

## Maximum Permissible Exposure (MPE) & Exposure evaluation

Report identification number: 1-0585/15-01-14

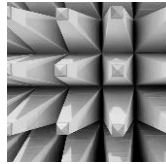
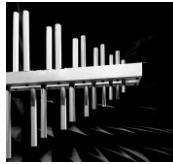
Certification numbers and labeling requirements	
FCC ID	2AEJD-103902-DT50RF
IC number	9301A-103902DT50
HVIN (Hardware Version Identification Number)	DT50RF_MK2
PMN (Product Marketing Name)	DT50RF_MK2
FVIN (Firmware Version Identification Number)	6.6
HMN (Host Marketing Name)	-/-

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### Document authorized:



Thomas Vogler  
Testing Manager  
Radio Communications & EMC



**The MPE is calculated from the worst case EIRP of the following antenna variants used together with the DT50RF WLAN module**

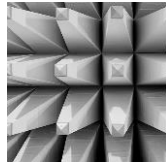
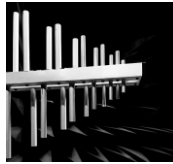
Antenna and firmware option:	Freq. Band	Max. power: dBm 1-port	Max. power: dBm 2-port	Max. power: dBm 3-port	Max. gain: dBi	Max. EIRP 1-port	Max. EIRP 2-port	Max. EIRP 3-port	worst case EIRP dBm	worst case EIRP mW	Max. Power Density mW/cm <sup>2</sup>
Tekfun F51-N	2450	18.4	21.2	23.1	4.5	22.9	25.7	27.6	27.6	575.44	0.1145
Tekfun F51-N	5GHz	18.4	21.2	23	7	25.4	28.2	30	30	1000.00	0.1989
SPA_2400_75_8_0_V	2450	21.7	20.4	24.1	7.5	29.2	27.9	31.6	31.6	1445.44	0.2876
SPA_5600_45_12_10_V	5GHz	13.3	15.9		12	25.3	27.9		27.9	616.60	0.1227
SPA_5600_40_14_0_V_2	5GHz	16.2	18.6		14	30.2	32.6		32.6	1819.70	0.3620
SPA_5600_65_9_0_MIMO	5GHz	17.4	19.5	21.5	9	26.4	28.5	30.5	30.5	1122.02	0.2232

Note:

Worst case conducted power values have been taken from RF test reports.

For the 2.4 GHz band 802.11b-mode with highest average output power was selected for calculation.

Maximum Power includes maximum tune-up tolerance of +2 dB.



### Prediction of MPE limit at given distance - FCC

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG / 4\pi R^2$$

where: S = Power density  
P = Power input to the antenna  
G = Antenna gain (declared by provider)  
R = Distance to the center of radiation of the antenna

The table below is excerpted from Table 1B of 47 CFR 1.1310 titled "Limits for Maximum Permissible Exposure (MPE), Limits for General Population/Uncontrolled Exposure"

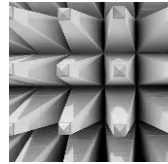
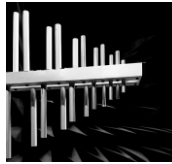
Frequency Range (MHz)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minutes)
300 -1500	f/1500	30
1500 - 100000	1.0	30

where f = Frequency (MHz)

	Technology	WLAN 2.4 GHz	WLAN 5 GHz
PG	Maximum EIRP	31.6 dBm	32.6 dBm
R	Distance	20 cm	20 cm
	Antenna	Antenna: 3x Huber & Suhner SPA_2400_75_8_0_V	Antenna: 2x Huber & Suhner SPA_5600_40_14_0_V_2
S	MPE limit for uncontrolled exposure	1.0 mW/cm <sup>2</sup>	1.0 mW/cm <sup>2</sup>
	<b>Calculated Power density: (collocation of up to 3 antennas assumed)</b>	<b>0.2876 mW/cm<sup>2</sup></b>	<b>0.3620 mW/cm<sup>2</sup></b>

**This prediction demonstrates the following:**

The power density levels for FCC at a distance of 20 cm are below the maximum levels allowed by regulations.



### Prediction of MPE limit at given distance - IC

RSS-102, Issue 5, 2.5.2

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $4.49/f^{0.5} \text{ W}$  (adjusted for tune-up tolerance), where  $f$  is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $1.31 \times 10^{-2} f^{0.6834} \text{ W}$  (adjusted for tune-up tolerance), where  $f$  is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

	Technology	WLAN 2450	WLAN 5 GHz
PG	Maximum EIRP	31.6 dBm	32.6 dBm
S	MPE limit for uncontrolled exposure	2113.3 mW	4478 mW )*
	Calculated output power: (Collocation of up to 3 antennas assumed)	<b>1445 mW</b>	<b>1820 mW</b>
	Antenna	3x Huber & Suhner SPA_2400_75_8_0_V	2x Huber & Suhner SPA_5600_40_14_0_V_2

) \* lowest limit at 5100 MHz

**Conclusion:** for applications where minimum distance to radiating element is 20cm Annex C of RSS-102 should be filled out.