FCC OET BULLETIN 65 SUPPLEMENT C
IC RSS-102 ISSUE 2

SAR EVALUATION REPORT

FOR

INTEL WI-FI LINK 5300 SERIES

FCC MODEL: 533AN_MMW
IC MODEL: 533ANMU

FCC ID: PD9533ANMU
IC: 1000M-533ANMU

REPORT NUMBER: 08U12063-3

ISSUE DATE: SEPTEMBER 19, 2008

Prepared for

INTEL CORPORATION
2111 N.E. 25TH AVENUE
HILLSBORO, OR 97124, USA

Prepared by

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issued date	Revisions	Revised By
--	September 19, 2008	Initial issue	--

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1 ATTESTATION OF TEST RESULTS

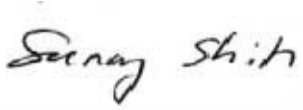
COMPANY NAME:	INTEL CORPORATION 2111 N.E. 25TH AVENUE HILLSBORO, OR 97124, USA
EUT DESCRIPTION:	Intel Wi-Fi Link 5300 Series
FCC ID: **FCC MODEL:**	PD9533ANMU 533AN_MMW
IC: **IC MODEL:**	1000M-533ANMU 533ANMU
DEVICE CATEGORY:	Portable
EXPOSURE CATEGORY:	General Population/Uncontrolled Exposure
DATE TESTED:	September 15-19, 2008
THE HIGHEST SAR VALUES:	See Table below

FCC / IC Rule Parts	Frequency Range [MHz]	The Highest SAR Values (1g_mW/g)	Limit (mW/g)
15.247 / RSS-102	2400 – 2483.5 5725 – 5850	0.133 (Secondary Landscape) 0.098 (Primary Landscape)	1.6
15.407 / RSS-102	5150 – 5250 5250 – 5350 5470 – 5725	0.164 (Secondary Portrait) 0.110 (Primary Portrait) 0.139 (Secondary Portrait)	1.6

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC OET BULLETIN 65 SUPPLEMENT C	Pass
RSS-102 ISSUE 2	Pass

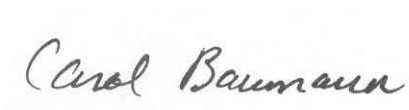
Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. The test results show 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. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:



SUNNY SHIH
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:



CAROL BAUMANN
SAR 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 May 2007, KDB 447498_RF Exposure Requirements and Procedures for mobile and portable devices and IC RSS 102 Issue 2: NOVEMBER 2005.

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.

5 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 Mechnical 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					11.44	10.49
Expanded Uncertainty (95% Confidence Interval)	K=2					22.87	20.98

Notesfor table
1. Tol. - tolerance in influence quaitity
2. N - Nomal
3. R - Rectangular
4. Div. - Divisor used to obtain standard uncertainty
5. Ci - is te 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 Mechnical 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					11.66	10.73
Expanded Uncertainty (95% Confidence Interval)	K=2					23.32	21.46

Notesfor table
1. Tol. - tolerance in influence quaitity
2. N - Nomal
3. R - Rectangular
4. Div. - Divisor used to obtain standard uncertainty
5. Ci - is te sensitivity coefficient

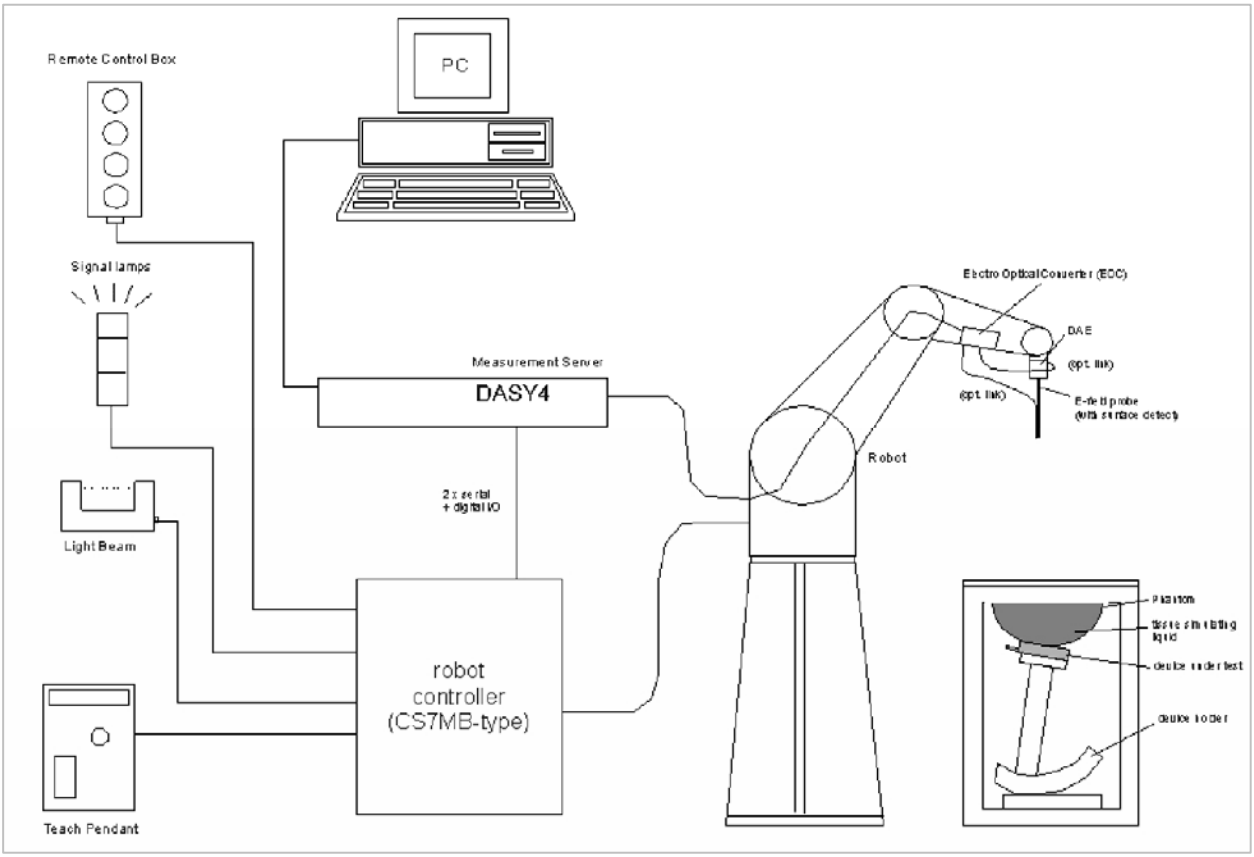
6 TEST EQUIPMENT LIST

Name of Equipment	Manufacturer	Type/Model	Serial Number	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	2008
E-Field Probe	SPEAG	EX3DV3	3531	4	23	2009
Thermometer	ERTCO	639-1S	1718	5	28	2009
Data Acquisition Electronics	SPEAG	DAE3 V1	500	11	16	2008
System Validation Dipole	SPEAG	D2450V2	748	4	14	2009
System Validation Dipole	SPEAG	D5GHzV2	1003	11	21	2009
Signal Generator	R&S	SMP 04	DE34210	2	16	2009
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	CCS	M2450	N/A	Within 24 hrs of first test		
Simulating Liquid	SPEAG	M5200-5800	N/A	Within 24 hrs of first test		

7 DEVICE UNDER TEST (DUT) DESCRIPTION

Intel Wi-Fi Link 5300 Series (Tested inside of LENOVO THINKPAD X200 TABLET SERIES)				
Normal operation:	• Laptop Mode • Tablet Mode – in the following configurations. o Bottom Face o Edge - Primary/Secondary landscape and Primary/Secondary portrait orientations.			
Antenna tested:	Vendor	Antenna	Part Number	Test software ID
	ACON	Main	25.90675.001	A
	WNC	Auxiliary	25.90670.001	B
	ACON	3rd (MIMO)	25.90677.001	C
Power supply:	Power supplied through laptop computer (host device)			

8 SYSTEM DESCRIPTION



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.

8.1 COMPOSITION OF INGREDIENTS FOR TISSUE SIMULATING LIQUIDS

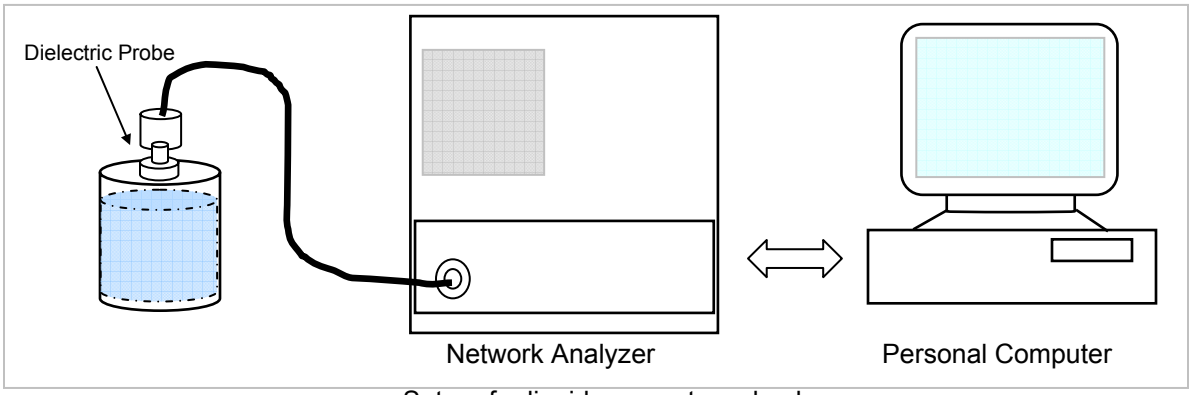
The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

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

9 SIMULATING LIQUID PARAMETERS CHECK

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



Set-up for liquid parameters check

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	0.80
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
5800	35.3	5.27	48.2	6.00

(ε_r = relative permittivity, σ = conductivity and ρ = 1000 kg/m^3)

9.1 SIMULATING LIQUID PARAMETER CHECK RESULT

Simulating Liquid Dielectric Parameter Check Result @ Muscle 2450 MHz

Room Ambient Temperature = 25°C; Relative humidity = 40% Measured by: Carol Baumann

Simulating Liquid		Parameters			Measured	Target	Deviation (%)	Limit (%)
f (MHz)	Depth (cm)							
2450	15	e'	51.4145	Relative Permittivity (ϵ_r):	51.4145	52.7	-2.44	± 5
		e"	14.3824	Conductivity (σ):	1.96027	1.95	0.53	± 5

Liquid Check
Ambient temperature: 25 deg. C; Liquid temperature: 24 deg. C
September 15, 2008 08:39 AM

Frequency	e'	e"
2400000000.	51.7593	14.1581
2405000000.	51.7190	14.1376
2410000000.	51.7284	14.1450
2415000000.	51.6984	14.0786
2420000000.	51.7113	14.1748
2425000000.	51.5684	14.2235
2430000000.	51.6209	14.1808
2435000000.	51.6115	14.2461
2440000000.	51.6223	14.3271
2445000000.	51.5203	14.2588
2450000000.	**51.4145**	**14.3824**
2455000000.	51.5482	14.2934
2460000000.	51.5599	14.3144
2465000000.	51.5566	14.4292
2470000000.	51.5122	14.5174
2475000000.	51.4844	14.4798
2480000000.	51.5010	14.5059
2485000000.	51.4344	14.5374
2490000000.	51.3919	14.5343
2495000000.	51.2902	14.5552
2500000000.	51.3308	14.5433

The conductivity (σ) can be given as:

$$\sigma = \omega \varepsilon_0 e'' = 2 \pi f \varepsilon_0 e''$$

where $f = target\ f * 10^6$

$\varepsilon_0 = 8.854 * 10^{-12}$

Simulating Liquid Dielectric Parameter Check Result @ Muscle 2450 MHz

Room Ambient Temperature = 25°C; Relative humidity = 40% Measured by: Carol Baumann

Simulating Liquid		Parameters			Measured	Target	Deviation (%)	Limit (%)
f (MHz)	Depth (cm)							
2450	15	e'	51.2509	Relative Permittivity (ϵ_r):	51.2509	52.7	-2.75	± 5
		e"	14.2156	Conductivity (σ):	1.93754	1.95	-0.64	± 5

Liquid Check
Ambient temperature: 25 deg. C; Liquid temperature: 24 deg. C
September 16, 2008 08:08 AM

Frequency	e'	e"
2400000000.	51.5397	13.9249
2405000000.	51.4662	14.0789
2410000000.	51.4547	13.9054
2415000000.	51.4722	13.9404
2420000000.	51.4417	14.0977
2425000000.	51.3575	14.0294
2430000000.	51.4602	14.0991
2435000000.	51.4179	14.1980
2440000000.	51.4639	14.1827
2445000000.	51.2275	14.1432
2450000000.	**51.2509**	**14.2156**
2455000000.	51.2879	14.1751
2460000000.	51.3253	14.1934
2465000000.	51.2948	14.2753
2470000000.	51.3173	14.2341
2475000000.	51.2463	14.3008
2480000000.	51.2116	14.3400
2485000000.	51.2197	14.4183
2490000000.	51.0732	14.4366
2495000000.	51.1471	14.4311
2500000000.	51.0998	14.4506

The conductivity (σ) can be given as:

$$\sigma = \omega \varepsilon_0 e'' = 2 \pi f \varepsilon_0 e''$$

where f = target f * 10^6
$\varepsilon_0 = 8.854 * 10^{-12}$

Simulating Liquid Parameter Check Result @ Muscle 5GHz

Room Ambient Temperature = 25°C; Relative humidity = 40% Measured by: Carol Baumann

Simulating Liquid f (MHz)	Parameters			Measured	Target	Deviation (%)	Limit (%)
5200	e'	46.7367	Relative Permittivity (ϵ_r):	46.7367	49.0	-4.62	± 10
	e"	18.8796	Conductivity (σ):	5.46154	5.30	3.05	± 5
5500	e'	46.1145	Relative Permittivity (ϵ_r):	46.1145	48.6	-5.11	± 10
	e"	19.0804	Conductivity (σ):	5.83807	5.65	3.33	± 5
5800	e'	45.3896	Relative Permittivity (ϵ_r):	45.3896	48.2	-5.83	± 10
	e"	19.2574	Conductivity (σ):	6.21362	6.00	3.56	± 5

Liquid Check
Ambient temperature: 25 deg. C; Liquid temperature: 24 deg. C
September 17, 2008 07:44 AM

Frequency	e'	e"
4600000000.	47.9838	17.8342
4650000000.	47.9238	17.9822
4700000000.	47.8269	18.0218
4750000000.	47.6730	18.1175
4800000000.	47.6240	18.1727
4850000000.	47.4547	18.1858
4900000000.	47.4623	18.3016
4950000000.	47.2818	18.3073
5000000000.	47.3021	18.4212
5050000000.	47.2374	18.4622
5100000000.	47.1399	18.6281
5150000000.	47.0442	18.8577
5200000000.	**46.7367**	**18.8796**
5250000000.	46.5696	18.8955
5300000000.	46.5182	18.8180
5350000000.	46.3384	18.9149
5400000000.	46.3575	18.9463
5450000000.	46.1524	19.0171
5500000000.	**46.1145**	**19.0804**
5550000000.	45.9563	19.1203
5600000000.	45.8614	19.1345
5650000000.	45.7803	19.2636
5700000000.	45.6344	19.2067
5750000000.	45.4820	19.3470
5800000000.	**45.3896**	**19.2574**
5850000000.	45.2073	19.4341
5900000000.	45.2615	19.3746
5950000000.	44.9850	19.4661
6000000000.	45.0159	19.4184

The conductivity (σ) can be given as:

$$\sigma = \omega \varepsilon_0 e'' = 2 \pi f \varepsilon_0 e''$$

where $f = target\ f * 10^6$

$\varepsilon_0 = 8.854 * 10^{-12}$

Simulating Liquid Parameter Check Result @ Muscle 5GHz

Room Ambient Temperature = 25°C; Relative humidity = 40% Measured by: Carol Baumann

Simulating Liquid f (MHz)	Parameters			Measured	Target	Deviation (%)	Limit (%)
5200	e'	44.9979	Relative Permittivity (ϵ_r):	44.9979	49.0	-8.17	± 10
	e"	18.5502	Conductivity (σ):	5.36625	5.30	1.25	± 5
5500	e'	44.4982	Relative Permittivity (ϵ_r):	44.4982	48.6	-8.44	± 10
	e"	18.6634	Conductivity (σ):	5.71048	5.65	1.07	± 5
5800	e'	43.8831	Relative Permittivity (ϵ_r):	43.8831	48.2	-8.96	± 10
	e"	18.8811	Conductivity (σ):	6.09220	6.00	1.54	± 5

Liquid Check
Ambient temperature: 25 deg. C; Liquid temperature: 24 deg. C
September 18, 2008 08:06 AM

Frequency	e'	e"
4600000000.	46.3903	17.4459
4650000000.	46.3151	17.7330
4700000000.	46.2646	17.5949
4750000000.	45.9361	17.8372
4800000000.	46.0919	17.8414
4850000000.	45.6967	17.8090
4900000000.	45.8373	17.9503
4950000000.	45.6802	17.9068
5000000000.	45.5878	18.0996
5050000000.	45.6262	18.0283
5100000000.	45.3944	18.2995
5150000000.	45.5078	18.4863
5200000000.	**44.9979**	**18.5502**
5250000000.	44.9076	18.5602
5300000000.	44.8592	18.4485
5350000000.	44.6466	18.5629
5400000000.	44.7308	18.5428
5450000000.	44.4456	18.6232
5500000000.	**44.4982**	**18.6634**
5550000000.	44.3566	18.8497
5600000000.	44.2260	18.7567
5650000000.	44.1433	18.9965
5700000000.	44.1019	18.7552
5750000000.	43.8255	19.0185
5800000000.	**43.8831**	**18.8811**
5850000000.	43.3855	18.9964
5900000000.	43.6113	19.0475
5950000000.	43.2342	18.9403
6000000000.	43.3131	19.1007

The conductivity (σ) can be given as:

$$\sigma = \omega \varepsilon_0 e'' = 2 \pi f \varepsilon_0 e''$$

where $f = target\ f * 10^6$

$\varepsilon_0 = 8.854 * 10^{-12}$

Simulating Liquid Parameter Check Result @ Muscle 5GHz

Room Ambient Temperature = 25°C; Relative humidity = 40% Measured by: Carol Baumann

Simulating Liquid f (MHz)	Parameters			Measured	Target	Deviation (%)	Limit (%)
5200	e'	44.935	Relative Permittivity (ϵ_r):	44.9350	49.0	-8.30	± 10
	e"	18.5559	Conductivity (σ):	5.36790	5.30	1.28	± 5
5500	e'	44.3958	Relative Permittivity (ϵ_r):	44.3958	48.6	-8.65	± 10
	e"	18.7096	Conductivity (σ):	5.72461	5.65	1.32	± 5
5800	e'	43.7501	Relative Permittivity (ϵ_r):	43.7501	48.2	-9.23	± 10
	e"	18.8804	Conductivity (σ):	6.09198	6.00	1.53	± 5

Liquid Check
Ambient temperature: 25 deg. C; Liquid temperature: 24 deg. C
September 19, 2008 07:55 AM

Frequency	e'	e"
4600000000.	46.2567	17.4818
4650000000.	46.1762	17.7279
4700000000.	46.1213	17.6383
4750000000.	45.8561	17.8202
4800000000.	45.9607	17.8647
4850000000.	45.6225	17.8263
4900000000.	45.7328	17.9946
4950000000.	45.5742	17.9341
5000000000.	45.4890	18.1145
5050000000.	45.5384	18.0954
5100000000.	45.3221	18.3176
5150000000.	45.3851	18.5381
5200000000.	**44.9350**	**18.5559**
5250000000.	44.7998	18.5962
5300000000.	44.7956	18.4781
5350000000.	44.5405	18.5938
5400000000.	44.6525	18.5932
5450000000.	44.3562	18.6565
5500000000.	**44.3958**	**18.7096**
5550000000.	44.2472	18.8248
5600000000.	44.1354	18.7891
5650000000.	44.0587	18.9838
5700000000.	43.9635	18.7967
5750000000.	43.7604	19.0267
5800000000.	**43.7501**	**18.8804**
5850000000.	43.3579	19.0329
5900000000.	43.5224	19.0340
5950000000.	43.1726	19.0051
6000000000.	43.2447	19.0909

The conductivity (σ) can be given as:

$$\sigma = \omega \varepsilon_0 e'' = 2 \pi f \varepsilon_0 e''$$

where $f = target\ f * 10^6$

$\varepsilon_0 = 8.854 * 10^{-12}$

10 SYSTEM PERFORMANCE 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 ±10%.

System Performance Check Measurement Conditions

- The measurements were performed in the flat section of the SAM twin phantom filled with Body simulating liquid of the following parameters.
- The DASY4 system with an Isotropic E-Field Probe EX3DV3-SN: 3531 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 (2.4 GHz) fine cube was chosen for cube integration and Special 8x8x10 (5 GHz) fine cube was chosen for cube integration
- 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 2.5mm
- The dipole input power (forward power) was 250 mW±3%.
- The results are normalized to 1 W input power.

450 to 2450 MHz Reference SAR Values for body-tissue

In the table below, the numerical reference SAR values of a SPEAG validation dipoles placed below the flat phantom filled with body-tissue simulating liquid are given. The reference SAR values were calculated using the finite-difference time-domain method and the geometry parameters.

Dipole Type	Distance (mm)	Frequency (MHz)	SAR (1g) [W/kg]	SAR (10g) [W/kg]	SAR (peak) [W/kg]
D450V2	15	450	5.01	3.36	7.22
D835V2	15	835	9.71	6.38	14.1
D900V2	15	900	**11.1**	**7.17**	16.3
D1450V2	10	1450	29.6	16.6	49.8
D1800V2	10	1800	**38.5**	**20.3**	67.5
D1900V2	10	1900	39.8	20.8	69.6
D2000V2	10	2000	**40.9**	**21.2**	71.5
D2450V2	10	2450	51.2	23.7	97.6

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

5 GHz Reference SAR Values for body-tissue

In the table below, the numerical reference SAR values of a SPEAG validation dipoles placed below the flat phantom filled with body-tissue simulating liquid are given. The reference SAR values were calculated using finite-difference time-domain FDTD method (feed point-impedance set to 50 ohms) and the mechanical dimensions of the D5GHzV2 dipole (manufactured by SPEAG).

f (MHz)	Head Tissue		Body Tissue		
	SAR_{1g}	SAR_{10g}	SAR_{1g}	SAR_{10g}	SAR_{Peak}
5000	72.9	20.7	68.1	19.2	260.3
5100	74.6	21.1	78.8	19.6	272.3
5200	76.5	21.6	71.8	20.1	284.7
5500	83.3	23.4	79.1	22.0	326.3
5800	78.0	21.9	74.1	20.5	324.7

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

10.1 SYSTEM PERFORMANCE CHECK RESULTS

System Validation Dipole: D2450V2 SN: 748

The dipole input power (forward power): 250 mW

Results

Date: September 15, 2008

Ambient Temperature = 25°C; Relative humidity = 40% Measured by: Carol Baumann

Body Simulating Liquid			Normalized to 1 W		Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)					
2450	24	15	1g	47.8	51.2	-6.64	± 10
			10g	22.5	23.7	-5.06	± 10

Date: September 16, 2008

Ambient Temperature = 25°C; Relative humidity = 40% Measured by: Carol Baumann

Body Simulating Liquid			Normalized to 1 W		Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)					
2450	24	15	1g	47.6	51.2	-7.03	± 10
			10g	22.4	23.7	-5.49	± 10

System Validation Dipole: D5GHzV2 SN 1003

Date: September 17, 2008

Ambient Temperature = 25 °C; Relative humidity = 40% Measured by: Sunny Shih

Body Simulating Liquid			Normalized to 1 W		Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)					
5200	24	15	1g	75.9	71.8	5.71	± 10
			10g	21.5	20.1	6.97	± 10

Body Simulating Liquid			Normalized to 1 W		Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)					
5500	24	15	1g	82.3	79.1	4.05	± 10
			10g	23.3	22.0	5.91	± 10

Body Simulating Liquid			Normalized to 1 W		Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)					
5800	24	15	1g	79.1	74.1	6.75	± 10
			10g	22.4	20.5	9.27	± 10

Date: September 18, 2008

Ambient Temperature = 25 °C; Relative humidity = 40% Measured by: Carol Baumann

Body Simulating Liquid			Normalized to 1 W		Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)					
5200	24	15	1g	77.6	71.8	8.08	± 10
			10g	21.9	20.1	8.96	± 10

Body Simulating Liquid			Normalized to 1 W		Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)					
5500	24	15	1g	79.2	79.1	0.13	± 10
			10g	22.3	22.0	1.36	± 10

Body Simulating Liquid			Normalized to 1 W		Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)					
5800	24	15	1g	77.8	74.1	4.99	± 10
			10g	21.9	20.5	6.83	± 10

System Validation Dipole: D5GHzV2 SN 1003

Date: September 19, 2008

Ambient Temperature = 25 °C; Relative humidity = 40% Measured by: Carol Baumann

Body Simulating Liquid			Normalized to 1 W		Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)					
5200	24	15	1g	78.3	71.8	9.05	± 10
			10g	22.1	20.1	9.95	± 10

Body Simulating Liquid			Normalized to 1 W		Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)					
5500	24	15	1g	79.8	79.1	0.88	± 10
			10g	22.3	22.0	1.36	± 10

Body Simulating Liquid			Normalized to 1 W		Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)					
5800	24	15	1g	77	74.1	3.91	± 10
			10g	22	20.5	7.32	± 10

11 OUTPUT POWER VERIFICATION

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

The client provided a special driver and program, CRTU v5.0.69.0, which enables 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:

802.11gn mode (2.4 GHz band)

Mode	Channel	f (MHz)	Antenna			Duty cycle (%)	Gain power setting
			A	B	C		
802.11b	6	2437	16.8			100	22
802.11b	6	2437		16.8		100	20.5
802.11b	6	2437			16.78	100	22
802.11n 40 MHz	6	2437	16.55		16.81	97	26.5 / 26

Note: A, B and C denote Main, Aux and 3rd Antenna

802.11an mode (5 GHz band)

Mode	Channel	f (MHz)	Antenna			Duty cycle (%)	Gain power setting
			A	B	C		
5.2 GHz Band							
802.11a	40	5200	16.7			99	28.5
802.11a	40	5200		16.8		99	28
802.11a	40	5200			16.6	99	27
802.11n 20 MHz	40	5200	16.7		16.7	98	29.5/28
5.3 GHz Band							
802.11a	56	5280	16.7			99	26
802.11a	56	5280		16.7		99	25.5
802.11a	56	5280			16.7	99	26
802.11n 20 MHz	56	5280	16.7		16.7	98	26.5/26.5
5.5 GHz Band							
802.11a	120	5600	16.8			99	24
802.11a	120	5600		16.7		99	23.5
802.11a	120	5600			16.8	99	23.5
802.11n 20 MHz	120	5600	16.7		16.7	98	25/24.5
5.8 GHz Band							
802.11a	157	5785	16.7			99	25
802.11a	157	5785		16.8		99	25
802.11a	157	5785			16.8	99	25
802.11n 40 MHz	159	5795	16.7		16.7	97	25/25

12 KDB 447498 RF EXPOSURE ASSESSMENT

KDB 447498, b) iii): For each edge positioned closest to the user, simultaneous transmission SAR evaluation is not required when the simultaneous transmitting antennas along that edge are:

(1) Located < 5 cm from the edge and the sum of the stand-alone 1-g SAR is < the SAR limit for these antennas or the SAR-to-peak location separation ratios are < 0.3 for all antenna pairs.

Assessment: When the Host is at lap held mode, the BT antenna and WLAN-Aux antenna is less than 5 cm from the edge, since BT output power is below power threshold (60/f(GHz) mW, BT stand alone SAR is not required. The stand alone WLAN-Aux (B) SAR value is 0.019 W/kg @2.4GHz and 0.038 W/kg @5GHz band. The sum of 1-g SAR of BT and WLAN-Aux (0.057 W/kg) is less than 1.6W/kg. The BT antenna-to-WLAN Aux antenna separation distance is 3.55 cm, thus the SAR-to-peak location ratio (0.016) is less than 0.3.

As the result, simultaneous SAR evaluation for WLAN-AUX and BT antenna pair is not required.

13 SAR TEST RESULTS

13.1 SAR TEST RESULT FOR THE 2.4 GHZ BAND

1) Laptop Mode: Lap-held with the display open at 90° to the keyboard.

Mode	Channel	f (MHz)	Antenna	Measured SAR 1g (mW/g)	Limit
802.11b	6	2437	C	0.016	1.6
802.11n 40 MHz	6	2437	A + C	0.044	1.6

2) Tablet Mode 1: Edge - Primary Landscape

Mode	Channel	f (MHz)	Antenna	Measured SAR 1g (mW/g)	Limit
802.11b	6	2437	C	0.013	1.6
802.11n 40 MHz	6	2437	A + C	0.025	1.6

3) Tablet Mode 2: Edge - Secondary Landscape

Mode	Channel	f (MHz)	Antenna	Measured SAR 1g (mW/g)	Limit
802.11b	6	2437	A	0.030	1.6
802.11n 40 MHz	**6**	**2437**	**A + C**	**0.133**	**1.6**

4) Tablet Mode 3: Edge - Primary Portrait

Mode	Channel	f (MHz)	Antenna	Measured SAR 1g (mW/g)	Limit
802.11b	6	2437	B	0.014	1.6

5) Tablet Mode 4: Edge - Secondary Portrait

Mode	Channel	f (MHz)	Antenna	Measured SAR 1g (mW/g)	Limit
802.11b	6	2437	B	0.086	1.6

6) Tablet Mode 5: Bottom Face - Lap-held

Mode	Channel	f (MHz)	Antenna	Measured SAR 1g (mW/g)	Limit
802.11b	6	2437	B	0.019	1.6
802.11b	6	2437	C	0.009	1.6
802.11b	6	2437	A	0.014	1.6
802.11n 40 MHz	6	2437	A+C	0.021	1.6

Notes:

a. The modes with highest output power channel were chosen for the testing.

b. The SAR measured at the middle channel for this configuration is at least 3 dB lower (0.8 mW/g) than SAR limit (1.6 mW/g), thus testing at low & high channel is optional.

The Highest SAR Plot & Data for 2.4 GHz Band

Date/Time: 9/16/2008 11:11:46 AM

Test Laboratory: Compliance Certification Services

Tablet Mode 2 Edge - Secondary Landscape

DUT: Lenovo X200 Tablet; Type: N/A; Serial: N/A

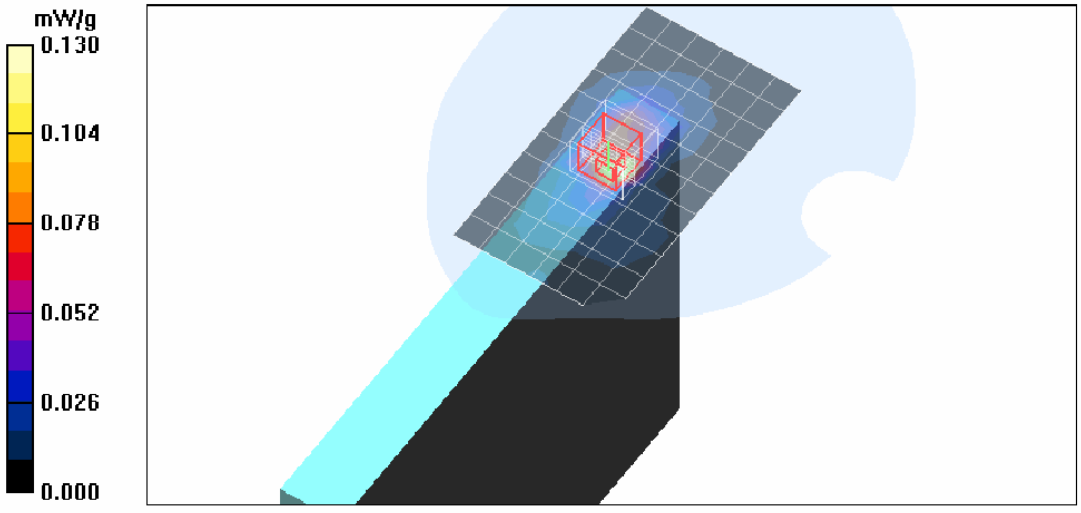
Communication System: 802.11bg; Frequency: 2437 MHz;Duty Cycle: 1:1.03
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.92 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

Room Ambient Temperature: 25.0 deg. C; Liquid Temperature: 24.0 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: EX3DV3 - SN3531; ConvF(7.91, 7.91, 7.91); Calibrated: 4/23/2008
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn500; Calibrated: 11/16/2007
- Phantom: SAM 2 (Twin); Type: SAM 2; Serial: 1050
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

802.11n 40 MHz_M-Ch A+C Ant/Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.130 mW/g

802.11n 40 MHz_M-Ch A+C Ant/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 3.19 V/m; Power Drift = -0.035 dB
Peak SAR (extrapolated) = 0.333 W/kg
SAR(1 g) = 0.133 mW/g; SAR(10 g) = 0.056 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.189 mW/g



13.2 SAR TEST RESULT FOR 5 GHZ BANDS

1) Laptop Mode: Lap-held with the display open at 90° to the keyboard.

Mode	Channel	f (MHz)	Antenna	Measured SAR 1g (mW/g)	Limit
5.2 GHz Band					
802.11a	40	5200	C	0.033	1.6
802.11n 20 MHz	40	5200	A + C	0.040	1.6
5.3 GHz Band					
802.11n 20 MHz	56	5280	A + C	0.042	1.6
5.5 GHz Band					
802.11n 20 MHz	120	5600	A + C	0.033	1.6
5.8 GHz Band					
802.11n 40 MHz	159	5795	A + C	0.031	1.6

Notes:

a. The modes with highest output power channel were chosen for the testing.
b. The SAR measured at the middle channel for this configuration is at least 3 dB lower (0.8 mW/g) than SAR limit (1.6 mW/g), thus testing at low & high channel is optional.

2) Tablet Mode 1: Edge - Primary Landscape

Mode	Channel	f (MHz)	Antenna	Measured SAR 1g (mW/g)	Limit
5.2 GHz Band					
802.11a	40	5200	C	0.034	1.6
802.11n 20 MHz	40	5200	A + C	0.072	1.6
5.3 GHz Band					
802.11n 20 MHz	56	5280	A + C	0.050	1.6
5.5 GHz Band					
802.11n 20 MHz	120	5600	A + C	0.095	1.6
5.8 GHz Band					
802.11n 40 MHz	159	5795	A + C	**0.098**	1.6

Notes:

a. The modes with highest output power channel were chosen for the testing.
b. The SAR measured at the middle channel for this configuration is at least 3 dB lower (0.8 mW/g) than SAR limit (1.6 mW/g), thus testing at low & high channel is optional.

3) Tablet Mode 2: Edge - Secondary Landscape

Mode	Channel	f (MHz)	Antenna	Measured SAR 1g (mW/g)	Limit
5.2 GHz Band					
802.11a	40	5200	A	0.041	1.6
802.11n 20 MHz	40	5200	A+C	0.039	1.6
5.3 GHz Band					
802.11a	56	5280	A	0.043	1.6
5.5 GHz Band					
802.11a	120	5600	A	0.036	1.6
5.8 GHz Band					
802.11a	157	5785	A	0.036	1.6

Notes:

a. The modes with highest output power channel were chosen for the testing.

b. The SAR measured at the middle channel for this configuration is at least 3 dB lower (0.8 mW/g) than SAR limit (1.6 mW/g), thus testing at low & high channel is optional.

4) Tablet Mode 3: Edge - Primary Portrait

Mode	Channel	f (MHz)	Antenna	Measured SAR 1g (mW/g)	Limit
5.2 GHz Band					
802.11a	40	5200	B	0.107	1.6
5.3 GHz Band					
802.11a	56	5280	B	**0.110**	1.6
5.5 GHz Band					
802.11a	120	5600	B	0.039	1.6
5.8 GHz Band					
802.11a	157	5785	B	0.037	1.6

Notes:

a. The modes with highest output power channel were chosen for the testing.

b. The SAR measured at the middle channel for this configuration is at least 3 dB lower (0.8 mW/g) than SAR limit (1.6 mW/g), thus testing at low & high channel is optional.

5) Tablet Mode 4: Edge - Secondary Portrait

Mode	Channel	f (MHz)	Antenna	Measured SAR 1g (mW/g)	Limit
5.2 GHz Band					
802.11a	40	5200	B	**0.164**	1.6
5.3 GHz Band					
802.11a	56	5280	B	0.101	1.6
5.5 GHz Band					
802.11a	120	5600	B	**0.139**	1.6
5.8 GHz Band					
802.11a	157	5785	B	0.088	1.6

Notes:

a. The modes with highest output power channel were chosen for the testing.

b. The SAR measured at the middle channel for this configuration is at least 3 dB lower (0.8 mW/g) than SAR limit (1.6 mW/g), thus testing at low & high channel is optional.

6) Tablet Mode 5: Bottom Face - Lap-held (Antenna B)

Mode	Channel	f (MHz)	Antenna	Measured SAR 1g (mW/g)	Limit
5.2 GHz Band					
802.11a	40	5200	B	0.038	1.6
5.3 GHz Band					
802.11a	56	5280	B	0.023	1.6
5.5 GHz Band					
802.11a	120	5600	B	0.028	1.6
5.8 GHz Band					
802.11a	157	5785	B	0.034	1.6

Notes:

a. The modes with highest output power channel were chosen for the testing.

b. The SAR measured at the middle channel for this configuration is at least 3 dB lower (0.8 mW/g) than SAR limit (1.6 mW/g), thus testing at low & high channel is optional.

7) Tablet Mode 5: Bottom Face - Lap-held (Antennas A and C)

Mode	Channel	f (MHz)	Antenna	Measured SAR 1g (mW/g)	Limit
5.2 GHz Band					
802.11a	40	5200	A	0.036	1.6
802.11a	40	5200	C	0.019	1.6
802.11n 20 MHz	40	5200	A+C	0.032	1.6
5.3 GHz Band					
802.11a	56	5280	A	0.051	1.6
5.5 GHz Band					
802.11a	120	5600	A	0.041	1.6
5.8 GHz Band					
802.11a	157	5785	A	0.037	1.6

Notes:

a. The modes with highest output power channel were chosen for the testing.

b. The SAR measured at the middle channel for this configuration is at least 3 dB lower (0.8 mW/g) than SAR limit (1.6 mW/g), thus testing at low & high channel is optional.

The Highest SAR Plot & Data for 5.2 GHz Band

Date/Time: 9/18/2008 11:50:26 PM

Test Laboratory: Compliance Certification Services

Tablet Mode 4 Edge - Secondary Portrait

DUT: Lenovo X200 Tablet; Type: N/A; Serial: N/A

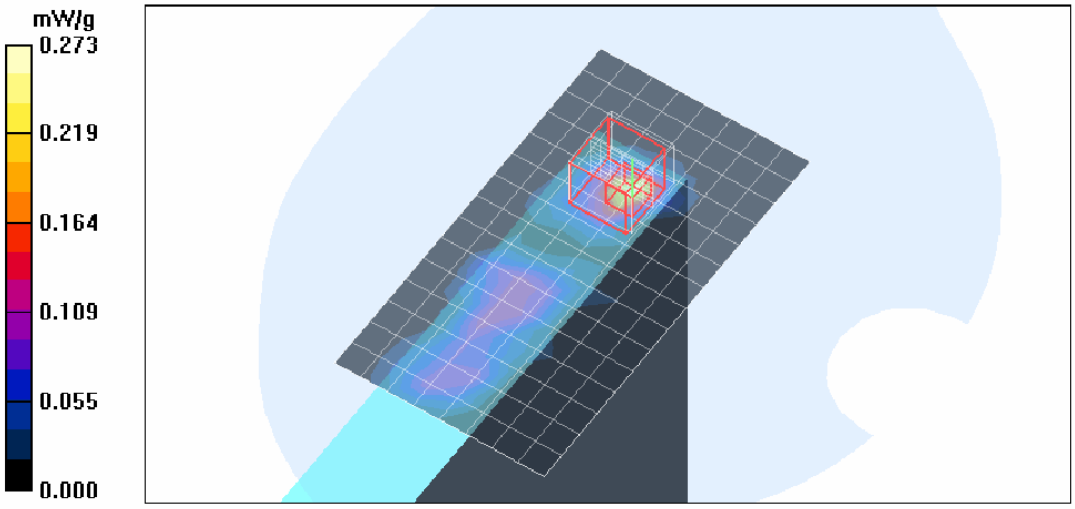
Communication System: 802.11abgn; Frequency: 5200 MHz;Duty Cycle: 1:1.01
Medium parameters used: f = 5200 MHz; σ = 5.37 mho/m; ε_r = 45; ρ = 1000 kg/m^3
Phantom section: Flat Section

Room Ambient Temperature: 25.0 deg. C; Liquid Temperature: 24.0 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: EX3DV3 - SN3531; ConvF(4.21, 4.21, 4.21); Calibrated: 4/23/2008
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn500; Calibrated: 11/16/2007
- Phantom: SAM 2 (Twin); Type: SAM 2; Serial: 1050
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

802.11b_M-Ch B Ant/Area Scan (9x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.273 mW/g

802.11b_M-Ch B Ant/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 1.25 V/m; Power Drift = 2.55 dB
Peak SAR (extrapolated) = 0.759 W/kg
SAR(1 g) = 0.164 mW/g; SAR(10 g) = 0.046 mW/g
Maximum value of SAR (measured) = 0.318 mW/g



The Highest SAR Plot & Data for 5.3 GHz Band

Date/Time: 9/18/2008 9:15:22 PM

Test Laboratory: Compliance Certification Services

Tablet Mode 5 Edge - Primary Portrait

DUT: Lenovo X200 Tablet; Type: N/A; Serial: N/A

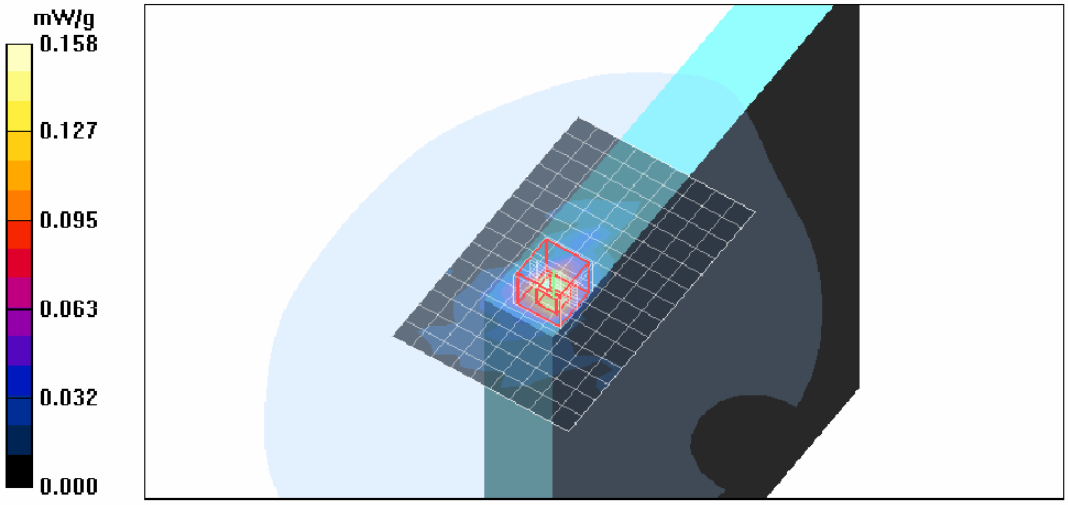
Communication System: 802.11abgn; Frequency: 5280 MHz;Duty Cycle: 1:1.01
Medium parameters used (interpolated): f = 5280 MHz; σ = 5.43 mho/m; ε_r = 44.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

Room Ambient Temperature: 25.0 deg. C; Liquid Temperature: 24.0 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: EX3DV3 - SN3531; ConvF(3.92, 3.92, 3.92); Calibrated: 4/23/2008
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn500; Calibrated: 11/16/2007
- Phantom: SAM 2 (Twin); Type: SAM 2; Serial: 1050
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

802.11a_M-Ch B Ant/Area Scan (10x15x1): Measurement grid: dx=10mm, dy=10mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.158 mW/g

802.11a_M-Ch B Ant/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 2.19 V/m; Power Drift = 1.00 dB
Peak SAR (extrapolated) = 0.463 W/kg
SAR(1 g) = 0.110 mW/g; SAR(10 g) = 0.035 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.178 mW/g



The Highest SAR Plot & Data for 5.5 GHz Band

Date/Time: 9/19/2008 1:19:38 AM

Test Laboratory: Compliance Certification Services

Tablet Mode 4 Edge - Secondary Portrait

DUT: Lenovo X200 Tablet; Type: N/A; Serial: N/A

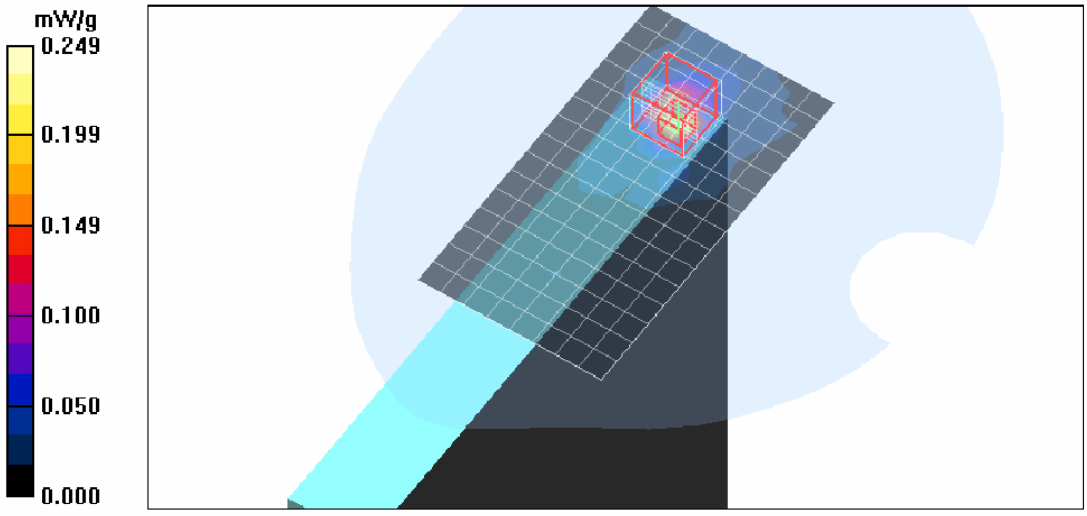
Communication System: 802.11abgn; Frequency: 5600 MHz;Duty Cycle: 1:1.01
Medium parameters used: f = 5600 MHz; σ = 5.84 mho/m; ε_r = 44.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

Room Ambient Temperature: 25.0 deg. C; Liquid Temperature: 24.0 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: EX3DV3 - SN3531; ConvF(3.5, 3.5, 3.5); Calibrated: 4/23/2008
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn500; Calibrated: 11/16/2007
- Phantom: SAM 2 (Twin); Type: SAM 2; Serial: 1050
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

802.11b_M-Ch B Ant/Area Scan (9x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.249 mW/g

802.11b_M-Ch B Ant/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 2.50 V/m; Power Drift = 0.741 dB
Peak SAR (extrapolated) = 0.742 W/kg
SAR(1 g) = 0.139 mW/g; SAR(10 g) = 0.042 mW/g
Maximum value of SAR (measured) = 0.262 mW/g



The Highest SAR Plot & Data for 5.8 GHz Band

Date/Time: 9/18/2008 10:50:27 AM

Test Laboratory: Compliance Certification Services

Tablet Mode 1 Edge - Primary Landscape 5.8 GHz

DUT: Lenovo X200 Tablet; Type: N/A; Serial: N/A

Communication System: 802.11abgn; Frequency: 5795 MHz;Duty Cycle: 1:1.03
Medium parameters used (interpolated): f = 5795 MHz; σ = 6.09 mho/m; ε_r = 43.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

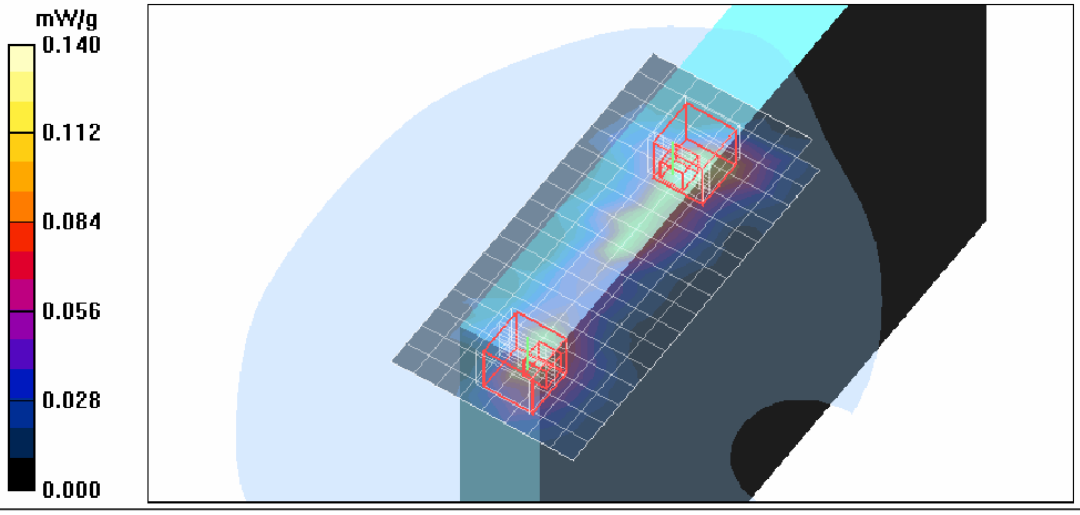
Room Ambient Temperature: 25.0 deg. C; Liquid Temperature: 24.0 deg. C

DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV3 - SN3531; ConvF(3.7, 3.7, 3.7); Calibrated: 4/23/2008
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn500; Calibrated: 11/16/2007
- Phantom: SAM 2 (Twin); Type: SAM 2; Serial: 1050
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

802.11n 40 MHz_M-Ch A+C Ant/Area Scan (9x18x1): Measurement grid: dx=10mm, dy=10mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.140 mW/g

802.11n 40 MHz_M-Ch A+C Ant/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 3.51 V/m; Power Drift = -0.020 dB
Peak SAR (extrapolated) = 0.410 W/kg
SAR(1 g) = 0.098 mW/g; SAR(10 g) = 0.036 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.151 mW/g

802.11n 40 MHz_M-Ch A+C Ant/Zoom Scan (7x7x9)/Cube 1: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 3.51 V/m; Power Drift = -0.020 dB
Peak SAR (extrapolated) = 0.484 W/kg
SAR(1 g) = 0.050 mW/g; SAR(10 g) = 0.020 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.100 mW/g



14 ATTACHMENTS

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