

RF EXPOSURE EVALUATION

EUT Specification

EUT	10.1" IN-CAR SEATBACK MONITOR WITH DVD
Frequency band (Operating)	<input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz for 802.11b/g/n(HT20) <input type="checkbox"/> WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz <input type="checkbox"/> WLAN: 5.745GHz ~ 5825GHz <input checked="" type="checkbox"/> Others(FM: 88.1~107.9MHz)
Device category	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others ____
Antenna diversity	<input type="checkbox"/> Single antenna <input checked="" type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity
Max. output power	For WIFI: 15.02 dBm (31.77mW) For FM: 61.51dBuV/m (-33.75dBm/ 4.22e-4 mW)
Antenna gain	For WIFI: 0dBi; For FM: 1.0dBi
Evaluation applied	<input checked="" type="checkbox"/> MPE Evaluation <input type="checkbox"/> SAR Evaluation

Limits for Maximum Permissible Exposure (MPE)

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density(mW/cm ²)	Average Time
(A) Limits for Occupational/Control Exposures				
300-1500	--	--	F/300	6
1500-100000	--	--	5	6
(B) Limits for General Population/Uncontrol Exposures				
300-1500	--	--	F/1500	6
1500-100000	--	--	1	30

Friis transmission formula: $P_d = \frac{P_{out} * G}{4 * \pi * R^2}$

Where

P_d = Power density in mW/cm^2

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 the limit of MPE, $1mW/cm^2$. If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

Measurement Result

For WIFI Mode

Channel	Gain	Channel Frequency (MHz)	Max Output power (dBm)	Tolerance	Max Tune-UP power (mW)	Power density at 20cm (mW/cm^2)	Power density Limits (mW/cm^2)
802.11b							
Low	0	2412	15.02	± 0.5	35.65	0.0071	1
Middle	0	2437	14.81	± 0.5	33.96	0.0068	1
High	0	2462	14.88	± 0.5	34.51	0.0069	1
802.11g							
Low	0	2412	14.46	± 0.5	31.33	0.0062	1
Middle	0	2437	14.63	± 0.5	32.58	0.0065	1
High	0	2462	14.65	± 0.5	32.76	0.0065	1
802.11n HT20							
Low	0	2412	14.60	± 0.5	32.36	0.0064	1
Middle	0	2437	14.60	± 0.5	32.36	0.0064	1
High	0	2462	15.01	± 0.5	35.56	0.0071	1

For FM mode

Channel Frequency (MHz)	Max Output power (dBuV/m)	Max Output power (dBm)	Tolerance	Max Tune-UP power (mW)	Power density at 20cm (mW/ cm ²)	Power density Limits (mW/cm ²)
88.1	51.87	-43.39	±0.5	5.14e-5	1.29e-8	1.0
97.9	61.51	-33.75	±0.5	4.73e-4	1.19e-7	1.0
107.9	57.18	-38.08	±0.5	1.75e-4	4.37e-8	1.0

$$E = \text{EIRP} - 20 \log D + 104.8$$

where:

E = electric field strength in dB μ V/m,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

$$\text{EIRP} = E - 104.9 + 20 \log D = 61.51 - 104.8 + 20 \log 3 = -33.75 \text{ dBm}$$

The EUT can not support the FM and WIFI at the same time.

The SAR measurement is not necessary.