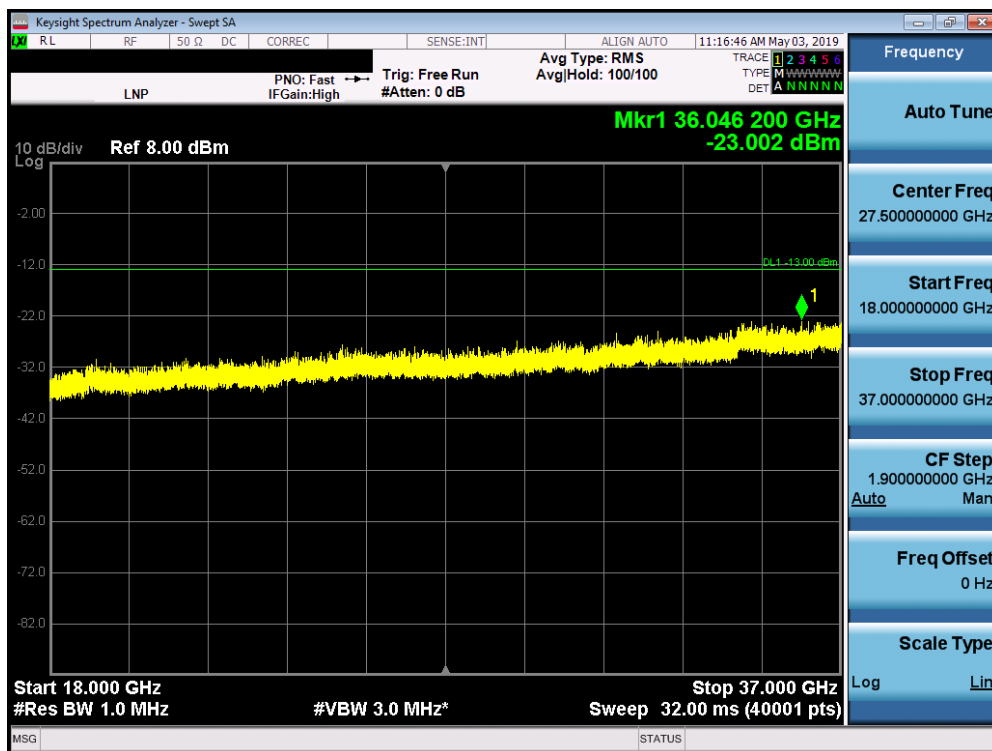
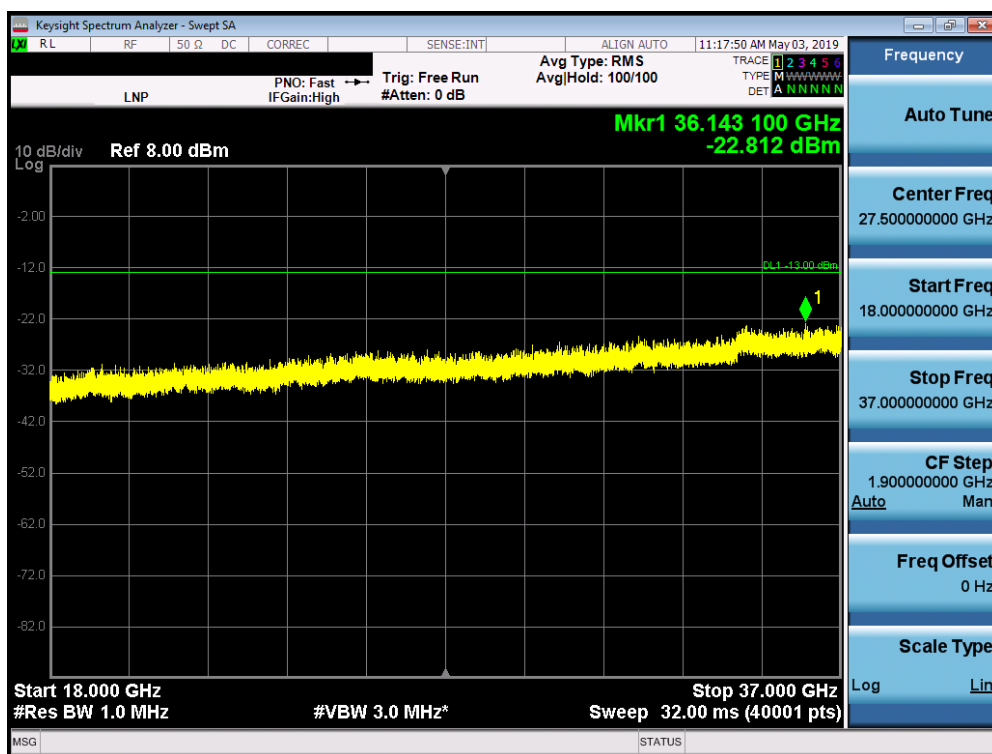




Plot 7-129. Vertical Radiated Spurious Plot 18-38.5 GHz (QTM0 1CC-100MHz Bandwidth QPSK Mid Channel)

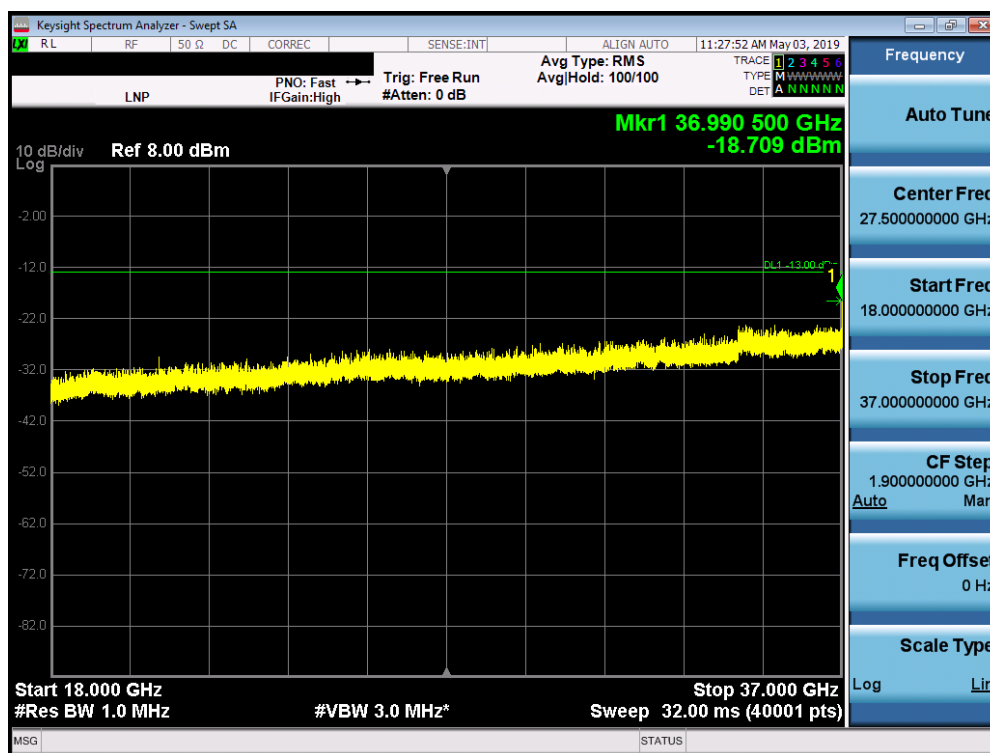


Plot 7-130. Vertical Radiated Spurious Plot 18-38.5 GHz (QTM0 1CC-100MHz Bandwidth QPSK High Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 93 of 202

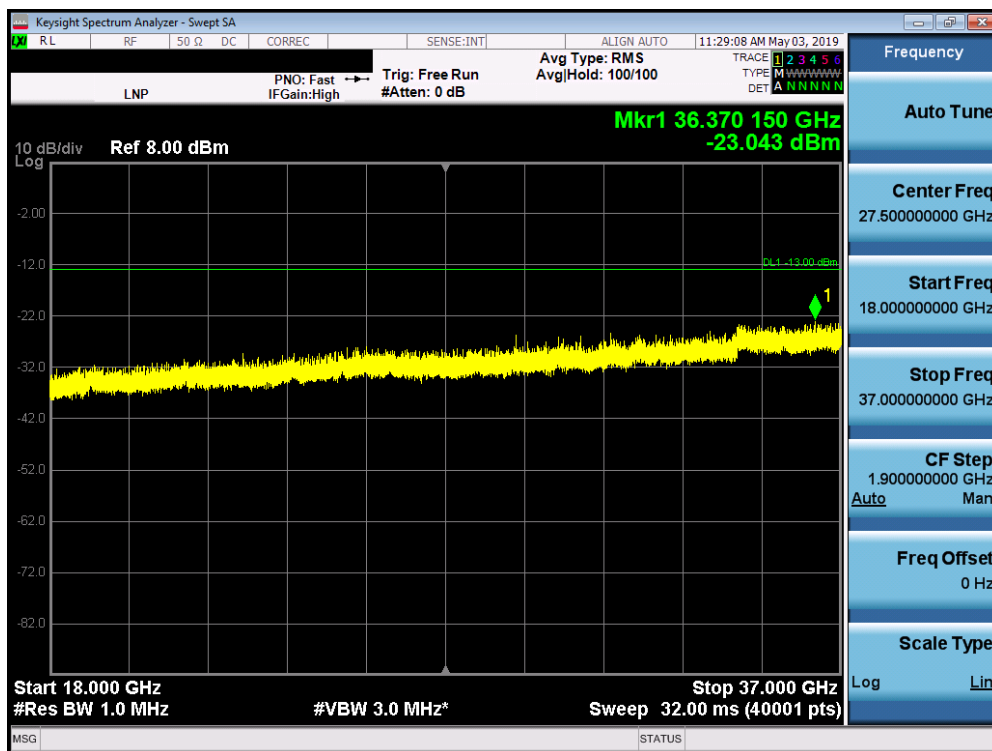
Frequency [MHz]	Detector /Trace	Chan.	Bandwidth (MHz)	Mod.	Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turntable Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
36983.85	Maxh/RMS	Low	100	QPSK	H + V	H	-	-	-20.74	-13.00	-7.74
34705.28	Maxh/RMS	Mid	100	QPSK	H + V	H	-	-	-22.84	-13.00	-9.84
36462.78	Maxh/RMS	High	100	QPSK	H + V	H	-	-	-22.74	-13.00	-9.74
36983.38	Maxh/RMS	Low	100	QPSK	H + V	V	-	-	-20.35	-13.00	-7.35
36046.20	Maxh/RMS	Mid	100	QPSK	H + V	V	-	-	-23.00	-13.00	-10.00
36143.10	Maxh/RMS	High	100	QPSK	H + V	V	-	-	-22.81	-13.00	-9.81

Table 7-21. Spurious Emissions QTM0 (18-38.5 GHz)

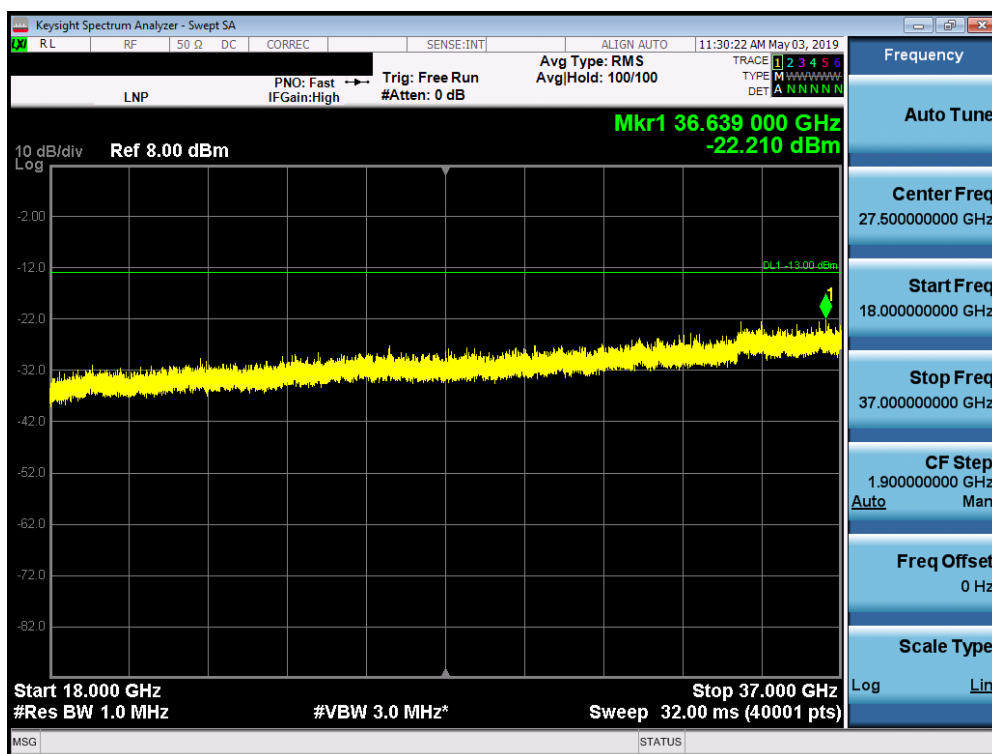


Plot 7-131. Horizontal Radiated Spurious Plot 18-38.5 GHz (QTM1 1CC-100MHz Bandwidth QPSK Low Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 94 of 202

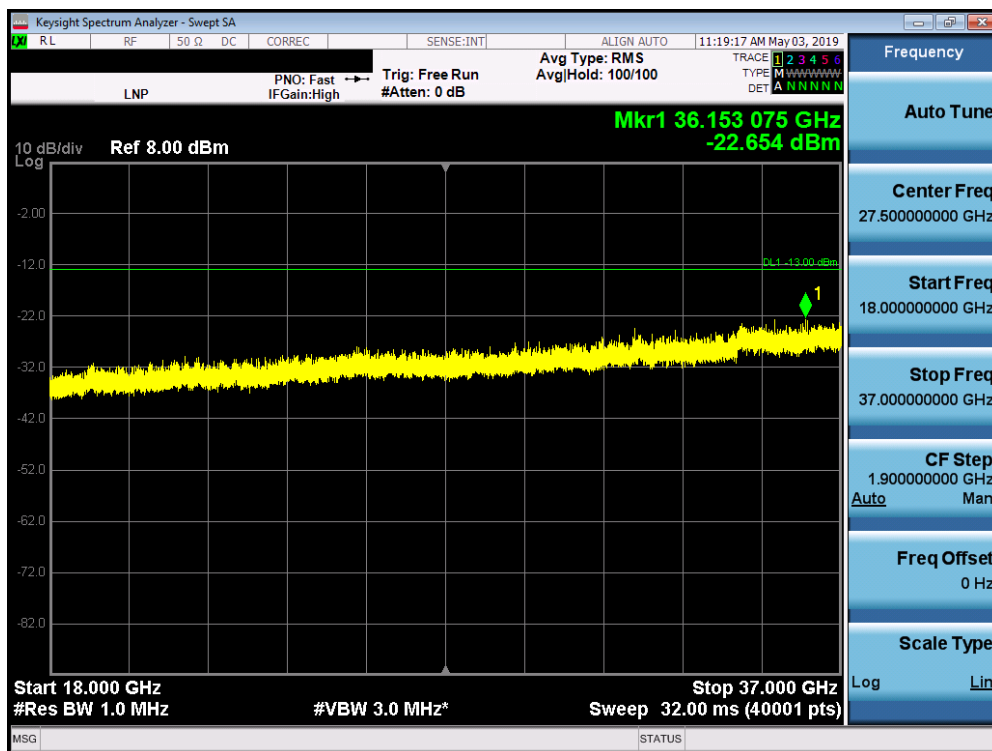


Plot 7-132. Horizontal Radiated Spurious Plot 18-38.5 GHz (QTM1 1CC-100MHz Bandwidth QPSK Mid Channel)

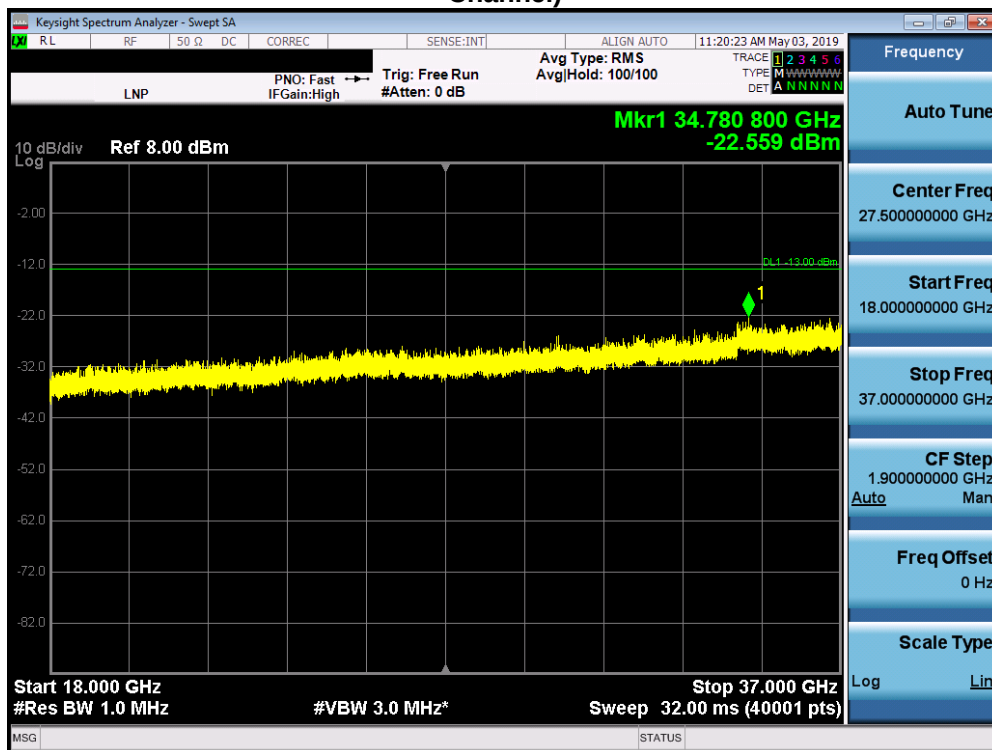


Plot 7-133. Horizontal Radiated Spurious Plot 18-38.5 GHz (QTM1 1CC-100MHz Bandwidth QPSK High Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 95 of 202

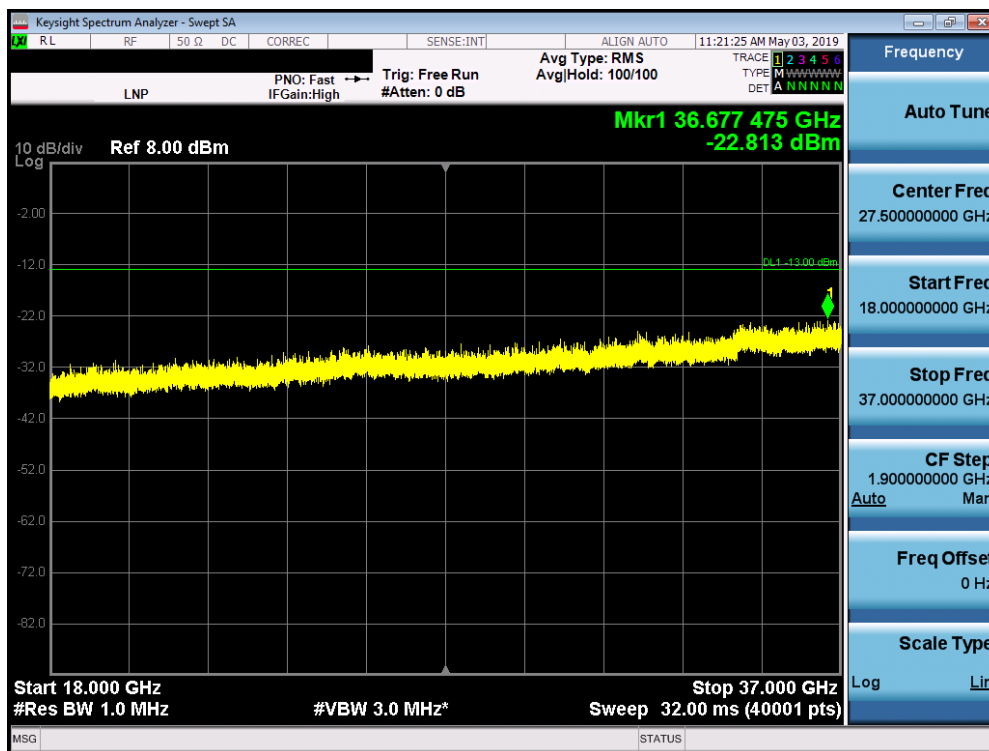


Plot 7-134. Vertical Radiated Spurious Plot 18-38.5 GHz (QTM1 1CC-100MHz Bandwidth QPSK Low Channel)



Plot 7-135. Vertical Radiated Spurious Plot 18-38.5 GHz (QTM1 1CC-100MHz Bandwidth QPSK Mid Channel)

FCC ID: ZNFV450VM		MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 96 of 202



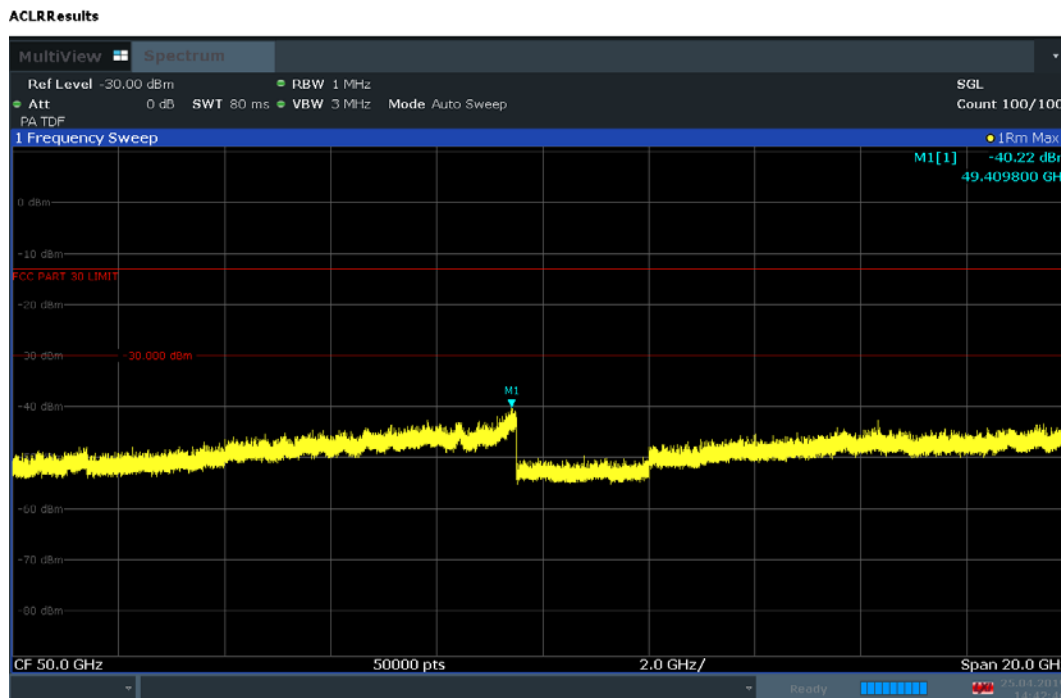
Plot 7-136. Vertical Radiated Spurious Plot 18-38.5 GHz (QTM1 1CC-100MHz Bandwidth QPSK High Channel)

Frequency [MHz]	Detector /Trace	Chan.	Bandwidth (MHz)	Mod.	Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turntable Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
36990.50	Maxh/RMS	Low	100	QPSK	H + V	H	-	-	-18.71	-13.00	-5.71
36370.15	Maxh/RMS	Mid	100	QPSK	H + V	H	-	-	-23.04	-13.00	-10.04
36639.00	Maxh/RMS	High	100	QPSK	H + V	H	-	-	-22.21	-13.00	-9.21
36153.08	Maxh/RMS	Low	100	QPSK	H + V	V	-	-	-22.65	-13.00	-9.65
34780.80	Maxh/RMS	Mid	100	QPSK	H + V	V	-	-	-22.56	-13.00	-9.56
36677.48	Maxh/RMS	High	100	QPSK	H + V	V	-	-	-22.81	-13.00	-9.81

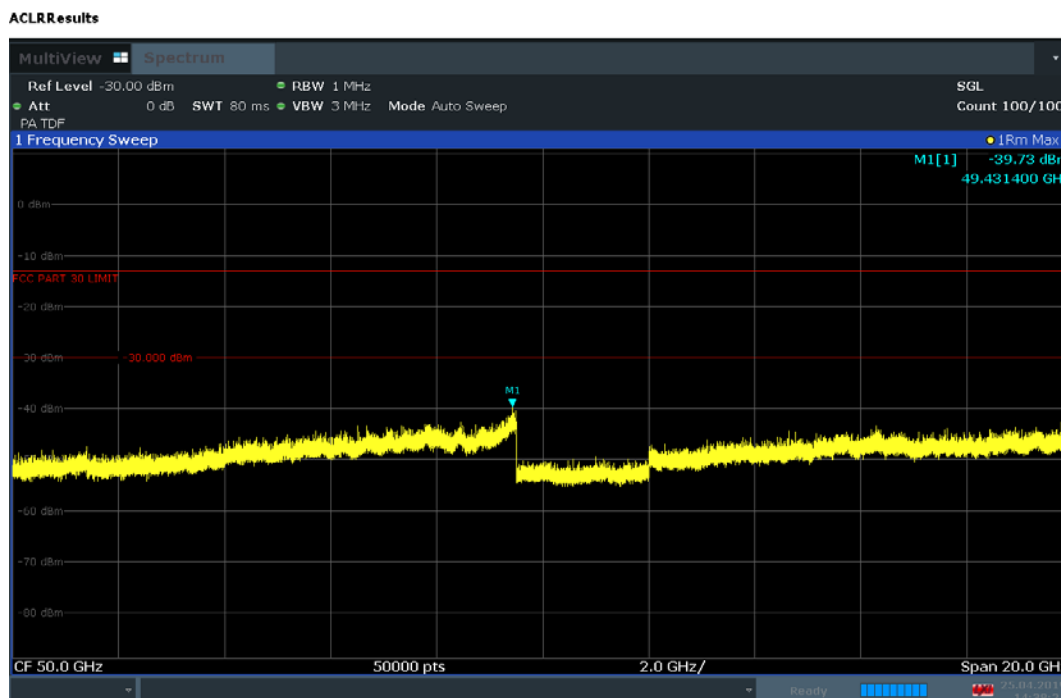
Table 7-22. Spurious Emissions QTM1 (18-38.5 GHz)

FCC ID: ZNFV450VM		MEASUREMENT REPORT (Class II Permissive Change)			Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 97 of 202	

7.4.11 Radiated Spurious Emissions Plots n260 (40 – 60GHz)



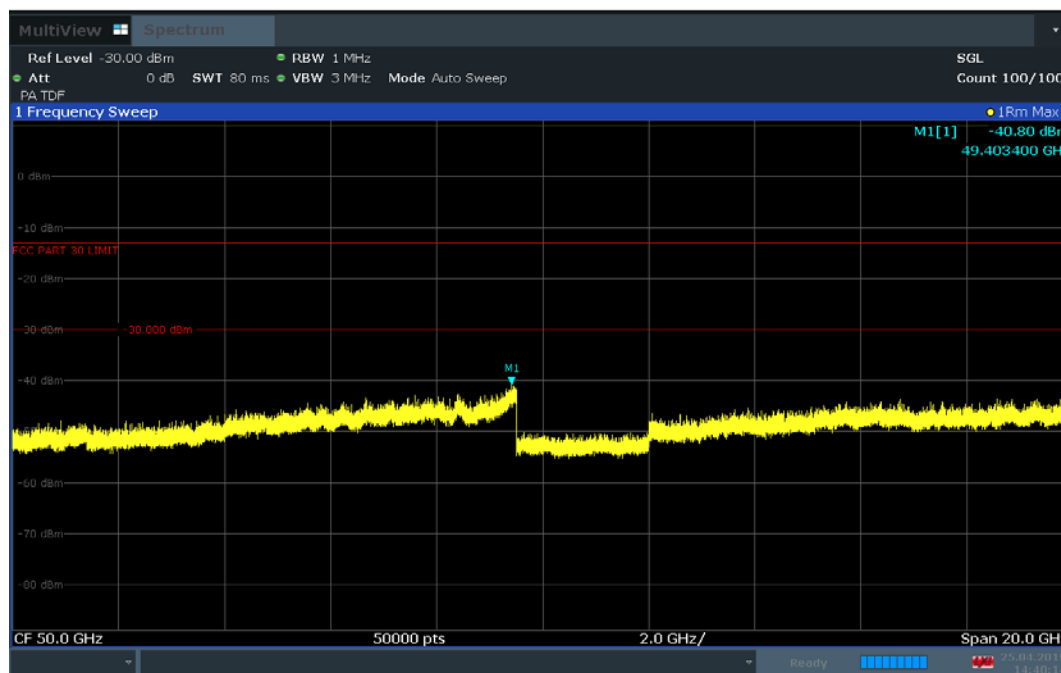
Plot 7-137. Horizontal Radiated Spurious Plot 40-60 GHz (QTM0 1CC-50MHz Bandwidth QPSK Low Channel)



Plot 7-138. Horizontal Radiated Spurious Plot 40-60 GHz (QTM0 1CC-50MHz Bandwidth QPSK Mid Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 98 of 202

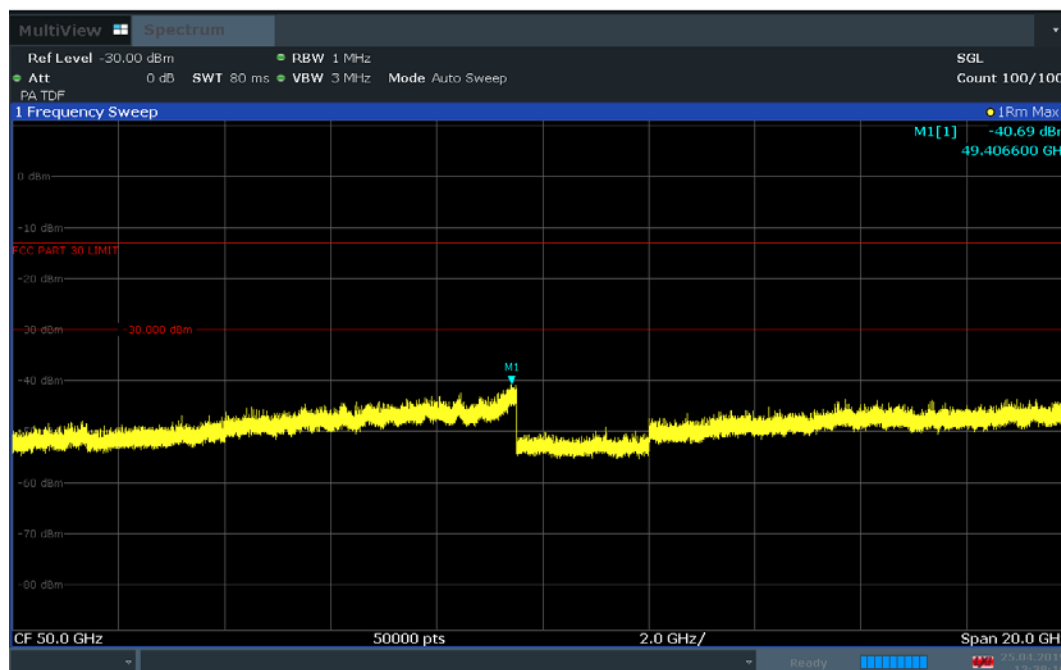
ACLRResults



14:40:15 25.04.2019

Plot 7-139. Horizontal Radiated Spurious Plot 40-60 GHz (QTM0 1CC-50MHz Bandwidth QPSK High Channel)

ACLRResults



13:38:20 25.04.2019

Plot 7-140. Vertical Radiated Spurious Plot 40-60 GHz (QTM0 1CC-50MHz Bandwidth QPSK Low Channel)

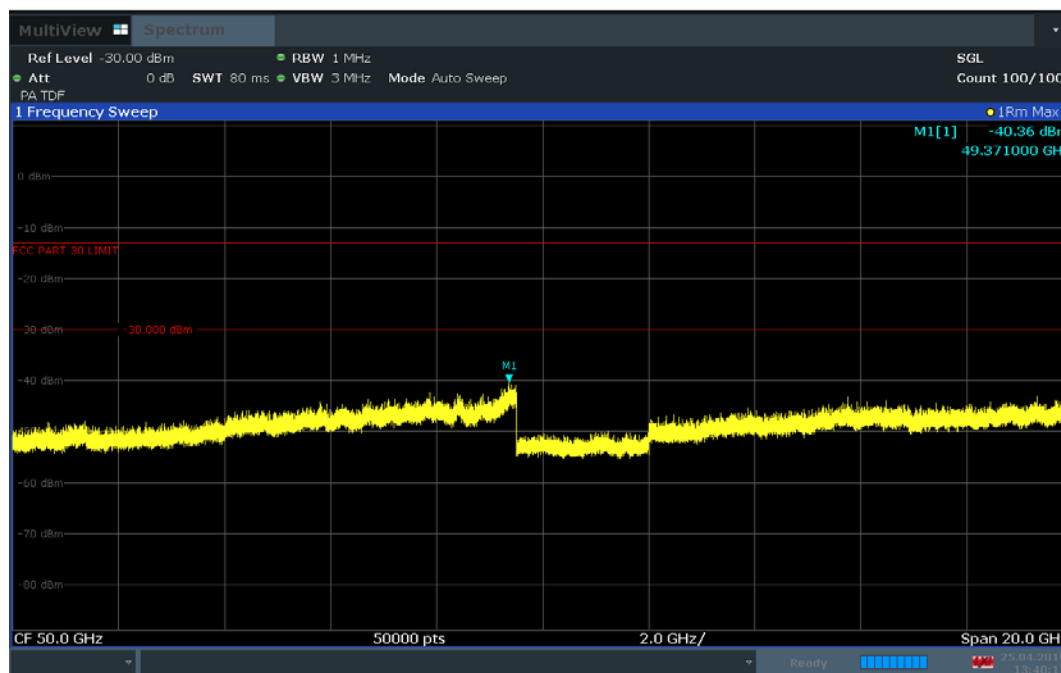
FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 99 of 202

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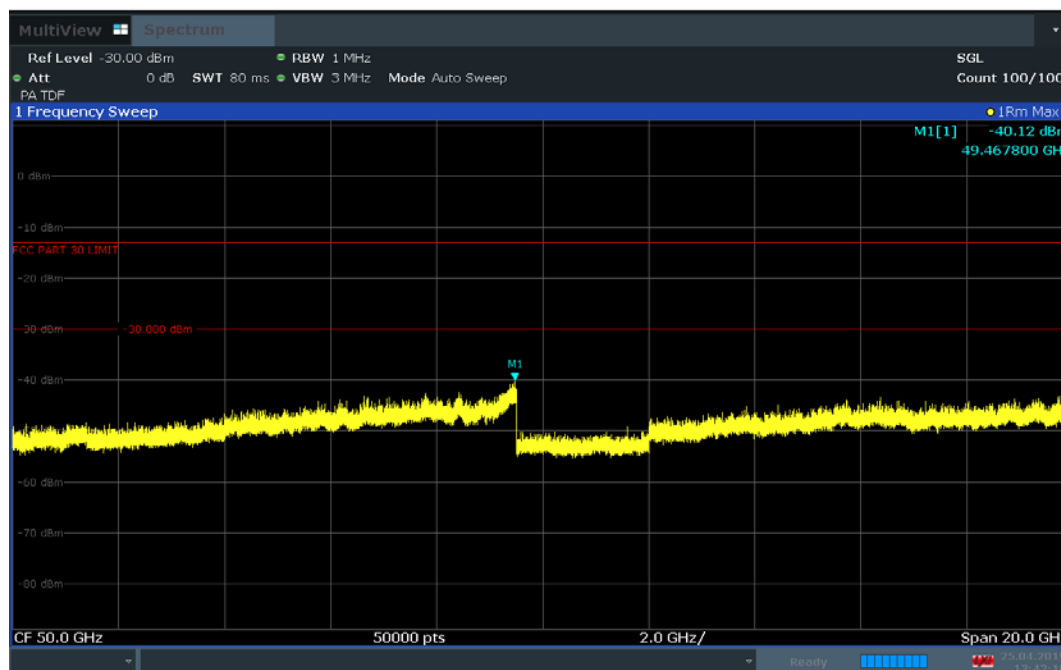
ACLRResults



13:40:18 25.04.2019

Plot 7-141. Vertical Radiated Spurious Plot 40-60 GHz (QTM0 1CC-50MHz Bandwidth QPSK Mid Channel)

ACLRResults



13:42:19 25.04.2019

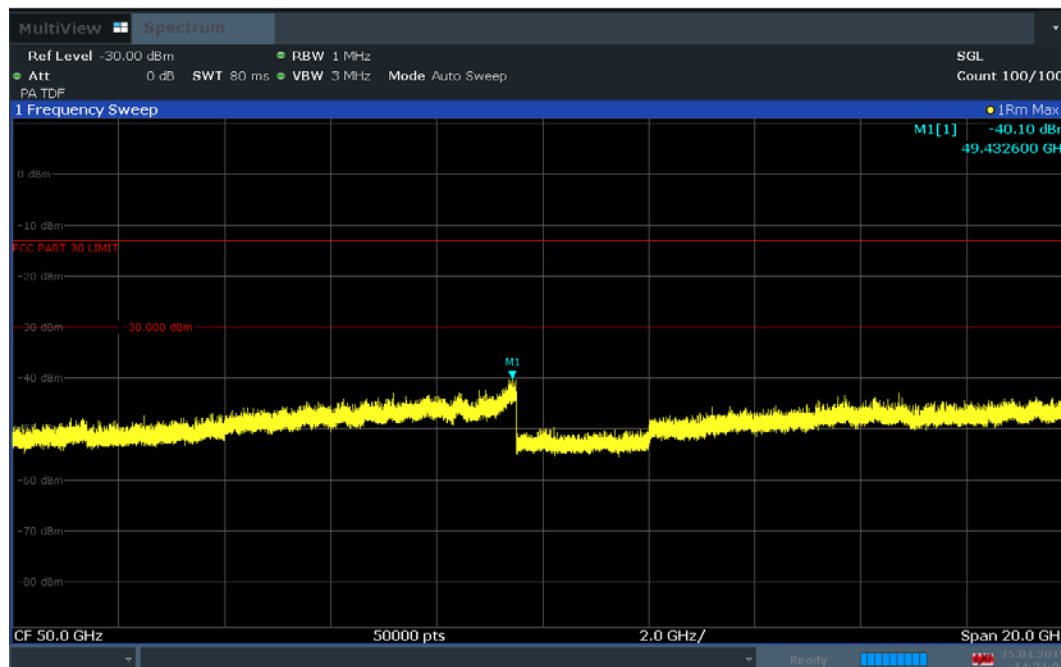
Plot 7-142. Vertical Radiated Spurious Plot 40-60 GHz (QTM0 1CC-50MHz Bandwidth QPSK High Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 100 of 202

Frequency [MHz]	Detector /Trace	Chan.	Bandwidth (MHz)	Mod.	Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
49409.80	Maxh/RMS	Low	100	QPSK	H + V	H	-	-	-40.22	-13.00	-27.22
49431.40	Maxh/RMS	Mid	100	QPSK	H + V	H	-	-	-39.73	-13.00	-26.73
49403.40	Maxh/RMS	High	100	QPSK	H + V	H	-	-	-40.80	-13.00	-27.80
49406.60	Maxh/RMS	Low	100	QPSK	H + V	V	-	-	-40.69	-13.00	-27.69
49371.00	Maxh/RMS	Mid	100	QPSK	H + V	V	-	-	-40.36	-13.00	-27.36
49467.80	Maxh/RMS	High	100	QPSK	H + V	V	-	-	-40.12	-13.00	-27.12

Table 7-23. Spurious Emissions QTM0 (40 – 60GHz)

ACLRResults

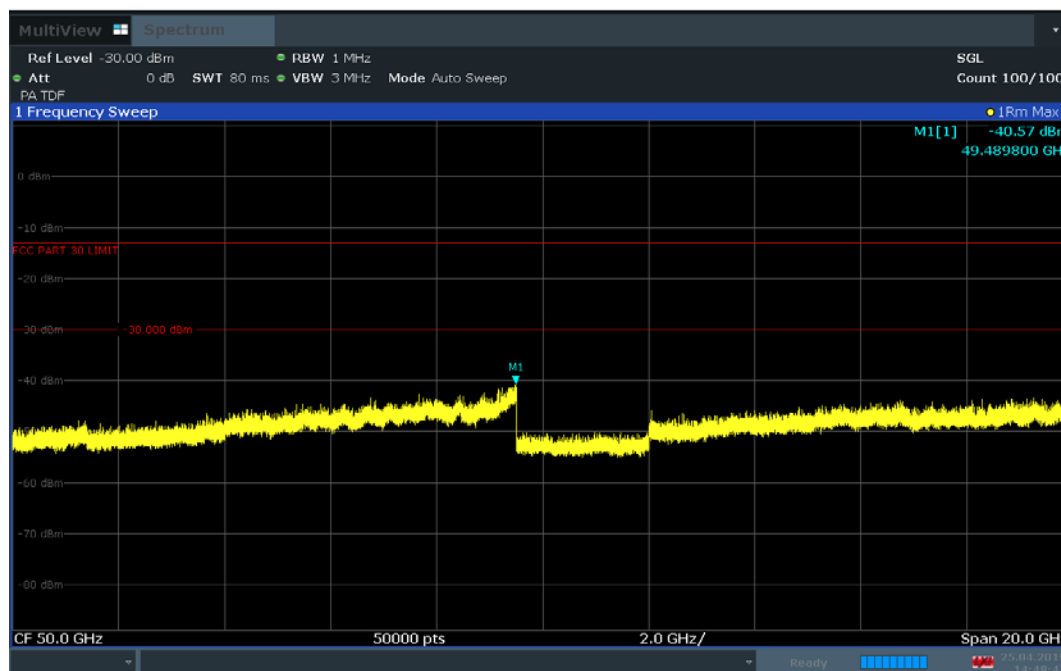


14:24:05 25.04.2019

Plot 7-143. Horizontal Radiated Spurious Plot 40-60 GHz (QTM1 1CC-100MHz Bandwidth QPSK Low Channel

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 101 of 202

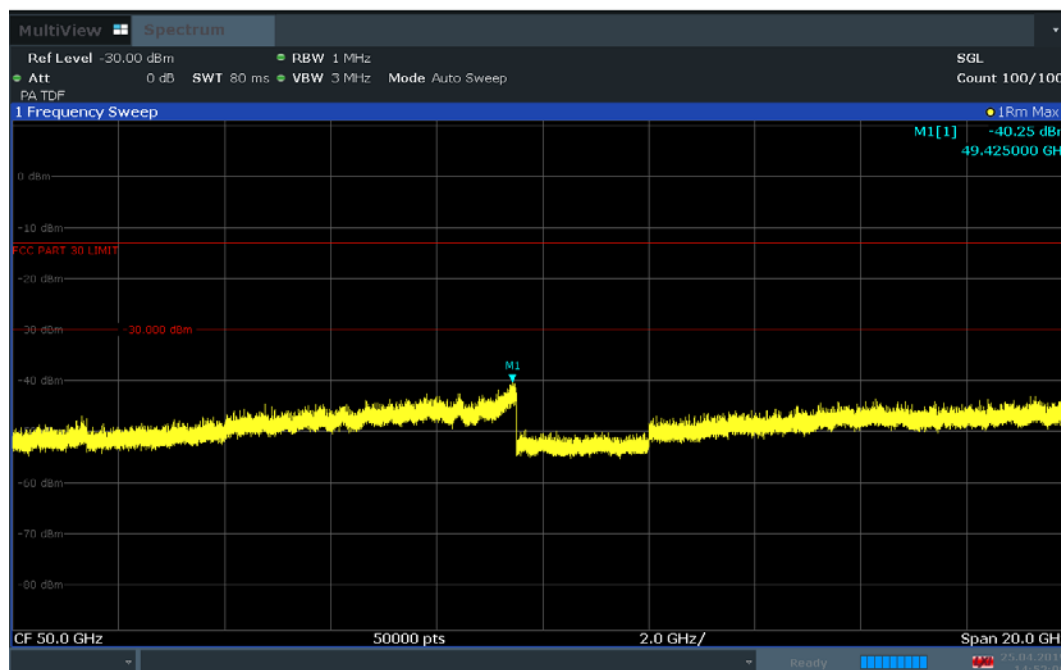
ACLRRResults



14:48:47 25.04.2019

Plot 7-144. Horizontal Radiated Spurious Plot 40-60 GHz (QTM1 1CC-100MHz Bandwidth QPSK Mid Channel)

ACLRRResults



14:52:10 25.04.2019

Plot 7-145. Horizontal Radiated Spurious Plot 40-60 GHz (QTM1 1CC-100MHz Bandwidth QPSK High Channel)

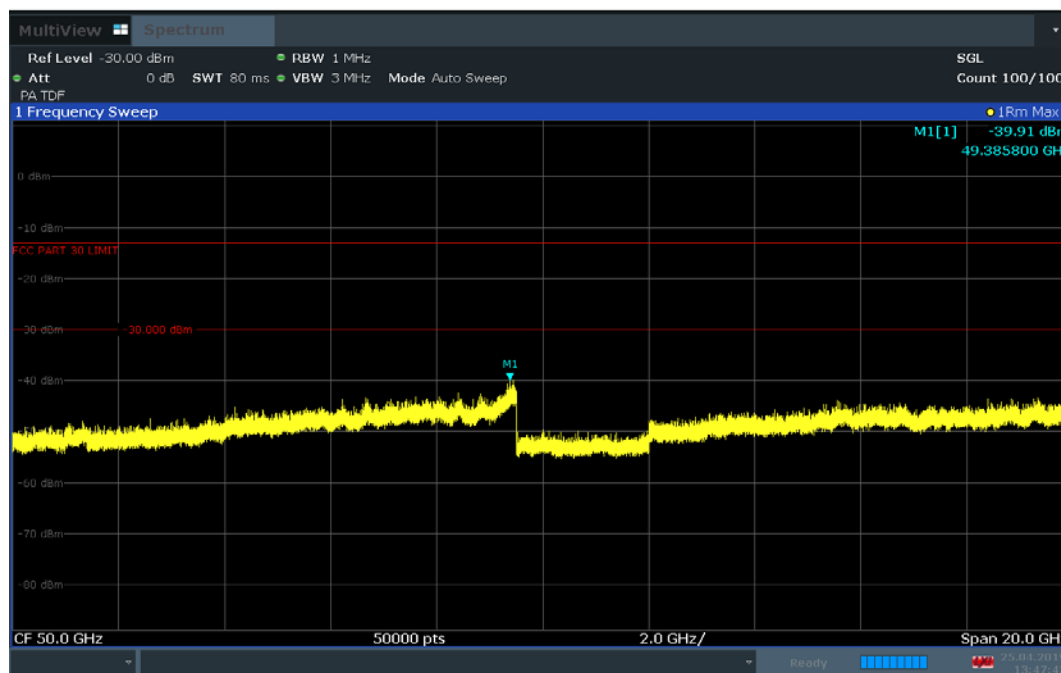
FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 102 of 202

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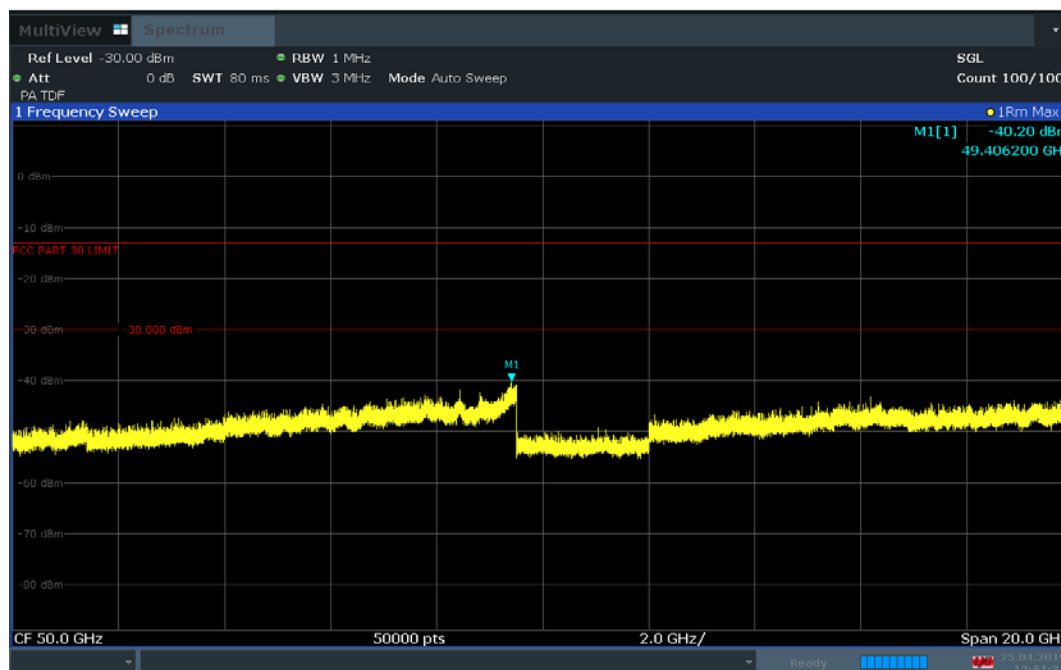
ACLRResults



13:47:43 25.04.2019

Plot 7-146. Vertical Radiated Spurious Plot 40-60 GHz (QTM1 1CC-100MHz Bandwidth QPSK Low Channel)

ACLRResults

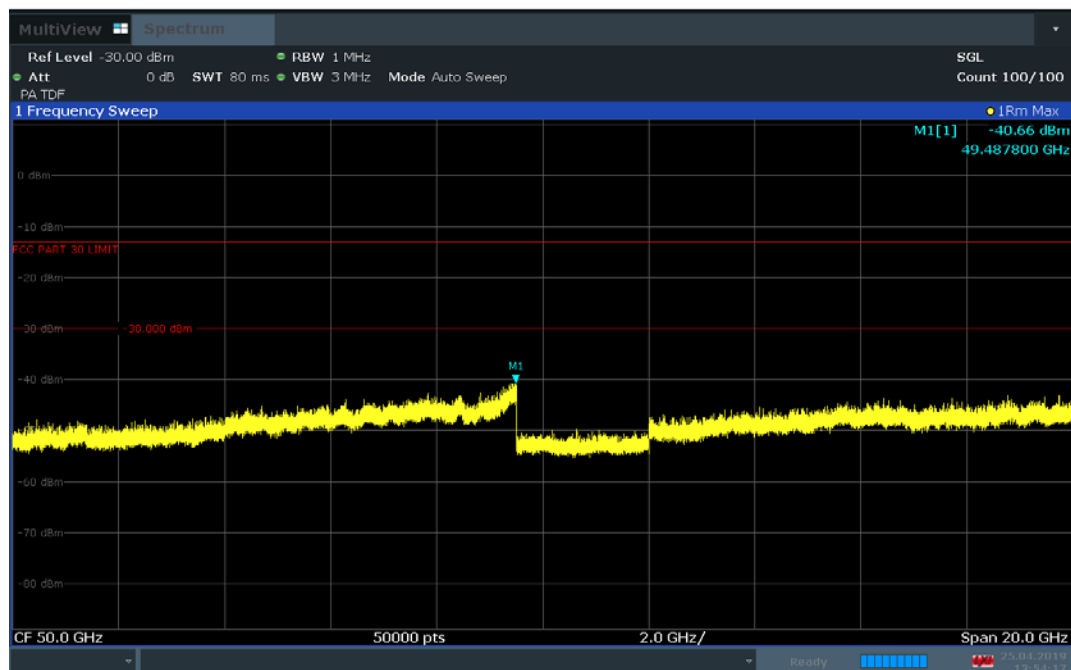


13:51:35 25.04.2019

Plot 7-147. Vertical Radiated Spurious Plot 40-60 GHz (QTM1 1CC-100MHz Bandwidth QPSK Mid Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 103 of 202

ACLRRResults



13:54:17 25.04.2019

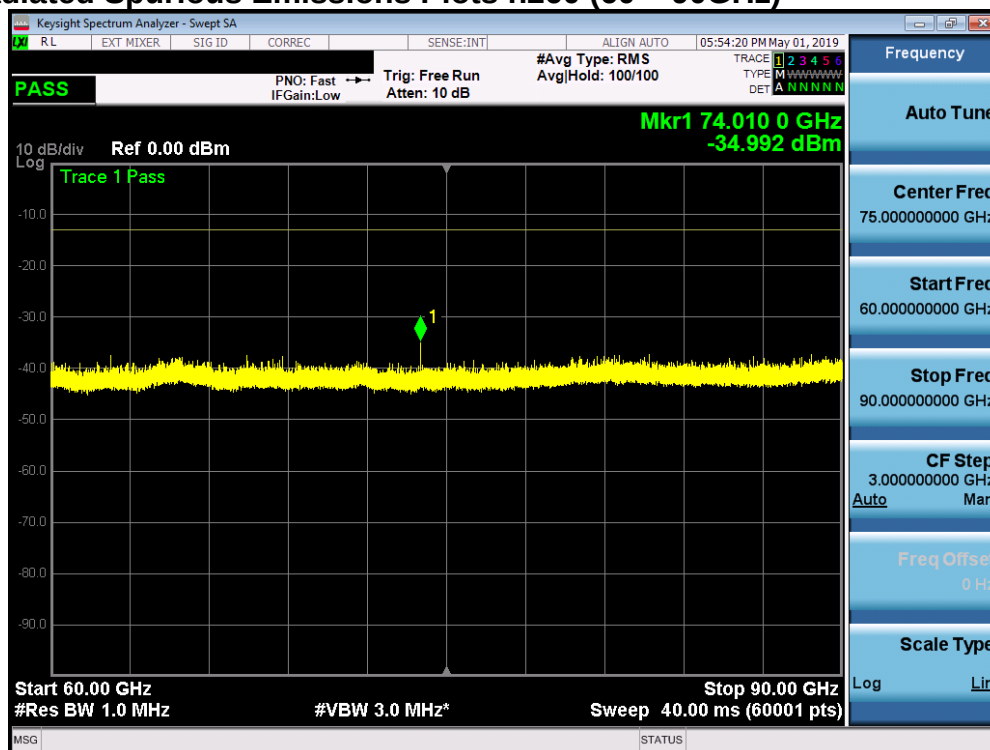
Plot 7-148. Vertical Radiated Spurious Plot 40-60 GHz (QTM1 1CC-100MHz Bandwidth QPSK High Channel)

Frequency [MHz]	Detector /Trace	Chan.	Bandwidth (MHz)	Mod.	Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
49432.60	Maxh/RMS	Low	100	QPSK	H + V	H	-	-	-40.10	-13.00	-27.10
49489.80	Maxh/RMS	Mid	100	QPSK	H + V	H	-	-	-40.57	-13.00	-27.57
49425.00	Maxh/RMS	High	100	QPSK	H + V	H	-	-	-40.25	-13.00	-27.25
49385.80	Maxh/RMS	Low	100	QPSK	H + V	V	-	-	-39.91	-13.00	-26.91
49406.20	Maxh/RMS	Mid	100	QPSK	H + V	V	-	-	-40.20	-13.00	-27.20
49487.80	Maxh/RMS	High	100	QPSK	H + V	V	-	-	-40.66	-13.00	-27.66

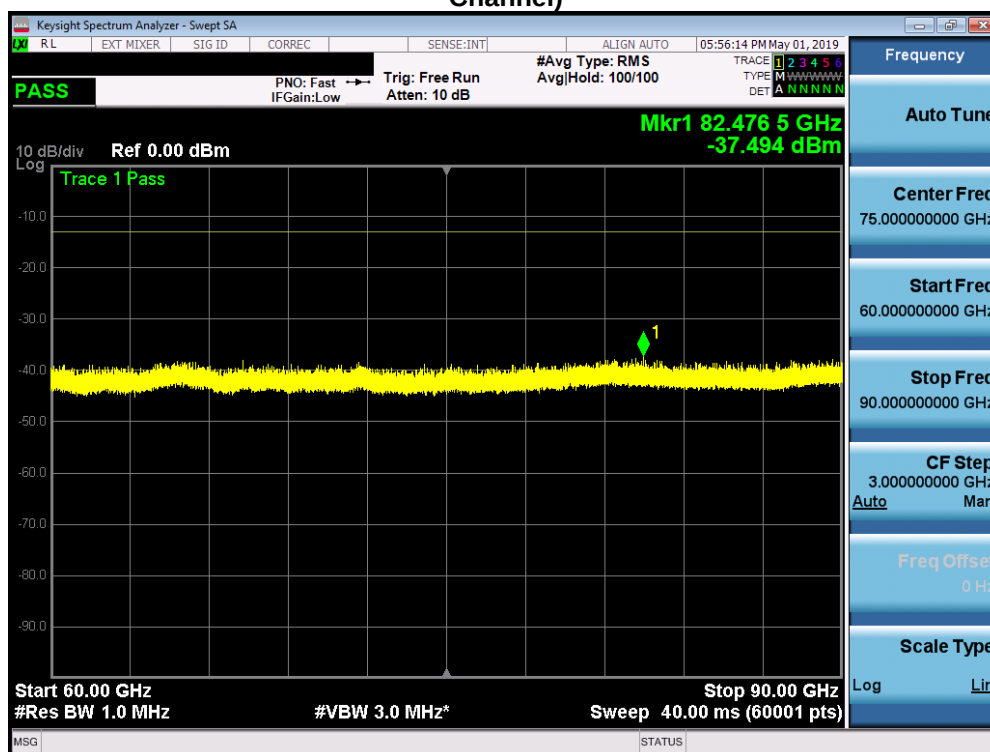
Table 7-24. Spurious Emissions QTM1 (40 – 60GHz)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)		LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset			Page 104 of 202

7.4.12 Radiated Spurious Emissions Plots n260 (60 – 90GHz)

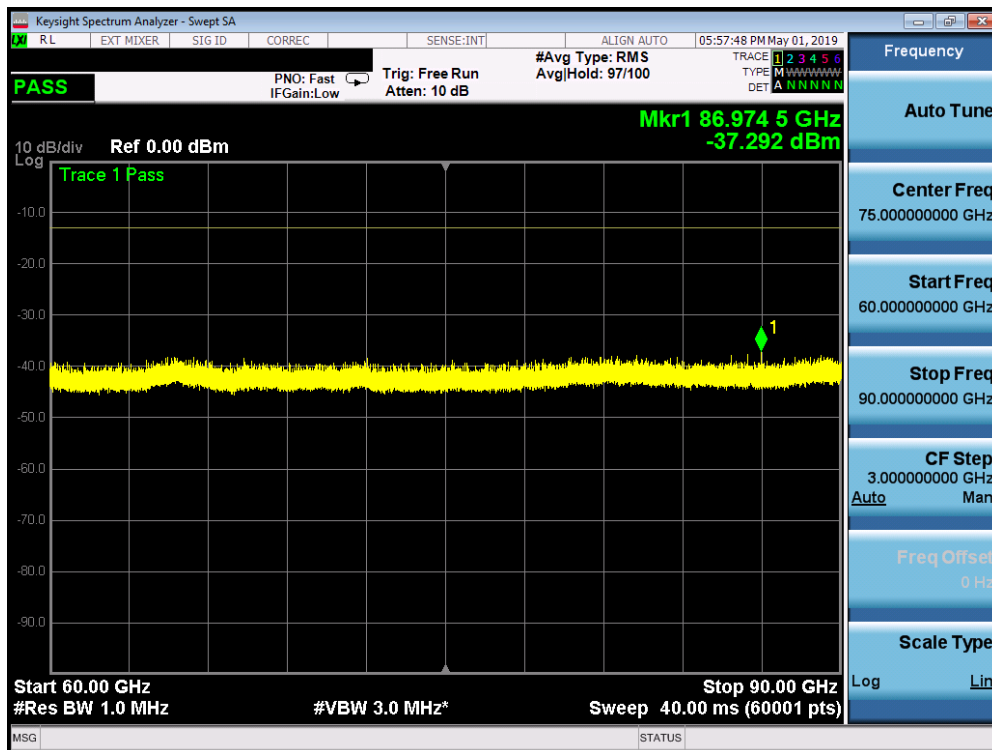


Plot 7-149. Horizontal Radiated Spurious Plot 60-90 GHz (QTM0 1CC-100MHz Bandwidth QPSK Low Channel)

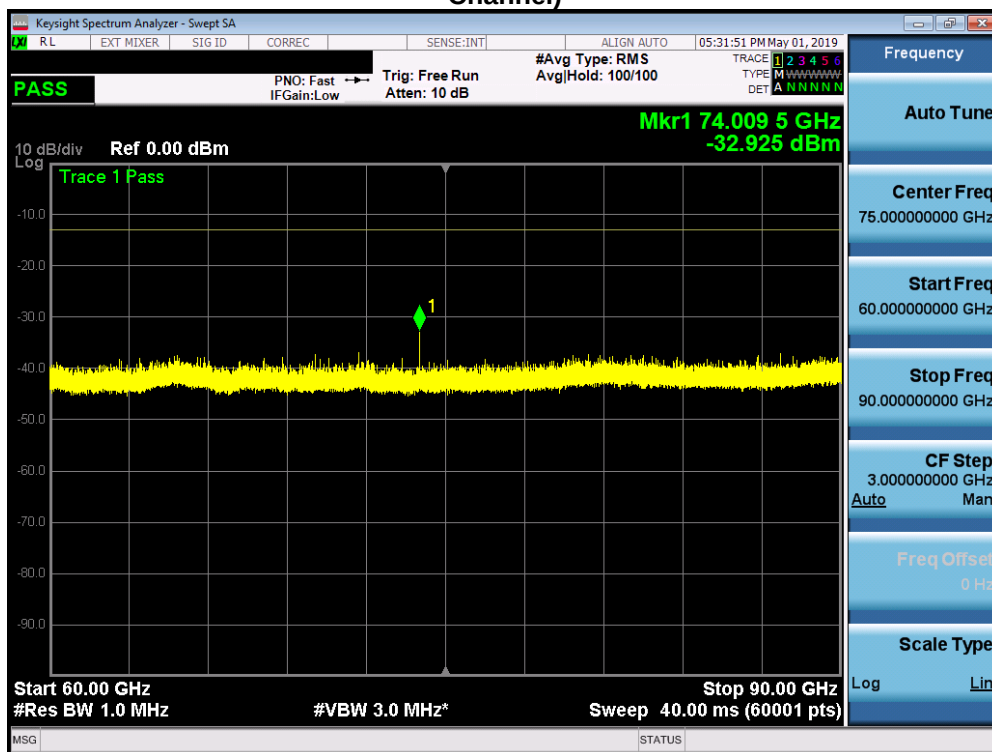


Plot 7-150. Horizontal Radiated Spurious Plot 60-90 GHz (QTM0 1CC-100MHz Bandwidth QPSK Mid Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 105 of 202

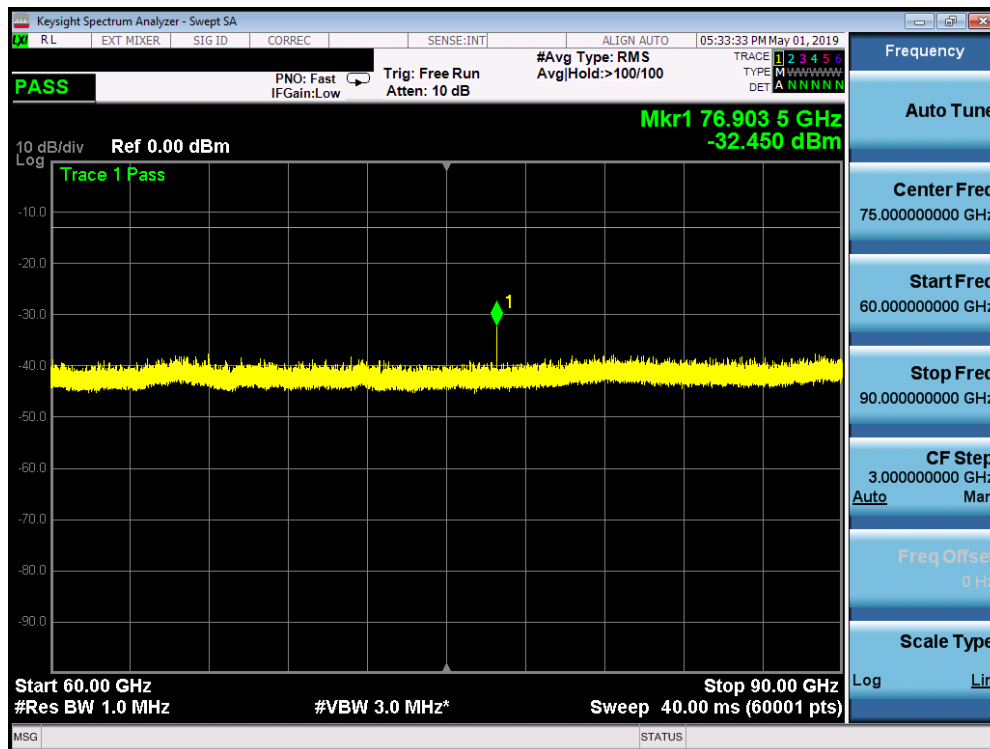


Plot 7-151. Horizontal Radiated Spurious Plot 60-90 GHz (QTM0 1CC-100MHz Bandwidth QPSK High Channel)

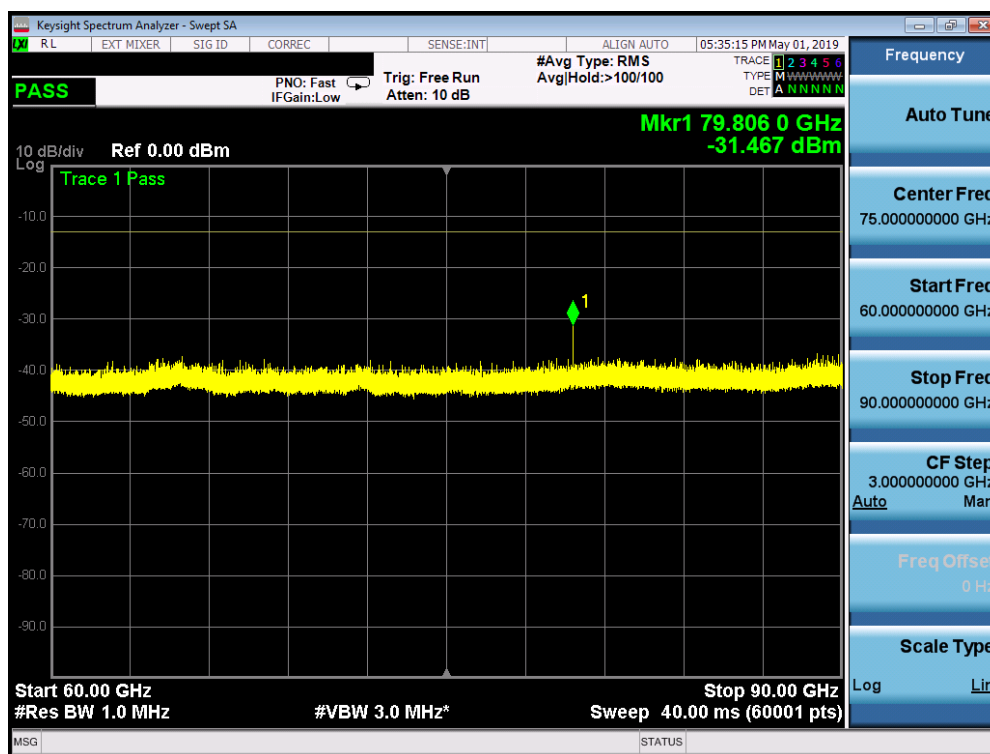


Plot 7-152. Vertical Radiated Spurious Plot 60-90 GHz (QTM0 1CC-100MHz Bandwidth QPSK Low Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 106 of 202



Plot 7-153. Vertical Radiated Spurious Plot 60-90 GHz (QTM0 1CC-100MHz Bandwidth QPSK Mid Channel)

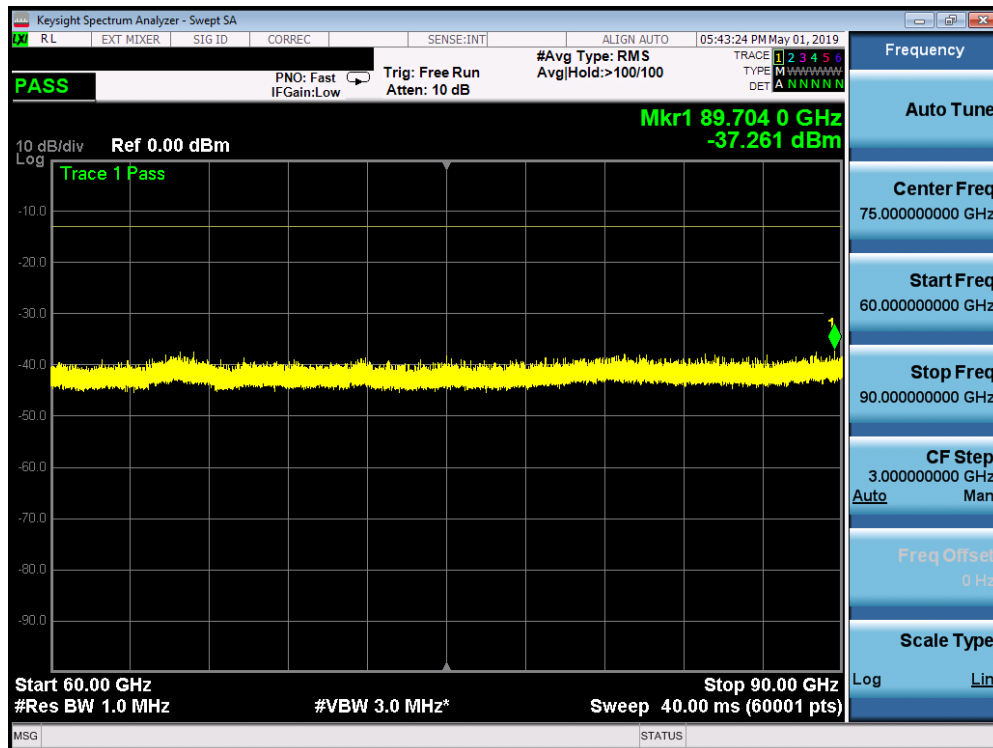


Plot 7-154. Vertical Radiated Spurious Plot 60-90 GHz (QTM0 1CC-100MHz Bandwidth QPSK High Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 107 of 202

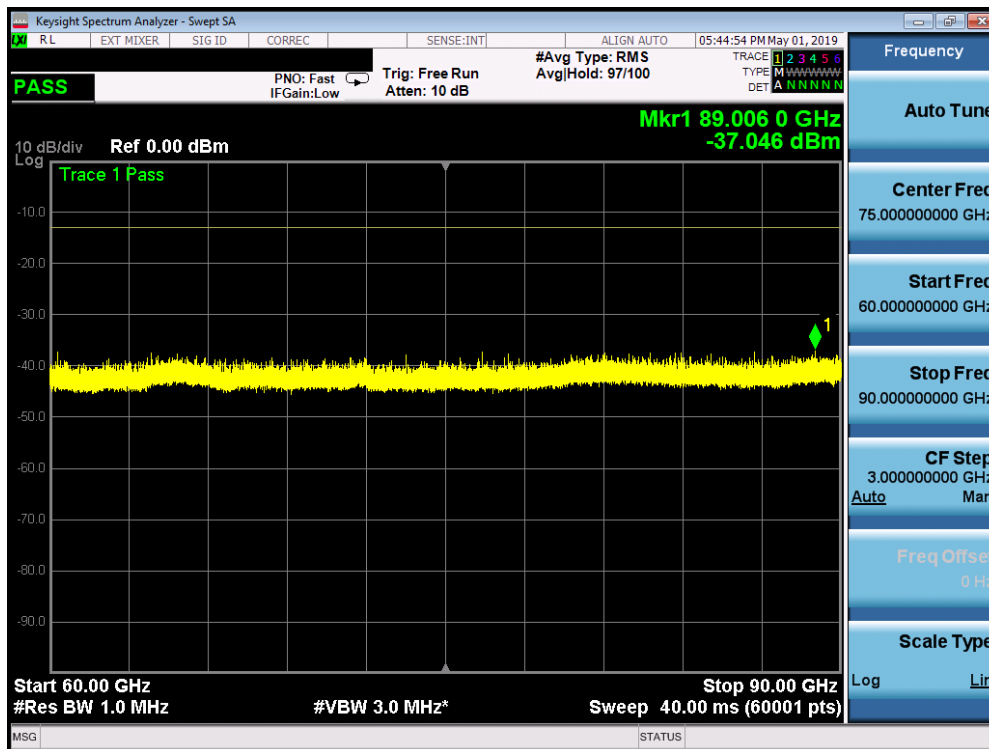
Frequency [MHz]	Detector /Trace	Chan.	Bandwidth (MHz)	Mod.	Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
74010.00	Maxh/RMS	Low	100	QPSK	H + V	H	150	112	-34.99	-13.00	-21.99
82476.50	Maxh/RMS	Mid	100	QPSK	H + V	H	150	115	-37.49	-13.00	-24.49
86974.50	Maxh/RMS	High	100	QPSK	H + V	H	150	110	-37.29	-13.00	-24.29
74009.50	Maxh/RMS	Low	100	QPSK	H + V	V	150	118	-32.93	-13.00	-19.93
76903.50	Maxh/RMS	Mid	100	QPSK	H + V	V	150	114	-32.45	-13.00	-19.45
79806.00	Maxh/RMS	High	100	QPSK	H + V	V	150	112	-31.47	-13.00	-18.47

Table 7-25. Spurious Emissions QTM0 (60 – 90GHz)

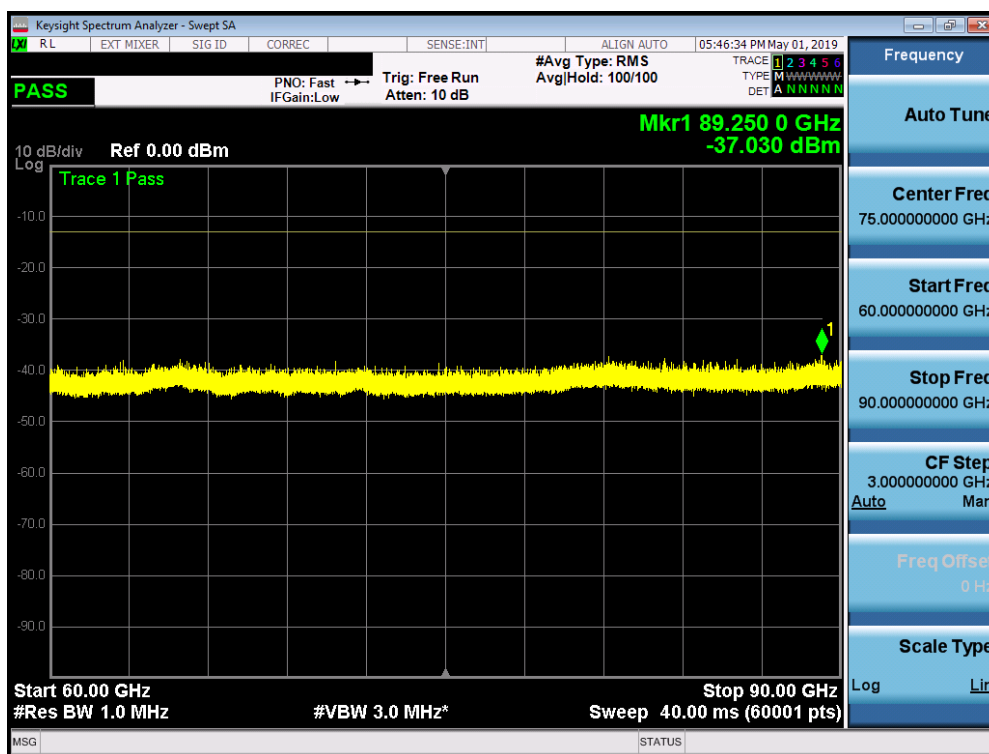


Plot 7-155. Horizontal Radiated Spurious Plot 60-90 GHz (QTM1 1CC-100MHz Bandwidth QPSK Low Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 108 of 202

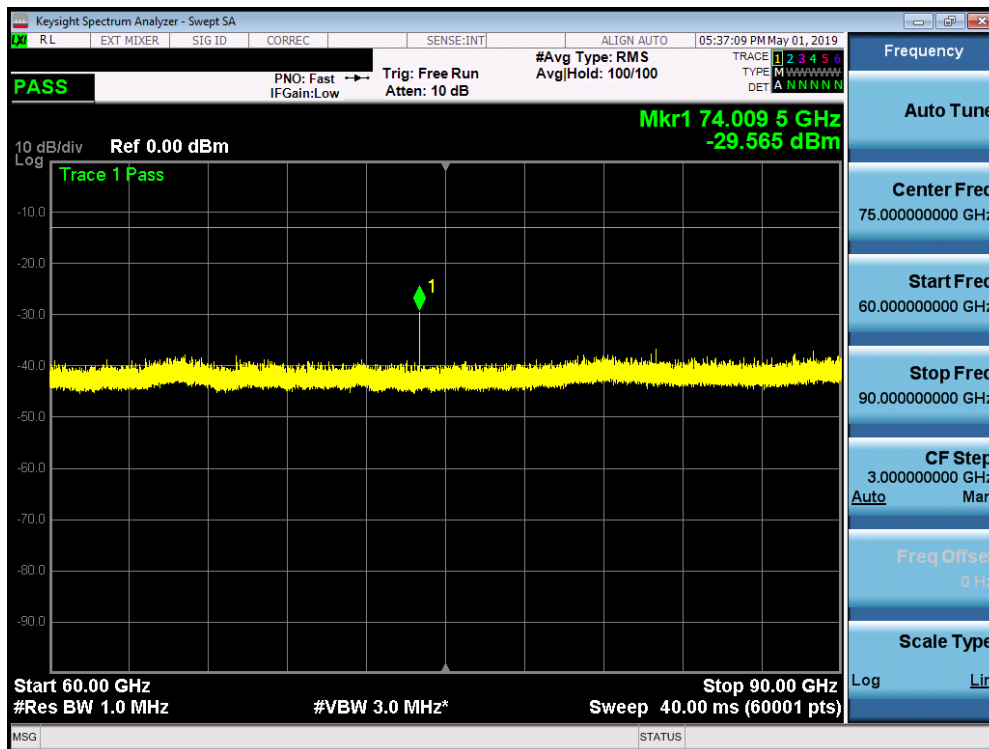


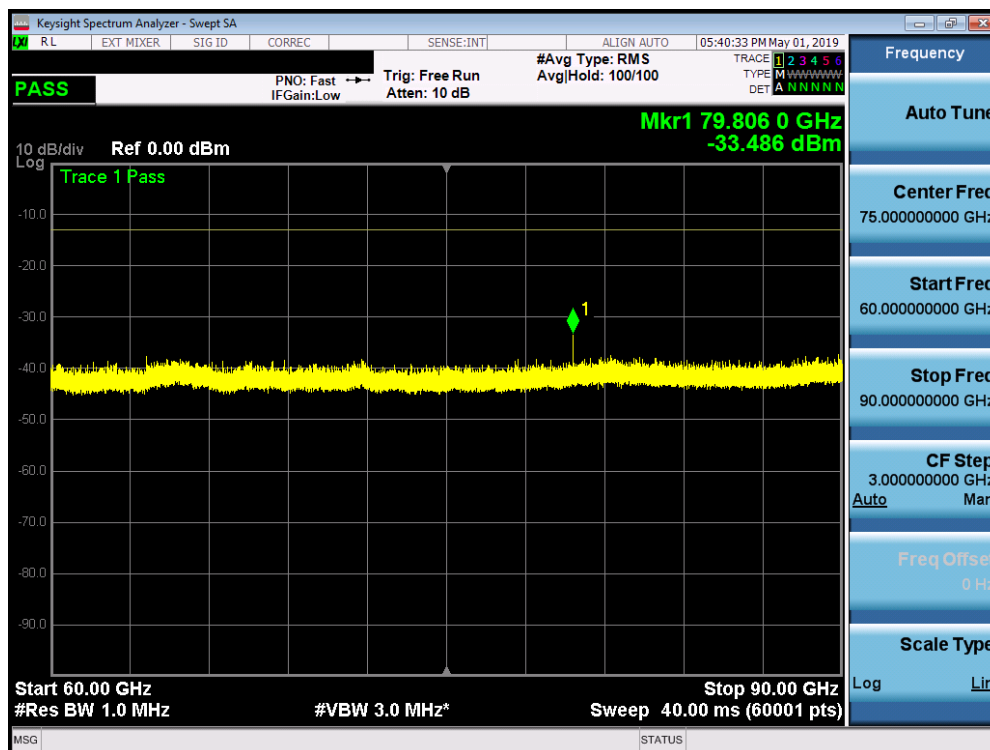
Plot 7-156. Horizontal Radiated Spurious Plot 60-90 GHz (QTM1 1CC-100MHz Bandwidth QPSK Mid Channel)



Plot 7-157. Horizontal Radiated Spurious Plot 60-90 GHz (QTM1 1CC-100MHz Bandwidth QPSK High Channel)

FCC ID: ZNFV450VM	 MEASUREMENT REPORT (Class II Permissive Change)			Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset	Page 109 of 202	





Plot 7-160. Vertical Radiated Spurious Plot 60-90 GHz (QTM1 1CC-100MHz Bandwidth QPSK High Channel)

Frequency [MHz]	Detector /Trace	Chan.	Bandwidth (MHz)	Mod.	Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
89704.00	Maxh/RMS	Low	100	QPSK	H + V	H	150	200	-37.26	-13.00	-24.26
89006.00	Maxh/RMS	Mid	100	QPSK	H + V	H	150	203	-37.05	-13.00	-24.05
89250.00	Maxh/RMS	High	100	QPSK	H + V	H	150	197	-37.03	-13.00	-24.03
74009.50	Maxh/RMS	Low	100	QPSK	H + V	V	150	201	-29.57	-13.00	-16.57
76903.50	Maxh/RMS	Mid	100	QPSK	H + V	V	150	205	-28.17	-13.00	-15.17
79806.00	Maxh/RMS	High	100	QPSK	H + V	V	150	195	-33.49	-13.00	-20.49

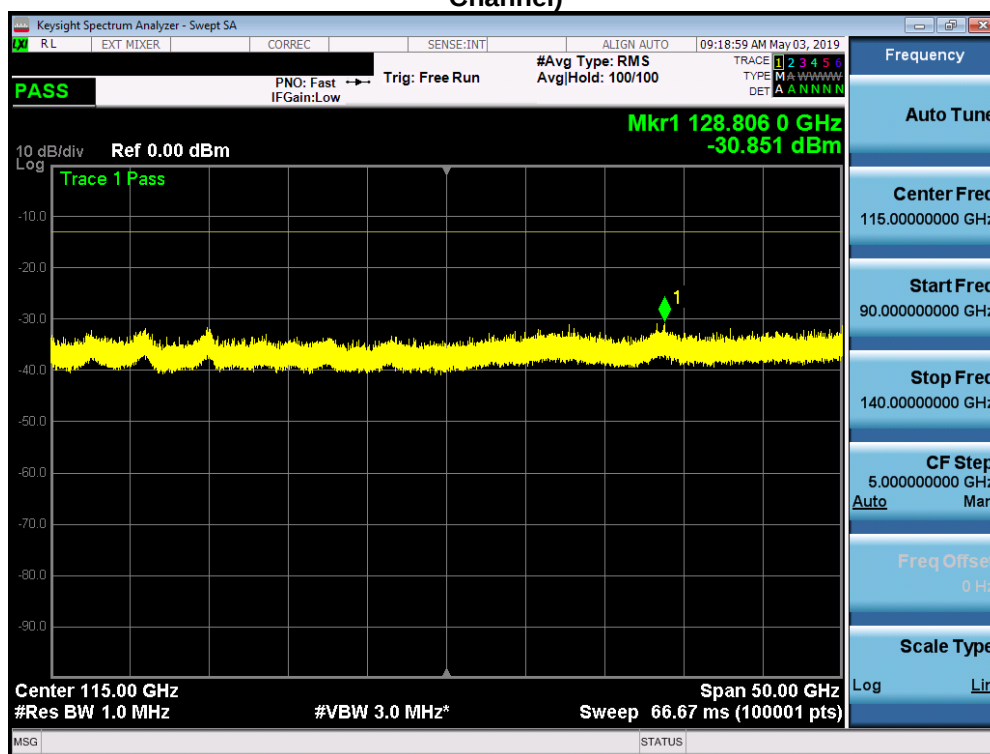
Table 7-26. Spurious Emissions QTM1 (60 – 90GHz)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)			Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset			Page 111 of 202

7.4.13 Radiated Spurious Emissions Plots n260(90 – 140GHz)

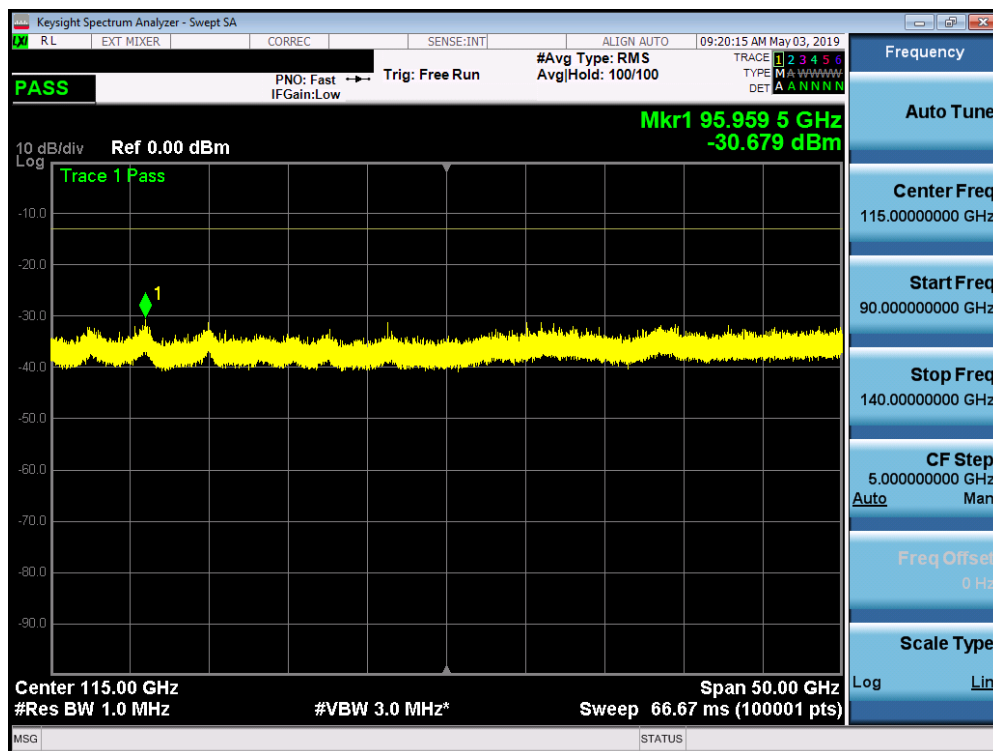


Plot 7-161. Horizontal Radiated Spurious Plot 90-140 GHz (QTM0 1CC-100MHz Bandwidth QPSK Low Channel)

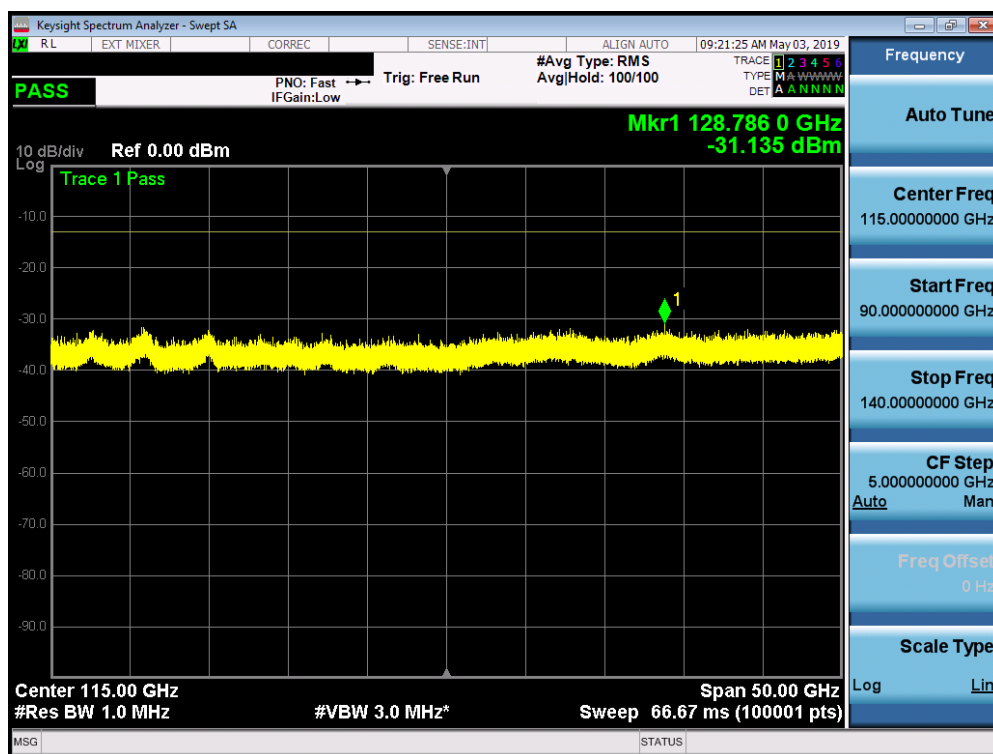


Plot 7-162. Horizontal Radiated Spurious Plot 90-140 GHz (QTM0 1CC-100MHz Bandwidth QPSK Mid Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 112 of 202

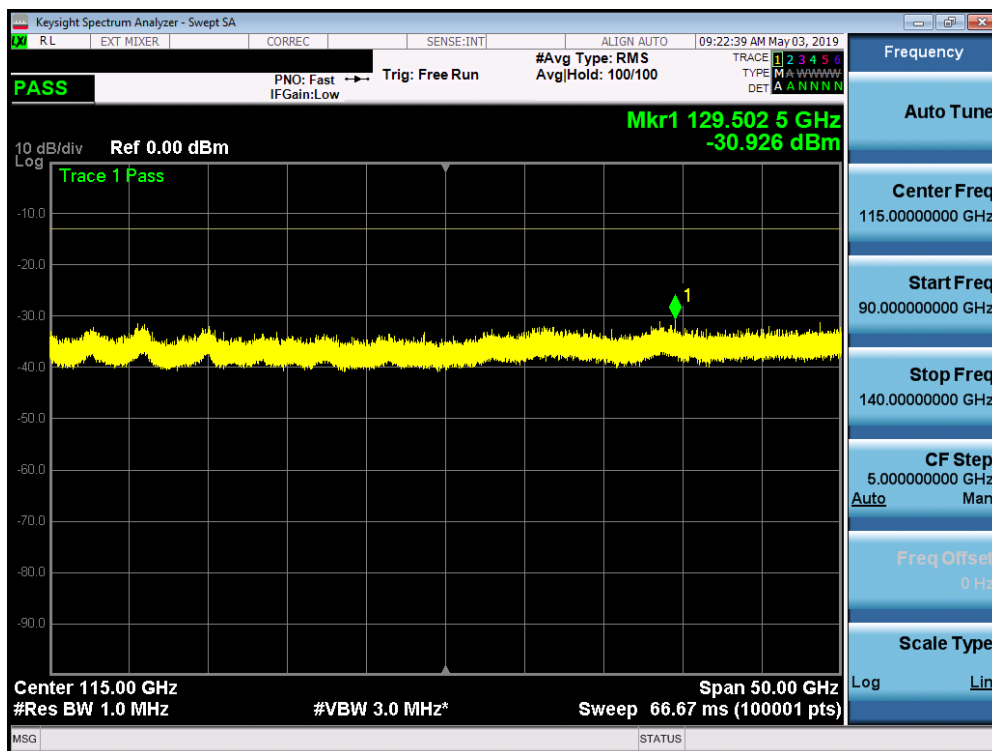


Plot 7-163. Horizontal Radiated Spurious Plot 90-140 GHz (QTM0 1CC-100MHz Bandwidth QPSK High Channel)

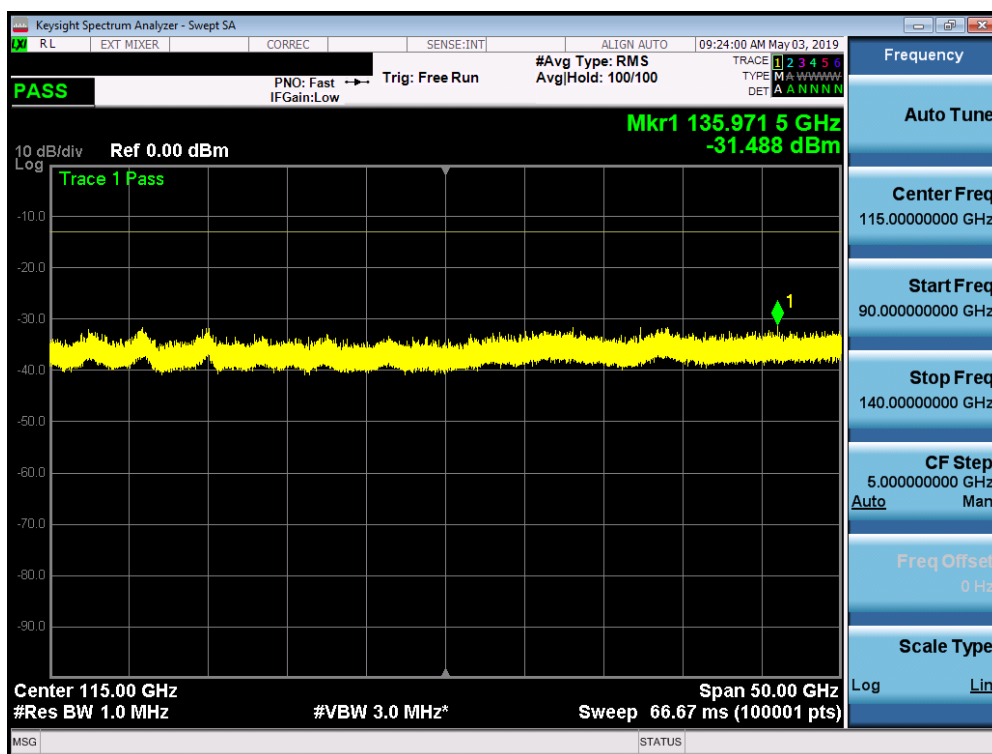


Plot 7-164. Vertical Radiated Spurious Plot 90-140 GHz (QTM0 1CC-100MHz Bandwidth QPSK Low Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 113 of 202



Plot 7-165. Vertical Radiated Spurious Plot 90-140 GHz (QTM0 1CC-100MHz Bandwidth QPSK Mid Channel)

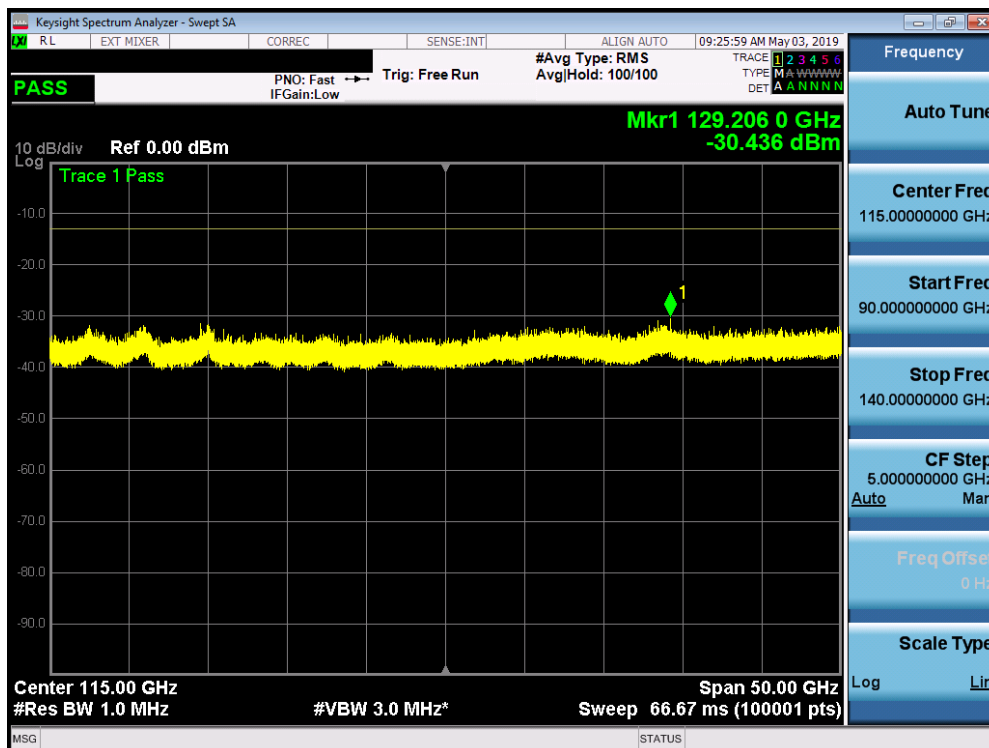


Plot 7-166. Vertical Radiated Spurious Plot 90-140 GHz (QTM0 1CC-100MHz Bandwidth QPSK High Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 114 of 202

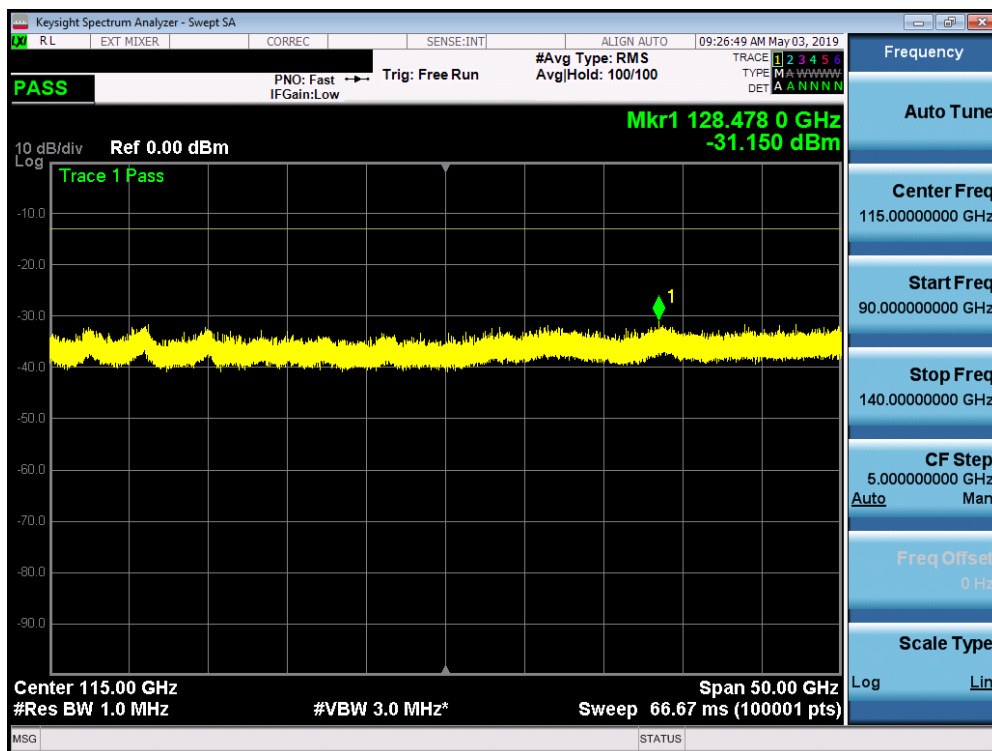
Frequency [MHz]	Detector /Trace	Chan.	Bandwidth (MHz)	Mod.	Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
128504.00	Maxh/RMS	Low	100	QPSK	H + V	H	-	-	-30.79	-13.00	-17.79
128806.00	Maxh/RMS	Mid	100	QPSK	H + V	H	-	-	-30.85	-13.00	-17.85
95959.50	Maxh/RMS	High	100	QPSK	H + V	H	-	-	-30.68	-13.00	-17.68
128786.00	Maxh/RMS	Low	100	QPSK	H + V	V	-	-	-31.14	-13.00	-18.14
129502.50	Maxh/RMS	Mid	100	QPSK	H + V	V	-	-	-30.93	-13.00	-17.93
135971.50	Maxh/RMS	High	100	QPSK	H + V	V	-	-	-31.49	-13.00	-18.49

Table 7-27. Spurious Emissions QTM0 (90-140GHz)

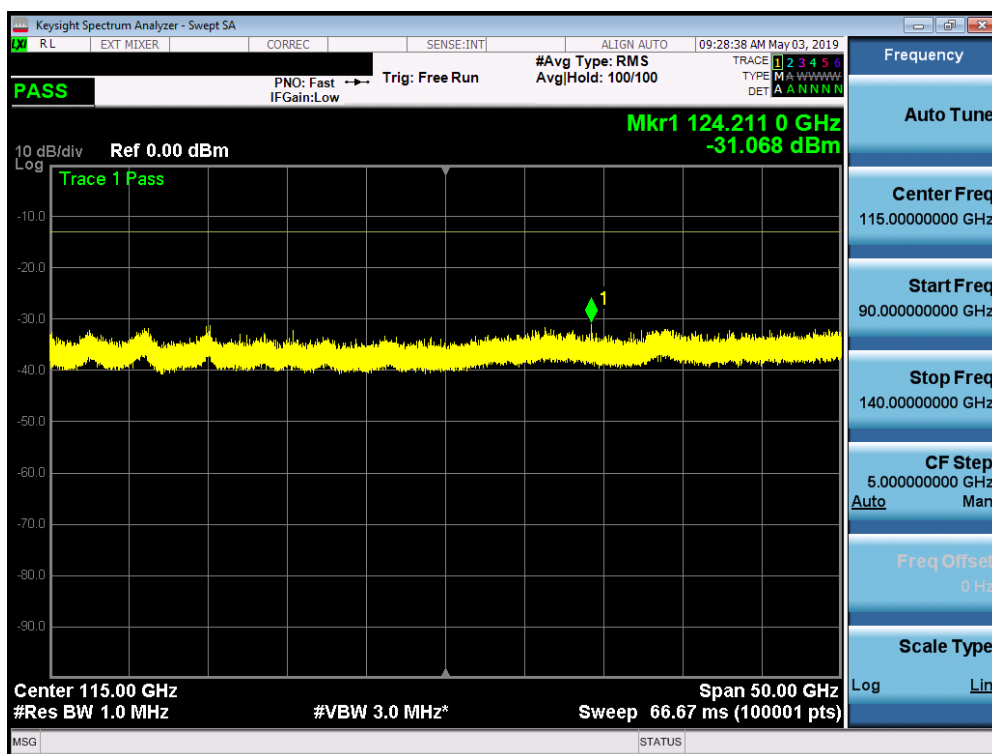


Plot 7-167. Horizontal Radiated Spurious Plot 90-140 GHz (QTM1 1CC-100MHz Bandwidth QPSK Low Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 115 of 202

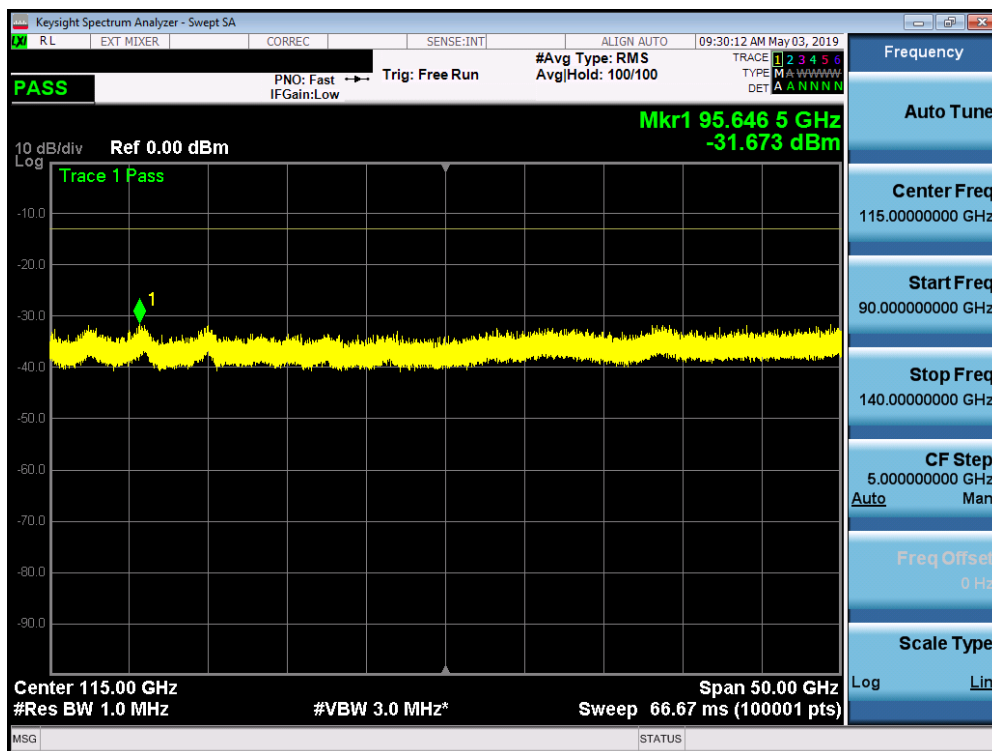


Plot 7-168. Horizontal Radiated Spurious Plot 90-140 GHz (QTM1 1CC-100MHz Bandwidth QPSK Mid Channel)

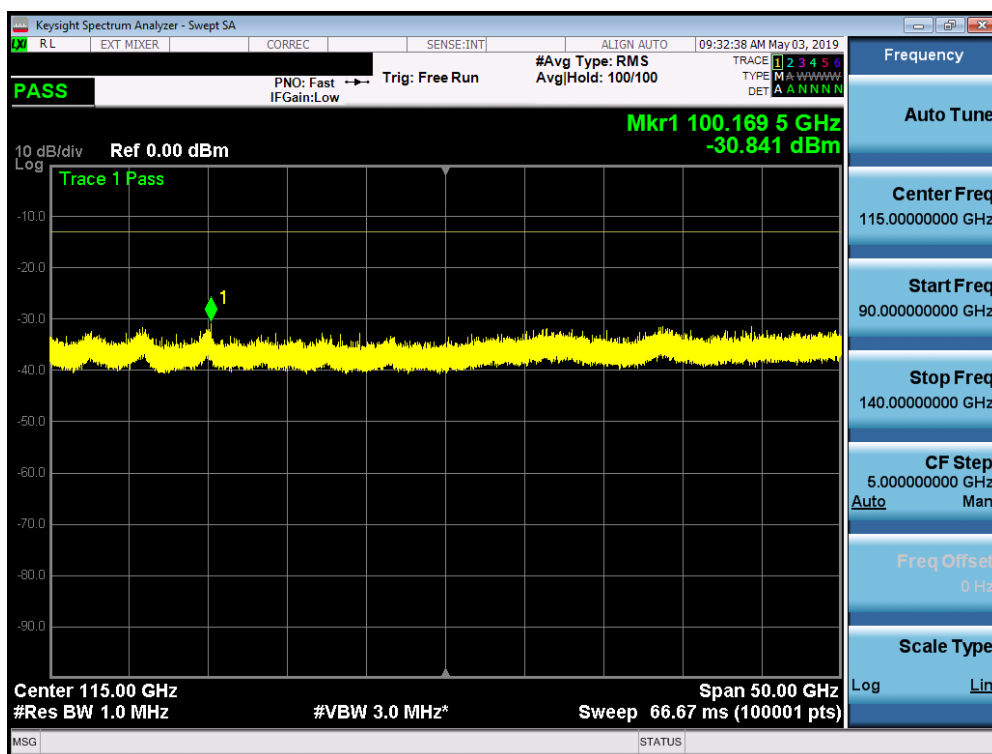


Plot 7-169. Horizontal Radiated Spurious Plot 90-140 GHz (QTM1 1CC-100MHz Bandwidth QPSK High Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 116 of 202

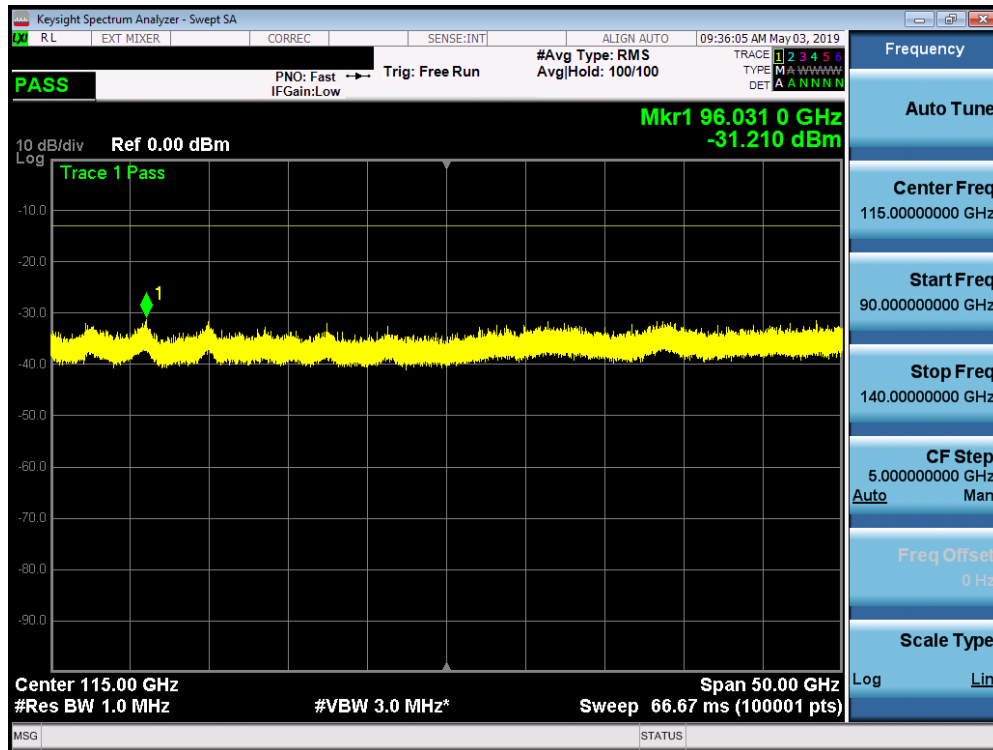


Plot 7-170. Vertical Radiated Spurious Plot 90-140 GHz (QTM1 1CC-100MHz Bandwidth QPSK Low Channel)



Plot 7-171. Vertical Radiated Spurious Plot 90-140 GHz (QTM1 1CC-100MHz Bandwidth QPSK Mid Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 117 of 202



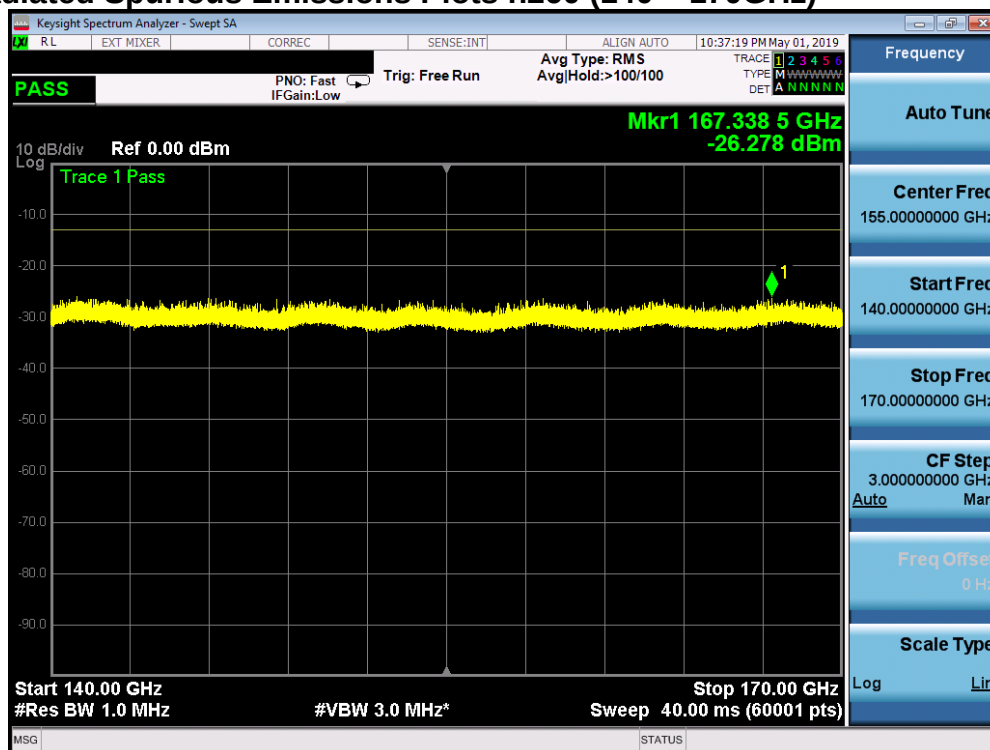
Plot 7-172. Vertical Radiated Spurious Plot 90-140 GHz (QTM1 1CC-100MHz Bandwidth QPSK High Channel)

Frequency [MHz]	Detector /Trace	Chan.	Bandwidth (MHz)	Mod.	Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
129206.00	Maxh/RMS	Low	100	QPSK	H + V	H	-	-	-30.44	-13.00	-17.44
128478.00	Maxh/RMS	Mid	100	QPSK	H + V	H	-	-	-31.15	-13.00	-18.15
124211.00	Maxh/RMS	High	100	QPSK	H + V	H	-	-	-31.07	-13.00	-18.07
95646.50	Maxh/RMS	Low	100	QPSK	H + V	V	-	-	-31.67	-13.00	-18.67
100169.50	Maxh/RMS	Mid	100	QPSK	H + V	V	-	-	-30.84	-13.00	-17.84
96031.00	Maxh/RMS	High	100	QPSK	H + V	V	-	-	-31.21	-13.00	-18.21

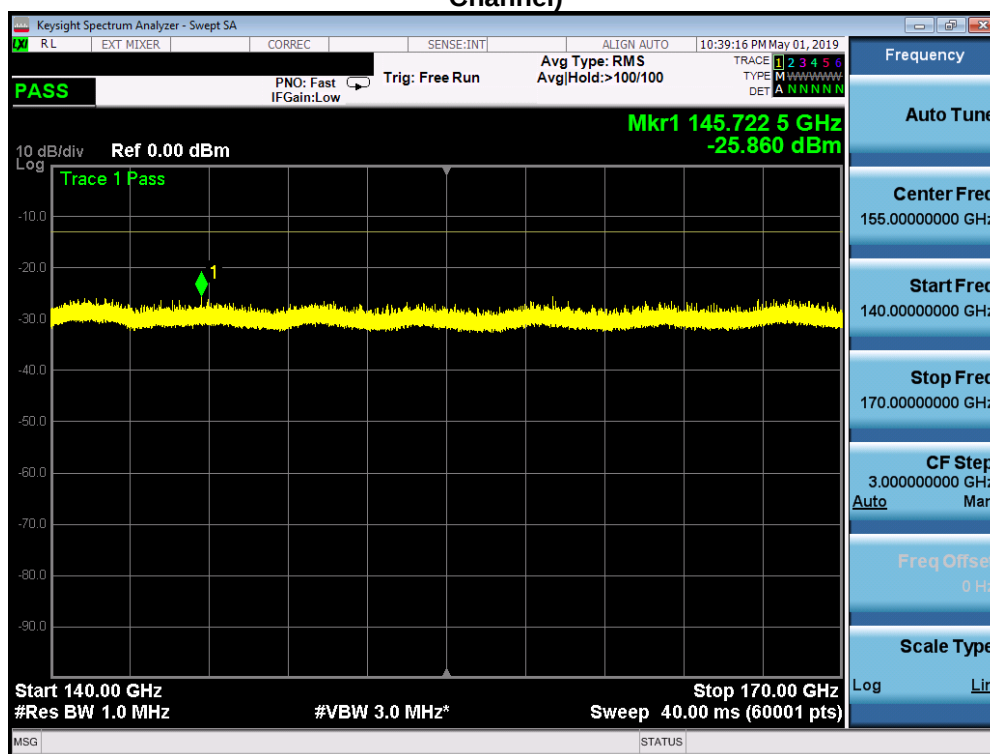
Table 7-28. Spurious Emissions QTM1 (90-140GHz)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)		LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset			Page 118 of 202

7.4.14 Radiated Spurious Emissions Plots n260 (140 – 170GHz)

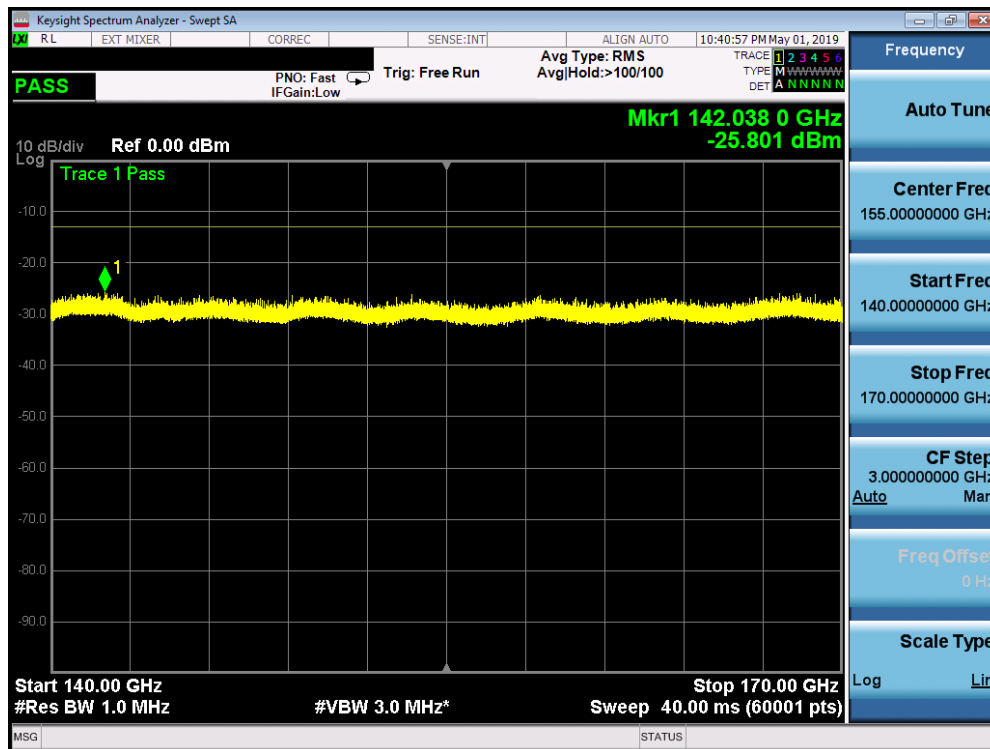


Plot 7-173. Horizontal Radiated Spurious Plot 140-170 GHz (QTM0 1CC-100MHz Bandwidth QPSK Low Channel)

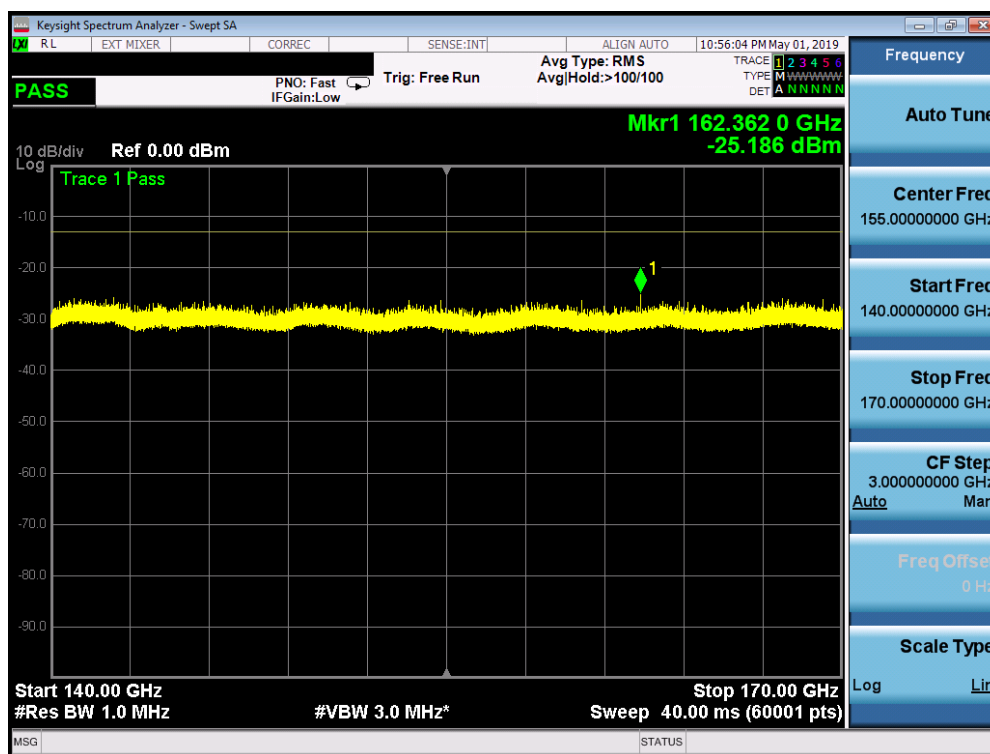


Plot 7-174. Horizontal Radiated Spurious Plot 140-170 GHz (QTM0 1CC-100MHz Bandwidth QPSK Mid Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 119 of 202

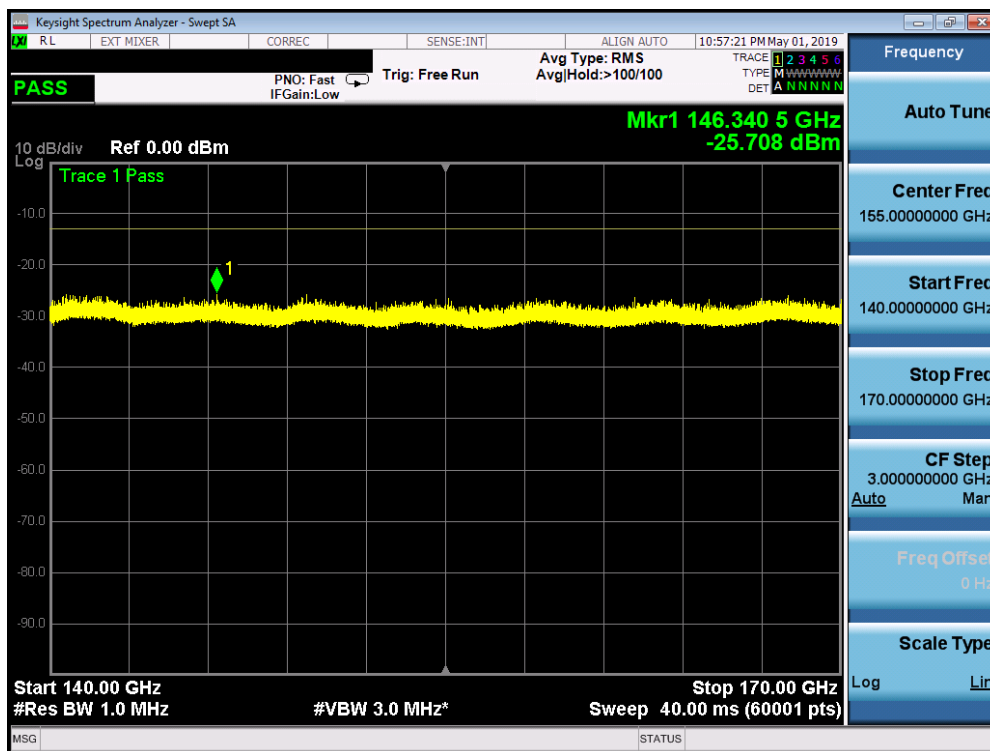


Plot 7-175. Horizontal Radiated Spurious Plot 140-170 GHz (QTM0 1CC-100MHz Bandwidth QPSK High Channel)

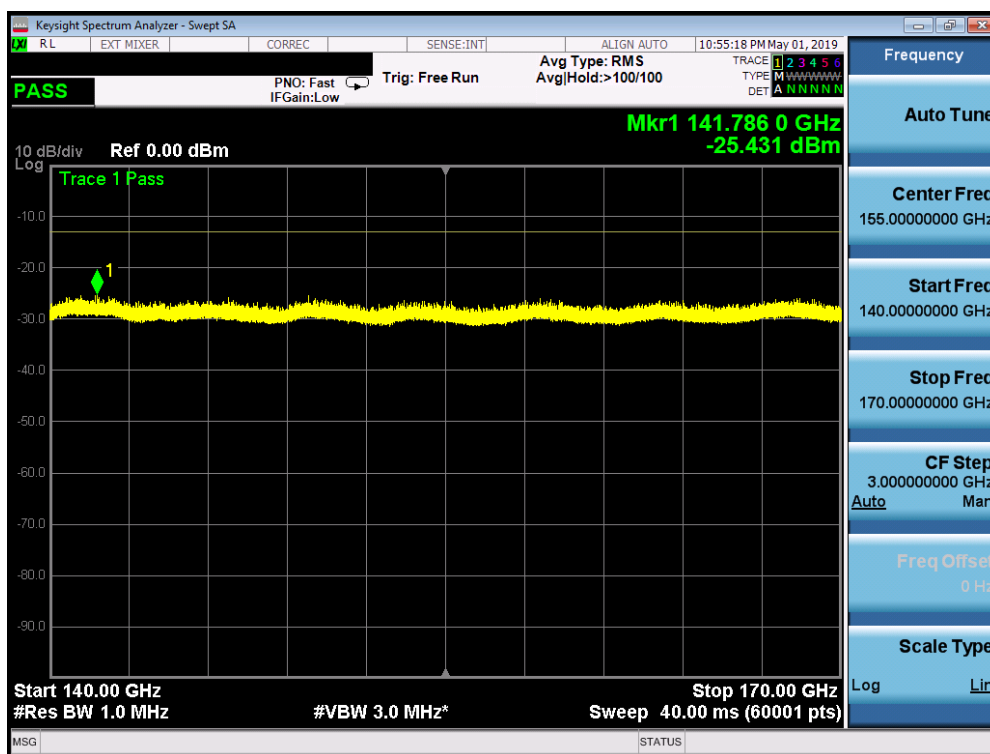


Plot 7-176. Vertical Radiated Spurious Plot 140-170 GHz (QTM0 1CC-100MHz Bandwidth QPSK Low Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 120 of 202



Plot 7-177. Vertical Radiated Spurious Plot 140-170 GHz (QTM0 1CC-100MHz Bandwidth QPSK Mid Channel)

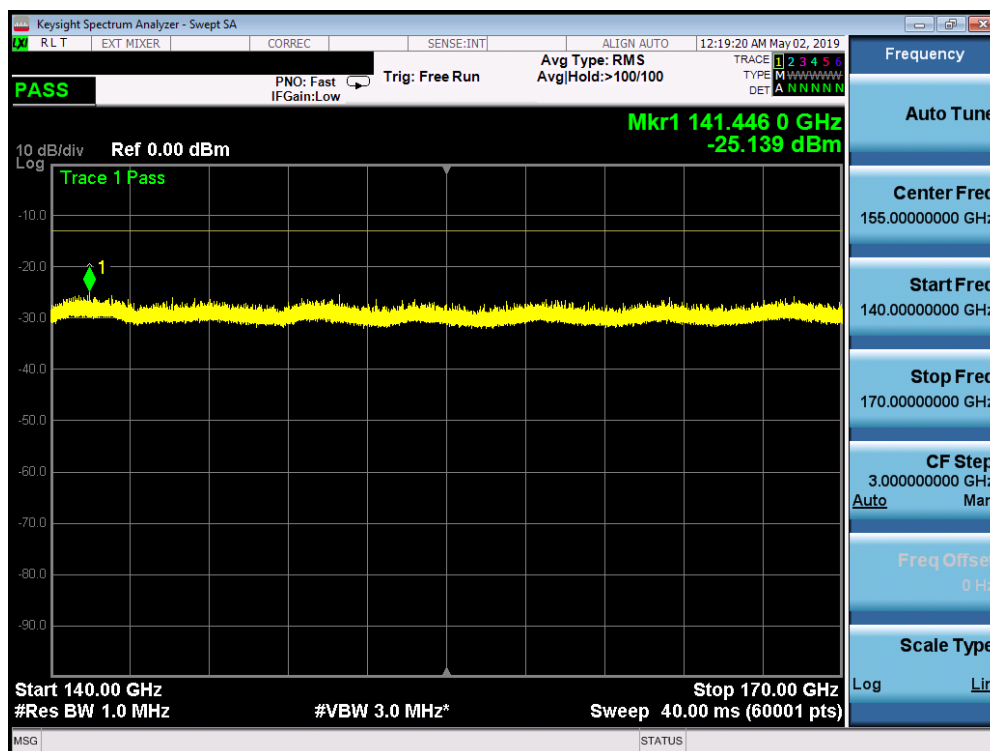


Plot 7-178. Vertical Radiated Spurious Plot 140-170 GHz (QTM0 1CC-100MHz Bandwidth QPSK High Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 121 of 202

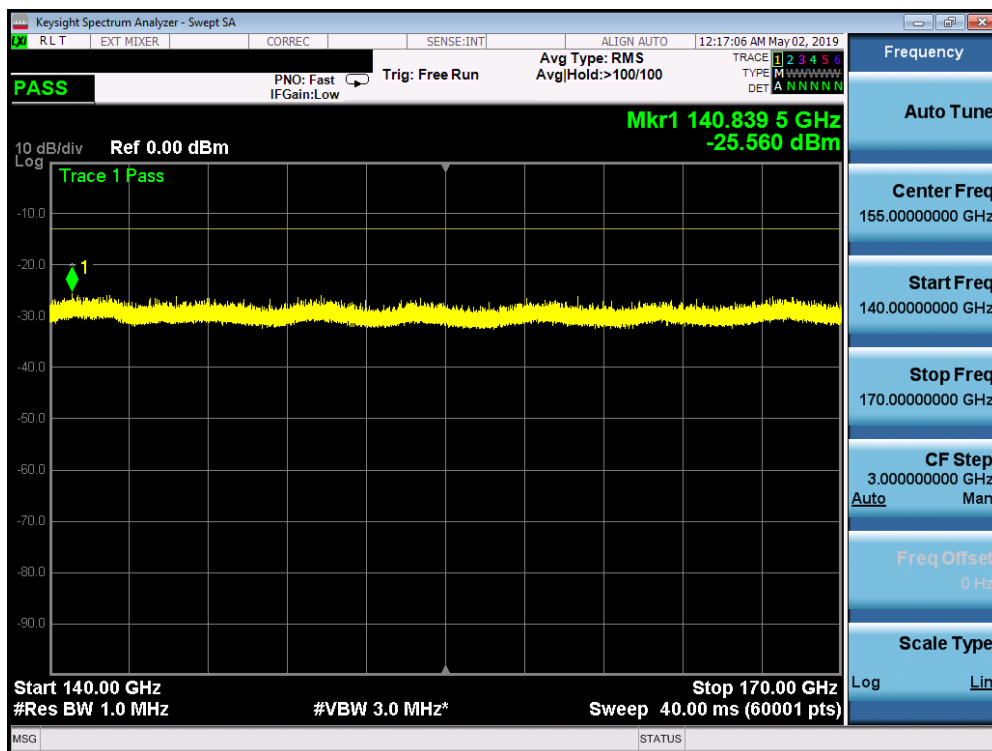
Frequency [MHz]	Detector /Trace	Chan.	Bandwidth (MHz)	Mod.	Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
167338.50	Maxh/RMS	Low	100	QPSK	H + V	H	-	-	-26.28	-13.00	-13.28
145722.50	Maxh/RMS	Mid	100	QPSK	H + V	H	-	-	-25.86	-13.00	-12.86
142038.00	Maxh/RMS	High	100	QPSK	H + V	H	-	-	-25.80	-13.00	-12.80
162362.00	Maxh/RMS	Low	100	QPSK	H + V	V	-	-	-25.19	-13.00	-12.19
146340.50	Maxh/RMS	Mid	100	QPSK	H + V	V	-	-	-25.71	-13.00	-12.71
141786.00	Maxh/RMS	High	100	QPSK	H + V	V	-	-	-25.43	-13.00	-12.43

Table 7-29. Spurious Emissions QTM0 (140 – 170GHz)

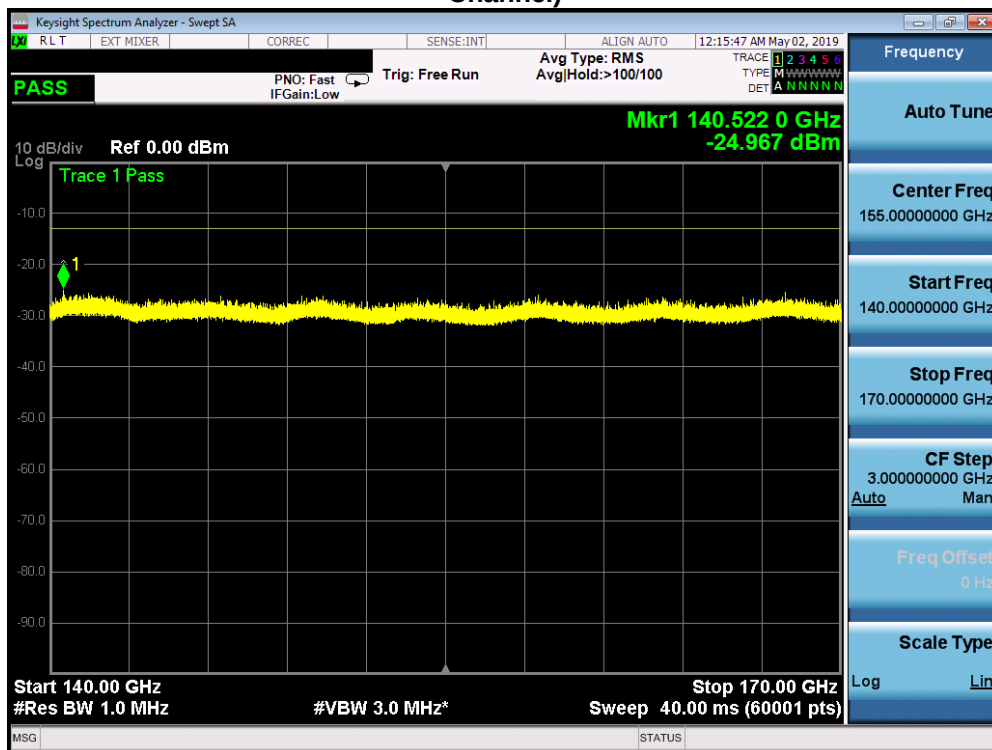


Plot 7-179. Horizontal Radiated Spurious Plot 140-170 GHz (QTM1 1CC-100MHz Bandwidth QPSK Low Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 122 of 202

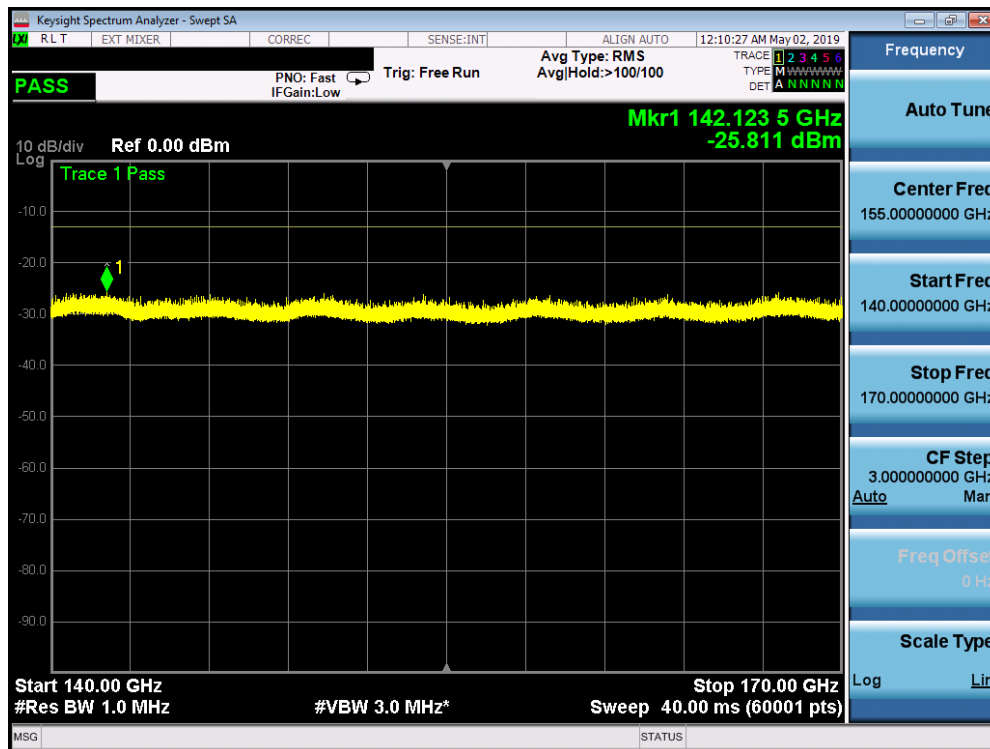


Plot 7-180. Horizontal Radiated Spurious Plot 140-170 GHz (QTM1 1CC-100MHz Bandwidth QPSK Mid Channel)

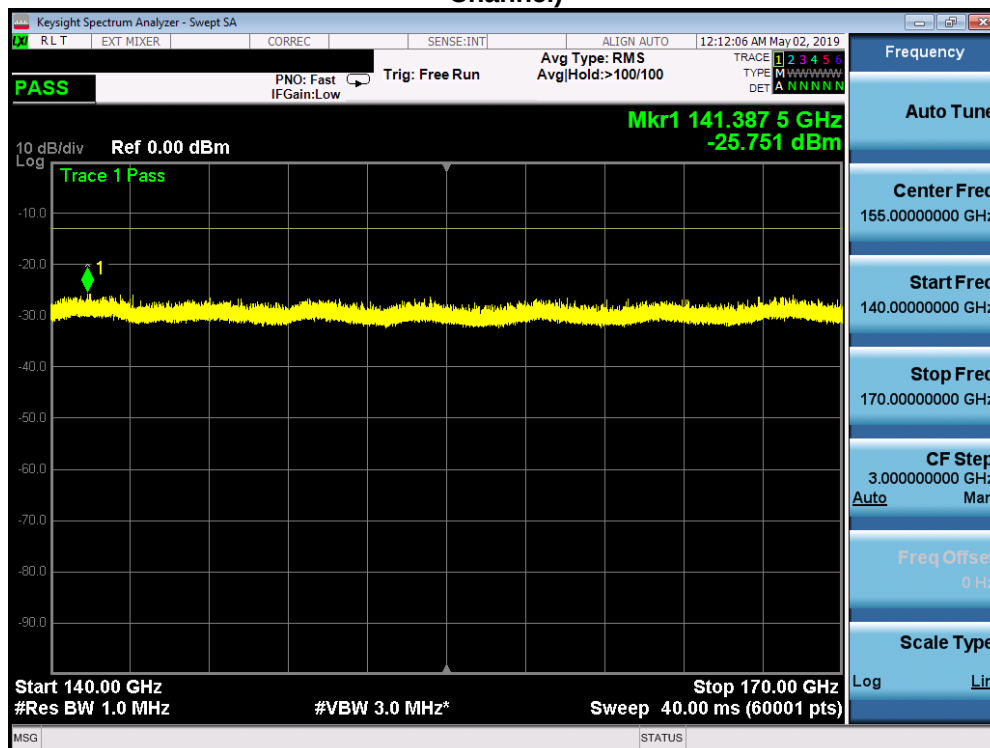


Plot 7-181. Horizontal Radiated Spurious Plot 140-170 GHz (QTM1 1CC-100MHz Bandwidth QPSK High Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 123 of 202

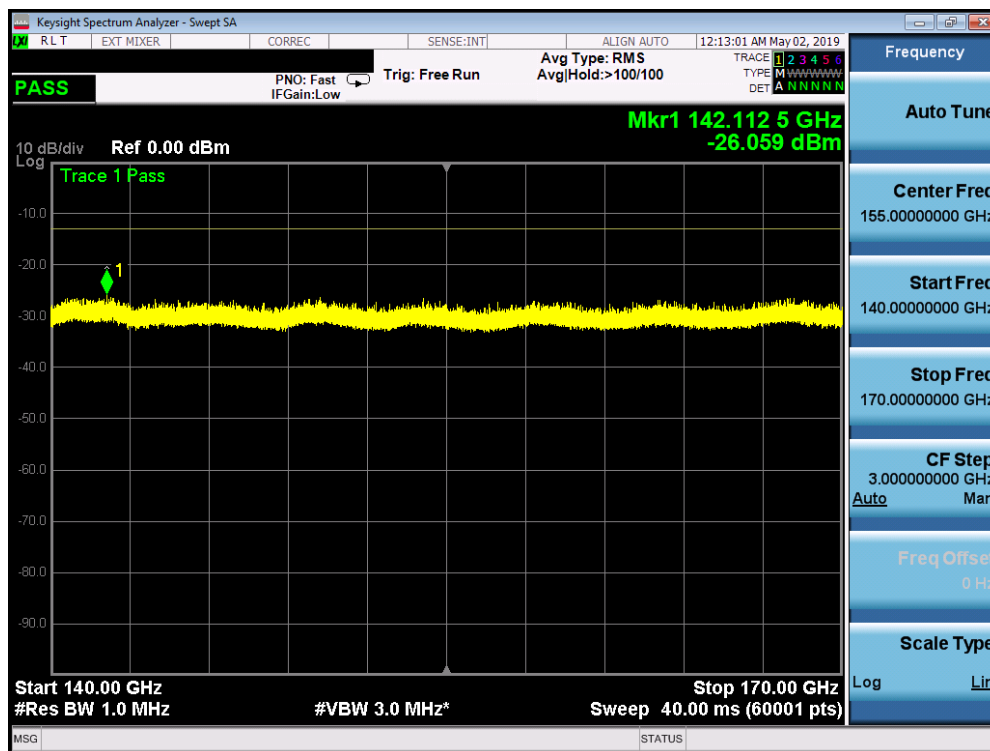


Plot 7-182. Vertical Radiated Spurious Plot 140-170 GHz (QTM1 1CC-100MHz Bandwidth QPSK Low Channel)



Plot 7-183. Vertical Radiated Spurious Plot 140-170 GHz (QTM1 1CC-100MHz Bandwidth QPSK Mid Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 124 of 202



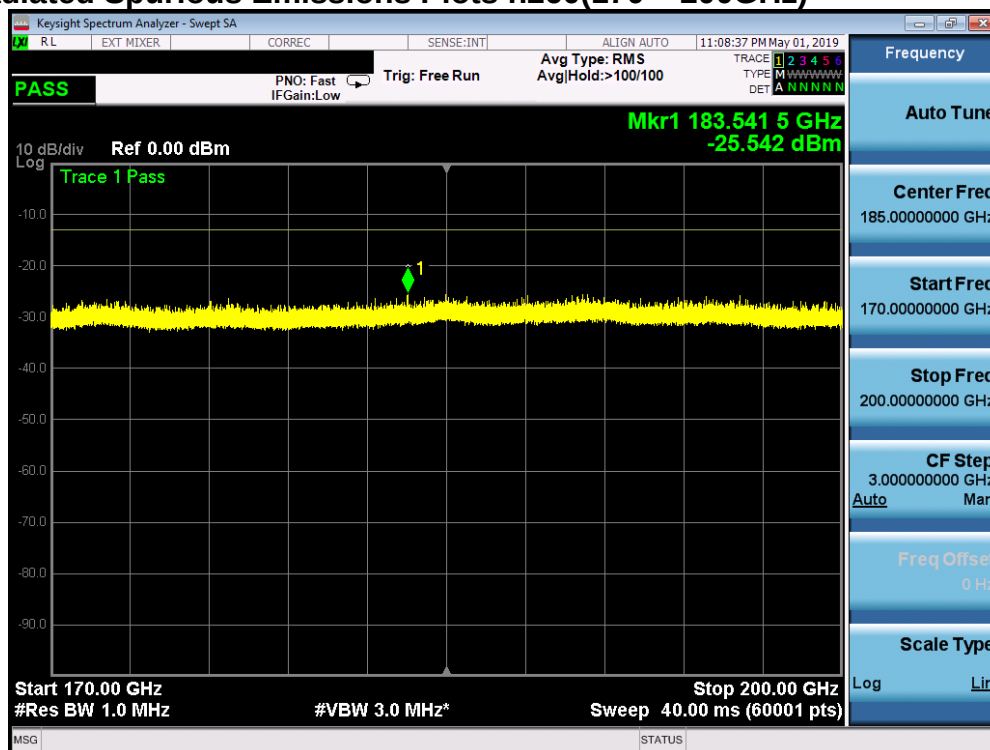
Plot 7-184. Vertical Radiated Spurious Plot 140-170 GHz (QTM1 1CC-100MHz Bandwidth QPSK High Channel)

Frequency [MHz]	Detector /Trace	Chan.	Bandwidth (MHz)	Mod.	Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
141446.00	Maxh/RMS	Low	100	QPSK	H + V	H	-	-	-25.14	-13.00	-12.14
140839.50	Maxh/RMS	Mid	100	QPSK	H + V	H	-	-	-25.56	-13.00	-12.56
140522.00	Maxh/RMS	High	100	QPSK	H + V	H	-	-	-24.97	-13.00	-11.97
142123.50	Maxh/RMS	Low	100	QPSK	H + V	V	-	-	-25.81	-13.00	-12.81
141387.50	Maxh/RMS	Mid	100	QPSK	H + V	V	-	-	-25.75	-13.00	-12.75
142112.50	Maxh/RMS	High	100	QPSK	H + V	V	-	-	-26.06	-13.00	-13.06

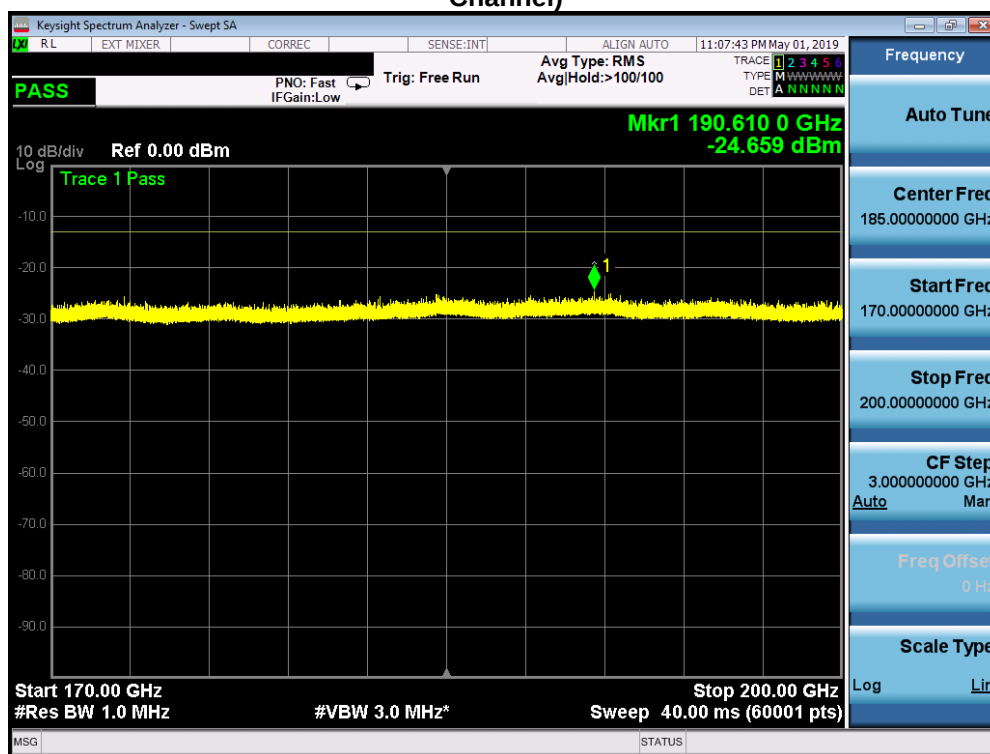
Table 7-30. Spurious Emissions QTM1 (140 – 170GHz)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)			Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset			Page 125 of 202

7.4.15 Radiated Spurious Emissions Plots n260(170 – 200GHz)

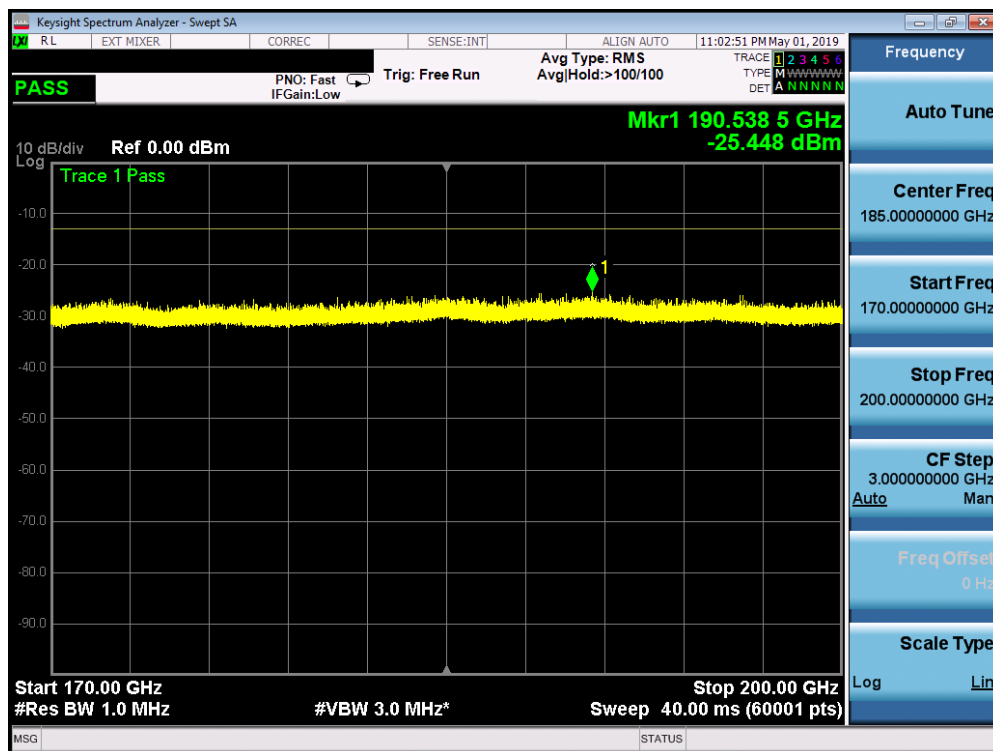


Plot 7-185. Horizontal Radiated Spurious Plot 170-200 GHz (QTM0 1CC-100MHz Bandwidth QPSK Low Channel)

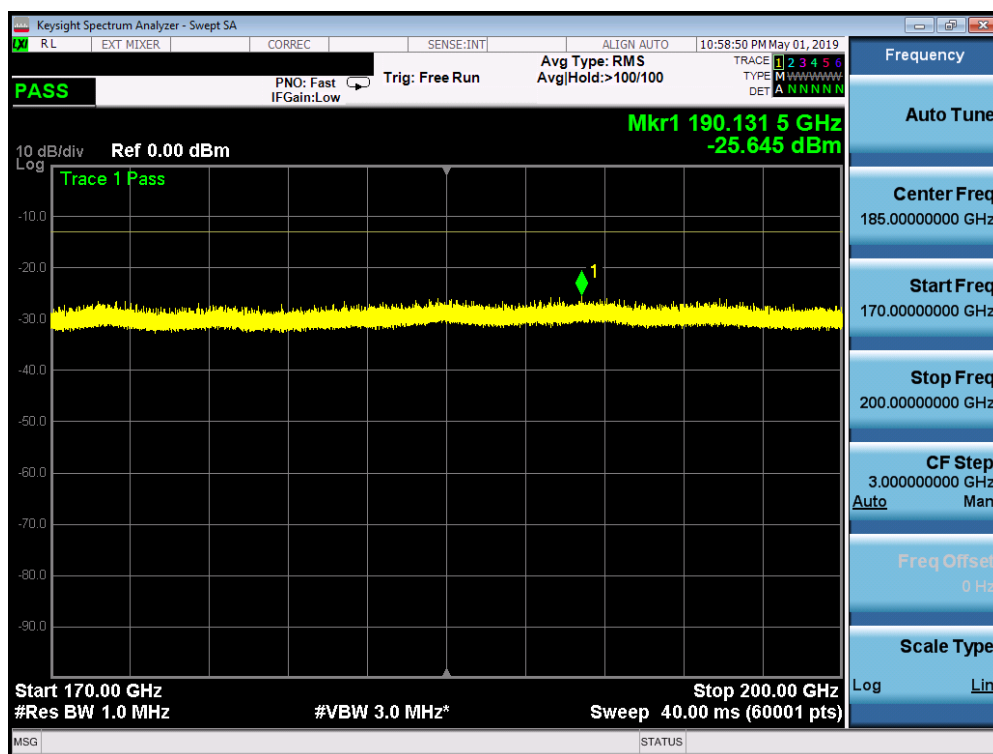


Plot 7-186. Horizontal Radiated Spurious Plot 170-200 GHz (QTM0 1CC-100MHz Bandwidth QPSK Mid Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 126 of 202

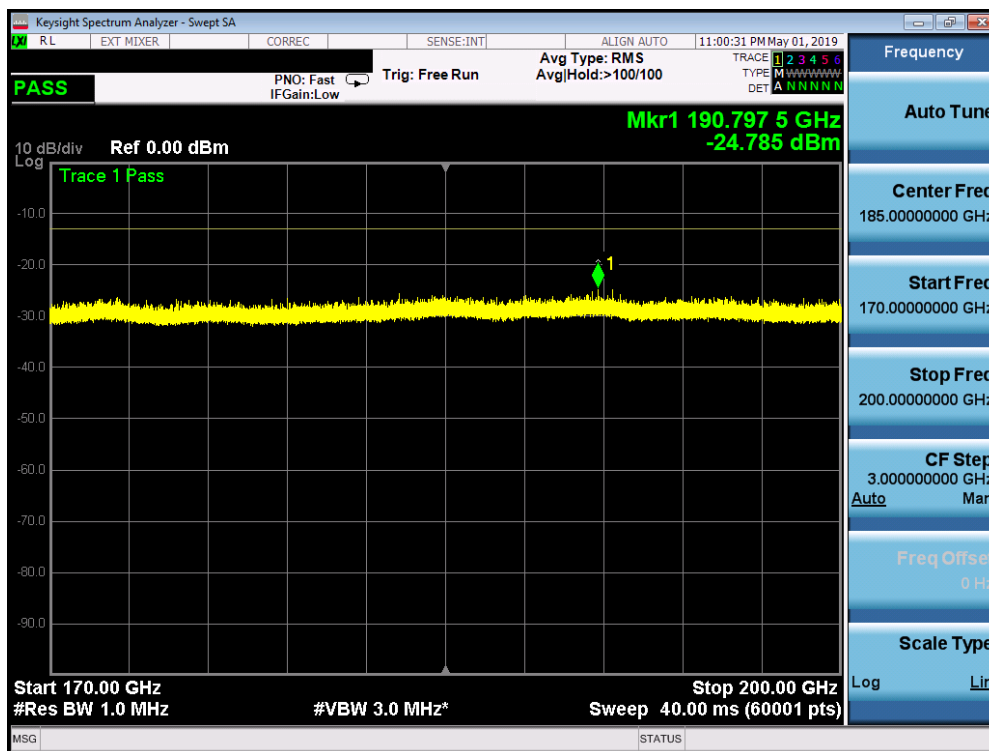


Plot 7-187. Horizontal Radiated Spurious Plot 170-200 GHz (QTM0 1CC-100MHz Bandwidth QPSK High Channel)

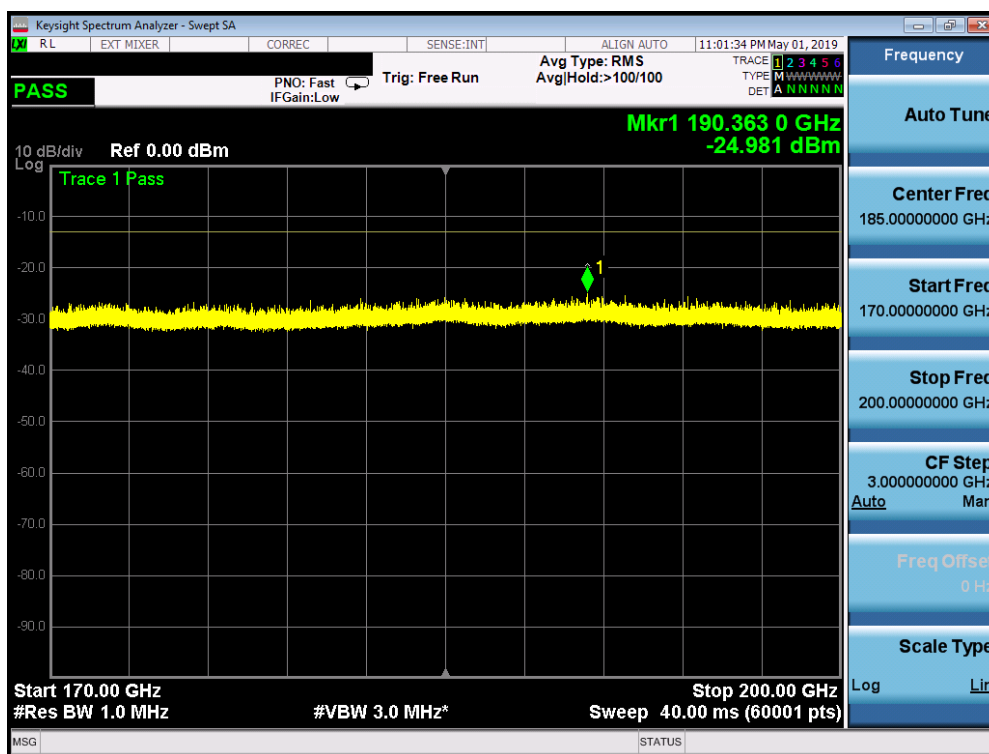


Plot 7-188. Vertical Radiated Spurious Plot 170-200 GHz (QTM0 1CC-100MHz Bandwidth QPSK Low Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 127 of 202



Plot 7-189. Vertical Radiated Spurious Plot 170-200 GHz (QTM0 1CC-100MHz Bandwidth QPSK Mid Channel)

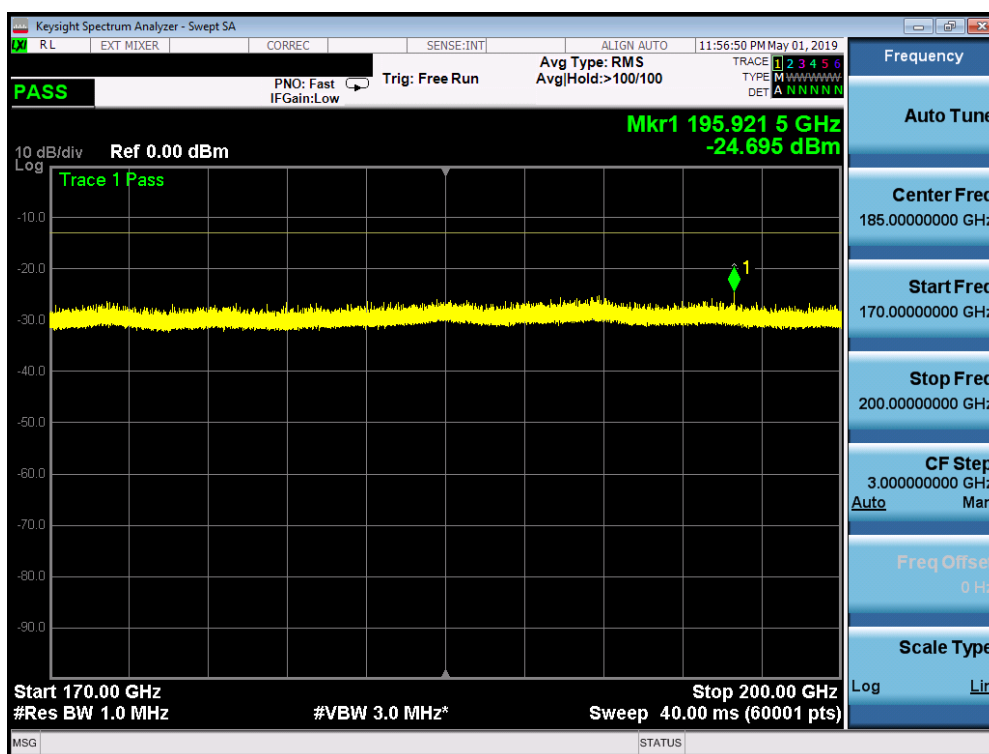


Plot 7-190. Vertical Radiated Spurious Plot 170-200 GHz (QTM0 1CC-100MHz Bandwidth QPSK High Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 128 of 202

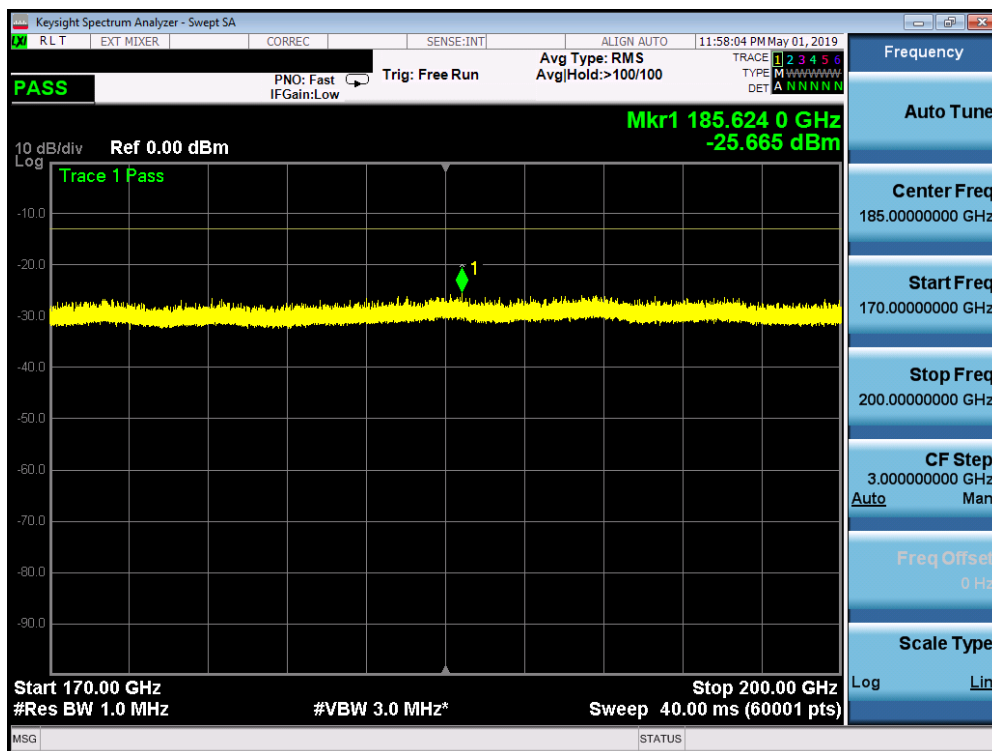
Frequency [MHz]	Detector /Trace	Chan.	Bandwidth (MHz)	Mod.	Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
183541.50	Maxh/RMS	Low	100	QPSK	H + V	H	-	-	-25.54	-13.00	-12.54
190610.00	Maxh/RMS	Mid	100	QPSK	H + V	H	-	-	-24.66	-13.00	-11.66
190538.50	Maxh/RMS	High	100	QPSK	H + V	H	-	-	-25.45	-13.00	-12.45
190131.50	Maxh/RMS	Low	100	QPSK	H + V	V	-	-	-25.65	-13.00	-12.65
190797.50	Maxh/RMS	Mid	100	QPSK	H + V	V	-	-	-24.79	-13.00	-11.79
190363.00	Maxh/RMS	High	100	QPSK	H + V	V	-	-	-24.98	-13.00	-11.98

Table 7-31. Spurious Emissions QTM0 (170 – 200GHz)

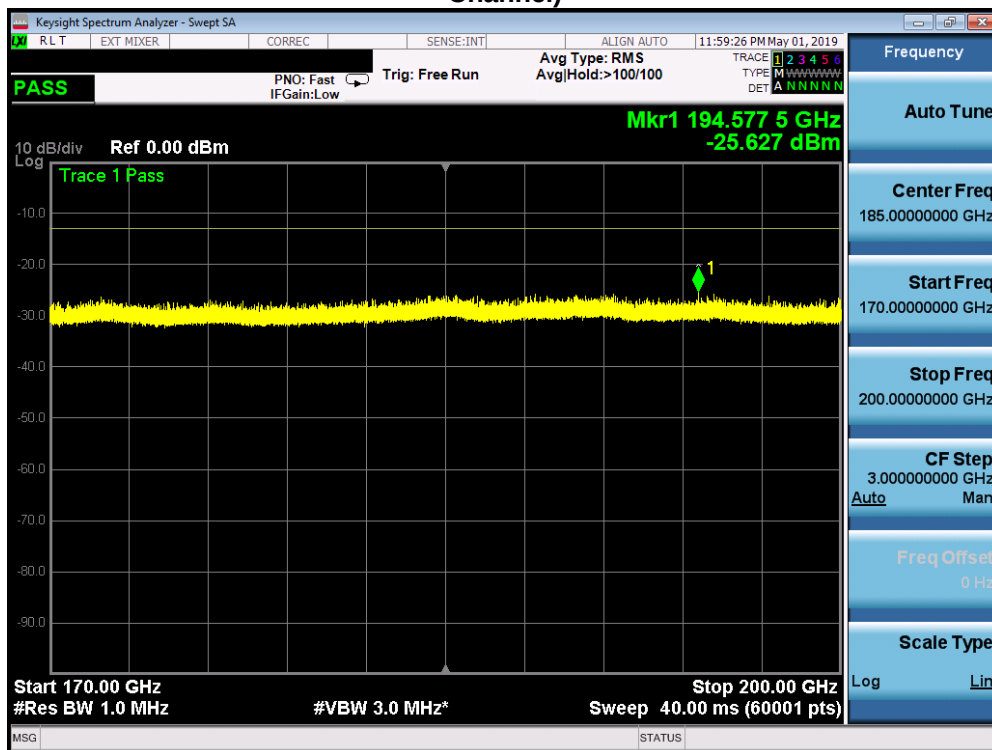


Plot 7-191. Horizontal Radiated Spurious Plot 170-200 GHz (QTM1 1CC-100MHz Bandwidth QPSK Low Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 129 of 202

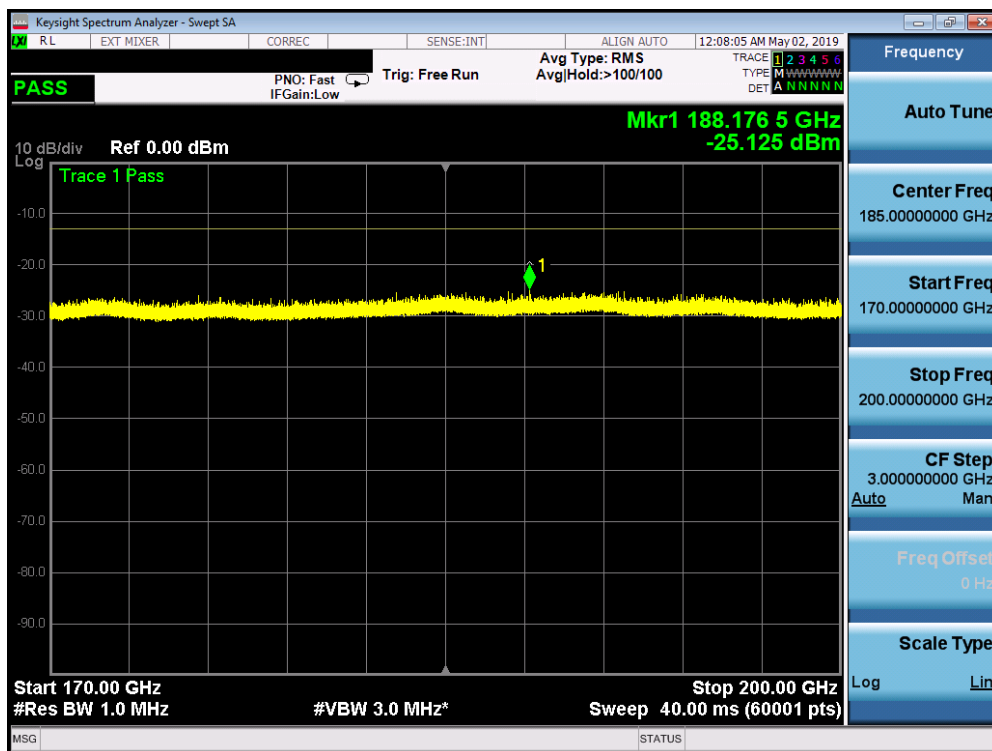


Plot 7-192. Horizontal Radiated Spurious Plot 170-200 GHz (QTM1 1CC-100MHz Bandwidth QPSK Mid Channel)

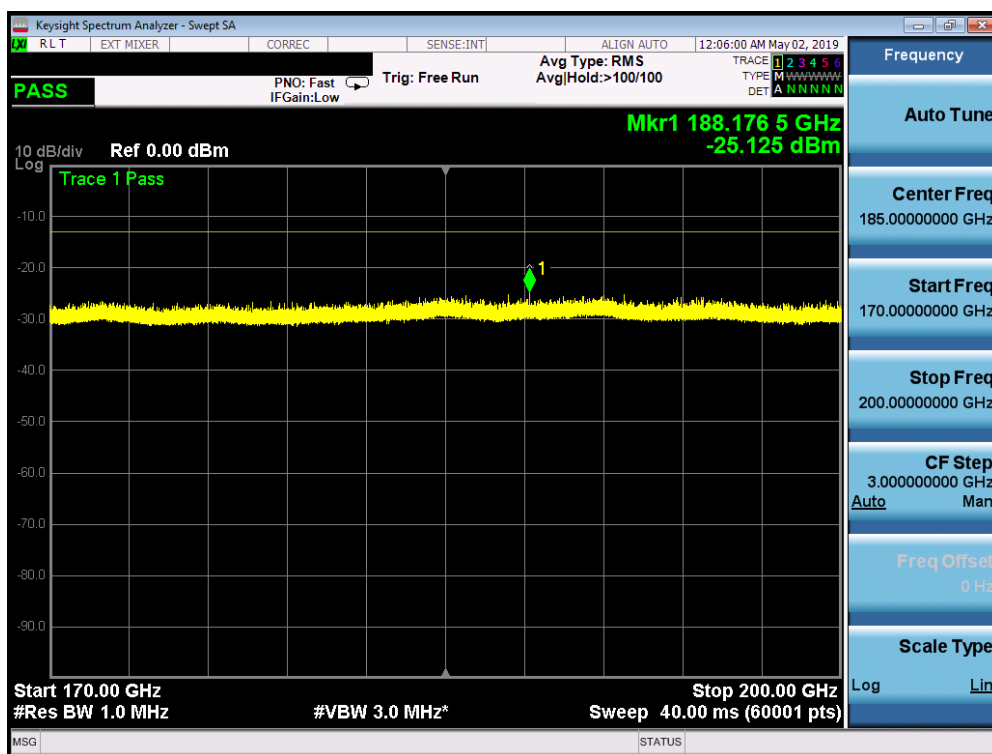


Plot 7-193. Horizontal Radiated Spurious Plot 170-200 GHz (QTM1 1CC-100MHz Bandwidth QPSK High Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 130 of 202

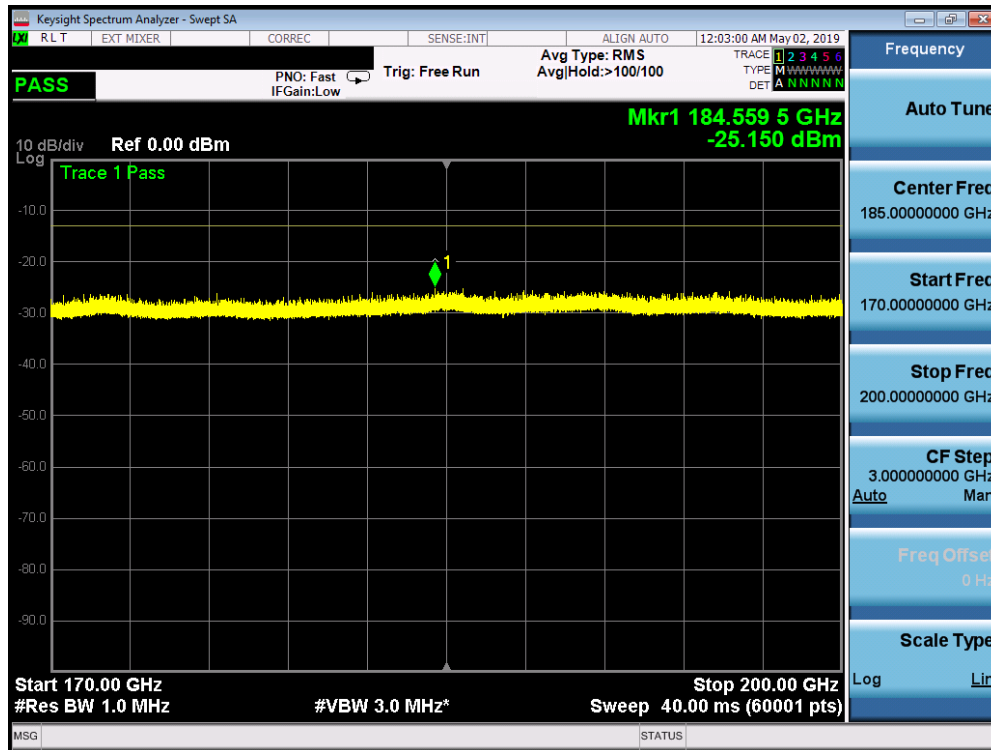


Plot 7-194. Vertical Radiated Spurious Plot 170-200 GHz (QTM1 1CC-100MHz Bandwidth QPSK Low Channel)



Plot 7-195. Vertical Radiated Spurious Plot 170-200 GHz (QTM1 1CC-100MHz Bandwidth QPSK Mid Channel)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903070034-14-R2.ZNF	Test Dates: 3/21/2019-5/3/2019	EUT Type: Portable Handset		Page 131 of 202



Plot 7-196. Vertical Radiated Spurious Plot 170-200 GHz (QTM1 1CC-100MHz Bandwidth QPSK High Channel)

Frequency [MHz]	Detector /Trace	Chan.	Bandwidth (MHz)	Mod.	Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
195921.50	Maxh/RMS	Low	100	QPSK	H + V	H	-	-	-24.70	-13.00	-11.70
185624.00	Maxh/RMS	Mid	100	QPSK	H + V	H	-	-	-25.67	-13.00	-12.67
194577.50	Maxh/RMS	High	100	QPSK	H + V	H	-	-	-25.63	-13.00	-12.63
188176.50	Maxh/RMS	Low	100	QPSK	H + V	V	-	-	-25.13	-13.00	-12.13
188176.50	Maxh/RMS	Mid	100	QPSK	H + V	V	-	-	-25.13	-13.00	-12.13
184559.50	Maxh/RMS	High	100	QPSK	H + V	V	-	-	-25.15	-13.00	-12.15

Table 7-32. Spurious Emissions QTM1 (170 – 200GHz)

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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 27.5 – 28.35GHz 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.

Band	Antenna Gain (dBi)
n261	9
n260	8

Table 7-33. Antenna Gains at the Band Edges

Sample Analyzer Offset Calculation (at 27.5GHz)

Measurement Antenna Factor = 40.70dB/m

Cable Loss = 8.44dB

EUT Antenna Gain = 7.53dBi

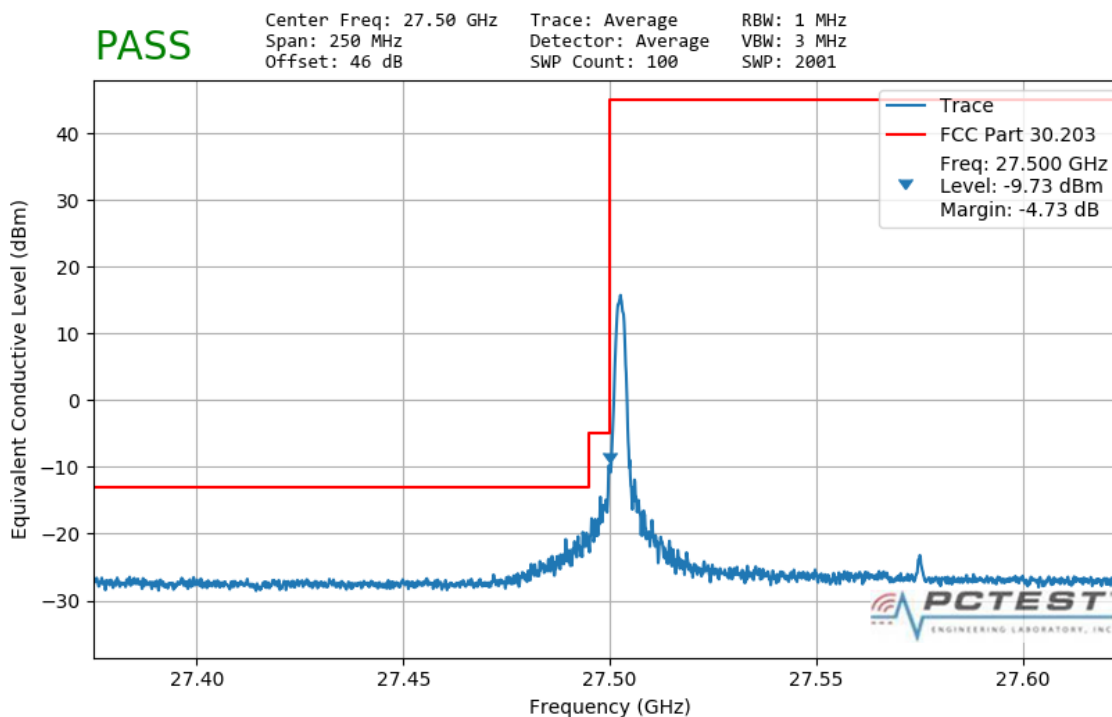
Analyzer Offset (dB) = AF (dB/m) + CL (dB) + 107 + 20log₁₀(D) – 104.8dB – Gain (dBi), where D = 1m

$$= 40.70\text{dB/m} + 8.44\text{dB} + 107 + 20\log_{10}(1\text{m}) - 104.8\text{dB} - 7.53\text{dBi}$$

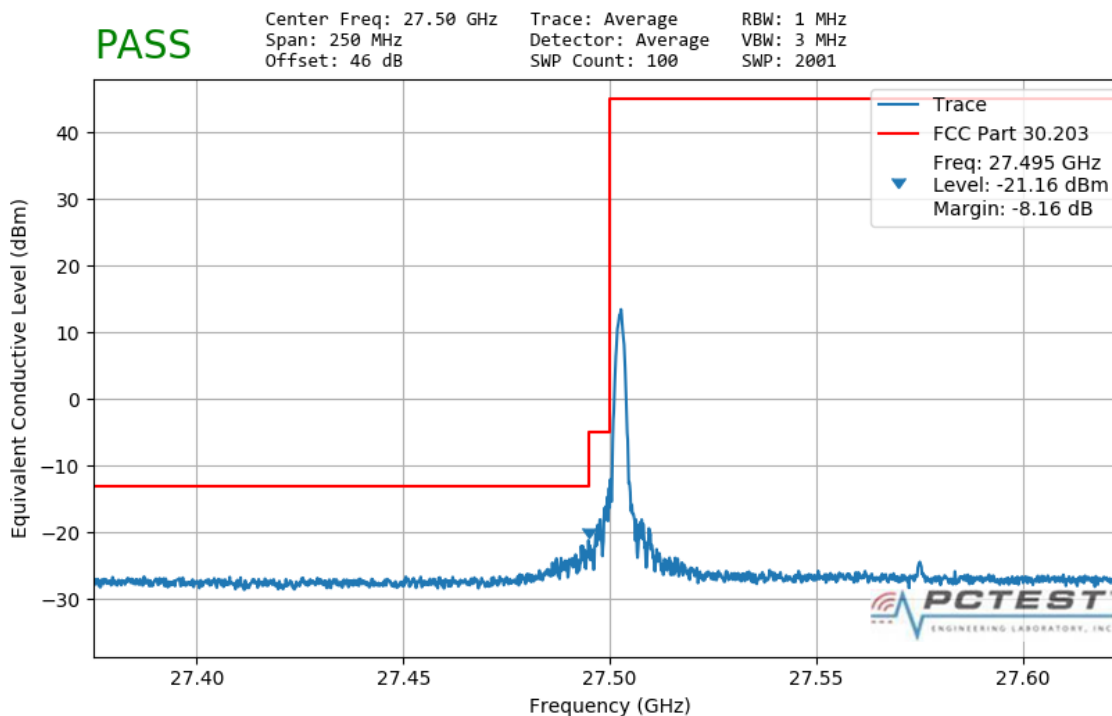
$$= 43.81\text{dB}$$

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7.5.2 N261 1CC 50MHz Bandwidth Band Edges QTM 0 - H + V

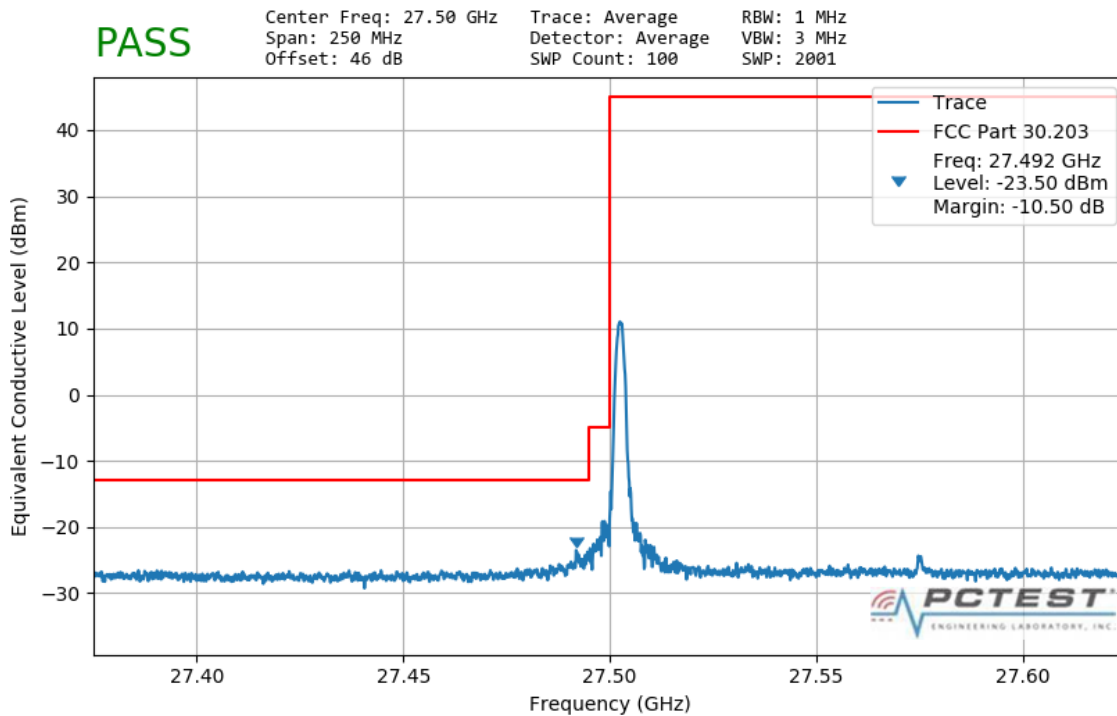


Plot 7-197. Band Edge Plot (1CC 50M QPSK Low Channel – 1 RB, 0 offset)

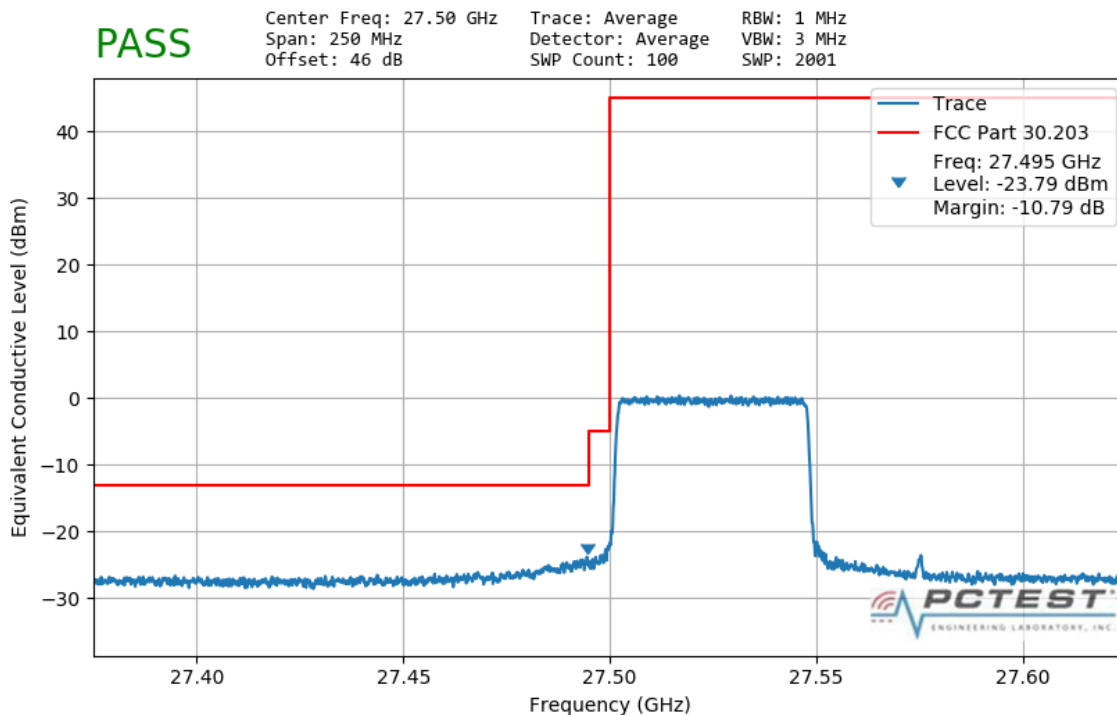


Plot 7-198. Band Edge Plot (1CC 50M 16QAM Low Channel – 1 RB, 0 offset)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
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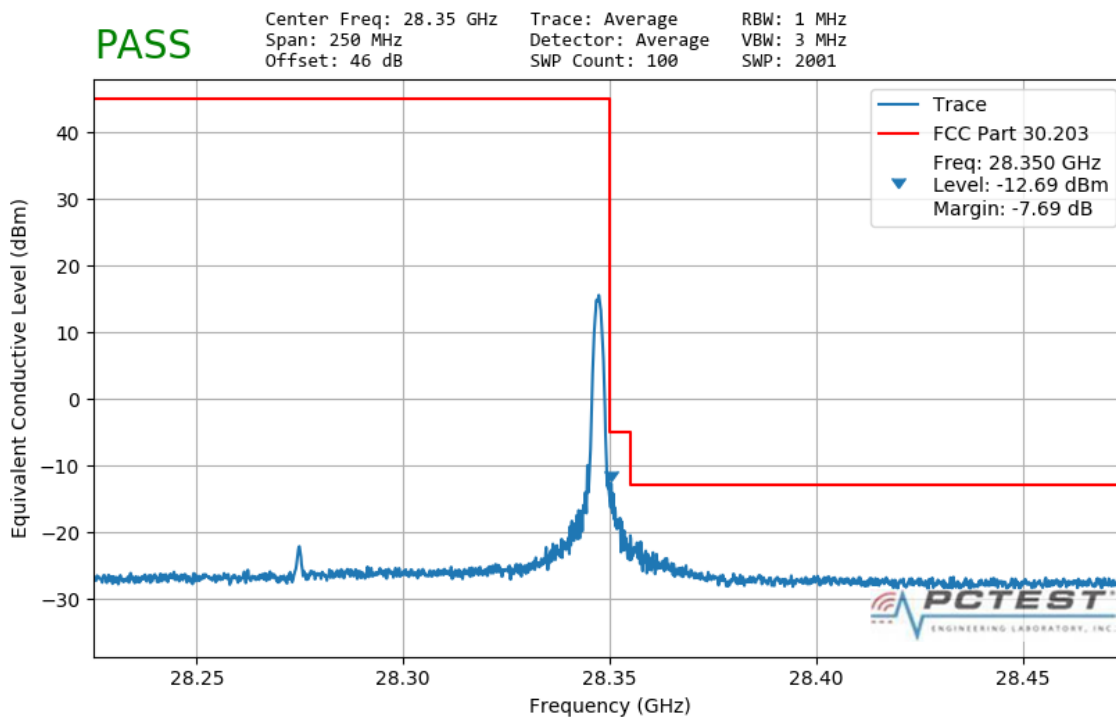


Plot 7-199. Band Edge Plot (1CC 50M 64QAM Low Channel – 1 RB, 0 offset)

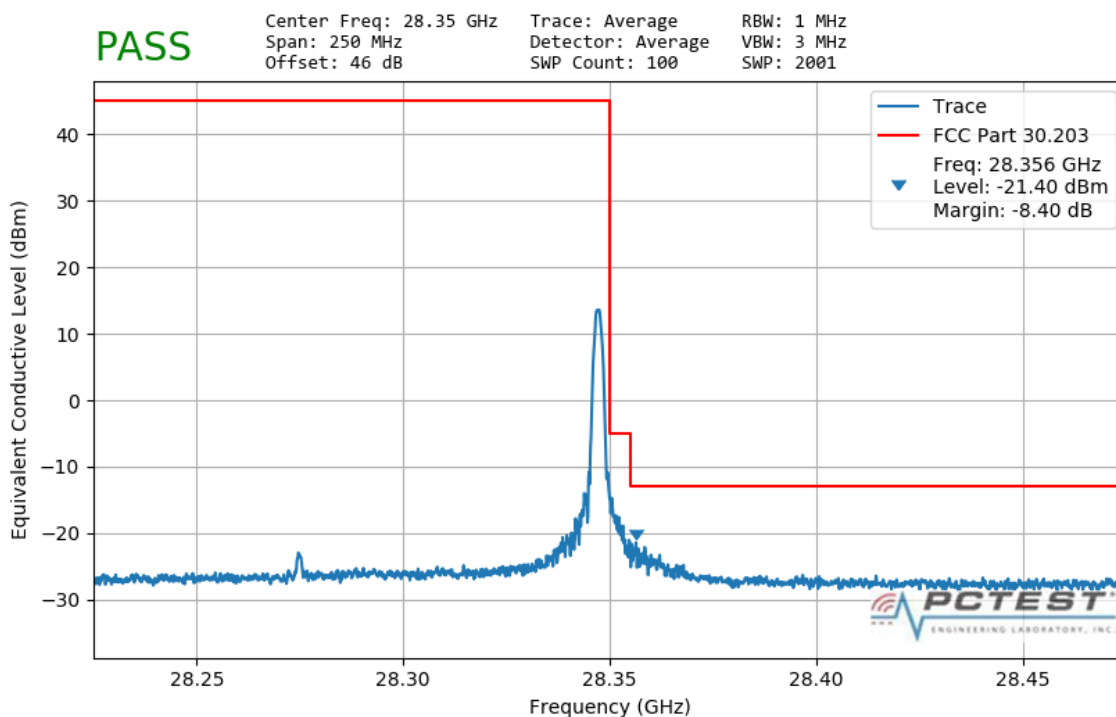


Plot 7-200. Band Edge Plot (1CC 50M QPSK Low Channel – 32 RB, 0 offset)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
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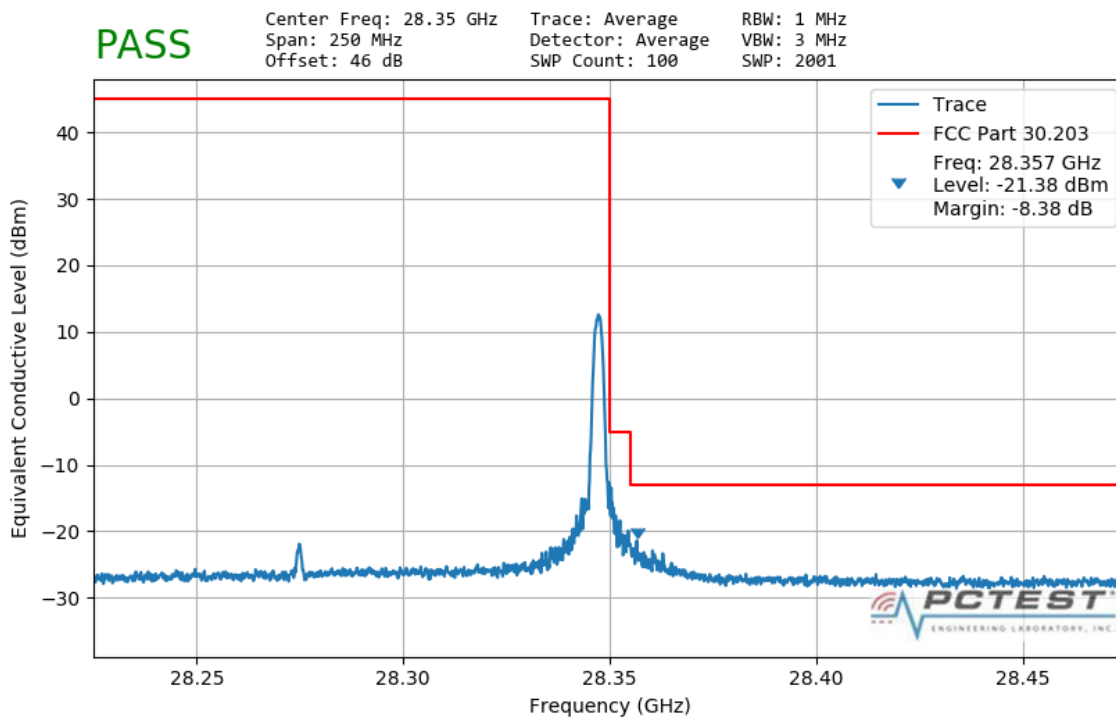


Plot 7-201. Band Edge Plot (1CC 50M QPSK High Channel – 1 RB, 31 offset)

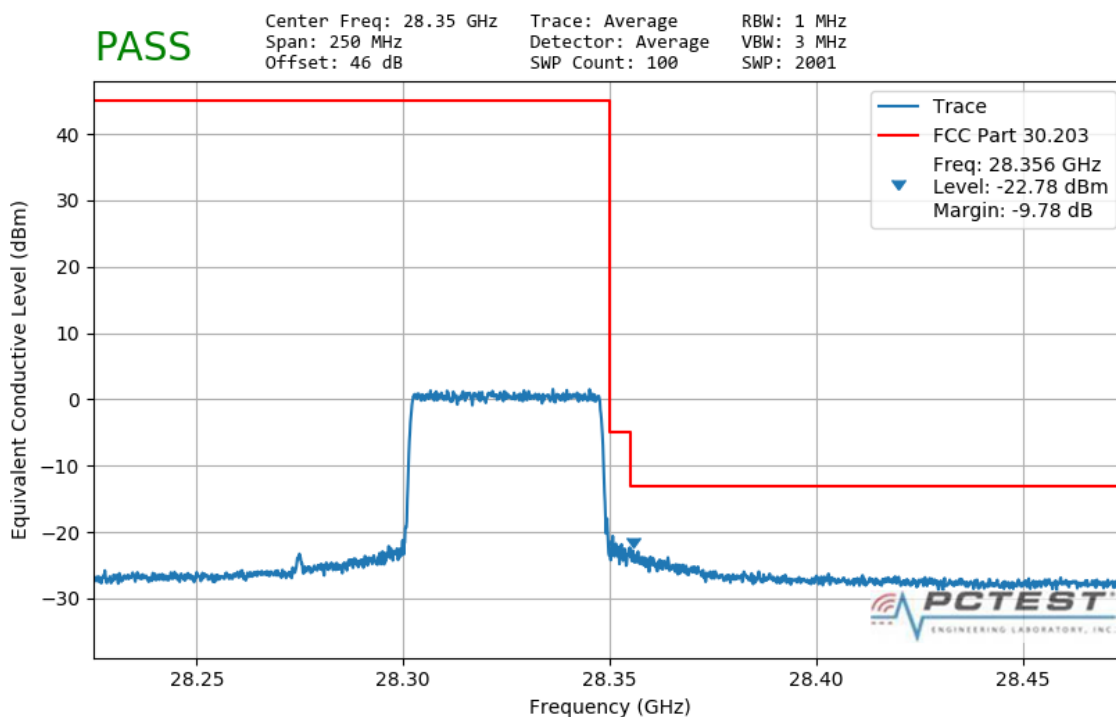


Plot 7-202. Band Edge Plot (1CC 50M 16QAM High Channel – 1 RB, 31 offset)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
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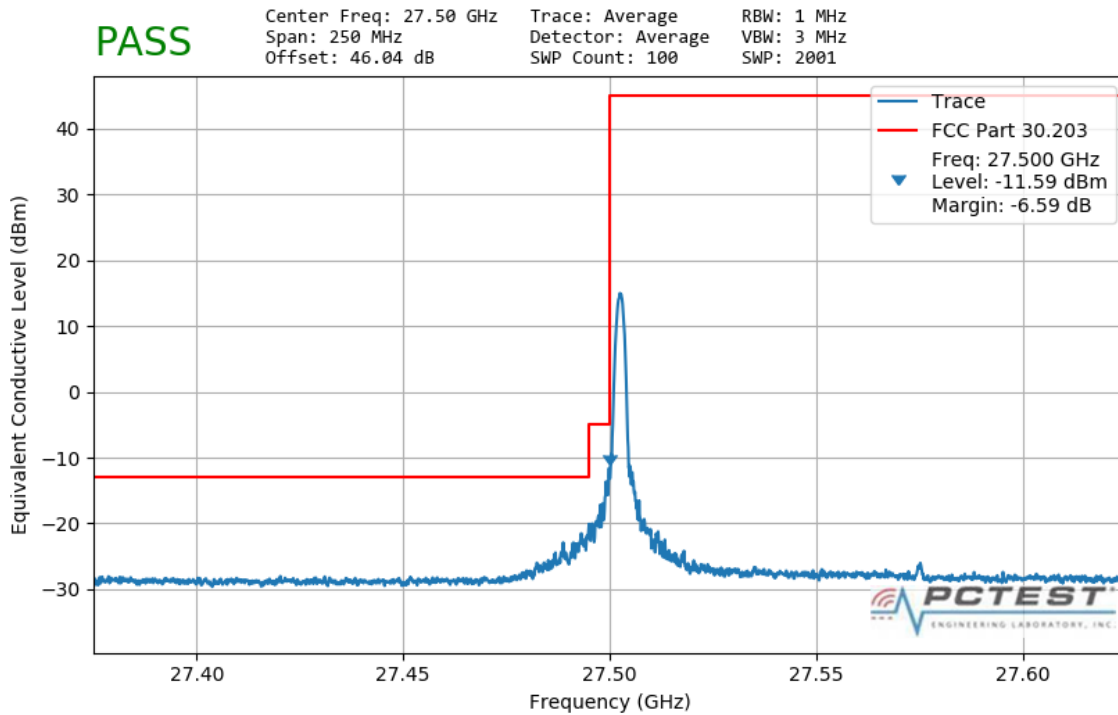
Plot 7-203. Band Edge Plot (1CC 50M 64QAM High Channel – 1 RB, 31 offset)



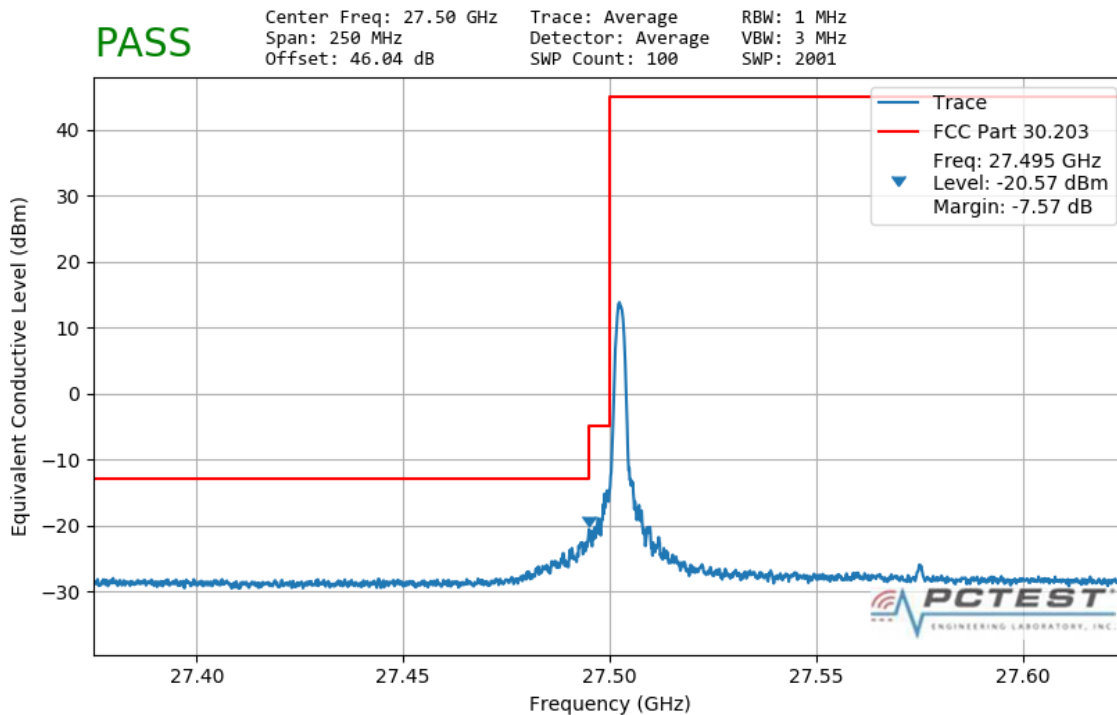
Plot 7-204. Band Edge Plot (1CC 50M QPSK High Channel – 32 RB, 0 offset)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
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QTM 1 - H + V



Plot 7-205. Band Edge Plot (1CC 50M QPSK Low Channel – 1 RB, 0 offset)



Plot 7-206. Band Edge Plot (1CC 50M 16QAM Low Channel – 1 RB, 0 offset)

FCC ID: ZNFV450VM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (Class II Permissive Change)	LG	Approved by: Quality Manager
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