

SAR evaluation

Product Name : Android TV Box
FCC ID : 2BFM3-TZS128A1
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)

BLE

Directional antennaGain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (mW/cm ²)	Test Result
5dBi(3.162)	3.899	2.454 (2440 BLE 1M)	3060	Compiles

ERP=3.899+5-2.15=4.730 mW

2.4G WIFI

Directional antennaGain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (mW/cm ²)	Test Result
2dBi(1.585)	22.591	181.593 (802.11G 2437)	3060	Compiles

ERP=22.591+2-2.15=175.428 mW

5.1G WIFI

Directional antennaGain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (mW/cm ²)	Test Result
2dBi(1.585)	17.247	51.251 (802.11a 5240)	3060	Compiles

ERP=17.247+2-2.15=242.326 mW

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} = 2.454/3060 + 181.593/3060 + 51.251/3060 = 0.0769 < 1$$

$$\sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} = (4.730 + 175.428 + 242.326) / 3060 = 0.1380 < 1$$