

Safety Human Exposure

1.1 Radio Frequency Exposure Compliance

1.1.1 Electromagnetic Fields

RESULT:

Pass

Test Specification

Test standard

: CFR47 FCC Part 2: Section 2.1091
CFR47 FCC Part 1: Section 1.1310
FCC KDB Publication 447498 v06
FCC KDB Publication 865664 D01 v01r04
FCC KDB Publication 865664 D02 v01r02
RSS-102 Issue 5 March 2015

1.1.1.1 RF Exposure Compliance Requirement for FCC (FCC ID: VLJ-EASE44BU)

FCC requirement: Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 20cm normally can be maintained between the user and the device.

MPE Calculation Method according to KDB 447498 v06

Power Density: $S_{(mW/cm^2)} = PG/4\pi R^2$ or $EIRP/4\pi R^2$

Where:

S = power density (mW/cm²)

P = power input to the antenna (mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (cm)

From the peak RF output power, the minimum mobile separation distance, d=20 cm, as well as the antenna gain (Max. 0.0 dBi for 2.4GHz FHSS, 0.0 dBi for Wi-Fi 802.11 b/g/n), the RF power density can be calculated as below:

$$S_{(mW/cm^2)} = PG/4\pi R^2$$

a) EUT RF Exposure Evaluation standalone operations

Test Mode	Antenna Gain	Measured Conducted Output Power (e.i.r.p)		Maximum Conducted Output Power (e.i.r.p)		$S_{(mW/cm^2)} = \frac{e.i.r.p}{4\pi R^2}$
	(dBi)	(dBm)	(mW)	(dBm)	(mW)	
2.4GHz	0	18.00	63.096	19.00	79.433	0.016
Wi-Fi b/g/n	0	19.70	93.325	20.00	100.000	0.020

b) EUT RF Exposure Evaluation simultaneous transmission operations

Simultaneous Transmission Mode	The Sum of the Ratios	Result
2.4GHz + Wi-Fi b/g/n	$0.016/1 + 0.020/1 < 1$	Pass

Limits for Maximum Permissible Exposure (MPE) according to FCC Part 1.1310:

1.0 mW/cm²

1.1.1.2 RF Exposure Compliance Requirement for IC (IC: 4522A-EASE44BU)

The EUT shall comply with the requirement of RSS-102 section 2.5.2.

Exemption from Routine Evaluation Limits – RF Exposure Evaluation

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device’s radiating element is greater than 20 cm, except when the device operates as follows:

at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;

- RF exposure evaluation exempted power for FHSS: 2.676 W
- RF exposure evaluation exempted power for Wi-Fi 802.11 b/g/n: 2.684 W

a) EUT RF Exposure Evaluation standalone operations:

Test Mode	Measured Peak Power		Antenna Gain (dBi)	Measured Peak Power e.i.r.p	
	(dBm)	(W)		(dBm)	(W)
2.4GHz	18.00	0.063	0	18.00	0.063
Wi-Fi b/g/n	19.70	0.093	0	19.70	0.093

b) EUT RF Exposure Evaluation simultaneous transmission operations

Simultaneous Transmission Mode	The Sum of the Ratios	Result
2.4GHz+ Wi-Fi b/g/n	$0.063/2.676 + 0.093/2.684 < 1$	Pass

The e.i.r.p. for FHSS and Wi-Fi 802.11 b/g/n are less than the RF exposure evaluation exempted power. So RF exposure evaluation is not required.

“RF Radiation Exposure Statement Caution: This Transmitter must be installed to provide a separation distance of at least 20 cm from all persons.”