September 24, 2024

FCC ID: HYQ17EAE

To whom it may concern,

We, UL Japan, Inc, hereby declare that BLE ECU, model: 17EAE (FCC ID: HYQ17EAE) of DENSO CORPORATION is exempt from RF exposure SAR evaluation because the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula according to the Code of Federal Regulation title 47 section 1.1307(b)(3)(i)(B). This method is used at separation distances d (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive) for single RF sources. P_{th} is given by:

$$P_{th}\ (\mathrm{mW}) = \begin{cases} ERP_{20\ \mathrm{cm}}\ (d\ /\ 20\ \mathrm{cm})^{x} & d \le 20\ \mathrm{cm} \\ ERP_{20\ \mathrm{cm}} & 20\ \mathrm{cm} < d \le 40\ \mathrm{cm} \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\ \mathrm{cm}}\sqrt{f}}\right) \text{ and } f \text{ is in GHz}$$

$$ERP_{20\ \mathrm{cm}}\ (\mathrm{mW}) = \begin{cases} 2040f & 0.3\ \mathrm{GHz} \le f < 1.5\ \mathrm{GHz} \\ 3060 & 1.5\ \mathrm{GHz} \le f \le 6\ \mathrm{GHz} \end{cases}$$

When the minimum separation distance is shorter than 0.5 cm, 0.5 cm is applied.

The SAR evaluation exemption threshold is calculated as below.

Pth (mW)	3060
f (GHz)	2.48
$ERP_{20\ \mathrm{cm}}$ (mW)	3060
d (cm)	20.0

Conducted Power	(dBm)	2.00
	(mW)	1.58
Antenna Gain (dBi)		1.44
EIRP (dBm)		3.44
ERP	(dBm)	1.30
	(mW)	1.35

The Maximum time-averaged power or ERP whichever greater is 1.6 mW.

Even considering the tolerance, this device can be satisfied with the threshold.

Thank you for your attention to this matter.

Shinichi Miyazono
Leader

UL Japan, Inc. Ise EMC Lab
4383-326 Asama-cho, Ise-shi, Mie 516-0021 Japan
T:: +81.596.24.8999 / F:: +81.596.24.8124 / W:: japan.ul.com