

APPENDIX J: IEEE 802.11 RU SAR EXCLUSION

J.1 IEEE 802.11ax/be RU SAR Exclusion

To make the most efficient use of the additional available subcarriers (data tones), IEEE 802.11ax can utilize Orthogonal Frequency-Division Multiple Access (OFDMA) which divides the existing 802.11 channels into smaller subchannels called Resource Units (RUs). Possible RU sizes are: 26T, 52T, 106T, 242T, 484T, 996T and 996Tx2.

Per FCC Guidance, 802.11ax was considered a higher order 802.11 mode when compared to a/b/g/n/ac to apply KDB Publication 248227 D01v02r02 for OFDM mode selection. Therefore, SAR tests were not required for 802.11ax based on the maximum allowed output powers of OFDM modes and the reported SAR values. Per FCC Guidance, maximum conducted powers were performed for each RU size to demonstrate that the output powers would not be higher than the other OFDM 802.11 modes.

J.2 IEEE 802.11ax/be RU Target Powers

J.2.1 2.4 GHz WLAN 802.11ax/be RU WLAN Output Power

The table below is applicable in the following conditions:

- Pmax, DSI=0 (Body-worn, Hotspot, or Phablet)

Mode	Band		IEEE 802.11ax/be RU (in dBm)											
			SISO Ant H (in dBm)				SISO Ant J (in dBm)				Antenna 1 & Antenna 2 in MIMO			
			26T	52T	106T	242T	26T	52T	106T	242T	26T	52T	106T	242T
2.4 GHz WIFI	2.45 GHz	Maximum	14	15	17	18	14	15	17	18	14	15	17	18
			ch. 12: 2.0 ch. 13: -4.0	ch. 12: 2.0 ch. 13: -3.0	ch. 12: 3.0 ch. 13: -3.0	ch. 1: 16.0 ch. 11: 16.0 ch. 12: 6.0 ch. 13: 0.0	ch. 12: 2.0 ch. 13: -4.0	ch. 12: 2.0 ch. 13: -3.0	ch. 12: 3.0 ch. 13: -3.0	ch. 1: 16.0 ch. 11: 16.0 ch. 12: 6.0 ch. 13: 0.0	ch. 12: 2.0 ch. 13: -4.0	ch. 12: 2.0 ch. 13: -3.0	ch. 12: 3.0 ch. 13: -3.0	ch. 1: 16.0 ch. 11: 16.0 ch. 12: 6.0 ch. 13: 0.0
			13	14	16	17	13	14	16	17	13	14	16	17
		Nominal	ch. 12: 1.0 ch. 13: -5.0	ch. 12: 1.0 ch. 13: -4.0	ch. 12: 2.0 ch. 13: -4.0	ch. 1: 15.0 ch. 11: 15.0 ch. 12: 5.0 ch. 13: -1.0	ch. 12: 1.0 ch. 13: -5.0	ch. 12: 1.0 ch. 13: -4.0	ch. 12: 2.0 ch. 13: -4.0	ch. 1: 15.0 ch. 11: 15.0 ch. 12: 5.0 ch. 13: -1.0	ch. 12: 1.0 ch. 13: -5.0	ch. 12: 1.0 ch. 13: -4.0	ch. 12: 2.0 ch. 13: -4.0	ch. 1: 15.0 ch. 11: 15.0 ch. 12: 5.0 ch. 13: -1.0

The table below is applicable in the following conditions:

- DSI=1 (Head)

Mode	Band		IEEE 802.11ax/be RU (in dBm)											
			SISO Ant H (in dBm)				SISO Ant J (in dBm)				Antenna 1 & Antenna 2 in MIMO			
			26T	52T	106T	242T	26T	52T	106T	242T	26T	52T	106T	242T
2.4 GHz WIFI	2.45 GHz	Maximum	14	15	17	17	14	15	17	17	14	15	17	17
			ch. 12: 2.0 ch. 13: -4.0	ch. 12: 2.0 ch. 13: -3.0	ch. 12: 3.0 ch. 13: -3.0	ch. 1: 16.0 ch. 11: 16.0 ch. 12: 6.0 ch. 13: 0.0	ch. 12: 2.0 ch. 13: -4.0	ch. 12: 2.0 ch. 13: -3.0	ch. 12: 3.0 ch. 13: -3.0	ch. 1: 16.0 ch. 11: 16.0 ch. 12: 6.0 ch. 13: 0.0	ch. 12: 2.0 ch. 13: -4.0	ch. 12: 2.0 ch. 13: -3.0	ch. 12: 3.0 ch. 13: -3.0	ch. 1: 16.0 ch. 11: 16.0 ch. 12: 6.0 ch. 13: 0.0
			13	14	16	16	13	14	16	16	13	14	16	16
		Nominal	ch. 12: 1.0 ch. 13: -5.0	ch. 12: 1.0 ch. 13: -4.0	ch. 12: 2.0 ch. 13: -4.0	ch. 1: 15.0 ch. 11: 15.0 ch. 12: 5.0 ch. 13: -1.0	ch. 12: 1.0 ch. 13: -5.0	ch. 12: 1.0 ch. 13: -4.0	ch. 12: 2.0 ch. 13: -4.0	ch. 1: 15.0 ch. 11: 15.0 ch. 12: 5.0 ch. 13: -1.0	ch. 12: 1.0 ch. 13: -5.0	ch. 12: 1.0 ch. 13: -4.0	ch. 12: 2.0 ch. 13: -4.0	ch. 1: 15.0 ch. 11: 15.0 ch. 12: 5.0 ch. 13: -1.0

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J.2.2 5 GHz WLAN 802.11ax/be RU WLAN Output Power

The table below is applicable in the following conditions:

- Pmax, DSI=0 (Body-worn, Hotspot, or Phablet)

Mode			IEEE 802.11ax/be RU (in dBm)																													
			SISO										SISO										Antenna 1 & Antenna 2 in MIMO									
			Antenna H										Antenna E																			
			26T	52T	106T	242T	484T	996T	996T*2	26T	52T	106T	242T	484T	996T	996T*2	26T	52T	106T	242T	484T	996T	996T*2									
5 GHz WIF1 (20MHz BW)	UN1-1/2A/2C/3/4	Maximum	11.0	14.0	16.0	18.0			11.0	14.0	16.0	18.0			11.0	14.0	16.0	18.0			11.0	14.0	16.0	18.0								
	UN1-1/2A/2C/3/4	Nominal	10.0	13.0	15.0	17.0			10.0	13.0	15.0	17.0			10.0	13.0	15.0	17.0			10.0	13.0	15.0	17.0								
5 GHz WIF1 (40MHz BW)	UN1-1/2A/2C/3/4	Maximum	11.0	14.0	16.0	18.0	18.0		11.0	14.0	16.0	18.0	18.0		11.0	14.0	16.0	18.0	18.0		11.0	14.0	16.0	18.0	18.0							
	UN1-1/2A/2C/3/4	Nominal	10.0	13.0	15.0	17.0	17.0		10.0	13.0	15.0	17.0	17.0		10.0	13.0	15.0	17.0	17.0		10.0	13.0	15.0	17.0	17.0							
5 GHz WIF1 (80MHz BW)	UN1-1/2A/2C/3/4	Maximum	11.0	14.0	16.0	18.0	18.0	UNB-1 17.0 UNB-2A 16.5	UNB-1 17.0 UNB-2A 16.5	11.0	14.0	16.0	18.0	18.0	UNB-1 17.0 UNB-2A 16.5	UNB-1 17.0 UNB-2A 16.5	11.0	14.0	16.0	18.0	18.0	UNB-1 17.0 UNB-2A 16.5	UNB-1 17.0 UNB-2A 16.5	11.0	14.0	16.0	18.0	18.0				
	UN1-1/2A/2C/3/4	Nominal	10.0	13.0	15.0	17.0	17.0	UNB-1 16.0 UNB-2A 15.5	UNB-1 16.0 UNB-2A 15.5	10.0	13.0	15.0	17.0	17.0	UNB-1 16.0 UNB-2A 15.5	UNB-1 16.0 UNB-2A 15.5	10.0	13.0	15.0	17.0	17.0	UNB-1 16.0 UNB-2A 15.5	UNB-1 16.0 UNB-2A 15.5	10.0	13.0	15.0	17.0	17.0				
5 GHz WIF1 (160MHz BW)	UN1-1/2A/2C/3/4	Maximum	11.0	14.0	16.0	18.0	18.0	UNB-1 18.0 UNB-2A 17.0	UNB-1 18.0 UNB-2A 17.0	11.0	14.0	16.0	18.0	18.0	UNB-1 18.0 UNB-2A 17.0	UNB-1 18.0 UNB-2A 17.0	11.0	14.0	16.0	18.0	18.0	UNB-1 18.0 UNB-2A 17.0	UNB-1 18.0 UNB-2A 17.0	11.0	14.0	16.0	18.0	18.0				
	UN1-1/2A/2C/3/4	Nominal	10.0	13.0	15.0	17.0	17.0	UNB-1 17.0 UNB-2A 16.0	UNB-1 17.0 UNB-2A 16.0	10.0	13.0	15.0	17.0	17.0	UNB-1 17.0 UNB-2A 16.0	UNB-1 17.0 UNB-2A 16.0	10.0	13.0	15.0	17.0	17.0	UNB-1 17.0 UNB-2A 16.0	UNB-1 17.0 UNB-2A 16.0	10.0	13.0	15.0	17.0	17.0				

The table below is applicable in the following conditions:

- DSI=1 (Head)

Mode			IEEE 802.11ax RU (in dBm)																													
			SISO										SISO										SISO in MIMO									
			Antenna H										Antenna E																			
			26T	52T	106T	242T	484T	996T	996T*2	26T	52T	106T	242T	484T	996T	996T*2	26T	52T	106T	242T	484T	996T	996T*2									
5 GHz WIF1 (20MHz BW)	UN1-1/2A/2C/3/4	Maximum	11.0	14.0	15.0	18.0			11.0	14.0	15.0	18.0			11.0	14.0	15.0	18.0			11.0	14.0	15.0	18.0								
	UN1-1/2A/2C/3/4	Nominal	10.0	13.0	14.0	15.0			10.0	13.0	14.0	15.0			10.0	13.0	14.0	15.0			10.0	13.0	14.0	15.0								
5 GHz WIF1 (40MHz BW)	UN1-1/2A/2C/3/4	Maximum	11.0	14.0	15.0	16.0	16.0		11.0	14.0	15.0	16.0	16.0		11.0	14.0	15.0	16.0	16.0		11.0	14.0	15.0	16.0	16.0							
	UN1-1/2A/2C/3/4	Nominal	10.0	13.0	14.0	15.0	15.0		10.0	13.0	14.0	15.0	15.0		10.0	13.0	14.0	15.0	15.0		10.0	13.0	14.0	15.0	15.0							
5 GHz WIF1 (80MHz BW)	UN1-1/2A/2C/3/4	Maximum	11.0	14.0	15.0	16.0	16.0	16.0		11.0	14.0	15.0	16.0	16.0	16.0		11.0	14.0	15.0	16.0	16.0	16.0	16.0	16.0	16.0							
	UN1-1/2A/2C/3/4	Nominal	10.0	13.0	14.0	15.0	15.0	15.0		10.0	13.0	14.0	15.0	15.0	15.0		10.0	13.0	14.0	15.0	15.0	15.0	15.0	15.0	15.0							
5 GHz WIF1 (160MHz BW)	UN1-1/2A/2C/3/4	Maximum	11.0	14.0	15.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0							
									UNB-1 15.0																							
									UNB-1 14.0																							
									UNB-1 13.0																							
									UNB-1 15.0																							
									UNB-1 14.0																							
									UNB-1 13.0																							

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Approved by:

Technical Manager

DUT Type:
Portable Handset

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J.2.3 6 GHz WLAN 802.11ax/be RU WLAN Output Power

The table below is applicable in the following conditions:

- Pmax

Mode		IEEE 802.11ax/be RU (in dBm)																							
		SISO								SISO								SISO in MIMO							
		Antenna H								Antenna E															
		26T	52T	106T	242T	484T	996T	996T*2	996T*4	26T	52T	106T	242T	484T	996T	996T*2	996T*4								
6 GHz WiFi (20MHz BW)	Maximum	0.0	3.0	6.0	11.0					0.0	3.0	6.0	11.0					0.0	3.0	6.0	11.0				
	Nominal	-1.0	2.0	5.0	10.0					-1.0	2.0	5.0	10.0					-1.0	2.0	5.0	10.0				
6 GHz WiFi (40MHz BW)	Maximum	0.0	3.0	6.0	11.0	13.0				0.0	3.0	6.0	11.0	13.0				0.0	3.0	6.0	11.0	13.0			
	Nominal	-1.0	2.0	5.0	10.0	12.0				-1.0	2.0	5.0	10.0	12.0				-1.0	2.0	5.0	10.0	12.0			
6 GHz WiFi (80MHz BW)	Maximum	0.0	3.0	6.0	11.0	13.0	16.0			0.0	3.0	6.0	11.0	13.0	16.0			0.0	3.0	6.0	11.0	13.0	16.0		
	Nominal	-1.0	2.0	5.0	10.0	12.0	15.0			-1.0	2.0	5.0	10.0	12.0	15.0			-1.0	2.0	5.0	10.0	12.0	15.0		
6 GHz WiFi (160MHz BW)	Maximum	0.0	3.0	6.0	11.0	13.0	16.0	16.0		0.0	3.0	6.0	11.0	13.0	16.0	16.0		0.0	3.0	6.0	11.0	13.0	16.0	16.0	
	Nominal	-1.0	2.0	5.0	10.0	12.0	15.0	15.0		-1.0	2.0	5.0	10.0	12.0	15.0	15.0		-1.0	2.0	5.0	10.0	12.0	15.0	15.0	
6 GHz WiFi (320MHz BW)	Maximum	0.0	3.0	6.0	11.0	13.0	16.0	16.0	15.0	0.0	3.0	6.0	11.0	13.0	16.0	16.0	15.0	0.0	3.0	6.0	11.0	13.0	16.0	16.0	15.0
	Nominal	-1.0	2.0	5.0	10.0	12.0	15.0	15.0	14.0	-1.0	2.0	5.0	10.0	12.0	15.0	15.0	14.0	-1.0	2.0	5.0	10.0	12.0	15.0	15.0	14.0
6 GHz WiFi (20MHz BW) - SP	Maximum	15.0	13.0	13.0	17.0					15.0	13.0	13.0	17.0					15.0	13.0	13.0	17.0				
	Nominal	14.0	12.0	12.0	16.0					14.0	12.0	12.0	16.0					14.0	12.0	12.0	16.0				
6 GHz WiFi (40MHz BW) - SP	Maximum	15.0	13.0	13.0	17.0	17.0				15.0	13.0	13.0	17.0	17.0				15.0	13.0	13.0	17.0	17.0			
	Nominal	14.0	12.0	12.0	16.0	16.0				14.0	12.0	12.0	16.0	16.0				14.0	12.0	12.0	16.0	16.0			
6 GHz WiFi (80MHz BW) - SP	Maximum	15.0	13.0	13.0	17.0	17.0	17.0			15.0	13.0	13.0	17.0	17.0	17.0			15.0	13.0	13.0	17.0	17.0	17.0		
	Nominal	14.0	12.0	12.0	16.0	16.0	16.0			14.0	12.0	12.0	16.0	16.0	16.0			14.0	12.0	12.0	16.0	16.0	16.0		
6 GHz WiFi (160MHz BW) - SP	Maximum	15.0	13.0	13.0	17.0	17.0	17.0	17.0		15.0	13.0	13.0	17.0	17.0	17.0	17.0		15.0	13.0	13.0	17.0	17.0	17.0	17.0	
	Nominal	14.0	12.0	12.0	16.0	16.0	16.0	16.0		14.0	12.0	12.0	16.0	16.0	16.0	16.0		14.0	12.0	12.0	16.0	16.0	16.0	16.0	
6 GHz WiFi (320MHz BW) - SP	Maximum	15.0	13.0	13.0	17.0	17.0	17.0	17.0	16.0	15.0	13.0	13.0	17.0	17.0	17.0	17.0	16.0	15.0	13.0	13.0	17.0	17.0	17.0	17.0	16.0
	Nominal	14.0	12.0	12.0	16.0	16.0	16.0	16.0	15.0	14.0	12.0	12.0	16.0	16.0	16.0	16.0	15.0	14.0	12.0	12.0	16.0	16.0	16.0	16.0	15.0

The table below is applicable in the following conditions:

- DSI=0 (Body-worn, Hotspot, or Phablet)
- DSI=1 (Head)

Mode		IEEE 802.11ax/be RU (in dBm)																								
		SISO								SISO								SISO in MIMO								
		Antenna H								Antenna E																
		26T	52T	106T	242T	484T	996T	996T*2	996T*4	26T	52T	106T	242T	484T	996T	996T*2	996T*4	26T	52T	106T	242T	484T	996T	996T*2	996T*4	
6 GHz WiFi (20MHz BW)	Maximum	0.0	3.0	6.0	11.0					0.0	3.0	6.0	11.0					0.0	3.0	6.0	11.0					
	Nominal	-1.0	2.0	5.0	10.0					-1.0	2.0	5.0	10.0					-1.0	2.0	5.0	10.0					
6 GHz WiFi (40MHz BW)	Maximum	0.0	3.0	6.0	11.0	12.0				0.0	3.0	6.0	11.0	12.0				0.0	3.0	6.0	11.0	12.0				
	Nominal	-1.0	2.0	5.0	10.0	11.0				-1.0	2.0	5.0	10.0	11.0				-1.0	2.0	5.0	10.0	11.0				
6 GHz WiFi (80MHz BW)	Maximum	0.0	3.0	6.0	11.0	12.0	12.0			0.0	3.0	6.0	11.0	12.0	12.0			0.0	3.0	6.0	11.0	12.0	12.0			
	Nominal	-1.0	2.0	5.0	10.0	11.0	11.0			-1.0	2.0	5.0	10.0	11.0	11.0			-1.0	2.0	5.0	10.0	11.0	11.0			
6 GHz WiFi (160MHz BW)	Maximum	0.0	3.0	6.0	11.0	12.0	12.0	12.0		0.0	3.0	6.0	11.0	12.0	12.0	12.0		0.0	3.0	6.0	11.0	12.0	12.0	12.0		
	Nominal	-1.0	2.0	5.0	10.0	11.0	11.0	11.0		-1.0	2.0	5.0	10.0	11.0	11.0	11.0		-1.0	2.0	5.0	10.0	11.0	11.0	11.0		
6 GHz WiFi (320MHz BW)	Maximum	0.0	3.0	6.0	11.0	12.0	12.0	12.0	12.0	0.0	3.0	6.0	11.0	12.0	12.0	12.0	12.0	12.0	0.0	3.0	6.0	11.0	12.0	12.0	12.0	12.0
	Nominal	-1.0	2.0	5.0	10.0	11.0	11.0	11.0	11.0	-1.0	2.0	5.0	10.0	11.0	11.0	11.0	11.0	11.0	-1.0	2.0	5.0	10.0	11.0	11.0	11.0	11.0
6 GHz WiFi (20MHz BW) - SP	Maximum	12.0	12.0	12.0	12.0					12.0	12.0	12.0	12.0					12.0	12.0	12.0	12.0					
	Nominal	11.0	11.0	11.0	11.0					11.0	11.0	11.0	11.0					11.0	11.0	11.0	11.0					
6 GHz WiFi (40MHz BW) - SP	Maximum	12.0	12.0	12.0	12.0	12.0				12.0	12.0	12.0	12.0	12.0				12.0	12.0	12.0	12.0	12.0				
	Nominal	11.0	11.0	11.0	11.0	11.0				11.0	11.0	11.0	11.0	11.0				11.0	11.0	11.0	11.0	11.0				
6 GHz WiFi (80MHz BW) - SP	Maximum	12.0	12.0	12.0	12.0	12.0	12.0			12.0	12.0	12.0	12.0	12.0	12.0			12.0	12.0	12.0	12.0	12.0	12.0			
	Nominal	11.0	11.0	11.0	11.0	11.0	11.0			11.0	11.0	11.0	11.0	11.0	11.0			11.0	11.0	11.0	11.0	11.0	11.0			
6 GHz WiFi (160MHz BW) - SP	Maximum	12.0	12.0	12.0	12.0	12.0	12.0	12.0		12.0	12.0	12.0	12.0	12.0	12.0	12.0		12.0	12.0	12.0	12.0	12.0	12.0	12.0		
	Nominal	11.0	11.0	11.0	11.0	11.0	11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0	11.0		
6 GHz WiFi (320MHz BW) - SP	Maximum	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
	Nominal	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	

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