

MPE Calculation

KDB 447498 - 4.3.1 b)

b) 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) {[Power allowed at numeric threshold for 50 mm in step a)] + [(test separation distance – 50 mm)·(f(MHz)/150)]} mW, for 100 MHz to 1500 MHz
- 2) {[Power allowed at numeric threshold for 50 mm in step a)] + [(test separation distance – 50 mm)·10]} mW, for > 1500 MHz and ≤ 6 GHz

KDB 447498 - Appendix B

Frequency (MHz)	Minimum Distance (mm)
	60
1900	209
2450	196
3600	179
5200	166
5400	165
5800	162

Model Name : **SP98**

FCC ID : **S7A-SP98**

Separation distance : **64.0 mm**

Modulation		Frequency (MHz)	Min. Test separation distance	Measured Maximum Average power	Tune-up tolerance	Max. Power with tune-up tolerance		SAR Test exclusion thresholds for 100MHz to 6GHz at test separation distance ≥ 50 mm	Limit	Result
			(mm)	(dBm)	(dB)	(dBm)	(mW)			
2.4GHz	GFSK	2402	60.00	13.98	± 1.00	14.98	31.48	100.8131	197.13	PASS
		2441		17.18		18.18	65.77	101.7125	196.21	PASS
		2480		16.50		17.50	56.23	101.4760	195.56	PASS
	π/4DQPSK	2402	60.00	8.28	± 1.00	9.28	8.47	100.2188	197.13	PASS
		2441		10.94		11.94	15.63	100.4070	196.21	PASS
		2480		10.33		11.33	13.58	100.3565	195.56	PASS
	8DPSK	2402	60.00	8.94	± 1.00	9.94	9.86	100.2548	197.13	PASS
		2441		11.64		12.64	18.37	100.4782	196.21	PASS
		2480		11.04		12.04	16.00	100.4198	195.56	PASS
	BT LE	2402	60.00	2.13	± 1.00	3.13	2.06	100.0531	197.13	PASS
		2442		5.94		6.94	4.94	100.1287	196.19	PASS
		2480		5.51		6.51	4.48	100.1175	195.56	PASS
	MESH	2410	60.00	19.78	± 1.00	20.78	119.67	103.0964	196.95	PASS
		2445		19.78		20.78	119.67	103.1188	196.12	PASS
		2475		19.06		20.06	101.39	102.6585	195.63	PASS
	802.11b	2412	60.00	6.87	± 1.00	7.87	6.12	100.1585	196.90	PASS
		2437		6.99		7.99	6.30	100.1638	196.31	PASS
		2462		7.48		8.48	7.05	100.1843	195.82	PASS
	802.11g	2412	60.00	8.50	± 1.00	9.50	8.91	100.2307	196.90	PASS
		2437		8.53		9.53	8.97	100.2335	196.31	PASS
		2462		8.60		9.60	9.12	100.2385	195.82	PASS
	802.11n_HT20	2412	60.00	8.51	± 1.00	9.51	8.93	100.2312	196.90	PASS
		2437		9.35		10.35	10.84	100.2820	196.31	PASS
		2462		9.15		10.15	10.35	100.2707	195.82	PASS
	802.11n_HT40	2422	60.00	7.66	± 1.00	8.66	7.35	100.1905	196.66	PASS
		2437		7.35		8.35	6.84	100.1779	196.31	PASS
		2452		7.48		8.48	7.05	100.1839	195.97	PASS
5.2GHz	802.11a	5180	60.00	-8.18	± 1.00	-7.18	0.19	100.0073	166.16	PASS
		5220		-8.63		-7.63	0.17	100.0066	165.90	PASS
		5240		-8.60		-7.60	0.17	100.0066	165.80	PASS
	802.11an_HT20	5180	60.00	-8.79	± 1.00	-7.79	0.17	100.0063	166.16	PASS
		5220		-8.87		-7.87	0.16	100.0062	165.90	PASS
		5240		-8.98		-7.98	0.16	100.0061	165.80	PASS
	802.11an_HT40	5190	60.00	-13.58	± 1.00	-12.58	0.06	100.0021	166.08	PASS
		5230		-13.39		-12.39	0.06	100.0022	165.85	PASS
	5.8GHz	5745	60.00	-8.17	± 1.00	-7.17	0.19	100.0077	162.41	PASS
		5785		-8.07		-7.07	0.20	100.0079	162.11	PASS
		5825		-8.36		-7.36	0.18	100.0074	161.81	PASS
	802.11an_HT20	5745	60.00	-8.19	± 1.00	-7.19	0.19	100.0076	162.41	PASS
		5785		-8.36		-7.36	0.18	100.0074	162.11	PASS
		5825		-8.75		-7.75	0.17	100.0068	161.81	PASS
	802.11an_HT40	5755	60.00	-12.48	± 1.00	-11.48	0.07	100.0028	162.34	PASS
		5795		-12.99		-11.99	0.06	100.0025	162.04	PASS

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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.

Modulation	Frequency (MHz)	Min. Test separation distance	Max. Power with tune-up tolerance		Simultaneous transmission SAR Test exclusion thresholds for 100MHz to 6GHz at test separation distance > 50 mm ($x=7.5$)	Limit	Result
		(mm)	(dBm)	(mW)			
Bluetooth	2480	60.00	18.18	65.77	0.3322	0.40	PASS
MESH	2475	60.00	12.64	18.37			
WLAN	2462	60.00	10.35	10.84			