Panasonic System Networks Evaluation Technology Co., Ltd. EMC Center

Testing LAB
RTL01900

EMC TEST REPORT

REPORT NUMBER	:	ERJ13-22030R00
APPLICANT	:	MAX Co., Ltd.
PRODUCT	:	Reber Tying Tool
MODEL NAME	:	RB441T-C
STANDARD	:	IEEE Std. 1528:2013 FCC 47 CFR part2 (2.1093) KDB 865664 D01 KDB 447498 D01
FCC ID	:	2AH2G-ZU99903

Issue Date: Mar 23, 2022

Authorized by: K. Nakamura
(Quality Manager)

Reviewed by: T. Kaneko
(Technical Manager)

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SECTION 1. SUMMARY OF MAXIMUM SAR VALUE

Mode	Limit SAR[W/kg]	Highest Reported Body SAR-1g [W/kg]
LTE Band 2	1.60	0.7009
LTE Band 4	1.60	0.6010
LTE Band 12	1.60	1.093

The device is in compliance with Specific Absorption Rate (SAR) for general population uncontrolled exposure limits (1.6W/kg) specified in IEEE Std. 1528:2013; FCC47 CFR part2(2.1093) and the following specific FCC Test Procedures:

・KDB 447498 D01 General RF Exposure Guidance v06
・KDB 865664 D01 SAR Measurement 100MHz to 6GHz v01r04

SECTION 2. GENERAL INFORMATION

2.1 Testing Laboratory

Name:	Panasonic System Networks Evaluation Technology Co., Ltd. EMC Center
Address:	600, Saedo-cho, Tsuzuki-ku, Yokohama-shi, Kanagawa-ken 224-8539, Japan
TEL:	045-939-1237 (+81-45-939-1237)
FAX:	045-939-1449 (+81-45-939-1449)
Test Site	Panasonic System Networks Evaluation Technology Co., Ltd. Yokohama Site
Address:	600, Saedo-cho, Tsuzuki-ku, Yokohama-shi, Kanagawa-ken 224-8539, Japan

2.2 Detail of Applicant

Name:	MAX Co., Ltd.
Address:	1848 Kawai, Tamamura-cho, Sawa-gun, Gunma, 370-1117, Japan

2.3 Information about Test Item

Kind of Test Item:	Reber Tying Tool
Model Name.: (Type Identification)	RB441T-C
Serial Number:	22121143I
Radio standard:	LTE(FDD)
Frequency range:	Band2 (1850.7 – 1909.3MHz) (*) Band4 (1710.7 – 1754.3MHz) (*) Band12 (699.7 – 715.3MHz) (*)
Antenna type:	Chip Antenna (*)
Antenna mounting type:	Internal(*)
Modulation type:	LTE (QPSK / 16QAM / 64QAM) (*)
Channel Bandwidth:	LTE Band2 : 1.4MHz,3MHz,5MHz,10MHz,15MHz,20MHz(*) LTE Band4 : 1.4MHz,3MHz,5MHz,10MHz,15MHz,20MHz(*) LTE Band12 : 1.4MHz,3MHz,5MHz,10MHz(*)
Rated voltage:	DC 14.4V (*)
Software used for testing:	version 0.55(*)
Test Item Received Date:	Mar 14, 2022
Test Date:	Mar 16, 2022 - Mar 18, 2022

2.4 Notes

・The test results in this report apply only to the sample(s) tested.
・The laboratory does not assume responsibility for the test results obtained from the information provided by customers that may affect the validity of the test results.
Those information are marked with an asterisk (*).

2.5 Report Revision History

Revision	Date	Description
R00	Mar 23, 2022	First issue

SECTION 3. MEASURMENT SYSTEM

3.1 System Description

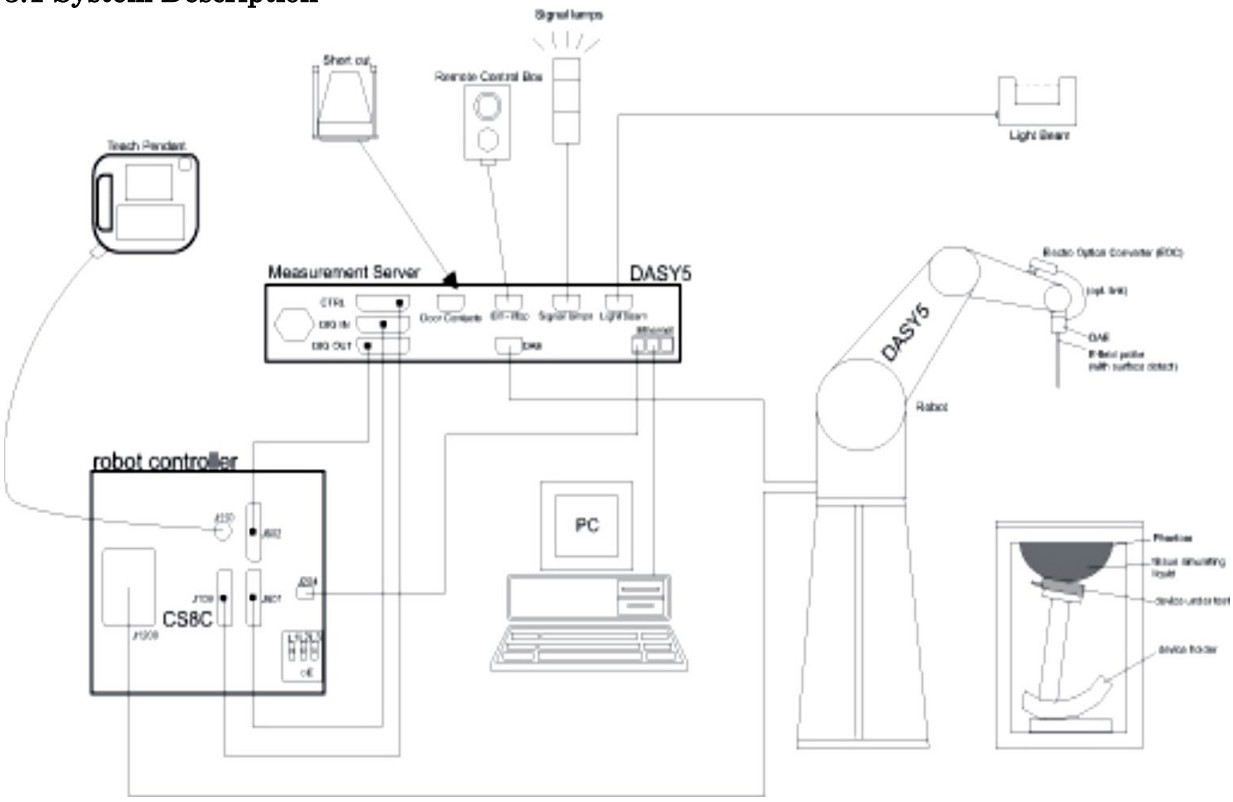


Figure 1 – The DASY5 measurement system

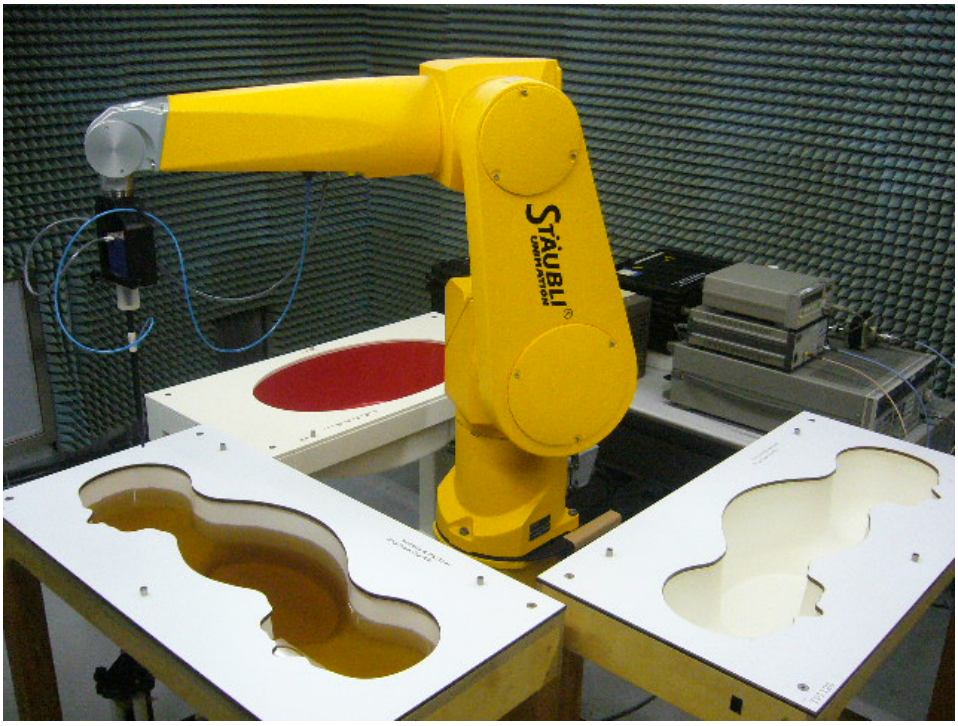


Figure 2 – Examination room

Outline of DASY5 system

DASY5 system for performing compliance tests consists of the following components:

- A standard high precision 6-axis robot (Staubli RX family) with a controller, a teach pendant, software and an arm extension for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- 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 between optical and electrical of the signals for the digital communication to the DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 7.
- DASY5 software.
- Remote control with a teach pendant and additional circuitries for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand and right-hand usage for Head SAR assessment and can be also used as a flat phantom, and another flat phantom is also provided for Body-worn devices.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validating the proper functioning of the system.

ELI Phantom

The flat region of ELI Phantom shell used for Body SAR measurement, corresponding to the requirements of the flat phantom specified in EN 62209-1528:2020 has following specifications:

- Material: Vinylester, glass fiber reinforced (VE-GF)
- Shell thickness: 2 ± 0.2 mm,
- Dimension: Flat region has oval shape with
  Approx. 600 mm (L) X 400 mm (W) X 185 mm (D)
- Filling volume: approx. 30 liters

E-Field Probe

ET3DV6

- Frequency band: 10 MHz – 2.3 GHz
- Dynamic range: 5 µW/g – 100 mW/g
- Probe linearity: ±0.2 dB
- Axial isotropy: ±0.2 dB
- Spherical isotropy: ±0.4 dB
- Dimension: Overall length: 337 mm (Tip 16 mm)
  Tip diameter: 6.8 mm (Body 12 mm)
  Distance from probe tip to dipole centers: 2.7 mm

3.2 Measurement Procedure

Step 1: Power Reference Measurement

We used a measured electric field at a fixed position above the ear point or at the center of the flat phantom as a reference for power evaluation. Power measurements are at the beginning and end of the process. The drift shown is primarily a variation in the output power of the DUT, max ± 5%.

Step 2: Area scan

The SAR distribution at the exposed side of head or body position was measured at a distance of each device from the inner surface of the shell. The area covered the entire dimension of the antenna of EUT and the horizontal grid spacing was 15mm×15mm.Based on these data, the area of the maximum absorption was determined by spline interpolation.

Step 3: Zoom scan

Around this point found in the Step (area scan), a volume of 30mm × 30mm × 30mm or more was assessed by measuring 5 × 5 × 7 point at least for below 2GHz.

The data at the surface were extrapolated, since the center of the dipoles is 2.7mm(ET3DV6) away from the tip of the probe and the distance between the surface and the lowest measuring point is 5 mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the point in Z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.

After the maximum interpolated value is searched with a least square algorithm. Around this maximum the SAR - values averaged over the spatial volumes (1g or 10 g) are computed using the 3d-spline interpolation algorithm.
All neighboring volumes are evaluated until no neighboring volume with a higher average value is found.

Step 4: Power drift Measurement

The electric field reference value, at the same location as step1, was re-measured after the zoom scan was complete to calculate the Power drift. if the drift deviated by more than 5%, the SAR test and drift measurement were repeated.

3.3 List of Measuring instruments and calibration status

Table 1 – Test equipment

Name/Model	Manufacturer	Calibration Organization	Calibration Type	Calibration Term of Validity	Serial Number
Network Analyzer/E5071C	KEYSIGHT	KEYSIGHT	Accredited Calibration ANAB	6/2022	MY46100389
RF Power Amp/CGA020M602	R&K	Panasonic SNET Standards Center	General Calibration	1/2023	B00240
Signal Generator/N5181A	Agilent	Panasonic SNET Standards Center	Accredited Calibration A2LA	7/2022	MY46240918
Power Meter/437B	HP	Panasonic SNET Standards Center	Accredited Calibration A2LA	12/2022	3125U17932
Power Meter/NRVD	ROHDE & SCHWARZ	Panasonic SNET Standards Center	Accredited Calibration A2LA	5/2022	100589
Thermal Power Sensor/NRV-Z51	ROHDE & SCHWARZ	Panasonic SNET Standards Center	Accredited Calibration A2LA	5/2022	100323
Thermal Power Sensor/NRV-Z51	ROHDE & SCHWARZ	Panasonic SNET Standards Center	Accredited Calibration A2LA	5/2022	100384
Thermometer/CT-280WR	CUSTOM	Panasonic SNET Standards Center	General Calibration	7/2022	11010732
DAE/DAE3V1	Schmid & Partner	Schmid & Partner	Accredited Calibration SCS	10/2023	407
Dipole Antenna/D750V3	Schmid & Partner	Schmid & Partner	Accredited Calibration SCS	4/2023	1115
Dipole Antenna/D1800V2	Schmid & Partner	Schmid & Partner	Accredited Calibration SCS	11/2022	2d004
Dipole Antenna/D1950V2	Schmid & Partner	Schmid & Partner	Accredited Calibration SCS	7/2022	1005
E-Field Probed/ET3DV6	Schmid & Partner	Schmid & Partner	Accredited Calibration SCS	6/2023	1552
Wireless Communications Test Set / MT8820C	Anritsu	Anritsu	General Calibration	8/2022	6201181461
Thermo-hygrometer /BM-744	EMPEX	Panasonic SNET Standards Center	General Calibration	2/2024	Q0025

3.4 Liquid material properties

The measured values shall comply with the values defined at the specific frequencies in Table 2 (from Table 2 of KDB865664 D01) with a tolerance of ± 5 % for relative permittivity and conductivity.

Table 2 – Dielectric properties of the liquid material

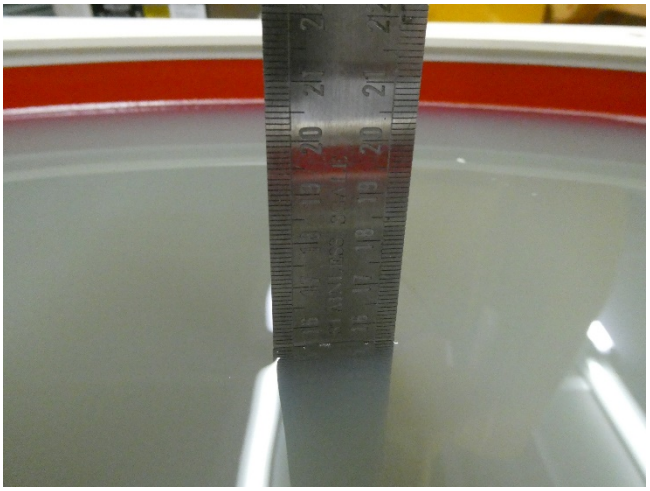
Target Frequency	Head		Body	
(MHz)	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5800	35.3	5.27	48.2	6.00

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

Dielectric properties of the tissue equivalent liquid used for the testing are recorded in 3.6 System check in the next page.

3.5 Liquid depth in the ELI Phantom (≥15cm depth)

MBBL600-6000V6_600MHz-6000MHz_15.5cm



3.6. System check

3.6.1 Material Parameters (Tissue-equivalent liquid)

For the measurement of the following parameters the HP 85070E dielectric probe kit is used, representing the open-ended coaxial probe measurement procedure. The measurements have been performed within 24 hours before the SAR testing and the measured conductivity and relative permittivity are shown in Table 3 and are within ±5 % of the target values in Table 2.

Table 3 – Parameter of the tissue simulating

	Mar 16, 2022			liquid temperature: 22.1 degree C Ambient Temp:21.6		
Frequency [MHz]	Measured Conductivity [σ]	Measured Permittivity [εr]	Targeted Conductivity [σ]	Targeted Permittivity [εr]	Deviation Conductivity [%]	Deviation Permittivity [%]
MSL 1800	1.47	54.30	1.52	53.30	-3.29	1.88
MSL 1950	1.57	54.02	1.52	53.30	3.29	1.35

	Mar 17, 2022			liquid temperature: 22.2 degree C Ambient Temp:21.8		
Frequency [MHz]	Measured Conductivity [σ]	Measured Permittivity [εr]	Targeted Conductivity [σ]	Targeted Permittivity [εr]	Deviation Conductivity [%]	Deviation Permittivity [%]
MSL 750	0.93	54.87	0.96	55.53	-3.13	-1.19
MSL 1800	1.46	53.34	1.52	53.30	-3.95	0.08
MSL 1950	1.56	53.22	1.52	53.30	2.63	-0.15

	Mar 18, 2022			liquid temperature: 22.0 degree C Ambient Temp:20.6		
Frequency [MHz]	Measured Conductivity [σ]	Measured Permittivity [εr]	Targeted Conductivity [σ]	Targeted Permittivity [εr]	Deviation Conductivity [%]	Deviation Permittivity [%]
MSL 750	0.93	55.29	0.96	55.53	-3.13	-0.43
MSL 1800	1.47	53.68	1.52	53.30	-3.29	0.71

3.6.2 SAR system check procedures

The SAR system check was achieved using the specified standard dipole.
The input power of 250 mW was supplied to a dipole antenna which was placed under the flat part of the SAM phantom. The target value was adopted from manufactures calibration certificates, and the measurement value is to be within ±10 % of the Target Value. The check was also done within 24 hours before SAR testing and the results shown in Table 4 met the requirement.

Table 4 – Measured dipole validation results

Frequency [MHz]	Target SAR-1g [W/kg]	Measured SAR-1g [W/kg]	Deviation [%]	Date
MSL 1800	9.74	8.92	-8.42	Mar 16, 2022
MSL 1950	9.64	9.47	-1.76	

Frequency [MHz]	Target SAR-1g [W/kg]	Measured SAR-1g [W/kg]	Deviation [%]	Date
MSL 750	2.21	2.11	-4.52	Mar 17, 2022
MSL 1800	9.74	9.00	-7.60	
MSL 1950	9.64	9.27	-3.84	

Frequency [MHz]	Target SAR-1g [W/kg]	Measured SAR-1g [W/kg]	Deviation [%]	Date
MSL 750	2.21	2.14	-3.17	Mar 18, 2022
MSL 1800	9.74	9.07	-6.88	

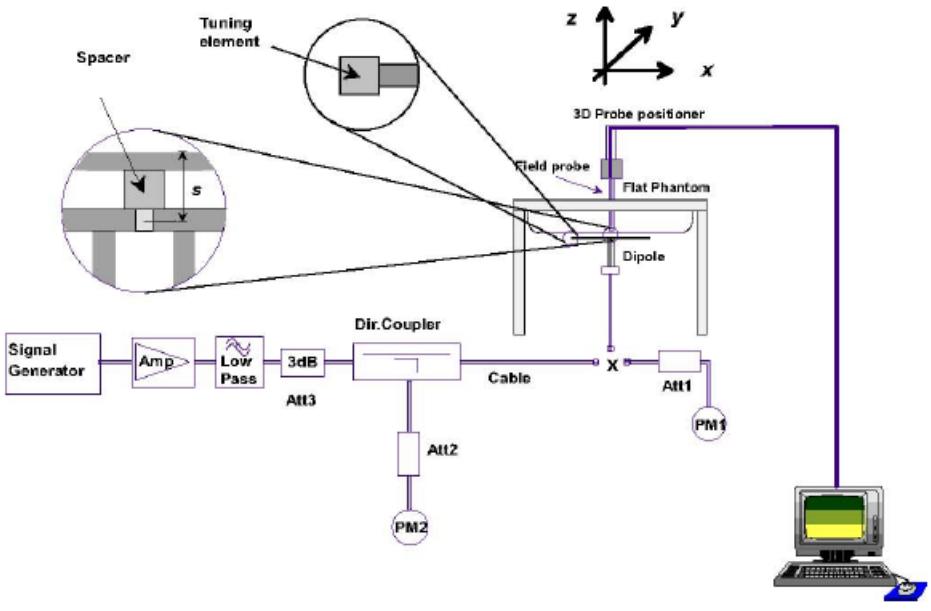


Figure 3 – Test setup for the system check.

3.6.3 SAR system checking Details

1800 MHz validation results 20220316

File Name: System Check MSL1800MHz (20220316).da52:0

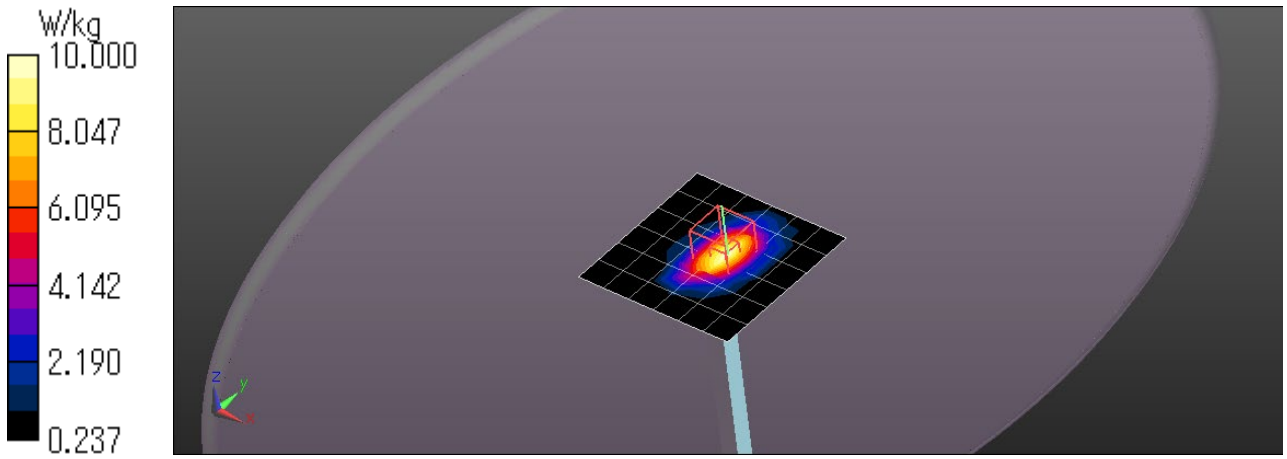
DUT: Dipole 1800 MHz D1800V2; Type: D1800V2; Serial: D1800V2 - SN:2d004

Communication System: UID 0, CW (0); Frequency: 1800 MHz
Medium parameters used: f = 1800 MHz; σ = 1.47 S/m; ε_r = 54.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ET3DV6 - SN1552; ConvF(4.94, 4.94, 4.94) @ 1800 MHz; Calibrated: 2021/06/18
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: TP1089
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

System Check/System Check/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 9.24 W/kg
System Check/System Check/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 86.68 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 13.6 W/kg
SAR(1 g) = 8.92 W/kg; SAR(10 g) = 4.96 W/kg
Smallest distance from peaks to all points 3 dB below = 11.2 mm
Ratio of SAR at M2 to SAR at M1 = 64.1%
Maximum value of SAR (measured) = 10.0 W/kg



1950 MHz validation results 20220316

File Name: System Check MSL1950MHz (20220316).da52:0

DUT: Dipole 1950 MHz D1950V2; Type: D1950V2; Serial: D1950V2 - SN:1005

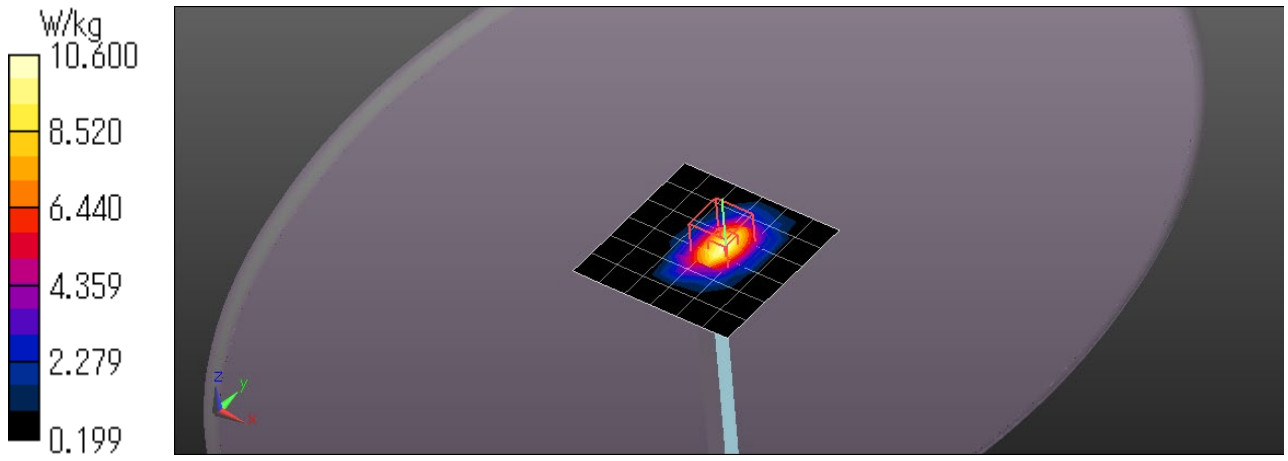
Communication System: UID 0, CW (0); Frequency: 1950 MHz
Medium parameters used: f = 1950 MHz; σ = 1.57 S/m; ε_r = 54.02; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ET3DV6 - SN1552; ConvF(4.87, 4.87, 4.87) @ 1950 MHz; Calibrated: 2021/06/18
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: TP1089
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

System Check/System Check/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 8.56 W/kg

System Check/System Check/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 79.53 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 15.8 W/kg
SAR(1 g) = 9.47 W/kg; SAR(10 g) = 5.07 W/kg
Smallest distance from peaks to all points 3 dB below = 11.2 mm
Ratio of SAR at M2 to SAR at M1 = 60.7%
Maximum value of SAR (measured) = 10.6 W/kg



750 MHz validation results 20220317

File Name: System Check MSL750MHz (20220317).da52:0

DUT: Dipole 750 MHz D750V3; Type: D750V3; Serial: D750V3 - SN:1115

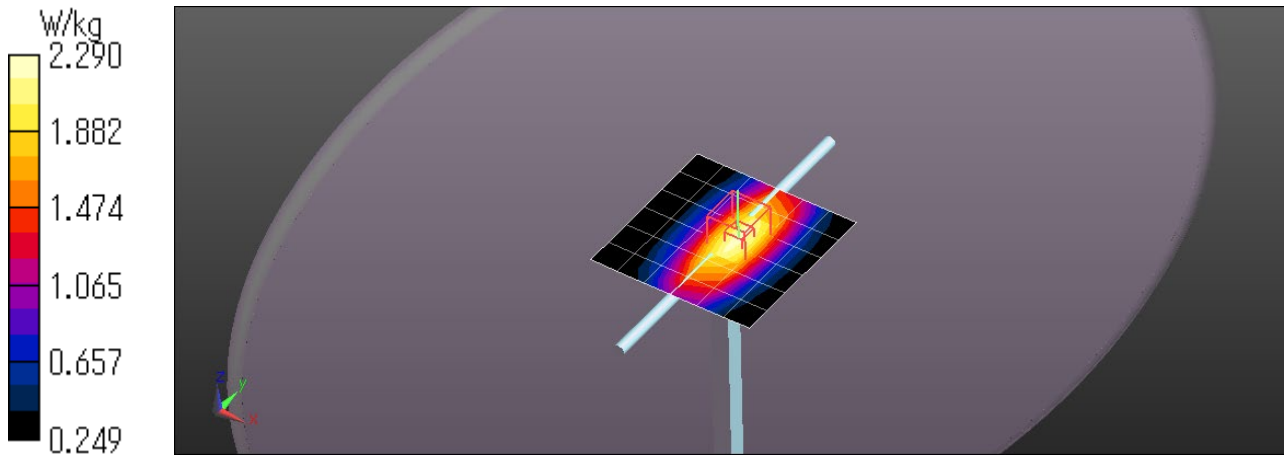
Communication System: UID 0, CW (0); Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.93 S/m; ε_r = 54.87; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ET3DV6 - SN1552; ConvF(6.66, 6.66, 6.66) @ 750 MHz; Calibrated: 2021/06/18
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: TP1089
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

System Check/System Check/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.10 W/kg

System Check/System Check/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.47 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 2.99 W/kg
SAR(1 g) = 2.11 W/kg; SAR(10 g) = 1.42 W/kg
Smallest distance from peaks to all points 3 dB below = 21.5 mm
Ratio of SAR at M2 to SAR at M1 = 70%
Maximum value of SAR (measured) = 2.29 W/kg



1800 MHz validation results 20220317

File Name: System Check MSL1800MHz (20220317).da52:0

DUT: Dipole 1800 MHz D1800V2; Type: D1800V2; Serial: D1800V2 - SN:2d004

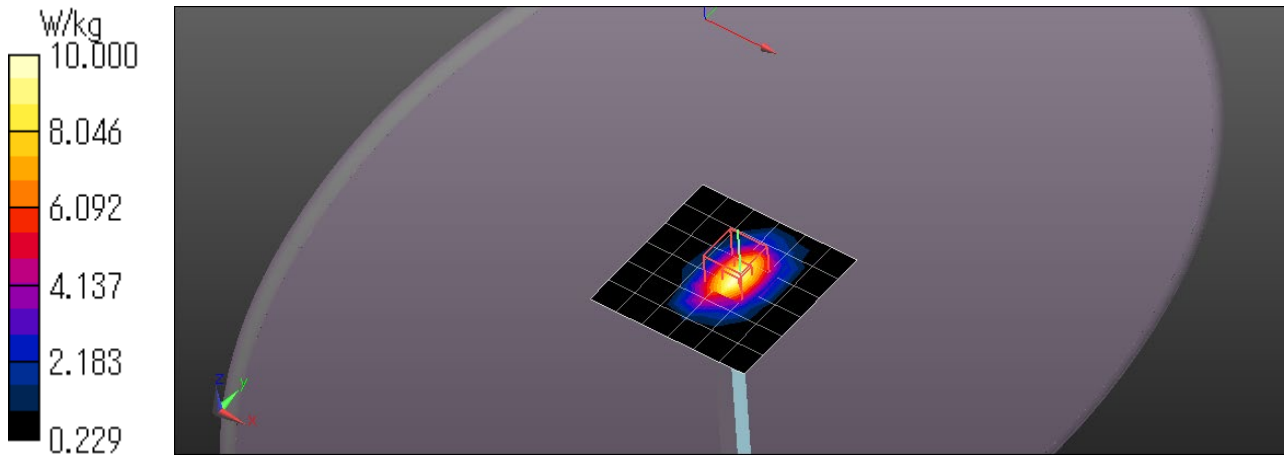
Communication System: UID 0, CW (0); Frequency: 1800 MHz
Medium parameters used: f = 1800 MHz; σ = 1.46 S/m; ε_r = 53.34; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ET3DV6 - SN1552; ConvF(4.94, 4.94, 4.94) @ 1800 MHz; Calibrated: 2021/06/18
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: TP1089
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

System Check/System Check/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 8.51 W/kg

System Check/System Check/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 83.29 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 13.6 W/kg
SAR(1 g) = 9 W/kg; SAR(10 g) = 5.02 W/kg
Smallest distance from peaks to all points 3 dB below = 11.2 mm
Ratio of SAR at M2 to SAR at M1 = 64.2%
Maximum value of SAR (measured) = 10.0 W/kg



1950 MHz validation results 20220317

File Name: System Check MSL1950MHz (20220317).da52:0

DUT: Dipole 1950 MHz D1950V2; Type: D1950V2; Serial: D1950V2 - SN:1005

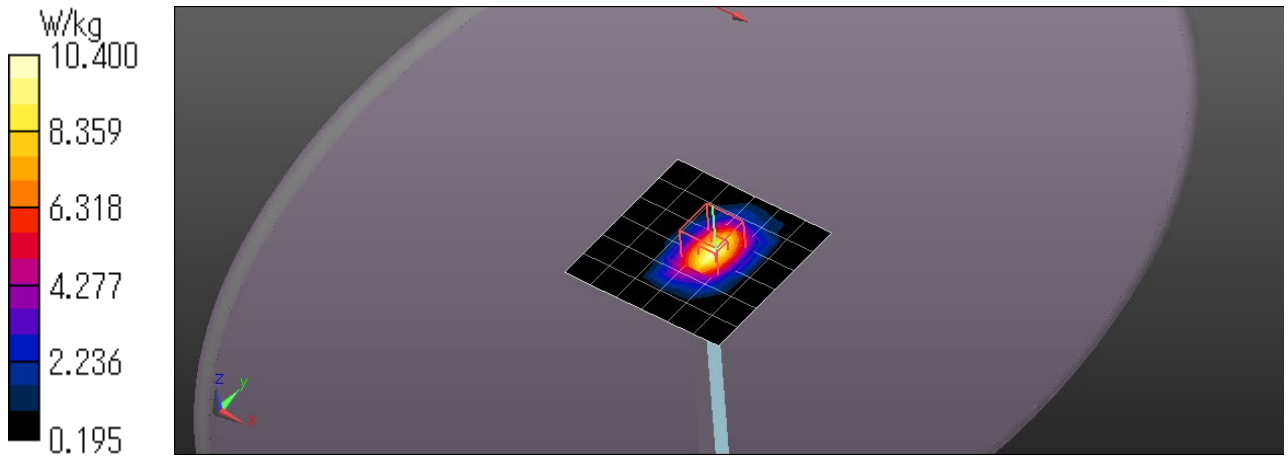
Communication System: UID 0, CW (0); Frequency: 1950 MHz
Medium parameters used: f = 1950 MHz; σ = 1.56 S/m; ε_r = 53.22; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ET3DV6 - SN1552; ConvF(4.87, 4.87, 4.87) @ 1950 MHz; Calibrated: 2021/06/18
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: TP1089
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

System Check/System Check/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 8.39 W/kg

System Check/System Check/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 79.05 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 15.4 W/kg
SAR(1 g) = 9.27 W/kg; SAR(10 g) = 4.98 W/kg
Smallest distance from peaks to all points 3 dB below = 11.2 mm
Ratio of SAR at M2 to SAR at M1 = 60.7%
Maximum value of SAR (measured) = 10.4 W/kg



750 MHz validation results 20220318

File Name: System Check MSL750MHz (20220318).da52:0

DUT: Dipole 750 MHz D750V3; Type: D750V3; Serial: D750V3 - SN:1115

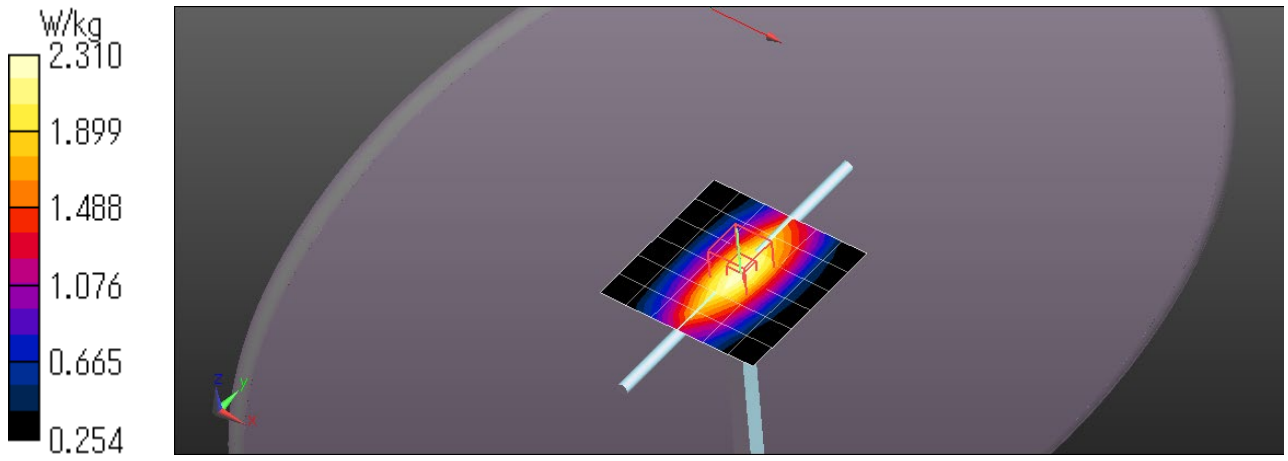
Communication System: UID 0, CW (0); Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.93 S/m; ε_r = 55.29; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ET3DV6 - SN1552; ConvF(6.66, 6.66, 6.66) @ 750 MHz; Calibrated: 2021/06/18
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: TP1089
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

System Check/System Check/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.27 W/kg

System Check/System Check/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 51.12 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 3.02 W/kg
SAR(1 g) = 2.14 W/kg; SAR(10 g) = 1.45 W/kg
Smallest distance from peaks to all points 3 dB below = 21.5 mm
Ratio of SAR at M2 to SAR at M1 = 70.2%
Maximum value of SAR (measured) = 2.31 W/kg



1800 MHz validation results 20220318

File Name: System Check MSL18000MHz (20220318).da52:0

DUT: Dipole 1800 MHz D1800V2; Type: D1800V2; Serial: D1800V2 - SN:2d004

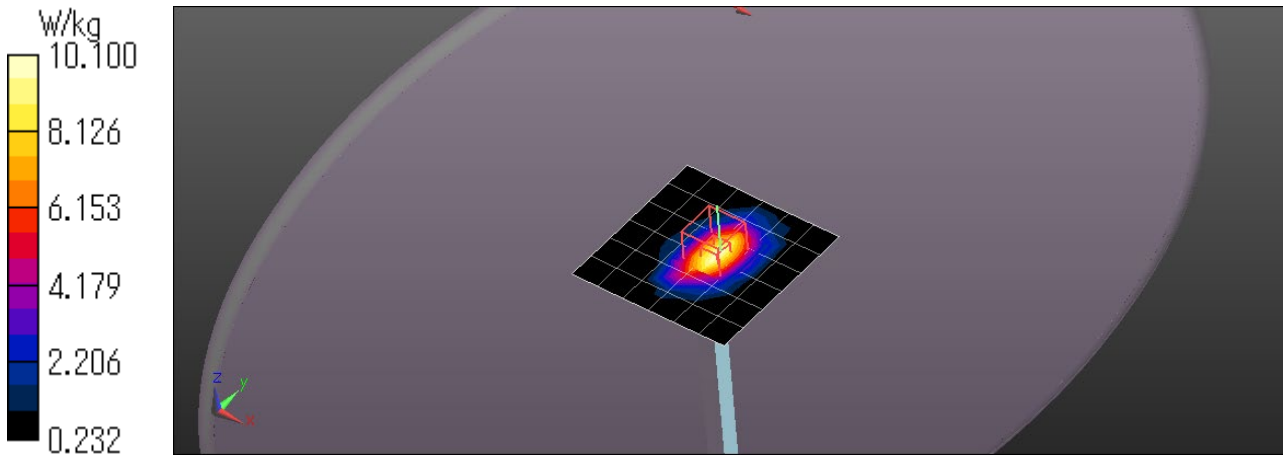
Communication System: UID 0, CW (0); Frequency: 1800 MHz
Medium parameters used: f = 1800 MHz; σ = 1.47 S/m; ε_r = 53.68; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ET3DV6 - SN1552; ConvF(4.94, 4.94, 4.94) @ 1800 MHz; Calibrated: 2021/06/18
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: TP1089
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

System Check/System Check/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 9.39 W/kg

System Check/System Check/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 87.53 V/m; Power Drift = -0.20 dB
Peak SAR (extrapolated) = 13.7 W/kg
SAR(1 g) = 9.07 W/kg; SAR(10 g) = 5.05 W/kg
Smallest distance from peaks to all points 3 dB below = 11.2 mm
Ratio of SAR at M2 to SAR at M1 = 64.2%
Maximum value of SAR (measured) = 10.1 W/kg



SECTION 4. UNCERTAINTY ESTIMATION

4.1 Frequency range of 600MHz to 2 GHz (ET3DV6)

Table 5 – Uncertainty budget of DASY5

Source of Uncertainty	Tolerance/ Uncertainty value ± %	Probability Distribution	Div.	c_i (1g)	c_i (10g)	Standard uncertainty ± %, (1 g)	Standard uncertainty ± %, (10 g)	v_i or v_{eff}
Measurement system								
Probe calibration	12.0	N	2	1	1	6.00	6.00	∞
Isotropy	7.6	R	√3	1	1	4.38	4.38	∞
Boundary effect	4.8	R	√3	1	1	2.78	2.78	∞
Linearity	4.7	R	√3	1	1	2.71	2.71	∞
Detection limits	1.0	R	√3	1	1	0.58	0.58	∞
Modulation response	2.4	R	√3	1	1	1.39	1.39	∞
Readout electronics	1.0	N	1	1	1	1.00	1.00	∞
Response time	0.8	R	√3	1	1	0.46	0.46	∞
Integration time	2.6	R	√3	1	1	1.55	1.55	∞
RF ambient conditions – noise	3.0	R	√3	1	1	1.73	1.73	∞
RF ambient conditions – reflections	3.0	R	√3	1	1	1.73	1.73	∞
Probe positioner mech. restrictions	0.36	R	√3	1	1	0.21	0.21	∞
Probe positioning with respect to phantom shell	2.9	R	√3	1	1	1.68	1.68	∞
Post-processing	3.9	R	√3	1	1	2.26	2.26	∞
Test sample related								
Test sample positioning	2.9	N	1	1	1	2.90	2.90	∞
Device holder Uncertainty	11.35	R	√3	1	1	6.55	6.55	∞
Drift of output power	5	R	√3	1	1	2.89	2.89	∞
Phantom and set-up								
Phantom uncertainty (shape and thickness tolerance)	8.2	R	√3	1	1	2.42	2.42	∞
Liquid conductivity (temperature)	0.14	R	√3	0.78	0.71	0.06	0.06	∞
Liquid conductivity (meas.)	4.3	N	1	0.78	0.71	3.35	3.05	∞
Liquid permittivity (temperature)	1.76	R	√3	0.26	0.26	0.26	0.26	∞
Liquid permittivity (meas.)	2.2	N	1	0.26	0.26	0.57	0.57	∞
Combined standard uncertainty						12.9	12.9	
Expanded uncertainty (95% conf. interval)						25.8	25.8	

※Measurement RF Ambient Condition: 0.000457 mW/g Reviewed: 11/1/2021

SECTION 5. REPORT SUMMARY

5.1 Tabulated SAR values

Body SAR, LET Band2

Date	Ambient Temperature	Relative humidity	Liquid temperature
Mar 16, 2022	21.5~23.2 degree C	39~44%	20.8~21.9 degree C
Mar 17, 2022	21.0~22.0 degree C	38~40%	20.0~21.0 degree C

Test Engineer: K. Numata

Judgment: ☑ PASS □ FAIL

Applicable Standards: IEEE 1528

Result:

Band Frequency [MHz]	Channel [ch]	Test Mode, Device direction	*Maximum Tune-up [dBm]	*Conducted Power [dBm]	Measured SAR-1g [W/kg]	Scaled factor	Reported SAR-1g [W/kg]
LTE Band2 1852.5	18625	Left	19	17.68	0.655	1.07	0.7009
LTE Band2 1880.0	18900	Front	19	17.73	-	-	Note.1
		Rear	19	17.73	0.0087	1.07	0.0093
		Right	19	17.73	0.00918	1.07	0.0098
		Worse case data position －Left	19	17.73	0.511	1.07	0.5468
		Top	19	17.73	0.036	1.07	0.0385
		Bottom	19	17.73	-	-	Note.1
LTE Band2 1907.5	19175	Left	19	17.55	0.276	1.08	0.2981

Material Parameters:

Date	Frequency [MHz]	Conductivity [σ]	Permittivity [εr]	Targeted Conductivity [σ]	Targeted Permittivity [εr]	Deviation Conductivity [%]	Deviation Permittivity [%]	Remark
Mar 16, 2022	1880.0	1.53	54.16	1.52	53.30	0.66	1.61	Note.2
Mar 17, 2022	1852.5	1.49	53.30	1.52	53.30	-1.97	0	
	1880.0	1.51	53.27	1.52	53.30	-0.66	-0.06	
	1907.5	1.53	53.26	1.52	53.30	0.66	-0.08	

Note.1: Measurement is not possible because the transmission power was low and the peak SAR value could not be obtained.

Note.2: The dielectric parameters should be linearly interpolated between the closest pair of target frequencies to determine the applicable dielectric parameters corresponding to the device test frequency.

See Appendix 2 for Test Mode, Device direction/distance.

Body SAR, LET Band4

Date	Ambient Temperature	Relative humidity	Liquid temperature
Mar 16, 2022	21.5~23.2 degree C	39~44%	20.8~21.9 degree C
Mar 17, 2022	21.0~22.0 degree C	38~40%	20.0~21.0 degree C
Mar 18, 2022	21.0~21.5 degree C	31~32.5%	19.6~19.7 degree C

Test Engineer: K. Numata

Judgment: ☑ PASS □ FAIL

Applicable Standards: IEEE 1528

Result:

Band Frequency [MHz]	Channel [ch]	Test Mode, Device direction	*Maximum Tune-up [dBm]	*Conducted Power [dBm]	Measured SAR-1g [W/kg]	Scaled factor	Reported SAR-1g [W/kg]
LTE Band4 1711.5	19965	Left	18	17.50	0.538	1.03	0.5541
LTE Band4 1732.5	20175	Front	18	17.61	-	-	Note.1
		Rear	18	17.61	0.00924	1.02	0.0094
		Right	18	17.61	0.013	1.02	0.0133
		Worse case data position －Left	18	17.61	0.582	1.02	0.5936
		Top	18	17.61	0.017	1.02	0.0173
		Bottom	18	17.61	-	-	Note.1
LTE Band4 1745.0	20300	Left	18	17.77	0.595	1.01	0.6010

Material Parameters:

Date	Frequency [MHz]	Conductivity [σ]	Permittivity [εr]	Targeted Conductivity [σ]	Targeted Permittivity [εr]	Deviation Conductivity [%]	Deviation Permittivity [%]	Remark
Mar 16, 2022	1732.5	1.42	54.37	1.48	53.48	-4.05	1.66	Note.2
Mar 17, 2022	1732.5	1.42	53.43	1.48	53.48	-4.05	-0.09	
Mar 18, 2022	1711.5	1.41	53.92	1.46	53.53	-3.42	0.73	
	1745.0	1.44	53.81	1.49	53.44	-3.36	0.69	

Note.1: Measurement is not possible because the transmission power was low and the peak SAR value could not be obtained.

Note.2: The dielectric parameters should be linearly interpolated between the closest pair of target frequencies to determine the applicable dielectric parameters corresponding to the device test frequency.

See Appendix 2 for Test Mode, Device direction/distance.

Body SAR, LET Band12

Date	Ambient Temperature	Relative humidity	Liquid temperature
Mar 17, 2022	21.0~22.0 degree C	38~40%	20.0~21.0 degree C
Mar 18, 2022	21.0~21.5 degree C	31~32.5%	19.6~19.7 degree C

Test Engineer: K. Numata

Judgment: ☑ PASS □ FAIL

Applicable Standards: IEEE 1528

Result:

Band Frequency [MHz]	Channel [ch]	Test Mode, Device direction	*Maximum Tune-up [dBm]	*Conducted Power [dBm]	Measured SAR-1g [W/kg]	Scaled factor	Reported SAR-1g [W/kg]
LTE Band12 701.5	23035	Left	23	22.94	1.09	1.003	1.093
LTE Band12 707.5	23095	Front	23	22.99	-	-	Note.1
		Rear	23	22.99	0.012	1.001	0.012
		Right	23	22.99	0.034	1.001	0.034
		Worse case data position −Left	23	22.99	1.08	1.001	1.081
		Top	23	22.99	0.023	1.001	0.023
		Bottom	23	22.99	-	-	Note.1
LTE Band12 713.5	23155	Left	23	22.92	1.06	1.003	1.063

Material Parameters:

Date	Frequency [MHz]	Conductivity [σ]	Permittivity [εr]	Targeted Conductivity [σ]	Targeted Permittivity [εr]	Deviation Conductivity [%]	Deviation Permittivity [%]	Remark
Mar 17, 2022	707.5	0.92	55.00	0.96	55.53	-4.17	-0.95	Note.2
Mar 18, 2022	701.5	0.915	55.49	0.96	55.72	-4.69	-0.41	
	707.5	0.92	55.46	0.96	55.70	-4.17	-0.43	
	713.5	0.92	55.43	0.96	55.67	-4.17	-0.43	

Note.1: Measurement is not possible because the transmission power was low and the peak SAR value could not be obtained.

Note.2: The dielectric parameters should be linearly interpolated between the closest pair of target frequencies to determine the applicable dielectric parameters corresponding to the device test frequency.

See Appendix 2 for Test Mode, Device direction/distance.

5.2 Details of test data

Test Results of LTE Band2 1880.0MHz / Mch / Rear

File Name: LTE Band2 1880.0MHz Rear 0mm RB441T-C 22121143I (16 Mar 2022).da52:1

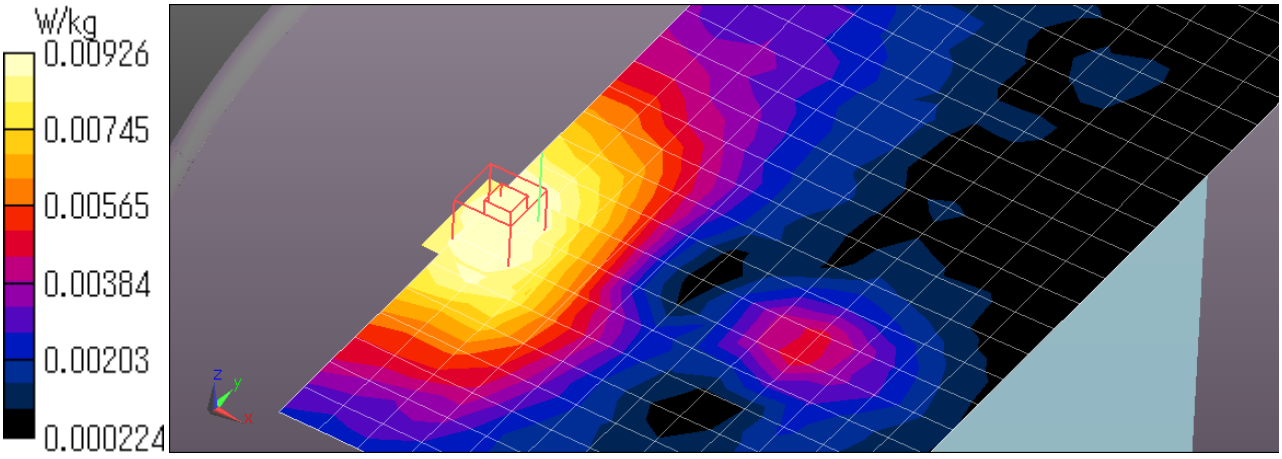
DUT: RB441T-C; Type: Binding machine; Serial: 22121143I

Communication System: UID 0, LTE-FDD (SC-FDMA,1RB,10MHz,QPSK) (0); Frequency: 1880 MHz
Medium parameters used: f = 1880 MHz; σ = 1.53 S/m; ε_r = 54.16; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ET3DV6 - SN1552; ConvF(4.87, 4.87, 4.87) @ 1880 MHz; Calibrated: 2021/06/18
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: TP1089
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/LTE Mode - Mch/Area Scan (13x25x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.00947 W/kg
Body/LTE Mode - Mch/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.9370 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 0.0130 W/kg
SAR(1 g) = 0.0087 W/kg; SAR(10 g) = 0.00598 W/kg
Ratio of SAR at M2 to SAR at M1 = 66.2%
Maximum value of SAR (measured) = 0.00926 W/kg



Test Results of LTE Band2 1880.0MHz / Mch / Right

File Name: LTE Band2 1880.0MHz Right 0mm RB441T-C 22121143I (16 Mar 2022).da52:1

DUT: RB441T-C; Type: Binding machine; Serial: 22121143I

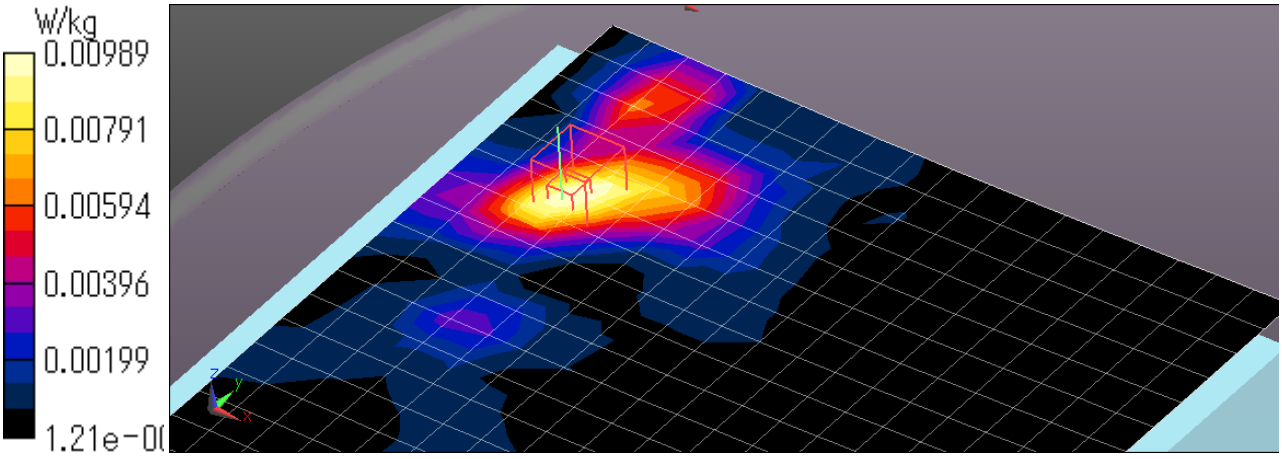
Communication System: UID 0, LTE-FDD (SC-FDMA,1RB,10MHz,QPSK) (0); Frequency: 1880 MHz
Medium parameters used: f = 1880 MHz; σ = 1.53 S/m; ε_r = 54.16; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ET3DV6 - SN1552; ConvF(4.87, 4.87, 4.87) @ 1880 MHz; Calibrated: 2021/06/18
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: TP1089
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/LTE Mode - Mch/Area Scan (19x22x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.00951 W/kg

Body/LTE Mode - Mch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.2940 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.0140 W/kg
SAR(1 g) = 0.00918 W/kg; SAR(10 g) = 0.00574 W/kg
Ratio of SAR at M2 to SAR at M1 = 66.8%
Maximum value of SAR (measured) = 0.00989 W/kg



Test Results of LTE Band2 1852.5MHz / Lch / Left

File Name: LTE Band2 1852.5MHz Left 0mm RB441T-C 22121143I (17 Mar 2022).da52:1

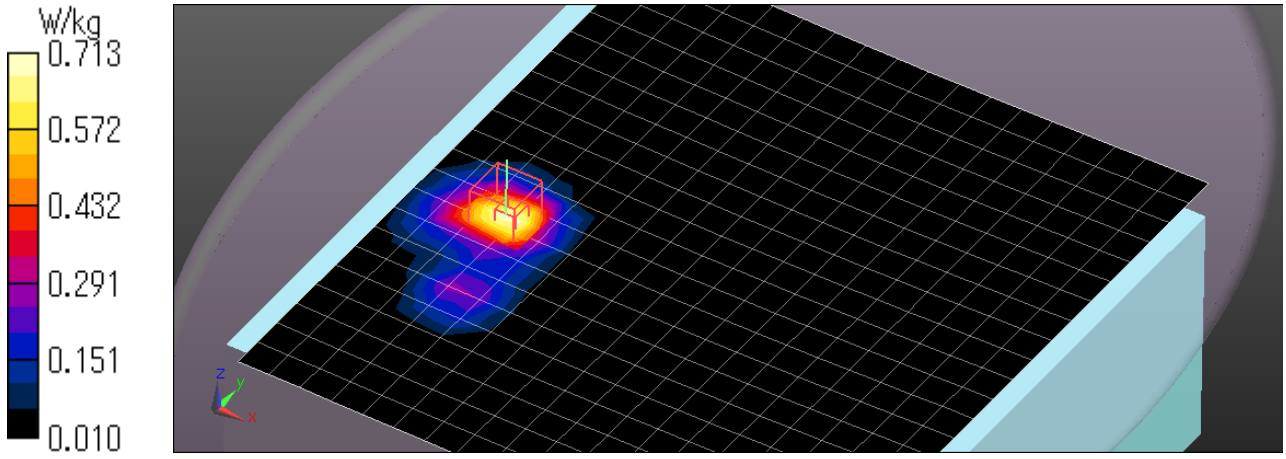
DUT: RB441T-C; Type: Binding machine; Serial: 22121143I

Communication System: UID 10177 - CAI, LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK);
Frequency: 1852.5 MHz
Medium parameters used: f = 1852.5 MHz; σ = 1.49 S/m; ε_r = 53.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ET3DV6 - SN1552; ConvF(4.87, 4.87, 4.87) @ 1852.5 MHz; Calibrated: 2021/06/18
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: TP1089
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/LTE Mode - Lch/Area Scan (19x22x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.644 W/kg
Body/LTE Mode - Lch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.7650 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 1.04 W/kg
SAR(1 g) = 0.655 W/kg; SAR(10 g) = 0.389 W/kg
Ratio of SAR at M2 to SAR at M1 = 63.7%
Maximum value of SAR (measured) = 0.713 W/kg



Test Results of LTE Band2 1880.0MHz / Mch / Left

File Name: LTE Band2 1880.0MHz Left 0mm RB441T-C 22121143I (16 Mar 2022).da52:1

DUT: RB441T-C; Type: Binding machine; Serial: 22121143I

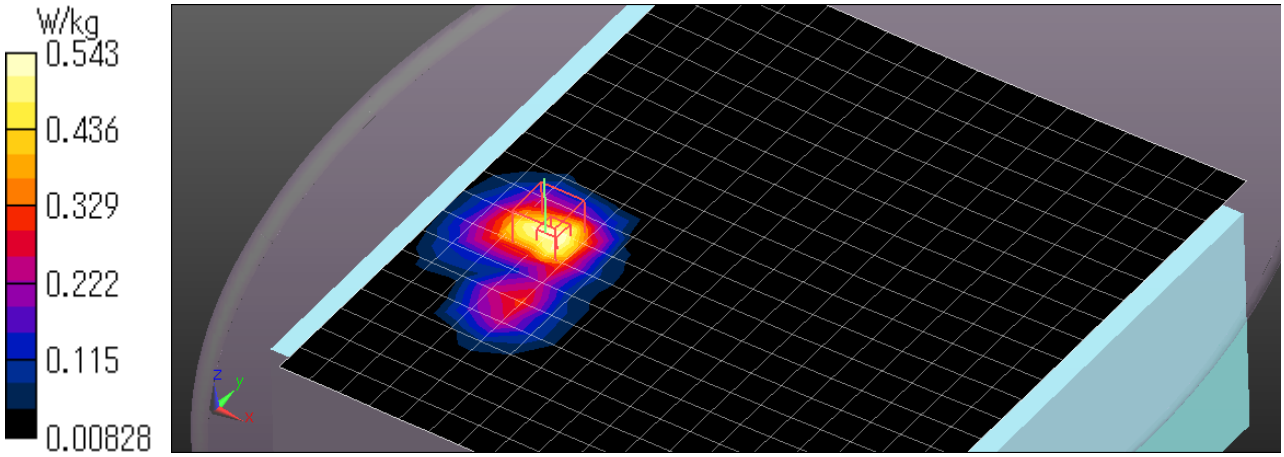
Communication System: UID 0, LTE-FDD (SC-FDMA,1RB,10MHz,QPSK) (0); Frequency: 1880 MHz
Medium parameters used: f = 1880 MHz; σ = 1.53 S/m; ε_r = 54.16; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ET3DV6 - SN1552; ConvF(4.87, 4.87, 4.87) @ 1880 MHz; Calibrated: 2021/06/18
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: TP1089
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/LTE Mode - Mch/Area Scan (19x22x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.528 W/kg

Body/LTE Mode - Mch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.6810 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 0.785 W/kg
SAR(1 g) = 0.511 W/kg; SAR(10 g) = 0.310 W/kg
Ratio of SAR at M2 to SAR at M1 = 64.1%
Maximum value of SAR (measured) = 0.543 W/kg



Test Results of LTE Band2 1907.5MHz / Hch / Left

File Name: LTE Band2 1907.5MHz Left 0mm RB441T-C 22121143I (17 Mar 2022).da52:1

DUT: RB441T-C; Type: Binding machine; Serial: 22121143I

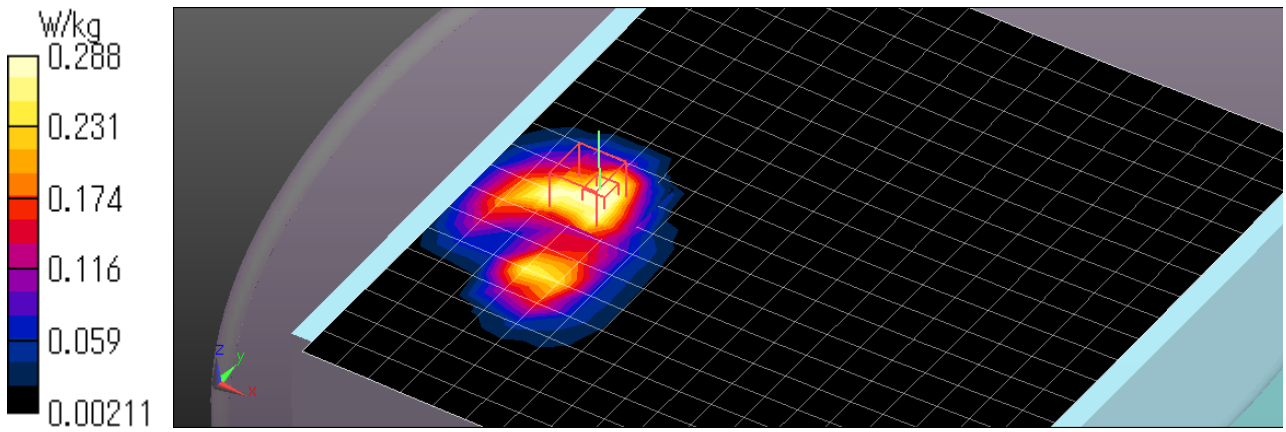
Communication System: UID 10177 - CAI, LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK);
Frequency: 1907.5 MHz
Medium parameters used: f = 1907.5 MHz; σ = 1.53 S/m; ε_r = 53.26; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ET3DV6 - SN1552; ConvF(4.87, 4.87, 4.87) @ 1907.5 MHz; Calibrated: 2021/06/18
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: TP1089
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/LTE Mode - Hch/Area Scan (19x22x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.291 W/kg

Body/LTE Mode - Hch/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.4430 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.520 W/kg
SAR(1 g) = 0.276 W/kg; SAR(10 g) = 0.166 W/kg
Ratio of SAR at M2 to SAR at M1 = 54.6%
Maximum value of SAR (measured) = 0.288 W/kg



Test Results of LTE Band2 1880.0MHz / Mch / Top

File Name: LTE Band2 1880.0MHz Top 0mm RB441T-C 22121143I (16 Mar 2022).da52:1

DUT: RB441T-C; Type: Binding machine; Serial: 22121143I

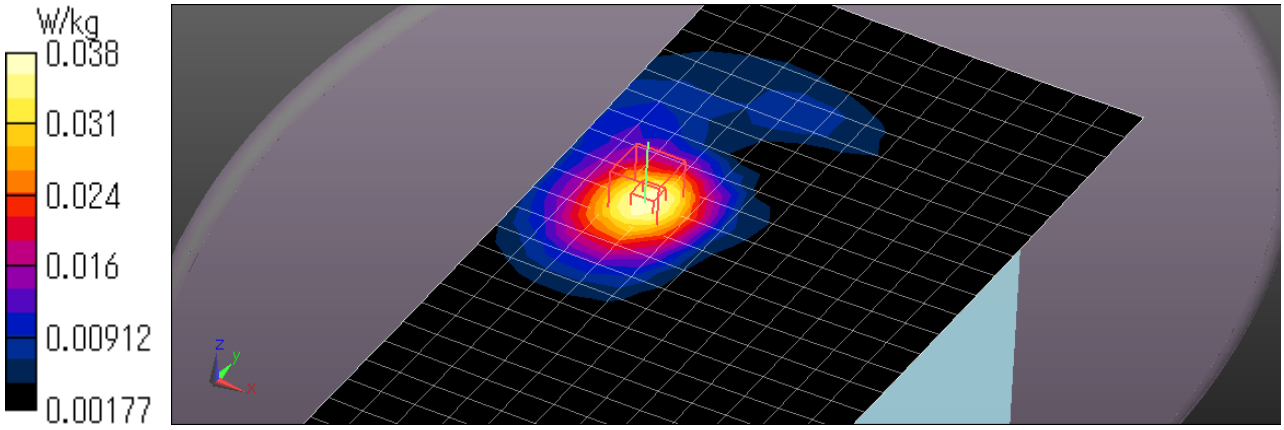
Communication System: UID 0, LTE-FDD (SC-FDMA,1RB,10MHz,QPSK) (0); Frequency: 1880 MHz
Medium parameters used: f = 1880 MHz; σ = 1.53 S/m; ε_r = 54.16; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ET3DV6 - SN1552; ConvF(4.87, 4.87, 4.87) @ 1880 MHz; Calibrated: 2021/06/18
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: TP1089
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/LTE Mode - Mch/Area Scan (13x25x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.0387 W/kg

Body/LTE Mode - Mch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.4880 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.0520 W/kg
SAR(1 g) = 0.036 W/kg; SAR(10 g) = 0.023 W/kg
Ratio of SAR at M2 to SAR at M1 = 68.2%
Maximum value of SAR (measured) = 0.0385 W/kg



Test Results of LTE Band4 1732.5MHz / Mch / Rear

File Name: LTE Band4 1732.5MHz Rear 0mm RB441T-C 22121143I (16 Mar 2022).da52:1

DUT: RB441T-C; Type: Binding machine; Serial: 22121143I

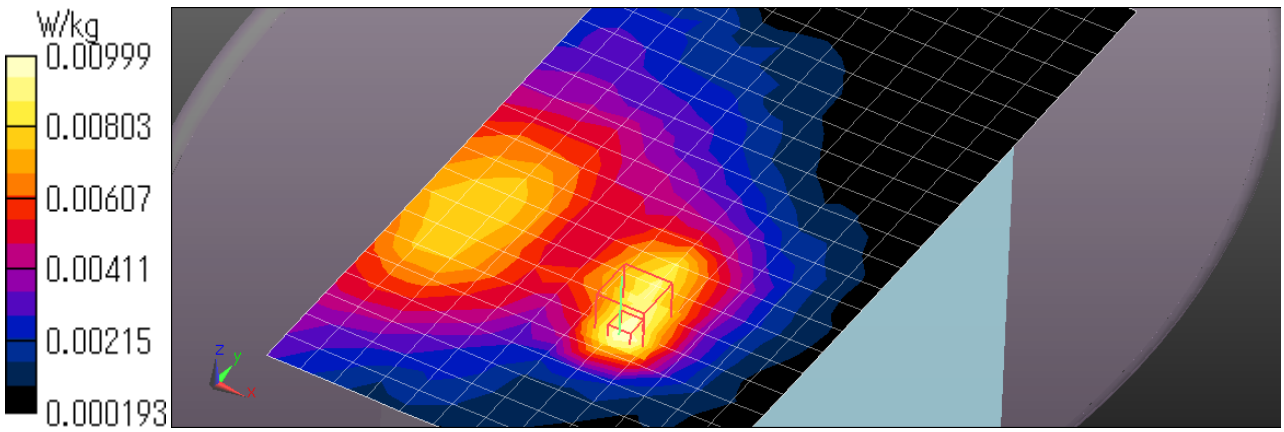
Communication System: UID 10177 - CAI, LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK);
Frequency: 1732.5 MHz
Medium parameters used: f = 1732.5 MHz; σ = 1.42 S/m; ε_r = 54.37; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ET3DV6 - SN1552; ConvF(4.94, 4.94, 4.94) @ 1732.5 MHz; Calibrated: 2021/06/18
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: TP1089
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/LTE Mode - Mch/Area Scan (13x25x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.00949 W/kg

Body/LTE Mode - Mch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.716 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 0.0130 W/kg
SAR(1 g) = 0.00924 W/kg; SAR(10 g) = 0.00614 W/kg
Ratio of SAR at M2 to SAR at M1 = 69.1%
Maximum value of SAR (measured) = 0.00999 W/kg



Test Results of LTE Band4 1732.5MHz / Mch / Right

File Name: LTE Band4 1732.5MHz Right 0mm RB441T-C 22121143I (16 Mar 2022).da52:1

DUT: RB441T-C; Type: Binding machine; Serial: 22121143I

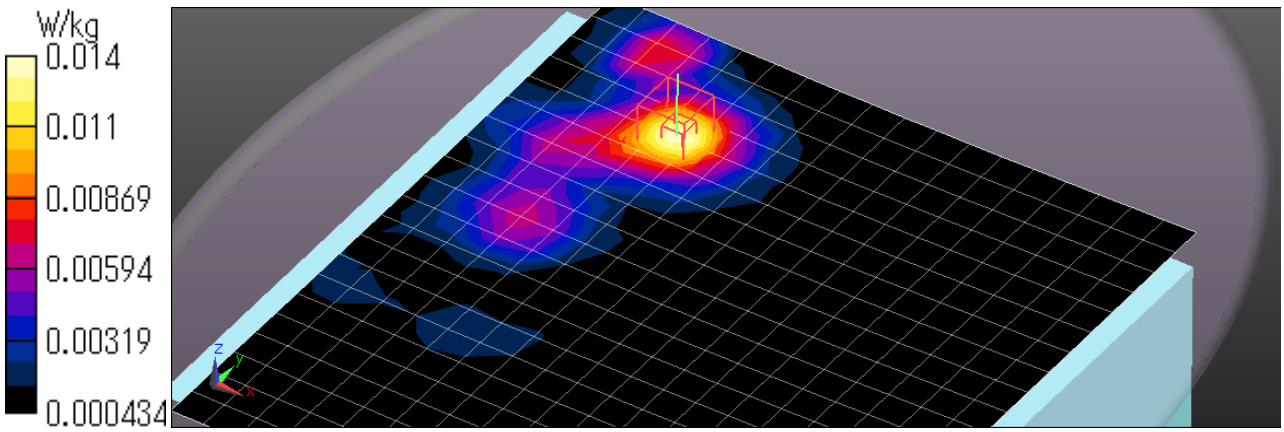
Communication System: UID 10177 - CAI, LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK);
Frequency: 1732.5 MHz
Medium parameters used: f = 1732.5 MHz; σ = 1.42 S/m; ε_r = 54.37; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ET3DV6 - SN1552; ConvF(4.94, 4.94, 4.94) @ 1732.5 MHz; Calibrated: 2021/06/18
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: TP1089
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/LTE Mode - Mch/Area Scan (19x22x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.0126 W/kg

Body/LTE Mode - Mch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.5220 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 0.0170 W/kg
SAR(1 g) = 0.013 W/kg; SAR(10 g) = 0.0086 W/kg
Ratio of SAR at M2 to SAR at M1 = 71.4%
Maximum value of SAR (measured) = 0.0142 W/kg



Test Results of LTE Band4 1711.5MHz / Lch / Left

File Name: LTE Band4 1711.5MHz Left 0mm RB441T-C 22121143I (18 Mar 2022).da52:1

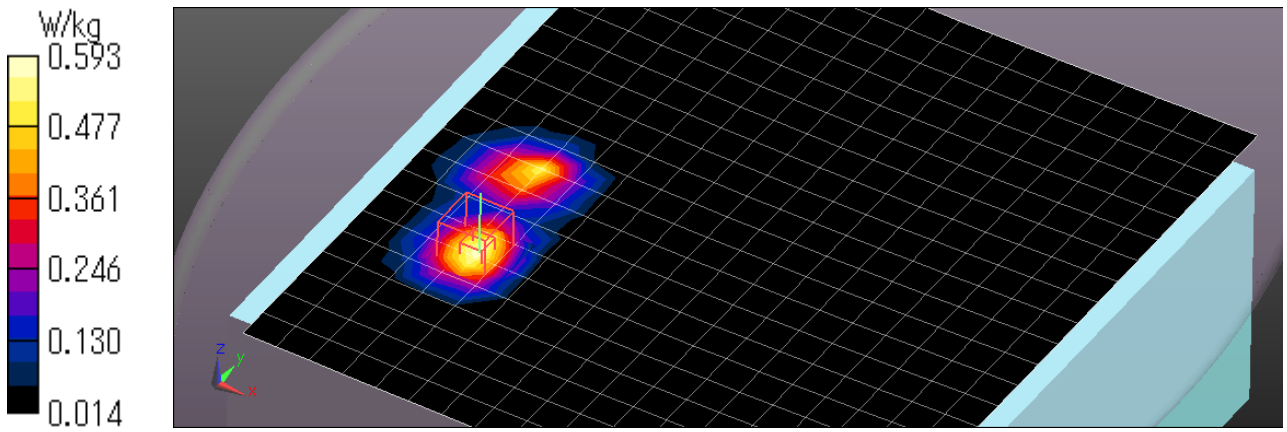
DUT: RB441T-C; Type: Binding machine; Serial: 22121143I

Communication System: UID 0, LTE-FDD (SC-FDMA,1RB,3MHz,QPSK) (0); Frequency: 1711.5 MHz
Medium parameters used: f = 1711.5 MHz; σ = 1.41 S/m; ε_r = 53.92; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ET3DV6 - SN1552; ConvF(4.94, 4.94, 4.94) @ 1711.5 MHz; Calibrated: 2021/06/18
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: TP1089
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/LTE Mode - Lch/Area Scan (19x22x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.530 W/kg
Body/LTE Mode - Lch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.6910 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.682 W/kg
SAR(1 g) = 0.538 W/kg; SAR(10 g) = 0.335 W/kg
Ratio of SAR at M2 to SAR at M1 = 74.7%
Maximum value of SAR (measured) = 0.593 W/kg



Test Results of LTE Band4 1732.5MHz / Mch / Left

File Name: LTE Band4 1732.5MHz Left 0mm RB441T-C 22121143I (16 Mar 2022).da52:1

DUT: RB441T-C; Type: Binding machine; Serial: 22121143I

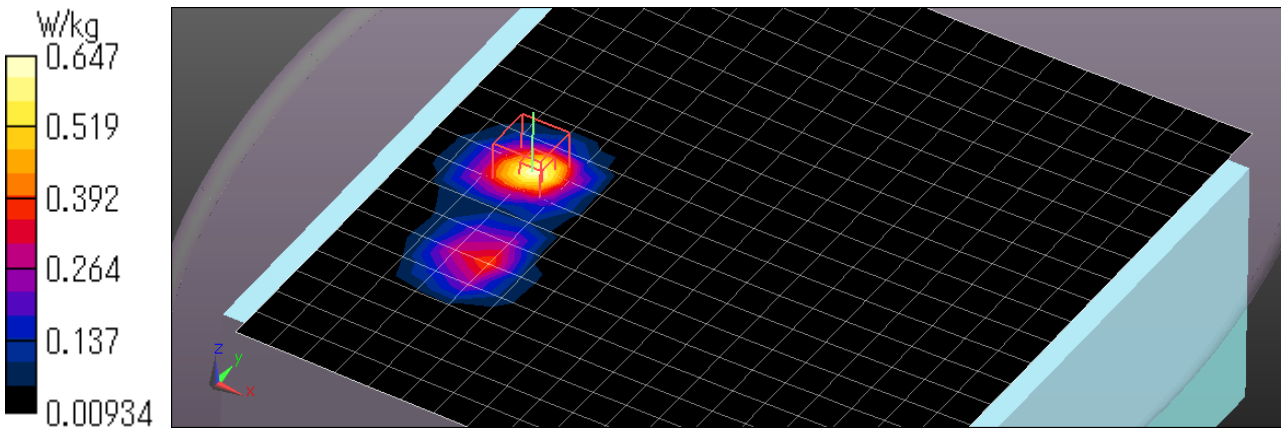
Communication System: UID 10177 - CAI, LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK);
Frequency: 1732.5 MHz
Medium parameters used: f = 1732.5 MHz; σ = 1.42 S/m; ε_r = 54.37; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ET3DV6 - SN1552; ConvF(4.94, 4.94, 4.94) @ 1732.5 MHz; Calibrated: 2021/06/18
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: TP1089
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/LTE Mode - Mch/Area Scan (19x22x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.630 W/kg

Body/LTE Mode - Mch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.9630 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 0.929 W/kg
SAR(1 g) = 0.582 W/kg; SAR(10 g) = 0.326 W/kg
Ratio of SAR at M2 to SAR at M1 = 64.3%
Maximum value of SAR (measured) = 0.647 W/kg



Test Results of LTE Band4 1745.0MHz / Hch / Left

File Name: LTE Band4 1745.0MHz Left 0mm RB441T-C 22121143I (18 Mar 2022).da52:1

DUT: RB441T-C; Type: Binding machine; Serial: 22121143I

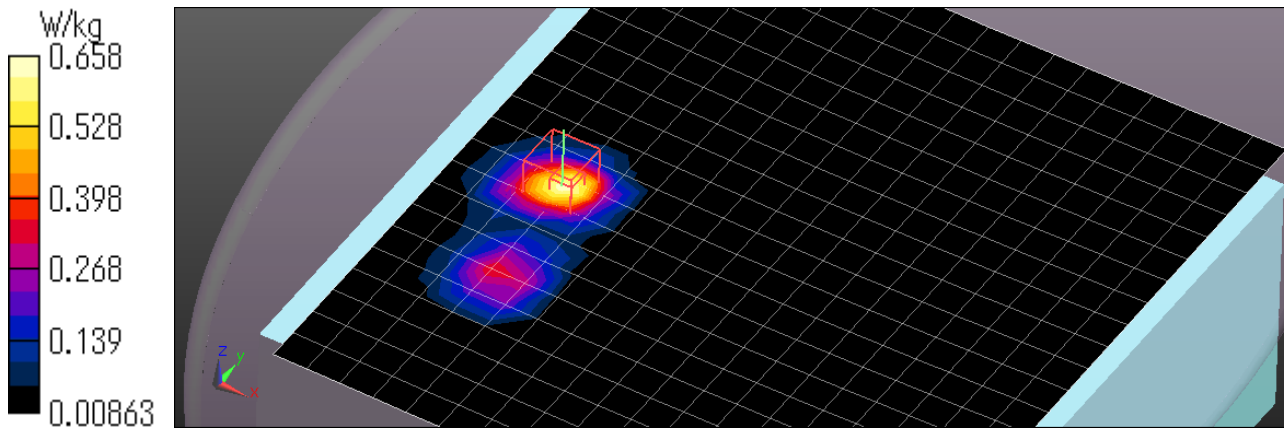
Communication System: UID 0, LTE-FDD (SC-FDMA,1RB,20MHz,QPSK) (0); Frequency: 1745 MHz
Medium parameters used: f = 1745 MHz; σ = 1.44 S/m; ε_r = 53.81; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ET3DV6 - SN1552; ConvF(4.94, 4.94, 4.94) @ 1745 MHz; Calibrated: 2021/06/18
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: TP1089
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/LTE Mode - Hch/Area Scan (19x22x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.626 W/kg

Body/LTE Mode - Hch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.9290 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.953 W/kg
SAR(1 g) = 0.595 W/kg; SAR(10 g) = 0.332 W/kg
Smallest distance from peaks to all points 3 dB below = 12.2 mm
Ratio of SAR at M2 to SAR at M1 = 65%
Maximum value of SAR (measured) = 0.658 W/kg



Test Results of LTE Band4 1732.5MHz / Mch / Top

File Name: LTE Band4 1732.5MHz Top 0mm RB441T-C 22121143I (16 Mar 2022).da52:1

DUT: RB441T-C; Type: Binding machine; Serial: 22121143I

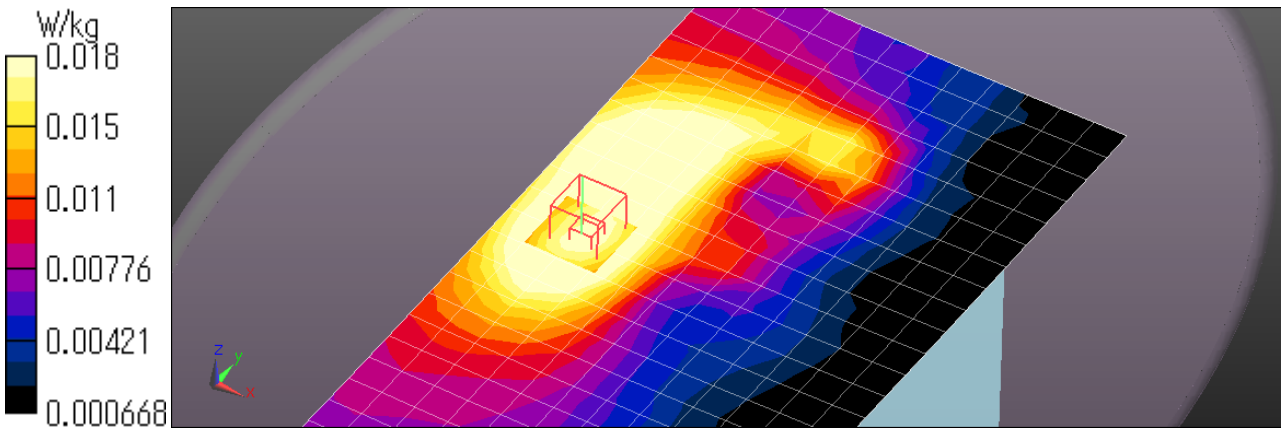
Communication System: UID 10177 - CAI, LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK);
Frequency: 1732.5 MHz
Medium parameters used: f = 1732.5 MHz; σ = 1.42 S/m; ε_r = 54.37; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ET3DV6 - SN1552; ConvF(4.94, 4.94, 4.94) @ 1732.5 MHz; Calibrated: 2021/06/18
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: TP1089
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/LTE Mode - Mch/Area Scan (13x25x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.0245 W/kg

Body/LTE Mode - Mch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.7230 V/m; Power Drift = 0.20 dB
Peak SAR (extrapolated) = 0.0240 W/kg
SAR(1 g) = 0.017 W/kg; SAR(10 g) = 0.012 W/kg
Ratio of SAR at M2 to SAR at M1 = 68.7%
Maximum value of SAR (measured) = 0.0184 W/kg



Test Results of LTE Band12 707.5MHz / Mch / Rear

File Name: LTE Band12 707.5MHz Rear 0mm RB441T-C 22121143I (18 Mar 2022).da52:1

DUT: RB441T-C; Type: Binding machine; Serial: 22121143I

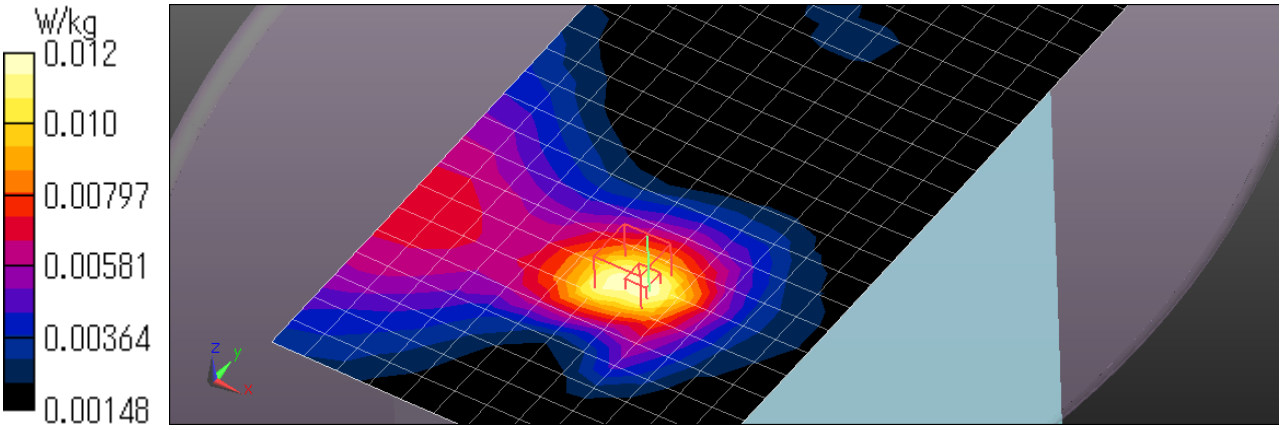
Communication System: UID 0, LTE-FDD (SC-FDMA,1RB,3MHz,QPSK) (0); Frequency: 707.5 MHz
Medium parameters used: f = 707.5 MHz; σ = 0.92 S/m; ε_r = 55.46; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ET3DV6 - SN1552; ConvF(6.66, 6.66, 6.66) @ 707.5 MHz; Calibrated: 2021/06/18
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: TP1089
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/LTE Mode - Mch/Area Scan (13x25x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.0120 W/kg

Body/LTE Mode - Mch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.9360 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 0.0160 W/kg
SAR(1 g) = 0.012 W/kg; SAR(10 g) = 0.00833 W/kg
Ratio of SAR at M2 to SAR at M1 = 73.3%
Maximum value of SAR (measured) = 0.0123 W/kg



Test Results of LTE Band12 707.5MHz / Mch / Right

File Name: LTE Band12 707.5MHz Right 0mm RB441T-C 22121143I (18 Mar 2022).da52:1

DUT: RB441T-C; Type: Binding machine; Serial: 22121143I

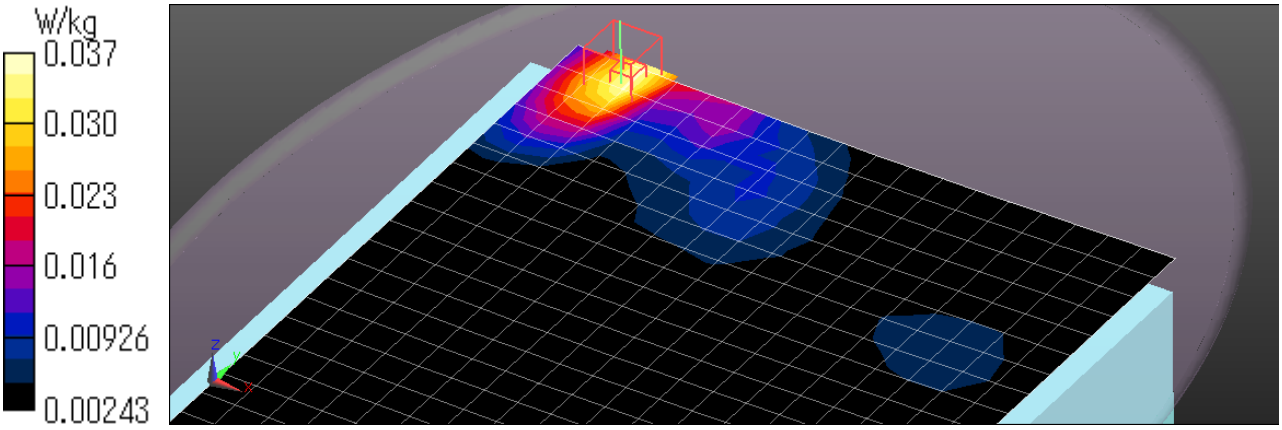
Communication System: UID 0, LTE-FDD (SC-FDMA,1RB,3MHz,QPSK) (0); Frequency: 707.5 MHz
Medium parameters used: f = 707.5 MHz; σ = 0.921 S/m; ε_r = 55.46; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ET3DV6 - SN1552; ConvF(6.66, 6.66, 6.66) @ 707.5 MHz; Calibrated: 2021/06/18
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: TP1089
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/LTE Mode - Mch/Area Scan (19x22x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.0351 W/kg

Body/LTE Mode - Mch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.106 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.0490 W/kg
SAR(1 g) = 0.034 W/kg; SAR(10 g) = 0.023 W/kg
Ratio of SAR at M2 to SAR at M1 = 70.6%
Maximum value of SAR (measured) = 0.0366 W/kg



Test Results of LTE Band12 701.5MHz / Lch / Left

File Name: LTE Band12 701.5MHz Left 0mm RB441T-C 22121143I (18 Mar 2022).da52:1

DUT: RB441T-C; Type: Binding machine; Serial: 22121143I

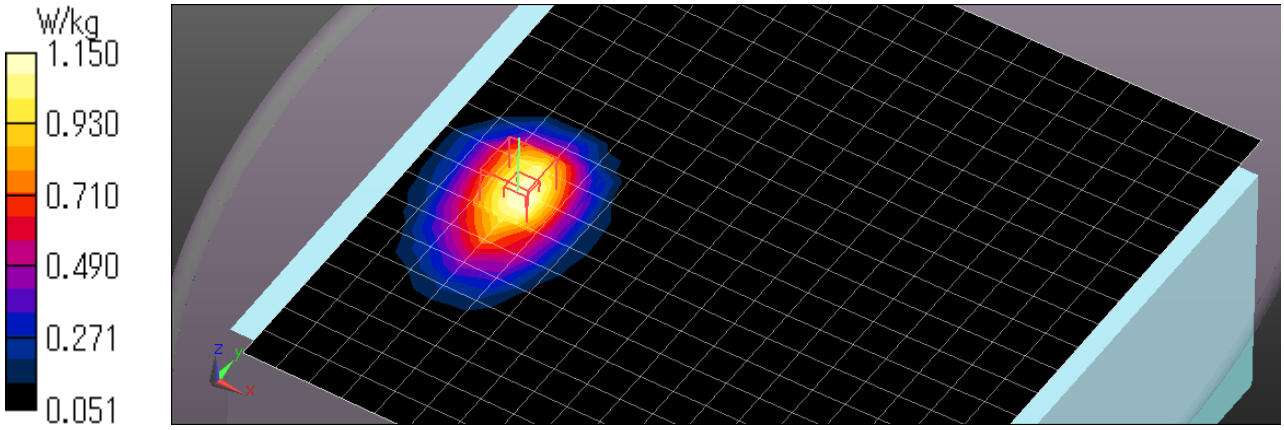
Communication System: UID 10177 - CAI, LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK);
Frequency: 701.5 MHz
Medium parameters used: f = 701.5 MHz; σ = 0.915 S/m; ε_r = 55.49; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ET3DV6 - SN1552; ConvF(6.66, 6.66, 6.66) @ 701.5 MHz; Calibrated: 2021/06/18
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: TP1089
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/LTE Mode - Lch/Area Scan (19x22x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.17 W/kg

Body/LTE Mode - Lch/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.106 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 1.52 W/kg
SAR(1 g) = 1.09 W/kg; SAR(10 g) = 0.737 W/kg
Ratio of SAR at M2 to SAR at M1 = 72.5%
Maximum value of SAR (measured) = 1.15 W/kg



Test Results of LTE Band12 707.5MHz / Mch / Left

File Name: LTE Band12 707.5MHz Left 0mm RB441T-C 22121143I (18 Mar 2022)da52:1

DUT: RB441T-C; Type: Binding machine; Serial: 22121143I

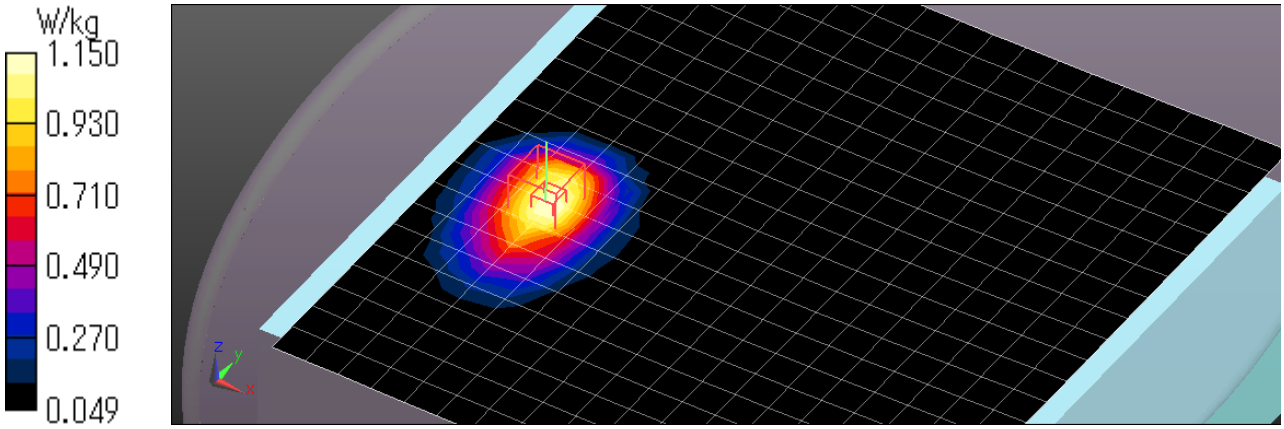
Communication System: UID 0, LTE-FDD (SC-FDMA,1RB,3MHz,QPSK) (0); Frequency: 707.5 MHz
Medium parameters used: f = 707.5 MHz; σ = 0.92 S/m; ε_r = 55.46; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ET3DV6 - SN1552; ConvF(6.66, 6.66, 6.66) @ 707.5 MHz; Calibrated: 2021/06/18
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: TP1089
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/LTE Mode - Mch/Area Scan (19x22x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.16 W/kg

Body/LTE Mode - Mch/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.255 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 1.49 W/kg
SAR(1 g) = 1.08 W/kg; SAR(10 g) = 0.738 W/kg
Ratio of SAR at M2 to SAR at M1 = 73.1%
Maximum value of SAR (measured) = 1.15 W/kg



Test Results of LTE Band12 713.5MHz / Hch / Left

File Name: LTE Band12 713.5MHz Left 0mm RB441T-C 22121143I (18 Mar 2022).da52:1

DUT: RB441T-C; Type: Binding machine; Serial: 22121143I

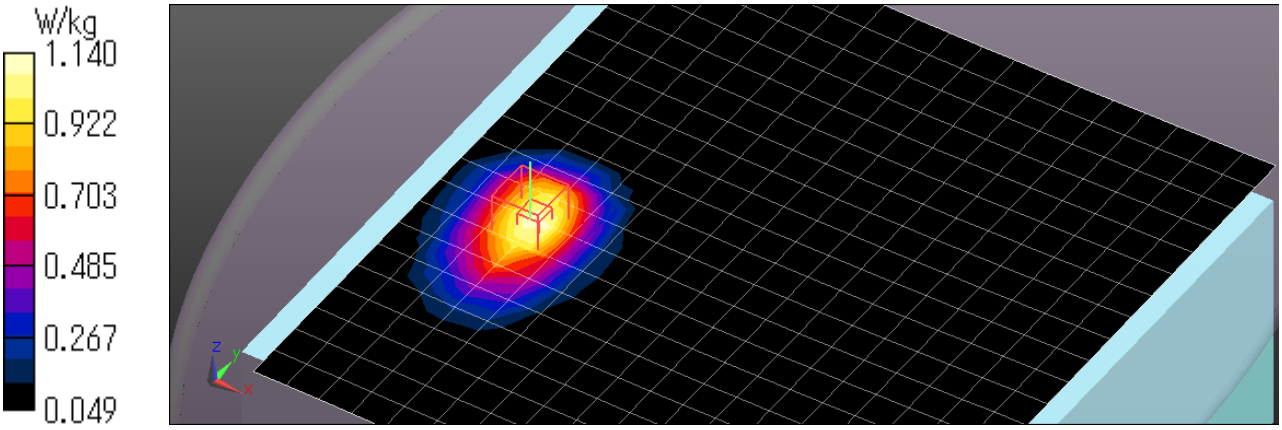
Communication System: UID 10177 - CAI, LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK);
Frequency: 713.5 MHz
Medium parameters used: f = 713.5 MHz; σ = 0.92 S/m; ε_r = 55.43; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ET3DV6 - SN1552; ConvF(6.66, 6.66, 6.66) @ 713.5 MHz; Calibrated: 2021/06/18
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: TP1089
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/LTE Mode - Hch/Area Scan (19x22x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.12 W/kg

Body/LTE Mode - Hch/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.258 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 1.47 W/kg
SAR(1 g) = 1.06 W/kg; SAR(10 g) = 0.718 W/kg
Ratio of SAR at M2 to SAR at M1 = 72.4%
Maximum value of SAR (measured) = 1.14 W/kg



Test Results of LTE Band12 707.5MHz / Mch / Top

File Name: LTE Band12 707.5MHz Top 0mm RB441T-C 22121143I (17 Mar 2022).da52:1

DUT: RB441T-C; Type: Binding machine; Serial: 22121143I

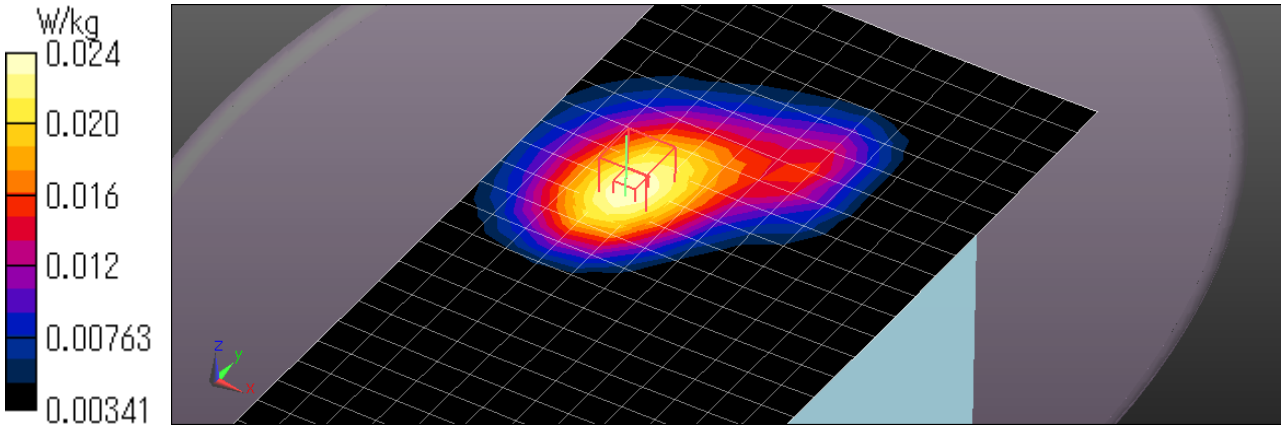
Communication System: UID 0, LTE-FDD (SC-FDMA,1RB,3MHz,QPSK) (0); Frequency: 707.5 MHz
Medium parameters used: f = 707.5 MHz; σ = 0.92 S/m; ε_r = 55; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: ET3DV6 - SN1552; ConvF(6.66, 6.66, 6.66) @ 707.5 MHz; Calibrated: 2021/06/18
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: TP1089
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/LTE Mode - Mch/Area Scan (13x25x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.0241 W/kg

Body/LTE Mode - Mch/Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.401 V/m; Power Drift = -0.21 dB
Peak SAR (extrapolated) = 0.0290 W/kg
SAR(1 g) = 0.023 W/kg; SAR(10 g) = 0.017 W/kg
Ratio of SAR at M2 to SAR at M1 = 77.2%
Maximum value of SAR (measured) = 0.0245 W/kg



Appendix 1. Conducted output power of the DUT

(Pls See Test Report No.ERJ13-22030R00_Appendix 1.)

Appendix 2. DEVICE AND TEST DETAILS

(Pls See Test Report No.ERJ13-22030R00_Appendix 2.)

END OF TEST REPORT