

## RF EXPOSURE EVALUATION

### EUT Specification

<b>EUT</b>	IP Camera
<b>Frequency band (Operating)</b>	<input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz <input type="checkbox"/> WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz <input type="checkbox"/> WLAN: 5.745GHz ~ 5.825GHz <input type="checkbox"/> Others(Bluetooth: 2.402GHz ~ 2.480GHz)
<b>Device category</b>	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others ____
<b>Antenna diversity</b>	<input checked="" type="checkbox"/> Single antenna <input type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity
<b>Max. output power</b>	20.62dBm(115.35mW)
<b>Antenna gain</b>	2.01dBi
<b>Evaluation applied</b>	<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 <sup>2</sup> )	Average Time
<b>(A) Limits for Occupational/Control Exposures</b>				
300-1500	--	--	F/300	6
1500-100000	--	--	5	6
<b>(B) Limits for General Population/Uncontrol Exposures</b>				
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

$\pi$  = 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

Channel	Channel Frequency (MHz)	gain of antenna in linear scale	Max Output power (dBm)	Tolerance	Max Tune-UP power (mW)	Power density at 20cm ( $mW/cm^2$ )	Power density Limits ( $mW/cm^2$ )
<b>802.11b</b>							
Low	2412	1.5885	12.18	$\pm 0.5$	18.54	0.00586	1
Middle	2437	1.5885	14.07	$\pm 0.5$	28.64	0.00905	1
High	2462	1.5885	13.76	$\pm 0.5$	26.67	0.00843	1
<b>802.11g</b>							
Low	2412	1.5885	18.09	$\pm 0.5$	72.28	0.0228	1
Middle	2437	1.5885	19.35	$\pm 0.5$	96.61	0.0305	1
High	2462	1.5885	19.14	$\pm 0.5$	92.04	0.0291	1
<b>802.11n HT20</b>							
Low	2412	1.5885	17.39	$\pm 0.5$	61.52	0.0194	1
Middle	2437	1.5885	19.23	$\pm 0.5$	93.97	0.0297	1
High	2462	1.5885	19.04	$\pm 0.5$	89.95	0.0284	1
<b>802.11n HT40</b>							
Low	2422	1.5885	20.62	$\pm 0.5$	129.42	0.0409	1
Middle	2437	1.5885	19.09	$\pm 0.5$	90.99	0.0288	1
High	2452	1.5885	16.16	$\pm 0.5$	46.34	0.0146	1