SAR Test Report

Report No.: AGC05041160809FH01

FCC ID	:	A2HW1013
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	Tablet
BRAND NAME	:	VENTURER, RCA
MODEL NAME	:	WT19503W, W1013, W101 V2
CLIENT	:	Alco Electronics Ltd.
DATE OF ISSUE	:	Oct. 31,2016
STANDARD(S)	:	IEEE Std. 1528:2013;FCC 47CFR § 2.1093;IEEE/ANSI C95.1:1992
REPORT VERSION	:	V1.0

Attestation of Global Compliance(Shenzhen) Co., Ltd.

Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Oct. 31,2016	Valid	Original Report

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Test Report Certification

Applicant Name	:	Alco Electronics Ltd.
Applicant Address	:	11/F Zung Fu Industrial Building,1067 King's Road, Quarry Bay, H.K.
Manufacturer Name	:	Alco Electronics (Dongguan) Limited
Manufacturer Address	:	Gong Ye Xi road, Houjie Technology Industrial Park, Houjie, Dongguan Guangdong, P.R.C. Postal Code: 523960
Product Designation	:	Tablet
Brand Name	:	VENTURER, RCA
Model Name	:	WT19503W, W1013, W101 V2
Different Description		See page 7. The test model is WT19503W.
EUT Voltage	:	DC3.7V by battery
Applicable Standard	:	IEEE Std. 1528:2013;FCC 47CFR § 2.1093;IEEE/ANSI C95.1:1992
Test Date	:	Sep.12,2016
Performed Location		Attestation of Global Compliance(Shenzhen) Co., Ltd. 2 F, Building 2, No.1-No.4, Chaxi Sanwei Technical Industrial Park, Gushu, Xixiang Street, Bao'an District, Shenzhen, China
Report Template		AGCRT-US-2.4G/SAR (2016-01-01)

Tested By: Bobby Wang (signature)
Bobby wang(Wang Zhicheng) Oct. 31,2016

Checked By: Angela Li (signature)
Angela Li(Li Jiao) Oct. 31,2016

Authorized By: Solger Zhang (signature)
Solger Zhang(Zhang Hongyi)
Authorized Officer
Oct. 31,2016

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1. SUMMARY OF MAXIMUM SAR VALUE

The maximum results of Specific Absorption Rate (SAR) found during testing for EUT are as follows:

Frequency Band	Highest Reported 1g-SAR(W/Kg)
	Body-worn(with 0 mm separation)
802.11b	0.940
802.11n(20)	0.759

This device is compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6W/Kg) specified in IEEE Std. 1528:2013; FCC 47CFR § 2.1093; IEEE/ANSI C95.1:1992 and the following specific FCC Test Procedures:

- KDB 447498 D01 General RF Exposure Guidance v06
- KDB 616217 D04 SAR for laptops and tablets v01r02
- KDB 865664 D01 SAR Measurement 100MHz to 6GHz v01r04
- KDB 248227 D01 802 11 Wi-Fi SAR v02r02

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2. GENERAL INFORMATION

2.1. EUT Description

General Information	
Product Designation	Tablet
Test Model	WT19503W
Hardware Version	WT19503W, W1013, W101 V2
Software Version	N/A
Device Category	Portable
RF Exposure Environment	Uncontrolled
Antenna Type	Internal, Integral
WIFI	
WIFI Specification	☐802.11ac ☒802.11b ☒802.11g ☒802.11n(20) ☒802.11n(40)
Operation Frequency	2412~2462MHz
Modulation	11b: DQPSK, DBPSK, DSSS, CCK; 11g\n: BPSK, QPSK, 16QAM, 64QAM, OFDM
Maximum Output Power	11b: 22.32dBm,11g: 23.56dBm,11n(20): 24.08dBm,11n(40): 17.12dBm
Antenna Gain	0dBi
Bluetooth	
Bluetooth Version	☐V2.0 ☐V2.1 ☐V2.1+EDR ☒V3.0 ☐V3.0+HS ☒V4.0 ☐V4.1
Operation Frequency	2402~2480MHz
Type of modulation	☒GFSK ☒П/4-DQPSK ☒8-DPSK
Maximum Output Power	-2.00 dBm
Antenna Gain	0dBi
Accessories	
Battery	Brand name: PowTech Model No. : PT3090135 Voltage and Capacitance: 3.7 V & 4000mAh
Adapter	Brand name: Dokocom, ACT Model No. : STC-U100502000-Z ,APS-L012050200W-G Input: AC 100-240V, 50/60Hz, 0.3A Output: DC 5V, 2000mA

Note: The sample used for testing is end product.

Product	Type	
	☒ Production unit	☐ Identical Prototype

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4 May 2016

To whom it may concern,

Multiple Models Confirmation Letter

I, the undersigned, hereby confirm that the family models are listed in the following table.

These models are **identical** as follows:

- ✔ Electronics/electrical designs, including software & firmware
- ✔ Construction design/Physical design/Enclosure
- ✔ PCB layout
- ☐ (Others, please specify)________________

The only **differences** between these models are the follows for marketing purpose:

- ☐ Color
- ☐ Cosmetic details
- ✔ Trade name
- ✔ Model Number
- ☐ (Others, please specify)________________

☐ Suffix ("__________") represents
- ☐ Color code
- ☐ Packing configuration
- ☐ (Others, please specify)________________

For the product subject to authorization under FCC Declaration of Conformity:
In addition, it is to confirm that all the below information
1) the U.S. responsible party,
2) FCC label artworks and location,
3) FCC required statement in the user manual
are the same but different in the following model numbers only:

Item No.	New model	Model Number	Trade Name	Remarks
1	✔ YES	WT19503W	VENTURER	
2	✔ YES	W1013, W101 V2	RCA	
3				
4		21-Jul-2016		
5				

The sample being submitted to Intertek Testing Services for conformity assessment is WT19503W (tested model) of the above list.

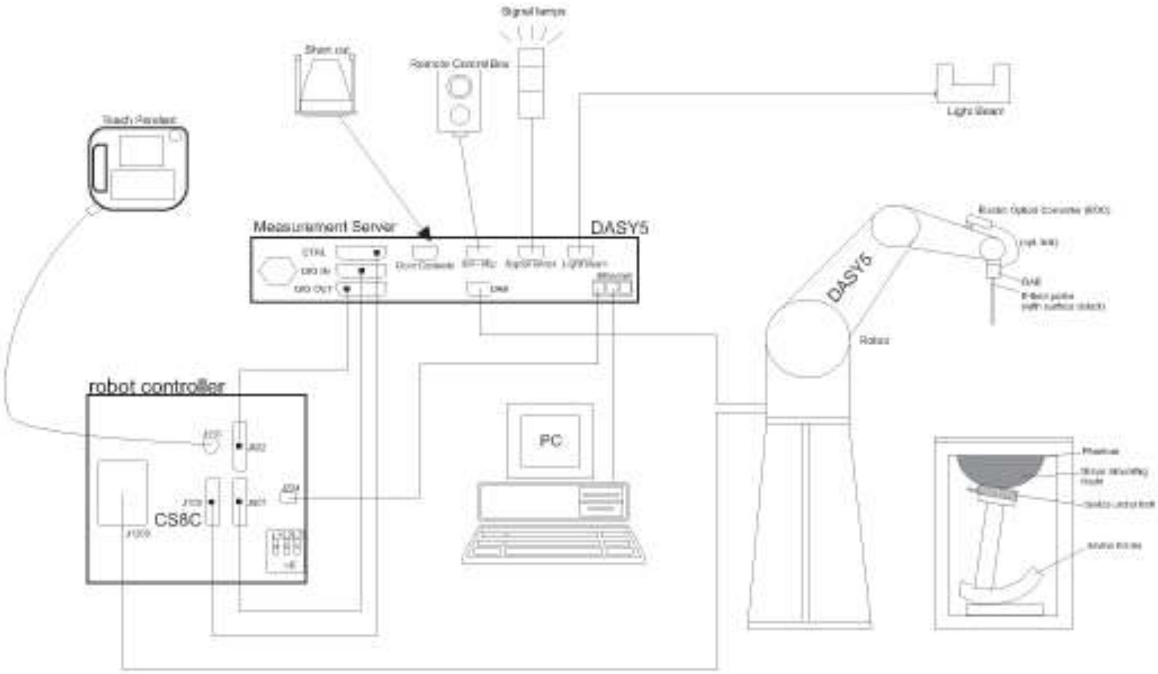
Regards,
Alco Electronics Ltd.

(for Peggy Suen)

PEGGY SUEN
Secretary, Engineering Dept.

3. SAR MEASUREMENT SYSTEM

3.1. The DASY5 system used for performing compliance tests consists of following items



- A standard high precision 6-axis robot with controller, teach pendant and software.
- Data acquisition electronics (DAE) which attached to the robot arm extension. The DAE consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information, as well as an optical uplink for commands and the clock
- A dosimetric probe equipped with an optical surface detector system.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital Communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- A Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- Phantoms, device holders and other accessories according to the targeted measurement.

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3.2. DASY5 E-Field Probe

The SAR measurement is conducted with the dosimetric probe manufactured by SPEAG. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. SPEAG conducts the probe calibration in compliance with international and national standards (e.g. IEEE Std. 1528:2013; FCC 47CFR § 2.1093; IEEE/ANSI C95.1:1992 and relevant KDB files.) The calibration data are in Appendix D.

Isotropic E-Field Probe Specification

Model	ES3DV3	
Manufacture	SPEAG	
frequency	0.15GHz-3 GHz Linearity:±0.2dB(150MHz-3 GHz)	
Dynamic Range	0.01W/Kg-100W/Kg Linearity:±0.2dB	
Dimensions	Overall length:337mm Tip diameter:4mm Typical distance from probe tip to dipole centers:2mm	
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 3 GHz with precision of better 30%.	

3.3. Data Acquisition Electronics description

The data acquisition electronics (DAE) consist if a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converte and a command decoder with a control logic unit. Transmission to the measurement sever is accomplished through an optical downlink fir data and status information, as well as an optical uplink for commands and the clock.

The mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection.

DAE4

Input Impedance	200MOhm	
The Inputs	Symmetrical and floating	
Common mode rejection	above 80 dB	

3.4. Robot

The DASY system uses the high precision robots (DASY5:TX60) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version from is used.
The XL robot series have many features that are important for our application:

- High precision (repeatability 0.02 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)
- 6-axis controller

3.5. Light Beam Unit

The light beam switch allows automatic “tooling” of the probe. During the process, the actual position of the probe tip with respect to the robot arm is measured, as well as the probe length and the horizontal probe offset. The software then corrects all movements, such that the robot coordinates are valid for the probe tip.
The repeatability of this process is better than 0.1 mm. If a position has been taught with an aligned prob.1 mm, even if the other probe has different dimensions. During probe rotations, the probe tip will keep its actual position. e, the same position will be reached with another aligned probe within 0

3.6. Device Holder

The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (EPR).
Thus the device needs no repositioning when changing the angles.
The DASY device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity ε=3 and loss tangent δ = 0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

3.7. Measurement Server

The measurement server is based on a PC/104 CPU board with CPU (DASY5: 400 MHz, Intel Celeron), chip-disk (DASY5: 128MB), RAM (DASY5: 128MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DAYS I/O board, which is directly connected to the PC/104 bus of the CPU board.
The measurement server performs all the real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operations.

3.8. PHANTOM

SAM Twin Phantom

The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region where shell thickness increases to 6mm). It has three measurement areas: □ Left head □ Right head □ Flat phantom	

The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

ELI4 Phantom

□ Flat phantom a fiberglass shell flat phantom with 2mm+/- 0.2 mm shell thickness. It has only one measurement area for Flat phantom	

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4. SAR MEASUREMENT PROCEDURE

4.1. Specific Absorption Rate (SAR)

SAR is related to the rate at which energy is absorbed per unit mass in object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and occupational/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of given mass density (ρ). The equation description is as below:

$$SAR = \frac{d}{dt}\left(\frac{dW}{dm}\right) = \frac{d}{dt}\left(\frac{dW}{\rho dV}\right)$$

SAR is expressed in units of Watts per kilogram (W/Kg)
SAR can be obtained using either of the following equations:

$$SAR = \frac{\sigma E^2}{\rho}$$

$$SAR = c_h \left.\frac{dT}{dt}\right|_{t=0}$$

Where

SAR	is the specific absorption rate in watts per kilogram;
E	is the r.m.s. value of the electric field strength in the tissue in volts per meter;
σ	is the conductivity of the tissue in siemens per metre;
ρ	is the density of the tissue in kilograms per cubic metre;
c_h	is the heat capacity of the tissue in joules per kilogram and Kelvin;
$\frac{dT}{dt} \mid t = 0$	is the initial time derivative of temperature in the tissue in kelvins per second

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4.2. SAR Measurement Procedure

Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurement are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface is 2.7mm This distance cannot be smaller than the distance os sensor calibration points to probe tip as `defined in the probe properties,

Step 2: Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in db) is specified in the standards for compliance testing. For example, a 2db range is required in IEEE Std. 1528:2013 standards, whereby 3db is a requirement when compliance is assessed in accordance with the ARIB standard (Japan) If one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximum are detected, the number of Zoom Scan has to be increased accordingly.

Area Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100MHz to 6GHz

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

Step 3: Zoom Scan

Zoom Scan are used to assess the peak spatial SAR value within a cubic average volume containing 1g abd 10g of simulated tissue. The Zoom Scan measures points(refer to table below) within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1g and 10g and displays these values next to the job's label.

Zoom Scan Parameters extracted from KDB865664 d01 SAR Measurement 100MHz to 6GHz

<table>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.
* When zoom scan is required and the <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

Step 4: Power Drift Measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the same settings. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

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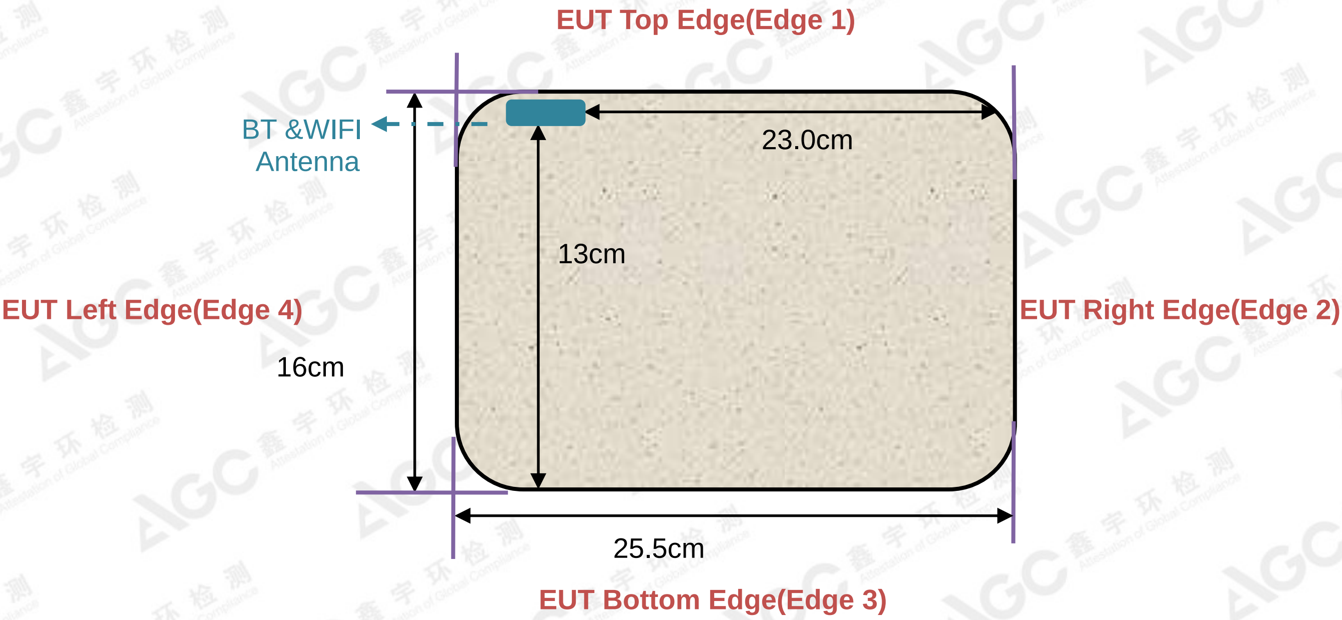
4.3. RF Exposure Conditions

Test Configuration and setting:

For WLAN testing, the EUT is configured with the WLAN continuous TX tool through engineering command.

Antenna Location: (front view)



5. TISSUE SIMULATING LIQUID

For SAR measurement of the field distribution inside the phantom, the phantom must be filled with homogeneous tissue simulating liquid to a depth of at least 15cm. For head SAR testing the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15cm For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15cm.The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5% are listed in 4.2

5.1. The composition of the tissue simulating liquid

Ingredient	2450MHz
(Weight)	Body (100%)
Water	70%
Salt	1%
DGBE	9%
Triton X-100	20%

5.2. Tissue Dielectric Parameters for Head and Body Phantoms

The head tissue dielectric parameters recommended by the IEEE 1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in IEEE 1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations described in Reference [12] and extrapolated according to the head parameters specified in IEEE 1528.

Target Frequency (MHz)	head		body	
	εr	σ (S/m)	εr	σ (S/m)
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	1.01	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	**52.7**	**1.95**
3000	38.5	2.40	52.0	2.73
5800	35.3	5.27	48.2	6.00

(εr = relative permittivity, σ = conductivity and ρ = 1000 kg/m3)

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5.3. Tissue Calibration Result

The dielectric parameters of the liquids were verified prior to the SAR evaluation using DASY5 Dielectric Probe Kit and R&S Network Analyzer ZVL6.

Tissue Stimulant Measurement for 2450MHz					
	Fr. (MHz)	Dielectric Parameters (±5%)		Tissue Temp [°C]	Test time
		εr52.7(50.065-55.335)	δ[s/m]1.95(1.8525-2.0475)		
Body	2412	54.23	1.89	21.5	Sep.12,2016
	2437	53.59	1.92		
	2450	52.96	1.94		
	2462	52.34	1.97		

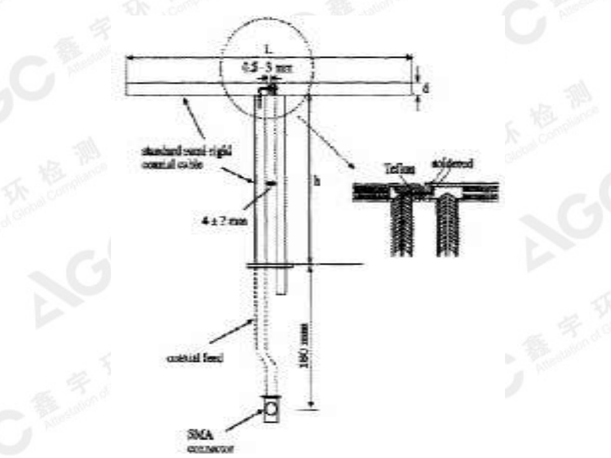
6. SAR SYSTEM CHECK PROCEDURE

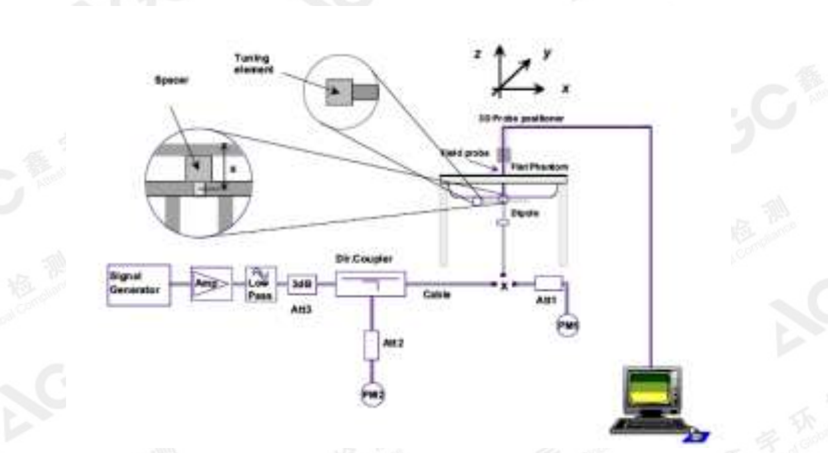
6.1. SAR System Check Procedures

SAR system check is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device. The same SAR probe(s) and tissue-equivalent media combinations used with each specific SAR system for system verification must be used for device testing. When multiple probe calibration points are required to cover substantially large transmission bands, independent system verifications are required for each probe calibration point. A system verification must be performed before each series of SAR measurements using the same probe calibration point and tissue-equivalent medium. Additional system verification should be considered according to the conditions of the tissue-equivalent medium and measured tissue dielectric parameters, typically every three to four days when the liquid parameters are remeasured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

Each DASY system is equipped with one or more system check kits. These units, together with the predefined measurement procedures within the DASY software, enable the user to conduct the system check and system validation. System kit includes a dipole, and dipole device holder.

The system check verifies that the system operates within its specifications. It’s performed daily or before every SAR measurement. The system check uses normal SAR measurement in the flat section of the phantom with a matched dipole at a specified distance. The system check setup is shown as below.





6.2. SAR System Check
6.2.1. Dipoles

The dipoles used is based on the IEEE 1528 standard, the table below provides details for the mechanical and electrical Specifications for the dipoles.

Frequency	L (mm)	h (mm)	d (mm)
2450MHz	51.5	30.4	3.6

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6.2.2. System Check Result

System Performance Check at 2450MHz for Body										
Validation Kit: D2450V2-SN:968										
Frequency [MHz]	Target Value(W/Kg)		Reference Result (± 10%)		Tested SAR Value(W/Kg) Input Power=18dBm		Normalized to 1W(W/Kg)		Tissue Temp. [°C]	Test time
	1g	10g	1g	10g	1g	10g	1g	10g		
2450	51.7	24.3	46.53-56.87	21.87-26.73	3.45	1.61	54.679	25.517	21.5	Sep.12,2016

Note:

(1) We use a CW signal of 18dBm for system check, and then all SAR value are normalized to 1W forward power. The result must be within ±10% of target value.

(2) Tested normalized SAR (W/kg) = Tested SAR (W/kg) ×[1000/ 10^1.8]

6.3. SAR System Validation

SAR probe and tissue dielectric parameters are as shown bellow.

Test Data	Probe S/N	Tested Freq. (MHz)	Tissue Type	Cond.	Perm	CW validation			Mod. validation		
						Sensitivity	Probe Linearity	Probe Isotropy	Mod. Type	Duty Factor	Peak to average power ratio
03/12/2016	3337	2450	body	1.95	53.55	PASS	PASS	PASS	OFDM	N/A	PASS
03/12/2016	3337	2450	body	1.95	53.55	PASS	PASS	PASS	DSSS	PASS	N/A
03/11/2016	3337	2450	head	1.73	39.77	PASS	PASS	PASS	OFDM	N/A	PASS
03/11/2016	3337	2450	head	1.73	39.77	PASS	PASS	PASS	DSSS	PASS	N/A

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7. EUT TEST POSITION

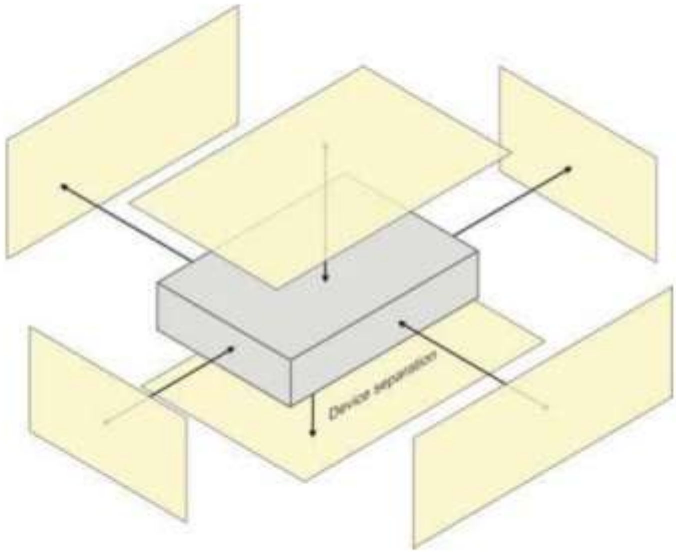
This EUT was tested in **Body back, Body front and 4 edges.**

7.1. Body Worn Position

(1) To position the EUT parallel to the phantom surface.

(2) To adjust the EUT parallel to the flat phantom.

(3) To adjust the distance between the EUT surface and the flat phantom to **0mm.**



8. SAR EXPOSURE LIMITS

SAR assessments have been made in line with the requirements of IEEE Std. 1528:2013, FCC 47CFR § 2.1093, FCC Supplement C, and comply with ANSI/IEEE C95.1-1992 "Uncontrolled Environments" limits. These limits apply to a location which is deemed as "Uncontrolled Environment" which can be described as a situation where the general public may be exposed to an RF source with no prior knowledge or control over their exposure.

Limits for General Population/Uncontrolled Exposure (W/kg)

Type Exposure	Uncontrolled Environment Limit (W/kg)
Spatial Peak SAR (1g cube tissue for brain or body)	1.60
Spatial Average SAR (Whole body)	0.08
Spatial Peak SAR (Limbs)	4.0

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9. TEST EQUIPMENT LIST

Equipment description	Manufacturer/ Model	Identification No.	Current calibration date	Next calibration date
Stäubli Robot	Stäubli-TX60	F13/5Q2UD1/A/01	N/A	N/A
Robot Controller	Stäubli-CS8	139522	N/A	N/A
TISSUE Probe	SATIMO	SN 45/11 OCPG45	12/02/2015	12/01/2016
E-Field Probe	Speag- ES3DV3	SN:3337	10/01/2015	09/30/2016
EL4 Phantom	ELI V5.0	1210	N/A	N/A
Device Holder	Speag-SD 000 H01 KA	SD 000 H01 KA	N/A	N/A
DAE4	Speag-SD 000 D04 BM	1398	02/02/2016	02/01/2017
SAR Software	Speag-DASY5	DASY52.8	N/A	N/A
Liquid	SATIMO	-	N/A	N/A
Dipole	D2450V2	SN968	06/12/2015	06/11/2018
Signal Generator	Agilent-E4438C	US41461365	02/29/2016	02/28/2017
Vector Analyzer	Agilent / E4440A	US40420298	07/02/2016	07/01/2017
Network Analyzer	Rhode & Schwarz ZVL6	SN100132	03/04/2016	03/03/2017
Attenuator	Warison /WATT-6SR1211	N/A	N/A	N/A
Attenuator	Mini-circuits / VAT-10+	N/A	N/A	N/A
Amplifier	EM30180	SN060552	03/04/2016	03/03/2017
Directional Couple	Werlatone/ C5571-10	SN99463	07/02/2016	07/01/2017
Directional Couple	Werlatone/ C6026-10	SN99482	07/02/2016	07/01/2017
Power Sensor	NRP-Z21	1137.6000.02	10/20/2015	10/19/2016
Power Sensor	NRP-Z23	US38261498	03/01/2016	02/28/2017
Power Viewer	R&S	V2.3.1.0	N/A	N/A

Note: Per KDB 865664 Dipole SAR Validation, AGC Lab has adopted 3 years calibration intervals. On annual basis, every measurement dipole has been evaluated and is in compliance with the following criteria:
1. There is no physical damage on the dipole;
2. System validation with specific dipole is within 10% of calibrated value;
3. Return-loss is within 20% of calibrated measurement;
4. Impedance is within 5Ω of calibrated measurement.

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10. MEASUREMENT UNCERTAINTY

The component of uncertainly may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainly by the statistical analysis of a series of observations is termed a Type An evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience, and knowledge of the behavior and properties of relevant materials and instruments, manufacture's specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in Table as follow.

Uncertainty Distributions	**Normal**	**Rectangular**	**Triangular**	**U-Shape**
Multi-plying Factor(a)	1/k(b)	$1/\sqrt{3}$	$1/\sqrt{6}$	$1/\sqrt{2}$

(a) Standard uncertainty is determined as the product of the multiplying factor and the estimated range of variations in the measured quantity

(b) κ is the coverage factor

Table 13.1 Standard Uncertainty for Assumed Distribution (above table)

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual "root-sum-squares" (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is shown in the following tables.

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DASY5 Uncertainty

Measurement uncertainty for 150 MHz to 3GHz averaged over 1 gram / 10 gram.

Uncertainty Component	Sec.	Tol (+- %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	Vi
Measurement System									
Probe calibration	E.2.1	6.65	N	1	1	1	6.65	6.65	∞
Axial Isotropy	E.2.2	0.25	R	$\sqrt{3}$	1	1	0.14	0.14	∞
Hemispherical Isotropy	E.2.2	1.3	R	$\sqrt{3}$	1	1	0.75	0.75	
Linearity	E.2.4	0.3	R	$\sqrt{3}$	1	1	0.17	0.17	∞
Probe modulation	E.2.5	1.65	R	$\sqrt{3}$	1	1	0.95	0.95	∞
Detection limits	E.2.4	0.9	R	$\sqrt{3}$	1	1	0.52	0.52	∞
Boundary effect	E.2.3	0.9	R	$\sqrt{3}$	1	1	0.52	0.52	∞
Readout Electronics	E.2.6	0.2	N	1	1	1	0.20	0.20	∞
Response Time	E.2.7	0.0	R	$\sqrt{3}$	1	1	0.00	0.00	∞
Integration Time	E.2.8	0.0	R	$\sqrt{3}$	1	1	0.00	0.00	∞
RF ambient Conditions-noise	E.6.1	0.9	R	$\sqrt{3}$	1	1	0.52	0.52	∞
RF ambient Conditions-reflections	E.6.1	0.9	R	$\sqrt{3}$	1	1	0.52	0.52	∞
Probe positioned mech. restrictions	E.6.2	0.7	R	$\sqrt{3}$	1	1	0.40	0.40	∞
Probe positioning with respect to phantom shell	E.6.3	6.5	R	$\sqrt{3}$	1	1	3.75	3.75	∞
Post-processing	E.5	3.8	R	$\sqrt{3}$	1	1	2.19	2.19	∞
Test sample related									
Device holder uncertainty	E.4.1	3.6	N	1	1	1	3.60	3.60	M-1
Test sample positioning	E.4.2	3.2	N	1	1	1	3.20	3.20	M-1
SAR scaling	E.6.5	0	R	$\sqrt{3}$	1	1	0.00	0.00	∞
Drift of output power(measured SAR drift)	E.2.9	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
Phantom and set-up									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞
Algorithm for correcting SAR for deviations in permittivity and conductivity	E.3.2	1.9	N	1	1	0.84	1.90	1.60	∞
Liquid conductivity (meas.)	E.3.3	5	N	1	0.78	0.71	3.90	3.55	M-1
Liquid permittivity (meas.)	E.3.3	5	N	1	0.23	0.26	1.15	1.30	M
Liquid permittivity – temperature uncertainty	E.3.4	5	R	$\sqrt{3}$	0.78	0.71	2.25	2.05	∞
Liquid conductivity – temperature uncertainty	E.3.4	5	R	$\sqrt{3}$	0.23	0.26	0.66	0.75	∞
Combined Standard Uncertainty			RSS				10.65	10.39	
Expanded Uncertainty (95% Confidence interval)			k				21.30	20.78	

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System validation for 150 MHz to 3GHz averaged over 1 gram / 10 gram.									
Uncertainty Component	Sec.	Tol (+- %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	Vi
Measurement System									
Probe calibration	E.2.1	6.65	N	1	1	1	6.65	6.65	∞
Axial Isotropy	E.2.2	0.25	R	$\sqrt{3}$	1	1	0.14	0.14	∞
Hemispherical Isotropy	E.2.2	1.3	R	$\sqrt{3}$	1	1	0.75	0.75	
Linearity	E.2.4	0.3	R	$\sqrt{3}$	1	1	0.17	0.17	∞
Probe modulation	E.2.5	1.65	R	$\sqrt{3}$	1	1	0.95	0.95	∞
Detection limits	E.2.4	0.9	R	$\sqrt{3}$	1	1	0.52	0.52	∞
Boundary effect	E.2.3	0.9	R	$\sqrt{3}$	1	1	0.52	0.52	∞
Readout Electronics	E.2.6	0.2	N	1	1	1	0.20	0.20	∞
Response Time	E.2.7	0.0	R	$\sqrt{3}$	1	1	0.00	0.00	∞
Integration Time	E.2.8	0.0	R	$\sqrt{3}$	1	1	0.00	0.00	∞
RF ambient Conditions-noise	E.6.1	0.9	R	$\sqrt{3}$	1	1	0.52	0.52	∞
RF ambient Conditions-reflections	E.6.1	0.9	R	$\sqrt{3}$	1	1	0.52	0.52	∞
Probe positioned mech. restrictions	E.6.1	0.7	R	$\sqrt{3}$	1	1	0.40	0.40	∞
Probe positioning with respect to phantom shell	E.6.2	6.5	R	$\sqrt{3}$	1	1	3.75	3.75	∞
Post-processing	E.6.3	3.8	R	$\sqrt{3}$	1	1	2.19	2.19	∞
System validation source(dipole)									
Deviation of the experimental source from numerical source	E6.4	5.3	N	1	1	1	5.30	5.30	∞
Source to liquid distance	8,E.6.6	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Drift of output power(measured SAR drift)	8,6.6.4	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
Phantom and set-up									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞
Algorithm for correcting SAR for deviations in permittivity and conductivity	E.3.2	1.9	N	1	1	0.84	1.90	1.60	∞
Liquid conductivity (meas.)	E.3.3	5	N	1	0.78	0.71	3.90	3.55	M
Liquid permittivity (meas.)	E.3.3	5	N	1	0.23	0.26	1.15	1.30	M
Liquid permittivity – temperature uncertainty	E.3.4	5	R	$\sqrt{3}$	0.78	0.71	2.25	2.05	∞
Liquid conductivity – temperature uncertainty	E.3.4	5	R	$\sqrt{3}$	0.23	0.26	0.66	0.75	∞
Combined Standard Uncertainty			RSS				10.90	10.635	
Expanded Uncertainty (95% Confidence interval)			k				21.79	21.270	

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System check for 150 MHz to 3GHz averaged over 1 gram / 10 gram.									
Uncertainty Component	Sec.	Tol (+- %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	Vi
Measurement System									
Probe calibration drift	E.2.1.3	2.0	N	1	1	1	6.00	6.00	∞
Axial Isotropy	E.2.2	0.25	R	$\sqrt{3}$	0	0	0	0	∞
Hemispherical Isotropy	E.2.2	1.3	R	$\sqrt{3}$	0	0	0	0	
Linearity	E.2.4	0.3	R	$\sqrt{3}$	0	0	0	0	∞
Probe modulation	E.2.5	1.65	R	$\sqrt{3}$	0	0	0	0	∞
Detection limits	E.2.4	0.9	R	$\sqrt{3}$	0	0	0	0	∞
Boundary effect	E.2.3	0.9	R	$\sqrt{3}$	0	0	0	0	∞
Readout Electronics	E.2.6	0.2	N	1	0	0	0	0	∞
Response Time	E.2.7	0	R	$\sqrt{3}$	0	0	0	0	∞
Integration Time	E.2.8	0	R	$\sqrt{3}$	0	0	0	0	∞
RF ambient Conditions-noise	E.6.1	0.9	R	$\sqrt{3}$	0	0	0	0	∞
RF ambient Conditions-reflections	E.6.1	0.9	R	$\sqrt{3}$	0	0	0	0	∞
Probe positioned mech. restrictions	E.6.2	0.7	R	$\sqrt{3}$	1	1	0.40	0.40	∞
Probe positioning with respect to phantom shell	E.6.3	6.5	R	$\sqrt{3}$	1	1	3.75	3.75	∞
Post-processing	E.5	3.8	R	$\sqrt{3}$	0	0	0	0	∞
System check source(dipole)									
Deviation of the experimental source from numerical source	E6.4	5.3	N	1	1	1	5.30	5.30	∞
Source to liquid distance	8,E.6.6	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Drift of output power(measured SAR drift)	8,6.6.4	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
Phantom and set-up									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞
Algorithm for correcting SAR for deviations in permittivity and conductivity	E.3.2	1.9	N	1	1	0.84	1.90	1.60	∞
Liquid conductivity (meas.)	E.3.3	5	N	1	0.78	0.71	3.90	3.55	M
Liquid permittivity (meas.)	E.3.3	5	N	1	0.23	0.26	1.15	1.30	M
Liquid permittivity – temperature uncertainty	E.3.4	5	R	$\sqrt{3}$	0.78	0.71	2.25	2.05	∞
Liquid conductivity – temperature uncertainty	E.3.4	5	R	$\sqrt{3}$	0.23	0.26	0.66	0.75	∞
Combined Standard Uncertainty			RSS				8.11	7.86	
Expanded Uncertainty (95% Confidence interval)			k				16.22	15.52	

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11. CONDUCTED POWER MEASUREMENT

WIFI

Mode	Data Rate (Mbps)	Channel	Frequency(MHz)	Maximum Output Power (dBm)
802.11b	1	01	2412	**22.32**
		06	2437	22.12
		11	2462	21.98
802.11g	6	01	2412	**23.56**
		06	2437	23.32
		11	2462	23.12
802.11n(20)	6.5	01	2412	**24.08**
		06	2437	24.04
		11	2462	23.68
802.11n(40)	13.5	03	2422	17.12
		06	2437	16.94
		09	2452	16.78

Bluetooth_V3.0

Modulation	Channel	Frequency(MHz)	Maximum Output Power (dBm)
GFSK	0	2402	-2.00
	39	2441	-2.80
	78	2480	-3.60
π /4-DQPSK	0	2402	-2.00
	39	2441	-2.80
	78	2480	-3.60
8-DPSK	0	2402	-2.00
	39	2441	-2.80
	78	2480	-3.60

Bluetooth_V4.0

Modulation	Channel	Frequency(MHz)	Maximum Output Power (dBm)
GFSK	0	2402	-3.00
	19	2440	-3.20
	39	2480	-4.00

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12. TEST RESULTS

12.1. SAR Test Results Summary

12.1.1. Test position and configuration

Body SAR was performed with the device 0mm from the phantom according to KDB 616217.

12.1.2. Operation Mode

1. Per KDB 447498 D01 v06 ,for each exposure position, if the highest 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional.
2. Per KDB 865664 D01 v01r04,for each frequency band, if the measured SAR is ≥0.8W/Kg, testing for repeated SAR measurement is required , that the highest measured SAR is only to be tested. When the SAR results are near the limit, the following procedures are required for each device to verify these types of SAR measurement related variation concerns by repeating the highest measured SAR configuration in each frequency band.
   (1) When the original highest measured SAR is ≥0.8W/Kg, repeat that measurement once.
   (2) 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.
   (3) Perform a third repeated measurement only if the original, first and second repeated measurement is ≥1.5 W/Kg and ratio of largest to smallest SAR for the original, first and second measurement is ≥ 1.20.
3. Maximum Scaling SAR in order to calculate the Maximum SAR values to test under the standard Peak Power, Calculation method is as follows:
   Maximum Scaling SAR =tested SAR (Max.) ×[maximum turn-up power (mw)/ maximum measurement output power(mw)]
4. 802.11b DSSS SAR Test Requirements:
   a. SAR is measured for 2.4GHz 802.11b DSSS mode using the highest measured maximum output power channel, when the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤0.8W/Kg, no further SAR testing is requires for 802.11b DSSS in that exposure configuration.
   b. When the reported SAR is >0.8W/Kg, SAR is required for that exposure configuration using the next highest measured output power channel. When any reported SAR is >1.2W/Kg, SAR is required the for third channel; iI,e., all channels require testing.
5. 802.11g/n OFDM SAR Test Exclusion Requirement:
   a. When KDB Publication 447498 D01 SAR test exclusion applies to the OFDM configuration.
   b. SAR is not required for 802.11g/n since the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤1.2W/Kg.
6. OFDM Transmission Mode SAR Test Channel Selection

   For the 2.4G and 5GHz bands, when the same maximum output power was specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration with the largest channel bandwidth, lowest order modulation and lowest data rate. SAR is measured using the configuration with the largest channel bandwidth, lowest order modulation and lowest data rate. When the maximum output power of a channel is the same for equivalent OFDM configuration; for example, 802.11n or 802.11g and 802.11n with the same channel bandwidth, modulation and data rate

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etc., the lower order 802.11 mode i.e., 802.11a, then 802.11n or 802.11g then 802.11n is used for SAR measurement. When the maximum output power ware the same for multiple test channels, either according to the default or additional power measurement requirements, SAR is measured using the channel closest to the middle of the frequency band or aggregated band. When there are multiple channels with the same maximum output power, SAR is measured using the higher number channel.

7. Initial Test Configuration Procedure

   For OFDM, in both 2.4GHz and 5GHz bands, an initial test configuration is determined for each frequency band and aggregated band, according to the transmission mode with the highest maximum output power specified for SAR measurements. When the same maximum output is specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configurations with the largest channel bandwidth, lowest order modulation, and lowest data rate. The channel of the transmission mode with the highest average RF output conducted power will be initial test configuration.

   When the reported SAR is ≤0.8W/Kg, no additional measurements on other test channels are required. Otherwise, SAR is evaluated using the subsequent highest average RF output channel until the reported SAR result is ≤ 1.2W/kg or all channels are measured. When there are multiple untested channels giving the 802.11 mode is considered for SAR measurements (See section 7).

8. Subsequent Test Configuration Procedure

   For OFDM configurations, in each frequency band and aggregated band, SAR is evaluated for initial test configuration using the fixed test position or the initial test position procedure, when applicable. When the highest reported SAR for the initial test configuration, adjusted by the radio of the subsequent test configuration to initial test configuration specified maximum output power is ≤1.2W/kg, no addition SAR testing for the subsequent test configurations is required.

9. Bluetooth and WIFI have same antennas, and cannot transmit simultaneously;
10. According to KDB 447498 D01, annex A, SAR is not required for bluetooth because its maximum output power is less than 10 mW.

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12.1.3. SAR Test Results Summary

SAR MEASUREMENT									
Depth of Liquid (cm):>15				Relative Humidity (%): 54.9					
Product: Tablet									
Test Mode: 802.11b									
Position	**Mode**	**Ch.**	**Fr. (MHz)**	**Power Drift (<±0.2)**	**SAR (1g) (W/kg)**	**Max. Tune-up Power (dBm)**	**Meas. output Power (dBm)**	**Scaled SAR (W/Kg)**	**Limit W/kg**
Body back	DSSS	01	2412	-0.02	0.529	22.50	22.32	0.551	1.6
Body front	DSSS	01	2412	-0.12	**0.902**	22.50	22.32	**0.940**	1.6
Body front	DSSS	06	2437	0.06	0.785	22.50	22.12	0.857	1.6
Body front	DSSS	11	2462	-0.13	0.809	22.50	21.98	0.912	1.6
Body back + keyboard	DSSS	01	2412	-0.08	0.701	22.50	22.32	0.731	1.6
Edge 1	DSSS	01	2412	0.05	0.155	22.50	22.32	0.162	1.6
Edge 4	DSSS	01	2412	-0.12	0.086	22.50	22.32	0.090	1.6

Note:
(1).When the 1-g Reported SAR is ≤ 0.8 W/kg, testing for low and high channel is optional. Refer to KDB 447498.
(2). The test separation of all above table is 0mm.

SAR MEASUREMENT									
Depth of Liquid (cm):>15				Relative Humidity (%): 54.9					
Product: Tablet									
Test Mode: 802.11n(20)									
Position	**Mode**	**Ch.**	**Fr. (MHz)**	**Power Drift (<±0.2)**	**SAR (1g) (W/kg)**	**Max. Tune-up Power (dBm)**	**Meas. output Power (dBm)**	**Scaled SAR (W/Kg)**	**Limit W/kg**
Body back	OFDM	01	2412	-0.19	0.432	24.50	24.08	0.476	1.6
Body front	OFDM	01	2412	0.18	**0.689**	24.50	24.08	**0.759**	1.6
Body back + keyboard	OFDM	01	2412	0.05	0.410	24.50	24.08	0.452	1.6
Edge 1	OFDM	01	2412	0.10	0.145	24.50	24.08	0.160	1.6
Edge 4	OFDM	01	2412	0.07	0.088	24.50	24.08	0.097	1.6

Note:
(1).When the 1-g Reported SAR is ≤ 0.8 W/kg, testing for low and high channel is optional. Refer to KDB 447498.
(2). The test separation of all above table is 0mm.

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Repeated SAR										
Product: Tablet										
Test Mode: 802.11b										
Position	**Mode**	**Ch.**	**Fr. (MHz)**	**Power Drift (<±5%)**	**Once SAR (1g) (W/kg)**	**Power Drift (<±5%)**	**Twice SAR (1g) (W/kg)**	**Power Drift (<±5%)**	**Third SAR (1g) (W/kg)**	**Limit (W/kg)**
Body front	DSSS	01	2412	-0.07	0.825	--	--	--	--	1.6

SAR Test Exclusion Consideration for Adjacent Edges
Per KDB 447498 D01 cl. 4.3.1:

a) For 100 MHz to 6 GHz and *test separation distances* ≤ 50 mm, the 1-g and 10-g *SAR test exclusion thresholds* are determined by the following:

[(*max. power of channel, including tune-up tolerance, mW*) / (*min. test separation distance, mm*)] · [√f(GHz)] ≤ 3.0

b) For 100 MHz to 6 GHz and *test separation distances* > 50 mm, the 1-g and 10-g *SAR test exclusion thresholds* are determined by the following:

1) {[Power allowed at *numeric threshold* for 50 mm in step a)] + [(test separation distance – 50 mm)·(f(MHz)/150)]} mW, for 100 MHz to 1500 MHz

2) {[Power allowed at *numeric threshold* for 50 mm in step a)] + [(test separation distance – 50 mm)·10]} mW, for > 1500 MHz and ≤ 6 GHz

Edge 2(Right)

SAR test exclusion threshold
= (Power allowed at numeric threshold for 50 mm in step a)+(test separation distance - 50 mm) x 10 mW
= 150/√2.412 + (230 -50) x 10 mW
= 1896.583 mW.

Edge 3(Bottom)

SAR test exclusion threshold
= (Power allowed at numeric threshold for 50 mm in step a)+(test separation distance - 50 mm) x 10 mW
= 150/√2.412 + (130-50) x 10 mW
= 896.583 mW.

Since the Maximum Tune-up Power (**281.84 mW**) is less than the SAR Exclusion Threshold for the right and the bottom, SAR evaluation for these adjacent edges are not required.

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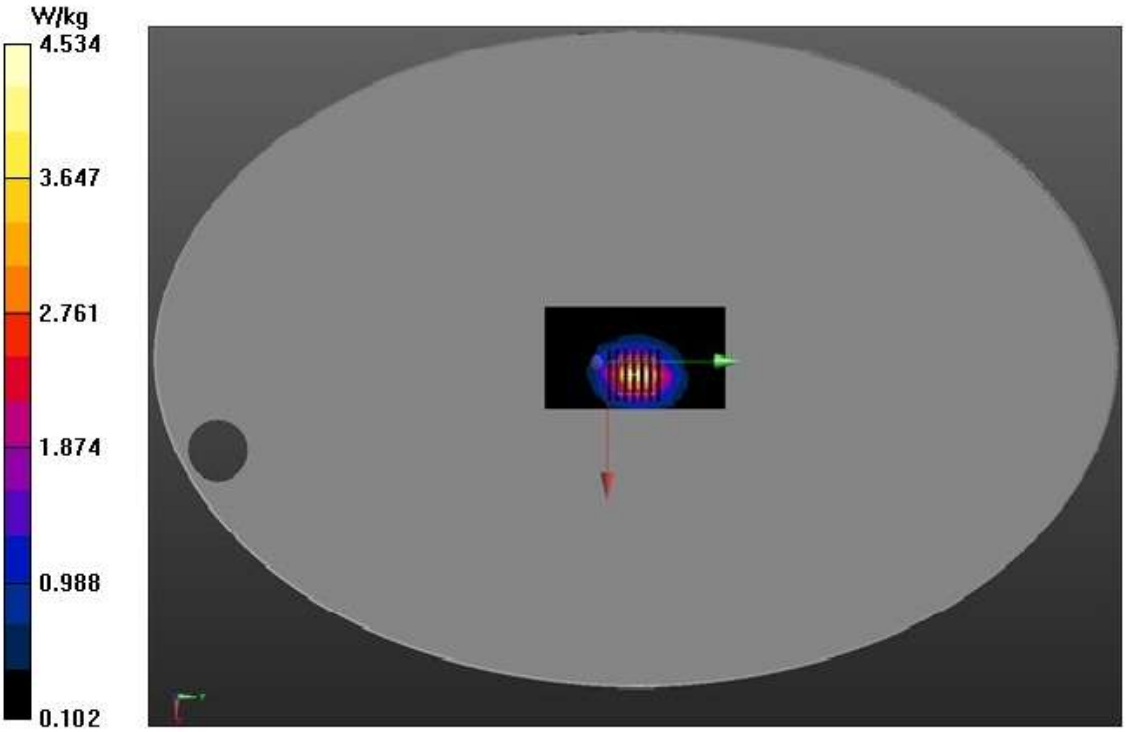
APPENDIX A. SAR SYSTEM CHECK DATA

Test Laboratory: AGC Lab **Date: Sep.12,2016**
System Check Body 2450 MHz
DUT: Dipole 2450 MHz Type: D2450V2
Communication System: CW; Communication System Band: D2450 (2450.0 MHz); Duty Cycle: 1:1;
Frequency: 2450 MHz; Medium parameters used: f = 2450 MHz; σ = 1.94mho/m; εr = 52.96; ρ= 1000 kg/m³ ;
Phantom section: Flat Section; Input Power=18dBm
Ambient temperature (℃): 22.1, Liquid temperature (℃): 21.5

DASY Configuration:
- Probe: ES3DV3 – SN3337; ConvF(4.36, 4.36, 4.36); Calibrated:10/01/2015
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1398; Calibrated: 02/02/2016
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1210;
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/System Check Body 2450MHz / Area Scan (7x12x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 4.47 W/kg
Configuration/System Check Body 2450MHz/ Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 51.689 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 7.27 W/kg
SAR(1 g) = 3.45 W/kg; SAR(10 g) = 1.61 W/kg
Maximum value of SAR (measured) = 4.53 W/kg



APPENDIX B. SAR MEASUREMENT DATA

Test Laboratory: AGC Lab **Date: Sep.12,2016**
802.11b Low- Body- Back
DUT: Tablet; Type: WT19503W

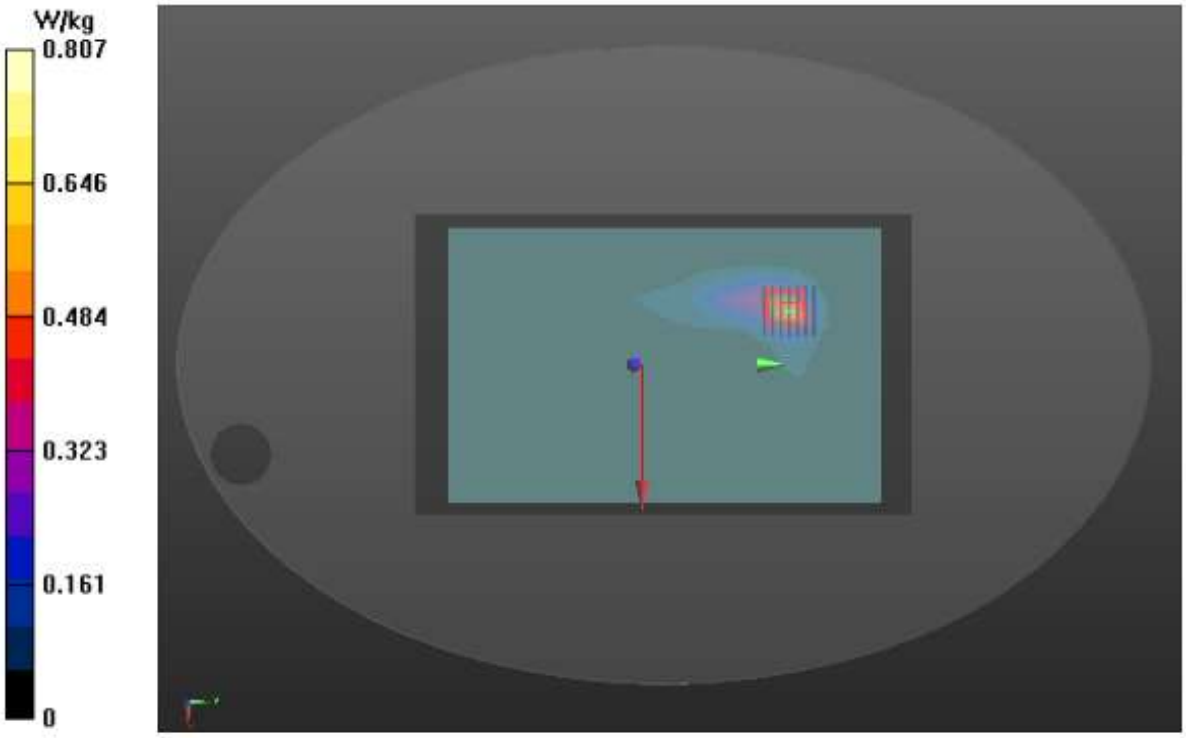
Communication System: UID 0, WiFi 802.11b (0); Communication System Band: 802.11b; Duty Cycle: 1:1;
Frequency: 2412 MHz; Medium parameters used: f = 2450 MHz; σ=1.89 mho/m; εr =54.23; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 22.1, Liquid temperature (℃): 21.5

DASY Configuration:

- Probe: ES3DV3 – SN3337; ConvF(4.36,4.36, 4.36); Calibrated:10/01/2015
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1398; Calibrated: 02/02/2016
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1210;
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

B-WIFI/BACK-L/Area Scan (19x31x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.779 W/kg

B-WIFI/BACK-L/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.578 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.12 W/kg
SAR(1 g) = 0.529 W/kg; SAR(10 g) = 0.235 W/kg
Maximum value of SAR (measured) = 0.807 W/kg



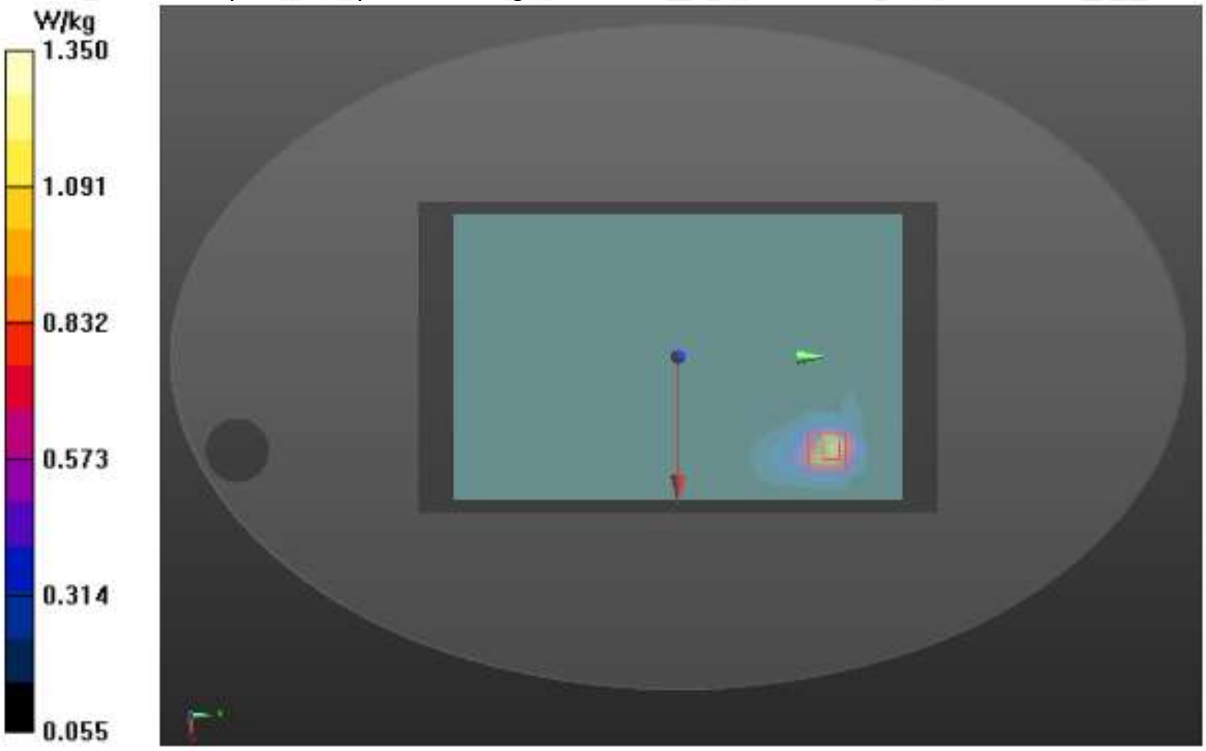
Test Laboratory: AGC Lab **Date: Sep.12,2016**
802.11b Low- Body- Front
DUT: Tablet; Type: WT19503W

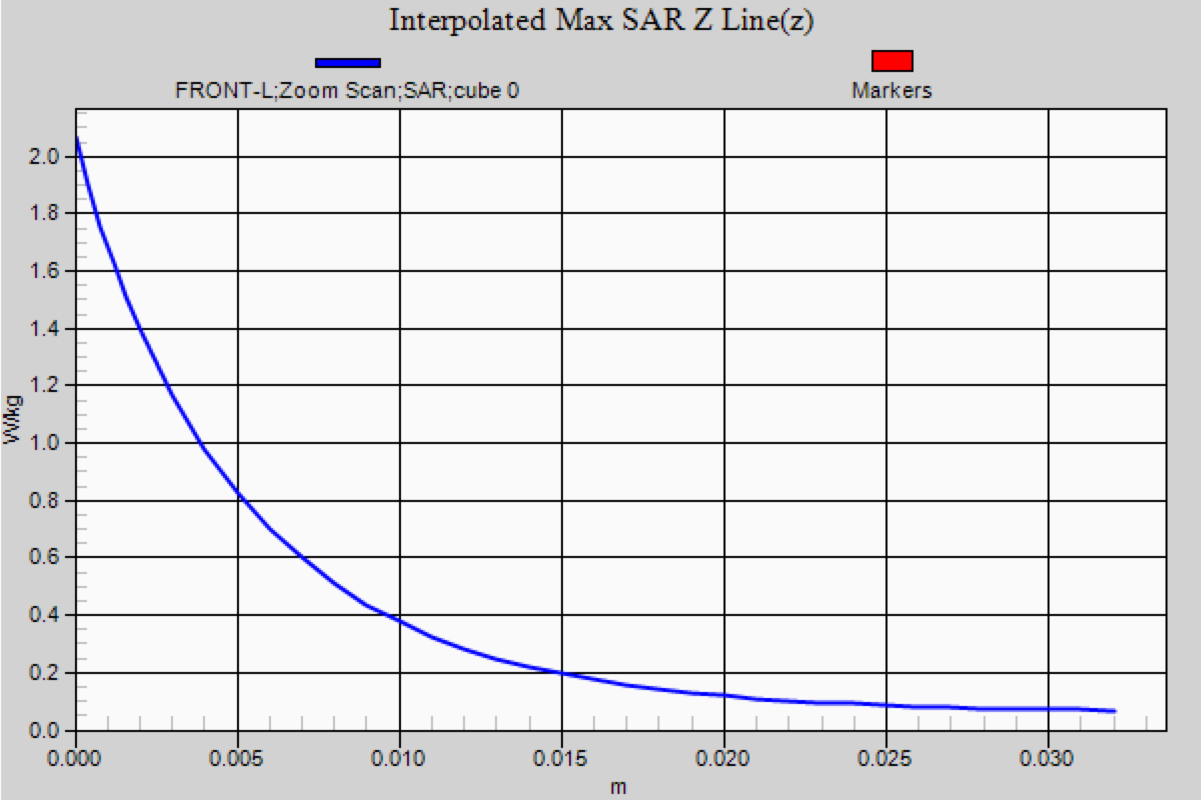
Communication System: UID 0, WiFi 802.11b (0); Communication System Band: 802.11b; Duty Cycle: 1:1;
Frequency: 2412 MHz; Medium parameters used: f = 2450 MHz; σ=1.89 mho/m; εr =54.23; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 22.1, Liquid temperature (℃): 21.5

DASY Configuration:
- Probe: ES3DV3 – SN3337; ConvF(4.36,4.36, 4.36); Calibrated:10/01/2015
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1398; Calibrated: 02/02/2016
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1210;
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

B-WIFI/FRONT-L/Area Scan (19x31x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.38 W/kg

B-WIFI/FRONT-L/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.234 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 2.07 W/kg
SAR(1 g) = 0.902 W/kg; SAR(10 g) = 0.432 W/kg
Maximum value of SAR (measured) = 1.35 W/kg




Interpolated Max SAR Z Line(z)
FRONT-L;Zoom Scan;SAR;cube 0
Markers
W/kg
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.000
0.005
0.010
0.015
0.020
0.025
0.030
m

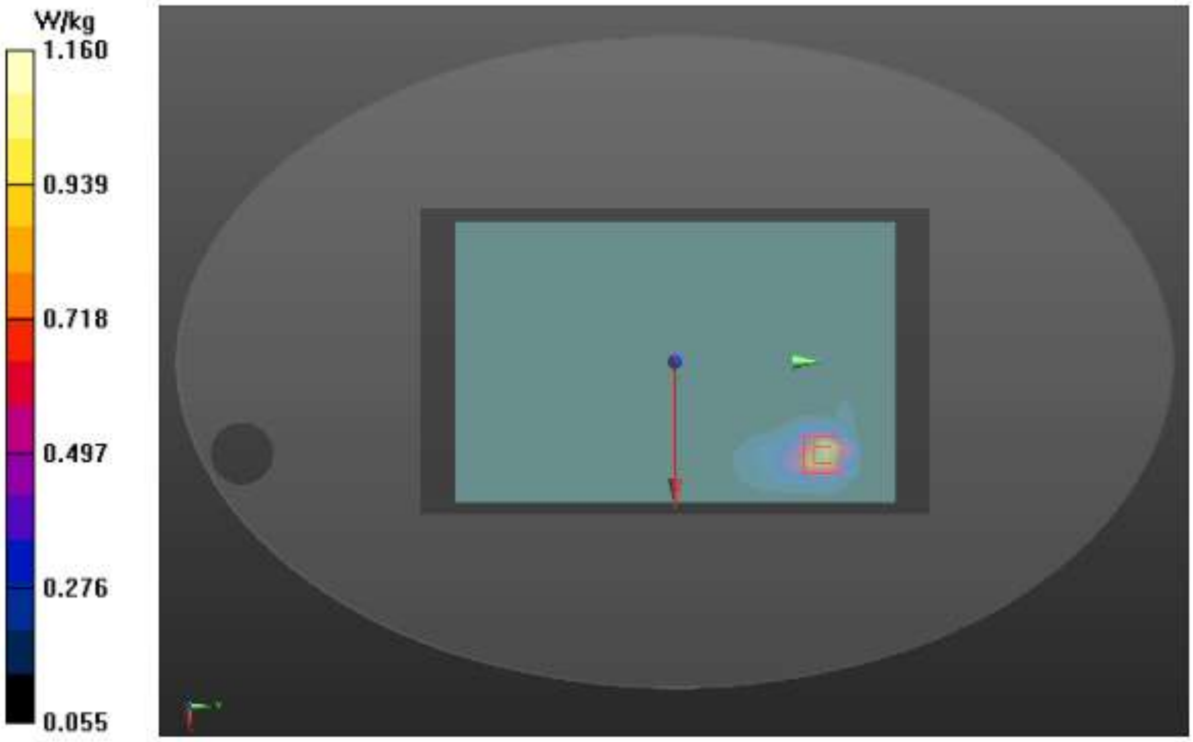
Test Laboratory: AGC Lab **Date: Sep.12,2016**
802.11bMid- Body- Front
DUT: Tablet; Type: WT19503W

Communication System: UID 0, WiFi 802.11b (0); Communication System Band: 802.11b; Duty Cycle: 1:1;
Frequency: 2437 MHz; Medium parameters used: f = 2450 MHz; σ=1.92 mho/m; εr =53.59; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 22.1, Liquid temperature (℃): 21.5

DASY Configuration:
- Probe: ES3DV3 – SN3337; ConvF(4.36,4.36, 4.36); Calibrated:10/01/2015
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1398; Calibrated: 02/02/2016
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1210;
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

B-WIFI/FRONT/Area Scan (19x31x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.10 W/kg

B-WIFI/FRONT/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.161 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.67 W/kg
SAR(1 g) = 0.785 W/kg; SAR(10 g) = 0.380 W/kg
Maximum value of SAR (measured) = 1.16 W/kg



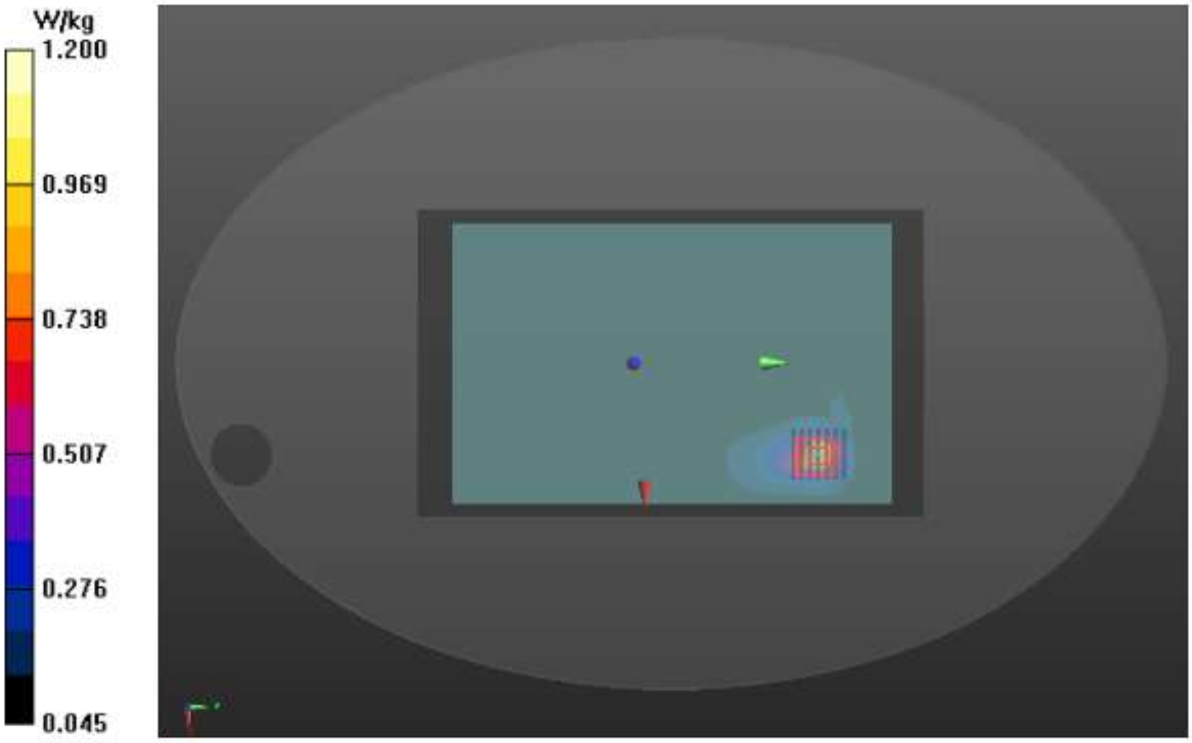
Test Laboratory: AGC Lab **Date: Sep.12,2016**
802.11bHigh- Body- Front
DUT: Tablet; Type: WT19503W

Communication System: UID 0, WiFi 802.11b (0); Communication System Band: 802.11b; Duty Cycle: 1:1;
Frequency: 2462 MHz; Medium parameters used: f = 2450 MHz; σ=1.97 mho/m; εr =52.34; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 22.1, Liquid temperature (℃): 21.5

DASY Configuration:
- Probe: ES3DV3 – SN3337; ConvF(4.36,4.36, 4.36); Calibrated:10/01/2015
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1398; Calibrated: 02/02/2016
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1210;
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

B-WIFI/FRONT-L-H/Area Scan (19x31x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.16 W/kg

B-WIFI/FRONT-L-H/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.987 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 1.74 W/kg
SAR(1 g) = 0.809 W/kg; SAR(10 g) = 0.390 W/kg
Maximum value of SAR (measured) = 1.20 W/kg



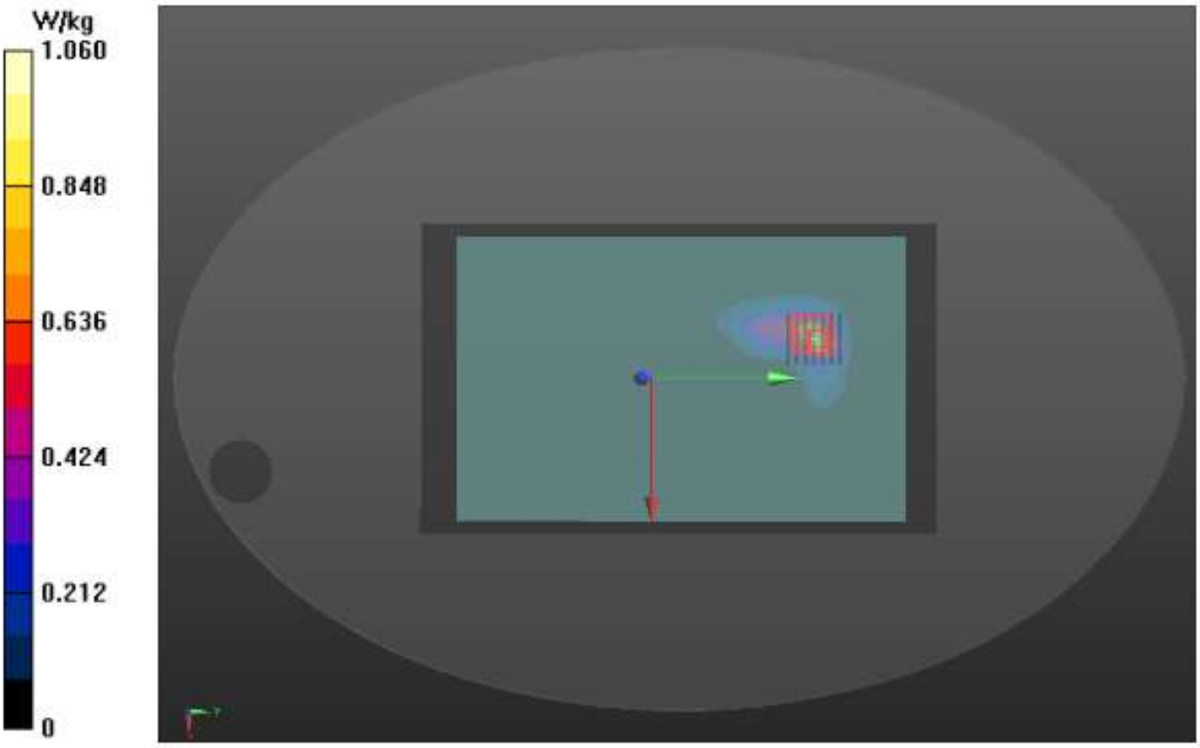
Test Laboratory: AGC Lab **Date: Sep.12,2016**
802.11b Low- Body- Back with keyboard
DUT: Tablet; Type: WT19503W

Communication System: UID 0, WiFi 802.11b (0); Communication System Band: 802.11b; Duty Cycle: 1:1;
Frequency: 2412 MHz; Medium parameters used: f = 2450 MHz; σ=1.89 mho/m; εr =54.23; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 22.1, Liquid temperature (℃): 21.5

DASY Configuration:
- Probe: ES3DV3 – SN3337; ConvF(4.36,4.36, 4.36); Calibrated:10/01/2015
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1398; Calibrated: 02/02/2016
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1210;
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

B-WIFI/KEYBOARD/Area Scan (19x31x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.06 W/kg

B-WIFI/KEYBOARD/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.718 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 1.62 W/kg
SAR(1 g) = 0.701 W/kg; SAR(10 g) = 0.306 W/kg



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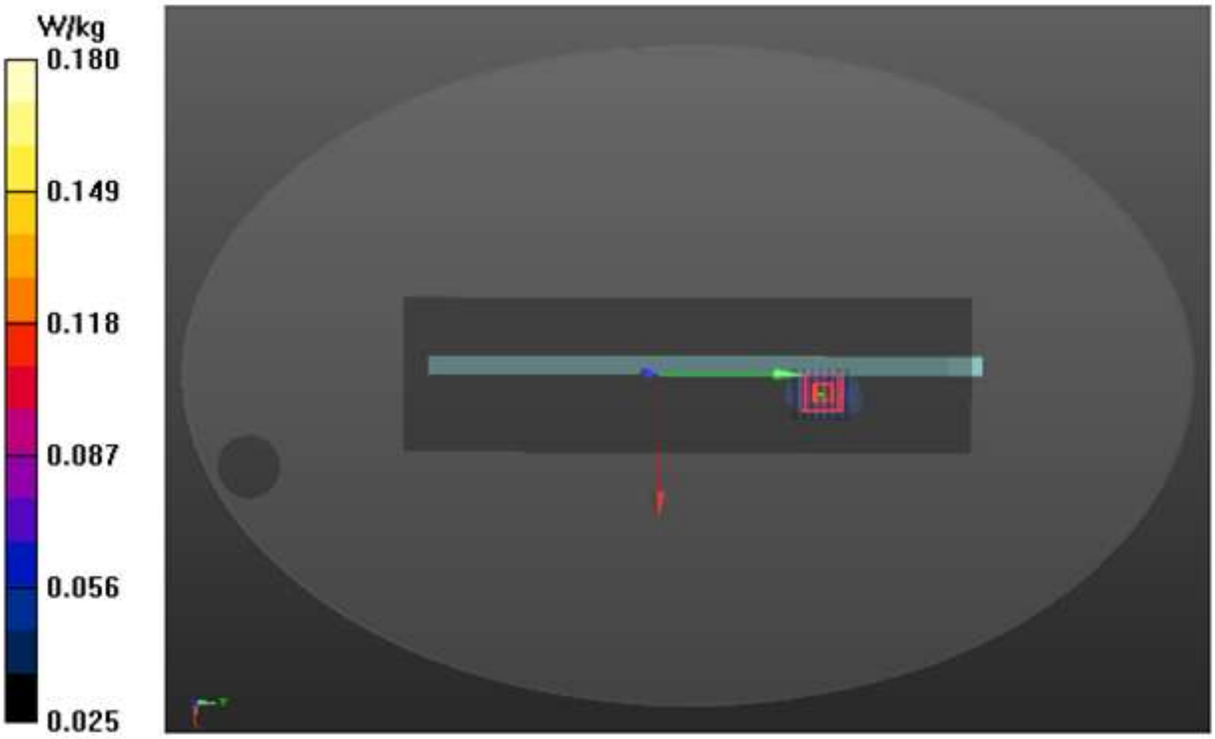
Test Laboratory: AGC Lab **Date: Sep.12,2016**
802.11b Low- Edge 1
DUT: Tablet; Type: WT19503W

Communication System: UID 0, WiFi 802.11b (0); Communication System Band: 802.11b; Duty Cycle: 1:1;
Frequency: 2412 MHz; Medium parameters used: f = 2450 MHz; σ=1.89 mho/m; εr =54.23; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 22.1, Liquid temperature (℃): 21.5

DASY Configuration:
- Probe: ES3DV3 – SN3337; ConvF(4.36,4.36, 4.36); Calibrated:10/01/2015
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1398; Calibrated: 02/02/2016
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1210;
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

B-WIFI/ Edge 1-L/Area Scan (10x34x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.174 W/kg

B-WIFI/ Edge 1-L /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.511 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.197 W/kg
SAR(1 g) = 0.155 W/kg; SAR(10 g) = 0.117 W/kg
Maximum value of SAR (measured) = 0.180 W/kg



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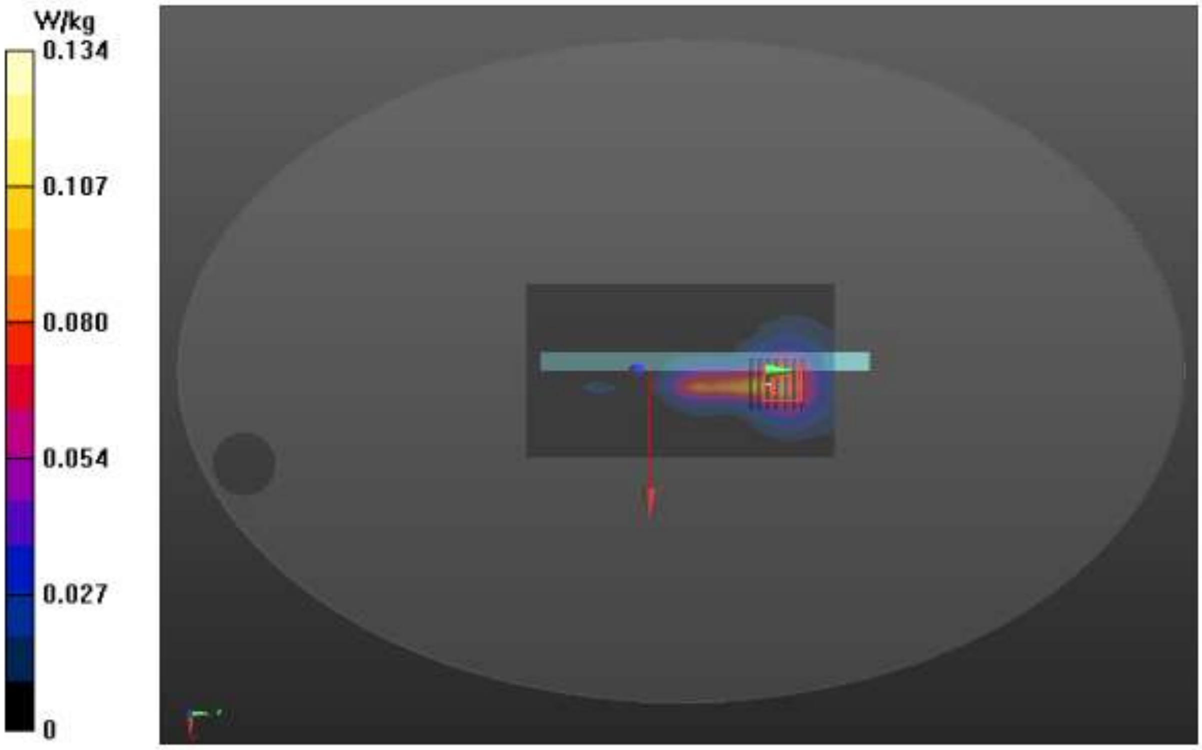
Test Laboratory: AGC Lab **Date: Sep.12,2016**
802.11b Low- Edge 4
DUT: Tablet; Type: WT19503W

Communication System: UID 0, WiFi 802.11b (0); Communication System Band: 802.11b; Duty Cycle: 1:1;
Frequency: 2412 MHz; Medium parameters used: f = 2450 MHz; σ=1.89 mho/m; εr =54.23; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 22.1, Liquid temperature (℃): 21.5

DASY Configuration:
- Probe: ES3DV3 – SN3337; ConvF(4.36,4.36, 4.36); Calibrated:10/01/2015
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1398; Calibrated: 02/02/2016
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1210;
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

B-WIFI/ Edge 4-L/Area Scan (11x19x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.126 W/kg

B-WIFI/ Edge 4-L/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.090 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.189 W/kg
SAR(1 g) = 0.086 W/kg; SAR(10 g) = 0.041 W/kg
Maximum value of SAR (measured) = 0.134 W/kg



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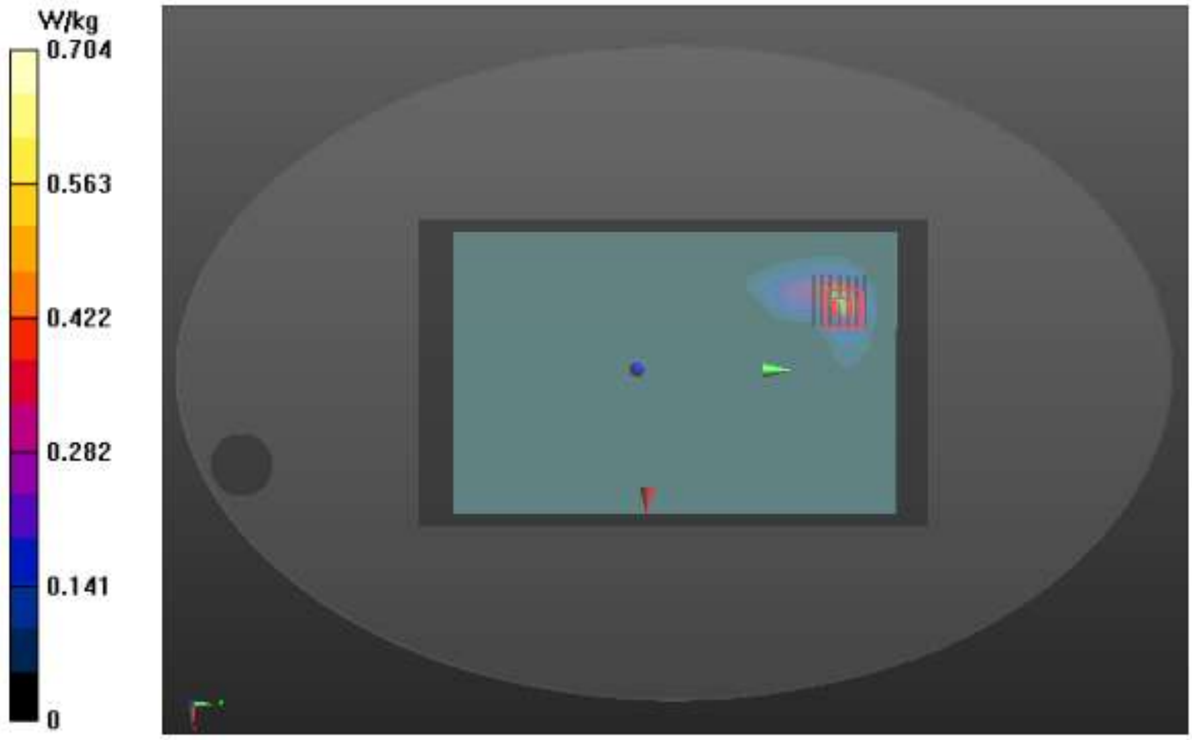
Test Laboratory: AGC Lab **Date: Sep.12,2016**
802.11n(20) Low- Body- Back
DUT: Tablet; Type: WT19503W

Communication System: UID 0, WiFi 802.11n(20) (0); Communication System Band: 802.11n(20); Duty Cycle: 1:1;
Frequency: 2412 MHz; Medium parameters used: f = 2450 MHz; σ=1.89 mho/m; εr =54.23; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 22.1, Liquid temperature (℃): 21.5

DASY Configuration:
- Probe: ES3DV3 – SN3337; ConvF(4.36,4.36, 4.36); Calibrated:10/01/2015
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1398; Calibrated: 02/02/2016
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1210;
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

N20-WIFI/BACK-L/Area Scan (19x31x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.744 W/kg

N20-WIFI/BACK-L/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.334 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 1.08 W/kg
SAR(1 g) = 0.432 W/kg; SAR(10 g) = 0.124 W/kg
Maximum value of SAR (measured) = 0.704 W/kg



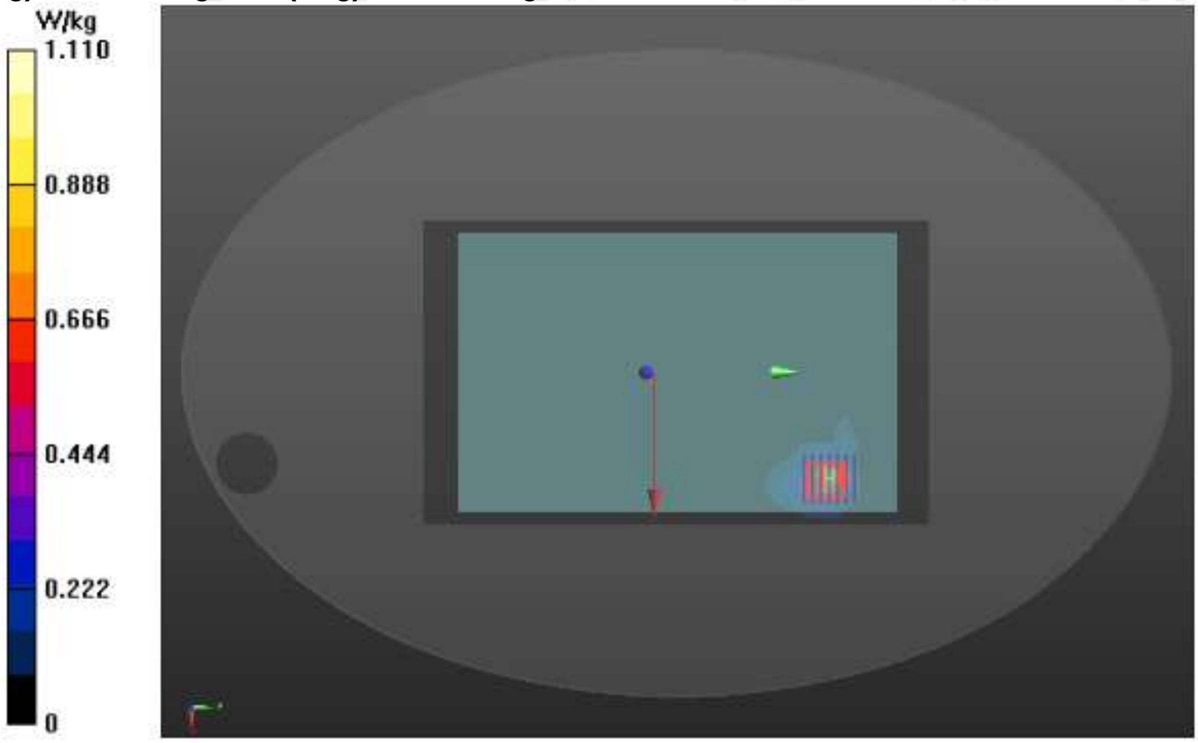
Test Laboratory: AGC Lab **Date: Sep.12,2016**
802.11n(20) Low- Body- Front
DUT: Tablet; Type: WT19503W

Communication System: UID 0, WiFi 802.11n(20) (0); Communication System Band: 802.11n(20); Duty Cycle: 1:1;
Frequency: 2412 MHz; Medium parameters used: f = 2450 MHz; σ=1.89 mho/m; εr =54.23; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 22.1, Liquid temperature (℃): 21.5

DASY Configuration:
- Probe: ES3DV3 – SN3337; ConvF(4.36,4.36, 4.36); Calibrated:10/01/2015
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1398; Calibrated: 02/02/2016
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1210;
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

N20-WIFI/FRONT-L/Area Scan (19x31x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.11 W/kg

N20-WIFI/FRONT-L/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 1.76 W/kg
SAR(1 g) = 0.689 W/kg; SAR(10 g) = 0.287 W/kg



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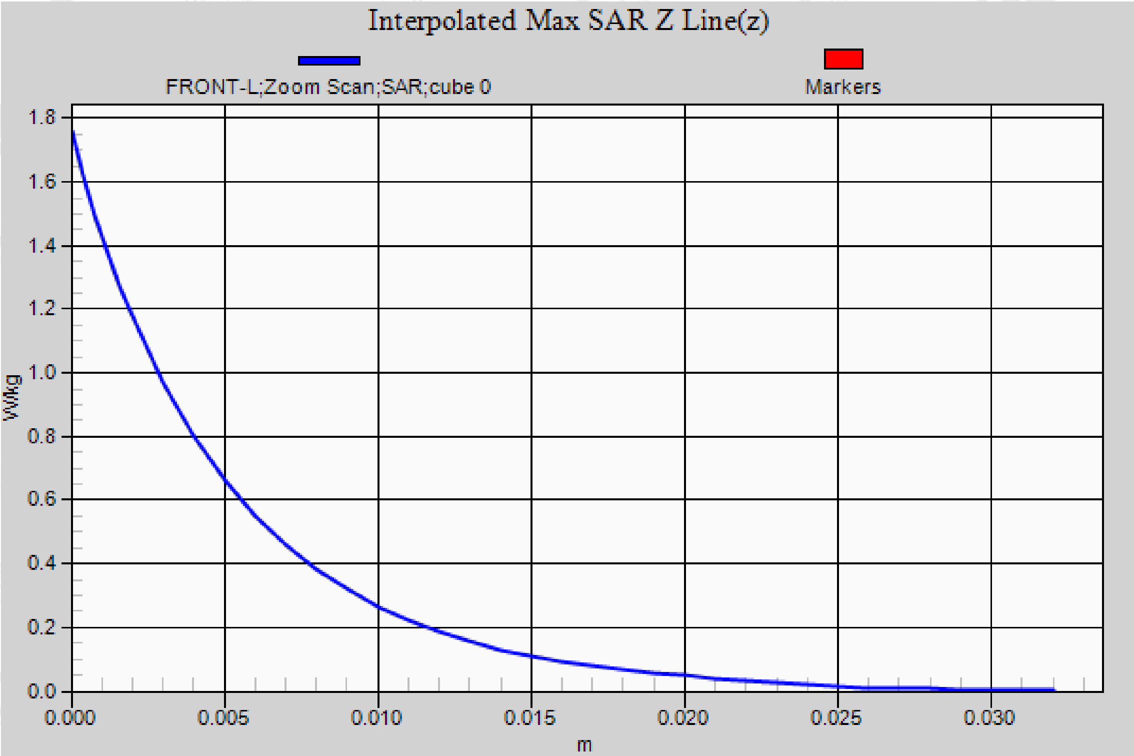

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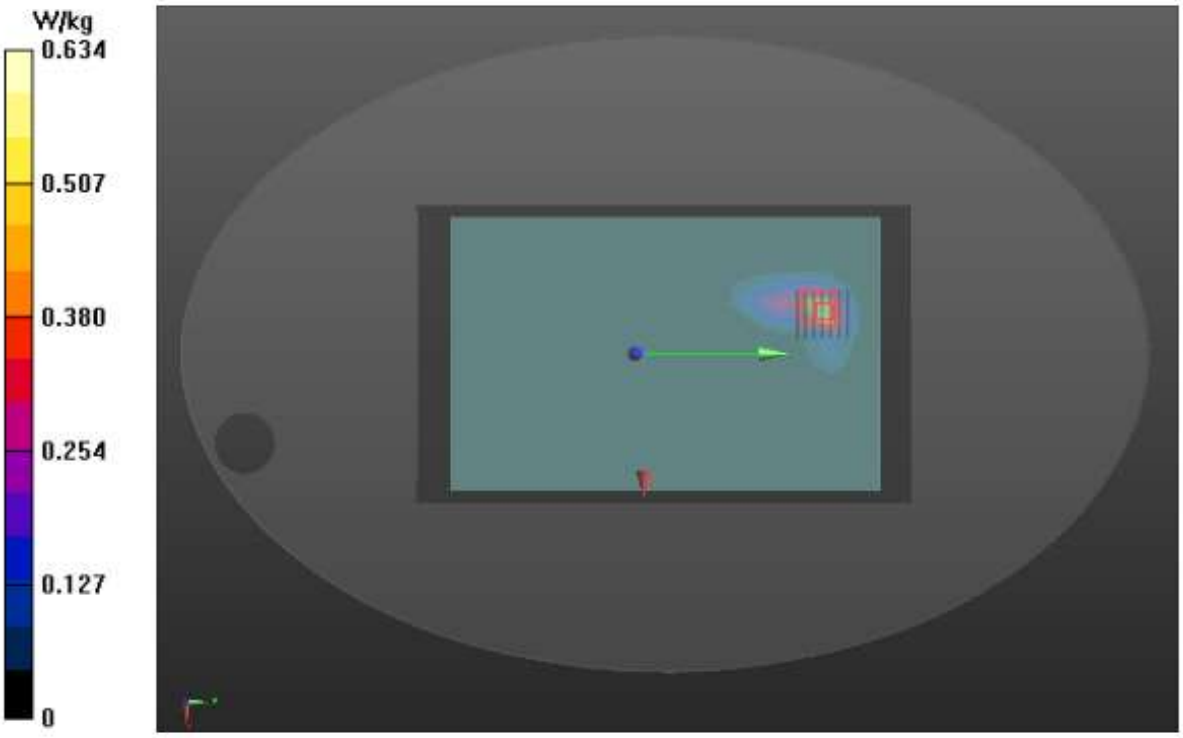
Test Laboratory: AGC Lab **Date: Sep.12,2016**
802.11n(20) Low- Body- Back with keyboard
DUT: Tablet; Type: WT19503W

Communication System: UID 0, WiFi 802.11n(20) (0); Communication System Band: 802.11n(20); Duty Cycle: 1:1;
Frequency: 2412 MHz; Medium parameters used: f = 2450 MHz; σ=1.89 mho/m; εr =54.23; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 22.1, Liquid temperature (℃): 21.5

DASY Configuration:
- Probe: ES3DV3 – SN3337; ConvF(4.36,4.36, 4.36); Calibrated:10/01/2015
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1398; Calibrated: 02/02/2016
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1210;
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

N20-WIFI/KEYBOARD/Area Scan (19x31x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.573 W/kg

N20-WIFI/KEYBOARD/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.840 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.935 W/kg
SAR(1 g) = 0.410 W/kg; SAR(10 g) = 0.178 W/kg
Maximum value of SAR (measured) = 0.634 W/kg



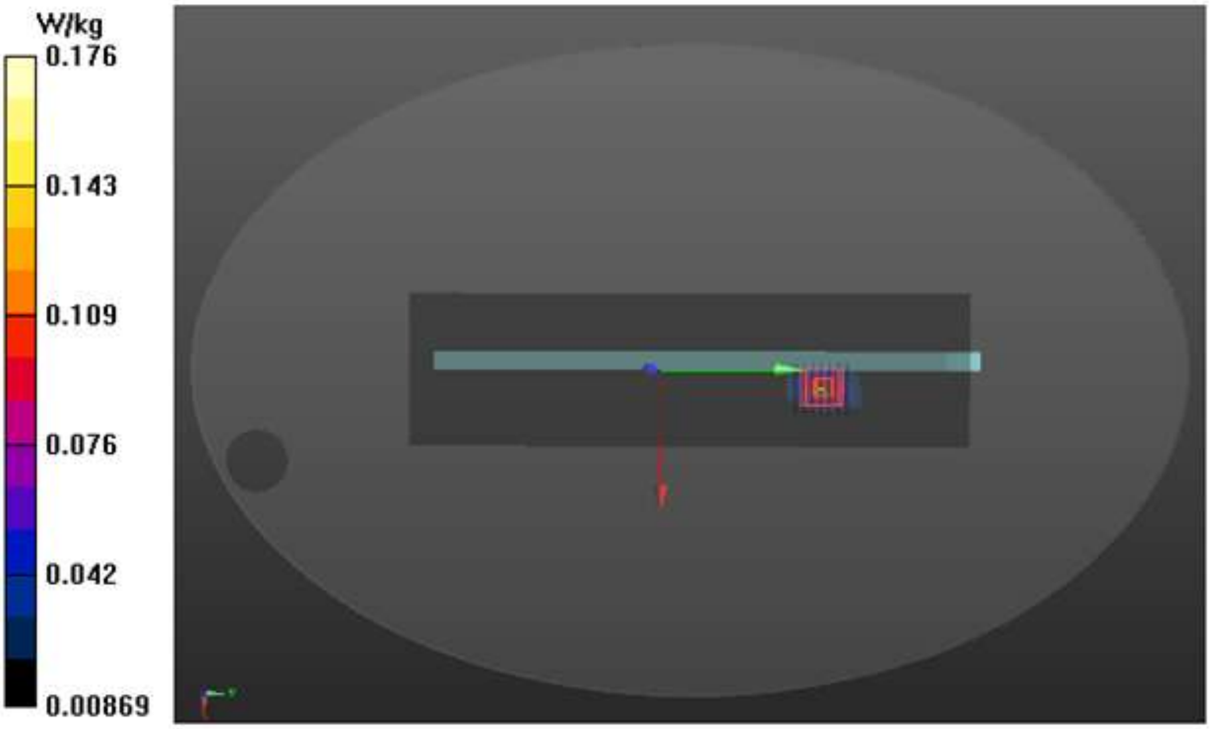
Test Laboratory: AGC Lab **Date: Sep.12,2016**
802.11n(20) Low- Edge 1
DUT: Tablet; Type: WT19503W

Communication System: UID 0, WiFi 802.11n(20) (0); Communication System Band: 802.11n(20); Duty Cycle: 1:1;
Frequency: 2412 MHz; Medium parameters used: f = 2450 MHz; σ=1.89 mho/m; εr =54.23; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 22.1, Liquid temperature (℃): 21.5

DASY Configuration:
- Probe: ES3DV3 – SN3337; ConvF(4.36,4.36, 4.36); Calibrated:10/01/2015
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1398; Calibrated: 02/02/2016
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1210;
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

N20-WIFI/ Edge 1-L/Area Scan (10x34x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.180 W/kg

N20-WIFI/ Edge 1-L/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.989 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.204 W/kg
SAR(1 g) = 0.145 W/kg; SAR(10 g) = 0.100 W/kg
Maximum value of SAR (measured) = 0.176 W/kg



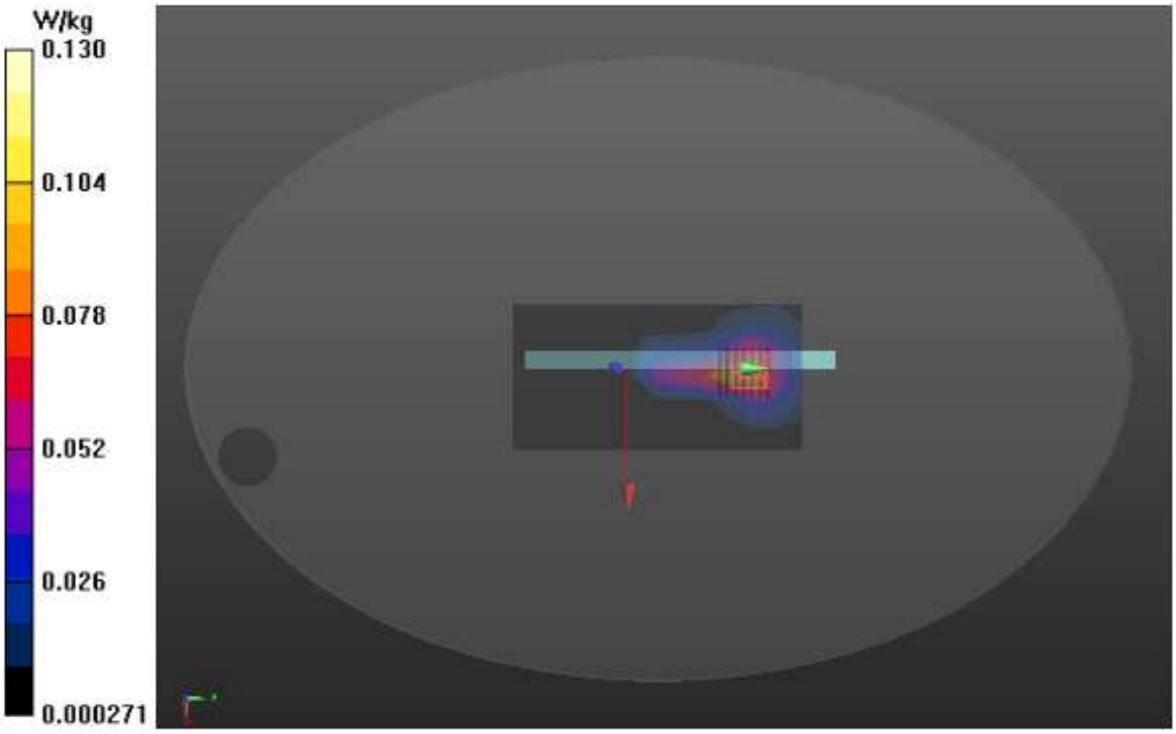
Test Laboratory: AGC Lab **Date: Sep.12,2016**
802.11n(20) Low- Edge 4
DUT: Tablet; Type: WT19503W

Communication System: UID 0, WiFi 802.11n(20) (0); Communication System Band: 802.11n(20); Duty Cycle: 1:1;
Frequency: 2412 MHz; Medium parameters used: f = 2450 MHz; σ=1.89 mho/m; εr =54.23; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 22.1, Liquid temperature (℃): 21.5

DASY Configuration:
- Probe: ES3DV3 – SN3337; ConvF(4.36,4.36, 4.36); Calibrated:10/01/2015
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1398; Calibrated: 02/02/2016
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1210;
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

N20-WIFI / Edge 4-L/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.121 W/kg

N20-WIFI /Edge 4-L/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.388 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.190 W/kg
SAR(1 g) = 0.088 W/kg; SAR(10 g) = 0.042 W/kg
Maximum value of SAR (measured) = 0.130 W/kg



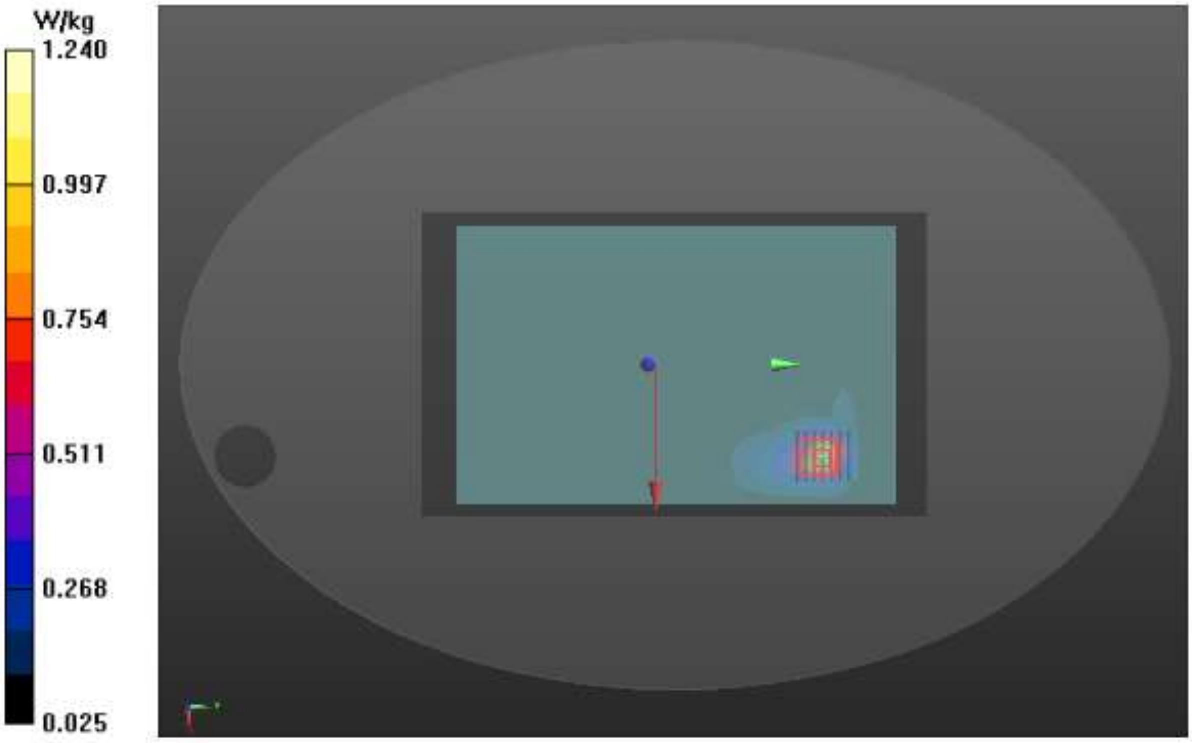
Test Laboratory: AGC Lab **Date: Sep.12,2016**
802.11b Low- Body- Front - Repeated SAR
DUT: Tablet; Type: WT19503W

Communication System: UID 0, WiFi 802.11b (0); Communication System Band: 802.11b; Duty Cycle: 1:1;
Frequency: 2412 MHz; Medium parameters used: f = 2450 MHz; σ=1.89 mho/m; εr =54.23; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 22.1, Liquid temperature (℃): 21.5

DASY Configuration:
- Probe: ES3DV3 – SN3337; ConvF(4.36,4.36, 4.36); Calibrated:10/01/2015
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1398; Calibrated: 02/02/2016
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1210;
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

B-WIFI/FRONT-L-REPEATED/Area Scan (19x31x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.22 W/kg

B-WIFI/FRONT-L-REPEATED/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.410 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 1.82 W/kg
SAR(1 g) = 0.825 W/kg; SAR(10 g) = 0.383 W/kg
Maximum value of SAR (measured) = 1.24 W/kg



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APPENDIX C. TEST SETUP PHOTOGRAPHS & EUT PHOTOGRAPHS

Refer to Attached files.

APPENDIX D. CALIBRATION DATA

Refer to Attached files.