APPENDIX 3: Test instruments

Appendix 3-1: Equipment used

Test Name	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Interval (Month)
AT,SAR	191844	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	-	2023/08/03	12
AT	169910	Power Meter	Keysight Technologies Inc	8990B	MY51000448	2023/09/28	12
AT	169911	Power sensor	Keysight Technologies Inc	N1923A	MY57270004	2023/09/28	12
AT	169912	Power sensor	Keysight Technologies Inc	N1923A	MY57290005	2023/09/28	12
AT	196947	Coaxial Cable	Huber+Suhner	SUCOFLEX 102	803478/2	2023/03/02	12
AT	236500	Attenuator	To-Conne Co., Ltd.	SA-PJ-10	-	2023/05/16	12
AT	236504	Attenuator	To-Conne Co., Ltd.	SA-PJ-10	-	2023/05/16	12
AT	235604	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY45300743	2023/05/18	12
SAR	224031	DASY8 Module SAR/APD soft	Schmid & Partner Engineering AG	ver.16.2.4.2524	9-2506F07D	-	-
SAR	144886	Dielectric assessment kit soft	Schmid & Partner Engineering AG	DAK ver.3.0.6.14	9-0EE103A4	-	-
SAR	224020	DASY8 PC	Hewlett Packard	HP Z4 G4 Workstation	CZC1198G21	-	-
SAR	225155	Mounting Platform	Schmid & Partner Engineering AG	MP8E-TX2-60L Basic	-	-	-
SAR	224032	6-axis Robot	Schmid & Partner Engineering AG	TX2-60L spe	F/22/0033789/A/001	2023/08/29	12
SAR	224023	Robot Controller	Schmid & Partner Engineering AG	CS9spe-TX2-60	F/22/0033789/C/001	-	-
SAR	224025	Measurement Server	Schmid & Partner Engineering AG	DASY8 Measurement Server	10042	2023/12/18	12
SAR	224026	Electro-Optical Converter	Schmid & Partner Engineering AG	EOC8-60	1027	-	-
SAR	224027	Light Beam Unit	Schmid & Partner Engineering AG	LIGHTBEAM-85	2069	-	-
SAR	243045	Data Acquisition Electronics	Schmid & Partner Engineering AG	DAE4	518	2023/04/19	12
SAR	226380	Dosimetric E-Field Probe	Schmid & Partner Engineering AG	EX3DV4	3745	2023/04/18	12
SAR	224034	Flat Phantom	Schmid & Partner Engineering AG	ELI V8.0	2161	2023/08/21	12
SAR	145596	Device holder	Schmid & Partner Engineering AG	Mounting device for transmitter	-	2023/08/29	12
SAR	145723	Laptop holder	Schmid & Partner Engineering AG	SM LH1 001 C	-	-	-
SAR	224028	Modulation & Audio Interference Analyzer	Schmid & Partner Engineering AG	MAIA	1582	-	-
SAR	145558	Dipole Antenna (2.45 GHz)	Schmid & Partner Engineering AG	D2450V2	765	2023/05/24	12
SAR	243047	Dipole Antenna (5 GHz)	Schmid & Partner Engineering AG	D5GHzV2	1039	2023/04/17	12
SAR	243048	Dielectric assessment kit	Schmid & Partner Engineering AG	DAKS-3.5	1058	2023/05/22	12
SAR	146258	Network Analyzer	Keysight Technologies Inc	8753ES	US39171777	2023/10/05	12
SAR	235176	Signal Generator	Rohde & Schwarz	SMB 100A	183690	2023/01/26	12
SAR	144988	Power meter	Keysight Technologies Inc	E4417A	GB41290718	2023/09/27	12
SAR	146308	Power sensor	Keysight Technologies Inc	E9327A	US40440545	2023/09/27	12
SAR	144990	Power sensor	Keysight Technologies Inc	E9327A	US40440544	2023/09/27	12
SAR	225418	Directional coupler (dual)	TAP Microwave	TDC20180A20D	22100556	2023/12/04	12
SAR	145105	Power meter	Anritsu Corporation	ML2495A	6K00003356	2023/09/27	12
SAR	144991	Power sensor	Anritsu Corporation	MA2411B	12088	2023/09/27	12
SAR	215438	Attenuator	To-Conne Co., Ltd.	SA-PJ-20	-	2023/12/04	12
SAR	236501	Coaxial Cable	To-Conne Co., Ltd.	TC-038-SP-SP-200	23E09-01	2023/12/04	12
SAR	236503	Coaxial Cable	To-Conne Co., Ltd.	TC-038-SP-SP-1800	23E09-02	2023/12/04	12
SAR	145106	Ruler(150mm,L)	SHINWA	12103	-	2023/02/08	12
SAR	145086	Ruler(300mm)	SHINWA	13134	-	2023/02/08	12
SAR	145087	Ruler(100x50mm,L)	SHINWA	12101	-	2023/02/08	12
SAR	150560	Measuring Tool, Ruler	SHINWA	14001	–	2023/02/08	12
SAR	144986	Thermo-Hygrometer data logger	SATO KEIRYOKI	SK-L200THIIα/SK-LTHIIα-2	015246/08169	2023/08/04	12
SAR	201967	Digital thermometer	HANNA	Checktemp-4	A01440226111	2023/08/04	12
SAR	201968	Digital thermometer	HANNA	Checktemp-4	A01310946111	2023/08/04	12
SAR	146176	Spectrum Analyzer	ADVANTEST	R3272	101100994	-	-
SAR	146185	DI water	MonotaRo	34557433	-	-	-
SAR	146112	Primepure Ethanol	Kanto Chemical Co., Inc.	14032-79	-	-	-
SAR	207714	Head Tissue Simulating Liquid	Schmid & Partner Engineering AG	HBBL600-10000V6	SL AAH U16 BC	-	-

*. AT was measured 2023-12-13~12-21. (See Section 5). SAR test was performed 2024-01-17~01-30.

The expiration date of calibration is the end of the expired month.
As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chain of calibrations.
All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.
*. Hyphens for Last Calibration Date and Cal Int (month) are instruments that Calibration is not required (e.g. software), or instruments checked in advance before use.

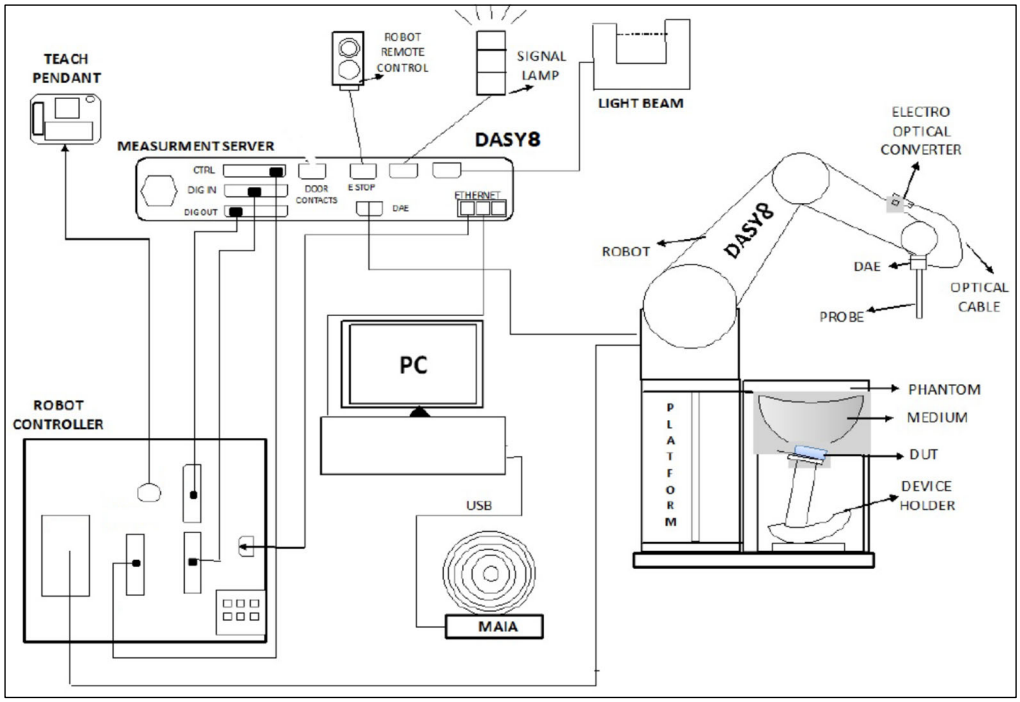
[Test Item] SAR: Specific Absorption Rate, AT: Antenna terminal conducted power

*. LIMS ID: 146112, the parameters of primepure Ethanol (as reference liquid) used for the simulated tissue parameter confirmation was defined the NPL Report MAT23 (http://www.npl.co.uk/content/conpublication/4295)

Appendix 3-2: Measurement System

Appendix 3-2-1: SAR Measurement System

These measurements were performed with the automated near-field scanning system DASY8 from Schmid & Partner Engineering AG (SPEAG). The system is based on a high precision robot), which positions the probes with a positional repeatability of better than ± 0.03 mm. Special E- and H-field probes have been developed for measurements close to material discontinuity, the sensors of which are directly loaded with a Schottky diode and connected via highly resistive lines to the data acquisition unit. The SAR measurements were conducted with the dosimetry probes EX3DV4 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.



The DASY8 SAR/APD system for performing compliance tests consist of the following items:

- 6-axis robotic arm (Stäubli TX2-60L) for positioning the probe
- Mounting Platform for keeping the phantoms at a fixed location relative to the robot
- Measurement Server for handling all time-critical tasks, such as measurement data acquisition and supervision of safety features
- EOC (Electrical to Optical Converter) for converting the optical signal from the DAE to electrical before being transmitted to the measurement server
- LB (Light-Beam unit) for probe alignment (measurement of the exact probe length and eccentricity)
- SAR probe (EX3DV4 probes) for measuring the E-field distribution in the phantom. The SAR distribution and the psSAR (peak spatial averaged SAR) are derived from the E-field measurement.
- SAR phantom that represents a physical model with an equivalent human anatomy. A Specific Anthropomorphic Mannequin (SAM) head is usually used for handheld devices, and a Flat phantom is used for body-worn devices.
- TSL (Tissue Simulating Liquid) representing the dielectric properties of used tissue, e.g. Head Simulating Liquid, HSL.
- DAE (Data Acquisition Electronics) for reading the probe voltages and transmitting it to the DASY8 PC.
- Device Holder for positioning the DUT beneath the phantom.
- MAIA (Modulation and Interference Analyzer) for confirming the accuracy of the probe linearization parameters
- Operator PC for running the DASY8 software to define/execute the measurements
- System validation kits for system check/validation purposes.

Platforms

The platform is a multi-phantom support structure made of a wood and epoxy composite (ε = 3.3 and loss tangent δ < 0.07). It is a strong and rigid structure transparent to electric and magnetic fields (nonmetallic components).

TX2-60L robot, CS9 robot controller

•Number of Axes : 6 •Repeatability : ±0.03 mm •Manufacture : Stäubli

DASY8 Measurement server

The DASY8 Measurement Server handles all time critical tasks such as acquisition of measurement data, detection of phantom surface, control of robot movements, supervision of safety features.
•Manufacture : Schmid & Partner Engineering AG

Data Acquisition Electronic (DAE)

The DAE is used to acquire the probe sensor voltages and transfer them to the DASY8 Measurement Server, and to report mechanical surface detection and probe collisions. The 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 with a control logic unit. Transmission to the DASY8 Measurement Server is accomplished through an optical downlink for data and status information and an optical uplink for commands and the clock. The mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts used for mechanical surface detection and probe collision detection.
•Measurement Range : 1 μV to > 200 mV (2 range settings: 4 mV (low), 400 mV (high))
•Input Offset voltage : < 1 μV (with auto zero) •Input Resistance : 200 MΩ
•Battery operation : > 10 hrs. (with two rechargeable 9 V battery)
•Manufacture : Schmid & Partner Engineering AG

Electro-Optical Converter (EOC8-TX2-60L)

The Electrical to Optical Converter (EOC8) supports as data exchange between the DAE and the measurement server (optical connector) and data acquisition based on Ethernet protocol.
•Manufacture : Schmid & Partner Engineering AG

Light Beam Switch

The light beam unit allows automatic "tooling" of the probe. During the process, the actual position of the probe tip with respect to the robot arm, as well as the probe length and the horizontal probe offset, are measured. The software then corrects all movements within the measurement jobs, 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 0.1mm, even if the other probe has different dimensions. During probe rotations, the probe tip will keep its actual position.
•Manufacture : Schmid & Partner Engineering AG

SAR measurement software

•Software version : Refer to Appendix 3-1 (Equipment used) •Manufacture : Schmid & Partner Engineering AG

E-Field Probe

•Model : EX3DV4 •Frequency : 4 MHz to 10 GHz, Linearity: ±0.2 dB (30 MHz to 10 GHz)
•Construction : Symmetrical design with triangular core, Built-in shielding against static charges, PEEK enclosure material (resistant to organic solvents, e.g., DGBE).
•CF : Refer to calibration data of Appendix. (CF: Conversion Factors)
•Directivity : ±0.1 dB in TSL (rotation around probe axis) / ±0.3 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)
•Dimension : Overall length: 330 mm (Tip: 20 mm) / Tip diameter: 2.5 mm (Body: 12 mm)
Typical distance from probe tip to dipole centers: 1mm
•Application : High precision dosimetric measurement in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6GHz with precision of better 30%.
•Manufacture : Schmid & Partner Engineering AG

ELI Phantom

The ELI phantom is used for compliance testing of handheld and body-mounted wireless devices in the frequency range of 4 MHz to 10 GHz. ELI is fully compatible with the IEC/IEEE 62209-1528 standard and all known tissue simulating liquids.
ELI V8.0 phantom shell has optimized pretension in the bottom surface during production, such that the phantom is more robust and with reduced sagging.
•Model Number : ELI V8.0 flat phantom •Shell Material : Vinyl ester, fiberglass reinforced (VE-GF)
•Shell Thickness : 2.0 ± 0.2 mm (bottom plate) •Dimensions : 600 mm × 400 mm (oval) (volume: Approx. 30 liters)
•Manufacture : Schmid & Partner Engineering AG

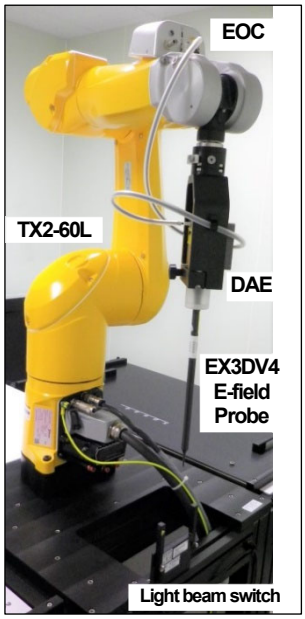
Device Holder, Laptop holder, support material

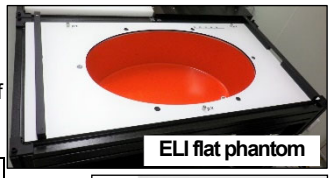
Accurate device positioning is crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards. The device holder is designed to cope with the different positions given in the standard. It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles. The DASY device holder is constructed of low-loss POM material having the following dielectric parameters: relative permittivity ε=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.

☒ Device holder: In combination with the ELI phantom, the Mounting Device enables the rotation of the mounted transmitter device in spherical coordinates. Transmitter devices can be easily and accurately positioned. The low-loss dielectric urethane foam was used for the mounting section of device holder.
•Material : Polyoxymethylene (POM) •Manufacture: Schmid & Partner Engineering AG

☒ Laptop holder: A simple but effective and easy-to-use extension for the Mounting Device; facilitates testing of larger devices (e.g., laptops, cameras, etc.) according to IEC 62209-2.
•Material : Polyoxymethylene (POM), PET-G, Foam•Manufacture: Schmid & Partner Engineering AG

☒ Support form: Urethane foam





Data storage and evaluation (post processing)

The uplink signal transmitted by the DUT is measured inside the TSL by the probe, which is accurately positioned at a precisely known distance and with a normal orientation with respect to the phantom surface. The dipole / loop sensors at the probe tips pick up the signal and generate a voltage, which is measured by the voltmeter inside the DAE. The DAE returns digital values, which are converted to an optical signal and transmitted via the EOC to the measurement server. The data is finally transferred to the DASY8 software for further post processing. In addition, the DASY8 software periodically requests a measurement with short-circuited inputs from the DAE to compensate the amplifier offset and drift. This procedure is called DAE zeroing.
The operator has access to the following low level measurement settings:
• the integration time is the voltage acquisition time at each measurement point. It is typically 0.5 s.
• the zeroing period indicates how often the DAE zeroing is performed.
In parallel, the MAIA measures the characteristics of the uplink signal via the air interface and sends this information to the DASY8 software, which compares them to the communication system defined by the operator. A warning is issued if any difference is detected.

The measurement data is now acquired and can be post processed to compute the psSAR1g /8g /10g.
The measured voltages are not directly proportional to SAR and must be linearized. The formulas below are based on [1] (*1).
The measured voltage is first linearized using the (a, b, c, d) set of parameters specific to the communication system and sensor:

$$V_{compi} = U_i + U_i^2 \cdot \frac{10^{\frac{d}{10}}}{d_{cp_i}}$$

with	V_{compi}	= compensated voltage of channel i (μV)	(i = x,y,z)
	U_i	= input voltage of channel i (μV)	(i = x,y,z)
	d	= PMR factor d (dB)	(Probe parameter)
	dcp_i	= diode compression point of channel i (μV)	(Probe parameter, i = x,y,z)

$$V_{compi_{dB\sqrt{\mu V}}} = 10 \cdot \log_{10}(V_{compi})$$

$$corr_i = a_i \cdot e^{-\left(\frac{b_i - 10\log_{10}(V_{compi})}{c_i}\right)^2}$$

with	$corr_i$	= correction factor of channel i (dB)	(i = x,y,z)
	$V_{compi_{dB\sqrt{\mu V}}}$	= compensated voltage of channel i ($dB\sqrt{\mu V}$)	(i = x,y,z)
	a_i	= PMR factor a of channel *i* (dB)	(Probe parameter, i = x,y,z)
	b_i	= PMR factor b of channel *i* ($dB\sqrt{\mu V}$)	(Probe parameter, i = x,y,z)
	c_i	= PMR factor c of channel *i* (-)	(Probe parameter, i = x,y,z)

The voltage $V_{i_{dB\sqrt{\mu V}}}$ is the linearized voltage in $dB\sqrt{\mu V}$):

$$V_{i_{dB\sqrt{\mu V}}} = V_{compi_{dB\sqrt{\mu V}}} - corr_i$$

with	$V_{i_{dB\sqrt{\mu V}}}$	= linearized voltage of channel i ($dB\sqrt{\mu V}$)	(i = x,y,z)
	$V_{compi_{dB\sqrt{\mu V}}}$	= compensated voltage of channel i ($dB\sqrt{\mu V}$)	(i = x,y,z)
	$Corr_i$	= PMR factor a of channel *i* (dB)	(i = x,y,z)

Finally, the linearized voltage is converted in μV :

$$V_i = 10^{\frac{V_{i_{dB\sqrt{\mu V}}}}{10}}$$

with	V_i	= linearized voltage of channel i (μV)	(i = x,y,z)
	$V_{compi_{dB\sqrt{\mu V}}}$	= linearized voltage of channel i ($dB\sqrt{\mu V}$)	(i = x,y,z)

The Field data for each channel are calculated using the linearized voltage:

E-fieldprobes: $$E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}$$

with	V_i	= linearized voltage of channel i in μV	(i = x,y,z)
	$Norm_i$	= sensor sensitivity of channel i in μV/(V/m)^2 for E-field Probes	(i = x,y,z)
	$ConvF$	= sensitivity enhancement in solution	
	E_i	= electric field strength of channel i in V/m	(i = x,y,z)

The RMS value of the field components gives the total field strength (Hermitian magnitude) :

$$E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$

The E-field data value is used to calculate SAR :

$$SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1000}$$

with	SAR	= local specific absorption rate in mW/g
	Etot	= total field strength in V/m
	σ	= conductivity in [Ω/m] or [S/m]
	ρ	= equivalent tissue density in g/cm^3

Note: The resulting linearized voltage is only approximated because the probe UID is used 0 (CW) for the test signal in this test report.

(*1) [1] Jagadish Nadakuduti, Sven Kuehn, Marcel Fehr, Mark Douglas Katja Pokovic and Niels Kuster, "The Effect of Diode Response of electromagnetic Field Probes for the Measurements of Complex Signals." IEEE Transactions on Electromagnetic Compatibility, vol. 54, pp. 1195–1204, Dec. 2012.

Appendix 3-2-2: SAR system check results

*. Prior to the SAR assessment of EUT, the Daily check was performed to test whether the SAR system was operating within its target of ±10%. The Daily check results are in the table below.

Liquid type: Head	ΔSAR		P.in	SAR (1g) [W/kg] (*b)							SAR (10g) [W/kg] (*b)						
Date	Freq.	1g	10g	Meas.	1W	Target (*c)		Dev.[%]		Pass	Meas.	1W	Target (*c)		Dev.[%]		Pass
	[MHz]	[%]	[%]	[mW]	(*a)	scaled	CAL.	STD	CAL.	STD	?	(*a)	scaled	CAL.	STD	Cal.	STD	?
2024-01-17	5250	0.7	0.9	50	4.12	81.82	80.7	N/A	1.4	-	Pass	1.19	23.59	23.1	N/A	2.1	-	Pass
2024-01-18	5250	0.7	0.9	50	4.08	81.03	80.7	N/A	0.4	-	Pass	1.18	23.39	23.1	N/A	1.3	-	Pass
2024-01-19	5250	0.7	0.9	50	4.06	80.63	80.7	N/A	-0.1	-	Pass	1.17	23.19	23.1	N/A	0.4	-	Pass
2024-01-22	5250	0.8	1.1	50	4.05	80.35	80.7	N/A	-0.4	-	Pass	1.18	23.34	23.1	N/A	1.0	-	Pass
2024-01-23	5250	0.8	1.1	50	4.03	79.96	80.7	N/A	-0.9	-	Pass	1.17	23.14	23.1	N/A	0.2	-	Pass
2024-01-24	5250	0.8	1.1	50	4.05	80.35	80.7	N/A	-0.4	-	Pass	1.17	23.14	23.1	N/A	0.2	-	Pass
2024-01-25	5250	0.8	1.1	50	4.02	79.76	80.7	N/A	-1.2	-	Pass	1.16	22.94	23.1	N/A	-0.7	-	Pass
2024-01-25	2450	1.3	0.7	50	2.65	52.31	52.7	52.4	-0.7	-0.2	Pass	1.23	24.43	24.7	24	-1.1	1.8	Pass
2024-01-26	2450	1.3	0.7	50	2.64	52.11	52.7	52.4	-1.1	-0.6	Pass	1.23	24.43	24.7	24	-1.1	1.8	Pass
2024-01-29	2450	1.5	0.8	50	2.73	53.78	52.7	52.4	2.0	2.6	Pass	1.27	25.20	24.7	24	2.0	5.0	Pass
2024-01-29	5250	0.8	1.1	50	4.04	80.15	80.7	N/A	-0.7	-	Pass	1.17	23.14	23.1	N/A	0.2	-	Pass
2024-01-30	5250	0.8	1.1	50	4	79.36	80.7	N/A	-1.7	-	Pass	1.16	22.94	23.1	N/A	-0.7	-	Pass
2024-01-30	2450	1.5	0.8	50	2.71	53.39	52.7	52.4	1.3	1.9	Pass	1.25	24.80	24.7	24	0.4	3.3	Pass

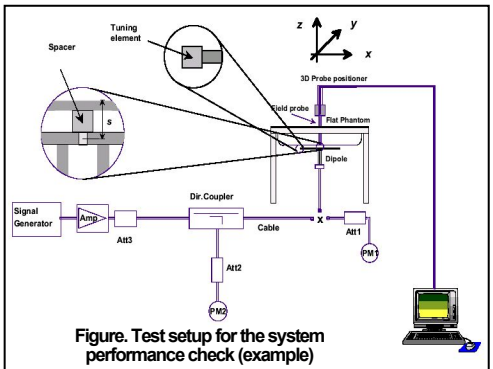
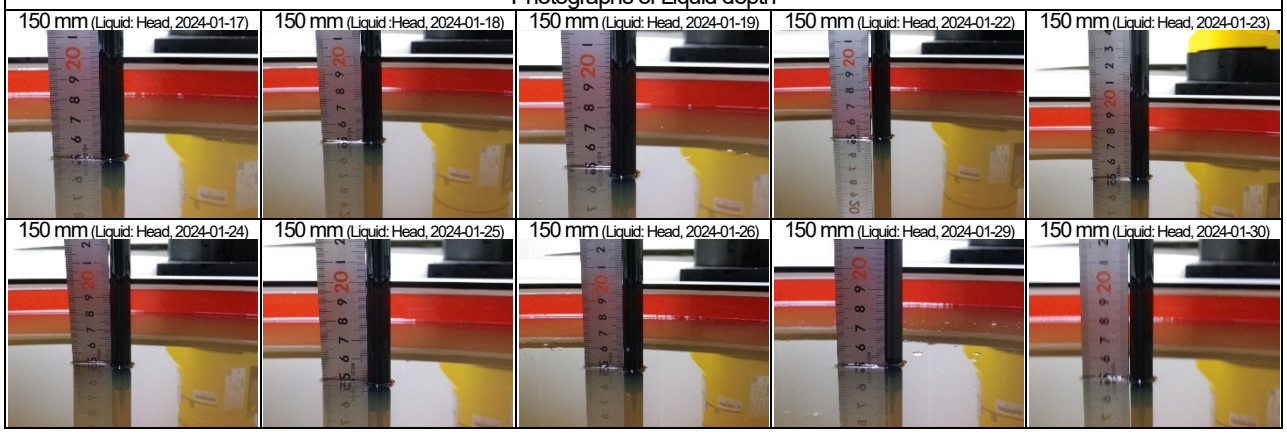


Figure. Test setup for the system performance check (example)

*. F: Frequency, Meas.: Measured, Cal.: Calibration value, STD: Standard value, Dev.: Deviation, n/a: not applicable.
*a. The Measured SAR value is obtained at 50 mW for 2450 MHz and 5250 MHz.
*b. The measured SAR value of Daily check was compensated for tissue dielectric deviations (ΔSAR) and scaled to 1W of output power in order to compare with the manufacture's calibration target value which was normalized.
ΔSAR corrected SAR (1g (10g)) (W/kg) = (Measured SAR(1g (10g)) (W/kg)) × (100 - (ΔSAR1g (10g) (%)) / 100
*c. The target value is a parameter defined in the calibration data sheet of D2450V2 (sn:765) dipole and D5GHzV2 (sn:1039) calibrated by Schmid & Partner Engineering AG, the data sheet was filed in this report when there were used.
*d. The target value (normalized to 1W) is defined in IEEE Std.1528.

Appendix 3-2-3: SAR system check measurement data

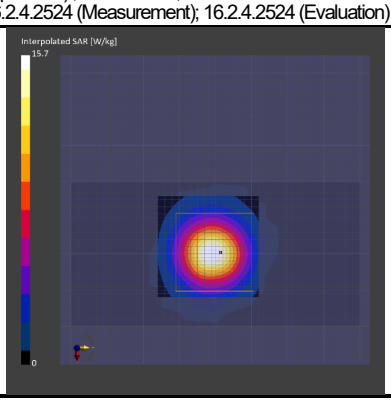
Photographs of Liquid depth



Dipole: D5GHzV2 - SN1039 ; Mode: CW (0) ; Frequency: 5250 MHz ; Test Distance: 10 mm (dipole to liquid); Power: 17.0 dBm
TSL parameters used: Head(v6) ; f= 5250 MHz; Conductivity: 4.571 S/m; Permittivity: 34.88

DASY8 Configuration: - Electronics: DAE4 - SN518 (Calibrated:2023-04-19)/ - Phantom: ELI V8.0 (20deg probe tilt) ; Serial: 2161 ; Phantom section: Flat
- Probe: EX3DV4 - SN3745(Calibrated: 2023-04-18); ConvF: (4.75, 4.75, 4.75)@5250 MHz / - Software: 16.2.4.2524 (Measurement); 16.2.4.2524 (Evaluation)

Scan Setup			Measurement Results		
Setup Items	Area Scan	Zoom Scan	Meas. Items	Area Scan	Zoom Scan
Grid Extents [mm]	40.0×80.0	24.0× 24.0 ×22.0	psSAR1g [W/kg]	3.90	**4.12**
Grid Steps [mm]	10.0×10.0	4.0× 4.0 ×1.4	psSAR10g [W/kg]	1.11	**1.19**
Sensor Surface [mm]	3.0	1.4	Power Drift [dB]	0.03	0.04
Graded Grid	N/A	Yes	Power Scaling	Disabled	Disabled
Grading Ratio	N/A	1.4	Scaling Factor [dB]	N/A	N/A
MAIA monitored	Y	Y	TSL Correction	No correction	No correction
Surface Detection	VMS + 6p	VMS + 6p	M2/M1 [%]	N/A	65.6
Scan Method	Measured	Measured	Dist 3dB Peak [mm]	N/A	7.2



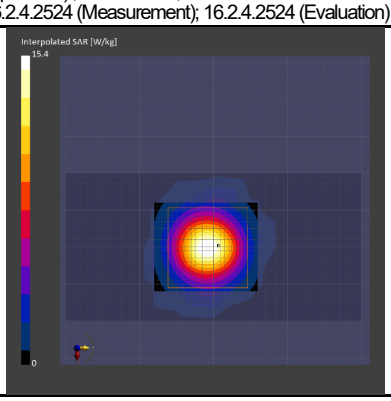
Remarks: *. Date tested:2024-01-17 ; Tested by: Hiroshi Naka; Tested place:No.7 shielded room; Ambient: 23 deg.C. / (70~75) %RH; Liquid depth: 150 mm;
*. Liquid temperature: 22.0 deg.C. ± 0.5 deg.C. (22.0 deg.C., in check); *. Red cubic: big=SAR(10g) / small=SAR(1g)
*. Project file name-Measurement Group: 240117_15032644_bee056.d8sar- SPC Measurement Group

Appendix 3-2-3: SAR system check measurement data (cont'd)

Dipole: D5GHzV2 - SN1039 ; Mode: CW (0) ; Frequency: 5250 MHz ; Test Distance: 10 mm (dipole to liquid); Power: 17.0 dBm
TSL parameters used: Head(v6) ; f= 5250 MHz; Conductivity: 4.571 S/m; Permittivity: 34.88

DASY8 Configuration: - Electronics: DAE4 - SN518 (Calibrated:2023-04-19)/ - Phantom: ELI V8.0 (20deg probe tilt) ; Serial: 2161 ; Phantom section: Flat
- Probe: EX3DV4 - SN3745(Calibrated: 2023-04-18); ConvF: (4.75, 4.75, 4.75)@5250 MHz / - Software: 16.2.4.2524 (Measurement); 16.2.4.2524 (Evaluation)

Scan Setup			Measurement Results		
Setup Items	Area Scan	Zoom Scan	Meas. Items	Area Scan	Zoom Scan
Grid Extents [mm]	40.0×80.0	24.0× 24.0 ×22.0	psSAR1g [W/kg]	3.78	**4.08**
Grid Steps [mm]	10.0×10.0	4.0× 4.0 ×1.4	psSAR10g [W/kg]	1.09	**1.18**
Sensor Surface [mm]	3.0	1.4	Power Drift [dB]	0.06	0.02
Graded Grid	N/A	Yes	Power Scaling	Disabled	Disabled
Grading Ratio	N/A	1.4	Scaling Factor [dB]	N/A	N/A
MAIA monitored	Y	Y	TSL Correction	No correction	No correction
Surface Detection	All points	All points	M2/M1 [%]	N/A	65.5
Scan Method	Measured	Measured	Dist 3dB Peak [mm]	N/A	7.6

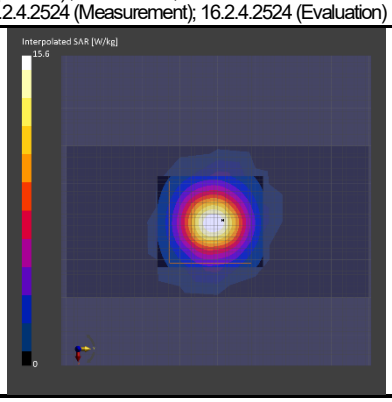


Remarks: *. Date tested:2024-01-18 ; Tested by: Hiroshi Naka; Tested place:No.7 shielded room; Ambient: (23) deg.C. / (70~75) %RH; Liquid depth: 150 mm;
*. Liquid temperature: 22.0 deg.C. ± 0.5 deg.C. (22.0 deg.C., in check); *. Red cubic: big=SAR(10g) / small=SAR(1g)
*. Project file name-Measurement Group: 240117_15032644_bee056.d8sar- 1/18a,sg,50mw

Dipole: D5GHzV2 - SN1039 ; Mode: CW (0) ; Frequency: 5250 MHz ; Test Distance: 10 mm (dipole to liquid); Power: 17.0 dBm
TSL parameters used: Head(v6) ; f= 5250 MHz; Conductivity: 4.571 S/m; Permittivity: 34.88

DASY8 Configuration: - Electronics: DAE4 - SN518 (Calibrated:2023-04-19)/ - Phantom: ELI V8.0 (20deg probe tilt) ; Serial: 2161 ; Phantom section: Flat
- Probe: EX3DV4 - SN3745(Calibrated: 2023-04-18); ConvF: (4.75, 4.75, 4.75)@5250 MHz / - Software: 16.2.4.2524 (Measurement); 16.2.4.2524 (Evaluation)

Scan Setup			Measurement Results		
Setup Items	Area Scan	Zoom Scan	Meas. Items	Area Scan	Zoom Scan
Grid Extents [mm]	40.0×80.0	24.0× 24.0 ×22.0	psSAR1g [W/kg]	3.84	**4.06**
Grid Steps [mm]	10.0×10.0	4.0× 4.0 ×1.4	psSAR10g [W/kg]	1.10	**1.17**
Sensor Surface [mm]	3.0	1.4	Power Drift [dB]	0.03	0.03
Graded Grid	N/A	Yes	Power Scaling	Disabled	Disabled
Grading Ratio	N/A	1.4	Scaling Factor [dB]	N/A	N/A
MAIA monitored	N/A	N/A	TSL Correction	No correction	No correction
Surface Detection	VMS + 6p	VMS + 6p	M2/M1 [%]	N/A	65.2
Scan Method	Measured	Measured	Dist 3dB Peak [mm]	N/A	7.2

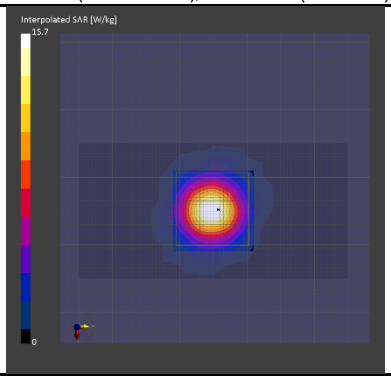


Remarks: *. Date tested:2024-01-19 ; Tested by: Hiroshi Naka; Tested place:No.7 shielded room; Ambient: 22 deg.C. / (70~75) %RH; Liquid depth: 150 mm;
*. Liquid temperature: 22.0 deg.C. ± 0.5 deg.C. (22.0 deg.C., in check); *. Red cubic: big=SAR(10g) / small=SAR(1g)
*. Project file name-Measurement Group: 240117-29_15032644_bee056_back.d8sar- 1/19a,sg,50mw

Dipole: D5GHzV2 - SN1039 ; Mode: CW (0) ; Frequency: 5250 MHz ; Test Distance: 10 mm (dipole to liquid); Power: 17.0 dBm
TSL parameters used: Head(v6) ; f= 5250 MHz; Conductivity: 4.534 S/m; Permittivity: 34.71

DASY8 Configuration: - Electronics: DAE4 - SN518 (Calibrated:2023-04-19)/ - Phantom: ELI V8.0 (20deg probe tilt) ; Serial: 2161 ; Phantom section: Flat
- Probe: EX3DV4 - SN3745(Calibrated: 2023-04-18); ConvF: (4.75, 4.75, 4.75)@5250 MHz / - Software: 16.2.4.2524 (Measurement); 16.2.4.2524 (Evaluation)

Scan Setup			Measurement Results		
Setup Items	Area Scan	Zoom Scan	Meas. Items	Area Scan	Zoom Scan
Grid Extents [mm]	40.0×80.0	24.0× 24.0 ×22.0	psSAR1g [W/kg]	3.82	**4.05**
Grid Steps [mm]	10.0×10.0	4.0× 4.0 ×1.4	psSAR10g [W/kg]	1.09	**1.18**
Sensor Surface [mm]	3.0	1.4	Power Drift [dB]	0.01	0.01
Graded Grid	N/A	Yes	Power Scaling	Disabled	Disabled
Grading Ratio	N/A	1.4	Scaling Factor [dB]	N/A	N/A
MAIA monitored	Y	Y	TSL Correction	No correction	No correction
Surface Detection	VMS + 6p	VMS + 6p	M2/M1 [%]	N/A	64.7
Scan Method	Measured	Measured	Dist 3dB Peak [mm]	N/A	7.3



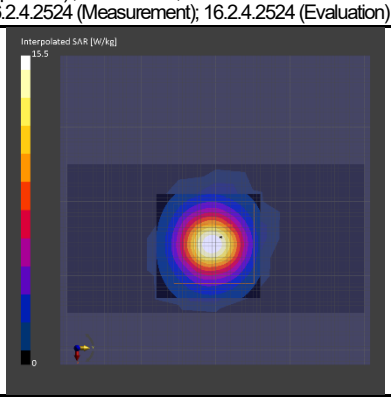
Remarks: *. Date tested:2024-01-22 ; Tested by: Hiroshi Naka; Tested place:No.7 shielded room; Ambient: 22 deg.C. / (65~70) %RH; Liquid depth: 150 mm;
*. Liquid temperature: 22.0 deg.C. ± 0.5 deg.C. (22.0 deg.C., in check); *. Red cubic: big=SAR(10g) / small=SAR(1g)
*. Project file name-Measurement Group: 240117_15032644_bee056.d8sar- SPC Measurement Group

Appendix 3-2-3: SAR system check measurement data (cont'd)

Dipole: D5GHzV2 - SN1039 ; Mode: CW (0) ; Frequency: 5250 MHz ; Test Distance: 10 mm (dipole to liquid); Power: 17.0 dBm
TSL parameters used: Head(v6) ; f= 5250 MHz; Conductivity: 4.534 S/m; Permittivity: 34.71

DASY8 Configuration: - Electronics: DAE4 - SN518 (Calibrated:2023-04-19)/ - Phantom: ELI V8.0 (20deg probe tilt) ; Serial: 2161 ; Phantom section: Flat
- Probe: EX3DV4 - SN3745(Calibrated: 2023-04-18); ConvF: (4.75, 4.75, 4.75)@5250 MHz / - Software: 16.2.4.2524 (Measurement); 16.2.4.2524 (Evaluation)

Scan Setup			Measurement Results		
Setup Items	Area Scan	Zoom Scan	Meas. Items	Area Scan	Zoom Scan
Grid Extents [mm]	40.0×80.0	24.0× 24.0 ×22.0	psSAR1g [W/kg]	3.75	**4.03**
Grid Steps [mm]	10.0×10.0	4.0× 4.0 ×1.4	psSAR10g [W/kg]	1.07	**1.17**
Sensor Surface [mm]	3.0	1.4	Power Drift [dB]	0.03	0.03
Graded Grid	N/A	Yes	Power Scaling	Disabled	Disabled
Grading Ratio	N/A	1.4	Scaling Factor [dB]	N/A	N/A
MAIA monitored	Y	Y	TSL Correction	No correction	No correction
Surface Detection	VMS + 6p	VMS + 6p	M2/M1 [%]	N/A	65.7
Scan Method	Measured	Measured	Dist 3dB Peak [mm]	N/A	7.3

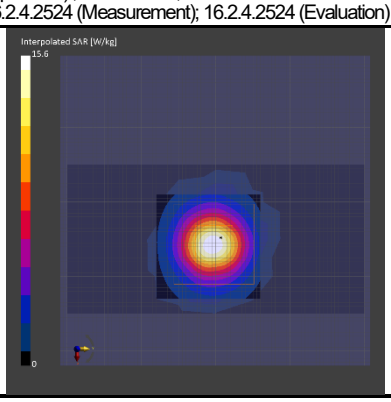


Remarks: *. Date tested:2024-01-23 ; Tested by: Hiroshi Naka; Tested place:No.7 shielded room; Ambient: 22 deg.C. / (65~70) %RH; Liquid depth: 150 mm;
*. Liquid temperature: 22.0 deg.C. ± 0.5 deg.C. (22.0 deg.C., in check); *. Red cubic: big=SAR(10g) / small=SAR(1g)
*. Project file name-Measurement Group: 240117_15032644_bee056.d8sar- 1/23a,sg,50mw

Dipole: D5GHzV2 - SN1039 ; Mode: CW (0) ; Frequency: 5250 MHz ; Test Distance: 10 mm (dipole to liquid); Power: 17.0 dBm
TSL parameters used: Head(v6) ; f= 5250 MHz; Conductivity: 4.534 S/m; Permittivity: 34.71

DASY8 Configuration: - Electronics: DAE4 - SN518 (Calibrated:2023-04-19)/ - Phantom: ELI V8.0 (20deg probe tilt) ; Serial: 2161 ; Phantom section: Flat
- Probe: EX3DV4 - SN3745(Calibrated: 2023-04-18); ConvF: (4.75, 4.75, 4.75)@5250 MHz / - Software: 16.2.4.2524 (Measurement); 16.2.4.2524 (Evaluation)

Scan Setup			Measurement Results		
Setup Items	Area Scan	Zoom Scan	Meas. Items	Area Scan	Zoom Scan
Grid Extents [mm]	40.0×80.0	24.0× 24.0 ×22.0	psSAR1g [W/kg]	3.77	**4.05**
Grid Steps [mm]	10.0×10.0	4.0× 4.0 ×1.4	psSAR10g [W/kg]	1.08	**1.17**
Sensor Surface [mm]	3.0	1.4	Power Drift [dB]	0.01	0.02
Graded Grid	N/A	Yes	Power Scaling	Disabled	Disabled
Grading Ratio	N/A	1.4	Scaling Factor [dB]	N/A	N/A
MAIA monitored	Y	Y	TSL Correction	No correction	No correction
Surface Detection	VMS + 6p	VMS + 6p	M2/M1 [%]	N/A	65.5
Scan Method	Measured	Measured	Dist 3dB Peak [mm]	N/A	7.3

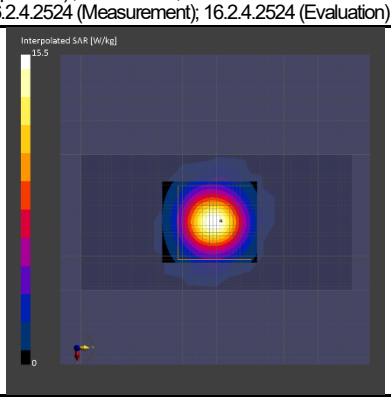


Remarks: *. Date tested:2024-01-24 ; Tested by: Hiroshi Naka; Tested place:No.7 shielded room; Ambient: 22 deg.C. / (55~65) %RH; Liquid depth: 150 mm;
*. Liquid temperature: 22.0 deg.C. ± 0.5 deg.C. (22.0 deg.C., in check); *. Red cubic: big=SAR(10g) / small=SAR(1g)
*. Project file name-Measurement Group: 240117_15032644_bee056.d8sar- 1/24a,sg,50mw

Dipole: D5GHzV2 - SN1039 ; Mode: CW (0) ; Frequency: 5250 MHz ; Test Distance: 10 mm (dipole to liquid); Power: 17.0 dBm
TSL parameters used: Head(v6) ; f= 5250 MHz; Conductivity: 4.534 S/m; Permittivity: 34.71

DASY8 Configuration: - Electronics: DAE4 - SN518 (Calibrated:2023-04-19)/ - Phantom: ELI V8.0 (20deg probe tilt) ; Serial: 2161 ; Phantom section: Flat
- Probe: EX3DV4 - SN3745(Calibrated: 2023-04-18); ConvF: (4.75, 4.75, 4.75)@5250 MHz / - Software: 16.2.4.2524 (Measurement); 16.2.4.2524 (Evaluation)

Scan Setup			Measurement Results		
Setup Items	Area Scan	Zoom Scan	Meas. Items	Area Scan	Zoom Scan
Grid Extents [mm]	40.0×80.0	24.0× 24.0 ×22.0	psSAR1g [W/kg]	3.77	**4.02**
Grid Steps [mm]	10.0×10.0	4.0× 4.0 ×1.4	psSAR10g [W/kg]	1.07	**1.16**
Sensor Surface [mm]	3.0	1.4	Power Drift [dB]	0.07	0.01
Graded Grid	N/A	Yes	Power Scaling	Disabled	Disabled
Grading Ratio	N/A	1.4	Scaling Factor [dB]	N/A	N/A
MAIA monitored	Y	Y	TSL Correction	No correction	No correction
Surface Detection	All points	All points	M2/M1 [%]	N/A	64.6
Scan Method	Measured	Measured	Dist 3dB Peak [mm]	N/A	7.3



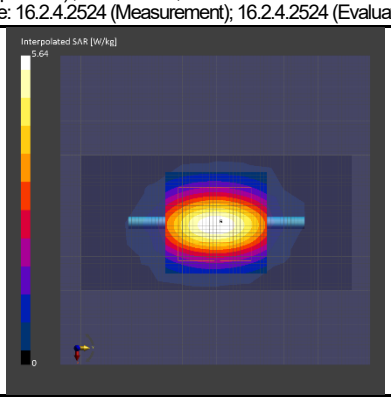
Remarks: *. Date tested:2024-01-25 ; Tested by: Hiroshi Naka; Tested place:No.7 shielded room; Ambient: 22 deg.C. / (70~75) %RH; Liquid depth: 150 mm;
*. Liquid temperature: 22.0 deg.C. ± 0.5 deg.C. (22.0 deg.C., in check); *. Red cubic: big=SAR(10g) / small=SAR(1g)
*. Project file name-Measurement Group: 240117_15032644_bee056.d8sar- 1/25a,sg,50mw

Appendix 3-2-3: SAR system check measurement data (cont'd)

Dipole: D2450V2 - SN765 ; Mode: CW (0) ; Frequency: 2450 MHz ; Test Distance: 10 mm (dipole to liquid); Power: 17.0 dBm
TSL parameters used: Head(v6) ; f= 2450 MHz; Conductivity: 1.848 S/m; Permittivity: 39.26

DASY8 Configuration: - Electronics: DAE4 - SN518 (Calibrated:2023-04-19)/ - Phantom: ELI V8.0 (20deg probe tilt) ; Serial: 2161 ; Phantom section: Flat
- Probe: EX3DV4 - SN3745(Calibrated: 2023-04-18); ConvF: (6.89, 6.89, 6.89)@2450.000 MHz / - Software: 16.2.4.2524 (Measurement); 16.2.4.2524 (Evaluation)

Scan Setup			Measurement Results		
Setup Items	Area Scan	Zoom Scan	Meas. Items	Area Scan	Zoom Scan
Grid Extents [mm]	40.0×80.0	30.0× 30.0 ×30.0	psSAR1g [W/kg]	2.65	**2.65**
Grid Steps [mm]	10.0×10.0	5.0× 5.0 ×1.5	psSAR10g [W/kg]	1.23	**1.23**
Sensor Surface [mm]	3.0	1.4	Power Drift [dB]	0.01	0.01
Graded Grid	N/A	Yes	Power Scaling	Disabled	Disabled
Grading Ratio	N/A	1.5	Scaling Factor [dB]	N/A	N/A
MAIA monitored	Y	Y	TSL Correction	No correction	No correction
Surface Detection	All points	All points	M2/M1 [%]	N/A	78.8
Scan Method	Measured	Measured	Dist 3dB Peak [mm]	N/A	9.1

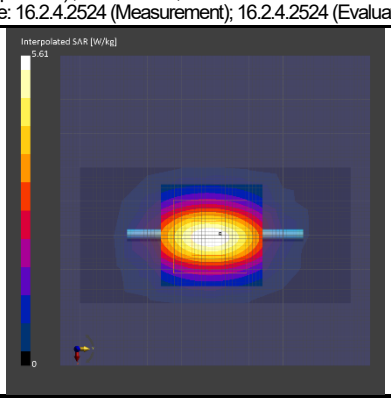


Remarks: *. Date tested:2024-01-25 ; Tested by: Hiroshi Naka; Tested place:No.7 shielded room; Ambient: 22 deg.C. / (70~75) %RH; Liquid depth: 150 mm;
*. Liquid temperature: 22.0 deg.C. ± 0.5 deg.C. (22.0 deg.C., in check); *. Red cubic: big=SAR(10g) / small=SAR(1g)
*. Project file name-Measurement Group: 240117_15032644_bee056.d8sar- 1/25b,sg,50mw

Dipole: D2450V2 - SN765 ; Mode: CW (0) ; Frequency: 2450 MHz ; Test Distance: 10 mm (dipole to liquid); Power: 17.0 dBm
TSL parameters used: Head(v6) ; f= 2450 MHz; Conductivity: 1.848 S/m; Permittivity: 39.26

DASY8 Configuration: - Electronics: DAE4 - SN518 (Calibrated:2023-04-19)/ - Phantom: ELI V8.0 (20deg probe tilt) ; Serial: 2161 ; Phantom section: Flat
- Probe: EX3DV4 - SN3745(Calibrated: 2023-04-18); ConvF: (6.89, 6.89, 6.89)@2450.000 MHz / - Software: 16.2.4.2524 (Measurement); 16.2.4.2524 (Evaluation)

Scan Setup			Measurement Results		
Setup Items	Area Scan	Zoom Scan	Meas. Items	Area Scan	Zoom Scan
Grid Extents [mm]	40.0×80.0	30.0× 30.0 ×30.0	psSAR1g [W/kg]	2.64	**2.64**
Grid Steps [mm]	10.0×10.0	5.0× 5.0 ×1.5	psSAR10g [W/kg]	1.22	**1.23**
Sensor Surface [mm]	3.0	1.4	Power Drift [dB]	-0.00	-0.00
Graded Grid	N/A	Yes	Power Scaling	Disabled	Disabled
Grading Ratio	N/A	1.5	Scaling Factor [dB]	N/A	N/A
MAIA monitored	N/A	Y	TSL Correction	No correction	No correction
Surface Detection	All points	All points	M2/M1 [%]	N/A	79.0
Scan Method	Measured	Measured	Dist 3dB Peak [mm]	N/A	9.0

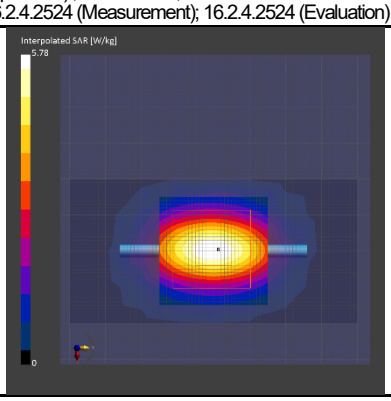


Remarks: *. Date tested:2024-01-26 ; Tested by: Hiroshi Naka; Tested place:No.7 shielded room; Ambient: 22 deg.C. / (60~65) %RH; Liquid depth: 150 mm;
*. Liquid temperature: 22.0 deg.C. ± 0.5 deg.C. (22.0 deg.C., in check); *. Red cubic: big=SAR(10g) / small=SAR(1g)
*. Project file name-Measurement Group: 240117_15032644_bee056.d8sar- 1/26a,sg,50mw

Dipole: D2450V2 - SN765 ; Mode: CW (0) ; Frequency: 2450 MHz ; Test Distance: 10 mm (dipole to liquid); Power: 17.0 dBm
TSL parameters used: Head(v6) ; f= 2450 MHz; Conductivity: 1.862 S/m; Permittivity: 39.37

DASY8 Configuration: - Electronics: DAE4 - SN518 (Calibrated:2023-04-19)/ - Phantom: ELI V8.0 (20deg probe tilt) ; Serial: 2161 ; Phantom section: Flat
- Probe: EX3DV4 - SN3745(Calibrated: 2023-04-18); ConvF: (6.89, 6.89, 6.89)@2450 MHz / - Software: 16.2.4.2524 (Measurement); 16.2.4.2524 (Evaluation)

Scan Setup			Measurement Results		
Setup Items	Area Scan	Zoom Scan	Meas. Items	Area Scan	Zoom Scan
Grid Extents [mm]	40.0×80.0	30.0× 30.0 ×30.0	psSAR1g [W/kg]	2.73	**2.73**
Grid Steps [mm]	10.0×10.0	5.0× 5.0 ×1.5	psSAR10g [W/kg]	1.26	**1.27**
Sensor Surface [mm]	3.0	1.4	Power Drift [dB]	0.02	0.02
Graded Grid	N/A	Yes	Power Scaling	Disabled	Disabled
Grading Ratio	N/A	1.5	Scaling Factor [dB]	N/A	N/A
MAIA monitored	Y	Y	TSL Correction	No correction	No correction
Surface Detection	All points	All points	M2/M1 [%]	N/A	78.9
Scan Method	Measured	Measured	Dist 3dB Peak [mm]	N/A	9.1



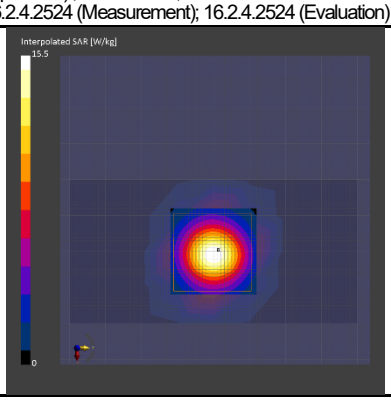
Remarks: *. Date tested:2024-01-29 ; Tested by: Hiroshi Naka; Tested place:No.7 shielded room; Ambient: 22 deg.C. / (55~65) %RH; Liquid depth: 150 mm;
*. Liquid temperature: 22.0 deg.C. ± 0.5 deg.C. (22.0 deg.C., in check); *. Red cubic: big=SAR(10g) / small=SAR(1g)
*. Project file name-Measurement Group: 240117_15032644_bee056.d8sar- 1/29a.sg,50mw

Appendix 3-2-3: SAR system check measurement data (cont'd)

Dipole: D5GHzV2 - SN1039 ; Mode: CW (0) ; Frequency: 5250 MHz ; Test Distance: 10 mm (dipole to liquid); Power: 17.0 dBm
TSL parameters used: Head(v6) ; f= 5250 MHz; Conductivity: 4.534 S/m; Permittivity: 34.62

DASY8 Configuration: - Electronics: DAE4 - SN518 (Calibrated:2023-04-19)/ - Phantom: ELI V8.0 (20deg probe tilt) ; Serial: 2161 ; Phantom section: Flat
- Probe: EX3DV4 - SN3745(Calibrated: 2023-04-18); ConvF: (4.75, 4.75, 4.75)@5250 MHz / - Software: 16.2.4.2524 (Measurement); 16.2.4.2524 (Evaluation)

Scan Setup			Measurement Results		
Setup Items	Area Scan	Zoom Scan	Meas. Items	Area Scan	Zoom Scan
Grid Extents [mm]	40.0×80.0	24.0× 24.0 ×22.0	psSAR1g [W/kg]	3.77	**4.04**
Grid Steps [mm]	10.0×10.0	4.0× 4.0 ×1.4	psSAR10g [W/kg]	1.07	**1.17**
Sensor Surface [mm]	3.0	1.4	Power Drift [dB]	0.08	0.05
Graded Grid	N/A	Yes	Power Scaling	Disabled	Disabled
Grading Ratio	N/A	1.4	Scaling Factor [dB]	N/A	N/A
MAIA monitored	Y	Y	TSL Correction	No correction	No correction
Surface Detection	All points	All points	M2/M1 [%]	N/A	64.8
Scan Method	Measured	Measured	Dist 3dB Peak [mm]	N/A	7.6

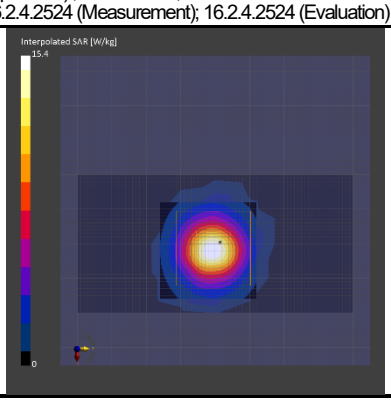


Remarks: *. Date tested:2024-01-29 ; Tested by: Hiroshi Naka; Tested place:No.7 shielded room; Ambient: 22 deg.C. / (55~65) %RH; Liquid depth: 150 mm;
*. Liquid temperature: 22.0 deg.C. ± 0.5 deg.C. (22.0 deg.C., in check); *. Red cubic: big=SAR(10g) / small=SAR(1g)
*. Project file name-Measurement Group: 240117_15032644_bee056.d8sar- 1/29b.sg,50mw

Dipole: D5GHzV2 - SN1039 ; Mode: CW (0) ; Frequency: 5250 MHz ; Test Distance: 10 mm (dipole to liquid); Power: 17.0 dBm
TSL parameters used: Head(v6) ; f= 5250 MHz; Conductivity: 4.534 S/m; Permittivity: 34.62

DASY8 Configuration: - Electronics: DAE4 - SN518 (Calibrated:2023-04-19)/ - Phantom: ELI V8.0 (20deg probe tilt) ; Serial: 2161 ; Phantom section: Flat
- Probe: EX3DV4 - SN3745(Calibrated: 2023-04-18); ConvF: (4.75, 4.75, 4.75)@5250 MHz / - Software: 16.2.4.2524 (Measurement); 16.2.4.2524 (Evaluation)

Scan Setup			Measurement Results		
Setup Items	Area Scan	Zoom Scan	Meas. Items	Area Scan	Zoom Scan
Grid Extents [mm]	40.0×80.0	24.0× 24.0 ×22.0	psSAR1g [W/kg]	3.67	**4.00**
Grid Steps [mm]	10.0×10.0	4.0× 4.0 ×1.4	psSAR10g [W/kg]	1.07	**1.16**
Sensor Surface [mm]	3.0	1.4	Power Drift [dB]	0.06	0.03
Graded Grid	N/A	Yes	Power Scaling	Disabled	Disabled
Grading Ratio	N/A	1.4	Scaling Factor [dB]	N/A	N/A
MAIA monitored	N/A	N/A	TSL Correction	No correction	No correction
Surface Detection	VMS + 6p	VMS + 6p	M2/M1 [%]	N/A	65.7
Scan Method	Measured	Measured	Dist 3dB Peak [mm]	N/A	7.4

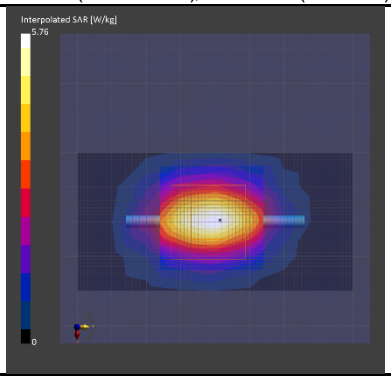


Remarks: *. Date tested:2024-01-30 ; Tested by: Hiroshi Naka; Tested place:No.7 shielded room; Ambient: 23 deg.C. / (70~75) %RH; Liquid depth: 150 mm;
*. Liquid temperature: 22.0 deg.C. ± 0.5 deg.C. (22.0 deg.C., in check); *. Red cubic: big=SAR(10g) / small=SAR(1g)
*. Project file name-Measurement Group: 240129-30_15032644_bee056_other.d8sar- 1/30a,sg,50mw

Dipole: D2450V2 - SN765 ; Mode: CW (0) ; Frequency: 2450 MHz ; Test Distance: 10 mm (dipole to liquid); Power: 17.0 dBm
TSL parameters used: Head(v6) ; f= 2450 MHz; Conductivity: 1.862 S/m; Permittivity: 39.37

DASY8 Configuration: - Electronics: DAE4 - SN518 (Calibrated:2023-04-19)/ - Phantom: ELI V8.0 (20deg probe tilt) ; Serial: 2161 ; Phantom section: Flat
- Probe: EX3DV4 - SN3745(Calibrated: 2023-04-18); ConvF: (6.89, 6.89, 6.89)@2450 MHz / - Software: 16.2.4.2524 (Measurement); 16.2.4.2524 (Evaluation)

Scan Setup			Measurement Results		
Setup Items	Area Scan	Zoom Scan	Meas. Items	Area Scan	Zoom Scan
Grid Extents [mm]	40.0×80.0	30.0× 30.0 ×30.0	psSAR1g [W/kg]	2.73	**2.71**
Grid Steps [mm]	10.0×10.0	5.0× 5.0 ×1.5	psSAR10g [W/kg]	1.26	**1.25**
Sensor Surface [mm]	3.0	1.4	Power Drift [dB]	0.02	0.01
Graded Grid	N/A	Yes	Power Scaling	Disabled	Disabled
Grading Ratio	N/A	1.5	Scaling Factor [dB]	N/A	N/A
MAIA monitored	N/A	N/A	TSL Correction	No correction	No correction
Surface Detection	VMS + 6p	VMS + 6p	M2/M1 [%]	N/A	79.4
Scan Method	Measured	Measured	Dist 3dB Peak [mm]	N/A	9.0



Remarks: *. Date tested:2024-01-30 ; Tested by: Hiroshi Naka; Tested place:No.7 shielded room; Ambient: 22 deg.C. / (60~65) %RH; Liquid depth: 150 mm;
*. Liquid temperature: 22.0 deg.C. ± 0.5 deg.C. (22.0 deg.C., in check); *. Red cubic: big=SAR(10g) / small=SAR(1g)
*. Project file name-Measurement Group: 240129-30_15032644_bee056_other.d8sar- 1/30b,sg,50mw

Appendix 3-3: Measurement Uncertainty

Uncertainty of SAR measurement (2.4GHz~6GHz) (*. liquid: head(v6), DAK, WLAN)								SAR 1g	SAR 10g
Symbol	Error Description	Unc. [%]	Probablity distribution	Divisor	ci 1g	ci 10g		ui 1g [%]	ui 10g [%]
-	**Measurement system (DASY8)**								
CF	Probe Calibration (EX3DV4) (*.HSL:10%)	± 14.0	Normal	2	1	1		± 7.0	± 7.0
CFdfift	Probe Calibration Drift	± 1.7	Rectangular	√3	1	1		± 1.0	± 1.0
LIN	Probe Linearity	± 4.7	Rectangular	√3	1	1		± 2.7	± 2.7
BBS	Broadband Signal	± 2.6	Rectangular	√3	1	1		± 1.5	± 1.5
ISO	Probe Isotropy	± 7.6	Rectangular	√3	1	1		± 4.4	± 4.4
DAE	Data Acquisition	± 1.2	Normal	1	1	1		± 1.2	± 1.2
AMB	RF Ambient (noise&refrection) (< 12 W/g)	± 1.0	Normal	1	1	1		± 1.0	± 1.0
Δsys	Probe Positioning	± 0.5	Normal	1	0.29	0.29		± 0.2	± 0.2
DAT	Data Processing	± 4.0	Rectangular	√3	1	1		± 2.3	± 2.3
-	**Phantom and Device Error**								
LIQ(σ)	Conductivity (measured) (DAK)	± 5.0	Normal	2	0.78	0.71		± 2.0	± 1.8
LIQ(Tσ)	Conductivit (temp.)(1°C,v6-head)	± 2.4	Rectangular	√3	0.78	0.71		± 1.1	± 1.0
EPS	Phantom Permittivity	± 14.0	Rectangular	√3	0.25	0.25		± 2.0	± 2.0
DIS	Distance EUT-TSL (liq.-ant:5mm)	± 2.7	Normal	1	2	2		± 5.4	± 5.4
Dxyz	Test Sample positioning	± 1.8	Normal	1	1	1		± 1.8	± 1.8
H	Device holder uncertainty	± 3.6	Normal	1	1	1		± 3.6	± 3.6
MOD	EUT Modulation	± 2.4	Normal	√3	1	1		± 1.4	± 1.4
TAS	Time-average SAR	± 0.0	Rectangular	√3	1	1		± 0.0	± 0.0
RFdfift	Drift of output power (measured, <0.2 dB)	± 4.7	Normal	2	1	1		± 2.4	± 2.4
-	**Correction to the SAR results**								
C(e,σ)	Deviation to Target (e',σ:10 %, IEC head)	± 1.9	Normal	1	1	0.84		± 1.9	± 1.6
C(R)	SAR Scaling	± 0.0	Rectangular	√3	1	1		± 0.0	± 0.0
u(ΔSAR)	**Combined standard uncertainty**					RSS		± **12.3**	± **12.3**
U	**Expand uncertainty (95% confidence interval)**				(v11r06)	k=2		± **24.6**	± **24.6**

*. This uncertainty budget is suggested by IEC/IEEE 62209-1528 and determined by SPEAG, DASY8 Module SAR Manual, 2024-05 (Chapter 6.3, DASY8 Uncertainty Budget for Hand-held/Body-worn Devices, Frequency band: 300 MHz - 3 GHz range and 3 GHz - 6 GHz range). All listed error components have veff equal to ∞.

Uncertainty of SAR daily check (2.4GHz~6GHz) (*. liquid: head(v6), DAK, CW)								SAR 1g	SAR 10g
Symbol	Error Description	Unc. [%]	Probablity distribution	Divisor	ci 1g	ci 10g		ui 1g [%]	ui 10g [%]
-	**Measurement system (DASY8)**								
CF	Probe Calibration (EX3DV4) (*.HSL:10%)	± 14.0	Normal	2	1	1		± 7.00	± 7.00
CFdfift	Probe Calibrationr Drift	± 1.7	Rectangular	√3	1	1		± 1.0	± 1.0
LIN	Probe Linearity	± 4.7	Rectangular	√3	1	1		± 2.7	± 2.7
ISO	Probe Isotropy	± 4.7	Rectangular	√3	1	1		± 2.7	± 2.7
DAE	Data Acquisition	± 1.2	Normal	1	1	1		± 1.2	± 1.2
AMB	RF Ambient (noise&refrection) (< 12 W/g)	± 1.0	Normal	1	1	1		± 1.0	± 1.0
Δsys	Probe Positioning	± 0.5	Normal	1	0.29	0.29		± 0.2	± 0.2
DAT	Data Processing	± 4.0	Rectangular	√3	1	1		± 2.3	± 2.3
-	**Phantom and Device Error**								
LIQ(σ)	Conductivity (measured) (DAK)	± 5.0	Normal	2	0.78	0.71		± 2.0	± 1.8
LIQ(Tσ)	Conductivit (temp.)(1°C,v6-head)	± 2.4	Rectangular	√3	0.78	0.71		± 1.1	± 1.0
EPS	Phantom Permittivity	± 14.0	Rectangular	√3	0.25	0.25		± 2.0	± 2.0
VAL	Validation antenna uncertainty	± 5.5	Rectangular	√3	1	1		± 3.2	± 3.2
Pin	Uncertainty in accpted power	± 2.5	Normal	2	1	1		± 1.3	± 1.3
DIS	Distance EUT-TSL (VAL) (liq.-ant:10mm)	± 2.0	Normal	1	2	2		± 4.0	± 4.0
Dxyz	Test Sample (dipole) positioning	± 1.0	Normal	1	1	1		± 1.0	± 1.0
RFdfift	Drift of output power (measured, <0.1dB)	± 2.3	Rectangular	√3	1	1		± 1.3	± 1.3
-	**Correction to the SAR results**								
C(e,σ)	Deviation to Target (e',σ:10 %, IEC head)	± 1.9	Normal	1	1	0.84		± 1.9	± 1.6
u(ΔSAR)	**Combined standard uncertainty**					RSS		± **10.8**	± **10.7**
U	**Expand uncertainty (95% confidence interval)**				(v11r06)	k=2		± **21.6**	± **21.4**

*. This uncertainty budget is suggested by IEC/IEEE 62209-1528 and determined by SPEAG, DASY8 Module SAR Manual, 2024-05 (Chapter 6.2, DASY8 Uncertainty Budget for System Verification, Frequency band: 300 MHz - 6 GHz range). All listed error components have veff equal to ∞.

*. Table of uncertainties are listed for ISO/IEC 17025.
*. Although this standard determines only the limit value of uncertainty, there is no applicable rule of uncertainty in this. Therefore, the results are derived depending on whether or not laboratory uncertainty is applied.

Appendix 3-4: Calibration certificates

2.4/5.2/5.3 GHz band

LIMS ID	Description	Type/Model	Serial Number	Manufacture	Calibration Certificate	Note
226380	Dosimetric E-Field Probe	EX3DV4	3745	SPEAG		-
145558	Dipole Antenna (2.45 GHz)	D2450V2	765	SPEAG		*1
243047	Dipole Antenna (5 GHz)	D5GHzV2	1039	SPEAG		*1

* SAR test was performed on 2024-01-17~2024-01-30.

*1. As stated on page 2 of the certificate, the calibration was performed in accordance with the latest standard IEC/IEEE 62209-1528. Therefore, the reported SAR values are valid for any system that complies with IEC/IEEE 62209-1528 including all new versions of DASY such as DASY6 and DASY8.

-End of report-