RF EXPOSURE EVALUATION METHOD

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

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	
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	SAR Test Exclusion Threshold (mW)
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	

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [$\sqrt{f(GHz)}$] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR,where

f(GHz) is the RF channel transmit frequency in GHz

Power and distance are rounded to the nearest mW and mm before calculation

The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

Maximum measured transmitter power.

BT4.2+EDR The Worst Case

Mode	2402-2480MHz
Detector	PEAK
GFSK	8±1dBm
π/4-DQPSK	7±1dBm
8DPSK	6±1dBm

Remark: The worst case gain of the antenna is 0dBi.

0dBi logarithmic terms convert to numeric result is nearly 1

Mode	frequency (GHz)	Maximum Peak Conducted Output Power (dBm)	Tune up Power(dBm)	Tune up Power (mW)	Result	Limit
GFSK	2.441	8.81	9	7.94328235	2.4821	3
π/4-DQPSK	2.441	7.89	8	6.30957344	1.9716	3
8DPSK	2.441	6.92	7	5.01187234	1.5661	3

Threshold at which no SAR required is 2.4821≤ 3.0 for 1-g SAR, Separation distance is 5mm.

BT4.2 The Worst Case

Mode	2402-2480MHz
Detector	PEAK
2402MHz	5±1dBm
2440MHz	6±1dBm
2480MHz	4±1dBm

Remark: The worst case gain of the antenna is 0dBi.

0dBi logarithmic terms convert to numeric result is nearly 1

frequency (GHz)	Maximum Peak Conducted Output Power (dBm)	Tune up Power (dBm)	Tune up Power (mW)	Result	Limit
2.402	5.13	6	3.981071706	1.2340	3
2.44	6.1	7	5.011872336	1.5658	3
2.48	4.29	5	3.16227766	0.9960	3

Threshold at which no SAR required is 1.5658≤ 3.0 for 1-g SAR, Separation distance is 5mm.

2.4GWIFI The Worst Case

Mode	802.11b/g/n20: 2412-2462MHz 802.11n40: 2422-2452MHz
Detector	PEAK
802.11b	8±1dBm
802.11g	7±1dBm
802.11n20	9±0.5dBm
802.11n40	8±1dBm

ANT A=0dBi

ANT B=0 dBi

GANT + 10 log(NANT) dBi

Directional gain= 0+10log2=3.01dBi

Remark: The worst case gain of the antenna is 3.01dBi.

0dBi logarithmic terms convert to numeric result is nearly 2.0

Mode	frequency (GHz)	Maximum Peak Conducted Output Power (dBm)	Tune up Power (dBm)	Tune up Power (mW)	Result	Limit
802.11b	2.462	9.46	9.5	8.91250938	2.7969	3
802.11g	2.412	8.46	8.5	7.07945784	2.1990	3
802.11n20	2.412	9.44	9.5	8.91250938	2.7683	3
802.11n40	2.422	8.42	9	7.94328235	2.4724	3

Threshold at which no SAR required is 2.7969≤ 3.0 for 1-g SAR, Separation distance is 5mm.

5GWIFI The Worst Case

Mode	IEEE 802.11ac(HT20) 5.180GHz-5.240GHz IEEE 802.11ac(HT40) 5.190GHz-5.310GHz IEEE 802.11ac(HT80) 5.210GHz
Detector	PEAK
802.11 ac(HT20)	7±1dBm
802.11 ac(HT40)	6±1dBm
802.11 ac(HT80)	6±1dBm

ANT A=0dBi

ANT B=0 dBi

GANT + 10 log(NANT) dBi

Directional gain= 0+10log2=3.01dBi

Remark: The worst case gain of the antenna is 3.01dBi.

0dBi logarithmic terms convert to numeric result is nearly 2.0

Mode	frequency (GHz)	Maximum Peak Conducted Output Power (dBm)	Tune up Power (dBm)	Tune up Power (mW)	Result	Limit
802.11ac(HT20)	5.18	7.36	8	6.309573445	2.8721	3
802.11ac(HT20)	5.19	6.7	7	5.011872336	2.2836	3
802.11ac(HT20)	5.21	6.2	7	5.011872336	2.2880	3

Threshold at which no SAR required is 2.8721≤ 3.0 for 1-g SAR, Separation distance is 5mm.

5GWIFI The Worst Case

Mode	IEEE 802.11ac(HT20) 5.26GHz-5.32GHz IEEE 802.11ac(HT40) 5.27GHz-5.31GHz IEEE 802.11ac(HT80) 5.29GHz
Detector	PEAK
802.11 ac(HT20)	6±1dBm
802.11 ac(HT40)	6±1dBm
802.11 ac(HT80)	4±1dBm

ANT A=0dBi

ANT B=0 dBi

GANT + 10 log(NANT) dBi

Directional gain= 0+10log2=3.01dBi

Remark: The worst case gain of the antenna is 3.01dBi.

0dBi logarithmic terms convert to numeric result is nearly 2.0

Mode	frequency (GHz)	Maximum Peak Conducted Output Power (dBm)	Tune up Power (dBm)	Tune up Power (mW)	Result	Limit
802.11ac(HT20)	5.32	6.49	7	5.011872336	2.3120	3
802.11ac(HT20)	5.27	6.15	7	5.011872336	2.3011	3
802.11ac(HT20)	5.29	4.64	5	3.16227766	1.4546	3

Threshold at which no SAR required is 2.3120≤ 3.0 for 1-g SAR, Separation distance is 5mm.

5GWIFI The Worst Case

Mode	IEEE 802.11ac(HT20) 5.5GHz-5.7GHz IEEE 802.11ac(HT40) 5.51GHz-5.67GHz IEEE 802.11ac(HT80) 5.53GHz-5.61GHz
Detector	PEAK
802.11 ac(HT20)	6±1dBm
802.11 ac(HT40)	5±1dBm
802.11 ac(HT80)	4±1dBm

ANT A=0dBi

ANT B=0 dBi

GANT + 10 log(NANT) dBi

Directional gain= 0+10log2=3.01dBi

Remark: The worst case gain of the antenna is 3.01dBi.

0dBi logarithmic terms convert to numeric result is nearly 2.0

Mode	frequency (GHz)	Maximum Peak Conducted Output Power (dBm)	Tune up Power (dBm)	Tune up Power (mW)	Result	Limit
802.11ac(HT20)	5.58	6.48	7	5.011872336	2.3678	3
802.11ac(HT20)	5.51	5.3	6	3.981071706	1.8690	3
802.11ac(HT20)	5.53	4.43	5	3.16227766	1.4873	3

Threshold at which no SAR required is 2.3678≤ 3.0 for 1-g SAR, Separation distance is 5mm.

5GWIFI The Worst Case

Mode	IEEE 802.11ac(HT20) 5.745GHz-5.825GHz IEEE 802.11ac(HT40) 5.755GHz-5.795GHz IEEE 802.11ac(HT80) 5.775GHz
Detector	PEAK
802.11 ac(HT20)	6±1dBm
802.11 ac(HT40)	5±1dBm
802.11 ac(HT80)	5±1dBm

ANT A=0dBi

ANT B=0 dBi

GANT + 10 log(NANT) dBi

Directional gain= 0+10log2=3.01dBi

Remark: The worst case gain of the antenna is 3.01dBi.

0dBi logarithmic terms convert to numeric result is nearly 2.0

Mode	frequency (GHz)	Maximum Peak Conducted Output Power (dBm)	Tune up Power (dBm)	Tune up Power (mW)	Result	Limit
802.11ac(HT20)	5.785	6.494	7	5.011872336	2.4109	3
802.11ac(HT20)	5.795	5.765	6	3.981071706	1.9167	3
802.11ac(HT20)	5.775	5.647	6	3.981071706	1.9134	3

Threshold at which no SAR required is 2.4109≤ 3.0 for 1-g SAR, Separation distance is 5mm.