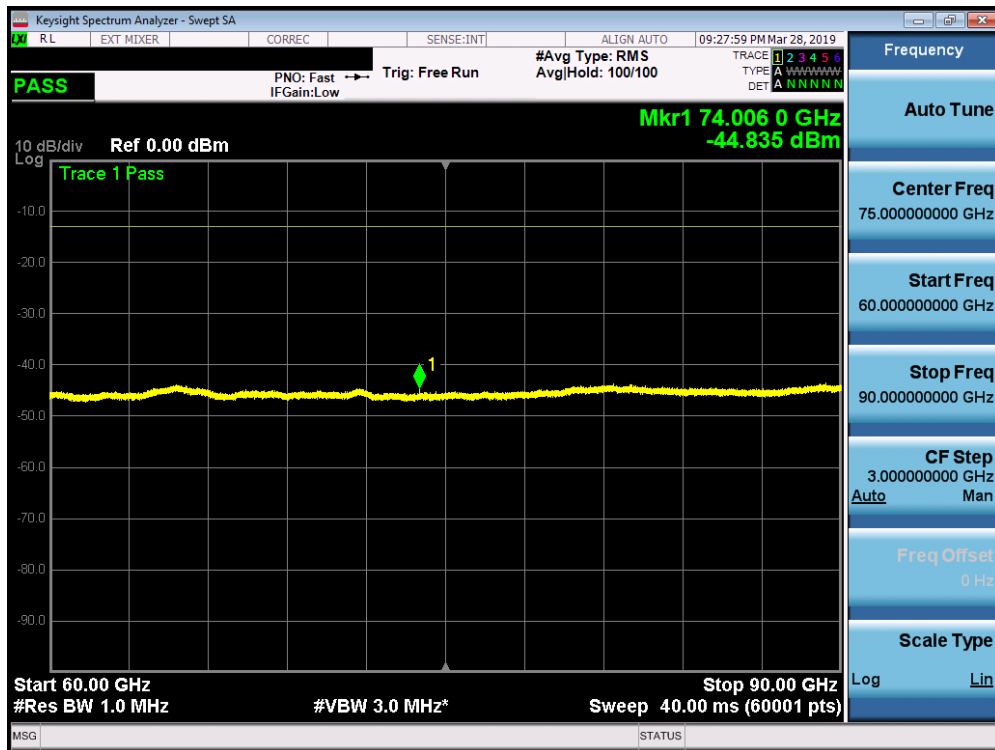




Plot 7-107. J Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK High Channel H Beam)

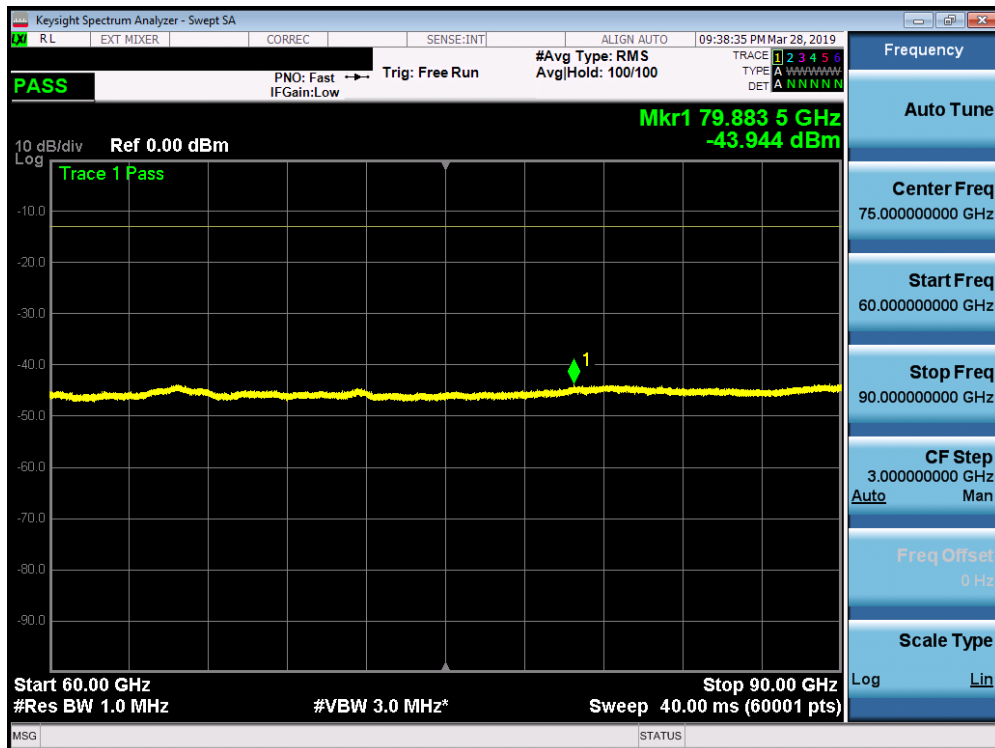


Plot 7-108. J Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK Low Channel V Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 87 of 355



Plot 7-109. J Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK Mid Channel V Beam)



Plot 7-110. J Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK High Channel V Beam)

FCC ID: A3LSMG977T	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset	Page 88 of 355

Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBμV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1 meter.

$$\text{RSE EIRP [dBm]} = \text{Analyzer Level [dBm]} + 107 + \text{AFCL [dB/m]} + 20\text{Log(Dm)} + \text{Harmonic Mixer Loss (dB)} - 104.8$$

Frequency [MHz]	Detector/Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
89967.50	RMS/Avg	Low	50	QPSK	H	H	-	-	-43.48	-13.00	-30.48
89367.50	RMS/Avg	Mid	50	QPSK	H	H	-	-	-43.63	-13.00	-30.63
81230.50	RMS/Avg	High	50	QPSK	H	H	150	195	-43.76	-13.00	-30.76
74006.00	RMS/Avg	Low	50	QPSK	V	V	150	216	-44.84	-13.00	-31.84
76946.00	RMS/Avg	Mid	50	QPSK	V	V	150	210	-44.96	-13.00	-31.96
79883.50	RMS/Avg	High	50	QPSK	V	V	150	328	-43.94	-13.00	-30.94

Table 7-23. J Patch Spurious Emissions Table (60-90GHz)

Notes

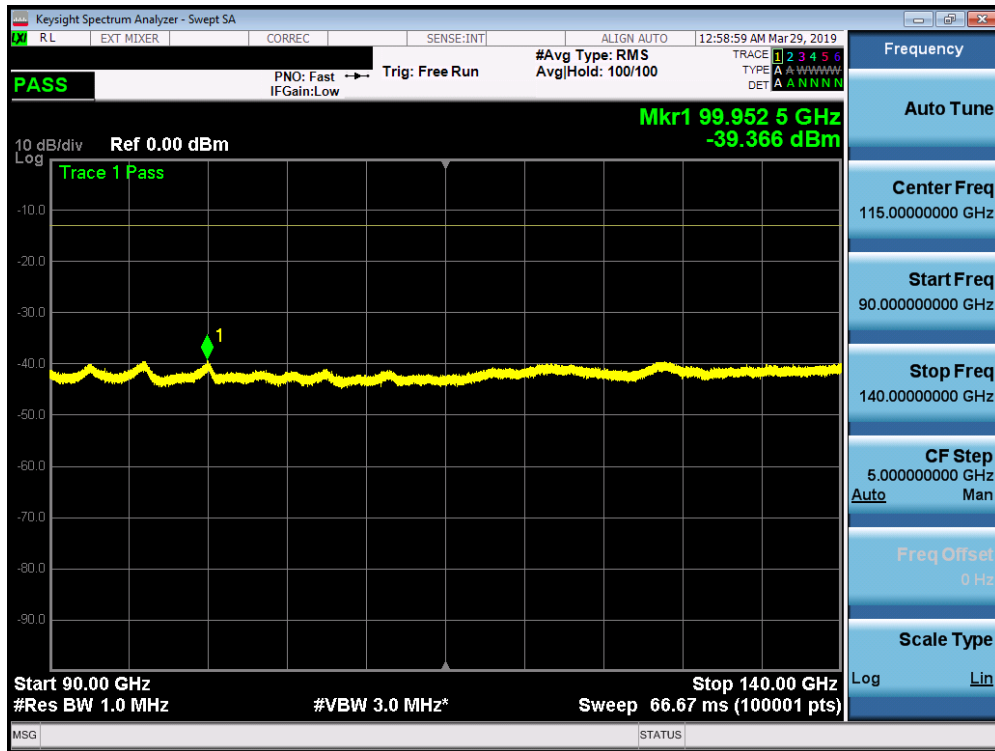
1. The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

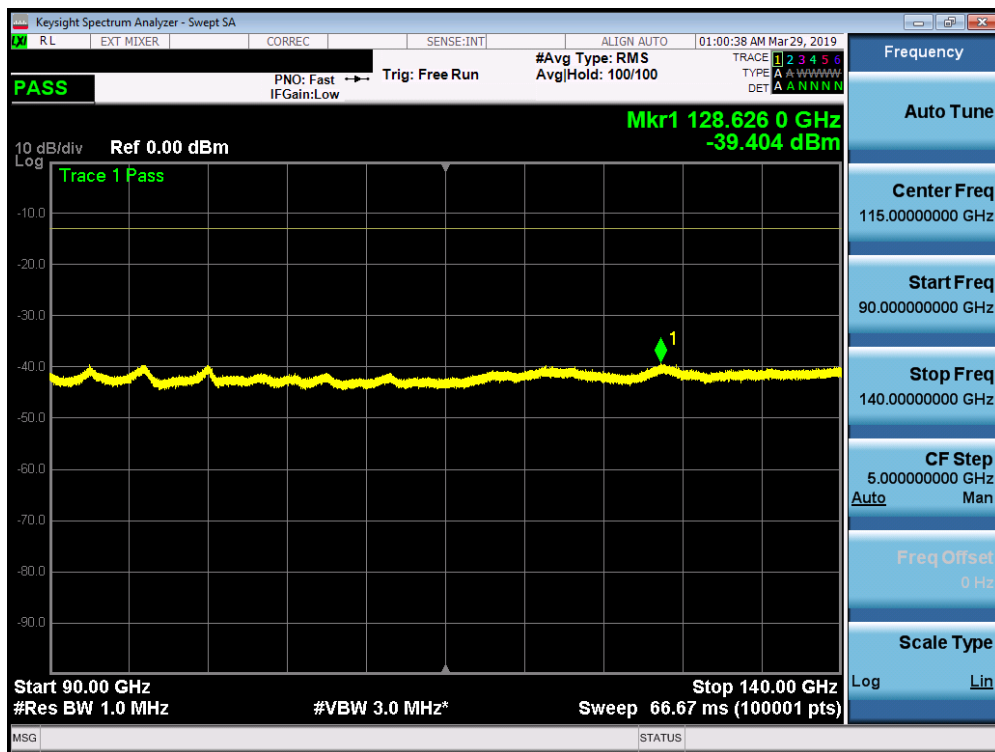
$$(-43.76 \text{ dBm} + -43.94 \text{ dBm}) = (42.07 \text{ nW} + 40.36 \text{ nW}) = (82.43 \text{ nW}) = -40.84 \text{ dBm}$$

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 89 of 355

90 – 140GHz

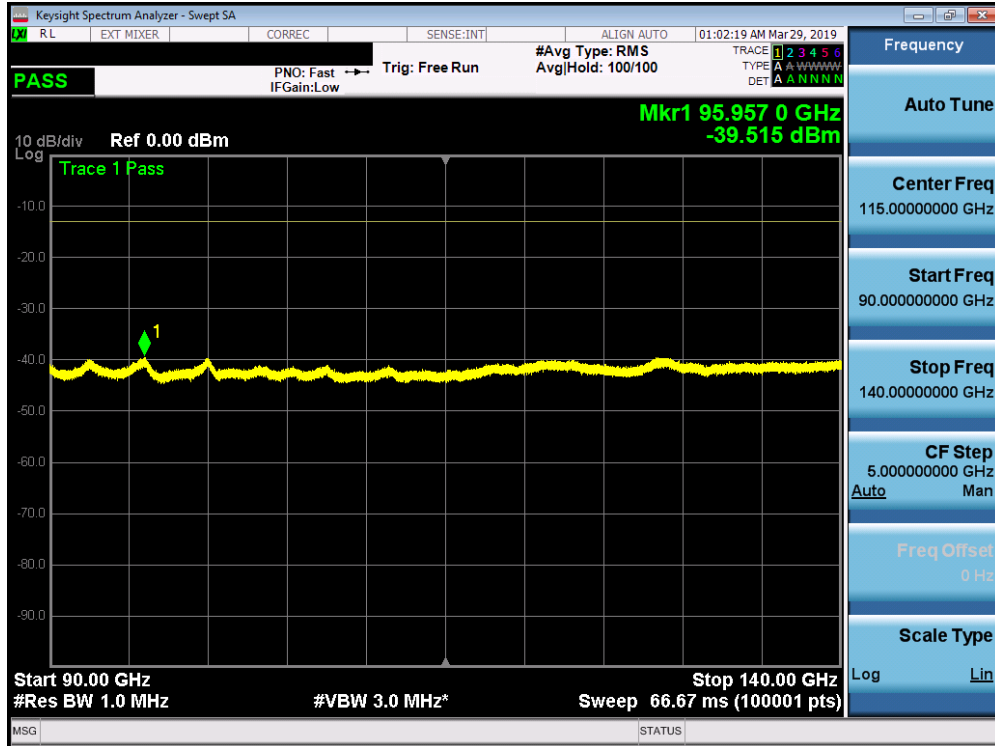


Plot 7-111. J Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK Low Channel H Beam)

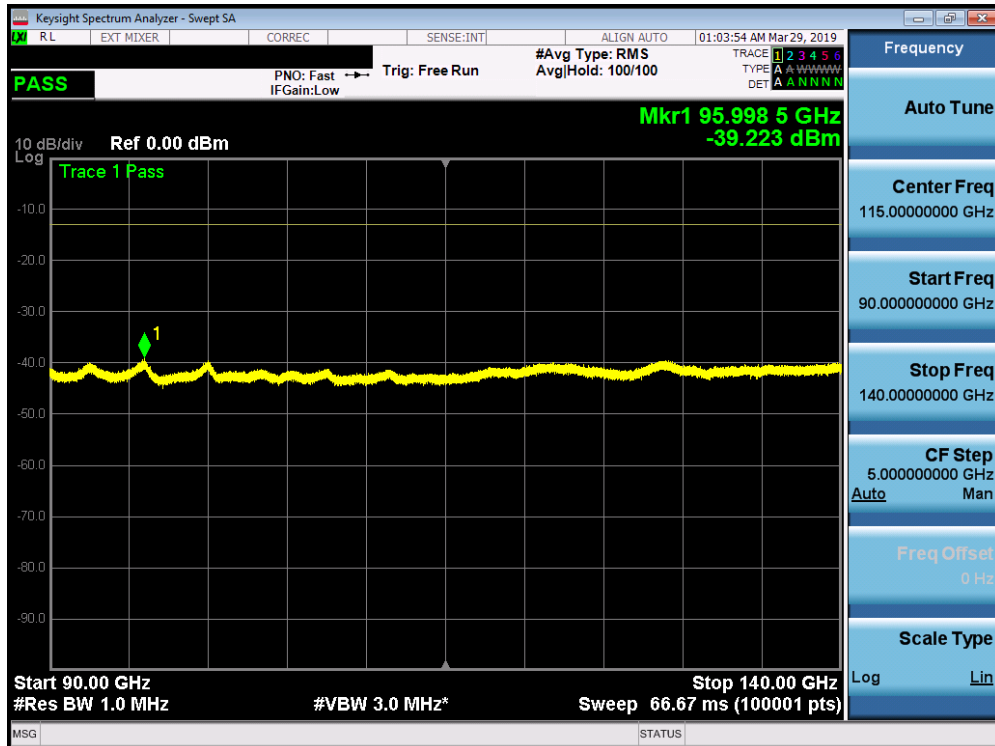


Plot 7-112. J Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK Mid Channel H Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 90 of 355

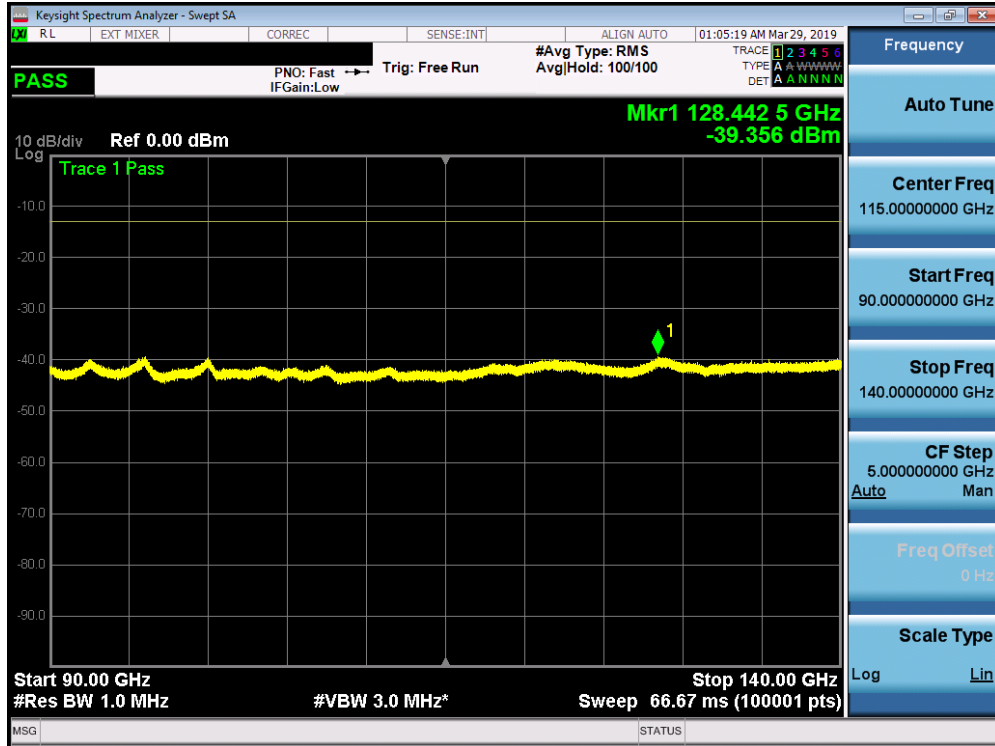


Plot 7-113. J Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK High Channel H Beam)

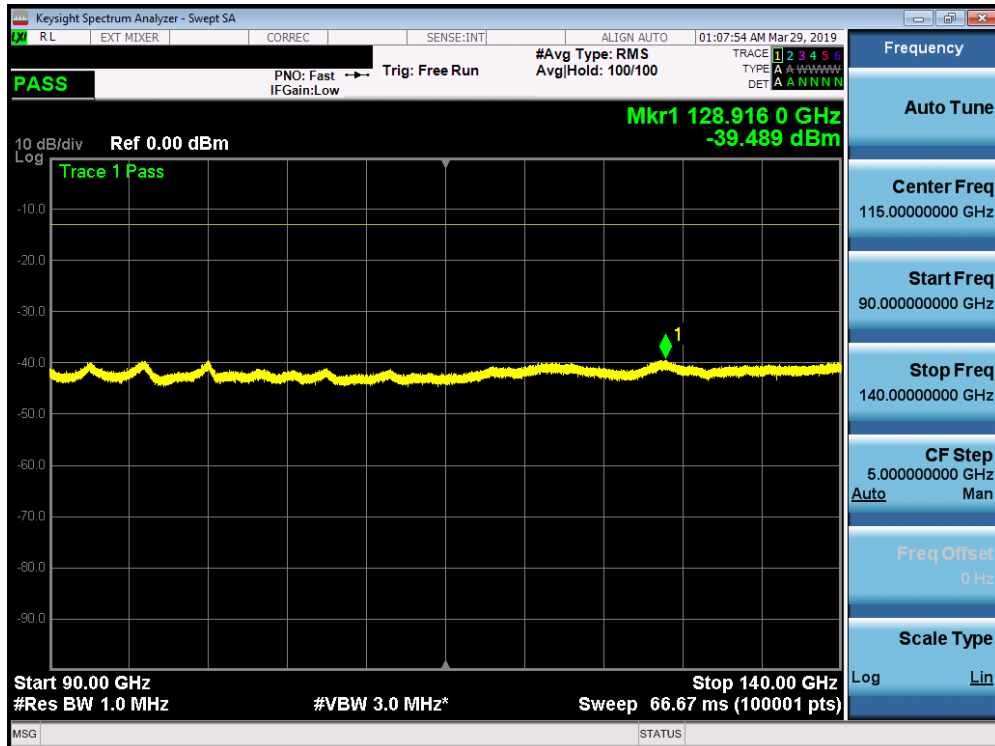


Plot 7-114. J Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK Low Channel V Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 91 of 355



Plot 7-115. J Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK Mid Channel V Beam)



Plot 7-116. J Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK High Channel V Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 92 of 355

Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBμV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1 meter.

$$\text{RSE EIRP [dBm]} = \text{Analyzer Level [dBm]} + 107 + \text{AFCL [dB/m]} + 20\text{Log(Dm)} + \text{Harmonic Mixer Loss (dB)} - 104.8$$

Frequency [MHz]	Detector/Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
99952.50	RMS/Avg	Low	50	QPSK	H	H	-	-	-39.37	-13.00	-26.37
128626.00	RMS/Avg	Mid	50	QPSK	H	H	-	-	-39.40	-13.00	-26.40
95957.00	RMS/Avg	High	50	QPSK	H	H	-	-	-39.52	-13.00	-26.52
95998.50	RMS/Avg	Low	50	QPSK	V	V	-	-	-39.22	-13.00	-26.22
128442.50	RMS/Avg	Mid	50	QPSK	V	V	-	-	-39.36	-13.00	-26.36
128916.00	RMS/Avg	High	50	QPSK	V	V	-	-	-39.49	-13.00	-26.49

Table 7-24. J Patch Spurious Emissions Table (90-140GHz)

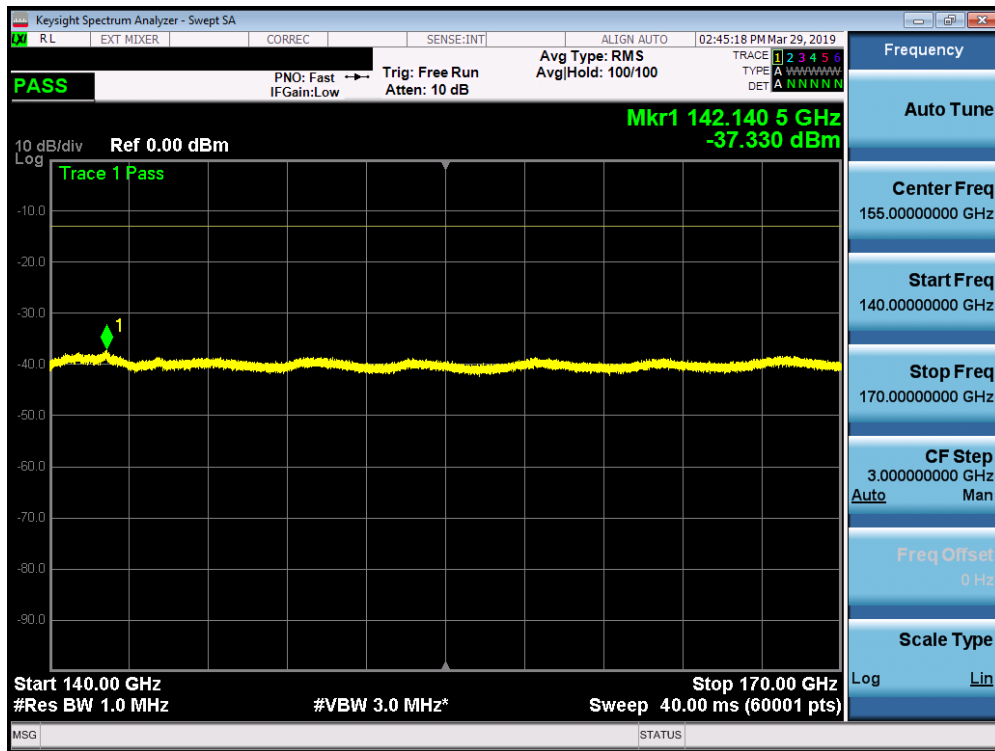
Notes

1. The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

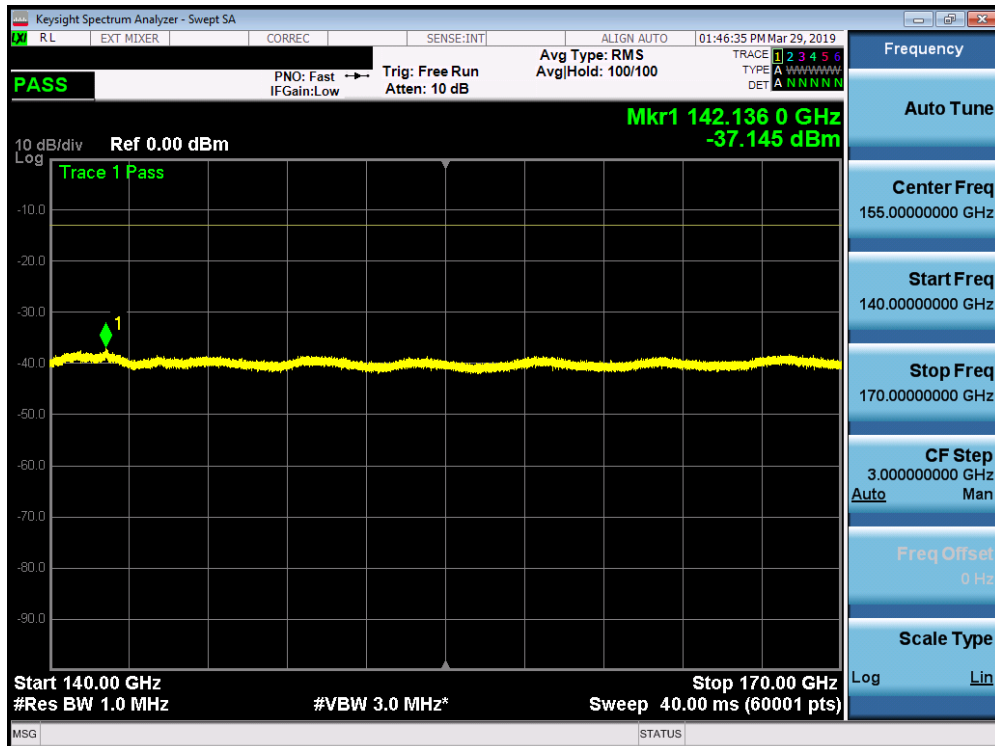
$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

$$(-39.37 \text{ dBm} + -39.22 \text{ dBm}) = (115.61 \text{ nW} + 119.67 \text{ nW}) = (235.28 \text{ nW}) = -36.28 \text{ dBm}$$

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 93 of 355

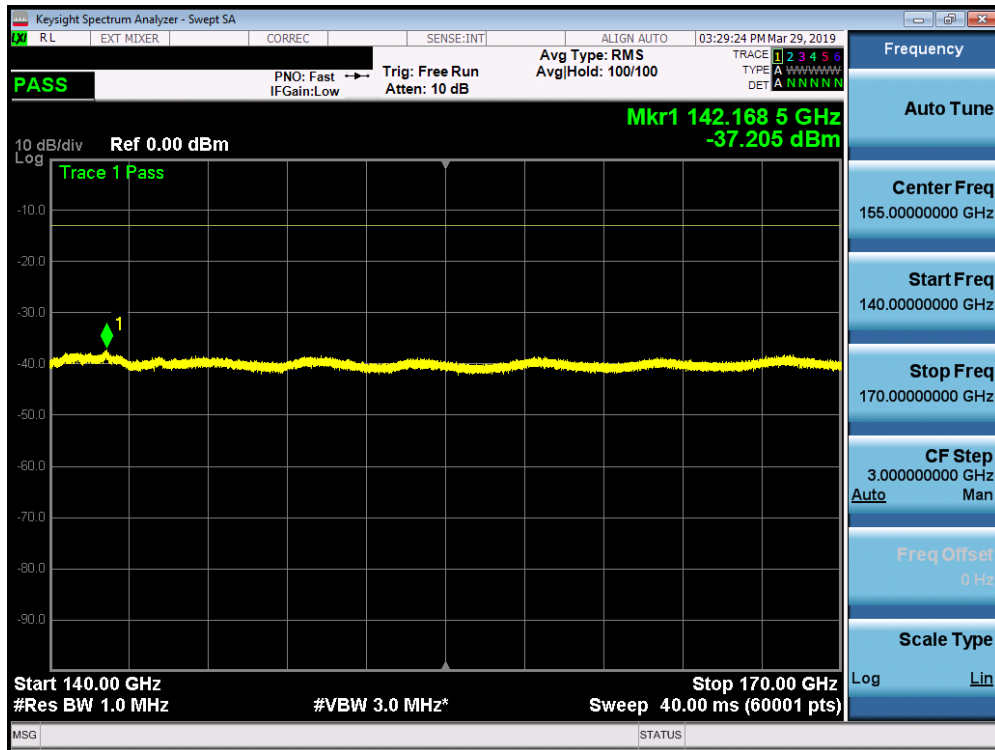


Plot 7-117. J Patch Radiated Spurious Plot 140-170 GHz (1CC QPSK Low Channel H Beam)

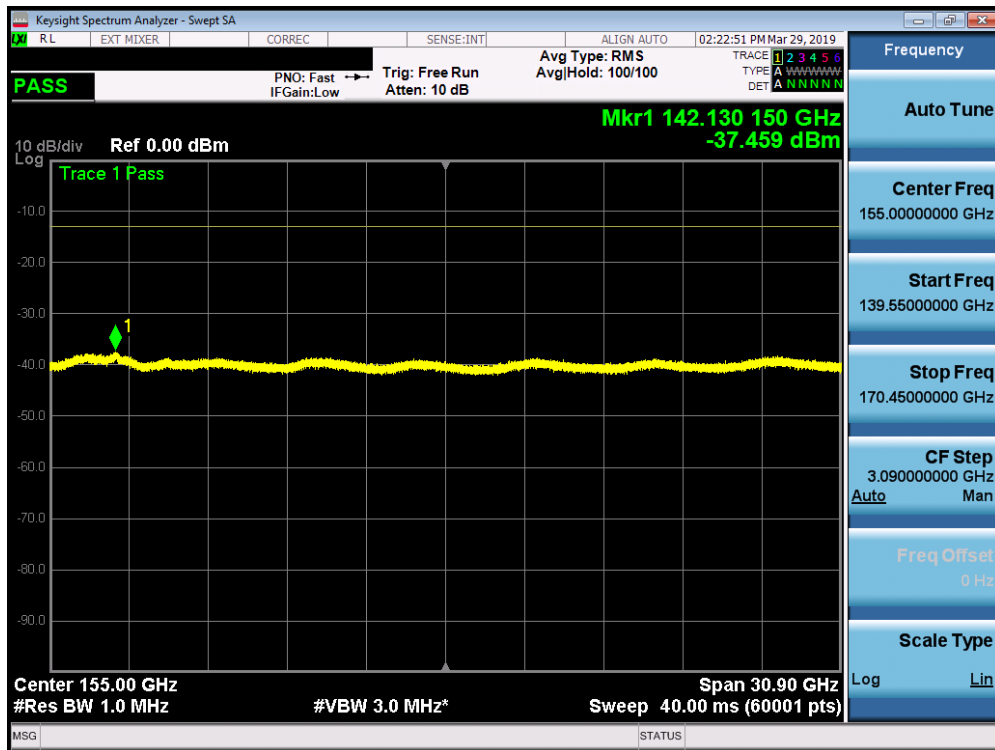


Plot 7-118. J Patch Radiated Spurious Plot 140-170 GHz (1CC QPSK Mid Channel H Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 94 of 355

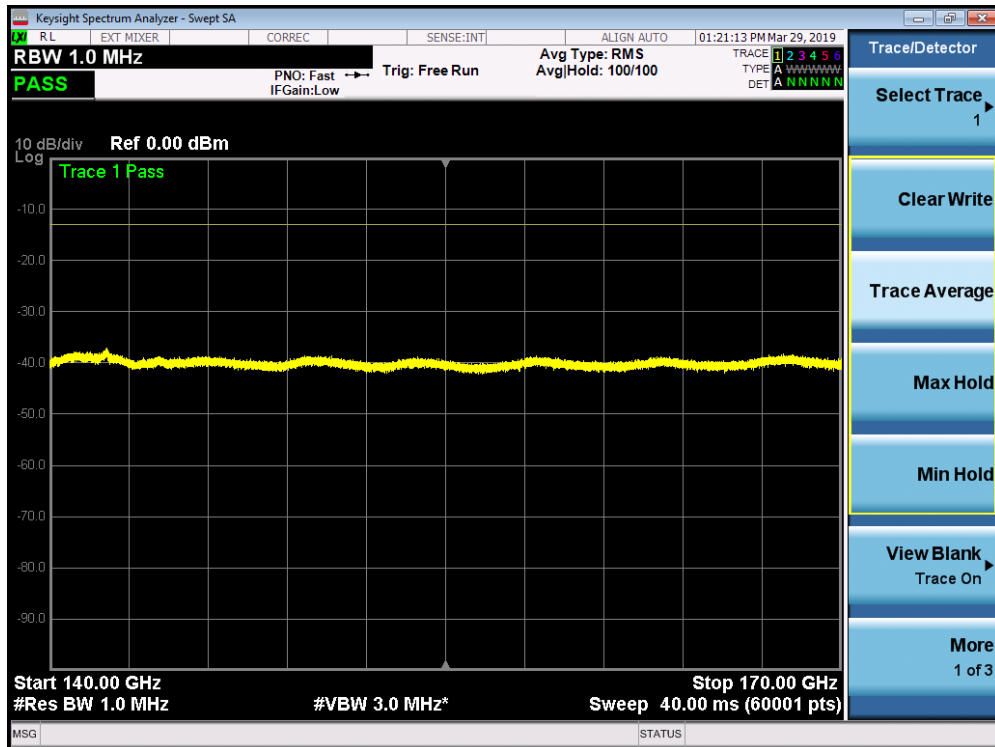


Plot 7-119. J Patch Radiated Spurious Plot 140-170 GHz (1CC QPSK High Channel H Beam)

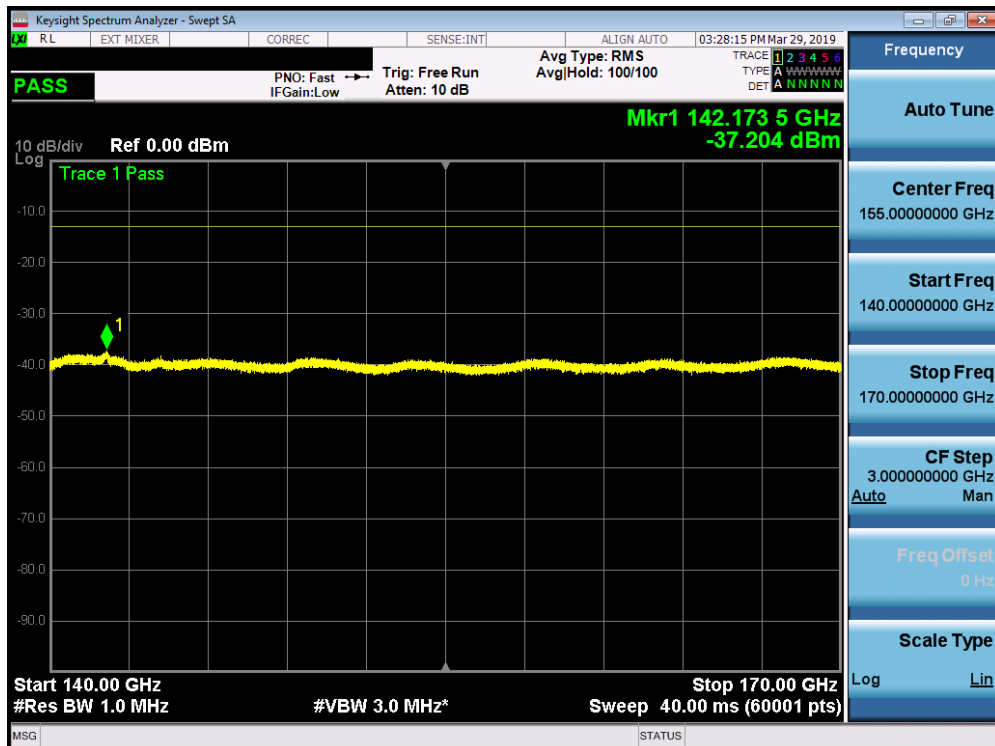


Plot 7-120. J Patch Radiated Spurious Plot 140-170 GHz (1CC QPSK Low Channel V Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 95 of 355



Plot 7-121. J Patch Radiated Spurious Plot 140-170 GHz (1CC QPSK Mid Channel V Beam)



Plot 7-122. J Patch Radiated Spurious Plot 140-170 GHz (1CC QPSK High Channel V Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 96 of 355

Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBμV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1 meter.

$$\text{RSE EIRP [dBm]} = \text{Analyzer Level [dBm]} + 107 + \text{AFCL[dB/m]} + 20\text{Log(Dm)} + \text{Harmonic Mixer Loss (dB)} - 104.8$$

Frequency [MHz]	Detector/Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
142140.50	RMS/Avg	Low	50	QPSK	H	H	-	-	-37.33	-13.00	-24.33
142136.00	RMS/Avg	Mid	50	QPSK	H	H	-	-	-37.15	-13.00	-24.15
142168.50	RMS/Avg	High	50	QPSK	H	H	-	-	-37.21	-13.00	-24.21
142130.15	RMS/Avg	Low	50	QPSK	V	V	-	-	-37.46	-13.00	-24.46
142158.00	RMS/Avg	Mid	50	QPSK	V	V	-	-	-37.16	-13.00	-24.16
142173.50	RMS/Avg	High	50	QPSK	V	V	-	-	-37.20	-13.00	-24.20

Table 7-25. J Patch Spurious Emissions Table (140-170GHz)

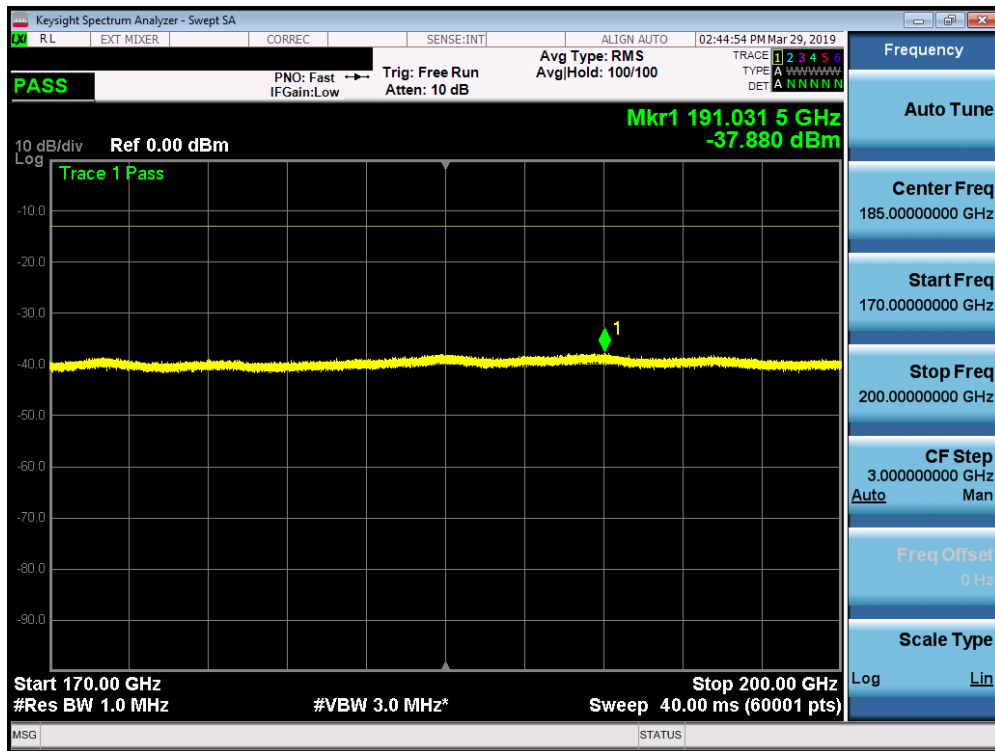
Notes

1. The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

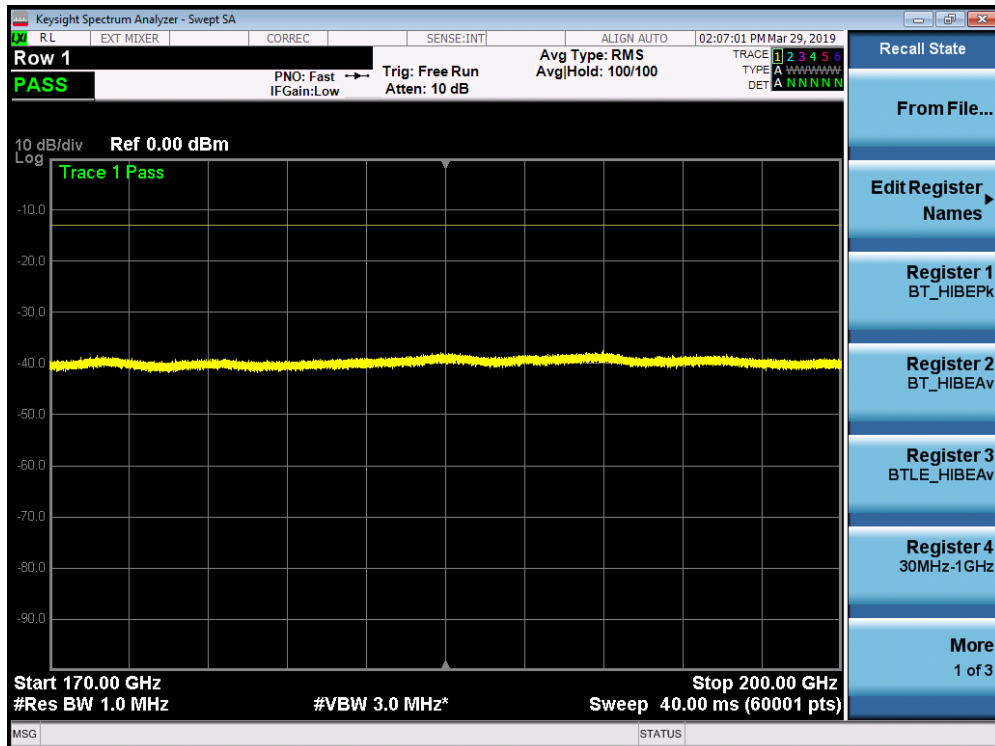
$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

$$(-37.15 \text{ dBm} + -37.16 \text{ dBm}) = (192.75 \text{ nW} + 192.31 \text{ nW}) = (385.06 \text{ nW}) = -34.14 \text{ dBm}$$

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 97 of 355

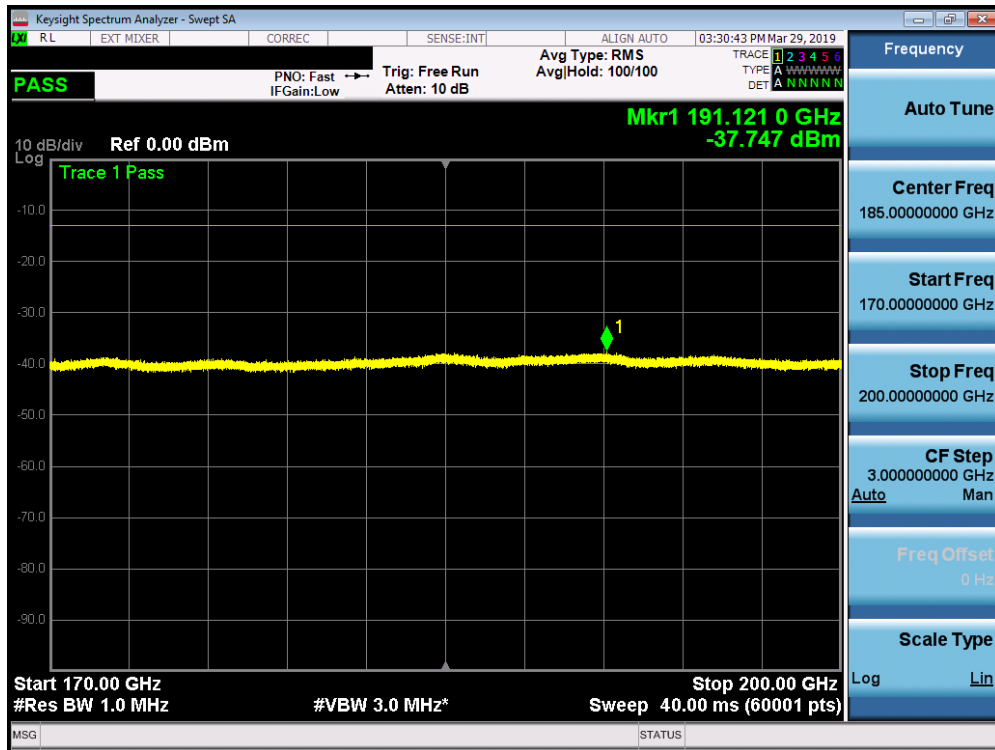


Plot 7-123. J Patch Radiated Spurious Plot 170-200 GHz (1CC QPSK Low Channel H Beam)

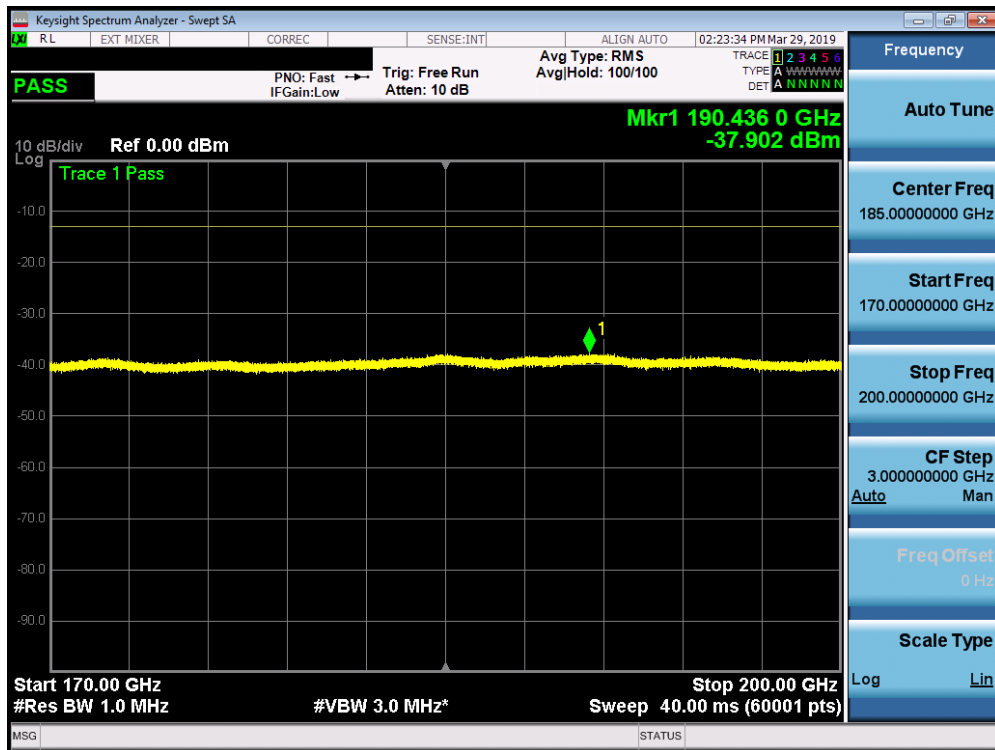


Plot 7-124. J Patch Radiated Spurious Plot 170-200 GHz (1CC QPSK Mid Channel H Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 98 of 355

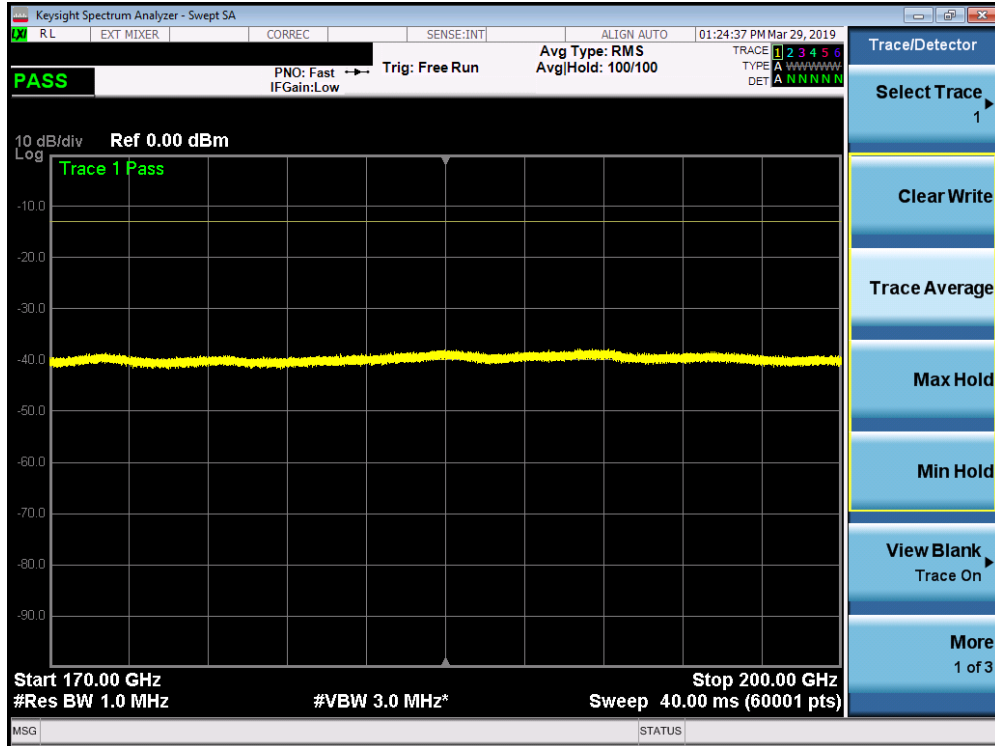


Plot 7-125. J Patch Radiated Spurious Plot 170-200 GHz (1CC QPSK High Channel H Beam)

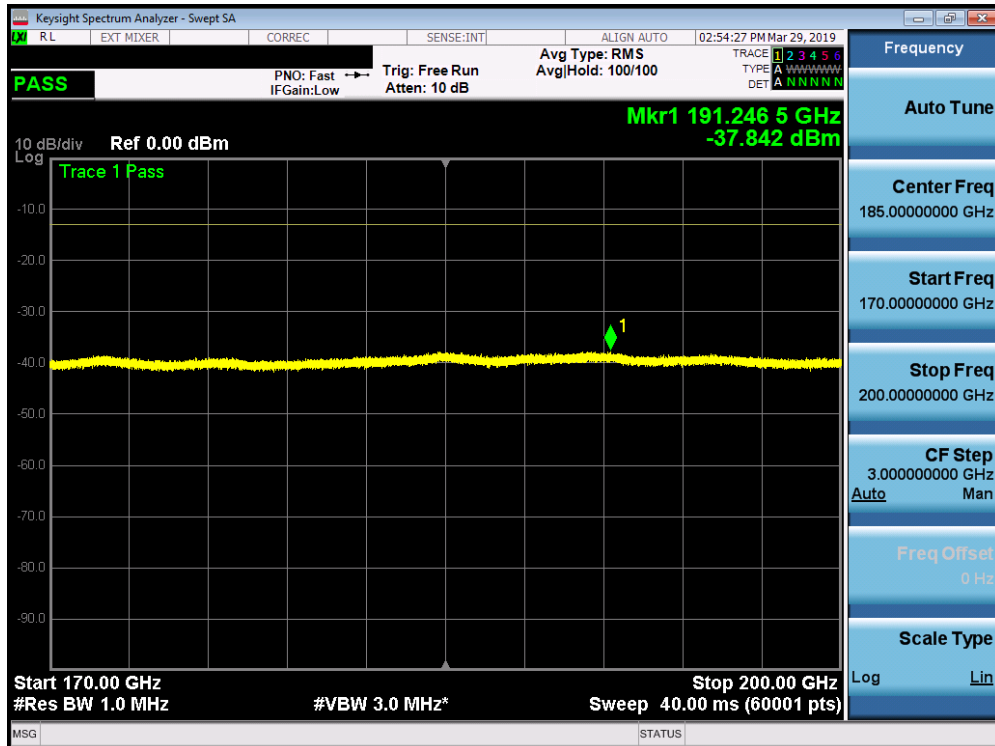


Plot 7-126. J Patch Radiated Spurious Plot 170-200 GHz (1CC QPSK Low Channel V Beam)

FCC ID: A3LSMG977T	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 99 of 355



Plot 7-127. J Patch Radiated Spurious Plot 170-200 GHz (1CC QPSK Mid Channel V Beam)



Plot 7-128. J Patch Radiated Spurious Plot 170-200 GHz (1CC QPSK High Channel V Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 100 of 355

Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBμV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1.5 meter.

$$\text{RSE EIRP [dBm]} = \text{Analyzer Level [dBm]} + 107 + \text{AFCL[dB/m]} + 20\text{Log(Dm)} + \text{Harmonic Mixer Loss (dB)} - 104.8$$

Frequency [MHz]	Detector/Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
191031.50	RMS/Avg	Low	50	QPSK	H	H	-	-	-37.88	-13.00	-24.88
190977.00	RMS/Avg	Mid	50	QPSK	H	H	-	-	-37.51	-13.00	-24.51
191121.00	RMS/Avg	High	50	QPSK	H	H	-	-	-37.75	-13.00	-24.75
190436.00	RMS/Avg	Low	50	QPSK	V	V	-	-	-37.90	-13.00	-24.90
190092.50	RMS/Avg	Mid	50	QPSK	V	V	-	-	-37.80	-13.00	-24.80
191246.50	RMS/Avg	High	50	QPSK	V	V	-	-	-37.84	-13.00	-24.84

Table 7-26. J Patch Spurious Emissions Table (170-200GHz)

Notes

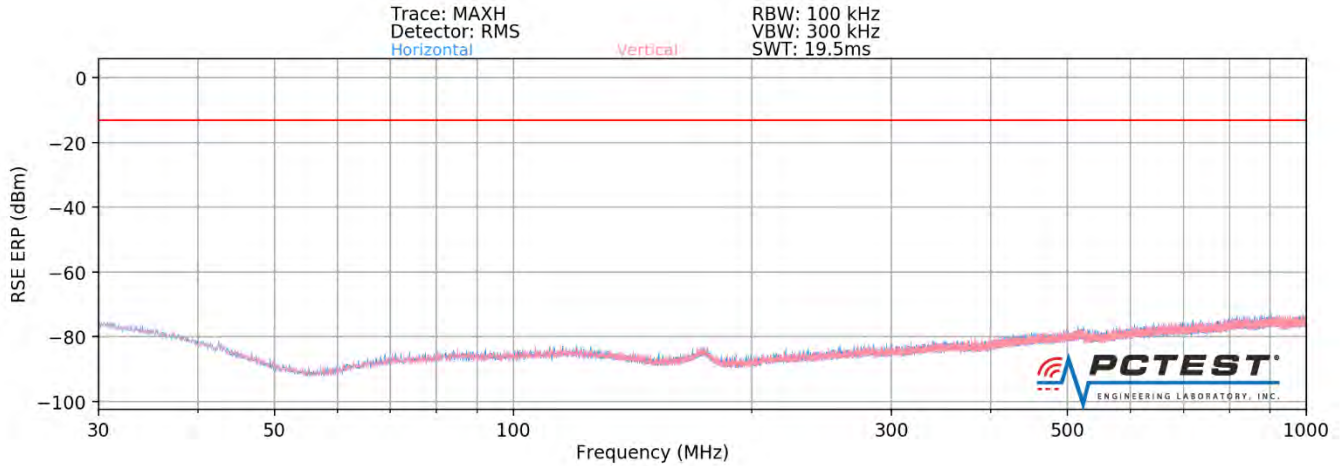
1. The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1.5 meter.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

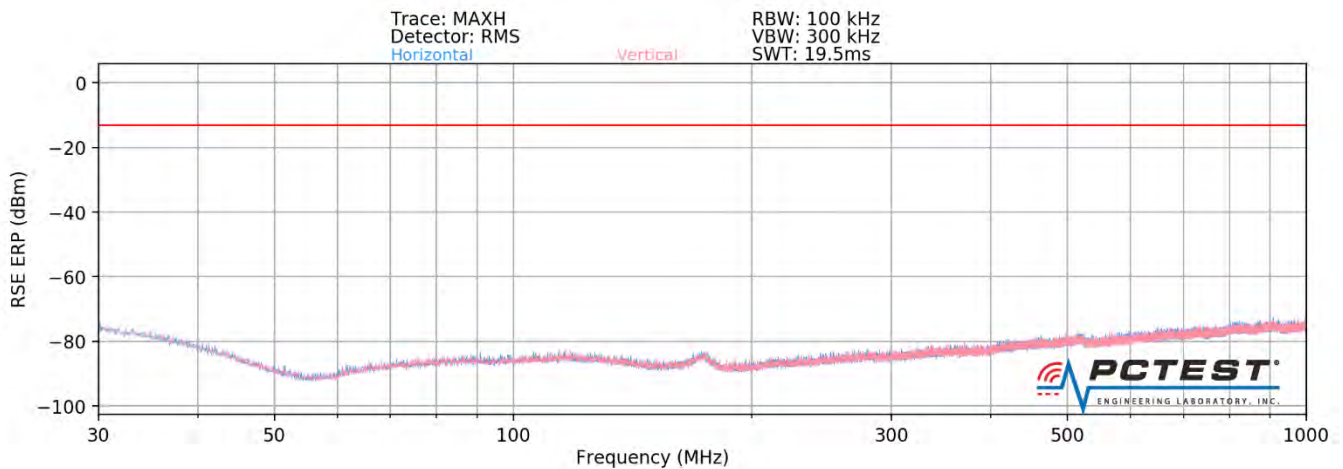
$$(-37.51 \text{ dBm} + -37.80 \text{ dBm}) = (177.42 \text{ nW} + 165.96 \text{ nW}) = (343.38 \text{ nW}) = -34.64 \text{ dBm}$$

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 101 of 355

7.4.3 K Patch Radiated Spurious Emissions 30MHz – 1GHz



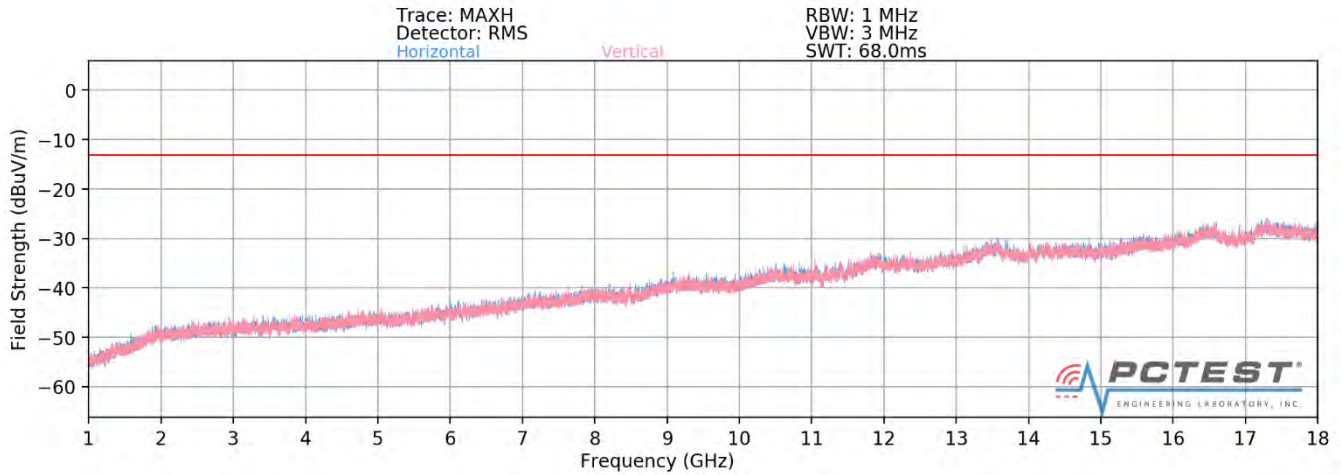
Plot 7-129. K Patch Radiated Spurious Plot 30 MHz - 1 GHz (1CC QPSK Mid Channel H Beam)



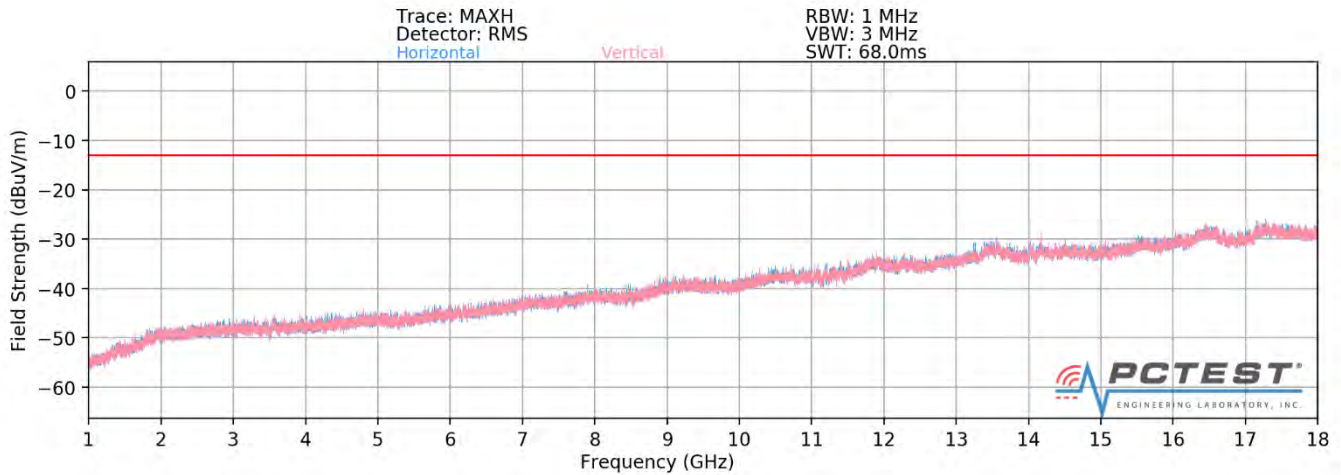
Plot 7-130. K Patch Radiated Spurious Plot 30 MHz - 1 GHz (1CC QPSK Mid Channel V Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 102 of 355

1 – 18GHz



Plot 7-131. K Patch Radiated Spurious Plot 1-18 GHz (1CC QPSK Mid Channel H Beam)

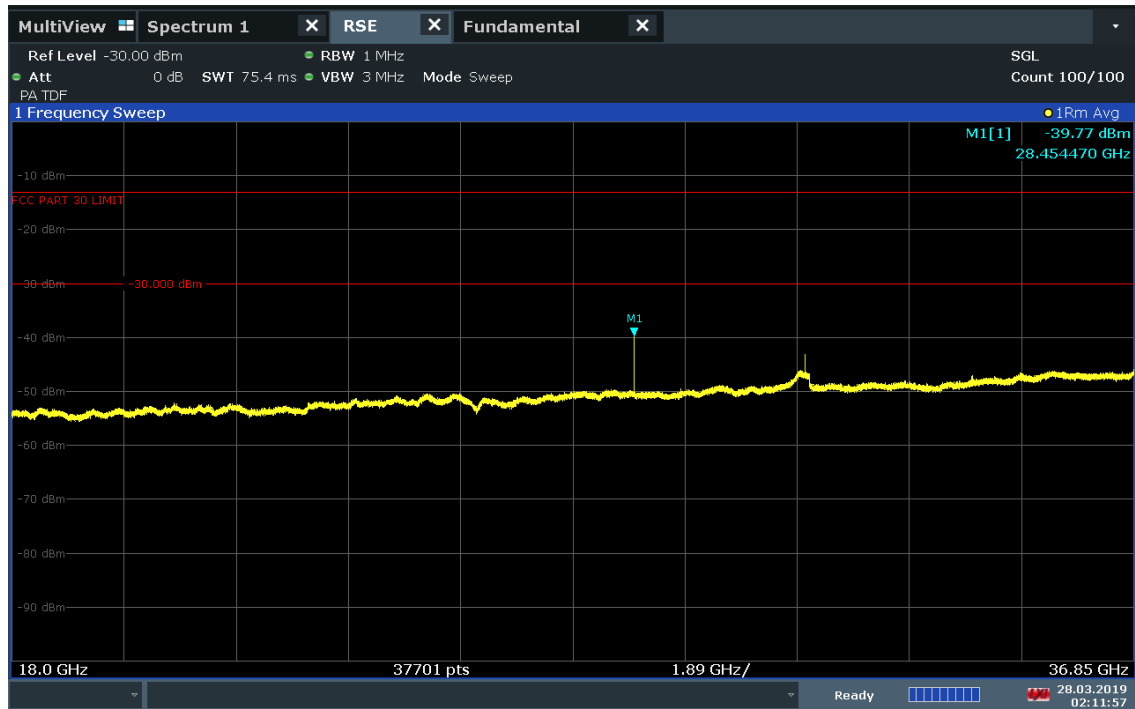


Plot 7-132. K Patch Radiated Spurious Plot 1-18 GHz (1CC QPSK Mid Channel V Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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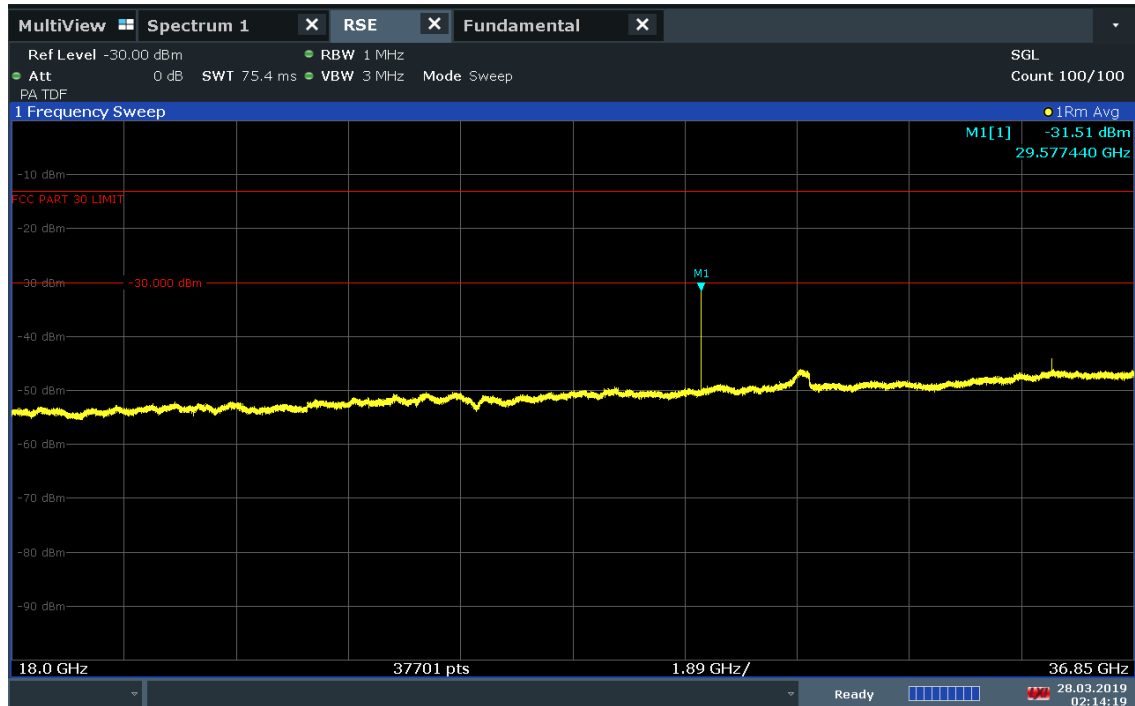
18 – 36.85GHz

ACLRRResults



Plot 7-133. K Patch Radiated Spurious Plot 18-36.85 GHz (1CC QPSK Low Channel H Beam)

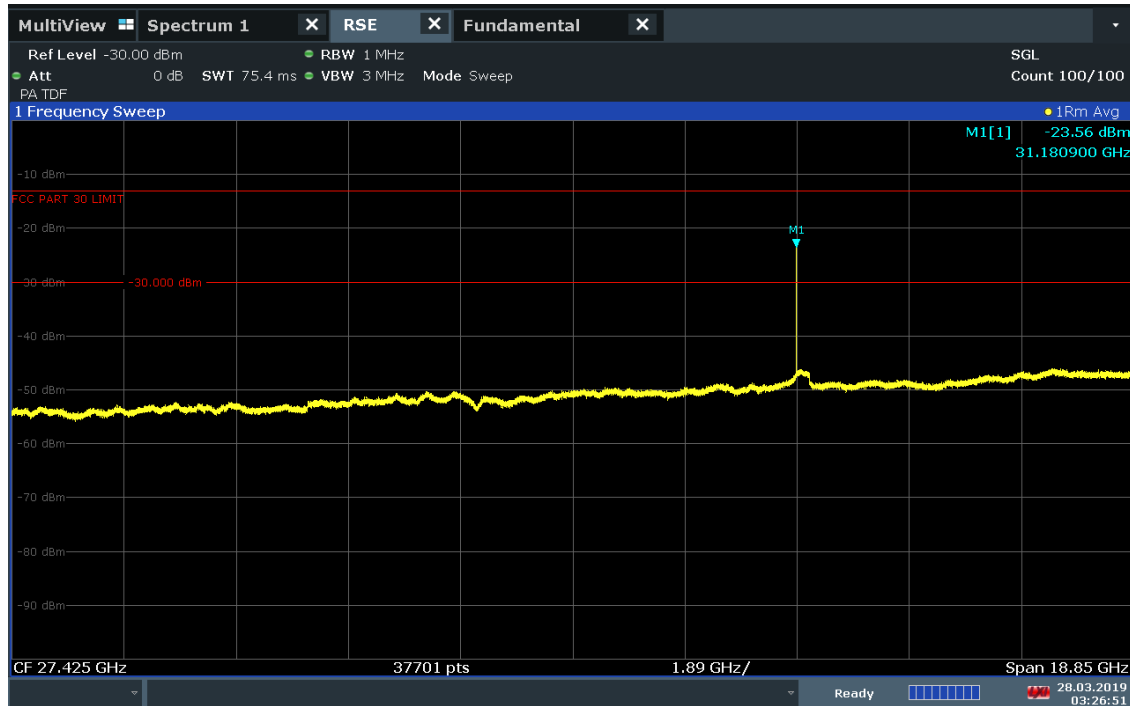
ACLRRResults



Plot 7-134. K Patch Radiated Spurious Plot 18-36.85 GHz (1CC QPSK Mid Channel H Beam)

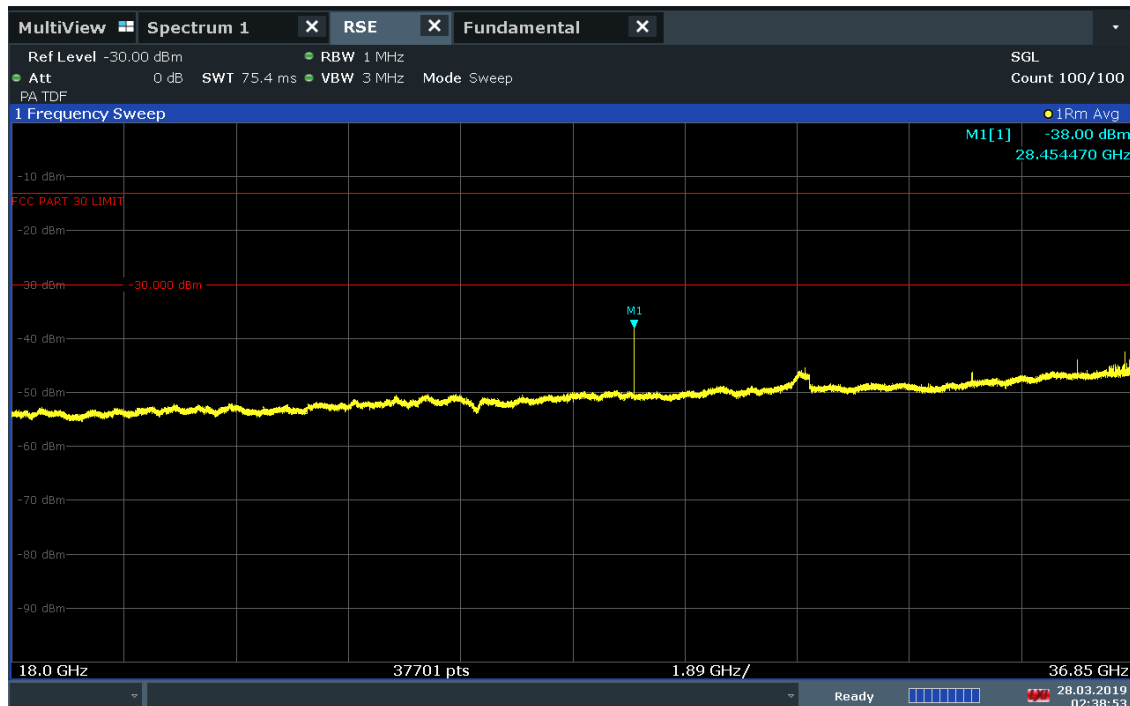
FCC ID: A3LSMG977T	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset	Page 104 of 355

ACLRResults



Plot 7-135. K Patch Radiated Spurious Plot 18-36.85 GHz (1CC QPSK High Channel H Beam)

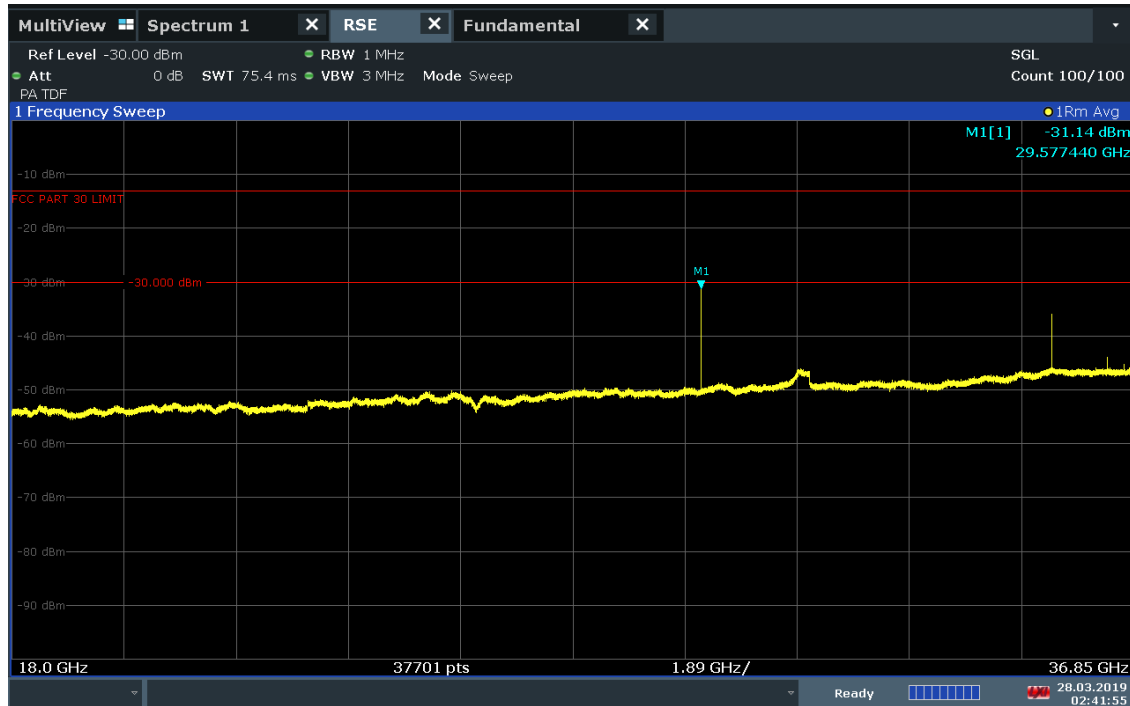
ACLRResults



Plot 7-136. K Patch Radiated Spurious Plot 18-36.85 GHz (1CC QPSK Low Channel V Beam)

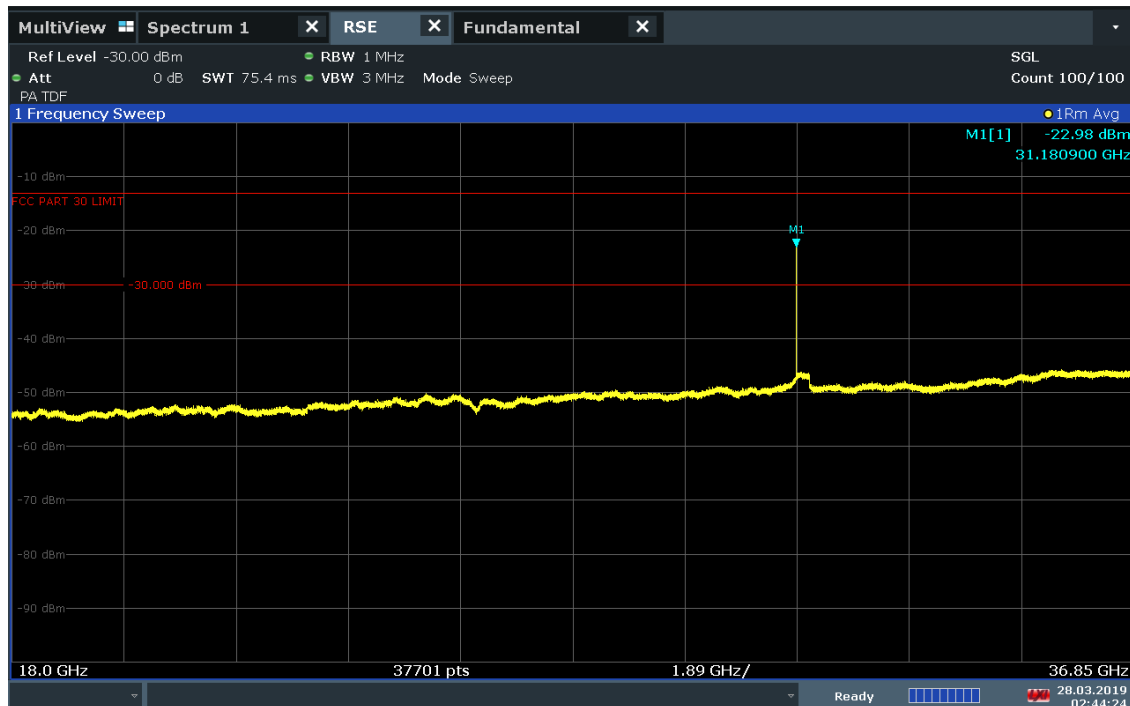
FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 105 of 355

ACLRResults



Plot 7-137. K Patch Radiated Spurious Plot 18-36.85 GHz (1CC QPSK Mid Channel V Beam)

ACLRResults



Plot 7-138. K Patch Radiated Spurious Plot 18-36.85 GHz (1CC QPSK High Channel V Beam)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 106 of 355

Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBμV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1 meter.

$$\text{RSE EIRP [dBm]} = \text{Analyzer Level [dBm]} + 107 + \text{AFCL [dB/m]} + 20\text{Log(Dm)} - 104.8$$

Frequency [MHz]	Detector/Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
28454.47	RMS/Avg	Low	50	QPSK	H	V	150	180	-39.77	-13.00	-26.77
29577.44	RMS/Avg	Mid	50	QPSK	H	V	150	303	-31.51	-13.00	-18.51
31180.90	RMS/Avg	High	50	QPSK	H	V	150	288	-23.56	-13.00	-10.56
28454.47	RMS/Avg	Low	50	QPSK	V	H	150	302	-38.00	-13.00	-25.00
29577.44	RMS/Avg	Mid	50	QPSK	V	H	150	272	-31.14	-13.00	-18.14
31180.90	RMS/Avg	High	50	QPSK	V	H	150	251	-22.98	-13.00	-9.98

Table 7-27. K Patch Spurious Emissions Table (18-36.85GHz)

Notes

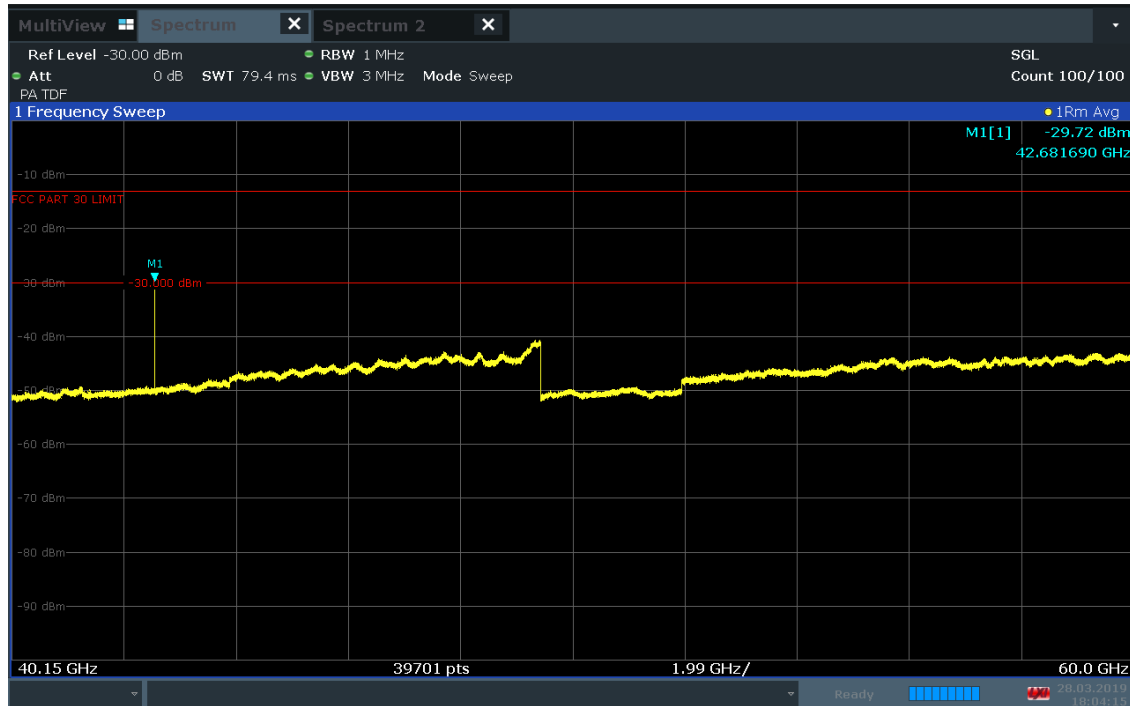
1. The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

$$(-23.56 \text{ dBm} + -22.98 \text{ dBm}) = (4.41 \text{ } \mu\text{W} + 5.04 \text{ } \mu\text{W}) = (9.45 \text{ } \mu\text{W}) = -20.25 \text{ dBm}$$

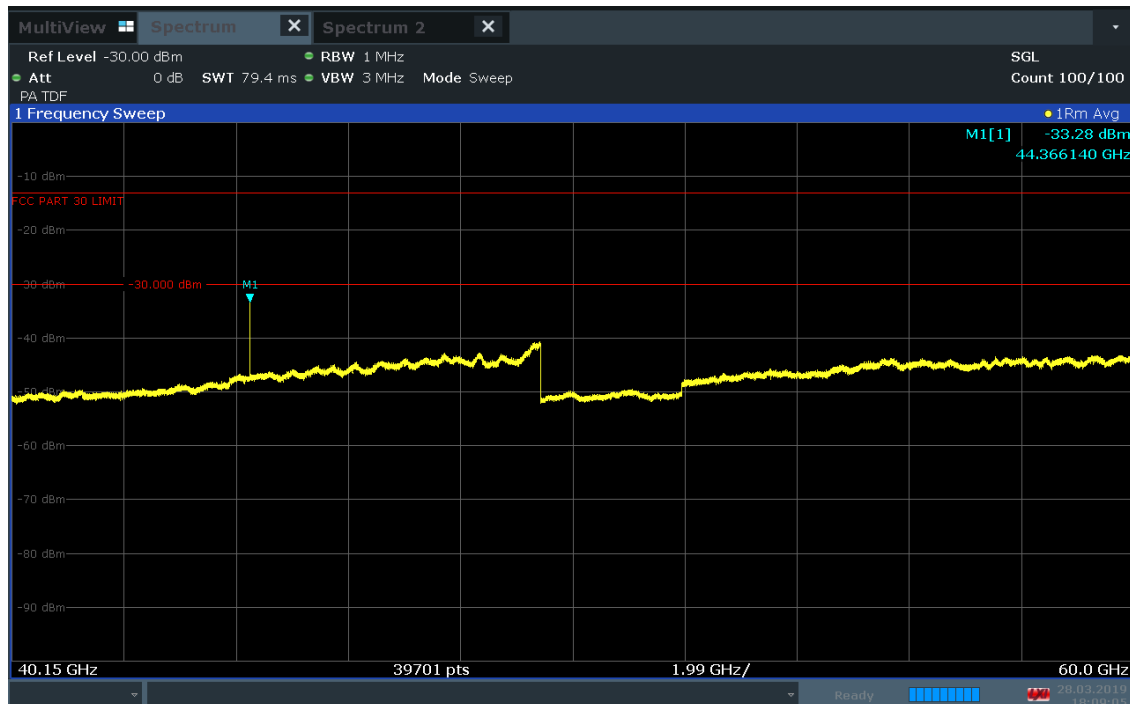
FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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ACLRRResults



Plot 7-139. K Patch Radiated Spurious Plot 40.15-60 GHz (1CC QPSK Low Channel H Beam)

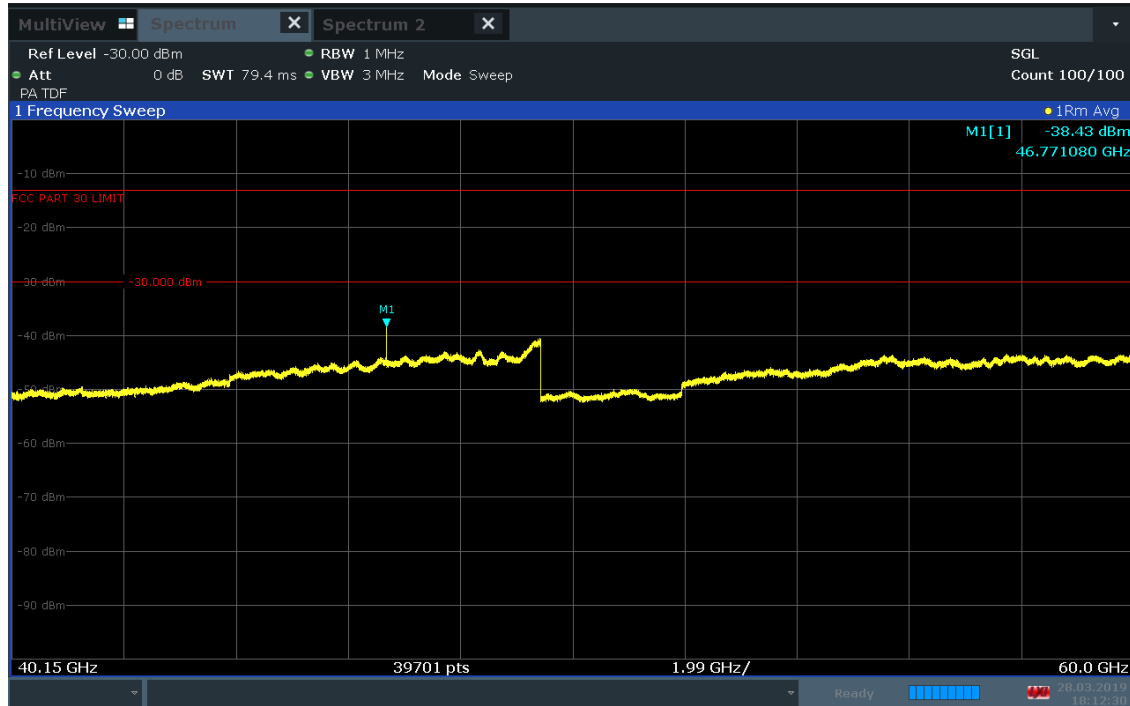
ACLRRResults



Plot 7-140. K Patch Radiated Spurious Plot 40.15-60 GHz (1CC QPSK Mid Channel H Beam)

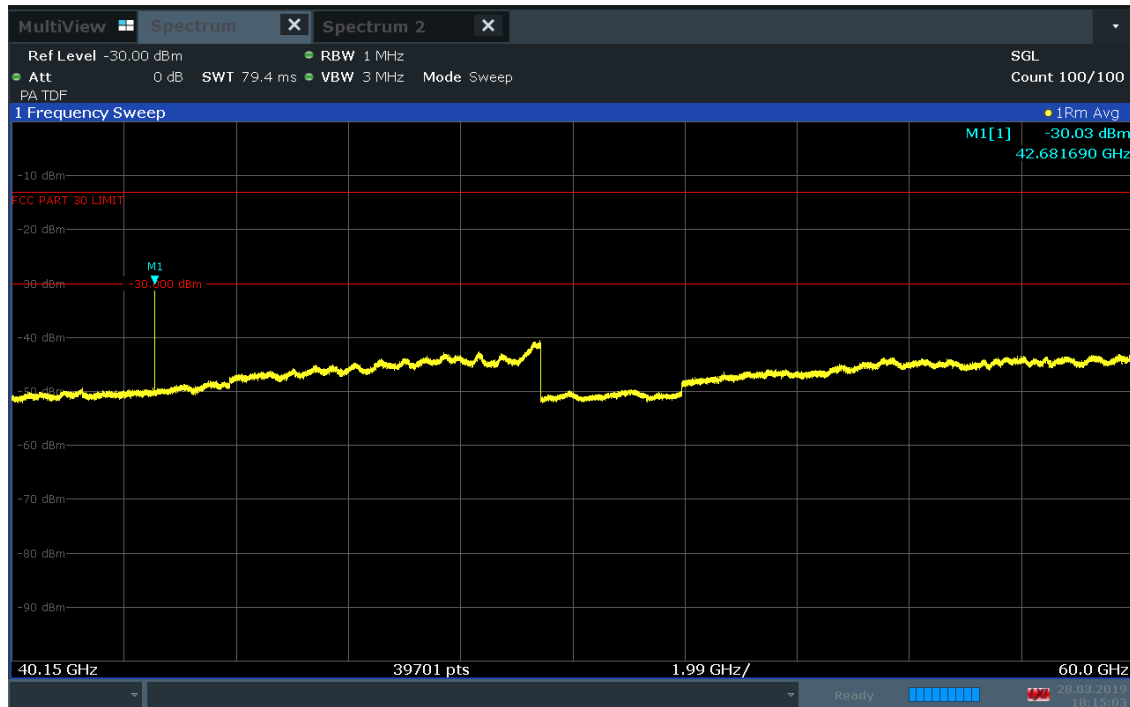
FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 108 of 355

ACLRResults



Plot 7-141. K Patch Radiated Spurious Plot 40.15-60 GHz (1CC QPSK High Channel H Beam)

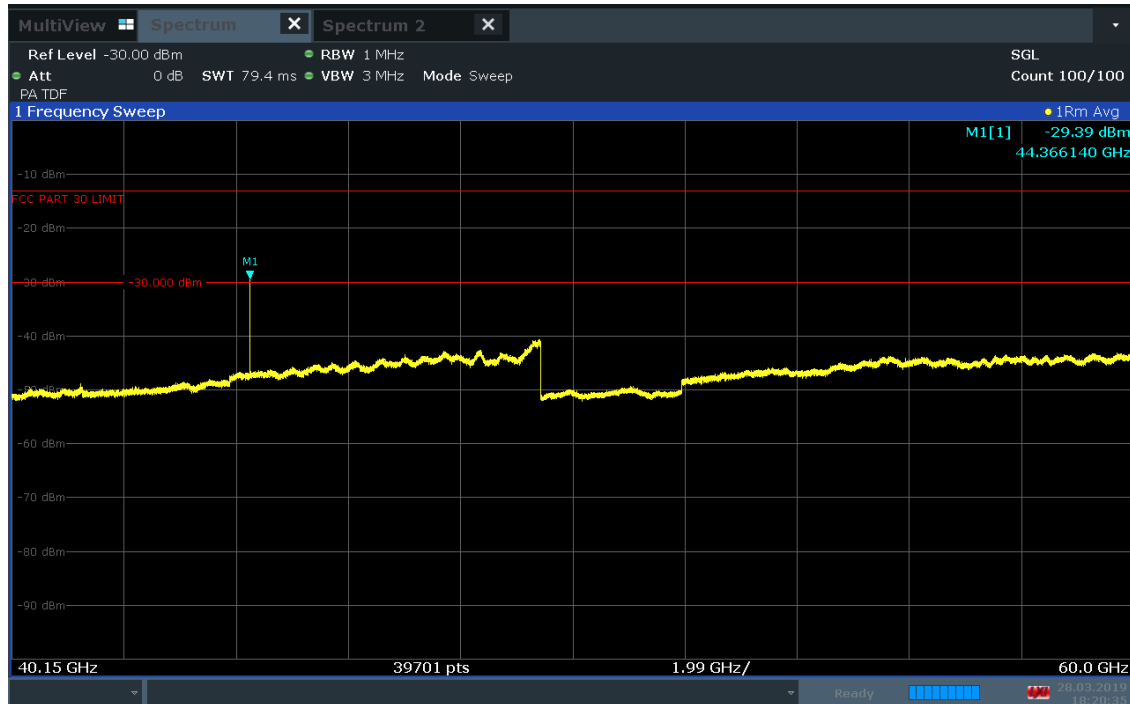
ACLRResults



Plot 7-142. K Patch Radiated Spurious Plot 40.15-60 GHz (1CC QPSK Low Channel V Beam)

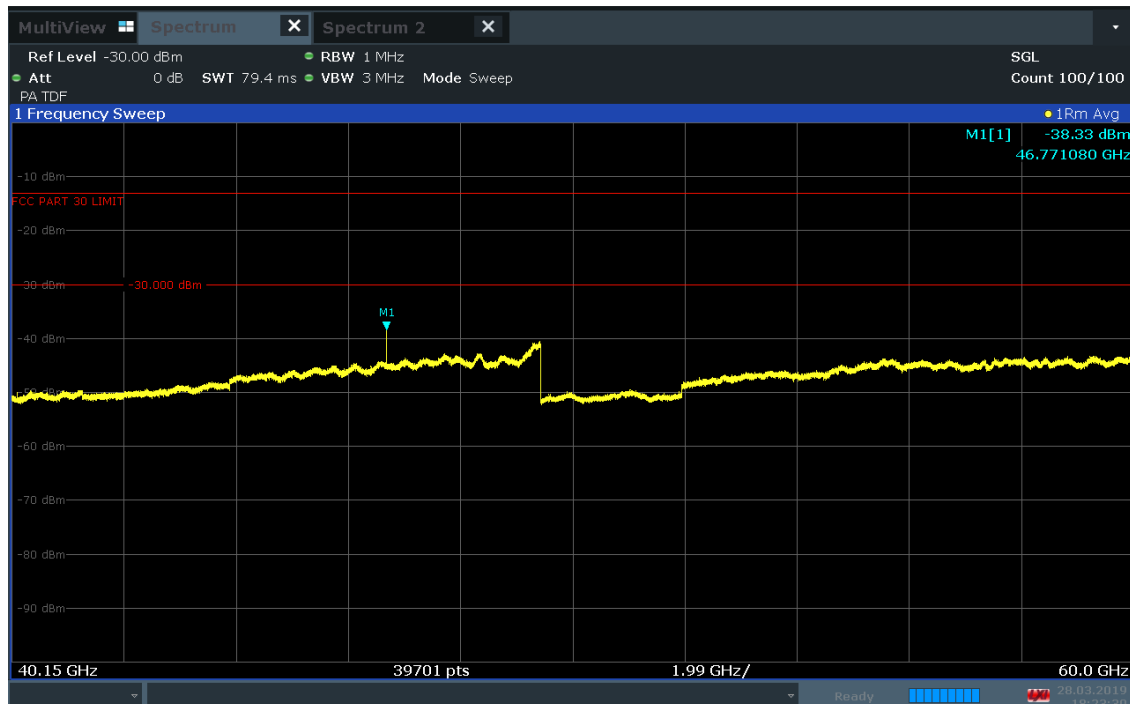
FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 109 of 355

ACLRResults



Plot 7-143. K Patch Radiated Spurious Plot 40.15-60 GHz (1CC QPSK Mid Channel V Beam)

ACLRResults



Plot 7-144. K Patch Radiated Spurious Plot 40.15-60 GHz (1CC QPSK High Channel V Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 110 of 355

Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBμV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1.5 meter.

$$\text{RSE EIRP [dBm]} = \text{Analyzer Level [dBm]} + \text{AFCL [dB/m]} + 20\text{Log(Dm)} - 104.8$$

Frequency [MHz]	Detector/Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
42681.69	RMS/Avg	Low	50	QPSK	H	H	150	184	-29.72	-13.00	-16.72
44366.14	RMS/Avg	Mid	50	QPSK	H	H	150	306	-33.28	-13.00	-20.28
46771.08	RMS/Avg	High	50	QPSK	H	H	150	295	-38.43	-13.00	-25.43
42681.69	RMS/Avg	Low	50	QPSK	V	H	150	298	-30.03	-13.00	-17.03
44366.14	RMS/Avg	Mid	50	QPSK	V	H	150	270	-29.39	-13.00	-16.39
46771.08	RMS/Avg	High	50	QPSK	V	H	150	229	-38.33	-13.00	-25.33

Table 7-28. K Patch Spurious Emissions Table (40.15-60 GHz)

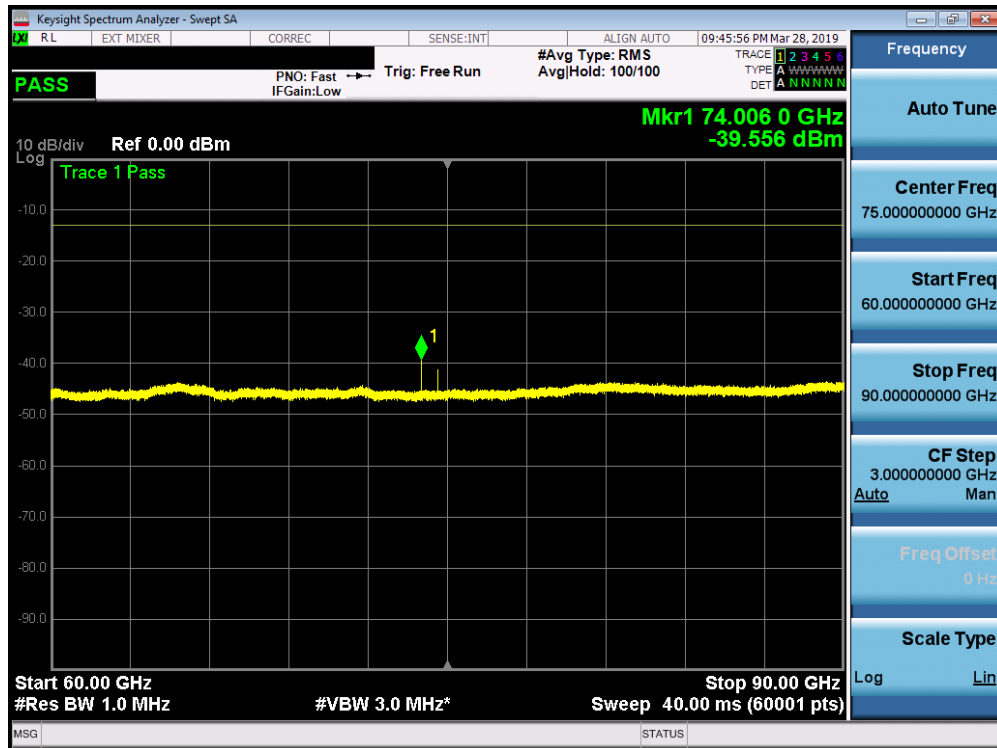
Notes

1. The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1.5 meter.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

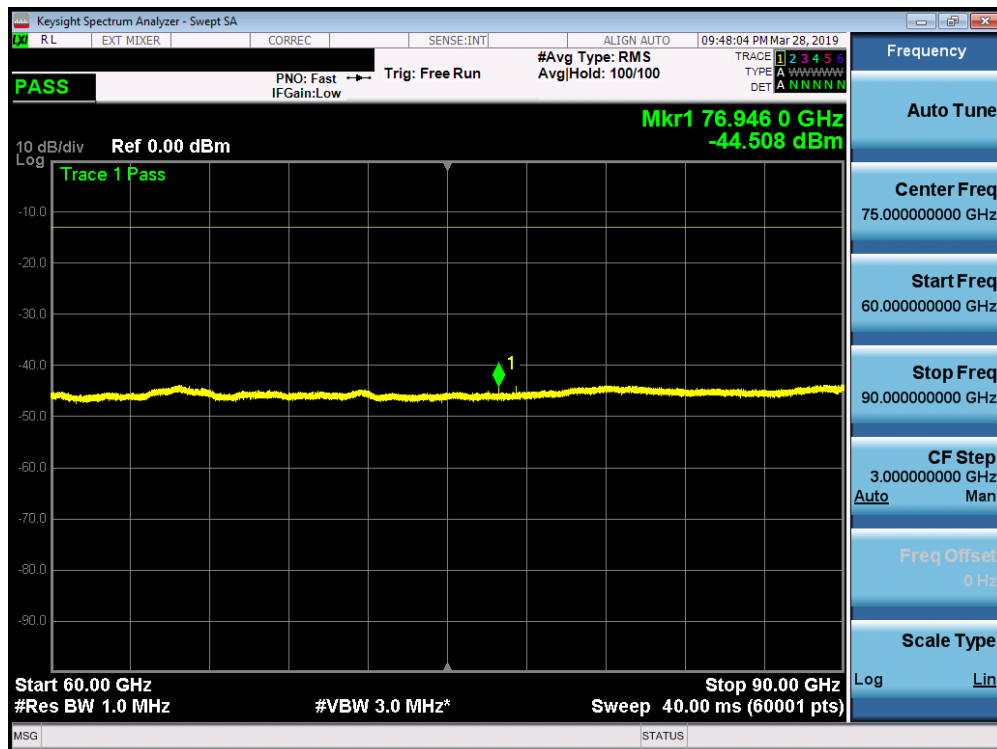
$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

$$(-29.72 \text{ dBm} + -30.03 \text{ dBm}) = (1066.60 \text{ nW} + 993.12 \text{ nW}) = (2059.72 \text{ nW}) = -26.86 \text{ dBm}$$

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-145. K Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK Low Channel H Beam)

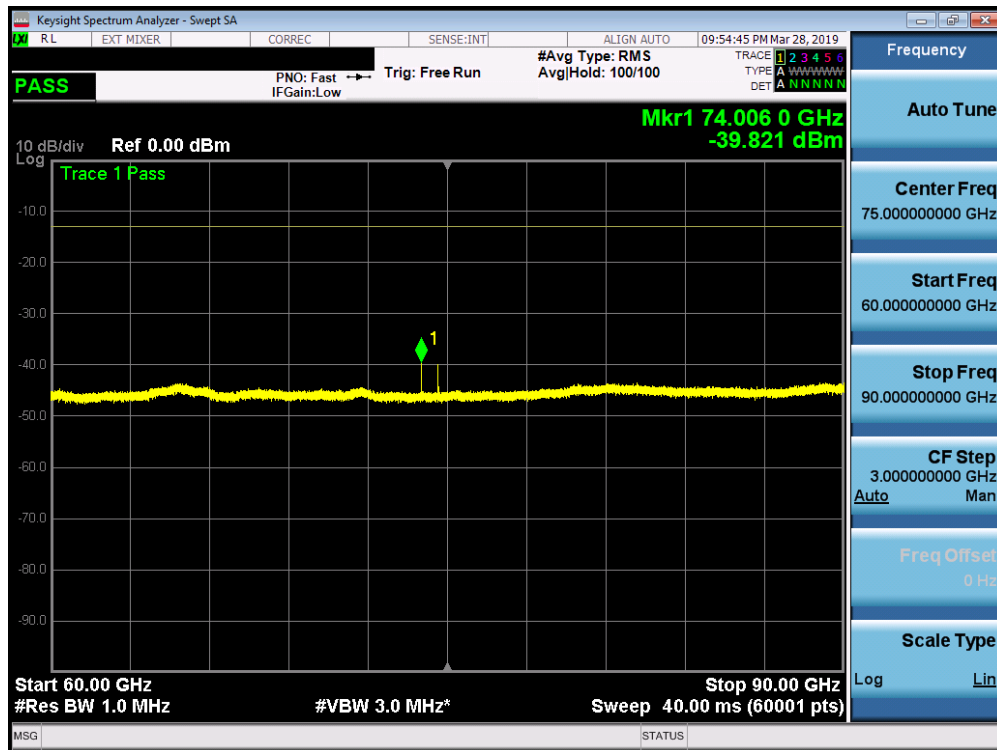


Plot 7-146. K Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK Mid Channel H Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 112 of 355

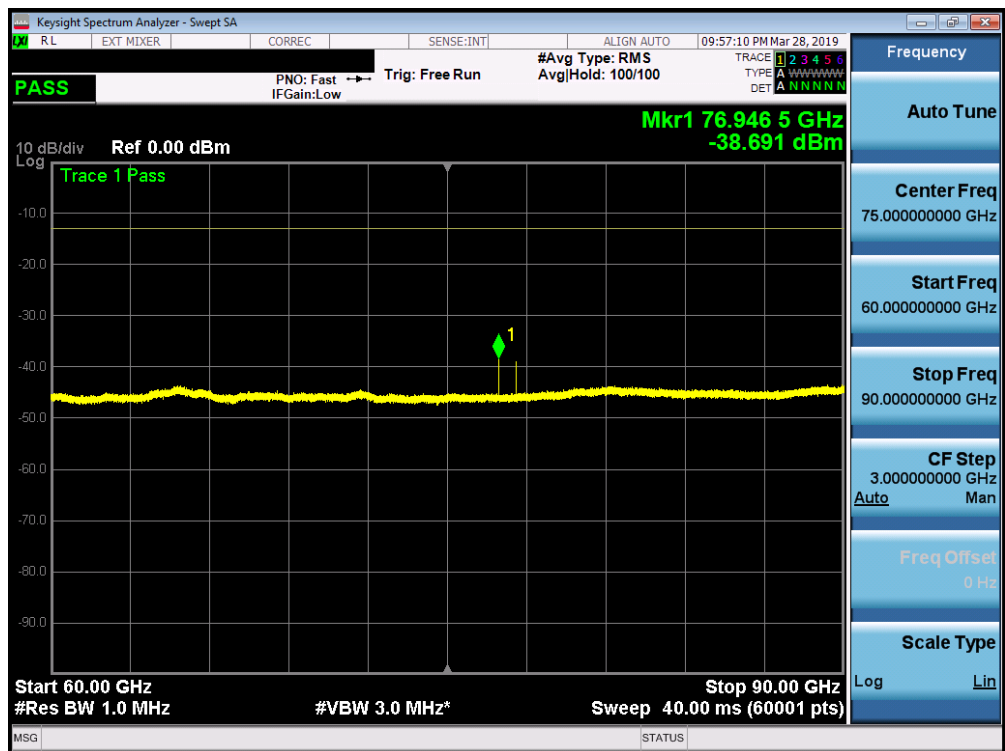


Plot 7-147. K Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK High Channel H Beam)

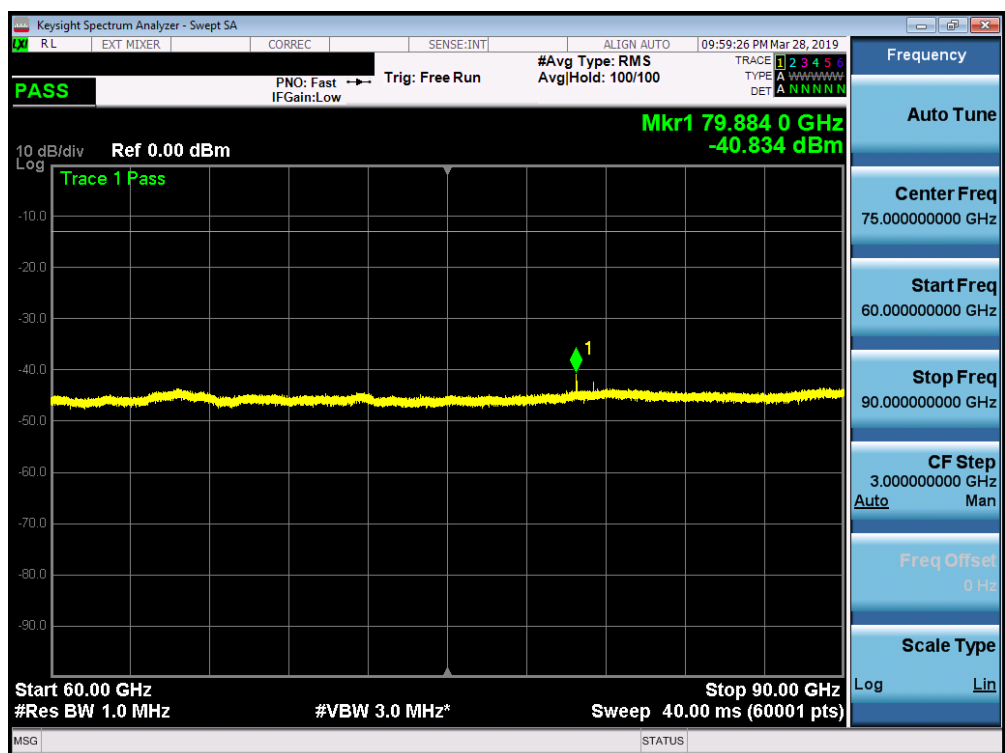


Plot 7-148. K Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK Low Channel V Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-149. K Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK Mid Channel V Beam)



Plot 7-150. K Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK High Channel V Beam)

FCC ID: A3LSMG977T	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset	Page 114 of 355

Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBμV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1 meter.

$$\text{RSE EIRP [dBm]} = \text{Analyzer Level [dBm]} + 107 + \text{AFCL [dB/m]} + 20\text{Log(Dm)} + \text{Harmonic Mixer Loss (dB)} - 104.8$$

Frequency [MHz]	Detector/Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
74006.00	RMS/Avg	Low	50	QPSK	H	V	150	233	-39.56	-13.00	-26.56
76946.00	RMS/Avg	Mid	50	QPSK	H	V	150	234	-44.51	-13.00	-31.51
79883.50	RMS/Avg	High	50	QPSK	H	V	150	200	-43.77	-13.00	-30.77
74006.00	RMS/Avg	Low	50	QPSK	V	H	150	225	-39.82	-13.00	-26.82
76946.50	RMS/Avg	Mid	50	QPSK	V	H	150	201	-38.69	-13.00	-25.69
79884.00	RMS/Avg	High	50	QPSK	V	H	150	266	-40.83	-13.00	-27.83

Table 7-29. K Patch Spurious Emissions Table (60-90GHz)

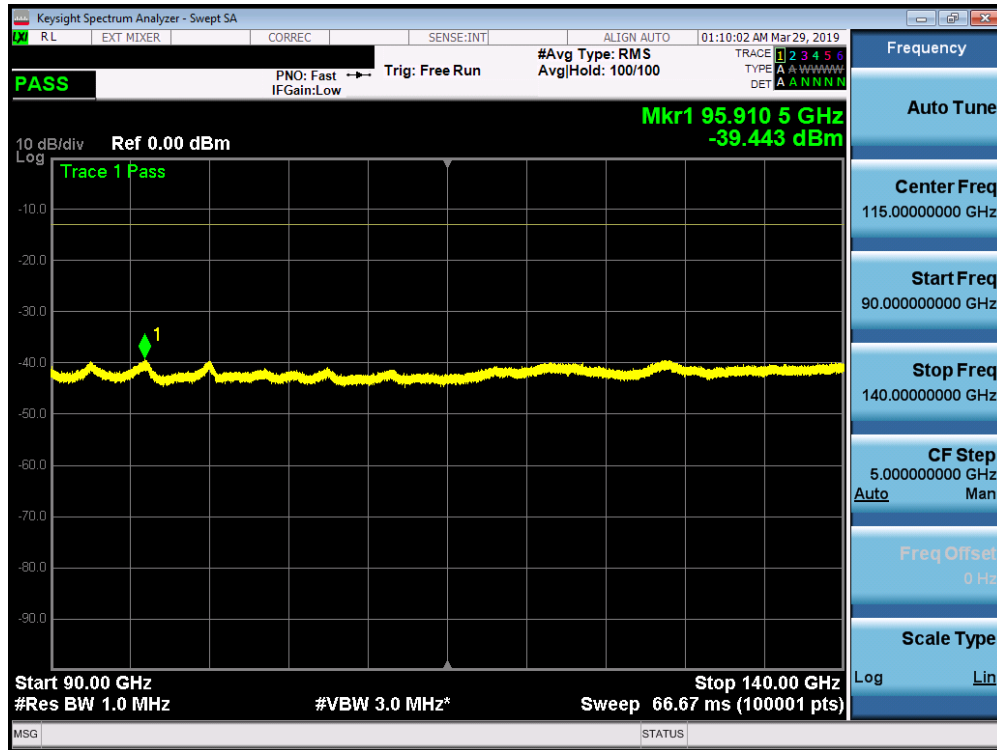
Notes

1. The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

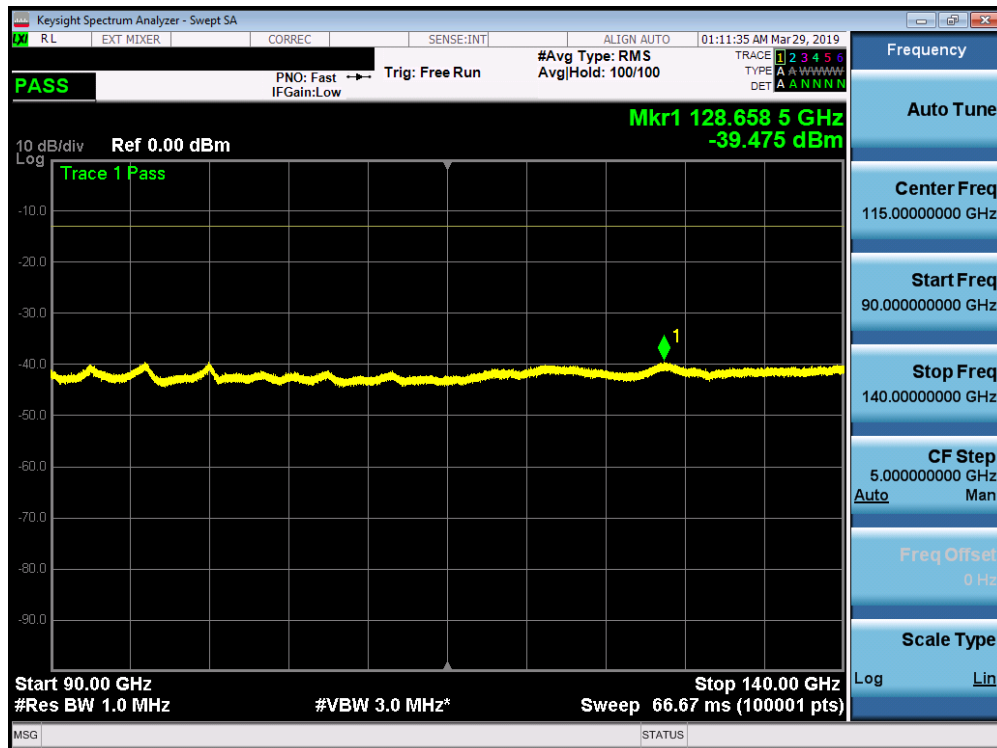
$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

$$(-39.56 \text{ dBm} + -39.82 \text{ dBm}) = (110.66 \text{ nW} + 104.23 \text{ nW}) = (214.89 \text{ nW}) = -36.68 \text{ dBm}$$

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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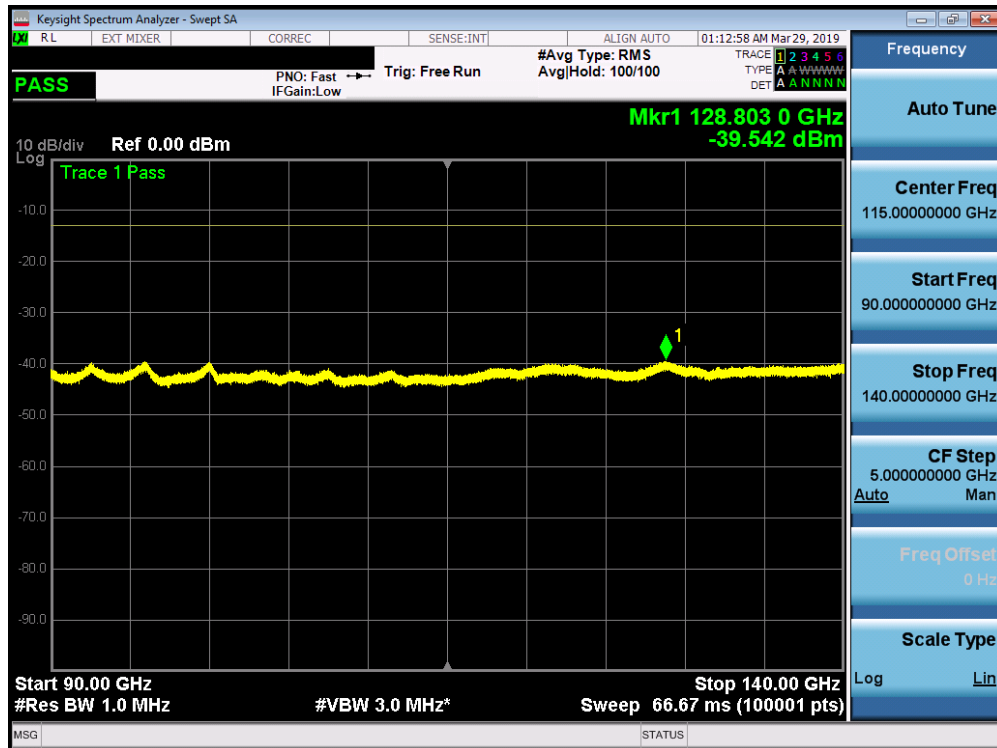


Plot 7-151. K Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK Low Channel H Beam)

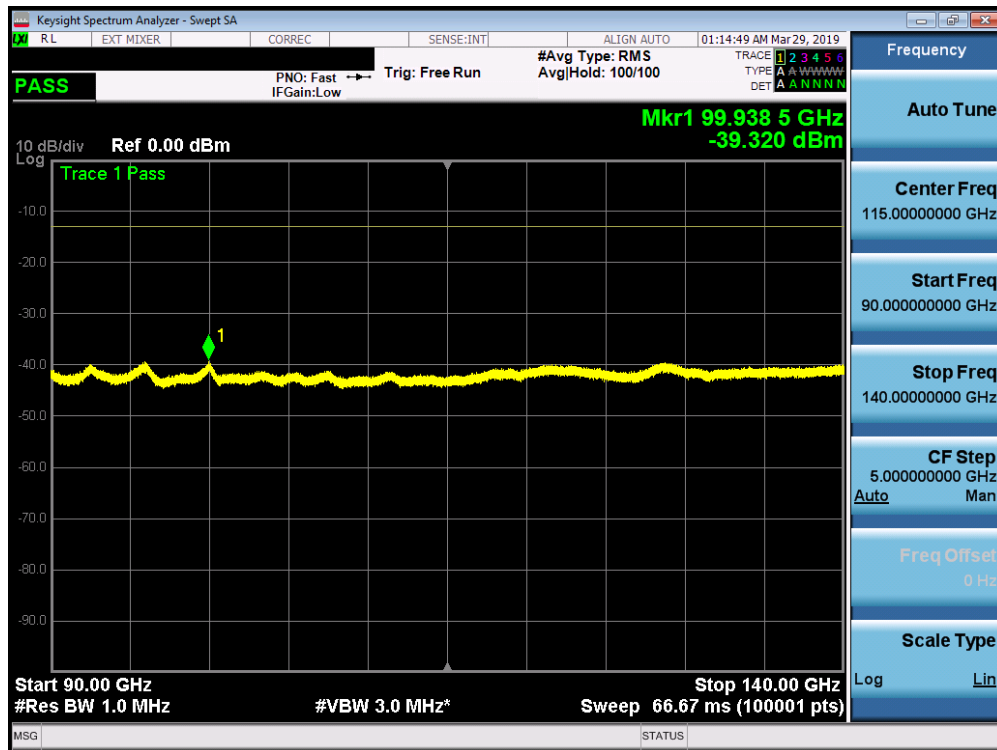


Plot 7-152. K Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK Mid Channel H Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 116 of 355

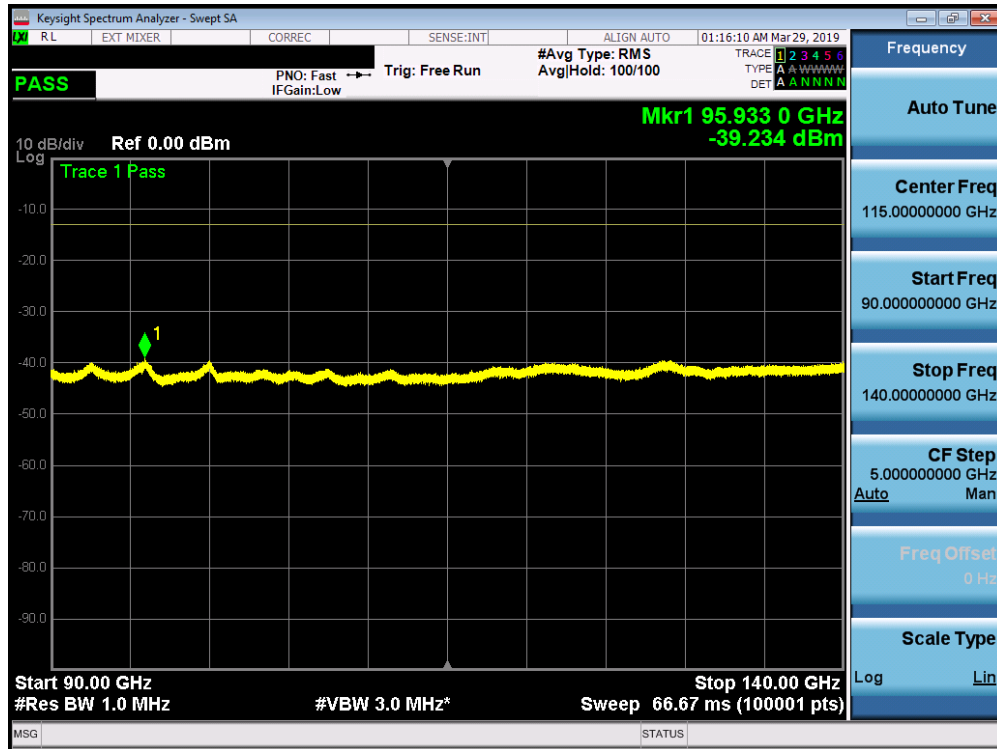


Plot 7-153. K Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK High Channel H Beam)

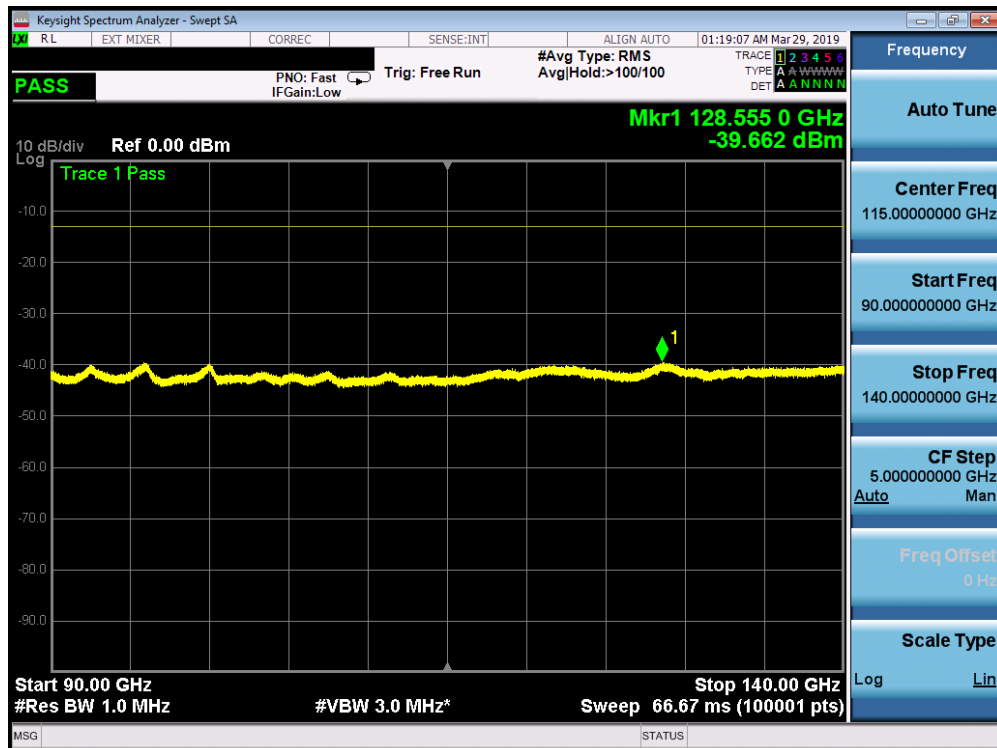


Plot 7-154. K Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK Low Channel V Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 117 of 355



Plot 7-155. K Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK Mid Channel V Beam)



Plot 7-156. K Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK High Channel V Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 118 of 355

Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBμV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1 meter.

$$\text{RSE EIRP [dBm]} = \text{Analyzer Level [dBm]} + 107 + \text{AFCL [dB/m]} + 20\text{Log(Dm)} + \text{Harmonic Mixer Loss (dB)} - 104.8$$

Frequency [MHz]	Detector/Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
95910.50	RMS/Avg	Low	50	QPSK	H	V	-	-	-39.44	-13.00	-26.44
128658.50	RMS/Avg	Mid	50	QPSK	H	V	-	-	-39.48	-13.00	-26.48
128803.00	RMS/Avg	High	50	QPSK	H	V	-	-	-39.54	-13.00	-26.54
99938.50	RMS/Avg	Low	50	QPSK	V	H	-	-	-39.32	-13.00	-26.32
95933.00	RMS/Avg	Mid	50	QPSK	V	H	-	-	-39.23	-13.00	-26.23
128555.00	RMS/Avg	High	50	QPSK	V	H	-	-	-39.66	-13.00	-26.66

Table 7-30. K Patch Spurious Emissions Table (90-140GHz)

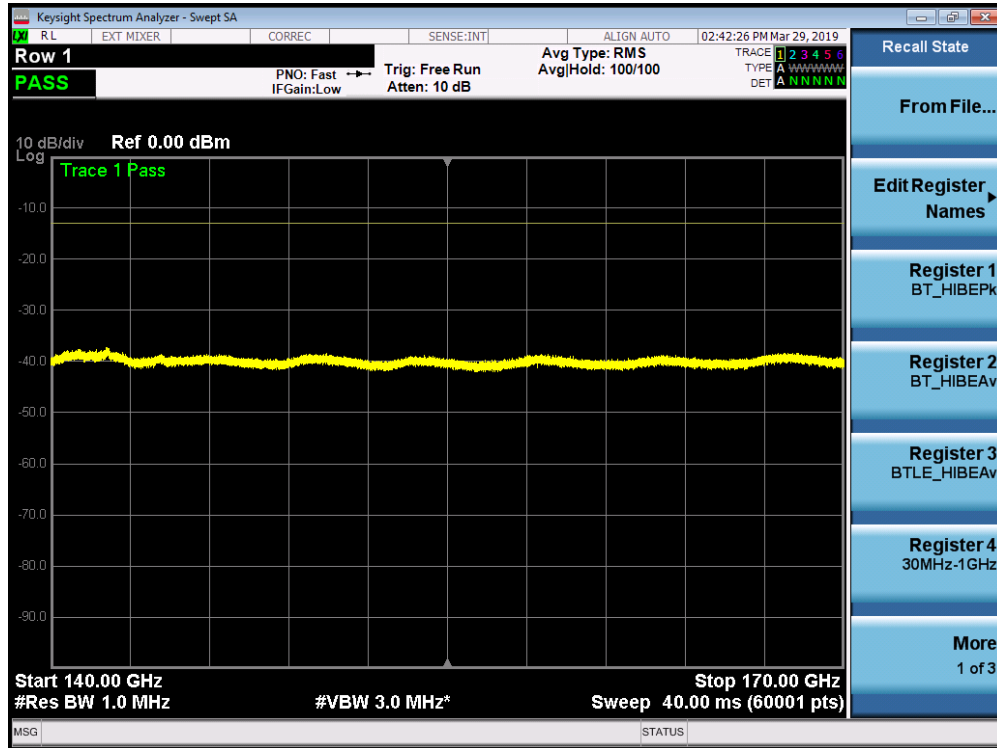
Notes

1. The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

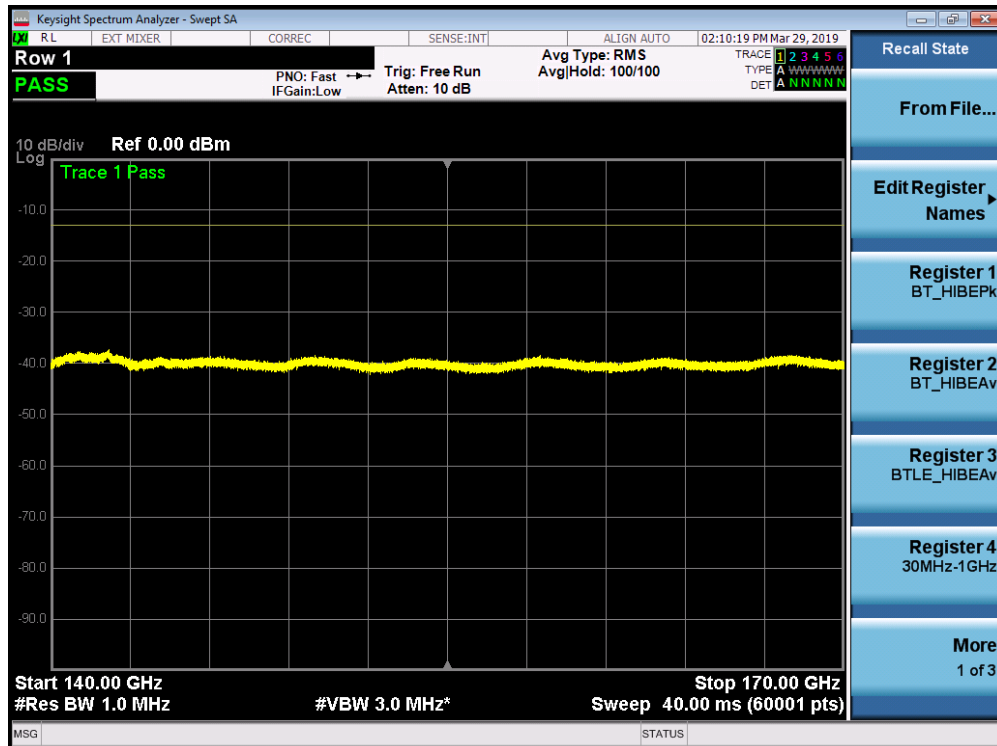
$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

$$(-39.48 \text{ dBm} + -39.23 \text{ dBm}) = (112.72 \text{ nW} + 119.40 \text{ nW}) = (232.12 \text{ nW}) = -36.34 \text{ dBm}$$

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 119 of 355

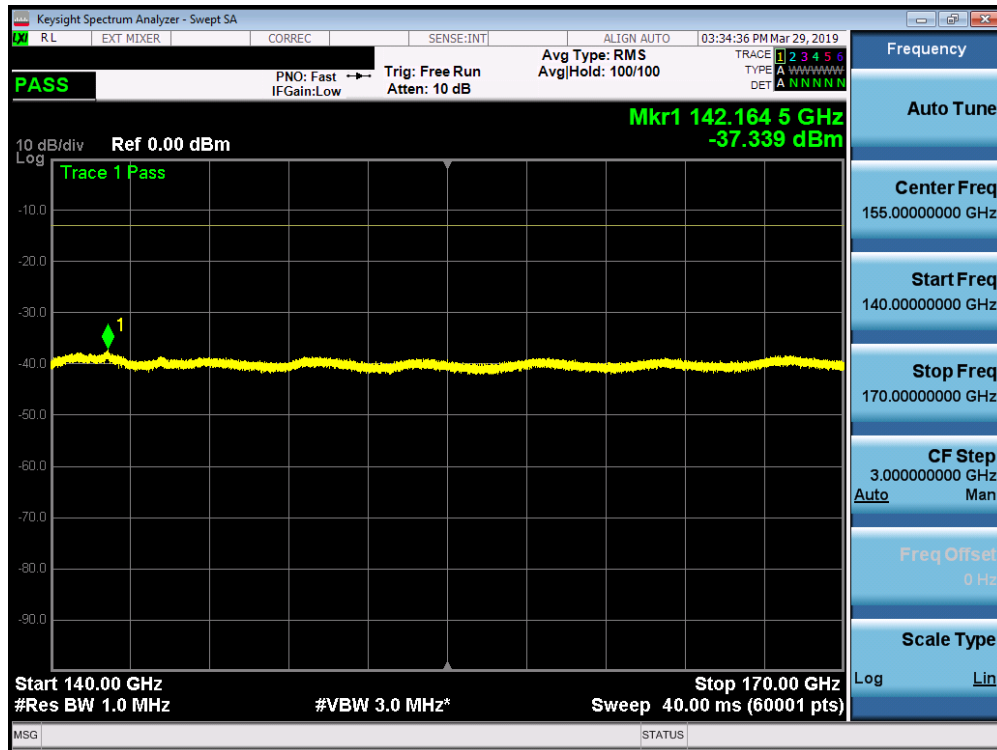


Plot 7-157. K Patch Radiated Spurious Plot 140-170 GHz (1CC QPSK Low Channel H Beam)

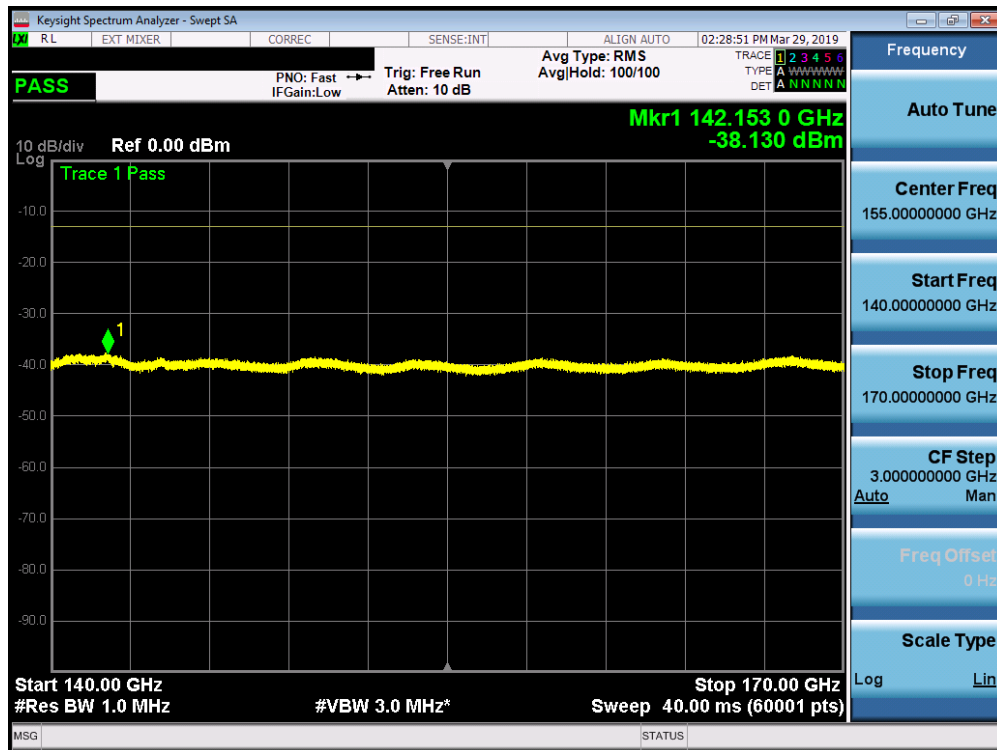


Plot 7-158. K Patch Radiated Spurious Plot 140-170 GHz (1CC QPSK Mid Channel H Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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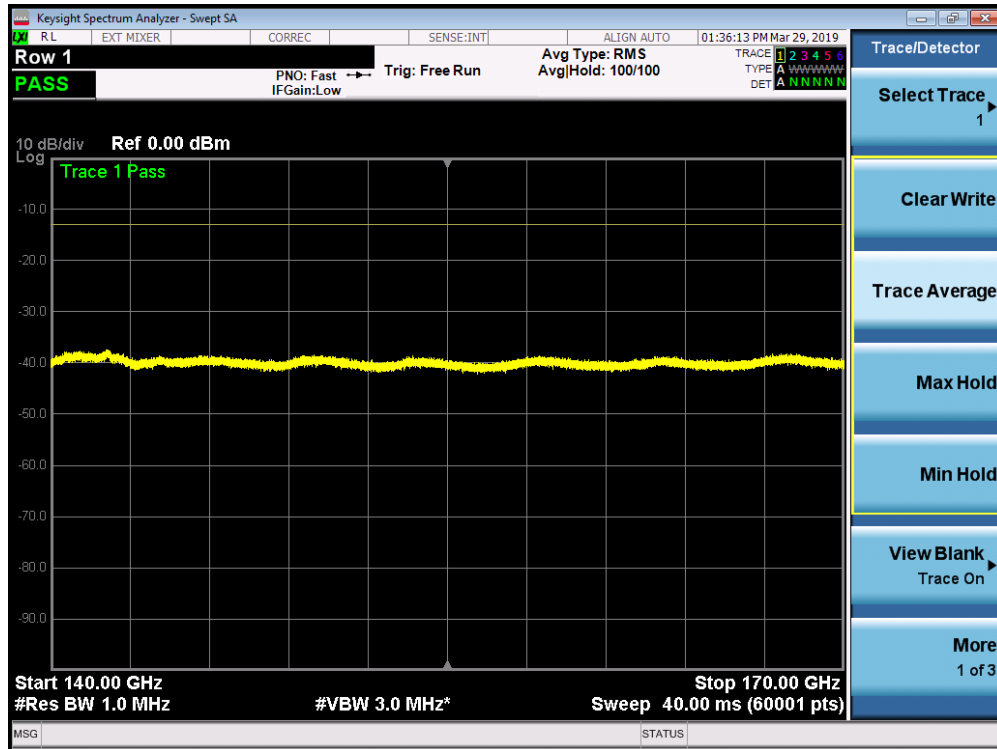


Plot 7-159. K Patch Radiated Spurious Plot 140-170 GHz (1CC QPSK High Channel H Beam)

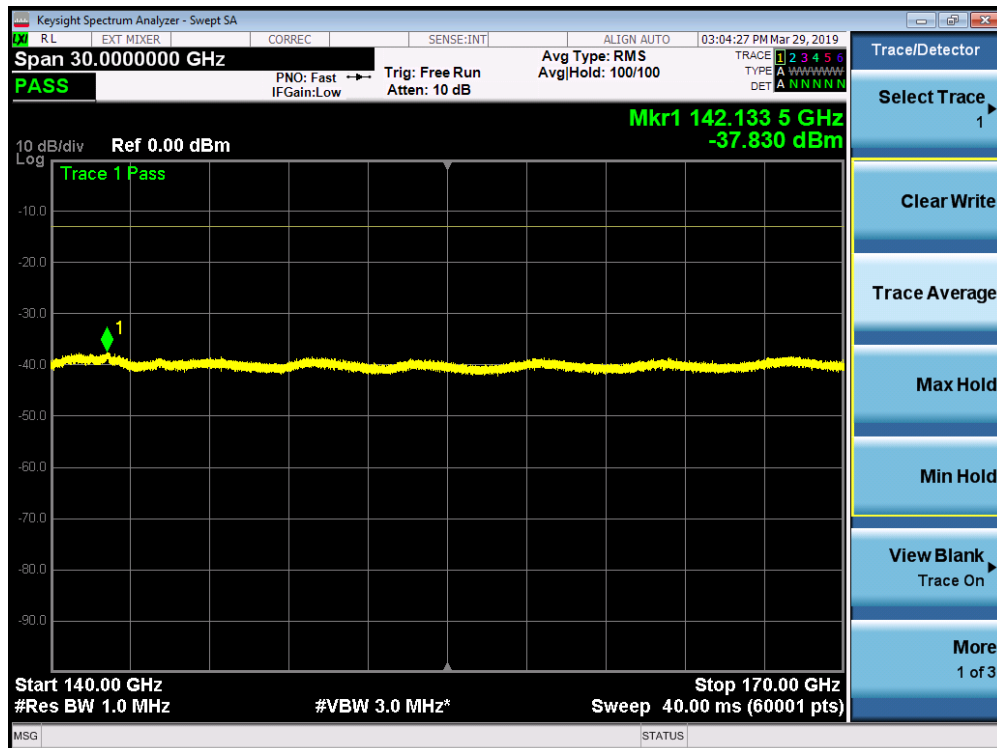


Plot 7-160. K Patch Radiated Spurious Plot 140-170 GHz (1CC QPSK Low Channel V Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-161. K Patch Radiated Spurious Plot 140-170 GHz (1CC QPSK Mid Channel V Beam)



Plot 7-162. K Patch Radiated Spurious Plot 140-170 GHz (1CC QPSK High Channel V Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 122 of 355

Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBμV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1 meter.

$$\text{RSE EIRP [dBm]} = \text{Analyzer Level [dBm]} + 107 + \text{AFCL[dB/m]} + 20\text{Log(Dm)} + \text{Harmonic Mixer Loss (dB)} - 104.8$$

Frequency [MHz]	Detector/Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
142135.50	RMS/Avg	Low	50	QPSK	H	V	-	-	-37.21	-13.00	-24.21
142179.00	RMS/Avg	Mid	50	QPSK	H	V	-	-	-37.28	-13.00	-24.28
142164.50	RMS/Avg	High	50	QPSK	H	V	-	-	-37.34	-13.00	-24.34
142153.00	RMS/Avg	Low	50	QPSK	V	H	-	-	-38.13	-13.00	-25.13
142148.00	RMS/Avg	Mid	50	QPSK	V	H	-	-	-37.48	-13.00	-24.48
142133.50	RMS/Avg	High	50	QPSK	V	H	-	-	-37.83	-13.00	-24.83

Table 7-31. K Patch Spurious Emissions Table (140-170GHz)

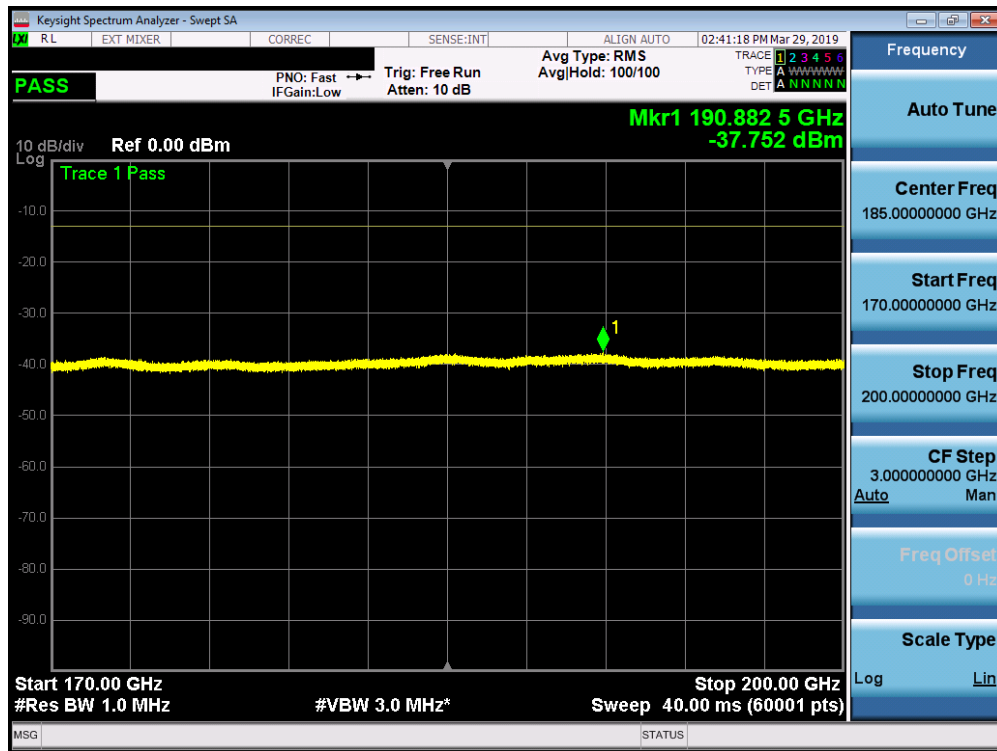
Notes

1. The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

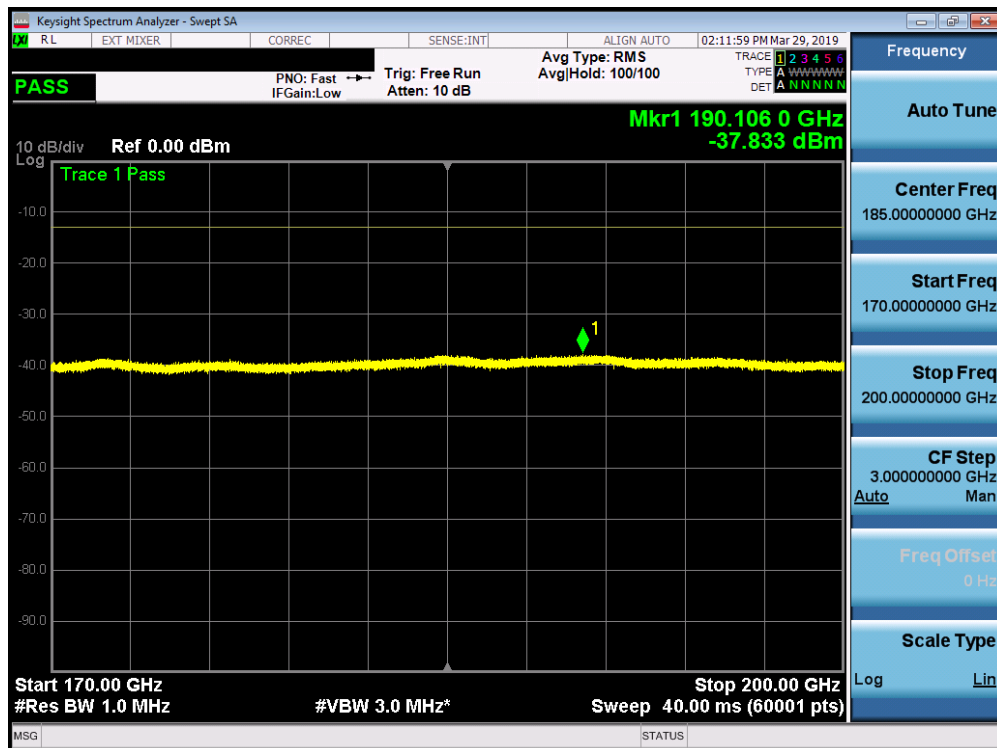
$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

$$(-37.28 \text{ dBm} + -37.48 \text{ dBm}) = (187.07 \text{ nW} + 178.65 \text{ nW}) = (365.72 \text{ nW}) = -34.37 \text{ dBm}$$

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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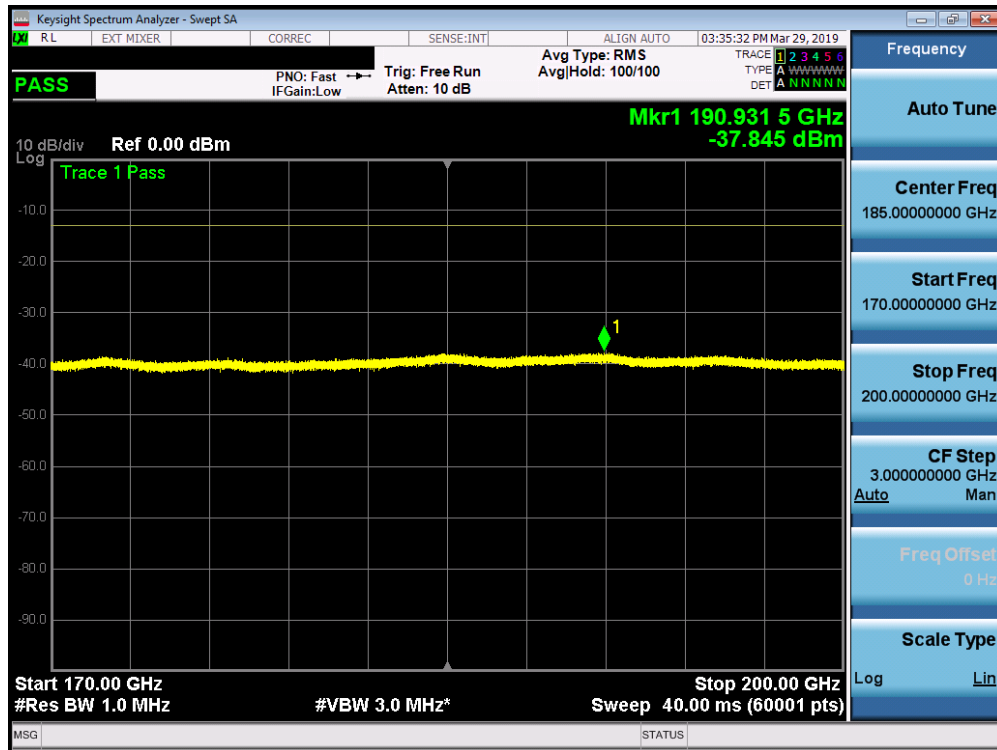


Plot 7-163. K Patch Radiated Spurious Plot 170-200 GHz (1CC QPSK Low Channel H Beam)

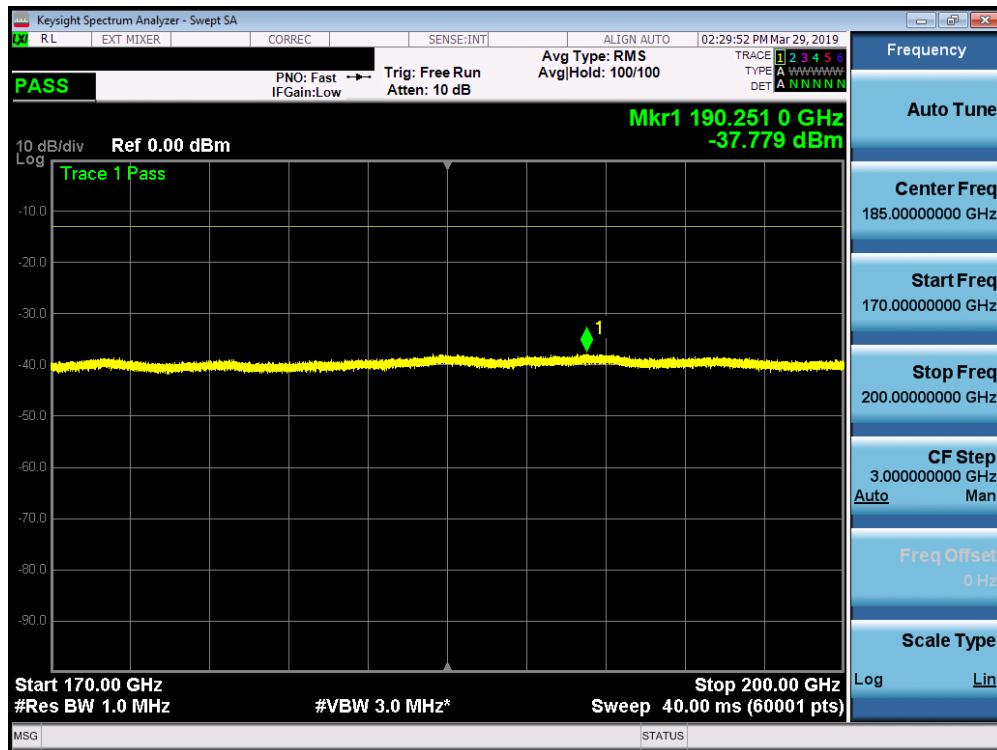


Plot 7-164. K Patch Radiated Spurious Plot 170-200 GHz (1CC QPSK Mid Channel H Beam)

FCC ID: A3LSMG977T	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset	Page 124 of 355

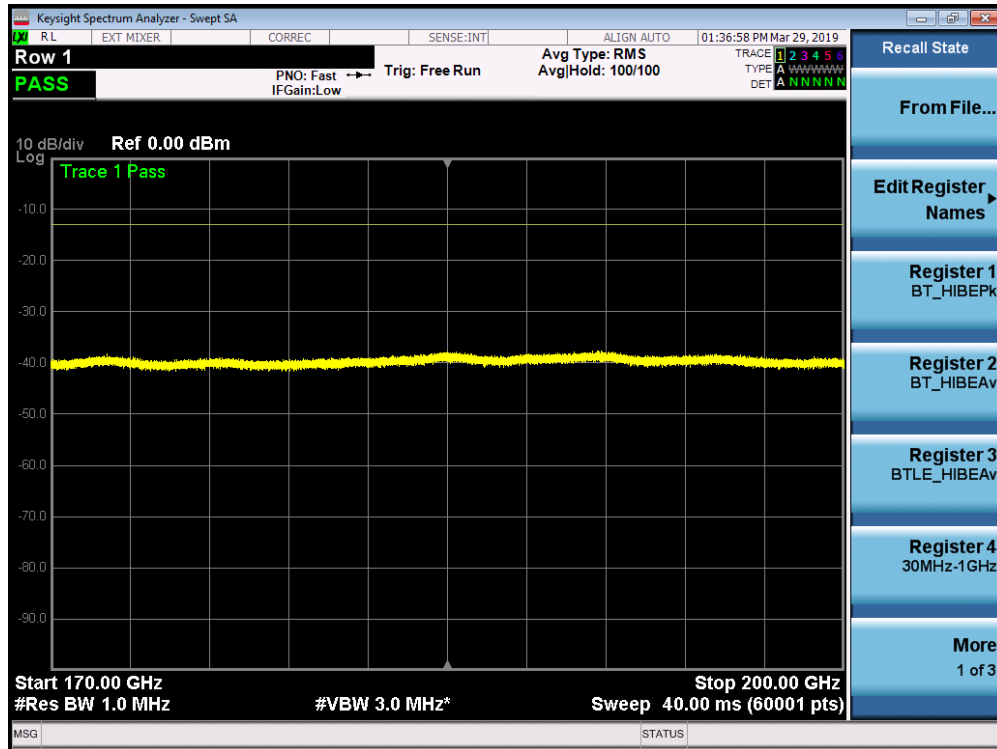


Plot 7-165. K Patch Radiated Spurious Plot 170-200 GHz (1CC QPSK High Channel H Beam)

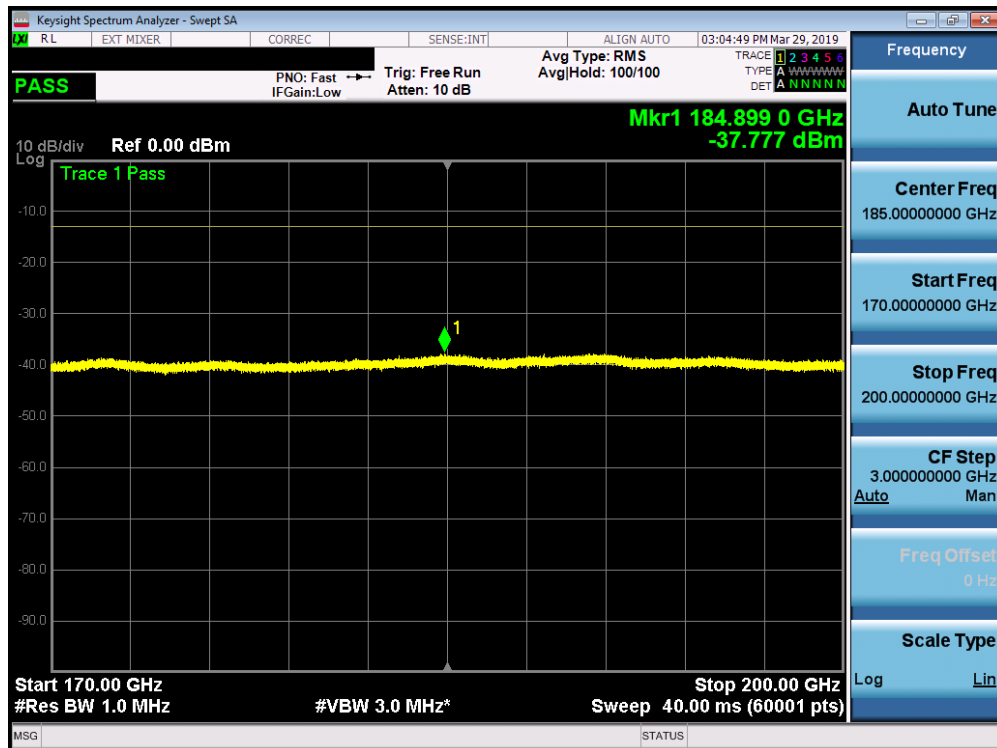


Plot 7-166. K Patch Radiated Spurious Plot 170-200 GHz (1CC QPSK Low Channel V Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 125 of 355



Plot 7-167. K Patch Radiated Spurious Plot 170-200 GHz (1CC QPSK Mid Channel V Beam)



Plot 7-168. K Patch Radiated Spurious Plot 170-200 GHz (1CC QPSK High Channel V Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 126 of 355

Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBμV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1 meter.

$$\text{RSE EIRP [dBm]} = \text{Analyzer Level [dBm]} + 107 + \text{AFCL[dB/m]} + 20\text{Log(Dm)} + \text{Harmonic Mixer Loss (dB)} - 104.8$$

Frequency [MHz]	Detector/Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
190882.50	RMS/Avg	Low	50	QPSK	H	V	-	-	-37.75	-13.00	-24.75
190106.00	RMS/Avg	Mid	50	QPSK	H	V	-	-	-37.83	-13.00	-24.83
190931.50	RMS/Avg	High	50	QPSK	H	V	-	-	-37.85	-13.00	-24.85
190251.00	RMS/Avg	Low	50	QPSK	V	H	-	-	-37.78	-13.00	-24.78
190703.50	RMS/Avg	Mid	50	QPSK	V	H	-	-	-37.67	-13.00	-24.67
184899.00	RMS/Avg	High	50	QPSK	V	H	-	-	-37.78	-13.00	-24.78

Table 7-32. K Patch Spurious Emissions Table (170-200GHz)

Notes

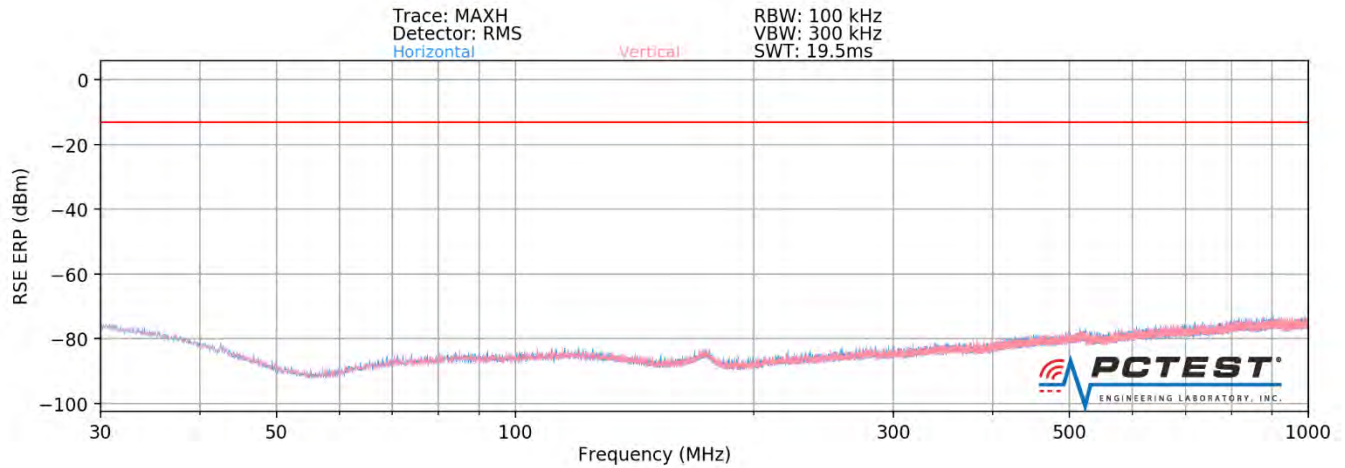
1. The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

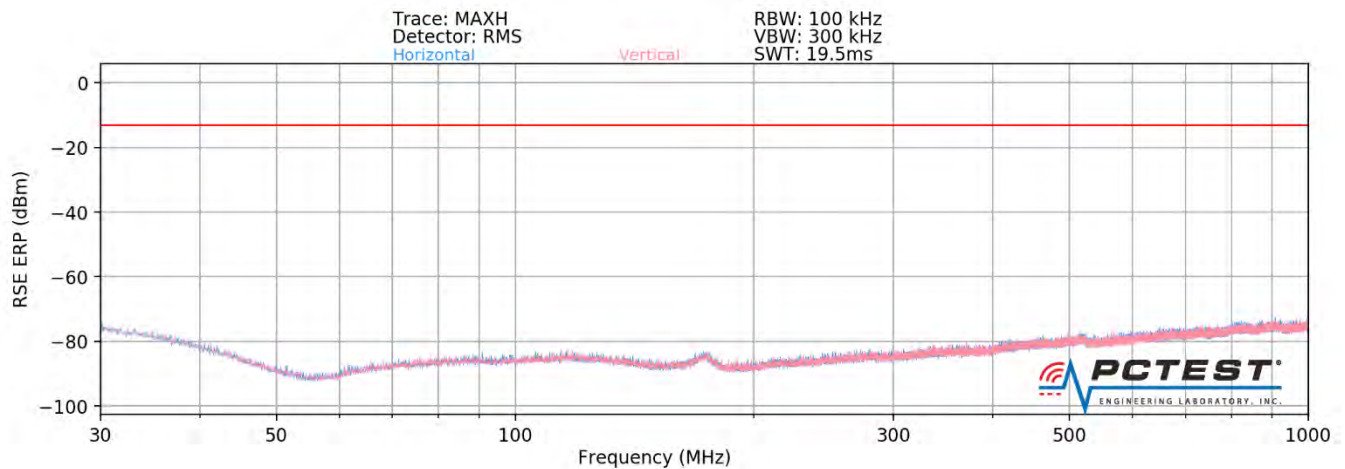
$$(-37.83 \text{ dBm} + -37.67 \text{ dBm}) = (164.82 \text{ nW} + 171.00 \text{ nW}) = (335.82 \text{ nW}) = -34.74 \text{ dBm}$$

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 127 of 355

7.4.4 L Patch Radiated Spurious Emissions 30MHz – 1GHz



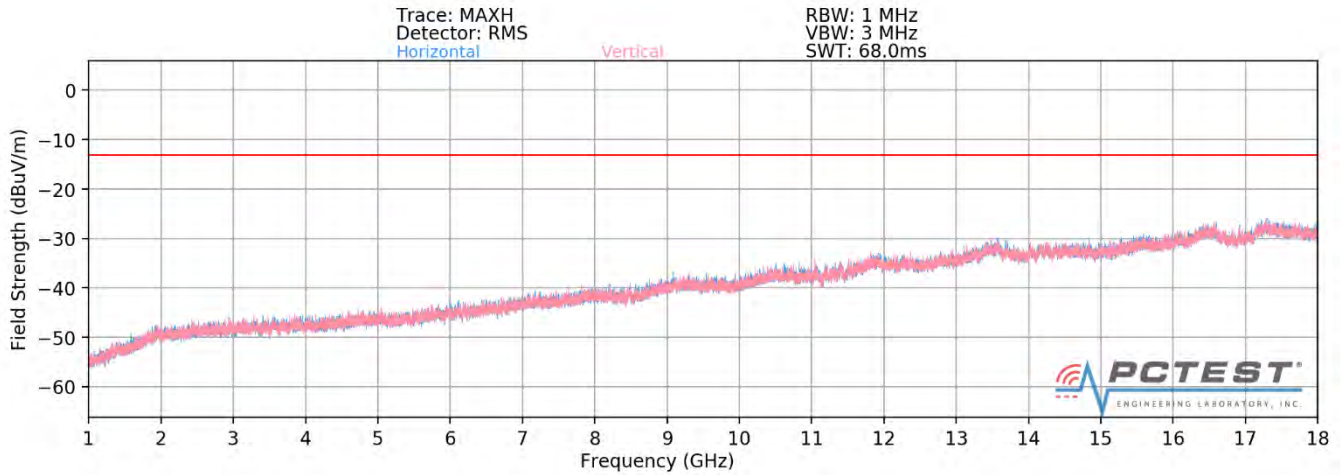
Plot 7-169. L Patch Radiated Spurious Plot 30 MHz - 1 GHz (1CC QPSK Mid Channel H Beam)



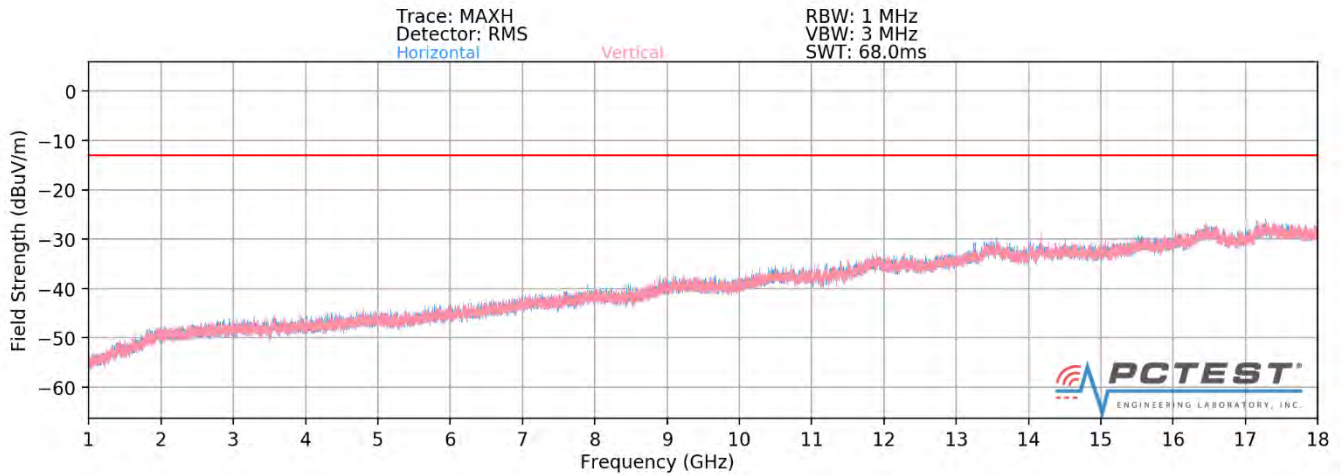
Plot 7-170. L Patch Radiated Spurious Plot 30 MHz - 1 GHz (1CC QPSK Mid Channel V Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 128 of 355

1 – 18GHz



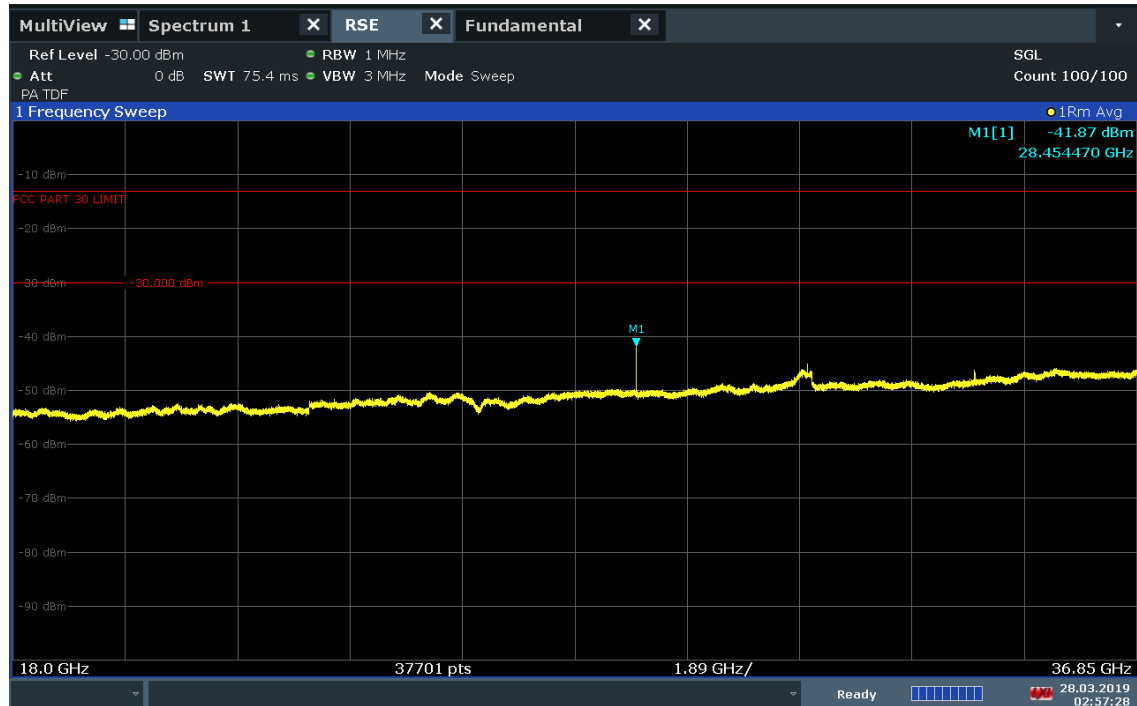
Plot 7-171. L Patch Radiated Spurious Plot 1-18 GHz (1CC QPSK Mid Channel H Beam)



Plot 7-172. L Patch Radiated Spurious Plot 1-18 GHz (1CC QPSK Mid Channel V Beam)

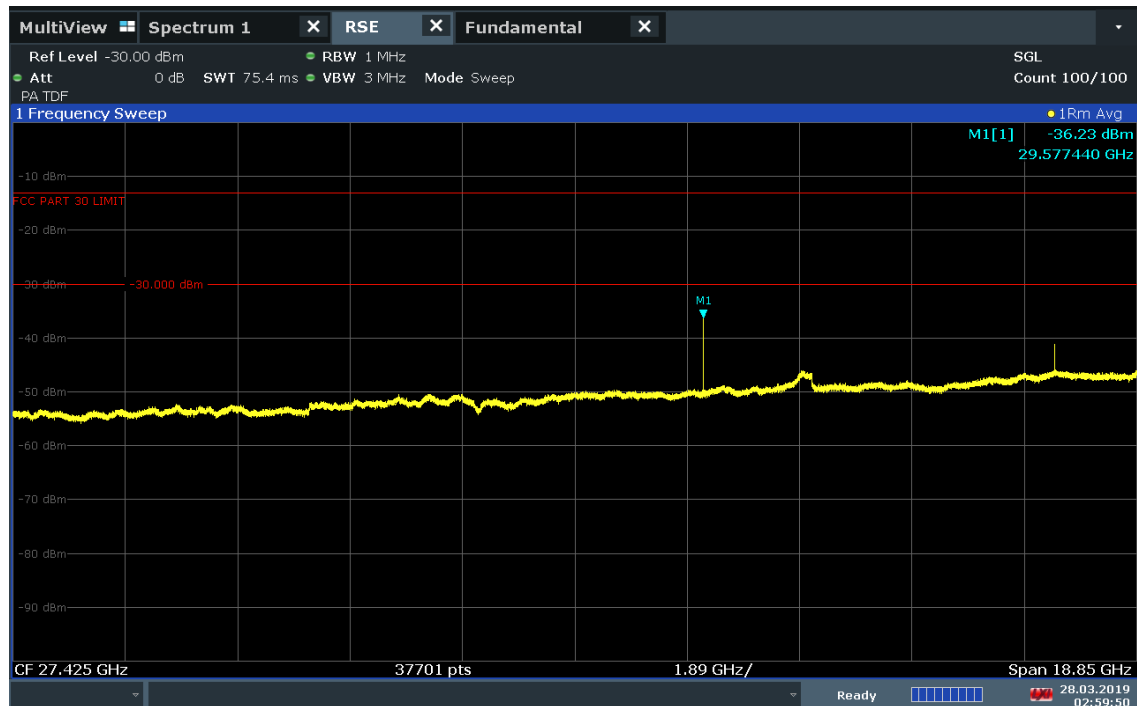
FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 129 of 355

ACLRRResults



Plot 7-173. L Patch Radiated Spurious Plot 18-36.85 GHz (1CC QPSK Low Channel H Beam)

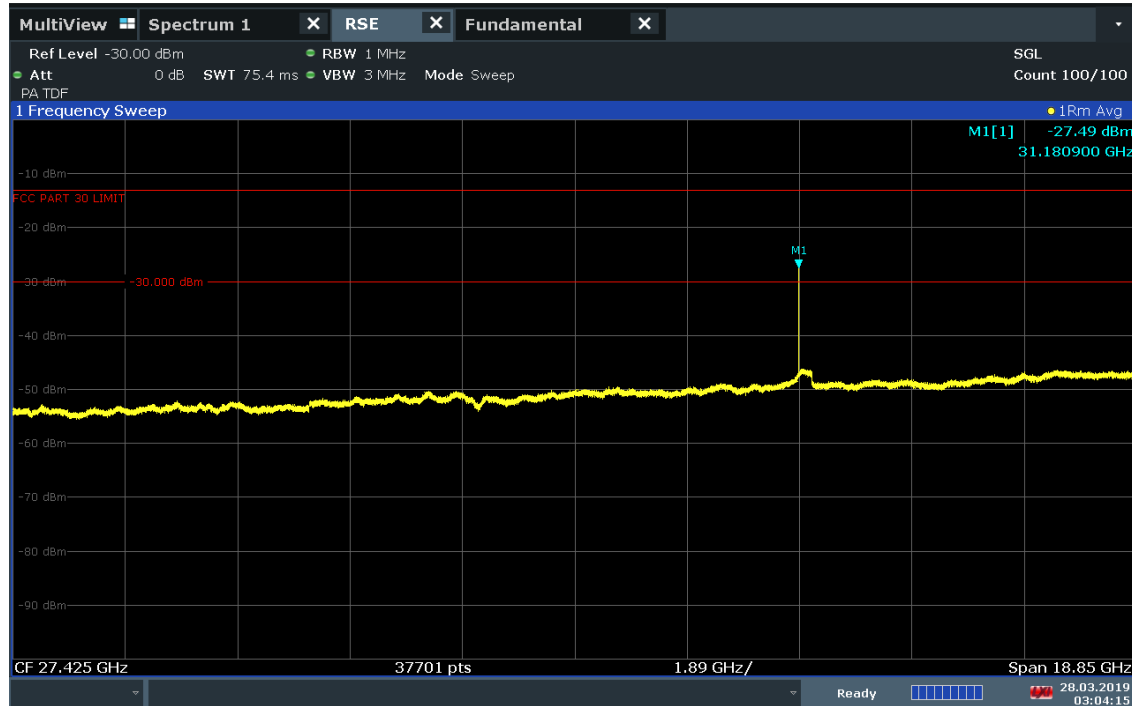
ACLRRResults



Plot 7-174. L Patch Radiated Spurious Plot 18-36.85 GHz (1CC QPSK Mid Channel H Beam)

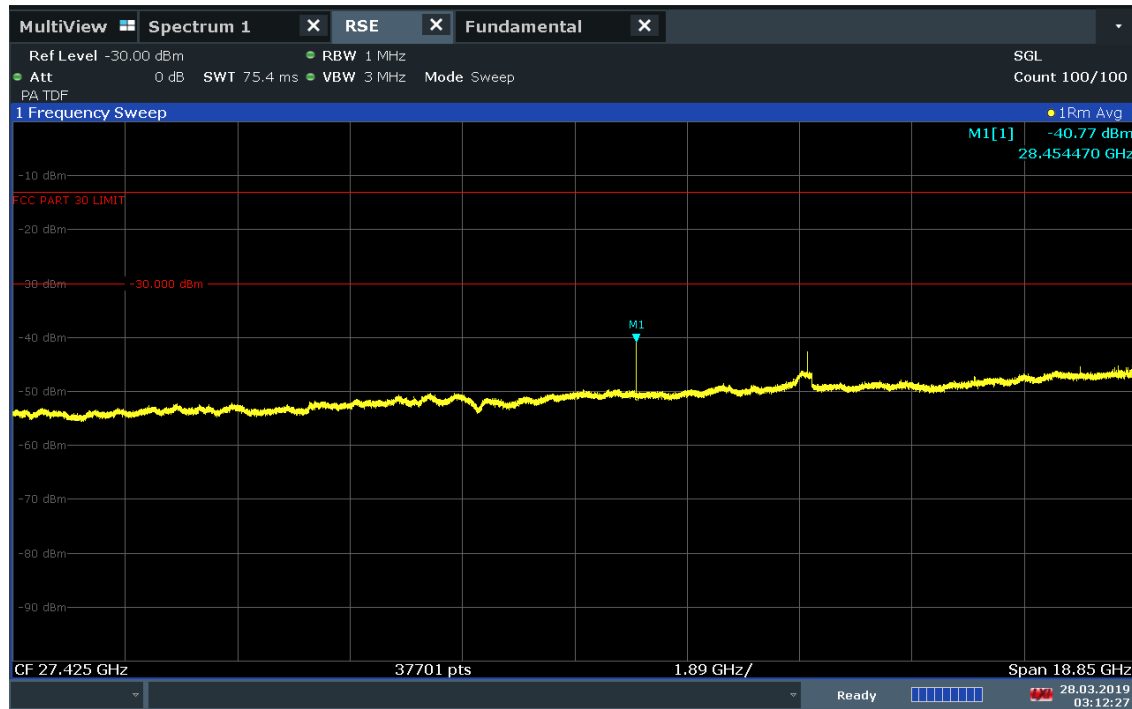
FCC ID: A3LSMG977T	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset	Page 130 of 355

ACLRRResults



Plot 7-175. L Patch Radiated Spurious Plot 18-36.85 GHz (1CC QPSK High Channel H Beam)

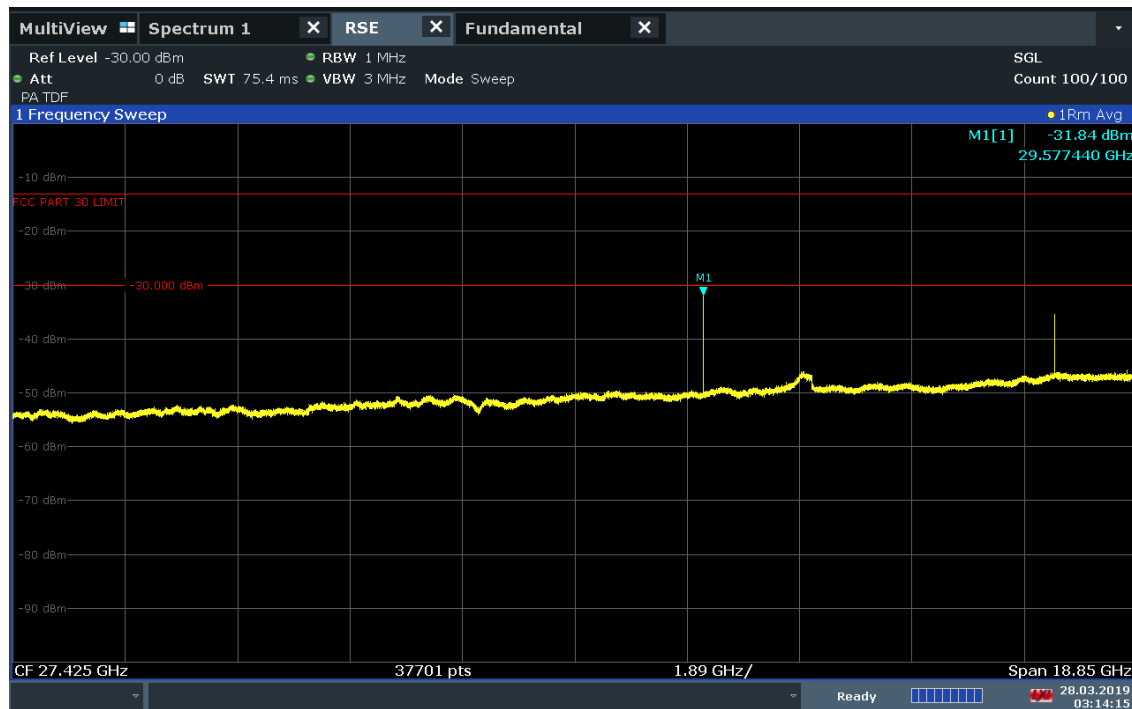
ACLRRResults



Plot 7-176. L Patch Radiated Spurious Plot 18-36.85 GHz (1CC QPSK Low Channel V Beam)

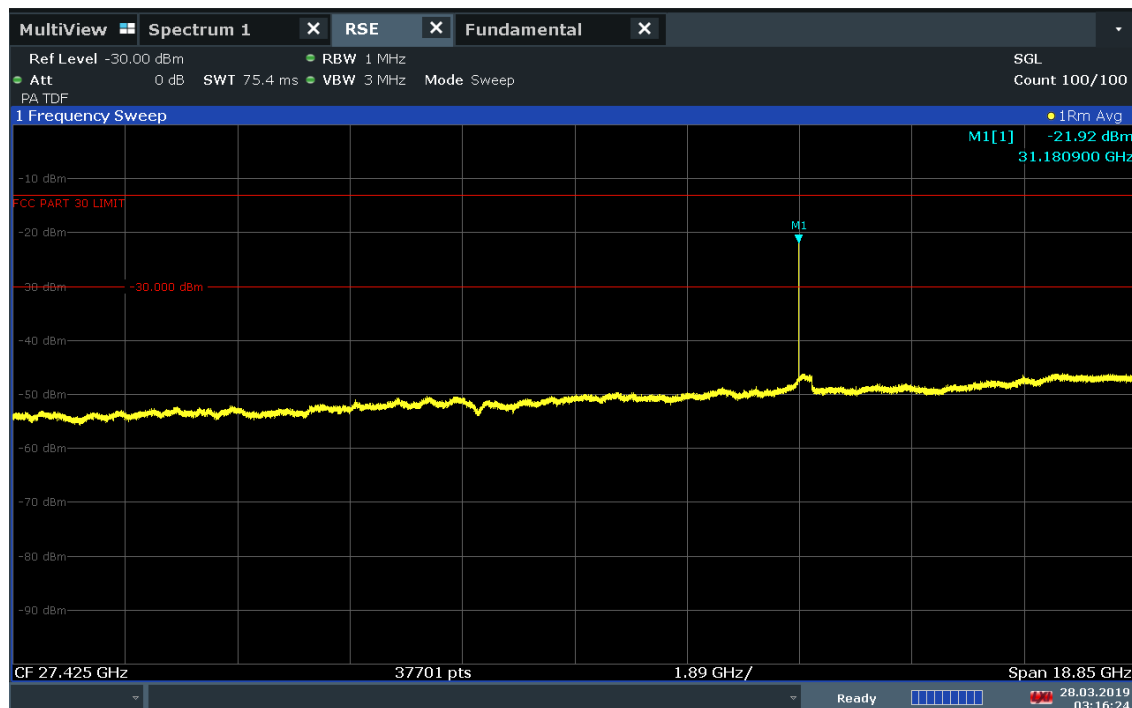
FCC ID: A3LSMG977T	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset	Page 131 of 355

ACLRResults



Plot 7-177. L Patch Radiated Spurious Plot 18-36.85 GHz (1CC QPSK Mid Channel V Beam)

ACLRResults



Plot 7-178. L Patch Radiated Spurious Plot 18-36.85 GHz (1CC QPSK High Channel V Beam)

FCC ID: A3LSMG977T	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset	Page 132 of 355

Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBμV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1 meter.

$$\text{RSE EIRP [dBm]} = \text{Analyzer Level [dBm]} + 107 + \text{AFCL [dB/m]} + 20\text{Log(Dm)} - 104.8$$

Frequency [MHz]	Detector/Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
28454.47	RMS/Avg	Low	50	QPSK	H	V	150	252	-41.87	-13.00	-28.87
29577.44	RMS/Avg	Mid	50	QPSK	H	V	150	222	-36.23	-13.00	-23.23
31180.90	RMS/Avg	High	50	QPSK	H	V	150	350	-27.49	-13.00	-14.49
28454.47	RMS/Avg	Low	50	QPSK	V	V	150	221	-40.77	-13.00	-27.77
29577.44	RMS/Avg	Mid	50	QPSK	V	V	150	262	-31.84	-13.00	-18.84
31180.90	RMS/Avg	High	50	QPSK	V	V	150	287	-21.92	-13.00	-8.92

Table 7-33. L Patch Spurious Emissions Table (18-36.85GHz)

Notes

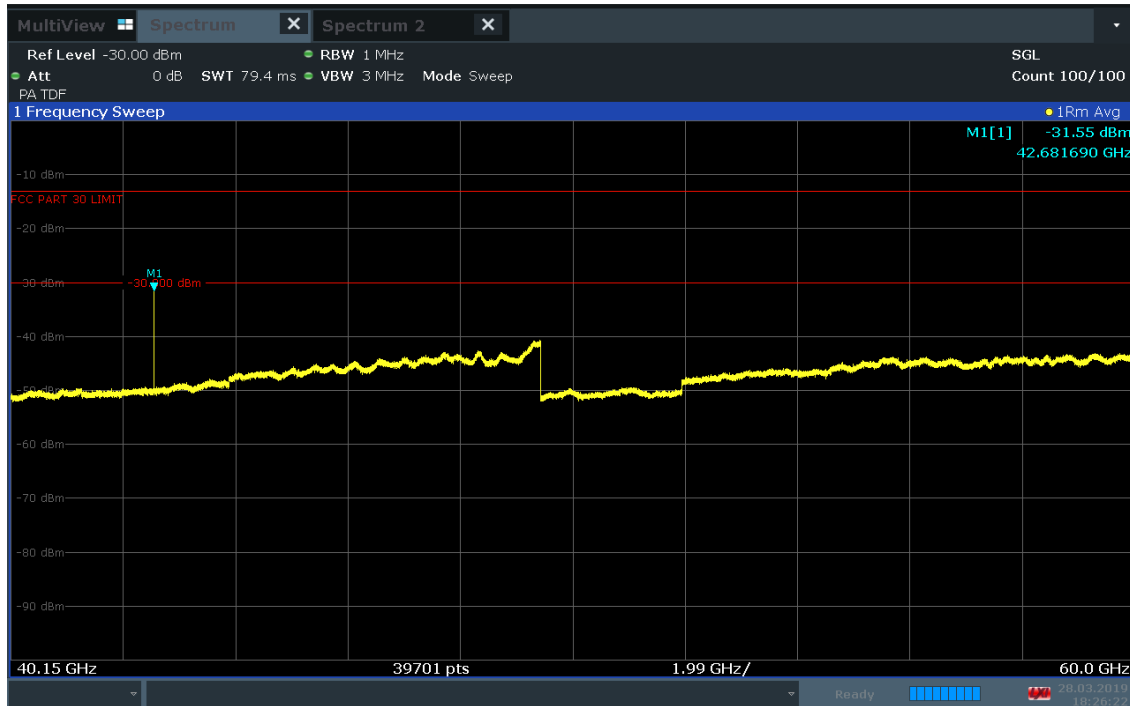
1. The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

$$(-27.49 \text{ dBm} + -21.92 \text{ dBm}) = (1.78 \text{ } \mu\text{W} + 6.43 \text{ } \mu\text{W}) = (8.21 \text{ } \mu\text{W}) = -20.86 \text{ dBm}$$

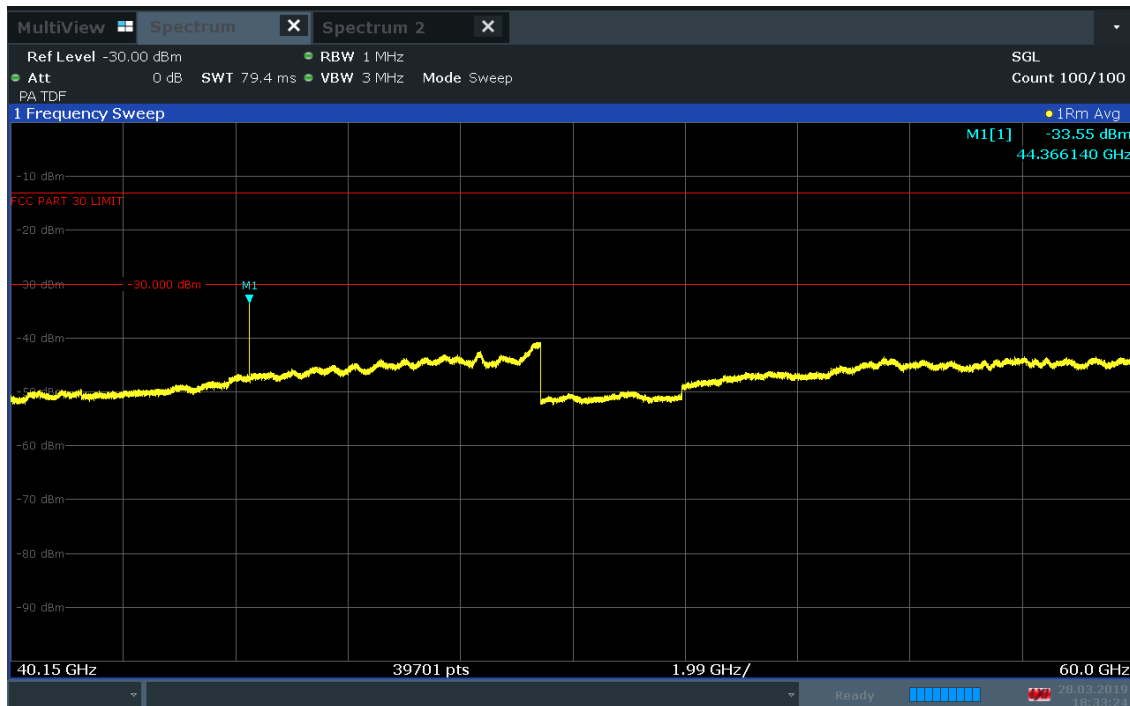
FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 133 of 355

ACLRRResults



Plot 7-179. L Patch Radiated Spurious Plot 40.15-60 GHz (1CC QPSK Low Channel H Beam)

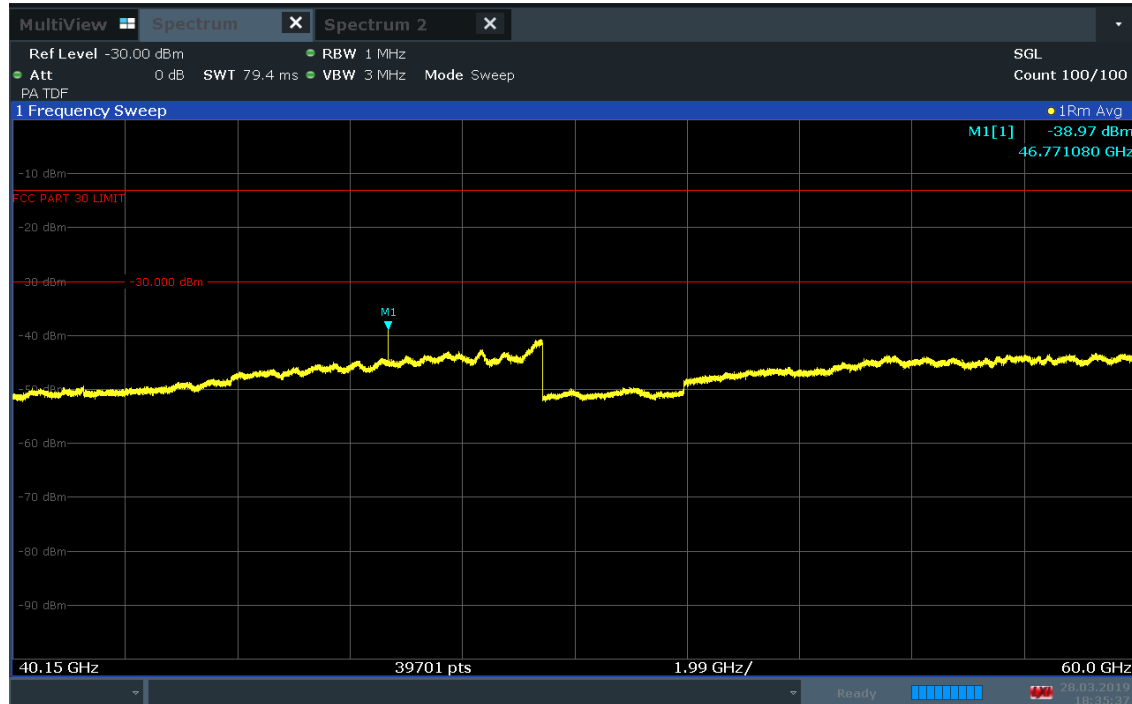
ACLRRResults



Plot 7-180. L Patch Radiated Spurious Plot 40.15-60 GHz (1CC QPSK Mid Channel H Beam)

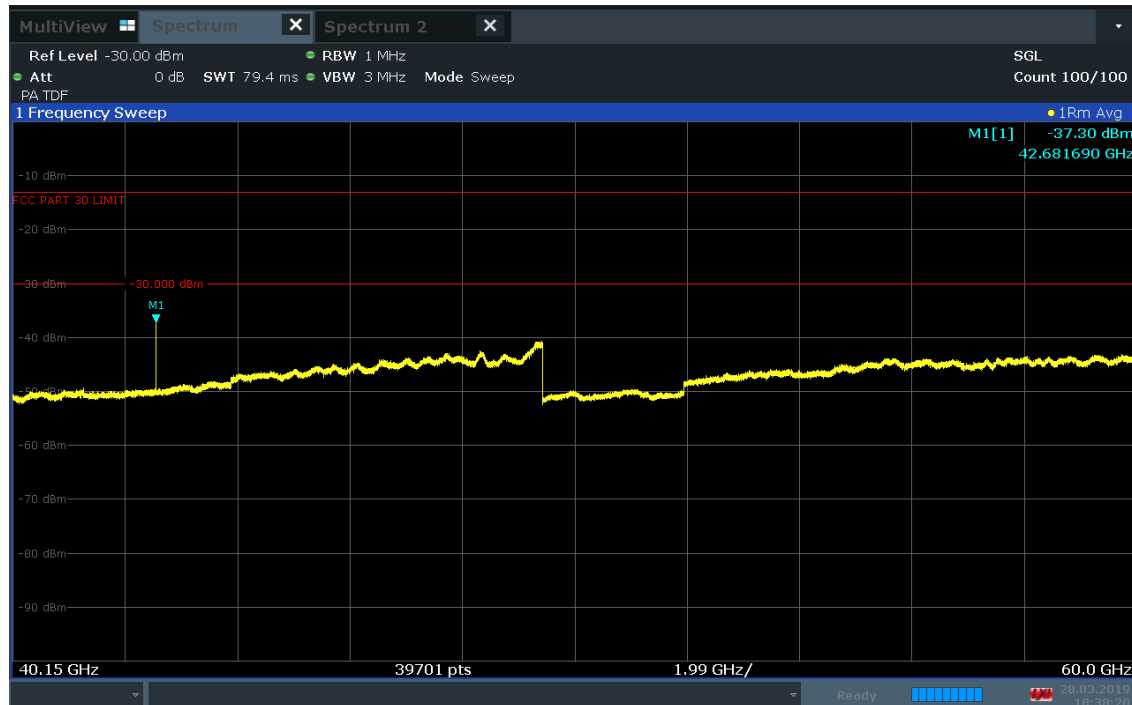
FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 134 of 355

ACLRResults



Plot 7-181. L Patch Radiated Spurious Plot 40.15-60 GHz (1CC QPSK High Channel H Beam)

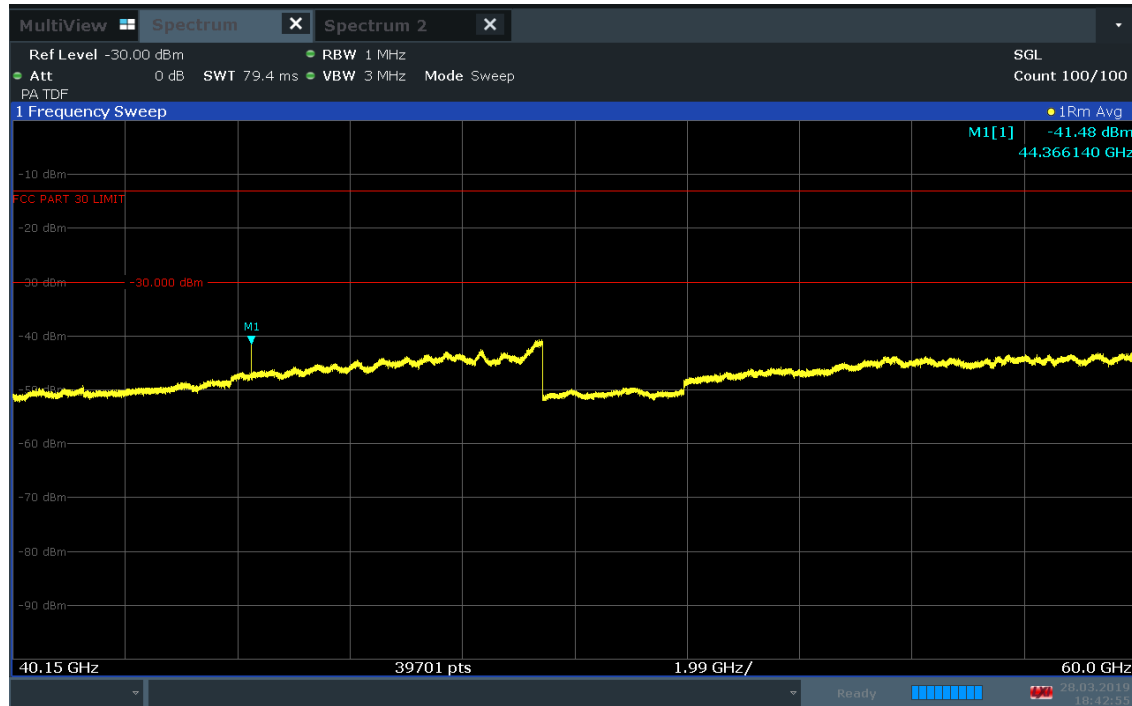
ACLRResults



Plot 7-182. L Patch Radiated Spurious Plot 40.15-60 GHz (1CC QPSK Low Channel V Beam)

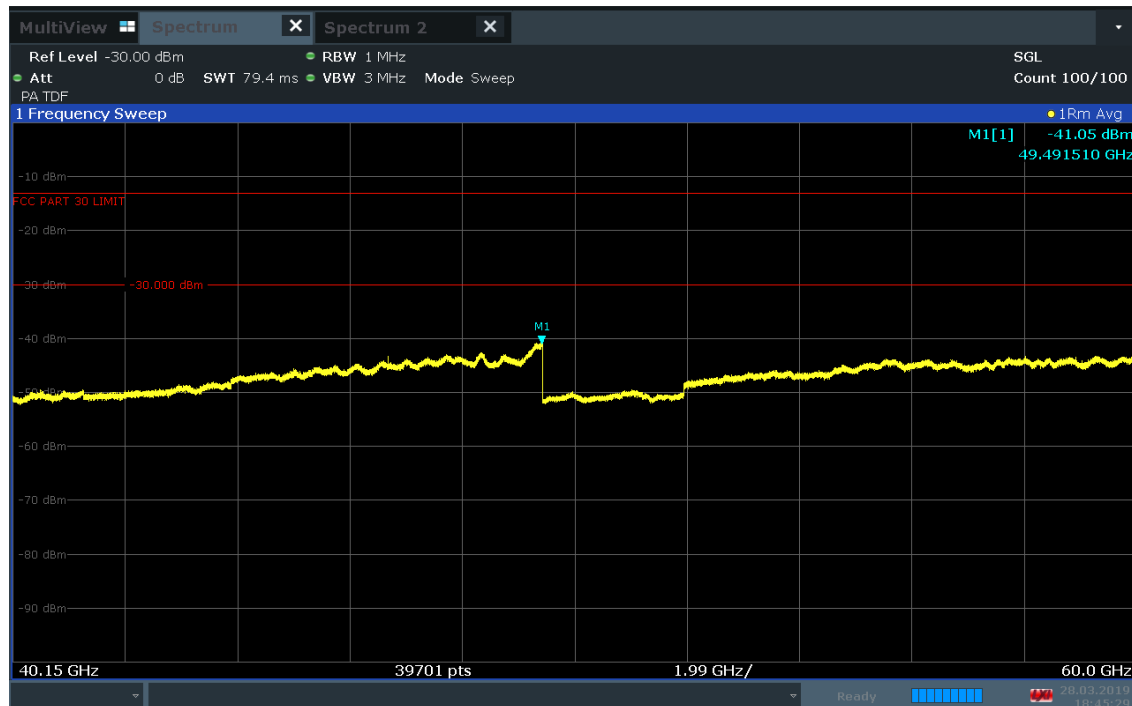
FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 135 of 355

ACLRResults



Plot 7-183. L Patch Radiated Spurious Plot 40.15-60 GHz (1CC QPSK Mid Channel V Beam)

ACLRResults



Plot 7-184. L Patch Radiated Spurious Plot 40.15-60 GHz (1CC QPSK High Channel V Beam)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 136 of 355

Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBμV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1.5 meter.

$$\text{RSE EIRP [dBm]} = \text{Analyzer Level [dBm]} + \text{AFCL [dB/m]} + 20\text{Log(Dm)} - 104.8$$

Frequency [MHz]	Detector/Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
42681.69	RMS/Avg	Low	50	QPSK	H	H	150	265	-31.55	-13.00	-18.55
44366.14	RMS/Avg	Mid	50	QPSK	H	H	150	217	-33.55	-13.00	-20.55
46771.08	RMS/Avg	High	50	QPSK	H	H	150	327	-38.97	-13.00	-25.97
42681.69	RMS/Avg	Low	50	QPSK	V	H	150	235	-37.30	-13.00	-24.30
44366.14	RMS/Avg	Mid	50	QPSK	V	H	150	268	-41.48	-13.00	-28.48
49491.51	RMS/Avg	High	50	QPSK	V	H	150	300	-41.05	-13.00	-28.05

Table 7-34. L Patch Spurious Emissions Table (40.15-60 GHz)

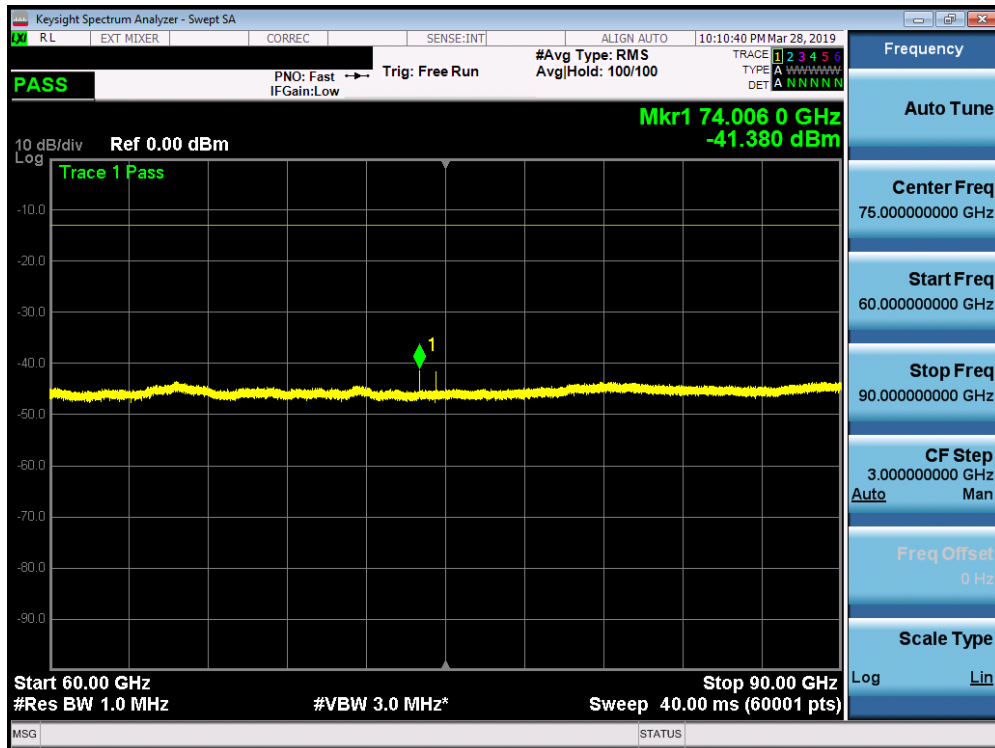
Notes

1. The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1.5 meter.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

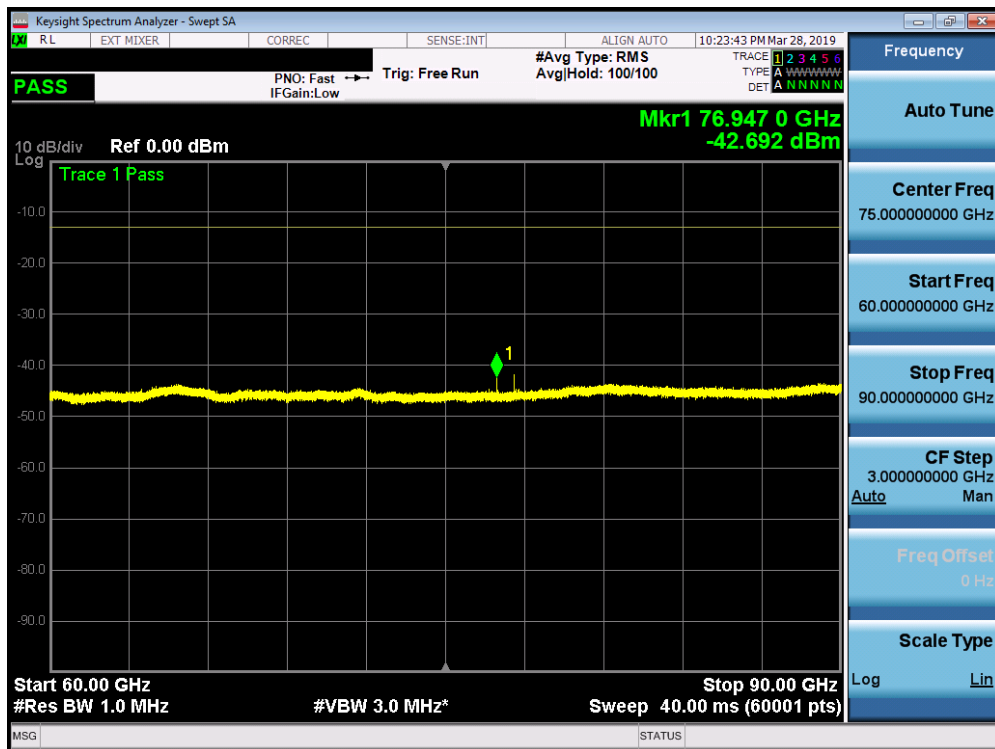
$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

$$(-31.55 \text{ dBm} + -37.30 \text{ dBm}) = (699.84 \text{ nW} + 186.21 \text{ nW}) = (886.05 \text{ nW}) = -30.53 \text{ dBm}$$

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 137 of 355



Plot 7-185. L Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK Low Channel H Beam)

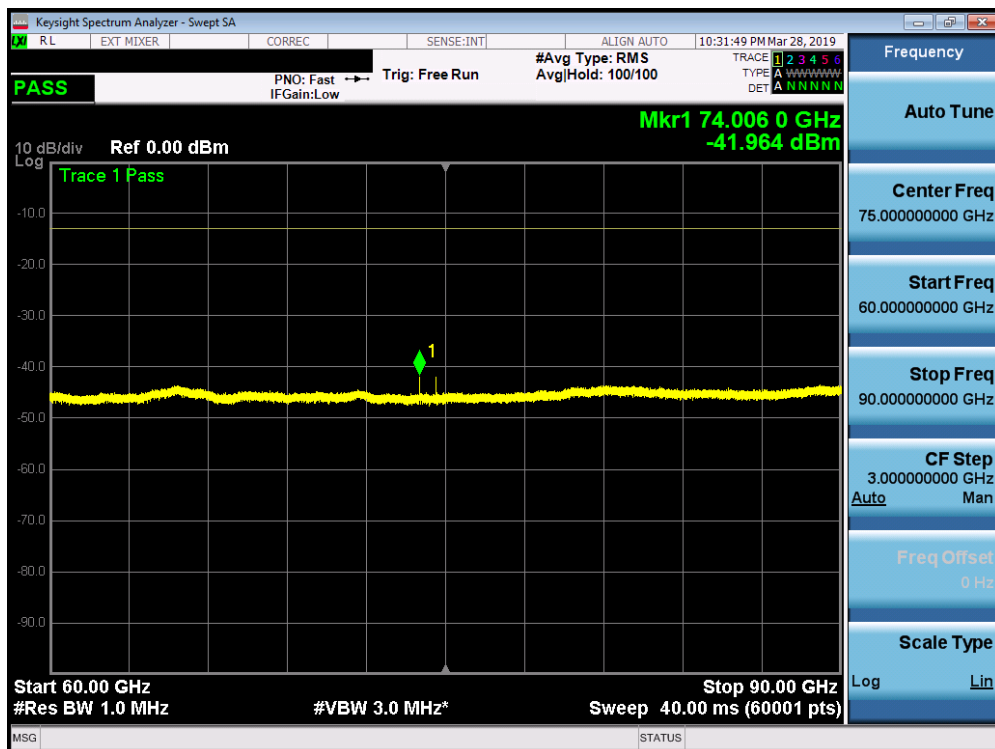


Plot 7-186. L Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK Mid Channel H Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 138 of 355

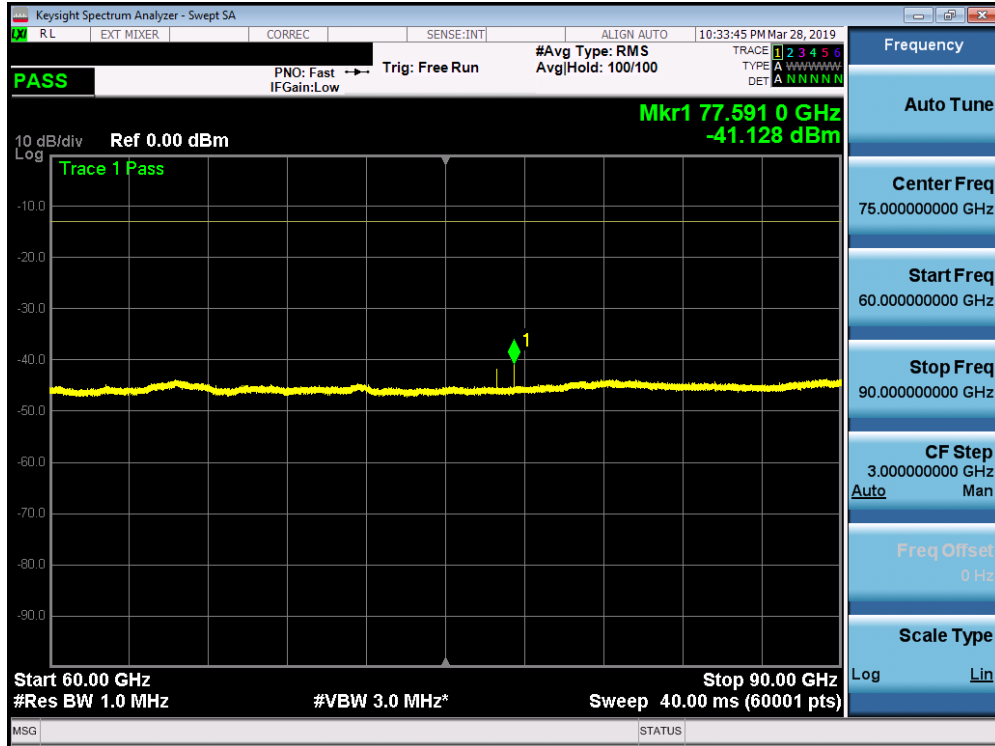


Plot 7-187. L Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK High Channel H Beam)

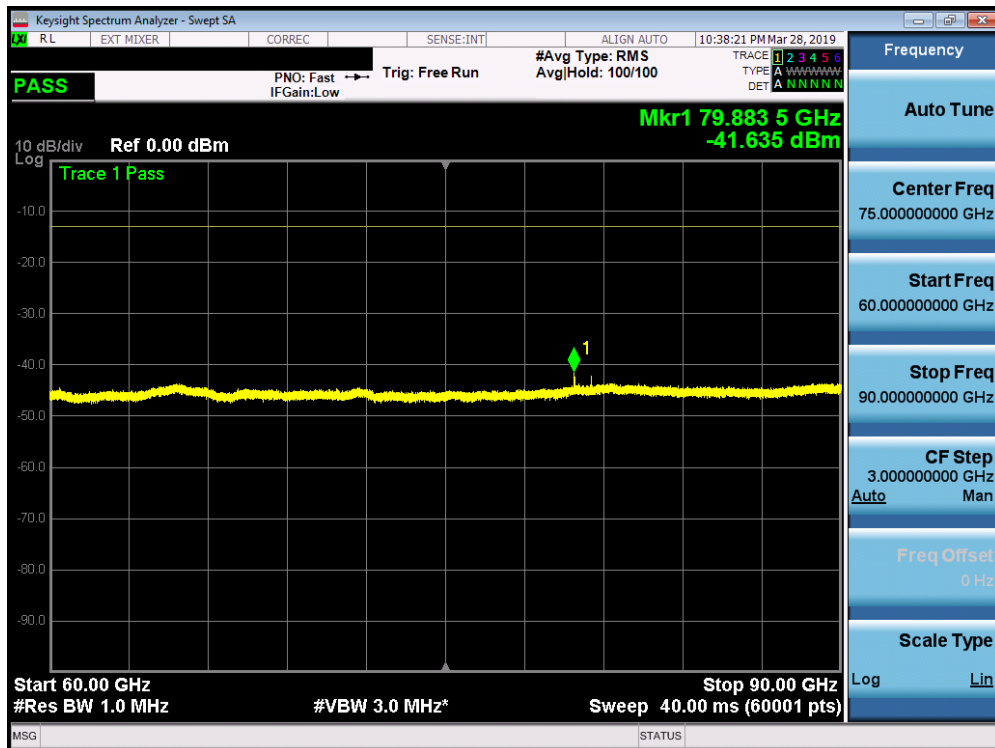


Plot 7-188. L Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK Low Channel V Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 139 of 355



Plot 7-189. L Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK Mid Channel V Beam)



Plot 7-190. L Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK High Channel V Beam)

FCC ID: A3LSMG977T	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset	Page 140 of 355

Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBμV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1 meter.

$$\text{RSE EIRP [dBm]} = \text{Analyzer Level [dBm]} + 107 + \text{AFCL [dB/m]} + 20\text{Log(Dm)} + \text{Harmonic Mixer Loss (dB)} - 104.8$$

Frequency [MHz]	Detector/Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
74006.00	RMS/Avg	Low	50	QPSK	H	V	150	308	-41.38	-13.00	-28.38
76947.00	RMS/Avg	Mid	50	QPSK	H	V	150	314	-42.69	-13.00	-29.69
79883.50	RMS/Avg	High	50	QPSK	H	V	150	288	-42.91	-13.00	-29.91
74006.00	RMS/Avg	Low	50	QPSK	V	H	150	316	-41.96	-13.00	-28.96
77591.00	RMS/Avg	Mid	50	QPSK	V	H	150	324	-41.13	-13.00	-28.13
79883.50	RMS/Avg	High	50	QPSK	V	H	150	333	-41.64	-13.00	-28.64

Table 7-35. L Patch Spurious Emissions Table (60-90GHz)

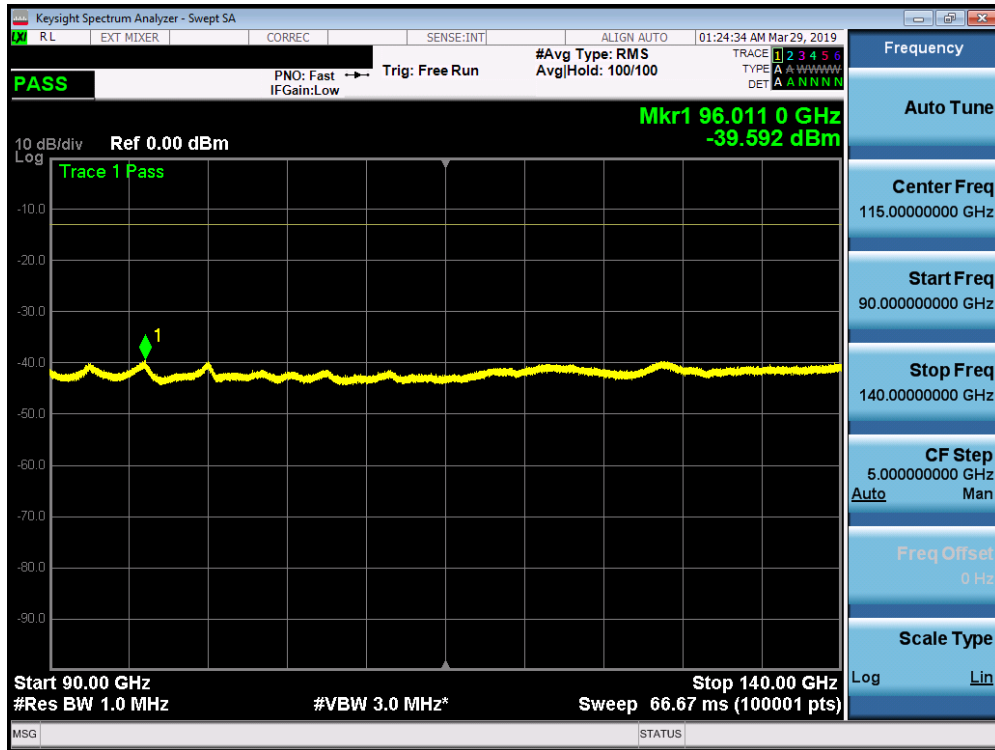
Notes

1. The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

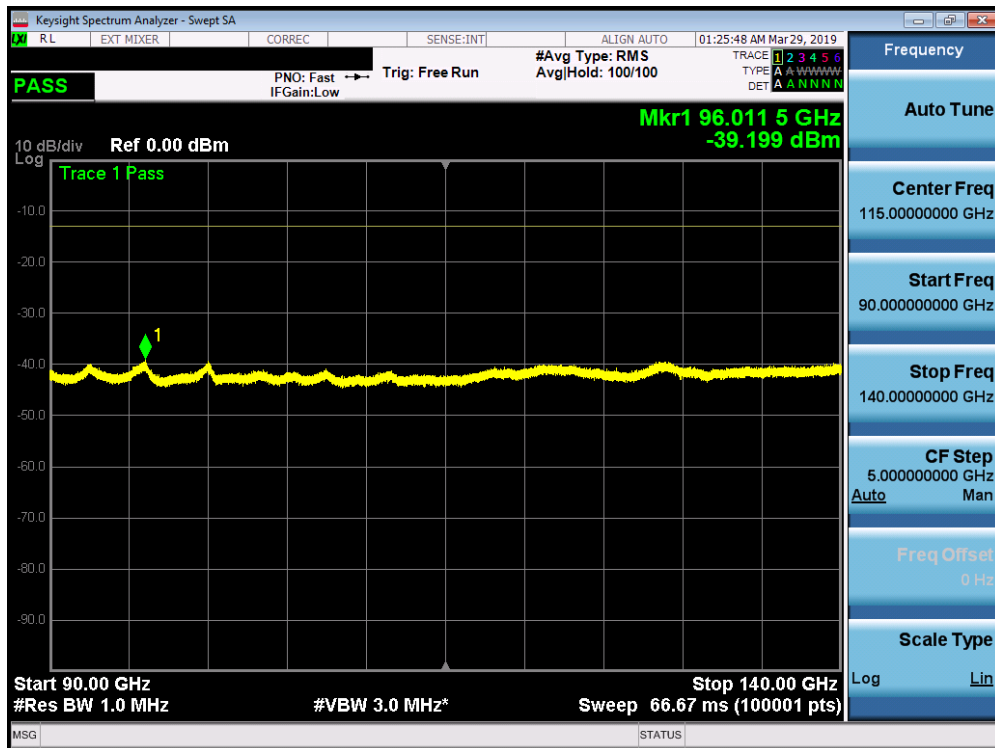
$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

$$(-41.38 \text{ dBm} + -41.96 \text{ dBm}) = (72.78 \text{ nW} + 63.68 \text{ nW}) = (136.46 \text{ nW}) = -38.65 \text{ dBm}$$

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 141 of 355

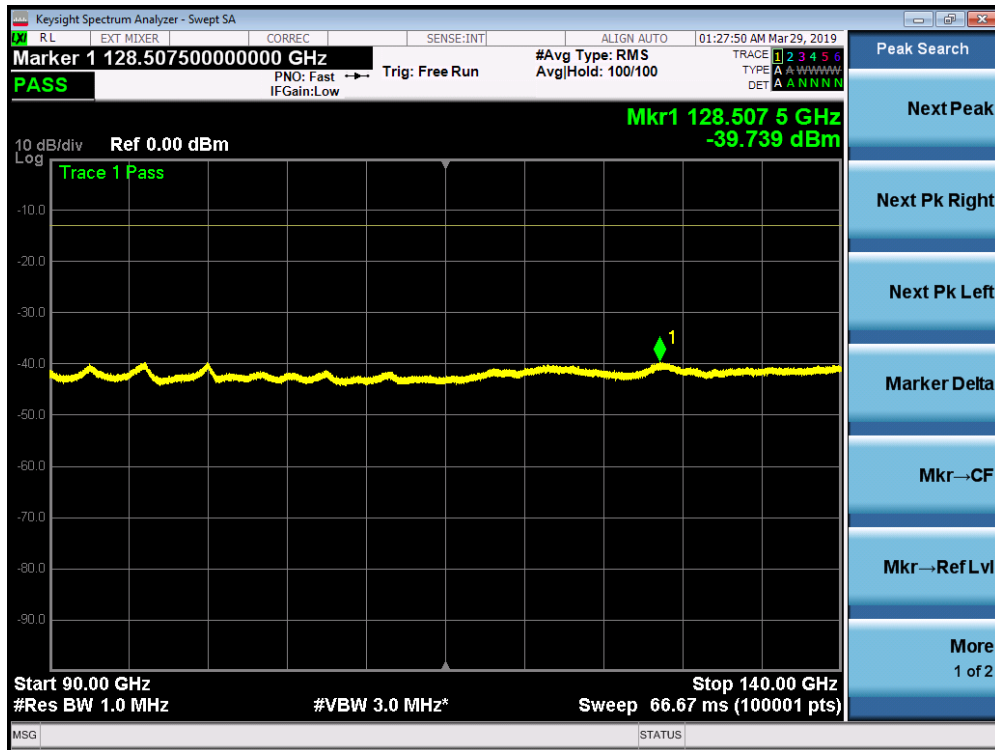


Plot 7-191. L Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK Low Channel H Beam)

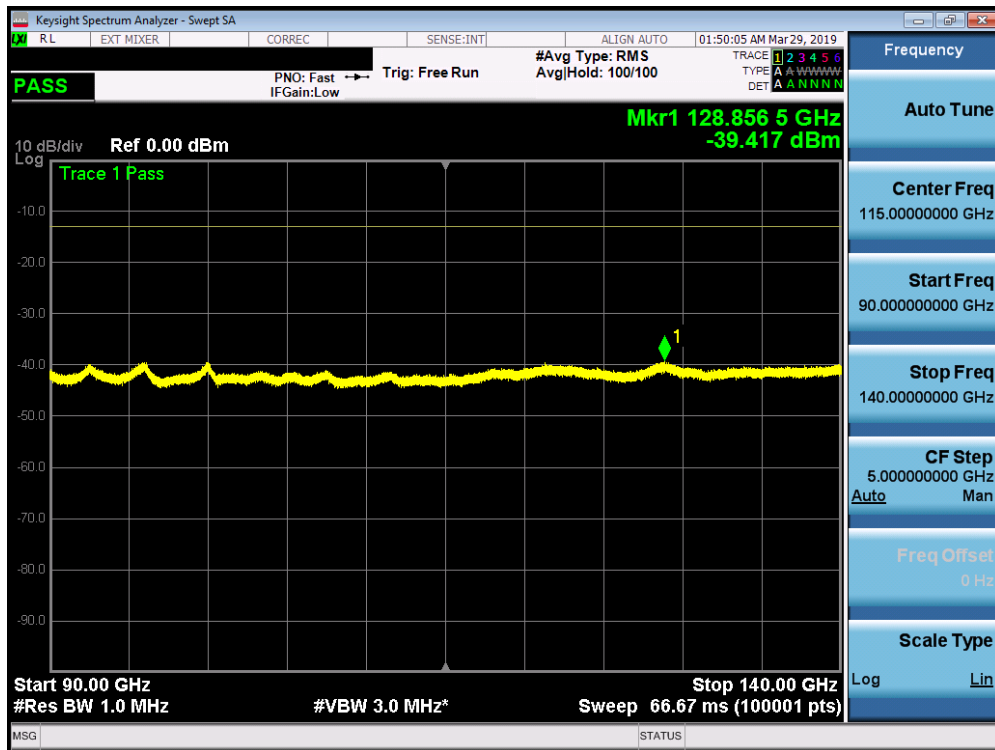


Plot 7-192. L Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK Mid Channel H Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 142 of 355

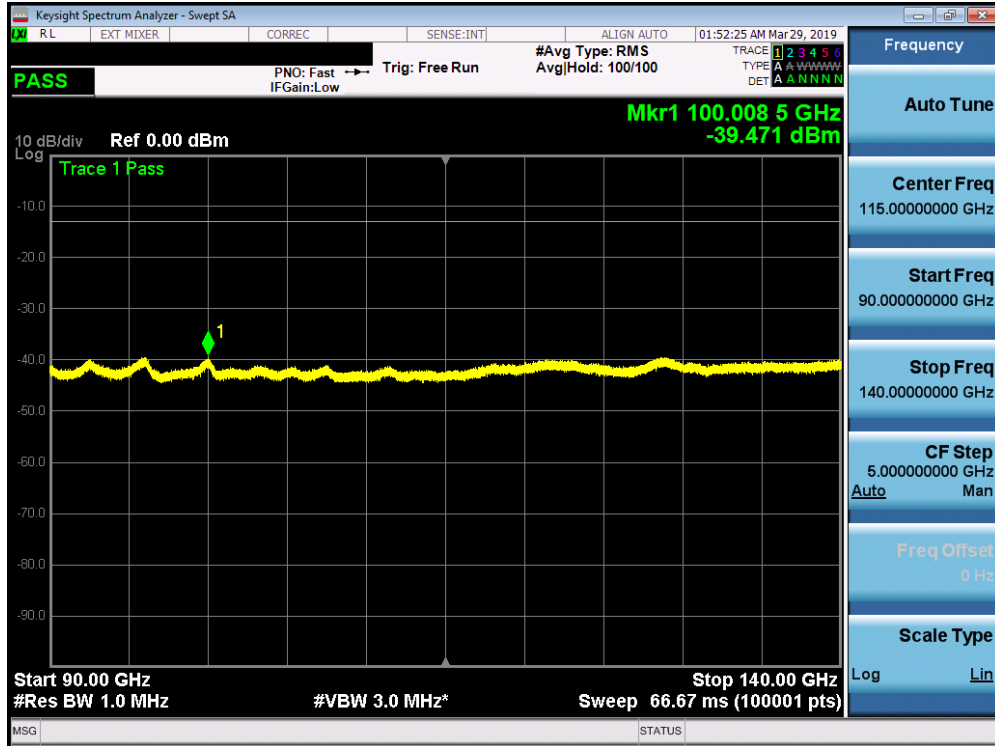


Plot 7-193. L Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK High Channel H Beam)

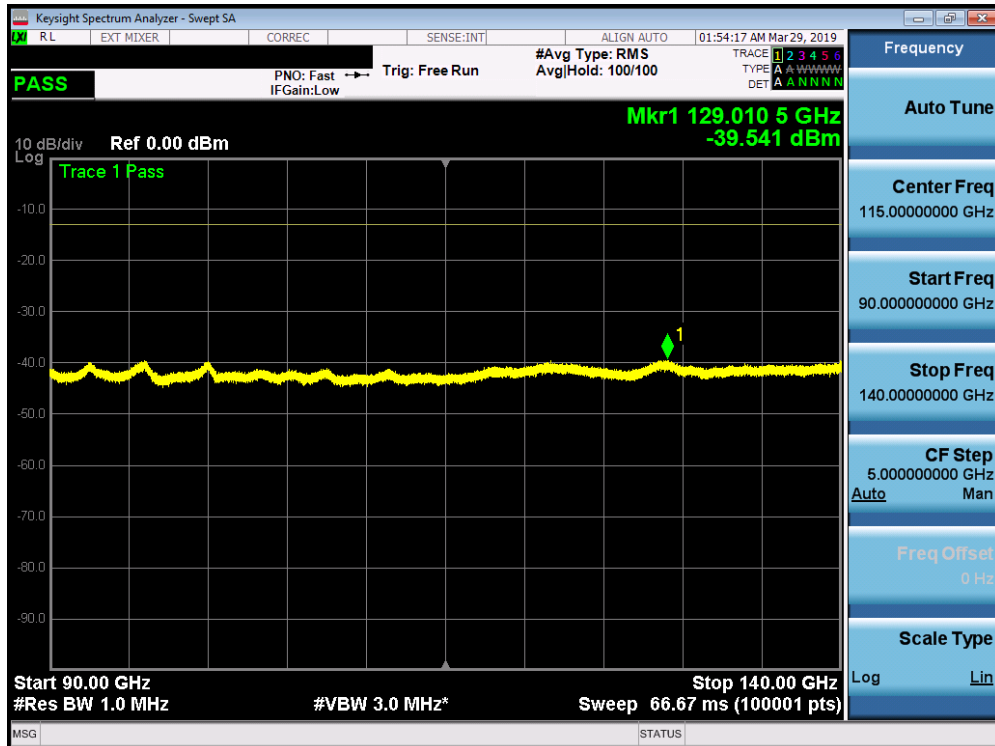


Plot 7-194. L Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK Low Channel V Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 143 of 355



Plot 7-195. L Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK Mid Channel V Beam)



Plot 7-196. L Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK High Channel V Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 144 of 355

Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBμV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1 meter.

$$\text{RSE EIRP [dBm]} = \text{Analyzer Level [dBm]} + 107 + \text{AFCL [dB/m]} + 20\text{Log(Dm)} + \text{Harmonic Mixer Loss (dB)} - 104.8$$

Frequency [MHz]	Detector/Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
96011.00	RMS/Avg	Low	50	QPSK	H	V	-	-	-39.59	-13.00	-26.59
96011.50	RMS/Avg	Mid	50	QPSK	H	V	-	-	-39.20	-13.00	-26.20
128507.50	RMS/Avg	High	50	QPSK	H	V	-	-	-39.74	-13.00	-26.74
128856.50	RMS/Avg	Low	50	QPSK	V	H	-	-	-39.42	-13.00	-26.42
100008.50	RMS/Avg	Mid	50	QPSK	V	H	-	-	-39.47	-13.00	-26.47
129010.50	RMS/Avg	High	50	QPSK	V	H	-	-	-39.54	-13.00	-26.54

Table 7-36. L Patch Spurious Emissions Table (90-140GHz)

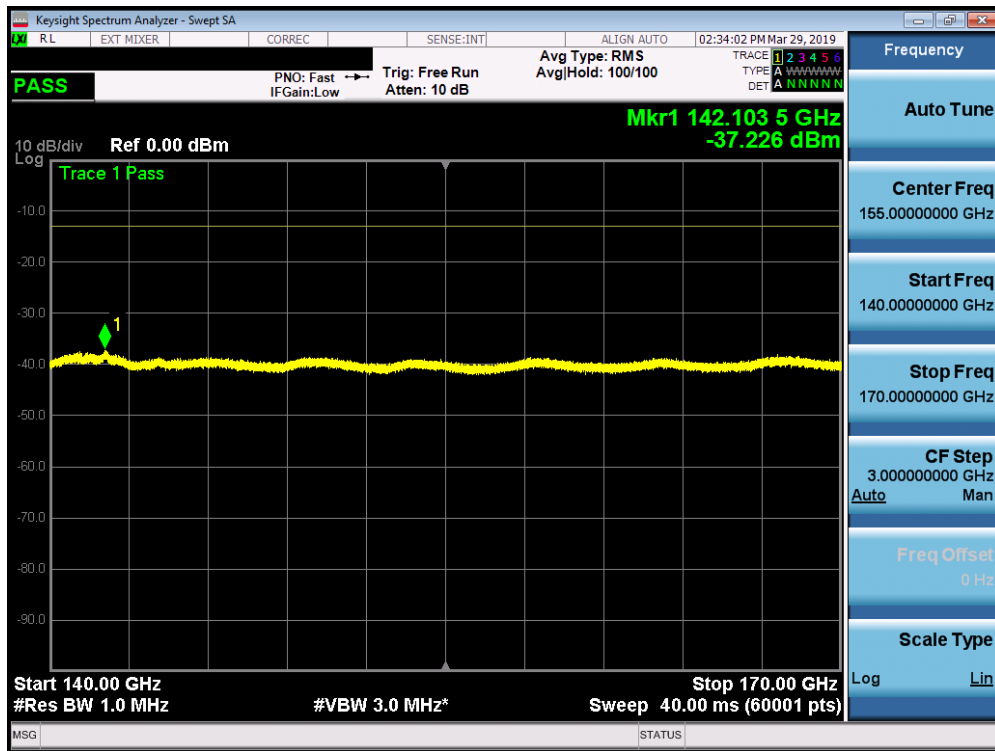
Notes

1. The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

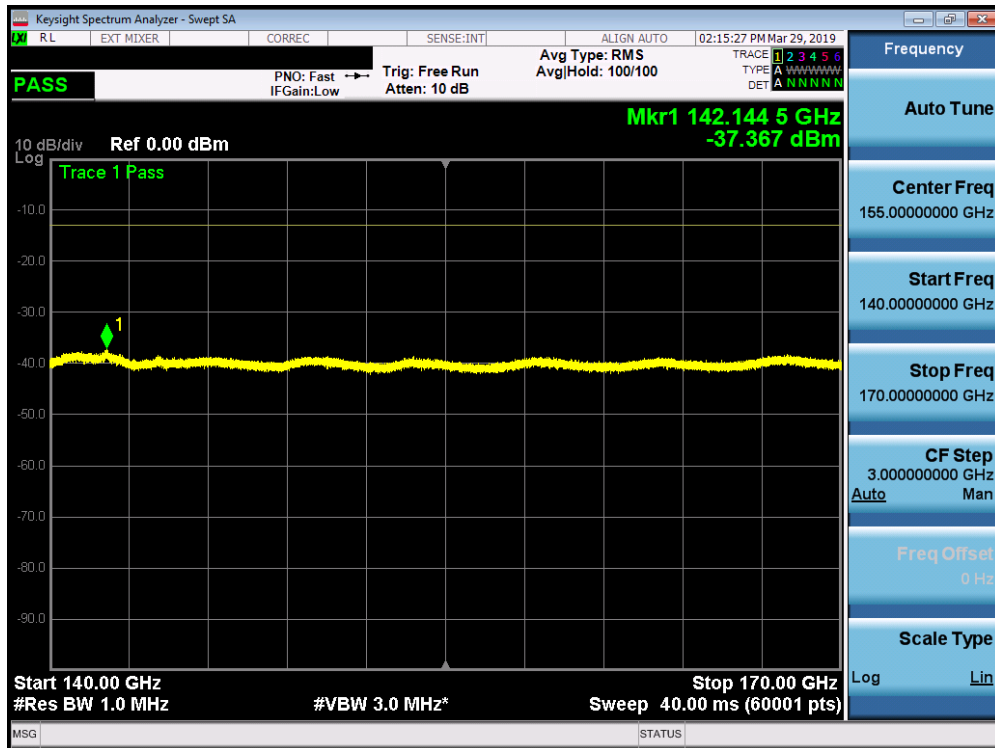
$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

$$(-39.20 \text{ dBm} + -39.47 \text{ dBm}) = (120.23 \text{ nW} + 112.98 \text{ nW}) = (233.21 \text{ nW}) = -36.32 \text{ dBm}$$

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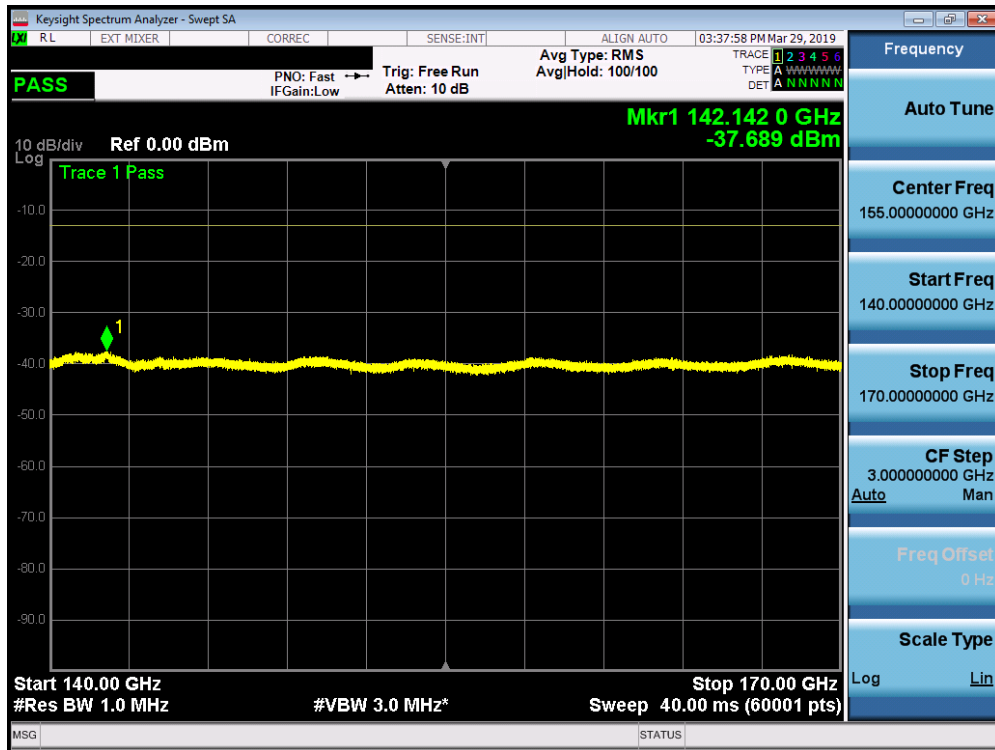


Plot 7-197. L Patch Radiated Spurious Plot 140-170 GHz (1CC QPSK Low Channel H Beam)

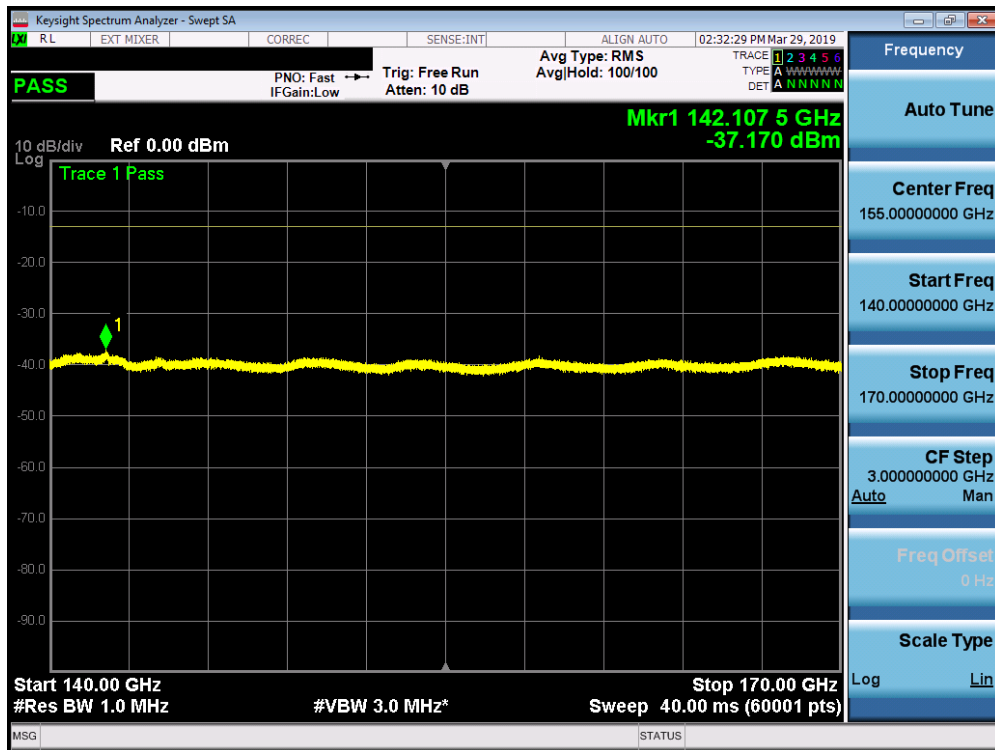


Plot 7-198. L Patch Radiated Spurious Plot 140-170 GHz (1CC QPSK Mid Channel H Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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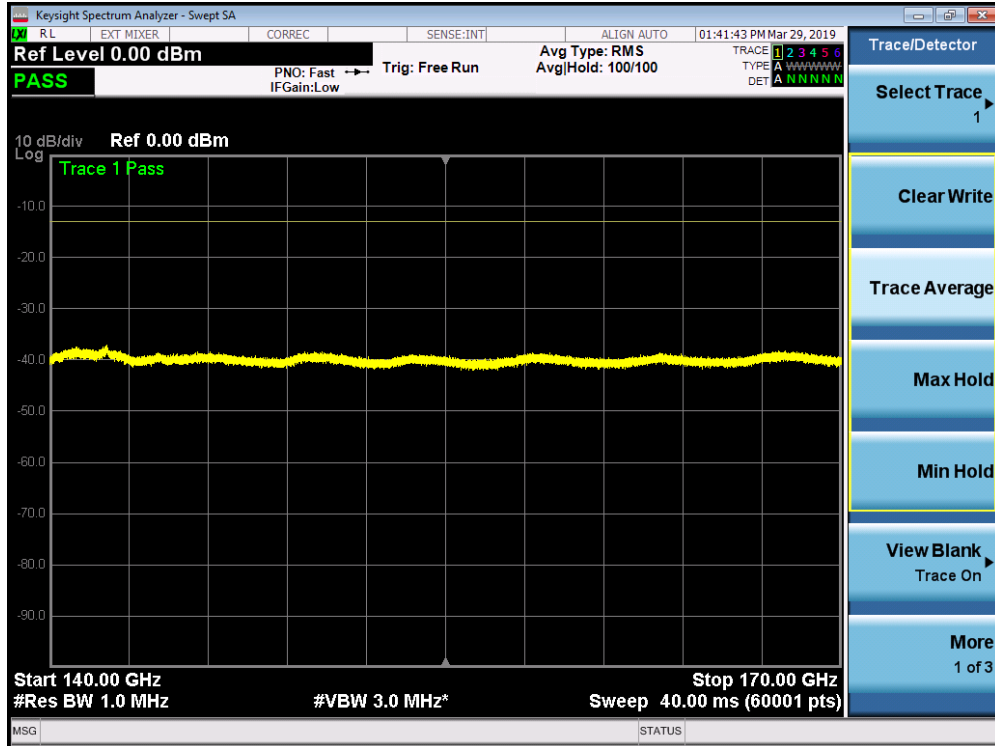


Plot 7-199. L Patch Radiated Spurious Plot 140-170 GHz (1CC QPSK High Channel H Beam)

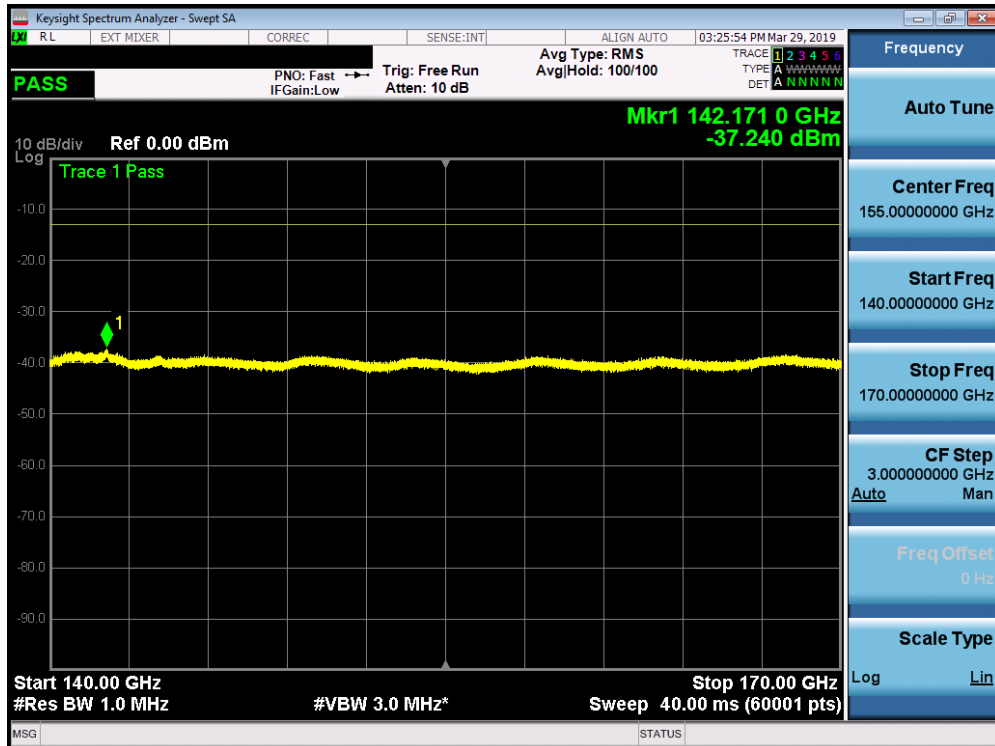


Plot 7-200. L Patch Radiated Spurious Plot 140-170 GHz (1CC QPSK Low Channel V Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-201. L Patch Radiated Spurious Plot 140-170 GHz (1CC QPSK Mid Channel V Beam)



Plot 7-202. L Patch Radiated Spurious Plot 140-170 GHz (1CC QPSK High Channel V Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBμV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1 meter.

$$\text{RSE EIRP [dBm]} = \text{Analyzer Level [dBm]} + 107 + \text{AFCL[dB/m]} + 20\text{Log(Dm)} + \text{Harmonic Mixer Loss (dB)} - 104.8$$

Frequency [MHz]	Detector/Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
142103.50	RMS/Avg	Low	50	QPSK	H	V	-	-	-37.23	-13.00	-24.23
142144.50	RMS/Avg	Mid	50	QPSK	H	V	-	-	-37.37	-13.00	-24.37
142142.00	RMS/Avg	High	50	QPSK	H	V	-	-	-37.69	-13.00	-24.69
142107.50	RMS/Avg	Low	50	QPSK	V	H	-	-	-37.17	-13.00	-24.17
142161.00	RMS/Avg	Mid	50	QPSK	V	H	-	-	-37.14	-13.00	-24.14
142171.00	RMS/Avg	High	50	QPSK	V	H	-	-	-37.24	-13.00	-24.24

Table 7-37. L Patch Spurious Emissions Table (140-170GHz)

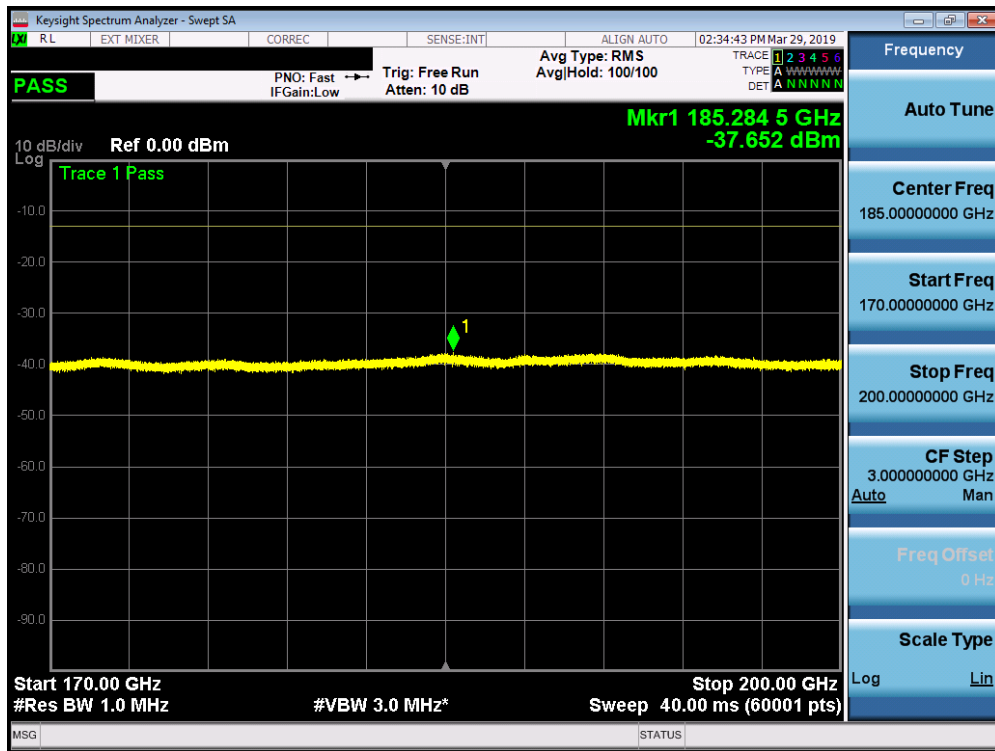
Notes

1. The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

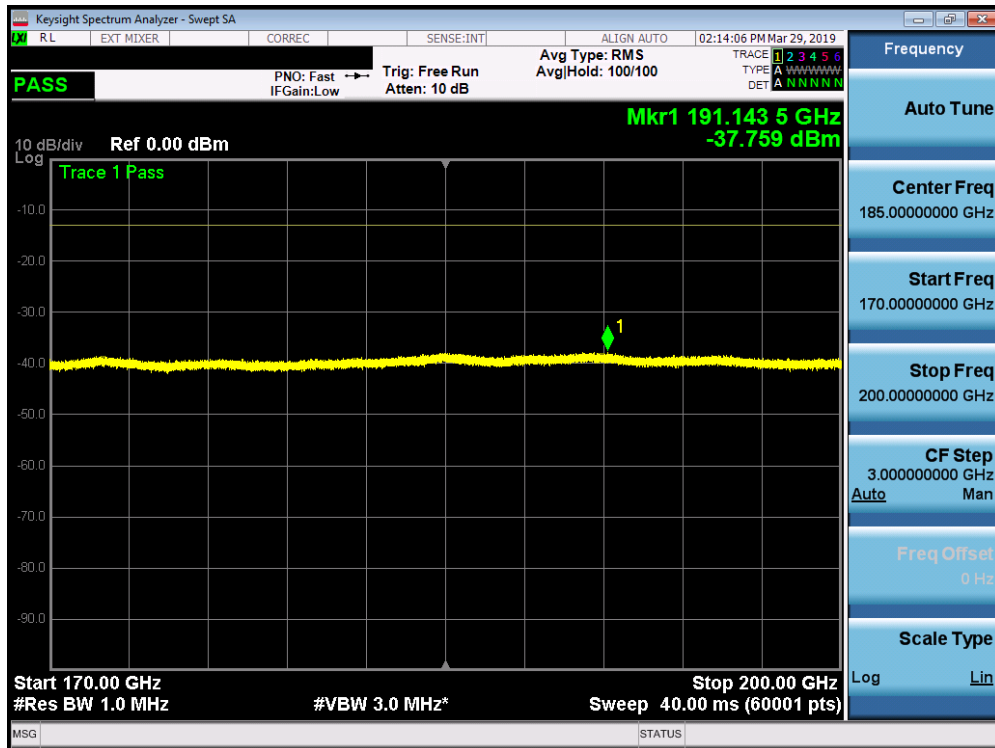
$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

$$(-37.23 \text{ dBm} + -37.17 \text{ dBm}) = (189.23 \text{ nW} + 191.87 \text{ nW}) = (381.10 \text{ nW}) = -34.19 \text{ dBm}$$

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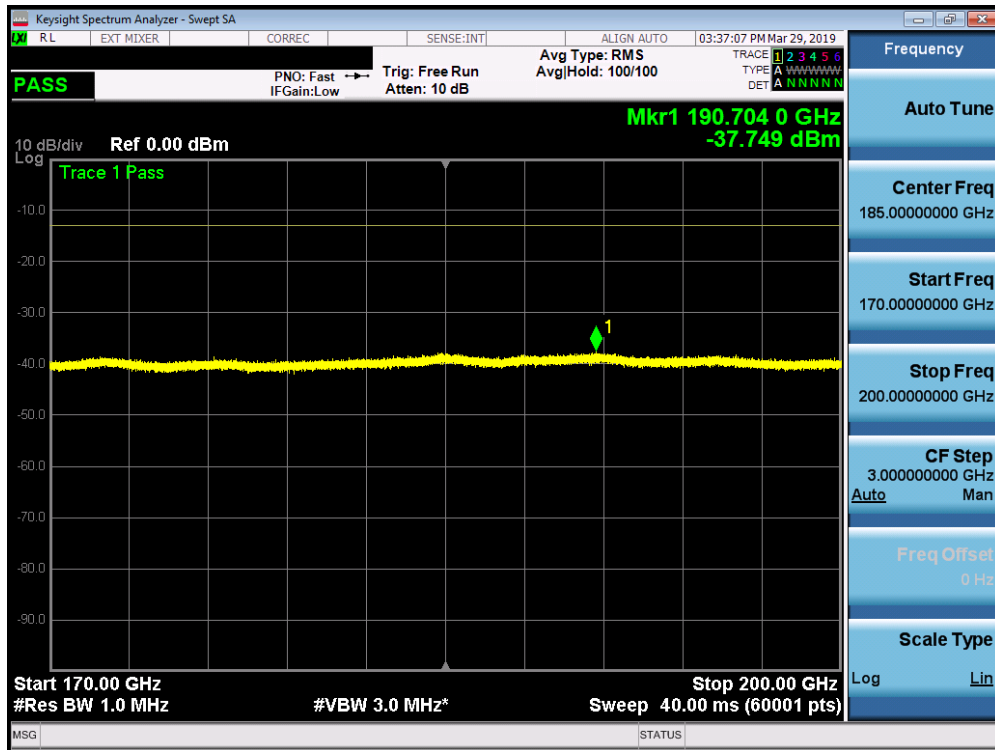


Plot 7-203. L Patch Radiated Spurious Plot 170-200 GHz (1CC QPSK Low Channel H Beam)

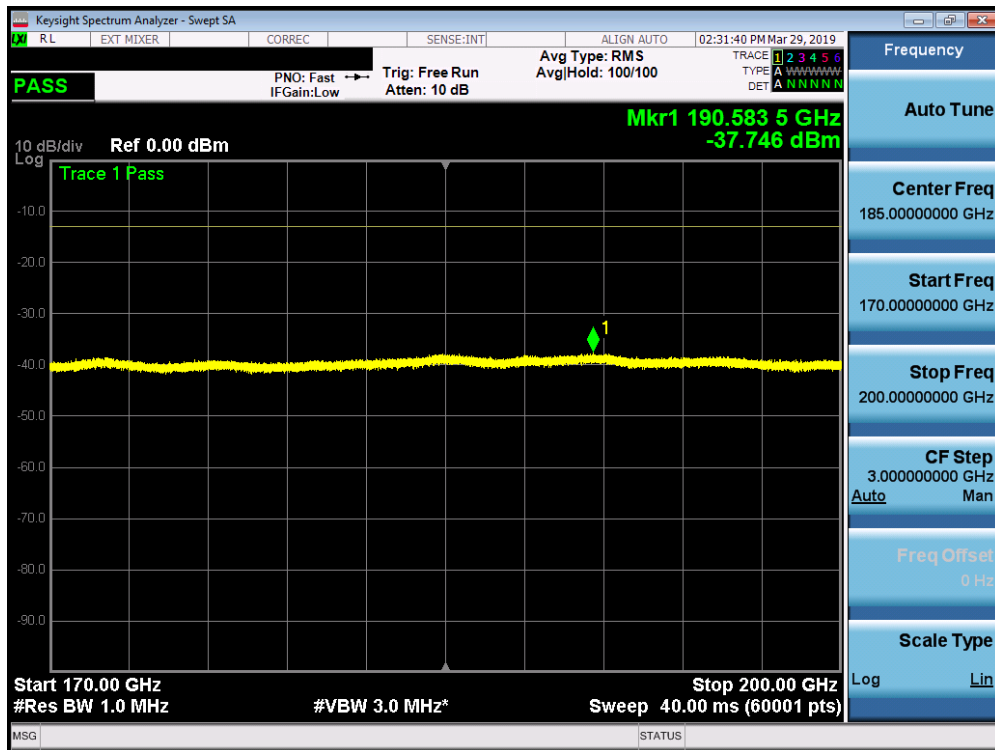


Plot 7-204. L Patch Radiated Spurious Plot 170-200 GHz (1CC QPSK Mid Channel H Beam)

FCC ID: A3LSMG977T	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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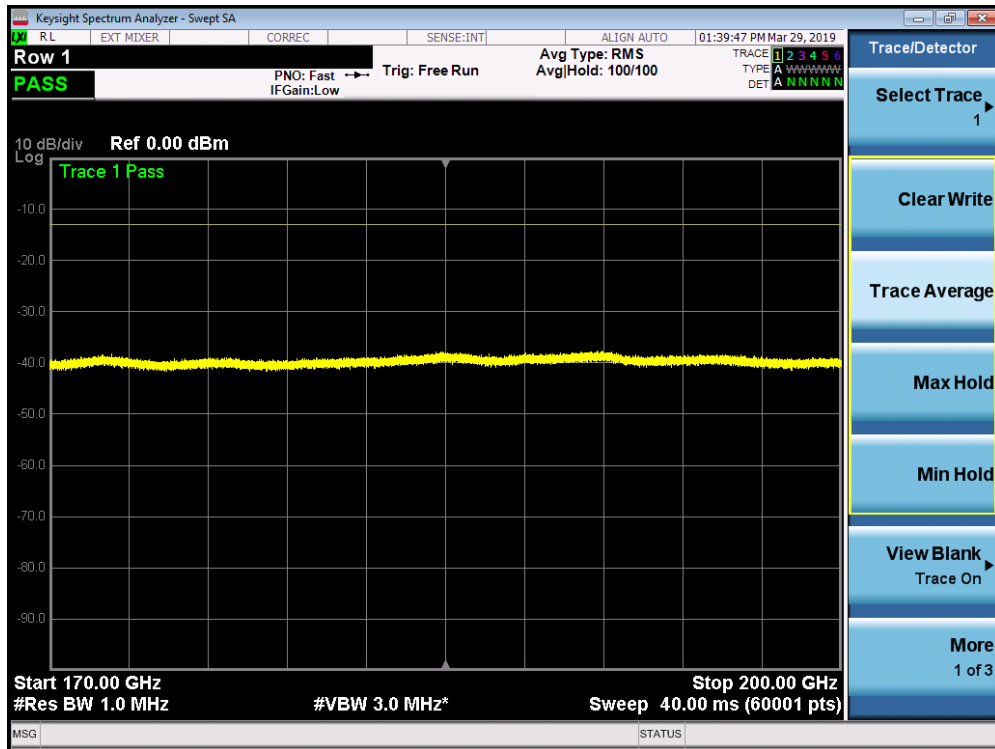


Plot 7-205. L Patch Radiated Spurious Plot 170-200 GHz (1CC QPSK High Channel H Beam)

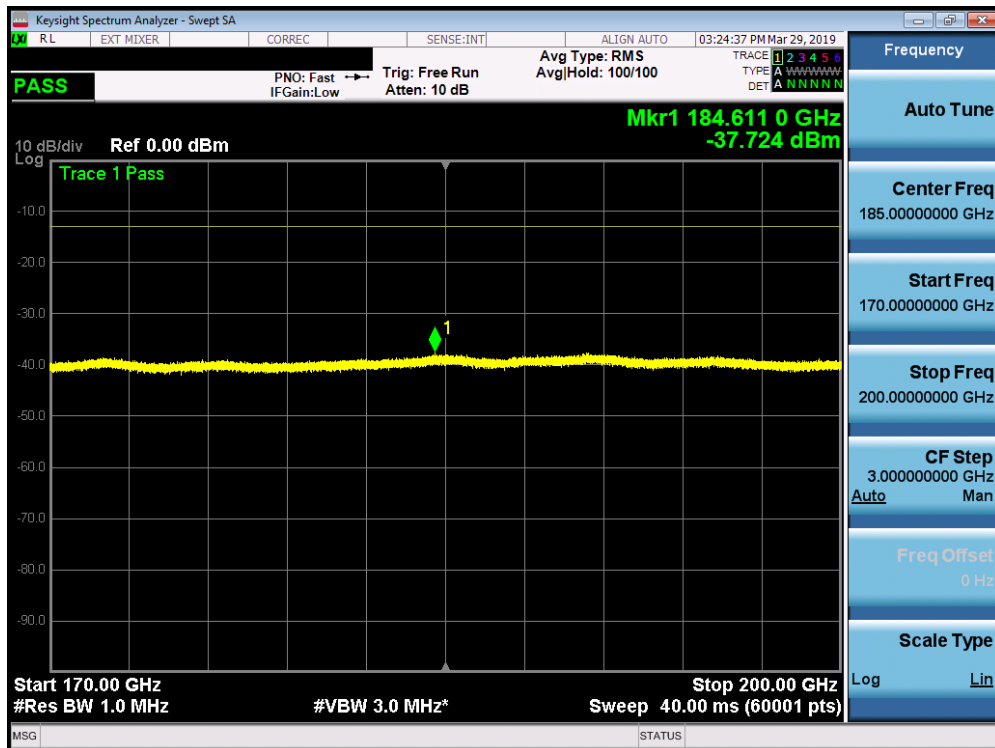


Plot 7-206. L Patch Radiated Spurious Plot 170-200 GHz (1CC QPSK Low Channel V Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-207. L Patch Radiated Spurious Plot 170-200 GHz (1CC QPSK Mid Channel V Beam)



Plot 7-208. L Patch Radiated Spurious Plot 170-200 GHz (1CC QPSK High Channel V Beam)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 152 of 355

Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBμV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1 meter.

$$\text{RSE EIRP [dBm]} = \text{Analyzer Level [dBm]} + 107 + \text{AFCL[dB/m]} + 20\text{Log(Dm)} + \text{Harmonic Mixer Loss (dB)} - 104.8$$

Frequency [MHz]	Detector/Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
185284.50	RMS/Avg	Low	50	QPSK	H	V	-	-	-37.65	-13.00	-24.65
191143.50	RMS/Avg	Mid	50	QPSK	H	V	-	-	-37.76	-13.00	-24.76
190704.00	RMS/Avg	High	50	QPSK	H	V	-	-	-37.75	-13.00	-24.75
190583.50	RMS/Avg	Low	50	QPSK	V	H	-	-	-37.75	-13.00	-24.75
190930.00	RMS/Avg	Mid	50	QPSK	V	H	-	-	-37.65	-13.00	-24.65
184611.00	RMS/Avg	High	50	QPSK	V	H	-	-	-37.72	-13.00	-24.72

Table 7-38. L Patch Spurious Emissions Table (170-200GHz)

Notes

1. The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

$$(-37.65 \text{ dBm} + -37.75 \text{ dBm}) = (171.79 \text{ nW} + 167.88 \text{ nW}) = (339.67 \text{ nW}) = -34.69 \text{ dBm}$$

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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7.5 Band Edge Emissions

§2.1051, §30.203

Test Overview

All out of band emissions are measured in a radiated setup while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All modulations 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 -13dBm/1MHz. However, in the bands immediately outside and adjacent to the licensee's frequency block, having a bandwidth equal to 10 percent of the channel bandwidth, the conductive power or the total radiated power of any emission shall be -5 dBm/MHz or lower.

Test Procedure Used

ANSI C63.26-2015 Section 5 and ANSI C63.26-2015 Section 6.4

Test Settings

1. Start and stop frequency were set such that both upper and lower band edges are measured.
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW = 1MHz
4. VBW $\geq 3 \times$ RBW
5. Detector = RMS
6. Number of sweep points $\geq 2 \times$ Span/RBW
7. Trace mode = trace average
8. Sweep time = auto couple
9. The trace was allowed to stabilize

Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning.
- 2) Band Edge measurements in this section are shown as equivalent conductive powers for direct comparison to the 30.203 limit. The conductive power at the band edge is calculated by subtracting the gain of the EUT's antenna from the measured EIRP level. Antenna Gain information is shown on the following page.
- 3) Band Edge emissions were measured at a 1 meter distance.
- 4) The spectrum analyzer for each measurement shows an offset value that was determined using the measurement antenna factor, cable loss, far field measurement distance, and EUT antenna gain. A sample calculation is shown on the following page.
- 5) MIMO Band Edge plots shown below are mathematically summed conductive powers between spectrum analyzer measurements on H Beam and V Beam. This MIMO bandedge plot was produced by summing the following two spectrum analyzer traces: (1) the first trace is maximized while the EUT is transmitting in H-beam and (2) the second trace is maximized while the EUT is transmitting in V-beam.
- 6) The MIMO Band Edges were calculated by using the "measure and sum the spectra across the outputs" technique specified in Section 6.4.3.2.2 of ANSI C63.26-2015. The spectra were summed linearly and converted to dBm for comparison with the limit.

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7.5.1 Antenna Gain Information at the Band Edge

The following antenna gain information is provided to demonstrate the antenna performance of the 37 – 40GHz band. These antenna gains were subtracted from the measured EIRP levels at the lower and upper band edge frequencies to determine an equivalent conductive power that was compared directly with the §30.203 limits.

Antenna	Channel	Beam Polarization	Beam ID	Gain (dBi)
J Dipole	Low	H	4	7.06
		V	133	7.24
	High	H	17	8.19
		V	144	8.17
J Patch	Low	H	25	10.33
		V	168	11.29
	High	H	24	10.19
		V	153	11.64
K Patch	Low	H	45	10.54
		V	172	10.14
	High	H	45	10.82
		V	172	8.23
L Patch	Low	H	35	11.35
		V	164	9.82
	High	H	35	10.63
		V	176	8.94

Table 7-39. Antenna Gains at the Band Edges

Sample Analyzer Offset Calculation (at 37GHz)

Measurement Antenna Factor = 41.30dB/m

Cable Loss = 10.01dB

EUT Antenna Gain = 7.06dBi

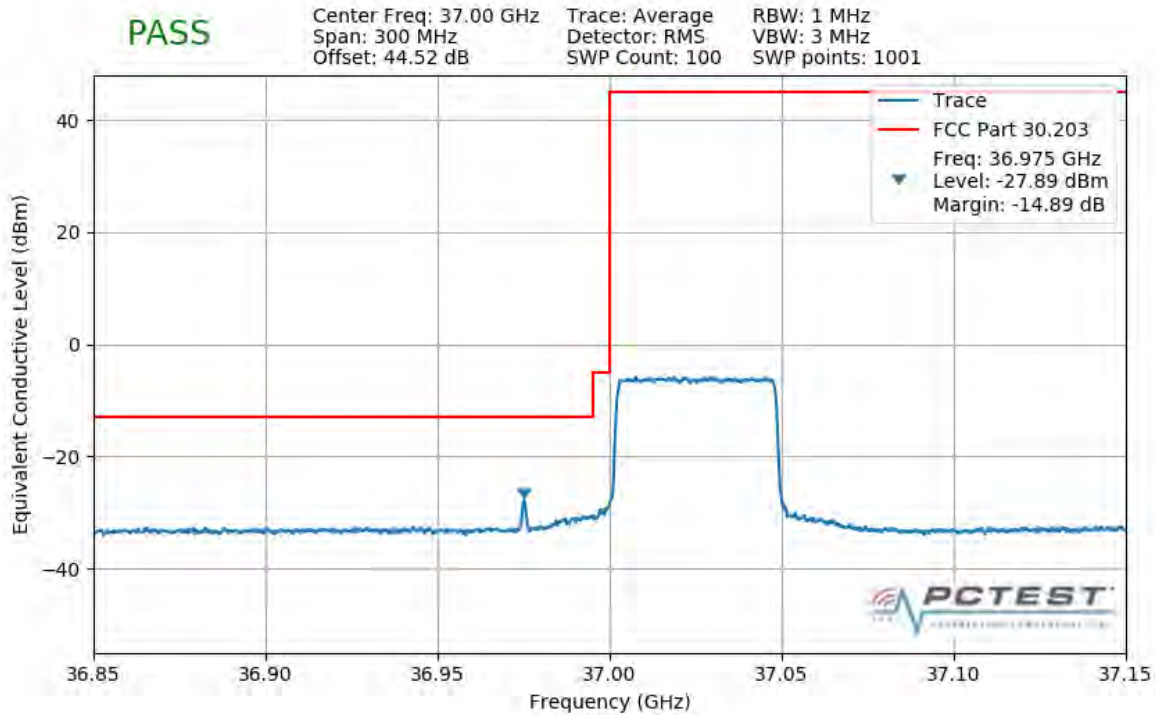
Analyzer Offset (dB) = AF (dB/m) + CL (dB) + 107 + 20log₁₀(D) – 104.8dB – Gain (dBi), where D = 1m

$$= 41.30\text{dB/m} + 10.01\text{dB} + 107 + 20\log_{10}(1\text{m}) - 104.8\text{dB} - 7.06\text{dBi}$$

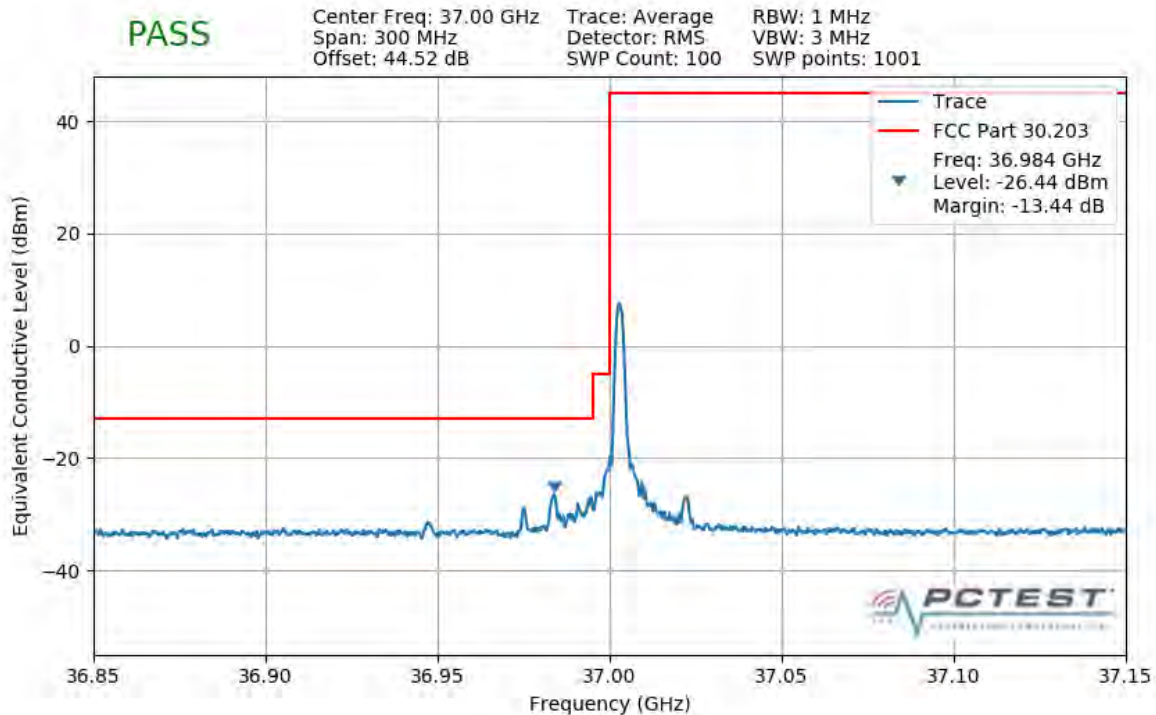
$$= 44.52\text{dB}$$

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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7.5.2 J Dipole Band Edge H Beam

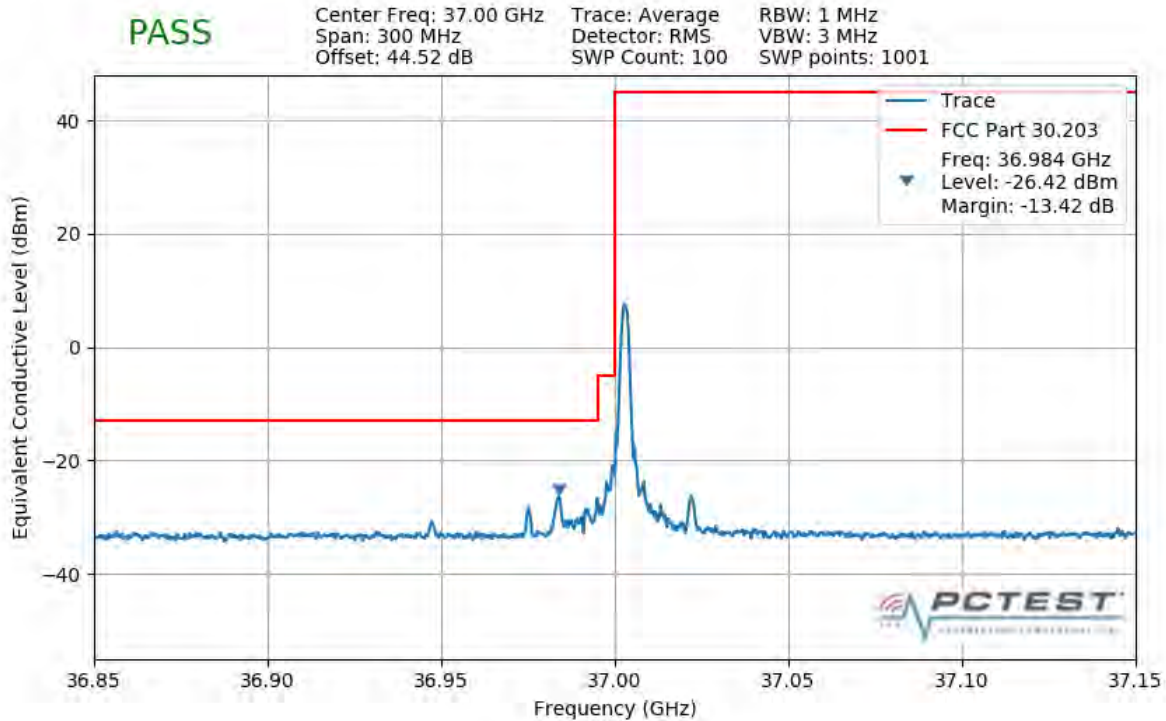


Plot 7-209. Lower Band Edge Plot (1CC 50MHz QPSK Full RB)

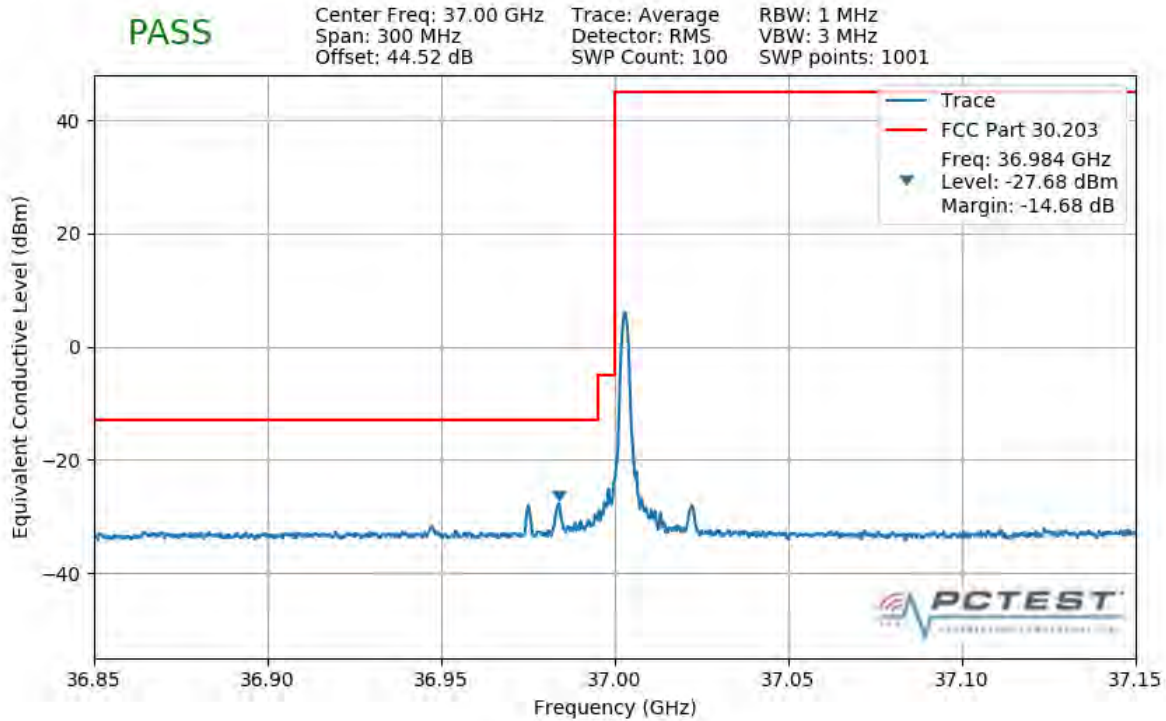


Plot 7-210. Lower Band Edge Plot (1CC 50MHz QPSK 1 RB)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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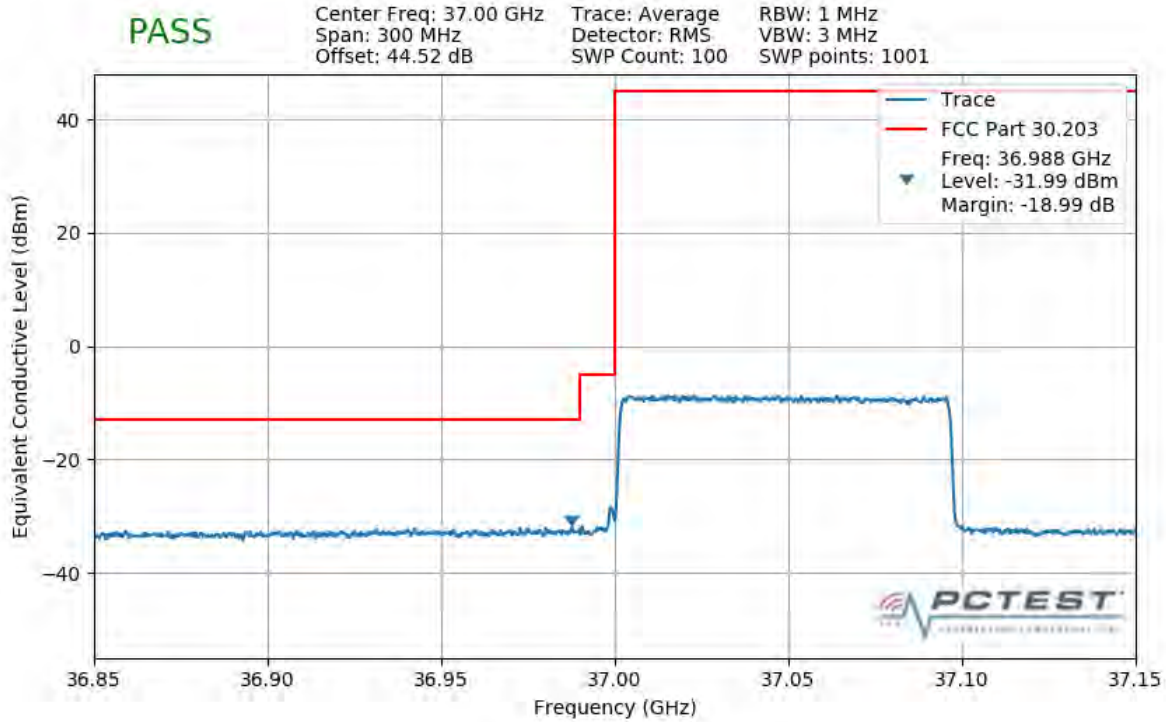


Plot 7-211. Lower Band Edge Plot (1CC 50MHz 16QAM 1 RB)

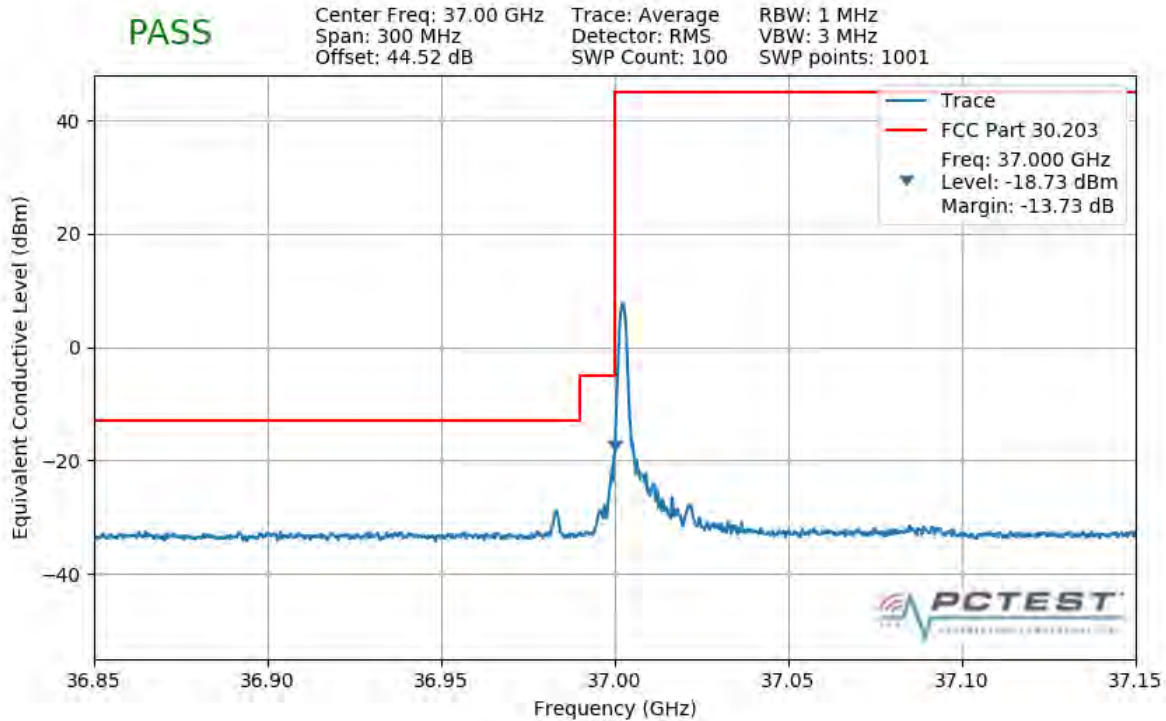


Plot 7-212. Lower Band Edge Plot (1CC 50MHz 64QAM 1 RB)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 157 of 355

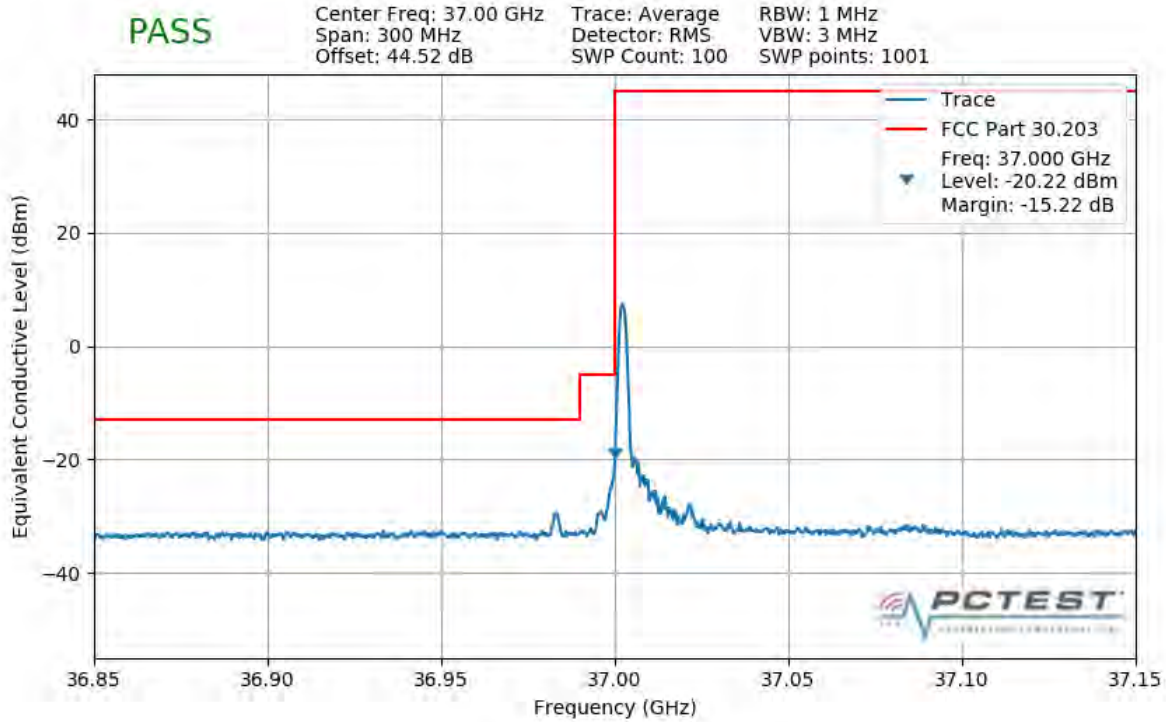


Plot 7-213. Lower Band Edge Plot (1CC 100MHz QPSK Full RB)

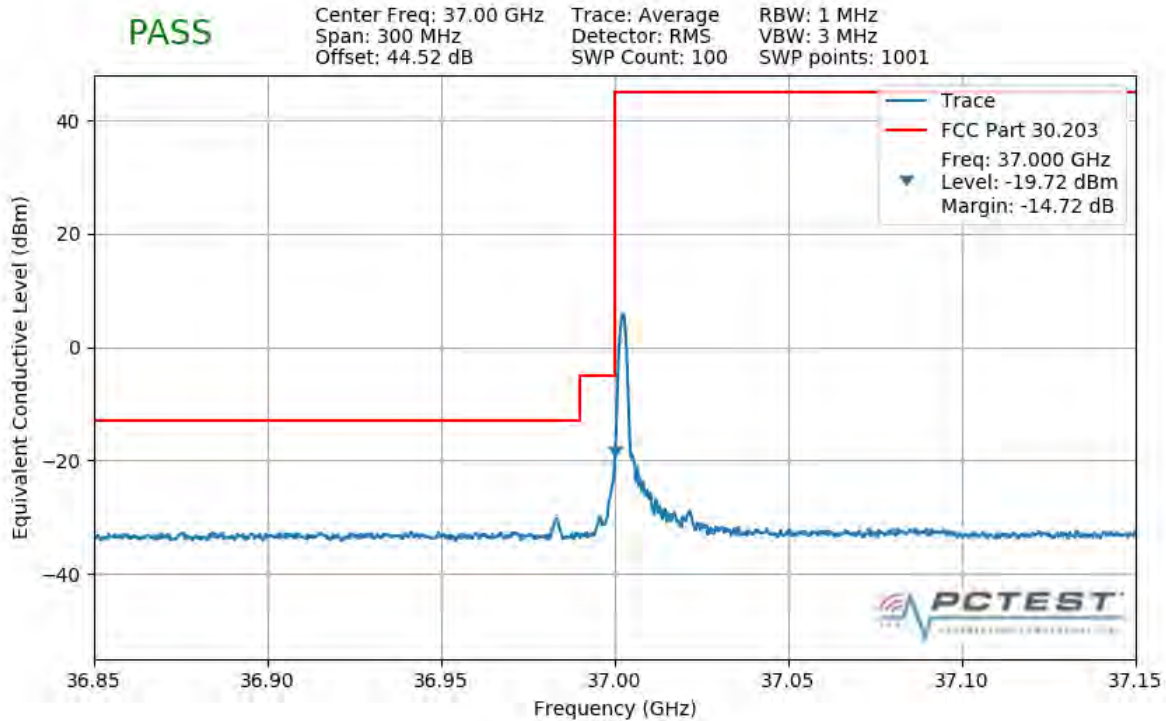


Plot 7-214. Lower Band Edge Plot (1CC 100MHz QPSK 1 RB)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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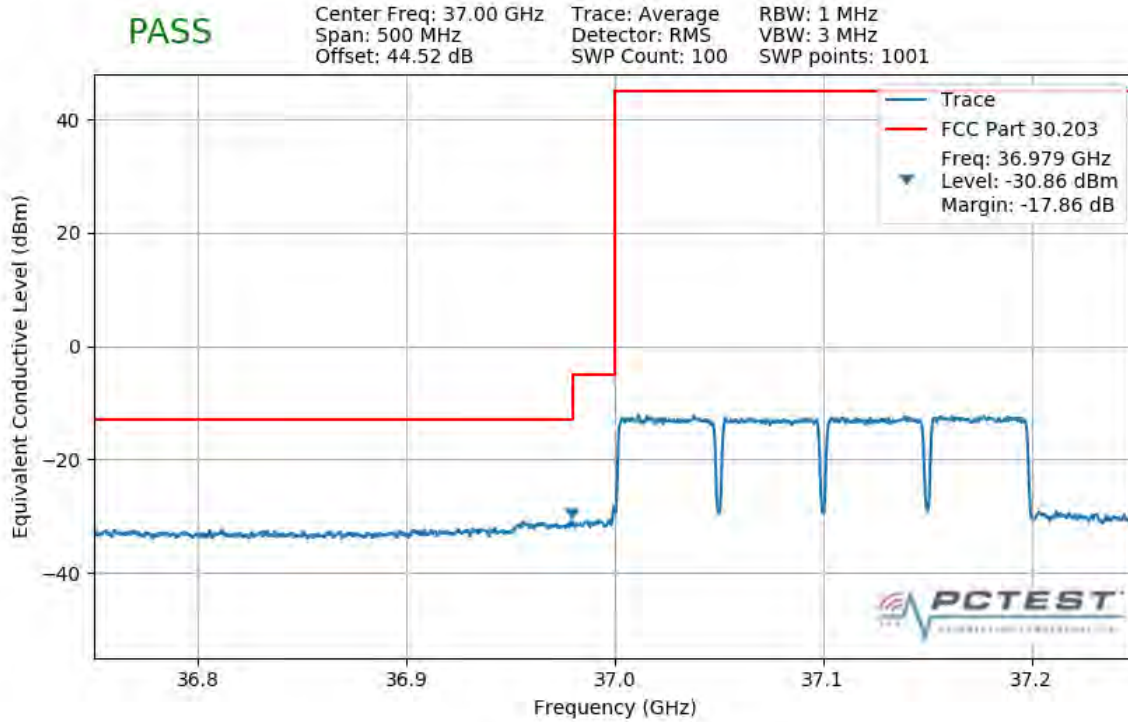


Plot 7-215. Lower Band Edge Plot (1CC 100MHz 16QAM 1 RB)

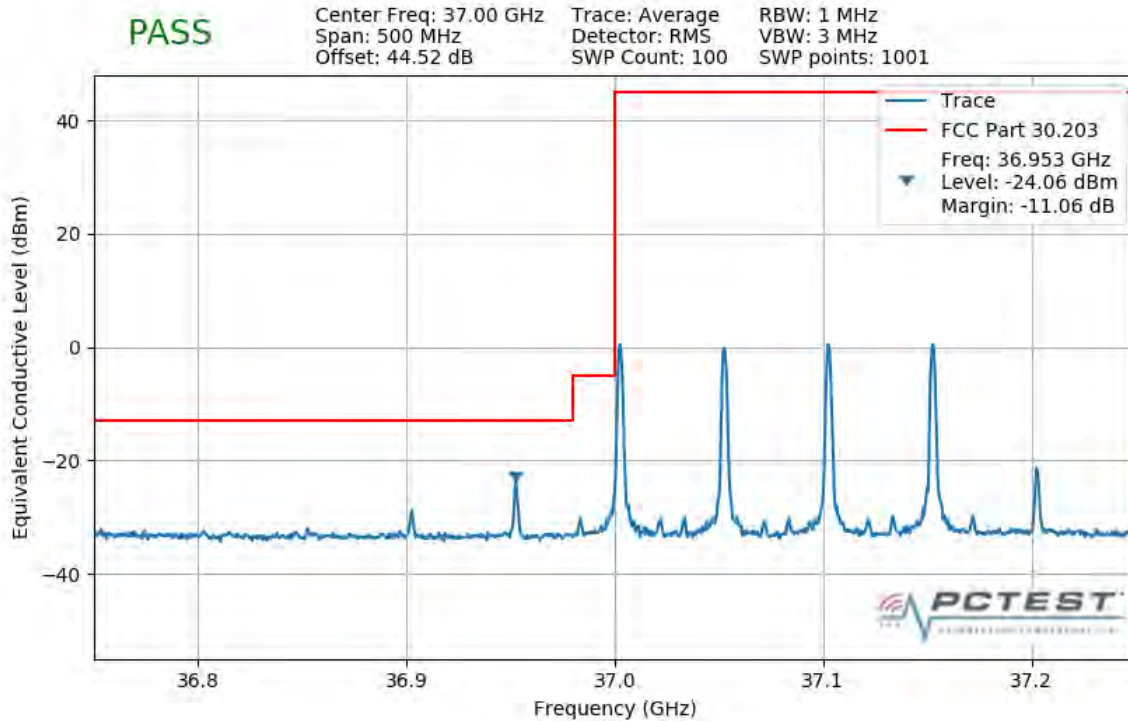


Plot 7-216. Lower Band Edge Plot (1CC 100MHz 64QAM 1 RB)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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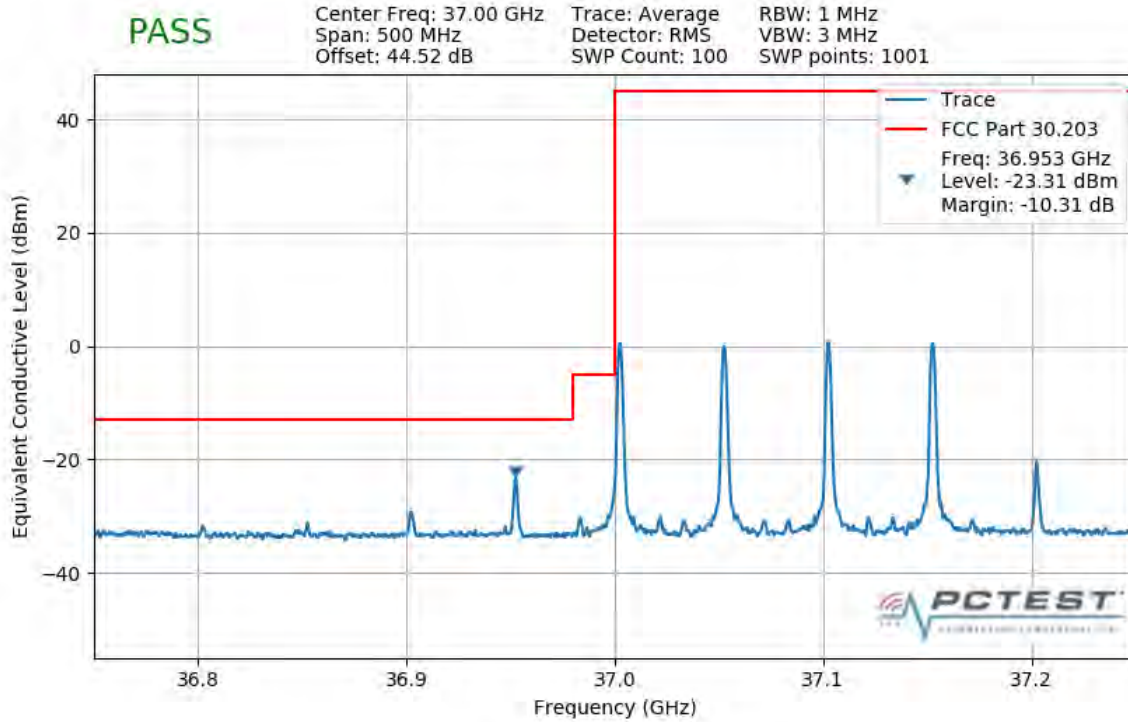


Plot 7-217. Lower Band Edge Plot (4CC 200MHz QPSK Full RB)

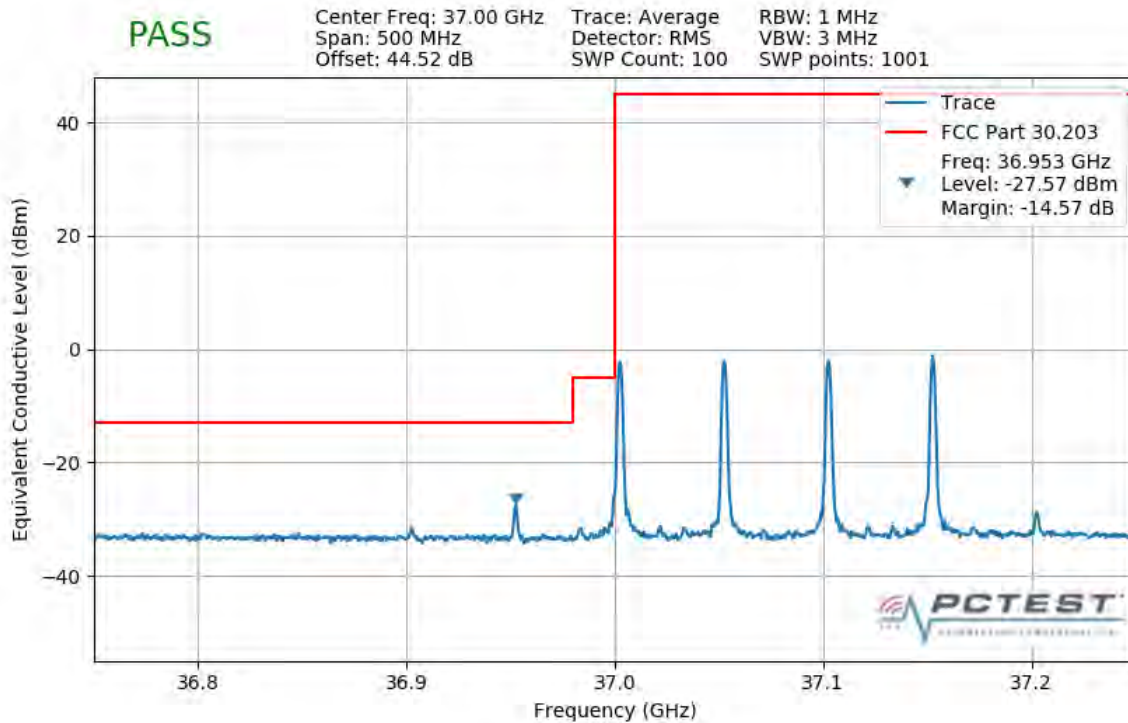


Plot 7-218. Lower Band Edge Plot (4CC 200MHz QPSK 1 RB)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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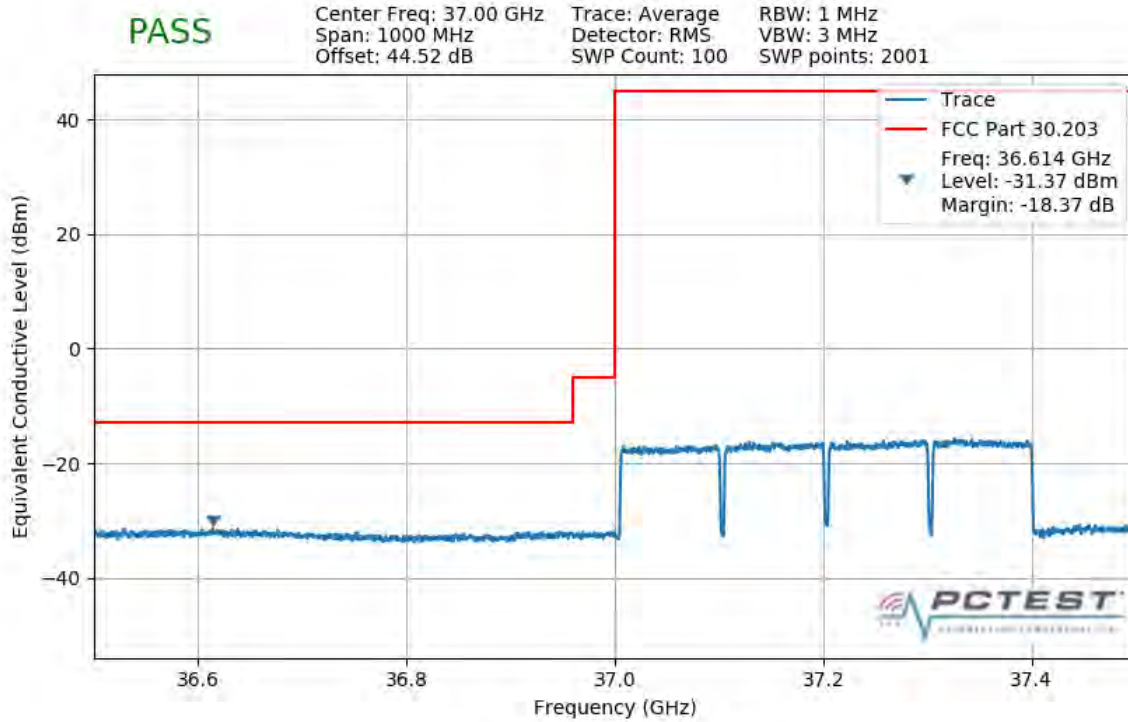


Plot 7-219. Lower Band Edge Plot (4CC 200MHz 16QAM 1 RB)

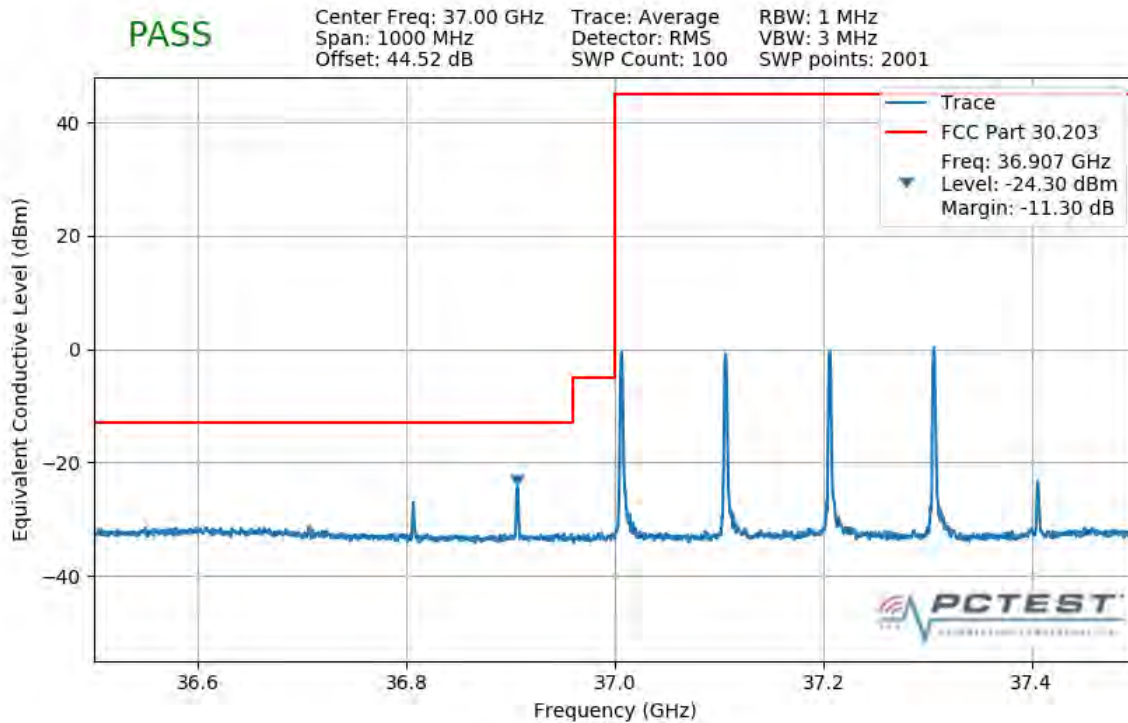


Plot 7-220. Lower Band Edge Plot (4CC 200MHz 64QAM 1 RB)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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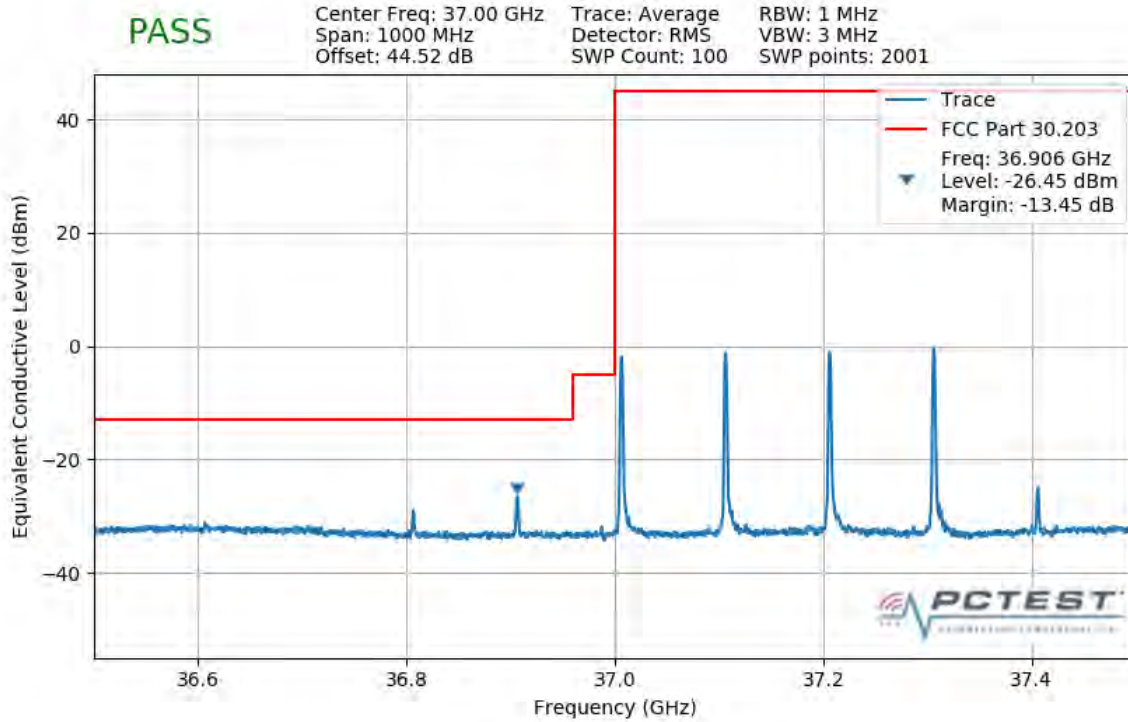


Plot 7-221. Lower Band Edge Plot (4CC 400MHz QPSK Full RB)

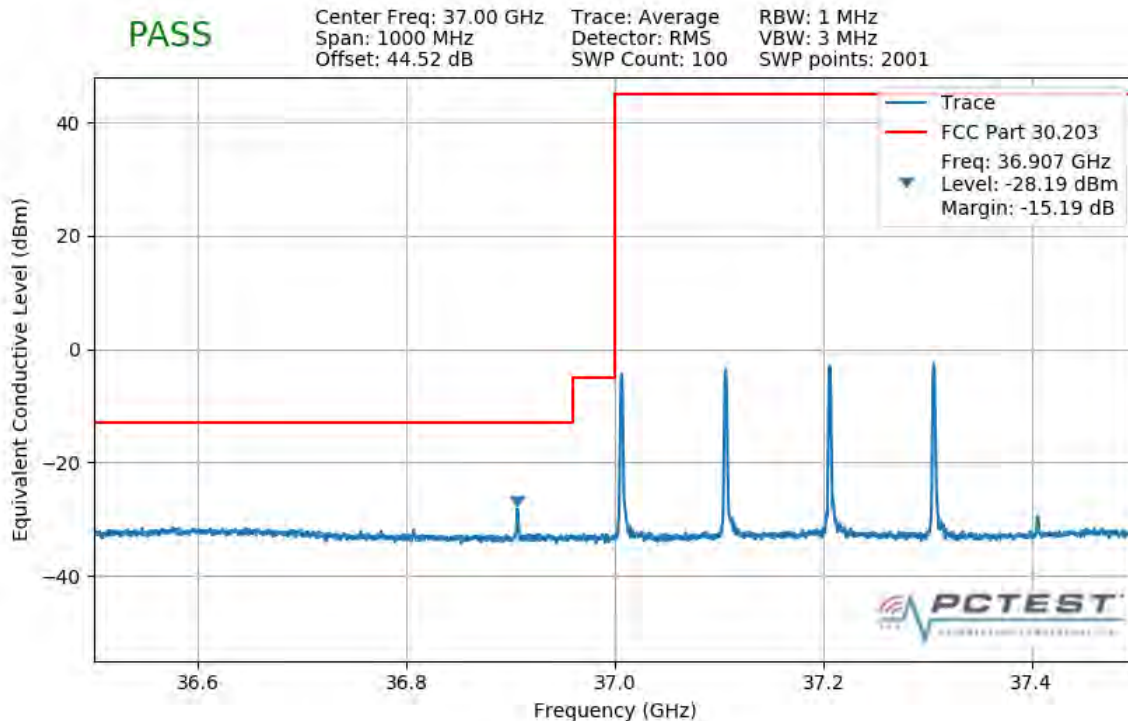


Plot 7-222. Lower Band Edge Plot (4CC 400MHz QPSK 1 RB)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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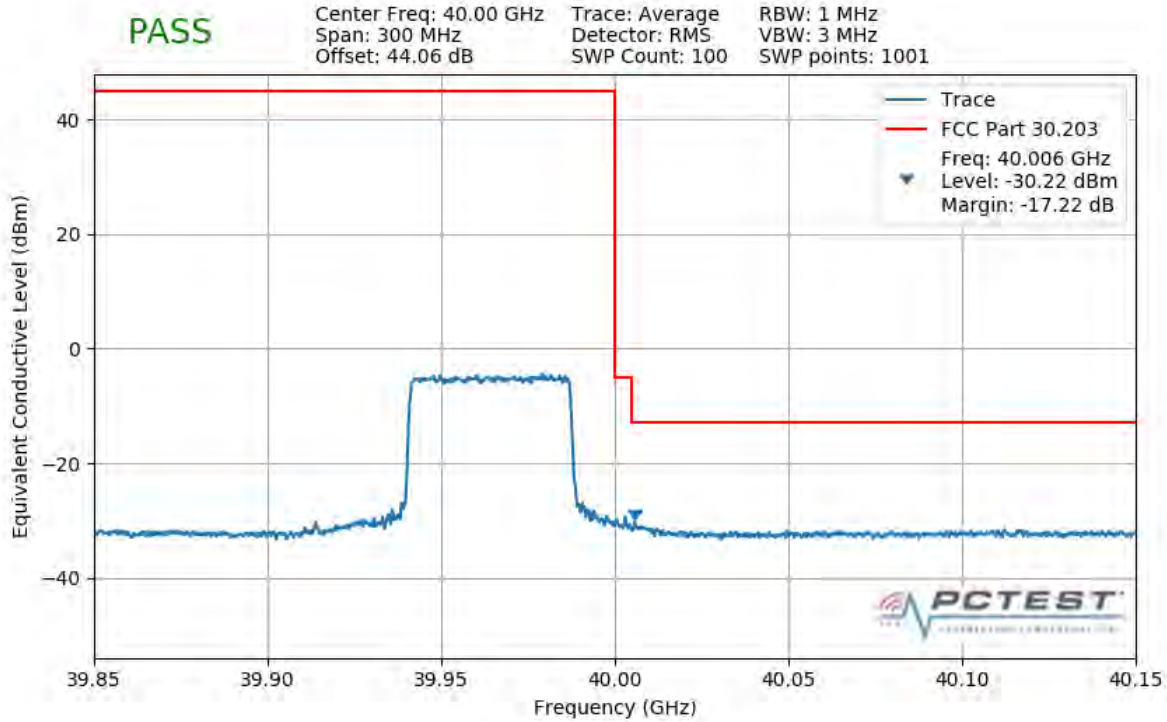


Plot 7-223. Lower Band Edge Plot (4CC 400MHz 16QAM 1 RB)

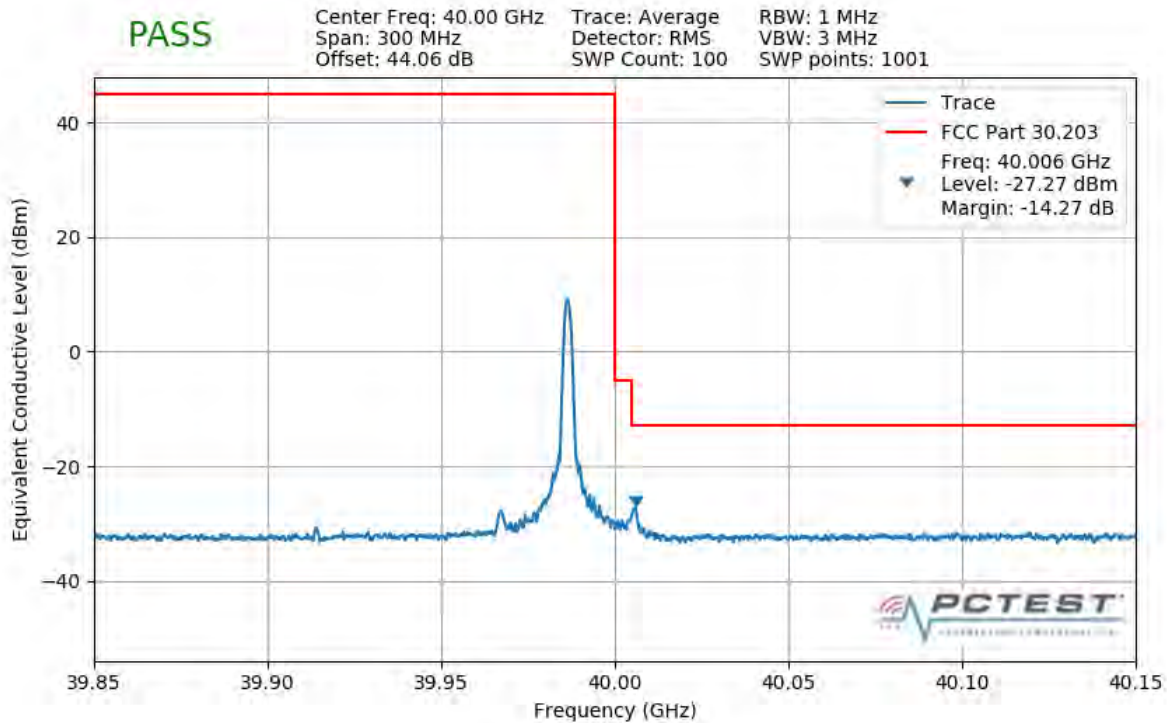


Plot 7-224. Lower Band Edge Plot (4CC 400MHz 64QAM 1 RB)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)		SAMSUNG	Approved by: Quality Manager
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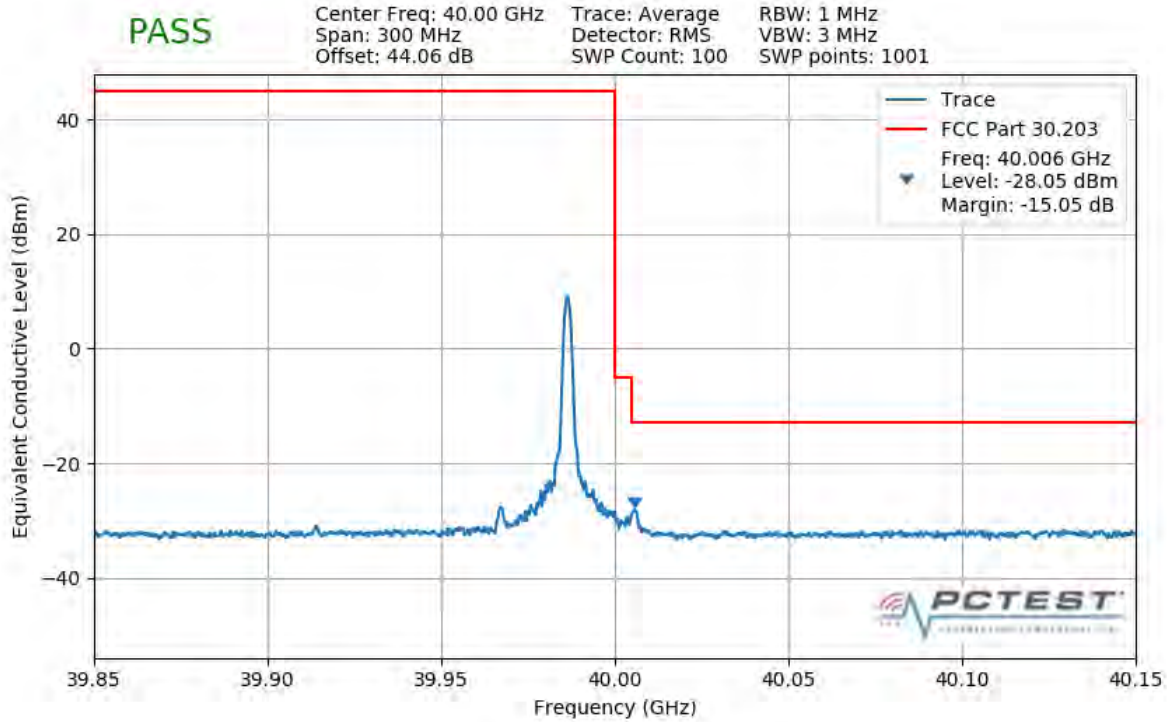


Plot 7-225. Upper Band Edge Plot (1CC 50MHz QPSK Full RB)

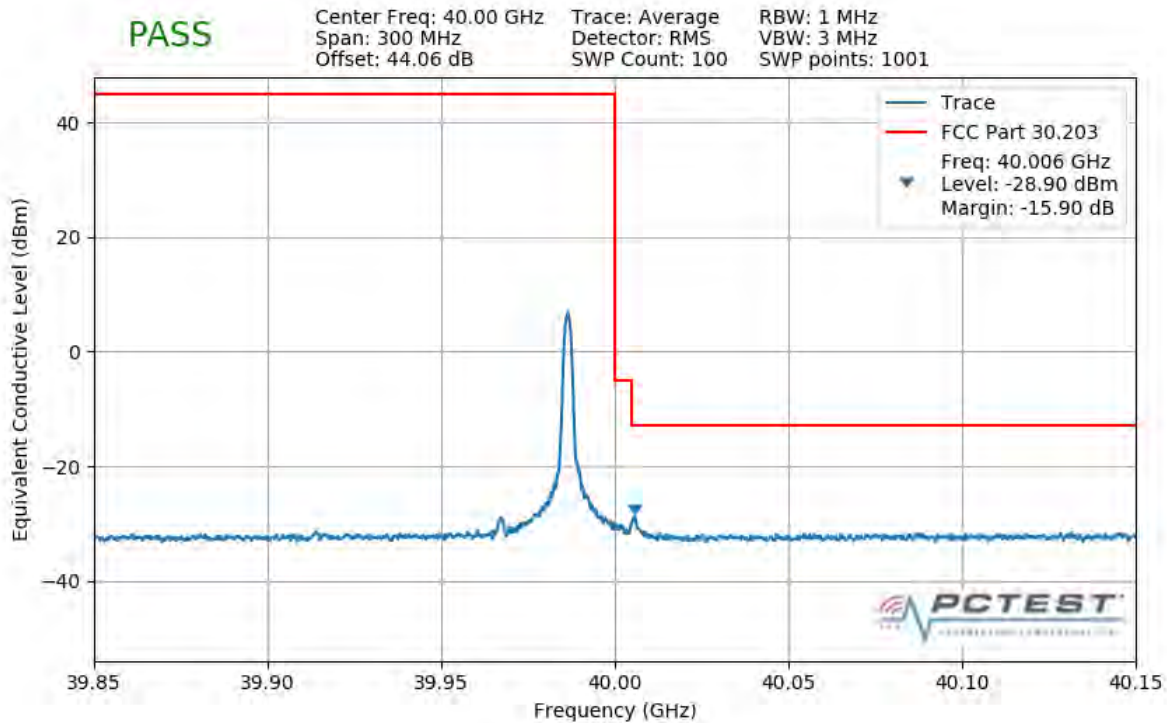


Plot 7-226. Upper Band Edge Plot (1CC 50MHz QPSK 1 RB)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 164 of 355

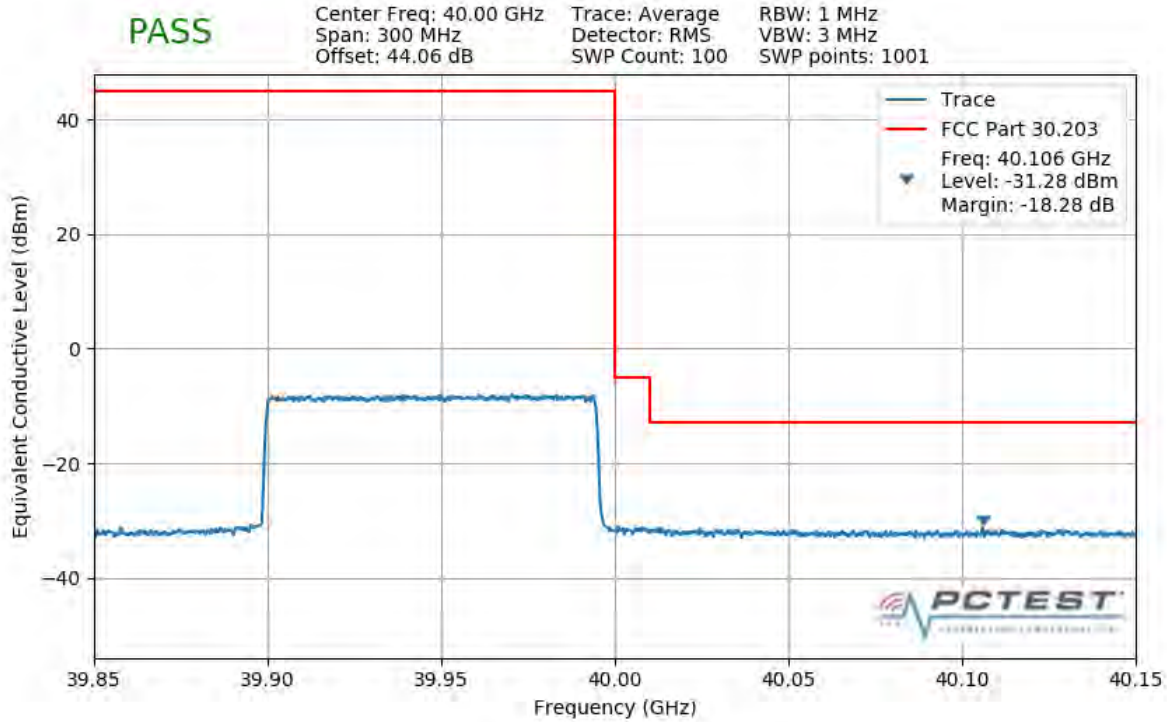


Plot 7-227. Upper Band Edge Plot (1CC 50MHz 16QAM 1 RB)

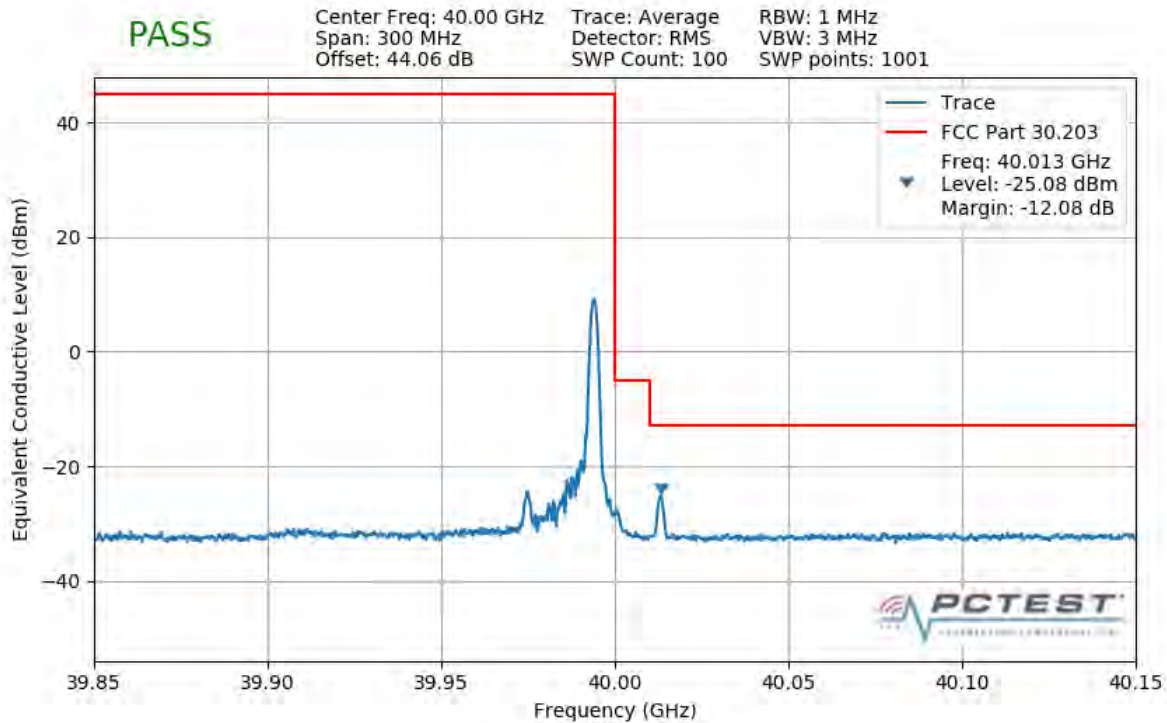


Plot 7-228. Upper Band Edge Plot (1CC 50MHz 64QAM 1 RB)

FCC ID: A3LSMG977T	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset	Page 165 of 355

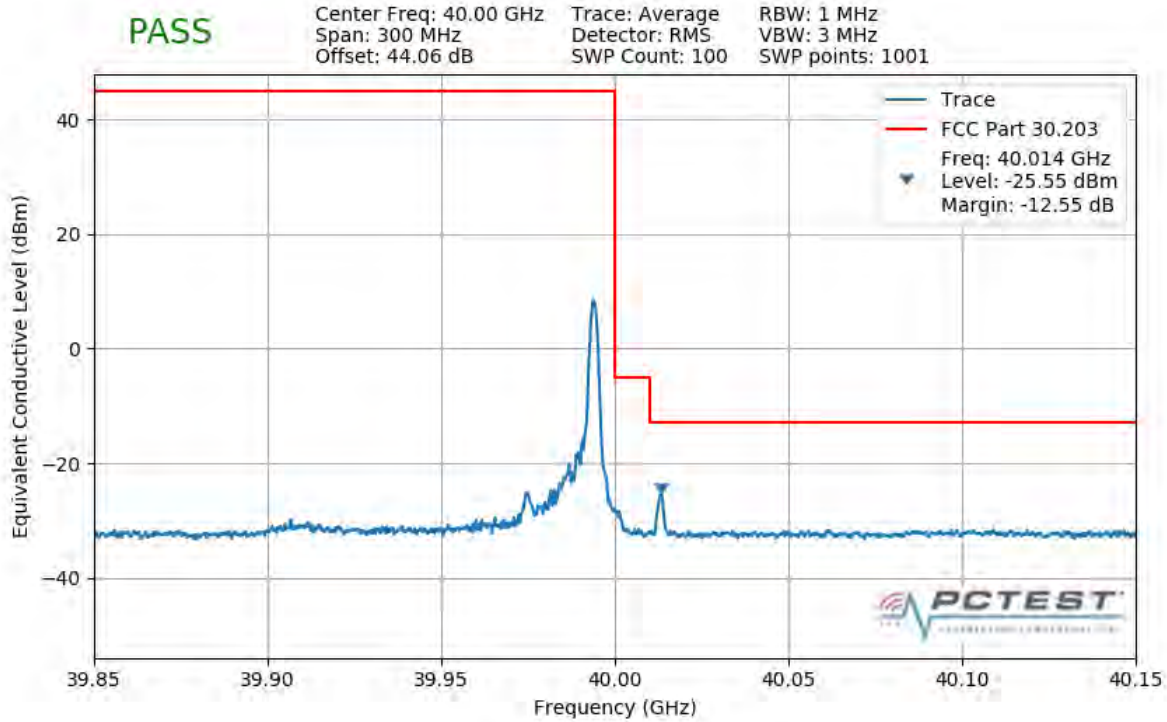


Plot 7-229. Upper Band Edge Plot (1CC 100MHz QPSK Full RB)

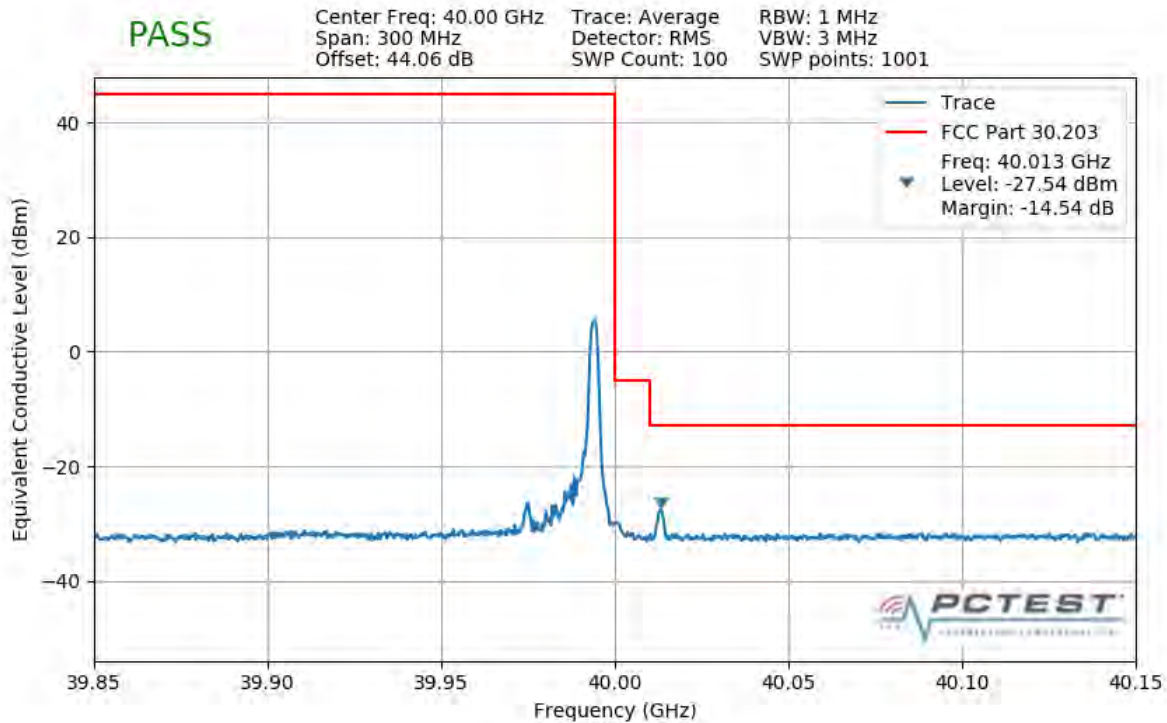


Plot 7-230. Upper Band Edge Plot (1CC 100MHz QPSK 1 RB)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 166 of 355

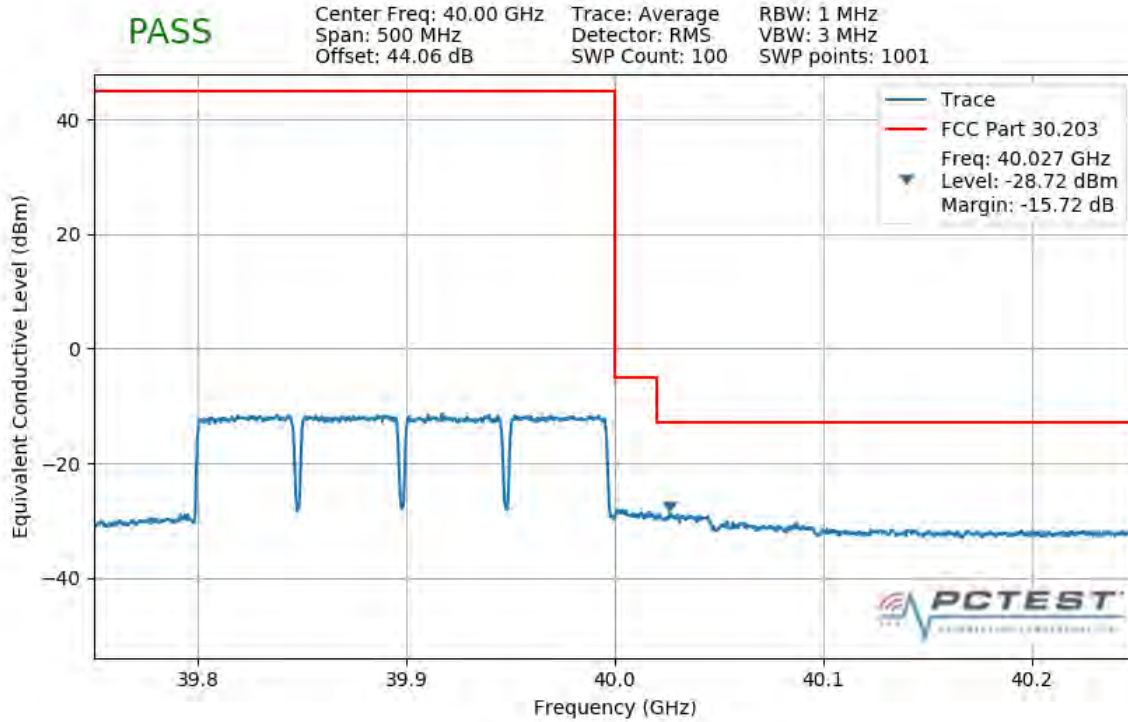


Plot 7-231. Upper Band Edge Plot (1CC 100MHz 16QAM 1 RB)

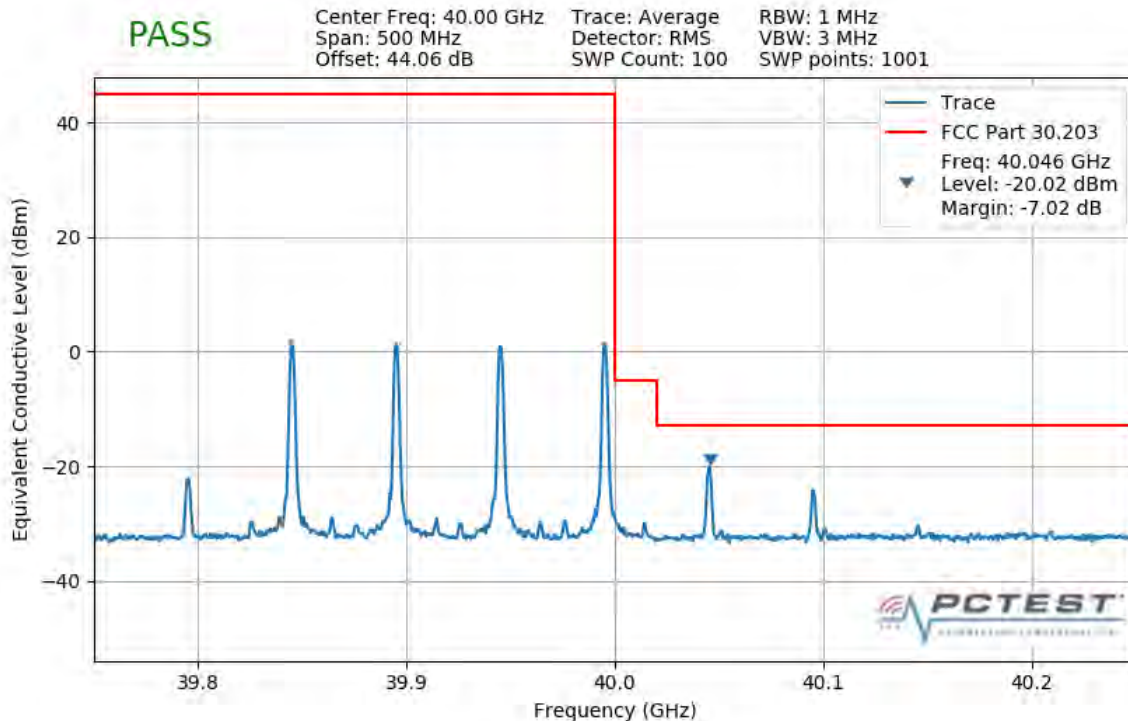


Plot 7-232. Upper Band Edge Plot (1CC 100MHz 64QAM 1 RB)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 167 of 355

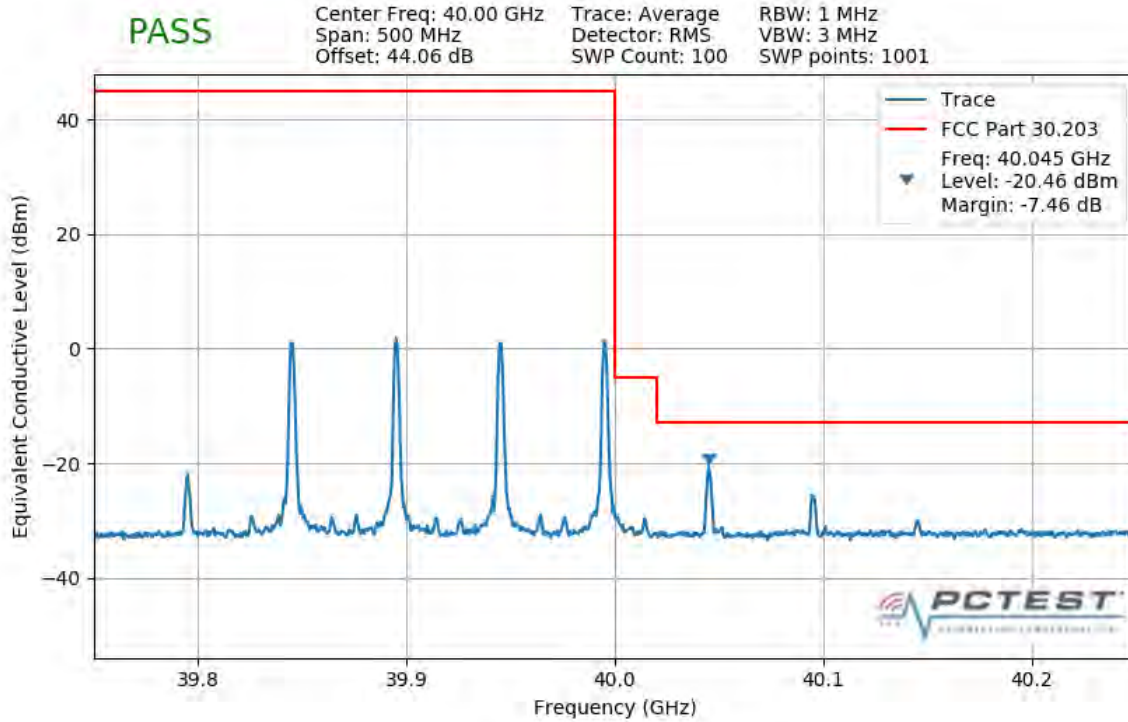


Plot 7-233. Upper Band Edge Plot (4CC 200MHz QPSK Full RB)

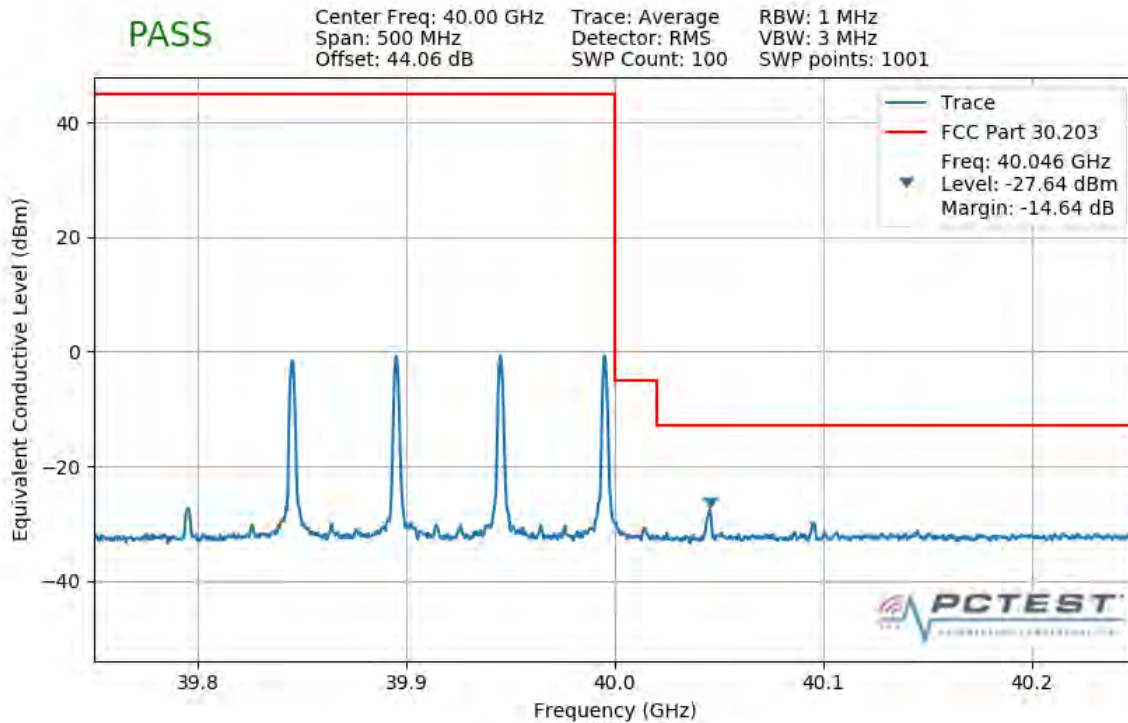


Plot 7-234. Upper Band Edge Plot (4CC 200MHz QPSK 1 RB)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 168 of 355

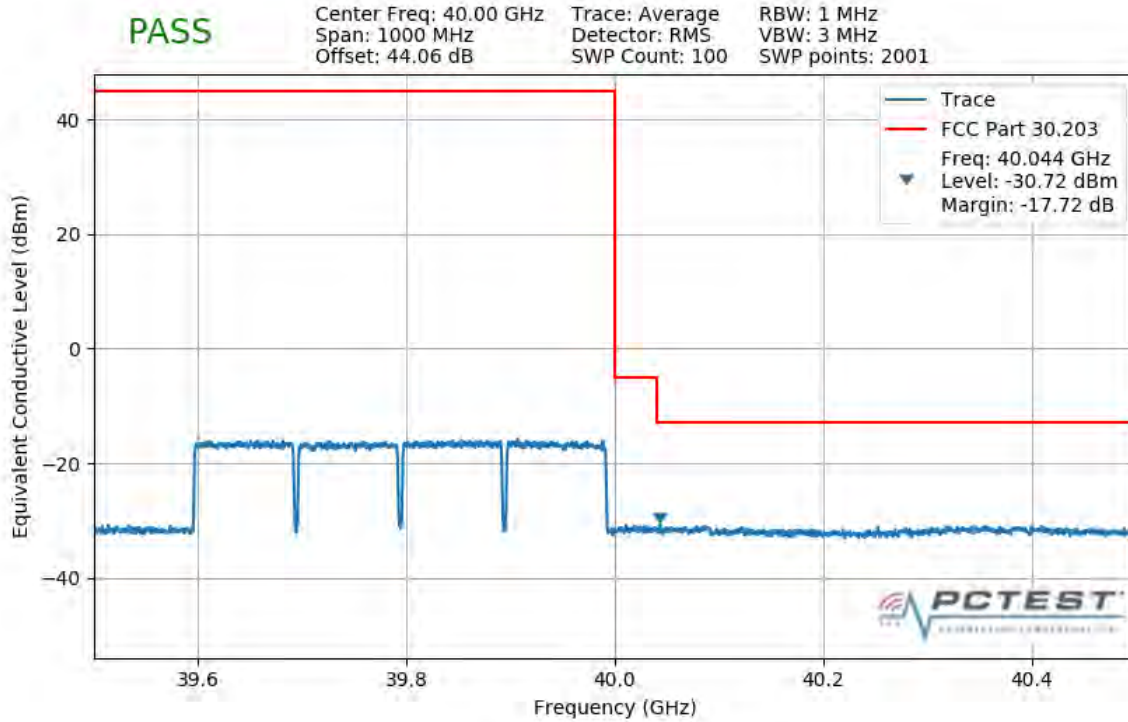


Plot 7-235. Upper Band Edge Plot (4CC 200MHz 16QAM 1 RB)

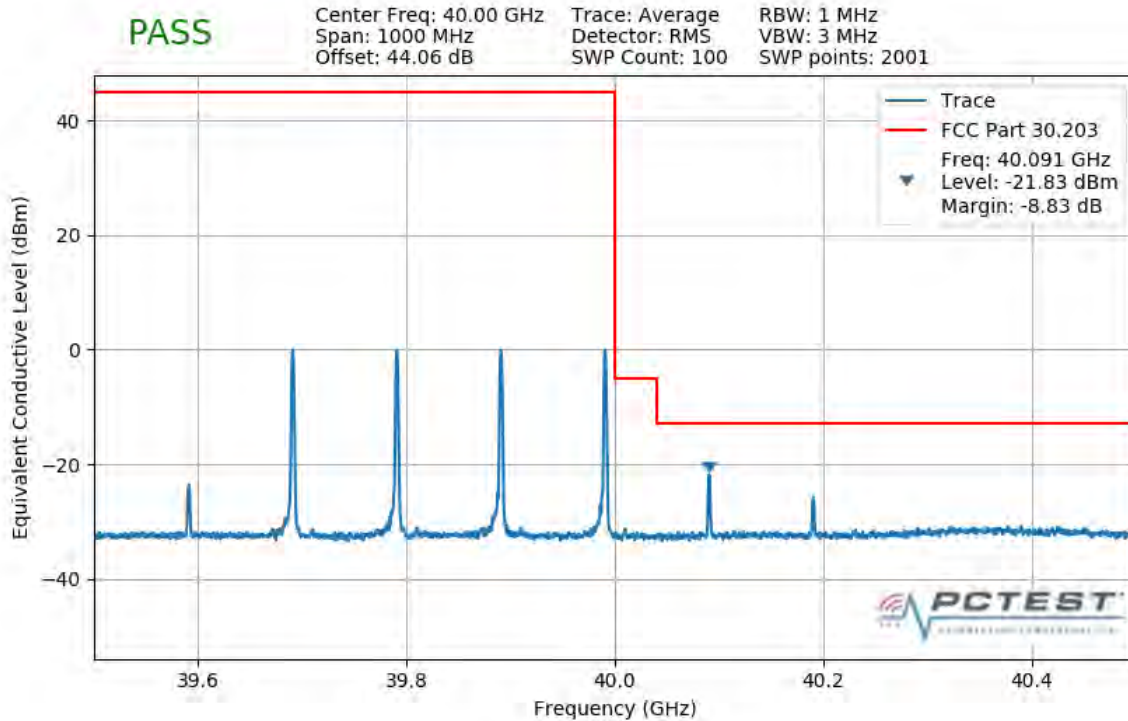


Plot 7-236. Upper Band Edge Plot (4CC 200MHz 64QAM 1 RB)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)		SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset			Page 169 of 355

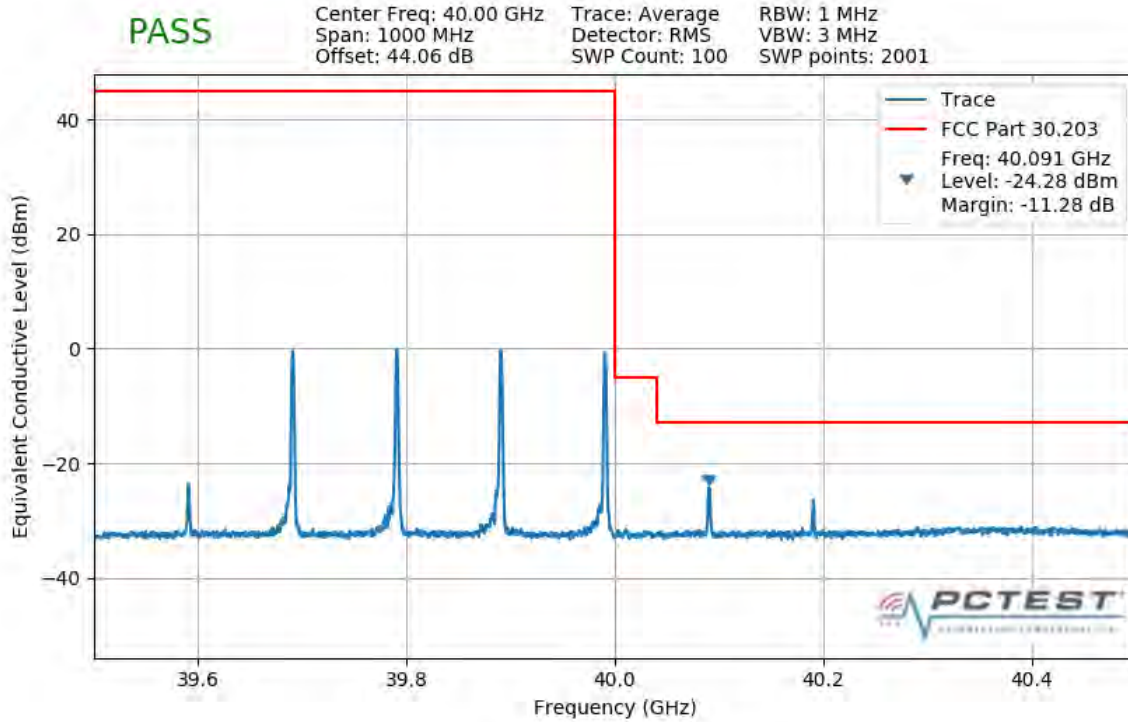


Plot 7-237. Upper Band Edge Plot (4CC 400MHz QPSK Full RB)

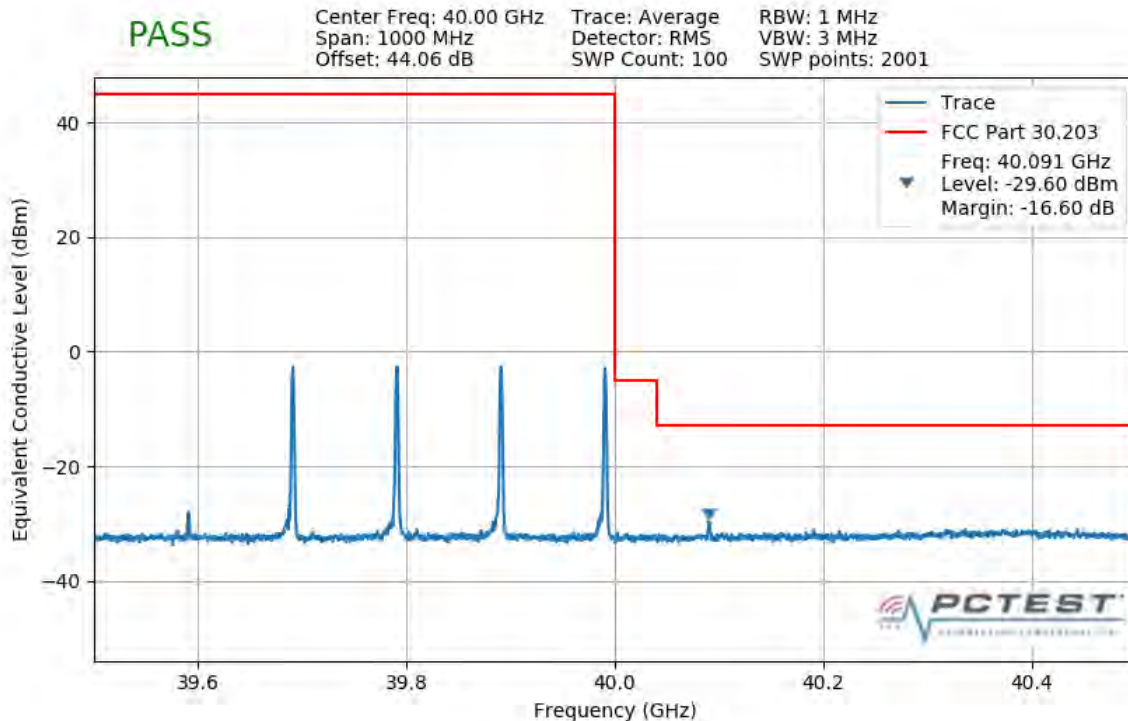


Plot 7-238. Upper Band Edge Plot (4CC 400MHz QPSK 1 RB)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 170 of 355

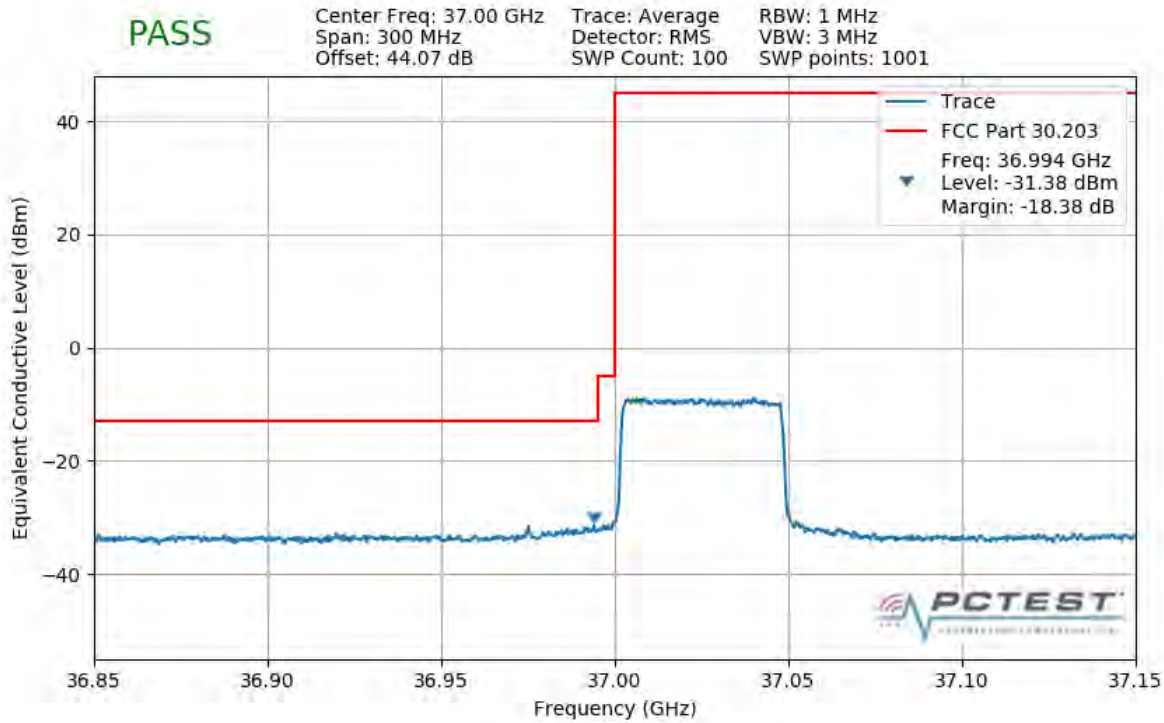


Plot 7-239. Upper Band Edge Plot (4CC 400MHz 16QAM 1 RB)

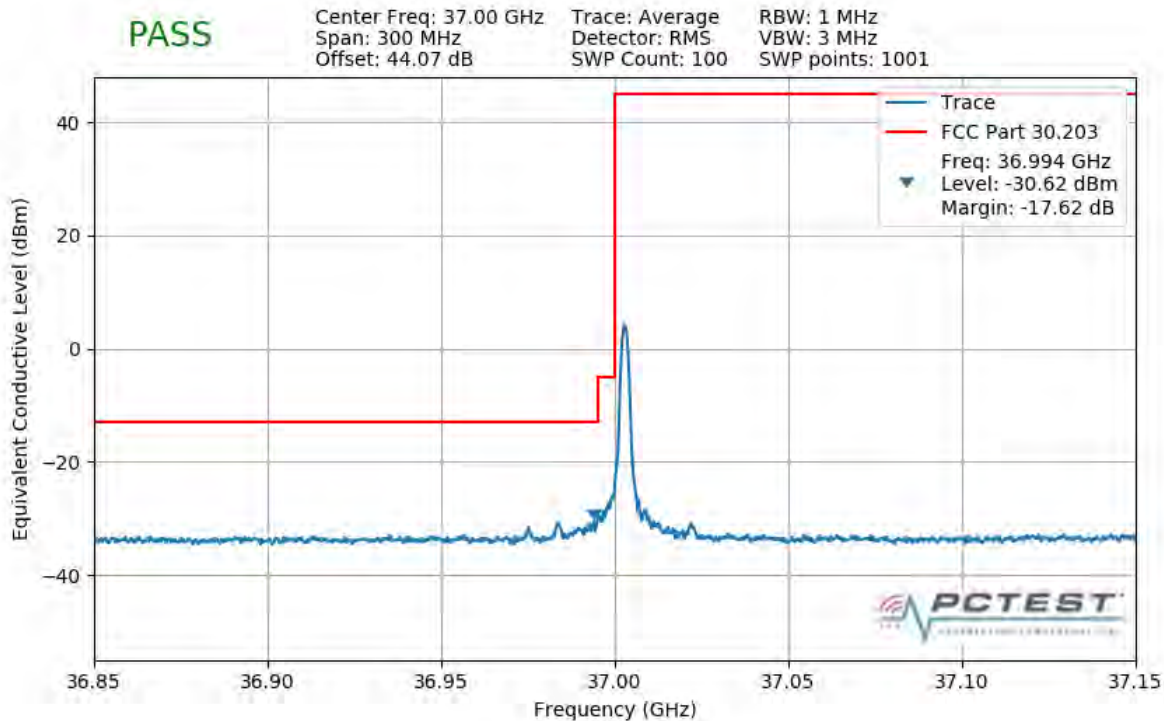


Plot 7-240. Upper Band Edge Plot (4CC 400MHz 64QAM 1 RB)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 171 of 355

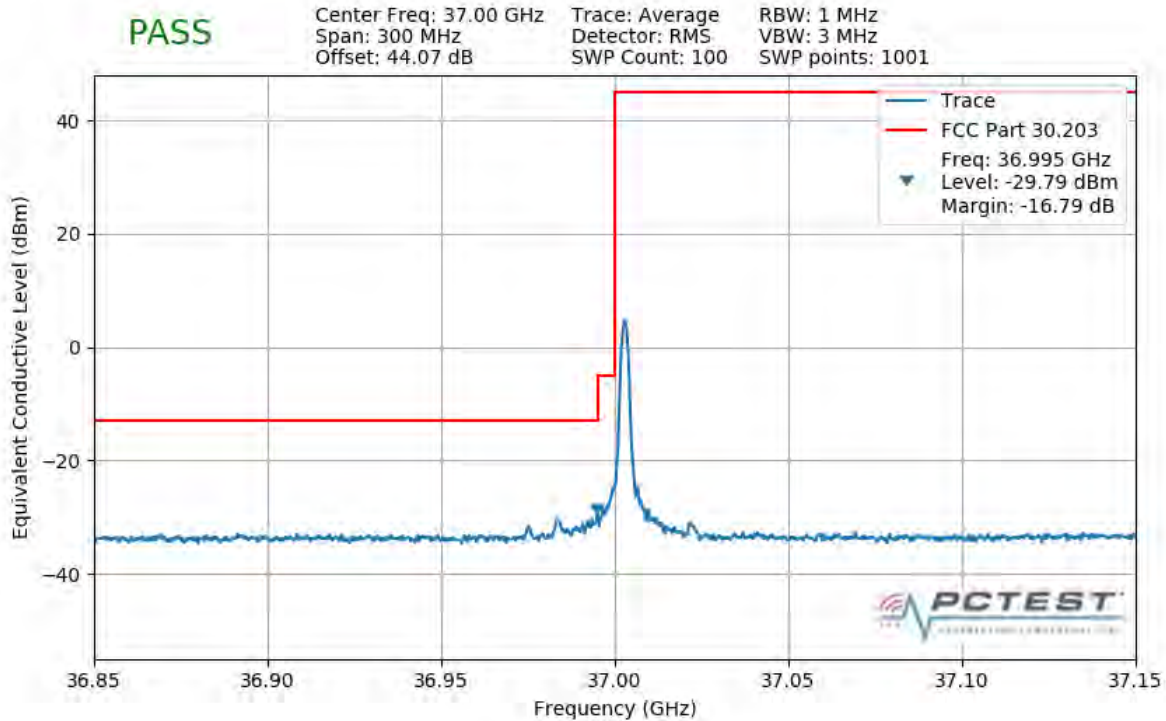


Plot 7-241. Lower Band Edge Plot (1CC 50MHz QPSK Full RB)

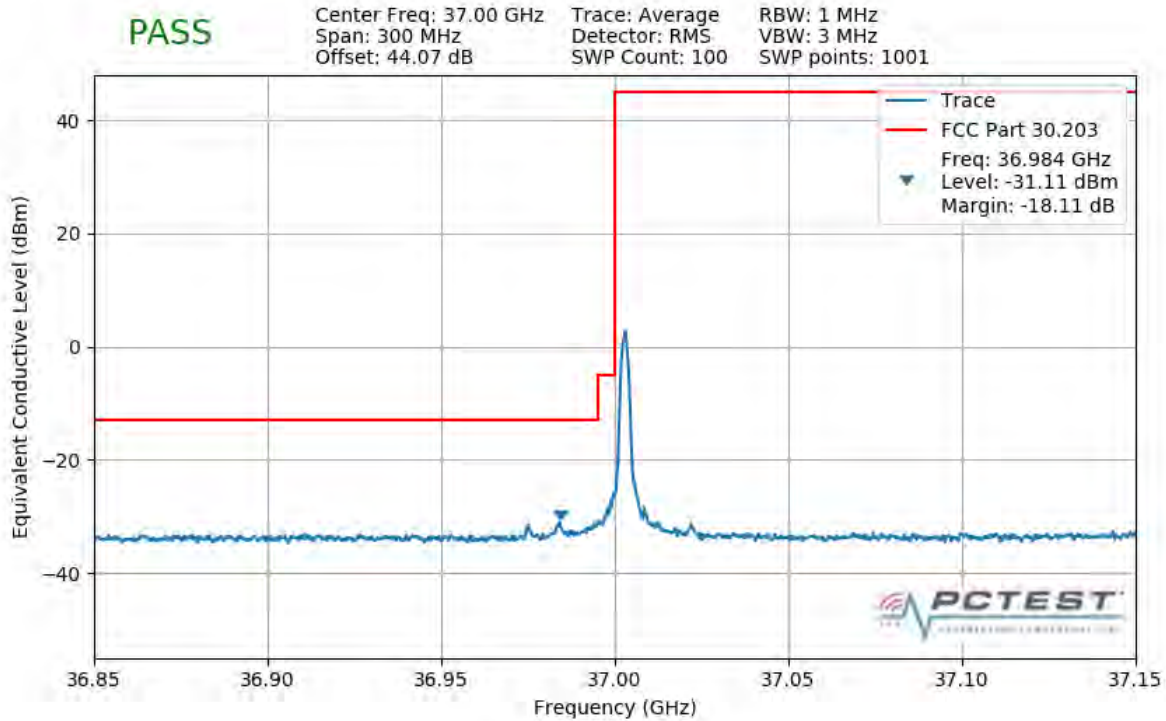


Plot 7-242. Lower Band Edge Plot (1CC 50MHz QPSK 1 RB)

FCC ID: A3LSMG977T	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset	Page 172 of 355

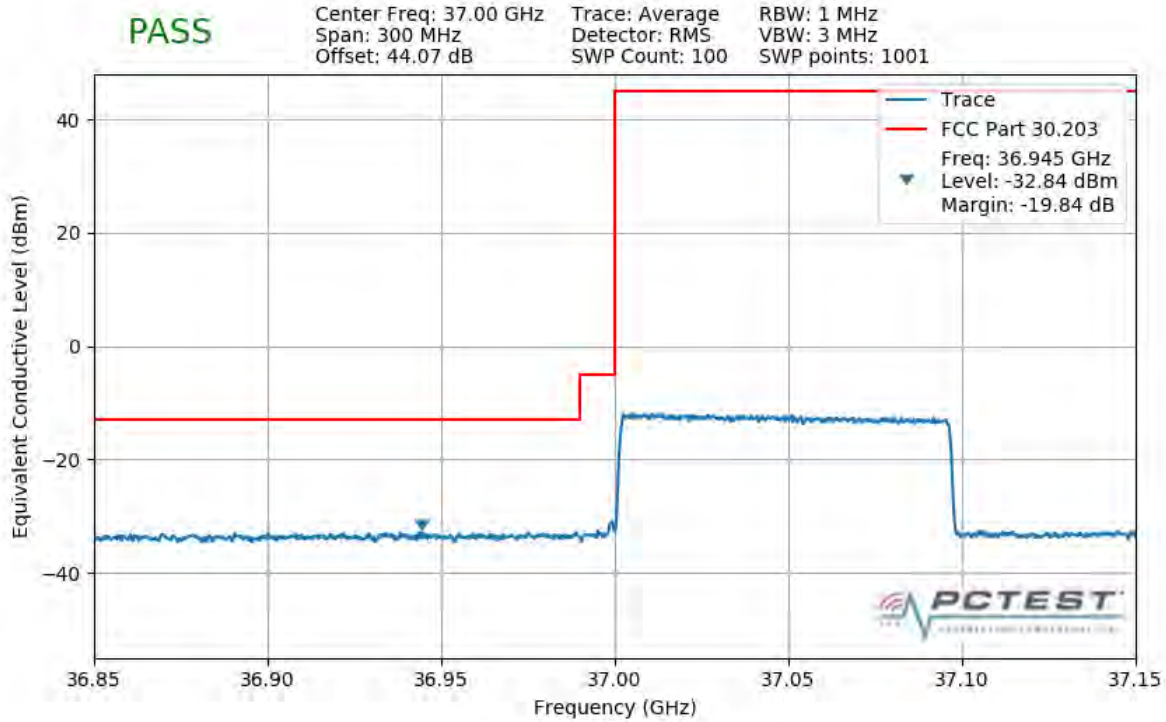


Plot 7-243. Lower Band Edge Plot (1CC 50MHz 16QAM 1 RB)

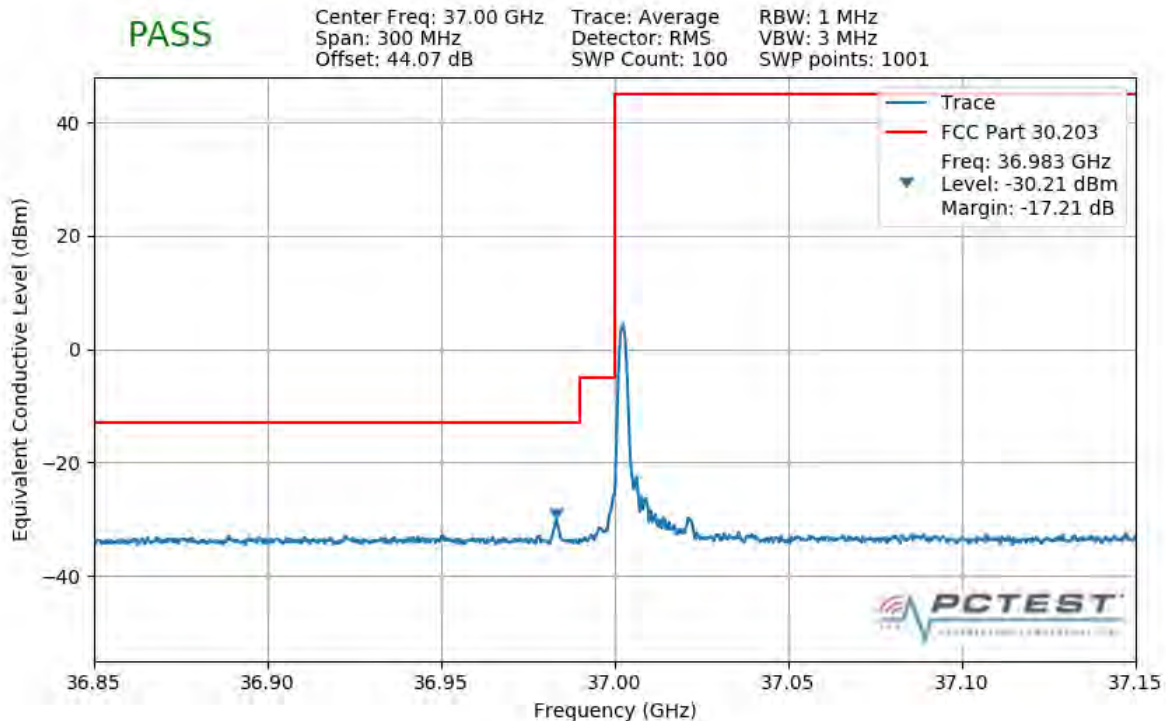


Plot 7-244. Lower Band Edge Plot (1CC 50MHz 64QAM 1 RB)

FCC ID: A3LSMG977T	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset	Page 173 of 355



Plot 7-245. Lower Band Edge Plot (1CC 100MHz QPSK Full RB)



Plot 7-246. Lower Band Edge Plot (1CC 100MHz QPSK 1 RB)

FCC ID: A3LSMG977T	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903060032-22.A3L	Test Dates: 01/22 - 05/08/2019	EUT Type: Portable Handset		Page 174 of 355