



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 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: $Pd = (P_{out} * G) / (4 * \pi * r^2)$

Where

Pd = 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

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

SISO ANT A								
Mode	Frequency (MHz)	Peak Output Power (dBm)	Tune UP tolerance (dBm)	Max Tune UP power (dBm)	Max Tune UP power (mW)	Power Density at R=20cm (mW/cm ²)	Limit (mW/cm ²)	Result
802.11a	5825	16.319	17.5+0/-2	17.5	56.23	0.077396	1.0	PASS
802.11n20	5825	17.489	17.5+0/-2	17.5	56.23	0.077396	1.0	PASS
802.11n40	5795	15.812	17.5+0/-2	17.5	56.23	0.077396	1.0	PASS
802.11ac20	5825	17.386	17.5+0/-2	17.5	56.23	0.077396	1.0	PASS
802.11ac40	5795	15.915	17.5+0/-2	17.5	56.23	0.077396	1.0	PASS
802.11ac80	5775	15.587	17.5+0/-2	17.5	56.23	0.077396	1.0	PASS
SISO ANT B								
802.11a	5745	16.372	16.5+0/-2	16.5	44.67	0.042729	1.0	PASS
802.11n20	5745	15.911	16.5+0/-2	16.5	44.67	0.042729	1.0	PASS
802.11n40	5755	14.892	16.5+0/-2	16.5	44.67	0.042729	1.0	PASS
802.11ac20	5745	15.772	16.5+0/-2	16.5	44.67	0.042729	1.0	PASS
802.11ac40	5755	14.993	16.5+0/-2	16.5	44.67	0.042729	1.0	PASS
802.11ac80	5775	14.604	16.5+0/-2	16.5	44.67	0.042729	1.0	PASS
MIMO ANT A+B								
802.11n20	5825	17.341	17.5+0/-2	17.5	56.23	0.129933	1.0	PASS
802.11n40	5795	15.714	17.5+0/-2	17.5	56.23	0.129933	1.0	PASS
802.11ac20	5825	17.201	17.5+0/-2	17.5	56.23	0.129933	1.0	PASS
802.11ac40	5795	15.791	17.5+0/-2	17.5	56.23	0.129933	1.0	PASS
802.11ac80	5775	15.907	17.5+0/-2	17.5	56.23	0.129933	1.0	PASS

Antenna is SISO ANT A is 8.40dBi, B is 6.82dBi and MIMO ANT A+B is 10.65dBi

All model has been tested, only the worst-case data has been evaluated.