

Test report No:
NIE: 64848REM.002

Test report

FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-19 Edition) & ICES-003 Issue 7 (October 2020)

(*) Identification of item tested	Automotive infotainment System
(*) Trademark	Audi
(*) Model and /or type reference	SCON2
Other identification of the product	HW version: C1 SW version: 0107
(*) Features	Wi-Fi
Manufacturer	HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH BECKER-GOERING-STR. 16 76307 KARLSBAD, GERMANY
Test method requested, standard	FCC CFR 47, Part 15, Subpart B (10-1-19 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	2021-02-15
Report template No	FDT08_23 (*) "Data provided by the client"

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Acronyms

Acronym ID	Acronym Description
Avg	Radiated Average Level
Avg	Conducted Average Level
Az	Azimuth
CPL	Zones / Coupling Cables
Code	EMC Test Code
Freq	Frequency
Freq Rng	Frequency Range
H	Height
Line	Conducted Emissions - Tested Line
MP	Measurement Point
Max	Conducted Maximum Level
MaxPeak	Radiated Maximum Peak Level
OM	Operation Mode
Pol	Polarization
QuasiPeak	Conducted Quasi Peak Level
QuasiPeak	Radiated Quasi Peak Level
S/	Sample
V	Verdict
Volt Immunity Lvl	Voltage Immunity Severity Level
Volt Immunity Type	Voltage Immunity Type

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.

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.

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

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Uncertainty

Uncertainty (factor $k=2$) was calculated according to the DEKRA Testing and Certification 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 $I = \pm 4,9$ dB for quasi-peak measurements, $I = \pm 4,6$ dB for peak measurements ($k=2$).

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 1000 MHz to 26 GHz is $I = \pm 2,6$ dB for peaks and average 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 consists of a rear Seat control unit.

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 N°	Date of Reception	Application
S/01	64848_006	Rear Seat Control Unit	SCON2	HBV006L66RPW YK	2020-12-15	Element under test
S/01	64848_011	Harness	---	---	2020-12-15	Auxiliary element
S/01	64848_014	USB adapter module	---	---	2020-12-15	Auxiliary element

Notes referenced to samples during the project.

Id	Note
S/01	Sample for radiated emission test

Test sample description

Test Sample description (compulsory information for EMC and RF testing services)

Ports..... :	Port name and description	Cable					
		Specified max length [m]	Attached during test	Shielded	Coupled to patient ⁽³⁾		
	Harness						
Supplementary information to the ports..... :	N/A						
Rated power supply	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	☒	DC: 12V Car battery / alternator (9.5V-15.5V normal operation)					
Rated Power	Not provided data						
Clock frequencies.....	Not provided data						
Other parameters	Not provided data						
Software version	0107						
Hardware version	C1						
Dimensions in cm (W x H x D)	Not provided data						
Mounting position		Table top equipment					
		Wall/Ceiling mounted equipment					
		Floor standing equipment					
		Hand-held equipment					
	X	Other: Automotive infotainment system					

Modules/parts.....:	Module/parts of test item	Type	Manufacturer
	N/A		
Accessories (not part of the test item)	Description	Type	Manufacturer
	N/A		
	N/A		
Documents as provided by the applicant.....:	Description	File name	Issue date
	N/A		

⁽³⁾ Only for Medical Equipment

Identification of the client

HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH
BECKER-GOERING-STR. 16
76307, KARLSBAD, GERMANY

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2020-12-18
Date (finish)	2020-12-18

Document history

Report number	Date	Description
64848REM.002	2021-02-15	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. = 20 % Max. = 75 %

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

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %

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. = 20 % Max. = 35 %

Remarks and comments

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

Testing verdicts

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

List of equipment used during the test

Control Number	Description	Model	Manufacturer	Next Calibration
2942	EMI TEST RECEIVER 20Hz-40GHz	ESU40	ROHDE AND SCHWARZ	2021-09-17
4612	HORN ANTENNA 1-18GHz	BBHA 9120 D	SCHWARZBECK MESS-ELEKTRONIK	2021-06-14
4656	HORN ANTENNA 18-40GHz	BBHA 9170	SCHWARZBECK	2021-07-19
4729	PRE-AMPLIFIER G>30dB 18-40GHz	BLMA 1840-1M	BONN ELEKTRONIK	2021-02-11
5641	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2021-07-31
6064	SEMIANECHOIC ABSORBER LINED CHAMBER III	SAC-3	Frankonia	---
6126	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2021-04-17
6132	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2021-04-20
6195	PRE-AMPLIFIER G>55dB 1-18GHz	AMF-7D-01001800-22-10P	NARDA	2021-05-19
6329	SHIELDED ROOM		FRANKONIA	---

Summary

Test Specification.	Requirement – Test case	Verdict	Remark
FCC CFR 47, Part 15, Subpart B (10-1-19 Edition) & ICES-003 Issue 7 (October 2020)	Radiated emission	Pass	---
FCC CFR 47, Part 15, Subpart B (10-1-19 Edition) & ICES-003 Issue 7 (October 2020)	Conducted emission	N/A	(1)

Supplementary information and remarks:

1. This test is not applicable because EUT is powered in DC.

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. Every operation mode takes a failure criteria for the immunity test that they were applying to it and a monitoring to guarantee performance of the same ones.

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. Display activated. WiFi 2.4GHz and WiFi 5 GHz OFF. Power supply: 12Vdc

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 (10-1-19 Edition) & ICES-003 Issue 7 (October 2020)	FCC CFR 47, Part 15, Subpart B (10-1-19 Edition) & ICES-003 Issue 7 (October 2020)	Radiated emission

Test Cases Details

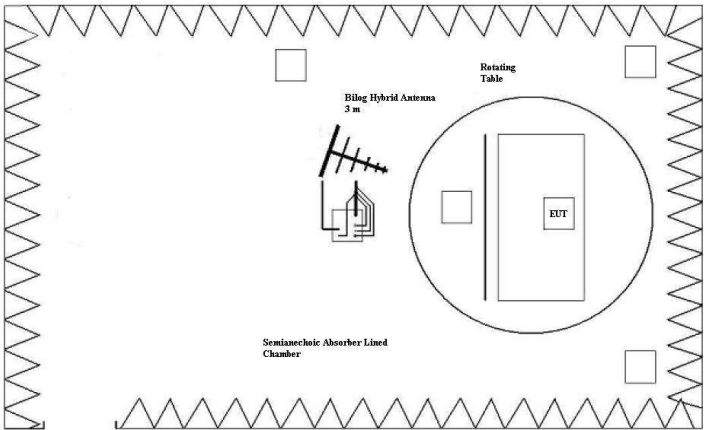
FCC CFR 47, Part 15, Subpart B (10-1-19 Edition) &
ICES-003 Issue 7 (October 2020)
RE Radiated emission

Limits of interference Class B

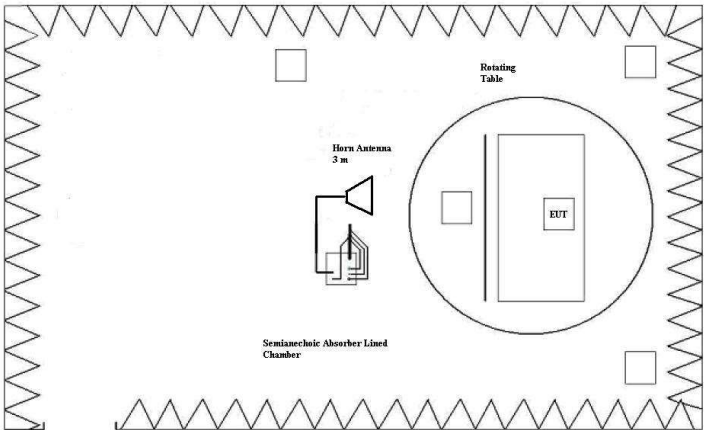
The applied limit for radiated emissions, 3 m distance, according with the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-1-19 Edition), Secs. 15.109 & ICES-003 Issue 7 (Updated 04-2020)

Frequency of emission (MHz)	Field strength limit (microvolt/meter) (QuasiPeak Detector)	ICES-003 Issue 7 Field strength (dBµV/m)
30-88	100	40
88-216	150	43.5
216-230	200	46
230-960	200	47
Above 960	500	54

*Above 1GHz, the limit is defined for an AVG detector.



Setup for measurements < 1GHz.



Setup for measurements > 1GHz.

RESULTS

REmmnnRR	Description	Result
RE0101LR	Range: 30 MHz - 1000 MHz.	P
RE0101HR1	Range: 1 GHz – 17 GHz.	P
RE0101HR2	Range: 17 GHz – 26 GHz.	P

REmmnnRR: RE: Radiated Emission; mm: Sample number; nn: Operation mode; RR: Measurement range.

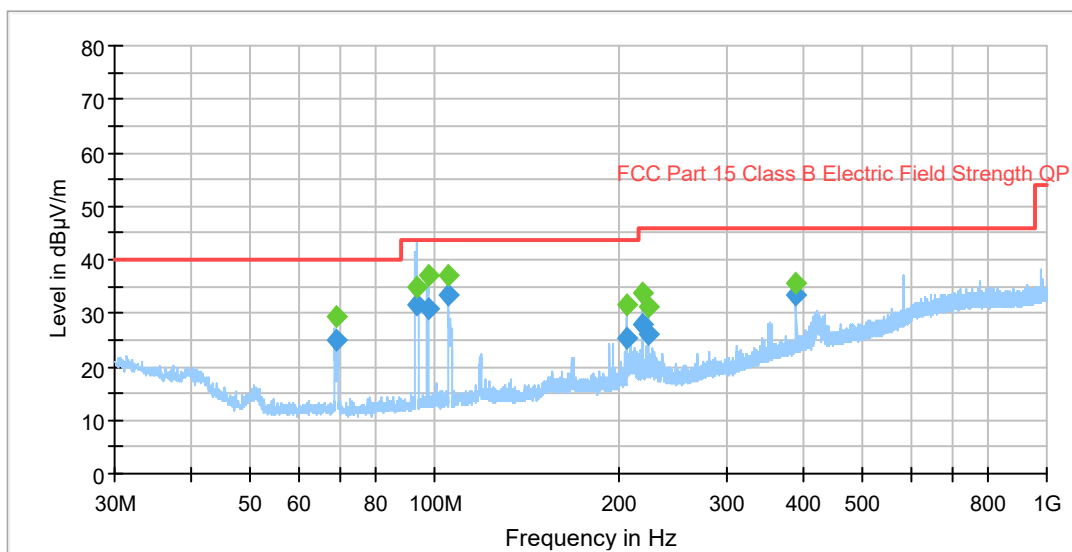
VERDICT

Pass

Images:

Project: 64848REM.002
Company: HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH
Sample: S/01
Operation mode: 01
Graphical code: RE0101LR
Description: EUT ON. Display activated. WiFi 2.4GHz and WiFi 5 GHz OFF.
Power supply: 12Vdc
Verdict: Passed

RE FCC Part 15 Class B



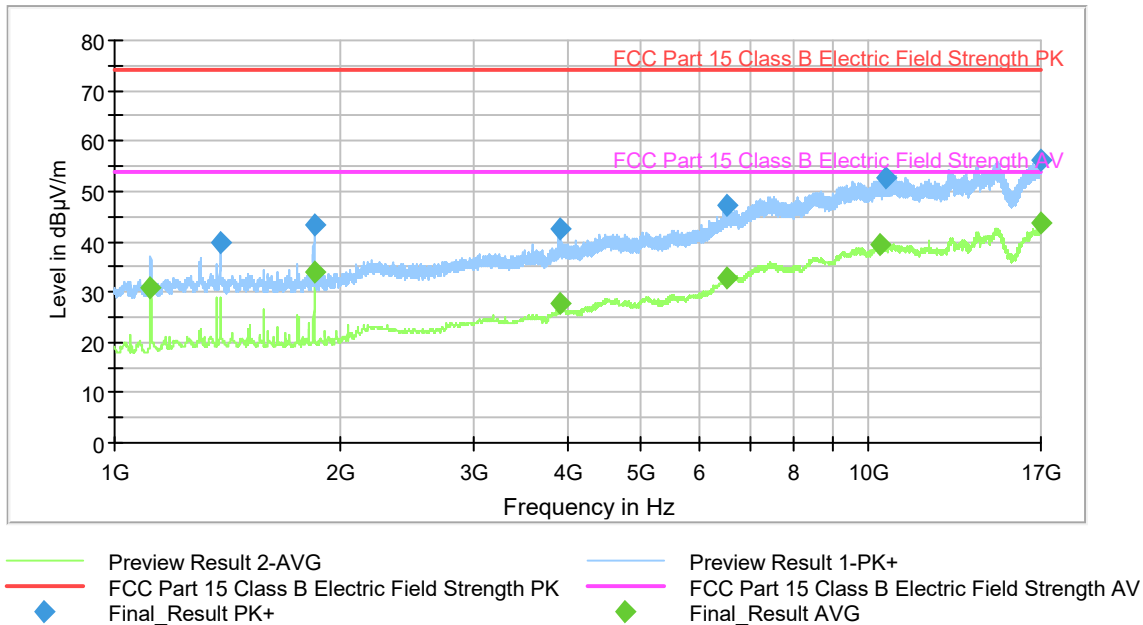
◆ Preview Result 1-PK+ Final_Result QPK
◆ FCC Part 15 Class B Electric Field Strength QF Final_Result PK+

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
68.969000	---	29.22	---	---	388.0	H	180.0
68.969000	24.97	---	40.00	15.03	388.0	H	180.0
93.512000	31.59	---	40.00	8.41	365.0	V	13.0
93.512000	---	35.03	---	---	365.0	V	13.0
97.953000	---	36.98	---	---	129.0	V	-172.0
97.953000	30.77	---	40.00	9.23	129.0	V	-172.0
104.921000	33.24	---	40.00	6.76	129.0	V	-147.0
104.921000	---	37.00	---	---	129.0	V	-147.0
205.761000	---	31.39	---	---	279.0	H	-155.0
205.761000	25.33	---	40.00	14.67	279.0	H	-155.0
218.181000	27.81	---	40.00	12.19	245.0	H	152.0
218.181000	---	33.61	---	---	245.0	H	152.0
224.014000	---	31.06	---	---	115.0	H	-162.0
224.014000	26.05	---	40.00	13.95	115.0	H	-162.0
390.074000	---	35.50	---	---	132.0	V	-96.0
390.074000	33.27	---	47.00	13.73	132.0	V	-96.0

Project: 64848REM.002
Company: HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH
Sample: S/01
Operation mode: 01
Graphical code: RE0101HR1
Description: EUT ON. Display activated. WiFi 2.4GHz and WiFi 5 GHz OFF.
Power supply: 12Vdc
Verdict: Passed

RE FCC Part 15 Class B

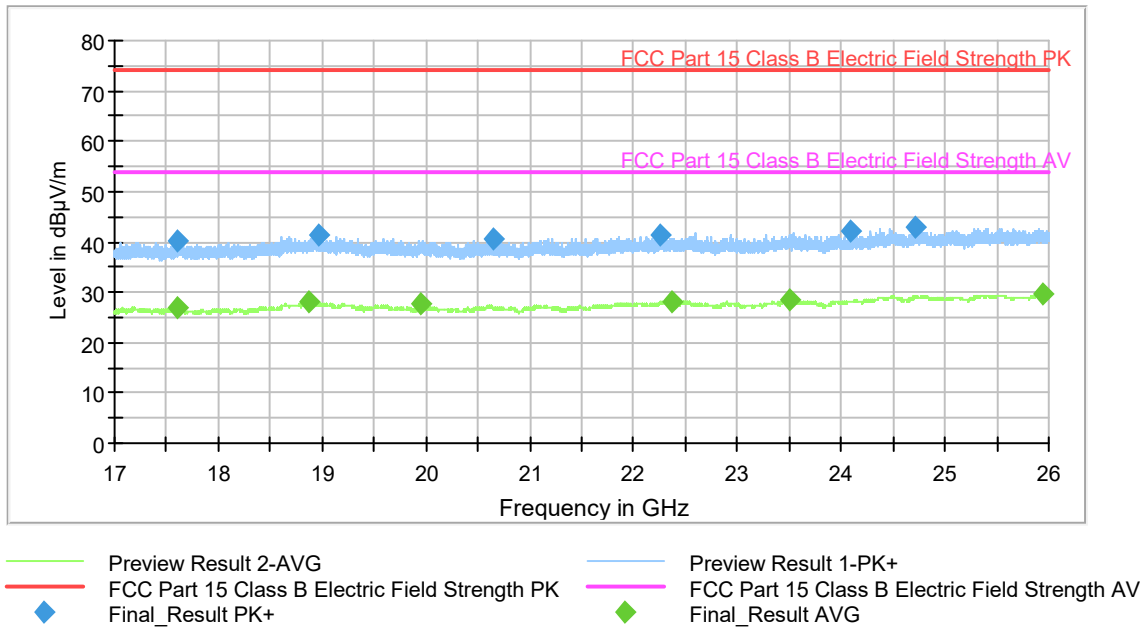


Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1117.200000	---	30.74	53.97	23.23
1380.000000	39.76	---	73.97	34.21
1840.000000	---	33.99	53.97	19.98
1840.000000	43.46	---	73.97	30.51
3895.200000	42.46	---	73.97	31.51
3896.000000	---	27.52	53.97	26.45
6512.000000	---	32.95	53.97	21.02
6514.800000	47.13	---	73.97	26.84
10382.000000	---	39.35	53.97	14.62
10560.400000	52.84	---	73.97	21.13
16956.800000	56.15	---	73.97	17.82
16957.600000	---	43.58	53.97	10.39

Project: 64848REM.002
Company: HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH
Sample: S/01
Operation mode: 01
Graphical code: RE0101HR2
Description: EUT ON. Display activated. WiFi 2.4GHz and WiFi 5 GHz OFF.
Power supply: 12Vdc
Verdict: Passed

RE FCC Part 15 Class B



Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)
17600.800000	---	26.93	53.97	27.04
17614.400000	40.19	---	73.97	33.78
18874.800000	---	27.96	53.97	26.01
18974.400000	41.39	---	73.97	32.58
19950.800000	---	27.57	53.97	26.40
20640.800000	40.71	---	73.97	33.26
22264.000000	41.25	---	73.97	32.72
22372.800000	---	28.10	53.97	25.87
23505.200000	---	28.47	53.97	25.50
24083.600000	42.19	---	73.97	31.78
24708.800000	42.81	---	73.97	31.16
25940.000000	---	29.49	53.97	24.48