

APPENDIX J: IEEE 802.11AX RU SAR EXCLUSION

J.1 IEEE 802.11ax 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.

Please refer to 1M2312040120-18, 20, 22 for IEEE 802.11ax/be RU powers.

J.2 IEEE 802.11ax RU Target Powers

J.2.1 Maximum 802.11ax RU WLAN Output Power

Mode	Bandwidth		IEEE 802.11ax/be RU (in dBm)									
			SISO/SISO In MIMO Ant 6 (in dBm)				SISO/SISO in MIMO Ant 7 (in dBm)					
			26T	52T, 52T+26T	106T, 106T +26T	242T	26T	52T, 52T+26T	106T, 106T +26T	242T		
2.4 GHz WIFI	20 MHz	Maximum	20	20	20	19.5	20	20	20	19.5		
			ch. 1: 18.0	ch. 1: 18.5	ch. 1: 17.5	ch. 1: 12.0 ch. 2: 16.0	ch. 1: 18.0	ch. 1: 18.5	ch. 1: 17.5	ch. 1: 12.0 ch. 2: 16.0		
			ch. 11: 18.0 ch. 12: -4.5 ch. 13: -6.0	ch. 11: 18.0 ch. 12: -0.5 ch. 13: -4.5	ch. 11: 18.0 ch. 12: 0.0 ch. 13: -2.0	ch. 9: 18.0 ch. 10: 18.0 ch. 11: 14.0 ch. 12: 11.0 ch. 13: -2.0	ch. 11: 18.0 ch. 12: -4.5 ch. 13: -6.0	ch. 11: 18.0 ch. 12: -0.5 ch. 13: -4.5	ch. 11: 18.0 ch. 12: 0.0 ch. 13: -2.0	ch. 9: 18.0 ch. 10: 18.0 ch. 11: 14.0 ch. 12: 11.0 ch. 13: -2.0		
		Nominal	19	19	19	18.5	19	19	19	18.5		
			ch. 1: 17.0	ch. 1: 17.5	ch. 1: 16.5	ch. 1: 11.0 ch. 2: 15.0	ch. 1: 17.0	ch. 1: 17.5	ch. 1: 16.5	ch. 1: 11.0 ch. 2: 15.0		
			ch. 11: 17.0 ch. 12: -5.5 ch. 13: -7.0	ch. 11: 17.0 ch. 12: -1.5 ch. 13: -5.5	ch. 11: 17.0 ch. 12: -1.0 ch. 13: -3.0	ch. 9: 17.0 ch. 10: 17.0 ch. 11: 13.0 ch. 12: 10.0 ch. 13: -3.0	ch. 11: 17.0 ch. 12: -5.5 ch. 13: -7.0	ch. 11: 17.0 ch. 12: -1.5 ch. 13: -5.5	ch. 11: 17.0 ch. 12: -1.0 ch. 13: -3.0	ch. 9: 17.0 ch. 10: 17.0 ch. 11: 13.0 ch. 12: 10.0 ch. 13: -3.0		
Mode	Bandwidth		IEEE 802.11ax RU (in dBm)									
			SISO/SISO In MIMO Ant 6 (in dBm)				SISO/SISO in MIMO Ant 7 (in dBm)					
			26T	52T, 52T+26T	106T, 106T +26T	242T	484T	26T	52T, 52T+26T	106T, 106T +26T	242T	484T
2.4 GHz WIFI	40 MHz	Maximum	20	20	20	19.5	16	20	20	20	19.5	16
						ch. 9: 18.0 ch. 10: 11.0 ch. 11: -0.5	ch. 3: 13.0 ch. 4: 14.0 ch. 5: 14.0 ch. 9: 14.0 ch. 10: 14.0 ch. 11: -0.5	ch. 11: 18.0	ch. 11: 18.0	ch. 11: 18.0	ch. 9: 18.0 ch. 10: 11.0 ch. 11: -0.5	ch. 3: 13.0 ch. 4: 14.0 ch. 5: 14.0 ch. 9: 14.0 ch. 10: 14.0 ch. 11: -0.5
			ch. 11: 18.0	ch. 11: 18.0	ch. 11: 18.0	ch. 9: 17.0 ch. 10: 10.0 ch. 11: -1.5	ch. 3: 12.0 ch. 4: 13.0 ch. 5: 13.0 ch. 9: 13.0 ch. 10: 13.0 ch. 11: -1.5	ch. 11: 18.0	ch. 11: 18.0	ch. 11: 18.0	ch. 9: 17.0 ch. 10: 10.0 ch. 11: -1.5	ch. 3: 12.0 ch. 4: 13.0 ch. 5: 13.0 ch. 9: 13.0 ch. 10: 13.0 ch. 11: -1.5
		Nominal	19	19	19	18.5	15	19	19	19	18.5	15
						ch. 9: 17.0 ch. 10: 10.0 ch. 11: -1.5	ch. 3: 12.0 ch. 4: 13.0 ch. 5: 13.0 ch. 9: 13.0 ch. 10: 13.0 ch. 11: -1.5	ch. 11: 18.0	ch. 11: 18.0	ch. 11: 18.0	ch. 9: 17.0 ch. 10: 10.0 ch. 11: -1.5	ch. 3: 12.0 ch. 4: 13.0 ch. 5: 13.0 ch. 9: 13.0 ch. 10: 13.0 ch. 11: -1.5
			ch. 11: 17.0	ch. 11: 17.0	ch. 11: 17.0	ch. 11: -1.5	ch. 11: 17.0	ch. 11: 17.0	ch. 11: 17.0	ch. 11: 17.0	ch. 11: -1.5	ch. 11: -1.5

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J.2.2 Reduced 802.11ax RU WLAN Output Power

Mode	Bandwidth		IEEE 802.11ax/be RU (in dBm)									
			SISO/SISO In MIMO Ant 6 (in dBm)					SISO/SISO in MIMO Ant 7 (in dBm)				
			26T	52T, 52T+26T	106T, 106T +26T	242T	26T	52T, 52T+26T	106T, 106T +26T	242T		
2.4 GHz WIFI	20 MHz	Maximum	14.75 ch. 12: -4.5 ch. 13: -6.0	14.75 ch. 12: -0.5 ch. 13: -4.5	14.75 ch. 12: 0.0 ch. 13: -2.0	14.75 ch. 11: 14.0 ch. 12: 11.0 ch. 13: -2.0	14.5 ch. 12: -4.5 ch. 13: -6.0	14.5 ch. 12: -0.5 ch. 13: -4.5	14.5 ch. 12: 0.0 ch. 13: -2.0	14.5 ch. 11: 14.0 ch. 12: 11.0 ch. 13: -2.0		
		Nominal	13.75 ch. 12: -5.5 ch. 13: -7.0	13.75 ch. 12: -1.5 ch. 13: -5.5	13.75 ch. 12: -1.0 ch. 13: -3.0	13.75 ch. 11: 13.0 ch. 12: 10.0 ch. 13: -3.0	13.5 ch. 12: -5.5 ch. 13: -7.0	13.5 ch. 12: -1.5 ch. 13: -5.5	13.5 ch. 12: -1.0 ch. 13: -3.0	13.5 ch. 11: 13.0 ch. 12: 10.0 ch. 13: -3.0		

Mode	Bandwidth		IEEE 802.11ax RU (in dBm)									
			SISO/SISO In MIMO Ant 6 (in dBm)					SISO/SISO in MIMO Ant 7 (in dBm)				
			26T	52T, 52T+26T	106T, 106T +26T	242T	484T	26T	52T, 52T+26T	106T, 106T +26T	242T	484T
2.4 GHz WIFI	40 MHz	Maximum	14.75	14.75	14.75	14.75	14.75 ch. 3: 13.0 ch. 4: 14.0 ch. 5: 14.0 ch. 9: 14.0 ch. 10: 11.0 ch. 11: -0.5	14.5	14.5	14.5	14.5	14.5 ch. 3: 13.0 ch. 4: 14.0 ch. 5: 14.0 ch. 9: 14.0 ch. 10: 14.0 ch. 11: -0.5
		Nominal	13.75	13.75	13.75	13.75	13.75 ch. 3: 12.0 ch. 4: 13.0 ch. 5: 13.0 ch. 9: 13.0 ch. 10: 13.0 ch. 11: -1.5	13.5	13.5	13.5	13.5	13.5 ch. 3: 12.0 ch. 4: 13.0 ch. 5: 13.0 ch. 9: 13.0 ch. 10: 13.0 ch. 11: -1.5

Mode			IEEE 802.11ax/be RU (in dBm)													
			SISO / SISO In MIMO Antenna 6							SISO / SISO In MIMO Antenna 7						
			26T	52T, 52T+26T	106T, 106T+26T	242T	484T, 484T+242T	996T, 996T+242T, 996T+484T	996T*2	26T	52T, 52T+26T	106T, 106T+26T	242T	484T, 484T+242T	996T, 996T+242T, 996T+484T	996T*2
5 GHz WIFI (20MHz BW)	Maximum	UNII-1	9.0	9.0	9.0	9.0			8.0	8.0	8.0	8.0				
		UNII-2A	9.0	9.0	9.0	9.0			8.0	8.0	8.0	8.0				
		UNII-2C	8.0	8.0	8.0	8.0			8.0	8.0	8.0	8.0				
		UNII-3	8.0	8.0	8.0	8.0			7.5	7.5	7.5	7.5				
	Nominal	UNII-1	8.0	8.0	8.0	8.0			7.5	7.5	7.5	7.5				
		UNII-2A	8.0	8.0	8.0	8.0			7.0	7.0	7.0	7.0				
		UNII-2C	7.0	7.0	7.0	7.0			7.0	7.0	7.0	7.0				
		UNII-3	7.0	7.0	7.0	7.0			6.5	6.5	6.5	6.5				
5 GHz WIFI (40MHz BW)	Maximum	UNII-1	9.0	9.0	9.0	9.0	9.0		8.0	8.0	8.0	8.0	8.0			
		UNII-2A	9.0	9.0	9.0	9.0	9.0		8.0	8.0	8.0	8.0	8.0			
		UNII-2C	8.0	8.0	8.0	8.0	8.0		8.0	8.0	8.0	8.0	8.0			
		UNII-3	8.0	8.0	8.0	8.0	8.0		7.5	7.5	7.5	7.5	7.5			
	Nominal	UNII-1	8.0	8.0	8.0	8.0	8.0		7.5	7.5	7.5	7.5	7.5			
		UNII-2A	8.0	8.0	8.0	8.0	8.0		7.0	7.0	7.0	7.0	7.0			
		UNII-2C	7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0	7.0	7.0			
		UNII-3	7.0	7.0	7.0	7.0	7.0		6.5	6.5	6.5	6.5	6.5			
5 GHz WIFI (80MHz BW)	Maximum	UNII-1	9.0	9.0	9.0	9.0	9.0	9.0	8.0	8.0	8.0	8.0	8.0	8.0		
		UNII-2A	9.0	9.0	9.0	9.0	9.0		8.0	8.0	8.0	8.0	8.0	8.0		
		UNII-2C	8.0	8.0	8.0	8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0		
		UNII-3	8.0	8.0	8.0	8.0	8.0		7.5	7.5	7.5	7.5	7.5	7.5		
	Nominal	UNII-1	8.0	8.0	8.0	8.0	8.0		7.5	7.5	7.5	7.5	7.5	7.5		
		UNII-2A	8.0	8.0	8.0	8.0	8.0		7.0	7.0	7.0	7.0	7.0	7.0		
		UNII-2C	7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0		
		UNII-3	7.0	7.0	7.0	7.0	7.0		6.5	6.5	6.5	6.5	6.5	6.5		
5 GHz WIFI (160MHz BW)	Maximum	UNII-1	9.0	9.0	9.0	9.0	9.0	9.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	
		UNII-2A	9.0	9.0	9.0	9.0	9.0		8.0	8.0	8.0	8.0	8.0	8.0		
		UNII-2C	8.0	8.0	8.0	8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0		
		UNII-3	8.0	8.0	8.0	8.0	8.0		7.5	7.5	7.5	7.5	7.5	7.5		
	Nominal	UNII-1	8.0	8.0	8.0	8.0	8.0		7.5	7.5	7.5	7.5	7.5	7.5	7.5	
		UNII-2A	8.0	8.0	8.0	8.0	8.0		7.0	7.0	7.0	7.0	7.0	7.0		
		UNII-2C	8.0	8.0	8.0	8.0	8.0		7.0	7.0	7.0	7.0	7.0	7.0		
		UNII-3	7.0	7.0	7.0	7.0	7.0		6.5	6.5	6.5	6.5	6.5	6.5		

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Mode	Band		IEEE 802.11a/b/g/n RU (in dBm)																		
			SSO / SISO in MIMO Antenna 5							SSO / SISO in MIMO Antenna 7											
			26T	52T, 52T+26T	106T, 106T+26T	242T	484T, 484T+242T	96T, 96T+242T, 96T+484T	96T*2, 96T*2+484T, 96T*3, 96T*3+484T	96T*4	26T	52T, 52T+26T	106T, 106T+26T	242T	484T, 484T+242T	96T, 96T+242T, 96T+484T	96T*2, 96T*2+484T, 96T*3, 96T*3+484T	96T*4			
6 GHz WIR (20MHz BW) - LP	MBO	LN15	-7.0	-5.0	-2.5	-0.5															
		LN16	-7.0	-5.0	-2.5	0.0															
		LN17	-7.0	-5.0	-2.5	0.0															
		LN18	-7.0	-5.0	-2.5	0.0															
	Nominal	LN15	-8.0	-6.0	-3.5	-1.5															
		LN16	-8.0	-6.0	-3.5	-1.0															
		LN17	-8.0	-6.0	-3.5	-1.0															
		LN18	-8.5	-6.5	-4.0	-1.5															
6 GHz WIR (40MHz BW) - LP	MBO	LN15	-7.0	-5.0	-2.5	-0.5	1.5														
		LN16	-7.0	-5.0	-2.5	0.0	3.0														
		LN17	-7.0	-5.0	-2.5	0.0	3.0														
		LN18	-7.5	-5.5	-3.0	-0.5	3.0														
	Nominal	LN15	-8.0	-6.0	-3.5	-1.5	0.5														
		LN16	-8.0	-6.0	-3.5	-1.0	2.0														
		LN17	-8.0	-6.0	-3.5	-1.0	2.0														
		LN18	-8.5	-6.5	-4.0	-1.5	2.0														
6 GHz WIR (80MHz BW) - LP	MBO	LN15	-7.0	-5.0	-2.5	-0.5	1.5	5.0													
		LN16	-7.0	-5.0	-2.5	0.0	3.0	5.5													
		LN17	-7.0	-5.0	-2.5	0.0	3.0	5.5	8.0												
		LN18	-7.5	-5.5	-3.0	-0.5	3.0	5.5	7.5												
	Nominal	LN15	-8.0	-6.0	-3.5	-1.5	0.5	4.0	7.0												
		LN16	-8.0	-6.0	-3.5	-1.0	2.0	4.5	7.0												
		LN17	-8.0	-6.0	-3.5	-1.0	2.0	4.5	7.0												
		LN18	-8.5	-6.5	-4.0	-1.5	2.0	4.5	6.5												
6 GHz WIR (160MHz BW) - LP	MBO	LN15	-7.0	-5.0	-2.5	-0.5	1.5	5.0	8.0	8.25											
		LN16	-7.0	-5.0	-2.5	0.0	3.0	5.5	8.0	8.25											
		LN17	-7.0	-5.0	-2.5	0.0	3.0	5.5	7.5	8.5											
		LN18	-7.5	-5.5	-3.0	-0.5	3.0	5.5	7.5	9.25											
	Nominal	LN15	-8.0	-6.0	-3.5	-1.5	0.5	4.0	7.0	7.25											
		LN16	-8.0	-6.0	-3.5	-1.0	2.0	4.5	7.0	7.25											
		LN17	-8.0	-6.0	-3.5	-1.0	2.0	4.5	6.5	7.5											
		LN18	-8.5	-6.5	-4.0	-1.5	2.0	4.5	6.5	6.25											
6 GHz WIR (320MHz BW) - LP	MBO	LN15	-7.0	-5.0	-2.5	-0.5	1.5	5.0	8.0	8.25	8.25										
		LN16	-7.0	-5.0	-2.5	0.0	3.0	5.5	8.0	8.25	8.25										
		LN17	-7.0	-5.0	-2.5	0.0	3.0	5.5	7.5	8.5	8.25										
		LN18	-7.5	-5.5	-3.0	-0.5	3.0	5.5	7.5	9.25	8.25										
	Nominal	LN15	-8.0	-6.0	-3.5	-1.5	0.5	4.0	7.0	7.25	7.25										
		LN16	-8.0	-6.0	-3.5	-1.0	2.0	4.5	7.0	7.25	7.25										
		LN17	-8.0	-6.0	-3.5	-1.0	2.0	4.5	6.5	7.5	7.25										
		LN18	-8.5	-6.5	-4.0	-1.5	2.0	4.5	6.5	6.25	7.25										
6 GHz WIR (20MHz BW) - SP	MBO	LN15	8.25	8.25	8.25	8.25															
		LN16	8.5	8.5	8.5	8.5															
		LN17	8.25	8.25	8.25	8.25															
		LN18	7.25	7.25	7.25	7.25															
	Nominal	LN15	7.5	7.5	7.5	7.5															
		LN16	7.25	7.25	7.25	7.25															
		LN17	7.5	7.5	7.5	7.5															
		LN18	7.25	7.25	7.25	7.25															
6 GHz WIR (40MHz BW) - SP	MBO	LN15	8.25	8.25	8.25	8.25	8.25														
		LN16	8.5	8.5	8.5	8.5															
		LN17	8.25	8.25	8.25	8.25															
		LN18	7.25	7.25	7.25	7.25															
	Nominal	LN15	7.5	7.5	7.5	7.5	7.5														
		LN16	7.25	7.25	7.25	7.25															
		LN17	7.5	7.5	7.5	7.5															
		LN18	7.25	7.25	7.25	7.25															
6 GHz WIR (80MHz BW) - SP	MBO	LN15	8.25	8.25	8.25	8.25	8.25	8.25													
		LN16	8.5	8.5	8.5	8.5															
		LN17	8.25	8.25	8.25	8.25															
		LN18	7.25	7.25	7.25	7.25															
	Nominal	LN15	7.5	7.5	7.5	7.5	7.5														
		LN16	7.25	7.25	7.25	7.25															
		LN17	7.5	7.5	7.5	7.5															
		LN18	7.25	7.25	7.25	7.25															
6 GHz WIR (160MHz BW) - SP	MBO	LN15	8.25	8.25	8.25	8.25	8.25	8.25													
		LN16	8.5	8.5	8.5	8.5															
		LN17	8.25	8.25	8.25	8.25															
		LN18	7.25	7.25	7.25	7.25															
	Nominal	LN15	7.5	7.5	7.5	7.5	7.5														
		LN16	7.25	7.25	7.25	7.25															
		LN17	7.5	7.5	7.5	7.5															
		LN18	7.25	7.25	7.25	7.25															
6 GHz WIR (320MHz BW) - SP	MBO	LN15	8.25	8.25	8.25	8.25	8.25	8.25	8.25												
		LN16	8.5	8.5	8.5	8.5															
		LN17	8.25	8.25	8.25	8.25															
		LN18	7.25	7.25	7.25	7.25															
	Nominal	LN15	7.5	7.5	7.5	7.5	7.5														
		LN16	7.25	7.25	7.25	7.25															
		LN17	7.5	7.5	7.5	7.5															
		LN18	7.25	7.25	7.25	7.25															

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