SAR TEST REPORT

Test Report No. : 10812026H-G

Applicant	:	**NIKON CORPORATION**
Type of Equipment	:	**Wireless Transmitter**
Model No.	:	**N1526**
FCC ID	:	**CGJ1152EA**
Test regulation	:	**FCC47CFR 2.1093**
Test Result	:	**Complied**
Reported SAR(1g) Value		**The highest reported SAR(1g)** DTS: 2412-2462MHz band: 1.19 W/kg UNII: 5180-5320MHz band: 1.08 W/kg UNII: 5745-5825MHz band: 1.08 W/kg

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
6. This test report covers SAR technical requirements. It does not cover administrative issues such as Manual or non-SAR test related Requirements. (if applicable)

Date of test: June 22 to 26, 2015

Representative test engineer: H. Sato
Hisayoshi Sato
Engineer
Consumer Technology Division

Approved by : T. Hatakeda
Takahiro Hatakeda
Leader
Consumer Technology Division

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*As for the range of Accreditation in NVLAP, you may refer to the WEB address,
http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap

REVISION HISTORY

Original Test Report No.: 10812026H-G

Revision	Test report No.	Date	Page revised	Contents
- (Original)	10812026H-G	July 29, 2015	-	-

UL Japan, Inc.
Ise EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone: +81 596 24 8999
Facsimile: +81 596 24 8124

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SECTION 1: Customer information

Company Name	:	NEC Platforms, Ltd.
Address	:	800, Shimomata, Kakegawa-shi, Shizuoka 436-8501,Japan
Telephone Number	:	+81-537-22-8276
Facsimile Number	:	+81-537-22-8236
Contact Person	:	Kouichi Sakurai

*Remarks:
NIKON CORPORATION designates NEC Platforms, Ltd. as manufacturer of the product (Wireless Transmitter).

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment	:	Wireless Transmitter
Model No.	:	N1526
Serial No.	:	PT2 No.11
Rating	:	DC 5.0 V
Receipt Date of Sample	:	June 1, 2015
Country of Mass-production	:	Japan
Condition of EUT	:	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	:	No Modification by the test lab

[Identification of Host]

Type of Equipment	:	Digital Camera
Model No.	:	Q870
Serial No.	:	PT62020
Rating	:	Li-ion battery(M/N: EN-EL18) 10.8V, 2000mAh, 22Wh
Option battery	:	None

2.2 Product Description

Model: N1526 (referred to as the EUT in this report) is a Wireless Transmitter.

General Specification

Clock frequency(ies) in the system	:	40 MHz (Crystal), 32.7 kHz (OSC)
Operating temperature	:	0 deg. C to +40 deg. C

Radio Specification

Radio Type	:	Transceiver
Power Supply (inner)	:	DC 3.3 V

Specification of Wireless LAN (IEEE802.11b/g/a/n-20/n-40/11ac-20/11ac-40/11ac-80)

Type of radio	**IEEE802.11b**	**IEEE802.11g/n (20 M band)**	**IEEE802.11n (40 M band)**	**IEEE802.11a/n/ac (20 M band)**	**IEEE802.11n/ac (40 M band)**	**IEEE802.11ac (80 M band)**
Frequency of operation (MHz)	2412 - 2462	2412 - 2462	2422 - 2452	5180 - 5240 5260 - 5320 5745 - 5825	5190 - 5230 5270 - 5310 5755 - 5795	5210 5290 5775
Type of modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM-CCK (64QAM, 16QAM, QPSK, BPSK)		OFDM (64QAM, 16QAM, QPSK, BPSK, 256QAM(IEEE802.11ac only))		
Channel spacing	5 MHz			20 MHz	40 MHz	80 MHz
Antenna type	Antenna 0: Pattern Antenna Inverted L Type Antenna 1: Pattern Antenna Inverted L Type					
Antenna Gain	2.4GHz: 1 dBi 5GHz: 1 dBi					
Directional Antenna Gain	2.4 GHz: 4.01 dBi 5 GHz: 4.01 dBi					

SECTION 3 : Test standard information

3.1 Test Specification

Title : **FCC47CFR 2.1093**
Radiofrequency radiation exposure evaluation: portable devices.

: **IEEE Std 1528-2003:**
IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices.

: **Published RF exposure KDB procedures**

☑	**KDB447498D01(v05r02)**	Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies
☐	**KDB447498D02(v02)**	SAR Measurement Procedures for USB Dongle Transmitters
☐	**KDB648474D04(v01r02)**	SAR Evaluation Considerations for Wireless Handsets
☐	**KDB941225D01(v02)**	SAR Measurement Procedures for 3G Devices
☐	**KDB941225D02(v02r02)**	3GPP R6 HSPA and R7 HSPA+ SAR Guidance
☐	**KDB941225D03(v01)**	Recommended SAR Test Reduction Procedures for GSM/GPRS/EDGE
☐	**KDB941225D04(v01)**	Evaluating SAR for GSM/(E)GPRS Dual Transfer Mode
☐	**KDB941225D05(v02r03)**	SAR for LTE Devices
☐	**KDB941225D06(v01r01)**	SAR test procedures for devices incorporating SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities (Hot Spot SAR)
☐	**KDB941225D07(v01r01)**	SAR Evaluation Procedures for UMPC Mini-Tablet Devices
☐	**KDB616217D04(v01r01)**	SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers
☑	**KDB865664D01(v01r03)**	SAR Measurement Requirements for 100MHz to 6 GHz
☑	**KDB248227D01(v02r01)**	SAR Measurement Procedures for 802.11a//b/g Transmitters

Reference
[1]SPEAG uncertainty document (AN 15-7/AN19-17) for DASY 5 System from SPEAG (Schmid & Partner Engineering AG).
[2] 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.

3.2 Procedure

Transmitter	**WLAN**
Test Procedure	Published RF exposure KDB procedures
	SAR
Category	FCC47CFR 2.1093
Note: UL Japan, Inc. 's SAR Work Procedures 13-EM-W0429 and 13-EM-W0430	

3.3 Exposure limit

(A) Limits for Occupational/Controlled Exposure (W/kg)

Spatial Average (averaged over the whole body)	Spatial Peak (averaged over any 1g of tissue)	Spatial Peak (hands/wrists/feet/ankles averaged over 10g)
0.4	8.0	20.0

(B) Limits for General population/Uncontrolled Exposure (W/kg)

Spatial Average (averaged over the whole body	Spatial Peak (averaged over any 1g of tissue)	Spatial Peak (hands/wrists/feet/ankles averaged over 10g)
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.

NOTE:GENERAL POPULATION/UNCONTROLLED EXPOSURE
SPATIAL PEAK(averaged over any 1g of tissue) LIMIT
1.6 W/kg

3.4 Test Location

*Shielded room for SAR testings
UL Japan, Inc. Ise EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8999 Facsimile : +81 596 24 8124

SECTION 4 : Test result

4.1 Stand-alone SAR result

Reported SAR

Measured SAR is scaled to the maximum tune-up tolerance limit by the following formulas.
Reported SAR= Measured SAR [W/kg] · Scaled factor *1
Maximum tune-up tolerance limit is by the specification from a customer.

Body SAR

Mode	Frequency	Measured power [dBm]*2	Measured power [mW]	Maximum tune-up tolerance limit [dBm]*3	Maximum tune-up tolerance limit [mW]*3	Measured SAR [W/kg]	Scaled factor	**Reported SAR [W/kg]**
WLAN 11b (DTS : 2412 - 2462MHz band)	2437MHz	11.99	15.81	12.50	17.78	1.06	1.125	**1.19**
WLAN 11ac40 (UNII : 5180 - 5320MHz band)	5310MHz	12.63	18.32	13.50	22.39	0.882	1.222	**1.08**
WLAN 11ac40 (UNII : 5745 - 5825MHz band)	5795MHz	12.66	18.45	13.50	22.39	0.887	1.213	**1.08**

Note

*1 Scaled factor = Maximum tune-up tolerance limit [mW] / Measured power [mW]
*2 The sample used by the SAR test is within the tune-up tolerance but not more than 2 dB lower than the maximum tune-up tolerance limit. That is, measured power is included the tune-up tolerance range.
*3 Maximum tune-up tolerance limit is defined as maximum timed-average value. (Considering to maximum duty cycle of WLAN.)

SECTION 5 SAR test exclusion considerations according to KDB447498 D01

The following is based on KDB447498D01.
1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] ·[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where
f(GHz) is the RF channel transmit frequency in GHz
Power and distance are rounded to the nearest mW and mm before calculation
The result is rounded to one decimal place for comparison
The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

WLAN 2.4GHz DSSS mode

Band	Standalone SAR tested	Positiom	Mode	Upper frequency of band *1	Maximum tune-up tolerance limit *4	Min distance *2	Calculation of exclusion *3
WLAN (2.4GHz band)	☐	Front	11b	2462 [MHz] (11ch)	12.5 [dBm] 17.78 [mW] 17 [mW]*5	22 [mm]	1.2
WLAN (2.4GHz band)	☐	Rear	11b	2462 [MHz] (11ch)	12.5 [dBm] 17.78 [mW] 17 [mW]*5	23 [mm]	1.2
WLAN (2.4GHz band)	☐	Top	11b	2462 [MHz] (11ch)	12.5 [dBm] 17.78 [mW] 17 [mW]*5	40 [mm]	0.7
WLAN (2.4GHz band)	☑	Left	11b	2462 [MHz] (11ch)	12.5 [dBm] 17.78 [mW] 17 [mW]*5	5 [mm]	5.3
WLAN (2.4GHz band)	☑	Front tilt	11b	2462 [MHz] (11ch)	12.5 [dBm] 17.78 [mW] 17 [mW]*5	5 [mm]	5.3
WLAN (2.4GHz band)	☑	Rear tilt	11b	2462 [MHz] (11ch)	12.5 [dBm] 17.78 [mW] 17 [mW]*5	5 [mm]	5.3
WLAN (2.4GHz band)	☑	Top tilt	11b	2462 [MHz] (11ch)	12.5 [dBm] 17.78 [mW] 17 [mW]*5	5 [mm]	5.3
WLAN (2.4GHz band)	☑	Bottom tilt	11b	2462 [MHz] (11ch)	12.5 [dBm] 17.78 [mW] 17 [mW]*5	5 [mm]	5.3

WLAN 2.4GHz OFDM mode

Band	Standalone SAR tested	Positiom	Mode	Upper frequency of band *1	Maximum tune-up tolerance limit *4	Min distance *2	Calculation of exclusion *3
WLAN (2.4GHz band)	☐	Front	11g 11n20	2462 [MHz] (11ch)	12.5 [dBm] 17.78 [mW] 17 [mW]*5	22 [mm]	1.2
WLAN (2.4GHz band)	☐	Rear	11g 11n20	2462 [MHz] (11ch)	12.5 [dBm] 17.78 [mW] 17 [mW]*5	23 [mm]	1.2
WLAN (2.4GHz band)	☐	Top	11g 11n20	2462 [MHz] (11ch)	12.5 [dBm] 17.78 [mW] 17 [mW]*5	40 [mm]	0.7
WLAN (2.4GHz band)	☑	Left	11g 11n20	2462 [MHz] (11ch)	12.5 [dBm] 17.78 [mW] 17 [mW]*5	5 [mm]	5.3
WLAN (2.4GHz band)	☑	Front tilt	11g 11n20	2462 [MHz] (11ch)	12.5 [dBm] 17.78 [mW] 17 [mW]*5	5 [mm]	5.3
WLAN (2.4GHz band)	☑	Rear tilt	11g 11n20	2462 [MHz] (11ch)	12.5 [dBm] 17.78 [mW] 17 [mW]*5	5 [mm]	5.3
WLAN (2.4GHz band)	☑	Top tilt	11g 11n20	2462 [MHz] (11ch)	12.5 [dBm] 17.78 [mW] 17 [mW]*5	5 [mm]	5.3
WLAN (2.4GHz band)	☑	Bottom tilt	11g 11n20	2462 [MHz] (11ch)	12.5 [dBm] 17.78 [mW] 17 [mW]*5	5 [mm]	5.3

Maximum tune-up tolerance limit of 11n40 is lower than Maximum tune-up tolerance limit of 11g, 11n20.

WLAN 5.2GHz OFDM mode

Band	Standalone SAR tested	Positiom	Mode	Upper frequency of band *1	Maximum tune-up tolerance limit *4	Min distance *2	Calculation of exclusion *3
WLAN (5.2GHz band)	☐	Front	11n40, 11ac40	5230 [MHz] (46ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	22 [mm]	2.3
WLAN (5.2GHz band)	☐	Rear	11n40, 11ac40	5230 [MHz] (46ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	23 [mm]	2.2
WLAN (5.2GHz band)	☐	Top	11n40, 11ac40	5230 [MHz] (46ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	40 [mm]	1.3
WLAN (5.2GHz band)	☑	Left	11n40, 11ac40	5230 [MHz] (46ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	5 [mm]	10.1
WLAN (5.2GHz band)	☑	Front tilt	11n40, 11ac40	5230 [MHz] (46ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	5 [mm]	10.1
WLAN (5.2GHz band)	☑	Rear tilt	11n40, 11ac40	5230 [MHz] (46ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	5 [mm]	10.1
WLAN (5.2GHz band)	☑	Top tilt	11n40, 11ac40	5230 [MHz] (46ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	5 [mm]	10.1
WLAN (5.2GHz band)	☑	Bottom tilt	11n40, 11ac40	5230 [MHz] (46ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	5 [mm]	10.1

Maximum tune-up tolerance limit of 11a, 11n20, 11ac20, 11ac80 are lower than Maximum tune-up tolerance limit of 11n40, 11ac40.

WLAN 5.3GHz OFDM mode

Band	Standalone SAR tested	Positiom	Mode	Upper frequency of band *1	Maximum tune-up tolerance limit *4	Min distance *2	Calculation of exclusion *3
WLAN (5.3GHz band)	☐	Front	11n40, 11ac40	5310 [MHz] (62ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	22 [mm]	2.3
WLAN (5.3GHz band)	☐	Rear	11n40, 11ac40	5310 [MHz] (62ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	23 [mm]	2.2
WLAN (5.3GHz band)	☐	Top	11n40, 11ac40	5310 [MHz] (62ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	40 [mm]	1.3
WLAN (5.3GHz band)	☑	Left	11n40, 11ac40	5310 [MHz] (62ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	5 [mm]	10.1
WLAN (5.3GHz band)	☑	Front tilt	11n40, 11ac40	5310 [MHz] (62ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	5 [mm]	10.1
WLAN (5.3GHz band)	☑	Rear tilt	11n40, 11ac40	5310 [MHz] (62ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	5 [mm]	10.1
WLAN (5.3GHz band)	☑	Top tilt	11n40, 11ac40	5310 [MHz] (62ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	5 [mm]	10.1
WLAN (5.3GHz band)	☑	Bottom tilt	11n40, 11ac40	5310 [MHz] (62ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	5 [mm]	10.1

Maximum tune-up tolerance limit of 11a, 11n20, 11ac20, 11ac80 are lower than Maximum tune-up tolerance limit of 11n40, 11ac40.

WLAN 5.8GHz OFDM mode

Band	Standalone SAR tested	Positiom	Mode	Upper frequency of band *1	Maximum tune-up tolerance limit *4	Min distance *2	Calculation of exclusion *3
WLAN (5.8GHz band)	☐	Front	11n40, 11ac40	5795 [MHz] (159ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	22 [mm]	2.4
WLAN (5.8GHz band)	☐	Rear	11n40, 11ac40	5795 [MHz] (159ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	23 [mm]	2.3
WLAN (5.8GHz band)	☐	Top	11n40, 11ac40	5795 [MHz] (159ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	40 [mm]	1.3
WLAN (5.8GHz band)	☑	Left	11n40, 11ac40	5795 [MHz] (159ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	5 [mm]	10.6
WLAN (5.8GHz band)	☑	Front tilt	11n40, 11ac40	5795 [MHz] (159ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	5 [mm]	10.6
WLAN (5.8GHz band)	☑	Rear tilt	11n40, 11ac40	5795 [MHz] (159ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	5 [mm]	10.6
WLAN (5.8GHz band)	☑	Top tilt	11n40, 11ac40	5795 [MHz] (159ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	5 [mm]	10.6
WLAN (5.8GHz band)	☑	Bottom tilt	11n40, 11ac40	5795 [MHz] (159ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	5 [mm]	10.6

Maximum tune-up tolerance limit of 11a, 11n20, 11ac20, 11ac80 are lower than Maximum tune-up tolerance limit of 11n40, 11ac40.

2) At 100 MHz to 6 GHz and for *test separation distances* > 50 mm, the SAR test exclusion threshold is determined according to the following.
a) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·(f(MHz)/150)] mW, at 100MHz to 1500 MHz
b) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and≤ 6 GHz

WLAN 2.4GHz DSSS mode

Band	Standalone SAR tested	Positiom	Mode	Upper frequency of band *1	Maximum tune-up tolerance limit *4	Min distance	Calculation of threshold*6
WLAN (2.4GHz band)	☐	Bottom	11b	2462 [MHz] (11ch)	12.5 [dBm] 17.78 [mW] 17 [mW]*5	73 [mm]	326 [mW]
WLAN (2.4GHz band)	☐	Right	11b	2462 [MHz] (11ch)	12.5 [dBm] 17.78 [mW] 17 [mW]*5	160 [mm]	1196 [mW]

WLAN 2.4GHz OFDM mode

Band	Standalone SAR tested	Positiom	Mode	Upper frequency of band *1	Maximum tune-up tolerance limit *4	Min distance	Calculation of threshold*6
WLAN (2.4GHz band)	☐	Bottom	11g, 11n20	2462 [MHz] (11ch)	12.5 [dBm] 17.78 [mW] 17 [mW]*5	73 [mm]	326 [mW]
WLAN (2.4GHz band)	☐	Right	11g, 11n20	2462 [MHz] (11ch)	12.5 [dBm] 17.78 [mW] 17 [mW]*5	160 [mm]	1196 [mW]

Maximum tune-up tolerance limit of 11n40 is lower than Maximum tune-up tolerance limit of 11g, 11n20.

WLAN 5.2GHz OFDM mode

Band	Standalone SAR tested	Positiom	Mode	Upper frequency of band *1	Maximum tune-up tolerance limit *4	Min distance	Calculation of threshold*6
WLAN (5.2GHz band)	☐	Bottom	11n40, 11ac40	5230 [MHz] (46ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	73 [mm]	296 [mW]
WLAN (5.2GHz band)	☐	Right	11n40, 11ac40	5230 [MHz] (46ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	160 [mm]	1166 [mW]

Maximum tune-up tolerance limit of 11a, 11n20, 11ac20, 11ac80 are lower than Maximum tune-up tolerance limit of 11n40, 11ac40.

WLAN 5.3GHz OFDM mode

Band	Standalone SAR tested	Positiom	Mode	Upper frequency of band *1	Maximum tune-up tolerance limit *4	Min distance	Calculation of threshold*6
WLAN (5.3GHz band)	☐	Bottom	11n40, 11ac40	5310 [MHz] (62ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	73 [mm]	295 [mW]
WLAN (5.3GHz band)	☐	Right	11n40, 11ac40	5310 [MHz] (62ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	160 [mm]	1165 [mW]

Maximum tune-up tolerance limit of 11a, 11n20, 11ac20, 11ac80 are lower than Maximum tune-up tolerance limit of 11n40, 11ac40.

WLAN 5.8GHz OFDM mode

Band	Standalone SAR tested	Positiom	Mode	Upper frequency of band *1	Maximum tune-up tolerance limit *4	Min distance	Calculation of threshold*6
WLAN (5.8GHz band)	☐	Bottom	11n40, 11ac40	5795 [MHz] (159ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	73 [mm]	292 [mW]
WLAN (5.8GHz band)	☐	Right	11n40, 11ac40	5795 [MHz] (159ch)	13.5 [dBm] 22.39 [mW] 22 [mW]*5	160 [mm]	1162 [mW]

Maximum tune-up tolerance limit of 11a, 11n20, 11ac20, 11ac80 are lower than Maximum tune-up tolerance limit of 11n40, 11ac40.

*1 The upper frequency of the frequency band was used in order to calculate standalone SAR test exclusion considerations.
*2 Based on KDB447498D01, min distance is 5mm. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.
*3 [(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] ·[√f(GHz)] ≤ 3.0
If it is Calculation of exclusion ≤ 3.0 standalone SAR test is excluded.
*4 Maximum tune-up tolerance limit is by the specification from a customer.
*5 Maximum tune-up tolerance limit(mW) is rounded to one decimal place.
*6 $[(3\cdot50)/(\sqrt{f_{(GHz)}}))$ + (test separation distance - 50 mm)·(f(MHz)/150)] mW at > 100 MHz and ≤ 1500 MHz
$[(3\cdot50)/(\sqrt{f_{(GHz)}}))$ + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz

SECTION 6 : SAR test opearting mode

6.1 Output Power and SAR test required

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 configurations in a frequency band have the same specified maximum output power, the initial test configuration is determined according to the following steps applied sequentially.

1) The largest channel bandwidth configuration is selected among the multiple configurations with the same specified maximum output power.
2) If multiple configurations have the same specified maximum output power and largest channel bandwidth, the lowest order modulation among the largest channel bandwidth configurations is selected.
3) If multiple configurations have the same specified maximum output power, largest channel bandwidth and lowest order modulation, the lowest data rate configuration among these configurations is selected.
4) When multiple transmission modes (802.11a/g/n/ac) 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; i.e., 802.11a is chosen over 802.11n then 802.11ac or 802.11g is chosen over 802.11n.

Wi-Fi 2.4GHz (DTS Band)
SISO

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Measured average Power (dBm)		Tune-up upper Power (dBm)		SAR Test (Yes/No)	Note(s)
					Main Ant Tx	Sub Ant Tx	Main Ant Tx	Sub Ant Tx		
2.4	802.11b	1 Mbps	1	2412	8.69	8.62	9.5	9.5	No	2
			6	2437	8.88	9.08				
			11	2462	9.10	9.10				
	802.11g	6 Mbps	1	2412	8.31	9.11	9.5	9.5	No	2
			6	2437	8.28	8.91				
			11	2462	8.05	8.26				
	802.11n (HT20)	6.5 Mbps	1	2412	8.09	8.90	9.5	9.5	No	2
			6	2437	8.15	8.54				
			11	2462	8.02	8.59				
	802.11n (HT40)	13.5 Mbps	3	2422	6.84	6.01	7.0	7.0	No	2
			6	2437	7.83	7.99	9.0	9.0		
			9	2452	5.68	5.17	6.0	6.0		

MIMO

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Measured average Power (dBm)			Tune-up upper Power (dBm)			SAR Test (Yes/No)	Note(s)
					Main Ant Tx	Sub Ant Tx	Main&Sub Ant Simultaneous Tx	Main Ant Tx	Sub Ant Tx	Main&Sub Ant Simultaneous Tx		
2.4	802.11b	1 Mbps	1	2412	8.69	8.62	11.67	9.5	9.5	12.5	Yes	
			6	2437	8.88	9.08	11.99					
			11	2462	9.10	9.10	12.11					
	802.11g	6 Mbps	1	2412	8.31	9.11	11.74	9.5	9.5	12.5	No	1
			6	2437	8.28	8.91	11.62					
			11	2462	8.05	8.26	11.17					
	802.11n (HT20)	6.5 Mbps	1	2412	8.09	8.90	11.52	9.5	9.5	12.5	No	1
			6	2437	8.15	8.54	11.36					
			11	2462	8.02	8.59	11.32					
	802.11n (HT40)	13.5 Mbps	1	2412	6.84	6.01	9.46	7.0	7.0	10.0	No	1
			6	2437	7.83	7.99	10.92	9.0	9.0	12.0		
			11	2462	5.68	5.17	8.44	6.0	6.0	9.0		

Note(s):

1. According to KDB248227D01, SAR is not required for 802.11g/n HT20 channels 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.
2. The distance between 2 antennas is close. The output power of each antenna is same at SISO mode and MIMO mode. When 2 antennas send at the same time in a MIMO mode, output power becomes higher than SISO mode. So SISO mode excluded the SAR test.

Software information

*The power value of the EUT was set for testing as follows (setting value might be different from product specification value);
- Power Setting: Refer to the following table.
- Software: LAB-tool
Ver : 15.2.4.92
*This setting of software is the worst case.
Any conditions under the normal use do not exceed the condition of setting.
In addition, end users cannot change the settings of the output power of the product.

[Power Settings]

Mode	ch1	ch2	ch3	ch4	ch5	ch6	ch7	ch8	ch9	ch10	ch11
11b	8 dBm	8 dBm	8 dBm	8 dBm	8 dBm	8 dBm	8 dBm	8 dBm	8 dBm	8 dBm	8 dBm
11g	8 dBm	8 dBm	8 dBm	8 dBm	8 dBm	8 dBm	8 dBm	8 dBm	8 dBm	8 dBm	8 dBm
11n-20	8 dBm	8 dBm	8 dBm	8 dBm	8 dBm	8 dBm	8 dBm	8 dBm	8 dBm	8 dBm	8 dBm
11n-40	-	-	6 dBm	8 dBm	8 dBm	8 dBm	8 dBm	8 dBm	5 dBm	-	-

Wi-Fi 5GHz (U-NII Bands)

SISO

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Measured average Power (dBm)		Tune-up upper Power (dBm)		SAR Test (Yes/No)	Note(s)
					Main Ant Tx	Sub Ant Tx	Main Ant Tx	Sub Ant Tx		
5.2 (U-NII 1)	802.11a	6 Mbps	36	5180	10.24	9.73	10.5	10.5	No	3,4
			40	5200	10.12	9.52				
			44	5220	10.18	9.75				
			48	5240	10.26	9.70				
	802.11n (HT20)	6.5 Mbps	36	5180	10.02	9.66	10.5	10.5	No	3,4
			40	5200	9.90	9.19				
			44	5220	9.86	9.41				
			48	5240	10.10	9.76				
	802.11n (HT40)	13.5 Mbps	38	5190	9.35	9.32	10.5	10.5	No	3,4
			46	5230	9.46	9.41				
	802.11ac (VHT20)	6.5 Mbps	36	5180	10.21	9.64	10.5	10.5	No	3,4
			40	5200	10.00	9.52				
			44	5220	10.13	9.72				
			48	5240	10.27	9.74				
	802.11ac (VHT40)	13.5 Mbps	38	5190	9.91	9.38	10.5	10.5	No	3,4
			46	5230	9.87	9.43				
	802.11ac (VHT80)	29.3 Mbps	42	5210	5.52	5.23	7.0	7.0	No	3,4
5.3 (U-NII 2A)	802.11a	6 Mbps	52	5260	10.15	9.90	10.5	10.5	No	4
			56	5280	10.04	9.59				
			60	5300	10.36	9.73				
			64	5320	10.17	9.94				
	802.11n (HT20)	6.5 Mbps	52	5260	10.29	9.61	10.5	10.5	No	4
			56	5280	10.07	9.24				
			60	5300	10.16	9.93				
			64	5320	10.28	9.89				
	802.11n (HT40)	13.5 Mbps	54	5270	9.86	9.38	10.5	10.5	No	4
			62	5310	9.95	9.54				
	802.11ac (VHT20)	6.5 Mbps	52	5260	10.03	9.46	10.5	10.5	No	4
			56	5280	10.06	9.44				
			60	5300	10.29	9.91				
			64	5320	10.16	9.78				
	802.11ac (VHT40)	13.5 Mbps	54	5270	9.97	9.58	10.5	10.5	No	4
			62	5310	9.69	9.54				
	802.11ac (VHT80)	29.3 Mbps	58	5290	7.12	6.48	8.0	8.0	No	4

SISO (continued)

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Measured average Power (dBm)		Tune-up upper Power (dBm)		SAR Test (Yes/No)	Note(s)
					Main Ant Tx	Sub Ant Tx	Main Ant Tx	Sub Ant Tx		
5.8 (UNII-3)	802.11a	6 Mbps	149	5745	7.52	7.31	8.0	8.0	No	4
			153	5765	9.65	9.60	10.5	10.5		
			157	5785	9.90	9.86	10.5	10.5		
			161	5805	9.67	9.59	10.5	10.5		
			165	5825	9.99	9.84	10.5	10.5		
	802.11n (HT20)	6.5 Mbps	149	5745	7.57	7.05	8.0	8.0	No	4
			153	5765	9.66	9.54	10.5	10.5		
			157	5785	9.78	9.97	10.5	10.5		
			161	5805	9.64	9.53	10.5	10.5		
			165	5825	9.87	9.94	10.5	10.5		
	802.11n (HT40)	13.5 Mbps	151	5755	6.92	6.30	8.0	8.0	No	4
			159	5795	9.58	9.50	10.5	10.5		
	802.11ac (VHT20)	6.5 Mbps	149	5745	7.21	7.05	8.0	8.0	No	4
			153	5765	9.71	9.60	10.5	10.5		
			157	5785	9.91	9.95	10.5	10.5		
			161	5805	9.69	9.53	10.5	10.5		
			165	5825	9.93	9.80	10.5	10.5		
	802.11ac (VHT40)	13.5 Mbps	151	5755	6.60	6.04	8.0	8.0	No	4
			159	5795	9.60	9.69	10.5	10.5		
	802.11ac (VHT80)	29.3 Mbps	155	5775	4.85	4.44	6.0	6.0	No	4

MIMO

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Measured average Power (dBm)			Tune-up upper Power (dBm)			SAR Test (Yes/No)	Note(s)
					Main Ant Tx	Sub Ant Tx	Main&Sub Ant Simultaneous Tx	Main Ant Tx	Sub Ant Tx	Main&Sub Ant Simultaneous Tx		
5.2 (U-NII 1)	802.11a	6 Mbps	36	5180	10.24	9.73	13.00	10.5	10.5	13.5	No	3
			40	5200	10.12	9.52	12.84					
			44	5220	10.18	9.75	12.98					
			48	5240	10.26	9.70	13.00					
	802.11n (HT20)	6.5 Mbps	36	5180	10.02	9.66	12.85	10.5	10.5	13.5	No	3
			40	5200	9.90	9.19	12.57					
			44	5220	9.86	9.41	12.65					
			48	5240	10.10	9.76	12.94					
	802.11n (HT40)	13.5 Mbps	38	5190	9.35	9.32	12.35	10.5	10.5	13.5	No	3
			46	5230	9.46	9.41	12.45					
	802.11ac (VHT20)	6.5 Mbps	36	5180	10.21	9.64	12.94	10.5	10.5	13.5	No	3
			40	5200	10.00	9.52	12.78					
			44	5220	10.13	9.72	12.94					
			48	5240	10.27	9.74	13.02					
	802.11ac (VHT40)	13.5 Mbps	38	5190	9.91	9.38	12.66	10.5	10.5	13.5	No	3
			46	5230	9.87	9.43	12.67					
	802.11ac (VHT80)	29.3 Mbps	42	5210	5.52	5.23	8.39	7.0	7.0	10.0	No	3
5.3 (U-NII 2A)	802.11a	6 Mbps	52	5260	10.15	9.90	13.04	10.5	10.5	13.5	No	1
			56	5280	10.04	9.59	12.83					
			60	5300	10.36	9.73	13.07					
			64	5320	10.17	9.94	13.07					
	802.11n (HT20)	6.5 Mbps	52	5260	10.29	9.61	12.97	10.5	10.5	13.5	No	1
			56	5280	10.07	9.24	12.69					
			60	5300	10.16	9.93	13.06					
			64	5320	10.28	9.89	13.10					
	802.11n (HT40)	13.5 Mbps	54	5270	9.86	9.38	12.64	10.5	10.5	13.5	No	1
			62	5310	9.95	9.54	12.76					
	802.11ac (VHT20)	6.5 Mbps	52	5260	10.03	9.46	12.76	10.5	10.5	13.5	No	1
			56	5280	10.06	9.44	12.77					
			60	5300	10.29	9.91	13.11					
			64	5320	10.16	9.78	12.98					
	802.11ac (VHT40)	13.5 Mbps	54	5270	9.97	9.58	12.79	10.5	10.5	13.5	Yes	
			62	5310	9.69	9.54	12.63					
	802.11ac (VHT80)	29.3 Mbps	58	5290	7.12	6.48	9.82	8.0	8.0	11.0	No	1

MIMO (continued)

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Measured average Power (dBm)			Tune-up upper Power (dBm)			SAR Test (Yes/No)	Note(s)
					Main Ant Tx	Sub Ant Tx	Main&Sub Ant Simultaneous Tx	Main Ant Tx	Sub Ant Tx	Main&Sub Ant Simultaneous Tx		
5.8 (UNII-3)	802.11a	6 Mbps	149	5745	7.52	7.31	10.43	8.0	8.0	11.0	No	1
			153	5765	9.65	9.60	12.64	10.5	10.5	13.5		
			157	5785	9.90	9.86	12.89	10.5	10.5	13.5		
			161	5805	9.67	9.59	12.64	10.5	10.5	13.5		
			165	5825	9.99	9.84	12.93	10.5	10.5	13.5		
	802.11n (HT20)	6.5 Mbps	149	5745	7.57	7.05	10.33	8.0	8.0	11.0	No	1
			153	5765	9.66	9.54	12.61	10.5	10.5	13.5		
			157	5785	9.78	9.97	12.89	10.5	10.5	13.5		
			161	5805	9.64	9.53	12.60	10.5	10.5	13.5		
			165	5825	9.87	9.94	12.92	10.5	10.5	13.5		
	802.11n (HT40)	13.5 Mbps	151	5755	6.92	6.30	9.63	8.0	8.0	11.0	No	1
			159	5795	9.58	9.50	12.55	10.5	10.5	13.5		
	802.11ac (VHT20)	6.5 Mbps	149	5745	7.21	7.05	10.14	8.0	8.0	11.0	No	1
			153	5765	9.71	9.60	12.67	10.5	10.5	13.5		
			157	5785	9.91	9.95	12.94	10.5	10.5	13.5		
			161	5805	9.69	9.53	12.62	10.5	10.5	13.5		
			165	5825	9.93	9.80	12.88	10.5	10.5	13.5		
	802.11ac (VHT40)	13.5 Mbps	151	5755	6.60	6.04	9.34	8.0	8.0	11.0	Yes	
			159	5795	9.60	9.69	12.66	10.5	10.5	13.5		
	802.11ac (VHT80)	29.3 Mbps	155	5775	4.85	4.44	7.66	6.0	6.0	9.0	No	1

Note(s):

1. According to KDB248227D01, SAR measurement is not required for 802.11a, 802.11n HT20, HT40 and 802.11ac VHT20, 802.11ac VHT80 channels because the specified tune-up tolerances for 802.11a, 802.11n HT20, HT40 and 802.11ac VHT20, 802. 11ac VHT80 are lower than 802.11ac VHT40 and the measured SAR is ≤ 1.2 W/Kg.
2. According to KDB248227D01, when the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 a/g/n/ac modes, the channel in the lower order/sequence 802.11 mode (i.e. a, g, n then ac) is selected.
3. According to KDB248227D01, when the specified maximum output power is the same for both UNII band I and UNII band 2A, begin SAR measurement in UNII band 2A; and if the highest reported SAR for UNII band 2A is
   - ≤ 1.2 W/kg, SAR is not required for UNII band I
   - > 1.2 W/kg, both bands should be tested independently for SAR.
4. The distance between 2 antennas is close. The output power of each antenna is same at SISO mode and MIMO mode. When 2 antennas send at the same time in a MIMO mode, output power becomes higher than SISO mode. So SISO mode excluded the SAR test.

Software information

*The power value of the EUT was set for testing as follows (setting value might be different from product specification value);
- Power Setting: Refer to the following table.
- Software: LAB-tool
  Ver：15.2.4.92

*This setting of software is the worst case.
Any conditions under the normal use do not exceed the condition of setting.
In addition, end users cannot change the settings of the output power of the product.

[Power Settings]

20MHz Band W52	ch36	ch40	ch44	ch48
11a	9 dBm	9 dBm	9 dBm	9 dBm
11n-20	9 dBm	9 dBm	9 dBm	9 dBm
11ac-20	9 dBm	9 dBm	9 dBm	9 dBm

20MHz Band W53	ch52	ch56	ch60	ch64
11a	9 dBm	9 dBm	9 dBm	9 dBm
11n-20	9 dBm	9 dBm	9 dBm	9 dBm
11ac-20	9 dBm	9 dBm	9 dBm	9 dBm

20MHz Band W58	ch149	ch153	ch157	ch161	ch165
11a	7 dBm	9 dBm	9 dBm	9 dBm	9 dBm
11n-20	7 dBm	9 dBm	9 dBm	9 dBm	9 dBm
11ac-20	7 dBm	9 dBm	9 dBm	9 dBm	9 dBm

40MHz Band W52	ch38	ch46
11n-40	9 dBm	9 dBm
11ac-40	9 dBm	9 dBm

40MHz Band W53	ch54	ch62
11n-40	9 dBm	9 dBm
11ac-40	9 dBm	9 dBm

40MHz Band W58	ch151	ch159
11n-40	7 dBm	9 dBm
11ac-40	7 dBm	9 dBm

80MHz Band W52	Ch42
11ac-80	6dBm

80MHz Band W53	ch58
11ac-80	7dBm

80MHz Band W58	ch155
11ac-80	5dBm

SECTION 7: Description of the Body setup

7.1 Test position for Body setup

i) Procedure for SAR testing

-The tested procedure was performed according to the KDB447498 D01 (Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies)

ii) Test mode

WLAN	**11b, 11ac40**

iii) Test position

No.	Position	Test distance	WLAN Tested
1	Front	0mm	☐
2	Rear	0mm	☐
3	Left	0mm	☑
4	Right	0mm	☐
5	Top	0mm	☐
6	Bottom	0mm	☐
7	Front tilt	0mm	☑
8	Rear tilt	0mm	☑
9	Top tilt	0mm	☑
10	Bottom tilt	0mm	☑

SECTION 8 : Test surrounding

8.1 Measurement uncertainty

This measurement uncertainty budget is suggested by IEEE Std 1528(2013) and IEC62209-2:2010, and determined by Schmid & Partner Engineering AG (DASY5 Uncertainty Budget). Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r01 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.

<0.3 – 3GHz range Body>

Error Description	Uncertai value ±	Probability distribution	divisor	(ci) 1g	Standard (1g)	vi or veff
Measurement System						
Probe calibration	± 6.00	Normal	1	1	± 6.00	∞
Axial isotropy of the probe	± 4.7	Rectangular	√3	0.7	± 1.9	∞
Spherical isotropy of the probe	± 9.6	Rectangular	√3	0.7	± 3.9	∞
Boundary effects	± 1.0	Rectangular	√3	1	± 0.6	∞
Probe linearity	± 4.7	Rectangular	√3	1	± 2.7	∞
Detection limit	± 1.0	Rectangular	√3	1	± 0.6	∞
Modulation response	± 2.4	Rectangular	√3	1	± 1.4	∞
Readout electronics	± 0.3	Normal	1	1	± 0.3	∞
Response time	± 0.8	Rectangular	√3	1	± 0.5	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.5	∞
RF ambient Noise	± 3.0	Rectangular	√3	1	± 1.7	∞
RF ambient Reflections	± 3.0	Rectangular	√3	1	± 1.7	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.2	∞
Probe positioning	± 2.9	Rectangular	√3	1	± 1.7	∞
Max.SAR Eval.	± 2.0	Rectangular	√3	1	± 1.2	∞
Test Sample Related						
Device positioning	± 2.9	Normal	1	1	± 2.9	4
Device holder uncertainty	± 3.6	Normal	1	1	± 3.6	6
Power drift	± 5.0	Rectangular	√3	1	± 2.9	∞
Power Scaling	+ 0.0	Rectangular	√3	1	± 0.0	∞
Phantom and Setup						
Phantom uncertainty	± 6.1	Rectangular	√3	1	± 3.5	∞
Algorithm for correcting SAR for deviations in permittivity and conductivity	± 1.9	Normal	1	1	± 1.9	∞
Liquid conductivity (meas.)	+ 2.3	Rectangular	1	0.78	+ 1.8	∞
Liquid permittivity (meas.)	- 4.1	Rectangular	1	0.23	- 0.9	∞
Liquid conductivity - temp.unc (below 2deg.C.)	± 5.2	Rectangular	√3	0.78	± 2.3	∞
Liquid permittivity - temp.unc (below 2deg.C.)	± 0.8	Rectangular	√3	0.23	± 0.1	∞
Combined Standard Uncertainty					± **11.442**	
Expanded Uncertainty (k=2)					± **22.9**	

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

<3 – 6GHz range Body>

Error Description	Uncertai value ±	Probability distribution	divisor	(ci) 1g	Standard (1g)	vi or veff
Measurement System						
Probe calibration	± 6.55	Normal	1	1	± 6.55	∞
Axial isotropy of the probe	± 4.7	Rectangular	√3	0.7	± 1.9	∞
Spherical isotropy of the probe	± 9.6	Rectangular	√3	0.7	± 3.9	∞
Boundary effects	± 2.0	Rectangular	√3	1	± 1.2	∞
Probe linearity	± 4.7	Rectangular	√3	1	± 2.7	∞
Detection limit	± 1.0	Rectangular	√3	1	± 0.6	∞
Modulation response	± 2.4	Rectangular	√3	1	± 1.4	∞
Readout electronics	± 0.3	Normal	1	1	± 0.3	∞
Response time	± 0.8	Rectangular	√3	1	± 0.5	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.5	∞
RF ambient Noise	± 3.0	Rectangular	√3	1	± 1.7	∞
RF ambient Reflections	± 3.0	Rectangular	√3	1	± 1.7	∞
Probe Positioner	± 0.8	Rectangular	√3	1	± 0.5	∞
Probe positioning	± 6.7	Rectangular	√3	1	± 3.9	∞
Max.SAR Eval.	± 4.0	Rectangular	√3	1	± 2.3	∞
Test Sample Related						
Device positioning	± 2.9	Normal	1	1	± 2.9	4
Device holder uncertainty	± 3.6	Normal	1	1	± 3.6	16
Power drift	± 5.0	Rectangular	√3	1	± 2.9	∞
Power Scaling	+ 0.0	Rectangular	√3	1	± 0.0	∞
Phantom and Setup						
Phantom uncertainty	± 6.6	Rectangular	√3	1	± 3.8	∞
Algorithm for correcting SAR for deviations in permittivity and conductivity	± 1.9	Normal	1	1	± 1.9	∞
Liquid conductivity (meas.)	+ 5.0	Rectangular	1	0.78	+ 3.9	∞
Liquid permittivity (meas.)	– 2.7	Rectangular	1	0.23	- 0.6	∞
Liquid conductivity - temp.unc (below 2deg.C.)	± 2.4	Rectangular	√3	0.78	± 1.1	∞
Liquid permittivity - temp.unc (below 2deg.C.)	± 0.8	Rectangular	√3	0.23	± 0.1	∞
Combined Standard Uncertainty					± **12.824**	
Expanded Uncertainty (k=2)					± **25.6**	

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

SECTION 9 : Measurement results

9.1 Body SAR of 2.4GHz

(1)Method of measurement

Step.1 The searching for the worst position
The test was performed at the highest power channel of DSSS. *1*2
Step.2 The changing of the channel *3
The test was performed at the worst position of Step.1.
Step.3 The repeated measurement *4
The test was performed at the worst condition of Step1 to Step2.

Note:
*1 Highest measured output power channel was tested initially according to KDB248227D01.

*2 SAR is not required for the following 2.4 GHz OFDM conditions according to KDB248227D01.
1) When KDB447498D01 SAR test exclusion applies to the OFDM configuration.
2) 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. Refer to (4) OFDM mode exclusion considerations.

*3 According to KDB248227D01
1) When the *reported* SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.
2) When the *reported* SAR is > 0.8 W/kg, 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.

*4 According to KDB865664 D1.
1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

(2)Simulated Tissue Liquid Parameter confirmation

The dielectric parameters were checked prior to assessment using the DAKS dielectric probe kit.
The dielectric parameters measurement is reported in each correspondent section.

DIELECTRIC PARAMETERS MEASUREMENT RESULTS											
Date	Ambient Temp. [deg.c]	Relative Humidity [%]	Liquid type	Liquid Temp. [deg.c]	Measured Frequency [MHz]	Parameters	Target Value	Measured	Deviation [%]	Limit [%]	Remark
-	-	-	-	-	2000	εr	53.3	-	-	-	*1
						σ [mho/m]	1.52	-	-	-	
22-Jun	24.0	48	MSL 2450	23.5	2437	εr	52.7	50.6	-4.0	+/-5	*2
						σ [mho/m]	1.94	1.97	1.8	+/-5	
-	-	-	-	-	2450	εr	52.7	-	-	-	*1
						σ [mho/m]	1.95	-	-	-	
22-Jun	24.0	48	MSL 2450	23.5	2462	εr	52.7	50.5	-4.1	+/-5	*2
						σ [mho/m]	1.97	2.02	2.3	+/-5	
-	-	-	-	-	3000	εr	52.0	-	-	-	*1
						σ [mho/m]	2.73	-	-	-	

εr: Relative Permittivity / σ : Coductivity
*1 The Target value is a parameter defined in KDB 865664D01.
*2 The dielectric parameters should be linearly interpolated between the closest pair of target frequencies to determine the applicable dielectric parameters corresponding to the device test frequency.

(3)Result of Body SAR

SAR MEASUREMENT RESULTS														
Frequency		Modulation	Measured power		Maximum tune-up tolerance limit		Phantom Section	EUT Set-up Conditions			Measured SAR(1g) [W/kg]	Scaled factor *1	Reported SAR(1g) [W/kg] *2	Remark
Channel	[MHz]		[dBm]	[mW]	[dBm]	[mW]		Antenna	Position	Separation [mm]				
Step.1 The searching for the worst position														
11	2462	11b 1Mbps 2Tx	12.11	16.26	12.50	17.78	Flat	Fixed	Top tilt	0	**0.037**	**1.094**	**0.040**	
11	2462	11b 1Mbps 2Tx	12.11	16.26	12.50	17.78	Flat	Fixed	Bottom tilt	0	**0.395**	**1.094**	**0.432**	
11	2462	11b 1Mbps 2Tx	12.11	16.26	12.50	17.78	Flat	Fixed	Front tilt	0	**0.277**	**1.094**	**0.303**	
11	2462	11b 1Mbps 2Tx	12.11	16.26	12.50	17.78	Flat	Fixed	Rear tilt	0	**0.288**	**1.094**	**0.315**	
11	2462	11b 1Mbps 2Tx	12.11	16.26	12.50	17.78	Flat	Fixed	Left	0	**0.826**	**1.094**	**0.904**	
Step.2 Channel change (SAR level in Step.1 > 0.8 W/kg)														
6	2437	11b 1Mbps 2Tx	11.99	15.81	12.50	17.78	Flat	Fixed	Left	0	**1.06**	**1.125**	**1.19**	***3**
Step.3 Repeat measurement of worst mode (Measured SAR value in Step.1 to Step.4 > 0.8 w/kg)														
6	2437	11b 1Mbps 2Tx	11.99	15.81	12.50	17.78	Flat	Fixed	Left	0	**0.967**	**1.125**	**1.09**	

*1 Scaled factor = Maximum tune-up tolerance limit [mW] / Measured power [mW]
*2 Reported SAR= Measured SAR [W/kg] · Scaled factor
*3 OFDM mode exclusion considerations
OFDM was excluded from the following table according to KDB248227D01.

Maximum tune-up tolerance limit		Maximum tune-up tolerance limit		OFDM scaled	Position	DSSS Reported SAR value [W/kg]	OFDM Estimated SAR value [W/kg] *5	Exclusion limit [W/kg]	**Standalone SAR tested**
DSSS		OFDM							
[dBm]	[mW]	[dBm]	[mW]						
12.50	17.78	12.50	17.78	1.000	**Left**	**1.19**	**1.19**	< 1.2	**No**

*4 OFDM scaled factor = Maximum tune-up tolerance limit of OFDM [mW] / Maximum tune-up tolerance limit of DSSS [mW]
*5 Estimated SAR of OFDM= Reported SAR of DSSS[W/kg] · OFDM scaled factor

9.2 Body SAR of 5.3GHz

(1)Method of measurement

Step.1 The searching for the worst position
The test was performed at the highest power channel of 5.3GHz band 11ac40 MCS0. *1 *2

Step.2 The changing of the channel *3
The test was performed at the worst position of Step.1.

Step.3 The repeated measurement *4
The test was performed at the worst condition of Step1 to Step2.

Note:
*1 According to KDB248227D01
1) The largest channel bandwidth configuration is selected among the multiple configurations in a frequency band with the same specified maximum output power.
2) If multiple configurations have the same specified maximum output power and largest channel bandwidth, the lowest order modulation among the largest channel bandwidth configurations is selected.
3) If multiple configurations have the same specified maximum output power, largest channel bandwidth and lowest order modulation, the lowest data rate configuration among these configurations is selected.
4) When multiple transmission modes (802.11a/g/n/ac) 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.

*2 SAR is not required for the following OFDM U-NII-1(5.2 GHz band) conditions according to KDB248227D01.
1) When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A(5.3GHz band) band by applying the OFDM SAR requirements. If the highest *reported* SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1(5.2GHz band) band for that configuration (802.11 mode and exposure condition); otherwise, each band is tested independently for SAR.
2) When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest *reported* SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, each band is tested independently for SAR.

*3 According to KDB248227D01
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.

*4 According to KDB865664 D1.
1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

(2)Simulated Tissue Liquid Parameter confirmation

The dielectric parameters were checked prior to assessment using the DAKS dielectric probe kit.
The dielectric parameters measurement is reported in each correspondent section.

DIELECTRIC PARAMETERS MEASUREMENT RESULTS											
Date	Ambient Temp. [deg.c]	Relative Humidity [%]	Liquid type	Liquid Temp. [deg.c]	Measured Frequency [MHz]	Parameters	Target Value	Measured	Deviation [%]	Limit [%]	Remark
-	-	-	-	-	3000	εr	52.0	-	-	-	*1
						σ [mho/m]	2.73	-	-	-	
26-Jun	24.0	50	MBBL 3.5-5.8	23.5	5270	εr	48.9	47.7	-2.5	+/-5	*2
						σ [mho/m]	5.38	5.65	4.9	+/-5	
26-Jun	24.0	50	MBBL 3.5-5.8	23.5	5310	εr	48.9	47.6	-2.7	+/-5	*2
						σ [mho/m]	5.43	5.69	4.8	+/-5	
-	-	-	MBBL 3.5-5.8	-	5800	εr	48.2	-	-	+/-5	*1
						σ [mho/m]	6.00	-	-	+/-5	

εr: Relative Permittivity / σ : Coductivity

*1 The Target value is a parameter defined in KDB 865664D01.

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

(3)Result of Body SAR

SAR MEASUREMENT RESULTS														
Frequency		Modulation	Measured power		Maximum tune-up tolerance limit		Phantom Section	EUT Set-up Conditions			Measured SAR(1g) [W/kg]	Scaled factor *1	Reported SAR(1g) [W/kg] *2	Remark
Channel	[MHz]		[dBm]	[mW]	[dBm]	[mW]		Antenna	Position	Separation [mm]				
Step.1 The searching for the worst position														
54	5270	11ac40 MCS0 2Tx	12.79	19.01	13.50	22.39	Flat	Fixed	Top tilt	0	**0.312**	**1.178**	**0.367**	
54	5270	11ac40 MCS0 2Tx	12.79	19.01	13.50	22.39	Flat	Fixed	Bottom tilt	0	**0.353**	**1.178**	**0.416**	
54	5270	11ac40 MCS0 2Tx	12.79	19.01	13.50	22.39	Flat	Fixed	Front tilt	0	**0.513**	**1.178**	**0.604**	
54	5270	11ac40 MCS0 2Tx	12.79	19.01	13.50	22.39	Flat	Fixed	Rear tilt	0	**0.423**	**1.178**	**0.498**	
54	5270	11ac40 MCS0 2Tx	12.79	19.01	13.50	22.39	Flat	Fixed	Left	0	**0.840**	**1.178**	**0.989**	
Step.2 Channel change (SAR level in Step.1 to 2 > 0.8 W/kg)														
62	5310	11ac40 MCS0 2Tx	12.63	18.32	13.50	22.39	Flat	Fixed	Left	0	**0.882**	**1.222**	**1.08**	***3**
Step.3 Repeat measurement of worst mode (Measured SAR level in Step.1 > 0.8 w/kg)														
62	5310	11ac40 MCS0 2Tx	12.63	18.32	13.50	22.39	Flat	Fixed	Left	0	**0.864**	**1.222**	**1.06**	

*1 Scaled factor = Maximum tune-up tolerance limit [mW] / Measured power [mW]
*2 Reported SAR= Measured SAR [W/kg] · Scaled factor
*3 OFDM 5.2GHz band mode exclusion considerations
OFDM 5.2GHz band was excluded from the following table according to KDB248227D01.

Maximum tune-up tolerance limit		Maximum tune-up tolerance limit		OFDM scaled	Position	OFDM 5.3GHz band Reported SAR value [W/kg]	OFDM 5.2GHz band Estimated SAR value [W/kg] *5	Exclusion limit [W/kg]	**Standalone SAR tested**
OFDM 5.3GHz band		OFDM 5.2GHz band							
[dBm]	[mW]	[dBm]	[mW]						
13.50	22.39	13.50	22.39	1.000	**Left**	**1.08**	**1.08**	< 1.2	**No**

*3 Scaled factor = Maximum tune-up tolerance limit of OFDM 5.2GHz band [mW] / Maximum tune-up tolerance limit of 5.3GHz band [mW]
*4 Estimated SAR of OFDM 5.2GHz band= Reported SAR of 5.3GHz band [W/kg] ·OFDM scaled factor

9.2 Body SAR of 5.8GHz

(1)Method of measurement

Step.1 The searching for the worst position
The test was performed at the highest power channel of 5.8GHz band 11ac40 MCS0. *1 *2
Step.2 The changing of the channel *3
The test was performed at the worst position of Step.1.
Step.3 The repeated measurement *4
The test was performed at the worst condition of Step1 to Step2.

Note:
*1 According to KDB248227D01
1) The largest channel bandwidth configuration is selected among the multiple configurations in a frequency band with the same specified maximum output power.
2) If multiple configurations have the same specified maximum output power and largest channel bandwidth, the lowest order modulation among the largest channel bandwidth configurations is selected.
3) If multiple configurations have the same specified maximum output power, largest channel bandwidth and lowest order modulation, the lowest data rate configuration among these configurations is selected.
4) When multiple transmission modes (802.11a/g/n/ac) 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.

*2 SAR is not required for the following OFDM U-NII-1(5.2 GHz band) conditions according to KDB248227D01.
1) When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A(5.3GHz band) band by applying the OFDM SAR requirements. If the highest *reported* SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1(5.2GHz band) band for that configuration (802.11 mode and exposure condition); otherwise, each band is tested independently for SAR.
2) When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest *reported* SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, each band is tested independently for SAR.

*3 According to KDB248227D01
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.

*4 According to KDB865664 D1.
1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

(2)Simulated Tissue Liquid Parameter confirmation

The dielectric parameters were checked prior to assessment using the DAKS dielectric probe kit.
The dielectric parameters measurement is reported in each correspondent section.

DIELECTRIC PARAMETERS MEASUREMENT RESULTS											
Date	Ambient Temp. [deg.c]	Relative Humidity [%]	Liquid type	Liquid Temp. [deg.c]	Measured Frequency [MHz]	Parameters	Target Value	Measured	Deviation [%]	Limit [%]	Remark
-	-	-	-	-	3000	εr	52.0	-	-	-	*1
						σ [mho/m]	2.73	-	-	-	
26-Jun	24.0	50	MBBL 3.5-5.8	23.5	5755	εr	48.3	47.2	-2.2	+/-5	*2
						σ [mho/m]	5.95	6.25	5.0	+/-5	
26-Jun	24.0	50	MBBL 3.5-5.8	23.5	5795	εr	48.2	47.4	-1.7	+/-5	*2
						σ [mho/m]	5.99	6.15	2.7	+/-5	
-	-	-	MBBL 3.5-5.8	-	5800	εr	48.2	-	-	+/-5	*1
						σ [mho/m]	6.00	-	-	+/-5	

εr: Relative Permittivity / σ : Coductivity
*1 The Target value is a parameter defined in KDB 865664D01.
*2 The dielectric parameters should be linearly interpolated between the closest pair of target frequencies to determine the applicable dielectric parameters corresponding to the device test frequency.

(3)Result of Body SAR

SAR MEASUREMENT RESULTS														
Frequency		Modulation	Measured power		Maximum tune-up tolerance limit		Phantom Section	EUT Set-up Conditions			Measured SAR(1g) [W/kg]	Scaled factor *1	Reported SAR(1g) [W/kg] *2	Remark
Channel	[MHz]		[dBm]	[mW]	[dBm]	[mW]		Antenna	Position	Separation [mm]				
Step.1 The searching for the worst position														
159	5795	11ac40 MCS0 2Tx	12.66	18.45	13.50	22.39	Flat	Fixed	Top tilt	0	**0.435**	**1.213**	**0.528**	
159	5795	11ac40 MCS0 2Tx	12.66	18.45	13.50	22.39	Flat	Fixed	Bottom tilt	0	**0.772**	**1.213**	**0.937**	
159	5795	11ac40 MCS0 2Tx	12.66	18.45	13.50	22.39	Flat	Fixed	Front tilt	0	**0.865**	**1.213**	**1.05**	
159	5795	11ac40 MCS0 2Tx	12.66	18.45	13.50	22.39	Flat	Fixed	Rear tilt	0	**0.741**	**1.213**	**0.899**	
159	5795	11ac40 MCS0 2Tx	12.66	18.45	13.50	22.39	Flat	Fixed	Left	0	**0.887**	**1.213**	**1.08**	
Step.2 Channel change (SAR level in Step.1 to 2 > 0.8 W/kg)														
151	5755	11ac40 MCS0 2Tx	9.34	8.59	11.00	12.59	Flat	Fixed	Bottom tilt	0	**0.620**	**1.466**	**0.909**	
151	5755	11ac40 MCS0 2Tx	9.34	8.59	11.00	12.59	Flat	Fixed	Front tilt	0	**0.676**	**1.466**	**0.991**	
151	5755	11ac40 MCS0 2Tx	9.34	8.59	11.00	12.59	Flat	Fixed	Rear tilt	0	**0.586**	**1.466**	**0.859**	
151	5755	11ac40 MCS0 2Tx	9.34	8.59	11.00	12.59	Flat	Fixed	Left	0	**0.675**	**1.466**	**0.989**	
Step.3 Repeat measurement of worst mode (Measured SAR level in Step.1 > 0.8 w/kg)														
159	5795	11ac40 MCS0 2Tx	12.66	18.45	13.50	22.39	Flat	Fixed	Left	0	**0.873**	**1.213**	**1.06**	

*1 Scaled factor = Maximum tune-up tolerance limit [mW] / Measured power [mW]
*2 Reported SAR= Measured SAR [W/kg] · Scaled factor

SECTION 10 Test instruments

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MOS-37	Digital thermometer	LKM electronic	DTM3000	-	SAR	2014/07/06 * 12
MOS-37	Digital thermometer	LKM electronic	DTM3000	-	SAR	2015/07/07 * 12
MDPK-03	Dielectric assessment kit	Schmid&Partner Engineering AG	DAK-3.5	0008	SAR	2015/03/10 * 12
COTS-MSAR-04	Dielectric assessment kit	Schmid&Partner Engineering AG	DAK		SAR	-
MDAE-01	Data Acquisition Electronics	Schmid&Partner Engineering AG	DAE4	509	SAR	2014/07/28 * 12
MPB-07	Dosimetric E-Field Probe	Schmid&Partner Engineering AG	EX3DV4	3825	SAR	2014/12/16 * 12
MPF-02	2mm Oval Flat Phantom	Schmid&Partner Engineering AG	QDOVA001BB	1045	SAR	2015/05/11 * 12
MOS-26	Thermo-Hygrometer	CUSTOM	CTH-201	A08Q29	SAR	2015/04/28 * 12
COTS-MSAR-03	Dasy5	Schmid&Partner Engineering AG	DASY5	-	SAR	-
MRBT-02	SAR robot	Schmid&Partner Engineering AG	TX60 Lspeag	F10/5E3LA1/A/01	SAR	2015/05/29 * 12
MRENT-119	Dosimetric E-Field Probe	Schmid&Partner Engineering AG	EX3DV4	SN3745	SAR	2015/04/24 * 12
MPF-03	2mm Oval Flat Phantom	Schmid&Partner Engineering AG	QDOVA001BB	1203	SAR	2015/05/11 * 12
MRBT-03	SAR robot	Schmid&Partner Engineering AG	TX60 Lspeag	F13/5PP1D1/A/01	SAR	2015/06/23 * 12
MPM-15	Power Meter	Agilent	N1914A	MY53060017	SAR	2015/06/15 * 12
MPSE-20	Power sensor	Agilent	N8482H	MY53050001	SAR	2015/06/15 * 12
MPSE-21	Power sensor	Agilent	N8482H	MY52460010	SAR	2015/06/15 * 12
MHDC-12	Dual Directional Coupler	Hewlett Packard	772D	2839A0016	SAR(2-18GHz)	Pre Check
MRFA-24	Pre Amplifier	R&K	R&K CGA020M602-2633R	B30550	SAR	2015/06/15 * 12
MSG-13	Signal Generator	Rohde & Schwarz	SMA 100A	103764	SAR	2015/06/15 * 12
MDA-07	Dipole Antenna	Schmid&Partner Engineering AG	D2450V2	713	SAR(D2450)	2013/09/10 * 24
MDA-08	Dipole Antenna	Schmid&Partner Engineering AG	D5GHzV2	1020	SAR(D5G)	2015/01/13 * 12
MAT-78	Attenuator	Telegrartner	J01156A0011	0042294119	SAR	Pre Check
MPM-01	Power Meter	Agilent	E4417A	GB41290639	SAR	2015/04/22 * 12
MPSE-01	Power Sensor	Agilent	E9300B	US40010300	SAR	2015/04/16 * 12
MAT-15	Attenuator	Agilent	8498A	US40010300	SAR	2015/04/09 * 12
CUST-MPMR	Power Read out form E4417A	UL Japan Inc.	-	-	SAR	-
MRENT-17	Data Acquisition Electronics	Schmid&Partner Engineering AG	DAE3	516	SAR	2015/04/24 * 12
MSL2450					Daily check	Target value ± 5%
MBBL3.5-5.8					Daily check	Target value ± 5%
SAR Room					Daily check	Ambient Noise<0.012W/kg

The expiration date of the calibration is the end of the expired month.
All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.
As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

APPENDIX 1 : SAR Measurement data

1. Evaluation procedure

The evaluation was performed with the following procedure:

Step 1: Measurement of the E-field at a fixed location above the ear point or central position of flat phantom was used as a reference value for assessing the power drop.

Step 2: The SAR distribution at the exposed side of head or body position was measured at a distance of each device from the inner surface of the shell. The area covered the entire dimension of the antenna of EUT and the horizontal grid spacing was 15 mm x 15 mm, 12 mm x 12 mm or 10mm x 10mm. Based on these data, the area of the maximum absorption was determined by spline interpolation.

Step 3: Around this point found in the Step 2 (area scan), a volume of 30mm x 30mm x 30mm or more was assessed by measuring 7 x 7 x 7 points at least for below 3GHz and a volume of 28 mm x 28mm x 22.5mm or more was assessed by measuring 8 x 8 x 6(ratio step method (*1)) points at least for 5GHz band.

And for any secondary peaks found in the Step2 which are within 2dB of maximum peak and not with this Step3 (Zoom scan) is repeated. On the basis of this data set, the spatial peak SAR value was evaluated under the following procedure:

(1). The data at the surface were extrapolated, since the center of the dipoles is 1mm(EX3DV4) away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.3 mm. The extrapolation was based on a least square algorithm [4]. A polynomial of the fourth order was calculated through the points in z-axes.
This polynomial was then used to evaluate the points between the surface and the probe tip.

(2). The maximum interpolated value was searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g or 10 g) were computed by the 3D-Spline interpolation algorithm. The 3D-Spline is composed of three one-dimensional splines with the “Not a knot"-condition (in x, y and z-directions) [4], [5]. The volume was integrated with the trapezoidal-algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the average.

(3). All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

Step 4: Re-measurement of the E-field at the same location as in Step 1.
It was checked that the power drift [W] is within +/-5%.The verification of power drift during the SAR test is that DASY5 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.
DASY5 system calculation Power drift value[dB] =20log(Ea)/(Eb)
Before SAR testing : Eb[V/m]
After SAR testing : Ea[V/m]
Limit of power drift[W] =+/-5%
X[dB]=10log[P]=10log(1.05/1)=10log(1.05)-10log(1)=0.212dB
from E-filed relations with power.
p=E^2/η=E^2/
Therefore, The correlation of power and the E-filed
XdB=10log(P)=10log(E)^2=20log(E)
Therefore,
The calculated power drift of DASY5 System must be the less than +/-0.212dB.

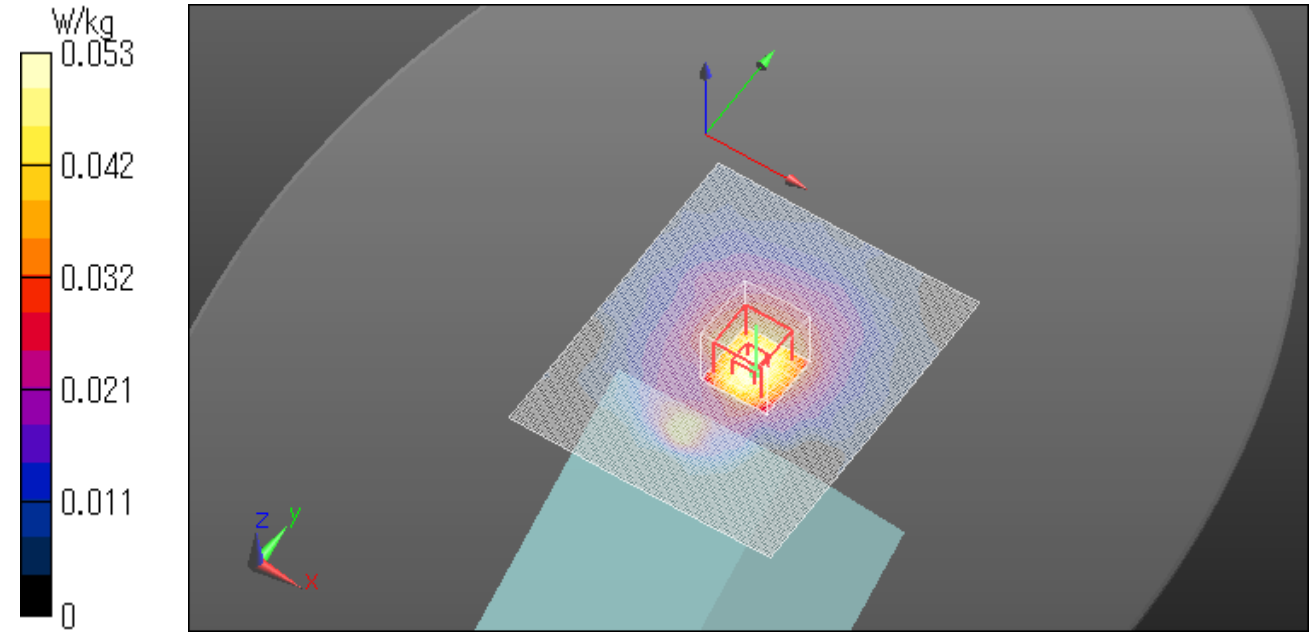
***1. Ratio step method parameters used;**
The first measurement point: 2mm from the phantom surface, the initial grid separation: 2mm, subsequent graded grid ratio: 1.5
These parameters comply with the requirement of the KDB 865664D01.

2. Measurement data(2.4GHz)

WLAN 2.4G 11b 1Mpbs 2462MHz Top tilt 0mm
Communication System: UID 0, WLAN 11a/b/g/n (0); Communication System Band: 11b/g/n (2.4G); Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 2.016 S/m; ε_r = 50.532; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY Configuration:
Probe: EX3DV4 - SN3825; ConvF(7.21, 7.21, 7.21); Calibrated: 2014/12/16;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn509; Calibrated: 2014/07/28
Phantom: ELI v4.0 (20deg probe tilt); Type: QDOVA001BB; Serial: TP:1045
DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

above 1 GHz/2462MHz 8dBm Top/Area Scan 2 2 (101x121x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.0543 W/kg

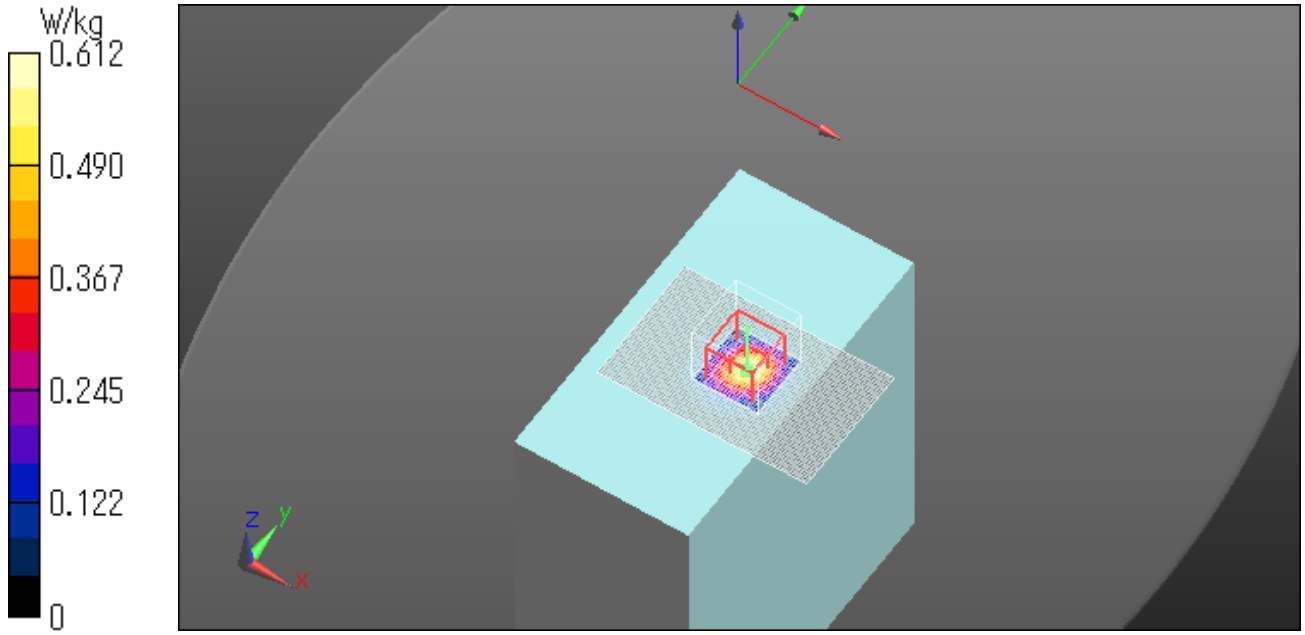
above 1 GHz/2462MHz 8dBm Top/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.066 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.0720 W/kg
SAR(1 g) = 0.037 W/kg; SAR(10 g) = 0.019 W/kg
Maximum value of SAR (measured) = 0.0527 W/kg
Date: 2015/06/22
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



WLAN 2.4G 11b 1Mpbs 2462MHz Bottom tilt 0mm
Communication System: UID 0, WLAN 11a/b/g/n (0); Communication System Band: 11b/g/n (2.4G); Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 2.016 S/m; ε_r = 50.532; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY Configuration:
Probe: EX3DV4 - SN3825; ConvF(7.21, 7.21, 7.21); Calibrated: 2014/12/16;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn509; Calibrated: 2014/07/28
Phantom: ELI v4.0 (20deg probe tilt); Type: QDOVA001BB; Serial: TP:1045
DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

above 1 GHz/2462MHz 8dBm bottom/Area Scan 2 2 (81x51x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.648 W/kg

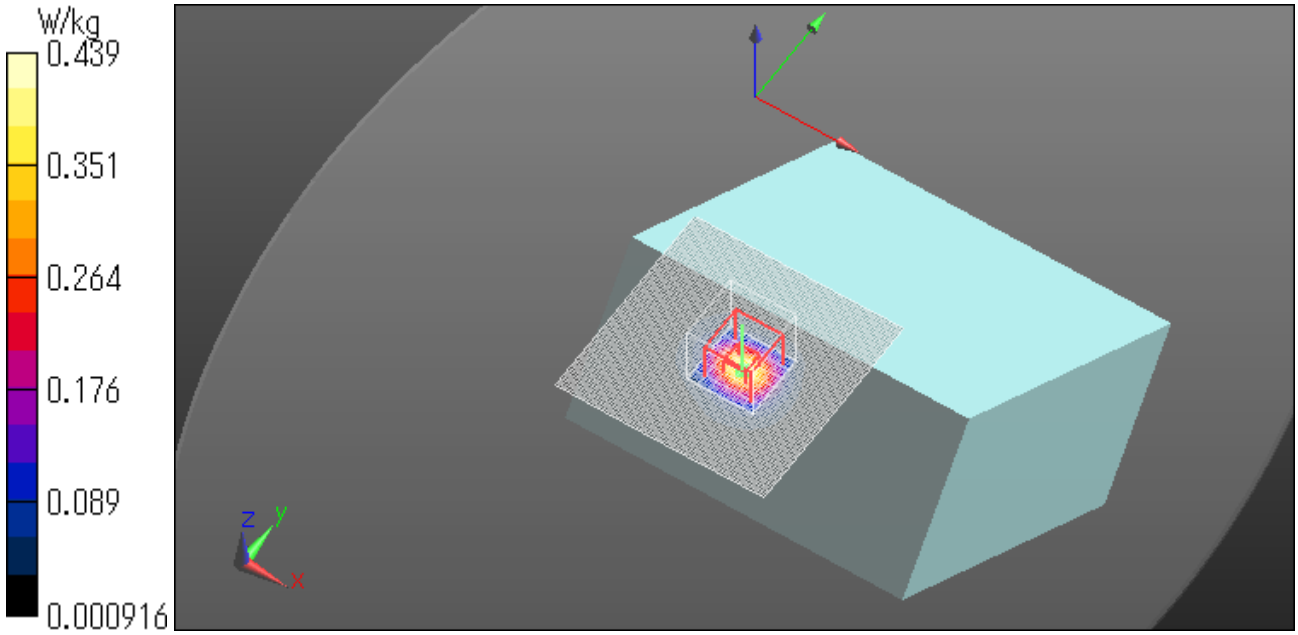
above 1 GHz/2462MHz 8dBm bottom/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.43 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.867 W/kg
SAR(1 g) = 0.395 W/kg; SAR(10 g) = 0.169 W/kg
Maximum value of SAR (measured) = 0.612 W/kg
Date: 2015/06/22
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



WLAN 2.4G 11b 1Mpbs 2462MHz Front tilt 0mm
Communication System: UID 0, WLAN 11a/b/g/n (0); Communication System Band: 11b/g/n (2.4G); Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 2.016 S/m; ε_r = 50.532; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY Configuration:
Probe: EX3DV4 - SN3825; ConvF(7.21, 7.21, 7.21); Calibrated: 2014/12/16;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn509; Calibrated: 2014/07/28
Phantom: ELI v4.0 (20deg probe tilt); Type: QDOVA001BB; Serial: TP:1045
DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

above 1 GHz/2462MHz 8dBm Front/Area Scan 2 2 (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.441 W/kg

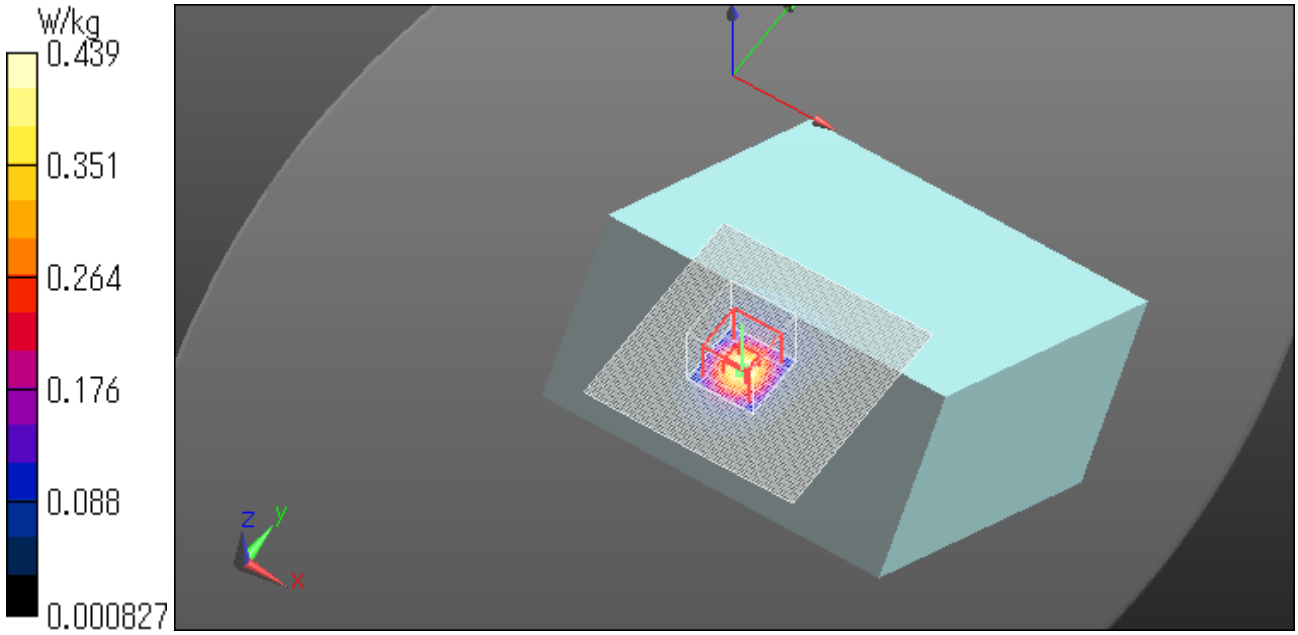
above 1 GHz/2462MHz 8dBm Front/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.81 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.604 W/kg
SAR(1 g) = 0.277 W/kg; SAR(10 g) = 0.119 W/kg
Maximum value of SAR (measured) = 0.439 W/kg
Date: 2015/06/22
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



WLAN 2.4G 11b 1Mpbs 2462MHz Rear tilt 0mm
Communication System: UID 0, WLAN 11a/b/g/n (0); Communication System Band: 11b/g/n (2.4G); Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 2.016 S/m; ε_r = 50.532; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY Configuration:
Probe: EX3DV4 - SN3825; ConvF(7.21, 7.21, 7.21); Calibrated: 2014/12/16;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn509; Calibrated: 2014/07/28
Phantom: ELI v4.0 (20deg probe tilt); Type: QDOVA001BB; Serial: TP:1045
DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

above 1 GHz/2462MHz 8dBm Rear/Area Scan 2 2 (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.418 W/kg

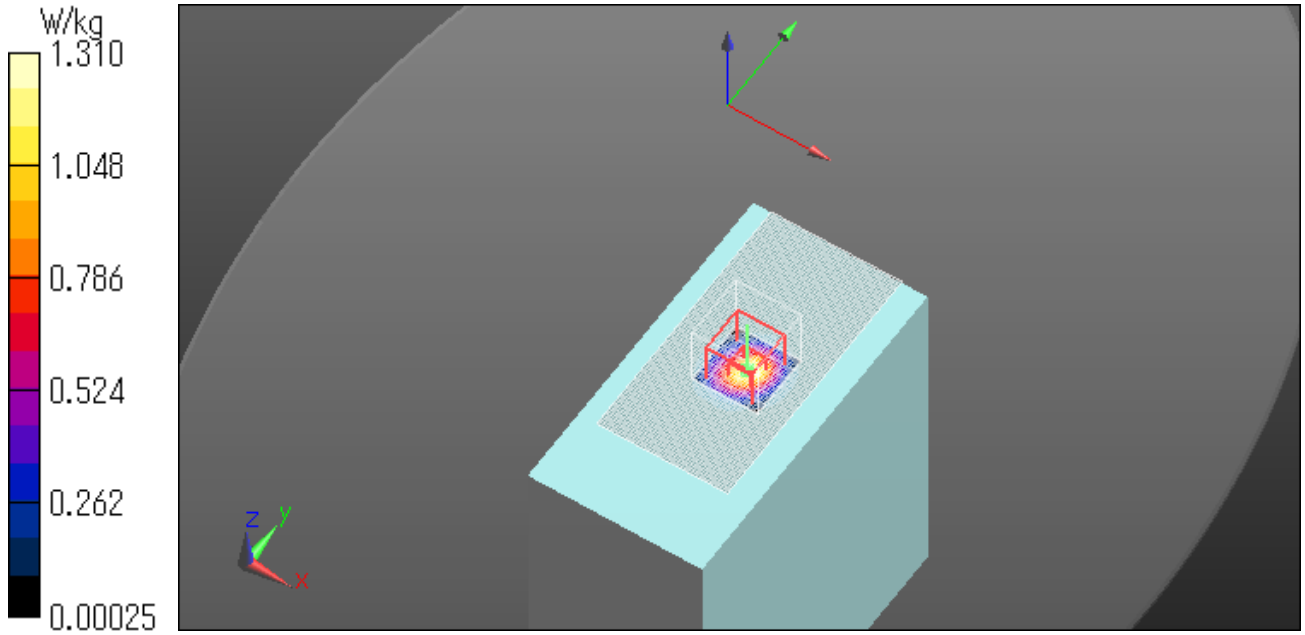
above 1 GHz/2462MHz 8dBm Rear/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.90 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 0.595 W/kg
SAR(1 g) = 0.288 W/kg; SAR(10 g) = 0.129 W/kg
Maximum value of SAR (measured) = 0.439 W/kg
Date: 2015/06/22
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



WLAN 2.4G 11b 1Mpbs 2462MHz Left 0mm
Communication System: UID 0, WLAN 11a/b/g/n (0); Communication System Band: 11b/g/n (2.4G); Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 2.016 S/m; ε_r = 50.532; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY Configuration:
Probe: EX3DV4 - SN3825; ConvF(7.21, 7.21, 7.21); Calibrated: 2014/12/16;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn509; Calibrated: 2014/07/28
Phantom: ELI v4.0 (20deg probe tilt); Type: QDOVA001BB; Serial: TP:1045
DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

above 1 GHz/2462MHz 8dBm Left/Area Scan 2 2 (51x101x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.53 W/kg

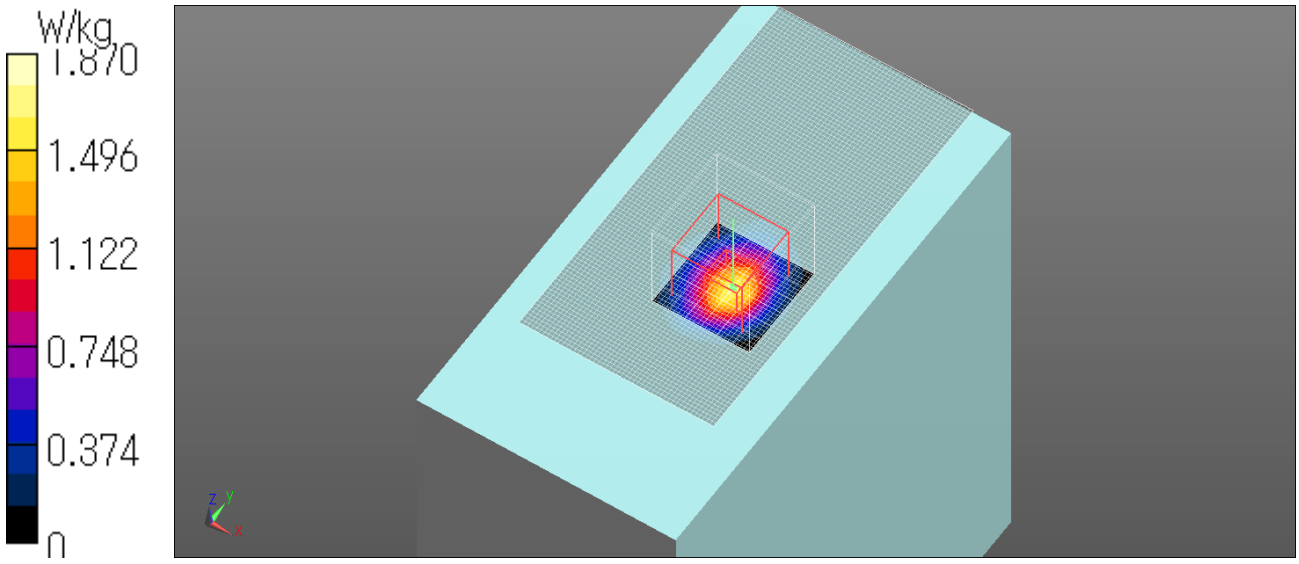
above 1 GHz/2462MHz 8dBm Left/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 25.35 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.95 W/kg
SAR(1 g) = 0.826 W/kg; SAR(10 g) = 0.332 W/kg
Maximum value of SAR (measured) = 1.31 W/kg
Date: 2015/06/22
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



WLAN 2.4G 11b 1Mpbs 2437MHz Left 0mm
Communication System: UID 0, WLAN 11a/b/g/n (0); Communication System Band: 11b/g/n (2.4G); Frequency: 2437 MHz; Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.974 S/m; ε_r = 50.62; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration
Probe: EX3DV4 - SN3825; ConvF(7.21, 7.21, 7.21); Calibrated: 2014/12/16;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn509; Calibrated: 2014/07/28
Phantom: ELI v4.0 (20deg probe tilt); Type: QDOVA001BB; Serial: TP:1045
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

above 1 GHz/2437MHz 8dBm Left /Area Scan 2 2 (51x101x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.87 W/kg

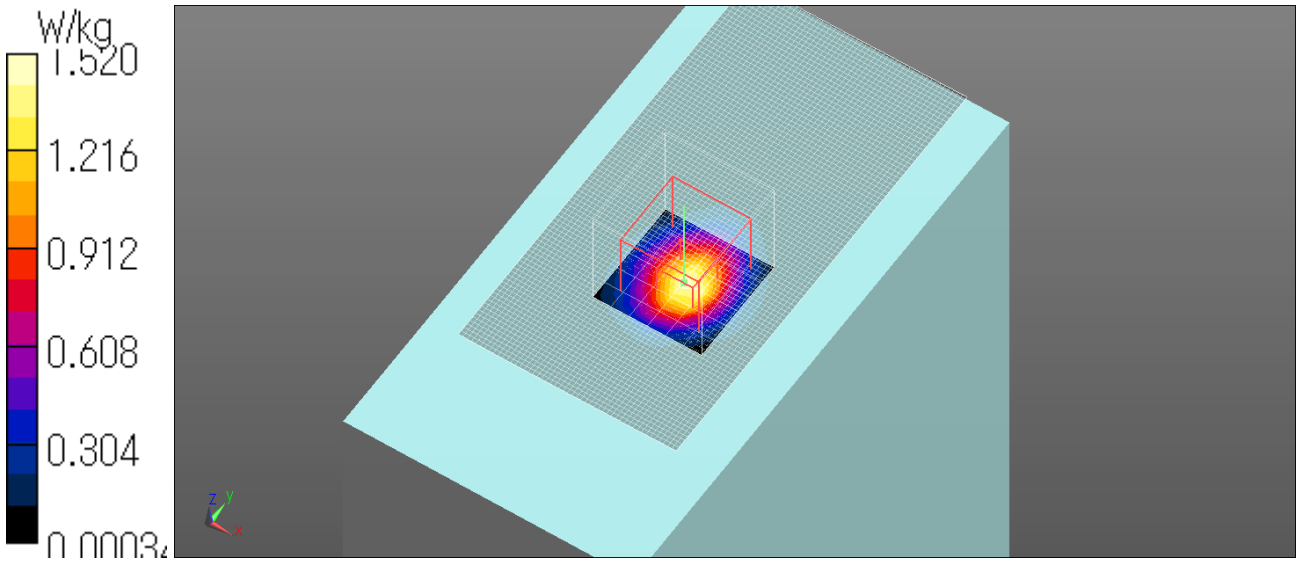
above 1 GHz/2437MHz 8dBm Left /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 28.97 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 2.50 W/kg
SAR(1 g) = 1.06 W/kg; SAR(10 g) = 0.427 W/kg
Maximum value of SAR (measured) = 1.72 W/kg
Date: 2015/06/22
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



WLAN 2.4G 11b 1Mpbs 2437MHz Left 0mm Repeat
Communication System: UID 0, WLAN 11a/b/g/n (0); Communication System Band: 11b/g/n (2.4G); Frequency: 2437 MHz; Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.974 S/m; ε_r = 50.62; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration
Probe: EX3DV4 - SN3825; ConvF(7.21, 7.21, 7.21); Calibrated: 2014/12/16;
Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn509; Calibrated: 2014/07/28
Phantom: ELI v4.0 (20deg probe tilt); Type: QDOVA001BB; Serial: TP:1045
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

above 1 GHz/2437MHz 8dBm Left/Area Scan 2 2 (51x101x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.86 W/kg

above 1 GHz/2437MHz 8dBm Left/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 28.01 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 2.20 W/kg
SAR(1 g) = 0.967 W/kg; SAR(10 g) = 0.398 W/kg
Maximum value of SAR (measured) = 1.52 W/kg
Date: 2015/06/22
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.

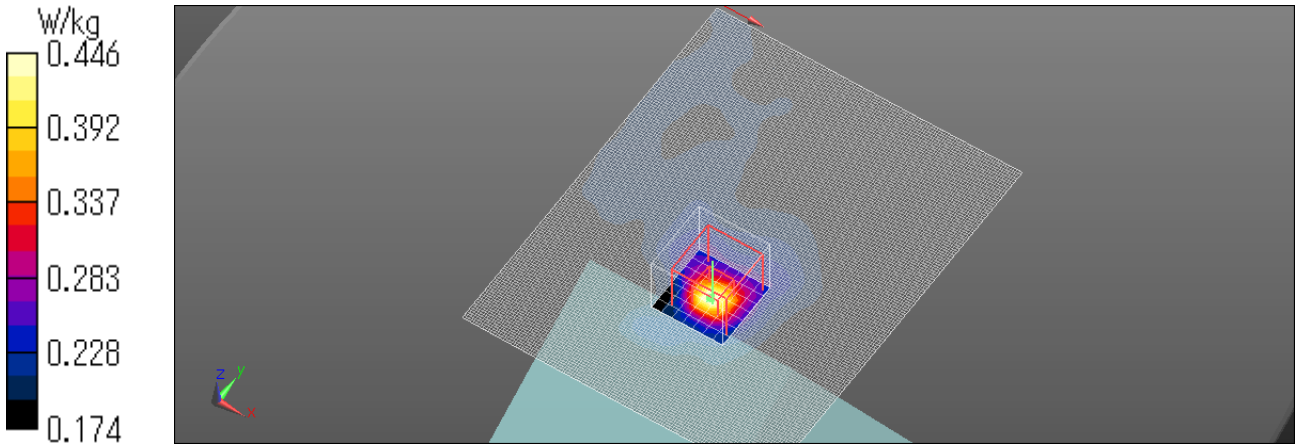


3. Measurement data(5.3GHz)

WLAN 5.3G 11ac40 MCS0 5270MHz Top tilt 0mm
Communication System: UID 0, WLAN 11a/b/g/n (0); Communication System Band: 11a/n (W52 53); Frequency: 5270 MHz; Duty Cycle: 1:1
Medium parameters used: f = 5270 MHz; σ = 5.645 S/m; ε_r = 47.702; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration
Probe: EX3DV4 - SN3745; ConvF(4.29, 4.29, 4.29); Calibrated: 2015/04/24;
Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn516; Calibrated: 2015/04/24
Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA; Serial: TP:1203
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Top tilt/11ac40 5270MHz 9dBm Top tilt/Area Scan 2 2 (121x151x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.483 W/kg

Top tilt/11ac40 5270MHz 9dBm Top tilt/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 9.459 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.756 W/kg
SAR(1 g) = 0.312 W/kg; SAR(10 g) = 0.243 W/kg
Maximum value of SAR (measured) = 0.446 W/kg
Date: 2015/06/26
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.

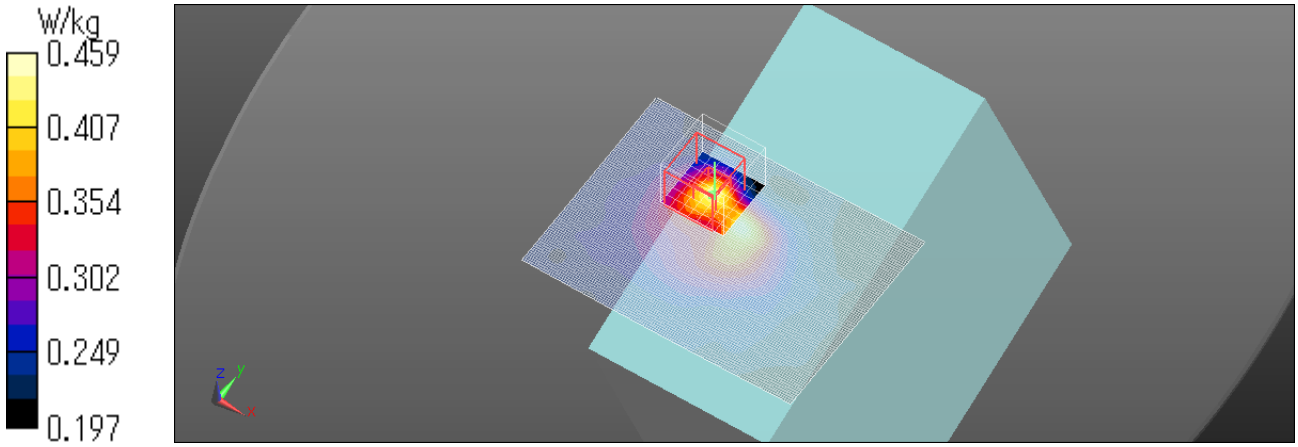


WLAN 5.3G 11ac40 MCS0 5270MHz Bottom tilt 0mm
Communication System: UID 0, WLAN 11a/b/g/n (0); Communication System Band: 11a/n (W52 53); Frequency: 5270 MHz; Duty Cycle: 1:1
Medium parameters used: f = 5270 MHz; σ = 5.645 S/m; ε_r = 47.702; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration
Probe: EX3DV4 - SN3745; ConvF(4.29, 4.29, 4.29); Calibrated: 2015/04/24;
Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn516; Calibrated: 2015/04/24
Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA; Serial: TP:1203
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Bottom tilt/11n40 5270MHz 9dBm Bottom tilt/Area Scan 2 3 2 2 2 (121x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.459 W/kg

Bottom tilt/11n40 5270MHz 9dBm Bottom tilt/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 9.331 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 0.576 W/kg
SAR(1 g) = 0.353 W/kg; SAR(10 g) = 0.308 W/kg

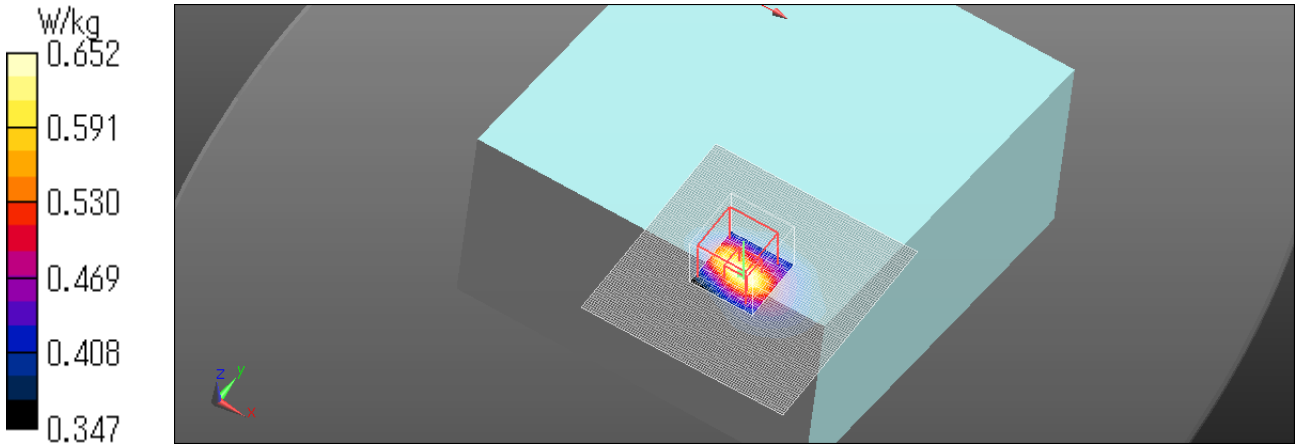
Maximum value of SAR (measured) = 0.442 W/kg
Date: 2015/06/26
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



WLAN 5.3G 11ac40 MCS0 5270MHz Front tilt 0mm
Communication System: UID 0, WLAN 11a/b/g/n (0); Communication System Band: 11a/n (W52 53); Frequency: 5270 MHz; Duty Cycle: 1:1
Medium parameters used: f = 5270 MHz; σ = 5.645 S/m; ε_r = 47.702; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration
Probe: EX3DV4 - SN3745; ConvF(4.29, 4.29, 4.29); Calibrated: 2015/04/24;
Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn516; Calibrated: 2015/04/24
Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA; Serial: TP:1203
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Front tilt Rear tilt/11ac40 5270MHz 9dBm Front tilt/Area Scan 2 3 2 2 2 (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.645 W/kg

Front tilt Rear tilt/11ac40 5270MHz 9dBm Front tilt/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 11.10 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.934 W/kg
SAR(1 g) = 0.513 W/kg; SAR(10 g) = 0.439 W/kg
Maximum value of SAR (measured) = 0.652 W/kg
Date: 2015/06/26
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.

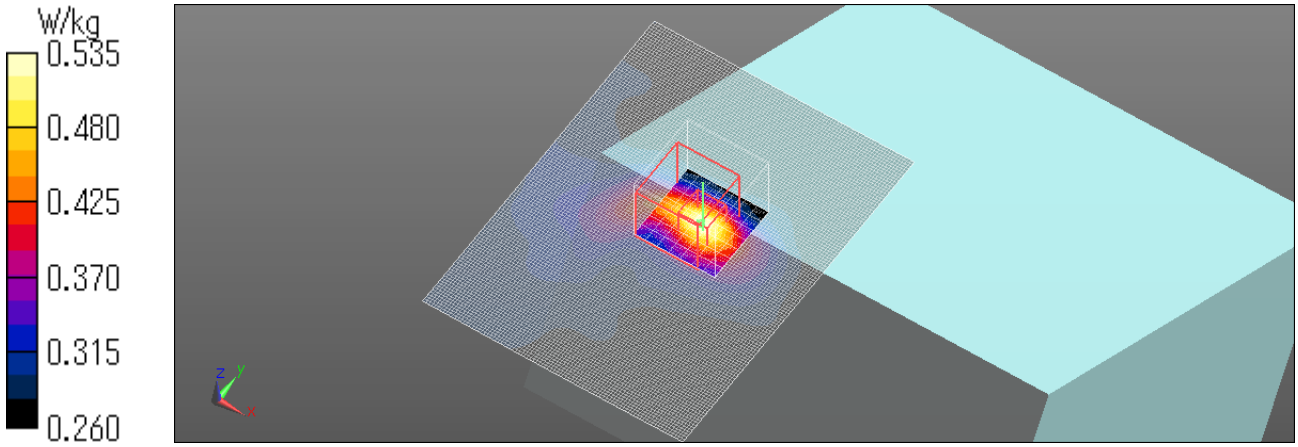


WLAN 5.3G 11ac40 MCS0 5270MHz Rear tilt 0mm
Communication System: UID 0, WLAN 11a/b/g/n (0); Communication System Band: 11a/n (W52 53); Frequency: 5270 MHz; Duty Cycle: 1:1
Medium parameters used: f = 5270 MHz; σ = 5.645 S/m; ε_r = 47.702; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration
Probe: EX3DV4 - SN3745; ConvF(4.29, 4.29, 4.29); Calibrated: 2015/04/24;
Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn516; Calibrated: 2015/04/24
Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA; Serial: TP:1203
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Front tilt Rear tilt/11ac40 5270MHz 9dBm Rear tilt/Area Scan 2 3 2 2 3 (91x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.579 W/kg

Front tilt Rear tilt/11ac40 5270MHz 9dBm Rear tilt/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 10.26 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.715 W/kg
SAR(1 g) = 0.423 W/kg; SAR(10 g) = 0.365 W/kg

Maximum value of SAR (measured) = 0.535 W/kg
Date: 2015/06/26
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.

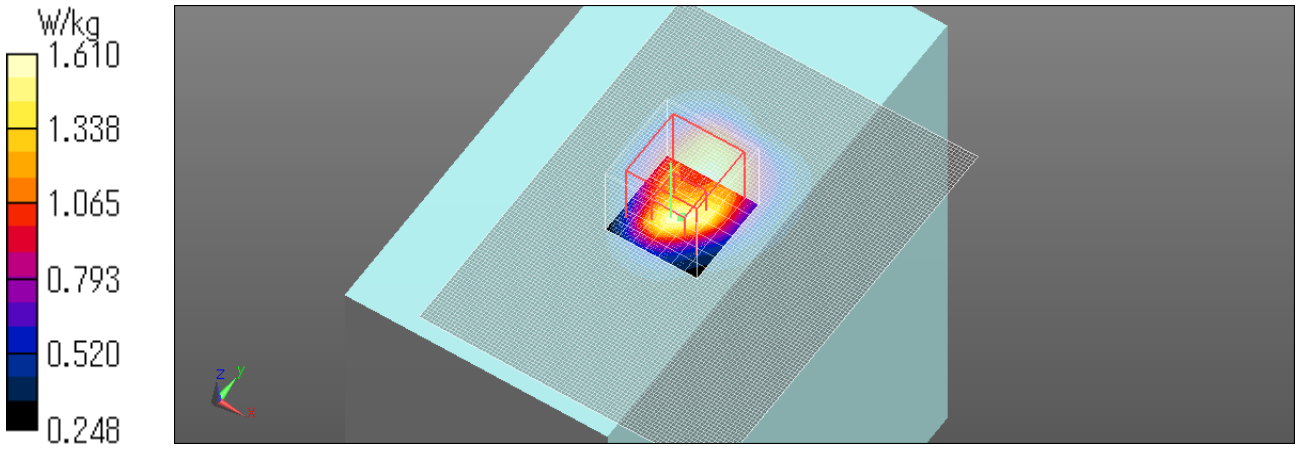


WLAN 5.3G 11ac40 MCS0 5270MHz Left 0mm
Communication System: UID 0, WLAN 11a/b/g/n (0); Communication System Band: 11a/n (W52 53); Frequency: 5270 MHz; Duty Cycle: 1:1
Medium parameters used: f = 5270 MHz; σ = 5.645 S/m; ε_r = 47.702; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration
Probe: EX3DV4 - SN3745; ConvF(4.29, 4.29, 4.29); Calibrated: 2015/04/24;
Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn516; Calibrated: 2015/04/24
Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA; Serial: TP:1203
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Left/11ac40 5270MHz 9dBm Se/Area Scan 2 3 3 (91x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 2.05 W/kg

Left/11ac40 5270MHz 9dBm Se/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 16.27 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 2.78 W/kg
SAR(1 g) = 0.840 W/kg; SAR(10 g) = 0.488 W/kg

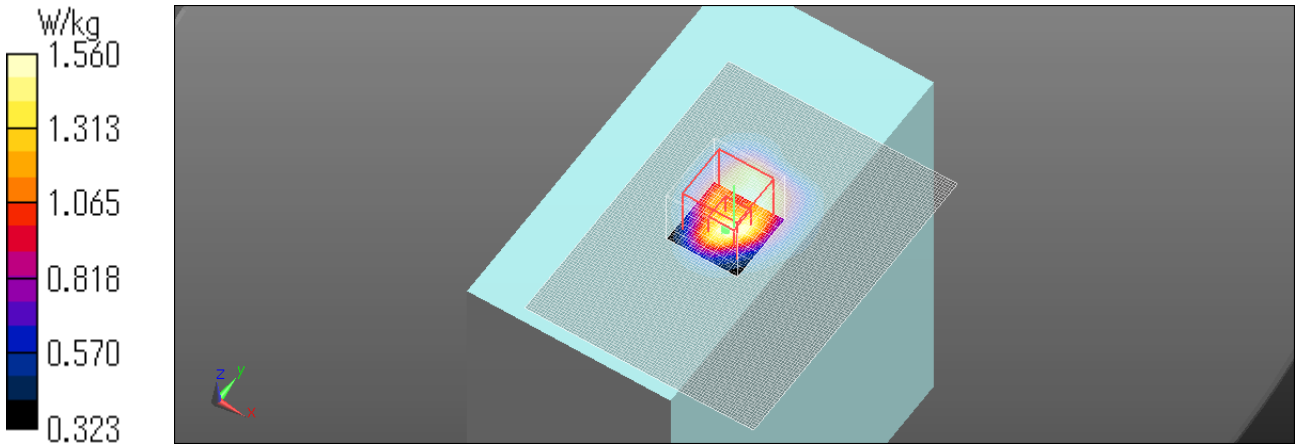
Maximum value of SAR (measured) = 1.61 W/kg
Date: 2015/06/26
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



WLAN 5.3G 11ac40 MCS0 5310MHz Left 0mm
Communication System: UID 0, WLAN 11a/b/g/n (0); Communication System Band: 11a/n (W52 53); Frequency: 5310 MHz; Duty Cycle: 1:1
Medium parameters used: f = 5310 MHz; σ = 5.693 S/m; ε_r = 47.56; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration
Probe: EX3DV4 - SN3745; ConvF(4.19, 4.19, 4.19); Calibrated: 2015/04/24;
Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn516; Calibrated: 2015/04/24
Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA; Serial: TP:1203
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Left/11ac40 5310MHz 9dBm Se/Area Scan 2 3 3 (91x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 2.15 W/kg

Left/11ac40 5310MHz 9dBm Se/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 16.53 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 2.78 W/kg
SAR(1 g) = 0.882 W/kg; SAR(10 g) = 0.555 W/kg
Maximum value of SAR (measured) = 1.56 W/kg
Date: 2015/06/26
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.

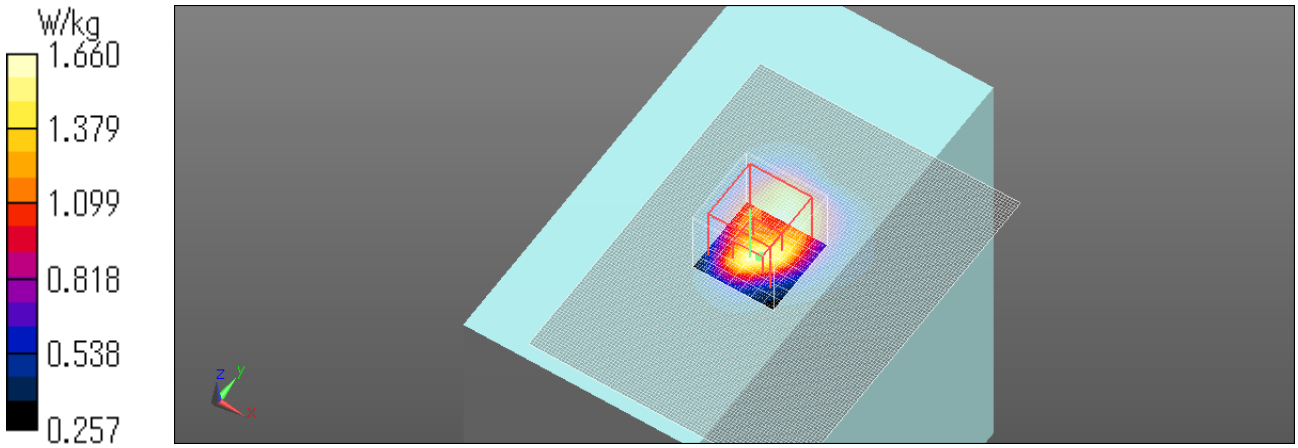


WLAN 5.3G 11ac40 MCS0 5310MHz Left 0mm Repeat

Communication System: UID 0, WLAN 11a/b/g/n (0); Communication System Band: 11a/n (W52 53); Frequency: 5310 MHz; Duty Cycle: 1:1
Medium parameters used: f = 5310 MHz; σ = 5.693 S/m; ε_r = 47.56; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration
Probe: EX3DV4 - SN3745; ConvF(4.19, 4.19, 4.19); Calibrated: 2015/04/24;
Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn516; Calibrated: 2015/04/24
Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA; Serial: TP:1203
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Left/11ac40 5310MHz 9dBm Se re/Area Scan 2 3 3 (91x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 2.26 W/kg

Left/11ac40 5310MHz 9dBm Se re/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 16.63 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 2.83 W/kg
SAR(1 g) = 0.864 W/kg; SAR(10 g) = 0.509 W/kg
Maximum value of SAR (measured) = 1.66 W/kg
Date: 2015/07/03
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



4. Measurement data(5.8GHz)

WLAN 5.8G 11ac40 MCS0 5795MHz Top tilt 0mm
Communication System: UID 0, WLAN 11a/b/g/n (0); Communication System Band: 11a/n (W58); Frequency: 5795 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5795 MHz; σ = 6.152 S/m; ε_r = 47.386; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration
Probe: EX3DV4 - SN3745; ConvF(3.84, 3.84, 3.84); Calibrated: 2015/04/24;
Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn516; Calibrated: 2015/04/24
Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA; Serial: TP:1203
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

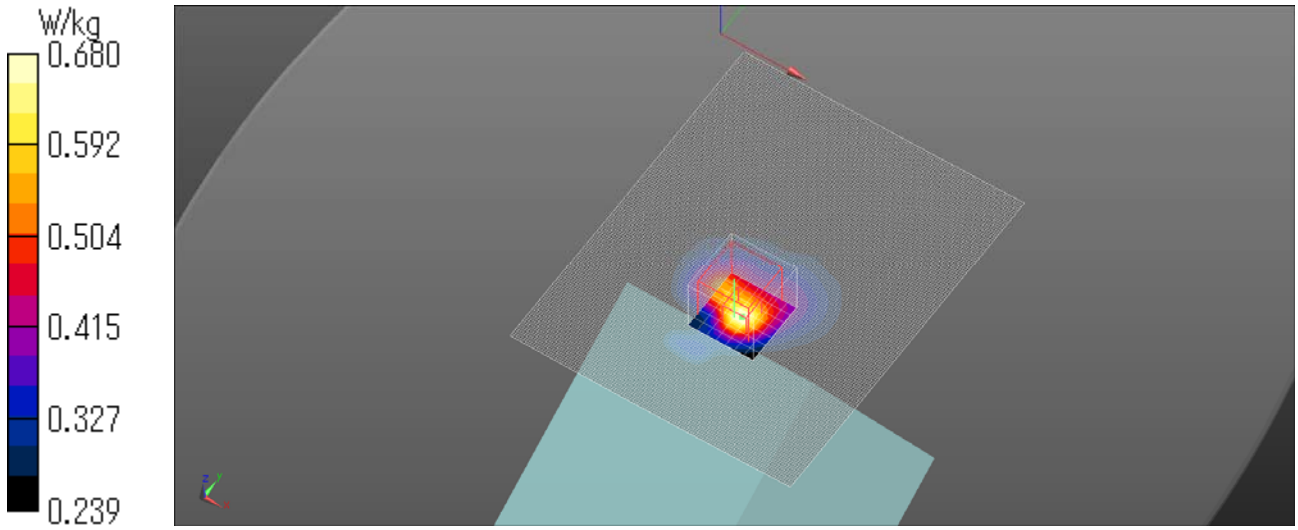
Top tilt/11ac40 5795MHz 9dBm Top tilt/Area Scan 2 2 (121x151x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.669 W/kg

Top tilt/11ac40 5795MHz 9dBm Top tilt/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 10.92 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.20 W/kg
SAR(1 g) = 0.435 W/kg; SAR(10 g) = 0.322 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.680 W/kg
Date: 2015/06/26
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



WLAN 5.8G 11ac40 MCS0 5795MHz Bottom tilt 0mm
Communication System: UID 0, WLAN 11a/b/g/n (0); Communication System Band: 11a/n (W58); Frequency: 5795 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5795 MHz; σ = 6.152 S/m; ε_r = 47.386; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration
Probe: EX3DV4 - SN3745; ConvF(3.84, 3.84, 3.84); Calibrated: 2015/04/24;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn516; Calibrated: 2015/04/24
Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA; Serial: TP:1203
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

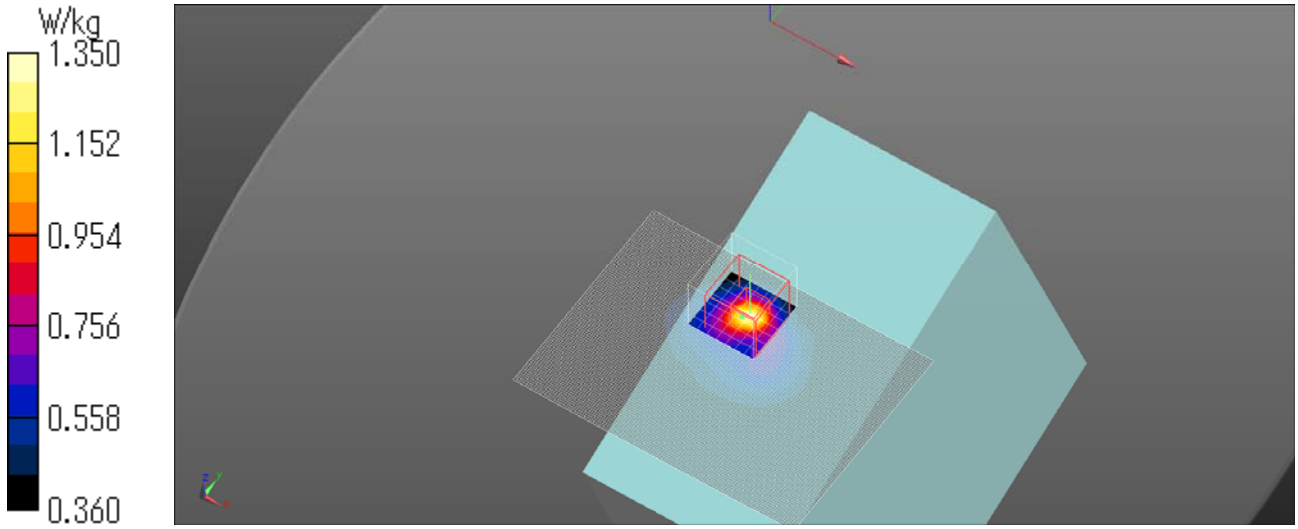
Bottom tilt/11ac40 5795MHz 9dBm Botoom tilt/Area Scan 2 3 2 2 2 (121x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 1.30 W/kg

Bottom tilt/11ac40 5795MHz 9dBm Botoom tilt/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 14.94 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 2.37 W/kg
SAR(1 g) = 0.772 W/kg; SAR(10 g) = 0.509 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 1.35 W/kg
Date: 2015/06/26
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



WLAN 5.8G 11ac40 MCS0 5795MHz Front tilt 0mm
Communication System: UID 0, WLAN 11a/b/g/n (0); Communication System Band: 11a/n (W58); Frequency: 5795 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5795 MHz; σ = 6.152 S/m; ε_r = 47.386; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration
Probe: EX3DV4 - SN3745; ConvF(3.84, 3.84, 3.84); Calibrated: 2015/04/24;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn516; Calibrated: 2015/04/24
Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA; Serial: TP:1203
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

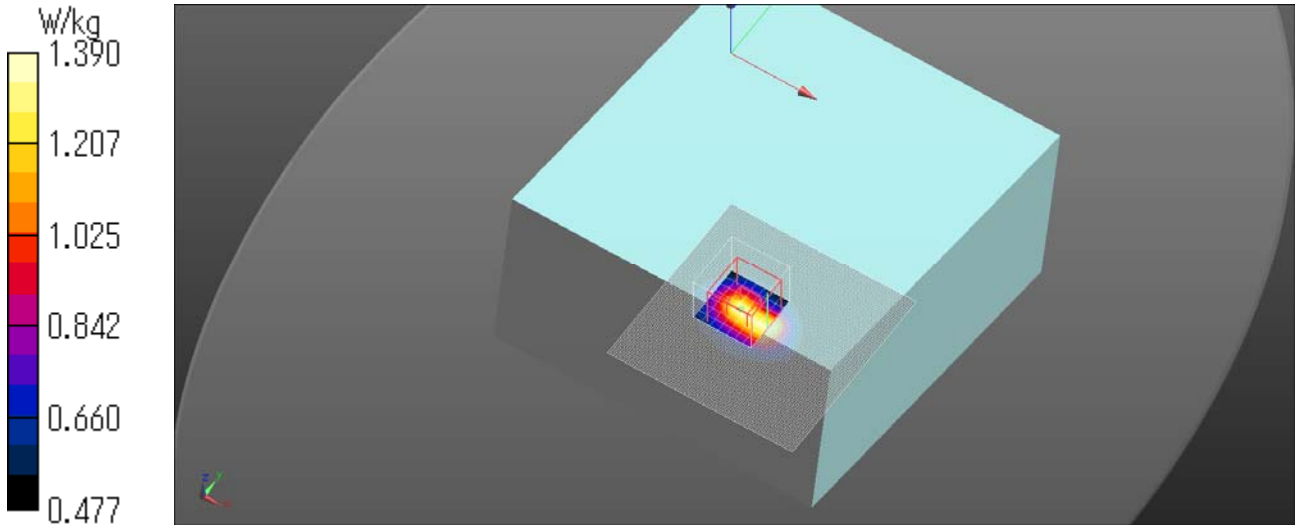
Front tilt Rear tilt/11ac40 5795MHz 9dBm Front tilt/Area Scan 2 3 2 2 2 (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 1.37 W/kg

Front tilt Rear tilt/11ac40 5795MHz 9dBm Front tilt/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 15.38 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 2.31 W/kg
SAR(1 g) = 0.865 W/kg; SAR(10 g) = 0.633 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 1.39 W/kg
Date: 2015/06/26
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



WLAN 5.8G 11ac40 MCS0 5795MHz Rear tilt 0mm
Communication System: UID 0, WLAN 11a/b/g/n (0); Communication System Band: 11a/n (W58); Frequency: 5795 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5795 MHz; σ = 6.152 S/m; ε_r = 47.386; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration
Probe: EX3DV4 - SN3745; ConvF(3.84, 3.84, 3.84); Calibrated: 2015/04/24;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn516; Calibrated: 2015/04/24
Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA; Serial: TP:1203
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

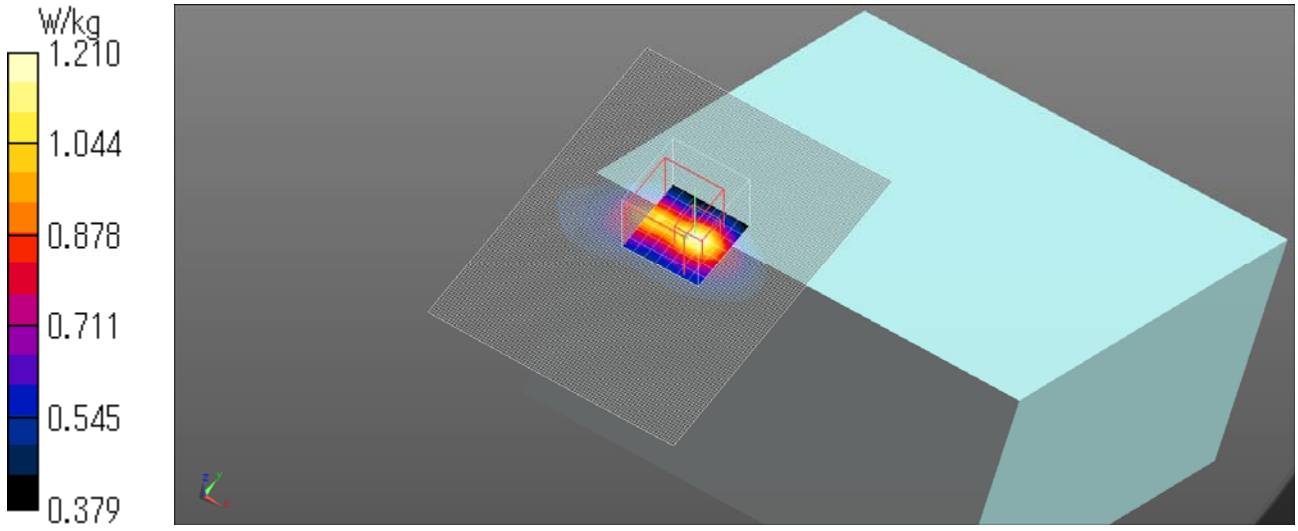
Front tilt Rear tilt/11ac40 5795MHz 9dBm Rear tilt/Area Scan 2 3 2 2 3 (91x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 1.22 W/kg

Front tilt Rear tilt/11ac40 5795MHz 9dBm Rear tilt/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 14.15 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 2.00 W/kg
SAR(1 g) = 0.741 W/kg; SAR(10 g) = 0.523 W/kg

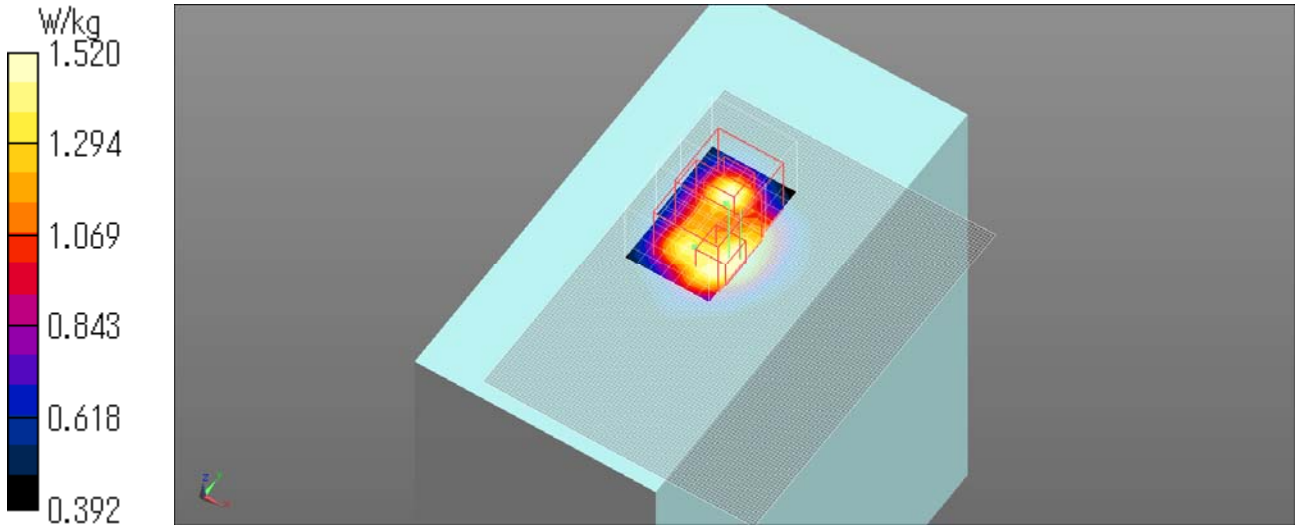
Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 1.21 W/kg
Date: 2015/06/26
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



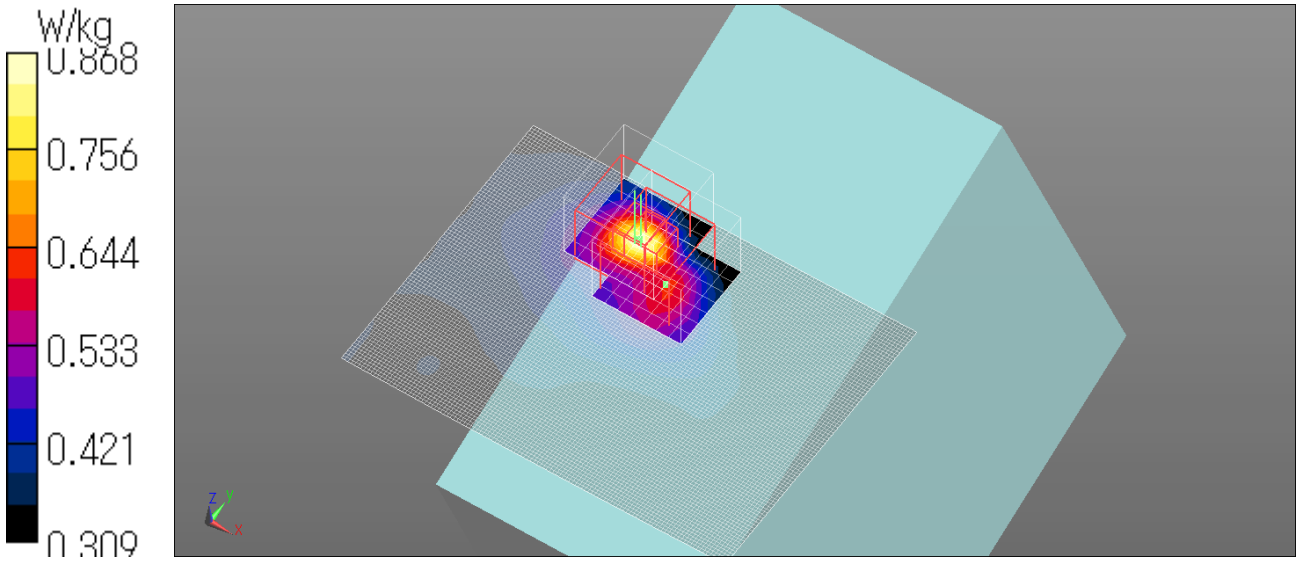
WLAN 5.8G 11ac40 MCS0 5795MHz Left 0mm
Communication System: UID 0, WLAN 11a/b/g/n (0); Communication System Band: 11a/n (W58); Frequency: 5795 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5795 MHz; σ = 6.152 S/m; ε_r = 47.386; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration
Probe: EX3DV4 - SN3745; ConvF(3.84, 3.84, 3.84); Calibrated: 2015/04/24;
Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn516; Calibrated: 2015/04/24
Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA; Serial: TP:1203
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Left/11ac40 5795MHz 9dBm/Area Scan 2 3 3 (91x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 1.68 W/kg
Left/11ac40 5795MHz 9dBm/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 15.60 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 2.89 W/kg
SAR(1 g) = 0.871 W/kg; SAR(10 g) = 0.597 W/kg
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.55 W/kg
Left/11ac40 5795MHz 9dBm/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm 2 (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 15.60 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 2.76 W/kg
SAR(1 g) = 0.887 W/kg; SAR(10 g) = 0.613 W/kg
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.52 W/kg
Date: 2015/06/26
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



WLAN 5.8G 11ac40 MCS0 5755MHz Bottom tilt 0mm

Communication System: UID 0, WLAN 11a/b/g/n (0); Communication System Band: 11a/n (W58); Frequency: 5755 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5755 MHz; σ = 6.245 S/m; ε_r = 47.194; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration
Probe: EX3DV4 - SN3745; ConvF(3.93, 3.93, 3.93); Calibrated: 2015/04/24;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn516; Calibrated: 2015/04/24
Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA; Serial: TP:1203
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)
Bottom tilt/11ac40 5755MHz 7dBm Botoom tilt/Area Scan 2 3 2 2 2 (121x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.811 W/kg
Bottom tilt/11ac40 5755MHz 7dBm Botoom tilt/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 12.63 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 1.36 W/kg
SAR(1 g) = 0.620 W/kg; SAR(10 g) = 0.499 W/kg
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.883 W/kg
Bottom tilt/11ac40 5755MHz 7dBm Botoom tilt/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm 2 (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 12.63 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 1.29 W/kg
SAR(1 g) = 0.581 W/kg; SAR(10 g) = 0.475 W/kg
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.868 W/kg
Date: 2015/06/26
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



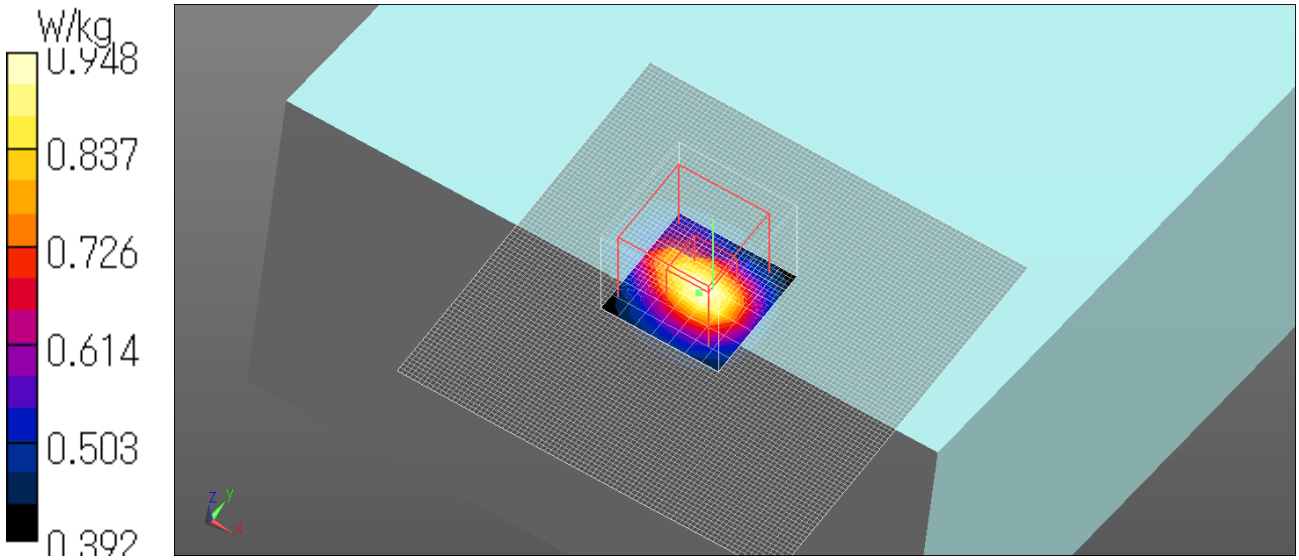
WLAN 5.8G 11ac40 MCS0 5755MHz Front tilt 0mm
Communication System: UID 0, WLAN 11a/b/g/n (0); Communication System Band: 11a/n (W58); Frequency: 5755 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5755 MHz; σ = 6.245 S/m; ε_r = 47.194; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration
Probe: EX3DV4 - SN3745; ConvF(3.93, 3.93, 3.93); Calibrated: 2015/04/24;
Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn516; Calibrated: 2015/04/24
Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA; Serial: TP:1203
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Front tilt 5.8GHz/11ac40 5755MHz 7dBm Front tilt second 2/Area Scan 2 3 2 2 2 (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.771 W/kg

Front tilt 5.8GHz/11ac40 5755MHz 7dBm Front tilt second 2/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 13.25 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 1.43 W/kg
SAR(1 g) = 0.676 W/kg; SAR(10 g) = 0.538 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.948 W/kg
Date: 2015/06/26
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



WLAN 5.8G 11ac40 MCS0 5755MHz Rear tilt 0mm
Communication System: UID 0, WLAN 11a/b/g/n (0); Communication System Band: 11a/n (W58); Frequency: 5755 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5755 MHz; σ = 6.245 S/m; ε_r = 47.194; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration
Probe: EX3DV4 - SN3745; ConvF(3.93, 3.93, 3.93); Calibrated: 2015/04/24;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn516; Calibrated: 2015/04/24
Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA; Serial: TP:1203
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

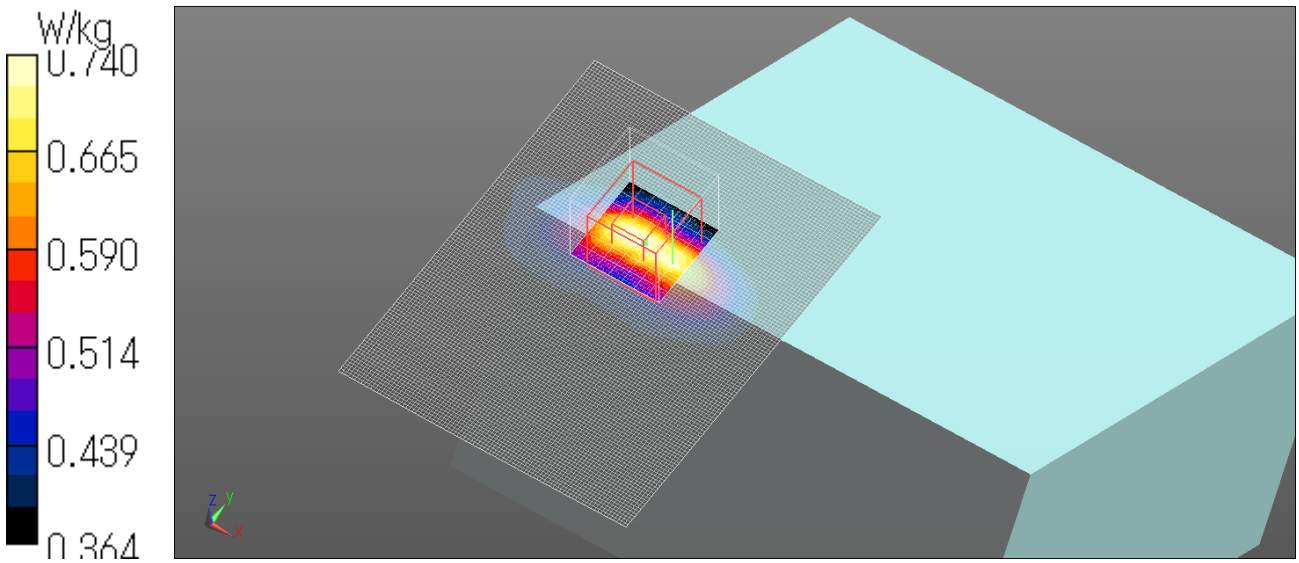
Rear tilt 5.8GHz/11ac40 5755MHz 7dBm Rear tilt 2/Area Scan 2 3 2 2 3 (91x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.792 W/kg

Rear tilt 5.8GHz/11ac40 5755MHz 7dBm Rear tilt 2/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 11.87 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.987 W/kg
SAR(1 g) = 0.586 W/kg; SAR(10 g) = 0.511 W/kg

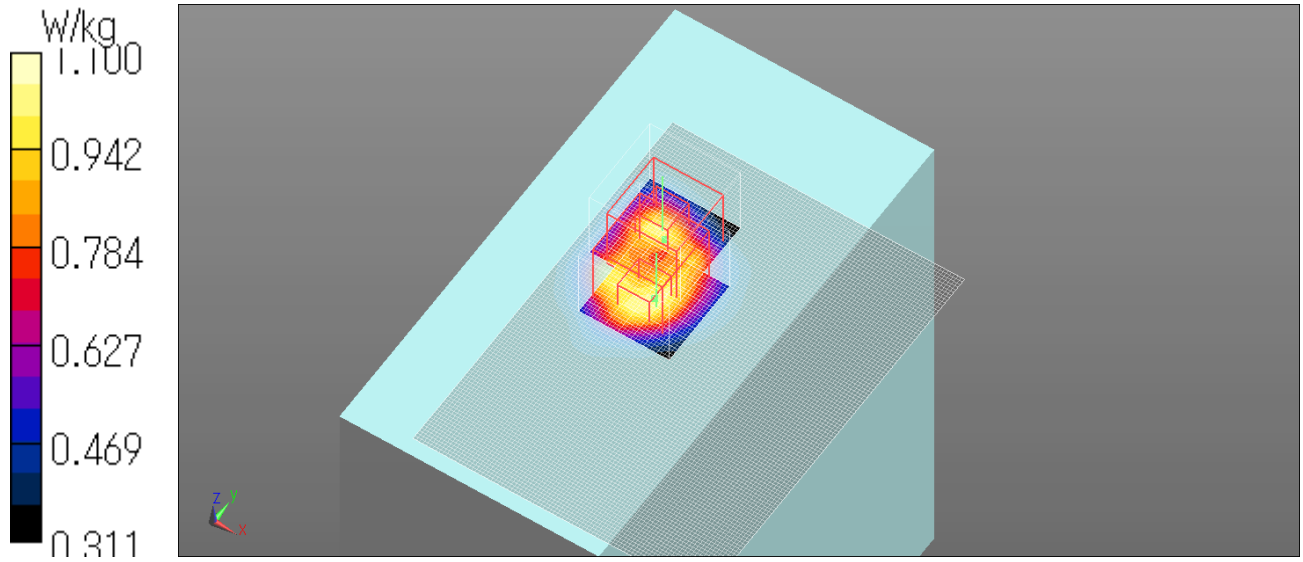
Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.740 W/kg
Date: 2015/06/26
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.

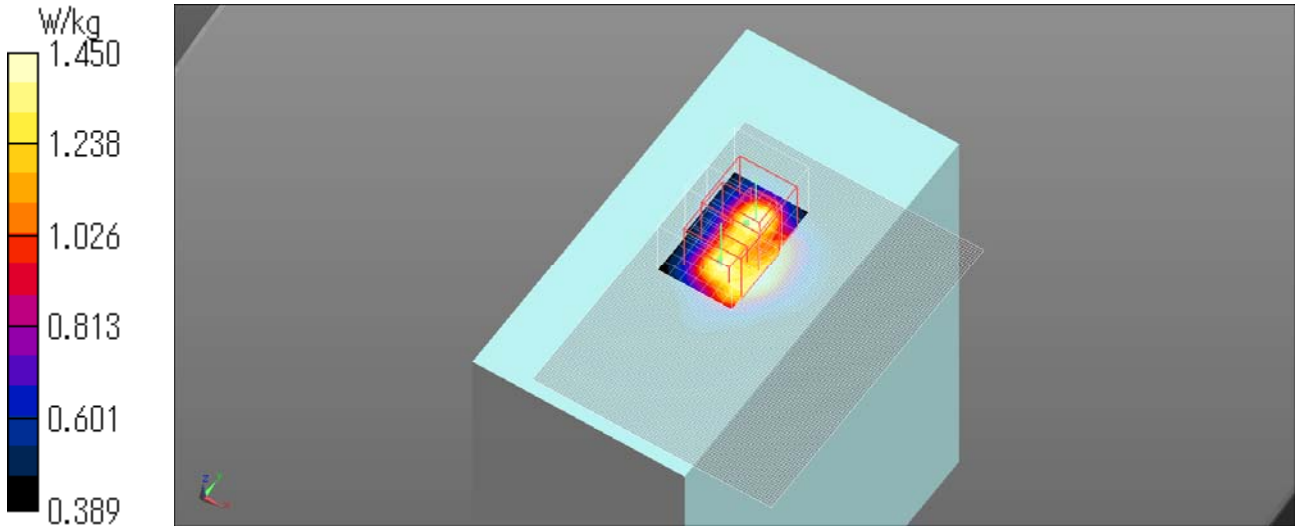


WLAN 5.8G 11ac40 MCS0 5755MHz Left 0mm
Communication System: UID 0, WLAN 11a/b/g/n (0); Communication System Band: 11a/n (W58); Frequency: 5755 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5755 MHz; σ = 6.245 S/m; ε_r = 47.194; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration
Probe: EX3DV4 - SN3745; ConvF(3.93, 3.93, 3.93); Calibrated: 2015/04/24;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn516; Calibrated: 2015/04/24
Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA; Serial: TP:1203
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)
Left/11ac40 5755MHz 7dBm/Area Scan 2 3 3 (91x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 1.09 W/kg

Left/11ac40 5755MHz 7dBm/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 13.39 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 1.83 W/kg
SAR(1 g) = 0.673 W/kg; SAR(10 g) = 0.516 W/kg
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.03 W/kg
Left/11ac40 5755MHz 7dBm/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm 2 (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 13.39 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 1.90 W/kg
SAR(1 g) = 0.675 W/kg; SAR(10 g) = 0.510 W/kg
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.10 W/kg
Date: 2015/06/26
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



WLAN 5.8G 11ac40 MCS0 5795MHz Left 0mm Repeat
Communication System: UID 0, WLAN 11a/b/g/n (0); Communication System Band: 11a/n (W58); Frequency: 5795 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5795 MHz; σ = 6.152 S/m; ε_r = 47.386; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration
Probe: EX3DV4 - SN3745; ConvF(3.84, 3.84, 3.84); Calibrated: 2015/04/24;
Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn516; Calibrated: 2015/04/24
Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA; Serial: TP:1203
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)
Left/11ac40 5795MHz 9dBm Re/Area Scan 2 3 3 (91x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 1.59 W/kg
Left/11ac40 5795MHz 9dBm Re/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 15.59 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 2.83 W/kg
SAR(1 g) = 0.873 W/kg; SAR(10 g) = 0.595 W/kg
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.58 W/kg
Left/11ac40 5795MHz 9dBm Re/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm 2 (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 15.59 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 2.58 W/kg
SAR(1 g) = 0.852 W/kg; SAR(10 g) = 0.604 W/kg
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.45 W/kg
Date: 2015/06/26
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



APPENDIX2 : System Check

1. System check result Body 2450MHz

(1) Simulated Tissue Liquid Parameter confirmation

DIELECTRIC PARAMETERS MEASUREMENT RESULTS											
Date	Ambient Temp. [deg.c]	Relative Humidity [%]	Liquid type	Liquid Temp. [deg.c]	Measured Frequency [MHz]	Parameters	Target Value	Measured	Deviation [%]	Limit [%]	Remark
22-Jun	24.0	48	MSL 2450	23.5	2450	εr	52.7	50.6	-4.0	+/-5	*1
						σ [mho/m]	1.95	2.00	2.8	+/-5	

εr: Relative Permittivity / σ : Coductivity
*1 The Target value is a parameter defined in KDB 865664D01.

DIELECTRIC PARAMETERS MEASUREMENT RESULTS											
Date	Ambient Temp. [deg.c]	Relative Humidity [%]	Liquid type	Liquid Temp. [deg.c]	Measured Frequency [MHz]	Parameters	Target Value	Measured	Deviation [%]	Limit [%]	Remark
22-Jun	24.0	48	MSL 2450	23.5	2450	εr	52.2	50.6	-3.1	+/-6	*2 *3
						σ [mho/m]	2.00	2.00	0.2	+/-6	

εr: Relative Permittivity / σ : Coductivity
*2 The target value is the calibrated dipole Body TSL parameters. (D2450V2 SN:713, Measured Body TSL parameters)
*3 The limit is for deviation provided by manufacture.

(2) System check result (for calibration by manufacture)

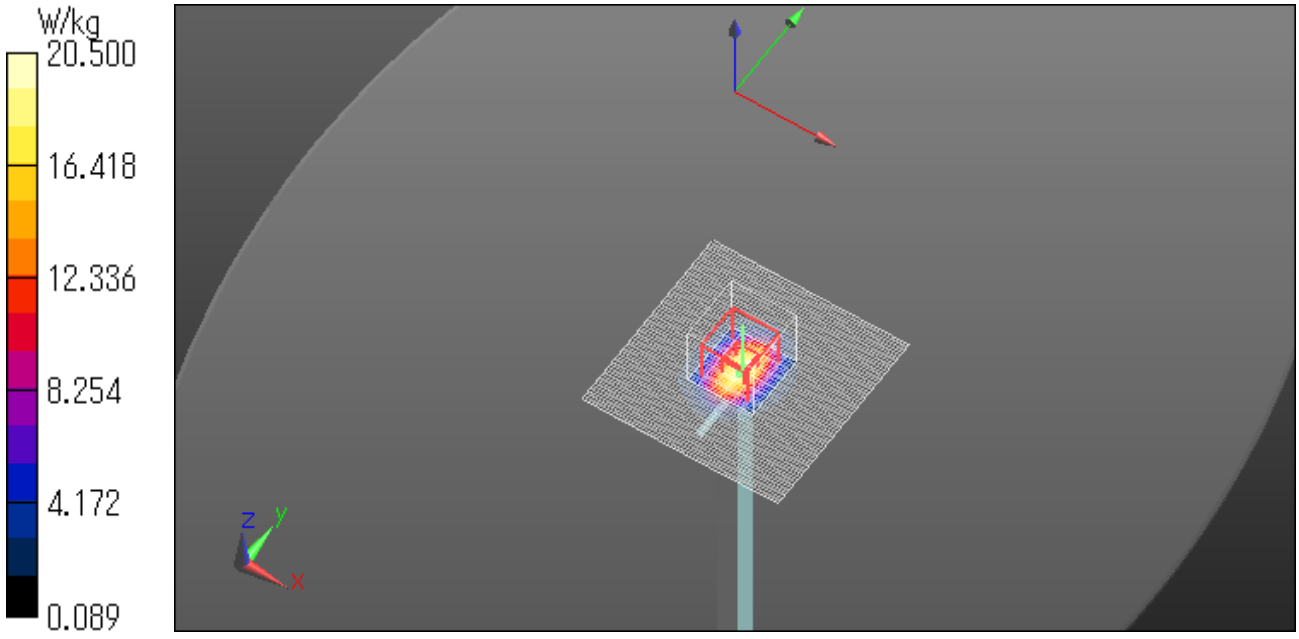
SYSTEM CHECK							
Date	Frequency [MHz]	SAR 1g [W/kg]		Target Value(1W)	Deviation [%]	Limit [%]	Remark
		Forward Power Measured	Conversion 1W Calculation				
22-Jun	2450.00	13.10	52.40	50.40	4.0	+/-10	*4

*4 The taget value is the parameter defined in SAR measured x4(12.6 x 4 = 50.4) in manufacturer calibrated dipole (D2450V2 SN:713)
Please refer to " SAR result with Body TSL of Appendix 2 System Check Dipole (D2450V2 SN:713)".

Body 2450MHz System Check DATA/ D2450V2/ Forward Conducted Power: 250mW
Communication System: UID 0, CW (0); Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 2.004 S/m; ε_r = 50.586; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY Configuration:
Probe: EX3DV4 - SN3825; ConvF(7.21, 7.21, 7.21); Calibrated: 2014/12/16;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn509; Calibrated: 2014/07/28
Phantom: ELI v4.0 (20deg probe tilt); Type: QDOVA001BB; Serial: TP:1045
DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 20.3 W/kg

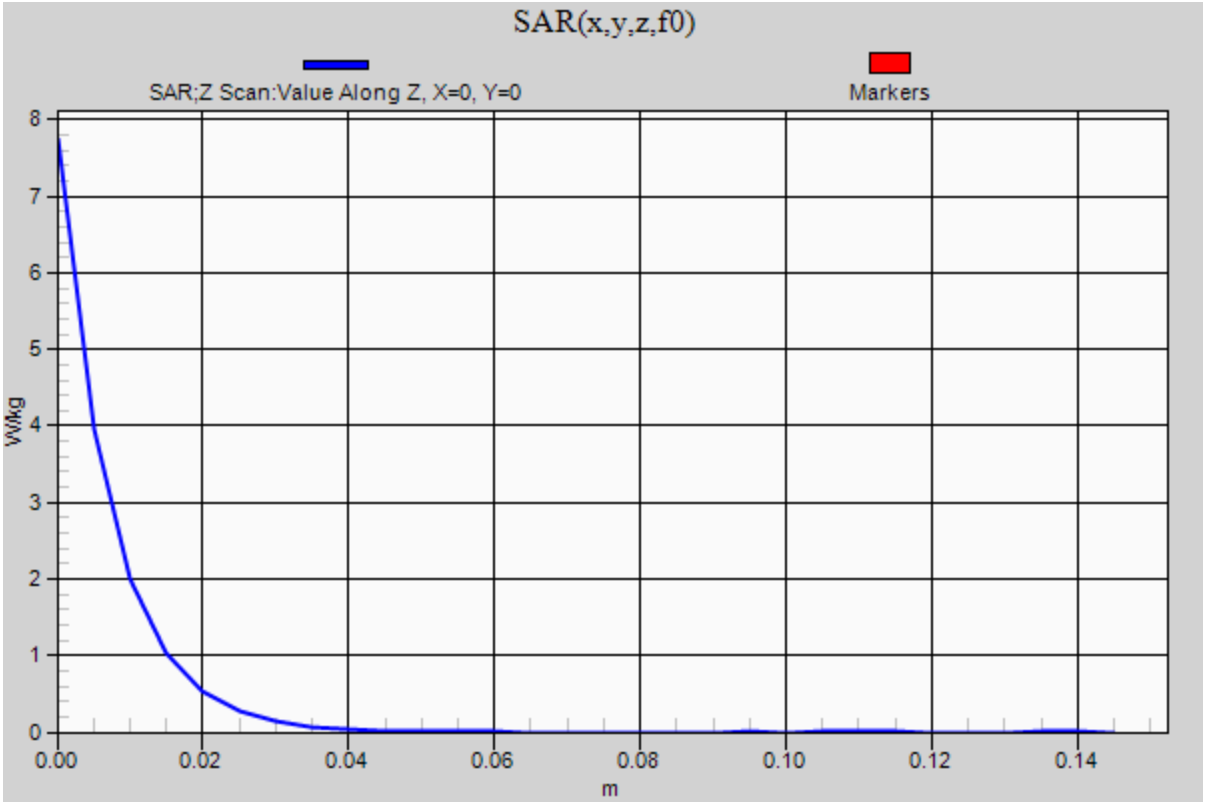
Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 97.27 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 28.5 W/kg
SAR(1 g) = 13.1 W/kg; SAR(10 g) = 5.86 W/kg
Maximum value of SAR (measured) = 20.5 W/kg
Date: 2015/06/22
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



Body 2450MHz System Check DATA/ D2450V2/ Forward Conducted Power: 250mW
Communication System: UID 0, CW (0); Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 2.004 S/m; ε_r = 50.586; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY Configuration:
Probe: EX3DV4 - SN3825; ConvF(7.21, 7.21, 7.21); Calibrated: 2014/12/16;
Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)
Electronics: DAE4 Sn509; Calibrated: 2014/07/28
Phantom: ELI v4.0 (20deg probe tilt); Type: QDOVA001BB; Serial: TP:1045
DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 20.3 W/kg

Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 97.27 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 28.5 W/kg
SAR(1 g) = 13.1 W/kg; SAR(10 g) = 5.86 W/kg
Maximum value of SAR (measured) = 20.5 W/kg
Z Scan (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 7.74 W/kg
Date: 2015/06/22
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



2. System check result Body 5250MHz

(1) Simulated Tissue Liquid Parameter confirmation

DIELECTRIC PARAMETERS MEASUREMENT RESULTS											
Date	Ambient Temp. [deg.c]	Relative Humidity [%]	Liquid type	Liquid Temp. [deg.c]	Measured Frequency [MHz]	Parameters	Target Value	Measured	Deviation [%]	Limit [%]	Remark
-	-	-	-	-	3000	εr	52.0	-	-	-	*1
						σ [mho/m]	2.73	-	-	-	
25-Jun	24.0	50	MBBL 3.5-5.8	23.5	5250	εr	49.0	47.1	-3.8	+/-5	*2
						σ [mho/m]	5.36	5.50	2.6	+/-5	
-	-	-	-	-	5800	εr	48.2	-	-	-	*1
						σ [mho/m]	6.00	-	-	-	

εr: Relative Permittivity / σ : Coductivity
*1 The Target value is a parameter defined in KDB 865664D01.
*2 The dielectric parameters should be linearly interpolated between the closest pair of target frequencies to determine the applicable dielectric parameters corresponding to the device test frequency.

DIELECTRIC PARAMETERS MEASUREMENT RESULTS											
Date	Ambient Temp. [deg.c]	Relative Humidity [%]	Liquid type	Liquid Temp. [deg.c]	Measured Frequency [MHz]	Parameters	Target Value	Measured	Deviation [%]	Limit [%]	Remark
25-Jun	24.0	50	MBBL 3.5-5.8	23.5	5250	εr	49.3	47.1	-4.5	+/-6	*3*4
						σ [mho/m]	5.48	5.50	0.4	+/-6	

εr: Relative Permittivity / σ : Coductivity
*3 The target value is the calibrated dipole Body TSL parameters. (D5GHzV2 SN:1020, Measured Body TSL parameters)
*4 The limit is for deviation provided by manufacture.

(2) System check result (for calibration by manufacture)

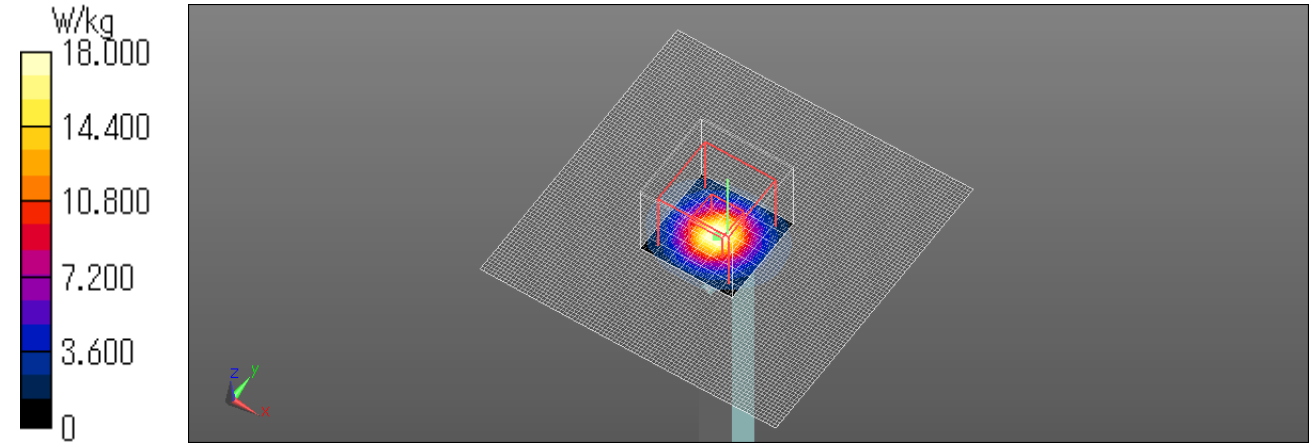
SYSTEM CHECK							
Date	Frequency [MHz]	SAR 1g [W/kg]		Target Value(1W)	Deviation [%]	Limit [%]	Remark
		Forward Power Measured	Conversion 1W Calculation				
25-Jun	5250.00	7.57	75.70	73.80	2.6	+/-10	*5

*5 The taget value is the parameter defined in SAR measured x 10(7.38 x 10 = 73.8) in manufacturer calibrated dipole (D5GHzV2 SN:1020)
Please refer to " SAR result with Body TSL of Appendix 2 System Check Dipole (D5GHzV2 SN:1020)".

Body 5250MHz System Check Data / D5GHzV2 / Forward Conducted Power: 100mW
Communication System: UID 0, CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5250 MHz; Duty Cycle: 1:1
Medium parameters used: f = 5250 MHz; σ = 5.5 S/m; ε_r = 47.092; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration
Probe: EX3DV4 - SN3745; ConvF(4.29, 4.29, 4.29); Calibrated: 2015/04/24;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn516; Calibrated: 2015/04/24
Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA; Serial: TP:1203
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

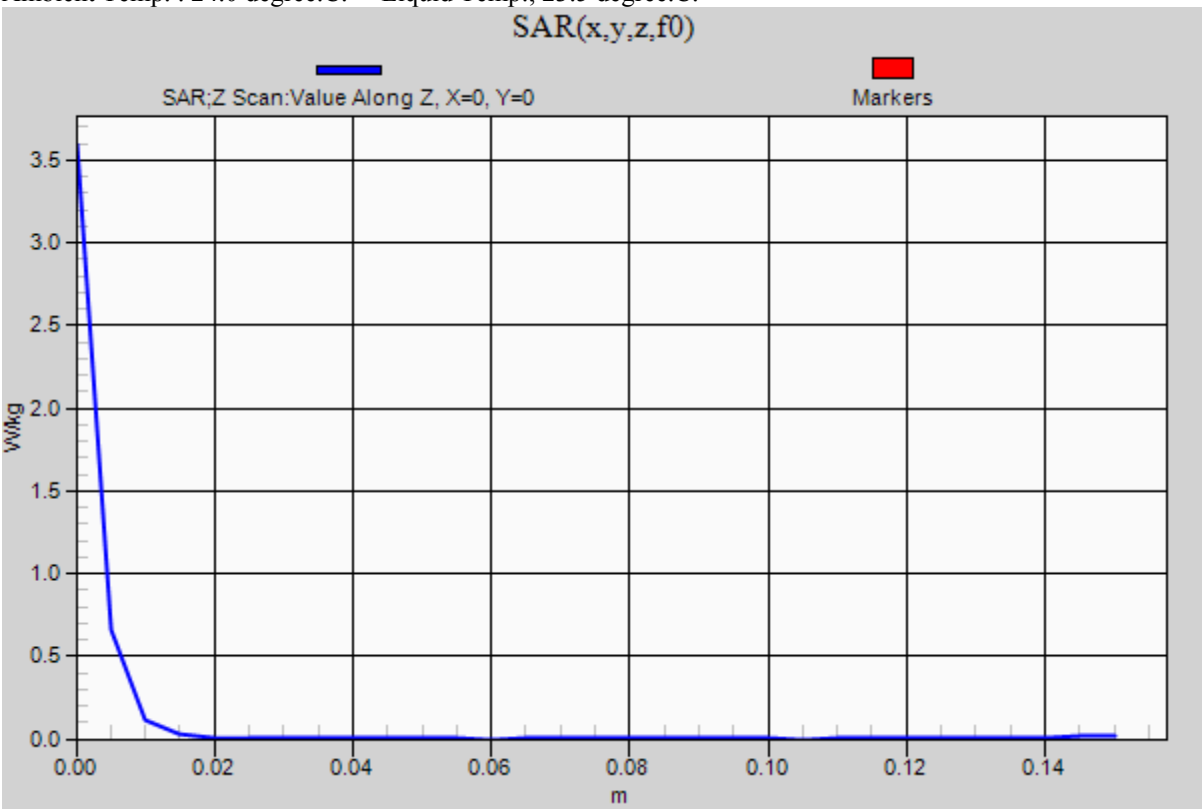
Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 17.8 W/kg

Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 64.23 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 33.9 W/kg
SAR(1 g) = 7.57 W/kg; SAR(10 g) = 2.11 W/kg
Maximum value of SAR (measured) = 18.0 W/kg
Date: 2015/06/25
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



Body 5250MHz System Check Data / D5GHzV2 / Forward Conducted Power: 100mW
Communication System: UID 0, CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5250 MHz; Duty Cycle: 1:1
Medium parameters used: f = 5250 MHz; σ = 5.5 S/m; ε_r = 47.092; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration
Probe: EX3DV4 - SN3745; ConvF(4.29, 4.29, 4.29); Calibrated: 2015/04/24;
Sensor-Surface: 0mm (Fix Surface)
Electronics: DAE4 Sn516; Calibrated: 2015/04/24
Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA; Serial: TP:1203
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Z Scan (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 3.59 W/kg
Date: 2015/06/25
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



3. System check result Body 5750MHz

(1) Simulated Tissue Liquid Parameter confirmation

DIELECTRIC PARAMETERS MEASUREMENT RESULTS											
Date	Ambient Temp. [deg.c]	Relative Humidity [%]	Liquid type	Liquid Temp. [deg.c]	Measured Frequency [MHz]	Parameters	Target Value	Measured	Deviation [%]	Limit [%]	Remark
-	-	-	-	-	3000	εr	52.0	-	-	-	*1
						σ [mho/m]	2.73	-	-	-	
25-Jun	24.0	50	MBBL 3.5-5.8	23.5	5750	εr	48.3	47.2	-2.2	+/-5	*2
						σ [mho/m]	5.94	6.23	4.8	+/-5	
-	-	-	-	-	5800	εr	48.2	-	-	-	*1
						σ [mho/m]	6.00	-	-	-	

εr: Relative Permittivity / σ : Coductivity
*1 The Target value is a parameter defined in KDB 865664D01.
*2 The dielectric parameters should be linearly interpolated between the closest pair of target frequencies to determine the applicable dielectric parameters corresponding to the device test frequency.

DIELECTRIC PARAMETERS MEASUREMENT RESULTS											
Date	Ambient Temp. [deg.c]	Relative Humidity [%]	Liquid type	Liquid Temp. [deg.c]	Measured Frequency [MHz]	Parameters	Target Value	Measured	Deviation [%]	Limit [%]	Remark
25-Jun	24.0	50	MBBL 3.5-5.8	23.5	5750	εr	48.5	47.2	-2.6	+/-6	*3*4
						σ [mho/m]	6.18	6.23	0.7	+/-6	

εr: Relative Permittivity / σ : Coductivity
*3 The target value is the calibrated dipole Body TSL parameters. (D5GHzV2 SN:1020, Measured Body TSL parameters)
*4 The limit is for deviation provided by manufacture.

(2) System check result (for calibration by manufacture)

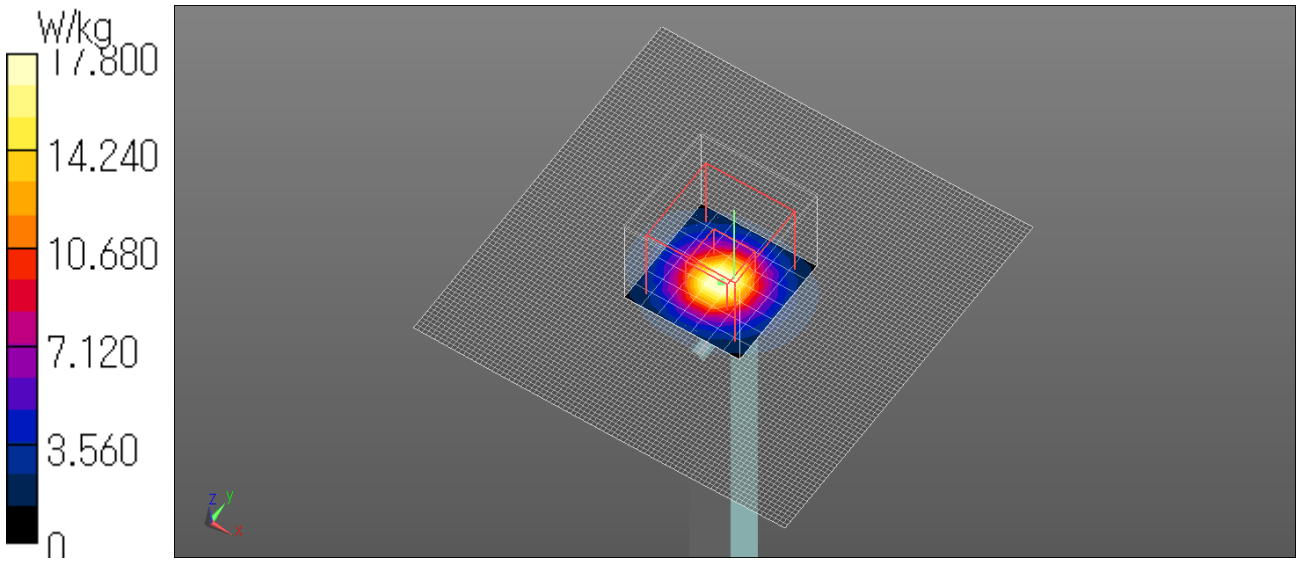
SYSTEM CHECK							
Date	Frequency [MHz]	SAR 1g [W/kg]		Target Value(1W)	Deviation [%]	Limit [%]	Remark
		Forward Power Measured	Conversion 1W Calculation				
25-Jun	5750.00	7.20	72.00	73.70	-2.3	+/-10	*5

*5 The taget value is the parameter defined in SAR measured x 10(7.37 x 10 = 73.7) in manufacturer calibrated dipole (D5GHzV2 SN:1020)
Please refer to " SAR result with Body TSL of Appendix 2 System Check Dipole (D5GHzV2 SN:1020)".

Body 5750MHz System Check Data / D5GHzV2 / Forward Conducted Power: 100mW
Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5750 MHz; Duty Cycle: 1:1
Medium parameters used: f = 5750 MHz; σ = 6.225 S/m; ε_r = 47.231; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration
Probe: EX3DV4 - SN3745; ConvF(3.93, 3.93, 3.93); Calibrated: 2015/04/24;
Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn516; Calibrated: 2015/04/24
Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA; Serial: TP:1203
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

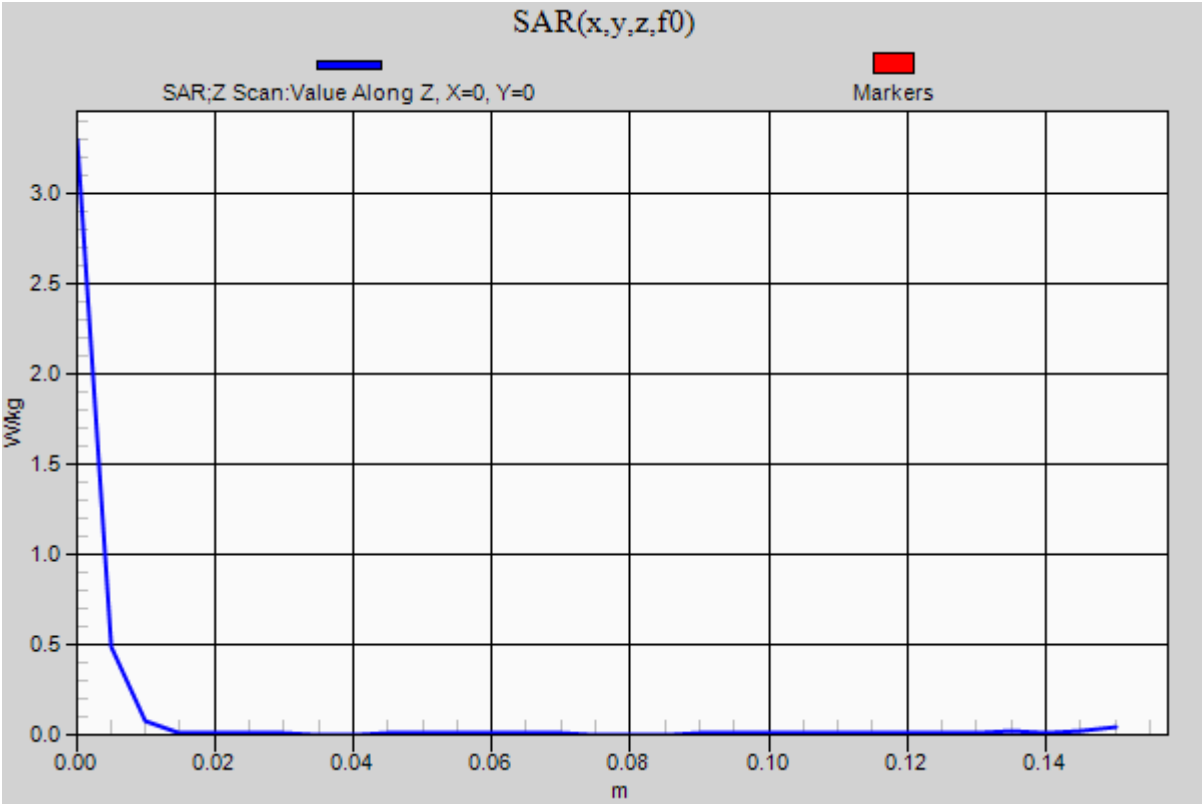
System Performance Check with D5GHzV2 Dipole (graded grid)/d=10mm, Pin=100mW, f=5750 MHz 2/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 18.3 W/kg

System Performance Check with D5GHzV2 Dipole (graded grid)/d=10mm, Pin=100mW, f=5750 MHz 2/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.76 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 34.9 W/kg
SAR(1 g) = 7.2 W/kg; SAR(10 g) = 2.01 W/kg
Maximum value of SAR (measured) = 17.8 W/kg
Date: 2015/06/26
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



Body 5750MHz System Check Data / D5GHzV2 / Forward Conducted Power: 100mW
Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5750 MHz; Duty Cycle: 1:1
Medium parameters used: f = 5750 MHz; σ = 6.225 S/m; ε_r = 47.231; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY5 Configuration
Probe: EX3DV4 - SN3745; ConvF(3.93, 3.93, 3.93); Calibrated: 2015/04/24;
Sensor-Surface: 0mm (Fix Surface)
Electronics: DAE4 Sn516; Calibrated: 2015/04/24
Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA; Serial: TP:1203
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

System Performance Check with D5GHzV2 Dipole (graded grid)/d=10mm, Pin=100mW, f=5750 MHz 2/Z Scan (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 3.30 W/kg
Date: 2015/06/26
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



4. System Check Dipole (D2450V2,S/N:713)

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

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

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

Accreditation No.: SCS 108

Client UL Japan (PTT)

Certificate No: D2450V2-713_Sep13

CALIBRATION CERTIFICATE

Object D2450V2 - SN: 713

Calibration procedure(s) QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: September 10, 2013

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	01-Nov-12 (No. 217-01640)	Oct-13
Power sensor HP 8481A	US37292783	01-Nov-12 (No. 217-01640)	Oct-13
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-13 (No. 217-01736)	Apr-14
Type-N mismatch combination	SN: 5047.3 / 06327	04-Apr-13 (No. 217-01739)	Apr-14
Reference Probe ES3DV3	SN: 3205	28-Dec-12 (No. ES3-3205_Dec12)	Dec-13
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

	Name	Function	Signature
Calibrated by:	Israe El-Naouq	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: September 10, 2013

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

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

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

Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.4 ± 6 %	1.83 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.0 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**51.6 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.05 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.1 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.2 ± 6 %	2.00 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.6 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**49.7 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.89 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**23.4 W/kg ± 16.5 % (k=2)**

UL Japan, Inc.
Ise EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone: +81 596 24 8999
Facsimile: +81 596 24 8124

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.8 Ω + 0.7 jΩ
Return Loss	- 34.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.7 Ω + 2.8 jΩ
Return Loss	- 30.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.162 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	July 05, 2002

DASY5 Validation Report for Head TSL

Date: 10.09.2013

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 713

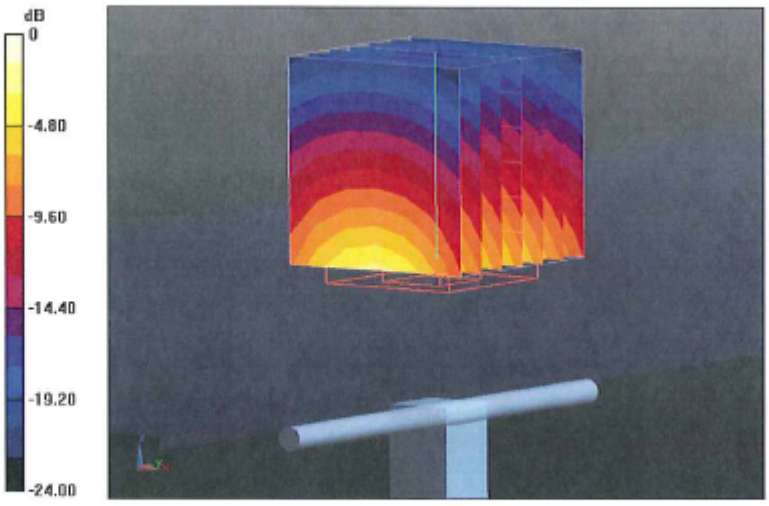
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.83 S/m; ε_r = 39.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.52, 4.52, 4.52); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

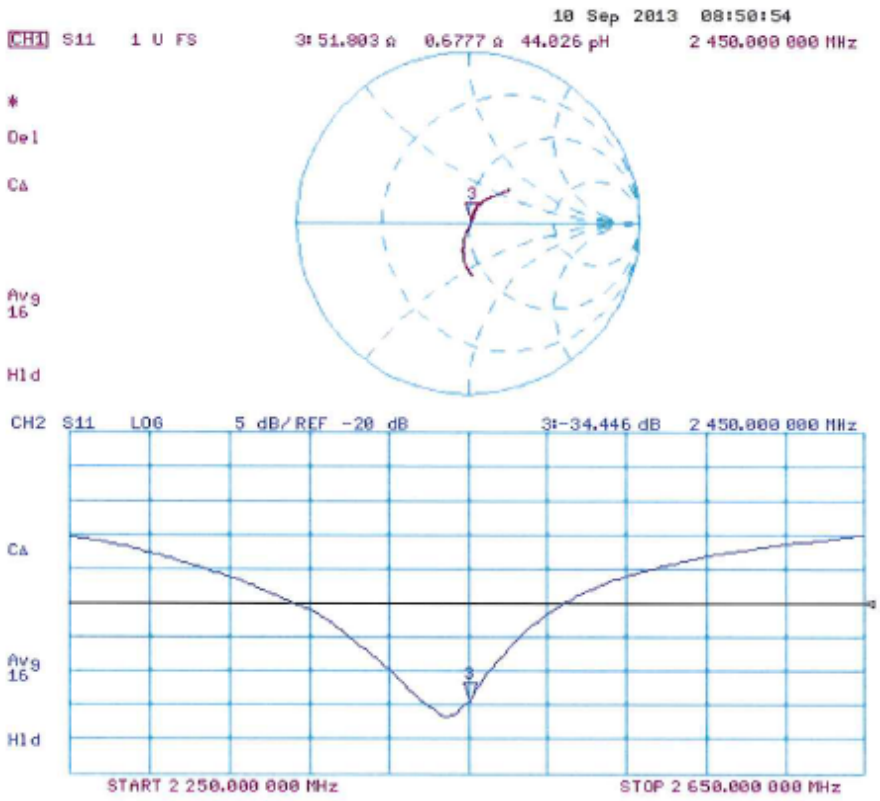
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.095 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 26.7 W/kg
SAR(1 g) = 13 W/kg; SAR(10 g) = 6.05 W/kg
Maximum value of SAR (measured) = 17.0 W/kg



0 dB = 17.0 W/kg = 12.30 dBW/kg

Impedance Measurement Plot for Head TSL



UL Japan, Inc.
Ise EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone: +81 596 24 8999
Facsimile: +81 596 24 8124

DASY5 Validation Report for Body TSL

Date: 10.09.2013

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 713

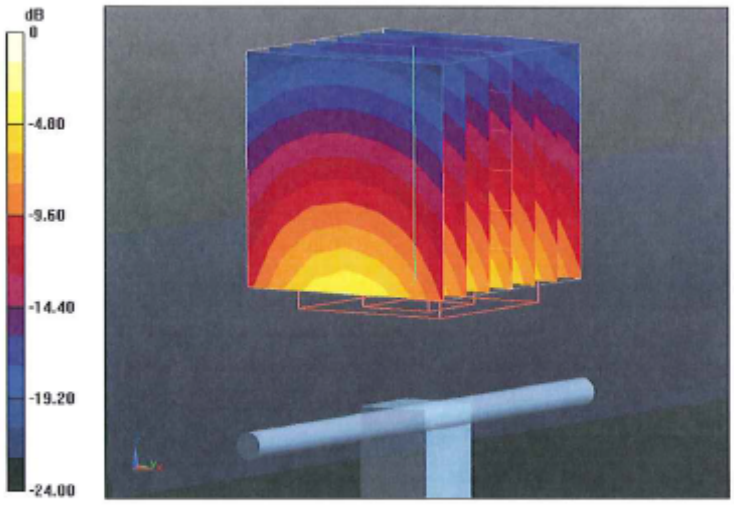
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2 S/m; ε_r = 52.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.42, 4.42, 4.42); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

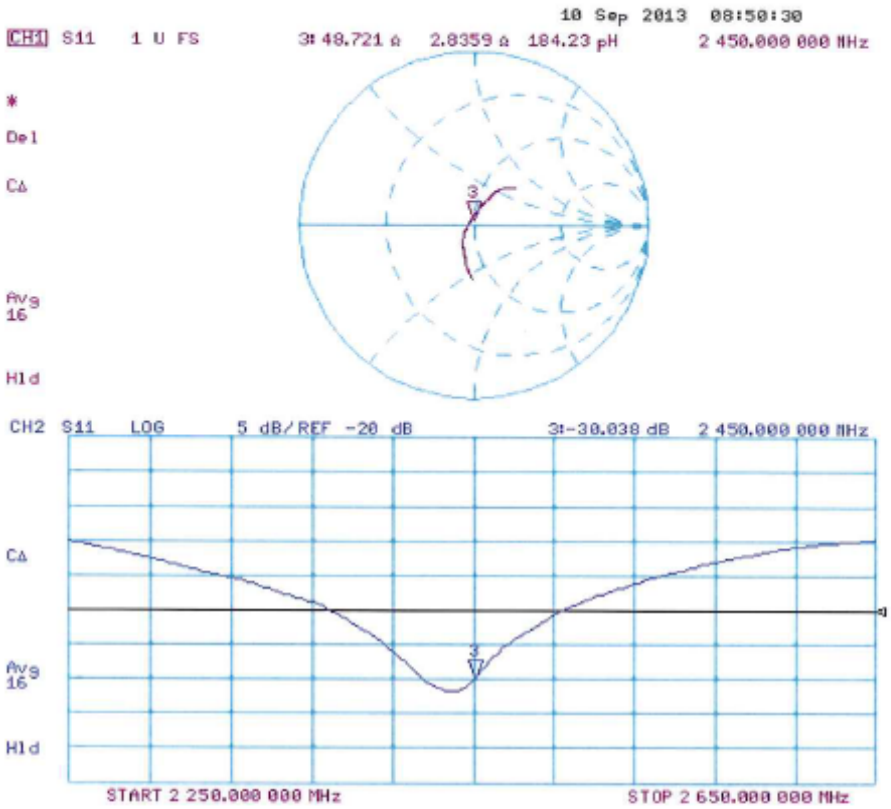
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.095 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 26.1 W/kg
SAR(1 g) = 12.6 W/kg; SAR(10 g) = 5.89 W/kg
Maximum value of SAR (measured) = 16.7 W/kg



0 dB = 16.7 W/kg = 12.23 dBW/kg

Impedance Measurement Plot for Body TSL



UL Japan, Inc.
Ise EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone: +81 596 24 8999
Facsimile: +81 596 24 8124

D2450V2 Calibration for Impedance and Return-loss

1. Test environment

Date	September 18, 2014		
Ambient Temperature	24.0 deg.C	Relative humidity	50%RH

2. Equipment used

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MNA-01	Network Analyzer	Agilent/HP	E8358A	US41080381	SAR	2014/08/21 * 12
MNCK-01	Type N Calibration Kit	Agilent	85032F	MY41495257	SAR	2014/08/18 * 12
EST-46	3.5mm ECONOMY CALIBRATION KIT	Agilent	85052D	MY43252869	SAR	2014/08/15 * 12
MPSAM-03	SAM Phantom	Schmid&Partner Engineering AG	QD000P40CD	1764	SAR	2014/06/03 * 12
MPF-03	2mmOval Flat Phantom ERI 5.0	Schmid&Partner Engineering AG	QDOVA001BB	1203	SAR	2014/06/03 * 12
MOS-30	Thermo-Hygrometer	Custom	CTH-201	3001	SAR	2014/07/06 * 12
MOS-35	Digital thermometer	HANNA	Checktemp 4	-	SAR	2014/07/06 * 12
HSL2450						Daily check
MSL2450						Daily check
SAR room1						Daily check

3. Test Result

Impeadance,Transformed to feed point	Head	Deviation	Tolerance	Result
Calibration (SPEAG) 2013/09/10	51.8 Ω+0.7jΩ	-	-	-
Calibration(ULJ)2014/9/18	51.5Ω+0.9jΩ	-0.3Ω+0.2jΩ	+/-5Ω+/-5jΩ	Complied

Return loss	Head	Deviation	Tolerance	Result
Calibration (SPEAG) 2013/09/10	-34.4dB	-	-	-
Calibration(ULJ)2014/9/18	-35.3dB	-0.9dB	-34.4 *+/-20%	Complied

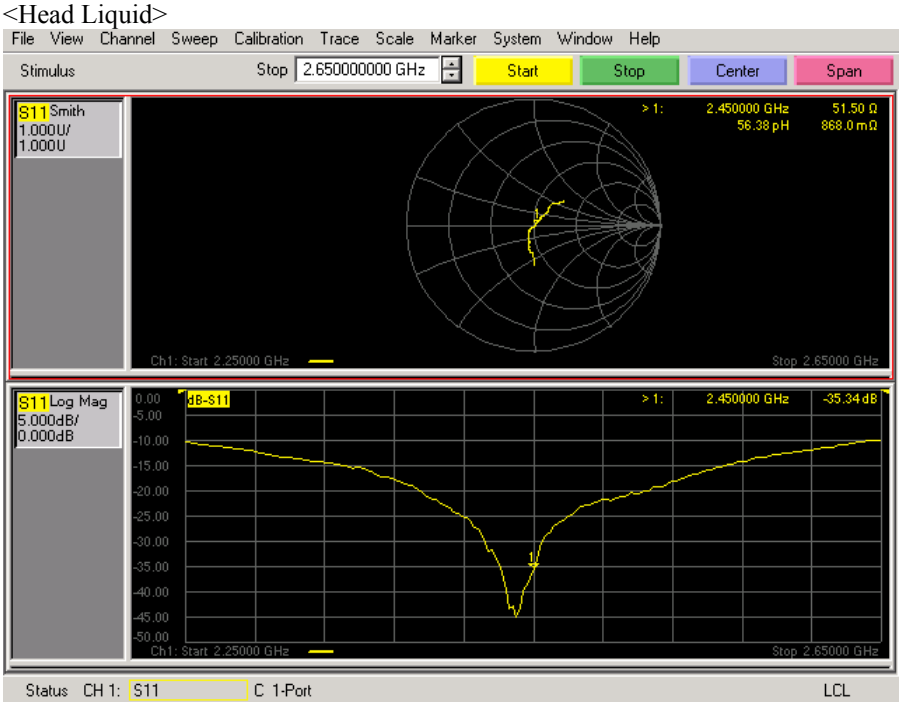
Impeadance,Transformed to feed point	Body	Deviation	Tolerance	Result
Calibration (SPEAG) 2013/09/10	48.7Ω+2.8jΩ	-	-	-
Calibration(ULJ)2014/9/18	49.6Ω+2.8jΩ	+0.9Ω+/-0jΩ	+/-5Ω+/-5jΩ	Complied

Return loss	Body		Tolerance	Result
Calibration (SPEAG) 2013/09/10	-30.0dB	-	-	-
Calibration(ULJ)2014/9/18	-31.0dB	-1.0dB	-30.0 *+/-20%	Complied

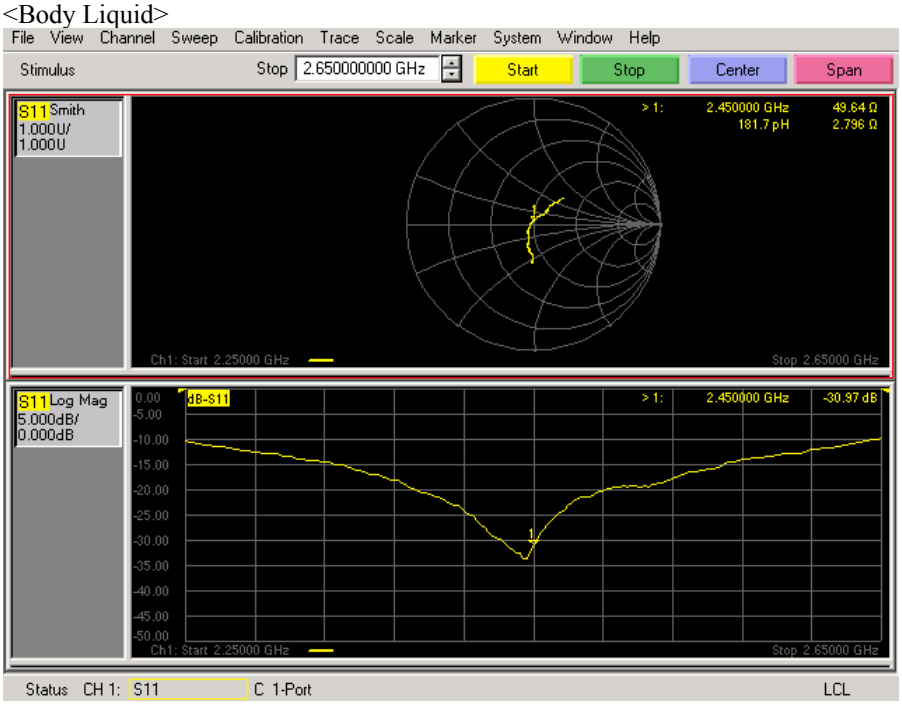
*Tolerance : According to the KDB450824D02

Measurement Plots

<Head Liquid>



<Body Liquid>



5. System Check Dipole (D5GHzV2,S/N:1020)

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client UL Japan (Vitec) **Certificate No: D5GHzV2-1020_Jan15**

CALIBRATION CERTIFICATE

Object D5GHzV2 - SN:1020

Calibration procedure(s) QA CAL-22.v2
Calibration procedure for dipole validation kits between 3-6 GHz

Calibration date: January 13, 2015

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe EX3DV4	SN: 3503	30-Dec-14 (No. EX3-3503_Dec14)	Dec-15
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-15

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

	Name	Function	Signature
Calibrated by:	Israe Elnaouq	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 14, 2015

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

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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEC 62209-2, "Evaluation of Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices in the Frequency Range of 30 MHz to 6 GHz: Human models, Instrumentation, and Procedures"; Part 2: "Procedure to determine the Specific Absorption Rate (SAR) for including accessories and multiple transmitters", March 2010
b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"
c) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.