FCC SAR Test Report

Product Name : Control Unit

Model No. : JRN-360T

Applicant : JRC Mobility Inc.

Address : 2-31-11, Nihonbashi Ningyo-cho, Chuo-ku, Tokyo 103-8650, Japan.

Date of Receipt : 2021/12/21

Issued Date : 2022/03/07

Report No. : 21C0753R-SAUSSARV02-A

Report Version : V1.0

Testing Laboratory
3023

Test Report

Issued Date: 2022/03/07
Report No.: 21C0753R-SAUSSARV02-A

Product Name	:	Control Unit
Applicant	:	JRC Mobility Inc.
Address	:	2-31-11, Nihonbashi Ningyo-cho, Chuo-ku, Tokyo 103-8650, Japan.
Manufacturer	:	JRC Mobility Inc.
Model No.	:	JRN-360T
Trade Name	:	JRC Mobility
FCC ID	:	2AX5HJRN-360T
Applicable Standard	:	IEEE 1528-2013 KDB 447498 D01 v06 KDB 865664 D01 v01r04
Measurement procedures	:	47CFR § 2.1093 KDB 941225 D01 v03r01 KDB 941225 D05 v02r05 KDB 941225 D06 v02r01
Test Result	:	Max. SAR Measurement (1g) WWAN: **1.107** W/kg
Application Type	:	Certification

The above equipment has been tested by DEKRA, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's SAR characteristics under the conditions specified in this report.

Documented By : Genie Chang
(Senior Project Specialist / Genie Chang)

Tested By : Luke Cheng
(Senior Engineer / Luke Cheng)

Approved By : San Lin
(Supervisor / San Lin)

TABLE OF CONTENTS

Revision History

Report No.	Version	Description	Issued Date
21C0753R-SAUSSARV02-A	V1.0	Initial issue of report.	2022/03/07

1. General Information

1.1 EUT Description

Product Name	Control Unit
Trade Name	JRC Mobility
Model No.	JRN-360T
FCC ID	2AX5HJRN-360T
Frequency Range	GSM850/WCDMA Band 5/LTE Band 5: 824-849MHz PCS1900/WCDMA Band 2/LTE Band 2: 1850-1910MHz WCDMA Band 4/LTE Band 4: 1710-1755 MHz LTE Band 7: 2500MHz ~2570 MHz, LTE Band 12: 699MHz-716 MHz
Type of Modulation	GSM: GMSK/8PSK, WCDMA: RMC 12.2Kbps/HSDPA/HSUPA, LTE: QPSK/16QAM
Antenna Type	Chip + Pattern
Device Category	Portable
RF Exposure Environment	Uncontrolled
Summary of test result-Reported 1g SAR (W/Kg)	
Test configuration	Licensed
Standalone	1.107

1.2 Antenna List

No.	Manufacturer	Part No.	Antenna Type
1	JRC Mobility Inc.	CAU-7360TA (WWAN)	Chip + Pattern

1.3 SAR Test Exclusion Calculation

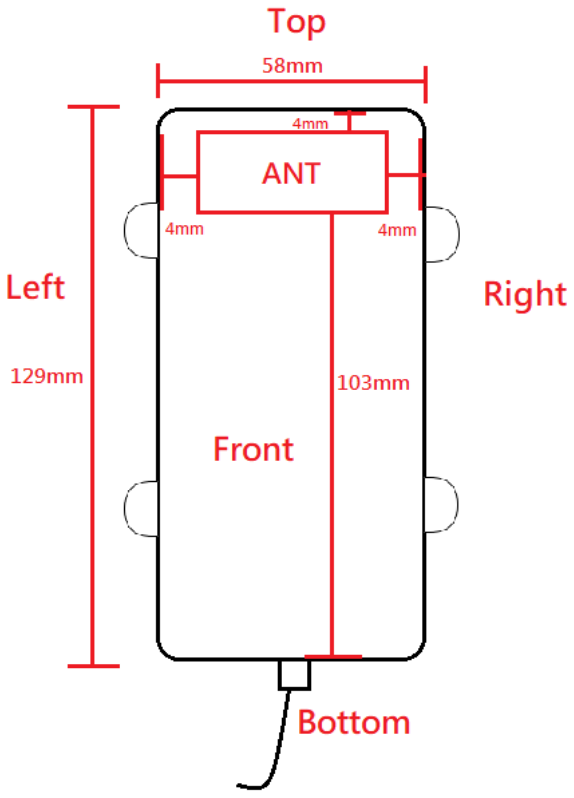
According to KDB Publication 447498 D01, section 4.3.1, per the calculations of item 1 (Power(mW)/separation (mm)*sqrt(f(GHz)≤3.0), SAR is required as shown in the table below where calculated values are greater than 3.0:

SAR exclusion calculations for WiFi-SISO and Bluetooth for antenna < 50mm from the user :

Antenna	Tx	Frequency (MHz)	Output Power		Separation distances (mm)						Calculated Threshold Value (≦3.0 SAR is not required)					
			dBm	mW	Back	Right	Left	Top	Bottom	Front	Back	Right	Left	Top	Bottom	Front
Main	GSM 850	850	34	2512	10	4	4	4	103	4	231.6	463.2	463.2	463.2	>50mm	463.2
Main	PCS 1900	1900	31.5	1413	10	4	4	4	103	4	194.7	389.4	389.4	389.4	>50mm	389.4
Main	WCDMA B2	1900	24.5	282	10	4	4	4	103	4	38.8	77.7	77.7	77.7	>50mm	77.7
Main	WCDMA B4	1700	24.5	282	10	4	4	4	103	4	36.7	73.5	73.5	73.5	>50mm	73.5
Main	WCDMA B5	850	24.5	282	10	4	4	4	103	4	26.0	52.0	52.0	52.0	>50mm	52.0
Main	LTE B2	1900	24.5	282	10	4	4	4	103	4	38.8	77.7	77.7	77.7	>50mm	77.7
Main	LTE B4	1700	24.5	282	10	4	4	4	103	4	36.7	73.5	73.5	73.5	>50mm	73.5
Main	LTE B5	850	24.5	282	10	4	4	4	103	4	26.0	52.0	52.0	52.0	>50mm	52.0
Main	LTE B7	2500	23	200	10	4	4	4	103	4	31.5	63.1	63.1	63.1	>50mm	63.1
Main	LTE B12	700	24.5	282	10	4	4	4	103	4	23.6	47.2	47.2	47.2	>50mm	47.2

SAR exclusion calculations for WiFi-SISO and Bluetooth for antenna > 50mm from the user :

Antenna	Tx	Frequency (MHz)	Output Power		Separation distances (mm)						Calculated Threshold Value (SAR test exclusion power,mW)					
			dBm	mW	Back	Right	Left	Top	Bottom	Front	Back	Right	Left	Top	Bottom	Front
Main	GSM850	850	34	2512	10	4	4	4	103	4	<50mm	<50mm	<50mm	<50mm	463.0	<50mm
Main	PCS1900	1900	31.5	1413	10	4	4	4	103	4	<50mm	<50mm	<50mm	<50mm	638.8	<50mm
Main	WCDMA B2	1900	24.5	282	10	4	4	4	103	4	<50mm	<50mm	<50mm	<50mm	638.8	<50mm
Main	WCDMA B4	1700	24.5	282	10	4	4	4	103	4	<50mm	<50mm	<50mm	<50mm	645.0	<50mm
Main	WCDMA B5	850	24.5	282	10	4	4	4	103	4	<50mm	<50mm	<50mm	<50mm	463.0	<50mm
Main	LTE B2	1900	24.5	282	10	4	4	4	103	4	<50mm	<50mm	<50mm	<50mm	638.8	<50mm
Main	LTE B4	1700	24.5	282	10	4	4	4	103	4	<50mm	<50mm	<50mm	<50mm	645.0	<50mm
Main	LTE B5	850	24.5	282	10	4	4	4	103	4	<50mm	<50mm	<50mm	<50mm	463.0	<50mm
Main	LTE B7	2500	23	200	10	4	4	4	103	4	<50mm	<50mm	<50mm	<50mm	624.9	<50mm
Main	LTE B12	700	24.5	282	10	4	4	4	103	4	<50mm	<50mm	<50mm	<50mm	438.2	<50mm



1.4 Test Environment

Ambient conditions in the laboratory:

Test Mode: GSM850, WCDMA Band 5, LTE Band 5, LTE Band 12
Test Date: Feb. 17, 2022

Items	Required	Actual
Temperature (°C)	18-25	23.1 ± 2
Humidity (%RH)	30-70	53

Test Mode: PCS1900, WCDMA Band 2, LTE Band 2
Test Date: Feb. 18, 2022

Items	Required	Actual
Temperature (°C)	18-25	22.8 ± 2
Humidity (%RH)	30-70	51

Test Mode: WCDMA Band 4, LTE Band 4,
Test Date: Feb. 18, 2022

Items	Required	Actual
Temperature (°C)	18-25	22.8 ± 2
Humidity (%RH)	30-70	53

Test Mode: LTE Band 7
Test Date: Feb. 21, 2022

Items	Required	Actual
Temperature (°C)	18-25	23.2 ± 2
Humidity (%RH)	30-70	54

USA : FCC Registration Number: TW0033

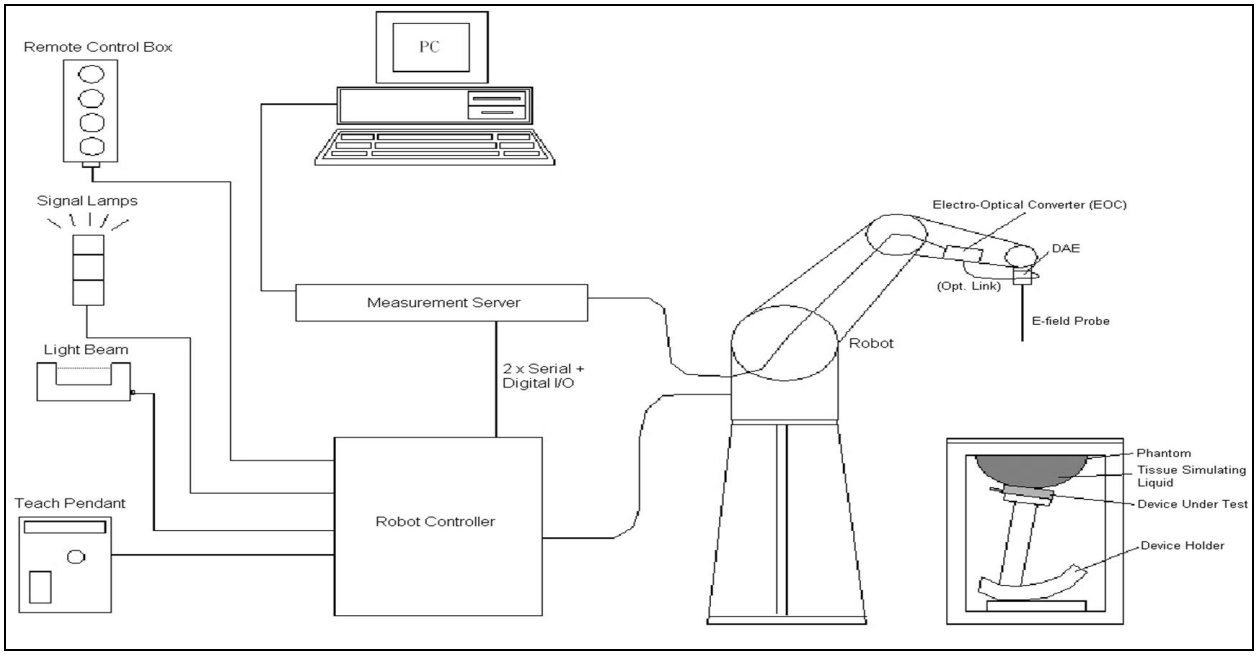
Canada : IC Registration Number: 26930

Site Description : Accredited by TAF
Accredited Number: 3023

Test Laboratory : DEKRA Testing and Certification Co., Ltd
Address : No. 26, Huaya 1st Rd., Guishan Dist.,Taoyuan City 333411, Taiwan, R.O.C.
Phone number : +886-3-275-7255
Fax number : +866-3-327-8031
Email address : info.tw@dekra.com
Website : http://www.dekra.com.tw

2. SAR Measurement System

2.1 DASY5 System Description



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

- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- 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 Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP and the DASY5 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.

2.1.1 Applications

Predefined procedures and evaluations for automated compliance testing with all worldwide standards, e.g., IEEE 1528, OET 65, IEC 62209-1, IEC 62209-2, EN 50360, EN 50383 and others.

2.1.2 Area Scans

Area scans are defined prior to the measurement process being executed with a user defined variable spacing between each measurement point (integral) allowing low uncertainty measurements to be conducted. Scans defined for FCC applications utilize a 10mm^2 step integral, with 1mm interpolation used to locate the peak SAR area used for zoom scan assessments.

When an Area Scan has measured all reachable points, it computes the field maxima found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE 1528-2013, EN 50361 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan).

2.1.3 Zoom Scan (Cube Scan Averaging)

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. A density of 1000 kg/m^3 is used to represent the head and body tissue density and not the phantom liquid density, in order to be consistent with the definition of the liquid dielectric properties, i.e. the side length of the 1 g cube is 10mm, with the side length of the 10 g cube 21,5mm.

The zoom scan integer steps can be user defined so as to reduce uncertainty, but normal practice for typical test applications (including FCC) utilize a physical step of 5x5x7 (8mmx8mmx5mm) providing a volume of 32mm in the X & Y axis, and 30mm in the Z axis.

2.1.4 Uncertainty of Inter-/Extrapolation and Averaging

In order to evaluate the uncertainty of the interpolation, extrapolation and averaged SAR calculation algorithms of the Postprocessor, DASY5 allows the generation of measurement grids which are artificially predefined by analytically based test functions. Therefore, the grids of area scans and zoom scans can be filled with uncertainty test data, according to the SAR benchmark functions of IEEE 1528.The three analytical functions shown in equations as below are used to describe the possible range of the expected SAR

distributions for the tested handsets. The field gradients are covered by the spatially flat distribution f1, the spatially steep distribution f3 and f2 accounts for H-field cancellation on the phantom/tissue surface.

$$f_1(x,y,z) = Ae^{-\frac{z}{2a}}\cos^2\left(\frac{\pi}{2}\frac{\sqrt{x'^2+y'^2}}{5a}\right)$$

$$f_2(x,y,z) = Ae^{-\frac{z}{a}}\frac{a^2}{a^2+x'^2}\left(3-e^{-\frac{2z}{a}}\right)\cos^2\left(\frac{\pi}{2}\frac{y'}{3a}\right)$$

$$f_3(x,y,z) = A\frac{a^2}{\frac{a^2}{4}+x'^2+y'^2}\left(e^{-\frac{2z}{a}}+\frac{a^2}{2(a+2z)^2}\right)$$

2.2 DASY5 E-Field Probe

The SAR measurement is conducted with the dosimetric probe manufactured by SPEAG. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency.

SPEAG conducts the probe calibration in compliance with international and national standards (e.g. IEEE 1528, EN 62209-1, IEC 62209, etc.) under ISO 17025. The calibration data are in Appendix D**.**

2.2.1 Isotropic E-Field Probe Specification

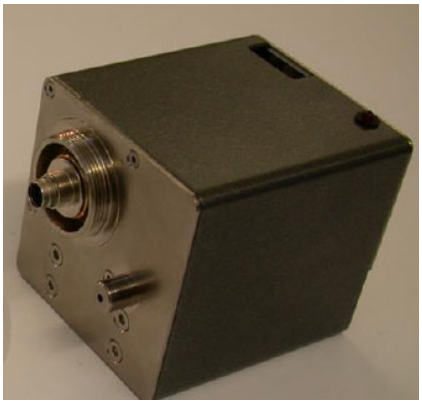
Model	Ex3DV4	
Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz to 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)	
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (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: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.	

2.3 Boundary Detection Unit and Probe Mounting Device

The DASY probes use a precise connector and an additional holder for the probe, consisting of a plastic tube and a flexible silicon ring to center the probe. The connector at the DAE is flexibly mounted and held in the default position with magnets and springs. Two switching systems in the connector mount detect frontal and lateral probe collisions and trigger the necessary software response.

2.4 DATA Acquisition Electronics (DAE) and Measurement Server

The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit.
Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.
The input impedance of the DAE4 is 200M Ohm; the inputs are symmetrical and floating. Common mode rejection is above 80dB.



The DASY5 measurement server is based on a PC/104 CPU board with a 400MHz intel ULV Celeron, 128MB chipdisk and 128MB RAM. The necessary circuits for communication with the DAE electronics box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY5 I/O board, which is directly connected to the PC/104 bus of the CPU board.

2.5 Robot

The DASY5 system uses the high precision robots TX90 XL type out of the newer series from Stäubli SA (France). For the 6-axis controller DASY5 system, the CS8C robot controller version from Stäubli is used.
The XL robot series have many features that are important for our application:

- High precision (repeatability 0.02 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)
- 6-axis controller

2.6 Light Beam Unit

The light beam switch allows automatic "tooling" of the probe. During the process, the actual position of the probe tip with respect to the robot arm is measured, as well as the probe length and the horizontal probe offset. The software then corrects all movements, such that the robot coordinates are valid for the probe tip.
The repeatability of this process is better than 0.1 mm. If a position has been taught with an aligned probe, the same position will be reached with another aligned probe within 0.1 mm, even if the other probe has different dimensions. During probe rotations, the probe tip will keep its actual position.

2.7 Device Holder

The DASY5 device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (EPR).

Thus the device needs no repositioning when changing the angles.

The DASY5 device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity εr =3 and loss tangent δ = 0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

2.8 SAM Twin Phantom

The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region where shell thickness increases to 6mm). It has three measurement areas:

- Left head
- Right head
- Flat phantom

The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

3. Tissue Simulating Liquid

3.1 The composition of the tissue simulating liquid

INGREDIENT (% Weight)	750MHz Head	1750MHz Head	1950MHz Head	2600MHz Head
Water	40.45	52.55	54.90	44.53
Salt	1.45	0.34	0.18	0.17
Sugar	57.60	0	0	0
HEC	0.40	0	0	0
Preventol	0.10	0	0	0
DGBE	0	47.50	44.92	55.30
Triton X-100	0	0	0	0

3.2 Tissue Calibration Result

The dielectric parameters of the liquids were verified prior to the SAR evaluation using Dielectric Probe Kit and Vector Network Analyzer.

Head Tissue Simulate Measurement				
Frequency [MHz]	Description	Dielectric Parameters		Tissue Temp. [°C]
		ε_r	σ [s/m]	
750 MHz	Reference result ± 5% window	41.9 39.81 to 44	0.89 0.85 to 0.93	N/A
	17-Feb-22	41.86	0.89	22.2
824.2 MHz	Channel 128	40.85	0.9	22.2
836.4 MHz	Channel 189	40.68	0.91	22.2
848.8 MHz	Channel 251	40.52	0.92	22.2
826.4 MHz	Channel 4132	40.87	0.9	22.2
836.6 MHz	Channel 4183	40.68	0.91	22.2
846.6 MHz	Channel 4233	40.55	0.92	22.2
836.5 MHz	Channel 20525	40.68	0.91	22.2
707.5 MHz	Channel 23095	42.43	0.87	22.2

Head Tissue Simulate Measurement				
Frequency [MHz]	Description	Dielectric Parameters		Tissue Temp. [°C]
		ε r	σ [s/m]	
1750MHz	Reference result ± 5% window	40.1 38.1 to 42.11	1.37 1.30 to 1.44	N/A
	18-Feb-22	39.62	1.39	22.1
1732.6 MHz	Channel 1513	39.79	1.38	22.1
1732.5 MHz	Channel 20175	39.79	1.38	22.1

Head Tissue Simulate Measurement				
Frequency [MHz]	Description	Dielectric Parameters		Tissue Temp. [°C]
		ε r	σ [s/m]	
1950MHz	Reference result ± 5% window	40 38 to 42	1.4 1.33 to 1.47	N/A
	18-Feb-22	39.72	1.43	22.1
1880 MHz	Channel 661	40.77	1.39	22.1
1880 MHz	Channel 9400	40.77	1.39	22.1
1880 MHz	Channel 18900	40.77	1.39	22.1

Head Tissue Simulate Measurement				
Frequency [MHz]	Description	Dielectric Parameters		Tissue Temp. [°C]
		ε r	σ [s/m]	
2600MHz	Reference result ± 5% window	39 37.05 to 40.95	1.96 1.86 to 2.06	N/A
	21-Feb-22	39.01	1.96	22.3
2535 MHz	Channel 21100	39.82	1.92	22.3

3.3 Tissue Dielectric Parameters for Head and Body Phantoms

The head tissue dielectric parameters recommended by the IEC 62209-1 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head tissue parameters that have not been specified are interpolated according to the head parameters specified in IEC 62209-1

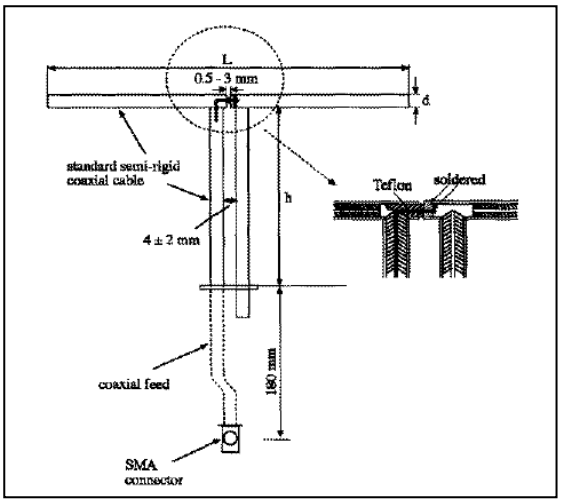
Target Frequency	Head	
(MHz)	ε_r	σ (S/m)
300	45.3	0.87
450	43.5	0.87
750	41.9	0.89
835	41.5	0.90
900	41.5	0.97
1450	40.5	1.20
1640	40.2	1.31
1750	40.1	1.37
1800 – 2000	40.0	1.40
2450	39.2	1.80
3000	38.5	2.40
5000	36.2	4.45
5200	36.0	4.66
5400	35.8	4.86
5600	35.3	5.27
5800	35.3	5.27
6000	35.1	5.48

(ε_r = relative permittivity, σ = conductivity and ρ = 1000 kg/m^3)

4. SAR Measurement Procedure

4.1 SAR System Check

4.1.1 Dipoles



The dipoles used is based on the IEEE-1528 standard, and is complied with mechanical and electrical specifications in line with the requirements of both IEEE and FCC Supplement C. the table below provides details for the mechanical and electrical specifications for the dipoles.

Frequency	L (mm)	h (mm)	d (mm)
750MHz	176.0	100.0	6.35
1750MHz	75.2	42.9	3.6
1950MHz	66.3	38.5	3.6
2600MHz	48.5	28.8	3.6

4.1.2 System Check Result

System Performance Check at 750MHz
Dipole Kit: D750V3

Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
750 MHz	Reference result ± 10% window	8.58 7.72 to 9.44	5.61 5.05 to 6.17	N/A
	17-Feb-22	8.56	5.56	22.2

Note: (1) The power level is used 250mW
(2) All SAR values are normalized to 1W forward power.
(3) The reference result is from Appendix E.

System Performance Check at 1750MHz, 1950MHz, 2450MHz, 2600MHz

Dipole Kit: D1750V2

Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
1750 MHz	Reference result ± 10% window	37.30 33.57 to 41.03	19.6 17.64 to 21.56	N/A
	18-Feb-22	36.72	19.48	22.1

Dipole Kit: D1950V3

Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
1950 MHz	Reference result ± 10% window	39.7 35.73 to 43.67	20.7 18.63 to 22.77	N/A
	18-Feb-22	39.48	19.88	22.1

Dipole Kit: ALS-D-2600

Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
2600 MHz	Reference result ± 10% window	57.9 52.11 to 63.69	25.7 23.13 to 28.27	N/A
	21-Feb-22	56.8	26.44	22.3

Note: (1) The power level is used 250mW
(2) All SAR values are normalized to 1W forward power.
(3) The reference result is from Appendix E.

4.2 SAR Measurement Procedure

The Dasy5 calculates SAR using the following equation,

$$SAR = \frac{\sigma |E|^2}{\rho}$$

σ: represents the simulated tissue conductivity

ρ: represents the tissue density

The EUT is set to transmit at the required power in line with product specification, at each frequency relating to the LOW, MID, and HIGH channel settings.

Pre-scans are made on the device to establish the location for the transmitting antenna, using a large area scan in either air or tissue simulation fluid.

The EUT is placed against the Universal Phantom where the maximum area scan dimensions are larger than the physical size of the resonating antenna. When the scan size is not large enough to cover the peak SAR distribution, it is modified by either extending the area scan size in both the X and Y directions, or the device is shifted within the predefined area.

The area scan is then run to establish the peak SAR location (interpolated resolution set at $1mm^2$)which is then used to orient the center of the zoom scan. The zoom scan is then executed and the 1g and 10g averages are derived from the zoom scan volume (interpolated resolution set at $1mm^3$).

5. SAR Exposure Limits

SAR assessments have been made in line with the requirements of IEEE-1528, FCC Supplement C, and comply with ANSI/IEEE C95.1-1992 “Uncontrolled Environments” limits. These limits apply to a location which is deemed as “Uncontrolled Environment” which can be described as a situation where the general public may be exposed to an RF source with no prior knowledge or control over their exposure.

Limits for General Population/Uncontrolled Exposure (W/kg)

Type Exposure	Uncontrolled Environment Limit
Spatial Peak SAR (1g cube tissue for brain or body)	**1.60 W/kg**
Spatial Average SAR (whole body)	**0.08 W/kg**
Spatial Peak SAR (10g for hands, feet, ankles and wrist)	**4.00 W/kg**

6. Test Equipment List

Instrument	Manufacturer	Model No.	Serial No.	Last Calibration	Next Calibration
Reference Dipole 750MHz	Speag	D750V3	1031	2020/05/27	2023/05/26
Reference Dipole 1750MHz	Speag	D1750V2	1113	2019/11/21	2022/11/20
Reference Dipole 1950MHz	Speag	D1950V3	1213	2019/11/05	2022/11/04
Reference Dipole 2600MHz	Speag	ALS-D-2600	QTK-225	2019/05/14	2022/05/13
Device Holder	Speag	N/A	N/A	N/A	N/A
Data Acquisition Electronic	Speag	DAE4	916	2021/12/30	2022/12/29
E-Field Probe	Speag	EX3DV4	7631	2022/01/24	2023/01/23
SAR Software	Speag	DASY52	V52.10.0.1446	N/A	N/A
Power Amplifier	Mini-Circuit	ZHL-42	D051404-20	N/A	N/A
Directional Coupler	Agilent	87300C	MY44300353	N/A	N/A[1]
Attenuator	Woken	WATT-218FS-10	N/A	N/A	N/A[1]
Attenuator	Mini-Circuit	BW-S20W2+	N/A	N/A	N/A[1]
Universal Radio Communication	Anritsu	MT8820C	6201465467	2021/08/13	2022/08/12
Universal Radio Communication	R&S	CMW500	157304	2021/11/29	2022/11/28
Vector Network Analyzer	Keysight	E5071C	MY46106342	2021/10/18	2022/10/17
Signal Generator	Anritsu	MG3694A	041902	2021/08/26	2022/08/25
Power Meter	Anritsu	ML2487A	6K00001447	2021/11/02	2022/11/01
Power Sensor	Anritsu	MA2411B	1339194	2021/11/02	2022/11/01

Note: 1. System Check, the path loss measured by the network analyzer, includes the signal generator, amplifier, cable, attenuator and directional coupler.

7. Measurement Uncertainty

DASY5 Uncertainty (According to IEEE 1528-2013) Measurement uncertainty for 30 MHz to 3 GHz								
Error Description	Uncert. value	Prob. Dist.	Div.	(c_i) 1g	(c_i) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(v_i) v_{eff}
Measurement System								
Probe Calibration	±6%	N	1	1	1	±6.0%	±6.0%	∞
Axial Isotropy	±4.7%	R	√3	0.7	0.7	±1.9%	±1.9%	∞
Hemispherical Isotropy	±9.6%	R	√3	0.7	0.7	±3.9%	±3.9%	∞
Boundary Effects	±1.0%	R	√3	1	1	±0.6%	±0.6%	∞
Linearity	±4.7%	R	√3	1	1	±2.7%	±2.7%	∞
System Detection Limits	±1.0%	R	√3	1	1	±0.6%	±0.6%	∞
Modulation Response	±2.4%	R	√3	1	1	±1.4%	±1.4%	∞
Readout Electronics	±0.3%	N	1	1	1	±0.3%	±0.3%	∞
Response Time	±0.8%	R	√3	1	1	±0.5%	±0.5%	∞
Integration Time	±2.6%	R	√3	1	1	±1.5%	±1.5%	∞
RF Ambient Noise	±3.0%	R	√3	1	1	±1.7%	±1.7%	∞
RF Ambient Reflections	±3.0%	R	√3	1	1	±1.7%	±1.7%	∞
Probe Positioner	±0.4%	R	√3	1	1	±0.2%	±0.2%	∞
Probe Positioning	±2.9%	R	√3	1	1	±1.7%	±1.7%	∞
Max. SAR Eval.	±4.0%	R	√3	1	1	±1.2%	±1.2%	∞
Test Sample Related								
Device Positioning	±2.9%	N	1	1	1	±2.9%	±2.9%	145
Device Holder	±3.6%	N	1	1	1	±3.6%	±3.6%	5
Power Drift	±5.0%	R	√3	1	1	±2.9%	±2.9%	∞
Power Scaling	±0%	R	√3	1	1	±0.0%	±0.0%	
Phantom and Setup								
Phantom Uncertainty	±6.1%	R	√3	1	1	±3.5%	±3.5%	∞
SAR correction	±1.9%	R	√3	1	0.84	±1.1%	±0.9%	∞
Liquid Conductivity (meas.)	±2.5%	R	√3	0.78	0.71	±1.1%	±1.0%	∞
Liquid Permittivity (meas.)	±2.5%	R	√3	0.26	0.26	±0.3%	±0.4%	∞
Temp. unc. - Conductivity	±3.4%	R	√3	0.78	0.71	±1.5%	±1.4%	∞
Temp. unc. - Permittivity	±0.4%	R	√3	0.23	0.26	±0.1%	±0.1%	∞
Combined Std. Uncertainty						±11.2%	±11.1%	361
Expanded STD Uncertainty						±22.3%	±22.2%	

DASY5 Uncertainty (According to IEEE 1528-2013) Measurement uncertainty for 3GHz to 6 GHz								
Error Description	Uncert. value	Prob. Dist.	Div.	(c_i) 1g	(c_i) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(v_i) v_{eff}
Measurement System								
Probe Calibration	±6.55%	N	1	1	1	±6.55%	±6.55%	∞
Axial Isotropy	±4.7%	R	√3	0.7	0.7	±1.9%	±1.9%	∞
Hemispherical Isotropy	±9.6%	R	√3	0.7	0.7	±3.9%	±3.9%	∞
Boundary Effects	±2.0%	R	√3	1	1	±1.2%	±1.2%	∞
Linearity	±4.7%	R	√3	1	1	±2.7%	±2.7%	∞
System Detection Limits	±1.0%	R	√3	1	1	±0.6%	±0.6%	∞
Modulation Response	±2.4%	R	√3	1	1	±1.4%	±1.4%	∞
Readout Electronics	±0.3%	N	1	1	1	±0.3%	±0.3%	∞
Response Time	±0.8%	R	√3	1	1	±0.5%	±0.5%	∞
Integration Time	±2.6%	R	√3	1	1	±1.5%	±1.5%	∞
RF Ambient Noise	±3.0%	R	√3	1	1	±1.7%	±1.7%	∞
RF Ambient Reflections	±3.0%	R	√3	1	1	±1.7%	±1.7%	∞
Probe Positioner	±0.8%	R	√3	1	1	±0.5%	±0.5%	∞
Probe Positioning	±6.7%	R	√3	1	1	±3.9%	±3.9%	∞
Post-processing	±4.0%	R	√3	1	1	±2.3%	±2.3%	∞
Test Sample Related								
Device Positioning	±2.9%	N	1	1	1	±2.9%	±2.9%	145
Device Holder	±3.6%	N	1	1	1	±3.6%	±3.6%	5
Power Drift	±5.0%	R	√3	1	1	±2.9%	±2.9%	∞
Power Scaling	±0%	R	√3	1	1	±0.0%	±0.0%	
Phantom and Setup								
Phantom Uncertainty	±6.6%	R	√3	1	1	±3.8%	±3.8%	∞
SAR correction	±1.9%	R	√3	1	1	±1.1%	±0.9%	∞
Liquid Conductivity (meas.)	±2.5%	R	√3	1	0.84	±1.1%	±1.0%	∞
Liquid Permittivity (meas.)	±2.5%	R	√3	0.26	0.26	±0.3%	±0.4%	∞
Temp. unc. - Conductivity	±3.4%	R	√3	0.78	0.71	±1.5%	±1.4%	∞
Temp. unc. - Permittivity	±0.4%	R	√3	0.23	0.26	±0.1%	±0.1%	∞
Combined Std. Uncertainty						±12.3%	±12.2%	748
Expanded STD Uncertainty						±24.6%	±24.5%	

8. Conducted Power Measurement (Including tolerance allowed for production unit)

Mode		Maximum Output Power (dBm) (Including tolerance)
GSM850	GPRS Class 8	34.0
	GPRS Class 10	31.5
	GPRS Class 11	29.0
	GPRS Class 12	27.5
PCS1900	GPRS Class 8	31.5
	GPRS Class 10	29.0
	GPRS Class 11	27.5
	GPRS Class 12	26.5
WCDMA Band 2	RMC	24.5
	HSDPA	23.0
	HSUPA	23.0
WCDMA Band 4	RMC	24.5
	HSDPA	23.0
	HSUPA	23.0
WCDMA Band 5	RMC	24.5
	HSDPA	23.0
	HSUPA	23.0
LTE Band 2	QPSK	24.5
LTE Band 4	QPSK	24.5
LTE Band 5	QPSK	24.5
LTE Band 7	QPSK	23.0
LTE Band 12	QPSK	24.5

Band	GSM850			PCS1900		
CHANNEL	128	189	251	512	661	885
GPRS Class 8	33.72	33.73	33.37	31.42	31.43	31.31
GPRS Class 10	31.04	31.23	30.56	28.60	28.95	28.81
GPRS Class 11	28.68	28.69	28.56	27.00	27.05	27.19
GPRS Class 12	27.29	27.27	27.04	25.96	26.04	26.02
EGPRS Class 8	27.96	28.08	28.01	26.95	27.08	26.87
EGPRS Class 10	25.31	25.07	25.23	24.12	24.11	24.31
EGPRS Class 11	23.24	23.14	23.40	22.53	22.59	22.91
EGPRS Class 12	21.98	21.93	21.89	21.48	21.49	21.47
Note: Unit : dBm						

Band	WCDMA Band 2			WCDMA Band 4			WCDMA Band 5		
CHANNEL	9262	9400	9538	1312	1413	1513	4132	4183	4233
RMC	23.66	23.75	23.38	23.17	23.62	23.42	23.68	23.92	23.77
HSDPA Set 1	21.83	21.64	21.57	21.74	22.07	22.17	22.77	22.93	22.72
HSDPA Set 2	21.22	21.24	21.2	21.22	21.59	21.68	21.99	22.16	22.54
HSDPA Set 3	21.24	21.34	21.21	21.22	21.58	21.69	21.94	22.03	22.46
HSDPA Set 4	21.35	21.37	21.24	21.29	21.61	21.75	22.1	22.11	22.55
HSUPA Set 1	22.81	22.67	22.59	22.37	22.50	22.27	22.37	22.24	22.5
HSUPA Set 2	21.95	21.99	21.76	21.74	22.17	22.01	22.51	22.28	22.23
HSUPA Set 3	22.39	22.48	22.56	22.2	22.19	22.29	22.57	22.28	22.39
HSUPA Set 4	22.29	22.18	21.99	22.19	22.07	22.1	22.41	22.34	22.38
HSUPA Set 5	21.94	21.98	22.1	21.81	22.07	22.05	22.07	22.1	22.28
Note: Unit : dBm									

Channel	Modulation	LTE Band 2							
		RB	RB	Maximum Conducted Output Power					
		No.	Offset	1.4M	3M	5M	10M	15M	20M
Low	QPSK	1	#0	24.15	24.20	24.24	23.96	23.73	24.12
		1	#Mid	24.29	24.45	24.48	23.97	23.54	24.06
		1	#Max	24.10	24.27	24.08	23.84	23.32	23.86
		50%	#0	23.16	23.19	23.20	23.01	22.73	22.94
		50%	#Mid	23.21	23.25	23.19	22.98	22.54	22.88
		50%	#Max	23.18	23.21	23.12	22.86	22.49	22.82
		100%	--	23.07	23.20	23.19	22.91	22.42	22.69
	16QAM	1	#0	23.14	23.10	23.01	--	--	--
		1	#Mid	23.24	23.49	23.44	--	--	--
		1	#Max	23.19	23.12	23.04	--	--	--
		50%	#0	23.13	22.15	22.14	--	--	--
		50%	#Mid	23.26	22.16	22.29	--	--	--
		50%	#Max	23.22	22.22	22.19	--	--	--
		100%	--	22.11	22.21	22.17	--	--	--
Mid	QPSK	1	#0	23.85	23.94	24.01	24.02	23.95	24.49
		1	#Mid	23.97	24.12	24.16	23.90	23.93	24.01
		1	#Max	23.97	24.06	23.95	23.89	23.60	23.95
		50%	#0	23.40	22.99	22.94	22.83	22.78	23.49
		50%	#Mid	23.45	23.05	23.03	22.80	22.86	22.93
		50%	#Max	23.41	23.02	23.07	22.76	22.80	22.94
		100%	--	22.86	22.97	23.04	22.82	22.76	22.76
	16QAM	1	#0	22.91	22.83	23.01	--	--	--
		1	#Mid	23.12	23.27	23.24	--	--	--
		1	#Max	23.03	23.09	23.08	--	--	--
		50%	#0	22.97	22.01	21.93	--	--	--
		50%	#Mid	23.08	22.07	21.95	--	--	--
		50%	#Max	22.99	22.05	22.08	--	--	--
		100%	--	21.98	21.97	22.00	--	--	--

High	QPSK	1	#0	23.97	24.17	24.21	24.00	24.13	23.97
		1	#Mid	24.17	24.36	24.41	24.23	24.10	23.88
		1	#Max	24.14	24.19	24.11	23.93	23.99	23.84
		50%	#0	23.39	23.07	23.11	22.90	22.87	22.89
		50%	#Mid	23.03	23.13	23.03	22.95	23.08	22.88
		50%	#Max	23.39	23.09	23.02	22.80	22.85	22.81
		100%	--	23.03	23.04	22.99	22.87	22.21	22.79
	16QAM	1	#0	23.09	23.06	23.09	--	--	--
		1	#Mid	23.17	23.41	23.32	--	--	--
		1	#Max	23.05	23.09	22.91	--	--	--
		50%	#0	23.21	22.08	22.02	--	--	--
		50%	#Mid	23.09	22.12	22.12	--	--	--
		50%	#Max	23.32	22.06	22.12	--	--	--
		100%	--	22.00	22.04	22.07	--	--	--

Channel	Modulation	LTE Band 4							
		RB	RB	Maximum Conducted Output Power					
		No.	Offset	1.4M	3M	5M	10M	15M	20M
Low	QPSK	1	#0	23.54	23.40	23.09	23.28	23.85	24.10
		1	#Mid	23.60	23.63	23.29	23.24	23.89	24.02
		1	#Max	23.51	23.47	23.11	23.19	23.90	24.01
		50%	#0	23.34	22.33	22.11	22.11	23.14	23.04
		50%	#Mid	23.30	22.28	22.13	22.16	23.00	23.01
		50%	#Max	23.28	22.32	22.08	22.10	23.00	22.94
		100%	--	22.39	22.29	22.06	22.15	23.19	22.98
	16QAM	1	#0	22.47	22.30	22.06	--	--	--
		1	#Mid	22.61	22.58	22.38	--	--	--
		1	#Max	22.47	22.28	21.94	--	--	--
		50%	#0	22.48	21.42	21.10	--	--	--
		50%	#Mid	22.51	21.39	21.12	--	--	--
		50%	#Max	22.42	21.31	20.96	--	--	--
		100%	--	21.47	21.37	21.12	--	--	--
Mid	QPSK	1	#0	23.66	23.59	23.46	23.53	24.09	24.26
		1	#Mid	23.77	23.68	23.53	23.70	23.96	24.07
		1	#Max	23.75	23.68	23.35	23.55	24.05	24.09
		50%	#0	23.26	22.46	22.20	22.52	23.01	23.36
		50%	#Mid	23.24	22.41	22.24	22.54	23.05	23.03
		50%	#Max	23.21	22.45	22.29	22.50	22.98	22.98
		100%	--	22.59	22.38	22.29	22.54	22.89	23.05
	16QAM	1	#0	22.70	22.35	22.41	--	--	--
		1	#Mid	22.72	22.50	22.48	--	--	--
		1	#Max	22.53	22.48	22.12	--	--	--
		50%	#0	22.65	21.53	21.24	--	--	--
		50%	#Mid	22.70	21.54	21.53	--	--	--
		50%	#Max	22.70	21.46	21.32	--	--	--
		100%	--	21.70	21.48	21.36	--	--	--

High	QPSK	1	#0	23.53	23.45	23.27	23.81	23.24	24.16
		1	#Mid	23.59	23.59	23.55	23.81	23.98	24.12
		1	#Max	23.58	23.52	23.31	23.84	24.19	24.06
		50%	#0	23.30	22.37	22.17	22.52	23.12	23.08
		50%	#Mid	23.24	22.32	22.26	22.50	23.05	23.03
		50%	#Max	23.21	22.30	22.26	22.54	22.97	23.05
		100%	--	22.35	22.27	22.21	22.51	23.03	23.01
	16QAM	1	#0	22.18	22.14	22.01	--	--	--
		1	#Mid	22.37	22.58	22.39	--	--	--
		1	#Max	22.28	22.30	22.17	--	--	--
		50%	#0	22.53	21.35	21.24	--	--	--
		50%	#Mid	22.43	21.37	21.15	--	--	--
		50%	#Max	22.35	21.44	21.22	--	--	--
		100%	--	21.48	21.34	21.24	--	--	--

Channel	Modulation	LTE Band 5							
		RB	RB	Maximum Conducted Output Power					
		No.	Offset	1.4M	3M	5M	10M	15M	20M
Low	QPSK	1	#0	23.86	23.89	23.14	23.01	--	--
		1	#Mid	23.95	23.01	23.18	23.07	--	--
		1	#Max	23.73	23.87	23.14	23.02	--	--
		50%	#0	22.73	22.83	22.07	22.79	--	--
		50%	#Mid	22.71	22.81	21.97	22.83	--	--
		50%	#Max	22.74	22.79	22.08	22.80	--	--
		100%	--	22.82	22.71	22.05	22.83	--	--
	16QAM	1	#0	23.01	22.93	21.80	--	--	--
		1	#Mid	23.00	23.07	22.09	--	--	--
		1	#Max	22.75	22.62	21.73	--	--	--
		50%	#0	22.65	21.79	21.09	--	--	--
		50%	#Mid	22.66	21.79	21.09	--	--	--
		50%	#Max	22.63	21.76	20.95	--	--	--
		100%	--	21.80	21.79	21.08	--	--	--
Mid	QPSK	1	#0	23.79	23.69	23.12	24.01	--	--
		1	#Mid	23.86	23.93	23.32	23.86	--	--
		1	#Max	23.77	23.67	23.05	23.96	--	--
		50%	#0	22.73	22.71	22.00	22.86	--	--
		50%	#Mid	22.81	22.73	21.98	22.83	--	--
		50%	#Max	22.79	22.74	21.93	22.84	--	--
		100%	--	22.80	22.67	21.93	22.80	--	--
	16QAM	1	#0	22.58	22.50	21.77	--	--	--
		1	#Mid	22.86	22.79	22.18	--	--	--
		1	#Max	22.68	22.47	21.74	--	--	--
		50%	#0	22.60	21.65	21.13	--	--	--
		50%	#Mid	22.64	21.62	21.15	--	--	--
		50%	#Max	22.53	21.58	20.93	--	--	--
		100%	--	21.70	21.64	21.01	--	--	--

High	QPSK	1	#0	23.95	23.82	23.17	23.07	--	--
		1	#Mid	23.01	23.98	23.37	23.10	--	--
		1	#Max	23.97	23.69	23.06	23.22	--	--
		50%	#0	22.80	22.64	21.94	22.82	--	--
		50%	#Mid	22.81	22.72	21.91	22.81	--	--
		50%	#Max	22.85	22.72	22.06	22.83	--	--
		100%	--	22.81	22.72	22.07	22.81	--	--
	16QAM	1	#0	22.93	22.65	21.87	--	--	--
		1	#Mid	23.08	22.81	21.87	--	--	--
		1	#Max	22.74	22.47	21.75	--	--	--
		50%	#0	22.53	21.52	20.91	--	--	--
		50%	#Mid	22.59	21.66	20.82	--	--	--
		50%	#Max	22.58	21.58	21.19	--	--	--
		100%	--	21.79	21.65	21.16	--	--	--

Channel	Modulation	LTE Band 7							
		RB	RB	Maximum Conducted Output Power					
		No.	Offset	1.4M	3M	5M	10M	15M	20M
Low	QPSK	1	#0	--	--	22.30	22.27	22.18	22.68
		1	#Mid	--	--	22.35	22.23	22.19	22.45
		1	#Max	--	--	22.09	22.38	22.17	22.44
		50%	#0	--	--	21.33	21.28	21.24	21.46
		50%	#Mid	--	--	21.36	21.23	21.22	21.44
		50%	#Max	--	--	21.22	21.22	21.22	21.38
		100%	--	--	--	21.27	21.26	21.47	21.40
	16QAM	1	#0	--	--	21.26	--	--	--
		1	#Mid	--	--	21.48	--	--	--
		1	#Max	--	--	21.08	--	--	--
		50%	#0	--	--	20.45	--	--	--
		50%	#Mid	--	--	20.52	--	--	--
		50%	#Max	--	--	20.22	--	--	--
		100%	--	--	--	20.39	--	--	--
Mid	QPSK	1	#0	--	--	22.12	22.26	22.34	22.99
		1	#Mid	--	--	22.44	22.35	22.48	22.69
		1	#Max	--	--	22.27	22.36	22.39	22.48
		50%	#0	--	--	21.29	21.24	21.18	21.80
		50%	#Mid	--	--	21.27	21.32	21.21	21.53
		50%	#Max	--	--	21.24	21.22	21.26	21.51
		100%	--	--	--	21.28	21.23	21.71	21.58
	16QAM	1	#0	--	--	21.22	--	--	--
		1	#Mid	--	--	21.47	--	--	--
		1	#Max	--	--	21.35	--	--	--
		50%	#0	--	--	20.34	--	--	--
		50%	#Mid	--	--	20.51	--	--	--
		50%	#Max	--	--	20.41	--	--	--
		100%	--	--	--	20.39	--	--	--

High	QPSK	1	#0	--	--	22.42	22.40	22.53	22.91
		1	#Mid	--	--	22.67	22.44	22.57	22.78
		1	#Max	--	--	22.28	22.47	22.50	22.89
		50%	#0	--	--	21.25	21.31	21.42	21.79
		50%	#Mid	--	--	21.28	21.37	21.43	21.69
		50%	#Max	--	--	21.39	21.27	21.43	21.65
		100%	--	--	--	21.36	21.34	21.34	21.33
	16QAM	1	#0	--	--	21.11	--	--	--
		1	#Mid	--	--	21.43	--	--	--
		1	#Max	--	--	21.14	--	--	--
		50%	#0	--	--	20.41	--	--	--
		50%	#Mid	--	--	20.47	--	--	--
		50%	#Max	--	--	20.30	--	--	--
		100%	--	--	--	20.39	--	--	--

Channel	Modulation	LTE Band 12							
		RB	RB	Maximum Conducted Output Power					
		No.	Offset	1.4M	3M	5M	10M	15M	20M
Low	QPSK	1	#0	23.03	23.03	22.98	23.25	--	--
		1	#Mid	23.09	23.17	23.28	22.83	--	--
		1	#Max	23.08	23.06	23.07	23.01	--	--
		50%	#0	21.26	21.80	21.85	21.73	--	--
		50%	#Mid	21.22	21.77	21.84	21.70	--	--
		50%	#Max	21.09	21.79	21.85	21.79	--	--
		100%	--	21.13	21.71	21.82	21.66	--	--
	16QAM	1	#0	22.24	22.11	21.89	--	--	--
		1	#Mid	22.27	22.20	22.01	--	--	--
		1	#Max	22.09	21.87	21.75	--	--	--
		50%	#0	21.17	20.94	20.84	--	--	--
		50%	#Mid	21.10	21.02	20.95	--	--	--
		50%	#Max	21.06	20.98	20.77	--	--	--
		100%	--	21.09	20.99	20.85	--	--	--
Mid	QPSK	1	#0	23.17	23.06	22.83	23.40	--	--
		1	#Mid	23.13	23.36	23.25	22.86	--	--
		1	#Max	23.12	23.08	22.84	22.87	--	--
		50%	#0	21.22	21.82	21.85	21.89	--	--
		50%	#Mid	21.26	21.85	21.80	21.77	--	--
		50%	#Max	21.16	21.83	21.79	21.81	--	--
		100%	--	21.10	21.81	21.77	21.82	--	--
	16QAM	1	#0	21.95	21.81	21.61	--	--	--
		1	#Mid	22.15	22.15	22.10	--	--	--
		1	#Max	22.07	22.01	21.62	--	--	--
		50%	#0	21.84	20.93	20.80	--	--	--
		50%	#Mid	21.86	21.02	20.80	--	--	--
		50%	#Max	21.70	21.04	20.95	--	--	--
		100%	--	21.03	21.09	20.86	--	--	--

High	QPSK	1	#0	23.06	22.95	22.81	22.99	--	--
		1	#Mid	23.16	23.27	22.98	22.98	--	--
		1	#Max	23.03	23.02	22.79	22.82	--	--
		50%	#0	21.03	21.82	21.67	21.77	--	--
		50%	#Mid	21.13	21.79	21.71	21.71	--	--
		50%	#Max	21.04	21.83	21.78	21.74	--	--
		100%	--	21.88	21.85	21.79	21.72	--	--
	16QAM	1	#0	21.91	21.89	21.73	--	--	--
		1	#Mid	21.92	22.06	21.80	--	--	--
		1	#Max	21.92	21.87	21.58	--	--	--
		50%	#0	21.00	20.89	20.75	--	--	--
		50%	#Mid	21.07	20.86	20.79	--	--	--
		50%	#Max	21.87	20.76	20.60	--	--	--
		100%	--	21.86	20.86	20.70	--	--	--

9. Test Results

9.1 SAR Test Results Summary

SAR MEASUREMENT									
Liquid Temperature (°C): 22.2 ±2						Relative Humidity (%): 53			
Ambient Temperature (°C): 23.1 ±2						Depth of Liquid (cm):>15			
Test Position	Antenna Position	Dist (mm)	Frequency		Conducted Power (dBm)		**SAR** 1g (W/kg)		Plot No.
			Channel	MHz	Measurement	Tune-up Limit	Measurement	Tune-up Scaled	
Test Mode: GSM850 GPRS 2UP_10mm									
Front	Fixed	10	128	824.2	31.04	31.5	0.918	1.021	
Front	Fixed	10	189	836.4	31.23	31.5	1.04	**1.107**	1
Front	Fixed	10	251	848.8	30.56	31.5	0.727	0.903	
Back	Fixed	10	189	836.4	31.23	31.5	0.546	0.581	
Top	Fixed	10	189	836.4	31.23	31.5	0.149	0.159	
Left-Side	Fixed	10	189	836.4	31.23	31.5	0.2	0.213	
Right-Side	Fixed	10	189	836.4	31.23	31.5	0.275	0.293	
Note: When the reported SAR of the Mid channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in other channel.									

SAR MEASUREMENT									
Liquid Temperature (°C): 22.1 ±2						Relative Humidity (%): 51			
Ambient Temperature (°C): 22.8 ±2						Depth of Liquid (cm):>15			
Test Position	Antenna Position	Dist (mm)	Frequency		Conducted Power (dBm)		**SAR** 1g (W/kg)		Plot No.
			Channel	MHz	Measurement	Tune-up Limit	Measurement	Tune-up Scaled	
Test Mode: PCS1900_GPRS 4UP_10mm									
Front	Fixed	10	661	1880	26.04	26.5	0.456	**0.507**	2
Back	Fixed	10	661	1880	26.04	26.5	0.08	0.089	
Top	Fixed	10	661	1880	26.04	26.5	0.056	0.062	
Left-Side	Fixed	10	661	1880	26.04	26.5	0.091	0.101	
Right-Side	Fixed	10	661	1880	26.04	26.5	0.197	0.219	
Note: When the reported SAR of the Mid channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in other channel.									

SAR MEASUREMENT									
Liquid Temperature (°C): 22.1 ±2						Relative Humidity (%): 51			
Ambient Temperature (°C): 22.8 ±2						Depth of Liquid (cm):>15			
Test Position	Antenna Position	Dist (mm)	Frequency		Conducted Power (dBm)		**SAR** 1g (W/kg)		Plot No.
			Channel	MHz	Measurement	Tune-up Limit	Measurement	Tune-up Scaled	
Test Mode: WCDMA Band 2 RMC_10mm									
Front	Fixed	10	9400	1880	23.75	24.5	0.632	**0.751**	3
Back	Fixed	10	9400	1880	23.75	24.5	0.271	0.322	
Top	Fixed	10	9400	1880	23.75	24.5	0.073	0.087	
Left-Side	Fixed	10	9400	1880	23.75	24.5	0.143	0.170	
Right-Side	Fixed	10	9400	1880	23.75	24.5	0.254	0.302	
Note: When the reported SAR of the Mid channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in other channel.									

SAR MEASUREMENT									
Liquid Temperature (°C): 22.1 ±2						Relative Humidity (%): 51			
Ambient Temperature (°C): 22.8 ±2						Depth of Liquid (cm):>15			
Test Position	Antenna Position	Dist (mm)	Frequency		Conducted Power (dBm)		**SAR** 1g (W/kg)		Plot No.
			Channel	MHz	Measurement	Tune-up Limit	Measurement	Tune-up Scaled	
Test Mode: WCDMA Band 4 RMC_10mm									
Front	Fixed	10	1413	1732.6	23.62	24.5	0.645	**0.790**	4
Back	Fixed	10	1413	1732.6	23.62	24.5	0.313	0.383	
Top	Fixed	10	1413	1732.6	23.62	24.5	0.102	0.125	
Left-Side	Fixed	10	1413	1732.6	23.62	24.5	0.137	0.168	
Right-Side	Fixed	10	1413	1732.6	23.62	24.5	0.263	0.322	
Note: When the reported SAR of the Mid channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in other channel.									

SAR MEASUREMENT									
Liquid Temperature (°C): 22.2 ±2					Relative Humidity (%): 53				
Ambient Temperature (°C): 23.1 ±2					Depth of Liquid (cm):>15				
Test Position	Antenna Position	Dist (mm)	Frequency		Conducted Power (dBm)		**SAR** 1g (W/kg)		Plot No.
			Channel	MHz	Measurement	Tune-up Limit	Measurement	Tune-up Scaled	
Test Mode: WCDMA Band 5 RMC_10mm									
Front	Fixed	10	4132	826.4	23.68	24.5	0.756	**0.913**	5
Front	Fixed	10	4183	836.6	23.92	24.5	0.758	0.866	
Front	Fixed	10	4233	846.6	23.77	24.5	0.761	0.900	
Back	Fixed	10	4183	836.6	23.92	24.5	0.337	0.385	
Top	Fixed	10	4183	836.6	23.92	24.5	0.124	0.142	
Left-Side	Fixed	10	4183	836.6	23.92	24.5	0.144	0.165	
Right-Side	Fixed	10	4183	836.6	23.92	24.5	0.185	0.211	
Note: When the reported SAR of the Mid channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in other channel.									

SAR MEASUREMENT											
Liquid Temperature (°C): 22.1 ±2							Relative Humidity (%): 53				
Ambient Temperature (°C): 22.8 ±2							Depth of Liquid (cm): >15				
Test Mode: LTE Band 2 QPSK 20M_10mm											
Test Position	Antenna Position	Dist (mm)	RB	RB offset	Frequency		Conducted Power (dBm)		SAR 1g (W/Kg)		Plot No.
					Channel	MHz	Measurement	Tune-up Limit	Measurement	Tune-up Limit	
Front	Fixed	10	1	0	18900	1880	24.49	24.5	0.612	**0.613**	6
Front	Fixed	10	50	0	18900	1880	23.49	23.5	0.432	0.433	
Back	Fixed	10	1	0	18900	1880	24.49	24.5	0.289	0.29	
Top	Fixed	10	1	0	18900	1880	24.49	24.5	0.08	0.08	
Left-Side	Fixed	10	1	0	18900	1880	24.49	24.5	0.03	0.03	
Right-Side	Fixed	10	1	0	18900	1880	24.49	24.5	0.104	0.104	
Note: When the reported SAR of the Mid channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in other channel.											

SAR MEASUREMENT											
Liquid Temperature (°C): 22.1 ±2							Relative Humidity (%): 51				
Ambient Temperature (°C): 22.8 ±2							Depth of Liquid (cm): >15				
Test Mode: LTE Band 4 QPSK 20M_10mm											
Test Position	Antenna Position	Dist (mm)	RB	RB offset	Frequency		Conducted Power (dBm)		SAR 1g (W/Kg)		Plot No.
					Channel	MHz	Measurement	Tune-up Limit	Measurement	Tune-up Limit	
Front	Fixed	10	1	0	20175	1732.5	24.26	24.5	0.702	**0.742**	7
Front	Fixed	10	50	0	20175	1732.5	23.36	23.5	0.509	0.526	
Back	Fixed	10	1	0	20175	1732.5	24.26	24.5	0.282	0.298	
Top	Fixed	10	1	0	20175	1732.5	24.26	24.5	0.083	0.088	
Left-Side	Fixed	10	1	0	20175	1732.5	24.26	24.5	0.066	0.070	
Right-Side	Fixed	10	1	0	20175	1732.5	24.26	24.5	0.122	0.129	
Note: When the reported SAR of the Mid channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in other channel.											

SAR MEASUREMENT	
Liquid Temperature (°C): 22.2 ±2	Relative Humidity (%): 53
Ambient Temperature (°C): 23.1 ±2	Depth of Liquid (cm): >15

Test Mode: LTE Band 5 QPSK 10M_10mm

Test Position	Antenna Position	Dist (mm)	RB	RB offset	Frequency		Conducted Power (dBm)		SAR 1g (W/Kg)		Plot No.
					Channel	MHz	Measurement	Tune-up Limit	Measurement	Tune-up Limit	
Front	Fixed	10	1	0	20525	836.5	24.01	24.5	0.513	**0.574**	8
Front	Fixed	10	25	0	20525	836.5	22.86	23.5	0.396	0.459	
Back	Fixed	10	1	0	20525	836.5	24.01	24.5	0.106	0.119	
Top	Fixed	10	1	0	20525	836.5	24.01	24.5	0.048	0.053	
Left-Side	Fixed	10	1	0	20525	836.5	24.01	24.5	0.084	0.094	
Right-Side	Fixed	10	1	0	20525	836.5	24.01	24.5	0.101	0.113	

Note: When the reported SAR of the Mid channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in other channel.

SAR MEASUREMENT											
Liquid Temperature (°C): 22.3 ±2							Relative Humidity (%): 54				
Ambient Temperature (°C): 23.2 ±2							Depth of Liquid (cm): >15				
Test Mode: LTE Band 7 QPSK 20M_10mm											
Test Position	Antenna Position	Dist (mm)	RB	RB offset	Frequency		Conducted Power (dBm)		SAR 1g (W/Kg)		Plot No.
					Channel	MHz	Measurement	Tune-up Limit	Measurement	Tune-up Limit	
Front	Fixed	10	1	0	21100	2535	22.99	23	0.745	**0.747**	9
Front	Fixed	10	50	0	21100	2535	21.8	22	0.580	0.607	
Back	Fixed	10	1	0	21100	2535	22.99	23	0.275	0.276	
Top	Fixed	10	1	0	21100	2535	22.99	23	0.074	0.074	
Left-Side	Fixed	10	1	0	21100	2535	22.99	23	0.042	0.042	
Right-Side	Fixed	10	1	0	21100	2535	22.99	23	0.135	0.135	
Note: When the reported SAR of the Mid channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in other channel.											

SAR MEASUREMENT											
Liquid Temperature (°C): 22.2 ±2							Relative Humidity (%): 52				
Ambient Temperature (°C): 23.1 ±2							Depth of Liquid (cm): >15				
Test Mode: LTE Band 12 QPSK 10M											
Test Position	Antenna Position	Dist (mm)	RB	RB offset	Frequency		Conducted Power (dBm)		SAR 1g (W/Kg)		Plot No.
					Channel	MHz	Measurement	Tune-up Limit	Measurement	Tune-up Limit	
Front	Fixed	10	1	0	23095	707.5	23.4	24.5	0.538	**0.693**	10
Front	Fixed	10	25	0	23095	707.5	21.89	23.5	0.431	0.624	
Back	Fixed	10	1	0	23095	707.5	23.4	24.5	0.213	0.274	
Top	Fixed	10	1	0	23095	707.5	23.4	24.5	0.086	0.111	
Left-Side	Fixed	10	1	0	23095	707.5	23.4	24.5	0.058	0.075	
Right-Side	Fixed	10	1	0	23095	707.5	23.4	24.5	0.074	0.095	
Note: When the reported SAR of the Mid channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in other channel.											

10. SAR measurement variability

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

Frequency				**SAR** 1g (W/kg)						
Mode	Band	Channel	MHz	Original	First Repeated		Second Repeated		Third Repeated	
					Value	Ratio	Value	Ratio	Value	Ratio
GSM	850	189	836.4	1.04	0.971	1.071	N/A	N/A	N/A	N/A

Appendix

Appendix A. SAR System Check Data

Appendix B. SAR measurement Data

Appendix C. Test Setup Photographs

Appendix D. Probe Calibration Data

Appendix E. Dipole Calibration Data

Appendix F. Product Photos-Please refer to the file: 21C0753R-Product Photos

Appendix A. SAR System Check Data

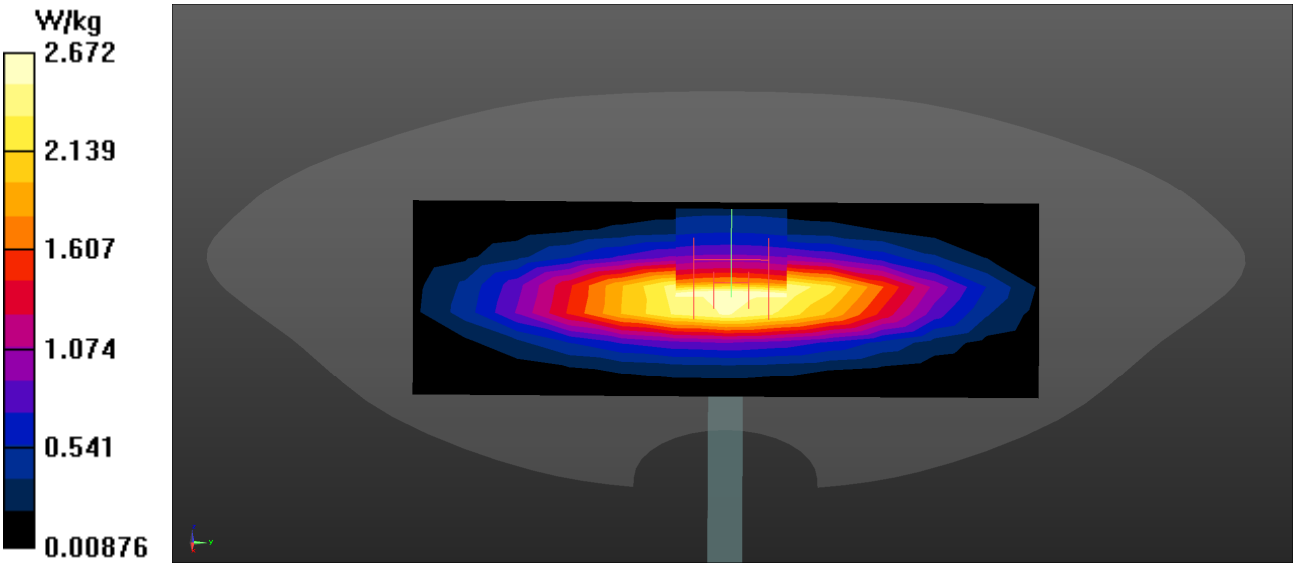
Test Laboratory: DEKRA Date: 2022/02/17

System Performance Check_750MHz-Head
DUT: Dipole 750 MHz; Type: D750V3
Communication System: UID 0, CW; Frequency: 750 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 750 MHz; σ = 0.89 S/m; ε_r = 41.86; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 23.1, Liquid Temperature (°C) : 22.2
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration:

- Probe: EX3DV4 - SN7631; ConvF(10.47, 10.47, 10.47); Calibrated: 2022/01/24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2021/12/30
- Phantom: Twin-SAM V8.0; Type: QD 000 P41 AA; Serial: 2030
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Configuration/750MHz Head/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.67 W/kg

Configuration/750MHz Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 59.83 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.22 W/kg
SAR(1 g) = 2.14 W/kg; SAR(10 g) = 1.39 W/kg
Maximum value of SAR (measured) = 3.02 W/kg



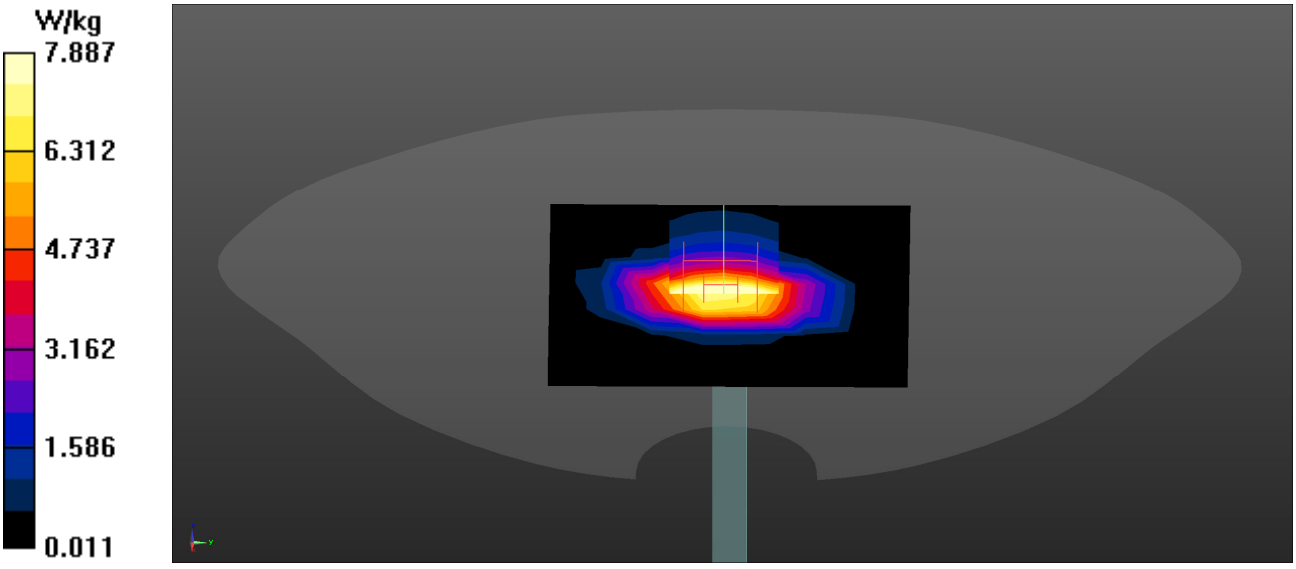
Test Laboratory: DEKRA Date: 2022/02/18

System Performance Check_1750MHz-Head
DUT: Dipole 1750 MHz; Type: D1750V2
Communication System: UID 0, CW; Frequency: 1750 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 1750 MHz; σ = 1.39 S/m; εr = 39.62; ρ = 1000 kg/m3
Phantom section: Flat Section
Ambient Temperature (°C) : 22.8, Liquid Temperature (°C) : 22.1
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration:

- Probe: EX3DV4 - SN7631; ConvF(8.76, 8.76, 8.76); Calibrated: 2022/01/24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2021/12/30
- Phantom: Twin-SAM V8.0; Type: QD 000 P41 AA; Serial: 2030
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Configuration/1750MHz Head/Area Scan (8x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 7.89 W/kg

Configuration/1750MHz Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 85.85 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 16.7 W/kg
SAR(1 g) = 9.18 W/kg; SAR(10 g) = 4.87 W/kg
Maximum value of SAR (measured) = 10.3 W/kg



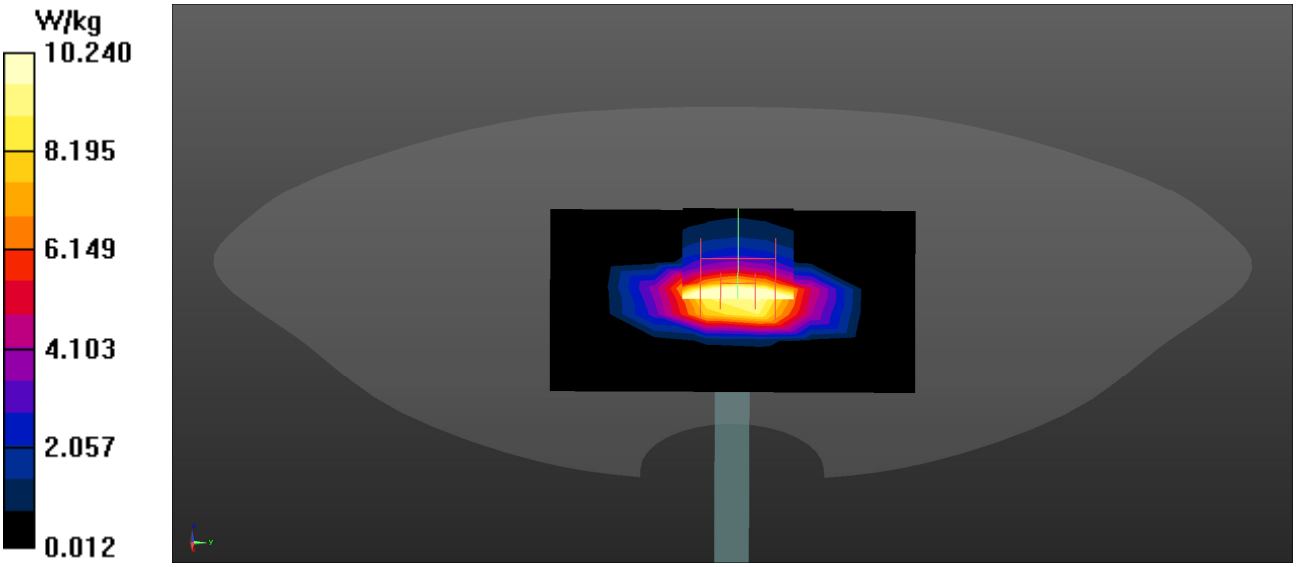
Test Laboratory: DEKRA Date: 2022/02/18

System Performance Check_1950MHz-Head
DUT: Dipole 1950 MHz; Type: D1950V3
Communication System: UID 0, CW ; Frequency: 1950 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 1950 MHz; σ = 1.43 S/m; ε_r = 39.72; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 22.8, Liquid Temperature (°C) : 22.1
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration:

- Probe: EX3DV4 - SN7631; ConvF(8.35, 8.35, 8.35); Calibrated: 2022/01/24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2021/12/30
- Phantom: Twin-SAM V8.0; Type: QD 000 P41 AA; Serial: 2030
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Configuration/1950MHz Head/Area Scan (8x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 10.2 W/kg

Configuration/1950MHz Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 108.1 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 19.2 W/kg
SAR(1 g) = 9.87 W/kg; SAR(10 g) = 4.97 W/kg
Maximum value of SAR (measured) = 15.8 W/kg



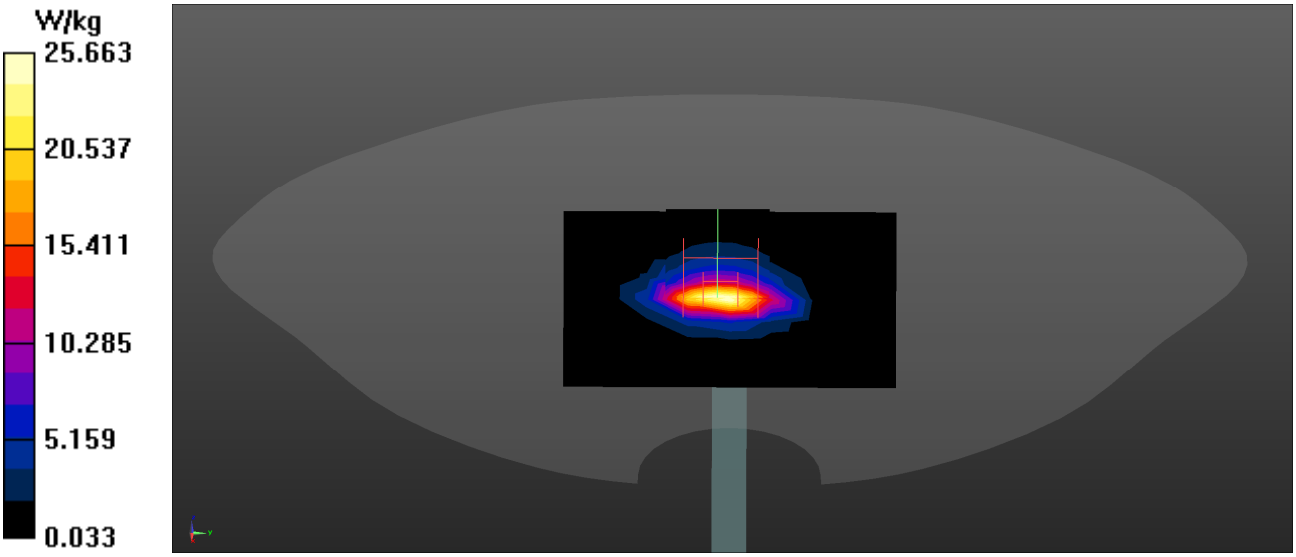
Test Laboratory: DEKRA Date: 2022/02/21

System Performance Check_2600MHz-Head
DUT: Dipole 2600MHz; Type: ALS-D-2600
Communication System: UID 0, CW; Frequency: 2600 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 2600 MHz; σ = 1.96 S/m; ε_r = 39.01; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 23.2, Liquid Temperature (°C) : 22.3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration:

- Probe: EX3DV4 - SN7631; ConvF(8.04, 8.04, 8.04); Calibrated: 2022/01/24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2021/12/30
- Phantom: Twin-SAM V8.0; Type: QD 000 P41 AA; Serial: 2030
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Configuration/2600MHz Head/Area Scan (9x9x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 25.7 W/kg

Configuration/2600MHz Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 92.76 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 30.8 W/kg
SAR(1 g) = 14.2 W/kg; SAR(10 g) = 6.61 W/kg
Maximum value of SAR (measured) = 26.7 W/kg



Appendix B. SAR measurement Data

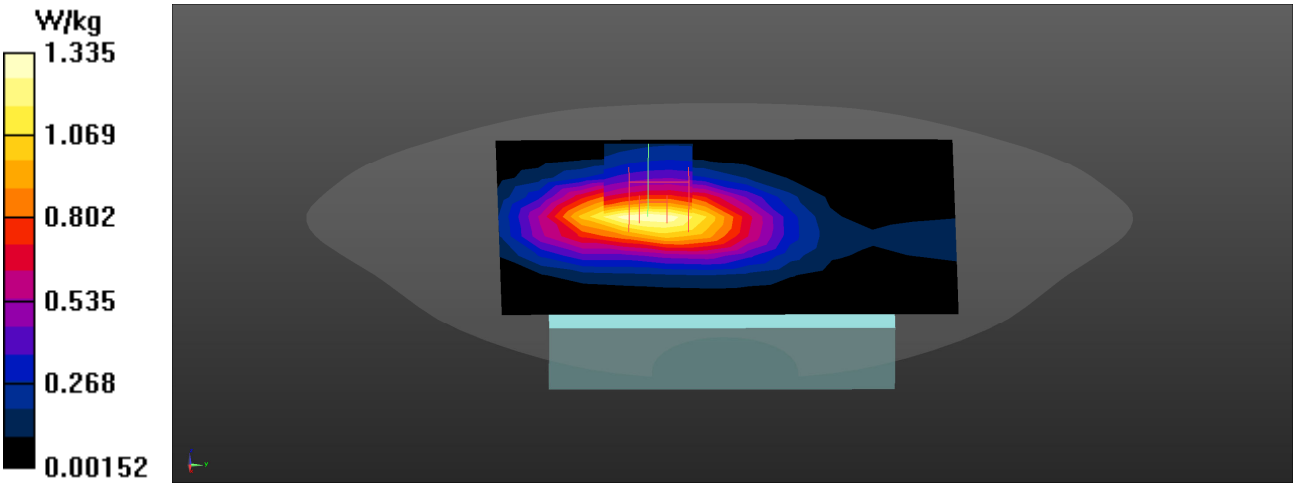
Test Laboratory: DEKRA Date: 2022/02/17

GSM_850_GPRS_2UP_189_Front 10mm
DUT: Control Unit; Type: JRN-360T
Communication System: UID 0, GSM_850MHz_GPRS&EGPRS-2 Slot;
Frequency: 836.4 MHz;
Communication System PAR: 6.128 dB
Medium parameters used: f = 836.4 MHz; σ = 0.91 S/m; ε_r = 40.68; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 23.1, Liquid Temperature (°C) : 22.2
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration:

- Probe: EX3DV4 - SN7631; ConvF(10.12, 10.12, 10.12); Calibrated: 2022/01/24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2021/12/30
- Phantom: Twin-SAM V8.0; Type: QD 000 P41 AA; Serial: 2030
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

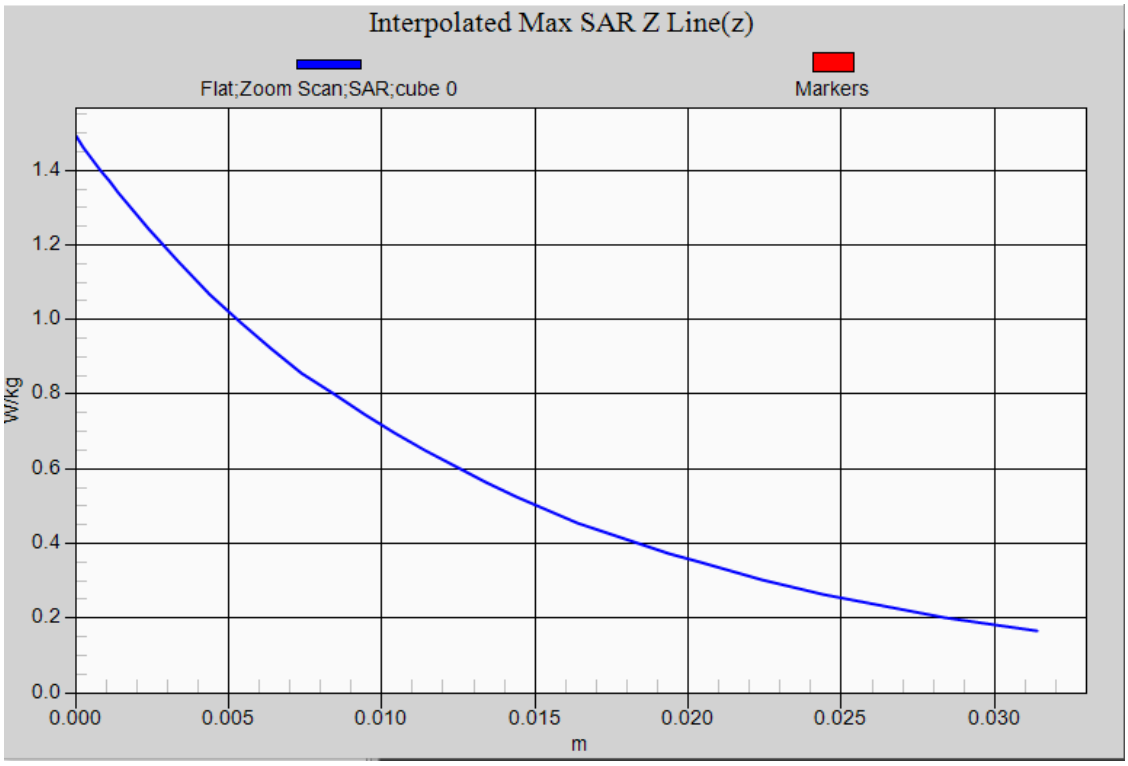
Configuration/Flat/Area Scan (10x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.34 W/kg

Configuration/Flat/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.49 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 1.49 W/kg
SAR(1 g) = 1.04 W/kg; SAR(10 g) = 0.706 W/kg
Maximum value of SAR (measured) = 1.35 W/kg



GSM 850 GPRS 2UP EUT Front (Body-10mm) Z-Axis plot

Channel: 189



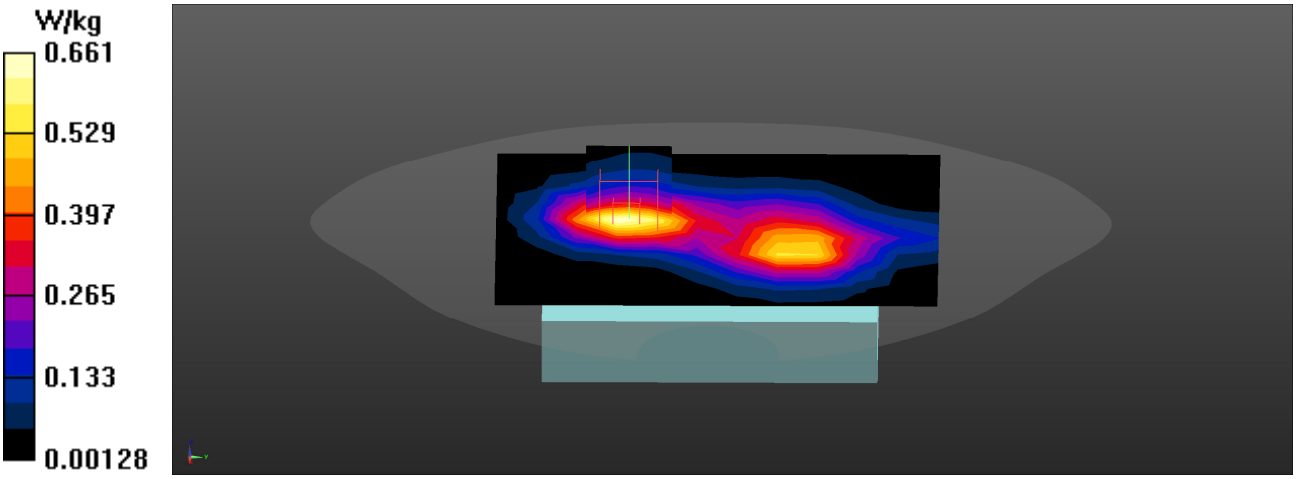
Test Laboratory: DEKRA Date: 2022/02/18

PCS_1900_GPRS_4UP_661_Front 10mm
DUT: Control Unit; Type: JRN-360T
Communication System: UID 0, PCS_1900MHz_GPRS&EGPRS-4 Slot;
Frequency: 1880 MHz;
Communication System PAR: 3.01 dB
Medium parameters used: f = 1880 MHz; σ = 1.39 S/m; ε_r = 40.77; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 22.8, Liquid Temperature (°C) : 22.1
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration:

- Probe: EX3DV4 - SN7631; ConvF(8.35, 8.35, 8.35); Calibrated: 2022/01/24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2021/12/30
- Phantom: Twin-SAM V8.0; Type: QD 000 P41 AA; Serial: 2030
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

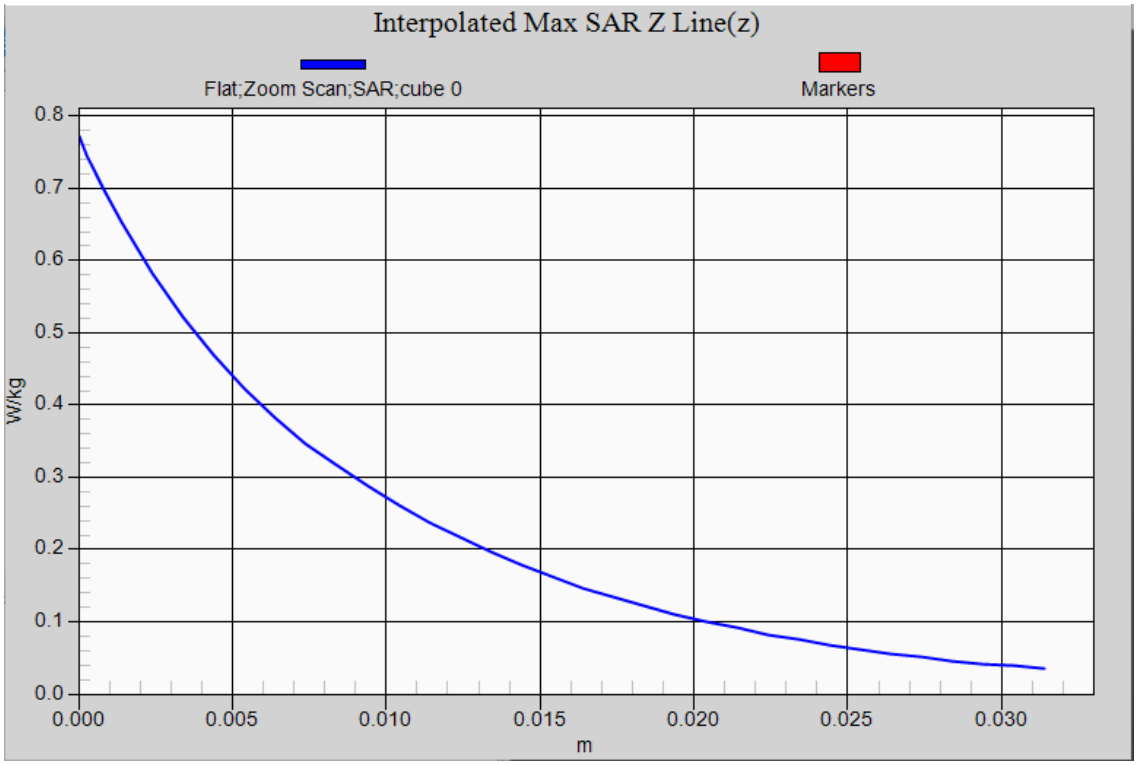
Configuration/Flat/Area Scan (10x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.661 W/kg

Configuration/Flat/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.33 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.773 W/kg
SAR(1 g) = 0.456 W/kg; SAR(10 g) = 0.272 W/kg
Maximum value of SAR (measured) = 0.652 W/kg



PCS 1900 GPRS 4UP EUT Front (Body-10mm) Z-Axis plot

Channel: 661



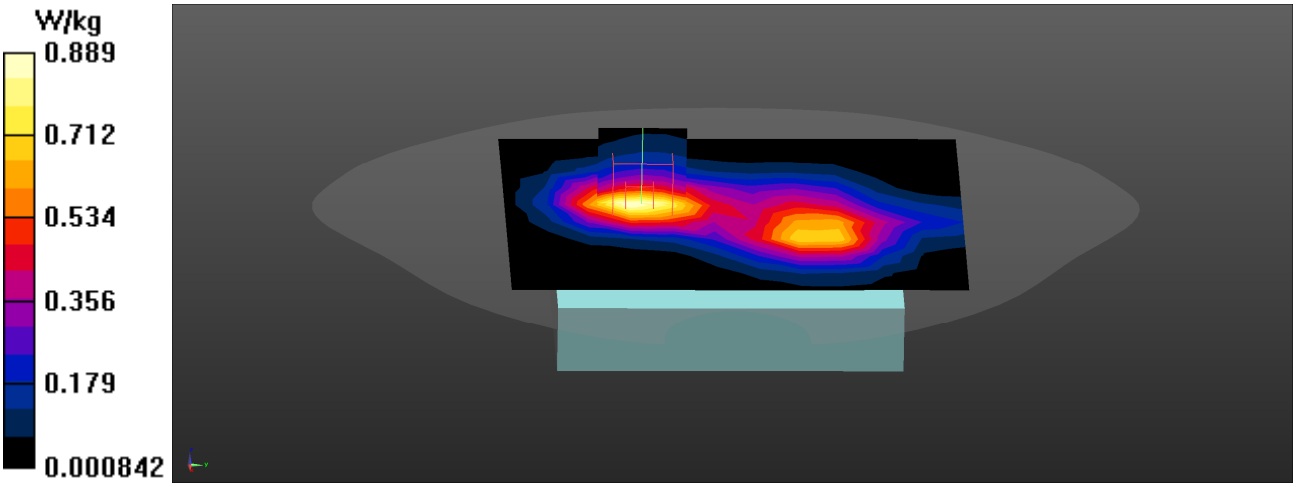
Test Laboratory: DEKRA Date: 2022/02/18

WCDMA_Band2_RMC_9400_Front 10mm
DUT: Control Unit; Type: JRN-360T
Communication System: UID 0, WCDMA; Frequency: 1880 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 1880 MHz; σ = 1.39 S/m; ε_r = 40.77; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 22.8, Liquid Temperature (°C) : 22.1
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration:

- Probe: EX3DV4 - SN7631; ConvF(8.35, 8.35, 8.35); Calibrated: 2022/01/24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2021/12/30
- Phantom: Twin-SAM V8.0; Type: QD 000 P41 AA; Serial: 2030
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

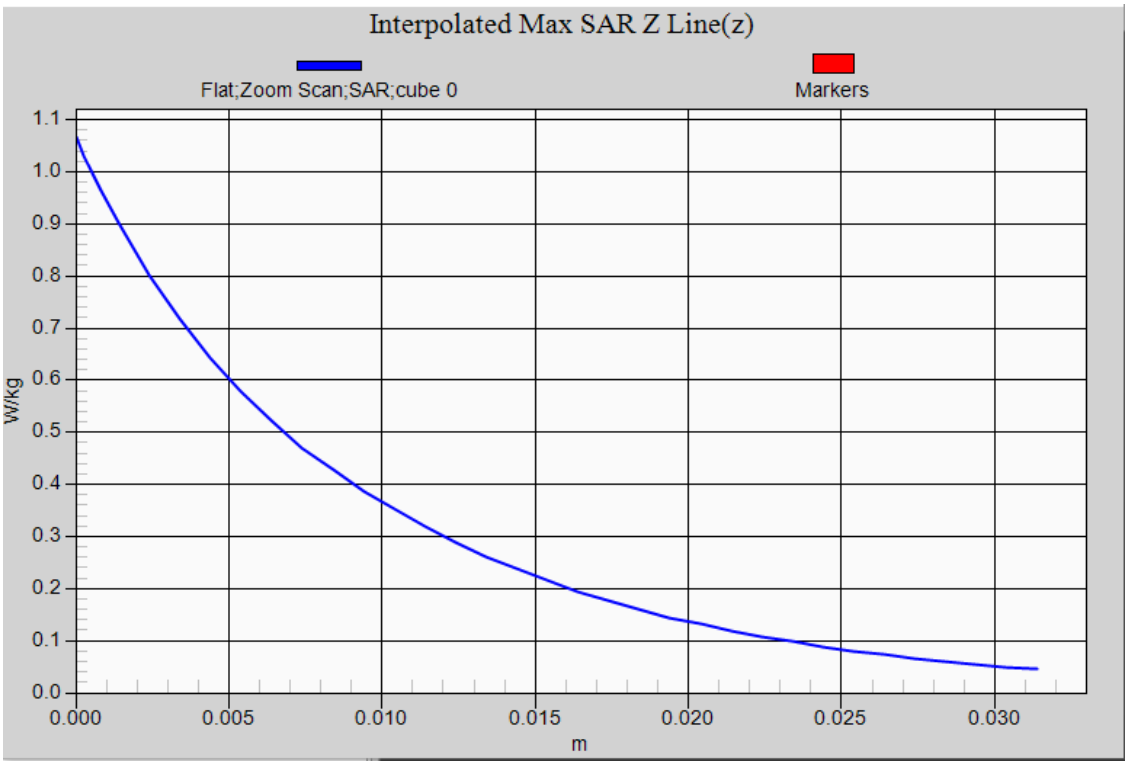
Configuration/Flat/Area Scan (10x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.889 W/kg

Configuration/Flat/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.77 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 1.07 W/kg
SAR(1 g) = 0.632 W/kg; SAR(10 g) = 0.378 W/kg
Maximum value of SAR (measured) = 0.894 W/kg



WCDMA Band2 RMC EUT Front (Body-10mm), Z-Axis plot

Channel: 9400



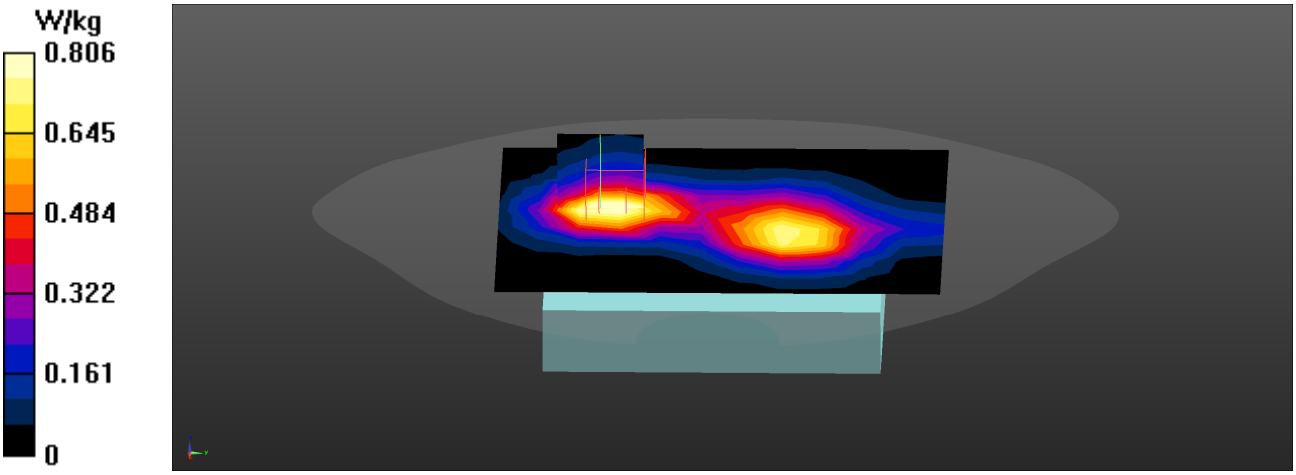
Test Laboratory: DEKRA Date: 2022/02/18

WCDMA_Band4_RMC_1413_Front 10mm
DUT: Control Unit; Type: JRN-360T
Communication System: UID 0, WCDMA; Frequency: 1732.6 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 1732.6 MHz; σ = 1.38 S/m; ε_r = 39.79; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 22.8, Liquid Temperature (°C) : 22.1
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration:

- Probe: EX3DV4 - SN7631; ConvF(8.76, 8.76, 8.76); Calibrated: 2022/01/24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2021/12/30
- Phantom: Twin-SAM V8.0; Type: QD 000 P41 AA; Serial: 2030
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

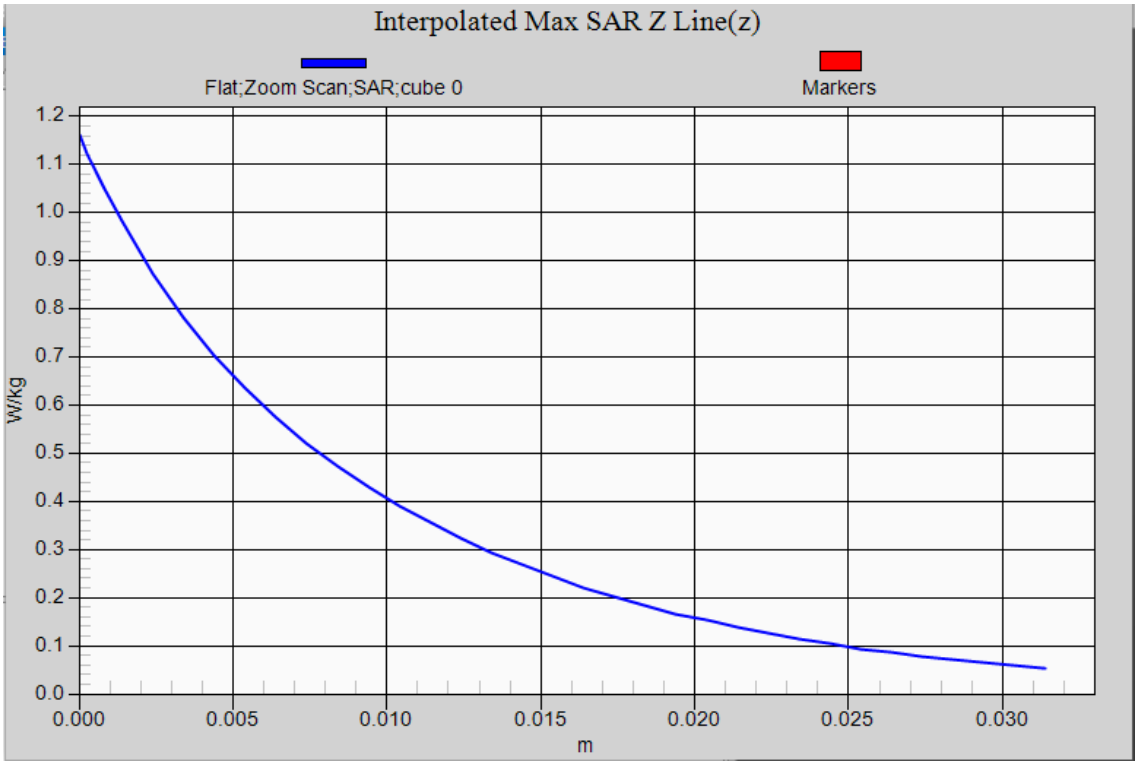
Configuration/Flat/Area Scan (10x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.806 W/kg

Configuration/Flat/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.31 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.16 W/kg
SAR(1 g) = 0.645 W/kg; SAR(10 g) = 0.392 W/kg
Maximum value of SAR (measured) = 0.948 W/kg



WCDMA Band4 RMC EUT Front (Body-10mm), Z-Axis plot

Channel: 1413



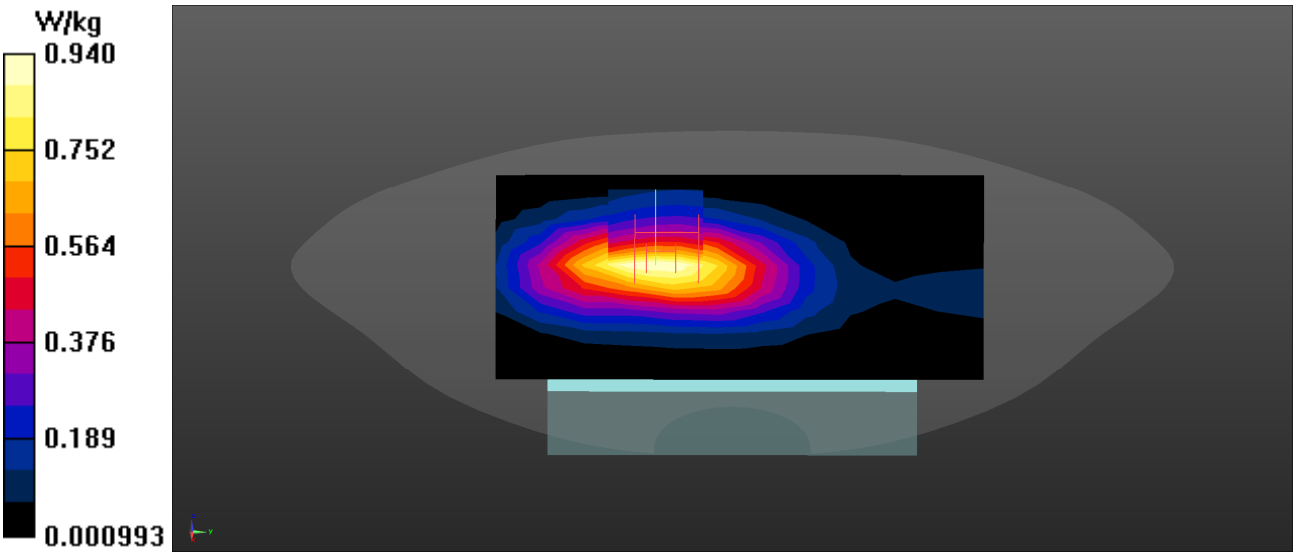
Test Laboratory: DEKRA Date: 2022/02/17

WCDMA_Band5_RMC_4132_Front 10mm
DUT: Control Unit; Type: JRN-360T
Communication System: UID 0, WCDMA; Frequency: 826.4 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 826.4 MHz; σ = 0.9 S/m; ε_r = 40.87; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 23.1, Liquid Temperature (°C) : 22.2
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration:

- Probe: EX3DV4 - SN7631; ConvF(10.12, 10.12, 10.12); Calibrated: 2022/01/24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2021/12/30
- Phantom: Twin-SAM V8.0; Type: QD 000 P41 AA; Serial: 2030
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

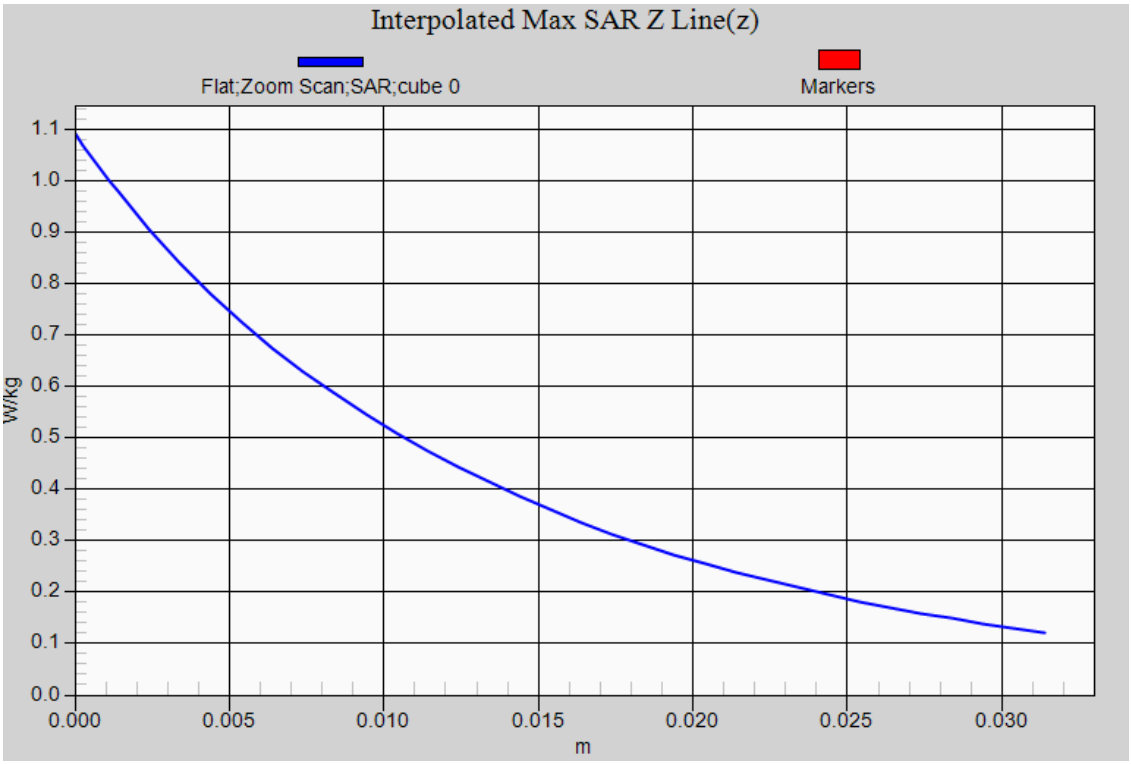
Configuration/Flat/Area Scan (10x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.940 W/kg

Configuration/Flat/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.51 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.09 W/kg
SAR(1 g) = 0.756 W/kg; SAR(10 g) = 0.515 W/kg
Maximum value of SAR (measured) = 0.979 W/kg



WCDMA Band5 RMC EUT Front (Body-10mm), Z-Axis plot

Channel: 4132



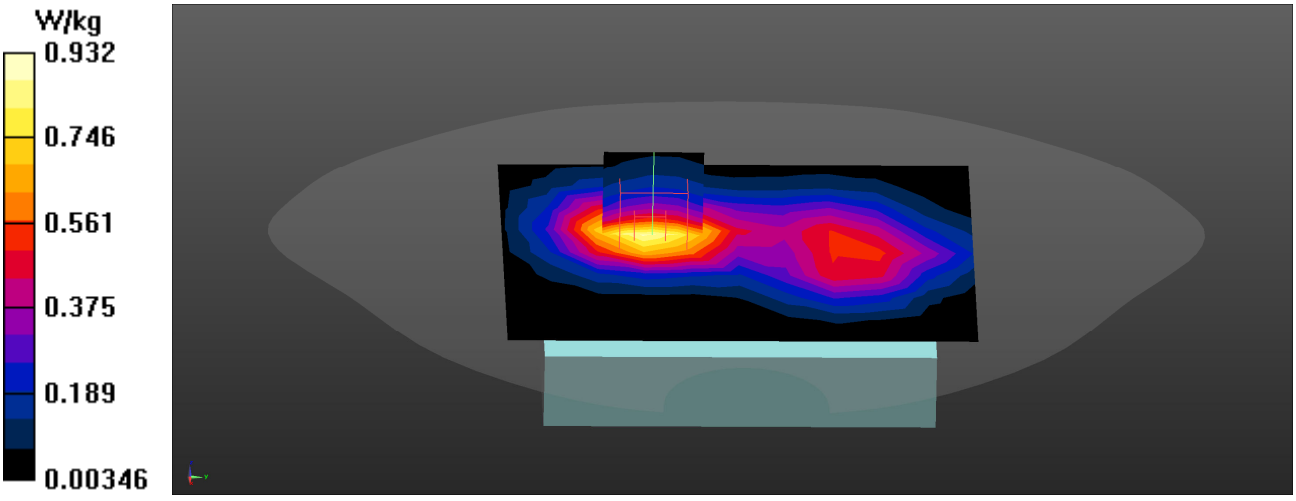
Test Laboratory: DEKRA Date: 2022/02/18

LTE Band2 20M QPSK 1RB-0_18900_Front_10mm
DUT: Control Unit; Type: JRN-360T
Communication System: UID 0, LTE Band2; Frequency: 1880 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 1880 MHz; σ = 1.39 S/m; ε_r = 40.77; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 22.8, Liquid Temperature (°C) : 21.6
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration:

- Probe: EX3DV4 - SN7631; ConvF(8.35, 8.35, 8.35); Calibrated: 2022/01/24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2021/12/30
- Phantom: Twin-SAM V8.0; Type: QD 000 P41 AA; Serial: 2030
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

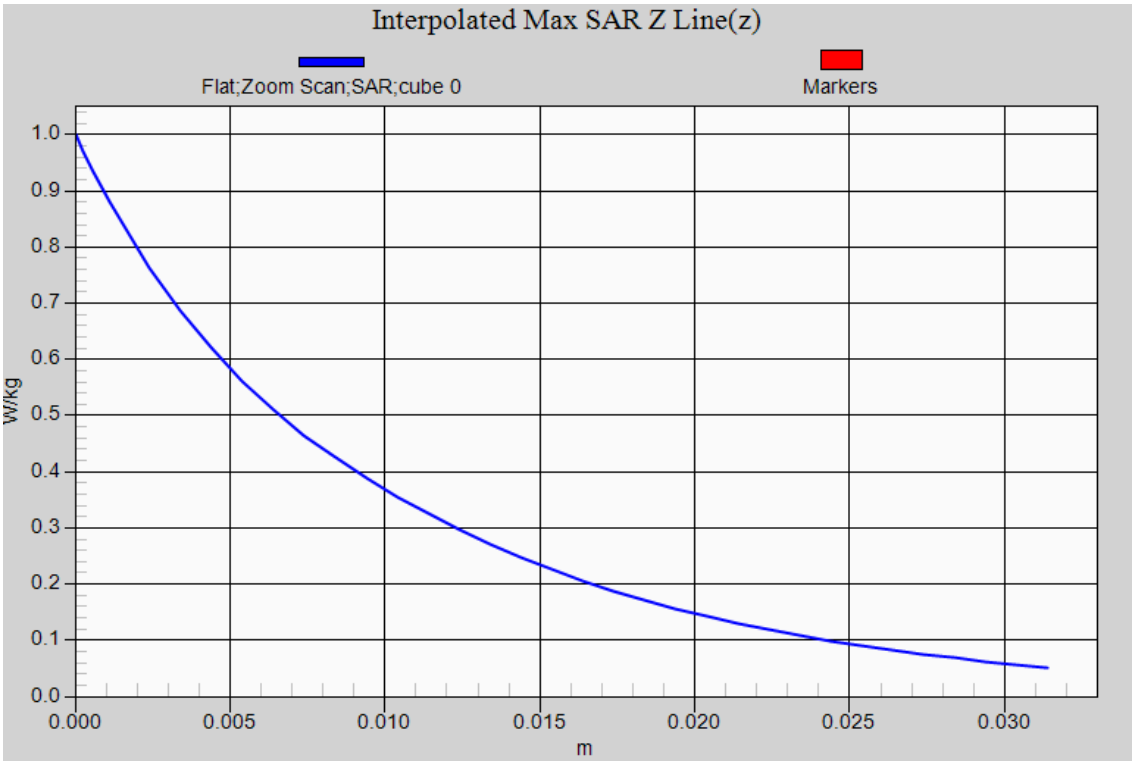
Configuration/Flat/Area Scan (9x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.932 W/kg

Configuration/Flat/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.32 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 1.05 W/kg
SAR(1 g) = 0.612 W/kg; SAR(10 g) = 0.376 W/kg
Maximum value of SAR (measured) = 0.883 W/kg



LTE Band2 20M QPSK 1RB-0 EUT Front (Body -0mm), Z-Axis plot

Channel: 18900



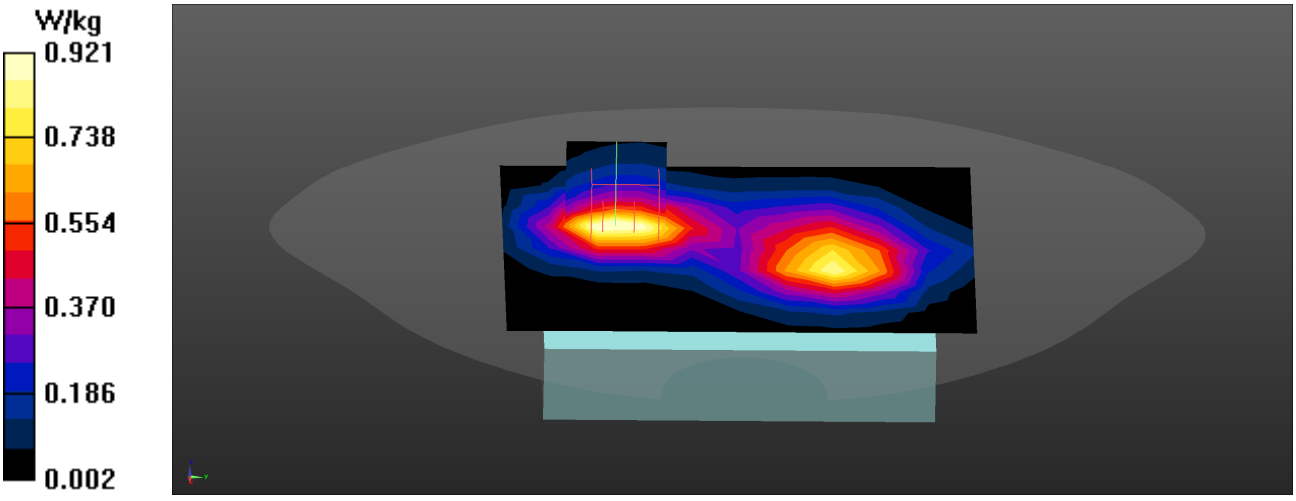
Test Laboratory: DEKRA Date: 2022/02/18

LTE Band4 20M QPSK 1RB-0_20175_Front_10mm
DUT: Control Unit; Type: JRN-360T
Communication System: UID 0, LTE Band4; Frequency: 1732.5 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 1732.5 MHz; σ = 1.38 S/m; ε_r = 39.79; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 22.8, Liquid Temperature (°C) : 22.1
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration:

- Probe: EX3DV4 - SN7631; ConvF(8.76, 8.76, 8.76); Calibrated: 2022/01/24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2021/12/30
- Phantom: Twin-SAM V8.0; Type: QD 000 P41 AA; Serial: 2030
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

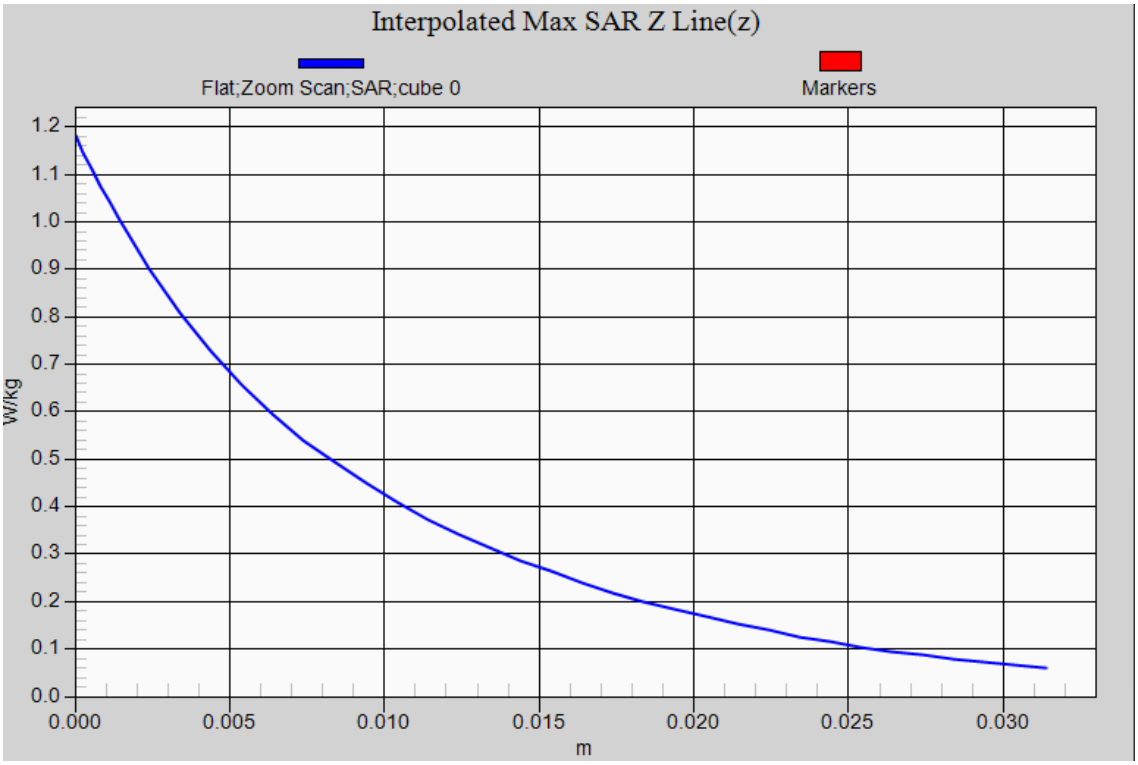
Configuration/Flat/Area Scan (9x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.921 W/kg

Configuration/Flat/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.80 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.18 W/kg
SAR(1 g) = 0.702 W/kg; SAR(10 g) = 0.419 W/kg
Maximum value of SAR (measured) = 1.01 W/kg



LTE Band4 20M QPSK 1RB-0 EUT Front (Body-10mm), Z-Axis plot

Channel: 20175



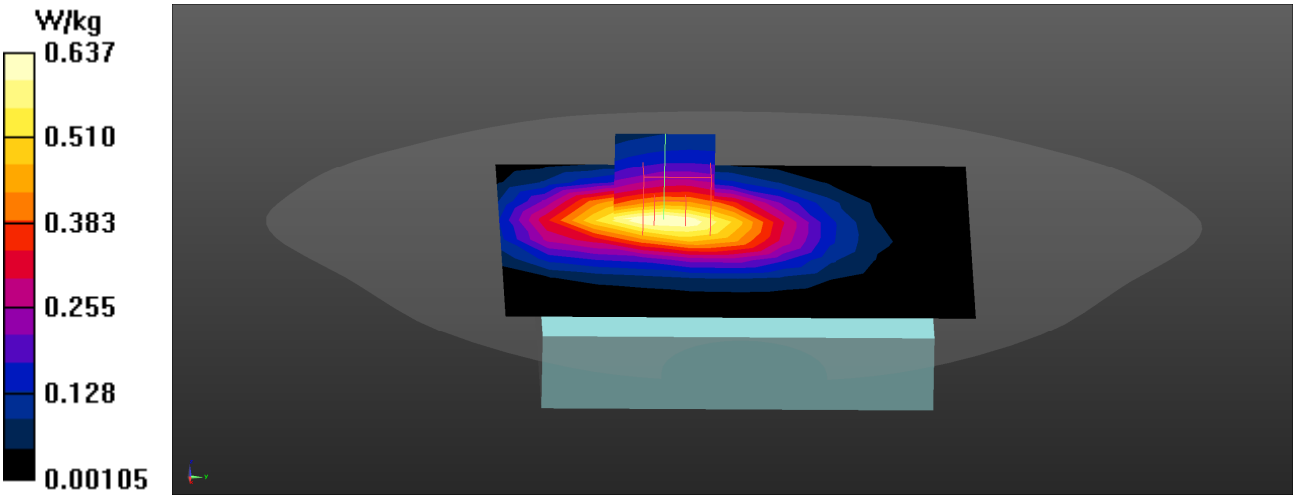
Test Laboratory: DEKRA Date: 2022/02/17

LTE Band5 10M QPSK 1RB-0_20525_Front_10mm
DUT: Control Unit; Type: JRN-360T
Communication System: UID 0, LTE Band5; Frequency: 836.5 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 836.5 MHz; σ = 0.91 S/m; ε_r = 40.68; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 23.1, Liquid Temperature (°C) : 22.2
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration:

- Probe: EX3DV4 - SN7631; ConvF(10.12, 10.12, 10.12); Calibrated: 2022/01/24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2021/12/30
- Phantom: Twin-SAM V8.0; Type: QD 000 P41 AA; Serial: 2030
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

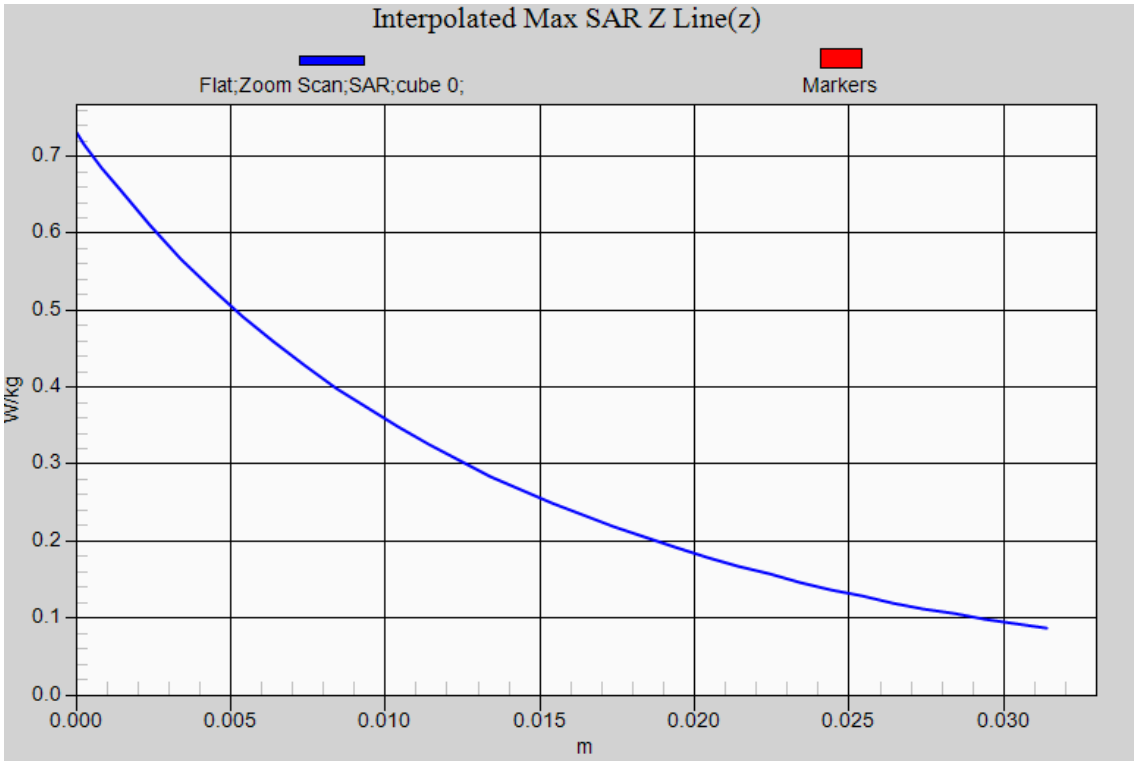
Configuration/Flat/Area Scan (9x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.637 W/kg

Configuration/Flat/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.73 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.732 W/kg
SAR(1 g) = 0.513 W/kg; SAR(10 g) = 0.353 W/kg
Maximum value of SAR (measured) = 0.658 W/kg



LTE Band5 10M QPSK 1RB-0 EUT Front (Body-10mm), Z-Axis plot

Channel: 20525



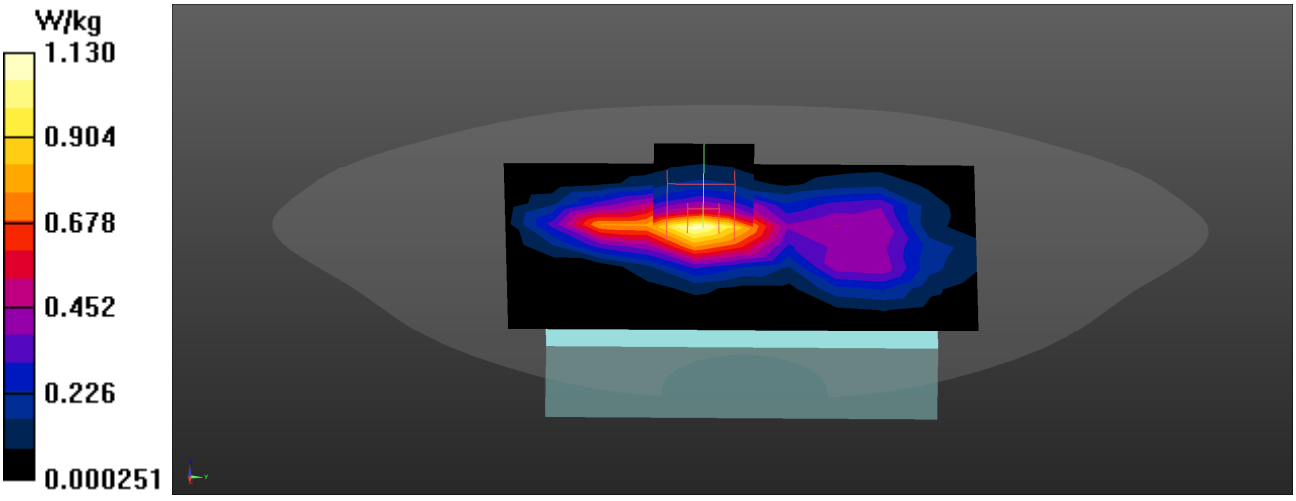
Test Laboratory: DEKRA Date: 2022/02/21

LTE Band7 20M QPSK 1RB-0_21100_Front_10mm
DUT: Control Unit; Type: JRN-360T
Communication System: UID 0, LTE Band7; Frequency: 2535 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 2535 MHz; σ = 1.92 S/m; ε_r = 39.82; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 23.2, Liquid Temperature (°C) : 22.3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration:

- Probe: EX3DV4 - SN7631; ConvF(8.04, 8.04, 8.04); Calibrated: 2022/01/24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2021/12/30
- Phantom: Twin-SAM V8.0; Type: QD 000 P41 AA; Serial: 2030
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

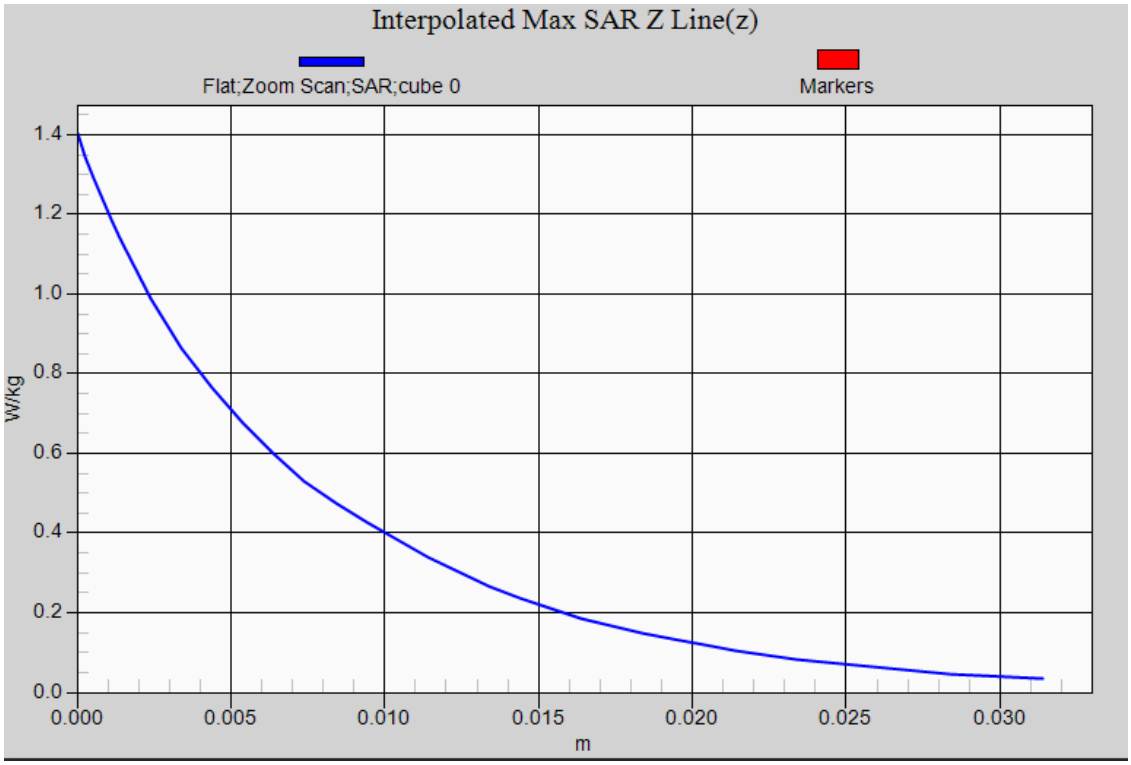
Configuration/Flat/Area Scan (11x13x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 1.13 W/kg

Configuration/Flat/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.24 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.41 W/kg
SAR(1 g) = 0.745 W/kg; SAR(10 g) = 0.411 W/kg
Maximum value of SAR (measured) = 1.14 W/kg



LTE Band7 20M QPSK 1RB-0 EUT Front (Body-10mm) Z-Axis plot

Channel: 21100



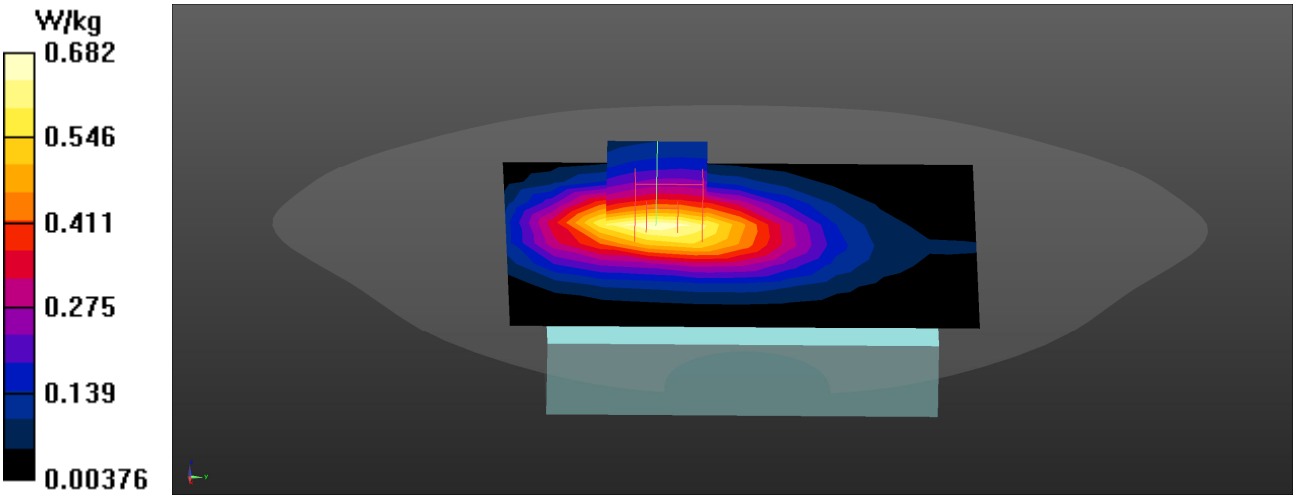
Test Laboratory: DEKRA Date: 2022/02/17

LTE Band12 10M QPSK 1RB-0_23095_Front_ 10mm
DUT: Control Unit; Type: JRN-360T
Communication System: UID 0, LTE Band12; Frequency: 707.5 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 707.5 MHz; σ = 0.87 S/m; ε_r = 42.43; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 22.9, Liquid Temperature (°C) : 21.8
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration:

- Probe: EX3DV4 - SN7631; ConvF(10.47, 10.47, 10.47); Calibrated: 2022/01/24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn916; Calibrated: 2021/12/30
- Phantom: Twin-SAM V8.0; Type: QD 000 P41 AA; Serial: 2030
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

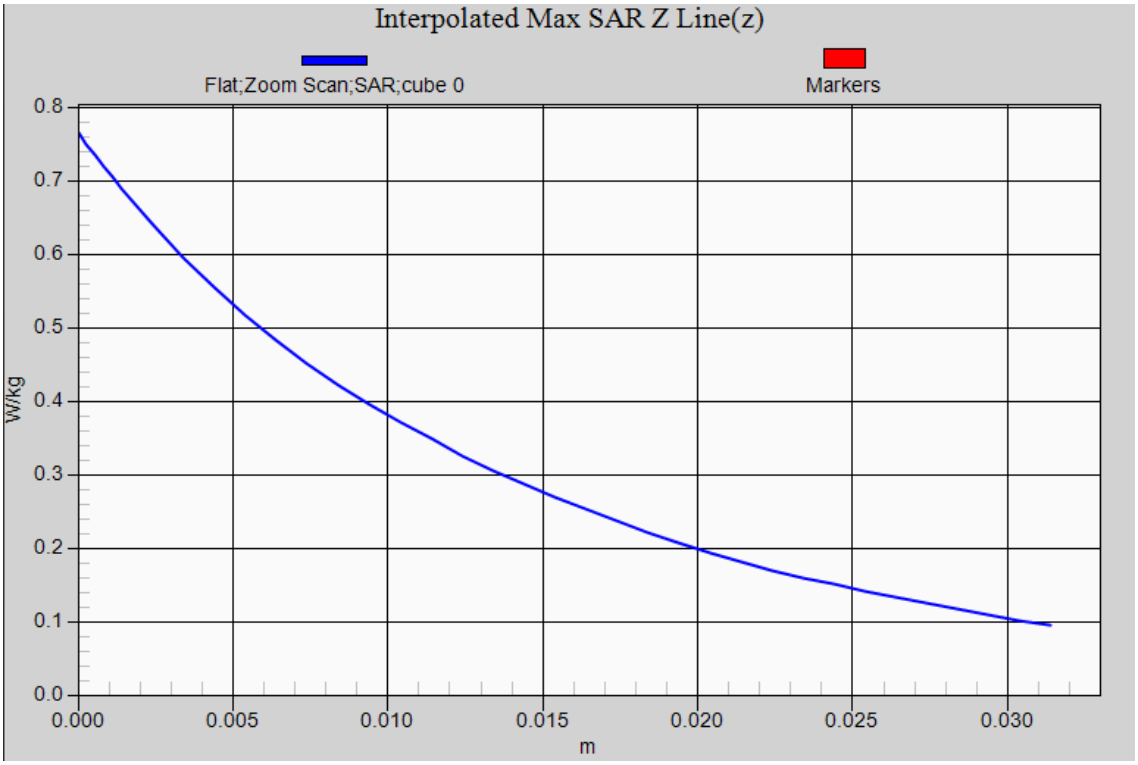
Configuration/Flat/Area Scan (9x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.682 W/kg

Configuration/Flat/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.82 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.767 W/kg
SAR(1 g) = 0.538 W/kg; SAR(10 g) = 0.373 W/kg
Maximum value of SAR (measured) = 0.691 W/kg



LTE Band12 10M QPSK 1RB-0 EUT Front (Body-10mm) Z-Axis plot

Channel: 23095



Appendix D. Probe Calibration

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client Dekra-TW (Auden)

Certificate No: EX3-7631_Jan22

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:7631

Calibration procedure(s): QA CAL-01.v9, QA CAL-12.v9, QA CAL-14.v6, QA CAL-23.v5, QA CAL-25.v7
Calibration procedure for dosimetric E-field probes

Calibration date: January 24, 2022

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	09-Apr-21 (No. 217-03291/03292)	Apr-22
Power sensor NRP-Z91	SN: 103244	09-Apr-21 (No. 217-03291)	Apr-22
Power sensor NRP-Z91	SN: 103245	09-Apr-21 (No. 217-03292)	Apr-22
Reference 20 dB Attenuator	SN: CC2552 (20x)	09-Apr-21 (No. 217-03343)	Apr-22
DAE4	SN: 660	13-Oct-21 (No. DAE4-660_Oct21)	Oct-22
Reference Probe ES3DV2	SN: 3013	27-Dec-21 (No. ES3-3013_Dec21)	Dec-22
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-20)	In house check: Jun-22
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-20)	In house check: Jun-22
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-20)	In house check: Jun-22
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-20)	In house check: Jun-22
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-22

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Sven Kühn	Deputy Manager	

Issued: January 28, 2022

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z*: *A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).