

RADIO FREQUENCY EXPOSURE

Limit

According to section 4.3.1 of KDB 447498 D01 General RF Exposure Guidance v06, SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in Appendix A.

Appendix A

SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	
MHz	30	35	40	45	50	mm
150	232	271	310	349	387	SAR Test Exclusion Threshold (mW)
300	164	192	219	246	274	
450	134	157	179	201	224	
835	98	115	131	148	164	
900	95	111	126	142	158	
1500	73	86	98	110	122	
1900	65	76	87	98	109	
2450	57	67	77	86	96	
3600	47	55	63	71	79	
5200	39	46	53	59	66	
5400	39	45	52	58	65	
5800	37	44	50	56	62	

Conducted Power Results

5G Band

UNII-1

Test Mode	Antenna	Frequency[MHz]	Result [dBm]
11A	Ant1	5180	3.26
11A	Ant2	5180	4.21
11A	Ant1	5200	3.64
11A	Ant2	5200	4.32
11A	Ant1	5240	2.02
11A	Ant2	5240	3.09
11N20MIMO	Ant1	5180	0.77
11N20MIMO	Ant2	5180	1.82
11N20MIMO	total	5180	4.34
11N20MIMO	Ant1	5200	1.20
11N20MIMO	Ant2	5200	2.05
11N20MIMO	total	5200	4.66
11N20MIMO	Ant1	5240	-0.05
11N20MIMO	Ant2	5240	0.85
11N20MIMO	total	5240	3.43
11AC20MIMO	Ant1	5180	1.01
11AC20MIMO	Ant2	5180	1.68
11AC20MIMO	total	5180	4.37
11AC20MIMO	Ant1	5200	1.06
11AC20MIMO	Ant2	5200	2.06
11AC20MIMO	total	5200	4.60
11AC20MIMO	Ant1	5240	1.04
11AC20MIMO	Ant2	5240	2.06
11AC20MIMO	total	5240	4.59

UNII-3 Band

Test Mode	Antenna	Frequency[MHz]	Result [dBm]
11A	Ant1	5745	2.46
11A	Ant2	5745	4.44
11A	Ant1	5785	2.20
11A	Ant2	5785	3.14
11A	Ant1	5825	0.64
11A	Ant2	5825	1.87
11N20MIMO	Ant1	5745	-0.09
11N20MIMO	Ant2	5745	1.80
11N20MIMO	total	5745	3.97
11N20MIMO	Ant1	5785	-1.23
11N20MIMO	Ant2	5785	0.68
11N20MIMO	total	5785	2.84
11N20MIMO	Ant1	5825	-2.14
11N20MIMO	Ant2	5825	-0.43
11N20MIMO	total	5825	1.81
11AC20MIMO	Ant1	5745	0.48
11AC20MIMO	Ant2	5745	2.19
11AC20MIMO	total	5745	4.43
11AC20MIMO	Ant1	5785	0.08
11AC20MIMO	Ant2	5785	1.32
11AC20MIMO	total	5785	3.75
11AC20MIMO	Ant1	5825	-1.38
11AC20MIMO	Ant2	5825	-0.04
11AC20MIMO	total	5825	2.35

Manufacturing tolerance

UNII-1 Antenna 1

IEEE 802.11a (Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	3	3	1.5
Tolerance $\pm$ (dB)	1	1	1
IEEE 802.11n HT20 (Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	0.5	0.5	-0.5
Tolerance $\pm$ (dB)	1	1	1
IEEE 802.11ac VHT20 (Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	0.5	0.5	0.5
Tolerance $\pm$ (dB)	1	1	1

UNII-1 Antenna 2

IEEE 802.11a (Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	3.5	4	2.5
Tolerance $\pm$ (dB)	1	1	1
IEEE 802.11n HT20 (Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	1.5	1.5	0.5
Tolerance $\pm$ (dB)	1	1	1
IEEE 802.11ac VHT20 (Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	1	1.5	1.5
Tolerance $\pm$ (dB)	1	1	1

UNII-3 Band – Antenna 1

IEEE 802.11a (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	2	1.5	0
Tolerance $\pm$ (dB)	1	1	1
IEEE 802.11n HT20 (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	-0.5	-1.5	-2.5
Tolerance $\pm$ (dB)	1	1	1
IEEE 802.11ac VHT20 (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	0	-0.5	-2
Tolerance $\pm$ (dB)	1	1	1

UNII-3 Band – Antenna 2

IEEE 802.11a (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	4	2.5	1.5
Tolerance $\pm$ (dB)	1	1	1
IEEE 802.11n HT20 (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	1.5	0	-1
Tolerance $\pm$ (dB)	1	1	1
IEEE 802.11ac VHT20 (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	1.5	1	-0.5
Tolerance $\pm$ (dB)	1	1	1

Results

UNII band 1:

Test Mode	Max Conducted Power with tune-up(dBm)	Test distance (mm)	Calculation Value for 1g SAR (Note 1)	Exemption Limit for 1g SAR
11A	4.50	5	1.29	3
11N20 MIMO Mode	5.04	5	1.46	3
11AC20MIMO Mode	5.04	5	1.46	3

UNII band 3:

Test Mode	Max Conducted Power with tune-up(dBm)	Test distance (mm)	Calculation Value for 1g SAR (Note 1)	Exemption Limit for 1g SAR
11A	5.00	5	1.53	3
11N20 MIMO Mode	4.62	5	1.40	3
11AC20MIMO Mode	4.82	5	1.46	3

Note:

1. Calculation Value = [(max. power of channel, mW) / (min. test separation distance, mm)] · [√f(GHz)].
f is 5.24 for UNII band 1 and 5.825 for UNII band 3.

Conclusion: The SAR evaluation is not required.