DEKRA Certification, Inc.
405 Glenn Dr. Suite 12,
Sterling, VA 20164
United States of America

Test report No:
3529ERM.003

Assessment report
RF EXPOSURE REPORT ACCORDING TO
FCC 47 CFR Part 2.1093
FCC 47 CFR Part 1.1307

(*) Identification of item under evaluation	Battery Radiofrequency Module
(*) Trademark	Visteon
(*) Model and /or type reference	BRFM S
(*) Other identification of the product	FCC ID: NT8-BRFMS
(*) Features	Wireless Battery Management
(*) Manufacturer	Visteon Corporation One Village Center Drive Van Buren Township, MI 48111, USA
Test method requested, standard	FCC 47 CFR Part 2.1093. Radiofrequency radiation exposure evaluation: portable devices FCC 47 CFR Part 1.1307: Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Domingo Galvez EMC&RF Lab Manager Digitally signed by Domingo Galvez DN: cn=Domingo Galvez, o=DEKRA Certification Inc., ou=Regulatory Lab, email=dgalvez@dekra.com, c=US Date: 2022.03.02 10:32:51 -05'00'
Date of issue	03-02-2022
Report template No	FAN24_02 (*) "Data provided by the client"

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Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested", “General description of the device”).
2. Maximum antenna gain and measurement distance information.
3. The device under evaluation consists of a Battery Radiofrequency Module (BRFM S) and 12 Cell Monitoring Units (FCC ID for SLA8: NT8-SLA8) in Wireless Battery Management device.

DEKRA Certification Inc. declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Identification of the client

Visteon Corporation

One Village Center Drive

Van Buren Township, MI 48111, USA

Document history

Report number	Date	Description
3529ERM.003	03-02-2022	First release

Appendix A: FCC RF Exposure assessment result

General description of the device under evaluation

The device under evaluation consists of Battery Radiofrequency Module (BRFM S) and 12 Cell Monitoring Units **(**FCC ID for SLA8: NT8-SLA8) in Wireless Battery Management device.

According to the manufacturer, during its normal use, the separation distance between the radiating structures of the device and nearby users will be greater than 11 cm. In order to perform the assessment a conservative evaluation distance of minimum compliance distance 11 cm has been used.

As stated into DEKRA Certification Inc. test reports. 3529ERM.002 and 3184ERM.002A1, the maximum measured output power levels for each supported technology are:

Technology /Mode	Band	Frequency (MHz)	Maximum Conducted Output Power (dBm)	Duty Cycle (%)	Time Averaged Conducted Power (dBm)	Antenna peak gain (dBi)	Maximum Averaged E.I.R.P. (dBm)	Maximum Averaged E.I.R.P. (mW)
Proprietary BRFM S	2.4 GHz	2405 - 2480	9.50	88.00	8.94	2.60	11.54	14.27
Proprietary CMUr*	2.4 GHz	2405 - 2480	7.60	3.70	-6.72	2.60	-4.12	0.39

Table 1: Equipment specifications

* The Proprietary CMUr information provided in the Table 1 is for 1 CMUr device, the information is same for all the 12 CMUr devices.

Evaluation Results

The evaluation according to the minimum intended use distance of 110 mm is as follows:

Technology / Mode	Band	Frequency (MHz)	Distance (cm)	Maximum E.R.P. output power (mW)	Limit (mW)	Verdict
Proprietary BRFM S	2.4 GHz	2405 - 2480	11	8.70	232.32	**Pass**
Proprietary CMUr*	2.4 GHz	2405 - 2480	11	0.24	232.32	**Pass**

Table 2: FCC Evaluation Result

* The Proprietary CMUr information provided in the Table 2 is for 1 CMUr device, the information is same for all the 12 CMUr devices.

The computed value(s) are below the limit(s), so according to KDB 447498 D01 – General RF Exposure Guidance, these modes meet the RF Exposure test exemption for single source.

Simultaneous transmission assessment:

The device under evaluation is able to transmit simultaneously using Proprietary 2.4 GHz BRFM S and 12 CMUrs transmitters, therefore the most conservative approach for the evaluation of the simultaneous transmission is as follows:

Simultaneous technologies and modes	Result (∑ of Pout/Pmax ratios)	Verdict (∑ ≤ 1)
Proprietary 2.4 GHz BRFM S + 12 Proprietary 2.4 GHz CMUrs	0.01	**Pass**

Table 3: Simultaneous Transmission assessment

Appendix B: FCC RF Exposure information

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RF Exposure determination of exemption

According to FCC 47 CFR §1.1307 (b)(3) Determination of exemption:

(i) For single RF sources (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph (b)(2), a single RF source is exempt if:

(A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A);

(B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold Pth (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). Pth is given by:

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

Where

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

and

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

d = the separation distance (cm);

(C) Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least λ/2π, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of λ/4 or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

TABLE 1 TO §1.1307(b)(3)(i)(C)—SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1,920 R^2.
1.34-30	3,450 R^2/f^2.
30-300	3.83 R^2.
300-1,500	0.0128 R^2f.
1,500-100,000	19.2R^2.

(ii) For multiple RF sources: Multiple RF sources are exempt if:

(A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required). This exemption may not be used in conjunction with other exemption criteria other than those is paragraph (b)(3)(i)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(i)(A).

(B) in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^{a} \frac{P_i}{P_{th,i}} + \sum_{j=1}^{b} \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^{c} \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

Where:

a = number of fixed, mobile, or portable RF sources claiming exemption using paragraph (b)(3)(i)(B) of this section for Pth, including existing exempt transmitters and those being added.

b = number of fixed, mobile, or portable RF sources claiming exemption using paragraph (b)(3)(i)(C) of this section for Threshold ERP, including existing exempt transmitters and those being added.

c = number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance including existing evaluated transmitters.

Pi = the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source i at a distance between 0.5 cm and 40 cm (inclusive).

Pth,i = the exemption threshold power (Pth) according to paragraph (b)(3)(i)(B) of this section for fixed, mobile, or portable RF source i.

ERPj = the ERP of fixed, mobile, or portable RF source j.

ERPth,j = exemption threshold ERP for fixed, mobile, or portable RF source j, at a distance of at least λ/2π according to the applicable formula of paragraph (b)(3)(i)(C) of this section.

Evaluated,k = the maximum reported SAR or MPE of fixed, mobile, or portable RF source k either in the device or at the transmitter site from an existing evaluation at the location of exposure.

Exposure Limit,k = either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable RF source k, as applicable from §1.1310 of this chapter.