

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)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

f = frequency in MHz

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

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

Test Channel	Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power (mW)
GFSK			
CH00	2402	4.121	2.583
CH39	2441	4.130	2.588
CH79	2480	4.157	2.604
$\pi/4$ -DQPSK			
CH00	2402	1.678	1.472
CH39	2441	1.599	1.445
CH79	2480	1.184	1.313
8-DPSK			
CH00	2402	2.132	1.634
CH39	2441	2.027	1.595
CH79	2480	1.644	1.460

	Frequency MHz	Peak Output Power (dBm)	Target power W/toler ance (dBm)	Max Output power to antenna (dBm)	Max Output power to antenna (mW)	Power Density at R=20cm (mW/cm ²)	Limit (mW/c m ²)	Result
GFSK	2402	4.121	4 \pm 1	5	3.162	0.0005	1.0	PASS
	2441	4.130	4 \pm 1	5	3.162	0.0005	1.0	PASS
	2480	4.157	4 \pm 1	5	3.162	0.0005	1.0	PASS
$\pi/4$ -DQPSK	2402	1.678	1 \pm 1	2	1.585	0.0003	1.0	PASS
	2441	1.599	1 \pm 1	2	1.585	0.0003	1.0	PASS
	2480	1.184	1 \pm 1	2	1.585	0.0003	1.0	PASS
8-DPSK	2402	2.132	2 \pm 1	3	1.995	0.0003	1.0	PASS
	2441	2.027	2 \pm 1	3	1.995	0.0003	1.0	PASS
	2480	1.644	1 \pm 1	2	1.585	0.0003	1.0	PASS

Remark: 1. BT Antenna gain is 1.3dBi

The Max Calc. Thresholds : 0.0005 \leq 1

Conclusion: No SAR is required.