

M10G1BA01 Maximum Permissible Exposure

1. Applicable Standard

According to KDB447498 D01 General RF Exposure Guidance v05r01 standalone SAR test exclusion, SAR test is not required in 100MHz to 6GHz at test separation distances $\leq 50\text{mm}$, if the output of EUT satisfy the following equation:

$[(\text{max power of channel, including tune-up tolerance, mW}) / (\text{min test separation distance, mm})] \cdot [f^{1/2} (\text{GHz})] \leq 3.0$ For 1-g SAR and ≤ 7.5 for 10-g extremity SAR.

- a. $f(\text{GHz})$ is the RF channel transmit frequency in GHz.
- b. Power and distance are rounded to the nearest mW and mm before calculation
- c. The result is rounded to one decimal place for comparison

2. MPE calculation

Conducted output power

For WIFI

Test CH	Maximum Conducted Output Power (dBm)			
	802.11b	802.11g	802.11n(H20)	802.11n(H40)
Lowest	9.50	8.94	8.37	8.23
Middle	9.64	9.01	8.56	8.42
Highest	9.65	9.25	8.66	8.53

Maximum Permissible Exposure:

11B Highest Channel: 2462MHz

Max power=9.65dBm, 9.23mW

Min test separation distance=5mm

$[9.23\text{mW}/5\text{mm}] \cdot [2.462^{1/2}] = 2.90 < 3.0$ For 1-g SAR

For BT

Test CH	Maximum Conducted Output Power (dBm)		
	GFSK	Pi/4DQPSK	8DPSK
Lowest	4.17	3.25	3.27
Middle	4.35	3.57	3.60
Highest	3.62	2.92	2.95

Maximum Permissible Exposure:

GFSK Middle Channel: 2441MHz

Max power=4.35dBm, 2.72mW

Min test separation distance=5mm

$[2.72\text{mW}/5\text{mm}] \cdot [2.441^{1/2}] = 0.85 < 3.0$ For 1-g SAR

For BLE

Test CH	Maximum Conducted Output Power (dBm)
	GFSK
Lowest	-3.98
Middle	-3.58
Highest	-3.79

Maximum Permissible Exposure:

Middle Channel: 2440MHz

Max power=-3.58dBm, 0.44mW

Min test separation distance=5mm

$[0.44\text{mW}/5\text{mm}] \cdot [2.440^{1/2}] = 0.14 < 3.0$ For 1-g SAR

So SAR test is not required for BT BLE and wifi at test separation distances $\leq 50\text{mm}$

Refer to Appendix A for details

Appendix A

SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and $\leq 50\text{ mm}$

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	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	

Note: 10-g Extremity SAR Test Exclusion Power Thresholds are 2.5 times higher than the 1-g SAR Test Exclusion Thresholds indicated above. These thresholds do not apply, by extrapolation or other means, to occupational exposure limits.