

Portable device

According to §15.247(e)(i) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to KDB447498 D01 General RF Exposure Guidance V06

Section 4.3.1 Standalone SAR test exclusion considerations

For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot$

$[\sqrt{f_{\text{(GHz)}}}] \leq 3.0$ for 1-g SAR, and ≤ 7.5 for 10-g extremity SAR, 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
- 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)

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 according to 4.1 f) is applied to determine SAR test exclusion.

For 100 MHz to 6 GHz and test separation distances > 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following (also illustrated in Appendix B):

- 1) $\{[\text{Power allowed at numeric threshold for 50 mm in step a)}] + [(\text{test separation distance} - 50 \text{ mm}) \cdot (f_{\text{(MHz)}}/150)]\}$ mW, for 100 MHz to 1500 MHz
- 2) $\{[\text{Power allowed at numeric threshold for 50 mm in step a)}] + [(\text{test separation distance} - 50 \text{ mm}) \cdot 10]\}$ mW, for > 1500 MHz and ≤ 6 GHz

Section 4.3.2 Simultaneous transmission SAR test exclusion considerations

Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneously transmitting antenna. When the sum of 1-g or 10-g SAR of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit, SAR test exclusion applies to that simultaneous transmission configuration.

When an antenna qualifies for the standalone SAR test exclusion of 4.3.1 and also transmits simultaneously with other antennas, the standalone SAR value must be estimated according to the following to determine the simultaneous transmission SAR test exclusion criteria:

- 1) $[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f_{\text{(GHz)}}}/x]$ W/kg, for test separation distances ≤ 50 mm;
where $x = 7.5$ for 1-g SAR and $x = 18.75$ for 10-g SAR.
- 2) 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distance is > 50 mm.

For the BT the test minimum separation is 38mm (see the following page photo)

For the WIFI the test minimum separation is 300mm (see the following page photo)

Standalone Mode

Bluetooth 2.1+EDR:

Mode	Transmit Frequency (GHz)	Measured Power (dBm)	Tune-up power (dBm)	Max tune-up power(dBm)	Result calculation	1-g SAR
GFSK	2.402	7.35	-6.5±1	7.5	0.2294	3.00
	2.441	8.13	-7.5±1	8.5	0.2910	3.00
	2.480	9.47	-8.5±1	9.5	0.3694	3.00
pi/4-DQPSK	2.402	5.50	-6±1	7	0.2044	3.00
	2.441	7.16	-7±1	8	0.2594	3.00
	2.480	8.69	-8±1	9	0.3292	3.00
8DPSK	2.402	5.93	-6±1	7	0.2044	3.00
	2.441	7.44	-7±1	8	0.2594	3.00
	2.480	8.91	-8±1	9	0.3292	3.00

Bluetooth 4.0:

Mode	Transmit Frequency (GHz)	Measured Power (dBm)	Tune-up power (dBm)	Max tune-up power(dBm)	Result calculation	1-g SAR
GFSK	2.402	7.42	7±1	8	0.2573	3.00
	2.440	8.31	8±1	9	0.3265	3.00
	2.480	9.72	9±1	10	0.4144	3.00

For WiFi

Tune-up power for SISO

Mode	2.4G WLAN	5.2G WLAN	5.3G WLAN	5.6G WLAN	5.8G WLAN
802.11b	17.5±1 dBm	N/A	N/A	N/A	N/A
802.11g	18.0±1 dBm	N/A	N/A	N/A	N/A
802.11a	N/A	11.0±1 dBm	13.5±1 dBm	11.5±1 dBm	11.0±1 dBm
802.11n HT20	18.0±1 dBm	11.0±1 dBm	12.0±1 dBm	11.5±1 dBm	9.0±1 dBm
802.11n HT40	18.0±1 dBm	11.0±1 dBm	10.5±1 dBm	11.0±1 dBm	9.0±1 dBm
802.11ac VHT80	N/A	8.0±1 dBm	7.5±1 dBm	9.5±1 dBm	7.0±1 dBm

Tune-up power for MIMO

Mode	2.4G WLAN	5.2G WLAN	5.3G WLAN	5.6G WLAN	5.8G WLAN
802.11n HT20	21.0±1 dBm	14.0±1 dBm	15.0±1 dBm	15.0±1 dBm	12±1 dBm
802.11n HT40	21.0±1 dBm	14.0±1 dBm	13.5±1 dBm	14.0±1 dBm	12.0±1 dBm
802.11ac VHT80	N/A	11.0±1 dBm	10±1 dBm	12±1 dBm	10±1 dBm

For 2.4G/5G wifi test Power, see the RF test report

Mode	Transmit Frequency (GHz)	Max Tune-up power (dBm)	Max Tune-up power (mW)	Exclusion threshold at 300mm (mW)
2.4G WLAN	2.462	22.0	159	2595
5.2G WLAN	5.240	15.0	31	2565
5.3G WLAN	5.320	16.0	40	2565
5.6G WLAN	5.700	16.0	40	2563
5.6G WLAN	5.825	13.0	20	2562

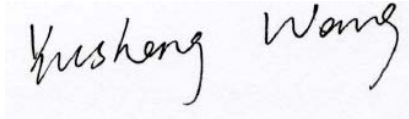
BT+WIFI Simultaneous transmission

Mode	BT Estimation SAR Value(W/kg)	WIFI Ant0 Estimation SAR Value(W/kg)	WIFI Ant1 Estimation SAR Value(W/kg)	Result Calculation (W/kg)	1-g SAR Limit (W/kg)
BT+WIFI	0.06	0.4	0.4	0.86	1.6

Conclusion:

No SAR Test is required.

Sincerely,



Signature

Yusheng Wang/Product Manager

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Antenna Location



BT Antenna separation
Bottom



Right



front



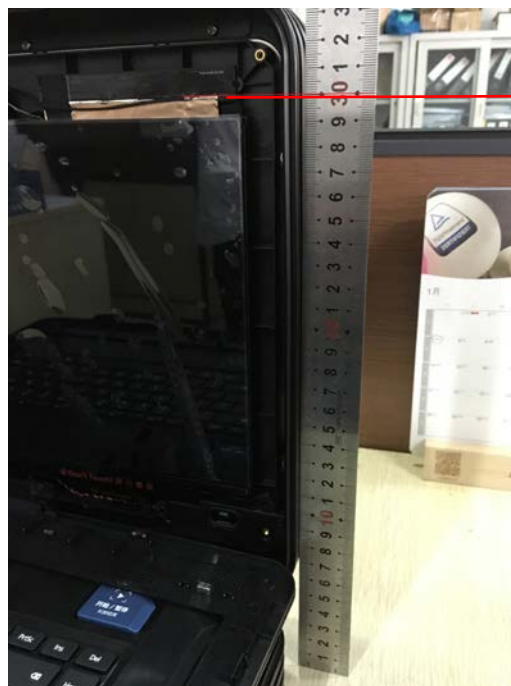
WIFI Main Antenna separation (300mm)

300mm



WIFI Aux Antenna separation (300mm)

300mm



Antenna Dimension

