

SAR Evaluation

1. RF Exposure Compliance Requirement:

Standard Requirement

According to FCC Part1.1310: 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 part1.1307(b)

TABLE 1—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

Formula

Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * R^2)$ Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW G =

gain of antenna in linear scale

π = 3.1416

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

P_d is the limit of MPE . 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.

2. EUT RF Exposure

Antenna Gain: 2Bi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is in linear scale. Output

Power Into Antenna & RF Exposure Evaluation Distance:

Measurement Data				
802.11b mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	14.35	15±1	16	39.81
Middle(2437MHz)	14.29	15±1	16	39.81
Highest(2462MHz)	14.29	15±1	16	39.81

802.11g mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	11.48	12±1	13	19.95
Middle(2437MHz)	11.22	12±1	13	19.95
Highest(2462MHz)	11.16	12±1	13	19.95
802.11n(HT20)mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	10.63	11±1	12	15.85
Middle(2437MHz)	10.28	11±1	12	15.85
Highest(2462MHz)	10.20	11±1	12	15.85
802.11n(HT40)mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2422MHz)	10.26	10±1	11	12.59
Middle(2437MHz)	9.93	10±1	11	12.59
Highest(2452MHz)	10.12	10±1	11	12.59

Worst case: 802.11b mode Lowest(2412MHz)
(Using the maximum value of the test report)

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
39.81	2.0	0.01255	1	PASS

Remark: The Max Conducted Peak Output Power data refer to report Report No.: HK1910152577-E

value.:

$$2) P_d = (P_{out} * G) / (4 * \pi * R^2) = (39.81 * 1.585) / (4 * 3.1416 * 20^2) = 0.01255$$