RF Exposure Evaluation

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 KDB 447498 D01 V06 and 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*G)/(4*pi*r^2)**

Where

Pd = power density in mW/cm^2, **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 id the limit of MPE, 1 mW/cm^2. 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.

EIRP=EMeas+20log(dMeas)-104.7

EIRP   is the equivalent isotropically radiated power, in dBm

EMeas   is the field strength of the emission at the measurement distance, in dB μ V/m

dMeas   is the measurement distance, in m

Test Result of RF Exposure Evaluation

wifi 2.4G mode

Channel	Output power to antenna (dBm)	Output power to antenna (mW)	Power Density at R=20cm (mW/cm^2)	Limit (mW/cm^2)	Result
802.11b	16.484	44.5041	0.01546	1.0	PASS
802.11g	13.319	21.4734	0.00746	1.0	PASS
802.11n HT20	14.179	26.1758	0.00909	1.0	PASS
802.11n HT40	13.279	21.2765	0.00739	1.0	PASS

Remark: antenna gain=2.42dBi

5.2G mode

Channel	Output power to antenna (dBm)	Output power to antenna (mW)	Power Density at R=20cm (mW/cm^2)	Limit (mW/cm^2)	Result
802.11a	12.959	19.7651	0.01342	1.0	PASS
802.11ac HT20	12.927	19.6200	0.01332	1.0	PASS
802.11ac HT40	13.02	20.0447	0.01361	1.0	PASS
802.11n HT20	12.823	19.1558	0.01300	1.0	PASS
802.11n HT40	13.011	20.0032	0.01358	1.0	PASS

Remark: antenna gain=5.33dBi

5.8G mode

Channel	Output power to antenna (dBm)	Output power to antenna (mW)	Power Density at R=20cm (mW/cm^2)	Limit (mW/cm^2)	Result
802.11a	14.119	25.8167	0.01752	1.0	PASS
802.11ac HT20	14.196	26.2785	0.01784	1.0	PASS
802.11ac HT40	14	25.1189	0.01705	1.0	PASS
802.11n HT20	14.316	27.0147	0.01834	1.0	PASS
802.11n HT40	13.922	24.6718	0.01675	1.0	PASS

Remark: antenna gain=5.33dBi

The product's 2.4G and 5G signals cannot be transmitted at the same time.