

MPE Calculation

Model Name : **SP90**
FCC ID : **S7A-SP90**

Device Category : **Portable device**
Separation distance : **23.0 mm**

KDB 447498 - 4.3.1 a)
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

Modulation	Frequency (MHz)	Min. Test separation distance	Measured Maximum Average power	Tune-up tolerance	Max. Power with tune-up tolerance		Standalone SAR Test exclusion thresholds for 100MHz to 6GHz at test separation distance ≤ 50 mm	Limit	Result
		(mm)	(dBm)	(dB)	(dBm)	(mW)			
GFSK	2402	23.00	7.49	± 1.00	8.49	7.06	0.4759	3.00	PASS
	2441		8.15		9.15	8.22	0.5585	3.00	PASS
	2480		8.39		9.39	8.69	0.5950	3.00	PASS
π /4DQPSK	2402	23.00	7.87	± 1.00	8.87	7.71	0.5195	3.00	PASS
	2441		8.51		9.51	8.93	0.6068	3.00	PASS
	2480		8.77		9.77	9.48	0.6494	3.00	PASS
8DPSK	2402	23.00	8.29	± 1.00	9.29	8.49	0.5722	3.00	PASS
	2441		8.96		9.96	9.91	0.6731	3.00	PASS
	2480		9.26		10.26	10.62	0.7269	3.00	PASS
BT LE	2402	23.00	3.74	± 1.00	4.74	2.98	0.2007	3.00	PASS
	2442		4.10		5.10	3.24	0.2199	3.00	PASS
	2480		4.28		5.28	3.37	0.2309	3.00	PASS
MESH	2410	23.00	9.79	± 1.00	10.79	11.99	0.8096	3.00	PASS
	2445		9.10		10.10	10.23	0.6957	3.00	PASS
	2475		8.25		9.25	8.41	0.5755	3.00	PASS

KDB 447498 - 4.3.2 b)
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)
$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})/x}] \leq 3.0$$
 W/kg, for test separation distances ≤ 50 mm;
where $x = 7.5$ for 1-g SAR and $x = 18.75$ for 10-g SAR.

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	23.00	10.26	10.62	0.2063	0.40	PASS
MESH	2472	23.00	10.79	11.99			

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)	Distance (mm)	
	60	70
1900	209	309
2450	196	296
3600	179	279

Model Name : **SP96-A**

FCC ID : **S7A-SP96**

Separation distance :

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)			
GFSK	2402	70.00	17.00	± 1.00	18.00	63.10	201.3970	297.13	PASS
	2442		17.00		18.00	63.10	201.4086	296.19	PASS
	2480		17.00		18.00	63.10	201.4195	295.56	PASS
BT LE	2402	70.00	3.74	± 1.00	4.74	2.98	200.0659	297.13	PASS
	2442		4.10		5.10	3.24	200.0722	296.19	PASS
	2480		4.28		5.28	3.37	200.0759	295.56	PASS
MESH	2410	60.00	9.79	± 1.00	10.79	11.99	100.3104	196.95	PASS
	2445		8.25		10.10	10.23	100.2667	196.12	PASS
	2475		8.25		9.25	8.41	100.2206	195.63	PASS
2.4 GHz WLAN	2412	70.00	9.00	± 1.00	10.00	10.00	200.2219	296.90	PASS
	2442		9.00		10.00	10.00	200.2232	296.19	PASS
	2472		9.00		10.00	10.00	200.2246	295.67	PASS
5 GHz WLAN	2405	70.00	3.00	± 1.00	4.00	2.51	200.0556	297.06	PASS
	2445		3.00		4.00	2.51	200.0561	296.12	PASS
	2470		3.00		4.00	2.51	200.0564	295.70	PASS

KDB 447498 - 4.3.2 b)

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) [(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)]·[√f(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	70.00	18.00	63.10	0.2252	0.40	PASS
MESH	2475	60.00	10.79	11.99			