

## 1) Standalone SAR test exclusion

According to 447498 D01 General RF Exposure Guidance v06

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

- a) For 100 MHz to 6 GHz and *test separation distances*  $\leq 50$  mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f_{\text{GHz}}}] \leq 3.0 \text{ for 1-g SAR, and } \leq 7.5 \text{ for 10-g extremity SAR,}^{30} \text{ where}$$

- $f_{\text{GHz}}$  is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation<sup>31</sup>
- The result is rounded to one decimal place for comparison
- The values 3.0 and 7.5 are referred to as *numeric thresholds* in step b) below

## 2) Manufacturing Tolerance

*Bluetooth*

GFSK (Peak)			
Channel	Channel 0	Channel 39	Channel 78
Target (dBm)	2.0	2.0	2.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
$\pi/4$ DQPSK (Peak)			
Channel	Channel 0	Channel 39	Channel 78
Target (dBm)	2.0	2.0	2.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
8-DPSK (Peak)			
Channel	Channel 0	Channel 39	Channel 78
Target (dBm)	2.0	2.0	2.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
BLE GFSK			
Channel	Channel 0	Channel 19	Channel 39
Target (dBm)	-3.0	-3.0	-3.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0

*2.4GHz WLAN*

IEEE 802.11b (Peak)			
Channel	Channel 01	Channel 06	Channel 11
Target (dBm)	8.5	8.5	8.5
Tolerance $\pm$ (dB)	1.0	1.0	1.0
IEEE 802.11g (Peak)			
Channel	Channel 01	Channel 06	Channel 11
Target (dBm)	8.0	8.0	8.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
IEEE 802.11n(HT20) (Peak)			
Channel	Channel 01	Channel 06	Channel 11
Target (dBm)	8.0	8.0	8.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
IEEE 802.11n(HT40) (Peak)			
Channel	Channel 03	Channel 06	Channel 09
Target (dBm)	8.0	8.0	8.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0

### 5GHz WLAN

5GHz WLAN Band 1				5GHz WLAN Band 4		
IEEE 802.11a (Average)						
Frequency (MHz)	5180	5200	5240	5745	5785	5825
Target (dBm)	6.0	6.0	6.0	6.0	6.0	6.0
Tolerance ± (dB)	1.0	1.0	1.0	1.0	1.0	1.0
IEEE 802.11n HT20 (Average)				IEEE 802.11n HT20 (Average)		
Frequency (MHz)	5180	5200	5240	5745	5785	5825
Target (dBm)	4.0	4.0	4.0	4.0	4.0	4.0
Tolerance ± (dB)	1.0	1.0	1.0	1.0	1.0	1.0
IEEE 802.11ac VHT20 (Average)				IEEE 802.11ac VHT20 (Average)		
Frequency (MHz)	5180	5200	5240	5745	5785	5825
Target (dBm)	4.0	4.0	4.0	4.0	4.0	4.0
Tolerance ± (dB)	1.0	1.0	1.0	1.0	1.0	1.0
IEEE 802.11n HT40 (Average)				IEEE 802.11n HT40 (Average)		
Frequency (MHz)	5190		5230	5755		5795
Target (dBm)	4.0		4.0	4.0		4.0
Tolerance ± (dB)	1.0		1.0	1.0		1.0
IEEE 802.11ac VHT40 (Average)				IEEE 802.11ac VHT40 (Average)		
Frequency (MHz)	5190		5230	5755		5795
Target (dBm)	4.0		4.0	4.0		4.0
Tolerance ± (dB)	1.0		1.0	1.0		1.0
IEEE 802.11ac VHT80 (Average)				IEEE 802.11ac VHT80 (Average)		
Frequency (MHz)	5210			5775		
Target (dBm)	4.0			4.0		
Tolerance ± (dB)	1.0			1.0		

According to the output power measurement, and the tune-up statement by manufacturer, the calculated value can obtained.

Mode	Test Frequency (MHz)	Minimum Separation Distance (mm)	Max. Output Power (dBm)	Output Power with tune up (dBm)	Output Power (mW)	calculated value	exclusion thresholds
BT	2402.00	5.0	2.867	3.0	1.995	0.6	3
BLE	2402.00	5.0	-2.874	-2.0	0.6310	0.2	3
WIFI 2.4G	2437.00	5.0	9.41	9.5	8.913	2.8	3
WIFI 5G B1	5200.00	5.0	6.75	7.0	5.012	2.3	3
WIFI 5G B4	5825.00	5.0	5.89	7.0	5.012	2.4	3

3) .Conclusion: No SAR is required.