

SAR evaluation

Product Name : Mobile Solar Trailer
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Test Standard : KDB447498D04 General RF Exposure Guidance v01

According to 447498 D04 Interim General RF Exposure Guidance v01

Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases} \quad (\text{B. 2})$$

where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right)$$

and f is in GHz, d is the separation distance (cm), and $ERP_{20 \text{ cm}}$ is per Formula (B.1).

Example values shown in Table B.2 are for illustration only.

Table B.2—Example Power Thresholds (mW)

Frequency (MHz)	Distance (mm)										
		5	10	15	20	25	30	35	40	45	50
	300	39	65	88	110	129	148	166	184	201	217
	450	22	44	67	89	112	135	158	180	203	226
	835	9	25	44	66	90	116	145	175	207	240
	1900	3	12	26	44	66	92	122	157	195	236
	2450	3	10	22	38	59	83	111	143	179	219
	3600	2	8	18	32	49	71	96	125	158	195
	5800	1	6	14	25	40	58	80	106	136	169

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases} \quad (\text{B. 1})$$

Calculated Result and Limit (WORSE CASE IS AS BELOW)

2.4G WIFI

Directional antennaGain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (mW/cm ²)	Test Result
2.7dBi(1.862)	16.907	49.057 (802.11n40 2437)	3060	Compiles

$$\text{ERP}=16.907+2.7-2.15=55.680 \text{ mW}$$

LTE:

LTE Band 2

Directional antennaGain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (mW/cm ²)	Test Result
2.82dBi(1.914)	23.9	245.471 (QPSK 1860)	3060	Compiles

$$\text{ERP}=23.9+2.82-2.15=286.418\text{mW}$$

LTE Band 4

Directional antennaGain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (mW/cm ²)	Test Result
3.31dBi(2.143)	24.07	255.270 (QPSK 1745)	3060	Compiles

$$\text{ERP}=24.07+3.31-2.15=333.426\text{mW}$$

LTE Band 5:TX: 824MHz-849MHz, RX: 869MHz-894MHz

Directional antennaGain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (mW/cm ²)	Test Result
2.66dBi(1.845)	24.81	302.691 (QPSK 836.5)	2040f= 1706.46	Compiles

$$\text{ERP}=24.81+2.66-2.15=340.408\text{mW}$$

LTE Band 7

Directional antennaGain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (mW/cm ²)	Test Result
2.07dBi(1.611)	23.09	203.704 (QPSK 2535.0)	3060	Compiles

$$\text{ERP}=23.09+2.07-2.15=199.986\text{mW}$$

LTE Band 12

Directional antennaGain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (mW/cm ²)	Test Result
-2.70dBi (0.537)	23.28	212.814 (QPSK 715.3)	2040f=1459.212	Compiles

$$\text{ERP}=23.28-2.70-2.15=69.663\text{mW}$$

LTE Band 13

Directional antennaGain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (mW/cm ²)	Test Result
1.60dBi(1.445)	22.61	182.390 (QPSK 782.0)	2040f=1595.28	Compiles

$$\text{ERP}=22.61+1.60-2.15=160.694\text{mW}$$

LTE Band 17

Directional antennaGain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (mW/cm ²)	Test Result
-2.70dBi (0.537)	23.44	220.800 (QPSK 711.0)	2040f=1450.44	Compiles

$$\text{ERP}=23.44-2.70-2.15=72.277\text{mW}$$

LTE Band 25

Directional antennaGain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (mW/cm ²)	Test Result
1.60dBi(1.445)	24.08	255.859 (QPSK 1852.5)	3060	Compiles

$$\text{ERP}=24.08+1.60-2.15=225.424\text{mW}$$

LTE Band 38

Directional antennaGain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (mW/cm ²)	Test Result
2.07dBi(1.611)	23.35	216.272 (QPSK 2572.5)	3060	Compiles

$$\text{ERP}=23.35+2.07-2.15=212.324\text{mW}$$

LTE Band 40

Directional antennaGain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (mW/cm ²)	Test Result
3.25dBi(2.113)	23.25	211.349 (QPSK 2302.5)	3060	Compiles

$$\text{ERP}=23.25+3.25-2.15=272.270\text{mW}$$

LTE Band 41

Directional antennaGain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (mW/cm ²)	Test Result
2.08dBi(1.614)	23.35	216.272 (QPSK 2506.0)	3060	Compiles

$$\text{ERP}=23.35+2.08-2.15=212.814\text{mW}$$

LTE Band 66

Directional antennaGain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (mW/cm ²)	Test Result
3.31dBi(2.143)	24.98	314.775 (QPSK 1745.0)	3060	Compiles

$$\text{ERP}=24.98+3.31-2.15=411.150\text{mW}$$