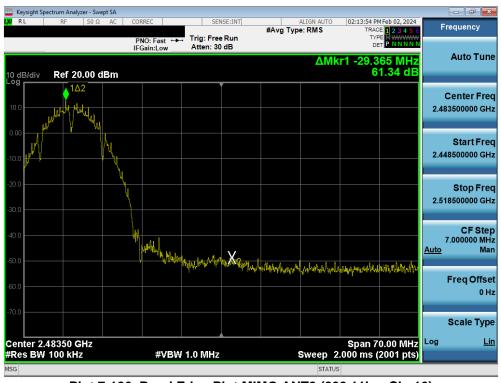


🤐 Keysight Spectru	m Analyzer - Sw	ept SA									
LXI RL	RF 50 Ω	AC CC	ORREC	SEI	NSE:INT	#Avg Typ	ALIGN AUTO		M Feb 02, 2024	Fr	equency
			PNO: Fast 🔸	. Trig: Free		#Avg iyp	e. Kivi S	TY	E M WWWWW		
			FGain:Low	Atten: 30	) dB						Auto Tuno
							ΔMk	r1 -31.8	50 MHz		Auto Tune
10 dB/div	tef 20.00 d	:IBm						6	1.88 dB		
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men lan	lu l									2.48	3500000 GHz
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0.00	N.										Start Freq
-10.0	144									2.44	8500000 GHz
-10.0	Ч,										
-20.0	Y.										
-20.0											Stop Freq
-30.0										2.51	8500000 GHz
-30.0											
-40.0		ln.									CF Step
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-50.0			handramhang	nd part of the last	MAR MARINA	hRMA choices had	attled Mark	AND COLORAD	. Markatana ka		
					. I I wate	the contraction of Aut	tallan da Ardon, ki-Ant	And Martin	a - Ant Alter Allen Al		Freq Offset
-60.0											0 Hz
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Plot 7-125. Band Edge Plot MIMO ANT2 (802.11b - Ch. 9)



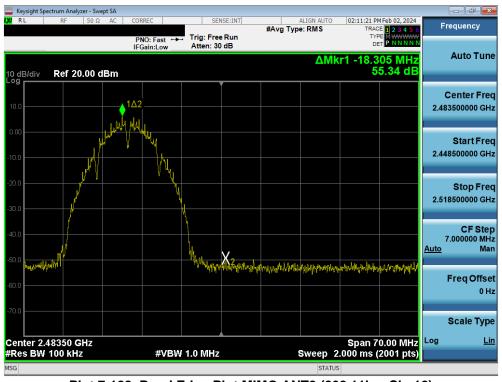
Plot 7-126. Band Edge Plot MIMO ANT2 (802.11b - Ch. 10)

FCC ID: C3K2077 IC: 3048A-2077		MEASUREMENT REPORT			
Test Report S/N:	Test Dates:	EUT Type:	Dogo 02 of 162		
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	pectrum Analyzer -	Swept SA								[	- # ×
RL	RF 50	Ω AC	CORREC	SEN	ISE:INT	#Avg Typ	ALIGN AUTO		Feb 02, 2024	Fre	equency
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70.0											
										5	Scale Type
	.48350 GHz							Span 7	0.00 MHz	Log	Lin
Res BW	/ 100 kHz		#VBW	1.0 MHz			Sweep 2	2.000 ms (	2001 pts)		
G							STATU	IS			

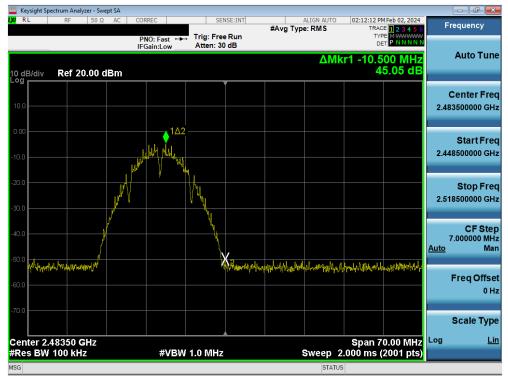
Plot 7-127. Band Edge Plot MIMO ANT2 (802.11b - Ch. 11)



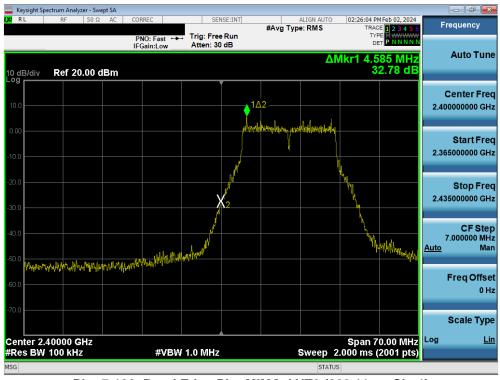
Plot 7-128. Band Edge Plot MIMO ANT2 (802.11b - Ch. 12)

FCC ID: C3K2077 IC: 3048A-2077		MEASUREMENT REPORT			
Test Report S/N:	Test Dates:	EUT Type:	Dogo 02 of 102		
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Plot 7-129. Band Edge Plot MIMO ANT2 (802.11b - Ch. 13)



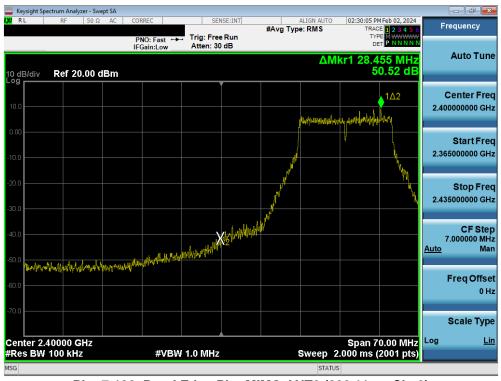
Plot 7-130. Band Edge Plot MIMO ANT2 (802.11g - Ch. 1)

FCC ID: C3K2077 IC: 3048A-2077		MEASUREMENT REPORT	Approved by: Technical Manager
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Plot 7-131. Band Edge Plot MIMO ANT2 (802.11g - Ch. 2)



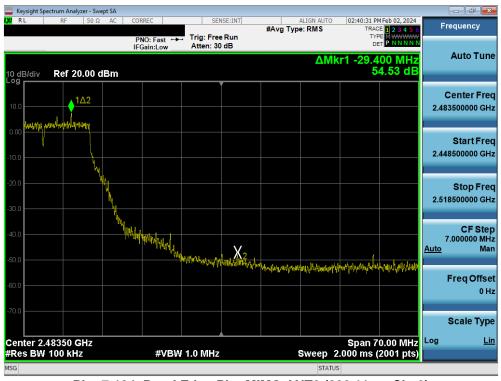
Plot 7-132. Band Edge Plot MIMO ANT2 (802.11g - Ch. 3)

FCC ID: C3K2077 IC: 3048A-2077		MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 05 of 102
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	pectrum Analyz											- 6 🗙
RL	RF	50 Ω	AC	CORREC	SE	NSE:INT	#Avg Typ	ALIGN AUTO		MFeb 02, 2024	E	requency
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odB/div	Ref 20	.00 d	IBm						5	6.07 dB		
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	h.,											
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	.48350 G			#\/B)	N 1.0 MHz			Sween 2	span / 2.000 ms (	0.00 101112	-	-
				# 9 D I						200 i pis)		
G								STATUS	S			

Plot 7-133. Band Edge Plot MIMO ANT2 (802.11g - Ch. 8)



Plot 7-134. Band Edge Plot MIMO ANT2 (802.11g - Ch. 9)

FCC ID: C3K2077 IC: 3048A-2077		MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dege 06 of 162
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weysight Spectrum Analyzer - Swept SA				- đ <b>-</b>
🗶 RL RF 50Ω AC CORR	EC SE	NSE:INT #Avg Typ		MFeb 02, 2024 Frequency
	D: Fast +++ Trig: Fre	e Run	TYP	
IFGa	in:Low Atten: 3	0 dB		•
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#Res BW 100 kHz	#VBW 1.0 MHz	2	Sweep 2.000 ms (	(2001 pts)
MSG			STATUS	

Plot 7-135. Band Edge Plot MIMO ANT2 (802.11g - Ch. 10)



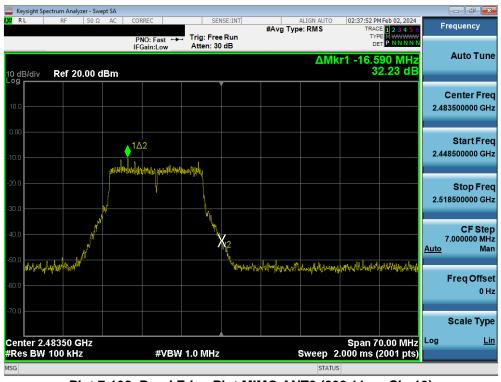
Plot 7-136. Band Edge Plot MIMO ANT2 (802.11g - Ch. 11)

FCC ID: C3K2077 IC: 3048A-2077		MEASUREMENT REPORT	Approved by: Technical Manager
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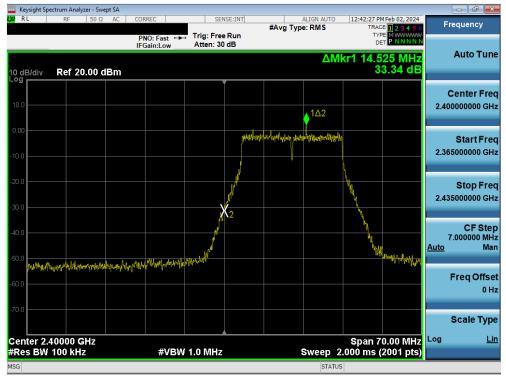
Plot 7-137. Band Edge Plot MIMO ANT2 (802.11g - Ch. 12)



Plot 7-138. Band Edge Plot MIMO ANT2 (802.11g - Ch. 13)

FCC ID: C3K2077 IC: 3048A-2077		MEASUREMENT REPORT			
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Plot 7-139. Band Edge Plot MIMO ANT2 (802.11n - Ch. 1)



Plot 7-140. Band Edge Plot MIMO ANT2 (802.11n – Ch. 2)

FCC ID: C3K2077 IC: 3048A-2077		MEASUREMENT REPORT	Approved by: Technical Manager
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Plot 7-142. Band Edge Plot MIMO ANT2 (802.11n - Ch. 8)

FCC ID: C3K2077 IC: 3048A-2077		MEASUREMENT REPORT	
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Plot 7-143. Band Edge Plot MIMO ANT2 (802.11n - Ch. 9)



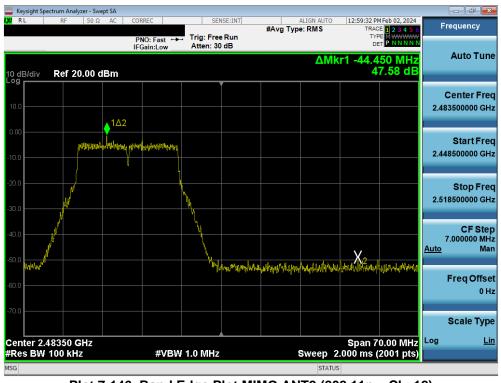
Plot 7-144. Band Edge Plot MIMO ANT2 (802.11n - Ch. 10)

FCC ID: C3K2077 IC: 3048A-2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 101 of 162
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Plot 7-145. Band Edge Plot MIMO ANT2 (802.11n - Ch. 11)



Plot 7-146. Band Edge Plot MIMO ANT2 (802.11n - Ch. 12)

FCC ID: C3K2077 IC: 3048A-2077		MEASUREMENT REPORT	
Test Report S/N:	Test Dates:	EUT Type:	Dage 102 of 162
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🚾 Keysight Spe	ctrum Analyzer - Sw	ept SA									
X/RL	RF 50 Ω	AC (	CORREC	SEN	ISE:INT	#Avg Typ	ALIGN AUTO		M Feb 02, 2024	Frequ	ency
			PNO: Fast ++-	Trig: Free Atten: 30				TY			
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-10.0			Δ2								art Freq 0000 GHz
-20.0		pro14/144/ber	langharinin phoriparatika	hmulling							op Freq 0000 GHz
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-50.0	want WMW				- WAYA HARAN	liaturi, den ara	handar an	nhilipeensteenskrilipertui	n <sup>ha</sup> yurthiaya (nayul	Fre	q Offsel 0 Hz
-70.0 Center 2.4	8350 GHz							Span 7	'0.00 MHz	Log	ale Type <u>Lin</u>
#Res BW			#VBW	1.0 MHz				2.000 ms (	(2001 pts)		
MSG							STAT	US			

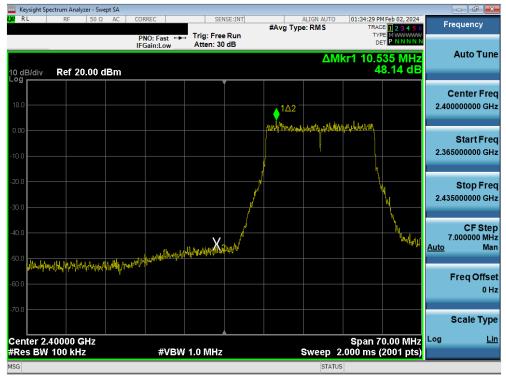
Plot 7-147. Band Edge Plot MIMO ANT2 (802.11n - Ch. 13)



Plot 7-148. Band Edge Plot MIMO ANT2 (802.11be – Ch. 1)

FCC ID: C3K2077 IC: 3048A-2077	MEASUREMENT REPORT		Approved by: Technical Manager
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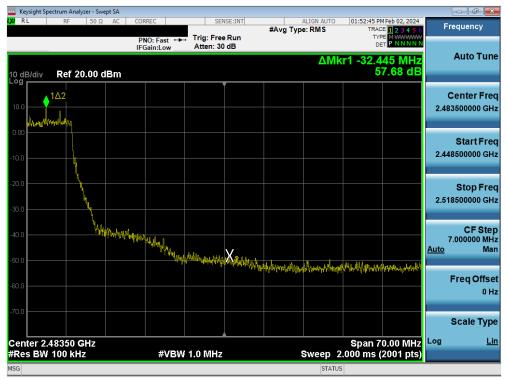
Plot 7-149. Band Edge Plot MIMO ANT2 (802.11be - Ch. 2)



Plot 7-150. Band Edge Plot MIMO ANT2 (802.11be – Ch. 3)

FCC ID: C3K2077 IC: 3048A-2077	MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-151. Band Edge Plot MIMO ANT2 (802.11be - Ch. 8)



Plot 7-152. Band Edge Plot MIMO ANT2 (802.11be – Ch. 9)

FCC ID: C3K2077 IC: 3048A-2077	MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-153. Band Edge Plot MIMO ANT2 (802.11be - Ch. 10)



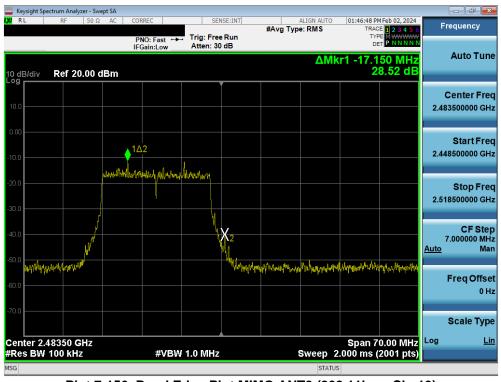
Plot 7-154. Band Edge Plot MIMO ANT2 (802.11be - Ch. 11)

FCC ID: C3K2077 IC: 3048A-2077		MEASUREMENT REPORT	
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Plot 7-155. Band Edge Plot MIMO ANT2 (802.11be - Ch. 12)



Plot 7-156. Band Edge Plot MIMO ANT2 (802.11be - Ch. 13)

FCC ID: C3K2077 IC: 3048A-2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dega 107 of 162
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Keysight Spectrum Analyzer - Swept SA - - - X ALIGN AUTO 11:53:20 AM Jan 16, 2024 #Avg Type: RMS TRACE 2345 SENSE:INT Frequency Trig: Free Run Atten: 36 dB TYPE PNO: Fast IFGain:Low DET P NNN Auto Tune ΔMkr1 19.635 MHz 30.28 dB Ref 25.00 dBm 10 dB/div **Center Freq** 2.400000000 GHz 1Δ2 Start Freq 2.365000000 GHz لأستحاذها Stop Freq 2.435000000 GHz **CF** Step 7.000000 MHz <u>Auto</u> Man North Annaly and the state of the 4 Martin mh Mhilipe **Freq Offset** 0 Hz Scale Type Center 2.40000 GHz #Res BW 100 kHz Span 70.00 MHz Log <u>Lin</u> #VBW 1.0 MHz Sweep 2.000 ms (2001 pts) MSG

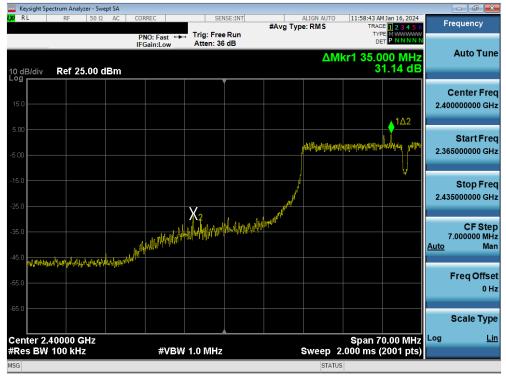




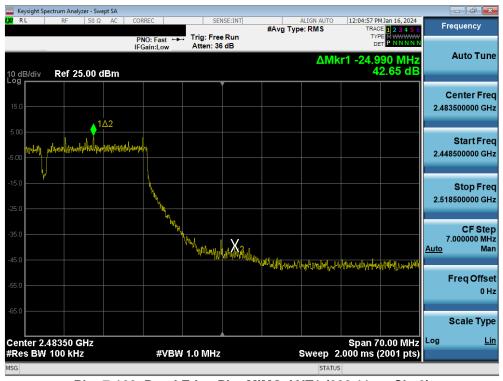
Plot 7-158. Band Edge Plot MIMO ANT1 (802.11n - Ch. 4)

FCC ID: C3K2077 IC: 3048A-2077		MEASUREMENT REPORT	
Test Report S/N:	Test Dates:	EUT Type:	Dama 400 af 400
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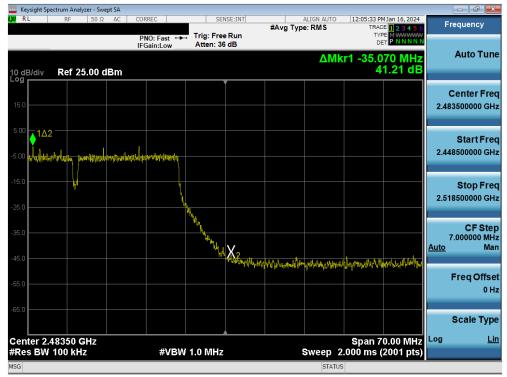
Plot 7-159. Band Edge Plot MIMO ANT1 (802.11n - Ch. 5)



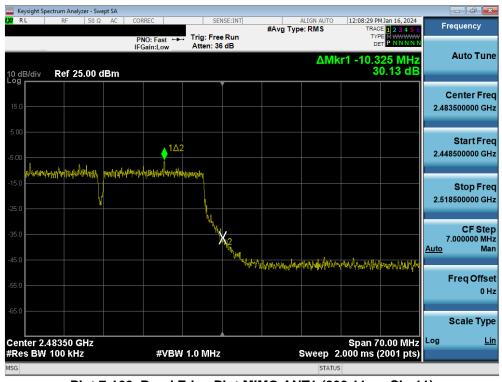
Plot 7-160. Band Edge Plot MIMO ANT1 (802.11n – Ch. 9)

FCC ID: C3K2077 IC: 3048A-2077		MEASUREMENT REPORT	
Test Report S/N:	Test Dates:	EUT Type:	Dogo 100 of 162
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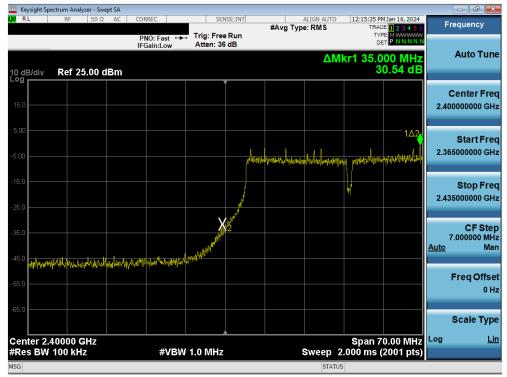




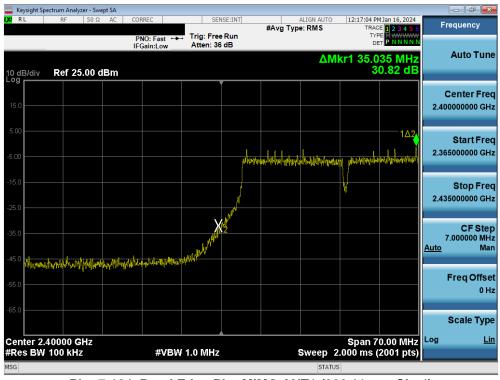
Plot 7-162. Band Edge Plot MIMO ANT1 (802.11n - Ch. 11)

FCC ID: C3K2077 IC: 3048A-2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 110 of 162
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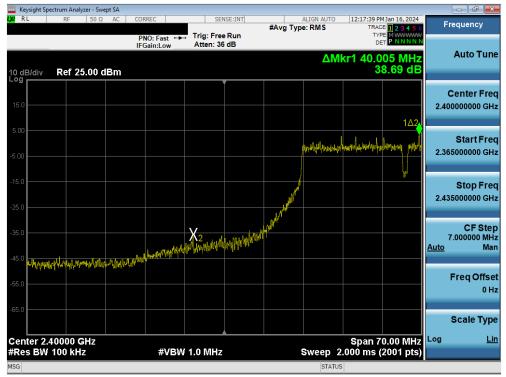




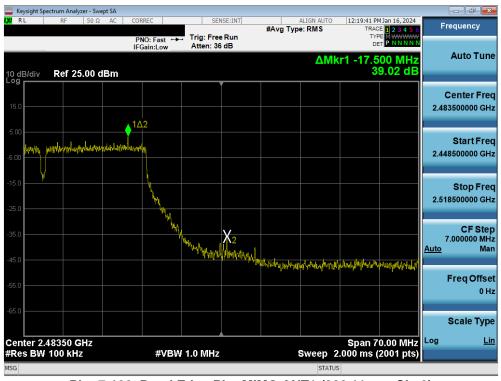
Plot 7-164. Band Edge Plot MIMO ANT1 (802.11ac - Ch. 4)

FCC ID: C3K2077 IC: 3048A-2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 111 of 162
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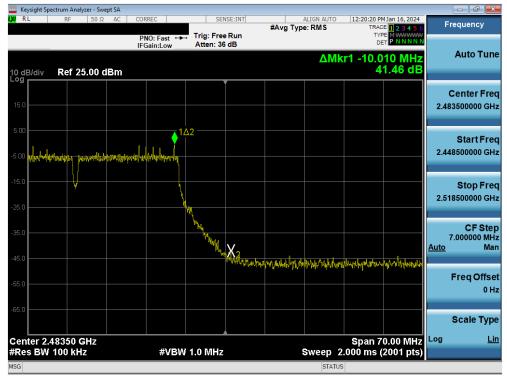




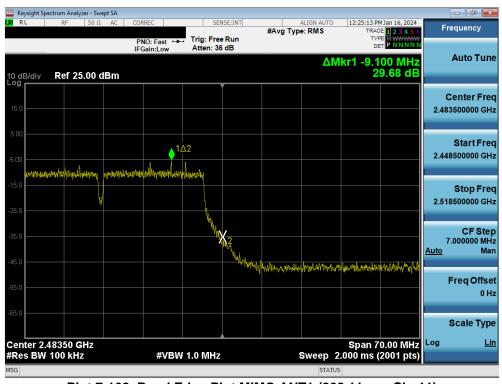
Plot 7-166. Band Edge Plot MIMO ANT1 (802.11ac – Ch. 9)

FCC ID: C3K2077 IC: 3048A-2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 112 of 162
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© 2024 ELEMENT			V11.1 08/28/2023





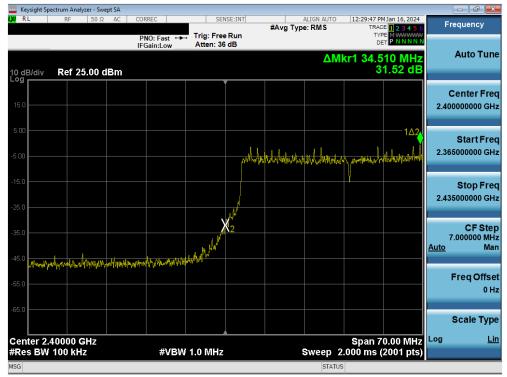
Plot 7-167. Band Edge Plot MIMO ANT1 (802.11ac - Ch. 10)



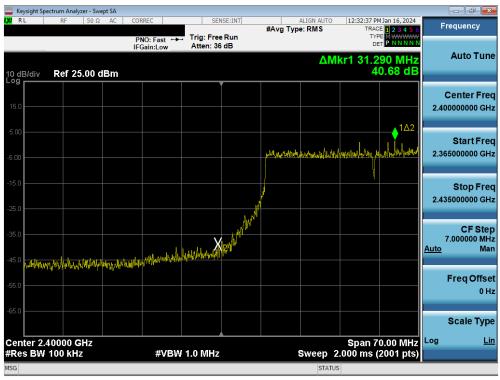
Plot 7-168. Band Edge Plot MIMO ANT1 (802.11ac - Ch. 11)

FCC ID: C3K2077 IC: 3048A-2077	MEASUREMENT REPORT		Approved by: Technical Manager
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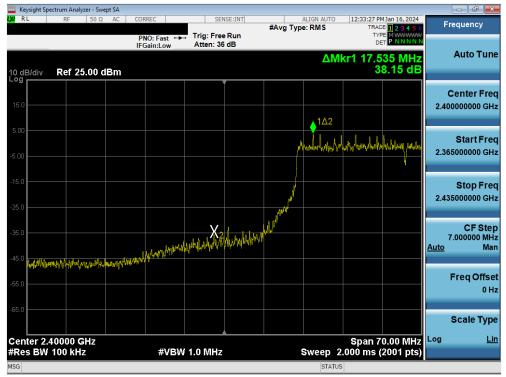
Plot 7-169. Band Edge Plot MIMO ANT1 (802.11be - Ch. 3)



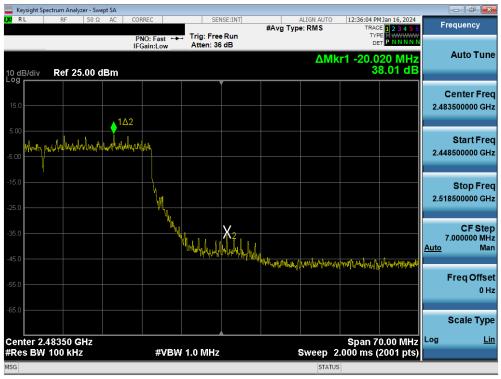
Plot 7-170. Band Edge Plot MIMO ANT1 (802.11be - Ch. 4)

FCC ID: C3K2077 IC: 3048A-2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 111 of 162
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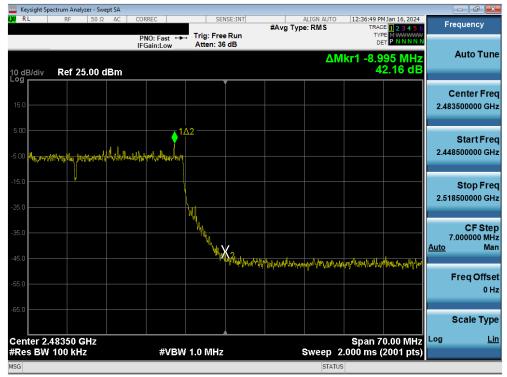




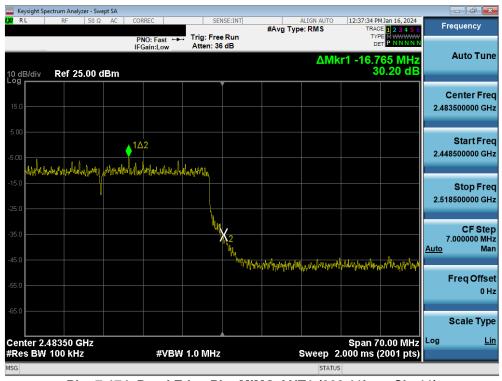
Plot 7-172. Band Edge Plot MIMO ANT1 (802.11be - Ch. 9)

FCC ID: C3K2077 IC: 3048A-2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 115 of 162
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Plot 7-174. Band Edge Plot MIMO ANT1 (802.11be - Ch. 11)

FCC ID: C3K2077 IC: 3048A-2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 116 of 162
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## 7.5.4 MIMO Antenna-2 Band Edge Measurements - 40MHz

Keysight Spectrum Analyzer - Swept SA ALIGN AUTO 01:16:19 PM Jan 16, 2024 #Avg Type: RMS TRACE 2345 SENSE:INT Frequency Trig: Free Run Atten: 36 dB TYPE PNO: Fast IFGain:Low DET P NNN Auto Tune ΔMkr1 4.550 MHz 30.83 dB Ref 25.00 dBm 10 dB/div **Center Freq** 2.400000000 GHz Start Freq 2.365000000 GHz Manurahi PREALING Not-July Stop Freq 2.435000000 GHz **CF** Step 7.000000 MHz <u>Auto</u> Man tur.Mr. whether the stand whether the stand whether the stand of harmalla **Freq Offset** 0 Hz Scale Type Center 2.40000 GHz #Res BW 100 kHz Span 70.00 MHz Log <u>Lin</u> #VBW 1.0 MHz Sweep 2.000 ms (2001 pts) MSG

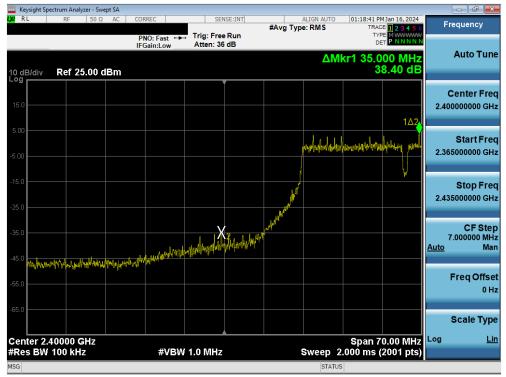




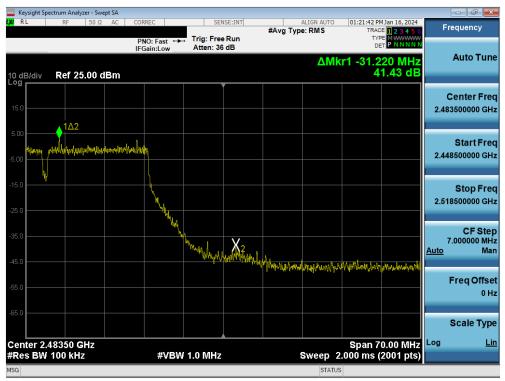
Plot 7-176. Band Edge Plot MIMO ANT2 (802.11n – Ch. 4)

FCC ID: C3K2077 IC: 3048A-2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dana 447 at 400
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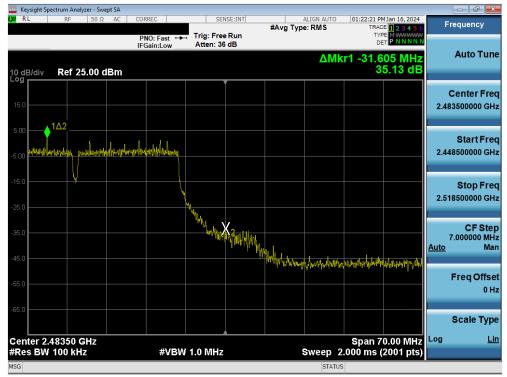




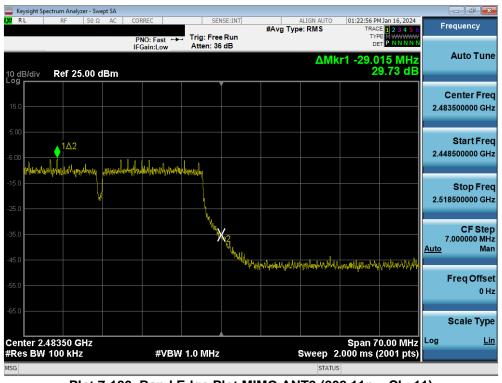
Plot 7-178. Band Edge Plot MIMO ANT2 (802.11n - Ch. 9)

FCC ID: C3K2077 IC: 3048A-2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 119 of 162
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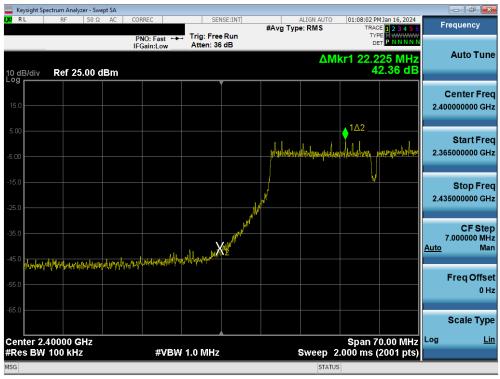
Plot 7-180. Band Edge Plot MIMO ANT2 (802.11n - Ch. 11)

FCC ID: C3K2077 IC: 3048A-2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dega 110 of 162
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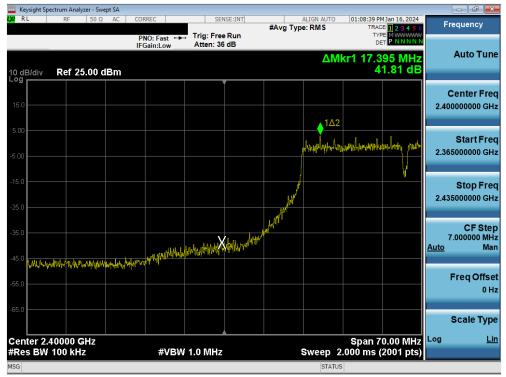




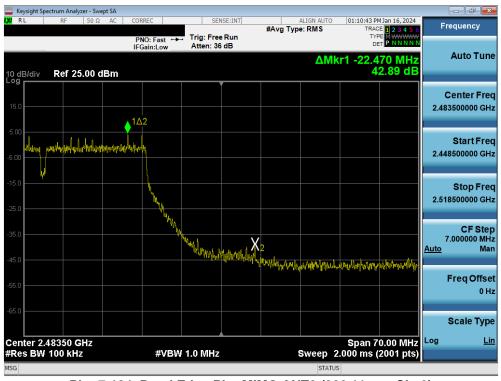
Plot 7-182. Band Edge Plot MIMO ANT2 (802.11ac - Ch. 4)

FCC ID: C3K2077 IC: 3048A-2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 120 of 162
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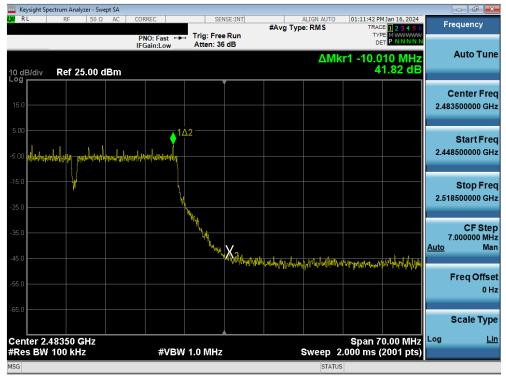




Plot 7-184. Band Edge Plot MIMO ANT2 (802.11ac – Ch. 9)

FCC ID: C3K2077 IC: 3048A-2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 101 of 160
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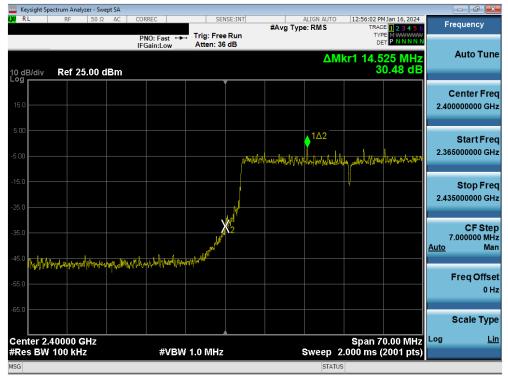
Plot 7-185. Band Edge Plot MIMO ANT2 (802.11ac - Ch. 10)



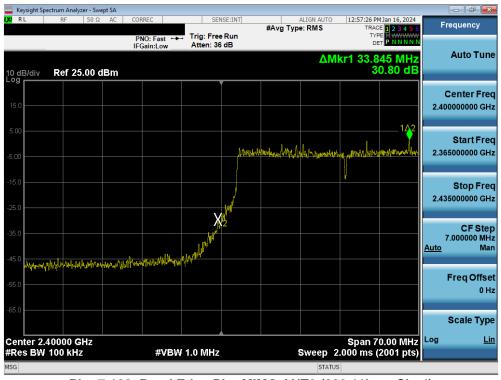
Plot 7-186. Band Edge Plot MIMO ANT2 (802.11ac - Ch. 11)

FCC ID: C3K2077 IC: 3048A-2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 100 of 160
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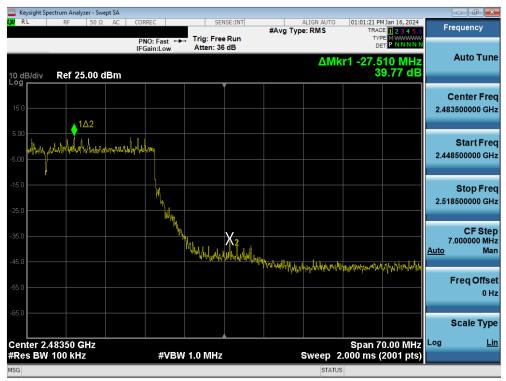
Plot 7-188. Band Edge Plot MIMO ANT2 (802.11be - Ch. 4)

FCC ID: C3K2077 IC: 3048A-2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 122 of 162
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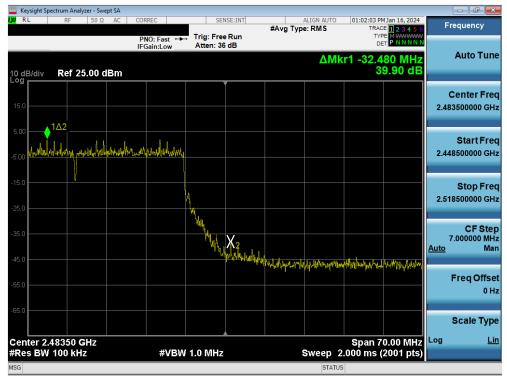




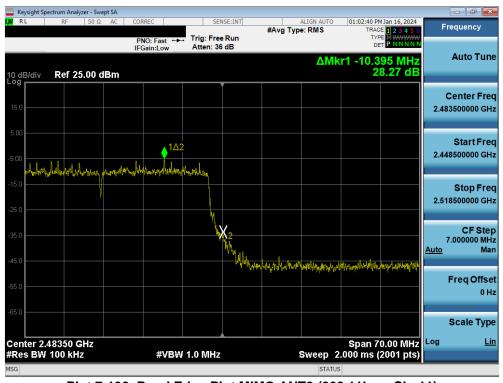
Plot 7-190. Band Edge Plot MIMO ANT2 (802.11be - Ch. 9)

FCC ID: C3K2077 IC: 3048A-2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 124 of 162
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Plot 7-191. Band Edge Plot MIMO ANT2 (802.11be - Ch. 10)



Plot 7-192. Band Edge Plot MIMO ANT2 (802.11be - Ch. 11)

FCC ID: C3K2077 IC: 3048A-2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dega 125 of 162
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# 7.6 Conducted Spurious Emissions

### Test Overview and Limit

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst-case configuration. For the following out of band conducted spurious emissions plots, the EUT was investigated in all available data rates for "b", "g", "n", "ax" modes. The worst-case spurious emissions for the 2.4GHz band were found while transmitting in "b" mode at 1 Mbps and are shown in the plots below.

The limit for out-of-band spurious emissions at the band edge is 30 dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100kHz bandwidth per the procedure in Section 11.11.3 of ANSI C63.10-2013.

#### Test Procedure Used

ANSI C63.10-2013 – Section 11.11.3 ANSI C63.10-2013 – Section 14.3.3

#### **Test Settings**

- 1. Start frequency was set to 30MHz and stop frequency was set to 25GHz (separated into two plots per channel)
- 2. RBW = 1MHz
- 3. VBW = 3MHz
- 4. Detector = Peak
- 5. Trace mode = max hold
- 6. Sweep time = auto couple
- 7. The trace was allowed to stabilize

#### Test Setup

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



Figure 7-5. Test Instrument & Measurement Setup

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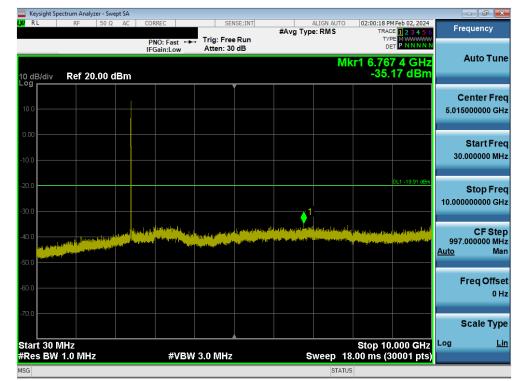


### Test Notes

- 1. RBW was set to 1MHz rather than 100kHz in order to increase the measurement speed.
- 2. The display line shown in the following plots denotes the limit at 30dB below the fundamental emission level measured in a 100kHz bandwidth. However, since the traces in the following plots are measured with a 1MHz RBW, the display line may not necessarily appear to be 30dB below the level of the fundamental in a 1MHz bandwidth.
- 3. For plots showing conducted spurious emissions near the limit, the frequencies were investigated with a reduced RBW to ensure that no emissions were present.
- 4. The conducted spurious emissions were measured to relative limits. Therefore, in accordance with ANSI C63.10-2013 Section 14.3.3, it was unnecessary to show compliance through the summation of test results of the individual outputs.

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# 7.6.1 MIMO Antenna-1 Conducted Spurious Emission – 20MHz





Plot 7-194. Conducted Spurious Plot MIMO ANT1 (802.11b - Ch. 1)

FCC ID: C3K2077 IC: 3048A-2077		MEASUREMENT REPORT				
Test Report S/N:	Test Dates:	EUT Type:	Dega 100 of 100			
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	ectrum Analyzer - Sv									
L <mark>X/</mark> RL	RF 50 S	AC AC	CORREC		ISE:INT	#Avg Typ	ALIGN AUTO e: RMS	TRAC	MFeb 02, 2024	Frequency
10 dB/div Log r	Ref 20.00	dBm	PNO: Fast ↔ IFGain:Low	. Trig: Free Atten: 30			М	DE kr1 3.12	5 4 GHz 14 dBm	Auto Tune
10.0										Center Freq 5.015000000 GHz
-10.0									DL1 -16.93 dBm	Start Freq 30.000000 MHz
-20.0			1							Stop Freq 10.000000000 GHz
الملاسات	and a state of the			haanse ale bele	nggal til ong til Alfred Tradition og til Angel	, and a second standard standard standards	n an	ille <sup>to</sup> bay a l'Ay (gen ver	an an an the second	CF Step 997.000000 MHz <u>Auto</u> Man
-50.0										Freq Offset 0 Hz
-70.0 Start 30 N	1Hz							Stop 10	.000 GHz	Scale Type
#Res BW			#VBW	3.0 MHz		S	weep 1	8.00 ms (3	0001 pts)	
MSG							STATU	IS		

Plot 7-195. Conducted Spurious Plot MIMO ANT1 (802.11b - Ch. 6)



Plot 7-196. Conducted Spurious Plot MIMO ANT1 (802.11b - Ch. 6)

FCC ID: C3K2077 IC: 3048A-2077		MEASUREMENT REPORT	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dogo 120 of 162	
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	ectrum Analyzer - Sw									- ā <b>-</b>
L <mark>XI</mark> RL	RF 50 Ω	AC (	CORREC		NSE:INT	#Avg Typ	ALIGN AUTO e: RMS	TRAC	Feb 02, 2024	Frequency
10 dB/div	Ref 20.00		PNO: Fast ↔ IFGain:Low	Trig: Free Atten: 30			M	or 1 3.124	7 GHz 5 dBm	Auto Tun
	Rei 20.00 (									Center Free 5.015000000 GH
0.00 -10.0										Start Free 30.000000 MH
-20.0			11						DL1 -21.53 dDm	Stop Free 10.000000000 GH
-40.0	Josh The Line of the second			angalan ang Kalada Pala Ing panta panta pala	a da parte da da da ser Na parte da	ing the state of a field of a	inerite (pythipeter) Interaction (picet)	an an the same and the fight of the same of the	leggesteensel omgeneersel	CF Stej 997.000000 MH <u>Auto</u> Ma
-60.0										Freq Offse 0 H
-70.0 Start 30 M	ЛНz							Stop 10.	000 GHz	Scale Type
#Res BW			#VBW	3.0 MHz		s	weep 18	3.00 ms (3	0001 pts)	
MSG							STATU	S		

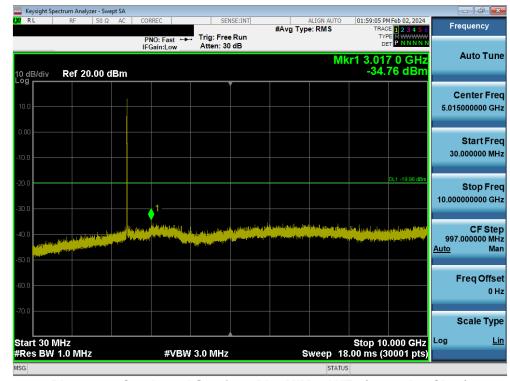
Plot 7-197. Conducted Spurious Plot MIMO ANT1 (802.11b - Ch. 11)



Plot 7-198. Conducted Spurious Plot MIMO ANT1 (802.11b - Ch. 11)

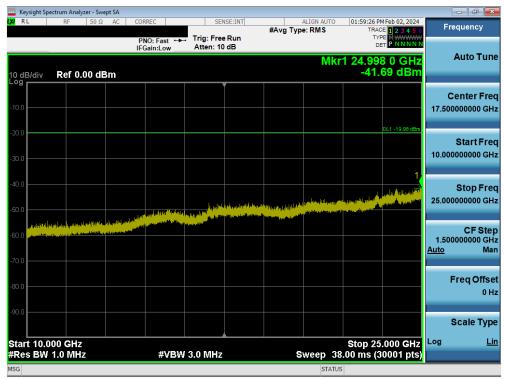
FCC ID: C3K2077 IC: 3048A-2077		MEASUREMENT REPORT					
Test Report S/N:	Test Dates:	EUT Type:	Dage 120 of 162				
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# 7.6.2 MIMO Antenna-2 Conducted Spurious Emissions – 20MHz

Plot 7-199. Conducted Spurious Plot MIMO ANT2 (802.11b - Ch. 1)



Plot 7-200. Conducted Spurious Plot MIMO ANT2 (802.11b - Ch. 1)

FCC ID: C3K2077 IC: 3048A-2077		MEASUREMENT REPORT				
Test Report S/N:	Test Dates:	EUT Type:	Dama 404 af 400			
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🔤 Keysight Spectrum Analyzer - Swept SA					- <b>.</b>
<b>LX RL </b> RF 50Ω AC	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	02:06:32 PM Feb 02, 2024 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast ↔ IFGain:Low	Trig: Free Run Atten: 30 dB	M		Auto Tune
10 dB/div Ref 20.00 dBm	1			-35.08 dBm	
10.0					Center Freq 5.015000000 GHz
-10.0					Start Freq 30.000000 MHz
				DL1 -16.67 dBm	
-20.0					Stop Freq 10.000000000 GHz
		in a state and a state and a state and a state of the state		aleri kayal barat kaya tahun ang ang ang ang ang ang ang ang ang an	CF Step 997.000000 MHz Auto Man
-50.0					Auto Mari
-60.0					Freq Offset 0 Hz
-70.0					Scale Type
Start 30 MHz #Res BW 1.0 MHz	#VBW	3.0 MHz	Sweep 18	Stop 10.000 GHz 3.00 ms (30001 pts)	Log <u>Lin</u>
MSG			STATU		

Plot 7-201. Conducted Spurious Plot MIMO ANT2 (802.11b - Ch. 6)



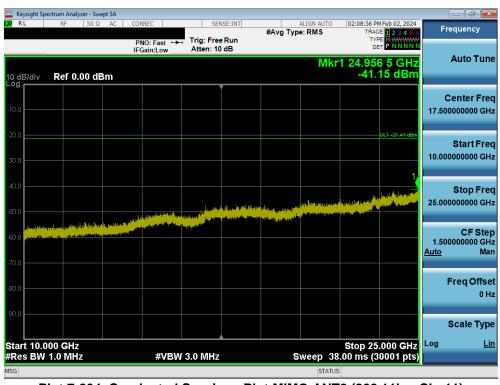
Plot 7-202. Conducted Spurious Plot MIMO ANT2 (802.11b - Ch. 6)

FCC ID: C3K2077 IC: 3048A-2077		MEASUREMENT REPORT	Approved by: Technical Manager			
Test Report S/N:	Test Dates:	EUT Type:	Page 132 of 163			
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🔤 Keysight Spectrum Analyzer - Swept SA						
<b>LXI</b> RE 50Ω AC	CORREC	SENSE:INT	ALIGN #Avg Type: RI	MS TRAC	1Feb 02, 2024 E 1 2 3 4 5 6	Frequency
	PNO: Fast ↔→ IFGain:Low	Trig: Free Run Atten: 30 dB		TYF DE Mkr1 7.120		Auto Tune
10 dB/div Ref 20.00 dBm				-35.	23 dBm	
		Ĭ				Center Freq
10.0						5.015000000 GHz
0.00						Otort Erog
-10.0						Start Freq 30.000000 MHz
-10.0						
-20.0					<u>DL1-21.41 dBm</u>	Stop Freq
-30.0						10.000000000 GHz
	And a strange of the start of the	والمعد والعرورين والمحار	halaati maalaataataa	in the line that while one third even a	Abdatasaasa	CF Step
-40.0	A and A statements	ang ta	an dia mandri mangangan di katang katang mangang mangang mangang mangang mangang mangang mangang mangang manga Mangang mangang	and the set of the set	أدماقا بلغريق بالمربدة	997.000000 MHz <u>Auto</u> Man
-50.0						
-60.0						Freq Offset 0 Hz
70.0						0 H2
-70.0						Scale Type
Start 30 MHz #Res BW 1.0 MHz	#\/B\M	3.0 MHz	Swo	Stop 10 ep 18.00 ms (3		Log <u>Lin</u>
MSG	#VDVV	5.0 WHZ	Swet	status	ooorpis)	

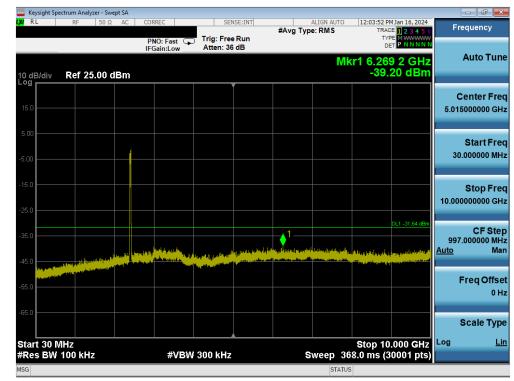
Plot 7-203. Conducted Spurious Plot MIMO ANT2 (802.11b - Ch. 11)



Plot 7-204. Conducted Spurious Plot MIMO ANT2 (802.11b – Ch. 11)

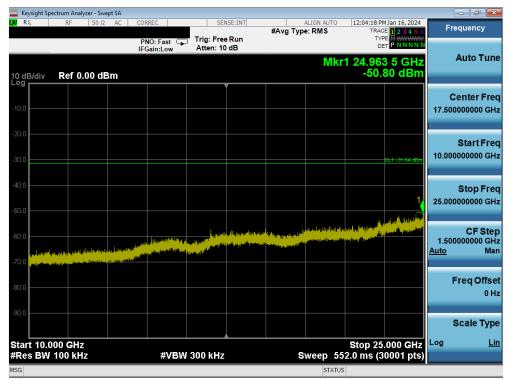
FCC ID: C3K2077 IC: 3048A-2077		MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 122 of 162
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# 7.6.3 MIMO Antenna-1 Conducted Spurious Emission – 40MHz





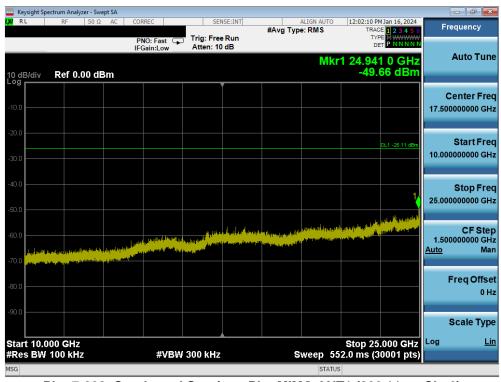
Plot 7-206. Conducted Spurious Plot MIMO ANT1 (802.11n – Ch. 3)

FCC ID: C3K2077 IC: 3048A-2077		MEASUREMENT REPORT				
Test Report S/N:	Test Dates:	EUT Type:	Dama 404 af 400			
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	ectrum Analyzer - Sv									_	
LX/ RL	RF 50 \$	2 AC C	ORREC		ISE:INT	#Avg Typ	ALIGN AU e: RMS		7 PM Jan 16, 2024 RACE 1 2 3 4 5 6	Freq	uency
			PNO: Fast 🖵 FGain:Low	Trig: Free Atten: 36							
			Guineon					Mkr1 5.(	568 7 GHz	A	uto Tune
10 dB/div Log	Ref 25.00	dBm						-3	8.71 dBm		
Log				Ì						Ce	nter Freq
15.0											00000 GHz
5.00										s	tart Freq
-5.00										30.00	00000 MHz
-15.0										s	top Freq
									DI 1 -26 11 dBm	10.0000	00000 GHz
-25.0									ULT -20.11 dDm		
-35.0					1					007.00	CF Step
				هيول بر	and a strength	a optimized ball	, berlangan ber	and an entities wells	has the state of the	Auto	Man
-45.0	Contraction of the second s	and the second second second	a designed and the second s	inggini gaponosi Decembro Minesi		هم بین بنی <sub>م</sub> ی بینی می می می ورد است. ا	and an and a second	A STATE OF THE OWNER OF THE OWNER OF	and any dispersion of the later of		
-55.0	والمتعادية والمتعادية									Fr	eq Offset
-33.0											0 Hz
-65.0											
										Sc	ale Type
Start 30 N								Stop	10.000 0112	Log	<u>Lin</u>
#Res BW	100 kHz		#VBW	300 kHz		s			(30001 pts)		
MSG							ST	ATUS			

Plot 7-207. Conducted Spurious Plot MIMO ANT1 (802.11n - Ch. 6)



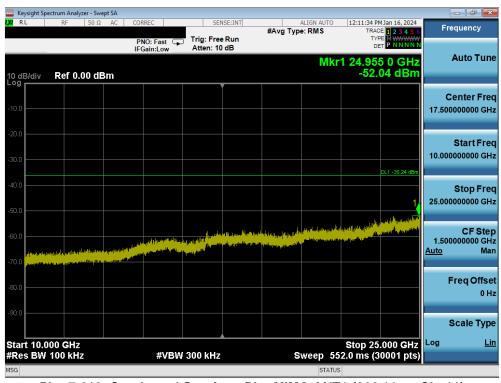
Plot 7-208. Conducted Spurious Plot MIMO ANT1 (802.11n – Ch. 6)

FCC ID: C3K2077 IC: 3048A-2077		MEASUREMENT REPORT				
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	ectrum Analyzer - Sw										×
LXI RL	RF 50 Ω	AC C	ORREC	SEN	ISE:INT	#Avg Typ	ALIGN AUT e: RMS		PMJan 16, 2024 ACE 1 2 3 4 5 6	Frequenc	;y
			PNO: Fast 🕞 FGain:Low	Trig: Free Atten: 36				T			
10 dB/div Log	Ref 25.00	dBm						Mkr1 6.93 -39	35 6 GHz .28 dBm	Auto '	Tune
				,						Center	Freq
15.0										5.01500000	0 GHz
5.00										Start	Freq
-5.00										30.00000	0 MHz
-15.0										Stop	Erog
-25.0										10.00000000	
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MSG								ATUS			

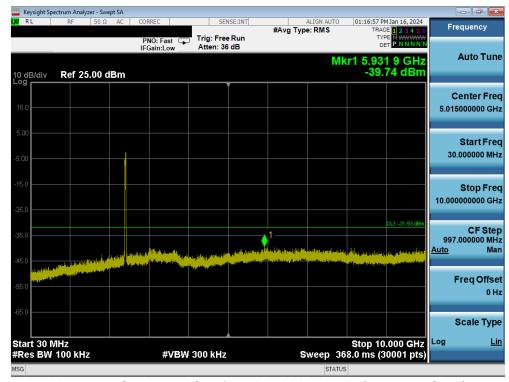
Plot 7-209. Conducted Spurious Plot MIMO ANT1 (802.11n - Ch. 11)



Plot 7-210. Conducted Spurious Plot MIMO ANT1 (802.11n – Ch. 11)

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# 7.6.4 MIMO Antenna-2 Conducted Spurious Emissions – 40MHz





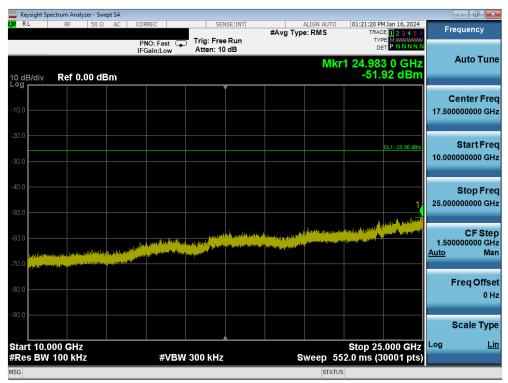
Plot 7-212. Conducted Spurious Plot MIMO ANT2 (802.11n - Ch. 3)

FCC ID: C3K2077 IC: 3048A-2077		MEASUREMENT REPORT			
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	ectrum Analyzer											
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												ale Type
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MSG								S	TATUS			

Plot 7-213. Conducted Spurious Plot MIMO ANT2 (802.11n - Ch. 6)



Plot 7-214. Conducted Spurious Plot MIMO ANT2 (802.11n - Ch. 6)

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	ectrum Analyzer -											
LXI RL	RF 50	Ω AC	COR	REC	SEN	ISE:INT	#Avg Typ	ALIGN AUT e: RMS		0 PM Jan 16, 2024 RACE 1 2 3 4 5 6	Freq	uency
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10 dB/div	Ref 25.00	) dBm							-3	9.25 dBm		
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-65.0											Sc	ale Type
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MSG										(ootor pto)		

Plot 7-215. Conducted Spurious Plot MIMO ANT2 (802.11n - Ch. 11



Plot 7-216. Conducted Spurious Plot MIMO ANT2 (802.11n - Ch. 11)

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# 7.7 Radiated Emission Measurements

## 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 FCC §15.205 of the Title 47 CFR and Table 6 of RSS-Gen (8.10) must not exceed the limits shown FCC §15.209 and RSS-Gen (8.9).

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 7-16. Radiated Limits

## **Test Procedures Used**

ANSI C63.10-2013 – Section 6.6.4.3

## Test Settings – Above 1GHz

#### Average Field Strength Measurements

- 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  $\geq 2 \times \text{span}$ )
- 6. Sweep time = auto
- 7. Trace (RMS) averaging was performed over at least 100 traces

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## Peak Field Strength Measurements

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

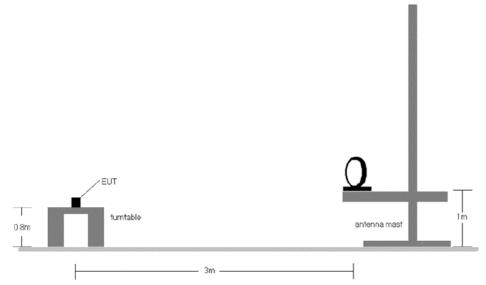
#### Test Settings – Below 1GHz

#### **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

#### Test Setup

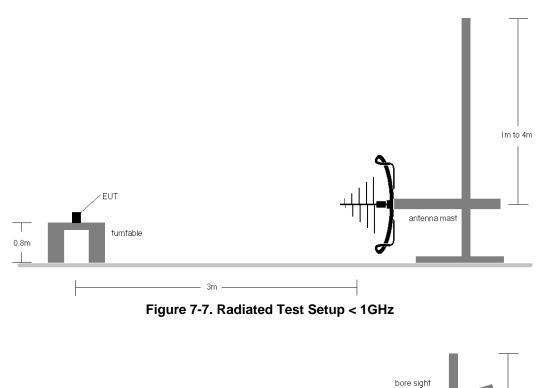
The EUT and measurement equipment were set up as shown in the diagram below.

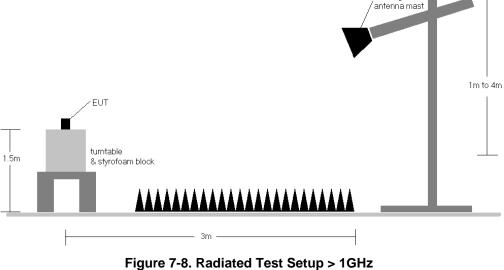


## Figure 7-6. Radiated Test Setup < 30MHz

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## Test Notes

- The optional test procedures for antenna port conducted measurements of unwanted emissions per the guidance of ANSI C63.10-2013 Section 11.3 were not used to evaluate this device for compliance to radiated limits. All radiated spurious emissions levels were measured in a radiated test setup.
- 2. All emissions lying in restricted bands specified in §15.205 and Section 8.10 of RSS-Gen are below the limits shown in §15.209.

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- 3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
- 4. This unit was tested with its standard battery.
- 5. The spectrum is measured from 9kHz to the 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.
- 6. 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.
- 7. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. Any emissions found to be within 20dB of the limit are fully investigated and the results are shown in this section.
- 8. The "-" shown in the following RSE tables are used to denote a noise floor measurement.
- 9. 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.
- 10. No spurious emissions were detected within 20dB of the limit below 30MHz.
- 11. The results recorded using the broadband antenna are 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.
- 12. 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.

#### 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]
- Margin [dB] = Field Strength Level  $[dB\mu V | m]$  Limit  $[dB\mu V | m]$

#### Radiated Band Edge Measurement Offset

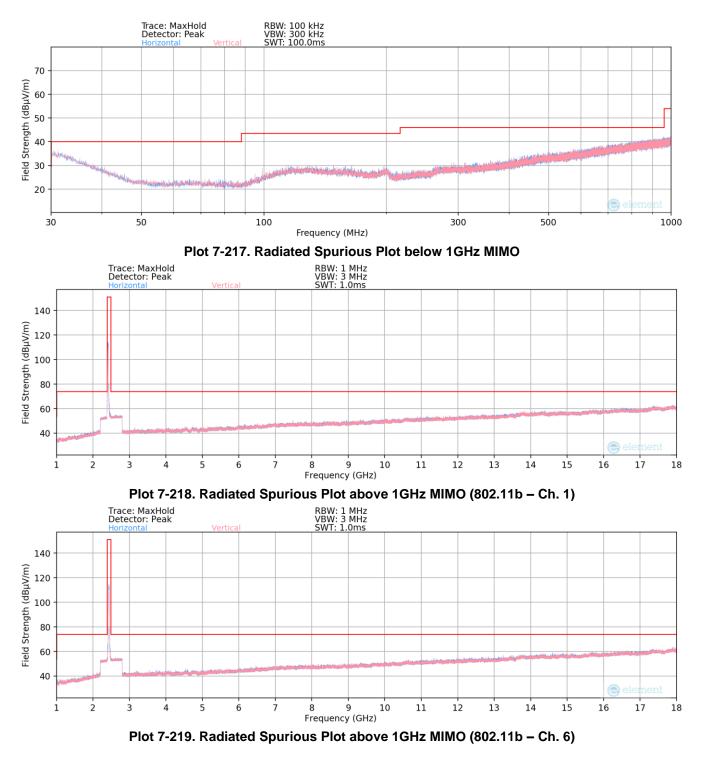
• The amplitude offset shown in the radiated restricted band edge plots in Section 7.7 was calculated using the formula:

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

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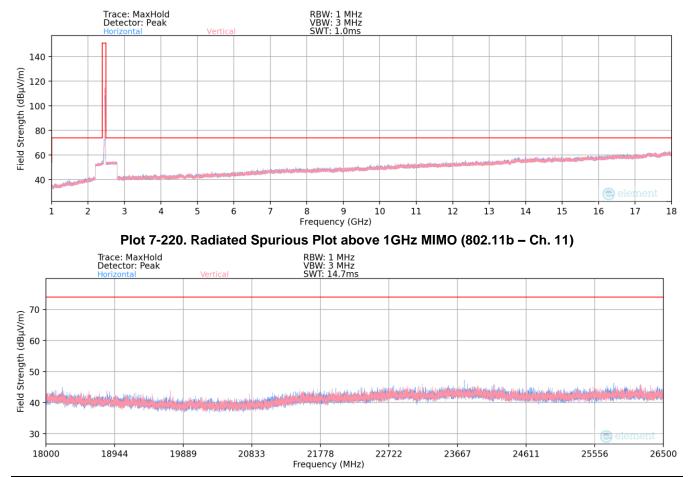


# 7.7.1 MIMO Radiated Spurious Emission Measurements



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Worst Case Mode:	802.11g
Worst Case Transfer Rate:	6 Mbps
Distance of Measurements:	3 Meters
Operating Frequency:	2412MHz
Channel:	1

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]
4824.00	Avg	Н	141	239	-70.43	2.81	39.38	53.98	-14.60
4824.00	Peak	н	141	239	-63.29	2.81	46.52	73.98	-27.46
12060.00	Avg	Н	-	-	-81.30	12.85	38.55	53.98	-15.43
12060.00	Peak	Н	-	-	-69.49	12.85	50.36	73.98	-23.62

Table 7-17. Radiated Measurements MIMO

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Worst Case Mode:	802.11g
Worst Case Transfer Rate:	6 Mbps
Distance of Measurements:	3 Meters
Operating Frequency:	2437MHz
Channel:	6

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]
4874.00	Avg	н	110	237	-72.29	3.15	37.86	53.98	-16.11
4874.00	Peak	Н	110	237	-64.14	3.15	46.01	73.98	-27.96
7311.00	Avg	Н	337	120	-77.46	9.58	39.12	53.98	-14.86
7311.00	Peak	н	337	120	-66.13	9.58	50.45	73.98	-23.53
12185.00	Avg	Н	-	-	-81.49	13.06	38.57	53.98	-15.41
12185.00	Peak	Н	-	-	-68.63	13.06	51.43	73.98	-22.55

## Table 7-18. Radiated Measurements MIMO

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

802.11g
6 Mbps
3 Meters
2462MHz
11

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]
4924.00	Avg	Н	109	211	-74.89	3.02	35.13	53.98	-18.85
4924.00	Peak	н	109	211	-64.50	3.02	45.52	73.98	-28.46
7386.00	Avg	Н	173	239	-78.32	9.34	38.02	53.98	-15.96
7386.00	Peak	н	173	239	-66.84	9.34	49.50	73.98	-24.48
12310.00	Avg	Н	-	-	-81.86	13.24	38.38	53.98	-15.60
12310.00	Peak	Н	-	-	-68.96	13.24	51.28	73.98	-22.70

#### Table 7-19. Radiated Measurements MIMO

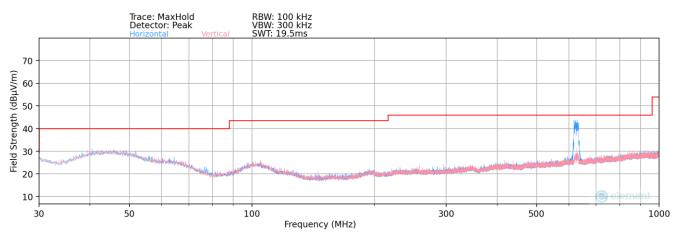
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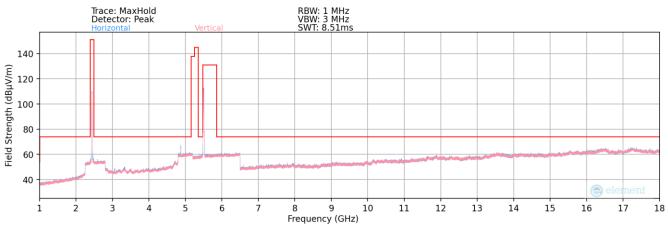
# 7.7.2 Simultaneous Tx Radiated Spurious Emissions Measurements

Description	2.4 GHz Emission	5 GHz Emission
Antenna	1, 2	1, 2
Channel	6	120
Operating Frequency (MHz)	2437	5600
Data Rate (Mbps)	1	6
Mode	802.11b	802.11a

Table 7-20. Simultaneous Transmission Config



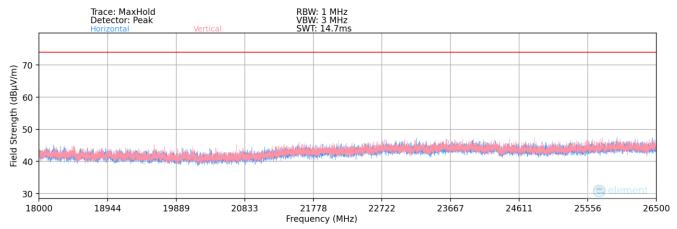


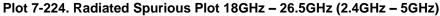


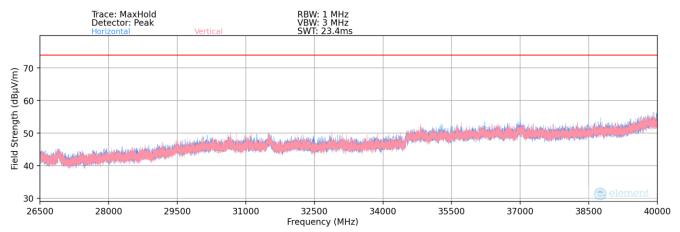


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Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
626.00	Quasi Peak	Н	121.00	311.00	-64.31	-4.67	38.02	46.00	-7.98
3689.00	Averag	Н	-	-	-88.64	8.07	26.43	53.98	-27.55
3689.00	Peak	Н	-	-	-77.62	8.07	37.45	73.98	-36.53
8563.00	Peak	Н	-	-	-77.16	17.61	47.45	73.98	-26.53
12811.00	Peak	Н	-	-	-78.82	24.54	52.72	73.98	-21.26

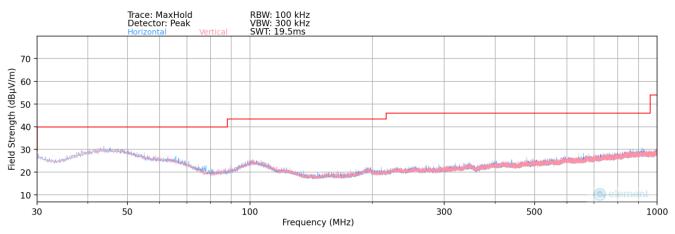
Table 7-21. Radiated Spurious Emission Measurements (2.4GHz - 5GHz)

FCC ID: C3K2077 IC: 3048A-2077		MEASUREMENT REPORT	
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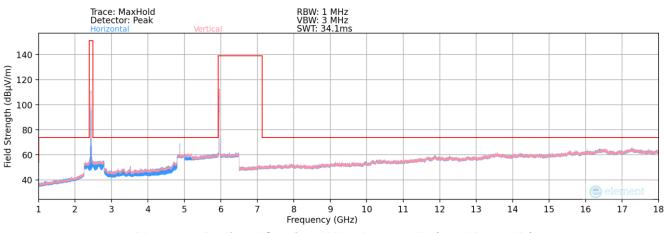


Description	2.4 GHz Emission	6 GHz Emission
Antenna	1, 2	1, 2
Channel	6	2
Operating Frequency (MHz)	2437	5935
Data Rate (Mbps)	1	6
Mode	802.11b	802.11a

Table 7-22. Simultaneous Transmission Config



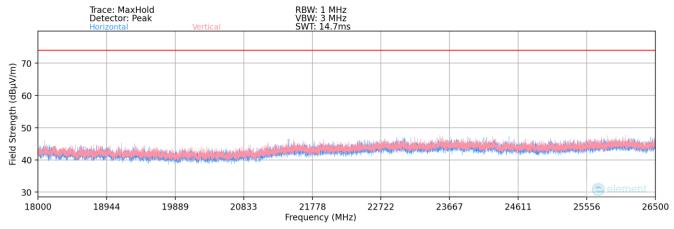




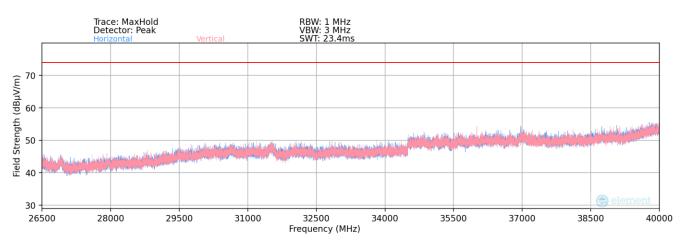


FCC ID: C3K2077 IC: 3048A-2077		MEASUREMENT REPORT		
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Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
1081.00	Average	Н	-	-	-87.85	-2.92	16.23	53.98	-37.75
1081.00	Peak	Н	-	-	-76.63	-2.92	27.45	73.98	-46.53
3518.00	Peak	Н	-	-	-76.63	7.73	38.10	73.98	-35.88
7036.00	Peak	Н	-	-	-76.69	15.23	45.54	73.98	-28.44
9473.00	Average	Н	-	-	-88.60	18.58	36.98	53.98	-17.00
9473.00	Peak	Н	-	-	-77.37	18.58	48.21	73.98	-25.77

Table 7-23. Radiated Spurious Emission Measurements (2.4GHz –6GHz)

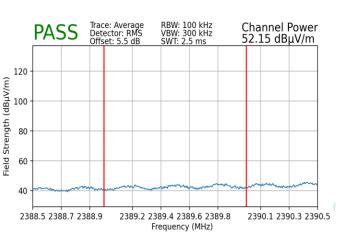
FCC ID: C3K2077 IC: 3048A-2077		MEASUREMENT REPORT	
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# 7.7.3 MIMO Radiated Restricted Band Edge Measurements

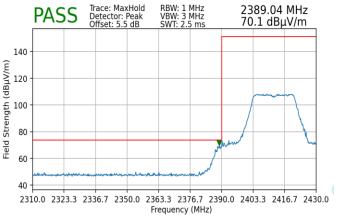
The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting.

Worst Case Mode:802.11nWorst Case Transfer Rate:MCS8Distance of Measurements:3 MetersOperating Frequency:2412MHzChannel:1

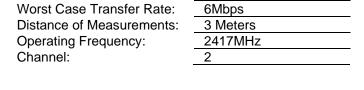


Plot 7-230. Radiated Restricted Lower Band Edge Measurement MIMO (Average)

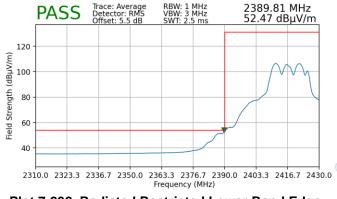
Worst Case Mode:



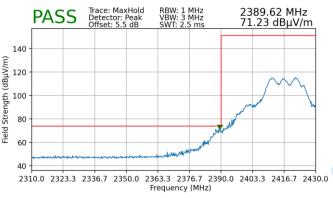
Plot 7-231. Radiated Restricted Lower Band Edge Measurement MIMO (Peak)



802.11g



Plot 7-232. Radiated Restricted Lower Band Edge Measurement MIMO (Average)



Plot 7-233. Radiated Restricted Lower Band Edge Measurement MIMO (Peak)

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