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

Testing LAB
RTL01900

EMC TEST REPORT

REPORT NUMBER	:	ERJ13-22004R00
APPLICANT	:	Donut Robotics Co., Ltd.
PRODUCT	:	Smart Mask
MODEL NAME	:	C-FACE
MODEL NUMBER	:	DRCF01
STANDARD	:	IEEE Std. 1528:2013 FCC 47 CFR part2 (2.1093) KDB 865664 D01 KDB 447498 D01
FCC ID	:	2A3EBDRCF01

Issue Date: Jun 26, 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	Highest Reported Body SAR-1g [W/kg]
Bluetooth	1.60	0.076

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:	Donut Robotics Co., Ltd.
Address:	1-17-1 Toranomon, Minato-Ku, Tokyo, 105-6415, Japan

2.3 Information about Test Item

Kind of Test Item:	Smart Mask
Model Name.:	C-FACE
(Type Identification)	
Model Number:	DRCF01
Serial Number:	A003168123-001
Radio standard:	Bluetooth 2.1 with EDR (class 1)
Frequency range:	2402 – 2480MHz
Antenna gain:	2dBi (*)
Antenna type:	Chip Antenna (*)
Antenna mounting type:	Internal
Modulation type:	DH5, (FHSS): GFSK (*) 2DH5, (OFDM): π/4-DQPSK (*) 3DH5, (OFDM): 8DPSK (*)
Signal spreading:	FHSS (coupled with modulation type above) (*)
Transmit speed:	DH5: 1 Mbps, 2DH5: 2 Mbps, 3DH5: 3 Mbps (*)
Number of channels:	79 (*)
Channel spacing:	1MHz (2MHz for Inquiry) (*)
Rated temperature:	+5 to 40°C
Rated voltage:	DC 3.7V (*)
Rated input Current:	Not specified
Protection class:	Ⅲ
Software used for testing:	RTLBTAPP version 5.2.2.52 by Realtek RtlBluetoothMP.dll version 5.3.1.20 by Realtek
Test Item Received Date:	Jan 21, 2022
Test Date:	Jan 21, 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	January 25, 2022	First issue

SECTION 3. MEASURMENT SYSTEM

3.1 System Description

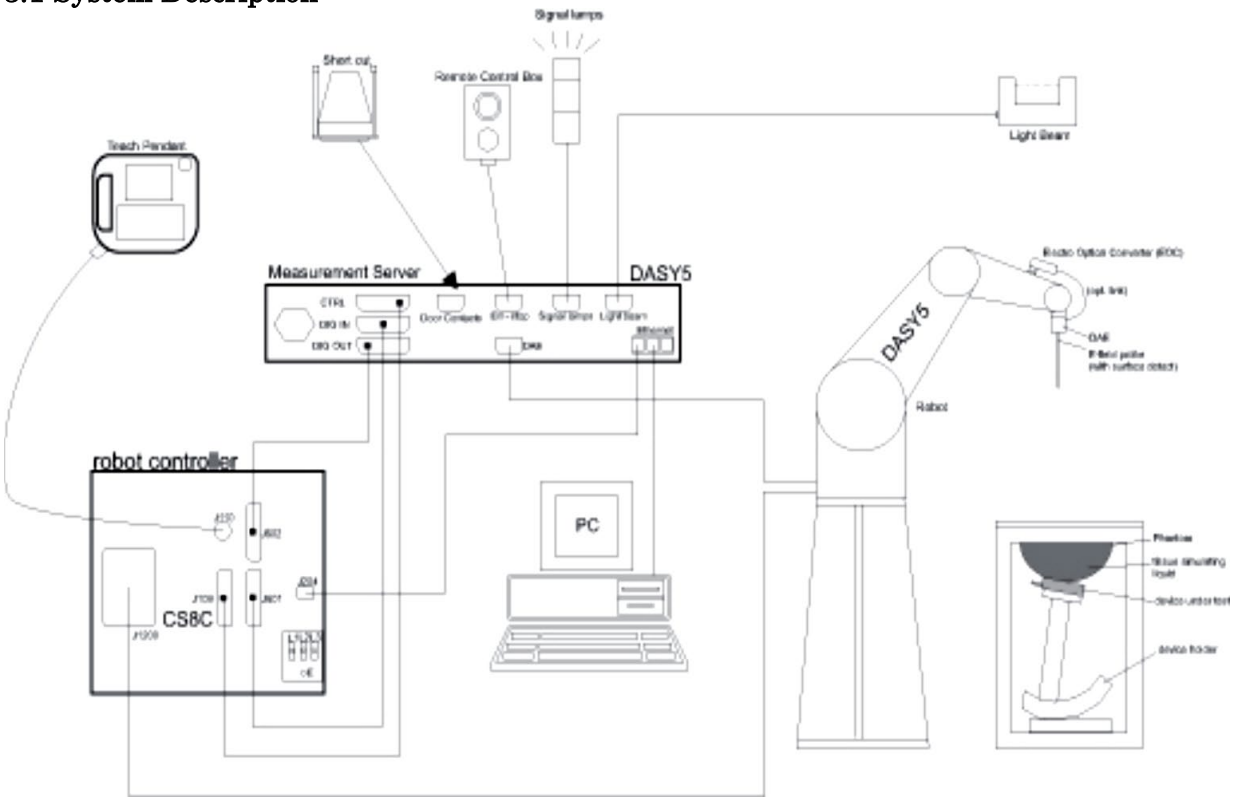


Figure 1 – The DASY5 measurement system

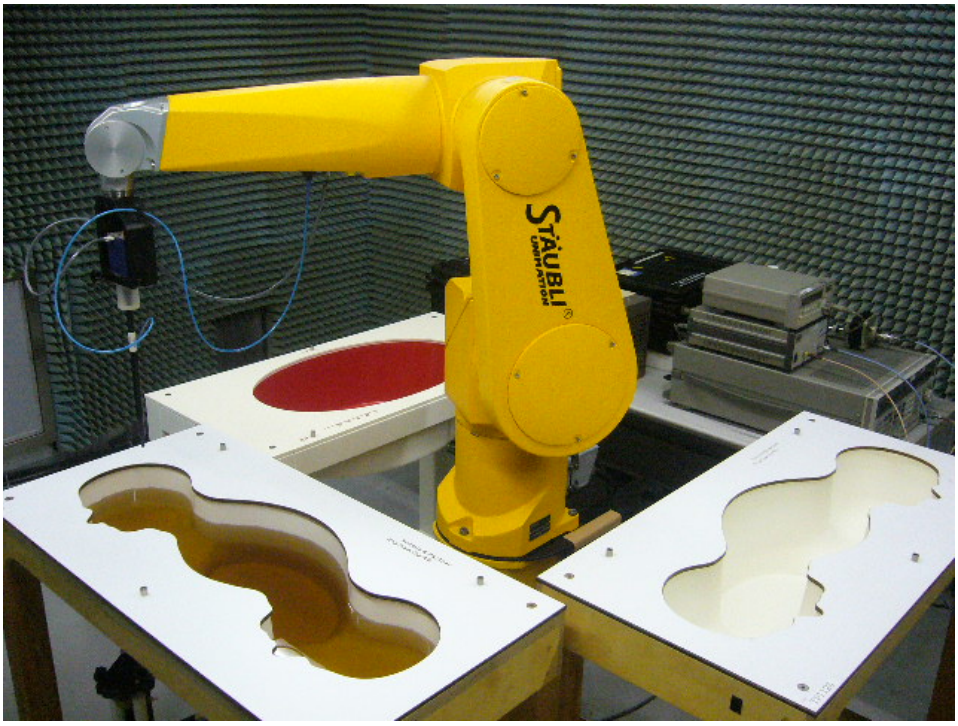


Figure 2 – Examination room

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.

SAM Phantom

The flat region of SAM Phantom shell used for Body SAR measurement, corresponding to the requirements of the flat phantom specified in IEC/IEEE 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. 300 mm (L) X 250 mm (W) X 210 mm (D)
- Filling volume: approx. 25 liters (SAM totally)

E-Field Probe

EX3DV4

- Frequency band: 10 MHz – 6 GHz
- Dynamic range: 10 μW/g – 100 mW/g
- Probe linearity: ±0.2 dB
- Axial isotropy: ±0.3 dB
- Spherical isotropy: ±0.5 dB
- Dimension: Overall length: 337 mm (Tip 20 mm)
  Tip diameter: 2.5 mm (Body 12 mm)
  Distance from probe tip to dipole centers: 1 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 10mm×10mm.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 7 × 7 × 7 point at least for below 3GHz.

The data at the surface were extrapolated, since the center of the dipoles is 1mm(EX3DV4) away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.4 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

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/D2450V2	Schmid & Partner	Schmid & Partner	Accredited Calibration SCS	8/2022	837
E-Field Probed/EX3DV4	Schmid & Partner	Schmid & Partner	Accredited Calibration SCS	12/2022	3681
Thermo-hygrometer /BM-727	EMPEX	Panasonic SNET Standards Center	General Calibration	4/2022	1370A

Table 1 – Test equipment

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 SAM Phantom (≥15cm depth)

MSL2450V2_1900MHz-2700MHz_17.2cm

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

				liquid temperature: 22.2 degree C Ambient Temp:20.8		
Frequency [MHz]	Measured Conductivity [σ]	Measured Permittivity [εr]	Targeted Conductivity [σ]	Targeted Permittivity [εr]	Deviation Conductivity [%]	Deviation Permittivity [%]
MSL 2450	2.03	50.18	1.95	52.70	4.10	-4.78

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 [%]
MSL 2450	12.8	12.1	-5.47

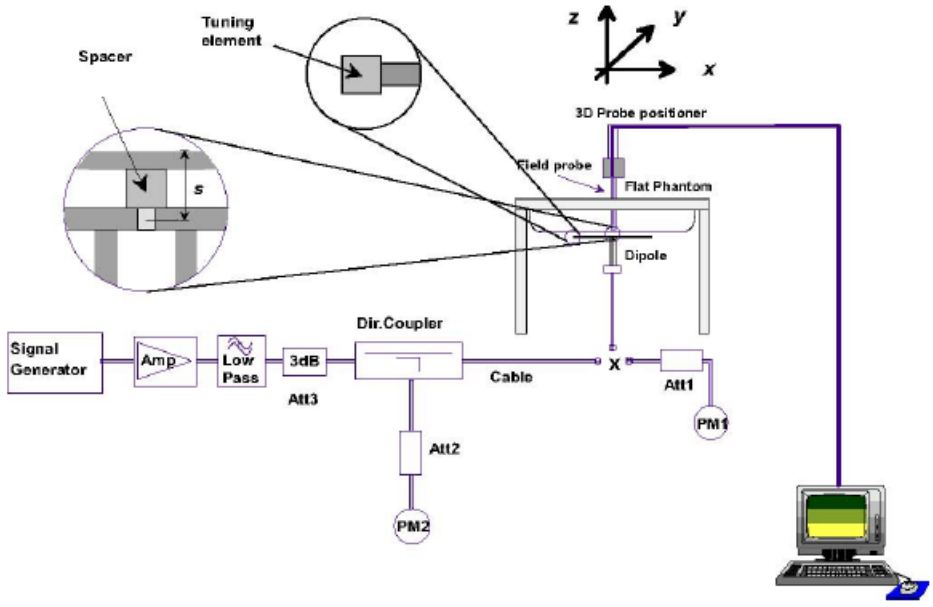


Figure 3 – Test setup for the system check.

3.6.3 SAR system checking Details

2450 MHz validation results

File Name: System Check MSL2450MHz (20220121).da52:0

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:837

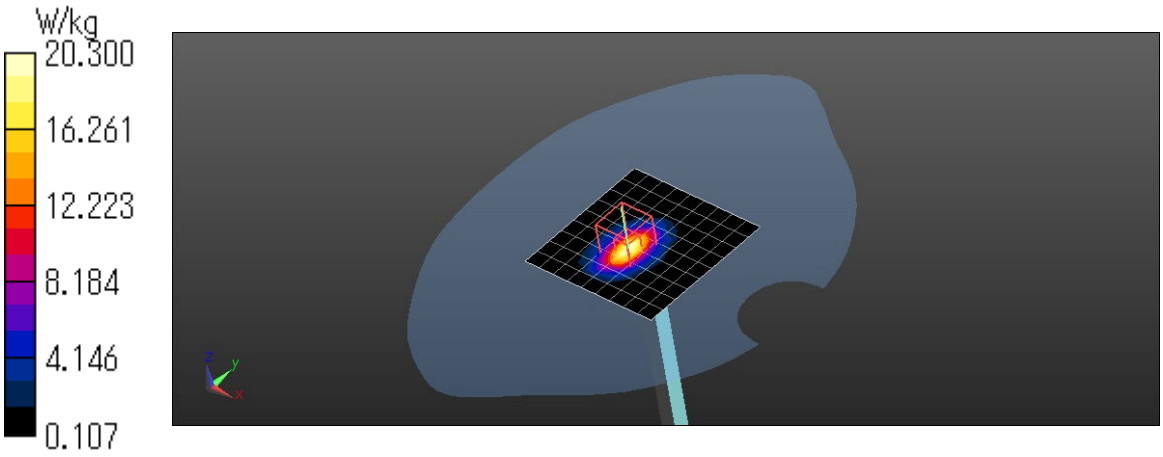
Communication System: UID 0, CW (0); Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.03 S/m; ε_r = 50.18; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: EX3DV4 - SN3681; ConvF(7.82, 7.82, 7.82) @ 2450 MHz; Calibrated: 2021/11/12
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: SAM with CRP Front; Type: SAM; Serial: TP1007
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

System Check/System Check/Area Scan (10x10x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 20.5 W/kg

System Check/System Check/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.57 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 25.3 W/kg
SAR(1 g) = 12.1 W/kg; SAR(10 g) = 5.52 W/kg
Smallest distance from peaks to all points 3 dB below = 8.5 mm
Ratio of SAR at M2 to SAR at M1 = 48.2 %
Maximum value of SAR (measured) = 20.3 W/kg



SECTION 4. UNCERTAINTY ESTIMATION

4.1 Frequency range of 2 GHz to 6 GHz (EX3DV4)

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	13.1	N	2	1	1	6.55	6.55	∞
Isotropy	10.0	R	√3	1	1	5.77	5.77	∞
Boundary effect	2.0	R	√3	1	1	1.15	1.15	∞
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	0.9	R	√3	1	1	0.52	0.52	∞
Probe positioning with respect to phantom shell	6.8	R	√3	1	1	3.93	3.93	∞
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	2.40	R	√3	1	1	1.39	1.39	∞
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)	0.57	R	√3	0.78	0.71	0.26	0.23	∞
Liquid conductivity (meas.)	4.3	N	1	0.78	0.71	3.35	3.05	∞
Liquid permittivity (temperature)	1.03	R	√3	0.26	0.26	0.15	0.15	∞
Liquid permittivity (meas.)	2.2	N	1	0.26	0.26	0.57	0.57	∞
Combined standard uncertainty						12.4	12.3	
Expanded uncertainty (95% conf. interval)						24.8	24.6	

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

SECTION 5. DEVICE AND TEST DETAILS

5.1 Appearance of DUT

・Front view

・Rear view

Figure 4 – Picture of the device under test (DUT)

5.2 Antenna position

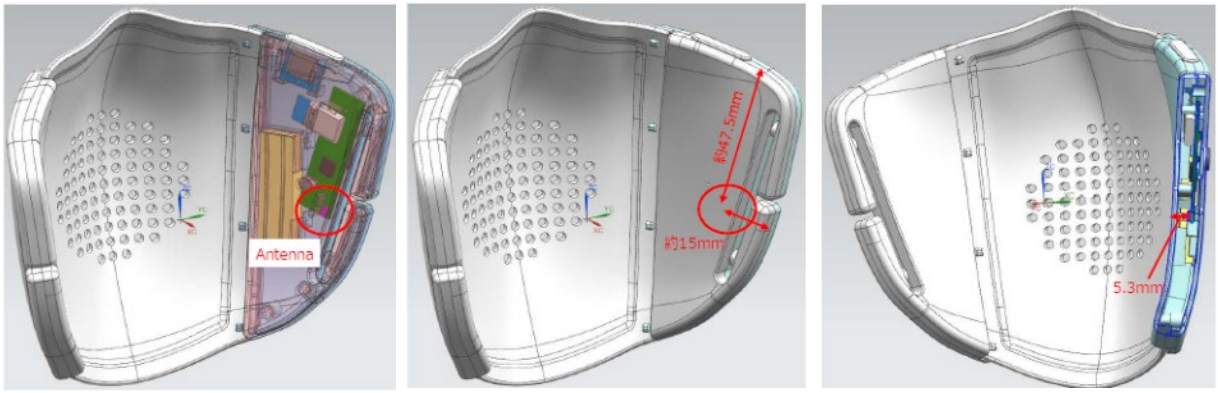


Figure 5 – Picture of the antenna position (DUT)

5.3 Positions and orientations of the DUT in relation to the phantom

For body-mounted positioning, the separation distance between the DUT and the flat phantom (user body) is specified as 0 mm because the device is used in close contact with the body.

5.4 Testing environmental condition

Environment temperature and relative humidity of the test room during the tests were normal and were recorded in 6.1 Tabulated SAR values.

Electromagnetic environment noise was low and its influence was entered into SECTION 4. Uncertainty estimation.

SECTION 6. REPORT SUMMARY

6.1 Tabulated SAR values

Body SAR, Bluetooth

Date: 21 Jun 2022

Climatic Condition : Ambient Temperature: 21.5~22 degree C Relative humidity: 22~23%

Liquid temperature: 18.8~19.4 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]
3DH5 2402.0	0	Front	10	5.07	0.011	1.97	0.022
3DH5 2441.0	39	Worse case data position －Front	10	5.46	0.041	1.83	0.075
		Rear	10	5.46	0.009	1.83	0.016
		Right	10	5.46	0.003	1.83	0.005
		Left	10	5.46	Note.1	1.83	Note.1
		Top	10	5.46	Note.1	1.83	Note.1
		Rear	10	5.46	Note.1	1.83	Note.1
3DH5 2480.0	78	Front	10	4.77	0.036	2.10	0.076

Material Parameters:

Frequency [MHz]	Conductivity [σ]	Permittivity [εr]	Targeted Conductivity [σ]	Targeted Permittivity [εr]	Deviation Conductivity [%]	Deviation Permittivity [%]	Remark
2402.0	1.96	50.35	1.90	52.76	3.16	-4.57	Note.2
2441.0	2.01	50.21	1.94	52.71	3.61	-4.74	Note.2
2480.0	2.07	50.08	1.99	52.66	4.02	-4.90	Note.2

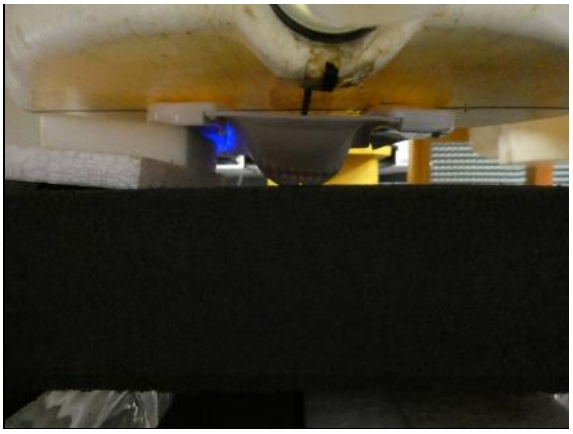
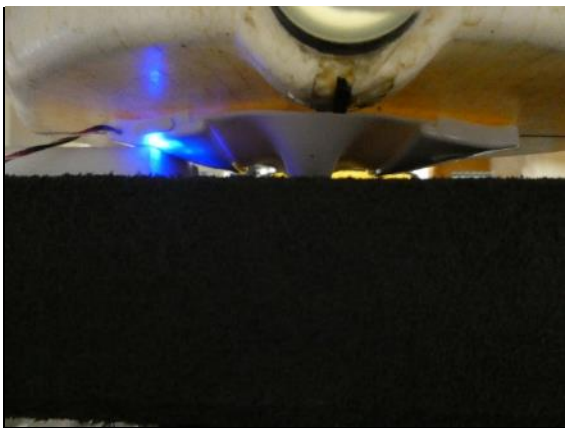
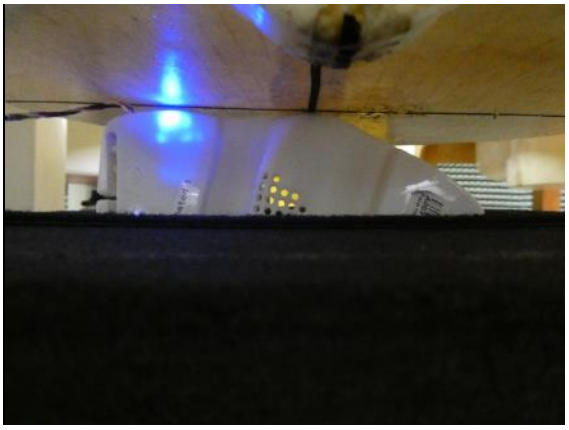
Note.1: Measurement is not possible because the transmission power was low and the peak SAR value could not be obtained.

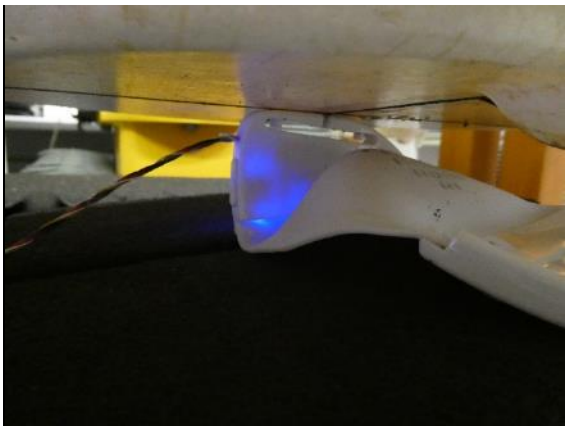
Note.2: The dielectric parameters should be linearly interpolated between the closest pair of target frequencies to determine the applicable dielectric parameters corresponding to the device test frequency.

See Table 6 for Test Mode, Device direction/distance.

6.2 Test Positions

Table 6 Body SAR－Test positions and photos

Operating band	DUT Direction / Position	Photos
Bluetooth 3DH5 2.4GHz	・Direction: Front ・Position (gap to Phantom) Distance gap:0mm	
	・Direction: Rear ・Position (gap to Phantom) Distance gap:0mm	
	・Direction: Top ・Position (gap to Phantom) Distance gap:0mm	

Bluetooth 3DH5 2.4GHz	・Direction: Bottom ・Position (gap to Phantom) Distance gap:0mm	
	・Direction: Right ・Position (gap to Phantom) Distance gap:0mm	
	・Direction: Left ・Position (gap to Phantom) Distance gap:0mm	

6.3 Details of test data

Test Results of Bluetooth 3DH5/ Mch / Front

File Name: Bluetooth 3DH5 2441.0MHz Front 0mm Face mask (21 Jan 2022).da52:1

DUT: Face mask; Type: Bluetooth Device; Serial: A003168123-001

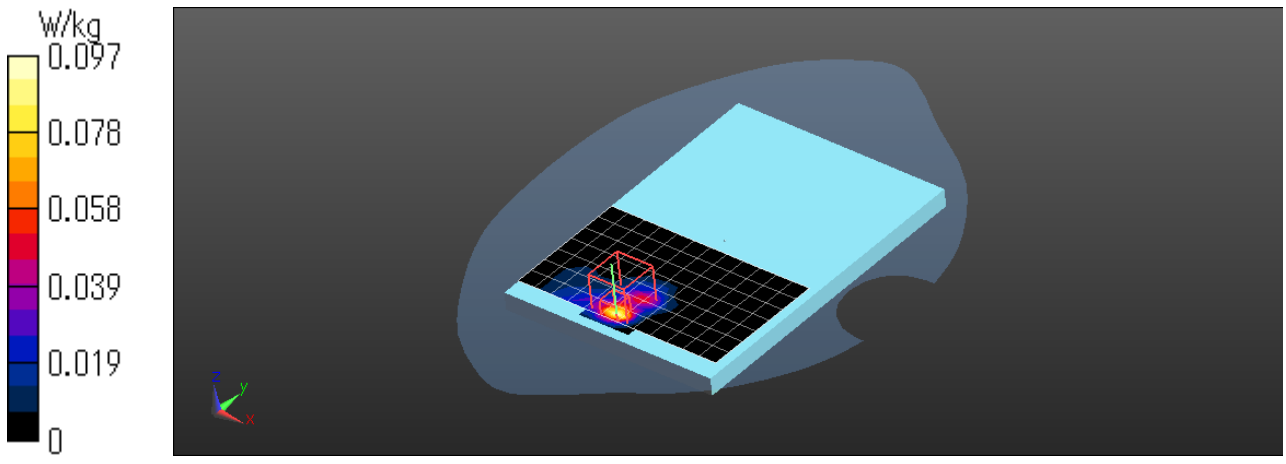
Communication System: UID 0, Bluetooth (BDR/EDR/BLE) (0); Frequency: 2441 MHz
Medium parameters used: f = 2441 MHz; σ = 2.01 S/m; ε_r = 50.21; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: EX3DV4 - SN3681; ConvF(7.82, 7.82, 7.82) @ 2441 MHz; Calibrated: 2021/11/12
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: SAM with CRP Front; Type: SAM; Serial: TP1007
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/Bluetooth Mode - Mch/Area Scan (13x8x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.0606 W/kg

Body/Bluetooth Mode - Mch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.06600 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.295 W/kg
SAR(1 g) = 0.041 W/kg; SAR(10 g) = 0.014 W/kg
Smallest distance from peaks to all points 3 dB below = 6 mm
Ratio of SAR at M2 to SAR at M1 = 29.2%
Maximum value of SAR (measured) = 0.0971 W/kg



Test Results of Bluetooth 3DH5/ Mch / Rear

File Name: Bluetooth 3DH5 2441.0MHz Rear 0mm Face mask (21 Jan 2022).da52:1

DUT: Face mask; Type: Bluetooth Device; Serial: A003168123-001

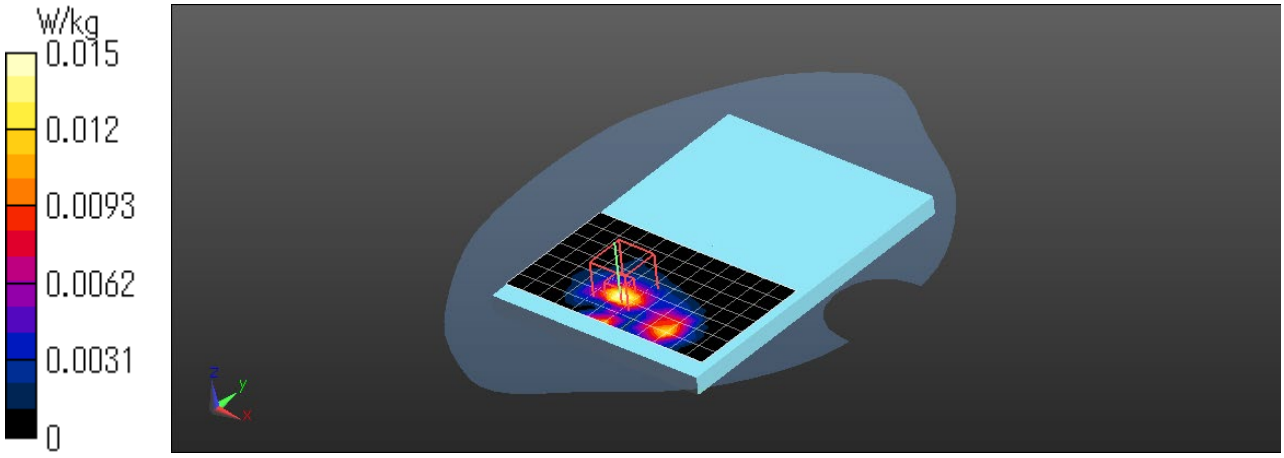
Communication System: UID 0, Bluetooth (BDR/EDR/BLE) (0); Frequency: 2441 MHz
Medium parameters used: f = 2441 MHz; σ = 2.01 S/m; ε_r = 50.21; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: EX3DV4 - SN3681; ConvF(7.82, 7.82, 7.82) @ 2441 MHz; Calibrated: 2021/11/12
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: SAM with CRP Front; Type: SAM; Serial: TP1007
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/Bluetooth Mode - Mch/Area Scan (13x8x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.0157 W/kg

Body/Bluetooth Mode - Mch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.3160 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 0.0440 W/kg
SAR(1 g) = 0.00856 W/kg; SAR(10 g) = 0.0032 W/kg
Ratio of SAR at M2 to SAR at M1 = 42.1%
Maximum value of SAR (measured) = 0.0155 W/kg



est Results of Bluetooth 3DH5/ Mch / Right

File Name: Bluetooth 3DH5 2441.0MHz Right 0mm Face mask (21 Jan 2022).da52:1

DUT: Face mask; Type: Bluetooth Device; Serial: A003168123-001

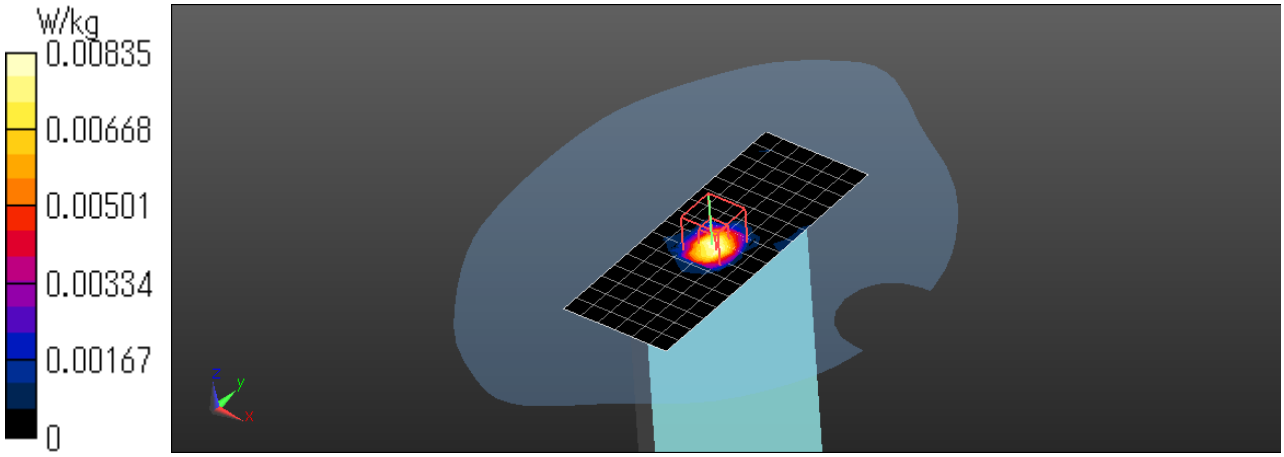
Communication System: UID 0, Bluetooth (BDR/EDR/BLE) (0); Frequency: 2441 MHz
Medium parameters used: f = 2441 MHz; σ = 2.01 S/m; ε_r = 50.21; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: EX3DV4 - SN3681; ConvF(7.82, 7.82, 7.82) @ 2441 MHz; Calibrated: 2021/11/12
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: SAM with CRP Front; Type: SAM; Serial: TP1007
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/Bluetooth Mode - Mch/Area Scan (7x17x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.00758 W/kg

Body/Bluetooth Mode - Mch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.158 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.0170 W/kg
SAR(1 g) = 0.00322 W/kg; SAR(10 g) = 0.00103 W/kg
Ratio of SAR at M2 to SAR at M1 = 29.1%
Maximum value of SAR (measured) = 0.00835 W/kg



Test Results of Bluetooth 3DH5/ Lch / Front

File Name: Bluetooth 3DH5 2402.0MHz Front 0mm Face mask (21 Jan 2022).da52:1

DUT: Face mask; Type: Bluetooth Device; Serial: A003168123-001

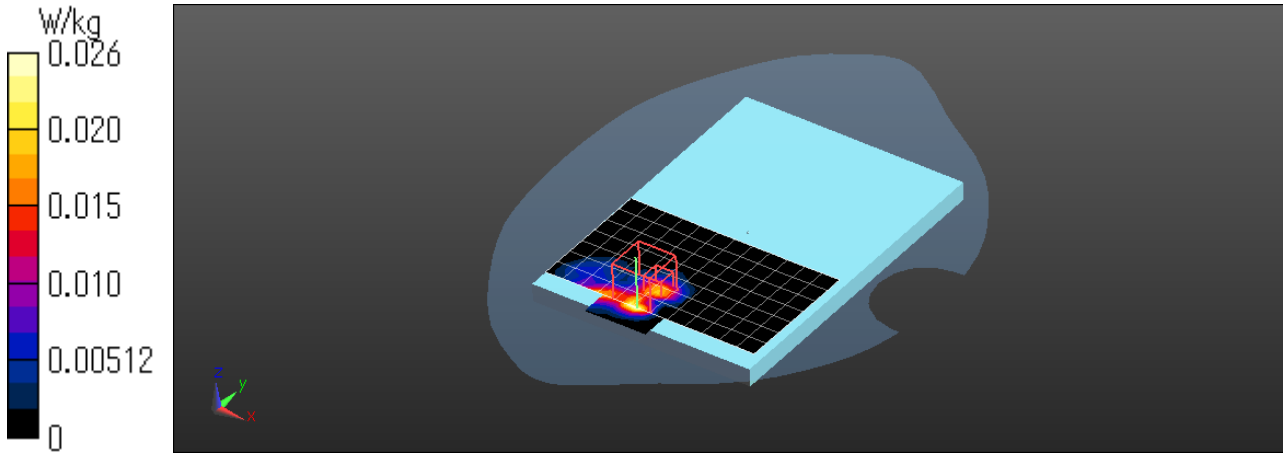
Communication System: UID 0, Bluetooth (BDR/EDR/BLE) (0); Frequency: 2402 MHz
Medium parameters used: f = 2402 MHz; σ = 1.96 S/m; ε_r = 50.35; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: EX3DV4 - SN3681; ConvF(7.82, 7.82, 7.82) @ 2402 MHz; Calibrated: 2021/11/12
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: SAM with CRP Front; Type: SAM; Serial: TP1007
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/Bluetooth Mode - Lch/Area Scan (13x8x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.0271 W/kg

Body/Bluetooth Mode - Lch/Zoom Scan (8x10x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.1540 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.0350 W/kg
SAR(1 g) = 0.011 W/kg; SAR(10 g) = 0.00337 W/kg
Ratio of SAR at M2 to SAR at M1 = 19.1%
Maximum value of SAR (measured) = 0.0256 W/kg



Test Results of Bluetooth 3DH5/ Hch / Front

File Name: Bluetooth 3DH5 2480.0MHz Front 0mm Face mask (21 Jan 2022).da52:1

DUT: Face mask; Type: Bluetooth Device; Serial: A003168123-001

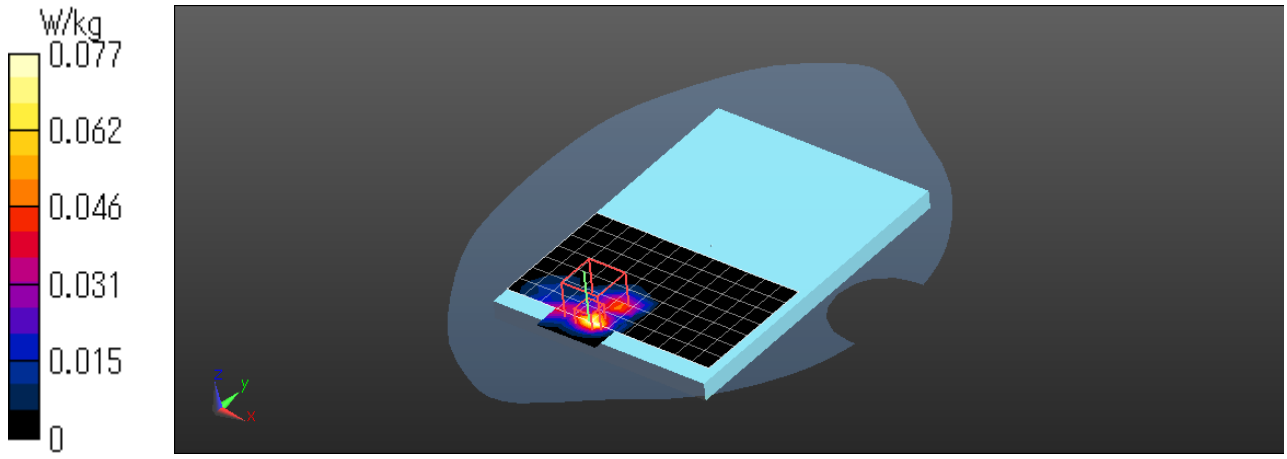
Communication System: UID 0, Bluetooth (BDR/EDR/BLE) (0); Frequency: 2480 MHz
Medium parameters used: f = 2480 MHz; σ = 2.07 S/m; ε_r = 50.08; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: EX3DV4 - SN3681; ConvF(7.82, 7.82, 7.82) @ 2480 MHz; Calibrated: 2021/11/12
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE3 Sn407; Calibrated: 2021/09/15
- Phantom: SAM with CRP Front; Type: SAM; Serial: TP1007
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

Body/Bluetooth Mode - Hch/Area Scan (13x8x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.0791 W/kg

Body/Bluetooth Mode - Hch/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.1152 V/m; Power Drift = 0.20 dB
Peak SAR (extrapolated) = 0.148 W/kg
SAR(1 g) = 0.036 W/kg; SAR(10 g) = 0.013 W/kg
Ratio of SAR at M2 to SAR at M1 = 34.8%
Maximum value of SAR (measured) = 0.0772 W/kg



Appendix 1. Conducted output power of the DUT

(The measurements and the resulted data in this appendix are not covered by JAB Accreditation of PSNET. Conducted output power and Maximum Tune-up power are data provided by TUV-R.)

FCC 15.247(b)(1)

For frequency hopping systems operating in the 2400-2483.5MHz band employing at least 75 non-overlapping hopping channels, the maximum peak conducted output power shall be 1W (30dBm). For other hopping systems operating in the 2400-2483.5MHz band, the maximum peak conducted output power shall be 0.125W (21dBm).

Test procedure:

ANSI C63.10 §7.8.5.
The maximum peak output power (conducted) was measured at the antenna connector with a power meter. The final result takes into account the loss generated by all the involved cables.

Table 7: Maximum Peak Output Power, BDR (DH5)

Freq. [MHz]	Peak Output Power [dBm]	Limit [dBm]	Margin [dB]
2402	2.09	21	18.91
2441	2.95	21	18.05
2480	2.34	21	18.66

Table 8: Maximum Peak Output Power, EDR (2DH5)

Freq. [MHz]	Peak Output Power [dBm]	Limit [dBm]	Margin [dB]
2402	4.56	21	16.44
2441	4.97	21	16.03
2480	3.85	21	17.15

Table 9: Maximum Peak Output Power, EDR (3DH5)

Freq. [MHz]	Peak Output Power [dBm]	Limit [dBm]	Margin [dB]
2402	5.07	21	15.93
2441	5.46	21	15.54
2480	4.77	21	16.23

Built-in Bluetooth module is rated at 10 dBm.

--- The end of Appendix ---

END OF TEST REPORT