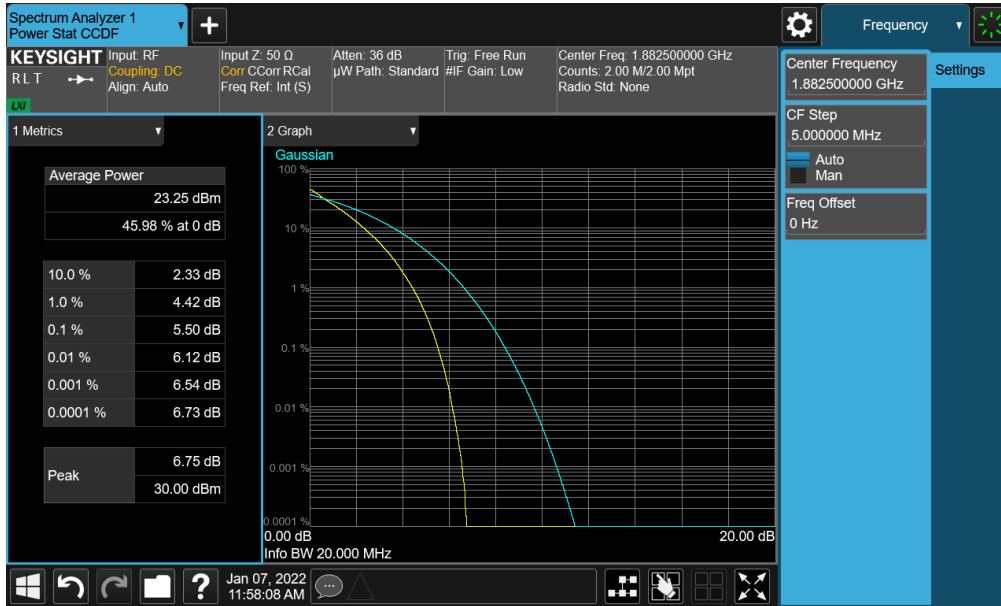
### Test Notes

None.

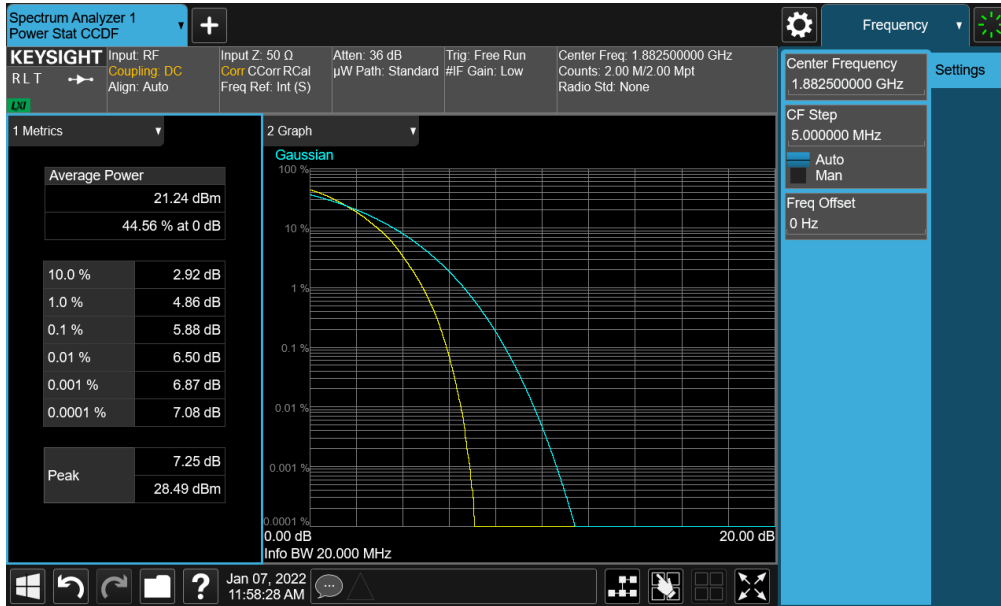
FCC ID: A3LSMA135U	<b>PCTEST</b> Proud to be part of element	<b>PART 24 MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2112270166-03.A3L	Test Dates: 01/03/2022 - 01/26/2022	EUT Type: Portable Handset		Page 59 of 87



## LTE Band 25/2



Plot 7-85. PAR Plot (LTE Band 25/2 - 20MHz QPSK - Full RB)



Plot 7-86. PAR Plot (LTE Band 25/2 - 20MHz 64-QAM - Full RB)

FCC ID: A3LSMA135U	<b>PCTEST</b> Proud to be part of element	<b>PART 24 MEASUREMENT REPORT</b>	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2112270166-03.A3L	Test Dates: 01/03/2022 - 01/26/2022	EUT Type: Portable Handset		Page 60 of 87