

Test report No:  
 3128ERM.007A1

## Assessment report RF EXPOSURE REPORT ACCORDING TO FCC 47 CFR Part 2.1091

(*) Identification of item under evaluation	LCD display unit for Rear seat entertainment
(*) Trademark	Innolux
(*) Model and /or type reference	Padi 31.3
(*) Other identification of the product	FCC ID: 2AQPW-DD313BZ-01C
(*) Features	Bluetooth Classic (BR & EDR)
(*) Manufacturer	CARUX TECHNOLOGY INC. No. 12, Building B, Nanke 8 <sup>th</sup> Road, Shanhua District, Tainan City, 74144
Test method requested, standard	FCC 47 CFR Part 2.1091 Radiofrequency radiation exposure evaluation: mobile devices.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Domingo Galvez EMC&RF Lab Manager
Date of issue	01-05-2022
Report template No	FERMUSA_200 (*) "Data provided by the client"

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## Competences and guarantees

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DEKRA Certification Inc. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Certification Inc. at the time of performance of the test.

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## General conditions

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1. This report is only referred to the item that has undergone the assessment.
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## 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

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Innolux Europe BV  
Stationsstraat 39G  
6411NK, Heerlen, Netherlands

## Document history

Report number	Date	Description
3128ERM.007	01-05-2022	First release
3128ERM.007A1	02-18-2022	Second release

## Modifications to the reference test report

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It was introduced the following modifications in respect to the test report number 3128ERM.007 related with the same samples:

Clauses/ Sub-Clauses	Modification	Justification
Page 6: General description of the device under evaluation	Antenna Gain value updated	Typo error
Page 1: Cover	Manufacturer information	Update requested by the customer

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This modification test report cancels and replaces the test report 3128ERM.007.

## Appendix A: FCC RF Exposure assessment result

## General description of the device under evaluation

The device under evaluation consists of an Automotive Rear Seat Entertainment LCD Display mounted on the Ceiling.

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 distance (>20cm). In order to perform the assessment a conservative evaluation distance of 20 cm has been used.

As stated into DEKRA Certification Inc. test report num. 3128ERM.006, the maximum measured output power levels for each supported technology are:

Technology / Mode	Band	Frequency (MHz)	Maximum Conducted Output Power (dBm)	Antenna peak gain (dBi)	Maximum E.I.R.P. (dBm)	Maximum E.I.R.P. (mW)
Bluetooth BR/EDR	2.4 GHz	2400 - 2483.5	2.80	-3.2	0.30	1.07

**Table 1:** Equipment specifications

## RF Exposure Assessment result and verdict

Limits for Maximum Permissible Exposure (MPE) to comply with FCC 47 CFR § 2.1091 are defined in “§1.1310 Radiation Exposure limits, paragraph (e)”:

Technology / Mode	Band	Frequency (MHz)	Distance (cm)	Power density (mW/cm <sup>2</sup> )	FCC General Population Limit (mW/cm <sup>2</sup> )	Verdict
Bluetooth BR/EDR	2.4 GHz	2400 - 2483.5	20	0.0002	1.00	<b>Pass</b>

**Table 2:** Assessment result and verdict

## Appendix B: FCC RF Exposure information

## RF Exposure evaluation

Devices operating in standalone mobile device exposure conditions may contain a single transmitter or multiple transmitters that do not transmit simultaneously. A minimum test separation distance  $\geq 20$  cm is required between the antenna and radiating structures of the device and nearby persons to apply mobile device exposure limits. The distance must be at least 20 cm and fully supported by the operating and installation configurations of the transmitter and its antenna(s), according to the source-based time-averaged maximum power requirements of § 2.1091(d)(2). In cases where cable losses or other attenuations are applied to determine compliance, the most conservative operating configurations and exposure conditions must be evaluated. The minimum test separation distance required for a device to comply with mobile device exposure conditions must be clearly identified in the installation and operating instructions, for all installation and exposure conditions, to enable users and installers to comply with RF exposure requirements. For mobile devices that have the potential to operate in portable device exposure conditions, similar to the configurations described in § 2.1091(d)(4), a KDB inquiry is required to determine the SAR test requirements for demonstrating compliance.

When a device qualifies for the categorical exclusion provision of § 2.1091(c), the minimum test separation distance may be estimated, when applicable, by simple calculations according to plane-wave equivalent conditions, to ensure the transmitter and its antenna(s) can operate in manners that meet or exceed the estimated distance. The source-based time-averaged maximum radiated power, according to the maximum antenna gain, must be applied to calculate the field strength and power density required to establish the minimum test separation distance. When the estimated test separation distance becomes overly conservative and does not support compliance, MPE measurement or computational modeling may be used to determine the required minimum separation distance.

According to §1.1310 Radiofrequency radiation exposure limits, paragraph (e), the limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields are:

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposure</b>				
0.3–3.0 .....	614	1.63	* 100	6
3.0–30 .....	1842/f	4.89/f	* 900/f <sup>2</sup>	6
30–300 .....	61.4	0.163	1.0	6
300–1,500 .....	.....	.....	f/300	6
1,500–100,000 .....	.....	.....	5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3–1.34 .....	614	1.63	* 100	30
1.34–30 .....	824/f	2.19/f	* 180/f <sup>2</sup>	30
30–300 .....	27.5	0.073	0.2	30
300–1,500 .....	.....	.....	f/1500	30
1,500–100,000 .....	.....	.....	1.0	30

f = frequency in MHz \* = Plane-wave equivalent power density



## MPE Evaluation

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Each supported transmission technology will be evaluated to determine if it is in compliance with limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields.

In order to perform the assessment, the following equations have been used for the calculations; these equations are accurate in the far-field of an antenna and will over-predict power density in the near field, where they could be used for making a "worst-case" or conservative prediction:

$$\text{Power density: } S[mW/cm^2] = \frac{P_{E.I.R.P.}[mW]}{4\pi R[cm]^2}$$

Where:

$S$  = power density

$P_{E.I.R.P.}$  = Equivalent isotopically radiated power

$R$  = distance to the center of radiation of the antenna (evaluation distance)

$$P_{E.I.R.P.} = P_T + G_T - L_C$$

Where:

$P_T$  = transmitter output power (including tune-up tolerance)

$G_T$  = gain of the transmitting antenna

$L_C$  = signal attenuation in the connecting cable between the transmitter and the antenna if applicable