SAR TEST REPORT

Test Report No. 13734841S-A-R3

Customer	**Canon Inc.**
Description of EUT	**Built-in Wireless module with Bluetooth in Flat Panel Detector**
Model Number of EUT	**WM01B**
FCC ID	**AZDWM01B**
Test Regulation	**FCC 47CFR Part 2 (2.1093)**
Test Result	**Complied (Refer to SECTION 3)**
Issue Date	**July 28, 2022**
Remarks	This SAR tested report is evaluation for the host platforms of WM01B. The past host platforms SAR results refer to section 3.1 in this report.

Representative Test Engineer	**Approved By**
Hiroshi Naka Engineer	Toyokazu Imamura Leader

CERTIFICATE 1266.03

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☒ There is no testing item of "Non-accreditation".

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REVISION HISTORY

Original Test Report No.: 13734841S-A

This report is a revised version of 13734841S-A-R2. 13734841S-A-R2 is replaced with this report.

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	13734841S-A	June 10, 2022	-
-R1	13734841S-A-R1	July 6, 2022	(p32) Added "KSDA-01" to table of "Equipment used".
-R2	13734841S-A-R2	July 21, 2022	(p9, 3.6) Added comment for Step 4 Zoom Scan (3dB check of Δx, Δy). "For 5 GHz band, SEMCAD Plot shows 4 mm, but the 3 dB point was tested at a distance greater than 4 mm in horizontally (which is step size of Δx, Δy)." "For 2.4 GHz band, SEMCAD Plot shows 5 mm, but the 3 dB point was tested at a distance greater than 5 mm in horizontally (which is step size of Δx, Δy)." (p11) Replaced (updated) KDB number of "*1". KDB 447498 D01 (v07)-> KDB 447498 D04 (v01) (p11) Corrected ERP calculation formula and calculated results in table. (was: "-2.54"->new: "-2.15") (p15) Corrected the mistake. [0.429 | 10g | 4 | 3a-2; 0.434 | 10g | 4 | -; 0.459 | 10g | 4 | 3a-1; 0.461 | 10g | 4 | -] -> [0.429 | 10g | 4 | -; 0.434 | 10g | 4 | 3a-2; 0.459 | 10g | 4 | -; 0.461 | 10g | 4 | 3a-1] (new) (SAR plot, p22~p31, p37~38) Replaced "Medium" name. (HSL5GHz(v6.2204) (was)->Head(v6.2204)(new))
-R3	13734841S-A-R3	July 28, 2022	(p7) Corrected the mistake. [Simultaneous SAR (5 GHz WLAN+BT LE) (Refer to Clause 6.3) | 5 | <0.10; Simultaneous SAR (5 GHz WLAN+BT LE) | 0.50] -> [DTS, Bluetooth | 5 | <0.10; Simultaneous SAR (5 GHz WLAN+BT LE) (Refer to Clause 6.3) | 0.50] (new) (p16, 6.3) Replaced (updated) KDB number. KDB 447498 D01 (v07)-> KDB 447498 D04 (v01)

Reference : Abbreviations (Including words undescribed in this report) (radio_r0v09s02_211221)

A2LA	The American Association for Laboratory Accreditation
AC	Alternating Current
AFH	Adaptive Frequency Hopping
AM	Amplitude Modulation
Amp, AMP	Amplifier
ANSI	American National Standards Institute
Ant, ANT	Antenna
AP	Access Point
ASK	Amplitude Shift Keying
Atten., ATT	Attenuator
AV	Average
BPSK	Binary Phase-Shift Keying
BR	Bluetooth Basic Rate
BT	Bluetooth
BT LE	Bluetooth Low Energy
BW	BandWidth
Cal Int	Calibration Interval
CCK	Complementary Code Keying
CDD	Cyclic Delay Diversity
Ch., CH	Channel
CISPR	Comite International Special des Perturbations Radioelectriques
CW	Continuous Wave
DBPSK	Differential BPSK
DC	Direct Current
D-factor	Distance factor
DFS	Dynamic Frequency Selection
DQPSK	Differential QPSK
DSSS	Direct Sequence Spread Spectrum
DUT	Device Under Test
EDR	Enhanced Data Rate
EIRP, e.i.r.p.	Equivalent Isotropically Radiated Power
EMC	ElectroMagnetic Compatibility
EMI	ElectroMagnetic Interference
EN	European Norm
ERP, e.r.p.	Effective Radiated Power
ETSI	European Telecommunications Standards Institute
EU	European Union
EUT	Equipment Under Test
Fac.	Factor
FCC	Federal Communications Commission
FHSS	Frequency Hopping Spread Spectrum
FM	Frequency Modulation
Freq.	Frequency
FSK	Frequency Shift Keying
GFSK	Gaussian Frequency-Shift Keying
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
Hori.	Horizontal
ICES	Interference-Causing Equipment Standard
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IF	Intermediate Frequency
ILAC	International Laboratory Accreditation Conference
ISED	Innovation, Science and Economic Development Canada
ISO	International Organization for Standardization
JAB	Japan Accreditation Board
LAN	Local Area Network
LIMS	Laboratory Information Management System
MCS	Modulation and Coding Scheme
MIMO	Multiple Input Multiple Output (Radio)
MRA	Mutual Recognition Arrangement
MU-MIMO	Multi-User Multiple Input Multiple Output (Radio)
N/A	Not Applicable, Not Applied
NII	National Information Infrastructure (Radio)
NIST	National Institute of Standards and Technology
NS	No signal detect.
NSA	Normalized Site Attenuation
OBW	Occupied Band Width
OFDM	Orthogonal Frequency Division Multiplexing
P/M	Power meter
PCB	Printed Circuit Board
PER	Packet Error Rate
PHY	Physical Layer
PK	Peak
PN	Pseudo random Noise
PRBS	Pseudo-Random Bit Sequence
PSD	Power Spectral Density
QAM	Quadrature Amplitude Modulation
QP	Quasi-Peak
QPSK	Quadrature Phase Shift Keying
RBW	Resolution Band Width
RDS	Radio Data System
RE	Radio Equipment
RF	Radio Frequency
RMS	Root Mean Square
RSS	Radio Standards Specifications
Rx	Receiving
SA, S/A	Spectrum Analyzer
SAR	Specific Absorption Rate
SISO	Single Input Single Output (Radio)
SG	Signal Generator
SPLSR	SAR to Peak Location Separation Ratio
SVSWR	Site-Voltage Standing Wave Ratio
T/R	Test Receiver
Tx	Transmitting
U-NII	Unlicensed National Information Infrastructure (Radio)
VBW	Video BandWidth
Vert.	Vertical
WLAN	Wireless LAN

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Contents of appendixes

SECTION 1: Customer information

Company Name	Canon Inc.
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Telephone Number	+81-3-3758-2111
Contact Person	Tetsuo Watanabe

The information provided from the customer is as follows;
- Customer name, Company name, Type of Equipment, Model No., FCC ID on the cover and other relevant pages
- SECTION 1: Customer information
- SECTION 2: Equipment under test (EUT)
- SECTION 4: Operation of EUT during testing
- Appendix 1: The part of Antenna location information, Description of EUT and Support Equipment

* The laboratory is exempted from liability of any test results affected from the above information in SECTION 2, SECTION 4 and Appendix 1.

SECTION 2: Equipment under test (EUT)

2.1 Identification of EUT and host platform

	EUT	Host platform
Type	Built-in Wireless Module with Bluetooth	Flat Panel Detector
Model Number	WM01B	WM5B05 (*2)
Serial Number	34:9F:7B:EF:DB:20	21MED-0327
Rating	DC 3.3 V supplied form the platform.	DC 22 V ~ DC 24 V
Condition of sample	Engineering prototype (*1)	Engineering prototype (*1)
Receipt Date of sample	September 28, 2021 (for power measurement) (*. No modification by the Lab.) April 12, 2022 (for SAR test) (*. No modification by the Lab.)	
Test Date	April 19~22, 2022	
SAR Category Identified	Portable device	
Feature of EUT	The EUT is a Built-in Wireless Module with Bluetooth, model: WM01B which installs into the specified platform as “Flat Panel Detector”.	
SAR Accessory	None	

*1. Not for sale: The sample is equivalent to mass-produced items.
*2. Another name for the model WM5B05 is AR-E2735W or CXDI-820C Wireless.

2.2 Product Description (Radio specification)

Model Number	WM01B
Equipment type	Transceiver
Frequency of operation	*. The operation frequency in each operation band refer to remarks in below.
Channel spacing	BT-LE: 2MHz / WLAN: 5 MHz (2.4 GHz band), 20 MHz (5 GHz band)
Bandwidth	BT-LE: 79 MHz (FHSS) / WLAN: 20 MHz (11b, 11g, 11a, 11n20, 11ac20), 40 MHz (11n40, 11ac40), 80 MHz (11ac80)
Type of modulation	BT-LE: GFSK / WLAN: DSSS: DBPSK, DQPSK, CCK (11b), WLAN: OFDM: BPSK, QPSK, 16QAM, 64QAM (11g, 11a, 11n20, 11ac20, 11n40, 11ac40, 11ac80), 256QAM (11ac80)
Typical power and tune-up limit (maximum) power	*. The specification of typical and maximum transmit power (which may occur) refer to remarks in below. *. The measured output power (conducted) as SAR reference power refers to section 5 in this report.

Antenna quantity	2 pcs. (*3)	
Antenna model	**Antenna 2:** ANT2444-16B/M-AB-125	**Antenna 1:** ANT2444-16B/M-AB-125
Antenna cable length	125 mm	125 mm
Antenna gain (*. max.peak)	3.33 dBi (2.4 GHz band), 3.79 dBi (5 GHz band) (*including 125 mm cable loss)	3.33 dBi (2.4 GHz band), 3.79 dBi (5 GHz band) (*including 125 mm cable loss)
Antenna type / connector type	Monopole (1/4λ) / PCB side: MHF, Antenna side: soldered	Monopole (1/4λ) / PCB side: MHF, Antenna side: soldered

*3. A transmission is performed from one of antenna 2 or antenna 1 (diversity). A transmission of WLAN(2.4 GHz) and BT-LE is time-division-processing. Therefore, simultaneously transmitted SAR was only considered for the WLAN(5 GHz) and BT-LE.

*. Typical power and tune-up limit power (as “maximum power”)

Tx Mode	Data rate, MCS Index	Output power (Typical and maximum) [dBm] (*. The measured output power (conducted) refers to section 5 in this report.)														
		2.4 GHz band			U-NII-1 (5.2GHz band)			U-NII-2A (5.3GHz band)			U-NII-2C (5.6GHz band)			U-NII-3 (5.8GHz band)		
		F [MHz]	Typical	Max.	F [MHz]	Typical	Max.	F [MHz]	Typical	Max.	F [MHz]	Typical	Max.	F [MHz]	Typical	Max.
BT-LE	(1~2) M-PHY	2402~2480	3	**5**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11b	(1~11) Mbps	2412~2462	12	**14**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11g	(6~54) Mbps	2412~2462	12	**14**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11a	(6~54) Mbps	N/A	N/A	N/A	5180~5240	11	**13**	5260~5320	11	**13**	5500~5580, 5660~5700	11	**13**	5745~5825	11	**13**
11n20-SISO	MCS0~7	2412~2462	12	**14**	5180~5240	11	**13**	5260~5320	11	**13**	5500~5580, 5660~5700	11	**13**	5745~5825	11	**13**
11ac20-SISO	MCS0~8	N/A	N/A	N/A	5180~5240	11	**13**	5260~5320	11	**13**	5500~5580, 5660~5700	11	**13**	5745~5825	11	**13**
11n40-SISO	MCS0~7	2422~2452	11	**13**	5190, 5230	11	**13**	5270, 5310	11	**13**	5510, 5550, 5670	11	**13**	5755, 5795	11	**13**
11ac40-SISO	MCS0~9	N/A	N/A	N/A	5190, 5230	11	**13**	5270, 5310	11	**13**	5510, 5550, 5670	11	**13**	5755, 5795	11	**13**
11ac80-SISO	MCS0~9	N/A	N/A	N/A	5210	8.5	**10.5**	5290	8.5	**10.5**	5530	8.5	**10.5**	5775	8.5	**10.5**

*. F: Frequency; Max.: maximum; N/A: Not applicable; (mode) 11b: IEEE 802.11b, 11g: IEEE 802.11g, 11a: IEEE 802.11a, 11n20-SISO: IEEE 802.11n(20HT)-SISO, 11n40-SISO: IEEE 802.11n(40HT)-SISO, 11ac20-SISO: IEEE 802.11ac(20VHT)-SISO, 11ac40-SISO: IEEE 802.11n (40VHT)-SISO, 11ac80-SISO: IEEE 802.11ac(80VHT)-SISO.

*. The EUT do not use the special transmitting technique such as “beam-forming” and “time-space code diversity.”

*. The EUT only supports BT-LE, does not support BR/EDR even though the EUT supports Bluetooth 5.2.

***.** Maximum tune-up tolerance limit is conducted burst average power and is defined by a customer as Duty cycle 100% (continuous transmitting).

2.3 Host platform information

This EUT (Built-in Wireless Module with Bluetooth, model: WM01B) is installed into the following "Flat Panel Detector" series models.
The host platform has the following "Model number" and specified "Medical equipment model number."

	Host platform information				SAR test information	
No.	Type of equipment	Model number	Medical equipment model number	Remarks	SAR test status	Reference SAR test report
1	Flat Panel Detector	WM5B04	CXDI-720C Wireless, AR-E3543W	14"×17" detector, Wireless High-end model	Tested	14033664S-A (latest version)
2	Flat Panel Detector	WM5B06	CXDI-420C Wireless, AR-E4343W	17"×17" detector, Wireless High-end model	Tested	13734845S-A (latest version)
3	Flat Panel Detector	WM5B05	CXDI-820C Wireless, AR-E2735W	11"×14" detector, Wireless High-end model	Tested	13734841S-A (this report)

2.4 SAR test consideration of this host platform

This platform is a large-sized transportable equipment and has a part coming in contact directly with a patient. An operator (a patient become an operator uncommonly) maintains EUT by hand. (Refer to photographs of Appendix 1-3: Usage example)
Because there is not the KDB for the product which is such a design specifications, we decide the SAR test method in below.

Physical characteristics of platform: WM5B05
Dimensions: 308 × 384 × 15.5 mm

- This platform is a transportable equipment, but, because it is a large-sized equipment, an operator (or a patient) fixes the edge of platform to stands and pushes or supports platform to a patient's body part (head, body, arm, hand, foot, etc.) by hand at the time of use.
  The X-ray imaging by platform changes the imaging part of the patient's body at every imaging after having needed several minutes for setting.
- The image transfer time (continuous transfer time) per one imaging is two or three seconds, it is short enough.
  The imaging of the same part can be performed consecutively several times.
  In the case of serial imaging, the image transfer time (continuous transfer time) occupies two or three seconds among the image intervals of 15 seconds. (Duty Cycle: < 20 %)
- On this account, the time when an operator (or patient) is really exposed to RF energy is short.
- In addition, an operator is only a doctor or a legally certified person because platform is medical equipment.
  - Explanatory note in the manual-
  "Only a physician or a legally certified operation should use the product."

In consideration of the terms of use mentioned above, we decide the SAR examination as the following contents.

a) **<u>The front (imaging area side) and side edge of platform carries out the Partial-body SAR examination.</u>**
   The front of platform comes in contact with a patient directly. In addition, consecutive RF energy may be exposed to the same neighborhood part of the patient although duty cycle is less than 20%.
   Because the front of platform comes in contact with a patient directly, we measure the Partial-body SAR at the position of the touch to a phantom around the antenna of the front and side-edge of platform with continuous transmission in 100% duty cycle as a worse condition.

b) **<u>The back of platform carries out the Hand SAR examination.</u>**
   An operator (or a patient) fixes the edge of platform to stands and pushes or supports platform to a patient's body part (head, body, arm, hand, foot, etc.) by hand and by holding back of platform at the time of use.
   In addition, consecutive RF energy may be exposed to the same neighborhood part of the patient although duty cycle is less than 20%.
   We measure the Hand SAR at the position of the touch to a phantom around the antenna of the back of platform with continuous transmission in 100% duty cycle as a worse condition.

*. In addition, because the following instructions for the operator are mentioned in a manual, the physical part of the operator does not touch directly the antenna part of the back.
   - Explanatory note in the manual -
   "Please do not adhere to your hands and body to an antenna part to restrain exposure of the RF energy when conducting an X-ray examination."

SECTION 3: Maximum SAR value, test specification and procedures

3.1 Summary of Maximum SAR Value

Band	Max. power [dBm]	Summary of Highest Reported SAR [W/kg]					
		Body-worn (Separation 0 mm, Flat phantom)		Extremity (Separation 0 mm, Flat phantom)		Head (Separation 0 mm, SAM phantom)	
		SAR (1g)		SAR (10g)			
		Antenna 1	Antenna 2	Antenna 1	Antenna 2	Antenna 1	Antenna 2
DTS, 2.4 GHz WLAN	14	**0.22**	**< 0.10**	**0.31**	**0.29**	**N/A**	**N/A**
U-NII-1, 5.2 GHz WLAN	13	**0.38**	**< 0.10**	**0.72**	**0.58**	**N/A**	**N/A**
U-NII-2A, 5.3 GHz WLAN	13	**0.48**	**< 0.10**	**0.75**	**0.52**	**N/A**	**N/A**
U-NII-2C, 5.6 GHz WLAN	13	**0.31**	**< 0.10**	**0.46**	**0.43**	**N/A**	**N/A**
U-NII-3, 5.8 GHz WLAN	13	**0.40**	**< 0.10**	**0.43**	**0.42**	**N/A**	**N/A**
DTS, Bluetooth	5	**< 0.10**	**< 0.10**	**< 0.10**	**< 0.10**	**N/A**	**N/A**
Simultaneous SAR (5 GHz WLAN + BT LE) (Refer to Clause 6.3)		**0.50**	**< 0.10**	**0.78**	**0.61**	**N/A**	**N/A**

Criteria	Partial body (head & body): 1.6 W/kg (SAR (1g)), Extremity: 4.0 W/kg (SAR (10g)) for general population/uncontrolled exposure is specified in FCC 47 CFR part 2 (2.1093).
Test Procedure	SAR measurement: KDB 447498 D04, KDB 248227 D01, KDB 865664 D01, IEC Std. 1528, UL Japan's SAR Work Procedures No.13-EM-W0429 and 13-EM-W0430.
Category	FCC 47CFR §2.1093 (Portable device)
SAR type	Partial-body (SAR (1g)), Hands (SAR(10g))

*. A transmission is performed from one of antenna 2 or antenna 1 (diversity). A transmission of 2.4 GHz WLAN and BT-LE is time-division-processing. Therefore, simultaneously transmitted SAR was only considered for the 5 GHz WLAN and BT-LE.
*. "yellow marker" in the table; the highest Reported SAR (1g) and SAR (10g) of each band (2.4 GHz, 5 GHz) are shaded with yellow marker.

Test outline: Where the EUT is built into this new platform, it was verified whether multi-platform conditions can be suited in according with clause 4.2.4 in KDB 447498 D04 (v01).

Consideration of the test results:	**The highest reported SAR of this platform was kept; ≤ 0.8 W/kg (SAR(1g)), ≤ 2 W/kg (SAR(10g))** Since highest reported SAR (1g,10g) on this EUT's platform obtained in accordance with KDB 447498 D04 (v01) was kept under 0.8 W/kg (SAR(1g)), kept under 3 W/kg (SAR(10g)) , this EUT was approved to operate "Specific Set of Host Platforms."

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg for partial body, 4 W/kg for hands (Extremity)) specified in FCC 47 CFR part 2 (2.1093) and had been tested in accordance with the measurement methods and procedures specified in FCC KDB publications and IEEE 1528-2013.

3.1.1 History of maximum SAR value in different platform - Informative (Reference purpose only)

*. The following information indicates a highest SAR number of the different host platform in the past test. The SAR test results are not described in this report.
*. In the past, this module had installed into the following host platforms and tested with measured highest reported SAR of < 0.8 W/kg (SAR(1g)), < 2 W/kg (SAR(10g)) (per KDB 447498 D01 (v06); multi-platform operation requirement).

Band	Max. Power [dBm]	Highest Reported SAR [W/kg]							
		Host platform (1) model number: WM5B04				Host platform (2) model number: WM5B06			
		Reference SAR test report: 14033664S-A (*1)				Reference SAR test report: 13734845S-A (*1)			
		Body-worn (Separation 0 mm)		Extremity (Separation 0 mm)		Body-worn (Separation 0 mm)		Extremity (Separation 0 mm)	
		SAR(1g)		SAR(10g)		SAR(1g)		SAR(10g)	
		Antenna 1	Antenna 2	Antenna 1	Antenna 2	Antenna 1	Antenna 2	Antenna 1	Antenna 2
2.4 GHz WLAN (*2)	14	**0.30**	**< 0.10**	**0.23**	**0.33**	**0.22**	**< 0.10**	**0.22**	**0.38**
5.2 GHz WLAN (*2)	13	**0.30**	**< 0.10**	**0.43**	**0.41**	**0.39**	**< 0.10**	**0.47**	**0.45**
5.3 GHz WLAN (*2)	13	**0.38**	**< 0.10**	**0.35**	**0.34**	**0.37**	**< 0.10**	**0.41**	**0.37**
5.6 GHz WLAN (*2)	13	**0.40**	**< 0.10**	**0.39**	**0.38**	**0.50**	**< 0.10**	**0.45**	**0.35**
5.8 GHz WLAN (*2)	13	**0.39**	**< 0.10**	**0.37**	**0.28**	**0.29**	**< 0.10**	**0.38**	**0.26**
Bluetooth	5	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
Simultaneous SAR per KDB 447498 D01 v06 (Simulated) (5 GHz WLAN + BT LE)		(0.56)	(0.57)	(0.88)	(0.89)	(0.56)	(0.57)	(0.88)	(0.89)

Criteria	Partial body (head & body): 1.6 W/kg (SAR (1g)), Extremity: 4.0 W/kg (SAR (10g)) for general population/uncontrolled exposure is specified in FCC 47 CFR part 2 (2.1093).
Test Procedure	SAR measurement: KDB 447498 D01(v06), KDB 248227 D01, KDB 865664 D01, IEC Std. 1528, UL Japan's SAR Work Procedures No.13-EM-W0429 and 13-EM-W0430.

*1. SAR evaluation and report publishing was done by Shonan EMC Lab. UL Japan.
*2. WLAN operation mode: IEEE 802.11n(40HT)-SISO
*. A transmission is performed from one of antenna 2 or antenna 1 (diversity). A transmission of 2.4 GHz WLAN and BT-LE is time-division-processing. Therefore, simultaneously transmitted SAR was only considered for the 5 GHz WLAN and BT-LE.
*. "yellow marker" in the table; the highest Reported SAR (1g) and SAR (10g) of each band (2.4 GHz, 5 GHz), on each host platform are shaded with yellow marker.

3.2 Test specification

The tests documented in this report were performed in accordance with the following standard: FCC 47 CFR Parts 2 (2.1093), IEEE Std.1528-2013, and the following FCC Published RF exposure KDB procedures:

FCC 47 CFR part 2 (2.1093)	Radiofrequency radiation exposure evaluation: portable devices
ANSI/IEEE C95.1-1992	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 KHz to 300 GHz
IEEE Std. 1528-2013	IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.
KDB 248227 D01	SAR Guidance for IEEE 802.11 (Wi-Fi) transmitters v02r02
KDB 447498 D04	Interim General RF Exposure Guidance v01
KDB 447498 D03	OET Bulletin 65, Supplement C Cross-Reference v01
KDB 865664 D01	SAR measurement 100 MHz to 6 GHz v01r04
KDB 865664 D02	RF exposure compliance reporting and documentation considerations v01r02

In addition to the above, the following information was used:

TCB workshop, October 2016	RF Exposure Procedure, DUT Holder Perturbations When the highest reported SAR of an antenna is > 1.2 W/kg, holder perturbation verification is required for each antenna, using the highest SAR configuration among all applicable frequency bands.
TCB workshop, April 2019	RF Exposure Procedure, 802.11ax SAR Testing
TCB workshop, October 2019	RF Exposure Procedure, Tissue Simulating Liquids (TSL) -Effective February 19, 2019, FCC has permitted the use of single head tissue simulating liquid specified in IEC 62209 for all SAR tests. -Mix and Match of traditional FCC SAR TSLs and IEC 62209 TSL in a single application is not permitted. -TSL can be changed in a Permissive Change. If SAR increases and original SAR > 1.2 W/kg, additional SAR tests will be required. -If FCC parameters are used, 5 % tolerance. If IEC parameters, 10 %.

3.3 Exposure limit

Environments of exposure limit	Whole-Body (averaged over the entire body)	Partial-Body (averaged over any 1g of tissue)	Hands, Wrists, Feet and Ankles (averaged over any 10g of tissue)
(A) Limits for Occupational /Controlled Exposure (W/kg)	0.4	8.0	20.0
(B) Limits for General population /Uncontrolled Exposure (W/kg)	0.08	1.6	4.0

*. Occupational/Controlled Environments: are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure, (i.e. as a result of employment or occupation).

*. General Population/Uncontrolled Environments: are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

The limit applied to this device which tested in this report is;

General population / uncontrolled exposure, Partial-Body (averaged over any 1g of tissue) limit: 1.6 W/kg (*. Refers to clause 2.3)
General population / uncontrolled exposure, Hands (averaged over any 10g of tissue) limit: 4 W/kg (*. Refers to clause 2.3)

3.4 Addition, deviation and exclusion to the test procedure

No addition, exclusion nor deviation has been made from the test procedure.

3.5 Test Location

UL Japan, Inc., Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN
Telephone number: +81 463 50 6400 / Facsimile number: +81 463 50 6401

*. A2LA Certificate Number: 1266.03 (FCC Test Firm Registration Number: 626366, ISED Lab Company Number: 2973D / CAB identifier: JP0001)

Place	Width × Depth × Height (m)	Size of reference ground plane (m) / horizontal conducting plane
No.7 Shielded room	2.76 × 3.76 × 2.4	2.76 × 3.76

3.6 SAR measurement procedure

3.6.1 Normal SAR measurement procedure

Step 1: Confirmation before SAR testing
Before SAR test, the RF wiring for the sample had been switched to the antenna conducted power measurement line from the antenna line and the average power was measured. The SAR test reference power measurement and the SAR test were proceeded with the lowest data rate (which has the higher time-based average power typically) on each operation mode. Therefore, the average output power was measured on the lower, middle (or near middle), upper and specified channels with the lowest data rate of each operation mode. The power of other data rate was also measured to confirm the time-base average power and when if it's required. The power measurement result is shown in Section 5.
*. The EUT transmission power was verified that it was not more than 2 dB lower than the maximum tune-up tolerance limit when it was set the rated power. (KDB447498 D04 (v01))

Step 2: Power reference measurement
Measurement of the E-field at a fixed location above the central position of flat phantom (or/and furthermore an interpolated peak SAR location of area scan in step 2) was used as a reference value for assessing the power drop.

Step 3: Area Scan (Area scan parameters: KDB 865664 D01 (v01r04).)
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 suitable horizontal grid spacing of EUT. Based on these data, the area of the maximum absorption was determined by splines interpolation.

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

Step 4: Zoom Scan and post-processing (Zoom scan parameters: KDB 865664 D01 (v01r04).)
Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The Zoom Scan measures points (refer to table below) within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure.
A volume of 30 mm (X) × 30 mm (Y) × 30 mm (Z) (or more) was assessed by measuring 7×7×7 points (or more), ≤ 3 GHz.
A volume of 28 mm (X) × 28 mm (Y) × 24mm (Z) (or more) was assessed by measuring 8×8×7 points (or more) (by "Ratio step" method (*1)), > 3 GHz.
When the SAR of the highest peak is within 2 dB of the SAR limit, additional zoom scans are proceeded for other peaks within 2 dB of the highest peak that have not been included in any zoom scan to ensure there is no increase in SAR. If the zoom scan measured as defined above complies with both of the following criteria. or if the peak spatial-average SAR is below 0.1 W/kg, no additional measurements are needed.
*. The smallest horizontal distance from the local SAR peaks to all points 3 dB below the SAR peak shall be larger than the horizontal grid steps in both x and y directions and recorded.
For 5 GHz band, SEMCAD Plot shows 4 mm, but the 3 dB point was tested at a distance greater than 4 mm in horizontally (which is step size of Δx, Δy).
For 2.4 GHz band, SEMCAD Plot shows 5 mm, but the 3 dB point was tested at a distance greater than 5 mm in horizontally (which is step size of Δx, Δy).
*. The ratio of the SAR at the second measured point to the SAR at the closest measured point at the x-y location of the measured maximum SAR value shall be at least 30 % and recorded.

				f ≤ 3 GHz	3 GHz < f ≤ 6 GHz
1	Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
2	Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
3		graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
4			$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5 ·$\Delta z_{Zoom}(n-1)$ mm	
5	Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm
	* The asterisk table-footnote is per KDB Pub. 865664 D01 v01r04. NOTE For uniformity purposes the integer frequency increments of rows 1 to 3 and 5 apply, rather than the corresponding variable and fixed parameters given in IEC 62209-1:2016 and IEC 62209-2:2010/AMD1:2019.				

Step 5: Power drift measurement
The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 2. It was checked that the power drift is within ±5% in the evaluation procedure of SAR testing. The verification of power drift during the SAR test is that DASY system calculates the power drift by measuring the e-filed at the same location at beginning and the end of the scan measurement for each test position. The result is shown in SAR plot data of APPENDIX 2.
*. DASY system calculation Power drift value[dB] =20log(Ea)/(Eb) (where, Before SAR testing: Eb[V/m] / After SAR testing: Ea[V/m])
Limit of power drift[W] = ±5%; Power drift limit (X) [dB] = 10log(P_drift)=10log(1.05/1) = 10log(1.05)-10log(1) = 0.21dB
from E-filed relations with power; S=E×H=E^2/η=P/(4×π×r^2) (η: Space impedance) → P=(E^2×4×π×r^2)/η
Therefore, The correlation of power and the E-filed
Power drift limit (X) dB=10log(P_drift) = 10log(E_drift)^2=20log(E_drift)
From the above mentioned, **the calculated power drift of DASY system must be the less than (±) 0.21 dB.**

Step 6: Z-Scan
The Z Scan measures points along a vertical straight line. The line runs along the Z-axis of a one-dimensional grid. In order to get a reasonable extrapolation the extrapolated distance should not be larger than the step size in Z-direction.

*. The all SAR tests were conservatively performed with test separation distance 0 mm. The phantom bottom thickness is approx. 2mm. Typical distance from probe tip to dipole centers is 1mm. The distance between the SAR probe tip to the surface of test device which is touched the bottom surface of the phantom is approx. 3 mm for 2.4GHz band and 2.4 mm for 5GHz band.
*1. "Ratio step" method parameters used; the first measurement point: "1.4mm" from the phantom surface, the initial z grid separation: "1.4mm", subsequent graded grid ratio: "1.4". These parameters comply with the requirement of KDB 865664 D01and recommended by Schmid & Partner Engineering AG (DASY5 manual).

SECTION 4: Operation of EUT during testing

4.1 Operating modes for SAR testing

The EUT has BT LE and IEEE 802.11b/11g/11a/11n20-SISO/11n40-SISO/11ac20-SISO/11ac40-SISO/11ac80-SISO continuous transmitting modes. The frequency and the modulation used in the SAR testing are shown as a following.

Operation mode	**BT LE**		**11b**	**11g**	**11n20**	**11n40**	**11a**	**11n20**	**11ac20**	**11n40**	**11ac40**	**11ac80**	**11a**	**11n20**	**11ac20**	**11n40**	**11ac40**	**11ac80**
band	2.4GHz band						U-NII-1 (5.2 GHz) (*4)						U-NII-2A (5.3 GHz)					
Tx band [MHz]	2402~2480		2412~2462			2422~ 2452	5180~5240			5190, 5230		5210	5260~5320			5270, 5310		5290
Antenna # (*1)	2 or 1		2 or 1	2 or 1	2 or 1	2 or 1	2 or 1	2 or 1	2 or 1	2 or 1	2 or 1	2 or 1	2 or 1	2 or 1	2 or 1	2 or 1	2 or 1	2 or 1
Bandwidth [MHz]	1		20	20	20	40	20	20	20	40	40	80	20	20	20	40	40	80
Max.power [dBm]	5		**14**	**14**	**14**	13	**13**	**13**	**13**	**13**	**13**	10.5	**13**	**13**	**13**	**13**	**13**	10.5
Modulation	GFSK		DSSS	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM
D/R [Mbps, MCS#]	1M-PHY	2M-PHY	1	6	MCS0	MCS0	6	MCS0	MCS0	MCS0	MCS0	MCS0	6	MCS0	MCS0	MCS0	MCS0	MCS0
Frequency tested [MHz]	2440 (*2)	n/a)	2412, 2437, 2462	n/a (*3)	n/a (*3)	n/a (*3)	n/a (*6)	n/a (*6)	n/a (*6)	5190, 5230	n/a (*6)	n/a (*5)	n/a (*6)	n/a (*6)	n/a (*6)	5270, 5310	n/a (*6)	n/a (*5)

Operation mode	**11a**	**11n20**	**11ac20**	**11n40**	**11ac40**	**11ac80**	**11a**	**11n20**	**11ac20**	**11n40**	**11ac40**	**11ac80**
band	U-NII-2C (5.6 GHz)						U-NII-3 (5.8 GHz)					
Tx band [MHz]	5500~5580, 5660~5700			5510,5550,5670		5530	5745~5825			5755, 5795		5775
Antenna # (*1)	2 or 1	2 or 1	2 or 1	2 or 1	2 or 1	2 or 1	2 or 1	2 or 1	2 or 1	2 or 1	2 or 1	2 or 1
Bandwidth [MHz]	20	20	20	40	40	80	20	20	20	40	40	80
Max.power [dBm]	**13**	**13**	**13**	**13**	**13**	10.5	**13**	**13**	**13**	**13**	**13**	10.5
Modulation	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM
D/R [Mbps, MCS#]	6	MCS0	MCS0	MCS0	MCS0	MCS0	6	MCS0	MCS0	MCS0	MCS0	MCS0
Frequency tested [MHz]	n/a (*6)	n/a (*6)	n/a (*6)	5510, 5550, 5670	n/a (*6)	n/a (*5)	n/a (*6)	n/a (*6)	n/a (*6)	5755, 5795	n/a	n/a (*5)

Controlled software	**Test name**	**Software name**	**Version**	**Date**	**Storage location / Remarks**
	Power measurement	Labtool Operation	Ver.1.0 (FW Ver.41)	2021/7/19	*. Memory of platform (firmware)
	SAR test	Labtool Operation	Ver.1.0 (FW Ver.42)	2022/4/11	*. Memory of platform (firmware)

*. Max.power: Maximum power (tune-up limit power), D/R: Data rate, n/a: SAR test was not applied.
*1. A transmission is performed from one of antenna 2 or antenna 1 (diversity). A transmission of WLAN(2.4GHz) and BT-LE is time-division-processing. Therefore, simultaneously transmitted SAR was only considered for the WLAN(5GHz) and BT-LE.
*2. SAR test applies to a middle channel of BT LE mode.
*3. (KDB 248227 D01) Since reported SAR (1g, 10g) of DSSS mode which had highest output power was enough small, SAR test was only applied DSSS mode.
*4. SAR test of U-NII-1 band was also applied for the reference purpose, even though the reported SAR(1g) and SAR(10g) of U-NII-2A band were enough low.
*5. Since the maximum output power was lower than other mode, the SAR test was reduced.
*6. (KDB 248227 D01) Initial SAR test was applied to the operation mode which has higher bandwidth with the highest tune-up power and lowest data rate (lowest modulation).

<u>*. OFDM Transmission Mode SAR Test Configuration and Channel Selection Requirements</u>

(KDB 248227 D01, , SAR Guidance for Wi-Fi Transmitters) The initial test configuration for 2.4 GHz and 5 GHz OFDM transmission modes is determined by the 802.11 configuration with the highest maximum output power specified for production units, including tune-up tolerance, in each standalone and aggregated frequency band. SAR for the initial test configuration is measured using the highest maximum output power channel determined by the default power measurement procedures.
When multiple channel bandwidth configurations in a frequency band have the same specified maximum output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected.

<u>*. SAR test reduction considerations</u>

(KDB 447498 D04 (v01), General RF Exposure Guidance) Testing of other required channels within the operating mode of a frequency band is not required when the reported 1g or 10g SAR for the mid-band or highest output power channel is:
(1) ≤ 0.8 W/kg for 1g , or 2.0 W/kg for 10g respectively, when the transmission band is ≤ 100 MHz
(2) ≤ 0.6 W/kg for 1g, or 1.5 W/kg for 10g respectively, when the transmission band is between 100 MHz and 200 MHz
(3) ≤ 0.4 W/kg for 1g, or 1.0 W/kg for 10g respectively, when the transmission band is ≥ 200 MHz
The SAR has been measured with highest transmission duty factor supported by the test mode tool for WLAN and/or Bluetooth. When the transmission duty factor could not be 100%, the reported SAR will be scaled to 100% transmission duty factor to determine compliance. When SAR is not measured at the maximum power level allowed for production unit, the measured SAR will be scaled to the maximum tune-up tolerance limit to determine compliance.

(KDB 248227 D01, SAR Guidance for Wi-Fi Transmitters) When the reported SAR of the initial test configuration is > 0.8 W/kg, SAR measurement is required for subsequent next highest measured output power channel(s) in the initial test configuration until reported SAR is ≤ 1.2 W/kg or all required channels are tested.

For 2.4GHz band, the highest measured maximum output power channel of DSSS was selected for SAR measurement, When the reported SAR is ≤ 0.8 W/kg, no further SAR test is required in this exposure configuration. Otherwise, SAR is required for that exposure configuration using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel. For OFDM modes (802.11g/n), SAR is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

For 5GHz band, the initial test configuration was selected accordance to the transmission mode with the highest maximum output power. When the reported SAR is > 0.8 W/kg, SAR is required for the subsequent highest measured output power channel until the reported SRA result is ≤ 1.2 W/kg or all required channels are measured. For other transmission modes, SAR is not required when the highest reported SAR for initial test configuration is adjusted by the ratio of subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

4.2 RF exposure conditions

After considering the outline of platform the SAR test was applied to the platform surface in follows.

Setup	Explanation of SAR test setup plan (*. Refer to Appendix 1 for test setup photographs which had been tested.)	Antenna 1			Antenna 2			SAR type
		D [mm]	SAR Tested / Reduced		D [mm]	SAR Tested / Reduced		
			BT LE	WLAN		BT LE	WLAN	
Front	A front surface (patient side) of platform was touched to the Flat phantom.	**7.76**	Reduced	**Tested**	**7.76**	Reduced	**Tested**	Partial-body touch
Side (Right)	A right surface of platform was touched to the Flat phantom.	**148.1**	Reduced (*1)		**281.7**	Reduced (>200 mm)		
Side (Left) (Antenna 2)	A left surface (antenna 2 side) of platform was touched to the Flat phantom.	**109.4**	Reduced (*1)		**19.8**	**Tested**	**Tested**	
Top	A top surface of platform was touched to the Flat phantom.	**360.45**	Reduced (>200 mm)		**281.3**	Reduced (>200 mm)		
Bottom (Antenna 1)	A bottom surface (antenna 1 side) of platform was touched to the Flat phantom.	**17.55**	**Tested**	**Tested**	**52.7**	Reduced (*1)		
Back	A back surface (operator handling, etc.) of platform was touched to the Flat phantom.	**4.24**	**Tested**	**Tested**	**4.24**	**Tested**	**Tested**	Hand-hold

*. **D:** Antenna separation distance. It is the distance from the antenna inside platform the outer surface of platform which user may touch.
*. Size of host platform: Refer to Appendix 1-1.
*1. [SAR test exemption consideration by KDB 447498 D04 (v01)]

Tx mode	Higher frequency [MHz]	Max. conducted output power		Antenna 1			Antenna 2			Judge of SAR test exemption ("Test "or "Exempt") (upper row) / SAR based Threshold power (lower row)											
										Antenna 1 separation distance						Antenna 2 separation distance					
				Gain	ERP		Gain	ERP		≤5mm	8 mm	18 mm	109 mm	148 mm	360 mm	≤ 5 mm	8 mm	20 mm	53 mm	281 mm	282 mm
										Back	Front	Bottom	Left	Right	Top	Back	Front	Left	Bottom	Top	Right
		[dBm]	[mW]	[dBi]	[dBm]	[mW]	[dBi]	[dBm]	[mW]	SAR10g	SAR1g	SAR1g	SAR1g	SAR1g	SAR1g	SAR10g	SAR1g	SAR1g	SAR1g	SAR1g	SAR1g
BT LE	2480	5	3	3.33	6.18	**4**	3.33	6.18	**4**	Exempt 7 mW	Exempt 7 mW	Exempt 31 mW	Exempt > 100 mW	Exempt > 100 mW	Exempt > 100 mW	Exempt 7 mW	Exempt 7 mW	Exempt 38 mW	Exempt > 100 mW	Exempt > 100 mW	Exempt > 100 mW
WLAN 2.4 GHz	2462	14	25	3.33	15.18	**33**	3.33	15.18	**33**	**Test** 7 mW	**Test** 7 mW	Exempt 31 mW	Exempt > 100 mW	Exempt > 100 mW	Exempt > 100 mW	**Test** 7 mW	**Test** 7 mW	Exempt 38 mW	Exempt > 100 mW	Exempt > 100 mW	Exempt > 100 mW
WLAN 5.2 GHz	5240	13	20	3.79	14.64	**29**	3.79	14.64	**29**	**Test** 4 mW	**Test** 4 mW	**Test** 21 mW	Exempt > 100 mW	Exempt > 100 mW	Exempt > 100 mW	**Test** 4 mW	**Test** 4 mW	**Test** 26 mW	Exempt > 100 mW	Exempt > 100 mW	Exempt > 100 mW
WLAN 5.3 GHz	5320	13	20	3.79	14.64	**29**	3.79	14.64	**29**	**Test** 4 mW	**Test** 4 mW	**Test** 21 mW	Exempt > 100 mW	Exempt > 100 mW	Exempt > 100 mW	**Test** 4 mW	**Test** 4 mW	**Test** 26 mW	Exempt > 100 mW	Exempt > 100 mW	Exempt > 100 mW
WLAN 5.6 GHz	5700	13	20	3.79	14.64	**29**	3.79	14.64	**29**	**Test** 3 mW	**Test** 4 mW	**Test** 20 mW	Exempt > 100 mW	Exempt > 100 mW	Exempt > 100 mW	**Test** 3 mW	**Test** 4 mW	**Test** 25 mW	Exempt > 100 mW	Exempt > 100 mW	Exempt > 100 mW
WLAN 5.8 GHz	5825	13	20	3.79	14.64	**29**	3.79	14.64	**29**	**Test** 3 mW	**Test** 4 mW	**Test** 20 mW	Exempt > 100 mW	Exempt > 100 mW	Exempt > 100 mW	**Test** 3 mW	**Test** 4 mW	**Test** 25 mW	Exempt > 100 mW	Exempt > 100 mW	Exempt > 100 mW

*. Antenna separation distance is rounded to the nearest integer numbers (in mm) before calculation.
*. (Calculating formula) ERP (dBm) = (max. conducted output power, dBm) + (antenna gain, dBi) – 2.15

<Conclusion for consideration for SAR test reduction>

1) **The all SAR tests were conservatively performed with test separation distance 0 mm.**
2) **For WLAN operation; "Back" and "Front" setup are applied the SAR test because near antenna section (higher than calculated threshold power). "Left" setup for antenna 2 is also applied the SAR test because it is near antenna section (higher than calculated threshold power). "Bottom" setup for antenna 1 is also applied the SAR test because of an antenna radiated slit is existed on these surface even though SAR test exclusion judge is "test can be reduced". The SAR test of other SAR test setup are reduced, because there have enough antenna separation distance and the SAR test exclusion judge was "test can be reduced".**
3) **For Bluetooth operation, the SAR test was applied with the worst SAR condition of WLAN mode to evaluate "simultaneous transmission" even though BT LE power is enough low.**

SAR-based thresholds (Pth (mW) shown below table of "Example Power Thresholds [mW]" are derived based on frequency, power, and separation distance of the RF source. The formula defines the thresholds in general for either available maximum time-averaged power or maximum time-averaged effective radiated power (ERP), whichever is greater. The SAR-based exemption is calculated by Formula (B.2) in below, applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold Pth (mW).
When 10-g extremity SAR applies, SAR test exemption may be considered by applying a factor of 2.5 to the SAR-based exemption thresholds.
*. This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive).

Table: Example Power Thresholds [mW] (SAR(1g), KDB 447498 D01 (v07))

Frequency [MHz] \ Distance [mm]	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	35	40	45	50
2402	3	4	5	7	9	10	12	15	17	20	22	25	28	32	35	39	42	46	50	55	59	64	68	73	78	84	112	144	180	220
2412	3	4	5	7	8	10	12	15	17	20	22	25	28	32	35	39	42	46	50	55	59	64	68	73	78	83	112	144	180	220
2450	3	4	5	7	8	10	12	15	17	19	22	25	28	31	35	38	42	46	50	54	59	63	68	73	78	83	111	143	179	219
2462	3	4	5	7	8	10	12	14	17	19	22	25	28	31	35	38	42	46	50	54	58	63	68	73	78	83	111	143	179	219
2480	3	4	5	7	8	10	12	14	17	19	22	25	28	31	35	38	42	46	50	54	58	63	67	72	77	82	111	143	179	218
3600	2	3	4	5	6	8	10	11	13	16	18	20	23	26	29	32	35	38	42	45	49	53	57	62	66	71	96	125	158	195
5180	2	2	3	4	5	6	8	9	11	13	15	17	19	21	24	26	29	32	35	38	42	45	49	53	57	61	84	110	141	175
5240	1	2	3	4	5	6	8	9	11	13	14	17	19	21	24	26	29	32	35	38	42	45	49	53	57	61	83	110	140	174
5260	1	2	3	4	5	6	8	9	11	13	14	16	19	21	24	26	29	32	35	38	42	45	49	52	56	61	83	110	140	174
5320	1	2	3	4	5	6	8	9	11	12	14	16	19	21	23	26	29	32	35	38	41	45	48	52	56	60	83	109	139	173
5500	1	2	3	4	5	6	7	9	10	12	14	16	18	21	23	26	28	31	34	37	41	44	48	51	55	59	82	108	138	172
5700	1	2	3	4	5	6	7	9	10	12	14	16	18	20	23	25	28	31	34	37	40	43	47	51	55	59	81	107	136	170
5745	1	2	3	4	5	6	7	9	10	12	14	16	18	20	22	25	28	31	34	37	40	43	47	51	54	58	80	106	136	169
5800	1	2	3	4	5	6	7	9	10	12	14	16	18	20	22	25	28	30	33	36	40	43	47	50	54	58	80	106	136	169
5825	1	2	3	4	5	6	7	9	10	12	14	16	18	20	22	25	28	30	33	36	40	43	47	50	54	58	80	106	135	169

Table: Example Power Thresholds [mW] (SAR(10g), KDB 447498 D01 (v07))

Frequency [MHz] \ Distance [mm]	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	35	40	45	50
2402	7	10	13	17	21	26	31	37	43	49	56	63	71	79	88	97	106	116	126	137	148	159	171	183	196	209	280	361	451	551
2412	7	10	13	17	21	26	31	37	43	49	56	63	71	79	88	97	106	116	126	137	148	159	171	183	196	209	279	360	450	550
2450	7	10	13	17	21	26	31	36	42	49	55	63	70	78	87	96	105	115	125	136	147	158	170	182	194	207	278	358	448	548
2462	7	10	13	17	21	26	31	36	42	48	55	63	70	78	87	96	105	115	125	135	146	158	169	181	194	207	277	358	447	547
2480	7	10	13	17	21	25	31	36	42	48	55	62	70	78	86	95	105	114	124	135	146	157	169	181	193	206	277	357	446	546
3600	5	7	10	13	16	20	24	29	34	39	45	51	57	64	71	79	87	96	104	114	123	133	143	154	165	177	240	313	396	488
5180	4	5	8	10	13	16	19	23	27	32	36	42	47	53	59	66	73	80	88	96	104	113	122	132	142	152	209	276	352	437
5240	4	5	7	10	13	16	19	23	27	31	36	41	47	53	59	66	72	80	87	96	104	113	122	131	141	152	208	275	350	436
5260	4	5	7	10	13	16	19	23	27	31	36	41	47	53	59	65	72	80	87	95	104	113	122	131	141	151	208	274	350	435
5320	4	5	7	10	12	15	19	23	27	31	36	41	46	52	58	65	72	79	87	95	103	112	121	131	140	151	207	273	349	434
5500	4	5	7	10	12	15	18	22	26	30	35	40	46	51	57	64	71	78	86	93	102	110	119	129	138	149	205	270	345	429
5700	3	5	7	9	12	15	18	22	26	30	34	39	45	50	56	63	70	77	84	92	100	109	117	127	136	146	202	267	341	425
5745	3	5	7	9	12	15	18	22	25	30	34	39	45	50	56	63	69	76	84	92	100	108	117	126	136	146	201	266	340	424
5800	3	5	7	9	12	15	18	21	25	30	34	39	44	50	56	62	69	76	83	91	99	108	117	126	135	145	201	265	339	422
5825	3	5	7	9	12	15	18	21	25	29	34	39	44	50	56	62	69	76	83	91	99	108	116	126	135	145	200	265	339	422

TABLE B.1—THRESHOLDS FOR SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION

RF Source Frequency			Minimum Distance			Threshold ERP
f_L MHz		f_H MHz	$\lambda_L / 2\pi$		$\lambda_H / 2\pi$	W
0.3	-	1.34	159 m	-	35.6 m	1,920 R^2
1.34	-	30	35.6 m	-	1.6 m	3,450 R^2/f^2
30	-	300	1.6 m	-	159 mm	3.83 R^2
300	-	1,500	159 mm	-	31.8 mm	0.0128 $R^2 f$
1,500	-	100,000	31.8 mm	-	0.5 mm	19.2R^2

Subscripts L and H are low and high; λ is wavelength.
From §1.1307(b)(3)(i)(C), modified by adding Minimum Distance columns.

R is in meter, f is in MHz
Threshold ERP [W] = 19.2 × R^2 (~formula (A.1))
(Distance: over 40 cm)

Calculating formula:

$$P_{th}\ (\text{mW}) = ERP_{20\,cm}\ (\text{mW}) = \begin{cases} 2040 f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases} \quad \text{(B.1)}$$

$$P_{th}\ (\text{mW}) = \begin{cases} ERP_{20\,cm} (d/20\ \text{cm})^x & d \le 20\ \text{cm} \\ ERP_{20\,cm} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases} \quad \text{(B.2)} \qquad x = -\log_{10}\left(\frac{60}{ERP_{20\,cm}\sqrt{f}}\right)$$

and f is in GHz, d is the separation distance (cm), and ERP_{20cm} is per Formula (B.1).

SECTION 5: Confirmation before testing

5.1 SAR reference power measurement (antenna terminal conducted average power) (WM01B's serial number 34:9F:7B:EF:DB:20-AT:2021/9/29)

Mode	Data rate [Mbps] or Index#	Frequency		Power spec.		Duty cycle			Antenna 2 (-divsw "0") power (WLAN or Bluetooth)							Antenna 1 (-divsw "1") power (WLAN or Bluetooth)						
				Typical	Tune-up limit (Max.)	Duty cycle	Duty factor	Scaled factor	Setting power	Burst average		Δ from Max.	Tune-up factor	Time average		Setting power	Burst average		Δ from Max.	Tune-up factor	Time average	
		[MHz]	CH	[dBm]	[dBm]	[%]	[dB]	[-]	[-]	[dBm]	[mW]	[dB]	[-]	[dBm]	[mW]	[-]	[dBm]	[mW]	[dB]	[-]	[dBm]	[mW]
BT LE	PHY1	2402	0	3	5	64.4	1.91	1.55	3	3.44	2.21	-1.56	1.43	1.53	1.42	3	3.47	2.22	-1.53	1.42	1.56	1.43
	PHY1	2440	19	3	5	64.4	1.91	1.55	3	3.34	2.16	-1.66	1.47	1.43	1.39	3	3.37	2.17	-1.63	1.46	1.46	1.40
	PHY1	2480	39	3	5	64.4	1.91	1.55	3	3.12	2.05	-1.88	1.54	1.21	1.32	3	3.15	2.07	-1.85	1.53	1.24	1.33
	PHY2	2402	0	3	5	34.9	4.57	2.87	3	3.36	2.17	-1.64	1.46	-1.21	0.76	3	3.37	2.17	-1.63	1.46	-1.20	0.76
	PHY2	2440	19	3	5	34.9	4.57	2.87	3	3.24	2.11	-1.76	1.50	-1.33	0.74	3	3.26	2.12	-1.74	1.49	-1.31	0.74
	PHY2	2480	39	3	5	34.9	4.57	2.87	3	3.04	2.01	-1.96	1.57	-1.53	0.70	3	3.03	2.01	-1.97	1.57	-1.54	0.70
11b	1	2412	1	12	14	100	0.00	1.00	12	11.89	15.45	-2.11	1.63	11.89	15.45	13	11.94	15.63	-2.06	1.61	11.94	15.63
	1	2412	1	12	14	100	0.00	1.00	13(*1)	12.84	19.23	-1.16	1.31	12.84	19.23	13	12.84	19.23	-1.16	1.31	12.84	19.23
	1	2437	6	12	14	100	0.00	1.00	12	12.09	16.18	-1.91	1.55	12.09	16.18	12	12.13	16.33	-1.87	1.54	12.13	16.33
	1	2462	11	12	14	100	0.00	1.00	12	12.23	16.71	-1.77	1.50	12.23	16.71	12	12.26	16.83	-1.74	1.49	12.26	16.83
11g	6	2412	1	12	14	100	0.00	1.00	12	11.85	15.31	-2.15	1.64	11.85	15.31	13	11.89	15.45	-2.11	1.63	11.89	15.45
	6	2412	1	12	14	100	0.00	1.00	13(*1)	12.80	19.05	-1.20	1.32	12.80	19.05	13	12.83	19.19	-1.17	1.31	12.83	19.19
	6	2437	6	12	14	100	0.00	1.00	12	12.05	16.03	-1.95	1.57	12.05	16.03	12	12.09	16.18	-1.91	1.55	12.09	16.18
	6	2462	11	12	14	100	0.00	1.00	12	12.19	16.56	-1.81	1.52	12.19	16.56	12	12.22	16.67	-1.78	1.51	12.22	16.67
11n20 -SISO	MCS0	2412	1	12	14	100	0.00	1.00	12	12.03	15.96	-1.97	1.57	12.03	15.96	12	12.09	16.18	-1.91	1.55	12.09	16.18
	MCS0	2437	6	12	14	100	0.00	1.00	12	12.22	16.67	-1.78	1.51	12.22	16.67	12	12.27	16.87	-1.73	1.49	12.27	16.87
	MCS0	2462	11	12	14	100	0.00	1.00	12	12.36	17.22	-1.64	1.46	12.36	17.22	12	12.41	17.42	-1.59	1.44	12.41	17.42
11n40 -SISO	MCS0	2422	3	11	13	100	0.00	1.00	11	11.05	12.74	-1.95	1.57	11.05	12.74	11	11.05	12.74	-1.95	1.57	11.05	12.74
	MCS0	2437	6	11	13	100	0.00	1.00	11	11.16	13.06	-1.84	1.53	11.16	13.06	11	11.14	13.00	-1.86	1.53	11.14	13.00
	MCS0	2452	9	11	13	100	0.00	1.00	11	11.24	13.30	-1.76	1.50	11.24	13.30	11	11.25	13.34	-1.75	1.50	11.25	13.34
11a	6	5180	36	11	13	100	0.00	1.00	12	11.90	15.49	-1.10	1.29	11.90	15.49	12	11.98	15.78	-1.02	1.26	11.98	15.78
	6	5200	40	11	13	100	0.00	1.00	12	11.88	15.42	-1.12	1.29	11.88	15.42	12	11.99	15.81	-1.01	1.26	11.99	15.81
	6	5220	44	11	13	100	0.00	1.00	12	11.99	15.81	-1.01	1.26	11.99	15.81	12	12.07	16.11	-0.93	1.24	12.07	16.11
	6	5240	48	11	13	100	0.00	1.00	12	11.88	15.42	-1.12	1.29	11.88	15.42	12	11.96	15.70	-1.04	1.27	11.96	15.70
	6	5260	52	11	13	100	0.00	1.00	12	11.79	15.10	-1.21	1.32	11.79	15.10	12	11.88	15.42	-1.12	1.29	11.88	15.42
	6	5280	56	11	13	100	0.00	1.00	12	11.63	14.55	-1.37	1.37	11.63	14.55	12	11.72	14.86	-1.28	1.34	11.72	14.86
	6	5300	60	11	13	100	0.00	1.00	12	11.97	15.74	-1.03	1.27	11.97	15.74	12	12.03	15.96	-0.97	1.25	12.03	15.96
	6	5320	64	11	13	100	0.00	1.00	12	11.80	15.14	-1.20	1.32	11.80	15.14	12	11.86	15.35	-1.14	1.30	11.86	15.35
	6	5500	100	11	13	100	0.00	1.00	11	11.08	12.82	-1.92	1.56	11.08	12.82	11	11.03	12.68	-1.97	1.57	11.03	12.68
	6	5580	116	11	13	100	0.00	1.00	11	11.13	12.97	-1.87	1.54	11.13	12.97	11	11.08	12.82	-1.92	1.56	11.08	12.82
	6	5700	140	11	13	100	0.00	1.00	11	11.12	12.94	-1.88	1.54	11.12	12.94	11	11.05	12.74	-1.95	1.57	11.05	12.74
	6	5745	149	11	13	100	0.00	1.00	11	11.16	13.06	-1.84	1.53	11.16	13.06	11	11.10	12.88	-1.90	1.55	11.10	12.88
	6	5785	157	11	13	100	0.00	1.00	11	11.30	13.49	-1.70	1.48	11.30	13.49	11	11.23	13.27	-1.77	1.50	11.23	13.27
	6	5825	165	11	13	100	0.00	1.00	11	11.50	14.13	-1.50	1.41	11.50	14.13	11	11.39	13.77	-1.61	1.45	11.39	13.77
11n20 -SISO	MCS0	5180	36	11	13	100	0.00	1.00	12	12.08	16.14	-0.92	1.24	12.08	16.14	12	12.17	16.48	-0.83	1.21	12.17	16.48
	MCS0	5200	40	11	13	100	0.00	1.00	12	12.08	16.14	-0.92	1.24	12.08	16.14	12	12.18	16.52	-0.82	1.21	12.18	16.52
	MCS0	5220	44	11	13	100	0.00	1.00	12	12.17	16.48	-0.83	1.21	12.17	16.48	12	12.26	16.83	-0.74	1.19	12.26	16.83
	MCS0	5240	48	11	13	100	0.00	1.00	12	12.06	16.07	-0.94	1.24	12.06	16.07	12	12.13	16.33	-0.87	1.22	12.13	16.33
	MCS0	5260	52	11	13	100	0.00	1.00	12	11.96	15.70	-1.04	1.27	11.96	15.70	12	12.05	16.03	-0.95	1.24	12.05	16.03
	MCS0	5280	56	11	13	100	0.00	1.00	12	11.80	15.14	-1.20	1.32	11.80	15.14	12	11.89	15.45	-1.11	1.29	11.89	15.45
	MCS0	5300	60	11	13	100	0.00	1.00	12	12.15	16.41	-0.85	1.22	12.15	16.41	12	12.20	16.60	-0.80	1.20	12.20	16.60
	MCS0	5320	64	11	13	100	0.00	1.00	12	11.97	15.74	-1.03	1.27	11.97	15.74	12	12.03	15.96	-0.97	1.25	12.03	15.96
	MCS0	5500	100	11	13	100	0.00	1.00	11	11.25	13.34	-1.75	1.50	11.25	13.34	11	11.20	13.18	-1.80	1.51	11.20	13.18
	MCS0	5580	116	11	13	100	0.00	1.00	11	11.31	13.52	-1.69	1.48	11.31	13.52	11	11.26	13.37	-1.74	1.49	11.26	13.37
	MCS0	5700	140	11	13	100	0.00	1.00	11	11.31	13.52	-1.69	1.48	11.31	13.52	11	11.23	13.27	-1.77	1.50	11.23	13.27
	MCS0	5745	149	11	13	100	0.00	1.00	11	11.35	13.65	-1.65	1.46	11.35	13.65	11	11.29	13.46	-1.71	1.48	11.29	13.46
	MCS0	5785	157	11	13	100	0.00	1.00	11	11.49	14.09	-1.51	1.42	11.49	14.09	11	11.41	13.84	-1.59	1.44	11.41	13.84
	MCS0	5825	165	11	13	100	0.00	1.00	11	11.68	14.72	-1.32	1.36	11.68	14.72	11	11.56	14.32	-1.44	1.39	11.56	14.32
11ac20 -SISO	MCS0	5180	36	11	13	100	0.00	1.00	12	12.08	16.14	-0.92	1.24	12.08	16.14	12	12.16	16.44	-0.84	1.21	12.16	16.44
	MCS0	5200	40	11	13	100	0.00	1.00	12	12.08	16.14	-0.92	1.24	12.08	16.14	12	12.17	16.48	-0.83	1.21	12.17	16.48
	MCS0	5220	44	11	13	100	0.00	1.00	12	12.18	16.52	-0.82	1.21	12.18	16.52	12	12.25	16.79	-0.75	1.19	12.25	16.79
	MCS0	5240	48	11	13	100	0.00	1.00	12	12.06	16.07	-0.94	1.24	12.06	16.07	12	12.13	16.33	-0.87	1.22	12.13	16.33
	MCS0	5260	52	11	13	100	0.00	1.00	12	11.98	15.78	-1.02	1.26	11.98	15.78	12	12.05	16.03	-0.95	1.24	12.05	16.03
	MCS0	5280	56	11	13	100	0.00	1.00	12	11.82	15.21	-1.18	1.31	11.82	15.21	12	11.88	15.42	-1.12	1.29	11.88	15.42
	MCS0	5300	60	11	13	100	0.00	1.00	12	12.16	16.44	-0.84	1.21	12.16	16.44	12	12.20	16.60	-0.80	1.20	12.20	16.60
	MCS0	5320	64	11	13	100	0.00	1.00	12	11.99	15.81	-1.01	1.26	11.99	15.81	12	12.03	15.96	-0.97	1.25	12.03	15.96
	MCS0	5500	100	11	13	100	0.00	1.00	11	11.26	13.37	-1.74	1.49	11.26	13.37	11	11.20	13.18	-1.80	1.51	11.20	13.18
	MCS0	5580	116	11	13	100	0.00	1.00	11	11.31	13.52	-1.69	1.48	11.31	13.52	11	11.27	13.40	-1.73	1.49	11.27	13.40
	MCS0	5700	140	11	13	100	0.00	1.00	11	11.32	13.55	-1.68	1.47	11.32	13.55	11	11.22	13.24	-1.78	1.51	11.22	13.24
	MCS0	5745	149	11	13	100	0.00	1.00	11	11.35	13.65	-1.65	1.46	11.35	13.65	11	11.28	13.43	-1.72	1.49	11.28	13.43
	MCS0	5785	157	11	13	100	0.00	1.00	11	11.50	14.13	-1.50	1.41	11.50	14.13	11	11.41	13.84	-1.59	1.44	11.41	13.84
	MCS0	5825	165	11	13	100	0.00	1.00	11	11.69	14.76	-1.31	1.35	11.69	14.76	11	11.56	14.32	-1.44	1.39	11.56	14.32

*1. Since the measured power of 2412 MHz on 11b and 11g mode with "12" power setting were more than 2dB lower than maximum tune-up power, the "13" power setting was used for power measurement and for SAR testing.

(cont'd)

(cont'd)

Mode	Data rate [Mbps] or Index#	Frequency [MHz]	CH	Power spec. Typical [dBm]	Power spec. Tune-up limit (Max.) [dBm]	Duty cycle [%]	Duty factor [dB]	Scaled factor [-]	Ant. 2 (-divsw "0") power (WLAN or Bluetooth) Setting power [-]	Ant. 2 Burst average [dBm]	Ant. 2 Burst average [mW]	Ant. 2 Δ from Max. [dB]	Ant. 2 Tune-up factor [-]	Ant. 2 Time average [dBm]	Ant. 2 Time average [mW]	Ant. 1 (-divsw "1") power (WLAN or Bluetooth) Setting power [-]	Ant. 1 Burst average [dBm]	Ant. 1 Burst average [mW]	Ant. 1 Δ from Max. [dB]	Ant. 1 Tune-up factor [-]	Ant. 1 Time average [dBm]	Ant. 1 Time average [mW]
11n40 -SISO	MCS0	5190	38	11	13	100	0.00	1.00	12	12.05	16.03	-0.95	1.24	12.05	16.03	12	12.13	16.33	-0.87	1.22	12.13	16.33
	MCS0	5230	46	11	13	100	0.00	1.00	12	12.12	16.29	-0.88	1.22	12.12	16.29	12	12.18	16.52	-0.82	1.21	12.18	16.52
	MCS0	5270	54	11	13	100	0.00	1.00	12	11.89	15.45	-1.11	1.29	11.89	15.45	12	11.96	15.70	-1.04	1.27	11.96	15.70
	MCS0	5310	62	11	13	100	0.00	1.00	12	12.06	16.07	-0.94	1.24	12.06	16.07	12	12.11	16.26	-0.89	1.23	12.11	16.26
	MCS0	5510	102	11	13	100	0.00	1.00	11	11.25	13.34	-1.75	1.50	11.25	13.34	11	11.19	13.15	-1.81	1.52	11.19	13.15
	MCS0	5550	110	11	13	100	0.00	1.00	11	11.28	13.43	-1.72	1.49	11.28	13.43	11	11.23	13.27	-1.77	1.50	11.23	13.27
	MCS0	5670	134	11	13	100	0.00	1.00	11	11.34	13.61	-1.66	1.47	11.34	13.61	11	11.23	13.27	-1.77	1.50	11.23	13.27
	MCS0	5755	151	11	13	100	0.00	1.00	11	11.38	13.74	-1.62	1.45	11.38	13.74	11	11.31	13.52	-1.69	1.48	11.31	13.52
	MCS0	5795	159	11	13	100	0.00	1.00	11	11.54	14.26	-1.46	1.40	11.54	14.26	11	11.45	13.96	-1.55	1.43	11.45	13.96
11ac40 -SISO	MCS0	5190	38	11	13	100	0.00	1.00	12	12.04	16.00	-0.96	1.25	12.04	16.00	12	12.12	16.29	-0.88	1.22	12.12	16.29
	MCS0	5230	46	11	13	100	0.00	1.00	12	12.11	16.26	-0.89	1.23	12.11	16.26	12	12.18	16.52	-0.82	1.21	12.18	16.52
	MCS0	5270	54	11	13	100	0.00	1.00	12	11.88	15.42	-1.12	1.29	11.88	15.42	12	11.96	15.70	-1.04	1.27	11.96	15.70
	MCS0	5310	62	11	13	100	0.00	1.00	12	12.06	16.07	-0.94	1.24	12.06	16.07	12	12.11	16.26	-0.89	1.23	12.11	16.26
	MCS0	5510	102	11	13	100	0.00	1.00	11	11.25	13.34	-1.75	1.50	11.25	13.34	11	11.18	13.12	-1.82	1.52	11.18	13.12
	MCS0	5550	110	11	13	100	0.00	1.00	11	11.28	13.43	-1.72	1.49	11.28	13.43	11	11.24	13.30	-1.76	1.50	11.24	13.30
	MCS0	5670	134	11	13	100	0.00	1.00	11	11.34	13.61	-1.66	1.47	11.34	13.61	11	11.23	13.27	-1.77	1.50	11.23	13.27
	MCS0	5755	151	11	13	100	0.00	1.00	11	11.38	13.74	-1.62	1.45	11.38	13.74	11	11.31	13.52	-1.69	1.48	11.31	13.52
	MCS0	5795	159	11	13	100	0.00	1.00	11	11.54	14.26	-1.46	1.40	11.54	14.26	11	11.90	15.49	-1.10	1.29	11.90	15.49
11ac80 -SISO	MCS0	5210	42	8.5	10.5	100	0.00	1.00	9	9.49	8.89	-1.01	1.26	9.49	8.89	9	9.56	9.04	-0.94	1.24	9.56	9.04
	MCS0	5290	58	8.5	10.5	100	0.00	1.00	9	9.25	8.41	-1.25	1.33	9.25	8.41	9	9.31	8.53	-1.19	1.32	9.31	8.53
	MCS0	5530	106	8.5	10.5	100	0.00	1.00	8	8.77	7.53	-1.73	1.49	8.77	7.53	8	8.72	7.45	-1.78	1.51	8.72	7.45
	MCS0	5775	155	8.5	10.5	100	0.00	1.00	8	8.99	7.93	-1.51	1.42	8.99	7.93	8	8.90	7.76	-1.60	1.45	8.90	7.76

*. The SAR test powers by setting power were not more than 2dB lower than maximum tune-up power (KDB 447498 D04 (v01) requirement).

*. CH: Channel; Max: Maximum; n/a: not applied; (mode) BT-LE: Bluetooth Low Energy; 11b: IEEE 802.11b, 11g: IEEE 802.11g, 11a: IEEE 802.11a, 11n20-SISO: IEEE 802.11n(20HT)-SISO, 11n40-SISO: IEEE 802.11n(40HT)-SISO, 11ac20-SISO: IEEE 802.11ac(20VHT)-SISO, 11ac40-SISO: IEEE 802.11n(40VHT)-SISO, 11ac80-SISO: IEEE 802.11ac(80VHT)-SISO.

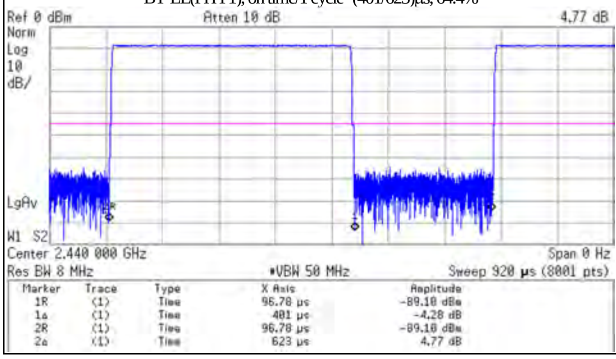
*. Calculating formula: Burst power (dBm) = (P/M Reading, dBm)+(Cable loss, dB)+(Attenuator, dB)+(duty factor, dB)
Time average power (dBm) = (P/M Reading, dBm)+(Cable loss, dB)+(Attenuator, dB)
Duty cycle: (duty cycle, %) = (Tx on time, ms) / (1 cycle time, ms) × 100, where Duty factor (dBm) = 10 × log (100/(duty cycle, %))
Duty cycle scaled factor: Duty cycle correction factor for obtained SAR value, Duty scaled factor [-] = 100(%) / (duty cycle, %)
Δ from max. (Deviation form maximum power, dB) = (Burst power measured (average, dBm)) - (Max.tune-up limit power (average, dBm))
Power scaled factor [-] = 1 / (10 ^ ("Δ from max., dB" / 10))

*. Date measured: September 29, 2021 / Measured by: H. Naka/ Place: Preparation room of No. 7 shield room. (25 deg.C./ 50 %RH)

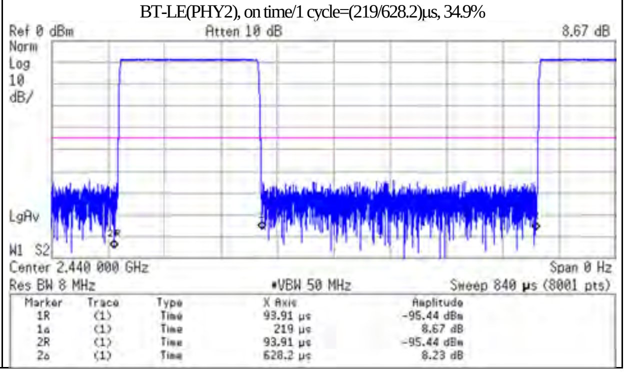
*. Uncertainty of antenna port conducted test (Average power); 1.3 dB / Uncertainty of Duty cycle and time measurement: 0.27 %

*. Chart of the worst duty cycle for each operation mode in right and in follows.

BT-LE(PHY1), on time/1 cycle=(401/623)µs, 64.4%



BT-LE(PHY2), on time/1 cycle=(219/628.2)µs, 34.9%



SECTION 6: SAR Measurement results

6.1 Tissue simulating liquid measurement

6.1.1 Target of tissue simulating liquid

Nominal dielectric values of the tissue simulating liquids in the phantom are listed in the following table. (Appendix A, KDB 865664 v01r04)

Target Frequency	Head		Body	
(MHz)	ε_r	σ(S/m)	ε_r	σ(S/m)
1800~2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95

Target Frequency	Head		Body	
(MHz)	ε_r	σ(S/m)	ε_r	σ(S/m)
3000	38.5	2.40	52.0	2.73
5800	35.3	5.27	48.2	6.00

6.1.2 Liquid measurement (Liquid verification)

Frequency [MHz]	Liquid type	Liquid parameters (*a)														ΔSAR Coefficients(*b)			Date measured
		Liquid Temp. [deg.C.]	Liquid depth of phantom [mm]	Permittivity (εr) [-]						Conductivity [S/m]						ΔSAR		Correction required? (*c)	
				Target value	Measured Value	Measured Δεr [%]	Measured Interpolated	Measured Limit [%]	Δend, >48hrs [%] (*1)	Target value	Measured Value	Measured Δσ [%]	Measured Interpolated	Measured Limit [%]	Δend, >48hrs [%] (*1)	(1g) [%]	(10g) [%]		
5190	Head	22.5	150	***36.00***	35.14	-2.4	☐	10	begin	***4.645***	4.477	-3.6	☐	10	begin	0.6	0.8	not required.	April 19,. 2022
5230				***35.95***	35.07	-2.5	☐	10	begin	***4.686***	4.519	-3.6	☐	10	begin	0.6	0.8	not required.	
5270				***35.91***	35.02	-2.5	☐	10	begin	***4.727***	4.569	-3.3	☐	10	begin	0.6	0.8	not required.	
5310				***35.86***	34.94	-2.6	☐	10	begin	***4.768***	4.612	-3.3	☐	10	begin	0.6	0.8	not required.	
5510	Head	22.5	150	***35.63***	34.60	-2.9	☐	10	begin	***4.973***	4.830	-2.9	☐	10	begin	0.7	0.9	not required.	April 20,. 2022
5550				***35.59***	34.54	-3.0	☐	10	begin	***5.014***	4.870	-2.9	☐	10	begin	0.7	0.9	not required.	
5670				***35.45***	34.37	-3.1	☐	10	begin	***5.137***	5.012	-2.4	☐	10	begin	0.7	0.9	not required.	
5755	Head	22.5	150	***35.35***	34.20	-3.3	☑	10	begin	***5.224***	5.118	-2.0	☑	10	begin	0.7	0.9	not required.	April 21,. 2022
5795				***35.31***	34.13	-3.3	☑	10	begin	***5.265***	5.152	-2.1	☑	10	begin	0.7	0.9	not required.	
2412	Head	22.5	150	***39.27***	39.63	0.9	☑	10	begin	***1.766***	1.82	3.1	☑	10	begin	1.3	0.7	not required.	April 22,. 2022
2437				***39.22***	39.61	1.0	☑	10	begin	***1.788***	1.843	3.1	☑	10	begin	1.3	0.7	not required.	
2440				***39.22***	39.61	1.0	☐	10	begin	***1.791***	1.845	3.0	☐	10	begin	1.2	0.6	not required.	
2462				***39.18***	39.57	1.0	☑	10	begin	***1.813***	1.862	2.7	☑	10	begin	1.1	0.5	not required.	

*1. "begin": SAR test has ended within 24 hours from the liquid parameter measurement, "< 48 hrs.": Since SAR test has ended within 48 hours (2 days) from the liquid parameter measurement and a change in the liquid temperature was within 1 degree, liquid parameters measured on first day were used on next day continuously, "value (%)": Since the SAR test series took longer than 48 hours, the liquid parameters were measured on every 48 hours period and on the date which was end of test series. Since the difference of liquid parameters between the beginning and next measurement was smaller than 5%, the liquid parameters measured in beginning were used until end of each test series.
Calculating formula: "Δend(>48 hrs.) (%)"" = {(dielectric properties, end of test series) / (dielectric properties, beginning of test series) -1} × 100

*a. The target values of (2000, 2450, 3000, 5800) MHz are parameters defined in Appendix A of KDB 865664 D01. For other frequencies, the target nominal dielectric values shall be obtained by linear interpolation between the higher and lower tabulated figures. Above 5800MHz were obtained using linear extrapolation.

*b. The coefficients in below are parameters defined in IEEE Std.1528-2013.
Calculating formula: $\Delta SAR(1g) = C\varepsilon r \times \Delta\varepsilon r + C\sigma \times \Delta\sigma$, $C\varepsilon r = -7.854E\text{-}4 \times f^3 + 9.402E\text{-}3 \times f^2 - 2.742E\text{-}2 \times f - 0.2026$ / $C\sigma = 9.804E\text{-}3 \times f^3 - 8.661E\text{-}2 \times f^2 + 2.981E\text{-}2 \times f + 0.7829$
Calculating formula: $\Delta SAR(10g) = C\varepsilon r \times \Delta\varepsilon r + C\sigma \times \Delta\sigma$, $C\varepsilon r = 3.456 \times 10^{-3} \times f^3 - 3.531 \times 10^{-2} \times f^2 + 7.675 \times 10^{-2} \times f - 0.1860$ / $C\sigma = 4.479 \times 10^{-3} \times f^3 - 1.586 \times 10^{-2} \times f^2 - 0.1972 \times f + 0.7717$
Since the calculated ΔSAR values of the tested liquid had shown positive correction, the measured SAR was not converted by ΔSAR correction.
Calculating formula: ΔSAR corrected SAR (W/kg) = (Measured SAR (W/kg)) × (100 - (ΔSAR(%)) / 100

*. Calibration frequency of the SAR measurement probe (and used conversion factors for each frequency.)
The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

Liquid	SAR test frequency	Probe calibration frequency	Validity	Conversion factor	Uncertainty
Head	(2412, 2437, 2440, 2462) MHz	2450 MHz	within ± 5 0MHz of calibration frequency	7.35	± 12.0 %
Head	(5190, 5230, 5270, 5310) MHz	5250 MHz	within ± 110 MHz of calibration frequency	4.75	± 13.1 %
Head	(5510, 5550, 5670) MHz	5600 MHz	within ± 110 MHz of calibration frequency	4.32	± 13.1 %
Head	(5755, 5795) MHz	5800 MHz	within ± 110 MHz of calibration frequency	4.36	± 13.1 %

6.2 SAR results

Test setup				Mode and Frequency (*2)			Duty cycle		Power correction			SAR results [W/kg] (Max.value of multi-peak)				SAR type	SAR Limit [W/kg]	SAR plot # in Appx. 2	Setup photo# in Appx. 1-3	Remarks
ANT #	Test position	Gap [mm]	Source power	Mode (D/R) Mark with "*" is the initial mode & frequency.	[MHz]	CH	Duty [%]	Duty scaled factor	Max. tune-up limit [dBm]	Measured conducted [dBm]	Power scaled factor	Measured	ΔSAR [%]	ΔSAR corrected	Scaled (*b)					
Step 1) 2.4 GHz Band (*1)																				
2	Back	0	Battery	11b (1Mbps)*	2412*	1	100	1.00	14	12.84	1.31	0.181	+ sign	n/a (*a)	**0.237**	10g	4	-	P1	Wide area scan
2	Back	0	Battery	11b (1Mbps)*	2437	6	100	1.00	14	12.09	1.55	0.169	+ sign	n/a (*a)	**0.262**	10g	4	-	P1	-
2	Back	0	Battery	11b (1Mbps)*	2462	11	100	1.00	14	12.23	1.50	0.190	+ sign	n/a (*a)	**0.285**	10g	4	1a-2	P1	-
2	Back	0	Battery	BT-LE (1Mbps)	2440	19	64.4	1.55	5	3.34	1.47	0.014	+ sign	n/a (*a)	**0.032**	10g	4		P1	-
1	Back	0	Battery	11b (1Mbps)*	2412*	1	100	1.00	14	12.84	1.31	0.207	+ sign	n/a (*a)	**0.271**	10g	4	-	P1	Wide area scan
1	Back	0	Battery	11b (1Mbps)*	2437	6	100	1.00	14	12.13	1.54	0.189	+ sign	n/a (*a)	**0.291**	10g	4	-	P1	-
1	Back	0	Battery	11b (1Mbps)*	2462	11	100	1.00	14	12.26	1.49	0.209	+ sign	n/a (*a)	**0.311**	10g	4	1a-1	P1	-
1	Back	0	Battery	BT-LE (1Mbps)	2440	19	64.4	1.55	5	3.37	1.46	0.017	+ sign	n/a (*a)	**0.038**	10g	4		P1	-
2	Front	0	Battery	11b (1Mbps)*	2412*	1	100	1.00	14	12.84	1.31	0.00456	+ sign	n/a (*a)	**0.006**	1g	1.6	-	P2	Wide area scan
1	Front	0	Battery	11b (1Mbps)*	2412*	1	100	1.00	14	12.84	1.31	0.025	+ sign	n/a (*a)	**0.033**	1g	1.6	-	P2	Wide area scan
2	Left (ant.2)	0	Battery	11b (1Mbps)*	2412*	1	100	1.00	14	12.84	1.31	0.030	+ sign	n/a (*a)	**0.039**	1g	1.6	1b-2	P3	Wide area scan
2	Left (ant.2)	0	Battery	11b (1Mbps)*	2437	6	100	1.00	14	12.09	1.55	0.023	+ sign	n/a (*a)	**0.036**	1g	1.6	-	P3	-
2	Left (ant.2)	0	Battery	11b (1Mbps)*	2462	11	100	1.00	14	12.23	1.50	0.024	+ sign	n/a (*a)	**0.036**	1g	1.6	-	P3	-
2	Left (ant.2)	0	Battery	BT-LE (1Mbps)	2440	19	64.4	1.55	5	3.34	1.47	0.00225	+ sign	n/a (*a)	**0.005**	1g	1.6	-	P3	-
1	Bottom (ant.1)	0	Battery	11b (1Mbps)*	2412*	1	100	1.00	14	12.84	1.31	0.167	+ sign	n/a (*a)	**0.219**	1g	1.6	1b-1	P4	Wide area scan
1	Bottom (ant.1)	0	Battery	11b (1Mbps)*	2437	6	100	1.00	14	12.13	1.54	0.128	+ sign	n/a (*a)	**0.197**	1g	1.6	-	P4	-
1	Bottom (ant.1)	0	Battery	11b (1Mbps)*	2462	11	100	1.00	14	12.26	1.49	0.122	+ sign	n/a (*a)	**0.182**	1g	1.6	-	P4	-
1	Bottom (ant.1)	0	Battery	BT-LE (1Mbps)	2440	19	64.4	1.55	5	3.37	1.46	0.00763	+ sign	n/a (*a)	**0.017**	1g	1.6	-	P4	-
Step 2) U-NII-2A (5.3 GHz) (and U-NII-1 (5.2 GHz)) Band																				
2	Back	0	Battery	11n40 (MCS0)*	5270	54	100	1.00	13	11.89	1.29	0.399	+ sign	n/a (*a)	**0.515**	10g	4	2a-2	P1	-
2	Back	0	Battery	11n40 (MCS0)*	5310*	62	100	1.00	13	12.06	1.24	0.393	+ sign	n/a (*a)	**0.487**	10g	4	-	P1	Wide area scan
1	Back	0	Battery	11n40 (MCS0)*	5270	54	100	1.00	13	11.96	1.27	0.587	+ sign	n/a (*a)	**0.745**	10g	4	2a-1	P1	-
1	Back	0	Battery	11n40 (MCS0)*	5310*	62	100	1.00	13	12.11	1.23	0.556	+ sign	n/a (*a)	**0.684**	10g	4	-	P1	Wide area scan
2	Front	0	Battery	11n40 (MCS0)*	5310*	62	100	1.00	13	12.06	1.24	0.00747	+ sign	n/a (*a)	**0.009**	1g	1.6	-	P2	-
1	Front	0	Battery	11n40 (MCS0)*	5310*	62	100	1.00	13	12.11	1.23	0.073	+ sign	n/a (*a)	**0.090**	1g	1.6	-	P2	-
2	Left (ant.2)	0	Battery	11n40 (MCS0)*	5310*	62	100	1.00	13	12.06	1.24	0.031	+ sign	n/a (*a)	**0.038**	1g	1.6	2b-2	P3	Wide area scan
1	Bottom (ant.1)	0	Battery	11n40 (MCS0)*	5270	54	100	1.00	13	11.96	1.27	0.305	+ sign	n/a (*a)	**0.387**	1g	1.6	-	P4	–
1	Bottom (ant.1)	0	Battery	11n40 (MCS0)*	5310*	62	100	1.00	13	12.11	1.23	0.389	+ sign	n/a (*a)	**0.478**	1g	1.6	2b-1	P4	Wide area scan
2	Back	0	Battery	11n40 (MCS0)*	5190	38	100	1.00	13	12.05	1.24	0.468	+ sign	n/a (*a)	**0.580**	10g	4	2c-2	P1	-
2	Back	0	Battery	11n40 (MCS0)*	5230*	46	100	1.00	13	12.12	1.22	0.423	+ sign	n/a (*a)	**0.516**	10g	4	-	P1	-
1	Back	0	Battery	11n40 (MCS0)*	5190	38	100	1.00	13	12.13	1.22	0.565	+ sign	n/a (*a)	**0.689**	10g	4	-	P1	-
1	Back	0	Battery	11n40 (MCS0)*	5230*	46	100	1.00	13	12.18	1.21	0.593	+ sign	n/a (*a)	**0.718**	10g	4	2c-1	P1	-
2	Left (ant.2)	0	Battery	11n40 (MCS0)*	5230*	46	100	1.00	13	12.12	1.22	0.024	+ sign	n/a (*a)	**0.029**	1g	1.6	2d-2	P3	-
1	Bottom (ant.1)	0	Battery	11n40 (MCS0)*	5190	38	100	1.00	13	12.13	1.22	0.229	+ sign	n/a (*a)	**0.279**	1g	1.6	-	P4	-
1	Bottom (ant.1)	0	Battery	11n40 (MCS0)*	5230*	46	100	1.00	13	12.18	1.21	0.313	+ sign	n/a (*a)	**0.379**	1g	1.6	2d-1	P4	-
Step 3) U-NII-2C (5.6 GHz) Band																				
2	Back	0	Battery	11n40 (MCS0)*	5510	102	100	1.00	13	11.25	1.50	0.286	+ sign	n/a (*a)	**0.429**	10g	4	-	P1	-
2	Back	0	Battery	11n40 (MCS0)*	5550	110	100	1.00	13	11.28	1.49	0.288	+ sign	n/a (*a)	**0.429**	10g	4	-	P1	-
2	Back	0	Battery	11n40 (MCS0)*	5670*	134	100	1.00	13	11.34	1.47	0.295	+ sign	n/a (*a)	**0.434**	10g	4	3a-2	P1	-
1	Back	0	Battery	11n40 (MCS0)*	5510	102	100	1.00	13	11.19	1.52	0.302	+ sign	n/a (*a)	**0.459**	10g	4	-	P1	-
1	Back	0	Battery	11n40 (MCS0)*	5550	110	100	1.00	13	11.23	1.50	0.307	+ sign	n/a (*a)	**0.461**	10g	4	3a-1	P1	-
1	Back	0	Battery	11n40 (MCS0)*	5670*	134	100	1.00	13	11.23	1.50	0.293	+ sign	n/a (*a)	**0.440**	10g	4	-	P1	-
2	Front	0	Battery	11n40 (MCS0)*	5670*	134	100	1.00	13	11.34	1.47	0.00348	+ sign	n/a (*a)	**0.005**	1g	1.6	-	P2	-
1	Front	0	Battery	11n40 (MCS0)*	5670*	134	100	1.00	13	11.23	1.50	0.022	+ sign	n/a (*a)	**0.033**	1g	1.6	-	P2	-
2	Left (ant.2)	0	Battery	11n40 (MCS0)*	5670*	134	100	1.00	13	11.34	1.47	0.011	+ sign	n/a (*a)	**0.016**	1g	1.6	3b-2	P3	-
1	Bottom (ant.1)	0	Battery	11n40 (MCS0)*	5510	102	100	1.00	13	11.19	1.52	0.197	+ sign	n/a (*a)	**0.299**	1g	1.6	-	P4	-
1	Bottom (ant.1)	0	Battery	11n40 (MCS0)*	5550	110	100	1.00	13	11.23	1.50	0.190	+ sign	n/a (*a)	**0.285**	1g	1.6	-	P4	-
1	Bottom (ant.1)	0	Battery	11n40 (MCS0)*	5670*	134	100	1.00	13	11.23	1.50	0.203	+ sign	n/a (*a)	**0.305**	1g	1.6	3b-1	P4	-
Step 4) U-NII-3 (5.8 GHz) Band																				
2	Back	0	Battery	11n40 (MCS0)*	5755	151	100	1.00	13	11.38	1.45	0.286	+ sign	n/a (*a)	**0.415**	10g	4	-	P1	-
2	Back	0	Battery	11n40 (MCS0)*	5795*	159	100	1.00	13	11.54	1.40	0.297	+ sign	n/a (*a)	**0.416**	10g	4	4a-2	P1	-
1	Back	0	Battery	11n40 (MCS0)*	5755	151	100	1.00	13	11.31	1.48	0.291	+ sign	n/a (*a)	**0.431**	10g	4	4a-1	P1	-
1	Back	0	Battery	11n40 (MCS0)*	5795*	159	100	1.00	13	11.45	1.43	0.291	+ sign	n/a (*a)	**0.416**	10g	4	-	P1	-
2	Front	0	Battery	11n40 (MCS0)*	5795	159	100	1.00	13	11.54	1.40	0.011	+ sign	n/a (*a)	**0.015**	1g	1.6	-	P2	-
1	Front	0	Battery	11n40 (MCS0)*	5795*	159	100	1.00	13	11.45	1.43	0.026	+ sign	n/a (*a)	**0.037**	1g	1.6	-	P2	-
2	Left (ant.2)	0	Battery	11n40 (MCS0)*	5795*	159	100	1.00	13	11.54	1.40	0.00977	+ sign	n/a (*a)	**0.014**	1g	1.6	4b-2	P3	-
1	Bottom (ant.1)	0	Battery	11n40 (MCS0)*	5755	151	100	1.00	13	11.31	1.48	0.231	+ sign	n/a (*a)	**0.342**	1g	1.6	-	P4	-
1	Bottom (ant.1)	0	Battery	11n40 (MCS0)*	5795*	159	100	1.00	13	11.45	1.43	0.281	+ sign	n/a (*a)	**0.402**	1g	1.6	4b-1	P4	-

Notes:
- *. The higher scaled (reported) SAR in each operation band is marked (shaded yellow marker).
- *. Appx. Appendix, ant: antenna; (mode) 11b: IEEE 802.11b, 11n40: IEEE 802.11n(40HT)-SISO; Max.: maximum.; n/a: not applied. Gap: It is the separation distance between the platform surface and the bottom outer surface of phantom.
- *. During test, the EUT was operated with full charged battery and connected an IF cable (except "Left" setup).
- *. During SAR test, the radiated power is always monitored by Spectrum Analyzer.

*a. Since the calculated ΔSAR values of the tested liquid had shown positive correction, the measured SAR was not converted by ΔSAR correction.
Calculating formula: ΔSAR corrected SAR (W/kg) = (Measured SAR (W/kg)) × (100 - (ΔSAR(%)) / 100
*b. Calculating formula: Scaled SAR (W/kg) = (Measured SAR (W/kg)) × (Duty scaled factor) × (Power scaled factor)
where, Duty scaled factor [-] = 100(%) / (duty cycle, %), Power scaled factor [-] = 10 ^ (((Max.tune-up limit, dBm) - (Measured conducted, dBm)) / 10)

*1. (KDB 248227 D01) When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR test of OFDM mode was reduced.

OFDM mode	Maximum tune-up tolerance limit				OFDM scaled factor [-]	DSSS worst reported SAR value				**Estimated SAR value: OFDM [W/kg]**	Exclusion limit [W/kg]	Standalone SAR test of OFDM mode require?
	DSSS		OFDM									
	[dBm]	[mW] (a)	[dBm]	[mW] (b)	(b)/(a)×100	SAR type	Setup	Antenna	[W/kg]			
11g	14.0	25	14.0	25	1.00	10g	Back	Antenna 1	0.311	**0.31**	**≤ 1.2**	**No**
11n20	14.0	25	14.0	25	1.00	10g	Back	Antenna 1	0.311	**0.31**	**≤ 1.2**	**No**
11n40	14.0	25	13.0	20	0.80	10g	Back	Antenna 1	0.311	**0.25**	**≤ 1.2**	**No**
11g	14.0	25	14.0	25	1.00	1g	Bottom	Antenna 1	0.219	**0.22**	**≤ 1.2**	**No**
11n20	14.0	25	14.0	25	1.00	1g	Bottom	Antenna 1	0.219	**0.22**	**≤ 1.2**	**No**
11n40	14.0	25	13.0	20	0.80	1g	Bottom	Antenna 1	0.219	**0.18**	**≤ 1.2**	**No**

*****. (mode) 11b: IEEE 802.11b, 11g: IEEE 802.11g, 11n20: IEEE 802.11n(20HT)-SISO, 11n40: IEEE 802.11n(40HT)-SISO.

6.3 Simultaneous transmission evaluation

Result: Simultaneous transmission SAR measurement (Volume Scan) was not required because the sum of the calculated SAR (1g) was within 1.6 W/kg (SAR (1g) limit) and SAR (10g) was within 4 W/kg (SAR (10g) limit).

Possible simultaneous transmission scenario																		
	Highest Scaled SAR(10g) @antenna 2 (*1)									**Highest Scaled SAR(10g) @antenna 1** (*1)								
SAR type	Worst SAR test position	**WLAN [W/kg]**		**BT LE [W/kg]**		**Σ SAR [W/kg]**	**Pass?**	Volume scan?	Antenna separation distance [mm]	Worst SAR test position	**WLAN [W/kg]**		**BT LE [W/kg]**		**Σ SAR [W/kg]**	**Pass?**	Volume scan?	Antenna separation distance [mm]
		SAR	Band	SAR	Band						SAR	Band	SAR	Band				
10 g	Back	0.285	2.4GHz	0.032	2.4GHz	*. not supported	n/a	-	-	Back	0.311	2.4GHz	0.038	2.4GHz	*. not supported	n/a	-	n/a
		0.580	5.2GHz	0.032	2.4GHz	**0.612** (< 4)	**Pass**	not required.	0 (*. same antenna)		0.718	5.2GHz	0.038	2.4GHz	**0.756** (< 4)	Pass	not required.	0 (*. same antenna)
		0.515	5.3GHz	0.032	2.4GHz	**0.547** (< 4)	**Pass**				0.745	5.3GHz	0.038	2.4GHz	**0.783** (< 4)	Pass		
		0.434	5.6GHz	0.032	2.4GHz	**0.466** (< 4)	**Pass**				0.461	5.6GHz	0.038	2.4GHz	**0.499** (< 4)	Pass		
		0.416	5.8GHz	0.032	2.4GHz	**0.448** (< 4)	**Pass**				0.431	5.8GHz	0.038	2.4GHz	**0.469** (< 4)	Pass		
1 g	Left	0.039	2.4GHz	0.005	2.4GHz	*. not supported	n/a	-	n/a	Bottom	0.219	2.4GHz	0.017	2.4GHz	*. not supported	n/a	-	n/a
		0.029	5.2GHz	0.005	2.4GHz	**< 0.1** (< 1.6)	**Pass**	not required.	0 (*. same antenna)		0.379	5.2GHz	0.017	2.4GHz	**0.396** (< 1.6)	Pass	not required.	0 (*. same antenna)
		0.038	5.3GHz	0.005	2.4GHz	**< 0.1** (< 1.6)	**Pass**				0.478	5.3GHz	0.017	2.4GHz	**0.495** (< 1.6)	Pass		
		0.016	5.6GHz	0.005	2.4GHz	**< 0.1** (< 1.6)	**Pass**				0.305	5.6GHz	0.017	2.4GHz	**0.322** (< 1.6)	Pass		
		0.014	5.8GHz	0.005	2.4GHz	**< 0.1** (< 1.6)	**Pass**				0.402	5.8GHz	0.017	2.4GHz	**0.419** (< 1.6)	Pass		

*1. A transmission is performed from one of antenna 2 or antenna 1 (diversity). A transmission of WLAN(2.4GHz) and BT-LE is time-division-processing. Therefore, simultaneously transmitted SAR was only considered for the WLAN(5GHz) and BT-LE.

<SAR Summation Analysis>
Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to reported standalone SAR of each applicable simultaneous transmitting antenna. When the sum of SAR of all simultaneous transmitting antennas in an operating mode and exposure condition is within the SAR limit (SAR(1g): 1.6 W/kg, SAR(10g): 4 W/kg), the simultaneous transmission SAR is not required. When the sum of SAR is greater than the SAR limit (SAR(1g): 1.6 W/kg, SAR(10g): 4 W/kg), SAR test exclusion is determined by the SPLSR.
(Calculating formula) Per KDB447498 D04(v01), SPLSR = (SAR1 + SAR2)^1.5 / (minimum antenna separation distance, mm)
where; the minimum antenna separation distance is determined by the closest physical separation of the antennas, according to geometric center of the antennas.

6.4 SAR Measurement Variability (Repeated measurement requirement)

In accordance with published RF Exposure KDB procedure 865664 D01 (v01r04) SAR measurement 100 MHz to 6 GHz. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

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

Since all the measured SAR are less than 0.8 W/kg (SAR(1g), or 2 W/kg (SAR(10g)), the repeated measurement is not required.

6.5 Device holder perturbation verification

When the highest reported SAR of an antenna is > 1.2 W/kg, holder perturbation verification (by Urethane form alone) is required by using the highest SAR configuration among all applicable frequency bands.

Since all the reported (scaled) SAR are less than 1.2 W/kg (SAR(1g), or 3 W/kg (SAR(10g)), the "device holder perturbation verification" measurement is not performed.

APPENDIX 2: SAR Measurement data

Appendix 2-1: Worst Scaled (Reported) SAR Plot

Plot 1a-1: 2.4GHz band, SAR(10g), Antenna 1; Back & touch / 11b (1Mbps) / 2462 MHz

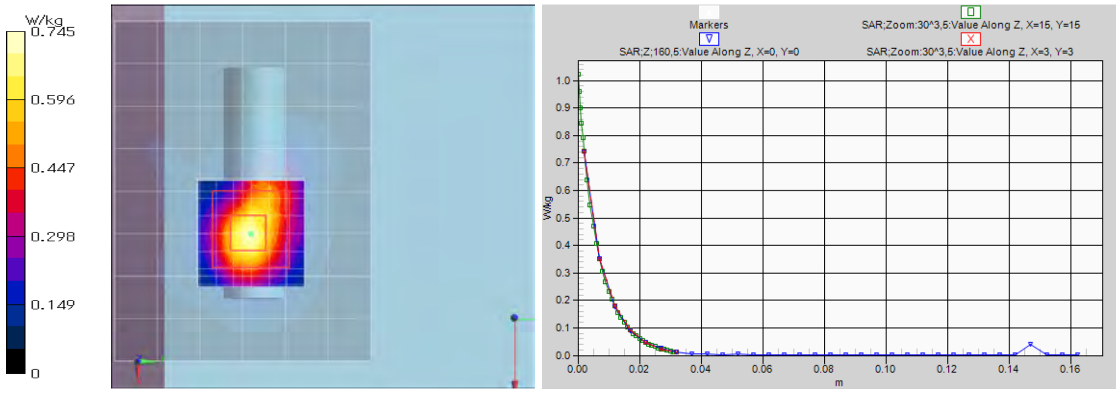
EUT: Built-in Wireless Module with BT/Flat Panel Detector; Type: WM01B/WM5B05; Serial: 34:9F:7B:EF:DB:20/21MED-0327

Mode: 11b(1Mbps, DSSS) (UID: 0, Wi-fi_2.4GHz (0), Frame Length in ms: 0; PAR: 0; PMF: 1); **Frequency: 2462 MHz; Crest Factor: 1.0**
Medium: Head(v6.2204); Medium parameters used (interpolated): f = 2462 MHz; σ = 1.862 S/m; ε_r = 39.57; ρ = 1000 kg/m^3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration: -Electronics: DAE4 Sn626; Calibrated: 2021/12/08 / -Phantom: ELI v4.0; Type: QDOVA001BA; Serial: 1059; Phantom section: Flat Section
-DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474) / -Probe: EX3DV4 - SN7372; ConvF(7.35, 7.35, 7.35) @ 2462 MHz; Calibrated: 2021/04/23
-Sensor-Surface: 2mm (Mechanical Surface Detection), z =1.0, 31.0, 161.0

touch,back,h24a/o24h12,2462,ant1,Rear&d0,b(1m)/
Area:96x72,stp12 (9x7x1): Measurement grid: dx=12mm, dy=12mm; Maximum value of SAR (measured) = 0.714 W/kg
Area:96x72,stp12 (81x61x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm; Maximum value of SAR (interpolated) = 0.744 W/kg
Z;160,5 (1x1x33): Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 0.740 W/kg

Zoom:30^3,5 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm;
Reference Value = 20.33 V/m; Power Drift = -0.02 dB; Maximum value of SAR (measured) = 0.745 W/kg; Peak SAR (extrapolated) = 1.02 W/kg
SAR(1 g) = 0.470 W/kg; SAR(10 g) = 0.209 W/kg (*. Smallest distance from peaks to all points 3 dB below = 8.6 mm; Ratio of SAR at M2 to SAR at M1 = 47.4%)



Remarks: *. Date tested: 2022/4/22; Tested by: Hiroshi Naka; Tested place:No.7 shielded room,
*. liquid depth: 150 mm; Position: distance of EUT to phantom: 0 mm (2 mm to liquid); ambient: (22~24) deg.C. / (60~75) %RH,
*. liquid temperature: 22.5 deg.C. ± 0.5 deg.C. (22.5 deg.C. , in check); *.White cubic: zoom scan area, Red cubic: big=SAR(10g)/small=SAR(1g)

Plot 1b-1: 2.4GHz band, SAR(1g), Antenna 1; Bottom & touch / 11b (1Mbps) / 2412 MHz

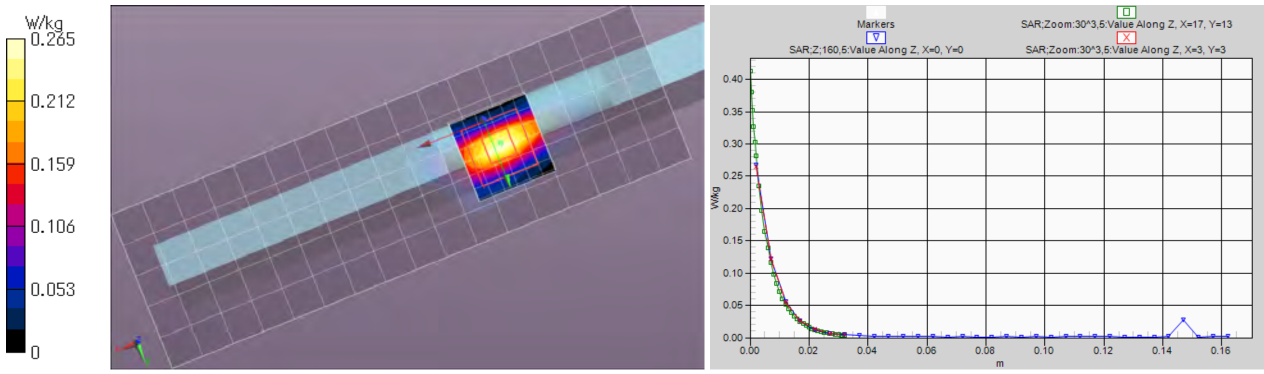
EUT: Built-in Wireless Module with BT/Flat Panel Detector; Type: WM01B/WM5B05; Serial: 34:9F:7B:EF:DB:20/21MED-0327

Mode: 11b(1Mbps, DSSS) (UID: 0, Wi-fi_2.4GHz (0), Frame Length in ms: 0; PAR: 0; PMF: 1); **Frequency: 2412 MHz; Crest Factor: 1.0**
Medium: Head(v6.2204); Medium parameters used (interpolated): f = 2412 MHz; σ = 1.82 S/m; ε_r = 39.63; ρ = 1000 kg/m^3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration: -Electronics: DAE4 Sn626; Calibrated: 2021/12/08 / -Phantom: ELI v4.0; Type: QDOVA001BA; Serial: 1059; Phantom section: Flat Section
-DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474) / -Probe: EX3DV4 - SN7372; ConvF(7.35, 7.35, 7.35) @ 2412 MHz; Calibrated: 2021/04/23
-Sensor-Surface: 2mm (Mechanical Surface Detection), z =1.0, 31.0, 161.0

touch,side/24h25;2412,ant1,side(1)&d0,b(1m)/
Area:204x60,12 (18x6x1): Measurement grid: dx=12mm, dy=12mm; Maximum value of SAR (measured) = 0.167 W/kg
Area:204x60,12 (171x51x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm; Maximum value of SAR (interpolated) = 0.370 W/kg
Z;160,5 (1x1x33): Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 0.268 W/kg

Zoom:30^3,5 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm;
Reference Value = 12.36 V/m; Power Drift = -0.03 dB; Maximum value of SAR (measured) = 0.265 W/kg; Peak SAR (extrapolated) = 0.413 W/kg
SAR(1 g) = 0.167 W/kg; SAR(10 g) = 0.066 W/kg (*. Smallest distance from peaks to all points 3 dB below = 5 mm; Ratio of SAR at M2 to SAR at M1 = 45.8%)



Remarks: *. Date tested: 2022/4/22; Tested by: Hiroshi Naka; Tested place:No.7 shielded room,
*. liquid depth: 150 mm; Position: distance of EUT to phantom: 0 mm (2 mm to liquid); ambient: (22~24) deg.C. / (60~75) %RH,
*. liquid temperature: 22.5 deg.C. ± 0.5 deg.C. (22.5 deg.C. , in check); *.White cubic: zoom scan area, Red cubic: big=SAR(10g)/small=SAR(1g)

APPENDIX 2: SAR Measurement data / Appendix 2-1: Worst Scaled (Reported) SAR Plot (cont'd)

Plot 2a-1: 5.3GHz band, SAR(10g), Antenna 1; Back & touch / 11n(40HT) (MCS0) / 5270 MHz

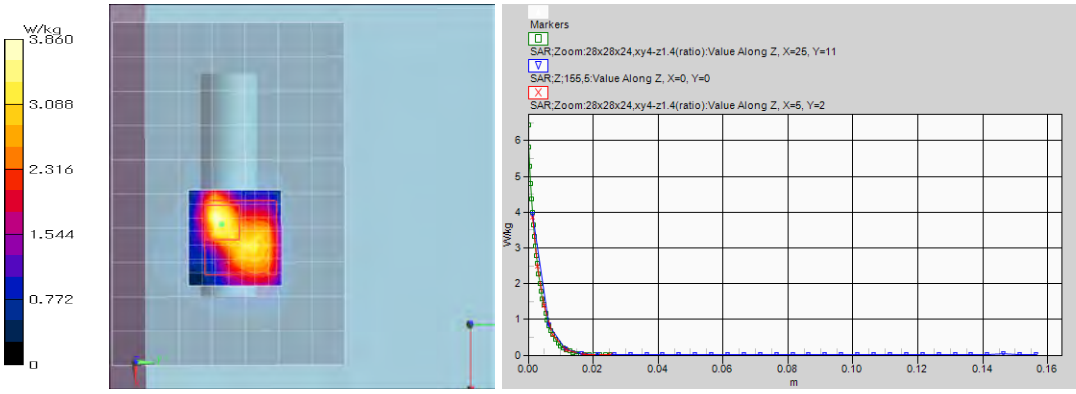
EUT: Built-in Wireless Module with BT/Flat Panel Detector; Type: WM01B/WM5B05; Serial: 34:9F:7B:EF:DB:20/21MED-0327

Mode: n40(MCS0, OFDM) (UID: 0, Wi-fi_5GHz (0), Frame Length in ms: 0; PAR: 0; PMF: 1); **Frequency: 5270 MHz; Crest Factor: 1.0**
Medium: Head(v6.2204); Medium parameters used: f = 5270 MHz; σ = 4.569 S/m; ε_r = 35.02; ρ = 1000 kg/m^3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration: -Electronics: DAE4 Sn626; Calibrated: 2021/12/08 / -Phantom: ELI v4.0; Type: QDOVA001BA; Serial: 1059; Phantom section: Flat Section
-DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474) / -Probe: EX3DV4 - SN7372; ConvF(4.75, 4.75, 4.75) @ 5270 MHz; Calibrated: 2021/04/23
-Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0, 156.0

touch,back,h5b/5h12.53.3,ant1,5270,Rear&d0,n40(m0)/
Area:100x70,stp10 (11x8x1): Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 3.19 W/kg
Area:100x70,stp10 (101x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm; Maximum value of SAR (interpolated) = 3.69 W/kg
Z;155,5 (1x1x32): Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 3.93 W/kg

Zoom:28x28x24,xy4-z1.4(ratio) (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm;
Reference Value = 31.95 V/m; Power Drift = -0.05 dB; Maximum value of SAR (measured) = 3.86 W/kg; Peak SAR (extrapolated) = 6.43 W/kg
SAR(1 g) = 1.48 W/kg; SAR(10 g) = 0.587 W/kg (*. Smallest distance from peaks to all points 3 dB below = 5.1 mm; Ratio of SAR at M2 to SAR at M1 = 64.4%)



Remarks: *. Date tested: 2022/4/19; Tested by: Hiroshi Naka; Tested place:No.7 shielded room,
*. liquid depth: 150 mm; Position: distance of EUT to phantom: 0 mm (2 mm to liquid); ambient: (22~24) deg.C. / (60~75) %RH,
*. liquid temperature: 22.5 deg.C. ± 0.5 deg.C. (22.5 deg.C. , in check); *.White cubic: zoom scan area, Red cubic: big=SAR(10g)/small=SAR(1g)

Plot 2b-1: 5.3GHz band, SAR(1g), Antenna 1; Bottom & touch / 11n(40HT) (MCS0) / 5310 MHz

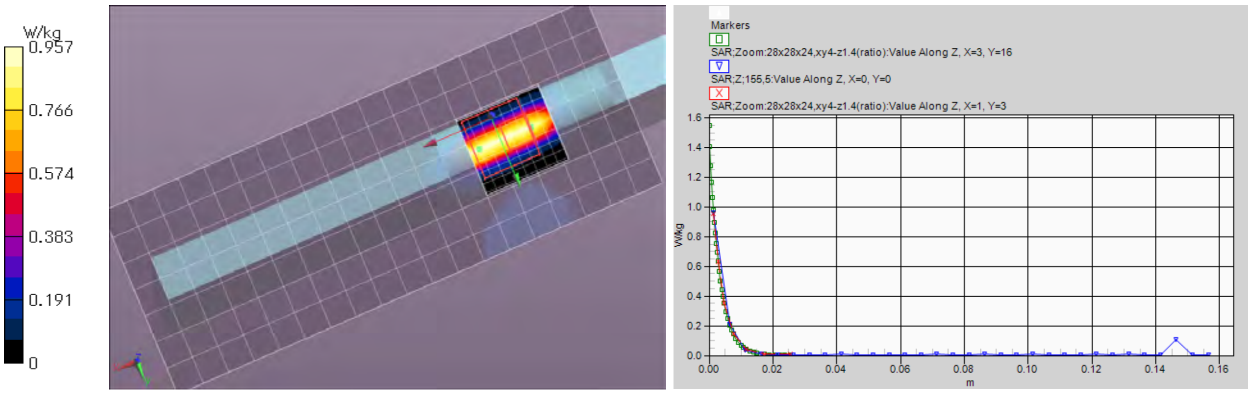
EUT: Built-in Wireless Module with BT/Flat Panel Detector; Type: WM01B/WM5B05; Serial: 34:9F:7B:EF:DB:20/21MED-0327

Mode: n40(MCS0, OFDM) (UID: 0, Wi-fi_5GHz (0), Frame Length in ms: 0; PAR: 0; PMF: 1); **Frequency: 5310 MHz; Crest Factor: 1.0**
Medium: Head(v6.2204); Medium parameters used: f = 5310 MHz; σ = 4.612 S/m; ε_r = 34.94; ρ = 1000 kg/m^3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration: -Electronics: DAE4 Sn626; Calibrated: 2021/12/08 / -Phantom: ELI v4.0; Type: QDOVA001BA; Serial: 1059; Phantom section: Flat Section
-DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474) / -Probe: EX3DV4 - SN7372; ConvF(4.75, 4.75, 4.75) @ 5310 MHz; Calibrated: 2021/04/23
-Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0, 156.0

touch,side1a/5h56.53.13,5310,ant1,side(1)&d0,n40(m0)/
Area:190x70,10 (20x8x1): Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 0.756 W/kg
Area:190x70,10 (191x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm; Maximum value of SAR (interpolated) = 0.983 W/kg
Z;155,5 (1x1x32): Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 0.963 W/kg

Zoom:28x28x24,xy4-z1.4(ratio) (9x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm;
Reference Value = 15.79 V/m; Power Drift = -0.11 dB; Maximum value of SAR (measured) = 0.957 W/kg; Peak SAR (extrapolated) = 1.55 W/kg
SAR(1 g) = 0.389 W/kg; SAR(10 g) = 0.115 W/kg (*. Smallest distance from peaks to all points 3 dB below = 4.8 mm; Ratio of SAR at M2 to SAR at M1 = 66.1%)



Remarks: *. Date tested: 2022/4/19; Tested by: Hiroshi Naka; Tested place:No.7 shielded room,
*. liquid depth: 150 mm; Position: distance of EUT to phantom: 0 mm (2 mm to liquid); ambient: (22~24) deg.C. / (60~75) %RH,
*. liquid temperature: 22.5 deg.C. ± 0.5 deg.C. (22.5 deg.C. , in check); *.White cubic: zoom scan area, Red cubic: big=SAR(10g)/small=SAR(1g)

APPENDIX 2: SAR Measurement data / Appendix 2-1: Worst Scaled (Reported) SAR Plot (cont'd)

Plot 2c-1: 5.2GHz band, SAR(10g), Antenna 1; Back & touch / 11n(40HT) (MCS0) / 5230 MHz

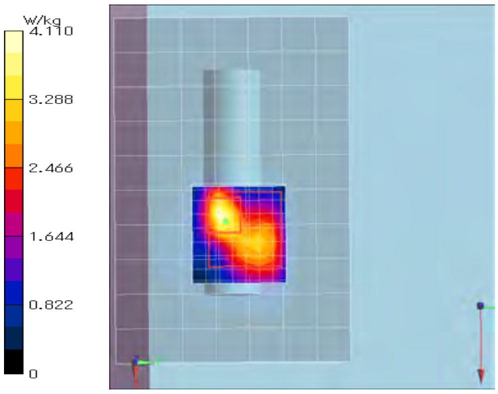
EUT: Built-in Wireless Module with BT/Flat Panel Detector; Type: WM01B/WM5B05; Serial: 34:9F:7B:EF:DB:20/21MED-0327

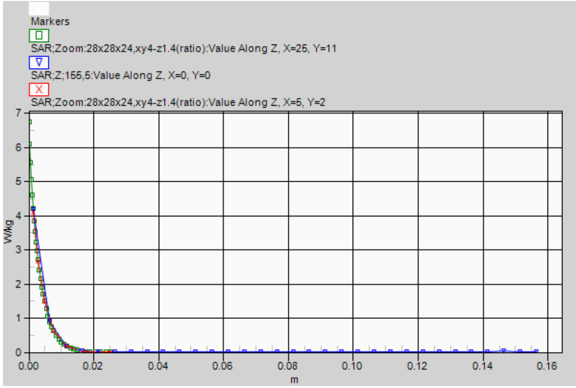
Mode: n40(MCS0, OFDM) (UID: 0, Wi-fi_5GHz (0), Frame Length in ms: 0; PAR: 0; PMF: 1); **Frequency: 5230 MHz; Crest Factor: 1.0**
Medium: Head(v6.2204); Medium parameters used: f = 5230 MHz; σ = 4.519 S/m; ε_r = 35.07; ρ = 1000 kg/m^3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration: -Electronics: DAE4 Sn626; Calibrated: 2021/12/08 / -Phantom: ELI v4.0; Type: QDOVA001BA; Serial: 1059; Phantom section: Flat Section
-DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474) / -Probe: EX3DV4 - SN7372; ConvF(4.75, 4.75, 4.75) @ 5230 MHz; Calibrated: 2021/04/23
-Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0, 156.0

touch,back,h5b/5h13.52.3,ant1,5230,Rear&d0,n40(m0)/
Area:100x70,stp10 (11x8x1): Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 3.42 W/kg
Area:100x70,stp10 (101x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm; Maximum value of SAR (interpolated) = 3.82 W/kg
Z;155,5 (1x1x32): Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 4.19 W/kg

Zoom:28x28x24,xy4-z1.4(ratio) (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm;
Reference Value = 32.70 V/m; Power Drift = -0.02 dB; Maximum value of SAR (measured) = 4.11 W/kg; Peak SAR (extrapolated) = 6.74 W/kg
SAR(1 g) = 1.57 W/kg; SAR(10 g) = 0.593 W/kg (*. Smallest distance from peaks to all points 3 dB below = 5.4 mm; Ratio of SAR at M2 to SAR at M1 = 65%)





Remarks: *. Date tested: 2022/4/19; Tested by: Hiroshi Naka; Tested place:No.7 shielded room,
*. liquid depth: 150 mm; Position: distance of EUT to phantom: 0 mm (2 mm to liquid); ambient: (22~24) deg.C. / (60~75) %RH,
*. liquid temperature: 22.5 deg.C. ± 0.5 deg.C. (22.5 deg.C. , in check); *.White cubic: zoom scan area, Red cubic: big=SAR(10g)/small=SAR(1g)

Plot 2d-1: 5.2GHz band, SAR(1g), Antenna 1; Bottom & touch / 11n(40HT) (MCS0) / 5230 MHz

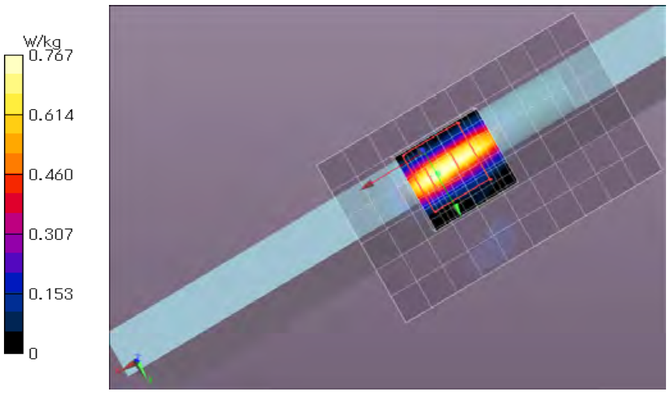
EUT: Built-in Wireless Module with BT/Flat Panel Detector; Type: WM01B/WM5B05; Serial: 34:9F:7B:EF:DB:20/21MED-0327

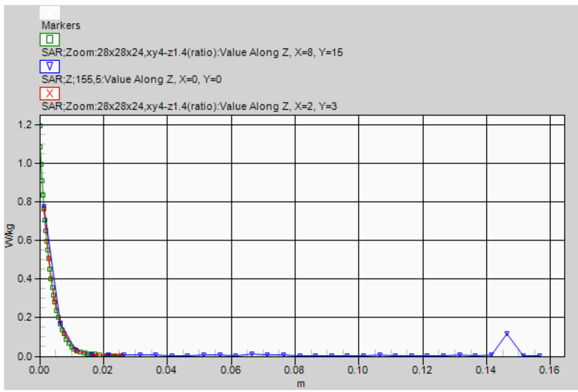
Mode: n40(MCS0, OFDM) (UID: 0, Wi-fi_5GHz (0), Frame Length in ms: 0; PAR: 0; PMF: 1); **Frequency: 5230 MHz; Crest Factor: 1.0**
Medium: Head(v6.2204); Medium parameters used: f = 5230 MHz; σ = 4.519 S/m; ε_r = 35.07; ρ = 1000 kg/m^3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration: -Electronics: DAE4 Sn626; Calibrated: 2021/12/08 / -Phantom: ELI v4.0; Type: QDOVA001BA; Serial: 1059; Phantom section: Flat Section
-DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474) / -Probe: EX3DV4 - SN7372; ConvF(4.75, 4.75, 4.75) @ 5230 MHz; Calibrated: 2021/04/23
-Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0, 156.0

touch,side1a/5h58.52.9,5230,ant1,side(1)&d0,n40(m0)
Area:100x60,10 (11x7x1): Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 0.630 W/kg
Area:100x60,10 (101x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm; Maximum value of SAR (interpolated) = 0.828 W/kg
Z;155,5 (1x1x32): Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 0.778 W/kg

Zoom:28x28x24,xy4-z1.4(ratio) (9x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm;
Reference Value = 14.56 V/m; Power Drift = -0.04 dB; Maximum value of SAR (measured) = 0.767 W/kg; Peak SAR (extrapolated) = 1.20 W/kg
SAR(1 g) = 0.313 W/kg; SAR(10 g) = 0.092 W/kg (*. Smallest distance from peaks to all points 3 dB below = 5.6 mm; Ratio of SAR at M2 to SAR at M1 = 67%)





Remarks: *. Date tested: 2022/4/19; Tested by: Hiroshi Naka; Tested place:No.7 shielded room,
*. liquid depth: 150 mm; Position: distance of EUT to phantom: 0 mm (2 mm to liquid); ambient: (22~24) deg.C. / (60~75) %RH,
*. liquid temperature: 22.5 deg.C. ± 0.5 deg.C. (22.5 deg.C. , in check); *.White cubic: zoom scan area, Red cubic: big=SAR(10g)/small=SAR(1g)

APPENDIX 2: SAR Measurement data / Appendix 2-1: Worst Scaled (Reported) SAR Plot (cont'd)

Plot 3a-1: 5.6GHz band, SAR(10g), Antenna 1; Back & touch / 11n(40HT) (MCS0) / 5550 MHz

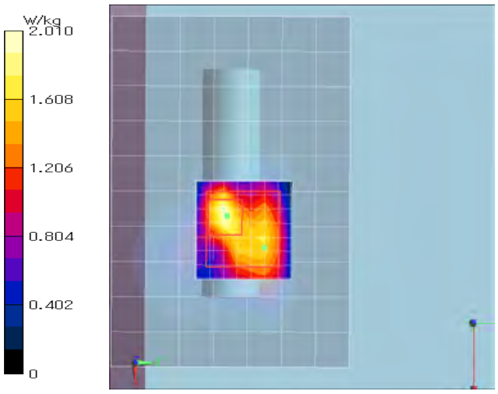
EUT: Built-in Wireless Module with BT/Flat Panel Detector; Type: WM01B/WM5B05; Serial: 34:9F:7B:EF:DB:20/21MED-0327

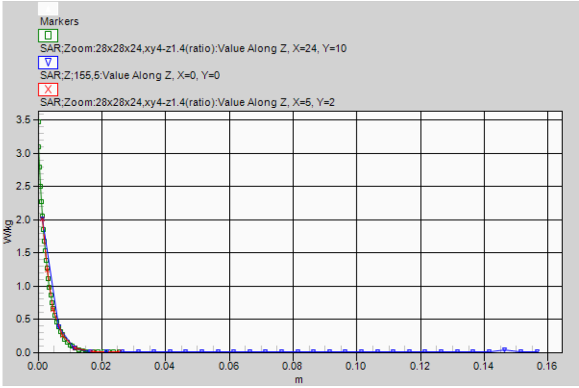
Mode: n40(MCS0, OFDM) (UID: 0, Wi-fi_5GHz (0), Frame Length in ms: 0; PAR: 0; PMF: 1); **Frequency: 5550 MHz; Crest Factor: 1.0**
Medium: Head(v6.2204); Medium parameters used: f = 5550 MHz; σ = 4.87 S/m; ε_r = 34.54; ρ = 1000 kg/m^3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration: -Electronics: DAE4 Sn626; Calibrated: 2021/12/08 / -Phantom: ELI v4.0; Type: QDOVA001BA; Serial: 1059; Phantom section: Flat Section
-DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474) / -Probe: EX3DV4 - SN7372; ConvF(4.32, 4.32, 4.32) @ 5550 MHz; Calibrated: 2021/04/23
-Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0, 156.0

touch,back,h5b/5h17.56.7,ant1,5550,Rear&d0,n40(m0)/
Area:100x70,stp10 (11x8x1): Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 1.44 W/kg
Area:100x70,stp10 (101x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm; Maximum value of SAR (interpolated) = 2.00 W/kg
Z;155,5 (1x1x32): Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 2.01 W/kg

Zoom:28x28x24,xy4-z1.4(ratio) (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm;
Reference Value = 20.26 V/m; Power Drift = 0.00 dB; Maximum value of SAR (measured) = 2.01 W/kg; Peak SAR (extrapolated) = 3.47 W/kg
SAR(1 g) = 0.763 W/kg; SAR(10 g) = 0.307 W/kg (*. Smallest distance from peaks to all points 3 dB below = 5.8 mm; Ratio of SAR at M2 to SAR at M1 = 61.8%)





Remarks: *. Date tested: 2022/4/20; Tested by: Hiroshi Naka; Tested place:No.7 shielded room,
*. liquid depth: 150 mm; Position: distance of EUT to phantom: 0 mm (2 mm to liquid); ambient: (22~24) deg.C. / (60~75) %RH,
*. liquid temperature: 22.5 deg.C. ± 0.5 deg.C. (22.5 deg.C. , in check); *.White cubic: zoom scan area, Red cubic: big=SAR(10g)/small=SAR(1g)

Plot 3b-1: 5.6GHz band, SAR(1g), Antenna 1; Bottom & touch / 11n(40HT) (MCS0) / 5670 MHz

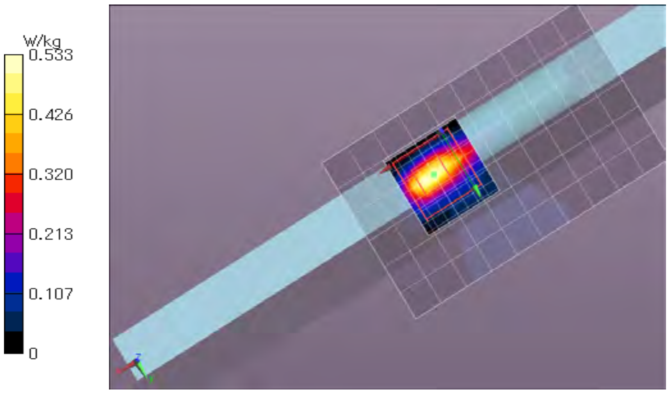
EUT: Built-in Wireless Module with BT/Flat Panel Detector; Type: WM01B/WM5B05; Serial: 34:9F:7B:EF:DB:20/21MED-0327

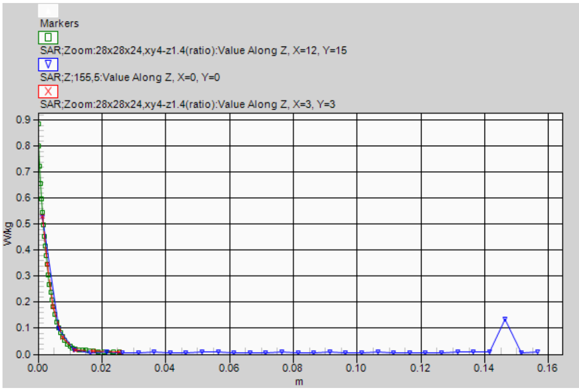
Mode: n40(MCS0, OFDM) (UID: 0, Wi-fi_5GHz (0), Frame Length in ms: 0; PAR: 0; PMF: 1); **Frequency: 5670 MHz; Crest Factor: 1.0**
Medium: Head(v6.2204); Medium parameters used: f = 5670 MHz; σ = 5.012 S/m; ε_r = 34.37; ρ = 1000 kg/m^3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration: -Electronics: DAE4 Sn626; Calibrated: 2021/12/08 / -Phantom: ELI v4.0; Type: QDOVA001BA; Serial: 1059; Phantom section: Flat Section
-DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474) / -Probe: EX3DV4 - SN7372; ConvF(4.32, 4.32, 4.32) @ 5670 MHz; Calibrated: 2021/04/23
-Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0, 156.0

touch,side1a/5h56.56.22,5670,ant1,side(1)&d0,n40(m0)/
Area:100x60,10 (11x7x1): Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 0.406 W/kg
Area:100x60,10 (101x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm; Maximum value of SAR (interpolated) = 0.576 W/kg
Z;155,5 (1x1x32): Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 0.528 W/kg

Zoom:28x28x24,xy4-z1.4(ratio) (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm;
Reference Value = 11.37 V/m; Power Drift = -0.00 dB; Maximum value of SAR (measured) = 0.533 W/kg; Peak SAR (extrapolated) = 0.885 W/kg
SAR(1 g) = 0.203 W/kg; SAR(10 g) = 0.054 W/kg (*. Smallest distance from peaks to all points 3 dB below = 4.8 mm; Ratio of SAR at M2 to SAR at M1 = 64.9%)





Remarks: *. Date tested: 2022/4/20; Tested by: Hiroshi Naka; Tested place:No.7 shielded room,
*. liquid depth: 150 mm; Position: distance of EUT to phantom: 0 mm (2 mm to liquid); ambient: (22~24) deg.C. / (60~75) %RH,
*. liquid temperature: 22.5 deg.C. ± 0.5 deg.C. (22.5 deg.C. , in check); *.White cubic: zoom scan area, Red cubic: big=SAR(10g)/small=SAR(1g)

APPENDIX 2: SAR Measurement data / Appendix 2-1: Worst Scaled (Reported) SAR Plot (cont'd)

Plot 4a-1: 5.8GHz band, SAR(10g), Antenna 1; Back & touch / 11n(40HT) (MCS0) / 5755 MHz

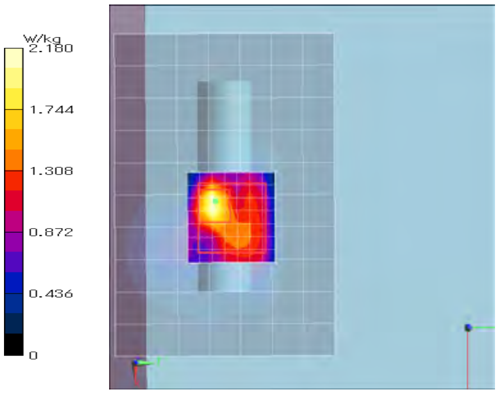
EUT: Built-in Wireless Module with BT/Flat Panel Detector; Type: WM01B/WM5B05; Serial: 34:9F:7B:EF:DB:20/21MED-0327

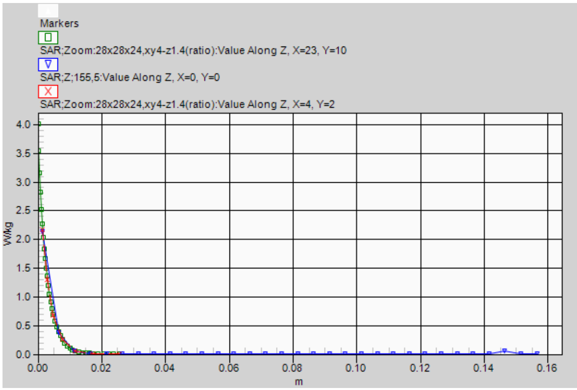
Mode: n40(MCS0, OFDM) (UID: 0, Wi-fi_5GHz (0), Frame Length in ms: 0; PAR: 0; PMF: 1); **Frequency: 5755 MHz; Crest Factor: 1.0**
Medium: Head(v6.2204); Medium parameters used (interpolated): f = 5755 MHz; σ = 5.118 S/m; ε_r = 34.20; ρ = 1000 kg/m^3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration: -Electronics: DAE4 Sn626; Calibrated: 2021/12/08 / -Phantom: ELI v4.0; Type: QDOVA001BA; Serial: 1059; Phantom section: Flat Section
-DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474) / -Probe: EX3DV4 - SN7372; ConvF(4.36, 4.36, 4.36) @ 5755 MHz; Calibrated: 2021/04/23
-Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0, 156.0

touch,back,h5b/5h20.58.4,ant1,5755,Rear&d0,n40(m0)/
Area:100x70,stp10 (11x8x1): Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 1.72 W/kg
Area:100x70,stp10 (101x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm; Maximum value of SAR (interpolated) = 1.99 W/kg
Z;155,5 (1x1x32): Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 2.13 W/kg

Zoom:28x28x24,xy4-z1.4(ratio) (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm;
Reference Value = 22.77 V/m; Power Drift = -0.07 dB; Maximum value of SAR (measured) = 2.18 W/kg; Peak SAR (extrapolated) = 4.01 W/kg
SAR(1 g) = 0.804 W/kg; SAR(10 g) = 0.291 W/kg (*. Smallest distance from peaks to all points 3 dB below = 5.4 mm; Ratio of SAR at M2 to SAR at M1 = 60%)





Remarks: *. Date tested: 2022/4/21; Tested by: Hiroshi Naka; Tested place:No.7 shielded room,
*. liquid depth: 150 mm; Position: distance of EUT to phantom: 0 mm (2 mm to liquid); ambient: (22~24) deg.C. / (60~75) %RH,
*. liquid temperature: 22.5 deg.C. ± 0.5 deg.C. (22.5 deg.C. , in check); *.White cubic: zoom scan area, Red cubic: big=SAR(10g)/small=SAR(1g)

Plot 4b-1: 5.8GHz band, SAR(1g), Antenna 1; Bottom & touch / 11n(40HT) (MCS0) / 5795 MHz

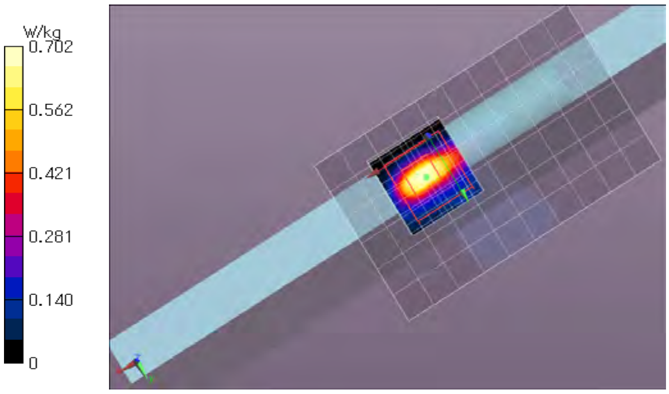
EUT: Built-in Wireless Module with BT/Flat Panel Detector; Type: WM01B/WM5B05; Serial: 34:9F:7B:EF:DB:20/21MED-0327

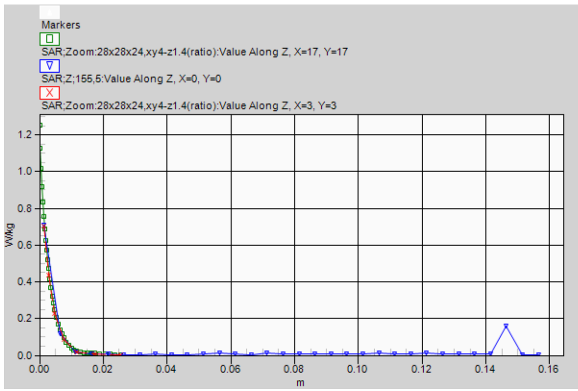
Mode: n40(MCS0, OFDM) (UID: 0, Wi-fi_5GHz (0), Frame Length in ms: 0; PAR: 0; PMF: 1); **Frequency: 5795 MHz; Crest Factor: 1.0**
Medium: Head(v6.2204); Medium parameters used (interpolated): f = 5795 MHz; σ = 5.152 S/m; ε_r = 34.13; ρ = 1000 kg/m^3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration: -Electronics: DAE4 Sn626; Calibrated: 2021/12/08 / -Phantom: ELI v4.0; Type: QDOVA001BA; Serial: 1059; Phantom section: Flat Section
-DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474) / -Probe: EX3DV4 - SN7372; ConvF(4.36, 4.36, 4.36) @ 5795 MHz; Calibrated: 2021/04/23
-Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0, 156.0

touch,side1a/5h63.58.15,5795,ant1,side(1)&d0,n40(m0)/
Area:100x60,10 (11x7x1): Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 0.644 W/kg
Area:100x60,10 (101x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm; Maximum value of SAR (interpolated) = 0.890 W/kg
Z;155,5 (1x1x32): Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 0.710 W/kg

Zoom:28x28x24,xy4-z1.4(ratio) (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 13.39 V/m; Power Drift = 0.00 dB; Maximum value of SAR (measured) = 0.702 W/kg; Peak SAR (extrapolated) = 1.25 W/kg
SAR(1 g) = 0.281 W/kg; SAR(10 g) = 0.078 W/kg (*. Smallest distance from peaks to all points 3 dB below = 5.1 mm; Ratio of SAR at M2 to SAR at M1 = 62.3%)





Remarks: *. Date tested: 2022/4/21; Tested by: Hiroshi Naka; Tested place:No.7 shielded room,
*. liquid depth: 150 mm; Position: distance of EUT to phantom: 0 mm (2 mm to liquid); ambient: (22~24) deg.C. / (60~75) %RH,
*. liquid temperature: 22.5 deg.C. ± 0.5 deg.C. (22.5 deg.C. , in check); *.White cubic: zoom scan area, Red cubic: big=SAR(10g)/small=SAR(1g)

Appendix 2: SAR measurement data (cont'd)

Appendix 2-2: Other SAR Plots

Plot 1a-2: 2.4GHz band, SAR(10g), Antenna 2; Back & touch / 11b (1Mbps) / 2462 MHz

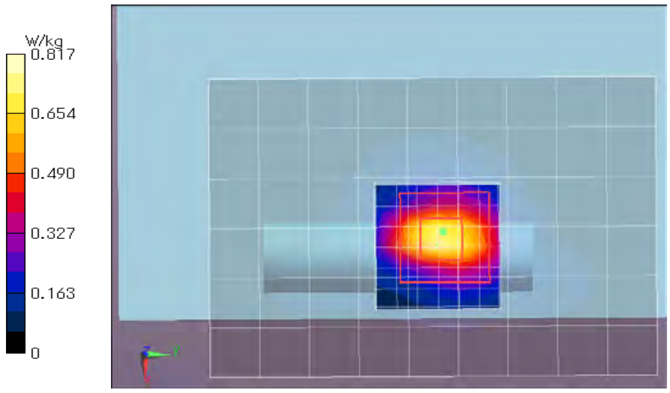
EUT: Built-in Wireless Module with BT/Flat Panel Detector; Type: WM01B/WM5B05; Serial: 34:9F:7B:EF:DB:20/21MED-0327

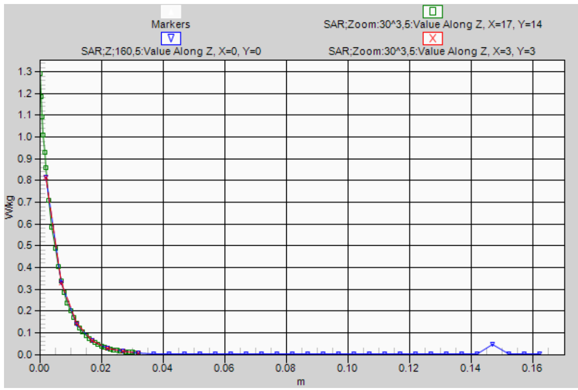
Mode: 11b(1Mbps, DSSS) (UID: 0, Wi-fi_2.4GHz (0), Frame Length in ms: 0; PAR: 0; PMF: 1); **Frequency: 2462 MHz; Crest Factor: 1.0**
Medium: Head(v6.2204); Medium parameters used (interpolated): f = 2462 MHz; σ = 1.862 S/m; ε_r = 39.57; ρ = 1000 kg/m³
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration: -Electronics: DAE4 Sn626; Calibrated: 2021/12/08 / -Phantom: ELI v4.0; Type: QDOVA001BA; Serial: 1059; Phantom section: Flat Section
-DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474) / -Probe: EX3DV4 - SN7372; ConvF(7.35, 7.35, 7.35) @ 2462 MHz; Calibrated: 2021/04/23
-Sensor-Surface: 2mm (Mechanical Surface Detection), z =1.0, 31.0, 161.0

touch,back,h24a/24h1;2462,ant0,Rear&d0,b(1m)/
Area:72x108,stp12 (7x10x1): Measurement grid: dx=12mm, dy=12mm; Maximum value of SAR (measured) = 0.666 W/kg
Area:72x108,stp12 (61x91x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm; Maximum value of SAR (interpolated) = 0.718 W/kg
Z;160,5 (1x1x33): Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 0.816 W/kg

Zoom:30^3,5 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm;
Reference Value = 21.24 V/m; Power Drift = 0.12 dB; Maximum value of SAR (measured) = 0.817 W/kg; Peak SAR (extrapolated) = 1.29 W/kg
SAR(1 g) = 0.481 W/kg; SAR(10 g) = 0.190 W/kg (*. Smallest distance from peaks to all points 3 dB below = 6 mm; Ratio of SAR at M2 to SAR at M1 = 40.4%)





Remarks: *. Date tested: 2022/4/22; Tested by: Hiroshi Naka; Tested place:No.7 shielded room,
*. liquid depth: 150 mm; Position: distance of EUT to phantom: 0 mm (2 mm to liquid); ambient: (22~24) deg.C. / (60~75) %RH,
*. liquid temperature: 22.5 deg.C. ± 0.5 deg.C. (22.5 deg.C. , in check); *.White cubic: zoom scan area, Red cubic: big=SAR(10g)/small=SAR(1g)

Plot 1b-2: 2.4GHz band, SAR(1g), Antenna 2; Left & touch / 11b (1Mbps) / 2412 MHz

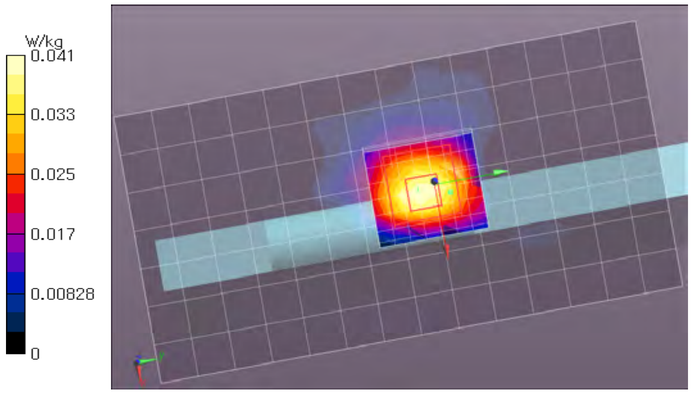
EUT: Built-in Wireless Module with BT/Flat Panel Detector; Type: WM01B/WM5B05; Serial: 34:9F:7B:EF:DB:20/21MED-0327

Mode: 11b(1Mbps, DSSS) (UID: 0, Wi-fi_2.4GHz (0), Frame Length in ms: 0; PAR: 0; PMF: 1); **Frequency: 2412 MHz; Crest Factor: 1.0**
Medium: Head(v6.2204); Medium parameters used (interpolated): f = 2412 MHz; σ = 1.82 S/m; ε_r = 39.63; ρ = 1000 kg/m³
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration: -Electronics: DAE4 Sn626; Calibrated: 2021/12/08 / -Phantom: ELI v4.0; Type: QDOVA001BA; Serial: 1059; Phantom section: Flat Section
-DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474) / -Probe: EX3DV4 - SN7372; ConvF(7.35, 7.35, 7.35) @ 2412 MHz; Calibrated: 2021/04/23
-Sensor-Surface: 2mm (Mechanical Surface Detection), z =1.0, 31.0

touch,side/24h19;2412,ant0,side(0)&d0,b(1m)/
Area:84x168,12 (8x15x1): Measurement grid: dx=12mm, dy=12mm; Maximum value of SAR (measured) = 0.0354 W/kg
Area:84x168,12 (71x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm; Maximum value of SAR (interpolated) = 0.0698 W/kg

Zoom:30^3,5 (7x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm;
Reference Value = 4.356 V/m; Power Drift = 0.20 dB; Maximum value of SAR (measured) = 0.0414 W/kg; Peak SAR (extrapolated) = 0.112 W/kg
SAR(1 g) = 0.030 W/kg; SAR(10 g) = 0.013 W/kg (*. Ratio of SAR at M2 to SAR at M1 = 53.1%)



Remarks: *. Date tested: 2022/4/22; Tested by: Hiroshi Naka; Tested place:No.7 shielded room,
*. liquid depth: 150 mm; Position: distance of EUT to phantom: 0 mm (2 mm to liquid); ambient: (22~24) deg.C. / (60~75) %RH,
*. liquid temperature: 22.5 deg.C. ± 0.5 deg.C. (22.5 deg.C. , in check); *.White cubic: zoom scan area, Red cubic: big=SAR(10g)/small=SAR(1g)

Appendix 2: SAR measurement data / Appendix 2-2: Other SAR Plots (cont'd)

Plot 2a-2: 5.3GHz band, SAR(10g), Antenna 2; Back & touch / 11n(40HT) (MCS0) / 5270 MHz

EUT: Built-in Wireless Module with BT/Flat Panel Detector; Type: WM01B/WM5B05; Serial: 34:9F:7B:EF:DB:20/21MED-0327

Mode: n40(MCS0, OFDM) (UID: 0, Wi-fi_5GHz (0), Frame Length in ms: 0; PAR: 0; PMF: 1); **Frequency: 5270 MHz; Crest Factor: 1.0**

Medium: Head(v6.2204); Medium parameters used: f = 5270 MHz; σ = 4.569 S/m; ε_r = 35.02; ρ = 1000 kg/m^3

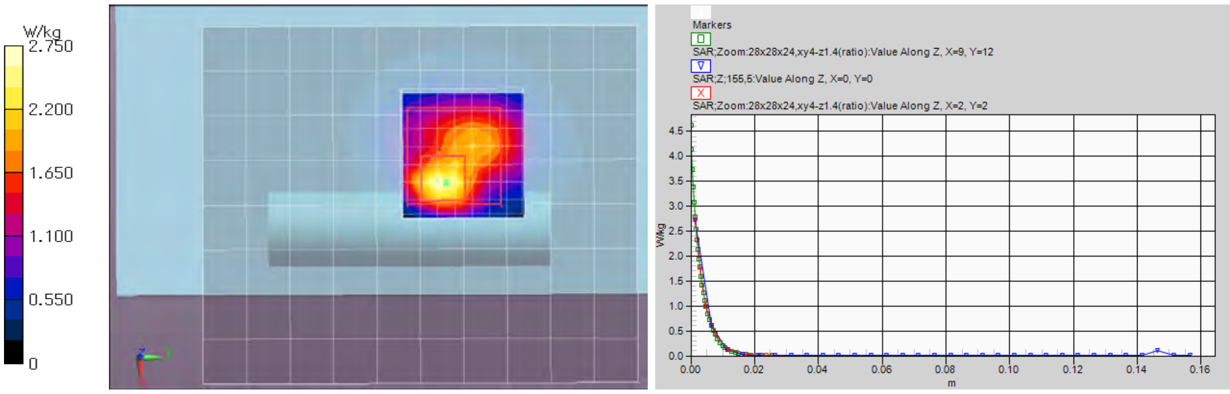
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration: -Electronics: DAE4 Sn626; Calibrated: 2021/12/08 / -Phantom: ELI v4.0; Type: QDOVA001BA; Serial: 1059; Phantom section: Flat Section
-DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474) / -Probe: EX3DV4 - SN7372; ConvF(4.75, 4.75, 4.75) @ 5270 MHz; Calibrated: 2021/04/23
-Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0, 156.0

touch,back,h5a/5h1.53.1,ant0,5270,Rear&d0,n40(m0)/
Area:80x100,stp10 (9x11x1): Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 1.96 W/kg
Area:80x100,stp10 (81x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm; Maximum value of SAR (interpolated) = 2.22 W/kg
Z;155,5 (1x1x32): Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 2.71 W/kg

Zoom:28x28x24,xy4-z1.4(ratio) (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm;
Reference Value = 26.65 V/m; Power Drift = -0.12 dB; Maximum value of SAR (measured) = 2.75 W/kg; Peak SAR (extrapolated) = 4.61 W/kg

SAR(1 g) = 1.09 W/kg; SAR(10 g) = 0.399 W/kg (*. Smallest distance from peaks to all points 3 dB below = 5.4 mm; Ratio of SAR at M2 to SAR at M1 = 64.3%)



Remarks: *. Date tested: 2022/4/19; Tested by: Hiroshi Naka; Tested place:No.7 shielded room,
*. liquid depth: 150 mm; Position: distance of EUT to phantom: 0 mm (2 mm to liquid); ambient: (22~24) deg.C. / (60~75) %RH,
*. liquid temperature: 22.5 deg.C. ± 0.5 deg.C. (22.5 deg.C. , in check); *.White cubic: zoom scan area, Red cubic: big=SAR(10g)/small=SAR(1g)

Plot 2b-2: 5.3GHz band, SAR(1g), Antenna 2; Left & touch / 11n(40HT) (MCS0) / 5310 MHz

EUT: Built-in Wireless Module with BT/Flat Panel Detector; Type: WM01B/WM5B05; Serial: 34:9F:7B:EF:DB:20/21MED-0327

Mode: n40(MCS0, OFDM) (UID: 0, Wi-fi_5GHz (0), Frame Length in ms: 0; PAR: 0; PMF: 1); **Frequency: 5310 MHz; Crest Factor: 1.0**

Medium: Head(v6.2204); Medium parameters used: f = 5310 MHz; σ = 4.612 S/m; ε_r = 34.94; ρ = 1000 kg/m^3

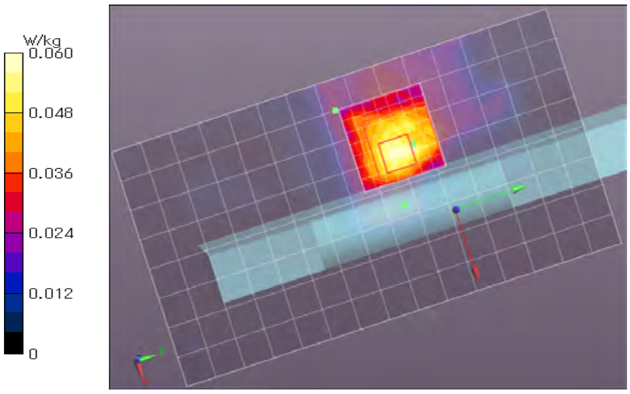
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration: -Electronics: DAE4 Sn626; Calibrated: 2021/12/08 / -Phantom: ELI v4.0; Type: QDOVA001BA; Serial: 1059; Phantom section: Flat Section
-DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474) / -Probe: EX3DV4 - SN7372; ConvF(4.75, 4.75, 4.75) @ 5310 MHz; Calibrated: 2021/04/23
-Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0

touch,side0a/5h47.53.11,5310,ant0,side(0)&d0,n40(m0)/
Area:80x150,10 (9x16x1): Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 0.0558 W/kg
Area:80x150,10 (81x151x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm; Maximum value of SAR (interpolated) = 0.0602 W/kg

Zoom:28x28x24,xy4-z1.4(ratio) (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm;
Reference Value = 3.779 V/m; Power Drift = 0.18 dB; Maximum value of SAR (measured) = 0.0595 W/kg; Peak SAR (extrapolated) = 0.115 W/kg

SAR(1 g) = 0.031 W/kg; SAR(10 g) = 0.020 W/kg (*. Ratio of SAR at M2 to SAR at M1 = 70.9%)



Remarks: *. Date tested: 2022/4/19; Tested by: Hiroshi Naka; Tested place:No.7 shielded room,
*. liquid depth: 150 mm; Position: distance of EUT to phantom: 0 mm (2 mm to liquid); ambient: (22~24) deg.C. / (60~75) %RH,
*. liquid temperature: 22.5 deg.C. ± 0.5 deg.C. (22.5 deg.C. , in check); *.White cubic: zoom scan area, Red cubic: big=SAR(10g)/small=SAR(1g)

Appendix 2: SAR measurement data / Appendix 2-2: Other SAR Plots (cont'd)

Plot 2c-2: 5.2GHz band, SAR(1g), Antenna 2; Back & touch / 11n(40HT) (MCS0) / 5190 MHz

EUT: Built-in Wireless Module with BT/Flat Panel Detector; Type: WM01B/WM5B05; Serial: 34:9F:7B:EF:DB:20/21MED-0327

Mode: n40(MCS0, OFDM) (UID: 0, Wi-fi_5GHz (0), Frame Length in ms: 0; PAR: 0; PMF: 1); **Frequency: 5190 MHz; Crest Factor: 1.0**

Medium: Head(v6.2204); Medium parameters used: f = 5190 MHz; σ = 4.477 S/m; ε_r = 35.14; ρ = 1000 kg/m^3

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration: -Electronics: DAE4 Sn626; Calibrated: 2021/12/08 / -Phantom: ELI v4.0; Type: QDOVA001BA; Serial: 1059; Phantom section: Flat Section
-DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474) / -Probe: EX3DV4 - SN7372; ConvF(4.75, 4.75, 4.75) @ 5190 MHz; Calibrated: 2021/04/23
-Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0, 156.0

touch,back,h5a/5h3.52.2,ant0,5190,Rear&d0,n40(m0)/

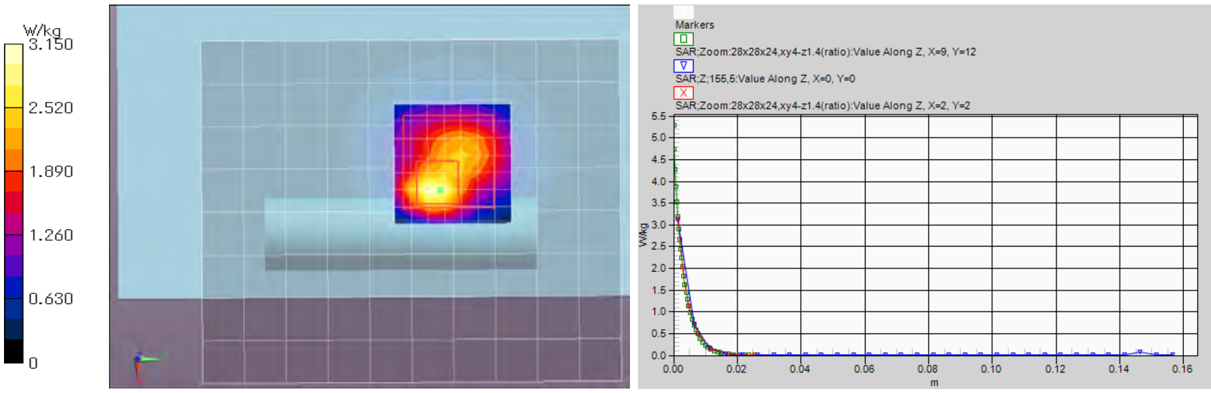
Area:80x100,stp10 (9x11x1): Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 2.34 W/kg

Area:80x100,stp10 (81x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm; Maximum value of SAR (interpolated) = 2.66 W/kg

Z;155,5 (1x1x32): Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 3.10 W/kg

Zoom:28x28x24,xy4-z1.4(ratio) (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm;
Reference Value = 28.98 V/m; Power Drift = -0.14 dB; Maximum value of SAR (measured) = 3.15 W/kg; Peak SAR (extrapolated) = 5.29 W/kg

SAR(1 g) = 1.27 W/kg; SAR(10 g) = 0.468 W/kg (*. Smallest distance from peaks to all points 3 dB below = 5.7 mm; Ratio of SAR at M2 to SAR at M1 = 64.3%)



Remarks: *. Date tested: 2022/4/19; Tested by: Hiroshi Naka; Tested place:No.7 shielded room,
*. liquid depth: 150 mm; Position: distance of EUT to phantom: 0 mm (2 mm to liquid); ambient: (22~24) deg.C. / (60~75) %RH,
*. liquid temperature: 22.5 deg.C. ± 0.5 deg.C. (22.5 deg.C. , in check); *.White cubic: zoom scan area, Red cubic: big=SAR(10g)/small=SAR(1g)

Plot 2d-2: 5.2GHz band, SAR(1g), Antenna 2; Left & touch / 11n(40HT) (MCS0) / 5230 MHz

EUT: Built-in Wireless Module with BT/Flat Panel Detector; Type: WM01B/WM5B05; Serial: 34:9F:7B:EF:DB:20/21MED-0327

Mode: n40(MCS0, OFDM) (UID: 0, Wi-fi_5GHz (0), Frame Length in ms: 0; PAR: 0; PMF: 1); **Frequency: 5230 MHz; Crest Factor: 1.0**

Medium: Head(v6.2204); Medium parameters used: f = 5230 MHz; σ = 4.519 S/m; ε_r = 35.07; ρ = 1000 kg/m^3

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration: -Electronics: DAE4 Sn626; Calibrated: 2021/12/08 / -Phantom: ELI v4.0; Type: QDOVA001BA; Serial: 1059; Phantom section: Flat Section
-DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474) / -Probe: EX3DV4 - SN7372; ConvF(4.75, 4.75, 4.75) @ 5230 MHz; Calibrated: 2021/04/23
-Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0

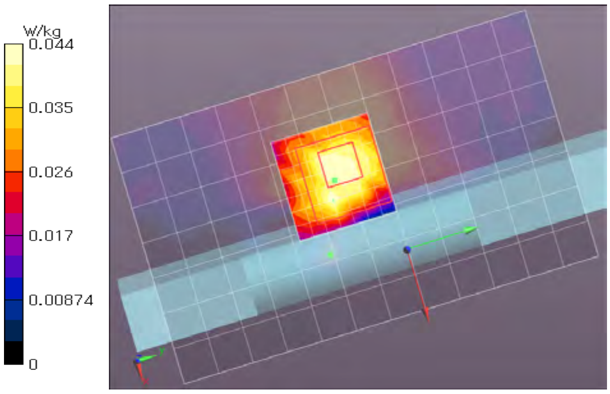
touch,side0a/5h48.52.7,5230,ant0,side(0)&d0,n40(m0)/

Area:70x120,10 (8x13x1): Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 0.0502 W/kg

Area:70x120,10 (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm; Maximum value of SAR (interpolated) = 0.0556 W/kg

Zoom:28x28x24,xy4-z1.4(ratio) (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm;
Reference Value = 3.346 V/m; Power Drift = -0.00 dB; Maximum value of SAR (measured) = 0.0437 W/kg; Peak SAR (extrapolated) = 0.0680 W/kg

SAR(1 g) = 0.024 W/kg; SAR(10 g) = 0.015 W/kg (*. Ratio of SAR at M2 to SAR at M1 = 67.1%)



Remarks: *. Date tested: 2022/4/19; Tested by: Hiroshi Naka; Tested place:No.7 shielded room,
*. liquid depth: 150 mm; Position: distance of EUT to phantom: 0 mm (2 mm to liquid); ambient: (22~24) deg.C. / (60~75) %RH,
*. liquid temperature: 22.5 deg.C. ± 0.5 deg.C. (22.5 deg.C. , in check); *.White cubic: zoom scan area, Red cubic: big=SAR(10g)/small=SAR(1g)

Appendix 2: SAR measurement data / Appendix 2-2: Other SAR Plots (cont'd)

Plot 3a-2: 5.6GHz band, SAR(10g), Antenna 2; Back & touch / 11n(40HT) (MCS0) / 5670 MHz

EUT: Built-in Wireless Module with BT/Flat Panel Detector; Type: WM01B/WM5B05; Serial: 34:9F:7B:EF:DB:20/21MED-0327

Mode: n40(MCS0, OFDM) (UID: 0, Wi-fi_5GHz (0), Frame Length in ms: 0; PAR: 0; PMF: 1); **Frequency: 5670 MHz; Crest Factor: 1.0**

Medium: Head(v6.2204); Medium parameters used: f = 5670 MHz; σ = 5.012 S/m; ε_r = 34.37; ρ = 1000 kg/m^3

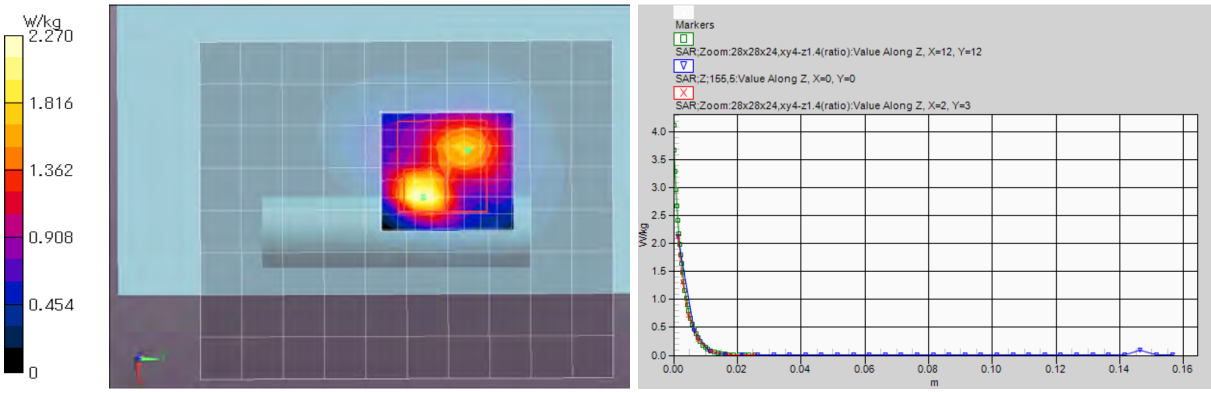
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration: -Electronics: DAE4 Sn626; Calibrated: 2021/12/08 / -Phantom: ELI v4.0; Type: QDOVA001BA; Serial: 1059; Phantom section: Flat Section
-DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474) / -Probe: EX3DV4 - SN7372; ConvF(4.32, 4.32, 4.32) @ 5670 MHz; Calibrated: 2021/04/23
-Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0, 156.0

touch,back,h5a/5h4.56.1,ant0,5670,Rear&d0,n40(m0)/
Area:80x100,stp10 (9x11x1): Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 1.41 W/kg
Area:80x100,stp10 (81x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm; Maximum value of SAR (interpolated) = 1.80 W/kg
Z;155,5 (1x1x32): Measurement grid: dx=20mm, dy=20mm, dz=5mm;Maximum value of SAR (measured) = 2.12 W/kg

Zoom:28x28x24,xy4-z1.4(ratio) (8x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm;
Reference Value = 23.78 V/m; Power Drift = -0.00 dB; Maximum value of SAR (measured) = 2.27 W/kg; Peak SAR (extrapolated) = 4.22 W/kg

SAR(1 g) = 0.845 W/kg; SAR(10 g) = 0.295 W/kg (*. Smallest distance from peaks to all points 3 dB below = 5.1 mm; Ratio of SAR at M2 to SAR at M1 = 61.6%)



Remarks: *. Date tested: 2022/4/20; Tested by: Hiroshi Naka; Tested place:No.7 shielded room,
*. liquid depth: 150 mm; Position: distance of EUT to phantom: 0 mm (2 mm to liquid); ambient: (22~24) deg.C. / (60~75) %RH,
*. liquid temperature: 22.5 deg.C. ± 0.5 deg.C. (22.5 deg.C. , in check); *.White cubic: zoom scan area, Red cubic: big=SAR(10g)/small=SAR(1g)

Plot 3b-2: 5.6GHz band, SAR(1g), Antenna 2; Left & touch / 11n(40HT) (MCS0) / 5670 MHz

EUT: Built-in Wireless Module with BT/Flat Panel Detector; Type: WM01B/WM5B05; Serial: 34:9F:7B:EF:DB:20/21MED-0327

Mode: n40(MCS0, OFDM) (UID: 0, Wi-fi_5GHz (0), Frame Length in ms: 0; PAR: 0; PMF: 1); **Frequency: 5670 MHz; Crest Factor: 1.0**

Medium: Head(v6.2204); Medium parameters used: f = 5670 MHz; σ = 5.012 S/m; ε_r = 34.37; ρ = 1000 kg/m^3

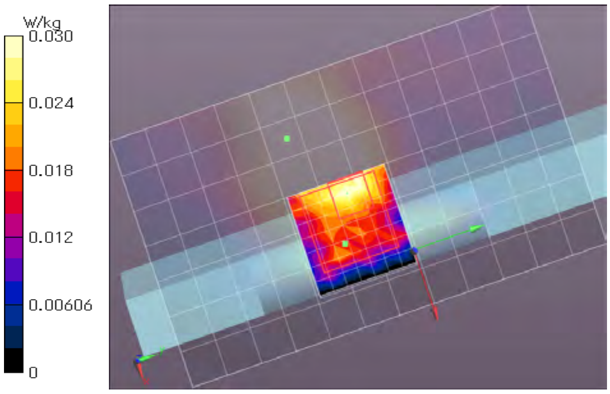
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration: -Electronics: DAE4 Sn626; Calibrated: 2021/12/08 / -Phantom: ELI v4.0; Type: QDOVA001BA; Serial: 1059; Phantom section: Flat Section
-DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474) / -Probe: EX3DV4 - SN7372; ConvF(4.32, 4.32, 4.32) @ 5670 MHz; Calibrated: 2021/04/23
-Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0

touch,side0a/5h49.56.23,5670,ant0,side(0)&d0,n40(m0)/
Area:70x120,10 (8x13x1): Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 0.0363 W/kg
Area:70x120,10 (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm; Maximum value of SAR (interpolated) = 0.0765 W/kg

Zoom:28x28x24,xy4-z1.4(ratio) (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm;
Reference Value = 2.115 V/m; Power Drift = 0.20 dB; Maximum value of SAR (measured) = 0.0303 W/kg; Peak SAR (extrapolated) = 0.0970 W/kg

SAR(1 g) = 0.011 W/kg; SAR(10 g) = 0.00413 W/kg (*. Ratio of SAR at M2 to SAR at M1 = 83%)



Remarks: *. Date tested: 2022/4/19; Tested by: Hiroshi Naka; Tested place:No.7 shielded room,
*. liquid depth: 150 mm; Position: distance of EUT to phantom: 0 mm (2 mm to liquid); ambient: (22~24) deg.C. / (60~75) %RH,
*. liquid temperature: 22.5 deg.C. ± 0.5 deg.C. (22.5 deg.C. , in check); *.White cubic: zoom scan area, Red cubic: big=SAR(10g)/small=SAR(1g)

Appendix 2: SAR measurement data / Appendix 2-2: Other SAR Plots (cont'd)

Plot 4a-2: 5.8GHz band, SAR(10g), Antenna 2; Back & touch / 11n(40HT) (MCS0) / 5795 MHz

EUT: Built-in Wireless Module with BT/Flat Panel Detector; Type: WM01B/WM5B05; Serial: 34:9F:7B:EF:DB:20/21MED-0327

Mode: n40(MCS0, OFDM) (UID: 0, Wi-fi_5GHz (0), Frame Length in ms: 0; PAR: 0; PMF: 1); **Frequency: 5795 MHz; Crest Factor: 1.0**

Medium: Head(v6.2204); Medium parameters used (interpolated): f = 5795 MHz; σ = 5.152 S/m; ε_r = 34.13; ρ = 1000 kg/m^3

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration: -Electronics: DAE4 Sn626; Calibrated: 2021/12/08 / -Phantom: ELI v4.0; Type: QDOVA001BA; Serial: 1059; Phantom section: Flat Section
-DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474) / -Probe: EX3DV4 - SN7372; ConvF(4.36, 4.36, 4.36) @ 5795 MHz; Calibrated: 2021/04/23
-Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0, 156.0

touch,back,h5b/5h10.58.1,ant0,5795,Rear&d0,n40(m0)/

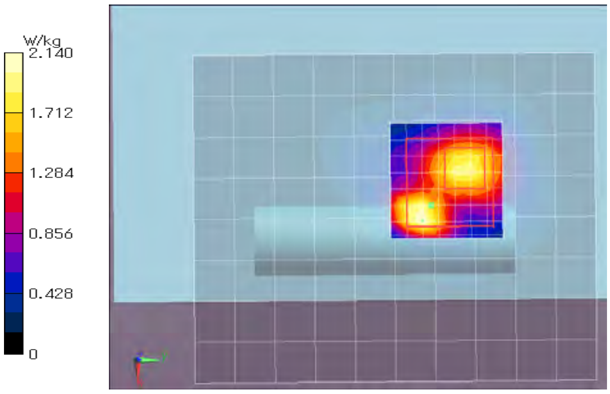
Area:80x100,stp10 (9x11x1): Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 1.85 W/kg

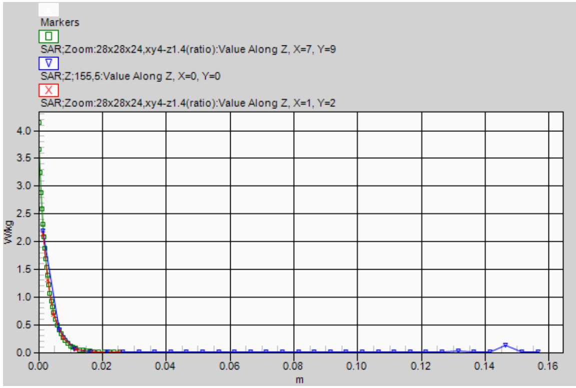
Area:80x100,stp10 (81x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm; Maximum value of SAR (interpolated) = 2.09 W/kg

Z;155,5 (1x1x32): Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 2.19 W/kg

Zoom:28x28x24,xy4-z1.4(ratio) (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm;
Reference Value = 20.63 V/m; Power Drift = -0.20 dB; Maximum value of SAR (measured) = 2.14 W/kg; Peak SAR (extrapolated) = 4.14 W/kg

SAR(1 g) = 0.807 W/kg; SAR(10 g) = 0.297 W/kg (*. Smallest distance from peaks to all points 3 dB below = 5.1 mm; Ratio of SAR at M2 to SAR at M1 = 60.8%)





Remarks: *. Date tested: 2022/4/21; Tested by: Hiroshi Naka; Tested place:No.7 shielded room,
*. liquid depth: 150 mm; Position: distance of EUT to phantom: 0 mm (2 mm to liquid); ambient: (22~24) deg.C. / (60~75) %RH,
*. liquid temperature: 22.5 deg.C. ± 0.5 deg.C. (22.5 deg.C. , in check); *.White cubic: zoom scan area, Red cubic: big=SAR(10g)/small=SAR(1g)

Plot 4b-2: 5.8GHz band, SAR(1g), Antenna 2; Left & touch / 11n(40HT) (MCS0) / 5795 MHz

EUT: Built-in Wireless Module with BT/Flat Panel Detector; Type: WM01B/WM5B05; Serial: 34:9F:7B:EF:DB:20/21MED-0327

Mode: n40(MCS0, OFDM) (UID: 0, Wi-fi_5GHz (0), Frame Length in ms: 0; PAR: 0; PMF: 1); **Frequency: 5795 MHz; Crest Factor: 1.0**

Medium: Head(v6.2204); Medium parameters used (interpolated): f = 5795 MHz; σ = 5.152 S/m; ε_r = 34.13; ρ = 1000 kg/m^3

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration: -Electronics: DAE4 Sn626; Calibrated: 2021/12/08 / -Phantom: ELI v4.0; Type: QDOVA001BA; Serial: 1059; Phantom section: Flat Section
-DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474) / -Probe: EX3DV4 - SN7372; ConvF(4.36, 4.36, 4.36) @ 5795 MHz; Calibrated: 2021/04/23
-Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0

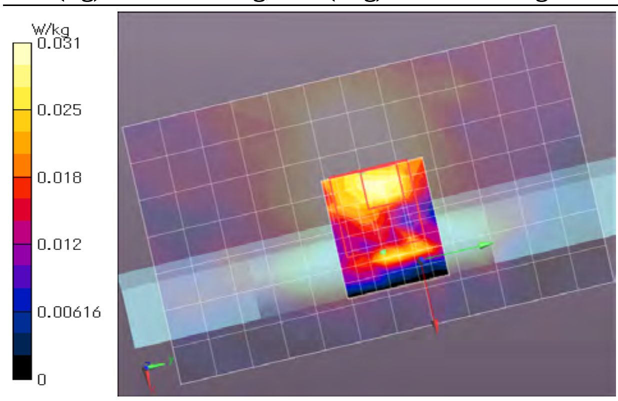
touch,side0a/5h50.58.13,5795,ant0,side(0)&d0,n40(m0)/

Area:70x120,10 (8x13x1): Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 0.0462 W/kg

Area:70x120,10 (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm; Maximum value of SAR (interpolated) = 0.0504 W/kg

Zoom:28x28x24,xy4-z1.4(ratio) (9x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm;
Reference Value = 2.349 V/m; Power Drift = 0.19 dB; Maximum value of SAR (measured) = 0.0308 W/kg; Peak SAR (extrapolated) = 0.144 W/kg

SAR(1 g) = 0.00977 W/kg; SAR(10 g) = 0.00302 W/kg (*. Ratio of SAR at M2 to SAR at M1 = 69.4%)



Remarks: *. Date tested: 2022/4/21; Tested by: Hiroshi Naka; Tested place:No.7 shielded room,
*. liquid depth: 150 mm; Position: distance of EUT to phantom: 0 mm (2 mm to liquid); ambient: (22~24) deg.C. / (60~75) %RH,
*. liquid temperature: 22.5 deg.C. ± 0.5 deg.C. (22.5 deg.C. , in check); *.White cubic: zoom scan area, Red cubic: big=SAR(10g)/small=SAR(1g)

APPENDIX 3: Test instruments

Appendix 3-1: Equipment used

Test Name	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Calibration Last Date	Calibration Interval (Month)
AT	SAT10-SARP1	160520	Attenuator	Weinschel - API Technologies Corp	4M-10	-	2020/12/11	12
AT	SPM-13	169910	Power Meter	Keysight Technologies Inc	8990B	MY51000448	2021/01/25	12
AT	SPSS-06	169911	Power sensor	Keysight Technologies Inc	N1923A	MY57270004	2021/01/25	12
AT	SRENT-15	160899	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46185516	2021/01/26	12
AT	STM-G6	146207	Terminator	JFW	50T-128	-	2020/11/19	12
AT	SOS-26	191844	Humidity Indicator	CUSTOM. Inc	CTH-201	-	2021/08/02	12

*. AT (antenna terminal conducted power measurement) was measured September 29, 2021. (Refer to Section 5 in this report.)

Test Name	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Calibration Last Date	Calibration Interval (Month)
SAR	COTS-SSAR-02	144885	DASY52 software	Schmid&Partner Engineering AG	DASY5 PRO	Ver.52.10.3.1513	-	-
SAR	COTS-SSEP-02	144886	Dielectric assessment software	Schmid&Partner Engineering AG	DAK	Ver.DAK1.10.317.11	-	-
SAR	KAT10-P1	144882	Attenuator	Weinschel - API Technologies Corp	24-10-34	BY5927	2021/12/01	12
SAR	KCPL-07	146100	Directional Coupler	Pulsar Microwave Corp.	CCS30-B26	621	-	-
SAR	KDAE-01	144944	Data Acquisition Electronics	Schmid&Partner Engineering AG	DAE4	626	2021/12/08	12
SAR	KIU-08	145059	Power sensor	Rohde & Schwarz	NRV-Z4	100372	2021/09/18	12
SAR	KIU-09	145099	Power sensor	Rohde & Schwarz	NRV-Z4	100371	2021/09/18	12
SAR	KOS-14	144986	Thermo-Hygrometer data logger	SATO KEIRYOKI	SK-L200THIIα/SK-LTHIIα-2	015246/08169	2021/10/13	12
SAR	KPA-12	145359	RF Power Amplifier	Milmega	AS2560-50	1018582	-	-
SAR	KPB-R02	144987	Dosimetric E-Field Probe	Schmid&Partner Engineering AG	EX3DV4	7372	2021/04/23	12
SAR	KPFL-01	145560	Flat Phantom	Schmid&Partner Engineering AG	Oval flat phantom ELI 4.0	1059	2021/08/18	12
SAR	KPM-06	144989	Power Meter	Rohde & Schwarz	NRVD	101599	2021/09/18	12
SAR	KPM-08	145105	Power meter	Anritsu Corporation	ML2495A	6K00003356	2021/09/18	12
SAR	KPSS-04	144991	Power sensor	Anritsu Corporation	MA2411B	12088	2021/09/18	12
SAR	KRU-02	145106	Ruler(150mm,L)	SHINWA	12103	-	2022/02/16	12
SAR	KRU-04	145086	Ruler(300mm)	SHINWA	13134	-	2022/02/16	12
SAR	KRU-05	145087	Ruler(100x50mm,L)	SHINWA	12101	-	2022/02/16	12
SAR	KSDA-01	145090	Dipole Antenna	Schmid&Partner Engineering AG	D2450V2	822	2021/12/09	12
SAR	KSDH-01	145596	Device holder	Schmid&Partner Engineering AG	Mounting device for transmitter	-	2021/09/14	12
SAR	KSG-08	145109	Signal Generator	Rohde & Schwarz	SMT06	100763	2021/09/19	12
SAR	SALC-01	146112	Primepure Ethanol	Kanto Chemical Co., Inc.	14032-79	-	-	-
SAR	SAT20-SAR2	215438	Attenuator	To-Conne Co., Ltd.	SA-PJ-20	-	2022/02/07	12
SAR	SAT6-SAR1	145160	Attenuator	Huber+Suhner	6806.17.A	766429-1	2021/12/01	12
SAR	SCC-SAR2	145405	Coaxial Cable	Huber+Suhner	SF104A/11PC3542/11N451/4M	MY699/4A	2021/12/01	12
SAR	SEPP-R04	206293	Dielectric probe(~20GHz)	Schmid & Partner Engineering AG	DAK3.5	1079	2021/06/16	12
SAR	SOS-26	191844	Humidity Indicator	CUSTOM. Inc	CTH-201	-	2021/08/02	12
SAR	SOS-SAR2	201967	Digital thermomoter	HANNA	Checktemp-4	A01440226111	2021/10/13	12
SAR	SOS-SAR3	201968	Digital thermomoter	HANNA	Checktemp-4	A01310946111	2021/10/13	12
SAR	SRU-06	150560	Measuring Tool, Ruler	SHINWA	14001	--	2022/02/16	12
SAR	SSA-04	146176	Spectrum Analyzer	ADVANTEST	R3272	101100994	-	-
SAR	SSAR-02	146177	SAR measurement system	Schmid&Partner Engineering AG	DASY5	1324	-	-
SAR	SSDA-R02	145592	Dipole Antenna	Schmid&Partner Engineering AG	D5GHzV2	1092	2021/10/15	12
SAR	SSDH-02	145723	Laptop holder	Schmid&Partner Engineering AG	SM LH1 001 C	-	-	-
SAR	SSLHV6-01	207714	Head Tissue Simulating Liquid	Schmid&Partner Engineering AG	HBBL600-10000V6	SL AAH U16 BC	-	-
SAR	SSNA-01	146258	Network Analyzer	Keysight Technologies Inc	8753ES	US39171777	2021/11/09	12
SAR	SSRBT-02	145621	SAR robot	Schmid&Partner Engineering AG	TX60 Lspeag	F12/5L2QA1/A/01	2021/09/14	12
SAR	SWTR-03	146185	DI water	MonotaRo	34557433	-	-	-

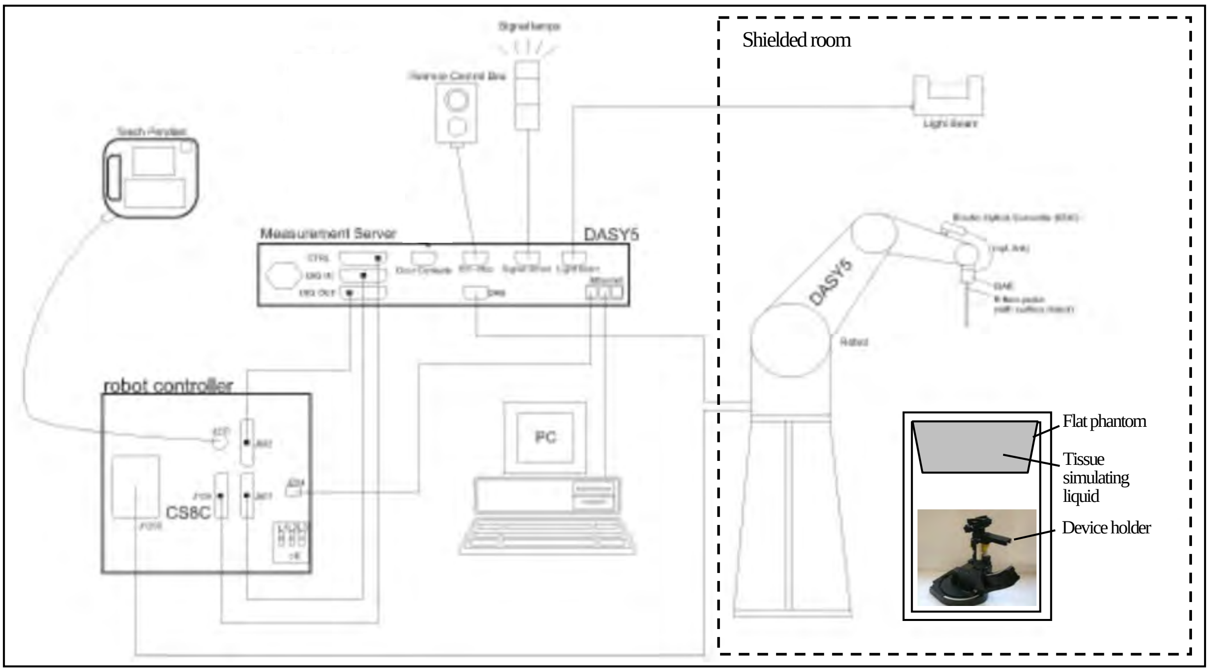
*. Local ID: SALC-01, the parameters of primepure Ethanol (as reference liquid) used for the simulated tissue parameter confirmation was defined the NPL Report MAT23 (http://www.npl.co.uk/content/conpublication/4295)

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

Appendix 3-2: Configuration and peripherals

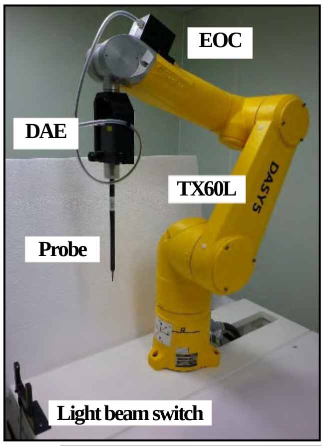
These measurements were performed with the automated near-field scanning system DASY5 from Schmid & Partner Engineering AG (SPEAG). The system is based on a high precision robot), which positions the probes with a positional repeatability of better than ± 0.02 mm. Special E- and H-field probes have been 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 DASY5 system for performing compliance tests consist of the following items:

1	A standard high precision 6-axis robot (Stäubli TX/RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
2	An isotropic field probe optimized and calibrated for the targeted measurement.
3	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.
4	The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
5	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.
6	The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
7	A computer running Win7 professional operating system and the DASY5 software.
8	R Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
9	The phantom.
10	The device holder for EUT. (low-loss dielectric palette) (*. when it was used.)
11	Tissue simulating liquid mixed according to the given recipes.
12	Validation dipole kits allowing to validate the proper functioning of the system.

Appendix 3-3: Test system specification



TX60 Lsepag robot/CS8Csepag-TX60 robot controller

•Number of Axes : 6 •Repeatability : ±0.02 mm
•Manufacture : Stäubli Unimation Corp.

DASY5 Measurement server

•Features : The DASY5 measurement server is based on a PC/104 CPU board with a 400MHz intel ULV Celeron, 128MB chip-disk and 128MB RAM. The necessary circuits for communication with the DAE4 electronics box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY5 I/O board, which is directly connected to the PC/104 bus of the CPU board.
•Calibration : No calibration required.
•Manufacture : Schmid & Partner Engineering AG

Data Acquisition Electronic (DAE)

•Features : Signal amplifier, multiplexer, A/D converter and control logic.
Serial optical link for communication with DASY5 embedded system (fully remote controlled).
2 step probe touch detector for mechanical surface detection and emergency robot stop (not in -R version)
•Measurement Range : 1 μV to > 200 mV (16bit resolution and 2 range settings: 4 mV, 400 mV)
•Input Offset voltage : < 1 μV (with auto zero)
•Input Resistance : 200 MΩ
•Battery Power : > 10 hrs. of operation (with two 9 V battery)
•Manufacture : Schmid & Partner Engineering AG

Electro-Optical Converter (EOC61)

•Manufacture : Schmid & Partner Engineering AG

Light Beam Switch (LB5/80)

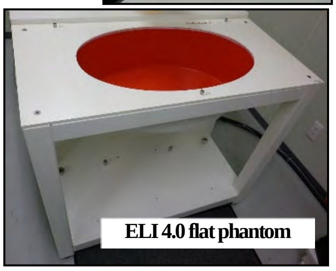
•Manufacture : Schmid & Partner Engineering AG

SAR measurement software

•Item : Dosimetric Assessment System DASY5
•Software version : Refer to Appendix 3-1 (Equipment used)
•Manufacture : Schmid & Partner Engineering AG

E-Field Probe

•Model : EX3DV4 (serial number: 7372)
•Construction : Symmetrical design with triangular core.
Built-in shielding against static charges.
PEEK enclosure material (resistant to organic solvents, e.g., DGBE).
•Frequency : 10MHz to 6GHz, Linearity: ±0.2 dB (30MHz to 6GHz)
•Conversion Factors (CF) : Head: (2.45, 5.25, 5.6, 5.8) GHz which were used.
•Directivity : ±0.3 dB in HSL (rotation around probe axis)
±0.5 dB in tissue material (rotation normal to probe axis)
•Dynamic Range : 10μW/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



Phantom

•Model Number : **ELI 4.0 oval flat phantom**
•Shell Material : Fiberglass •Shell Thickness : Bottom plate: 2 ±0.2 mm
•Dimensions : Bottom elliptical: 600×400 mm, Depth: 190 mm (Volume: Approx. 30 liters)
•Manufacture : Schmid & Partner Engineering AG

Device Holder

☒ Urethane foam
☒ Device holder: In combination with the ELI4, 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

Data storage and evaluation (postprocessing)

The DASY5 software stores the measured voltage acquired by the Data Acquisition Electronics (DAE) as raw data together with all the necessary software parameters for the data evaluation (probe calibration data, liquid parameters and communication system parameters) in measurement files with the extension ".da5x". The postprocessing software evaluates the data every time the data is visualized or exported.

The fields and SAR are calculated from the measured voltage (probe voltage acquired by the DAE) and the following parameters:

Probe parameters:	- Sensitivity	*normi, ai0, ai1, ai2*
	- Conversion Factor	*convFi*
	- Diode Compression Point	*dcpi*
	- Probe Modulation Response Factors	*ai, bi, ci, d*
Device parameters:	- Frequency	*f*
	- Crest factor	*cf*
Media parameters:	- Conductivity	σ
	- Relative Permittivity	ρ

This parameters are stored in the DASY5 V52 measurement file.

These parameters must be correctly set in the DASY5 V52 software setup. They are available as configuration file and can be imported into the measurement file. The values displayed in the multimeter window are assessed using the parameters of the actual system setup. In the scan visualization and export modes, the parameters stored in the measurement file are used.

The measured voltage is not proportional to the exciting. It must be first linearized.

Approximated Probe Response Linearization using Crest Factor;

This linearization method is enabled when a custom defined communication system is measured. The compensation applied is a function of the measured voltage, the detector diode compression point and the crest factor of the measured signal.

$$V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}$$

with	V_i	= linearized voltage of channel i in µV	(i = x,y,z)
	U_i	= measured voltage of channel i in µV	(i = x,y,z)
	cf	= crest factor of exciting field	(DASY parameter)
	dcp_i	= diode compression point of channel i in µV	(Probe parameter, i = x,y,z)

The resulting linearized voltage is only approximated because the probe is not calibrated to this specific signal.

Field and SAR Calculation

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

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

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 primary field data are used to calculate the derived field units.

$$SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1'000}$$

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

Appendix 3-4: Simulated tissue composition and parameter confirmation

Liquid type	Head	Control No.	SSLHV6-01	Model No. / Product No.	HBBL600-10000V6 / SL AAH U16 BC
Ingredient: Mixture [%]	Water: >77, Ethanediol: <5.2, Sodium petroleum sulfonate:<2.9, Hexylene Glycol: <2.9, alkoxylated alcohol (>C_{16}):<2.0				
Tolerance specification	± 10%				
Temperature gradients [% / deg.C]	permittivity: -0.19 / conductivity: -0.57 (at 2.6 GHz), permittivity: +0.31 / conductivity: -1.43 (at 5.5 GHz) (*1)				
Manufacture	Schmid & Partner Engineering AG	Note: *1. speag_920-SLAAxyy-E_1.12.15CL (Maintenance of tissue simulating liquid)			

*. The dielectric parameters were checked prior to assessment using the DAK3.5 dielectric probe kit.

Date measured	Frequency [MHz]	Liquid type	Ambient/		Liquid temp.	Liquid depth of phantom	Liquid parameters (*a)										ΔSAR (*b)	
							Permittivity (εr) [-]					Conductivity [S/m]					1g	10g
							Target	Measured			Δend, >48hrs	Target	Measured			Δend, >48hrs		
			[deg.C.]	[%RH]	[deg.C.]	[mm]		Meas.	Δεr[%]	Limit			Meas.	Δσ[%]	Limit		[%]	[%]
April 19, 2022	5250	Head	24	40~50	22.5	150	***35.93***	35.01	-2.6	10%	-	***4.706***	4.546	-3.4	10%	-	0.6	0.8
April 20, 2022	5600	Head	24	40~50	22.5	150	***35.53***	34.44	-3.1	10%	-	***5.065***	4.931	-2.6	10%	-	0.7	0.9
April 21, 2022	5800	Head	24	40~50	22.5	150	***35.3***	34.12	-3.4	10%	-	***5.27***	5.156	-2.2	10%	-	0.8	0.9
April 22, 2022	2450	Head	24	40~50	22.5	150	***39.2***	39.59	1.0	10%	-	***1.80***	1.852	2.9	10%	-	1.2	0.6

*. Calculating formula: Δend(>48 hrs.) (%) = {(dielectric properties, end of test series) / (dielectric properties, beginning of test series) -1} × 100

*a. The target values of (2000, 2450, 3000 and 5800) MHz are parameters defined in Appendix A of KDB 865664 D01. For other frequencies, the target nominal dielectric values shall be obtained by linear interpolation between the higher and lower tabulated figures.

Standard										*Interpolated & Extrapolated*									
f (MHz)	Head Tissue		Body Tissue		f	Head Tissue		Body Tissue		f	Head Tissue		Body Tissue		f	Head Tissue		Body Tissue	
	εr	σ [S/m]	εr	σ [S/m]	(MHz)	εr	σ [S/m]	εr	σ [S/m]	(MHz)	εr	σ [S/m]	εr	σ [S/m]	(MHz)	εr	σ [S/m]	εr	σ [S/m]
(1800-)2000	**40.0**	**1.40**	**53.3**	**1.52**	3000	**38.5**	**2.40**	**52.0**	**2.73**	*5250*	*35.93*	*4.706*	*48.95*	*5.358*	*5750*	*35.36*	*5.219*	*48.27*	*5.942*
2450	**39.2**	**1.80**	**52.7**	**1.95**	5800	**35.3**	**5.27**	**48.2**	**6.00**	*5600*	*35.53*	*5.065*	*48.47*	*5.766*					

*b. The coefficients are parameters defined in IEEE Std. 1528-2013.

ΔSAR(1g)= Cεr ×Δεr + Cσ ×Δσ, Cεr=-7.854E-4×f^3+9.402E-3×f^2-2.742E-2×f-0.2026 / Cσ =9.804E-3×f^3-8.661E-2×f^2+2.981E-2×f+0.7829

ΔSAR(10g)= Cεr ×Δεr + Cσ ×Δσ, Cεr=3.456×10^{-3}×f^3-3.531×10^{-2}×f^2+7.675×10^{-2}×f-0.1860 / Cσ =4.479×10^{-3}×f^3-1.586×10^{-2}×f^2-0.1972×f+0.7717

Appendix 3-5: Daily 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.

Date	Frequency [MHz]	ΔSAR			Daily check results (*. Meas.: Measured, Cal.: Calibration value, STD: Standard value, n/a: not applicable)																		
					SAR (1g) [W/kg] (*d)									SAR (10g) [W/kg] (*d)									
		Liquid Type	1g [%]	10g [%]	Meas. (*c)	ΔSAR-correct	1W scaled	Target		Deviation		Limit [%]	Pass ?	Meas. (*c)	ΔSAR-correct	1W scaled	Target		Deviation		Limit [%]	Pass ?
								Cal. (*e)	STD (*f)	Cal. [%]	STD [%]						Cal. (*e)	STD (*f)	Cal. [%]	STD [%]		
April 19, 2022	5250	Head	0.6	0.8	8.09	8.04	80.4	80	n/a	0.5	-	±10	Pass	2.37	2.35	23.5	22.8	n/a	3.1	-	±10	Pass
April 20, 2022	5600	Head	0.7	0.9	8.82	8.76	87.6	85.1	n/a	2.9	-	±10	Pass	2.52	2.5	25.0	22.8	n/a	9.6	-	±10	Pass
April 21, 2022	5800	Head	0.8	0.9	8.37	8.3	83.0	83	78	0.0	6.4	±10	Pass	2.39	2.37	23.7	23.3	21.9	1.7	8.2	±10	Pass
April 22, 2022	2450	Head	1.2	0.6	13.7	13.54	54.16	52	52.4	4.2	3.4	±10	Pass	6.38	6.34	25.36	24.4	24	3.9	5.7	±10	Pass

*. Calculating formula:
ΔSAR corrected SAR (1g,10g) (W/kg) = (Measured SAR(1g,10g) (W/kg)) × (100 - (ΔSAR(%)) / 100

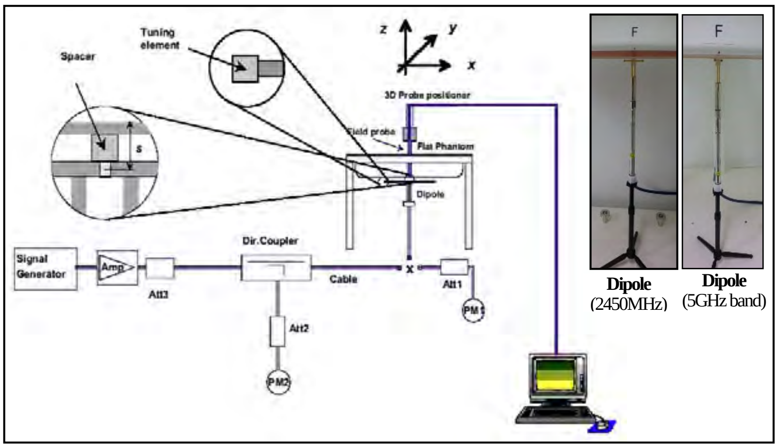
*c. The "Meas. (Measured)" SAR value is obtained at 250 mW for 2450MHz, 100 mW for (5250, 5600, 5800) MHz

*d. 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.

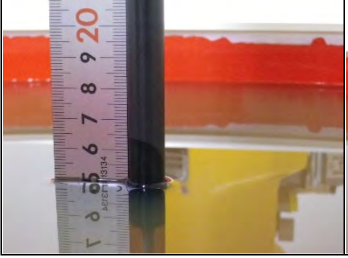
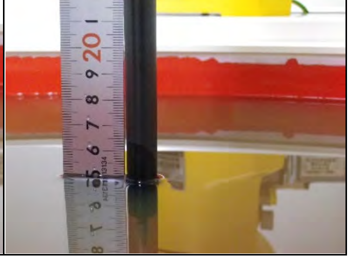
*e. The target value is a parameter defined in the calibration data sheet of D2450V2 (sn:822) and D5GHZV2 (sn:1092) dipole calibrated by Schmid & Partner Engineering AG (Certification No. D2450V2-822_Dec21 and D5GHzV2-1092_Oct21, the data sheet was filed in this report).

*f. The target value (normalized to 1W) is defined in IEEE Std.1528.

Test setup for the system performance check->



Appendix 3-6: Daily check measurement data

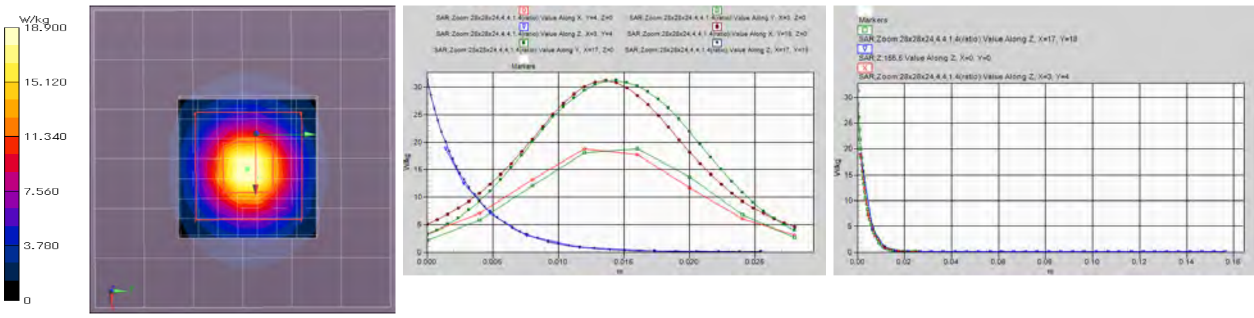
Photographs of Liquid depth	
150 mm (Liquid type: Head, April 19, 2022)	151 mm (Liquid type: Head, April 20, 2022)
	

EUT: Dipole(5GHz); Type: D5GHzV2; Serial: 1092; Forward conducted power: 100mW
Communication System: CW (0) (*.UID: 0, Frame Length in ms: 0; Communication System PAR: 0; PMF: 1) **; Frequency: 5250 MHz; Crest Factor: 1.0**
Medium: Head(v6.2204); Medium parameters used: f = 5250 MHz; σ = 4.546 S/m; ε_r = 35.01; ρ = 1000 kg/m^3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration: -Electronics: DAE4 Sn626; Calibrated: 2021/12/08 / -Phantom: ELI v4.0; Type: QDOVA001BA; Serial: 1059; Phantom section: Flat Section
-DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474) / -Probe: EX3DV4 - SN7372; ConvF(4.75, 4.75, 4.75) @ 5250 MHz; Calibrated: 2021/04/23
-Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0, 156.0

Area:60x60,10 (7x7x1): Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 18.1 W/kg
Area:60x60,10 (61x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm; Maximum value of SAR (interpolated) = 19.2 W/kg
Z;155,5 (1x1x32): Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 18.8 W/kg

Zoom:28x28x24,4,4,1.4(ratio) (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm;
Reference Value = 69.68 V/m; Power Drift = -0.06 dB; Maximum value of SAR (measured) = 18.9 W/kg; Peak SAR (extrapolated) = 31.2 W/kg
SAR(1 g) = 8.09 W/kg; SAR(10 g) = 2.37 W/kg (*. Smallest distance from peaks to all points 3 dB below = 7.9 mm; Ratio of SAR at M2 to SAR at M1 = 66.2%)



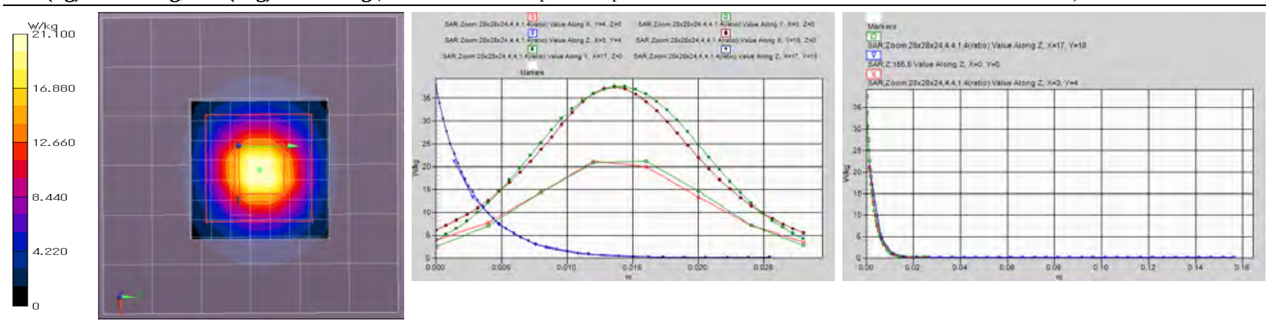
Remarks: *. Date tested: 2022/4/19; Tested by: Hiroshi Naka; Tested place:No.7 shielded room,
*. liquid depth: 150 mm; Position: distance of dipole to phantom: 8mm (10mm to liquid); ambient: 23 deg.C. / (55~65) %RH,
*. liquid temperature: 22.5(start)/22.4(end)/22.5(in check) deg.C.; *.White cubic: zoom scan area, Red cubic: big=SAR(10g)/small=SAR(1g)

EUT: Dipole(5GHz); Type: D5GHzV2; Serial: 1092; Power; 100 mW
Communication System: CW (0) (*.UID: 0, Frame Length in ms: 0; Communication System PAR: 0; PMF: 1) **; Frequency: 5600 MHz; Crest Factor: 1.0**
Medium: Head(v6.2204); Medium parameters used: f = 5600 MHz; σ = 4.931 S/m; ε_r = 34.44; ρ = 1000 kg/m^3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration: -Electronics: DAE4 Sn626; Calibrated: 2021/12/08 / -Phantom: ELI v4.0; Type: QDOVA001BA; Serial: 1059; Phantom section: Flat Section
-DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474) / -Probe: EX3DV4 - SN7372; ConvF(4.32, 4.32, 4.32) @ 5600 MHz; Calibrated: 2021/04/23
-Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0, 156.0

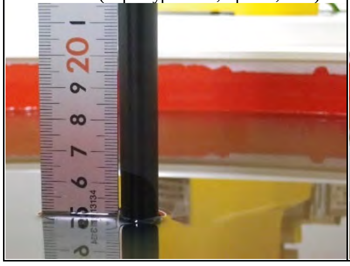
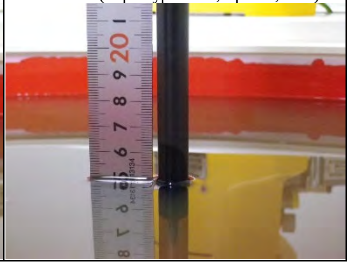
Area:60x60,10 (7x7x1): Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 20.9 W/kg
Area:60x60,10 (61x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm; Maximum value of SAR (interpolated) = 22.3 W/kg
Z;155,5 (1x1x32): Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 21.1 W/kg

Zoom:28x28x24,4,4,1.4(ratio) (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm;
Reference Value = 71.91 V/m; Power Drift = -0.03 dB; Maximum value of SAR (measured) = 21.1 W/kg; Peak SAR (extrapolated) = 37.4 W/kg
SAR(1 g) = 8.82 W/kg; SAR(10 g) = 2.52 W/kg (*. Smallest distance from peaks to all points 3 dB below = 7.4 mm; Ratio of SAR at M2 to SAR at M1 = 63.3%)



Remarks: *. Date tested: 2022/4/20; Tested by: Hiroshi Naka; Tested place:No.7 shielded room,
*. liquid depth: 150 mm; Position: distance of dipole to phantom: 8mm (10mm to liquid); ambient: 23 deg.C. / (55~65) %RH,
*. liquid temperature: 22.5(start)/22.4(end)/22.5(in check) deg.C.; *.White cubic: zoom scan area, Red cubic: big=SAR(10g)/small=SAR(1g)

Appendix 3-6: Daily check measurement data (cont'd)

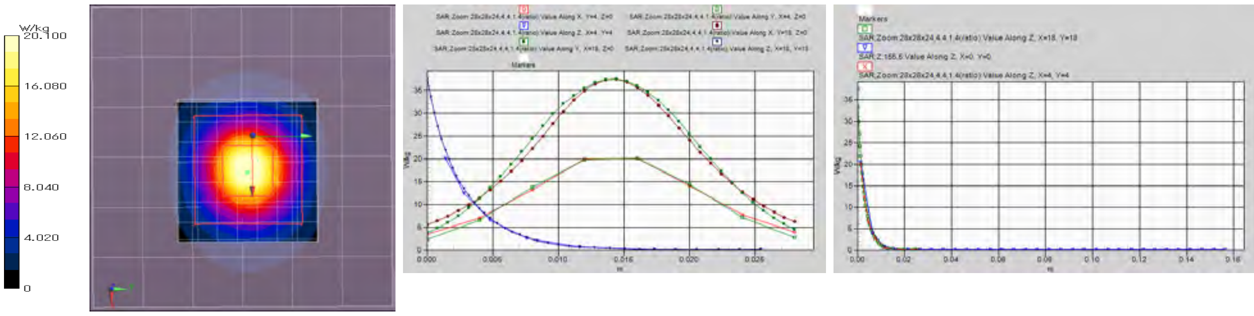
Photographs of Liquid depth	
150 mm (Liquid type: Head, April 21, 2022)	151 mm (Liquid type: Head, April 22, 2022)
	

EUT: Dipole(5GHz); Type: D5GHzV2; Serial: 1092; Power; 100 mW
Communication System: CW (0) (*.UID: 0, Frame Length in ms: 0; Communication System PAR: 0; PMF: 1) **; Frequency: 5600 MHz; Crest Factor: 1.0**
Medium: Head(v6.2204); Medium parameters used: f = 5800 MHz; σ = 5.156 S/m; ε_r = 34.12; ρ = 1000 kg/m^3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration: -Electronics: DAE4 Sn626; Calibrated: 2021/12/08 / -Phantom: ELI v4.0; Type: QDOVA001BA; Serial: 1059; Phantom section: Flat Section
-DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474) / -Probe: EX3DV4 - SN7372; ConvF(4.36, 4.36, 4.36) @ 5800 MHz; Calibrated: 2021/04/23
-Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0, 156.0

Area:60x60,10 (7x7x1): Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 19.2 W/kg
Area:60x60,10 (61x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm; Maximum value of SAR (interpolated) = 20.8 W/kg
Z;155,5 (1x1x32): Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 20.5 W/kg

Zoom:28x28x24,4,4,1.4(ratio) (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm;
Reference Value = 67.65 V/m; Power Drift = -0.10 dB; Maximum value of SAR (measured) = 20.1 W/kg; Peak SAR (extrapolated) = 37.4 W/kg
SAR(1 g) = 8.37 W/kg; SAR(10 g) = 2.39 W/kg (*. Smallest distance from peaks to all points 3 dB below = 7.5 mm; Ratio of SAR at M2 to SAR at M1 = 61.6%)



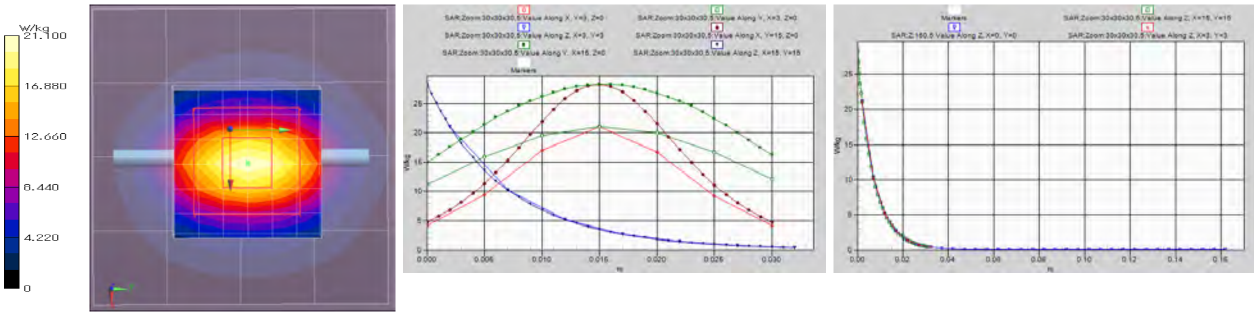
Remarks: *. Date tested: 2022/4/21; Tested by: Hiroshi Naka; Tested place:No.7 shielded room,
*. liquid depth: 150 mm; Position: distance of dipole to phantom: 8mm (10mm to liquid); ambient: 23 deg.C. / (55~65) %RH,
*. liquid temperature: 22.5(start)/22.4(end)/22.5(in check) deg.C.; *.White cubic: zoom scan area, Red cubic: big=SAR(10g)/small=SAR(1g)

EUT: Diploe(2.4GHz); Type: D2450V2; Serial: 822; Power; 250 mW
Communication System: CW (0) (*.UID: 0, Frame Length in ms: 0; Communication System PAR: 0; PMF: 1) **; Frequency: 2450 MHz; Crest Factor: 1.0**
Medium: Head(v6.2204); Medium parameters used: f = 2450 MHz; σ = 1.852 S/m; ε_r = 39.59; ρ = 1000 kg/m^3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration: -Electronics: DAE4 Sn626; Calibrated: 2021/12/08 / -Phantom: ELI v4.0; Type: QDOVA001BA; Serial: 1059; Phantom section: Flat Section
-DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474) / -Probe: EX3DV4 - SN7372; ConvF(7.35, 7.35, 7.35) @ 2450 MHz; Calibrated: 2021/04/23
-Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 31.0, 161.0

daily-h24a;kpb-r02(7372-2104),kdae-01(626),ksda-01(822-2112)/h2450,220418d,d10,250mw/
Area:60x60,15 (5x5x1): Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 20.1 W/kg
Area:60x60,15 (41x41x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm; Maximum value of SAR (interpolated) = 20.6 W/kg
Z;160,5 (1x1x33): Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 21.2 W/kg

Zoom:30x30x30,5 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm;
Reference Value = 106.5 V/m; Power Drift = 0.01 dB; Maximum value of SAR (measured) = 21.1 W/kg; Peak SAR (extrapolated) = 28.3 W/kg
SAR(1 g) = 13.7 W/kg; SAR(10 g) = 6.38 W/kg (*. Smallest distance from peaks to all points 3 dB below = 9.2 mm; Ratio of SAR at M2 to SAR at M1 = 48.9%)



Remarks: *. Date tested: 2022/4/22; Tested by: Hiroshi Naka; Tested place:No.7 shielded room,
*. liquid depth: 150 mm; Position: distance of dipole to phantom: 8mm (10mm to liquid); ambient: 23 deg.C. / (55~65) %RH,
*. liquid temperature: 22.5(start)/22.4(end)/22.5(in check) deg.C.; *.White cubic: zoom scan area, Red cubic: big=SAR(10g)/small=SAR(1g)

Appendix 3-7: Uncertainty Assessment (SAR measurement/Daily check)

*. Although this standard determines only the limit value of uncertainty, there is no applicable rule of uncertainty in this. Therefore, the following results are derived depending on whether or not laboratory uncertainty is applied.

Uncertainty of SAR measurement (2.4GHz~6GHz) (*.v6h,ε&σ: 10%, DAK3.5, Tx: ≈100% duty cycle) (v09r02)	1g SAR	10g SAR
Combined measurement uncertainty of the measurement system (k=1)	± 13.2 %	± 13.1 %
Expanded uncertainty (k=2)	± 26.4 %	± 26.2 %

	Error Description (2.4-6GHz)	Uncertainty Value	Probability distribution	Divisor	ci (1g)	ci (10g)	ui (1g)	ui (10g)	Vi, veff
A	**Measurement System** (DASY5)						(std. uncertainty)	(std. uncertainty)	
1	Probe Calibration Error	±7.0 %	Normal	1	1	1	±7.0 %	±7.0 %	∞
2	Axial isotropy Error	±4.7 %	Rectangular	√3	0.71	0.71	±1.9 %	±1.9 %	∞
3	Hemispherical isotropy Error	±9.6 %	Rectangular	√3	0.71	0.71	±3.9 %	±3.9 %	∞
4	Linearity Error	±4.7 %	Rectangular	√3	1	1	±2.7 %	±2.7 %	∞
5	Probe modulation response (v09)	±5.5 %	Rectangular	√3	1	1	±3.2 %	±3.2 %	∞
6	Sensitivity Error (detection limit)	±1.0 %	Rectangular	√3	1	1	±0.6 %	±0.6 %	∞
7	Boundary effects Error	±4.3%	Rectangular	√3	1	1	±2.5 %	±2.5 %	∞
8	Readout Electronics Error(DAE)	±0.3 %	Rectangular	√3	1	1	±0.3 %	±0.3 %	∞
9	Response Time Error	±0.8 %	Normal	1	1	1	±0.5 %	±0.5 %	∞
10	Integration Time Error (≈100% duty cycle)	±0 %	Rectangular	√3	1	1	0 %	0 %	∞
11	RF ambient conditions-noise (v09)	±1.0 %	Rectangular	√3	1	1	±0.6 %	±0.6 %	∞
12	RF ambient conditions-reflections	±3.0 %	Rectangular	√3	1	1	±1.7 %	±1.7 %	∞
13	Probe positioner mechanical tolerance	±3.3 %	Rectangular	√3	1	1	±1.9 %	±1.9 %	∞
14	Probe Positioning with respect to phantom shell	±6.7 %	Rectangular	√3	1	1	±3.9 %	±3.9 %	∞
15	Max. SAR evaluation (Post-processing)	±4.0 %	Rectangular	√3	1	1	±2.3 %	±2.3 %	∞
B	**Test Sample Related**								
16	Device Holder or Positioner Tolerance (v09)	±3.2 %	Normal	1	1	1	±3.2 %	±3.2 %	5
17	Test Sample Positioning Error (v09)	±2.1 %	Normal	1	1	1	±2.1 %	±2.1 %	10
18	Power scaling	±0 %	Rectangular	√3	1	1	±0 %	±0 %	∞
19	Drift of output power (measured, <0.2dB)	±5.0 %	Rectangular	√3	1	1	±2.9 %	±2.9 %	∞
C	**Phantom and Setup**								
20	Phantom uncertainty (shape, thickness tolerances)	±7.5 %	Rectangular	√3	1	1	±4.3 %	±4.3 %	∞
21	Algorithm for correcting SAR (e',σ: 10%)	±1.9 %	Normal	1	1	0.84	±1.9 %	±1.6 %	∞
22	Measurement Liquid Conductivity Error (DAK3.5)	±3.0 %	Normal	1	0.78	0.71	±2.3 %	±2.1 %	7
23	Measurement Liquid Permittivity Error (DAK3.5)	±3.1 %	Normal	1	0.23	0.26	±0.7 %	±0.8 %	7
24	Liquid Conductivity-temp.uncertainty (≤2deg.C.v6h)	±3.0 %	Rectangular	√3	0.78	0.71	±1.4 %	±1.2 %	∞
25	Liquid Permittivity-temp.uncertainty (≤2deg.C.v6h)	±1.0 %	Rectangular	√3	0.23	0.26	±0.1 %	±0.2 %	∞
	Combined Standard Uncertainty (v09r02)						**± 13.2 %**	**± 13.1 %**	945
	Expanded Uncertainty (k=2) (v09r02)						**± 26.4 %**	**± 26.2 %**	

*. This measurement uncertainty budget is suggested by IEEE Std.1528(2013) and determined by Schmid & Partner Engineering AG (DASY5 Uncertainty Budget). Per KDB 865664 D01 (v01r04) SAR Measurement 100 MHz to 6 GHz, Section 2.8.1., when the highest measured SAR(1g) within a frequency band is < 1.5W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std.1528 (2013) is not required in SAR reports submitted for equipment approval.

Uncertainty of daily check (2.4~6GHz) (*.v6h,ε&σ tolerance: 10%, DAK3.5, CW) (v09r02)	1g SAR	10g SAR
Combined measurement uncertainty of the measurement system (k=1)	± 10.8 %	± 10.7 %
Expanded uncertainty (k=2)	± 21.6 %	± 21.4 %

	Error Description (2.4-6GHz)	Uncertainty Value	Probability distribution	Divisor	ci (1g)	ci (10g)	ui (1g)	ui (10g)	Vi, veff
A	**Measurement System** (DASY5)						(std. uncertainty)	(std. uncertainty)	
1	Probe Calibration Error	±7.0 %	Normal	1	1	1	±7.0 %	±7.0 %	∞
2	Axial isotropy error	±4.7 %	Rectangular	√3	0.71	0.71	±1.9 %	±1.9 %	∞
3	Hemispherical isotropy error	±9.6 %	Rectangular	√3	0	0	0 %	0 %	∞
4	Probe linearity	±4.7 %	Rectangular	√3	1	1	±2.7 %	±2.7 %	∞
5	Probe modulation response (CW)	±0.0 %	Rectangular	√3	1	1	0 %	0 %	∞
6	System detection limit	±1.0 %	Rectangular	√3	1	1	±0.6 %	±0.6 %	∞
7	Boundary effects	±4.3 %	Rectangular	√3	1	1	±2.5 %	±2.5 %	∞
8	System readout electronics (DAE)	±0.3 %	Normal	1	1	1	±0.3 %	±0.3 %	∞
9	Response Time Error (<5ms/100ms wait)	±0.0 %	Rectangular	√3	1	1	0 %	0 %	∞
10	Integration Time Error (CW)	±0.0 %	Rectangular	√3	1	1	0 %	0 %	∞
11	RF ambient conditions-noise	±3.0 %	Rectangular	√3	1	1	±1.7 %	±1.7 %	∞
12	RF ambient conditions-reflections	±3.0 %	Rectangular	√3	1	1	±1.7 %	±1.7 %	∞
13	Probe positioner mechanical tolerance	±3.3 %	Rectangular	√3	1	1	±1.9 %	±1.9 %	∞
14	Probe positioning with respect to phantom shell	±6.7 %	Rectangular	√3	1	1	±3.9 %	±3.9 %	∞
15	Max. SAR evaluation (Post-processing)	±4.0 %	Rectangular	√3	1	1	±2.3 %	±2.3 %	∞
B	**Test Sample Related**								
16	Deviation of the experimental source	±1.9 %	Normal	1	1	1	±1.9 %	±1.9 %	∞
17	Dipole to liquid distance (10mm±0.2mm,<2deg.)	±2.0 %	Rectangular	√3	1	1	±1.2 %	±1.2 %	∞
18	Drift of output power (measured, <0.1dB)	±2.3 %	Rectangular	√3	1	1	±1.3 %	±1.3 %	∞
C	**Phantom and Setup**								
19	Phantom uncertainty	±2.0 %	Rectangular	√3	1	1	±1.2 %	±1.2%	∞
20	Algorithm for correcting SAR (e',σ: 10%)	±1.9 %	Normal	1	1	0.84	±1.9 %	±1.6 %	∞
21	Liquid conductivity (meas.) (DAK3.5)	±3.0 %	Normal	1	0.78	0.71	±2.3 %	±2.1 %	∞
22	Liquid permittivity (meas.) (DAK3.5)	±3.1 %	Normal	1	0.23	0.26	±0.7 %	±0.8 %	∞
23	Liquid Conductivity-temp.uncertainty (≤2deg.C.v6h)	±3.0 %	Rectangular	√3	0.78	0.71	±1.4 %	±1.2 %	∞
24	Liquid Permittivity-temp.uncertainty (≤2deg.C.v6h)	±1.0 %	Rectangular	√3	0.23	0.26	±0.1 %	±0.2 %	∞
	Combined Standard Uncertainty (v09r02)						**±10.8 %**	**±10.7 %**	
	Expanded Uncertainty (k=2) (v09r02)						**±21.6 %**	**±21.4 %**	

*. This measurement uncertainty budget is suggested by IEEE Std. 1528(2013) and determined by Schmid & Partner Engineering AG (DASY5 Uncertainty Budget).

*. Table of uncertainties are listed for ISO/IEC 17025.