DEKRA Certification, Inc.
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United States of America

Test report No:
3183ERM.006A1

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

(*) Identification of item under evaluation	Battery Radiofrequency Module
(*) Trademark	Visteon
(*) Model and /or type reference	BRFM
(*) Other identification of the product	FCC ID: NT8-BRFM
(*) 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
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: 2021.11.08 15:23:59 -05'00'
Date of issue	2021-11-08
Report template No	FAN24_02 (*) "Data provided by the client"

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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 use distance information.

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
3183ERM.006	2021-10-15	First release
3183ERM.006A1	2021-11-08	Second release

Modifications to the reference test report

It was introduced the following modification in respect to the test report number 3183ERM.006 related with the same samples:

Clauses/ Sub-Clauses	Modification	Justification
Page 6/Table 1 and Table 2	Adding additional values for port 1 and port 2.	As per Certification Body comments
Page 7/Table 3	Adding additional values for port 1 and port 2.	As per Certification Body comments
Page 7/Table 4	Adding table 4 to include the simultaneous transmission evaluation	As per Certification Body comments

This modification test report cancels and replaces the test report 3183ERM.006.

Appendix A: FCC RF Exposure assessment result

General description of the device under evaluation

The device under evaluation consists of a Battery Radiofrequency Module.

According to the manufacturer, the separation distance between the radiating structures of the device and users nearby will be 11 cm during its normal use.

As stated in the test report number 3183ERM.002 from DEKRA Certification Inc., the maximum measured output power level for the supported technology is the following:

Technology / Mode	Band	Frequency (MHz)	Maximum E.I.R.P. (dBm)	Maximum E.I.R.P. (mW)
Proprietary Port 1	2.4 GHz	2402 - 2480	14.50	28.18
Proprietary Port 2	2.4 GHz	2402 - 2480	14.10	25.70

Table 1: Equipment specifications

Assessment summary

The assessment summary according to the radiofrequency radiation exposure limits defined in FCC 47 CFR § 2.1093 is the following:

Technology / Mode	Band	Frequency (MHz)	Verdict
Proprietary Port 1	2.4 GHz	2402 - 2480	**Pass**
Proprietary Port 2	2.4 GHz	2402 - 2480	**Pass**

Table 2: Assessment summary

Evaluation Results

The evaluation according to the minimum intended use distance of 11 cm will be as follow:

Technology / Mode	Band	Frequency (MHz)	Distance (cm)	Max Output Power (mW)	Limit 1-g SAR (mW)	SAR Test Exclusion
Proprietary DM	2.4 GHz	2402 - 2480	11.00	28.18	696	**Pass**
Proprietary Flora	2.4 GHz	2402 - 2480	11.00	25.70	696	**Pass**

Table 3: FCC Evaluation Result

The computed value(s) are below the limit(s), so according to KDB 447498 D01 – General RF Exposure Guidance, these modes qualify for Standalone SAR test exclusion for 1-g SAR and 10-g Extremity SAR.

Simultaneous Transmission results:

The device under evaluation is able to transmit simultaneously using Proprietary protocol transmitters, therefore the most conservative approach for the evaluation of the simultaneous transmission will be:

Simultaneous technologies and modes	Result (W/kg)	Limit (W/kg)	Verdict
Proprietary 2.4 GHz Port 1 + Proprietary 2.4 GHz Port 2	0.8*	1.6**	**Pass**

Table 4. Simultaneous Transmission evaluation

* According to section 4.3.2, part b.2 of the KDB 447498 D01. Conservative estimation is applied per each port: 0.4W/kg.

** Average SAR limit.

Appendix B: FCC RF Exposure information

FCC SAR test exclusion considerations for portable devices

For transmission frequencies below 6GHz, as stated by the FCC (47 CFR §2.1093), human exposure to RF emissions from portable devices, which are defined as transmitting devices to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user, must be evaluated with respect to the FCC-adopted limits for SAR.

According to FCC OET KDB 447498 D01 General RF Exposure Guidance:

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition is satisfied.

- For distances ≤ 50 mm

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR

Where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table:

MHz	5	10	15	20	25	30	35	40	45	50	mm
150	39	77	116	155	194	232	271	310	349	387	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	164	192	219	246	274	
450	22	45	67	89	112	134	157	179	201	224	
835	16	33	49	66	82	98	115	131	148	164	
900	16	32	47	63	79	95	111	126	142	158	
1500	12	24	37	49	61	73	86	98	110	122	
1900	11	22	33	44	54	65	76	87	98	109	
2450	10	19	29	38	48	57	67	77	86	96	
3600	8	16	24	32	40	47	55	63	71	79	
5200	7	13	20	26	33	39	46	53	59	66	
5400	6	13	19	26	32	39	45	52	58	65	
5800	6	12	19	25	31	37	44	50	56	62	

SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm

- **For distances > 50 mm**

For 100 MHz to 6 GHz frequencies and for test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following:

1) [Power allowed at numeric threshold for 50 mm in table 1) + (test separation distance - 50 mm)·(f(MHz)/150)] mW, at 100 MHz to 1500 MHz

2) [Power allowed at numeric threshold for 50 mm in table 1) + (test separation distance - 50 mm)·10] mW, at > 1500 MHz and ≤ 6 GHz

Approximate SAR test exclusion power thresholds at selected frequencies and test separation distances are illustrated in the following table

MHz	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	mm
100	474	481	487	494	501	507	514	521	527	534	541	547	554	561	567	SAR Test Exclusion Threshold (mW)
150	387	397	407	417	427	437	447	457	467	477	487	497	507	517	527	
300	274	294	314	334	354	374	394	414	434	454	474	494	514	534	554	
450	224	254	284	314	344	374	404	434	464	494	524	554	584	614	644	
835	164	220	275	331	387	442	498	554	609	665	721	776	832	888	943	
900	158	218	278	338	398	458	518	578	638	698	758	818	878	938	998	
1500	122	222	322	422	522	622	722	822	922	1022	1122	1222	1322	1422	1522	
1900	109	209	309	409	509	609	709	809	909	1009	1109	1209	1309	1409	1509	
2450	96	196	296	396	496	596	696	796	896	996	1096	1196	1296	1396	1496	
3600	79	179	279	379	479	579	679	779	879	979	1079	1179	1279	1379	1479	
5200	66	166	266	366	466	566	666	766	866	966	1066	1166	1266	1366	1466	
5400	65	165	265	365	465	565	665	765	865	965	1065	1165	1265	1365	1465	
5800	62	162	262	362	462	562	662	762	862	962	1062	1162	1262	1362	1462	

SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and > 50 mm

- For frequencies below 100 MHz

The following may be considered for SAR test exclusion:

1) For test separation distances > 50 mm and < 200 mm, the power threshold at the corresponding test separation distance at 100 MHz in step b) is multiplied by [1 + log(100/f(MHz))]

2) For test separation distances ≤ 50 mm, the power threshold determined by the equation in c) 1) for 50 mm and 100 MHz is multiplied by ½

Approximate SAR test exclusion power thresholds at selected frequencies and test separation distances are illustrated in the following table

MHz	< 50	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	mm
100	237	474	481	487	494	501	507	514	521	527	534	541	547	554	561	567	mW
50	308	617	625	634	643	651	660	669	677	686	695	703	712	721	729	738	
10	474	948	961	975	988	1001	1015	1028	1041	1055	1068	1081	1095	1108	1121	1135	
1	711	1422	1442	1462	1482	1502	1522	1542	1562	1582	1602	1622	1642	1662	1682	1702	
0.1	948	1896	1923	1949	1976	2003	2029	2056	2083	2109	2136	2163	2189	2216	2243	2269	
0.05	1019	2039	2067	2096	2125	2153	2182	2211	2239	2268	2297	2325	2354	2383	2411	2440	
0.01	1185	2370	2403	2437	2470	2503	2537	2570	2603	2637	2670	2703	2737	2770	2803	2837	

SAR Test Exclusion Thresholds for frequencies < 100 MHz

Simultaneous Transmission SAR Test Exclusion:

According to FCC OET KDB 447498 D01 General RF Exposure Guidance:

When an antenna qualifies for the standalone SAR test exclusion of 4.3.1 and also transmits simultaneously with other antennas, the standalone SAR value must be estimated according to the following to determine the simultaneous transmission SAR test exclusion criteria:

1) [(*max. power of channel, including tune-up tolerance, mW*) / (*min. test separation distance, mm*)]·[√f(GHz)/*x*] W/kg, for *test separation distances* ≤ 50 mm;
where *x* = 7.5 for 1-g SAR and *x* = 18.75 for 10-g SAR.

2) 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the *test separation distance* is > 50 mm.