

SAR evaluation

Product Name : WIFI&BT Module
FCC ID : VYV-AW65S1-50B1
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)

BT

Directional antennaGain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (mW/cm ²)	Test Result
3dBi(1.995)	6.07	4.046 (GFSK 2402)	3060	Compiles

ERP=6.07+3-2.15=4.920 mW

BLE

Directional antennaGain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (mW/cm ²)	Test Result
3dBi(1.995)	12.773	18.937 (BLE 1M 2480)	3060	Compiles

ERP=12.773+3-2.15=23.030 mW

WIFI 2.4G

Directional antennaGain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (mW/cm ²)	Test Result
3dBi(1.995)	19.185	82.890 (802.11n40 2422)	3060	Compiles

ERP=19.185+3-2.15=100.809 mW

WIFI 5G

Directional antennaGain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (mW/cm ²)	Test Result
3dBi(1.995)	18.086	64.358 (802.11n40 5190)	3060	Compiles

ERP=18.086+3-2.15=78.271 mW

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} = 4.046/3060 + 18.937/3060 + 82.89/3060 + 64.358/3060 = 0.055631 < 1$$

$$\sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} = (4.920 + 23.030 + 100.809 + 78.271) / 3060 = 0.067657 < 1$$