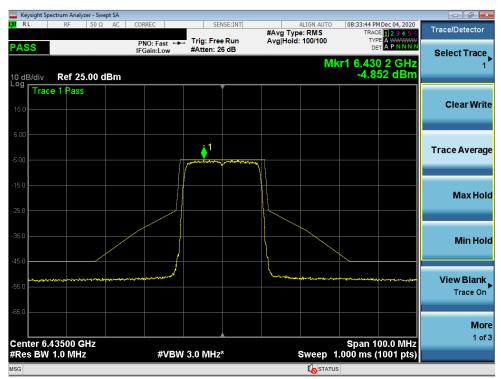


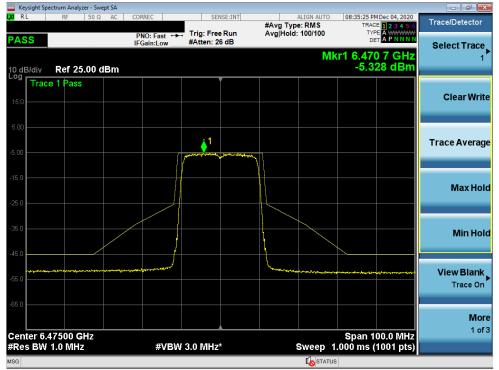
Plot 7-269. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11a (UNII Band 6) - Ch. 113)



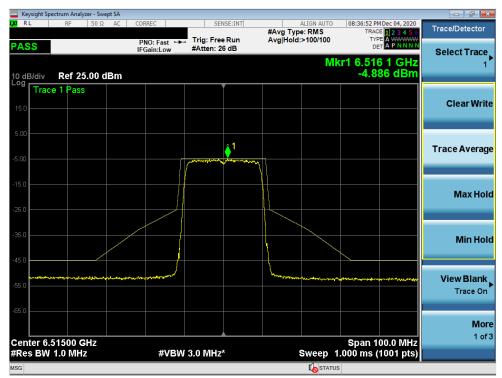
Plot 7-270. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (UNII Band 6) - Ch. 97)

FCC ID: A3LSMG998B	PCTEST° Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	MASUNG	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dama 400 af 045	
1M2009280154-26.A3L	10/05 - 12/14/2020	Portable Handset		Page 160 of 215	
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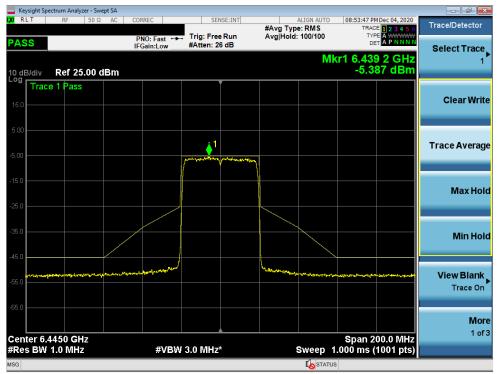
Plot 7-271. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (UNII Band 6) - Ch. 105)



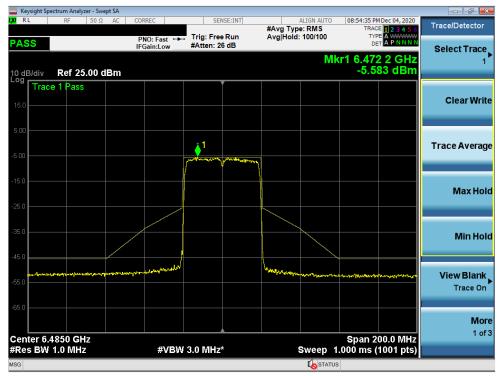
Plot 7-272. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (UNII Band 6) - Ch. 113)

FCC ID: A3LSMG998B	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dama 404 -6045	
1M2009280154-26.A3L	10/05 - 12/14/2020	Portable Handset		Page 161 of 215	
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Plot 7-273. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (UNII Band 6) - Ch. 99)



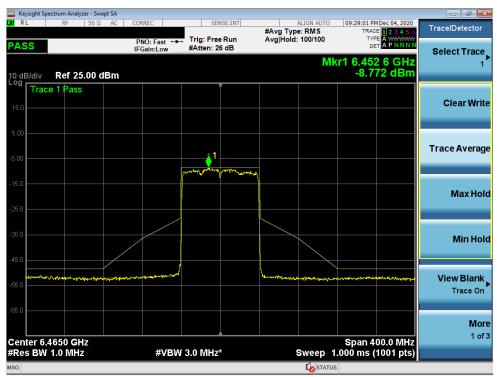
Plot 7-274. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (UNII Band 6) - Ch. 107)

FCC ID: A3LSMG998B	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 162 of 215
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Keysight Spectrum Analyzer - Swept S					- ē ×
<mark>X/</mark> RL RF 50Ω/	AC CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	08:56:00 PM Dec 04, 2020 TRACE 1 2 3 4 5 6	Trace/Detector
PASS	PNO: Fast ↔ IFGain:Low	Trig: Free Run #Atten: 26 dB	Avg Hold: 100/100	TYPE A WWWW DET A P N N N N	Select Trace
10 dB/div Ref 25.00 dB	m		MI	r1 6.529 8 GHz -5.364 dBm	1
15.0 Trace 1 Pass					Clear Write
5.00		<u></u> 1			Trace Average
15.0					
25.0					Max Hol
15.0					Min Hol
55.0	mannapartershiphilthe		Westernamon and		<b>View Blank</b> Trace On
56.0					Mor
Center 6.5250 GHz Res BW 1.0 MHz	#VBW	3.0 MHz*	Sweep 1	Span 200.0 MHz .000 ms (1001 pts)	1 of 3
ISG					

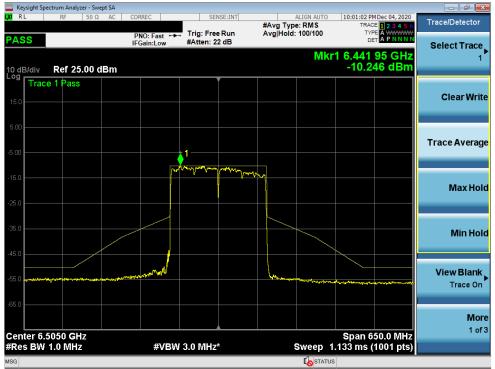
Plot 7-275. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (UNII Band 6) - Ch. 115)



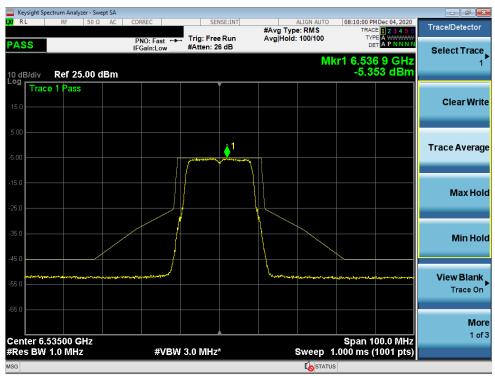
Plot 7-276. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (UNII Band 6) - Ch. 103)

FCC ID: A3LSMG998B	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dama 402 af 245	
1M2009280154-26.A3L	10/05 - 12/14/2020	Portable Handset	Page 163 of 215	
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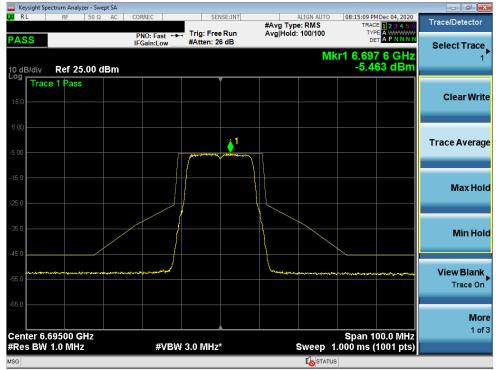
Plot 7-277. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (26 Tones) (UNII Band 6) - Ch. 111)



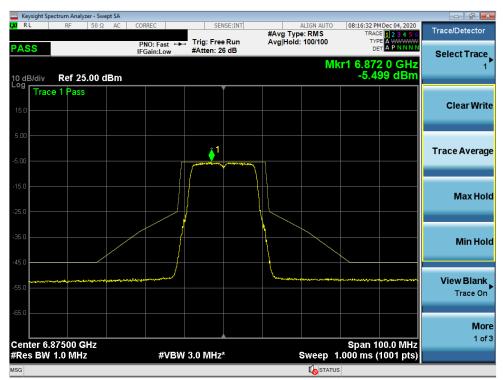
Plot 7-278. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11a (UNII Band 7) - Ch. 117)

FCC ID: A3LSMG998B	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 164 of 215	
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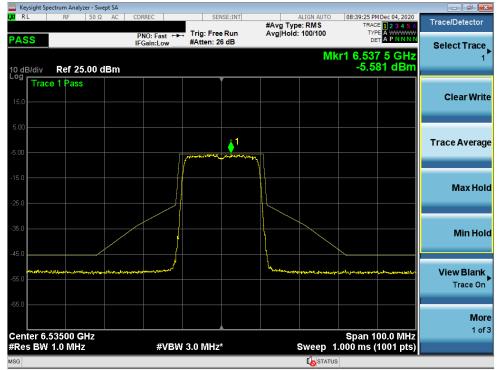
Plot 7-279. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11a (UNII Band 7) - Ch. 149)



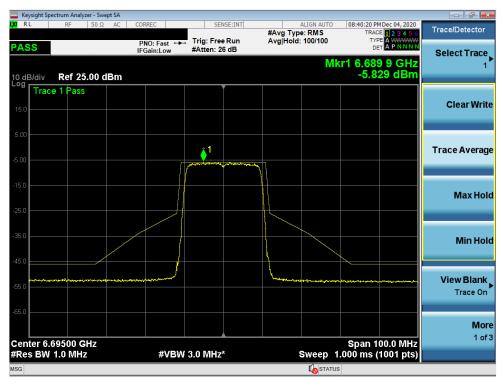
Plot 7-280. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11a (UNII Band 7) - Ch. 185)

FCC ID: A3LSMG998B	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 165 of 215
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Plot 7-281. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (UNII Band 7) - Ch. 117)



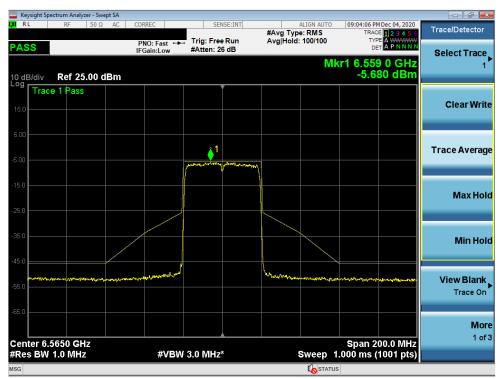
Plot 7-282. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (UNII Band 7) - Ch. 149)

FCC ID: A3LSMG998B	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dama 400 af 045	
1M2009280154-26.A3L	10/05 - 12/14/2020	Portable Handset		Page 166 of 215	
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Keysight Spectrum Analyzer - Swept SA					
<b>X/</b> RL RF 50Ω AC	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	08:42:52 PM Dec 04, 2020 TRACE 1 2 3 4 5 6	Trace/Detector
PASS	PNO: Fast ↔ IFGain:Low	Trig: Free Run #Atten: 26 dB	Avg Hold: 100/100	TYPE A WWWW DET A P N N N N	Select Trace
10 dB/div Ref 25.00 dBm			M	cr1 6.877 7 GHz -5.942 dBm	1
15.0 Trace 1 Pass					Clear Write
5.00					Trace Averag
15.0					Max Hole
35.0					Min Hol
55.0					<b>View Blank</b> Trace On
enter 6.87500 GHz				Span 100.0 MHz	<b>Mor</b> 1 of
Res BW 1.0 MHz	#VBW	3.0 MHz*		.000 ms (1001 pts)	
SG				5	

Plot 7-283. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (UNII Band 7) - Ch. 185)



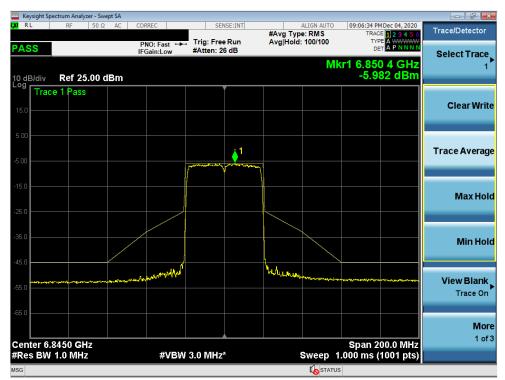
Plot 7-284. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (UNII Band 7) - Ch. 123)

FCC ID: A3LSMG998B	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dawa 407 -6045	
1M2009280154-26.A3L	10/05 - 12/14/2020	Portable Handset		Page 167 of 215	
© 2020 PCTEST				V 9.0 02/01/2019	



Keysight Spectrum Analyzer - Swept									- ē ×
X/ RL RF 50 Ω	AC COR	REC	SE	NSE:INT	#Avg Ty	ALIGN AUTO	09:04:54 PM D	ec 04, 2020	Trace/Detector
PASS		IO: Fast ↔ Sain:Low	Trig: Fre #Atten: 1			i: 100/100	TYPE DET	A WWWWW A P N N N N	Select Trace
10 dB/div Ref 25.00 dB	3m					MK	r1 6.731 -5.952	4 GHZ 2 dBm	1
15.0				<u> </u>					Clear Write
5.00				^ <b>1</b>					Trace Average
5.00			for the second s						Trace Averag
25.0									Max Hol
35.0									Min Hol
45.0		mound			her particular				
55.0	an a	and the second			P Challen	Merry Workshop State		*****	<b>View Blank</b> Trace On
65.0									Mon 1 of
Center 6.7250 GHz #Res BW 1.0 MHz		#VBW	/ 3.0 MH;	*		Sweep 1	Span 200 000 ms (10	).0 MHz )01 pts)	1 01.
ISG						STATUS			

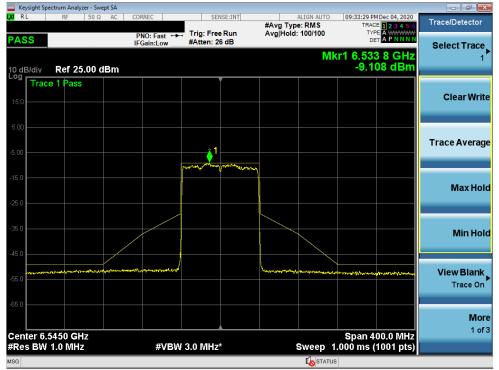
Plot 7-285. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (UNII Band 7) - Ch. 155)



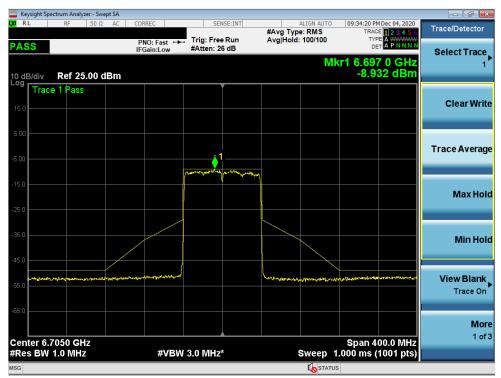
Plot 7-286. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (UNII Band 7) - Ch. 179)

FCC ID: A3LSMG998B	PCTEST* Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dama 400 of 045	
1M2009280154-26.A3L	10/05 - 12/14/2020	Portable Handset		Page 168 of 215	
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Plot 7-287. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (UNII Band 7) - Ch. 119)



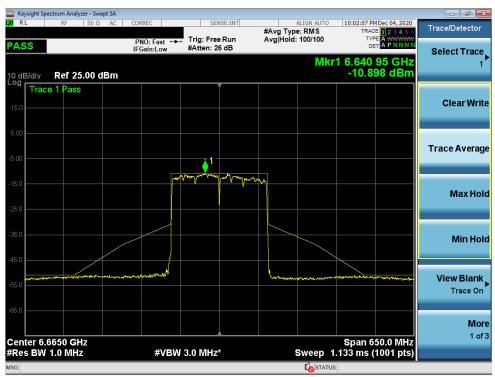
Plot 7-288. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (UNII Band 7) - Ch. 151)

FCC ID: A3LSMG998B	PCTEST° Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 400 of 045
1M2009280154-26.A3L	10/05 - 12/14/2020	Portable Handset		Page 169 of 215
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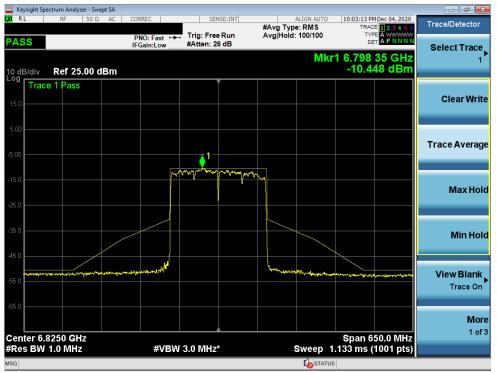
Plot 7-289. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (UNII Band 7) - Ch. 183)



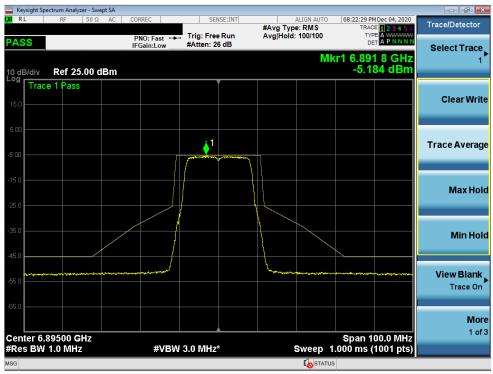
Plot 7-290. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (UNII Band 7) - Ch. 143)

FCC ID: A3LSMG998B	PCTEST* Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 170 of 015
1M2009280154-26.A3L	10/05 - 12/14/2020	Portable Handset	Page 170 of 215
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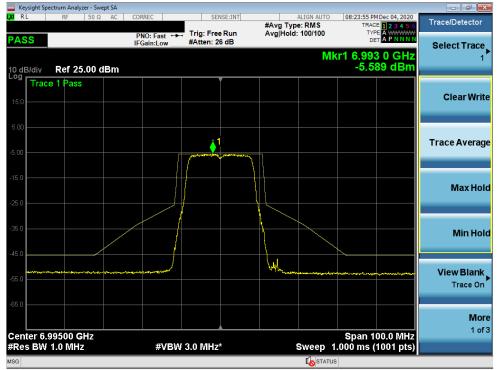
Plot 7-291. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (UNII Band 7) - Ch. 175)



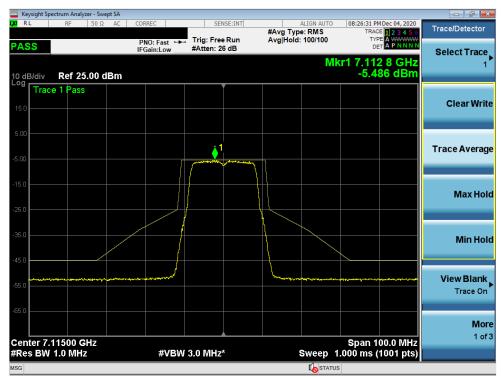
Plot 7-292. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11a (UNII Band 8) - Ch. 189)

FCC ID: A3LSMG998B	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Page 171 of 215	
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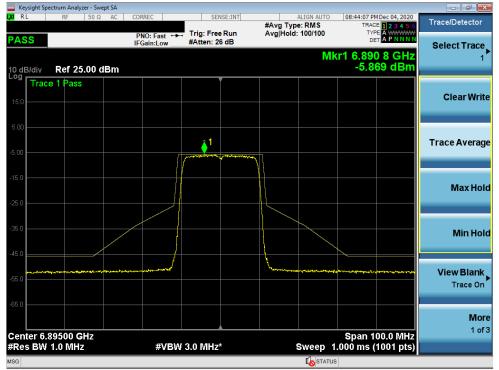
Plot 7-293. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11a (UNII Band 8) - Ch. 209)



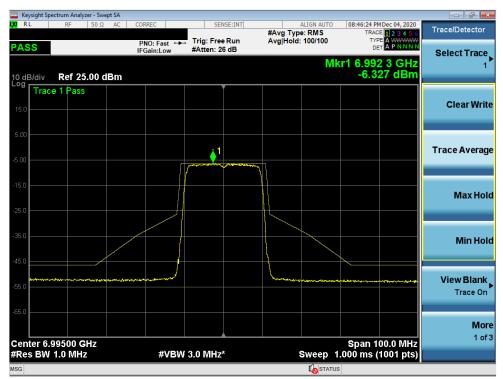
Plot 7-294. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11a (UNII Band 8) - Ch. 233)

FCC ID: A3LSMG998B	PCTEST° Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 172 of 215
1M2009280154-26.A3L	10/05 - 12/14/2020	Portable Handset		Page 172 of 215
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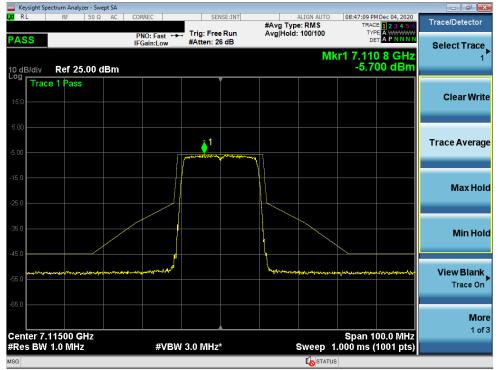
Plot 7-295. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (UNII Band 8) - Ch. 189)



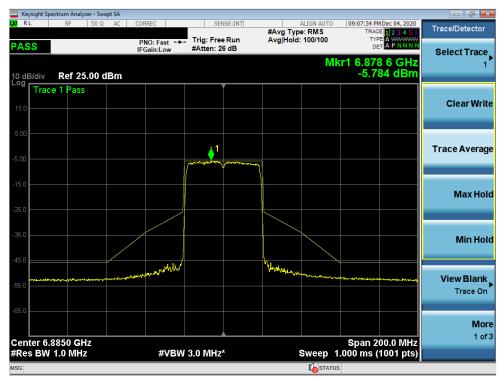
Plot 7-296. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (UNII Band 8) - Ch. 209)

FCC ID: A3LSMG998B	PCTEST* Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type: Portable Handset		Dama 470 -6045
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Plot 7-297. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11ax (UNII Band 8) - Ch. 233)



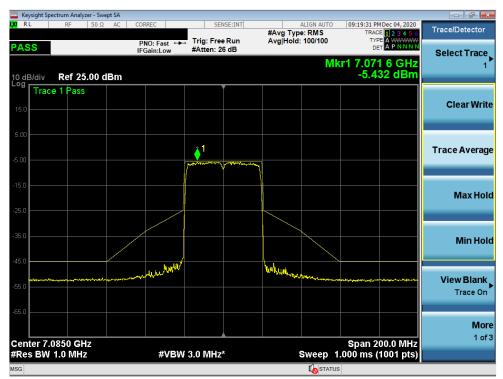
Plot 7-298. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (UNII Band 8) - Ch. 195)

FCC ID: A3LSMG998B	PCTEST* Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMBUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type: Portable Handset		Dama 474 -6045
1M2009280154-26.A3L	10/05 - 12/14/2020			Page 174 of 215
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Keysight Spectrum Analyzer - Swept S					
<b>X/</b> R.L RF 50Ω A	C CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	09:18:18 PM Dec 04, 2020 TRACE 1 2 3 4 5 6	Trace/Detector
PASS	PNO: Fast ↔ IFGain:Low	Trig: Free Run #Atten: 26 dB	Avg Hold: 100/100	DET A P N N N N	Select Trace
10 dB/div Ref 25.00 dBr	n		MI	r1 7.001 2 GHz -6.045 dBm	1
15.0					Clear Write
5.00		1			Trace Average
15.0		for the second s			Max Hold
35.0					Min Hole
45.0					
55.0	unamengen dan kalan k		and the second s		View Blank Trace On
55.0 Center 7.0050 GHz				Span 200.0 MHz	Mon 1 of∛
Res BW 1.0 MHz	#VBW	3.0 MHz*	Sweep 1	.000 ms (1001 pts)	
ISG					

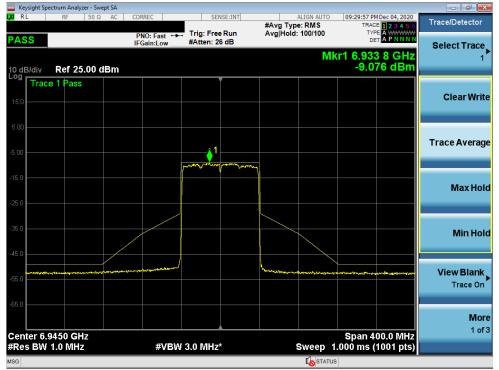
Plot 7-299. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (UNII Band 8) - Ch. 211)



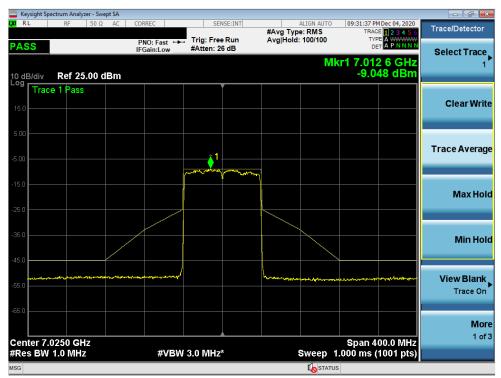
Plot 7-300. In-Band Emission Plot MIMO ANT2 (40MHz BW 802.11ax (UNII Band 8) - Ch. 227)

FCC ID: A3LSMG998B	PCTEST* Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type: Portable Handset		Dama 475 af 045
1M2009280154-26.A3L	10/05 - 12/14/2020			Page 175 of 215
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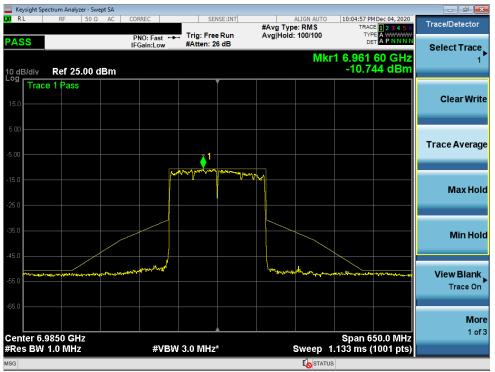
Plot 7-301. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (UNII Band 8) - Ch. 199)



Plot 7-302. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11ax (UNII Band 8) - Ch. 215)

FCC ID: A3LSMG998B	PCTEST° Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
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Plot 7-303. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11ax (UNII Band 8) - Ch. 207)

FCC ID: A3LSMG998B	PCTEST <sup>•</sup> Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 177 of 215
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#### 7.6 Contention Based Protocol – 802.11a/ax §15.407(d)(6)

#### **Test Overview and Limit**

Indoor access points, subordinate devices and client devices operating in the 5.925-7.125 GHz band (herein referred to as unlicensed devices) are required to use technologies that include a contention-based protocol to avoid co-channel interference with incumbent devices sharing the band. To ensure incumbent co-channel operations are detected in a technology-agnostic manner, unlicensed devices are required to detect co-channel radio frequency energy (energy detect) and avoid simultaneous transmission.

Unlicensed indoor low-power devices must detect co-channel radio frequency power that is at least -62 dBm or lower. Upon detection of energy in the band, unlicensed low power indoor devices must vacate the channel and stay off the channel as long as detected radio frequency power is equal to or greater than the threshold (-62 dBm). The -62 dBm (or lower) threshold is referenced to a 0 dBi antenna gain.

To ensure incumbent operations are reliably detected in the band, low power indoor devices must detect RF energy throughout their intended operating channel.

#### Test Procedure Used

ANSI C63.10-2013 – Section 12.3.2.2 KDB 987594 D02

#### **Test Settings**

- 1) Configure the EUT to transmit with a constant duty cycle.
- 2) Set the operating parameters of the EUT including power level, operating frequency, modulation and bandwidth.
- 3) Set the signal analyzer center frequency to the nominal EUT channel center frequency. The span range of the signal analyzer shall be between two times and five times the OBW of the EUT. Connect the output port of the EUT to the signal analyzer 2, as shown in Figure 2. Ensure that the attenuator 2 provides enough attenuation to not overload the signal analyzer 2 receiver.
- **4)** Monitoring the signal analyzer 2, verify the EUT is operating and transmitting with the parameters set at step two.
- 5) Using an AWGN signal source, generate (but do not transmit, i.e., RF OFF) a 10 MHz-wide AWGN signal. Use Table 1 to determine the center frequency of the 10 MHz AWGN signal relative to the EUT's channel bandwidth and center frequency.
- 6) Set the AWGN signal power to an extremely low level (more than 20 dB below the -62 dBm threshold). Connect the AWGN signal source, via a 3-dB splitter, to the signal analyzer 1 and the EUT as shown in Figure 2.
- 7) Transmit the AWGN signal (RF ON) and verify its characteristics on the signal analyzer 1.
- 8) Monitor the signal analyzer 2 to verify if the AWGN signal has been detected and the EUT has ceased transmission. If the EUT continues to transmit, then incrementally increase the AWGN signal power level until the EUT stops transmitting.
- 9) (Including all losses in the RF paths) Determine and record the AWGN signal power level (at the EUT's antenna port) at which the EUT ceased transmission. Repeat the procedure at least 10 times to verify the EUT can detect an AWGN signal with 90% (or better) level of certainty.
- **10)** Refer to Table 1 to determine number of times the detection threshold testing needs to be repeated. If testing is required more than once, then go back to step 5, choose a different center frequency for the AWGN signal and repeat the process.

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#### **Test Setup**

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

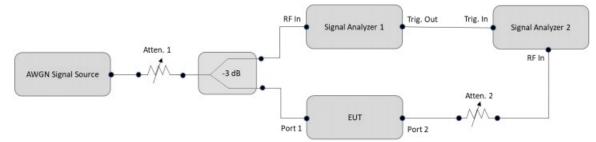


Figure 7-5. Test Instrument & Measurement Setup

### **Test Notes**

- 1. Per guidance from KDB 987594 D02, contention based protocol was tested using an AWGN signal with a bandwidth of 10MHz (see Plot 7-304). The amplitude of the signal was increased until detected by the EUT, signaled by the ceasing of transmission (see Plot 7-305), marker indicates the point at which the AWGN signal is introduced.
- 2. Per 987594 D02, the detection threshold at the antenna port is calculated in the following way, where G is the gain of the antenna. D

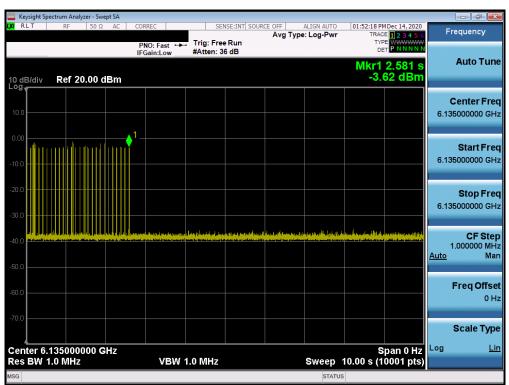
	trum Analyzer - Swept SA								
X/RLT	RF 50 Ω AC	CORREC	SEN	SE:INT	#Avg Type	ALIGN AUTO	TRAC	Dec 02, 2020	Trace/Detector
		PNO: Fast ++ IFGain:Low	, Trig: Free #Atten: 36			<b>A B</b>	TYP DE		Select Trace
10 dB/div Log	Ref 25.00 dBm						/kr1 10. -0.	024 dB	1
15.0									Clear Write
-5.00			4. 114. 1		1Δ2				Trace Average
-15.0			2 2	dave alardal					Max Hold
-25.0						n a - kal - 1 <b>10</b>			
-45.0	uni haranashiyaaya	(malionaph/Pylyhodjentyn)			- CANARA CA	uller og til som	n dan dan dan dan dan dan dan dan dan da	hangu lining ang ang ang ang ang ang ang ang ang a	Min Hold
-55.0									View Blank View
-65.0 Center 6.1	3500 GHz						Span 5	0.00 MHz	More 1 of 3
#Res BW		#VBW	3.0 MHz		\$	Sweep 1	.000 ms (	1001 pts)	
MSG						STATUS			

Petection Threshold = -	-62.0 [dBm] –	G[dBi]
-------------------------	---------------	--------

Plot 7-304. AWGN Sample Signal

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Plot 7-305. Contention Based Protocol Timing Plot

Band	Channel	Channel Freq [MHz]	Channel BW [MHz]	Incumbent Freq [MHz]	Detection Power Level [dBm]	Antenna Gain [dBi]	Detection Limit [dBm]	Modified Detection Limit [dBm]	Margin [dB]					
	37	6135	20	6135	-69.01	-0.89	-62.0	-61.11	-7.9					
UNII				6110	-65.46	-0.89	-62.0	-61.11	-4.35					
Band 5	47	6185	160	6175	-67.52	-0.89	-62.0	-61.11	-6.41					
				6240	-67.15	-0.89	-62.0	-61.11	-6.04					
	101	6455	20	6455	-71.22	-1.55	-62.0	-60.45	-10.77					
UNII				6435	-70.16	-1.55	-62.0	-60.45	-9.71					
Band 6	111	6505	160	6495	-73.46	-1.55	-62.0	-60.45	-13.01					
									6575	-68.66	-1.55	-62.0	-60.45	-8.21
	149	6695	20	6695	-70.98	-1.55	-62.0	-60.45	-10.53					
UNII				6595	-70.82	-1.55	-62.0	-60.45	-10.37					
Band 7	143	6665	160	6655	-72.44	-1.55	-62.0	-60.45	-11.99					
				6735	-68.36	-1.55	-62.0	-60.45	-7.91					
	213	7015	20	7015	-69.13	-1.71	-62.0	-60.29	-8.84					
UNII				6915	-69.22	-1.71	-62.0	-60.29	-8.93					
Band 8	207	6985	160	6975	-70.46	-1.71	-62.0	-60.29	-10.17					
				7055	-66.44	-1.71	-62.0	-60.29	-6.15					

Table 7-8. Contention Based Protocol – Incumbent Detection Results

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CBP Detection (1 = Detection, Blank = No Detection)														
Band	Channel	Channel Freq [MHz]	Channel BW [MHz]	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)
	37	6135	20	1	1	1	1	1	1	1	1	1	1	100
UNII				1	1	1	1	1	1	1	1	1	1	100
Band 5	47	6185	160	1	1	1	1	1	1	1	1	1	1	100
				1	1	1	1	1	1	1	1	1	1	100
	101	6455	20	1	1	1	1	1	1	1	1	1	1	100
UNII				1	1	1	1	1	1	1	1	1	1	100
Band 6	111	6505	160	1	1	1	1	1	1	1	1	1	1	100
				1	1	1	1	1	1	1	1	1	1	100
	149	6695	20	1	1	1	1	1	1	1	1	1	1	100
UNII				1	1	1	1	1	1	1	1	1	1	100
Band 7	143	6665	160	1	1	1	1	1	1	1	1	1	1	100
				1	1	1	1	1	1	1	1	1	1	100
	213	7015	20	1	1	1	1	1	1	1	1	1	1	100
UNII				1	1	1	1	1	1	1	1	1	1	100
Band 8	207	6985	160	1	1	1	1	1	1	1	1	1	1	100
				1	1	1	1	1	1	1	1	1	1	100

Table 7-9. Contention Based Protocol – Incumbent Detection Trial Results

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# 7.7 Radiated Spurious Emission Measurements – Above 1GHz §15.205, §15.209

#### **Test Overview and Limit**

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in ANSI C63.10-2013 and KDB 789033 D02 v02r01, and at the appropriate frequencies. All channels, modes (e.g. 802.11a, 802.11ax (20MHz BW), 802.11ax (40MHz BW), 802.11ax (80MHz), and 802.11ax (160MHz)), and modulations/data rates were investigated among all UNII bands. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

## For transmitters operating within the 5.925-7.125 GHz band: Any emissions outside of the 5.925-7.125 GHz band must not exceed an e.i.r.p. of −27 dBm/MHz

## All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table 7-10 per Section 15.209).

Frequency	Field Strength [μV/m]	Measured Distance [Meters]
Above 960.0 MHz	500	3

Table 7-10. Radiated Limits

#### **Test Procedures Used**

ANSI C63.10-2013 – Sections 12.7.7.2, 12.7.6, 12.7.5 KDB 789033 D02 v02r01 – Section G

#### **Test Settings**

#### Average Measurements above 1GHz (Method AD)

- 1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
- 2. RBW = 1MHz
- 3. VBW = 3MHz
- 4. Detector = power average (RMS)
- 5. Number of measurement points = 1001 (Number of points must be  $\geq 2 \times \text{span/RBW}$ )
- 6. Averaging type = power (RMS)
- 7. Sweep time = auto couple
- 8. Trace was averaged over 100 sweeps

#### Peak Measurements above 1GHz

- 1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
- 2. RBW = 1MHz
- 3. VBW = 3MHz
- 4. Detector = peak
- 5. Sweep time = auto couple

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- 6. Trace mode = max hold
- 7. Trace was allowed to stabilize

#### Peak Measurements below 1GHz

- 1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
- 2. Span was set greater than 1MHz
- 3. RBW = 120kHz
- 4. Detector = CISPR quasi-peak
- 5. Sweep time = auto couple
- 6. Trace was allowed to stabilize

#### Test Setup

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

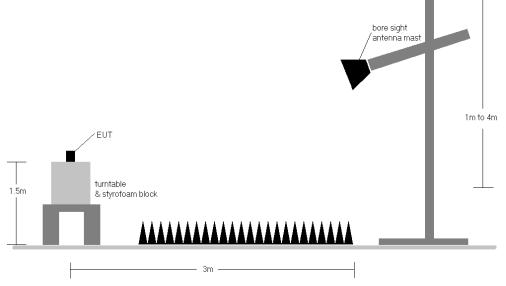


Figure 7-6. Test Instrument & Measurement Setup

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#### Test Notes

- 1. All emissions that lie in the restricted bands (denoted by a \* next to the frequency) specified in §15.205 are below the limit shown in Table 7-10.
- 2. All spurious emissions lying in restricted bands specified in §15.205 are below the limit shown in Table 7-10. All spurious emissions that do not lie in a restricted band are subject to an average limit of -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBµV/m can be determined by adding a "conversion" factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions of 68.2dBµV/m.
- All spurious emissions that do not lie in a restricted band are subject to a peak limit not to exceed 20dB of the average limit [68.2dBµV/m]. If a peak measurement passes the average limit it was determined no further investigation is necessary.
- 4. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
- 5. This unit was tested with its standard battery.
- 6. The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz. Above 1 GHz, average and peak measurements were taken using linearly polarized horn antennas. The worst-case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
- 7. Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
- 8. Radiated spurious emissions were investigated while operating in MIMO mode, however, it was determined that single antenna operation produced the worst case emissions. Since the emissions produced from MIMO operation were found to be more than 20dB below the limit, the MIMO emissions are not reported.
- 9. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. Any emissions found to be within 20dB of the limit are fully investigated and the results are shown in this section.
- 10. The "-" shown in the following RSE tables are used to denote a noise floor measurement.

## Sample Calculations

## **Determining Spurious Emissions Levels**

- ο Field Strength Level [dBµV/m] = Analyzer Level [dBm] + 107 + AFCL [dB/m]
- AFCL [dB/m] = Antenna Factor [dB/m] + Cable Loss [dB]
- ο Margin [dB] = Field Strength Level [dBμV/m] Limit [dBμV/m]

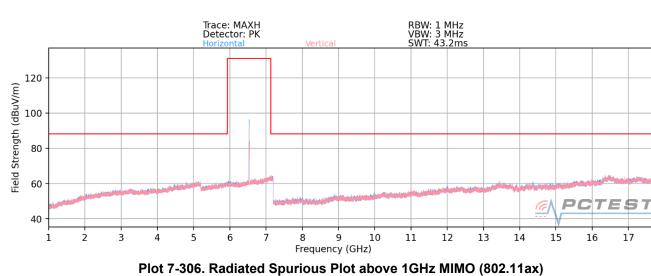
## Radiated Band Edge Measurement Offset

• The amplitude offset shown in the radiated restricted band edge plots was calculated using the formula:

Offset (dB) = (Antenna Factor + Cable Loss + Attenuator) – Preamplifier Gain

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## 7.6.1 MIMO Radiated Spurious Emission Measurements

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# MIMO Radiated Spurious Emission Measurements §15.407(b) §15.205 & §15.209

Worst Case Mode:	802.11ax
Worst Case Transfer Rate:	MCS0
Distance of Measurements:	1 & 3 Meters
Operating Frequency:	5935MHz
Channel:	2

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correctio n Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
*	11870.00	Average	V	-	-	-81.11	13.66	0.00	39.55	53.98	-14.43
*	11870.00	Peak	V	-	-	-69.38	13.66	0.00	51.28	73.98	-22.70
*	17805.00	Average	V	-	-	-82.10	21.98	0.00	46.88	53.98	-7.10
*	17805.00	Peak	V	-	-	-70.10	21.98	0.00	58.88	73.98	-15.10
*	23740.00	Average	V	-	-	-63.64	2.52	-9.54	36.34	53.98	-17.64
*	23740.00	Peak	V	-	-	-51.45	2.52	-9.54	48.53	73.98	-25.45
	29675.00	Peak	V	-	-	-51.21	3.77	-9.54	50.02	68.20	-18.18

#### Table 7-11. Radiated Measurements MIMO

Worst Case Mode: Worst Case Transfer Rate: Distance of Measurements: Operating Frequency: Channel:

802.11ax	
MCS0	
1 & 3 Meters	
6175MHz	
45	

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correctio n Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
*	12350.00	Average	V	-	-	-81.60	12.65	0.00	38.05	53.98	-15.93
*	12350.00	Peak	V	-	-	-70.31	12.65	0.00	49.34	73.98	-24.64
*	18525.00	Average	V	-	-	-63.70	-0.07	-9.54	33.69	53.98	-20.29
*	18525.00	Peak	V	-	-	-52.26	-0.07	-9.54	45.13	73.98	-28.85
	24700.00	Peak	V	-	-	-51.34	3.04	-9.54	49.16	68.20	-19.04
	30875.00	Peak	V	-	-	-52.54	4.26	-9.54	49.17	68.20	-19.03

#### Table 7-12. Radiated Measurements MIMO

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02.11ax
CS0
& 3 Meters
415MHz
3

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correctio n Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	12830.00	Peak	V	-	-	-70.12	13.16	0.00	50.04	68.20	-18.16
*	19245.00	Average	V	-	-	-63.48	0.82	-9.54	34.80	53.98	-19.18
*	19245.00	Peak	V	-	-	-51.90	0.82	-9.54	46.38	73.98	-27.60
	25660.00	Peak	V	-	-	-51.45	4.39	-9.54	50.40	68.20	-17.80
	32075.00	Peak	V	-	-	-52.29	5.38	-9.54	50.55	68.20	-17.65
				Table 7-1	3 Radiat	od Mose	uromon	te MIMO			

Table 7-13.	Radiated	Measureme	ents	MIMO

Worst Case Mode: Worst Case Transfer Rate: Distance of Measurements: **Operating Frequency:** Channel:

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	12870.00	Peak	V	-	-	-25.47	13.45	0.00	50.88	68.20	-17.32
*	19305.00	Average	V	-	-	-63.22	0.70	-9.54	34.93	53.98	-19.04
*	19305.00	Peak	V	-	-	-51.44	0.70	-9.54	46.71	73.98	-27.26
	25740.00	Peak	V	-	-	-51.30	4.23	-9.54	50.39	68.20	-17.81
	32175.00	Peak	V	-	-	-52.07	5.13	-9.54	50.52	68.20	-17.68

Table 7-14. Radiated Measurements MIMO

FCC ID: A3LSMG998B	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager	
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Worst Case Mode:	802.11ax
Worst Case Transfer Rate:	MCS0
Distance of Measurements:	1 & 3 Meters
Operating Frequency:	6475MHz
Channel:	105

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	12950.00	Peak	V	-	-	-25.89	13.24	0.00	51.05	68.20	-17.15
*	19425.00	Average	V	-	-	-63.17	0.76	-9.54	35.05	53.98	-18.93
*	19425.00	Peak	V	-	-	-51.14	0.76	-9.54	47.08	73.98	-26.90
	25900.00	Peak	V	-	-	-51.85	4.37	-9.54	49.98	68.20	-18.22
	32375.00	Peak	V	-	-	-51.80	5.10	-9.54	50.75	68.20	-17.45

Table 7-15. Radiated Measurements MIMO	Table 7-	15. Radiated	Measurements	MIMO
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Worst Case Mode: Worst Case Transfer Rate: Distance of Measurements: Operating Frequency: Channel:

802.11	ax
MCS0	
1&3N	leters
6515M	Hz
113	

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	13030.00	Peak	V	-	-	-24.61	14.65	0.00	51.96	68.20	-16.24
*	19545.00	Average	V	-	-	-63.00	0.88	-9.54	35.34	53.98	-18.64
*	19545.00	Peak	V	-	-	-51.33	0.88	-9.54	47.01	73.98	-26.97
	26060.00	Peak	V	-	-	-51.14	4.61	-9.54	50.92	68.20	-17.28
	32575.00	Peak	V	-	-	-51.54	5.09	-9.54	51.01	68.20	-17.19

Table 7-16. Radiated Measurements MIMO

FCC ID: A3LSMG998B	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	NO	Approved by: Technical Manager	
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Worst Case Mode:	802.11ax
Worst Case Transfer Rate:	MCS0
Distance of Measurements:	1 & 3 Meters
Operating Frequency:	6535MHz
Channel:	117

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Strength	Limit [dBµV/m]	Margin [dB]
	13070.00	Peak	Н	-	-	-25.48	13.82	0.00	50.85	68.20	-17.35
*	19605.00	Average	н	-	-	-63.71	0.98	-9.54	34.73	73.98	-39.25
*	19605.00	Peak	Н	-	-	-52.06	0.98	-9.54	46.38	68.20	-21.82
	26140.00	Peak	н	-	-	-51.59	4.49	-9.54	50.36	68.20	-17.84
	32675.00	Peak	н	-	-	-50.82	4.88	-9.54	51.52	68.20	-16.68

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\_\_\_\_\_

Worst Case Mode: Worst Case Transfer Rate: Distance of Measurements: Operating Frequency: Channel:

802.11ax	
MCS0	
1 & 3 Meters	
6695MHz	
149	

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
*	13390.00	Average	Н	-	-	-81.75	13.95	0.00	39.20	53.98	-14.78
*	13390.00	Peak	Н	-	-	-70.17	13.95	0.00	50.78	73.98	-23.20
*	20085.00	Average	Н	-	-	-63.23	0.94	-9.54	35.16	53.98	-18.82
*	20085.00	Peak	Н	-	-	-51.62	0.94	-9.54	46.77	73.98	-27.21
	26780.00	Peak	Н	-	-	-51.45	4.32	-9.54	50.32	68.20	-17.88
	33475.00	Peak	Н	-	-	-51.81	5.85	-9.54	51.50	68.20	-16.70

Table 7-18. Radiated Measurements MIMO

FCC ID: A3LSMG998B	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager	
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Worst Case Mode:	802.11ax
Worst Case Transfer Rate:	MCS0
Distance of Measurements:	1 & 3 Meters
Operating Frequency:	6875MHz
Channel:	185

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	13750.00	Peak	Н	-	-	-69.99	15.78	0.00	52.79	68.20	-15.41
*	20625.00	Average	Н	-	-	-64.91	1.47	-9.54	34.02	53.98	-19.96
*	20625.00	Peak	Н	-	-	-53.16	1.47	-9.54	45.77	73.98	-28.21
	27500.00	Peak	Н	-	-	-51.84	3.49	-9.54	49.11	68.20	-19.09
	34375.00	Peak	Н	-	-	-51.52	7.16	-9.54	53.10	68.20	-15.10

Worst Case Mode: Worst Case Transfer Rate: Distance of Measurements: Operating Frequency: Channel:

802.11ax
MCS0
1 & 3 Meters
6895MHz
189

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	13790.00	Peak	Н	-	-	-70.04	15.49	0.00	52.45	68.20	-15.75
*	20685.00	Average	н	-	-	-64.66	1.38	-9.54	34.18	53.98	-19.80
*	20685.00	Peak	н	-	-	-51.82	1.38	-9.54	47.02	73.98	-26.96
	27580.00	Peak	Н	-	-	-51.64	3.48	-9.54	49.30	68.20	-18.90
	34475.00	Peak	Н	-	-	-52.06	7.52	-9.54	52.92	68.20	-15.28

Table 7-20. Radiated Measurements MIMO

FCC ID: A3LSMG998B	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager	
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802.11ax
MCS0
1 & 3 Meters
6995MHz
209

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	13990.00	Peak	Н	-	-	-69.87	16.61	0.00	53.74	68.20	-14.46
*	20985.00	Average	Н	-	-	-64.22	1.88	-9.54	35.12	53.98	-18.86
*	20985.00	Peak	Н	-	-	-52.11	1.88	-9.54	47.23	73.98	-26.75
	27980.00	Peak	Н	-	-	-51.41	3.63	-9.54	49.68	68.20	-18.52
	34975.00	Peak	Н	-	-	-52.55	8.01	-9.54	52.92	68.20	-15.28

Worst Case Mode: Worst Case Transfer Rate: Distance of Measurements: Operating Frequency: Channel:

802.11ax
MCS0
1 & 3 Meters
7115MHz
233

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	14230.00	Peak	н	-	-	-69.53	16.10	0.00	53.57	68.20	-14.63
*	21345.00	Average	Н	-	-	-64.34	1.90	-9.54	35.02	53.98	-18.96
*	21345.00	Peak	Н	-	-	-52.53	1.90	-9.54	46.83	73.98	-27.15
	28460.00	Peak	Н	-	-	-51.33	3.74	-9.54	49.87	68.20	-18.33
	35575.00	Peak	Н	-	-	-52.23	6.97	-9.54	52.19	68.20	-16.01

Table 7-22. Radiated Measurements MIMO

FCC ID: A3LSMG998B	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager					
Test Report S/N:	Test Dates:	EUT Type:		Dage 101 of 215					
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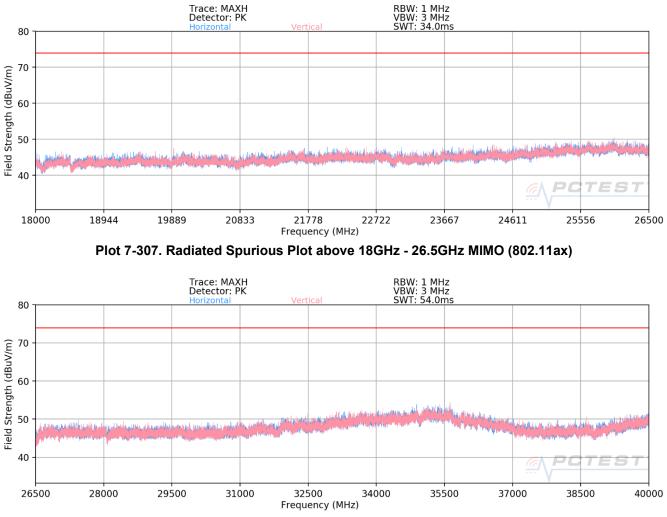
Worst Case Mode:	802.11ax
Worst Case Transfer Rate:	MCS0
Distance of Measurements:	1 & 3 Meters
Operating Frequency:	5935
Channel:	2

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]		Strongth	Limit [dBµV/m]	Margin [dB]
*	11870.00	Average	V	-	-	-81.43	13.66	0.00	39.23	53.98	-14.75
*	11870.00	Peak	V	-	-	-69.29	13.66	0.00	51.37	73.98	-22.61
*	17805.00	Average	V	-	-	-82.13	21.98	0.00	46.85	53.98	-7.13
*	17805.00	Peak	V	-	-	-70.48	21.98	0.00	58.50	73.98	-15.48

Table 7-23. Radiated Measurements MIMO with WCP

FCC ID: A3LSMG998B	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager	
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## MIMO Radiated Spurious Emissions Measurements (Above 18GHz)

Plot 7-308. Radiated Spurious Plot 26.5GHz - 40GHz MIMO (802.11ax)

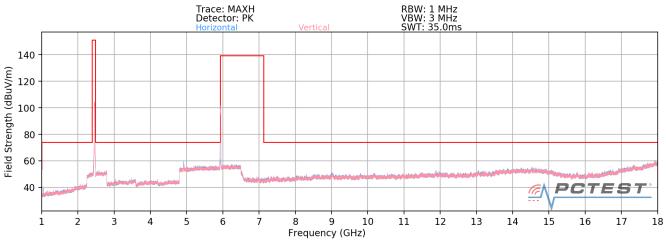
FCC ID: A3LSMG998B	PCTEST* Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 102 of 215	
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# 7.6.2 Simultaneous Tx Radiated Spurious Emissions Measurements §15.407(b) §15.205 & §15.209

Description	2.4 GHz Emission	6 GHz Emission
Antenna	1, 2	1, 2
Channel	6	2
Operating Frequency (MHz)	2437	5935
Data Rate (Mbps)	6Mbps	6Mbps
Mode	g	а

Table 7-24. Simultaneous Transmission Config-2



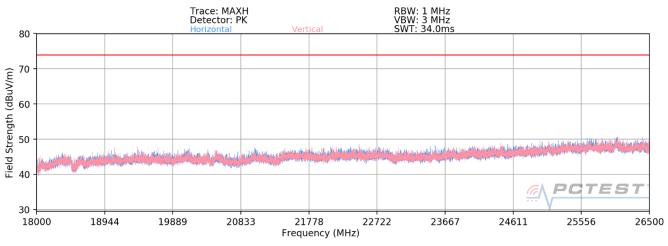
Plot 7-309. Radiated Spurious Plot above 1GHz (2.4GHz - 6GHz)

FCC ID: A3LSMG998B	PCTEST* Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager		
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	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
*	1581.00	Average	~	-	-	-78.56	0.75	29.19	53.98	-24.79
	1581.00	Peak	V	-	-	-67.08	0.75	40.67	73.98	-33.31
	5599.00	Peak	V	-	-	-70.29	11.44	48.15	88.20	-40.05
	9617.00	Peak	V	-	-	-72.26	18.81	53.55	88.20	-34.65
	10473.00	Peak	~	-	-	-72.64	20.04	54.40	88.20	-33.80
	13635.00	Peak	V	-	-	-72.33	24.52	59.19	88.20	-29.01
*	14491.00	Average	V	-	-	-84.48	25.69	48.21	53.98	-5.77
	14491.00	Peak	V	-	-	-72.26	25.69	60.43	73.98	-13.55

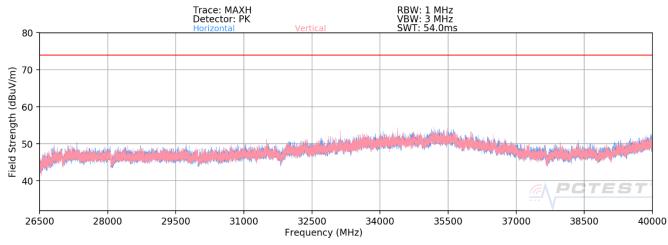
Table 7-25. Radiated Measurements (2.4GHz - 6GHz)

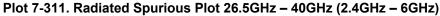


Plot 7-310. Radiated Spurious Plot 18GHz – 26.5GHz (2.4GHz – 6GHz)

FCC ID: A3LSMG998B	Proud to be part of @ element	SAMSUNG			
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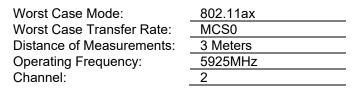




FCC ID: A3LSMG998B	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 106 of 215
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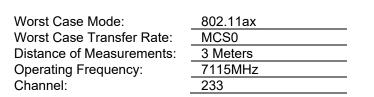


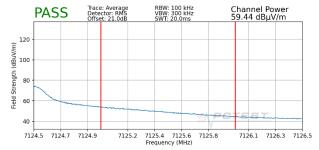
### 7.6.3 MIMO Radiated Band Edge Measurements (20MHz BW) §15.407(b.5) §15.205 §15.209



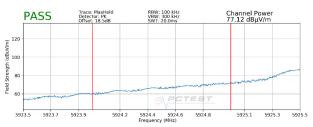


Plot 7-312. Radiated Lower Band Edge Plot MIMO (Average – UNII Band 5)

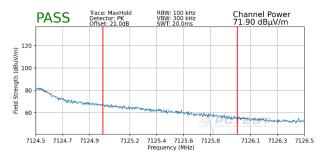




Plot 7-314. Radiated Upper Band Edge Plot MIMO (Average – UNII Band 8)



Plot 7-313. Radiated Lower Band Edge Plot MIMO (Peak – UNII Band 5)

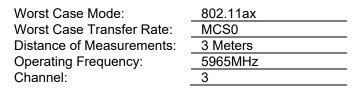


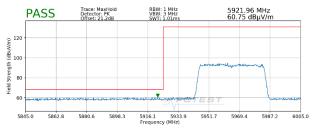
Plot 7-315. Radiated Upper Band Edge Plot MIMO (Peak – UNII Band 8)

FCC ID: A3LSMG998B	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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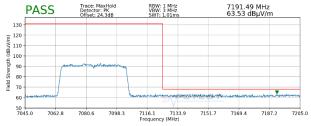
### 7.6.4 MIMO Radiated Band Edge Measurements (40MHz BW) §15.407(b.5) §15.205 §15.209





Plot 7-316. Radiated Lower Band Edge Plot MIMO (Peak – UNII Band 5)

Worst Case Mode:	802.11ax
Worst Case Transfer Rate:	MCS0
Distance of Measurements:	3 Meters
Operating Frequency:	7085MHz
Channel:	227

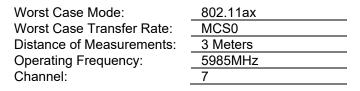


Plot 7-317. Radiated Upper Band Edge Plot MIMO (Peak – UNII Band 8)

FCC ID: A3LSMG998B	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMBUNG	Approved by: Technical Manager
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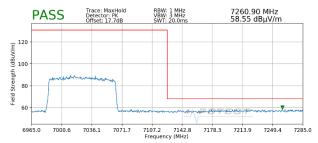
### 7.6.5 MIMO Radiated Band Edge Measurements (80MHz BW) §15.407(b.5) §15.205 §15.209





Plot 7-318. Radiated Lower Band Edge Plot MIMO (Peak – UNII Band 5)

802.11ax
MCS0
3 Meters
7025MHz
215

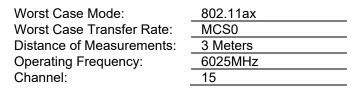


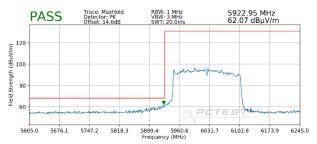
Plot 7-319. Radiated Upper Band Edge Plot MIMO (Peak – UNII Band 8)

FCC ID: A3LSMG998B	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
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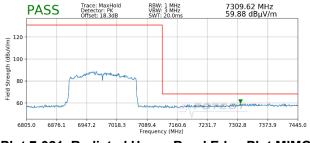
### 7.6.6 MIMO Radiated Band Edge Measurements (160MHz BW) §15.407(b.5) §15.205 §15.209





Plot 7-320. Radiated Lower Band Edge Plot MIMO (Peak – UNII Band 5)

Worst Case Mode:	802.11ax
Worst Case Transfer Rate:	MCS0
Distance of Measurements:	3 Meters
Operating Frequency:	6985MHz
Channel:	207



Plot 7-321. Radiated Upper Band Edge Plot MIMO (Peak – UNII Band 8)

FCC ID: A3LSMG998B	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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# 7.8 Radiated Spurious Emissions Measurements – Below 1GHz §15.209

### **Test Overview and Limit**

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

### All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table 7-65 per Section 15.209).

Frequency	Field Strength [μV/m]	Measured Distance [Meters]
0.009 – 0.490 MHz	2400/F (kHz)	300
0.490 – 1.705 MHz	24000/F (kHz)	30
1.705 – 30.00 MHz	30	30
30.00 – 88.00 MHz	100	3
88.00 – 216.0 MHz	150	3
216.0 – 960.0 MHz	200	3
Above 960.0 MHz	500	3

Table 7-26. Radiated Limits

### Test Procedures Used

ANSI C63.10-2013

### **Test Settings**

### **Quasi-Peak Field Strength Measurements**

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

FCC ID: A3LSMG998B	PCTEST* Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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### Test Setup

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

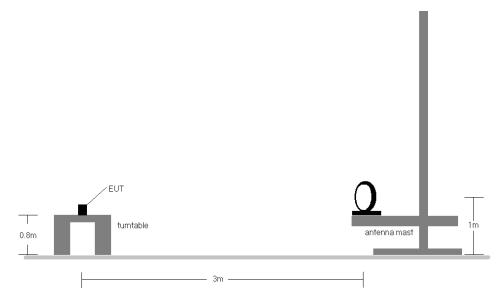
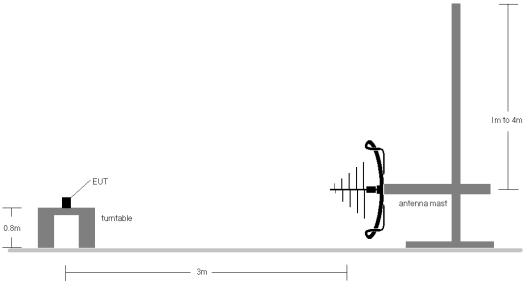
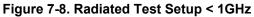


Figure 7-7. Radiated Test Setup < 30MHz





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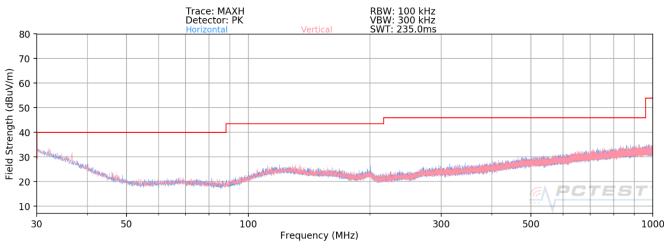
### Test Notes

- 1. All emissions lying in restricted bands specified in §15.205 are below the limit shown in Table 7-26.
- 2. The broadband receive antenna is manipulated through vertical and horizontal polarizations during the tests. The EUT is manipulated through three orthogonal planes.
- 3. This unit was tested with its standard battery.
- 4. The spectrum is investigated using a peak detector and final measurements are recorded using CISPR quasi peak detector. The worst-case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
- 5. Emissions were measured at a 3 meter test distance.
- 6. Emissions are investigated while operating on the center channel of the mode, band, and modulation that produced the worst case results during the transmitter spurious emissions testing.
- 7. No spurious emissions were detected within 20dB of the limit below 30MHz.
- 8. The results recorded using the broadband antenna is known to correlate with the results obtained by using a tuned dipole with an acceptable degree of accuracy. The VSWR for the measurement antenna was found to be less than 2:1.
- The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. There were no emissions detected in the 30MHz – 1GHz frequency range, as shown in the subsequent plots.

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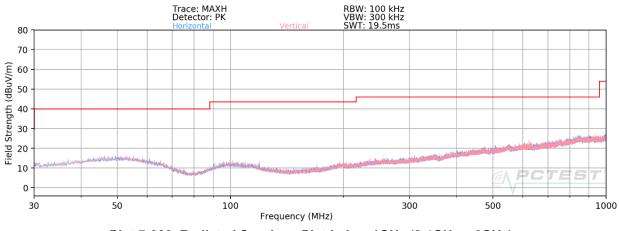


# Radiated Spurious Emissions Measurements (Below 1GHz) §15.209





Simultaneous Tx Radiated Spurious Emissions Measurements (Below 1GHz) §15.209



Plot 7-323. Radiated Spurious Plot below 1GHz (2.4GHz – 6GHz)

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### 7.9 Line-Conducted Test Data §15.407

### **Test Overview and Limit**

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

### All conducted emissions must not exceed the limits shown in the table below, per Section 15.207.

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

Table 7-27. Conducted Limits

\*Decreases with the logarithm of the frequency.

### **Test Procedures Used**

ANSI C63.10-2013, Section 6.2

### Test Settings

### **Quasi-Peak Field Strength Measurements**

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

### Average Field Strength Measurements

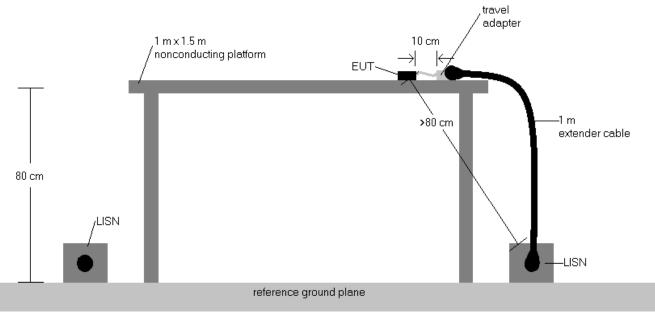
- 1. Analyzer center frequency was set to the frequency of the spurious emission of interest
- 2. RBW = 9kHz (for emissions from 150kHz 30MHz)
- 3. Detector = RMS
- 4. Sweep time = auto couple
- 5. Trace mode = max hold
- 6. Trace was allowed to stabilize

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### Test Setup

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



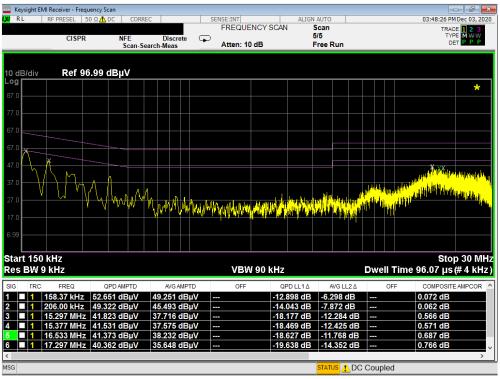


### Test Notes

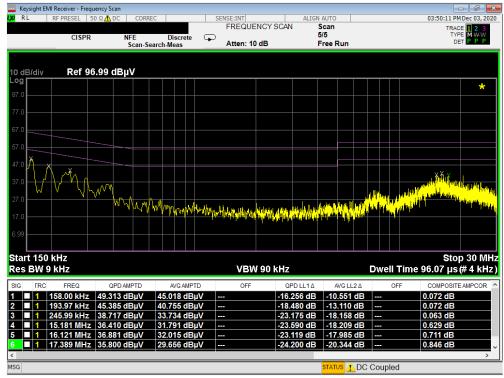
- 1. All modes of operation were investigated and the worst-case emissions are reported using mid channel. The emissions found were not affected by the choice of channel used during testing.
- 2. The limit for an intentional radiator from 150kHz to 30MHz are specified in 15.207.
- 3. Corr. (dB) = Cable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

FCC ID: A3LSMG998B	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
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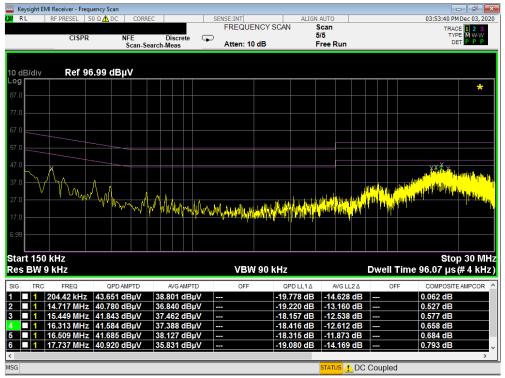




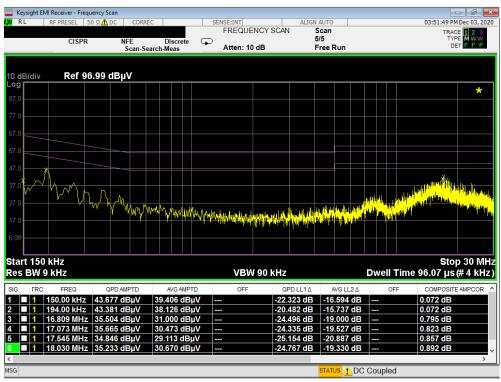


FCC ID: A3LSMG998B	PCTEST* Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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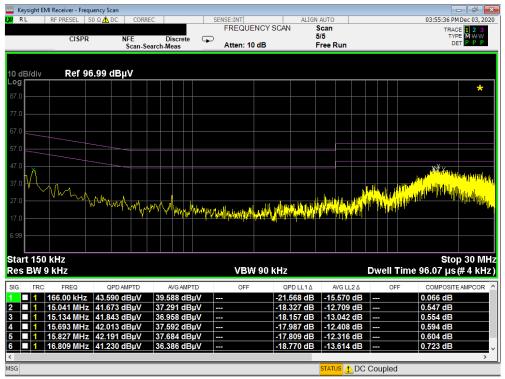
Plot 7-326. Line Conducted Plot with 802.11a UNII Band 6 (L1)



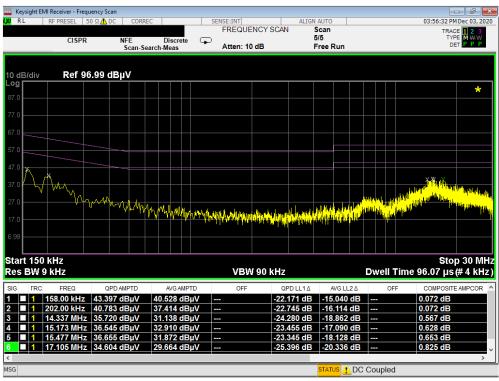


FCC ID: A3LSMG998B	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 200 af 245
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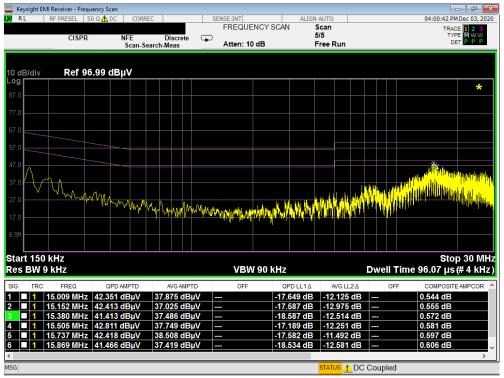
Plot 7-328. Line Conducted Plot with 802.11a UNII Band 7 (L1)



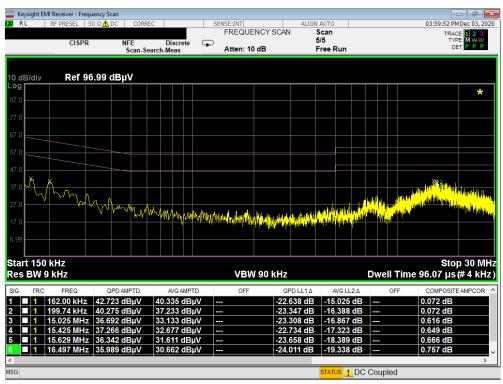


FCC ID: A3LSMG998B	Proved to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		D 000 -f 015
1M2009280154-26.A3L	10/05 - 12/14/2020	Portable Handset		Page 209 of 215
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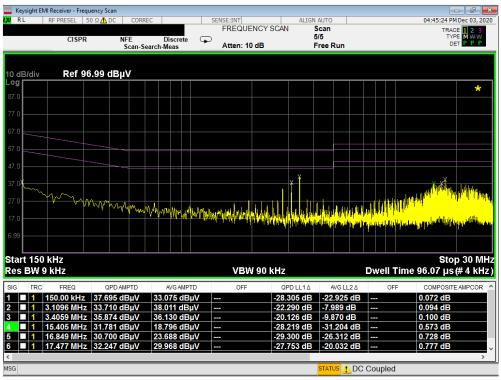
Plot 7-330. Line Conducted Plot with 802.11a UNII Band 8 (L1)



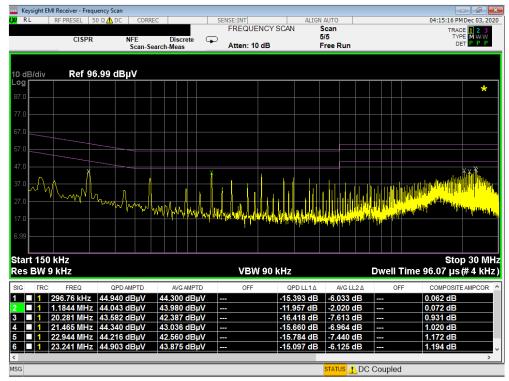


FCC ID: A3LSMG998B	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 210 of 215
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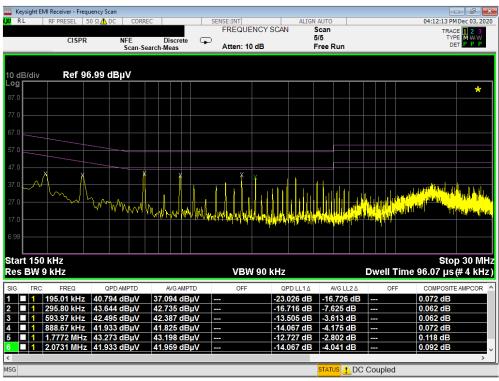


FCC ID: A3LSMG998B	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 211 of 215
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art 150	9 kHz FREQ 157.74 kHz 15.029 MHz 16.885 MHz	QP z 36.69 z 30.89 z 32.80	D AMP 1 dB 0 dB 4 dB	тр µV µV	34. 18. 17.	AVG/ 105 818 896	AMPT dBµ dBµ	D IV IV			¥ 90 I	(Hz QP -28.8 -29.1 -27.1	D LL1A 91 dB 10 dB 96 dB	-21 -31 -32	WG LL2 .477 (c .182 (c .104 (c)	2∆ dB dB	Dwe			C 0.0 0.5 0.7	07 µ 0MPOSI 72 dB 46 dB 33 dB	S (# 4 K	G
art 150	9 kHz FREQ 157.74 kHz 15.029 MH; 16.885 MH; 17.109 MH;	2 36.69 z 30.89 z 32.80 z 29.51	2D AMP 11 dB 10 dB 14 dB 9 dB	<sup>TD</sup> μV μV μV	34. 18. 17. 16.	AVG/ 105 818 896 455	AMPT dBµ dBµ dBµ				V 90	<hz QP -28.8 -29.1 -27.1 -30.4</hz 	D LL1A 91 dB 10 dB 96 dB 81 dB	-21 -31 -32 -33	WG LL2 .477 (c .182 (c .104 (c .545 (c	2 A dB dB dB dB	Dwe			C 0.0 0.5 0.7 0.7	07 µ 0MPOSI 72 dB 46 dB 33 dB 54 dB	S (# 4 K	G
art 150	9 kHz FREQ 157.74 kHz 15.029 MHz 16.885 MHz 17.109 MHz 17.225 MHz	2 36.69 z 30.89 z 32.80 z 29.51 z 29.79	D AMP 1 dB 0 dB 4 dB 9 dB 2 dB	TD μV μV μV μV	34. 18. 17. 16. 23.	AVG / 105 818 896 455 020	AMPT dBµ dBµ dBµ dBµ				V 90	<hz -28.8 -29.1 -27.1 -30.4 -30.2</hz 	D LL1A 191 dB 10 dB 96 dB 81 dB 08 dB	-21 -31 -32 -33 -26	WG LL2 .477 c .182 c .104 c .545 c .980 c	2 A B B B B B B B B	Dwe			C 0.0 0.5 0.7 0.7 0.7	07 μ 0MPOSI 072 dB 046 dB 033 dB 054 dB 054 dB 054 dB	S (# 4 K	G
art 15(	9 kHz FREQ 157.74 kHz 15.029 MH; 16.885 MH; 17.109 MH;	2 36.69 z 30.89 z 32.80 z 29.51 z 29.79	D AMP 1 dB 0 dB 4 dB 9 dB 2 dB	TD μV μV μV μV	34. 18. 17. 16. 23.	AVG/ 105 818 896 455	AMPT dBµ dBµ dBµ dBµ				V 90	<hz -28.8 -29.1 -27.1 -30.4 -30.2</hz 	D LL1A 91 dB 10 dB 96 dB 81 dB	-21 -31 -32 -33 -26	WG LL2 .477 (c .182 (c .104 (c .545 (c	2 A B B B B B B B B	Dwe			C 0.0 0.5 0.7 0.7 0.7	07 µ 0MPOSI 72 dB 46 dB 33 dB 54 dB	S (# 4 K	G
nrt 150	9 kHz FREQ 157.74 kHz 15.029 MHz 16.885 MHz 17.109 MHz 17.225 MHz	2 36.69 z 30.89 z 32.80 z 29.51 z 29.79	D AMP 1 dB 0 dB 4 dB 9 dB 2 dB	TD μV μV μV μV	34. 18. 17. 16. 23.	AVG / 105 818 896 455 020	AMPT dBµ dBµ dBµ dBµ				V 90	<hz -28.8 -29.1 -27.1 -30.4 -30.2</hz 	D LL1A 191 dB 10 dB 96 dB 81 dB 08 dB	-21 -31 -32 -33 -26	WG LL2 .477 c .182 c .104 c .545 c .980 c	2 A B B B B B B B B	Dwe			C 0.0 0.5 0.7 0.7 0.7	07 μ 0MPOSI 072 dB 046 dB 033 dB 054 dB 054 dB 054 dB	S (# 4 K	G

Plot 7-334. Line Conducted Plot with 802.11a UNII Band 6 with WCP (L1)



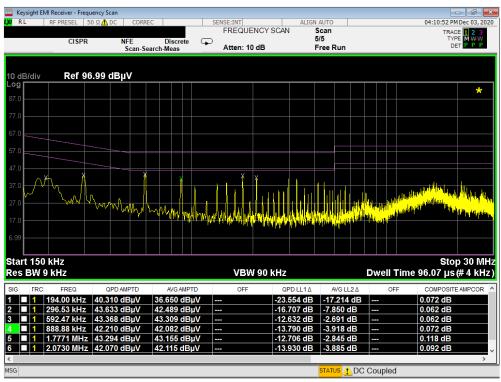
Plot 7-335. Line Conducted Plot with 802.11a UNII Band 6 with WCP (N)

FCC ID: A3LSMG998B	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 212 of 215
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art 150 s BW 9	) KHZ 9 KHZ FREQ 150.00 KHZ	QF 2 37.31	PD AMP	ידD <b>µV</b>	33.	AVG A 360	AMPT dBµ	D D		VBV		kHz 0 -28.	PD LL17	A B -2	2.640	dB			Tim	ne 96	St 5.07 µ COMPOS 072 dE	I <b>S (#</b> 4 SITE AMI 3	4 kH
art 150 s BW 1	) KHz 9 kHz FREQ 150.00 kHz 202.00 kHz	QF 2 37.31 2 35.66	°D AMP 15 dB 32 dB	PTD UTV UTV	33.3 31.7	AVG A 360	AMPT dBµ dBµ	D IV		VBV		kHz 0 -28. -27.	PD LL11 685 di 867 di	A B -2 B -2	2.640	dB dB			Tim	ne 96 0. 0.	S1 0.07 µ 0072 dE 072 dE	IS (# 4 SITE AMI B B B	4 kH
art 150 s BW 1	) KHZ 9 KHZ FREQ 150.00 KHZ	QF 2 37.31 2 35.66 z 31.39	<sup>2</sup> D AMP 15 dB 32 dB 90 dB	<sup>PTD</sup> μV μV	33.3 31.1 24.3	AVG A 360	MPT dBµ dBµ			VBV		kHz         	PD LL17	B -2 B -2 B -2	2.640	dB dB dB			Tim	ne 96 0. 0.	St 5.07 µ COMPOS 072 dE	IS (# 4 SITE AMI B B B B B	4 kH
art 150 s BW 9	) kHz 9 kHz FREQ 150.00 kHz 202.00 kHz 15.429 MH;	2 37.31 2 35.66 z 31.39 z 31.45	PD AMP 15 dB 2 dB 20 dB 53 dB	ο Π Π Π Π Π Π Π Π Π Π Π Π Π Π Π Π Π Π Π	33.3 31.7 24.3 25.8	AVG A 360 199	dBµ dBµ dBµ			VBV		kHz -28. -27. -28. -28.	PD LL17 685 dl 867 dl 610 dl	B -2 B -2 B -2 B -2 B -2	2.640 2.329 5.668	dB dB dB dB			Tim	ie 96 0. 0. 0. 0.	Si 0.07 µ 0072 dE 062 dE 575 dE	IS (# 4 SITE AMI 3 3 3 3 3	4 kH
art 150 s BW 9	) kHz 9 kHz 150.00 kHz 202.00 kHz 15.429 MHz 15.925 MHz	GF 2 37.31 2 35.66 2 31.39 2 31.45 2 31.65	PD AMP 15 dB 32 dB 30 dB 53 dB 58 dB	TD μV μV μV μV	33.3 31.7 24.3 25.8 23.0	AVG A 360 199 332 861	AMPT dBµ dBµ dBµ dBµ			VBV		kHz -28. -27. -28. -28. -28. -28.	PD LL17 685 dl 867 dl 610 dl 547 dl	B -2 B -2 B -2 B -2 B -2 B -2 B -2 B -2	2.640 2.329 5.668 4.139	dB dB dB dB dB			Tim	e 96 0. 0. 0. 0. 0.	S1 5.07 µ 0072 de 062 de 575 de 610 de	IS (# 4 SITE AMI B B B B B B B B B B B B B B B B B B B	4 kH
art 150 s BW 9	0 kHz 9 kHz 150.00 kHz 202.00 kHz 15.429 MH; 15.925 MH; 15.937 MH;	GF 2 37.31 2 35.66 2 31.39 2 31.45 2 31.65	PD AMP 15 dB 32 dB 30 dB 53 dB 58 dB	TD μV μV μV μV	33.3 31.7 24.3 25.8 23.0	AVG A 360 199 332 861 033	AMPT dBµ dBµ dBµ dBµ			VBV		kHz -28. -27. -28. -28. -28. -28.	PD LL17 685 dl 867 dl 610 dl 547 dl 342 dl	B -2 B -2 B -2 B -2 B -2 B -2 B -2 B -2	2.640 2.329 5.668 4.139 6.967	dB dB dB dB dB			Tim	e 96 0. 0. 0. 0. 0.	S1 5.07 µ 072 dE 062 dE 575 dE 610 dE 611 dE	IS (# 4 SITE AMI B B B B B B B B B B B B B B B B B B B	4 kH

Plot 7-336. Line Conducted Plot with 802.11a UNII Band 7 with WCP (L1)



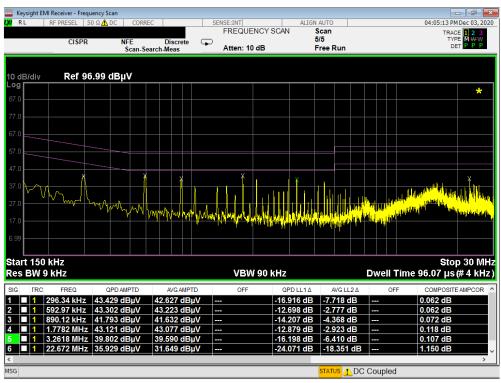
Plot 7-337. Line Conducted Plot with 802.11a UNII Band 7 with WCP (N)

FCC ID: A3LSMG998B	PCTEST* Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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art 150 s BW 9	9 kHz FREQ 15.937 MHz 16.597 MHz	QF 2 31.39 2 30.48	PD AMP 93 dB 34 dB	<sup>TD</sup> ΨV	24	AVG .287	AMPT dBj dBj	<b>JV</b>				QPD LL1 28.607 d 29.516 d	B -2	5.713 6.187	dB dB				0.	5.07 μ COMPOS 611 dE 695 dE	ITE AMP	кН
art 150 s BW 9 1 1	9 kHz FREQ 15.937 MHz 16.597 MHz 16.885 MHz	2 31.39 2 30.48 2 33.16	PD AMP 93 dB 94 dB 56 dB	<sup>TD</sup> μV μV	24 23 32	AVG .287 .813 .302	AMPT dBj dBj dBj	1V 1V D				QPD LL1 28.607 d 29.516 d 26.834 d	B -2 B -2 B -1	5.713 6.187 7.698	dB dB dB				0. 0. 0.	5.07 μ COMPOS 611 dE 695 dE 733 dE	ITE AMP 3 3 3	кН
art 150 s BW 9 TRC 1 1 1	FREQ FREQ 15.937 MHz 16.597 MHz 16.885 MHz 16.941 MHz	CF 2 31.39 2 30.48 2 33.16 2 30.88	PD AMP 93 dB 94 dB 56 dB 89 dB	TD μV μV μV	24 23 32 23	AVG .287 .813 .302 .042	AMPT dBj dBj dBj dBj	JV JV JV JV			42 42 42 42	QPD LL1 28.607 d 29.516 d 26.834 d 29.111 d	B -2 B -2 B -1 B -2	5.713 6.187 7.698 6.958	dB dB dB dB				0. 0. 0. 0.	0.07 µ 00000000000000000000000000000000000	ITE AMP 3 3 3 3	кН
art 150 s BW 9 IRC 1 1 1 1	9 KHz FREQ 15.937 MHz 16.597 MHz 16.885 MHz 16.941 MHz 16.953 MHz	0F 2 31.39 2 30.48 2 33.16 2 30.88 2 30.94	PD AMP 93 dB 34 dB 36 dB 39 dB 39 dB	<sup>TD</sup> μV μV μV μV	24 23 32 23 24	AVG .287 .813 .302 .042 .605	AMPT dBL dBL dBL dBL	1V 1V 1V 1V 1V 1V 1V 1V	 			QPD LL1 28.607 d 29.516 d 26.834 d 29.111 d 29.051 d	B -2 B -2 B -1 B -2 B -2	25.713 6.187 7.698 6.958 5.395	dB dB dB dB dB				0. 0. 0. 0.	0.07 µ 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.000000	ite AMP 3 3 3 3 3 3	kH
TRC 1 1 1 1 1 1 1 1 1 1 1 1 1	FREQ FREQ 15.937 MHz 16.597 MHz 16.885 MHz 16.941 MHz	0F 2 31.39 2 30.48 2 33.16 2 30.88 2 30.94	PD AMP 93 dB 34 dB 36 dB 39 dB 39 dB	<sup>TD</sup> μV μV μV μV	24 23 32 23 24	AVG .287 .813 .302 .042	AMPT dBL dBL dBL dBL	1V 1V 1V 1V 1V 1V 1V 1V				QPD LL1 28.607 d 29.516 d 26.834 d 29.111 d	B -2 B -2 B -1 B -2 B -2	5.713 6.187 7.698 6.958	dB dB dB dB dB				0. 0. 0. 0.	0.07 µ 00000000000000000000000000000000000	ite AMP 3 3 3 3 3 3	kH

Plot 7-338. Line Conducted Plot with 802.11a UNII Band 8 with WCP (L1)



Plot 7-339. Line Conducted Plot with 802.11a UNII Band 8 with WCP (N)

FCC ID: A3LSMG998B	PCTEST* Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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### 8.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMG998B** is in compliance with Part 15 Subpart E (15.407) of the FCC Rules.

FCC ID: A3LSMG998B	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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