

## RF EXPOSURE EVALUATION

### EUT Specification

<b>EUT</b>	<b>Waterproof MP3 Radio Receiver</b>
<b>Frequency band (Operating)</b>	<input 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 checked="" 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>	-1.01dBm(0.79mW)
<b>Antenna gain</b>	0dBi
<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)	Max Output power (dBm)	Tolerance	Max Tune-UP power (mW)	Power density at 20cm ( $mW/cm^2$ )	Power density Limits ( $mW/cm^2$ )
Test mode: GFSK						
Low	2402	-3.32	$\pm 0.1$	0.48	9.48e-5	1
Middle	2441	-2.07	$\pm 0.1$	0.64	1.26e-4	1
High	2480	-1.01	$\pm 0.1$	0.81	1.61e-4	1
Test mode: $\pi/4$ -DQPSK						
Low	2402	-4.94	$\pm 0.1$	0.33	6.53e-5	1
Middle	2441	-3.78	$\pm 0.1$	0.43	8.53e-5	1
High	2480	-2.74	$\pm 0.1$	0.54	1.08e-4	1
Test mode: 8DPSK						
Low	2402	-4.49	$\pm 0.1$	0.36	7.24e-5	1
Middle	2441	-3.23	$\pm 0.1$	0.49	9.68e-5	1
High	2480	-2.29	$\pm 0.1$	0.60	1.20e-4	1

**Remark: Both of transmitters can not transmit simultaneously.**

**According to KDB447498 D01 V06, no simultaneous SAR measurement is required.**