

Test report No:
NIE: 80708RAN.004A1

Assessment report

RF EXPOSURE REPORT ACCORDING TO

FCC 47 CFR Part 2.1093

FCC 47 CFR Part 1.1307

(*) Identification of item under evaluation	Headunit with Display and TP, USB, BT and WLAN
(*) Trademark	HARMAN
(*) Model and /or type reference	SPACE 4 BASE 1.1A
(*) Other identification of the product	FCC ID : T8GSPACE4B11 IC : 6434A-SPACE4B11 HW version : DV2 SW version: R11
(*) Features	Bluetooth, WLAN
(*) Manufacturer	Harman Becker Automotive Systems GmbH BECKER-GOERING-STR. 16; 76307 KARLSBAD GERMANY
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)	Manuel García Antennas Lab Technical Responsible
Date of issue	2024-12-18
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 under evaluation", "Trademark", "Model and/or type reference", "General description of the device", "Other identification of the product").
2. Maximum output power, maximum antenna gain and use distance information.
3. The device under evaluation consists of a Headunit with Display and TP, USB, BT and WLAN.
4. Software version clarification cover letter.

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To whom it may concern

Karlsbad, 27.11.2024

SW-Declaration for model: SPACE 4 BASE 1.1A

Dear Ladies and Gentlemen,

we, Harman Becker Automotive Systems GmbH herewith confirm, that the product used for RED/FCC testing had the following HW/SW configuration:

Model: SPACE 4 BASE 1.1A
HW: DV2
SW: R11

Hint: On the product label you can find the SW version "SW: RB09.1.1" – this was printed in the production, but before doing the measurements the units have been updated.

In case of any question please do not hesitate and contact us. Thank you

Regards



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Identification of the client

HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH
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Document history

Report number	Date	Description
80708RAN.004	2024-12-10	First release
80708RAN.004A1	2024-12-18	Second release. The SAR reference report has been updated. This test report cancels and replaces test report num 80708RAN.004.

Appendix A: FCC RF Exposure assessment result

General description of the device under evaluation

Table 1 shows information used for the RF Evaluation, taking into account the following declared specifications for the device:

Description and technologies: the device under evaluation consists of a Headunit with Display and Touch panel (TP) with the following features: USB, BT and WLAN. For RF Exposure evaluation, only transmission technologies: BT and WLAN are taken into account.

RF Exposure assessment for WLAN technology have been already evaluated through SAR tests and results and compliance are stated in report DEKRA Testing and Certification, S.A.U. test report num. 80708RAN.002. Maximum measured values will be used for simultaneous transmission calculus as part of the RF Exposure assessment.

Evaluation Distance: The device is intended for use in both extremity and body exposure conditions. According to the manufacturer, the separation distance between the radiating structures of the device and nearby users will be greater than 0 cm for extremity exposure condition and 2 cm for body exposure condition. In order to perform the assessment, a conservative evaluation distance of 0 cm for extremity exposure condition and 2 cm for body exposure condition has been used.

Maximum output power:

Values corresponding to WLAN maximum output power have been declared by the device manufacturer (maximum output power values stated in manufacturer's technical description document).

Values corresponding to conducted output power for Bluetooth have been measured and stated into DEKRA Testing and Certification, S.A.U. test report num. 80708RRF.006.

Antennas: the device supports several antennas for the BT and WLAN transmitting technologies:

- "ANT 1" antenna for Bluetooth transmissions.
- "ANT 2" antenna for Bluetooth and Wi-Fi transmissions
- "ANT 3" antenna for Bluetooth transmissions.

Maximum peak antenna gain values have been declared by the device manufacturer (maximum peak gain stated in antenna manufacturer's datasheet)

The following table shows the information provided above:

Technology / Mode	Operating Band	Frequency under evaluation (MHz)	Maximum Conducted Output Power (dBm)	Antenna peak gain (dBi)	Maximum E.R.P. (dBm)	Maximum E.R.P. (mW)	Maximum E.I.R.P. (dBm)	Maximum E.I.R.P. (mW)
Bluetooth	2.4 GHz	2400 - 2483.5	3.49	0.34	1.68	1.47	3.83	2.42
Bluetooth	2.4 GHz	2400 - 2483.5	2.98	-0.40	0.43	1.10	2.58	1.81
Bluetooth	2.4 GHz	2400 - 2483.5	2.07	1.37	1.29	1.35	3.44	2.21
802.11b/g/n	2.4 GHz	2412 - 2484	15.40	-0.40	12.85	19.28	15.00	31.62
802.11a/n/ac	U-NII-1	5150 - 5250	9.30	-0.40	6.75	4.73	8.90	7.76
802.11a/n/ac	U-NII-3	5650 - 5850	9.30	-0.40	6.75	4.73	8.90	7.76

Table 1: Equipment specifications

Evaluation Results

Determination of Exemption according to FCC 47 CFR Part 1.1307:

The evaluation for body exposure condition according to the minimum intended use distance of 2 cm will be as follow:

Technology / Mode	Operating Band	Frequency under evaluation (MHz)	Distance (cm)	Maximum Conducted Power (mW)	§ 1.1307(b)(3).i.(B) Exposure Limit (mW)	Verdict
802.11b/g/n	2.4 GHz	2412 - 2484	2.00	34.67	38.07	Pass*
802.11a/n/ac	U-NII-1	5150 - 5250	2.00	8.51	26.19	Pass*
802.11a/n/ac	U-NII-3	5650 - 5850	2.00	8.51	24.81	Pass*
Bluetooth	2.4 GHz	2400 - 2483.5	2.00	2.24	38.07	Pass
Bluetooth	2.4 GHz	2400 - 2483.5	2.00	1.99	38.07	Pass
Bluetooth	2.4 GHz	2400 - 2483.5	2.00	1.61	38.07	Pass

Table 2: FCC Exemption Evaluation Result for Body exposure condition

The evaluation for extremity exposure condition according to the minimum intended use distance of 0 cm (5mm applied for the evaluation) will be as follow:

Technology / Mode	Operating Band	Frequency under evaluation (MHz)	Distance (cm)	Maximum Conducted Power (mW)	§ 1.1307(b)(3).i.(B) Exposure Limit (mW)	Verdict
802.11b/g/n	2.4 GHz	2412 - 2484	0.50	34.67	6.78	SAR needed*
802.11a/n/ac	U-NII-1	5150 - 5250	0.50	8.51	3.73	SAR needed*
802.11a/n/ac	U-NII-3	5650 - 5850	0.50	8.51	3.42	SAR needed*
Bluetooth	2.4 GHz	2400 - 2483.5	0.50	2.24	6.79	Pass
Bluetooth	2.4 GHz	2400 - 2483.5	0.50	1.99	6.79	Pass
Bluetooth	2.4 GHz	2400 - 2483.5	0.50	1.61	6.79	Pass

Table 3: FCC Exemption Evaluation Result for Extremity exposure condition

The computed value(s) for Bluetooth are below the exemption limit(s), so these modes meet the requirements stated in FCC 47 CFR Part 1.1307.

*SAR testing for Body and extremity exposure conditions for WIFI technology has been completed, and the results are stated in the test report 80708RAN.003A1.

Simultaneous transmission assessment:

The device under evaluation is able to transmit simultaneously using Bluetooth and WIFI transmitters.

Maximum measured SAR values are stated into DEKRA Testing and Certification, S.A.U. test report num. 80708RAN.003A1, therefore the most conservative approach for the evaluation of the simultaneous transmission will be:

Simultaneous technologies and modes	Exposure condition	Result (Σ of Pout/Pmax ratios)	Verdict ($\Sigma \leq 1$)
Bluetooth 2.4 GHz + Bluetooth 2.4 GHz + Bluetooth 2.4 GHz + WIFI 5 GHz	Body	0.89	Pass
Bluetooth 2.4 GHz + Bluetooth 2.4 GHz + Bluetooth 2.4 GHz + WIFI 5 GHz	Extremity	0.91	Pass

Table 4: Simultaneous Result

Appendix B: FCC RF Exposure information

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:

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

Where

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

and

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

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 $\lambda/2\pi$, 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 $\lambda/4$ 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 ² f.
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 in 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 $\lambda/2\pi$ 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.

The available maximum time-averaged power or effective radiated power (ERP), can be calculated using the following formula to assess compliance with the Exemption Limits:

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

Where:

P_T = transmitter time-averaged output power (including Duty Cycle and tune-up tolerance, if applicable)

G_T = gain of the transmitting antenna

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

$$P_{E.R.P.} = P_{E.I.R.P.} - 2.15 \text{ dB}$$