



**FCC OET BULLETIN 65 SUPPLEMENT C
CLASS II PERMISSIVE CHANGE
IC RSS-102 ISSUE 3**

SAR EVALUATION REPORT

For

**802.11 bgn Mini Card
(Tested inside of Satellite T110/115)**

**FCC ID: CJ6UPA3758WL
IC: 248H-DPA3758W
Model: PA3758U-1MPC**

REPORT NUMBER: 09U12828-1

ISSUE DATE: September 23, 2009

Prepared for

**TOSHIBA AMERICA INFORMATION SYSTEMS, INC.
9740 IRVINE BLVD. IRVINE,
CA 92618, USA**

Prepared by

**COMPLIANCE CERTIFICATION SERVICES
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NVLAP®
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Revision History

| Rev. | Issue Date | Revisions | Revised By |
|------|--------------------|---------------|------------|
| -- | September 23, 2009 | Initial Issue | -- |

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1. ATTESTATION OF TEST RESULTS

| | | | |
|--------------------|---|--|--|
| COMPANY NAME: | TOSHIBA AMERICA INFORMATION SYSTEMS, INC. 9740 IRVINE BLVD. IRVINE, CA 92618, USA | | |
| FCC ID: | CJ6UPA3758WL | | |
| MODEL: | PA3758U-1MPC | | |
| IC: | 248H-DPA3758W | | |
| DEVICE CATEGORY: | Portable | | |
| EXPOSURE CATEGORY: | General Population/Uncontrolled Exposure | | |
| DATE TESTED: | September 19-20, 2009 | | |

THE HIGHEST SAR VALUES:

| FCC / IC Rule Parts | Frequency Range [MHz] | The Highest SAR Values (1g_mW/g) | Limit (mW/g) |
|---------------------|-----------------------|----------------------------------|--------------|
| 15.247 / RSS-102 | 2400 – 2483.5 | 0.022 | 1.6 |

APPLICABLE STANDARDS AND TEST PROCEDURES:

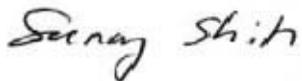
| STANDARD | TEST RESULTS |
|----------------------------------|--------------|
| FCC OET BULLETIN 65 SUPPLEMENT C | Pass |
| RSS-102 ISSUE 3 | Pass |

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For CCS By:

Tested By:



SUNNY SHIH
ENGINEERING SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

CHAO YEN LIN
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC OET Bulletin 65 Supplement C, Specific FCC Procedure KDB 248227 SAR Measurement Procedure for 820.11abg Transmitters and IC RSS 102 Issue 3.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

| Name of Equipment | Manufacturer | Type/Model | Serial No. | Cal. Due date | | |
|------------------------------|---------------|-------------|------------|-----------------------------|----|------|
| | | | | MM | DD | Year |
| Robot - Six Axes | Stäubli | RX90BL | N/A | | | N/A |
| Robot Remote Control | Stäubli | CS7MB | 3403-91535 | | | N/A |
| DASY4 Measurement Server | SPEAG | SEUMS001BA | 1041 | | | N/A |
| Probe Alignment Unit | SPEAG | LB (V2) | 261 | | | N/A |
| SAM Phantom (SAM1) | SPEAG | QD000P40CA | 1185 | | | N/A |
| SAM Phantom (SAM2) | SPEAG | QD000P40CA | 1050 | | | N/A |
| Oval Flat Phantom (ELI 4.0) | SPEAG | QD OVA001 B | 1003 | | | N/A |
| Electronic Probe kit | HP | 85070C | N/A | | | N/A |
| S-Parameter Network Analyzer | Agilent | 8753ES-6 | MY40001647 | 11 | 14 | 2009 |
| Signal Generator | Agilent | 8753ES-6 | MY40001647 | 11 | 14 | 2009 |
| E-Field Probe | SPEAG | EX3DV4 | 3686 | 3 | 23 | 2010 |
| Thermometer | ERTCO | 639-1S | 1718 | 5 | 1 | 2010 |
| Data Acquisition Electronics | SPEAG | DAE3 V1 | 427 | 10 | 20 | 2009 |
| System Validation Dipole | SPEAG | D835V2 | 4d002 | 4 | 23 | 2011 |
| System Validation Dipole | SPEAG | D900V2 | 108 | 1 | 21 | 2010 |
| System Validation Dipole | SPEAG | D1800V2 | 294 | 1 | 29 | 2010 |
| System Validation Dipole | SPEAG | D1900V2 | 5d043 | 1 | 29 | 2010 |
| System Validation Dipole | SPEAG | D2450V2 | 748 | 4 | 14 | 2010 |
| System Validation Dipole | SPEAG | D5GHzV2 | 1003 | 11 | 21 | 2009 |
| MXA Signal Analyzer | Agilent | N9020A | US48350984 | 10 | 23 | 2009 |
| ESG Vector Signal Generator | Agilent | E4438C | US44271090 | 9 | 17 | 2010 |
| Power Meter | Giga-tronics | 8651A | 8651404 | 1 | 11 | 2010 |
| Power Sensor | Giga-tronics | 80701A | 1834588 | 1 | 11 | 2010 |
| Amplifier | Mini-Circuits | ZVE-8G | 90606 | | | N/A |
| Amplifier | Mini-Circuits | ZHL-42W | D072701-5 | | | N/A |
| Simulating Liquid | SPAEG | H2450 | N/A | Within 24 hrs of first test | | |
| Simulating Liquid | SPAEG | M2450 | N/A | Within 24 hrs of first test | | |
| Simulating Liquid | SPAEG | M5800 | N/A | Within 24 hrs of first test | | |

4.2. MEASUREMENT UNCERTAINTY

Measurement uncertainty for 300 MHz – 3000 MHz

| Uncertainty component | Tol. (±%) | Probe Dist. | Div. | Ci (1g) | Ci (10g) | Std. Unc.(±%) | |
|---|-----------|-------------|-------|---------|----------|---------------|---------|
| | | | | | | Ui (1g) | Ui(10g) |
| Measurement System | | | | | | | |
| Probe Calibration | 4.80 | N | 1 | 1 | 1 | 4.80 | 4.80 |
| Axial Isotropy | 4.70 | R | 1.732 | 0.707 | 0.707 | 1.92 | 1.92 |
| Hemispherical Isotropy | 9.60 | R | 1.732 | 0.707 | 0.707 | 3.92 | 3.92 |
| Boundary Effects | 1.00 | R | 1.732 | 1 | 1 | 0.58 | 0.58 |
| Linearity | 4.70 | R | 1.732 | 1 | 1 | 2.71 | 2.71 |
| System Detection Limits | 1.00 | R | 1.732 | 1 | 1 | 0.58 | 0.58 |
| Readout Electronics | 1.00 | N | 1 | 1 | 1 | 1.00 | 1.00 |
| Response Time | 0.80 | R | 1.732 | 1 | 1 | 0.46 | 0.46 |
| Integration Time | 2.60 | R | 1.732 | 1 | 1 | 1.50 | 1.50 |
| RF Ambient Conditions - Noise | 1.59 | R | 1.732 | 1 | 1 | 0.92 | 0.92 |
| RF Ambient Conditions - Reflections | 0.00 | R | 1.732 | 1 | 1 | 0.00 | 0.00 |
| Probe Positioner Mechanical Tolerance | 0.40 | R | 1.732 | 1 | 1 | 0.23 | 0.23 |
| Probe Positioning With Respect to Phantom Shell | 2.90 | R | 1.732 | 1 | 1 | 1.67 | 1.67 |
| algorithms for max. SAR evaluation | 3.90 | R | 1.732 | 1 | 1 | 2.25 | 2.25 |
| Test sample Related | | | | | | | |
| Test Sample Positioning | 1.10 | N | 1 | 1 | 1 | 1.10 | 1.10 |
| Device Holder Uncertainty | 3.60 | N | 1 | 1 | 1 | 3.60 | 3.60 |
| Power and SAR Drift Measurement | 5.00 | R | 1.732 | 1 | 1 | 2.89 | 2.89 |
| Phantom and Tissue Parameters | | | | | | | |
| Phantom Uncertainty | 4.00 | R | 1.732 | 1 | 1 | 2.31 | 2.31 |
| Liquid Conductivity - Target | 5.00 | R | 1.732 | 0.64 | 0.43 | 1.85 | 1.24 |
| Liquid Conductivity - Meas. | 8.60 | N | 1 | 0.64 | 0.43 | 5.50 | 3.70 |
| Liquid Permittivity - Target | 5.00 | R | 1.732 | 0.6 | 0.49 | 1.73 | 1.41 |
| Liquid Permittivity - Meas. | 3.30 | N | 1 | 0.6 | 0.49 | 1.98 | 1.62 |
| Combined Standard Uncertainty | | | | | | | |
| RSS | | | | | | | |
| 11.44 | | | | | | | |
| Expanded Uncertainty (95% Confidence Interval) | | | | | | | |
| K=2 | | | | | | | |
| 22.87 | | | | | | | |
| 20.98 | | | | | | | |

Notes for table

1. Tol. - tolerance in influence quantity
2. N - Nominal
3. R - Rectangular
4. Div. - Divisor used to obtain standard uncertainty
5. Ci - is the sensitivity coefficient

Measurement uncertainty for 3 GHz – 6 GHz

| Uncertainty component | Tol. (±%) | Probe Dist. | Div. | Ci (1g) | Ci (10g) | Std. Unc.(±%) | |
|--|-----------|-------------|-------|---------|----------|---------------|---------|
| | | | | | | Ui (1g) | Ui(10g) |
| Measurement System | | | | | | | |
| Probe Calibration | 4.80 | N | 1 | 1 | 1 | 4.80 | 4.80 |
| Axial Isotropy | 4.70 | R | 1.732 | 0.707 | 0.707 | 1.92 | 1.92 |
| Hemispherical Isotropy | 9.60 | R | 1.732 | 0.707 | 0.707 | 3.92 | 3.92 |
| Boundary Effects | 1.00 | R | 1.732 | 1 | 1 | 0.58 | 0.58 |
| Linearity | 4.70 | R | 1.732 | 1 | 1 | 2.71 | 2.71 |
| System Detection Limits | 1.00 | R | 1.732 | 1 | 1 | 0.58 | 0.58 |
| Readout Electronics | 1.00 | N | 1 | 1 | 1 | 1.00 | 1.00 |
| Response Time | 0.80 | R | 1.732 | 1 | 1 | 0.46 | 0.46 |
| Integration Time | 2.60 | R | 1.732 | 1 | 1 | 1.50 | 1.50 |
| RF Ambient Conditions - Noise | 3.00 | R | 1.732 | 1 | 1 | 1.73 | 1.73 |
| RF Ambient Conditions - Reflections | 3.00 | R | 1.732 | 1 | 1 | 1.73 | 1.73 |
| Probe Positioner Mechanical Tolerance | 0.40 | R | 1.732 | 1 | 1 | 0.23 | 0.23 |
| Probe Positioning With Respect to Phantom Shell | 2.90 | R | 1.732 | 1 | 1 | 1.67 | 1.67 |
| Extrapolation, interpolation, and integration algorithms for max. SAR evaluation | 3.90 | R | 1.732 | 1 | 1 | 2.25 | 2.25 |
| Test sample Related | | | | | | | |
| Test Sample Positioning | 1.10 | N | 1 | 1 | 1 | 1.10 | 1.10 |
| Device Holder Uncertainty | 3.60 | N | 1 | 1 | 1 | 3.60 | 3.60 |
| Power and SAR Drift Measurement | 5.00 | R | 1.732 | 1 | 1 | 2.89 | 2.89 |
| Phantom and Tissue Parameters | | | | | | | |
| Phantom Uncertainty | 4.00 | R | 1.732 | 1 | 1 | 2.31 | 2.31 |
| Liquid Conductivity - Target | 5.00 | R | 1.732 | 0.64 | 0.43 | 1.85 | 1.24 |
| Liquid Conductivity - Meas. | 8.60 | N | 1 | 0.64 | 0.43 | 5.50 | 3.70 |
| Liquid Permittivity - Target | 5.00 | R | 1.732 | 0.6 | 0.49 | 1.73 | 1.41 |
| Liquid Permittivity - Meas. | 3.30 | N | 1 | 0.6 | 0.49 | 1.98 | 1.62 |
| Combined Standard Uncertainty | | | | | | | |
| RSS | | | | | | | |
| Expanded Uncertainty (95% Confidence Interval) | | | | | | | |
| K=2 | | | | | | | |
| Notes for table | | | | | | | |
| 1. Tol. - tolerance in influence quality | | | | | | | |
| 2. N - Nominal | | | | | | | |
| 3. R - Rectangular | | | | | | | |
| 4. Div. - Divisor used to obtain standard uncertainty | | | | | | | |
| 5. Ci - is the sensitivity coefficient | | | | | | | |

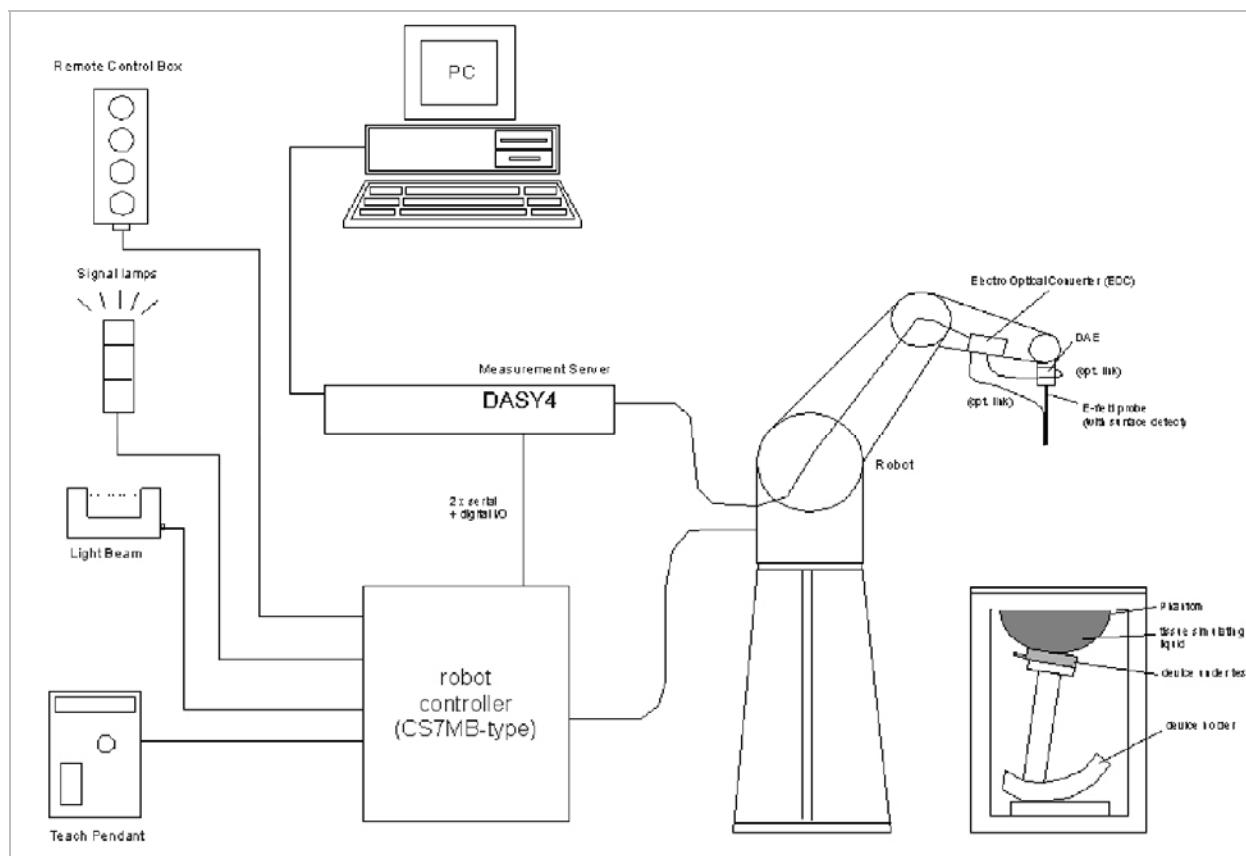
5. EQUIPMENT UNDER TEST

802.11bgn Mini Card (Tested inside of Satellite T110/115)

802.11bgn MISO with HT20 and HT40

| | | | | |
|--------------------------|--|--|--------------------|---------------------------|
| Normal operation: | Lap-held only Note: SAR test with display open at 90° to the keyboard | | | |
| Antenna tested: | <u>Vendor</u> | <u>Antenna</u> | <u>Part number</u> | <u>Antenna gain (dBi)</u> |
| | Hitachi | <input checked="" type="checkbox"/> TX 1 | HFT60-QT16W | -0.32 |
| | | TX 2 | HFT60-QT16W | |
| | Tyco | TX 1 | 1556060-1 | -2.88 |
| | | TX 2 | 1556060-1 | |
| Power supply: | Power supplied through laptop computer (host device) | | | |

6. SYSTEM SPECIFICATIONS



The DASY4 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Stäubli RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 2000 or Windows XP.
- DASY4 software.
- Remote controls with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validate the proper functioning of the system.

7. COMPOSITION OF INGREDIENTS FOR TISSUE SIMULATING LIQUIDS

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

8. LIQUID PARAMETERS CHECK

The simulating liquids should be checked at the beginning of a series of SAR measurements to determine if the dielectric parameters are within the tolerances of the specified target values. The relative permittivity and conductivity of the tissue material should be within $\pm 5\%$ of the values given in the table below.

Reference Values of Tissue Dielectric Parameters for Head and Body Phantom (for 150 – 3000 MHz and 5800 MHz)

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in IEEE Standard 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 P1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations and extrapolated according to the head parameters specified in IEEE Standard 1528.

| Target Frequency (MHz) | Head | | Body | |
|------------------------|--------------|----------------|--------------|----------------|
| | ϵ_r | σ (S/m) | ϵ_r | σ (S/m) |
| 150 | 52.3 | 0.76 | 61.9 | 0.8 |
| 300 | 45.3 | 0.87 | 58.2 | 0.92 |
| 450 | 43.5 | 0.87 | 56.7 | 0.94 |
| 835 | 41.5 | 0.9 | 55.2 | 0.97 |
| 900 | 41.5 | 0.97 | 55 | 1.05 |
| 915 | 41.5 | 0.98 | 55 | 1.06 |
| 1450 | 40.5 | 1.2 | 54 | 1.3 |
| 1610 | 40.3 | 1.29 | 53.8 | 1.4 |
| 1800 – 2000 | 40 | 1.4 | 53.3 | 1.52 |
| 2450 | 39.2 | 1.8 | 52.7 | 1.95 |
| 3000 | 38.5 | 2.4 | 52 | 2.73 |
| 5800 | 35.3 | 5.27 | 48.2 | 6 |

(ϵ_r = relative permittivity, σ = conductivity and $\rho = 1000$ kg/m³)

8.1. LIQUID CHECK RESULTS FOR 2450 MHZ

Simulating Liquid Dielectric Parameters for Muscle 2450 MHz

Room Ambient Temperature = 24°C; Relative humidity = 40%

Measured by: Chaoyen Lin

| f (MHz) | Liquid Parameters | | | Measured | Target | Delta (%) | Limit (%) |
|---------|-------------------|-------|---|----------|--------|-----------|-----------|
| 2450 | e' | 52.20 | Relative Permittivity (ϵ_r): | 52.204 | 52.7 | -0.94 | ± 5 |
| | e" | 13.95 | Conductivity (σ): | 1.902 | 1.95 | -2.47 | ± 5 |

Liquid Temperature: 23 deg. C

September 19, 2009 4:25 PM

| Frequency | e' | e" |
|-------------------|----------------|----------------|
| 2400000000 | 52.3004 | 13.706 |
| 2405000000 | 52.2883 | 13.7794 |
| 2410000000 | 52.2737 | 13.8446 |
| 2415000000 | 52.2701 | 13.8881 |
| 2420000000 | 52.2562 | 13.9143 |
| 2425000000 | 52.2516 | 13.9325 |
| 2430000000 | 52.2573 | 13.9258 |
| 2435000000 | 52.2415 | 13.9319 |
| 2440000000 | 52.2371 | 13.9464 |
| 2445000000 | 52.2081 | 13.9741 |
| 2450000000 | 52.2042 | 13.9532 |
| 2455000000 | 52.1352 | 13.9298 |
| 2460000000 | 52.0991 | 13.9017 |
| 2465000000 | 52.0353 | 13.8645 |
| 2470000000 | 52.0199 | 13.8169 |
| 2475000000 | 52.0048 | 13.7927 |
| 2480000000 | 52.0126 | 13.7998 |
| 2485000000 | 52.0058 | 13.8189 |
| 2490000000 | 52.0082 | 13.8762 |
| 2495000000 | 52.0101 | 13.95 |
| 2500000000 | 52.0052 | 14.0529 |

The conductivity (σ) can be given as:

$$\sigma = \omega \epsilon_0 \epsilon'' = 2 \pi f \epsilon_0 \epsilon''$$

where $f = \text{target } f * 10^6$

$$\epsilon_0 = 8.854 * 10^{-12}$$

9. SYSTEM CHECK

The system performance check is performed prior to any usage of the system in order to guarantee reproducible results. The system performance check verifies that the system operates within its specifications of $\pm 10\%$.

System Performance Check Measurement Conditions

- The measurements were performed in the flat section of the SAM twin phantom filled with Head or Body simulating liquid of the following parameters.
- The DASY4 system with an Isotropic E-Field Probe EX3DV4 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 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm 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 fine cube was chosen for 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 $250 \text{ mW} \pm 3\%$.
- The results are normalized to 1 W input power

Reference SAR Values for HEAD & BODY-tissue from calibration certificate of SPEAG. Certificate no: D2450V2-748_Apr08

| f (MHz) | Head Tissue | | Body Tissue | |
|---------|-------------------|--------------------|-------------------|--------------------|
| | SAR _{1g} | SAR _{10g} | SAR _{1g} | SAR _{10g} |
| 2450 | | | 50.8 | 23.7 |

Note: All SAR values normalized to 1 W forward power.

9.1. SYSTEM CHECK RESULTS FOR D2450V2

System Validation Dipole: D2450V2 SN: 748

Date: September 19, 2009

Ambient Temperature = 24°C; Relative humidity = 40%

Measured by: Chao Lin

| Medium | CW Signal (MHz) | Forward power (mW) | Measured (Normalized to 1 W) | | Target | Delta (%) | Tolerance (%) |
|--------|-----------------|--------------------|------------------------------|------|--------|-----------|---------------|
| Body | 2450 | 250 | 1g SAR: | 53.7 | 50.8 | 5.71 | ± 10 |
| | | | 10g SAR: | 25.2 | 23.7 | 6.33 | |

10. OUTPUT POWER VERIFICATION

The following procedures had been used to prepare the EUT for the SAR test.

The client provided a special driver and program, MP_Kit RTL11n_SingleCheip_PCIE_V025, which enable a user to control the frequency and output power of the module.

The modes with highest output power channel were chosen for the conducted output power measurement.

Results:

802.11bgn mode (2.4 GHz band)

| Mode | Channel | f (MHz) | Antenna | Average Output Power |
|----------------|---------|----------|---------|----------------------|
| 802.11b | 6 | 2437 (M) | Tx1 | 18.3 |
| 802.11n 20 MHz | 6 | 2437 (M) | Tx1 | 16.7 |

11. SUMMARY OF TEST RESULTS

If the SAR measured at the middle channel for each test configuration is at least 3.0 dB (0.8 mW/g) lower than the SAR limit (1.6 mW/g), testing at the high and low channels is optional for such test configuration(s).

| Mode | Channel | f (MHz) | Antenna | Measured SAR | Limit (mW/g) |
|----------------|---------|----------|---------|--------------|--------------|
| | | | | 1g (mW/g) | |
| 802.11b | 6 | 2437 (M) | TX 1 | 0.017 | 1.6 |
| 802.11n 20 MHz | 6 | 2437 (M) | TX 1 | 0.022 | |

12. WORST-CASE SAR TEST PLOTS

WORST-CASE SAR PLOT for 2.4 GHz Band

Date/Time: 9/20/2009 1:03:03 PM

Test Laboratory: Compliance Certification Services

802.11bgn for Lapheld

DUT: Toshiba; Type: NA; Serial: NA

Communication System: 802.11bg; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.89$ mho/m; $\epsilon_r = 52.2$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Room Ambient Temperature: 24.0 deg. C; Liquid Temperature: 23.0 deg. C

DASY4 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3686; ConvF(6.48, 6.48, 6.48); Calibrated: 3/23/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn427; Calibrated: 10/20/2008
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Lapheld, 802.11n M-ch/Area Scan (11x15x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.025 mW/g

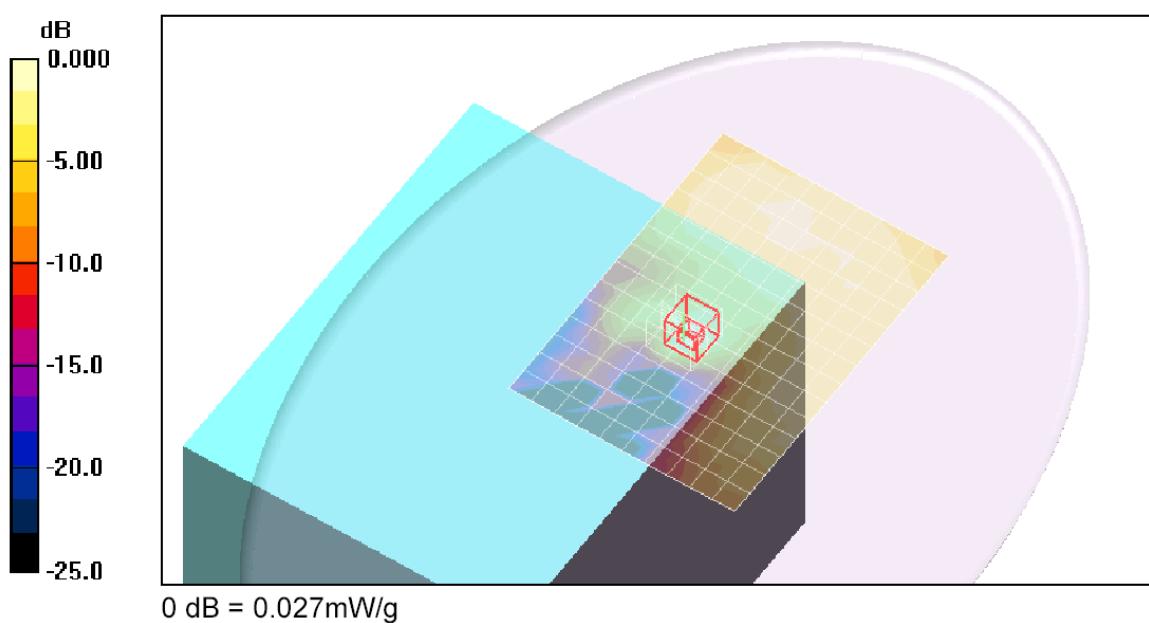
Lapheld, 802.11n M-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm

Reference Value = 0.683 V/m; Power Drift = 4.70 dB

Peak SAR (extrapolated) = 0.039 W/kg

SAR(1 g) = 0.022 mW/g; SAR(10 g) = 0.010 mW/g

Maximum value of SAR (measured) = 0.027 mW/g



13. ATTACHMENTS

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| 1 | System Performance Check Plots | 2 |
| 2 | SAR Test Plots | 3 |
| 3 | Certificate of E-Field Probe – EX3DV4 SN 3686 | 10 |
| 4 | Certificate of System Validation Dipole - D2450V2 SN:748 | 6 |