

# 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) |
|-----------------|---------------|
|                 | 50            |
| 1900            | 109           |
| 2450            | 96            |
| 3600            | 79            |

Model Name : **SP134**

FCC ID : **2A5D3-SP134**

Separation distance : **59.5 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)  |                                                                                      |       |        |
| GFSK       | 2402            | 50.00                         | 6.20                           | ± 1.00            | 7.20                              | 5.25  | 0.1627                                                                               | 97.13 | PASS   |
|            | 2441            |                               | 5.91                           |                   | 6.91                              | 4.91  | 0.1534                                                                               | 96.21 | PASS   |
|            | 2480            |                               | 5.65                           |                   | 6.65                              | 4.62  | 0.1456                                                                               | 95.56 | PASS   |
| π/4DQPSK   | 2402            | 50.00                         | 4.02                           | ± 1.00            | 5.02                              | 3.18  | 0.0985                                                                               | 97.13 | PASS   |
|            | 2441            |                               | 3.73                           |                   | 4.73                              | 2.97  | 0.0929                                                                               | 96.21 | PASS   |
|            | 2480            |                               | 3.45                           |                   | 4.45                              | 2.79  | 0.0878                                                                               | 95.56 | PASS   |
| 8DPSK      | 2402            | 50.00                         | 6.19                           | ± 1.00            | 7.19                              | 5.24  | 0.1623                                                                               | 97.13 | PASS   |
|            | 2441            |                               | 5.90                           |                   | 6.90                              | 4.90  | 0.1530                                                                               | 96.21 | PASS   |
|            | 2480            |                               | 5.63                           |                   | 6.63                              | 4.60  | 0.1450                                                                               | 95.56 | PASS   |
| BT LE      | 2402            | 50.00                         | 2.07                           | ± 1.00            | 3.07                              | 2.03  | 0.0629                                                                               | 97.13 | PASS   |
|            | 2442            |                               | 1.79                           |                   | 2.79                              | 1.90  | 0.0594                                                                               | 96.19 | PASS   |
|            | 2480            |                               | 1.47                           |                   | 2.47                              | 1.77  | 0.0556                                                                               | 95.56 | PASS   |
| MESH       | 2410            | 50.00                         | 16.74                          | ± 1.00            | 17.74                             | 59.43 | 1.8452                                                                               | 96.95 | PASS   |
|            | 2445            |                               | 16.05                          |                   | 17.05                             | 50.70 | 1.5855                                                                               | 96.12 | PASS   |
|            | 2475            |                               | 15.68                          |                   | 16.68                             | 46.56 | 1.4649                                                                               | 95.63 | 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            | 50.00                         | 7.20                              | 5.25  | 0.2714                                                                                                                 | 0.40  | PASS   |
| MESH       | 2475            | 50.00                         | 17.74                             | 59.43 |                                                                                                                        |       |        |