DEKRA Testing and Certification, S.A.U.
Parque Tecnológico de Andalucía,
c/ Severo Ochoa nº 2 · 29590 Campanillas · Málaga · España
C.I.F. A29 507 456

Test report No:

NIE: 80708RAN.003A1

Test report
IEEE Std 1528™-2013

(*) Identification of item tested	Headunit with Display and TP, USB, BT and WLAN
(*) Trademark	HARMAN
(*) Model and /or type reference tested	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	1. IEEE Std 1528™-2013. 2. FCC 47 CFR Part 2.1093.
Summary	Considering the results of the performed test, the item under test is IN COMPLIANCE with FCC 47CFR Part 2.1093 exposure limits. The maximum 1g volume averaged SAR found during this test have been 0.598 W/kg, for 802.11ac20 mode. The maximum 10g volume averaged SAR found during this test have been 0.238 W/kg, for 802.11b mode.
Approved by (name / position & signature)	Manuel García Antennas Lab Technical Responsible 74862741H MANUEL GARCÍA (C:A29507456) 74862741H MANUEL GARCÍA (C:A29507456) 2024.12.18 14:06:11 +01'00'
Date of issue	2024-12-18
Report template No	FAN44_01

(*) "Data provided by the client"

Index

Competences and guarantees 3
General conditions 3
Uncertainty 3
Data provided by the client 4
Usage of samples 6
Test sample description 7
Identification of the client 7
Testing period and place 7
Document history 7
Environmental conditions 7
Remarks and comments 8
Testing verdicts 9
Summary 9
Appendix A: Test configuration 10
Appendix B: Test results 23
Appendix C: Measurement report 32
Appendix D: System validation report 37
Appendix E: Calibration data 41
Appendix G: Photographs 113

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 is a FCC-recognized accredited testing laboratory with appropriate scope of accreditation that include testing performed in this test 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 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.

General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Testing and Certification S.A.U.
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 following documents:

1. DEKRA Testing and Certification S.A.U. internal document PODT000.
2. FCC OET KDB 865664 D01 - SAR Measurement Requirements for 100 MHz to 6 GHz v01r04 (August 2015).

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", "Derived model not tested", "Other identification of the product", "Features" and "Test sample description").

2. Maximum output power and normal use conditions distance information.

3. Software version clarification cover letter.

HARMAN AUTOMOTIVE DIVISION
HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH
BECKER-GOERING-STRASSE 16
76307 KARLSBAD, GERMANY
E-MAIL: STEFAN.BLASCHEK@HARMAN.COM

Harman Becker Automotive Systems GmbH | Postfach 2260 | 76303 Karlsbad

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

Stefan Blaschek
Regulatory Compliance Management

Harman Infotainment Division
Harman Becker Automotive Systems GmbH
Becker-Göring-Straße 16
76307 Karlsbad
Mobile: +49 172 94 191 49
Email: stefan.blaschek@harman.com
Web: www.harman.com

Simon Vögele
Regulatory Compliance Management

Harman Infotainment Division
Harman Becker Automotive Systems GmbH
Becker-Göring-Straße 16
76307 Karlsbad
Mobile: +49 175 4366188
Email: simon.voegele@harman.com
Web: www.harman.com

Usage of samples

Samples undergoing test have been selected by: HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH.

Samples are composed of the following elements:

Sample	Control Nº	Description	Model	Serial Nº	Date of reception
S/01	76426_10.1	SPACE 4 BASE 1.1A (Display)	SPACE 4 BASE 1.1A	Z0681A000041379321A0694E0010	2024-08-21
S/01	76426_11.1	Harness	--	--	2024-08-21
S/01	76426_12.1	Cable USB Type USB-A -USB-B,	--	--	2024-08-21
S/01	76426_13.1	Level-Shifter with Board-Edge-Connector	--	--	2024-08-21
S/02	76426_14.1	SPACE 4 BASE 1.1A (BIOS / Radiated unit)	SPACE 4 BASE 1.1A	Z0681A000041379321A0694E0012	2024-09-30
S/02	76426_15.1	PCB board (level shifter)	--	--	2024-09-30
S/02	76426_16.1	USB A-B cable	--	--	2024-09-30
S/02	76426_17.1	Harness	--	--	2024-09-30

1. Sample S/01 has undergone the test(s) specified in subclause “Test method requested”: Conducted average output power.
2. Sample S/02 has undergone the test(s) specified in subclause “Test method requested”: SAR evaluation for Wi-Fi modes.

Test sample description

Description of product ..... :	Headunit with Display and TP, USB, BT and WLAN		
Software version..... :	R11		
Hardware version ..... :	DV2		
Mounting position ..... :	[ ]	Table top equipment	
	[ ]	Wall/Ceiling mounted equipment	
	[ ]	Equipment used next to the ear	
	[ ]	Hand-held equipment	
	[x]	Other: Infotainment unit for automotive industry	
Accessories (not part of the test item)..... :	Description	Type	Manufacturer

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)	2024-08-29
Date (finish)	2024-10-23

Document history

Report number	Date	Description
80708RAN.003	2024-12-10	First release.
80708RAN.003A1	2024-12-18	Second release. The scale factor, title of the bottom photograph, antenna location photograph, plot 1, maximum reported values table, and maximum reported extremity value on the front page have been updated. This test report cancels and replaces test report num 80708RAN.003.

Environmental conditions

Date	Max. Temp. ºC	Min. Temp. ºC	Max. Hum. %	Min. Hum. %	Limit
From 2024-08-29 to 2024-10-23	24.9542	20.1593	69.8371	42.8353	18-25 ºC, 30-70%

Remarks and comments

1. Zoom scan is not required according to FCC OET KDB 447498 D01 General RF Exposure Guidance 06, paragraph “4.4.2. Area scan based 1-g estimation”.
2. Zoom scan and/or power drifts measurements have not been able to be performed by the measurement system due to very low SAR values close to or under the noise level.
3. Only the plots of the highest SAR for each test position and mode/band are included in appendix C.
4. The tests have been performed by the technical personnel: Ismael Gamarro with the assistance of Christian Hernandez (under qualification)
5. The instrumentation utilized to perform the tests covered in this test report is listed in the following table:

DEKRA Control Number	Equipment	S/N
02402	20 dB Attenuator, WEINSCHEL model 75A-20-11	902
03436	Robot controller, Stäubli model CS7MB	F04/50P5A1/C/01
03420	Robot, Stäubli model RX60BL	F04/SOP5A1/A/01
03438	Electro-optical converter, SPEAG model EOC3	391
04859	DAK software, SPEAG model DAK V1.10.325.10	-
04835	DC POWER SUPPLY 30V/5A 150W	MY58500043
03430	Data acquisition device, SPEAG model DAE4	669
08876	Data acquisition device, SPEAG model DAE4	1690
09448	Dielectric probe kit, SPEAG model DAK-3.5	1329
04170	Digital thermometer, LKM Electronics model DTM3000-SpezialL	2989
03524	Dipole Validation Kit 5 GHz	1071.
03429	Dipole validation kit 2450 MHz, SPEAG model D2450V2	756
06125	Dosimetric E-field Probe, SPEAG model EX3DV4	7461
09513	Dosimetric E-field Probe, SPEAG model EX3DV4	7766
04393	Dual Power meter, Agilent model E4419B	MY45103349
03630	Dual directional coupler, NARDA model 4227-16	02953
04173	Head Tissue Equivalent Liquid for 1900-3800 MHz band, SPEAG model HBBL1900-3800V3	-
03636	Head Tissue Equivalent Liquid for 5 GHz band, SPEAG model HSL5800	-
03525	Oval flat phantom, SPEAG model ELI4	1060
03526	Mounting Device for Laptops and Body-Worn Transmitters, SPEAG model LH1 001 AC	-
02216	Power Divider, PICOSECOND PULSE LABS model 5333-104	236310 1504
04164	Power Sensor 50 MHz-18GHz, R&S model NRP-Z81	100527
03485	Power amplifier, MITEQ model AMF-4D-00400600-50-30P	1456425
04392	Power sensor, Agilent model E9300A	SG41491189
04391	Power sensor, Agilent model E9300A	SG41491203
03847	Measurement server, SPEAG model DASY5 SE UMS 011 BS	1227
03423	SAR measurement software, SPEAG model DASY52	-
03346	Signal RF Generator, R&S model SMU200A	102234
03453	Temperature and humidity probe, Pico Technology model HUMIDIPROBE	UAL02/077
04482	Vector Network Analyzer, Agilent Technologies model N9923A FieldFox	US49470126

6. References

The tests documented in this report were performed in accordance with FCC 47 CFR § 2.1093 and the following FCC Published RF exposure KDB procedures:

- FCC OET KDB 447498 D01 General RF Exposure Guidance v06 (October 2015).
- FCC OET KDB 865664 D01 - SAR Measurement Requirements for 100 MHz to 6 GHz v01r04 (August 2015).
- FCC OET KDB 865664 D02 RF Exposure Reporting v01r02 (October 2015).
- FCC OET KDB 248227 D01 802.11 Wi-Fi SAR v02r02 (October 2015).

Testing verdicts

Not applicable :	N/A
Pass :	P
Fail :	F
Not measured :	N/M

Summary

FCC 47CFR Part 2.1093	VERDICT			
	N/A	P	F	N/M
802.11b/g/n		P		
802.11a/n/ac		P		

Appendix A: Test configuration

Index

1. GENERAL INTRODUCTION 12
1.1. Application Standard 12
1.2. General requirements 12
1.3. Measurement system requirements 12
1.4. Phantom requirements 12
1.5. Measurement Liquids requirements 13

2. MEASUREMENT SYSTEM 14
2.1. Measurement System 14
2.2. Device Holder 17
2.3. Test Positions of device relative to body 17
2.4. Test to be performed 17
2.5. Description of interpolation/extrapolation scheme 17
2.6. Determination of the largest peak spatial-average SAR 17
2.7. System Check 18

3. UNCERTAINTY 19

4. SAR LIMIT 21

5. DEVICE UNDER TEST 21
5.1. Dimensions 21
5.2. Wireless Technology 21
5.3. Simultaneous Transmission 22
5.4. Antenna Location 22

1. GENERAL INTRODUCTION

1.1. Application Standard

The Federal Communications Commission (FCC) sets the limits for General Population/Uncontrolled exposure to radio frequency electromagnetic fields for transmitting devices designed to be used within 20 centimetres of the body of the user under FCC 47 CFR Part 2.1093 - "Radiofrequency radiation exposure evaluation: portable devices", paragraph (d)(2).

1.2. General requirements

The SAR measurement has been performed continuing the following considerations and environment conditions:

The ambient temperature shall be in the range of 18ºC to 25ºC and the variation shall not exceed +/-2ºC during the test.

The ambient humidity shall be in the range of and 30% - 70%.

The device battery shall be fully charged before each measurement.

1.3. Measurement system requirements

The measurement system used for SAR tests fulfills the procedural and technical requirements described at the reference standards used.

1.4. Phantom requirements

The phantom model for body measurements is an elliptical open-top container with a flat bottom, with the following shape and dimensions:

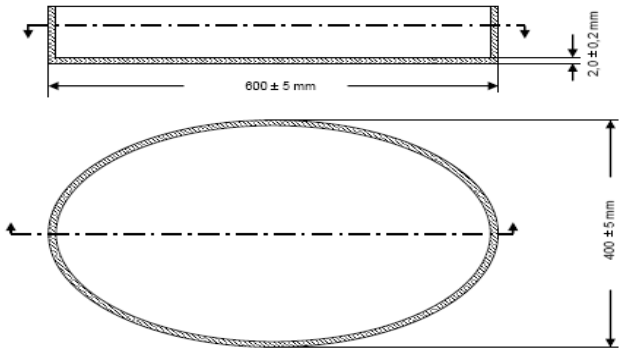


Figure 1: Proportions and shape of Phantom shell

1.5. Measurement Liquids requirements

The liquids used to simulate the human tissues, must fulfill the requirements of the dielectric properties required. These target dielectric properties are indicated into FCC OET KDB 865664 D01 Appendix A.

Frequency (MHz)	Head		Body	
	ε_r	σ (S/m)	ε_r	σ (S/m)
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800-2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5800	35.3	5.27	48.2	6.00

Table 1: Liquid material requirements

To minimize the effect of reflections on peak spatial-average SAR values, from the upper surface of the tissue equivalent liquid, the depth of the liquid should be at least 15 cm.

Dielectric porperties values of the Tissue Simulant Liquids used for SAR measurements are included in Appendix B, Section 3, of this document.

2. MEASUREMENT SYSTEM

2.1. Measurement System

The DASY5 system for performing compliance tests consists of the following items:

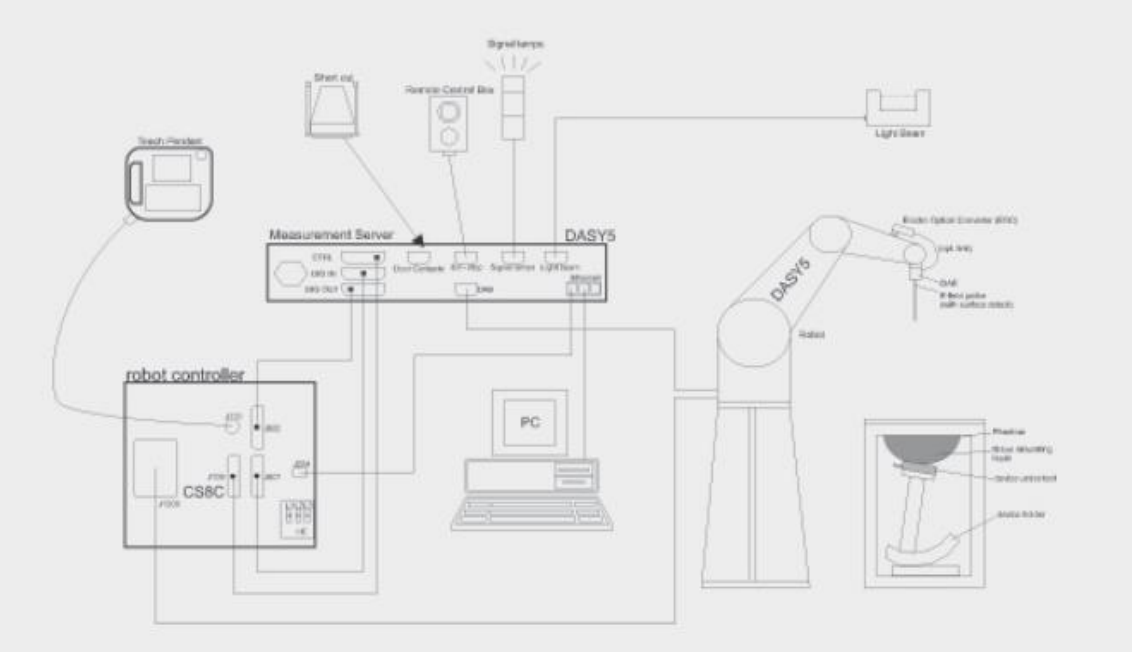
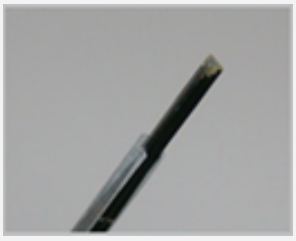


Figure 2: DASY5 SAR Measurement system

- A standard high precision 6-axis robot (Stäubli TX=RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running the DASY software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

	Model	EX3DV4
	**Construction**	Symmetrical design with triangular core. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE).
	Frequency	10 MHz to > 6 GHz; Linearity: ± 0.2 dB (30 MHz to 6 GHz)
	Directivity	± 0.3 dB in TSL (rotation around probe axis) ± 0.5 dB in TSL (rotation normal to probe axis)
	Dynamic Range	10 µW/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 µW/g)
	Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1.0 mm

	Model	DAE4
	**Construction**	Signal amplifier, multiplexer, A/D converter, and control logic. Serial optical link communication with DASY4/5 embedded system (fully remote controlled). Two-step probe touch detector for mechanical surface detection and emergency robot stop.
	Measurement Range	-100 to +300 mV (16 bit resolution and two range settings: 4mV, 400mV)
	Input Offset Voltage	< 5 µV (with auto zero)
	Input Resistance	200 MOhm
	Input Blas Current	< 50 fA

	Model	ELI
	**Construction**	Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.
	Material	Vinylester, glass fiber reinforced (VE-GF)
	Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)
	Shell Thickness	2 ± 0.2 mm (bottom plate)
	Dimensions	Major axis: 600 mm, Minor axis: 400 mm
	Filling Volume	Approx. 30 liters
	Wooden Support	SPEAG standard phantom table

	**Model**	**Mounting Device for Laptop and Body-Worn Transmitters**
	Construction	In combination with the Twin SAM V5.0/V5.0c or ELI Phantoms, the Mounting Device (Body-worn) enables testing of transmitters devices according to IEC 62209-2 specifications. The device holder can be locked for positioning at flat phantom section.
	Material	Polyoxymethylene (POM), PET-G, Foam

	**Model**	**System Validations Kits 450 MHz – 6 GHz**
	Construction	Symmetrical dipole with I/4 balun. Enables measurement of feedpoint impedance with NWA. Matched for use near flat phantoms filled with tissue simulating solutions.
	Frequency	450 MHz to 5800 MHz
	Return Loss	20 dB at specified validation position

Dimensions (length and overall height in mm)

Product	Dipole length	Overall height
D450V3	290.0	330.0
D750V3	179.0	330.0
D900V2	148.5	340.0
D1800V2	72.5	300.0
D2000V2	65.0	300.0
D2300V2	56.3	290.0
D2450V2	52.0	290.0
D2600V2	49.2	290.0
D3300V2	38.0	285.0
D3500V2	37.0	285.0
D3700V2	34.7	285.0
D3900V2	32.0	280.0
D4200V2	30.1	280.0
D4600V2	27.0	280.0
D4900V2	25.0	280.0
D5GHzV2	20.6	300.0

2.2. Device Holder

The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source in 5mm distance, a positioning uncertainty of ±0.5mm would produce a SAR uncertainty of ±20%. An accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions, in which the devices must be measured, are defined by the standards.

The DASY Laptop Holder extension is lightweight and made of POM, PET-G acrylic glass and foam. It fits easily on the upper part of the Mounting Device in place of the phone positioner. The extension is fully compatible with the Twin-SAM and ELI phantoms.

2.3. Test Positions of device relative to body

The device under test consists of a Headunit with Display and Touch panel (TP), which will be installed on a motocycle front panel in a fixed position. This unit is designed for automotive usage and supports the following features: Bluetooth and WLAN. The DUT shall be tested according to the procedures in KDB 447498.

For extremity and body exposure conditions, each face of the DUT has been measured place against the flat phantom with a test separation distance of 0 mm, except for the back position, which is not accessible to the end user.

2.4. Test to be performed

Test shall be performed for each test position previously described, using the channel producing the highest rated output power.

Additionally the other applicable test frequency channels must be measured for the test configuration providing the highest SAR for each applicable transmitting band.

2.5. Description of interpolation/extrapolation scheme

The local SAR inside the Phantom is measured using small dipole sensing elements inside a probe element. The probe tip must not be in contact with the Phantoms surface in order to minimise measurement errors, but the highest local SAR is obtained from measurements at a certain distances from the shell trough extrapolation. The accurate assessment of the maximum SAR averaged over 10 gr. requires a very fine resolution in the three dimensional scanned data array. Since the measurements have to be performed over a limited time, the measured data have to be interpolated to provide an array of sufficient resolution.

The interpolation of 2D area scan is used after the initial area scan, at a fixed distance from the Phantom shell wall. The initial scan data is collected with approx. 15 mm spatial resolution and this interpolation is used to find the location of the local maximum for positioning the subsequent 3D scanning within a 1mm resolution.

For the 3D scan, data is collected on a spatially regular 3D grid having 5 mm steps in both directions. After the data collection by the SAR probe, the data are extrapolated in the depth direction to assign values to points in the 3D array closer to the shell wall. A notional extrapolation value is also assigned to the first point outside the shell wall so that subsequent interpolation schemes will be applicable right up to the shell wall boundary.

2.6. Determination of the largest peak spatial-average SAR

To determine the maximum value of the peak spatial-average SAR of a DUT, all device positions, configurations and operational modes should be tested for each frequency band.

The averaging volume shall be chosen as 1gr. of contiguous tissue. The cubic volumes, over which the SAR measurements are averaged after extrapolation and interpolation, are chosen in order to include the highest values of local SAR.

The maximum SAR level for the DUT will be the maximum level obtained of the performed measurements indicated in the previous points.

2.7. System Check

Prior to the SAR measurements, system verification is done to verify the system accuracy. As IEEE 1528-2013, Annex paragraph 8.2.1 “System Check - Purpose” specifies, a complete SAR evaluation is done using a half-wavelength dipole as source with the frequency of the mid-band channel of the operating band, or within 10% of this channel, whichever is greater.

The measured 1 gr. and 10 gr. SAR should be within 10% of the expected target values specified in the calibration certificate of the dipole, for the specific tissue and frequency used.

3. UNCERTAINTY

According to FCC OET KDB 865664 D01, if the highest measured 1-g SAR is < 1.5 W/kg, SAR measurement uncertainty analysis is not required to be included into SAR report, but it has been included for ISO 17025 accreditation.

Uncertainty for 300 MHz – 3 GHz

ERROR SOURCES (source of uncertainty)	Uncertainty value (%)	Prob. Dist.	Div.	*ci (1g)*	*ci (10g)*	*Standard uncertainty (1g) (%)*	*Standard uncertainty (10g) (%)*
Measurement Equipment							
Probe Calibration	13.30%	N	2	1	1	6.65%	6.65%
Probe calibration drift	1.70%	R	√3	1	1	0.98%	0.98%
Axial Isotropy	4.70%	R	√3	0.7	0.7	1.90%	1.90%
Hemisfericall Isotropy	9.60%	R	√3	0.7	0.7	3.88%	3.88%
Boundary effect	1.00%	R	√3	1	1	0.58%	0.58%
Linearity	4.70%	R	√3	1	1	2.71%	2.71%
System Detection limits	0.25%	R	√3	1	1	0.14%	0.14%
Probe modulation response	4.80%	N	1	1	1	4.80%	4.80%
Readout electronics	0.30%	N	1	1	1	0.30%	0.30%
Response time	1.01%	R	√3	1	1	0.58%	0.58%
Integration time	2.60%	R	√3	1	1	1.50%	1.50%
RF Ambient noise	3.00%	R	√3	1	1	1.73%	1.73%
RF Ambient reflections	3.00%	R	√3	1	1	1.73%	1.73%
Probe positioner mech. restrictions	0.40%	R	√3	1	1	0.23%	0.23%
Probe positioning with respect to phantom shell	2.90%	R	√3	1	1	1.67%	1.67%
Max. SAR Eval.	2.00%	R	√3	1	1	1.15%	1.15%
Test Sample Related							
Device holder uncertainty	3.60%	N	1	1	1	3.60%	3.60%
Test sample positioning	2.90%	N	1	1	1	2.90%	2.90%
Drift of output power	2.50%	N	1	1	1	2.50%	2.50%
System Validation source (dipole)							
Deviation of experimental dipole from numerical dipole	0.00%	N	1	0	0	0.00%	0.00%
Input power and SAR drift measurement	2.00%	R	√3	1	1	1.15%	1.15%
Dipole axis to liquid distance	3.40%	R	√3	1	1	1.96%	1.96%
Phantom and Setup							
Phantom uncertainty (shape and thickness tolerances)	6.10%	R	√3	1	1	3.52%	3.52%
Algorithm for correcting SAR for deviations in permittivity and conductivity	1.90%	N	1	1	0.84	1.90%	1.60%
Liquid conductivity (meas.)	3.57%	N	1	0.78	0.71	2.79%	2.54%
Liquid permittivity (meas.)	3.57%	N	1	0.26	0.26	0.93%	0.93%
Liquid conductivity – temperature uncertainty	2.30%	R	√3	0.78	0.71	1.04%	0.94%
Liquid permittivity – temperature uncertainty	0.36%	R	√3	0.23	0.26	0.05%	0.05%
Combined standard uncertainty (Validation antenna)	$u_c = \sqrt{\sum_{i=1}^{m} c_i^2 \cdot u_i^2}$					9.88%	9.75%
Expanded uncertainty (confidence interval of 95%)	*ue =2.00 uc*					**19.77%**	**19.51%**
Combined standard uncertainty (DUT)	$u_c = \sqrt{\sum_{i=1}^{m} c_i^2 \cdot u_i^2}$					12.68%	12.58%
Expanded uncertainty (confidence interval of 95%)	*ue =2.00 uc*					**25.36%**	**25.16%**

Table 2: Uncertainty Assessment for 300 MHz - 3 GHz.

Uncertainty for 3 GHz – 6 GHz

ERROR SOURCES (source of uncertainty)	Uncertainty value (%)	Prob. Dist.	Div.	*ci (1g)*	*ci (10g)*	*Standard uncertainty (1g) (%)*	*Standard uncertainty (10g) (%)*
Measurement Equipment							
Probe Calibration	13.10%	N	2	1	1	6.55%	6.55%
Probe calibration drift	1.70%	R	√3	1	1	0.98%	0.98%
Axial Isotropy	4.70%	R	√3	0.7	0.7	1.90%	1.90%
Hemisfericall Isotropy	9.60%	R	√3	0.7	0.7	3.88%	3.88%
Boundary effect	2.00%	R	√3	1	1	1.15%	1.15%
Linearity	4.70%	R	√3	1	1	2.71%	2.71%
System Detection limits	0.25%	R	√3	1	1	0.14%	0.14%
Probe modulation response	4.80%	N	1	1	1	4.80%	4.80%
Readout electronics	0.30%	N	1	1	1	0.30%	0.30%
Response time	1.01%	R	√3	1	1	0.58%	0.58%
Integration time	2.60%	R	√3	1	1	1.50%	1.50%
RF Ambient noise	3.00%	R	√3	1	1	1.73%	1.73%
RF Ambient reflections	3.00%	R	√3	1	1	1.73%	1.73%
Probe positioner mech. restrictions	0.40%	R	√3	1	1	0.23%	0.23%
Probe positioning with respect to phantom shell	6.70%	R	√3	1	1	3.87%	3.87%
Max. SAR Eval.	4.00%	R	√3	1	1	2.31%	2.31%
Test Sample Related							
Device holder uncertainty	3.60%	N	1	1	1	3.60%	3.60%
Test sample positioning	2.90%	N	1	1	1	2.90%	2.90%
Drift of output power	2.50%	N	1	1	1	2.50%	2.50%
System Validation source (dipole)							
Deviation of experimental dipole from numerical dipole	0.00%	N	1	0	0	0.00%	0.00%
Input power and SAR drift measurement	2.00%	R	√3	1	1	1.15%	1.15%
Dipole axis to liquid distance	3.40%	R	√3	1	1	1.96%	1.96%
Phantom and Setup							
Phantom uncertainty (shape and thickness tolerances)	6.60%	R	√3	1	1	3.81%	3.81%
Algorithm for correcting SAR for deviations in permittivity and conductivity	1.90%	N	1	1	0.84	1.90%	1.60%
Liquid conductivity (meas.)	3.57%	N	1	0.78	0.71	2.79%	2.54%
Liquid permittivity (meas.)	3.57%	N	1	0.26	0.26	0.93%	0.93%
Liquid conductivity – temperature uncertainty	3.36%	R	√3	0.78	0.71	1.51%	1.38%
Liquid permittivity – temperature uncertainty	0.40%	R	√3	0.23	0.26	0.05%	0.06%
Combined standard uncertainty (Validation antenna)	$u_c = \sqrt{\sum_{i=1}^{m} c_i^2 \cdot u_i^2}$					10.81%	10.68%
Expanded uncertainty (confidence interval of 95%)	*ue =2.00 uc*					**21.62%**	**21.36%**
Combined standard uncertainty (DUT)	$u_c = \sqrt{\sum_{i=1}^{m} c_i^2 \cdot u_i^2}$					13.42%	13.31%
Expanded uncertainty (confidence interval of 95%)	*ue =2.00 uc*					**26.83%**	**26.62%**

Table 3: Uncertainty Assessment for 3 GHz – 6GHz.

4. SAR LIMIT

Having a worst-case measurement, the SAR limit is valid for general population/uncontrolled exposure.

The SAR values have to be averaged over a mass of 1 gr. (SAR 1 gr.) with the shape of a cube and averaged over a mass of 10 gr (Extremity SAR 10 gr). These levels could not exceed the values indicated in the application Standard:

Standard	Exposure	SAR	SAR Limit (W/kg)
FCC 47 CFR Part 1.1310, Paragraph (c)	General population/Uncontrolled	SAR 1-g.	1.6
FCC 47 CFR Part 1.1310, Paragraph (c)	General population/Uncontrolled Extremity	SAR 10-g.	4.0

Table 4: SAR limit

5. DEVICE UNDER TEST

5.1. Dimensions

Dimensions	Millimetres
Width x Height x Depth	215 x 145 x 55

Table 5: DUT dimensions

5.2. Wireless Technology

Wireless Technology	Frequency Bands	Modes	Duty Cycle used for SAR testing
Wi-Fi	2.4 GHz	- 802.11b/g/n (20 MHz)	- 802.11b/g/n (20 MHz): 95.6 %
	5 GHz	- 802.11a/n/ac (20 MHz) - 802.11a/n/ac (40 MHz) - 802.11ac (80 MHz)	- 802.11a/n/ac (20 MHz): 80 % - 802.11a/n/ac (40 MHz): 80 % - 802.11ac (80 MHz): 80 %
Bluetooth	2.4 GHz	- Bluetooth BR, BTLE	SAR Low-Power Exclusion compliant

Table 6: Supported modes

5.3. Simultaneous Transmission

Simultaneous transmission evaluation has been performed in the test report 80708RAN.004.

5.4. Antenna Location

See the “Antenna Location” pictures in Appendix C for more details.

Appendix B: Test results

Index

1. TEST CONDITIONS....25
1.1. Power supply (V):....25
1.2. Temperature (ºC):....25
1.3. DUT information and test-site configurations....25
1.4. Test signal, Output Power and Frequencies....25

2. CONDUCTED AVERAGE POWER MEASUREMENTS....26
2.1. WLAN....26
2.2. BLUETOOTH....27

3. TISSUE PARAMETERS MEASUREMENTS....27

4. SYSTEM CHECK MEASUREMENTS....28

5. MEASUREMENT RESULTS FOR SAR (SPECIFIC ABSORPTION RATE)....29
5.1. Summary maximum results for body measurements.....29
5.2. Summary maximum results for extremity measurements.....29
5.3. WLAN....30

1. TEST CONDITIONS

1.1. Power supply (V):

Vn = 12.0 V

Type of power supply = DC Voltage from automotive battery

1.2. Temperature (ºC):

Tn = +20.00 to +25.00

The subscript n indicates normal test conditions.

1.3. DUT information and test-site configurations

For extremity and body exposure conditions, each face of the DUT has been measured place against the flat phantom with a test separation distance of 0 mm, except for the back position, which is not accessible to the end user.

1.4. Test signal, Output Power and Frequencies

For the 802.11a/b/g/n/ac modes, the device was put into operation by using a proprietary test mode with test commands supplied by the manufacturer, setting the maximum output power for each mode. The duty cycle was set to maximum (aprox. 100%).

In all operating bands and test positions, the measurements were performed using the channel producing the highest rated output power.

In each band, for those positions where the maximum averaged SAR was found, measurements were performed on the other applicable test frequency channels except those with applicable test reductions.

The actual SAR sample does not have accessible antenna connectors for conducted measurements, so the conducted average output power was measured using others identical samples (S/01) provided by the manufacturer with auxiliary external connectors that make the measurements representative and applicable for all the tested samples. See ‘usage of samples’ paragraph of this report.

The maximum conducted time-averaged power of the device for each mode was measured with a power sensor R&S NRP-Z81.

The target power alignments, including tune-up tolerance, for RF components declared by the manufacturer for each supported technology are:

Maximum Output Power (dBm)			
Band	**802.11a**	**802.11n20/n40**	**802.11ac40/ac80**
UNII-1	9.3	9.3	9.3
UNII-3	9.3	9.3	9.3

Maximum Output Power (dBm)	
Band	**802.11 b/g/n**
2.4 GHz	15.4

2. CONDUCTED AVERAGE POWER MEASUREMENTS

2.1. WLAN

Module port	TX Configuration	WLAN Mode	Band	Bandwidth (MHz)	Channel	Frequency (MHz)	Data Rate	Average Output Power (dBm)
1	SISO	802.11b	2.4 GHz	20.00	1.0	2412.00	1 Mbps	13.75
1	SISO	802.11b	2.4 GHz	20.00	6.0	2437.00	1 Mbps	14.02
1	SISO	802.11b	2.4 GHz	20.00	11.0	2462.00	1 Mbps	14.46
1	SISO	802.11g	2.4 GHz	20.00	1.0	2412.00	6 Mbps	13.15
1	SISO	802.11g	2.4 GHz	20.00	6.0	2437.00	6 Mbps	13.40
1	SISO	802.11g	2.4 GHz	20.00	11.0	2462.00	6 Mbps	13.65
1	SISO	802.11n	2.4 GHz	20.00	1.0	2412.00	HT0	13.13
1	SISO	802.11n	2.4 GHz	20.00	6.0	2437.00	HT0	13.30
1	SISO	802.11n	2.4 GHz	20.00	11.0	2462.00	HT0	13.60
1	SISO	802.11a	U-NII-1	20.00	36.0	5180.00	6 Mbps	7.06
1	SISO	802.11a	U-NII-1	20.00	40.0	5200.00	6 Mbps	6.79
1	SISO	802.11a	U-NII-1	20.00	44.0	5220.00	6 Mbps	6.66
1	SISO	802.11a	U-NII-1	20.00	48.0	5240.00	6 Mbps	6.76
1	SISO	802.11n	U-NII-1	20.00	36.0	5180.00	HT0	7.05
1	SISO	802.11n	U-NII-1	20.00	40.0	5200.00	HT0	6.81
1	SISO	802.11n	U-NII-1	20.00	44.0	5220.00	HT0	6.60
1	SISO	802.11n	U-NII-1	20.00	48.0	5240.00	HT0	6.66
1	SISO	802.11ac	U-NII-1	20.00	36.0	5180.00	VHT0	6.76
1	SISO	802.11ac	U-NII-1	20.00	40.0	5200.00	VHT0	6.79
1	SISO	802.11ac	U-NII-1	20.00	44.0	5220.00	VHT0	6.65
1	SISO	802.11ac	U-NII-1	20.00	48.0	5240.00	VHT0	6.44
1	SISO	802.11n	U-NII-1	40.00	38.0	5190.00	HT0	6.33
1	SISO	802.11n	U-NII-1	40.00	46.0	5230.00	HT0	6.22
1	SISO	802.11ac	U-NII-1	40.00	38.0	5190.00	VHT0	6.38
1	SISO	802.11ac	U-NII-1	40.00	46.0	5230.00	VHT0	6.24
1	SISO	802.11ac	U-NII-1	80.00	42.0	5210.00	VHT0	5.48
1	SISO	802.11a	U-NII-3	20.00	149.0	5745.00	6 Mbps	7.56
1	SISO	802.11a	U-NII-3	20.00	157.0	5785.00	6 Mbps	7.14
1	SISO	802.11a	U-NII-3	20.00	165.0	5825.00	6 Mbps	7.44
1	SISO	802.11n	U-NII-3	20.00	149.0	5745.00	HT0	7.62
1	SISO	802.11n	U-NII-3	20.00	157.0	5785.00	HT0	7.04

Module port	TX Configuration	WLAN Mode	Band	Bandwidth (MHz)	Channel	Frequency (MHz)	Data Rate	Average Output Power (dBm)
1	SISO	802.11n	U-NII-3	20.00	165.0	5825.00	HT0	7.28
1	SISO	802.11ac	U-NII-3	20.00	149.0	5745.00	VHT0	7.49
1	SISO	802.11ac	U-NII-3	20.00	157.0	5785.00	VHT0	7.05
1	SISO	802.11ac	U-NII-3	20.00	165.0	5825.00	VHT0	7.60
1	SISO	802.11n	U-NII-3	40.00	151.0	5755.00	HT0	7.27
1	SISO	802.11n	U-NII-3	40.00	159.0	5795.00	HT0	7.13
1	SISO	802.11ac	U-NII-3	40.00	151.0	5755.00	VHT0	7.31
1	SISO	802.11ac	U-NII-3	40.00	159.0	5795.00	VHT0	7.12
1	SISO	802.11ac	U-NII-3	80.00	155.0	5775.00	HE80	6.05

2.2. BLUETOOTH

Bluetooth evaluation is exempted for SAR measurement and the RF exposure evaluation has been performed in the test report 80708RAN.004.

3. TISSUE PARAMETERS MEASUREMENTS

Frequency (MHz)	Target Head Tissue		Measured Head Tissue		Deviation %		Measured Date
	Permittivity ε	Conductivity σ [S/m]	Permittivity ε	Conductivity σ [S/m]	Permittivity ε	Conductivity σ [S/m]	
5200	36.00	4.66	33.95	4.45	-5.67	-4.42	2024-10-02
5500	35.65	4.97	33.55	4.76	-5.88	-4.07	2024-10-02
5800	35.30	5.27	33.09	5.08	-6.27	-3.62	2024-10-02
5200	36.00	4.66	35.75	4.53	-0.67	-2.66	2024-10-20
5500	35.65	4.97	35.24	4.88	-1.13	-1.68	2024-10-20
5800	35.30	5.27	34.74	5.31	-1.58	0.76	2024-10-20
2300	39.47	1.67	36.90	1.78	-6.50	7.05	2024-10-22
2450	39.20	1.80	36.42	1.90	-7.09	5.65	2024-10-22
2600	39.00	1.96	36.08	2.07	-7.51	5.51	2024-10-22

Note: The dielectric properties have been measured by the contact probe method at 22° C.

DASY5 and DASY6 measurement systems have a SAR error compensation algorithm to automatically compensate the measured SAR results for deviations between the measured and required tissue dielectric parameters, so the tolerance for εr and σ may be relaxed to ± 10%.

- Composition / Information on ingredients

Head and Muscle Tissue Simulation Liquids HBBL1900-3800V3/MBBL1900-3800V3

Water	50 – 73 %
Non-ionic detergents	27 – 50 % polyoxyethylenesorbitan monolaurate
NaCl	0 – 2 %
Preservative	0.05 – 0.1% Preventol-D7
Safety relevant ingredients:	
CAS-No. 55965-84-9	< 0.1 % aqueous preparation, containing 5-chloro-2-methyl-3(2H)-isothiazolone and 2-methyyl-3(2H)-isothiazolone
CAS-No. 9005-64-5	<50 % polyoxyethylenesorbitan monolaurate

Head and Muscle Tissue Simulation Liquids HBBL5GHzV2

Water	76 – 80 %
Mineral Oil	10 – 12 %
Emulsifiers	8 – 10 %
Additives and Salt	1 – 3%

4. SYSTEM CHECK MEASUREMENTS

Execution Date	Frequency (MHz)	Exposure Conditions	SAR over	Fast SAR (W/Kg)	SAR (W/Kg)	1 W Target SAR (W/Kg)	1 W Nor. SAR (W/Kg)	Drift (%)
2024-10-02	5250	Head	1-g	7.45	7.98	77.01	79.80	3.62
2024-10-02	5250	Head	10-g	2.07	2.29	22.55	22.90	1.55
2024-10-20	5800	Head	1-g	8.33	7.96	75.70	79.60	5.15
2024-10-20	5800	Head	10-g	2.26	2.27	22.16	22.70	2.44
2024-10-22	2450	Head	1-g	5.55	5.13	50.50	51.30	1.58
2024-10-22	2450	Head	10-g	2.56	2.36	23.50	23.60	0.43

5. MEASUREMENT RESULTS FOR SAR (SPECIFIC ABSORPTION RATE)

5.1. Summary maximum results for body measurements.

Mode	Side / Position	Channel (Frequency)	Reported SAR 1-g (W/kg)	Limit SAR 1-g (W/kg)
802.11 b	Front face 0mm	CH 1 (2412 MHz)	0.595	1.6
802.11 ac40	Front face 0 mm	CH 38 (5190 MHz)	0.445	1.6
802.11 ac20	Front fase 0 mm	CH 149 (5745 MHz)	0.598	1.6

5.2. Summary maximum results for extremity measurements.

Mode	Side / Position	Channel (Frequency)	Reported SAR 10-g (W/kg)	Limit SAR 10-g (W/kg)
802.11 b	Front face 0mm	CH 1 (2412 MHz)	0.238	4.0
802.11 ac40	Front face 0 mm	CH 38 (5190 MHz)	0.111	4.0
802.11 n20	Front fase 0 mm	CH 149 (5745 MHz)	0.080	4.0

5.3. WLAN

Band	Ant.	TX Config	Expos. Cond.	Mode	BW (MHz)	Pos.	Dist (mm)	Ch.	Freq. (MHz)	Duty Cycle (%)	Estim. SAR 1-g (W/kg)	SAR 1-g (W/kg)	Estim. SAR 10-g (W/kg)	SAR 10-g (W/kg)	Power Drift (%)	Scale factor	Report. SAR 1-g (W/kg)	Limit SAR 1-g (W/kg)	Report. SAR 10-g (W/kg)	Limit SAR 10-g (W/kg)	Verdict	Plot No.
2.4 GHz	1.0	SISO	Body & Extremity	802.11b	20.00	Front Face	0	11.0	2462.00	100.00	0.362	0.378	0.157	0.145	-0.574	1.242	0.469	1.600	0.180	4.0	Pass	
				802.11b	20.00	Left Edge	0	11.0	2462.00	100.00	0.000*	N/M	0.000*	N/M	-1.938	1.242	N/A	1.600	N/A	4.0	Pass	
				802.11b	20.00	Right Edge	0	11.0	2462.00	100.00	0.000*	N/M	0.000*	N/M	0.000	1.242	N/A	1.600	N/A	4.0	Pass	
				802.11b	20.00	Top Edge	0	11.0	2462.00	100.00	0.016	N/M	0.016*	N/M	0.000	1.242	N/A	1.600	N/A	4.0	Pass	
				802.11b	20.00	Bottom Edge	0	11.0	2462.00	100.00	0.000*	N/M	0.000*	N/M	0.000	1.242	N/A	1.600	N/A	4.0	Pass	
				802.11g	20.00	Front Face	0	11.0	2462.00	100.00	0.300	0.305	0.132	0.177	-1.031	1.496	0.456	1.600	0.175	4.0	Pass	
				802.11n	20.00	Front Face	0	11.0	2462.00	100.00	0.298	0.306	0.131	0.177	-1.031	1.514	0.463	1.600	0.177	4.0	Pass	
				802.11b	20.00	Front Face	0	1.0	2412.00	100.00	0.399	0.407	0.178	0.163	-0.917	1.462	0.595	1.600	0.238	4.0	Pass	1
				802.11b	20.00	Front Face	0	6.0	2437.00	100.00	0.372	0.382	0.166	0.149	-1.145	1.374	0.525	1.600	0.205	4.0	Pass	
U-NII-1	1.0	SISO	Body & Extremity	802.11a	20.00	Front Face	0	36.0	5180.00	100.00	0.254	0.241	0.067	0.060	-0.230	1.675	0.404	1.600	0.100	4.0	Pass	
				802.11a	20.00	Left Edge	0	36.0	5180.00	100.00	0.000*	N/M	0.000*	N/M	0.000	1.675	N/A	1.600	N/A	4.0	Pass	
				802.11a	20.00	Right Edge	0	36.0	5180.00	100.00	0.000*	N/M	0.000*	N/M	0.000	1.675	N/A	1.600	N/A	4.0	Pass	
				802.11a	20.00	Top Edge	0	36.0	5180.00	100.00	0.000*	N/M	0.000*	N/M	0.000	1.675	N/A	1.600	N/A	4.0	Pass	
				802.11a	20.00	Bottom Edge	0	36.0	5180.00	100.00	0.000*	N/M	0.000*	N/M	0.000	1.675	N/A	1.600	N/A	4.0	Pass	
				802.11n	20.00	Front Face	0	36.0	5180.00	100.00	0.250	0.244	0.068	0.061	1.976	1.679	0.410	1.600	0.102	4.0	Pass	
				802.11ac	20.00	Front Face	0	40.0	5200.00	100.00	0.232	0.225	0.063	0.056	3.753	1.782	0.401	1.600	0.099	4.0	Pass	
				802.11n	40.00	Front Face	0	38.0	5190.00	100.00	0.211	0.214	0.058	0.055	0.000	1.982	0.424	1.600	0.108	4.0	Pass	
				802.11ac	40.00	Front Face	0	38.0	5190.00	100.00	0.205	0.227	0.060	0.056	0.346	1.959	0.445	1.600	0.110	4.0	Pass	2
				802.11ac	80.00	Front Face	0	42.0	5210.00	100.00	0.110	0.119	0.031	0.028	0.809	2.410	0.287	1.600	0.056	4.0	Pass	
				802.11ac	40.00	Front Face	0	46.0	5230.00	100.00	0.166	0.170	0.048	0.040	1.520	2.020	0.344	1.600	0.080	4.0	Pass	

Band	Ant.	TX Config	Expos. Cond.	Mode	BW (MHz)	Pos.	Dist (mm)	Ch.	Freq. (MHz)	Duty Cycle (%)	Estim. SAR 1-g (W/kg)	SAR 1-g (W/kg)	Estim. SAR 10-g (W/kg)	SAR 10-g (W/kg)	Power Drift (%)	Scale factor	Report. SAR 1-g (W/kg)	Limit SAR 1-g (W/kg)	Report. SAR 10-g (W/kg)	Limit SAR 10-g (W/kg)	Verdict	Plot No.
U-NII-3	1.0	SISO	Body & Extremity	802.11n	20.00	Front Face	0	149.0	5745.00	100.00	0.240	0.379	0.058	0.080	-1.938	1.472	0.558	1.600	0.177	4.0	Pass	3
				802.11n	20.00	Left Edge	0	149.0	5745.00	100.00	0.000*	N/M	0.000*	N/M	0.000	1.472	N/A	1.600	N/A	4.0	Pass	
				802.11n	20.00	Right Edge	0	149.0	5745.00	100.00	0.000*	N/M	0.000*	N/M	0.000	1.472	N/A	1.600	N/A	4.0	Pass	
				802.11n	20.00	Top Edge	0	149.0	5745.00	100.00	0.012*	N/M	0.002*	N/M	3.157	1.472	N/A	1.600	N/A	4.0	Pass	
				802.11n	20.00	Bottom Edge	0	149.0	5745.00	100.00	0.000*	N/M	0.000*	N/M	0.000	1.472	N/A	1.600	N/A	4.0	Pass	
				802.11a	20.00	Front Face	0	149.0	5745.00	100.00	0.228	0.336	0.061	0.067	-1.145	1.493	0.502	1.600	0.100	4.0	Pass	
				802.11ac	20.00	Front Face	0	165.0	5825.00	100.00	0.259	0.381	0.070	0.076	-1.599	1.479	0.563	1.600	0.112	4.0	Pass	
				802.11n	40.00	Front Face	0	151.0	5755.00	100.00	0.235	0.328	0.063	0.067	-3.839	1.596	0.523	1.600	0.106	4.0	Pass	
				802.11ac	40.00	Front Face	0	151.0	5755.00	100.00	0.205	0.326	0.060	0.066	-2.949	1.581	0.515	1.600	0.105	4.0	Pass	
				802.11ac	80.00	Front Face	0	155.0	5775.00	100.00	0.170	0.249	0.048	0.048	-0.917	2.113	0.526	1.600	0.102	4.0	Pass	
				802.11ac	20.00	Front Face	0	149.0	5745.00	100.00	0.234	0.356	0.064	0.071	2.212	1.679	0.598	1.600	0.107	4.0	Pass	4
				802.11ac	20.00	Front Face	0	132.0	5660.00	100.00	0.229	0.339	0.064	0.068	-2.949	1.517	0.514	1.600	0.068	4.0	Pass	

N/M: Not Measured (See Remarks and comments 1.)
* (See Remarks and comments 2.)
N/A: Not Applicable.

DEKRA Testing and Certification, S.A.U.
Parque Tecnológico de Andalucía,
c/ Severo Ochoa nº 2 · 29590 Campanillas · Málaga · España
C.I.F. A29 507 456

Appendix C: Measurement report

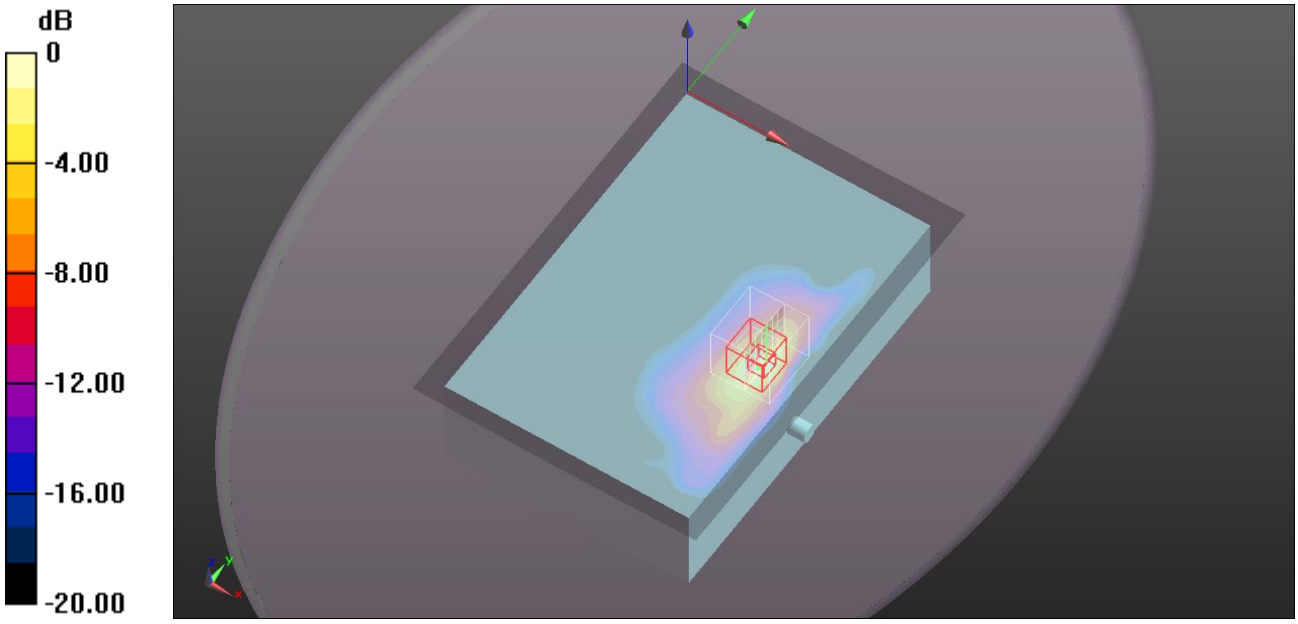
Plot Nº1

Test Laboratory: DEKRA Testing and Certification, S.A.U; Date: 23/10/2024

DUT: Harman SPACE4 BASE 1.1A; Type: Headunit; Serial: Z0681A000041379321A0694E0012
Communication System: UID 10415 - AAA, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle);
Frequency: 2412 MHz; Duty Cycle: 1:1.4243
Medium parameters used (interpolated): f = 2412 MHz; σ = 1.872 S/m; ε_r = 36.506; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY5 Configuration:
- Probe: EX3DV4 - SN7461; ConvF(7.68, 7.89, 8.22) @ 2412 MHz; Calibrated: 04/07/2024
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 09/07/2024
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1060
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

Flat Phantom, d=0 mm, 2450MHz/802.11b, 1Mbps, CH 1, Front face/Area Scan (141x201x1):
Interpolated grid: dx=1.200 mm, dy=1.200 mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.601 W/kg

Flat Phantom, d=0 mm, 2450MHz/802.11b, 1Mbps, CH 1, Front face/Zoom Scan (8x8x8)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=1.4mm
Reference Value = 18.91 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 1.14 W/kg
SAR(1 g) = 0.407 W/kg; SAR(10 g) = 0.163 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 7 mm
Ratio of SAR at M2 to SAR at M1 = 73.8%
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.779 W/kg



0 dB = 0.779 W/kg = -1.08 dBW/kg

Plot Nº2

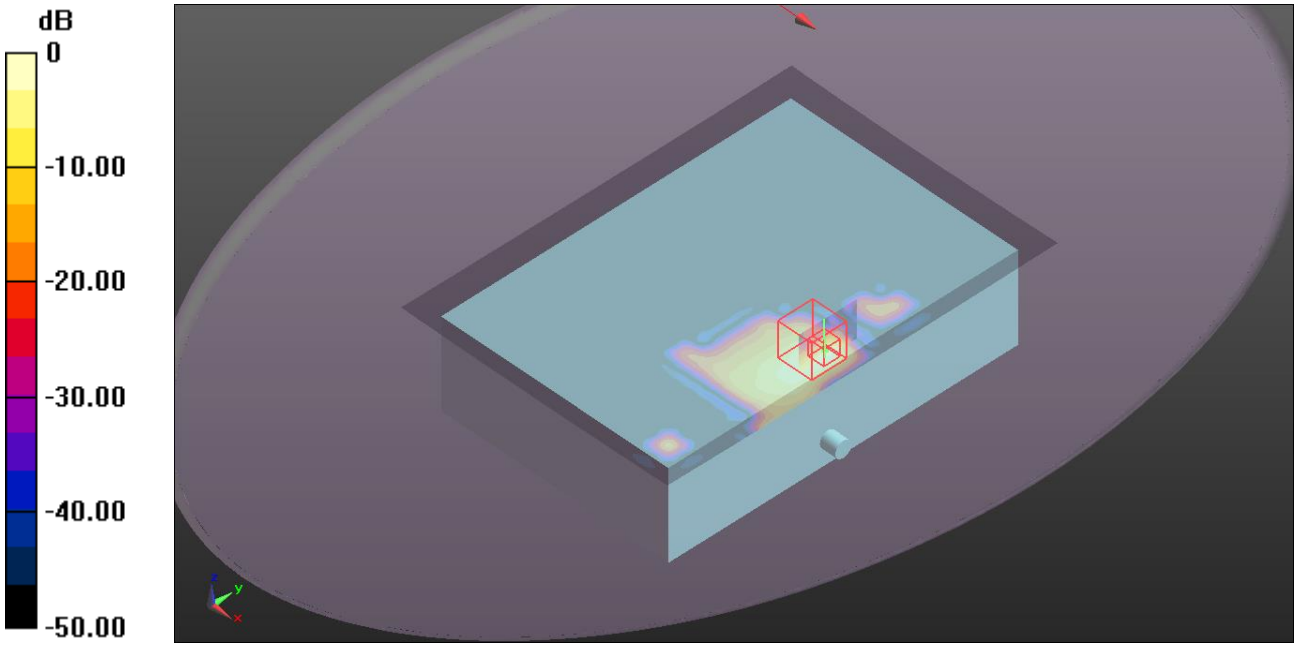
Test Laboratory: DEKRA Testing and Certification, S.A.U; Date: 02/10/2024

DUT: Harman SPACE4 BASE 1.1A; Type: Headunit; Serial: Z0681A000041379321A0694E0012
Communication System: UID 10534 - AAD, IEEE 802.11ac WiFi (40MHz, MCS0, 99pc duty cycle); Frequency: 5190 MHz; Duty Cycle: 1:7.00164
Medium parameters used (interpolated): f = 5190 MHz; σ = 4.44 S/m; ε_r = 33.96; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN7766; ConvF(5.88, 5.17, 5.02) @ 5190 MHz; Calibrated: 17/10/2023
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1690; Calibrated: 20/10/2023
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1060
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

Flat Phantom, d=0 mm, 5250MHz/802.11ac, VHT0, CH 38, Front face/Area Scan (171x241x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.509 W/kg

Flat Phantom, d=0 mm, 5250MHz/802.11ac, VHT0, CH 38, Front face/Zoom Scan (10x10x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 6.994 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.28 W/kg
SAR(1 g) = 0.227 W/kg; SAR(10 g) = 0.056 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 4.1 mm
Ratio of SAR at M2 to SAR at M1 = 58.3%
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.607 W/kg



0 dB = 0.607 W/kg = -2.17 dBW/kg

Plot Nº3

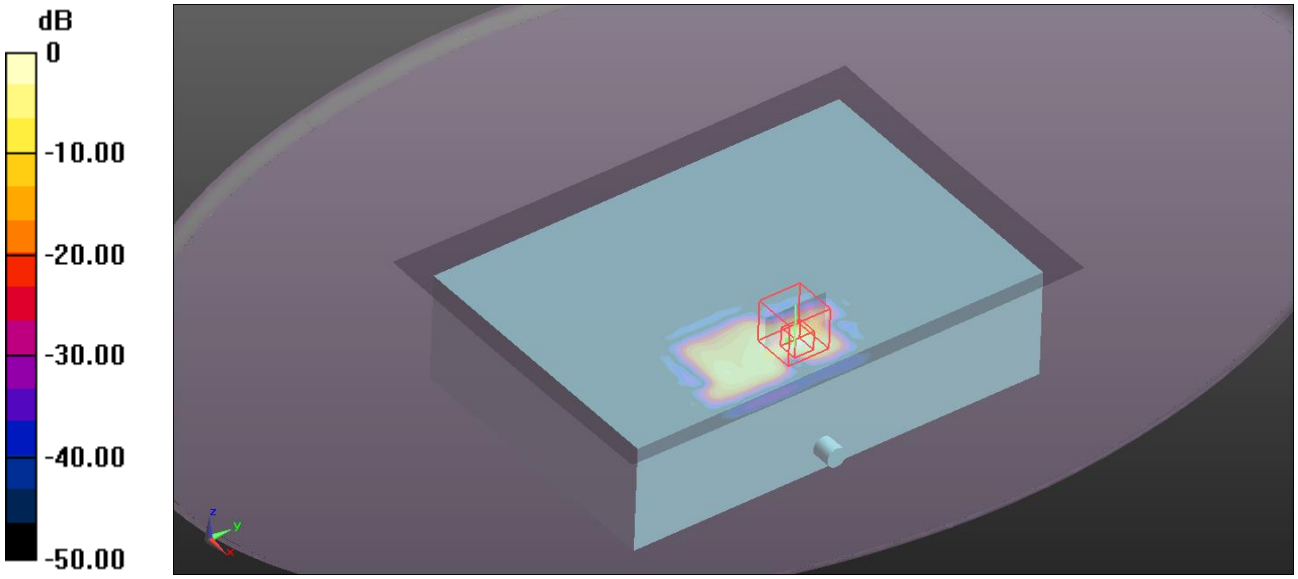
Test Laboratory: DEKRA Testing and Certification, S.A.U; Date: 20/10/2024

DUT: Harman SPACE4 BASE 1.1A; Type: Headunit; Serial: Z0681A000041379321A0694E0012
Communication System: UID 10591 - AAD, IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc duty cycle); Frequency: 5745 MHz; Duty Cycle: 1:7.29122
Medium parameters used (interpolated): f = 5745 MHz; σ = 5.192 S/m; ε_r = 34.875; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN7461; ConvF(5.35, 5.5, 5.72) @ 5745 MHz; Calibrated: 04/07/2024
- Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 09/07/2024
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1060
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

Flat Phantom, d=0 mm, 5800MHz/802.11n, HT0, CH 149, Front face/Area Scan (171x241x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.750 W/kg

Flat Phantom, d=0 mm, 5800MHz/802.11n, HT0, CH 149, Front face/Zoom Scan (9x9x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 13.03 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 2.61 W/kg
SAR(1 g) = 0.379 W/kg; SAR(10 g) = 0.080 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 4.7 mm
Ratio of SAR at M2 to SAR at M1 = 54.4%
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.19 W/kg



0 dB = 0.750 W/kg = -1.25 dBW/kg

Plot Nº4

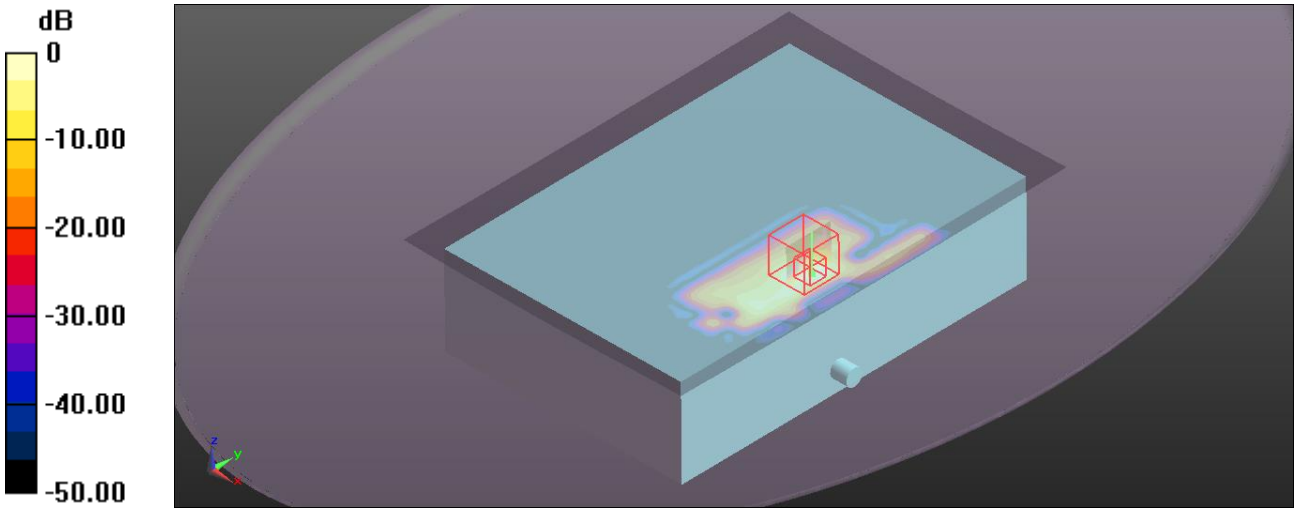
Test Laboratory: DEKRA Testing and Certification, S.A.U; Date: 21/10/2024

DUT: Harman SPACE4 BASE 1.1A; Type: Headunit; Serial: Z0681A000041379321A0694E0012
Communication System: UID 10525 - AAD, IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle); Frequency: 5745 MHz; Duty Cycle: 1:6.85488
Medium parameters used (interpolated): f = 5745 MHz; σ = 5.192 S/m; ε_r = 34.875; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN7461; ConvF(5.35, 5.5, 5.72) @ 5745 MHz; Calibrated: 04/07/2024
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 09/07/2024
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1060
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

Flat Phantom, d=0 mm, 5800MHz/802.11ac, VHT0, CH149, Front face/Area Scan (171x241x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.718 W/kg

Flat Phantom, d=0 mm, 5800MHz/802.11ac, VHT0, CH149, Front face/Zoom Scan (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 0.6900 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 2.72 W/kg
SAR(1 g) = 0.356 W/kg; SAR(10 g) = 0.071 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 4.3 mm
Ratio of SAR at M2 to SAR at M1 = 55.2%
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.18 W/kg



0 dB = 0.718 W/kg = -1.44 dBW/kg

Appendix D: System validation report

Validation results in 5250 MHz Band for Head TSL

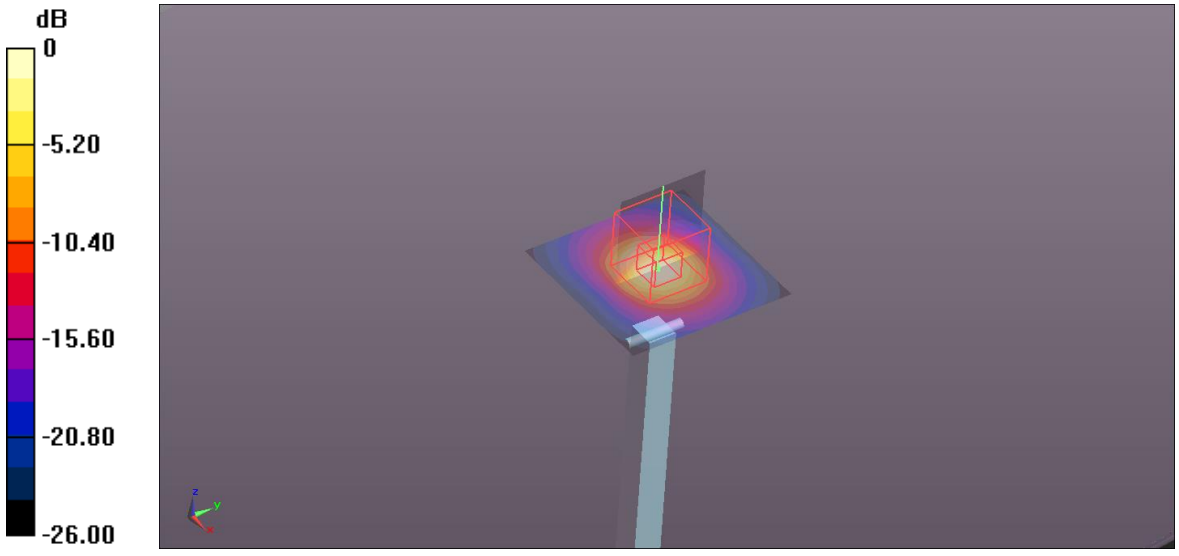
Test Laboratory: DEKRA Testing and Certification, S.A.U; Date: 02/10/2024

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1071
Communication System: UID 0, CW (0); Frequency: 5250 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5250 MHz; σ = 4.5 S/m; ε_r = 33.89; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN7766; ConvF(5.88, 5.17, 5.02) @ 5250 MHz; Calibrated: 17/10/2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1690; Calibrated: 20/10/2023
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1060
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

Configuration 5 GHz 02-10-2024/5.25 GHz, d=10mm, Pin=100 mW/Area Scan (61x61x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 19.8 W/kg

Configuration 5 GHz 02-10-2024/5.25 GHz, d=10mm, Pin=100 mW/Zoom Scan (9x9x8)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 69.94 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 33.3 W/kg
SAR(1 g) = 7.98 W/kg; SAR(10 g) = 2.29 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 7.1 mm
Ratio of SAR at M2 to SAR at M1 = 64.1%
Maximum value of SAR (measured) = 20.6 W/kg



0 dB = 19.8 W/kg = 12.97 dBW/kg

Validation results in 5800 MHz Band for Head TSL

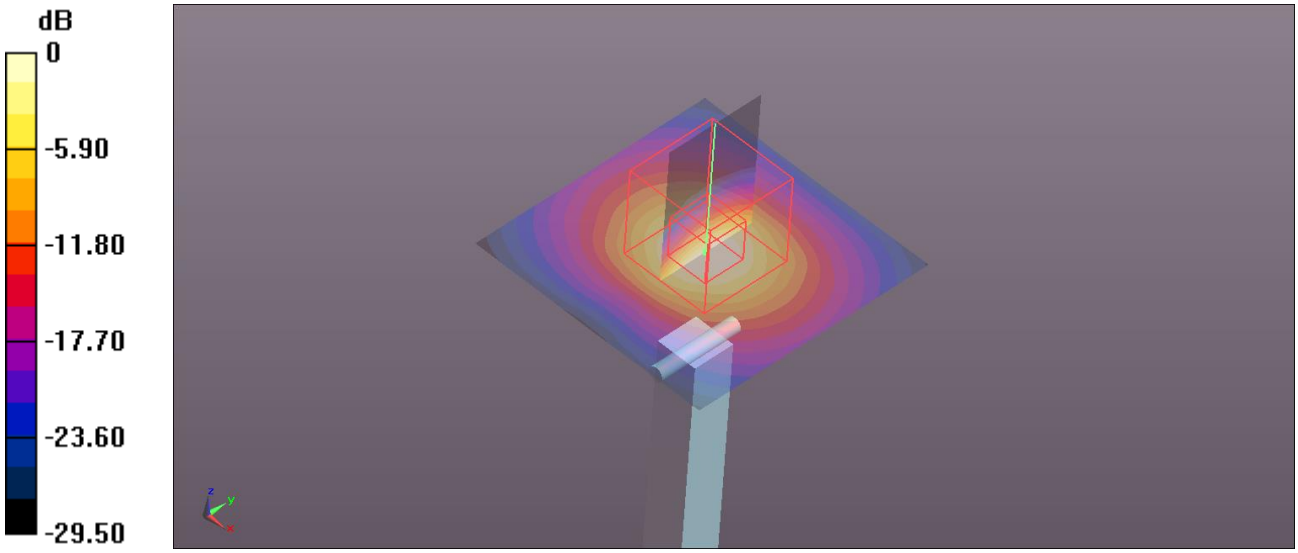
Test Laboratory: DEKRA Testing and Certification, S.A.U; Date: 20/10/2024

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1071
Communication System: UID 0, CW (0); Frequency: 5800 MHz; Duty Cycle: 1:1
Medium parameters used: f = 5800 MHz; σ = 5.31 S/m; ε_r = 34.74; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN7461; ConvF(5.35, 5.5, 5.72) @ 5800 MHz; Calibrated: 04/07/2024
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 09/07/2024
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1060
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

Configuration 5 GHz 20-10-2024/5.8 GHz, d=10mm, Pin=100 mW/Area Scan (61x61x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 23.7 W/kg

Configuration 5 GHz 20-10-2024/5.8 GHz, d=10mm, Pin=100 mW/Zoom Scan (7x7x8)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 70.28 V/m; Power Drift = -0.55 dB
Peak SAR (extrapolated) = 38.6 W/kg
SAR(1 g) = 7.96 W/kg; SAR(10 g) = 2.27 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 7.9 mm
Ratio of SAR at M2 to SAR at M1 = 58.9%
Maximum value of SAR (measured) = 21.2 W/kg



0 dB = 21.2 W/kg = 13.27 dBW/kg

Validation results in 2450 MHz Band for Head TSL

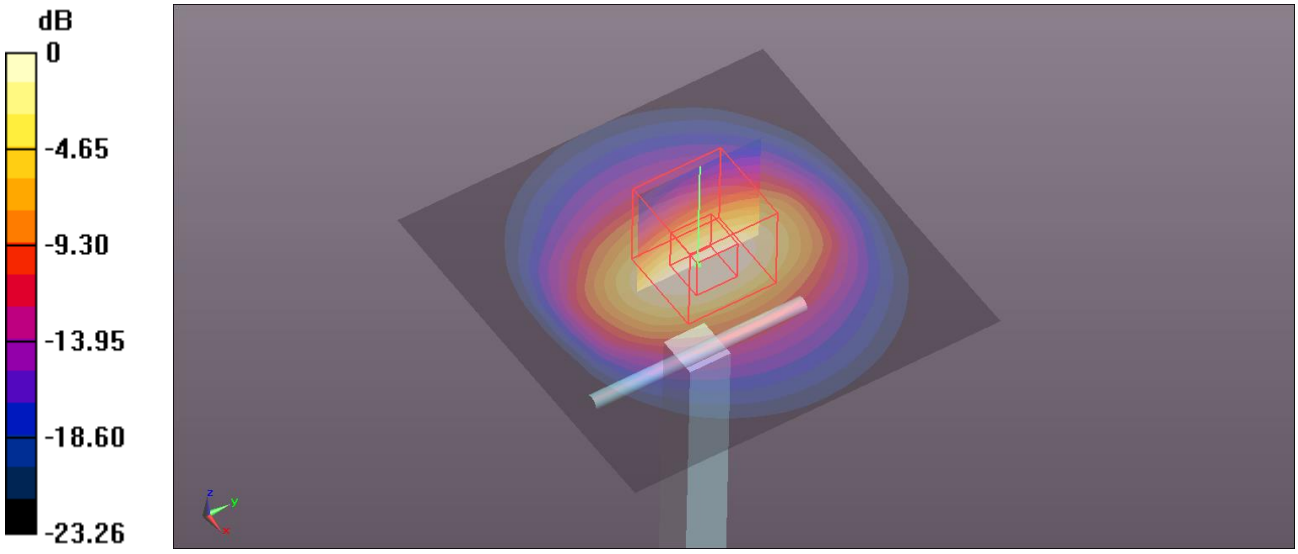
Test Laboratory: DEKRA Testing and Certification, S.A.U; Date: 22/10/2024

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:756
Communication System: UID 0, CW (0); Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.9 S/m; ε_r = 36.42; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN7461; ConvF(7.68, 7.89, 8.22) @ 2450 MHz; Calibrated: 04/07/2024
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn669; Calibrated: 09/07/2024
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1060
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

Configuration 2450 MHz 22-10-2024/2.45GHz, d=10mm, Pin=100 mW/Area Scan (91x91x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 8.24 W/kg

Configuration 2450 MHz 22-10-2024/2.45GHz, d=10mm, Pin=100 mW/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 67.31 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 10.4 W/kg
SAR(1 g) = 5.13 W/kg; SAR(10 g) = 2.36 W/kg (SAR corrected for target medium)
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 49.1%
Maximum value of SAR (measured) = 7.85 W/kg



0 dB = 7.85 W/kg = 8.95 dBW/kg