



RF Exposure evaluation

RF Exposure Evaluation

According to KDB 447498 D01 General RF Exposure Guidance v06 and part 2.1091, 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 Test Exclusion Threshold condition(s), listed below, is (are) satisfied.

Limits

The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

Limits for Maximum Permissible Exposure (MPE)

Table with 5 columns: Frequency range (MHz), Electric field strength (V/m), Magnetic field strength (A/m), Power density (mW/cm²), Averaging time (minutes). It is divided into two sections: (A) Limits for Occupational/Controlled Exposures and (B) Limits for General Population/Uncontrolled Exposure.

f = frequency in MHz

Friis transmission formula: Pd = (Pout * G) / (4 * pi * r^2)

Where

Pd = power density in mW/cm², Pout = output power to antenna in mW;

G = gain of antenna in linear scale, Pi = 3.1416;

R = distance between observation point and center of the radiator in cm

Pd is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.



Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

Test Result of RF Exposure Evaluation

Mode	Max Output power(dBm)	Output power (mW)	Power Density at R=20cm (mW/cm2)	Limit (mW/cm2)	Result
BLE	-0.3	0.93	0.0004	1.0	PASS
5.2G WIFI	15.77	37.76	0.0218	1.0	PASS
5.8G WIFI	19.19	82.99	0.0478	1.0	PASS
BT	-0.74	0.84	0.0004	1.0	PASS

Remark: BT, BLE antenna gain=3.35dBi, 5GWIFI antenna gain=4.62dBi

Remark: BT, BLE, 5.2GWIFI and 5.8GWIFI can transmit at the same time.

In the case of simultaneous launches for BT, BLE, 5.2GWIFI and 5.8GWIFI:

The Max Calc. Thresholds : BLE: 0.0004, 5.2G WIFI: 0.0218, 5.8G WIFI:0.0478, BT:0.0004

BT, BLE, 5.2GWIFI and 5.8GWIFI: $0.0004/1+0.0218/1+0.0478/1+0.0004/1=0.0704 \leq 1$

So a SAR test is not required