

Test report No:
NIE: 71652REM.002

Test report

FCC Rules and Regulations CFR 47, Part 15, Subpart B
(10-1-20 Edition) & ICES-003 Issue 7 (October 2020)

(*) Identification of item tested	Instrument Cluster incl. immobilizer for Audi Cars
(*) Trademark	Bosch
(*) Model and /or type reference	Audi FPK Gen2+
(*) Other identification of the product	FCC ID: 2AUXS -AUFPK2P IC: 25847-AUFPK2P HW version: H02 SW version: X010 HVIN: 0 263 742, 0 263 753
(*) Features	Immobilizer
Manufacturer	Robert Bosch GmbH Robert-Bosch-Platz 1 70839 Gerlingen, Germany
Test method requested, standard	FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-20 Edition) & ICES-003 Issue 7 (October 2020)
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Rafael López Martín EMC Consumer & RF Lab. Manager
Date of issue	2022-09-20
Report template No.	FDT08_24 (*) "Data provided by the client"



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Acronyms

Acronym ID	Acronym Description
Code	EMC Test Code
Freq Rng	Frequency Range
MP	Measurement Point
OM	Operation Mode
S/	Sample
V	Verdict

Competences and guarantees

DEKRA Testing and Certification S.A.U. is a testing laboratory accredited by the National Accreditation Body (ENAC - Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

DEKRA Testing and Certification S.A.U. is an FCC-recognized accredited testing laboratory with the appropriate scope of accreditation that covers the performed tests in this report, FCC designation number ES0004.

DEKRA Testing and Certification S.A.U. is an ISED recognized accredited testing laboratory, CABid: ES1909, with the appropriate scope of accreditation that covers the performed tests in this report.

In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification S.A.U. has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification S.A.U. 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 Testing and Certification S.A.U. at the time of performance of the test.

DEKRA Testing and Certification S.A.U. is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

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2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
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4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Testing and Certification S.A.U. and the Accreditation Bodies.

Uncertainty

Uncertainty (factor $k=2$) was calculated according to the DEKRA Testing and Certification S.A.U. internal document PODT000.

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 30 MHz to 1000 MHz is $l = \pm 4,9$ dB for quasi-peak measurements, $l = \pm 4,6$ dB for peak measurements ($k = 2$).

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").
2. The sample of the model Audi FPK Gen2+ is a digital instrument cluster with an immobilizer for Audi cars.

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

Usage of samples

Samples undergoing test have been selected by: The client.

Id	Control Number	Description	Model	Serial Nº	Date of Reception	Application
S/01, S/02	71652_10.1	AC/DC adapter	FW7555O/12	--	2022-05-04	Auxiliary Equipment
S/01, S/02	71652_14.1	USB cable	--	--	2022-05-04	Auxiliary Equipment
S/01, S/02	71652_15.1	USB cable	--	--	2022-05-04	Auxiliary Equipment
S/01, S/02	71652_16.1	Media cable	--	--	2022-05-04	Auxiliary Equipment
S/01, S/02	71652_17.1	Optic cable	--	--	2022-05-04	Auxiliary Equipment
S/01, S/02	71652_18.1	Harness	--	--	2022-05-04	Auxiliary Equipment
S/01, S/02	71652_20.1	Laptop	X201	R9DFKE2	2022-05-04	Auxiliary Equipment
S/01, S/02	71652_21.1	Monitor	TFT1780A	YELV009172	2022-05-04	Auxiliary Equipment
S/01	71652_25.1	Cluster	Audi FPK Gen2+ (Q2 variant)	0416 1629	2022-05-04	Equipment Under Test
S/02	71652_27.1	Cluster	Audi FPK Gen2+ (Q3 variant)	0416 1901	2022-06-16	Equipment Under Test
S/01, S/02	71652_3.1	Car-key		--	2022-05-03	Auxiliary Equipment
S/01, S/02	71652_7.1	MOST150 Interface box	VN2640	007149-000298	2022-05-04	Auxiliary Equipment
S/01, S/02	71652_8.1	Interface box	--	007129-032669	2022-05-04	Auxiliary Equipment
S/01, S/02	71652_9.1	AC/DC adapter	CH-1205	0232M	2022-05-04	Auxiliary Equipment

Notes referenced to samples during the project.:

S/01: Sample testing for Q2 variant.

S/02: Sample testing for Q3 variant.

Test sample description

Ports..... :	Port name and description		Cable				
			Specified max length [m]	Attached during test	Shielded	Coupled to patient ⁽³⁾	
	Main Connector		> 3m	☒	☐	☐	
	MOST-Connector		> 3m	☒	☐	☐	
LVDS-Connector		> 3m	☒	☒	☐		
Supplementary information to the ports..... :							
Rated power supply	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	☐	AC:	☐	☐	☐	☐	☐
	☐	AC:	☐	☐	☐	☐	☐
	☒	DC: 9-16V. Nominal: 12 Vdc by vehicle battery.					
☒	DC: 2.5A at 14V.						
Rated Power							
Clock frequencies..... : 125 kHz							
Other parameters							
Software version : X010							
Hardware version : H02							
Dimensions in cm (W x H x D) : 18 x 32.5 x 9.3							
Mounting position	☐	Table top equipment					
	☐	Wall/Ceiling mounted equipment					
	☐	Floor standing equipment					
	☐	Hand-held equipment					
	☒	Other: Cluster in the car					
Modules/parts..... :	Module/parts of test item		Type		Manufacturer		
Accessories (not part of the test item)	Description		Type		Manufacturer		
Documents as provided by the applicant	Description		File name		Issue date		

⁽³⁾ Only for Medical Equipment.

Identification of the client

Robert Bosch GmbH
Robert-Bosch-Platz 1
70839 Gerlingen, Germany

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2022-05-25
Date (finish)	2022-05-25

Document history

Report number	Date	Description
71652REM.002	2022-09-20	First release

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860mbar Max. = 1060mbar

In the semianechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860mbar Max. = 1060mbar

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 60 %
Air pressure	Min. = 860mbar Max. = 1060mbar

Remarks and comments

The tests have been performed by the technical personnel: Antonio Ruiz Sánchez.

Testing verdicts

Fail	F
Inconclusive	I
Not applicable	N/A
Not measured	N/M
Pass	P

List of equipment used during the test

Control No.	Equipment	Model	Manufacturer	Next Calibration
4848	EMC/RF MEASUREMENT SOFTWARE	EMC32	ROHDE AND SCHWARZ	---
5641	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2024-09-15
6064	SEMIANECHOIC ABSORBER LINED CHAMBER III	SAC-3	FRANKONIA	---
8866	EMI TEST RECEIVER 2Hz-44GHz	ESW44	ROHDE AND SCHWARZ	2023-09-21
6129	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2023-04-28
6126	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2023-05-04
6132	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2023-05-09

Summary

Test Specification.	Requirement – Test case	Verdict	Remark
FCC CFR 47, Part 15, Subpart B (10-1-20 Edition) & ICES-003 Issue 7 (October 2020)	RE Radiated emission. Electromagnetic field measure	P	--
	CE Continuous Conducted Emission	N/A	(1)
<u>Supplementary information and remarks:</u> (1). Not applicable according to standard. DC powered equipment for vehicular use.			

Appendix A: Test results

Appendix A content

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Description of the operation modes

The operation modes described in this paragraph constitute a functionality of the sample under test for itself.

The operation modes used by the samples to which the present report refers are shown in the following table:

Id	Description
OM/01	EUT ON. Active dashboard . Key inserted. speedometer at 100km/h, tachometer at 3000rpm, indicators active and temperature at 90°C, and with the auxiliary PC monitoring the Bus statistics. Power supply:13.5Vdc

Test standards version applied

The product standards and test standards applied for each test cases are shown in the following table:

Product Test Standard	Test standard	Requirement – Test case
FCC CFR 47, Part 15, Subpart B (10-1-20 Edition) & ICES-003 Issue 7 (October 2020)	ANSI C63.4 (2014)	RE Radiated emission.

Test Cases Details

FCC CFR 47, Part 15, Subpart B
(10-1-20 Edition) & ICES-003 Issue 7 (October 2020)
RE Radiated emission. Electromagnetic field measure

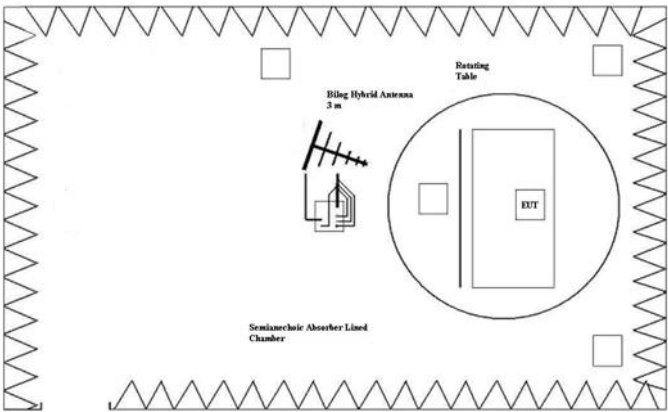
Limits of interference Class B

The applied limit for radiated emissions, 3 m distance, according to the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-1-20 Edition), Secs. 15.109 & ICES-003 Issue 7 (October 2020)

Frequency range (MHz)	FCC Part 15B		ICES-003 Issue 7		FCC Part 15B & ICES-003 Issue 7	
	QP Limit for 3 m		QP Limit for 3 m		PK Limit for 3 m	AVG Limit for 3 m
	(µV/m)	(dBµV/m)	(µV/m)	(dBµV/m)	(dBµV/m)	(dBµV/m)
30 to 88	100	40	100	40	---	---
88 to 216	150	43.5	150	43.5	---	---
216 to 230	200	46	200	46	---	---
230 to 960	200	46	224	47		
960 to 1000	500	54	500	54	---	---
Above 1000	---	---	---	---	74	54

Limits according to FCC Part 15B are equal to or more stringent than those of ICES-003 Issue 7.

Setup for measurements



Setup for measurements < 1GHz.

Results

SI	OM	Code	Freq Rng (MHz)	V
01	OM/01	RE0101LR	[30, 1000]	P
02	OM/01	RE0201LR	[30,1000]	P

Verdict

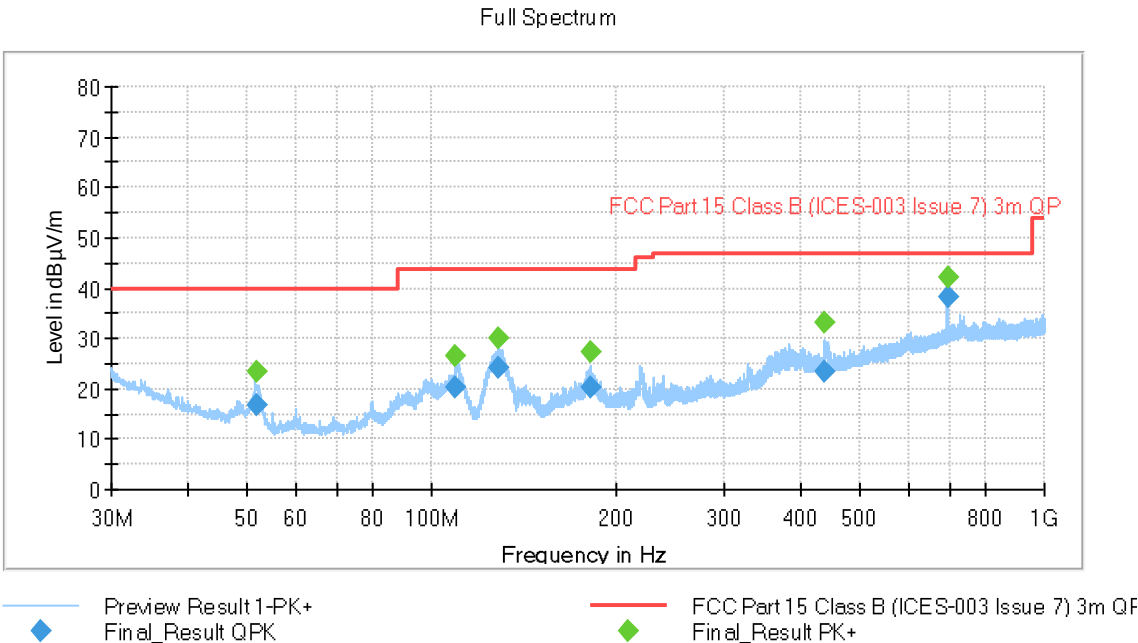
P

EMC Test Code = RE0101LR, Frequency Range MHz = [30, 1000]

Sample ID: S/01

Operation Mode: OM/01. EUT ON. Active dashboard . Key inserted. speedometer at 100km/h, tachometer at 3000rpm, indicators active and temperature at 90°C, and with the auxiliary PC monitoring the Bus statistics.
Power supply:13.5Vdc.

Images:



Tables:

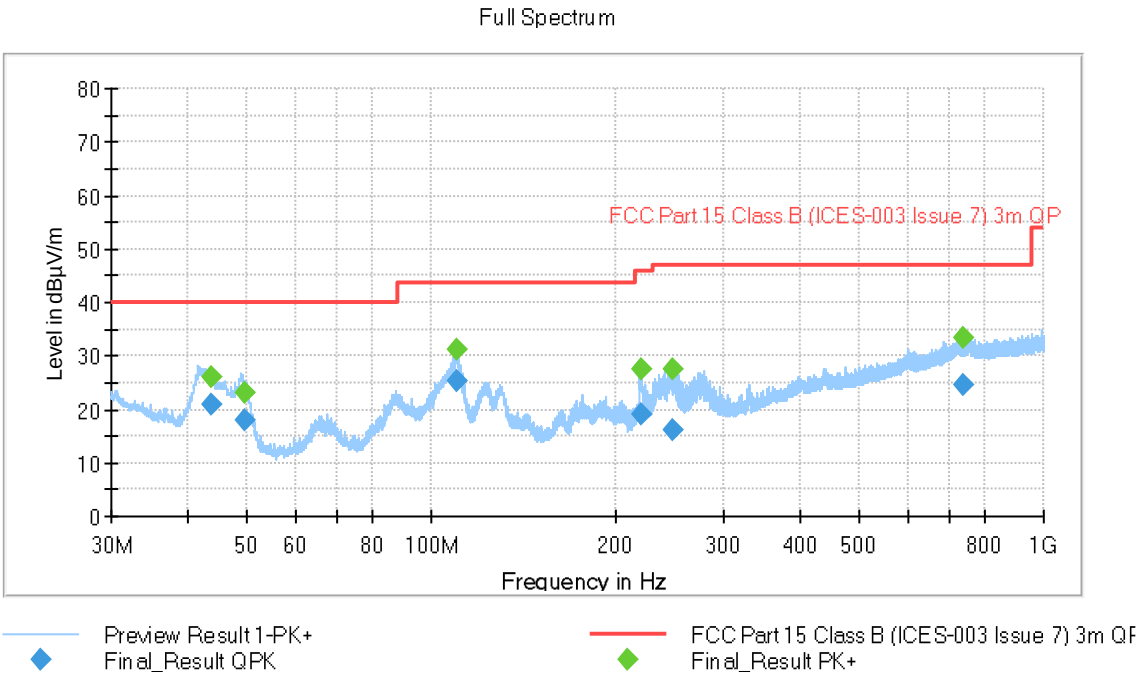
Frequency(MHz)	QuasiPeak(dBµV/m)	MaxPeak(dBµV/m)	Limit(dBµV/m)	Margin(dB)	Height(cm)	PoI	Azimuth(deg)
51.614000	---	23.32	---	---	171.0	V	42.0
51.614000	16.81	---	40.00	23.19	171.0	V	42.0
109.473000	---	26.53	---	---	122.0	V	-90.0
109.473000	20.26	---	43.52	23.26	122.0	V	-90.0
128.001000	---	29.94	---	---	136.0	V	-92.0
128.001000	24.13	---	43.52	19.39	136.0	V	-92.0
181.992000	---	27.48	---	---	114.0	V	88.0
181.992000	20.40	---	43.52	23.12	114.0	V	88.0
438.502000	23.57	---	47.00	23.43	183.0	H	-28.0
438.502000	---	33.16	---	---	183.0	H	-28.0
693.905000	38.39	---	47.00	8.61	125.0	H	88.0
693.905000	---	42.26	---	---	125.0	H	88.0

EMC Test Code = RE0201LR, Frequency Range MHz = [30, 1000]

Sample ID: S/02

Operation Mode: OM/01. EUT ON. Active dashboard . Key inserted. speedometer at 100km/h, tachometer at 3000rpm, indicators active and temperature at 90°C, and with the auxiliary PC monitoring the Bus statistics.
Power supply:13.5Vdc.

Images:



Tables:

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
43.734000	20.96	---	40.00	19.04	115.0	V	148.0
43.734000	---	26.05	---	---	115.0	V	148.0
49.605000	---	23.26	---	---	301.0	V	-117.0
49.605000	17.87	---	40.00	22.13	301.0	V	-117.0
109.666000	---	31.35	---	---	100.0	V	-114.0
109.666000	25.44	---	43.52	18.08	100.0	V	-114.0
220.136000	19.22	---	46.00	26.78	181.0	H	-91.0
220.136000	---	27.49	---	---	181.0	H	-91.0
247.947000	---	27.46	---	---	136.0	H	-14.0
247.947000	16.18	---	47.00	30.82	136.0	H	-14.0
736.530000	---	33.22	---	---	163.0	V	-152.0
736.530000	24.69	---	47.00	22.31	163.0	V	-152.0