EMC Technologies Pty Ltd
ABN 82 057 105 549
176 Harrick Road
Keilor Park
Victoria Australia 3042

Ph: + 613 9365 1000
Fax: + 613 9331 7455
email: melb@emctech.com.au

SAR Test Report

Report Number: M1005100_FCC_AR5BHB92_SAR_5.6

Test Sample:	Portable TABLET Computer
Host PC Model Number:	T900 / TH900
Radio Modules:	WLAN AR5BHB92 & Bluetooth EYSMJCS
PC System FCC ID:	EJE-WB0059(with Bluethooth variant) EJE-WL0020 (with No Bluethooth variant)
PC System IC:	337J-WB0059(with Bluethooth variant) 337J-WL0020 (with No Bluethooth variant)
Date of Issue:	22nd June 2010

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PC System IC: 337J-WB0059 (with Bluetooth variant) 337J-WL0020 (with No Bluetooth variant)

1.0 GENERAL INFORMATION

Table 1

Test Sample:	Portable TABLET Computer
Model Name:	T900 / TH900
Radio Modules:	WLAN AR5BHB92 & Bluetooth EYSMJCS
Interface Type:	Half Mini-Card Module
Device Category:	Portable Transmitter
Test Device:	Pre-Production Unit
FCC System ID:	EJE-WB0059(with Bluethooth variant) EJE-WL0020 (with No Bluethooth variant)
PC System IC:	337J-WB0059(with Bluethooth variant) 337J-WL0020 (with No Bluethooth variant)
RF exposure Category:	General Population/Uncontrolled
Manufacturer:	Fujitsu Limited
Test Standards:	**1.** Evaluating Compliance with FCC Guidelines For Human Exposure to Radiofrequency Electromagnetic Fields Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01) **2.** Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands), RSS-102
Statement Of Compliance:	The Fujitsu TABLET Computer T900 / TH900 with Wireless LAN model AR5BHB92 and Bluetooth module EYSMJCS complied with the FCC General public/uncontrolled RF exposure limits of 1.6mW/g per requirements of 47CFR2.1093(d). It also complied with IC RSS-102 requirements.
Test Dates:	17th to 18th June 2010
Test Officer:	Peter Jakubiec
Authorised Signature:	Peter Jakubiec

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SAR TEST REPORT
Portable TABLET Computer
Model: T900 / TH900
Report Number: M1005100_FCC_AR5BHB92_SAR_5.6

2.0 INTRODUCTION

This is a supplementary report to be used in conjunction with "M080425_Cert_AR5BHB92_SAR_5.6-1". The measurement test results mentioned hereon only apply to the 5.2GHz and 5.6GHz frequency bands. Reports titled "M080425_Cert_AR5BHB92_SAR_5.6-1" and "M080425_Cert_AR5BHB92_SAR_2.4/1" apply to the and 5.8GHz and 2.45GHz frequency ranges respectively.
The purpose of additional (supplementary) testing is to apply for a Class II permissive change. The Secondary Landscape edge of this tablet PC was disabled for the previous submission and Grant. The Secondary Landscape edge is now enabled for operation, and hence SAR tests in Secondary Landscape configuration were conducted and included in this report.

SAR testing was performed on the Fujitsu TABLET PC, Model: T900 / TH900 with ATHEROS Half Mini-Card Wireless LAN Module (IEEE 802.11a/b/g/n), Model: AR5BHB92 & TAIYO YUDEN Bluetooth Module, Model: EYSMJCS. The module is an OEM product. The Half Mini-Card Wireless LAN (WLAN) was tested in the dedicated host – LIFEBOOK T SERIES, Model T900 / TH900.
There are two variants of the Fujitsu Tablet PC, Model: T900 / TH900 one that is equipped with the Bluetooth transmitter and Bluetooth antenna FCC ID: EJE-WB0059 IC: 337J-WB0059, and one variant that does not contain Bluetooth transmitter or Bluetooth antenna FCC ID: EJE-WL0020 IC: 337J-WL0020.
SAR testing was conducted on the sample that is equipped with the Bluetooth transmitter and Bluetooth antenna. Additionally the test sample had the WWAN antenna present during testing but WWAN antenna was not transmitting and the distance between WWAN antenna and any other transmitting antenna was at least 106 mm.
According to the manufacturer specifications the Bluetooth is a low power transmitter (4dBm), also Bluetooth Antenna is located >5cms from any other antenna in the system. The Antenna location is shown on pages 19 and 22 of this report.

3.0 TEST SAMPLE TECHNICAL INFORMATION

(Information supplied by the client)

3.1 EUT (WLAN) Details

Table 2

Transmitter:	Half Mini-Card Wireless LAN Module
Wireless Module:	HB92 (11a/b/g/n)
Model Number:	AR5BHB92
Manufacturer:	Atheros Communication Inc,
Modulation Type:	DSSS for 802.11b; OFDM for 802.11g; OFDM for 802.11a; OFDM for 802.11n
5GHz (802.11a/n)	BPSK, QPSK, 16QAM, 64QAM
2.4GHz (802.11b/g/n)	CCK, DQPSK, DBPSK, 16QAM, 64QAM
Maximum Data Rate:	802.11b = 11 Mbps, 802.11g and 802.11a = 54 Mbps, 802.11n = 300 Mbps
Frequency Range:	2.412–2.462 GHz for 11b/g/n 5.18-5.32 GHz, 5.5-5.6 GHz and 5.745-5.825 GHz for 11a/n
Number of Channels:	11 channels for 11b/g/n with 20MHz Bandwidth 24 channels for 11a/n with 20MHz Bandwidth 18 channels for 11n with 40MHz Bandwidth
Antenna Types:	Nissei Electric Inverted F Antenna Model: CP405102 (Tx1), CP405101(Tx2) Location: Top edge of LCD screen
Antenna gain:	Tx1 Antenna: CP405102: 1.05 dBi Tx2 Antenna: CP405101: -0.01 dBi
Power Supply:	3.3 VDC from PCI Express bus

Table 3 Channels and Output power setting

Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Tx BW (MHz)	Target Average Power (dBm), Ant A	Target Average Power (dBm), Ant B
802.11a 5.2 GHz	36	5180	6	-	6.5	8.5
	40	5200			11.0	13.0
	44	5220			11.0	13.0
	48	5240			11.0	13.0
	52	5260			11.0	13.0
	56	5280			11.0	13.0
	60	5300			11.0	13.0
	64	5320			11.0	13.0
802.11n 5.2 GHz	36	5180	MCS0	20	8.0	10.0
	40	5200			11.5	13.5
	44	5220			11.5	13.5
	48	5240			11.5	13.5
	52	5260			11.5	13.5
	56	5280			11.5	13.5
	60	5300			11.5	13.5
	64	5320			11.5	13.5
	38	5190		40 Wide	10.5	12.5
	46	5230			12.0	14.0
	54	5270			12.0	14.0
	62	5310			12.0	14.0
802.11a 5.6 GHz	100	5500	6	-	14.0	12.0
	104	5520			14.0	12.0
	108	5540			14.0	12.0
	112	5560			14.0	12.0
	116	5580			14.0	12.0
	120	5600			14.0	12.0
	124	5620			14.0	12.0
	128	5640			14.0	12.0
	132	5660			14.0	12.0
	136	5680			14.0	12.0
802.11n 5.6 GHz	100	5500	MCS0	20	14.0	12.0
	104	5520			14.0	12.0
	108	5540			14.0	12.0
	112	5560			14.0	12.0
	116	5580			14.0	12.0
	120	5600			14.0	12.0
	124	5620			14.0	12.0
	128	5640			14.0	12.0
	132	5660			14.0	12.0
	136	5680			14.0	12.0
	102	5510		40 Wide	14.0	12.0
	118	5590			14.0	12.0
	134	5670			14.0	12.0

NOTE: For 2450MHz SAR results refer to report “M080425_Cert_AR5BHB92_SAR_2.4-1”

3.2 EUT (Bluetooth) Details

Table 4

Transmitter:	Bluetooth
Model Number:	EYSMJCS
Manufacturer:	TAIYO YUDEN
Network Standard:	BluetoothTM RF Test Specification
Modulation Type:	Frequency Hopping Spread Spectrum (FHSS)
Frequency Range:	2402 MHz to 2480 MHz
Number of Channels:	79
Carrier Spacing:	1.0 MHz
Antenna Types:	Included BT module Location: left side of hinge
Max. Output Power:	4 dBm
Reference Oscillator:	16 MHz (Built-in)
Power Supply:	3.3 VDC from host.

Table 5 Frequency allocation

Channel Number	Frequency (MHz)	Bluetooth Utility power setting
1	2402	Power (Ext, Int) = 0, 96
2	2403	
3	2404	
.	.	
.	.	
39	2440	
40	2441	
41	2442	
.	.	
.	.	
77	2478	
78	2479	
79	2480	

3.3 EUT (Notebook PC) Details

Table 6

Host notebook :	LifeBook T series
Model Name (Reg No.):	T900 / TH900*
Serial Number:	Pre-production Sample
Manufacturer:	FUJITSU LIMITED
CPU Type and Speed:	Core i7 M620 2.67GHz
LCD	13.3"WXGA
Wired LAN:	Intel 82577LM : 10 Base-T/100 Base-TX/1000Base-T
Modem:	Agere MDC1.5 modem Model: D40
Port Replicator Model:	ZPR0030
AC Adapter Model:	80W: SEE100P2-19.0 (Sanken), SEC100P3-19.0 (Sanken), ADP-80NB A (Delta) 100W: SEE120P2-19.0 (Sanken)
Voltage:	19V
Current Specs:	4.22A / 5.27A
Watts:	80W / 100W

*The model numbers shown T900 and TH900 are for the same product.
The T900 is for commercial market (there is Port-Replicator as option).
The TH900 is for consumer market (there is no Port-Replicator).

3.4 Test sample Accessories

3.4.1 Battery Types

One type of Fujitsu Lithium Ion Battery is used to power the Portable TABLET Computer with Wireless LAN Model: AR5BHB92. SAR measurements were performed with the battery as shown below.

Table 7 Battery Details

Battery #1		**Battery #2**	
Product No.	CP422590-02	Product No.	CP422590-02
V/mAh	10.8V/5800mAh	V/mAh	10.8V/5800mAh
Serial No.	01A-Z090511000293Z	Serial No.	01A-Z090429000610Z

4.0 TEST SIGNAL, FREQUENCY AND OUTPUT POWER

"ART" software test tool was used to configure the WLAN for testing. The Portable Tablet Computer Wireless LAN had a total of 11 channels (USA model) within the 2412 to 2462 MHz frequency band; and 24 channels within the frequency range 5180 to 5825 MHz. In the frequency range 2412 MHz to 2462 MHz the device operates in 2 modes, OFDM and DSSS. Within the 5180 to 5825 MHz frequency range the device operates in OFDM mode only. For the SAR measurements the device was operating in continuous transmit mode using programming codes supplied by Fujitsu. The fixed frequency channels used in the testing are shown in Table 3.

The Bluetooth module operates over 79 channels within the frequency range 2402 to 2480 MHz. It is possible for the Bluetooth module to operate simultaneously with the WLAN module (co-transmission). However, due to low output power of Bluetooth module (less than 5mW), standalone SAR measurement for Bluetooth module was not conducted (as per KDB 616217). The Bluetooth interface utilizes dedicated antenna, for the purpose of this report labelled antenna "D".

The WLAN modules can be configured in a number of different data rates. It was found that the highest source based time averaged power was measured when using the lowest data rates available in each mode. This lowest data rate corresponds to 6Mbps in OFDM mode and 1Mbps in DSSS mode.

The frequency span of the 2450 MHz range and 5600MHz bands was more than 10MHz consequently; the SAR levels of the test sample were measured for lowest, centre and highest channels in the applicable modes. The EUT is capable of using two antennas transmitting simultaneously (HT8 DATA mode) the power level is 3dB lower (50%) than if a single antenna was transmitting. There were no wires or other connections to the Portable TABLET Computer during the SAR measurements.

At the beginning and at the completion of the SAR tests, the conducted power of the device was measured after temporary modification of antenna connector inside the device's Tx/Rx compartment. Measurements were performed with a calibrated Power Meter. The transmitter power was set to be equal or higher than power specified by the manufacturer.

Table 8 Frequency and Conducted Power Results Bluetooth

Channel	Channel Frequency MHz	*Data Rate (Mbps)	Maximum Conducted Output Power Measured (dBm)
Channel 40	2441	N/A	3.9

4.1 Battery Status

The device battery was fully charged prior to commencement of measurement. Each SAR test was completed within 30 minutes. The battery condition was monitored by measuring the RF field at a defined position inside the phantom before the commencement of each test and again after the completion of the test. It was not possible to perform conducted power measurements at the output of the device, at the beginning and end of each scan due to lack of a suitable antenna port. The uncertainty associated with the power drift was less than 12% and was assessed in the uncertainty budget.

5.0 DETAILS OF TEST LABORATORY

5.1 Location

EMC Technologies Pty Ltd
176 Harrick Road
Keilor Park, (Melbourne) Victoria
Australia 3042

Telephone: +61 3 9365 1000
Facsimile: +61 3 9331 7455
email: melb@emctech.com.au
website: www.emctech.com.au

5.2 Accreditations

EMC Technologies Pty. Ltd. is accredited by the National Association of Testing Authorities, Australia (NATA).
NATA Accredited Laboratory Number: 5292

EMC Technologies Pty Ltd is NATA accredited for the following standards:

Table 9

AS/NZS 2772.1:	RF and microwave radiation hazard measurement
ACMA:	Radio communications (Electromagnetic Radiation - Human Exposure) Standard 2003, Amdt (No. 1):2007
FCC:	Guidelines for Human Exposure to RF Electromagnetic Field OET65C 01/01
EN 50360: 2001	Product standard to demonstrate the compliance of mobile phones with the basic restrictions related to human exposure to electromagnetic fields (300 MHz – 3 GHz)
EN 62209-1:2006	Human Exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models instrumentation and procedures. **Part 1:** Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (300 MHz to 3 GHz)
IEEE 1528: 2003	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head Due to Wireless Communications Devices: Measurement Techniques.

Refer to NATA website www.nata.asn.au for the full scope of accreditation.

5.3 Environmental Factors

The measurements were performed in a shielded room with no background RF signals. The temperature in the laboratory was controlled to within 21±1°C, the humidity was in the range 45% to 48%. The liquid parameters are measured daily prior to the commencement of each test. Tests were performed to check that reflections within the environment did not influence the SAR measurements. The noise floor of the DASY4 SAR measurement system using the SN3563 probe was less than 5μV in both air and liquid mediums.

6.0 DESCRIPTION OF SAR MEASUREMENT SYSTEM

Table 10

Applicable Head Configurations	: None
Applicable Body Configurations	: Edge On Position

6.1 Probe Positioning System

The measurements were performed with the state-of-the-art automated near-field scanning system **DASY4 V4.7 Build 53** from Schmid & Partner Engineering AG (SPEAG). The DASY4 fully complies with the OET65 C (01-01), IEEE 1528 and EN62209-1 SAR measurement requirements.

6.2 E-Field Probe Type and Performance

The SAR measurements were conducted with SPEAG dosimetric probe EX3DV4 Serial: 3563. Please refer to appendix C for detailed information.

6.4 System verification

6.4.1 System verification Results @ 5GHz

The following table lists the dielectric properties of the tissue simulating liquid measured prior to SAR system verification. The results of the system verification are listed in columns 4 and 5. The forward power into the reference dipole for SAR system verification was adjusted to 100 mW.

Table 11 System verification Results (Dipole: SPEAG D5GHzV2 SN: 1008)

1. System verification: Frequency and Date	2. ∈r (measured)	3. σ (mho/m) (measured)	4. Measured SAR 1g (mW/g)	5. Measured SAR 10g (mW/g)
17th June 2010 5500 MHz	45.3	5.74	9.35	2.65
18th June 2010 5200 MHz	45.3	5.15	8.67	2.45

6.4.2 Deviation from reference system verification values

The reference SAR value is the SAR system verification result obtained in a specific dielectric liquid using the validation dipole (D5GHzV2) after system component calibration. The measured one-gram SAR should be within 10% of the expected target reference values shown in table below.

Table 12 Deviation from reference system verification values in 5.6 GHz band

Frequency and Date	Measured SAR 1g (mW/g)	Measured SAR 1g (Normalized to 1W)	SPEAG Calibration reference SAR Value 1g (mW/g)	Deviation From SPEAG Reference 1g (%)
5200MHz 18th June 2010	8.67	86.70	87.7	-1.14
5500MHz 17th June 2010	9.35	93.50	92.9	0.65

NOTE: All reference system verification values are referenced to 1W input power.

6.4.3 Liquid Depth 15cm

During the SAR measurement process the liquid level was maintained to a level of a least 15cm with a tolerance of 0.5cm.

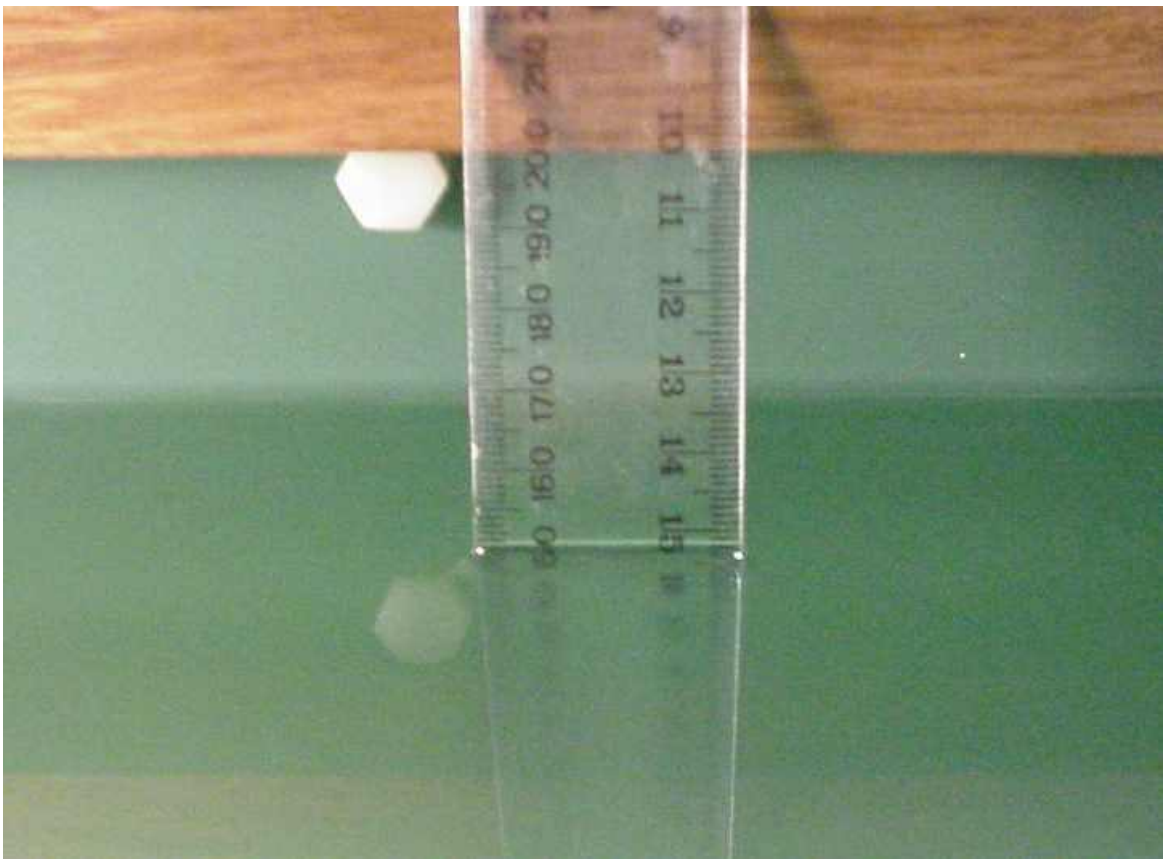


Photo of liquid Depth in Flat Phantom

6.5 Phantom Properties

The phantoms used during the testing comply with the OET65 C (01-01), IEEE 1528 and EN62209-1 SAR measurement requirements.

6.6 Tissue Material Properties

The dielectric parameters of the brain simulating liquid were measured prior to SAR assessment using the HP85070A dielectric probe kit and HP8753ES Network Analyser. The actual dielectric parameters are shown in the following table.

Table 13 Measured Body Simulating Liquid Dielectric Values for System verifications

Frequency Band	∈r (measured range)	∈r (target)	σ (mho/m) (measured range)	σ (target)	ρ kg/m^3
5200 MHz Body	45.3	49.0 ±10% (44.1 to 53.9)	5.14	5.3 ±5% (5.04 to 5.57)	1000
5500 MHz Body	45.3	48.6 ±10% (43.7 to 53.4)	5.74	5.6 ±5% (5.32 to 5.88)	1000

NOTE: The brain liquid parameters were within the required tolerances of ±5% for σ and 10% for ∈r.

Table 14 Measured Body Simulating Liquid Dielectric Values for 5200MHz range

Frequency Band	∈r (measured range)	∈r (target)	σ (mho/m) (measured range)	σ (target)	ρ kg/m^3
5190 MHz Body	45.3	49.0 ±10% (44.1 to 53.9)	5.14	5.3 ±5% (5.04 to 5.57)	1000
5230 MHz Body	45.2	48.9 ±10% (44.0 to 53.8)	5.20	5.4 ±5% (5.13 to 5.67)	1000
5270 MHz Body	45.0	48.9 ±10% (44.0 to 53.8)	5.29	5.4 ±5% (5.13 to 5.67)	1000
5310 MHz Body	44.9	48.8 ±10% (43.9 to 53.7)	5.33	5.4 ±5% (5.13 to 5.67)	1000

Table 15 Measured Body Simulating Liquid Dielectric Values for 5600MHz range

Frequency Band	∈r (measured range)	∈r (target)	σ (mho/m) (measured range)	σ (target)	ρ kg/m^3
5520 MHz Body	45.3	48.6 ±10% (43.7 to 53.4)	5.77	5.6 ±5% (5.32 to 5.88)	1000
5580 MHz Body	45.1	48.5 ±10% (43.8 to 53.5)	5.89	5.77 ±5% (5.48 to 6.06)	1000
5620 MHz Body	45.1	48.5 ±10% (43.8 to 53.5)	5.93	5.77 ±5% (5.48 to 6.06)	1000
5680 MHz Body	44.8	48.4 ±10% (43.6 to 53.2)	6.05	5.9 ±5% (5.61 to 6.20)	1000

6.6.1 Liquid Temperature and Humidity

The humidity and dielectric/ambient temperatures were recorded during the assessment of the tissue material dielectric parameters. The difference between the ambient temperature of the liquid during the dielectric measurement and the temperature during tests was less than |2|°C.

Table 16 Temperature and Humidity recorded for each day

Date	Ambient Temperature (°C)	Liquid Temperature (°C)	Humidity (%)
17th June 2010	20.7	20.5	48
18th June 2010	20.9	20.6	45

6.7 Simulated Tissue Composition Used for SAR Test

A low loss clamp was used to position the TABLET underneath the phantom surface. Small pieces of foam were then used to press the TABLET flush against the phantom surface.

Table 17 Tissue Type: Muscle @ 5600MHz

EMCT Liquid, Volume of Liquid: 60 Litres

Composition
Distilled Water
Salt
Triton X-100

6.8 Device Holder for Laptops and P 10.1 Phantom

A low loss clamp was used to position the TABLET underneath the phantom surface.
Refer to Appendix A for photographs of device positioning

7.0 SAR MEASUREMENT PROCEDURE USING DASY4

The SAR evaluation was performed with the SPEAG DASY4 system. A summary of the procedure follows:

a) A measurement of the SAR value at a fixed location is used as a reference value for assessing the power drop of the EUT. The SAR at this point is measured at the start of the test, and then again at the end of the test.

b) The SAR distribution at the exposed flat section of the flat phantom is measured at a distance of 2.0 mm from the inner surface of the shell. The area covers the entire dimension of the EUT and the horizontal grid spacing is 10 mm x 10 mm. The actual Area Scan has dimensions of 100 mm x 140 mm surrounding the test device. Based on this data, the area of the maximum absorption is determined by Spline interpolation.

c) Around this point, a volume of 24 mm x 24 mm x 20 mm is assessed by measuring 7 x 7 x 9 points. On the basis of this data set, the spatial peak SAR value is evaluated with the following procedure:

(i) The data at the surface are extrapolated, since the centre of the dipoles is 1.0 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 2.0 mm. The extrapolation is based on a least square algorithm. A polynomial of the fourth order is calculated through the points in z-axes. This polynomial is then used to evaluate the points between the surface and the probe tip.

(ii) The maximum interpolated value is searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g and 10 g) are computed using the 3D-Spline interpolation algorithm. The 3D-Spline is composed of three one-dimensional splines with the “Not a knot”- condition (in x, y and z-direction). The volume is integrated with the trapezoidal – algorithm. One thousand points (10 x 10 x 10) are interpolated to calculate the averages.

(iii) All neighbouring volumes are evaluated until no neighbouring volume with a higher average value is found.

(iv) The SAR value at the same location as in Step (a) is again measured to evaluate the actual power drift.

8.0 MEASUREMENT UNCERTAINTY

The uncertainty analysis is based on the template listed in the IEEE Std 1528-2003 for both device SAR tests and Validation uncertainty. The measurement uncertainty of a specific device is evaluated independently.

Table 18 Uncertainty Budget for DASY4 Version V4.7 Build 53– EUT SAR test 5GHz

Uncertainty Component	Tol. (6%)	Prob. Dist.	Div.	C_i (1g)	C_i (10g)	1g u_i (6%)	10g u_i (6%)	v_i
Measurement System								
Probe Calibration	6.55	N	1	1	1	6.6	6.6	∞
Axial Isotropy	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effects	2	R	1.73	1	1	1.2	1.2	∞
Linearity	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	1	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	0.3	N	1	1	1	0.3	0.3	∞
Response Time	0.8	R	1.73	1	1	0.5	0.5	∞
Integration Time	2.6	R	1.73	1	1	1.5	1.5	∞
RF Ambient Noise	3	R	1.73	1	1	1.7	1.7	∞
RF Ambient Reflections	3	R	1.73	1	1	1.7	1.7	∞
Probe Positioner	0.8	R	1.73	1	1	0.5	0.5	∞
Probe Positioning	9.9	R	1.73	1	1	5.7	5.7	∞
Max. SAR Eval.	4	R	1.73	1	1	2.3	2.3	∞
Test Sample Related								
Test Sample Positioning	1.61	N	1	1	1	1.6	1.6	11
Device Holder Uncertainty	3.6	N	1	1	1	3.6	3.6	7
Output Power Variation – SAR Drift Measurement	8.77	R	1.73	1	1	5.1	5.1	∞
Phantom and Setup								
Phantom Uncertainty	4	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity – Deviation from target values	5	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity – Measurement uncertainty	5	N	1.00	0.64	0.43	3.2	2.2	5
Liquid Permittivity – Deviation from target values	10	R	1.73	0.6	0.49	3.5	2.8	∞
Liquid Permittivity – Measurement uncertainty	5	N	1.00	0.6	0.49	3.0	2.5	5
Combined standard Uncertainty		RSS				13.8	13.4	154
Expanded Uncertainty (95% CONFIDENCE LEVEL)		k=2				27.6	26.71	

Estimated total measurement uncertainty for the DASY4 measurement system was ±13.8%. The extended uncertainty (K = 2) was assessed to be ±27.6% based on 95% confidence level. The uncertainty is not added to the measurement result.

Table 19 Uncertainty Budget for DASY4 Version V4.7 Build 53 – System verification 5GHz

Uncertainty Component	Tol. (6%)	Prob. Dist.	Div.	C_i (1g)	C_i (10g)	1g u_i (6%)	10g u_i (6%)	v_i
Measurement System								
Probe Calibration	6.55	N	1	1	1	6.6	6.6	∞
Axial Isotropy	4.7	R	1.73	1	1	2.7	2.7	∞
Hemispherical Isotropy	9.6	R	1.73	0	0	0.0	0.0	∞
Boundary Effects	2	R	1.73	1	1	1.2	1.2	∞
Linearity	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	1	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	0.3	N	1	1	1	0.3	0.3	∞
Response Time	0	R	1.73	1	1	0.0	0.0	∞
Integration Time	0	R	1.73	1	1	0.0	0.0	∞
RF Ambient Noise	3	R	1.73	1	1	1.7	1.7	∞
RF Ambient Reflections	3	R	1.73	1	1	1.7	1.7	∞
Probe Positioner	0.8	R	1.73	1	1	0.5	0.5	∞
Probe Positioning	9.9	R	1.73	1	1	5.7	5.7	∞
Max. SAR Eval.	4	R	1.73	1	1	2.3	2.3	∞
Dipole								
Dipole Axis to Liquid Distance	2	N	1.73	1	1	1.2	1.2	11
Input Power and SAR drift meas.	4.7	R	1.73	1	1	2.7	2.7	∞
Phantom and Tissue Param.								
Phantom Uncertainty	4	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity – Deviation from target values	5	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity – Measurement uncertainty	2.5	N	1.00	0.64	0.43	1.6	1.1	5
Liquid Permittivity – Deviation from target values	10	R	1.73	0.6	0.49	3.5	2.8	∞
Liquid Permittivity – Measurement uncertainty	2.5	N	1.00	0.6	0.49	1.5	1.2	5
Combined standard Uncertainty		RSS				11.7	11.4	154
Expanded Uncertainty (95% CONFIDENCE LEVEL)		k=2				23.5	22.79	

Estimated total measurement uncertainty for the DASY4 measurement system was ±11.7%. The extended uncertainty (K = 2) was assessed to be ±23.5% based on 95% confidence level. The uncertainty is not added to the measurement result.

9.0 EQUIPMENT LIST AND CALIBRATION DETAILS

Table 20 SPEAG DASY4 Version V4.7 Build 53

Equipment Type	Manufacturer	Model Number	Serial Number	Calibration Due	Used For this Test?
Robot - Six Axes	Staubli	RX90BL	N/A	Not applicable	✓
Robot Remote Control	SPEAG	CS7MB	RX90B	Not applicable	✓
SAM Phantom	SPEAG	N/A	1260	Not applicable	✓
SAM Phantom	SPEAG	N/A	1060	Not applicable	
Flat Phantom	AndreT	10.1	P 10.1	Not Applicable	✓
Flat Phantom	AndreT	9.1	P 9.1	Not Applicable	
Flat Phantom	SPEAG	PO1A 6mm	1003	Not Applicable	
Data Acquisition Electronics	SPEAG	DAE3 V1	359	08-July-2010	
Data Acquisition Electronics	SPEAG	DAE3 V1	442	08-Dec-2010	✓
Probe E-Field - Dummy	SPEAG	DP1	N/A	Not applicable	
Probe E-Field	SPEAG	ET3DV6	1380	11-Dec-2010	
Probe E-Field	SPEAG	ET3DV6	1377	14-July-2010	
Probe E-Field	SPEAG	ES3DV6	3029	Not Used	
Probe E-Field	SPEAG	EX3DV4	3563	16-July-2010	✓
Probe E-Field	SPEAG	EX3DV4	3557	16-Dec-2010	
Antenna Dipole 300 MHz	SPEAG	D300V2	1005	15-Dec-2011	
Antenna Dipole 450 MHz	SPEAG	D450V2	1009	17-Dec-2010	
Antenna Dipole 900 MHz	SPEAG	D900V2	047	7-July-2010	
Antenna Dipole 1640 MHz	SPEAG	D1640V2	314	16-July-2010	
Antenna Dipole 1800 MHz	SPEAG	D1800V2	242	8-July-2010	
Antenna Dipole 1950 MHz	SPEAG	D1950V3	1113	12-Dec -2010	
Antenna Dipole 3500 MHz	SPEAG	D3500V2	1002	17-July-2010	
Antenna Dipole 2450 MHz	SPEAG	D2450V2	724	10-Dec-2010	
Antenna Dipole 5600 MHz	SPEAG	D5GHzV2	1008	16-Dec-2011	✓
RF Amplifier	EIN	603L	N/A	*In test	
RF Amplifier	Mini-Circuits	ZHL-42	N/A	*In test	
RF Amplifier	Mini-Circuits	ZVE-8G	N/A	*In test	✓
Synthesized signal generator	Hewlett Packard	ESG-D3000A	GB37420238	*In test	✓
RF Power Meter Dual	Hewlett Packard	437B	3125012786	29-June-2010	✓
RF Power Sensor 0.01 - 18 GHz	Hewlett Packard	8481H	1545A01634	01-July-2010	✓
RF Power Meter Dual	Gigatronics	8542B	1830125	26-Mar-2010	
RF Power Sensor	Gigatronics	80301A	1828805	26-Mar-2010	
RF Power Meter Dual	Hewlett Packard	435A	1733A05847	*In test	✓
RF Power Sensor	Hewlett Packard	8482A	2349A10114	*In test	✓
Network Analyser	Hewlett Packard	8714B	GB3510035	30-Sept-2010	
Network Analyser	Hewlett Packard	8753ES	JP39240130	24-Nov-2010	✓
Dual Directional Coupler	Hewlett Packard	778D	1144 04700	*In test	
Dual Directional Coupler	NARDA	3022	75453	*In test	✓

* Calibrated during the test for the relevant parameters.

10.0 OET BULLETIN 65 – SUPPLEMENT C TEST METHOD

Notebooks should be evaluated in normal use positions, typical for lap-held bottom-face only. However the number of positions will depend on the number of configurations the laptop can be operated in. The "LIFEBOOK T SERIES" can be used in either a conventional laptop position (see Appendix A1) or a Tablet configuration. The antenna location in the "LIFEBOOK T SERIES" is closest to the top of the screen when used in a conventional laptop configuration and due to the separation distances involved between the phantom and the laptop antenna, testing is not required in this position.

10.1 Position

10.1.1 "Edge On" Position (Landscape)

The device was tested in the (2.00 mm) flat section of the AndreT phantom for the "Edge On" position. The Antenna edge of the Transceiver was placed underneath the flat section of the phantom and suspended until the edge touched the phantom. *Refer to Appendix A for photos of measurement positions.*

10.2 List of All Test Cases (Antenna In/Out, Test Frequencies, User Modes)

The device has a fixed antenna. Depending on the measured SAR level up to three test channels with the test sample operating at maximum power were recorded. The following table represents the matrix used to determine what testing was required. All relevant provisions of KDB 447498 and KDB 616217 are applied for SAR measurements of the host system.

Table 21 Testing configurations

Phantom Configuration	*Device Mode	Antenna	Test Configurations		
			Channel (Low)	Channel (Middle)	Channel (High)
Edge On Secondary Landscape	OFDM 5GHz All Bands	A B		X X	

Legend

X	Testing Required in this configuration
	Testing required in this configuration only if SAR of middle channel is more than 3dB below the SAR limit or it is the worst case.

NOTE: Throughout this report, Antenna A and B refer to Tx1 and Tx2 in the host respectively.

11.0 SAR MEASUREMENT RESULTS

The SAR values averaged over 1g tissue masses were determined for the sample device for all test configurations listed in section 10.2.

11.1 5 GHz Band SAR Results

Table 22 SAR MEASUREMENT RESULTS Lower Band

Test Position	Plot No.	Ant	Bit rate Mode (Mbps)	Channel Bandwidth (MHz)	Test Channel	Test Freq (MHz)	Measured 1g SAR Results (mW/g)	Measured Drift (dB)
Edge on Secondary Landscape	1	A	MCS0	40	38	5190	0.928	-0.175
	2				46	5230	1.240	-0.149
	3				54	5270	1.250	-0.365
	4				62	5310	1.130	-0.291
	5	B			38	5190	1.400	-0.076
	6				46	5230	**1.490**	-0.006
	7				54	5270	1.000	-0.068
	8				62	5310	0.984	0.049

NOTE: The measurement uncertainty of 27.6% for 5GHz testing is not added to the result.

The highest SAR level recorded in the 5.2 GHz band was 1.49 mW/g as evaluated in a 1g cube of averaging mass. This value was obtained in “Secondary Landscape” position in MCS0 40 MHz mode, utilizing channel 46 (5230 MHz) and antenna B.

Table 23 SAR MEASUREMENT RESULTS Middle Band

Test Position	Plot No.	Ant	Bit rate Mode (Mbps)	Channel Bandwidth (MHz)	Test Channel	Test Freq (MHz)	Measured 1g SAR Results (mW/g)	Measured Drift (dB)
Edge on Secondary Landscape	9	A	6	-	104	5520	1.100	-0.265
	10				116	5580	1.260	-0.070
	11				124	5620	1.010	-0.182
	12				136	5680	0.713	-0.010
	13	B			104	5520	**1.450**	-0.148
	14				116	5580	1.060	0.020
	15				124	5620	0.789	-0.042
	16				136	5680	0.637	0.092

NOTE: The measurement uncertainty of 27.6% for 5GHz testing is not added to the result.

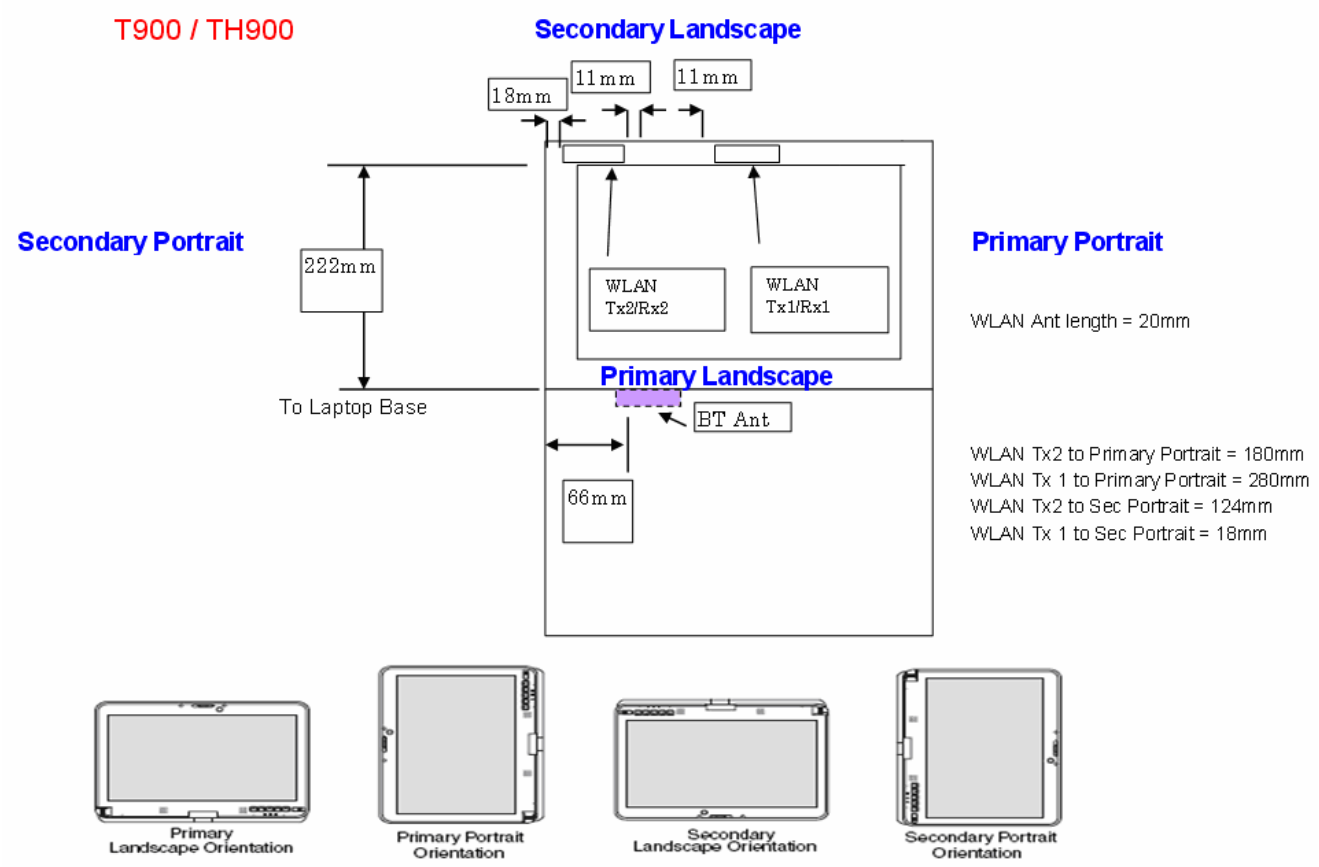
The highest SAR level recorded in the 5.6 GHz band was 1.45 mW/g as evaluated in a 1g cube of averaging mass. This value was obtained in “Secondary Landscape” position in OFDM mode, utilizing channel 104 (5520 MHz) and antenna B.

12.0 COMPLIANCE STATEMENT

The Fujitsu TABLET PC, Model: T900 / TH900 with ATHEROS Half-Mini Card Wireless LAN Module (802.11a/b/g/n), Model: AR5BHB92 & TAIYO YUDEN Bluetooth Module, Model: EYSMJCS was found to comply with the FCC and RSS-102 SAR requirements.

The highest SAR level recorded was 1.49 mW/g for a 1g cube. This value was measured at 5230 MHz (channel 46) in the “Edge on Secondary Landscape” position in MCS0 40 MHz mode at the antenna B. This was below the limit of 1.6 mW/g for uncontrolled exposure, but was within the band of measurement uncertainty around the limit.

Diagram Showing Antenna Positions



NOTE: Throughout this report, Antenna A and B refer to Tx1 and Tx2 in the host.