

RF EXPOSURE EVALUATION

EUT Specification

EUT	BLUETOOTH SPEAKER
Frequency band (Operating)	☐ WLAN: 2.412GHz ~ 2.462GHz ☐ WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz ☐ WLAN: 5.745GHz ~ 5825GHz ☒ Others(Bluetooth: 2.402GHz ~ 2.480GHz)
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others ____
Antenna diversity	☒ Single antenna ☐ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☐ Tx/Rx diversity
Max. output power	-2.68dBm (0.540mW)
Antenna gain	-0.68dBi
Evaluation applied	☒ MPE Evaluation ☐ SAR Evaluation

Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time $ E ^2, H ^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	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, * Plane-wave equivalent power density

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

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

From the peak EUT RF output power, the minimum mobile separation distance, $d=0.2m$, as well as the gain of the antenna is $-0.68dBi$, the RF power density can be obtained.

Channel Frequency (MHz)	Antenna Gain (Numeric)	Max Output power (dBm)	Tolerance	Max Tune-UP power (mW)	Power density at 20cm (mW/cm^2)	Power density Limits (mW/cm^2)
GFSK						
2402	0.855	-3.87	± 1	0.516	0.00009	1.0
2441	0.855	-3.63	± 1	0.546	0.00009	1.0
2480	0.855	-3.48	± 1	0.565		1.0
$\pi/4$ -DQPSK						
2402	0.855	-3.26	± 1	0.594	0.00010	1.0
2441	0.855	-2.99	± 1	0.632	0.00011	1.0
2480	0.855	-2.68	± 1	0.679	0.00012	1.0

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure.

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, Human proximity to the antenna shall not be less than 20cm(8 inches) during normal operation. Proposed RF exposure safety information to include in User's Manual.