FCC 47 CFR Parts 1 & 2
Published RF Exposure KDB Procedures
IEEE Std 1528-2003 and IEEE Std 1528a-2005

(Class II Permissive Change)

SAR EVALUATION REPORT

For
Wireless LAN Module
(Tested inside of Casio Digital Camera EX-ZR850)

Model: DWM-W078
FCC ID: EW4DWMW078

Report Number: 10216791H-R1
Issue Date: March 28, 2014

Prepared for
Mitsumi Electric Co., Ltd.
1601, Sakai, Atsugi-shi, Kanagawa,
243-8533 JAPAN

Prepared by
UL Japan, Inc.
Head Office EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
TEL: +81 596 24 8999
FAX: +81 596 24 8124

NVLAP LAB CODE: 200572-0

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Revision History

Rev.	Issue Date	Revisions	Revised By
--	03/05/2014	Initial Issue	T. Hatakeda
1	03/28/2014	1. Page 5: Correction of tested date 2. Page 6: Correction of highest reported SAR value 3. Page 7: Correction of test methodology 4. Page 8: Addition of dipole antenna information 5. Page 23, 24: Correction of Section 13.1.1 and 13.1.2 6. Page 6, 20, 22, 25-28: Correction of test data 7. Page 31: Correction of Section 16 *This report is a revised version of 10216791H, which is replaced with this report.	T. Hatakeda

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

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4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN TEL: +81 596 24 8999 FAX: +81 596 24 8124

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1. Attestation of Test Results

Applicant	Mitsumi Electric Co., Ltd.
DUT description	Wireless LAN Module (Tested inside of Casio Digital Camera EX-ZR850)
Model	DWM-W078
Test device is	An identical prototype
Device category	Portable
Exposure category	General Population/Uncontrolled Exposure
Date tested	February 21 to March 27, 2014

Applicable Standards	Test Results
FCC 47 CFR Parts 1 & 2 FCC Published RF exposure KDB procedures, and TCB workshop updates IEEE Std 1528-2003 and IEEE Std 1528a-2005	Pass

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Approved & Released For UL Japan, Inc By:

Takahiro Hatakeda
Leader of WiSE Japan,
UL Verification Service

Tested By:

Hisayoshi Sato
Engineer of WiSE Japan,
UL Verification Service

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4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN TEL: +81 596 24 8999 FAX: +81 596 24 8124

1.1. Summary of Highest 1-g SAR Results

Worst Case SAR data for each Frequency Band

RF Exposure Rule	Freq. Range	Highest Reported SAR	Limit
15.247 (Wi-Fi)	2412-2462 MHz	Body: 1.168 W/kg (Front)	1.6 W/kg

LEGEND:

- Front = Camera Lens side

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2. Test Methodology

The tests documented in this report were performed in accordance with FCC 47 CFR Parts 1 & 2, IEEE STD 1528-2003, IEEE Std 1528a-2005, TCB workshop updates, and the following KDB procedures:

- o 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r03
- o 865664 D02 SAR Reporting v01r01
- o 447498 D01 General RF Exposure Guidance v05r02
- o 248227 D01 SAR Meas for 802 11abg v01r02

3. Facilities and Accreditation

*Shielded room for SAR testings
The test sites and measurement facilities used to collect data are located at 4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN.

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http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap

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4. Calibration and Uncertainty

4.1. Measuring Instrument Calibration

The measuring equipment used to perform the tests documented in this report has been calibrated in accordance with the manufacturers' recommendations, and is traceable to recognized national standards.

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due date		
				MM	DD	Year
Power Meter	Anritsu	ML2495A	0825002	6	30	2014
Power sensor	Anritsu	MA2411B	0738285	6	30	2014
Power Meter	Agilent	N1914A	MY53060017	6	30	2014
Power Sensor	Agilent	N8482H	MY53050001	6	30	2014
Power sensor	Agilent	N8482H	MY52460010	6	30	2014
Signal Generator	Rohde & Schwarz	SMA 100A	103764	6	30	2014
Pre Amplifier	R & K	CGA020M602-2633R	B30550	6	30	2014
Dual Directional Coupler	Agilent	87300B	14893A	Pre Check		
Network Analyzer	Agilent/HP	E8358A	US41080381	9	30	2014
Dielectric probe kit	Agilent	85070D	702	9	30	2014
Type N Calibration Kit	Agilent	85032F	MY41495257	9	30	2014
Dosimetric E-Field Probe	Schmid&Partner Engineering AG	EX3DV4	3825	12	13	2014
Data Acquisition Electronics	Schmid&Partner Engineering AG	DAE4	509	7	31	2014
Thermo-Hygrometer	CUSTOM	CTH-201	A08Q29	5	31	2014
Digtal thermometer	HANNA	Checktemp-2	MOS-10	8	31	2014
Barometer	Sunoh	SBR121	837	3	31	2014
Dipole Antenna	Schmid&Partner Engineering AG	D2450V2	713	9	10	2014

4.2. Measurement Uncertainty

Per KDB 865664, when no measured SAR values exceed 1.5 W/kg, measurement uncertainty analysis does not need to be provided in the test report.

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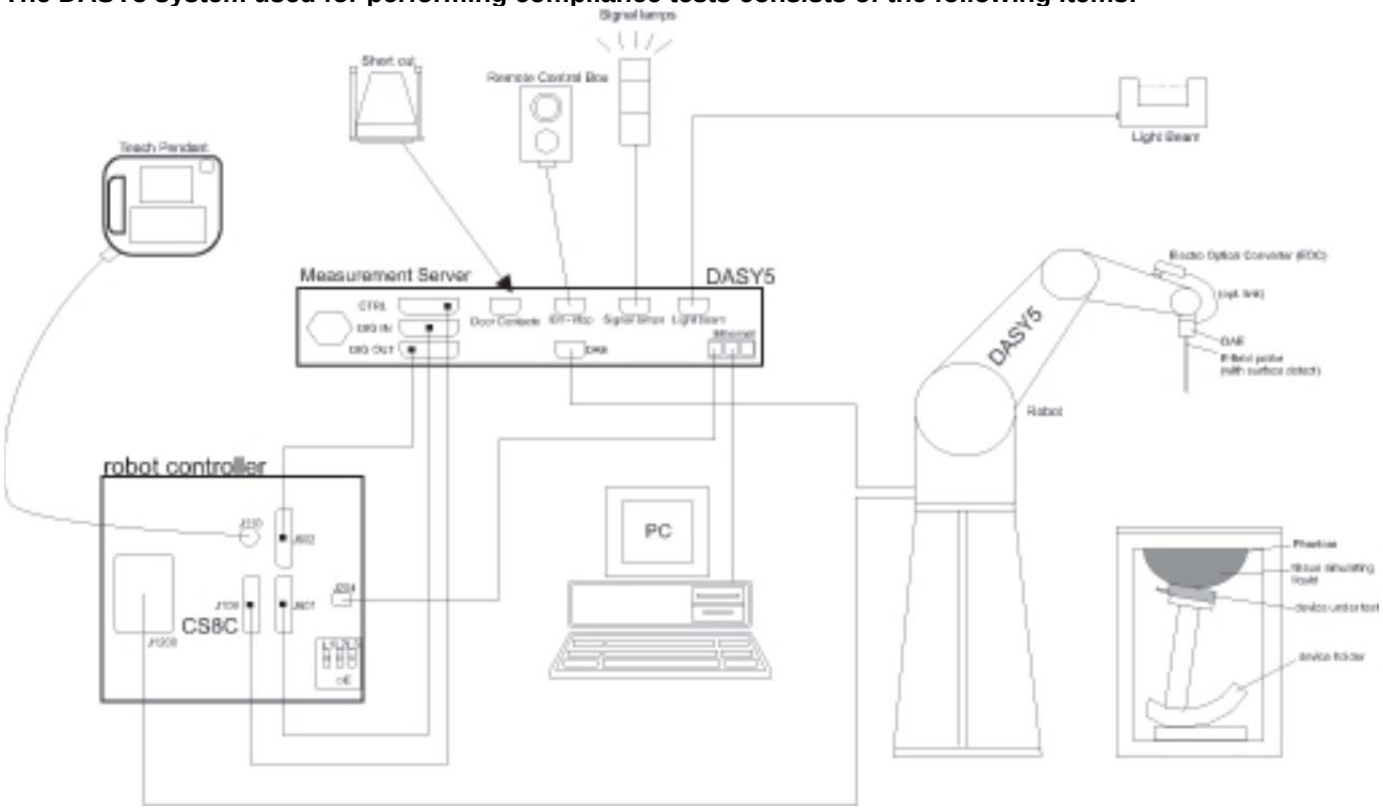
5. Measurement System Description and Setup

The DASY5 system used for performing compliance tests consists of the following items:



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion 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.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP or Win7 and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

6. SAR Measurement Procedure

6.1. Normal SAR Measurement Procedure

Step 1: Power Reference Measurement
The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 2.1 mm. This distance cannot be smaller than the distance of 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 2 dB range is required in IEEE Standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan). If only one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of Zoom Scans has to be increased accordingly.

Area Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01

	≤ 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.	

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Step 3: Zoom Scan

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

Zoom Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01 (Draft)

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

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 *reported* 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.

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 last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

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6.2. Volume Scan Procedures

Step 1: Repeat Step 1-4 in Section 6.1

Step 2: Volume Scan
Volume Scans are used to assess peak SAR and averaged SAR measurements in largely extended 3-dimensional volumes within any phantom. This measurement does not need any previous area scan. The grid can be anchored to a user specific point or to the current probe location.

Step 3: Power drift measurement
The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

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7. Device Under Test

Wireless LAN Module (Tested inside of Casio Digital Camera EX-ZR850) Model: DWM-W078	
Exposure Condition(s)	• The device is used in close proximity to the body. Specific details of the required test positions are provided in Section 8 “Exposure Conditions”
Accessory	• None

7.1. Band and Air Interfaces

Tx Frequency Bands	• 802.11 b/g/n : 2412 - 2462 MHz, b / g / HT20
Modulation	• 802.11 b/g/n : BPSK, QPSK, CCK, 16-QAM and 64-QAM
Duty Cycle	• WLAN: 100%

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8. Exposure Conditions

Refer to Section 16 “Antenna Dimensions and Separation Distances” for the specific details of the antenna-to-antenna and antenna-to-edge(s) distances.

8.1. Test Configurations

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	27.29mm	No	Refer to section 13 for SAR exclusion justification
Front	3.36mm	Yes	
Top	19.24mm	No	Refer to section 13 for SAR exclusion justification
Right	16.65mm	No	Refer to section 13 for SAR exclusion justification
Bottom	39.21mm	No	Refer to section 13 for SAR exclusion justification
Left	87.55mm	No	Refer to section 13 for SAR exclusion justification

LEGEND:

- Front = Camera Lens side

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9. Summary of Required Test Modes

9.1. Wi-Fi 2.4 GHz Band

Mode	Ch. #	Freq. (MHz)	Module Original Power (dBm)	SAR Test (Yes/No)	Surfaces/Edges requiring SAR evaluation
802.11b	1	2412	12.62	Yes	Front
	6	2437	12.53		
	11	2462	12.52		
802.11g	1	2412	10.15	No	-
	6	2437	12.09		
	11	2462	9.81		
802.11n HT20	1	2412	10.29	No	-
	6	2437	12.14		
	11	2462	10.12		

Note(s):

- Per KDB 248227, SAR is not required for 802.11g/HT20 channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11b channels.
- Refer to Original Module Report : 33EE0032-HO-A

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10. RF Output Power Measurement

Required Test Channels per KDB 248227 D01

Mode	Band	GHz	Channel	"Default Test Channels"	
				802.11b	802.11g/n
802.11b/g/n	2.4 GHz	2.412	1#	√	∇
		2.437	6	√	∇
		2.462	11#	√	∇

√ = "default test channels"

∇ = possible 802.11g/n channels with maximum average output ¼ dB ≥ the "default test channels"
= when output power is reduced for channel 1 and /or 11 to meet restricted band requirements the highest output channels closest to each of these channels should be tested.

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10.1 Output Power

The target power is the absolute maximum.

Tune-up Tolerance
The upper limit of tune-up tolerance : 13.00dBm

Mode	BAND	Channel	Frequency (MHz)	Measured Power (dBm)
802.11b	2400MHz	1	2412	12.45
		6	2437	12.35
		11	2462	12.58
802.11g	2400MHz	1	2412	9.87
		6	2437	11.99
		11	2462	9.71
802.11n	2400MHz	1	2412	10.07
		6	2437	12.00
		11	2462	10.35

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11. Tissue Dielectric Properties

IEEE Std 1528-2003 Table 2

Target Frequency (MHz)	Head	
	ε_r	σ (S/m)
300	45.3	0.87
450	43.5	0.87
835	41.5	0.90
900	41.5	0.97
1450	40.5	1.20
1800 – 2000	40.0	1.40
2450	39.2	1.80
2600	39.0	1.96
3000	38.5	2.40

KDB865664 D01 SAR Measurement 100 MHz to 6 GHz v01r02

Target Frequency (MHz)	Head		Body	
	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5000	36.2	4.45	49.3	5.07
5100	36.1	4.55	49.1	5.18
5200	36.0	4.66	49.0	5.30
5300	35.9	4.76	48.9	5.42
5400	35.8	4.86	48.7	5.53
5500	35.6	4.96	48.6	5.65
5600	35.5	5.07	48.5	5.77
5700	35.4	5.17	48.3	5.88
5800	35.3	5.27	48.2	6.00

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11.1. Composition of Ingredients for the Tissue Material Used in the SAR Tests

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Ingredients (% by weight)	Frequency (MHz)									
	450		835		915		1900		2450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2
Salt (NaCl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04
Sugar	56.32	46.78	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0
HEC	0.98	0.52	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7
Dielectric Constant	43.42	58.0	42.54	56.1	42.0	56.8	39.9	54.0	39.8	52.5
Conductivity (S/m)	0.85	0.83	0.91	0.95	1.0	1.07	1.42	1.45	1.88	1.78

Salt: 99+% Pure Sodium Chloride Sugar: 98+% Pure Sucrose
Water: De-ionized, 16 MΩ+ resistivity HEC: Hydroxyethyl Cellulose
DGBE: 99+% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]
Triton X-100 (ultra pure): Polyethylene glycol mono [4-(1,1, 3, 3-tetramethylbutyl)phenyl]ether

Simulating Liquids for 5 GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	78
Mineral oil	11
Emulsifiers	9
Additives and Salt	2

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11.2. Tissue Dielectric Parameter Check Results

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within ± 2°C of the temperature when the tissue parameters are characterized.
The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3 – 4 days of use; or earlier if the dielectric parameters can become out of tolerance; for example, when the parameters are marginal at the beginning of the measurement series.
Tissue dielectric parameters were measured at the low, middle and high frequency of each operating frequency range of the test device.

Date	Freq. (MHz)	Liquid Parameters	Measured	Target	Delta (%)	Limit ±(%)
2014/3/27	Body 2412	Relative Permittivity (ϵ_r):	52.15	52.75	-1.15	5
		Conductivity (σ):	1.84	1.91	-3.97	5
	Body 2437	Relative Permittivity (ϵ_r):	52.06	52.72	-1.24	5
		Conductivity (σ):	1.87	1.94	-3.61	5
	Body 2450	Relative Permittivity (εr):	52.07	51.84	0.43	5
		Conductivity (σ):	1.89	1.98	-4.44	5
	Body 2462	Relative Permittivity (ϵ_r):	52.01	52.68	-1.28	5
		Conductivity (σ):	1.88	1.96	-4.18	5

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12. System Performance Check

SAR system verification 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.

12.1. System Performance Check Measurement Conditions

- The measurements were performed in the flat section of the TWIN SAM or ELI phantom, shell thickness: 2.0 ±0.2 mm (bottom plate) filled with Body or Head simulating liquid of the following parameters.
- The depth of tissue-equivalent liquid in a phantom must be ≥ 15.0 cm ± 0.5 cm for SAR measurements.
- The DASY system with an E-Field Probe was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 3GHz), 12 mm (1GHz to 3GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 12 mm (1GHz to 3GHz) and15 mm (below 1GHz) was aligned with the dipole. For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7x7x7 (below 3 GHz) and/or 8x8x7 (above 3 GHz) fine cube was chosen for the cube.
- Distance between probe sensors and phantom surface was set to 3 mm. For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.5 mm
- The dipole input power (forward power) was 100 mW(For 5GHz band) or 250 mW(For 2.4GHz band).
- The results are normalized to 1 W input power.

12.2. Reference SAR Values for System Performance Check

The reference SAR values can be obtained from the calibration certificate of system validation dipoles

System Dipole	Serial No.	Cal. Date	Freq. (MHz)	Target SAR Values (mW/g)		
				1g/10g	Head	Body
D2450V2	713	9/10/2013	2450	1g	52.0	50.4
				10g	24.2	23.6

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System Performance Check Results

The 1-g and 10-g SAR measured with a reference dipole, using the required tissue-equivalent medium at the test frequency, must be within 10% of the manufacturer calibrated dipole SAR target.

Date Tested	System Dipole		T.S. Liquid		Measured Results		Target (Ref. Value)	Delta ±10 %
	Type	Serial #			Zoom Scan	Normalize to 1 W		
2014/3/27	D2450V2	713	Body	1g	12.90	51.6	50.4	2.38
				10g	5.87	23.5	23.6	-0.51

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13. SAR Test Results

13.1. Standalone SAR Test Exclusion Considerations

Standalone SAR test exclusion was based upon the following criteria:

1. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

13.1.1. SAR exclusion calculations for Wi-Fi for antenna <50mm from the user

Antenna	Tx	Frequency	Output power		Separation distances(mm)						Calculated Threshold Value					
		(MHz)	dBm	mW	Rear	Front	Top	Right	Bottm	Left	Rear	Front	Top	Right	Bottom	Left
WLAN	WiFi	2462	13.00	20	27	3	19	17	39	88	**1.2**	**6.3**	1.7	1.8	0.8	> 50 mm

Note(s):

1. According to KDB 447498, if the calculated threshold value is >3 then SAR testing is required.
2. Power and distance are rounded to the nearest mW and mm.
3. The result(Calculated Threshold Value) is rounded to one decimal place for comparison.

Conclusion:

- As the calculated Threshold Value is <3 for Rear, Top, Right and Bottom side, SAR testing is not required for these configurations

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13.1.2. SAR exclusion calculations for Wi-Fi for antenna >50mm from the user

Antenna	Tx	Frequency	Output power		Separation distances(mm)						Power Threshold (mW)					
		(MHz)	dBm	mW	Rear	Front	Top	Right	Bottm	Left	Rear	Front	Top	Right	Bottom	Left
WLAN	WiFi	2462	13.00	20	27	3	19	17	39	88	< 50 mm	< 50 mm	< 50 mm	< 50 mm	< 50 mm	476

Note(s):

1. According to KDB 447498, if the calculated Power threshold is less than the output power then SAR testing is required.
2. Power and distance are rounded to the nearest mW and mm.

Conclusion:

- As the calculated Power Threshold is greater than the DUT output power for Left side, SAR testing is not required for these configurations

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13.3. Wi-Fi 2.4 GHz Band

Main Antenna

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.	Note
					Tune-up limit	Meas.	Meas.	Scaled		
Front	802.11b	0	1	2412	13.00	12.45	0.883	1.002	1	
			6	2437	13.00	12.35	0.943	1.095	2	
			11	2462	13.00	12.58	1.060	1.168	3	

Note(s):

According to KDB 447498 D01 General RF Exposure Guidance v05, testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is

1. ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
2. ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
3. ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

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13.4. Summary of Highest SAR Values

Results for the highest measured SAR values in each frequency band and mode

Technology/ Band	Test configuration		Mode	Dist. (mm)	Freq. (Mhz)	Power (dBm)	1g SAR (W/kg)
	Exposure	Position					
Wi-Fi 2.4 GHz	Body	Front	802.11b 1Mbps	0	2462	12.58	1.060

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13.5. SAR Measurement Variability and Uncertainty

In accordance with published RF Exposure KDB procedure 865664 D01 SAR measurement 100 MHz to 6 GHz v01. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

1) Repeated measurement is not required when the original highest measured SAR 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.

Wireless Technologies	Test Configuration		Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Meas. SAR (W/kg)		Largest to Smallest SAR Ratio	Plot No.
	Exposure	Position					Original	Repeated		
Wi-Fi 2.4 GHz	Body	Front	802.11b 1Mbps	0	11	2462	1.060	1.020	1.04	1

Note(s):
Second Repeated Measurement is not required since the ratio of the largest to smallest SAR for the original and first repeated measurement is not > 1.20.

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13.6. SAR Plots (from Summary of Highest Measured SAR Values)

WLAN 11b 1Mbps Front 2462MHz

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 (interpolated): f = 2462 MHz; σ = 1.879 S/m; ε_r = 52.009; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

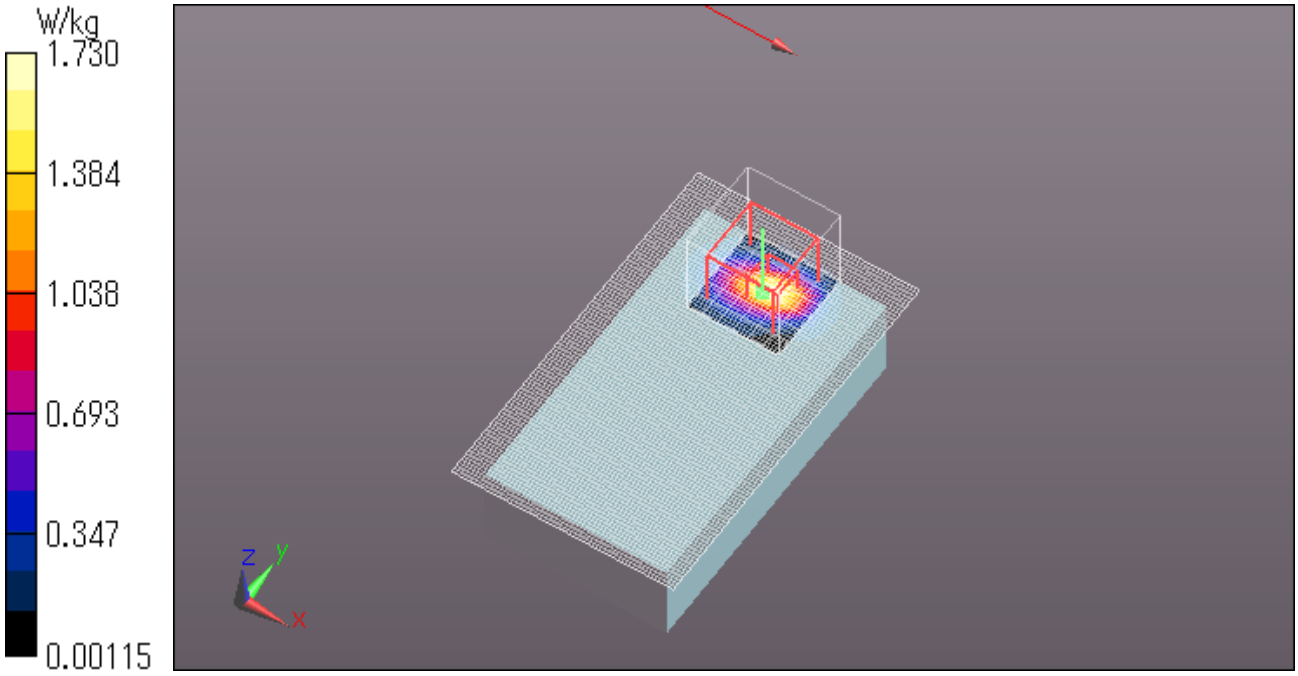
DASY5 Configuration

Probe: EX3DV4 - SN3825; ConvF(7.23, 7.23, 7.23); Calibrated: 2013/12/13;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn509; Calibrated: 2013/07/16
Phantom: ELI 4.0; Type: QDOVA001BA
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Area Scan (61x101x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.68 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 30.438 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 3.00 W/kg
SAR(1 g) = 1.06 W/kg; SAR(10 g) = 0.367 W/kg
Maximum value of SAR (measured) = 1.73 W/kg

Date: 2014/03/27
Ambient Temp. : 24.0 degree.C. Liquid Temp.; 23.5 degree.C.



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14. Appendixes

Refer to separated files for the following appendixes.

14.1. System Performance Check Plots

14.2. SAR Test Plots for Wi-Fi 2.4 GHz Band

14.3. SAR Test Plots for Repeated Test

14.4. Calibration Certificate for E-Field Probe EX3DV4 - SN 3825

14.5. Calibration Certificate for D2450V2 - SN 713

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